

TEST #3



U.S. Department  
of Transportation  
**National Highway  
Traffic Safety  
Administration**

V1808

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**DOT HS 807 947  
Final Report**

**May-June 1992**

# **Reducing Heavy Truck Aggressiveness Moving Heavy Truck Into a 1988 Ford Taurus 4-Door Sedan at 64.9 KPH**

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15. Supplementary Notes					
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 1988 Ford Taurus 4-door sedan, VIN 1FABP50UXJG112324, at the Transportation Research Center Inc. on May 29, 1992. The test vehicle was impacted in the front at 35° by the heavy truck. The struck vehicle contained ten (10) accelerometers and one (1) instrumented Hybrid III driver dummy.					
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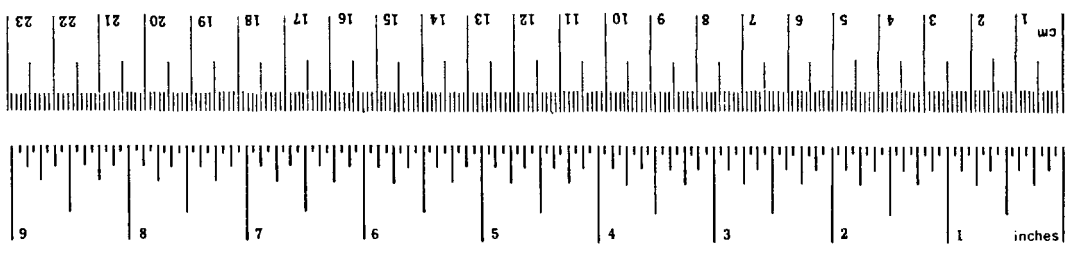
# METRIC CONVERSION FACTORS

## Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
<b>AREA</b>				
m <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>
	acres	0.4	hectares	ha
<b>MASS (weight)</b>				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	tonnes	t
<b>VOLUME</b>				
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 <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

## Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
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
<b>AREA</b>				
cm <sup>2</sup>	square centimeters	0.16	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	1.2	square yards	yd <sup>2</sup>
km <sup>2</sup>	square kilometers	0.4	square miles	mi <sup>2</sup>
ha	hectares (10,000 m <sup>2</sup> )	2.5	acres	ac
<b>MASS (weight)</b>				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	st
<b>VOLUME</b>				
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 <sup>3</sup>	cubic meters	35	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.3	cubic yards	yd <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



\*1.013 x 2.54 inch = 2.54 centimeters and more detailed tables, see NBS Misc. Publ. 75b, Units of Weights and Measures, Price \$2.25, SD Catalog No. C-13, 10-286.

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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 May 29, 1992.

The stationary vehicle, a 1988 Ford Taurus 4-door sedan, was equipped with a 3.0 liter, 6-cylinder, transverse gasoline engine and a 3-speed automatic transmission. The test weight of the vehicle was 1580 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 front at 35 degrees by a moving heavy truck at 64.9 kph. The intended impact engagement was the left front corner of the truck into the left front corner of the car.

The moving heavy truck's test weight was 19001 kg. The truck was equipped with a standard truck bumper. The truck was instrumented with two (2) longitudinal and vertical axis accelerometers and one (1) vertical axis accelerometer.

The dummy's head injury criterion, HIC, was 586. The dummy's chest deceleration with 3 milliseconds minimum duration was 72.0 g. The dummy's maximum left and right femur forces were 11104 N and 2415 N, respectively.

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

TABLE 1 CRASH TEST SUMMARY

TEST TYPE: Heavy Truck into Stationary Vehicle  
TEST DATE: 05/29/92 TEST TIME: 1317 AMBIENT TEMP. (°C): 16  
VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1988/Ford/Taurus/4-door sedan  
VEHICLE TEST WEIGHT (KG): 1580  
IMPACT ANGLE (DEG)\*: 35  
IMPACT VELOCITY (KPH)\*\*: PRIMARY = 64.9 SECONDARY = 64.9  
MAXIMUM STATIC CRUSH (MM): 496  
DUMMY: Driver #048  
TYPE: Part 572E  
LOCATION: Left front  
RESTRAINT: 3-point unbelt  
NUMBER OF DATA CHANNELS: 38  
NUMBER OF CAMERAS: HIGH-SPEED 5 REAL-TIME 2

\*With respect to tow track centerline.  
\*\*Speed trap measurement ( $\pm$  .08 kph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Ford/Taurus

VIN: 1FABP50UXJG112324

BODY STYLE: 4-door sedan

MODEL YEAR: 1988

COLOR: Maroon

ENGINE DATA: TYPE: transverse CYLINDERS: 6 DISPLACEMENT: 3.0 liters

TRANSMISSION DATA: 3 SPEED,     MANUAL, X AUTOMATIC, X FWD,     RWD,     4WD

DATE VEHICLE RECEIVED: NA

ODOMETER READING: 71,036.0

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	Yes
POWER SEATS	No	TILTING STEERING WHEEL	Yes
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	Yes
RADIO	Yes	ANTI-SKID BRAKE	No
CLOCK	Yes	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: Ford Motor Company

DATE OF MANUFACTURE: 09/87 VIN: 1FABP50UXJG112324

GVWR: 4615 LBS

GAWR: FRONT: 2594 LBS., REAR: 2135 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Firestone, Supreme, 205/70R14

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

SPARE TIRE (MFR., LINE, SIZE): Michelin, Temp, 135/80R14

TYPE OF SEATS: FRONT: Split bench  
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually adjustable

MAXIMUM WIDTH: 1805 MILLIMETERS

WHEELBASE: 2686 MILLIMETERS

LOCATION OF LABEL STATING TIRE & CAPACITY DATA:

The label was located on the passenger's side C-pillar.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P205/70R14

RECOMMENDED COLD TIRE PRESSURE: FRONT: 35 PSI; REAR: 35 PSI

DESIGNATED SEATING CAPACITY: 3 FRONT 3 REAR 6 TOTAL

VEHICLE CAPACITY WEIGHT: 1100 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN MILLIMETERS):

DELIVERED ATTITUDE: LF 672; RF 679; LR 633; RR 644

PRE-TEST ATTITUDE: LF 655; RF 660; LR 627; RR 631

POST-TEST ATTITUDE: LF 680; RF 604; LR 549; RR 652

TABLE 2 TEST VEHICLE INFORMATION CONT'D

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

RIGHT FRONT	453 KG	RIGHT REAR	281 KG
LEFT FRONT	498 KG	LEFT REAR	254 KG
TOTAL FRONT WEIGHT	951 KG	(64.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	535 KG	(36.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	1486 KG		
TARGET TEST WEIGHT	1581 KG *		

WEIGHT OF TEST VEHICLE:

RIGHT FRONT	461 KG	RIGHT REAR	314 KG
LEFT FRONT	471 KG	LEFT REAR	334 KG
TOTAL FRONT WEIGHT	932 KG	(59.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	648 KG	(41.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	1580 KG		

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: None

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 1101 MILLIMETERS REARWARD OF FRONT WHEEL CENTERLINE

\*The target test weight was established during Test 920507.

TABLE 2A TRUCK INFORMATION

WEIGHT DISTRIBUTION

FRONT: 4772 KG

REAR: 14229 KG

AXLE SPACING

FRONT: 3835 MM

REAR: 1308 MM

DISTANCE OF C.G. BEHIND FRONT AXLE: 3363 MM

BUMPER DESCRIPTION: Stock truck bumper

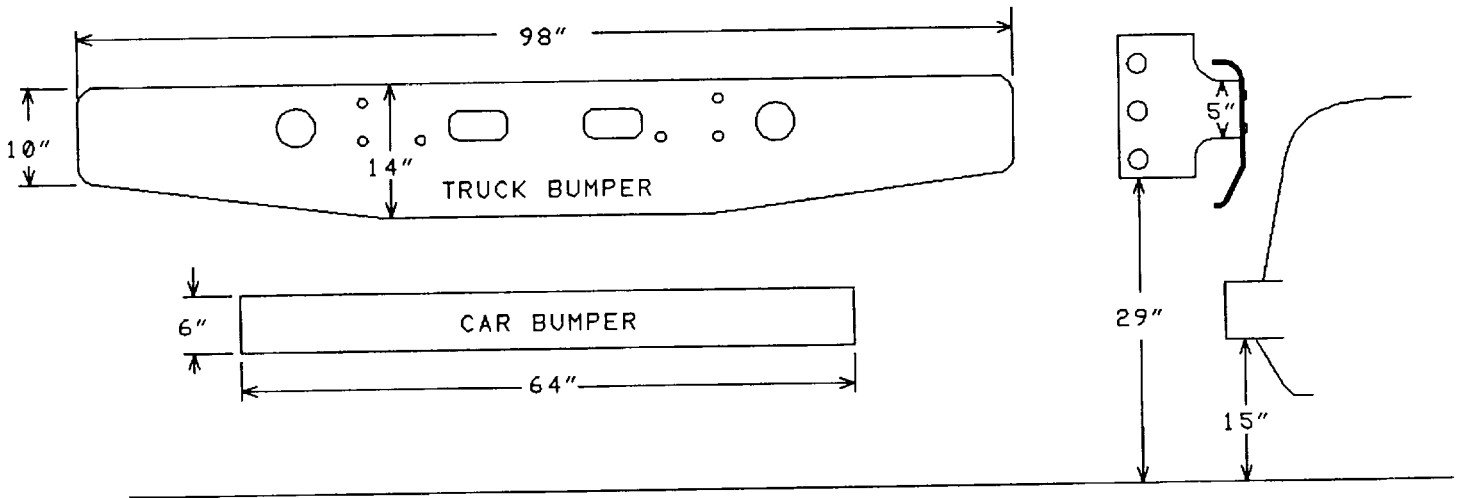


TABLE 3 POST-IMPACT DATA

TEST NUMBER: 920529

TEST DATE: 05/29/92

TEST TIME: 1317

TEST TYPE: Heavy Truck into Stationary Vehicle

IMPACT ANGLE: 0

AMBIENT TEMPERATURE AT IMPACT AREA: 16° C

TEMPERATURE IN OCCUPANT COMPARTMENT: 16° C

IMPACT VELOCITY: PRIMARY = 64.9 KPH

SECONDARY = 64.9 KPH

(SPECIFIED RANGE = 63.6 TO 65.2 KPH)

DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 660 MM

EXITING VELOCITY TRAP = 51 MM

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

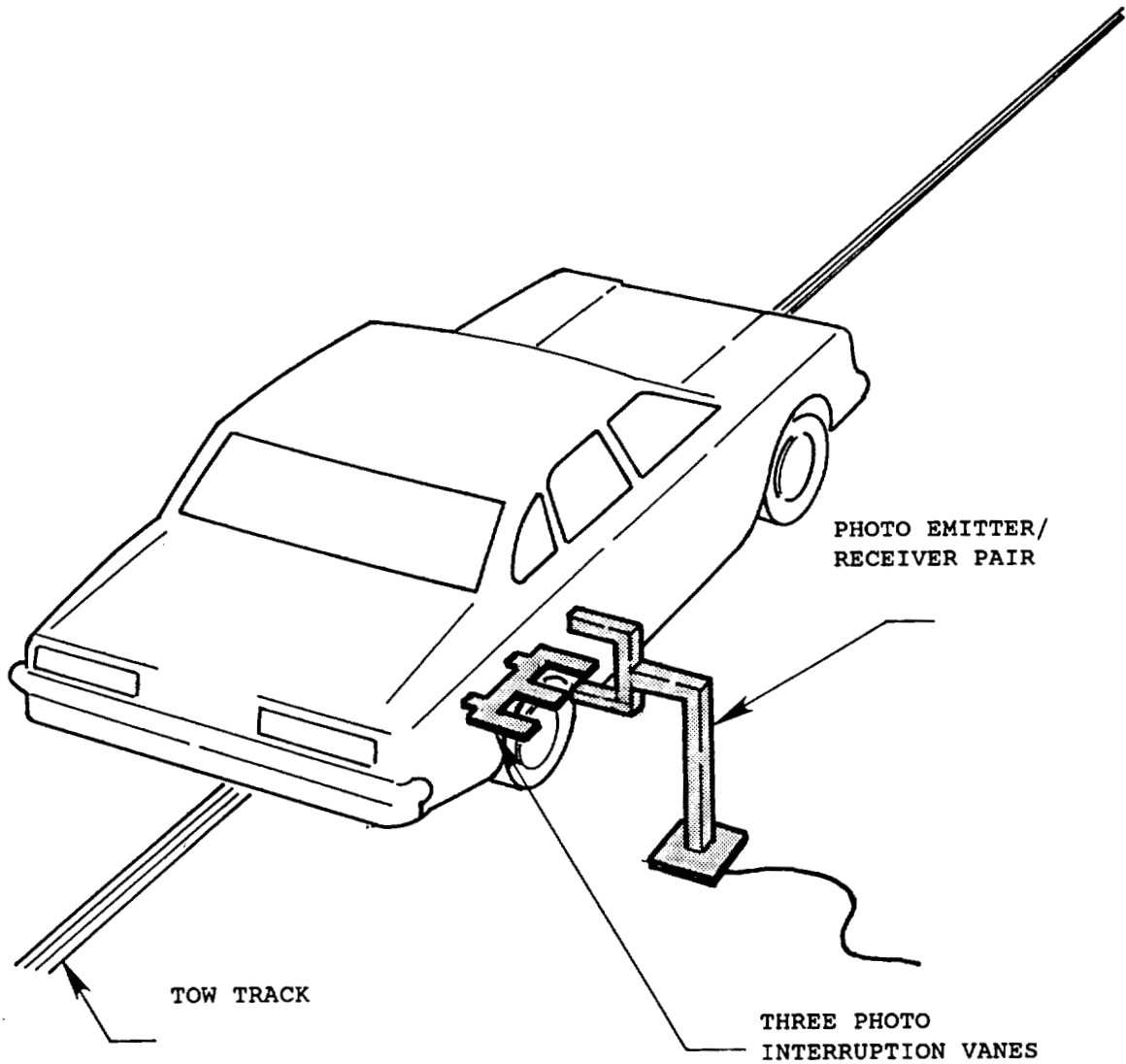
OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 4660; C 4765; R 4654

POST-TEST: L 4164; C 4549; R 4646

TOTAL CRUSH: L 496; C 216; R 8

AVERAGE CRUSH: 240

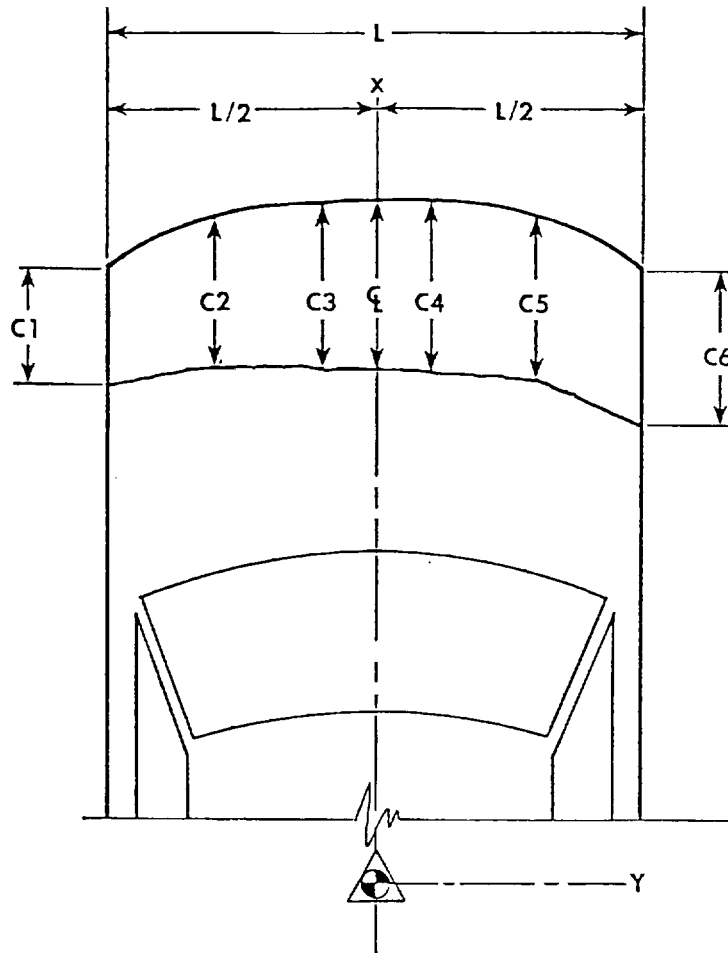
FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



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 Ford Taurus

	PRE-TEST	POST-TEST	CRUSH
L	<u>1457</u>		
C1	<u>4660</u>	C1 <u>4164</u>	C1 <u>496</u>
C2	<u>4730</u>	C2 <u>4320</u>	C2 <u>410</u>
C3	<u>4761</u>	C3 <u>4471</u>	C3 <u>290</u>
C4	<u>4755</u>	C4 <u>4595</u>	C4 <u>160</u>
C5	<u>4742</u>	C5 <u>4645</u>	C5 <u>97</u>
C6	<u>4654</u>	C6 <u>4646</u>	C6 <u>8</u>
CL	<u>4765</u>	CL <u>4549</u>	CL <u>216</u>

FIGURE 3

PRE-TEST AND POST-TEST MEASUREMENT POINTS

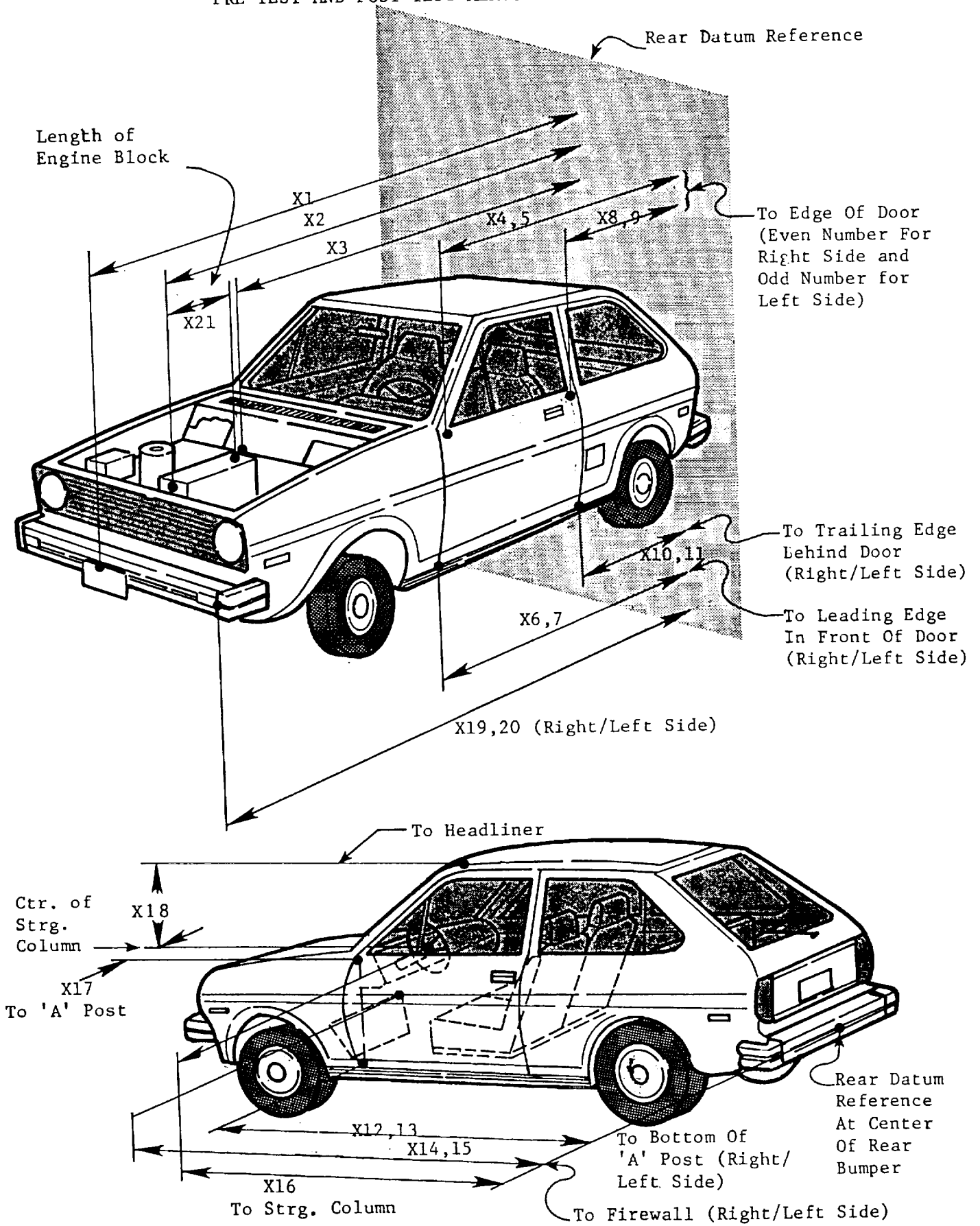


TABLE 4 IMPACTED VEHICLE MEASUREMENTS

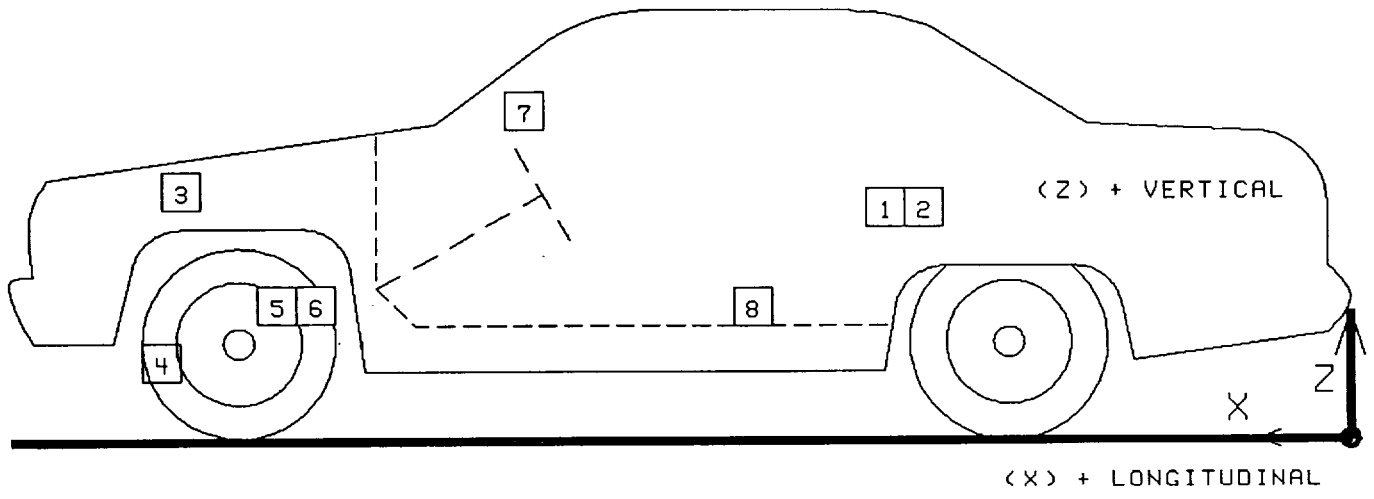
VEHICLE MAKE/MODEL: Ford/Taurus

TEST NUMBER: 920529

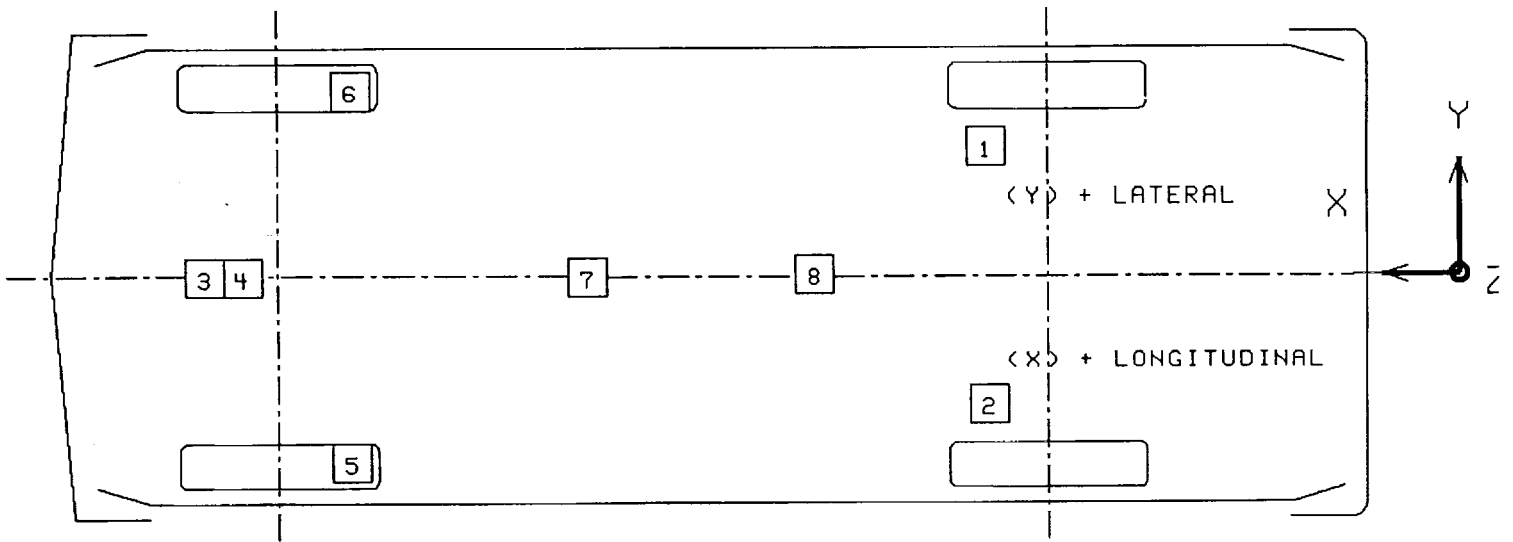
ALL MEASUREMENTS ARE IN MILLIMETERS

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	4765	4549	216
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	4255	4014	241
X3	REAR SURFACE OF VEHICLE TO FIREWALL	3625	3385	240
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	3310	3367	-57
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	3307	2844	463
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	3245	3246	-1
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	3244	2749	495
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	2234	2280	-46
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	2229	2148	81
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	2215	2212	3
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	2215	2242	-27
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	3231	3240	-9
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	3232	2821	411
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	3574	3300	274
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	3550	3160	390
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	2865	2619	246
X17	CENTER OF STEERING COLUMN TO "A" POST	280	435	-155
X18	CENTER OF STEERING COLUMN TO HEADLINER	427	556	-129
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	4654	4646	8
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	4660	4164	496
X21	LENGTH OF ENGINE BLOCK	580	580	0

FIGURE 4  
VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 5

## VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920529

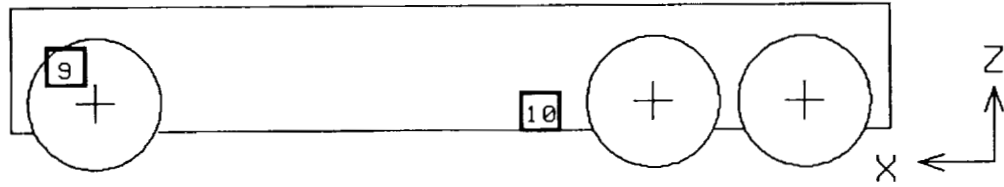
No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G	MSEC	MAX G	MSEC
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	1895	610	345	2.7	30.5	14.2	132.0
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	1888	-622	345	0.3	1.9	17.3	74.9
3	ENGINE TOP LONGITUDINAL	4165	-125	725	2.3	275.8	21.2	91.3
4	ENGINE BOTTOM LONGITUDINAL	3952	-72	221	1.8	289.9	30.2	86.8
5	RIGHT BRAKE CALIPER LONGITUDINAL	3887	-680	306	13.2	51.3	27.1	93.3
6	LEFT BRAKE CALIPER LONGITUDINAL	3863	680	284	32.1	53.8	86.1	37.3
7	INSTRUMENT PANEL CENTER LONGITUDINAL	3205	-35	937	31.5	103.1	76.1	107.3
8	CENTER OF GRAVITY LONGITUDINAL	2244	0	275	5.9	209.0	19.6	74.3
	LATERAL				2.4	208.8	16.0	68.6
	VERTICAL				11.5	150.6	13.5	121.9
	RESULTANT				24.7	151.8		

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN MILLIMETERS.

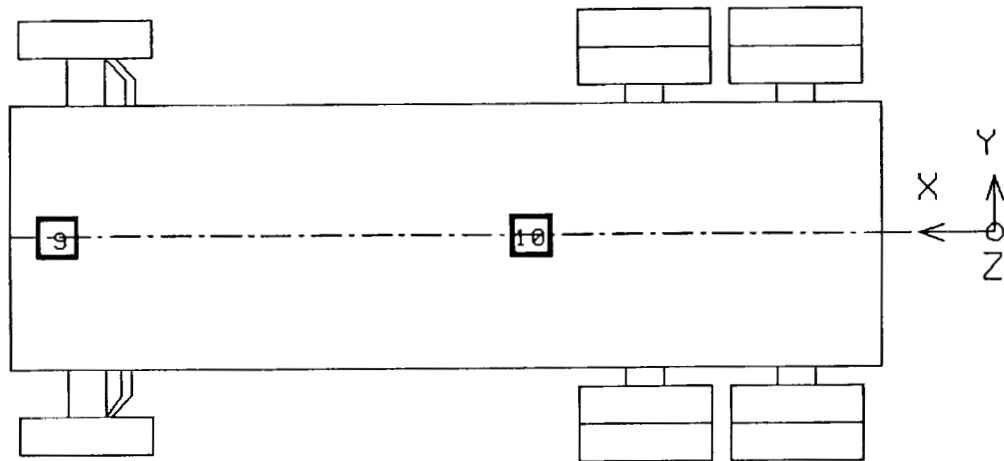
REFERENCE: X: + FORWARD FROM REAR BUMPER  
 Y: + LEFTWARD FROM VEHICLE CENTERLINE  
 Z: + UPWARD FROM GROUND LEVEL

FIGURE 5

HEAVY TRUCK ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 6

TRUCK ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920529

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G	MSEC	MAX G	MSEC
9	FRONT FRAME CROSSMEMBER	2527	0	1050				
	LONGITUDINAL				26.1	230.4	14.1	75.8
	LATERAL				12.9	73.6	12.6	100.6
	VERTICAL				25.7	229.6	11.1	170.8
	RESULTANT				35.7	229.9		
10	CENTER OF GRAVITY	6160	0	658				
	LONGITUDINAL				2.0	154.1	3.5	157.9
	LATERAL				1.7	162.4	1.2	78.5

\* 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 7

## DUMMY DATA SUMMARY

TEST NUMBER 920529

DRIVER DUMMY

SN: 048

POSITIVE DIRECTION		NEGATIVE DIRECTION	
MAX	MSEC	MAX	MSEC

## HEAD ACCELERATION (g)

LONGITUDINAL	74.8	139.4	106.7	100.9
LATERAL	12.5	224.5	124.5	100.3
VERTICAL	51.4	128.8	89.2	139.9
RESULTANT	165.6	100.6		
HIC	586 FROM 105.6 TO 141.6			

## NECK FORCE (N)

LONGITUDINAL	1865.1	146.6	1002.1	131.8
LATERAL	684.9	155.5	588.7	100.9
VERTICAL	797.7	107.4	2395.4	148.6
RESULTANT	2892.7	148.6		

## NECK MOMENT (N-M)

ABOUT X	58.2	115.1	44.3	229.1
ABOUT Y	30.6	196.9	238.2	146.3
ABOUT Z	33.7	143.6	26.5	203.0
RESULTANT	240.2	146.3		

## CHEST ACCELERATION (g)

LONGITUDINAL	14.8	148.8	54.7	110.3
LATERAL	11.2	196.5	61.3	125.9
VERTICAL	20.8	109.3	19.8	127.6
RESULTANT	79.6	125.9		
3 MSEC	72.0			

## CHEST DEFELECTION (mm)

LONGITUDINAL	0.2	40.8	44.3	141.5
--------------	-----	------	------	-------

## PELVIS ACCELERATION (g)

LONGITUDINAL	20.7	148.0	57.7	102.4
LATERAL	28.8	193.1	51.5	115.9
VERTICAL	32.9	110.8	19.0	149.9
RESULTANT	66.5	104.9		

TABLE 7

DUMMY DATA SUMMARY CONTINUED

TEST NUMBER 920529

DRIVER DUMMY

SN: 048

POSITIVE			NEGATIVE		
DIRECTION			DIRECTION		
MAX	MSEC		MAX	MSEC	

---

FEMUR LOAD (N)

LEFT	649.4	207.9	11104.5	102.6	
RIGHT	2783.7	137.9	2415.5	97.6	

---

POSITIVE DIRECTION

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

NEGATIVE DIRECTION

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

TABLE 8 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #048	PASSENGER # NA
HEAD	<u>A-pillar</u>	<u></u>
CHEST	<u>Door panel</u>	<u></u>
ABDOMEN	<u>Door panel</u>	<u></u>
LEFT KNEE	<u>Door panel</u>	<u></u>
RIGHT KNEE	<u>Left knee</u>	<u></u>

DOOR OPENING:

	LEFT	RIGHT
FRONT	<u>Tools required</u>	<u>Opened easily</u>
REAR	<u>Tools required</u>	<u>Opened easily</u>

SEAT MOVEMENT:

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

GLAZING DAMAGE:

The entire windshield and driver's side door glass  
was cracked on impact.

OTHER NOTABLE IMPACT EFFECTS:

None

DUMMY KINEMATIC SUMMARY

The dummy head and torso translated to the front and left at impact. The dummy's head struck the A-pillar and then the truck bumper. The dummy's torso and left leg struck the driver's inner door panel and the steering wheel. The dummy's head and torso rebounded to the right. The dummy came to rest, leaning to the right, restrained by the three-point unbelt.

**FIGURE 6 DUMMY AND SEAT POSITIONING DATA**

**PRE-IMPACT DATA:**

MAKE/MODEL: Ford/Taurus  
 BODY STYLE: 4-door sedan MODEL YEAR: 1988  
 COLOR: Maroon

**DATA FROM CERTIFICATION LABEL:**

VEHICLE MANUFACTURER: Ford Motor Company  
 DATE OF MANUFACTURE: 09/87 VIN: 1FABP50UXJG112324  
 GVWR: 4615 LBS.; GAWR: FRONT = 2594 LBS.; REAR = 2135 LBS.

**POST-IMPACT DATA:**

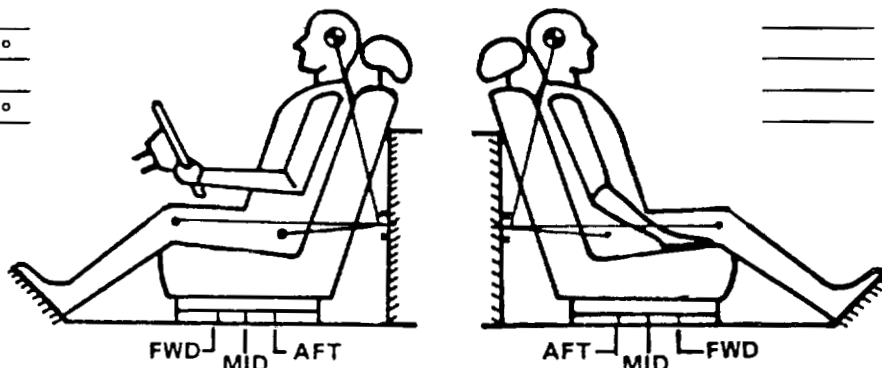
DATE OF TEST: 05/29/92 TIME: 1317 TEMPERATURE: 16° C  
 IMPACT VELOCITY: PRIMARY = 64.9 MPH SECONDARY = 64.9 MPH  
 REQUIRED IMPACT VELOCITY RANGE: 63.6 TO 65.2 MPH  
 SEAT TYPE: Bucket ADJUSTER TYPE: Manual  
 FRONT SEAT BACK TYPE: Reclining  
 TECHNICIANS: \_\_\_\_\_

DRIVER DUMMY # 048 TYPE: HIII

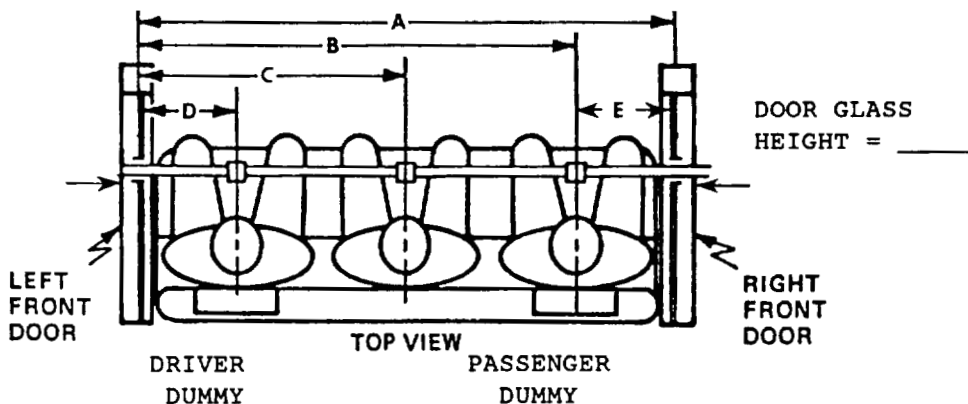
HEAD 465  
 TARGET 12°  
 KNEE 585  
 JOINT 111°  
 APPROX- 265  
 IMATE 150°  
 "H"  
 POINT

PASSENGER DUMMY # NA TYPE: \_\_\_\_\_

\_\_\_\_\_ HEAD  
 \_\_\_\_\_ TARGET  
 \_\_\_\_\_ KNEE  
 \_\_\_\_\_ JOINT  
 \_\_\_\_\_ APPROX-  
 \_\_\_\_\_ IMATE  
 \_\_\_\_\_ "H"  
 \_\_\_\_\_ POINT



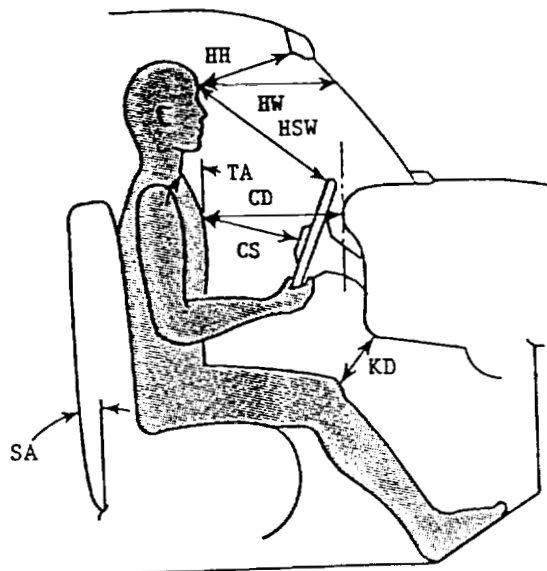
A = 1442  
 B = NA  
 C = NA  
 D = 353  
 E = NA  
 DOOR GLASS  
 HEIGHT = 205



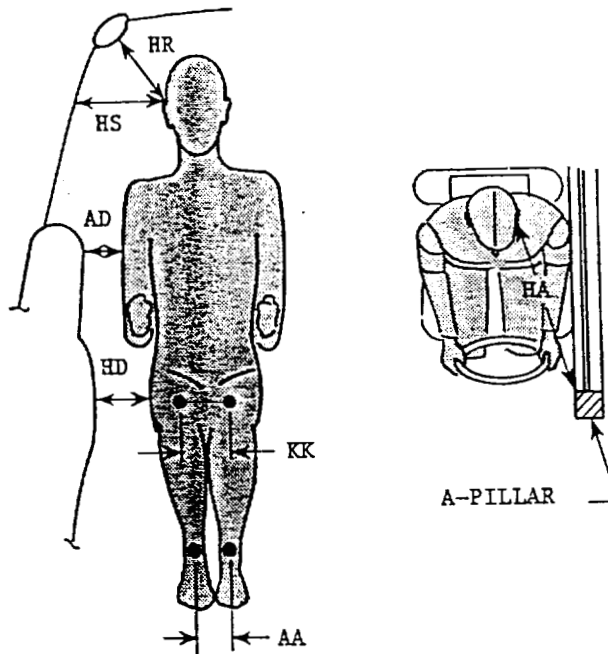
ALL ANGLES ARE RELATIVE TO VERTICAL PLANE THROUGH DOOR STRIKER.  
 ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 7 DUMMY IN VEHICLE POSITIONING DATA

	DRIVER	PASSENGER
	048	NA
HH	328	
HW	557	
CD	560	
CS	349	
KDL	130	
KDR	140	
TA	16°	
SA	23°	
HSW	463	



	DRIVER	PASSENGER
	048	NA
HR	172	
HS	259	
AD	127	
HD	181	
KK	212	
AA	270	
HA	557	



KNEE OUTER CLEVIS TO OUTER CLEVIS SPACING:

DRIVER = 300

PELVIS ANGLE:

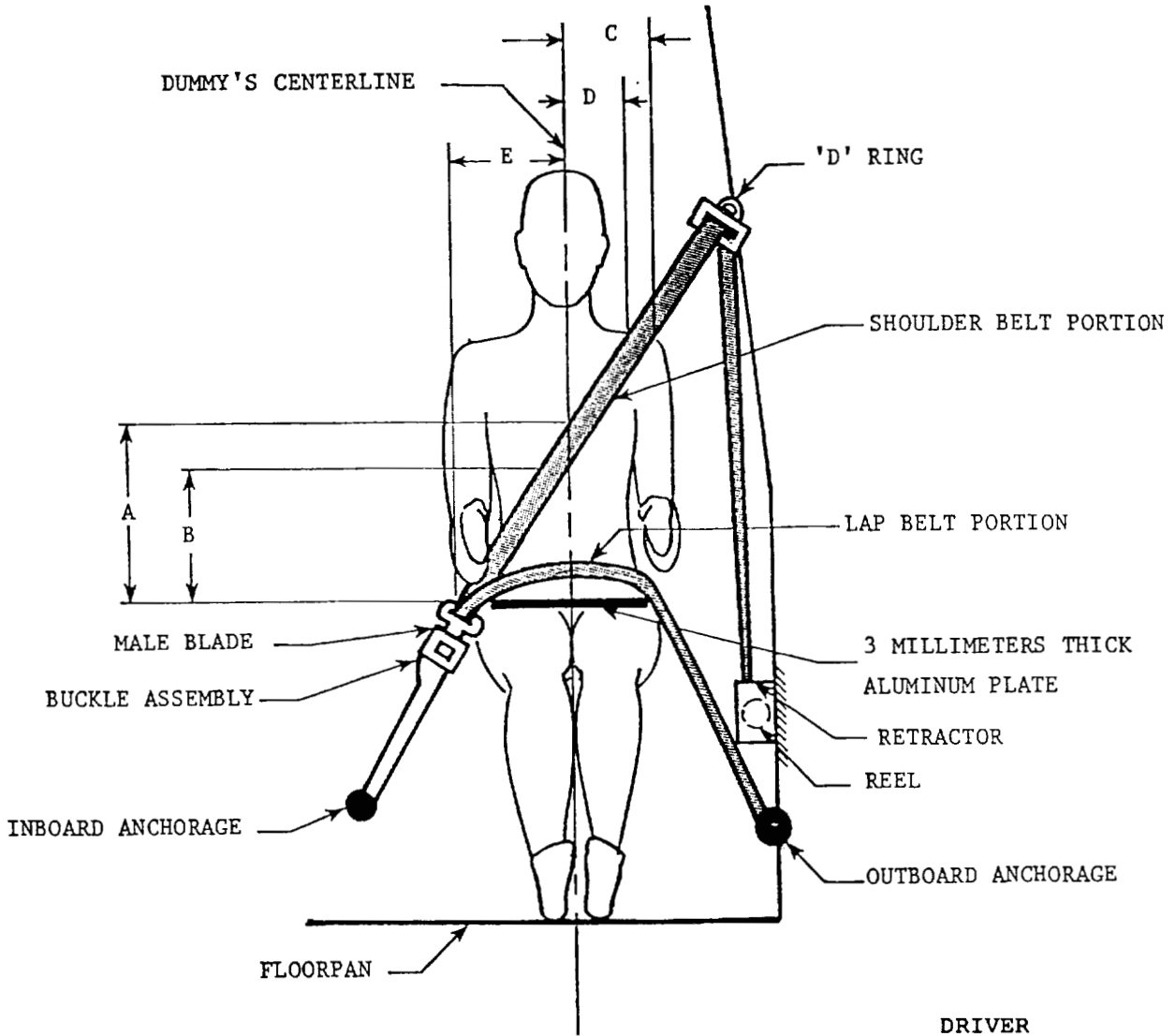
DRIVER = 23°

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.

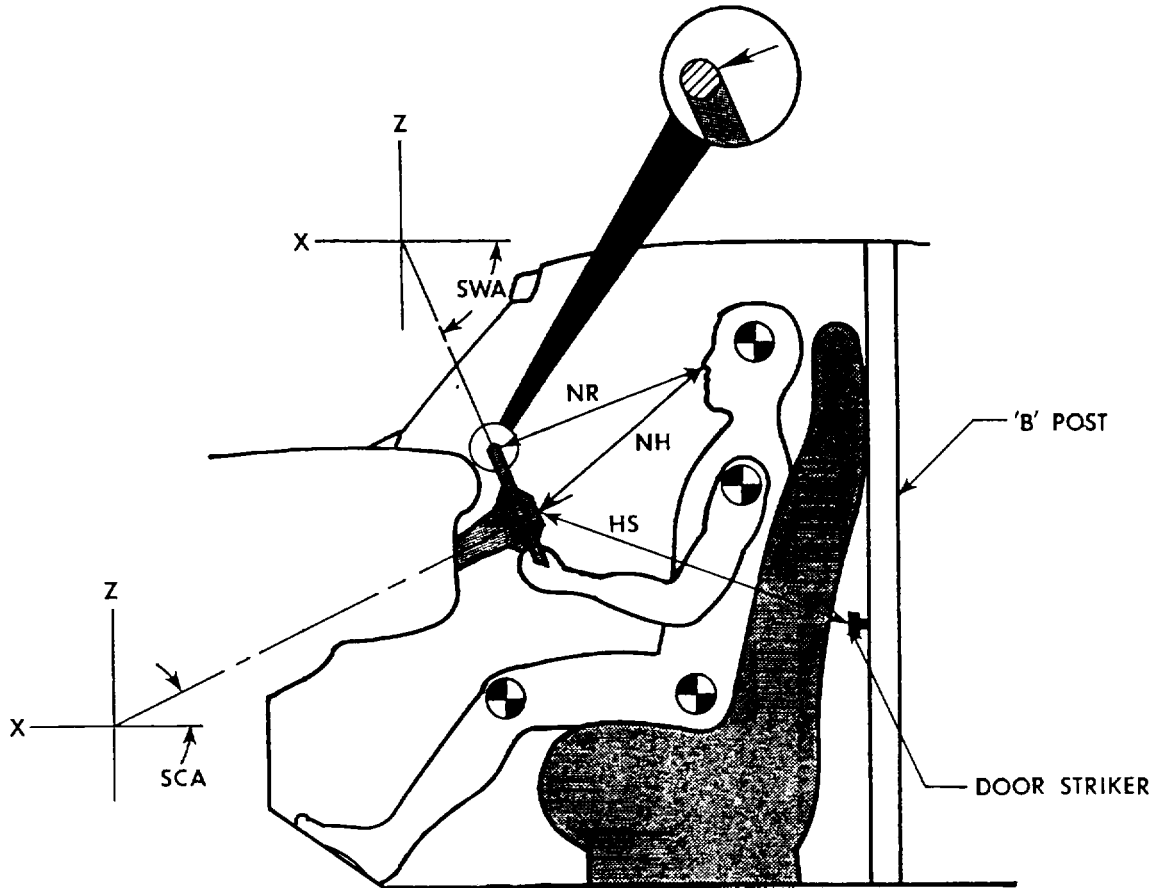
**FIGURE 8 SEAT BELT POSITIONING DATA**



	DRIVER DUMMY
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	384
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	296
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	99
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	36
E - DUMMY CENTERLINE TO INTERSECTION OF UPPER TORSO BELT AND LAP BELT	235

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 3rd adjustment position from the bottom.

**MEASUREMENTS**

NR	- DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	434
NH	- DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	420
HS	- DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	575
SCA	- ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	28°
SWA	- ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	62°

ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 10

CAMERA POSITIONS

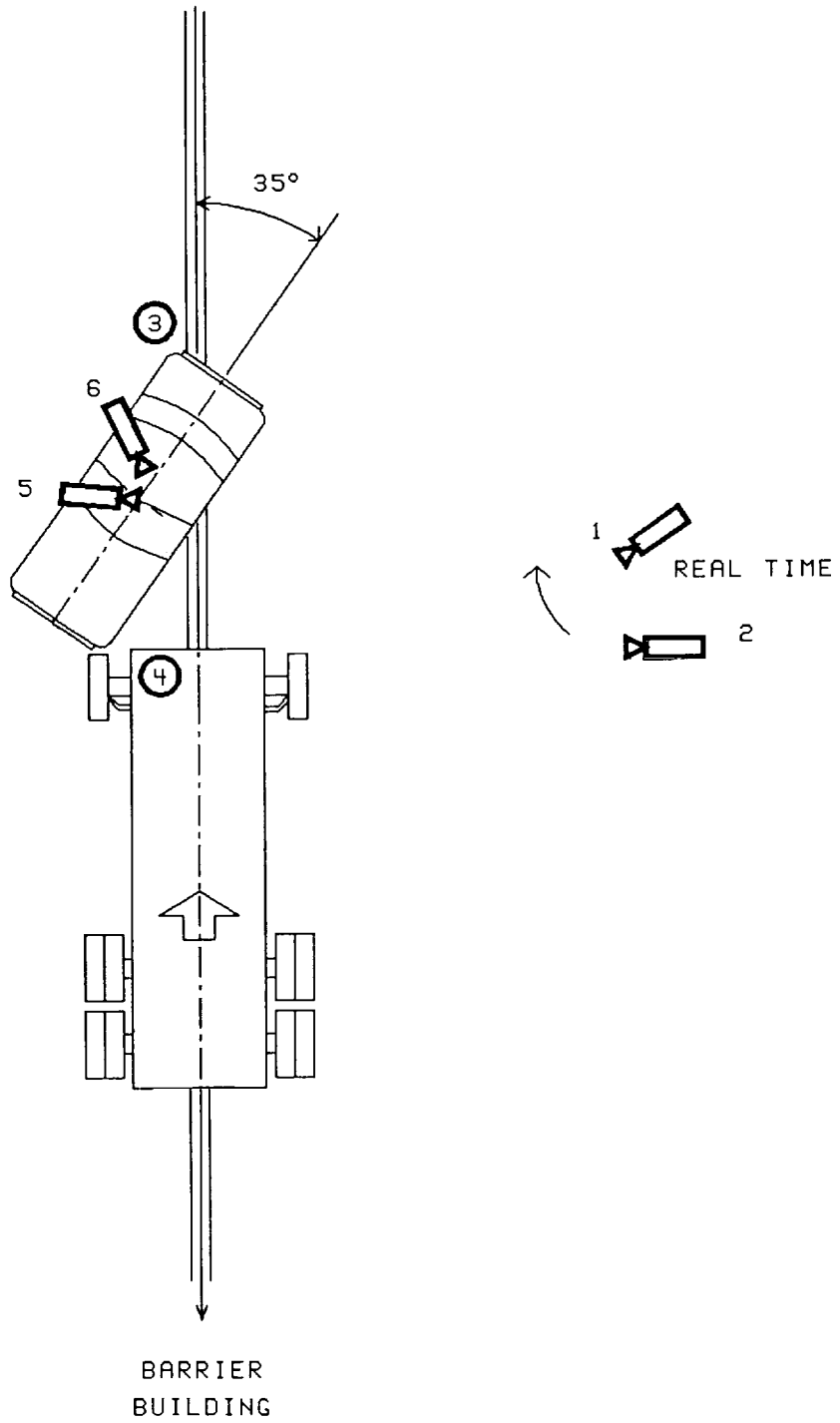


TABLE 9 MOTION PICTURE CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Left panning	Bolex	13	24	Real-time documentation
2	Left wide	Photosonic	13	498	Vehicle dynamics
3	Overhead wide	Photosonic	8	500	Vehicle dynamics
4	Onboard truck	Photosonic	13	500	Vehicle dynamics
5	Onboard car front	Photosonic	8	1002	Dummy kinematics
6	Onboard car rear	Photosonic	8	1002	Dummy kinematics

APPENDIX A

PHOTOGRAPHS

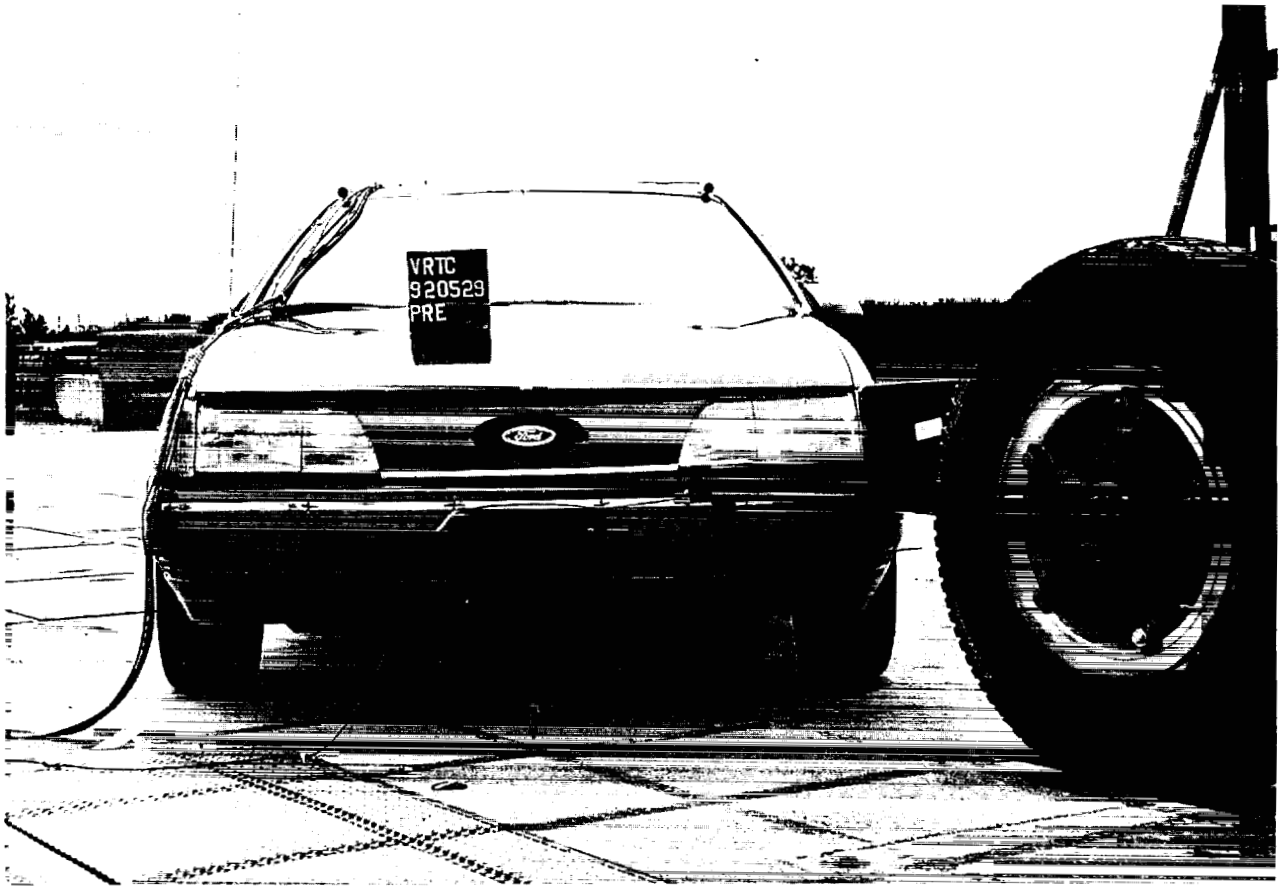


Figure A-1. PRE-TEST FRONT VIEW

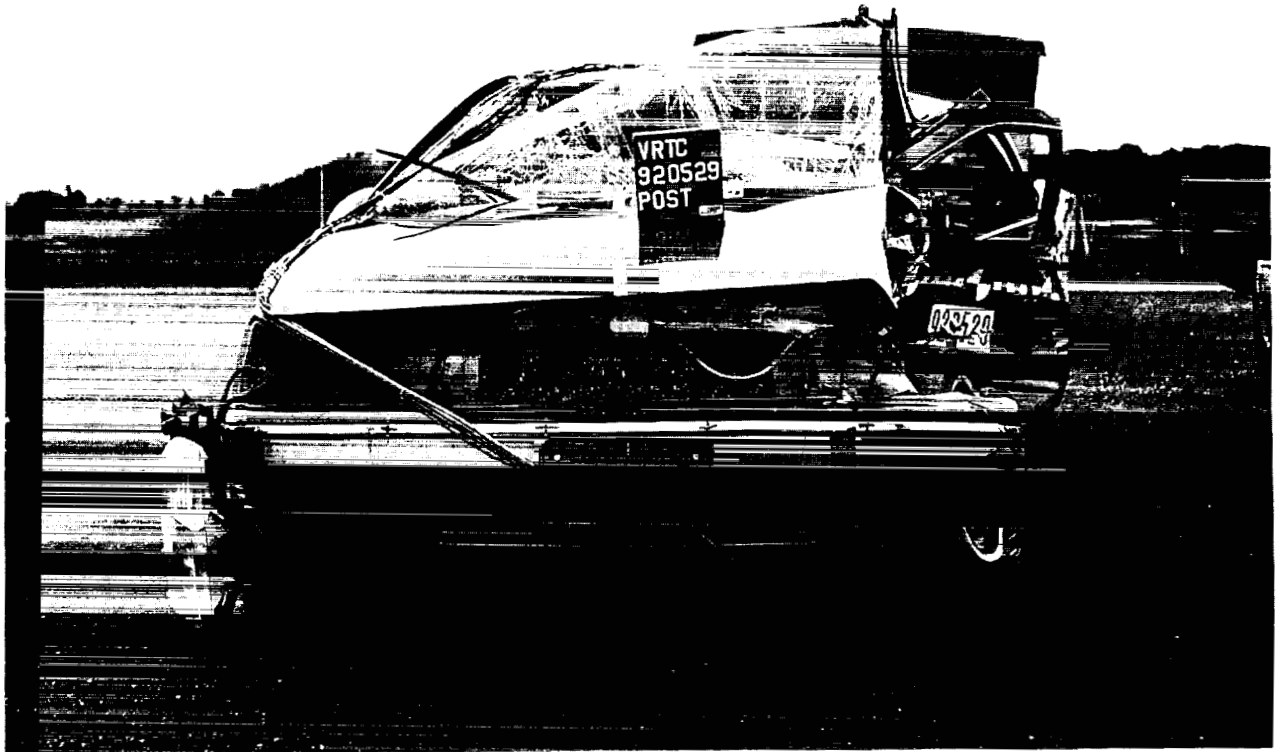


Figure A-2. POST-TEST FRONT VIEW



Figure A-3. PRE-TEST LEFT SIDE VIEW

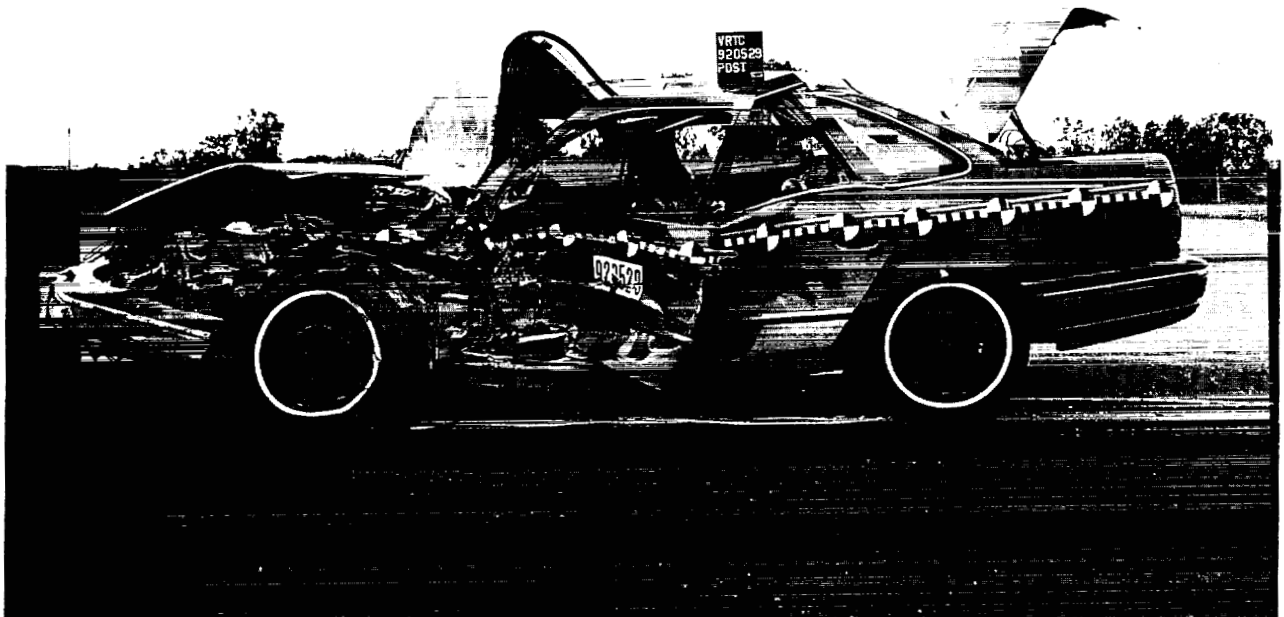


Figure A-4. POST-TEST LEFT SIDE VIEW

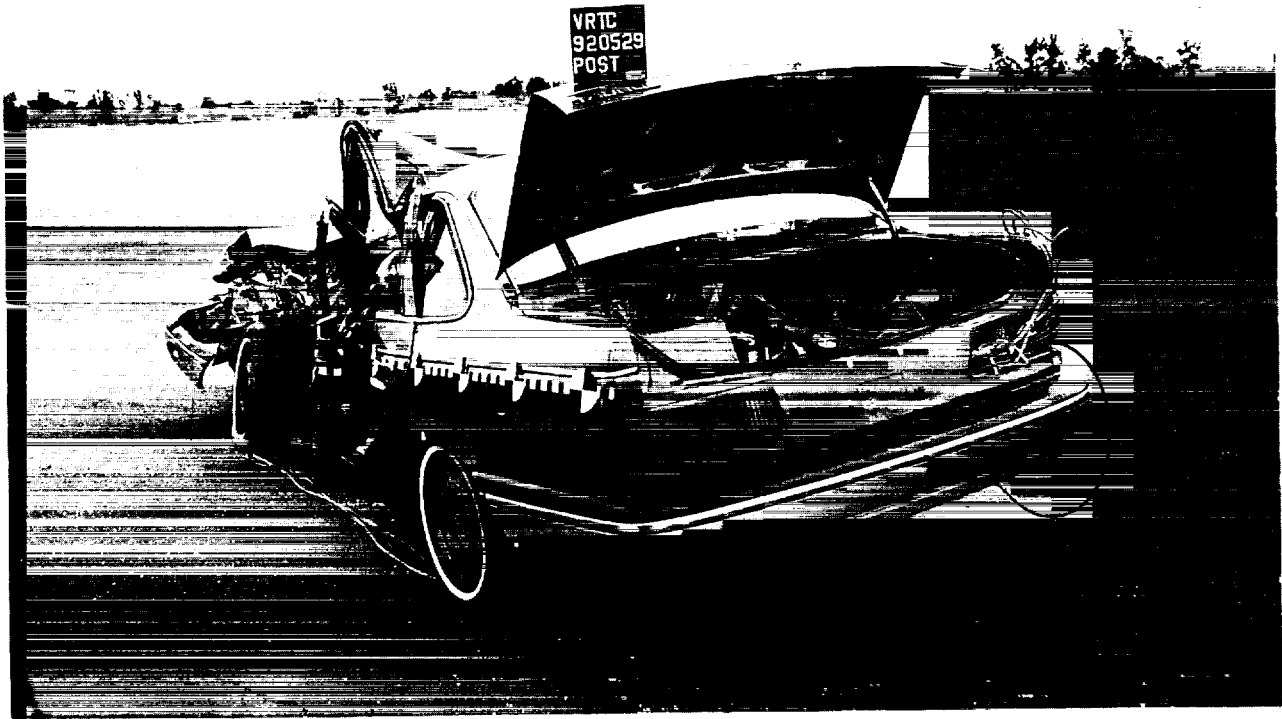


Figure A-5. POST-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-6. PRE-TEST REAR VIEW



Figure A-7. PRE-TEST RIGHT SIDE VIEW

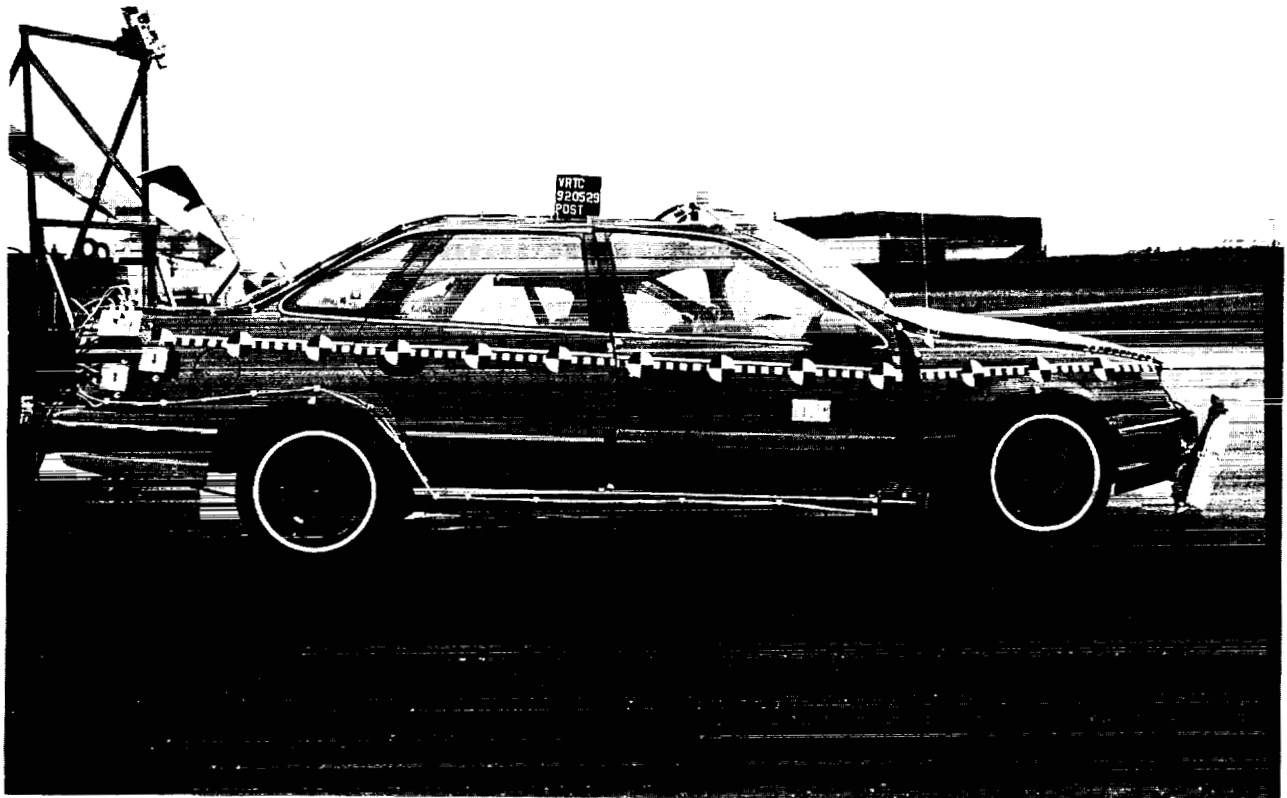


Figure A-8. POST-TEST RIGHT SIDE VIEW

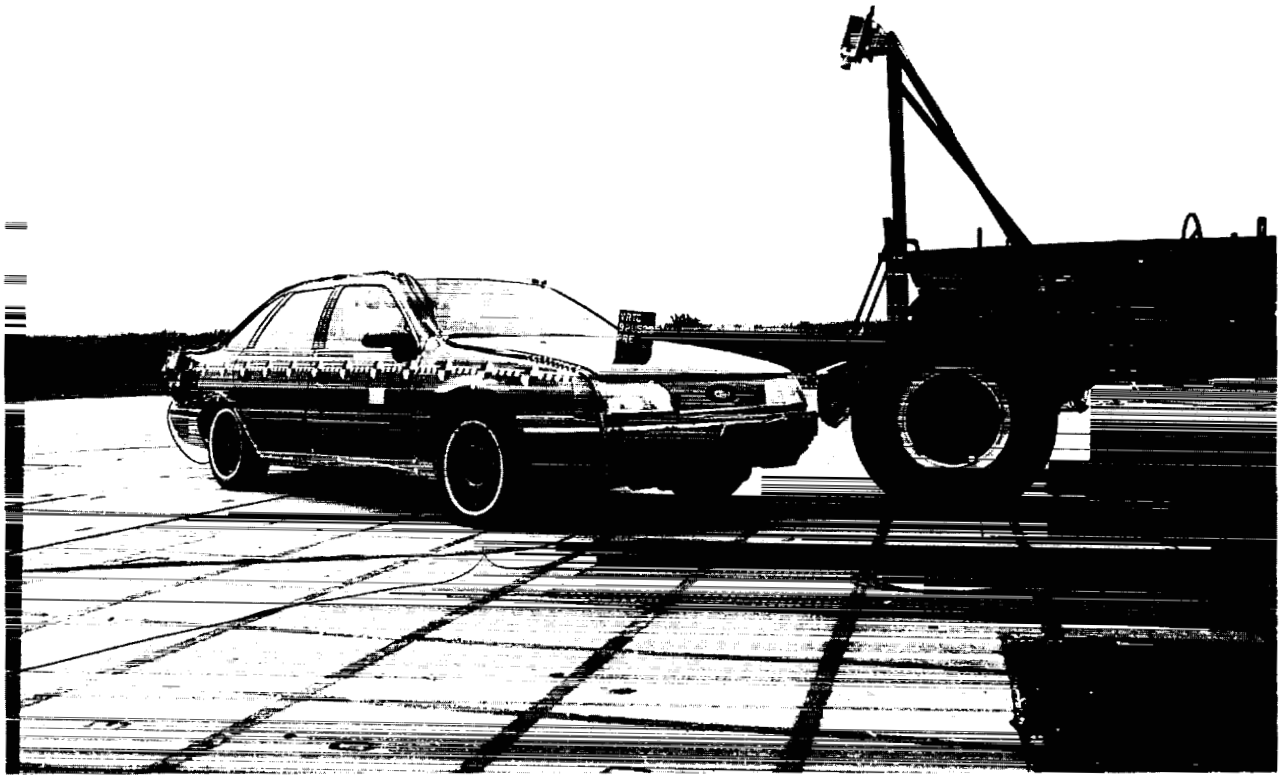


Figure A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



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

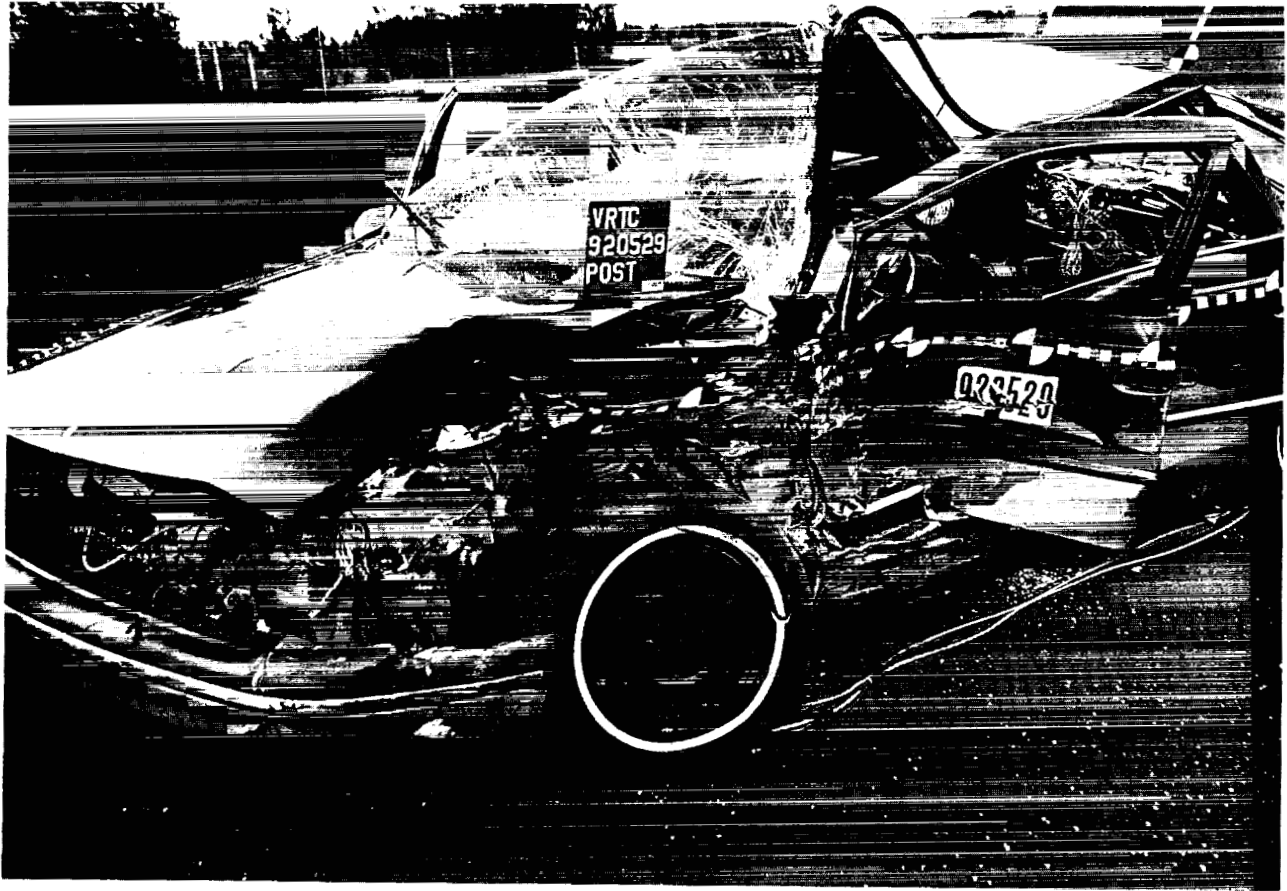


Figure A-11. POST-TEST VEHICLE DAMAGE CLOSE-UP VIEW



Figure A-12. PRE-TEST BUMPER ENGAGEMENT VIEW

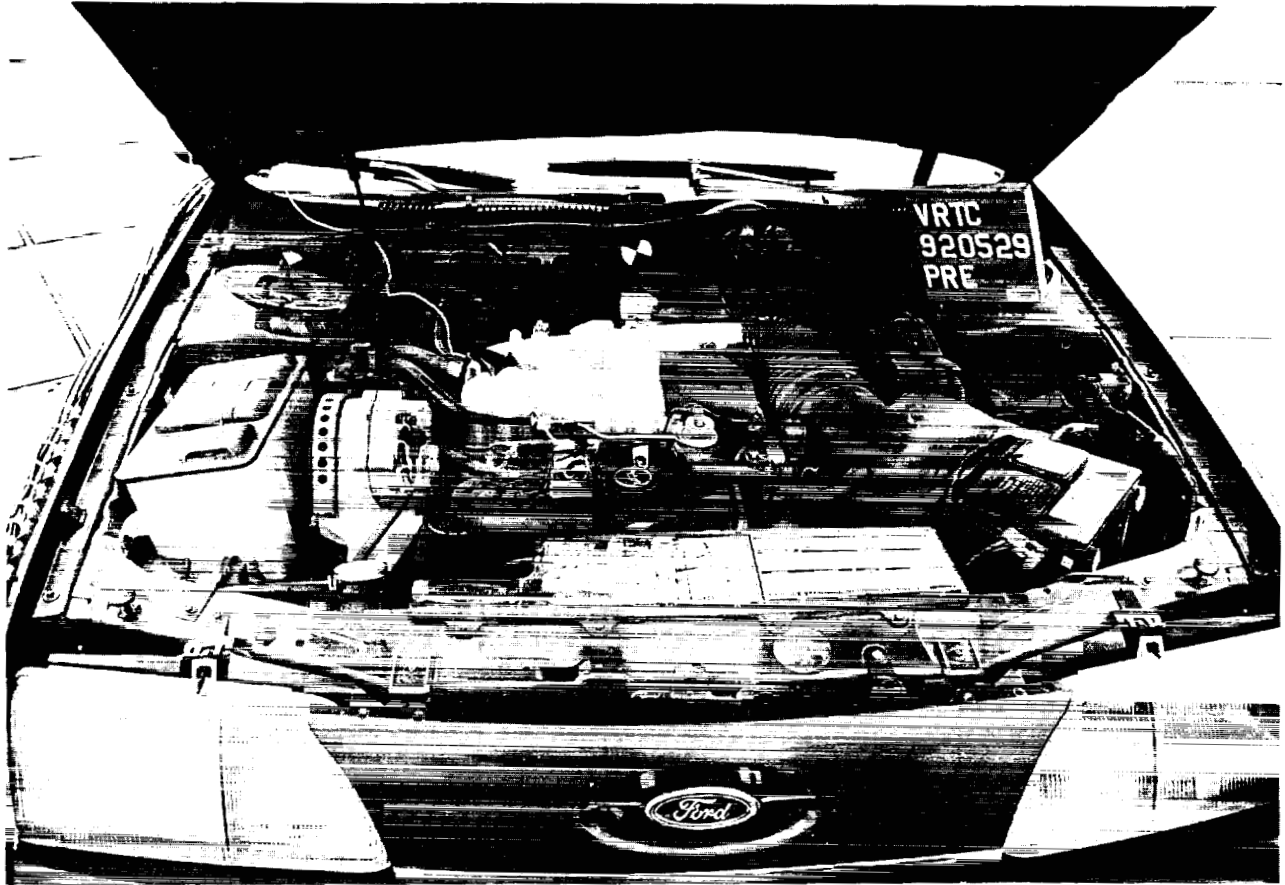


Figure A-13. PRE-TEST ENGINE COMPARTMENT VIEW



Figure A-14. POST-TEST ENGINE COMPARTMENT VIEW

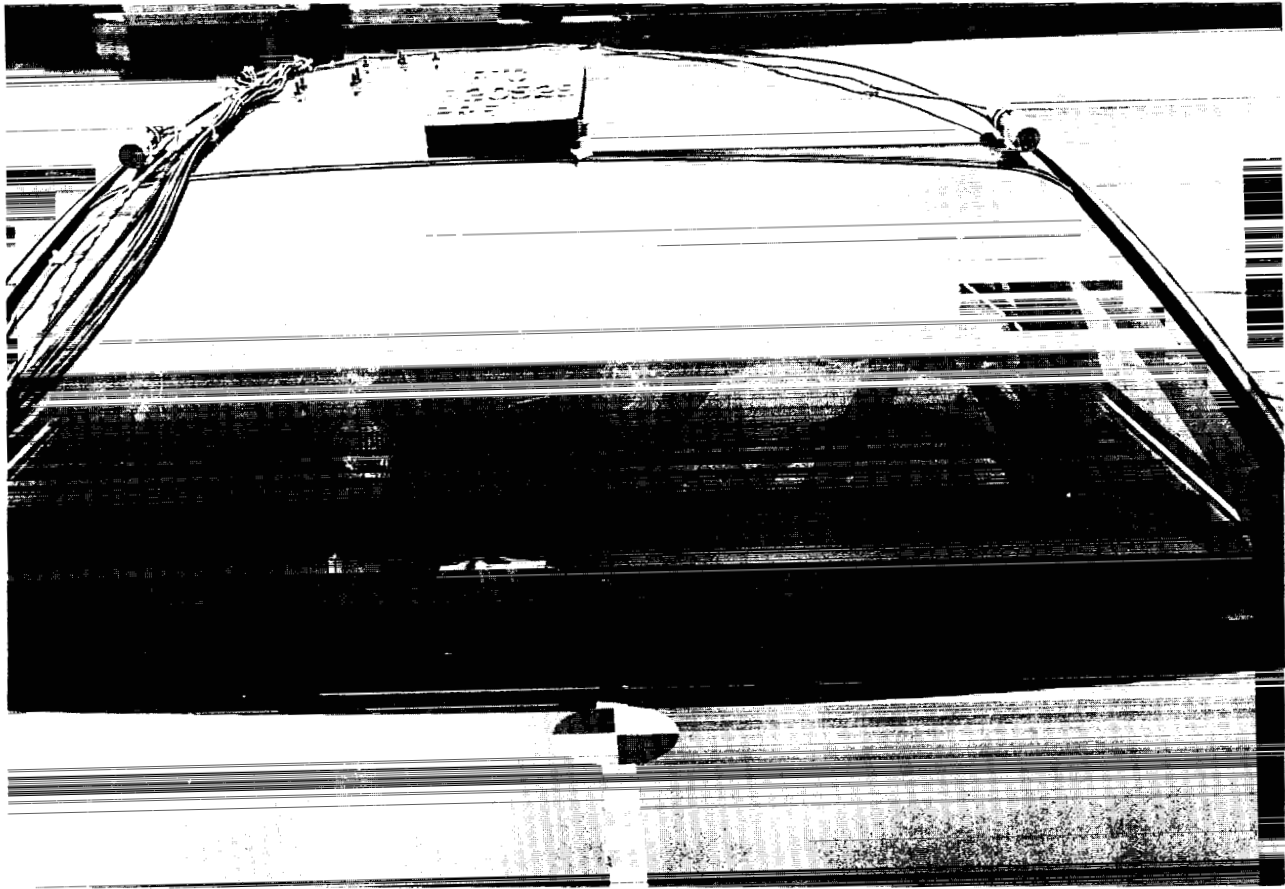


Figure A-15. PRE-TEST WINDSHIELD VIEW

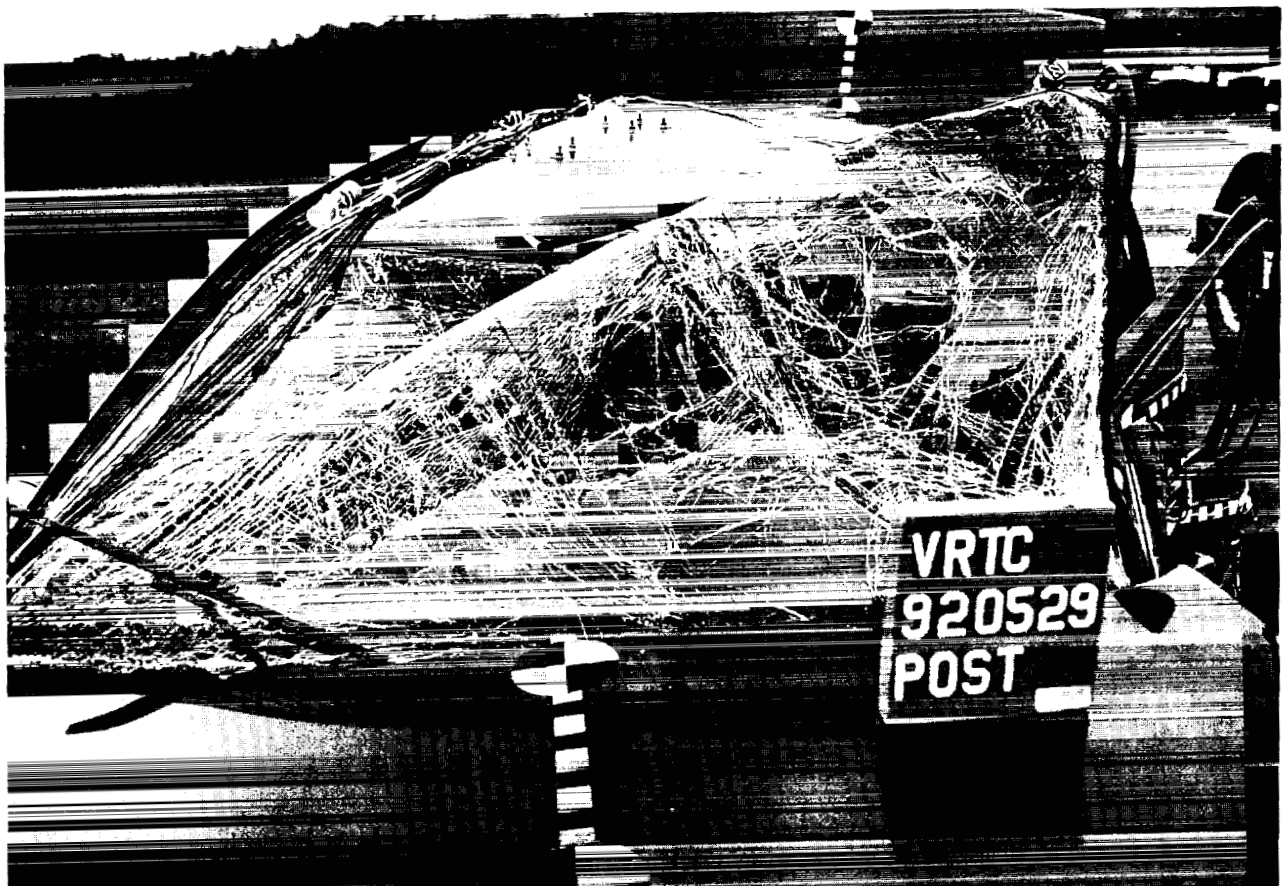


Figure A-16. POST-TEST WINDSHIELD VIEW

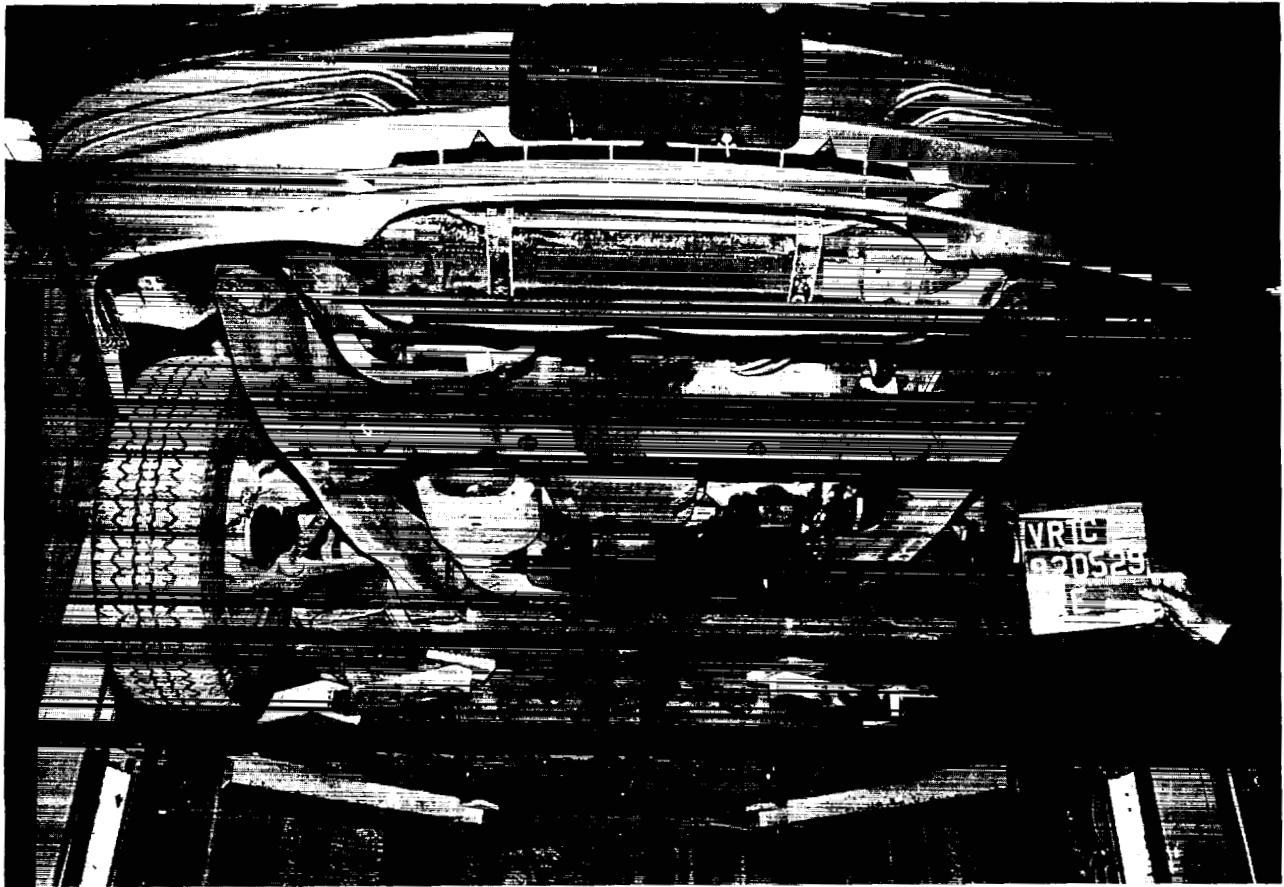


Figure A-17. PRE-TEST FRONT UNDERBODY VIEW

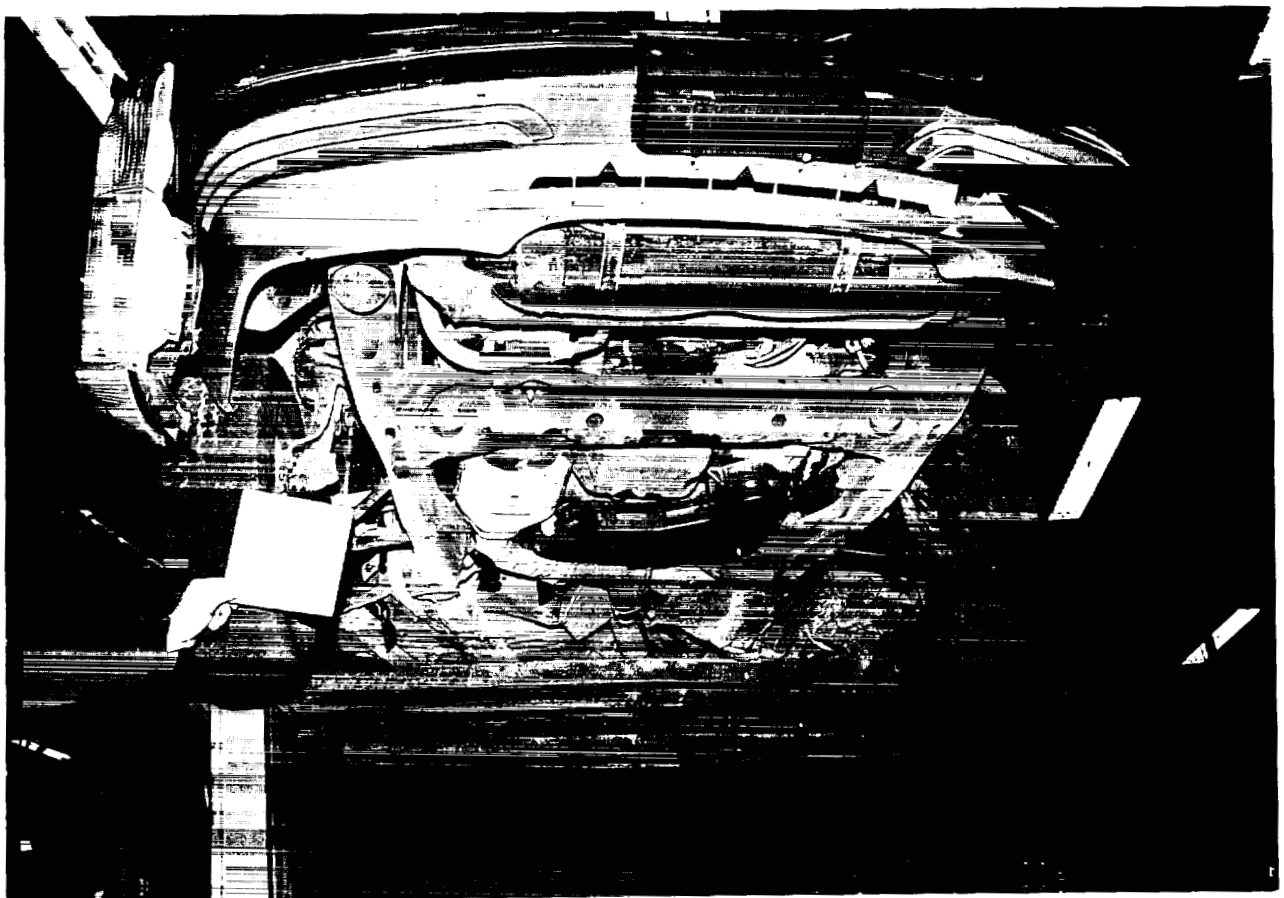


Figure A-18. POST-TEST FRONT UNDERBODY VIEW

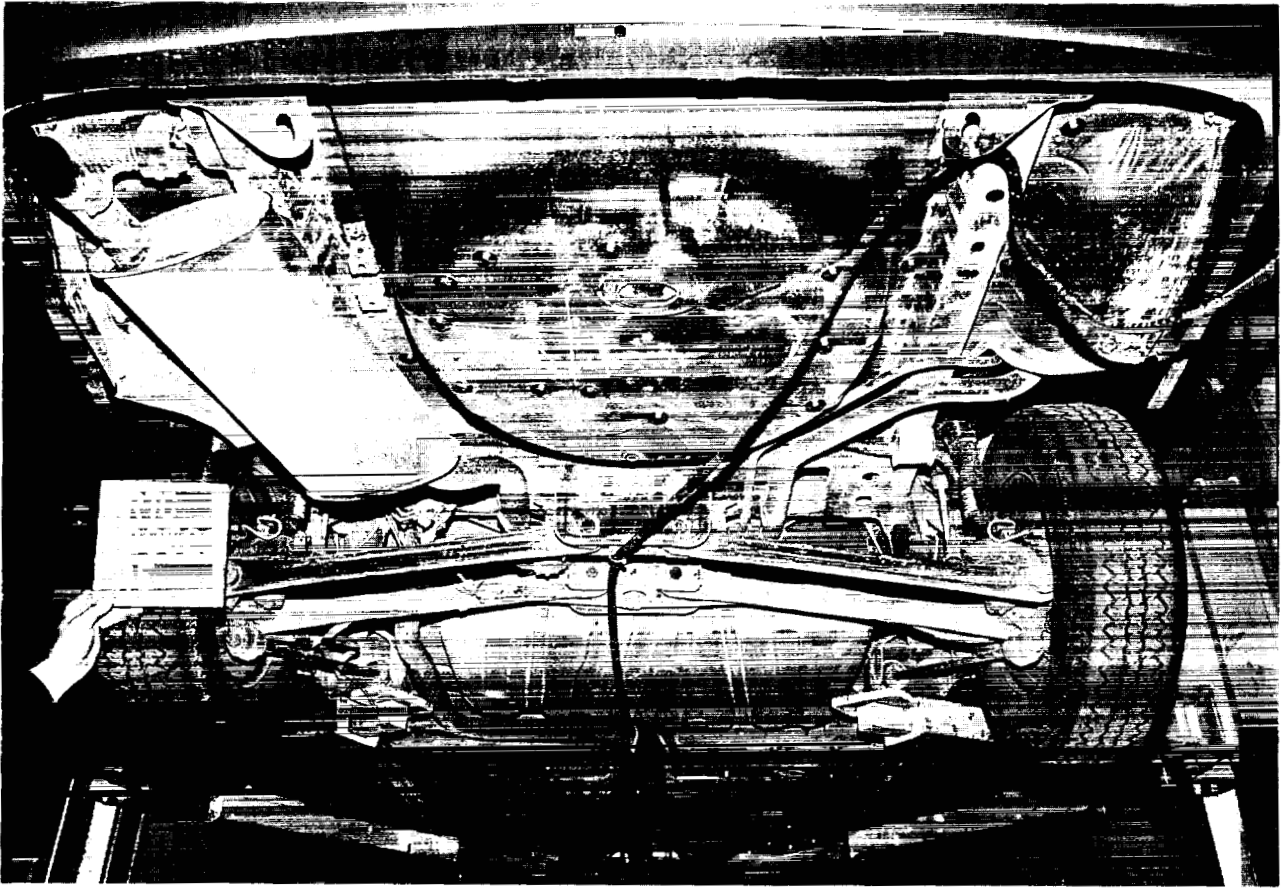


Figure A-19. PRE-TEST REAR UNDERBODY VIEW

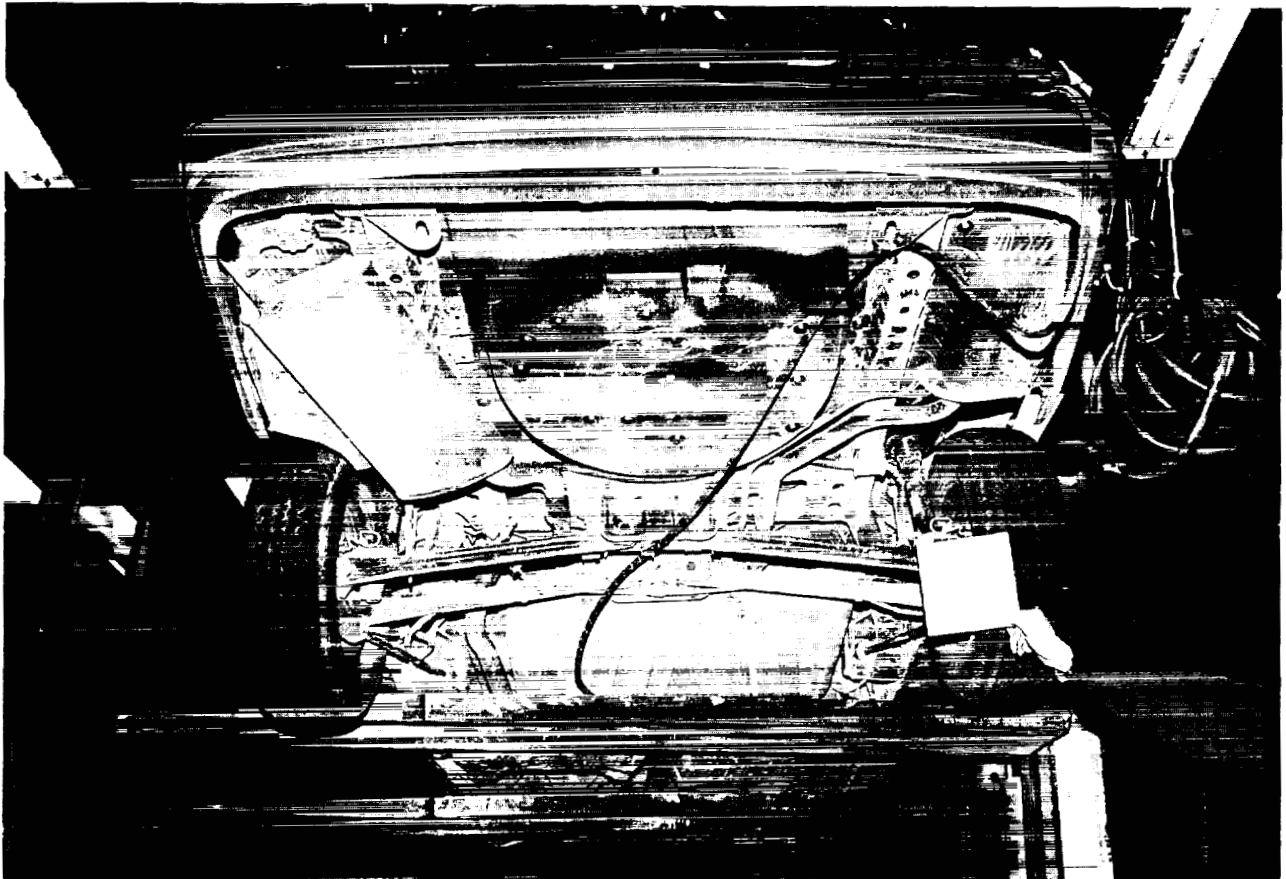


Figure A-20. POST-TEST REAR UNDERBODY VIEW



Figure A-25. POST-TEST DUMMY VIEW



Figure A-26. PRE-TEST VEHICLE INTERIOR AND DUMMY - VIEW 1



Figure A-27. PRE-TEST VEHICLE INTERIOR AND DUMMY - VIEW 2



Figure A-28. POST-TEST VEHICLE INTERIOR AND DUMMY VIEW



Figure A-29. POST-TEST DUMMY HEAD CONTACT - VIEW 1

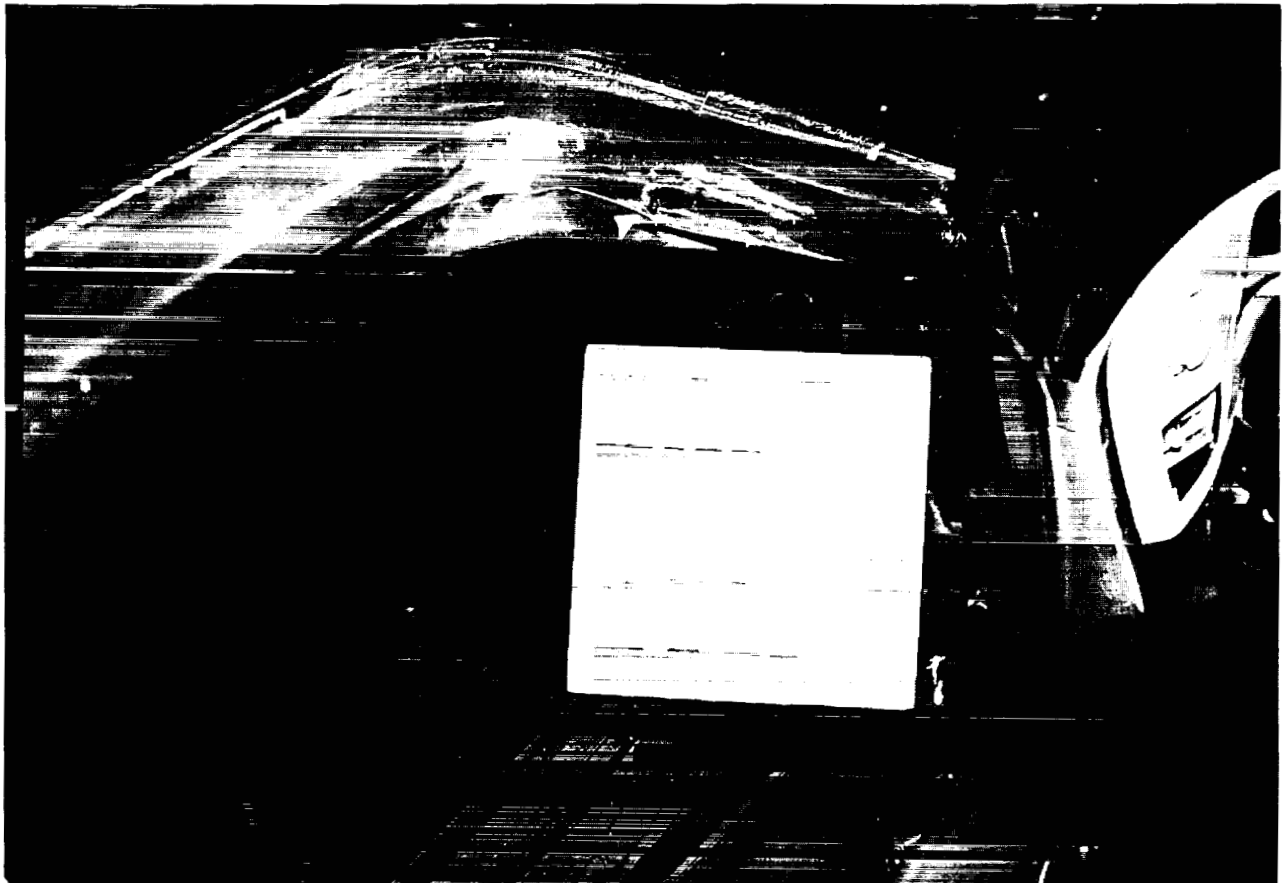


Figure A-30. POST-TEST DUMMY HEAD CONTACT - VIEW 2



Figure A-31. POST-TEST DUMMY KNEE CONTACT - VIEW 1



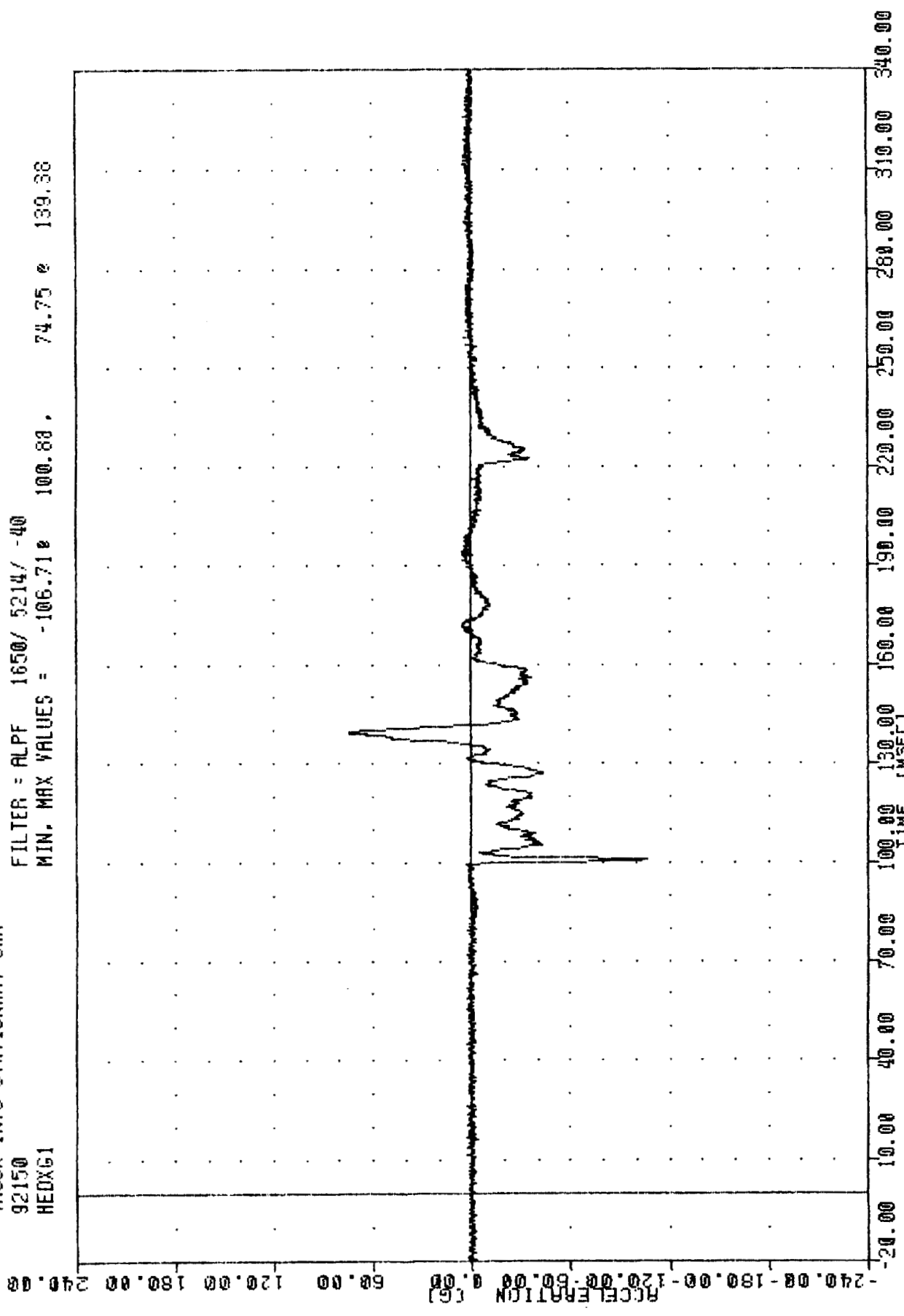
Figure A-32. POST-TEST DUMMY KNEE CONTACT - VIEW 2

APPENDIX B

DATA PLOTS

TRC  
920529  
TRUCK INTO STATIONARY CAR  
92150  
HDXG1

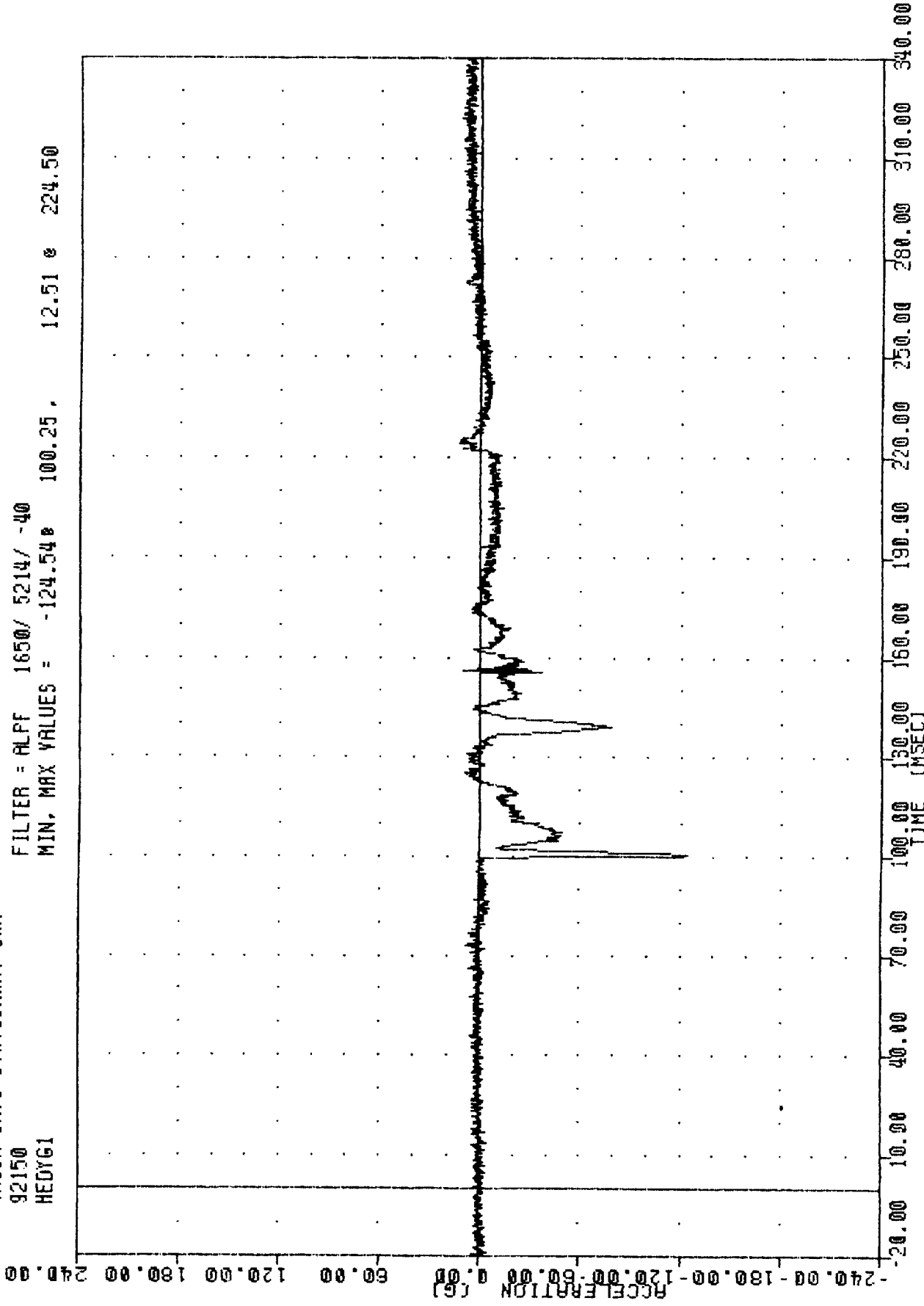
FILTER = ALPF 1650/ 5214/ -40  
MIN. MAX VALUES = -106.71e 100.88 . 74.75 e 139.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER HEAD X-AXIS ACCELERATION

TRC  
920529  
TRUCK INTO STATIONARY CAR  
92150  
HEDYG1

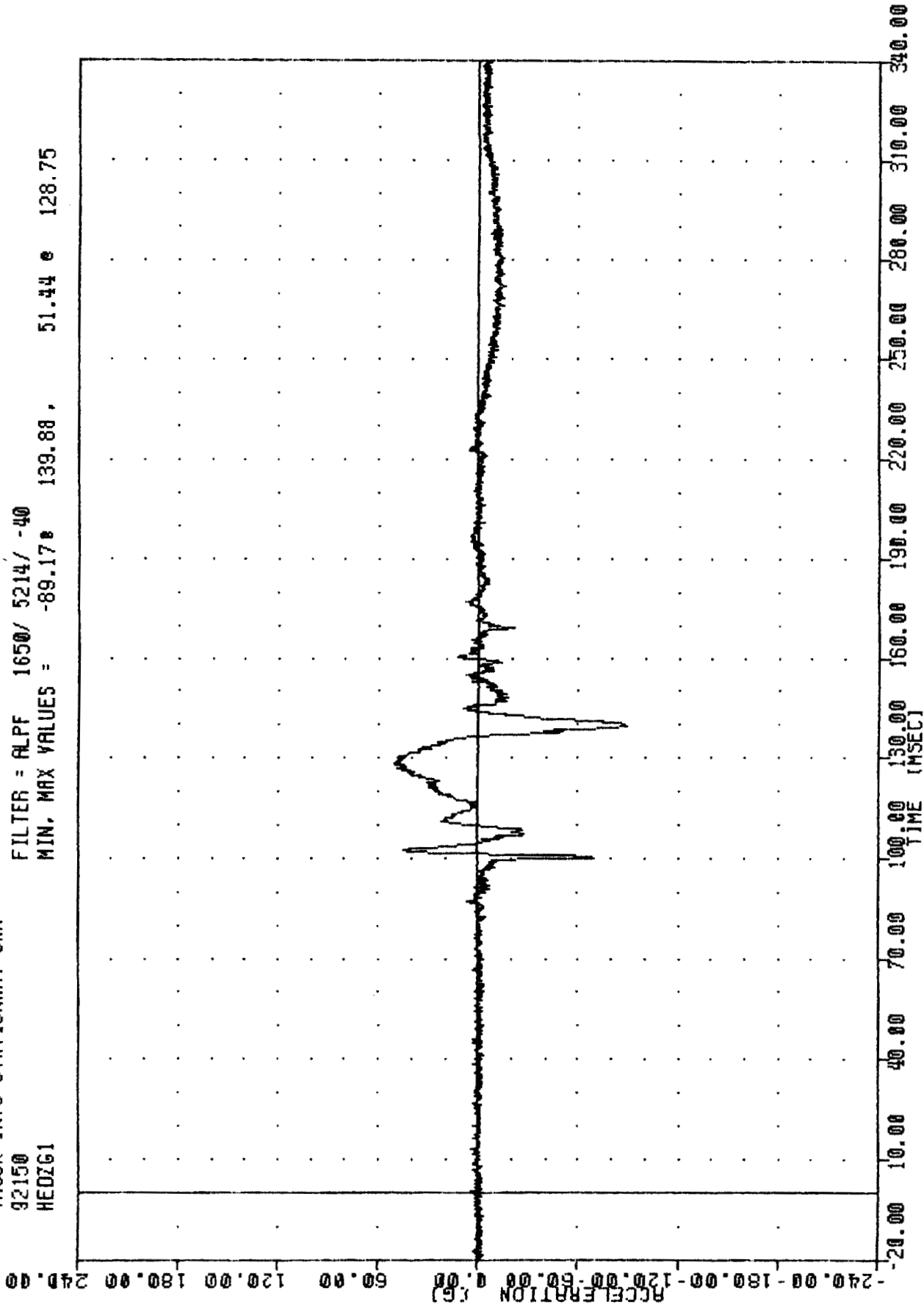
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = -124.54 @ 100.25, 12.51 @ 224.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER HEAD Y-AXIS ACCELERATION

TRC  
92150  
HEDZG1

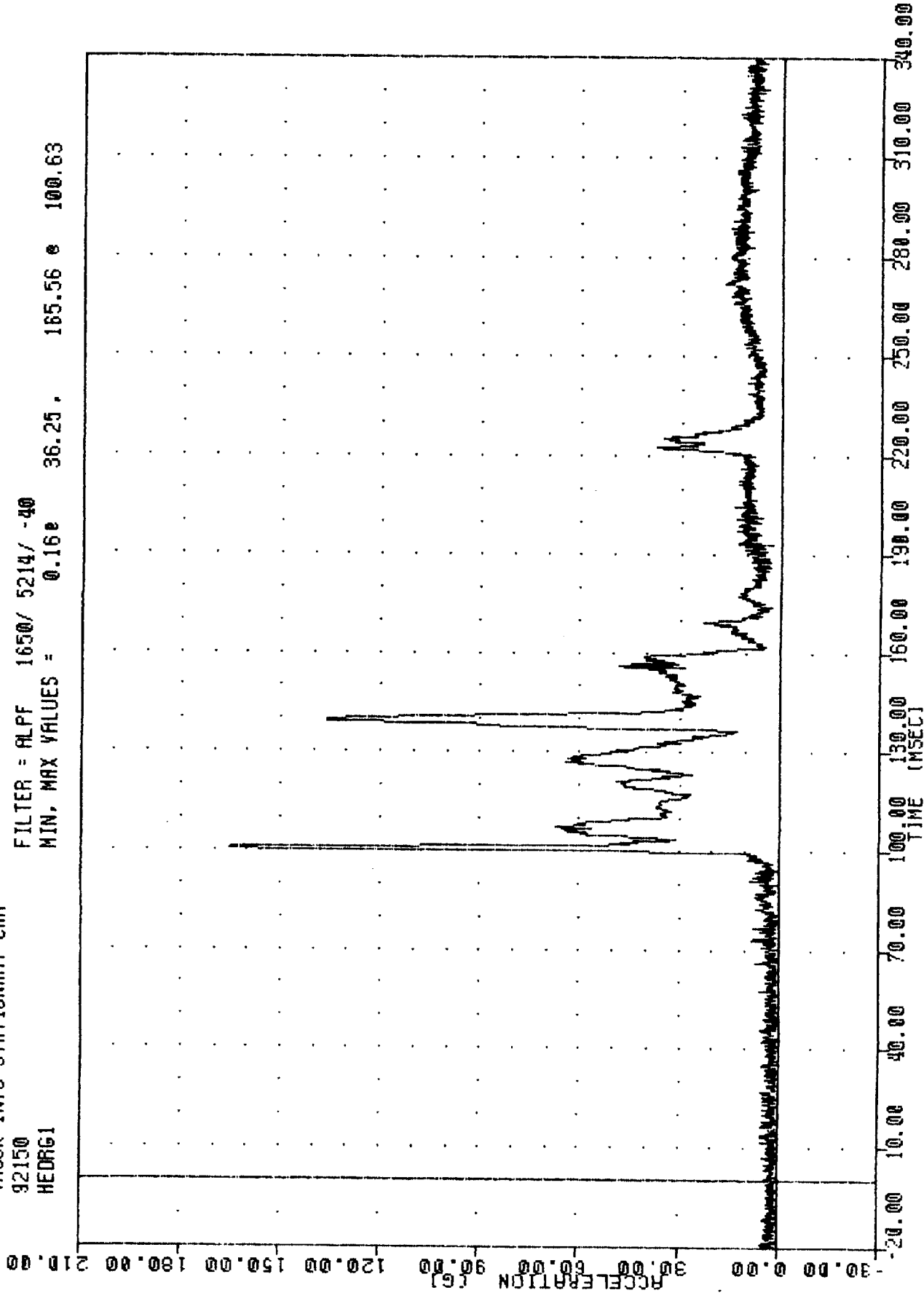
TRUCK INTO STATIONARY CAR  
920529  
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = -89.17 139.88, 51.44 e 128.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER HEAD Z-AXIS ACCELERATION

TRC  
920529  
TRUCK INTO STATIONARY CAR  
92150  
HEADG1

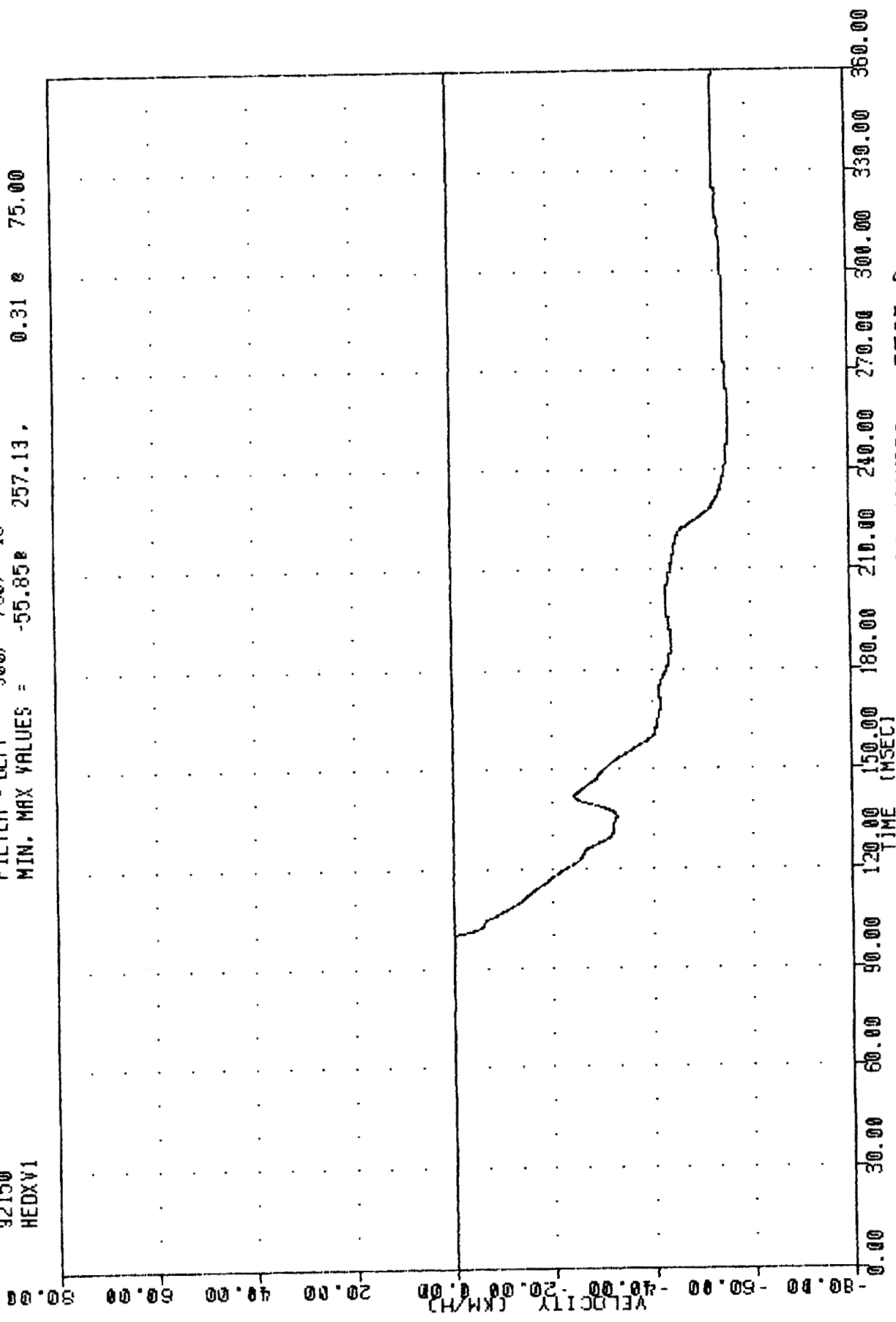
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = 0.16e 165.56 e 100.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER HEAD RESULTANT ACCELERATION

TRC  
920529  
TRUCK INTO STATIONARY CAR  
92150  
HEDXV1

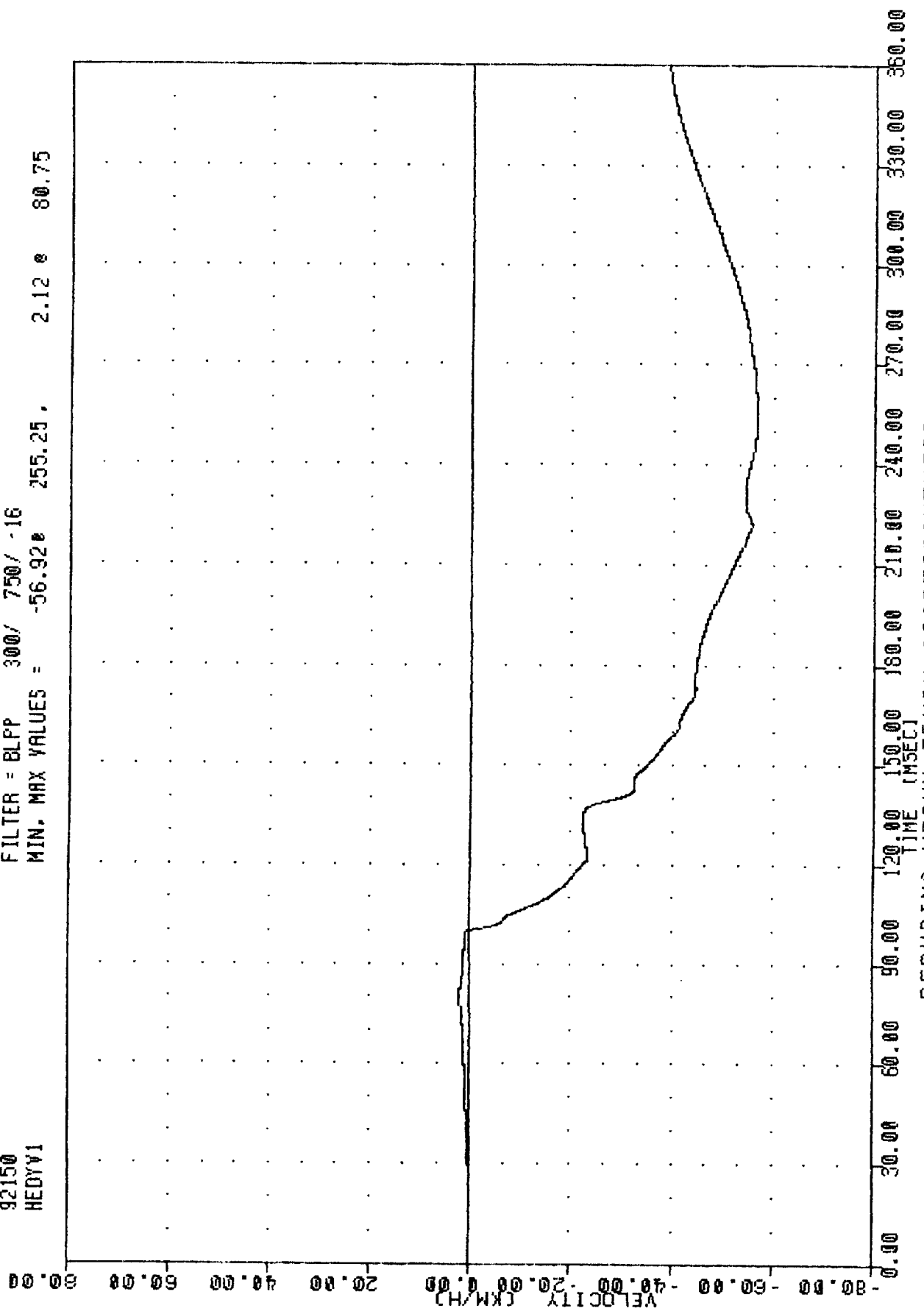
FILTER = BLFF 300/ 750/ -16  
MIN. MAX VALUES = -55.85 257.13 0.31 75.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER HEAD X-AXIS VELOCITY

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
HEDYV1

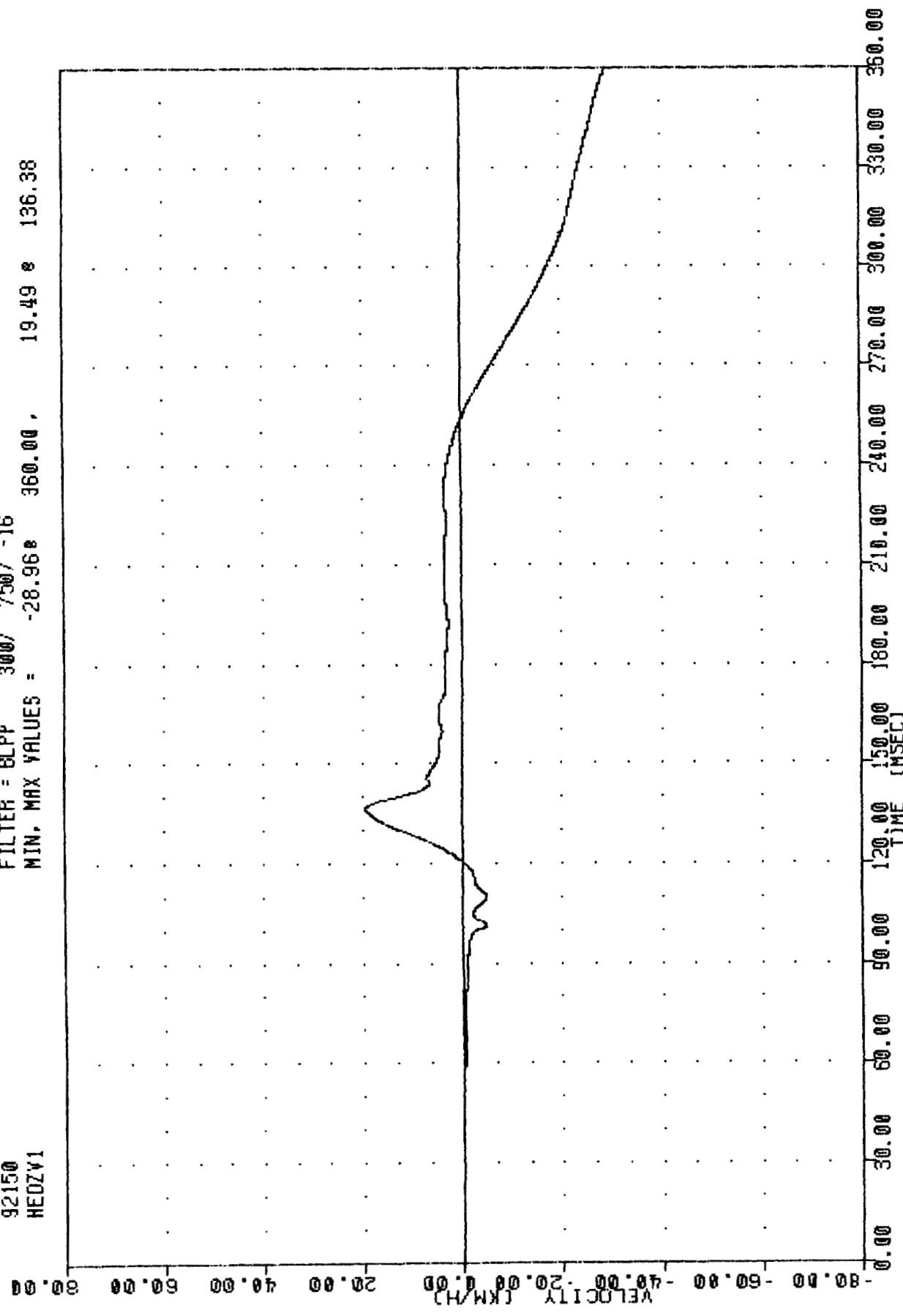
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -56.92 255.25 , 2.12 80.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER HEAD Y-AXIS VELOCITY

TRC . 920529  
TRUCK INTO STATIONARY CAR  
92150  
HEADV1

FILTER = BLPP 300/ 750/ -16  
MIN, MAX VALUES = -28.96 360.00 , 19.49 136.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER HEAD Z-AXIS VELOCITY

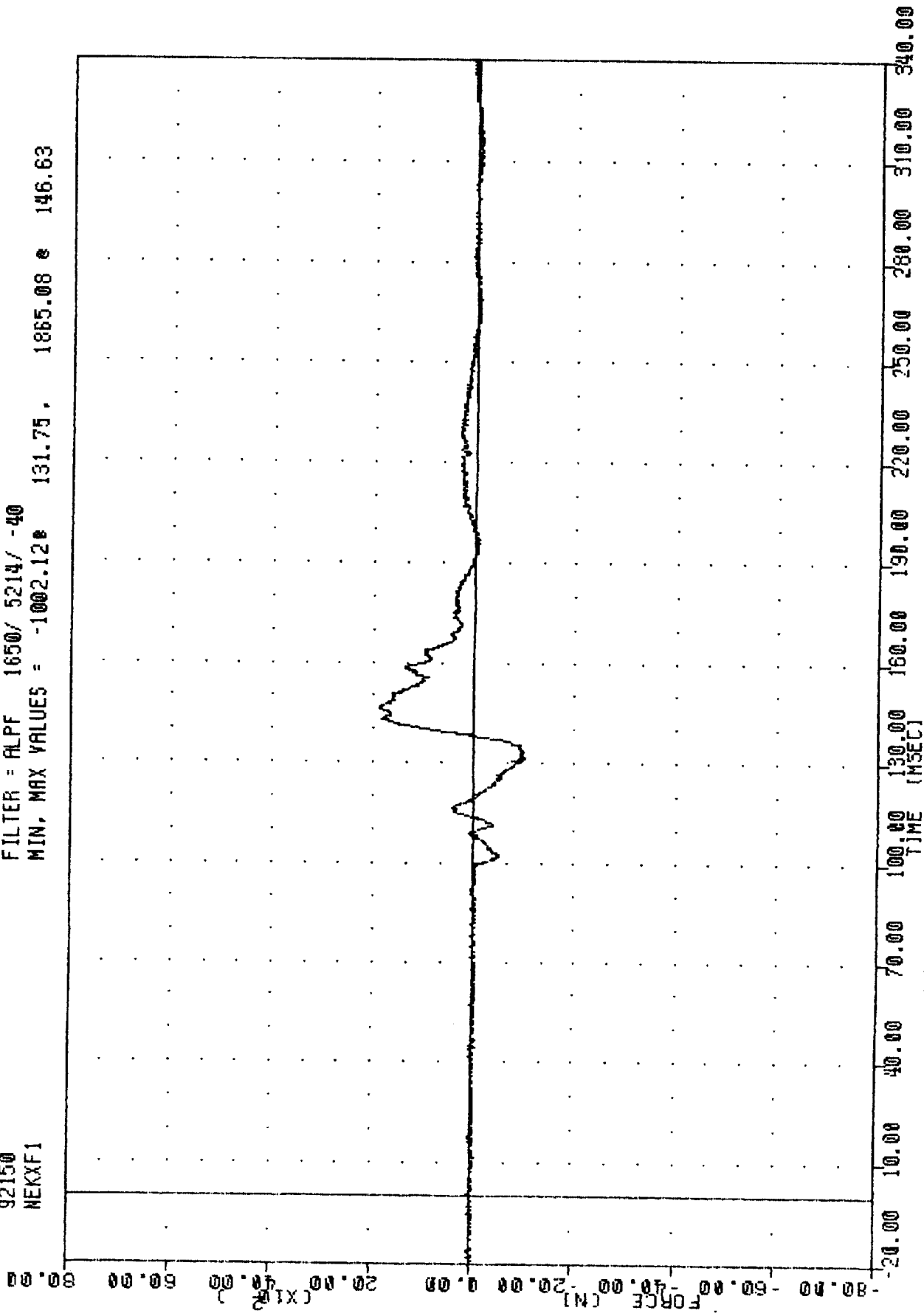
TRC  
92150  
MEKXF1

920529

TRUCK INTO STATIONARY CAR

FILTER = ALPF 1650/ 5214/ -40

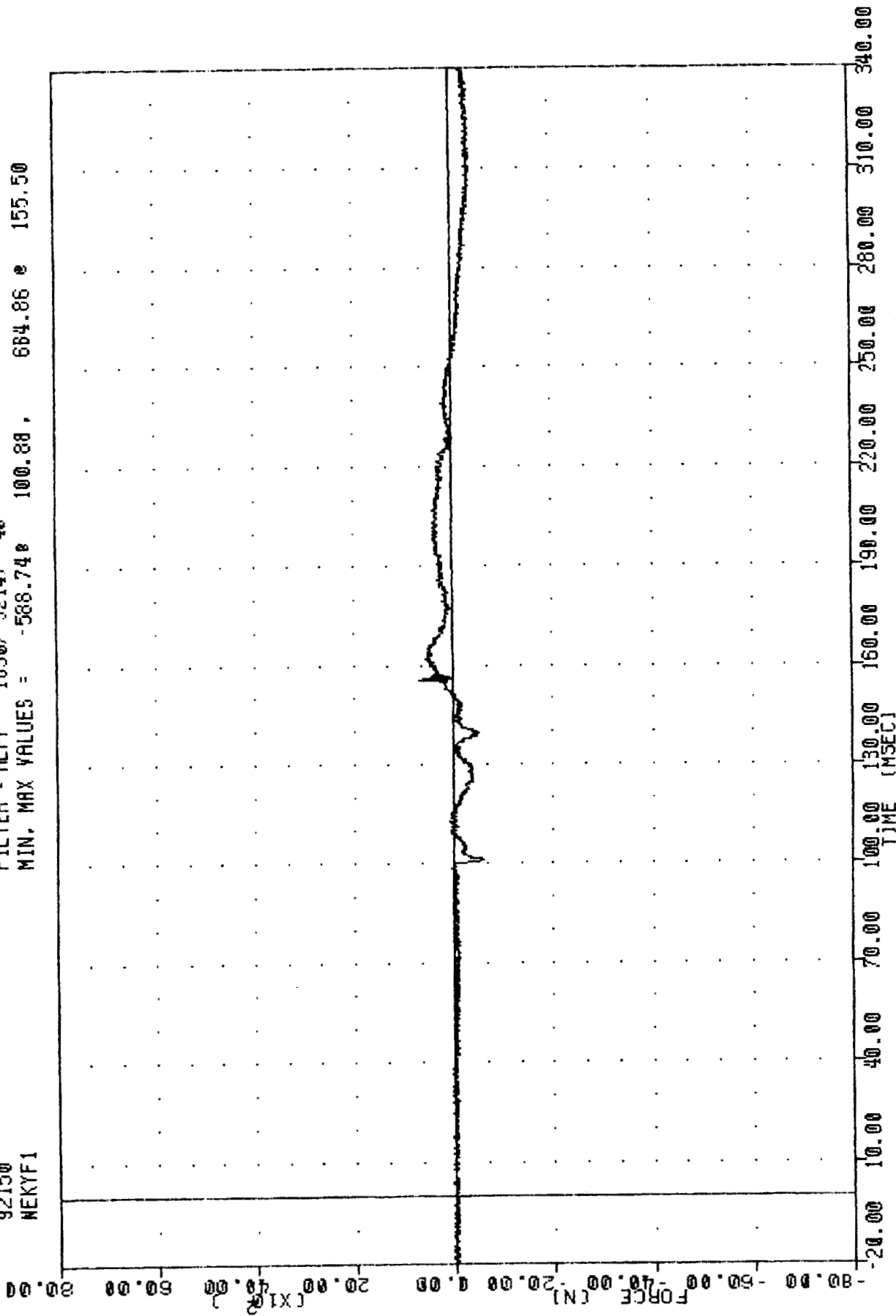
MIN, MAX VALUES = -1002.12 e 131.75 , 1865.08 e 146.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER NECK X-AXIS SHEAR FORCE

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
NEKYF1

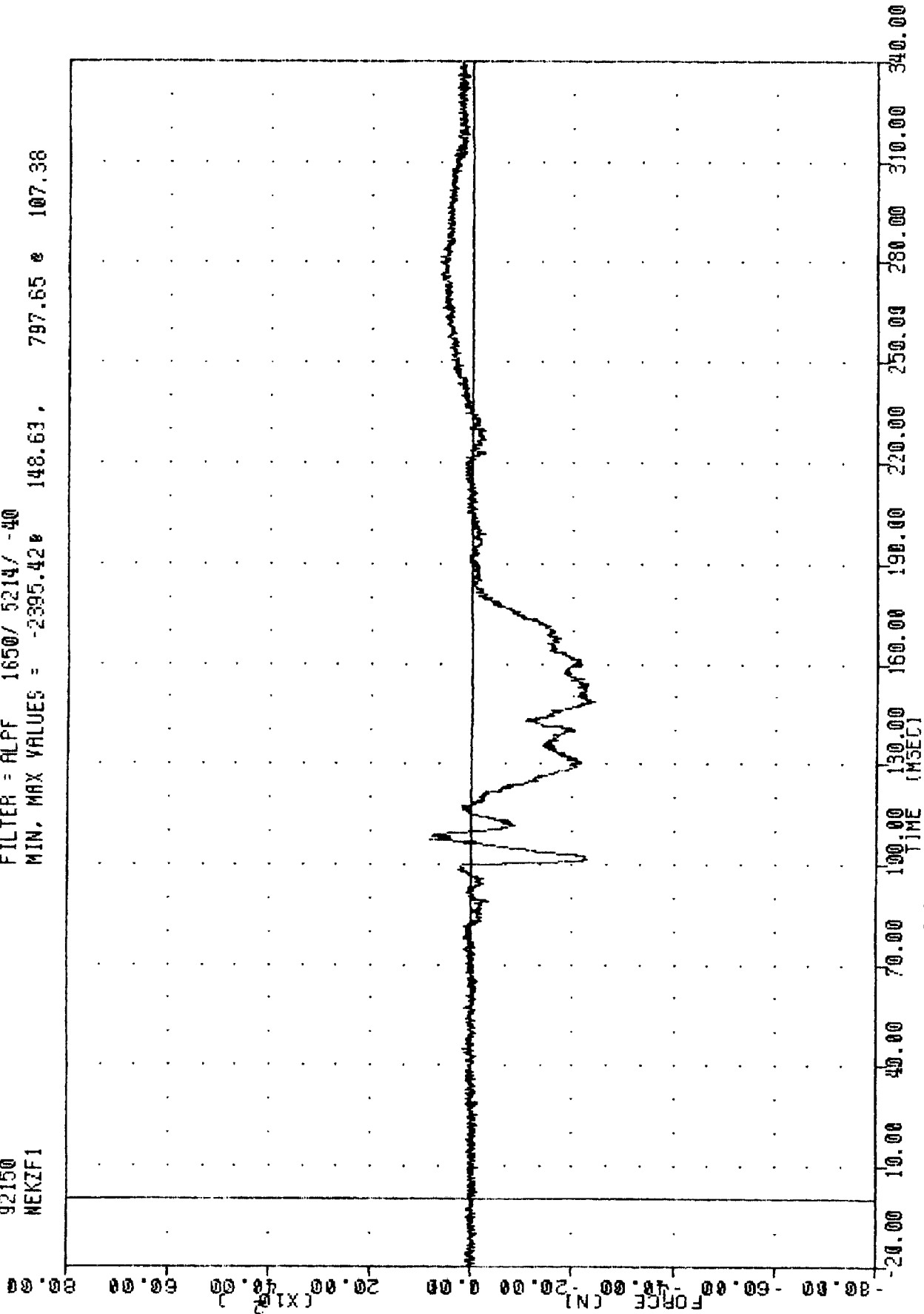
FILTER = ALPF 1650/ 5214/ -40  
MIN. MAX VALUES = -588.74e 100.88 , 684.86 e 155.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER NECK Y-AXIS SHEAR FORCE

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
NEKZF1

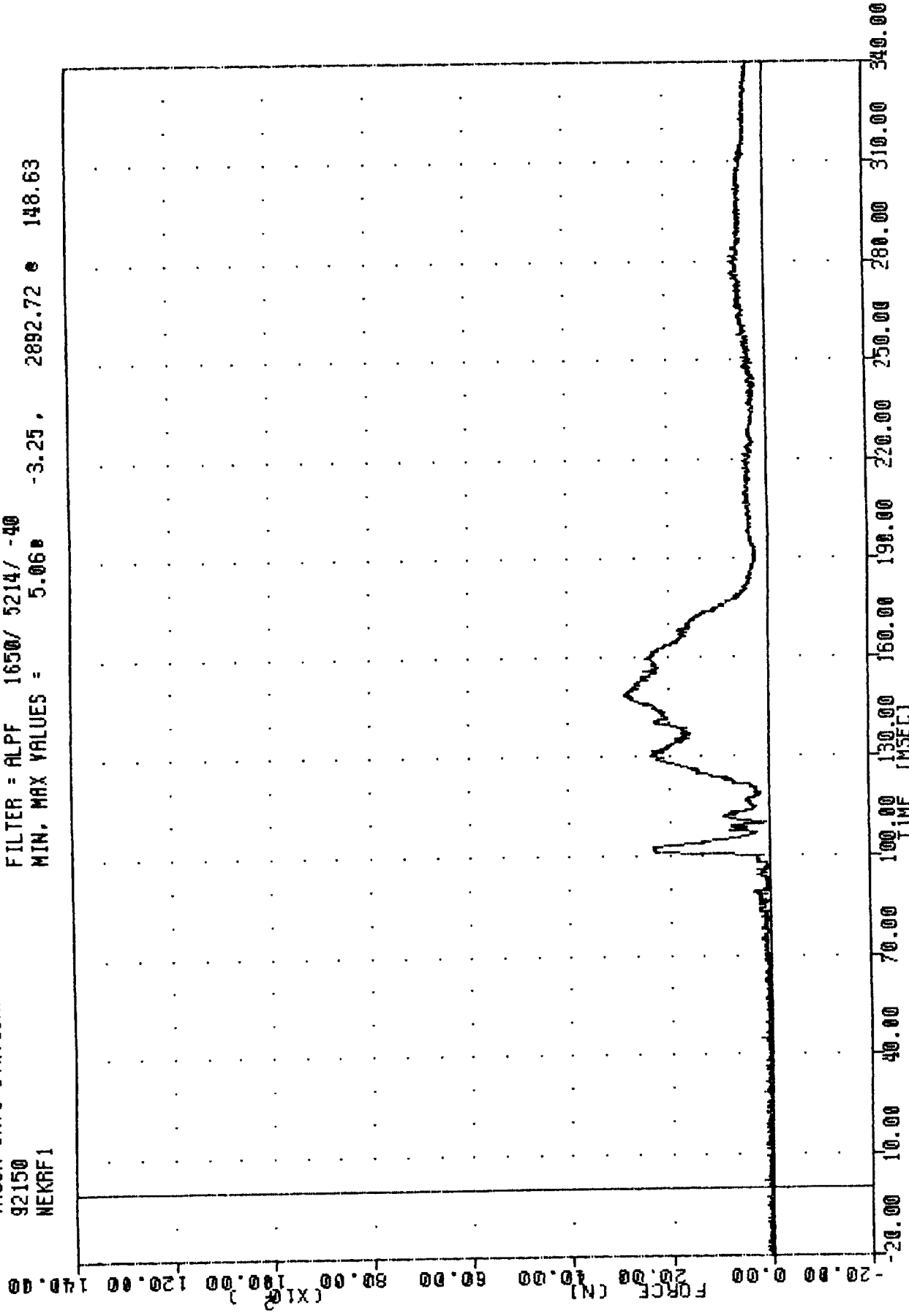
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = -2395.42 e 148.63 , 797.65 e 107.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER NECK Z-AXIS AXIAL FORCE

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
NEKRF1

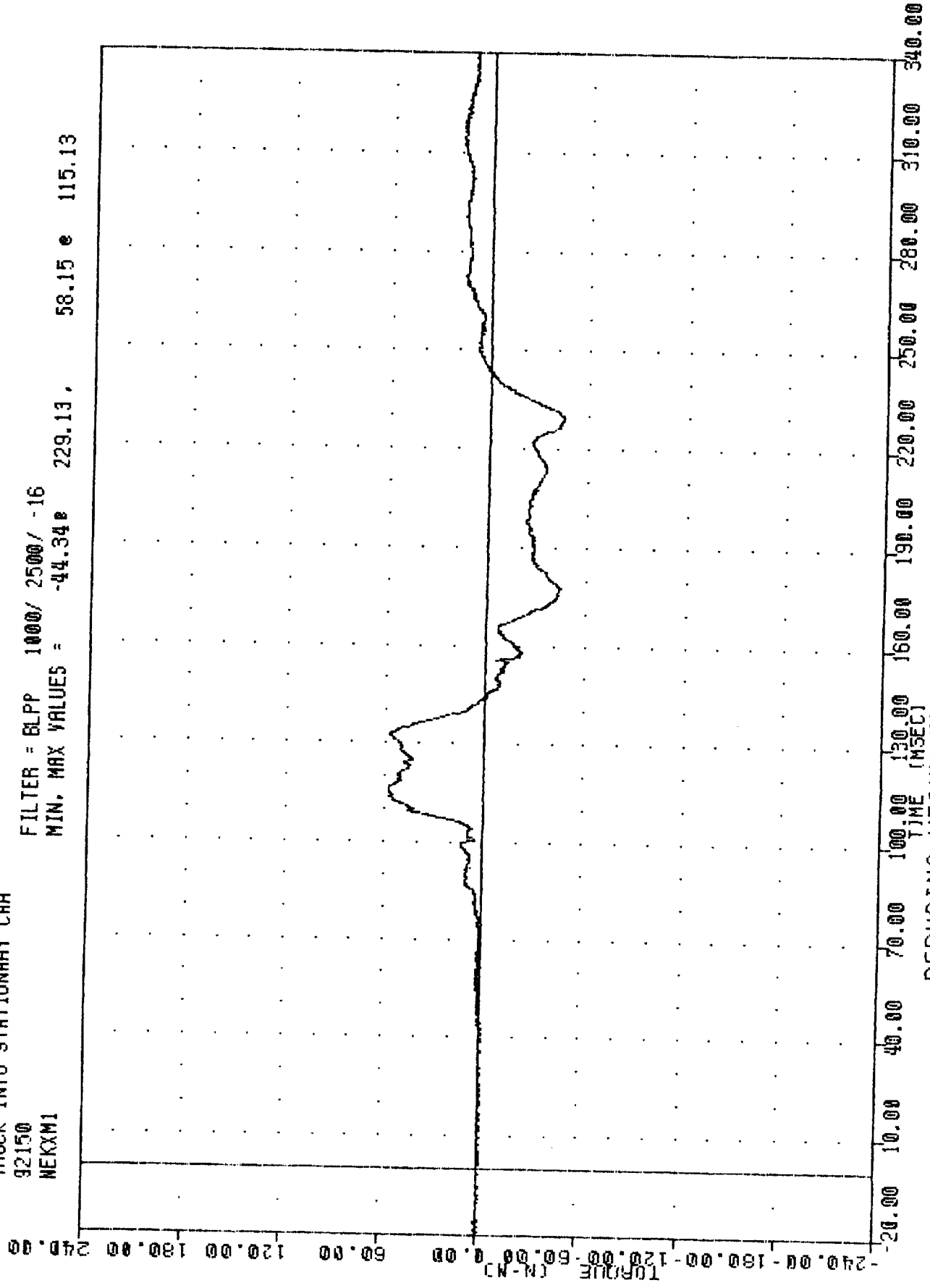
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = 5.06 2892.72 148.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER NECK RESULTANT FORCE

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
MEKYM1

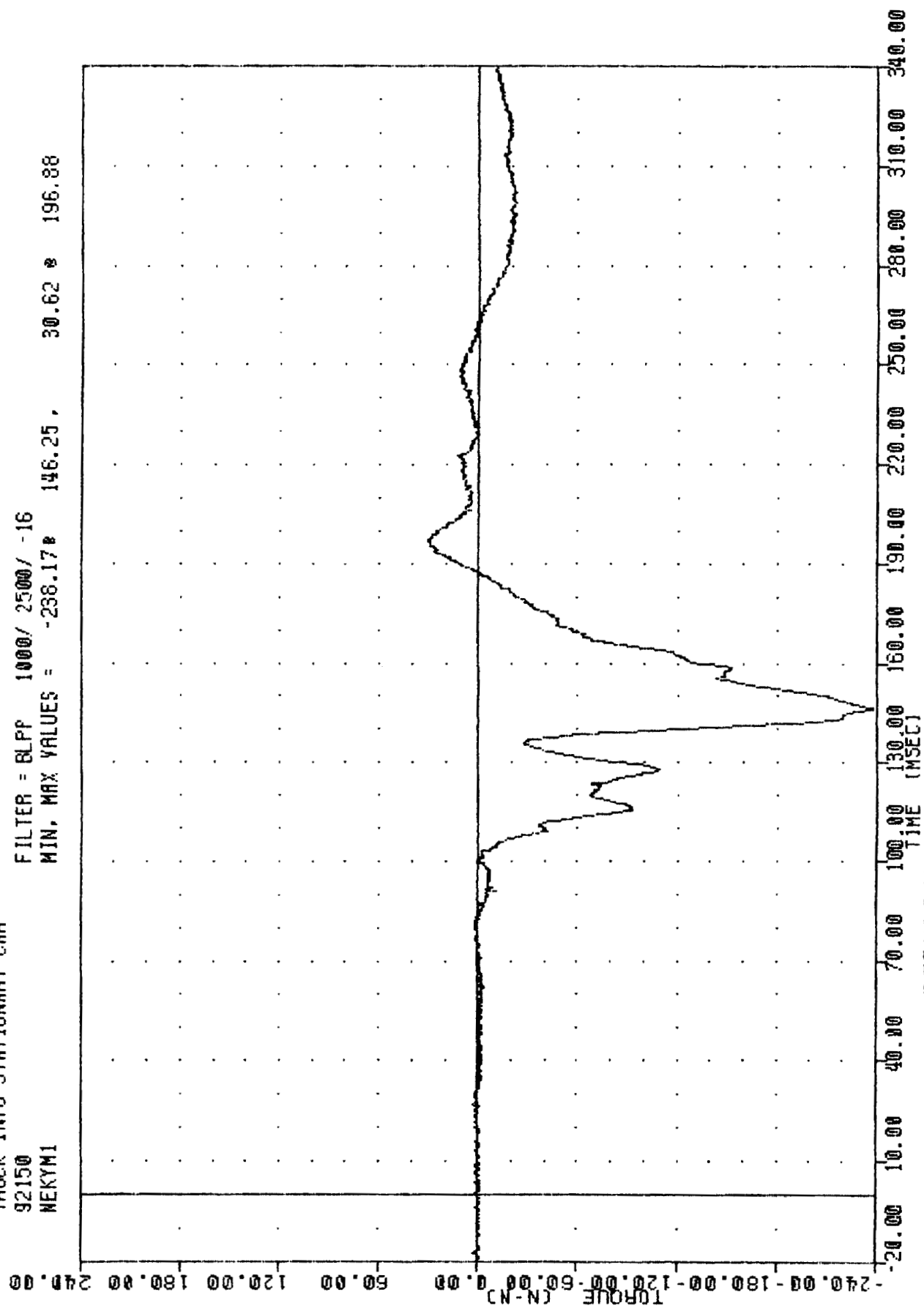
FILTER = 6LPP 1000/ 2500/ -16  
MIN. MAX VALUES = -44.34e 229.13, 58.15 e 115.13



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER NECK MOMENT ABOUT X AXIS

TRC . 920529  
TRUCK INTO STATIONARY CAR  
92150  
NEKYM1

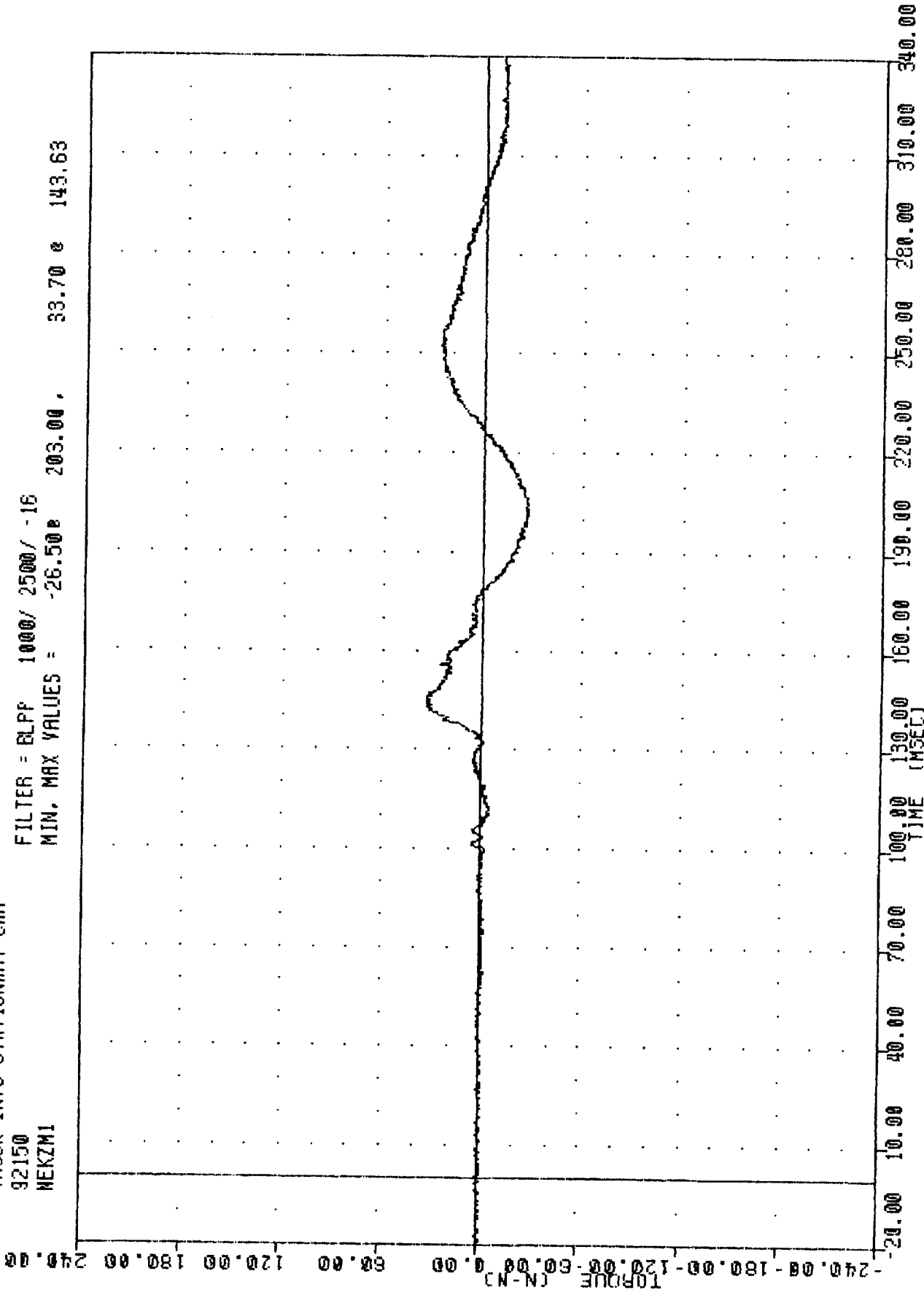
FILTER = BLPP 1000/ 2500/ -16  
MIN. MAX VALUES = -236.17\* 146.25 , 30.62 \* 196.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER NECK MOMENT ABOUT Y AXIS

TAC . 920529  
TRUCK INTO STATIONARY CAR  
92150  
NEZM1

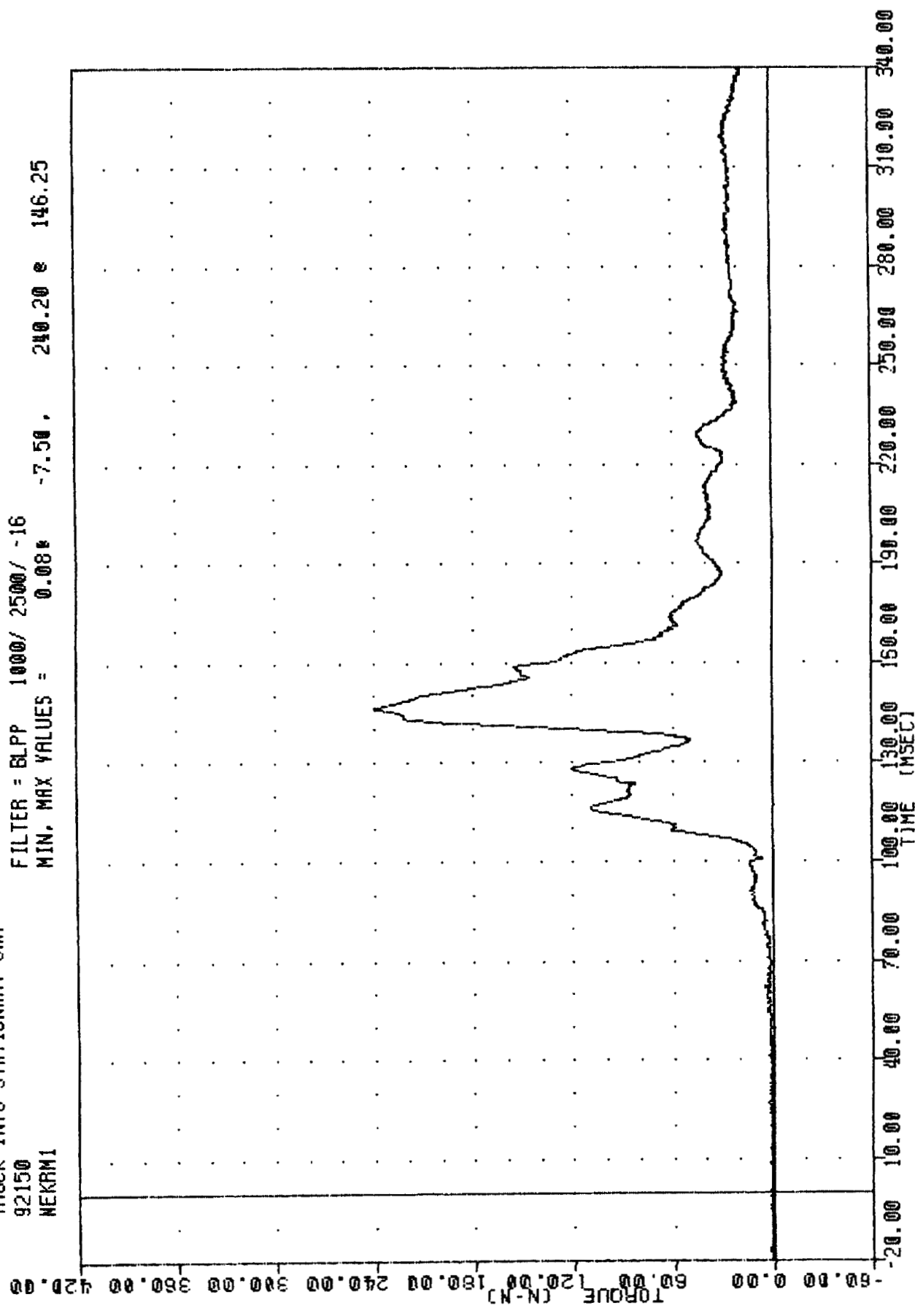
FILTER = BLPF 1000/ 2500/ -16  
MIN. MAX VALUES = -26.50e 203.00, 33.70 e 143.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER NECK MOMENT ABOUT Z AXIS

TRC  
TRUCK INTO STATIONARY CAR  
92150  
NEKRM1

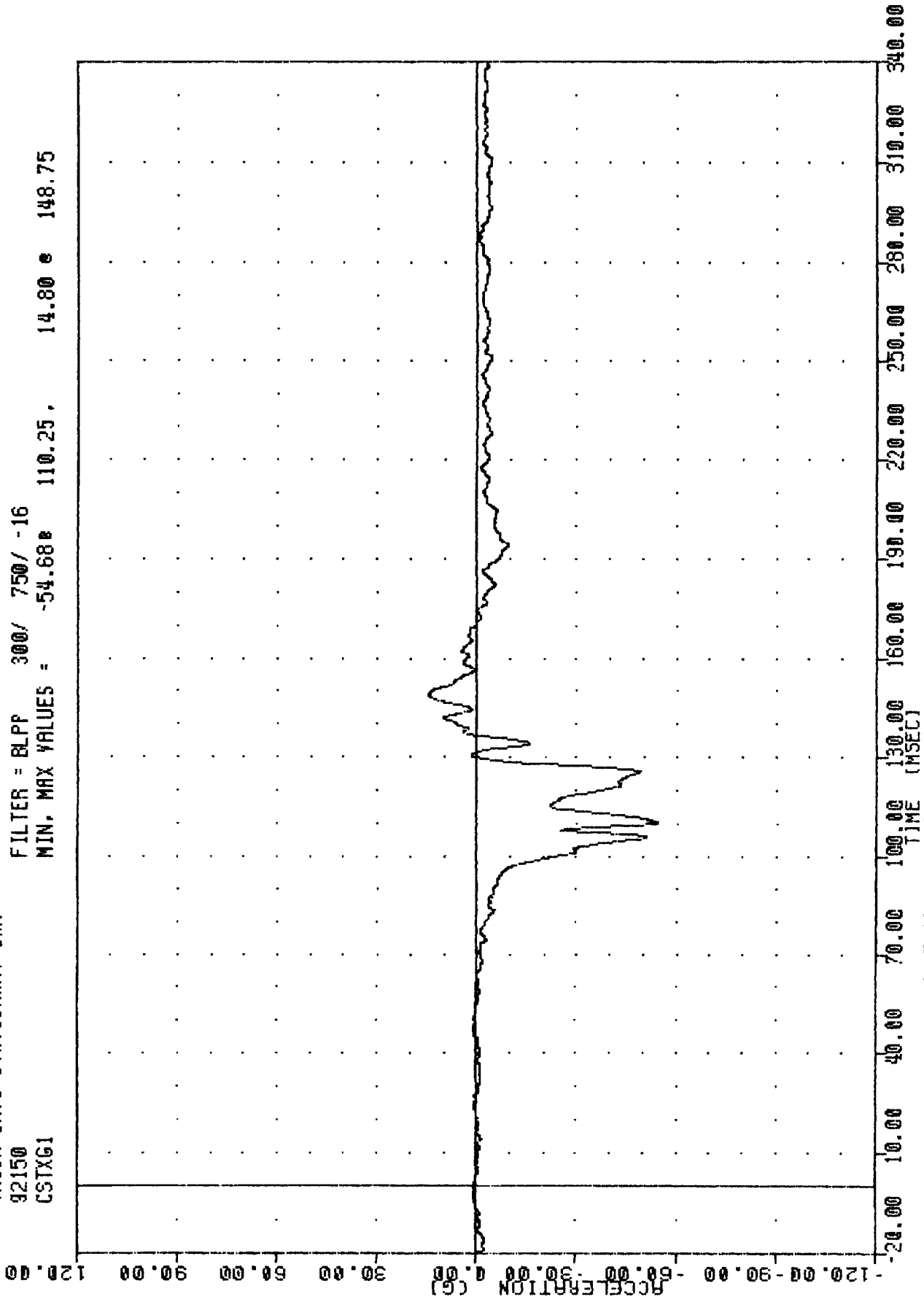
FILTER = BLPP 1000/ 2500/ -16  
MIN. MAX VALUES = 0.08# -7.50, 240.20 e 146.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER NECK MOMENT RESULTANT

TRC . 920529  
TRUCK INTO STATIONARY CAR  
92150  
CSTXG1

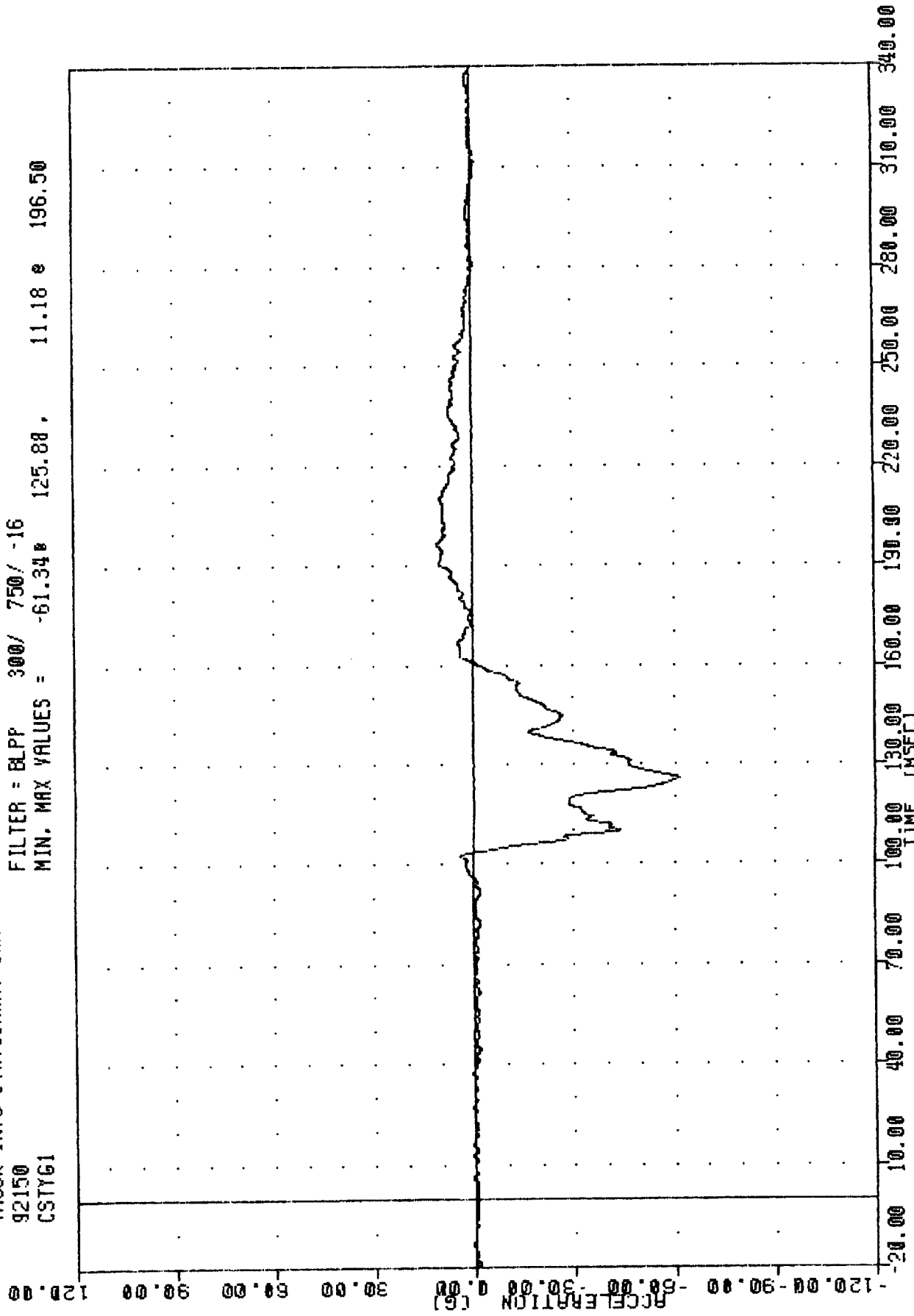
FILTER = BLPF 300/ 750/ -16  
MIN. MAX VALUES = -54.68 110.25, 14.80 e 148.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER CHEST X-AXIS ACCELERATION

TRC  
92150  
CSTY61  
TRUCK INTO STATIONARY CAR

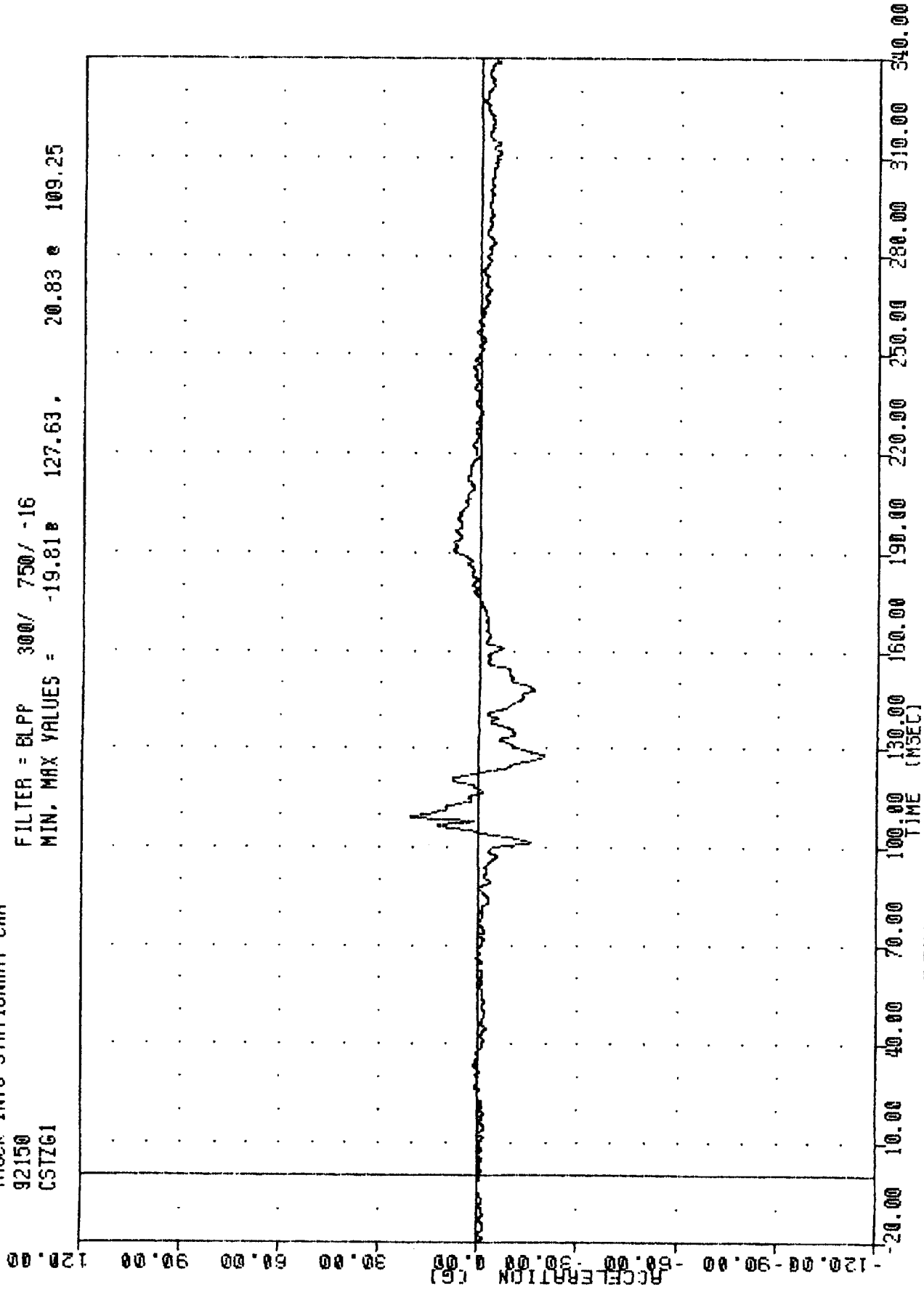
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -61.34 125.88, 11.18 e 196.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER CHEST Y-AXIS ACCELERATION

TRC .920529  
TRUCK INTO STATIONARY CAR  
92150  
CSTZG1

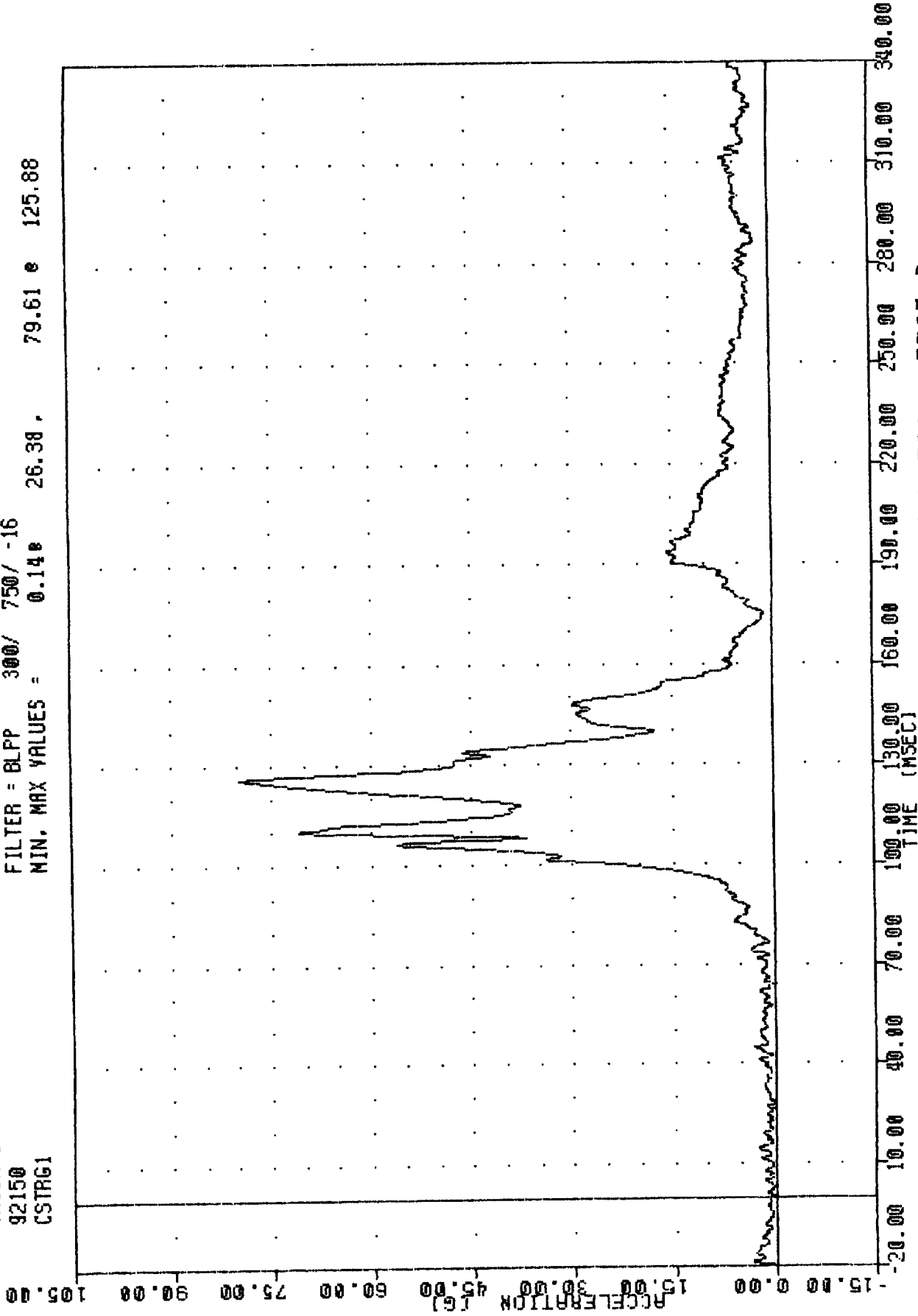
FILTER = BLPF 300/ 750/ -16  
MIN, MAX VALUES = -19.81 127.63 20.83 e 109.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER CHEST Z-AXIS ACCELERATION

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
CSTRG1

FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = 0.14e 26.38 , 79.61 e 125.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER CHEST RESULTANT ACCELERATION

TRC  
92150  
CSTXV1

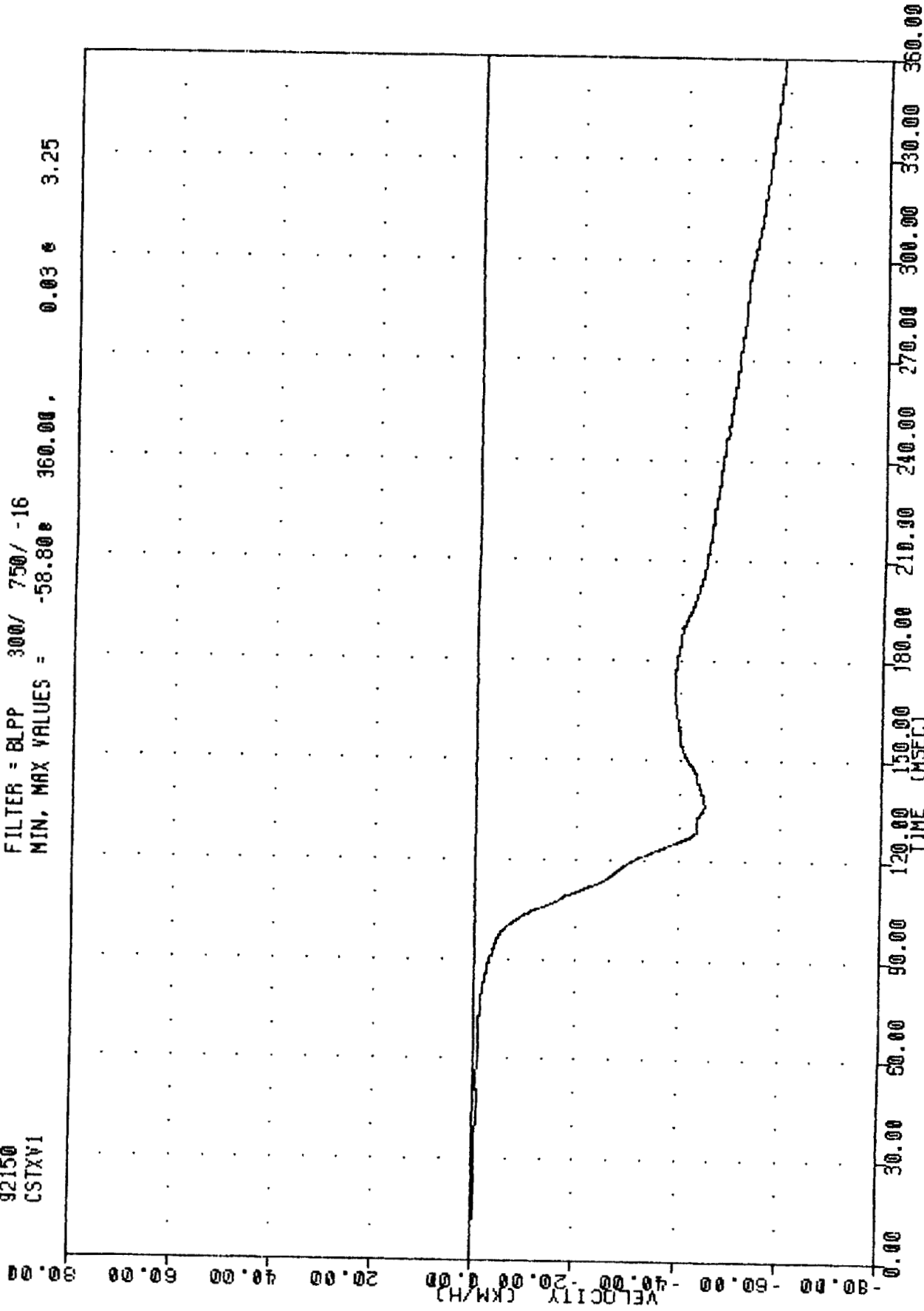
920529

TRUCK INTO STATIONARY CAR

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -58.80e 360.00 ,

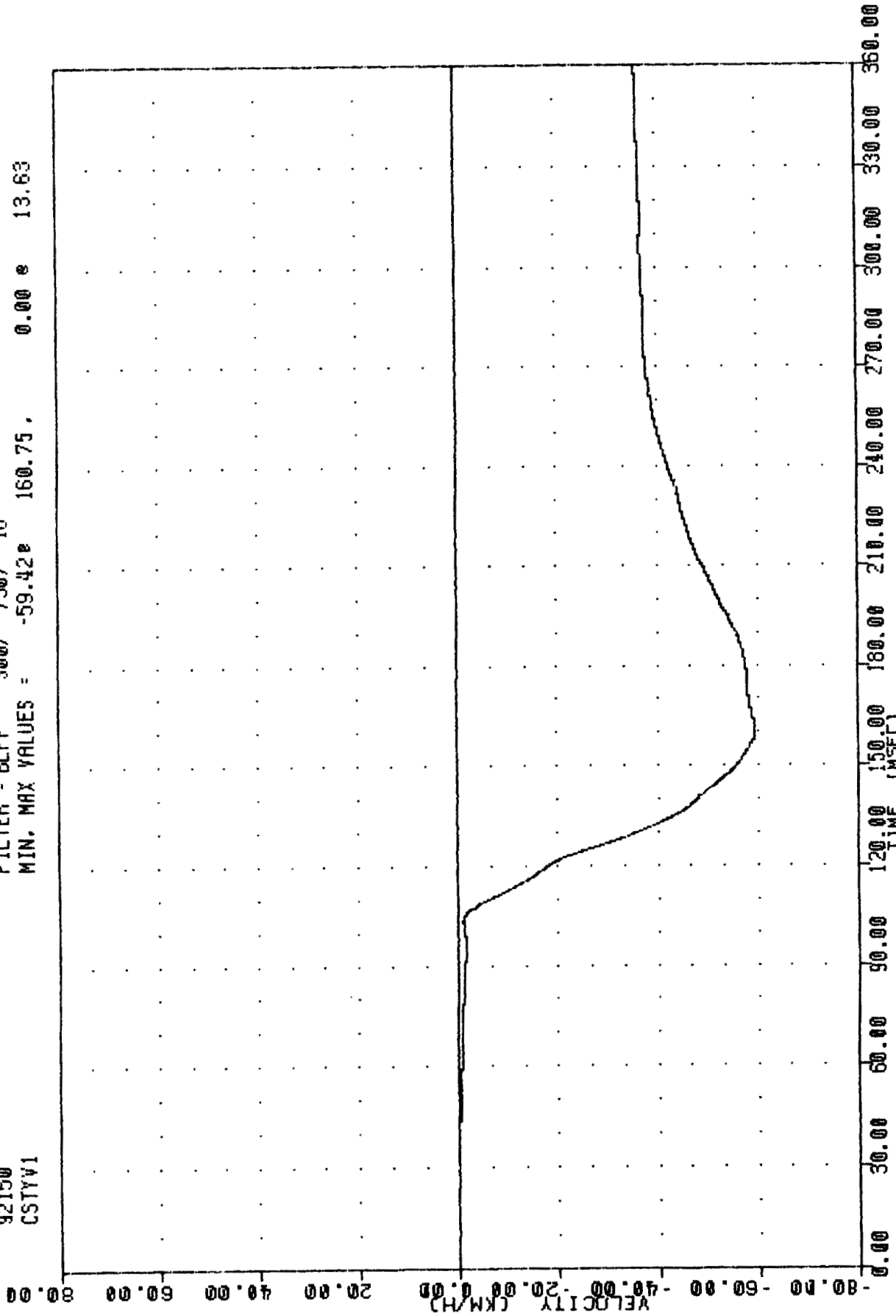
0.03 e 3.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER CHEST X-AXIS VELOCITY

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
CSTYV1

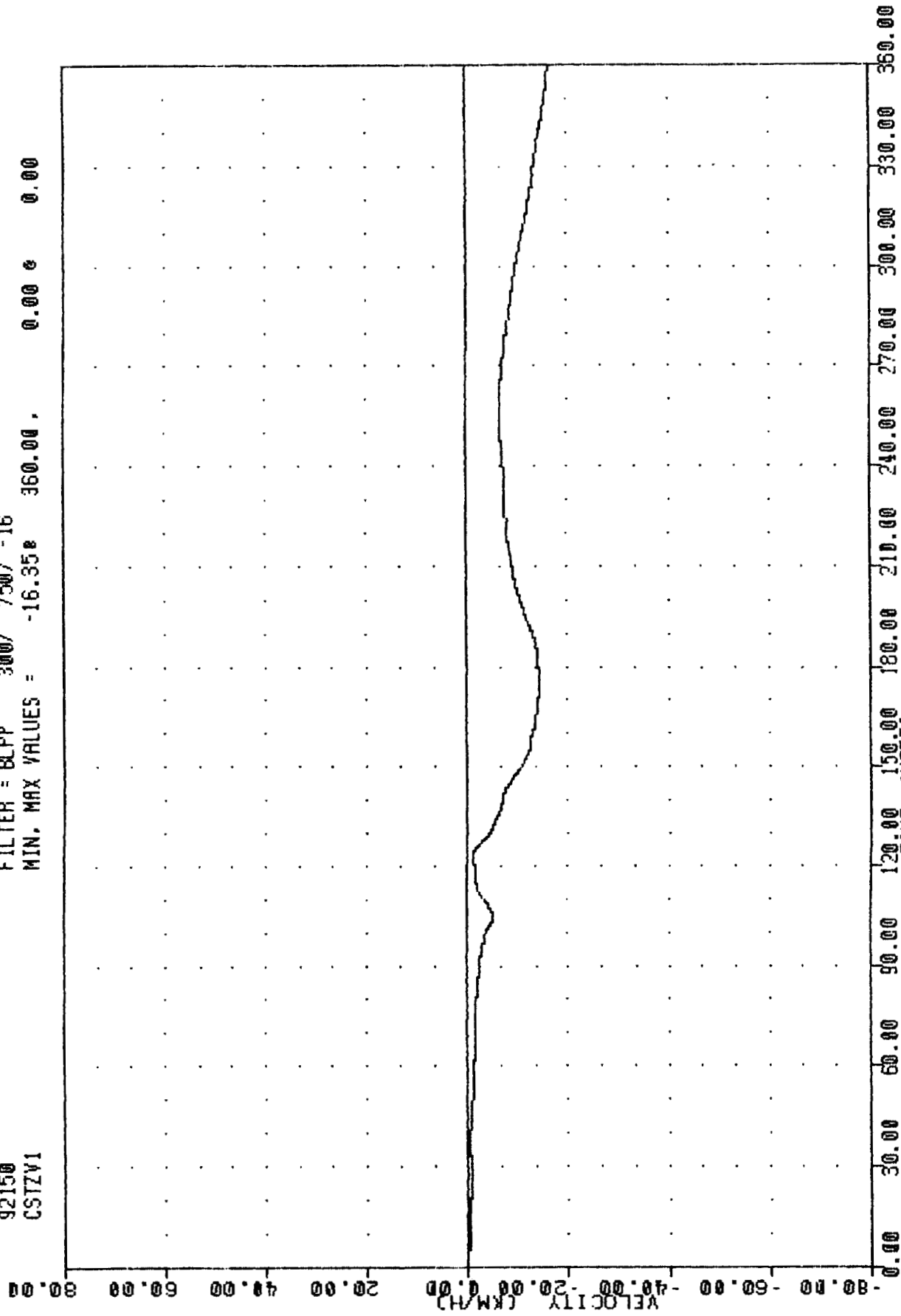
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -59.42e 160.75. 0.00 e 13.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER CHEST Y-AXIS VELOCITY

TRC 920529  
TRUCK INTO STATIONARY CAR  
92150  
CSIZV1

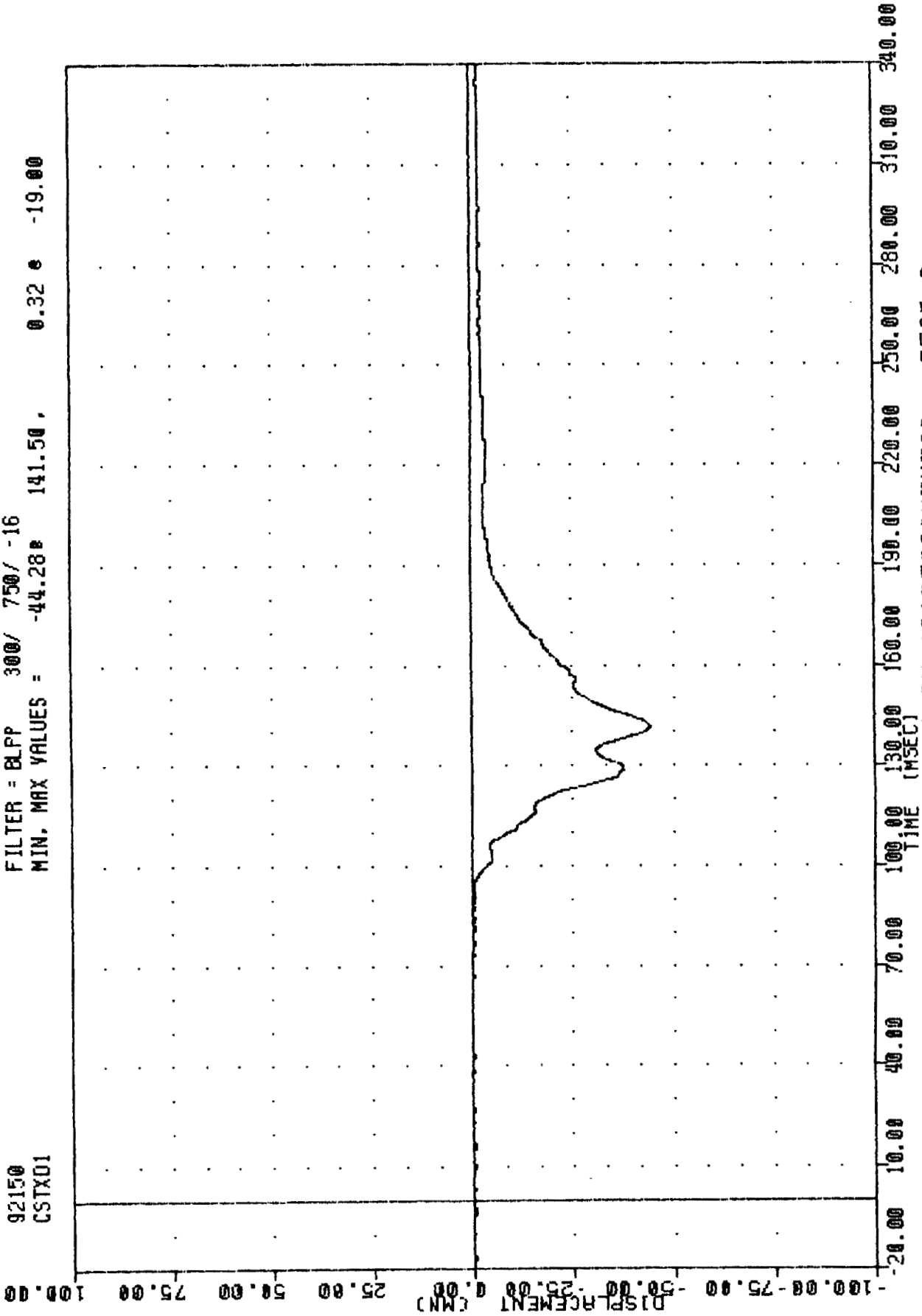
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -16.35% 360.00 , 0.00 e 0.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER CHEST Z-AXIS VELOCITY

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
CSTXD1

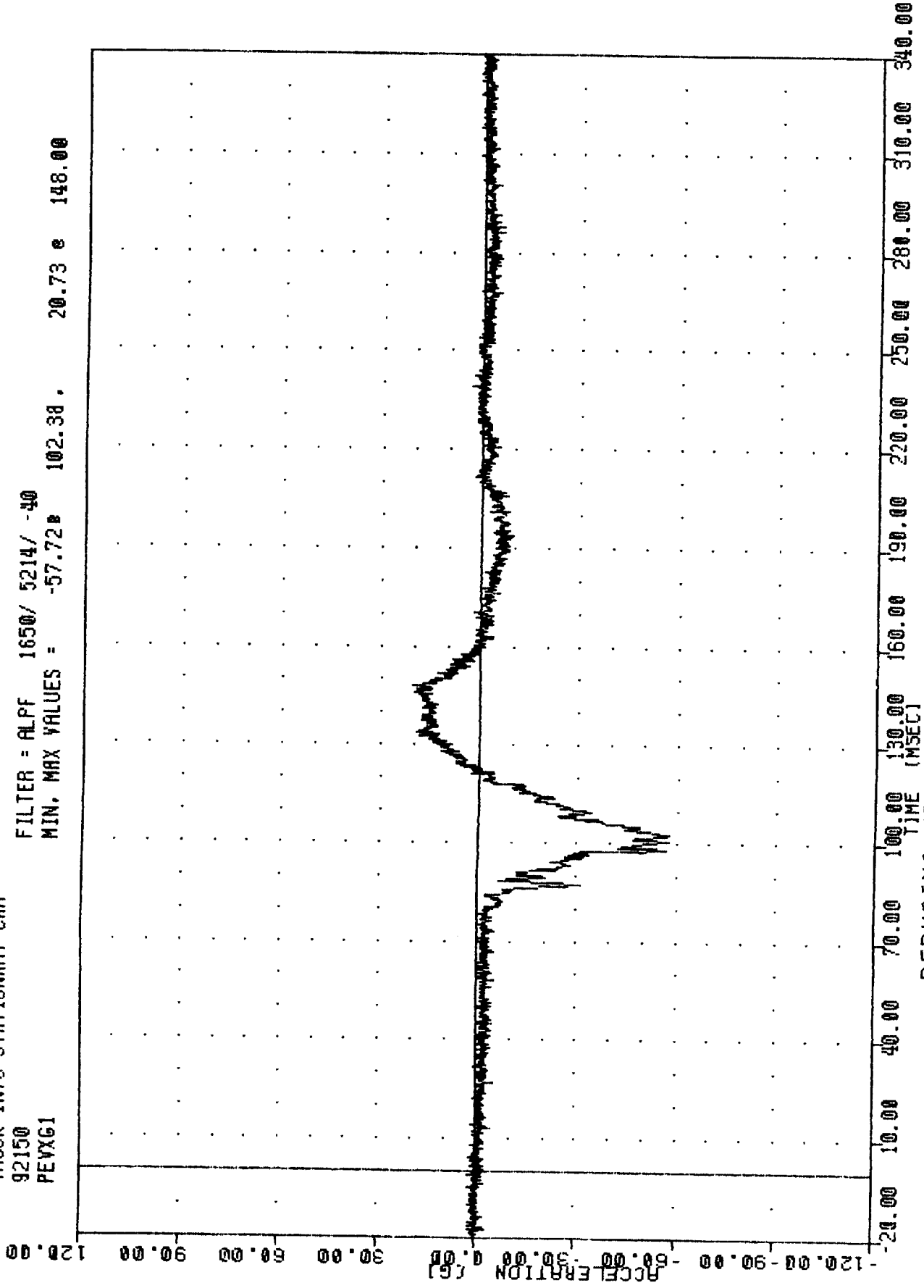
FILTER = BLFP 300/ 750/ -16  
MIN. MAX VALUES = -44.28e 141.50, 0.32 e -19.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER CHEST DEFLECTION

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
PEVXG1

FILTER = ALPF 1650/ 5214/ -40  
MIN. MAX VALUES = -57.72 102.38 . 20.73 e 148.00



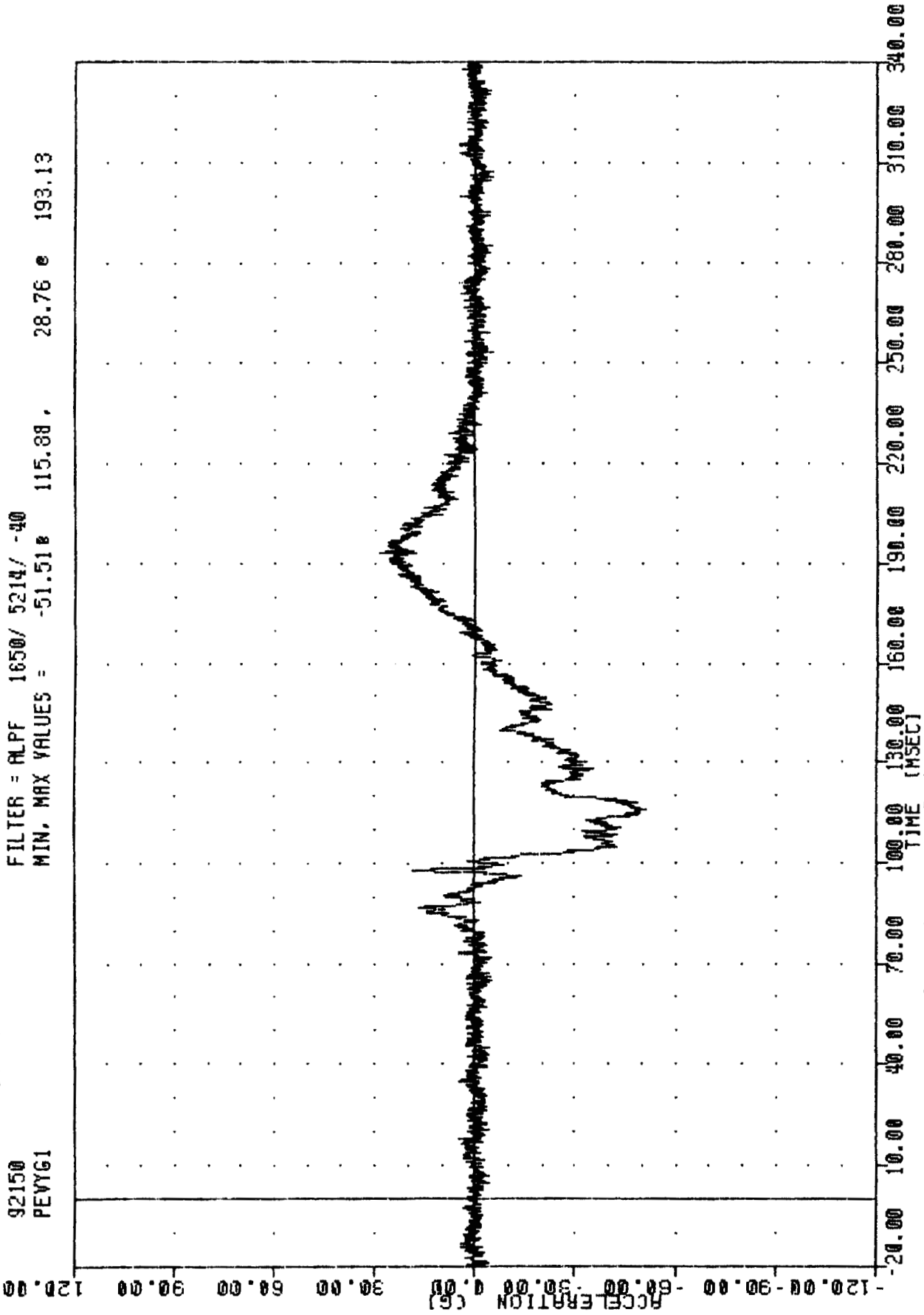
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER PELVIS X-AXIS ACCELERATION

TRC  
92150  
PEVYG1

TRUCK INTO STATIONARY CAR

920529

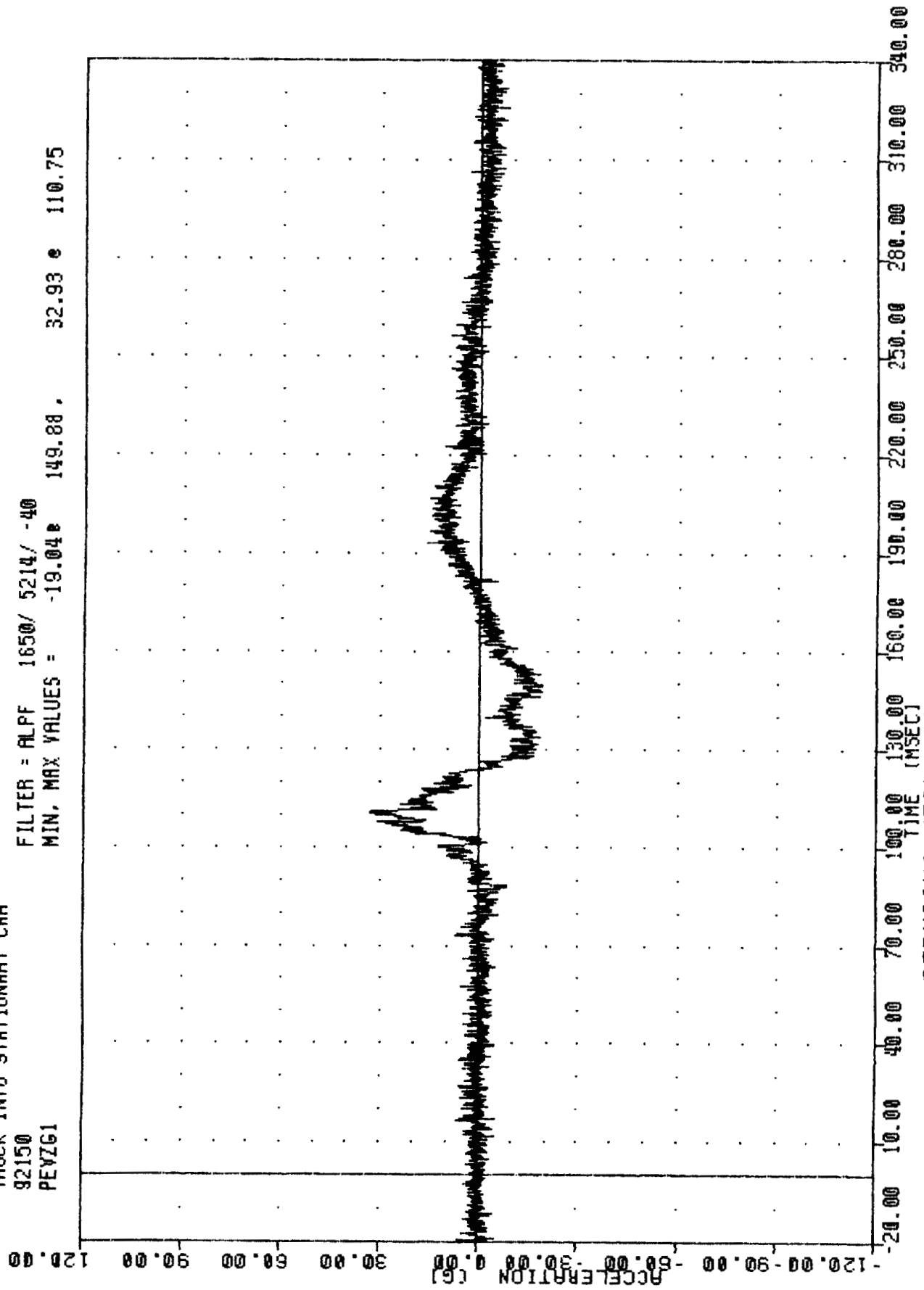
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = -51.51 e 115.88 , 28.76 e 193.13



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER PELVIS Y-AXIS ACCELERATION

TRC . 920529  
TRUCK INTO STATIONARY CAR  
92150  
PEYZG1

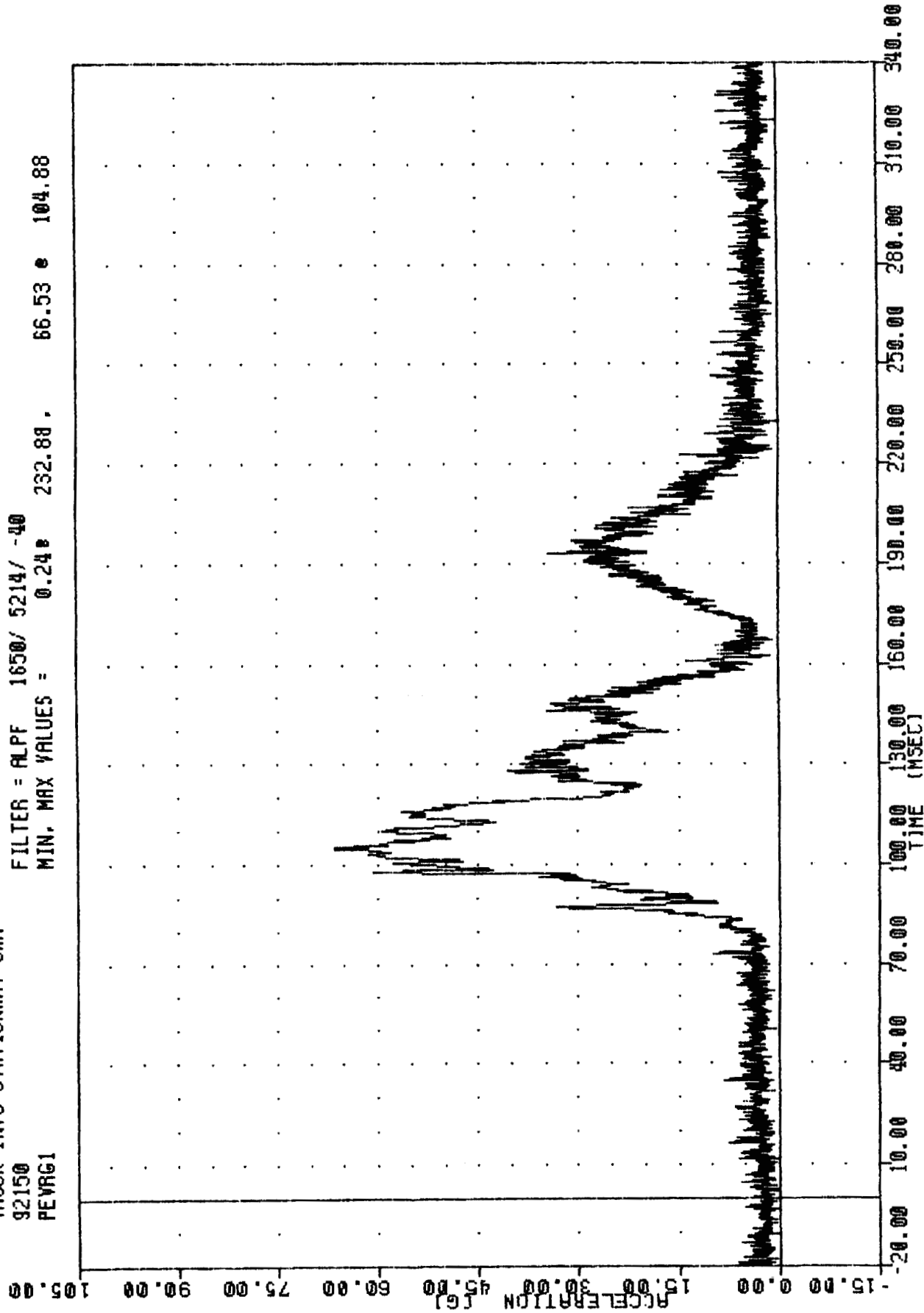
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = -19.04 e 149.88 , 32.93 e 110.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER PELVIS Z-AXIS ACCELERATION

TRC . 920529  
TRUCK INTO STATIONARY CAR  
92150  
PEVRG1

FILTER = ALPF 1650/ 5214/ -40  
MIN. MAX VALUES = 0.24e 232.88 . 66.53 e 104.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER PELVIS RESULTANT ACCELERATION

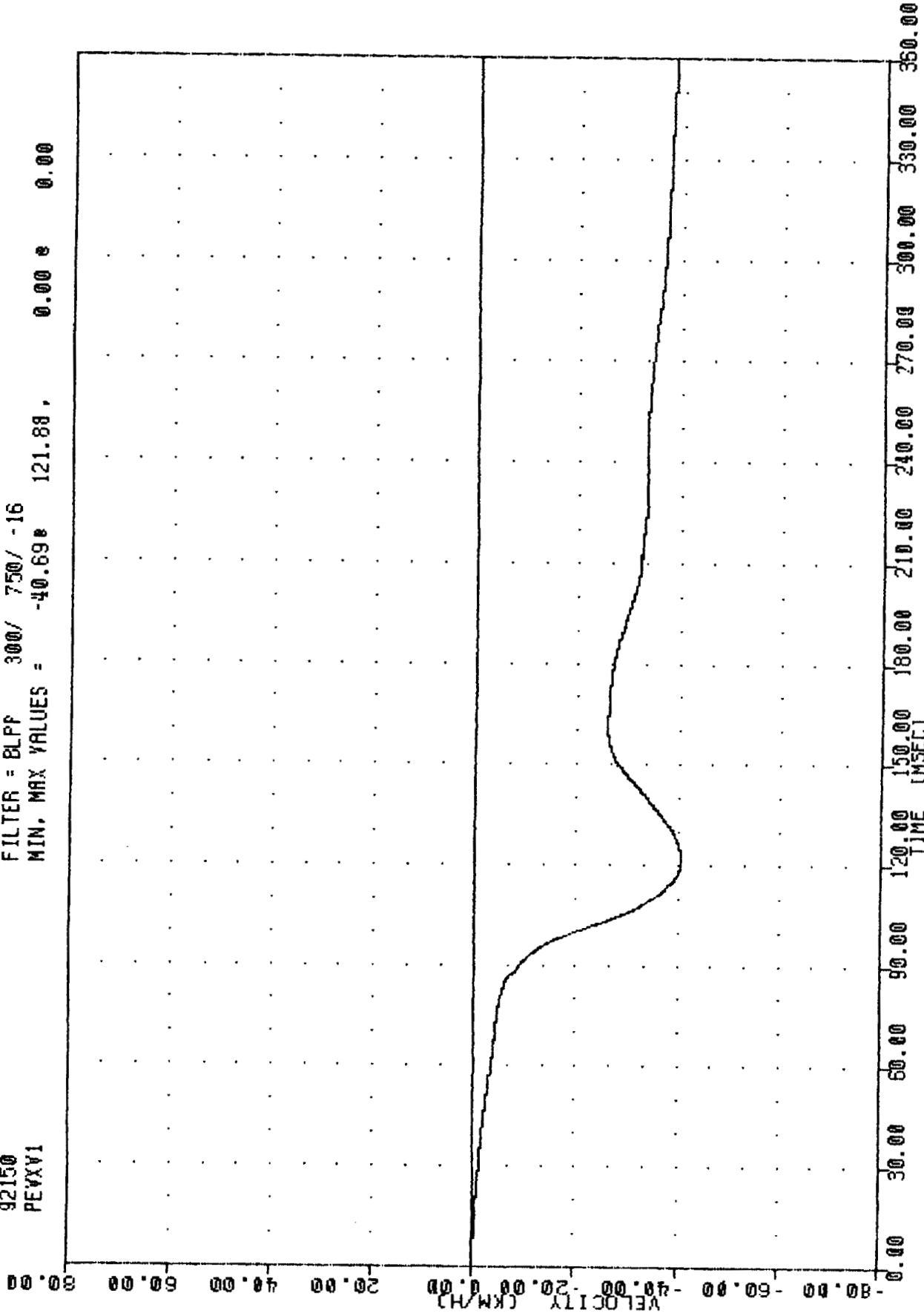
TRC  
92150  
PEVXV1

, 920529

TRUCK INTO STATIONARY CAR

FILTER = BLPF 300/ 750/ -16

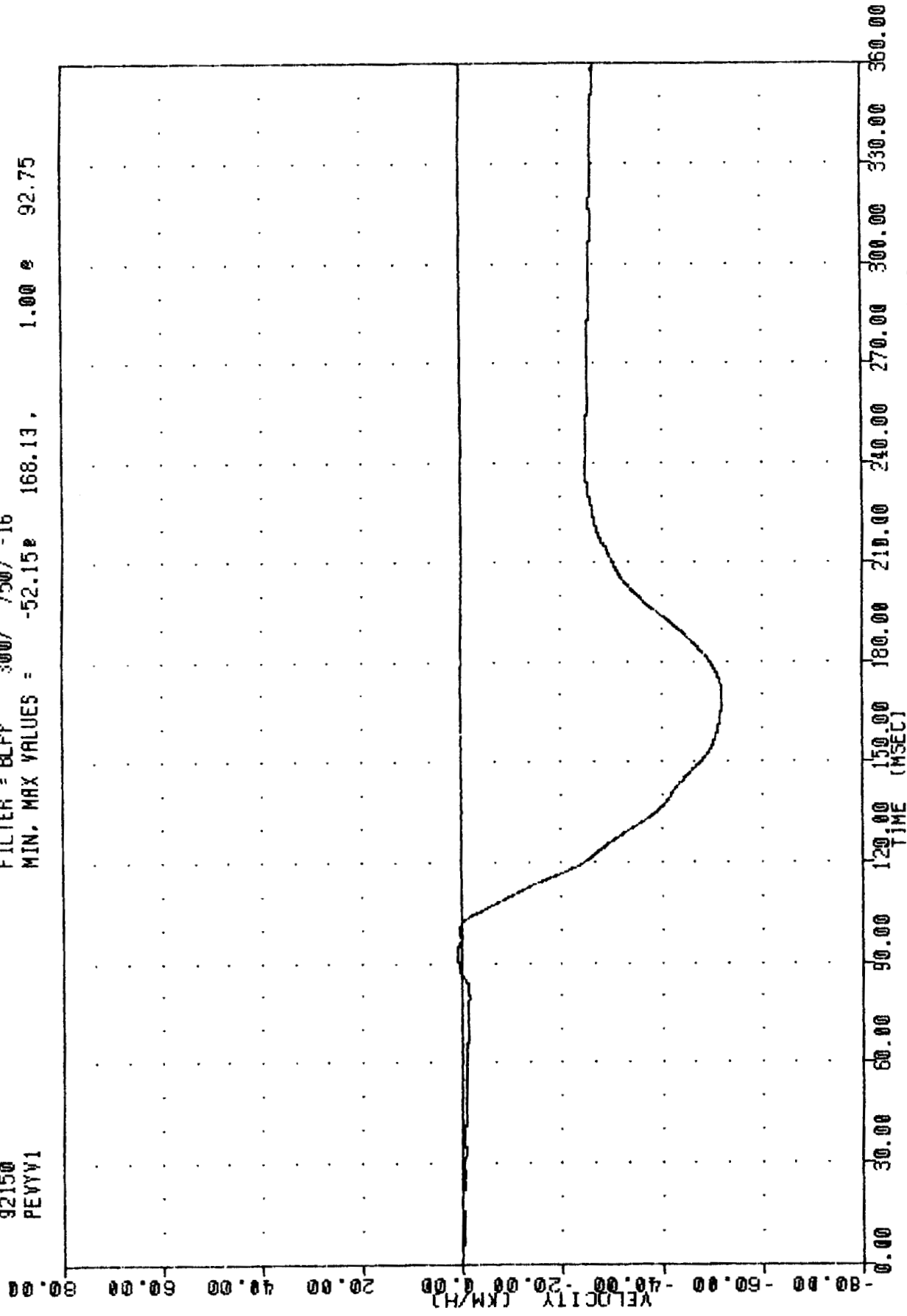
MIN. MAX VALUES = -40.69e 121.88, 0.00 e 0.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER PELVIS X-AXIS VELOCITY

TRC . 920529  
TRUCK INTO STATIONARY CAR  
92150  
PEVYV1

FILTER = BLFP 300/ 750/ -16  
MIN. MAX VALUES = -52.15e 168.13. 1.00 e 92.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER PELVIS Y-AXIS VELOCITY

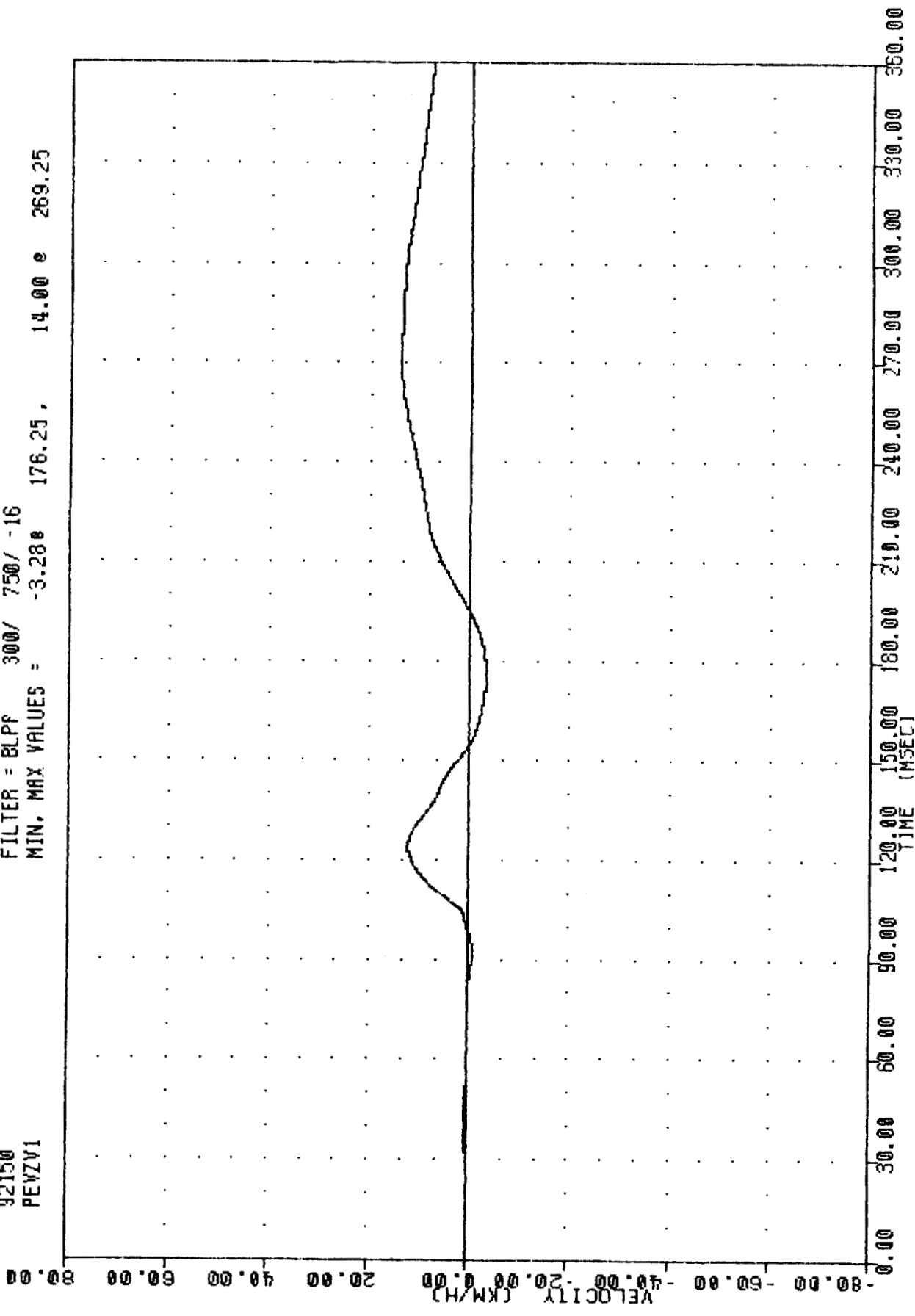
TRC  
92150  
PEVZV1

, 920529

TRUCK INTO STATIONARY CAR

FILTER = BLPF 300/ 750/ -16

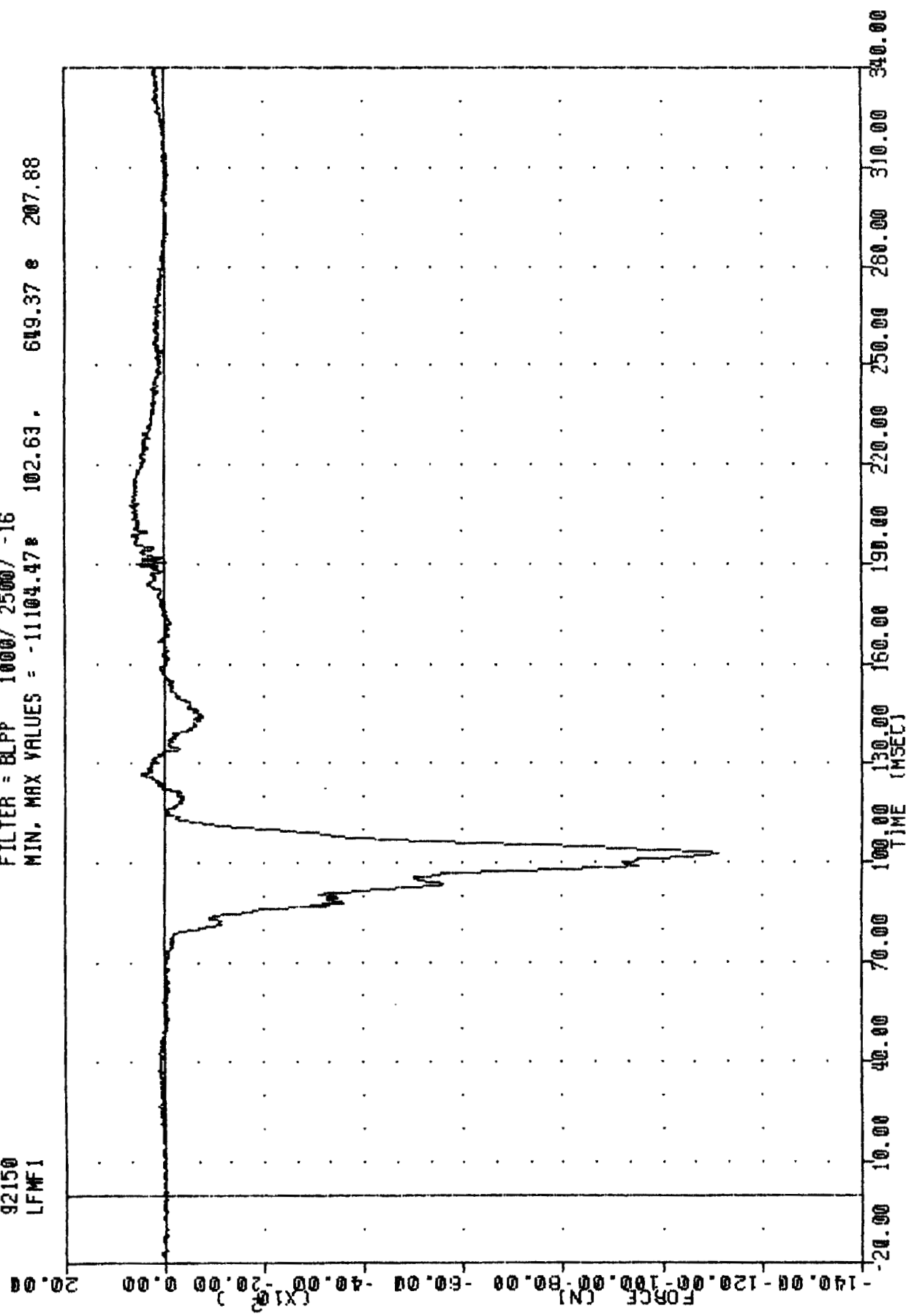
MIN, MAX VALUES = -3.28e 176.25, 14.00 e 269.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER PELVIS Z-AXIS VELOCITY

TRC . 920529  
TRUCK INTO STATIONARY CAR  
92150  
LFMF1

FILTER = BLPP 1000/ 2500/ -16  
MIN. MAX VALUES = -11104.478 102.63 . 649.37 e 207.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER LEFT FEMUR FORCE

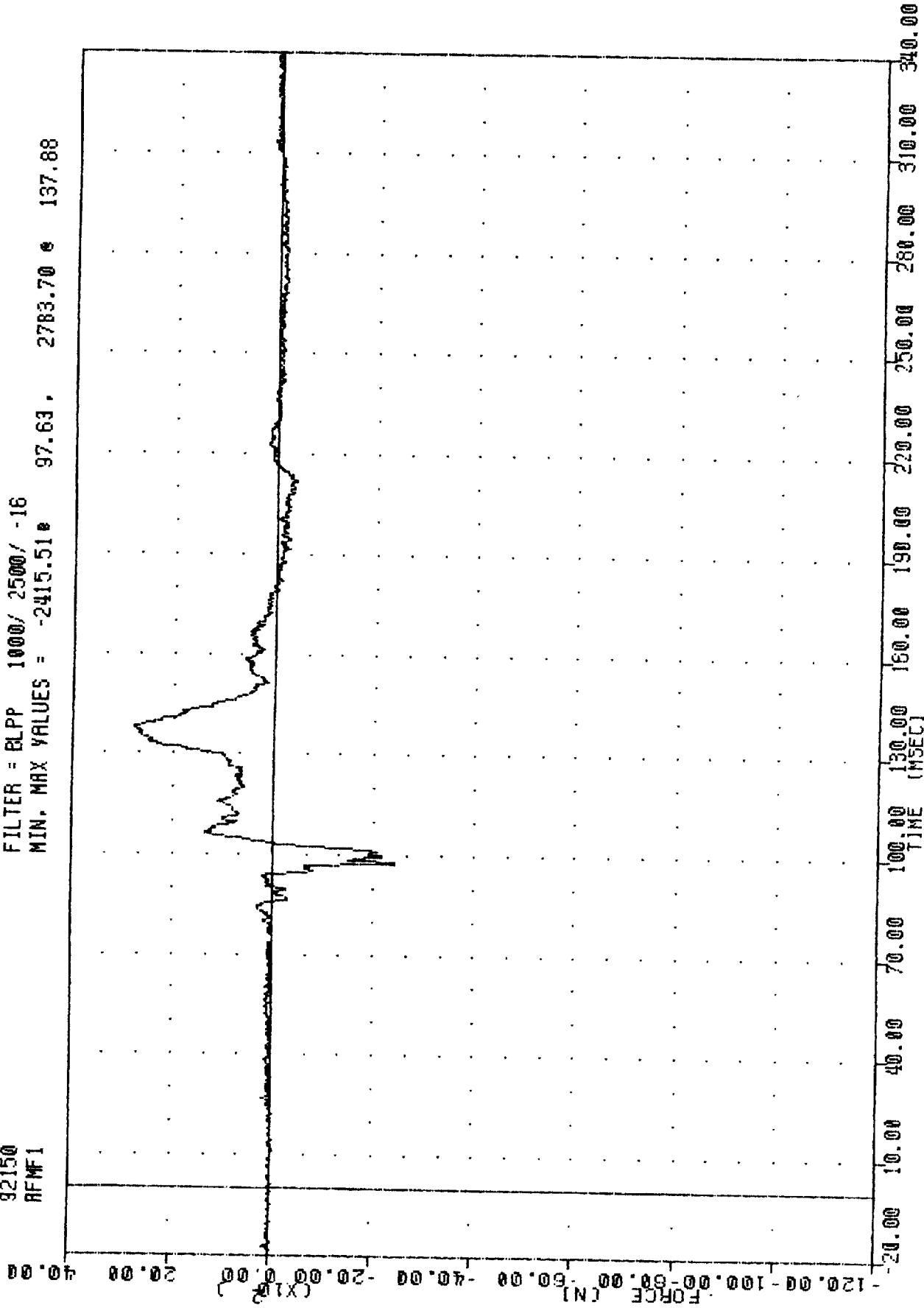
TRC  
92150  
AFMF1

920529

TRUCK INTO STATIONARY CAR

FILTER = BLPP 1000/ 2500/ -16

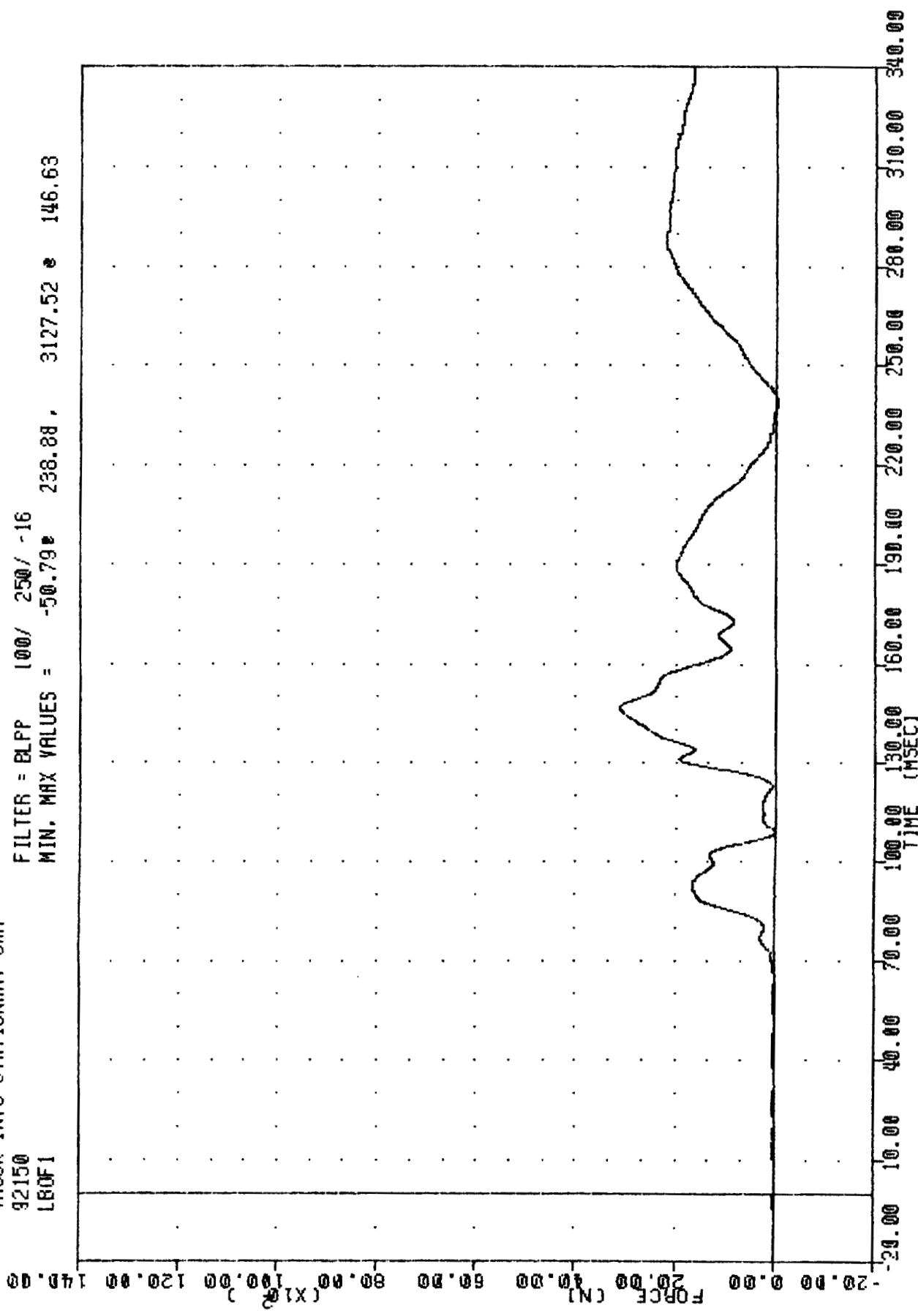
MIN. MAX VALUES = -2415.51e 97.63, 2783.70 e 137.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER RIGHT FEMUR FORCE

TRC , 920529  
 TRUCK INTO STATIONARY CAR  
 92150  
 LB0F1

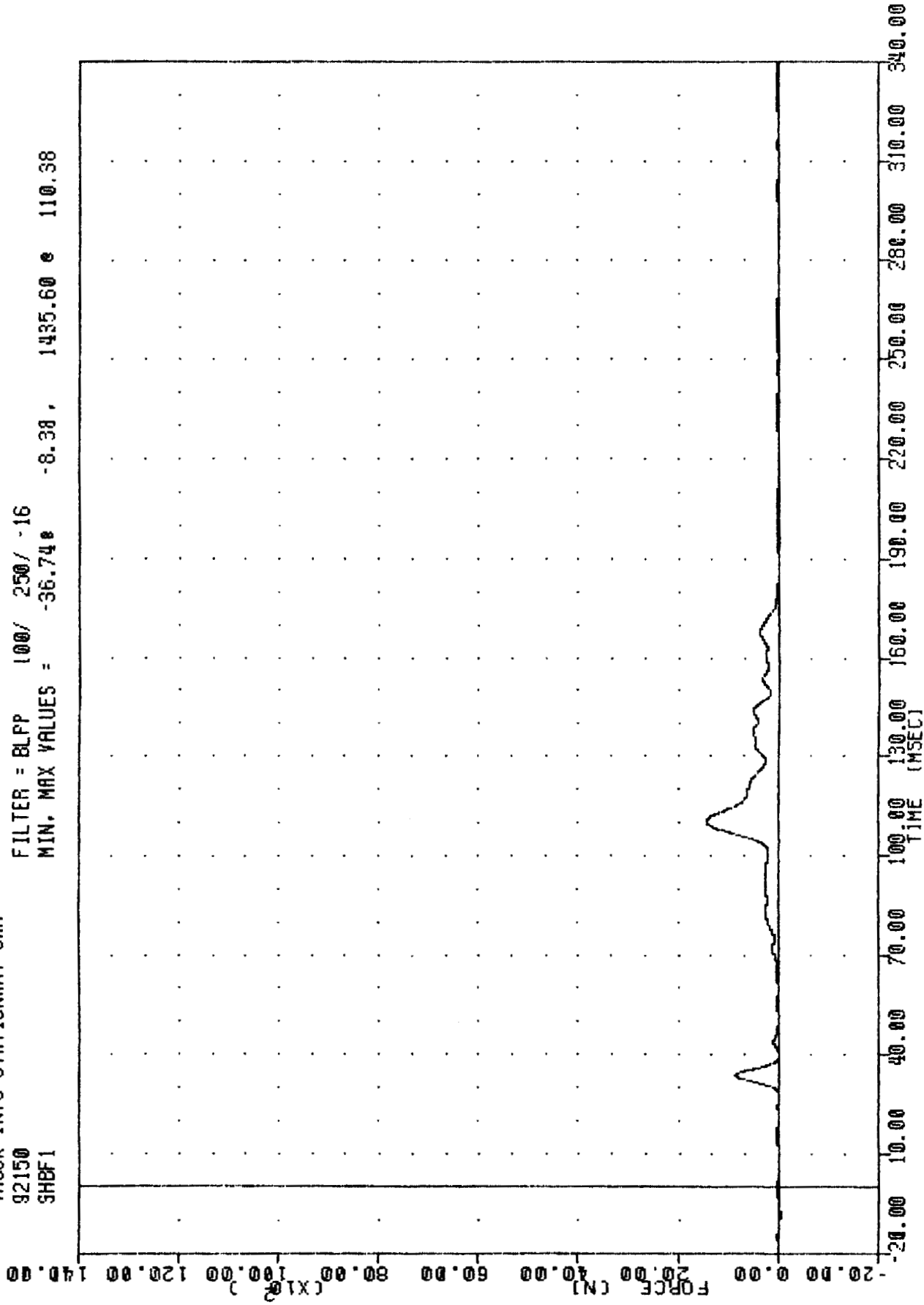
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -50.79 238.88 , 3127.52 146.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
 DRIVER LAP BELT OUTBOARD FORCE

TRC . 920529  
TRUCK INTO STATIONARY CAR  
92150  
SHBF1

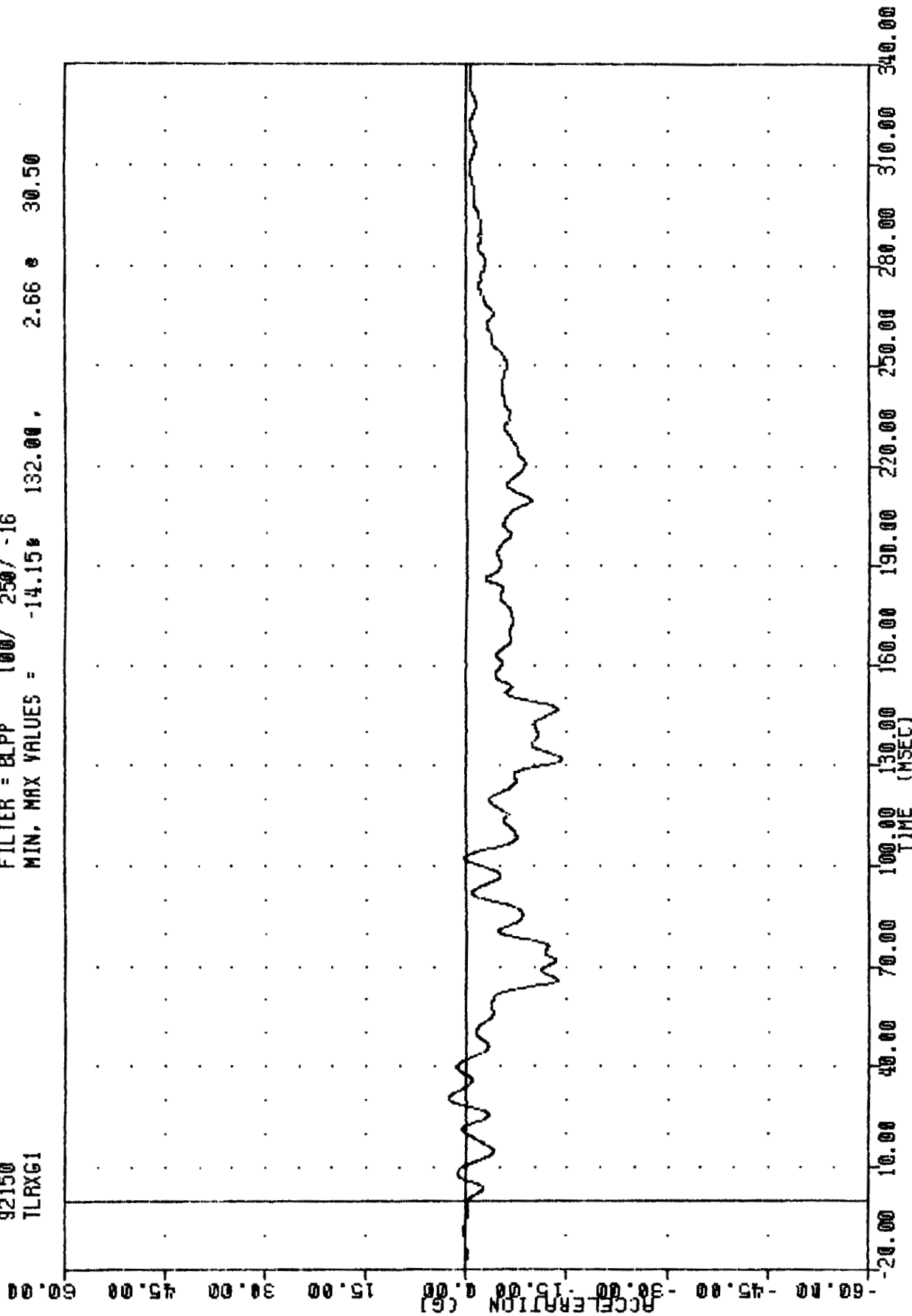
FILTER = BLFP 100/ 250/ -16  
MIN. MAX VALUES = -36.74e -8.38, 1435.60 e 110.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
DRIVER SHOULDER BELT FORCE

TRC  
920529  
TRUCK INTO STATIONARY CAR  
92150  
TLRXG1

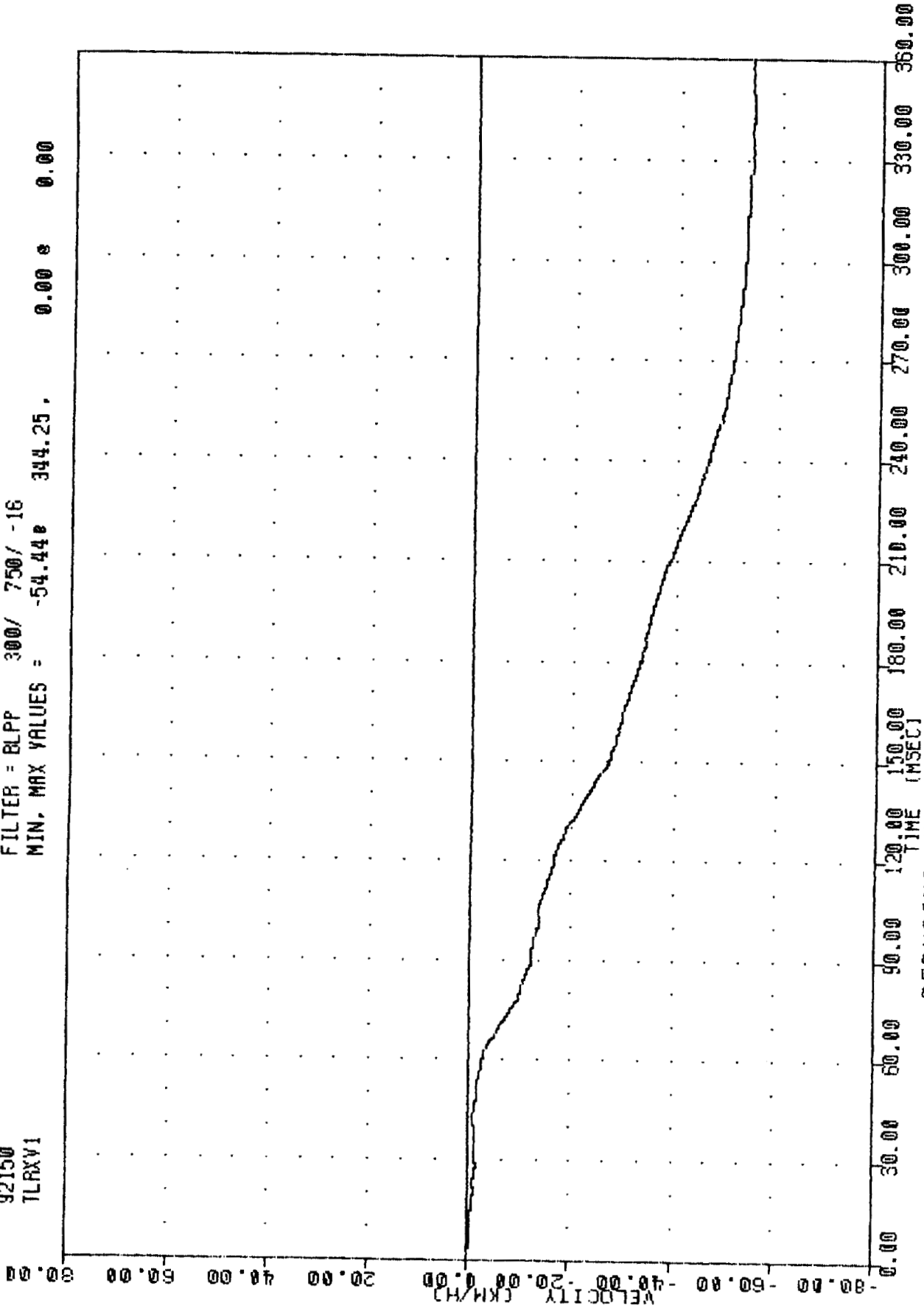
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -14.150 132.00, 2.66 e 30.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
LEFT REAR SEAT X-AXIS ACCELERATION

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
TLRXV1

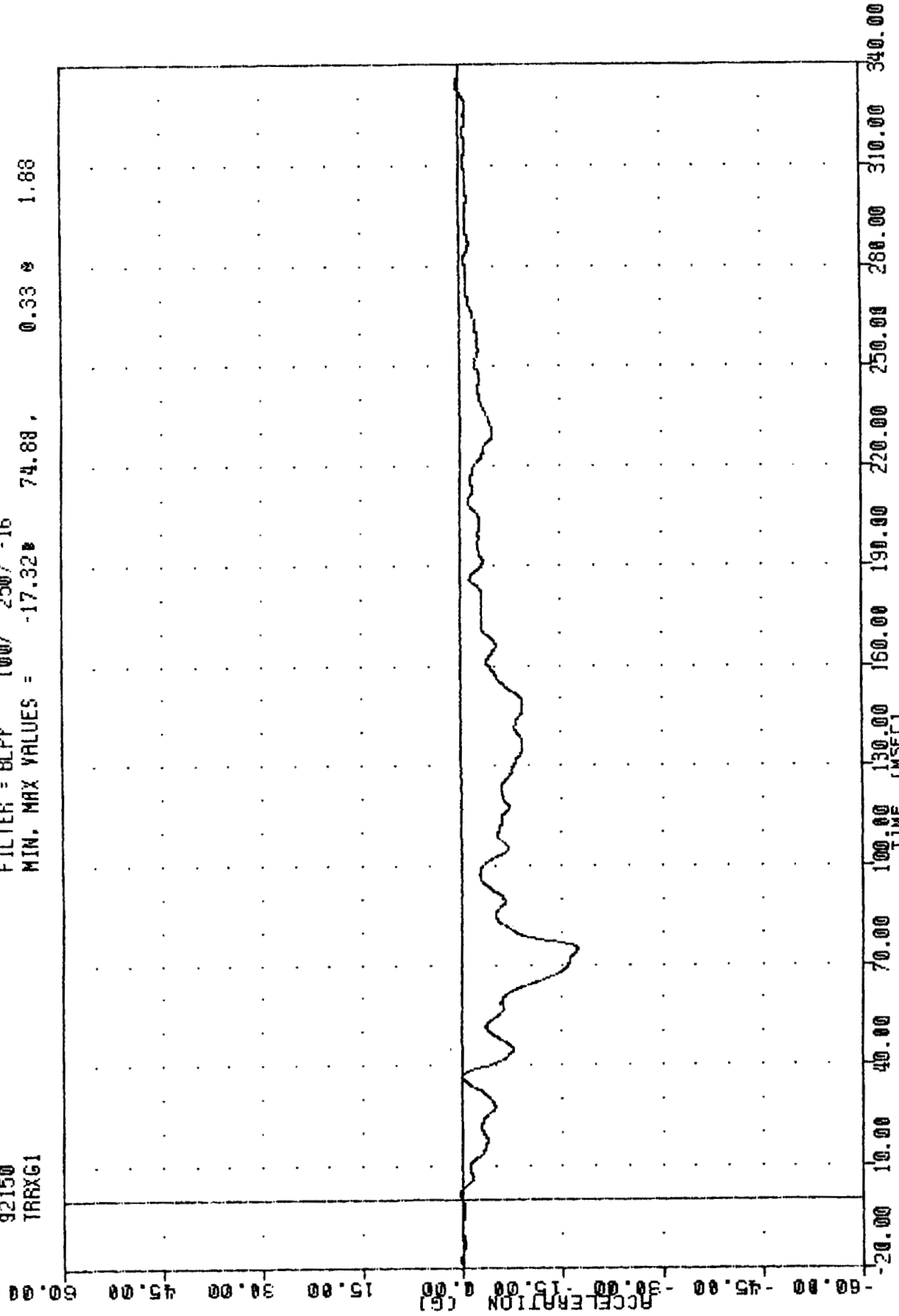
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -54.44e 344.25 . 0.00 e 0.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
LEFT REAR SEAT X-AXIS VELOCITY

TRC  
TRUCK INTO STATIONARY CAR  
92150  
TRRXG1

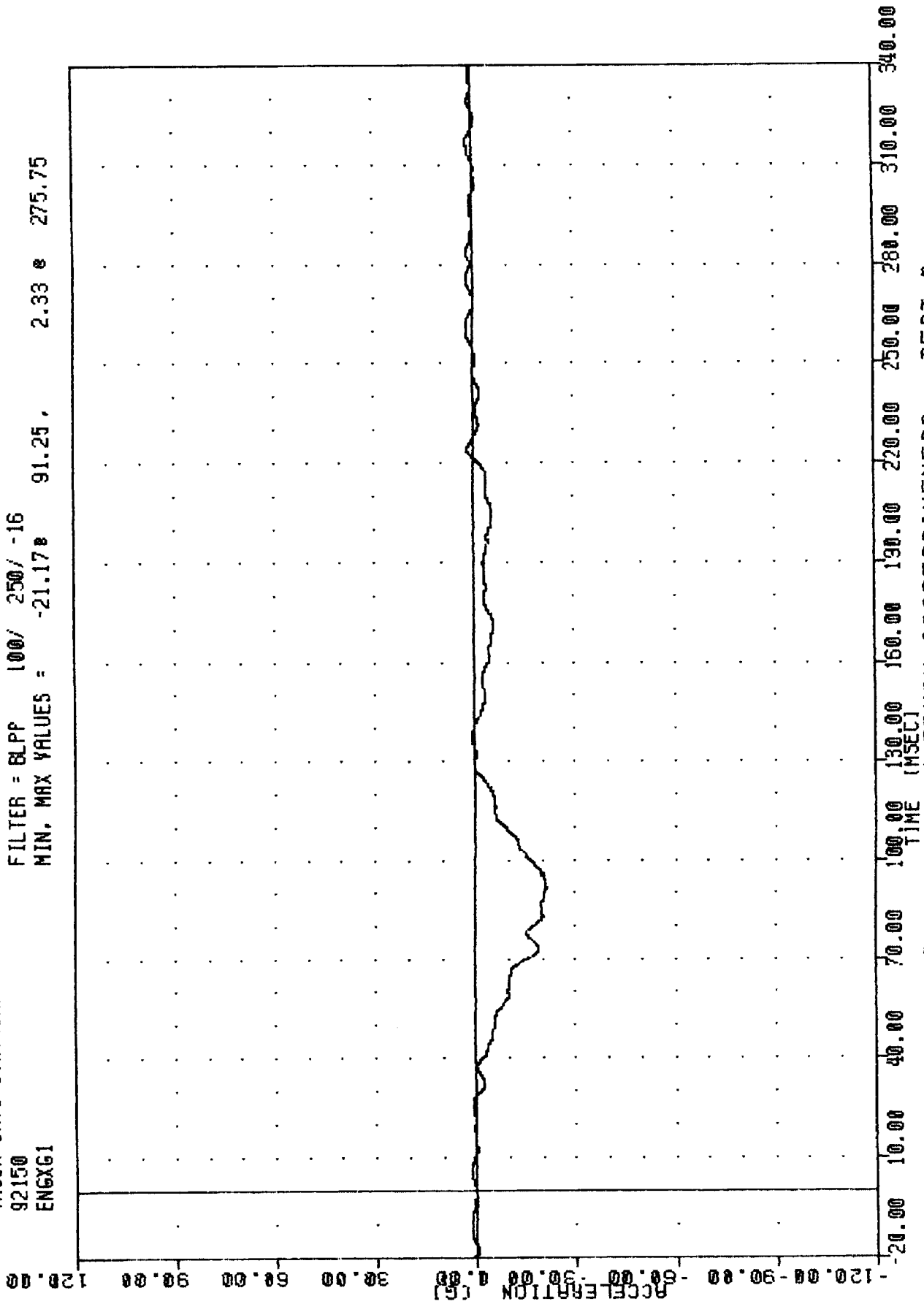
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -17.32 74.88 0.33 1.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
RIGHT REAR SEAT X-AXIS ACCELERATION

TRC 920529  
TRUCK INTO STATIONARY CAR  
92150  
ENGXG1

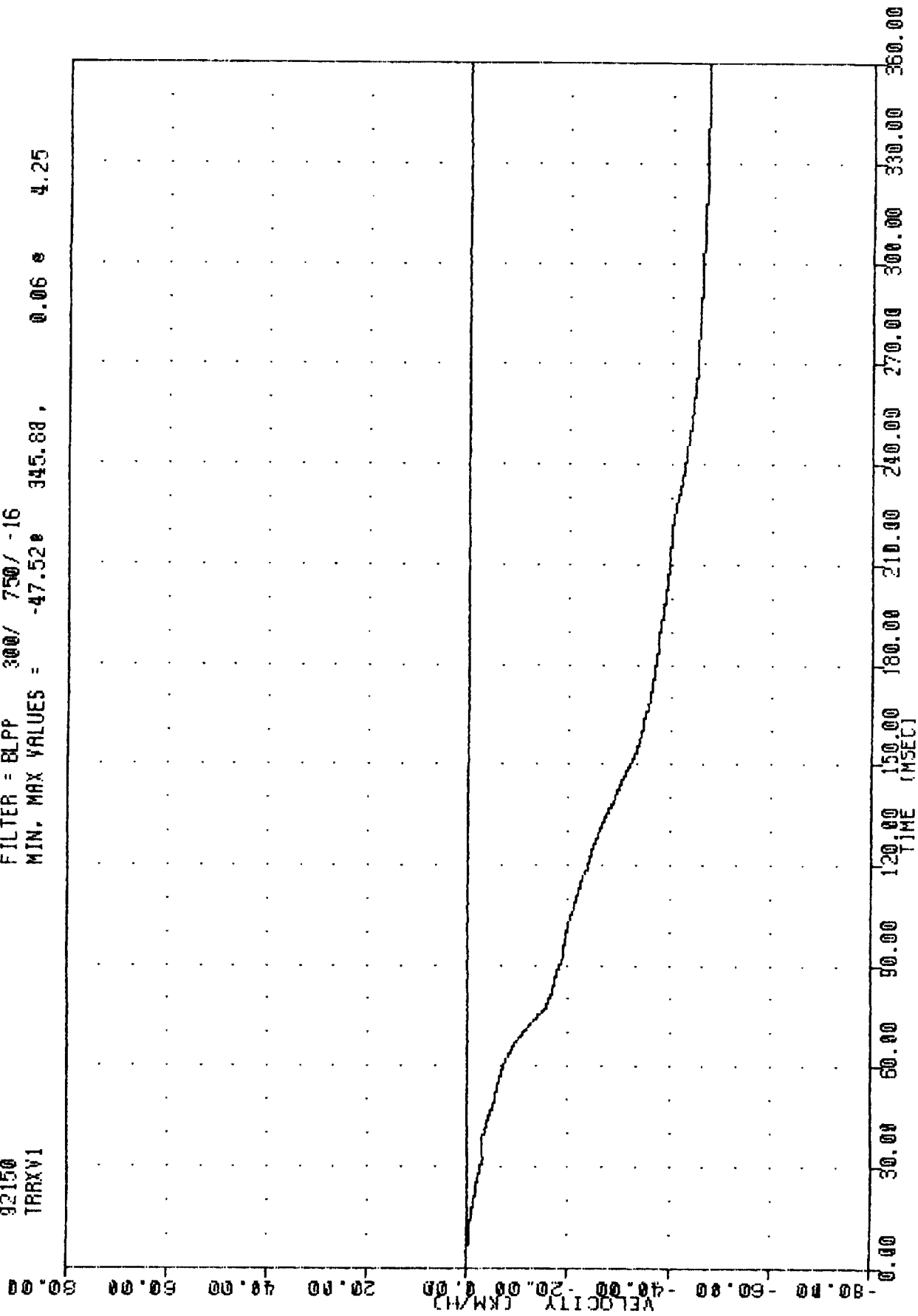
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -21.17% 91.25, 2.33 e 275.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
ENGINE TOP X-AXIS ACCELERATION

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
TRRXV1

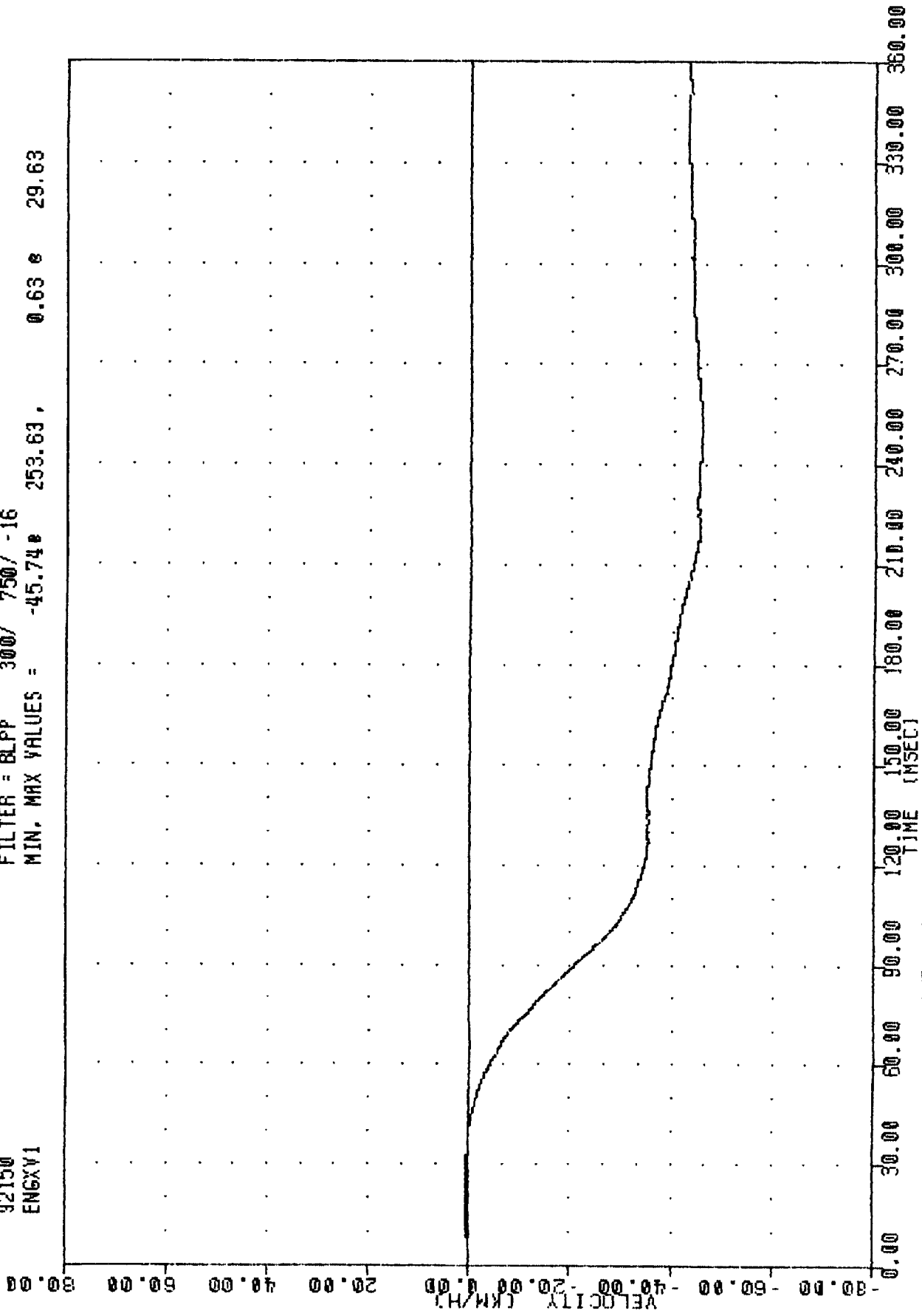
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -47.52 345.88 , 0.06 4.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
RIGHT REAR SEAT X-AXIS VELOCITY

TRC  
TRUCK INTO STATIONARY CAR  
92150  
ENGV1

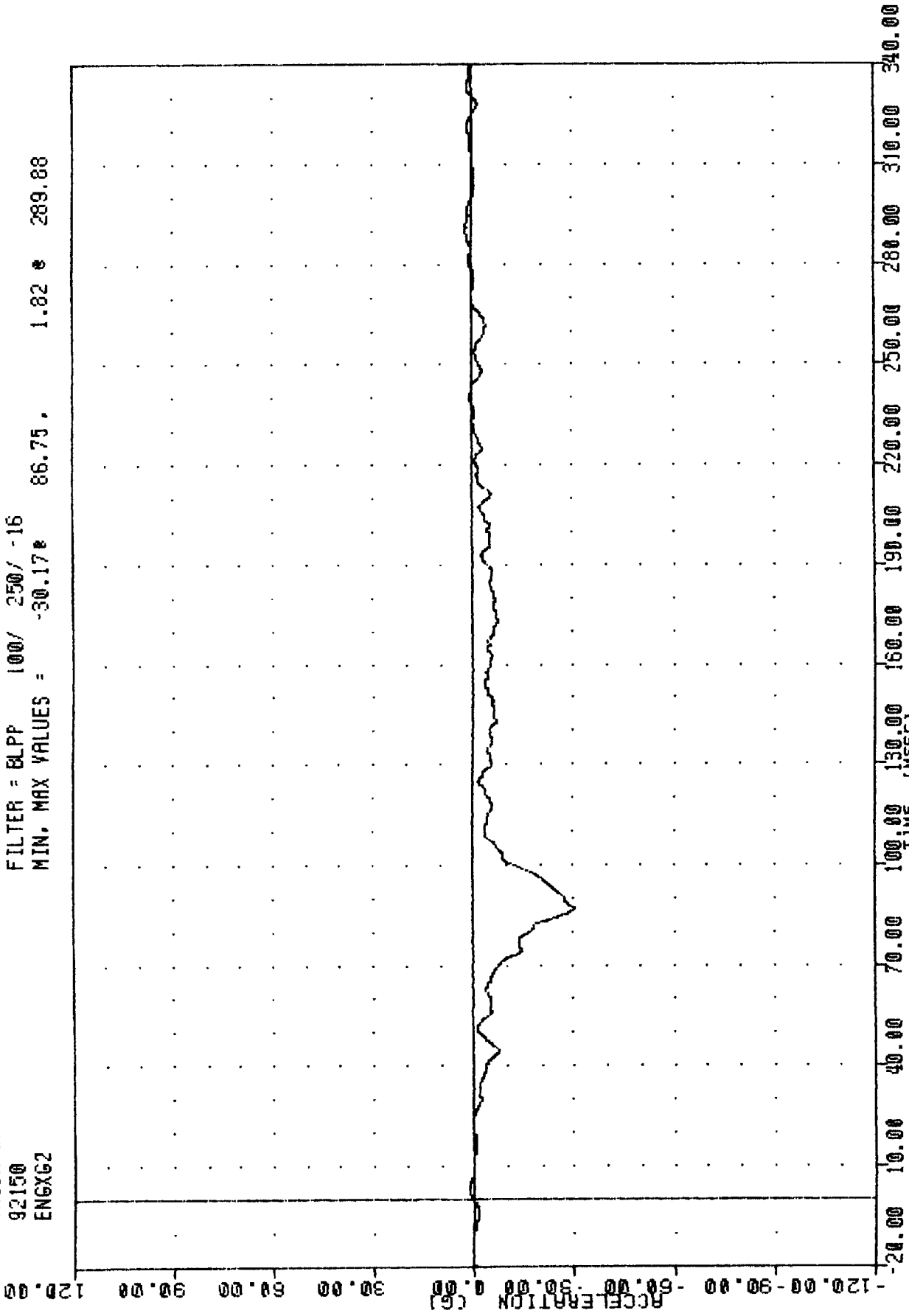
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -45.74 253.63, 0.63 29.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
ENGINE TOP X-AXIS VELOCITY

TRC 920529  
TRUCK INTO STATIONARY CAR  
92150  
ENGXG2

FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -30.17 86.75 1.82 289.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
ENGINE BOTTOM X-AXIS ACCELERATION

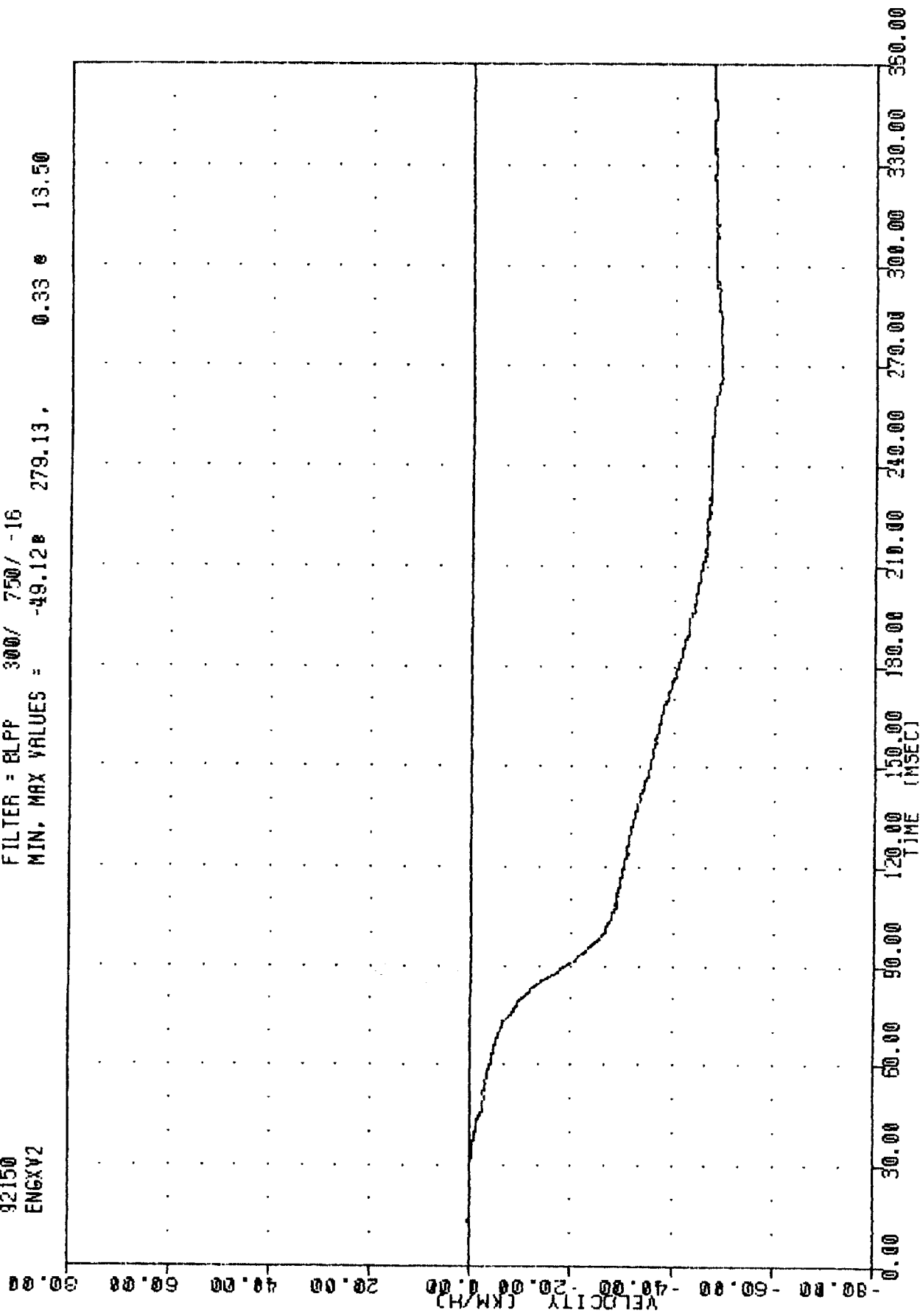
TRC  
92150  
ENGXV2

920529

TRUCK INTO STATIONARY CAR

FILTER = BLPP 300/ 750/ -16

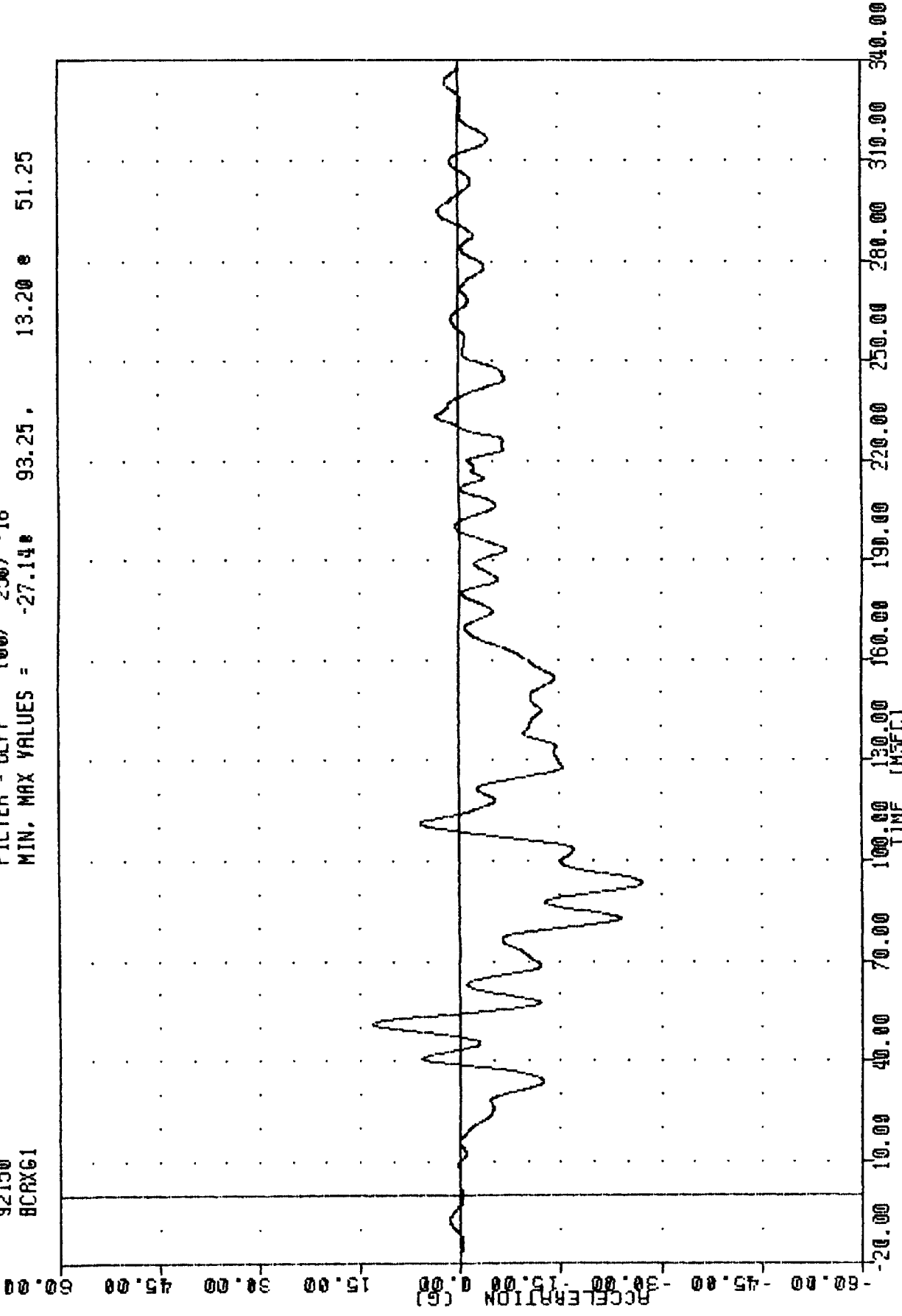
MIN. MAX VALUES = -49.12 279.13 0.33 13.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
ENGINE BOTTOM X-AXIS VELOCITY

TRC  
920529  
TRUCK INTO STATIONARY CAR  
92150  
BCRX61

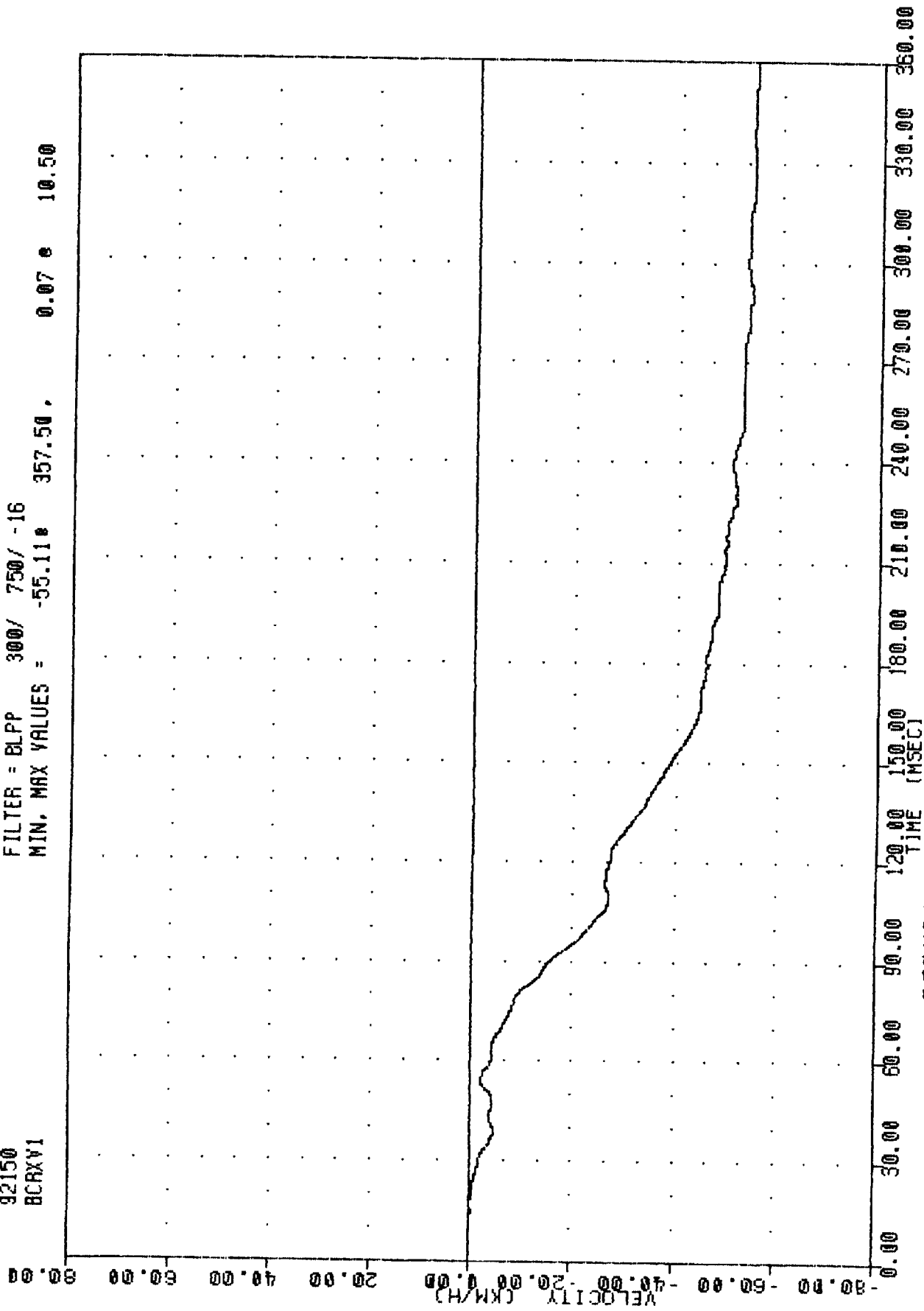
FILTER = 8LPP 100/ 250/ -16  
MIN, MAX VALUES = -27.14 93.25, 13.20 51.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
BCRXV1

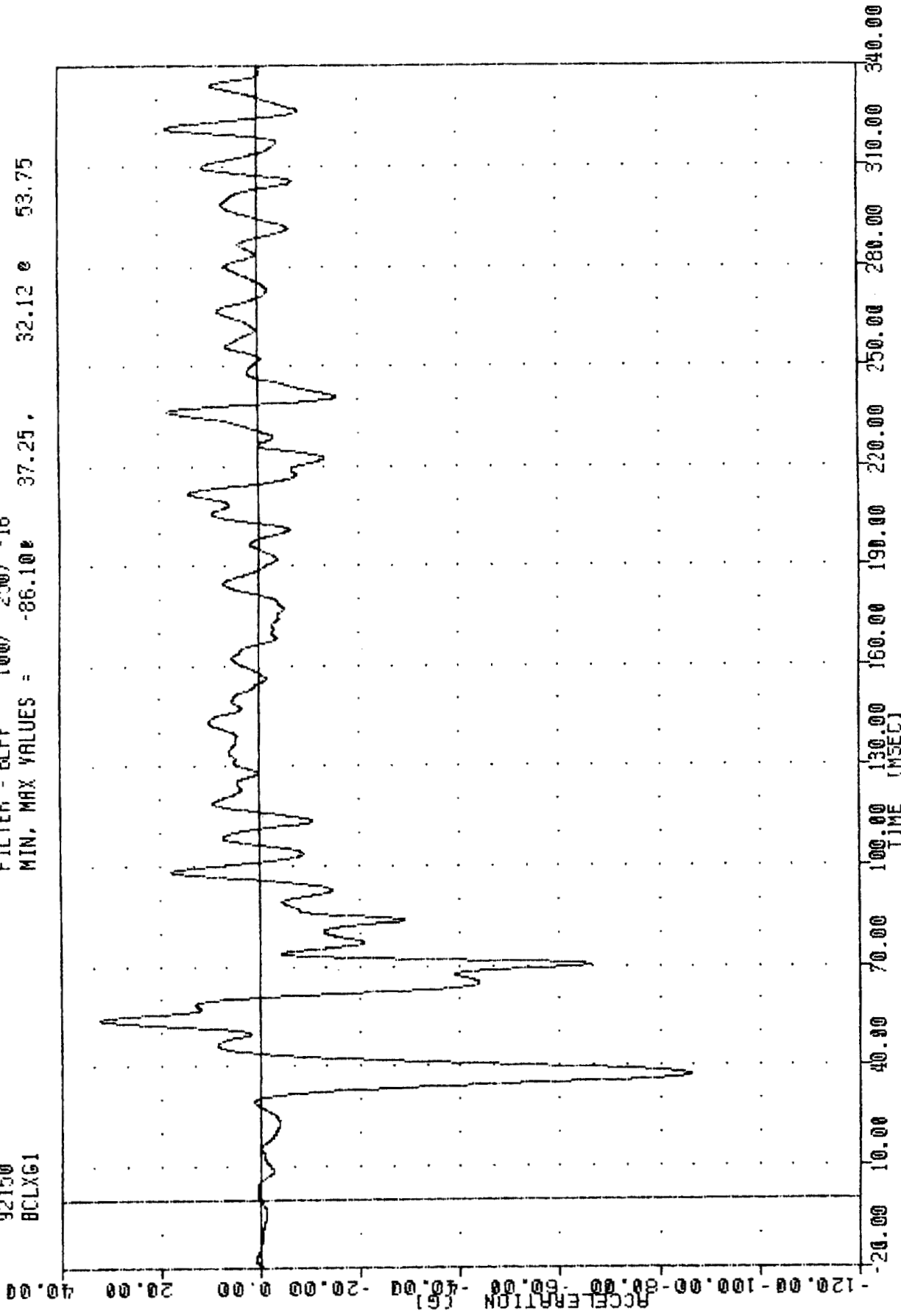
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -55.11 357.50 0.07 10.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
RIGHT BRAKE CALIPER X-AXIS VELOCITY

TRC  
920529  
TRUCK INTO STATIONARY CAR  
92150  
BCLXG1

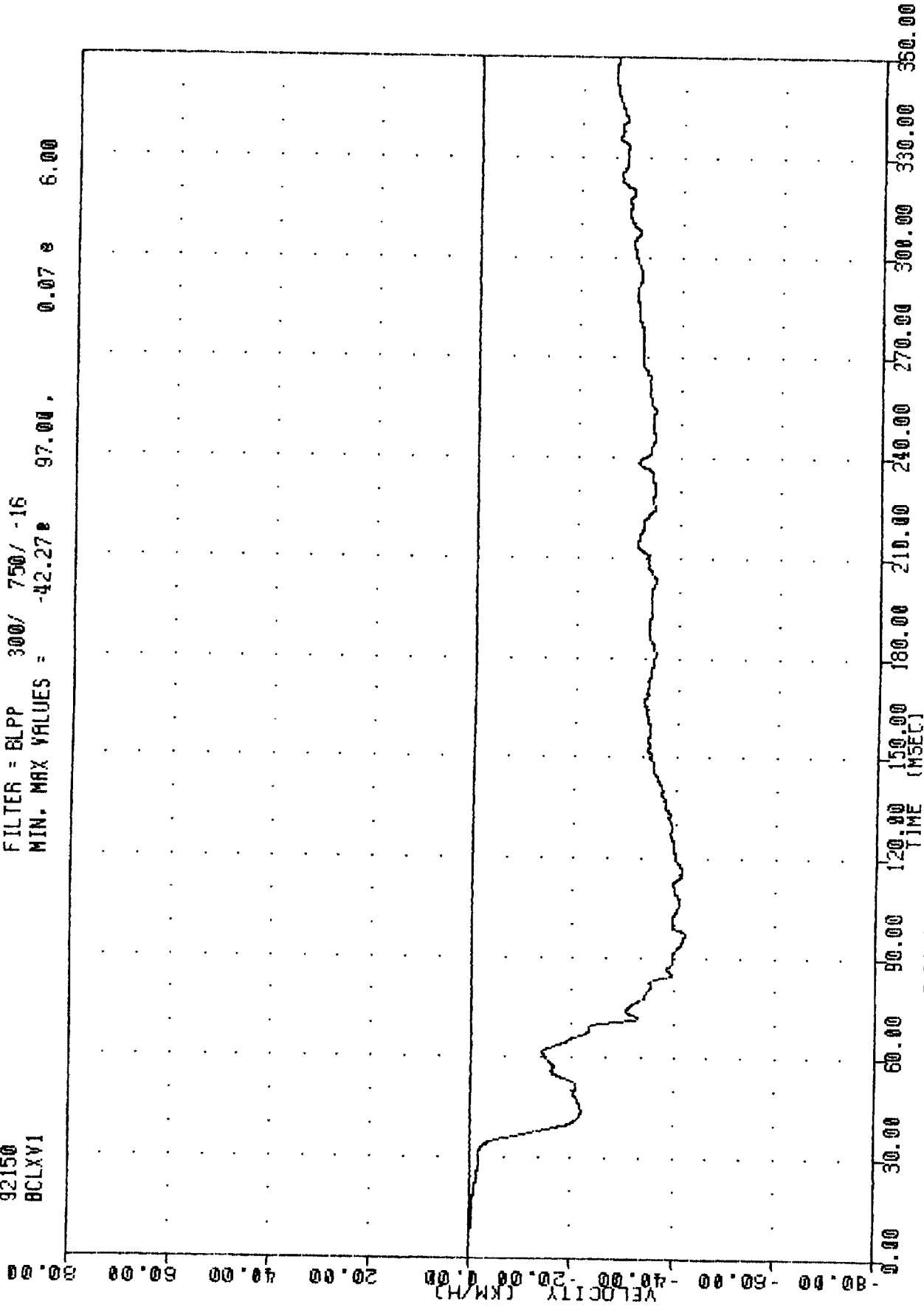
FILTER = BLFF 100/ 250/ -16  
MIN, MAX VALUES = -86.10e 32.12 e 53.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
BCLXV1

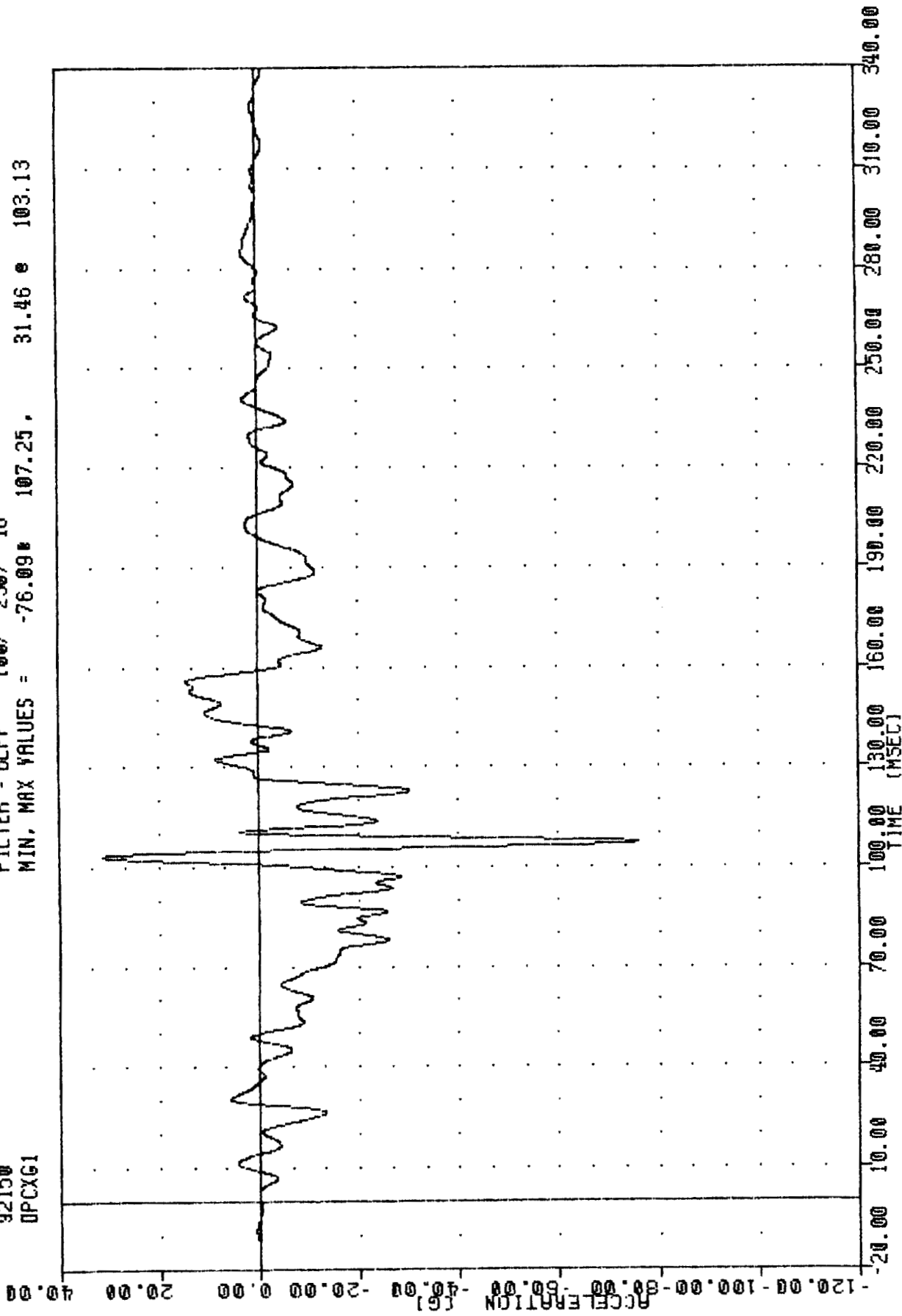
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -42.27 e 97.00 , 0.07 e 6.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
LEFT BRAKE CALIPER X-AXIS VELOCITY

TRC 920529  
TRUCK INTO STATIONARY CAR  
92150  
DPCXG1

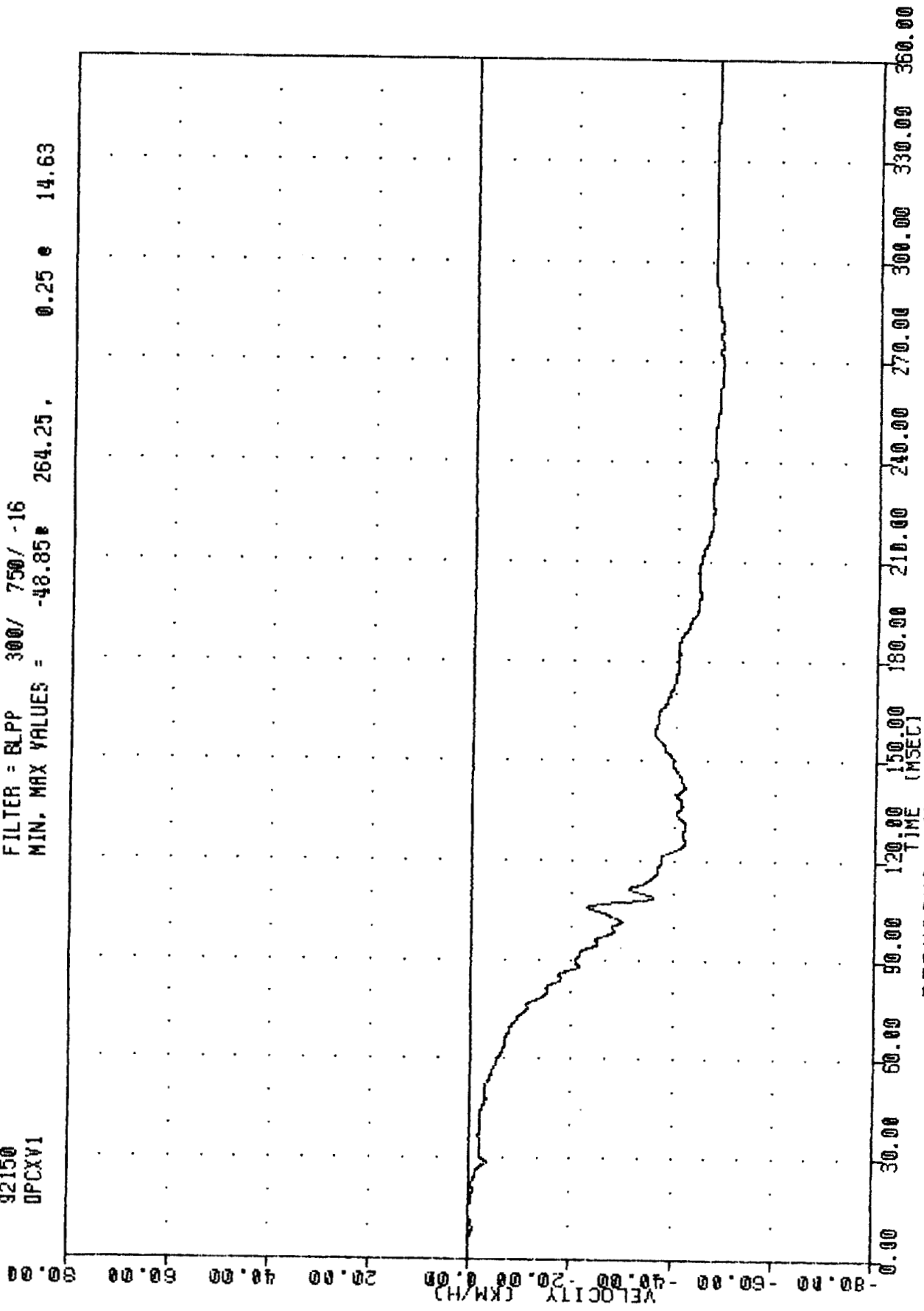
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -76.09 107.25, 31.46 e 103.13



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
DPCXV1

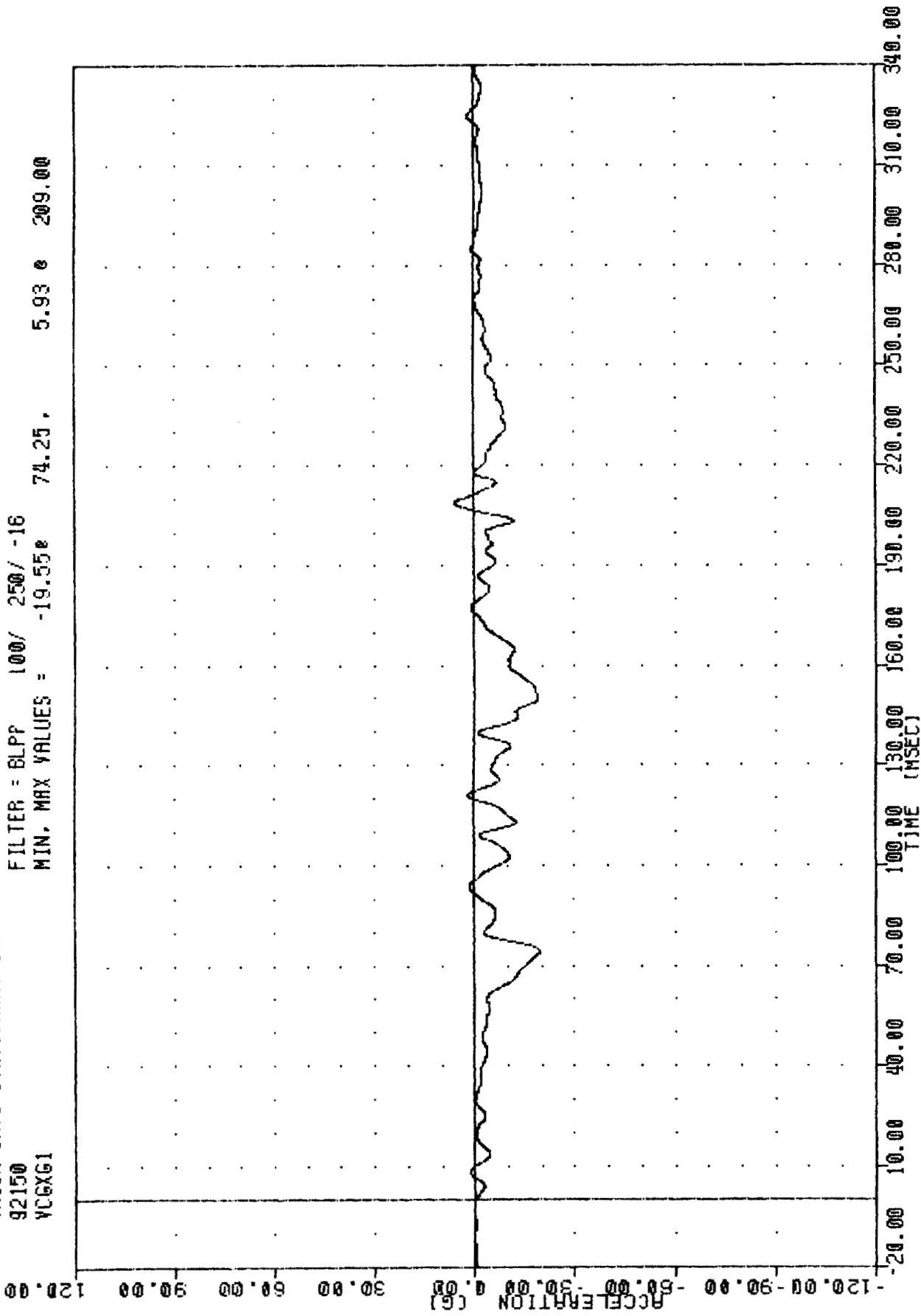
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -48.85 264.25 0.25 e 14.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
INSTRUMENT PANEL CENTER X-AXIS VELOCITY

TRC 920529  
TRUCK INTO STATIONARY CAR  
92150  
YCGXG1

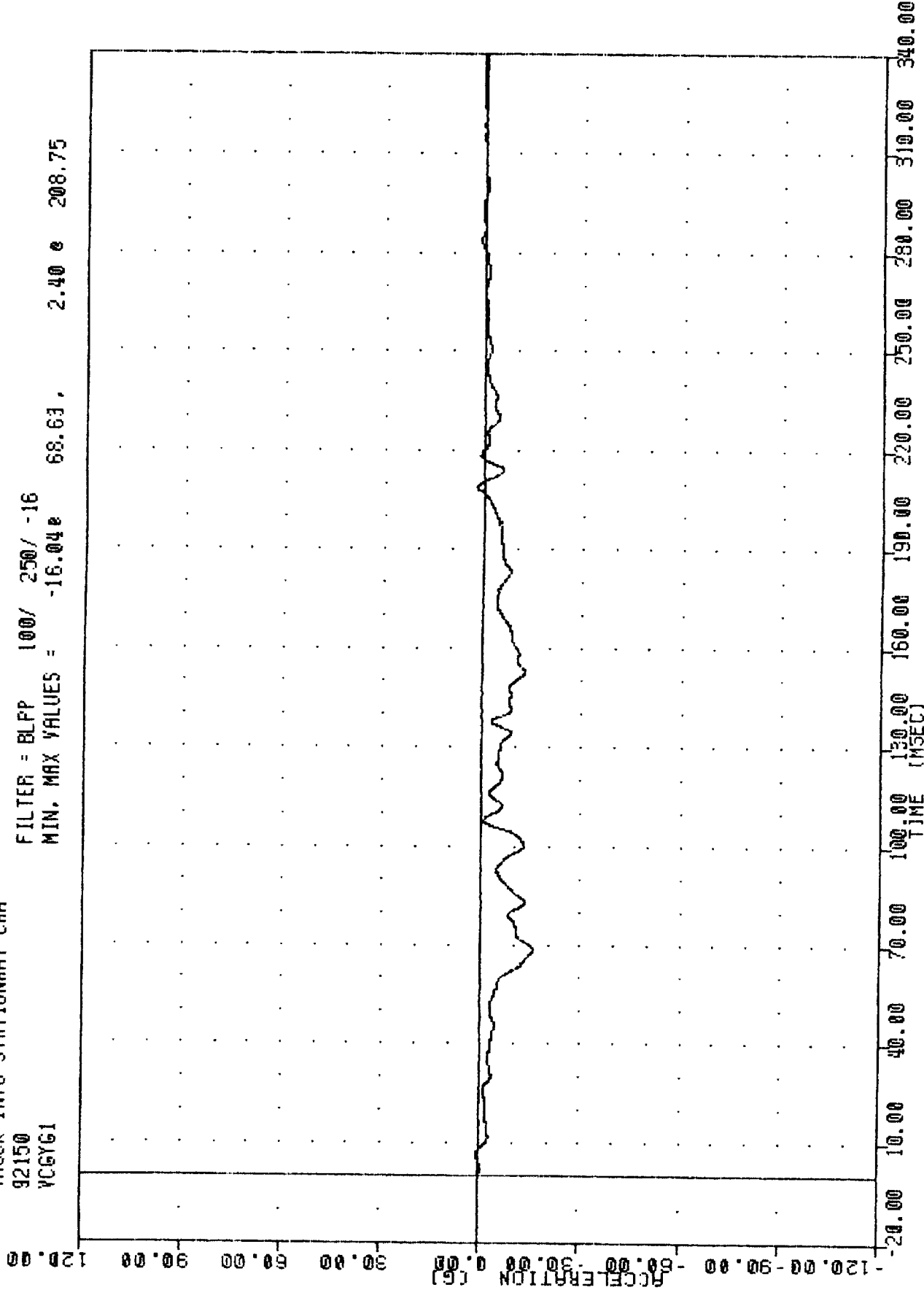
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -19.55e 74.25 . 5.93 e 209.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
CAR CENTER OF GRAVITY X-AXIS ACCELERATION

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
VCGYG1

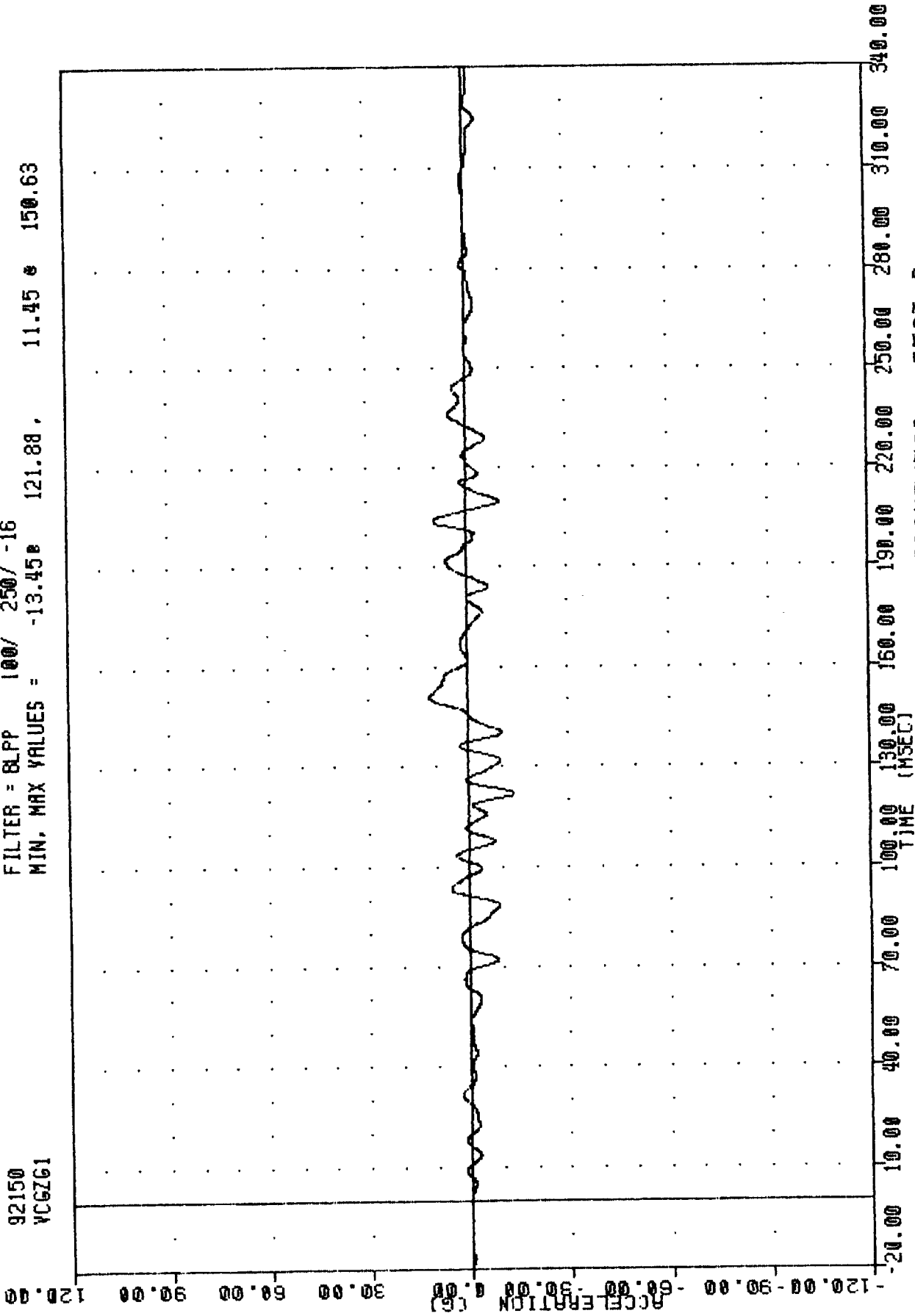
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -16.04e 68.63, 2.40 e 208.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
CAR CENTER OF GRAVITY Y-AXIS ACCELERATION

TRC  
TRUCK INTO STATIONARY CAR  
92150  
YCGZG1

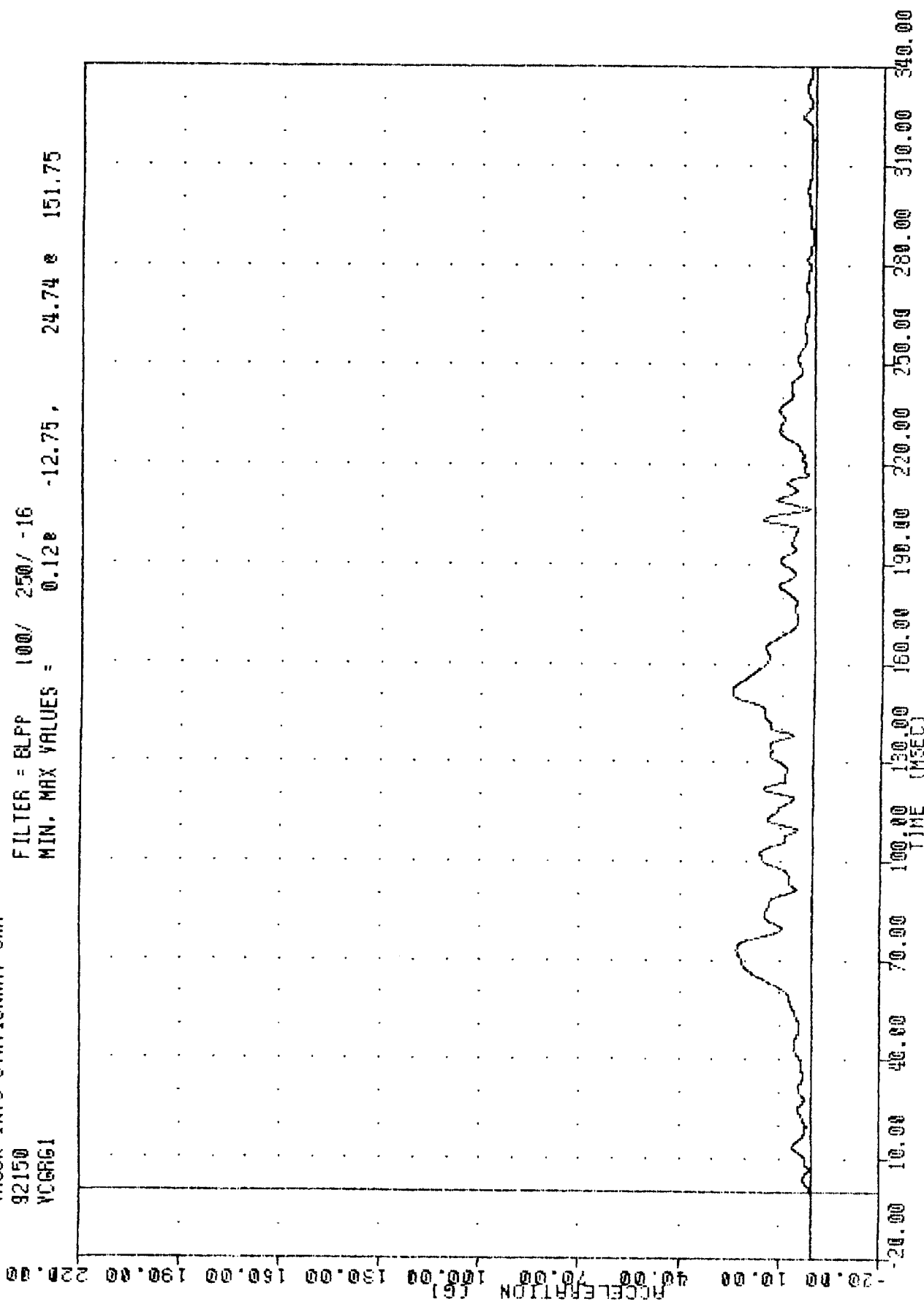
FILTER = 8LPP 100/ 250/ -16  
MIN. MAX VALUES = -13.45 121.88 11.45 150.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
CAR CENTER OF GRAVITY Z-AXIS ACCELERATION

TRC  
920529  
TRUCK INTO STATIONARY CAR  
92150  
VCGR61

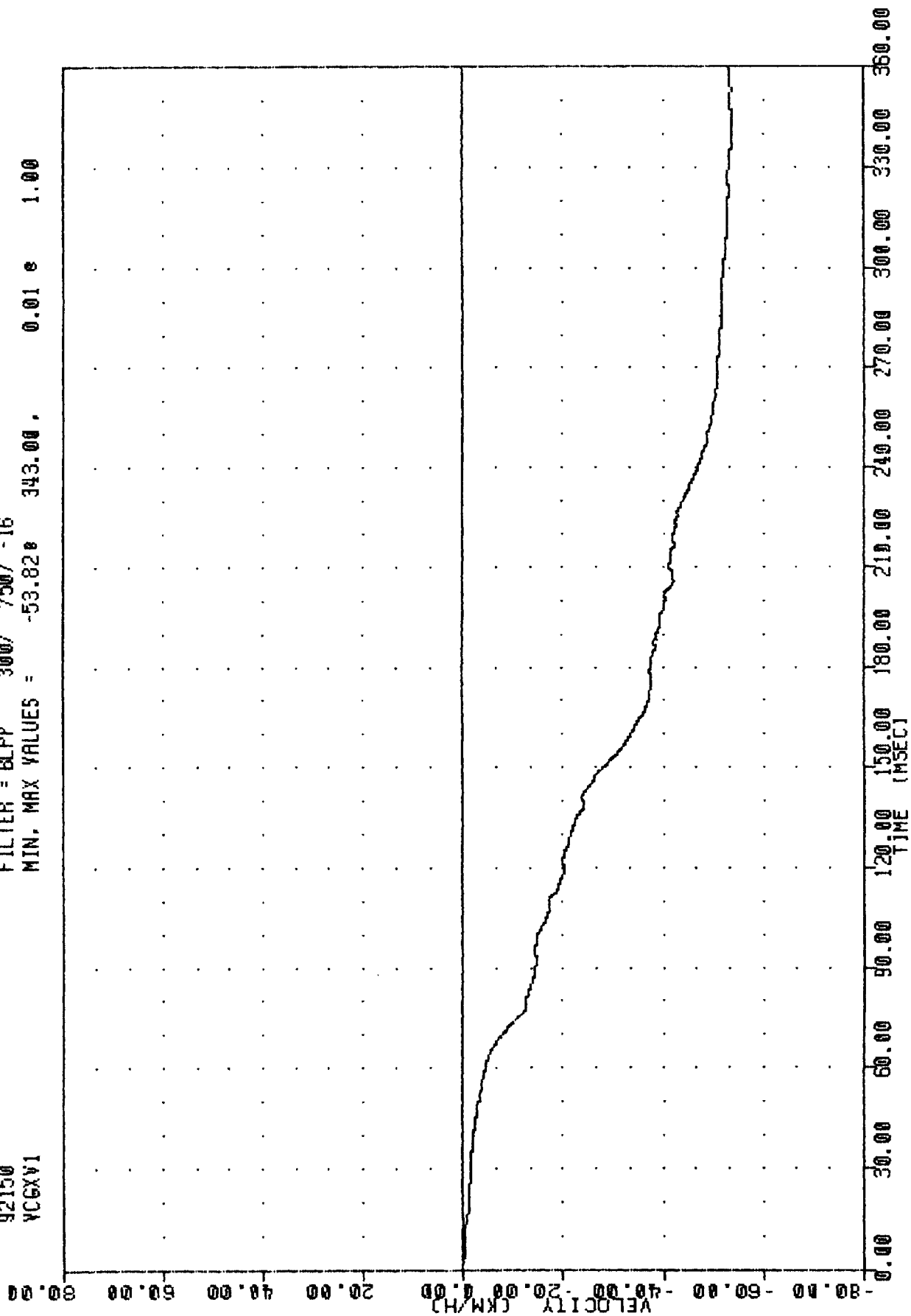
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = 0.12e -12.75, 24.74 e 151.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
CAR CENTER OF GRAVITY RESULTANT ACCELERATION

TRC  
TRUCK INTO STATIONARY CAR  
92150  
YC6XV1

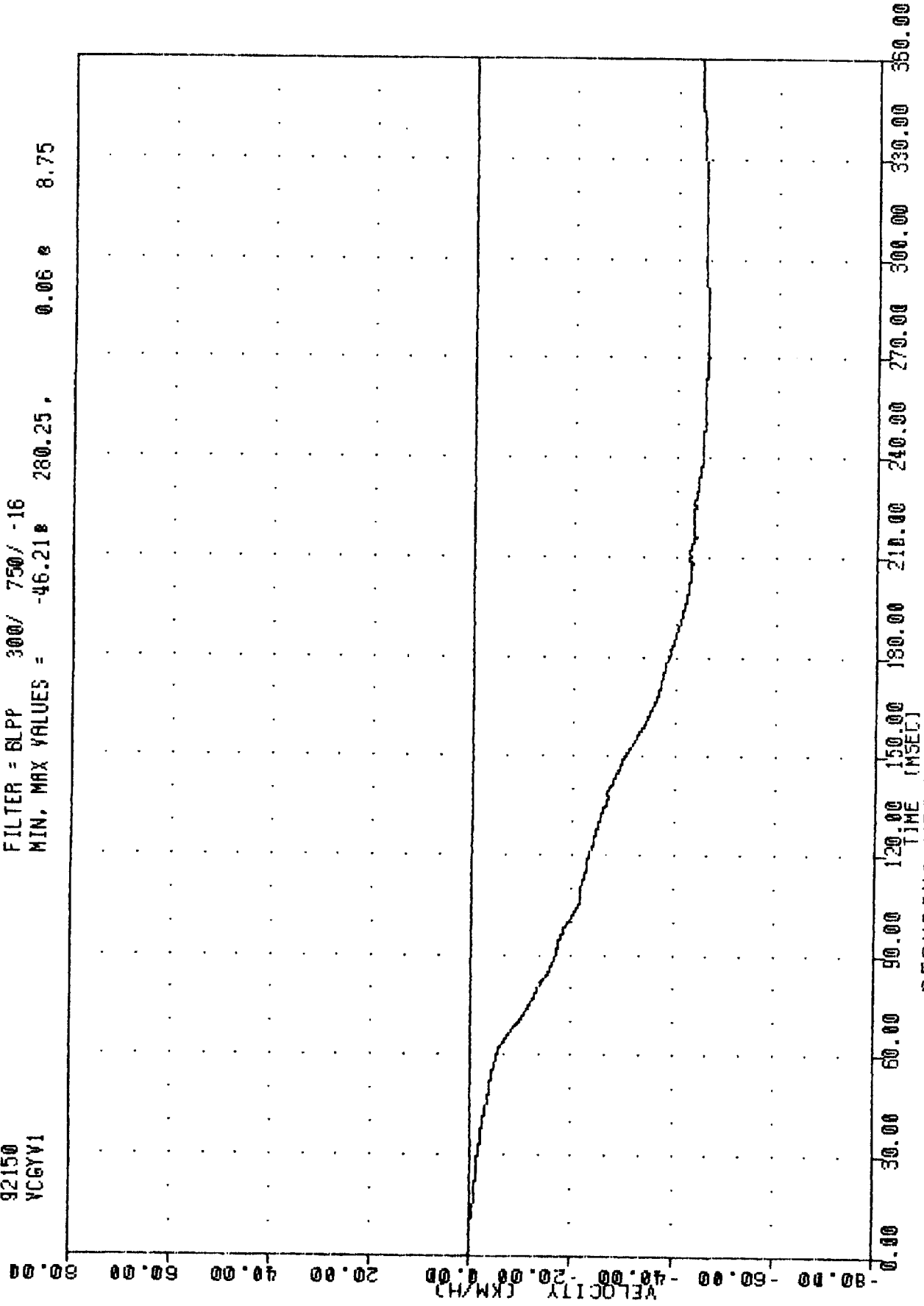
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -53.82 343.00 0.01 e 1.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
CAR CENTER OF GRAVITY X-AXIS VELOCITY

TRC .920529  
TRUCK INTO STATIONARY CAR  
92150  
YCGYV1

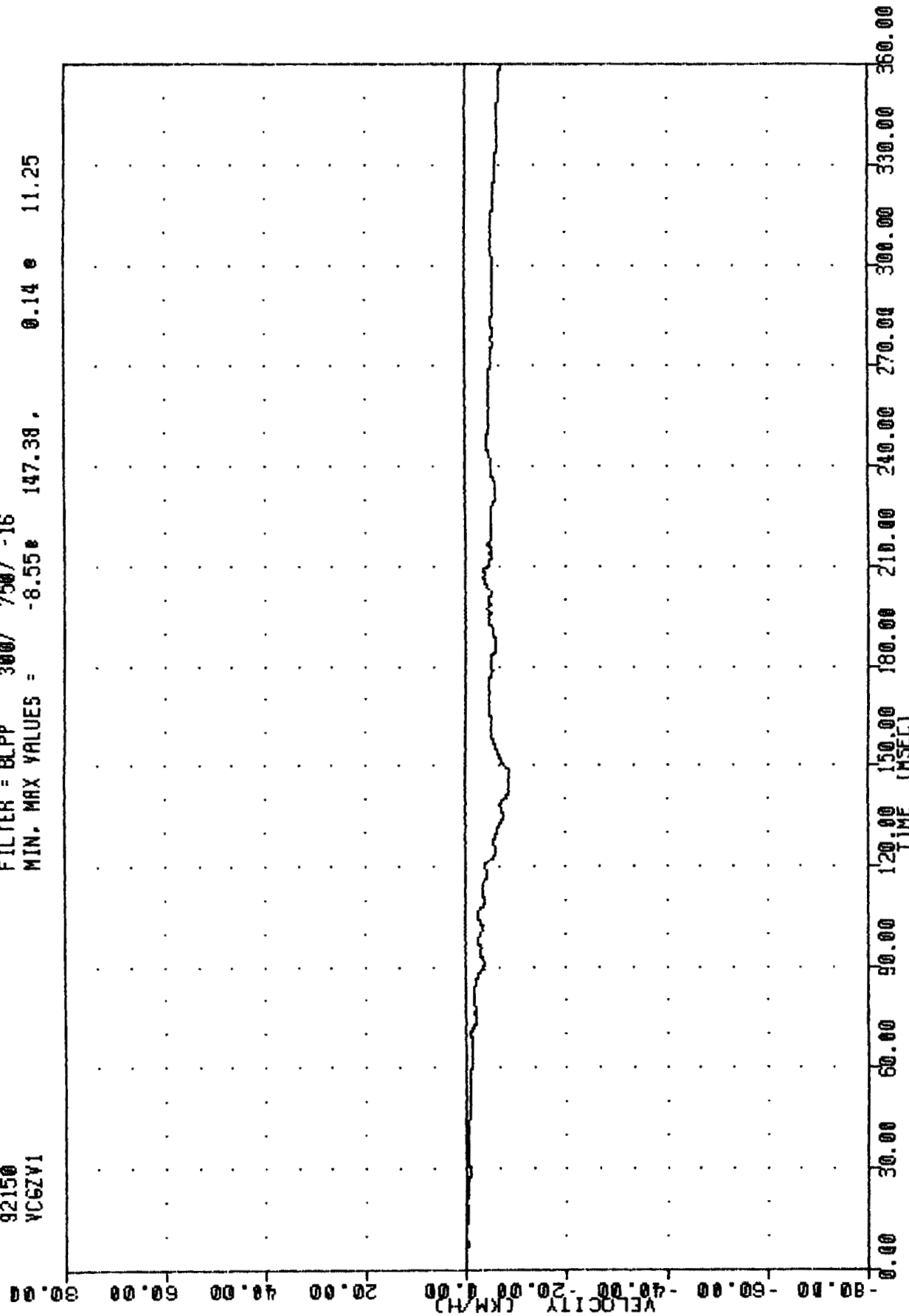
FILTER = BLPP 300/ 750/ -16  
MIN, MAX VALUES = -46.21 280.25 0.06 8.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
CAR CENTER OF GRAVITY Y-AXIS VELOCITY

TRC . 920529  
TRUCK INTO STATIONARY CAR  
92150  
YC6ZV1

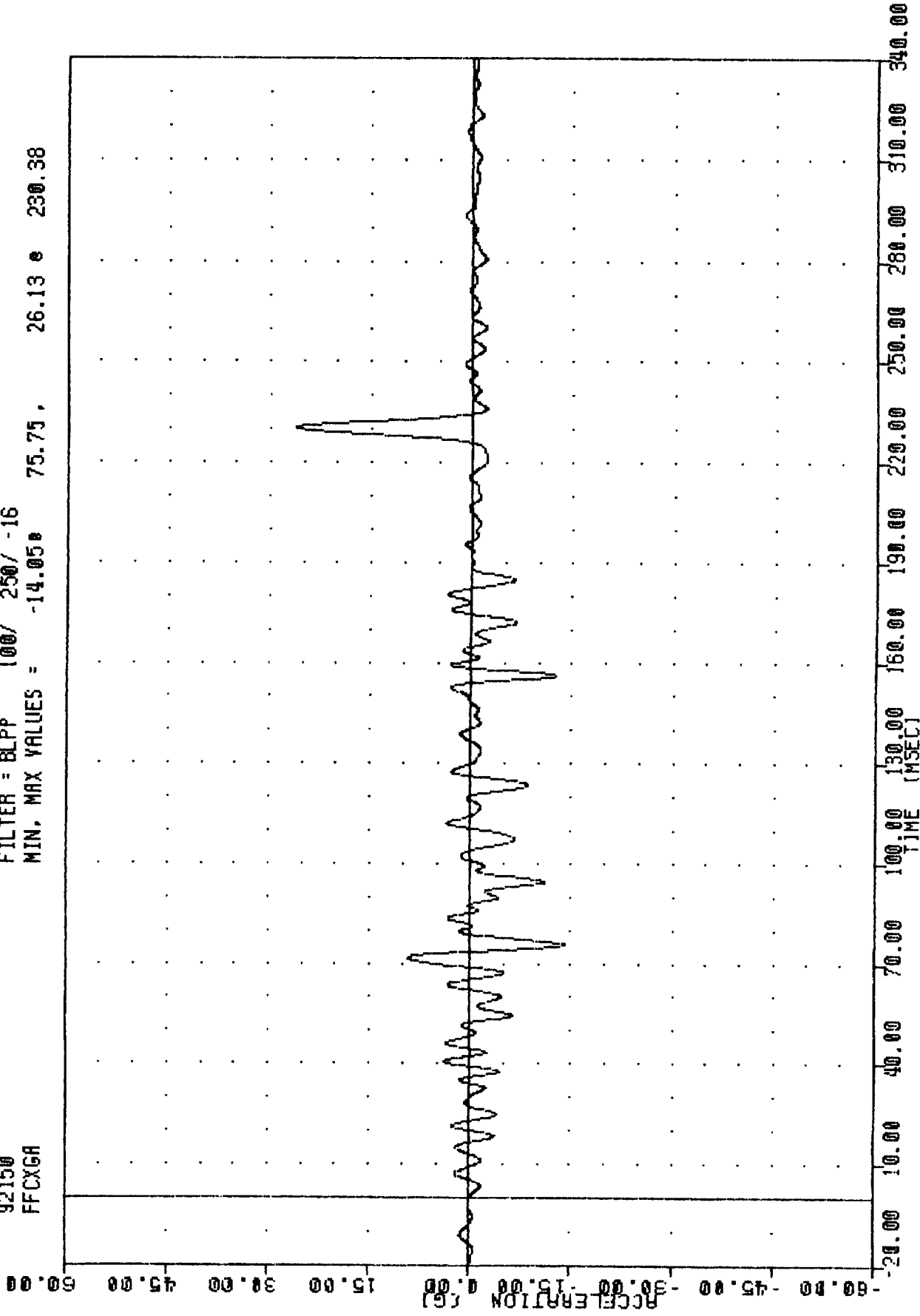
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -8.55 147.38 0.14 11.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
CAR CENTER OF GRAVITY Z-AXIS VELOCITY

TRC . 920529  
TRUCK INTO STATIONARY CAR  
92150  
FFCXGA

FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -14.05 75.75 . 26.13 e 230.38

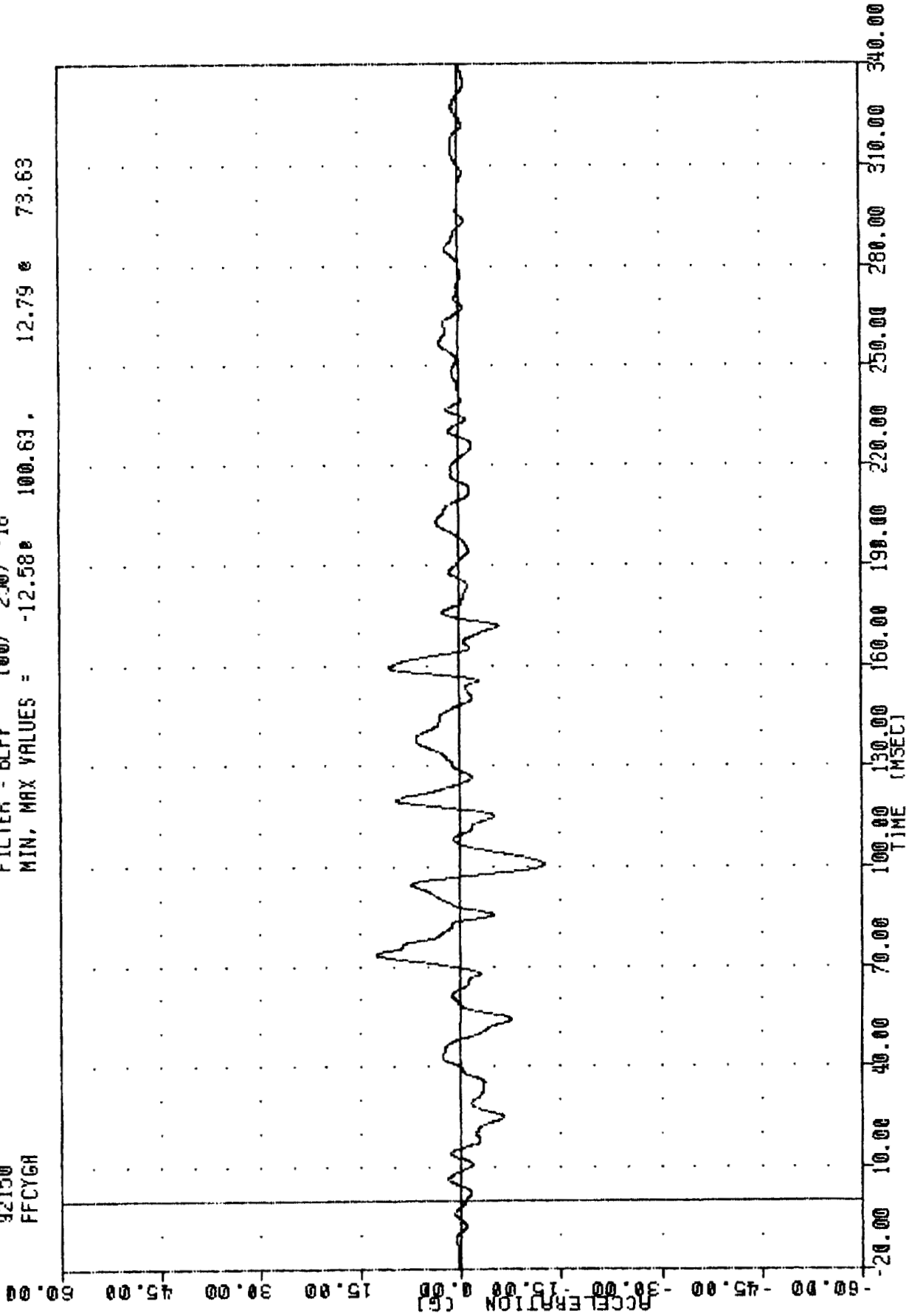


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
TRUCK FRONT FRAME CROSSMEMBER X-AXIS ACCELERATION

TRC  
TRUCK INTO STATIONARY CAR  
92150  
FFCYGR

920529

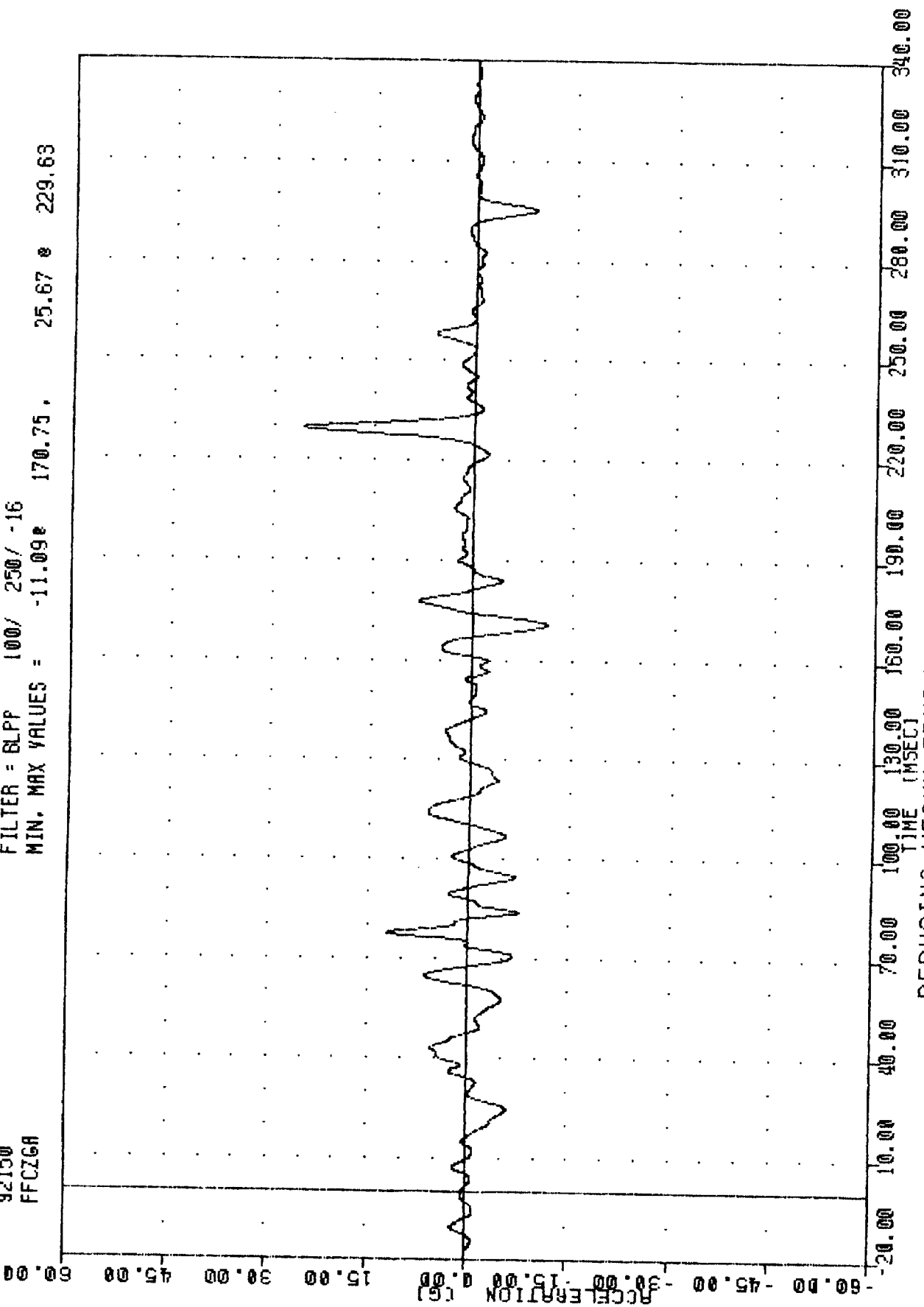
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -12.58 100.63, 12.79 73.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
TRUCK FRONT FRAME CROSSMEMBER Y-AXIS ACCELERATION

TRC  
920529  
TRUCK INTO STATIONARY CAR  
92150  
FFCZGA

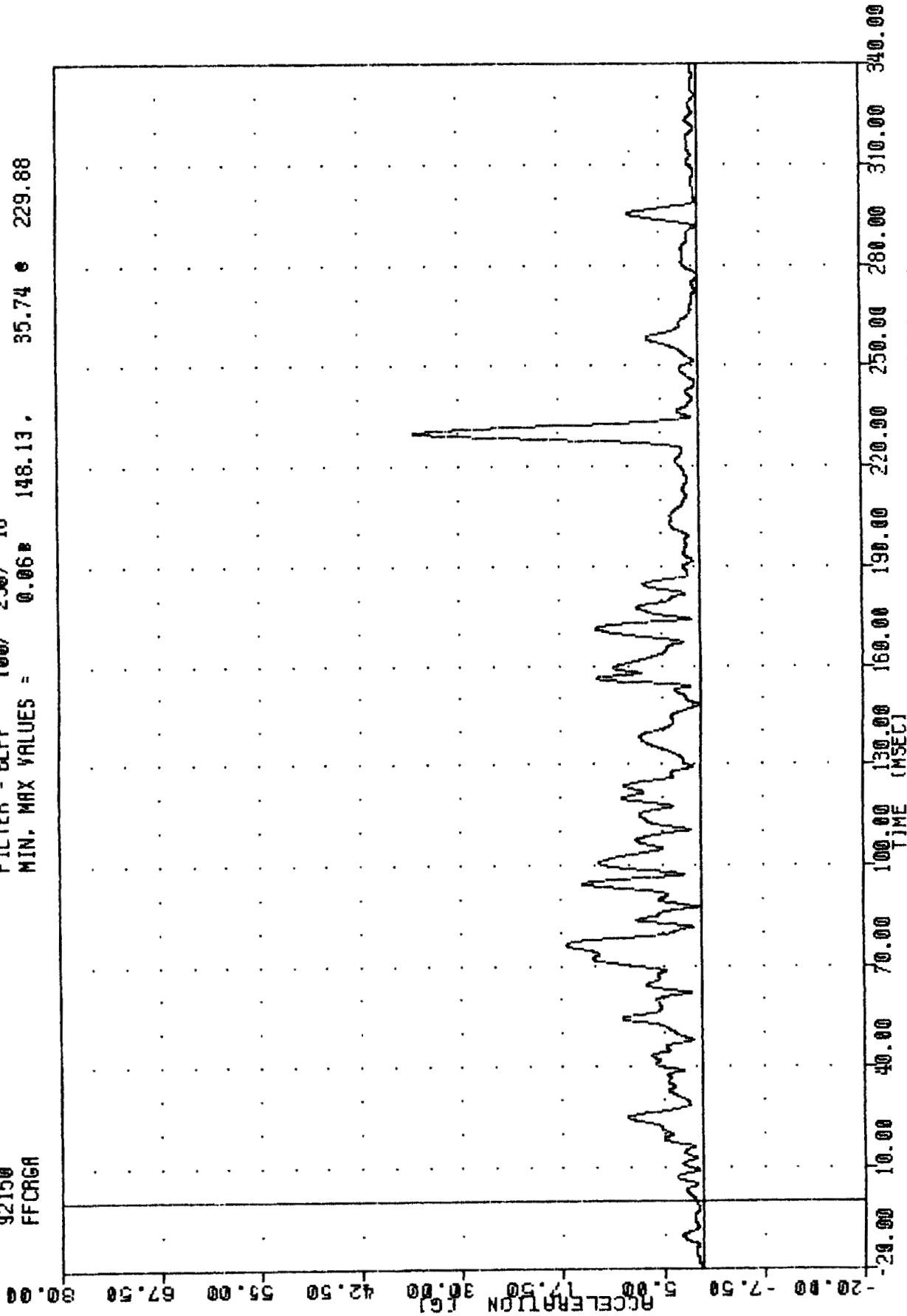
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -11.09e 170.75 . 25.67 e 229.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
TRUCK FRONT FRAME CROSSMEMBER Z-AXIS ACCELERATION

TRC  
920529  
TRUCK INTO STATIONARY CAR  
92150  
FFCRGA

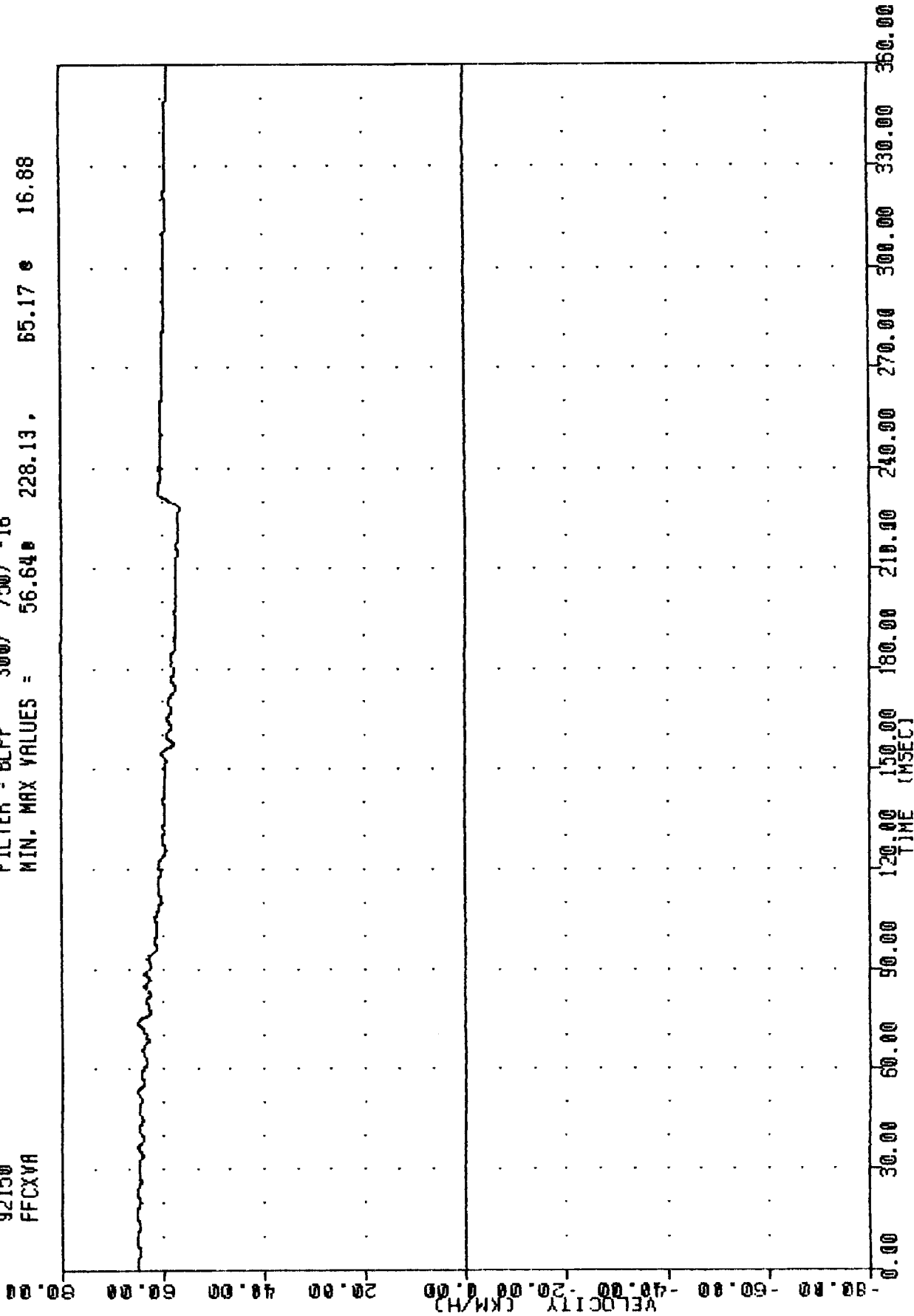
FILTER = 8LPP 100/ 250/ -16  
MIN. MAX VALUES = 0.06 148.13 35.74 229.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
TRUCK FRONT FRAME CROSSMEMBER RESULTANT ACCELERATION

TRC  
TRUCK INTO STATIONARY CAR  
92150  
FFCXVA

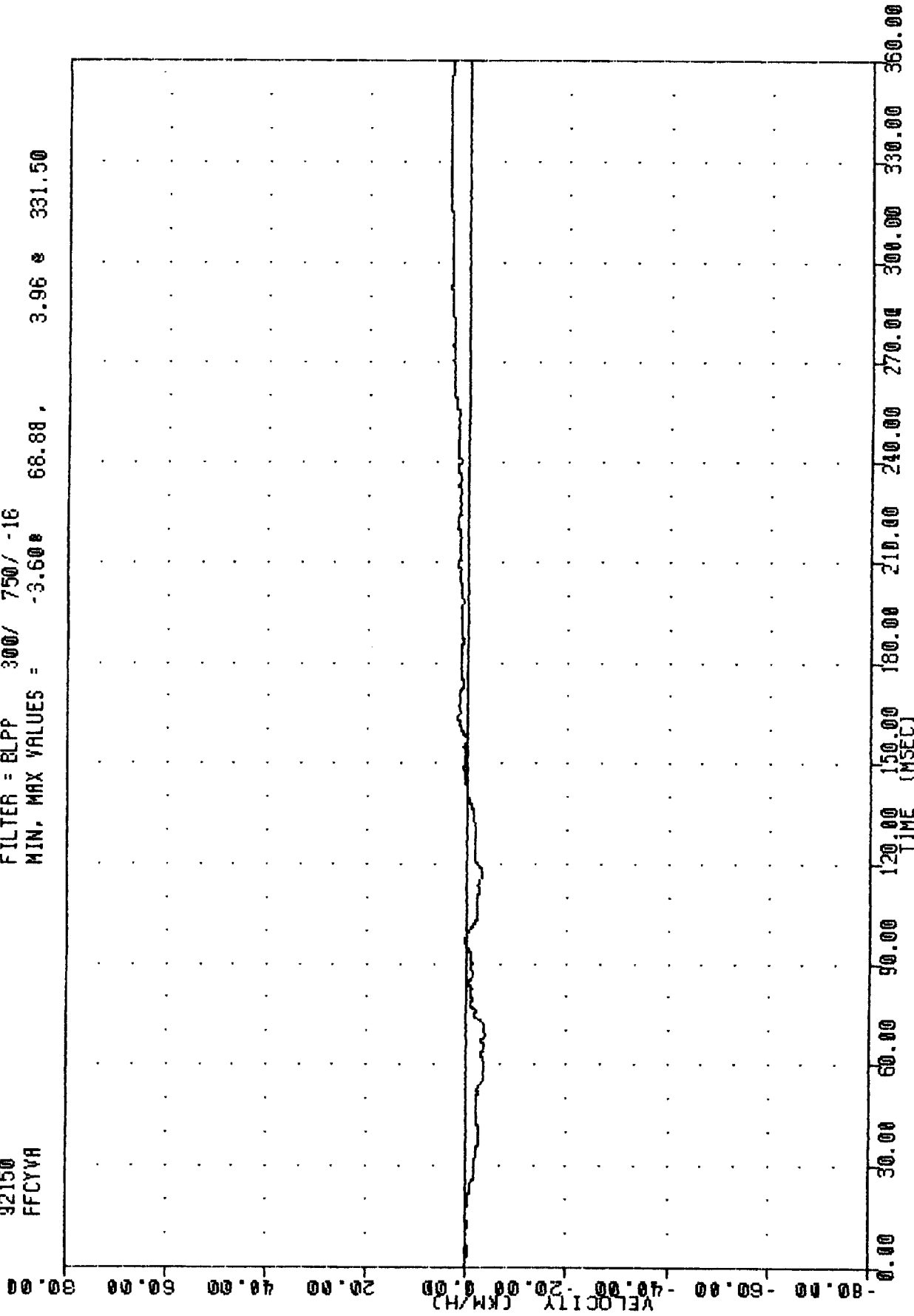
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = 56.64 228.13 65.17 16.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
TRUCK FRONT FRAME CROSSMEMBER X-AXIS VELOCITY

TRC  
920529  
TRUCK INTO STATIONARY CAR  
32150  
FFCYVA

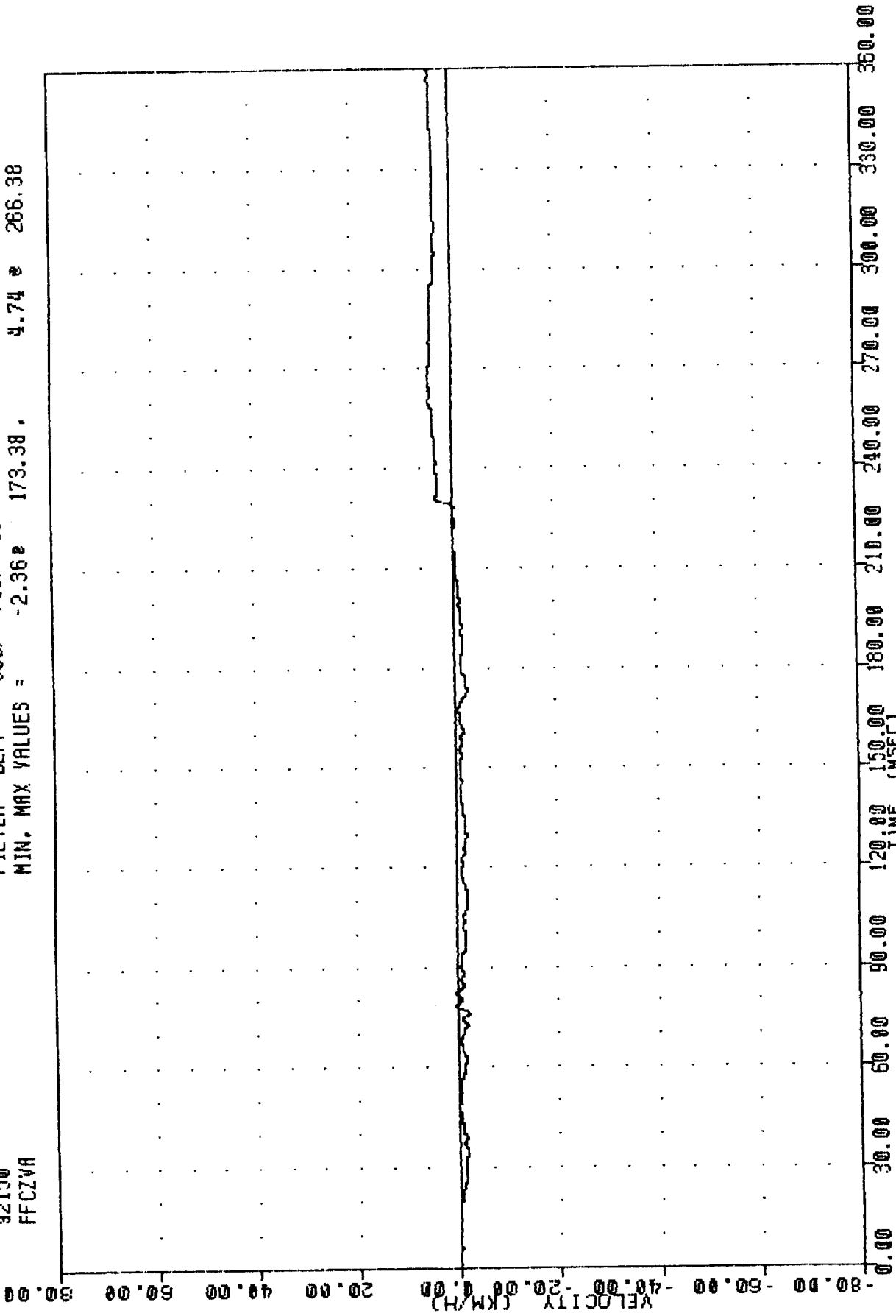
FILTER = BLPP 300/ 750/ -16  
MIN, MAX VALUES = -3.60\* 68.88, 3.96 \* 331.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
TRUCK FRONT FRAME CROSSMEMBER Y-AXIS VELOCITY

TRC , 920529  
TRUCK INTO STATIONARY CAR  
92150  
FFCZVA

FILTER = BLPF 300/ 750/ -16  
MIN. MAX VALUES = -2.36e 173.38 , 4.74 e 266.38



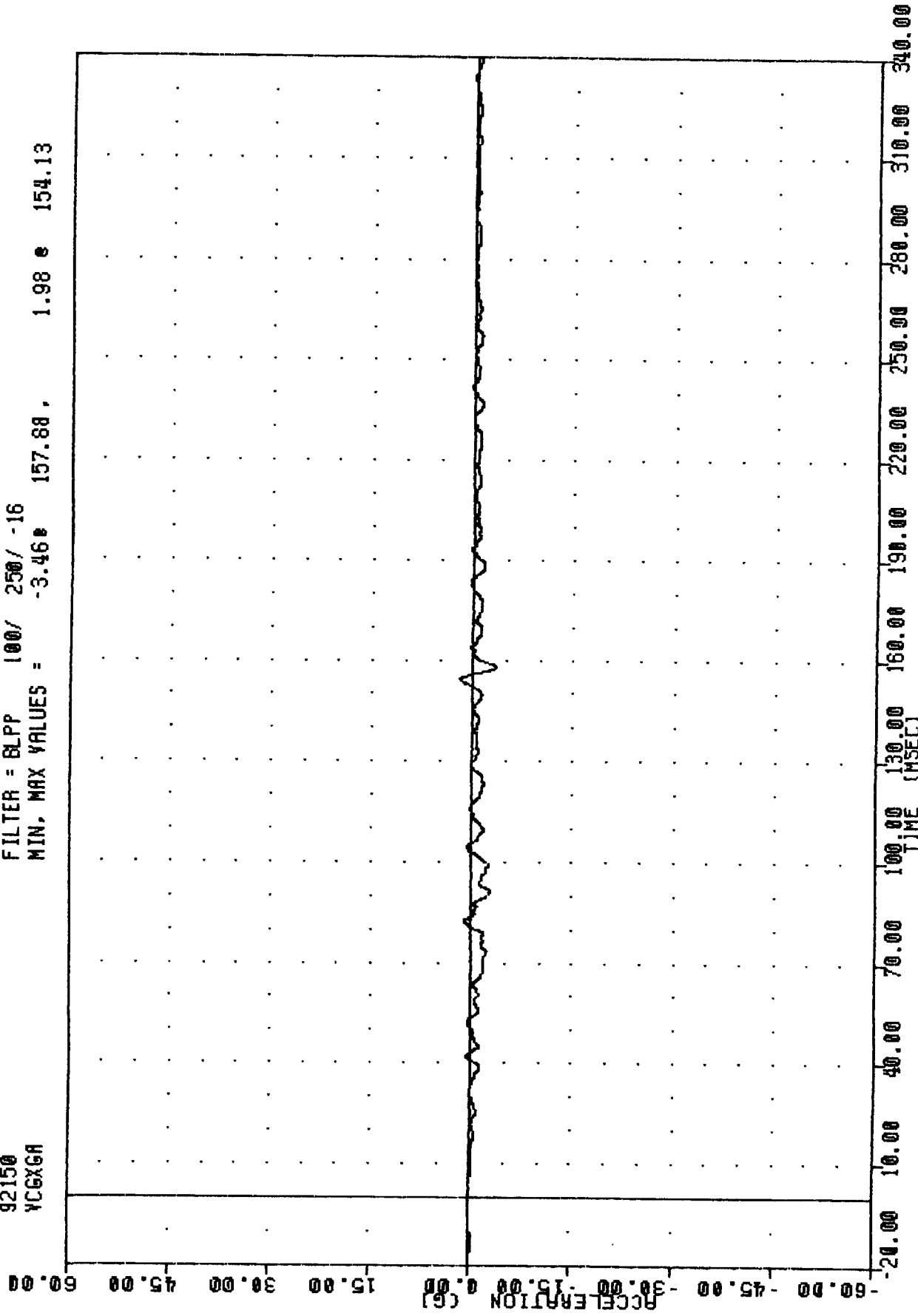
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
TRUCK FRONT FRAME CROSSMEMBER Z-AXIS VELOCITY

TRC  
 92150  
 YCGXGA

920529

TRUCK INTO STATIONARY CAR

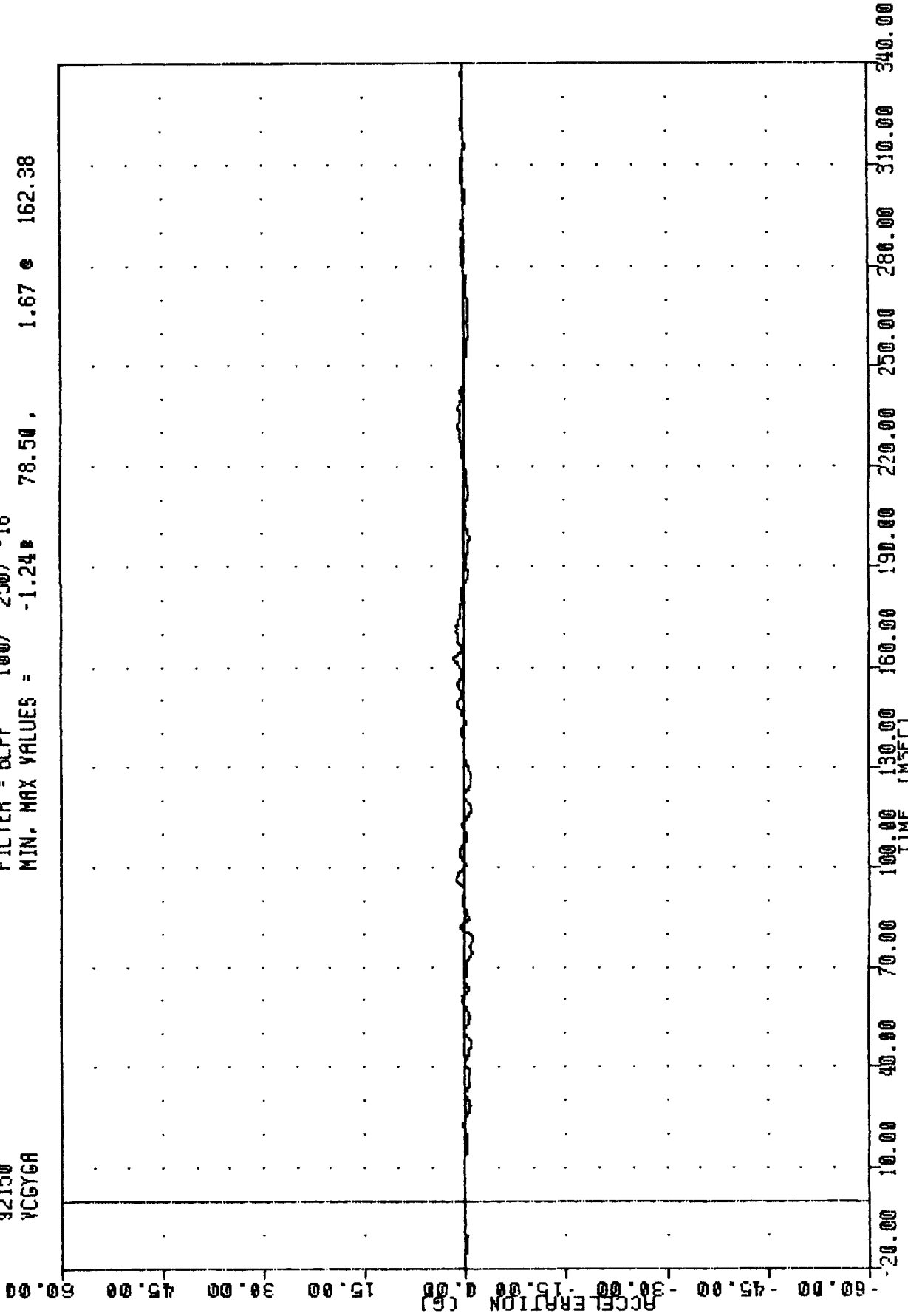
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -3.46 157.88 1.98 154.13



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
 TRUCK CENTER OF GRAVITY X-AXIS ACCELERATION

TRC , 920529  
 TRUCK INTO STATIONARY CAR  
 92150  
 VCCYGA

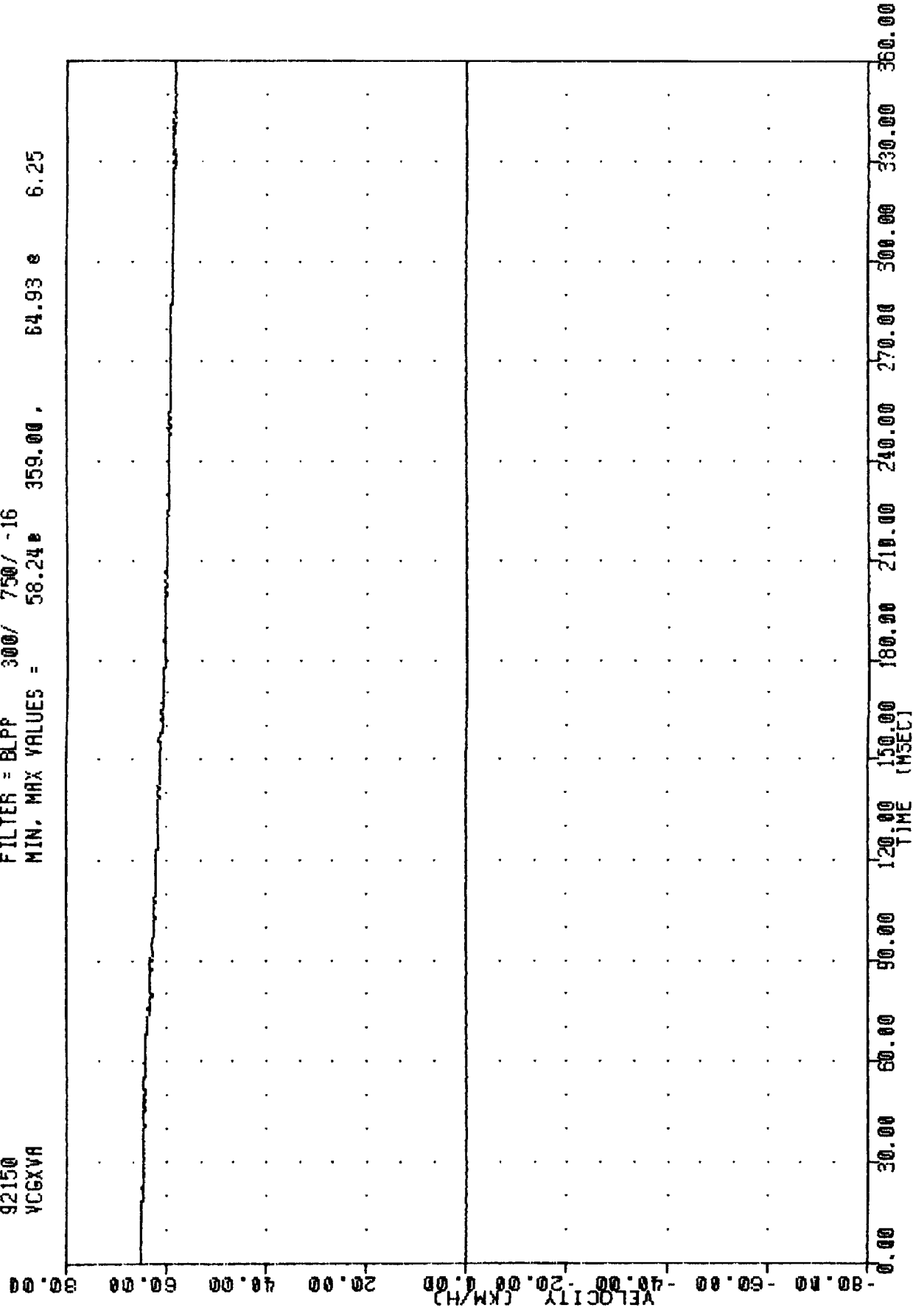
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -1.24 78.50, 1.67 162.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
 TRUCK CENTER OF GRAVITY Y-AXIS ACCELERATION

TRC  
 TRUCK INTO STATIONARY CAR  
 92150  
 VCGXVA

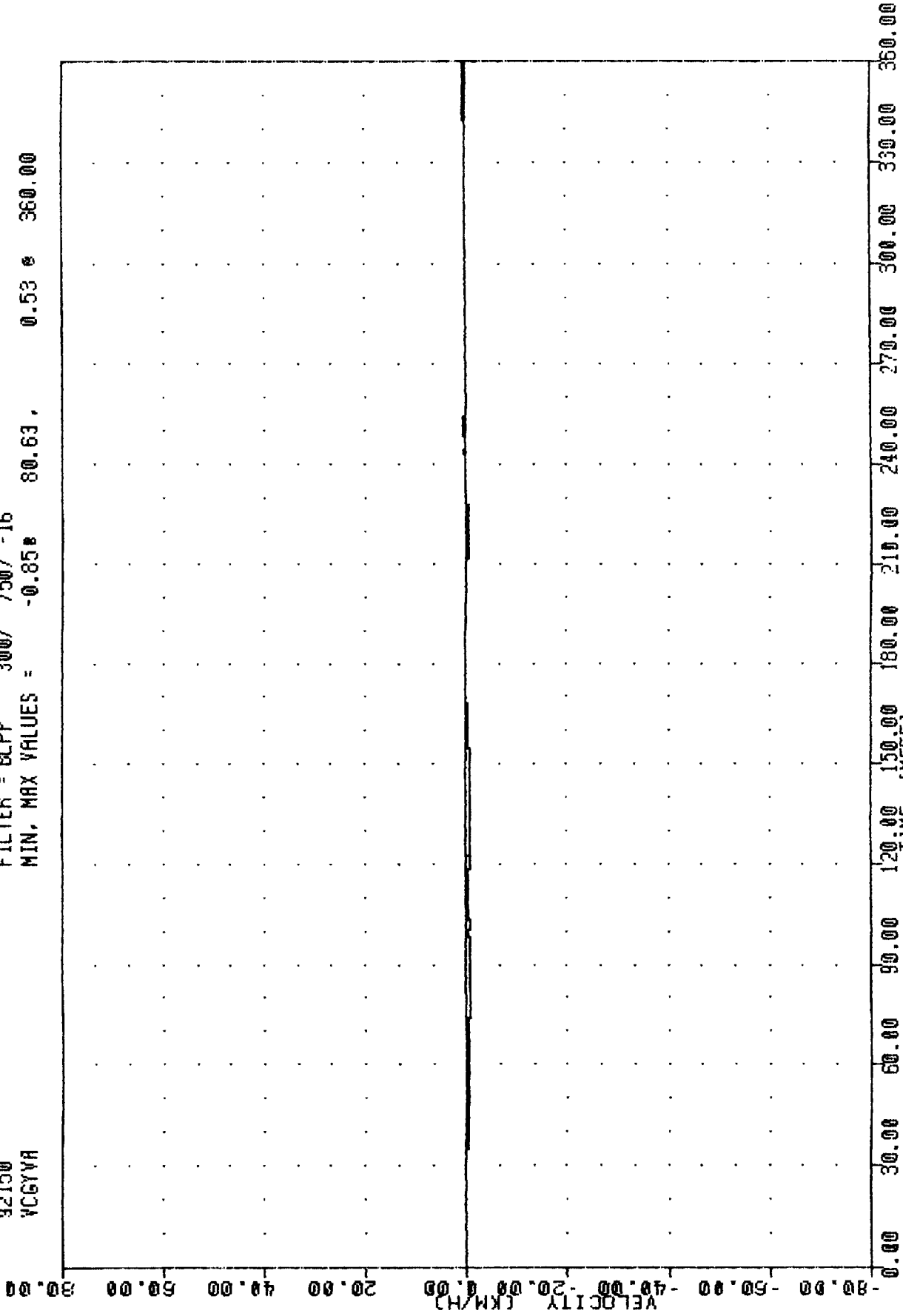
, 920529  
 FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 58.24e 359.00 , 64.93 e 6.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 3  
 TRUCK CENTER OF GRAVITY X-AXIS VELOCITY

TRC , 920529  
 TRUCK INTO STATIONARY CAR  
 92150  
 VCGYVA

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -0.85 80.63, 0.53 360.00



APPENDIX C

MISCELLANEOUS TEST INFORMATION

VEHICLE INSTRUMENTATION INFORMATION

TEST NO. 920529

NO.	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
1	LEFT REAR SEAT					
	CROSSMEMBER LONGITUDINAL	X	ENDEVCO	7264	AS29	REAR
2	RIGHT REAR SEAT					
	CROSSMEMBER LONGITUDINAL	X	ENDEVCO	7264	AR24	REAR
3	ENGINE TOP LONGITUDINAL	X	ENDEVCO	7264	AS76	FRONT
4	ENGINE BOTTOM LONGITUDINAL	X	ENDEVCO	7264	BB67	REAR
5	RIGHT BRAKE CALIPER					
	LONGITUDINAL	X	ENDEVCO	7264	AY59	REAR
6	LEFT BRAKE CALIPER					
	LONGITUDINAL	X	ENDEVCO	7264	AT38	REAR
7	INSTRUMENT PANEL CENTER					
	LONGITUDINAL	X	ENDEVCO	7264	AS44	REAR
	LAP BELT OUTBOARD FORCE		LEBOW	3419	610	TENSION
	SHOULDER BELT OUTBOARD FORCE		LEBOW	3419	590	TENSION
8	VEHICLE CENTER OF GRAVITY					
	LONGITUDINAL	X	ENDEVCO	7264	AY66	FRONT
	LATERAL	Y	ENDEVCO	7264	AS03	LEFT
	VERTICAL	Z	ENDEVCO	7264	AG24	UP

HEAVY TRUCK ACCELEROMETER INFORMATION

TEST NO. 920529

NO.	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
9	FRONT FRAME CROSSMEMBER	X	ENDEVCO	7264	CF11H	FRONT
		Y	ENDEVCO	7264	CL73H	LEFT
		Z	ENDEVCO	7264	CH97H	UP
10	TRUCK CENTER OF GRAVITY	X	ENDEVCO	7264	CJ04H	REAR
		Y	ENDEVCO	7264	CJ37H	RIGHT

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	014	TENSION
RIGHT FEMUR FORCE		GSE	2430	756	TENSION

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

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: ENLONGATION  
+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