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June 1993

Final Report

Reducing Heavy Truck Aggressiveness

Moving Heavy Truck into a 1993 Honda Civic 3-Door Hatchback at 80.4 KPH

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16. Abstract

This test report documents a crash test that was conducted for research and development in support of reducing heavy truck aggressiveness. This test was conducted with a 1993 Honda Civic 3-door hatchback, VIN 2HGEH2365PH519207, at Transportation Research Center Inc. on June 14, 1993. The test vehicle was impacted on the front left corner by the heavy truck. The struck vehicle contained ten (10) accelerometers and one (1) instrumented Hybrid III driver dummy.

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METRIC CONVERSION FACTORS

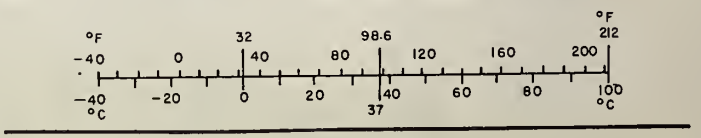
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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SECTION 1.0

PURPOSE AND TEST SUMMARY

This test was conducted as research in support of reducing heavy truck aggressiveness. This test was conducted on June 14, 1993.

The stationary vehicle, a 1993 Honda Civic 3-door hatchback, was equipped with a 1.5-liter, 4-cylinder, transverse gasoline engine and a 5-speed manual transmission. The test weight of the vehicle was 1121 kg. The vehicle was instrumented with eight (8) longitudinal axis accelerometers, one (1) lateral axis accelerometer, one (1) vertical axis accelerometer and two (2) seat belt force load cells. One (1) Part 572E dummy was seated in the left front outboard seating position according to the dummy placement procedure specified in Appendix B and Optional Appendix C of Laboratory Procedure TP-208-08. The dummy was instrumented in the head, chest, and pelvis with longitudinal, lateral, and vertical accelerometers. The dummy was also instrumented with a 6-axis neck load cell, two (2) femur load cells, and a chest deflection potentiometer.

The stationary vehicle was impacted in the left front at 340 degrees by a moving heavy truck at 80.4 kph. The intended impact engagement was the left front of the car with the right front of the truck.

The moving heavy truck's test weight was 11,163 kg. The truck was equipped with a standard bumper extended 16 inches forward of the standard location. The truck was instrumented with two (2) longitudinal and lateral axis accelerometers and one (1) vertical axis accelerometer.

The dummy's Head Injury Criteria, HIC, was 295. The dummy's chest deceleration with 3 milliseconds minimum duration was 43.5 g. The dummy's maximum left femur force was 7950 N. The dummy's maximum right femur force was 6745 N.

The vehicle, dummy, and heavy truck data were multiplexed and recorded on a 14-channel analog tape deck. The analog data was digitally sampled at 8000 samples per second. The data was digitally filtered as per SAE J211 OCT88.

The test was filmed by one (1) real-time panning motion picture camera and five (5) high-speed motion picture cameras operating at approximately 500 frames per second.

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

SECTION 2.0

VEHICLE, DUMMY, TRUCK AND TEST DATA

DATA ACQUISITION EXPLANATIONS

The engine bottom X-axis accelerometer, ENGXG2, lost data at 57 milliseconds because the cable was cut by vehicle crush. The engine bottom X-axis velocity, ENGXV2, calculation was affected by this anomaly.

The left brake caliper X-axis accelerometer, BCLXG1, lost data at 57 milliseconds because the cable was cut by vehicle crush. The left brake caliper X-axis velocity calculation, BCLXV1, was affected by this anomaly.

The right brake caliper X-axis accelerometer, BCRXG1, lost data at 122 milliseconds because the cable was cut by vehicle crush. The right brake caliper X-axis velocity calculation, BCRXV1, was affected by this anomaly.

The car center of gravity Y-axis accelerometer, VCGYG1, did not return to zero after the crash test. The car center of gravity Y-axis velocity calculation, VCGYG1, and the car center of gravity resultant acceleration calculation, VCGRG1, were affected by this anomaly.

TABLE 1 CRASH TEST SUMMARY

TEST TYPE: Heavy Truck into Stationary Vehicle

TEST DATE: 06/14/93 TEST TIME: 1338 AMBIENT TEMP. (°C): 26

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1993/Honda/Civic/3-door hatchback

VEHICLE TEST WEIGHT (KG): 1121

IMPACT ANGLE (DEG)[1]: 340

IMPACT VELOCITY (KPH)[2]: PRIMARY = 80.4 SECONDARY = 80.4

MAXIMUM STATIC CRUSH (MM): 466

DUMMY: Driver #048

TYPE: Part 572E

LOCATION: Left front

RESTRAINT: Airbag and
3-point unibelt

NUMBER OF DATA CHANNELS: 35

NUMBER OF CAMERAS: HIGH-SPEED 5 REAL-TIME 1

[1]With respect to tow track centerline.
[2]Speed trap measurement (± .08 kph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Honda of Canada, Mfg.

MAKE/MODEL: Honda/Civic VIN: 2HGEH2365PH519207

BODY STYLE: 3-door hatchback MODEL YEAR: 1993

COLOR: Green

ENGINE DATA: TYPE: transverse CYLINDERS: 4 DISPLACEMENT: 1.5 liters

TRANSMISSION DATA: _5_SPEED, _X_MANUAL, ___AUTOMATIC, _X_FWD, ___RWD, ___4WD

DATE VEHICLE RECEIVED: NA ODOMETER READING: 60

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

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

REMARKS:

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

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Honda of Canada, Mfg.

DATE OF MANUFACTURE: 01/93 VIN: 2HGEH2365PH519207

GVWR: 3090 LBS

GAWR: FRONT: 1635 LBS., REAR: 1510 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D.

TIRES ON VEHICLE (MFR., LINE, SIZE): Goodyear, Invicta G1R, P175/70R13

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 44 PSI
REAR: 44 PSI

SPARE TIRE (MFR., SIZE): NA

TYPE OF SEATS: FRONT: Bucket
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually-adjustable

MAXIMUM WIDTH: 1695 MILLIMETERS

WHEELBASE: 2565 MILLIMETERS

LOCATION OF LABEL STATING TIRE & CAPACITY DATA:

The label was located in the glove box.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P175/70R13

RECOMMENDED COLD TIRE PRESSURE: FRONT: 32 PSI; REAR: 32 PSI

DESIGNATED SEATING CAPACITY: 2 FRONT 3 REAR 5 TOTAL

VEHICLE CAPACITY WEIGHT: 850 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN MILLIMETERS):

DELIVERED ATTITUDE:	LF	634;	RF	650;	LR	625;	RR	640
PRE-TEST ATTITUDE:	LF	640;	RF	645;	LR	605;	RR	610
POST-TEST ATTITUDE:	LF	NA;	RF	530;	LR	610;	RR	662

TABLE 2 TEST VEHICLE INFORMATION CONT'D.

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

RIGHT FRONT	299 KG	RIGHT REAR	162 KG
LEFT FRONT	297 KG	LEFT REAR	172 KG
TOTAL FRONT WEIGHT	596 KG	(64.1% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	334 KG	(35.9% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	930 KG		
TARGET TEST WEIGHT[1]	1122 KG		

WEIGHT OF TEST VEHICLE:

RIGHT FRONT	317 KG	RIGHT REAR	233 KG
LEFT FRONT	324 KG	LEFT REAR	247 KG
TOTAL FRONT WEIGHT	641 KG	(57.2% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	480 KG	(42.8% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	1121 KG	(1 KG UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: None

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: Muffler, tail lights, rear seat belt assembly, rear wiper mount.

CG = 1098 MILLIMETERS REARWARD OF FRONT WHEEL CENTERLINE

[1]The target test weight was established during Test 920825.

TABLE 3 TRUCK INFORMATION

WEIGHT DISTRIBUTION

FRONT: 3543 KG

REAR: 7620 KG

AXLE SPACING

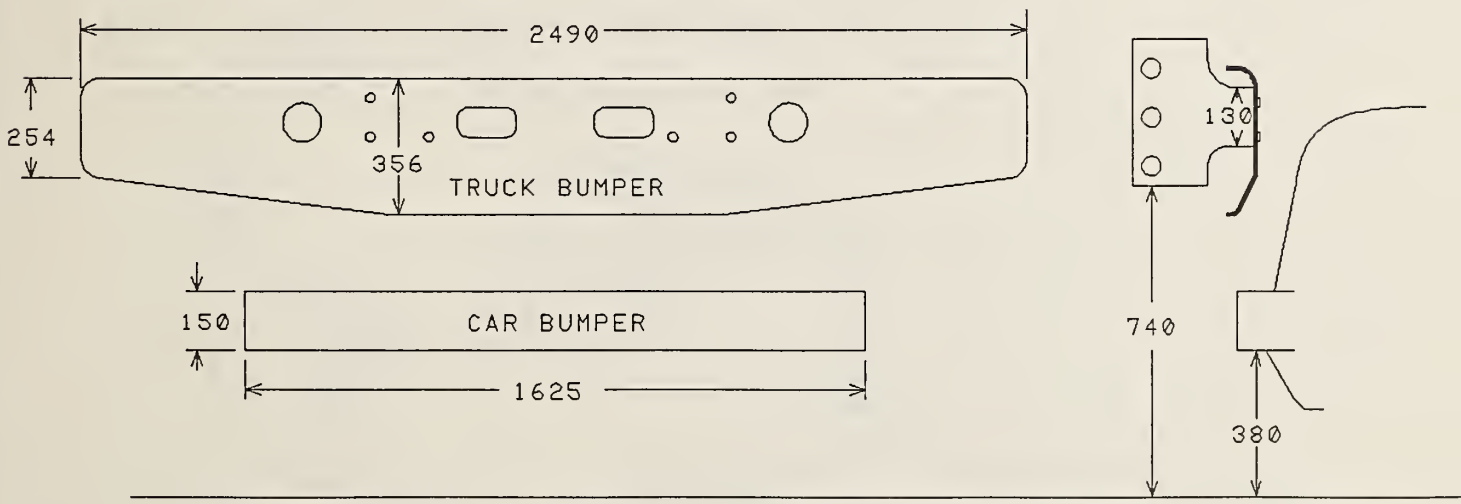
FRONT: 3835 MM

REAR: 1308 MM

DISTANCE OF C.G. BEHIND FRONT AXLE: 3064 MM

BUMPER DESCRIPTION: Stock truck bumper extended forward 16 inches.

TRUCK DAMAGE: The truck bumper face was badly deformed during the crash test.



All dimensions are in millimeters.

TABLE 4 POST-IMPACT DATA

TEST NUMBER: 930614

TEST DATE: 06/14/93 TEST TIME: 1338

TEST TYPE: Heavy Truck into Stationary Vehicle IMPACT ANGLE: 340°

AMBIENT TEMPERATURE AT IMPACT AREA: 26° C

TEMPERATURE IN OCCUPANT COMPARTMENT: 26° C

IMPACT VELOCITY: PRIMARY = 80.4 KPH
SECONDARY = 80.4 KPH

(SPECIFIED RANGE = 79.7 TO 81.3 KPH)

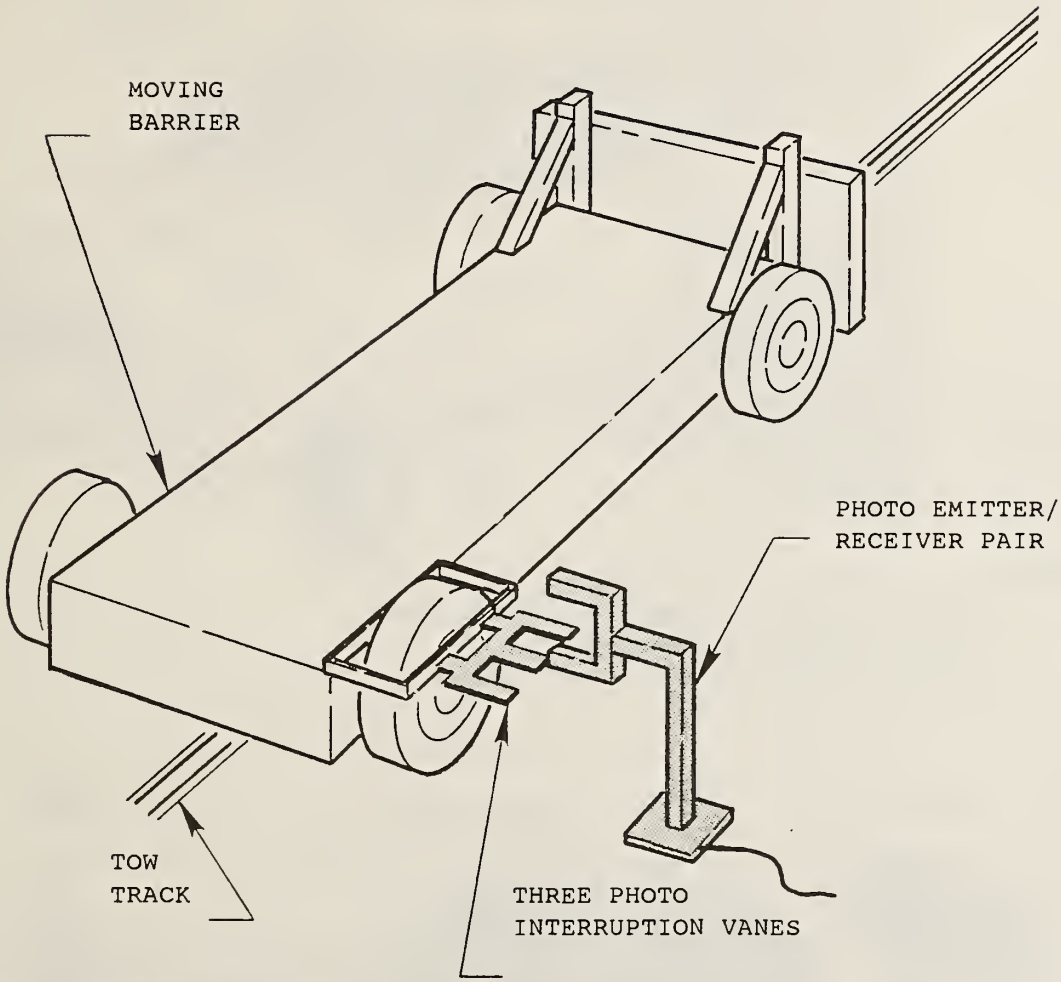
DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 381 MM

EXITING VELOCITY TRAP = 51 MM

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

OVERALL LENGTH OF TEST VEHICLE:	PRE-TEST:	L	3926;	C	4060;	R 3905
	POST-TEST:	L	3682;	C	3594;	R 3860
	TOTAL CRUSH:	L	244;	C	466;	R 45
	AVERAGE CRUSH:	252				

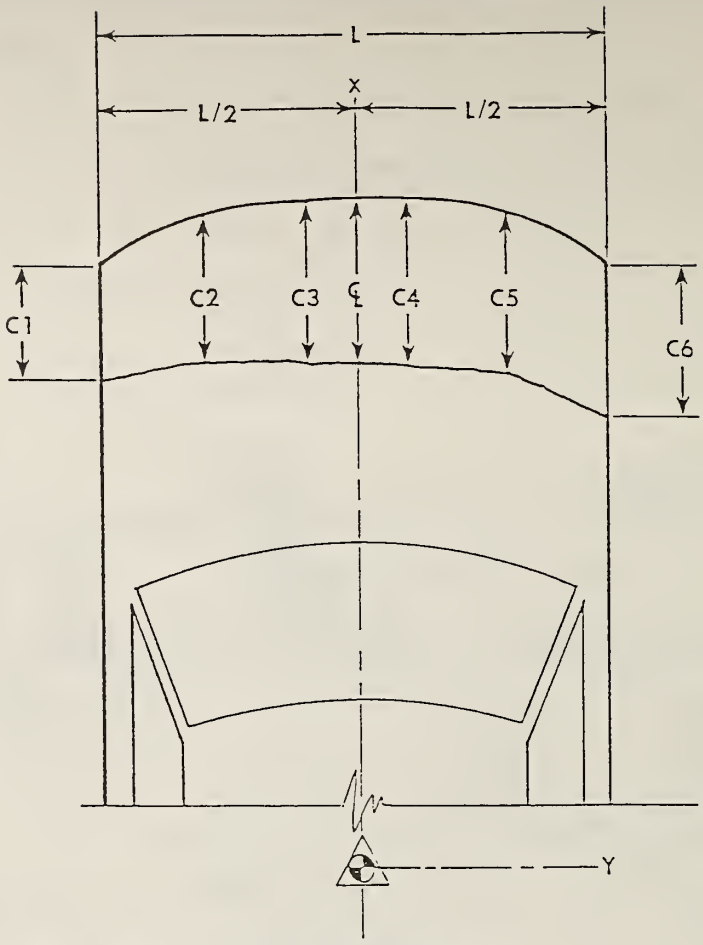
FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



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

The vanes have 305-millimeter spacing.

FIGURE 2 VEHICLE CRUSH

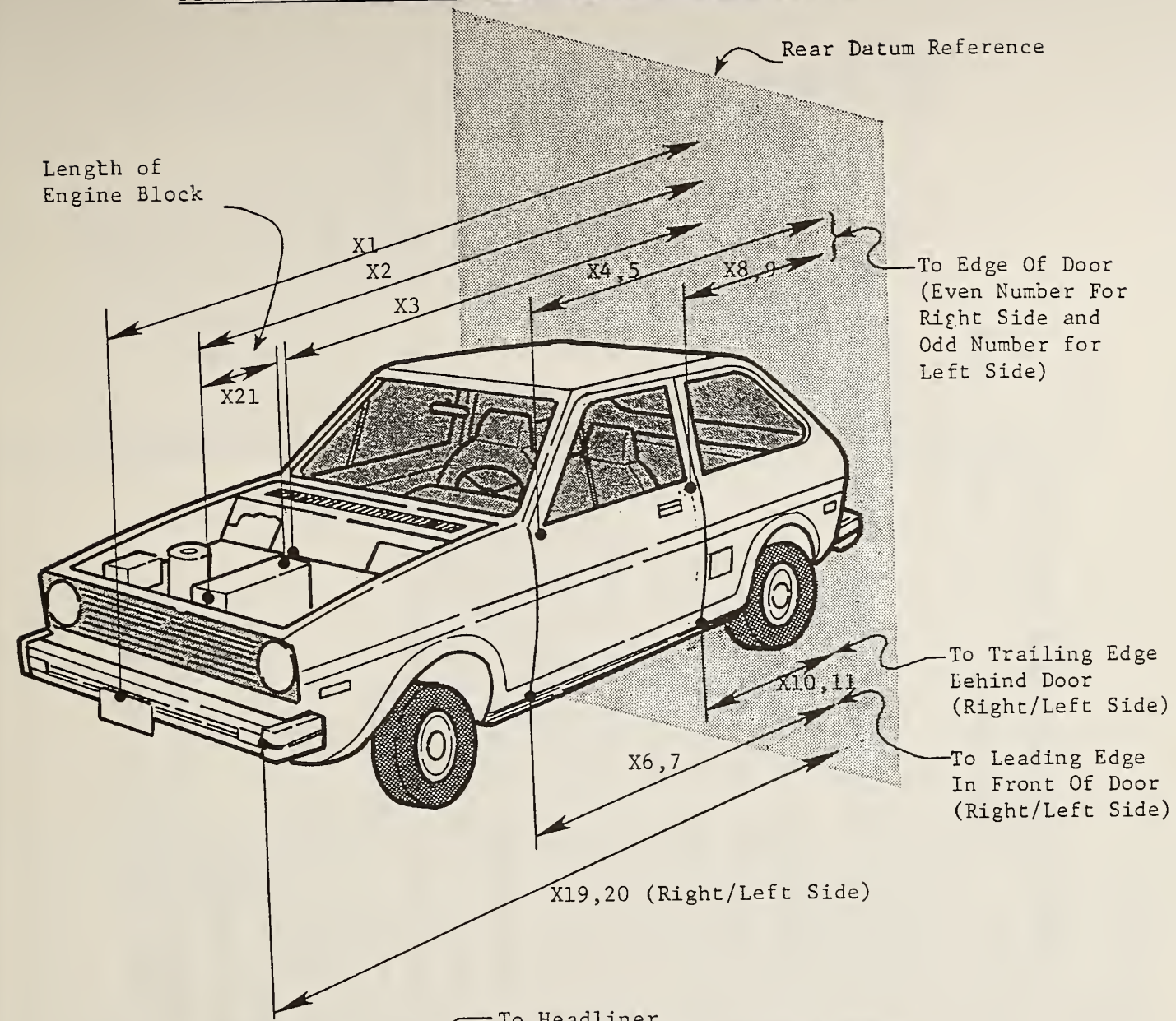


NOTES: L is pre-test length of contact surface.
C1 through C6 are spaced equally apart.
CL is vehicle centerline.
All measurements are in millimeters.

Vehicle Honda Civic

	PRE-TEST		POST-TEST		CRUSH
L	1400				
C1	3926	C1	3682	C1	244
C2	4025	C2	3688	C2	337
C3	4056	C3	3635	C3	421
C4	4055	C4	3620	C4	435
C5	4022	C5	3755	C5	267
C6	3905	C6	3860	C6	45
CL	4060	CL	3594	CL	466

FIGURE 3 PRE-TEST AND POST-TEST MEASUREMENT POINTS



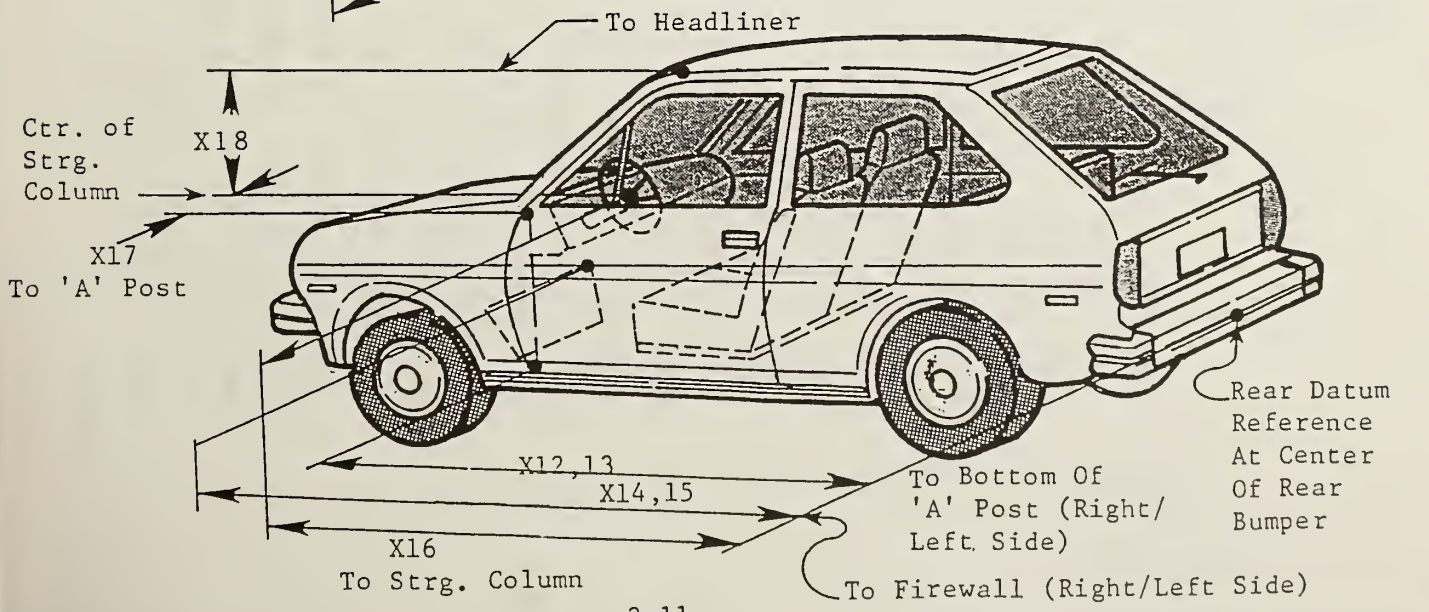


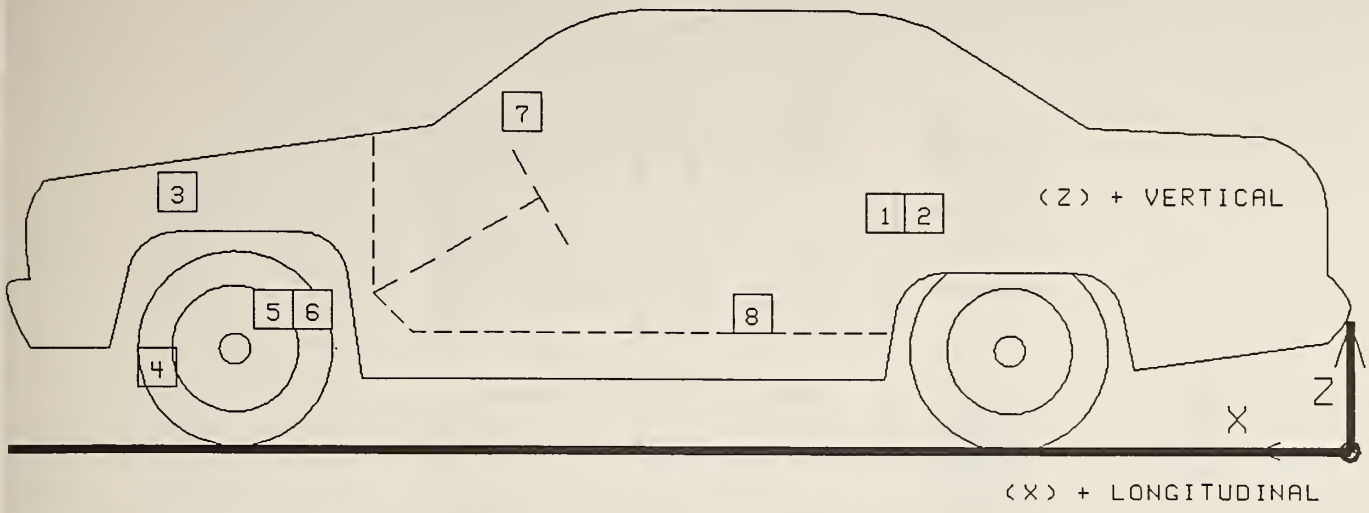
TABLE 5 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Honda/Civic TEST NUMBER: 930614

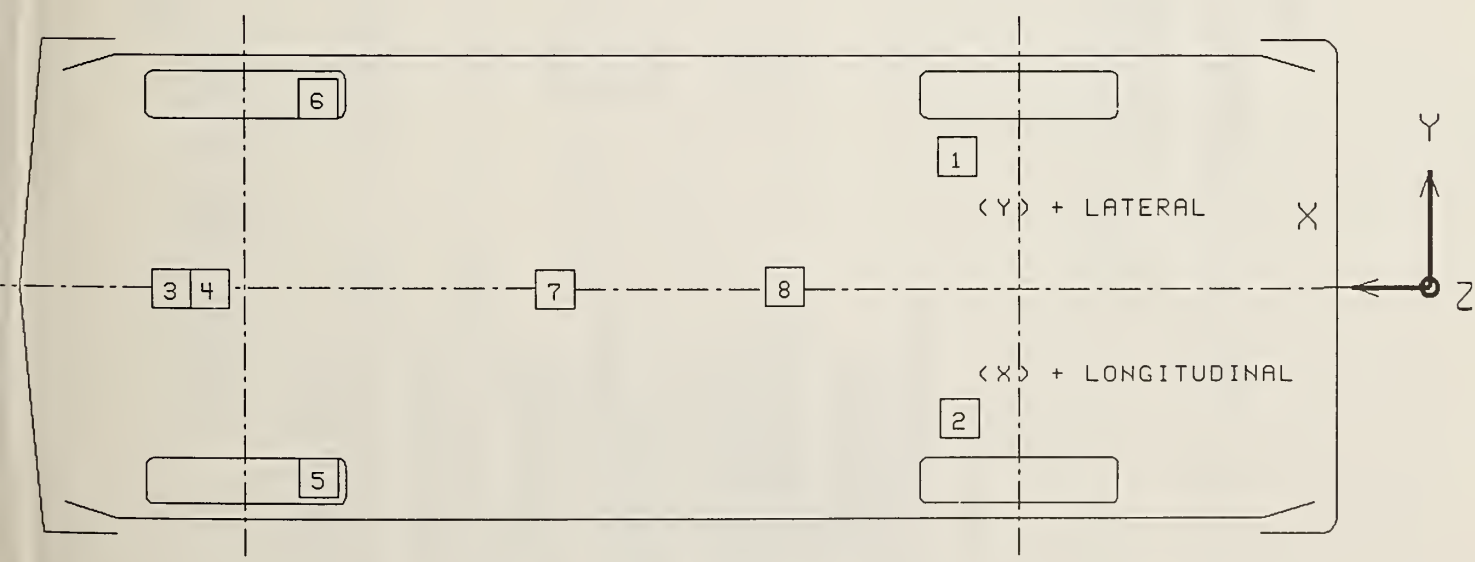
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	4060	3594	466
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	3585	3056	529
X3	REAR SURFACE OF VEHICLE TO FIREWALL	3049	2686	363
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	2741	2783	-42
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	2742	2735	7
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	2750	2740	10
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	2750	2717	33
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	1465	1620	-155
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	1469	1601	-132
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	1527	1508	19
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	1523	1505	18
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	2730	2693	37
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	2732	2648	84
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	2956	2797	159
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	3010	2512	498
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	2255	1980	275
X17	CENTER OF STEERING COLUMN TO "A" POST	280	75	205
X18	CENTER OF STEERING COLUMN TO HEADLINER	420	638	-218
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	3905	3860	45
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	3926	3682	244
X21	LENGTH OF ENGINE BLOCK	450	450	0

All distance measurements are in millimeters.

FIGURE 4 VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 6

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 930614

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION MAX G	POSITIVE DIRECTION MSEC	NEGATIVE DIRECTION MAX G	NEGATIVE DIRECTION MSEC
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	1394	415	380	8.6	67.5	22.1	46.3
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	1397	-415	382	1.2	275.3	23.4	43.6
3	ENGINE TOP LONGITUDINAL	3494	130	755	60.0	62.8	282.5	22.9
4	ENGINE BOTTOM LONGITUDINAL[1]	3335	208	197	---	---	---	---
5	RIGHT BRAKE CALIPER LONGITUDINAL[1]	3323	-650	270	---	---	---	---
6	LEFT BRAKE CALIPER LONGITUDINAL[1]	3326	650	268	---	---	---	---

TABLE 6

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY CONTINUED

TEST NUMBER 930614

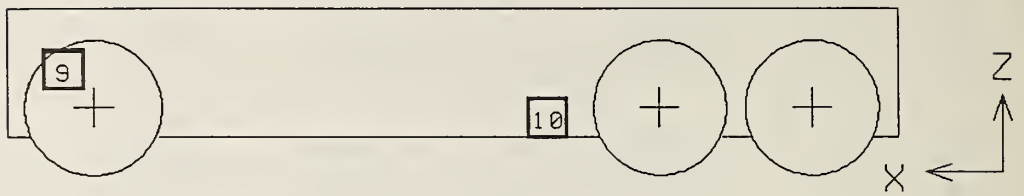
No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION MAX G	POSITIVE DIRECTION MSEC	NEGATIVE DIRECTION MAX G	NEGATIVE DIRECTION MSEC
7	INSTRUMENT PANEL CENTER	2629	23	920				
	LONGITUDINAL				18.9	121.3	157.6	89.3
8	CENTER OF GRAVITY	2076	0	324				
	LONGITUDINAL				12.2	64.0	46.5	55.6
	LATERAL[1]				28.0	59.1	---	---
	VERTICAL				58.1	57.5	32.4	32.9
	RESULTANT[1]				101.9	130.8		

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN MILLIMETERS.

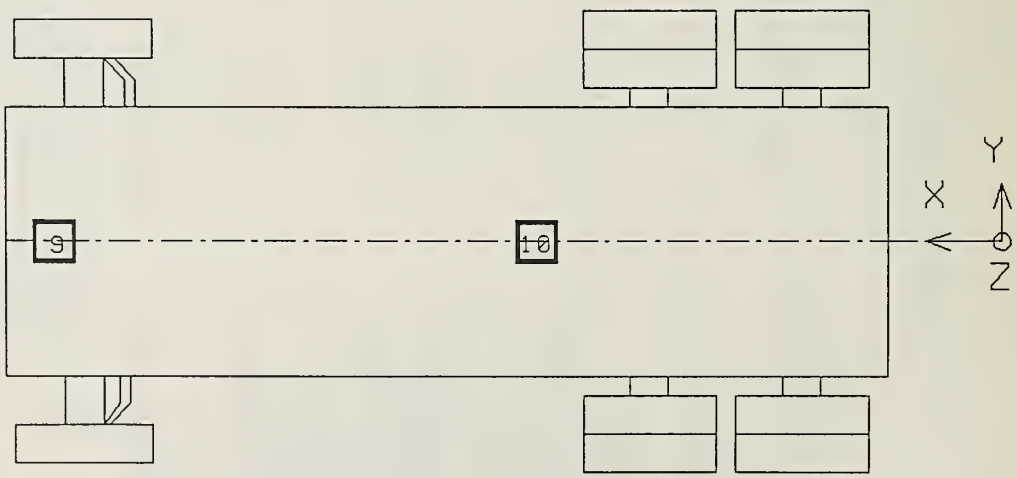
REFERENCE: X: + FORWARD FROM REAR BUMPER
Y: + LEFTWARD FROM VEHICLE CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

[1]See DATA ACQUISITION EXPLANATIONS

FIGURE 5 HEAVY TRUCK ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 7

HEAVY TRUCK ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 930614

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION MAX G	POSITIVE DIRECTION MSEC	NEGATIVE DIRECTION MAX G	NEGATIVE DIRECTION MSEC
9	FRONT FRAME CROSSMEMBER	6160	0	658				
	LONGITUDINAL				15.2	38.9	20.5	86.1
	LATERAL				15.6	35.4	11.4	22.4
	VERTICAL				45.2	42.0	7.7	8.5
	RESULTANT				46.4	42.0		
10	CENTER OF GRAVITY	2527	0	1050				
	LONGITUDINAL				0.6	39.8	4.9	48.4
	LATERAL				2.0	54.4	2.6	33.0

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN MILLIMETERS.

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

TABLE 8

DUMMY DATA SUMMARY

TEST NUMBER 930614

	DRIVER DUMMY SN: 048			
	POSITIVE DIRECTION		NEGATIVE DIRECTION	
	MAX	MSEC	MAX	MSEC
HEAD ACCELERATION (g)				
LONGITUDINAL	38.4	141.6	39.8	78.1
LATERAL	9.1	148.6	27.5	107.3
VERTICAL	3.0	9.1	33.3	94.8
RESULTANT	48.1	142.0		
HIC	295 FROM 72.0 TO 108.0			
NECK FORCE (N)				
LONGITUDINAL	350.7	69.6	643.3	90.5
LATERAL	553.2	123.1	144.9	90.4
VERTICAL	1611.7	78.3	70.4	12.6
RESULTANT	1615.7	78.6		
NECK MOMENT (N-M)				
ABOUT X	8.1	265.1	55.7	131.8
ABOUT Y	64.1	91.6	40.3	164.8
ABOUT Z	10.5	265.1	41.6	120.3
RESULTANT	76.0	114.9		

TABLE 8

DUMMY DATA SUMMARY CONTINUED

TEST NUMBER 930614

	DRIVER DUMMY SN: 048			
	POSITIVE DIRECTION		NEGATIVE DIRECTION	
	MAX	MSEC	MAX	MSEC
CHEST ACCELERATION (g)				
LONGITUDINAL	3.0	261.9	47.2	77.6
LATERAL	5.3	72.3	17.3	120.8
VERTICAL	11.1	82.5	11.3	62.9
RESULTANT	47.7	77.5		
3 MSEC	43.5			
CHEST DEFLECTION (mm)				
LONGITUDINAL	0.3	3.3	36.5	84.9
PELVIS ACCELERATION (g)				
LONGITUDINAL	20.8	86.1	67.2	60.0
LATERAL	9.9	42.9	27.8	81.1
VERTICAL	34.6	80.5	14.9	97.0
RESULTANT	67.6	60.0		
FEMUR LOAD (N)				
LEFT	1369.9	36.9	7950.6	69.9
RIGHT	4608.9	99.1	6745.5	60.4

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

TABLE 9 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #048	PASSENGER # NA
HEAD	Airbag	
CHEST	Airbag	
ABDOMEN	Airbag	
LEFT KNEE	Instrument panel	
RIGHT KNEE	Instrument panel	

DOOR OPENING:

	LEFT	RIGHT
FRONT	Tools required	Opened with difficulty
REAR	NA	NA

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	None	None
REAR	NA	NA

GLAZING DAMAGE:

The entire windshield cracked on impact.

The driver's side door glass broke on impact.

OTHER NOTABLE IMPACT EFFECTS:

The vehicle left the crash pad. Both front tires were deflated during the crash test.

DUMMY KINEMATIC SUMMARY

The dummy translated forward at impact. The airbag inflated and reacted against the dummy's head and upper torso. The dummy's hands, forearms, and knees impacted the instrument panel. The dummy's head impacted the driver's side inner door panel. Ths dummy rebounded into the seat back. The dummy came to rest in the seat restrained by the 3-point unibelt. The dummy's legs were pinned against the seat cushion by vehicle crush.

FIGURE 6 DUMMY AND SEAT POSITIONING DATA

PRE-IMPACT DATA:

MAKE/MODEL/BODY STYLE: Honda/Civic/3-door hatchback

MODEL YEAR: 1993 COLOR: Green

DATA FROM CERTIFICATION LABEL:

VEHICLE MANUFACTURER: Honda of Canada, Mfg.

DATE OF MANUFACTURE: 01/93 VIN: 2HGEH2365PH519207

GVWR: 3090 LBS.; GAWR: FRONT = 1635 LBS.; REAR = 1510 LBS.

POST-IMPACT DATA:

DATE OF TEST: 06/14/93 TIME: 1338 TEMPERATURE: 26° C

IMPACT VELOCITY: PRIMARY = 80.4 KPH SECONDARY = 80.4 KPH

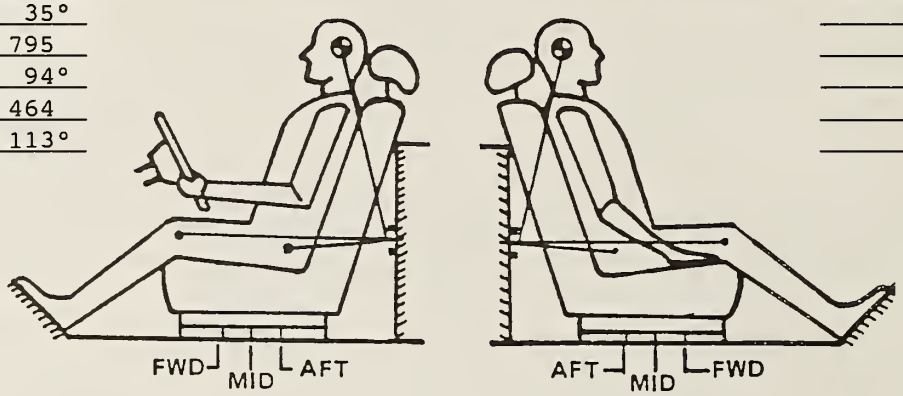
REQUIRED IMPACT VELOCITY RANGE: 79.7 TO 81.3 KPH

SEAT TYPE: Bucket ADJUSTER TYPE: Manual

FRONT SEAT BACK TYPE: Manually-adjustable

TECHNICIANS: B. Fishbaugh, J. Walters, R. Summers

DRIVER DUMMY # 048 TYPE: HIII		PASSENGER DUMMY # NA TYPE:	
HEAD	576		HEAD
TARGET	35°		TARGET
KNEE	795		KNEE
JOINT	94°		JOINT
APPROX-	464		APPROX-
IMATE	113°		IMATE
"H"			"H"
POINT			POINT



A = 1330

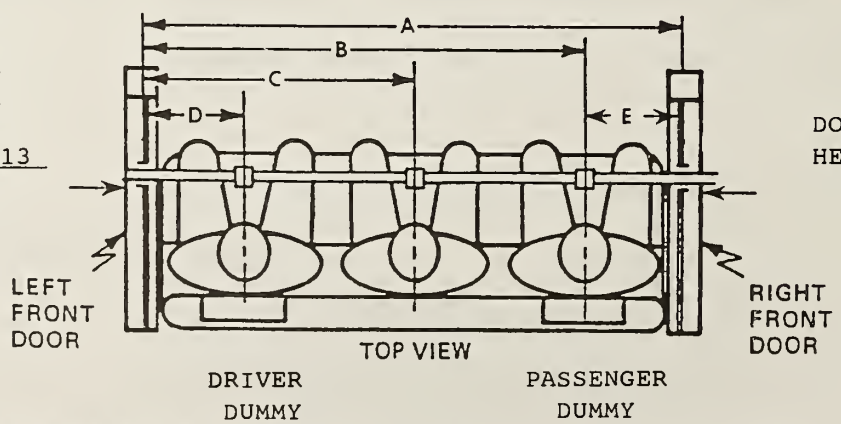
B = NA

C = NA

D = 337

E = NA

DOOR GLASS HEIGHT = 213



DOOR GLASS HEIGHT = NA

ALL ANGLES ARE RELATIVE TO VERTICAL PLANE THROUGH DOOR STRIKER.

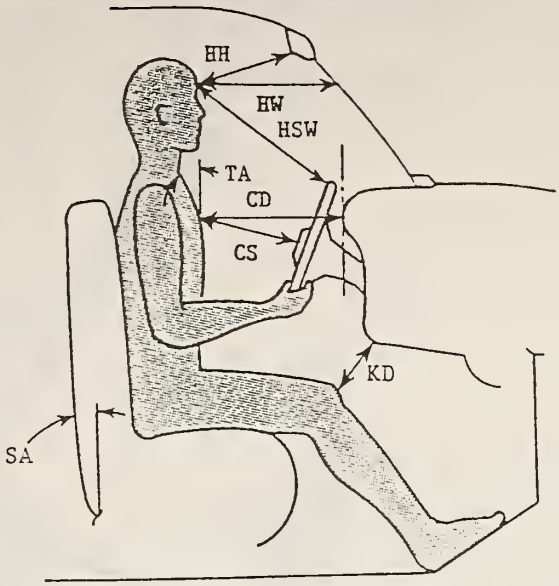
ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

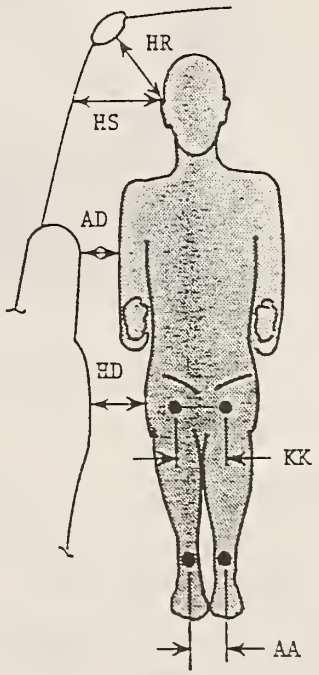
FIGURE 7 DUMMY IN VEHICLE POSITIONING DATA

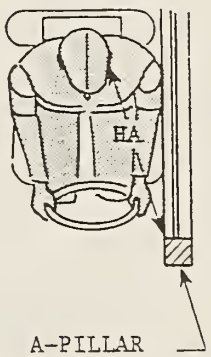
	DRIVER 048	PASSENGER NA
HH	261	
HW	489	
CD	470	
CS	285	
KDL	82	
KDR	84	
TA	15°	
SA	23°	
HSW	427	

	DRIVER 048	PASSENGER NA
HR	156	
HS	263	
AD	93	
HD	139	
KK	213	
AA	242	
HA	398	

KNEE OUTER CLEVIS TO
OUTER CLEVIS SPACING:
DRIVER = 280
PELVIS ANGLE:
DRIVER = 23°





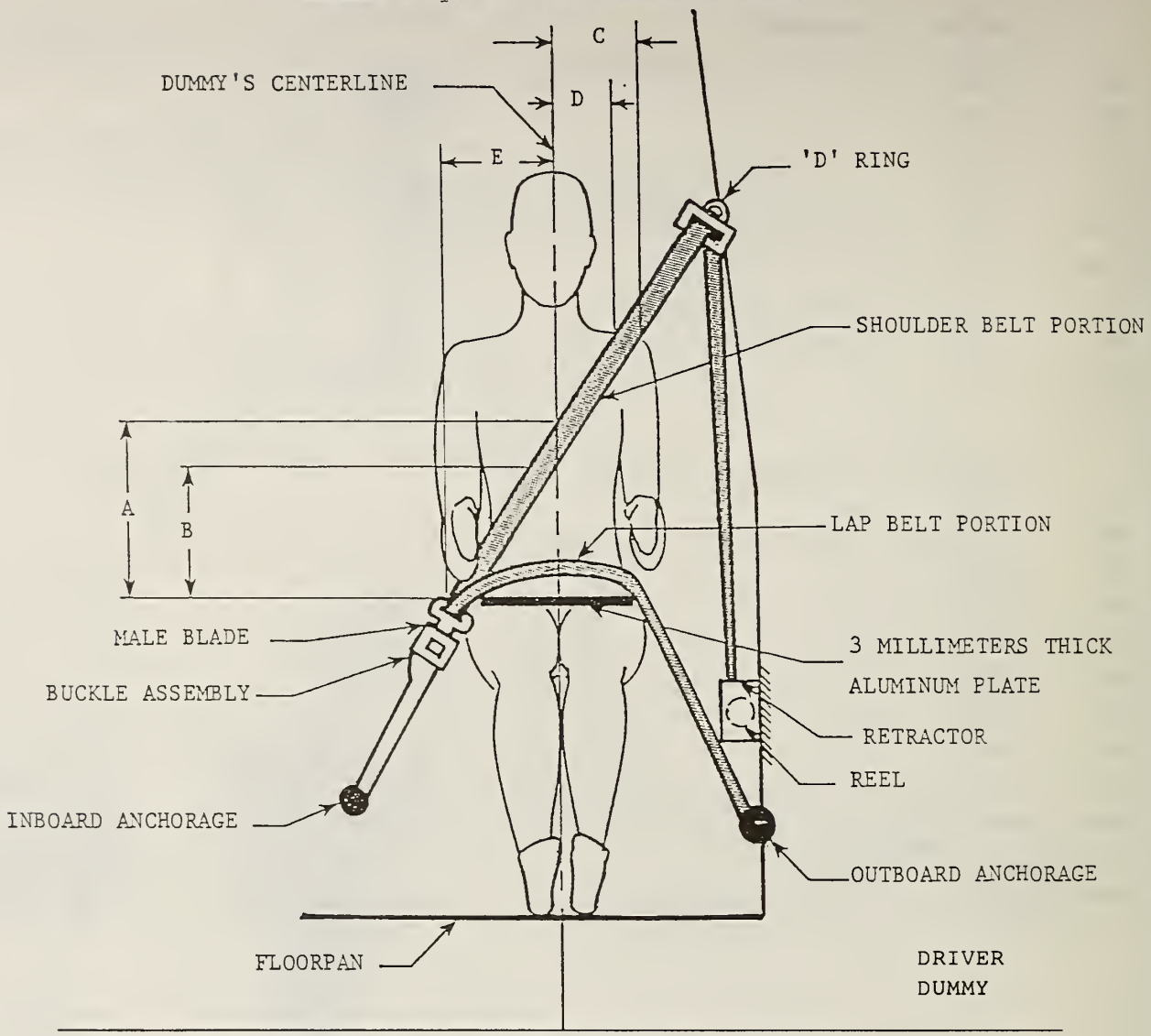


HH = HEAD TO WINDSHIELD HEADER
HW = HEAD TO WINDSHIELD
CD = CHEST TO DASH
CS = CHEST TO STEERING WHEEL
KD = KNEE TO DASH
TA = TORSO ANGLE
SA = SEAT BACK ANGLE
HSW= HEAD TO STEERING WHEEL

HR = HEAD C.G. TARGET TO SIDE ROOF HEADER
HS = HEAD C.G. TARGET TO SIDE WINDOW
AD = ARM TO DOOR
HD = HIP TO DOOR
KK = KNEE TO KNEE
AA = ANKLE TO ANKLE
HA = HEAD C.G. TARGET TO A-PILLAR

TORSO AND SEAT BACK ANGLES ARE RELATIVE TO VERTICAL.
ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

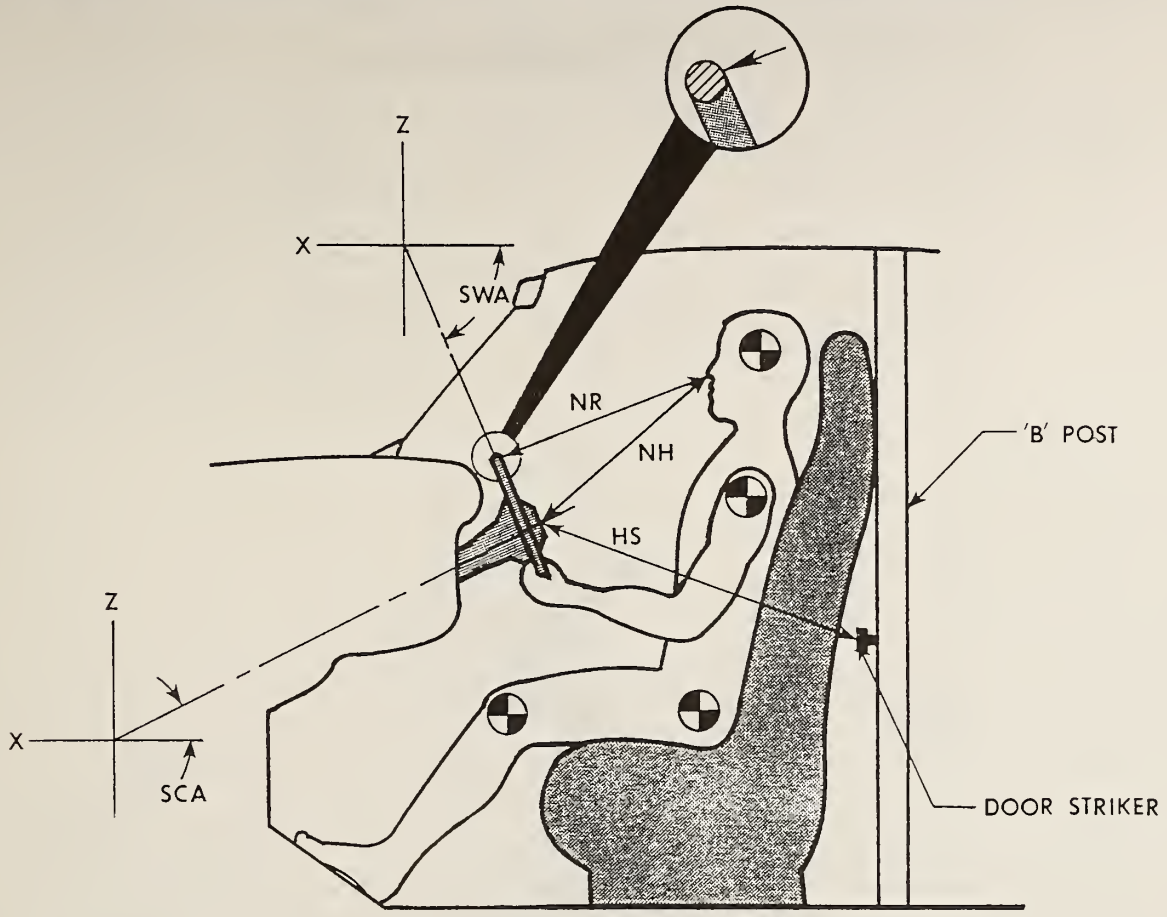
FIGURE 8 SEAT BELT POSITIONING DATA



A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	350
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	265
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	84
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	22
E - DUMMY CENTERLINE TO INTERSECTION OF UPPER TORSO BELT AND LAP BELT	270

ALL MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 9 DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY DATA



POSITION OF STEERING COLUMN TILTING AND TELESCOPING ADJUSTMENTS, IF ANY:
The steering column was fastened in the middle position.

	MEASUREMENTS
NR - DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	391
NH - DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	388
HS - DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	800
SCA - ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	22°
SWA - ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	68°

ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 10 CAMERA POSITIONS

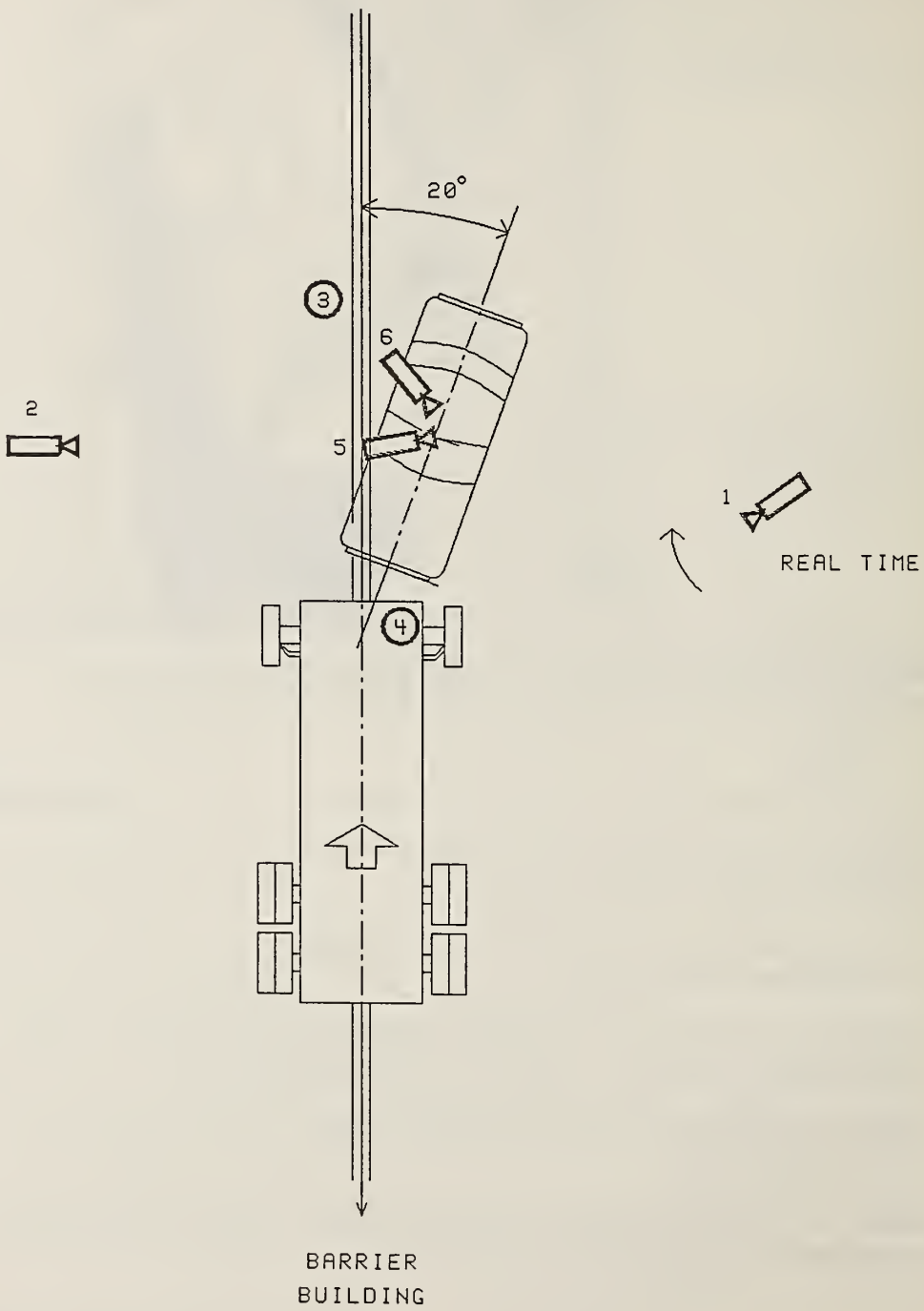


TABLE 10 MOTION PICTURE CAMERA INFORMATION

CAMERA NUMBER	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right panning	Bolex	18	24	Real-time documentation
2	Left wide	Photosonic	13	998	Vehicle dynamics
3	Overhead wide	Photosonic	8.5	1022	Vehicle dynamics
4	Onboard truck	Photosonic	8	1000	Dummy kinematics
5	Onboard car-front	Photosonic	8	995	Dummy kinematics
6	Onboard car-rear	Photosonic	8	998	Dummy kinematics

APPENDIX A

PHOTOGRAPHS

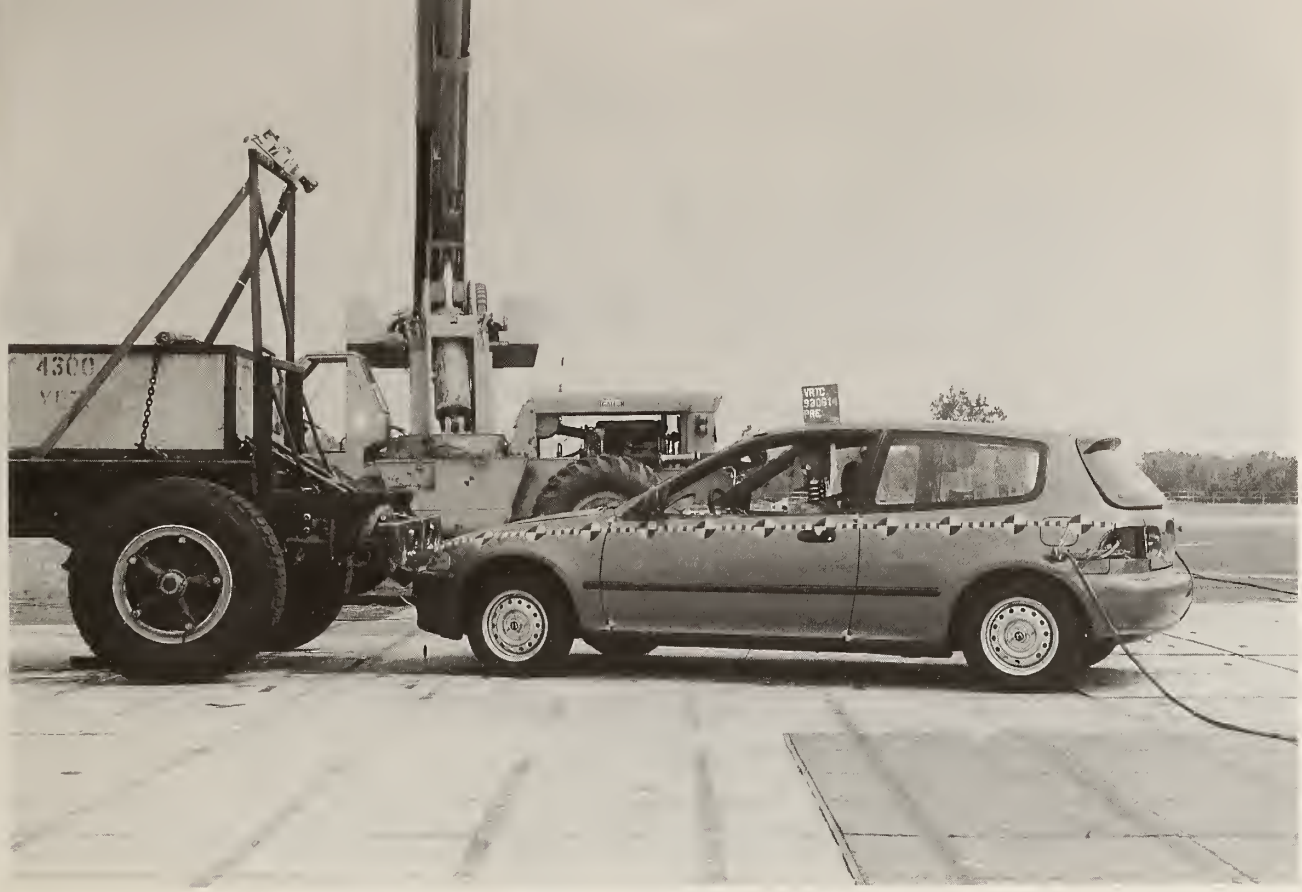


Figure A-1. PRE-TEST VEHICLE - LEFT SIDE VIEW

Figure A-2. POST-TEST VEHICLE - LEFT SIDE VIEW

Figure A-3. PRE-TEST VEHICLE - REAR VIEW

Figure A-4. POST-TEST VEHICLE - REAR VIEW

Figure A-5. PRE-TEST VEHICLE - RIGHT SIDE VIEW

Figure A-6. POST-TEST VEHICLE - RIGHT SIDE VIEW

Figure A-7. PRE-TEST BUMPER ENGAGEMENT VIEW

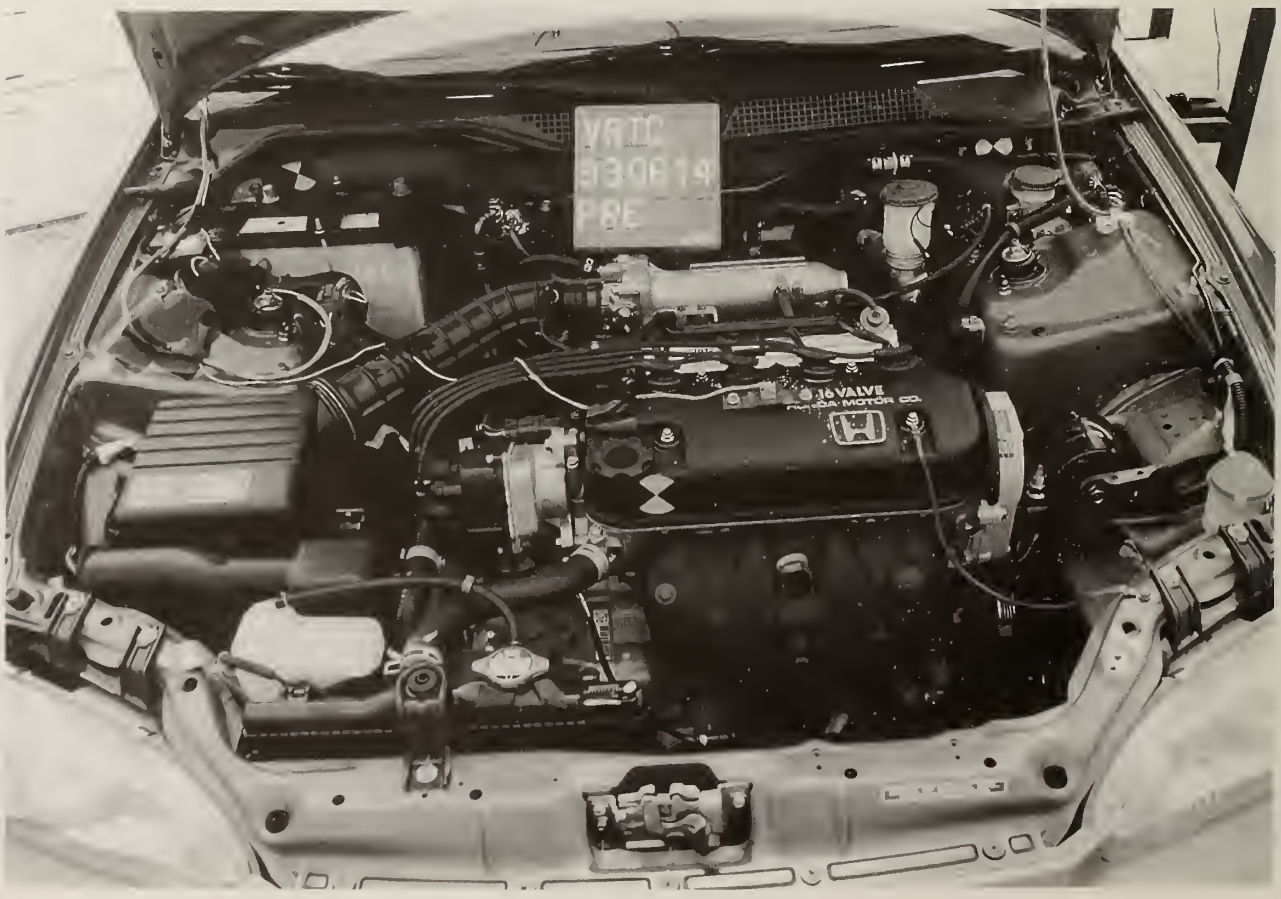


Figure A-8. PRE-TEST VEHICLE - ENGINE COMPARTMENT VIEW

Figure A-9. POST-TEST VEHICLE - ENGINE COMPARTMENT VIEW

Figure A-10. POST-TEST VEHICLE - WINDSHIELD VIEW

Figure A-11. PRE-TEST TRUCK - LEFT SIDE VIEW

Figure A-12. POST-TEST TRUCK - LEFT SIDE VIEW

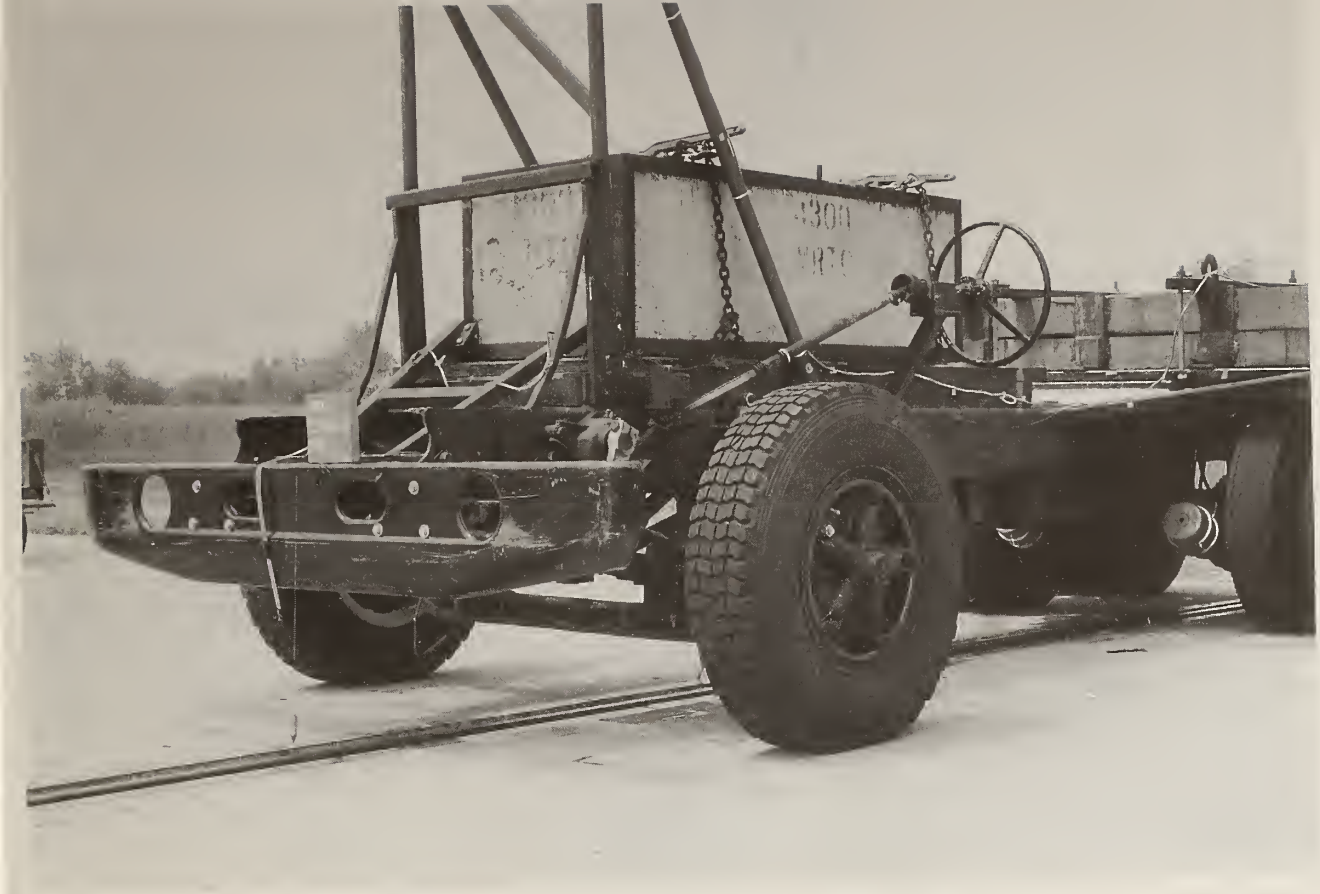


Figure A-13. PRE-TEST TRUCK - LEFT FRONT VIEW

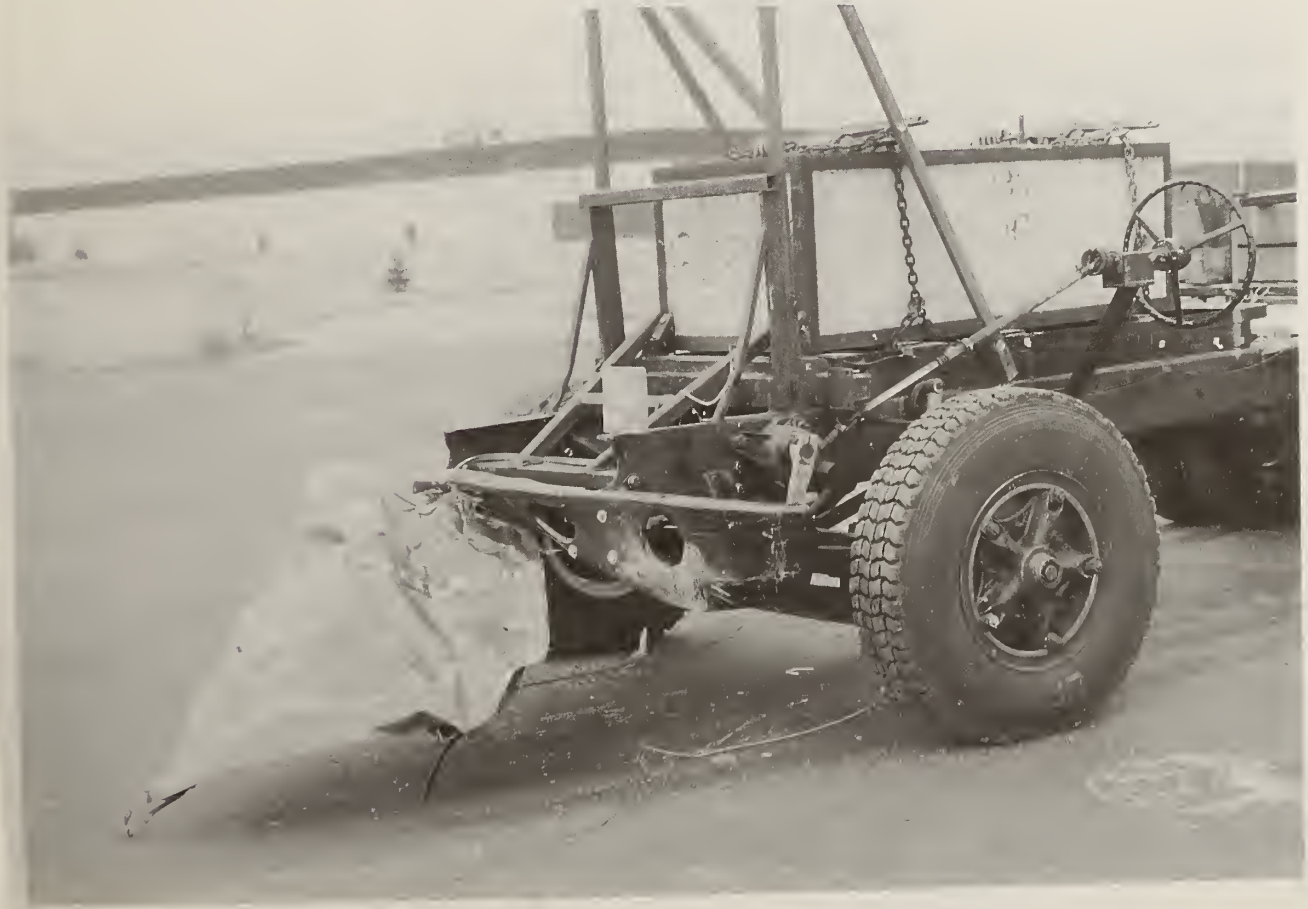


Figure A-14. POST-TEST TRUCK - LEFT FRONT VIEW

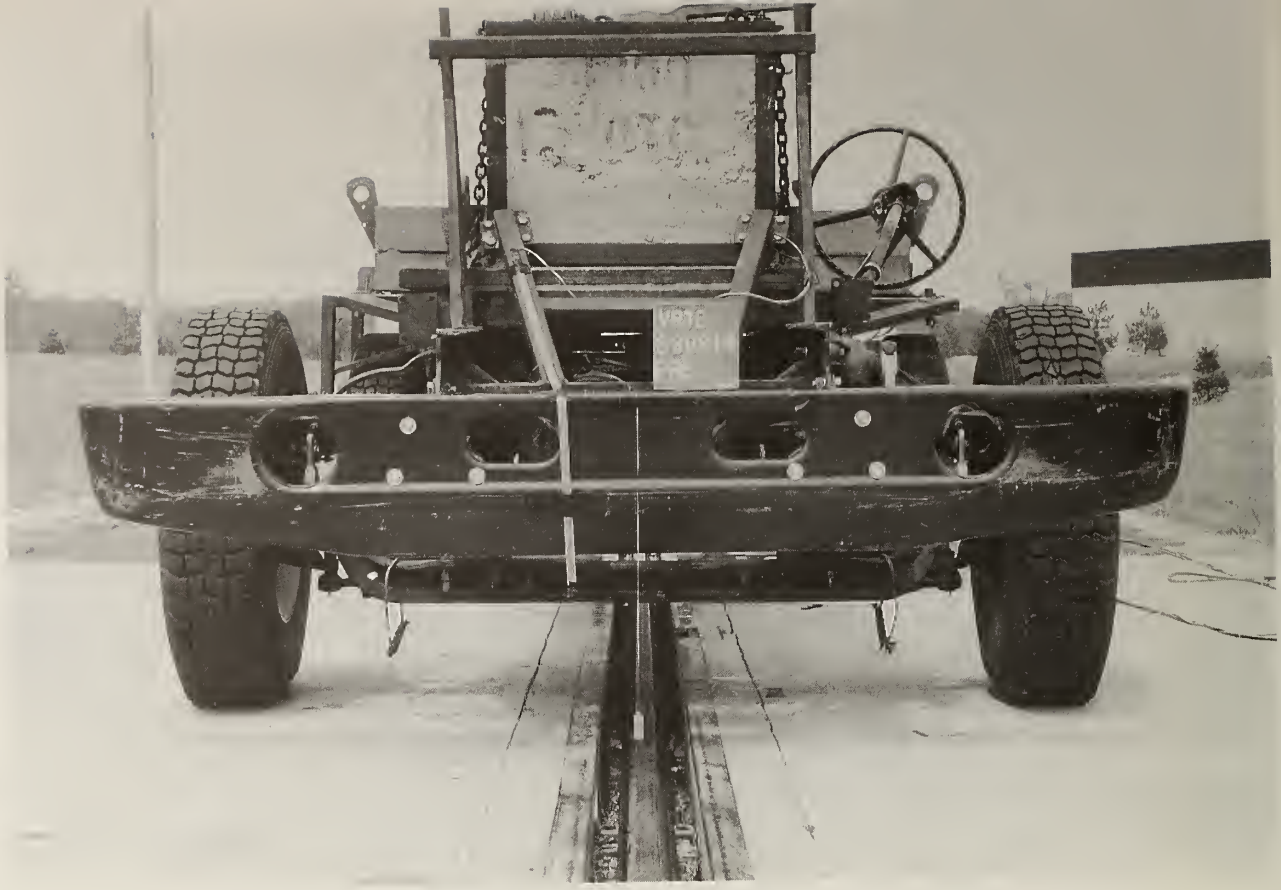


Figure A-15. PRE-TEST TRUCK - FRONT VIEW

Figure A-16. POST-TEST TRUCK - FRONT VIEW

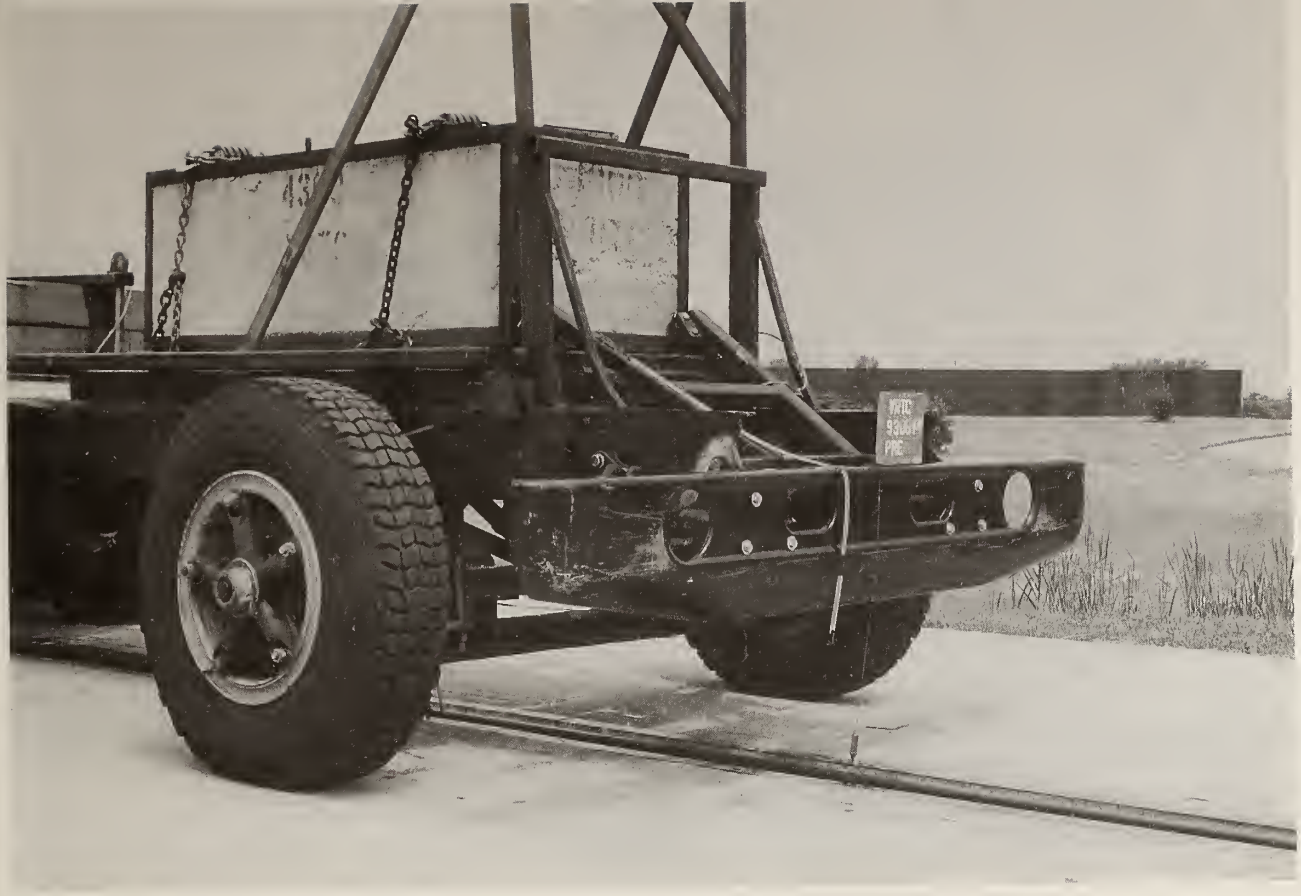


Figure A-17. PRE-TEST TRUCK - RIGHT FRONT VIEW

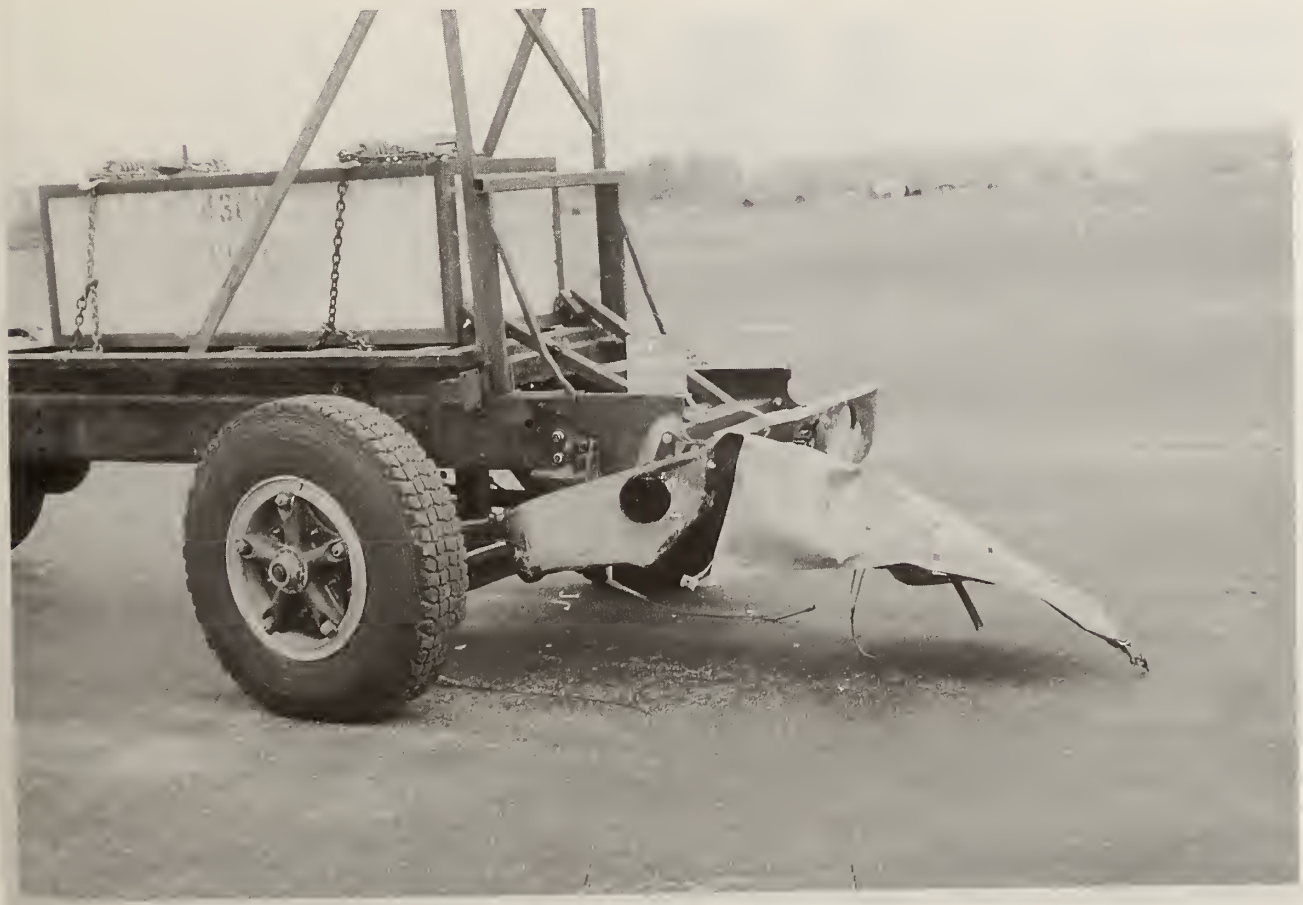


Figure A-18. POST-TEST TRUCK - RIGHT FRONT VIEW

Figure A-19. PRE-TEST TRUCK - RIGHT SIDE VIEW

Figure A-20. POST-TEST TRUCK - RIGHT SIDE VIEW

Figure A-21. PRE-TEST DUMMY VIEW

Figure A-22. POST-TEST DUMMY VIEW

Figure A-23. PRE-TEST VEHICLE INTERIOR AND DUMMY - VIEW 1

Figure A-24. PRE-TEST VEHICLE INTERIOR AND DUMMY - VIEW 2

Figure A-25. POST-TEST DUMMY HEAD CONTACT VIEW

Figure A-26. POST-TEST DUMMY KNEE CONTACT VIEW

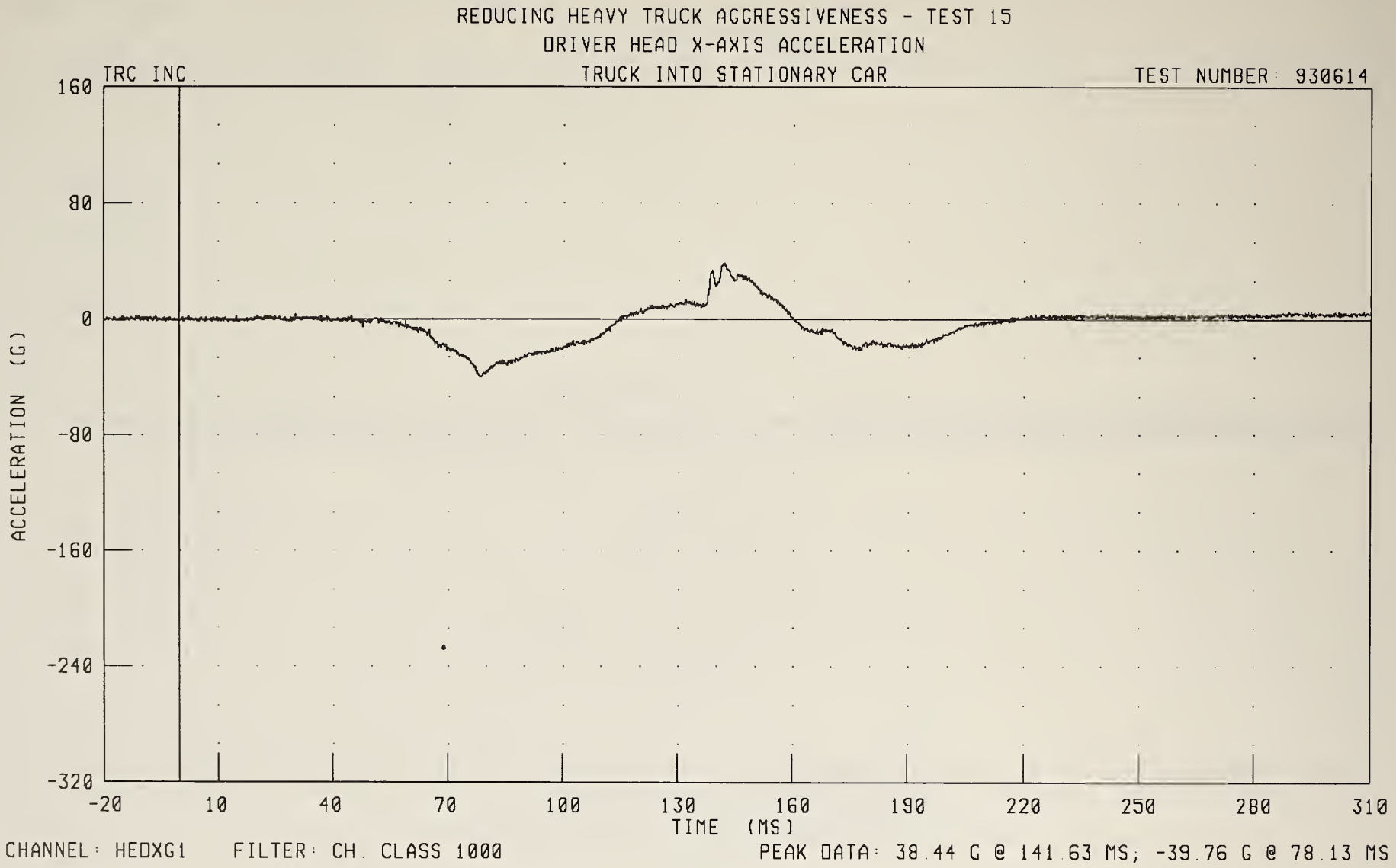
Figure A-27. POST-TEST VEHICLE AND TRUCK RESTING POSITIONS

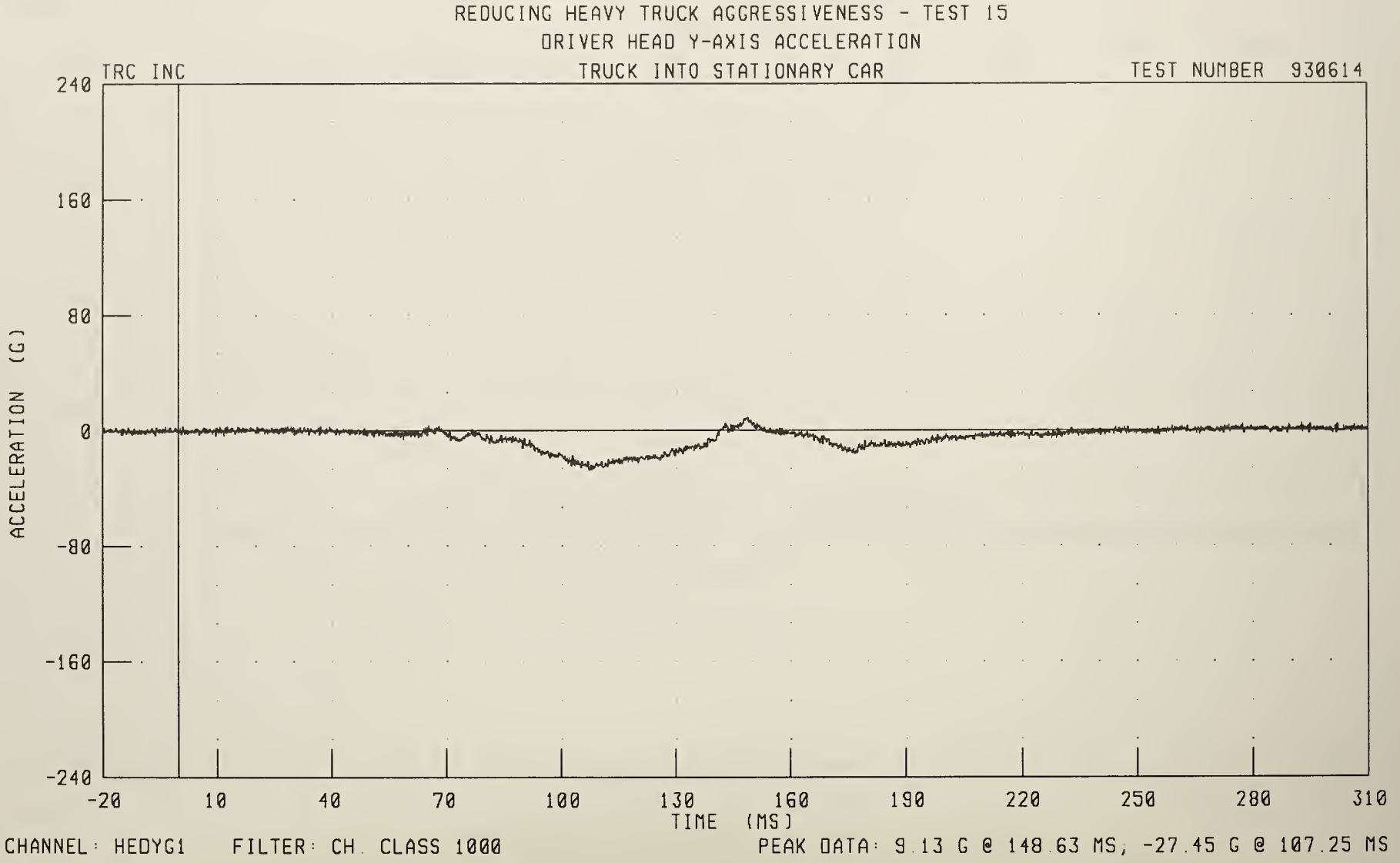
Figure A-28. POST-TEST IMPACT EVENT - VIEW 1

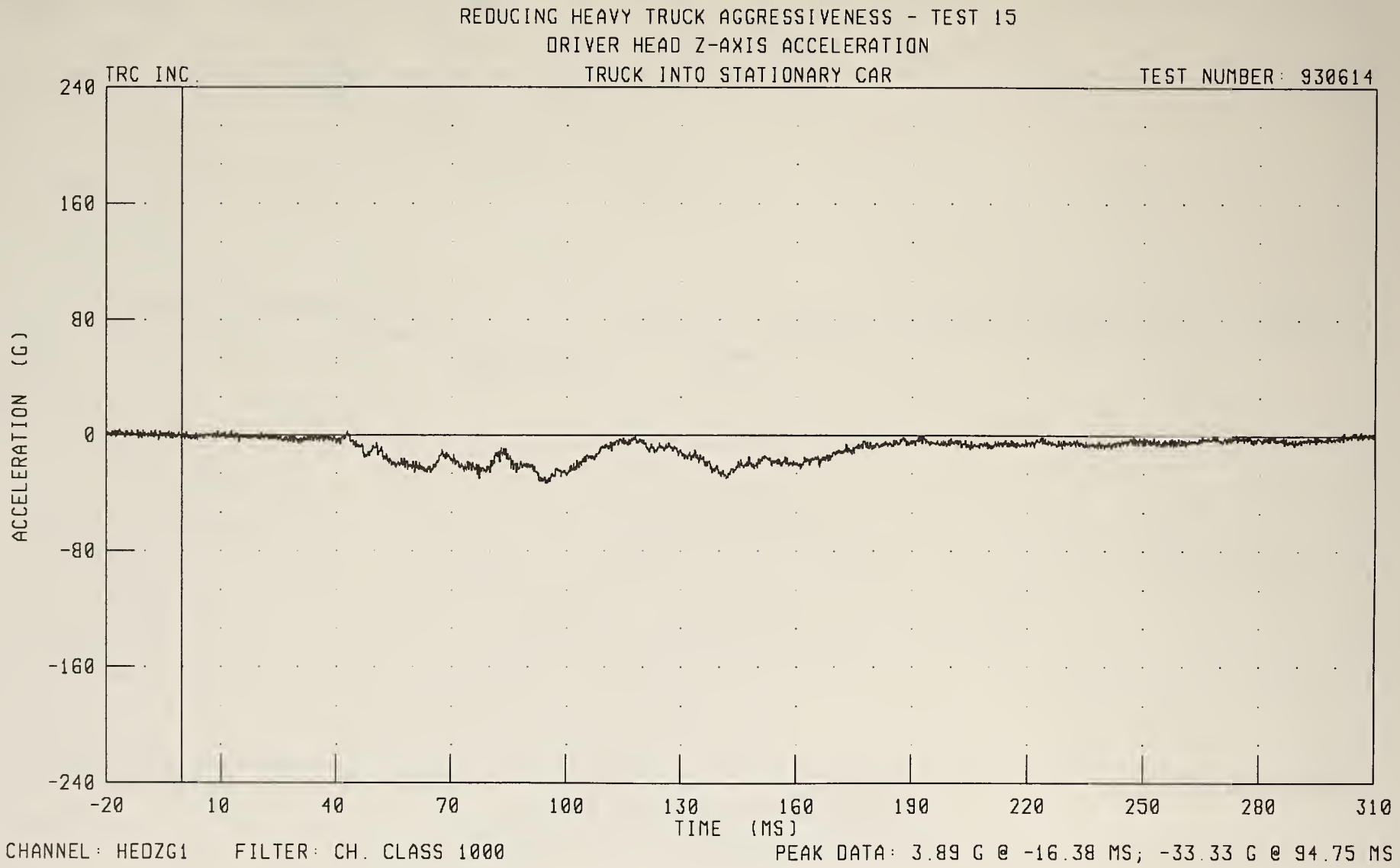
Figure A-29. POST-TEST IMPACT EVENT - VIEW 2

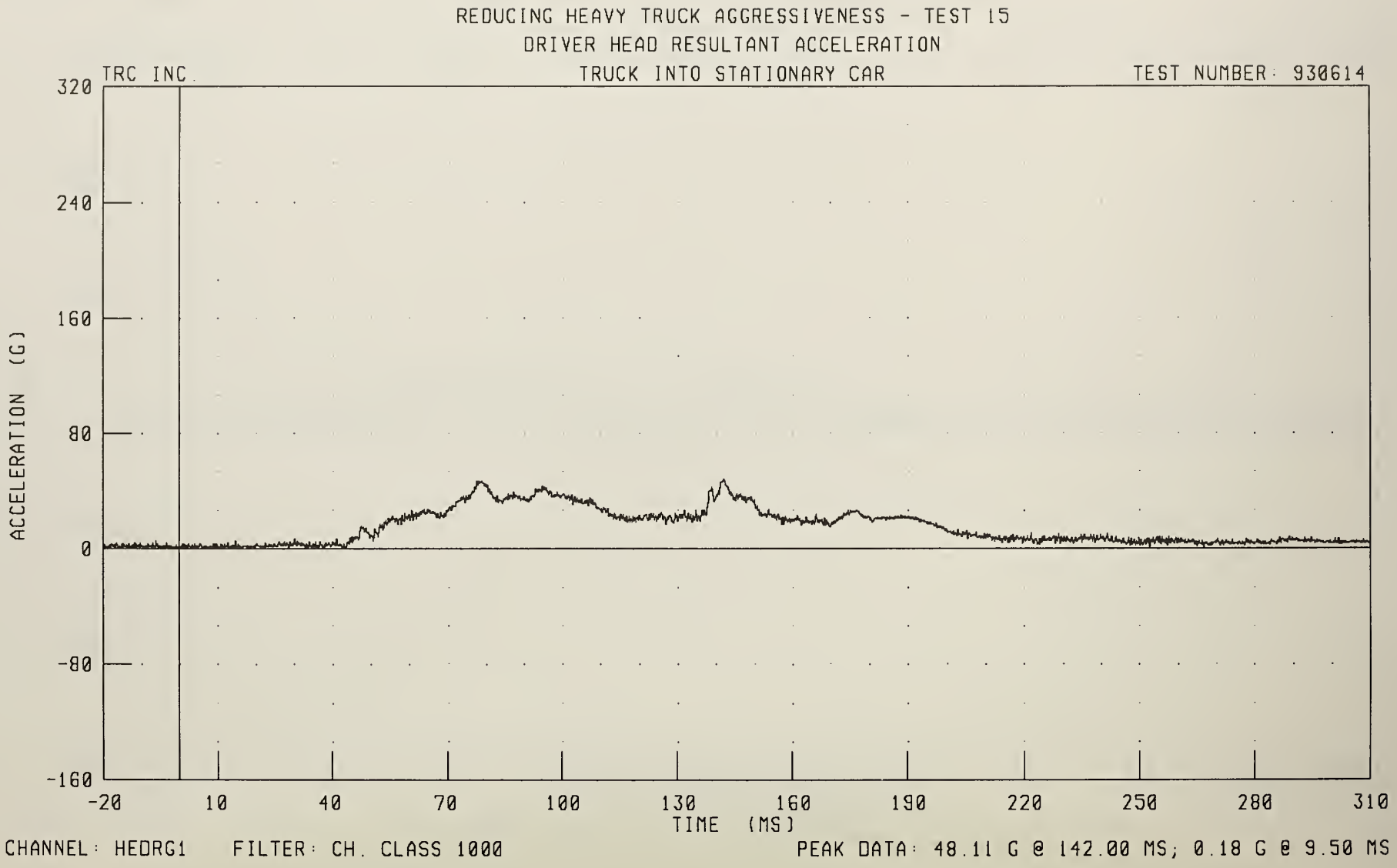
APPENDIX B

DATA PLOTS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER HEAD X-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
160
80
0
-80
-160
-240
-320
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXG1
FILTER: CH. CLASS 1000
PEAK DATA: 38.44 G @ 141.63 MS; -39.76 G @ 78.13 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER HEAD Y-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR
TRC INC
TEST NUMBER 930614
240
160
80
0
-80
-160
-240
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYG1
FILTER: CH. CLASS 1000
PEAK DATA: 9.13 G @ 148.63 MS, -27.45 G @ 107.25 MS

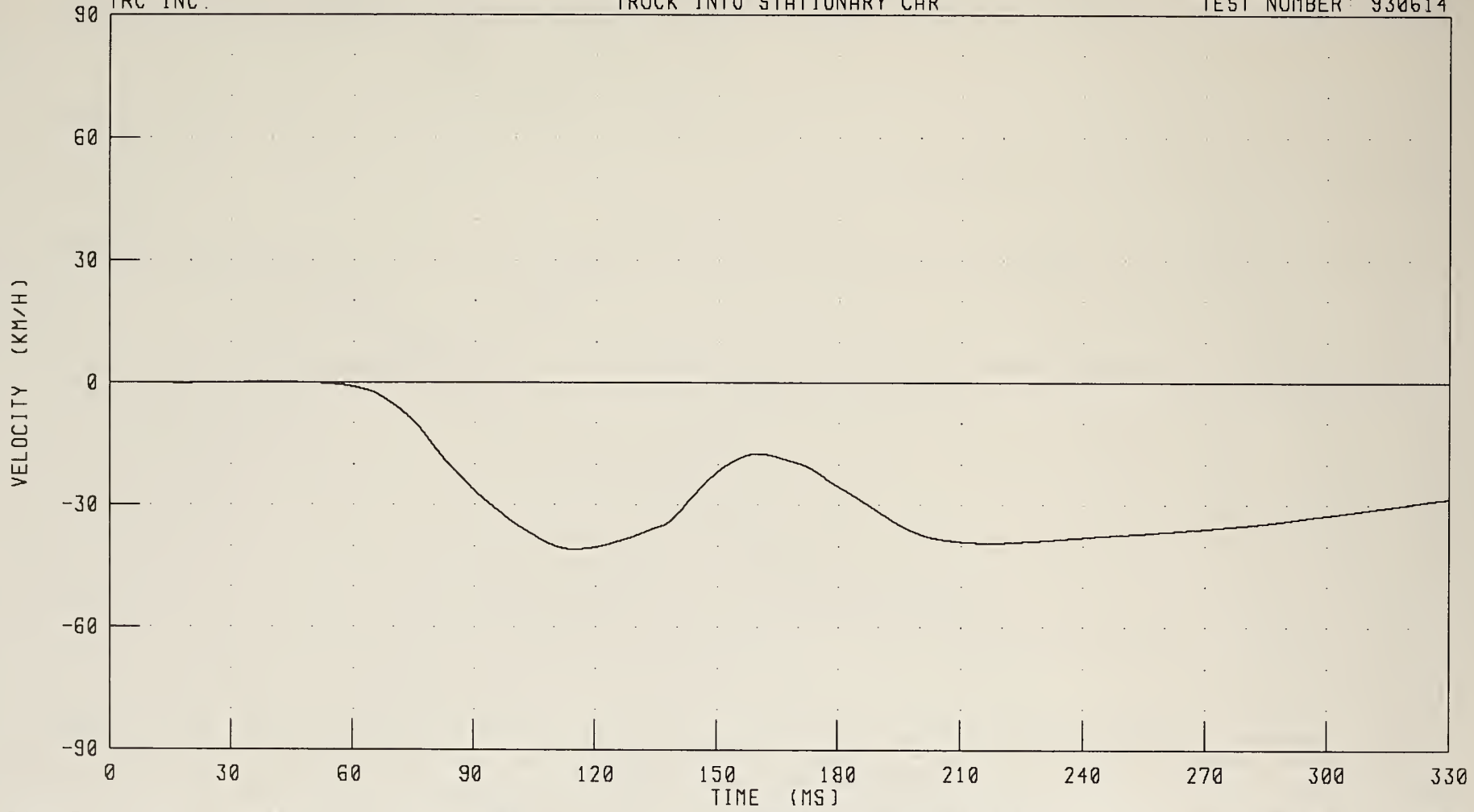

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER HEAD Z-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
240
160
80
0
-80
-160
-240
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZG1
FILTER: CH. CLASS 1000
PEAK DATA: 3.89 G @ -16.38 MS; -33.33 G @ 94.75 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER HEAD RESULTANT ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
320
240
160
80
0
-80
-160
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRG1
FILTER: CH. CLASS 1000
PEAK DATA: 48.11 G @ 142.00 MS; 0.18 G @ 9.50 MS

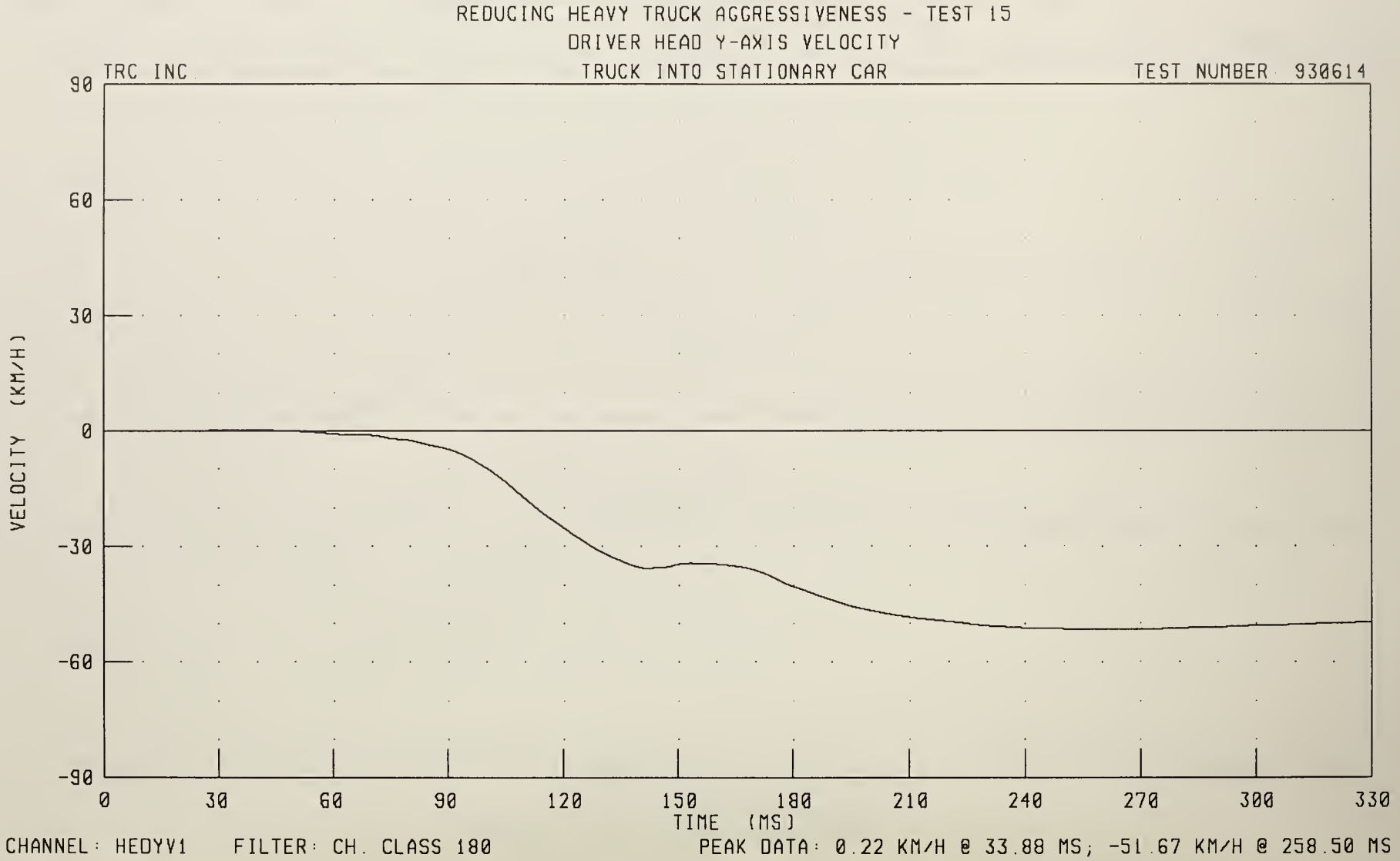
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15

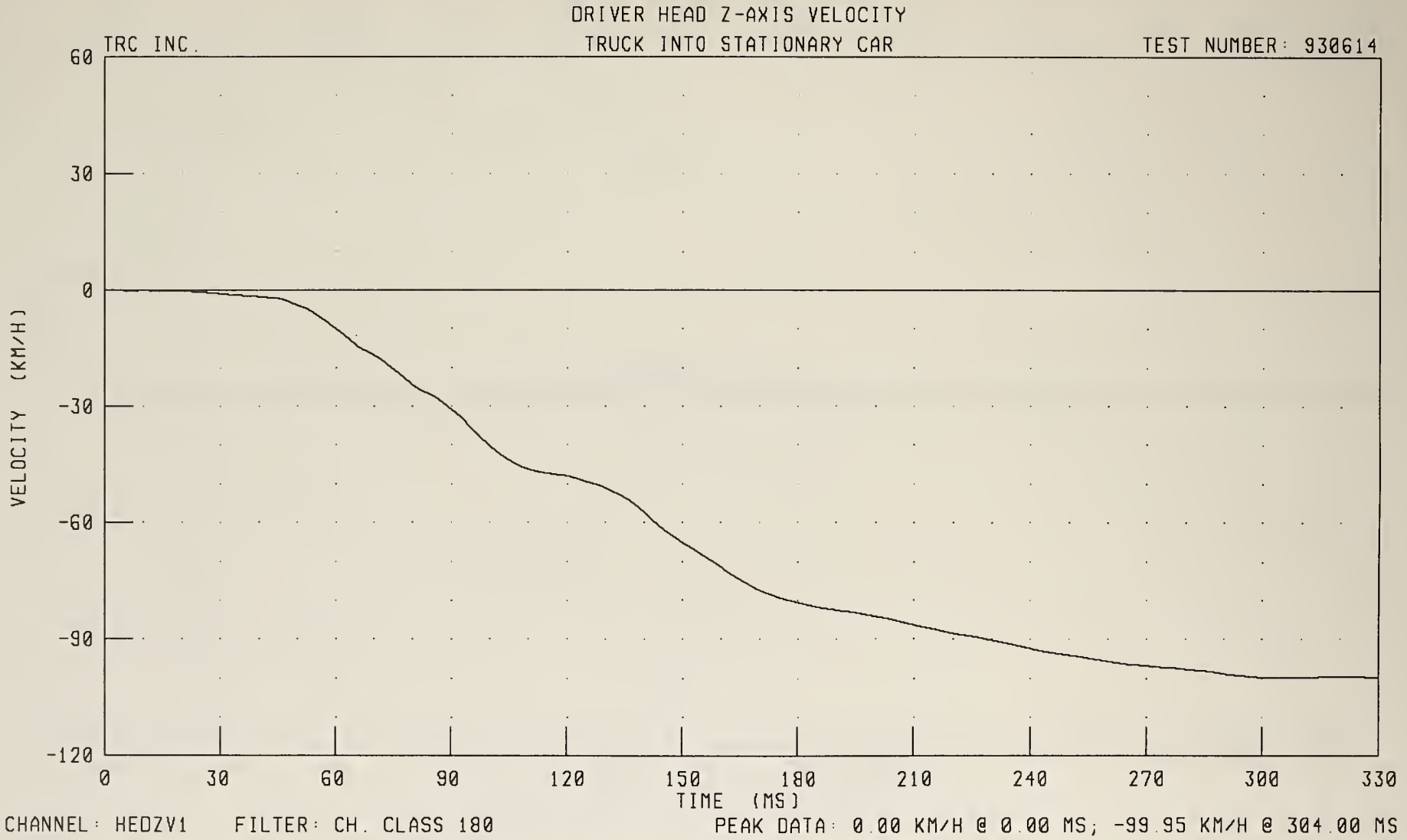
DRIVER HEAD X-AXIS VELOCITY

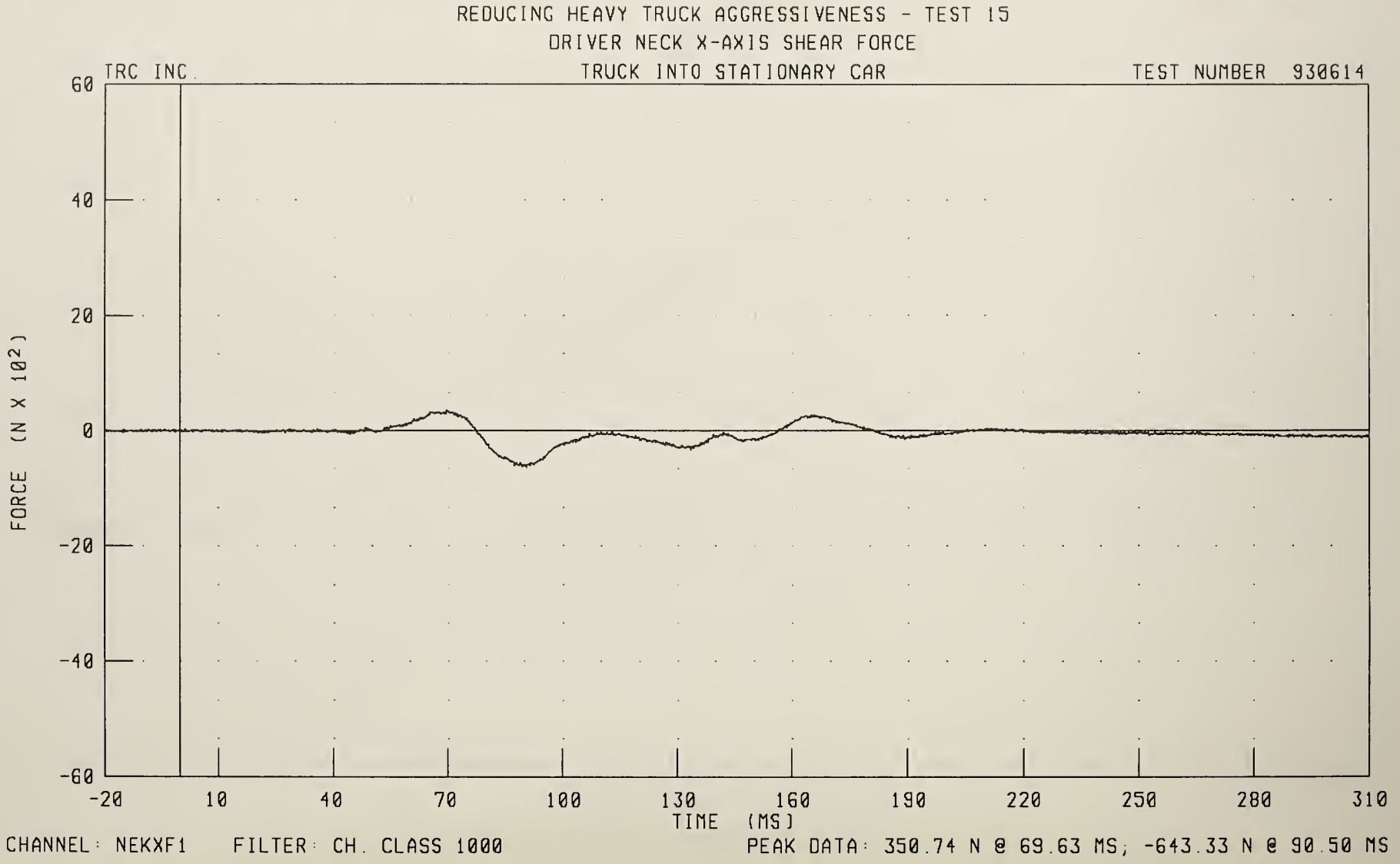
TRC INC. TRUCK INTO STATIONARY CAR TEST NUMBER: 930614

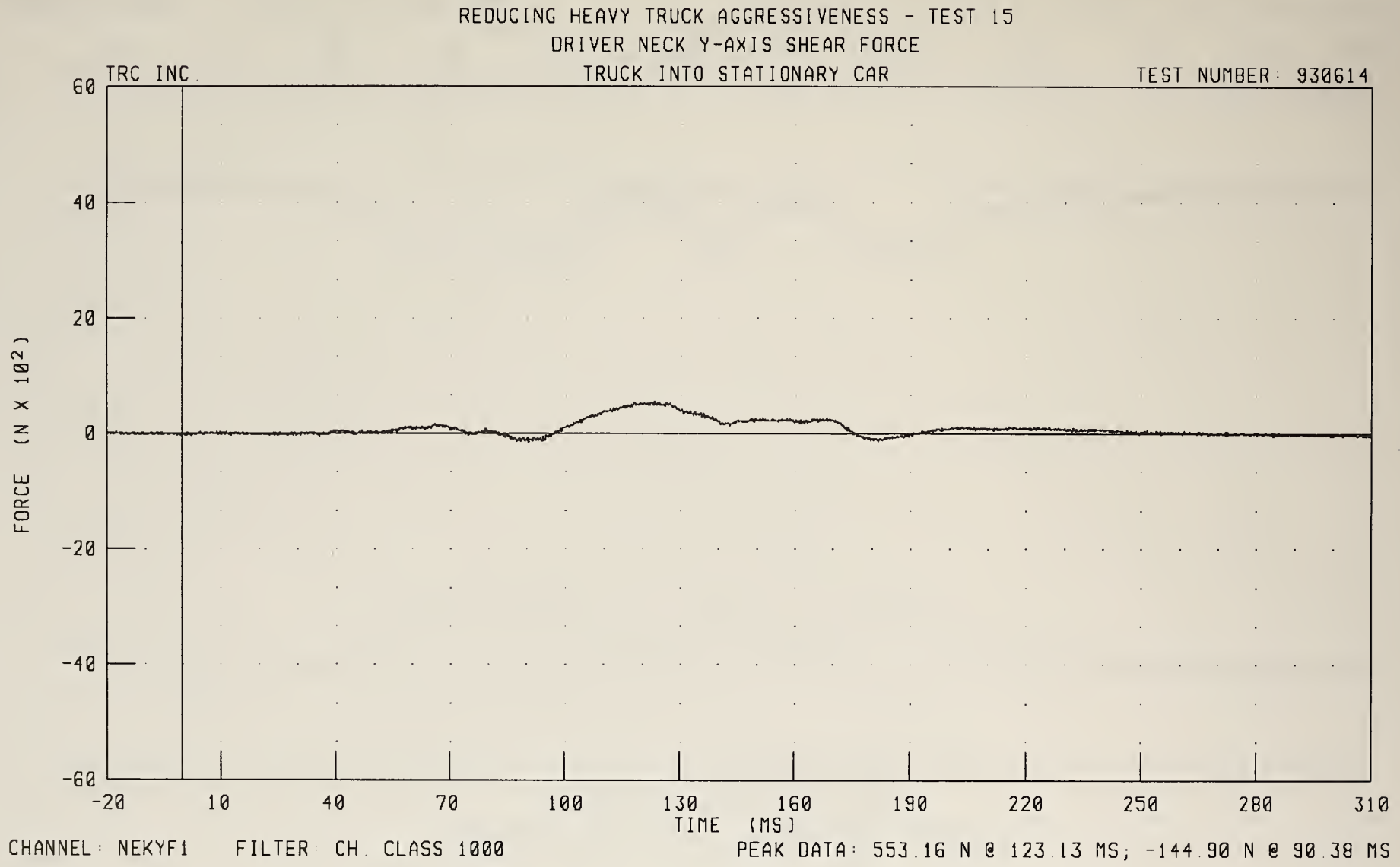


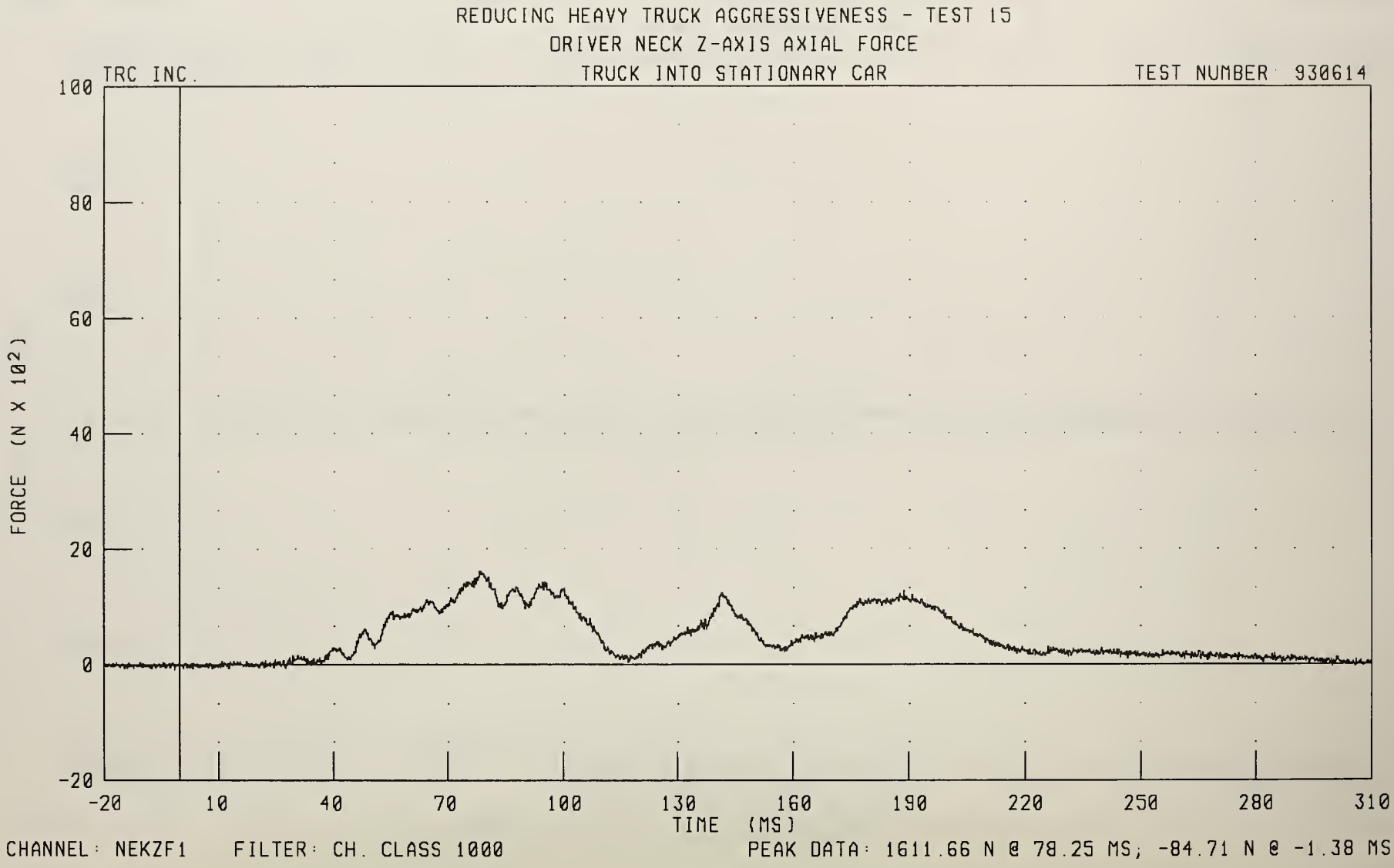
CHANNEL: HEDXV1 FILTER: CH. CLASS 180 PEAK DATA: 0.22 KM/H @ 38.75 MS; -40.87 KM/H @ 114.75 MS

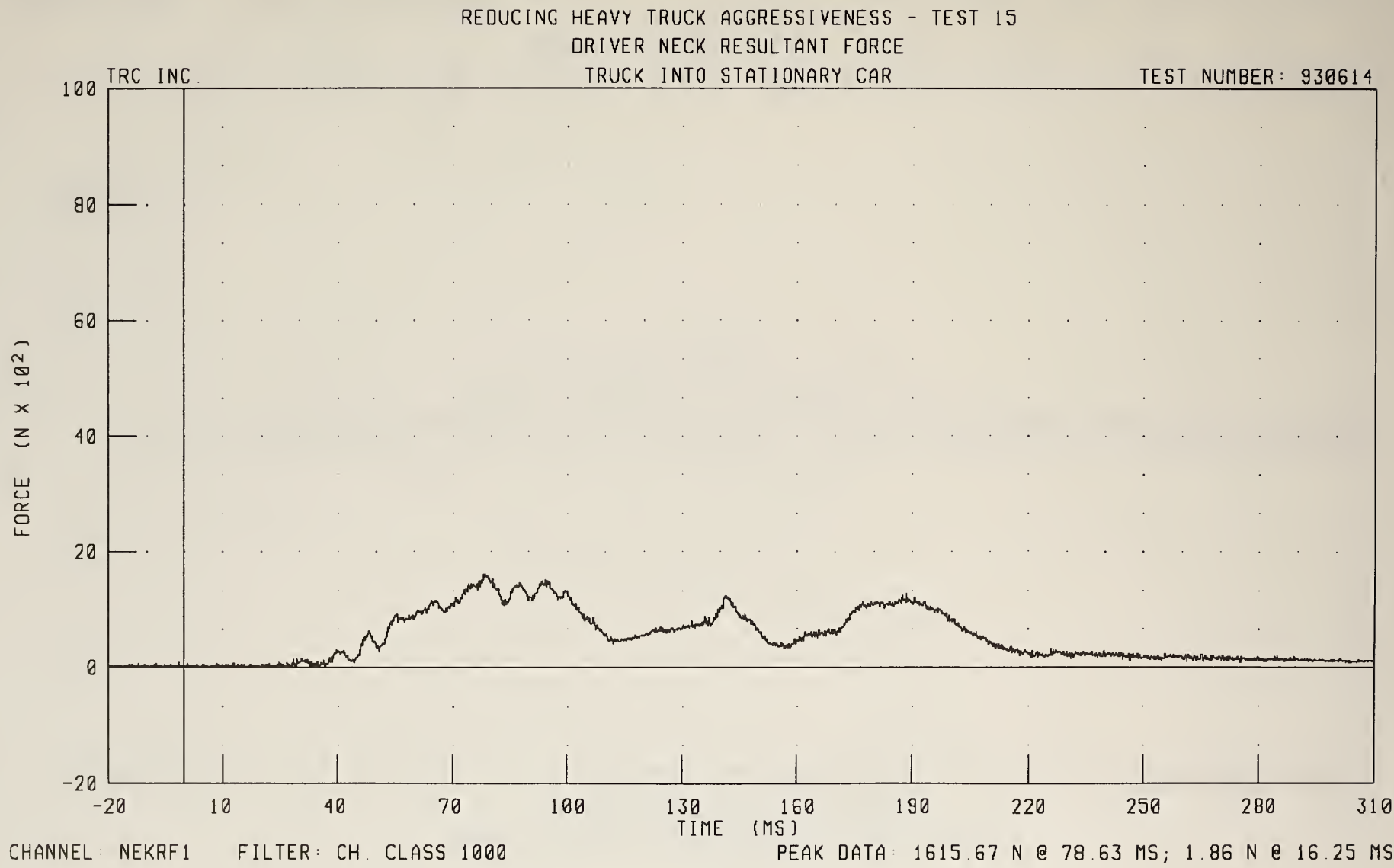

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER HEAD Y-AXIS VELOCITY
TRC INC
TRUCK INTO STATIONARY CAR
TEST NUMBER 930614
90
60
30
0
-30
-60
-90
VELOCITY (KM/H)
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: HEDYV1
FILTER: CH. CLASS 180
PEAK DATA: 0.22 KM/H @ 33.88 MS; -51.67 KM/H @ 258.50 MS

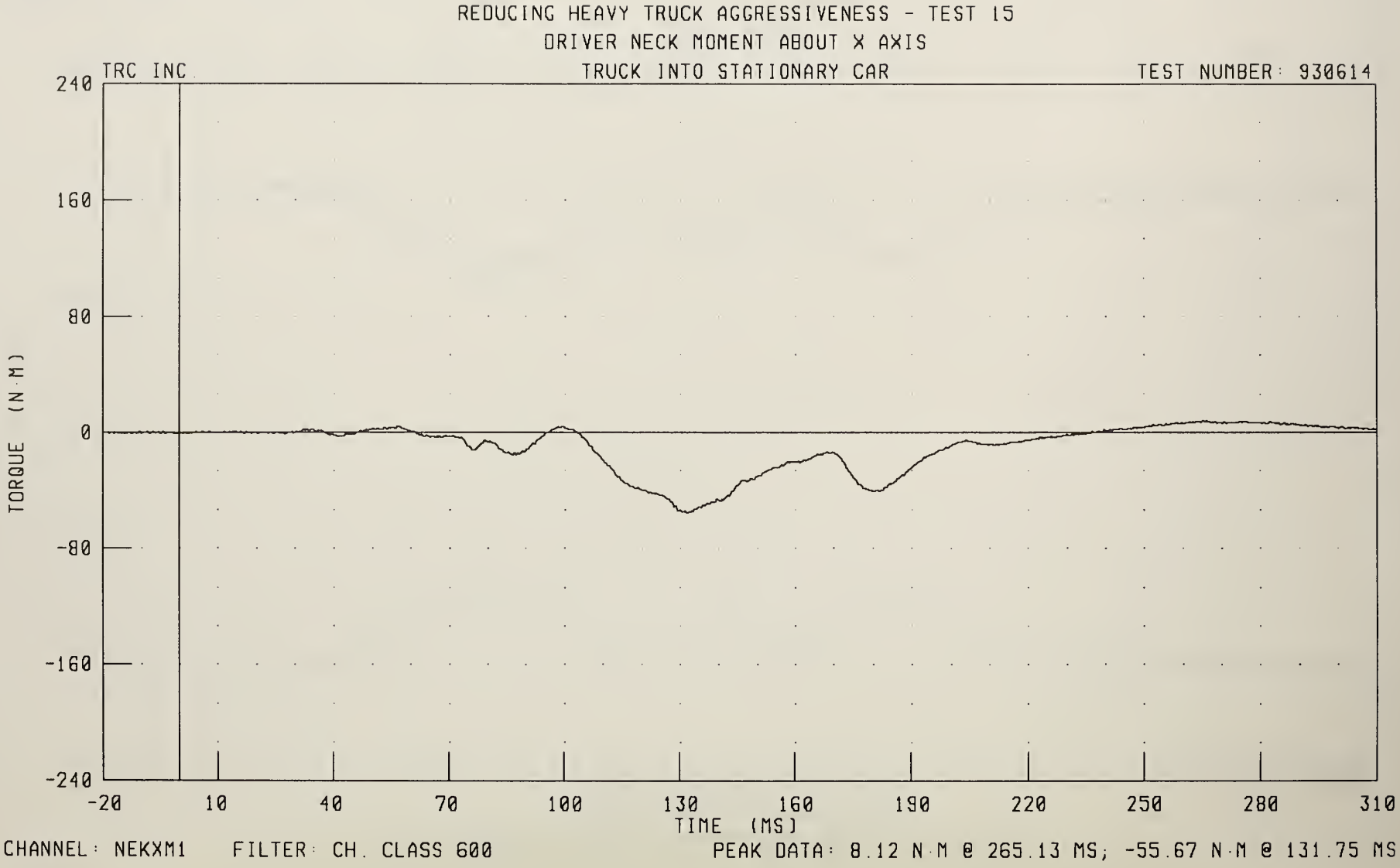

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER HEAD Z-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
60
30
0
-30
-60
-90
-120
VELOCITY (KM/H)
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: HEDZV1
FILTER: CH. CLASS 180
PEAK DATA: 0.00 KM/H @ 0.00 MS; -99.95 KM/H @ 304.00 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER NECK X-AXIS SHEAR FORCE
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER 930614
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXF1
FILTER: CH. CLASS 1000
PEAK DATA: 350.74 N @ 69.63 MS; -643.33 N @ 90.50 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER NECK Y-AXIS SHEAR FORCE
TRC INC
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYF1
FILTER: CH CLASS 1000
PEAK DATA: 553.16 N @ 123.13 MS; -144.90 N @ 90.38 MS

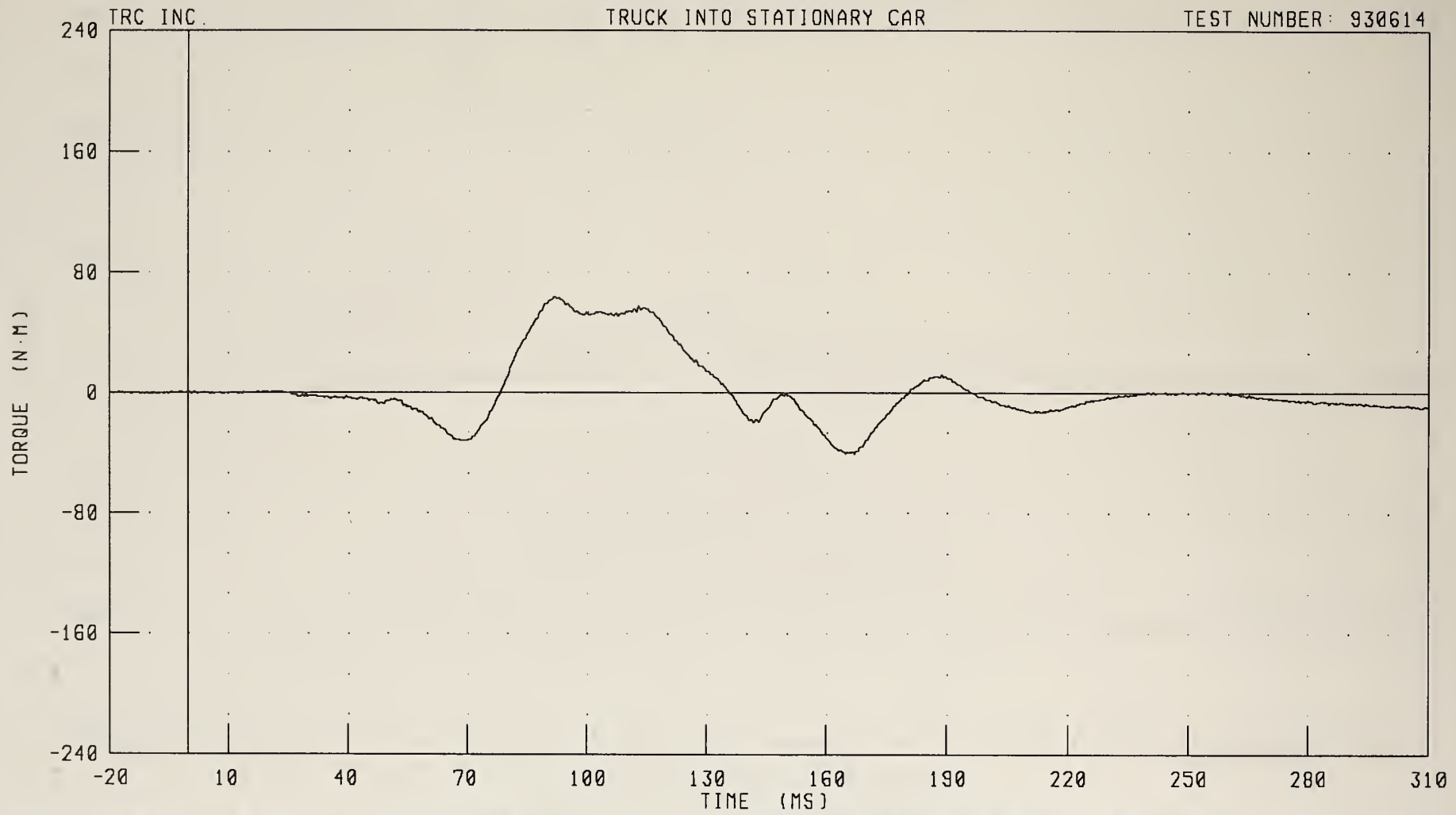

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER NECK Z-AXIS AXIAL FORCE
TRUCK INTO STATIONARY CAR
TRC INC.
TEST NUMBER: 930614
FORCE (N X 10²)
100
80
60
40
20
0
-20
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKZF1
FILTER: CH. CLASS 1000
PEAK DATA: 1611.66 N @ 78.25 MS; -84.71 N @ -1.38 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER NECK RESULTANT FORCE
TRUCK INTO STATIONARY CAR
TRC INC.
TEST NUMBER: 930614
100
80
60
40
20
0
-20
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKRF1
FILTER: CH. CLASS 1000
PEAK DATA: 1615.67 N @ 78.63 MS; 1.86 N @ 16.25 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER NECK MOMENT ABOUT X AXIS
TRC INC
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
240
160
80
0
-80
-160
-240
TORQUE (N.M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXM1
FILTER: CH. CLASS 600
PEAK DATA: 8.12 N.M @ 265.13 MS; -55.67 N.M @ 131.75 MS

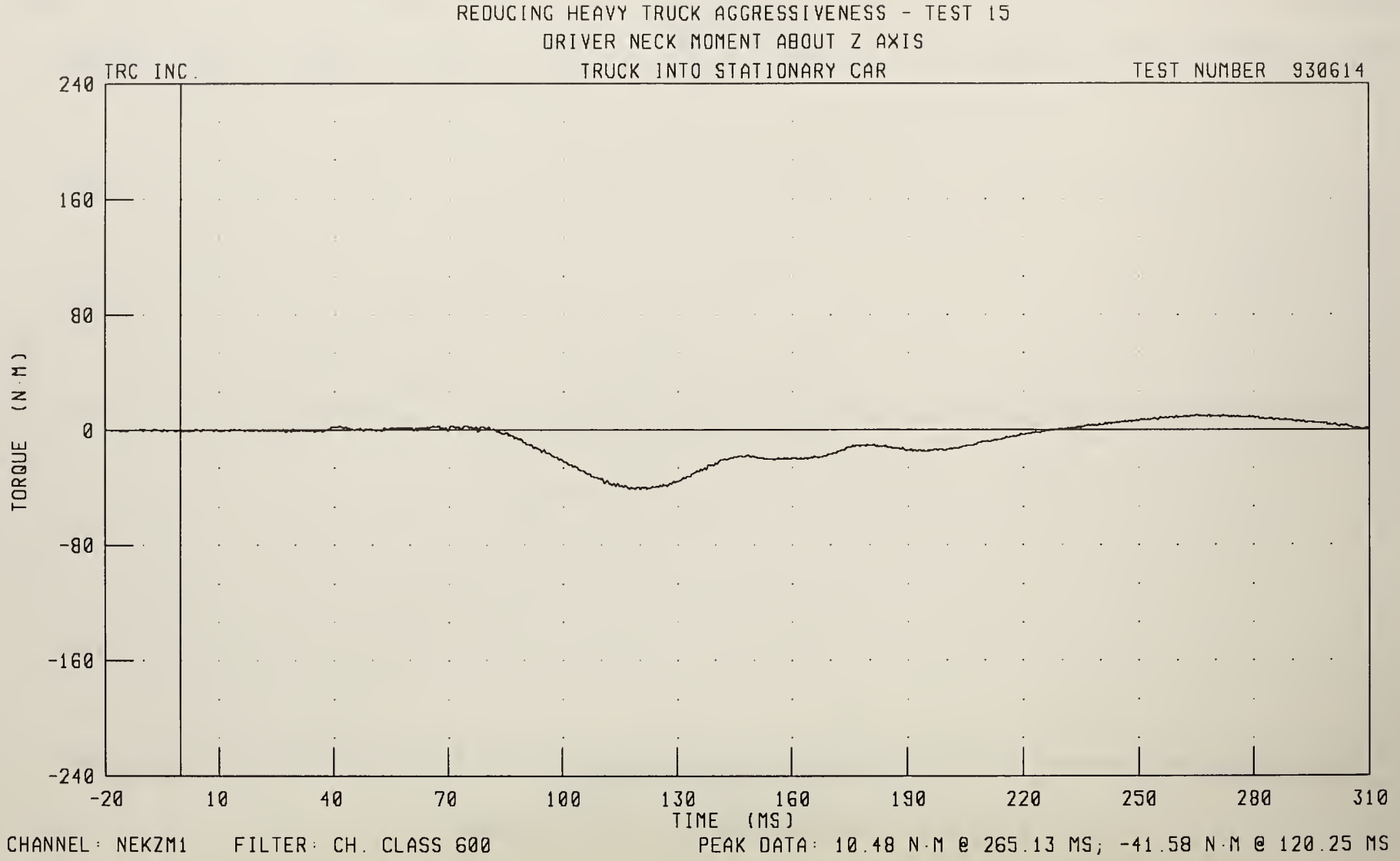
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15

DRIVER NECK MOMENT ABOUT Y AXIS



CHANNEL: NEKYM1 FILTER: CH. CLASS 600

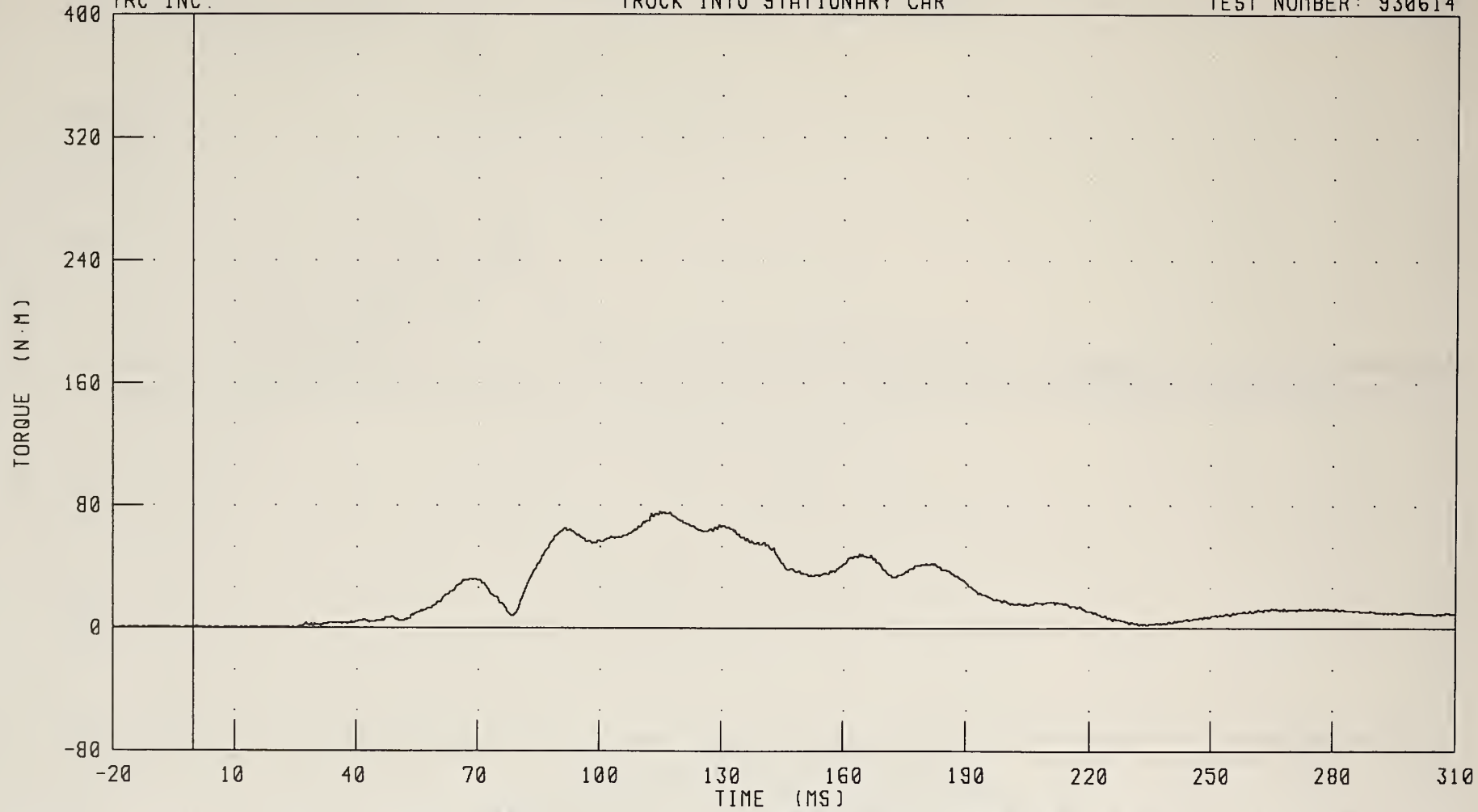
PEAK DATA: 64.05 N·M @ 91.63 MS; -40.29 N·M @ 164.75 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER NECK MOMENT ABOUT Z AXIS
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER 930614
240
160
80
0
-80
-160
-240
TORQUE (N·M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKZM1
FILTER: CH. CLASS 600
PEAK DATA: 10.48 N·M @ 265.13 MS; -41.58 N·M @ 120.25 MS

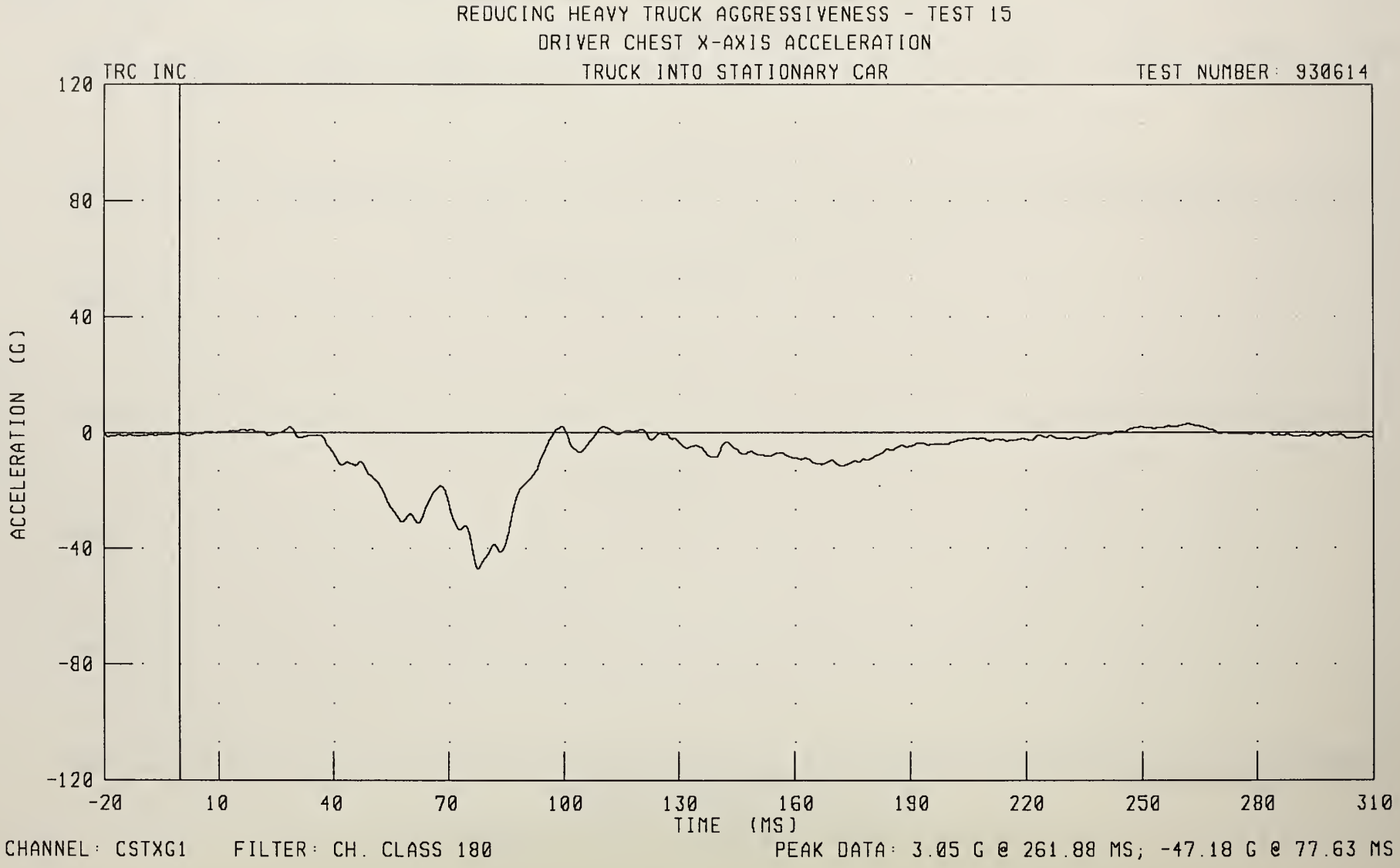
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15

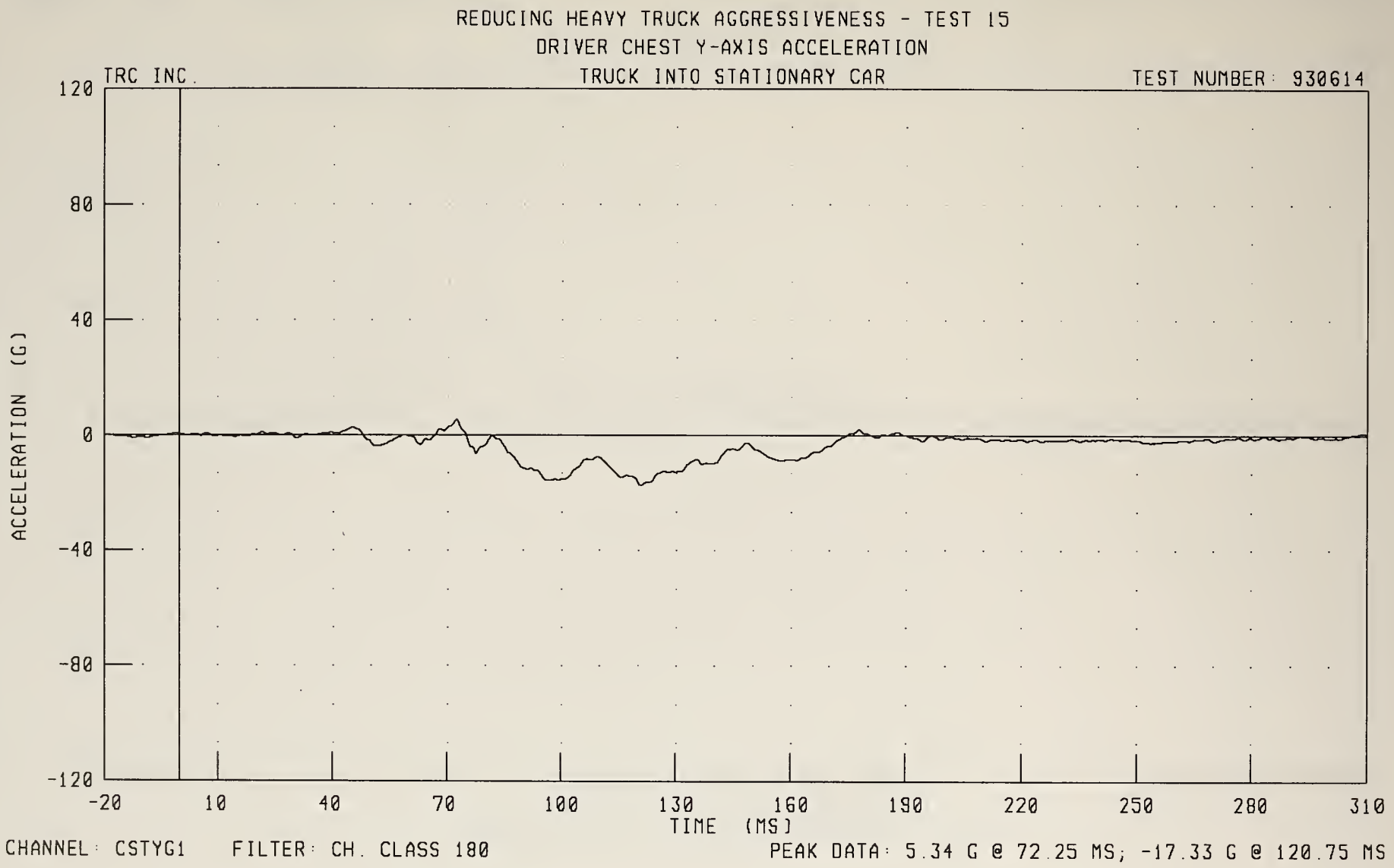
DRIVER NECK MOMENT RESULTANT

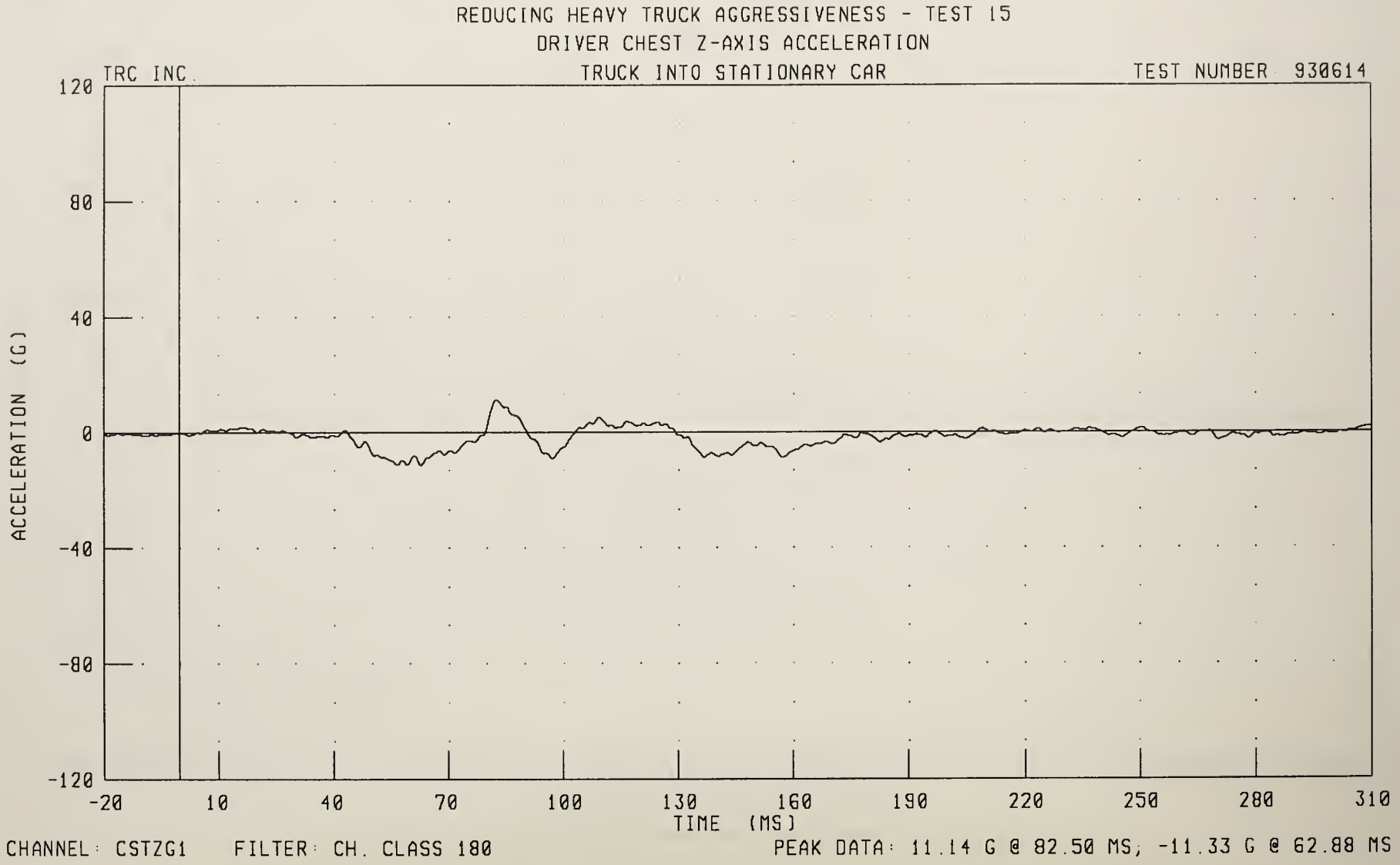
TRC INC. TRUCK INTO STATIONARY CAR TEST NUMBER: 930614



CHANNEL: NEKRM1 FILTER: CH. CLASS 600 PEAK DATA: 76.03 N·M @ 114.88 MS; 0.11 N·M @ 13.50 MS

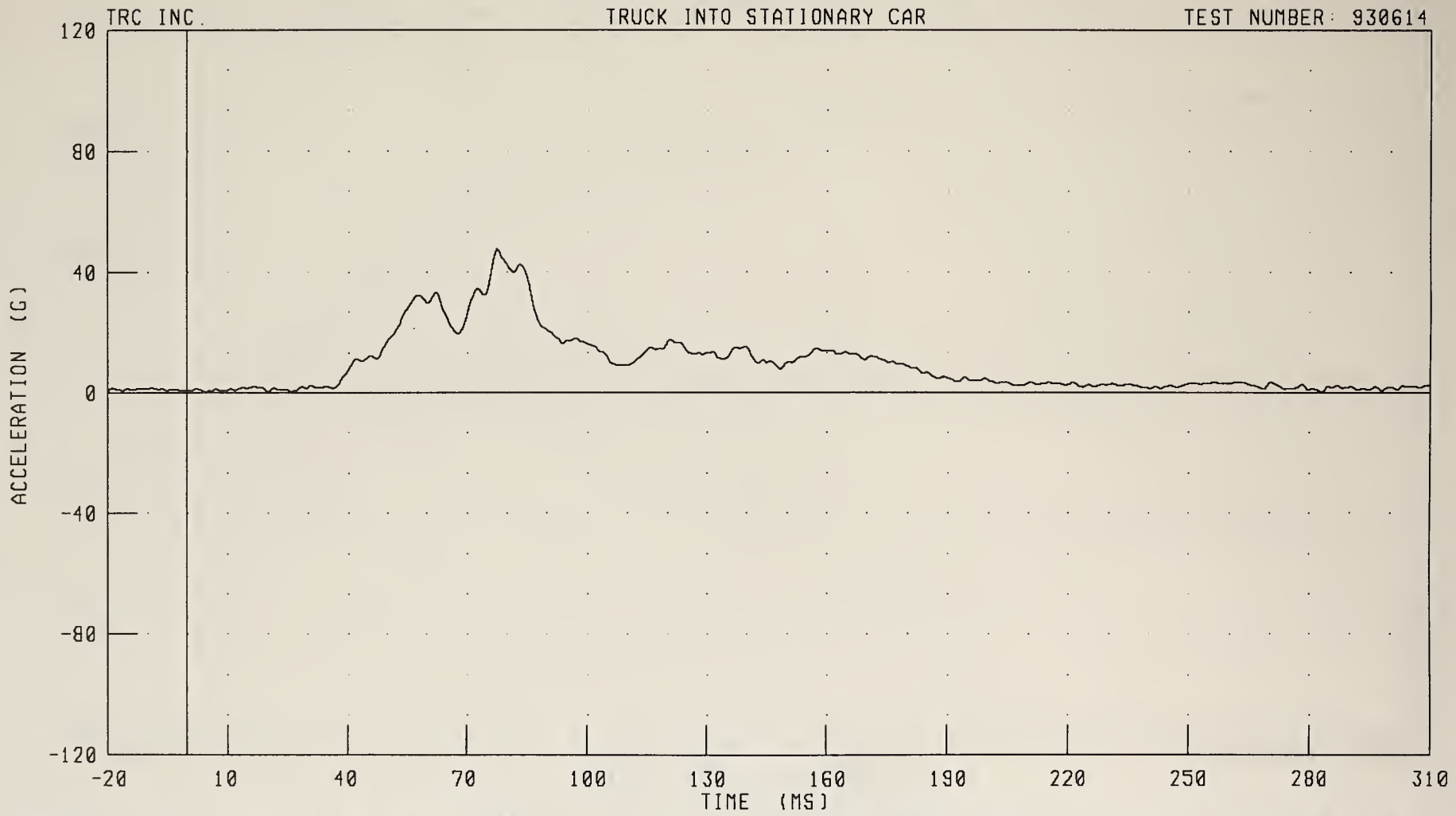

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER CHEST X-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR
TRC INC
TEST NUMBER: 930614
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG1
FILTER: CH. CLASS 180
PEAK DATA: 3.05 G @ 261.88 MS; -47.18 G @ 77.63 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER CHEST Y-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG1
FILTER: CH. CLASS 180
PEAK DATA: 5.34 G @ 72.25 MS; -17.33 G @ 120.75 MS

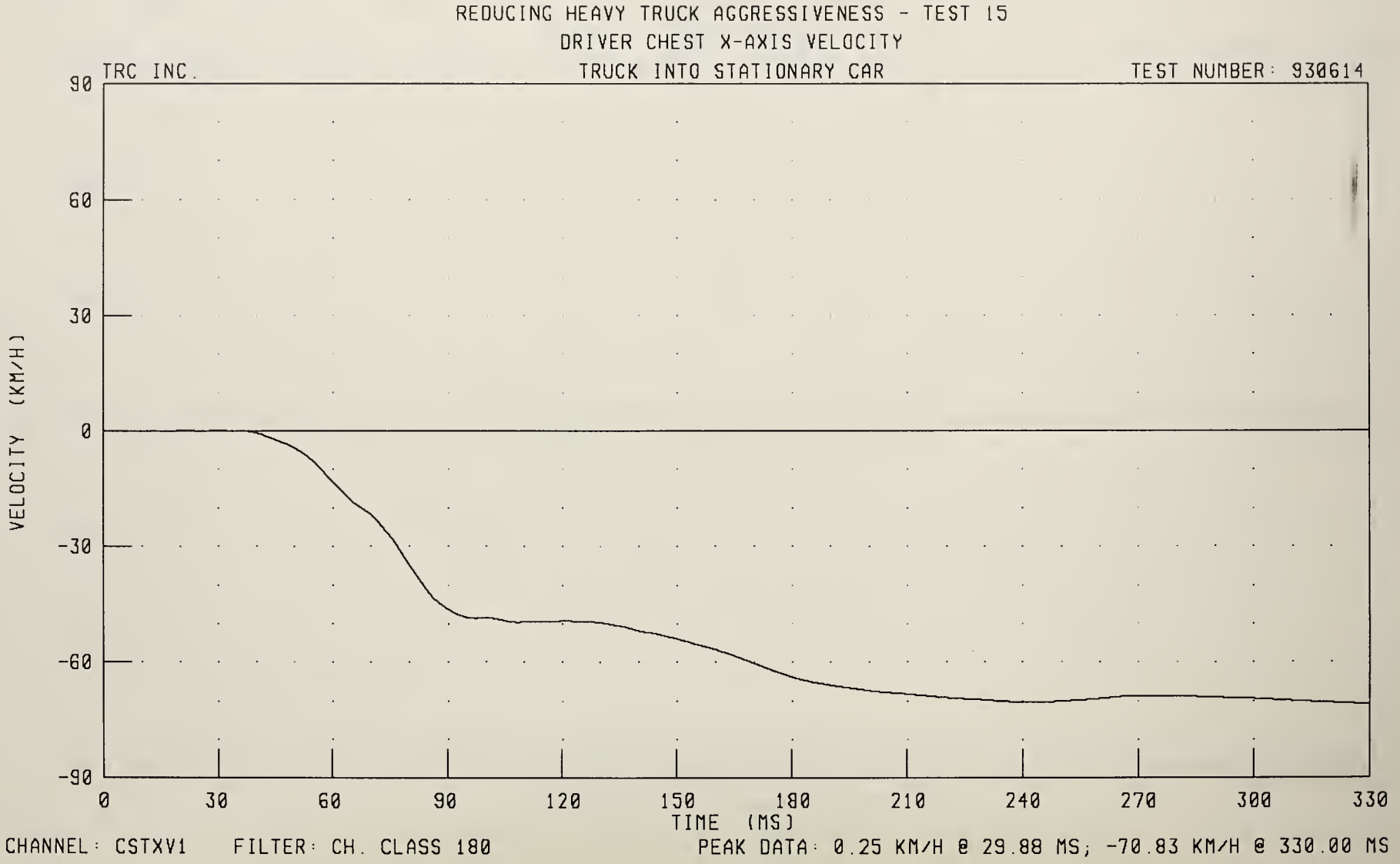

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER CHEST Z-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR
TRC INC.
TEST NUMBER 930614
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZG1
FILTER: CH. CLASS 180
PEAK DATA: 11.14 G @ 82.50 MS; -11.33 G @ 62.88 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15

DRIVER CHEST RESULTANT ACCELERATION



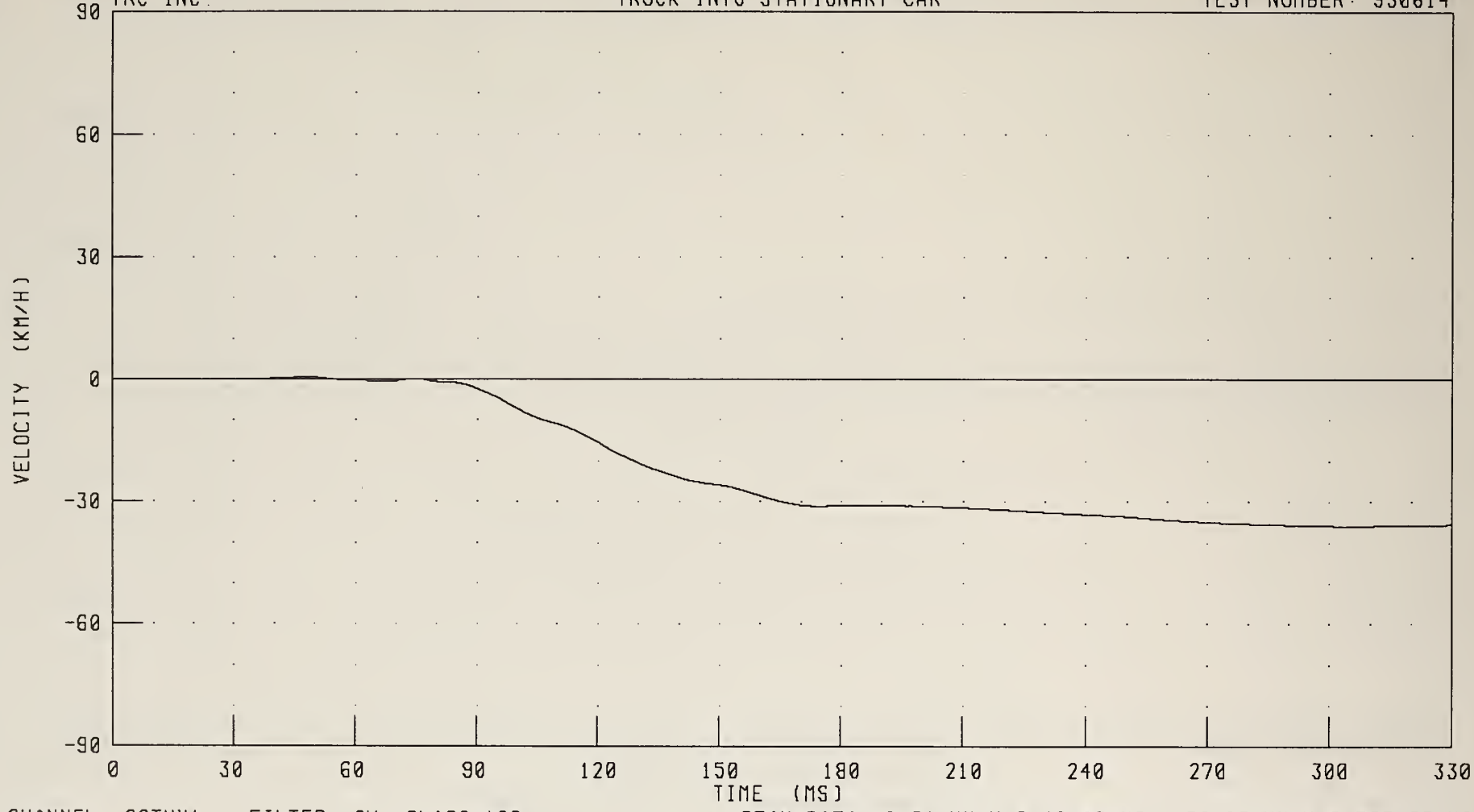
CHANNEL: CSTRG1 FILTER: CH. CLASS 180 PEAK DATA: 47.67 G @ 77.50 MS; 0.15 G @ -20.00 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER CHEST X-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
VELOCITY (KM/H)
90
60
30
0
-30
-60
-90
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: CSTXV1
FILTER: CH. CLASS 180
PEAK DATA: 0.25 KM/H @ 29.88 MS; -70.83 KM/H @ 330.00 MS

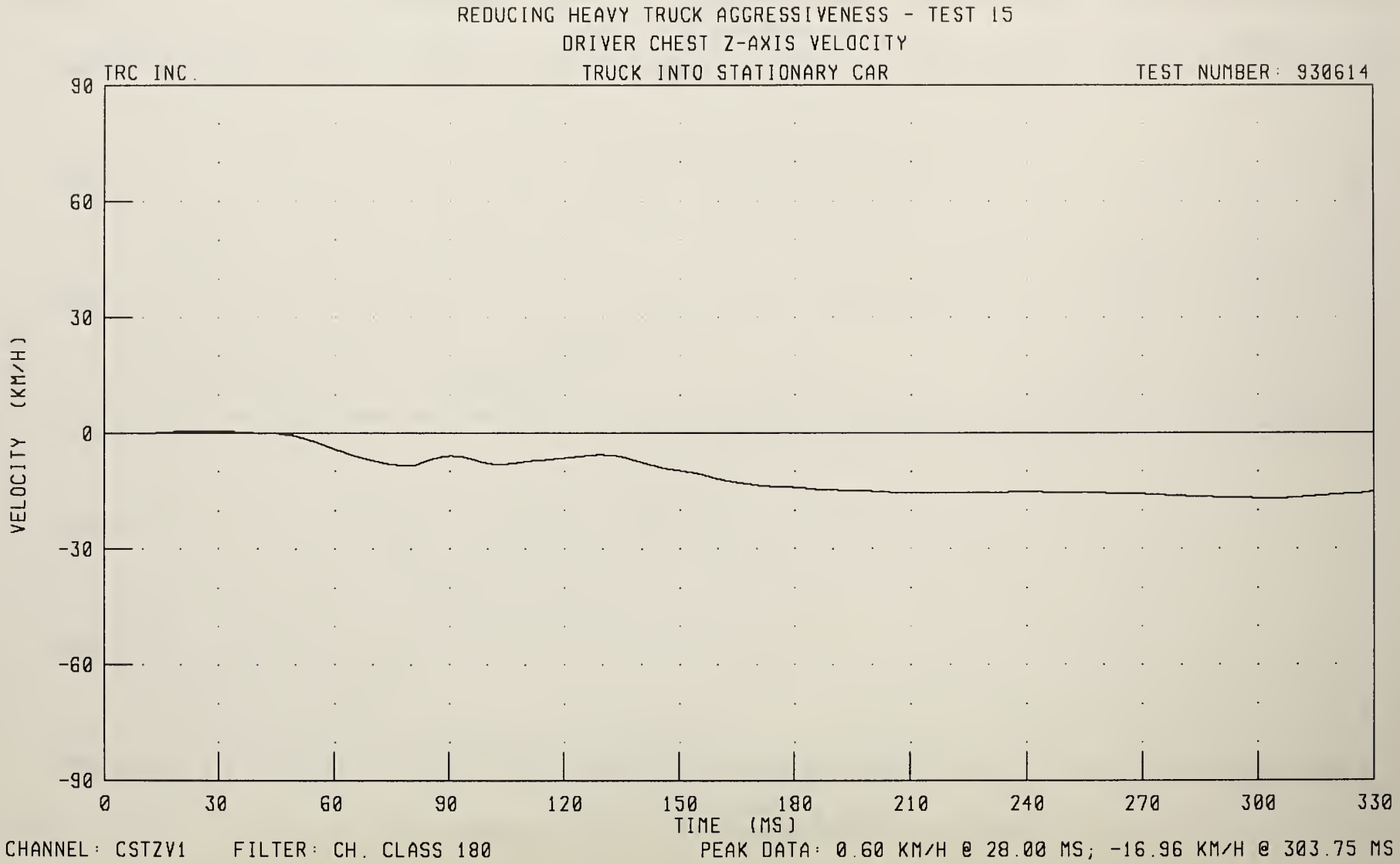
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15

DRIVER CHEST Y-AXIS VELOCITY

TRC INC. TRUCK INTO STATIONARY CAR TEST NUMBER: 930614



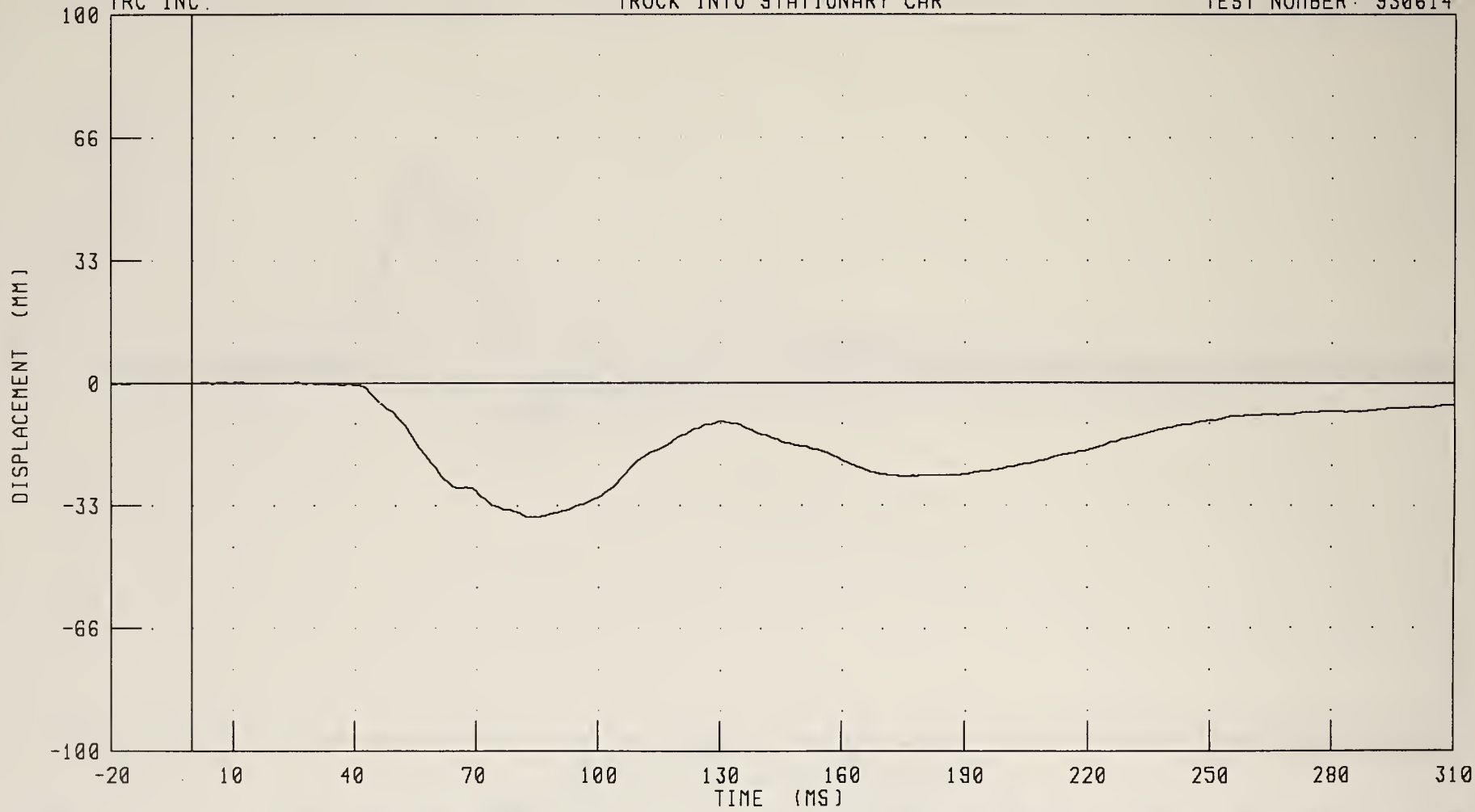
CHANNEL: CSTYV1 FILTER: CH. CLASS 180 PEAK DATA: 0.61 KM/H @ 48.00 MS; -36.03 KM/H @ 305.63 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER CHEST Z-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
VELOCITY (KM/H)
90
60
30
0
-30
-60
-90
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: CSTZV1
FILTER: CH. CLASS 180
PEAK DATA: 0.60 KM/H @ 28.00 MS; -16.96 KM/H @ 303.75 MS

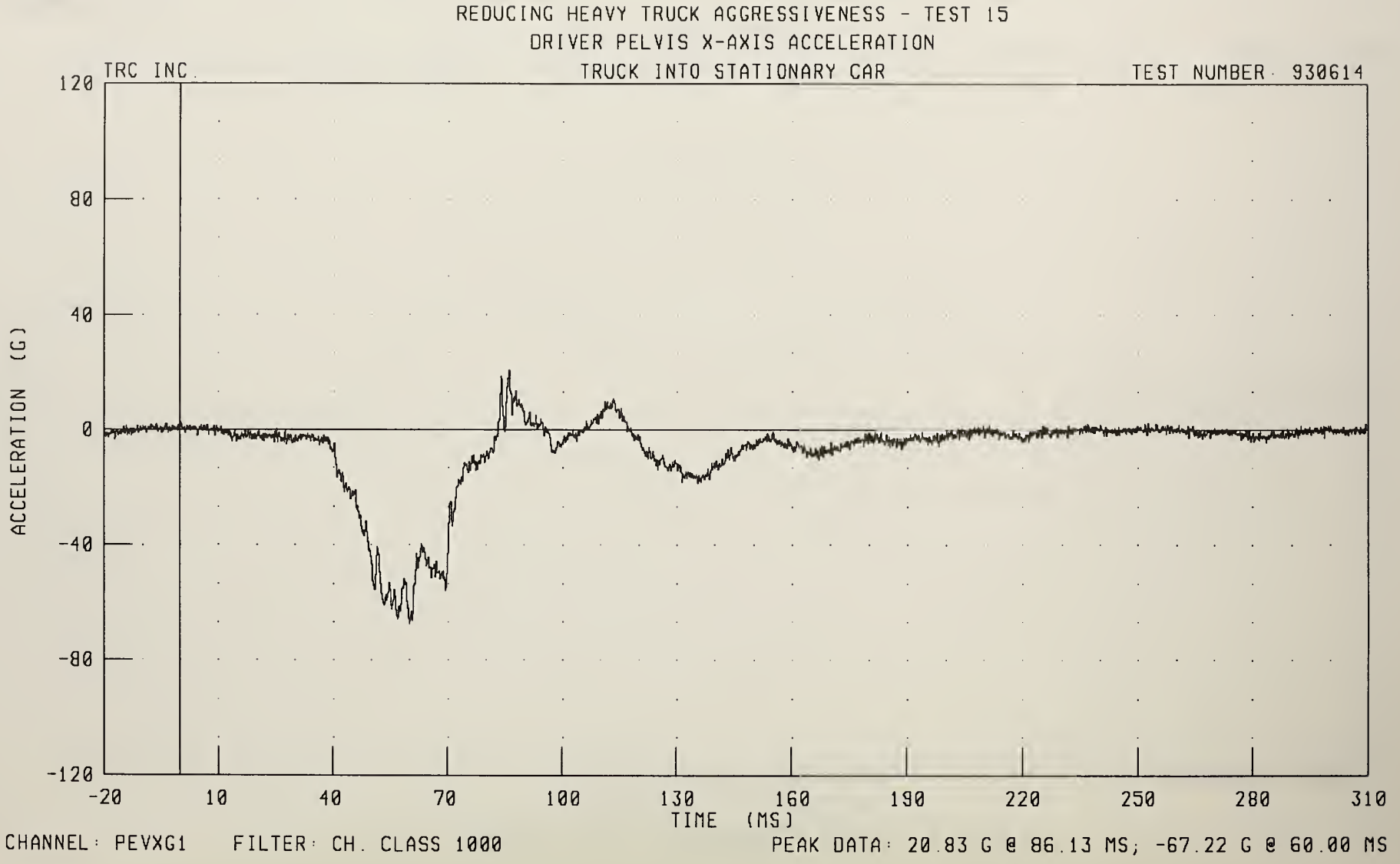
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15

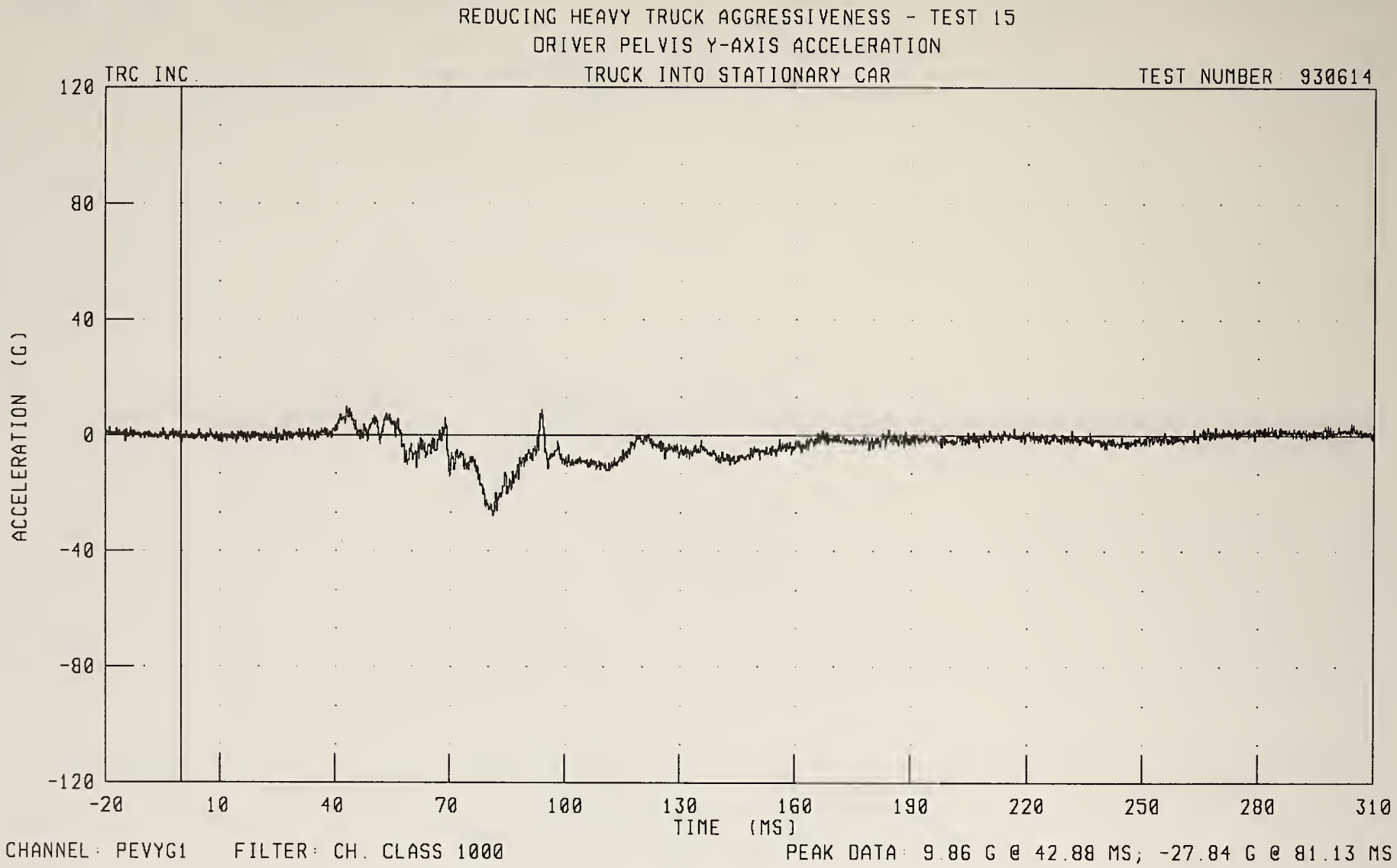
DRIVER CHEST DEFLECTION

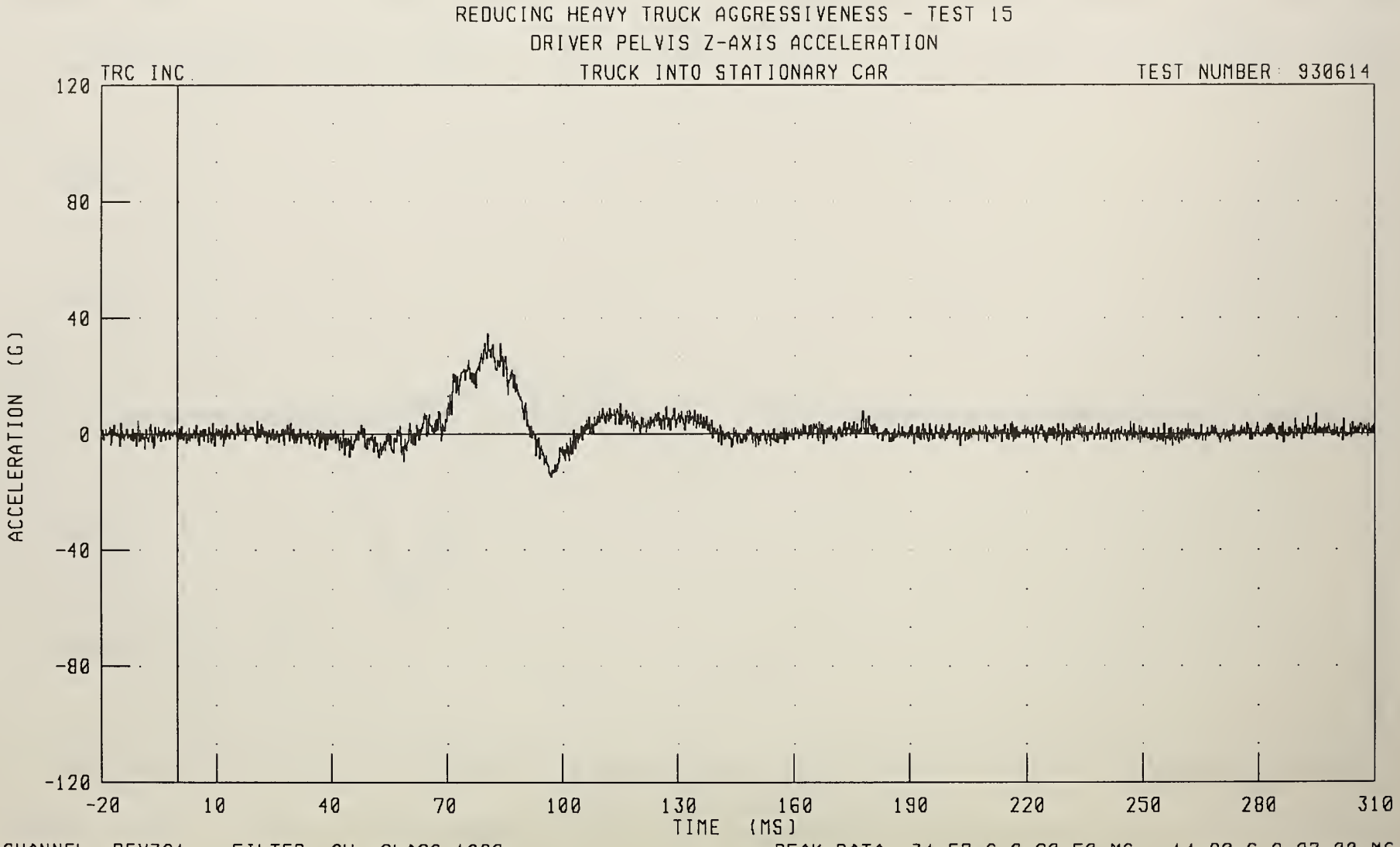
TRC INC. TRUCK INTO STATIONARY CAR TEST NUMBER: 930614

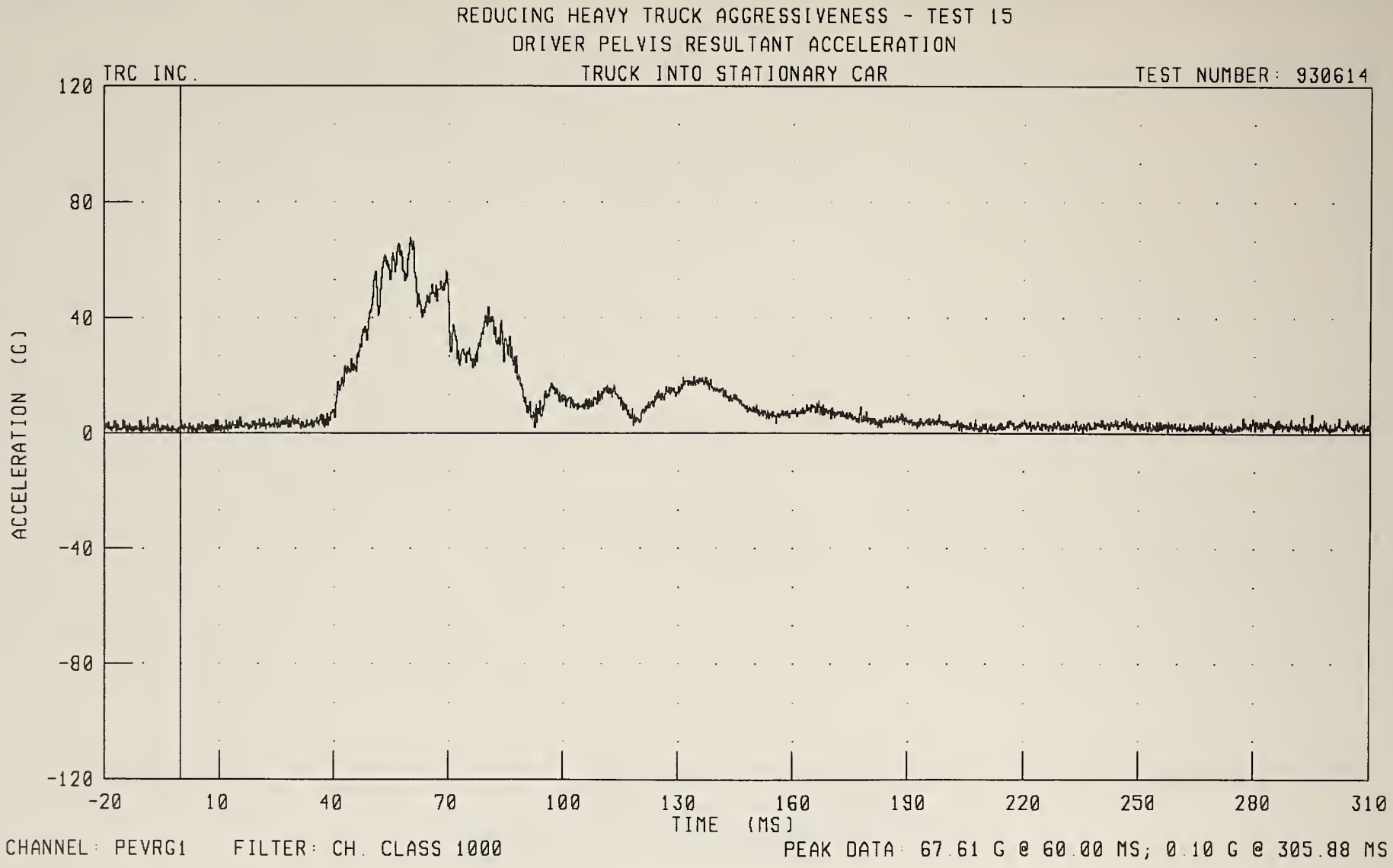


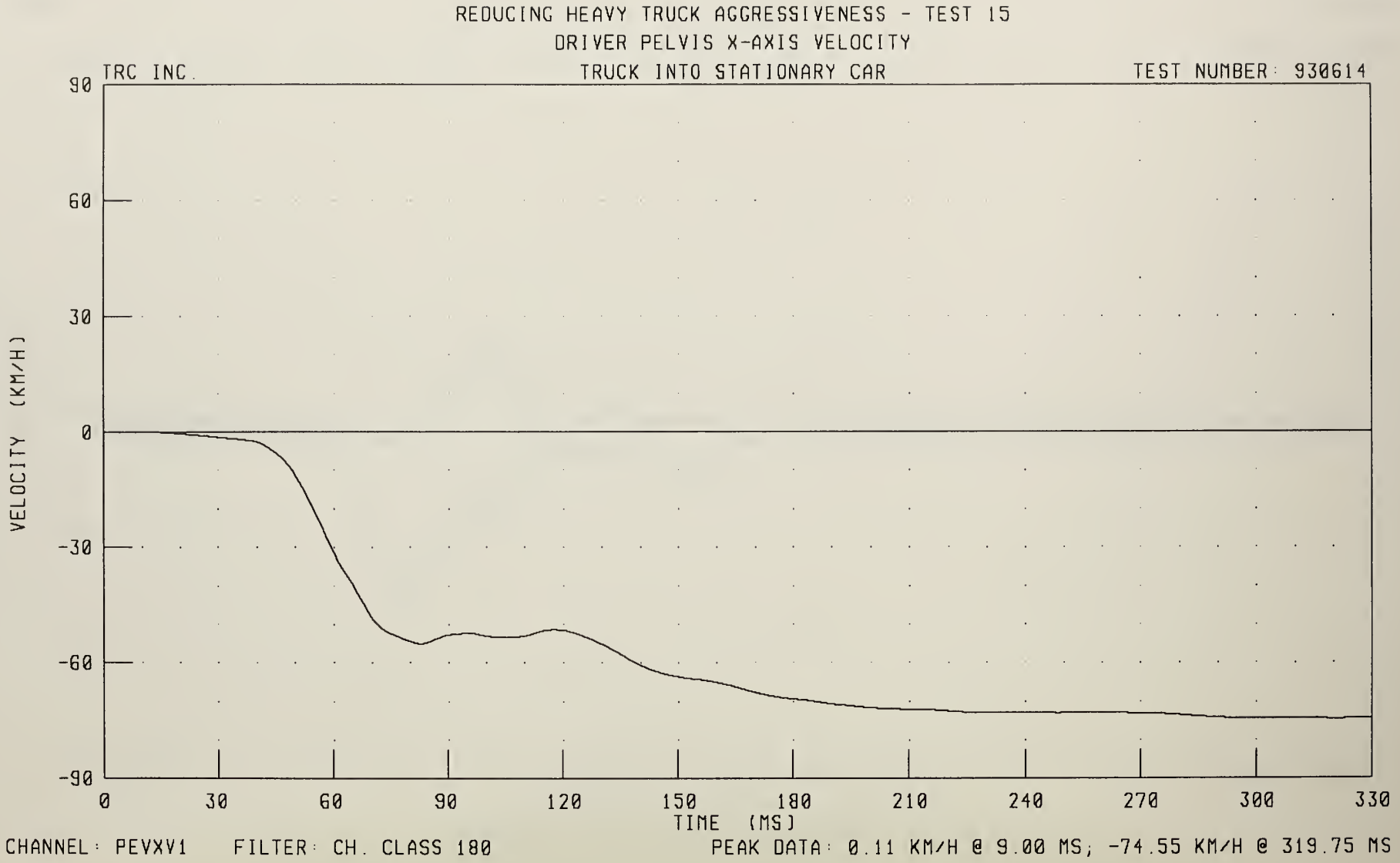
CHANNEL: CSTXD1 FILTER: CH. CLASS 180 PEAK DATA: 0.31 MM @ 3.25 MS; -36.48 MM @ 84.88 MS

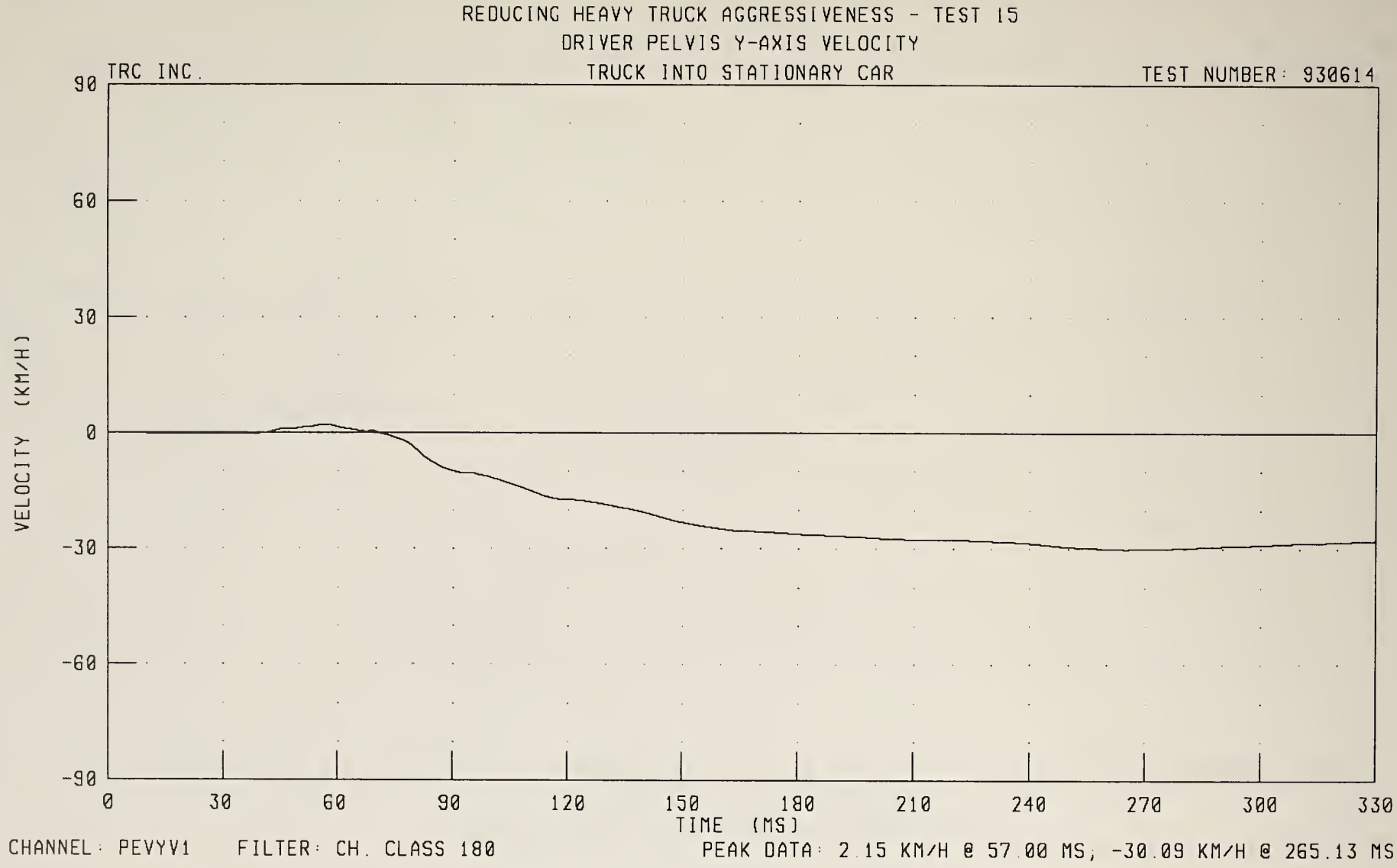

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER PELVIS X-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR
TRC INC.
TEST NUMBER: 930614
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVXG1
FILTER: CH. CLASS 1000
PEAK DATA: 20.83 G @ 86.13 MS; -67.22 G @ 60.00 MS

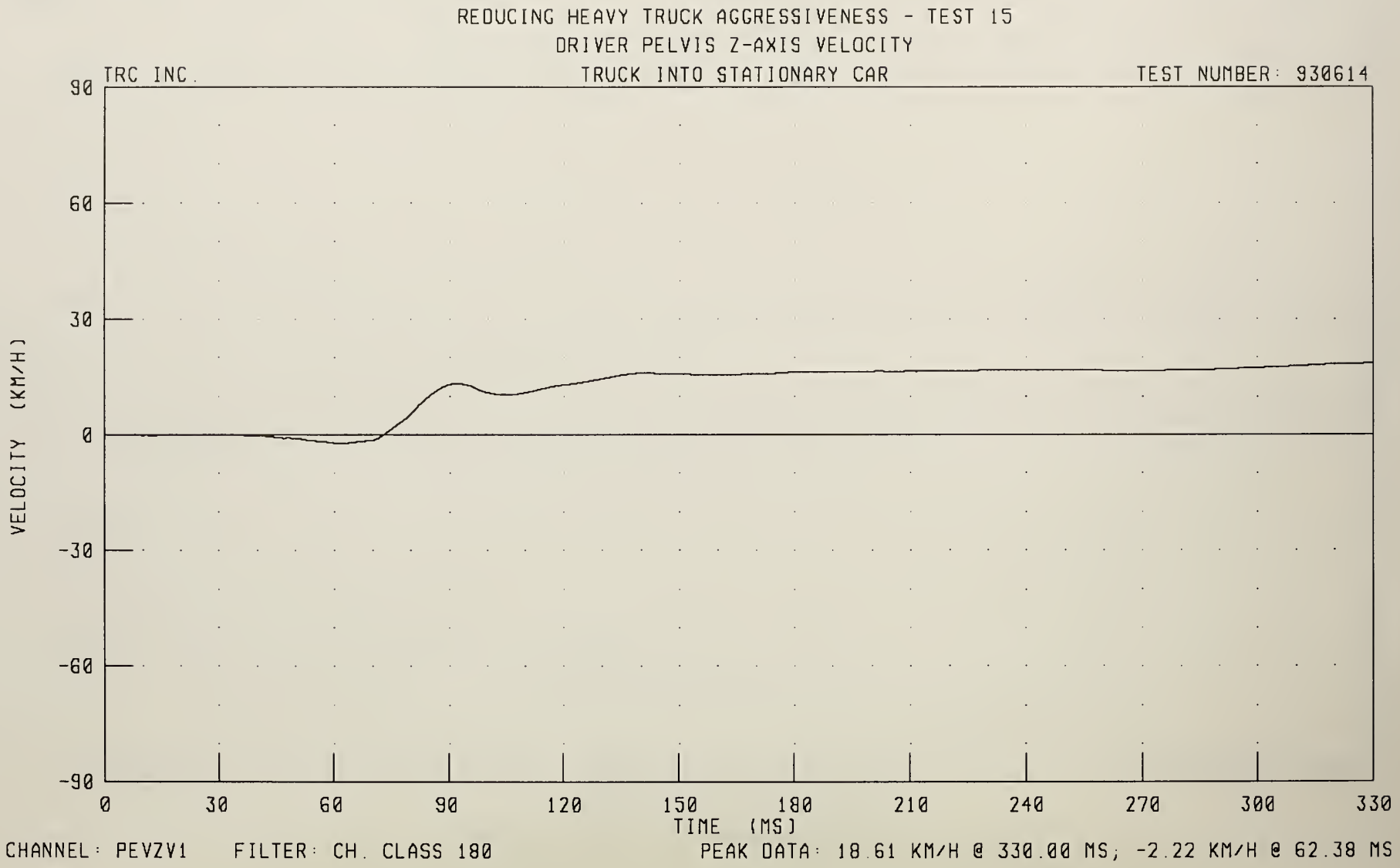

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER PELVIS Y-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVYG1
FILTER: CH. CLASS 1000
PEAK DATA: 9.86 G @ 42.88 MS; -27.84 G @ 81.13 MS

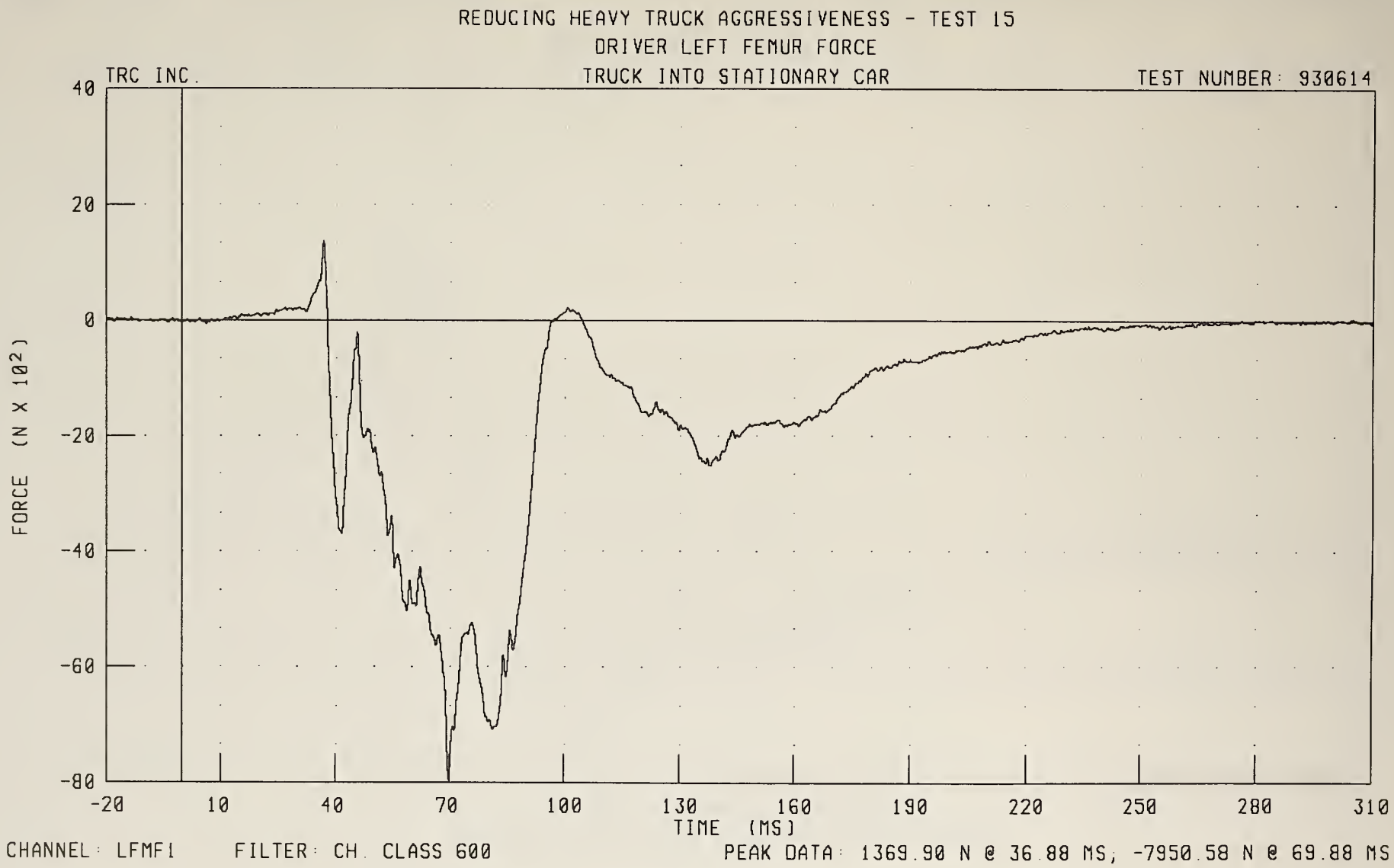

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER PELVIS Z-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVZG1
FILTER: CH. CLASS 1000
PEAK DATA: 34.57 G @ 80.50 MS; -14.90 G @ 97.00 MS

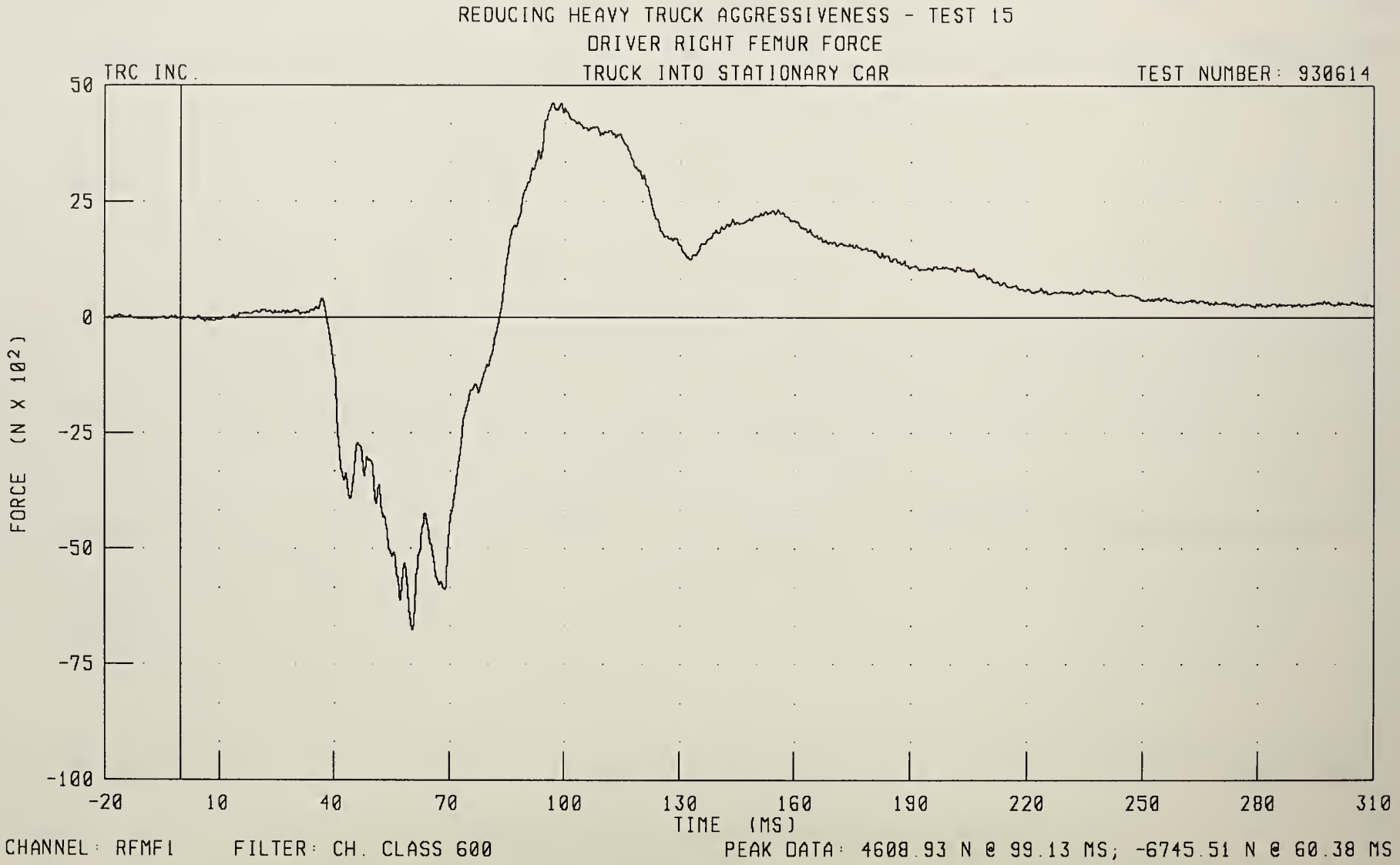

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER PELVIS RESULTANT ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVRG1
FILTER: CH. CLASS 1000
PEAK DATA: 67.61 G @ 60.00 MS; 0.10 G @ 305.88 MS

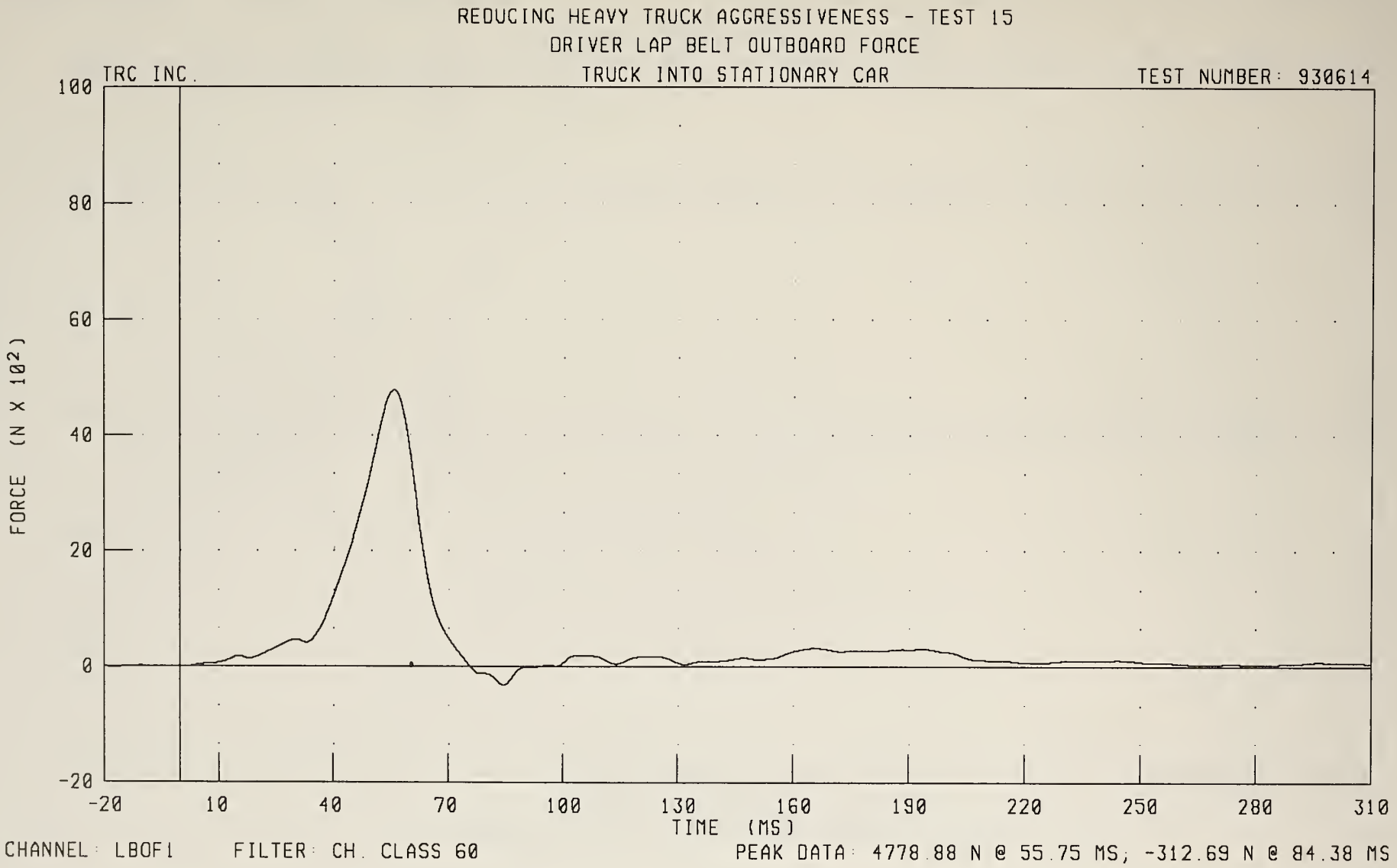

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER PELVIS X-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
VELOCITY (KM/H)
90
60
30
0
-30
-60
-90
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: PEVXV1
FILTER: CH. CLASS 180
PEAK DATA: 0.11 KM/H @ 9.00 MS; -74.55 KM/H @ 319.75 MS

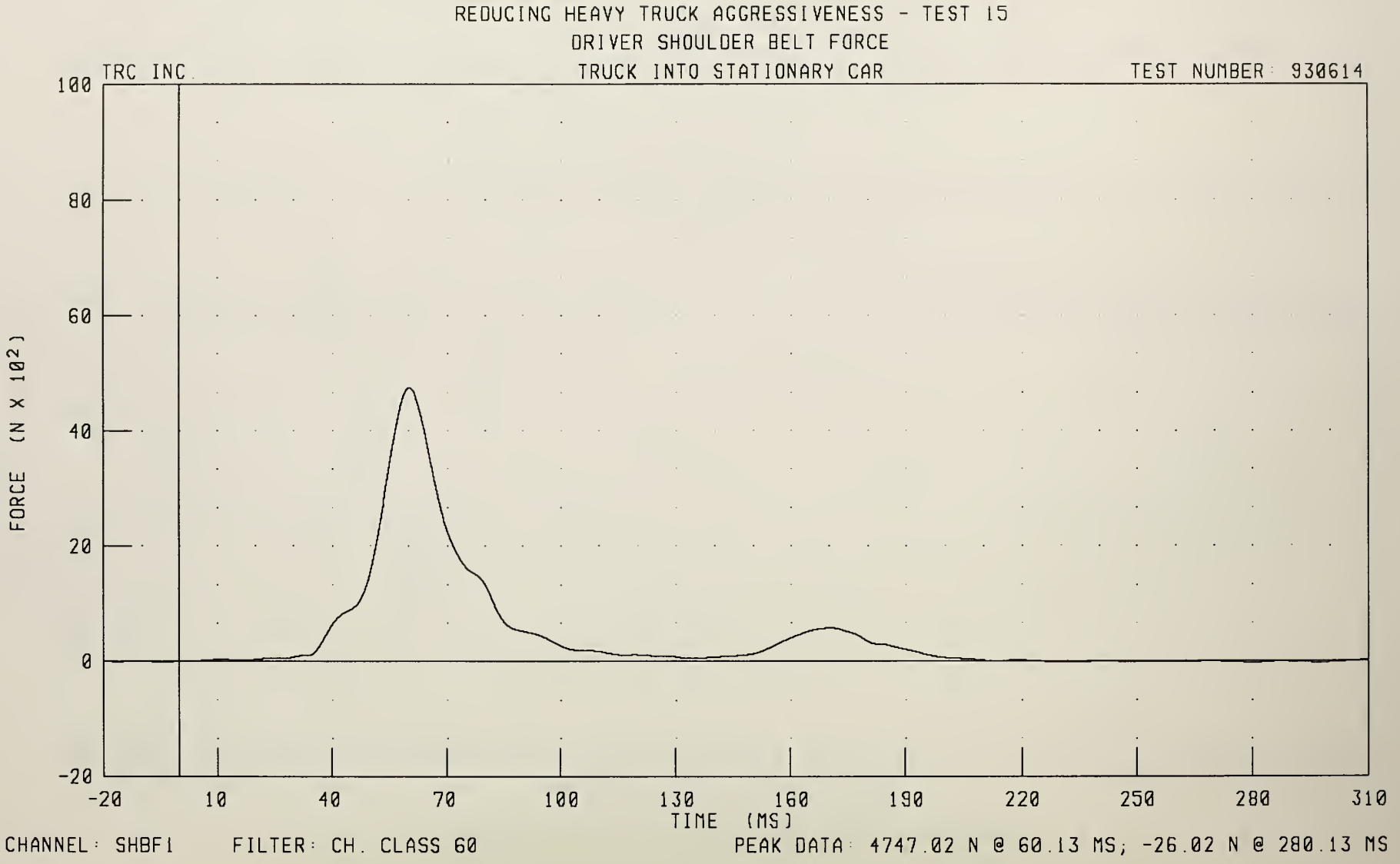

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER PELVIS Y-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
VELOCITY (KM/H)
90
60
30
0
-30
-60
-90
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: PEVYV1
FILTER: CH. CLASS 180
PEAK DATA: 2.15 KM/H @ 57.00 MS; -30.09 KM/H @ 265.13 MS

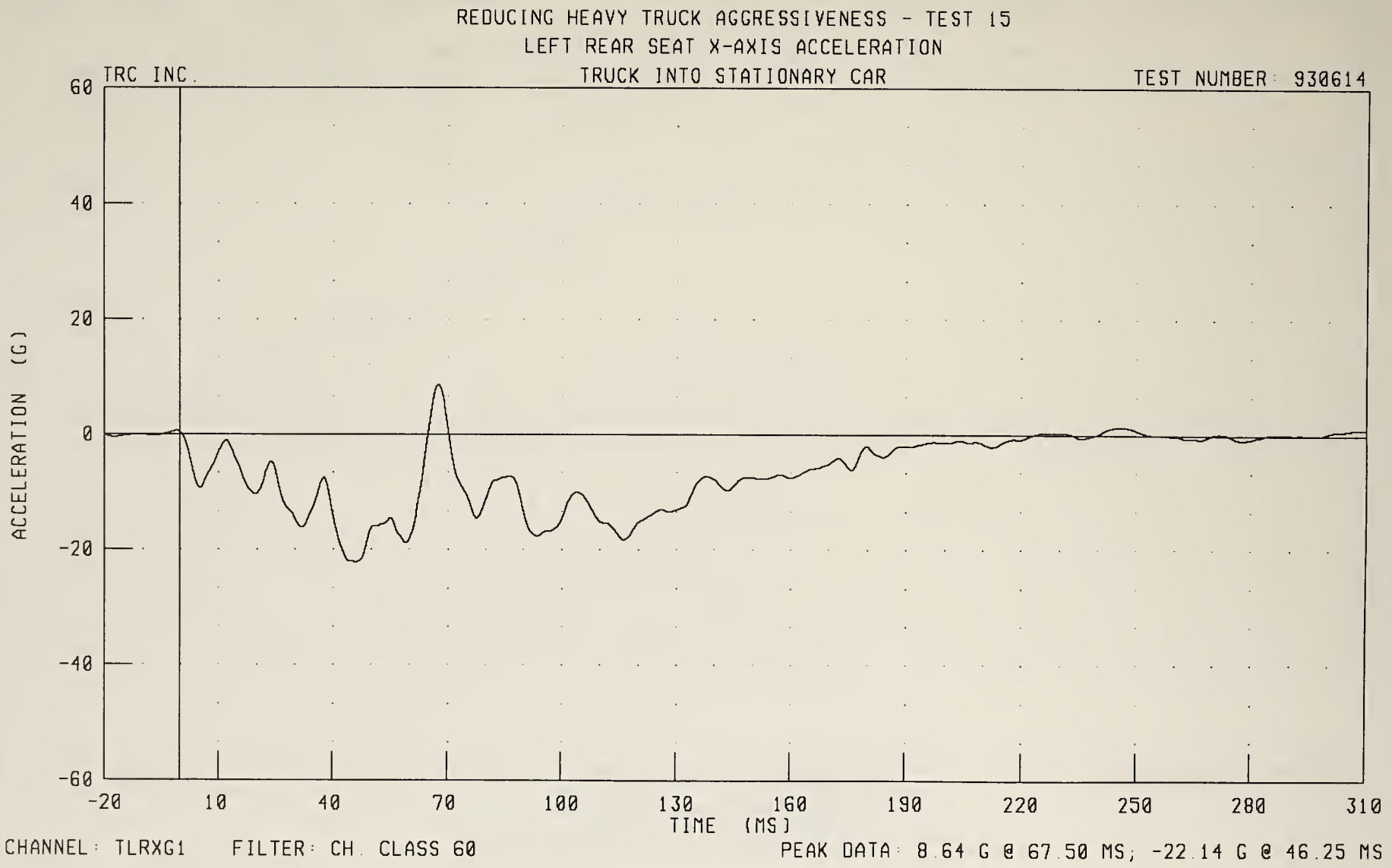

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER PELVIS Z-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
90
60
30
0
-30
-60
-90
VELOCITY (KM/H)
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: PEVZV1
FILTER: CH. CLASS 180
PEAK DATA: 18.61 KM/H @ 330.00 MS; -2.22 KM/H @ 62.38 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER LEFT FEMUR FORCE
TRUCK INTO STATIONARY CAR
TRC INC.
TEST NUMBER: 930614
40
20
0
-20
-40
-60
-80
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LFMF1
FILTER: CH. CLASS 600
PEAK DATA: 1369.90 N @ 36.88 MS; -7950.58 N @ 69.88 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER RIGHT FEMUR FORCE
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
50
25
0
-25
-50
-75
-100
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMF1
FILTER: CH. CLASS 600
PEAK DATA: 4608.93 N @ 99.13 MS; -6745.51 N @ 60.38 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER LAP BELT OUTBOARD FORCE
TRUCK INTO STATIONARY CAR
TRC INC.
TEST NUMBER: 930614
100
80
60
40
20
0
-20
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LBOF1
FILTER: CH. CLASS 60
PEAK DATA: 4778.88 N @ 55.75 MS; -312.69 N @ 84.38 MS

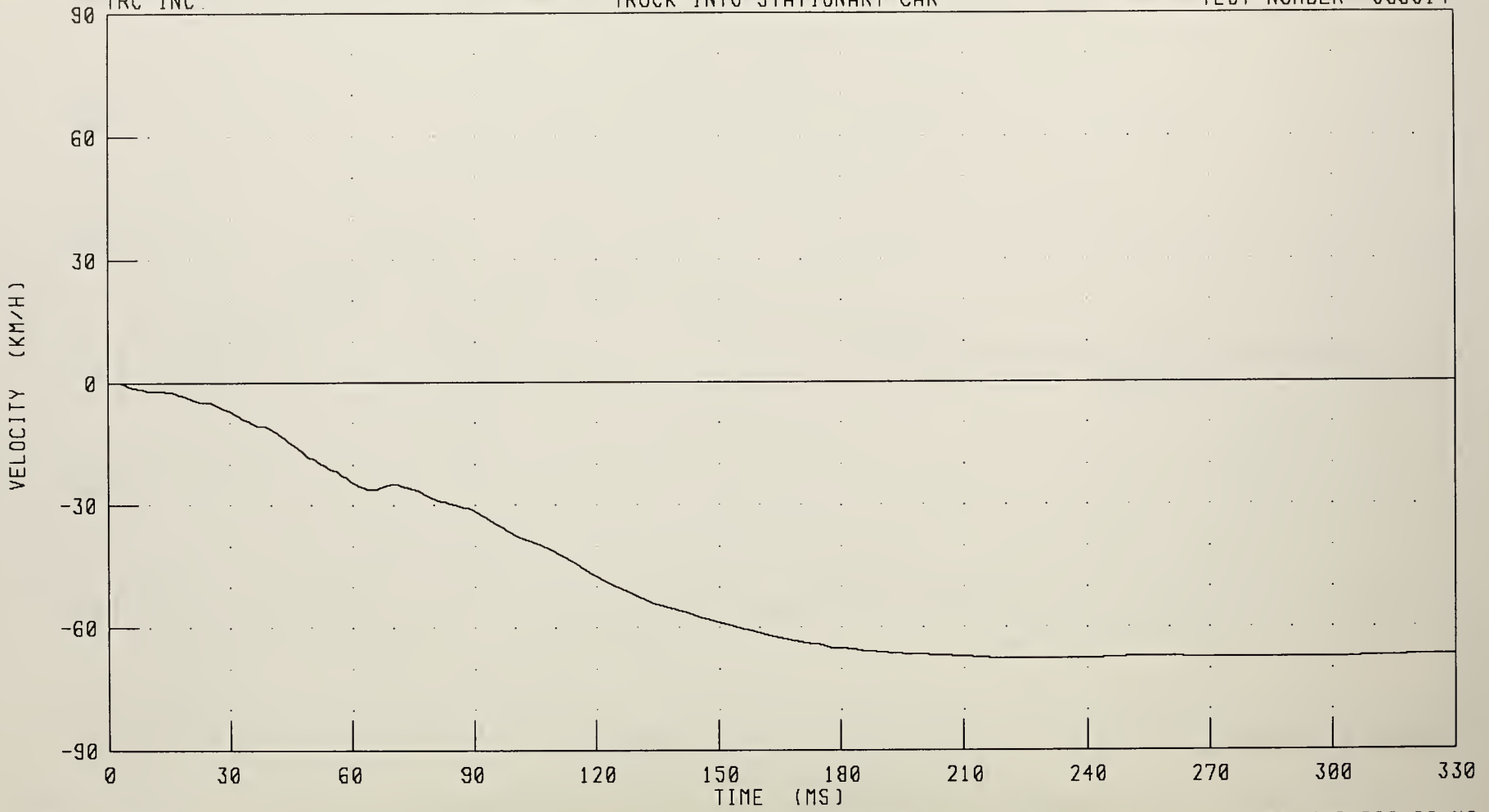

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
DRIVER SHOULDER BELT FORCE
TRUCK INTO STATIONARY CAR
TRC INC.
TEST NUMBER: 930614
100
80
60
40
20
0
-20
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: SHBF1
FILTER: CH. CLASS 60
PEAK DATA: 4747.02 N @ 60.13 MS; -26.02 N @ 280.13 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
LEFT REAR SEAT X-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR
TRC INC.
TEST NUMBER: 930614
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TLRXG1
FILTER: CH. CLASS 60
PEAK DATA: 8.64 G @ 67.50 MS; -22.14 G @ 46.25 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15

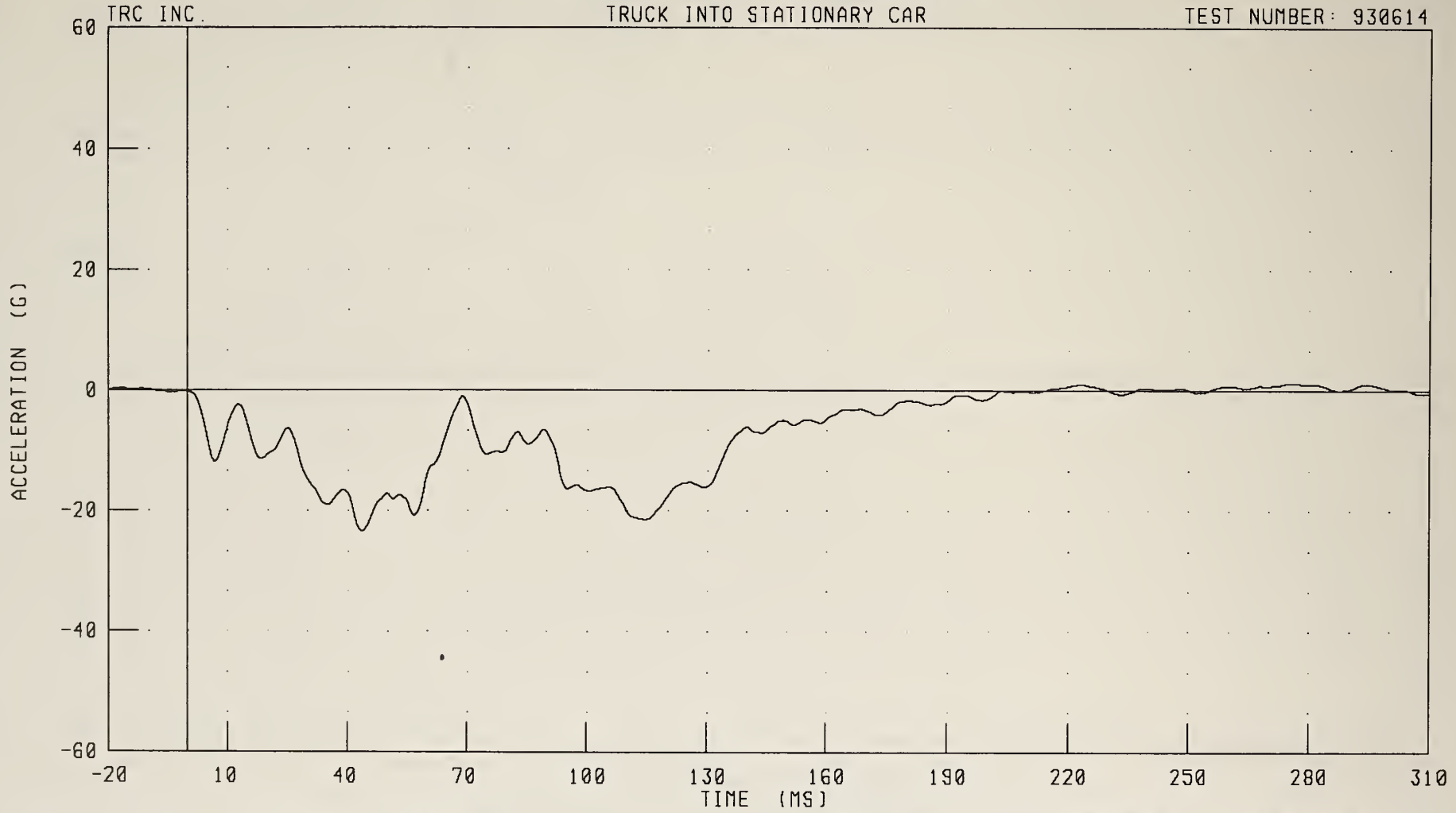
LEFT REAR SEAT X-AXIS VELOCITY

TRC INC TRUCK INTO STATIONARY CAR TEST NUMBER 930614

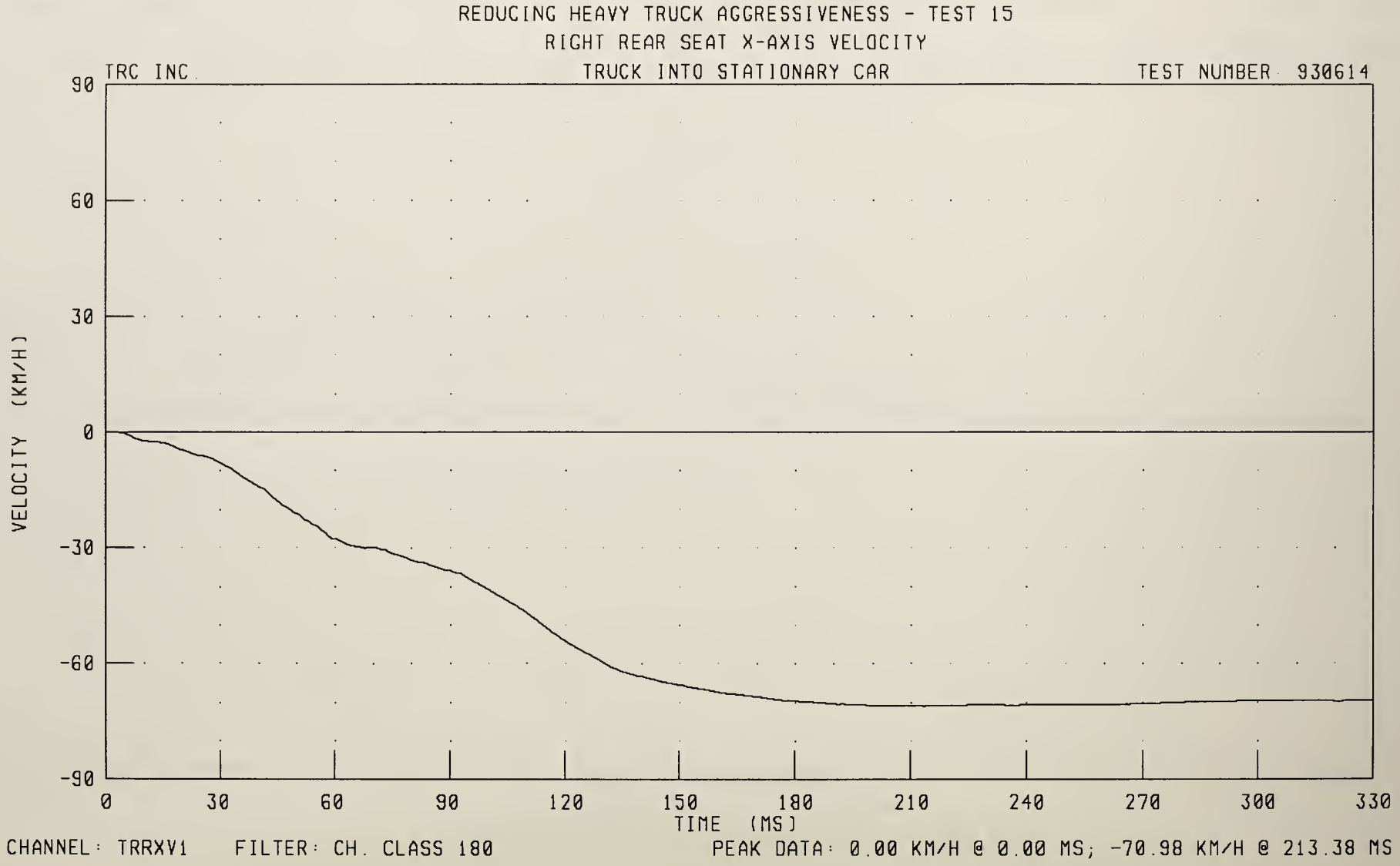


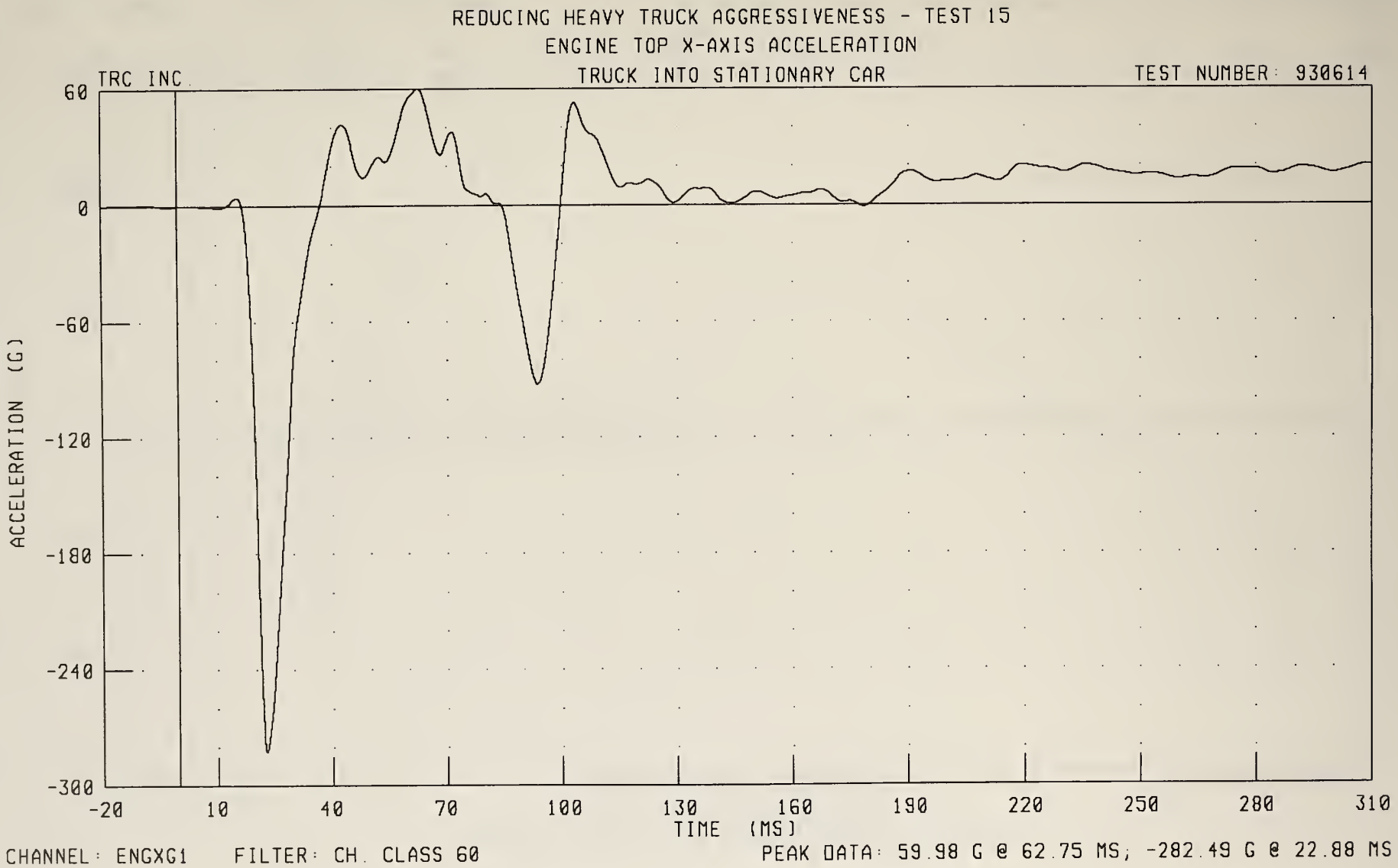
CHANNEL: TLRXV1 FILTER: CH. CLASS 180 PEAK DATA: 0.03 KM/H @ 1.88 MS; -67.59 KM/H @ 222.00 MS

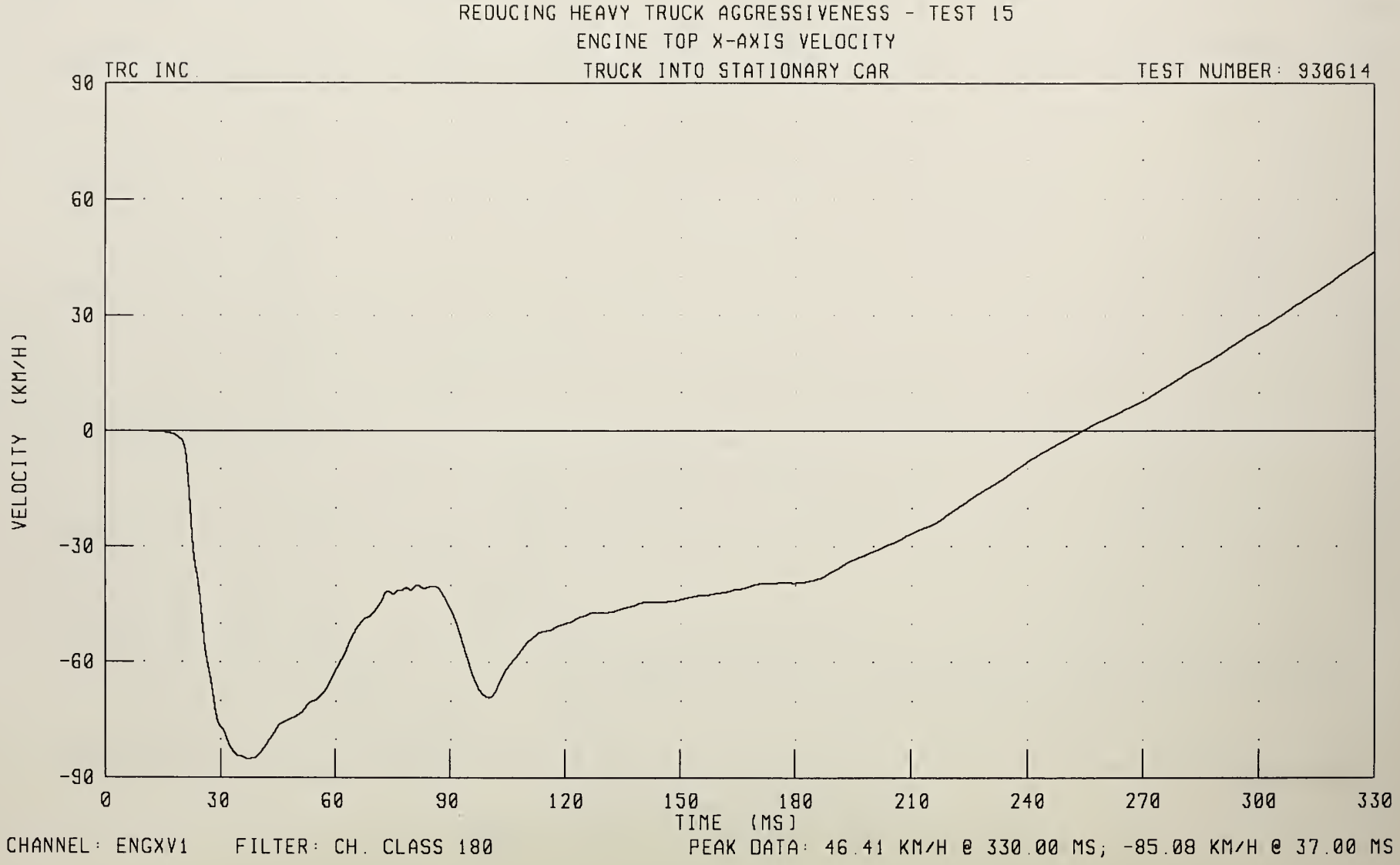
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
RIGHT REAR SEAT X-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR

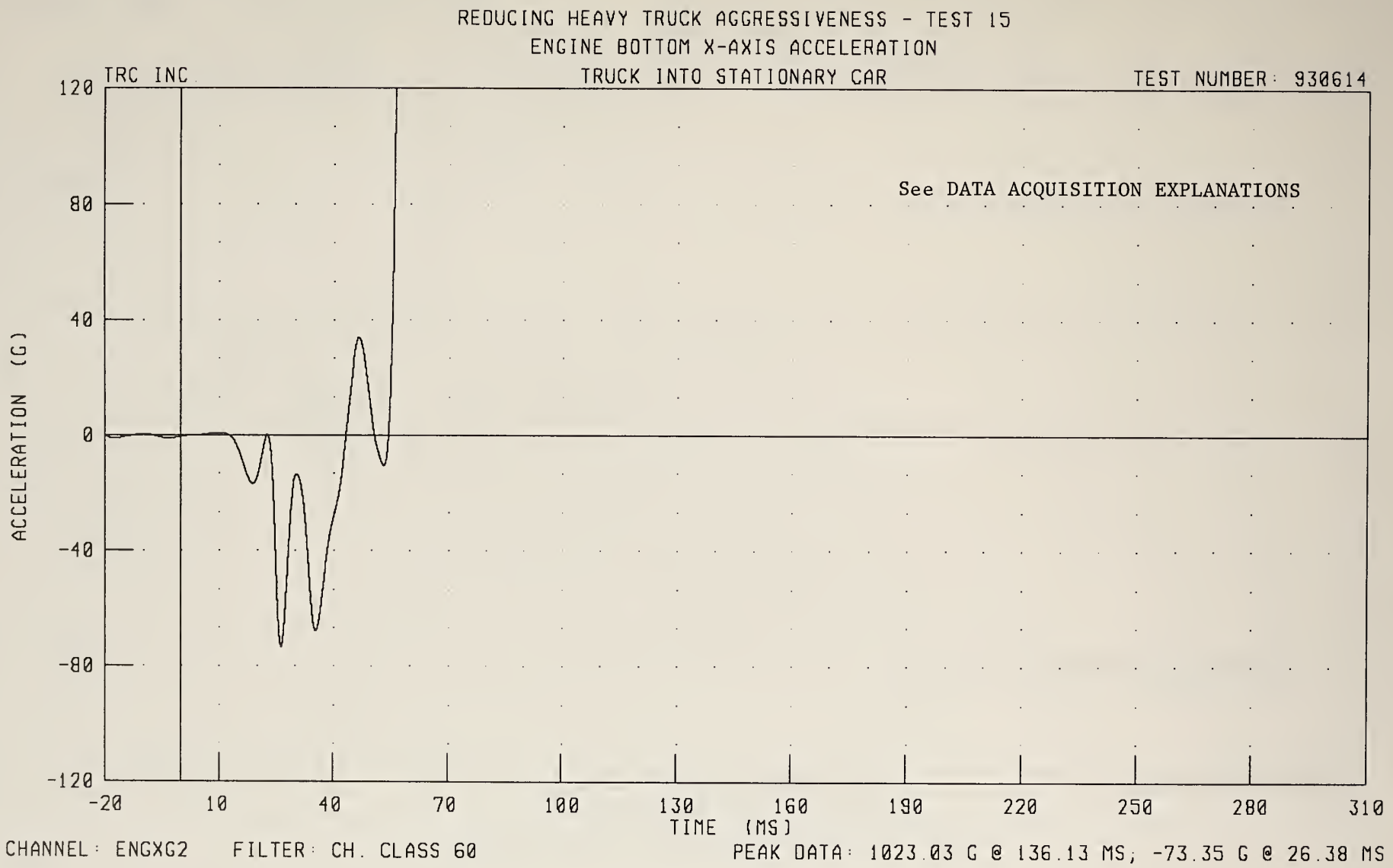


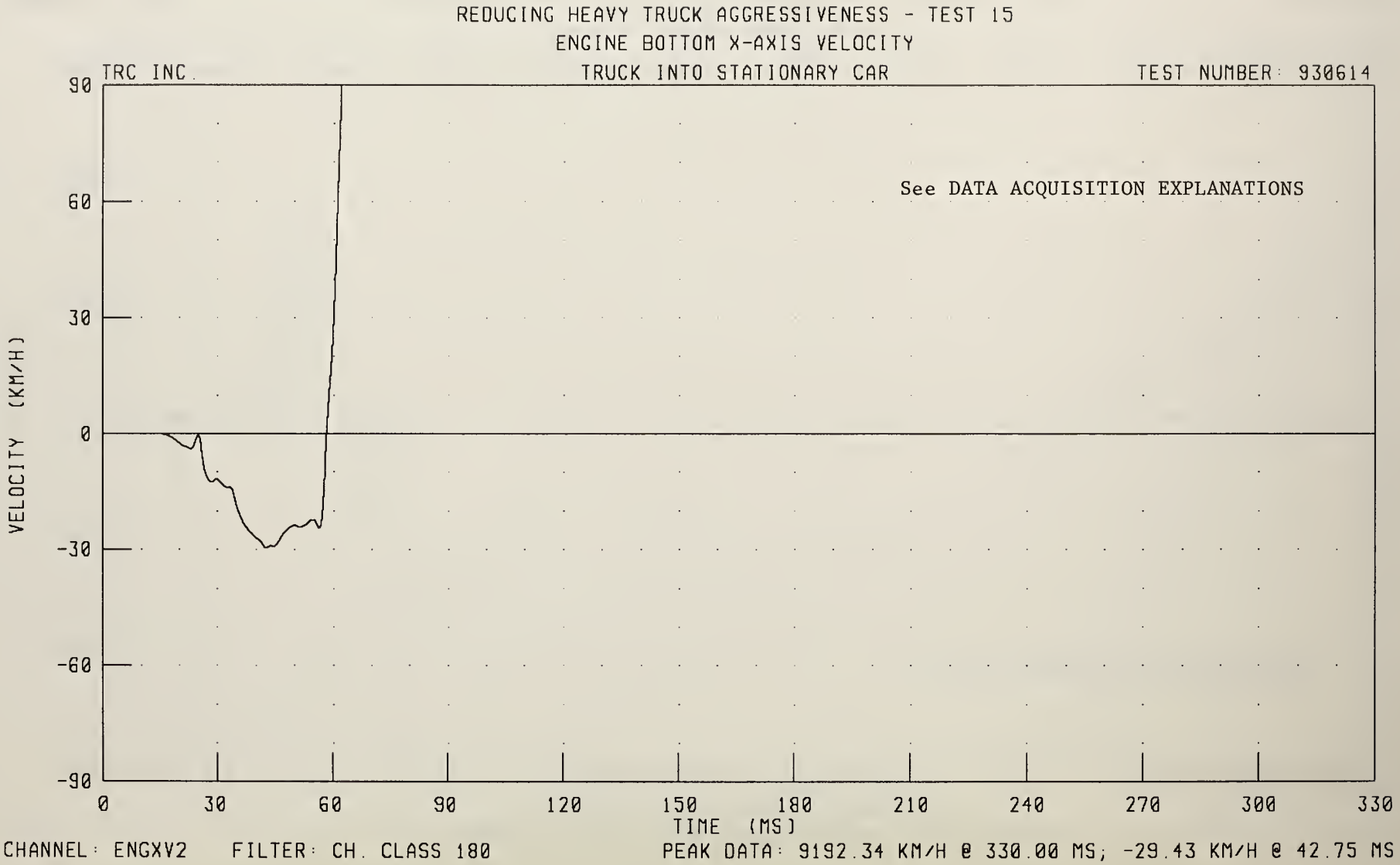
CHANNEL: TRRXG1 FILTER: CH. CLASS 60 PEAK DATA: 1.25 G @ 275.25 MS; -23.40 G @ 43.63 MS

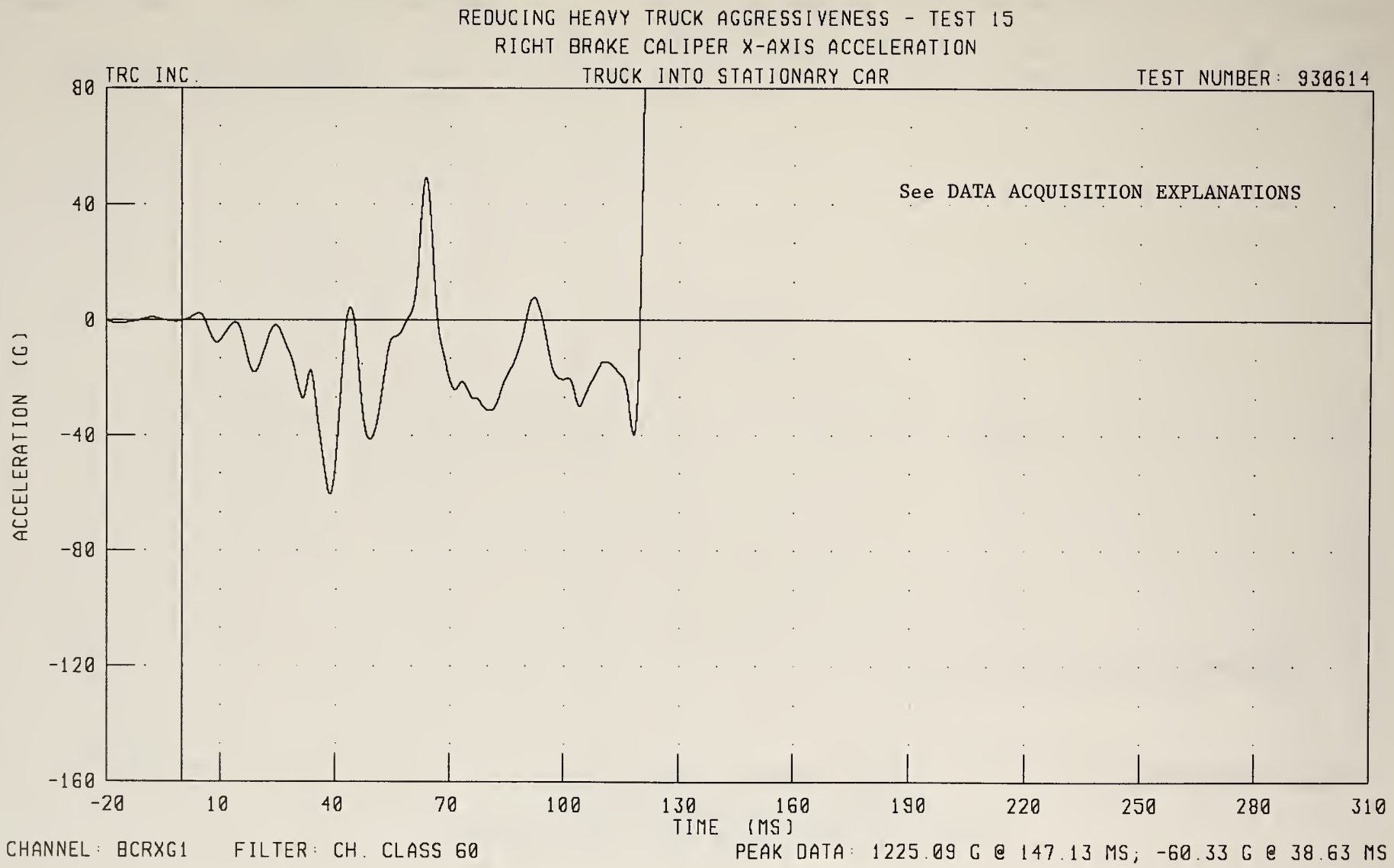

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
RIGHT REAR SEAT X-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER 930614
90
60
30
0
-30
-60
-90
VELOCITY (KM/H)
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: TRRXV1
FILTER: CH. CLASS 180
PEAK DATA: 0.00 KM/H @ 0.00 MS; -70.98 KM/H @ 213.38 MS

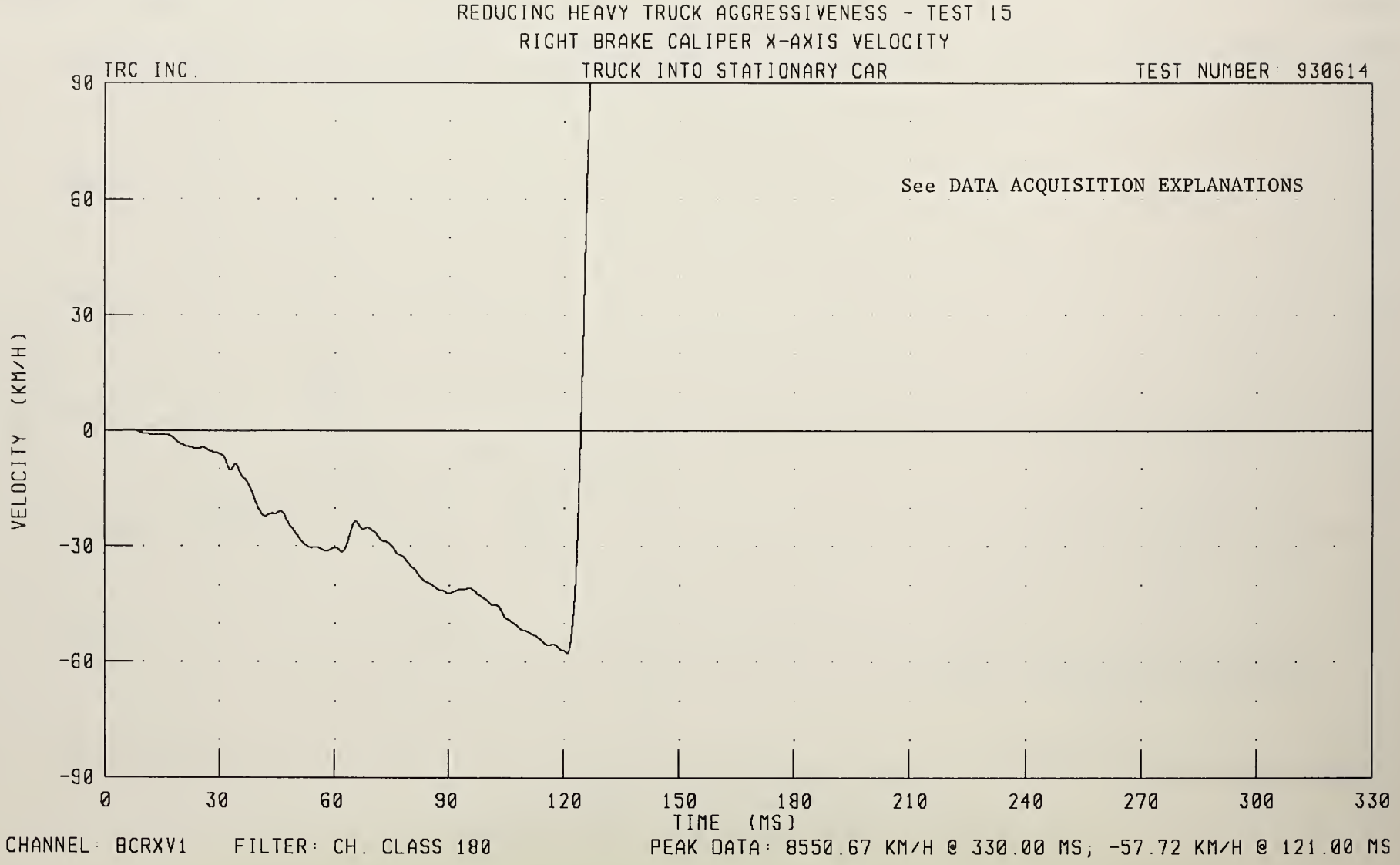

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
ENGINE TOP X-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR
TRC INC.
TEST NUMBER: 930614
60
0
-60
-120
-180
-240
-300
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG1
FILTER: CH. CLASS 60
PEAK DATA: 59.98 G @ 62.75 MS; -282.49 G @ 22.88 MS

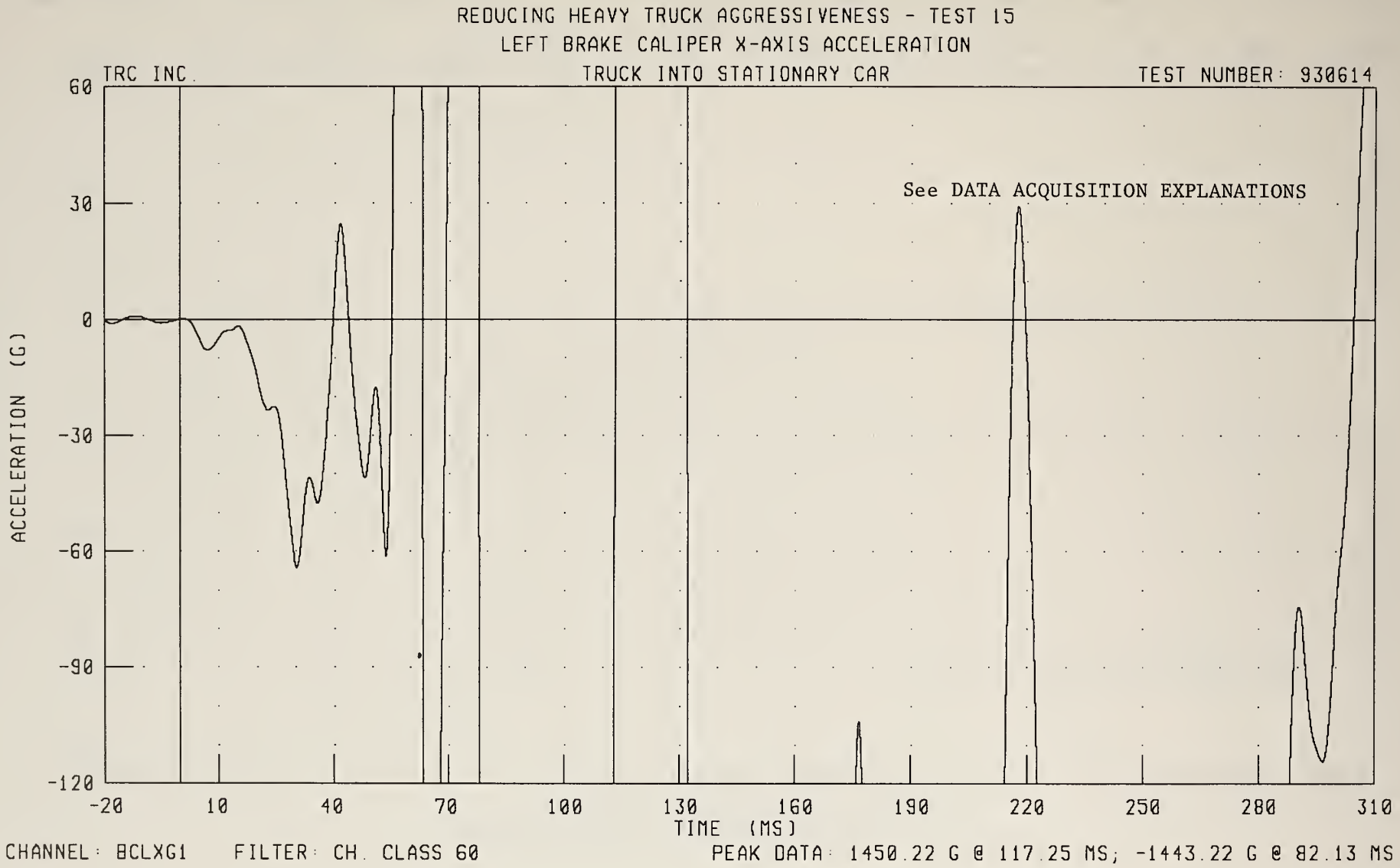

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
ENGINE TOP X-AXIS VELOCITY
TRC INC
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
VELOCITY (KM/H)
90
60
30
0
-30
-60
-90
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: ENGXV1
FILTER: CH. CLASS 180
PEAK DATA: 46.41 KM/H @ 330.00 MS; -85.08 KM/H @ 37.00 MS

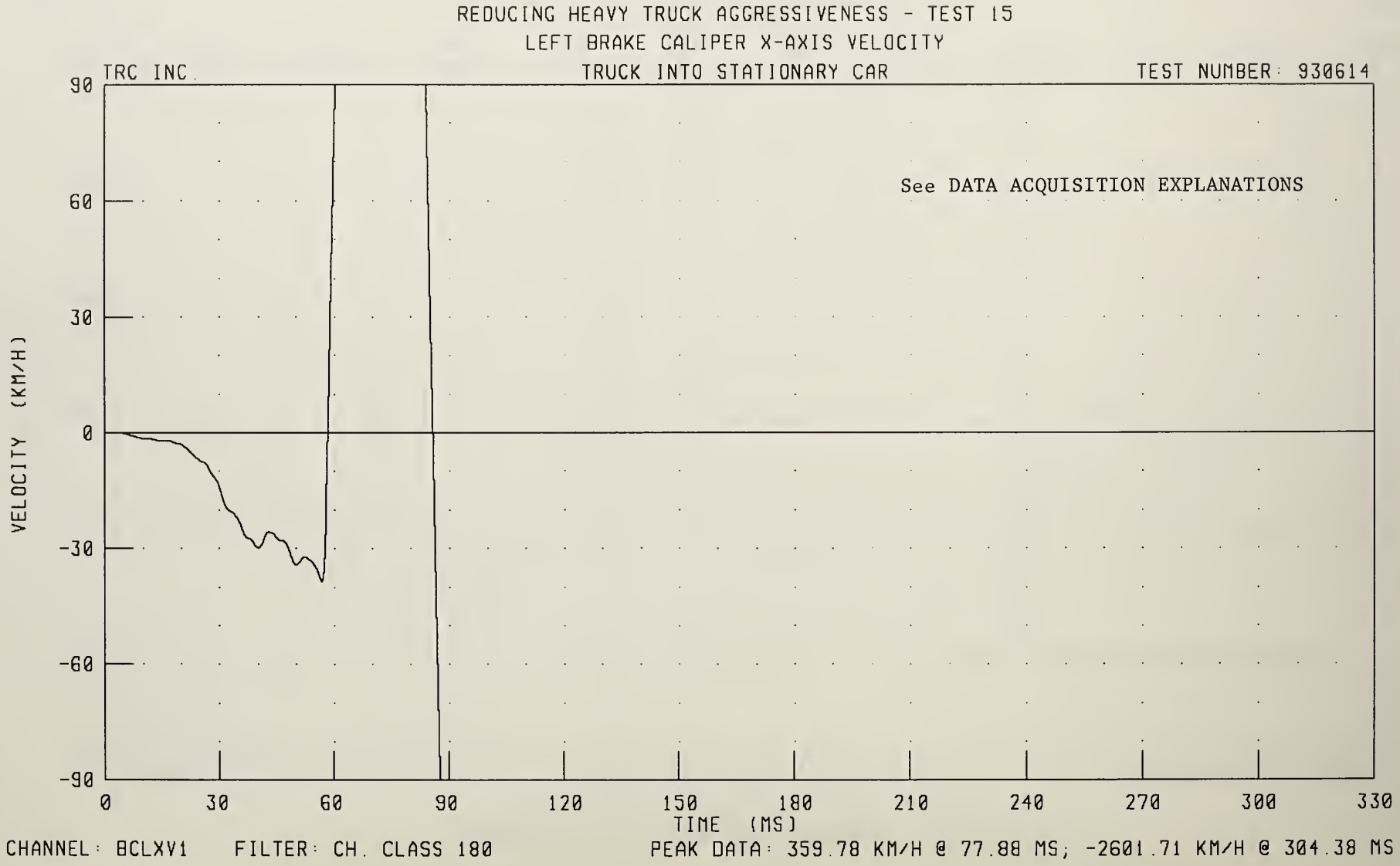

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
ENGINE BOTTOM X-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR
TRC INC
TEST NUMBER: 930614
See DATA ACQUISITION EXPLANATIONS
ACCELERATION (G)
120
80
40
0
-40
-80
-120
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG2
FILTER: CH. CLASS 60
PEAK DATA: 1023.03 G @ 136.13 MS; -73.35 G @ 26.38 MS

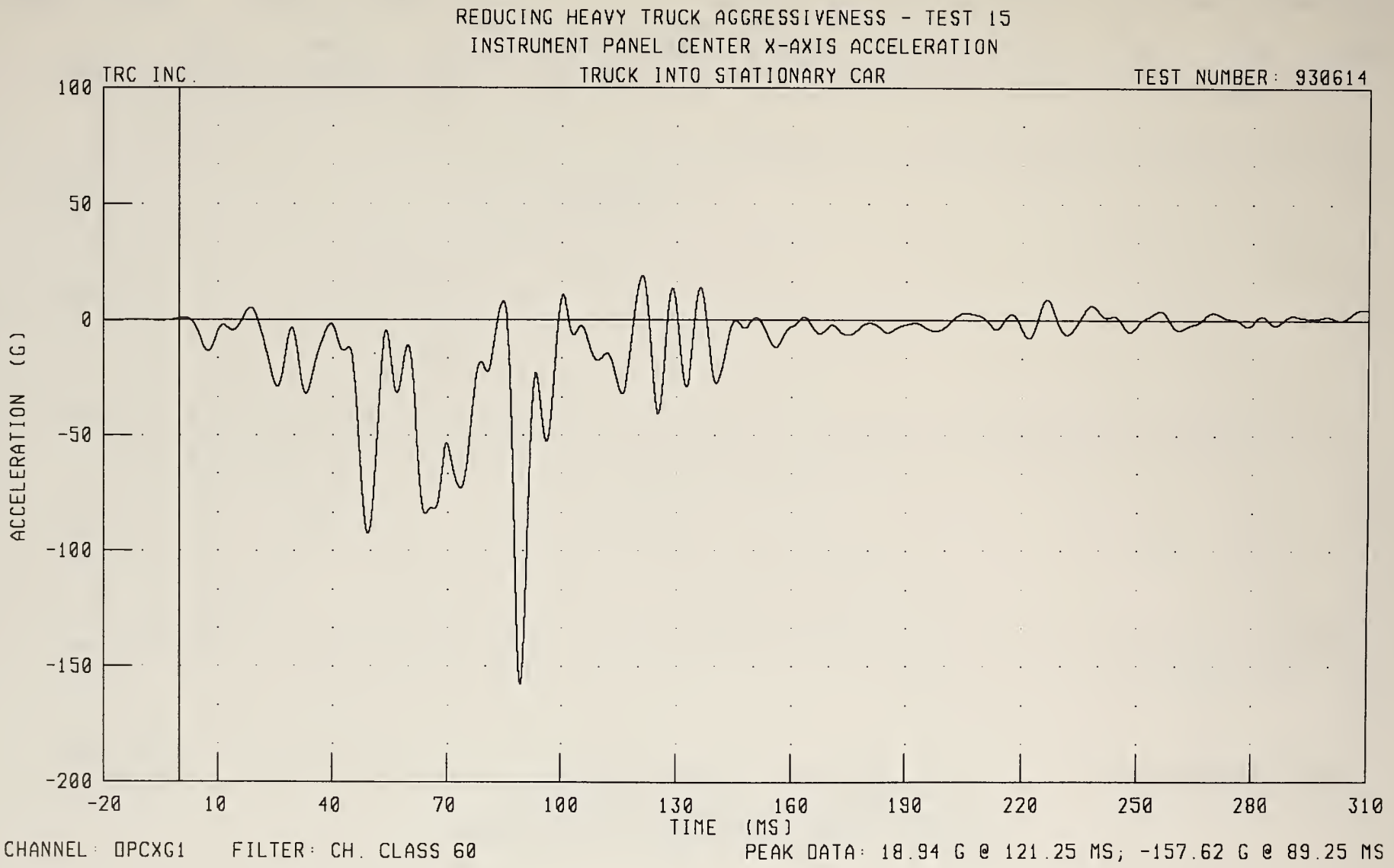

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
ENGINE BOTTOM X-AXIS VELOCITY
TRUCK INTO STATIONARY CAR
TRC INC.
TEST NUMBER: 930614
See DATA ACQUISITION EXPLANATIONS
VELOCITY (KM/H)
90
60
30
0
-30
-60
-90
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: ENGXV2
FILTER: CH. CLASS 180
PEAK DATA: 9192.34 KM/H @ 330.00 MS; -29.43 KM/H @ 42.75 MS

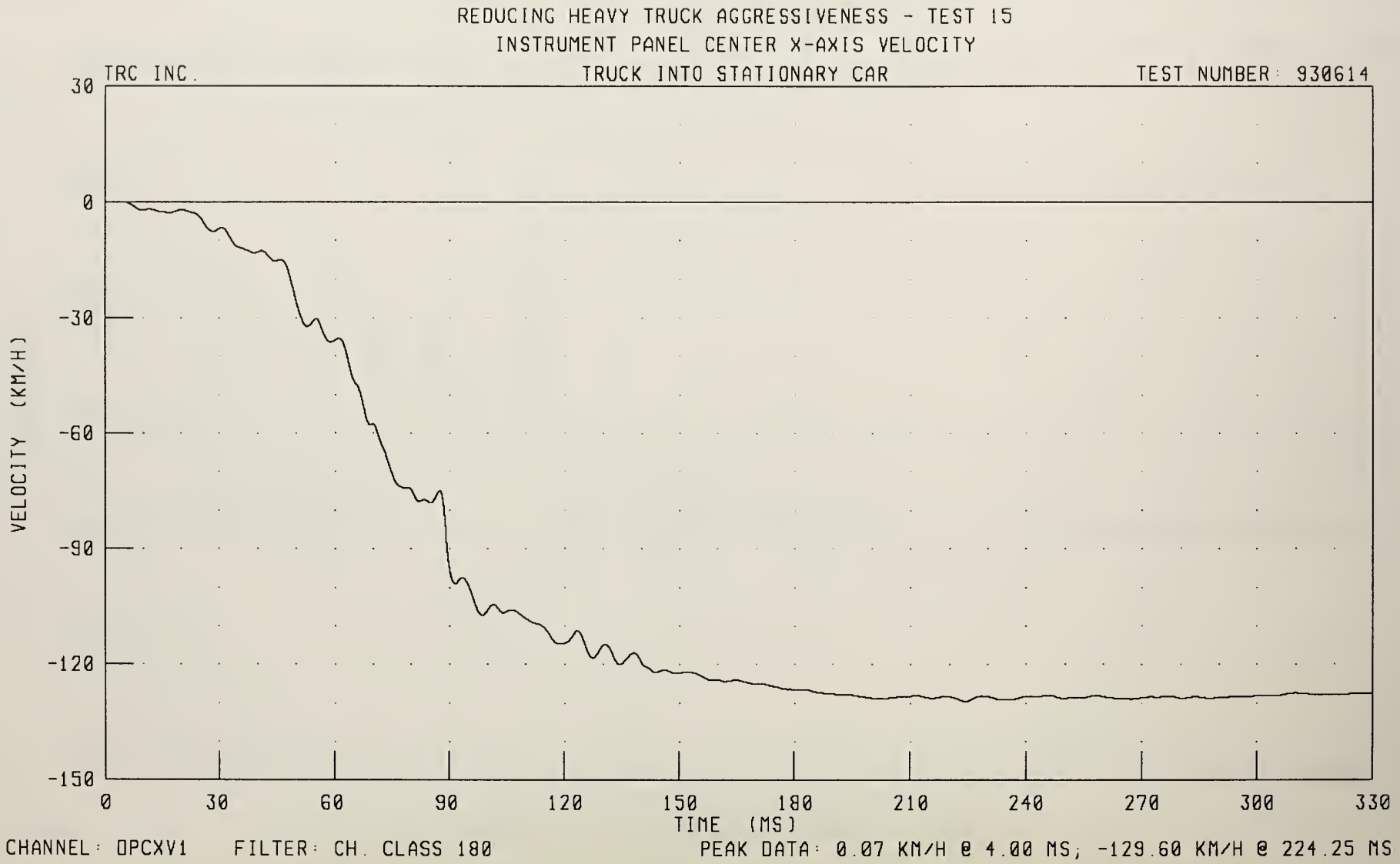

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
RIGHT BRAKE CALIPER X-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
See DATA ACQUISITION EXPLANATIONS
ACCELERATION (G)
80
40
0
-40
-80
-120
-160
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCRXG1
FILTER: CH. CLASS 60
PEAK DATA: 1225.09 G @ 147.13 MS; -60.33 G @ 38.63 MS

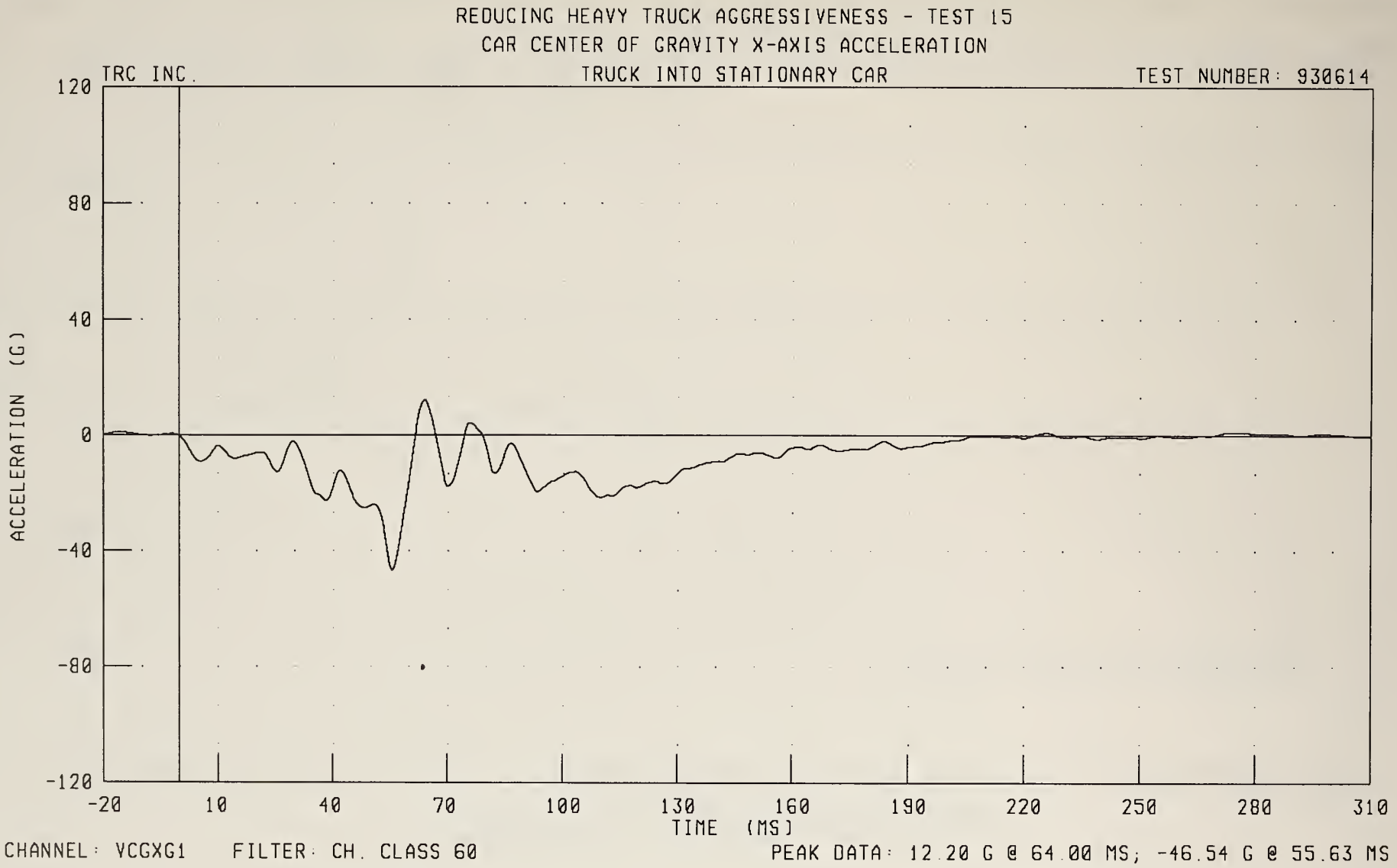

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
RIGHT BRAKE CALIPER X-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
See DATA ACQUISITION EXPLANATIONS
VELOCITY (KM/H)
90
60
30
0
-30
-60
-90
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: BCRXV1
FILTER: CH. CLASS 180
PEAK DATA: 8550.67 KM/H @ 330.00 MS; -57.72 KM/H @ 121.00 MS

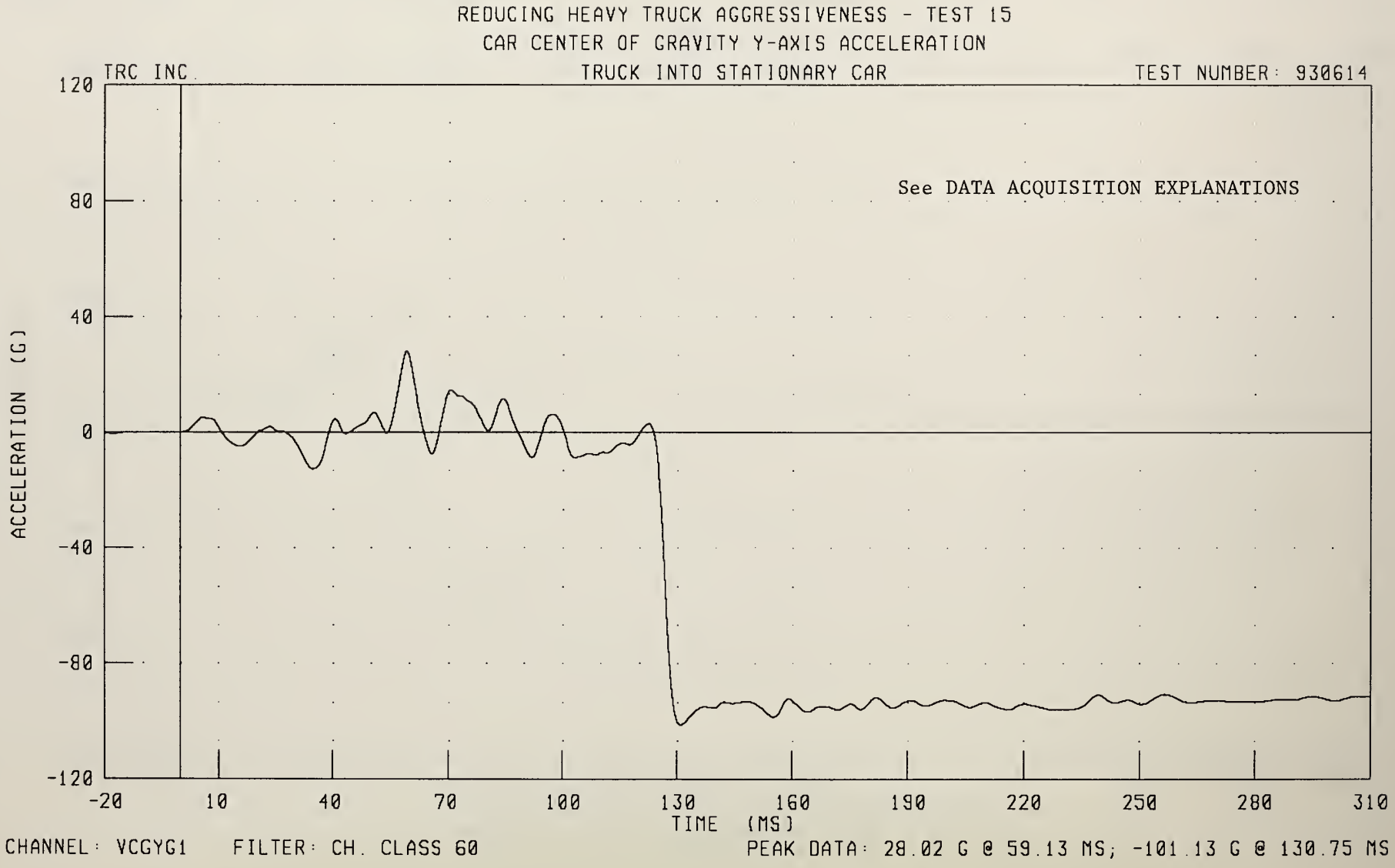

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
LEFT BRAKE CALIPER X-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
See DATA ACQUISITION EXPLANATIONS
ACCELERATION (G)
60
30
0
-30
-60
-90
-120
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCLXG1
FILTER: CH. CLASS 60
PEAK DATA: 1450.22 G @ 117.25 MS; -1443.22 G @ 82.13 MS

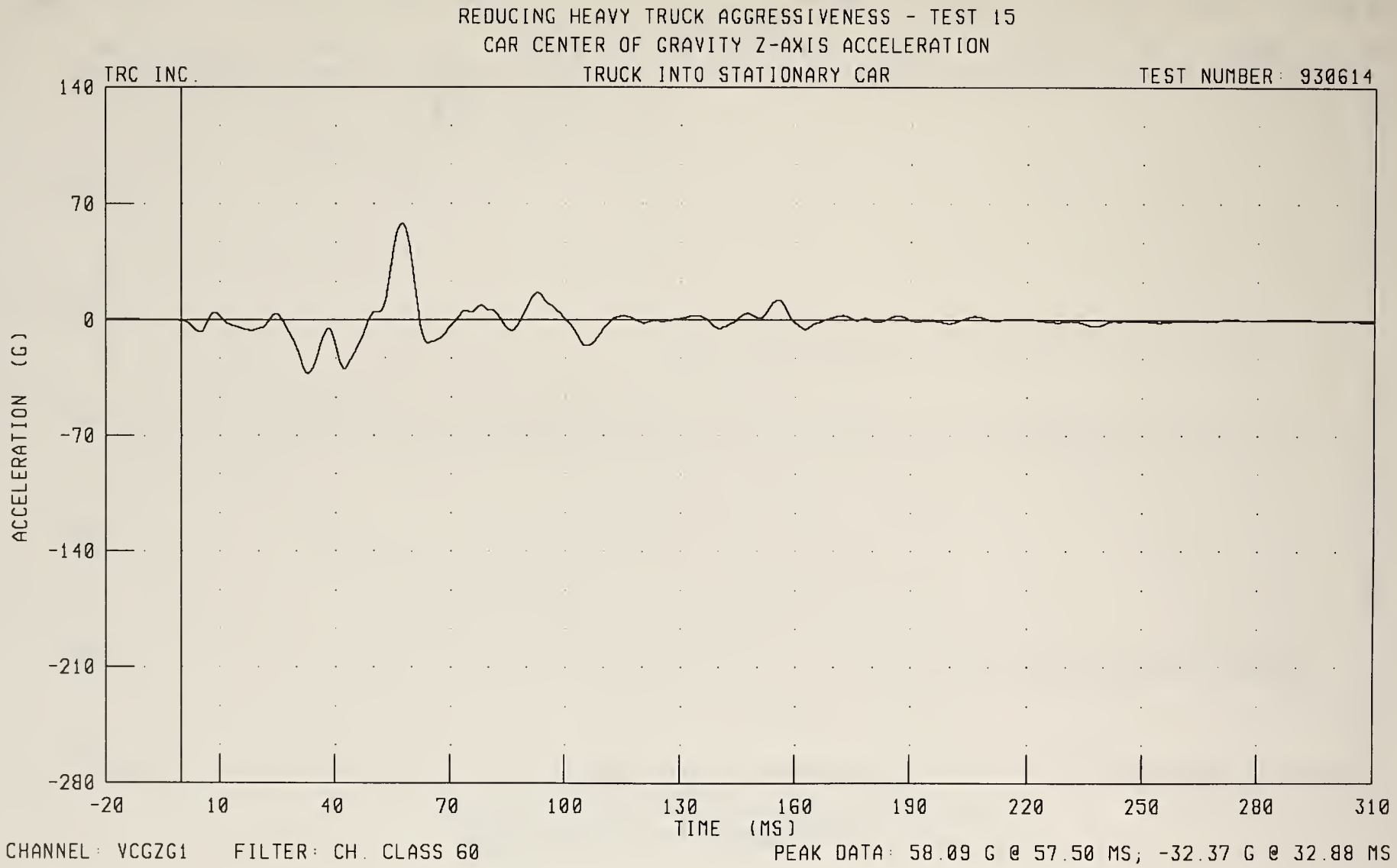

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
LEFT BRAKE CALIPER X-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
See DATA ACQUISITION EXPLANATIONS
VELOCITY (KM/H)
90
60
30
0
-30
-60
-90
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: BCLXV1
FILTER: CH. CLASS 180
PEAK DATA: 359.78 KM/H @ 77.88 MS; -2601.71 KM/H @ 304.38 MS

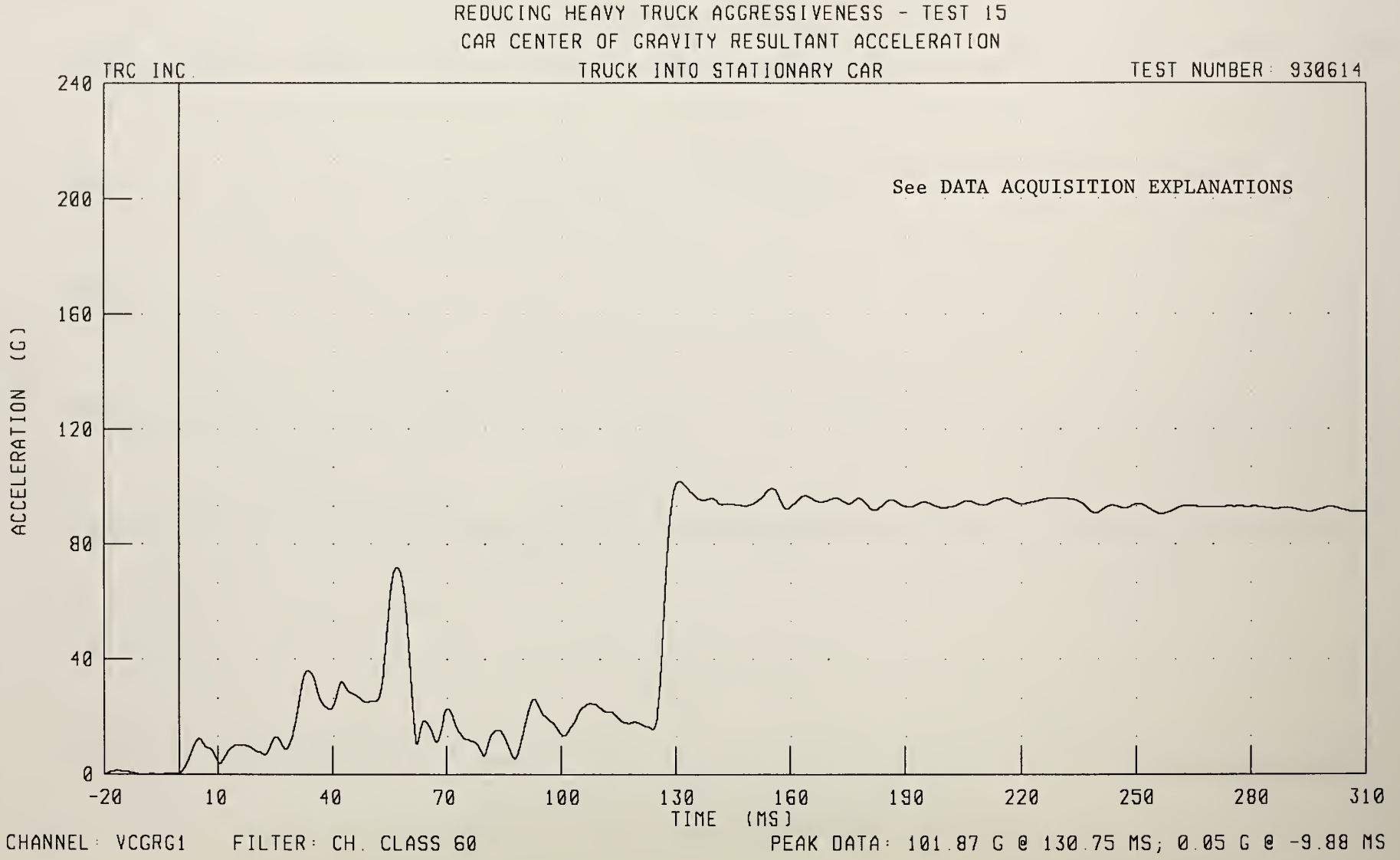

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
100
50
0
-50
-100
-150
-200
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: DPCXG1
FILTER: CH. CLASS 60
PEAK DATA: 18.94 G @ 121.25 MS; -157.62 G @ 89.25 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
INSTRUMENT PANEL CENTER X-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
30
0
-30
-60
-90
-120
-150
VELOCITY (KM/H)
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: DPCXV1
FILTER: CH. CLASS 180
PEAK DATA: 0.07 KM/H @ 4.00 MS; -129.60 KM/H @ 224.25 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
CAR CENTER OF GRAVITY X-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: VCGXG1
FILTER: CH. CLASS 60
PEAK DATA: 12.20 G @ 64.00 MS; -46.54 G @ 55.63 MS

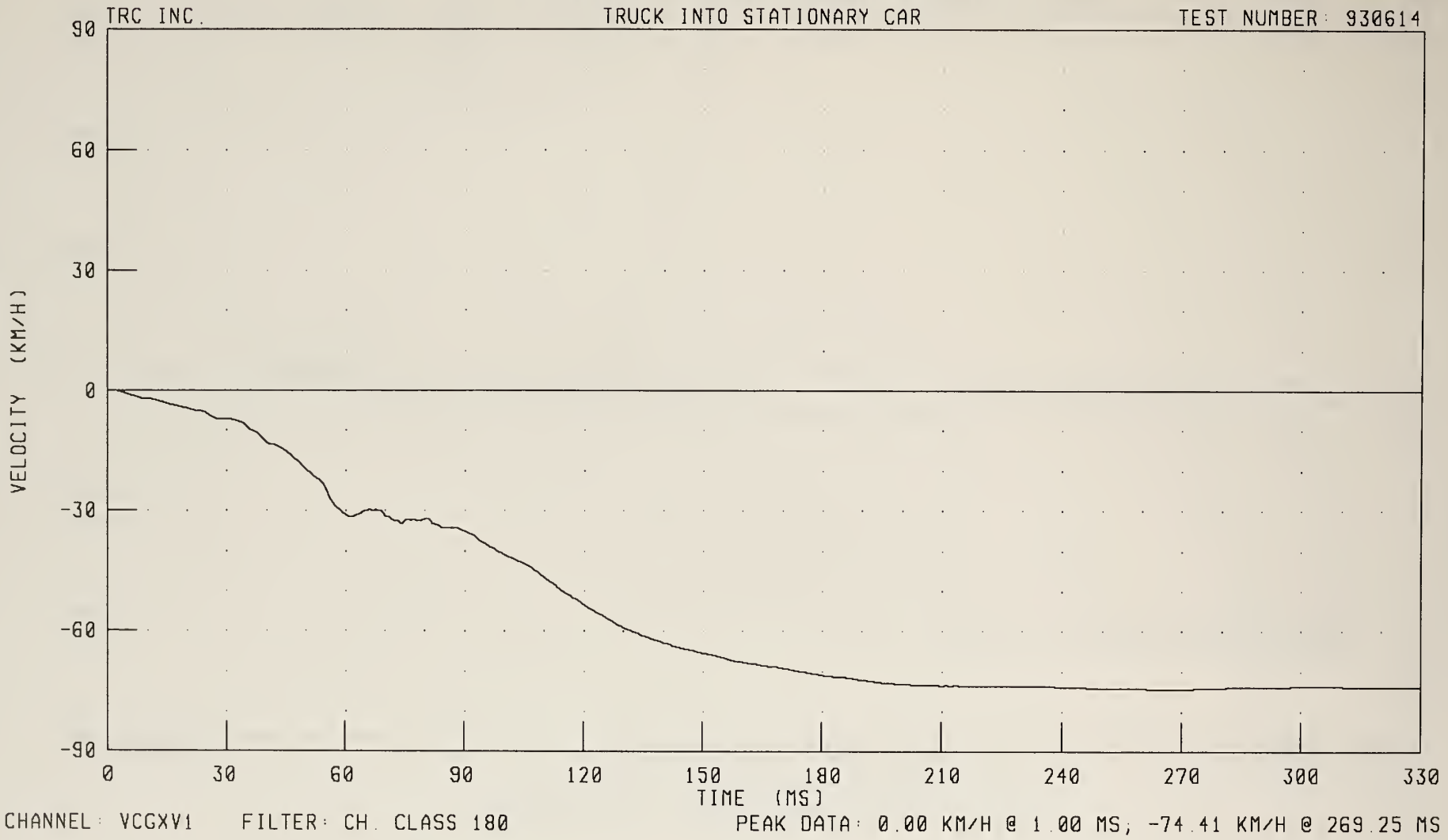

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
CAR CENTER OF GRAVITY Y-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
See DATA ACQUISITION EXPLANATIONS
ACCELERATION (G)
120
80
40
0
-40
-80
-120
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: VCGYG1
FILTER: CH. CLASS 60
PEAK DATA: 28.02 G @ 59.13 MS; -101.13 G @ 130.75 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
CAR CENTER OF GRAVITY Z-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
140
70
0
-70
-140
-210
-280
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: VCGZG1
FILTER: CH. CLASS 60
PEAK DATA: 58.09 G @ 57.50 MS; -32.37 G @ 32.88 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
CAR CENTER OF GRAVITY RESULTANT ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
See DATA ACQUISITION EXPLANATIONS
ACCELERATION (G)
240
200
160
120
80
40
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: VCGRG1
FILTER: CH. CLASS 60
PEAK DATA: 101.87 G @ 130.75 MS; 0.05 G @ -9.88 MS

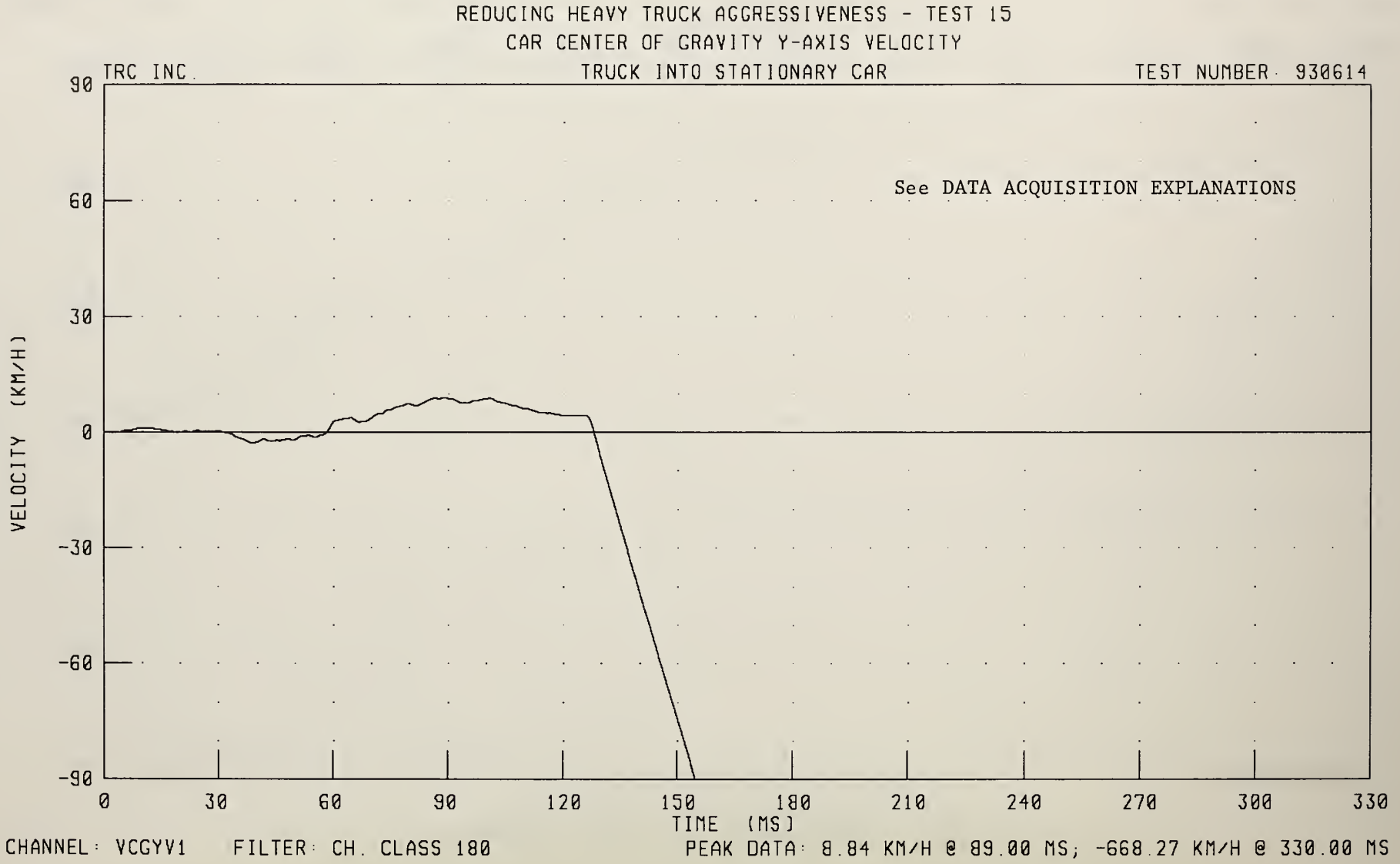
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15

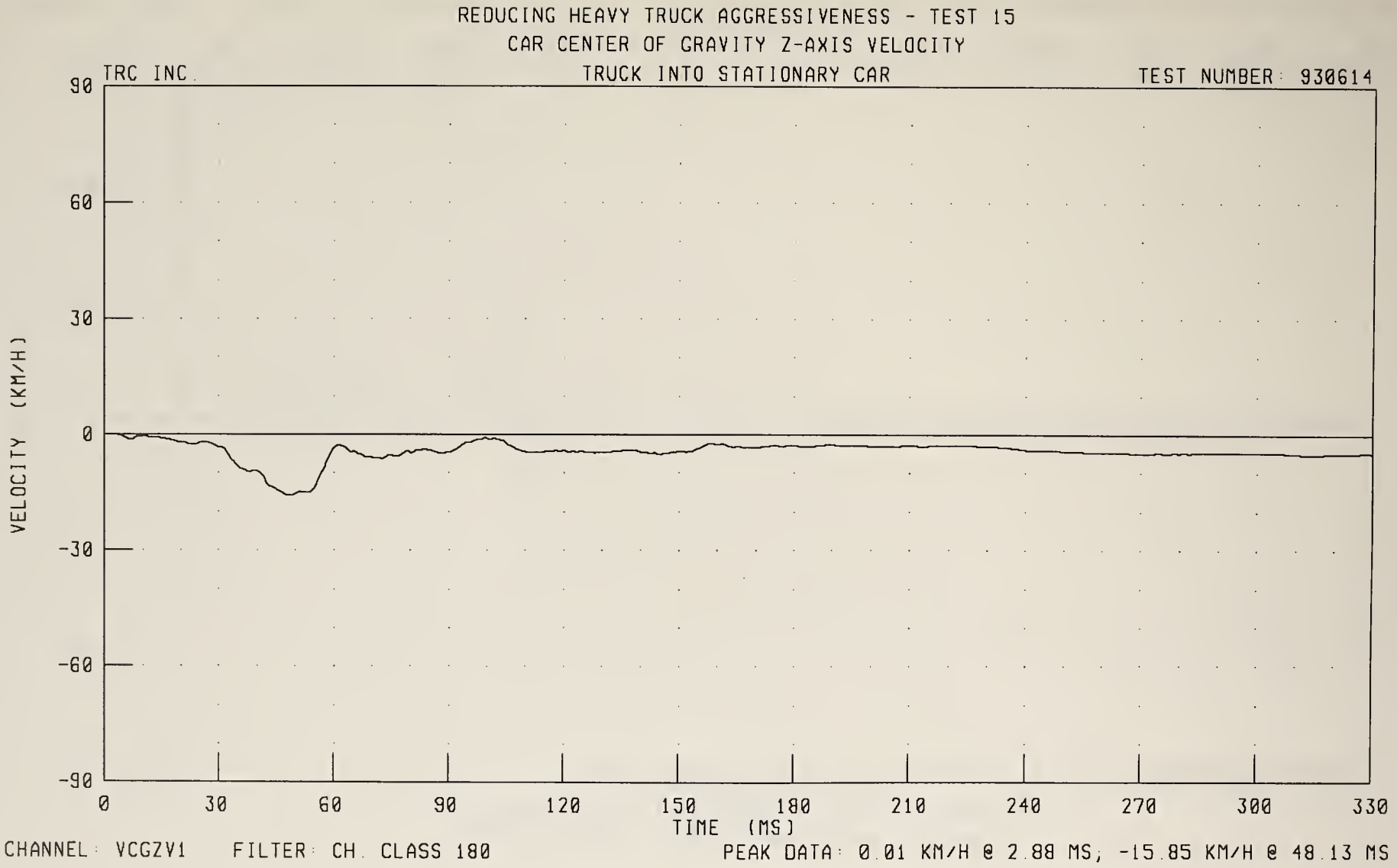
CAR CENTER OF GRAVITY X-AXIS VELOCITY

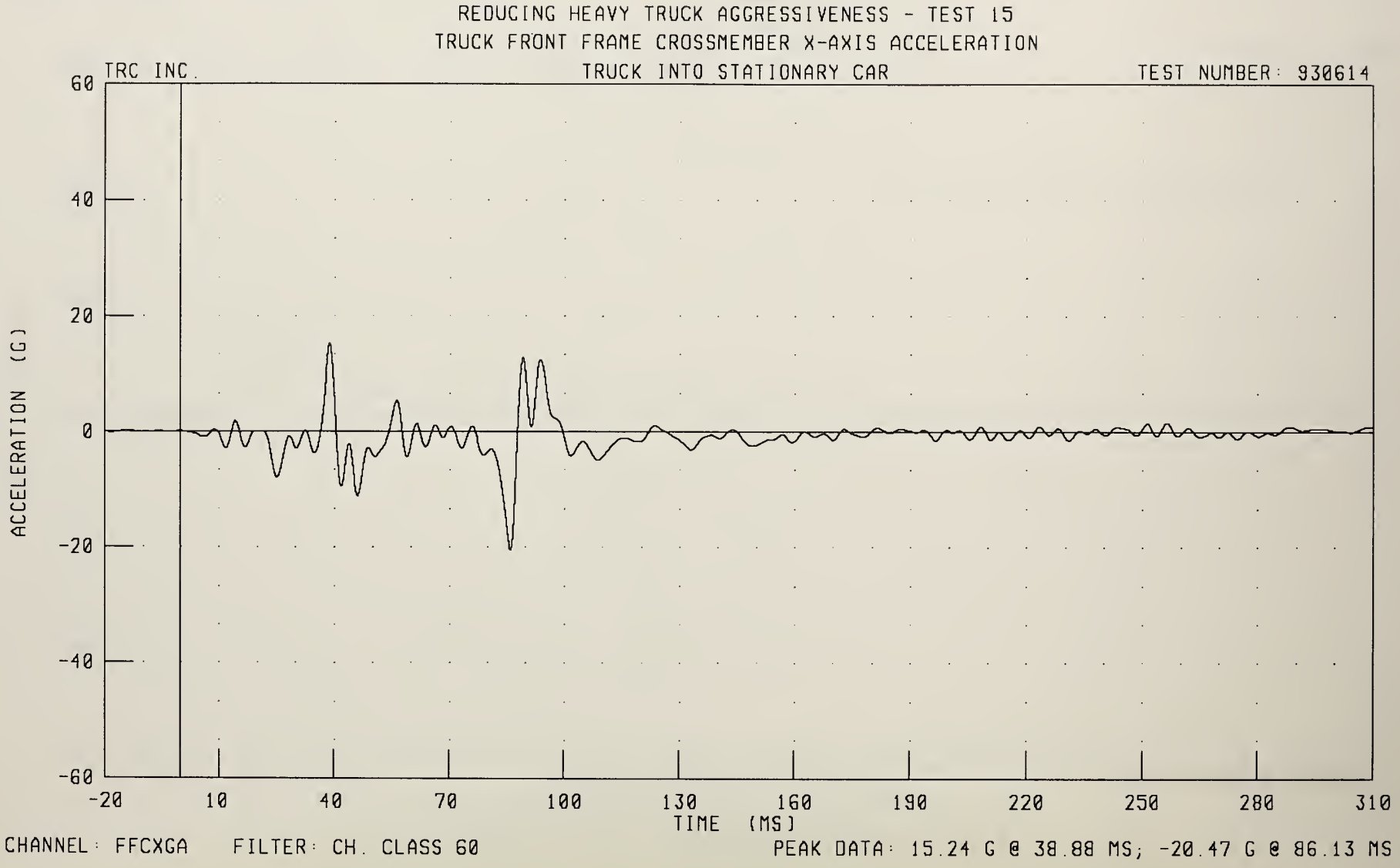


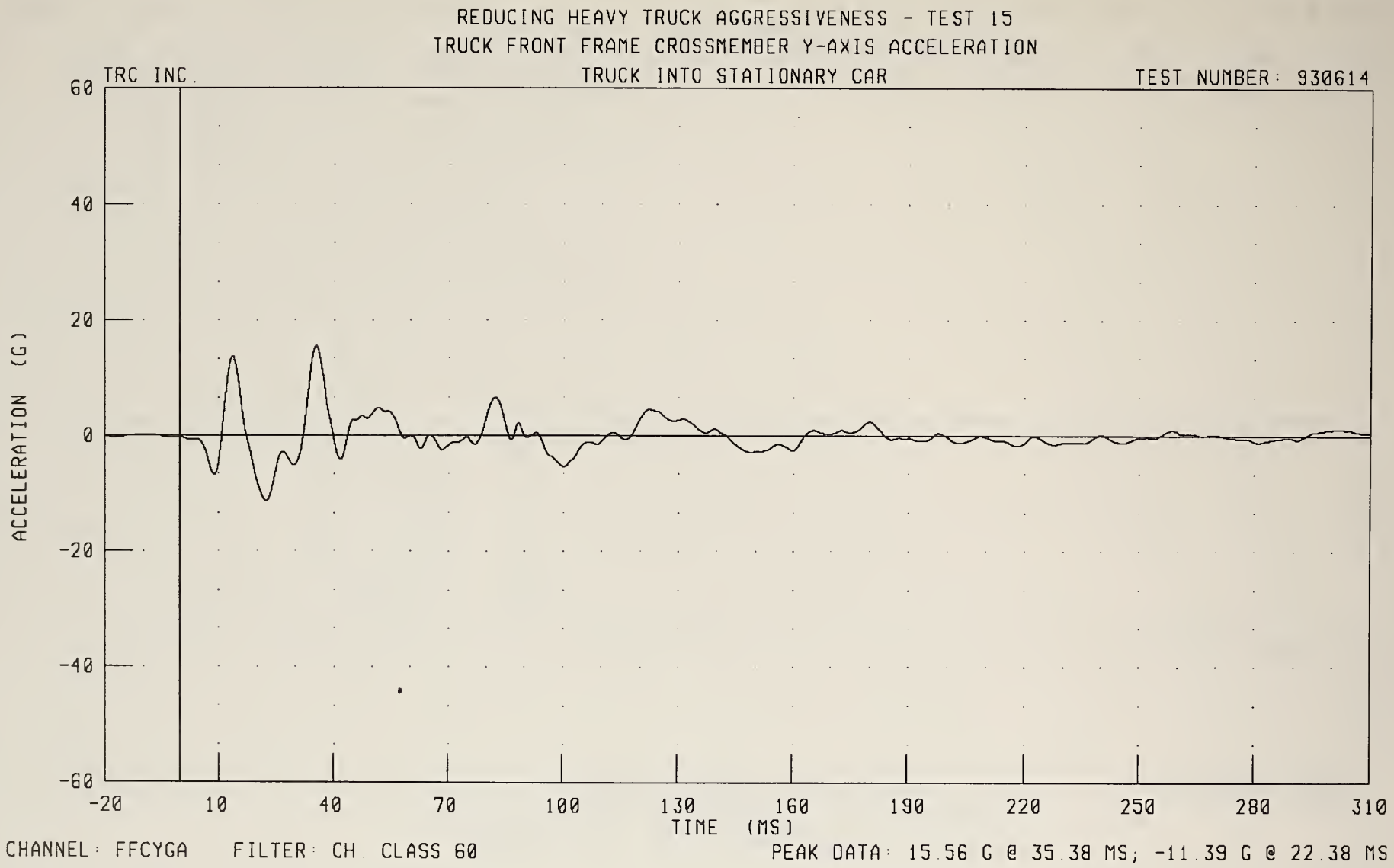
CHANNEL: VCGXV1 FILTER: CH. CLASS 180

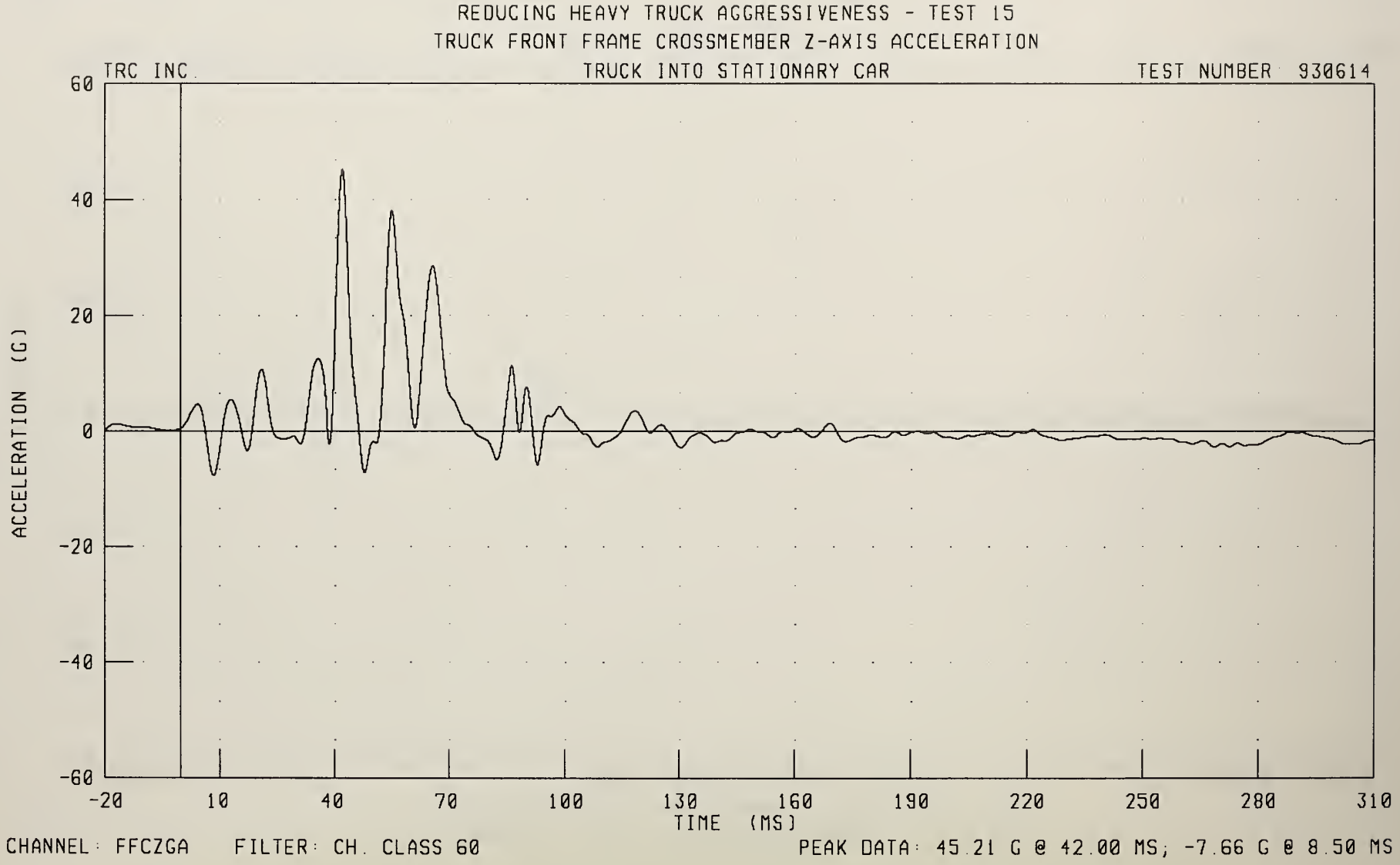
PEAK DATA: 0.00 KM/H @ 1.00 MS; -74.41 KM/H @ 269.25 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
CAR CENTER OF GRAVITY Y-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
See DATA ACQUISITION EXPLANATIONS
VELOCITY (KM/H)
90
60
30
0
-30
-60
-90
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: VCGYV1
FILTER: CH. CLASS 180
PEAK DATA: 8.84 KM/H @ 89.00 MS; -668.27 KM/H @ 330.00 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
CAR CENTER OF GRAVITY Z-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
VELOCITY (KM/H)
90
60
30
0
-30
-60
-90
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: VCGZV1
FILTER: CH. CLASS 180
PEAK DATA: 0.01 KM/H @ 2.88 MS; -15.85 KM/H @ 48.13 MS

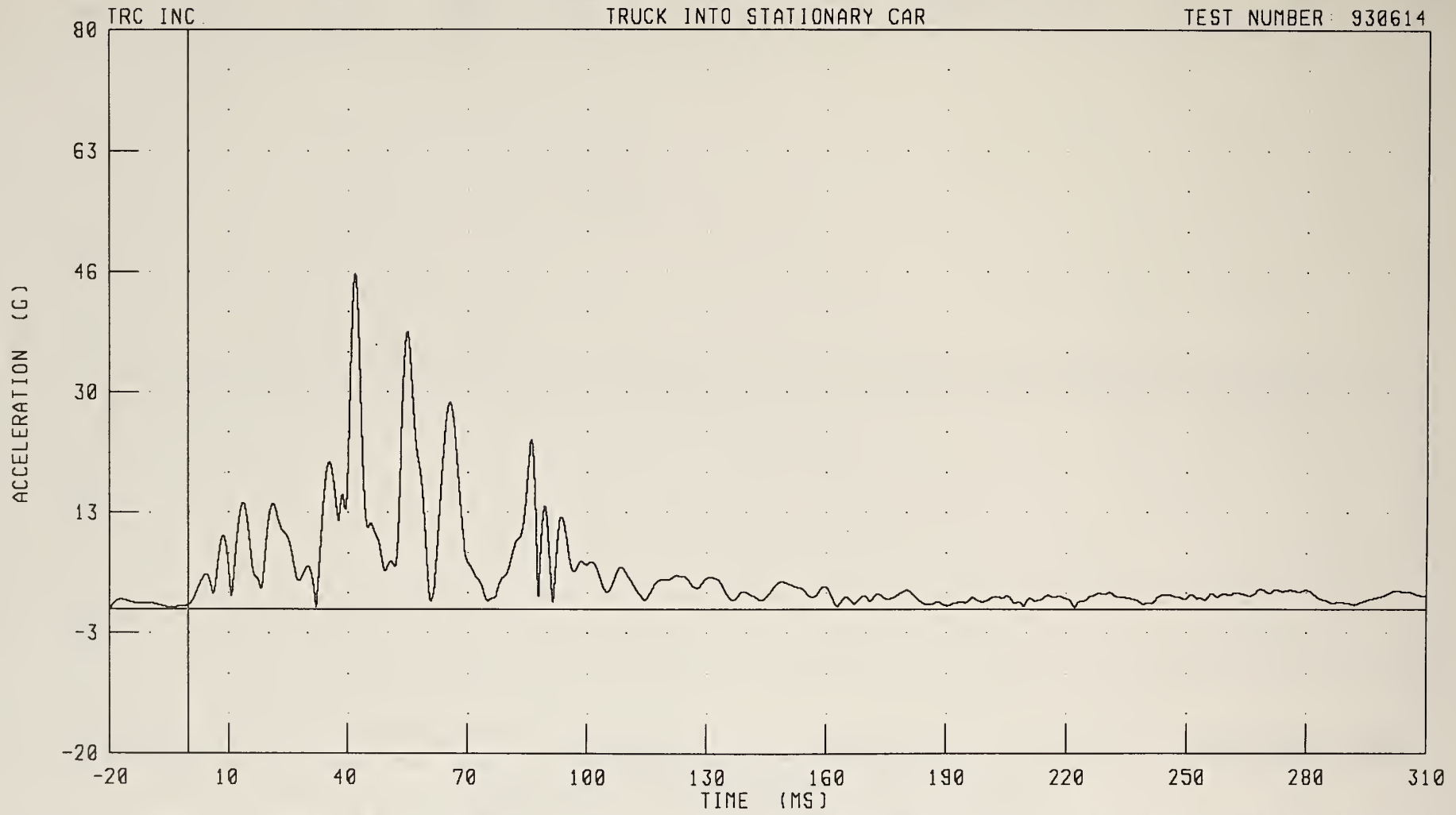

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
TRUCK FRONT FRAME CROSSMEMBER X-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FFCXGA
FILTER: CH. CLASS 60
PEAK DATA: 15.24 G @ 38.88 MS; -20.47 G @ 86.13 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
TRUCK FRONT FRAME CROSSMEMBER Y-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FFCYGA
FILTER: CH. CLASS 60
PEAK DATA: 15.56 G @ 35.38 MS; -11.39 G @ 22.38 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
TRUCK FRONT FRAME CROSSMEMBER Z-AXIS ACCELERATION
TRC INC
TRUCK INTO STATIONARY CAR
TEST NUMBER 930614
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FFCZGA
FILTER: CH. CLASS 60
PEAK DATA: 45.21 G @ 42.00 MS; -7.66 G @ 8.50 MS

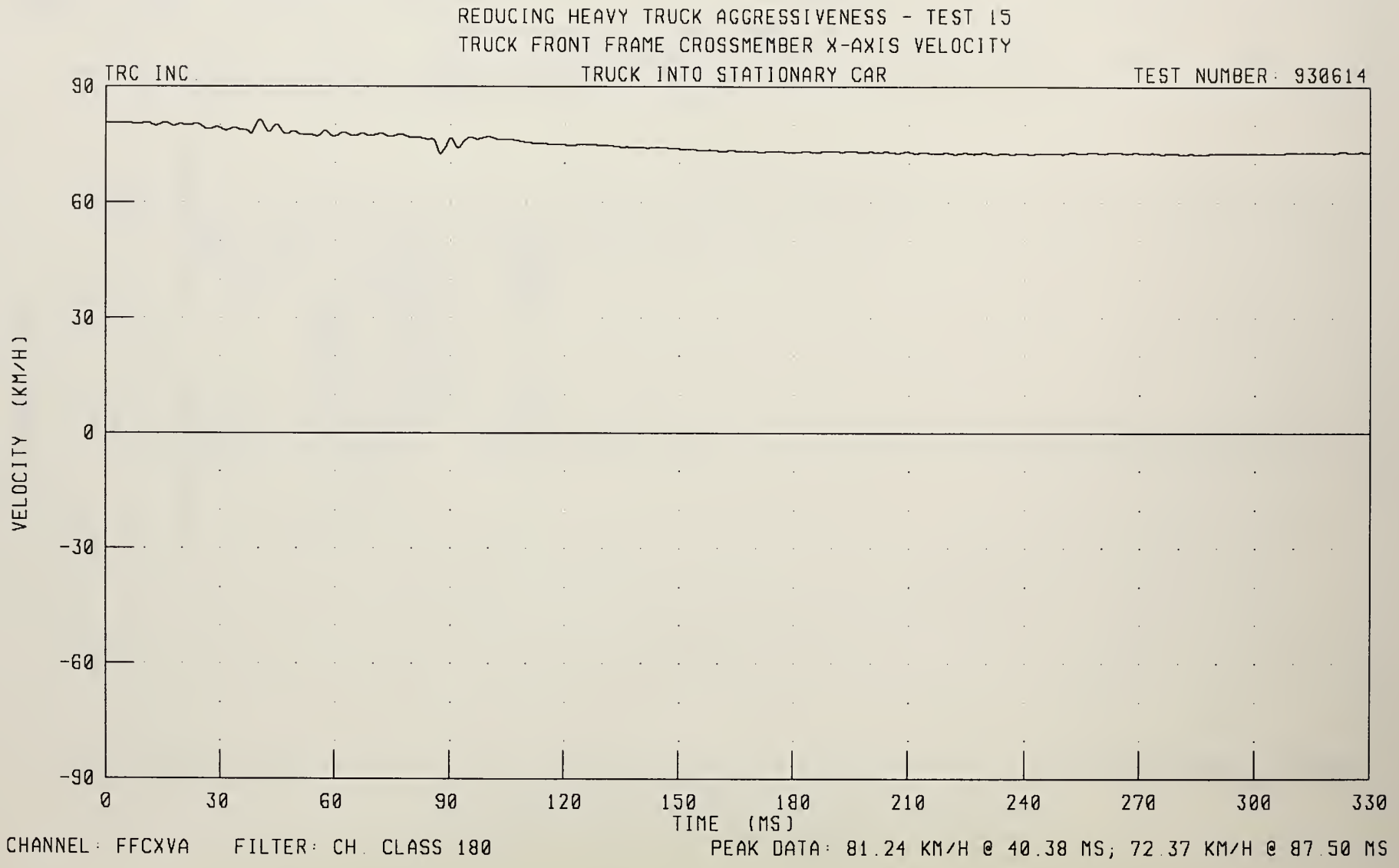
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15

TRUCK FRONT FRAME CROSSMEMBER RESULTANT ACCELERATION

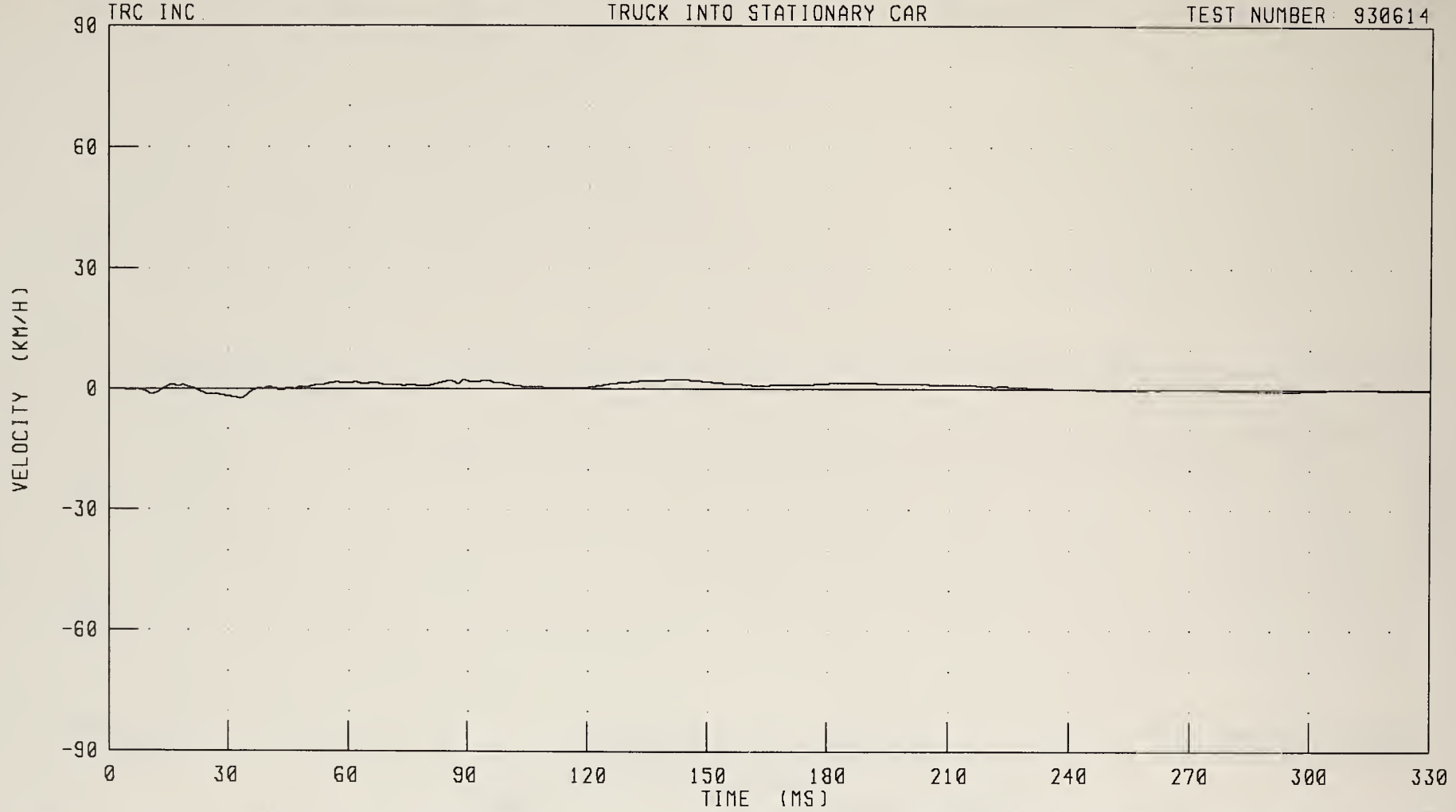


CHANNEL: FFCRGA FILTER: CH. CLASS 60

PEAK DATA: 46.37 G @ 42.00 MS; 0.10 G @ -19.88 MS

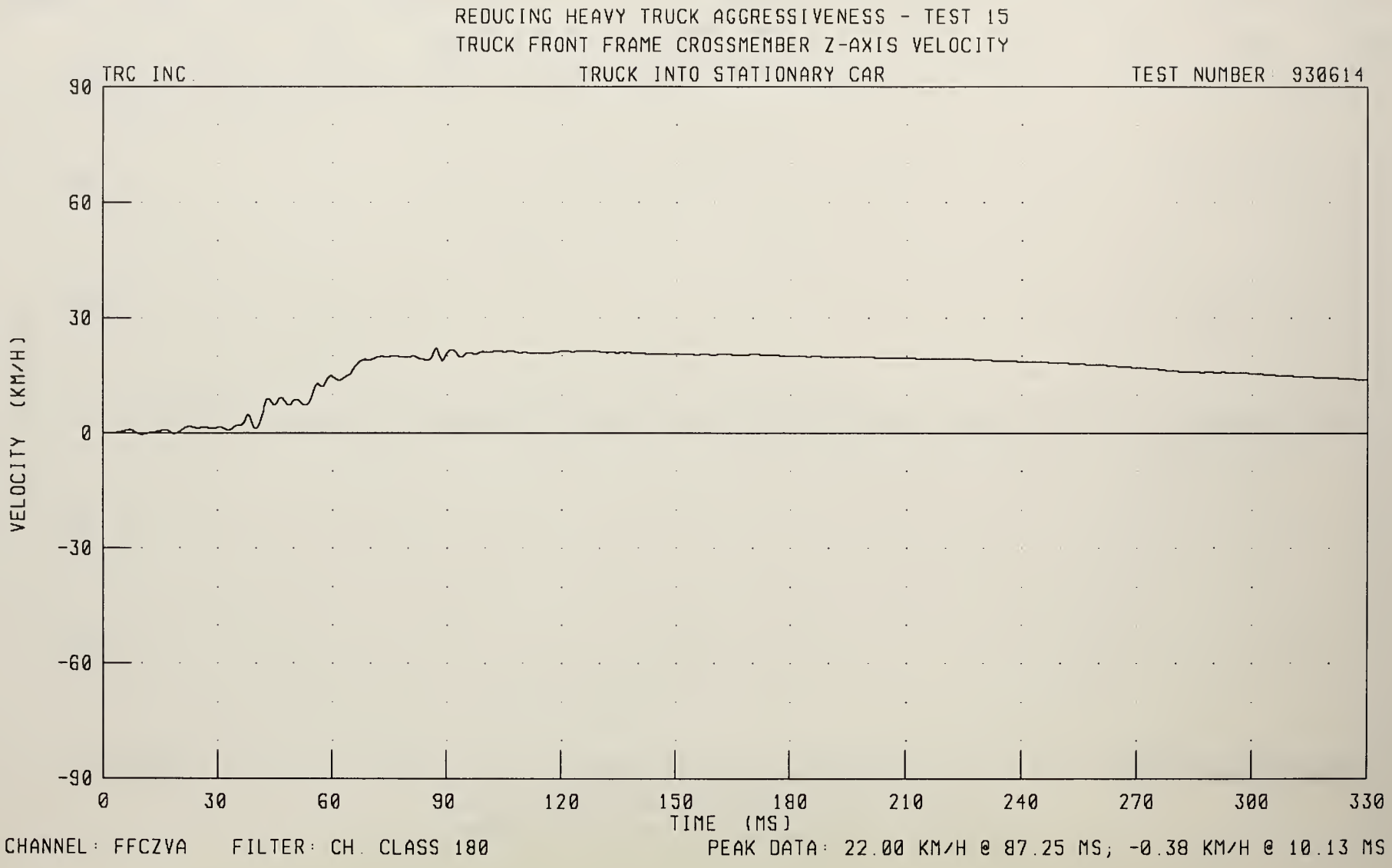

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
TRUCK FRONT FRAME CROSSMEMBER X-AXIS VELOCITY
TRC INC
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
90
60
30
0
-30
-60
-90
VELOCITY (KM/H)
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: FFCXVA
FILTER: CH CLASS 180
PEAK DATA: 81.24 KM/H @ 40.38 MS; 72.37 KM/H @ 87.50 MS

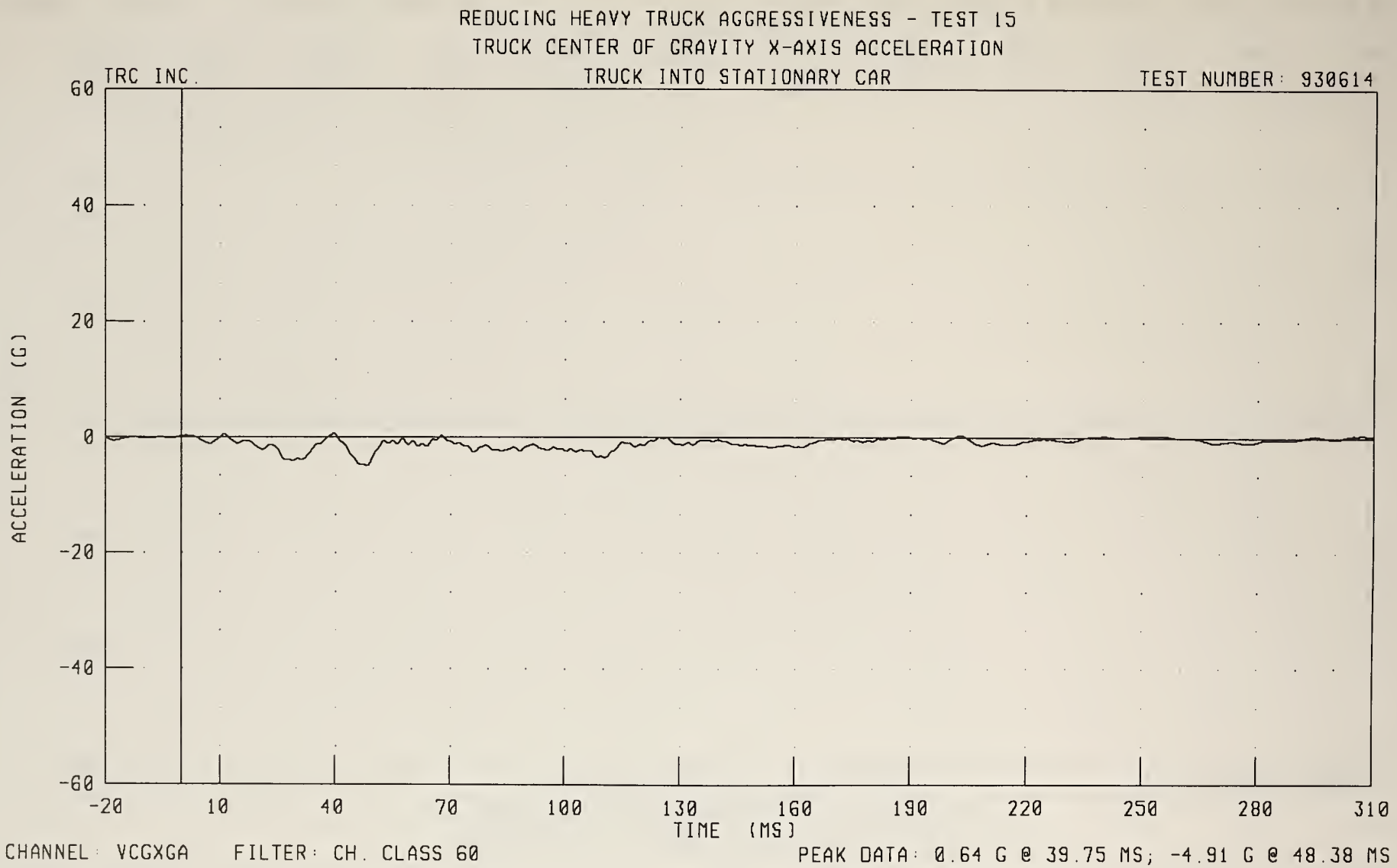
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
TRUCK FRONT FRAME CROSSMEMBER Y-AXIS VELOCITY

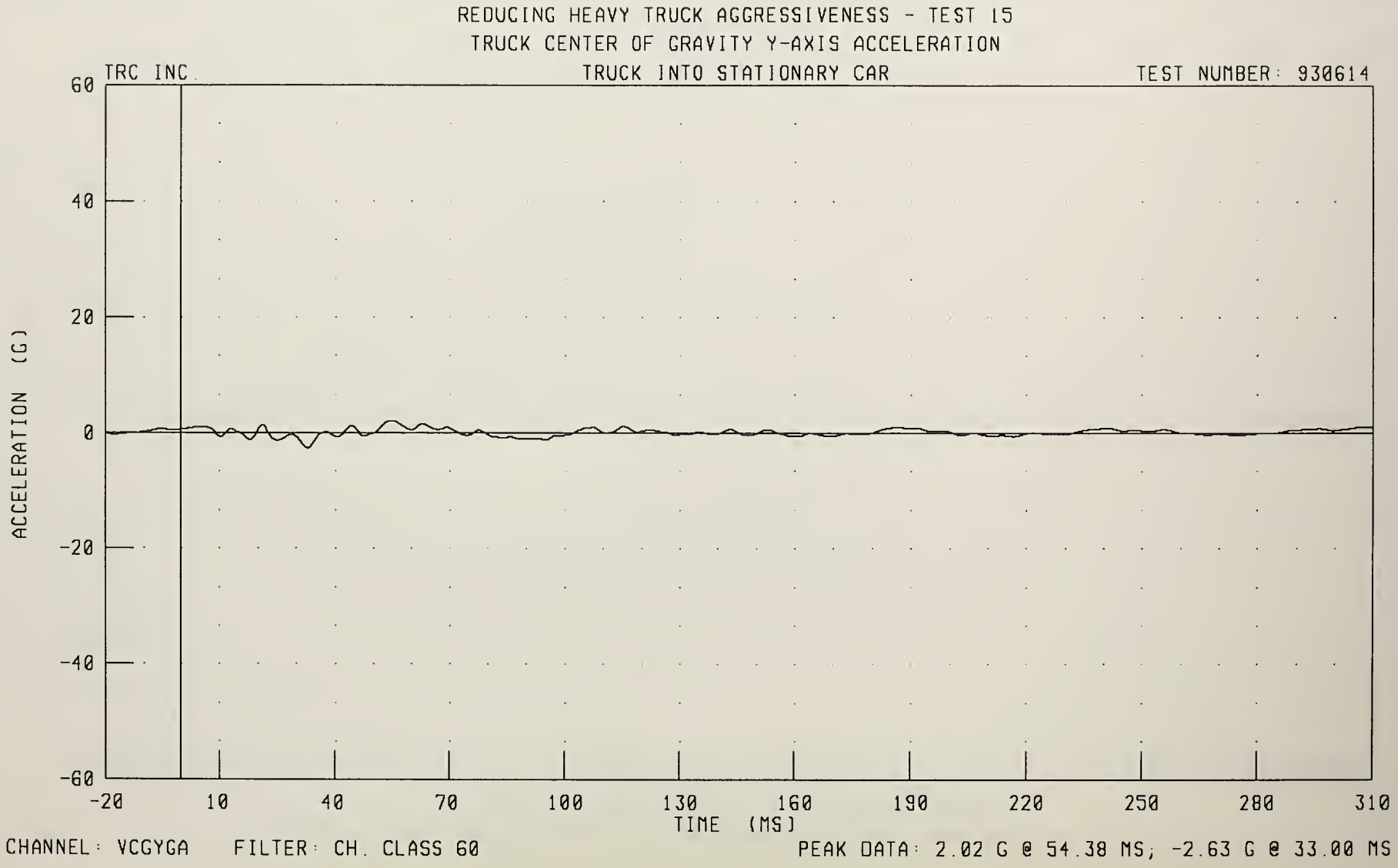


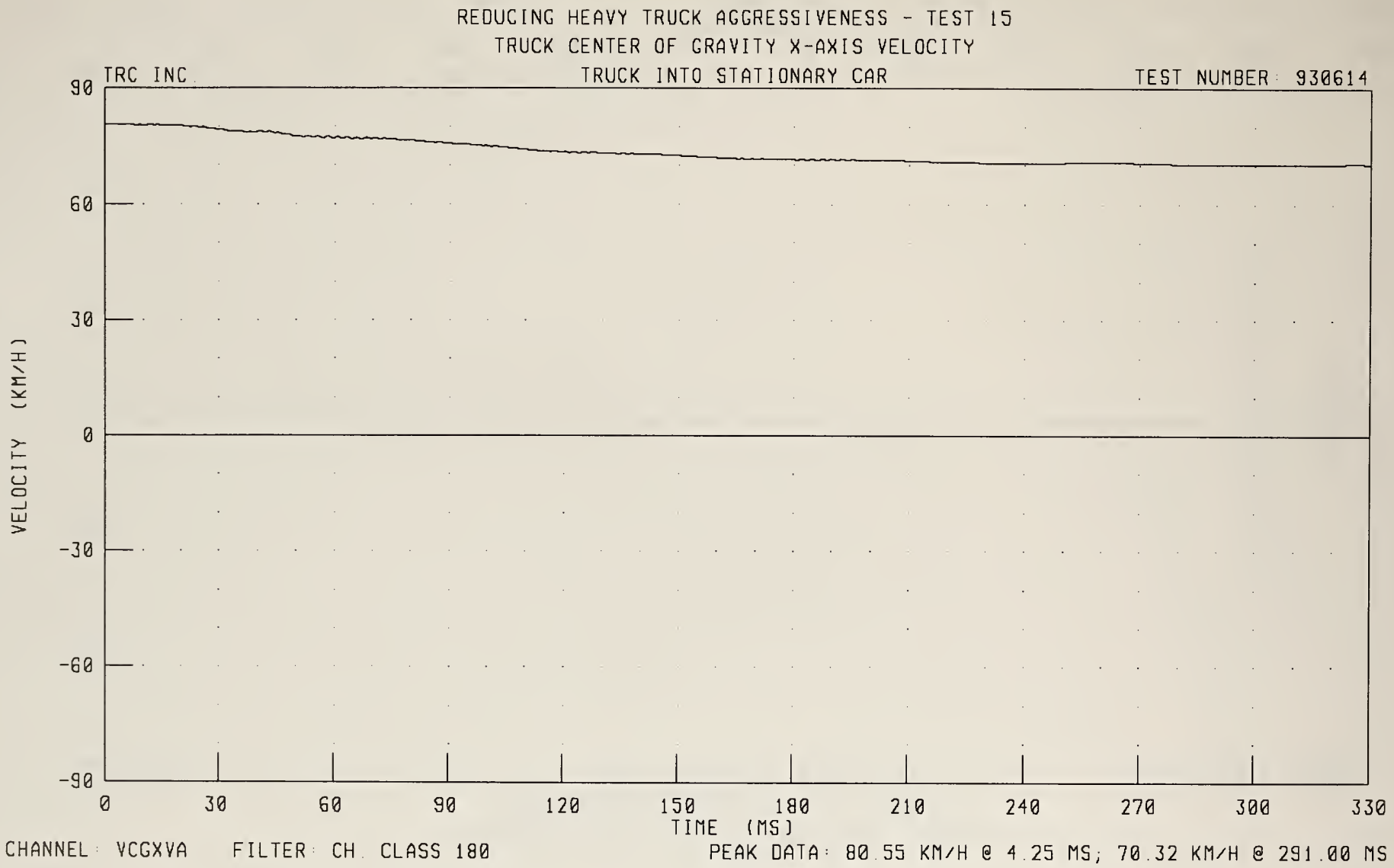
CHANNEL: FFCYVA FILTER: CH. CLASS 180

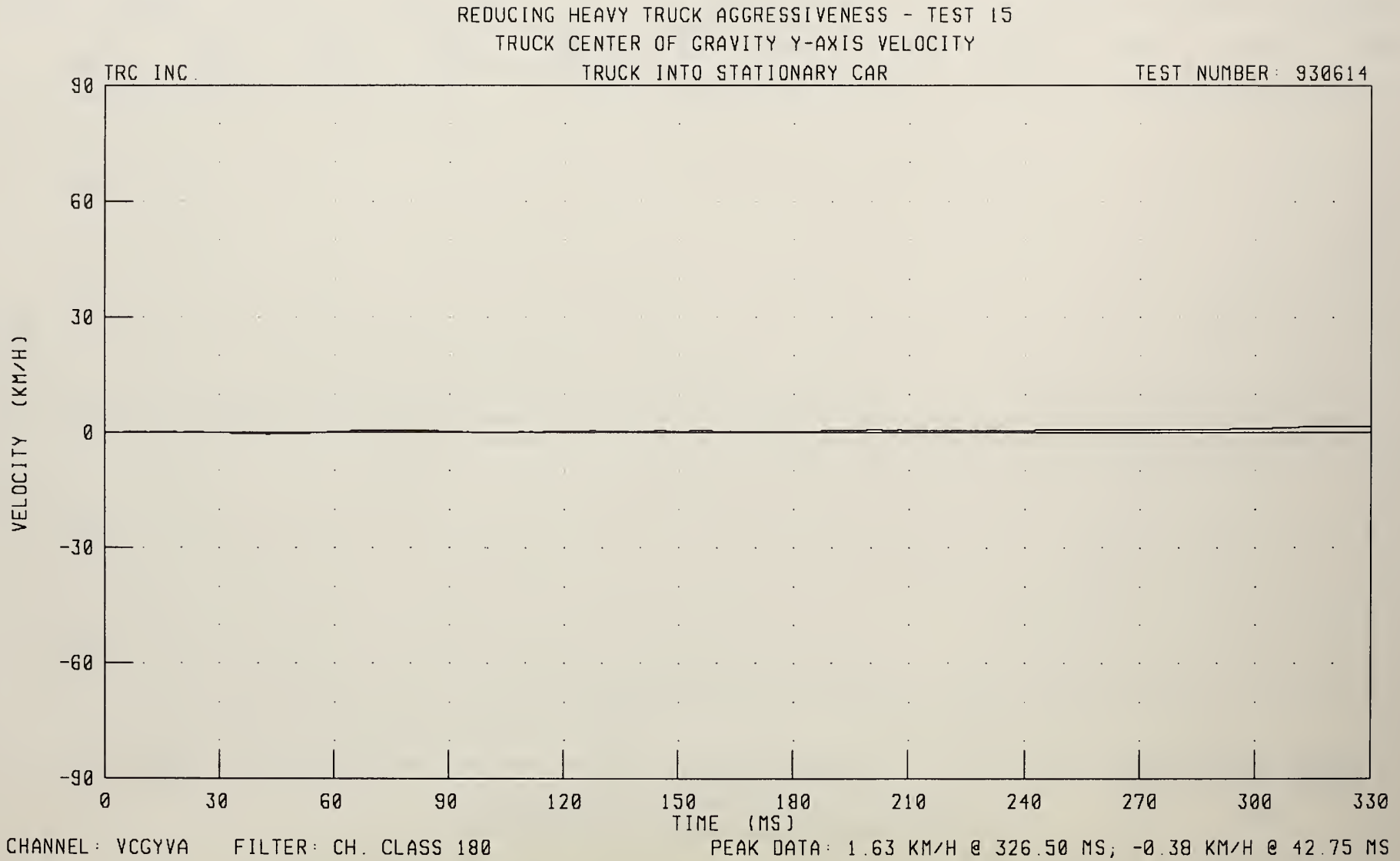
PEAK DATA: 2.29 KM/H @ 140.25 MS, -2.21 KM/H @ 33.00 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
TRUCK FRONT FRAME CROSSMEMBER Z-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
VELOCITY (KM/H)
90
60
30
0
-30
-60
-90
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: FFCZVA
FILTER: CH. CLASS 180
PEAK DATA: 22.00 KM/H @ 87.25 MS; -0.38 KM/H @ 10.13 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
TRUCK CENTER OF GRAVITY X-AXIS ACCELERATION
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: VCGXGA
FILTER: CH. CLASS 60
PEAK DATA: 0.64 G @ 39.75 MS; -4.91 G @ 48.38 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
TRUCK CENTER OF GRAVITY Y-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR
TRC INC.
TEST NUMBER: 930614
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: VCGYGA
FILTER: CH. CLASS 60
PEAK DATA: 2.02 G @ 54.38 MS; -2.63 G @ 33.00 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
TRUCK CENTER OF GRAVITY X-AXIS VELOCITY
TRC INC
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
90
60
30
0
-30
-60
-90
VELOCITY (KM/H)
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: VCGXVA FILTER: CH. CLASS 180
PEAK DATA: 80.55 KM/H @ 4.25 MS; 70.32 KM/H @ 291.00 MS


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 15
TRUCK CENTER OF GRAVITY Y-AXIS VELOCITY
TRC INC.
TRUCK INTO STATIONARY CAR
TEST NUMBER: 930614
90
60
30
0
-30
-60
-90
VELOCITY (KM/H)
0
30
60
90
120
150
180
210
240
270
300
330
TIME (MS)
CHANNEL: VCGYVA
FILTER: CH. CLASS 180
PEAK DATA: 1.63 KM/H @ 326.50 MS; -0.38 KM/H @ 42.75 MS

APPENDIX C

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENTATION PLACEMENT

DUMMY MFR. & S/N: HUMANOID/048

SEATING POSITION: DRIVER

LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
HEAD ACCELERATION	X	ENDEVCO	7264	EH78J	REAR
HEAD ACCELERATION	Y	ENDEVCO	7264	DH37J	LEFT
HEAD ACCELERATION	Z	ENDEVCO	7264	DD17J	UP
NECK FORCE	X	DENTON	1716	0106	*
NECK FORCE	Y	DENTON	1716	0106	*
NECK FORCE	Z	DENTON	1716	0106	*
NECK MOMENT	X	DENTON	1716	0106	*
NECK MOMENT	Y	DENTON	1716	0106	*
NECK MOMENT	Z	DENTON	1716	0106	*
CHEST ACCELERATION	X	ENDEVCO	7264	EH92J	FRONT
CHEST ACCELERATION	Y	ENDEVCO	7264	CC24H	LEFT
CHEST ACCELERATION	Z	ENDEVCO	7264	FG28J	UP
CHEST DEFLECTION	X	VERNITECH	81422A	9041	OUTWARD
PELVIS ACCELERATION	X	ENDEVCO	7264	BC75J	REAR
PELVIS ACCELERATION	Y	ENDEVCO	7264	FC43J	LEFT
PELVIS ACCELERATION	Z	ENDEVCO	7264	AP87	UP
LEFT FEMUR FORCE		GSE	2435	726	TENSION
RIGHT FEMUR FORCE		GSE	2430	756	TENSION

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

VEHICLE INSTRUMENTATION INFORMATION

TEST NO. 930614

NO.	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
1	LEFT REAR SEAT					
	CROSSMEMBER LONGITUDINAL	X	ENDEVCO	2264	BF05	REAR
2	RIGHT REAR SEAT					
	CROSSMEMBER LONGITUDINAL	X	ENDEVCO	2264	AT38	FRONT
3	ENGINE TOP LONGITUDINAL	X	ENDEVCO	2264	AC44	REAR
4	ENGINE BOTTOM LONGITUDINAL	X	ENDEVCO	2264	BR37J	REAR
5	RIGHT BRAKE CALIPER					
	LONGITUDINAL	X	ENDEVCO	2264	AZ88	REAR
6	LEFT BRAKE CALIPER					
	LONGITUDINAL	X	ENDEVCO	2264	AU31	REAR
7	INSTRUMENT PANEL CENTER					
	LONGITUDINAL	X	ENDEVCO	2264	BA68	REAR
	LAP BELT OUTBOARD FORCE		LEBOW	3419	590	TENSION
	SHOULDER BELT OUTBOARD FORCE		LEBOW	3419	613	TENSION
8	VEHICLE CENTER OF GRAVITY					
	LONGITUDINAL	X	ENDEVCO	2264	AK21	FRONT
	LATERAL	Y	ENDEVCO	2264	CJ30H	RIGHT
	VERTICAL	Z	ENDEVCO	2264	BB60	UP

HEAVY TRUCK ACCELEROMETER INFORMATION

TEST NO. 930614

NO.	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
9	FRONT FRAME CROSSMEMBER	X	ENDEVCO	7264	CR83H	REAR
		Y	ENDEVCO	7264	CK56H	RIGHT
		Z	ENDEVCO	7264	CH81H	UP
10	TRUCK CENTER OF GRAVITY	X	ENDEVCO	7264	CJ72H	REAR
		Y	ENDEVCO	7264	CL83H	RIGHT

SIGN CONVENTION
NHTSA DATA TAPE REFERENCE GUIDE

ACCELEROMETERS:	+X:	FORWARD
	+Y:	LEFTWARD
	+Z:	UPWARD
POTENTIOMETERS:	+CHEST LONGITUDINAL DEFLECTION:	OUTWARD
	+CHEST LATERAL DEFLECTION:	LEFTWARD
	+SEAT BELT DISPLACEMENT:	OUTWARD
	+SEAT BELT EXTENSION:	ELONGATION
	+KNEE SLIDER DISPLACEMENT:	DISTANCE BETWEEN FEMUR AND TIBIA INCREASED (IN RELATION TO A SEATED DUMMY)
LOAD CELLS:	+FEMUR FORCE:	TENSION
	+SEAT BELT FORCE:	TENSION
	+BARRIER FORCE:	TENSION
NECK LOAD CELLS:	+X FORCE:	HEAD PUSHED FORWARD
	+Y FORCE:	HEAD PUSHED LEFTWARD
	+Z FORCE:	HEAD PULLED UPWARD (TENSION ON NECK)
	+X MOMENT:	RIGHT EAR ROTATING TOWARD RIGHT SHOULDER
	+Y MOMENT:	CHIN ROTATING TOWARD CHEST
	+Z MOMENT:	CHIN ROTATING TOWARD LEFT SHOULDER
TIBIA LOAD CELLS:	+X FORCE:	TENSION
	+Y FORCE:	TENSION
	+Z FORCE:	TENSION
	+X MOMENT:	BOTTOM OF TIBIA MOVING LEFTWARD
	+Y MOMENT:	BOTTOM OF TIBIA MOVING REARWARD

*U.S. G.P.O.:1993-301-717:80393