VEHICLE AND DUMMY KINEMATICS IN A CONTROLLED ROLLOVER CRASH 1990 NISSAN PICKUP TRUCK

V2141

PREPARED BY:
TRANSPORTATION RESEARCH CENTER INC.
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TEST REPORT

PREPARED FOR:
SYSTEMS RESEARCH LABORATORIES
2800 INDIAN RIPPLE ROAD
DAYTON, OH 45440

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SECTION 1.0

PURPOSE AND TEST SUMMARY

This rollover crash test has the main objective to investigate both vehicle and occupant dynamics during automobile rollover crashes.

This test was conducted with a 1990 Nissan pickup truck on the NHTSA rollover cart moving at 30 mph, releasing the vehicle with its roll axis perpendicular to the direction of rollover cart motion, and first contacting the passenger's side. The test vehicle contained an instrumented Part 572 E dummy restrained with a three-point unibelt.

SECTION 2.0

SUMMARY OF ROLLOVER CRASH TEST

A 1990 Nissan pickup truck, containing one instrumented Part 572 E test dummy was placed upon the rollover test device at 30 degrees above the horizontal and was released at 30 mph. The device was attached to the tow cable of the drive system. After the vehicle had been released the device was brought to a stop with an auxiliary brake system. After release the vehicle impacted the ground on its right side. The vehicle made two rolls and came to rest on its wheels. The rollover crash test was conducted by Transportation Research Center Inc. (TRC) in East Liberty, Ohio, on September 7, 1994.

The Part 572 E 50th percentile adult male anthropomorphic test device (dummy) was placed in the driver's designated seating position according to the placement procedure specified in Appendix B and Optional Appendix C of Laboratory Procedure TP-208-09. The dummy was instrumented with a nine-accelerometer array in the head, chest and pelvis triaxial accelerometers, head and chest triaxial angular velocity sensors, a six-axis neck load cell, and a chest deflection potentiometer.

The vehicle was instrumented with fifteen (15) accelerometers, three (3) rate gyros, three (3) angular velocity sensors, and four (4) suspension displacement potentiometers. The seat belt was instrumented with shoulder and lap belt load cells and a shoulder belt spoolout potentiometer. The rollover test device was instrumented with three (3) accelerometers, two (2) potentiometers, and two (2) event switches.

The crash event was recorded by sixty-three (63) channels of data on a 14-track tape drive. The analog data was digitally sampled at 8000 samples per second. The data was digitally filtered as per SAE J211 OCT88.

The crash event was filmed by eight (8) high-speed motion picture cameras operating at approximately 500 frames per second and one (1) real-time panning motion picture camera.

Section 3.0 contains the general test and vehicle parameter data. Section 4.0 contains the occupant information. Appendix A contains the pre- and post-test still photographs. Appendix B contains the final test data plots. Appendix C contains the post-test dummy certification data. Appendix D contains miscellaneous test information which includes the pre-test and post-test IPMD vehicle data sheets.

TABLE 1 ROLL CART INSTRUMENTATION LOCATIONS AND DATA SUMMARY

TEST NUMBER: 940907 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 CENTER OF GRAVITY	42.9 in	-3.5 in	8.0 in				
ACCELERATION (g)							
LONGITUDINAL[1]				11.2 g	@1259.8 ms	8.0 g	@ 201.5 ms
LATERAL[1]				4.0 g	@ 221.0 ms	12.2 g	@ 203.8 ms
VERTICAL[1]				54.0 g	@ 204.1 ms	5.1 g	@ 263.8 ms
RESULTANT[1]				55.5 g	@ 204.1 ms		
2 PLATFORM DISPLACEMENT (in)	14.0 in	24.9 in	28.6 in				
LEFT SIDE[1]				25.6 in	@1259.8 ms	0.0 in	@ 110.1 ms
RIGHT SIDE[1]				26.0 in	@1259.8 ms	0.0 in	@ 0.0 ms
3 VEHICLE/ROLLOVER	NA	NA	NA				
CART SEPARATION TIMES (sec)							
UPPER SWITCH[1]				---	---	---	---
LOWER SWITCH[1]				---	---	---	---

REFERENCE: X: + FORWARD FROM ROLLOVER CART
Y: + LEFTWARD FROM ROLLOVER CART CENTERLINE
Z: + UPWARD FROM THE GROUND LEVEL
DISPLACEMENT: + OUTWARD

[1]See DATA ACQUISITION EXPLANATIONS

TABLE 2 FINAL RESTING PLACE OF VEHICLE, PARTS, AND ROLLOVER CART

DESCRIPTION OF VEHICLE	X, DISTANCE[1]	Y, DISTANCE[1]
Left rear corner	131.5	-10.0
Right rear corner	136.5	-10.0
Left front corner	131.0	4.0
Right front corner	136.0	4.0
DESCRIPTION OF PARTS		
Tailgate	136.5	-11.0
DESCRIPTION OF ROLLOVER CART		
Left rear corner	125.0	-2.0
Right rear corner	126.5	-11.5
Left front corner	130.0	-0.8
Right front corner	131.0	-11.5

[1] REFERENCE: +X: FORWARD FROM RELEASE BLOCK
+Y: LEFTWARD FROM CENTER RELEASE BLOCK

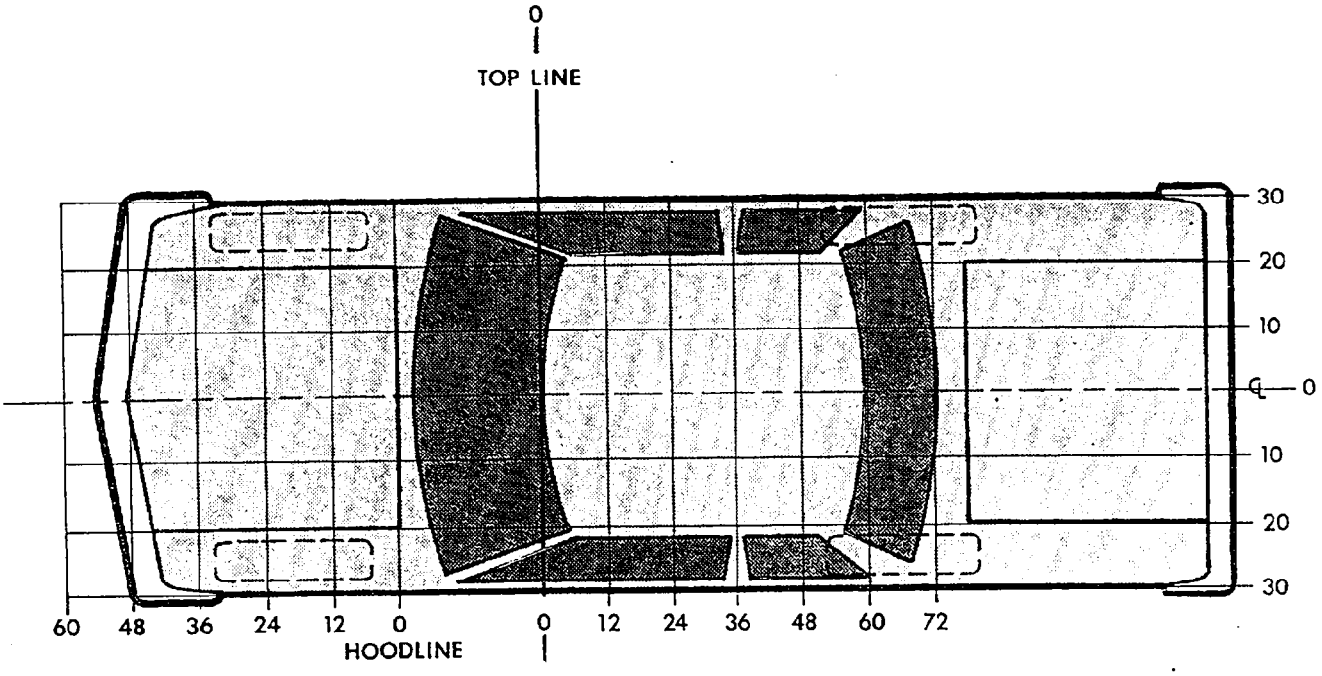
All measurements are in feet.

TABLE 3 VEHICLE INTERIOR MEASUREMENTS

DESCRIPTION	PRE-TEST	POST-TEST	DIFFERENCE
Floor board to top of left "A" post	42.5	31.4	11.1
Floor board to top of right "A" post	42.8	38.5	4.3
Door sill to top of left "B" post	41.5	32.7	8.8
Door sill to top of right "B" post	41.3	38.6	2.7
Door sill to top of left door opening	43.3	33.9	9.4
Door sill to top of right door opening	41.3	36.8	4.5
Floor tunnel to windshield header	36.7	28.3	8.4
Floor tunnel to center of roof	41.9	36.8	5.1
Rear of floor tunnel to roof	41.2	35.5	5.7
Maximum width at "B" post	54.3	51.5	2.8
Maximum width at "A" post	53.4	52.1	1.3
Maximum width at top of door opening	45.3	43.2	2.1

All measurements are in inches.

FIGURE 1 HOOD AND ROOF STATIC CRUSH LOCATIONS



HOOD AND ROOF STATIC CRUSH LOCATIONS

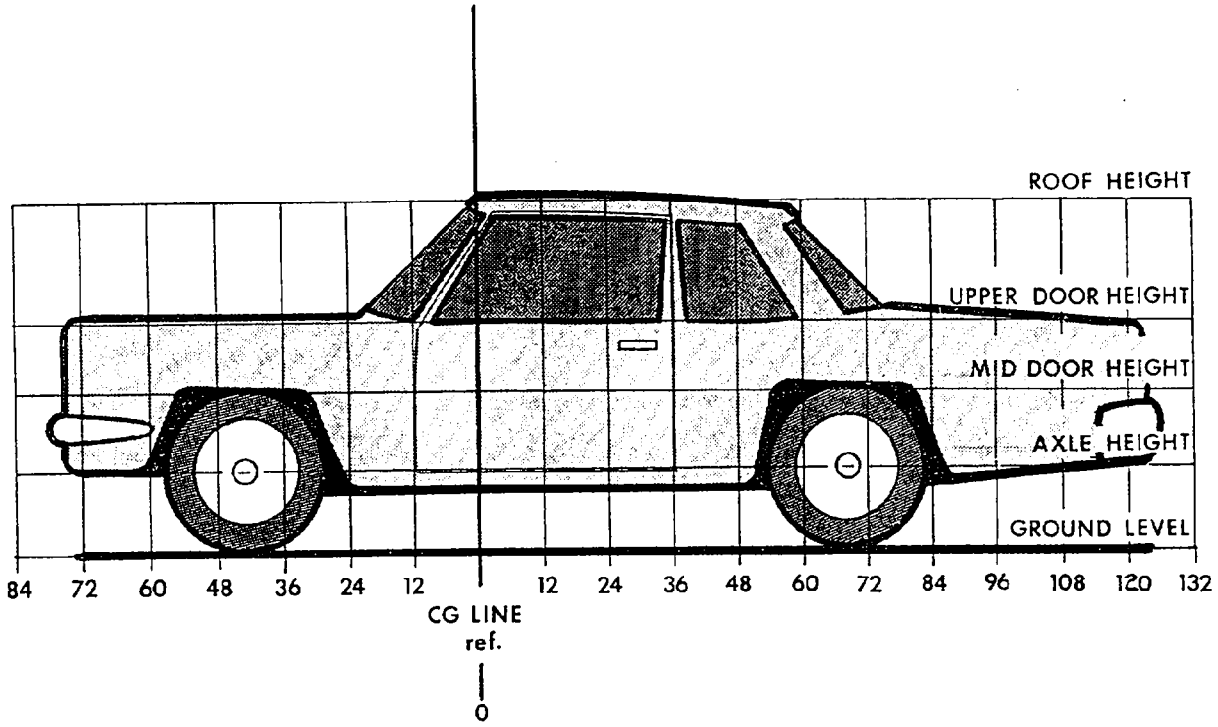


TABLE 4 VEHICLE HOOD EXTERIOR PROFILES
ZERO DISTANCE AT VEHICLE HOOD CENTERLINE[1]

LOCATION	30	20	10	0	10	20	30
PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE[2])							
Trailing edge of cowl at centerline	40.7	41.6	41.9	42.6	42.3	42.2	41.0
Trailing edge of cowl + 12 inches[3]	39.5	40.3	40.6	41.7	41.2	40.8	39.9
Trailing edge of cowl + 24 inches	37.7	38.6	38.9	39.6	39.5	39.1	38.1
Trailing edge of cowl + 36 inches	X	36.1	36.3	36.5	36.2	36.0	X
Trailing edge of cowl + 48 inches	X	X	X	X	X	X	X
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE[2])							
Trailing edge of cowl at centerline	39.7	40.7	40.0	39.5	38.7	38.0	36.6
Trailing edge of cowl + 12 inches[3]	37.5	38.7	39.0	38.6	38.2	37.5	35.9
Trailing edge of cowl + 24 inches	35.4	36.7	36.9	37.2	36.7	36.1	34.5
Trailing edge of cowl + 36 inches	X	33.8	33.7	33.9	33.9	33.5	X
Trailing edge of cowl + 48 inches	X	X	X	X	X	X	X
STATIC CRUSH (IN.)							
Trailing edge of cowl at centerline							
Trailing edge of cowl + 12 inches[3]	-1.0	-0.9	-1.9	-3.1	-3.6	-4.2	-4.4
Trailing edge of cowl + 24 inches	-2.0	-1.6	-1.6	-3.1	-3.0	-3.3	-4.0
Trailing edge of cowl + 36 inches	-2.3	-1.9	-2.0	-2.4	-2.8	-3.0	-3.6
Trailing edge of cowl + 48 inches	X	-2.3	-2.6	-2.6	-2.3	-2.5	X

[1] Column readings are left to right from left to right on vehicle.
[2] Reference plane is a horizontal plane at ground level.
[3] Longitudinal distance from trailing edge of cowl at centerline forward to measurement plane.
\+ Static crush means vehicle structure is bowed upward.
\- Static crush means vehicle structure is crushed.

TABLE 5 VEHICLE ROOF EXTERIOR PROFILES
ZERO DISTANCE AT VEHICLE ROOF CENTERLINE[1]

LOCATION	20	10	0	10	20
PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE[2])					
Longitudinal center of gravity - 12 inches	60.2	60.9	60.7	60.4	59.9
Longitudinal center of gravity	60.1	60.8	60.5	60.3	58.7
Longitudinal center of gravity + 12 inches[3]	59.1	59.8	59.6	59.3	59.7
Longitudinal center of gravity + 24 inches	X	X	X	X	X
Longitudinal center of gravity + 36 inches	X	X	X	X	X
Longitudinal center of gravity + 48 inches	X	X	X	X	X
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE[2])					
Longitudinal center of gravity - 12 inches	51.5	52.6	53.0	51.2	50.6
Longitudinal center of gravity	49.0	51.2	51.8	51.6	50.0
Longitudinal center of gravity + 12 inches[3]	43.0	46.2	49.7	52.8	52.0
Longitudinal center of gravity + 24 inches	X	X	X	X	X
Longitudinal center of gravity + 36 inches	X	X	X	X	X
Longitudinal center of gravity + 48 inches	X	X	X	X	X
STATIC CRUSH (IN.)					
Longitudinal center of gravity - 12 inches	-8.7	-8.3	-7.7	-9.2	-9.3
Longitudinal center of gravity	-11.1	-9.6	-8.7	-8.7	-8.7
Longitudinal center of gravity + 12 inches[3]	-16.1	-13.6	-9.9	-6.5	-7.7
Longitudinal center of gravity + 24 inches	X	X	X	X	X
Longitudinal center of gravity + 36 inches	X	X	X	X	X
Longitudinal center of gravity + 48 inches	X	X	X	X	X

[1] Column readings are left to right from left to right on vehicle.
[2] Reference plane is a horizontal plane at ground level.
[3] Longitudinal distance from center of gravity rearward to measurement plane.
\+ Static crush means vehicle structure is bowed upward.
\- Static crush means vehicle structure is crushed.

TABLE 6 VEHICLE LEFT SIDE EXTERIOR PROFILES AND STATIC CRUSH

ZERO DISTANCE AT VEHICLE LONGITUDINAL CENTER OF GRAVITY[1]

LOCATION	HEIGHT	72	60	48	36	24	12	0	12	24	36	48	60	72	84	96
PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE[2])																
Roof height	59.2	X	X	X	X	X	23.8	22.9	23.1	X	X	X	X	X	X	X
Upper door	39.5	X	X	18.1	17.4	17.3	17.3	17.1	17.2	17.4	17.2	17.3	17.2	17.3	X	X
Mid door	27.5	X	X	X	16.1	16.1	16.1	15.9	16.1	16.1	15.9	X	X	16.3	X	X
Axle height	12.0	X	X	X	X	18.8	18.8	18.3	18.9	18.9	X	X	X	X	X	X
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE[2])																
Roof height	59.2	X	X	X	X	X	30.1	27.7	22.7	X	X	X	X	X	X	X
Upper door	39.5	X	X	20.4	18.7	14.4	10.9	8.1	11.7	20.0	20.1	20.2	21.2	20.7	X	X
Mid door	27.5	X	X	X	16.2	13.9	10.0	6.4	8.0	17.0	16.7	X	X	17.9	X	X
Axle height	12.0	X	X	X	X	15.7	13.1	11.1	9.6	18.5	X	X	X	X	X	X
STATIC CRUSH (IN)																
Roof height	59.2	X	X	X	X	X	6.3	4.8	-0.4	X	X	X	X	X	X	X
Upper door	39.5	X	X	2.3	1.3	-6.4	-6.4	-9.0	-5.5	2.6	2.9	2.9	4.0	3.4	X	X
Mid door	27.5	X	X	X	0.1	-2.2	-6.1	-9.5	-8.1	0.9	0.8	X	X	-1.6	X	X
Axle height	12.0	X	X	X	X	-3.1	-5.7	-7.2	-9.3	-0.4	X	X	X	X	X	X

[1] Center of gravity is located 52.9 inches rearward of vehicle front wheels.
Column readings are left to right from front to rear on vehicle.

[2] Reference plane is parallel to and 48.0 inches from the vehicle longitudinal centerline.
+ Static crush means that vehicle structure is crushed.
- Static crush means that vehicle structure is bowed outward.

TABLE 7 VEHICLE RIGHT SIDE EXTERIOR PROFILES AND STATIC CRUSH
ZERO DISTANCE AT VEHICLE LONGITUDINAL CENTER OF GRAVITY[1]

LOCATION	HEIGHT	72	60	48	36	24	12	0	12	24	36	48	60	72	84	96
PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE[2])																
Roof height	65.2	X	X	X	X	X	23.1	23.1	23.4	X	X	X	X	X	X	X
Upper door	44.2	X	X	17.3	17.2	16.9	17.0	17.0	17.0	16.9	17.1	17.1	17.4	17.1	X	X
Mid door	32.1	X	X	X	15.6	15.5	15.8	15.5	15.5	15.6	15.8	X	X	16.0	X	X
Axle height	19.5	X	X	X	X	18.1	18.1	18.1	18.2	18.4	X	X	X	X	X	X
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE[2])																
Roof height	65.2	X	X	X	X	X	23.6	26.8	23.5	X	X	X	X	X	X	X
Upper door	44.2	X	X	16.7	16.4	15.7	15.2	14.3	14.5	15.5	16.2	17.1	17.9	18.4	X	X
Mid door	32.1	X	X	X	16.0	14.9	14.7	14.3	14.8	15.2	15.2	X	X	16.8	X	X
Axle height	19.5	X	X	X	X	19.0	19.3	18.2	19.5	19.2	X	X	X	X	X	X
STATIC CRUSH (IN)																
Roof height	65.2	X	X	X	X	X	0.5	3.7	0.1	X	X	X	X	X	X	X
Upper door	44.2	X	X	-0.6	-0.8	-1.2	-1.8	-2.7	-2.5	-1.4	-0.9	0.0	0.5	1.3	X	X
Mid door	32.1	X	X	X	0.4	-0.6	-1.1	-1.2	-0.7	-0.4	-0.6	X	X	0.8	X	X
Axle height	19.5	X	X	X	X	0.9	1.2	0.1	1.3	0.8	X	X	X	X	X	X

[1] Center of gravity is located 52.9 inches rearward of vehicle front wheels.
Column readings are left to right from front to rear on vehicle.

[2] Reference plane is parallel to and 48.0 inches from the vehicle longitudinal centerline.
+ Static crush means that vehicle structure is crushed.
- Static crush means that vehicle structure is bowed outward.

FIGURE 2 VEHICLE PRE-TEST AND POST-TEST MEASUREMENT POINTS

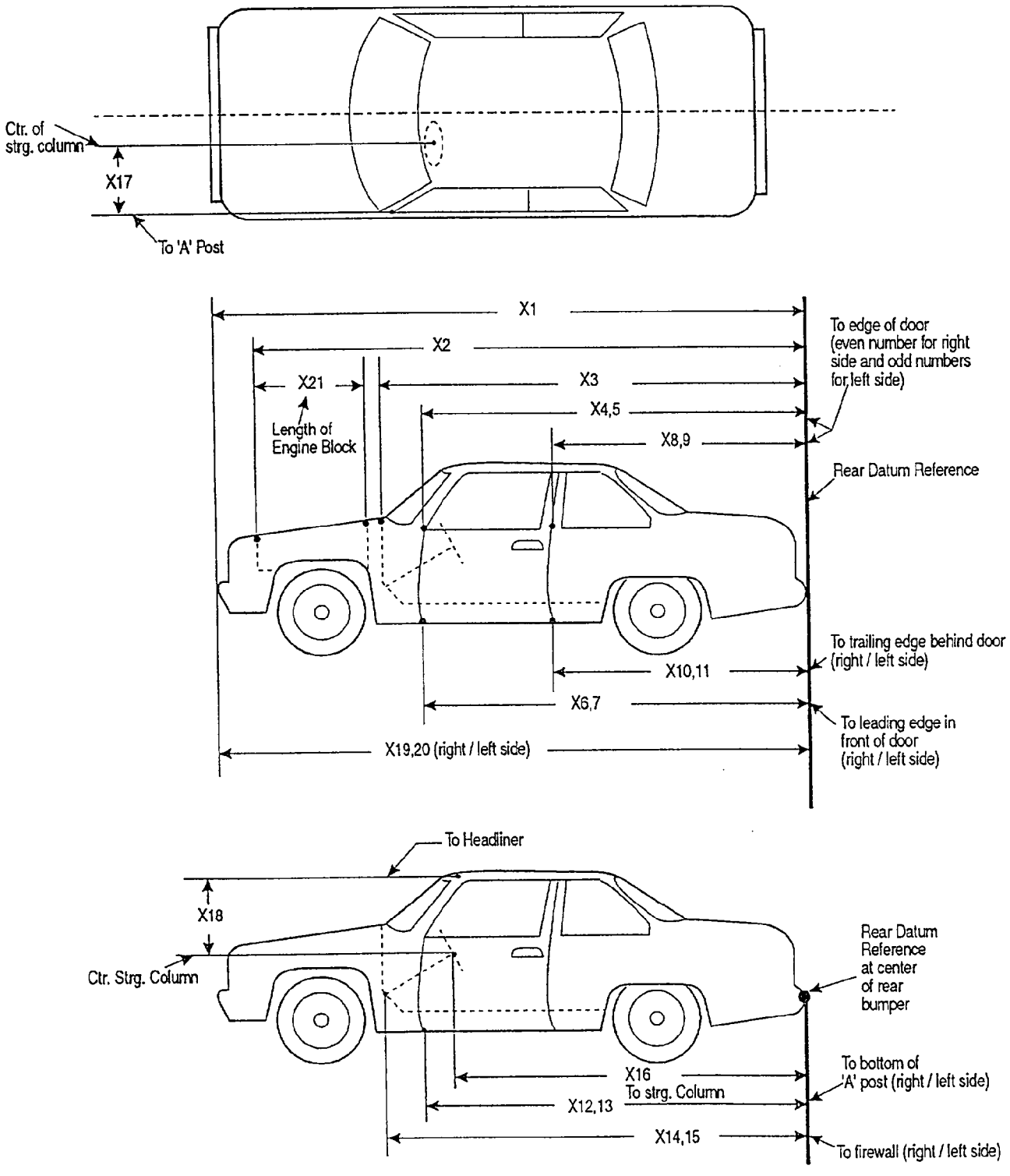


TABLE 8 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Nissan/pickup truck TEST NUMBER: 940907

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	179.4	179.5	-0.1
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	161.2	161.2	0.0
X3	REAR SURFACE OF VEHICLE TO FIREWALL	141.5	141.5	0.0
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	131.9	131.2	0.7
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	132.8	132.4	0.4
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	131.2	131.6	-0.4
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	131.2	133.1	-1.9
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	86.8	86.2	0.6
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	86.8	88.3	-1.5
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	87.0	87.2	-0.2
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	86.9	88.8	-1.9
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	131.9	131.9	0.0
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	132.0	132.3	-0.3
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	141.1	141.1	0.0
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	141.9	141.9	0.0
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	112.9	112.7	0.2
X17	CENTER OF STEERING COLUMN TO "A" POST	12.2	9.8	2.4
X18	CENTER OF STEERING COLUMN TO HEADLINER	17.9	4.2	13.7
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	178.1	178.3	-0.2
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	178.1	178.5	-0.4
X21	LENGTH OF ENGINE BLOCK	19.5	19.5	0.0

All distance measurements are in inches.

DATA ACQUISITION EXPLANATIONS

The following data channels lost data at 3463 milliseconds as a result of the rollover cart striking the data acquisition box electrical connectors:

HD1XG1, driver head position 1 X-axis acceleration
HD1ZG1, driver head position 1 Z-axis acceleration
HD2YG1, driver head position 2 Y-axis acceleration
HD2ZG1, driver head position 2 Z-axis acceleration
HD3XG1, driver head position 3 X-axis acceleration
HD3YG1, driver head position 3 Y-axis acceleration
PEVXG1, driver pelvis X-axis acceleration
VCGYG1, vehicle center of gravity Y-axis acceleration
VCGXV1, vehicle pitch rate

The vehicle center of gravity Z-axis acceleration, VCGZG1, data was lost after 3400 milliseconds as a result of the rollover cart striking the data acquisition box. The driver's pelvis resultant acceleration, PEVRG1, and vehicle center of gravity resultant acceleration, VCGRG1, calculations were affected by the above anomalies.

The driver's head X-axis angular velocity, HEDXV1, data channel recorded intermittent spikes throughout the data after 1750 milliseconds and exceeded the full scale of the data channel at 948 milliseconds.

The driver's neck moment about X-axis, NEKXM1, data channel was lost after 970 milliseconds.

The driver's shoulder belt, SHBF1, data was lost after 2390 milliseconds.

The driver's shoulder belt displacement, SHBD1, data was lost after 1700 milliseconds.

The vehicle roll rate, VCGXV1, data channel recorded a spike at 3463 milliseconds as a result of the rollover cart striking the data acquisition box.

DATA ACQUISITION EXPLANATIONS, CONT'D.

The vehicle yaw rate, VCGZV1, gyroscope did not produce output when it was started prior to the rollover test.

The vehicle X-axis, Y-axis, and Z-axis angular velocity data channels, VCGXVA, VCGYGA, VCGZVA, did not produce output. Post-test investigations found that the signal wires were reversed on these new cables. This problem was corrected and subsequent tests indicated the devices then showed the expected output.

The right door at latch Y-axis acceleration, RFDYG1, data channel recorded data spikes from 1810 to 1850 milliseconds. The right door at latch resultant acceleration, RFDRG1, calculation was affected by these spikes.

All rollover cart data channels recorded intermittent spikes throughout the impact event.

The vehicle/roll cart separation time data channels did not record a transition as a result of loosing electrical continuity prior to the roll event.

TABLE 9 EVENT TIMES

TEST DATE: September 7, 1994

EVENT DESCRIPTION	TIME, SEC.
CONTACT RELEASE BLOCK	0.0
START COLLECTING DATA	-0.2
STOP COLLECTING DATA	3.65
ZERO TIME FOR DATA	0.0
STROBE LIGHTS FLASH	0.0
CAMERA LED GOES OFF	0.0[1]
PIN RELEASES (ROLLOVER CART)	-0.429[2]
CYLINDERS START (ROLLOVER CART)	0.126

[1] Locate frame where event LED stripe ends. Put projector into reverse mode and go backwards four frames. This frame is T-zero for the data.

[2] Release time as setup on rollover cart control panel and as setup by position of rollover cart cycle start switch and release block. Cycle start switch was 20 feet in front of release block.

SECTION 3.0

GENERAL TEST AND VEHICLE PARAMETER DATA

The following data sheets describe the General Test & Vehicle parameter data.

TABLE 10 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Nissan Motor Co., Ltd.

MAKE/MODEL: Nissan/pickup truck VIN: 1N6SD11S7LC308270

BODY STYLE: pickup truck MODEL YEAR: 1990

COLOR: Red

ENGINE DATA: TYPE: inline CYLINDERS: 4 DISPLACEMENT: 2.4 liters

TRANSMISSION DATA: _5_SPEED, _X_MANUAL, ___AUTOMATIC, ___FWD, _X_RWD, ___4WD

DATE VEHICLE RECEIVED: 08/29/94 ODOMETER READING: 44,656

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

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

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? No[1]
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: Nissan Motor Co., Ltd.

DATE OF MANUFACTURE: 10/89 VIN: 1N6SD11S7LC308270

GVWR: 4400 LBS

GAWR: FRONT: 2200 LBS., REAR: 2544 LBS.

[1] Vehicle's B-pillars and header were modified.

TABLE 10 TEST VEHICLE INFORMATION, CONT'D.

TIRES ON VEHICLE (MFR., LINE, SIZE): Firestone, WR-12, P195/75R14

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 35 PSI
REAR: 35 PSI

SPARE TIRE (MFR., SIZE): No spare

TYPE OF SEATS: FRONT: Bench
REAR: NA

TYPE OF FRONT SEAT BACKS: Non-adjustable

MAXIMUM WIDTH: 65.4 INCHES

WHEELBASE: 104.5 INCHES

LOCATION OF LABEL STATING TIRE & CAPACITY DATA:

The label was located in the glove box.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:[1]

RECOMMENDED TIRE SIZE: P195/75R14

RECOMMENDED COLD TIRE PRESSURE: FRONT: 26 PSI; REAR: 34 PSI

DESIGNATED SEATING CAPACITY: ___FRONT ___REAR ___TOTAL

VEHICLE CAPACITY WEIGHT: ____ LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE:	LF	29.0;	RF	28.9;	LR	31.2;	RR 30.4
FULLY LOADED ATTITUDE:	LF	28.7;	RF	28.6;	LR	28.7;	RR 28.4
PRE-TEST ATTITUDE:	LF	28.1;	RF	28.3;	LR	28.4;	RR 28.3
POST-TEST ATTITUDE:	LF	28.0;	RF	25.4;	LR	31.0;	RR 23.7

[1] The vehicle did not contain capacity data.

TABLE 10 TEST VEHICLE INFORMATION, CONT'D.

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

RIGHT FRONT	796 LBS.	RIGHT REAR	634 LBS.
LEFT FRONT	772 LBS.	LEFT REAR	621 LBS.
TOTAL FRONT WEIGHT	1568 LBS.	(55.5% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1255 LBS.	(44.5% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	2823 LBS.		

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW[1] = RATED CARGO AND LUGGAGE WEIGHT

UDW = UNLOADED DELIVERED WEIGHT (2823 LBS.)

VCW[1] = VEHICLE CAPACITY WEIGHT (LBS.)

DSC[1] = DESIGNATED SEATING CAPACITY (3)

RCLW[1] = VCW - 150 (DSC) = 300 LBS.

TARGET TEST WEIGHT = UDW + RCLW[1]+(NO. OF HYBRID III DUMMIES X 167 LBS./DUMMY)

TARGET TEST WEIGHT = 2823 + 300 + 167

TARGET TEST WEIGHT = 3290 LBS.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 300 LBS. OF CARGO WEIGHT:

RIGHT FRONT	791 LBS.	RIGHT REAR	827 LBS.
LEFT FRONT	832 LBS.	LEFT REAR	840 LBS.
TOTAL FRONT WEIGHT	1623 LBS.	(49.3% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1667 LBS.	(50.7% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	3290 LBS.	(0.0% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 0 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 52.9 INCHES REARWARD OF FRONT WHEEL CENTERLINE

[1] Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's calculated cargo and luggage weight or 300 pounds, whichever is less.

TABLE 11 TEST CONDITIONS

TEST NUMBER: 940907

TEST DATE: 09/07/94

TEST TEMPERATURES:

IMPACT AREA:	73° F
OCCUPANT COMPARTMENT:	73° F
DRIVER DUMMY:	73° F

VEHICLE AND ROLL CART DATA:	ACTUAL	INTENDED
VEHICLE TEST WEIGHT (LBS.):	3290	3290
VEHICLE ORIENTATION (DEG.) ROLL[1]:	30	30
IMPACT SIDE:	Right	Right
ROLL CART WEIGHT (LBS.):	3347	3347
ROLL CART CRABBED ANGLE (DEG.)[2]:	0	0
ROLL CART VELOCITY (MPH)[3]:	30.0	30.0

VEHICLE MEASUREMENTS:

MAXIMUM LENGTH:	179.4
MAXIMUM WIDTH:	65.4
WHEELBASE:	104.5
TOP WIDTH:	52.0
C.G. REARWARD OF FRONT WHEEL CENTERLINE:	52.9
C.G. HEIGHT ABOVE GROUND LEVEL:	24.2

[1] As measured on the roll cart with cylinder in rest position.
[2] As measured from roll cart's centerline to direction of travel (positive is clockwise).
[3] As measured over final one foot of travel.

All measurements are in inches.

TABLE 11 TEST CONDITIONS, CONT'D.

VEHICLE INFORMATION:

LEFT FRONT:	DOOR	-	UNLOCKED	WINDOW	-	UP
LEFT REAR:	DOOR	-	NA	WINDOW	-	NA
RIGHT FRONT	DOOR	-	UNLOCKED	WINDOW	-	UP
RIGHT REAR	DOOR	-	NA	WINDOW	-	NA
EMERGENCY BRAKE:	OFF					
TRANSMISSION:	NEUTRAL					
HEADRESTS:	DRIVER	-	UPMOST	PASSENGER	-	UPMOST
TIRE PRESSURE:	FRONT	-	26 PSI	REAR	-	34 PSI

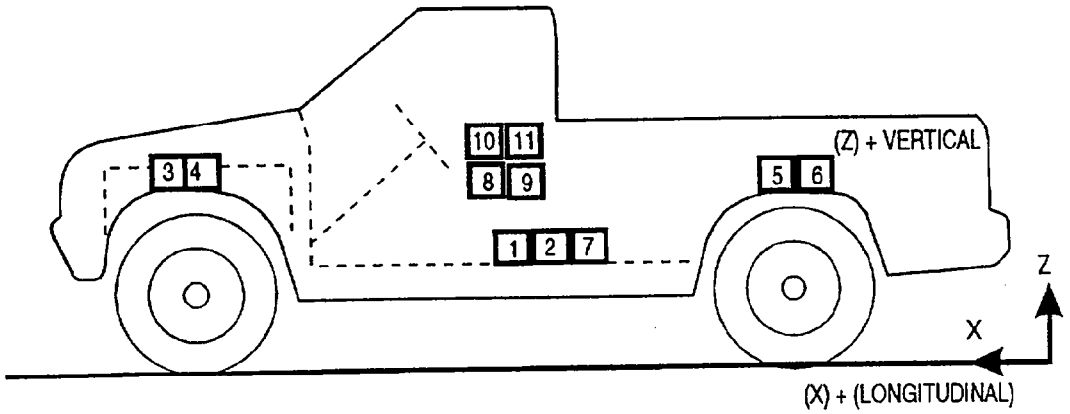
DUMMY INFORMATION:

TYPE:	PART 572 E
POSITION:	LEFT FRONT
SERIAL NO.:	043

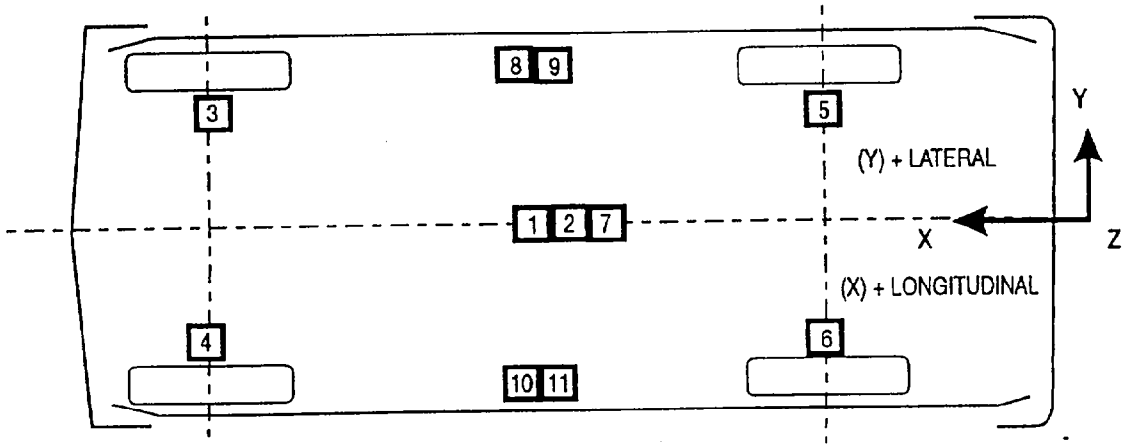
INSTRUMENTATION:

HEAD ACCELEROMETERS:	9
HEAD ANGULAR VELOCITY SENSORS:	3
NECK LOAD CELLS:	6
CHEST ACCELEROMETERS:	3
CHEST DEFLECTION POTENTIOMETERS:	1
CHEST ANGULAR VELOCITY SENSORS:	3
PELVIS ACCELEROMETERS:	3
RESTRAINT SYSTEM:	THREE-POINT UNIBELT

FIGURE 3 VEHICLE INSTRUMENTATION LOCATIONS



SIDE VIEW



BOTTOM VIEW

TABLE 12 VEHICLE INSTRUMENTATION LOCATIONS AND DATA SUMMARY

TEST NUMBER: 940907 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 CENTER OF GRAVITY	89.0 in	0.0 in	19.2 in				
ACCELERATION (g)							
LONGITUDINAL				7.1 g	@ 799.1 ms	4.3 g	@ 803.5 ms
LATERAL[1]				26.8 g	@ 797.9 ms	9.8 g	@ 956.6 ms
VERTICAL[1]				19.2 g	@ 969.6 ms	50.2 g	@ 796.8 ms
RESULTANT[1]				56.5 g	@ 796.9 ms		
2 CENTER OF GRAVITY	75.0 in	0.0 in	28.6 in				
ROLL (X-AXIS)[1]				2.6 deg/s	@ 7.1 ms	269.2 deg/s	@1826.6 ms
PITCH (Y-AXIS)				162.3 deg/s	@ 826.1 ms	140.6 deg/s	@ 853.5 ms
YAW (Z-AXIS)[1]				0.0 deg/s	@ 826.1 ms	0.0 deg/s	@ 0.0 ms
3 LEFT FRONT SUSPENSION	152.0 in	22.2 in	37.9 in				
DISPLACEMENT (in)							
VERTICAL				0.6 in	@ 162.6 ms	2.4 in	@1085.9 ms
4 RIGHT FRONT SUSPENSION	152.0 in	-23.0 in	37.8 in				
DISPLACEMENT (in)							
VERTICAL				1.1 in	@1794.6 ms	4.7 in	@1637.1 ms
5 LEFT REAR SUSPENSION	47.5 in	23.0 in	38.0 in				
DISPLACEMENT (in)							
VERTICAL				1.4 in	@1909.8 ms	2.5 in	@2417.5 ms
6 RIGHT REAR SUSPENSION	47.2 in	-22.6 in	37.8 in				
DISPLACEMENT (in)							
VERTICAL				1.1 in	@1819.2 ms	8.1 in	@1916.9 ms

TABLE 12 VEHICLE INSTRUMENTATION LOCATIONS AND DATA SUMMARY, CONT'D.

TEST NUMBER: 940907 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
7 CENTER OF GRAVITY	75.0 in	0.0 in	26.1 in				
ANGULAR VELOCITY							
LONGITUDINAL[1]				---	---	---	---
LATERAL[1]				---	---	---	---
VERTICAL[1]				---	---	---	---
8 LEFT INNER DOOR	92.0 in	26.1 in	30.2 in				
PANEL ACCELERATION (g)							
LONGITUDINAL				24.9 g	@ 836.1 ms	22.2 g	@ 965.1 ms
LATERAL				51.3 g	@ 959.1 ms	26.1 g	@1052.9 ms
VERTICAL				16.3 g	@1006.2 ms	56.8 g	@2289.4 ms
RESULTANT				71.8 g	@ 959.0 ms		
9 LEFT B-PILLAR	90.0 in	26.1 in	28.2 in				
ACCELERATION (g)							
LONGITUDINAL				37.6 g	@ 832.5 ms	15.7 g	@ 958.5 ms
LATERAL				111.0 g	@ 870.3 ms	71.6 g	@ 865.6 ms
VERTICAL				33.9 g	@ 969.3 ms	46.1 g	@ 959.4 ms
RESULTANT				111.3 g	@ 870.3 ms		
10 RIGHT INNER	90.8 in	-28.9 in	28.8 in				
DOOR PANEL ACCELERATION (g)							
LONGITUDINAL				13.6 g	@ 836.5 ms	15.0 g	@ 828.0 ms
LATERAL				25.8 g	@ 864.3 ms	154.8 g	@1851.3 ms
VERTICAL				12.5 g	@1919.0 ms	61.4 g	@ 797.9 ms
RESULTANT				154.8 g	@1851.2 ms		

TABLE 12 VEHICLE INSTRUMENTATION LOCATIONS AND DATA SUMMARY, CONT'D.

TEST NUMBER: 940907 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
11 RIGHT B-PILLAR	88.8 in	-28.9 in	29.1 in				
ACCELERATION (g)							
LONGITUDINAL				20.7 g	@ 804.3 ms	25.3 g	@ 798.9 ms
LATERAL				25.0 g	@ 796.5 ms	14.7 g	@ 955.5 ms
VERTICAL				27.3 g	@ 803.8 ms	73.9 g	@ 794.5 ms
RESULTANT				75.3 g	@ 794.6 ms		

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER
Y: + LEFTWARD FROM VEHICLE'S CENTERLINE
Z: + UPWARD FROM GROUND LEVEL
ROLL: + TO RIGHT
PITCH: + NOSE DOWNWARD
YAW: + COUNTERCLOCKWISE
DISPLACEMENT: + OUTWARD

[1]See DATA ACQUISTION EXPLANATIONS

FIGURE 4 STADIA POLE LAYOUT AND NUMBERING SYSTEM

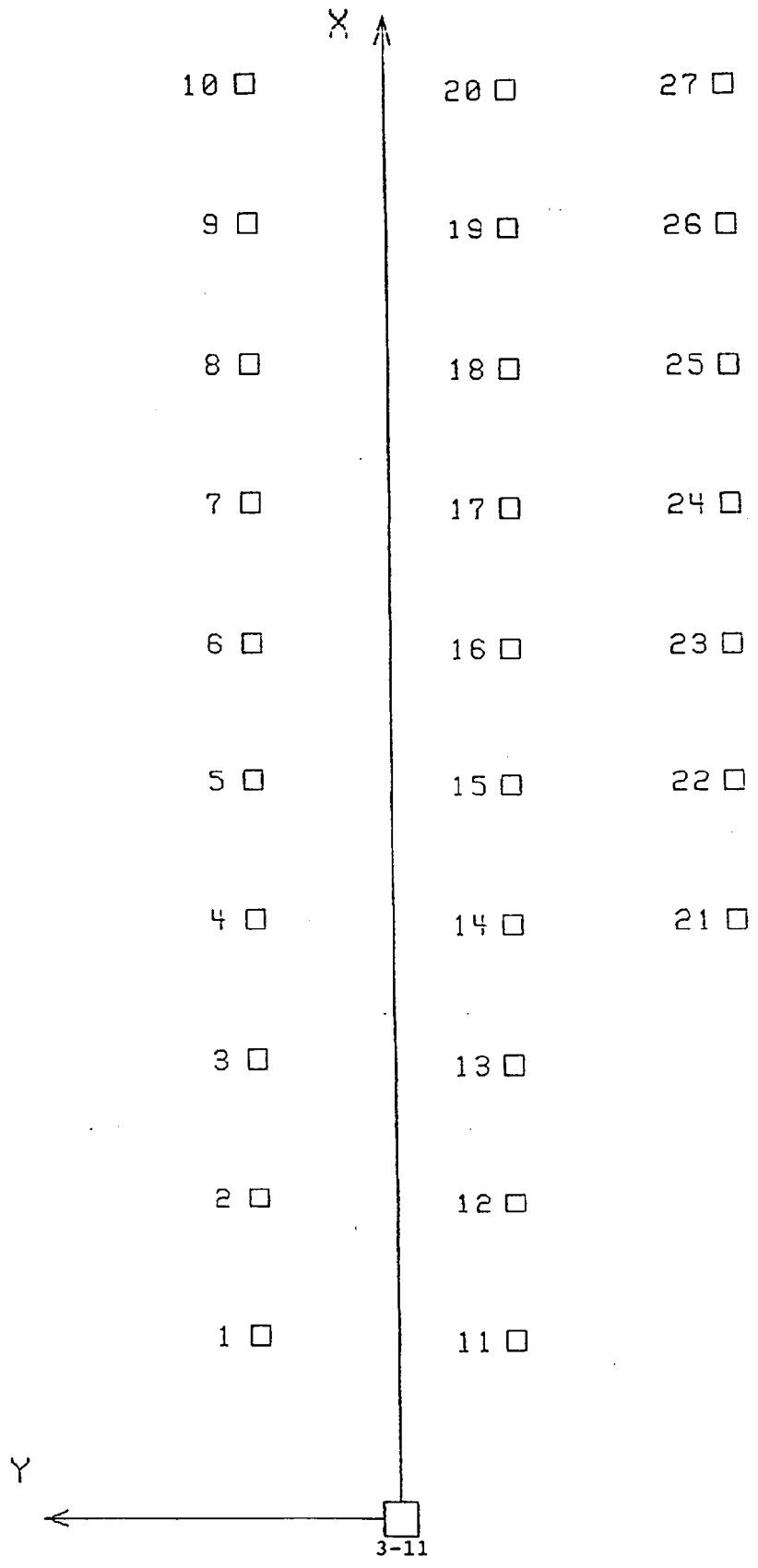


TABLE 13 STADIA POLE LOCATIONS

POLE NO.	X DISTANCE[1]	Y DISTANCE[1]
1	35.0	8.0
2	43.0	8.0
3	51.0	8.0
4	59.0	8.0
5	67.0	8.0
6	75.0	8.0
7	83.0	8.0
8	91.0	8.0
9	99.0	8.0
10	107.0	8.0
11	35.0	-8.0
12	43.0	-8.0
13	51.0	-8.0
14	59.0	-8.0
15	67.0	-8.0
16	75.0	-8.0
17	83.0	-8.0
18	91.0	-8.0
19	99.0	-8.0
20	107.0	-8.0
21	59.0	-18.0
22	67.0	-18.0
23	75.0	-18.0
24	83.0	-18.0
25	91.0	-18.0
26	99.0	-18.0
27	107.0	-18.0

[1] REFERENCE: +X: FORWARD FROM RELEASE BLOCK

+Y: LEFTWARD FROM CENTER RELEASE BLOCK

All measurements are in feet.

FIGURE 5 CAMERA LOCATIONS

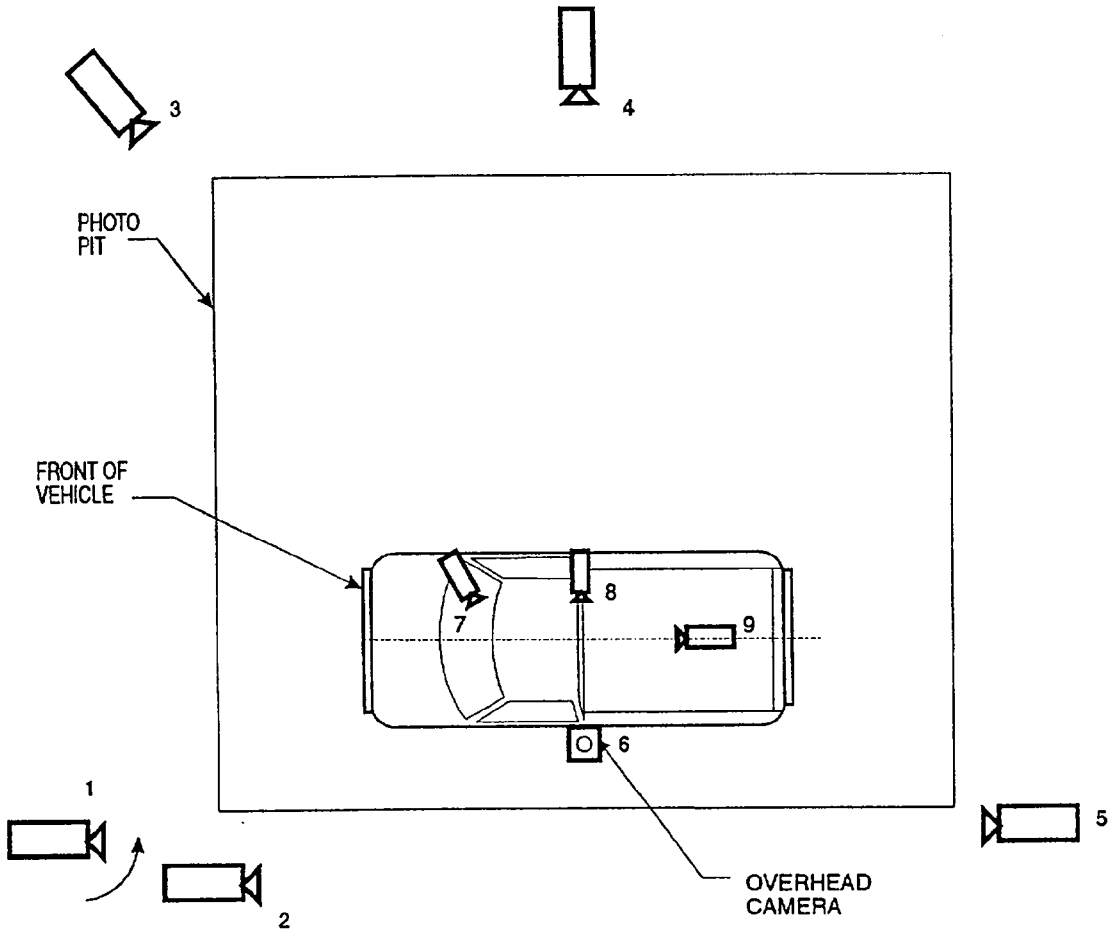


TABLE 14 HIGH-SPEED CAMERA LOCATIONS

OFFBOARD

CAMERA NO.	X[1]	Y[1]	Z[1]
2	96.0	195.0	5.5
3	167.0	56.0	4.0
4	210.0	0.0	4.0
5	55.0	-100.0	4.0

[1]REFERENCE:

+X: Forward from release block

+Y: Leftward from the centerline of the release block

+Z: Upward from the ground level

ONBOARD

CAMERA NO.	X[2]	Y[2]	Z[2]
7	1.0	-1.2	2.5
8	0.8	-1.1	3.5
9	-4.5	0.0	2.2

[2] REFERENCE:

+X: Forward from the C. G. of vehicle

+Y: Leftward from the centerline of the vehicle

+Z: Upward from the ground level

All measurements are in feet.

TABLE 15 MOTION PICTURE CAMERA INFORMATION

CAMERA NUMBER	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Left panning	Bolex	16	24	Real-time documentation
2	Left wide	Photosonic	13	500	Vehicle dynamics
3	Left angle	Photosonic	13	500	Vehicle dynamics
4	Downstream	Photosonic	25	1005	Vehicle dynamics
5	Right wide	Photosonic	13	495	Vehicle dynamics
6	Overhead	Photosonic	8	498	Vehicle dynamics
7	Onboard-front	Photosonic	8	500	Dummy kinematics
8	Onboard-rear	Photosonic	8	498	Dummy kinematics
9	Onboard-bed	Photosonic	8	498	Roof crush

SECTION 4.0

OCCUPANT INFORMATION

TABLE 16 DUMMY DATA SUMMARY

TEST NUMBER: 940907 DRIVER DUMMY SERIAL NUMBER: 43

	POSITIVE DIRECTION		NEGATIVE DIRECTION	
HEAD ACCELERATION				
LONGITUDINAL	26.3 g	@ 969.6 ms	65.2 g	@ 961.8 ms
LATERAL	42.3 g	@ 964.0 ms	66.4 g	@ 947.1 ms
VERTICAL	17.8 g	@ 2312.9ms	117.0 g	@ 960.1 ms
RESULTANT	133.0 g	@ 960.1 ms		
HIC	513 from 958.9 to 964.2 ms			
HEAD ARRAY 1 ACCELERATION				
LONGITUDINAL[1]	31.4 g	@ 947.0 ms	73.9 g	@ 960.8 ms
VERTICAL[1]	33.9 g	@ 2313.0 ms	131.8 g	@ 959.4 ms
HEAD ARRAY 2 ACCELERATION				
LATERAL[1]	38.5 g	@ 959.3 ms	80.9 g	@ 946.4 ms
VERTICAL[1]	24.3 g	@ 2313.0 ms	107.1 g	@ 959.9 ms
HEAD ARRAY 3 ACCELERATION				
LONGITUDINAL[1]	38.5 g	@ 947.3 ms	81.8 g	@ 961.5 ms
LATERAL[1]	53.4 g	@ 959.4 ms	127.0 g	@ 946.3 ms
HEAD ANGULAR VELOCITY				
LONGITUDINAL[1]	1240.6 deg/s	@ 948.0 ms	1123.8 deg/s	@ 1710.5ms
LATERAL	548.2 deg/s	@ 1747.8ms	682.9 deg/s	@ 963.5 ms
VERTICAL	903.7 deg/s	@ 1692.8ms	942.9 deg/s	@ 1937.8ms
NECK FORCES				
LONGITUDINAL	70.3 lb	@ 2399.4ms	619.1 lb	@ 966.3 ms
LATERAL	102.5 lb	@ 1729.1ms	351.7 lb	@ 975.4 ms
VERTICAL	105.6 lb	@ 1717.9ms	4330.5 lb	@ 965.4 ms
NECK MOMENT				
ABOUT LONG.[1]	24.8 lb-ft	@ 950.1 ms	--- lb-ft	@ --- ms
ABOUT LATERAL	205.6 lb-ft	@ 969.6 ms	14.2 lb-ft	@ 1871.9ms
ABOUT VERTICAL	18.5 lb-ft	@ 1718.8ms	13.8 lb-ft	@ 1221.2ms
CHEST ACCELERATION				
LONGITUDINAL	15.3 g	@ 988.4 ms	15.9 g	@ 968.8 ms
LATERAL	18.4 g	@ 968.9 ms	7.4 g	@ 987.0 ms
VERTICAL	6.3 g	@ 985.5 ms	78.2 g	@ 964.1 ms
RESULTANT	79.5 g	@ 964.1 ms		
3 MSEC	66.5 g			

TABLE 16 DUMMY DATA SUMMARY, CONT'D.

TEST NUMBER: 940907 DRIVER DUMMY SERIAL NUMBER: 43

	POSITIVE DIRECTION		NEGATIVE DIRECTION	
CHEST ANGULAR VELOCITY				
LONGITUDINAL	496.5 deg/s	@ 999.1 ms	233.1 deg/s	@ 2323.9ms
LATERAL	425.6 deg/s	@ 967.4 ms	342.4 deg/s	@ 2338.6ms
VERTICAL	340.8 deg/s	@ 972.1 ms	620.4 deg/s	@ 1005.9ms
CHEST DEFLECTION				
LONGITUDINAL	0.0 in	@ 487.9 ms	0.1 in	@ 870.4 ms
PELVIS ACCELERATION				
LONGITUDINAL[1]	11.8 g	@ 1009.3ms	25.5 g	@ 840.3 ms
LATERAL	7.8 g	@ 1012.1ms	8.8 g	@ 1076.4ms
VERTICAL	6.5 g	@ 1014.6ms	45.7 g	@ 966.0 ms
RESULTANT	46.4 g	@ 966.0 ms		

POSITIVE DIRECTION		NEGATIVE DIRECTION	
LONGITUDINAL:	FORWARD	LONGITUDINAL:	REARWARD
LATERAL:	LEFTWARD	LATERAL:	RIGHTWARD
VERTICAL:	UPWARD	VERTICAL:	DOWNWARD
FORCE:	OUTWARD	FORCE:	INWARD

[1] See DATA ACQUISITION EXPLANATIONS

TABLE 17 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #043	PASSENGER # NA
HEAD	Head liner	
CHEST	Left door inner panel	
ABDOMEN	None	
LEFT KNEE	Instrument panel	
RIGHT KNEE	Instrument panel	

DOOR OPENING:

	LEFT	RIGHT
FRONT	Tools required	Tools required
REAR	NA	NA

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	None	None
REAR	NA	NA

GLAZING DAMAGE:

All vehicle glazing was broken during the crash test.

OTHER NOTABLE IMPACT EFFECTS:

The truck tailgate was broken off of all but the right upper gate hinge. Both right tires were flattened.

KINEMATIC SUMMARY

The vehicle struck the ground at the junction of the roof and the passenger's side A- and B-pillars. The dummy's knees then rose and struck the dash panel as the dummy's hands and arms rose and struck the roof. Simultaneously, the vehicle then rolled fully onto its top collapsing the driver's side of the roof onto the dummy's head. Both the driver and passenger side window glass broke out at this time. The vehicle next bounced onto its left front and then bounced onto its right front. The vehicle next rolled onto the passenger's side. The dummy's arms and upper torso rose and struck the roof a second time as the vehicle rolled onto the roof again. The rollover cart repeatedly struck the top and passenger side of the vehicle as the vehicle rolled to a stop on its tires. The vehicle rolled forward 720° total. The dummy was restrained with a 3-point unibelt. The dummy's Head Injury Criteria, HIC, was 513, its maximum chest resultant acceleration with three milliseconds minimum duration was 66.5 g.

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle and dummy were left inside the temperature controlled building eight hours prior to the time the dummy was loaded into the vehicle. After the vehicle had been positioned on the rollover device it was towed outside for launch.

One Part 572 E dummy was instrumented for this test. The dummy instrumentation consisted of triaxial accelerometers in the head, chest, and pelvis, a deflection potentiometer in the chest, and six load cells in the neck. The head and chest were also instrumented with angular velocity sensors. The head was instrumented with six (6) additional accelerometers to form a 9-accelerometer array. Prior to seating the dummy, the driver's seat was positioned in the mid-adjustment notch of the seat track. The seat back angle was not adjustable. The dummy was positioned in the seat according to the dummy placement procedure specified in Appendix B and Optional Appendix C of Laboratory Procedure TP-208-09. The H-point location of the seat was obtained by using the SAE J211 OCT88 H-point machine. The driver dummy was restrained with a three-point unibelt.

FIGURE 6 DUMMY AND SEAT POSITIONING DATA

MAKE/MODEL/BODY STYLE: Nissan/Pickup truck

SEAT TYPE: X Bench
_____Bucket
_____Split bench

ADJUSTER TYPE: X Manual
_____Power
_____Non-adjustable

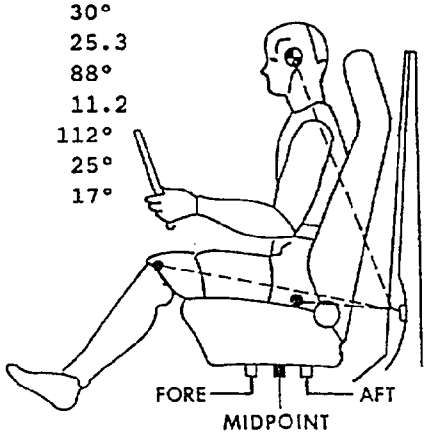
SEAT BACK TYPE: X Non-adjustable
___ Adjustable reclining

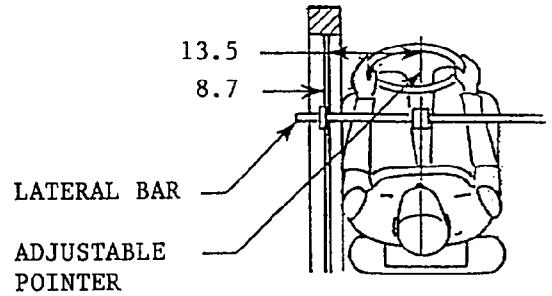
TECHNICIANS:
1. R. Branham
2. R. Fishbaugh
3. M. Garrison
4. B. Miller

POSITIONING DATE: 09/07/94
TIME: 1500 TEMPERATURE: 74° F

DRIVER DUMMY[1] # 043 TYPE: HIII

HEAD	22.4
TARGET	30°
KNEE	25.3
JOINT	88°
APPROX.	11.2
H-POINT	112°
PELVIS	25°
SEATBACK	17°



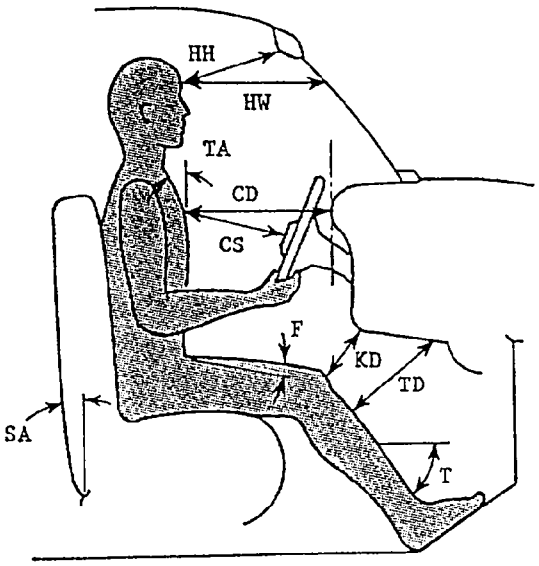


[1] Driver dummy measurements are referenced to top of front door striker for 4-door vehicles.

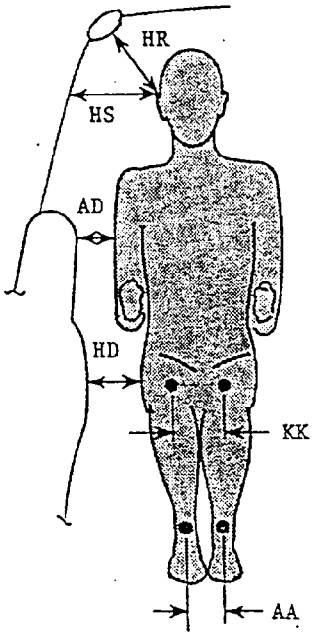
ALL ANGLES ARE REFERENCED TO VERTICAL.
ALL DISTANCE MEASUREMENTS ARE IN INCHES.

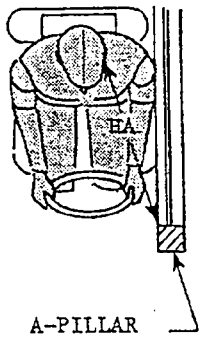
FIGURE 7 DUMMY IN-VEHICLE POSITIONING DATA

	DRIVER 043	PASSENGER NA
HH	15.7	
HW	23.6	
CD	22.3	
CS	12.5	
KDL	5.0	
KDR	5.3	
FL	20°	
FR	22°	
TDL	4.3	
TDR	4.2	
TL	40°	
TR	41°	



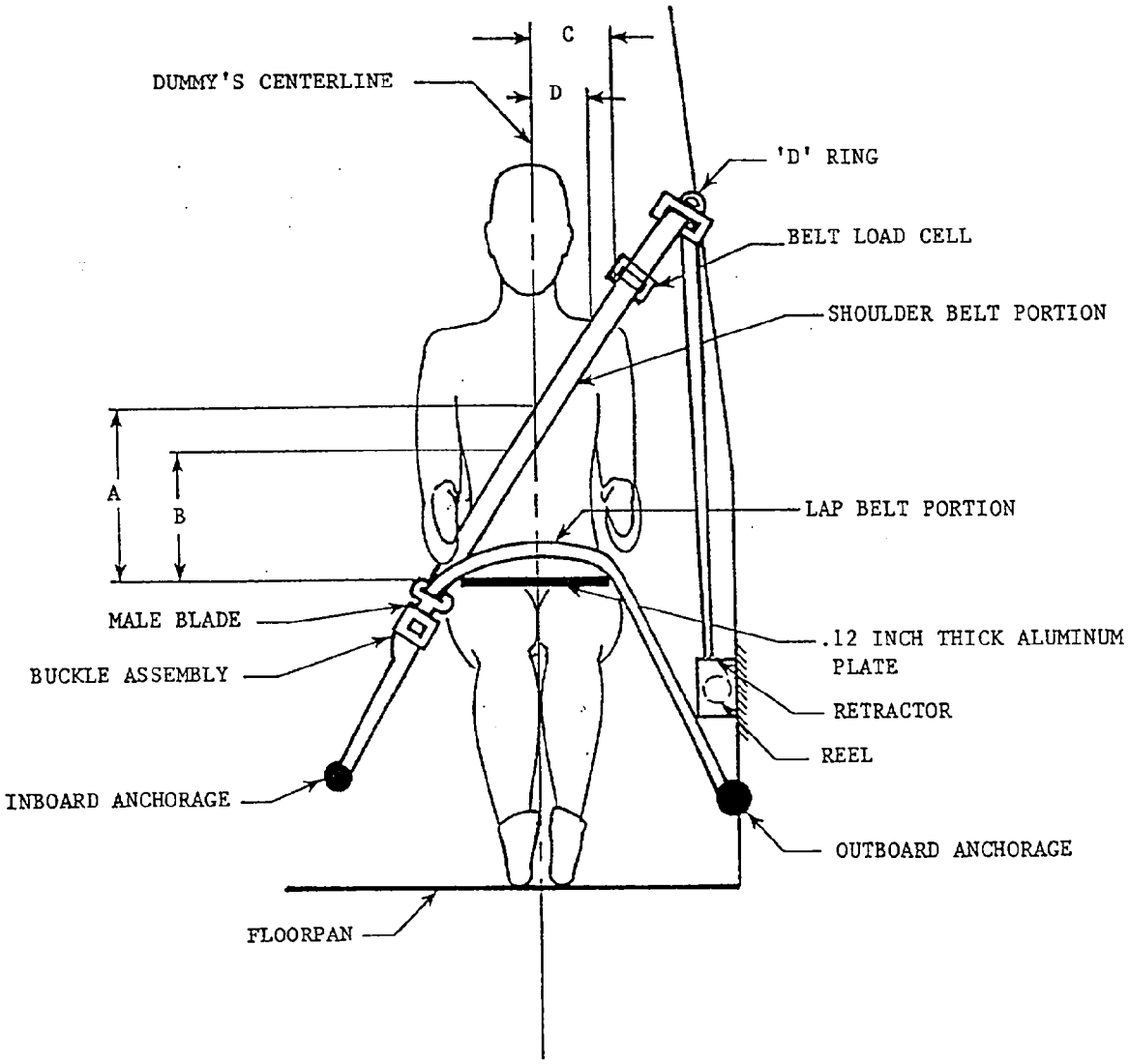
	DRIVER 043	PASSENGER NA
HR	7.4	
HS	10.8	
AD	3.3	
HD	6.5	
HZ	6.1	





All distance measurements are in inches.

FIGURE 8 SEAT BELT POSITIONING DATA



		DRIVER	PASSENGER
A -	TOP SURFACE OF ALUM. PLATE TO BELT UPPER EDGE	14.3	NA
B -	TOP SURFACE OF ALUM. PLATE TO BELT LOWER EDGE	10.8	NA
C -	DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	4.0	NA
D -	DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	1.4	NA

All distance measurements are in inches.

APPENDIX A

PHOTOGRAPHS

Figure A-1 PRE-TEST FRONT VIEW

Figure A-2 PRE-TEST LEFT SIDE VIEW

Figure A-3 PRE-TEST REAR VIEW

Figure A-4 PRE-TEST RIGHT SIDE VIEW

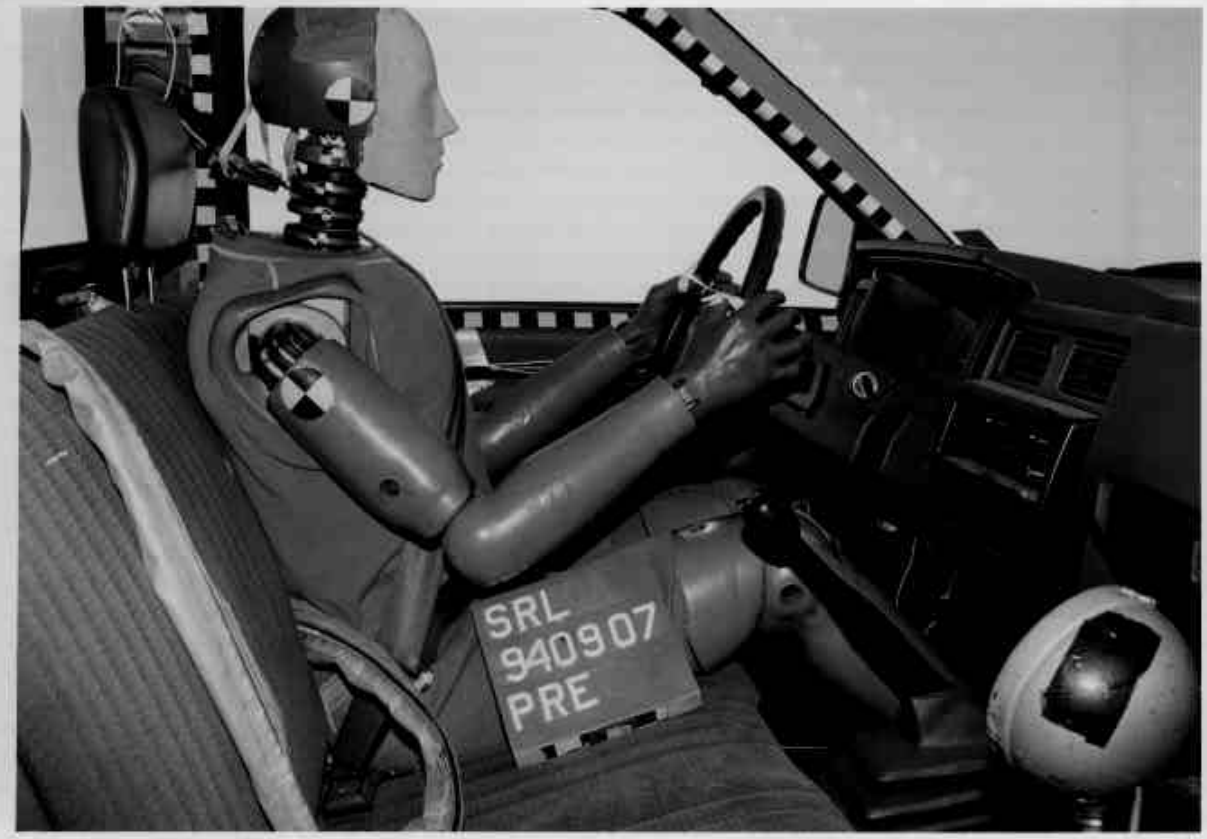


Figure A-5 PRE-TEST DRIVER DUMMY VIEW

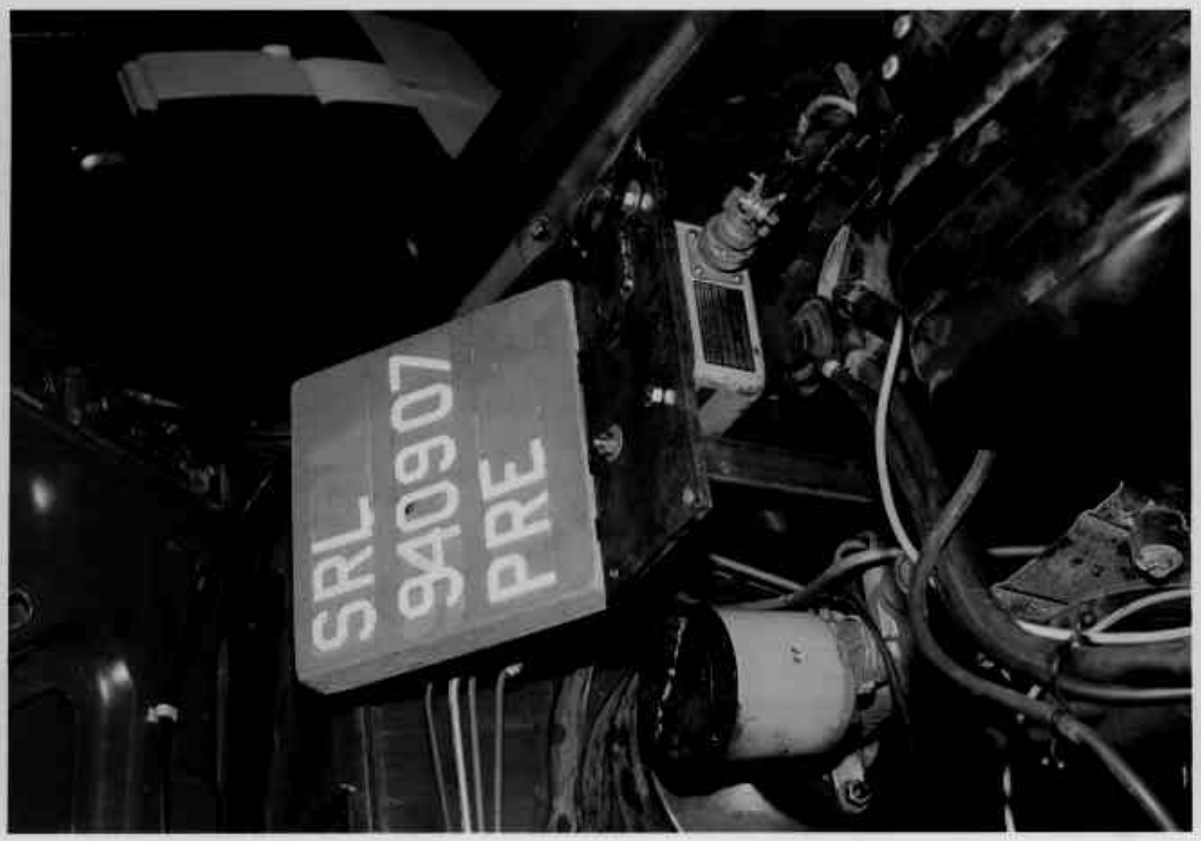


Figure A-6 PRE-TEST LEFT FRONT SUSPENSION STRING POTENTIOMETER VIEW

Figure A-7 PRE-TEST RIGHT FRONT SUSPENSION STRING POTENTIOMETER VIEW

Figure A-8 PRE-TEST LEFT REAR SUSPENSION STRING POTENTIOMETER VIEW

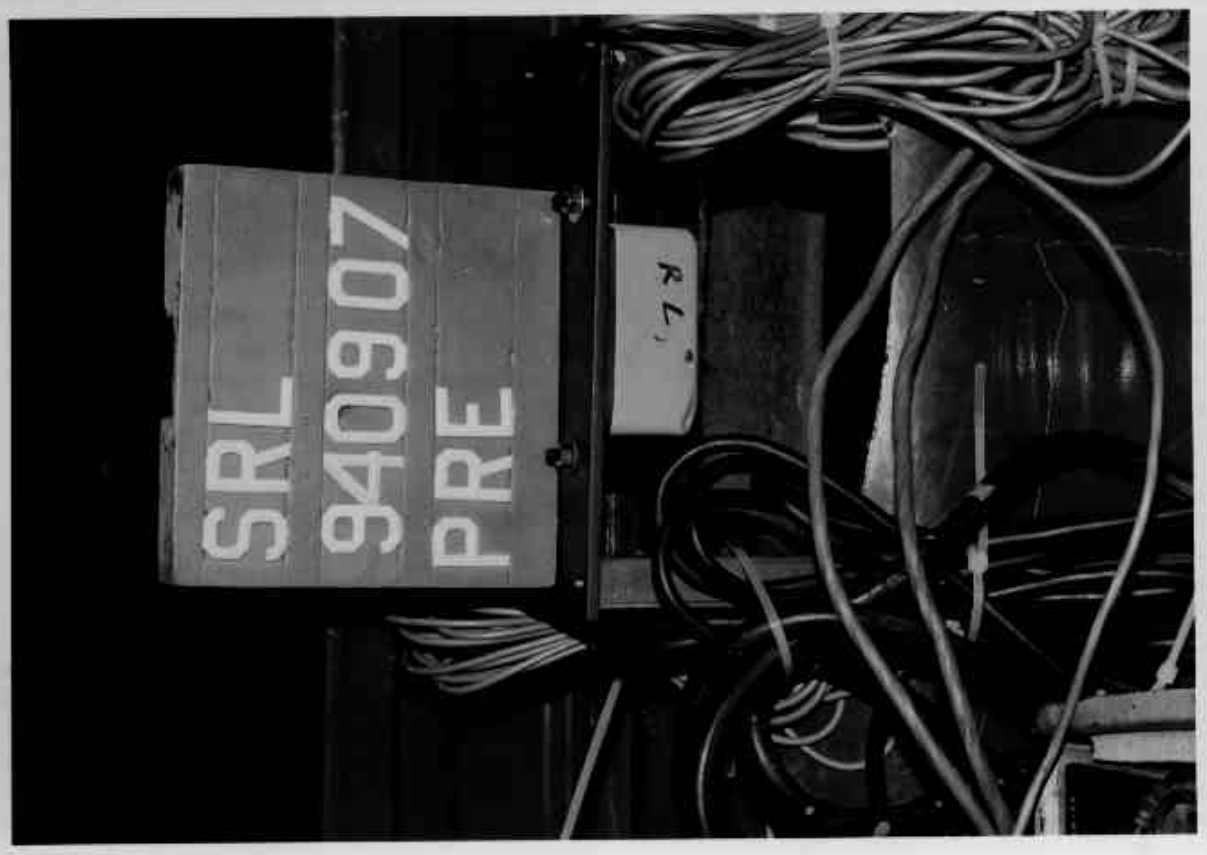


Figure A-9 PRE-TEST RIGHT REAR SUSPENSION STRING POTENTIOMETER VIEW

Figure A-10 PRE-TEST DRIVER'S SHOULDER BELT STRING POTENTIOMETER VIEW

Figure A-11 PRE-TEST VEHICLE CENTER OF GRAVITY ACCELEROMETER VIEW

Figure A-12 PRE-TEST LEFT DOOR ACCELEROMETER VIEW

Figure A-13 PRE-TEST RIGHT DOOR ACCELEROMETER VIEW

Figure A-14 PRE-TEST LEFT B-PILLAR ACCELEROMETER VIEW

Figure A-15 PRE-TEST RIGHT B-PILLAR ACCELEROMETER VIEW

Figure A-16 PRE-TEST VEHICLE INSTRUMENTATION AND BALLAST LOCATION VIEW

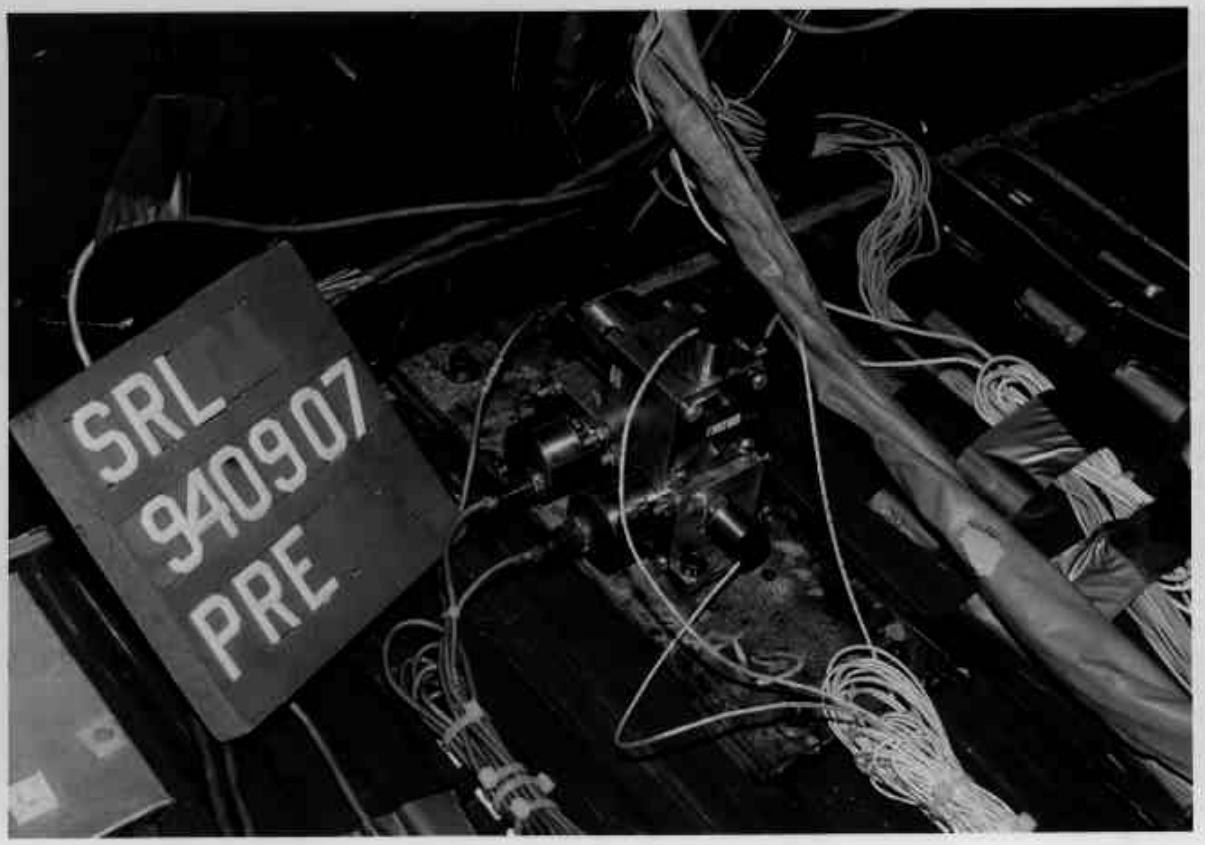


Figure A-17 PRE-TEST GYROSCOPE PLACEMENT VIEW

Figure A-18 PRE-TEST CAMERA LOCATION - VIEW 1

Figure A-19 PRE-TEST CAMERA LOCATION - VIEW 2

Figure A-20 POST-TEST FRONT VIEW

Figure A-21 POST-TEST LEFT SIDE VIEW

Figure A-22 POST-TEST REAR VIEW

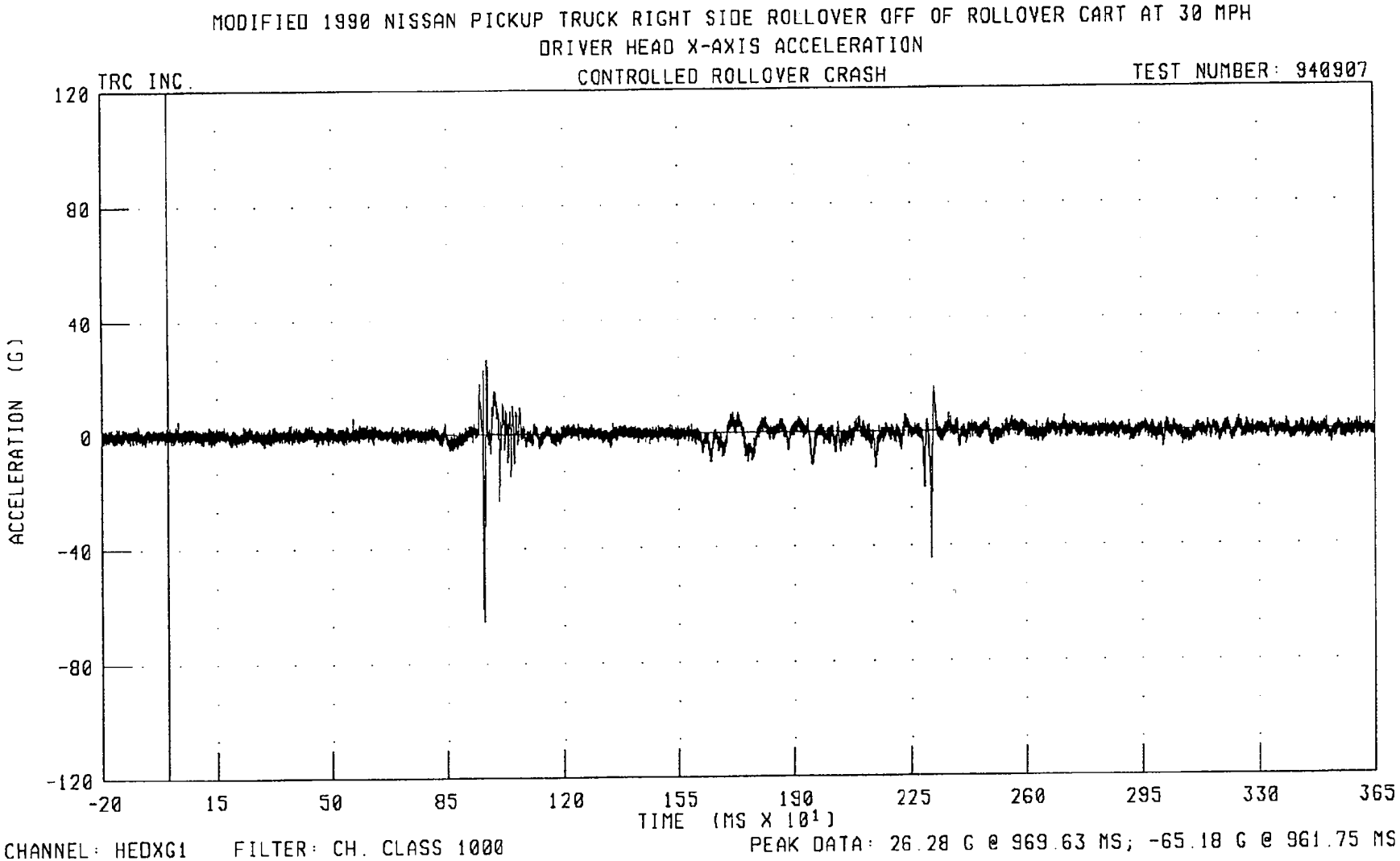
Figure A-23 POST-TEST RIGHT SIDE VIEW

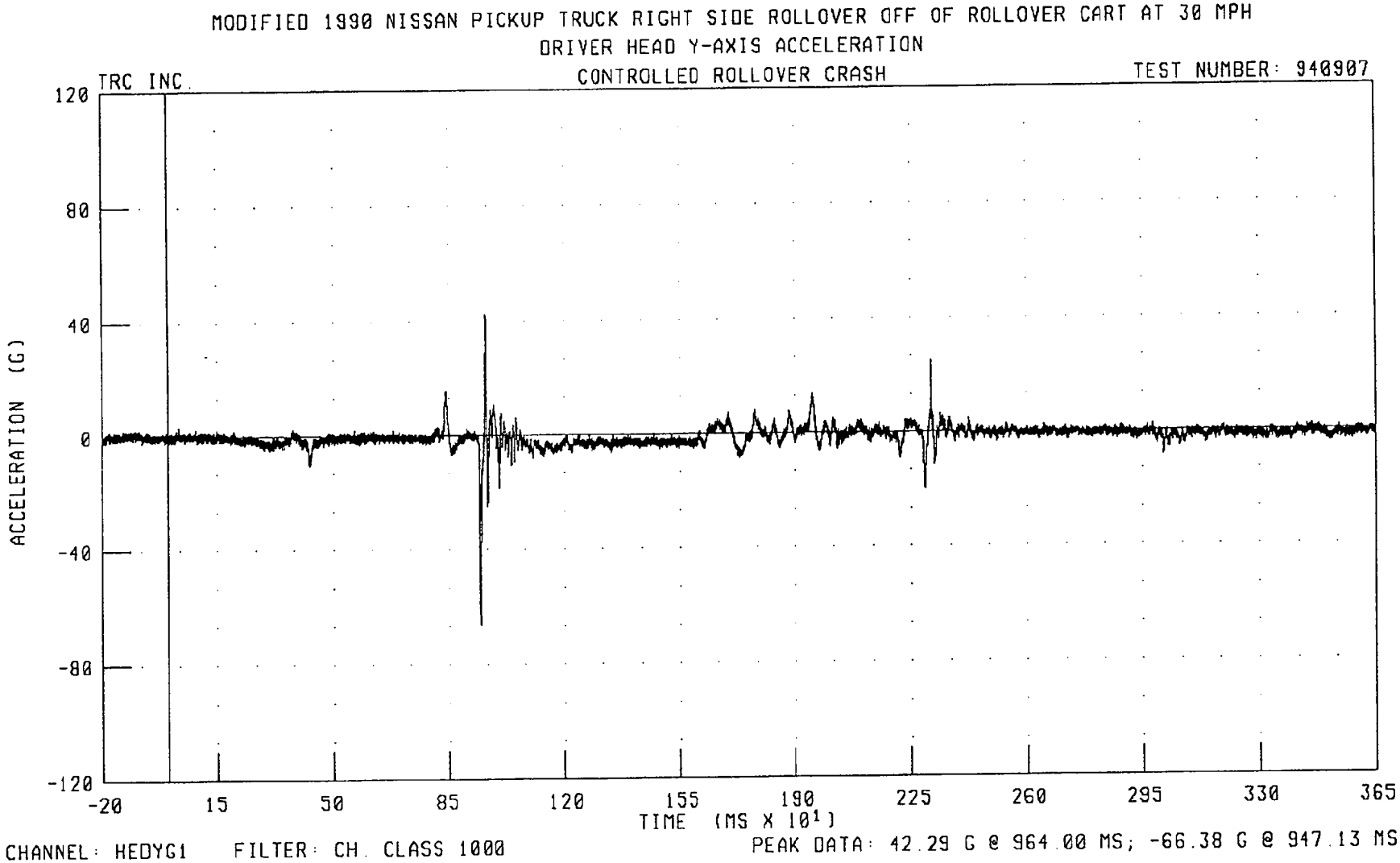
Figure A-24 POST-TEST DUMMY AND VEHICLE - VIEW 1

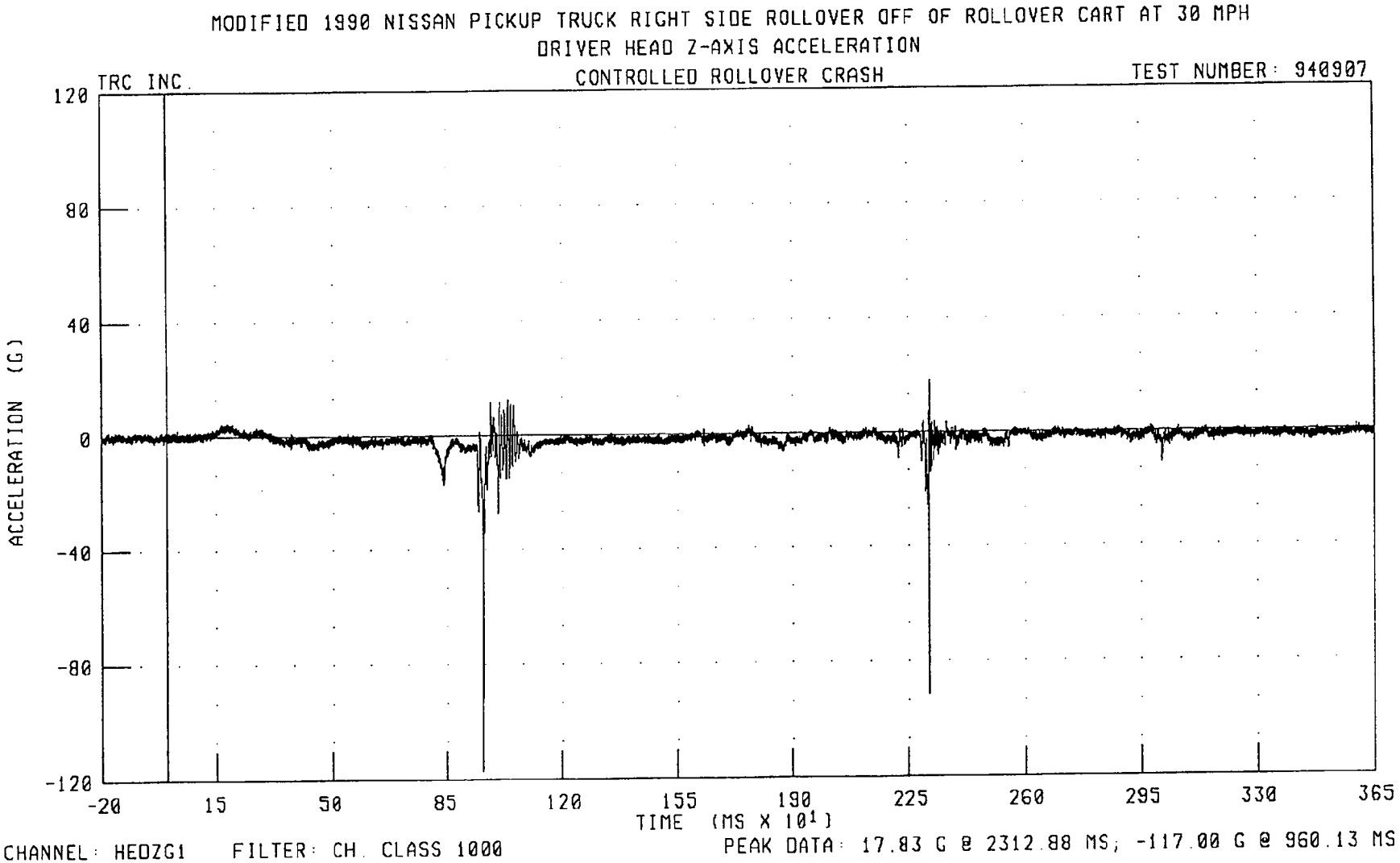
Figure A-25 POST-TEST DUMMY AND VEHICLE - VIEW 2

APPENDIX B

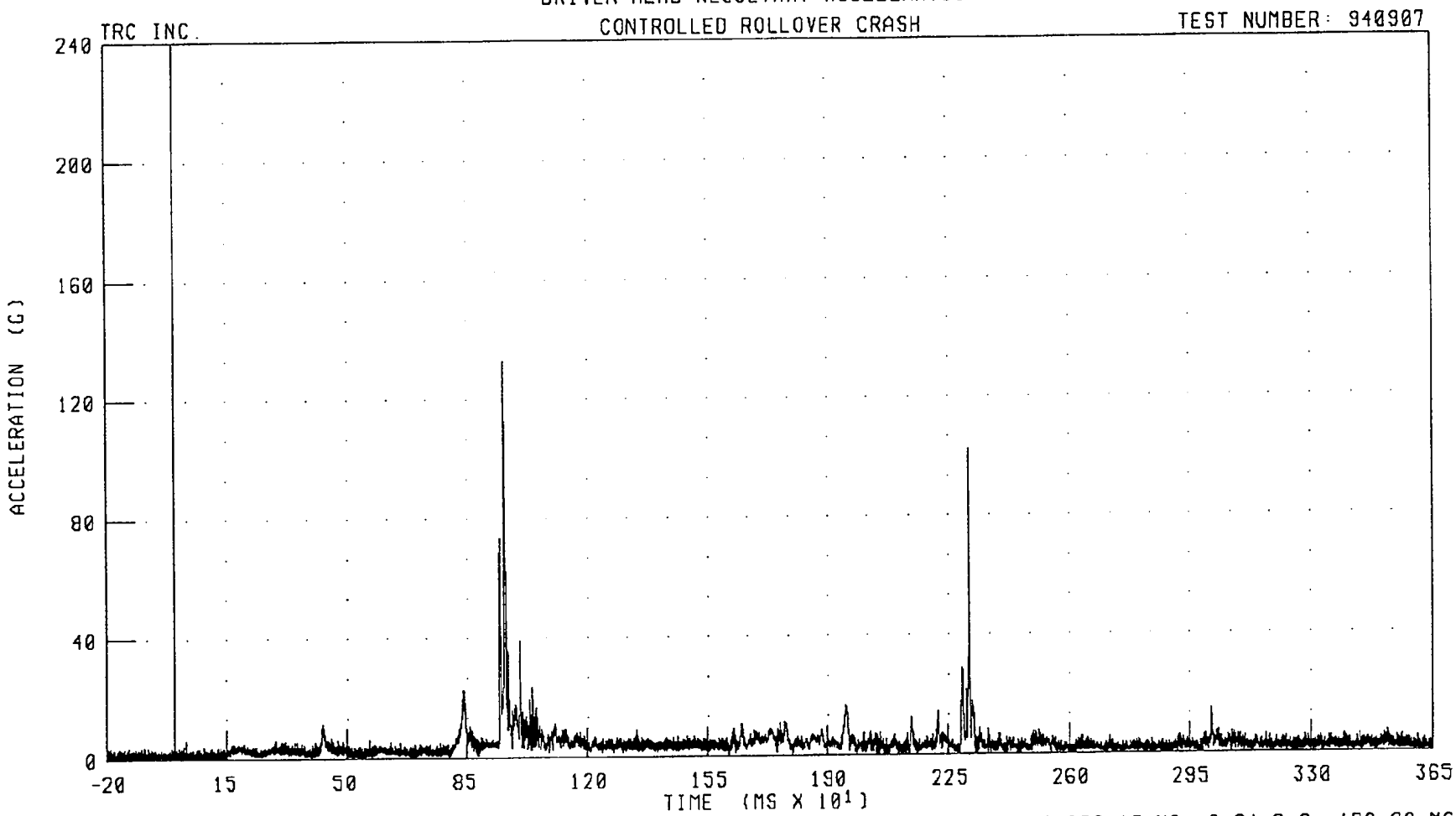
DATA PLOTS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD X-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: HEDXG1
FILTER: CH. CLASS 1000
PEAK DATA: 26.28 G @ 969.63 MS; -65.18 G @ 961.75 MS

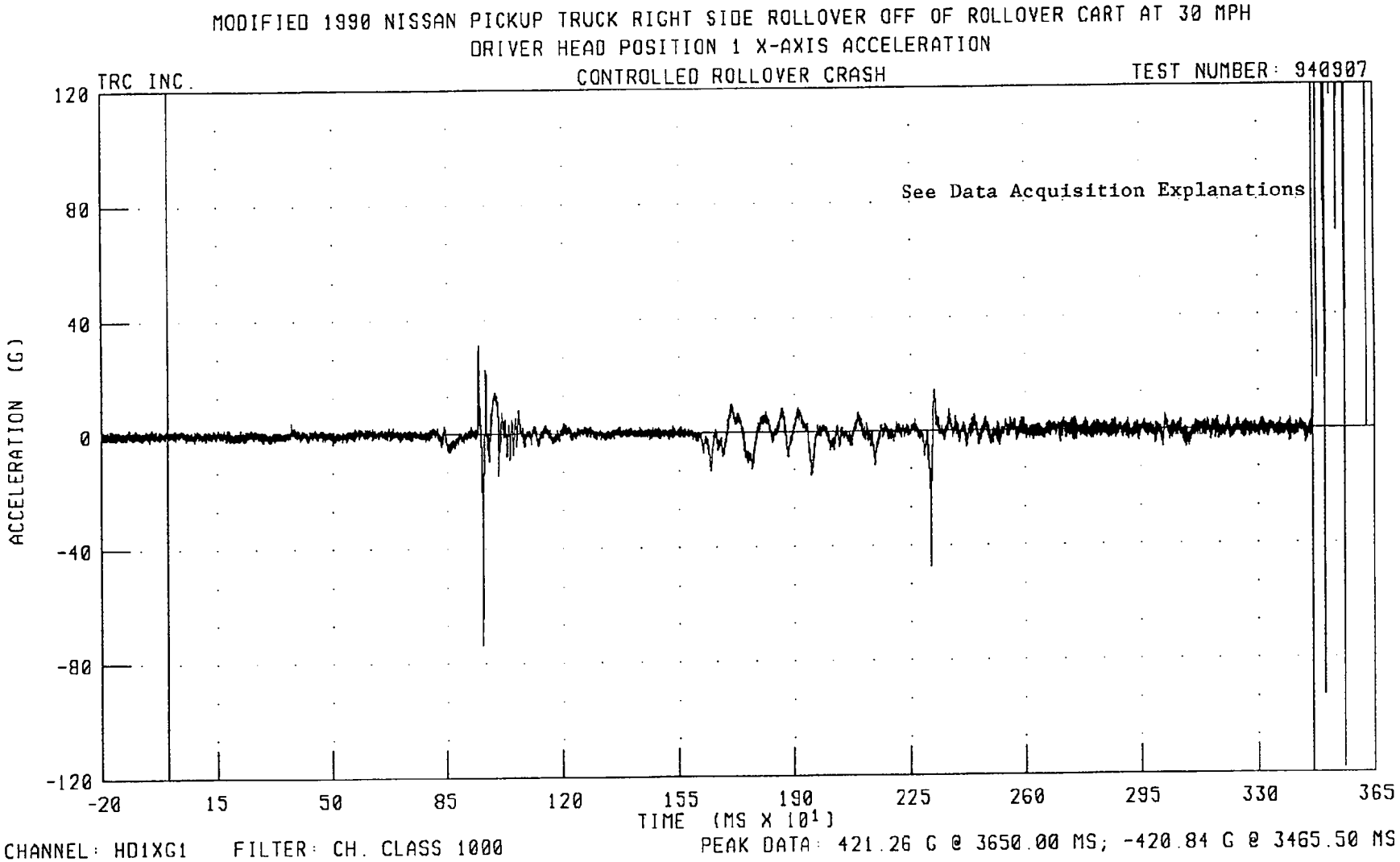

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD Y-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
ACCELERATION (G)
120
80
40
0
-40
-80
-120
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: HEDYG1
FILTER: CH. CLASS 1000
PEAK DATA: 42.29 G @ 964.00 MS; -66.38 G @ 947.13 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD Z-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: HEDZG1
FILTER: CH. CLASS 1000
PEAK DATA: 17.83 G @ 2312.88 MS; -117.00 G @ 960.13 MS

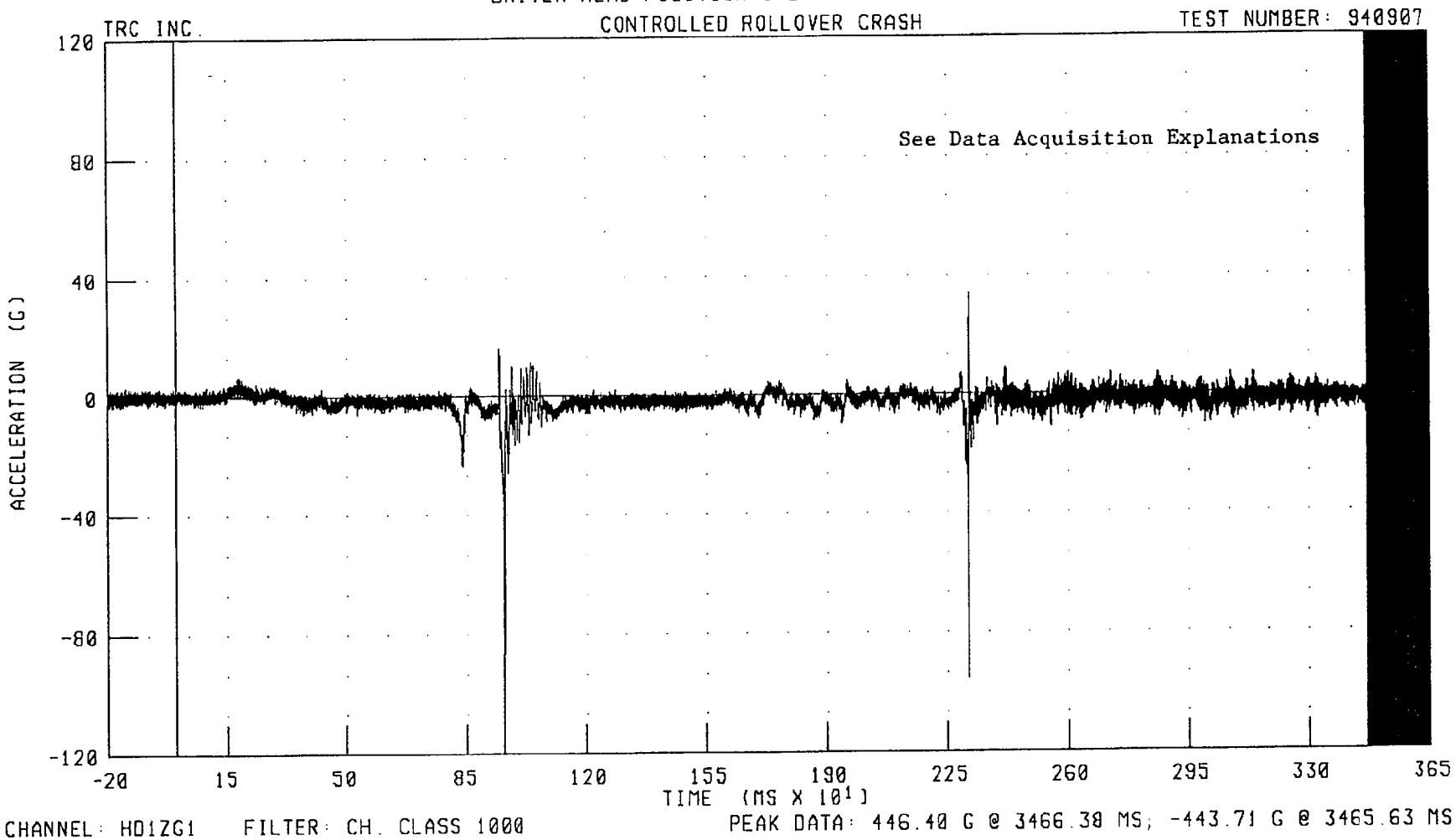
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD RESULTANT ACCELERATION
CONTROLLED ROLLOVER CRASH



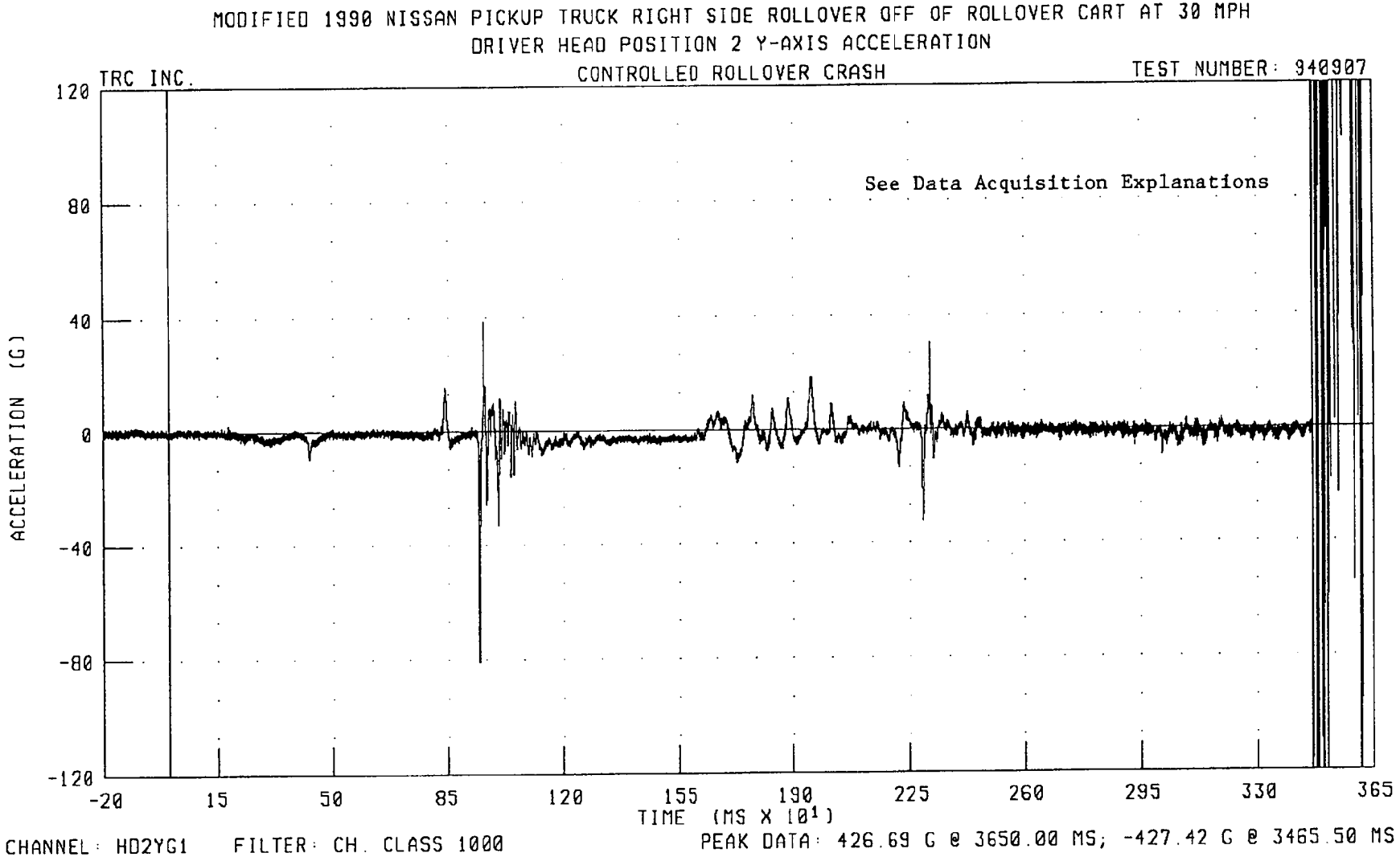
CHANNEL: HEDRG1 FILTER: CH. CLASS 1000 PEAK DATA: 133.02 G @ 960.13 MS; 0.04 G @ -179.88 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD POSITION 1 X-AXIS ACCELERATION
TRC INC.
CONTROLLED ROLLOVER CRASH
TEST NUMBER: 940907
See Data Acquisition Explanations
ACCELERATION (G)
120
80
40
0
-40
-80
-120
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: HD1XG1
FILTER: CH. CLASS 1000
PEAK DATA: 421.26 G @ 3650.00 MS; -420.84 G @ 3465.50 MS

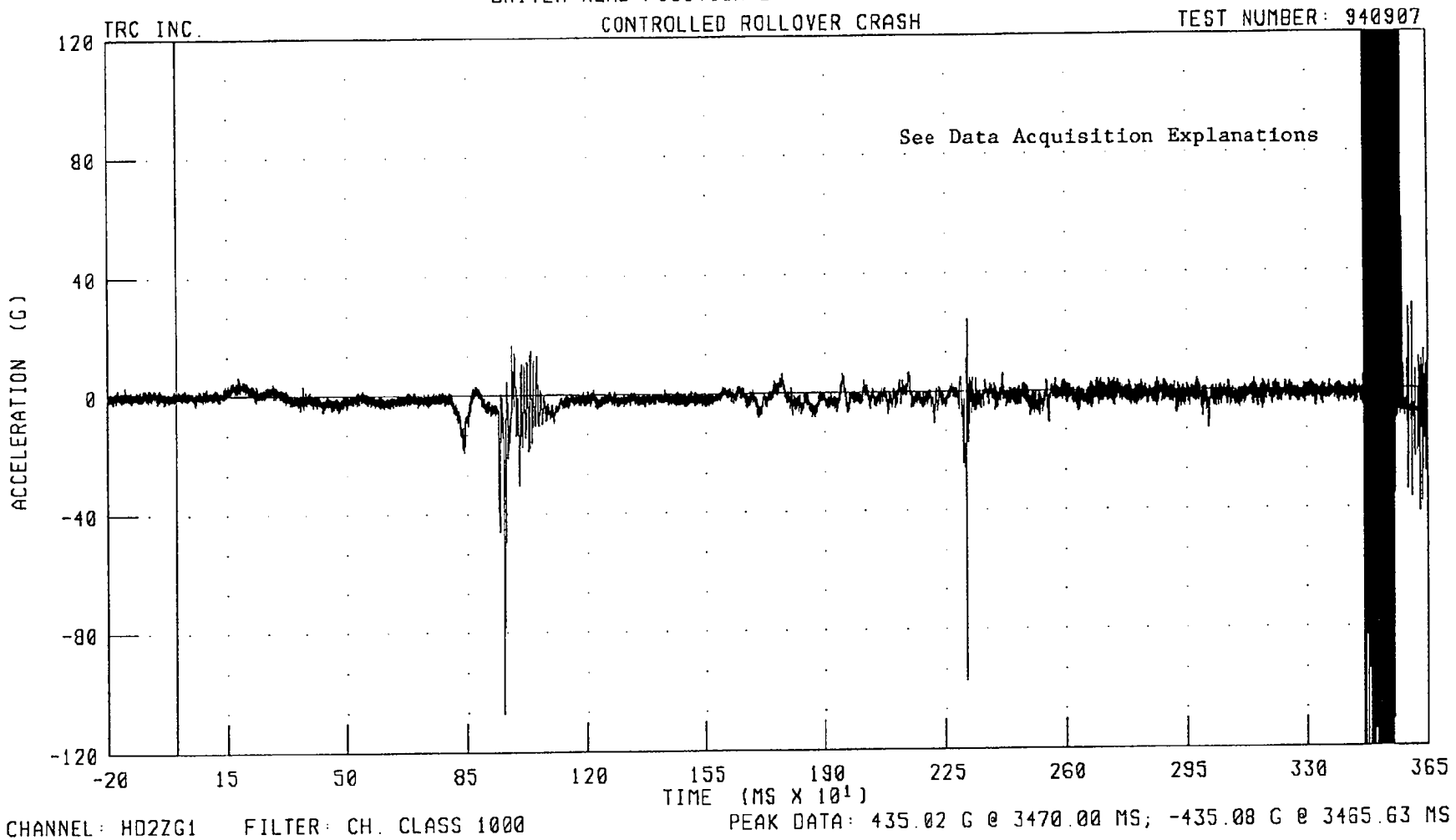
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD POSITION 1 Z-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH



CHANNEL: H01ZG1 FILTER: CH. CLASS 1000 PEAK DATA: 446.40 G @ 3466.38 MS; -443.71 G @ 3465.63 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD POSITION 2 Y-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
See Data Acquisition Explanations
ACCELERATION (G)
120
80
40
0
-40
-80
-120
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: HD2YG1
FILTER: CH. CLASS 1000
PEAK DATA: 426.69 G @ 3650.00 MS; -427.42 G @ 3465.50 MS

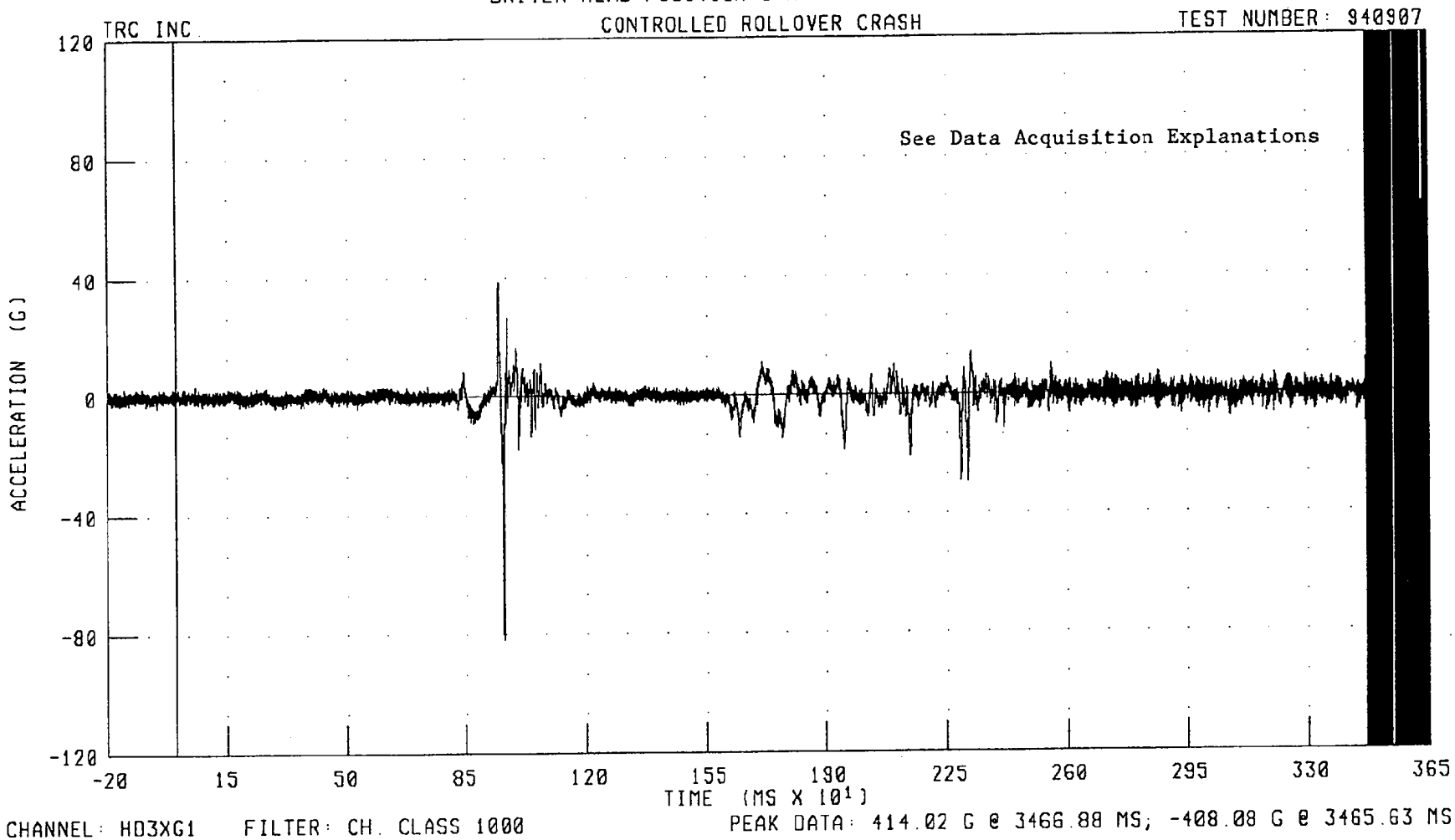
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD POSITION 2 Z-AXIS ACCELERATION



CHANNEL: H02ZG1 FILTER: CH. CLASS 1000

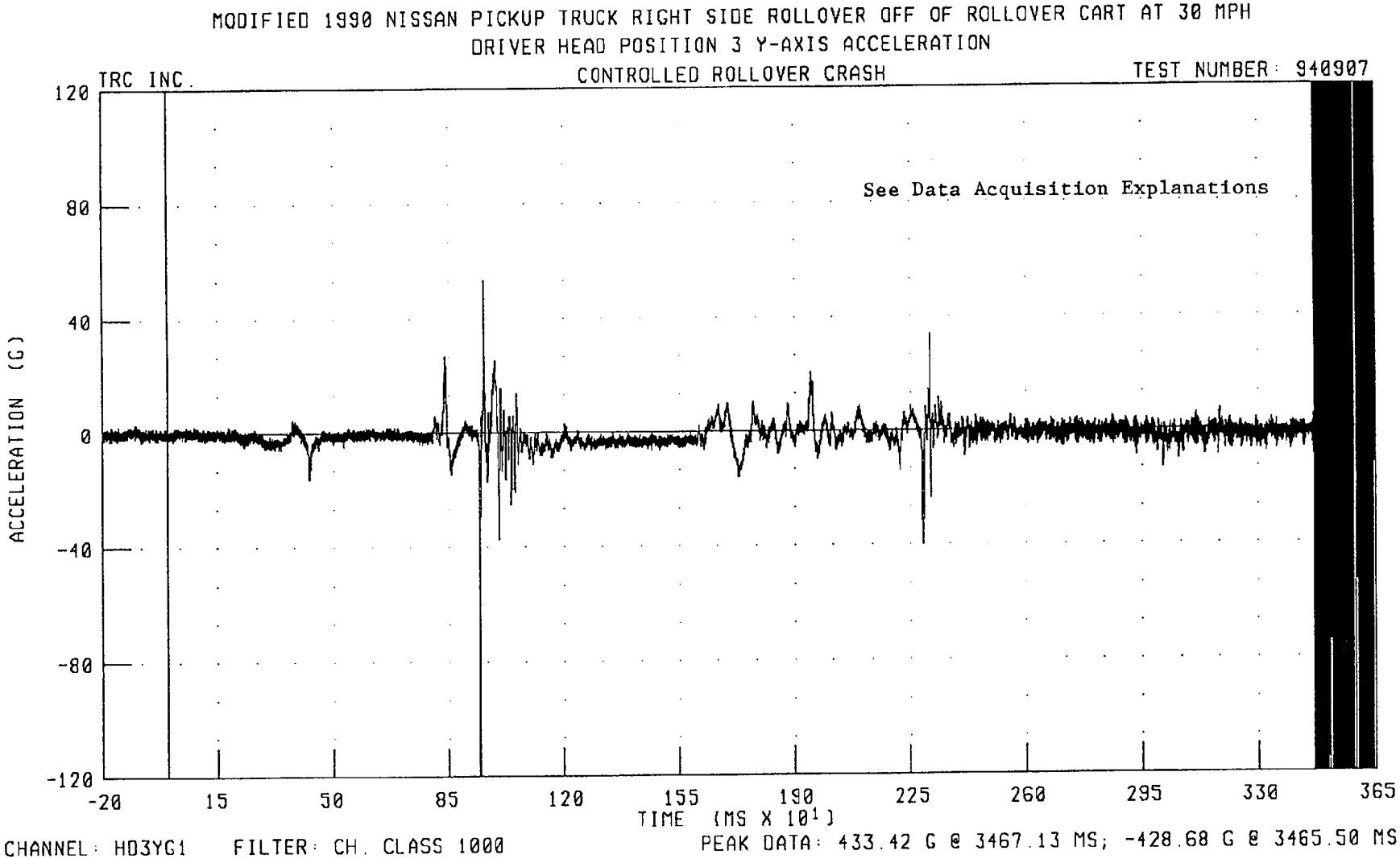
PEAK DATA: 435.02 G @ 3470.00 MS; -435.08 G @ 3465.63 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD POSITION 3 X-AXIS ACCELERATION

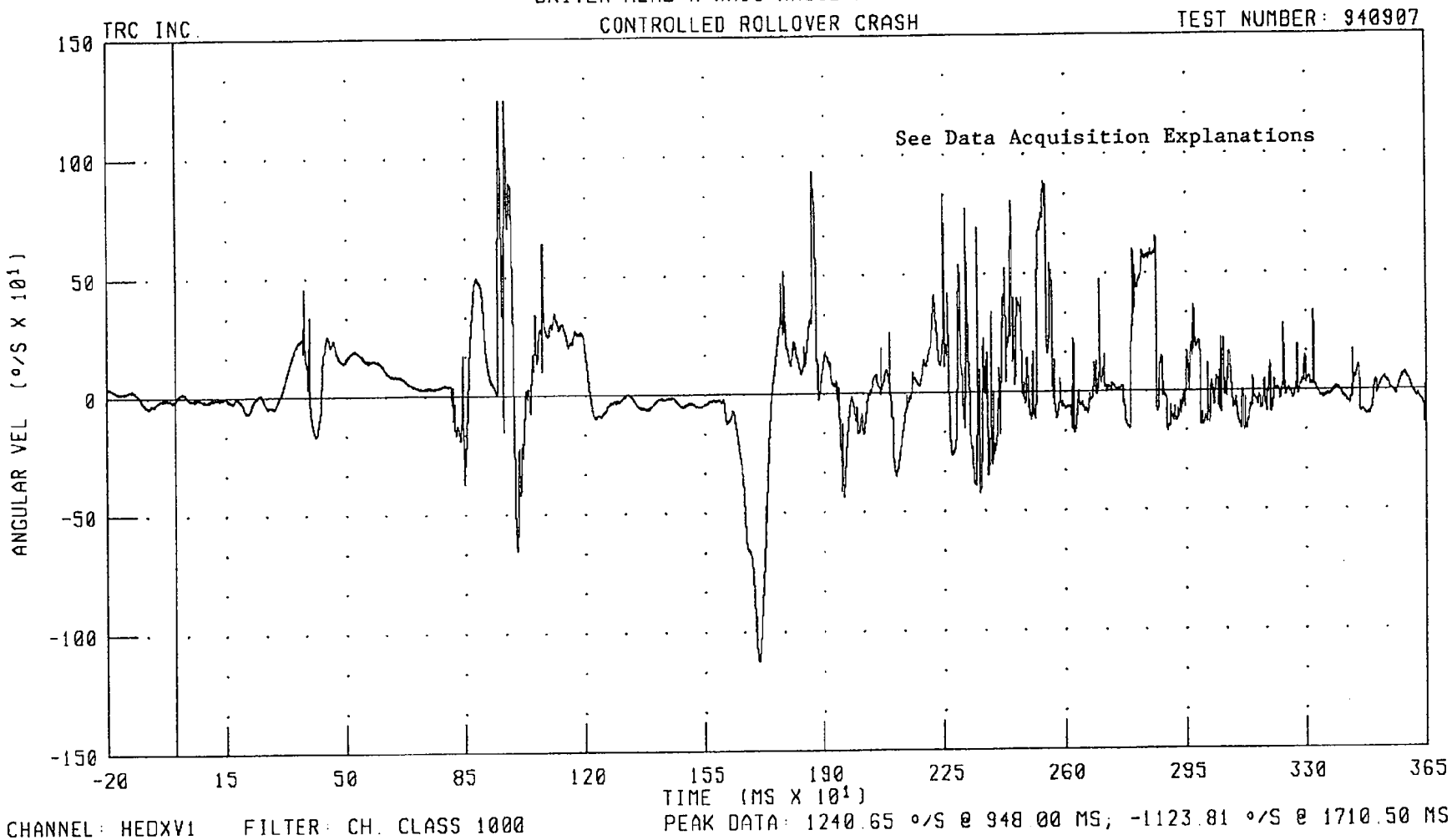


CHANNEL: H03XG1 FILTER: CH. CLASS 1000

PEAK DATA: 414.02 G @ 3466.88 MS; -408.08 G @ 3465.63 MS

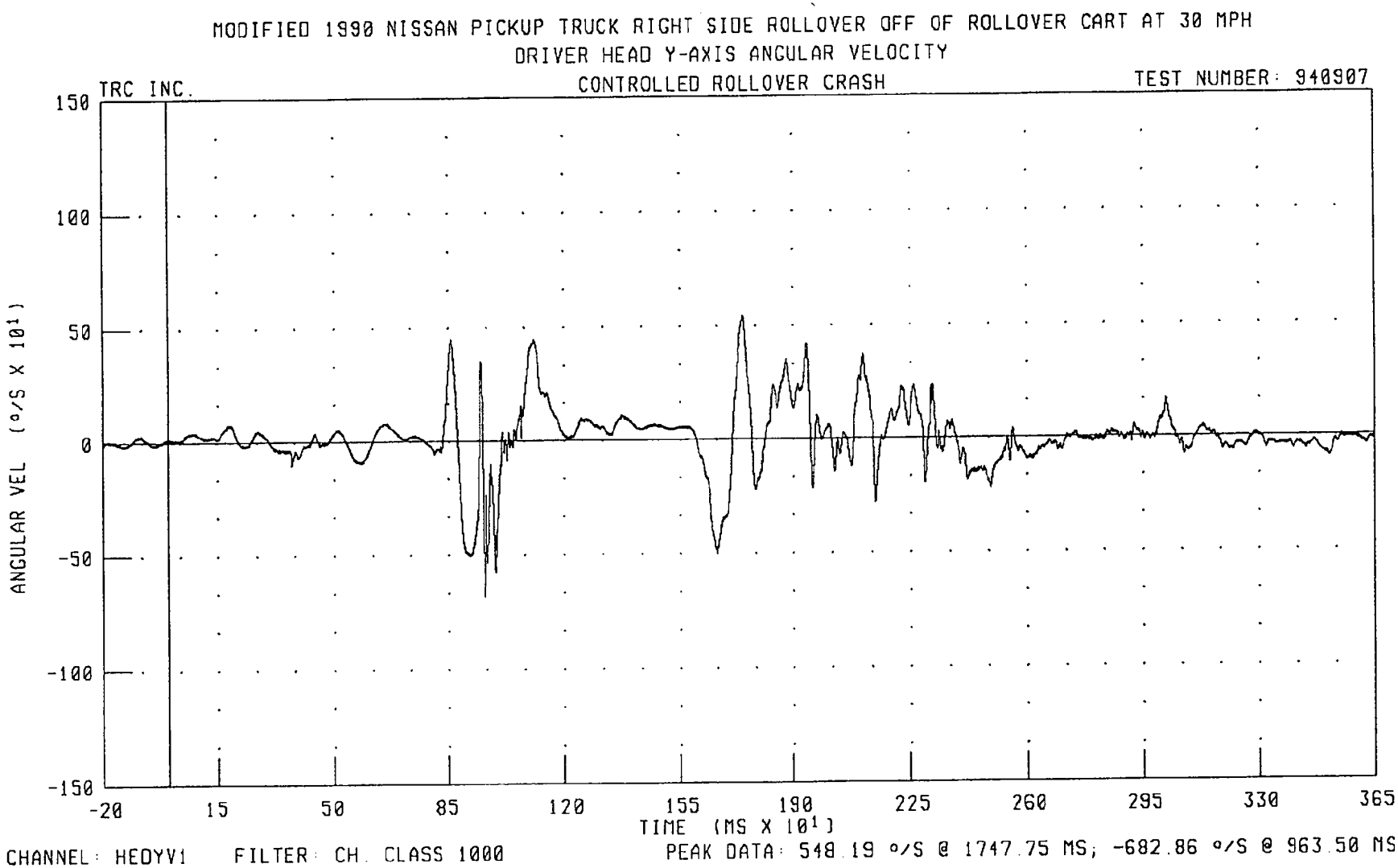

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD POSITION 3 Y-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
See Data Acquisition Explanations
ACCELERATION (G)
120
80
40
0
-40
-80
-120
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: H03YG1
FILTER: CH. CLASS 1000
PEAK DATA: 433.42 G @ 3467.13 MS; -428.68 G @ 3465.50 MS

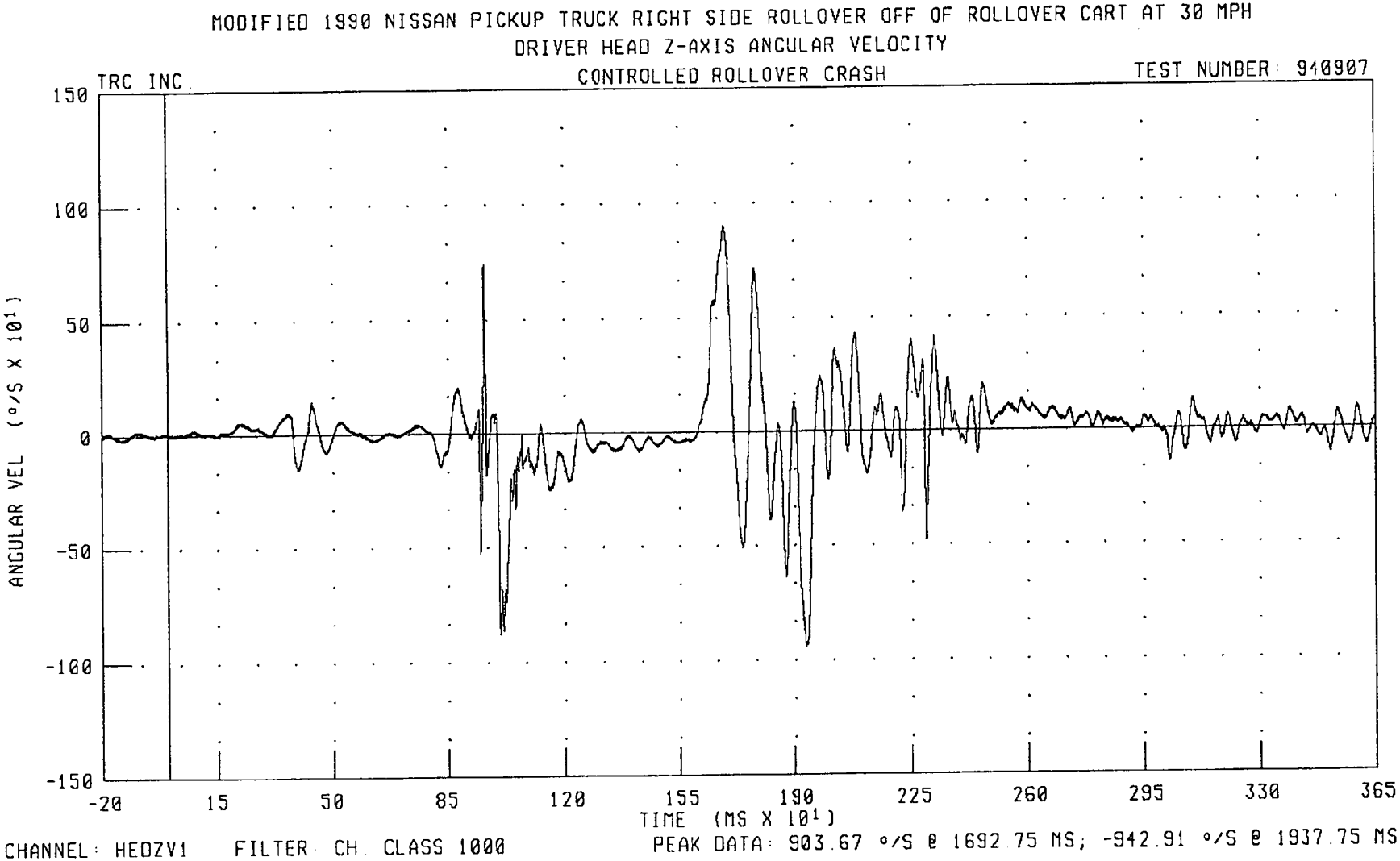
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD X-AXIS ANGULAR VELOCITY
CONTROLLED ROLLOVER CRASH



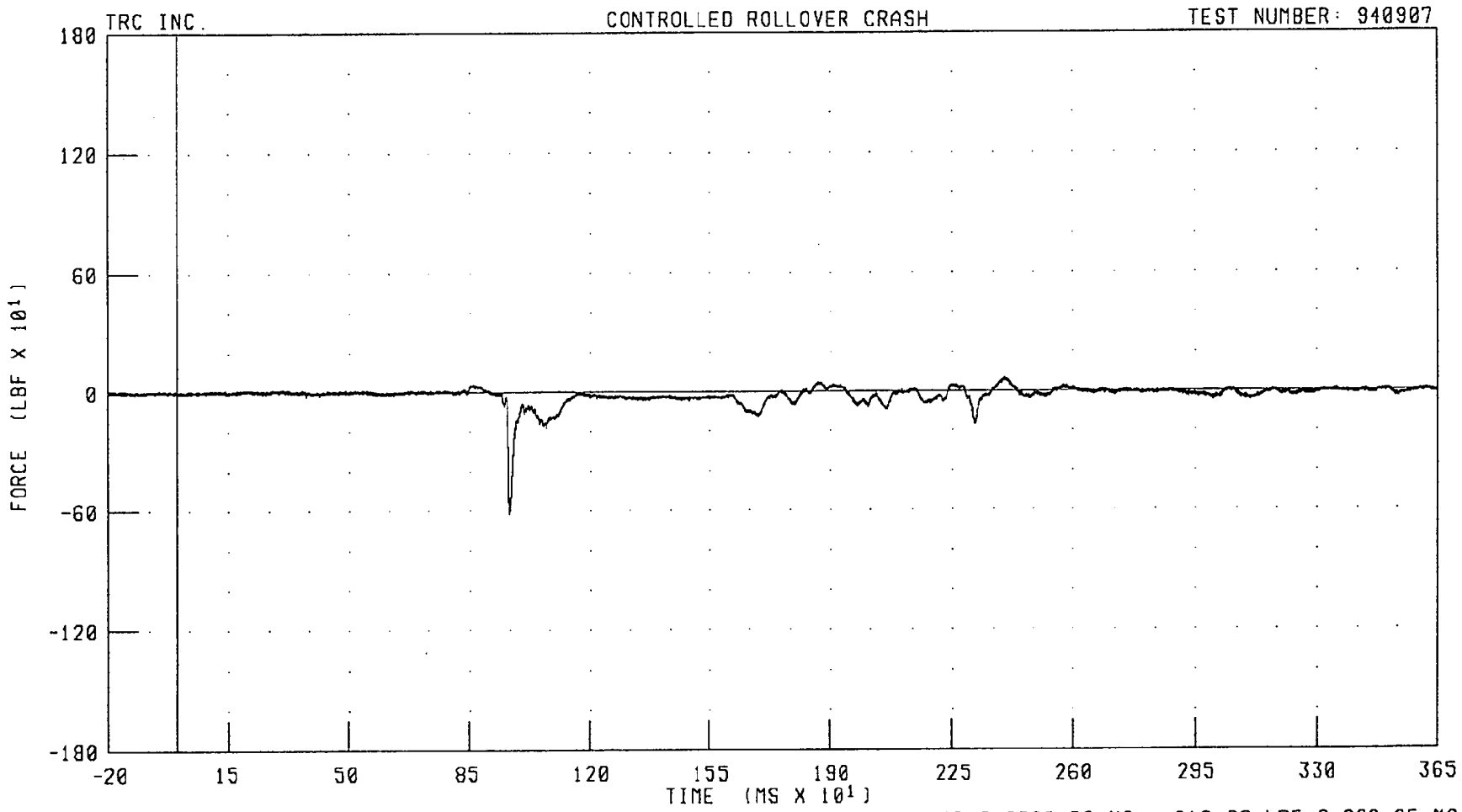
CHANNEL: HEDXV1 FILTER: CH. CLASS 1000

PEAK DATA: 1240.65 °/S @ 948.00 MS; -1123.81 °/S @ 1710.50 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD Y-AXIS ANGULAR VELOCITY
TRC INC.
CONTROLLED ROLLOVER CRASH
TEST NUMBER: 940907
ANGULAR VEL (°/S X 10¹)
150
100
50
0
-50
-100
-150
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: HEDYV1
FILTER: CH. CLASS 1000
PEAK DATA: 548.19 °/S @ 1747.75 MS; -682.86 °/S @ 963.50 MS

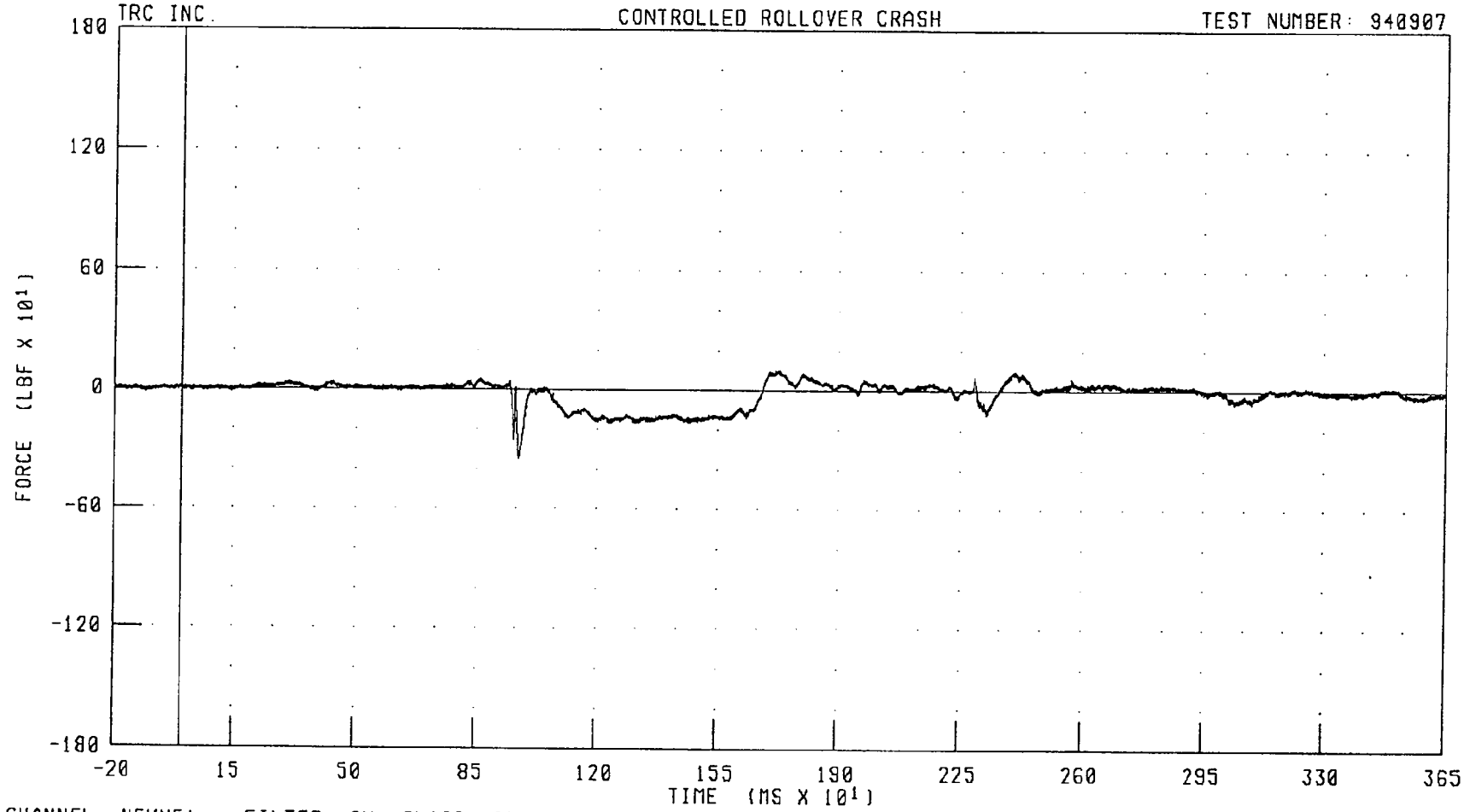

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER HEAD Z-AXIS ANGULAR VELOCITY
CONTROLLED ROLLOVER CRASH
TRC INC
TEST NUMBER: 940907
ANGULAR VEL (°/S X 10¹)
150
100
50
0
-50
-100
-150
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: HEDZV1
FILTER: CH. CLASS 1000
PEAK DATA: 903.67 °/S @ 1692.75 MS; -942.91 °/S @ 1937.75 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER NECK X-AXIS SHEAR FORCE



CHANNEL: NEKXF1 FILTER: CH. CLASS 1000 PEAK DATA: 70.34 LBF @ 2399.38 MS; -619.06 LBF @ 966.25 MS

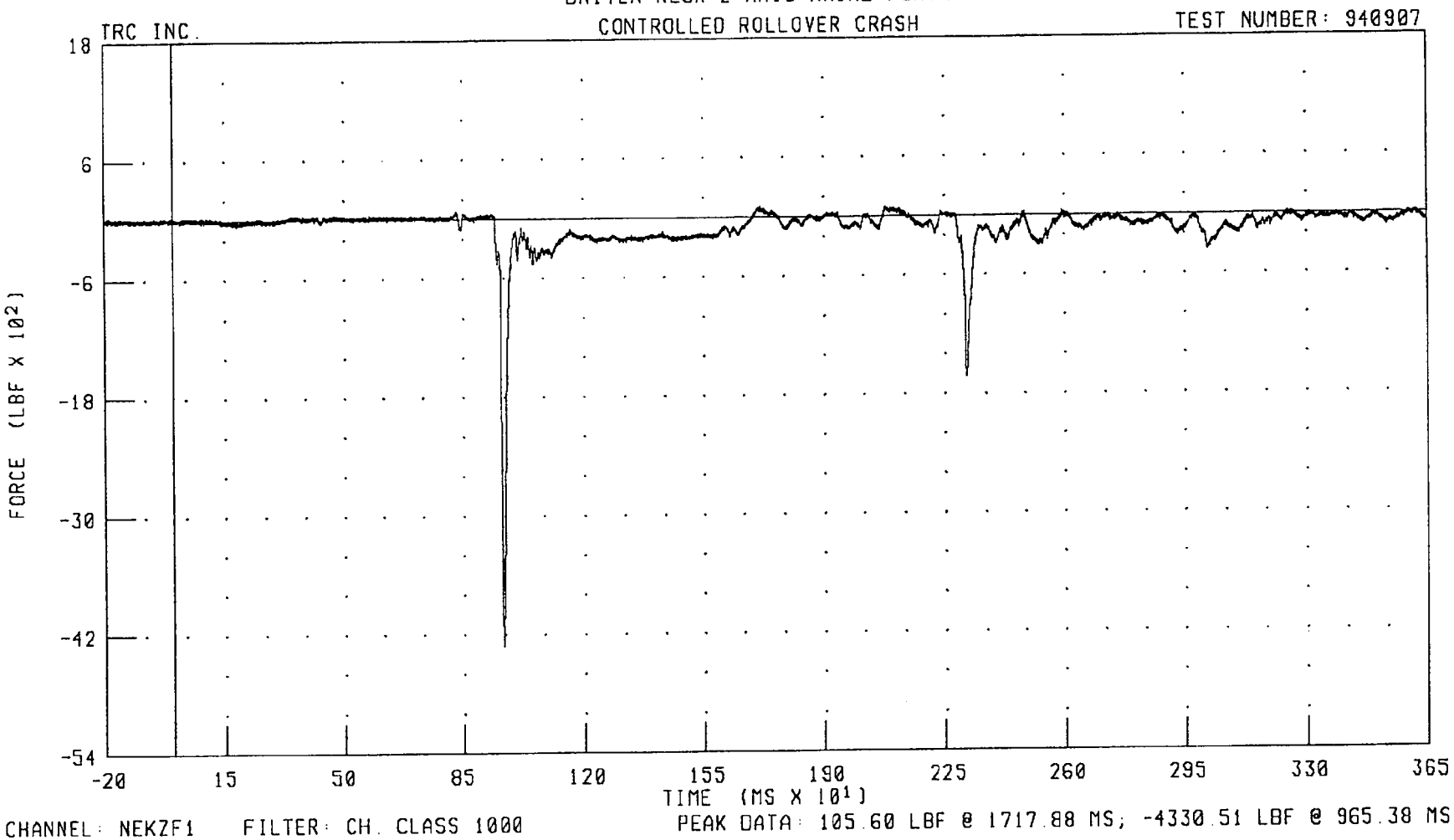
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER NECK Y-AXIS SHEAR FORCE



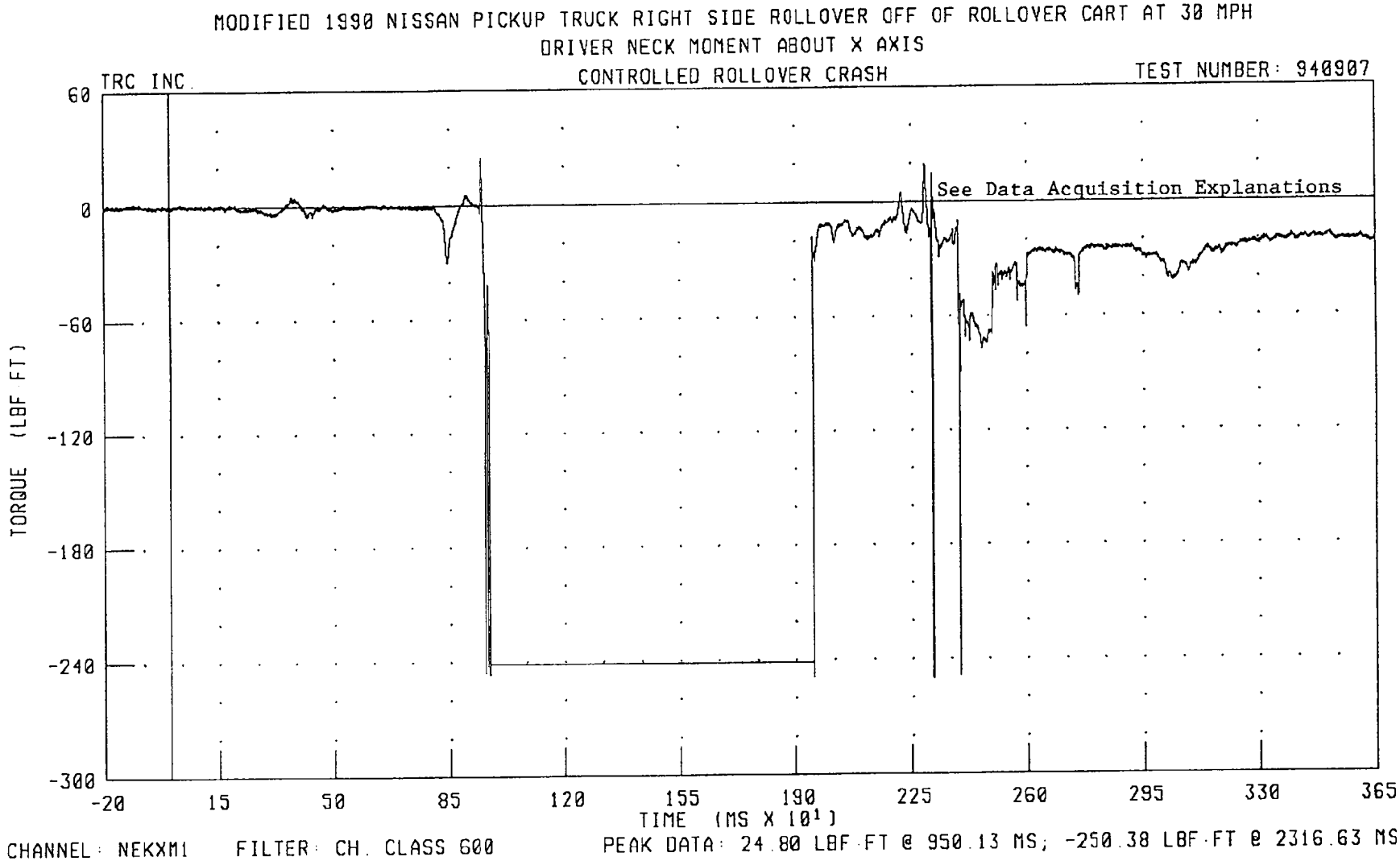
CHANNEL: NEKYF1 FILTER: CH CLASS 1000

PEAK DATA: 102.52 LBF @ 1729.13 MS; -351.73 LBF @ 975.38 MS

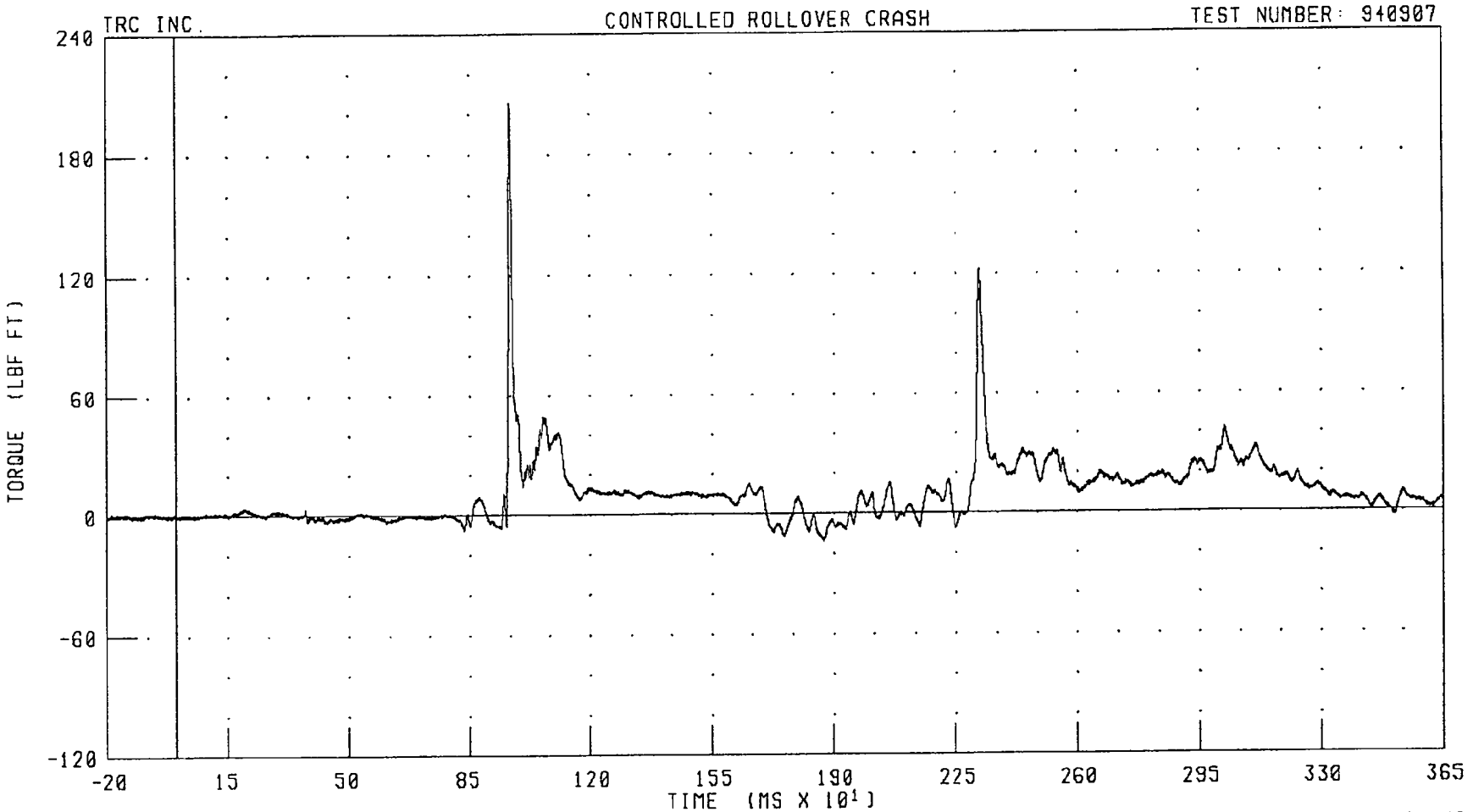
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER NECK Z-AXIS AXIAL FORCE
CONTROLLED ROLLOVER CRASH



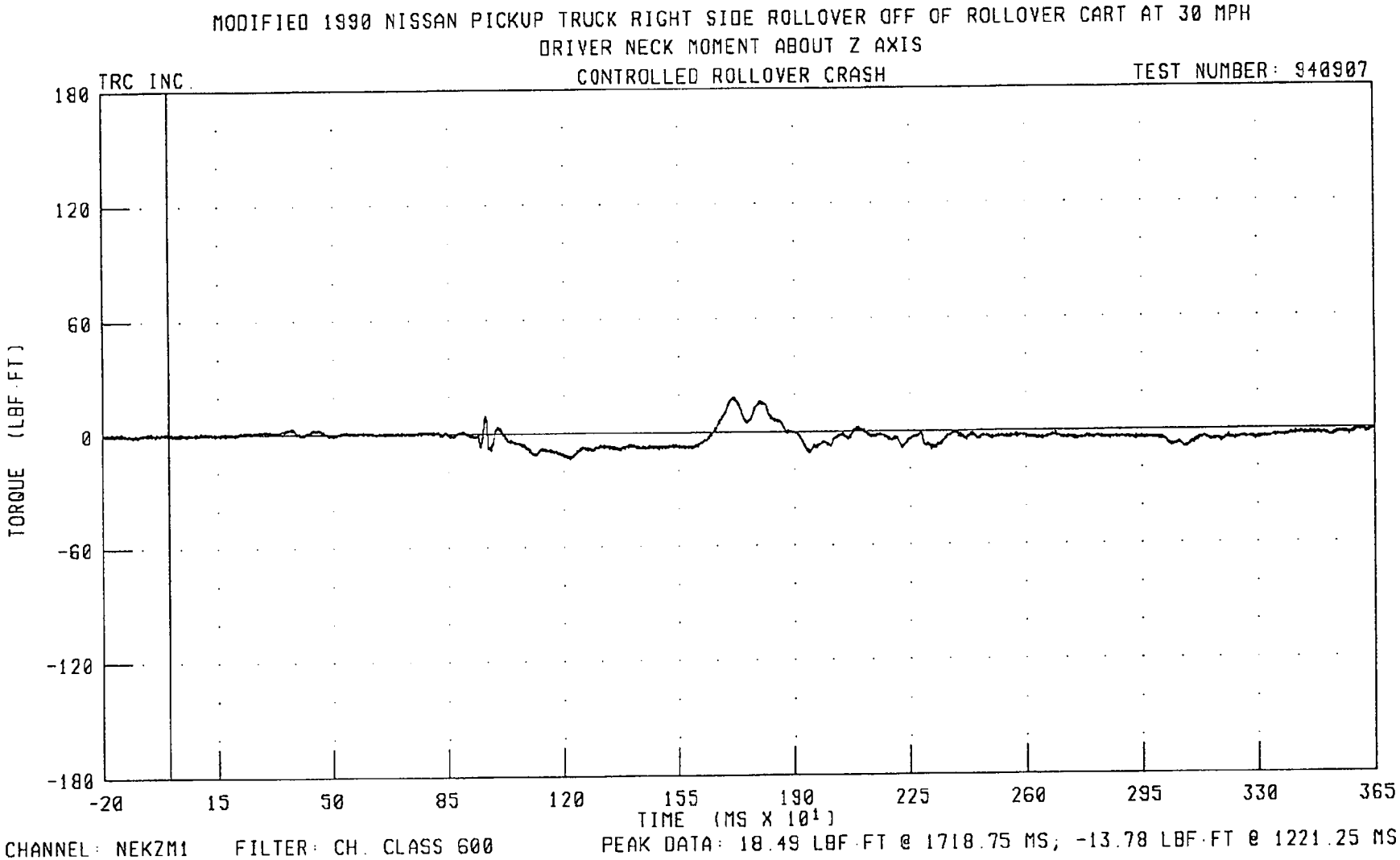
CHANNEL: NEKZF1 FILTER: CH. CLASS 1000
PEAK DATA: 105.60 LBF @ 1717.88 MS; -4330.51 LBF @ 965.38 MS

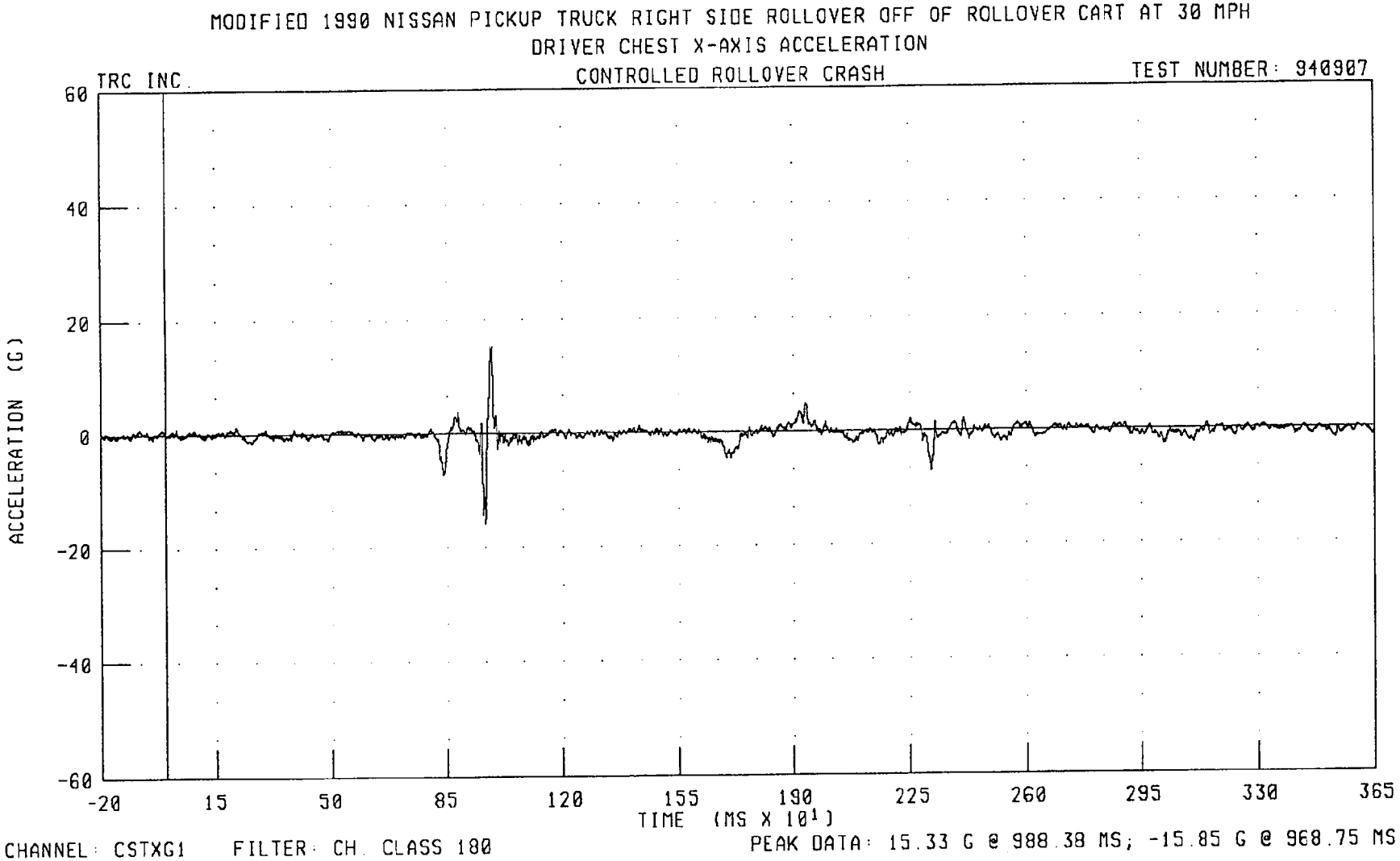

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER NECK MOMENT ABOUT X AXIS
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
See Data Acquisition Explanations
TORQUE (LBF FT)
60
0
-60
-120
-180
-240
-300
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: NEKXM1
FILTER: CH. CLASS 600
PEAK DATA: 24.80 LBF-FT @ 950.13 MS; -250.38 LBF-FT @ 2316.63 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER NECK MOMENT ABOUT Y AXIS
CONTROLLED ROLLOVER CRASH

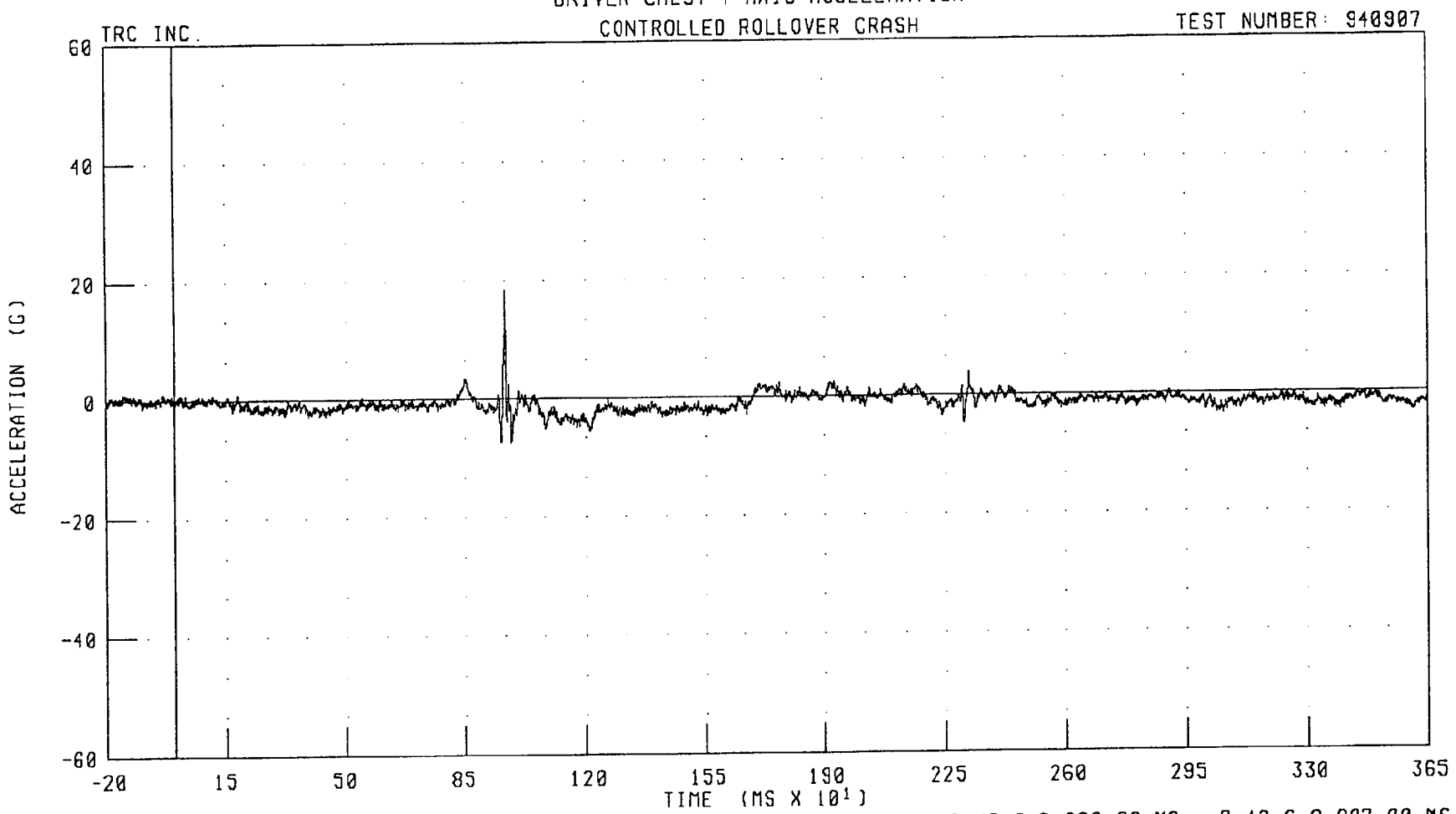


CHANNEL: NEKYM1 FILTER: CH. CLASS 600 PEAK DATA: 205.65 LBF-FT @ 969.63 MS; -14.15 LBF-FT @ 1871.88 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER NECK MOMENT ABOUT Z AXIS
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
180
120
60
0
-60
-120
-180
TORQUE (LBF-FT)
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: NEKZM1
FILTER: CH. CLASS 600
PEAK DATA: 18.49 LBF-FT @ 1718.75 MS; -13.78 LBF-FT @ 1221.25 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER CHEST X-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: CSTXG1
FILTER: CH. CLASS 180
PEAK DATA: 15.33 G @ 988.38 MS; -15.85 G @ 968.75 MS

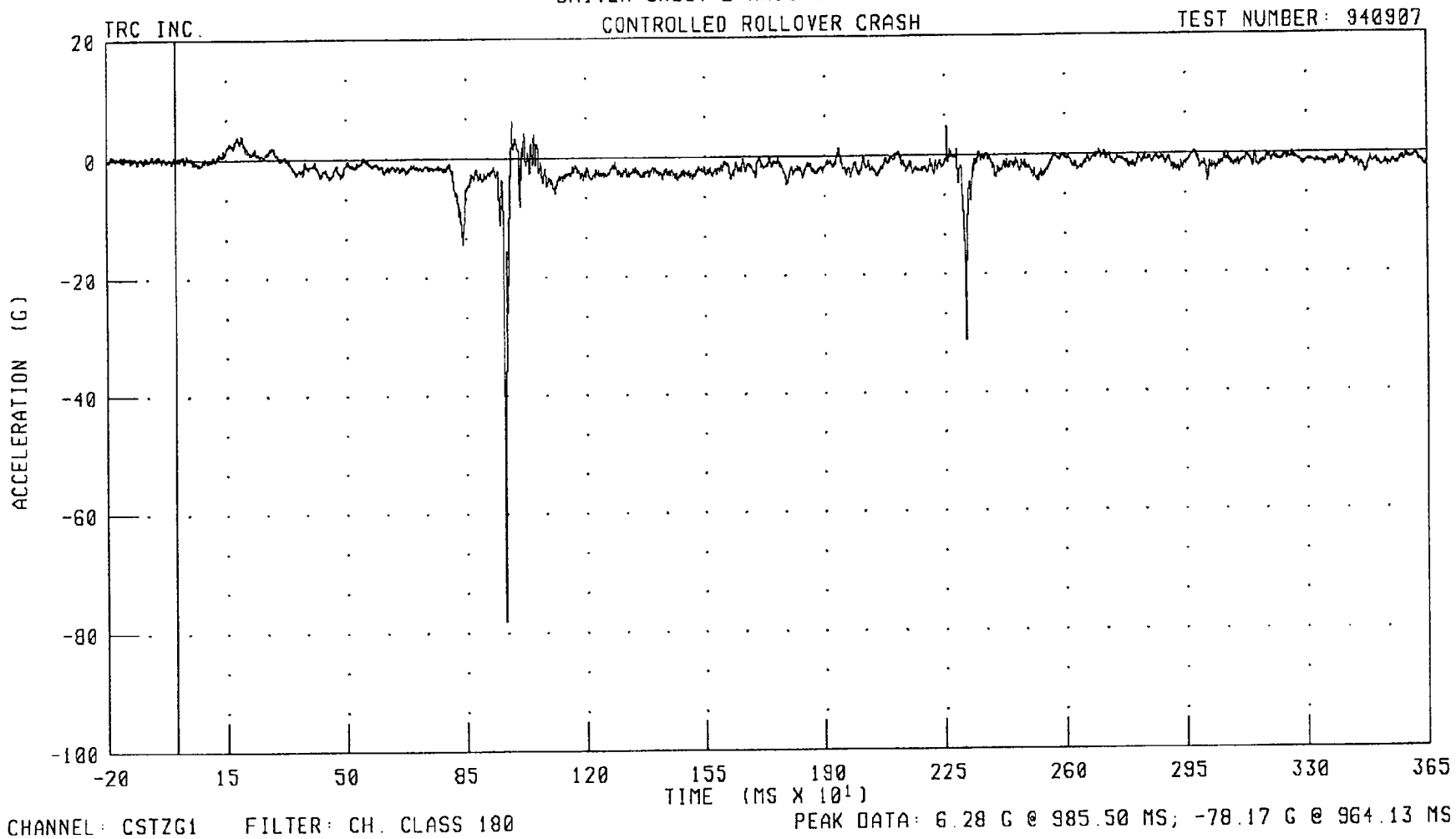
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER CHEST Y-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH



CHANNEL: CSTYG1 FILTER: CH CLASS 180

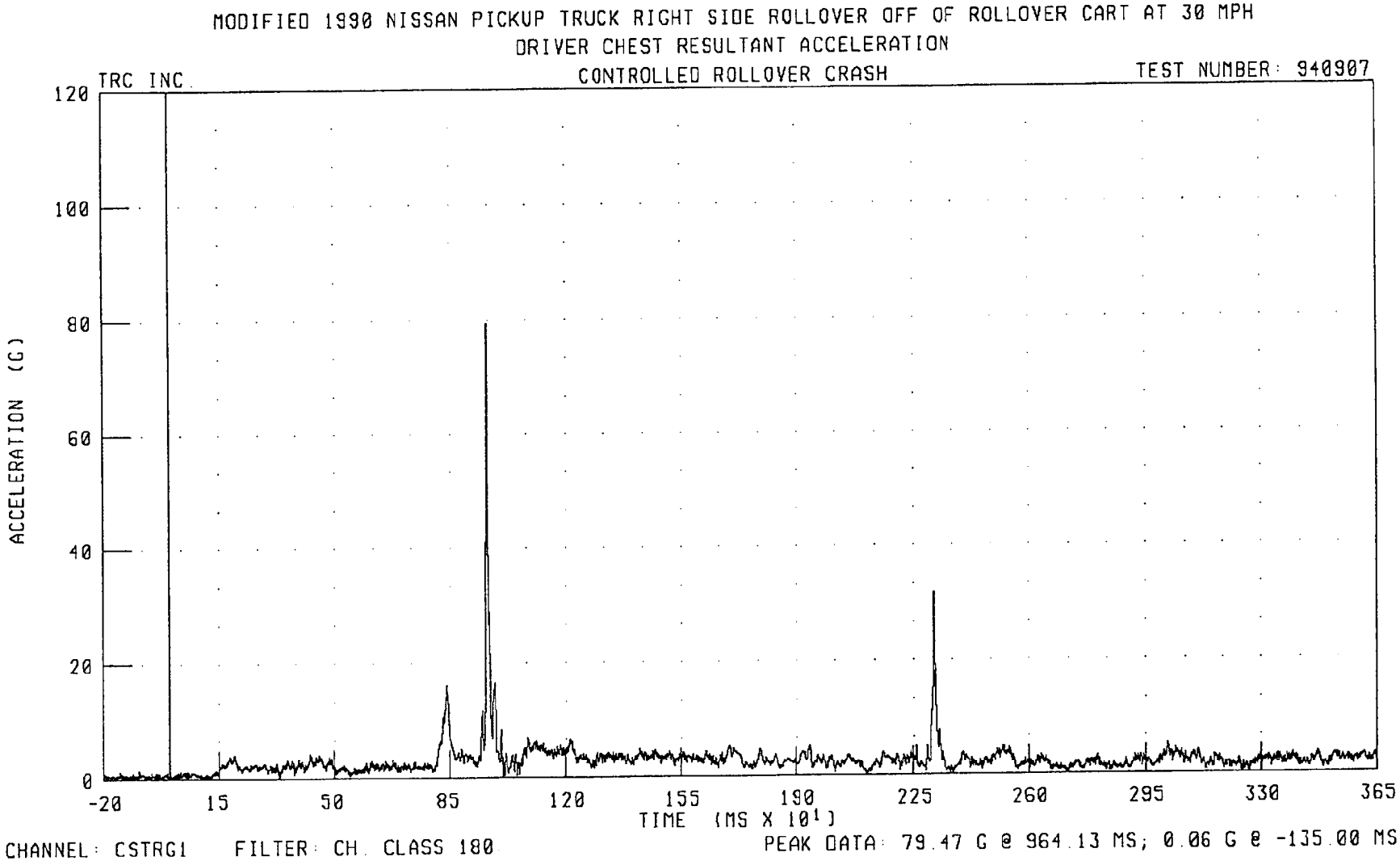
PEAK DATA: 18.43 G @ 968.88 MS; -7.42 G @ 987.00 MS

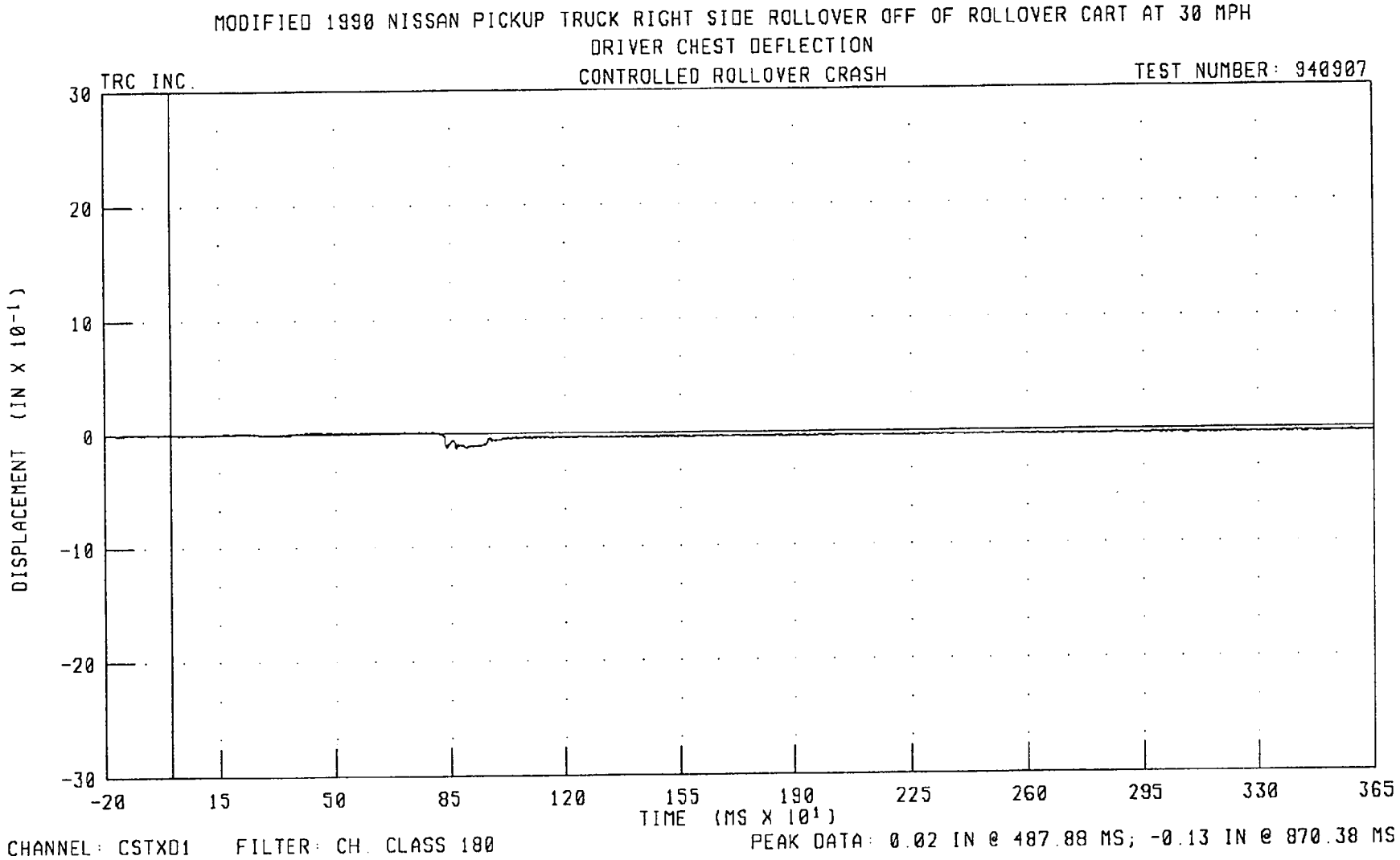
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER CHEST Z-AXIS ACCELERATION



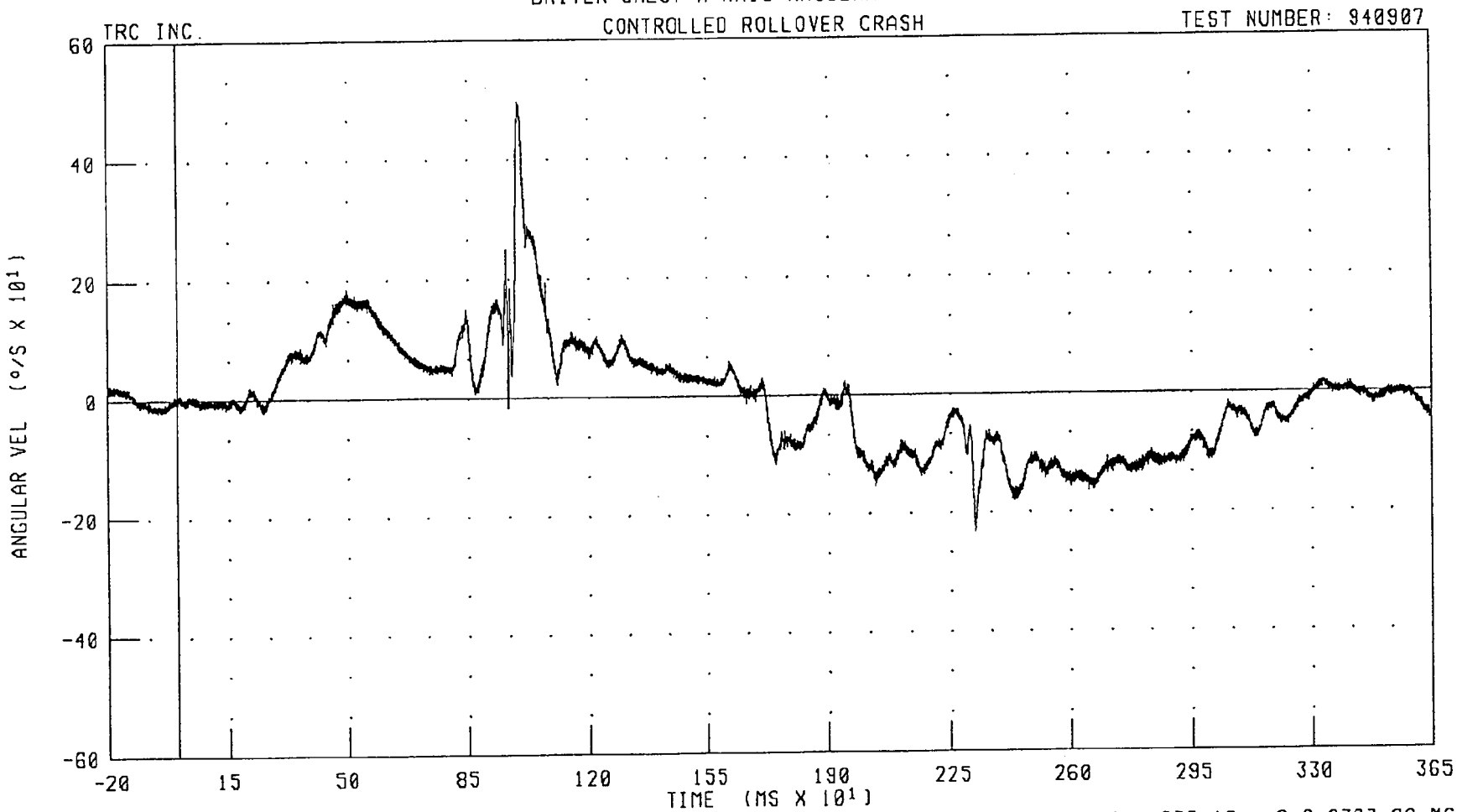
CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 6.28 G @ 985.50 MS; -78.17 G @ 964.13 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER CHEST RESULTANT ACCELERATION
TRC INC.
CONTROLLED ROLLOVER CRASH
TEST NUMBER: 940907
ACCELERATION (G)
120
100
80
60
40
20
0
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: CSTRG1
FILTER: CH. CLASS 180
PEAK DATA: 79.47 G @ 964.13 MS; 0.06 G @ -135.00 MS

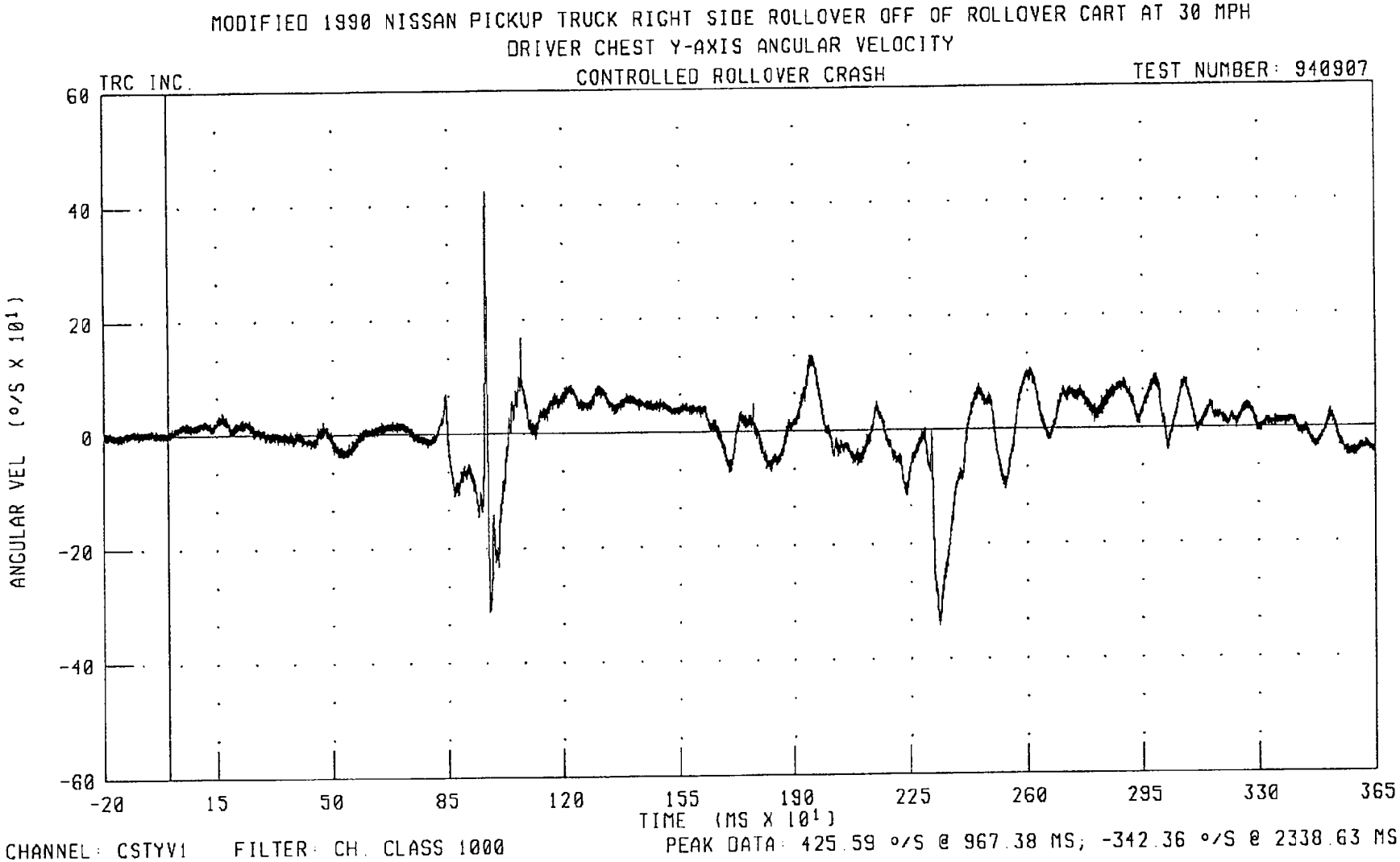

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER CHEST DEFLECTION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
DISPLACEMENT (IN X 10⁻¹)
30
20
10
0
-10
-20
-30
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: CSTXD1
FILTER: CH. CLASS 180
PEAK DATA: 0.02 IN @ 487.88 MS; -0.13 IN @ 870.38 MS

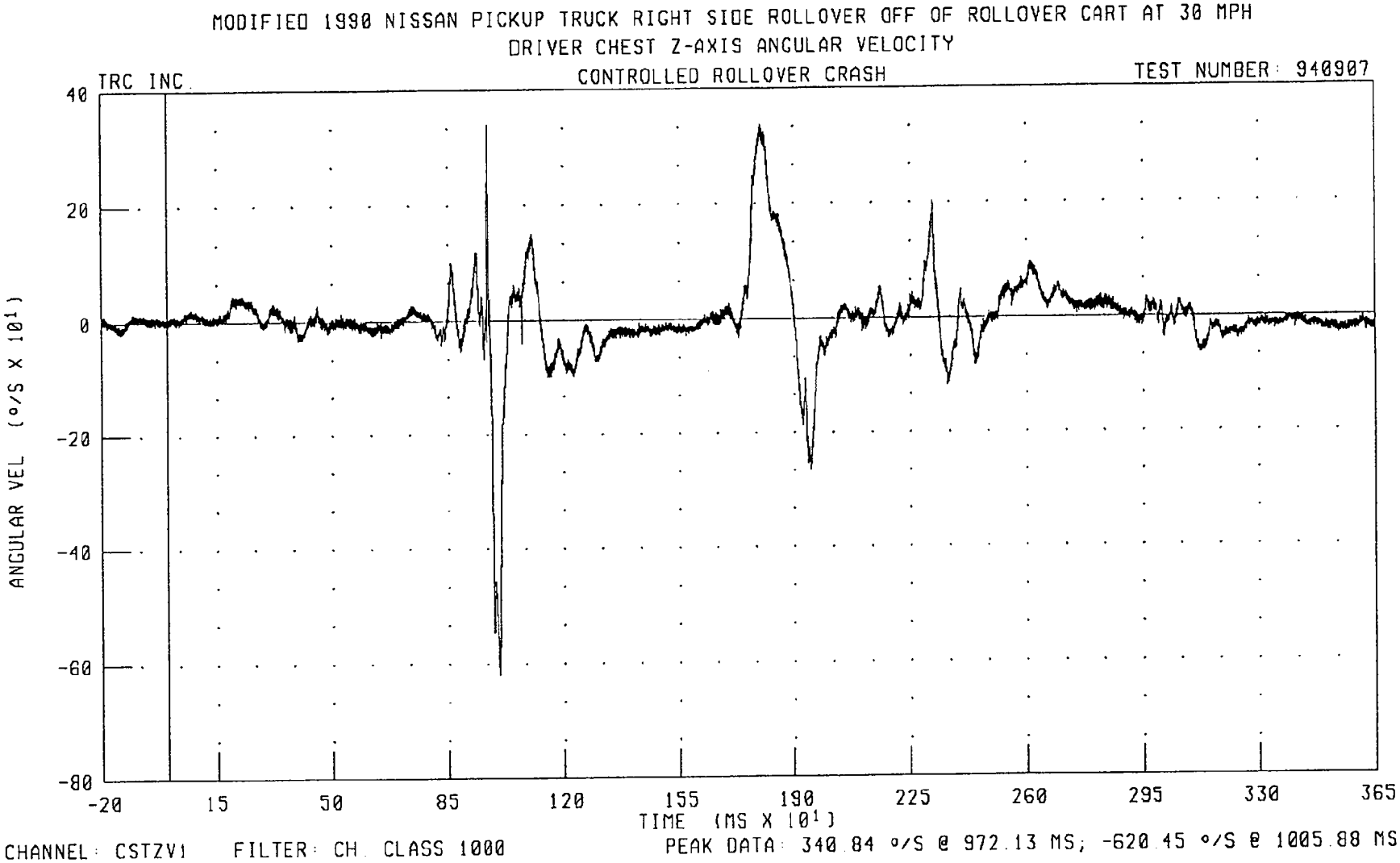
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER CHEST X-AXIS ANGULAR VELOCITY
CONTROLLED ROLLOVER CRASH

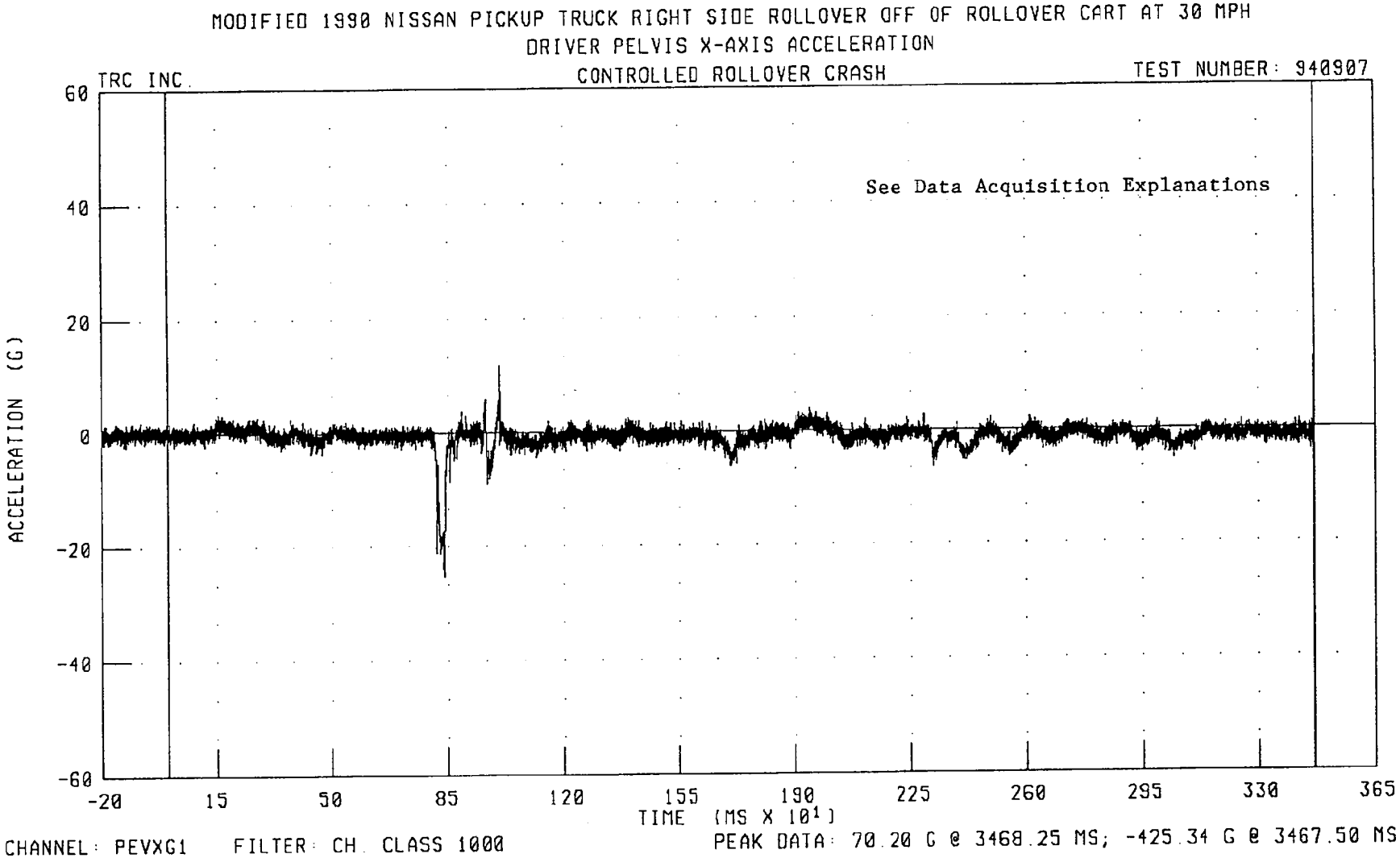


CHANNEL: CSTXV1 FILTER: CH. CLASS 1000

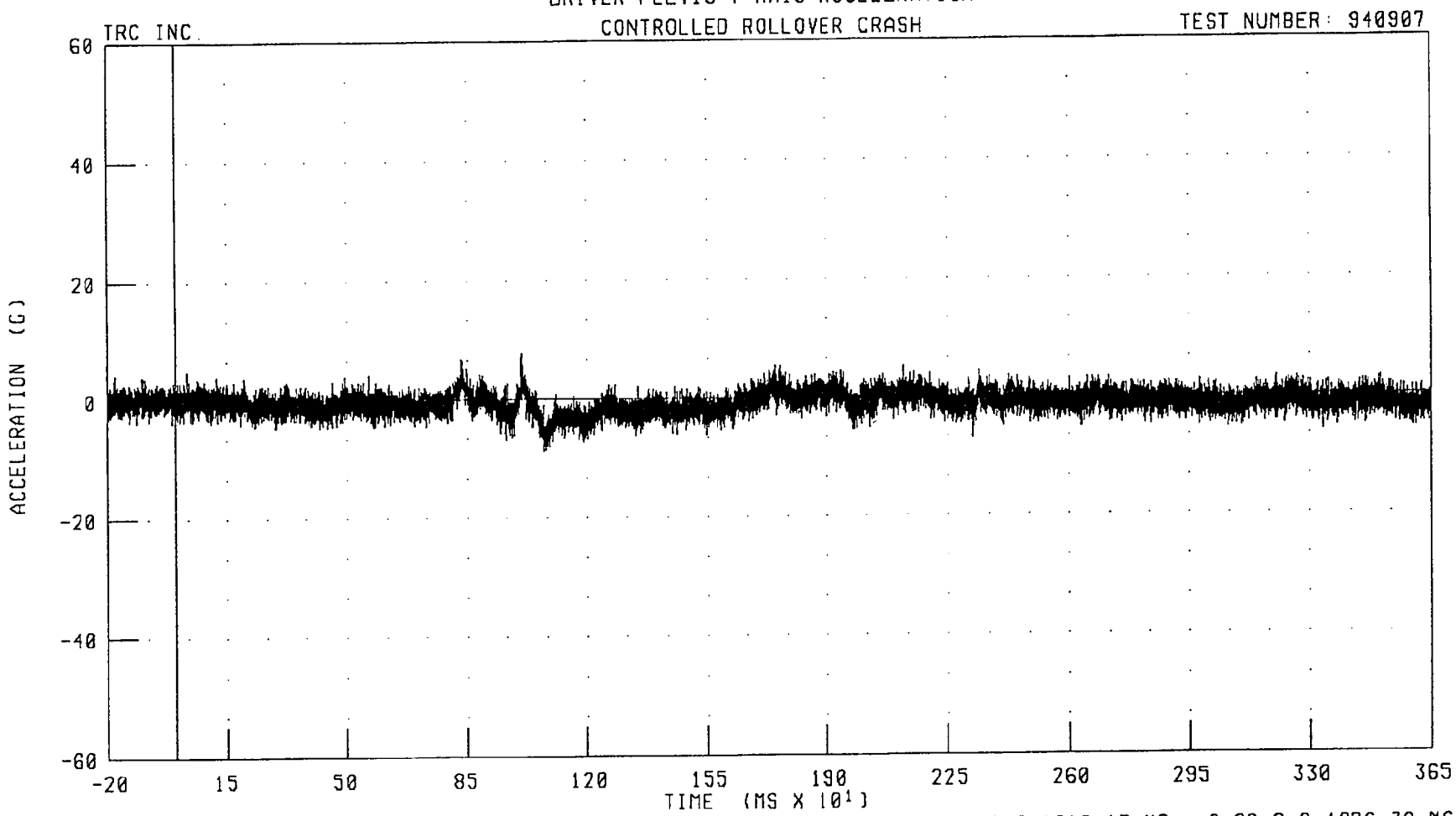
PEAK DATA: 496.54 °/S @ 999.13 MS; -233.10 °/S @ 2323.88 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER CHEST Y-AXIS ANGULAR VELOCITY
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
ANGULAR VEL (°/S X 10¹)
60
40
20
0
-20
-40
-60
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: CSTYV1
FILTER: CH. CLASS 1000
PEAK DATA: 425.59 °/S @ 967.38 MS; -342.36 °/S @ 2338.63 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER CHEST Z-AXIS ANGULAR VELOCITY
TRC INC.
CONTROLLED ROLLOVER CRASH
TEST NUMBER: 940907
ANGULAR VEL (°/S X 10¹)
40
20
0
-20
-40
-60
-80
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: CSTZV1
FILTER: CH CLASS 1000
PEAK DATA: 340.84 °/S @ 972.13 MS; -620.45 °/S @ 1005.88 MS

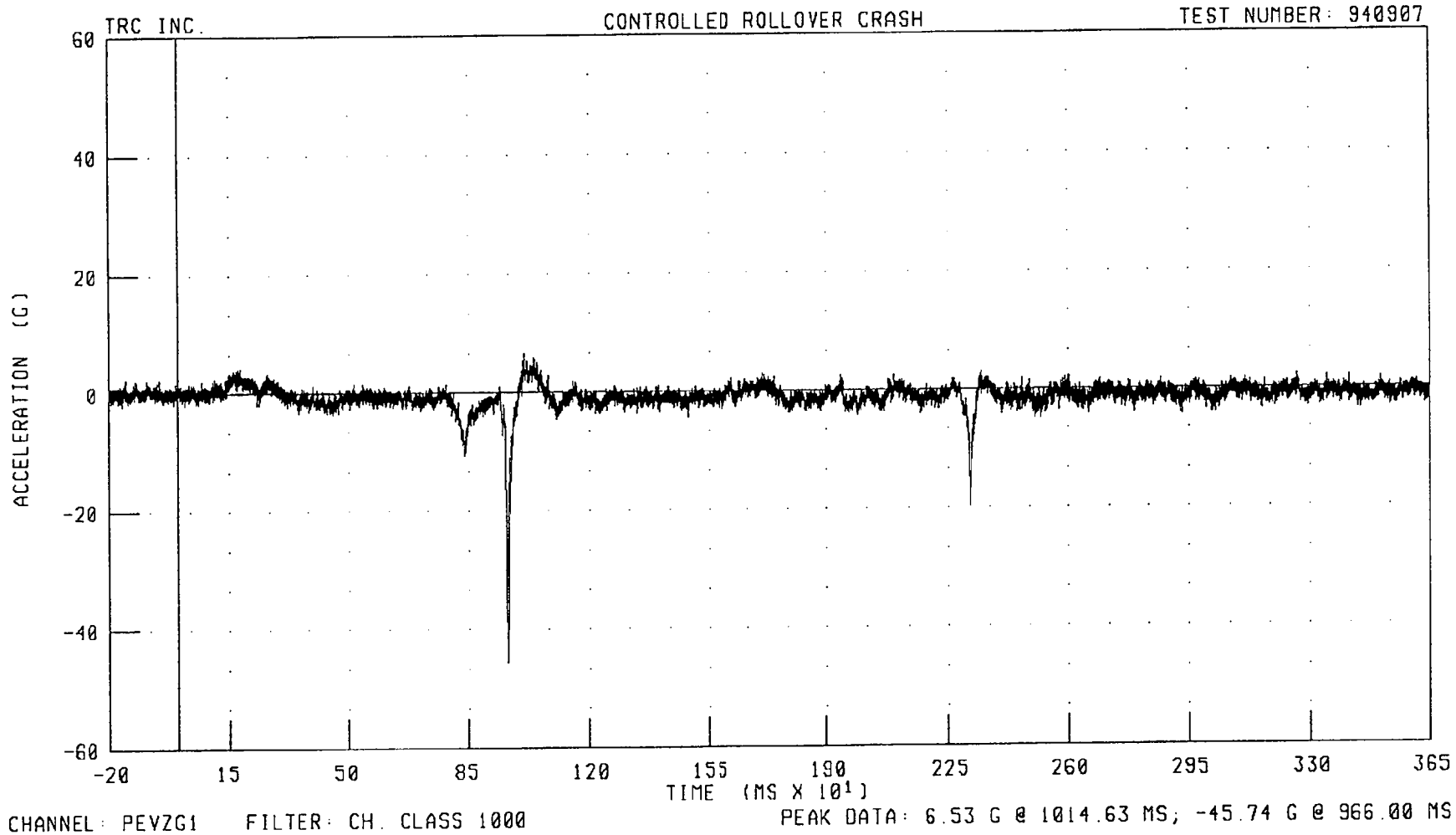

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER PELVIS X-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
See Data Acquisition Explanations
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: PEVXG1
FILTER: CH. CLASS 1000
PEAK DATA: 70.20 G @ 3468.25 MS; -425.34 G @ 3467.50 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER PELVIS Y-AXIS ACCELERATION

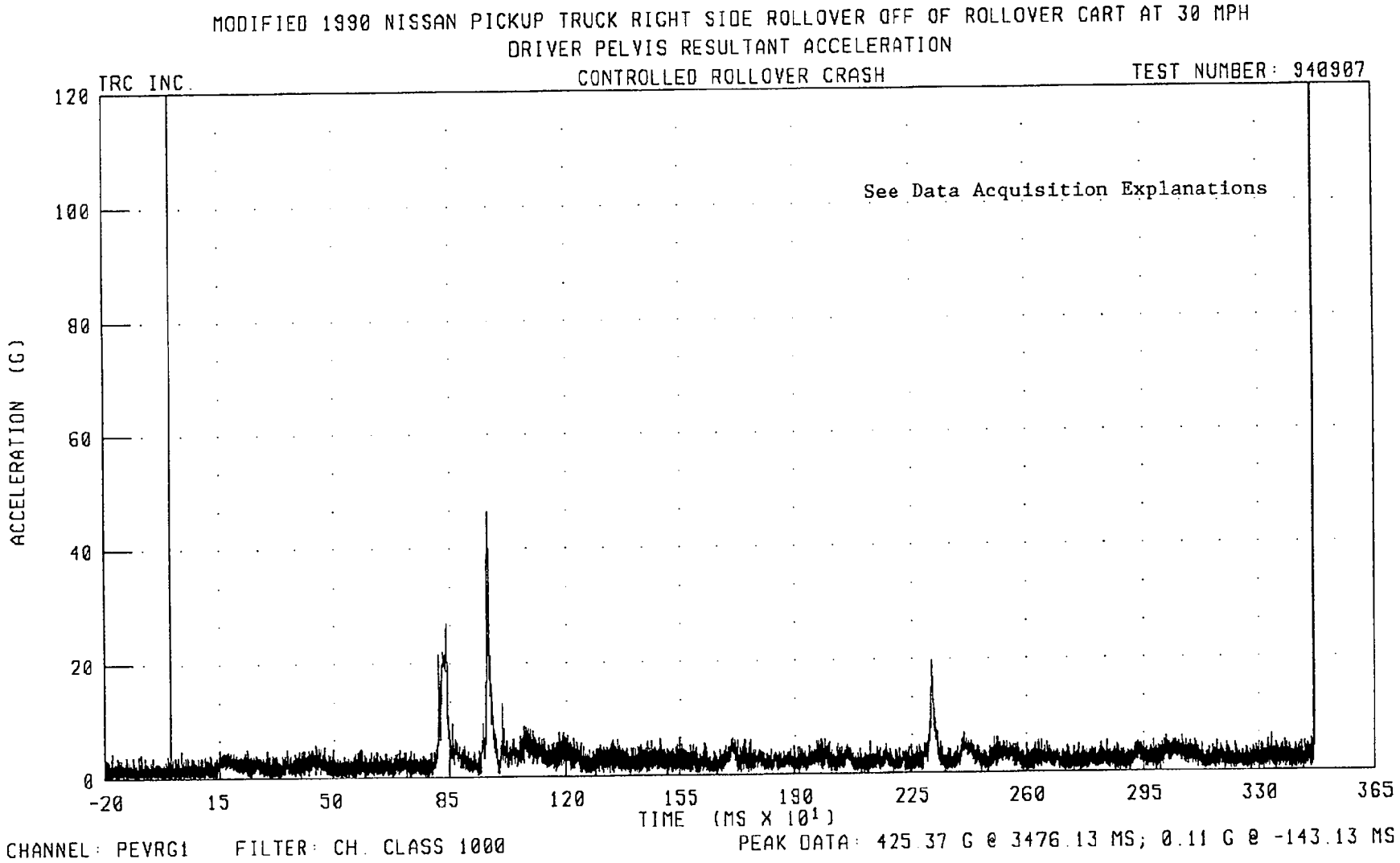


CHANNEL: PEVYG1 FILTER: CH. CLASS 1000 PEAK DATA: 7.76 G @ 1012.13 MS; -8.80 G @ 1076.38 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER PELVIS Z-AXIS ACCELERATION



CHANNEL: PEVZG1 FILTER: CH. CLASS 1000 PEAK DATA: 6.53 G @ 1014.63 MS; -45.74 G @ 966.00 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER PELVIS RESULTANT ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
See Data Acquisition Explanations
ACCELERATION (G)
120
100
80
60
40
20
0
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: PEVRG1
FILTER: CH. CLASS 1000
PEAK DATA: 425.37 G @ 3476.13 MS; 0.11 G @ -143.13 MS

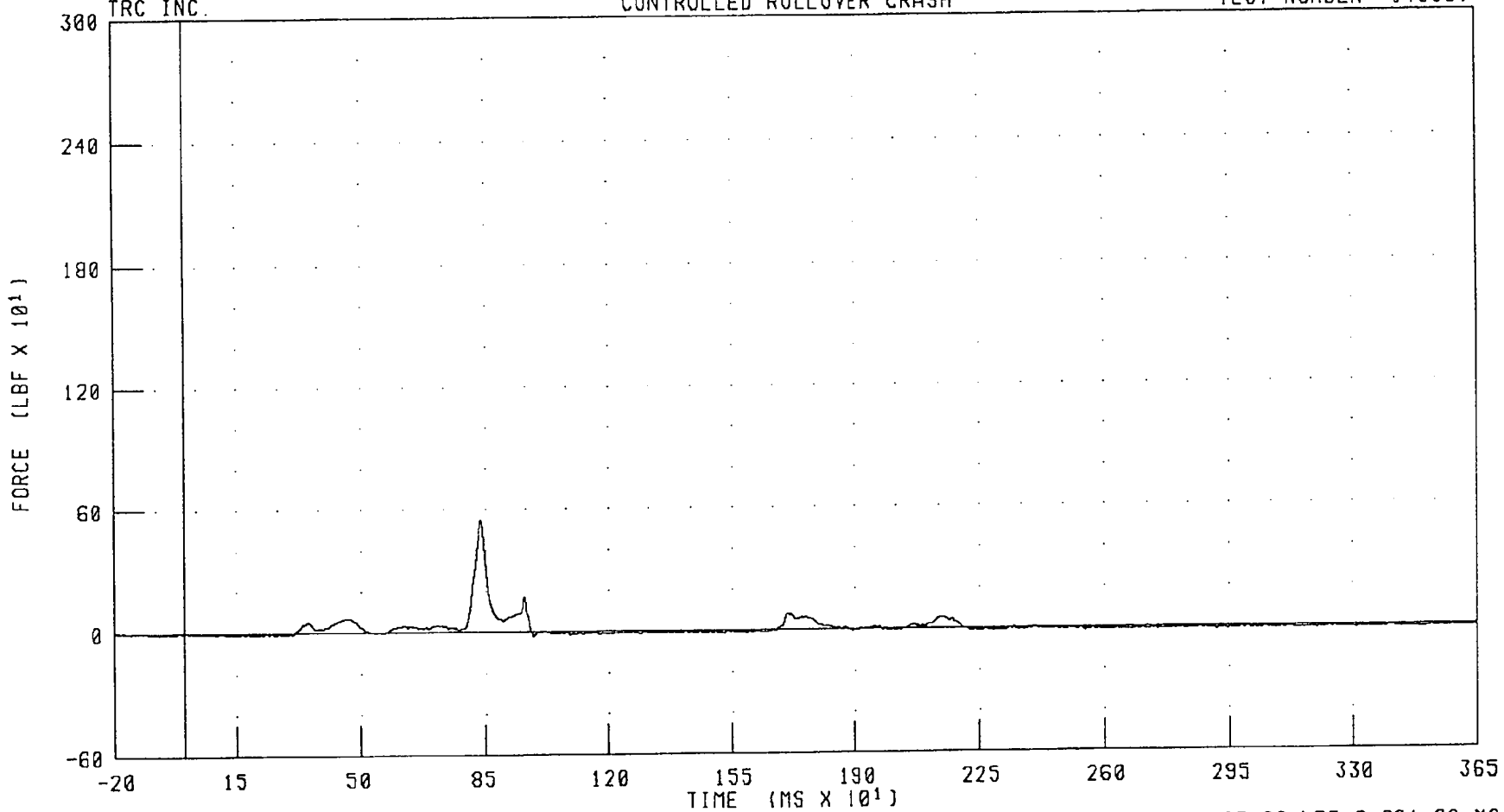
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH

DRIVER LAP BELT FORCE

CONTROLLED ROLLOVER CRASH

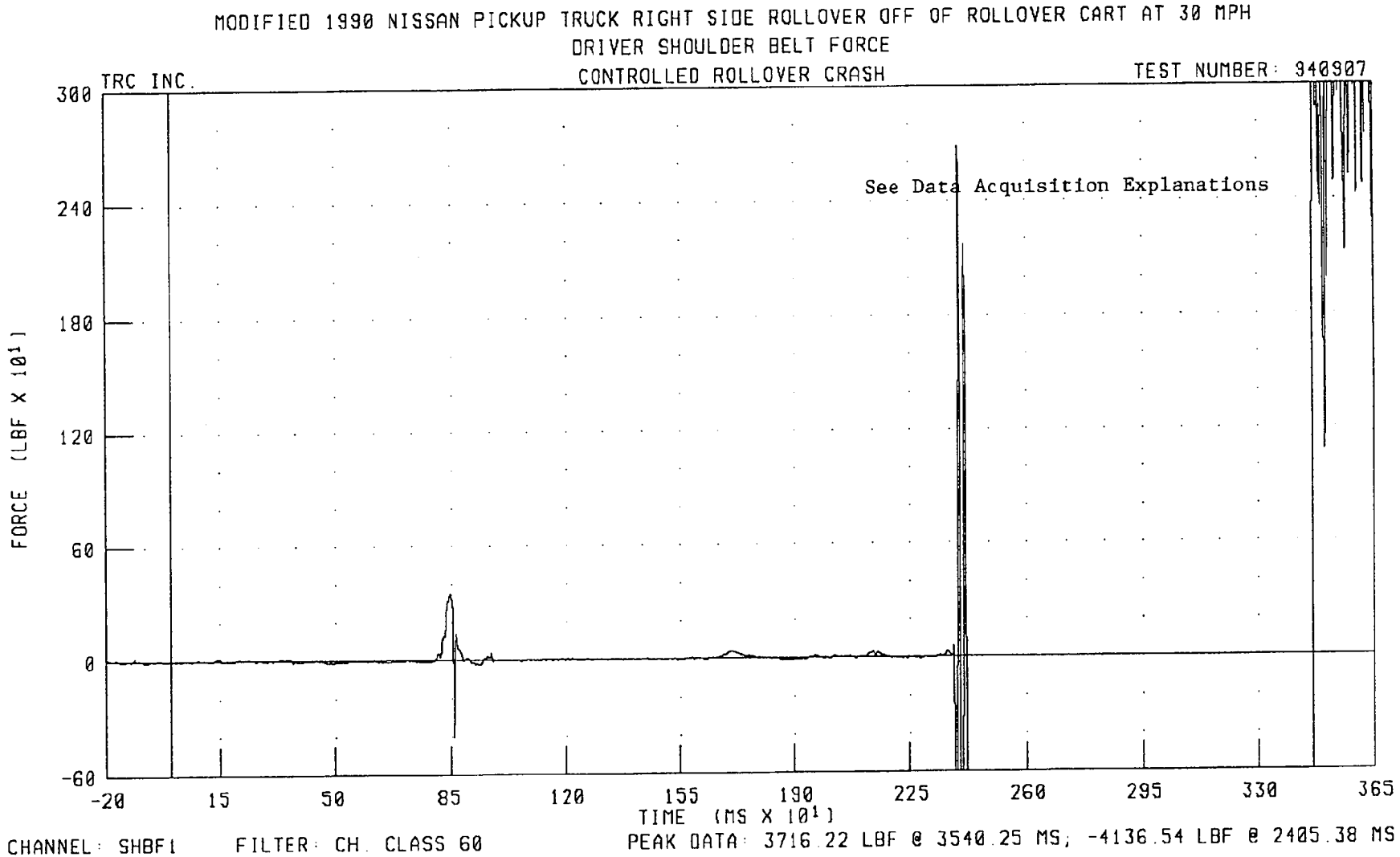
TRC INC.

TEST NUMBER: 940907

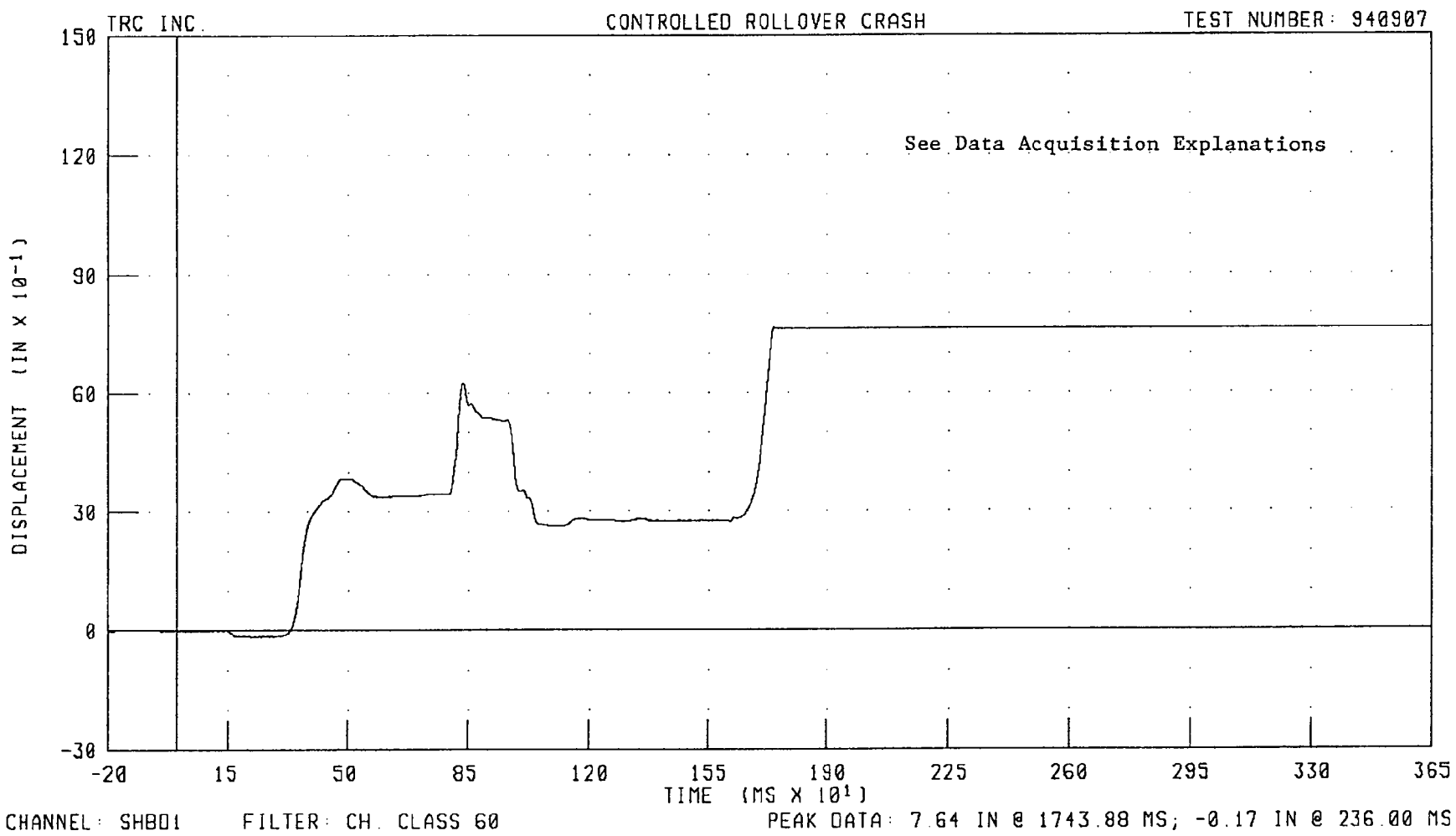


CHANNEL: LBOF1 FILTER: CH. CLASS 60

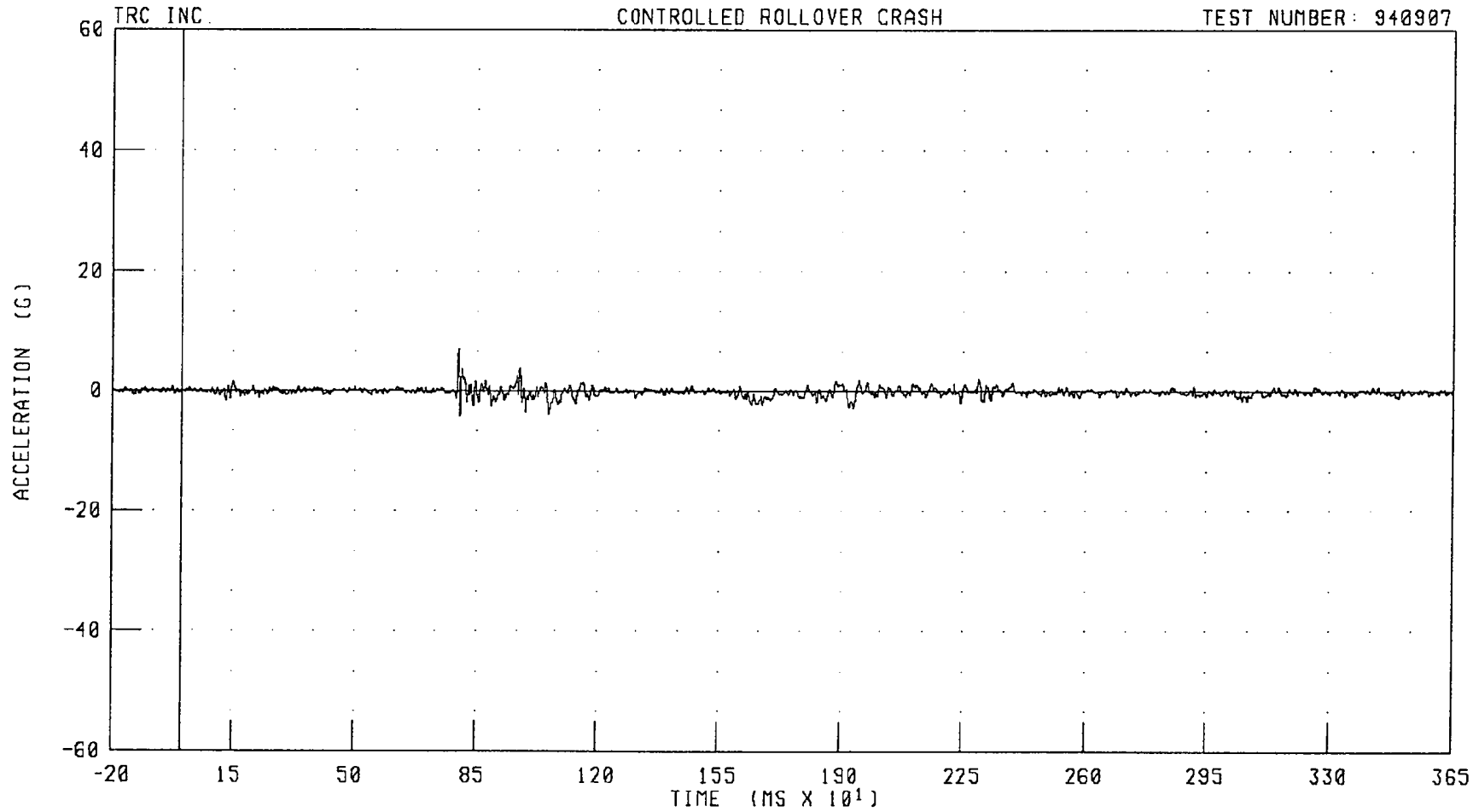
PEAK DATA: 543.34 LBF @ 838.25 MS; -23.26 LBF @ 991.00 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER SHOULDER BELT FORCE
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
See Data Acquisition Explanations
FORCE (LBF X 10¹)
300
240
180
120
60
0
-60
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: SHBF1
FILTER: CH. CLASS 60
PEAK DATA: 3716.22 LBF @ 3540.25 MS; -4136.54 LBF @ 2405.38 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
DRIVER SHOULDER BELT DISPLACEMENT

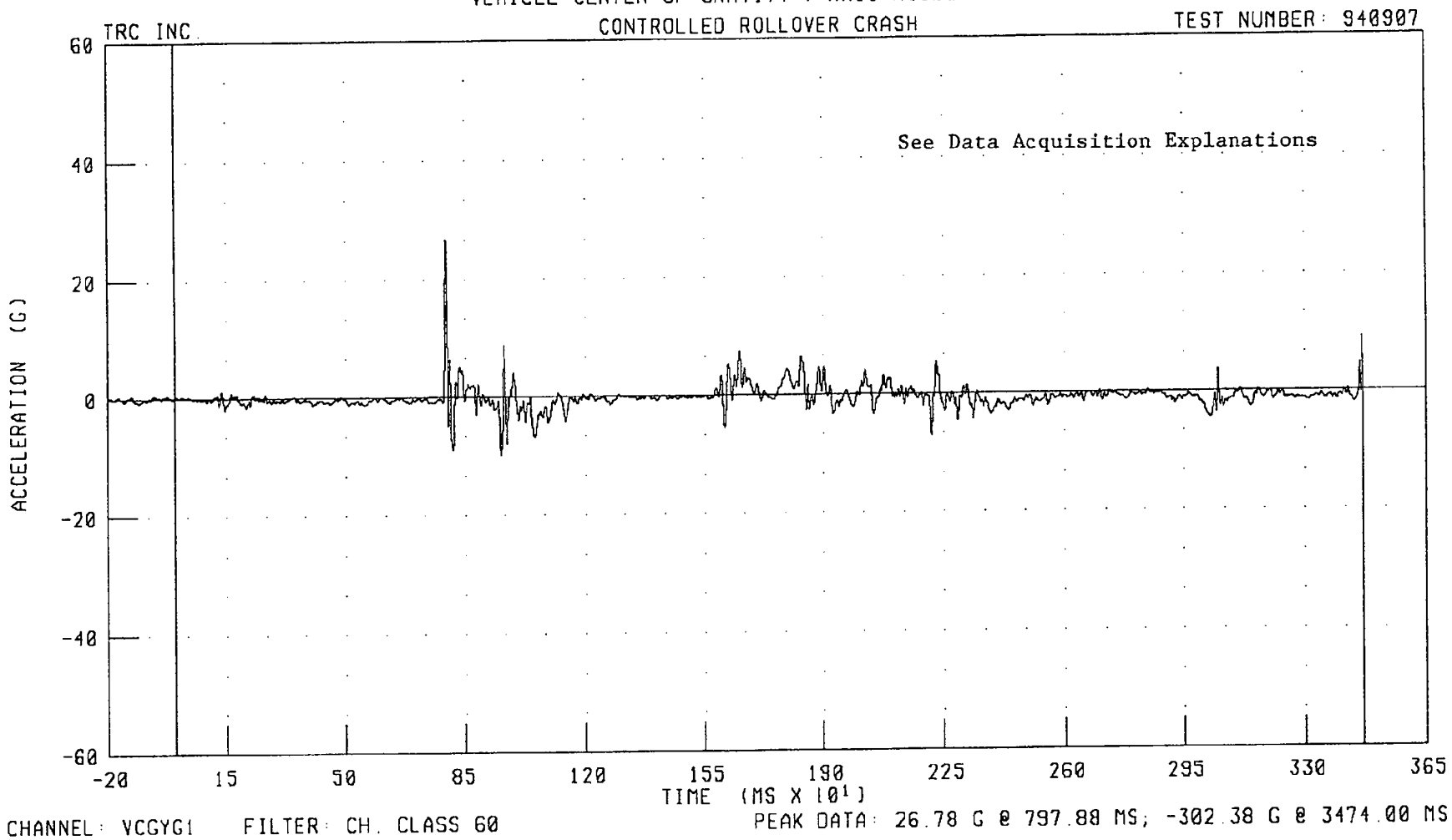


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION



CHANNEL: VCGXG1 FILTER: CH. CLASS 60 PEAK DATA: 7.15 G @ 799.13 MS; -4.28 G @ 803.50 MS

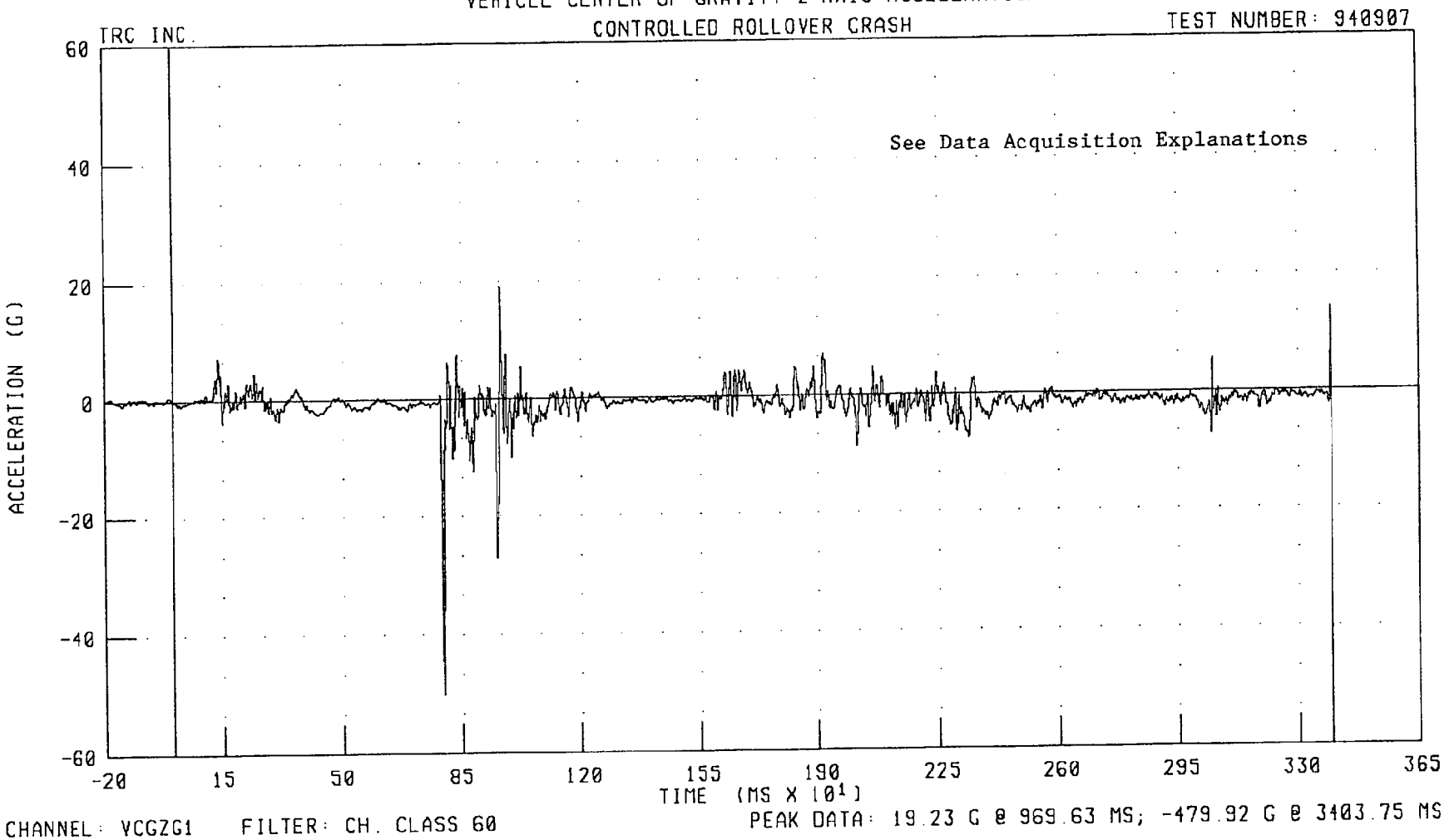
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION



CHANNEL: VCGYG1 FILTER: CH. CLASS 60

PEAK DATA: 26.78 G @ 797.88 MS; -302.38 G @ 3474.00 MS

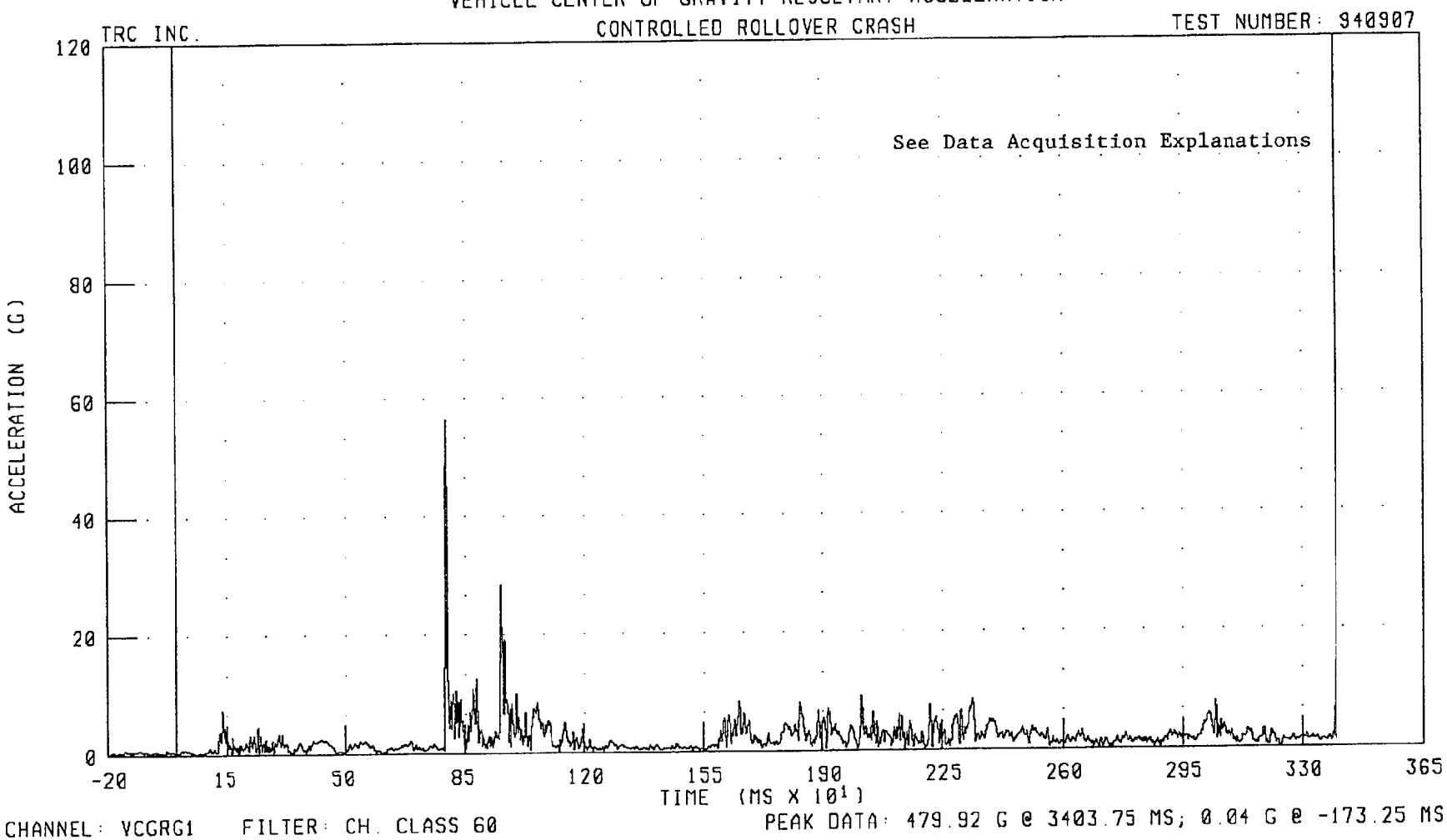
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE CENTER OF GRAVITY Z-AXIS ACCELERATION



CHANNEL: VCGZG1 FILTER: CH. CLASS 60

PEAK DATA: 19.23 G @ 969.63 MS; -479.92 G @ 3403.75 MS

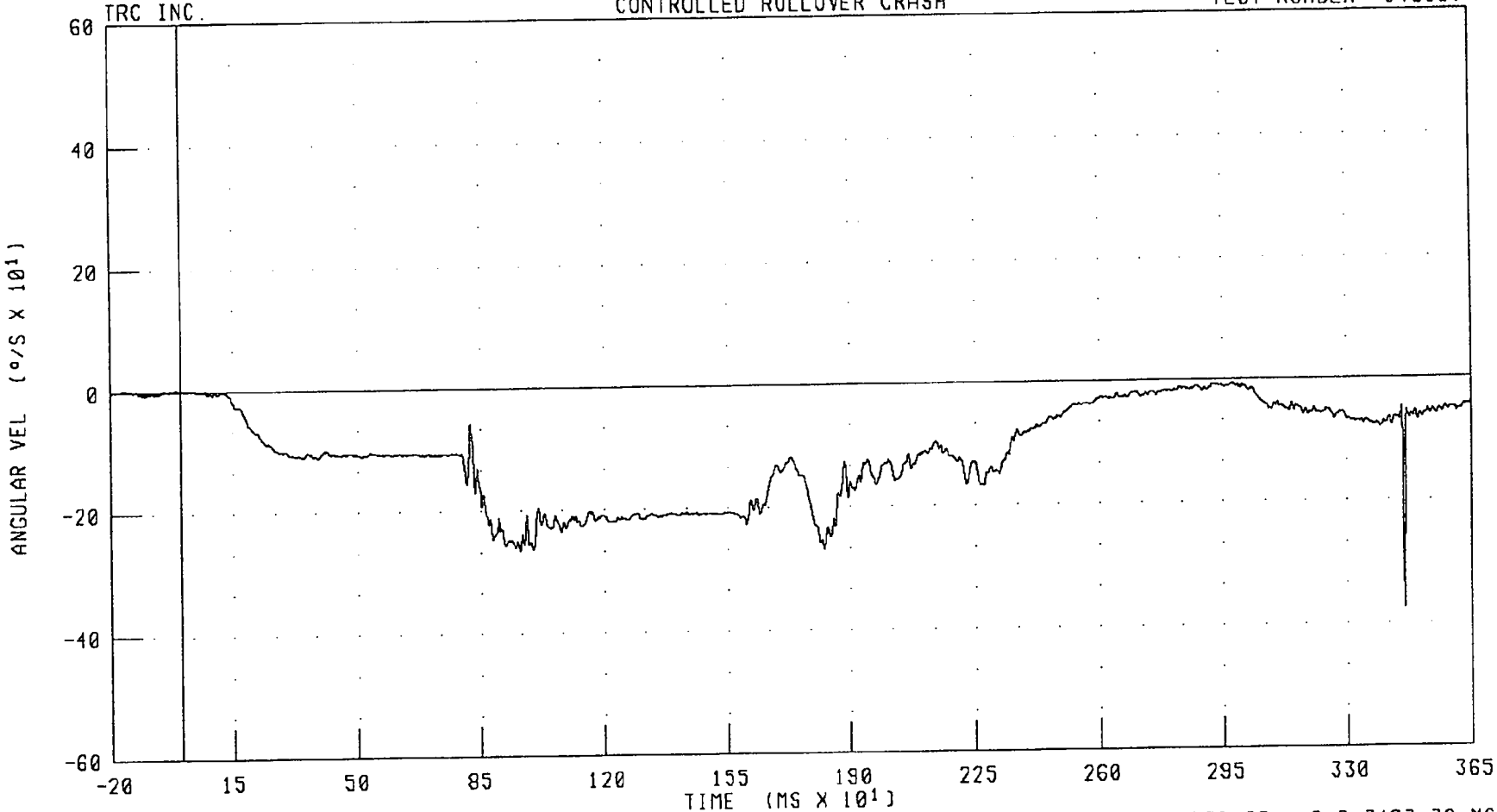
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION



MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH

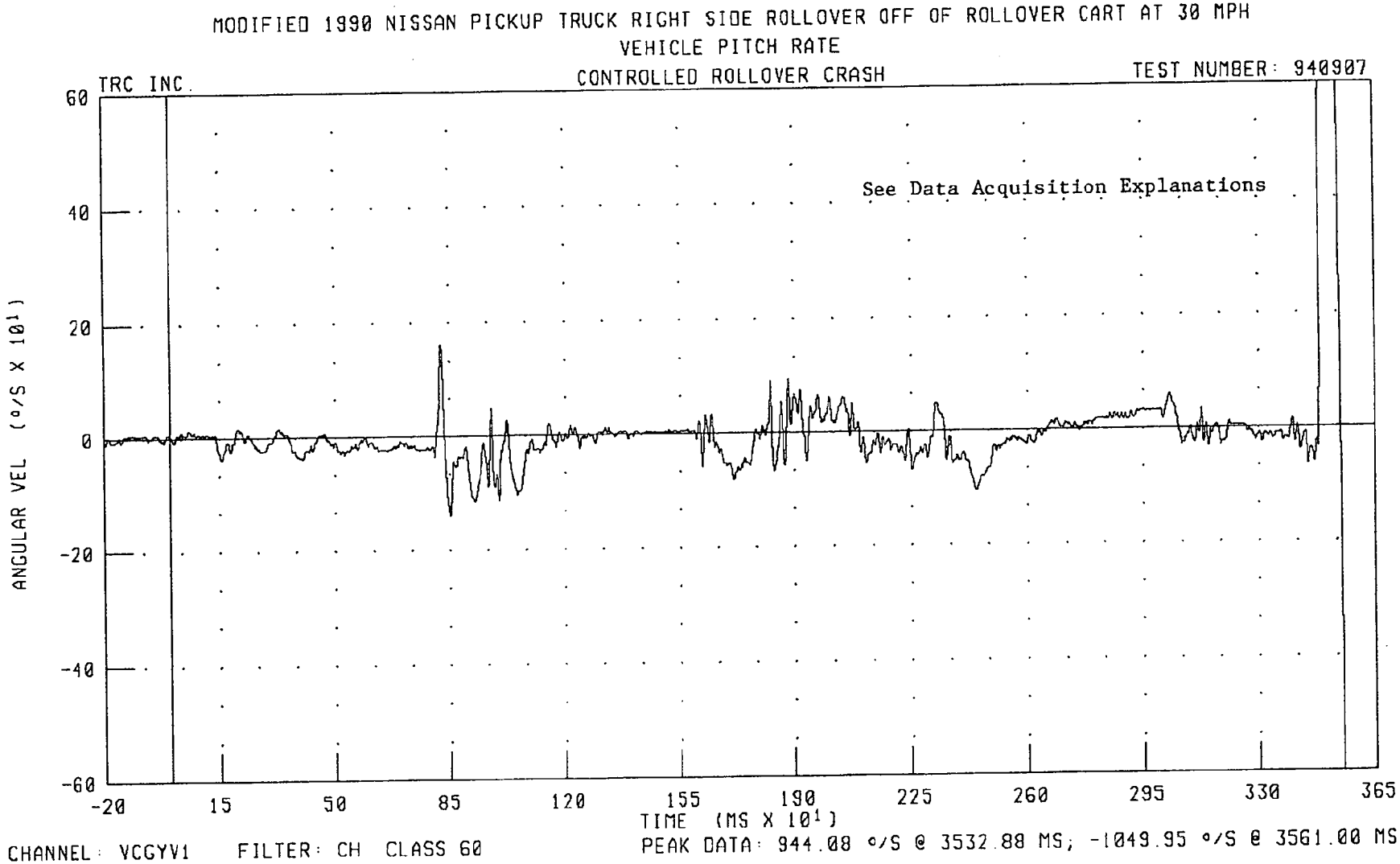
VEHICLE ROLL RATE

TRC INC. CONTROLLED ROLLOVER CRASH TEST NUMBER: 940907



CHANNEL: VCGXV1 FILTER: CH. CLASS 60

PEAK DATA: 3.87 °/S @ -10.75 MS; -373.62 °/S @ 3463.38 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE PITCH RATE
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
See Data Acquisition Explanations
ANGULAR VEL (°/S X 10¹)
60
40
20
0
-20
-40
-60
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: VCGYV1 FILTER: CH CLASS 60
PEAK DATA: 944.08 °/S @ 3532.88 MS; -1049.95 °/S @ 3561.00 MS

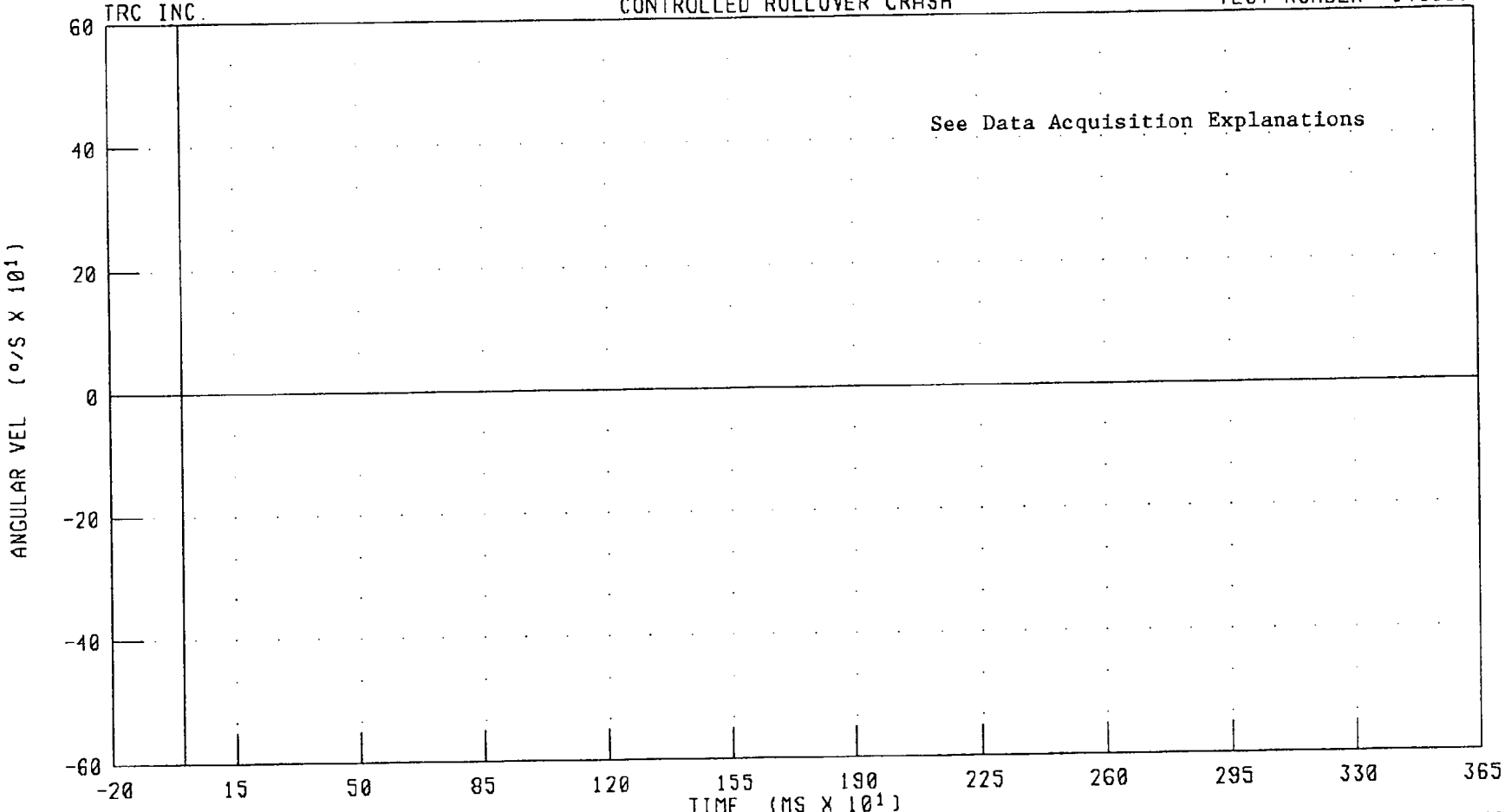
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH

VEHICLE YAW RATE

CONTROLLED ROLLOVER CRASH

TRC INC.

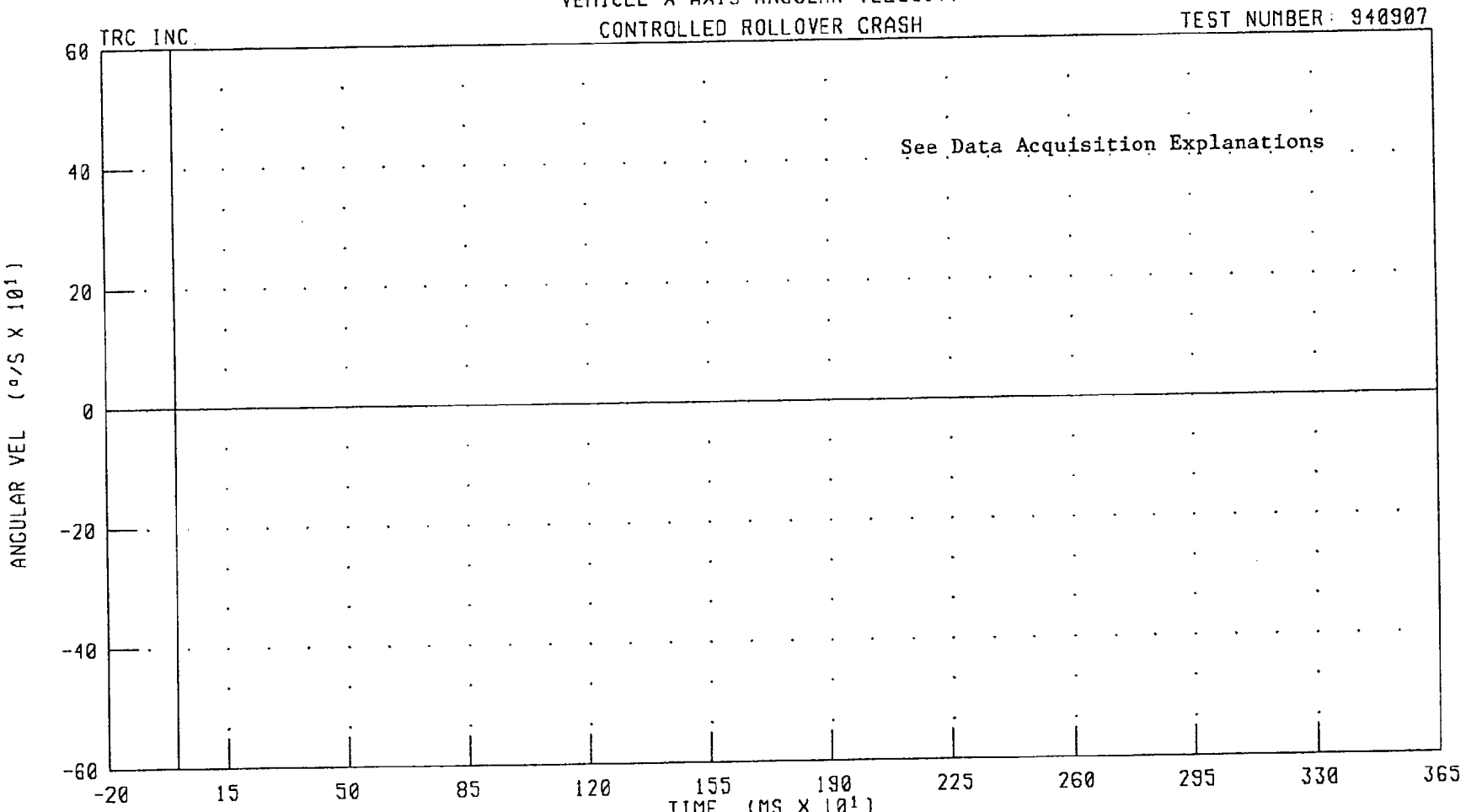
TEST NUMBER: 940907



CHANNEL: VCGZV1 FILTER: CH. CLASS 60

PEAK DATA: 0.00 °/S @ 3650.00 MS; 0.00 °/S @ -200.00 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE X-AXIS ANGULAR VELOCITY
CONTROLLED ROLLOVER CRASH



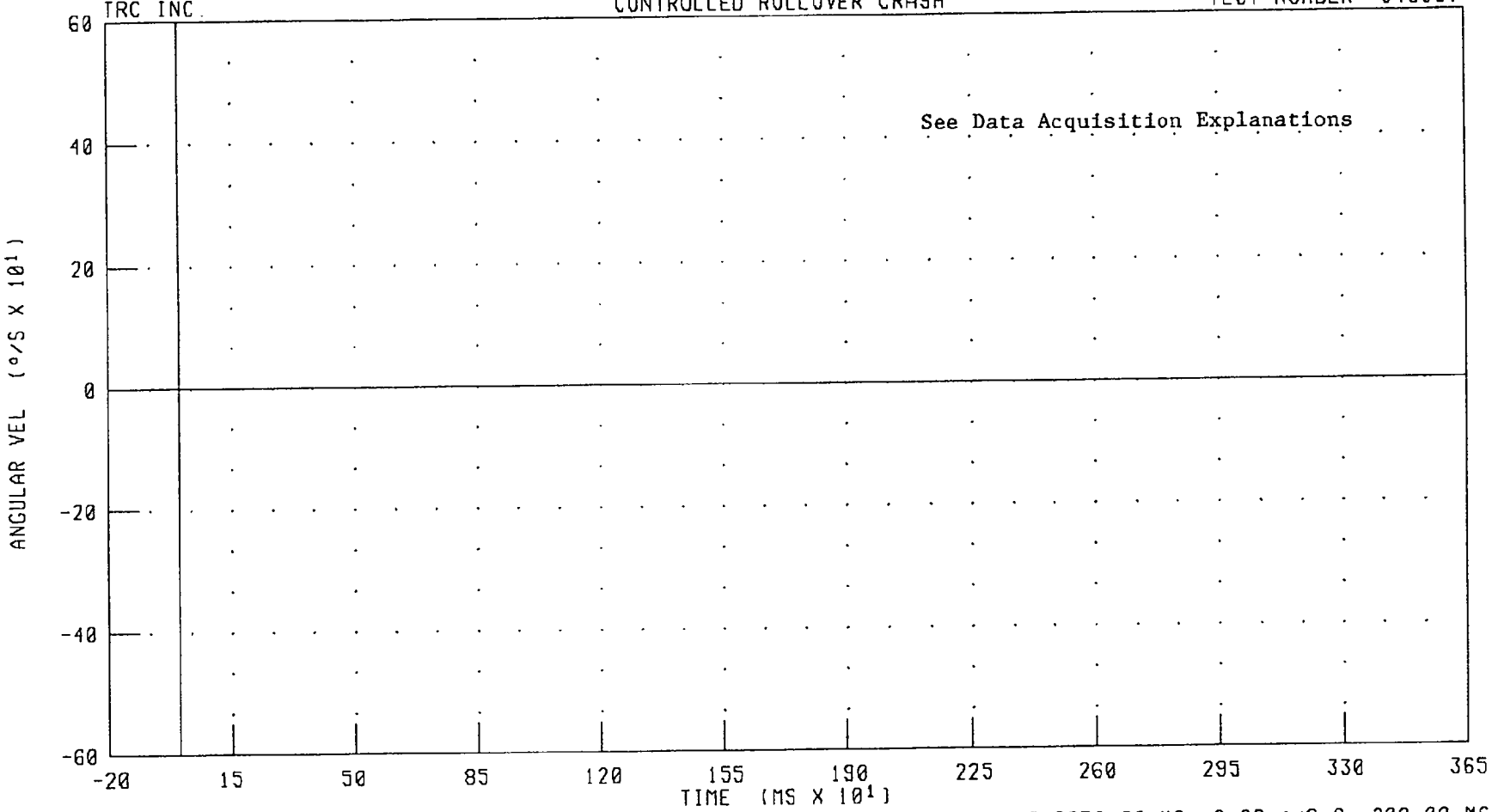
CHANNEL: VCGXVA FILTER: CH. CLASS 60

PEAK DATA: 0.00 °/S @ 3650.00 MS, 0.00 °/S @ -200.00 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH

VEHICLE Y-AXIS ANGULAR VELOCITY

TRC INC. CONTROLLED ROLLOVER CRASH TEST NUMBER: 940907



CHANNEL: VCGYVA FILTER: CH. CLASS 60

PEAK DATA: 0.00 °/S @ 3650.00 MS; 0.00 °/S @ -200.00 MS

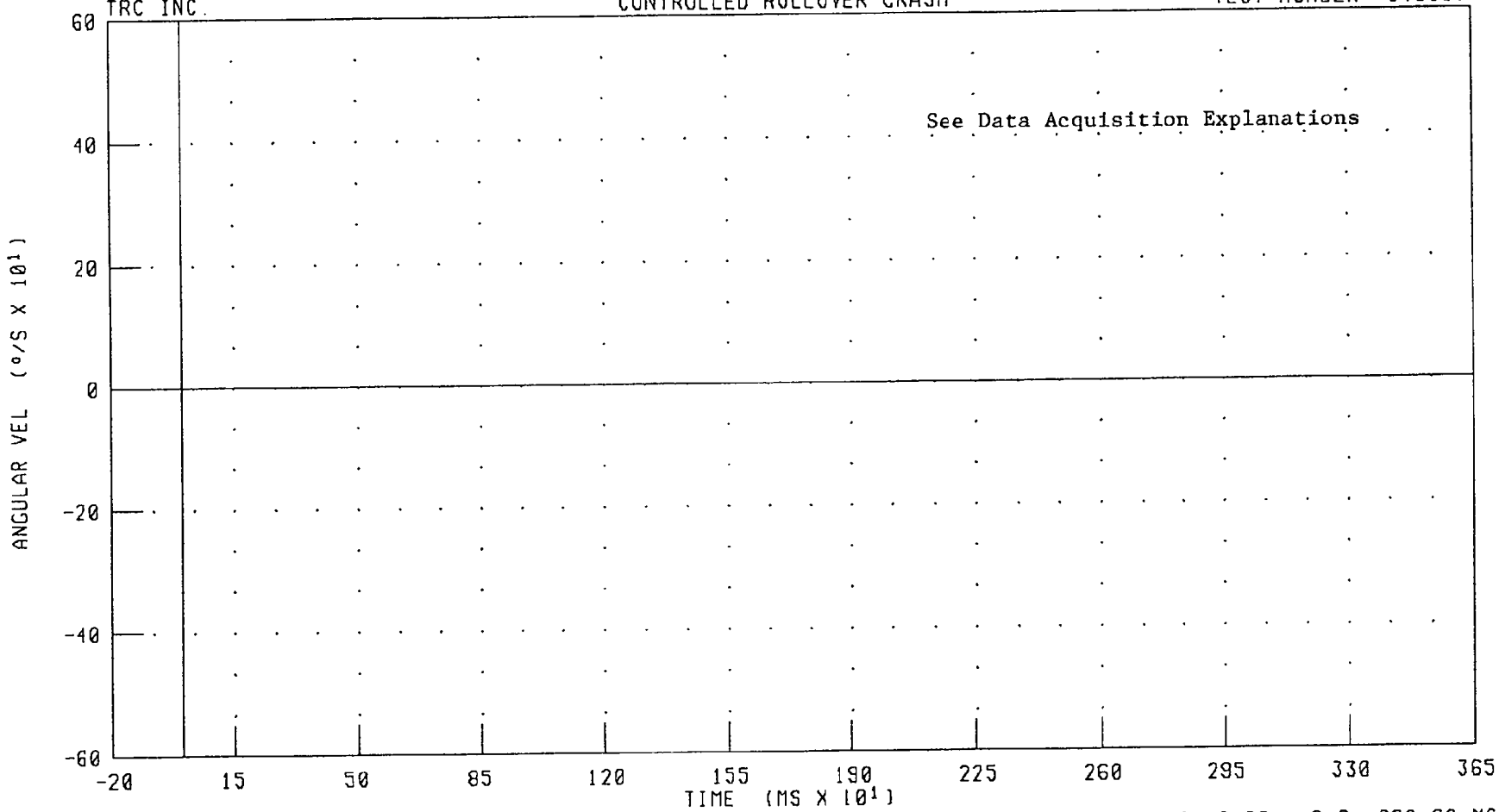
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH

VEHICLE Z-AXIS ANGULAR VELOCITY

CONTROLLED ROLLOVER CRASH

TRC INC.

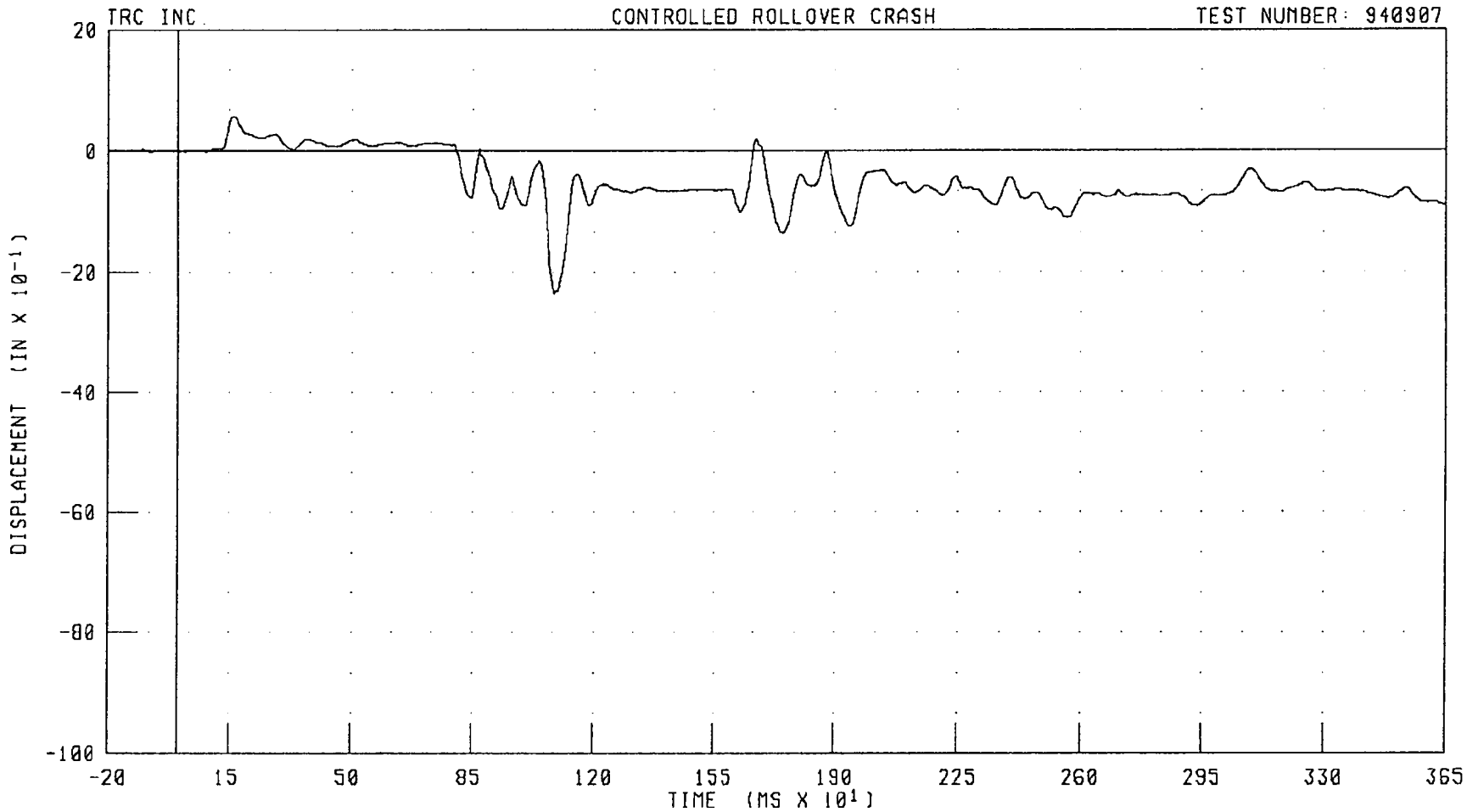
TEST NUMBER: 940907



CHANNEL: VCGZVA FILTER: CH. CLASS 60

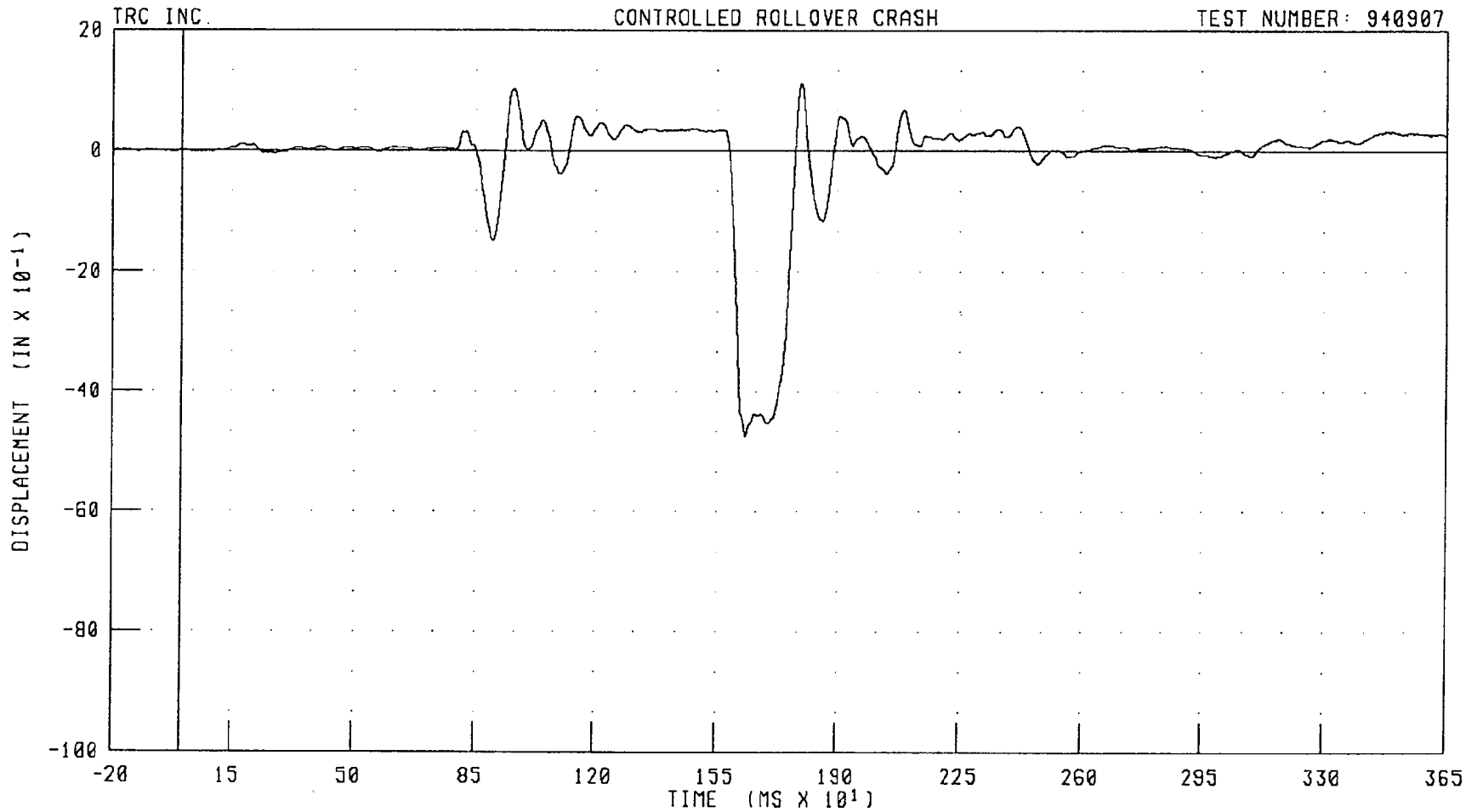
PEAK DATA: 0.00 °/S @ 3650.00 MS; 0.00 °/S @ -200.00 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE LEFT FRONT SUSPENSION DISPLACEMENT



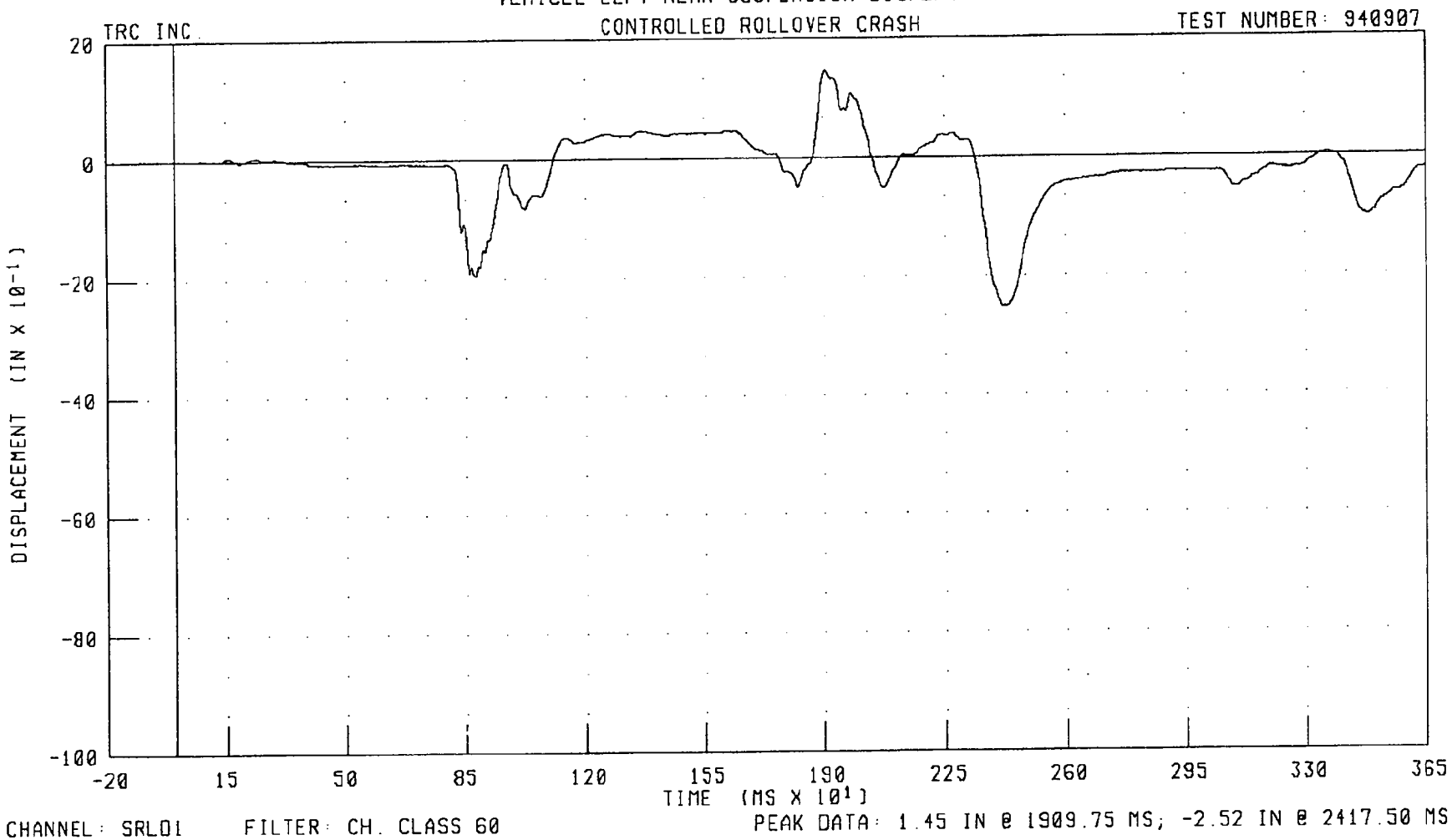
CHANNEL: SFL01 FILTER: CH. CLASS 60 PEAK DATA: 0.56 IN @ 162.63 MS; -2.36 IN @ 1085.88 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE RIGHT FRONT SUSPENSION DISPLACEMENT



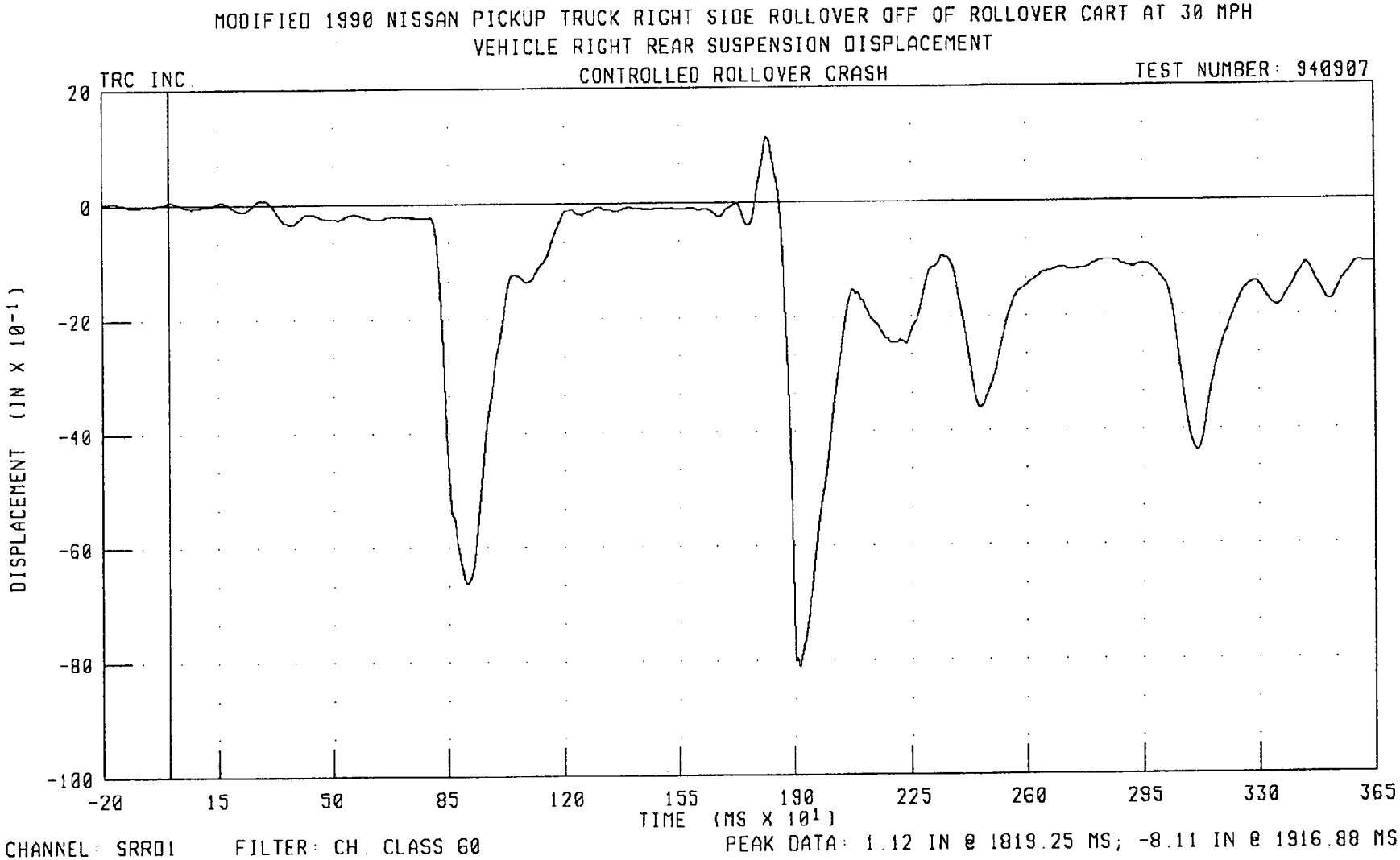
CHANNEL: SFR01 FILTER: CH. CLASS 60 PEAK DATA: 1.12 IN @ 1794.63 MS; -4.74 IN @ 1637.13 MS

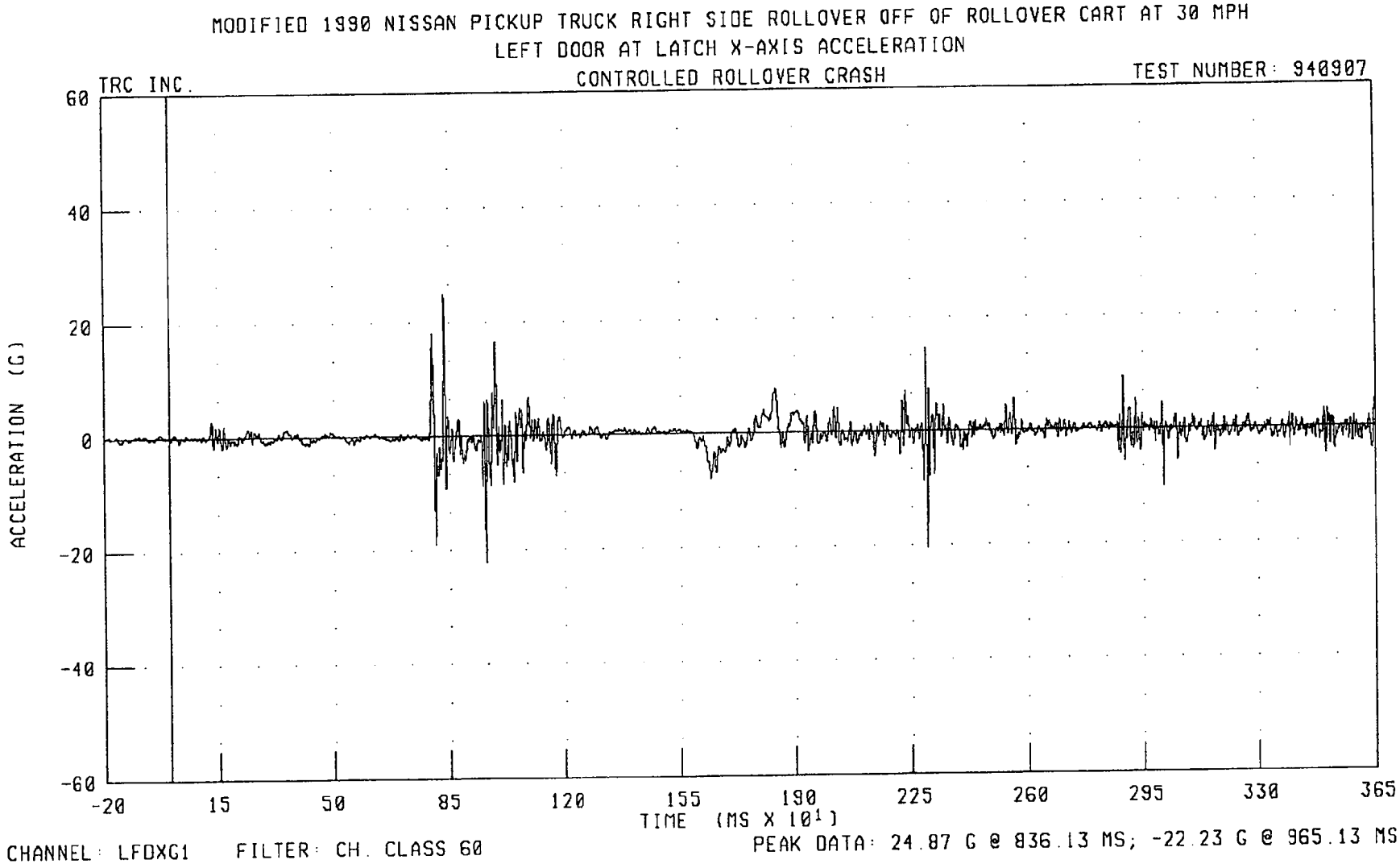
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE LEFT REAR SUSPENSION DISPLACEMENT
CONTROLLED ROLLOVER CRASH

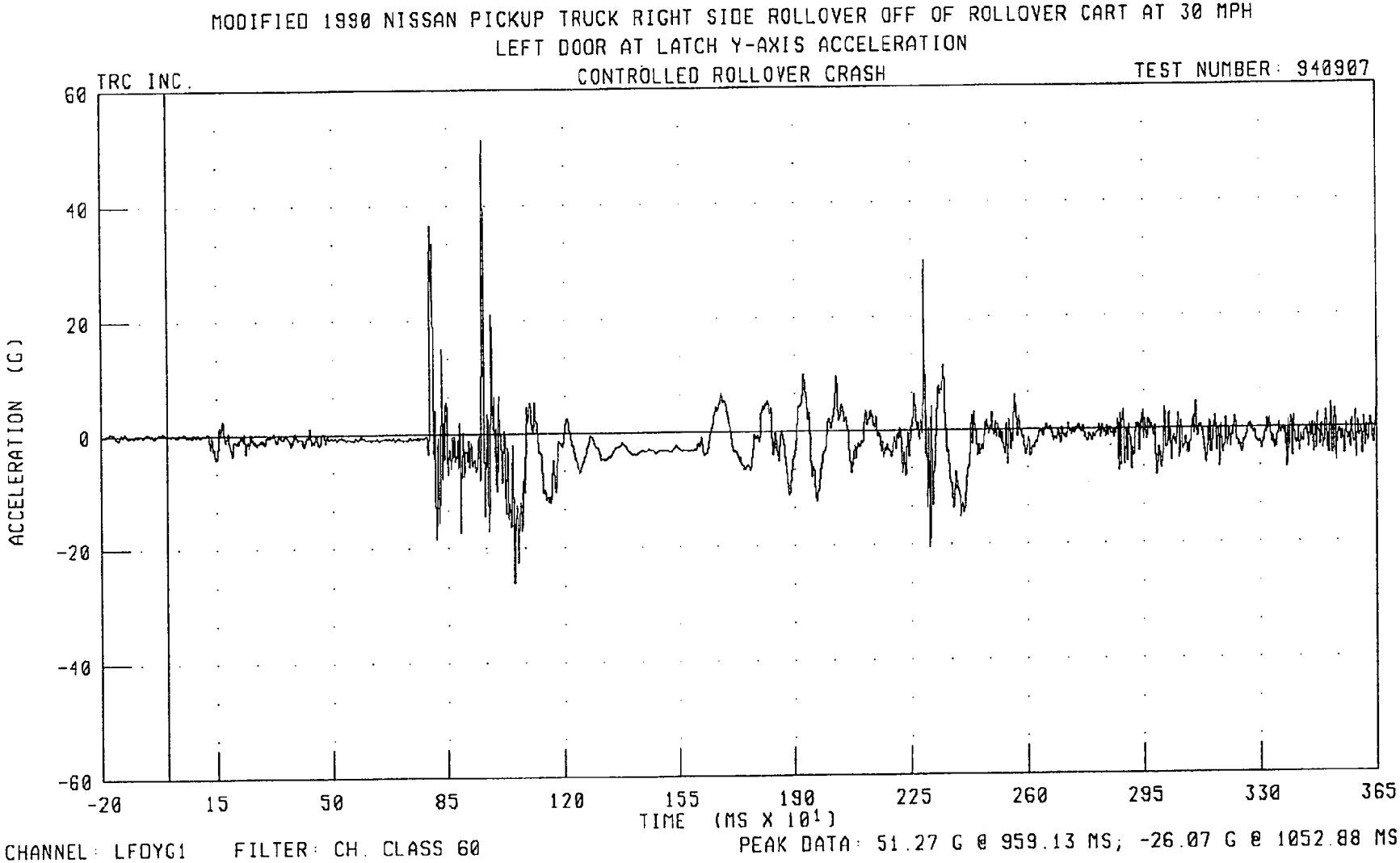


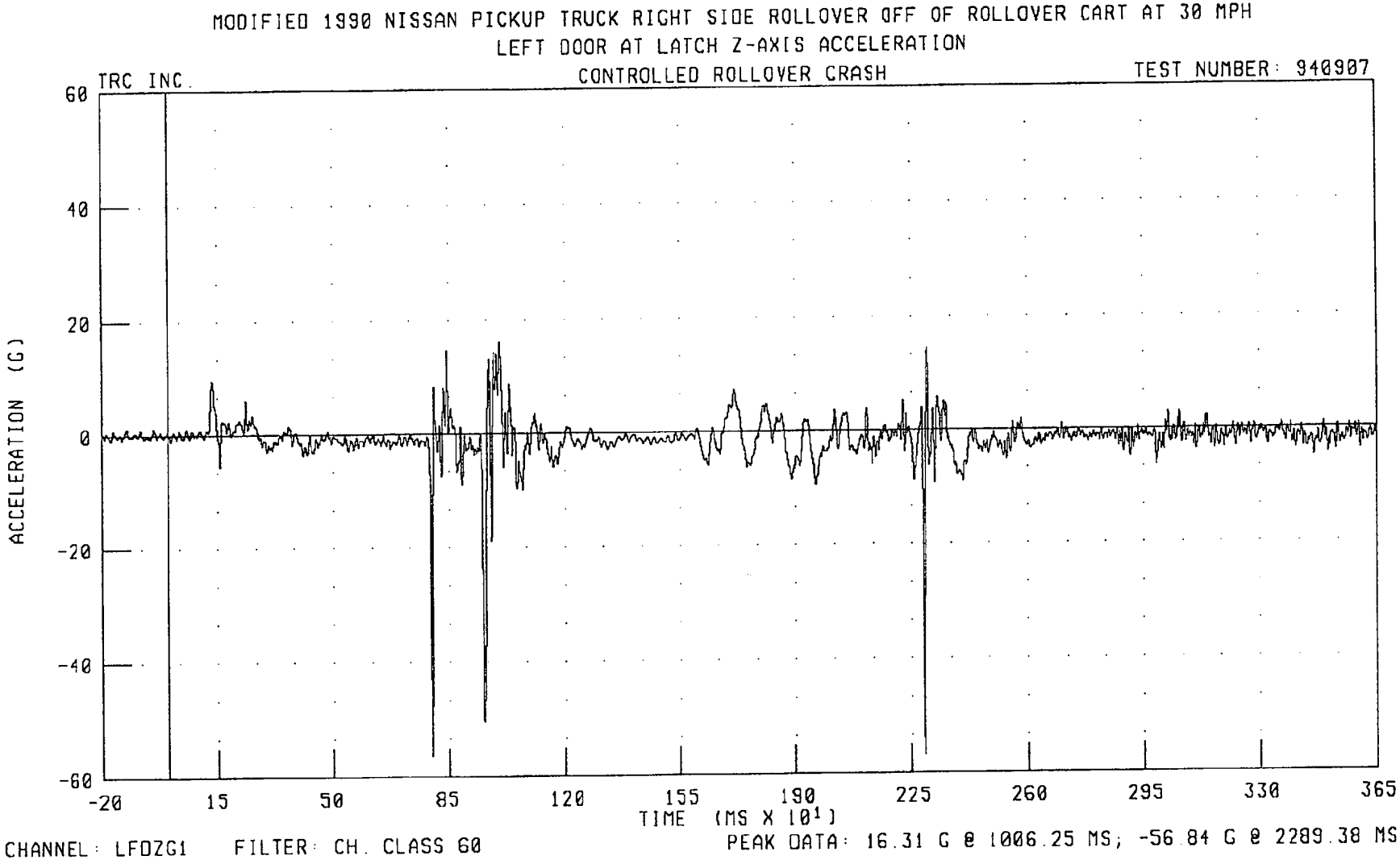
CHANNEL: SRL01 FILTER: CH. CLASS 60

PEAK DATA: 1.45 IN @ 1909.75 MS; -2.52 IN @ 2417.50 MS

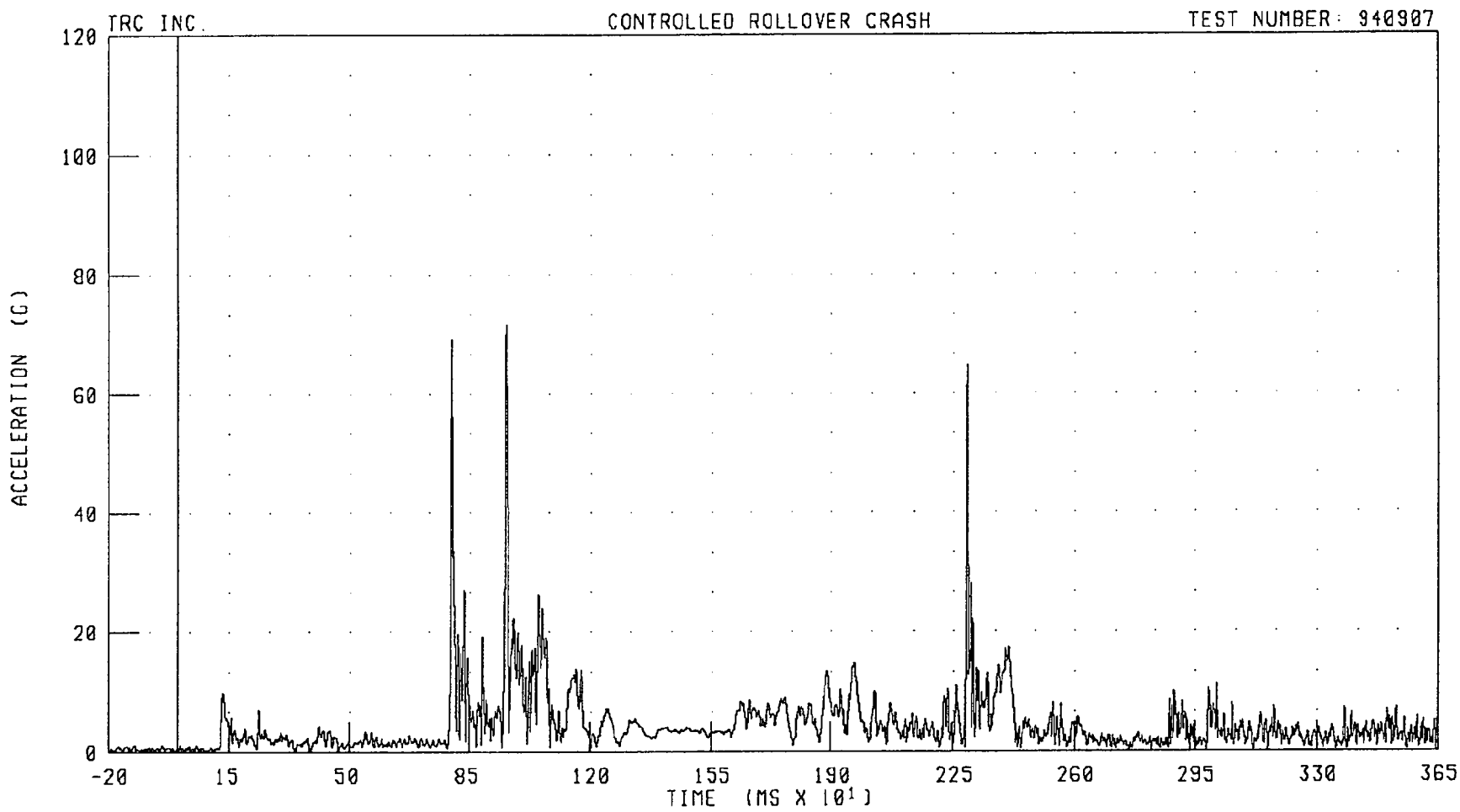

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE RIGHT REAR SUSPENSION DISPLACEMENT
CONTROLLED ROLLOVER CRASH
TRC INC
TEST NUMBER: 940907
DISPLACEMENT (IN X 10-1)
20
0
-20
-40
-60
-80
-100
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 101)
CHANNEL: SRR01
FILTER: CH CLASS 60
PEAK DATA: 1.12 IN @ 1819.25 MS; -8.11 IN @ 1916.88 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
LEFT DOOR AT LATCH X-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: LFDXG1
FILTER: CH. CLASS 60
PEAK DATA: 24.87 G @ 836.13 MS; -22.23 G @ 965.13 MS

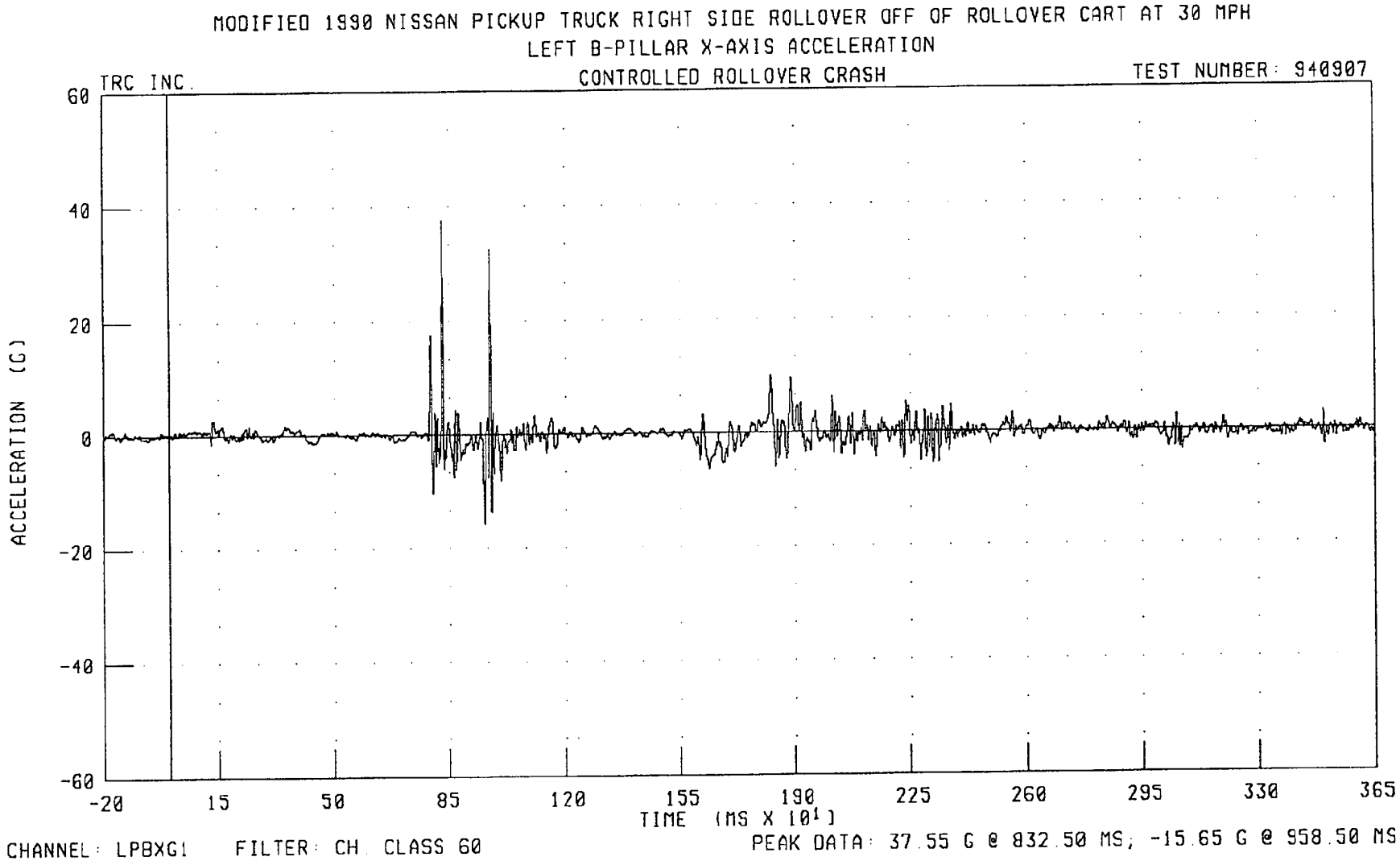

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
LEFT DOOR AT LATCH Y-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: LFOYG1
FILTER: CH. CLASS 60
PEAK DATA: 51.27 G @ 959.13 MS; -26.07 G @ 1052.88 MS

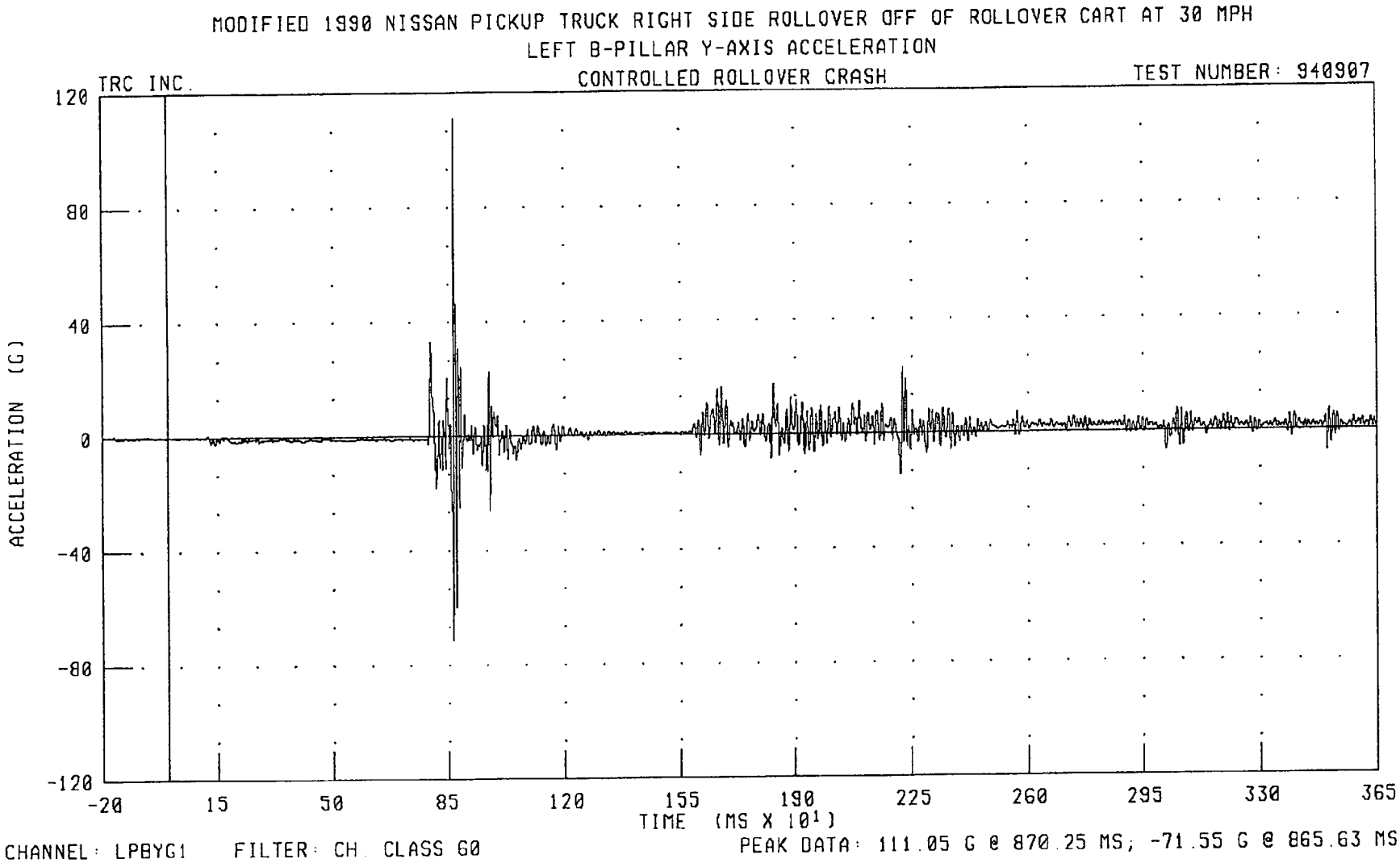

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
LEFT DOOR AT LATCH Z-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: LFDZG1
FILTER: CH. CLASS 60
PEAK DATA: 16.31 G @ 1006.25 MS; -56.84 G @ 2289.38 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
LEFT DOOR AT LATCH RESULTANT ACCELERATION

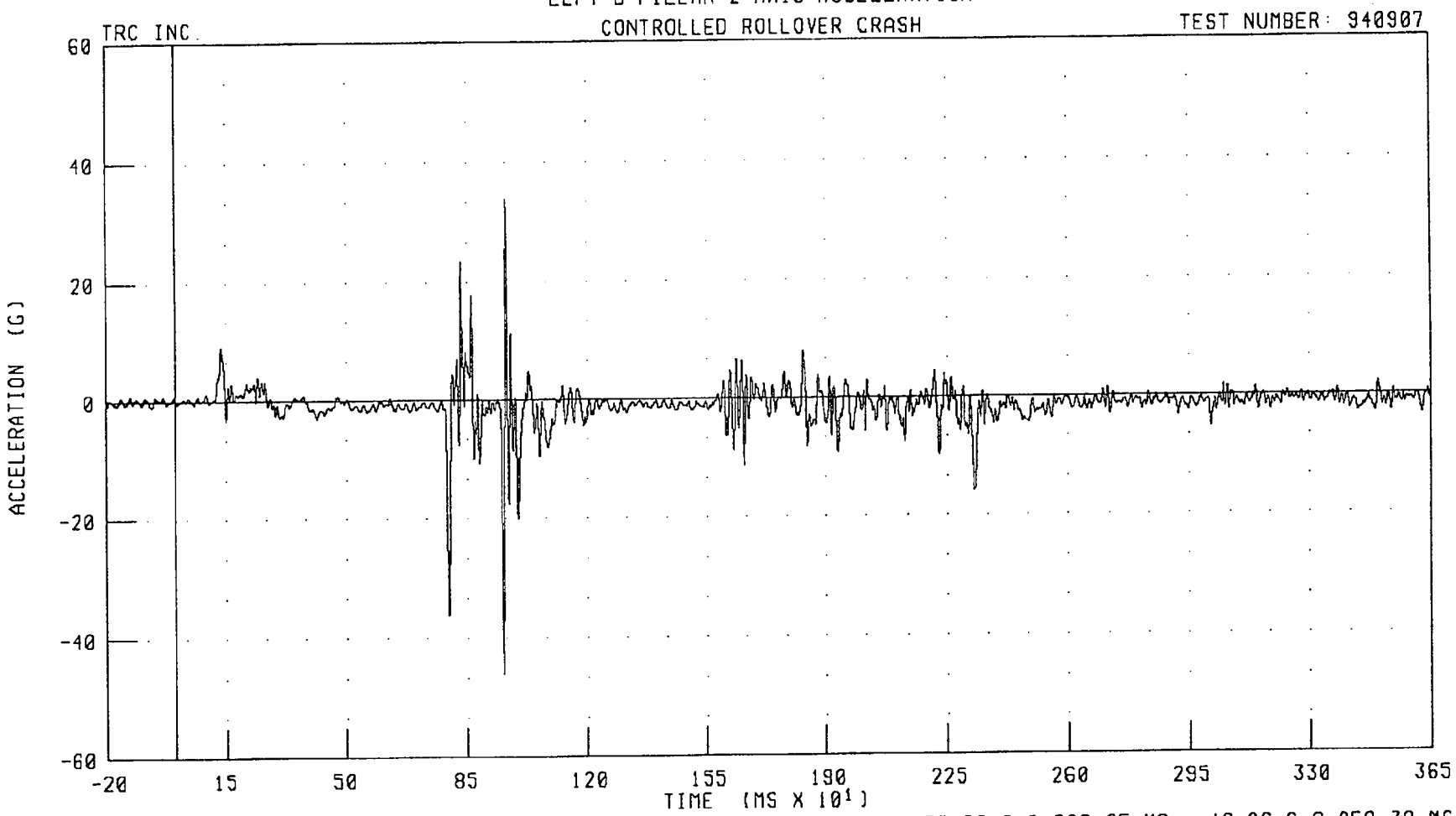


CHANNEL: LFORG1 FILTER: CH. CLASS 60 PEAK DATA: 71.77 G @ 959.00 MS; 0.08 G @ 83.63 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
LEFT B-PILLAR X-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: LPBXG1
FILTER: CH CLASS 60
PEAK DATA: 37.55 G @ 832.50 MS; -15.65 G @ 958.50 MS

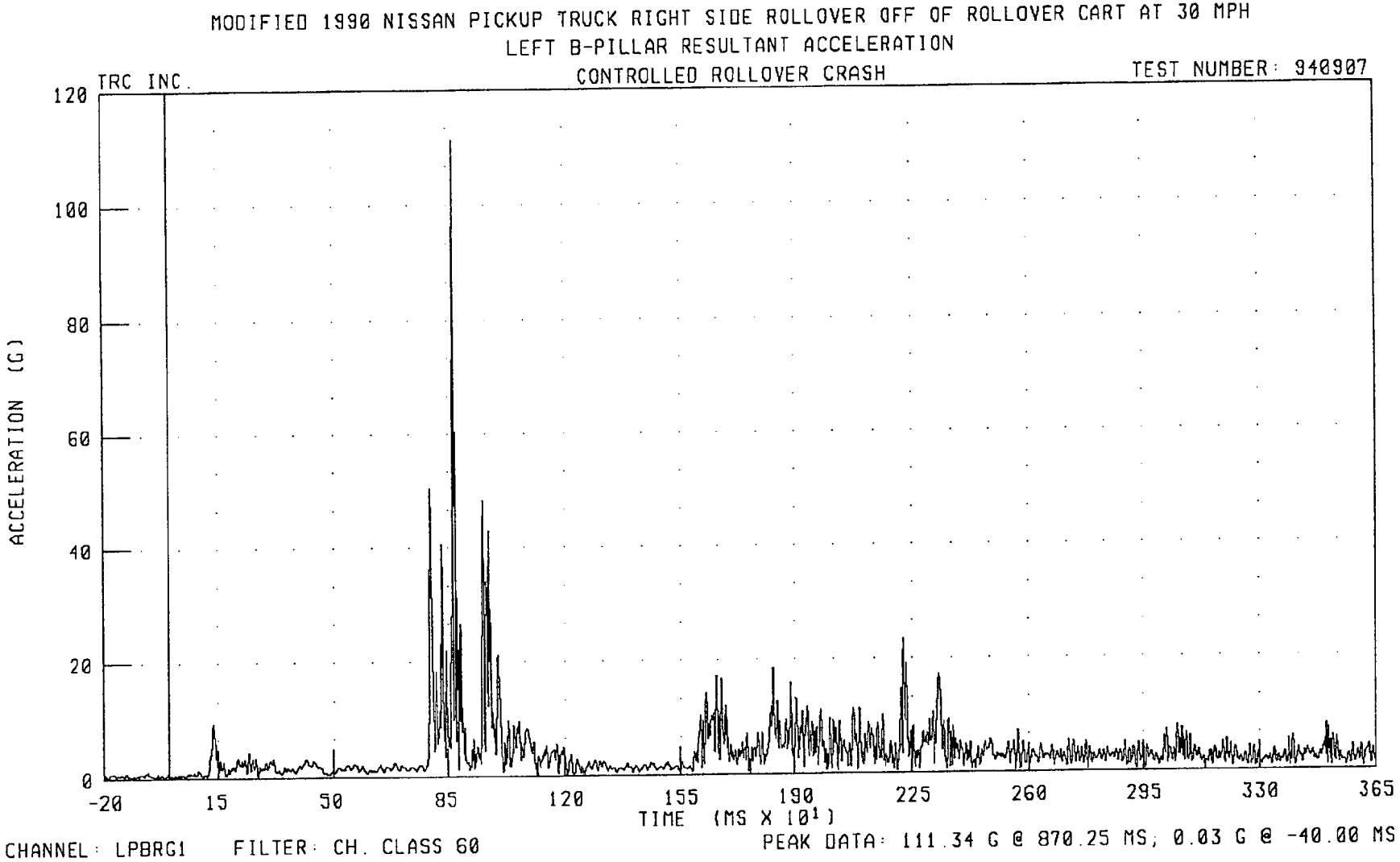

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
LEFT B-PILLAR Y-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: LPBYG1
FILTER: CH. CLASS 60
PEAK DATA: 111.05 G @ 870.25 MS; -71.55 G @ 865.63 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
LEFT B-PILLAR Z-AXIS ACCELERATION

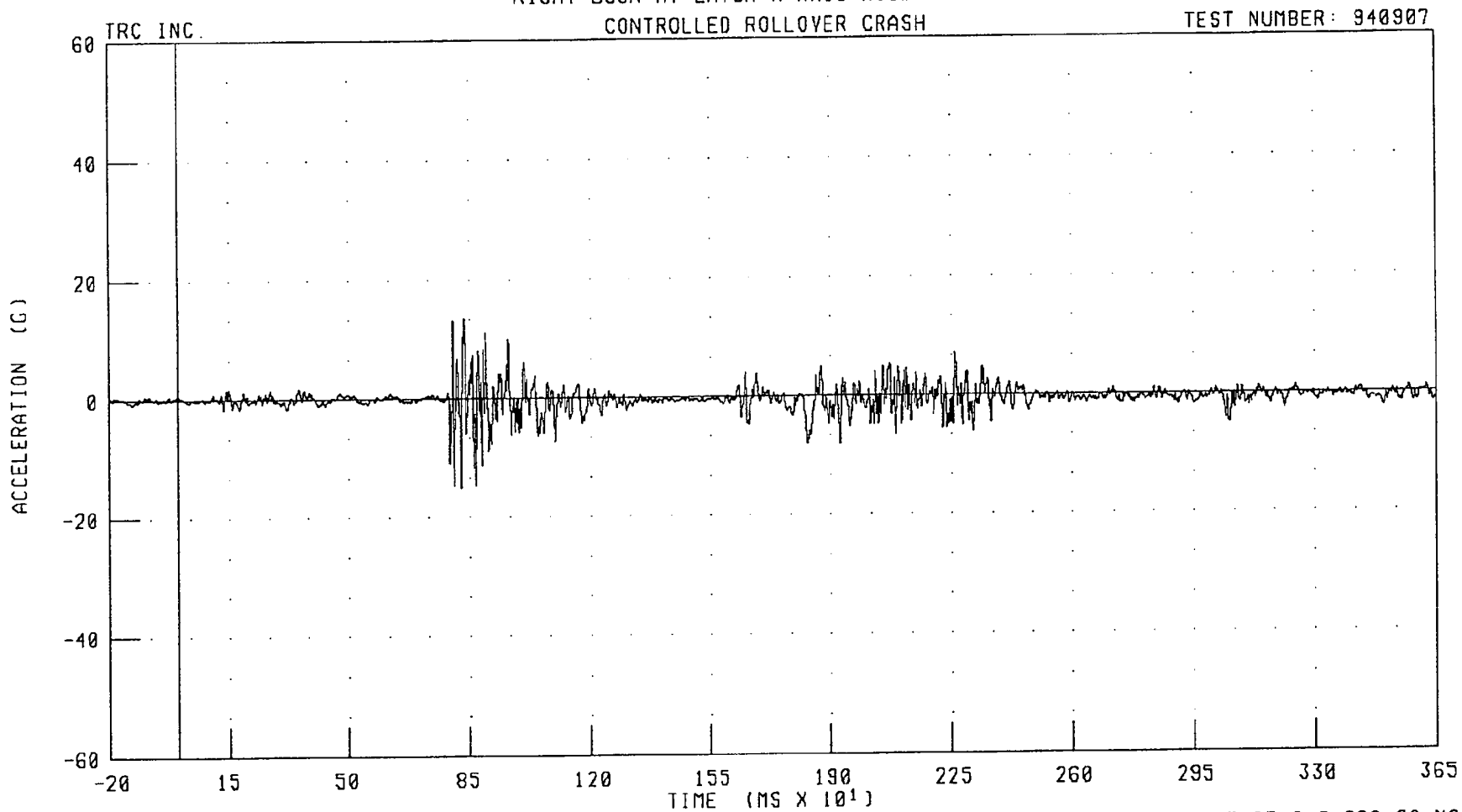


CHANNEL: LPBZG1 FILTER: CH. CLASS 60

PEAK DATA: 33.92 G @ 969.25 MS; -46.06 G @ 959.38 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
LEFT B-PILLAR RESULTANT ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
ACCELERATION (G)
120
100
80
60
40
20
0
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: LPBRG1
FILTER: CH. CLASS 60
PEAK DATA: 111.34 G @ 870.25 MS; 0.03 G @ -40.00 MS

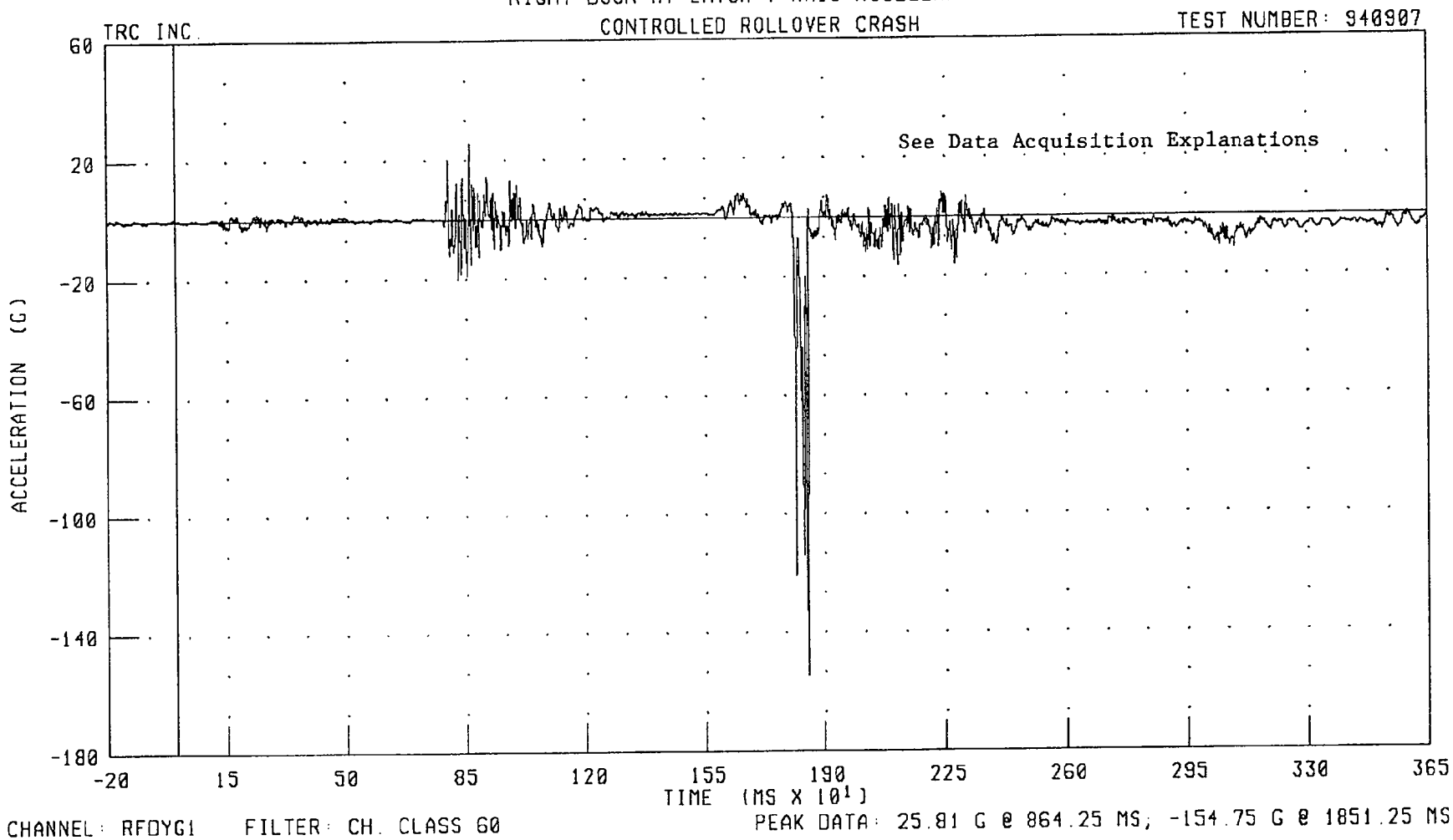
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
RIGHT DOOR AT LATCH X-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH



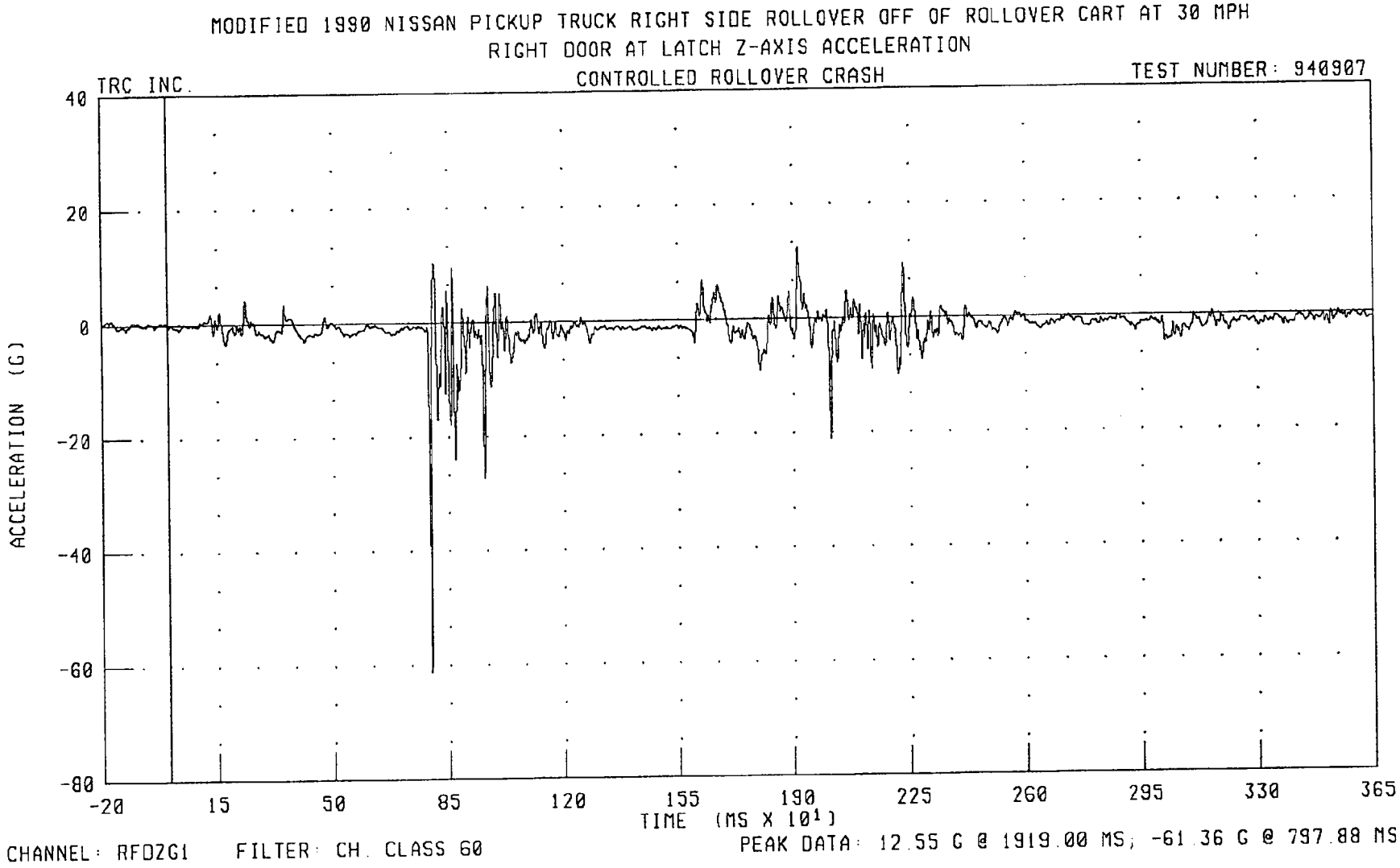
CHANNEL: RFDXG1 FILTER: CH. CLASS 60

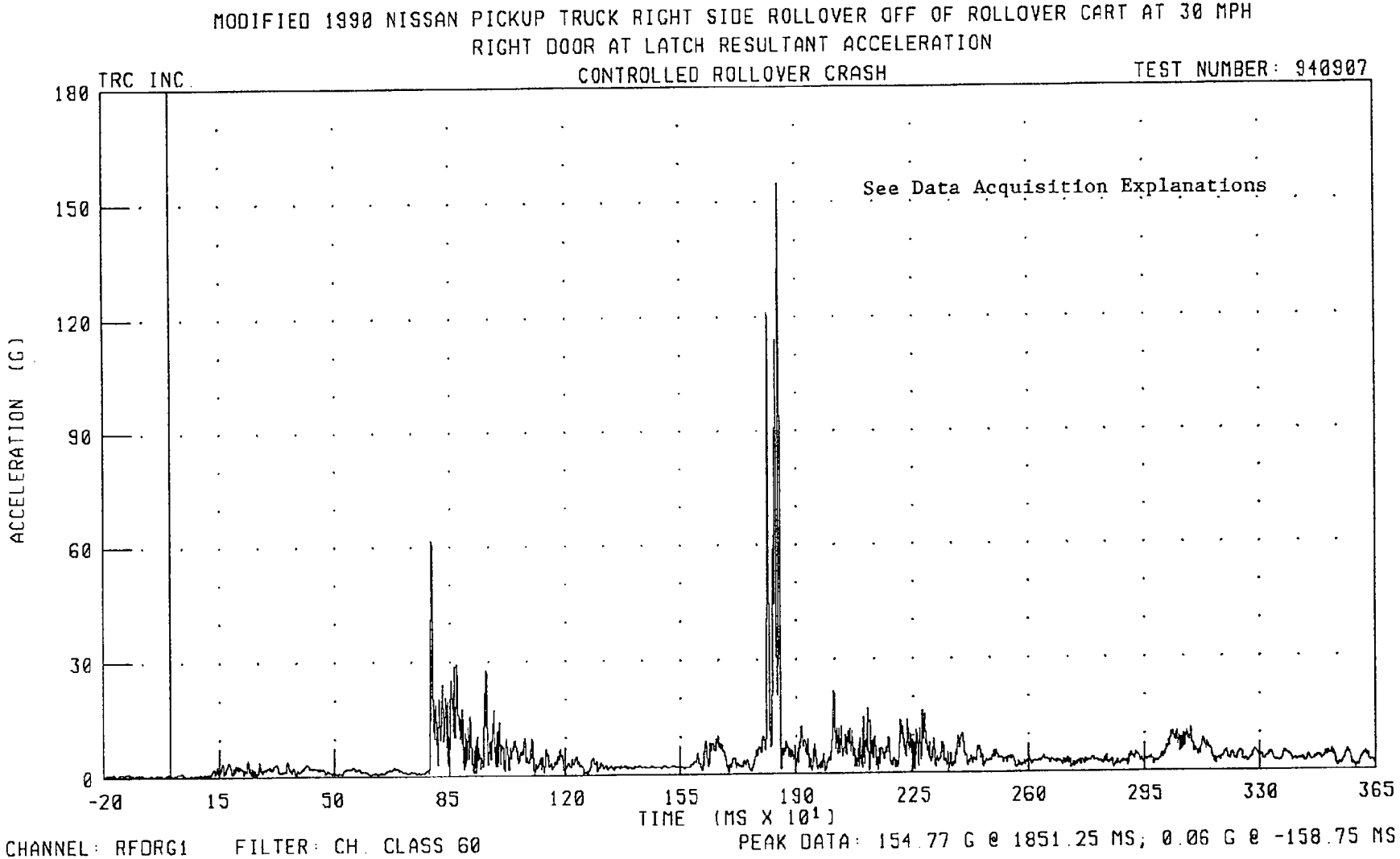
PEAK DATA: 13.58 G @ 836.50 MS; -15.05 G @ 828.00 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
RIGHT DOOR AT LATCH Y-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH

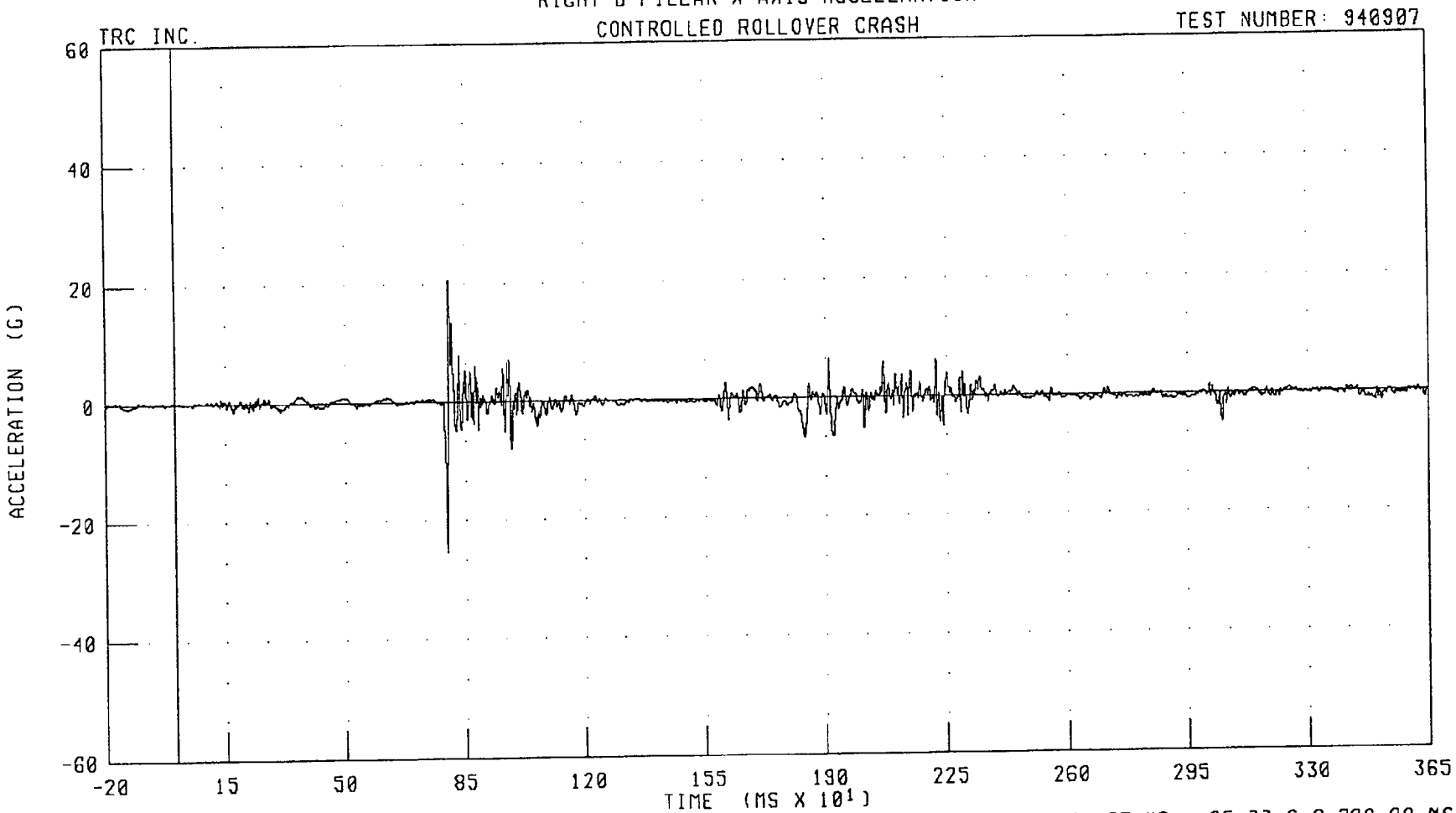


CHANNEL: RFDYG1 FILTER: CH. CLASS 60 PEAK DATA: 25.81 G @ 864.25 MS; -154.75 G @ 1851.25 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
RIGHT DOOR AT LATCH Z-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
ACCELERATION (G)
40
20
0
-20
-40
-60
-80
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: RFDZG1
FILTER: CH. CLASS 60
PEAK DATA: 12.55 G @ 1919.00 MS; -61.36 G @ 797.88 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
RIGHT DOOR AT LATCH RESULTANT ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC
TEST NUMBER: 940907
See Data Acquisition Explanations
ACCELERATION (G)
180
150
120
90
60
30
0
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: RFORG1
FILTER: CH. CLASS 60
PEAK DATA: 154.77 G @ 1851.25 MS; 0.06 G @ -158.75 MS

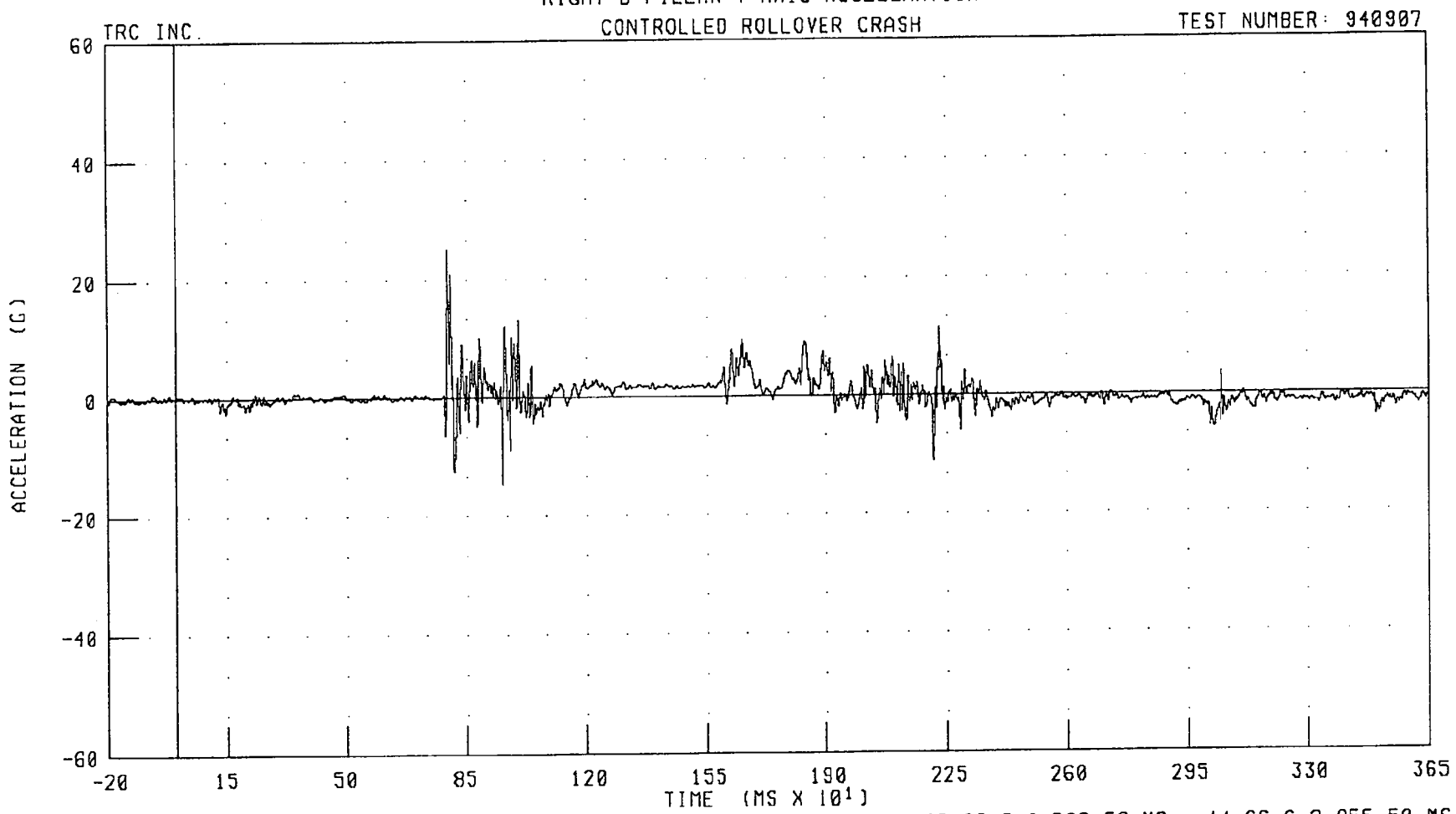
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
RIGHT B-PILLAR X-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH



CHANNEL: RPBXG1 FILTER: CH. CLASS 60

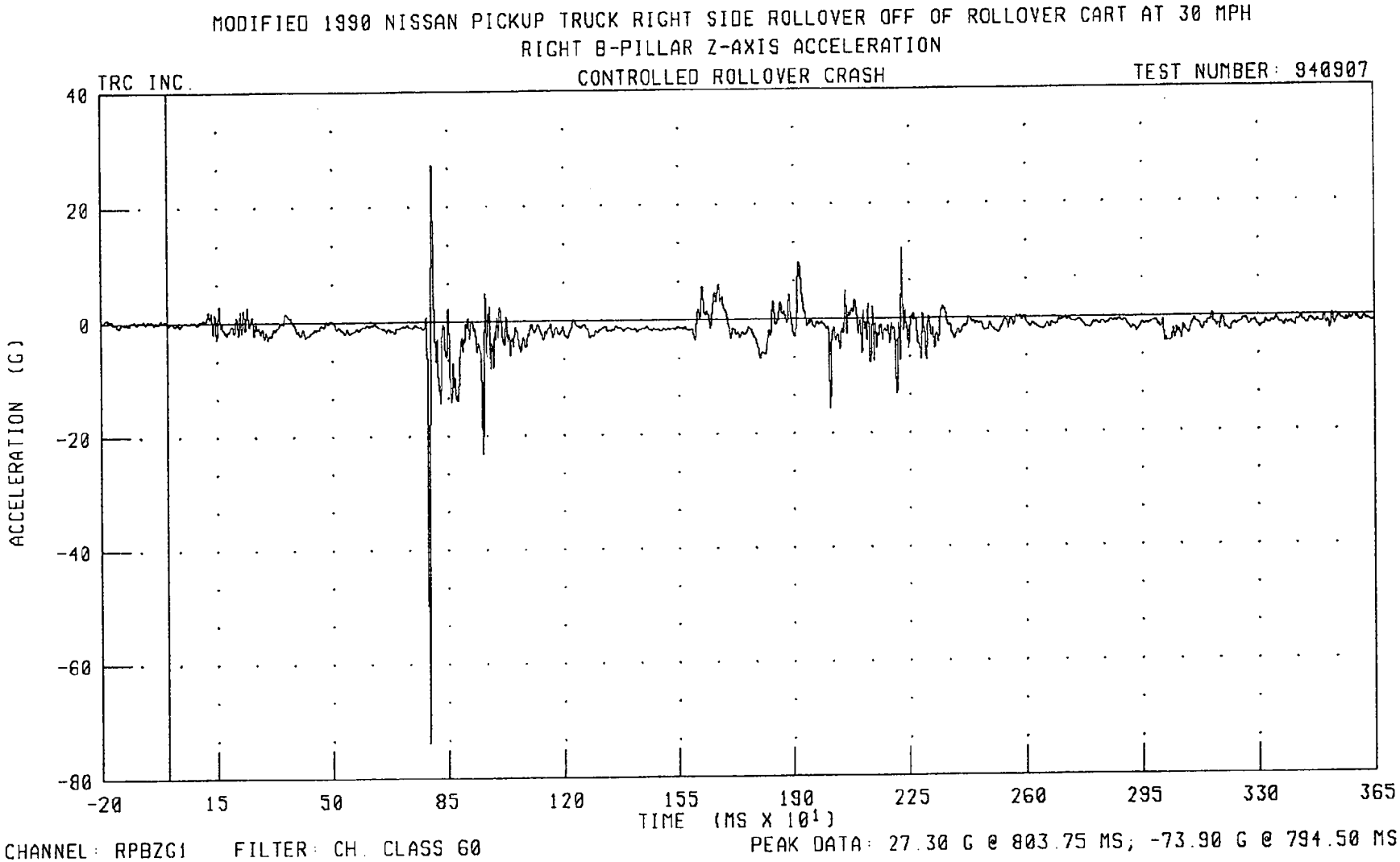
PEAK DATA: 20.68 G @ 804.25 MS; -25.33 G @ 798.88 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
RIGHT B-PILLAR Y-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH

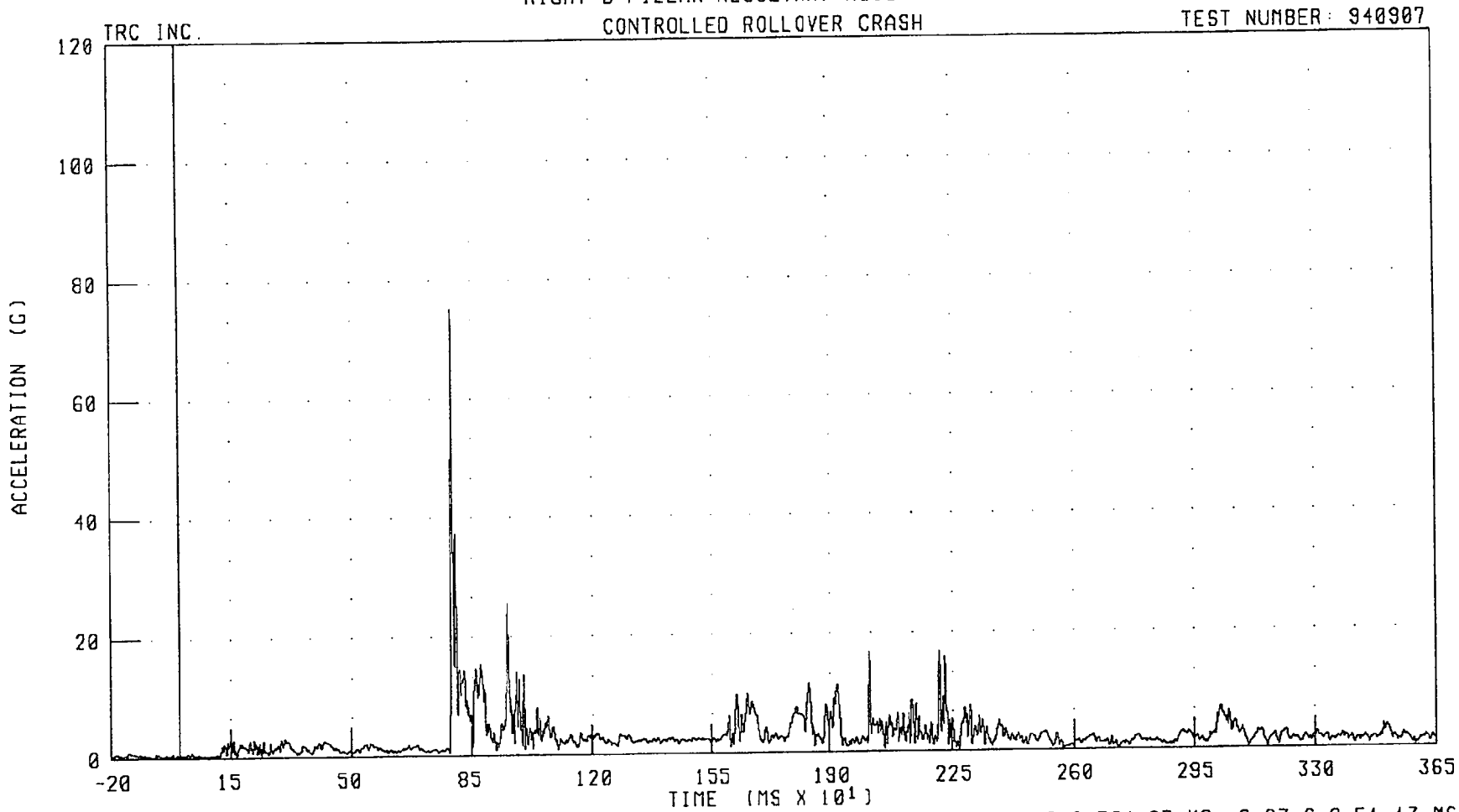


CHANNEL: RPBYG1 FILTER: CH. CLASS 60

PEAK DATA: 25.02 G @ 796.50 MS; -14.66 G @ 955.50 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
RIGHT B-PILLAR Z-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
ACCELERATION (G)
40
20
0
-20
-40
-60
-80
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: RPBZG1
FILTER: CH. CLASS 60
PEAK DATA: 27.30 G @ 803.75 MS; -73.90 G @ 794.50 MS

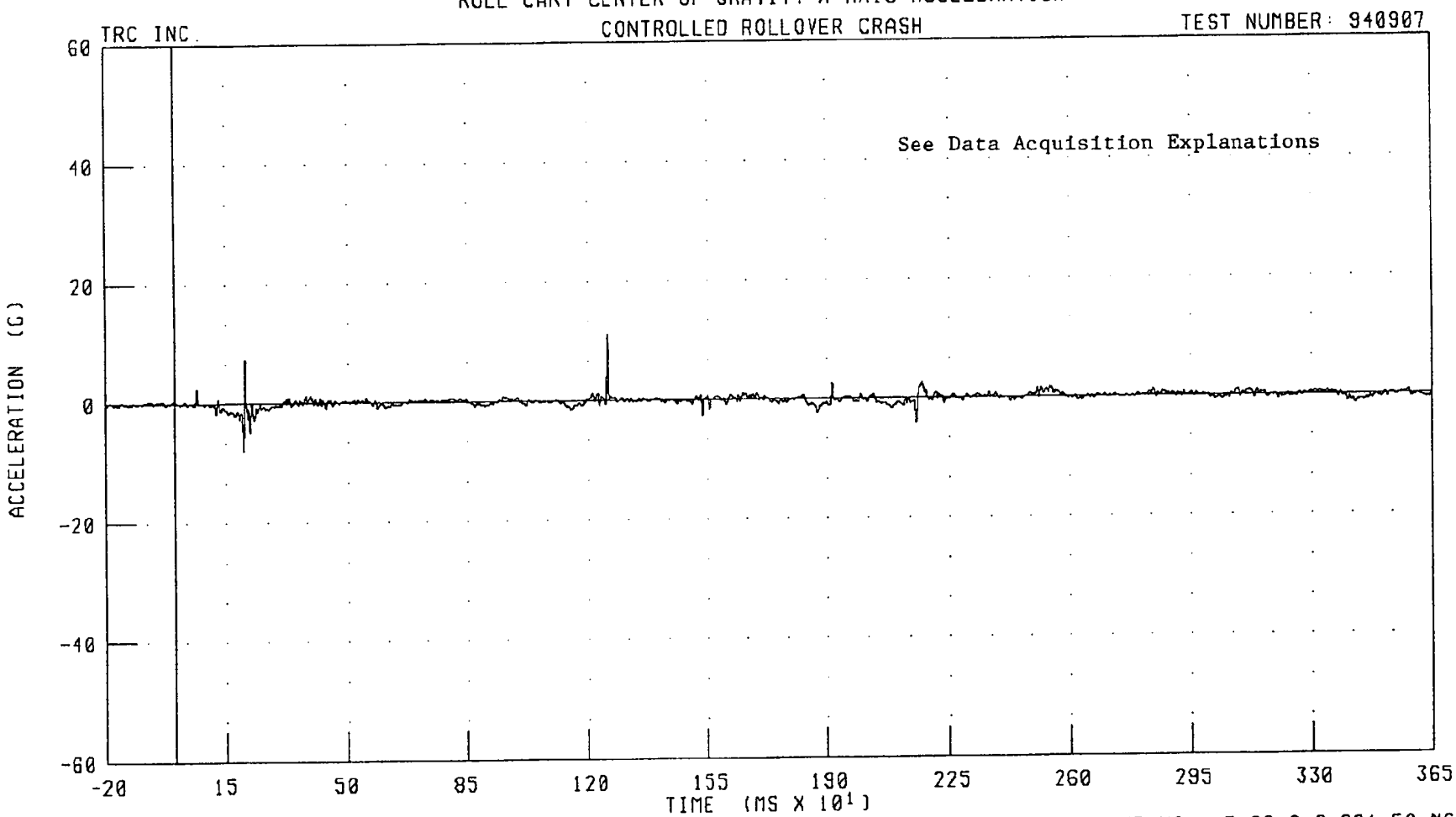
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
RIGHT B-PILLAR RESULTANT ACCELERATION
CONTROLLED ROLLOVER CRASH



CHANNEL: RPBRG1 FILTER: CH. CLASS 60

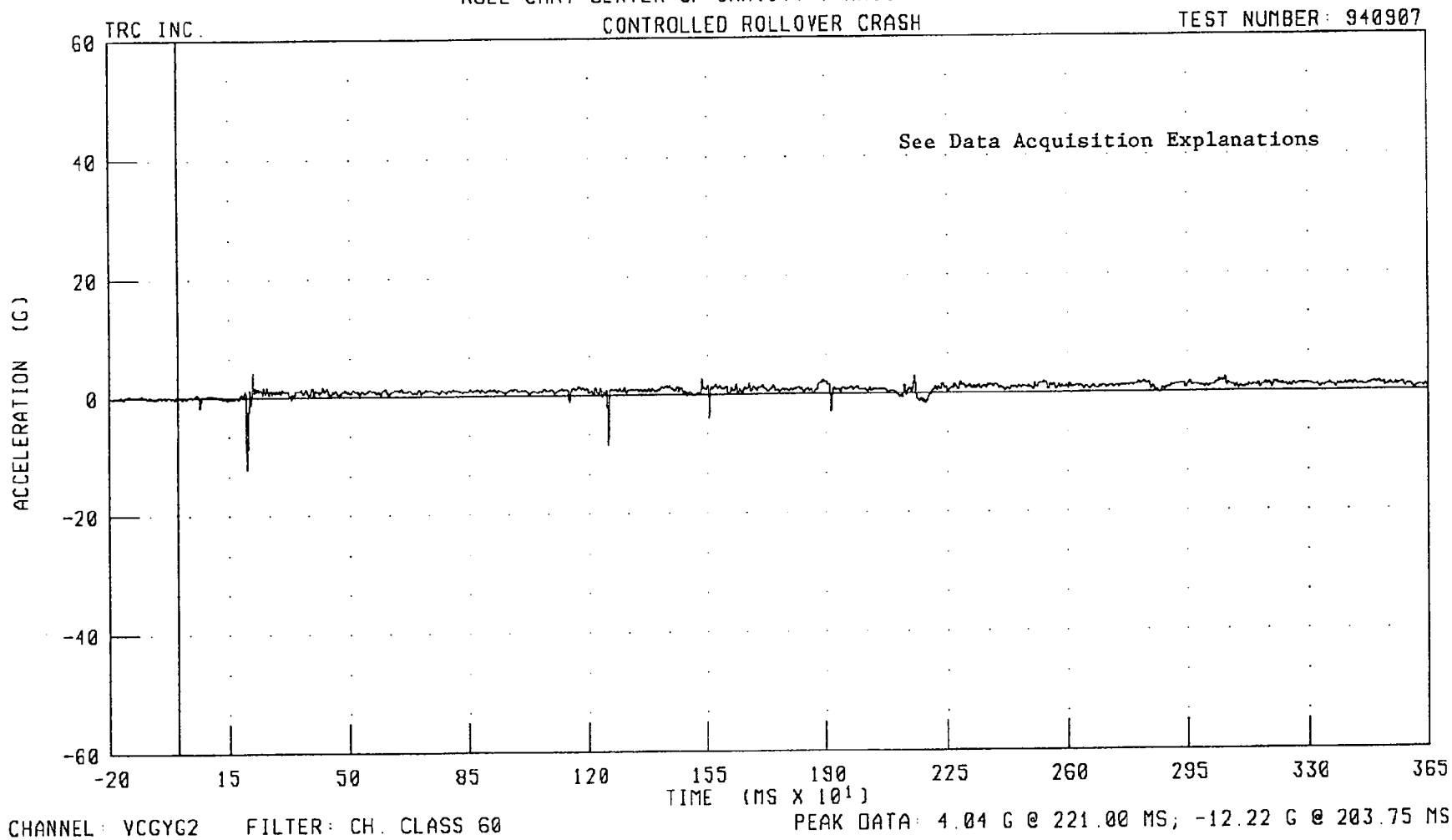
PEAK DATA: 75.27 G @ 794.63 MS; 0.03 G @ 51.13 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
ROLL CART CENTER OF GRAVITY X-AXIS ACCELERATION



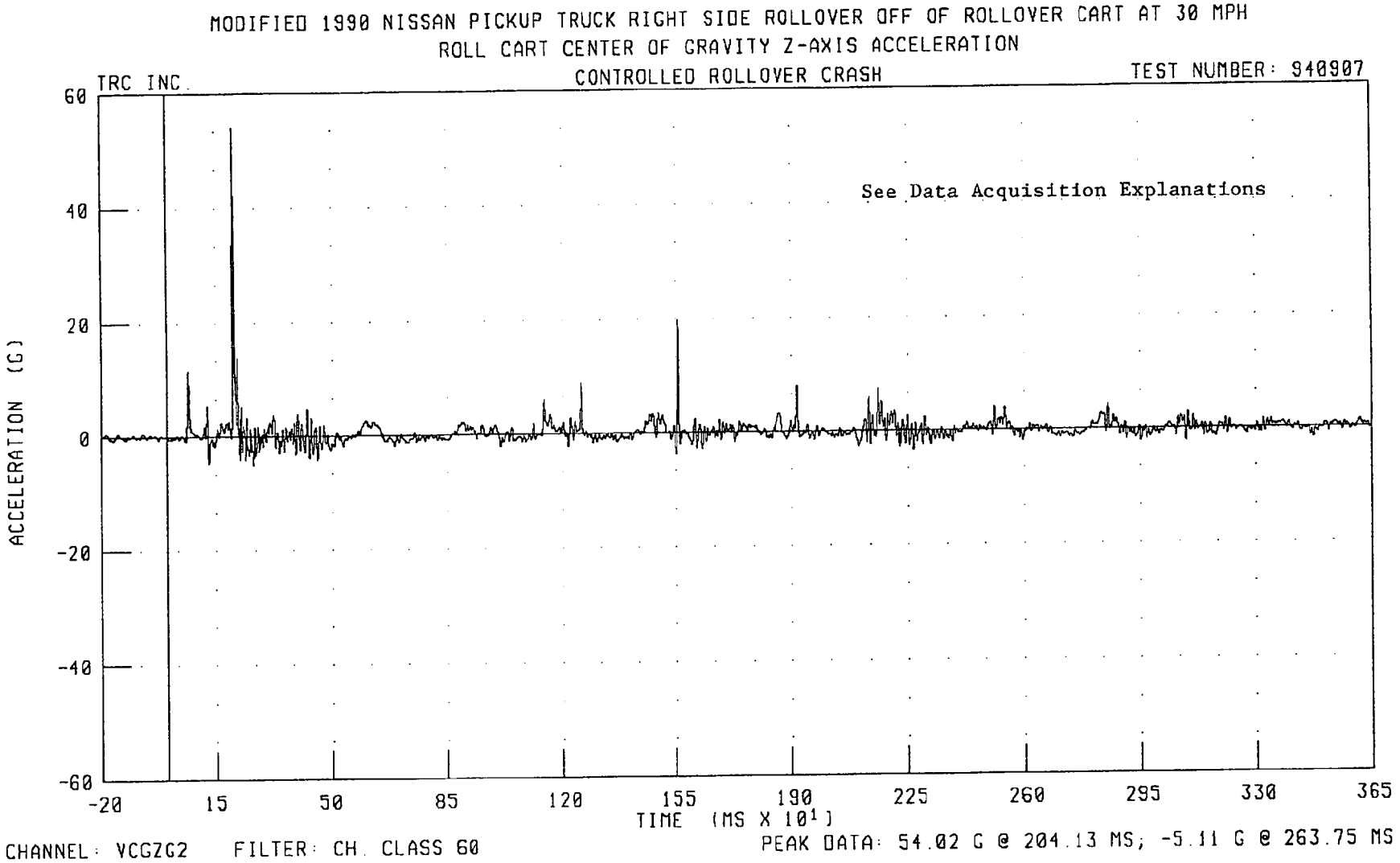
CHANNEL: VCGXG2 FILTER: CH. CLASS 60 PEAK DATA: 11.16 G @ 1259.75 MS; -7.98 G @ 201.50 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
ROLL CART CENTER OF GRAVITY Y-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH

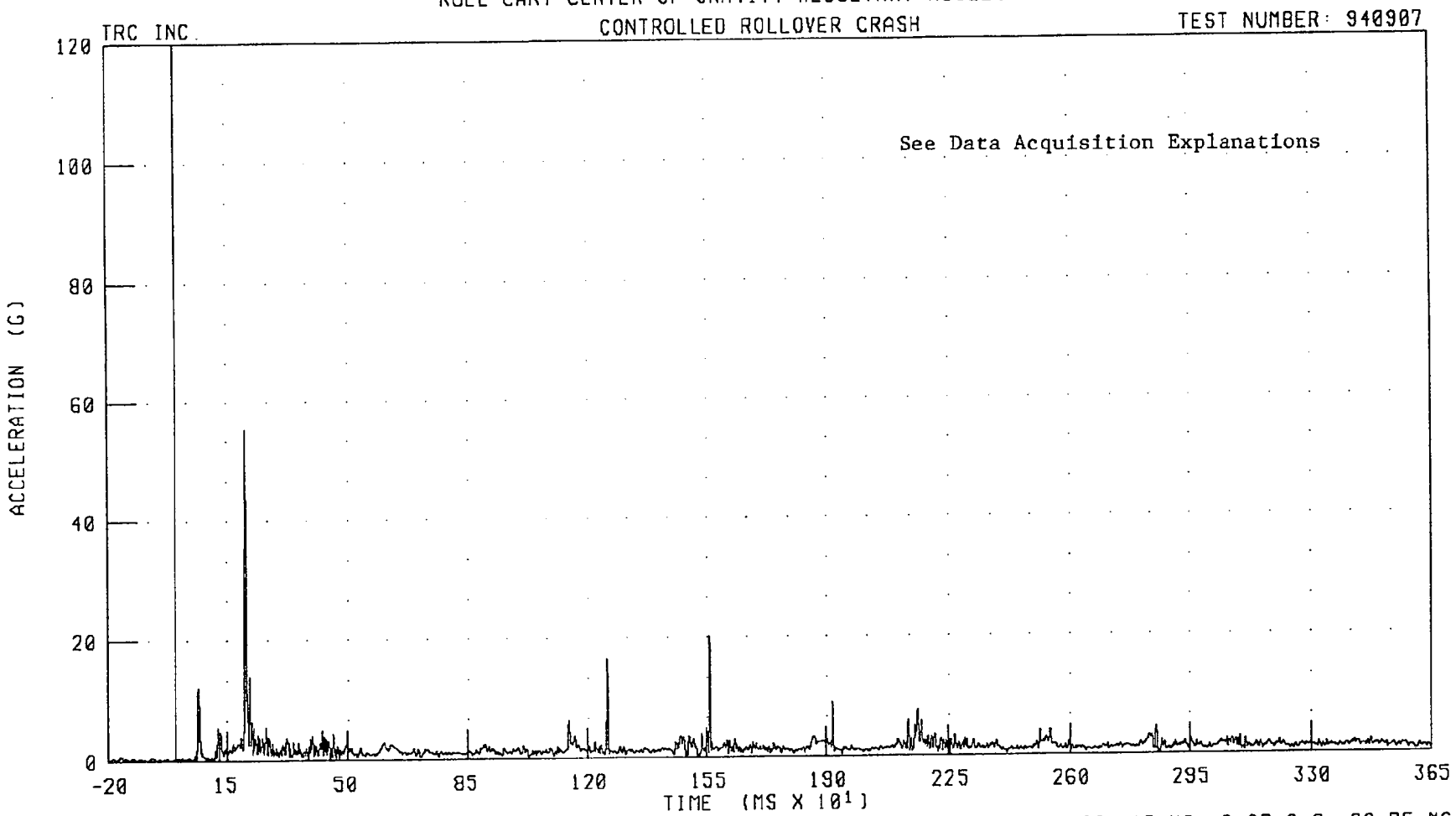


CHANNEL: VCGYG2 FILTER: CH. CLASS 60

PEAK DATA: 4.04 G @ 221.00 MS; -12.22 G @ 203.75 MS

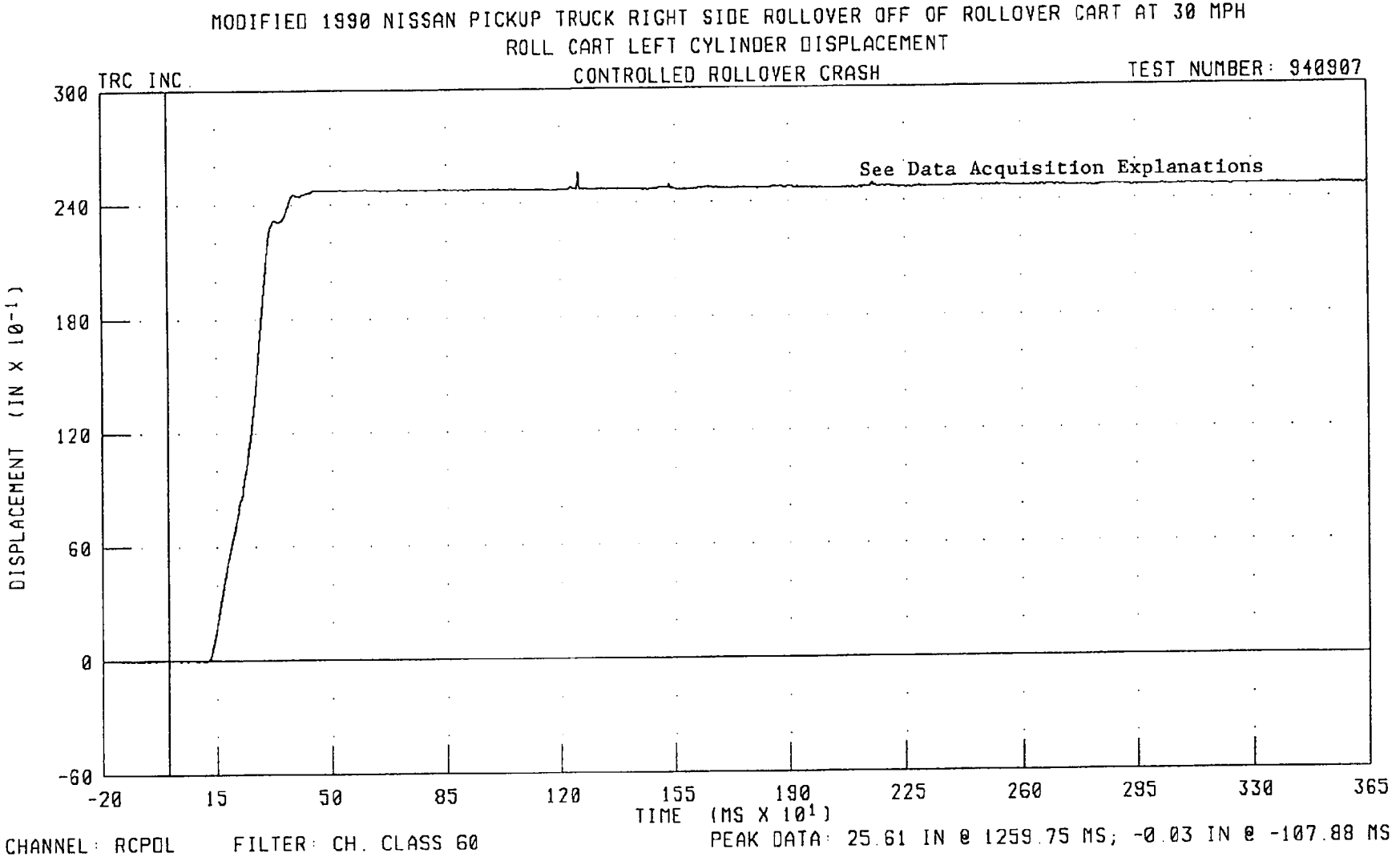

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
ROLL CART CENTER OF GRAVITY Z-AXIS ACCELERATION
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
See Data Acquisition Explanations
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: VCGZG2
FILTER: CH. CLASS 60
PEAK DATA: 54.02 G @ 204.13 MS; -5.11 G @ 263.75 MS

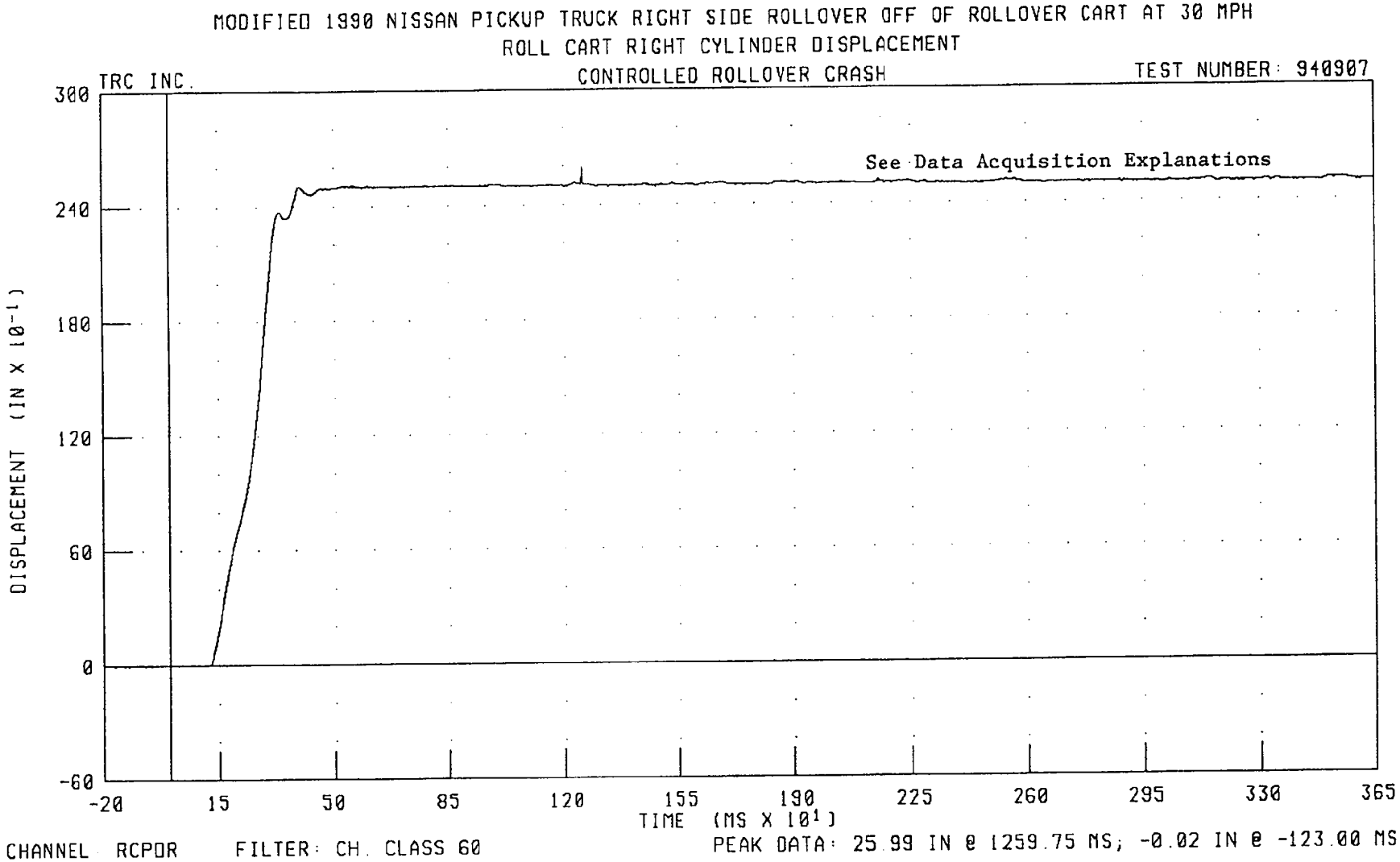
MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
ROLL CART CENTER OF GRAVITY RESULTANT ACCELERATION



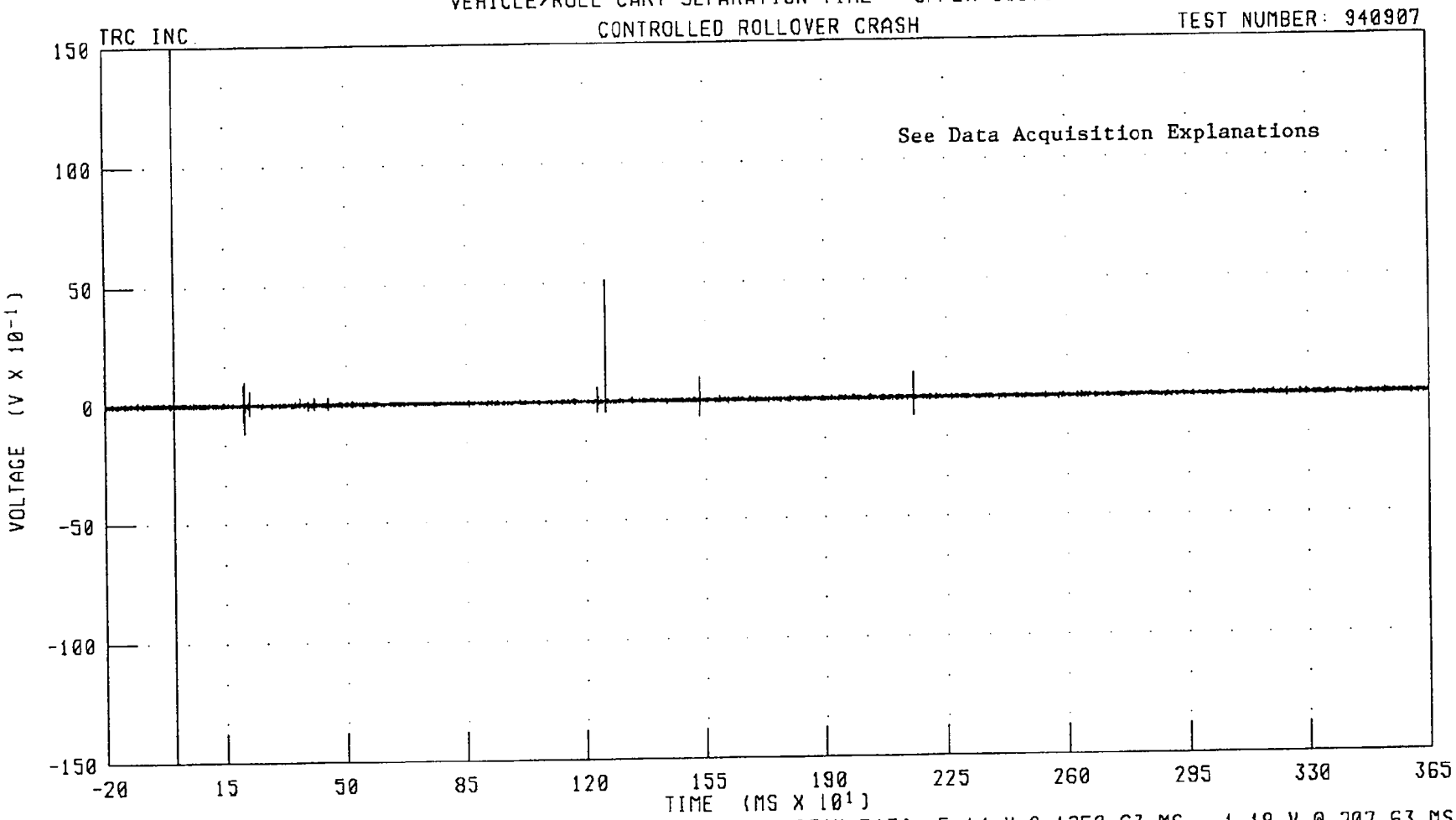
CHANNEL: VCGRG2 FILTER: CH. CLASS 60

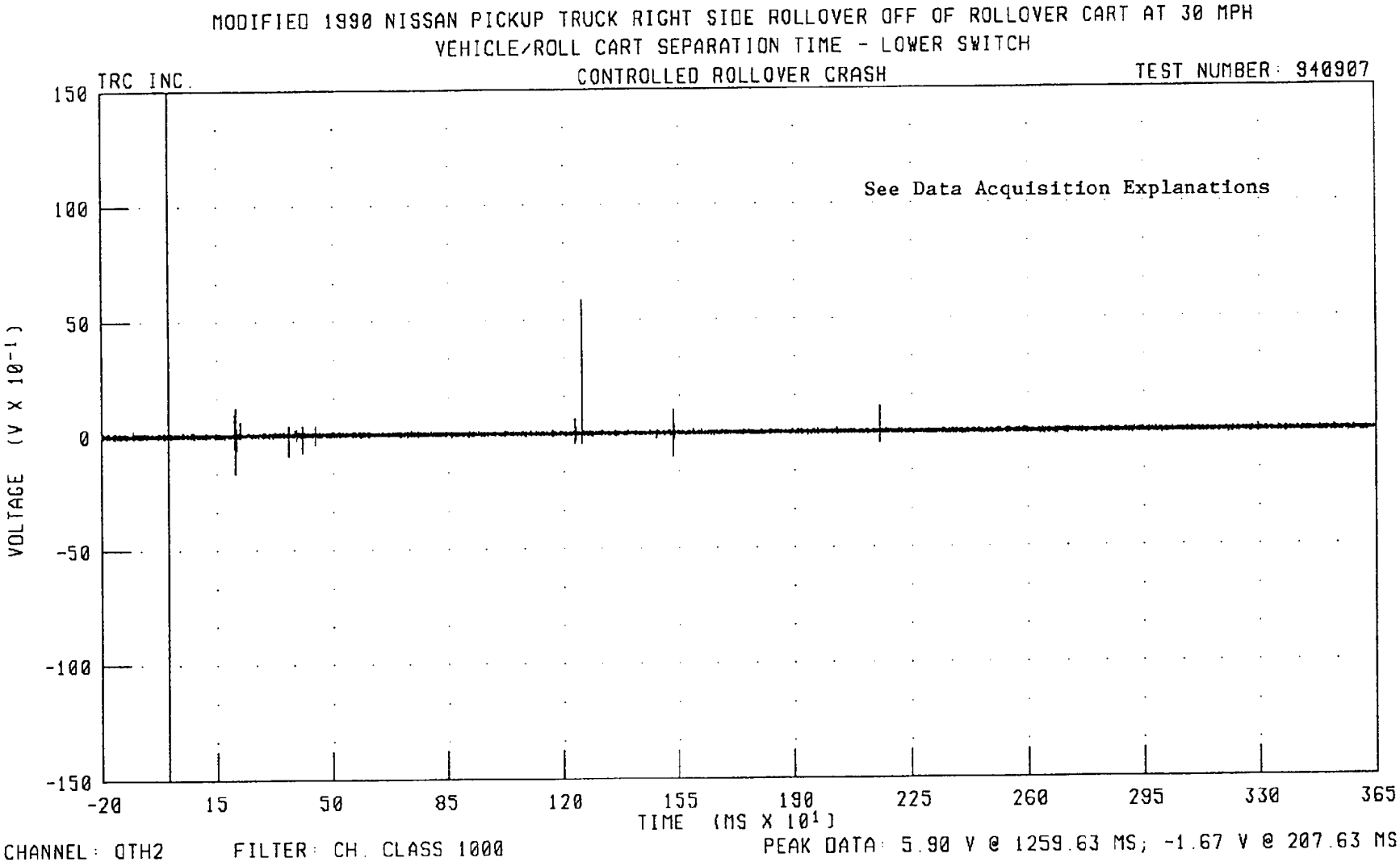
PEAK DATA: 55.46 G @ 204.13 MS; 0.07 G @ -96.75 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
ROLL CART LEFT CYLINDER DISPLACEMENT
CONTROLLED ROLLOVER CRASH
TRC INC
TEST NUMBER: 940907
See Data Acquisition Explanations
DISPLACEMENT (IN X 10-1)
300
240
180
120
60
0
-60
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 101)
CHANNEL: RCPOL
FILTER: CH. CLASS 60
PEAK DATA: 25.61 IN @ 1259.75 MS; -0.03 IN @ -107.88 MS


MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
ROLL CART RIGHT CYLINDER DISPLACEMENT
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
See Data Acquisition Explanations
DISPLACEMENT (IN X 10⁻¹)
300
240
180
120
60
0
-60
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL RCPDR
FILTER: CH. CLASS 60
PEAK DATA: 25.99 IN @ 1259.75 MS; -0.02 IN @ -123.00 MS

MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE/ROLL CART SEPARATION TIME - UPPER SWITCH
CONTROLLED ROLLOVER CRASH




MODIFIED 1990 NISSAN PICKUP TRUCK RIGHT SIDE ROLLOVER OFF OF ROLLOVER CART AT 30 MPH
VEHICLE/ROLL CART SEPARATION TIME - LOWER SWITCH
CONTROLLED ROLLOVER CRASH
TRC INC.
TEST NUMBER: 940907
See Data Acquisition Explanations
VOLTAGE (V X 10⁻¹)
150
100
50
0
-50
-100
-150
-20
15
50
85
120
155
190
225
260
295
330
365
TIME (MS X 10¹)
CHANNEL: DTH2
FILTER: CH. CLASS 1000
PEAK DATA: 5.90 V @ 1259.63 MS; -1.67 V @ 207.63 MS

APPENDIX C

DUMMY CERTIFICATION DATA

PRE-TEST CERTIFICATION DATA

DRIVER DUMMY S/N 043

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
043 HUMANOID 31-AUG-94

TRC INC. TEST NO: 43C9ED1 572E SN043 EXT.DIMENSION CAL09

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	978. MM
WAIST CIRCUMFERENCE	(Z)	836 - 866 MM	861. MM
CHEST DEPTH	(O)	213 - 229 MM	218. MM
H-POINT HEIGHT	(C)	84 - 89 MM	89. MM
H-POINT FROM SEATBACK	(D)	135 - 140 MM	140. MM
SKULL CAP TO BACKLINE	(H)	41 - 46 MM	43. MM
TOTAL SITTING HEIGHT	(A)	879 - 889 MM	879. MM
THIGH CLEARANCE	(F)	140 - 155 MM	155. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	605. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	475. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	429. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	490. MM
FOOT LENGTH	(P)	252 - 267 MM	257. MM
FOOT BREADTH	(W)	91 - 107 MM	97. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84 - 94 MM	91. MM
SHOULDER BREADTH	(V)	422 - 437 MM	424. MM
SHOULDER PIVOT HEIGHT	(B)	506 - 521 MM	511. MM
ELBOW REST HEIGHT	(J)	191 - 211 MM	198. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	343. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	290. MM

DUMMY MEETS SPECIFICATIONS
TECHNICIAN Pete Ex

RUN NUMBER: 090194.1300

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

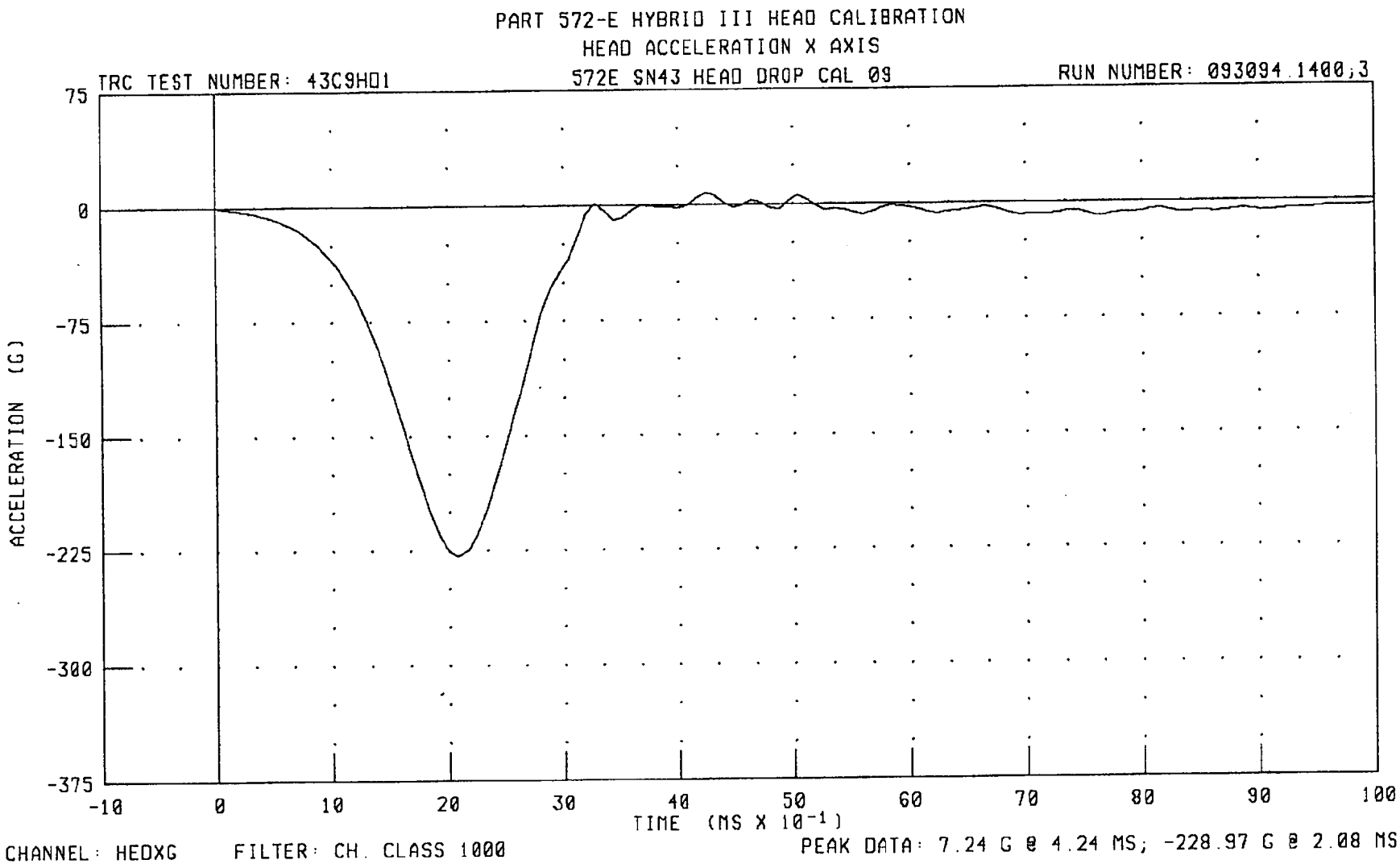
HYBRID III 31-AUG-94

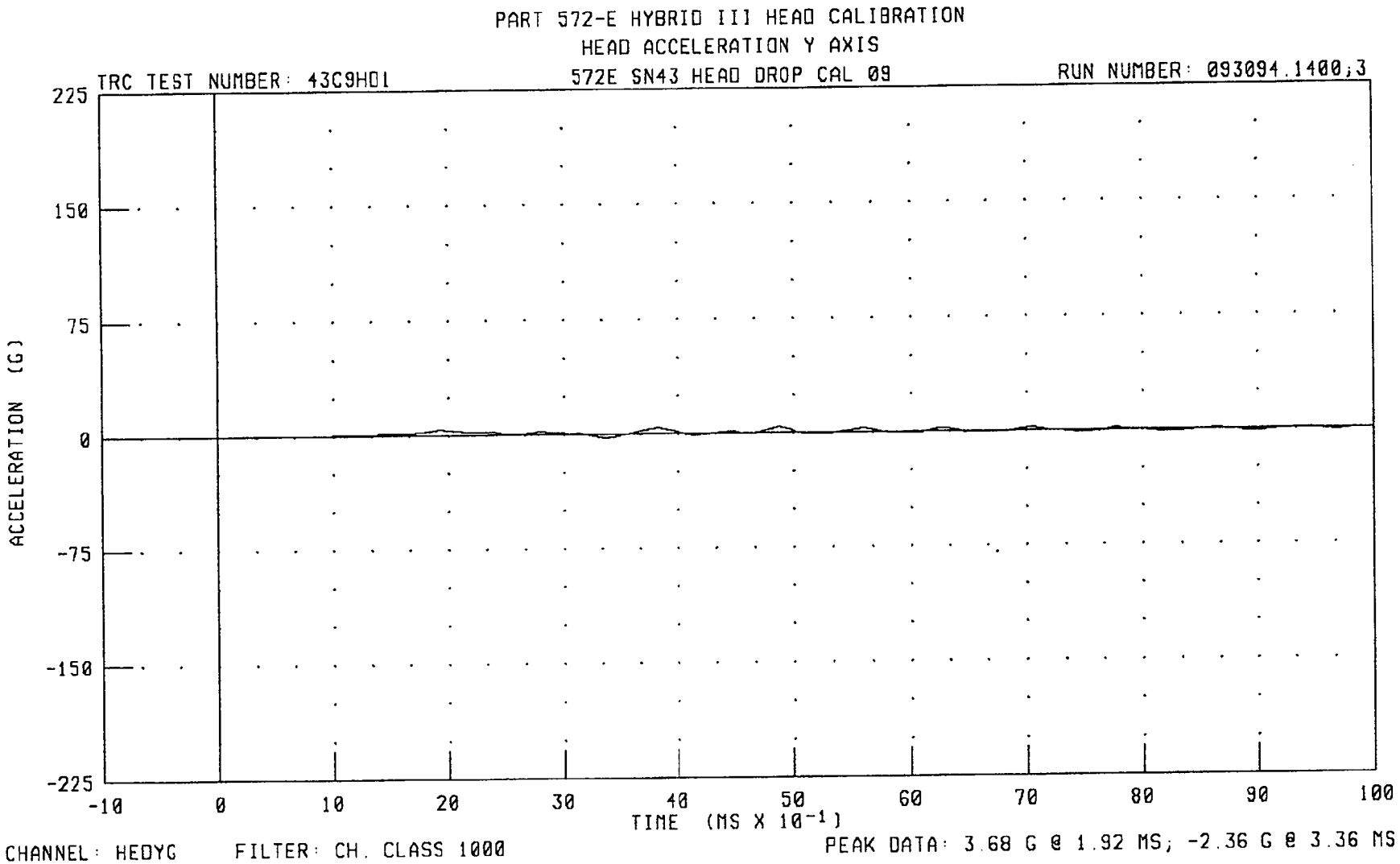
TRC INC. TEST NO: 43C9HD1 572E SN43 HEAD DROP CAL 09

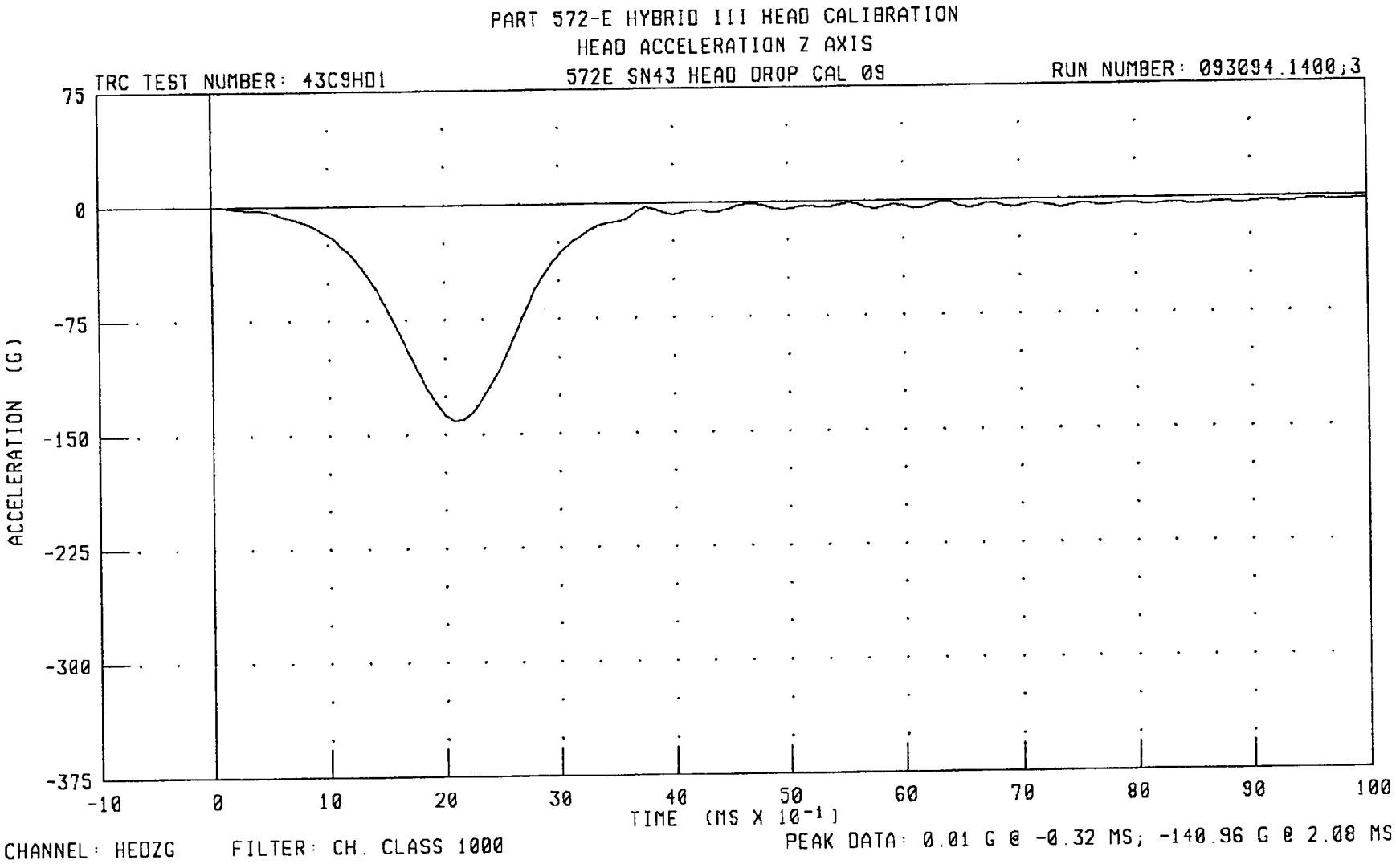
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	60.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	268.89 G
PEAK LATERAL ACCELERATION	15 G MAX	3.67 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

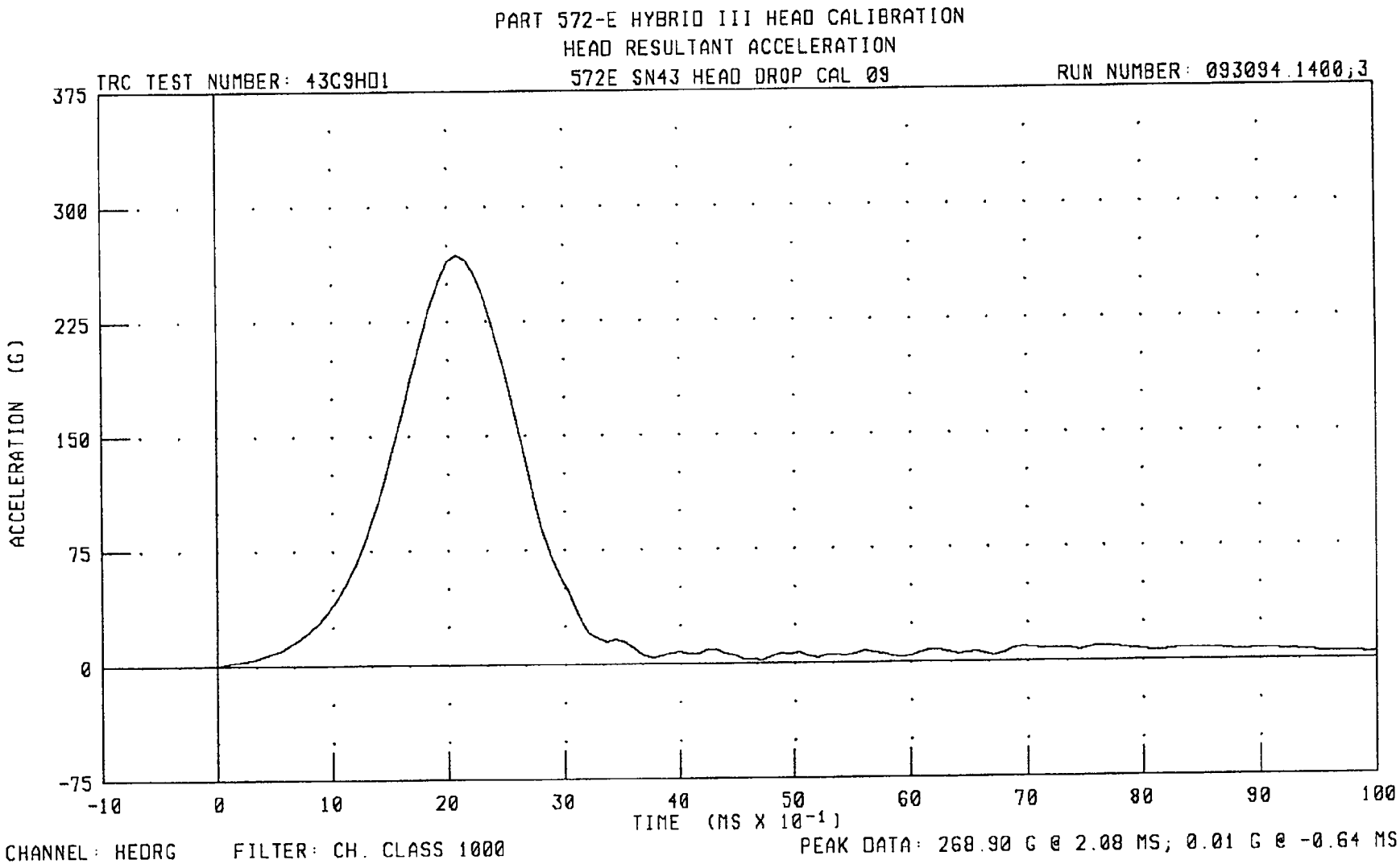
TEST MEETS SPECIFICATIONS

TECHNICIAN Peter Foss RUN NUMBER: 083194.1511;3


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
572E SN43 HEAD DROP CAL 09
TRC TEST NUMBER: 43C9H01
RUN NUMBER: 093094.1400;3
75
0
-75
-150
-225
-300
-375
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDXG
FILTER: CH. CLASS 1000
PEAK DATA: 7.24 G @ 4.24 MS; -228.97 G @ 2.08 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS
TRC TEST NUMBER: 43C9H01
572E SN43 HEAD DROP CAL 09
RUN NUMBER: 093094.1400;3
225
150
75
0
-75
-150
-225
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDYG
FILTER: CH. CLASS 1000
PEAK DATA: 3.68 G @ 1.92 MS; -2.36 G @ 3.36 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS
572E SN43 HEAD DROP CAL 09
TRC TEST NUMBER: 43C9HD1
RUN NUMBER: 093094.1400;3
75
0
-75
-150
-225
-300
-375
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDZG
FILTER: CH. CLASS 1000
PEAK DATA: 0.01 G @ -0.32 MS; -140.96 G @ 2.08 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
TRC TEST NUMBER: 43C9H01
572E SN43 HEAD DROP CAL 09
RUN NUMBER: 093094.1400;3
ACCELERATION (G)
375
300
225
150
75
0
-75
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDRG
FILTER: CH. CLASS 1000
PEAK DATA: 268.90 G @ 2.08 MS; 0.01 G @ -0.64 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

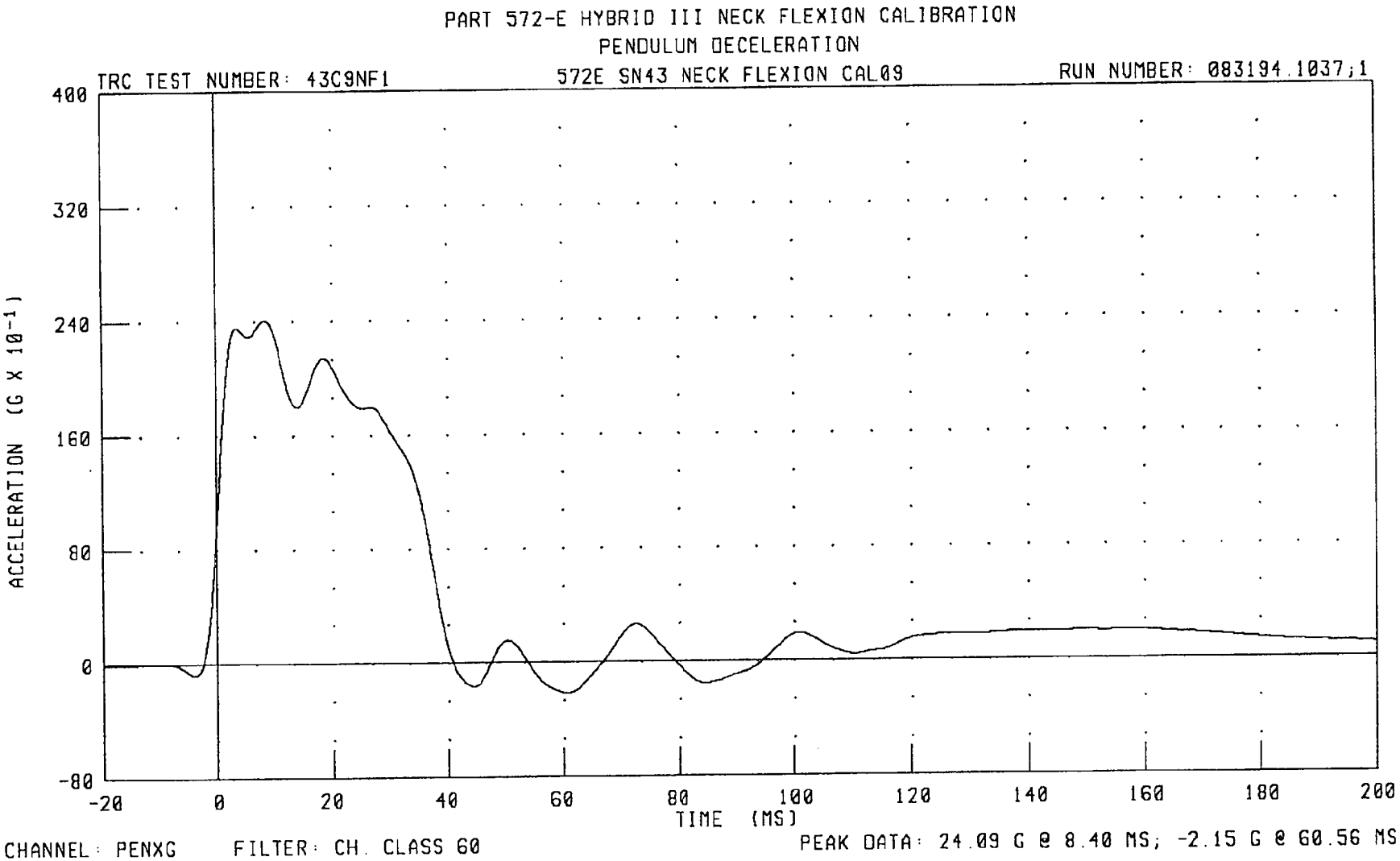
HYBRID III 31-AUG-94

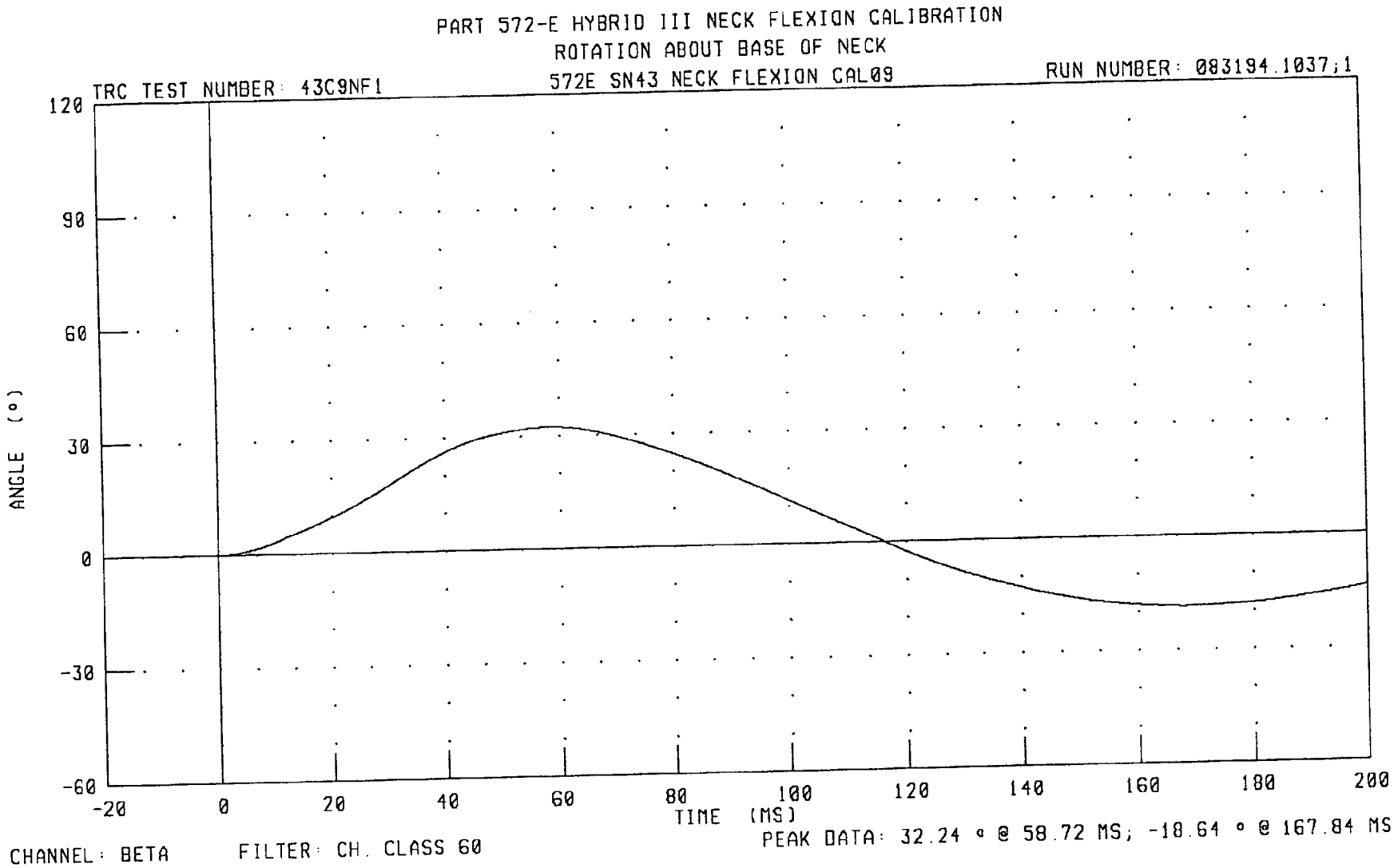
TRC INC. TEST NO: 43C9NF1 572E SN43 NECK FLEXION CAL09

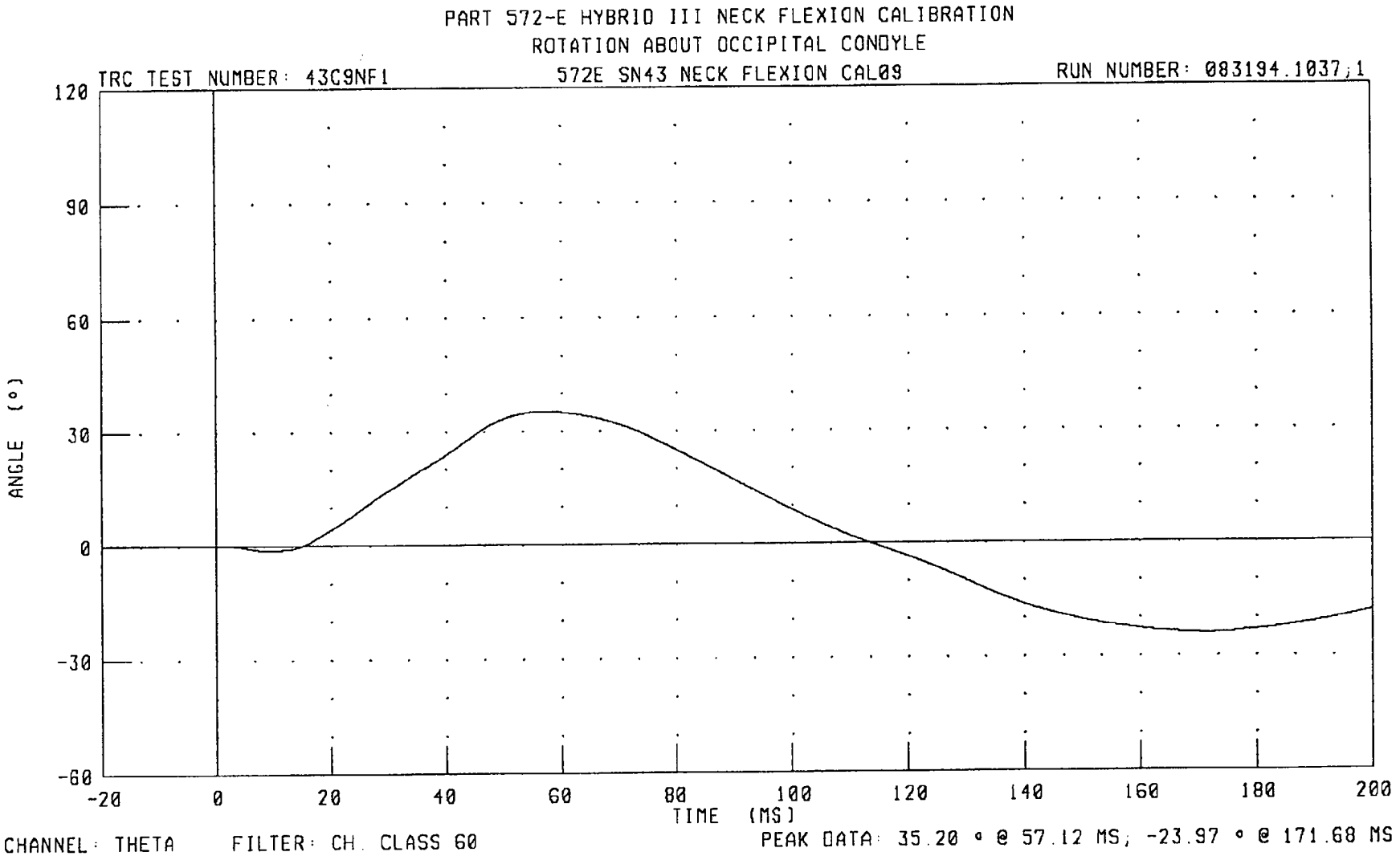
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	60.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.10 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.10 G
	20 MS	17.60 - 22.60 G	20.77 G
	30 MS	12.50 - 18.50 G	16.29 G
MAX PENDULUM G		29 G MAX	24.09 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.24 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.08 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	67.40 DEG.
	TIME	57 - 64 MS	57.68 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	97.04 NM
	TIME	47 - 58 MS	51.04 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	115.04 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	97.36 MS

TEST MEETS SPECIFICATIONS

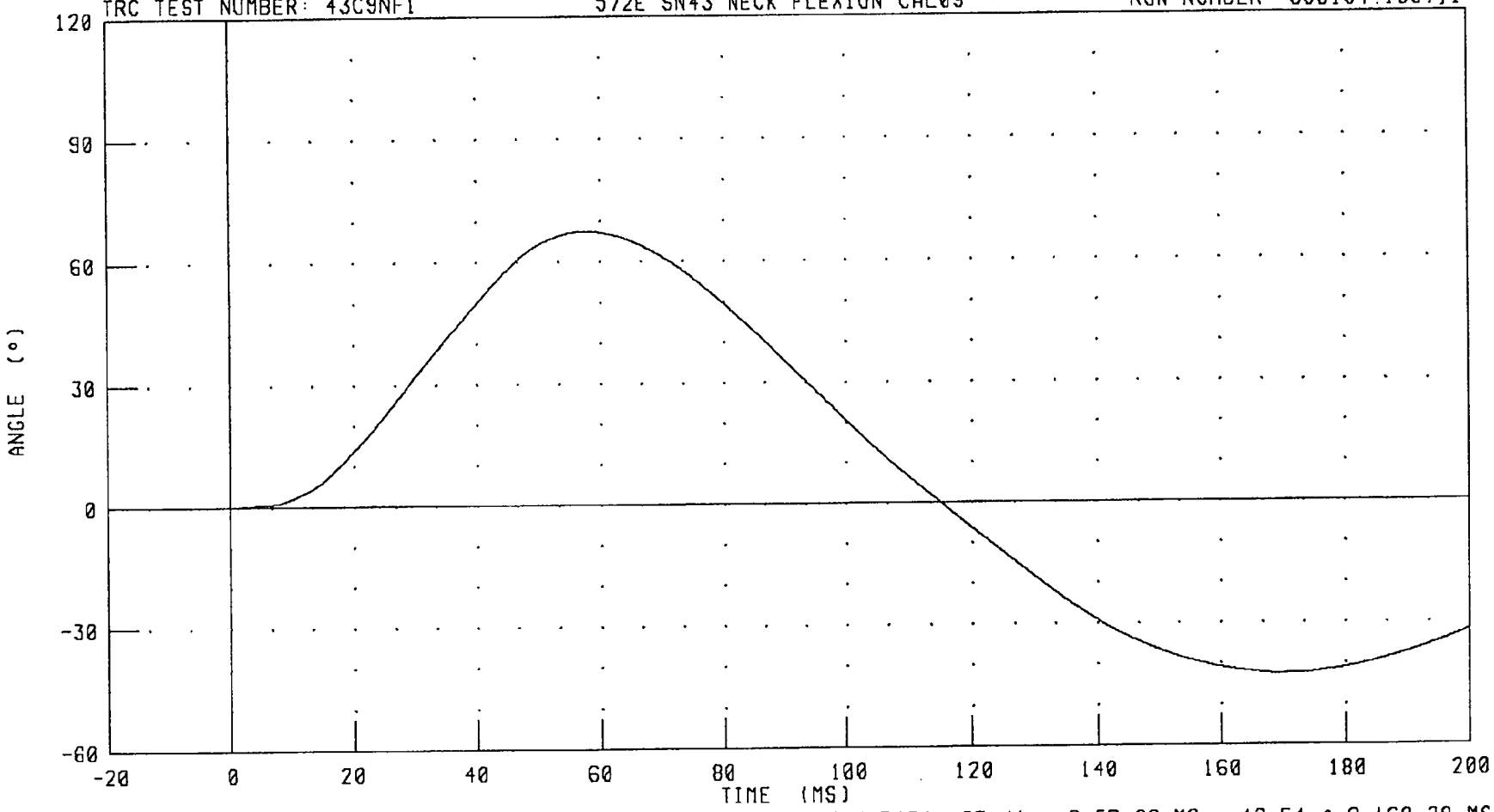
TECHNICIAN Peter Fox RUN NUMBER: 083194.1036;1


PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 43C9NF1
572E SN43 NECK FLEXION CAL09
RUN NUMBER: 083194.1037;1
ACCELERATION (G X 10⁻¹)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 24.09 G @ 8.40 MS; -2.15 G @ 60.56 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK
572E SN43 NECK FLEXION CAL09
TRC TEST NUMBER: 43C9NF1
RUN NUMBER: 083194.1037;1
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 32.24 ° @ 58.72 MS; -18.64 ° @ 167.84 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 43C9NF1
572E SN43 NECK FLEXION CAL09
RUN NUMBER: 083194.1037;1
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: THETA
FILTER: CH. CLASS 60
PEAK DATA: 35.20 ° @ 57.12 MS; -23.97 ° @ 171.68 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION



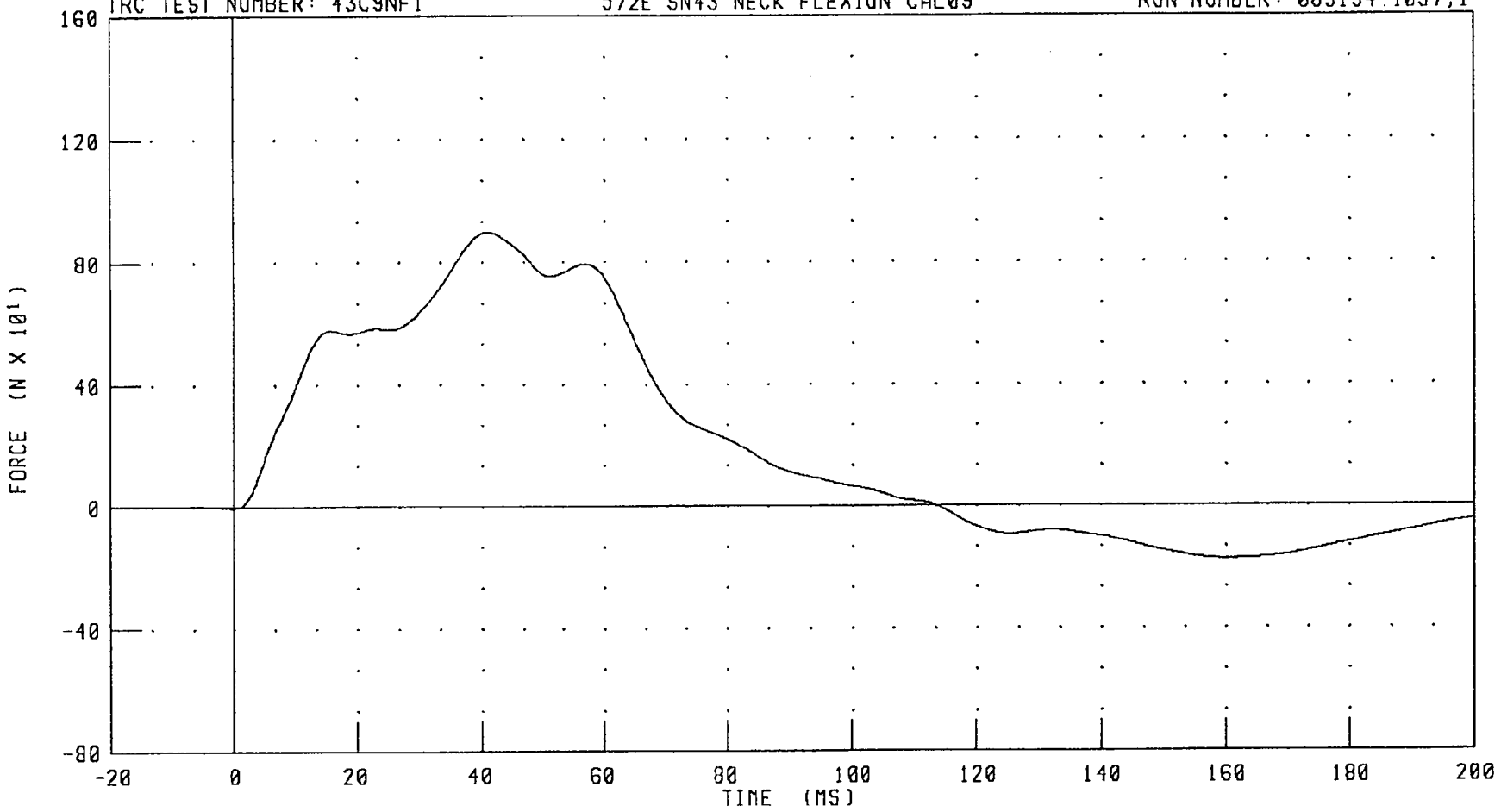
CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 67.41 ° @ 57.68 MS; -42.54 ° @ 169.28 MS

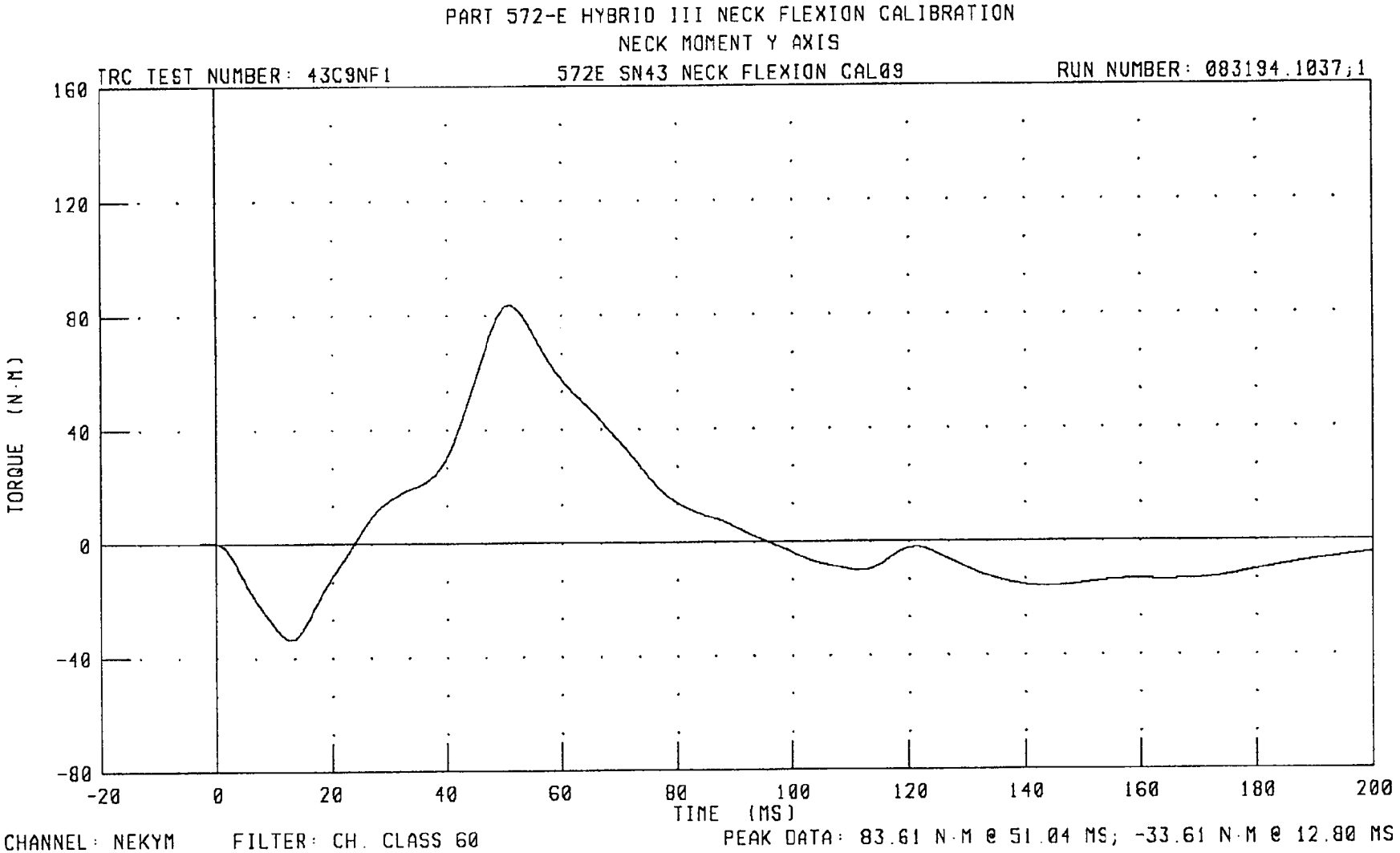
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

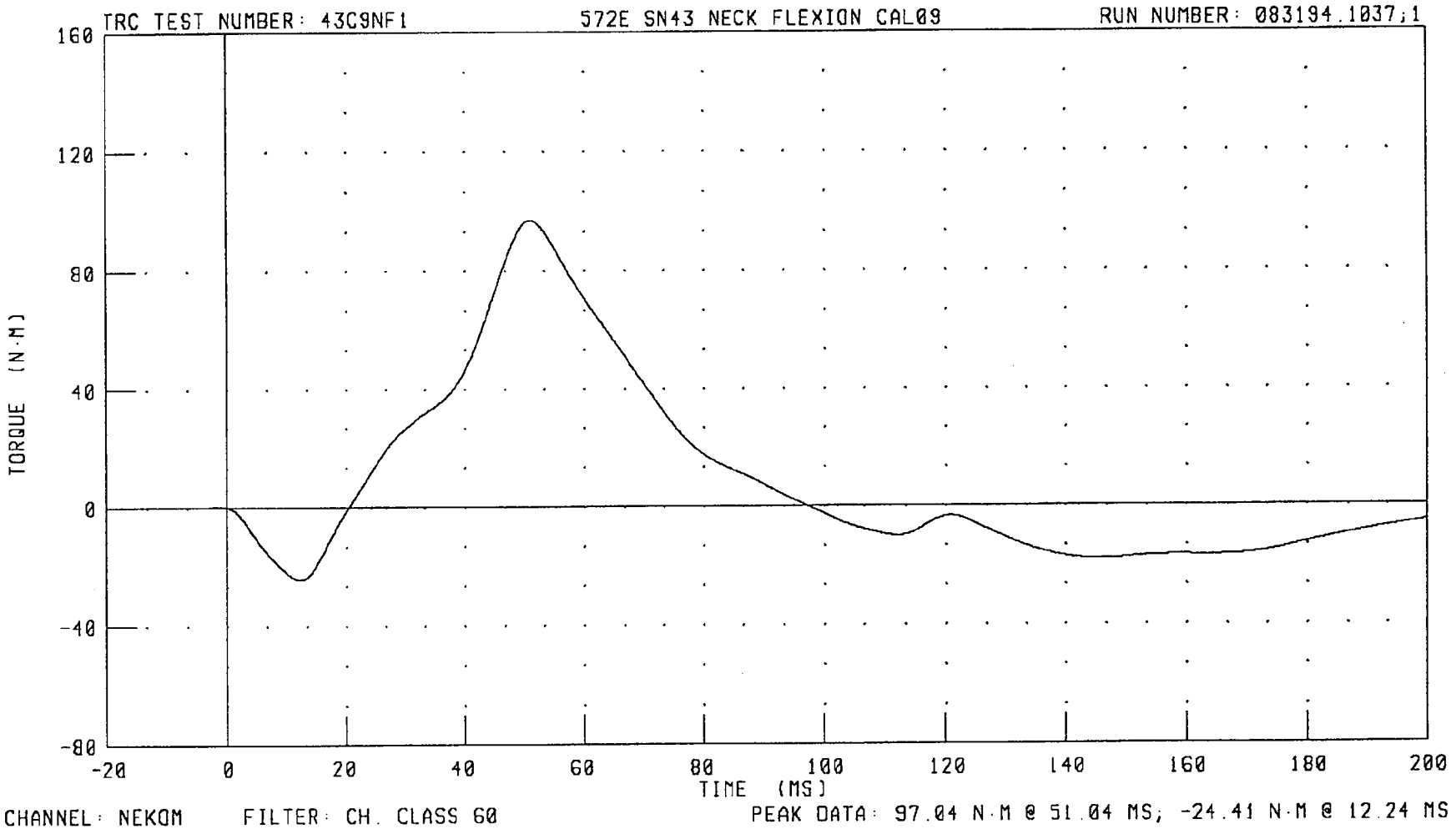
TRC TEST NUMBER: 43C9NF1 572E SN43 NECK FLEXION CAL09 RUN NUMBER: 083194.1037;1



CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 899.33 N @ 40.88 MS; -174.41 N @ 160.24 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 43C9NF1
572E SN43 NECK FLEXION CAL09
RUN NUMBER: 083194.1037;1
160
120
80
40
0
-40
-80
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKYM
FILTER: CH. CLASS 60
PEAK DATA: 83.61 N-M @ 51.04 MS; -33.61 N-M @ 12.80 MS

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



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 97.04 N·M @ 51.04 MS; -24.41 N·M @ 12.24 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III 31-AUG-94

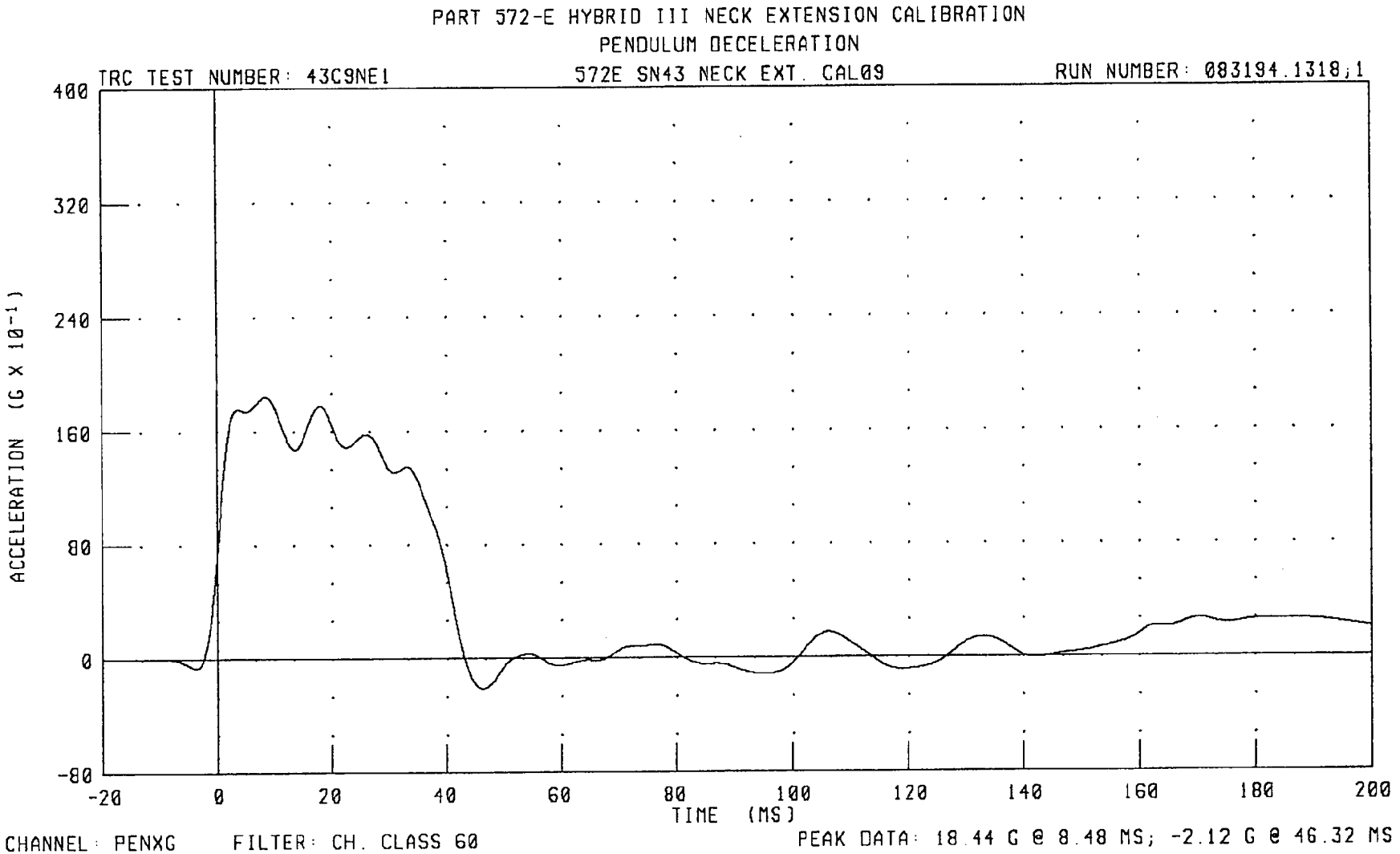
TRC INC. TEST NO: 43C9NE1 572E SN43 NECK EXT. CAL09

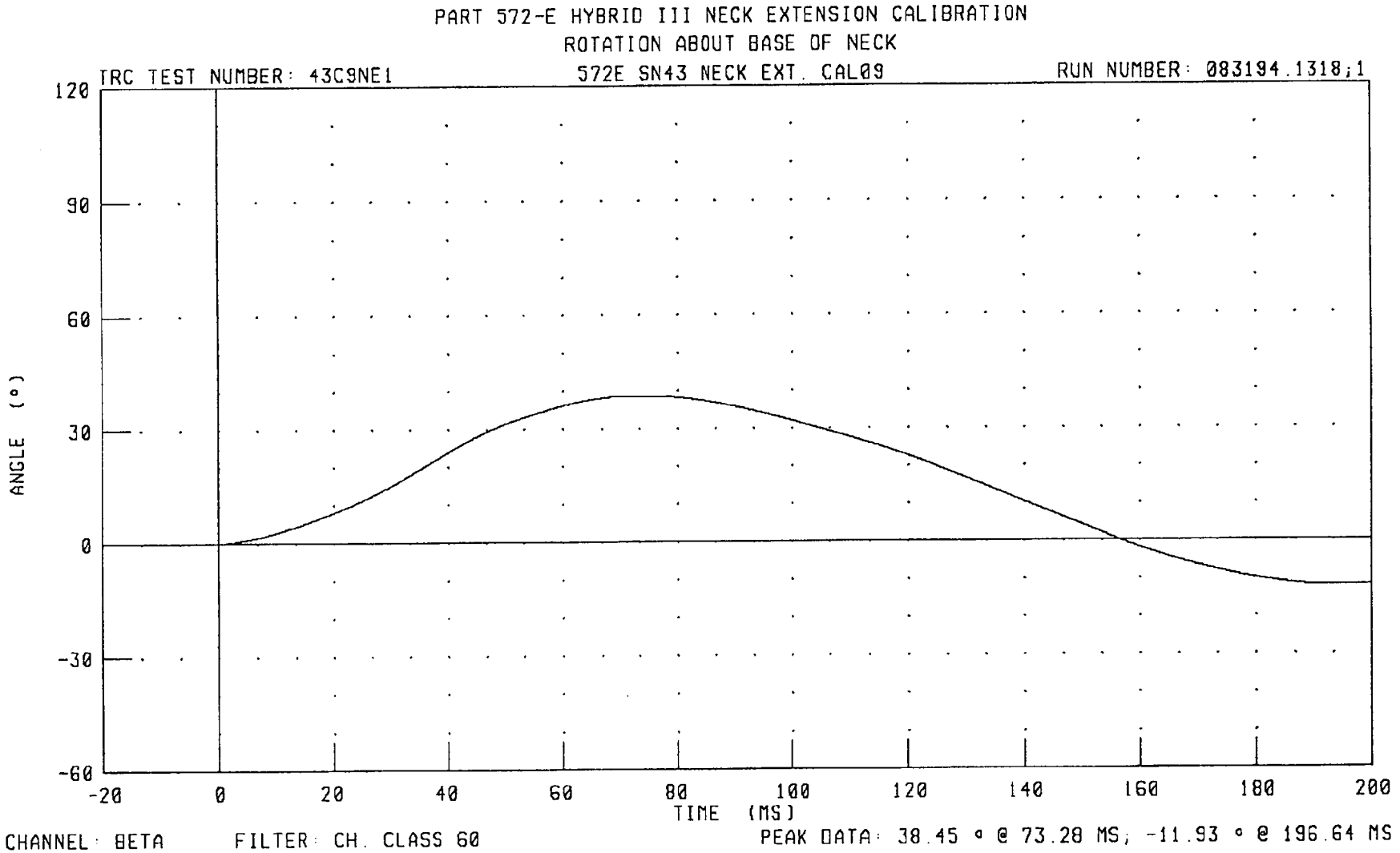
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	60.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.76 G
	20 MS	14.00 - 19.00 G	16.51 G
	30 MS	11.00 - 16.00 G	13.30 G
MAX PENDULUM G		22 G MAX	18.44 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.48 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.56 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	90.86 DEG.
	TIME	72 - 82 MS	74.96 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-58.19 NM
	TIME	65 - 79 MS	69.84 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	156.72 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	135.60 MS

TEST MEETS SPECIFICATIONS

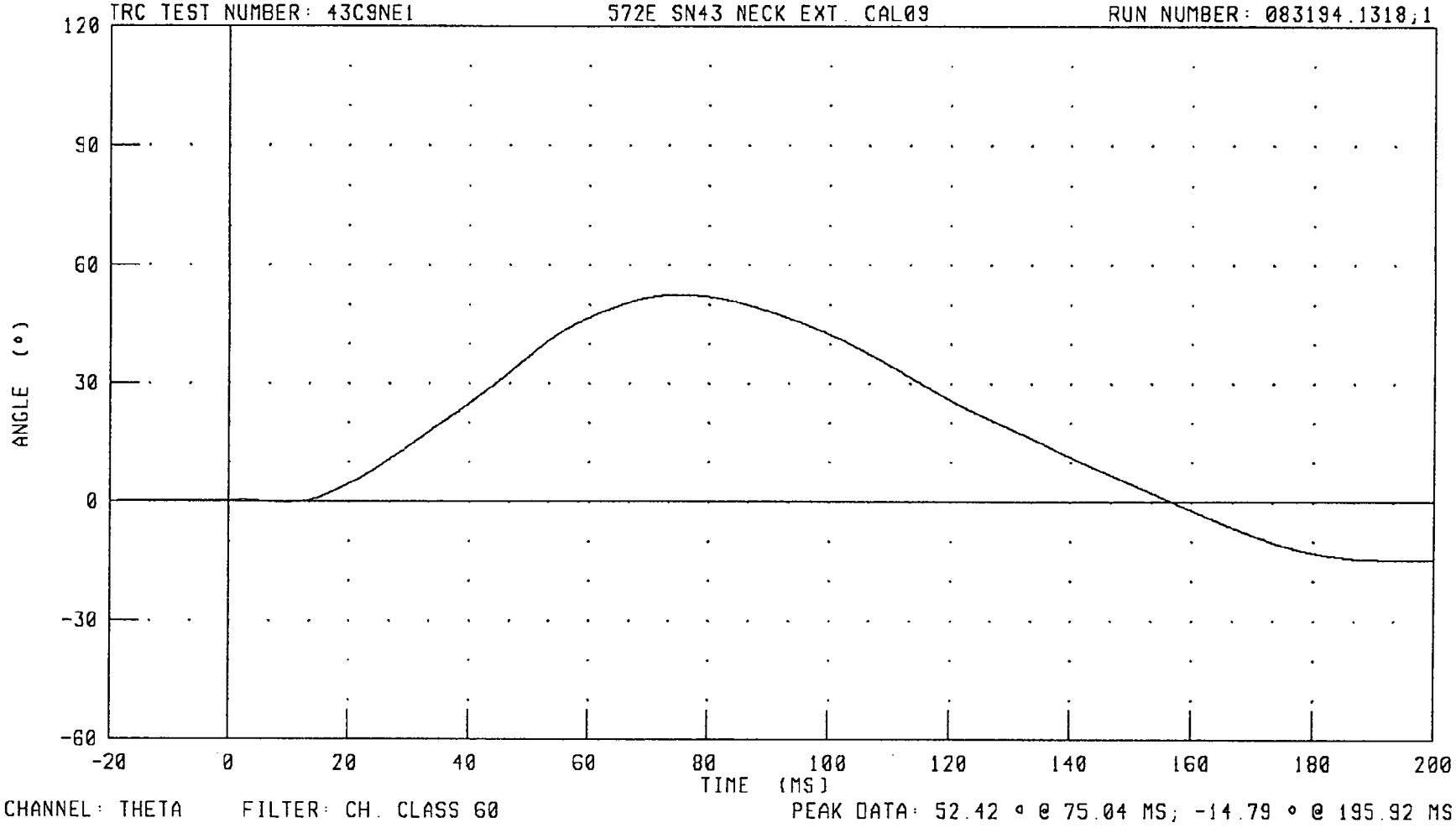
TECHNICIAN Pete Fox

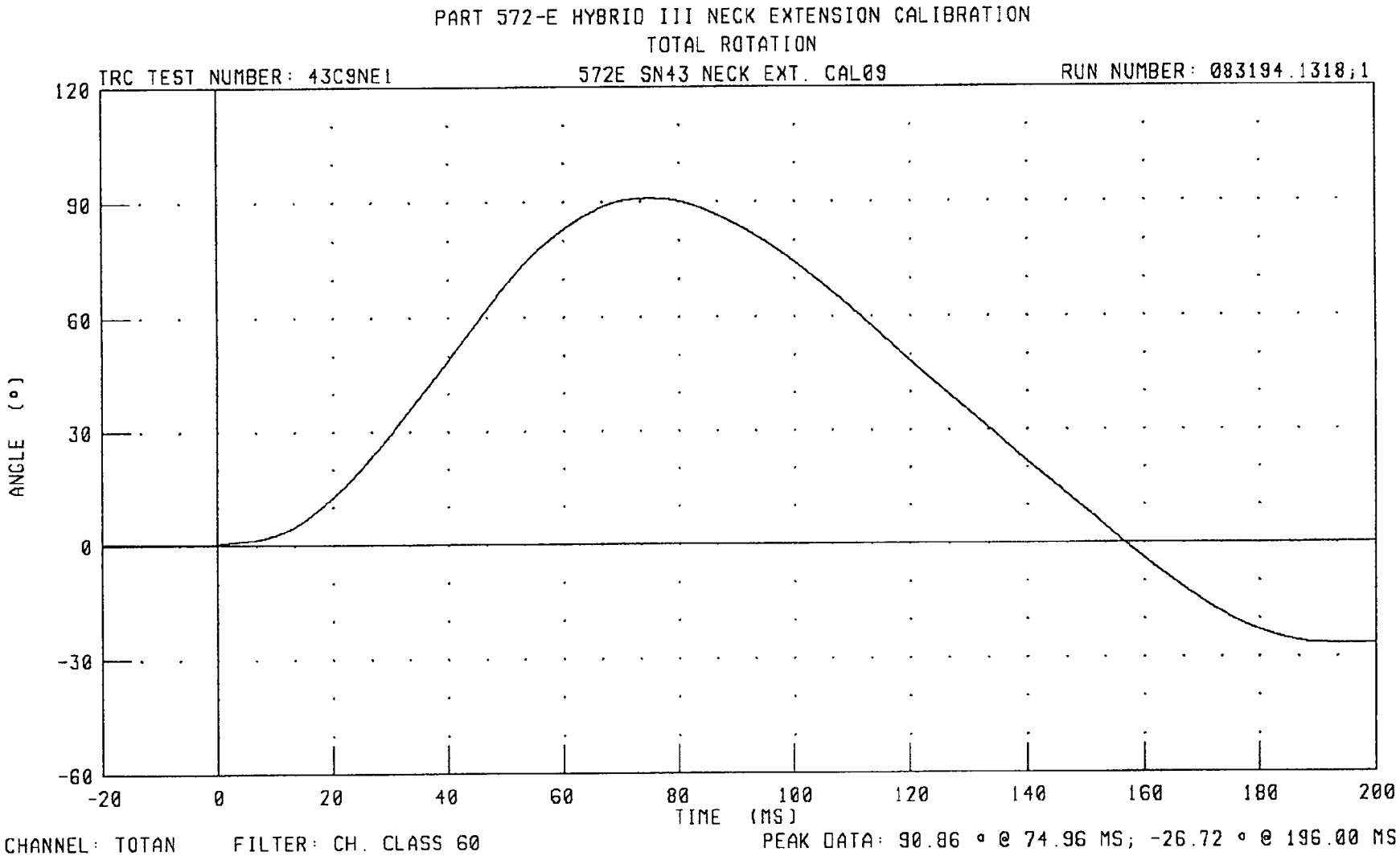
RUN NUMBER: 083194.1314;1

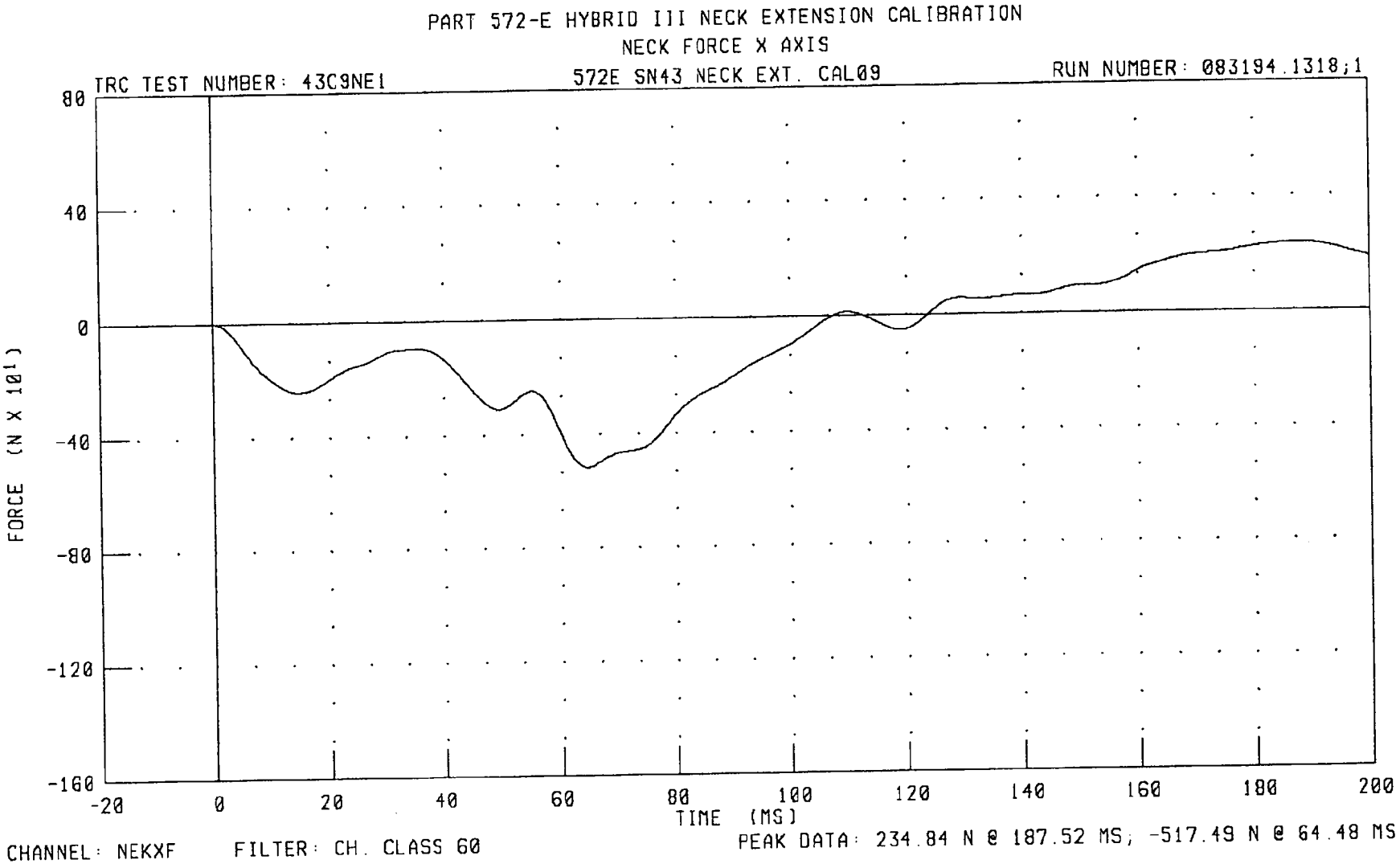

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 43C9NE1
572E SN43 NECK EXT. CAL09
RUN NUMBER: 083194.1318;1
ACCELERATION (G X 10⁻¹)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 18.44 G @ 8.48 MS; -2.12 G @ 46.32 MS

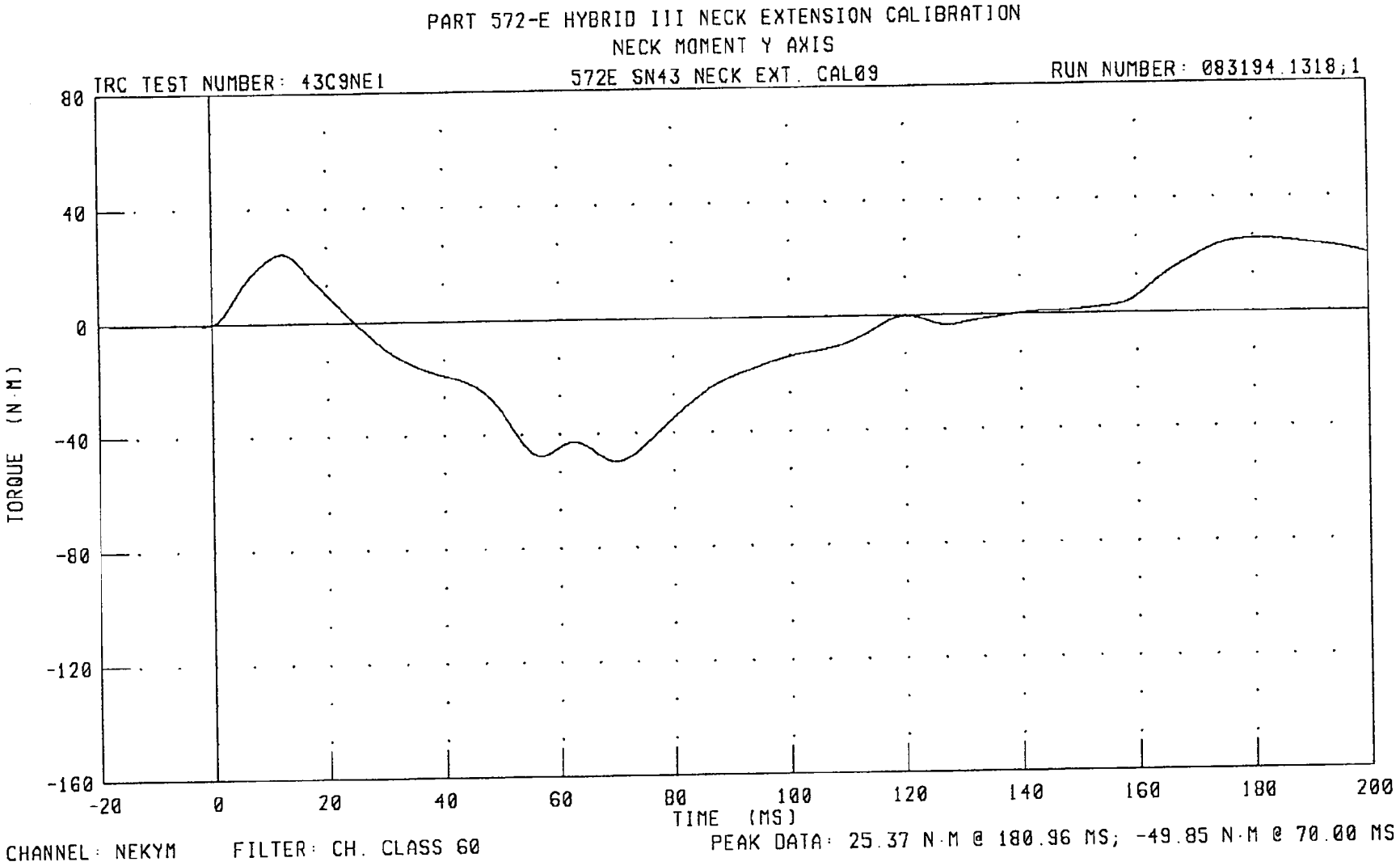

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK
TRC TEST NUMBER: 43C9NE1
572E SN43 NECK EXT. CAL09
RUN NUMBER: 083194.1318;1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 38.45 ° @ 73.28 MS; -11.93 ° @ 196.64 MS

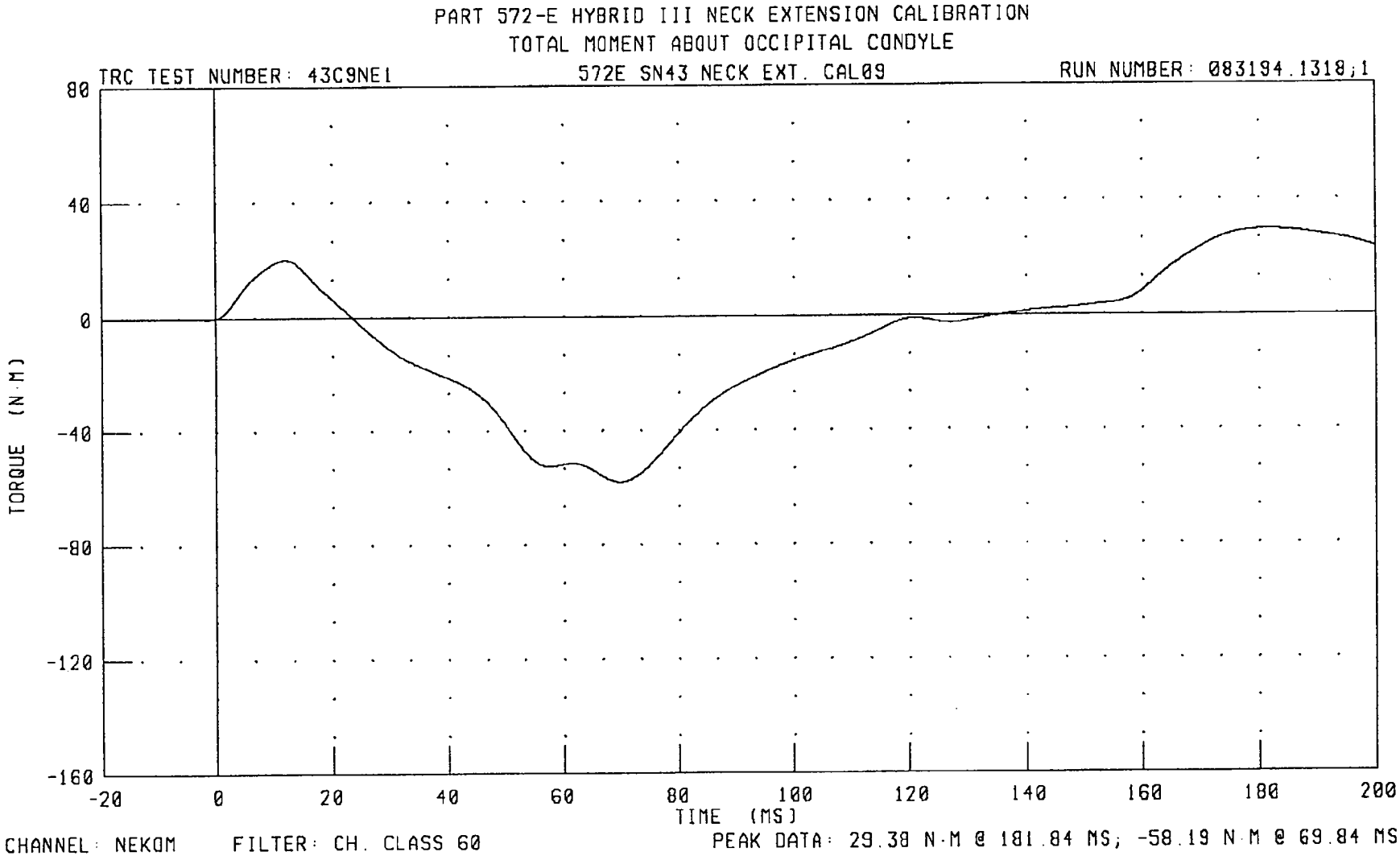
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE




PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION
TRC TEST NUMBER: 43C9NE1
572E SN43 NECK EXT. CAL09
RUN NUMBER: 083194.1318;1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: TOTAN
FILTER: CH. CLASS 60
PEAK DATA: 90.86 ° @ 74.96 MS; -26.72 ° @ 196.00 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 43C9NE1
572E SN43 NECK EXT. CAL09
RUN NUMBER: 083194.1318;1
80
40
0
-40
-80
-120
-160
FORCE (N X 10¹)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKXF
FILTER: CH. CLASS 60
PEAK DATA: 234.84 N @ 187.52 MS; -517.49 N @ 64.48 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 43C9NE1
572E SN43 NECK EXT. CAL09
RUN NUMBER: 083194.1318;1
80
40
0
-40
-80
-120
-160
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKYM
FILTER: CH. CLASS 60
PEAK DATA: 25.37 N-M @ 180.96 MS; -49.85 N-M @ 70.00 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 43C9NE1
572E SN43 NECK EXT. CAL09
RUN NUMBER: 083194.1318;1
80
40
0
-40
-80
-120
-160
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 29.38 N-M @ 181.84 MS; -58.19 N-M @ 69.84 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

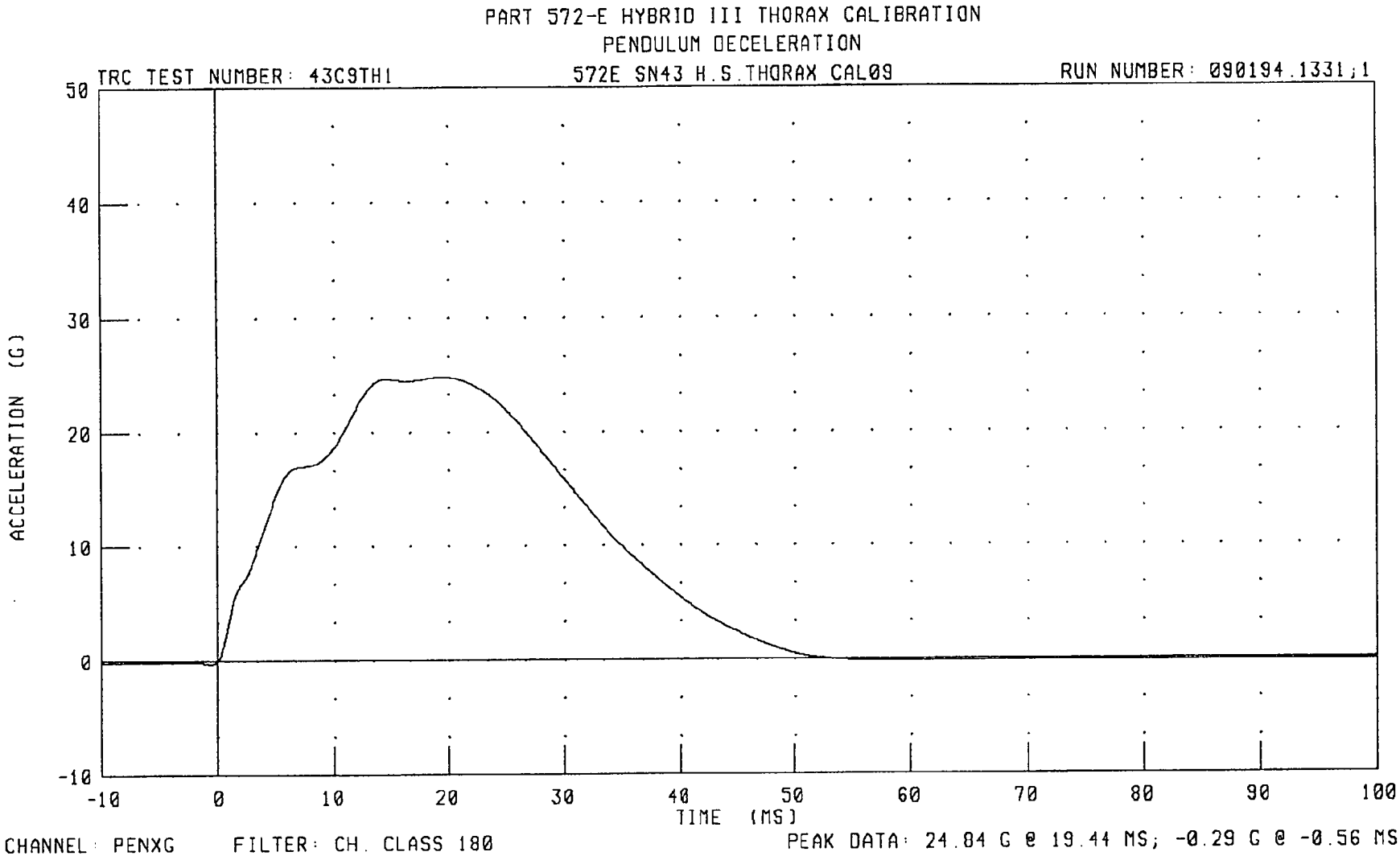
HYBRID III 01-SEP-94

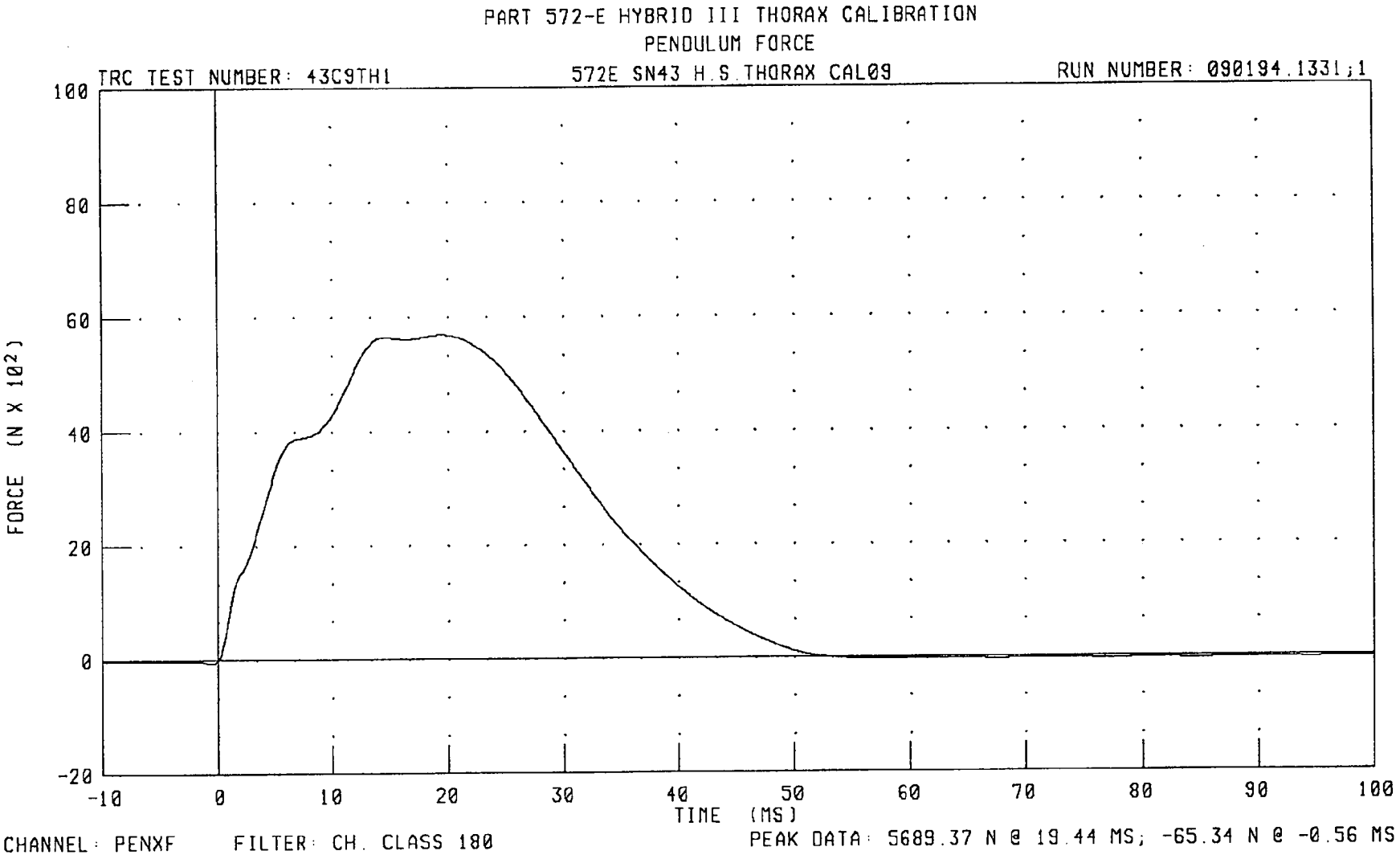
TRC INC. TEST NO: 43C9TH1 572E SN43 H.S.THORAX CAL09

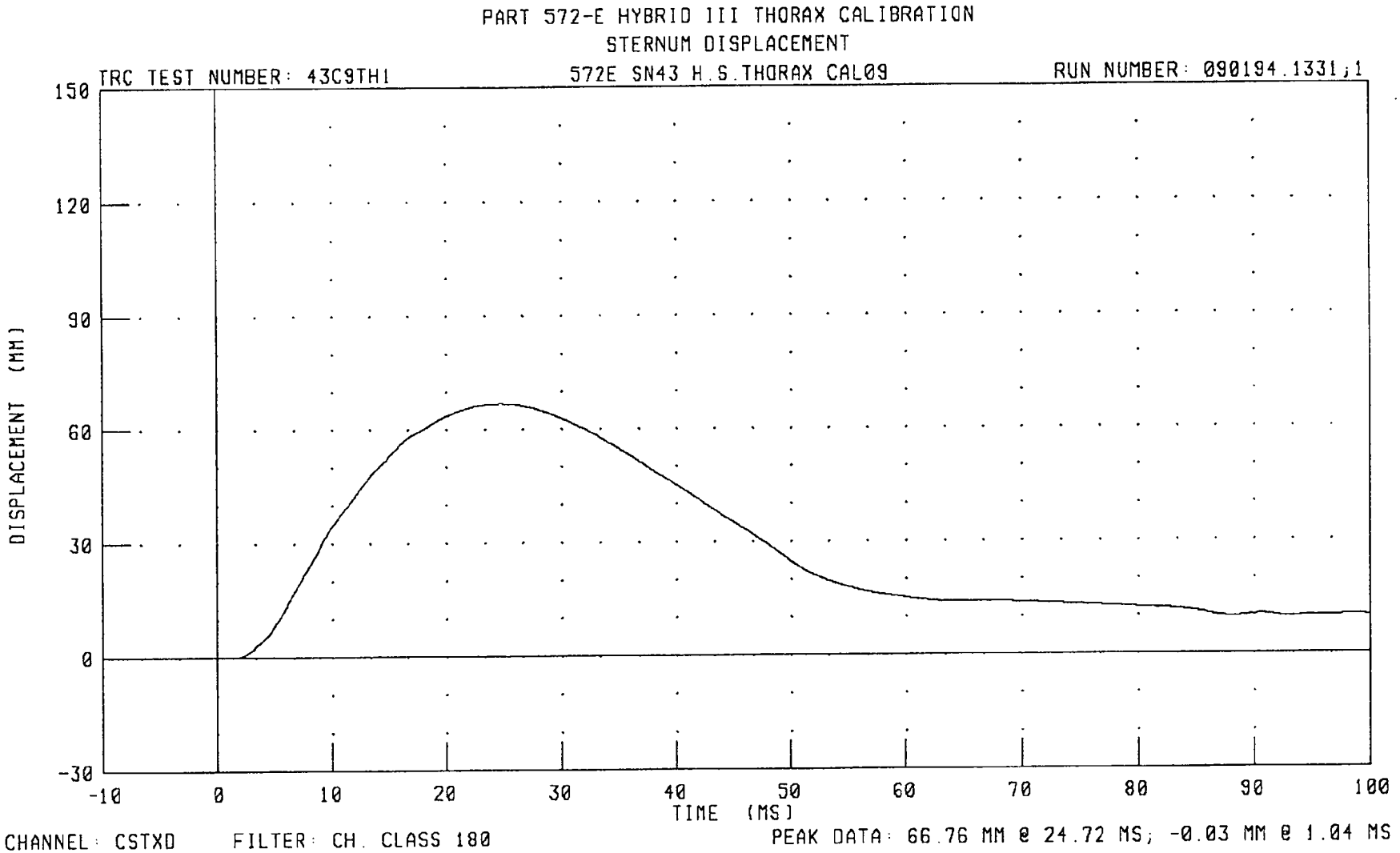
TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	60.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.68 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	66.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5689. N
INTERNAL HYSTERESIS	69% - 85%	76.7%

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Fox RUN NUMBER: 090194.1002;1

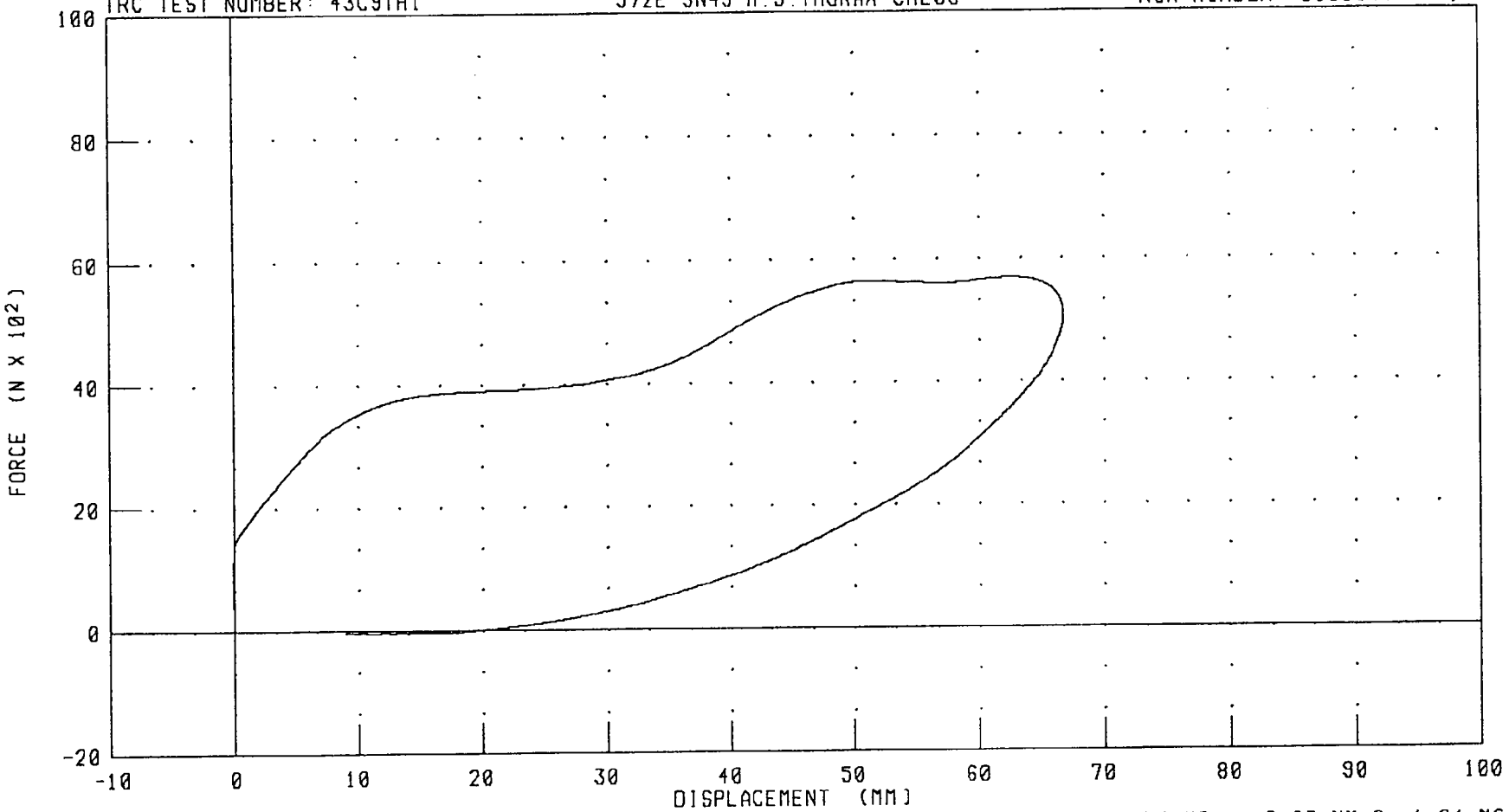

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 43C9TH1
572E SN43 H.S.THORAX CAL09
RUN NUMBER: 090194.1331;1
ACCELERATION (G)
50
40
30
20
10
0
-10
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 180
PEAK DATA: 24.84 G @ 19.44 MS; -0.29 G @ -0.56 MS


PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE
TRC TEST NUMBER: 43C9TH1
572E SN43 H.S. THORAX CAL09
RUN NUMBER: 090194.1331;1
100
80
60
40
20
0
-20
FORCE (N X 10²)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXF
FILTER: CH. CLASS 180
PEAK DATA: 5689.37 N @ 19.44 MS; -65.34 N @ -0.56 MS


PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT
TRC TEST NUMBER: 43C9TH1
572E SN43 H.S.THORAX CAL09
RUN NUMBER: 090194.1331;1
DISPLACEMENT (MM)
150
120
90
60
30
0
-30
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: CSTXD
FILTER: CH. CLASS 180
PEAK DATA: 66.76 MM @ 24.72 MS; -0.03 MM @ 1.04 MS

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

TRC TEST NUMBER: 43C9TH1 572E SN43 H.S.THORAX CAL09 RUN NUMBER: 090194.1331;1



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

PEAK DATA: 66.76 MM @ 24.72 MS; -0.03 MM @ 1.04 MS
5689.37 N @ 19.44 MS; -65.34 N @ -0.56 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 31-AUG-94

TRC INC. TEST NO: 43C9RK1 572E SN43 RIGHT KNEE CAL 09

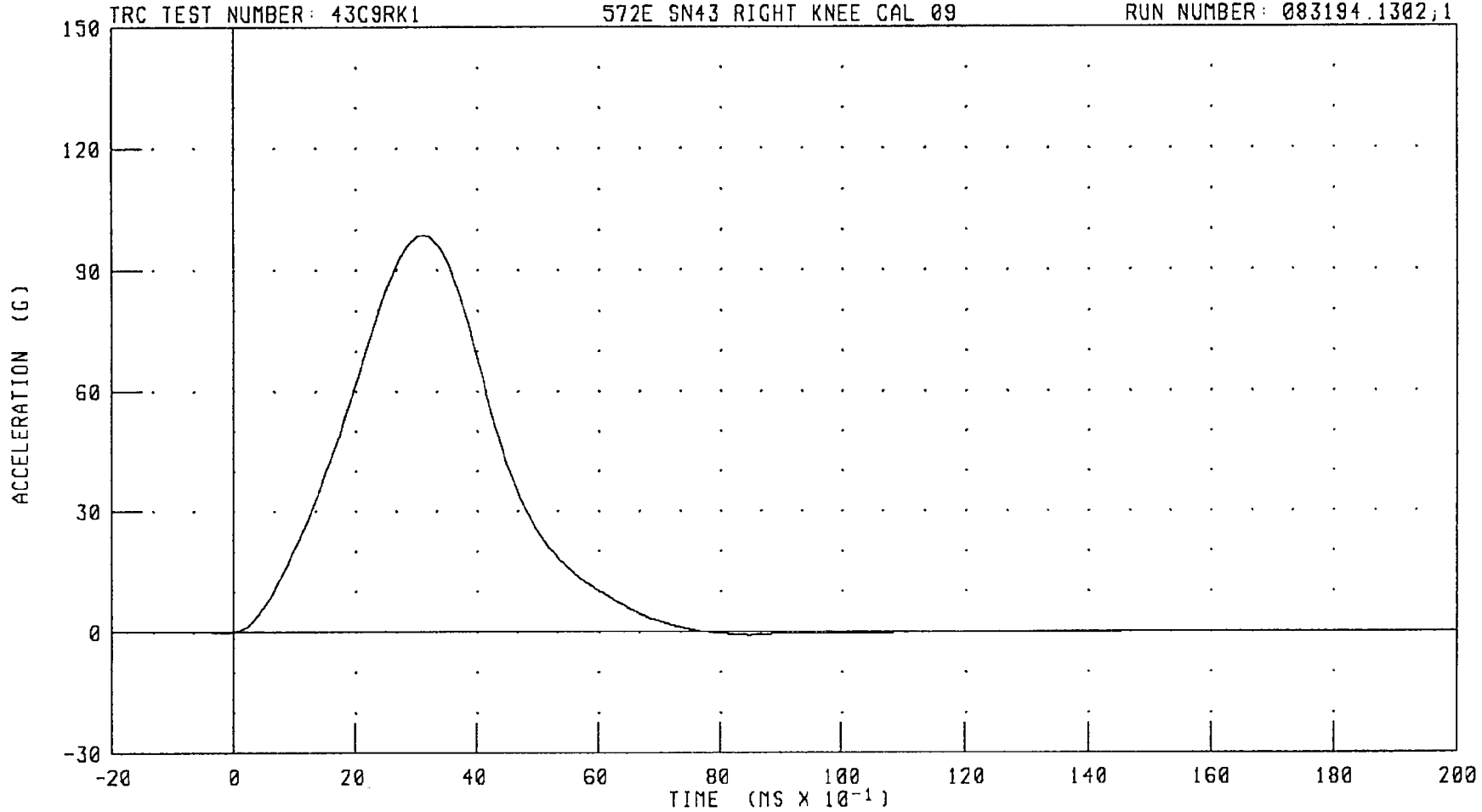
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	60.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.09 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4714 - 5783 N	4830.8 N

TEST MEETS SPECIFICATIONS

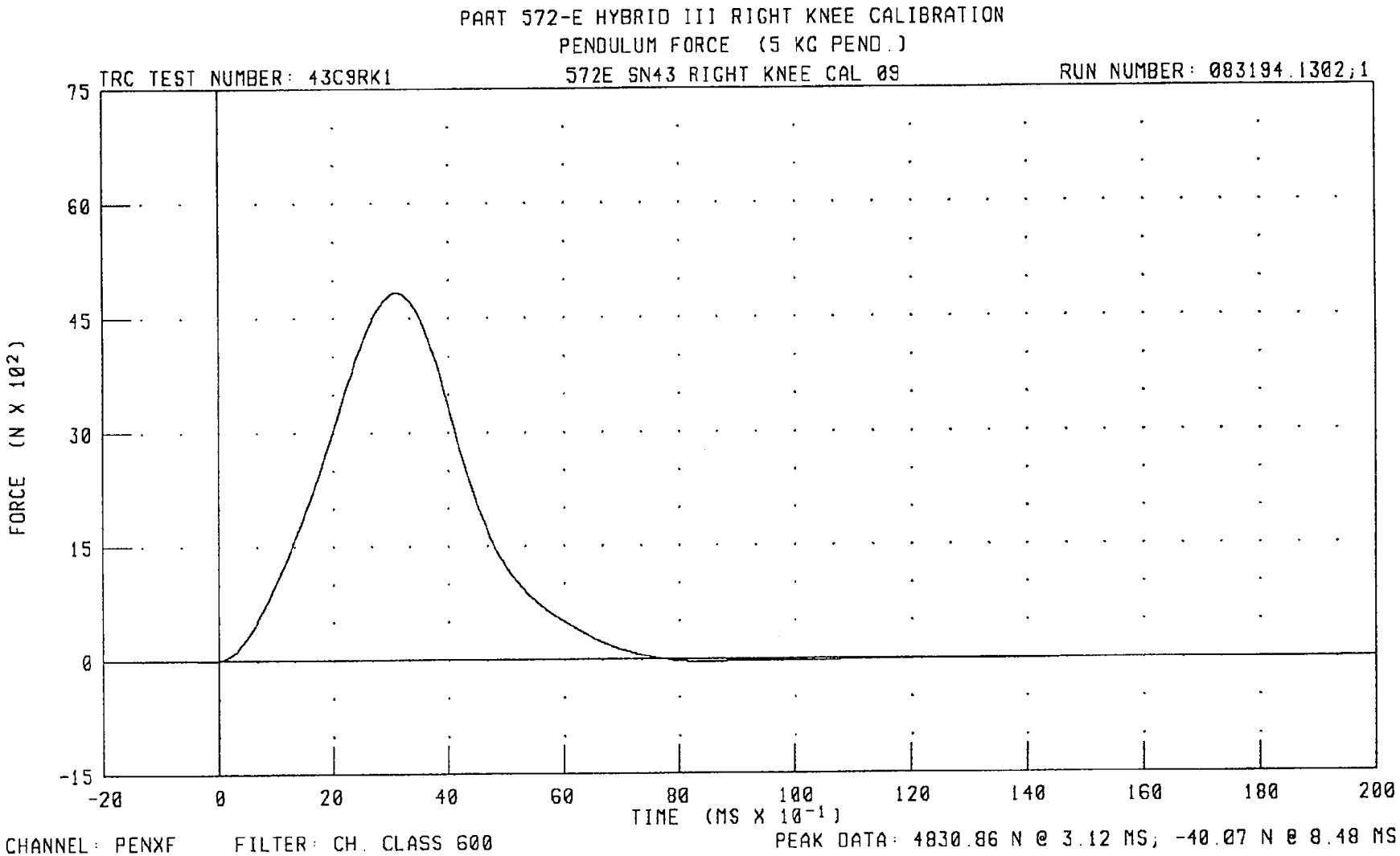
TECHNICIAN _____ RUN NUMBER: 083194.1302;1

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

TRC TEST NUMBER: 43C9RK1 572E SN43 RIGHT KNEE CAL 09 RUN NUMBER: 083194.1302;1



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 98.73 G @ 3.12 MS; -0.82 G @ 8.48 MS


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 43C9RK1
572E SN43 RIGHT KNEE CAL 09
RUN NUMBER: 083194.1302;1
FORCE (N X 10²)
75
60
45
30
15
0
-15
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXF
FILTER: CH. CLASS 600
PEAK DATA: 4830.86 N @ 3.12 MS; -40.07 N @ 8.48 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 31-AUG-94

TRC INC. TEST NO: 43C9LK1 572E SN43 LEFT KNEE CAL 09

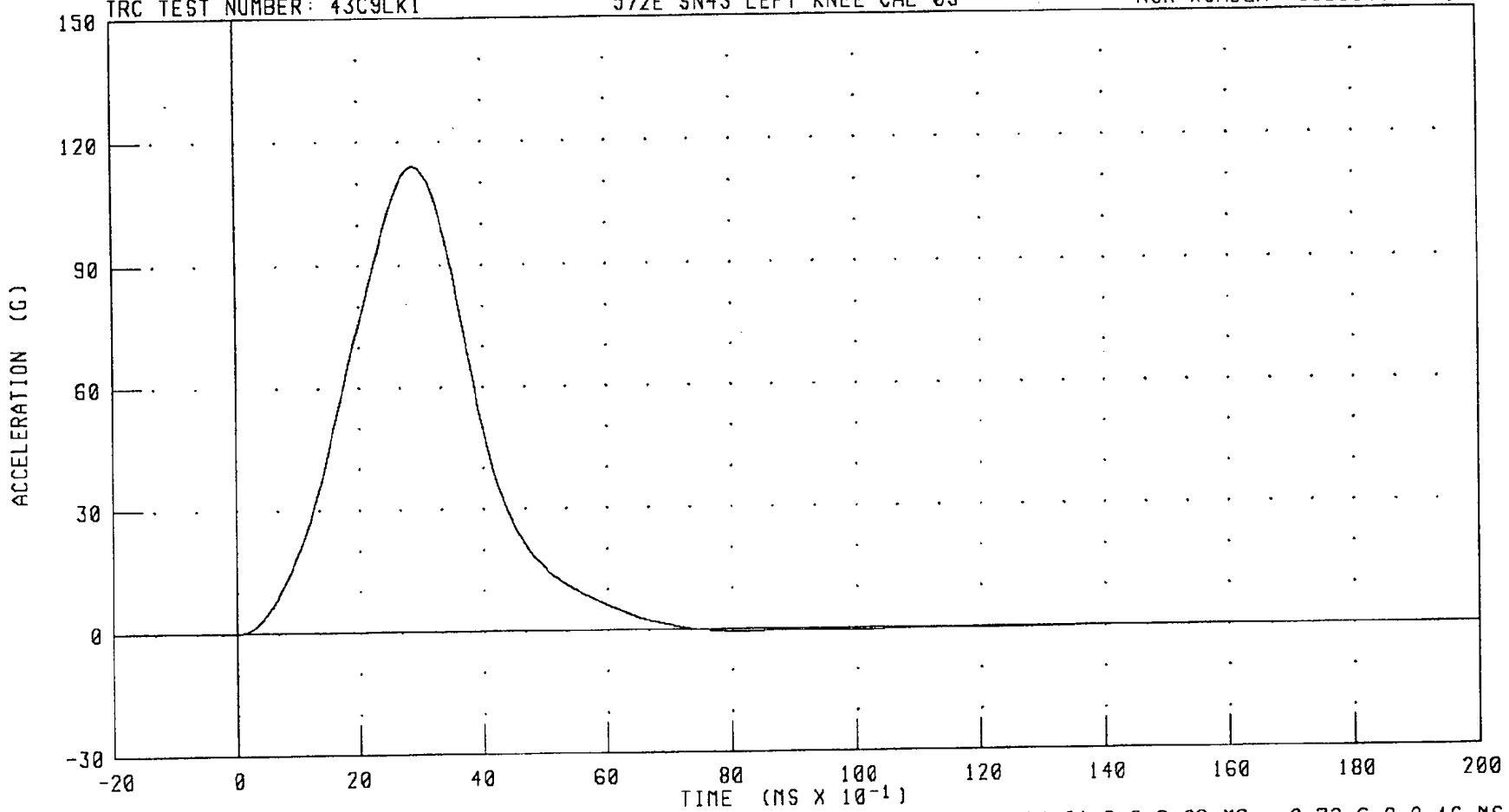
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	60.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.08 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4714 - 5783 N	5578.1 N

TEST MEETS SPECIFICATIONS

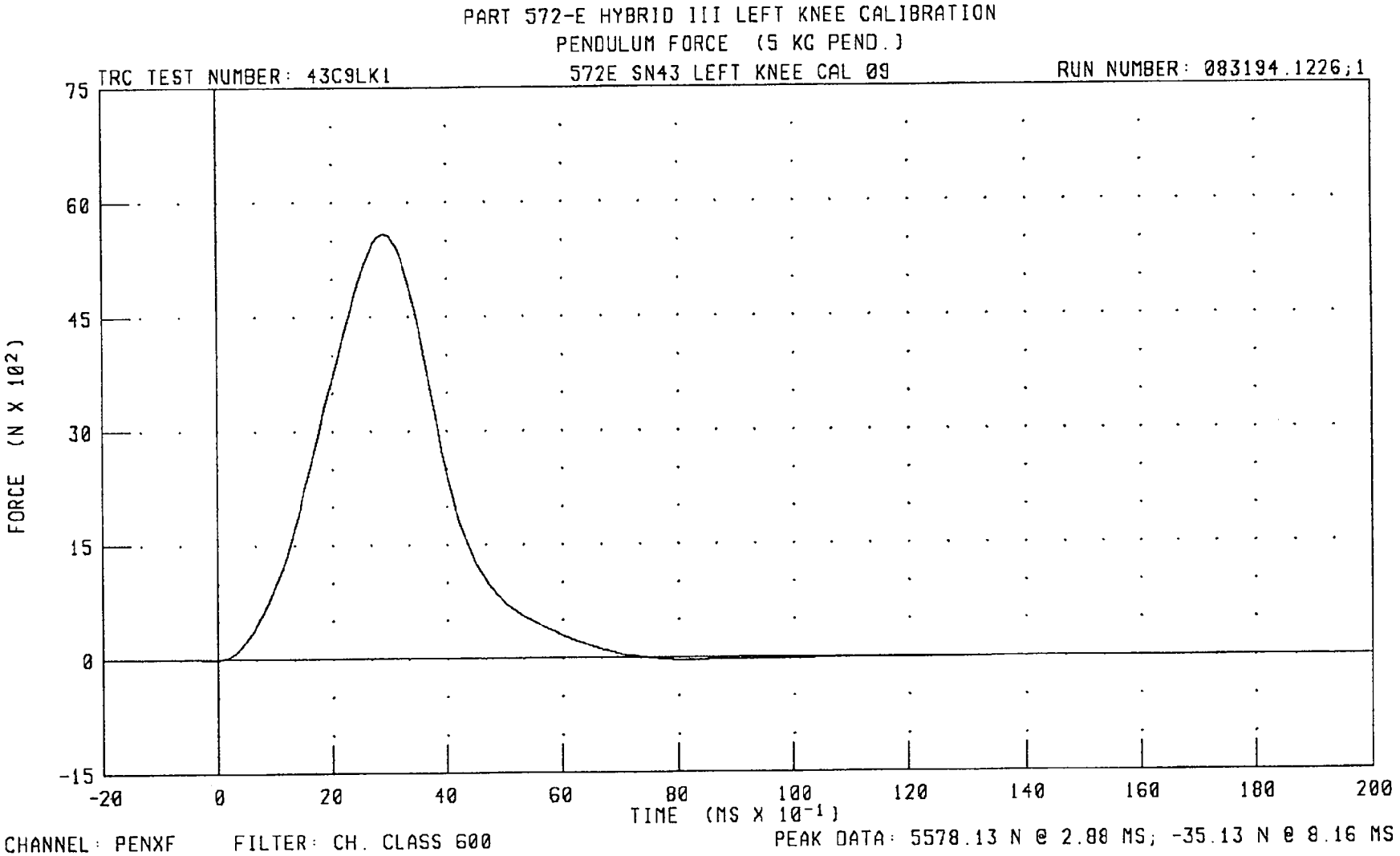
TECHNICIAN Pete Fox RUN NUMBER: 083194.1226;1

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

TRC TEST NUMBER: 43C9LK1 572E SN43 LEFT KNEE CAL 09 RUN NUMBER: 083194.1226;1



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 114.01 G @ 2.88 MS; -0.72 G @ 8.16 MS


PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 43C9LK1
572E SN43 LEFT KNEE CAL 09
RUN NUMBER: 083194.1226;1
FORCE (N X 10²)
75
60
45
30
15
0
-15
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXF
FILTER: CH. CLASS 600
PEAK DATA: 5578.13 N @ 2.88 MS; -35.13 N @ 8.16 MS

APPENDIX D

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENTATION PLACEMENT

DUMMY MFR. & S/N: HUMANETICS/043

SEATING POSITION: DRIVER

LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
HEAD ACCELERATION	X	ENDEVCO	7264	DP46J	FRONT
HEAD ACCELERATION	Y	ENDEVCO	7264	EK16J	LEFT
HEAD ACCELERATION	Z	ENDEVCO	7264	BH91J	UP
HEAD 1 ACCELERATION	X	ENDEVCO	7264	BD98J	FRONT
HEAD 1 ACCELERATION	Z	ENDEVCO	7264	BF19J	UP
HEAD 2 ACCELERATION	Y	ENDEVCO	7264	AP87	LEFT
HEAD 2 ACCELERATION	Z	ENDEVCO	7264	BF99J	UP
HEAD 3 ACCELERATION	X	ENDEVCO	7264	BF22J	FRONT
HEAD 3 ACCELERATION	Y	ENDEVCO	7264	FC43J	LEFT
HEAD ANGULAR VELOCITY	X	ATA	ARS-01	193	REAR
HEAD ANGULAR VELOCITY	Y	ATA	ARS-01	194	RIGHT
HEAD ANGULAR VELOCITY	Z	ATA	ARS-01	195	UP
NECK FORCE	X	DENTON	1716	0452	*
NECK FORCE	Y	DENTON	1716	0452	*
NECK FORCE	Z	DENTON	1716	0452	*
NECK MOMENT	X	DENTON	1716	0452	*
NECK MOMENT	Y	DENTON	1716	0452	*
NECK MOMENT	Z	DENTON	1716	0452	*
CHEST ACCELERATION	X	ENDEVCO	7264	BC75J	FRONT
CHEST ACCELERATION	Y	ENDEVCO	7264	DH37J	LEFT
CHEST ACCELERATION	Z	ENDEVCO	7264	BD90J	UP
CHEST ANGULAR VELOCITY	X	ATA	ARS-01	177	FRONT
CHEST ANGULAR VELOCITY	Y	ATA	ARS-01	179	LEFT
CHEST ANGULAR VELOCITY	Z	ATA	ARS-01	161	DOWN
CHEST DEFLECTION	X	VERNITECH	81422-A	043	OUTWARD
PELVIS ACCELERATION	X	ENDEVCO	7264	BE97J	REAR
PELVIS ACCELERATION	Y	ENDEVCO	7264	EW44J	LEFT
PELVIS ACCELERATION	Z	ENDEVCO	7264	BF04	UP

7264 BC75

*See SIGN CONVENTION sheet for positive sensing orientation of neck load channels.

VEHICLE INSTRUMENTATION PLACEMENT

LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
CENTER OF GRAVITY ACCEL.	X	ENDEVCO	7264	DR87J	REAR
CENTER OF GRAVITY ACCEL.	Y	ENDEVCO	7264	DA06H	LEFT
CENTER OF GRAVITY ACCEL.	Z	ENDEVCO	7264	CC53H	UP
CENTER OF GRAVITY ROLL	X	HUMPHREY	RG28-0128-1	H-21	LEFT
CENTER OF GRAVITY PITCH	Y	HUMPHREY	RG28-0128-1	H-10	DOWN
CENTER OF GRAVITY YAW	Z	HUMPHREY	RG28-0128-1	H-14	RIGHT
CENTER OF GRAVITY ANGULAR VELOCITY	X	ATA	ARS-01	167	FRONT
CENTER OF GRAVITY ANGULAR VELOCITY	Y	ATA	ARS-01	176	FRONT
CENTER OF GRAVITY ANGULAR VELOCITY	Z	ATA	ARS-01	184	FRONT
LEFT B-PILLAR	X	ENDEVCO	7264	BE69J	FRONT
	Y	ENDEVCO	7264	DG56J	RIGHT
	Z	ENDEVCO	7264	DC68J	UP
RIGHT B-PILLAR	X	ENDEVCO	7264	AL40	FRONT
	Y	ENDEVCO	7264	AW52	LEFT
	Z	ENDEVCO	7264	BH32J	UP
LEFT FRONT DOOR LATCH	X	ENDEVCO	7264	DG70J	REAR
	Y	ENDEVCO	7264	DP98J	RIGHT
	Z	ENDEVCO	7264	DG06J	DOWN
RIGHT FRONT DOOR LATCH	X	ENDEVCO	7264	BC26J	REAR
	Y	ENDEVCO	7264	DG05J	LEFT
	Z	ENDEVCO	7264	DG50J	UP
DRIVER'S SHOULDER BELT DISPLACEMENT		CELESCO	PT-101-0040 111-5110	0275533	OUTWARD
DRIVER'S SHOULDER BELT FORCE		LEBOW	3419	610	TENSION
DRIVER'S LAP BELT OUTBOARD FORCE		LEBOW	3419	571	TENSION
LEFT FRONT SUSPENSION DISPLACEMENT		CELESCO	PT-101-50A	A12889	OUTWARD
RIGHT FRONT SUSPENSION DISPLACEMENT		CELESCO	PT-101-40A	0586135	OUTWARD
LEFT REAR SUSPENSION DISPLACEMENT		CELESCO	PT-101-40A	A48391	OUTWARD
RIGHT REAR SUSPENSION DISPLACEMENT		CELESCO	PT-101-40A	A02465	OUTWARD

ROLL CART INSTRUMENTATION PLACEMENT

LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
CENTER OF GRAVITY	X	ENDEVCO	7264	AGRF9	FRONT
CENTER OF GRAVITY	Y	ENDEVCO	7264	AGRJ4	RIGHT
CENTER OF GRAVITY	Z	ENDEVCO	7264	AGRH7	UP
LEFT CYLINDER DISPLACEMENT		CELESCO	PT-101-60A	A23306	OUTWARD
RIGHT CYLINDER DISPLACEMENT		CELESCO	PT-101-60A	A23305	OUTWARD
VEHICLE/ROLL CART SEPARATION - UPPER SWITCH	NA	NA	NA	NA	NA
VEHICLE/ROLL CART SEPARATION - LOWER SWITCH	NA	NA	NA	NA	NA

SIGN CONVENTION

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

POTENTIOMETERS:	+CHEST DISPLACEMENT:	OUTWARD
	+SEAT BELT DISPLACEMENT:	OUTWARD
	+SEAT BELT EXTENSION:	ELONGATION
	+VEHICLE DISPLACEMENT:	OUTWARD

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:	HEAD ROTATING FORWARD
	+Z MOMENT:	CHIN ROTATING TO LEFT SHOULDER

GYROSCOPES:	+X ROLL:	TO RIGHT
	+Y PITCH:	FRONT DOWN
	+Z YAW:	COUNTERCLOCKWISE

PRE-TEST

IPMD VEHICLE DATA SHEET

Filled Out By: S. Bilbee Date: September 2, 1994

VEHICLE DATA

Vehicle Make and Model (written out): Nissan pickup truck

NHTSA ID Code (7 characters): _____ /Model Year (2 digits): 90

Vehicle Make (2 characters): 64

11 - American	02 - Ford	64 = Nissan
12 = Audi	40 = GMC	48 = Odyssey
53 = Battronics	23 = Honda	06 = Oldsmobile
27 = BMW	34 = Hyundai	14 = Peugeot
04 = Buick	41 = IH	05 = Plymouth
10 = Cadillac	42 = Isuzu	03 = Pontiac
35 = Champion	44 = Jeep	17 = Renault
36 = Checker	54 = Jet	30 = Saab
01 = Chevrolet	22 = Lectra	26 = Subaru
37 = Chinook	59 = Lectric	33 = Suzuki
21 = Chrysler	13 = Lincoln	16 = Toyota
29 = Comuta	18 = Mazda	31 = Triumph
15 = Datsun	28 = Mercedes	56 = UM
38 = Delorean	09 = Mercury	08 = Volkswagen
07 = Dodge	25 = MG	20 = Volvo
58 = Eva	62 = Mitsubishi	60 = Winnebago
19 = Fiat	32 = NHTSA	24 = Yugo
99 = Other: _____		

Vehicle Model (2 characters = see Appendix B): _____

Body Style (2 characters): PU

2C = 2 Door Coupe	SW = Stationwagon
2S = 2 Door Sedan	PU = Pickup Truck
3H = 3 Door Hatchback	TR = Truck
4S = 4 Door Sedan	VN = Van
5H = 5 Door Hatchback	BU = Bus
OH = Other: _____	MP = Multipurpose
_____	UT = Utility

VIN (20 characters): 1N6SD11S7LC308270

Odometer Reading: 44659.0 Thousands of Miles: 45

Overall Length: 178.0 (in) x 25.4 =: 4521 (mm)

Wheelbase: 104.5 (in) x 25.4 =: 2654 (mm)

Front Track: 55.0 (in) x 25.4 =: 1397 (mm)

Rear Track: 54.6 (in) x 25.4 =: 1387 (mm)

Roof Height: 60.5 (in) x 25.4 =: 1537 (mm)

IPMD VEHICLE DATA SHEET

G.V.W.R.: 4400 (lbs) x 4.45 =: 19580 (N)

FRONT G.A.W.R.: 2200 (lbs) x 4.45 =: 9790 (N)

REAR G.A.W.R.: 2544 (lbs) x 4.45 =: 11321 (N)

The following tire loadings are measured with the vehicle at Test Weight.

Weight on RF Tire: 825 (lbs) x 4.45 =: 3671 (N)

Weight on LF Tire: 819 (lbs) x 4.45 =: 3644 (N)

Weight on LR Tire: 821 (lbs) x 4.45 =: 3653 (N)

Weight on RR Tire: 819 (lbs) x 4.45 =: 3644 (N)

Vehicle Test Weight: 3284 (lbs) x 4.45 =: 14614 (N)

Lateral and Longitudinal Center of Gravity Location.

From Front Axle: 52.2 (in) x 25.4 =: 1326 (mm)

From Center Line: 0.03 (in) x 25.4 =: .8 (mm)

Engine Displacement: 140.0 (cu in) x 0.0164 =: 2.3 (L)

Engine Type (2 characters): L4

L3	F4	L4
V4	F6	L6
V6	V8	RT = Rotary
L5	OT = Other:	

Engine Location (1 character): F

F = Front M = Mid R = Rear

Engine Orientation (1 character): L

L = Longitudinal T = Transverse

Transmission Type: (1 character): M

M = Manual A = Automatic

Drive Axle (1 character): R

F = Front R = Rear 4 = Four Wheel Drive

Vehicle Comments (30 characters): _____

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Suspension Number (4 digits): F554

Front/Rear Flag (1 character): F

Axle Type (1 character): I

I = Independent
S = Solid

Suspension Type (1 character): A

A = Unequal A Arm
L = Leaf
M = Multiple Link
Q = Torque Arm
S = Strut
O = Other:_____
T = Semi-Trailing Arm
W = Twist
4 = 4 Link
3 = 3 Link
I = Twin I Beam

Spring Type (2 characters): TB

CO = Coil
LL = Longitudinal Leaf
OT = Other:_____
TB = Torsion Bar
TL = Transverse Leaf

Brake Type (2 characters): DI

DI = Disk
DS = Duo-Servo Shoe
OT = Other:_____
LT = Leading-Trailer Shoe

Suspension Modified (1 character): N

N = No
Y = Yes

Suspension Modification

R = Raised
S = Stiffened
O = Other
L = Lowered
W = Widened
1 = _____
2 = _____

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Tire Manufacturer (10 characters): Firestone

Tire Size Code (10 characters): P195/75R14

Tire Construction (2 characters): SB

BB = Bias Belted
BP = Bias Ply
OT = Other:_____
GP = Glass Belted Radial
SB = Steel Belted Radial

Tire Rim width: 5.0 (in) X 25.4 =: 127 (mm)

Axle Height: 11.5 (in) X 25.4 =: 292 (mm)

Tire Pressure: 27.0 (psi) X 6.897 =: 186 (kpa)

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Suspension Number (4 digits): R554

Front/Rear Flag (1 character): R

Axle Type (1 character): S

I = Independent
S = Solid

Suspension Type (1 character): L

A = Unequal A Arm
L = Leaf
M = Multiple Link
Q = Torque Arm
S = Strut
O = Other:_____
T = Semi-Trailing Arm
W = Twist
4 = 4 Link
3 = 3 Link
I = Twin I Beam

Spring Type (2 characters): LL

CO = Coil
LL = Longitudinal Leaf
OT = Other:_____
TB = Torsion Bar
TL = Transverse Leaf

Brake Type (2 characters): LT

DI = Disk
DS = Duo-Servo Shoe
OT = Other:_____
LT = Leading-Trailer Shoe

Suspension Modified (1 character): N

N = No
Y = Yes

Suspension Modification

R = Raised
S = Stiffened
O = Other
L = Lowered
W = Widened
1 = _____
2 = _____

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Tire Manufacturer (10 characters): Firestone

Tire Size Code (10 characters): P195/75R14

Tire Construction (2 characters): SB

BB = Bias Belted
BP = Bias Ply
OT = Other: _____
GP = Glass Belted Radial
SB = Steel Belted Radial

Tire Rim Width: 5.0 (in) X 25.4 =: 127 (mm)

Axle Height: 11.4 (in) X 25.4 =: 289 (mm)

Tire Pressure: 26.0 (psi) X 6.897 =: 179 (kpa)

I P M D M E A S U R E D D A T A Version 3.00.10

Vehicle # and Run # 55401 Date: 09/02/1994 Time: 08:52
Vehicle Type: 1990 Nissan Pickup - Pre-Rollover Fuel: empty
Load: 50th percentile male driver
Weight (lb): 3283 Wheelbase (in): 104.5 Roof Hgt (in): 60.50
Ramp Distance (in): 45.00 UltraSonic Offset (in): 6.50
Vehicle Lateral CG (in): 0.00 Front axle to CG (in): 52.17

IPMD Calibration Check (no Vehicle)

Applied Weight (lbs.)	Schaevitz Output (Deg.)	System C.G. Pivot
0	0.01	0.00
86	-5.95	33.39
131	-8.67	33.34
0	-0.02	0.00
81	5.69	33.34
129	8.55	33.24
0	0.03	0.00

Average System C.G. Pivot (in): 33.33

C.G. Height:

Applied Weight (lbs.)	Schaevitz Output (Deg)	Resultant Longitudinal Movement (In.)	Individual C.G. Calc
0	0.06	0.000	0.00
74	-4.62	0.178	24.08
120	-7.33	0.401	24.13
0	-0.12	0.079	0.00
73	4.58	-0.116	24.37
120	7.31	-0.294	24.34
0	0.14	0.001	0.00

Average calculated C.G. Height (in): 24.23

Vehicle # and Run # 55401 Date: 09/02/1994 Time: 08:52
Vehicle Type: 1990 Nissan Pickup - Pre-Rollover Fuel: empty
Load: 50th percentile male driver
Weight (lb): 3283 Wheelbase (in): 104.5 Roof Hgt (in): 60.50
Ramp Distance (in): 45.00 UltraSonic Offset (in): 6.50
Vehicle Lateral CG (in): 0.00 Front axle to CG (in): 52.17

Pitch Inertia:

Run #	Period (sec)	Platform Ampl (Deg)	Relative Ampl (In)	Individual Pitch Calc	
1	3.953	8.62	0.298	2015.0	(1)
2	3.952	8.18	0.279	2016.4	(1)
3	3.953	8.60	0.296	2016.1	(1)

Average Pitch Inertia (ft. lb. sec^2): 2015.8

Roll Inertia:

Run #	Period (sec)	Platform Ampl (Deg)	Relative Ampl (In)	Individual Roll Calc	
1	2.456	8.72	0.126	345.1	
2	2.457	8.45	0.123	345.9	
3	2.455	8.78	0.126	345.0	(1)

Average Roll Inertia (ft. lb. sec^2): 345.4

Yaw Inertia:

Run #	Period (sec)	Platform Ampl (Deg)	Relative Ampl (Deg)	Individual Yaw Calc
1	2.463	4.53	0.05	2012.8
2	2.461	4.16	0.04	2009.9
3	2.462	4.36	0.05	2009.9

Average Yaw Inertia (ft. lb. sec^2): 2010.9

POST-TEST

IPMD VEHICLE DATA SHEET

Filled Out By: S. Bilbee Date: September 15, 1994

VEHICLE DATA

Vehicle Make and Model (written out): Nissan pickup truck

NHTSA ID Code (7 characters): _____ /Model Year (2 digits): 90

Vehicle Make (2 characters): 64

11 - American	02 - Ford	64 = Nissan
12 = Audi	40 = GMC	48 = Odyssey
53 = Battronics	23 = Honda	06 = Oldsmobile
27 = BMW	34 = Hyundai	14 = Peugeot
04 = Buick	41 = IH	05 = Plymouth
10 = Cadillac	42 = Isuzu	03 = Pontiac
35 = Champion	44 = Jeep	17 = Renault
36 = Checker	54 = Jet	30 = Saab
01 = Chevrolet	22 = Lectra	26 = Subaru
37 = Chinook	59 = Lectric	33 = Suzuki
21 = Chrysler	13 = Lincoln	16 = Toyota
29 = Comuta	18 = Mazda	31 = Triumph
15 = Datsun	28 = Mercedes	56 = UM
38 = Delorean	09 = Mercury	08 = Volkswagen
07 = Dodge	25 = MG	20 = Volvo
58 = Eva	62 = Mitsubishi	60 = Winnebago
19 = Fiat	32 = NHTSA	24 = Yugo
99 = Other: _____		

Vehicle Model (2 characters = see Appendix B): _____

Body Style (2 characters): PU

2C = 2 Door Coupe	SW = Stationwagon
2S = 2 Door Sedan	PU = Pickup Truck
3H = 3 Door Hatchback	TR = Truck
4S = 4 Door Sedan	VN = Van
5H = 5 Door Hatchback	BU = Bus
OH = Other: _____	MP = Multipurpose
	UT = Utility

VIN (20 characters): 1N6SD11S7LC308270

Odometer Reading: 44,659.0 Thousands of Miles: 45

Overall Length: 178.0 (in) x 25.4 =: 4521 (mm)

Wheelbase: 104.5 (in) x 25.4 =: 2654 (mm)

Front Track: 55.0 (in) x 25.4 =: 1397 (mm)

Rear Track: 54.6 (in) x 25.4 =: 1387 (mm)

Roof Height: 52.6 (in) x 25.4 =: 1336 (mm)

IPMD VEHICLE DATA SHEET

G.V.W.R.: 4400 (lbs) x 4.45 =: 19580 (N)

FRONT G.A.W.R.: 2200 (lbs) x 4.45 =: 9790 (N)

REAR G.A.W.R.: 2544 (lbs) x 4.45 =: 11321 (N)

The following tire loadings are measured with the vehicle at Test Weight.

Weight on RF Tire: 802 (lbs) x 4.45 =: 3569 (N)

Weight on LF Tire: 827 (lbs) x 4.45 =: 3680 (N)

Weight on LR Tire: 728 (lbs) x 4.45 =: 3240 (N)

Weight on RR Tire: 908 (lbs) x 4.45 =: 4040 (N)

Vehicle Test Weight: 3265 (lbs) x 4.45 =: 14529 (N)

Lateral and Longitudinal Center of Gravity Location.

From Front Axle: 52.4 (in) x 25.4 =: 1331 (mm)

From Center Line: 1.3 (in) x 25.4 =: 33 (mm)

Engine Displacement: 140.0 (cu in) x 0.0164 =: 2.3 (L)

Engine Type (2 characters): L4

L3	F4	L4
V4	F6	L6
V6	V8	RT = Rotary
L5	OT = Other:_____	

Engine Location (1 character): F

F = Front M = Mid R = Rear

Engine Orientation (1 character): L

L = Longitudinal T = Transverse

Transmission Type: (1 character): M

M = Manual A = Automatic

Drive Axle (1 character): R

F = Front R = Rear 4 = Four Wheel Drive

Vehicle Comments (30 characters):_____

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Suspension Number (4 digits): F554

Front/Rear Flag (1 character): F

Axle Type (1 character): I

I = Independent S = Solid

Suspension Type (1 character): A

A = Unequal A Arm T = Semi-Trailing Arm
L = Leaf W = Twist
M = Multiple Link 4 = 4 Link
Q = Torque Arm 3 = 3 Link
S = Strut I = Twin I Beam
O = Other: _____

Spring Type (2 characters): TB

CO = Coil TB = Torsion Bar
LL = Longitudinal Leaf TL = Transverse Leaf
OT = Other: _____

Brake Type (2 characters): DI

DI = Disk LT = Leading-Trailer Shoe
DS = Duo-Servo Shoe
OT = Other: _____

Suspension Modified (1 character): N

N = No Y = Yes

Suspension Modification

R = Raised L = Lowered
S = Stiffened W = Widened
O = Other 1 = _____
2 = _____

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Tire Manufacturer (10 characters): Firestone

Tire Size Code (10 characters): P195/75R14

Tire Construction (2 characters): SB

BB = Bias Belted
BP = Bias Ply
OT = Other:_____
GP = Glass Belted Radial
SB = Steel Belted Radial

Tire Rim width: 5.0 (in) X 25.4 =: 127 (mm)

Axle Height: 11.5 (in) X 25.4 =: 292 (mm)

Tire Pressure: 27.0 (psi) X 6.897 =: 186 (kpa)

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Suspension Number (4 digits): R554

Front/Rear Flag (1 character): R

Axle Type (1 character): S

I = Independent
S = Solid

Suspension Type (1 character): L

A = Unequal A Arm
L = Leaf
M = Multiple Link
Q = Torque Arm
S = Strut
O = Other:_____
T = Semi-Trailing Arm
W = Twist
4 = 4 Link
3 = 3 Link
I = Twin I Beam

Spring Type (2 characters): LL

CO = Coil
LL = Longitudinal Leaf
OT = Other:_____
TB = Torsion Bar
TL = Transverse Leaf

Brake Type (2 characters): LT

DI = Disk
DS = Duo-Servo Shoe
OT = Other:_____
LT = Leading-Trailer Shoe

Suspension Modified (1 character): N

N = No
Y = Yes

Suspension Modification

R = Raised
S = Stiffened
O = Other
L = Lowered
W = Widened
1 = _____
2 = _____

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Tire Manufacturer (10 characters): Firestone

Tire Size Code (10 characters): P195/75R14

Tire Construction (2 characters): SB

BB = Bias Belted
BP = Bias Ply
OT = Other:
GP = Glass Belted Radial
SB = Steel Belted Radial

Tire Rim Width: 5.0 (in) X 25.4 =: 127 (mm)

Axle Height: 11.4 (in) X 25.4 =: 289 (mm)

Tire Pressure: 26.0 (psi) X 6.897 =: 179 (kpa)

I P M D M E A S U R E D D A T A Version 3.00.10

Vehicle # and Run # 55402 Date: 09/15/1994 Time: 11:03
Vehicle Type: 1990 Nissan Pickup - Post Rollover Fuel: empty
Load: 50th percentile male driver dummy
Weight (lb): 3265 Wheelbase (in): 104.5 Roof Hgt (in): 52.60
Ramp Distance (in): 45.00 UltraSonic Offset (in): 2.88
Vehicle Lateral CG (in): 1.28 Front axle to CG (in): 52.15

IPMD Calibration Check (no Vehicle)

Applied Weight (lbs.)	Schaevitz Output (Deg.)	System C.G. Pivot
0	0.14	0.00
74	-4.92	34.14
145	-8.94	34.22
0	0.14	0.00
73	5.16	33.90
146	9.36	33.91
0	0.20	0.00

Average System C.G. Pivot (in): 34.04
*** Empty Center of Gravity Height varied (inches) 0.318
*** Consult Project Engineer

C.G. Height:

Applied Weight (lbs.)	Schaevitz Output (Deg)	Resultant Longitudinal Movement (In.)	Individual C.G. Calc
0	0.18	0.000	0.00
80	-3.98	0.064	20.10
151	-7.20	0.141	20.03
0	0.12	0.025	0.00
81	4.41	-0.064	20.37
154	7.74	-0.163	20.28
0	0.30	-0.045	0.00

Average calculated C.G. Height (in): 20.19

Vehicle # and Run # 55402 Date: 09/15/1994 Time: 11:03
Vehicle Type: 1990 Nissan Pickup - Post Rollover Fuel: empty
Load: 50th percentile male driver dummy
Weight (lb): 3265 Wheelbase (in): 104.5 Roof Hgt (in): 52.60
Ramp Distance (in): 45.00 UltraSonic Offset (in): 2.88
Vehicle Lateral CG (in): 1.28 Front axle to CG (in): 52.15

Pitch Inertia:

Run #	Period (sec)	Platform Ampl (Deg)	Relative Ampl (In)	Individual Pitch Calc	
1	3.728	8.78	0.125	2147.9	
2	3.730	8.82	0.122	2153.0	(1)
3	3.730	8.94	0.126	2151.7	

Average Pitch Inertia (ft. lb. sec^2): 2150.9

Roll Inertia:

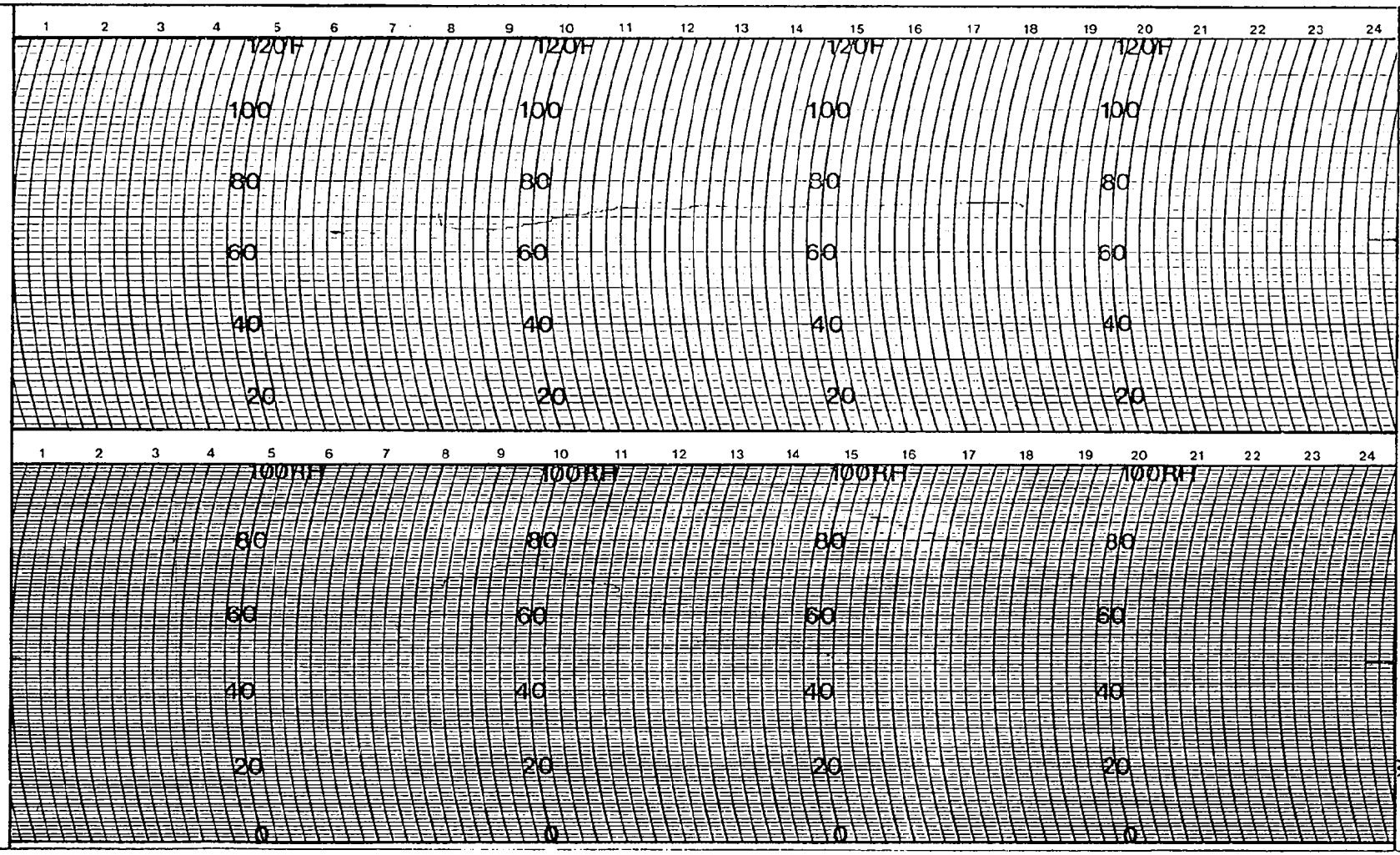
Run #	Period (sec)	Platform Ampl (Deg)	Relative Ampl (In)	Individual Roll Calc	
1	2.369	9.05	0.086	375.2	(1)
2	2.370	9.42	0.076	379.2	(1)
3	2.369	9.21	0.089	375.3	(1)

Average Roll Inertia (ft. lb. sec^2): 376.6

Yaw Inertia:

Run #	Period (sec)	Platform Ampl (Deg)	Relative Ampl (Deg)	Individual Yaw Calc	
1	2.479	5.42	0.04	2051.6	
2	2.477	5.50	0.04	2047.1	
3	2.480	6.16	0.05	2052.8	(1)

Average Yaw Inertia (ft. lb. sec^2): 2050.5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120F
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CHART # C311 D HF
PART # 699123
HYGROTHERMOGRAPH
1 DAY
WEATHER MEASURE
P.O. BOX 41257
SACRAMENTO, CA. 95841
PHONE (916)481-7565
STATION
DATE ON
DATE OFF