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January 1984
Final Report

DOT HS-806 702



US Department
of Transportation
National Highway
Traffic Safety
Administration

SIDE PROTECTION IN 2-DOOR AND 4-DOOR PRODUCTION
VEHICLES MDB-TO-CAR SIDE IMPACT TEST OF A 26°
CRABBED MOVING DEFORMABLE BARRIER TO A 1981
CHEVROLET CITATION AT 33.5 MPH

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Contract No. DTNH22-82-A-08401

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1984a

1. Report No. DOT HS 806 702		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle SIDE PROTECTION IN 2-DOOR AND 4-DOOR PRODUCTION VEHICLES MDB-TO-CAR SIDE IMPACT TEST OF A 26° CRABBED MOVING DEFORMABLE BARRIER TO A 1981 CHEVROLET CITATION AT 33.5 MPH				5. Report Date JANUARY 1984	
				6. Performing Organization Code	
7. Author(s) J. Stultz, Project Engineer, TRCO				8. Performing Organization Report No. 831219	
9. Performing Organization Name and Address Vehicle Research and Test Center St. Rt. 33, Logan County East Liberty, Ohio 43319				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. DTNH22-82-A-08401	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh Street, S.W. Washington, DC 20590				13. Type of Report and Period Covered FINAL REPORT December 1983	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract This test report documents one of a series of thirteen crash tests to evaluate side impact protection in various vehicle models. Testing was conducted on a 1981 Chevrolet Citation 4-door hatchback at the TRCO Crash Test Facility, East Liberty, Ohio. The test vehicle was impacted on the left side by a moving deformable barrier, crabbled to 26°, at 33.5 mph. Occupant responses of two side impact dummies were measured. One dummy was located in the driver's designated seating position and one was located in the left rear seating position. The test date was December 19, 1983 and the ambient temperature was 10°F.					
17. Key Words Occupant Response Moving Barrier Crash Testing			18. Distribution Statement Available From: Technical Reference Division, National Highway Traffic Safety Administration Room 5108, Nassif Building 400 Seventh Street, S.W. Washington, DC 20590		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 174	22. Price

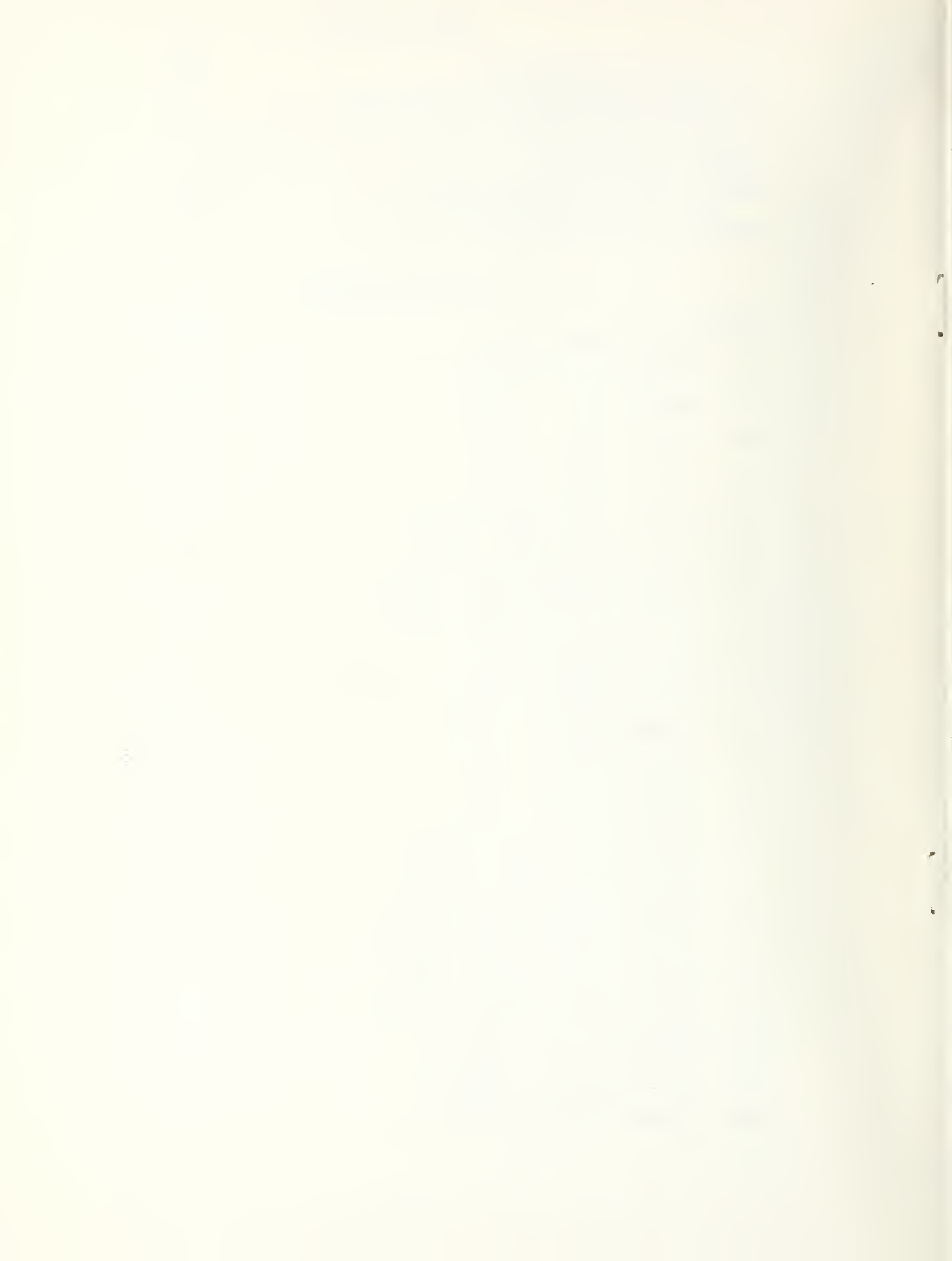
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SECTION 1.0
PURPOSE AND INTRODUCTION

PURPOSE

The main purpose of this test was to evaluate side impact protection in one of a fleet of 2-door and 4-door vehicles. The vehicle was tested using conditions not currently contained in a Federal Motor Vehicle Safety Standard.

INTRODUCTION

A stationary 1981 Chevrolet Citation 4-door hatchback was impacted on the left side by a Moving Deformable Barrier (MDB) on December 19, 1983. The test was to simulate an intersection collision with the striking vehicle traveling at 30 mph and the struck vehicle traveling at 15 mph. The orientation angle of the striking vehicle was 90° counterclockwise with respect to the longitudinal axis of the struck vehicle. The leading edge of contact was to be 37 inches forward of the vehicle center of gravity which is defined by accident investigation to be the midpoint of the wheelbase.

To simulate this collision, the MDB was to be towed into the stationary Chevrolet Citation at 33.5 mph with the MDB's wheels crabbed clockwise to 26°. The actual test speed was 33.5 mph and the actual leading edge of contact was 37. inches forward of the midpoint of the Chevrolet Citation's wheelbase.

The vehicle was a baseline model with no structural modification. The driver door and left rear door were unpadded.

Section 2 contains General Test and Vehicle Parameter Data. Section 3 contains data required by R & D. Appendix A contains pre-test and post-test vehicle and dummy photographs. Appendix B contains Data Plots. Appendix C contains Dummy Certification Data.



SECTION 2.0
GENERAL TEST AND VEHICLE PARAMETER DATA

The following data sheets describe the General Test and Vehicle Parameter Data.

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: General Motors Corporation

MAKE/MODEL: Chevrolet Citation

VIN: 1G1AX6857B6246605

BODY STYLE: 4-Door Hatchback

MODEL YEAR: 1981

NHTSA NO.: R & D

COLOR: Dark Blue Metallic

ENGINE DATA: TYPE: Transverse

CYLINDERS: 4

DISPLACEMENT 2500 CC

TRANSMISSION DATA: 4 Speed Manual

DATE VEHICLE RECEIVED: 11/06/81

ODOMETER READING: 95.5

DEALER'S NAME AND ADDRESS: Daring Chevrolet Cadillac

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	No
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	No	AIR CONDITIONING	No
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	No	REAR WINDOW DEFROSTER	No
OTHER			

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

DATA FROM CERTIFICATION LABEL ON LEFT DOOR FACE OR "B" POST:

VEHICLE MANUFACTURED BY: General Motors Corporation

DATE OF MANUFACTURE: 4/81

GVWR: 3470 LBS.,

GAWR: FRONT 1847 LBS., REAR 1623 LBS.

VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 30 psi; REAR 30 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Goodyear Viva Radial P185/80R13

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 3

IS SPARE TIRE "SPACE SAVER"? Yes

IS SPARE TIRE STANDARD EQUIPMENT? Yes

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

RIGHT FRONT	756	LBS.	RIGHT REAR	496	LBS.
LEFT FRONT	836	LBS.	LEFT REAR	464	LBS.
TOTAL FRONT WEIGHT	1592	LBS.	(62.4 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	960	LBS.	(37.6 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	2552	LBS.			

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 28 9/16	;LF 27 7/8	;RR 27 1/2	;LR 27 1/4
PRE-TEST ATTITUDE:	RF 27 7/16	;LF 27 5/16	;RR 24 9/16	;LR 24 3/16
POST-TEST ATTITUDE:	RF 25 5/8	;LF 27 9/16	;RR 22 7/8	;LR 24 1/8

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 160 LBS. CARGO:

RIGHT FRONT	800	LBS.	RIGHT REAR	690	LBS.
LEFT FRONT	910	LBS.	LEFT REAR	660	LBS.
TOTAL FRONT WEIGHT	1710	LBS.	(55.9 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1350	LBS.	(44.1 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	3060	LBS.			

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

TEST FLUID DATA

TEST FLUID TYPE: RED STODDARD SOLVENT #2; SPEC. GRAVITY: 0.764
KINEMATIC VISCOSITY: 0.99 CENTISTOKES
"USEABLE" CAPACITY*: NA GALLONS
TEST VOLUME: 1.0 GALLONS
FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 14.0 GALLONS
DETAILS OF FUEL SYSTEM: DNA

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

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVEBOX, ETC.

VEHICLE LOAD (UP TO CAPACITY): FRONT 30 psi; REAR 30 psi
RECOMMENDED TIRE SIZE: P185/80 R 13 LOAD RANGE X B, C,
VEHICLE CAPACITY: TYPES OF SEATS: Bench
NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 2 FRONT
CARGO LOAD 145 LBS. 3 REAR
5 TOTAL
TOTAL 895 LBS.

*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

TEST CONDITIONS

TEST NUMBER: 831219

DATE OF TEST: December 19, 1983

TIME OF TEST: 13:20

WIND VELOCITY: 5-10 mph 342° NW

HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 10° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 78° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
VEHICLE TEST WEIGHT (LBS.)	3060	3045
MDB TEST WEIGHT (LBS.)	2990	3000
MDB VELOCITY (MPH)*	33.5	33.5
IMPACT POINT (INCHES)**	37.	37

DUMMIES

	<u>DRIVER</u>	<u>MIDDLE PASSENGER</u>	<u>RT. FRONT PASSENGER</u>	<u>LEFT REAR PASSENGER</u>	<u>RT. REAR PASSENGER</u>
TYPE:	SID			SID	
SERIAL NO.:	06			U02	
INSTRUMENTATION:					
HEAD ACCEL.:	Yes			Yes	
CHEST ACCEL.:	Yes (Upper/Lower)			Yes (Upper/Lower)	
FEMUR L.C.'S:	No			No	
OTHER:	Pelvis/Ribs			Pelvis/Ribs	
RESTRAINT SYSTEM:	Both dummies were unrestrained				

* \ As measured over final one foot of travel.

** As measured forward of the midpoint of the Citation's wheelbase.

VISIBLE DUMMY CONTACT POINTS:

	DRIVER 06	PASSENGER U02
Head	<u>Side Window</u>	<u>Side Header</u>
Chest	<u>Driver's Door Panel</u>	<u>Left Rear Door Panel</u>
Abdomen	<u>Driver's Door Panel</u>	<u>Left Rear Door Panel</u>
Left Knee	<u>Driver's Door Panel</u>	<u>Left Rear Door Panel</u>
Right Knee	<u>Left Knee</u>	<u>Left Knee</u>

DOOR OPENING:

	LEFT	RIGHT
Front	<u>Tools Required</u>	<u>Easy</u>
Rear	<u>Tools Required</u>	<u>Easy</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	<u>No</u>	<u>Yes</u>
Rear	<u>No</u>	<u>Yes</u>

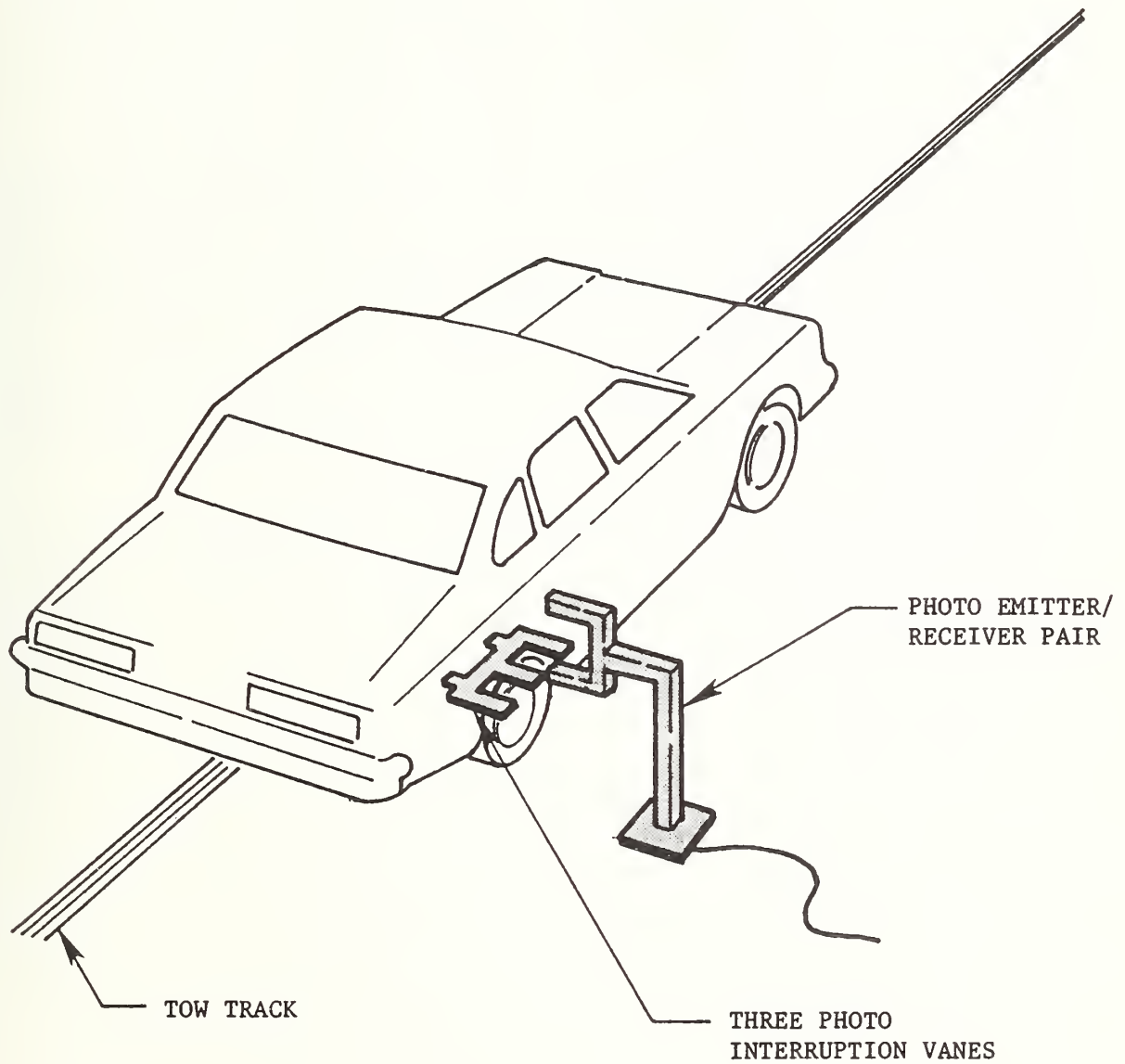
GLAZING DAMAGE:

Left side of windshield cracked, all left side windows
shattered, no backlight damage.

OTHER NOTABLE IMPACT EFFECTS:

Both bench seats buckled upward along vehicle
centerline.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane is located two inches before impact.

The vanes have one foot spacing.

VEHICLE TEST WEIGHT CALCULATION

$$\begin{aligned}\text{Test Weight} &= \text{Unloaded Delivered Weight} + \\ &\quad \text{Number of Dummies X 174 lbs.} + \\ &\quad \text{Cargo Weight} \\ &= 2552 + 2 \times 174 + 145 \text{ lbs.} \\ &= 3045 \text{ lbs.}\end{aligned}$$

To achieve test weight, the exhaust system and battery were removed and 1 gallon of Stoddard Solvent was added in the fuel tank. The weight of the test vehicle was measured by placing each wheel on a Loadmeter Corporation Hiway Loadometer.

TEST ANOMALIES

1) One 6 volt cell of a 30 volt battery assembly that powers the MDB onboard cameras shorted down so that both cameras (#3 and #4) received insufficient voltage for proper operation. Camera #3, which was located on the left hand side of the MDB, ran at a very slow rate and contained no usable footage. Camera #4, which was located centrally on the MDB ran at a very erratic rate but footage from this camera was included as test film.

2) Data channel T01YGC - Passenger Upper Spine Acceleration #2 Y Axis contained an anomalous spike at approximately 23 msec. This spike does not correlate with the primary upper spine data channel (T01YG3). Peak levels, resultant and delta velocity using this channel are suspect.

3) Pin separation occurred in data channel LFDYG2 - Vehicle Left Front Door (Position 8) Acceleration Y Axis at approximately 62 msec.

SECTION 3.0
DATA REQUIRED BY R&D

The following pages are included in this section:

1. Dummy temperature control and positioning data
2. Dummy kinematic summary
3. Vehicle crush data
4. Dummy and vehicle accelerometer location and data summary
5. High speed camera information
6. Transducer information

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle was kept inside the temperature controlled crash test building until approximately 2 hours prior to the test. Temperature inside the vehicle and ambient temperature at the crash area were recorded. Dummy temperature while outside the crash test building was maintained portably until approximately 1 minute prior to the test.

The following table summarizes the steps taken to position the instrumented, calibrated dummies in the test vehicle.

DUMMY PLACEMENT AND POSITIONING

SIDE IMPACT DUMMY*

DRIVER DSP

REAR PASSENGER DSP

HEAD Surface of transverse instrument mounting platform is as horizontal as possible without inducing torso movement & midsagittal plane falls in longitudinal plane.

Surface of transverse instrument mounting platform is as horizontal as possible without inducing torso movement & midsagittal plane falls in longitudinal plane.

UPPER TORSO Placed against seat back. Midsagittal plane is vertical and centered behind steering column.

Placed against seat back. Midsagittal plane is vertical and contained in the same longitudinal plane as the driver's midsagittal plane.

LOWER TORSO Midsagittal plane is vertical and centered behind steering column.

Midsagittal plane is vertical and contained in the same longitudinal plane as the driver's midsagittal plane.

UPPER LEGS (thighs or femurs) Placed against seat cushion. Planes defined by femur and tibia centerlines are as close as possible to vertical.

Placed against seat cushion. Planes defined by femur and tibia centerlines are as close as possible to vertical.

KNEES Knees set 14.5" apart between pivot bolt head outer surfaces. Outer surface of right knee pivot bolt is 8.6" from midsagittal plane of dummy. Outer surface of left knee pivot bolt is 5.9" from midsagittal plane of dummy.

Located so that planes defined by femur and tibia centerlines are as close as possible to vertical.

LOWER LEGS Plane defined by femur and tibia centerlines are as close as possible to vertical longitudinal plane.

Plane defined by femur and tibia centerlines are as close as possible to vertical longitudinal plane.

RIGHT FOOT Placed on undepressed accelerator pedal -- rearmost point of heel on floorpan in plane of pedal.

Centerline falls in vertical longitudinal plane. Placed on floor as far forward as possible without front seat interference.

LEFT FOOT Placed on toeboard -- rearmost point of heel on floorpan as close as possible to intersection of toeboard and floorpan. Centerline falls in vertical longitudinal plane.

Centerline falls in vertical longitudinal plane. Placed on floor as far forward as possible without front seat interference.

*NOTE: THE SIDE IMPACT DUMMY DOES NOT INCLUDE ARMS.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

VEHICLE NHTSA NO. R & D

MFR./MAKE/MODEL: Chevrolet Citation

FRONT SEAT TYPE: BENCH
 BUCKET
 SPLIT BENCH

ADJUSTER TYPE: MANUAL
 POWER

BUCKET SEAT BACK TYPE: FIXED
 ADJUSTABLE

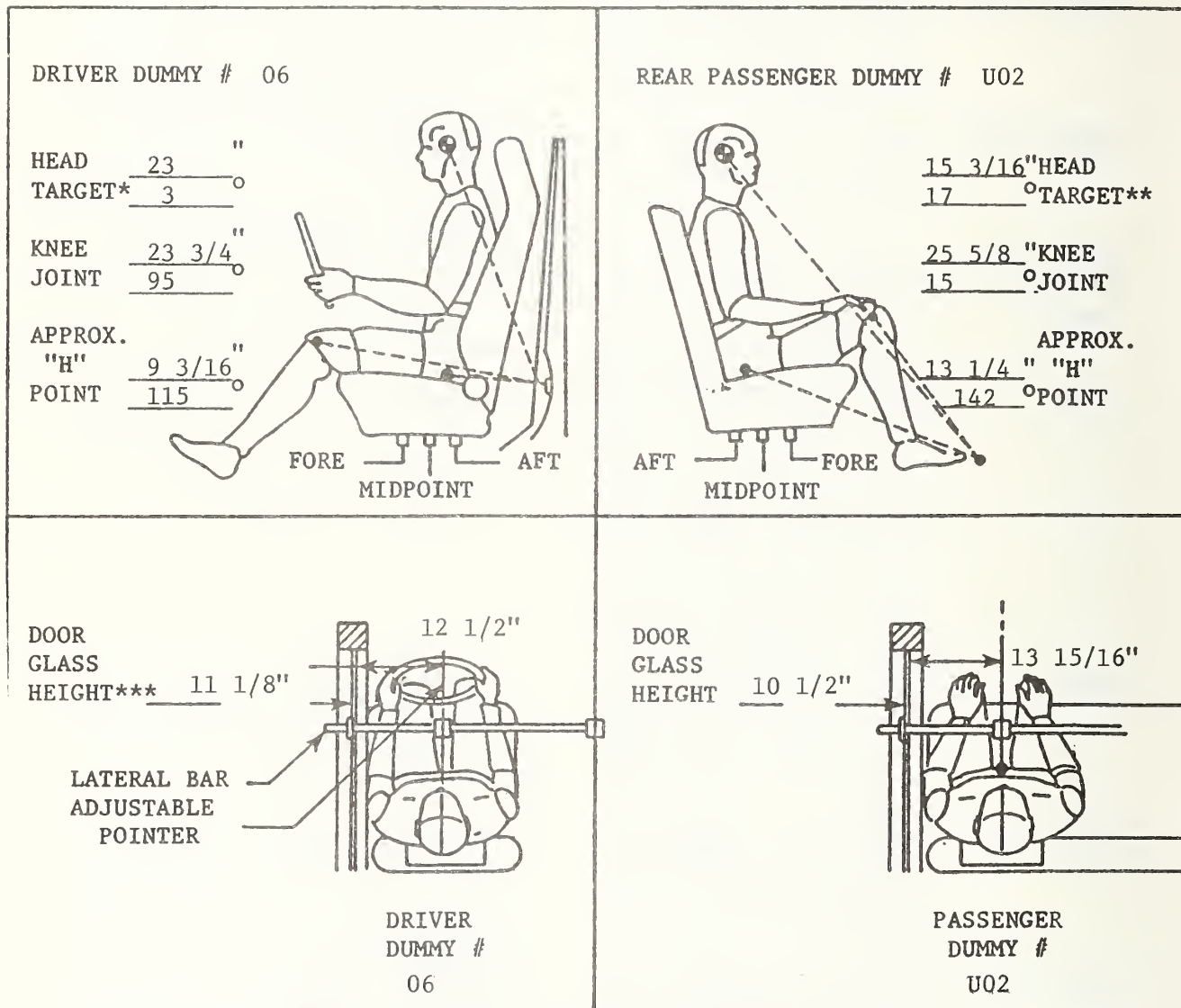
TECHNICIANS:
 1. B. Miller

POSITIONING DATE: 12/19/83

2. D. LeVally

AMBIENT TEMP.: 68° F. TIME: 8:15

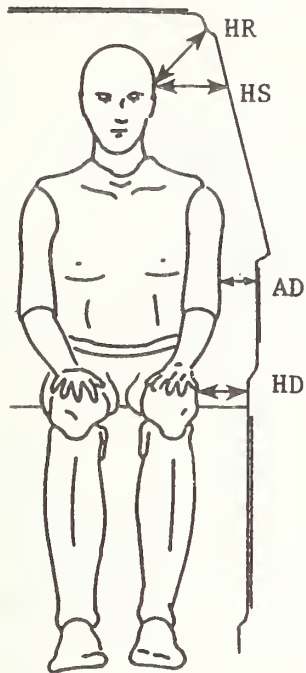
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*All driver dummy dimensions referenced to top of striker bolt and all angles referenced to vertical.

**All passenger dummy dimensions referenced to top of rear seat striker bolt (not as shown) and all angles referenced to vertical.

***Door glass height is set equal to the dummy nose level.



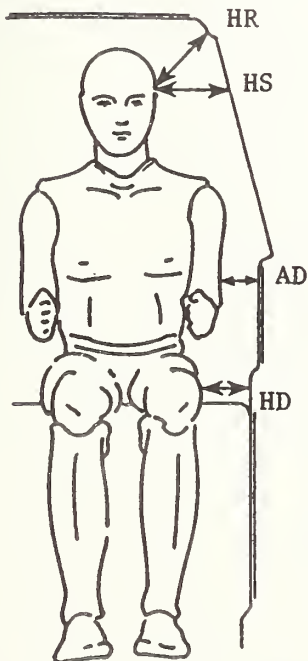
DRIVER

PASSENGER

06

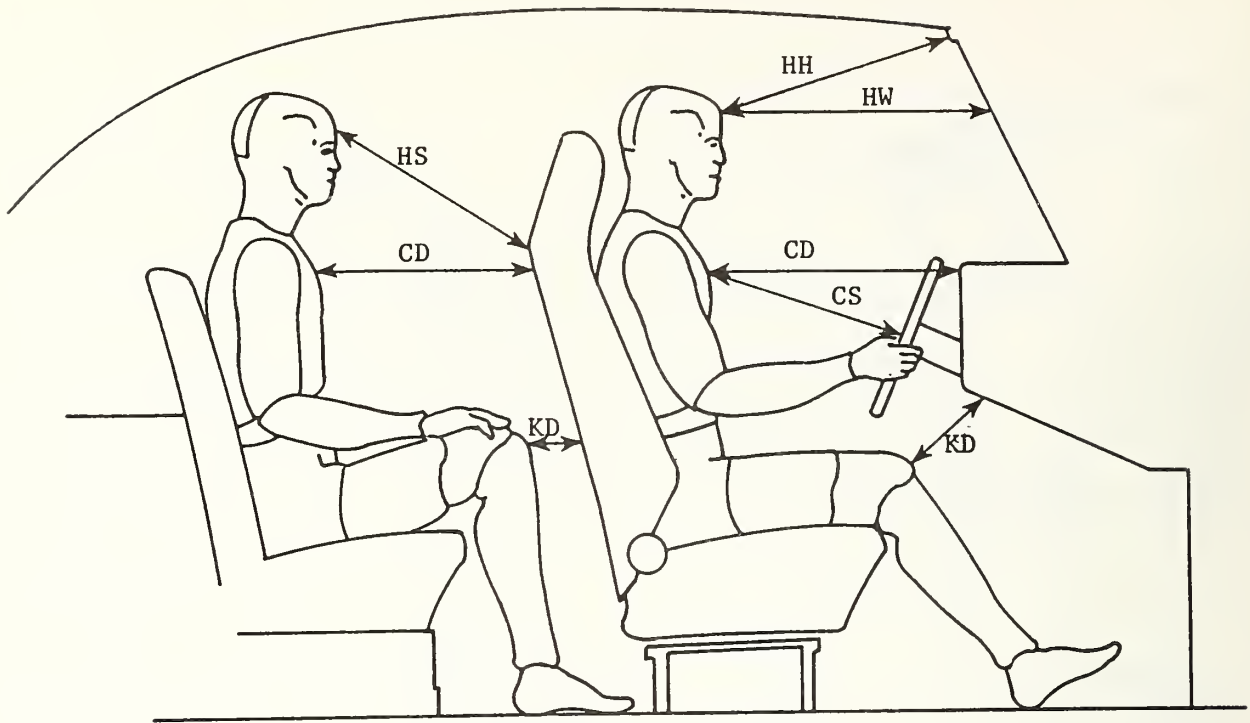
U02

HR	5 13/16	7 1/4
HS	8 1/16	8 1/4
AD	4 1/4	5 7/16
HD	6 5/16	7 3/16



ALL MEASUREMENTS IN INCHES

DUMMY LATERAL CLEARANCE DIMENSIONS



DRIVER
06

PASSENGER
U02

HH	12 1/8	DNA
HW	17 1/8	DNA
HS	DNA	21
CD	21 5/8	19 1/8
CS	13 9/16	DNA
KDL	6 1/2	5 7/8
KDR	6 13/16	5 3/16

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

DUMMY KINEMATIC SUMMARY

DRIVER

During impact, the dummy's torso contacted the driver's door and the head contacted the driver's side window. The dummy rebounded across the vehicle; the buttocks struck the front passenger's door and the head struck the side header. The dummy came to rest laying across the front passenger's seat on it's left side and facing the driver's side.

PASSENGER

During impact, the dummy's torso contacted the left rear passenger's door and the head contacted the side header. The dummy rebounded laterally across the vehicle; the right side struck the right rear passenger's door and the head struck the side header. The dummy came to rest setting upright in the right rear passenger's seat facing forward.

VEHICLE EXTERIOR PROFILES AND STATIC CRUSH
ZERO DISTANCE AT PROJECTED IMPACT POINT*

LOCATION	HEIGHT (in)	6	0	6	12	18	24	30	36	42	48	54	60	66	72	78
		PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)														
Axle Height	10.0	X	15.9	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.3	15.3	15.3	X	X
H-Point	20.0	X	13.3	13.1	13.1	13.0	12.9	12.9	12.9	12.9	12.9	13.0	13.0	13.0	13.1	X
Mid Door***	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Window Sill	33.0	15.5	15.4	15.3	15.1	15.1	15.1	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Window Top	52.5	X	X	X	X	X	23.8	23.1	23.1	23.1	23.1	23.1	23.2	23.2	23.3	23.9

POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)

Axle Height	10.0	X	18.5	22.9	23.4	24.3	25.0	25.8	26.6	27.8	24.5	22.1	19.9	18.0	X	X
H-Point	20.0	X	16.6	23.1	23.9	24.5	25.1	25.4	25.9	26.6	27.5	28.7	29.1	29.9	27.2	X
Mid Door***	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Window Sill	33.0	17.6	17.7	21.2	21.8	23.9	24.4	24.7	25.4	25.9	27.0	27.3	27.8	27.1	22.3	18.1
Window Top	52.5	X	X	X	X	X	26.8	26.6	27.1	27.6	28.3	27.9	27.1	26.6	26.3	26.2

STATIC CRUSH (IN)

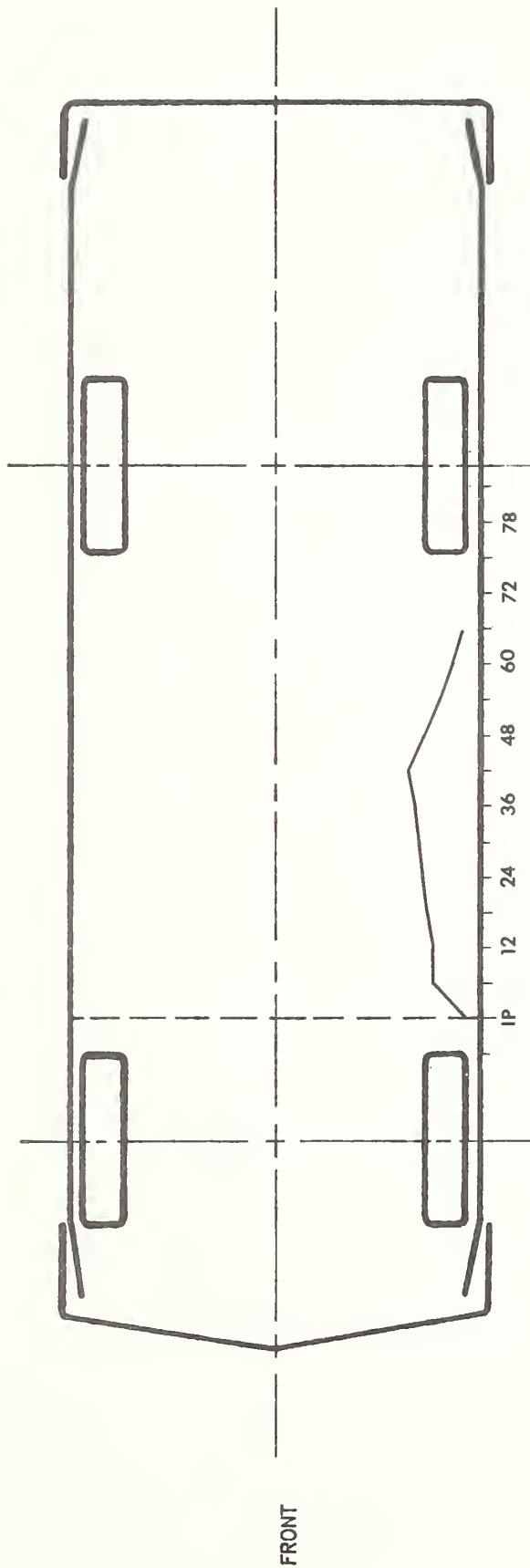
Axle Height	10.0	X	2.6	7.5	8.0	8.9	9.6	10.4	11.2	12.4	9.1	6.8	4.6	2.7	X	X
H-Point	20.0	X	3.3	9.8	10.8	11.4	12.1	12.5	13.0	13.7	14.6	15.7	16.1	16.9	14.1	X
Mid Door***	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Window Sill	33.0	2.1	2.3	5.9	6.5	8.8	9.3	9.6	10.4	10.9	12.0	12.3	12.8	12.1	7.3	3.1
Window Top	52.5	X	X	X	X	X	3.0	3.5	4.0	4.5	5.2	4.8	3.9	3.4	3.0	2.3

* Projected impact point is 37 inches forward of driver's side wheelbase midpoint. Column readings are front to rear from left to right.

** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

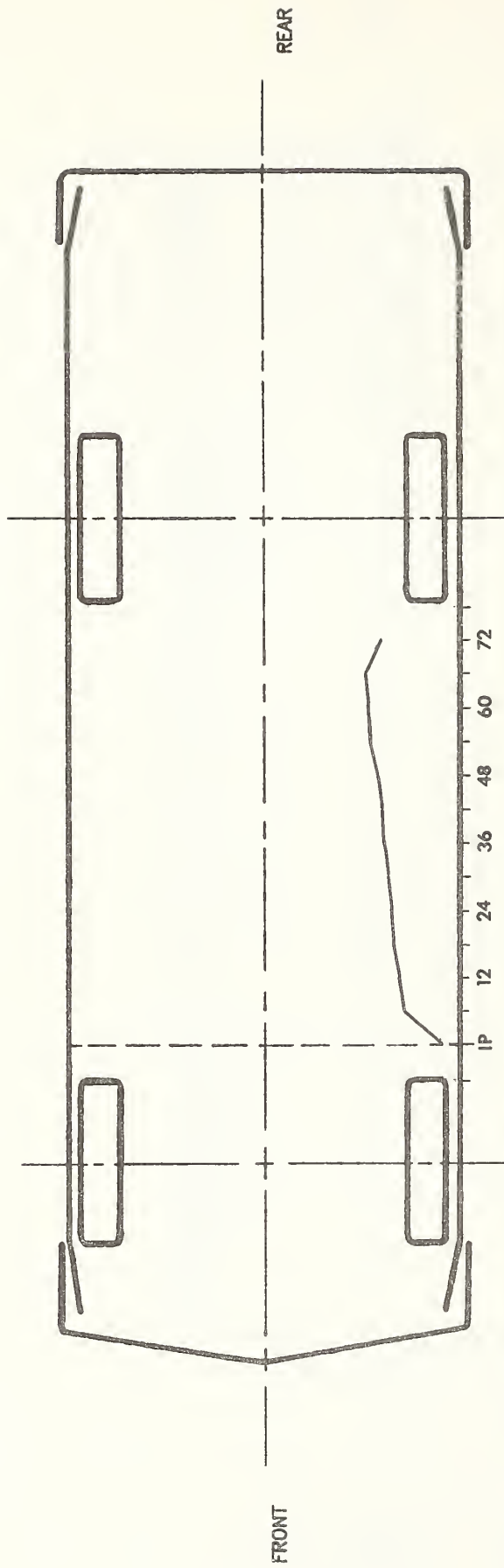
*** The Mid Door and H-Point heights are within two inches; only H-Point crush is reported.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



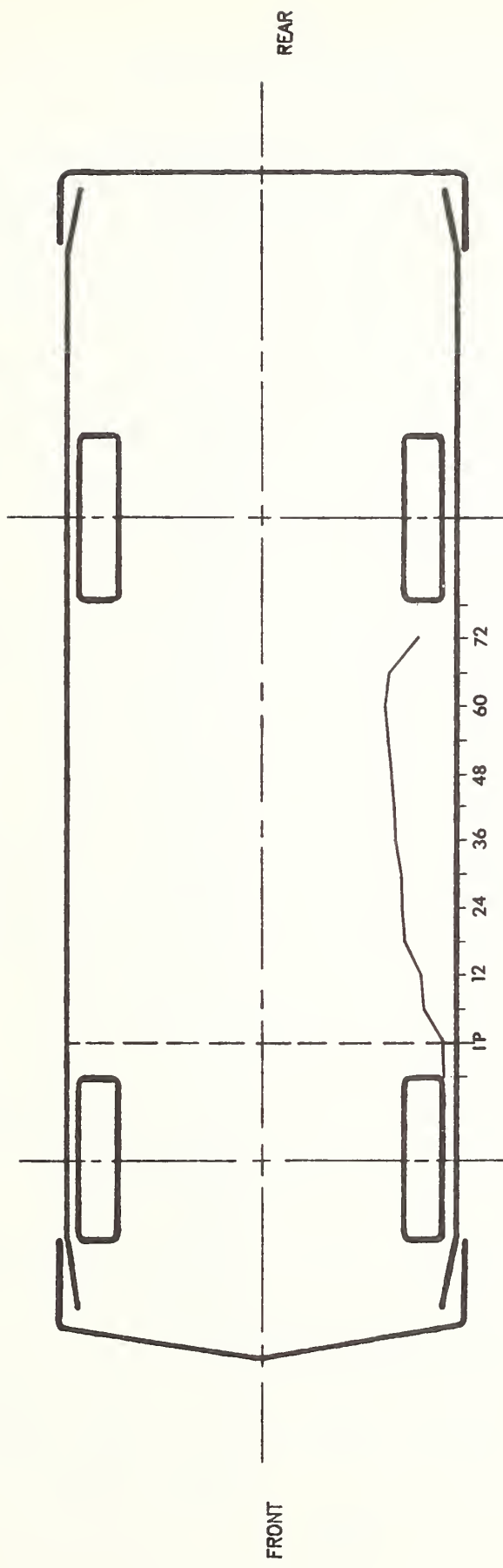
PROFILE LEVEL EQUALS AXLE HEIGHT
IP EQUALS PROJECTED IMPACT POINT

VEHICLE EXTERIOR STATIC CRUSH PROFILE



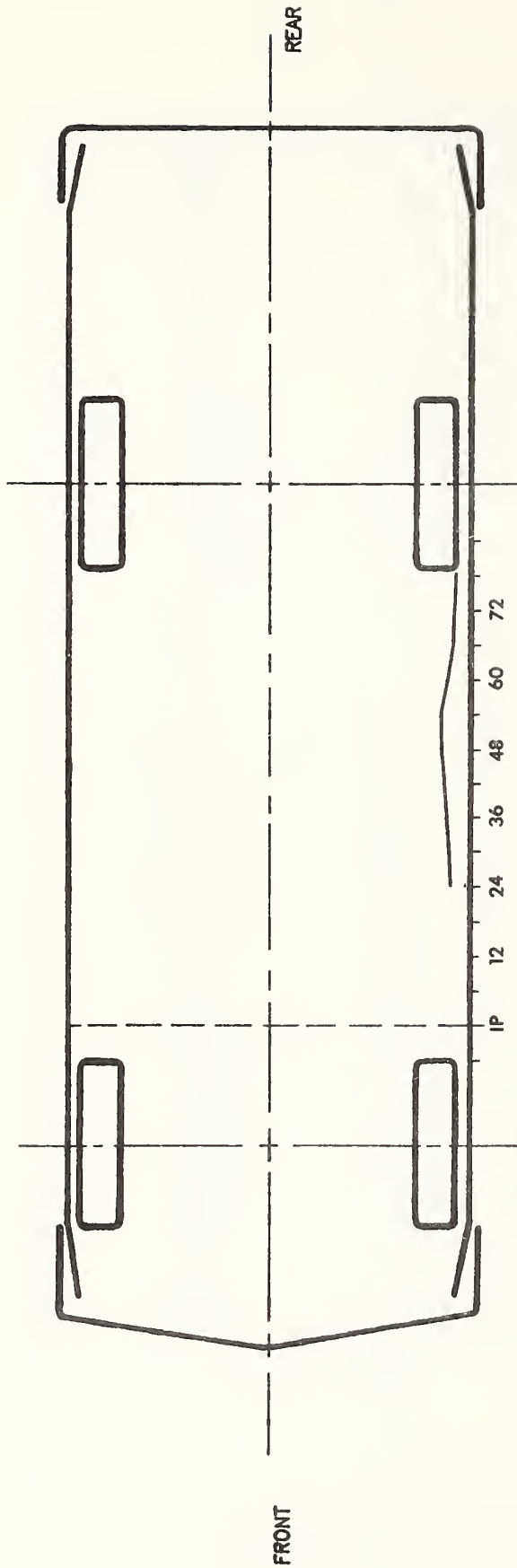
PROFILE LEVEL EQUALS H-POINT HEIGHT
IP EQUALS PROJECTED IMPACT POINT

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW SILL HEIGHT
IP EQUALS PROJECTED IMPACT POINT

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT
IP EQUALS PROJECTED IMPACT POINT

SIDE IMPACT DUMMY DATA SUMMARY

	DRIVER DUMMY				PASSENGER DUMMY			
	POSITIVE		NEGATIVE		POSITIVE		NEGATIVE	
	DIRECTION*		DIRECTION**		DIRECTION*		DIRECTION**	
	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
HEAD ACCELERATION								
LONGITUDINAL	6.90	44.88	21.04	72.75	16.46	242.75	23.88	54.88
LATERAL	82.53	45.38	12.75	33.75	204.50	54.38	23.18	39.00
VERTICAL	50.13	50.88	34.08	68.88	104.32	53.63	23.07	39.75
RESULTANT		85.32 @	45.38			222.17 @	54.63	
HIC	350.00	from	41.75	to 52.88	1490.23	from	53.13	to 56.50
CHEST ACCELERATION								
UPPER SPINE								
LONGITUDINAL	26.76	51.25	35.99	63.75	21.28	54.38	28.12	46.25
LATERAL (P)***	77.87	41.87	52.29	63.13	101.33	44.38	23.39	35.63
LATERAL (R)***	76.98	41.87	45.46	63.13	125.88	27.50 Y	40.76	32.50 Y
VERTICAL	9.11	32.50	20.45	40.63	7.54	31.25	15.09	65.63
RESULTANT (P)		80.33 @	41.87			104.21 @	44.38	
RESULTANT (R)		79.47 @	41.87			125.91 @	27.50Y	
DELTA V (MPH)****		26.0 @	60.00 (P)			21.3 @	124.38 (P)	
		26.7 @	60.00 (R)			33.3 @	124.38 (R) Y	
LOWER SPINE								
LONGITUDINAL	52.95	40.00	29.37	34.38	35.41	48.75	32.46	61.87
LATERAL (P)	102.94	33.75	35.27	63.13	88.10	36.25	32.22	60.62
LATERAL (R)	101.27	33.75	52.00	62.50	87.79	36.25	30.74	61.25
VERTICAL	33.64	62.50	49.50	121.87	32.27	41.25	8.32	66.25
RESULTANT (P)		108.45 @	33.75			89.48 @	36.25	
RESULTANT (R)		106.87 @	33.75			89.17 @	36.25	
DELTA V (MPH)		31.4 @	52.50 (P)			27.3 @	57.50 (P)	
		30.7 @	52.50 (R)			27.5 @	57.50 (R)	
LEFT UPPER RIB								
LATERAL (P)	88.87	38.13	11.84	44.38	85.64	40.00	9.38	66.87
LATERAL (R)	93.67	37.50	9.83	43.75	78.64	40.00	14.54	52.50
DELTA V (MPH)		24.5 @	74.38 (P)			23.4 @	108.13 (P)	
		25.5 @	75.63 (R)			24.5 @	141.25 (R)	
LEFT LOWER RIB								
LATERAL (P)	86.01	36.25	36.23	68.13	120.31	38.75	31.55	66.87
LATERAL (R)	90.28	36.25	35.08	68.13	135.23	39.38	38.33	66.25
DELTA V (MPH)		25.4 @	79.38 (P)			24.4 @	63.13 (P)	
		26.2 @	79.38 (R)			25.3 @	63.13 (R)	
PELVIS ACCELERATION								
LONGITUDINAL	12.65	44.63	12.86	48.13	12.95	42.50	77.02	35.13
LATERAL	170.92	33.13	10.07	66.13	160.71	32.13	15.44	24.63
VERTICAL	22.67	40.75	10.07	49.50	29.40	38.25	6.65	29.50
RESULTANT		171.24 @	33.13			164.14 @	32.25	
DELTA V (MPH)		29.4 @	56.63			28.0 @	42.88	

SIDE IMPACT DUMMY DATA SUMMARY CONTD

	<u>DRIVER DUMMY</u>				<u>PASSENGER DUMMY</u>			
	<u>POSITIVE DIRECTION*</u>		<u>NEGATIVE DIRECTION**</u>		<u>POSITIVE DIRECTION*</u>		<u>NEGATIVE DIRECTION**</u>	
	<u>MAX (in)</u>	<u>TIME (msec)</u>	<u>MAX (in)</u>	<u>TIME (msec)</u>	<u>MAX (in)</u>	<u>TIME (msec)</u>	<u>MAX (in)</u>	<u>TIME (msec)</u>
RIB DEFLECTION †	0.02	292.63	1.78	62.50	0.04	30.25	1.35	60.25

* LONGITUDINAL: FORWARD
 LATERAL: RIGHTWARD
 VERTICAL: UPWARD

**LONGITUDINAL: REARWARD
 LATERAL: LEFTWARD
 VERTICAL: DOWNWARD

*** (P) = Primary Sensor, (R) = Redundant Sensor

**** For dummy channels, Delta V is the velocity change at the approximate time of separation from the contact area.

† Compression: Negative

Y SEE TEST ANOMALIES

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

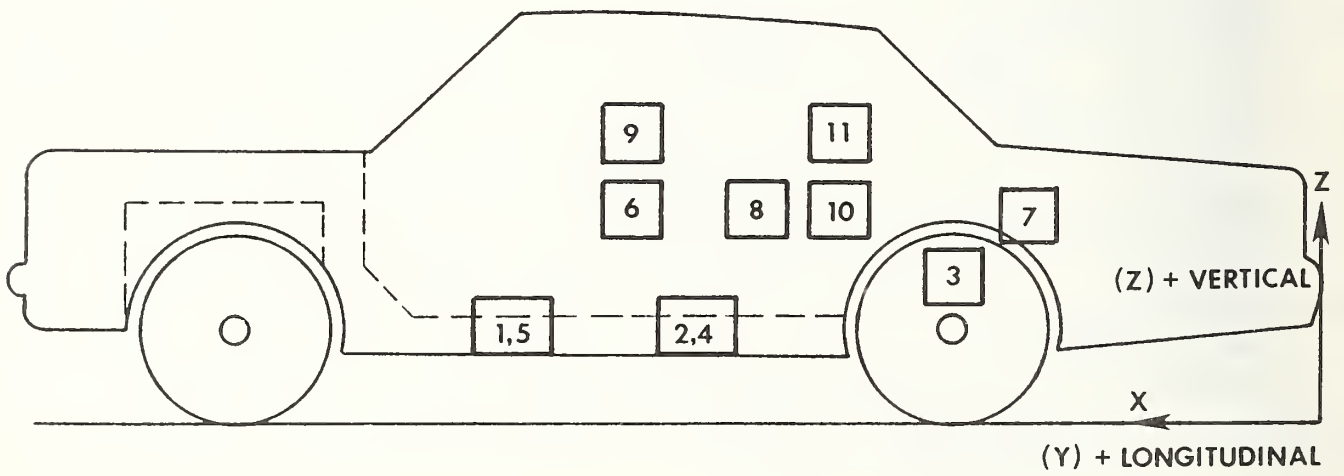
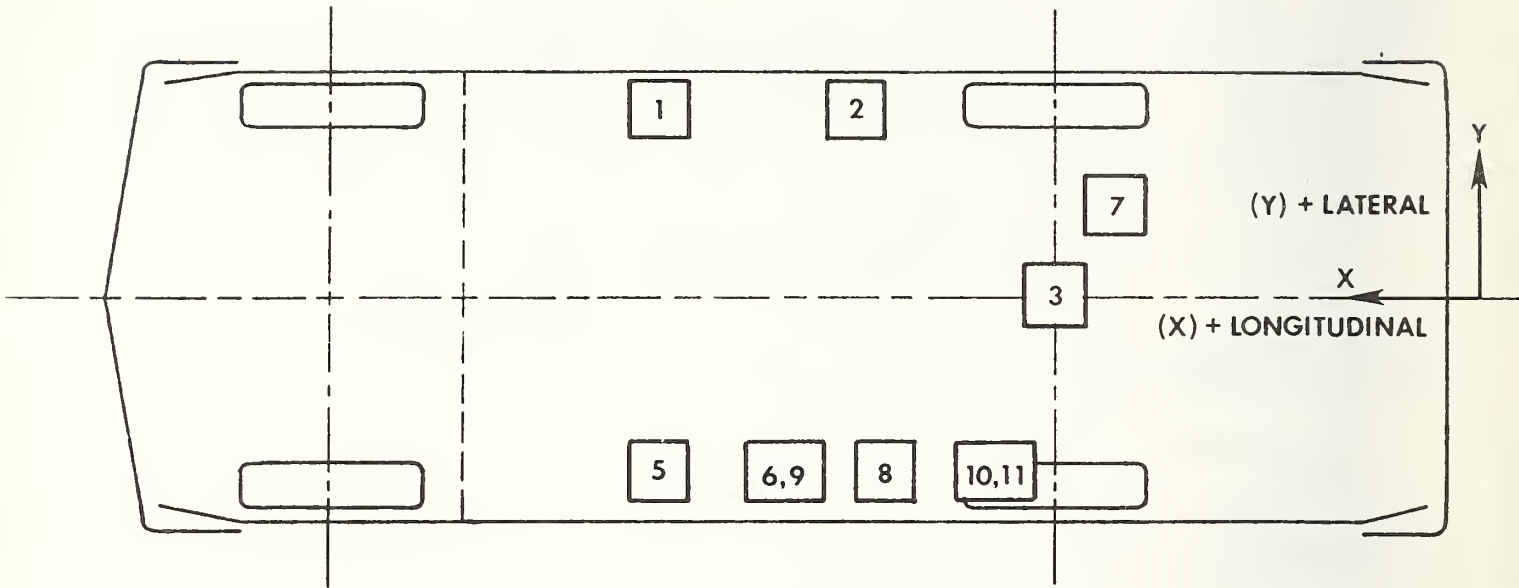
NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	RIGHT SILL AT FRONT SEAT (LONGITUDINAL)	104.6	26.3	9.6				
	(LATERAL)				2.85	58.25	10.59	20.75
	(VERTICAL)				4.75	61.75	4.61	54.13
	(RESULTANT)					22.58 @	45.38	
2	RIGHT SILL AT REAR SEAT (LONGITUDINAL)	73.4	26.6	9.5				
	(LATERAL)				3.80	58.25	9.70	20.88
	(VERTICAL)				19.49	47.00	1.76	86.38
	(RESULTANT)				11.49	26.88	8.27	51.25
						20.33 @	47.38	
3	REAR DECK OVER AXLE (LONGITUDINAL)	37.5	-0.0	35.9				
	(LATERAL)				7.91	41.25	11.99	21.88
	(VERTICAL)				19.06	23.88	3.32	166.75
	(RESULTANT)				7.29	43.00	8.25	31.25
						22.70 @	23.00	
4	LEFT SILL AT REAR SEAT (LATERAL)	72.7	-26.1	9.3				
					58.98	22.50	21.44	37.00
5	LEFT SILL AT FRONT SEAT (LATERAL)	104.2	-26.3	9.0				
					62.33	7.88	10.03	62.50
6	LEFT FRONT DOOR CENTERLINE (LATERAL)	102.6	-27.9	20.5				
					234.02	11.88	108.65	18.88
7	RIGHT REAR COMPARTMENT (LONGITUDINAL)	32.2	20.6	17.8				
					5.29	42.00	8.82	22.63
8	MIDREAR OF LEFT FRONT DOOR (LATERAL)	94.6	-28.1	23.1				
					Y335.43	68.75Y	95.13	19.38 Y
9	UPPER LEFT FRONT DOOR CENTERLINE (LATERAL)	102.6	-28.3	28.0				
					161.67	12.63	47.93	20.75
10	MIDREAR OF LEFT REAR DOOR (LATERAL)	63.5	-28.7	20.1				
					109.31	9.63	115.13	17.00
11	UPPER LEFT REAR DOOR CENTERLINE (LATERAL)	63.7	-29.6	27.4				
					242.88	14.00	141.41	20.13

* Reference: X - Rear Bumper (+ Forward), Y - Vehicle Centerline (+ To Right), Z - Ground Level (+ Up)

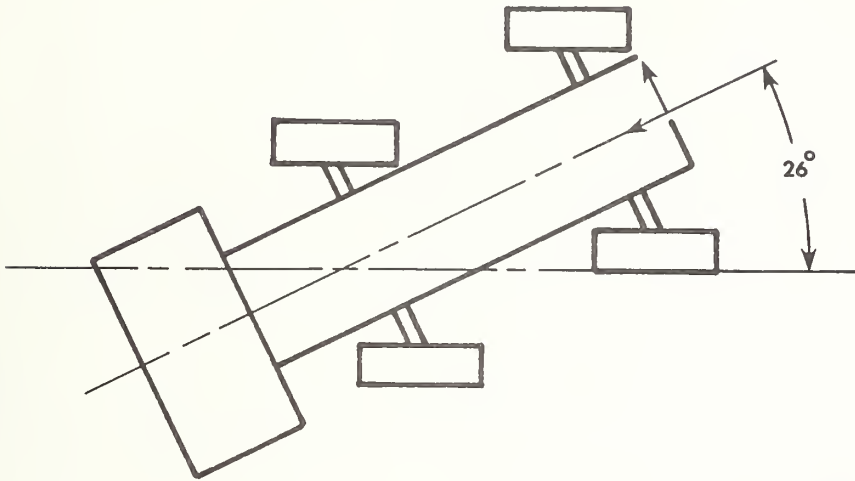
All measurements of accelerometer locations in inches.

Y: See TEST ANOMALIES

VEHICLE ACCELEROMETER LOCATIONS



MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY



NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	CENTER OF GRAVITY	74.5	0.0	11.5				
	(LONGITUDINAL)	$\Delta V = -17.1 \text{ mph @ } 120.00 \text{ msec}$			1.58	175.50	17.16	38.75
	(LATERAL)	$\Delta V = -4.8 \text{ mph @ } 120.00 \text{ msec}$			0.97	168.75	8.27	28.25
	(VERTICAL)				15.56	133.13	14.21	144.38
	(RESULTANT)					17.72 @	38.88	
2	FRONT FRAME MEMBER	130.3	0.0	11.3				
	(LONGITUDINAL)	$\Delta V = -18.6 \text{ mph @ } 120.00 \text{ msec}$			1.77	148.63	16.83	38.50
3	REAR FRAME MEMBER	23.3	0.0	11.5				
	(LONGITUDINAL)	$\Delta V = -16.1 \text{ mph @ } 120.00 \text{ msec}$			1.86	152.88	16.63	38.00

* Reference: X - Rear Most Point of Frame (+ To Forward), Y - Barrier Centerline (+ To Right), Z - Ground Level (+ To Up)

All measurements of accelerometer locations in inches.

HIGH SPEED CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Overhead	Photosonics 1B	8	770	Vehicle Dynamics
2	Overhead	Photosonics 1B	25	775	Close-up of impact point
3	Onboard MDB	Photosonics 1B	25	----*	Close-up of impact point
4	Onboard MDB	Stalex	13	166	Driver kinematics
5	Ground level - right	Photosonics 1B	25	737	Overall view
6	Ground level - left	Photosonics 1B	17	800	Overall view
7	Onboard vehicle	Photosonics 1B	8	807	Driver kinematics - front view
8	Onboard vehicle	Photosonics 1B	8	805	Driver kinematics
9	Onboard vehicle	Photosonics 1B	8	812	Passenger kinematics

NOTE: CAMERAS ARE NUMBERED ACCORDING TO SPLICING SEQUENCE OF FILM.
 (24 fps) REAL TIME MOVIE FILM COVERAGE OF PRE-CRASH, POST-CRASH
 AND CRASH EVENT SPLICED AT START AND END OF FILM.

*SEE TEST ANOMALIES

LOCATIONS OF OFFBOARD HIGH SPEED CAMERAS

CAMERA NO.	X	Y	Z
1	0	0	25'
2	0	0	25'
5	24'10"	58'8"	45"
6	-20'11"	-13'3"	45"

Origin of Coordinate System is Point of Impact

- +X = Forward with Respect to Striking Vehicle's Velocity Vector
- +Y = Rightward with Respect to Striking Vehicle's Velocity Vector
- +Z = Upward with Respect to Striking Vehicle's Velocity Vector

NON-GOVERNMENT FURNISHED TRANSDUCER INFORMATION

PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NUMBER	SERIAL NUMBER	MFGR.	DATE OF LAST CALIBRATION	SENSITIVITY	DESIRED FULL SCALE (ENGR. UNITS)
BOGXG	Accel	4-202-0001	18845	Bell Howell	12/7/83	.237 MV/G	50 G
BOGYG	Accel	4-202-0001	18858	Bell Howell	12/7/83	.240 MV/G	50 G
BOGZG	Accel	4-202-0001	18857	Bell Howell	12/7/83	.240 MV/G	50 G
BFCXG	Accel	4-202-0001	18240	Bell Howell	12/7/83	.240 MV/G	50 G
BRCXG	Accel	4-202-0001	19022	Bell Howell	12/7/83	.222 MV/G	50 G

All dummy and struck vehicle accelerometers were Government Furnished Equipment and were Endevco 2264 Accelerometers.

APPENDIX A
PHOTOGRAPHS



Figure A-1. PRE-TEST OVERALL - VIEW 1



Figure A-2. PRE-TEST OVERALL - VIEW 2



Figure A-3. PRE-TEST OVERALL - VIEW 3



Figure A-4. PRE-TEST OVERALL - VIEW 4



Figure A-5. PRE-TEST CLOSEUP - VIEW 1



Figure A-6. PRE-TEST CLOSEUP - VIEW 2



Figure A-7. PRE-TEST DRIVER DUMMY - VIEW 1



Figure A-8. PRE-TEST DRIVER DUMMY - VIEW 2



Figure A-9. PRE-TEST PASSENGER DUMMY - VIEW 1



Figure A-10. PRE-TEST PASSENGER DUMMY - VIEW 2



Figure A-11. CRASH EVENT PHOTOGRAPH



Figure A-12. POST-TEST OVERALL - VIEW 1



Figure A-13. POST-TEST OVERALL - VIEW 2



Figure A-14. POST-TEST OVERALL - VIEW 3



Figure A-15. POST-TEST OVERALL - VIEW 4



Figure A-16. POST-TEST CLOSEUP - VIEW 1

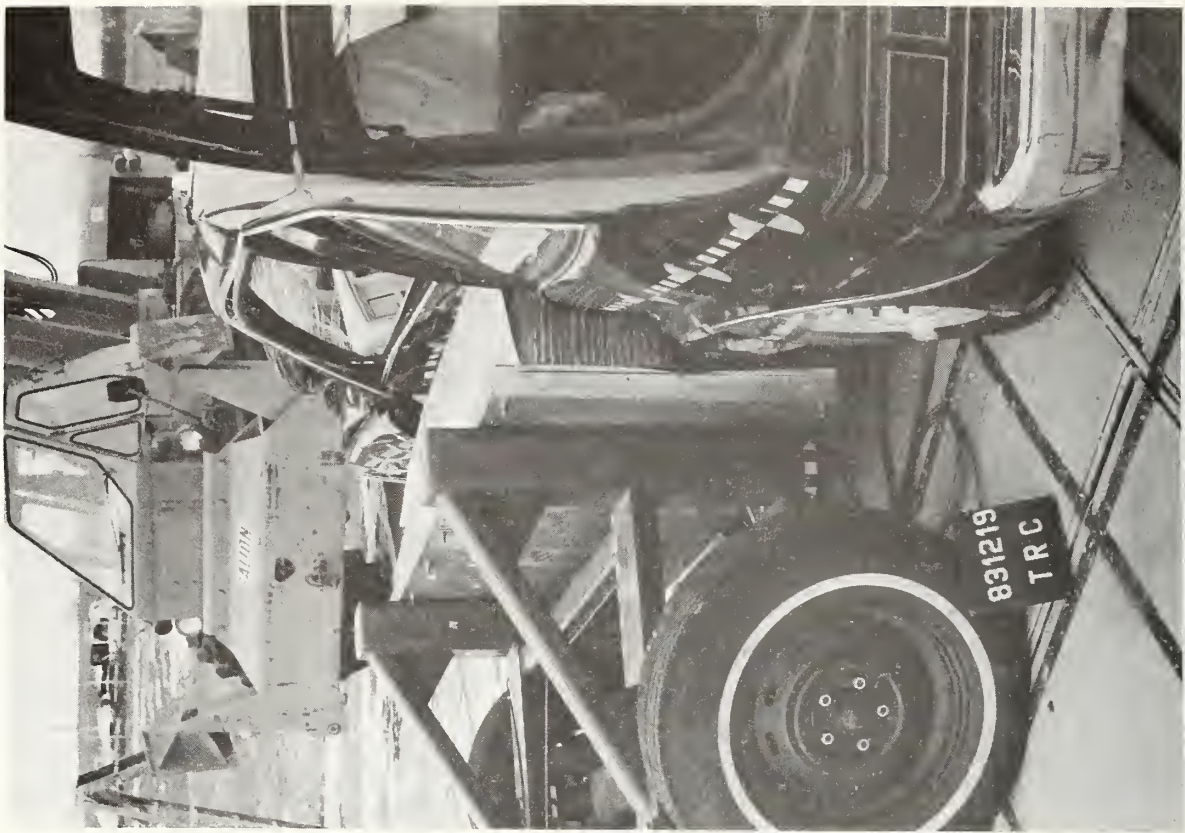


Figure A-17. POST-TEST CLOSEUP - VIEW 2



Figure A-18. POST-TEST DRIVER DUMMY - VIEW 1



Figure A-19. POST-TEST DRIVER DUMMY - VIEW 2

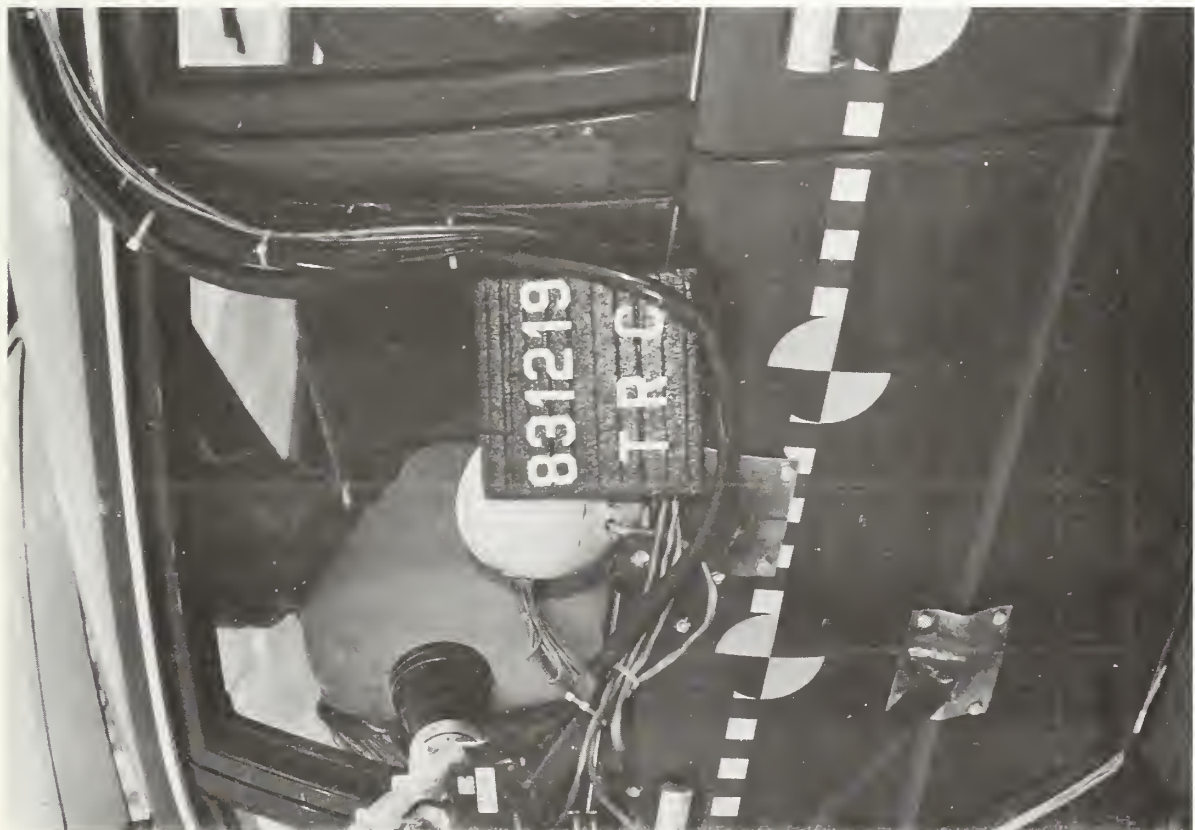


Figure A-20. POST-TEST PASSENGER DUMMY - VIEW 1



Figure A-21. POST-TEST PASSENGER DUMMY - VIEW 2

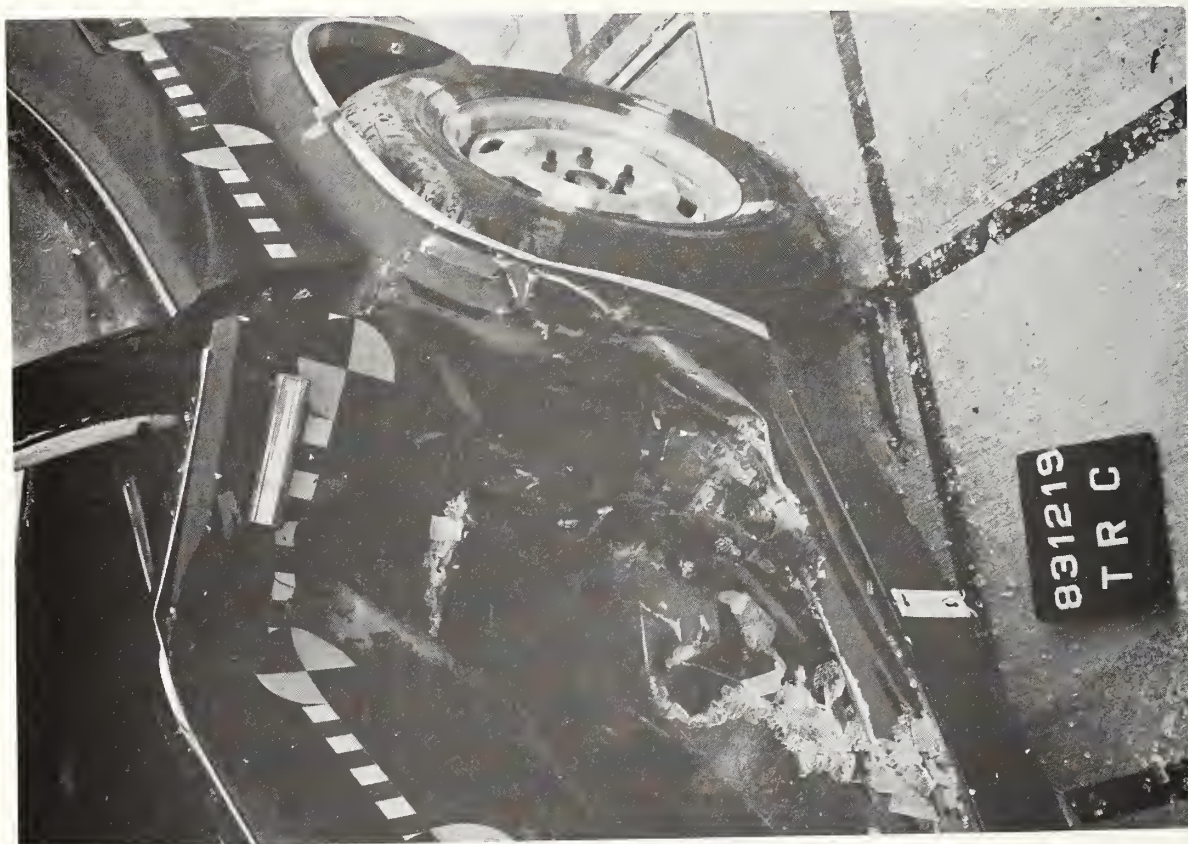


Figure A-22. POST-TEST VEHICLE DAMAGE - VIEW 1



Figure A-23. POST-TEST VEHICLE DAMAGE - VIEW 2

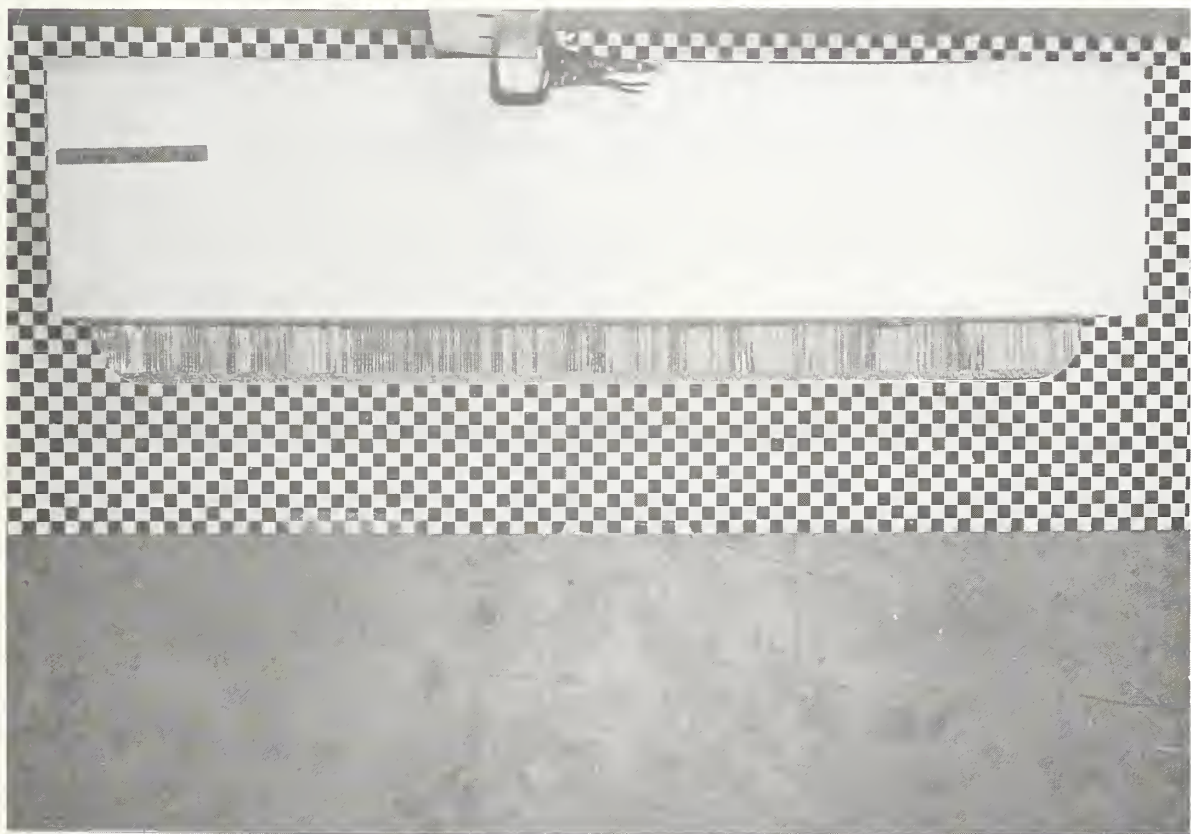


Figure A-24. PRE-TEST MDB FACE - VIEW 1

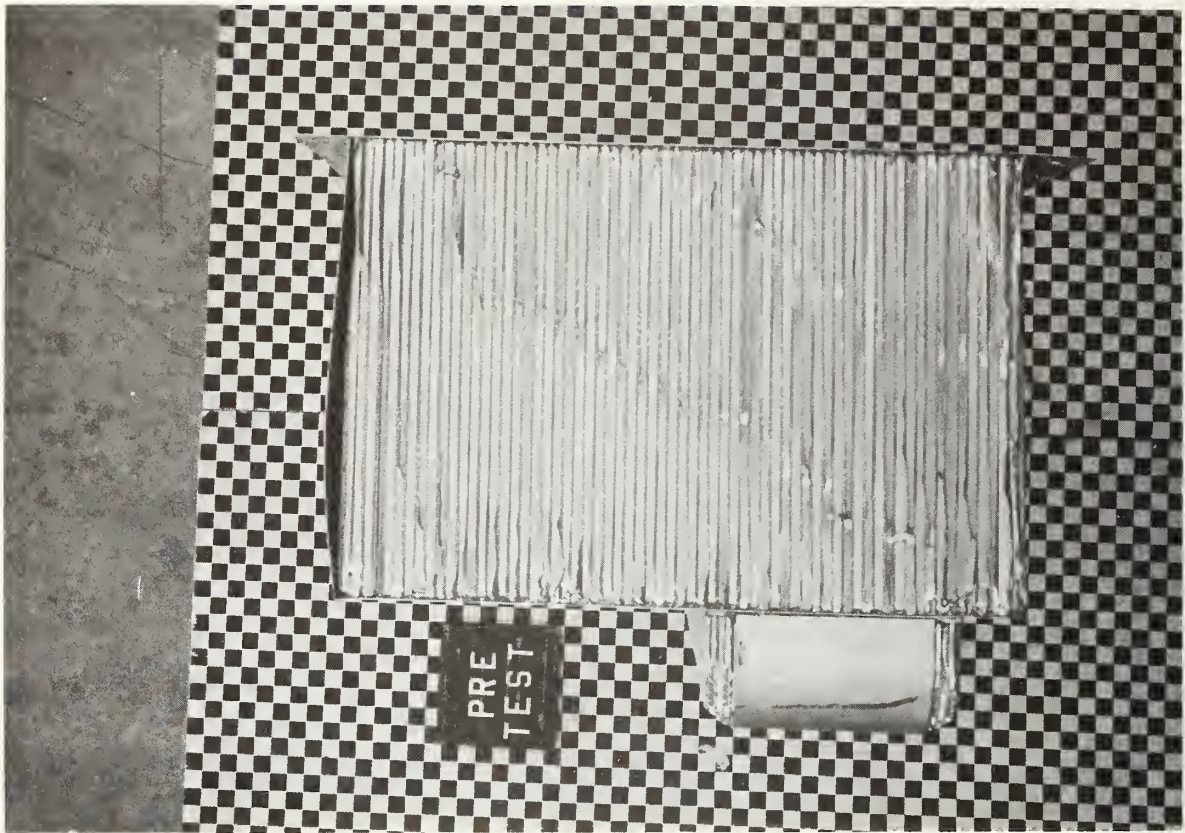


Figure A-25. PRE-TEST MDB FACE - VIEW 2

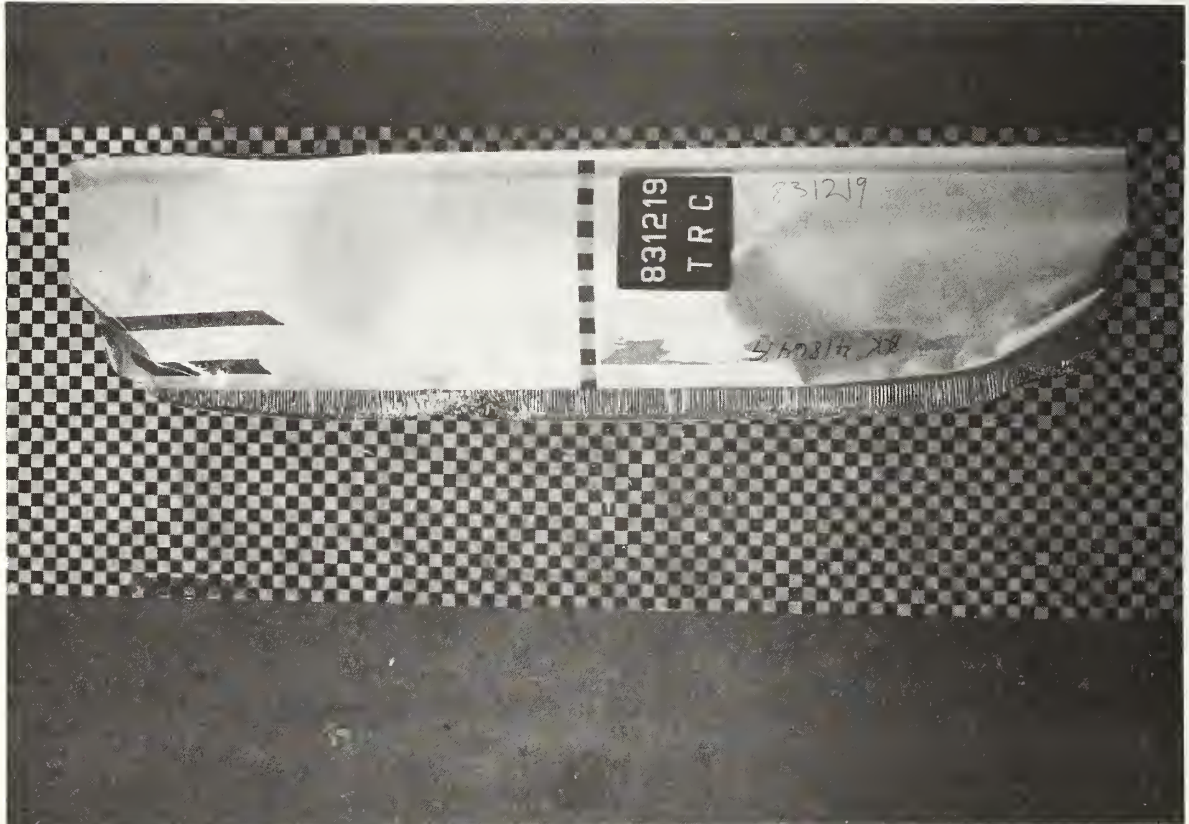


Figure A-26. POST-TEST MDB FACE - VIEW 1

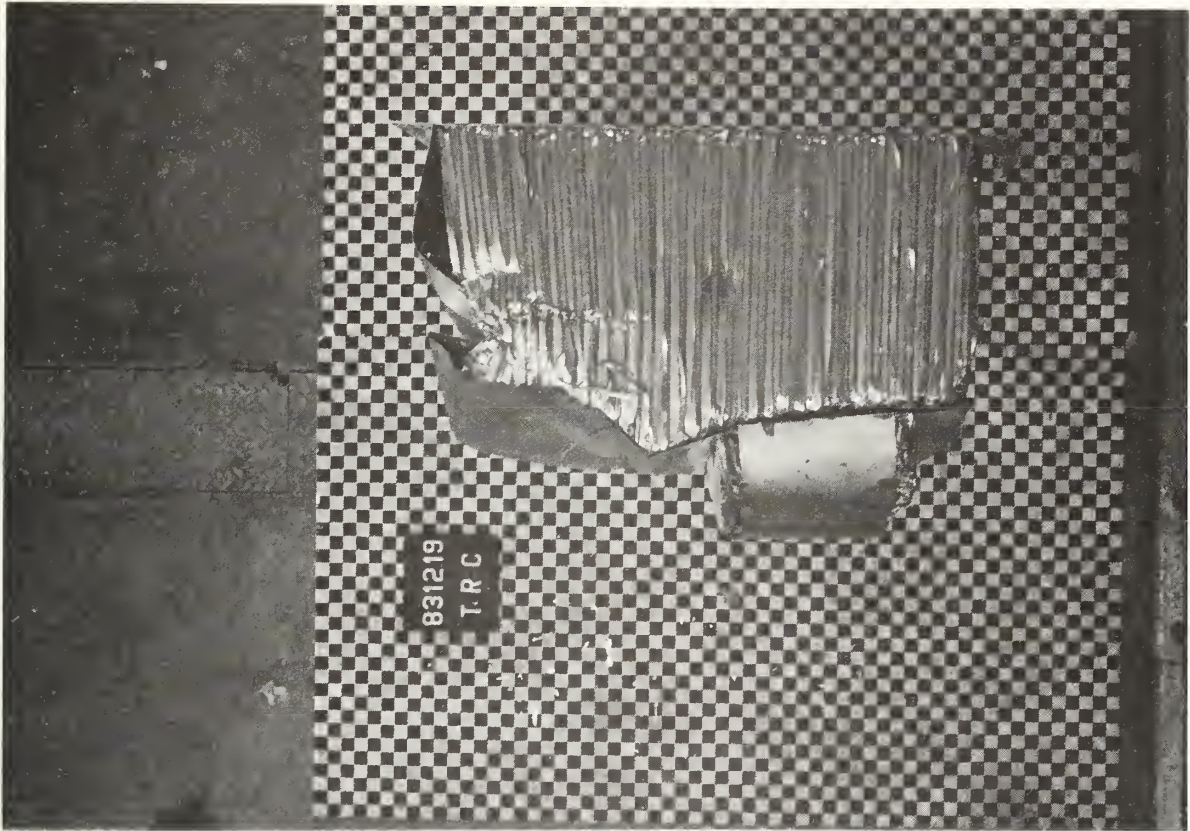


Figure A-27. POST-TEST MDB FACE - VIEW 2

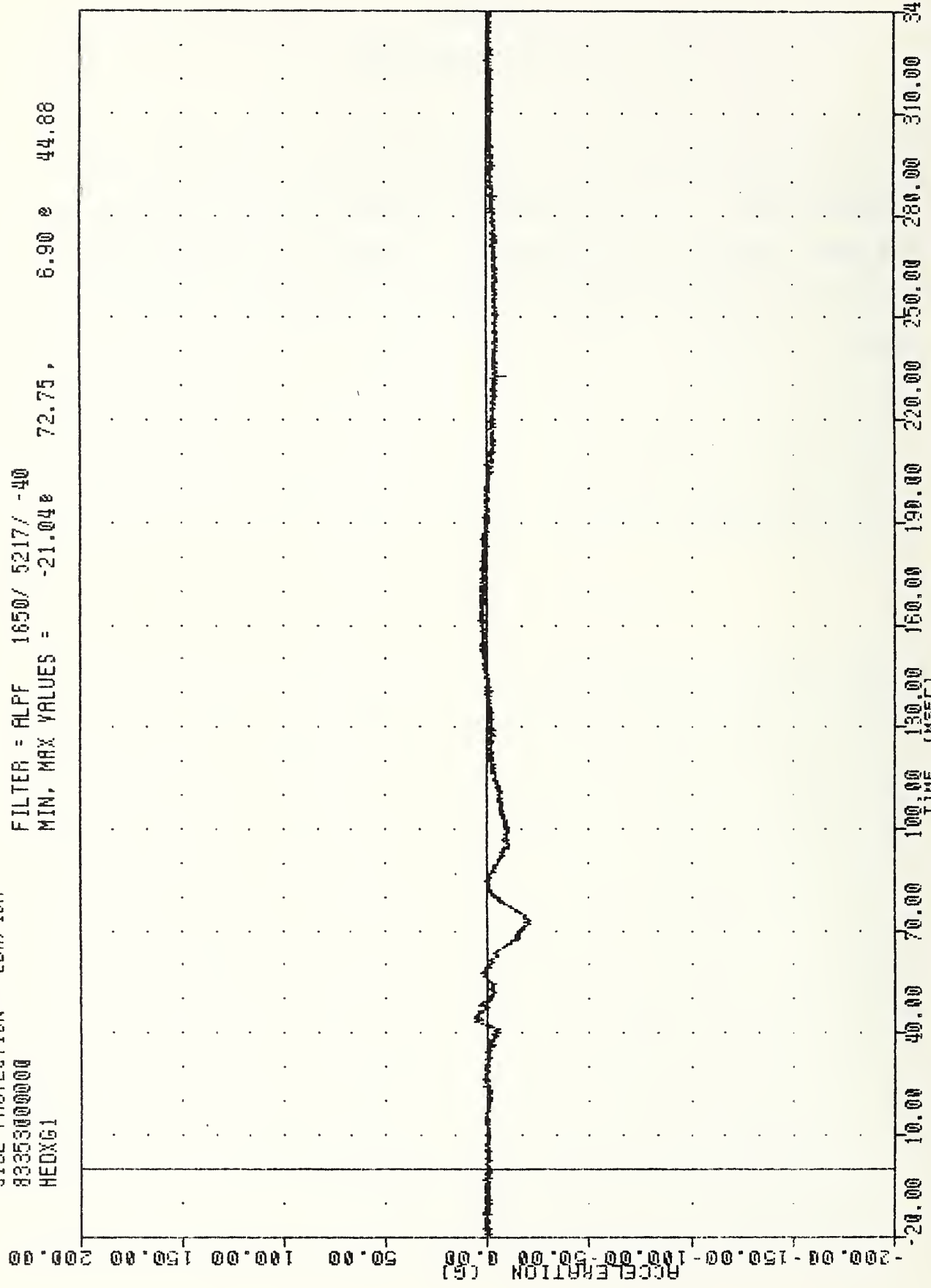
APPENDIX B

DATA PLOT PRESENTATION

Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. All data were filtered according to SAE J211, except that dummy thorax data were filtered using the HSRI filter.

INL , 831219
 SIDE PROTECTION - 20R/40R
 83353000000
 HEDXG1

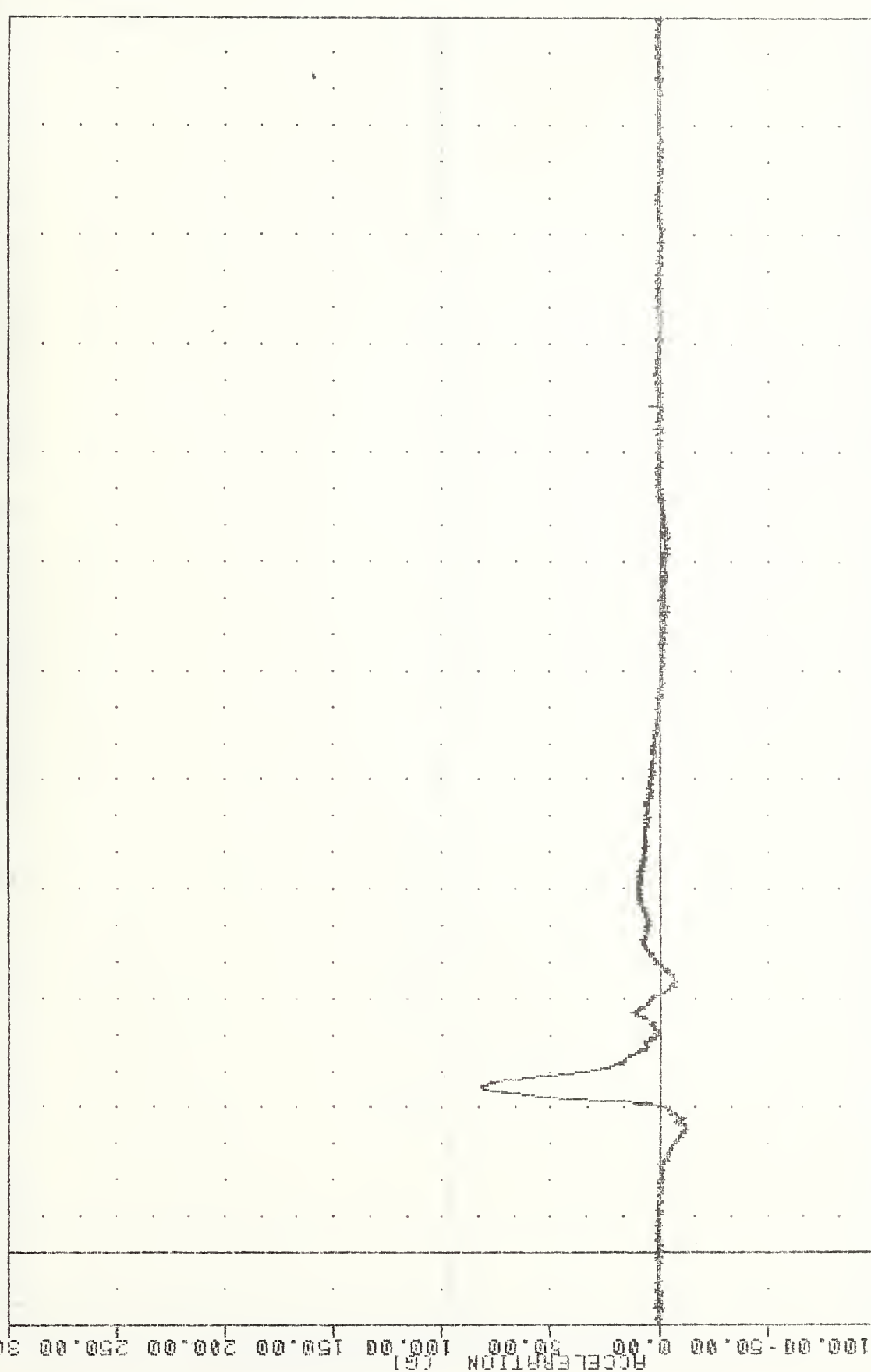
PLDT Dmic 4/-DEL-03 10:23:05
 FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -21.04e 72.75, 6.90 e 44.88



MOVING DEFORMABLE BARRIER INTO CITATION
 DRIVER HEAD ACCELERATION X AXIS

INL 831219
 SIDE PROTECTION - 2DR/4DR
 8335300000
 HEDYGI

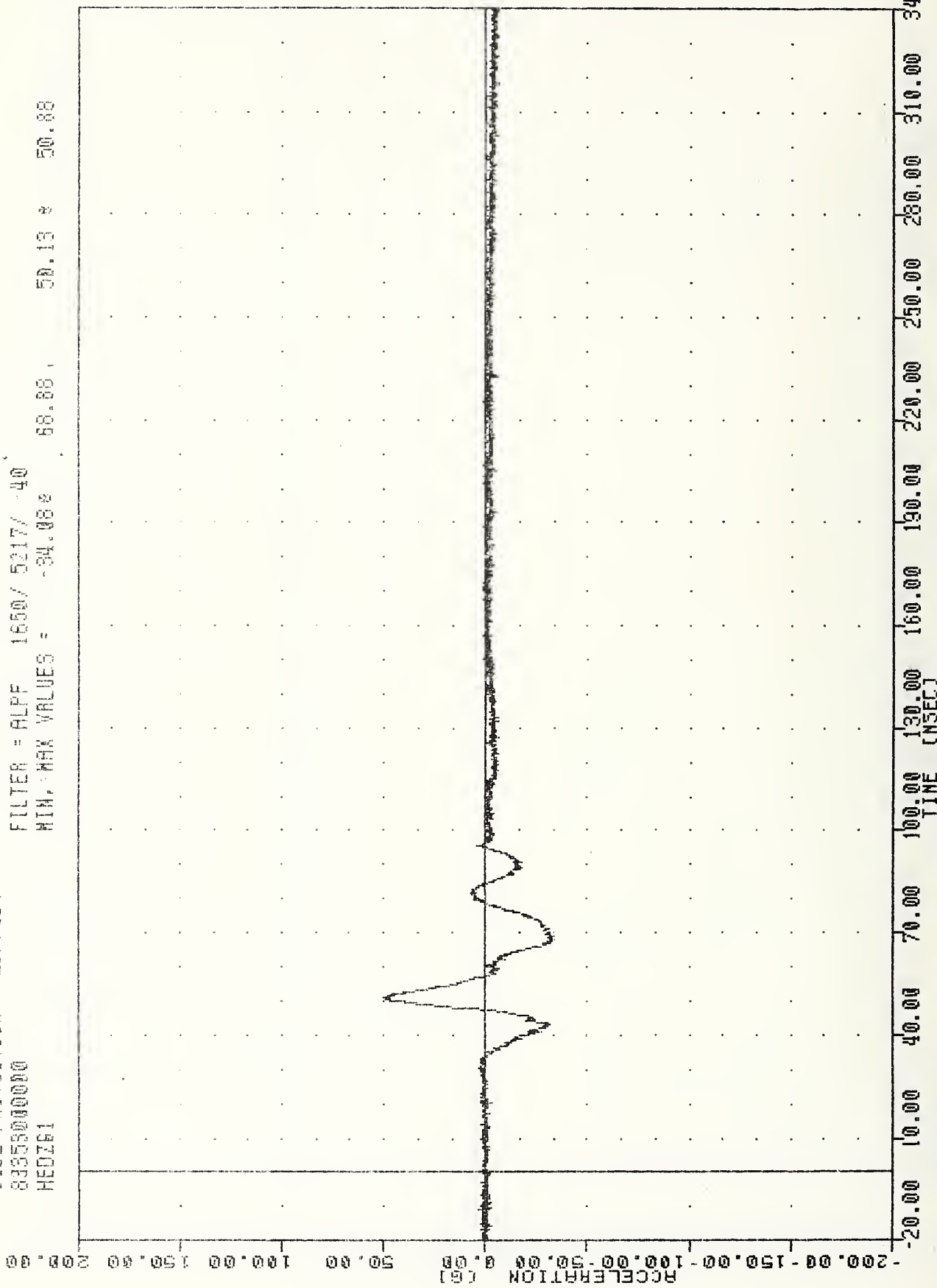
rluT Onie 27-0EL-03 10:23:00
 FILTER = ALPF 1650/ 5217/ -10
 MIN. MAX VALUES = -12.75e 83.75. 82.53 e 45.38



-20.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO CITATION
 DRIVER HEAD ACCELERATION Y AXIS

Job Date: 27-DEC-00 10:28:00
 FILTER = ALPF 1650/ 5217/ 40
 MIN. MAX VALUES = -34.08g 50.13g 50.88

INC 831210
 SIDE PROTECTION - 20R/40A
 8335500000
 HEDZ61



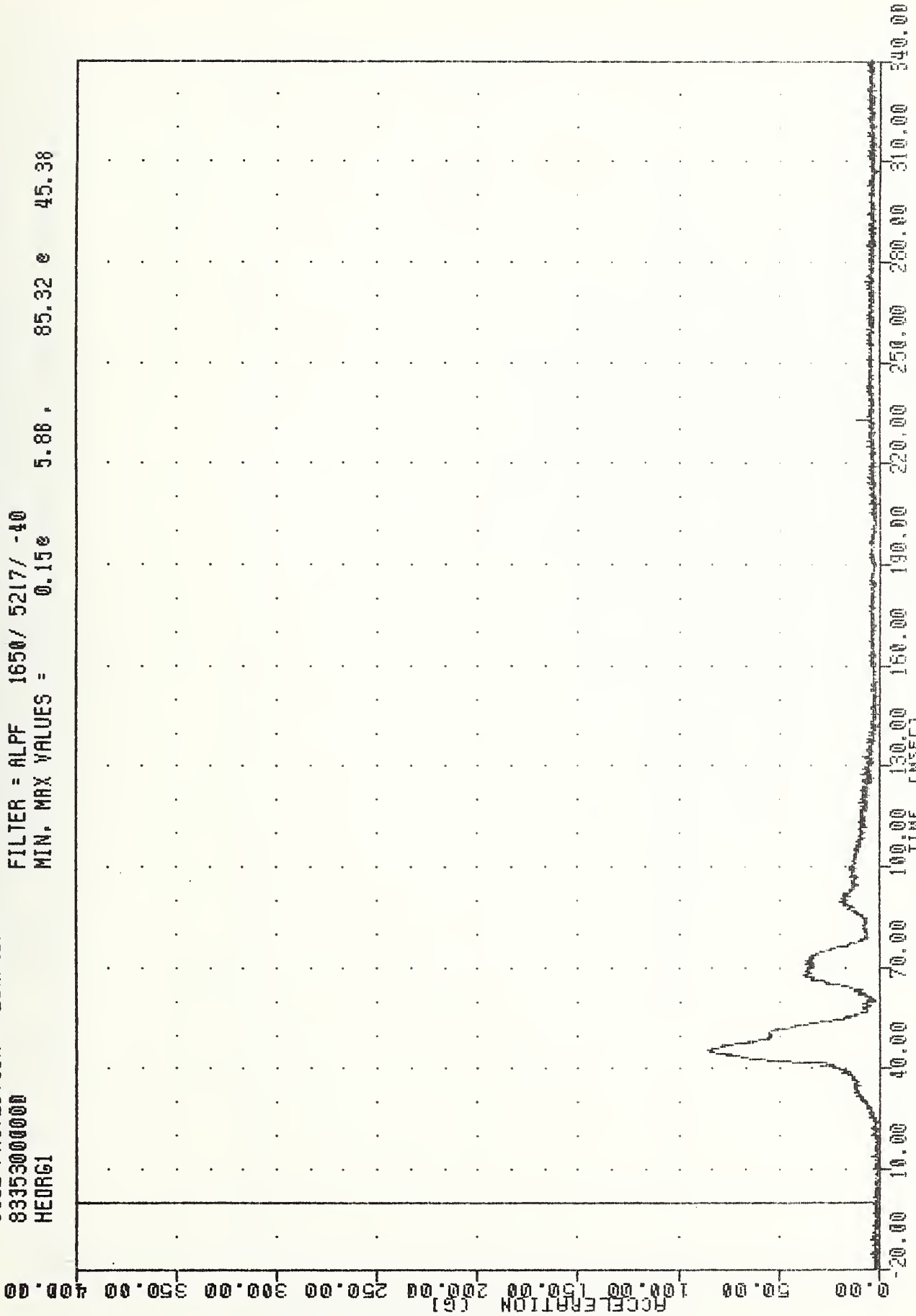
MOVING DEFORMABLE BARRIER INTO CITATION
 DRIVER HEAD ACCELERATION Z AXIS

IHC
831219
SIDE PROTECTION - 2DR/4DR
83353000000
HEORGI

PLUI DATE 27-DEC-83 10:23:03

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = 0.15e 5.88e 85.32 e 45.38



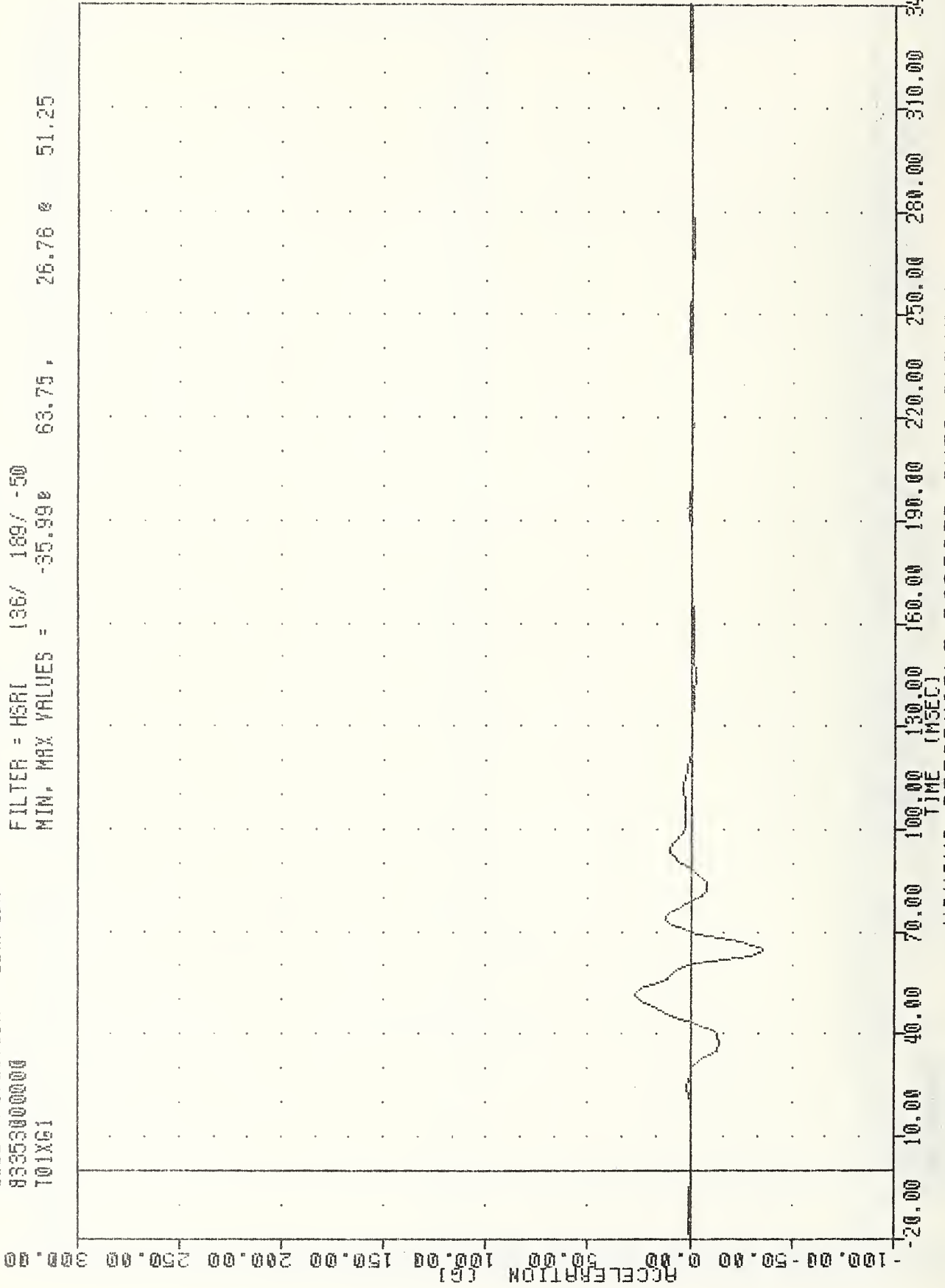
MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER HEAD RESULTANT

TRC
83353000000
701XG1

FLUT DATE 27-DEC-83 10:25:21

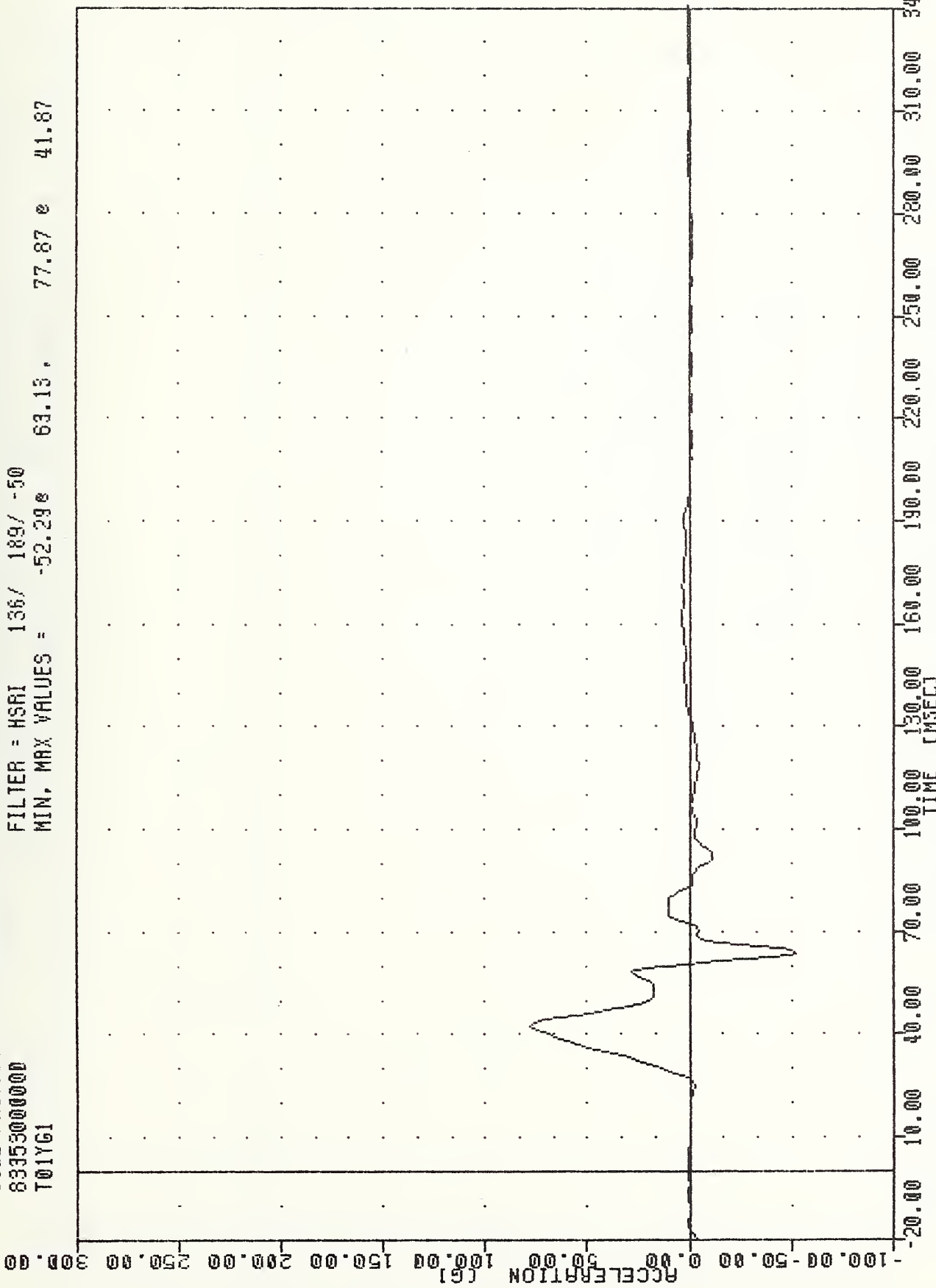
FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -95.99e 63.75e 26.76e 51.25



MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER UPPER SPINE ACCELERATION X AXIS

TRC 831219 PLOT DATE 27-DEC-83 10:25:21
 SIDE PROTECTION - 20A/40R
 83353000000
 T01Y61
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -52.29e 63.13. 77.87 e 41.87

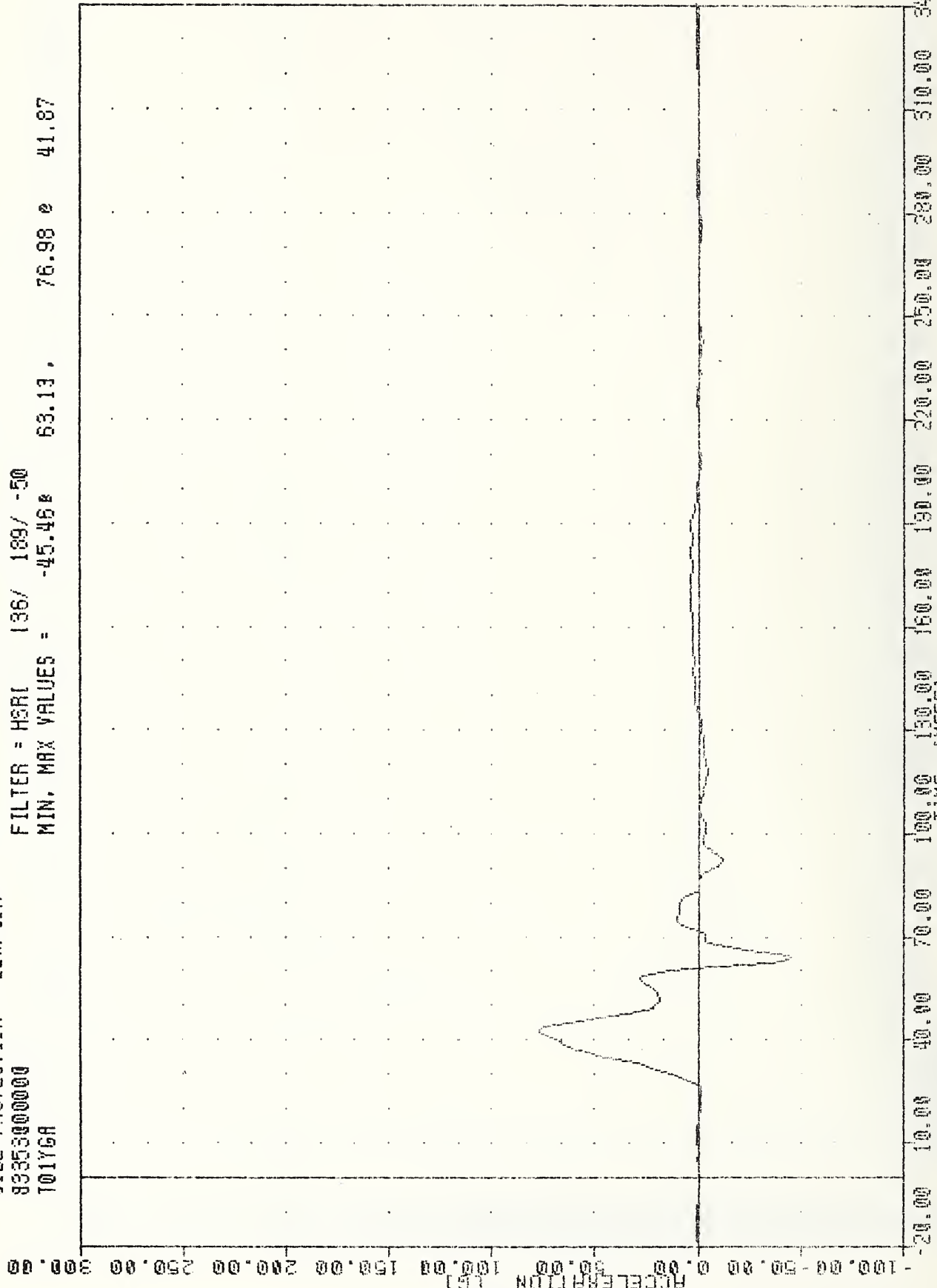


MOVING DEFORMABLE BARRIER INTO CITATION
 DRIVER UPPER SPINE ACCELERATION Y AXIS

IRC , 831219
SIDE PROTECTION - 20R/40R
83353000000
T01Y6R

PLOT DATE 3-JUN-84 10:13:17

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -45.46 63.13 76.98 41.87



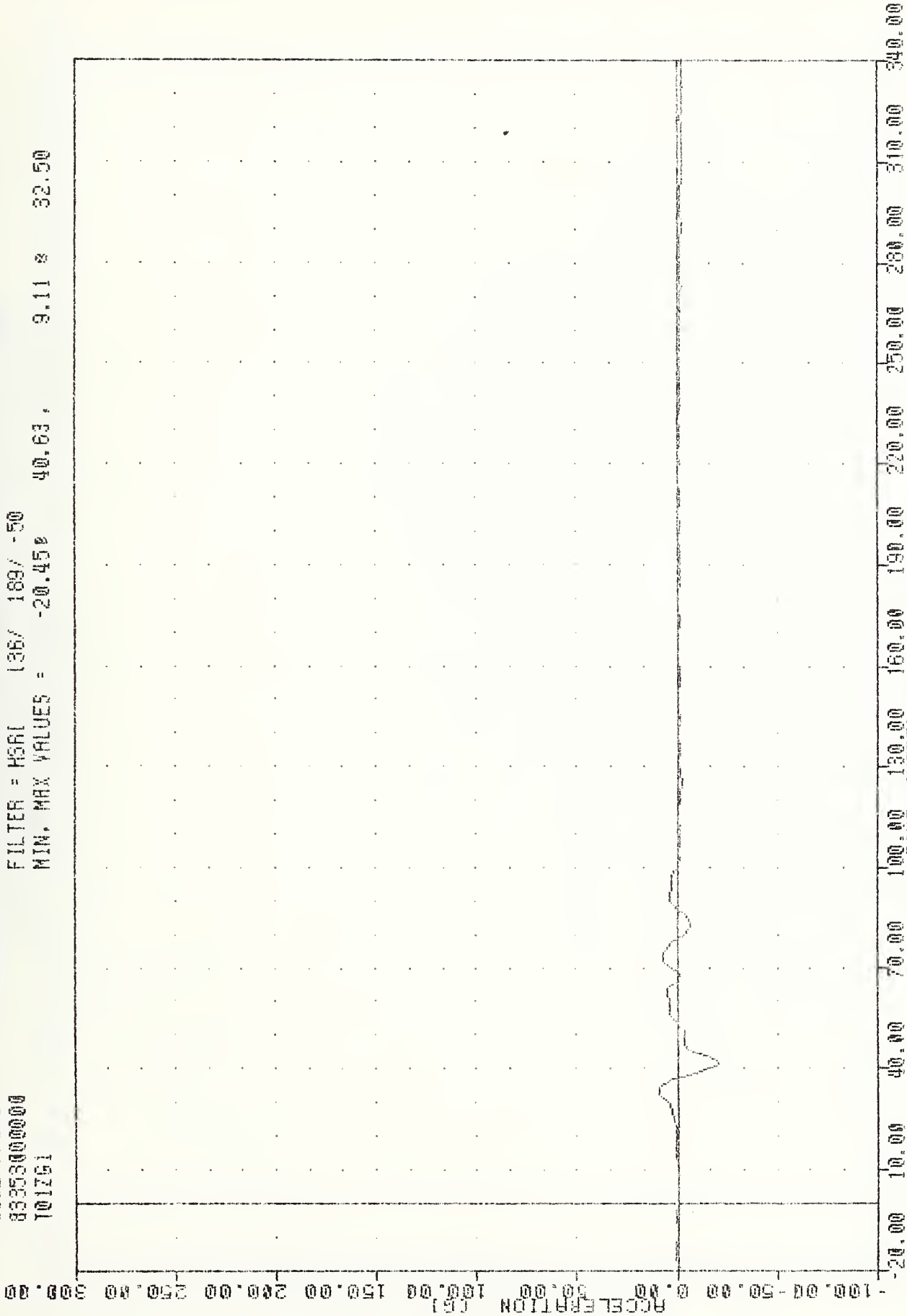
MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER UPPER SPINE ACCELERATION #2 Y AXIS

INC , 831219
SIDE PROTECTION - 20R/40R
83353000000
T01791

PLUT DATE 27-DEC-83 10:25:21

FILTER = HSR1 (36/ 189/ -50

MIN. MAX VALUES = -20.45% 40.63, 9.11 * 32.50



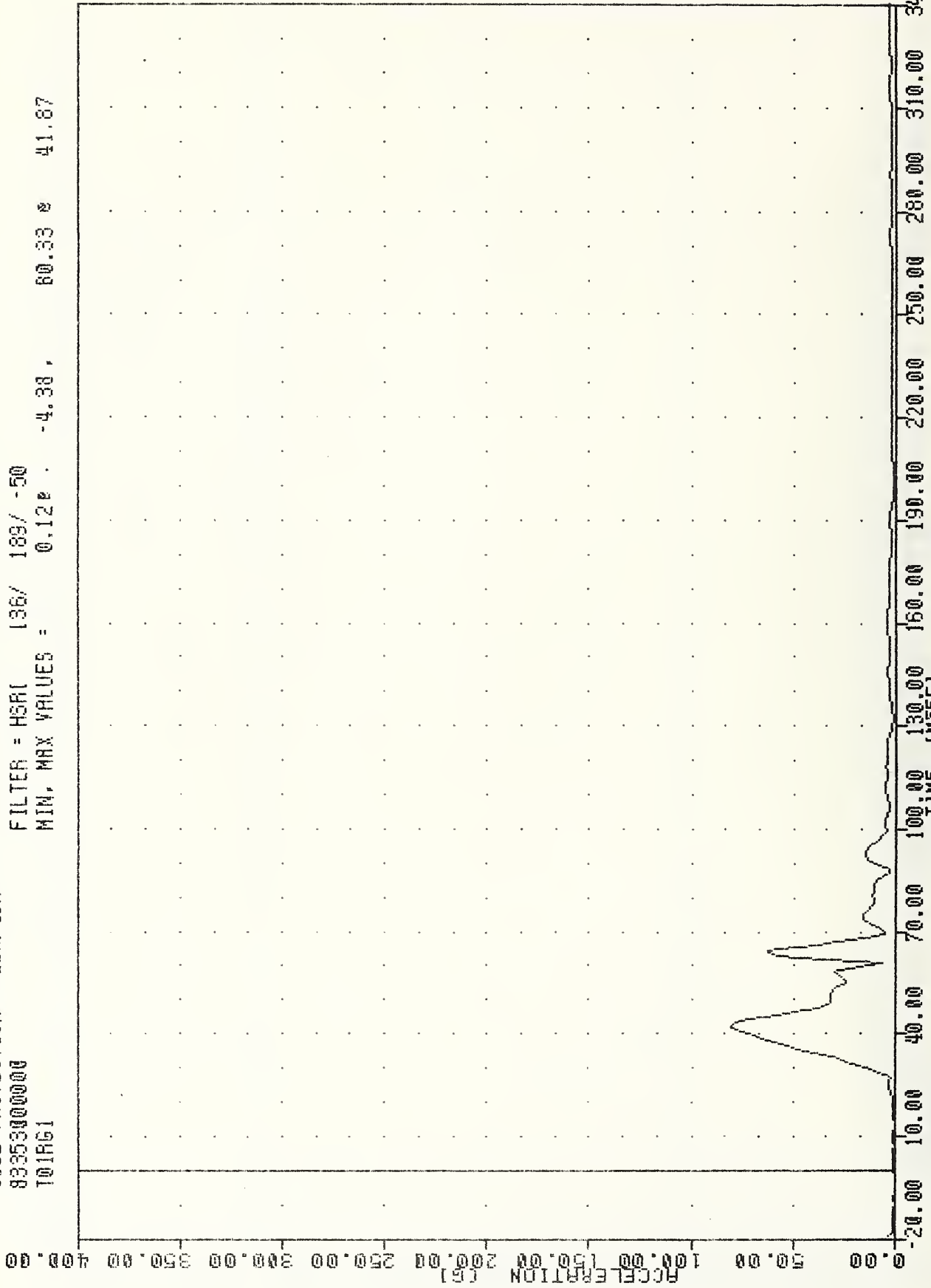
MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER UPPER SPINE ACCELERATION Z AXIS

PKC 831214
SIDE PROTECTION - 20R/40R
83353000000
T01R61

PLUT DATE 27-DEC-83 10:25:21

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = 0.12e -4.38e 60.33e 41.87



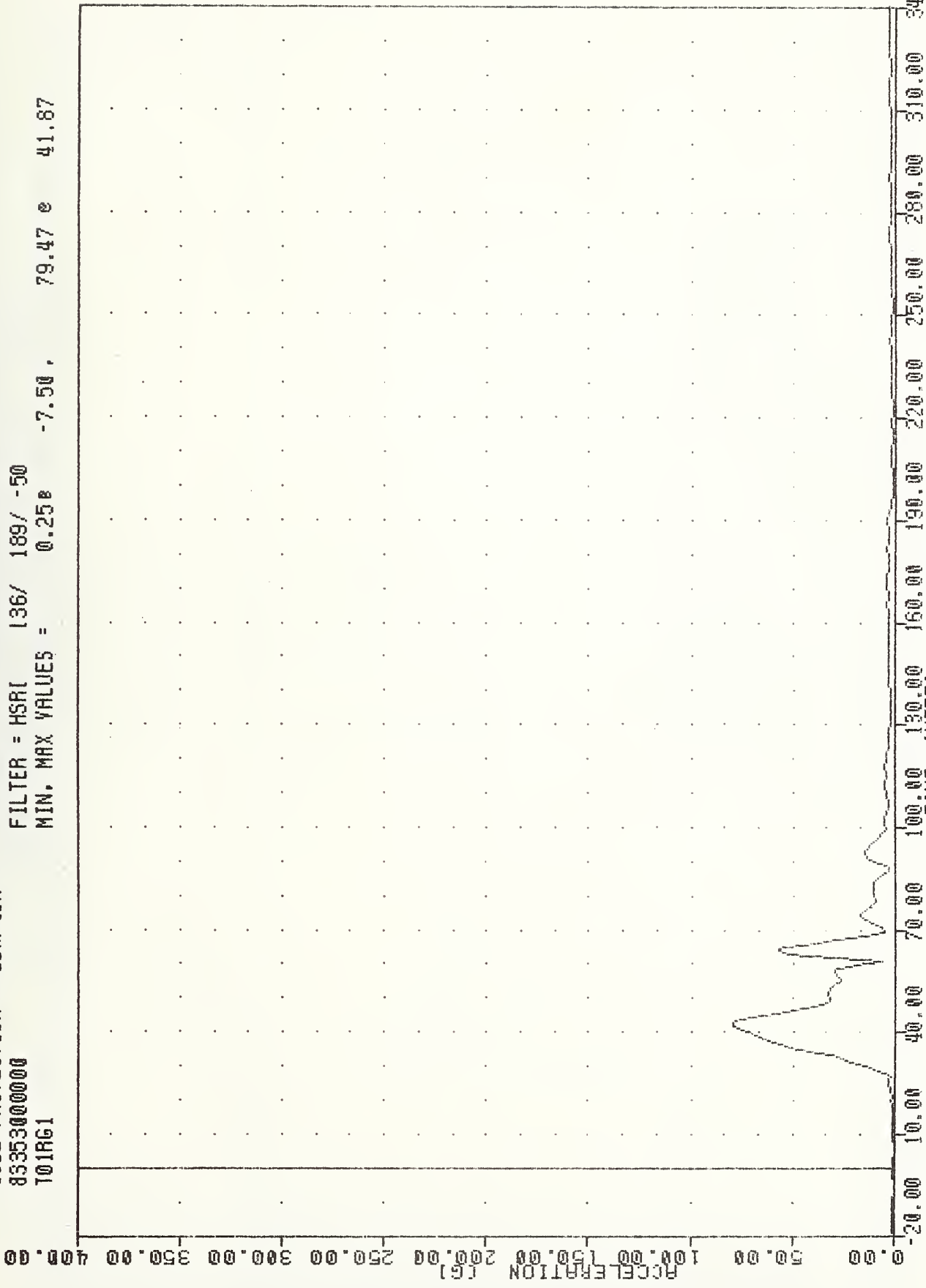
MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER UPPER SPINE RESULTANT

IMC , 831219
SIDE PROTECTION - 20R/40R
8535300000
T01RG1

PLUT DATE 27-DEC-83 10:27:36

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = 0.258 -7.50 , 79.47 e 41.87

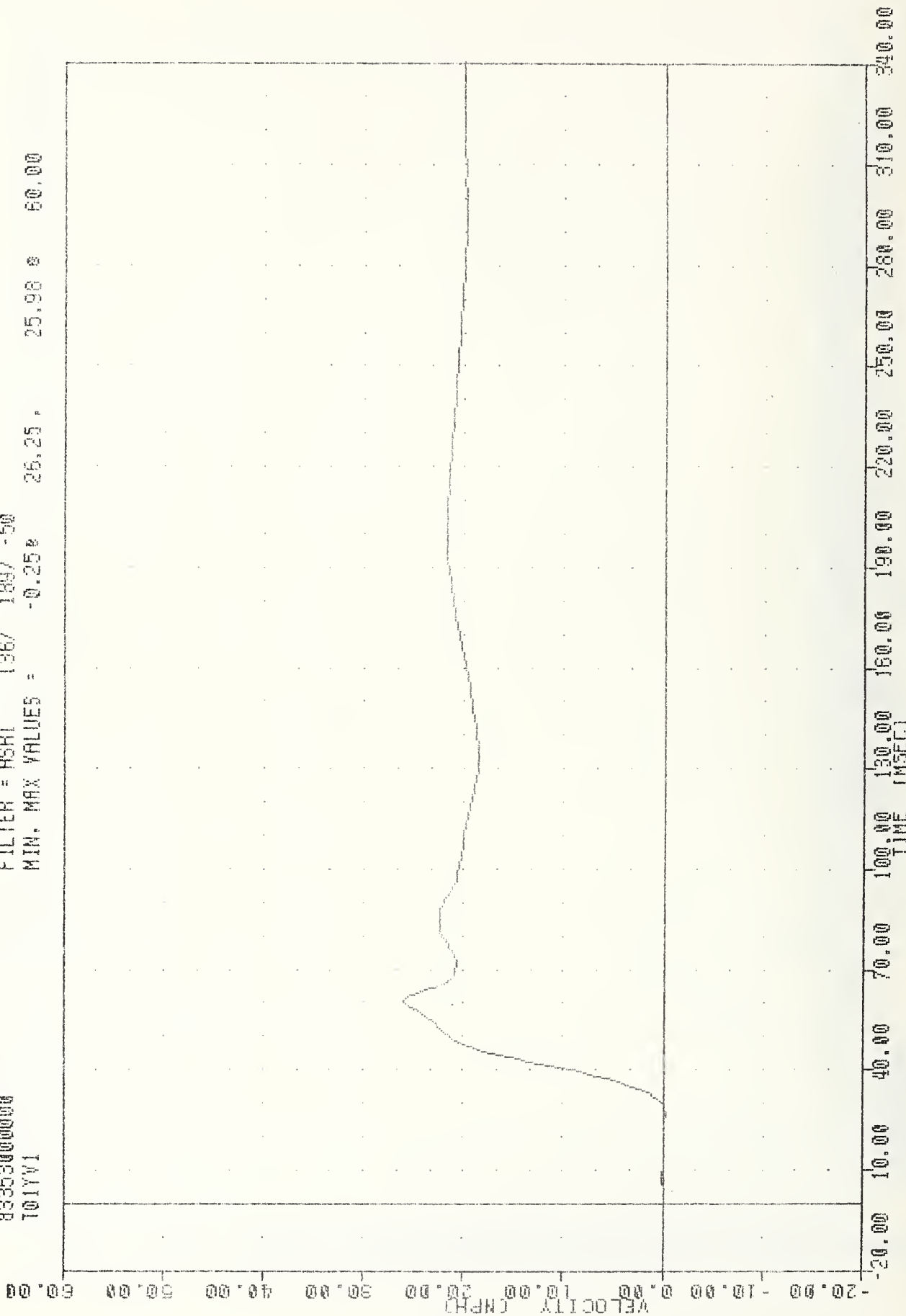


MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER UPPER SPINE RESULTANT USING T01YGA

IRC
833530000000
T01YV1

831219
SIDE PROTECTION - 20R/40R
FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = 26.25 , 25.98 @ 60.00

PLT DATE 27-JUL-83 12:00:34

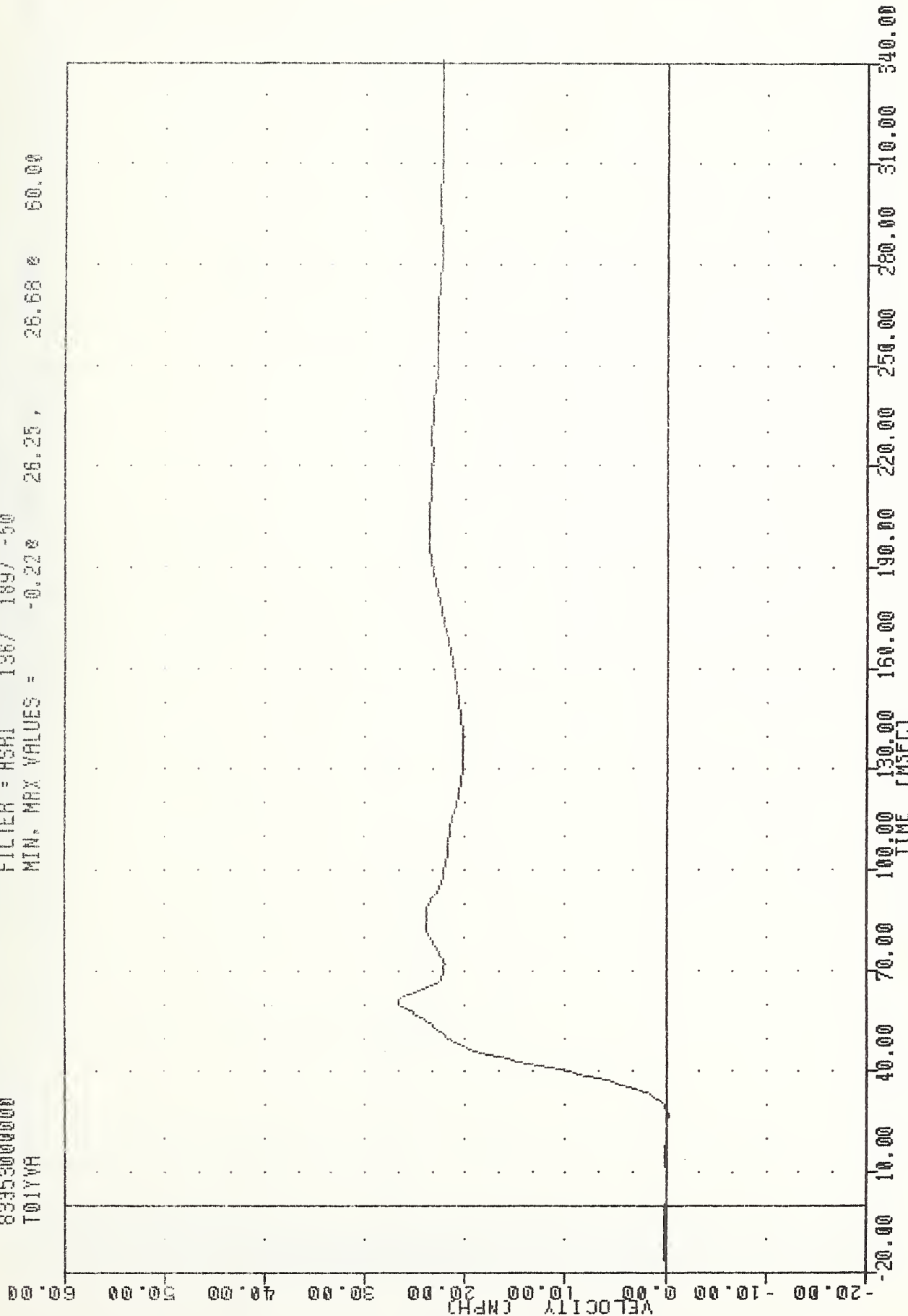


MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING T01YV1

TRC , 831219
SIDE PROTECTION - 2DR/4DR
83353000000
T01YVA

PLOT DATE 27-DEC-83 12:58:34

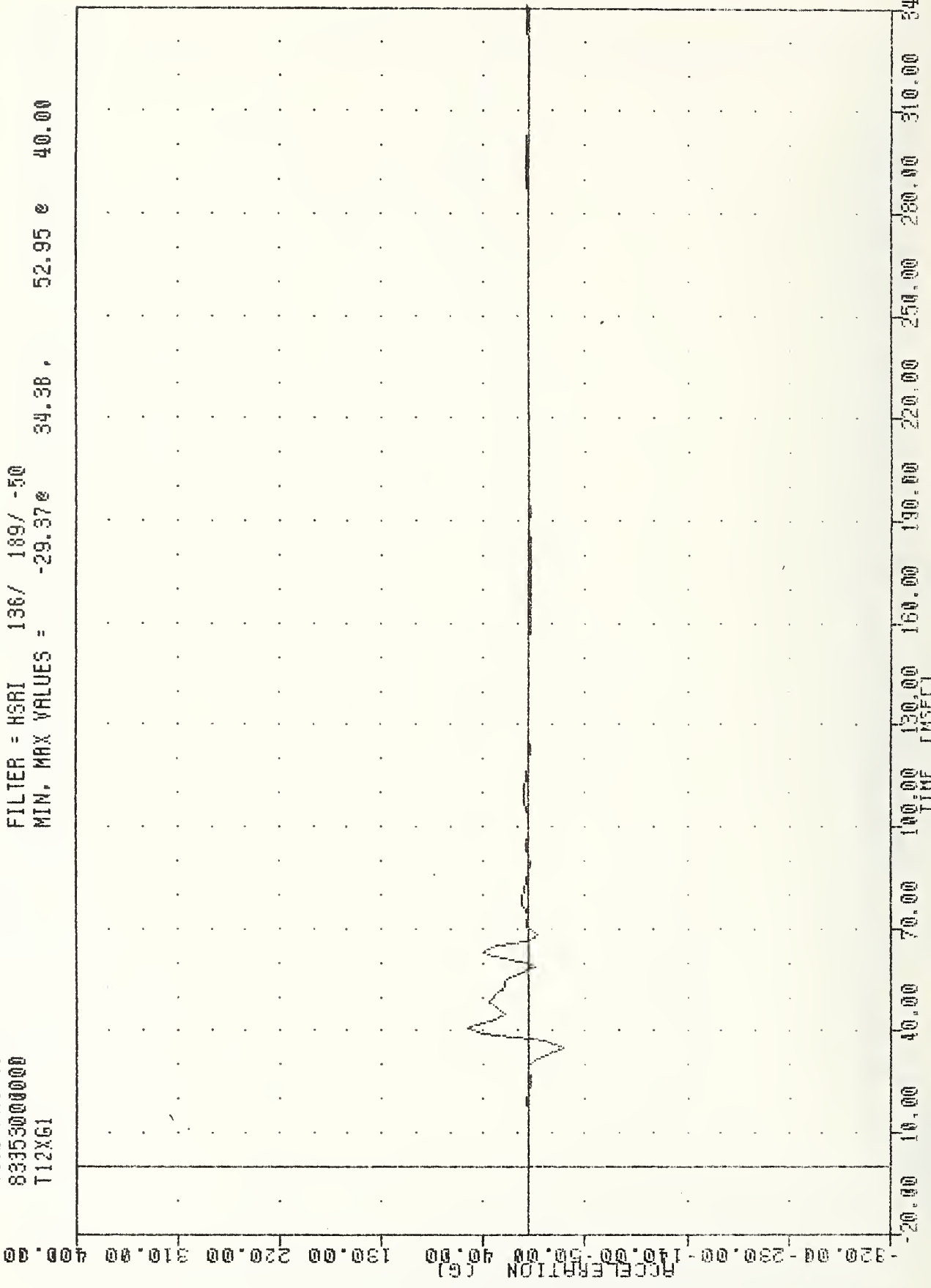
FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -0.22% 26.25 , 26.68 % 60.00



MOVING DEFORMABLE BARRIER INTO CITATION
DELTA Y USING T01YGA

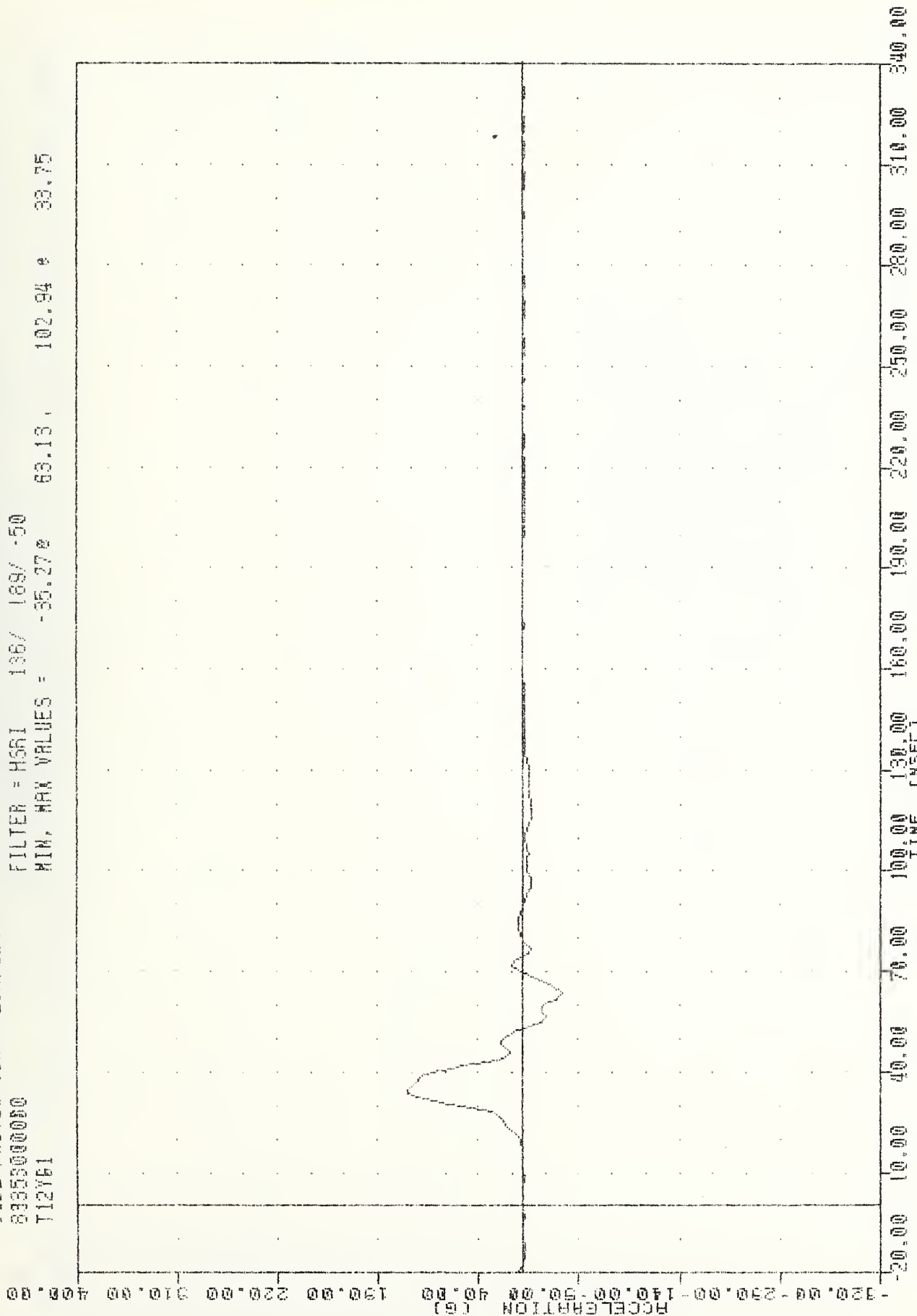
IMC 831219
SIDE PROTECTION - 20R/4DR
8335300000
T12XG1

PLU1 DR1E 27-DEC-83 10:25:21
FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -29.37e 34.38. 52.95 e 40.00



MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER LOWER SPINE ACCELERATION X AXIS

IAL 831219
 83353000000
 T12Y61
 SIDE PROTECTION - 20R/40R
 FILTER = HSRI 136/ 169/ -50
 MIN, MAX VALUES = -35.27 83.13 102.94 33.75
 FLU DRIVE 27-DEC-00 10:25:21

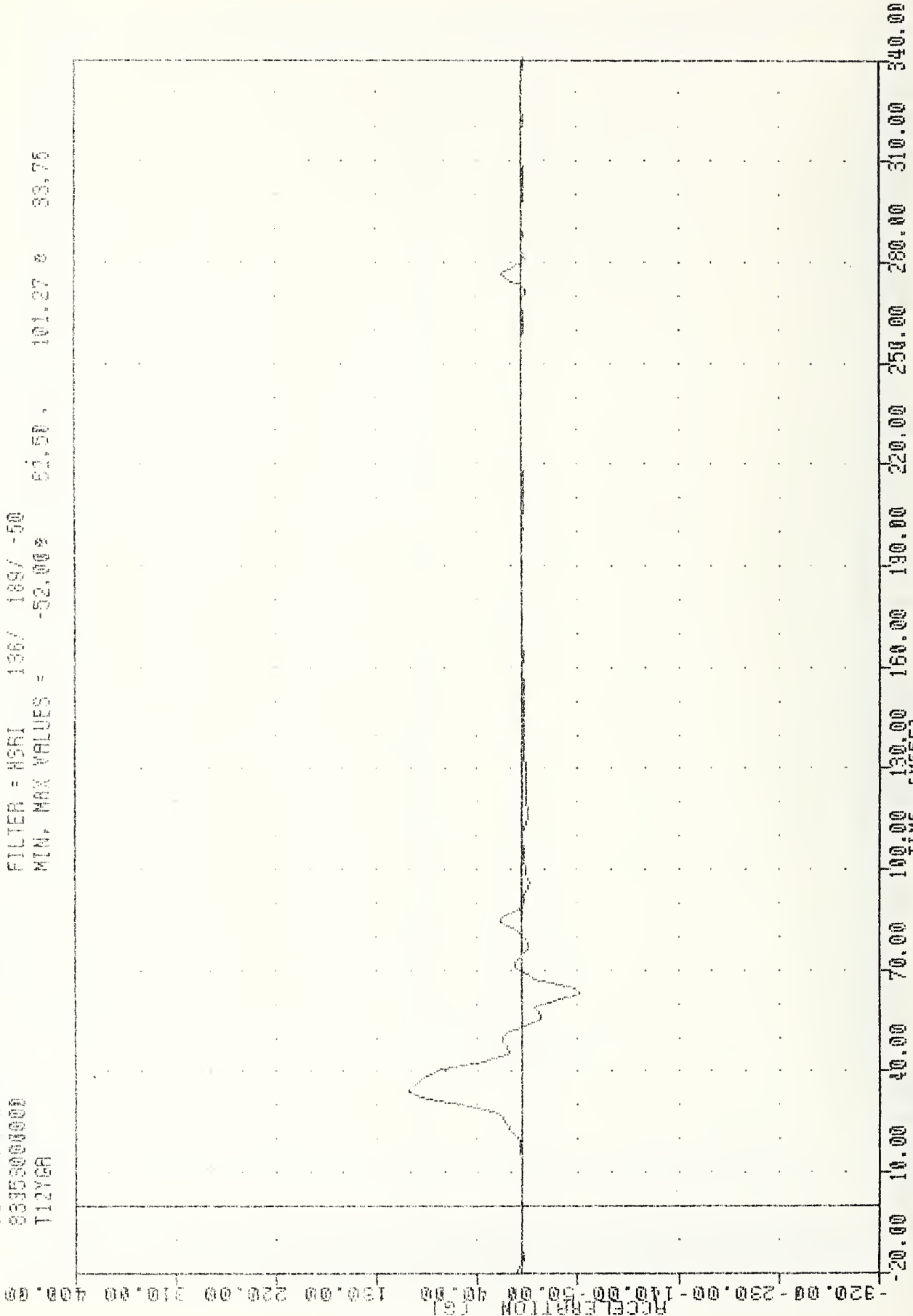


MOVING DEFORMABLE BARRIER INTO CITATION
 DRIVER LOWER SPINE ACCELERATION Y AXIS

TRC
841210
SIDE PROTECTION - 2DR/4DR
83353000000
T12Y6A

PLOT DATE 3-JUN-84 10:13:17.

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -52.000 51.50 101.27 8 93.75

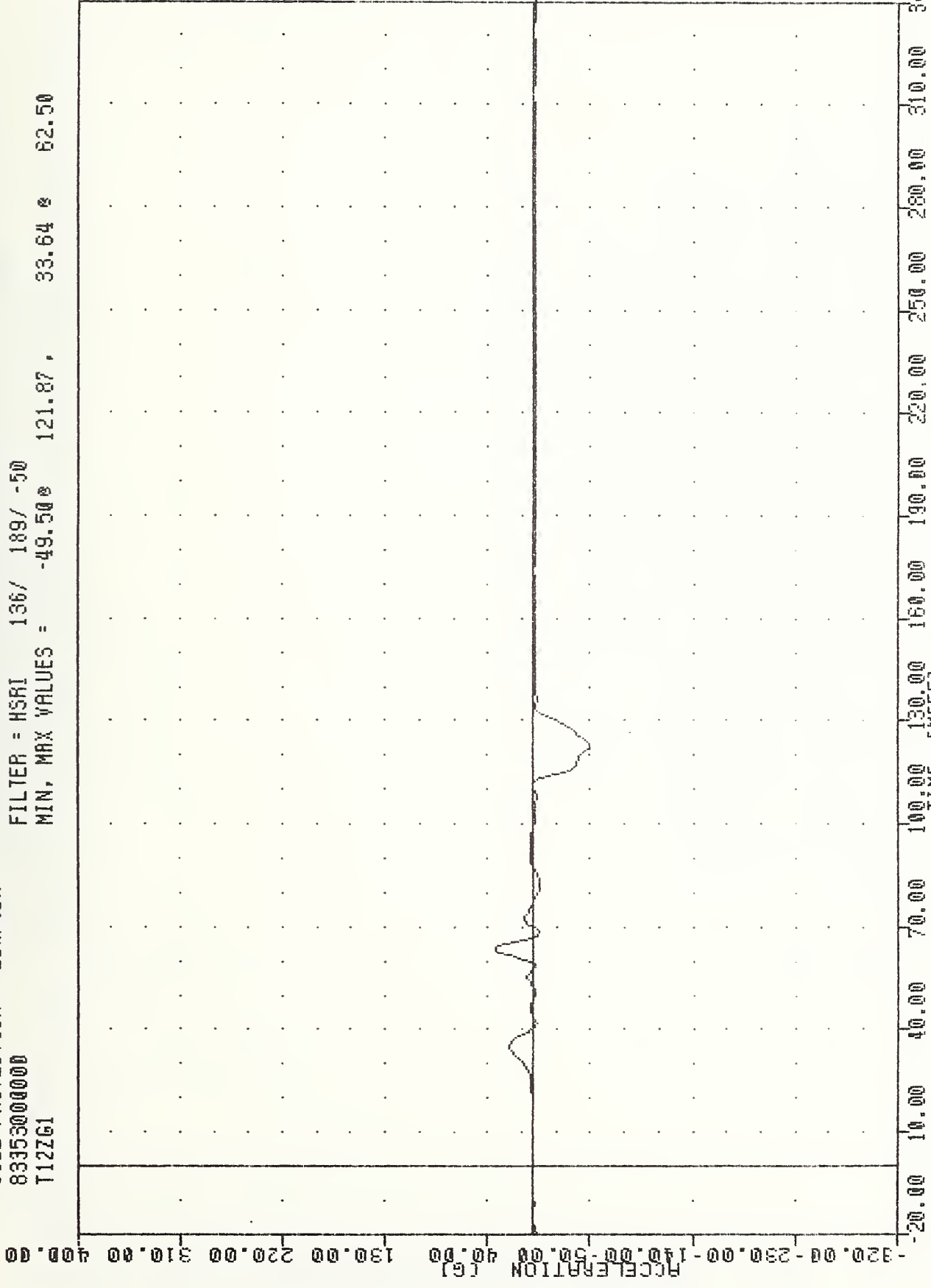


MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER LOWER SPINE ACCELERATION -2 Y AXIS

FILE 831410
 SIDE PROTECTION - 20R/40A
 83353000000
 T12ZG1

FILED D111L 27 DEC 03 10:25.24

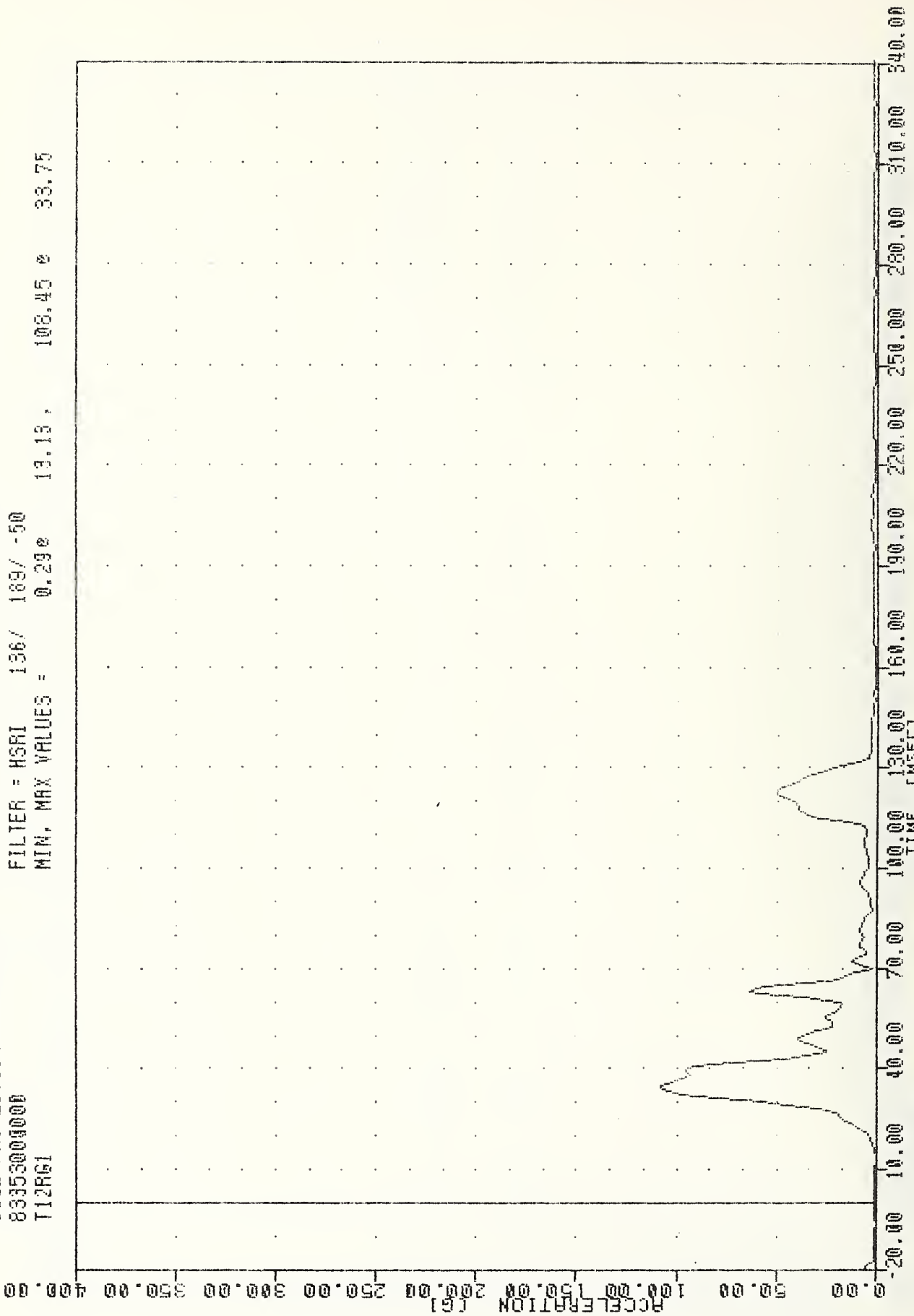
FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -49.500 121.87, 33.64 62.50



MOVING DEFORMABLE BARRIER INTO CITATION
 DRIVER LOWER SPINE ACCELERATION Z AXIS

IHC , 831219
SIDE PROTECTION - 2DR/4DR
83353004000
T12R61

PLUT DATE 27-DEC-88 10:25:21
FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = 0.29% 13.13, 108.45 % 33.75



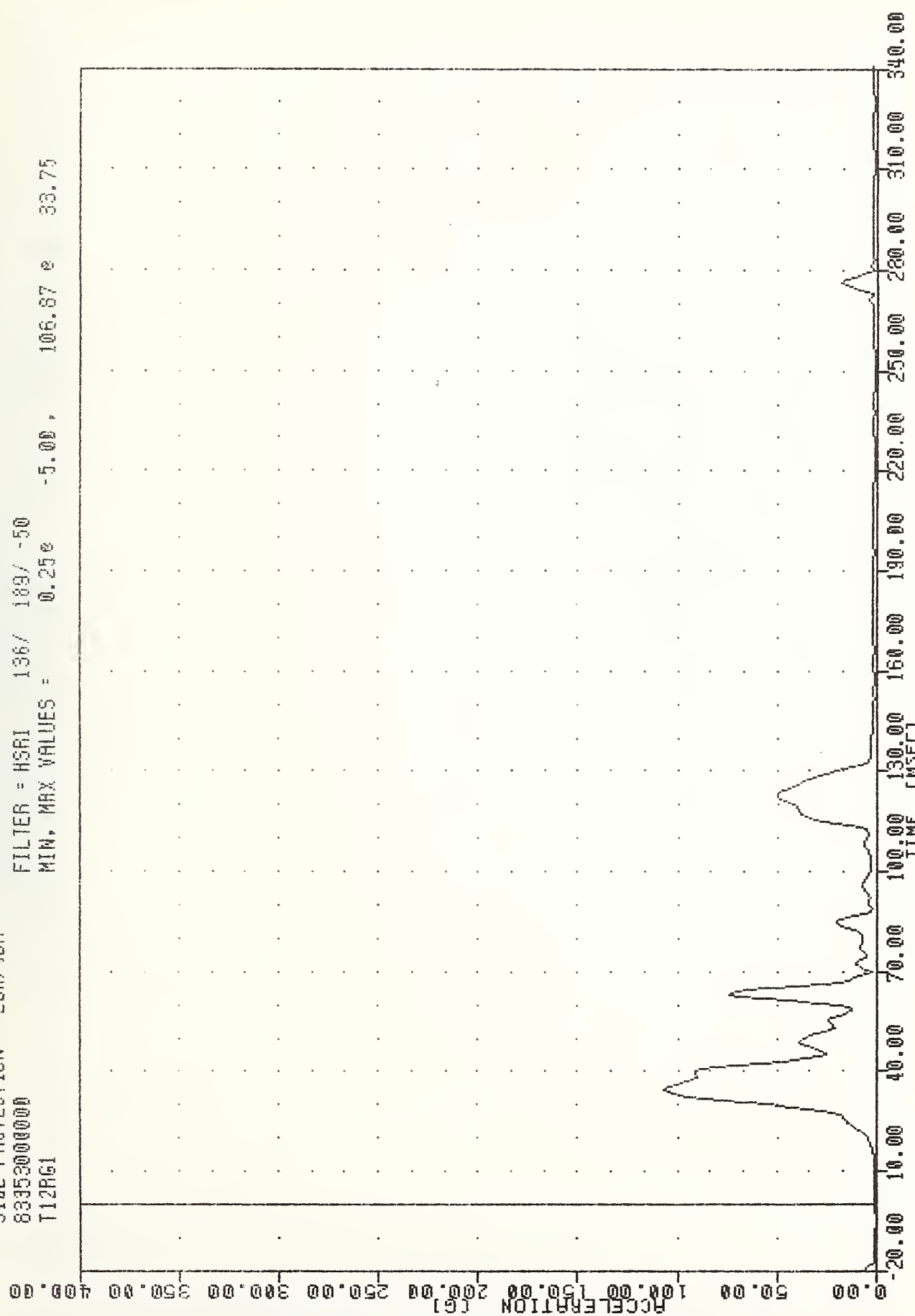
MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER LOWER SPINE RESULTANT

TRC , 831219
SIDE PROTECTION - 20R/40R
833530000000
T12R61

PLUT DATE 27-DEC-83 10:27:36

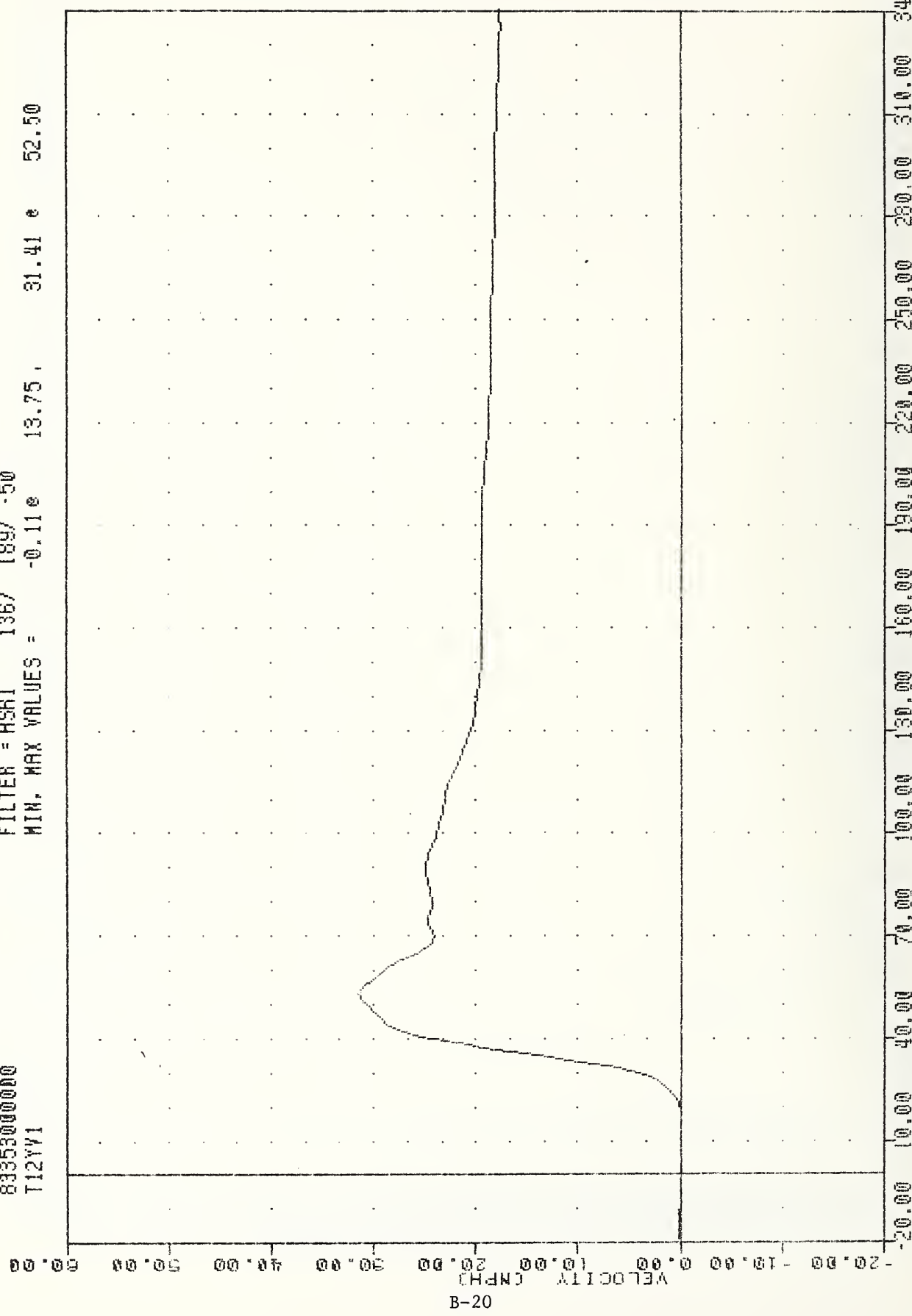
FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = 0.25e -5.00, 106.67 e 33.75



MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER LOWER SPINE RESULTANT USING T12Y6A

IRC , 831219 PLOT DATE 27-DEC-83 12:58:34
 SIDE PROTECTION - 20R/4DR
 83353000000 FILTER = HSRI 136/ 189/ -50
 T12YV1 MIN. MAX VALUES = -0.11e 13.75 , 31.41 e 52.50

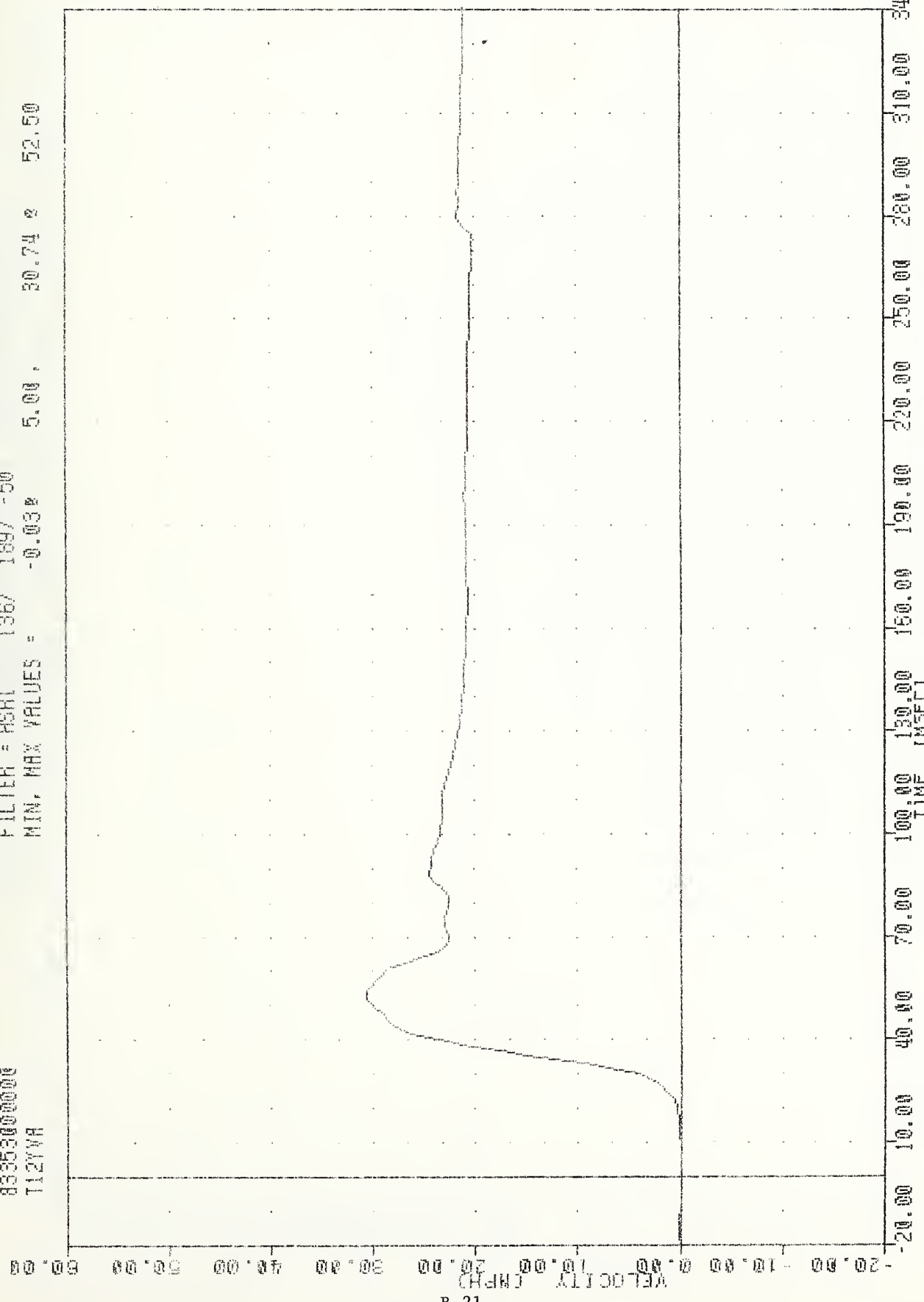


MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA V USING T12Y61

TRC 831219
SIDE PROTECTION - 20R/40R
83353000000
T12YVR

PLOT DATE 27-DEC-88 12:58:34

FILTER = HSRI 136/ 169/ -50
MIN, MAX VALUES = -0.03 5.00, 30.74 52.50



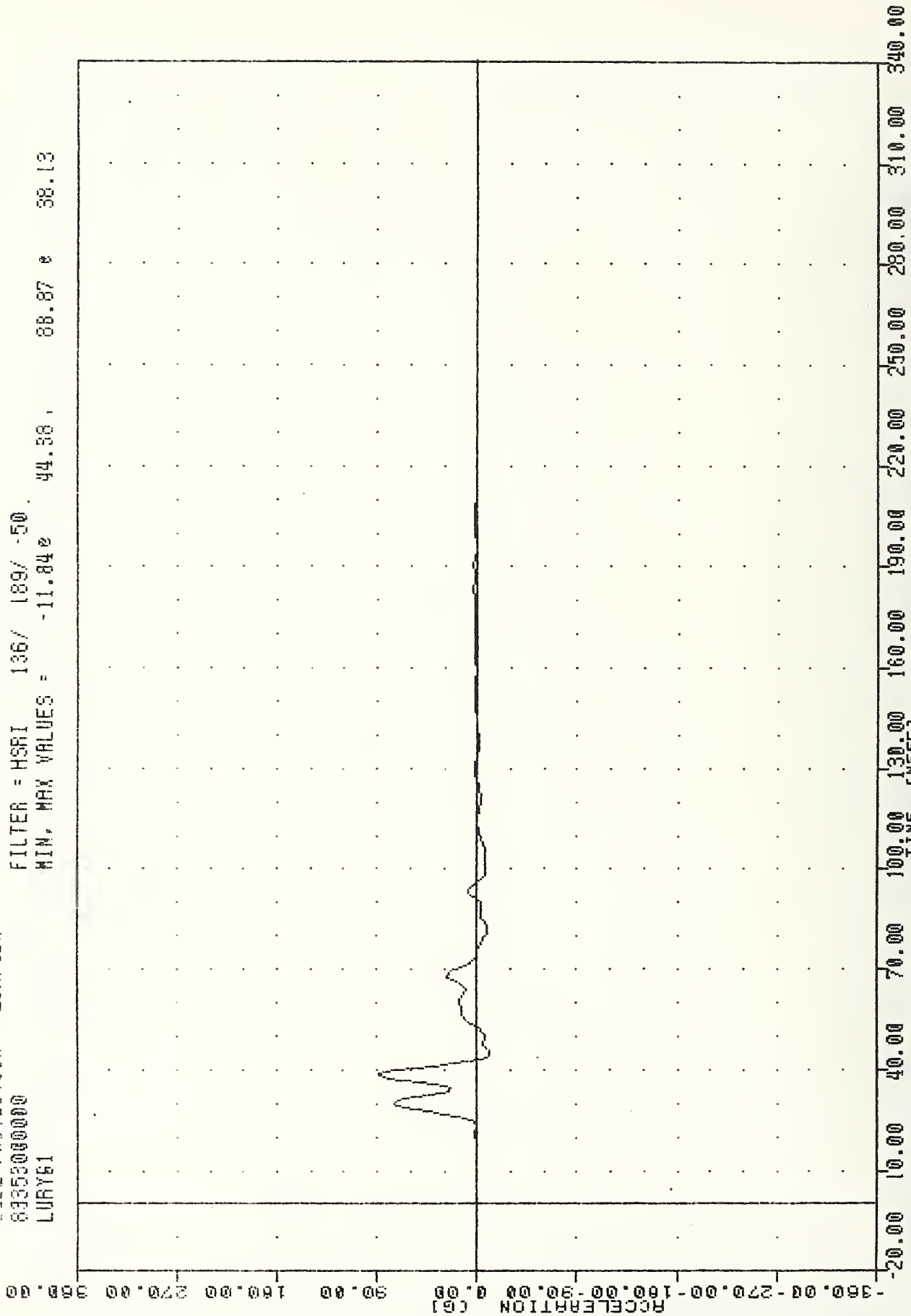
MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING T12YVR

TAL
831219
SIDE PROTECTION - 2DR/4DR
83353000000
LURY51

PLU1 DATE 27-DEC-83 10:25:21

FILTER = HSRI 136/ 189/ -50

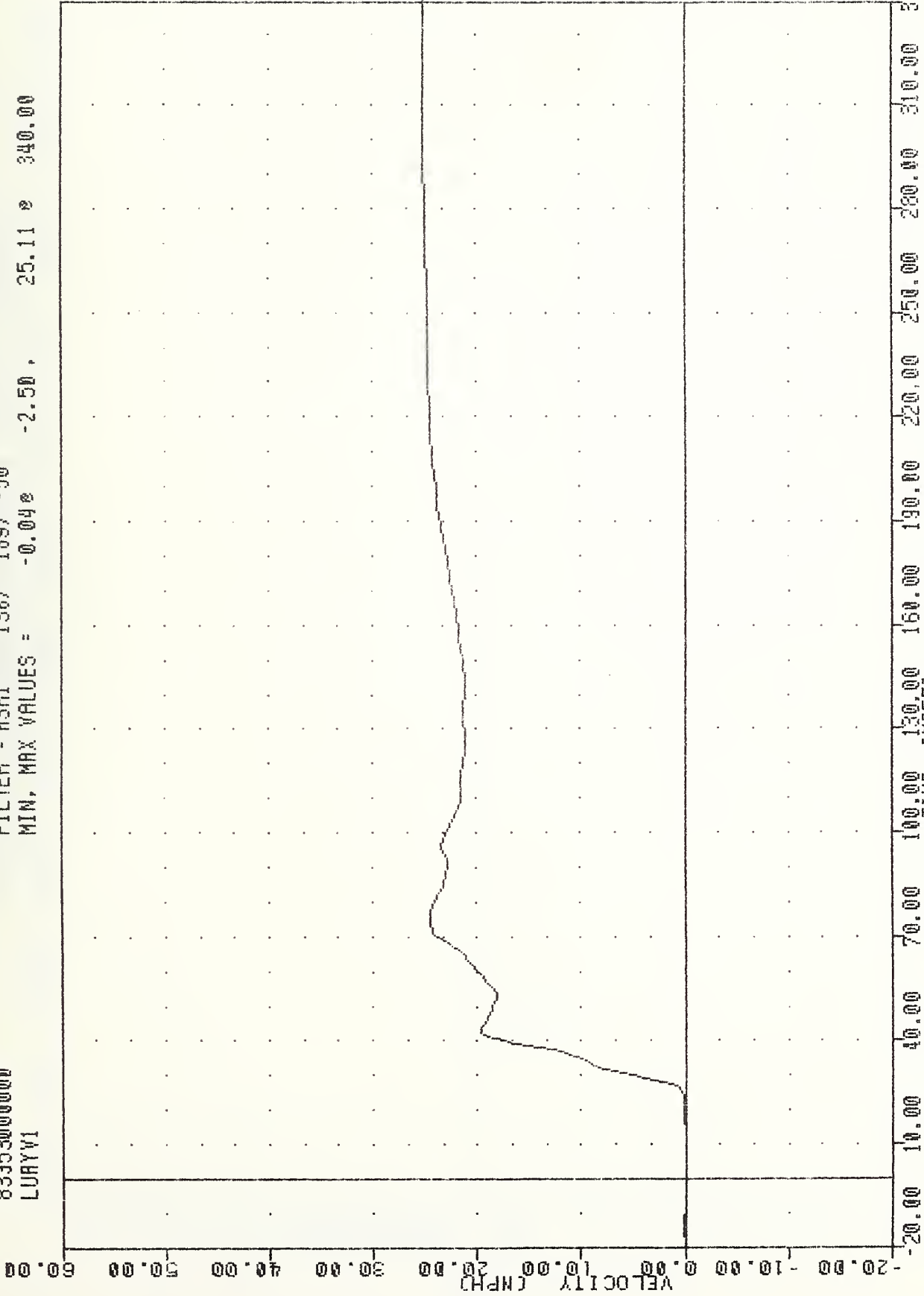
MIN, MAX VALUES = -11.84% 44.58 , 88.87 * 38.13



MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER LEFT UPPER RIB ACCELERATION Y AXIS

TRC 831219
SIDE PROTECTION - 2DR/4DR
83353000000
LURAYVI

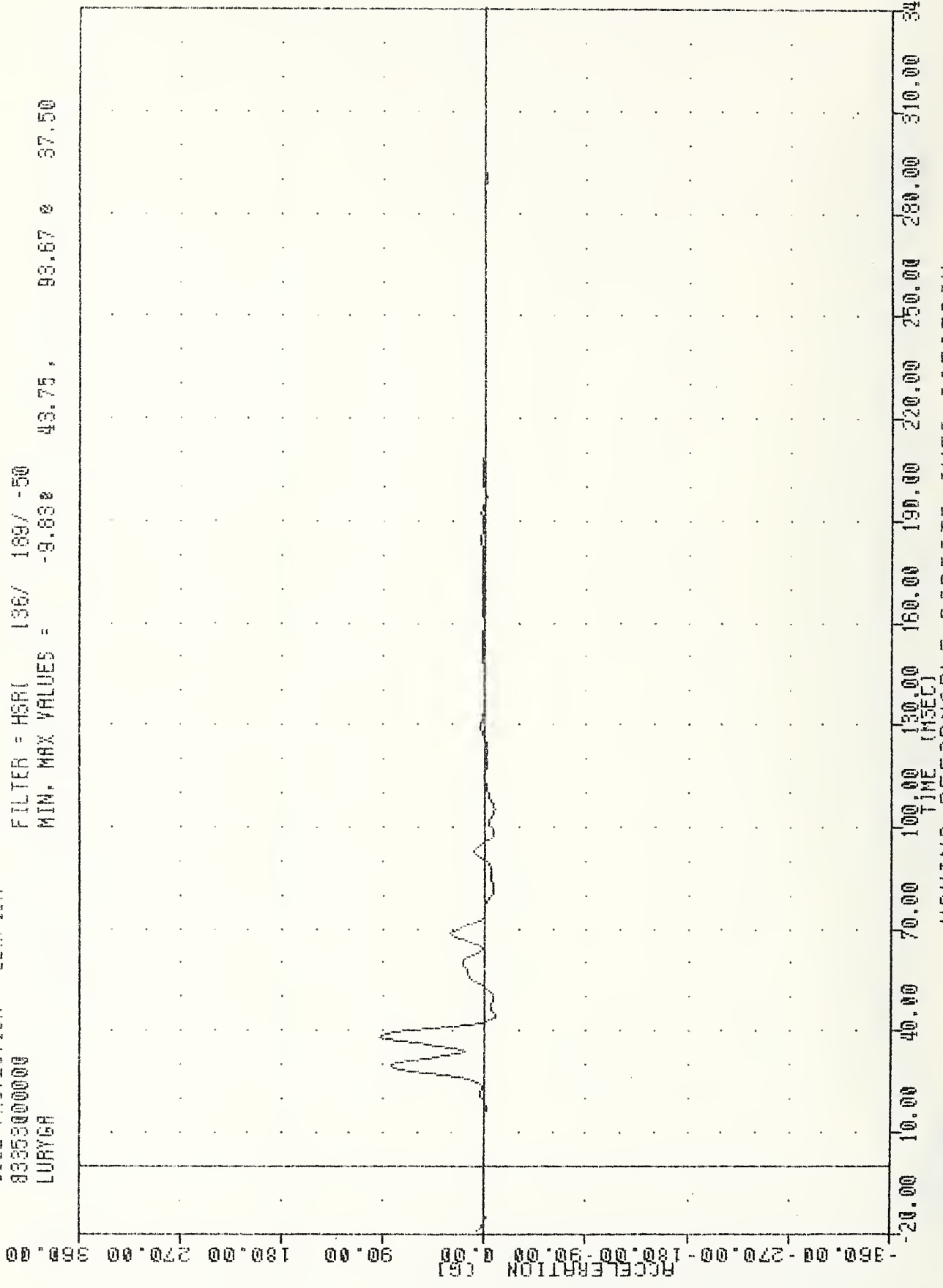
PLOT DATE 27-DEC-83 12:58:34
FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -0.04e -2.50 , 25.11 e 340.00



MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING LURAYVI

TRC , 831219
SIDE PROTECTION - 2DR/4DR
83353000000
LURYGR

PLOT DATE 27-DEC-83 10:25:21
FILTER = HSR(136/ 188/ -50
MIN. MAX VALUES = -9.83e 43.75 , 93.67 e 37.50



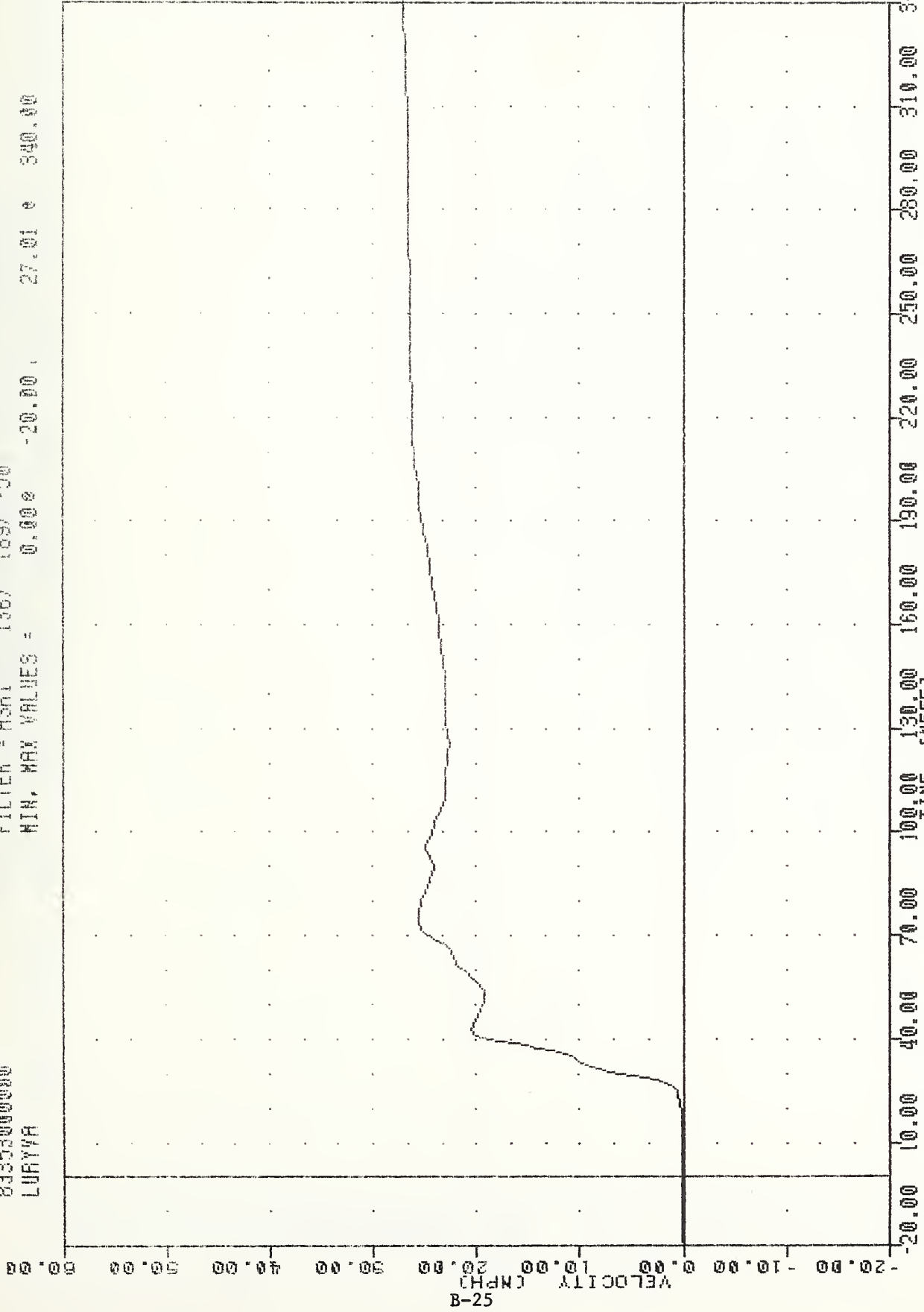
MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER LEFT UPPER AIB ACCELERATION -2 Y AXIS

TAC 831219
SIDE PROTECTION - 20R/40A
83353000000
LURYVA

PLOT DATE 27-DEC-88 12:59:34

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = 0.000 -20.00 , 27.01 @ 340.00



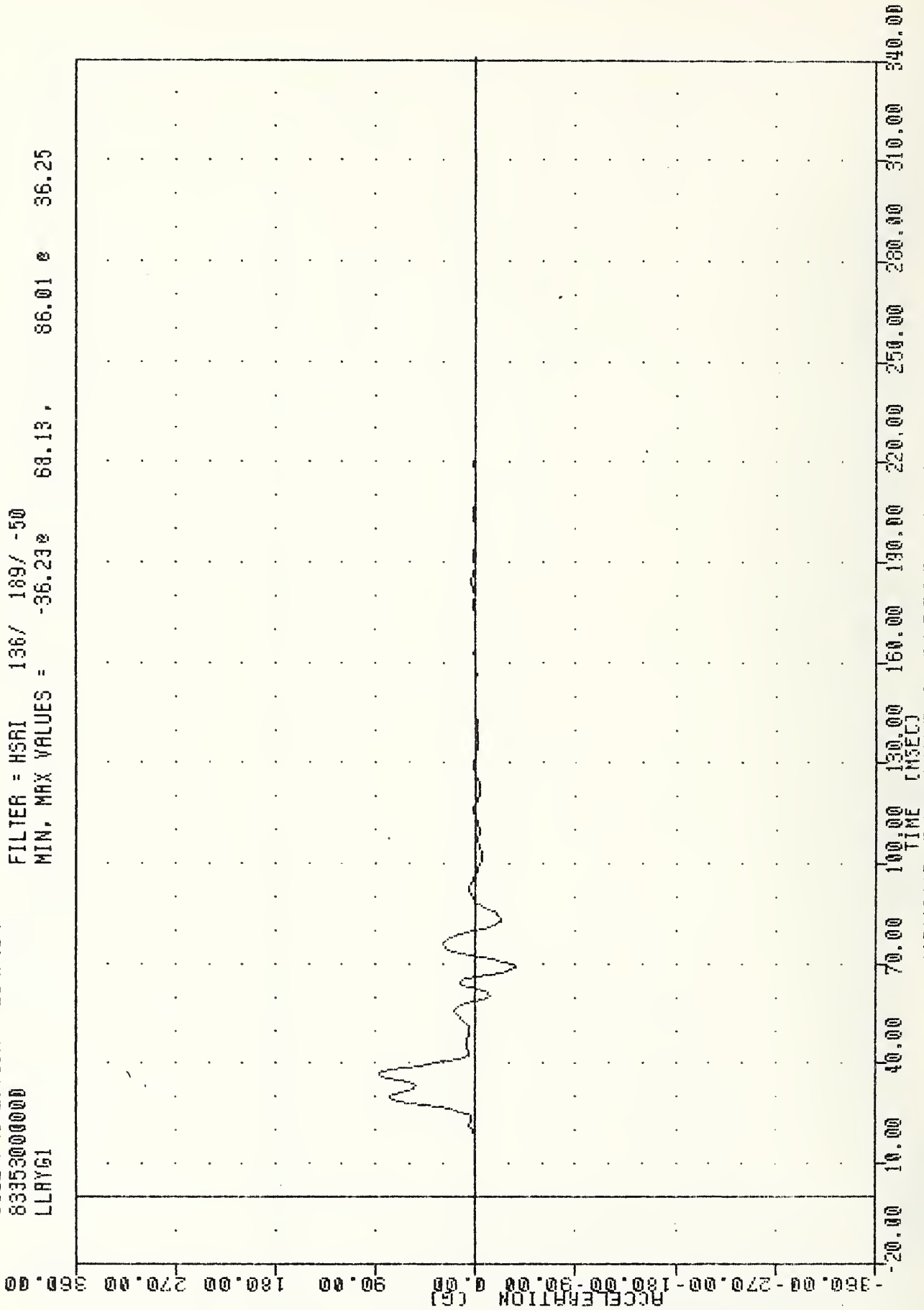
MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING LURYVA

INC , 831219
SIDE PROTECTION - 2DR/4DR
83353000000
LLRYG1

PLUT DATE 27-DEC-83 10:25:21

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -36.23e 68.13 , 86.01 e 36.25



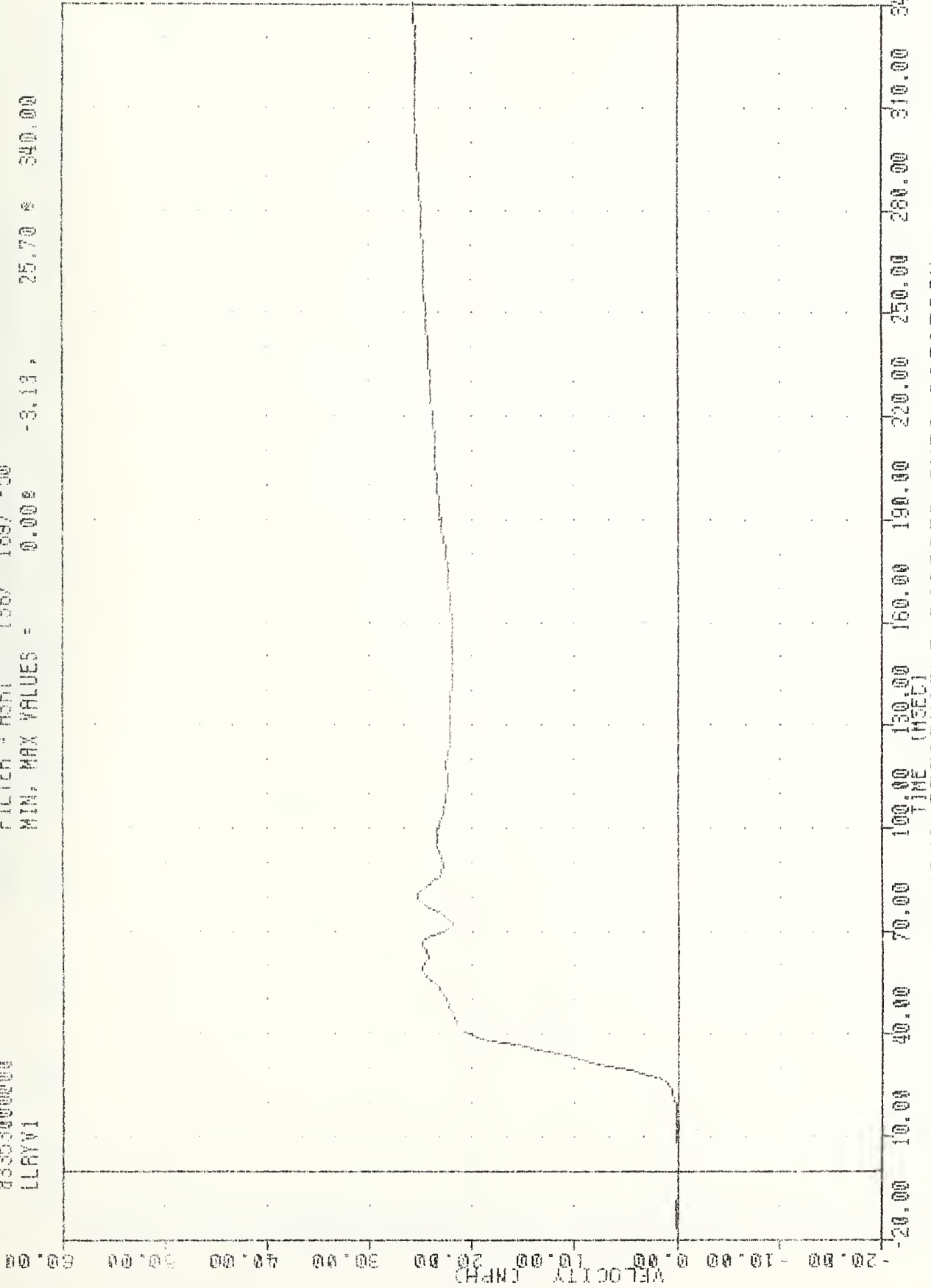
MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER LEFT LOWER RIB ACCELERATION Y AXIS

TRC 831219
SIDE PROTECTION - 208/40R
83353000000
LLAYV1

7(0) UNITE 27-JUL-83 12:36.34

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = 0.00E -3.13, 25.70 * 340.00



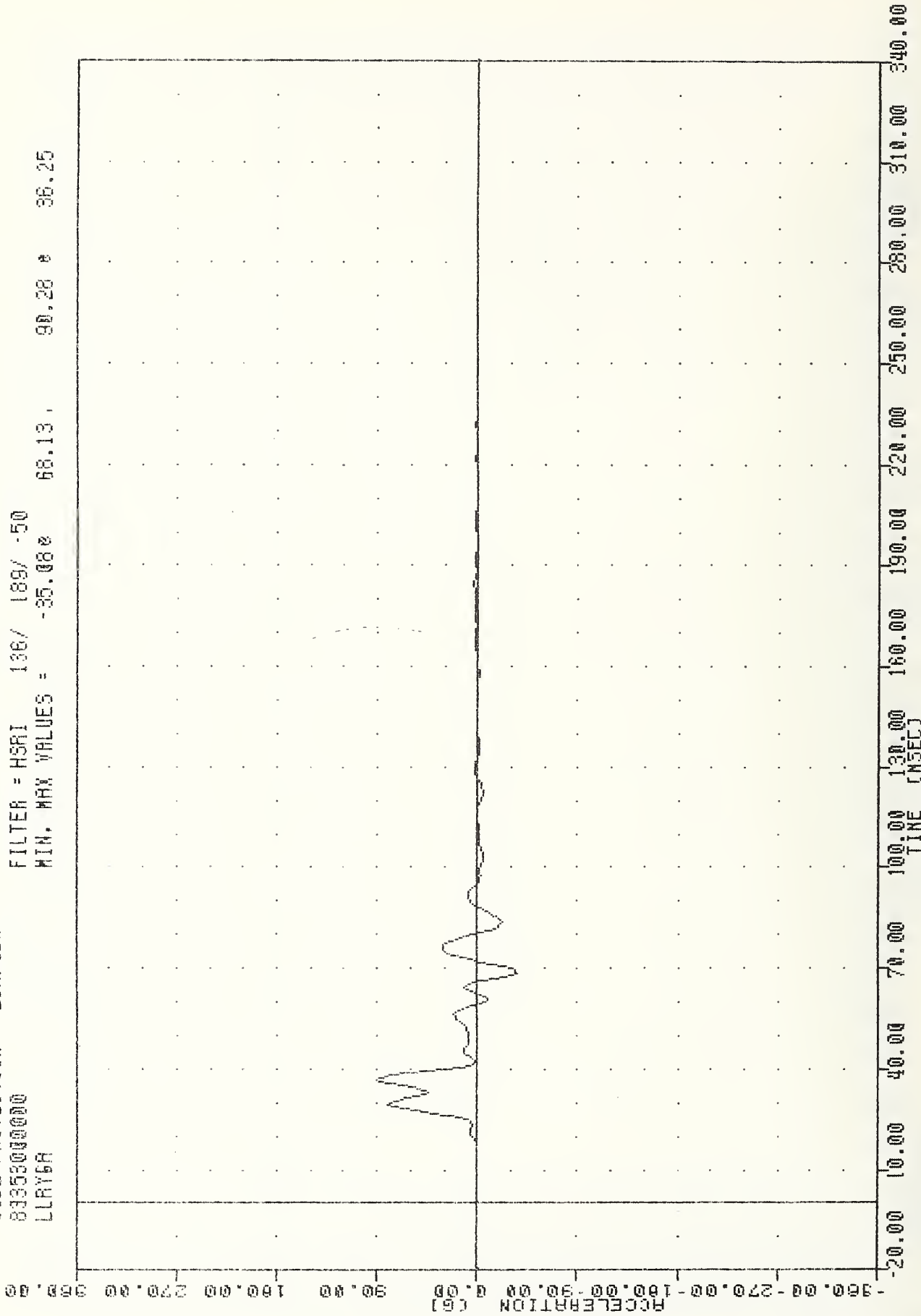
MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING LLAYV1

TAC 831219
SIDE PROTECTION - 20R/4DA
8335000000
LLRY5A

PLUT DATE 27-DEC-83 10:25:21

FILTER = HSRI 186/ 189/ -50

MIN. MAX VALUES = -35.08e 68.13, 90.28 * 36.25



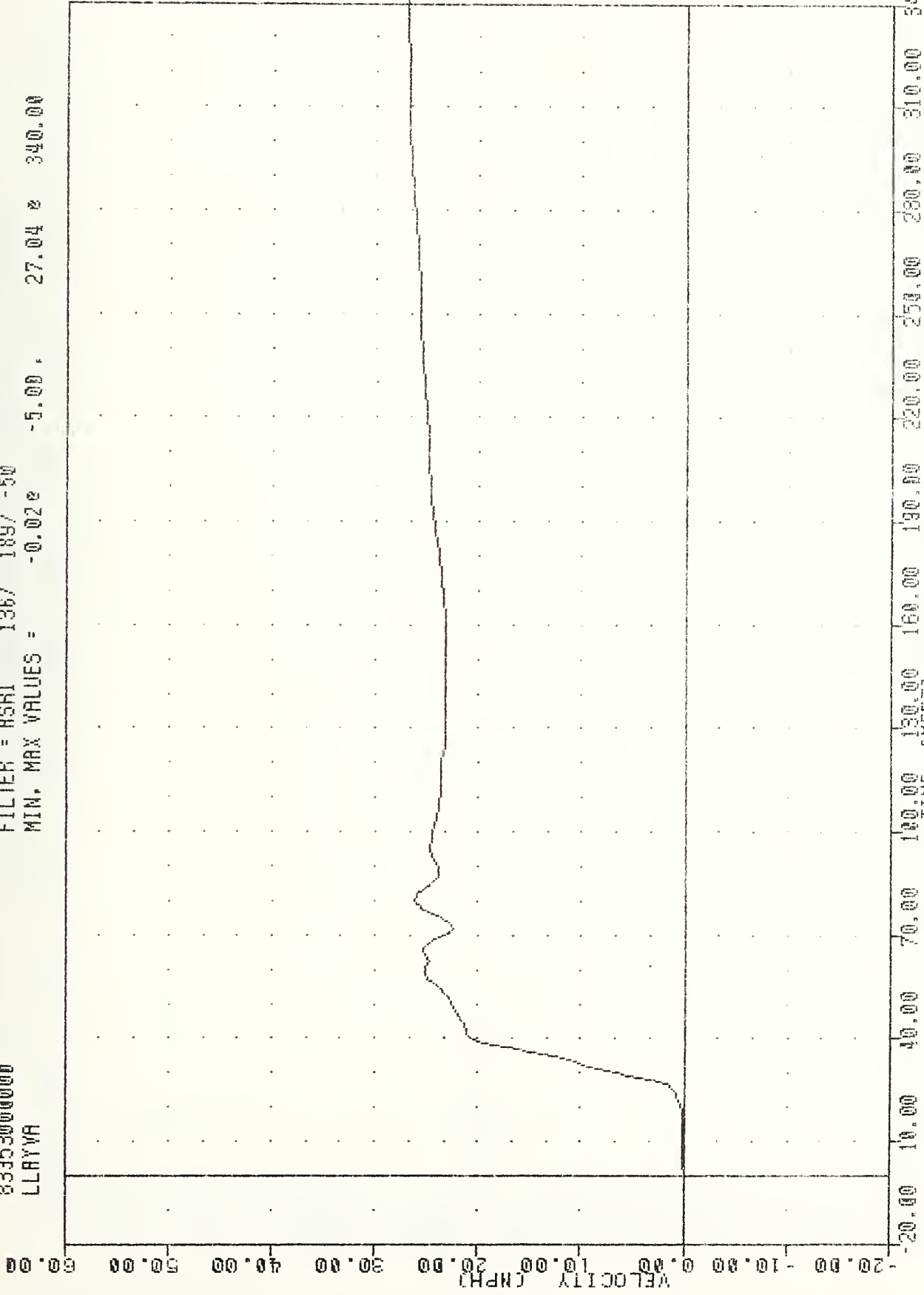
MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER LEFT LOWER RIB ACCELERATION -2 Y AXIS

FRC
831219
SIDE PROTECTION - 20R/40R
83353000000
LLAYVA

PLOT DATE 27-DEC-83 12:56:34

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.02e -5.00e 27.04e 340.00

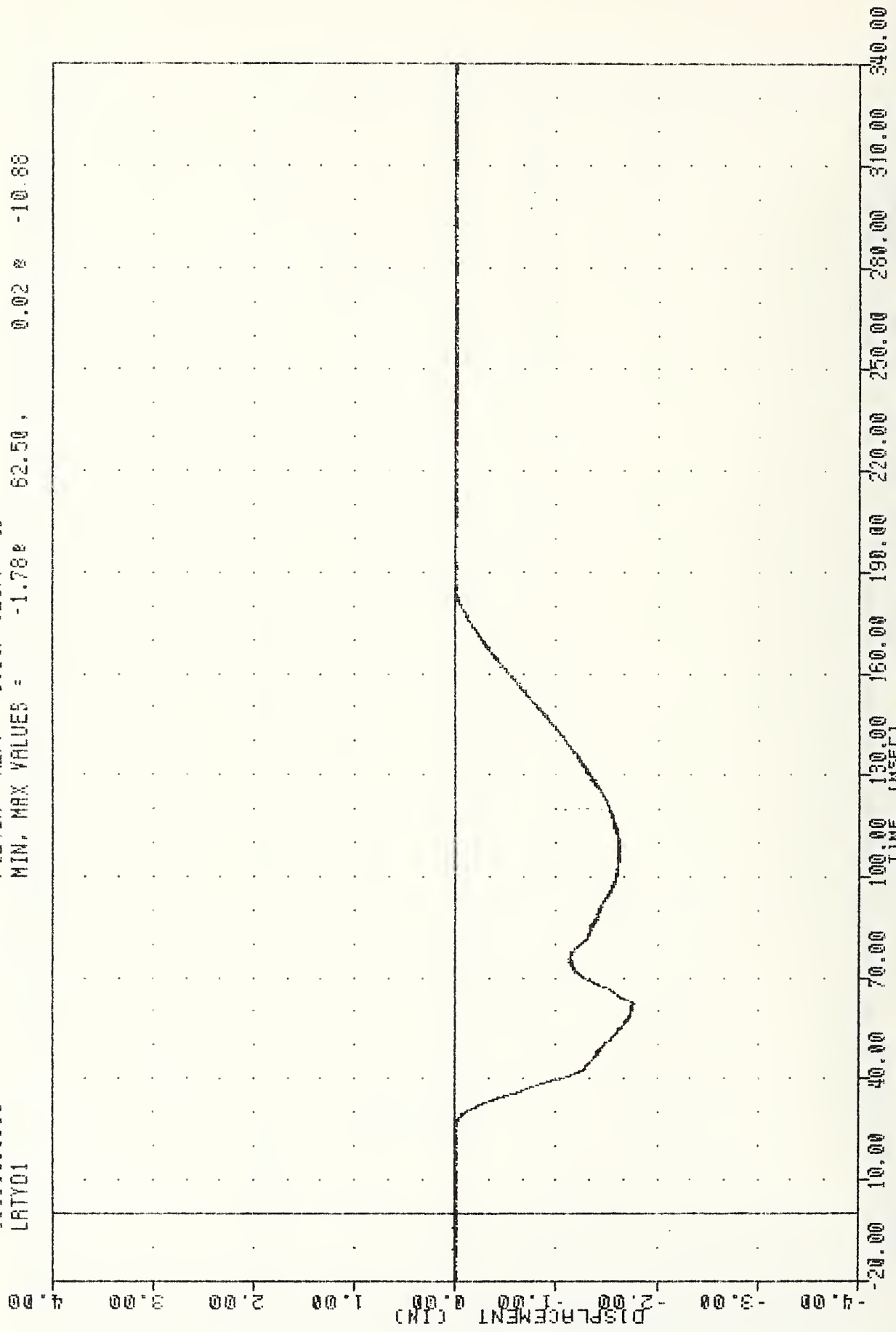


MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING LLAYVA

INC 831219
SIDE PROTECTION - 2DR/4DR
83353000000
LATYD1

PLUT DATE 27-DEC-83 10:23:03

FILTER = ALPF 1650/ 5217/ -40
MIN. MAX VALUES = -1.78% 62.50 , 0.02% -10.88



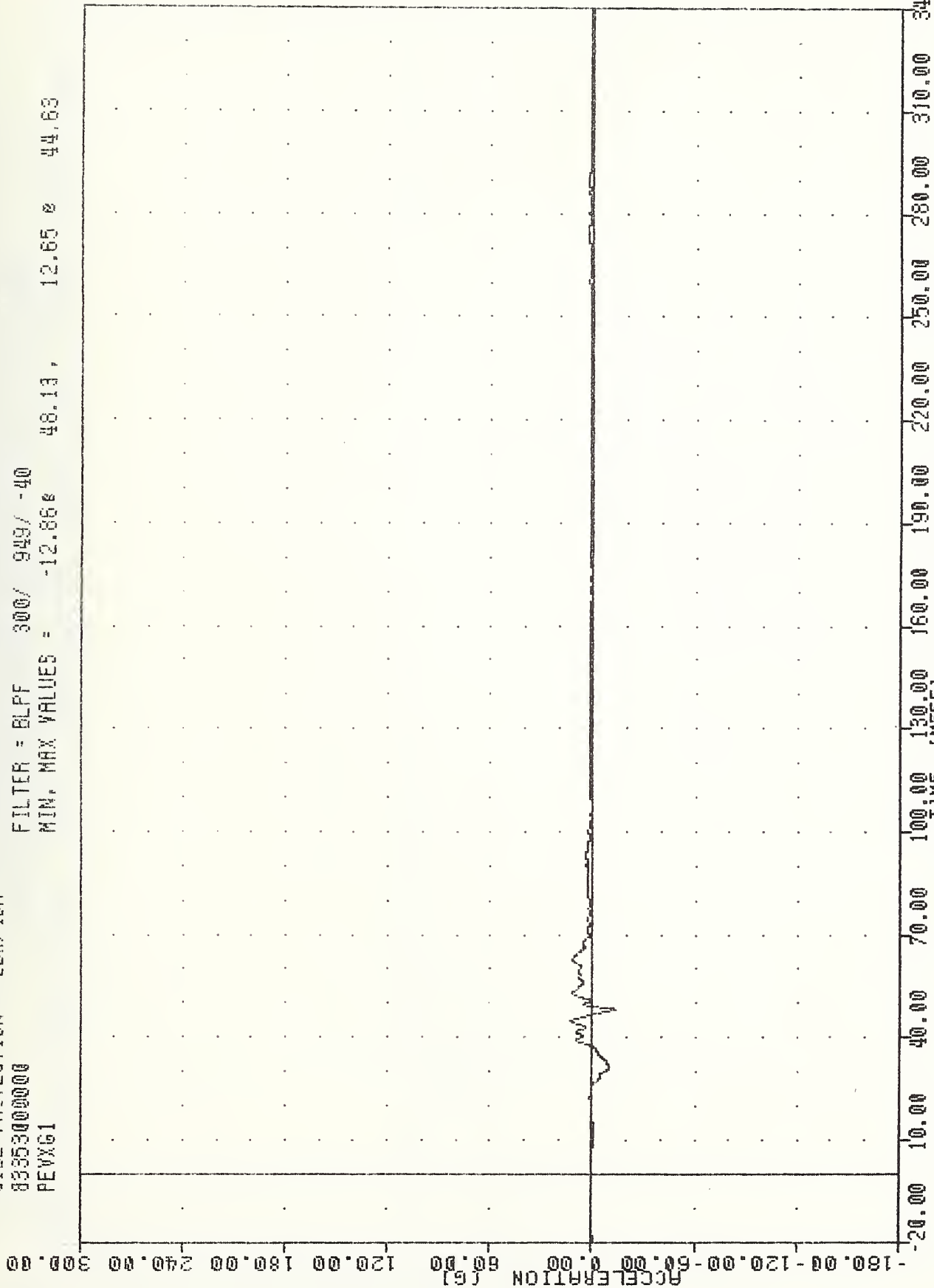
MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER LEFT RID TO SPINE DISPLACEMENT INCHES

TRC 831219
SIDE PROTECTION - 20A/40A
83353000000
PEVXG1

PLUT DATE 27-DEC-83 10:23:03

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -12.86e 48.13, 12.65 e 44.63

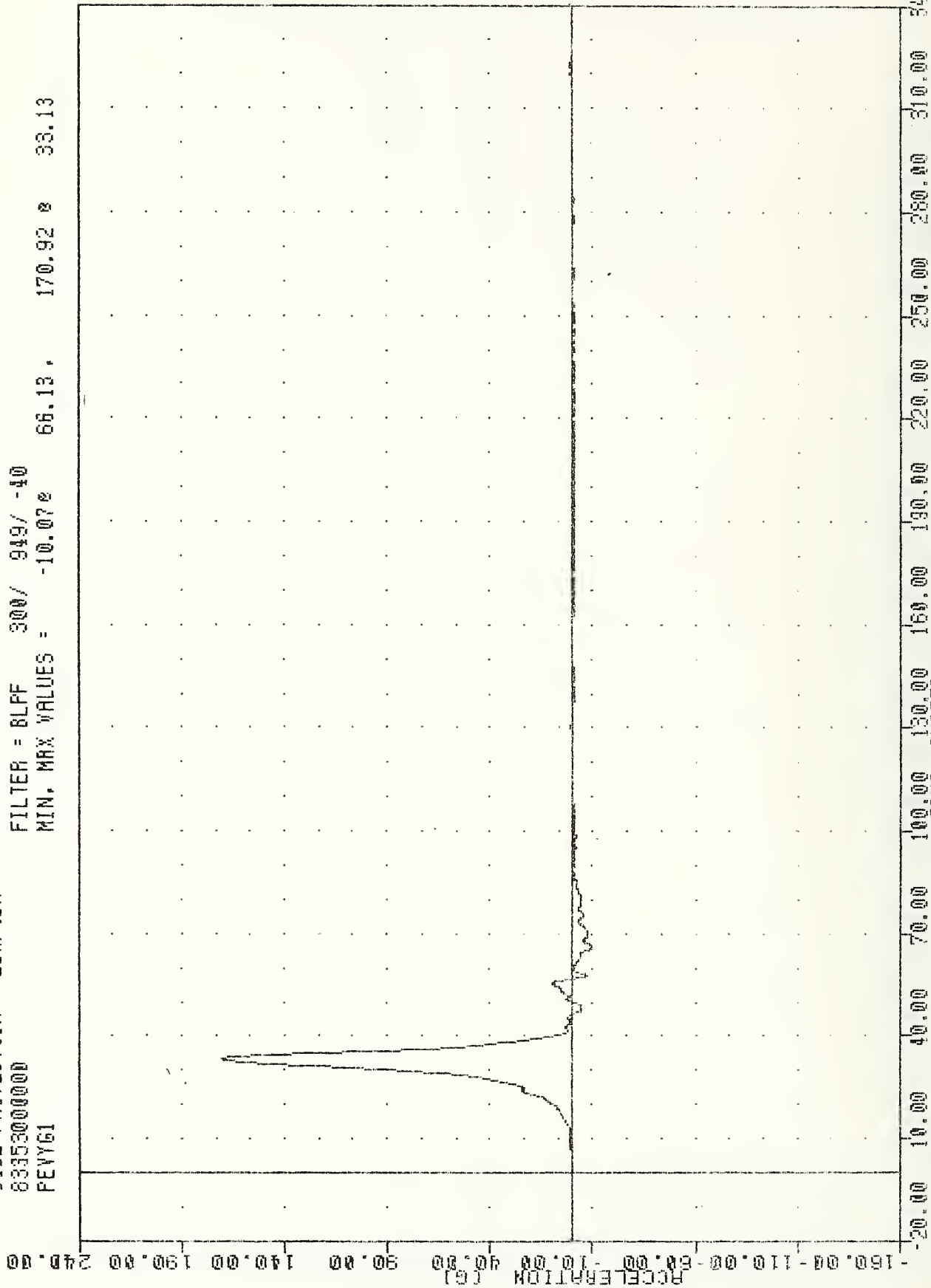


MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER PELVIS ACCELERATION X AXIS

INC 831214
SIDE PROTECTION - 20R/40R
8335300000
PEVY61

PLU1 DRIE 27-DEC-83 10:23:03

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -10.07% 66.13, 170.92 & 33.13



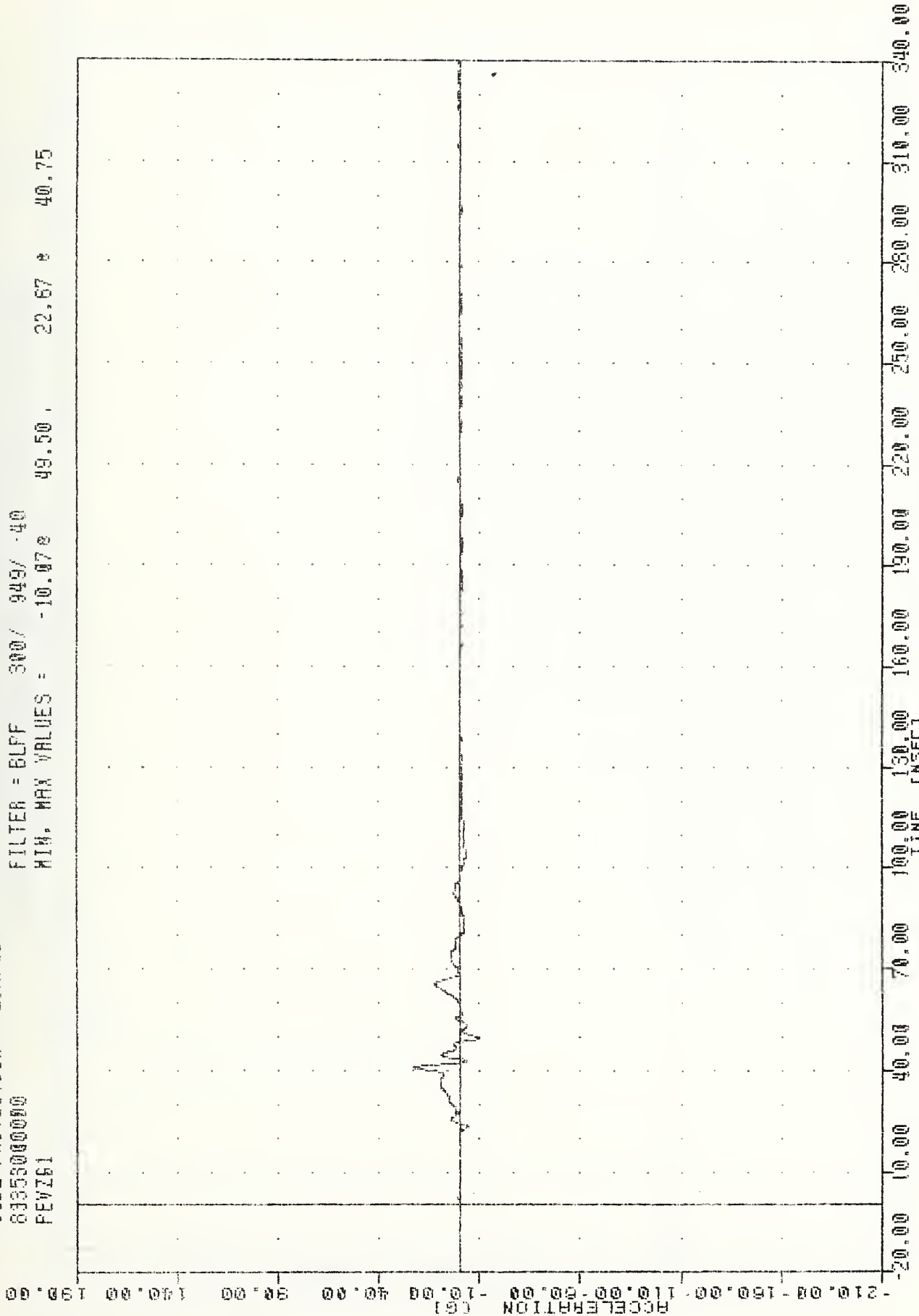
MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER PELVIS ACCELERATION Y AXIS

TAC
831219
SIDE PROTECTION - 20A/40A
8335000000
FEVZ61

PLVI DATE 27-DEC-88 10:23:03

FILTER = BLPF 300/ 949/ -40

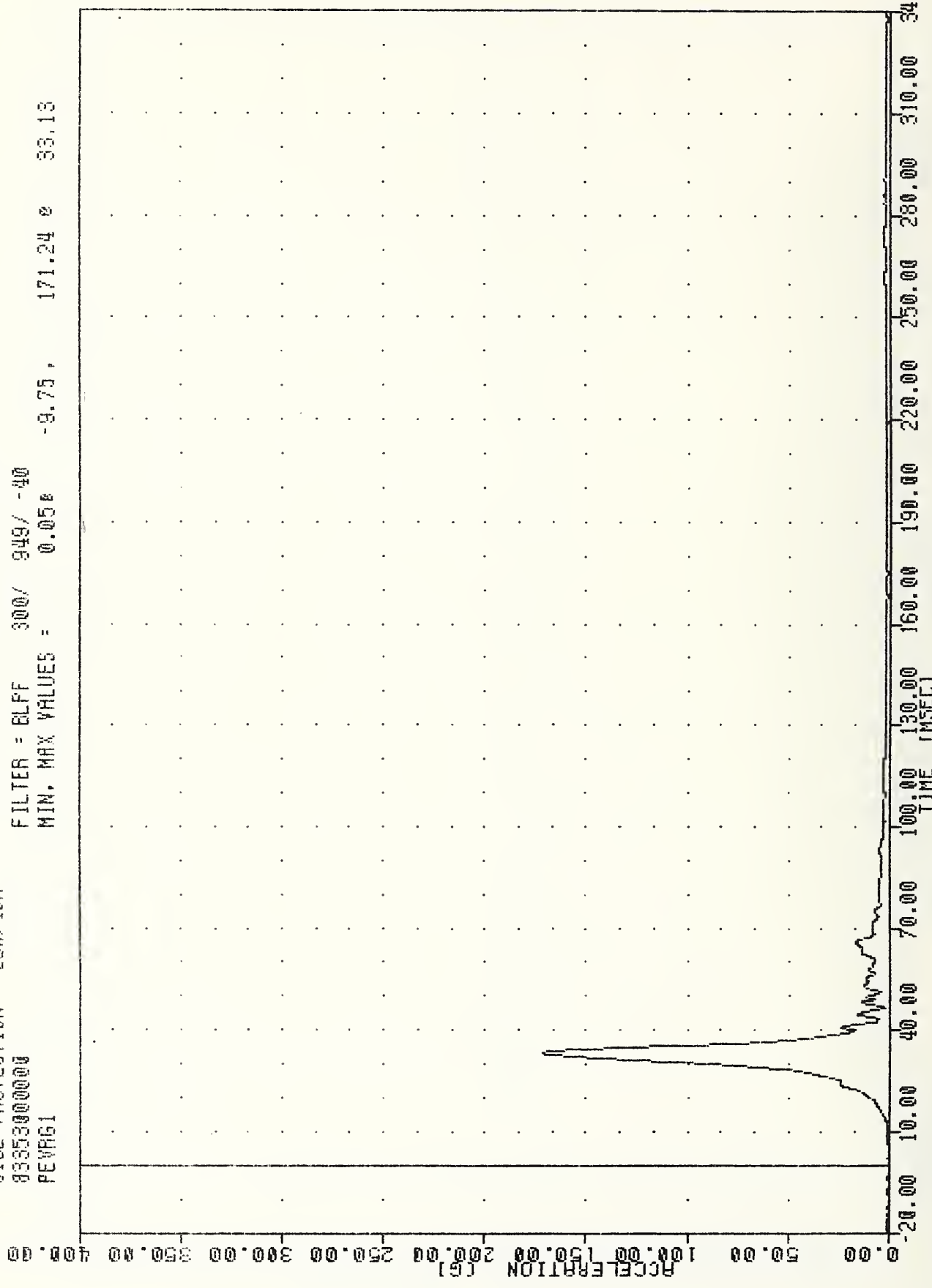
MIN. MAX VALUES = -10.07g 49.50g 22.67g 40.75



MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER PELVIS ACCELERATION Z AXIS

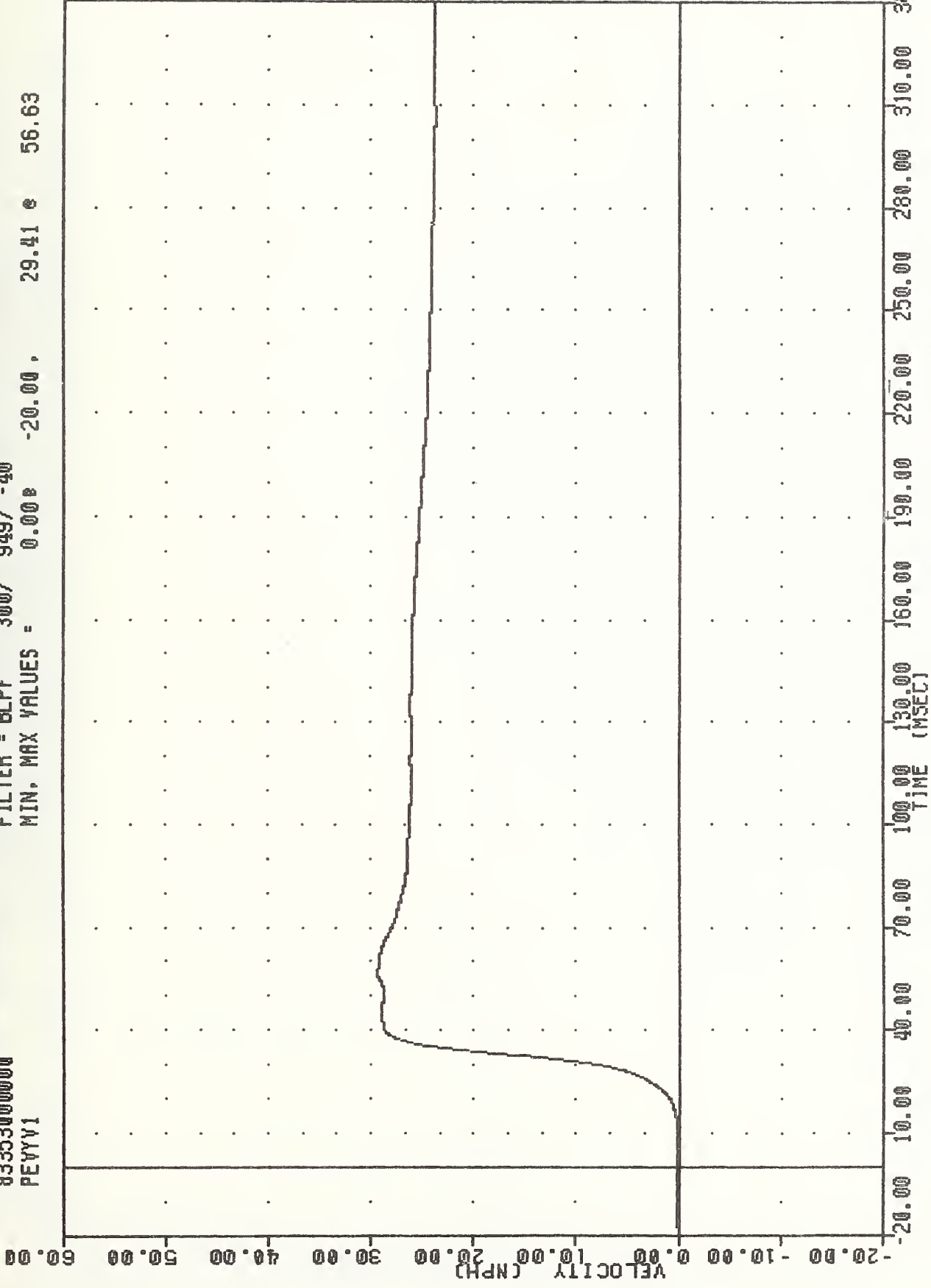
TAC . 831218
SIDE PROTECTION - 20R/40R
83553000000
PEVR61

PLOT DATE 27-DEC-83 10:23:03
FILTER = BLFF 300/ 949/ -40
MIN, MAX VALUES = 0.05e -9.75, 171.24 e 33.13



MOVING DEFORMABLE BARRIER INTO CITATION
DRIVER PELVIS RESULTANT

TRC 831219 PLUI DATE 5-JAN-84 12:42:30
 SIDE PROTECTION - 2DR/4DR
 83353000000 FILTER = BLPF 300/ 949/ -40
 PEVYV1 MIN. MAX VALUES = 0.00E -20.00 , 29.41 e 56.63



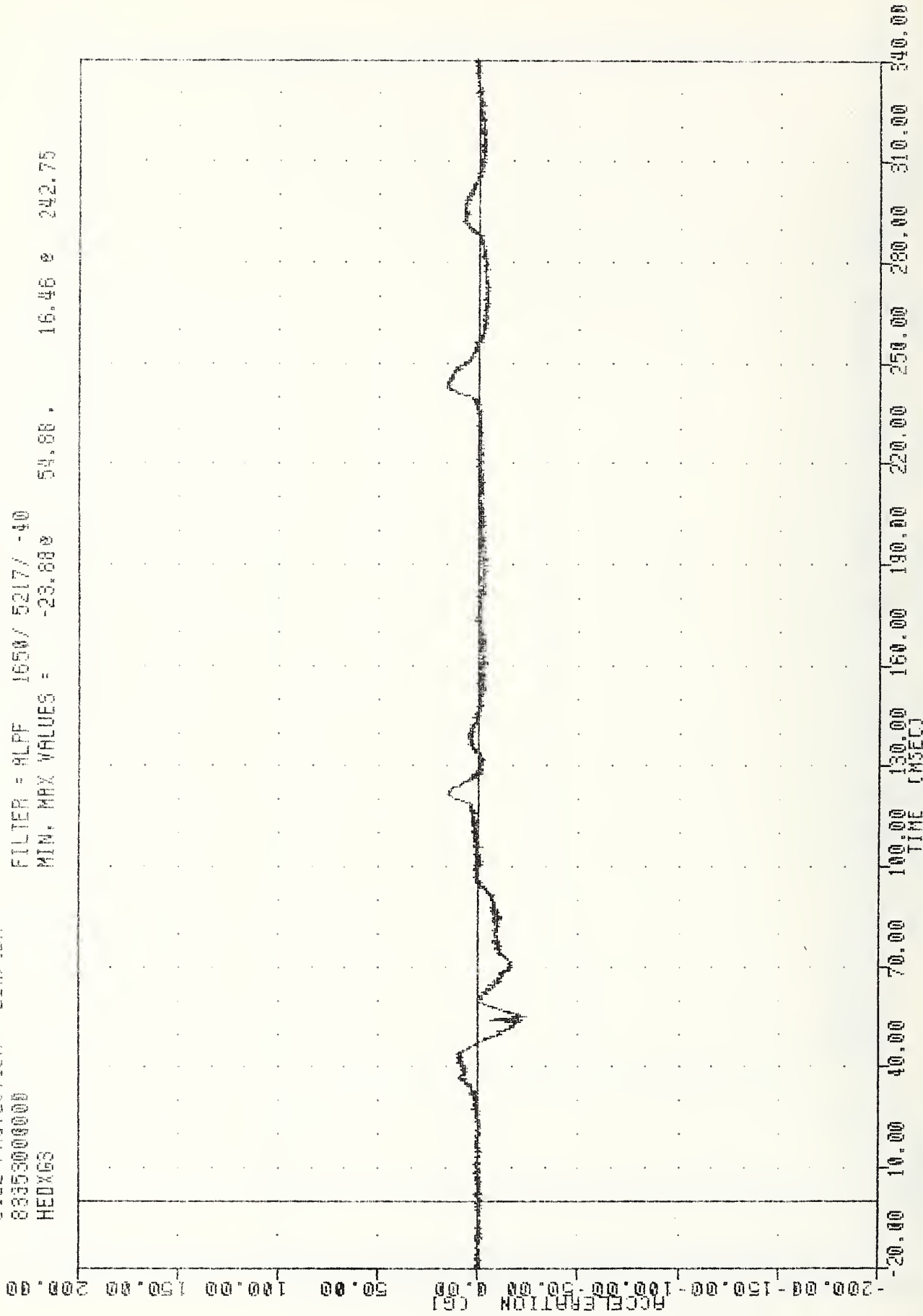
MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA V USING PEVYGI

IRC . 831219
SIDE PROTECTION - 20R/40R
83353000000
HEDX63

FLUT DATE 27-DEC-83 10:23:03

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -23.880 54.880 16.46 e 242.75



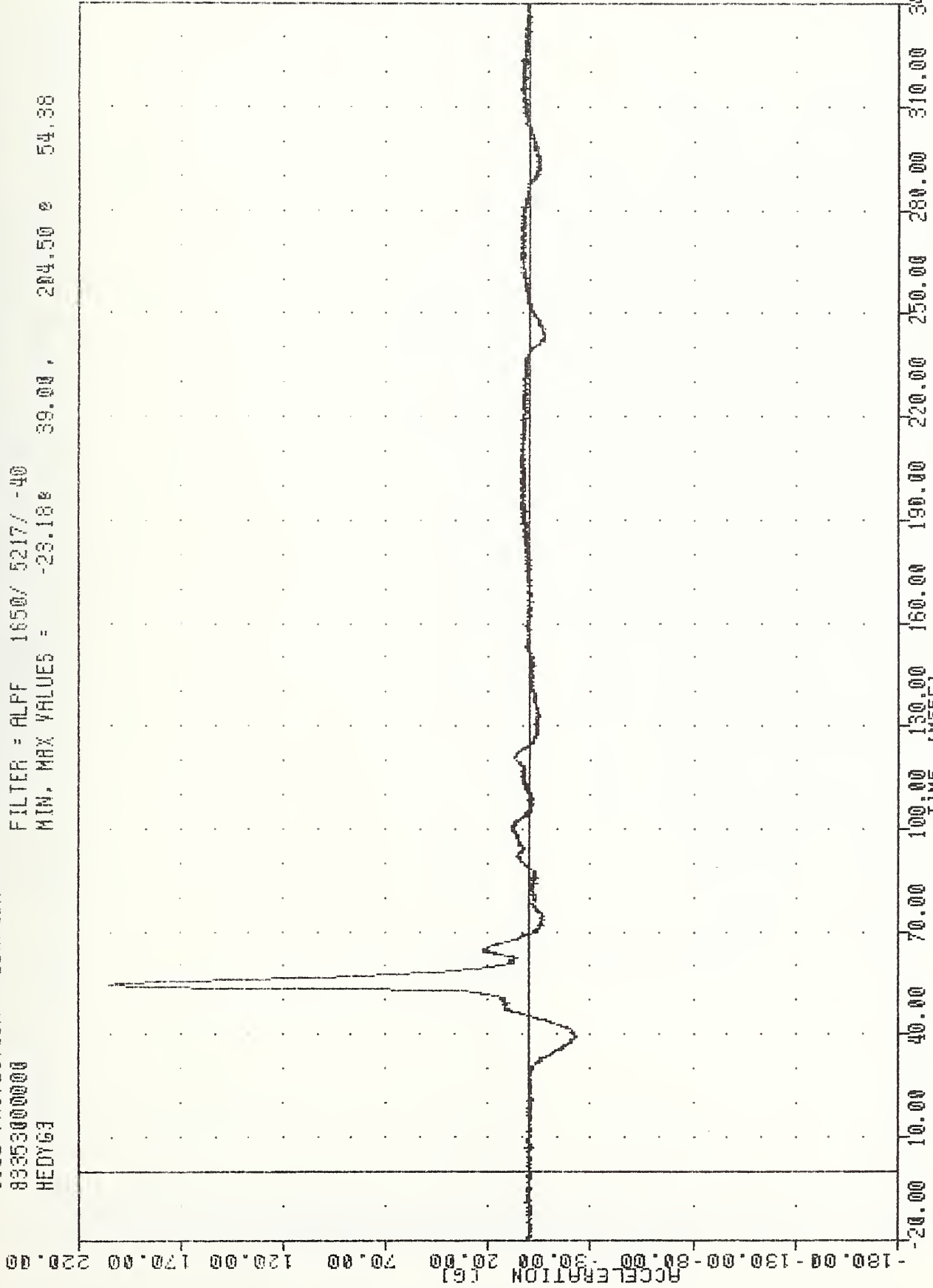
MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER HEAD ACCELERATION X AXIS

IRC , 831219
SIDE PROTECTION - 2DR/4DR
83353000000
HEDY63

PLOT DATE 30-ULL-83 09:46:07

FILTER = ALPF 1650/ 5217/ -40

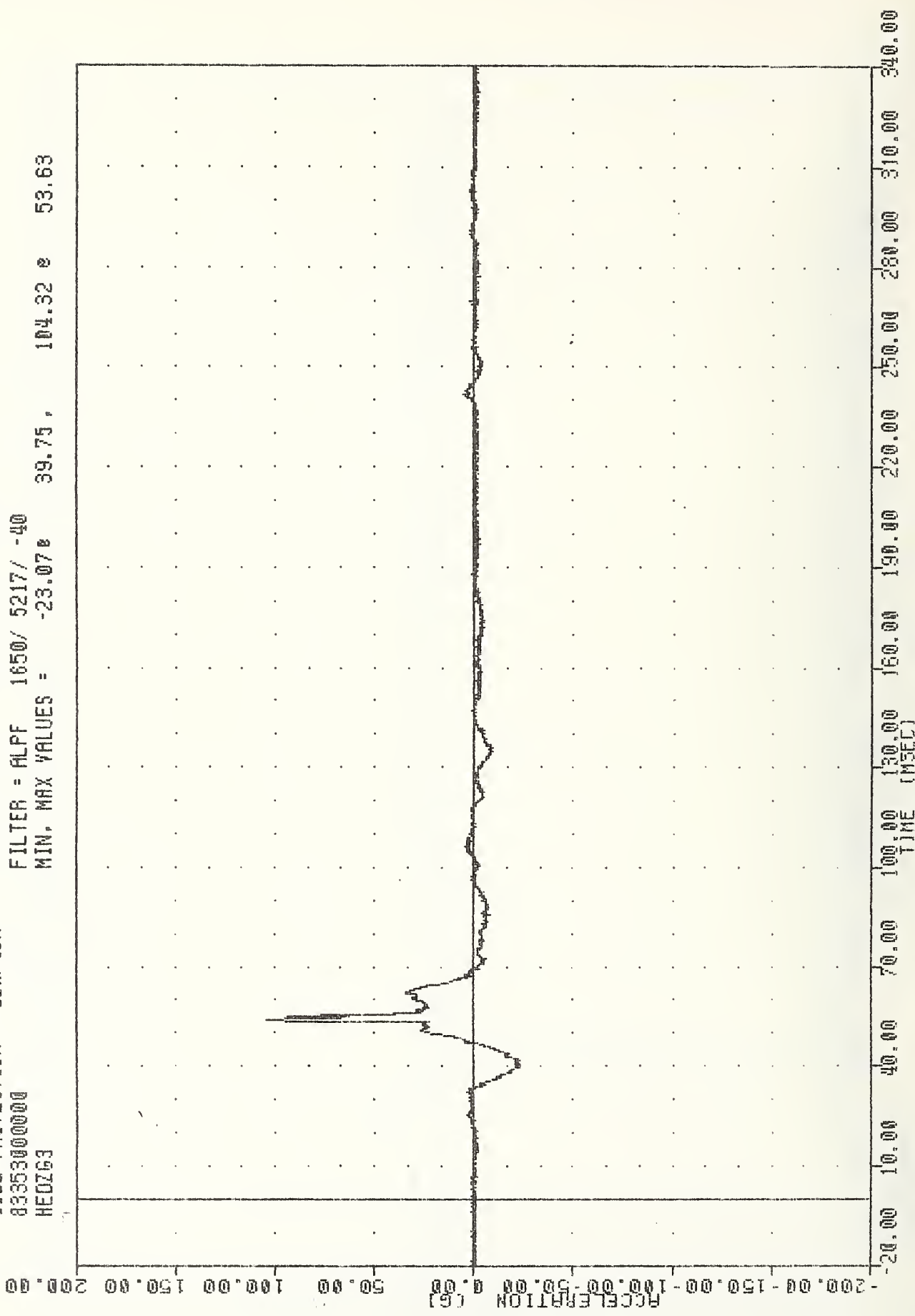
MIN. MAX VALUES = -23.18% 39.00 , 204.50 e 54.38



MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER HEAD ACCELERATION Y AXIS

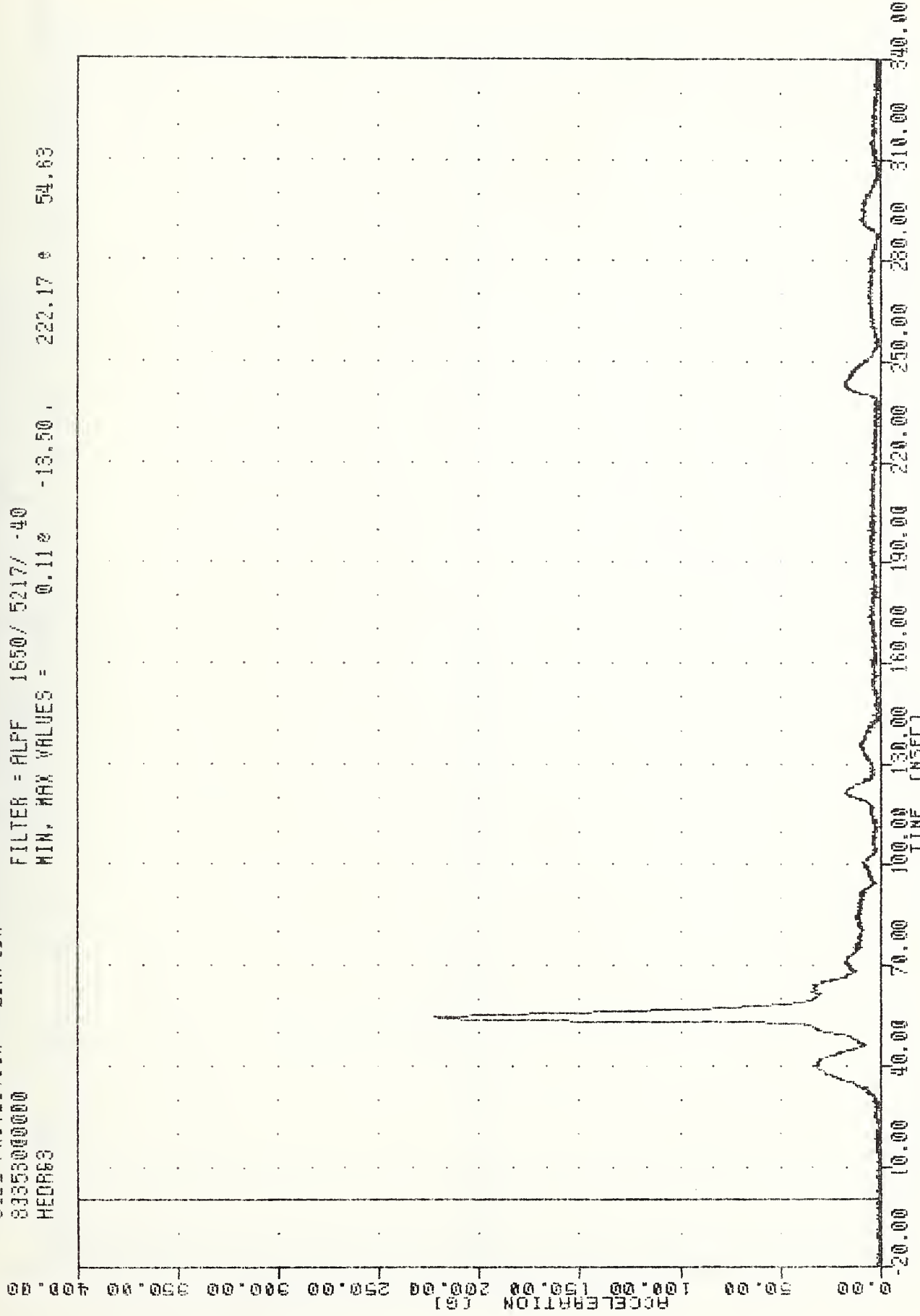
IRC , 831219
SIDE PROTECTION - 20R/40R
83353000000
HE0263

PLUT DATE 27-DEC-83 10:23:03
FILTER = ALPF 1650/ 5217/ -40
MIN. MAX VALUES = -23.078 39.75 , 104.32 e 53.63



MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER HEAD ACCELERATION Z AXIS

IHL 831219
 SIDE PROTECTION - 20R/4DR
 83355000000
 HEAD63
 FLUF DATE 27-DEC-83 10:28:03
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = 0.11e -13.50 , 222.17 e 54.83



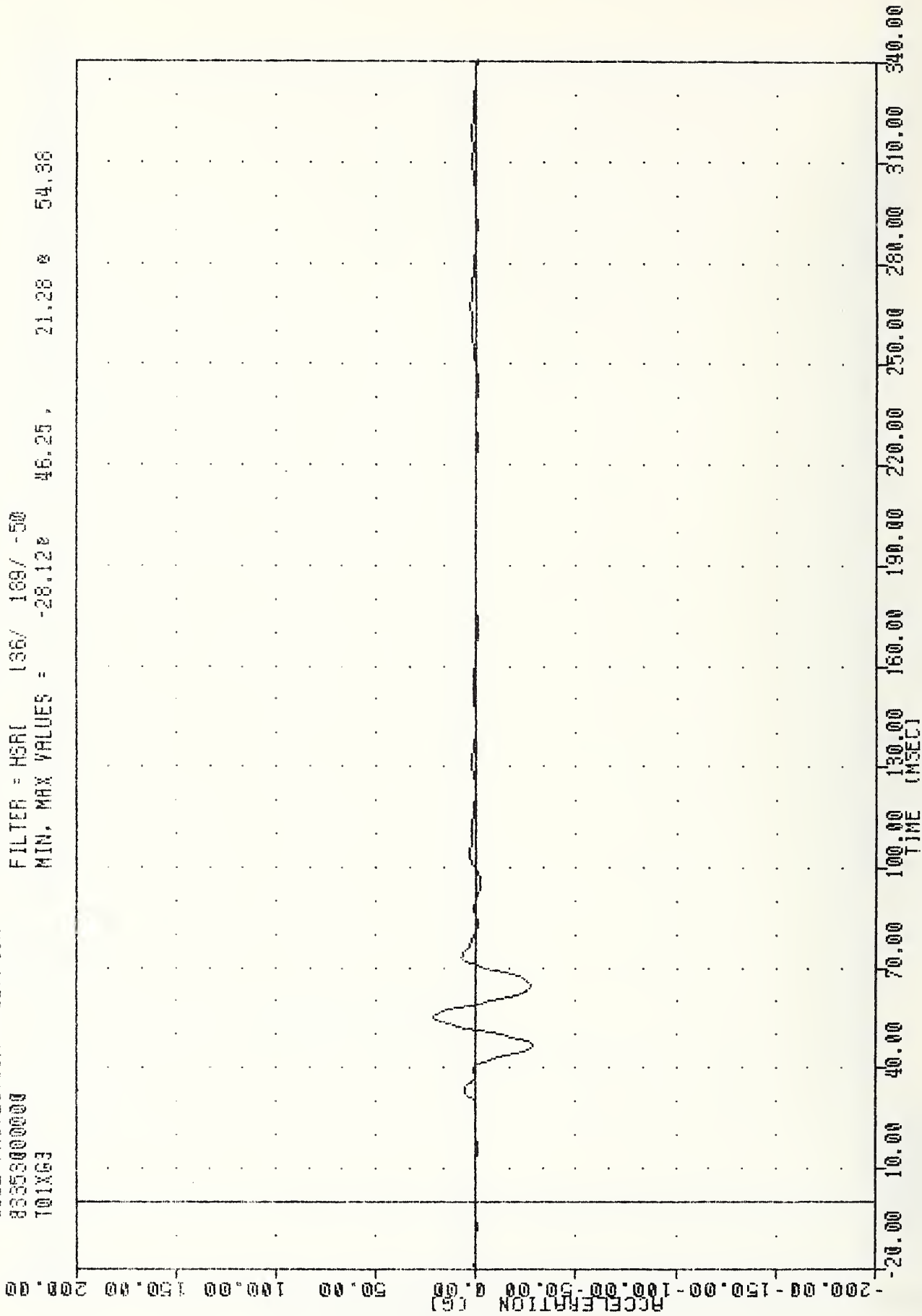
MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER HEAD RESULTANT

TRC 831219
SIDE PROTECTION - 20R/40R
83353000000
T01X63

PLOT DATE 27-DEC-88 10:25:21

FILTER = HGR1 136/ 168/ -50

MIN. MAX VALUES = -28.12e 46.25 , 21.28 e 54.36



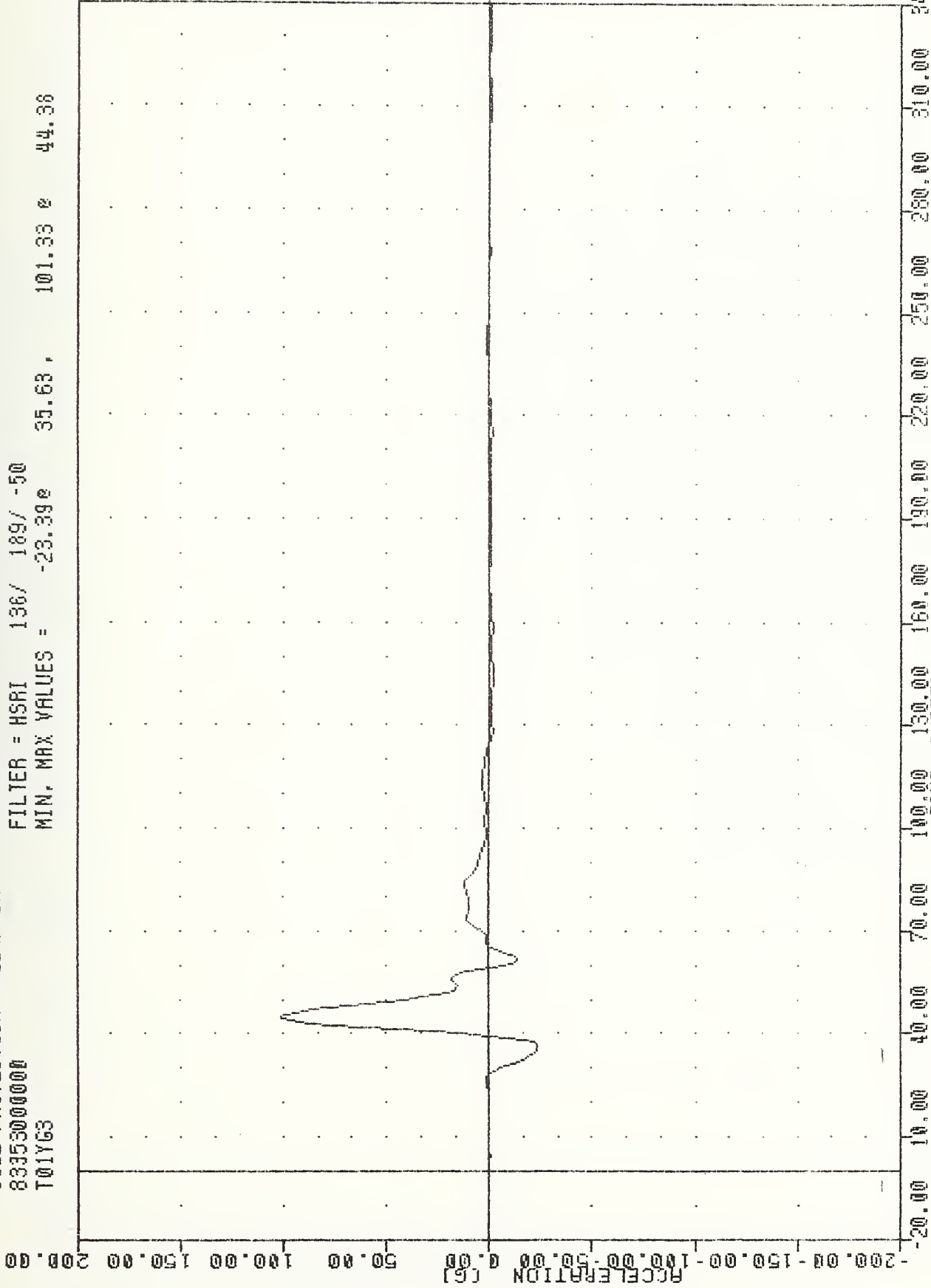
MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER UPPER SPINE ACCELERATION X AXIS

TRC , 831219
SIDE PROTECTION - 2DR/4DR
83353000000
T01Y63

PLOT DATE 27-DEC-83 18:25:21

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -23.39e 35.63 , 101.33 e 44.38



MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER UPPER SPINE ACCELERATION Y AXIS

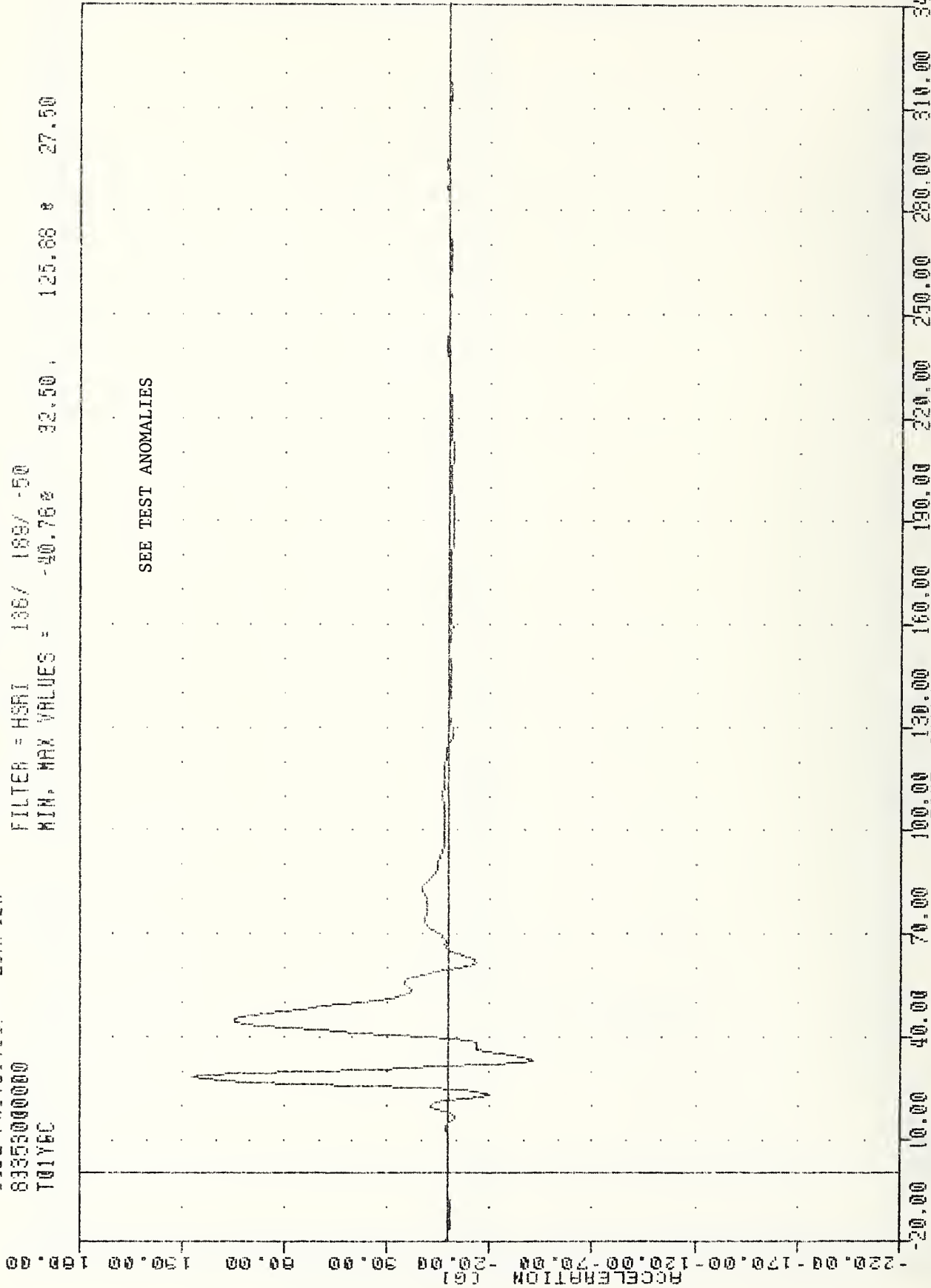
IHC , 831219
SIDE PROTECTION - 20R/40R
83353000000
T01Y6C

PLUF 0A1E 27-DEC-85 10:25:21

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -40.76 32.50 , 125.88 27.50

SEE TEST ANOMALIES



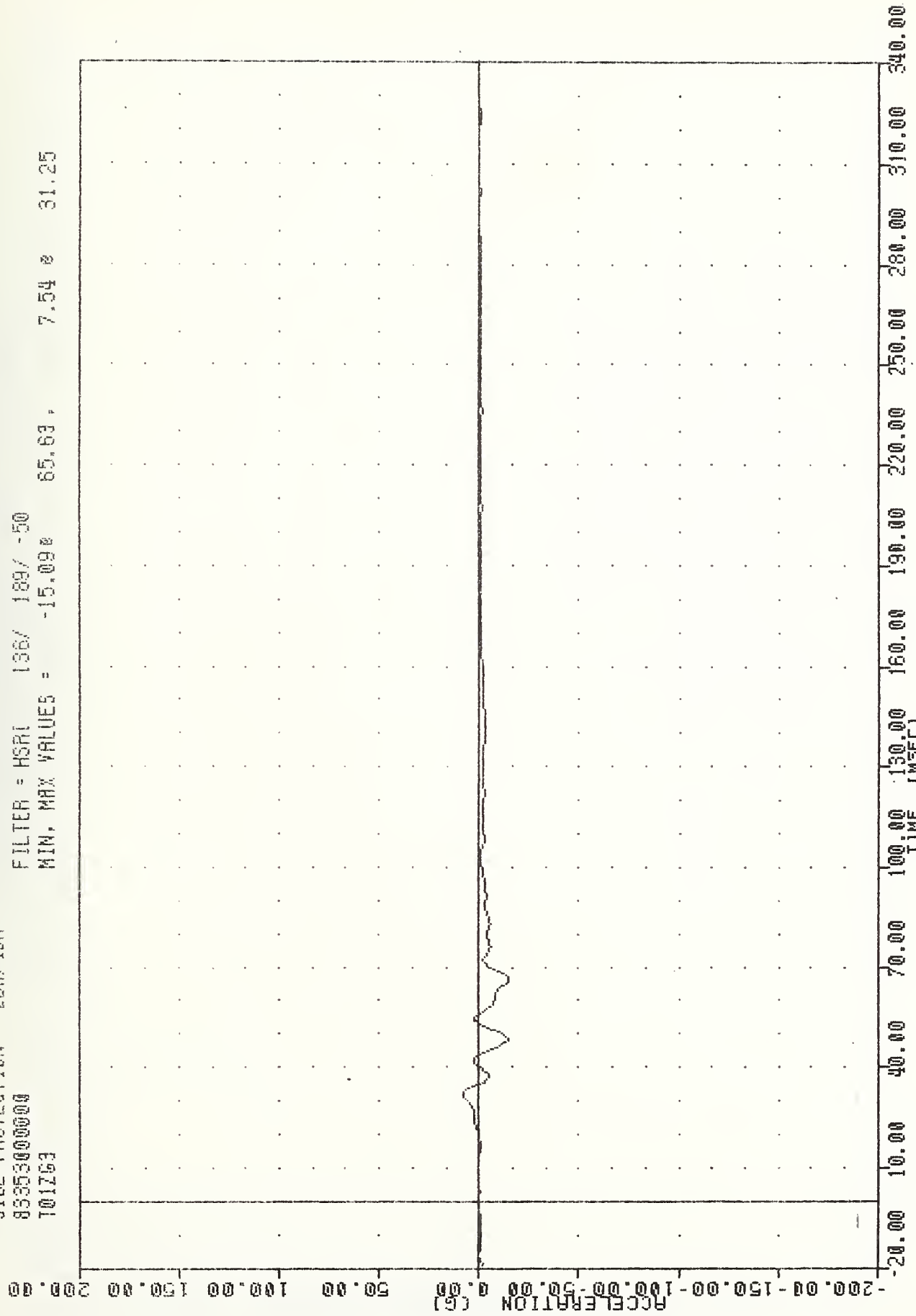
MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER UPPER SPINE ACCELERATION - 2 Y AXIS

IRC , 831215
SIDE PROTECTION - 20R/40R
83353000000
T01Z63

PLUT DATE 27-DEC-83 10:25:21

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -15.09e 65.63, 7.54 e 31.25



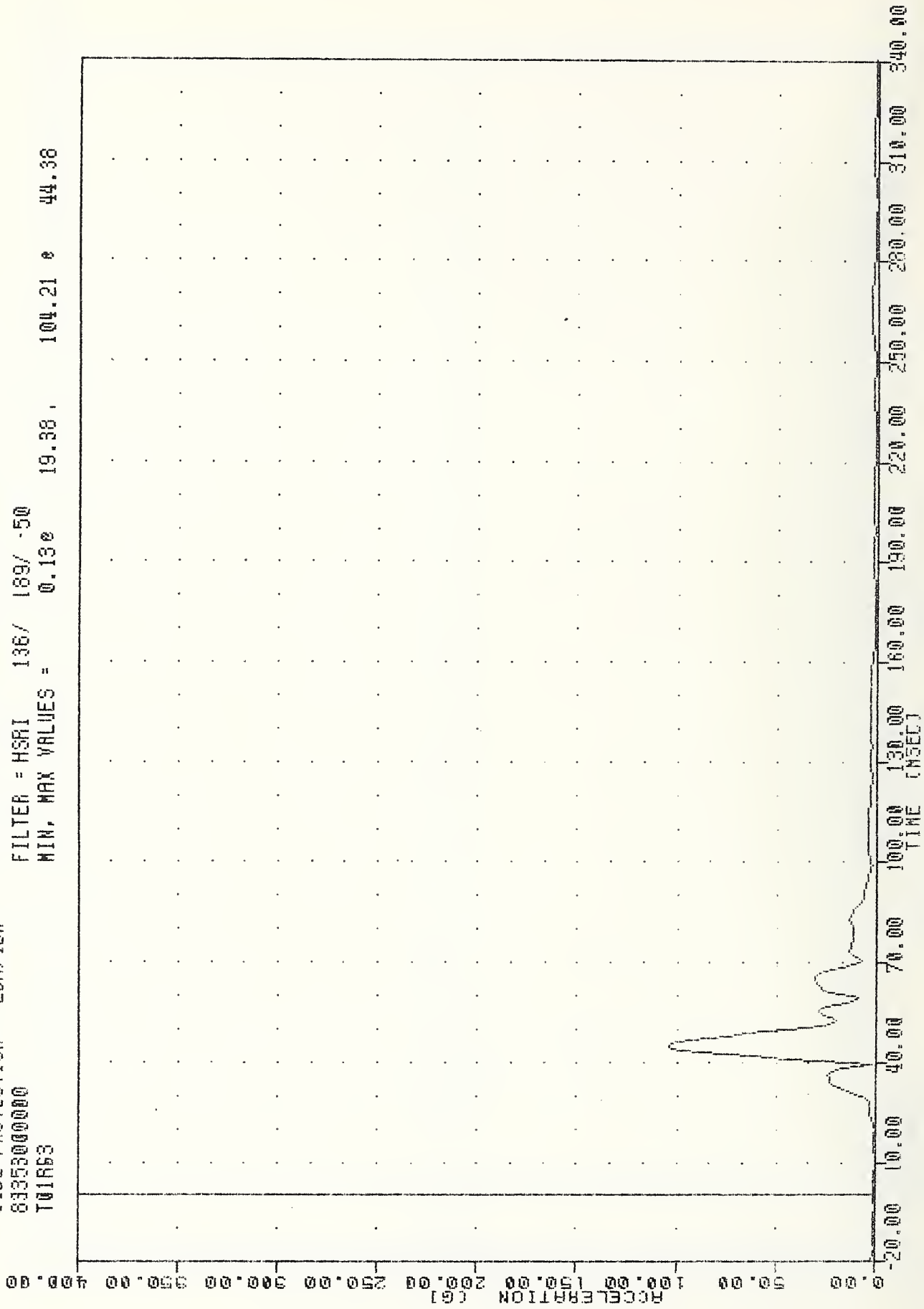
MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER UPPER SPINE ACCELERATION Z AXIS

IML 831219
SIDE PROTECTION - 20R/40R
63353000000
T01R53

FLUT DATE 27-DEC-88 10:25:21

FILTER = HSRI 136/ 189/ -50

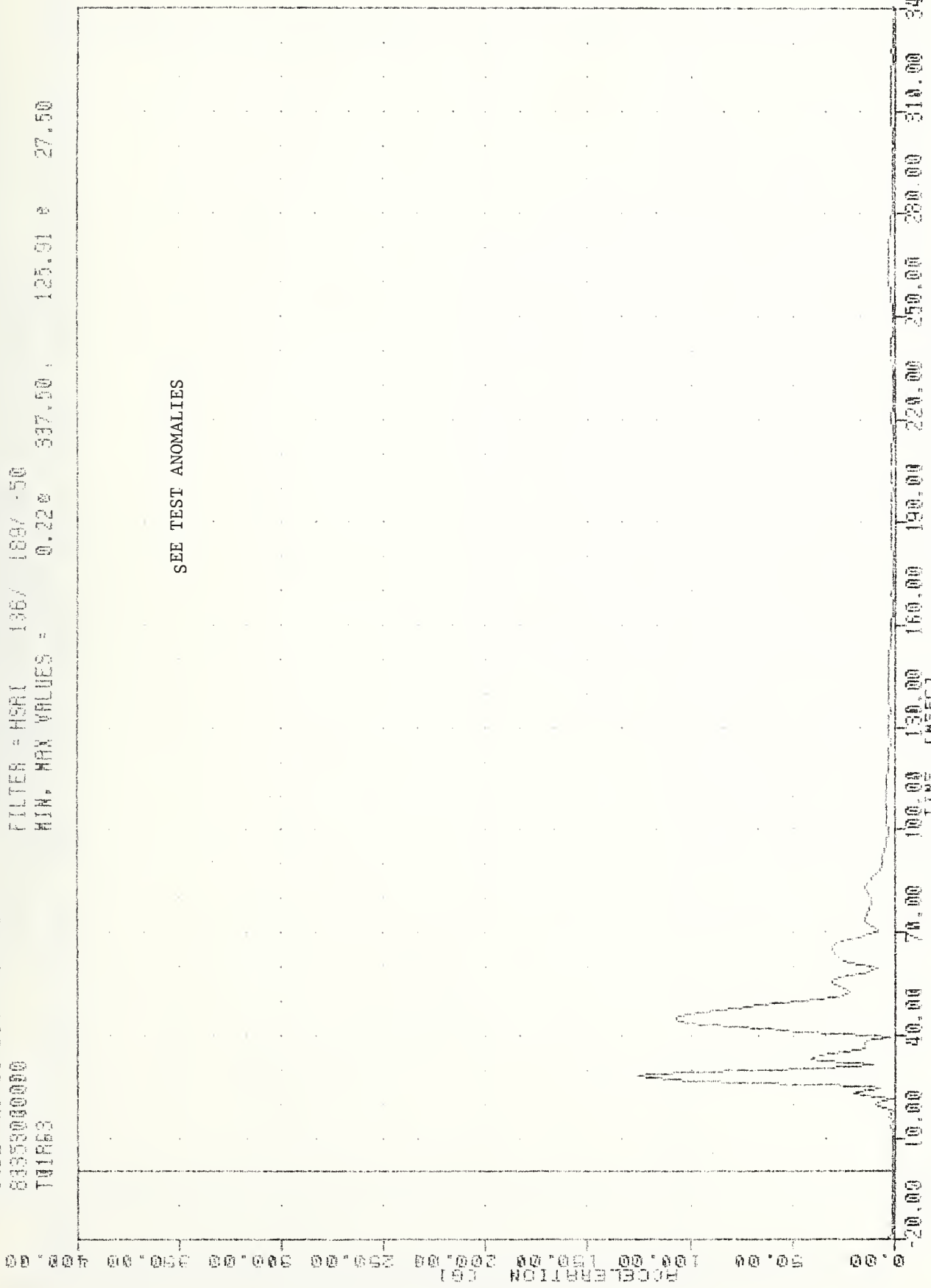
MIN. MAX VALUES = 0.13e 19.38 , 104.21 e 44.38



MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER UPPER SPINE RESULTANT

PL - 031219
SIDE PROTECTION - 20R/40R
8355000000
TWIR53

FLUJ 001c 27-0ED-00 10:27:56
FILTER = HSR1 1867 1897-50
MIN. MAX VALUES = 0.220 337.50 125.91 27.50



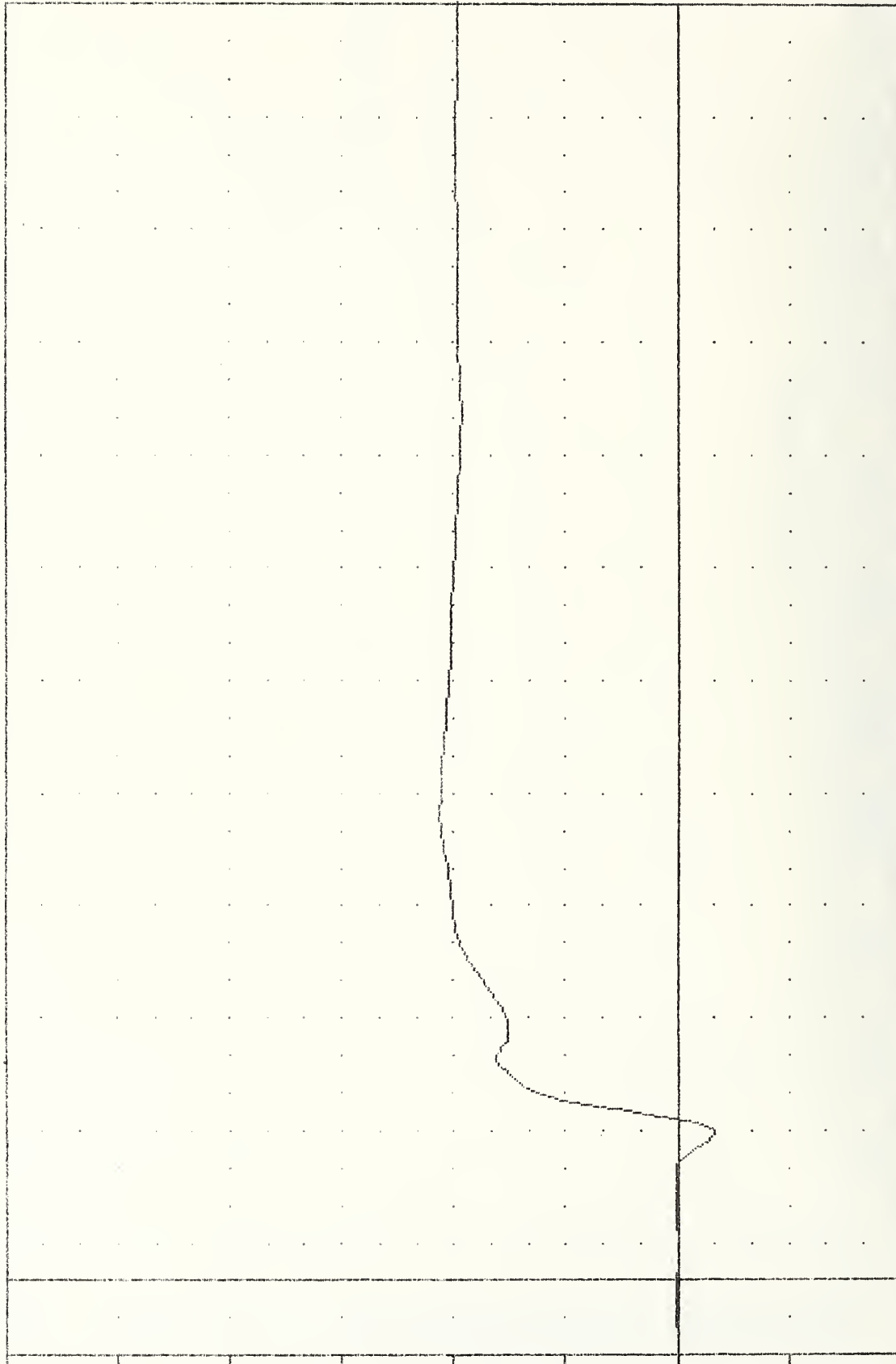
SEE TEST ANOMALIES

MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER UPPER SPINE RESULT USING T01YGL

180
831219
SIDE PROTECTION - 20R/40R
835500000
T01Y3

PLOT DATE 27-DEC-88 12:58:34
FILTER = HSRI 136/ 188/ 50
MIN. MAX VALUES = -8.936 38.75 , 21.26 * 124.38

VELOCITY (MPH)
-20.00 -10.00 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00



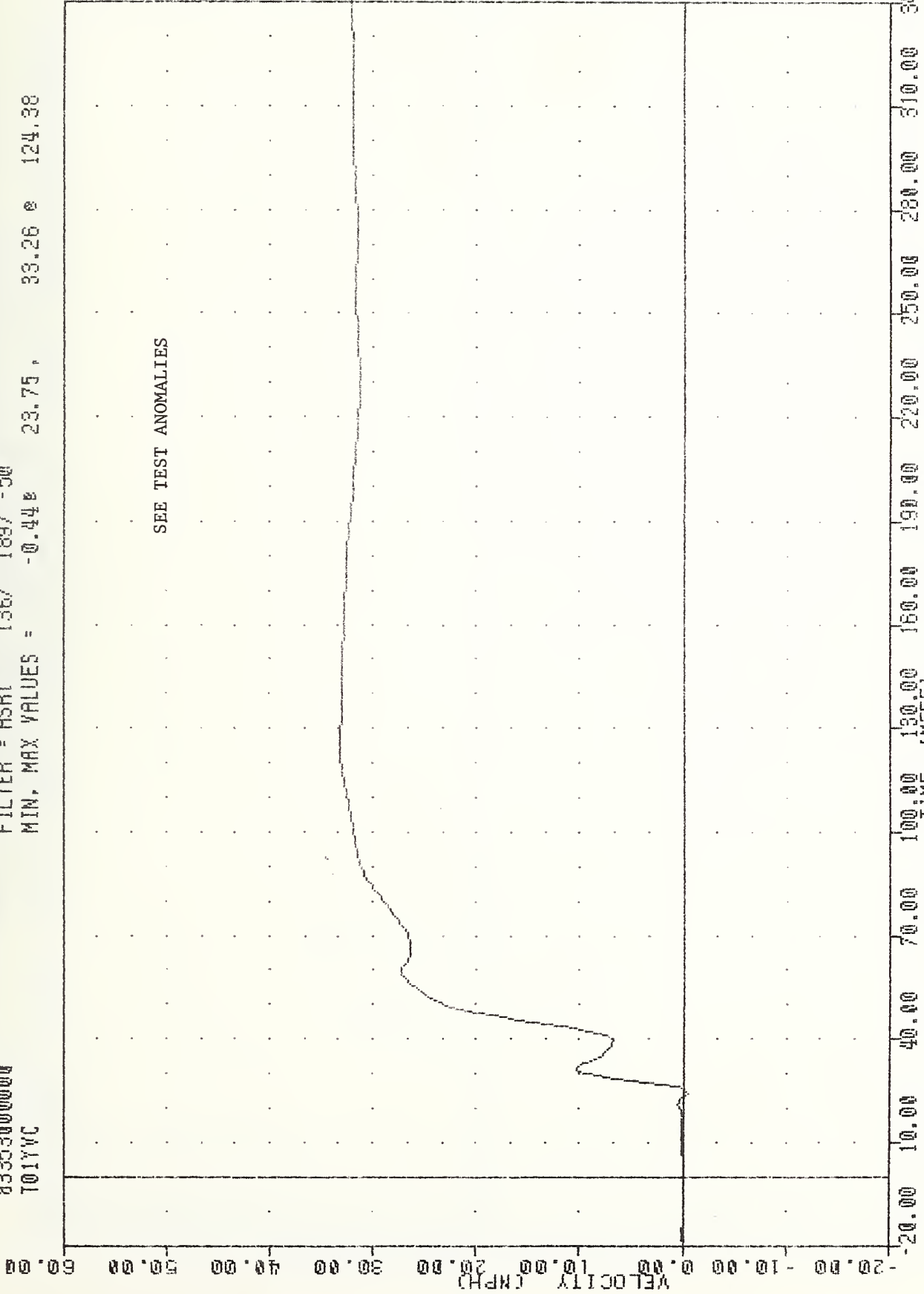
-20.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00
100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
TIME MSECT

MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING T01Y3

TRC
831219
SIDE PROTECTION - 2DR/4DR
83353000000
T01YVC

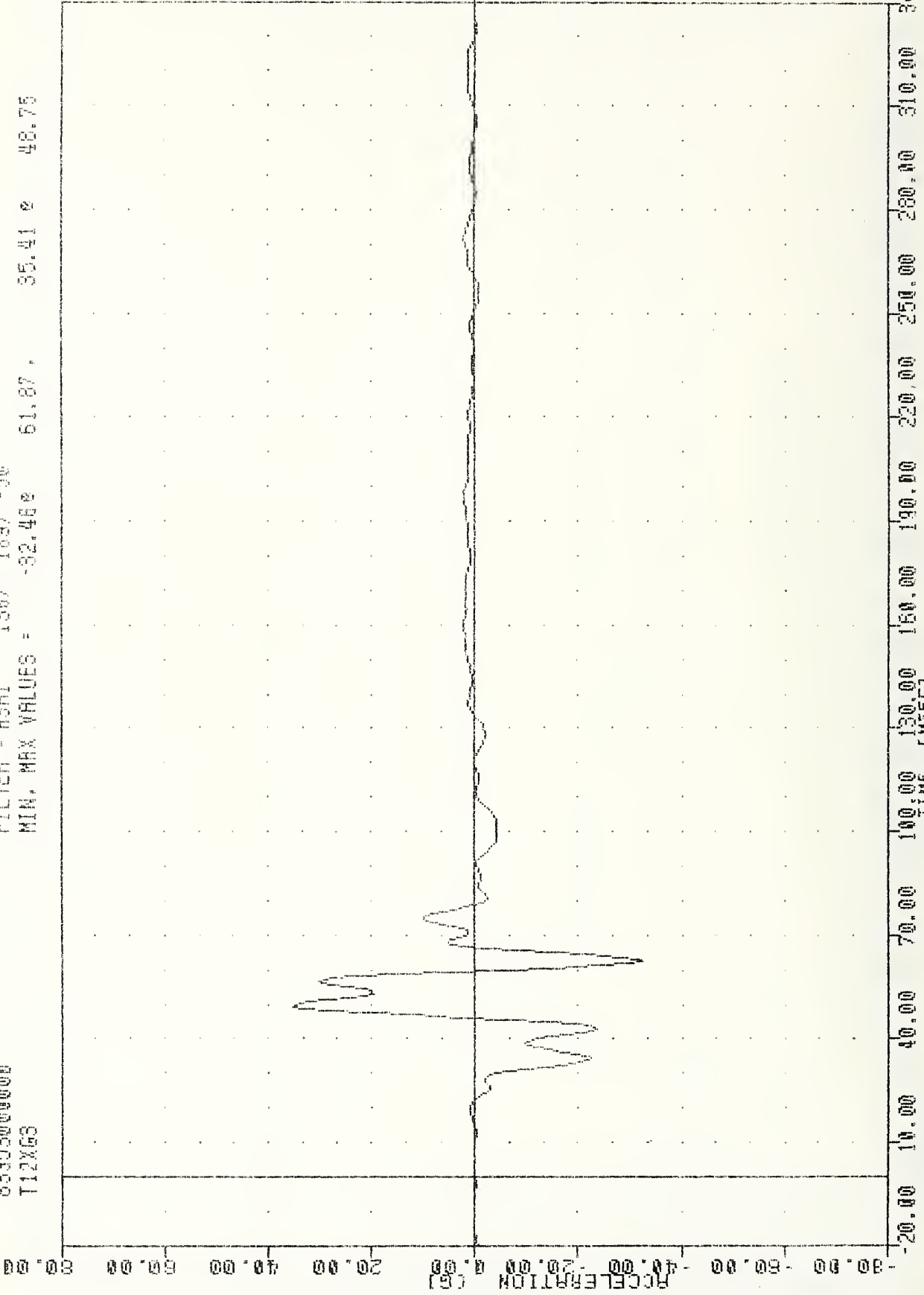
PLOT DATE 27-DEC-83 12:58:34

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -0.448 23.75 , 33.26 @ 124.38



MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING T01YVC

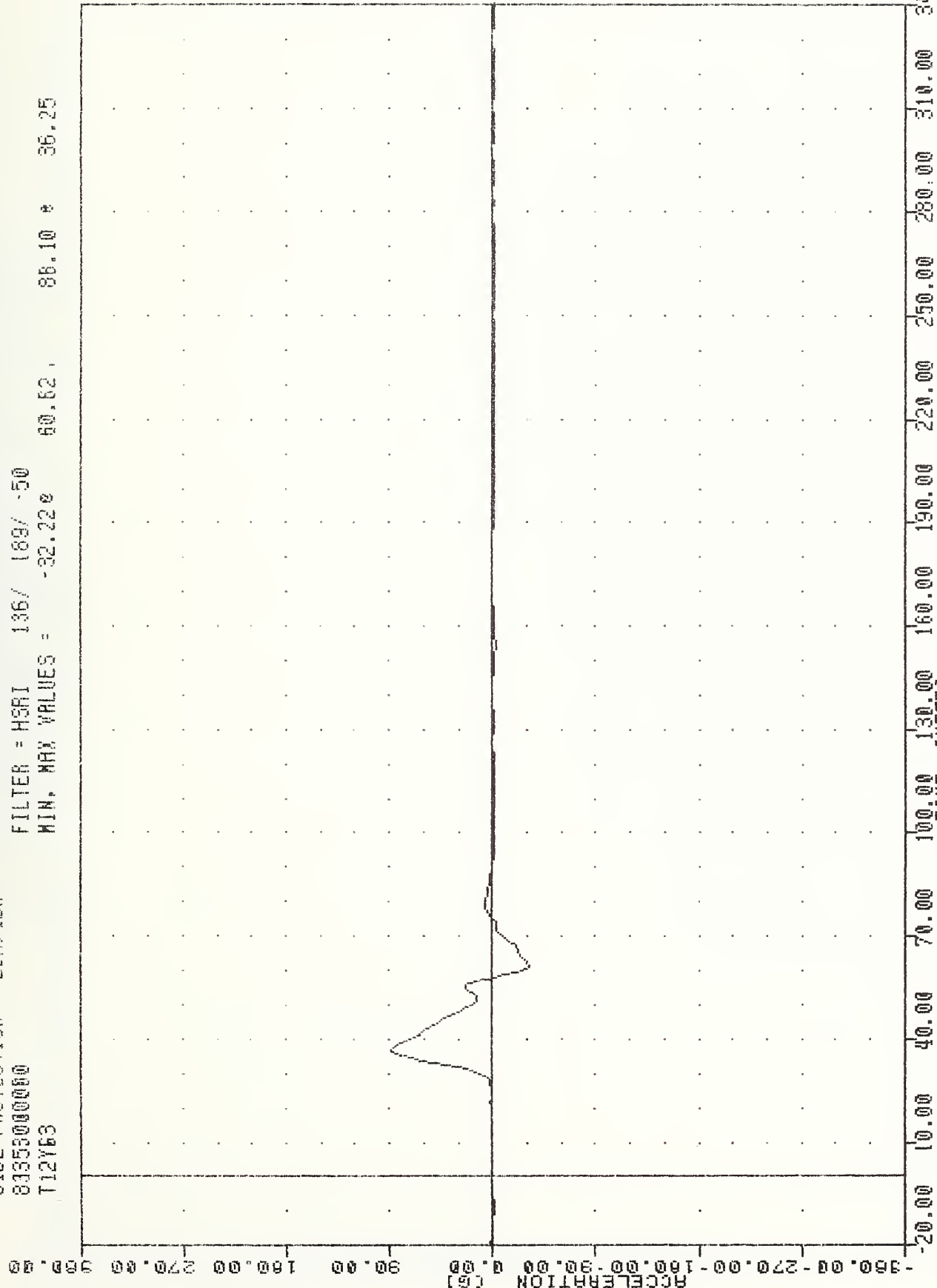
INC 831219
 SIDE PROTECTION - 20R/4DR
 83353000000
 T12X63
 FLUT DRIC 27-DEC-83 10:25:21
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -32.46g 61.87g 35.41g 48.75g



MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER LOWER SPINE ACCELERATION X AXIS

IHL 831219
 SIDE PROTECTION - 20R/40R
 83353000000
 T12Y63

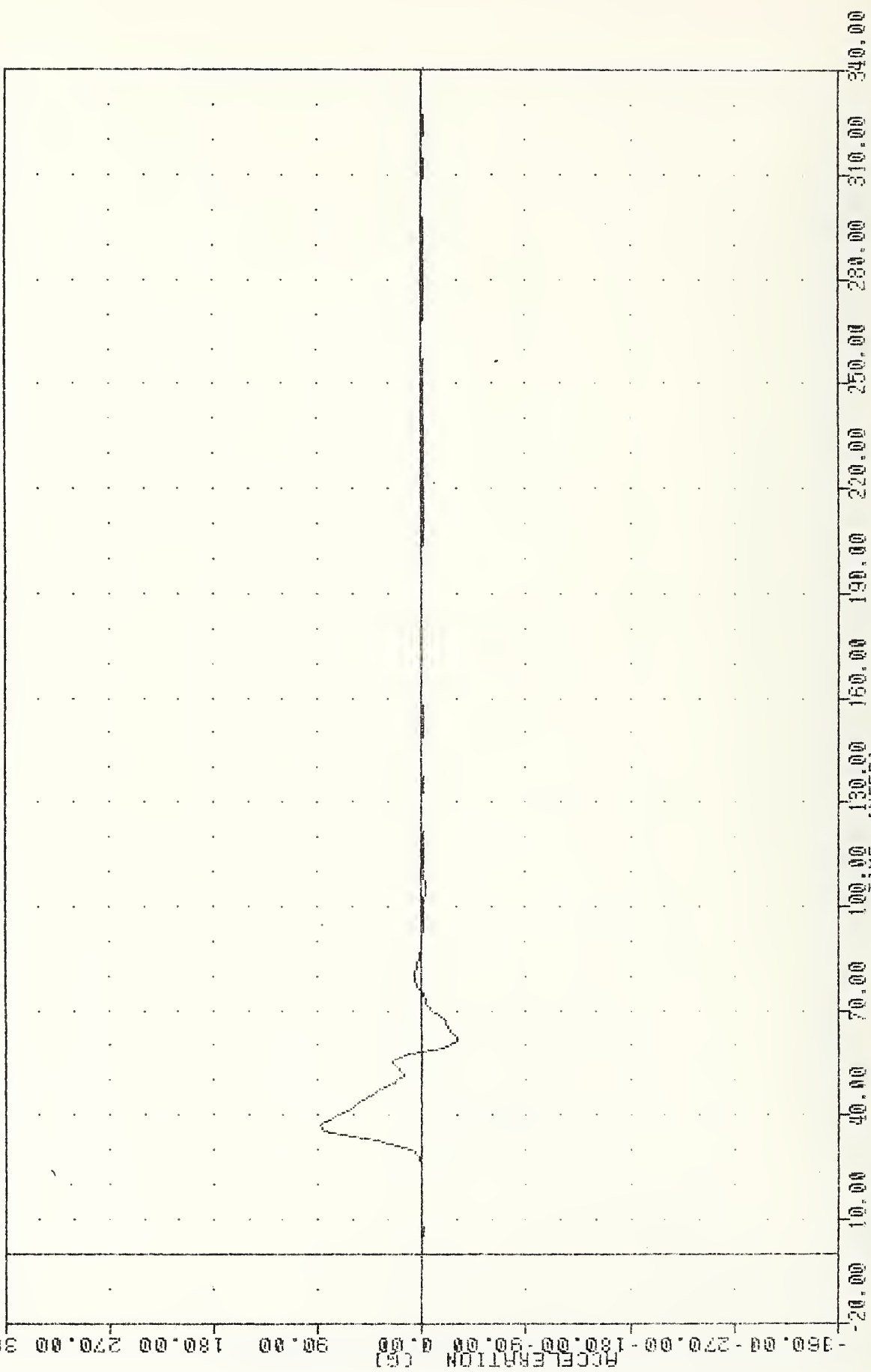
FLUT DATE 27-DEC-88 10:25:21
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -32.22 60.62 88.10 * 36.25



MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER LOWER SPINE ACCELERATION Y AXIS

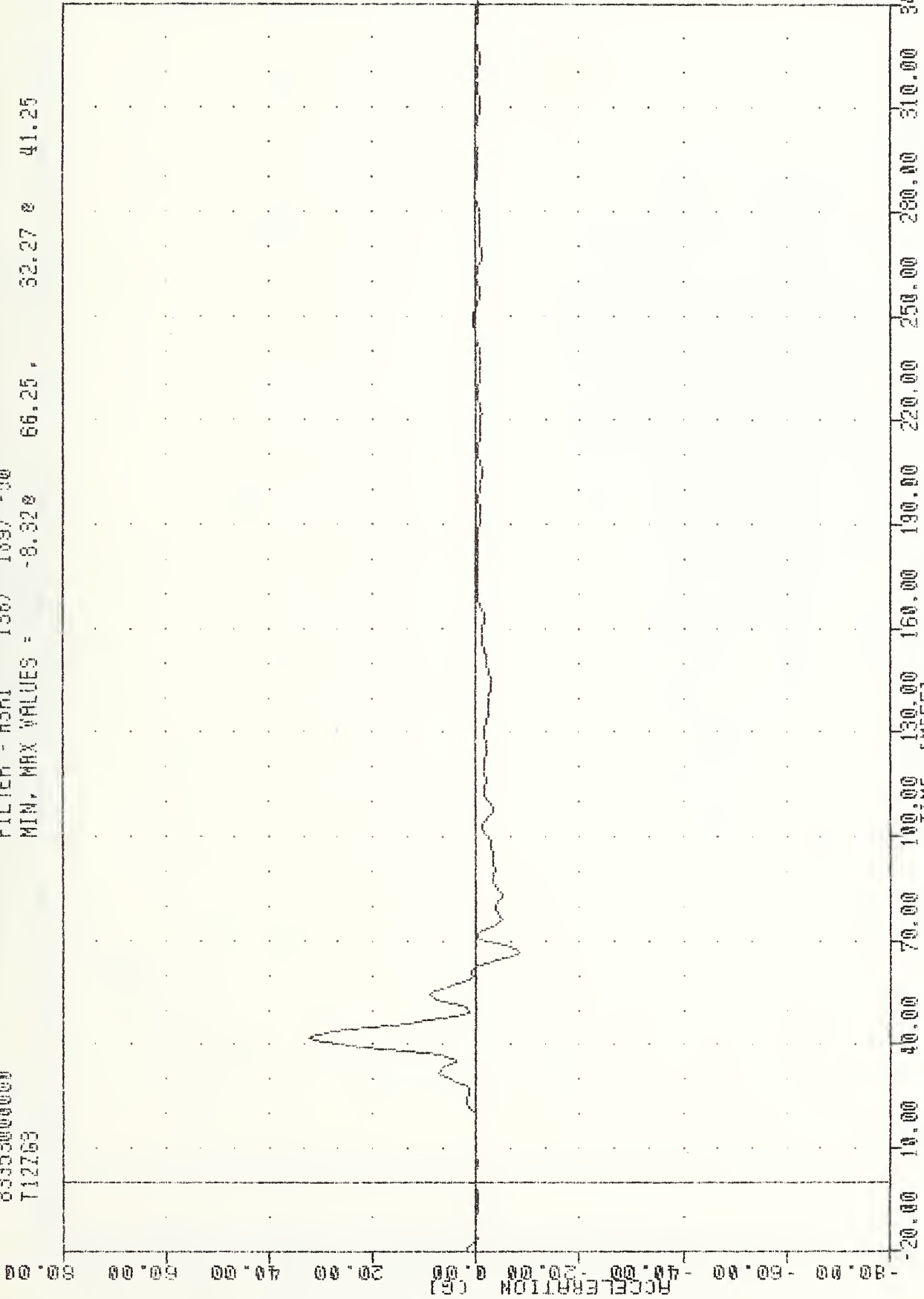
IRC , 831219
 SIDE PROTECTION - 20R/40R
 83353000000
 T12YGC

FLUT DATE 27-DEC-83 10:25:21
 FILTER = HSR1 136/ 189/ -50
 MIN. MAX VALUES = -30.74% 61.25 , 87.79 @ 36.25



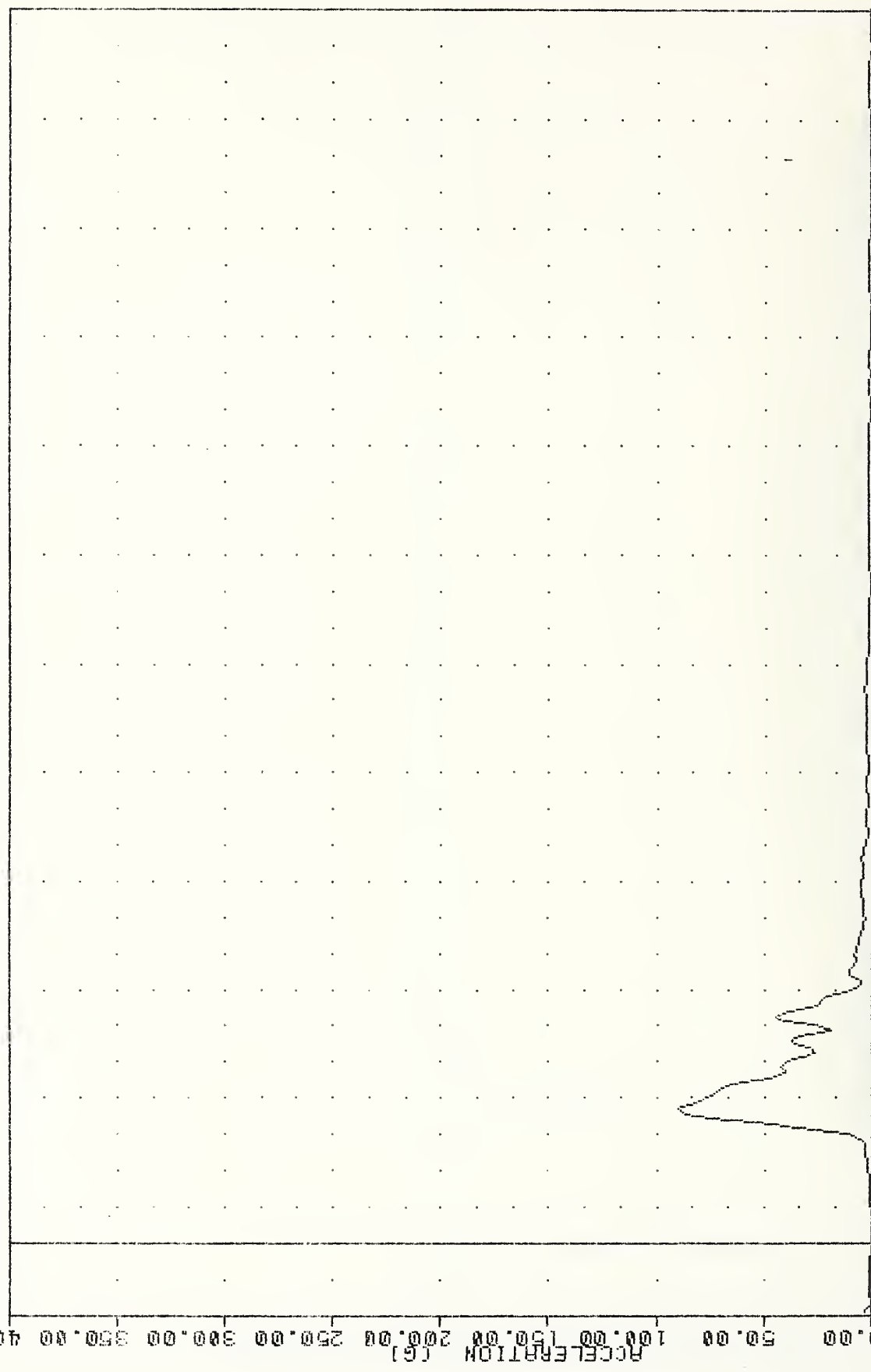
MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER LOWER SPINE ACCELERATION -2 Y AXIS

TRU , 831219 PLOT DATE 27-DEC-83 10:25:21
 SIDE PROTECTION - 2DR/4DR
 83353000000 FILTER = HSRI 136/ 189/ -50
 T12763 MIN. MAX VALUES = -8.32g 66.25 , 32.27 g 41.25



MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER LOWER SPINE ACCELERATION Z AXIS

INU 831419 FLUT DATE 27-DEC-83 10:25:21.
 SIDE PROTECTION - 20R/40R
 83353000000
 T12R63 MIN. MAX VALUES = 0.05B 2.50 , 89.48 # 36.25

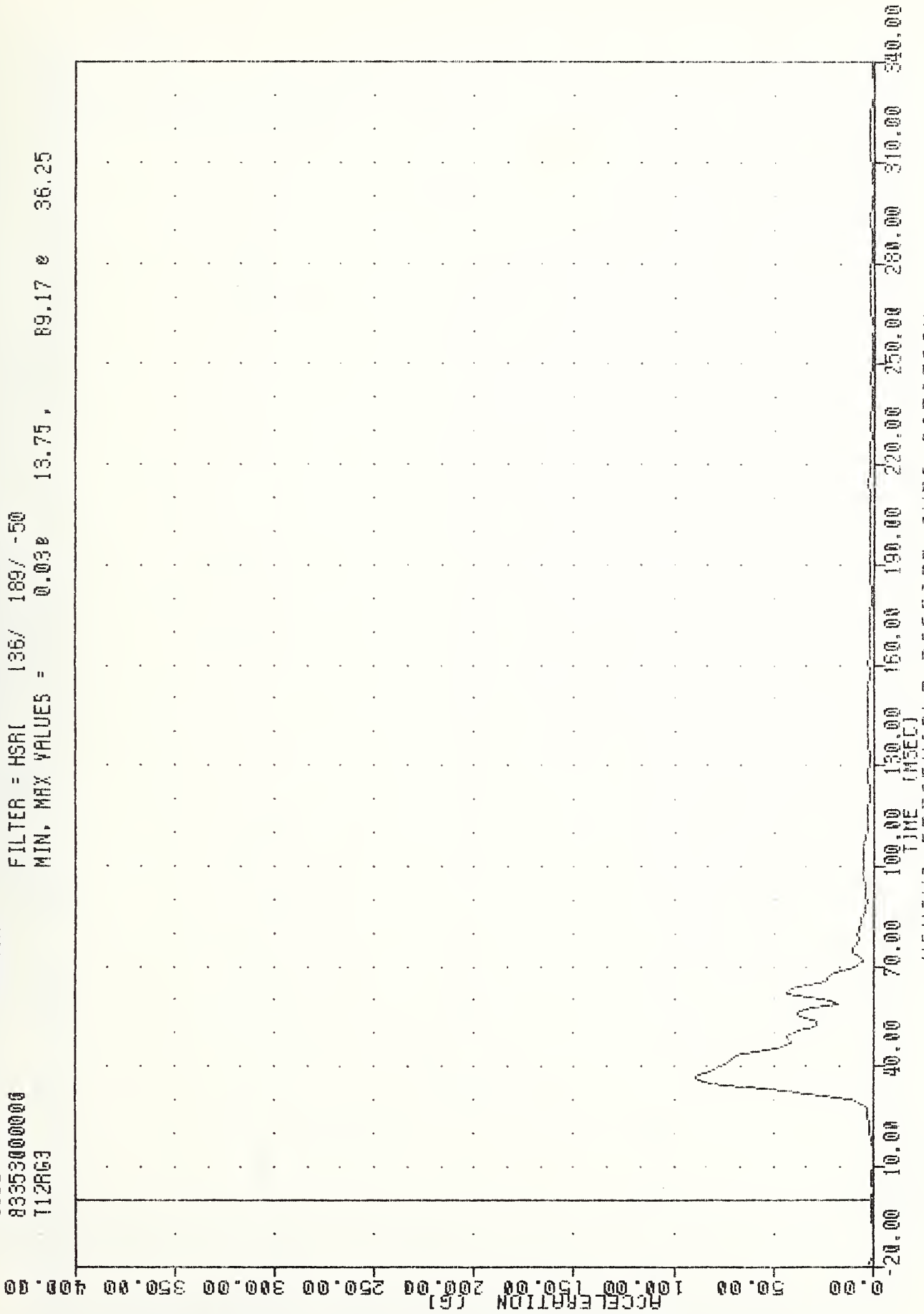


-20.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER LOWER SPINE RESULTANT

INC , 831213
SIDE PROTECTION - 20R/40R
83353000000
T12R63

PLUT Dmic 47-DEL-03 10:27.30

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = 0.03e 13.75, 89.17 e 36.25

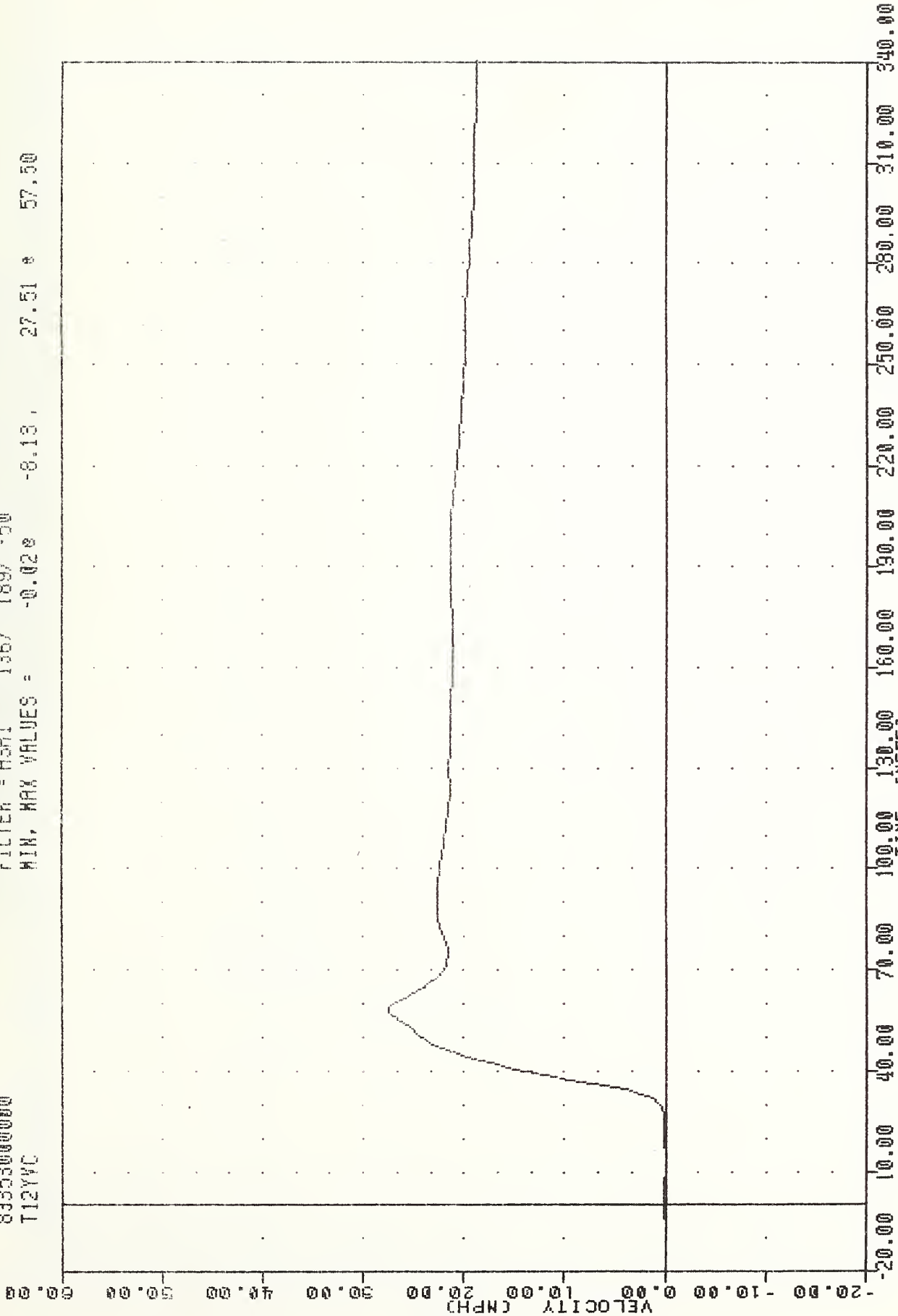


MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER LOWER SPINE RESULTANT USING T12Y6C

TAC 831219
SIDE PROTECTION - 20R/40R
83353000000
T12YVC

PLOT DATE 27-DEC-83 12:58:34

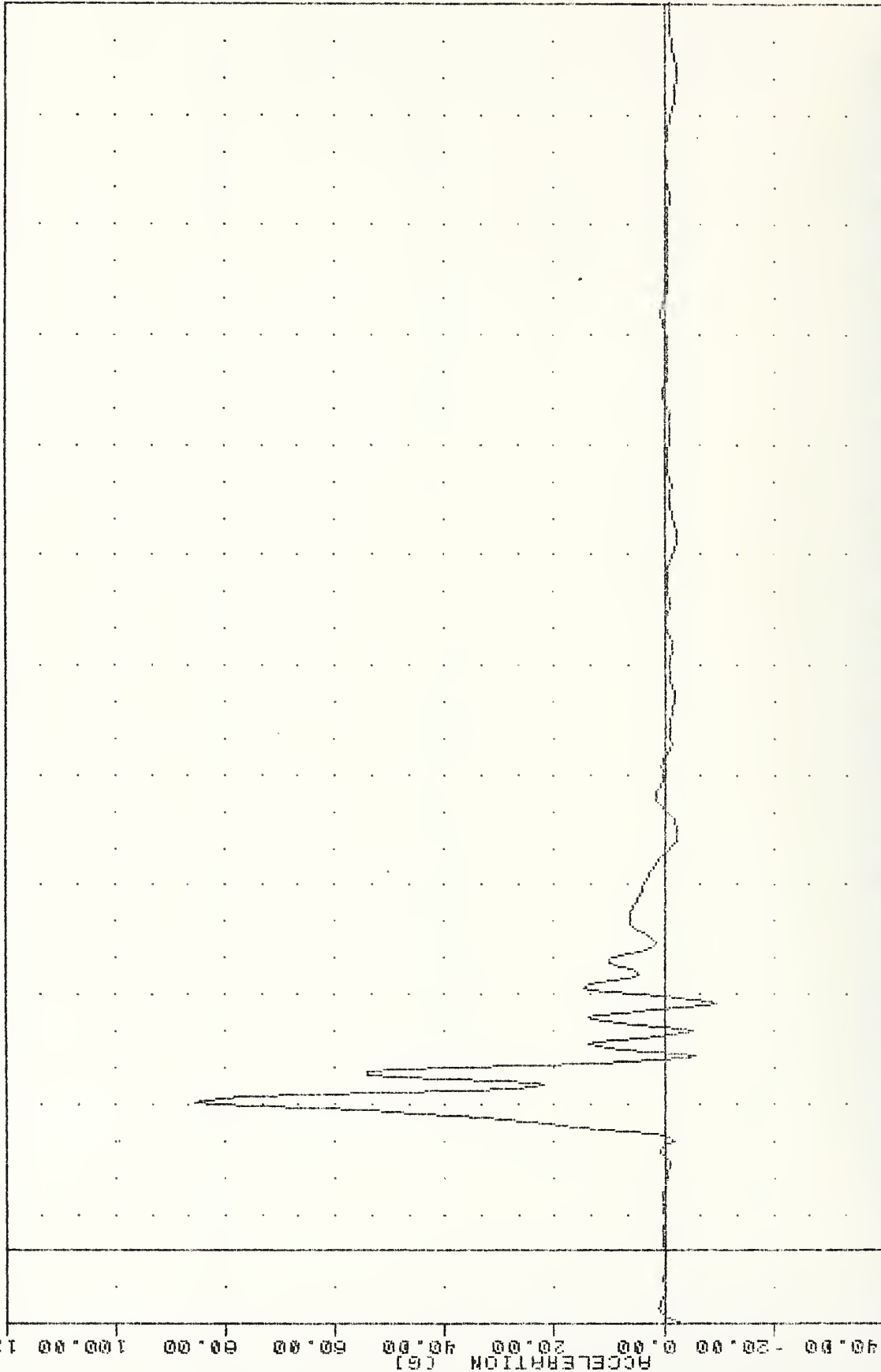
FILTER = MSPI 136/ 189/ -50
MIN, MAX VALUES = -0.028 -8.13 , 27.51 * 57.50



MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING T12YVC

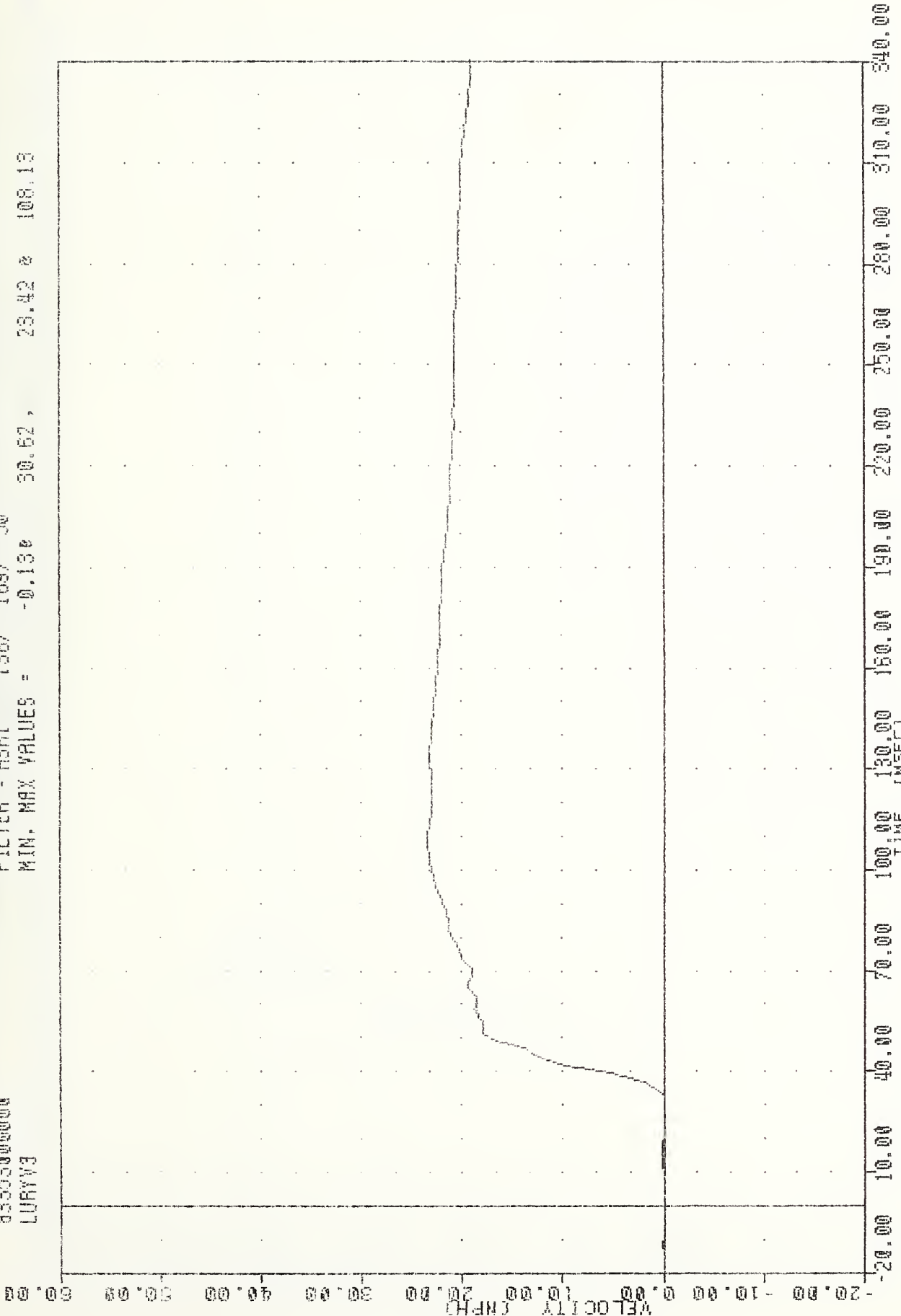
TAC , 831219
 SIDE PROTECTION - 20R/40R
 83353000000
 LURY63

PLUT DATE 27-DEC-83 10:25:21
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -9.38e 85.64 e 40.00



ACCELERATION (G)
 TIME (msec)
 MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER LEFT UPPER RIB ACCELERATION Y AXIS

IRC . 831219 PLOT DATE 27-DEC-83 12:08:34
 SIDE PROTECTION - 20R/40R
 8335300000
 LURYV3
 FILTER = HSRI 136/ 169/ -50
 MIN. MAX VALUES = -0.13e 50.62, 23.42 e 108.13

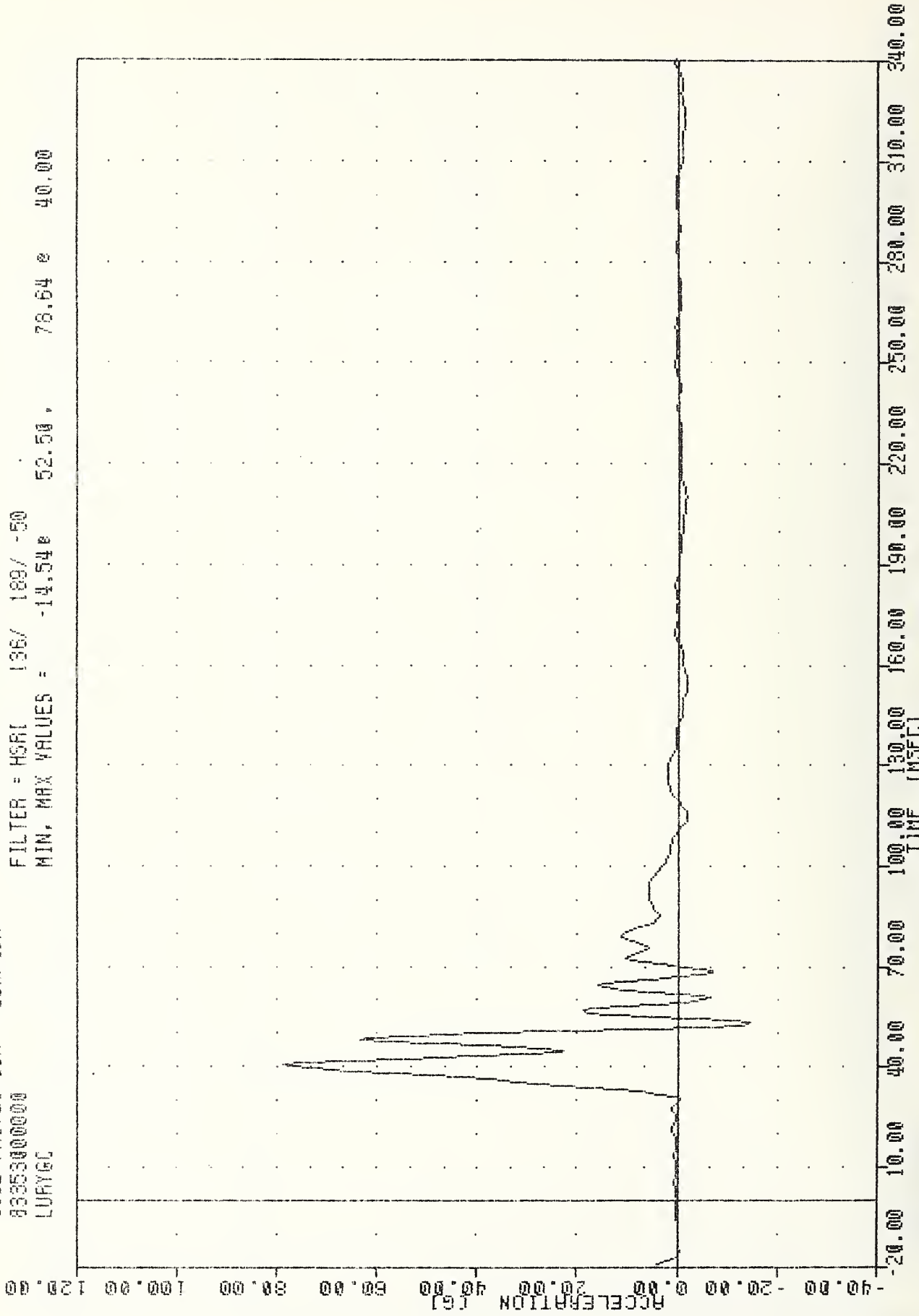


MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA V USING LURYV3

TAC 831219
SIDE PROTECTION - 209/40A
83353000000
LURYGC

PLOT DATE 27-DEC-83 10:25:21

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -14.54e 78.64 e 40.00

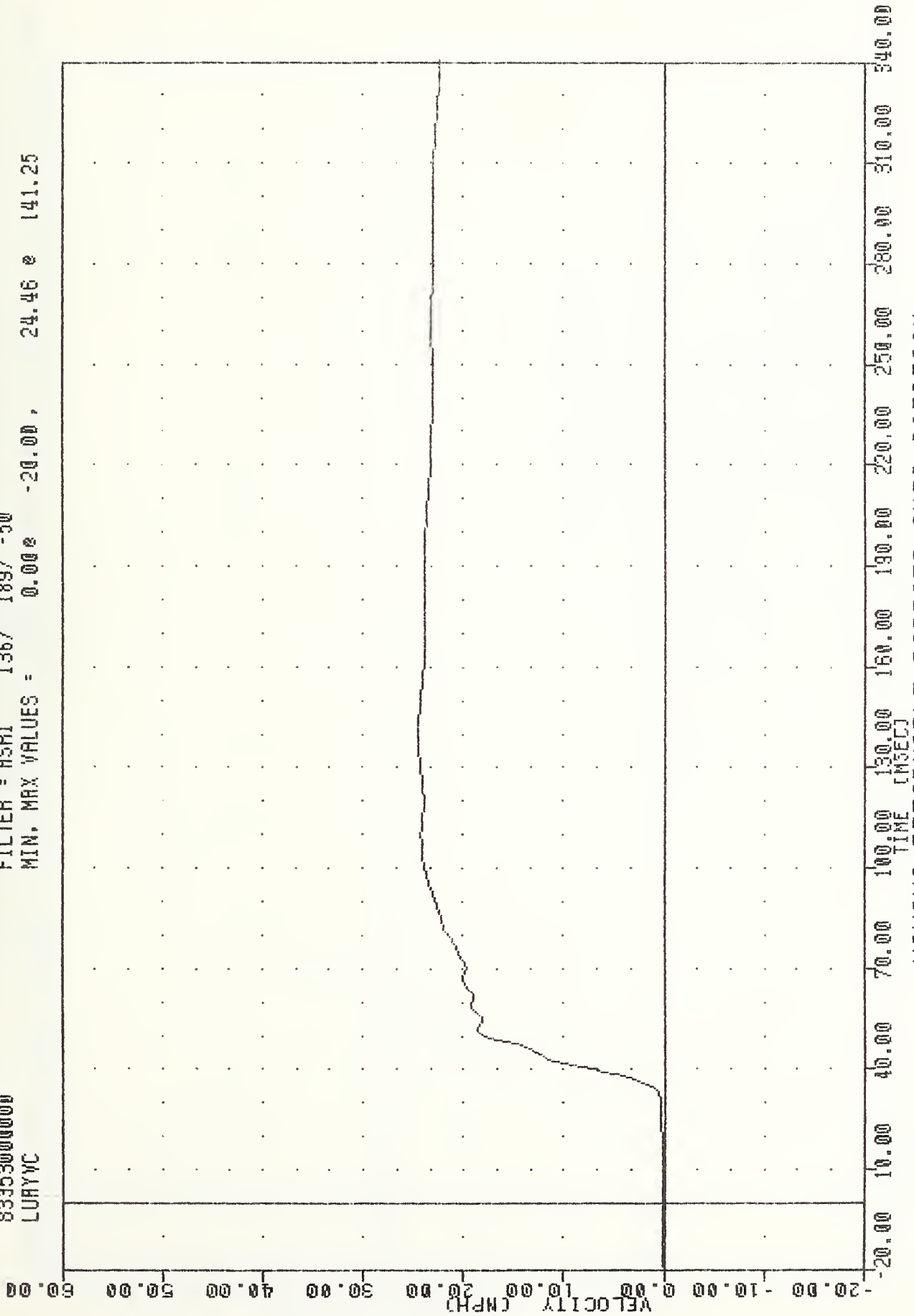


MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER LEFT UPPER RIB ACCELERATION -2 Y AXIS

TRC , 831219
SIDE PROTECTION - 2DR/4DR
83353000000
LURYVC

PLOT DATE 27-DEC-83 12:58:34

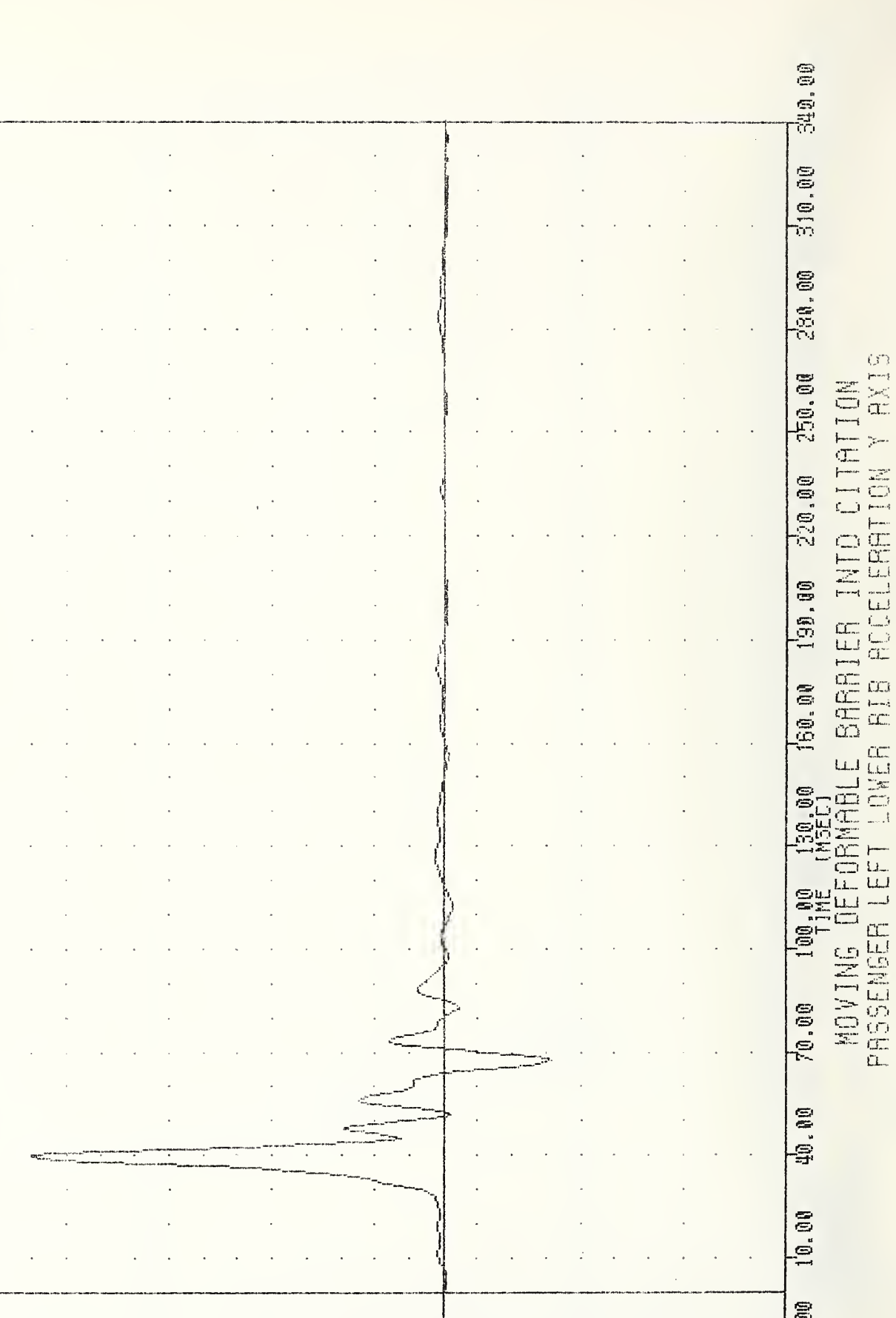
FILTER = HSP1 136/ 189/ -50
MIN. MAX VALUES = 0.00e -20.00 , 24.46 e 141.25



MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING LURYVC

TRC , 031219
 SIDE PROTECTION - 20R/40R
 0335300000
 LLRYG3

PLOT DATE 30-DEC-83 09:48:07
 FILTER = HSR1 136/ 189/ -50
 MIN. MAX VALUES = -31.55% 86.67% 120.31% 38.75

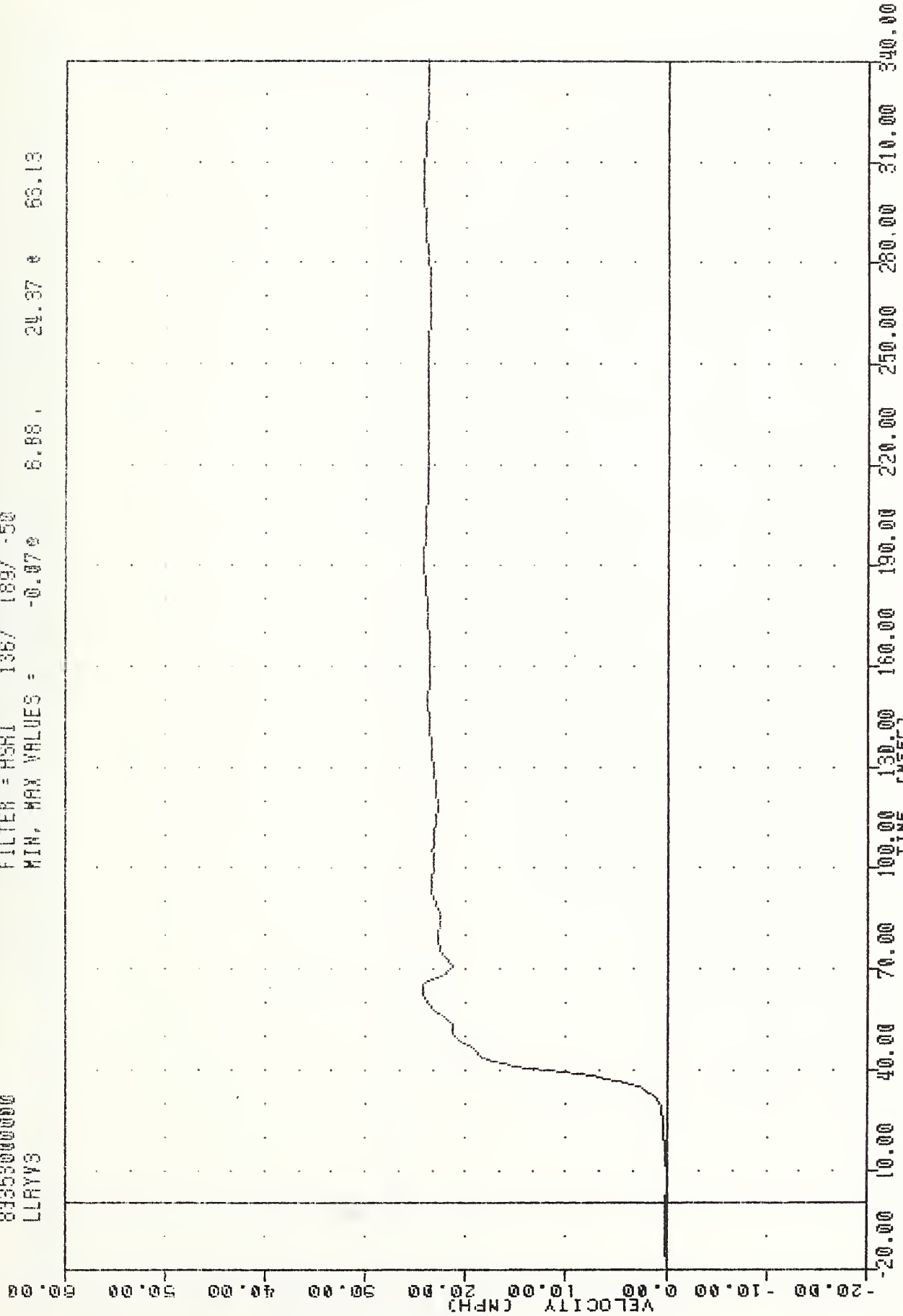


MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER LEFT LOWER RIB ACCELERATION Y AXIS

19-B
83353000000
SIDE PROTECTION - 20R/40R
LLAYV3

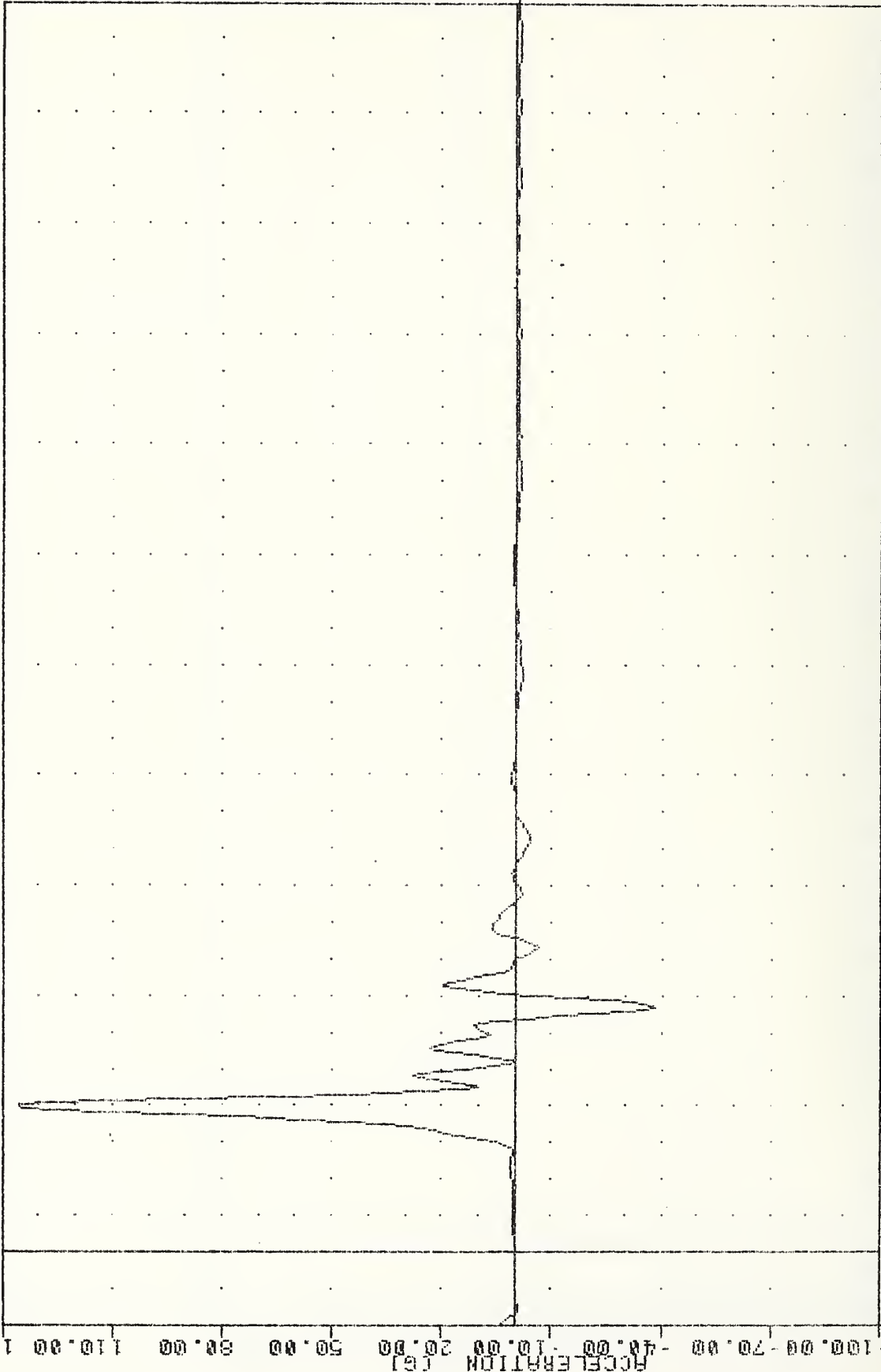
PLOT DATE 27-06-83 12:08:34

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -0.070 6.88, 24.37 e 63.13



MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING LLAYV3

FRC . 881219
 SIDE PROTECTION - 2DR/4DR
 8335300000
 LLAYGC
 FL01 UHTE 30-UEU-83 09:46:07
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -38.33% 66.25 . 135.23 e 39.38

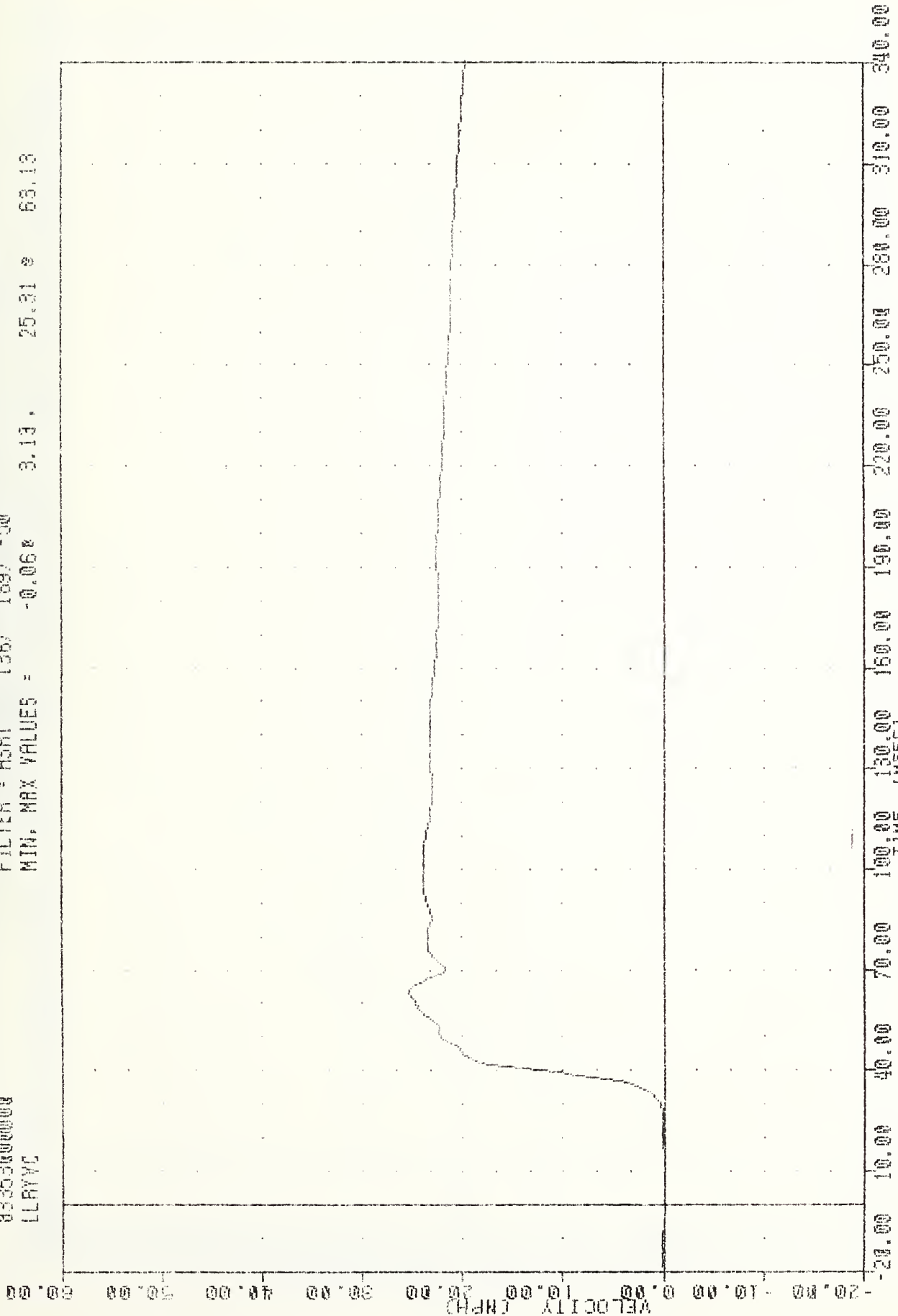


MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER LEFT LOWER RIB ACCELERATION #2 Y AXIS

TRC . 631219
SIDE PROTECTION - 20R/40R
8335300000
LLRYC

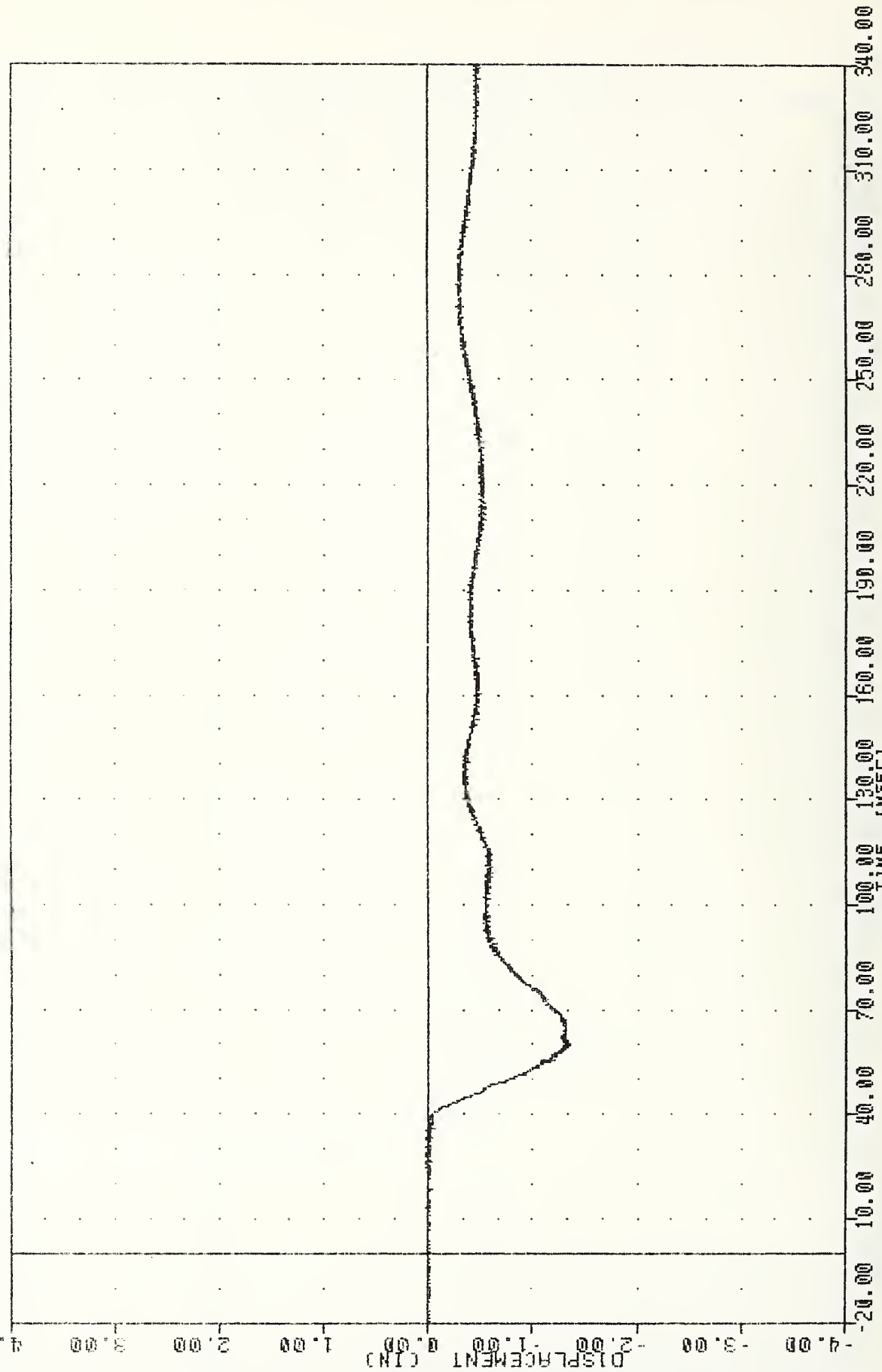
PLOT DATE 27-DEC-83 12:00:34

FILTER = HSR1 136/ 189/ -50
MIN. MAX VALUES = -0.068 3.13 25.31 63.13



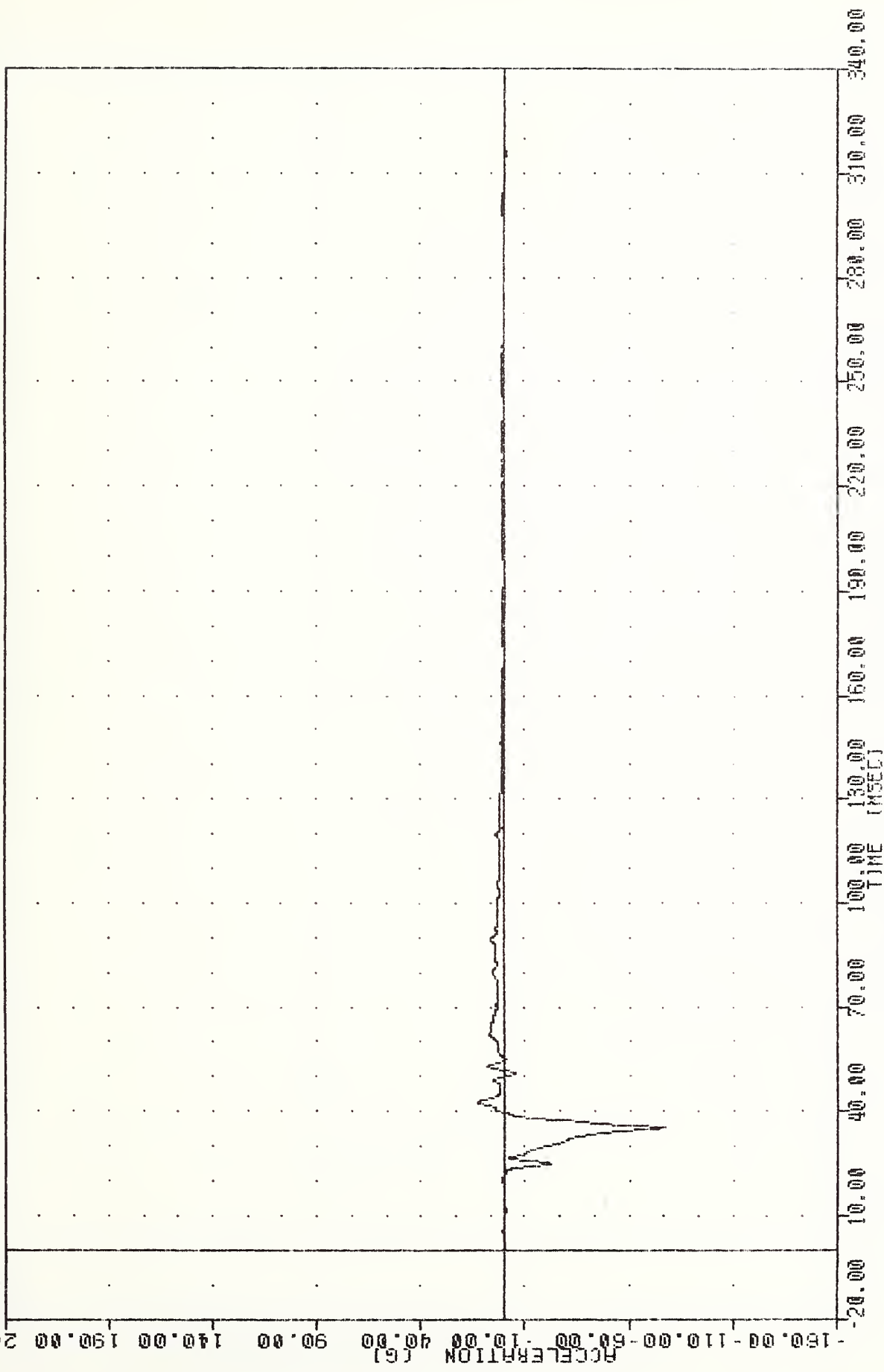
MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING LLRYC

INL . 831219
 SIDE PROTECTION - 2DR/4DR
 83353000000
 LATYD3
 FLUT DATE 27-DEC-93 10:28:07
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -1.35e 60.25 , 0.04 e 50.25



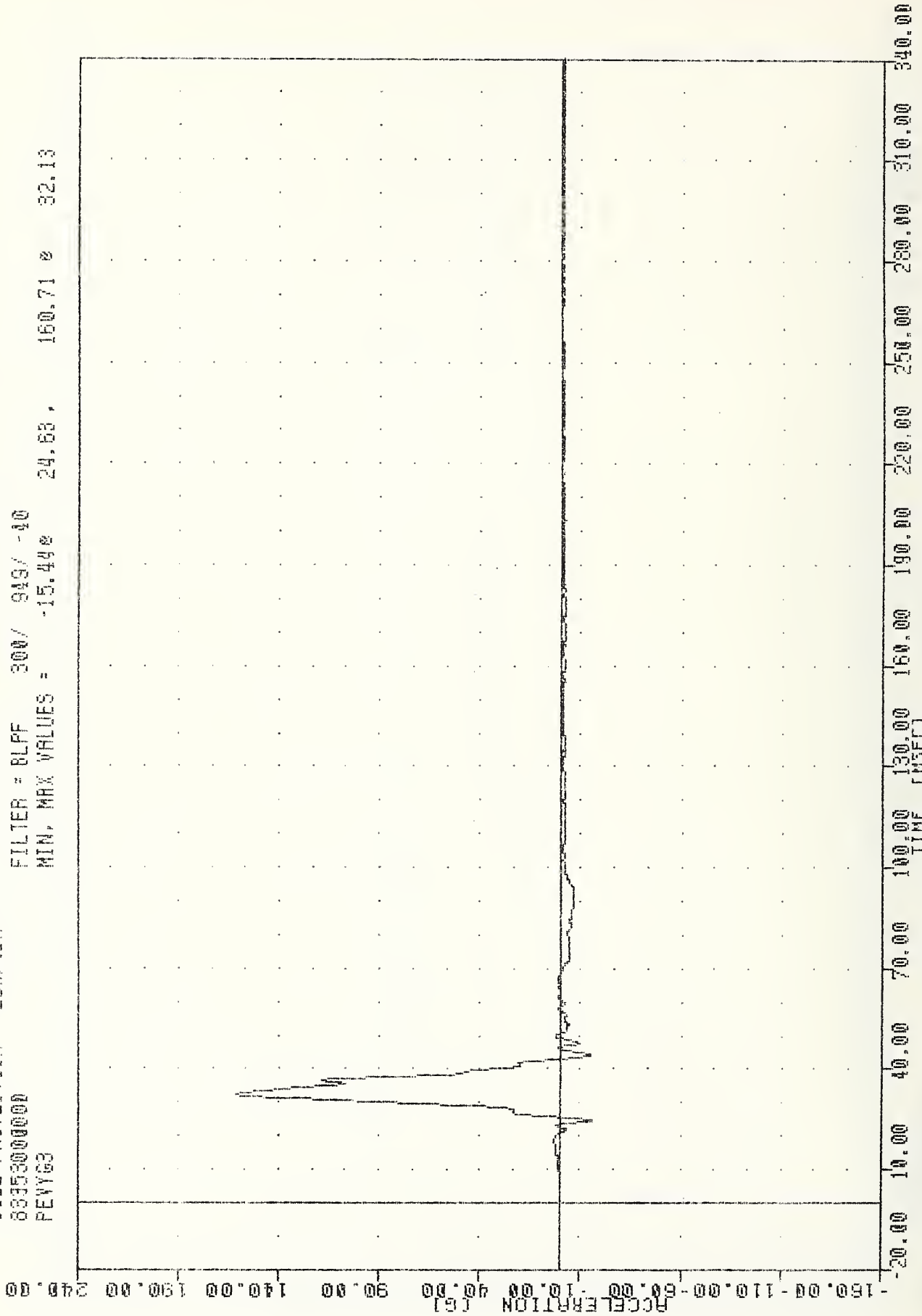
MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER LEFT RIB TO SPINE DISPLACEMENT INCHES

IHC , 831219 PLOT DATE 27-DEC-83 10:28:57
 SIDE PROTECTION - 2DR/4DR
 83353000000
 PEVX63
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -77.02e 35.13, 12.95 e 42.50



MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER PELVIS ACCELERATION X AXIS

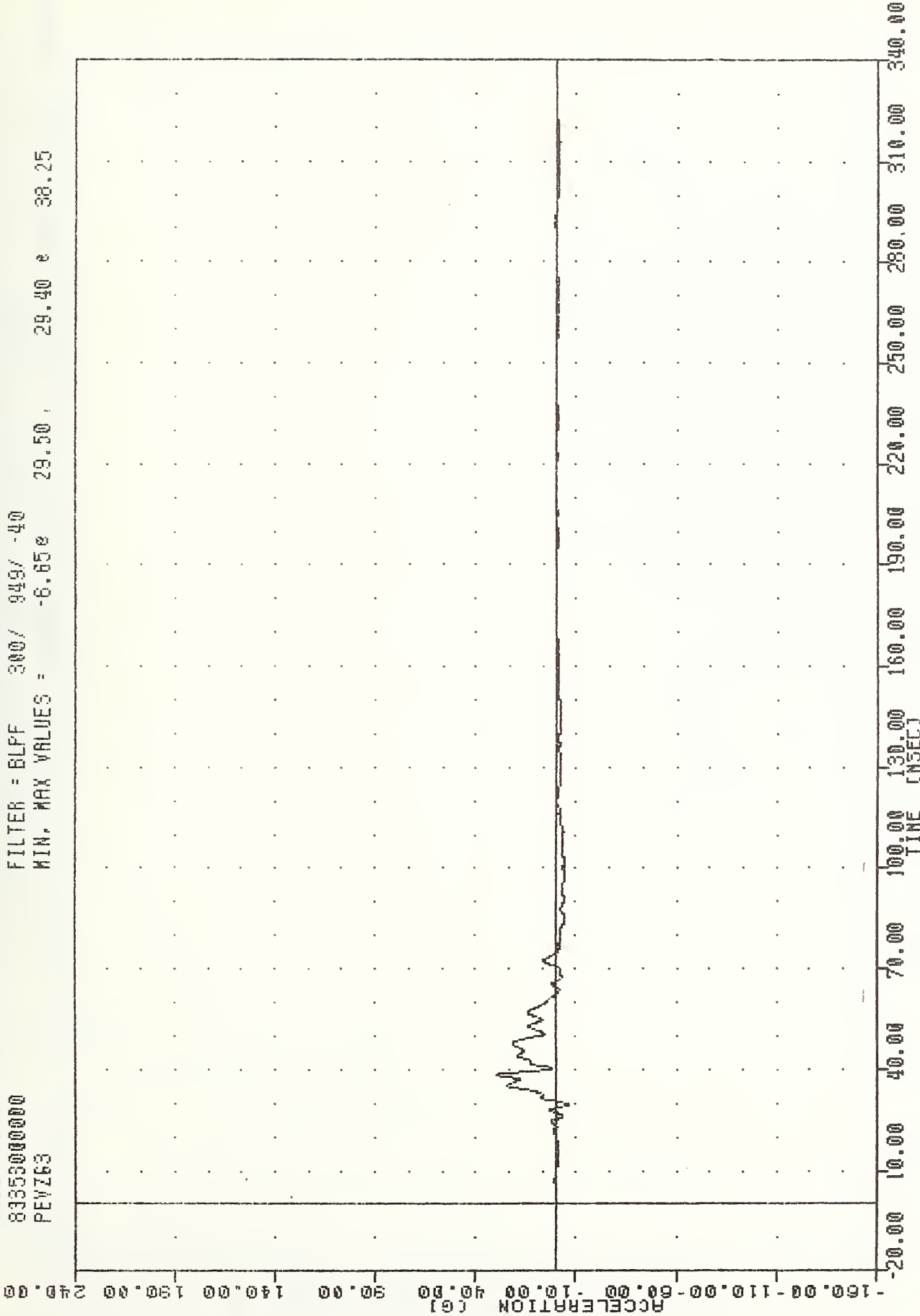
INC , 831214
 SIDE PROTECTION - 206/40R
 8335300000
 PEY63
 FLUT Dmic 27-DEC-00 10:28.07
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -15.44e 24.63, 160.71 e 32.13



MOVING DEFORMABLE BARRIER INTO CITATION
 PASSENGER PELVIS ACCELERATION Y AXIS

TAC , 831219
SIDE PROTECTION - 20R/4DR
83353000000
PEVZ63

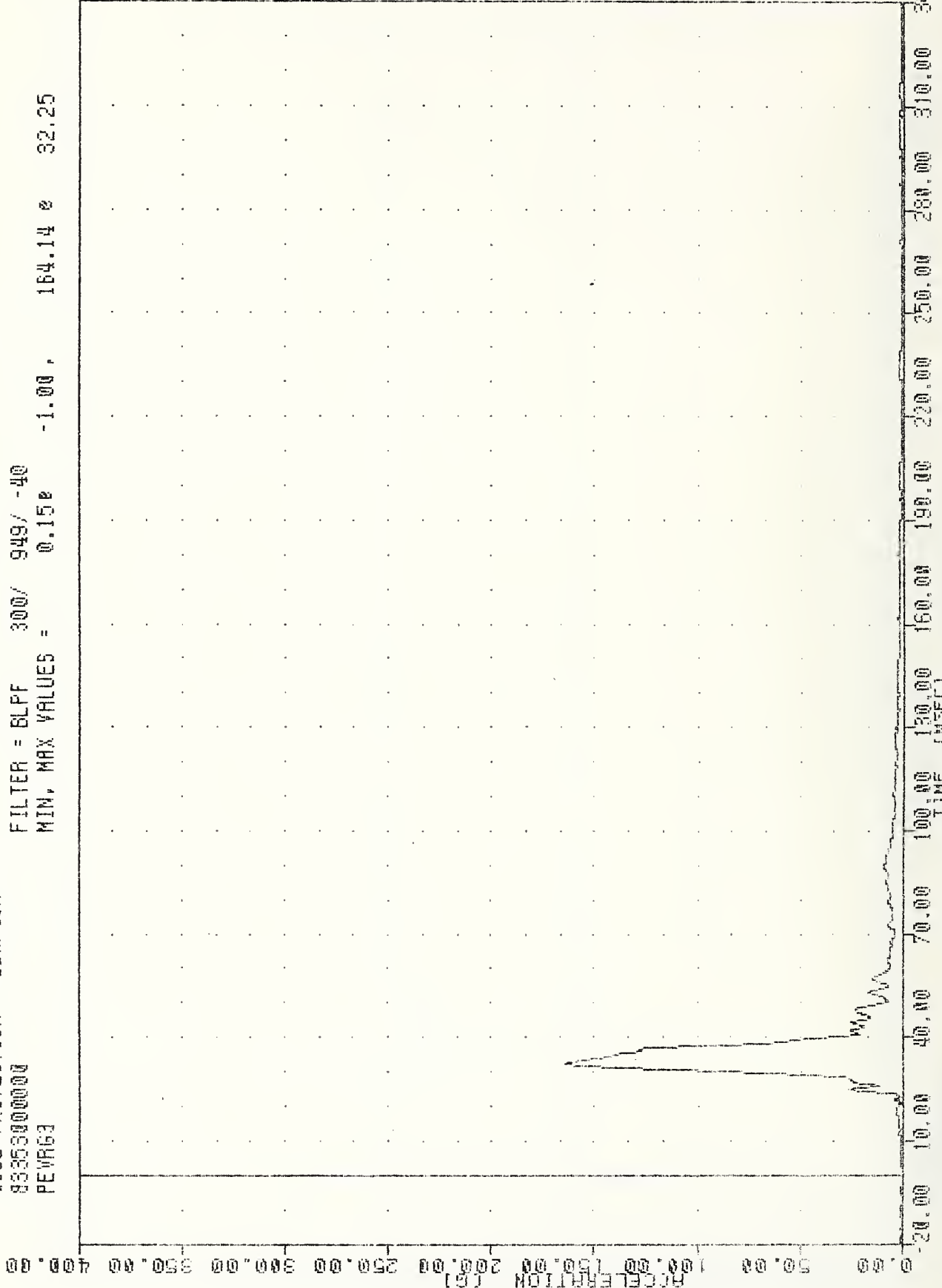
PLU1 DATE 47-DEC-00 10:28:07
FILTER = BLFF 300/ 949/ -40
MIN. MAX VALUES = 29.50 , 29.40 e 38.25



MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER PELVIS ACCELERATION Z AXIS

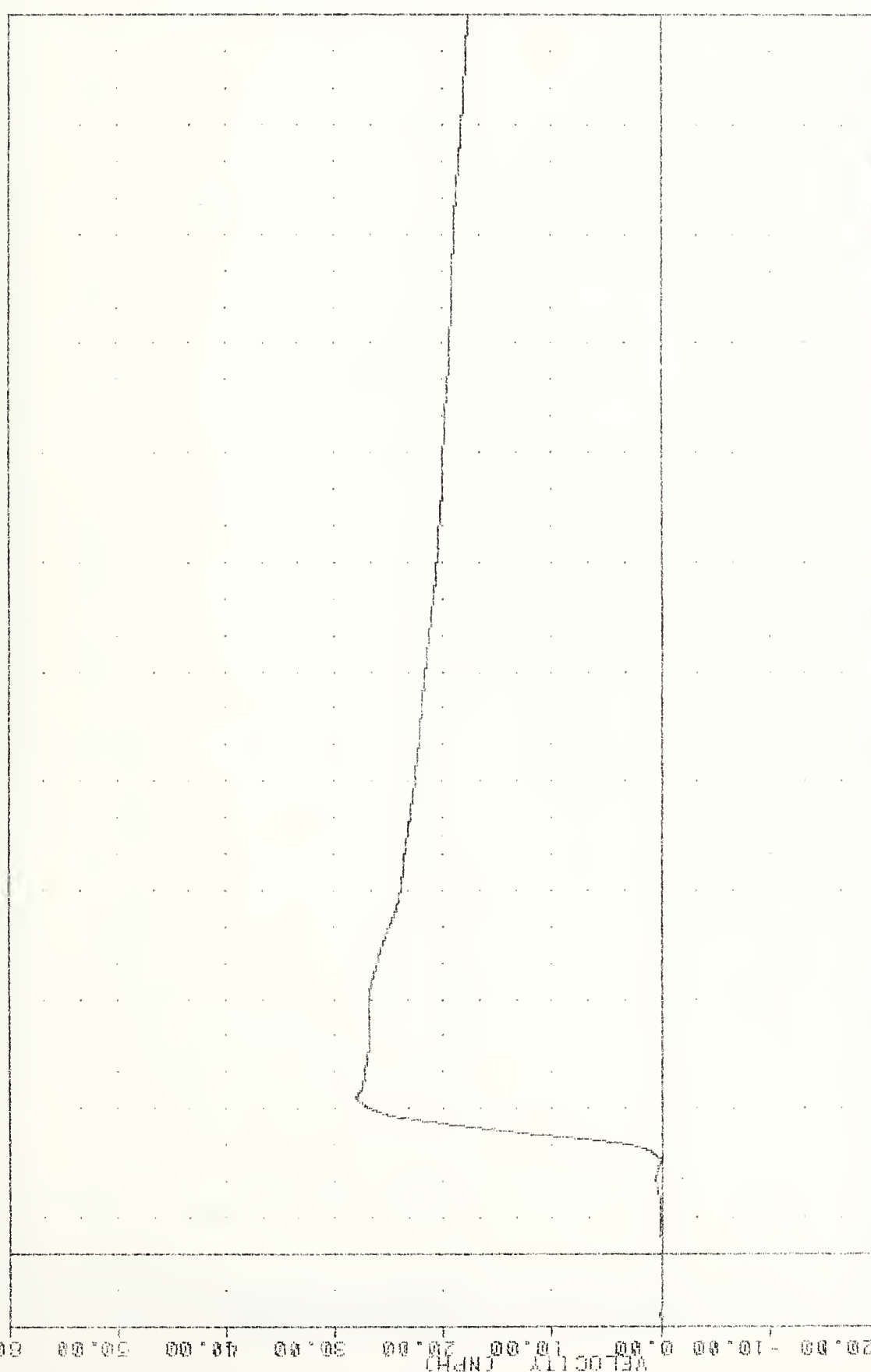
PLUT DATE 27-DEC-83 11:15:47
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = 0.150 -1.00, 164.14 0 32.25

INC 831219
SIDE PROTECTION - 2DR/40A
8335300000
PEVR63



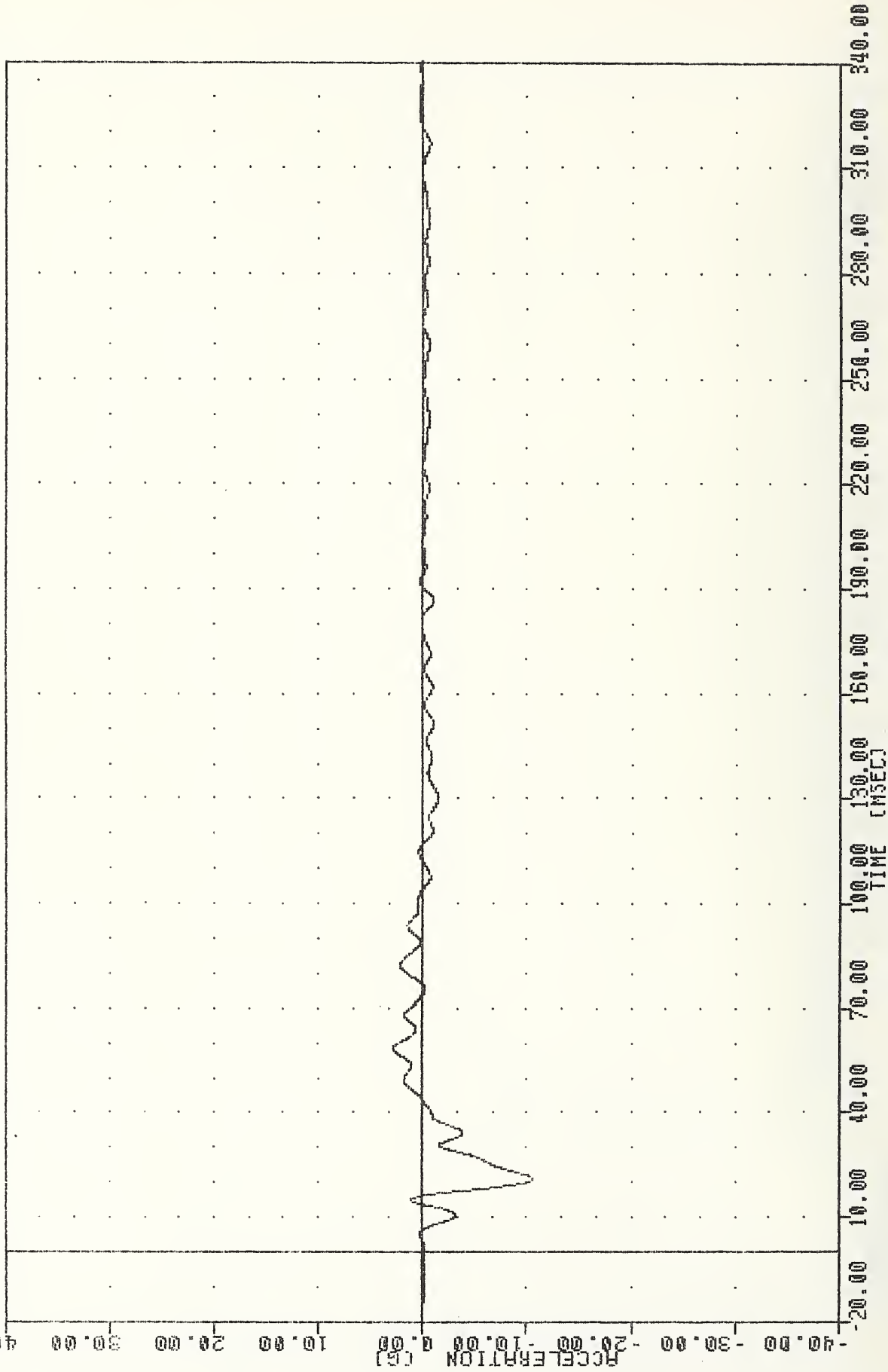
MOVING DEFORMABLE BARRIER INTO CITATION
PASSENGER PELVIS RESULTANT

IRC , 631219
 SIDE PROTECTION - 20R/40R
 6385000000
 PEVYV3
 FLOT URTE 27-DEC-63 13:22:05
 FILTER = BLPF 300/ 049/ -40
 MIN. MAX VALUES = -0.048 25.50 28.04 42.86



-20.00 10.00 20.00 30.00 40.00 50.00 60.00
 VELOCITY (MPH)
 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA V USING PEVYV3

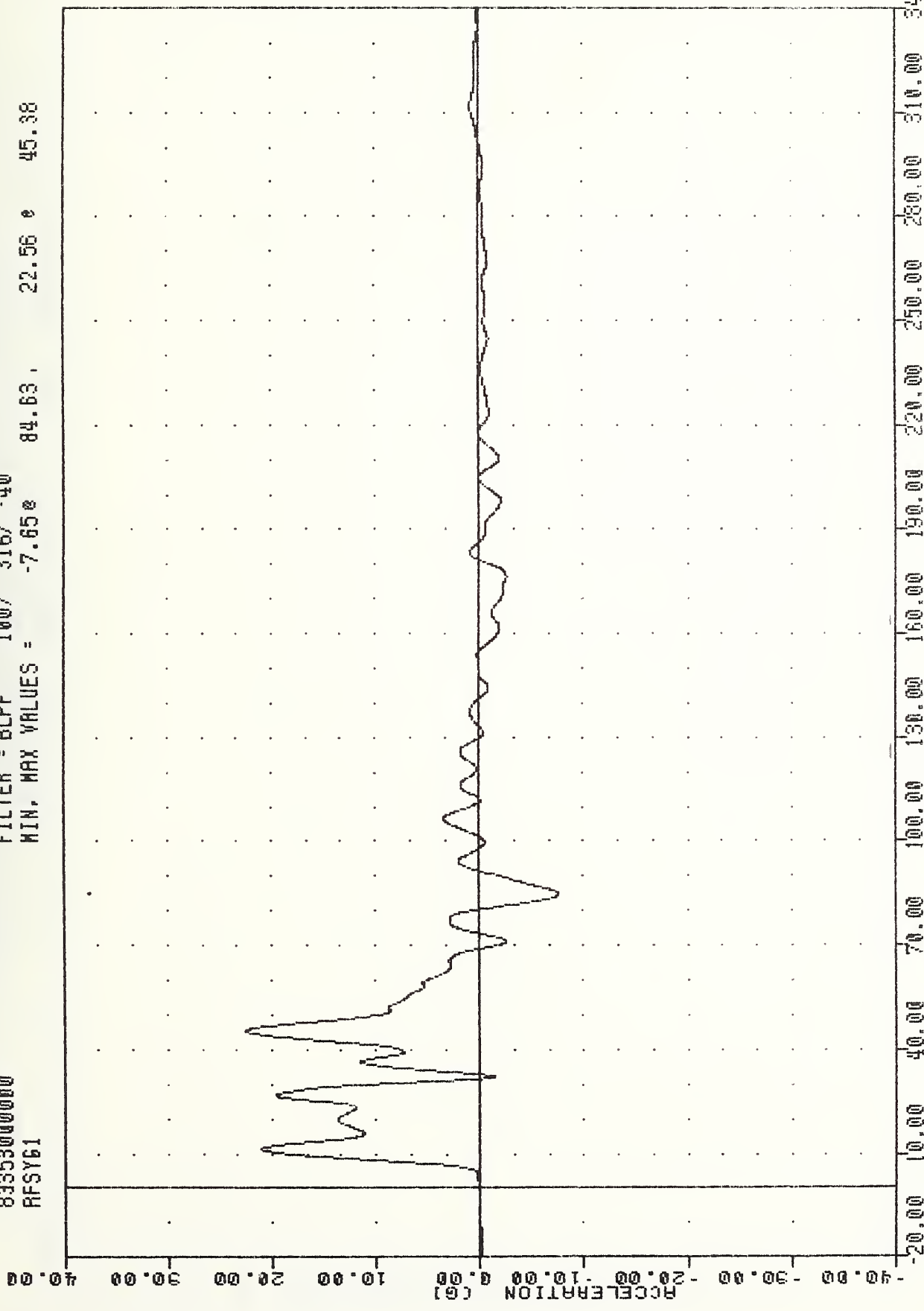
IAC , 831218
 SIDE PROTECTION - 20R/40R
 833530000000
 RFSXG1
 PLOT DATE 27-DEC-83 10:28:07
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -10.59g 20.75, 2.85 g 58.25



MOVING DEFORMABLE BARRIER INTO CITATION
 VEHICLE RIGHT FRONT SILL ACCELERATION X AXIS

IHC , 831219
 SIDE PROTECTION - 2DR/4DR
 83353000000
 RFSY61

PLUJ DATE 27-DEC-83 10:28:07
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -7.65e 84.63 , 22.56 e 45.38



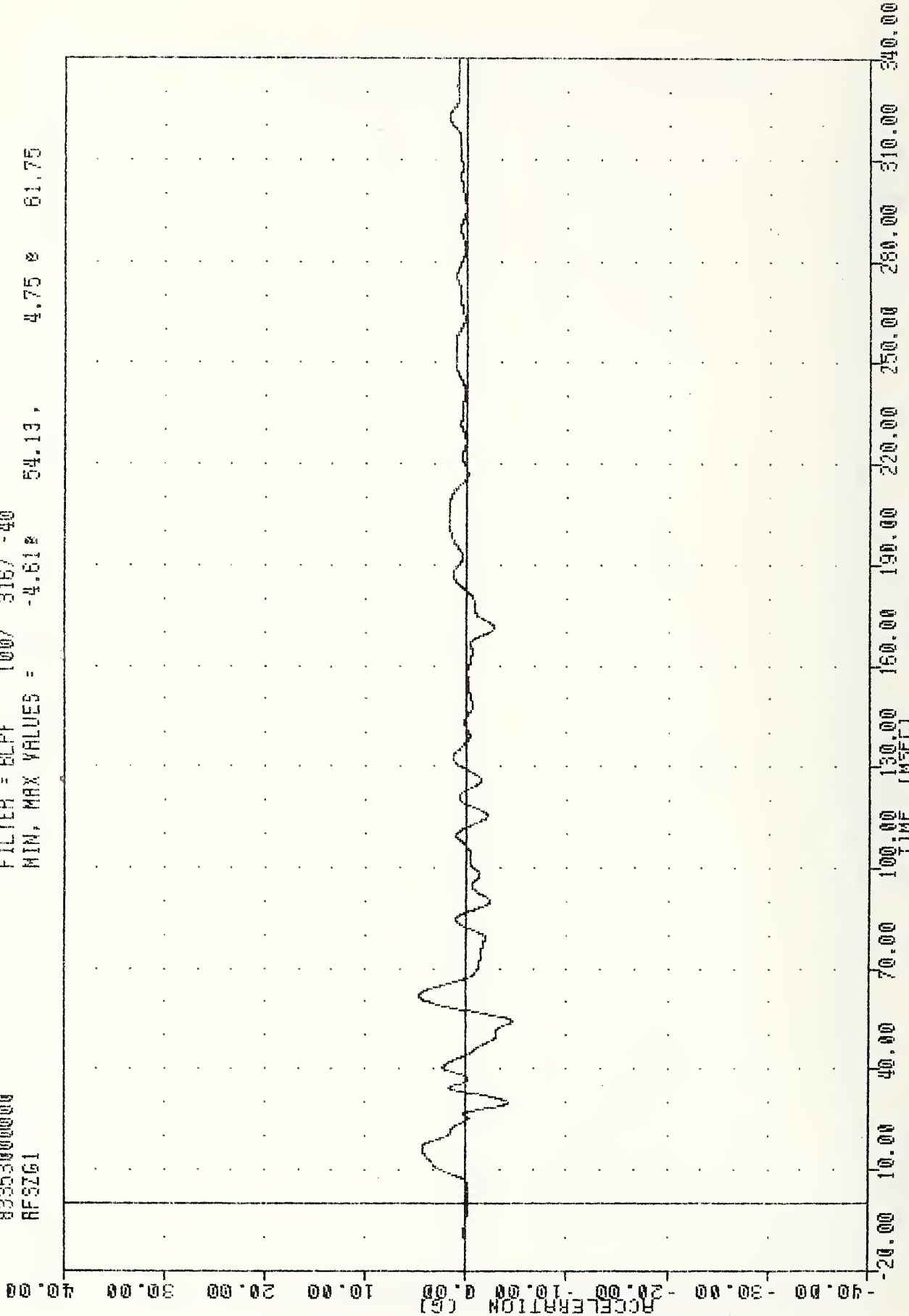
MOVING DEFORMABLE BARRIER INTO CITATION
 VEHICLE RIGHT FRONT SILL ACCELERATION Y AXIS

TRC 831218
SIDE PROTECTION - 20R/40R
83353000000
RFSZG1

PLUT DATE 27-DEC-83 10:26:07

FILTER = BLPF 100/ 316/ -40

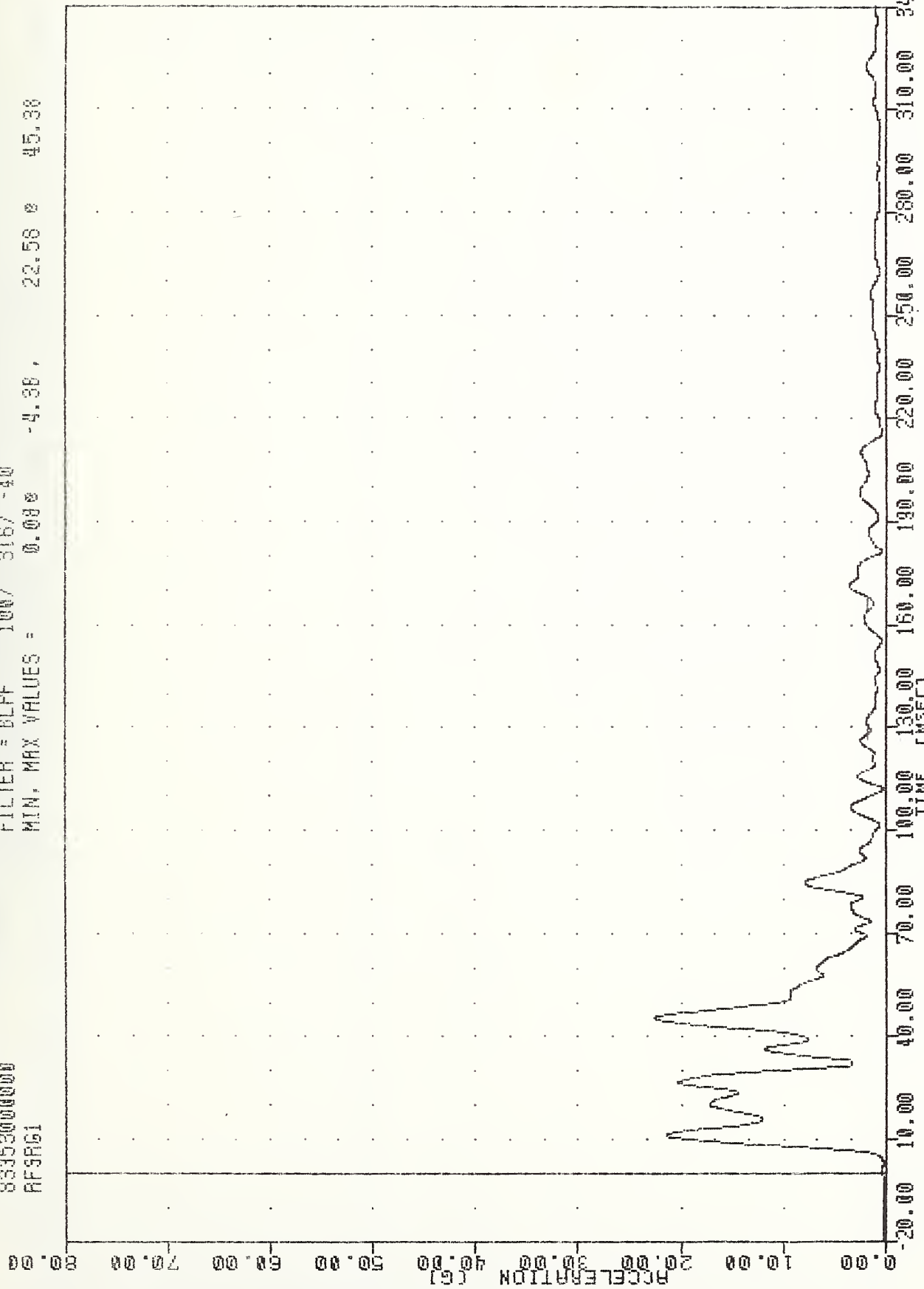
MIN, MAX VALUES = -4.61g 54.13g 4.75g 61.75g



MOVING DEFORMABLE BARRIER INTO CITATION
VEHICLE RIGHT FRONT SILL ACCELERATION Z AXIS

TAC , 831219 , 27-DEC-83 11:15:47
SIDE PROTECTION - 20R/4DR
83353000000
RF3R61

FILTER = BLFF 10N/ 316/ -40
MIN, MAX VALUES = 0.00e -4.38 , 22.58 e 45.38

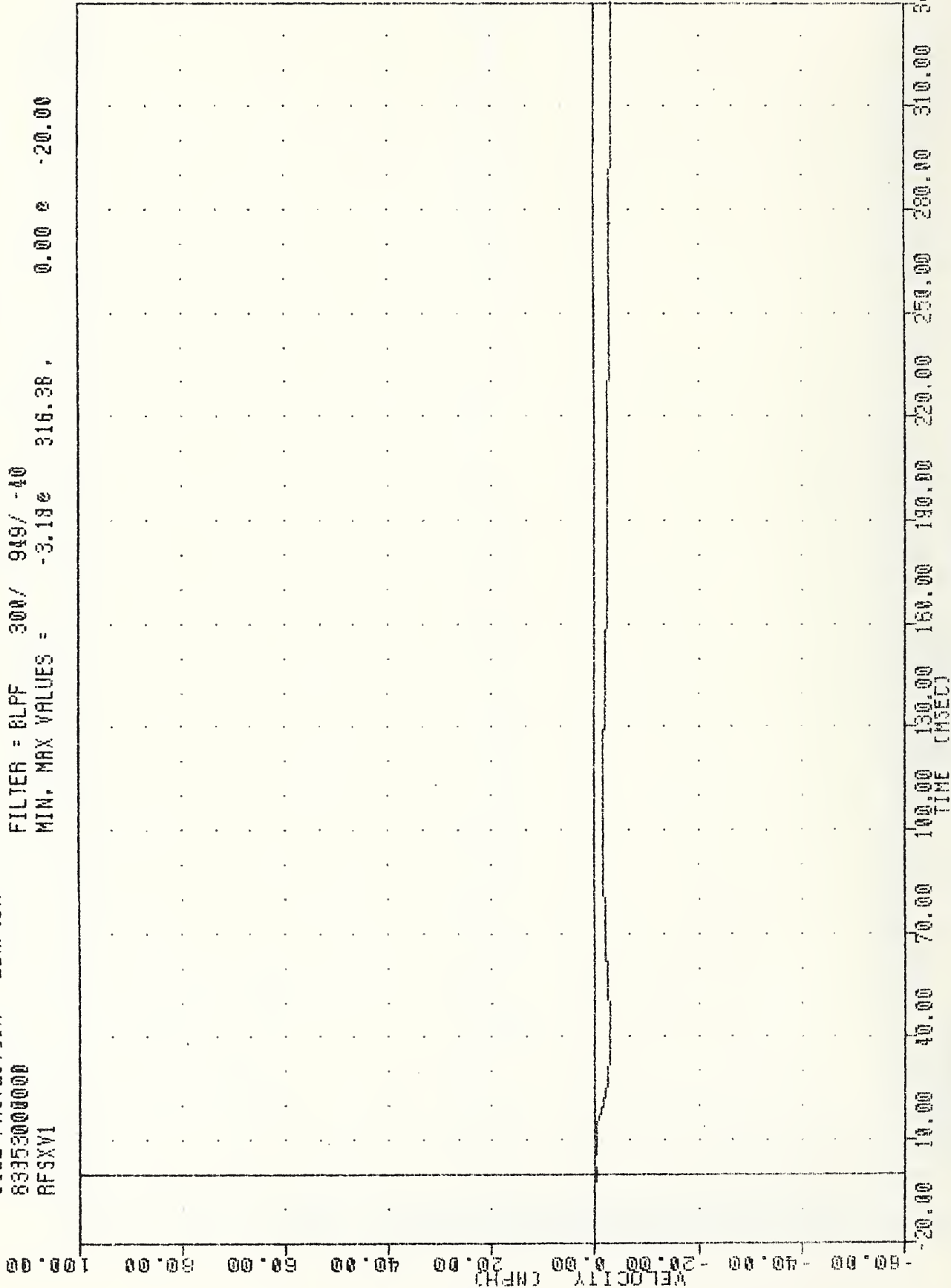


MOVING DEFORMABLE BARRIER INTO CITATION
VEHICLE RIGHT FRONT SILL RESULTANT

TRC , 831219
SIDE PROTECTION - 20R/40R
83353000000
RFSXV1

PL01 UNTE 27-DEC-83 13:22:05

FILTER = 8LPF 300/ 949/ -40
MIN. MAX VALUES = -3.18e 316.38e 0.00e -20.00

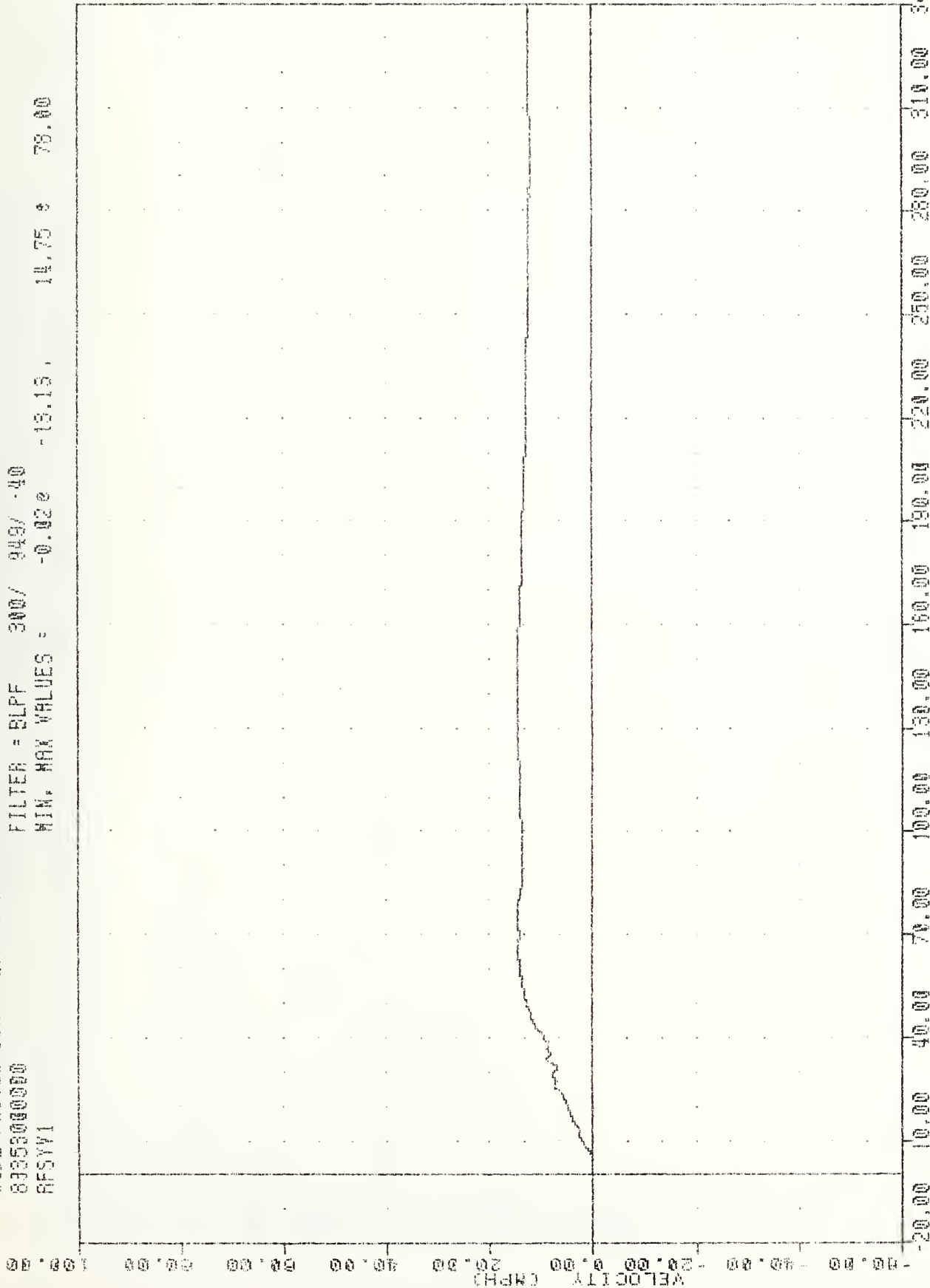


MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING RFSXG1

TBC
891219
SIDE PROTECTION - 20R/40R
8935800000
RFSYV1

PLOT DATE 27-DEC-83 13:22:05

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -0.02e -13.13 14.75 79.00

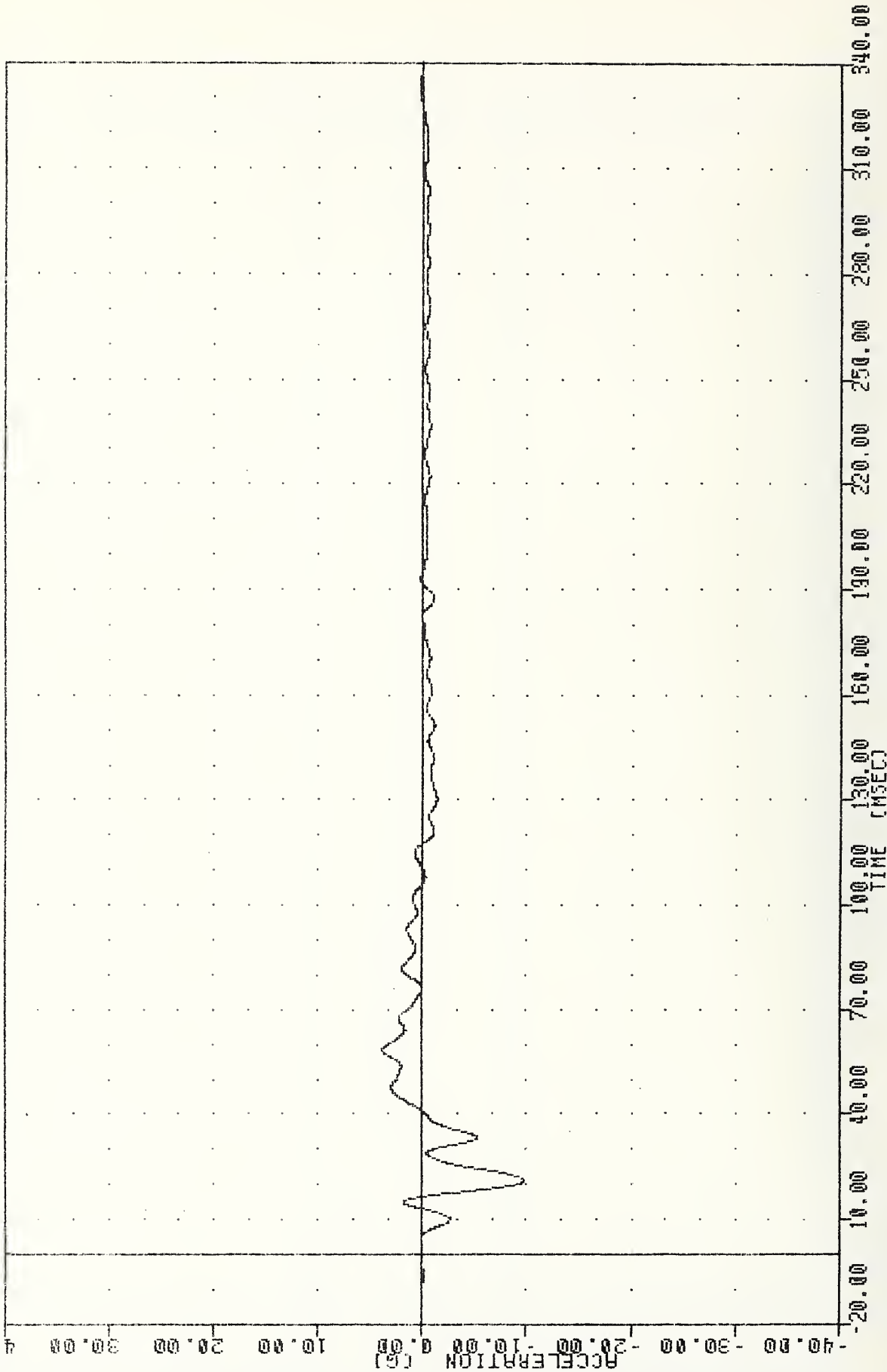


-100.00
-80.00
-60.00
-40.00
-20.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
200.00
220.00
240.00
260.00
280.00
300.00
320.00
340.00

MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING RFSYGI

IRL 881219
 SIDE PROTECTION - 20R/40R
 8335300000
 RRSX62

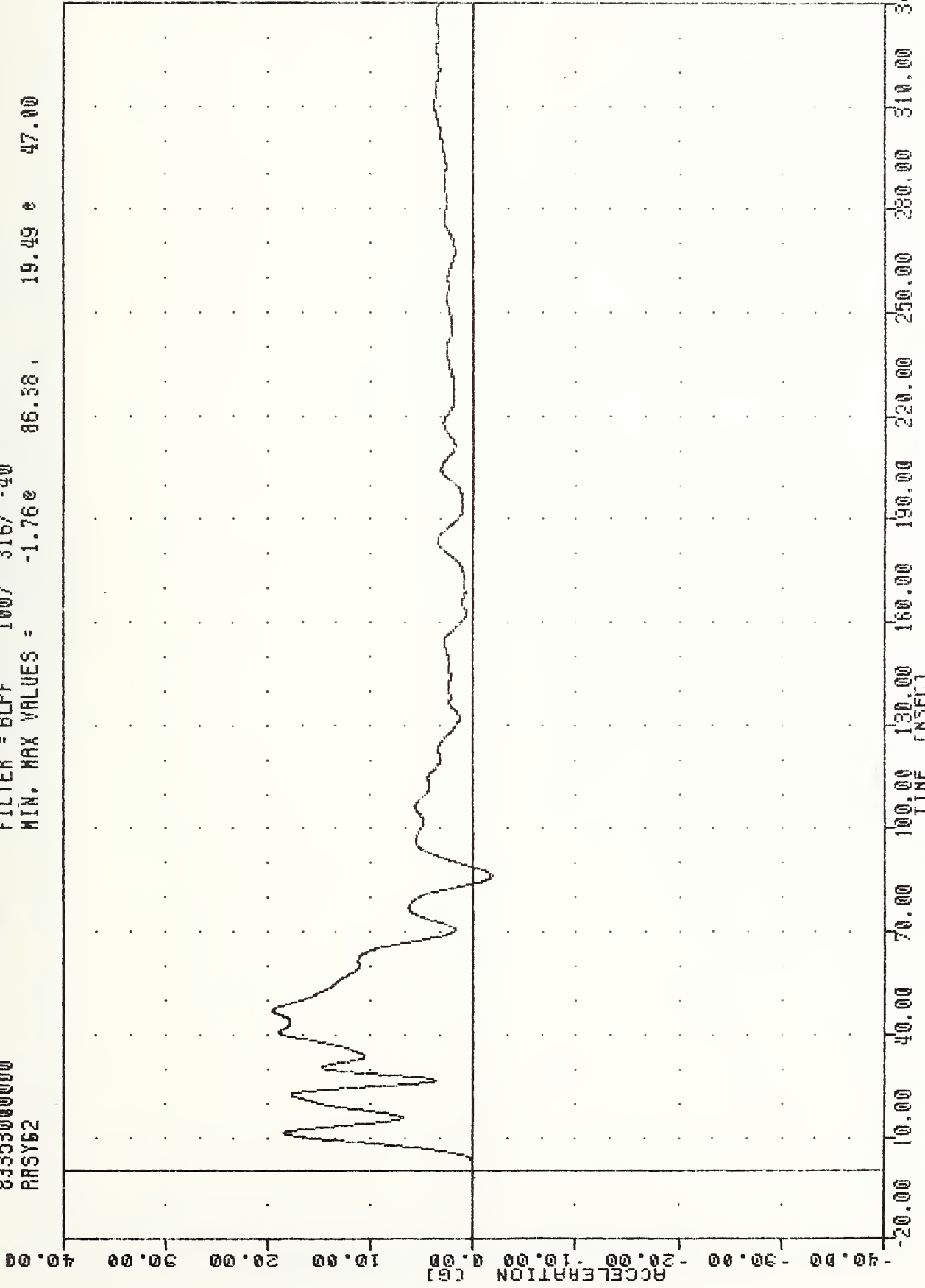
FLUT DATE 27-DEC-93 10:28:07
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -9.70e 20.88, 3.80 e 58.25



MOVING DEFORMABLE BARRIER INTO CITATION
 VEHICLE RIGHT REAR SILL ACCELERATION X AXIS

INC , 831219
 SIDE PROTECTION - 20R/40R
 83353000000
 ARSY62

FLUI DATE 27-DEC-83 10:28:07
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -1.76e 86.38 , 19.49 e 47.00



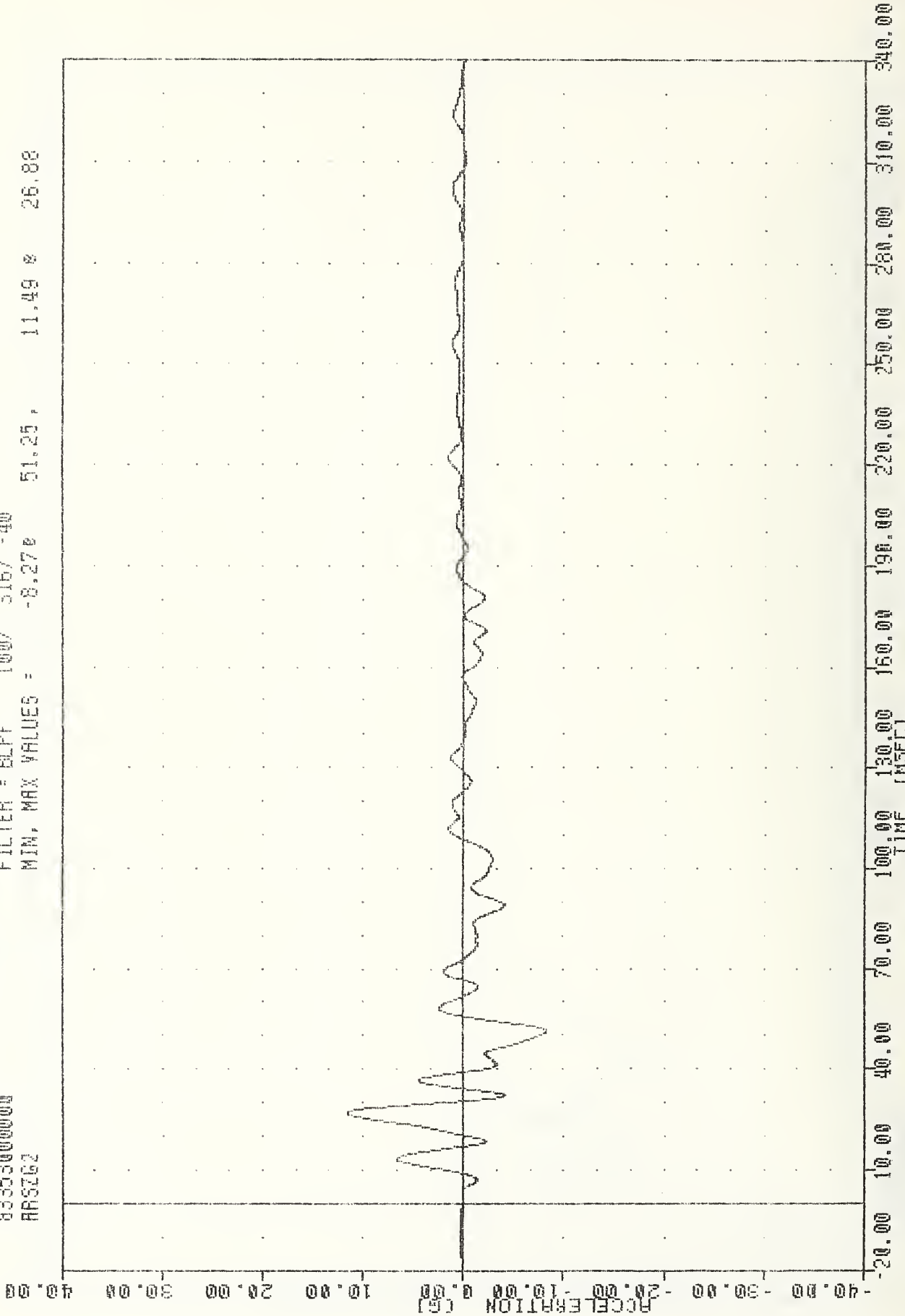
MOVING DEFORMABLE BARRIER INTO CITATION
 VEHICLE RIGHT REAR SILL ACCELERATION Y AXIS

INC 831219
SIDE PROTECTION - 2DR/4DR
83353000000
ARSZG2

PLUT DATE 27-DEC-88 10:28:07

FILTER = ELPF 100/ S16/ -40

MIN, MAX VALUES = -8.27e 51.25, 11.49 e 26.88



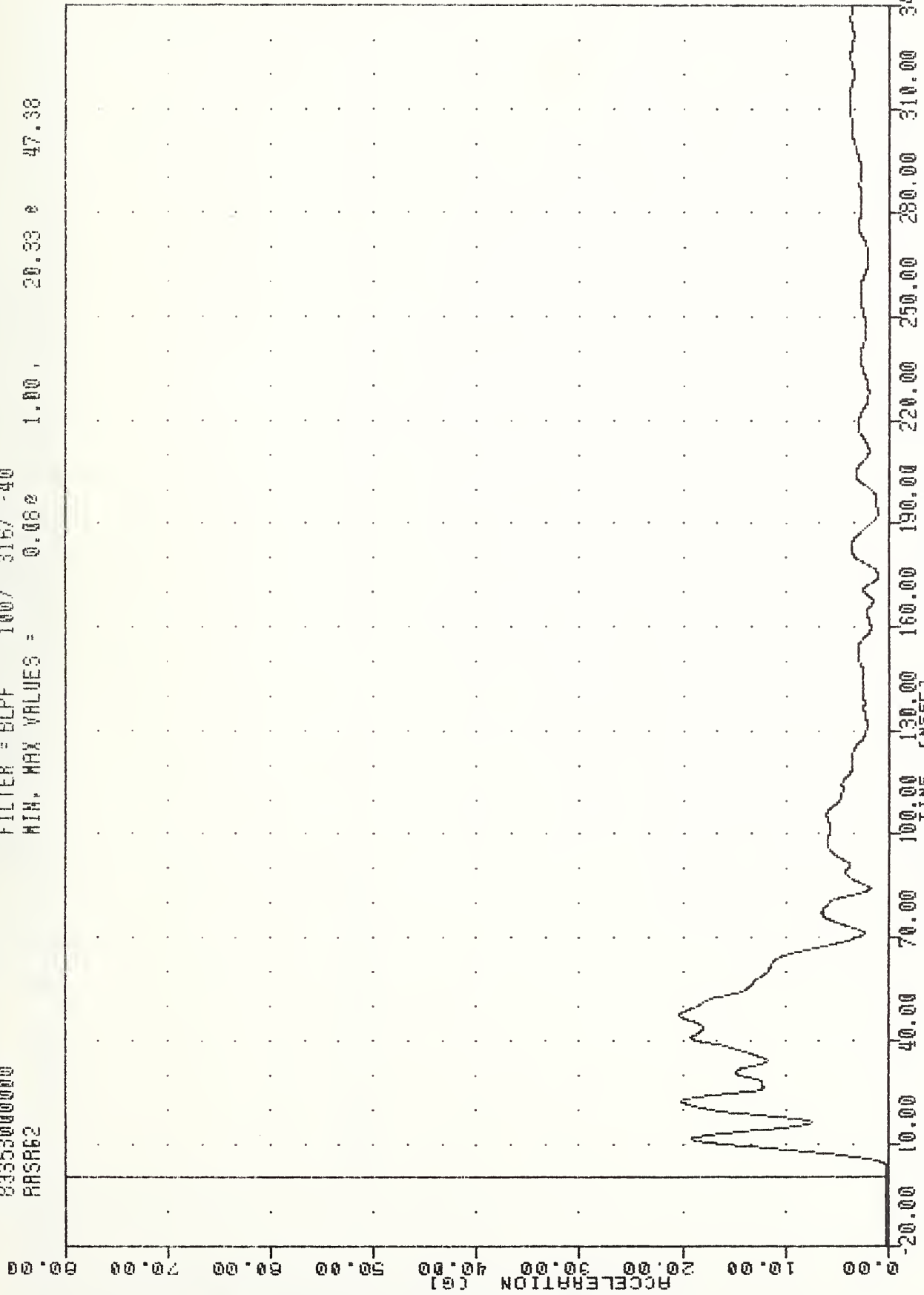
MOVING DEFORMABLE BARRIER INTO CITATION
VEHICLE RIGHT REAR STILL ACCELERATION Z AXIS

IHL
831218
SIDE PROTECTION - 20R/4DR
8353000000
RRSR62

PLU1 DATE 27-DEC-85 11:15:47

FILTER = BLPF 100/ 316/ -40

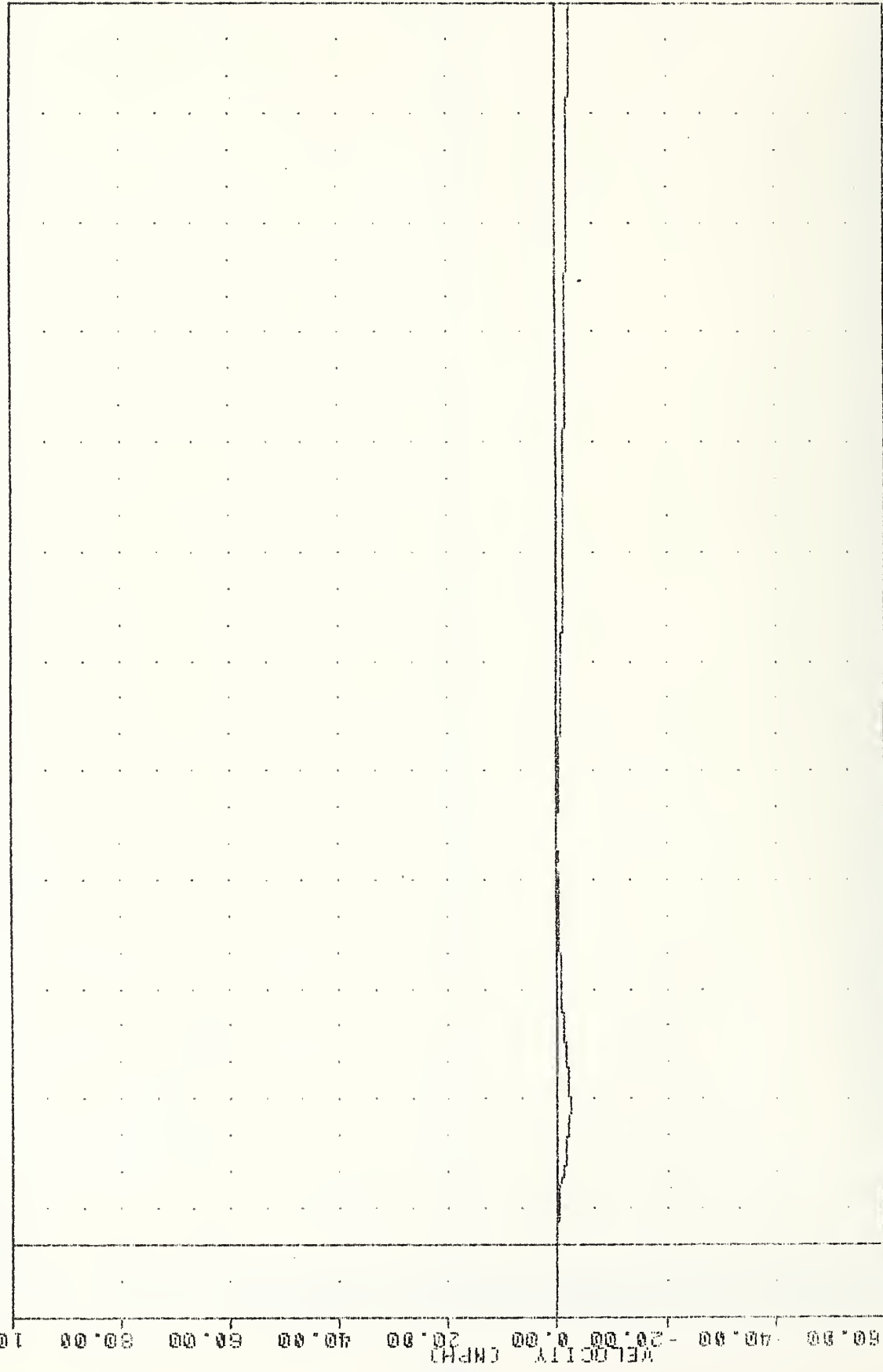
MIN. MAX VALUES = 0.08e 1.00, 20.33 e 47.38



MOVING DEFORMABLE BARRIER INTO CITATION
VEHICLE RIGHT REAR SILL RESULTANT

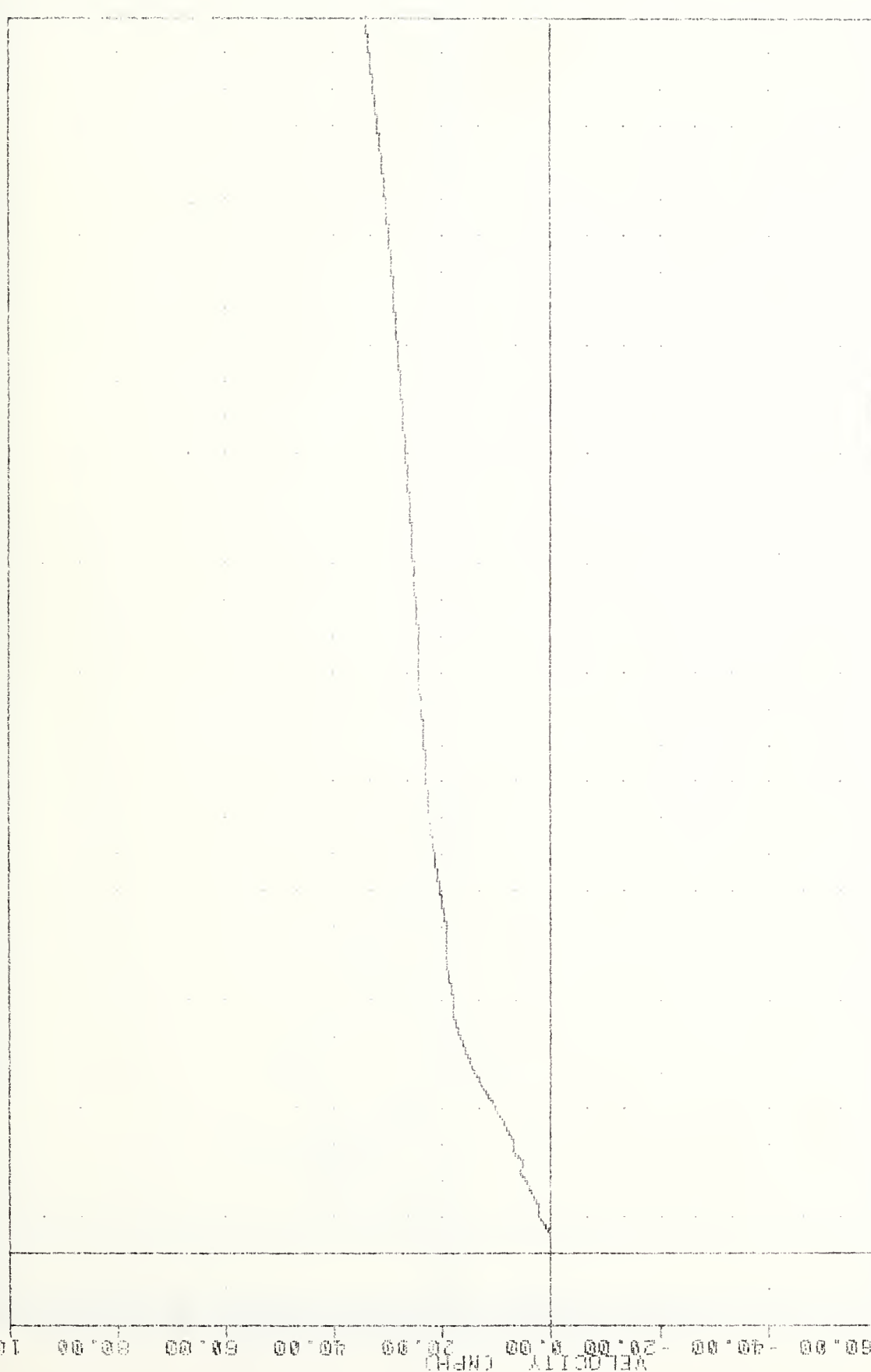
IRC : 831219
 SIDE PROTECTION - 2DR/4DR
 83353000000
 ARSXVZ

PLOT DATE 27-DEC-83 13:22:05
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -2.23% 39.13, 0.03% 114.38



-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA V USING PAS(G2)

PLOT DATE 27-DEC-88 13:22:05
 FILTER = BLFF 300/ 949/ -10
 MIN. MAX VALUES = 0.08E -28.00 34.24 E 340.00

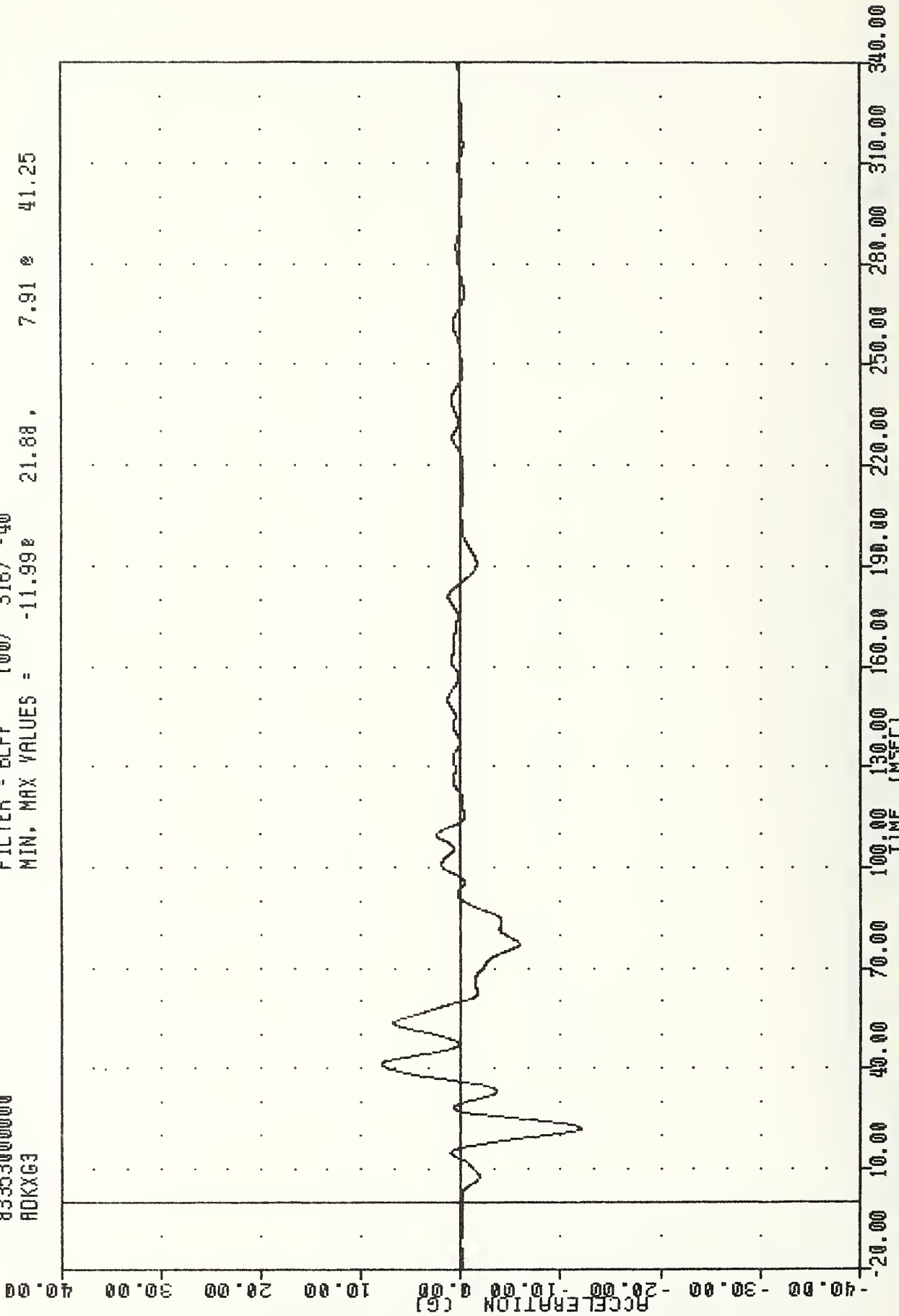


-50.00
-40.00
-20.00
0.00
20.00
40.00
60.00
80.00
100.00
 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA V USING RRSY62

INC 831219
SIDE PROTECTION - 2DR/4DR
83353000000
ADKXG3

PLU1 DR1E 9-JAN-84 14:54:42

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -11.998 21.88 7.91 41.25

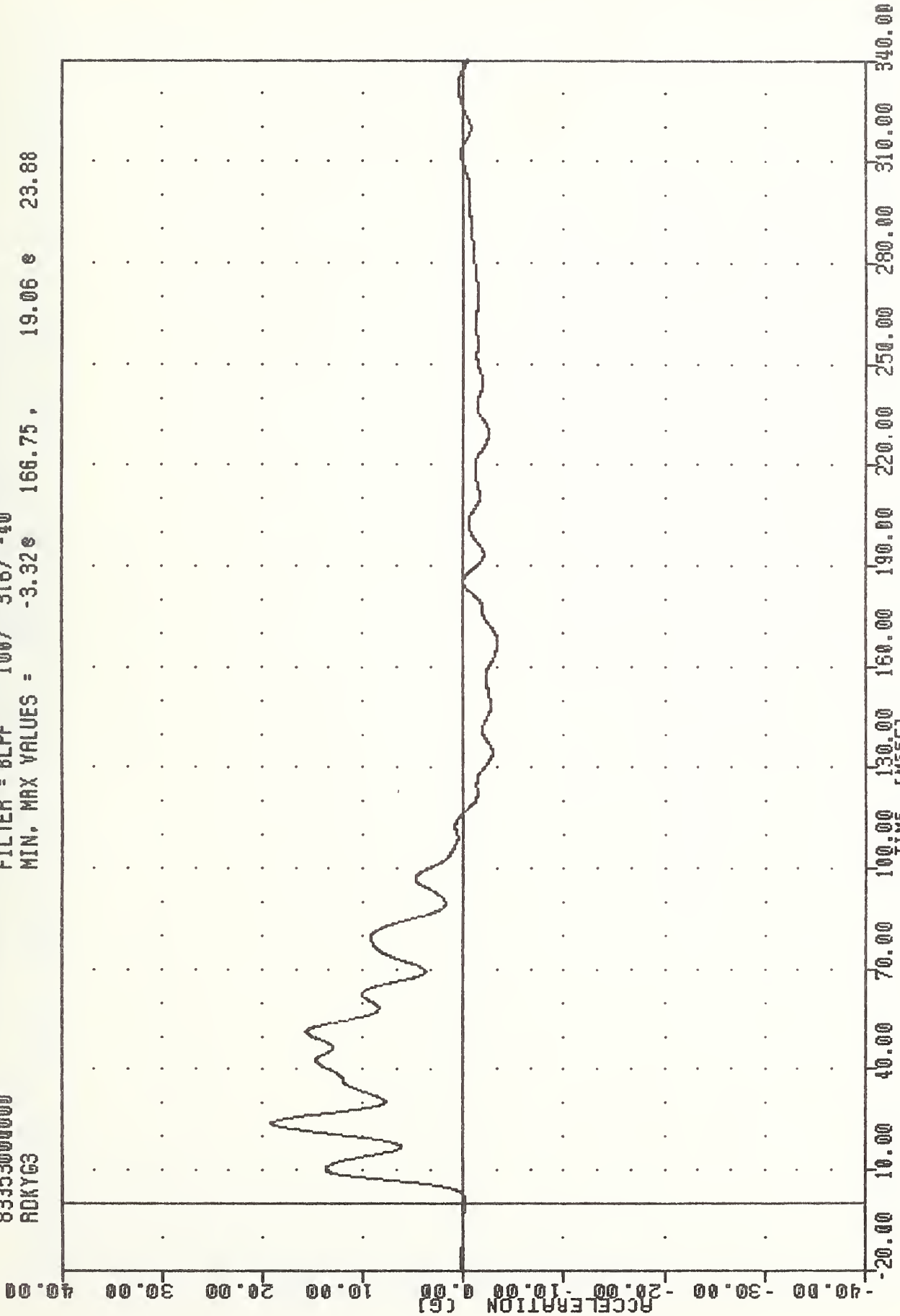


MOVING DEFORMABLE BARRIER INTO CITATION
VEHICLE REAR DECK ACCELERATION X AXIS

1ML 051219
SIDE PROTECTION - 20R/4DA
83353000000
ADKY63

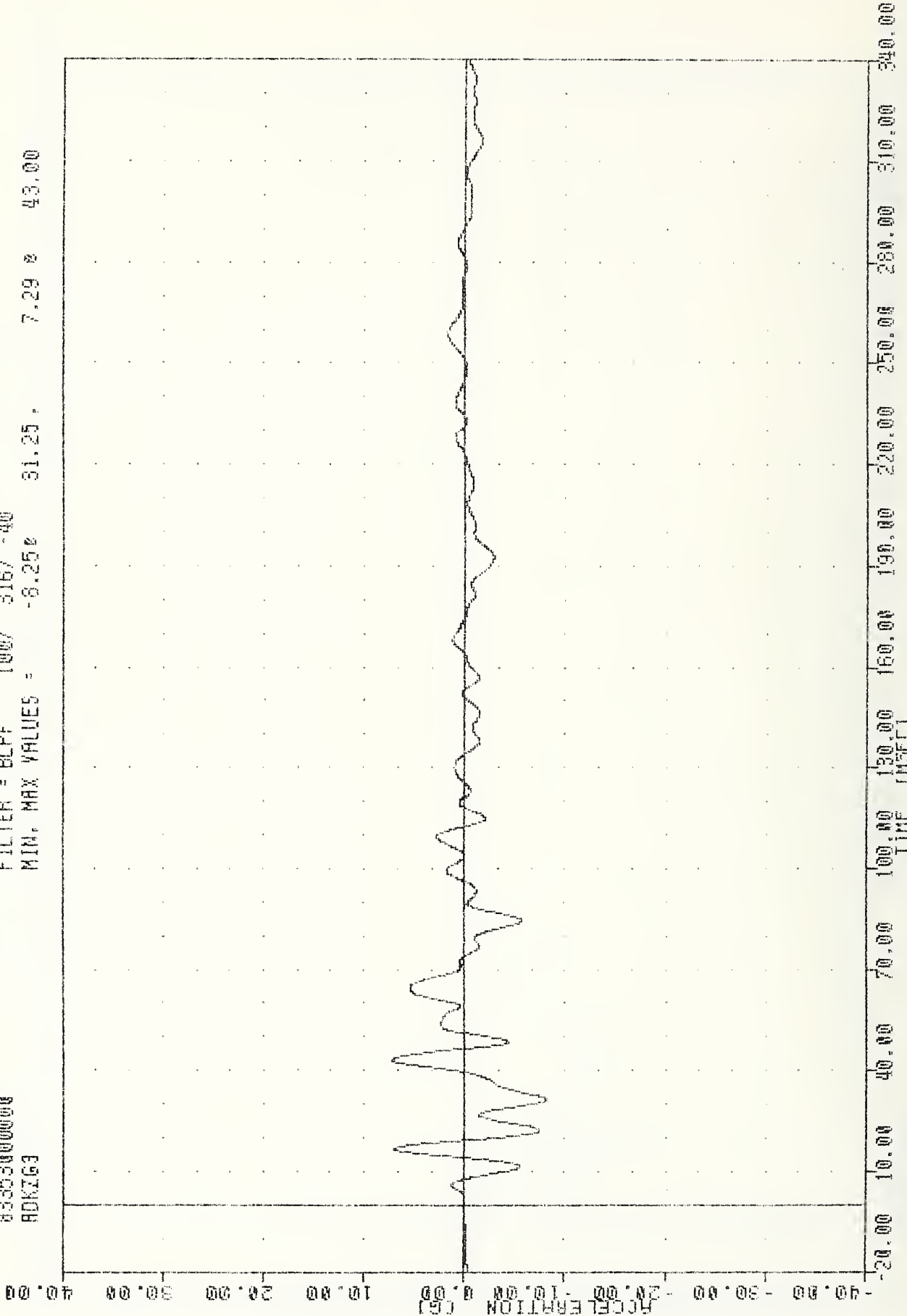
PLU1 DR1E 9-JAN-84 14:54:42

FILTER = 8LPF 100/ 316/ -40
MIN. MAX VALUES = -3.32e 166.75, 19.06 e 23.88



MOVING DEFORMABLE BARRIER INTO CITATION
VEHICLE REAR DECK ACCELERATION Y AXIS

TRC 831214
 SIDE PROTECTION - 20R/40R
 83353000000
 ADVZG3
 FLUT DATE 27-DEC-88 10:26:07
 FILTER = BLFF 100/ 316/ -40
 MIN. MAX VALUES = -8.25E 31.25 7.29 E 43.00



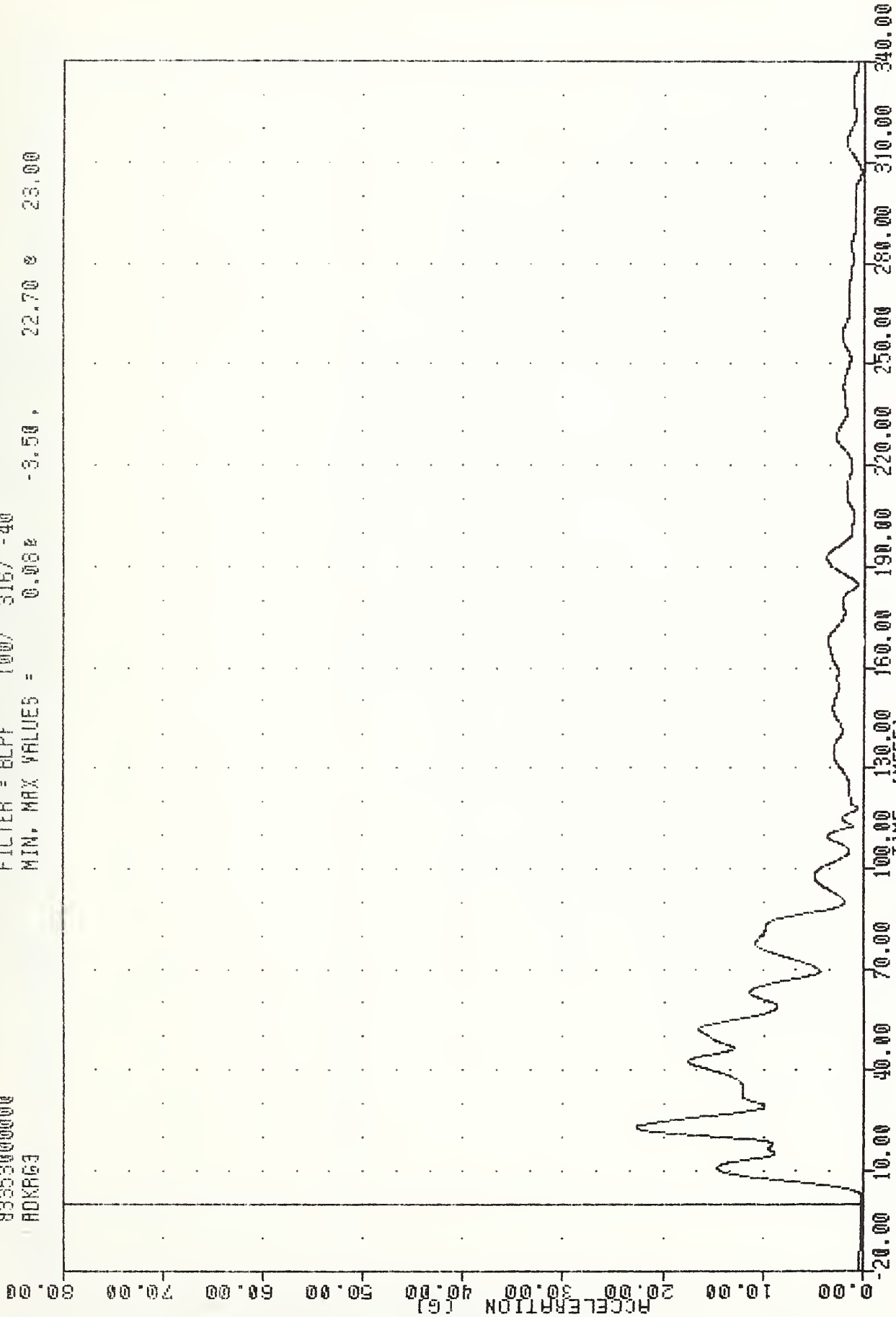
MOVING DEFORMABLE BARRIER INTO CITATION
 VEHICLE REAR DECK ACCELERATION Z AXIS

INC , 831219
SIDE PROTECTION - 20R/40R
8335300000
ADKRG3

PLUT DATE 27-DEC-63 11:15:47

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = 0.06g -3.50, 22.70 g 23.00

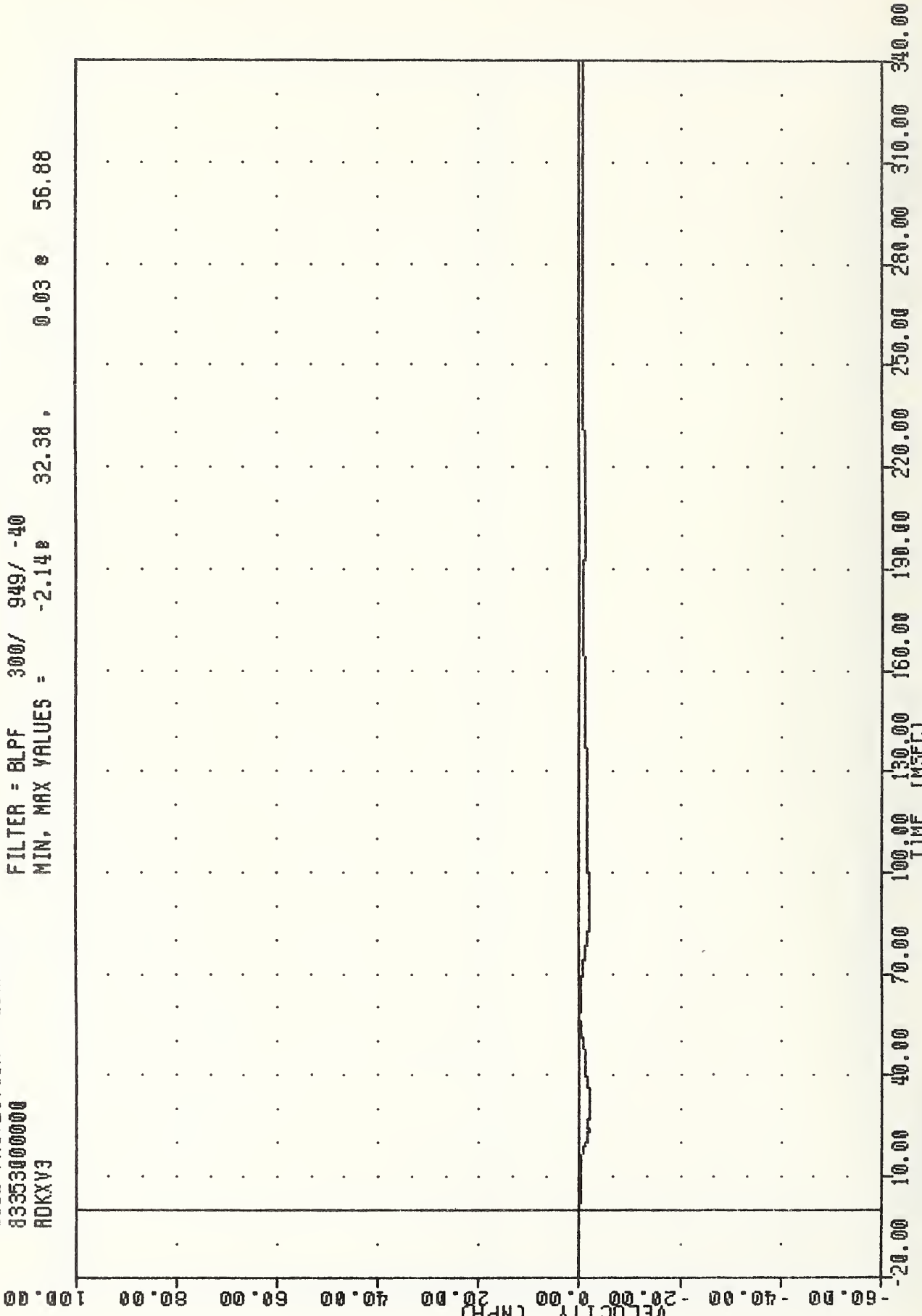


MOVING DEFORMABLE BARRIER INTO CITATION
VEHICLE REAR DECK RESULTANT

TRC , 831219
 SIDE PROTECTION - 2DR/4DR
 83353000000
 RDKXV3

PLOT DATE 9-JAN-84 14:58:42

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -2.148 32.38 , 0.03 e 56.88

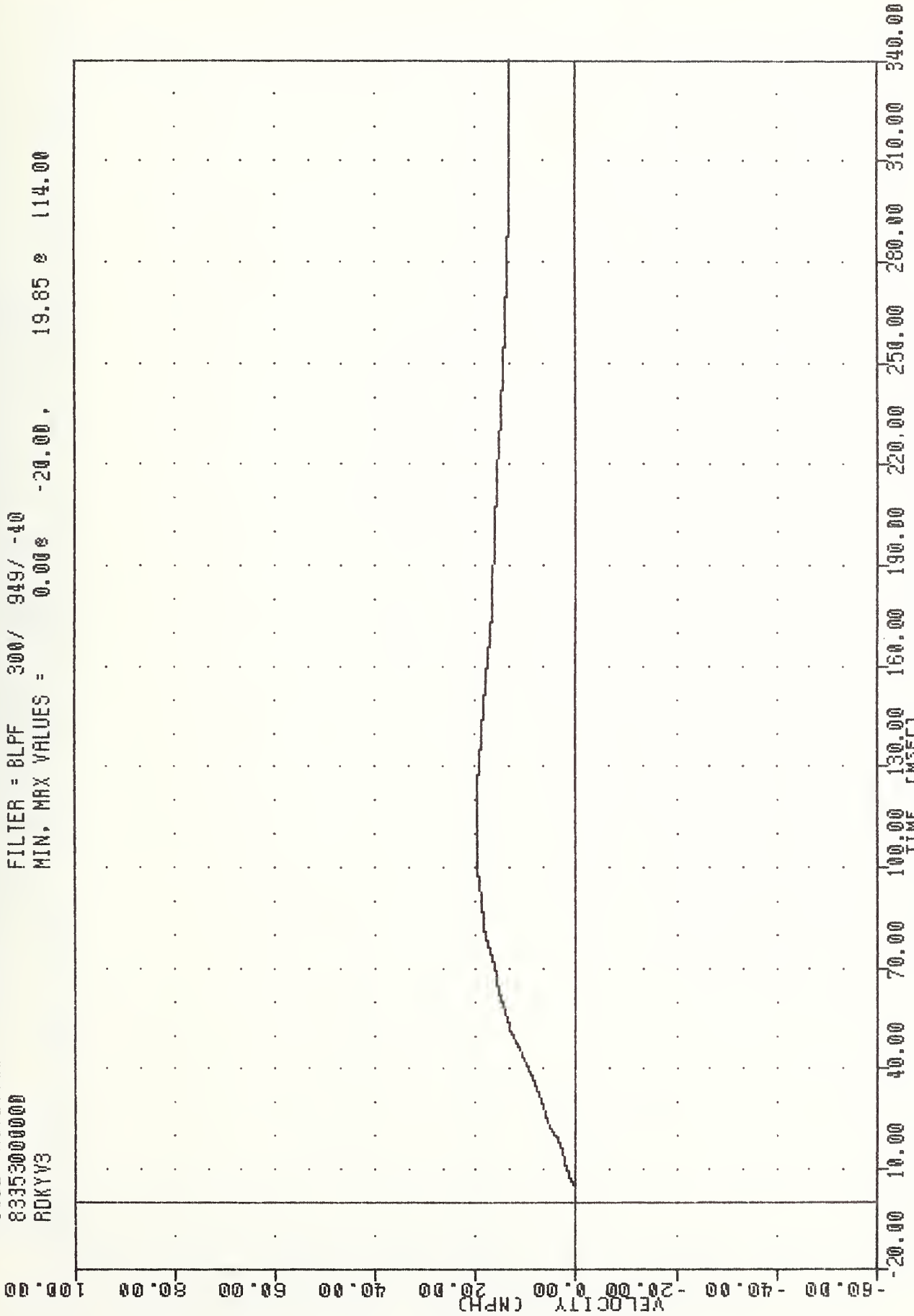


MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA V USING RDKXG3

7HC , 831219
SIDE PROTECTION - 2DR/4DR
83353000000
RDKYV3

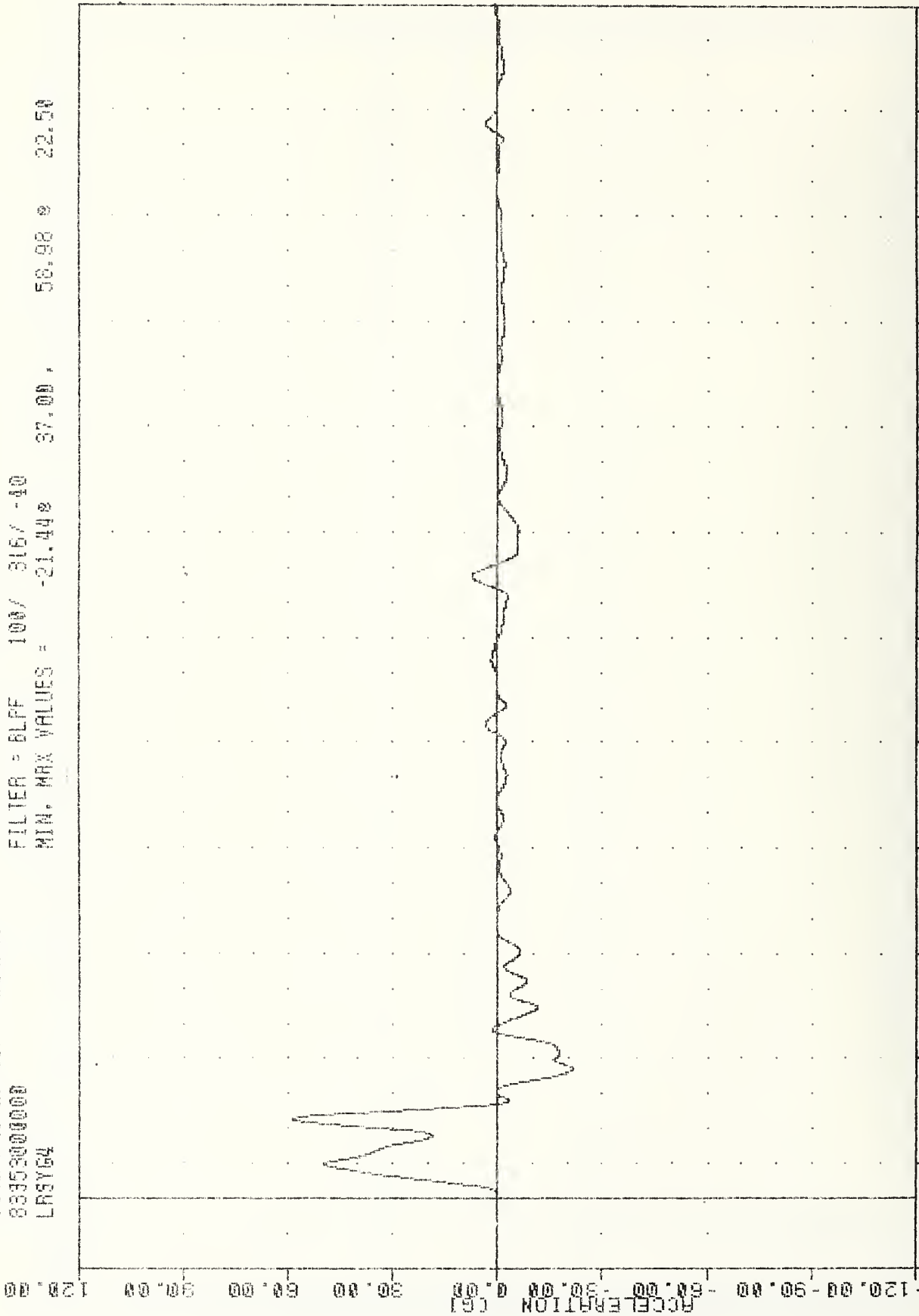
PLOT DATE 9-JAN-84 14:54:42

FILTER = 8LPF 300/ 949/ -40
MIN, MAX VALUES = 0.00e -20.00, 19.85 e 114.00



MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING RDKYG3

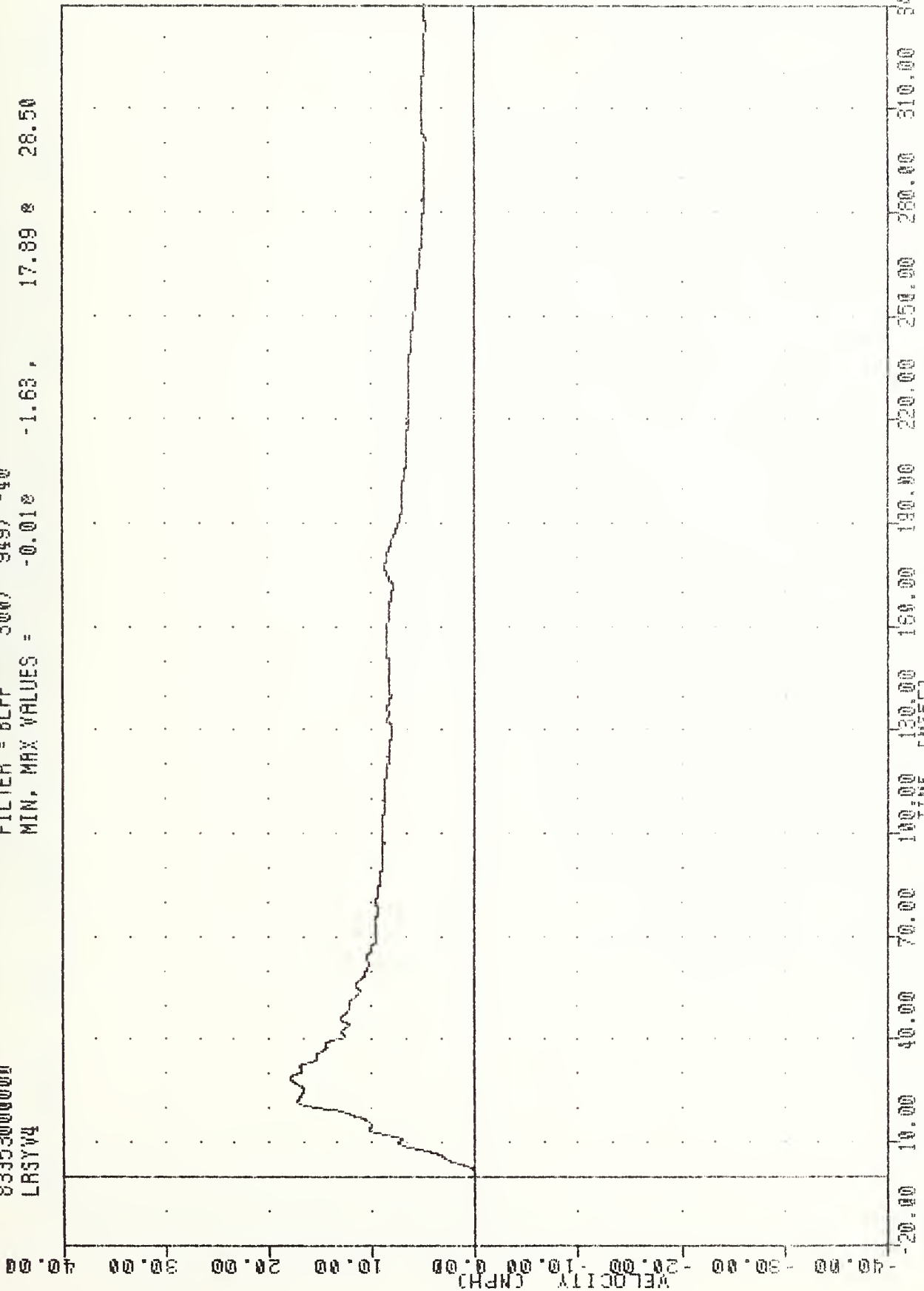
INL 881219 PLUT DATE 27-DEL-00 10:28:07
 SIDE PROTECTION - 20A/40A
 88353000000
 LRSY64
 FILTER = 6LFF 100/ 316/ -10
 MIN. MAX VALUES = -21.442 37.00 50.98 22.50



-120.00 -90.00 -60.00 -30.00 0.00 30.00 60.00 90.00 120.00
 ACCELERATION (G)
 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00
 TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO CITATION
 VEHICLE LEFT REAR SILL ACCELERATION Y AXIS

IRC , 831219 PLOT UNTE 27-DEC-83 13:22:05
 SIDE PROTECTION - 2DR/4DR
 83353000000
 LRSYV4
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -0.01e -1.63 , 17.89 e 28.50

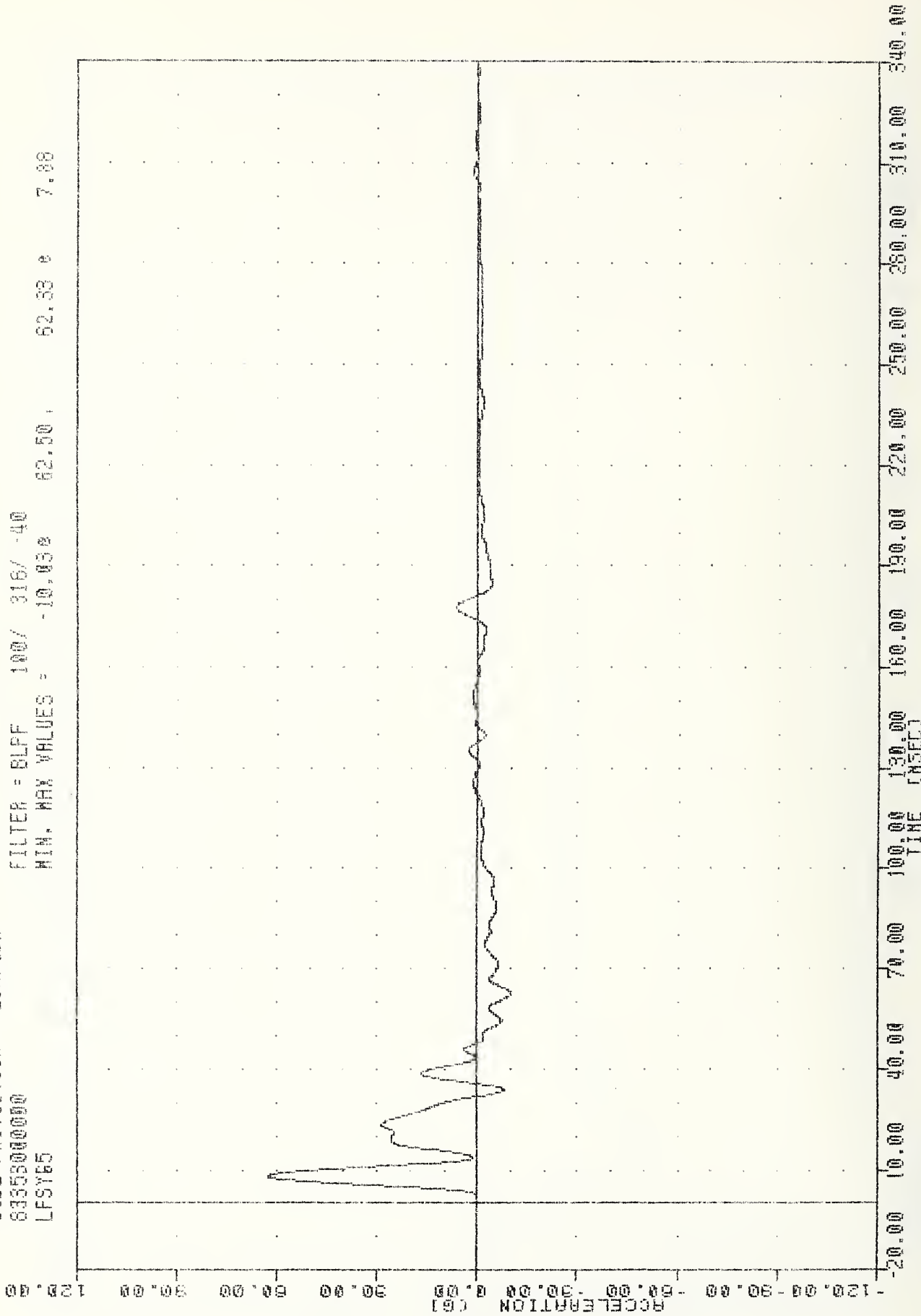


B-89

MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA V USING LRSYV4

TAC 831219
SIDE PROTECTION - 20R/40R
8335800000
LFSY65

PLU1 DATE 27-DEC-83 10:28:07
FILTER = BLFF 100/ 316/ -40
MIN. MAX VALUES = -10.03e 62.50 , 62.33 e 7.88



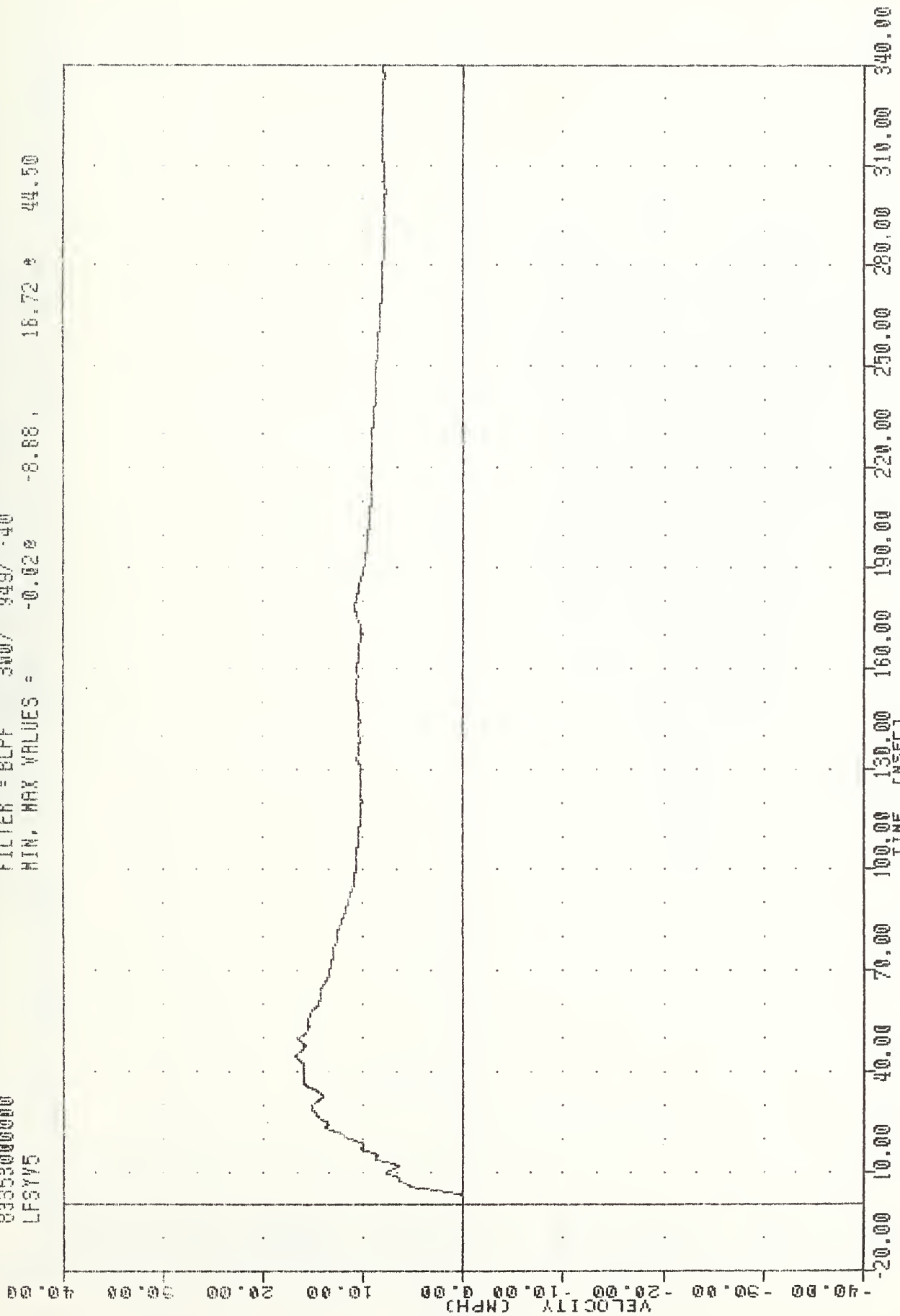
MOVING DEFORMABLE BARRIER INTO CITATION
VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS

RAC 831219
SIDE PROTECTION - 20A/40A
83353000000
LFSYV5

FLOT W/IE 27-DEC-83 13:22:05

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -0.020 -8.88 16.72 * 44.50



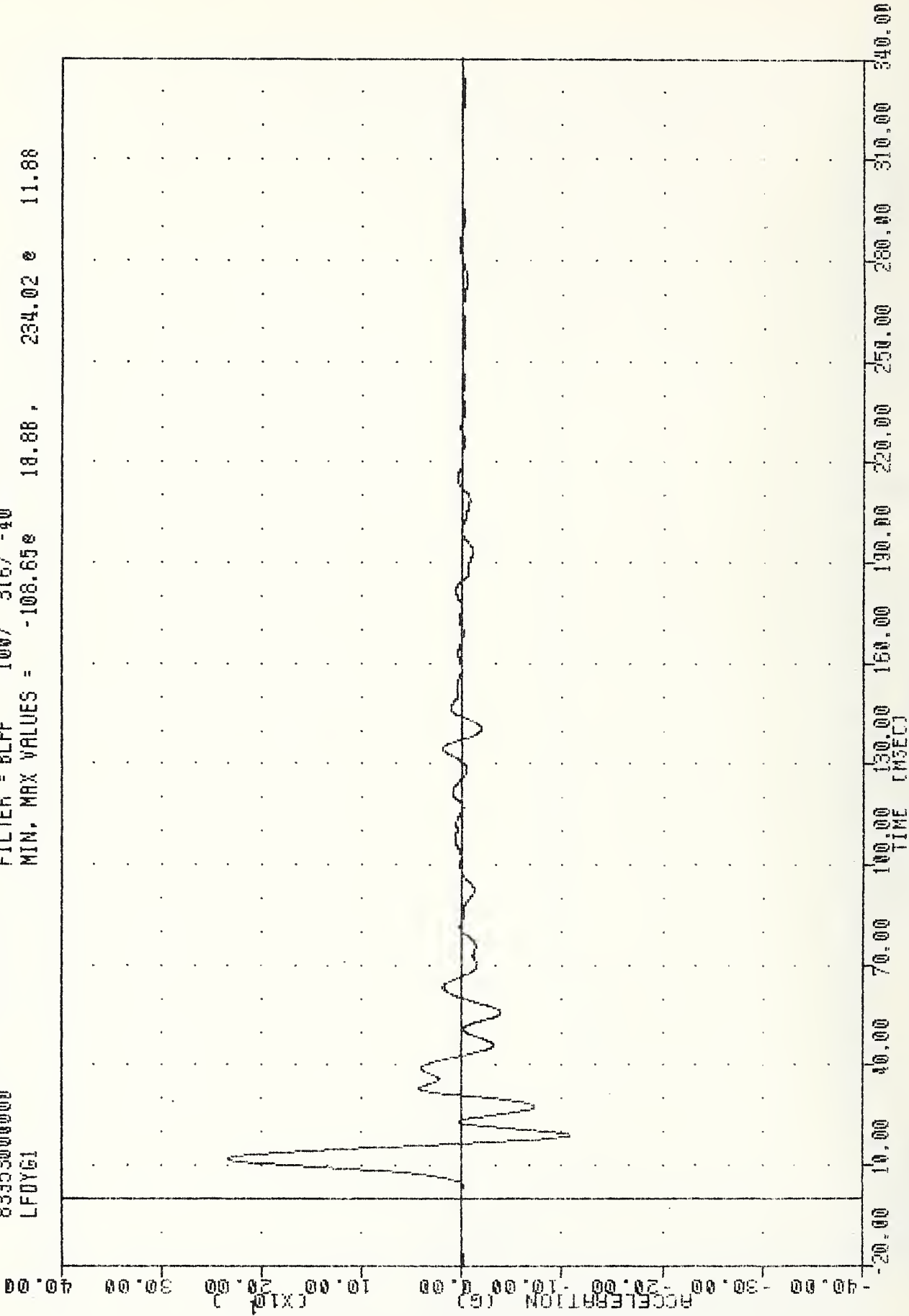
MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING LFSYGS

IML 831219
SIDE PROTECTION - 2DR/4DR
83353000000
LFDY61

PLUT DATE 2/-DEC-88 10:28:07

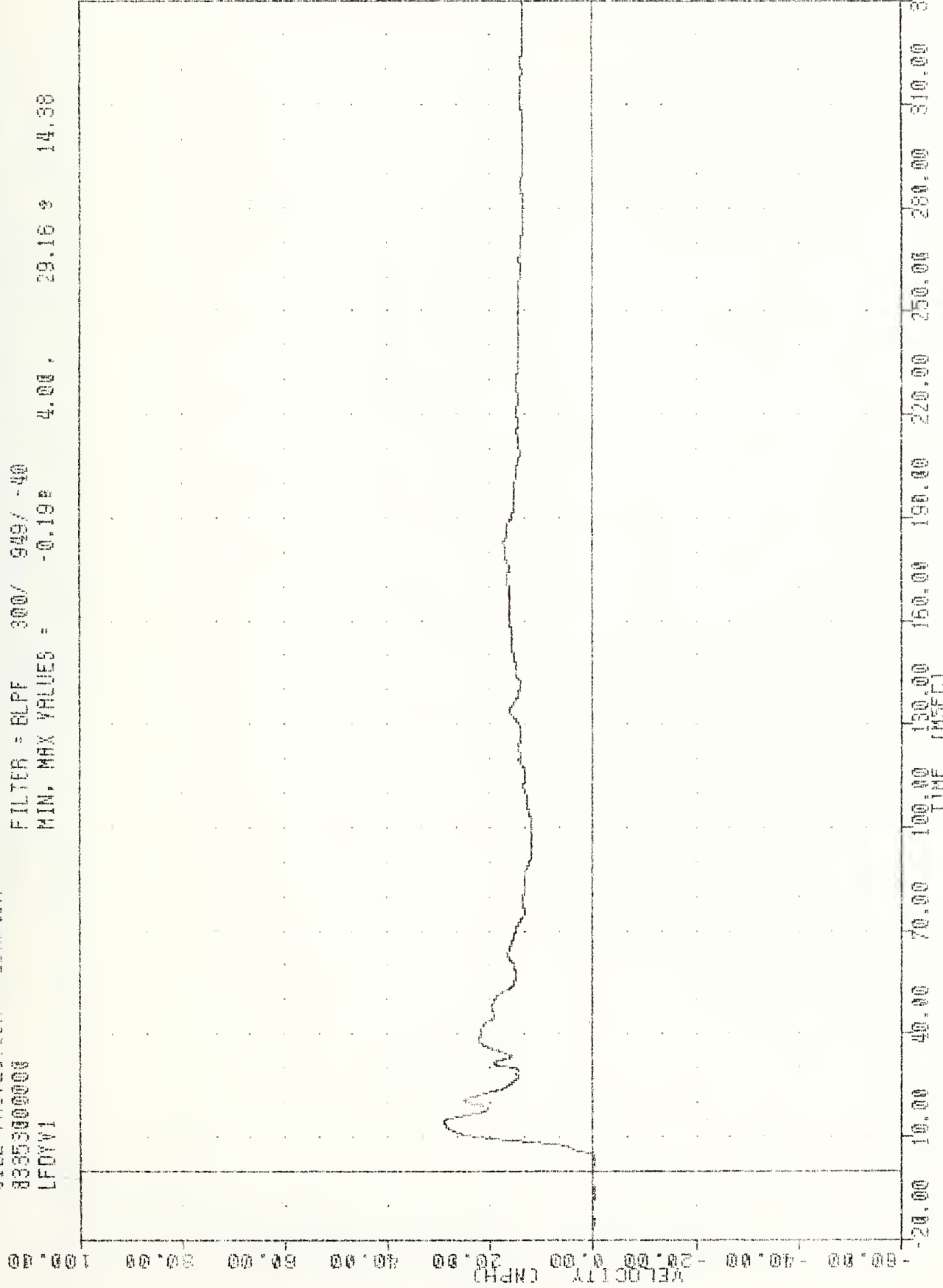
FILTER = BLFF 100/ 316/ -40

MIN. MAX VALUES = -108.65e 18.88, 234.02 e 11.88



MOVING DEFORMABLE BARRIER INTO CITATION
VEHICLE LEFT FRONT DOOR (POSITION 6) ACCELERATION Y AXIS

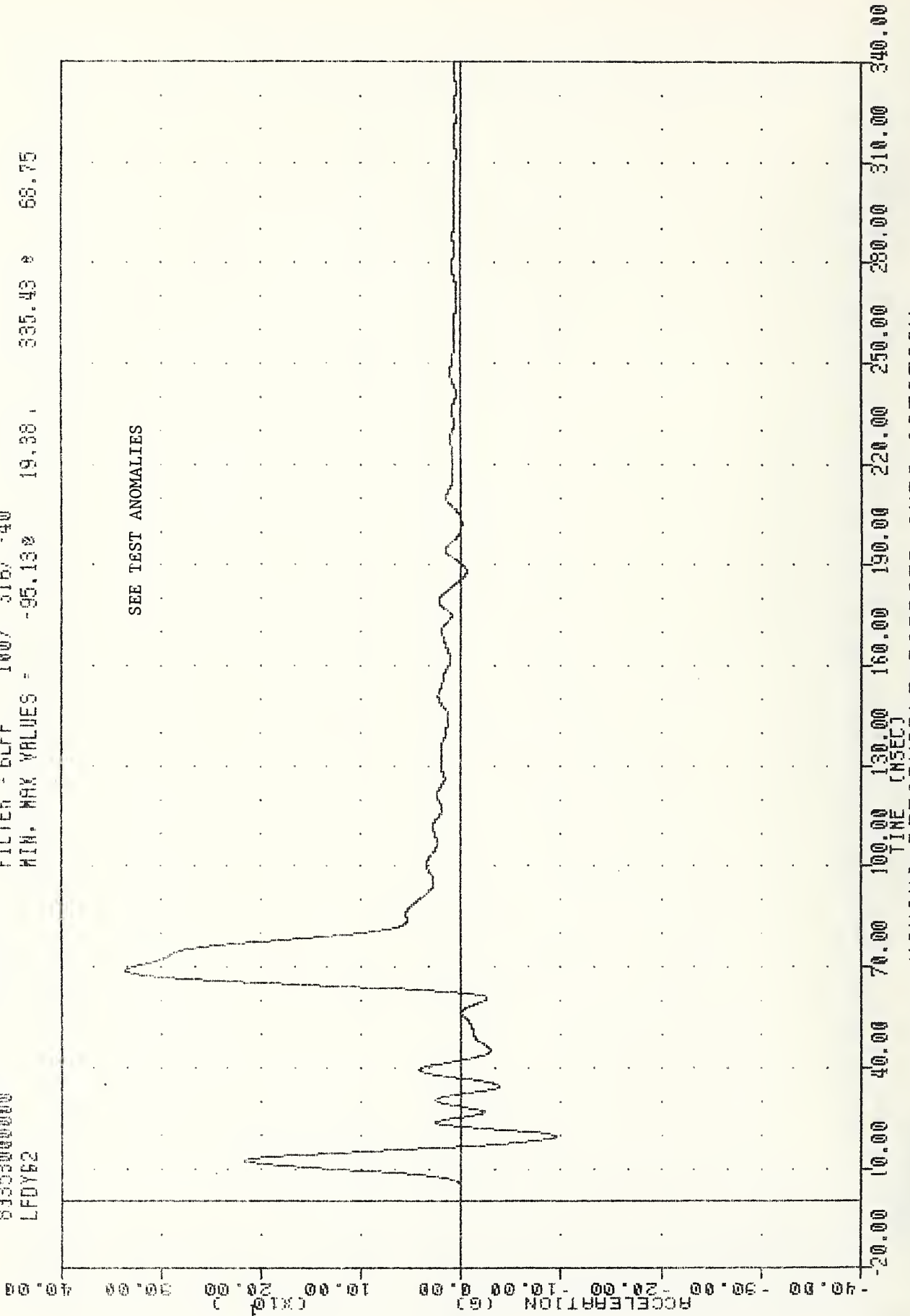
TRC , 231219 PLOT DATE 27-URL-83 13:27:05
 SIDE PROTECTION - 2DR/4DR
 8335300000
 LFDYV1
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 4.00, 29.16 % 14.38



MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA V USING LFDYV1

HL 831219
SIDE PROTECTION - 20R/40R
83353000000
LFDY62

FLUT DATE 27-DEC-83 10:28:07
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -95.13% 335.43% 68.75



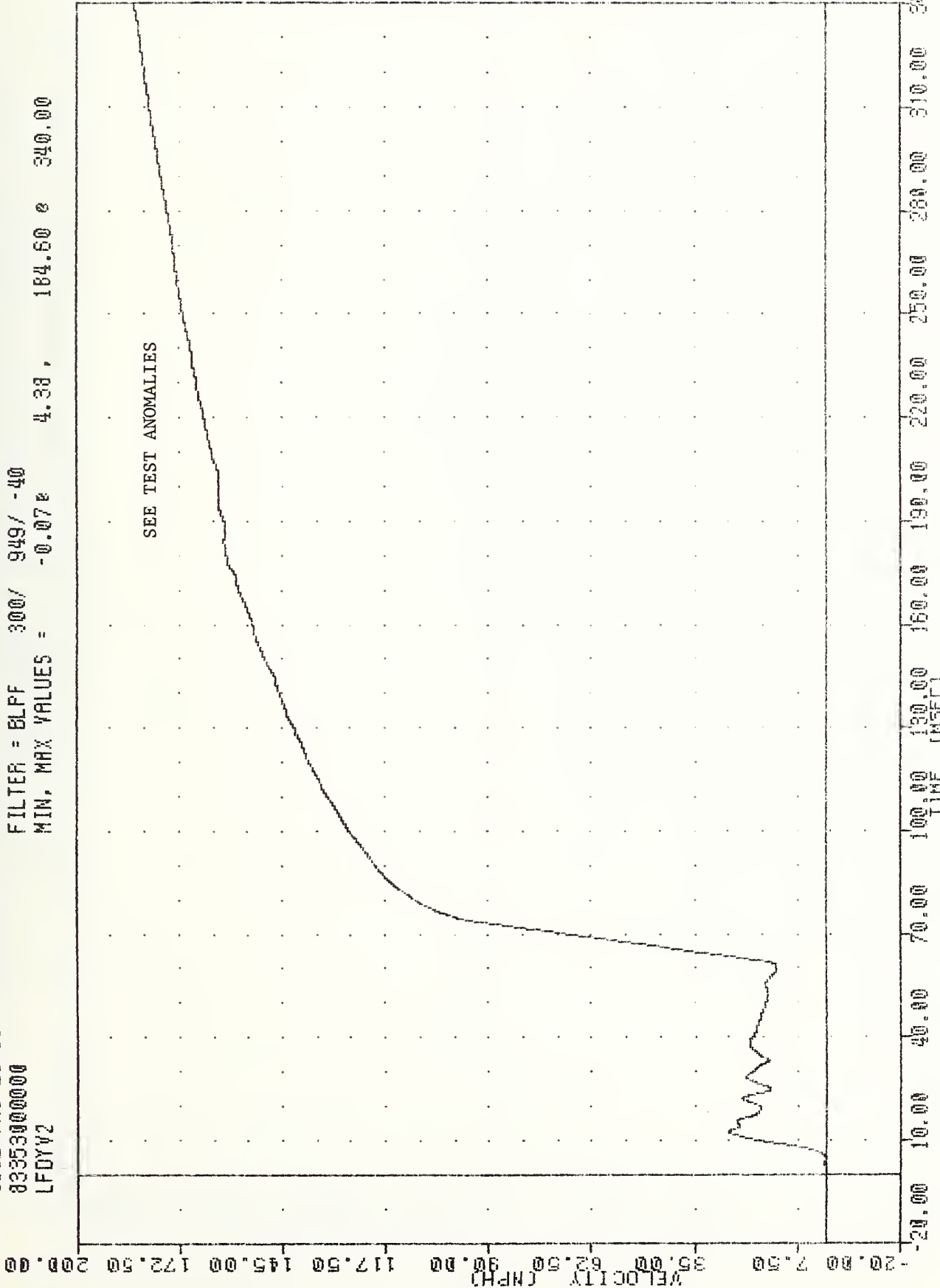
MOVING DEFORMABLE BARRIER INTO CITATION
VEHICLE LEFT FRONT DOOR (POSITION 8) ACCELERATION Y AXIS

TRC 831219
SIDE PROTECTION - 2DR/4DR
83353000000
LFDYV2

FL01 DATE 30-DEC-83 09:52:07

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -0.07% 4.38 , 184.60 e 340.00

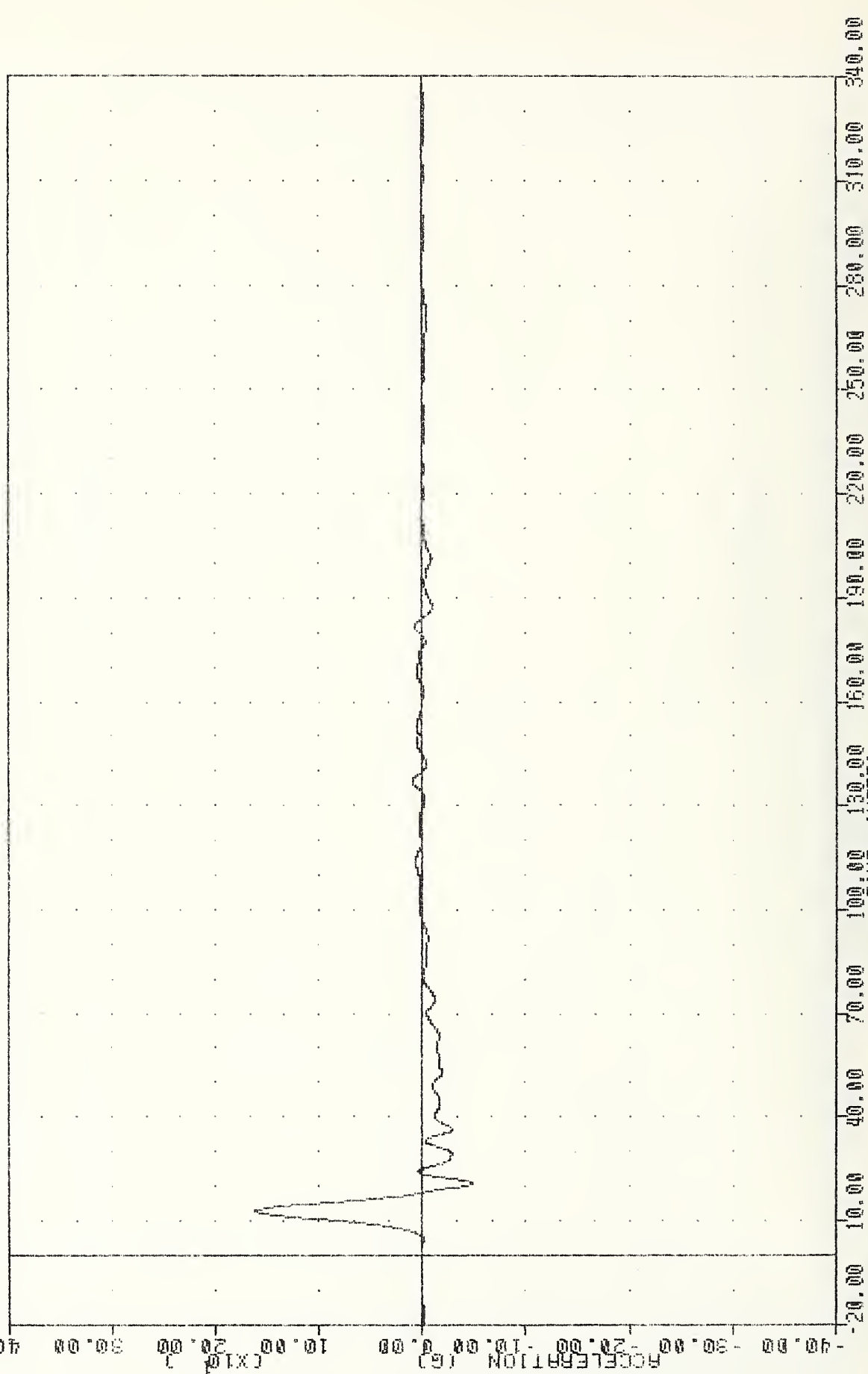


SEE TEST ANOMALIES

MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING LFDY62

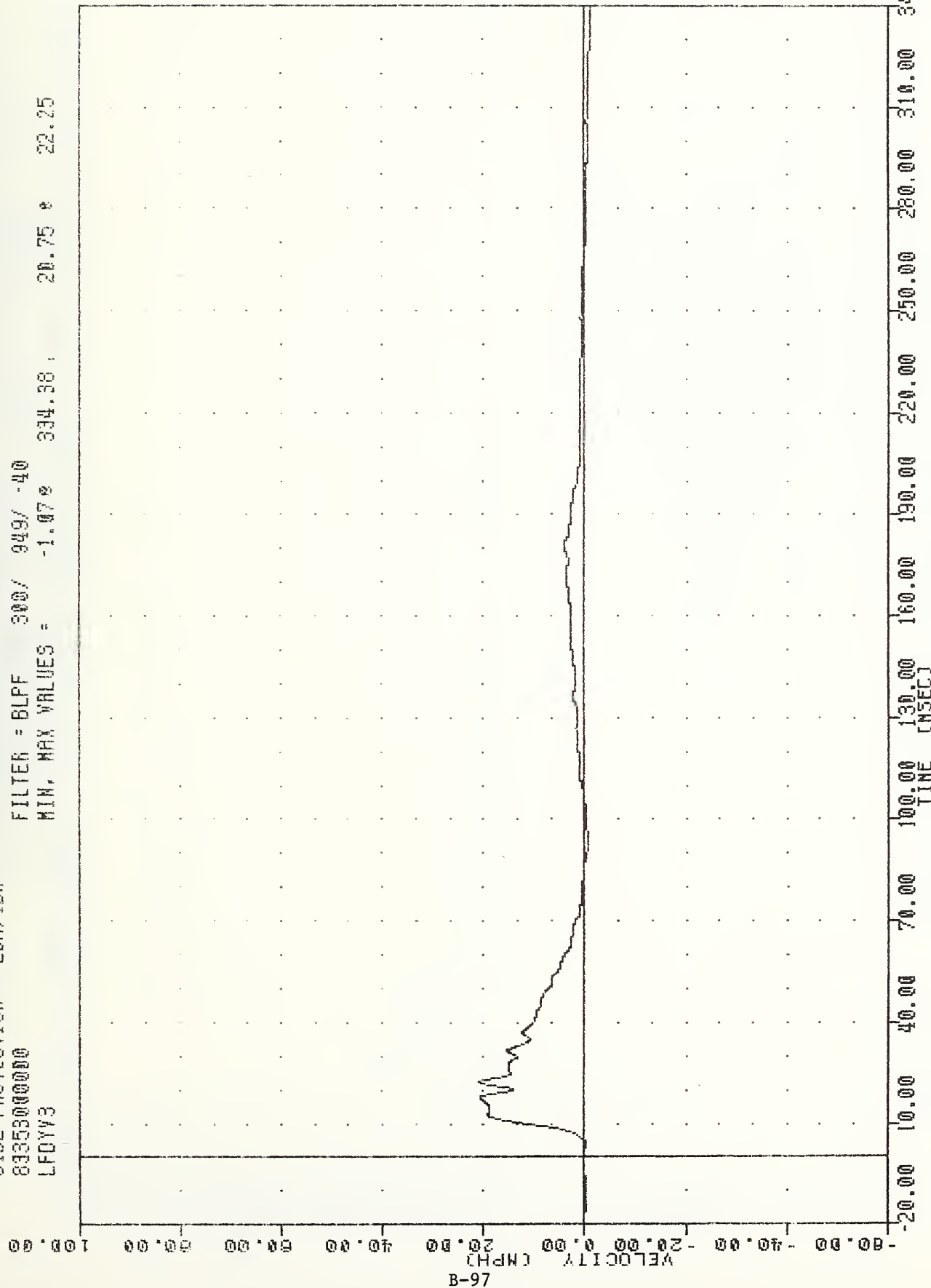
IHC 831219
 SIDE PROTECTION - 3DR/4DR
 8333000000
 LFOYGG

PLOT DATE 27-DEC-83 10:28:07
 FILTER = 5LPF 100/ 316/ -40
 MIN. MAX VALUES = -47.99E 161.67 e 12.63



MOVING DEFORMABLE BARRIER INTO CITATION
 VEHICLE LEFT FRONT DOOR (POSITION 9) ACCELERATION Y AXIS

TRC , 831219 PLOT DATE 27-DEC-83 13:22:05
 SIDE PROTECTION - 20R/40R
 83353000000
 LFDYV3
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -1.07% 334.38 ; 20.75 * 22.25

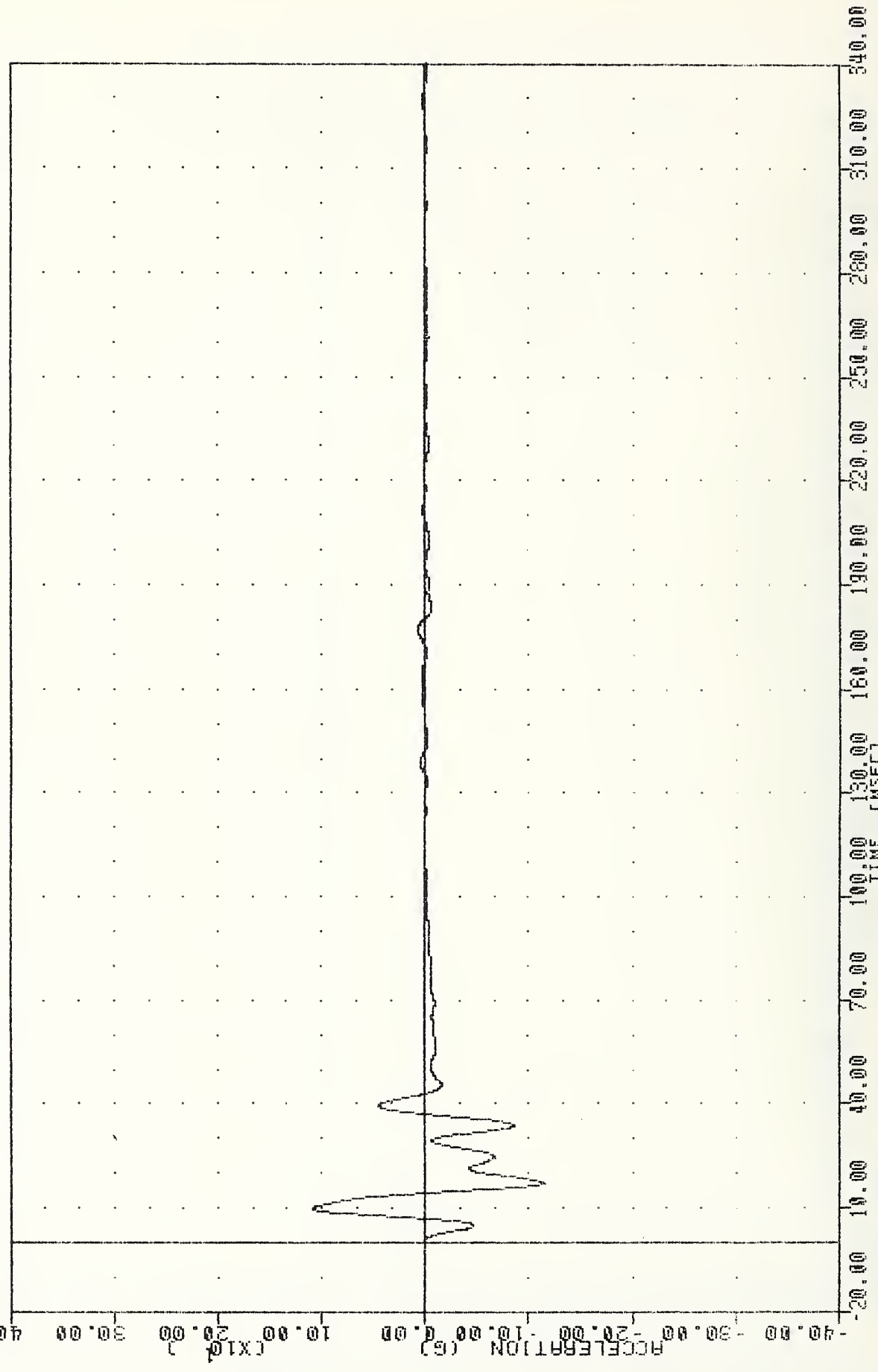


B-97

MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA Y USING LFDY63

IML 831219
 SIDE PROTECTION - 20R/40R
 83353000000
 LR0Y64

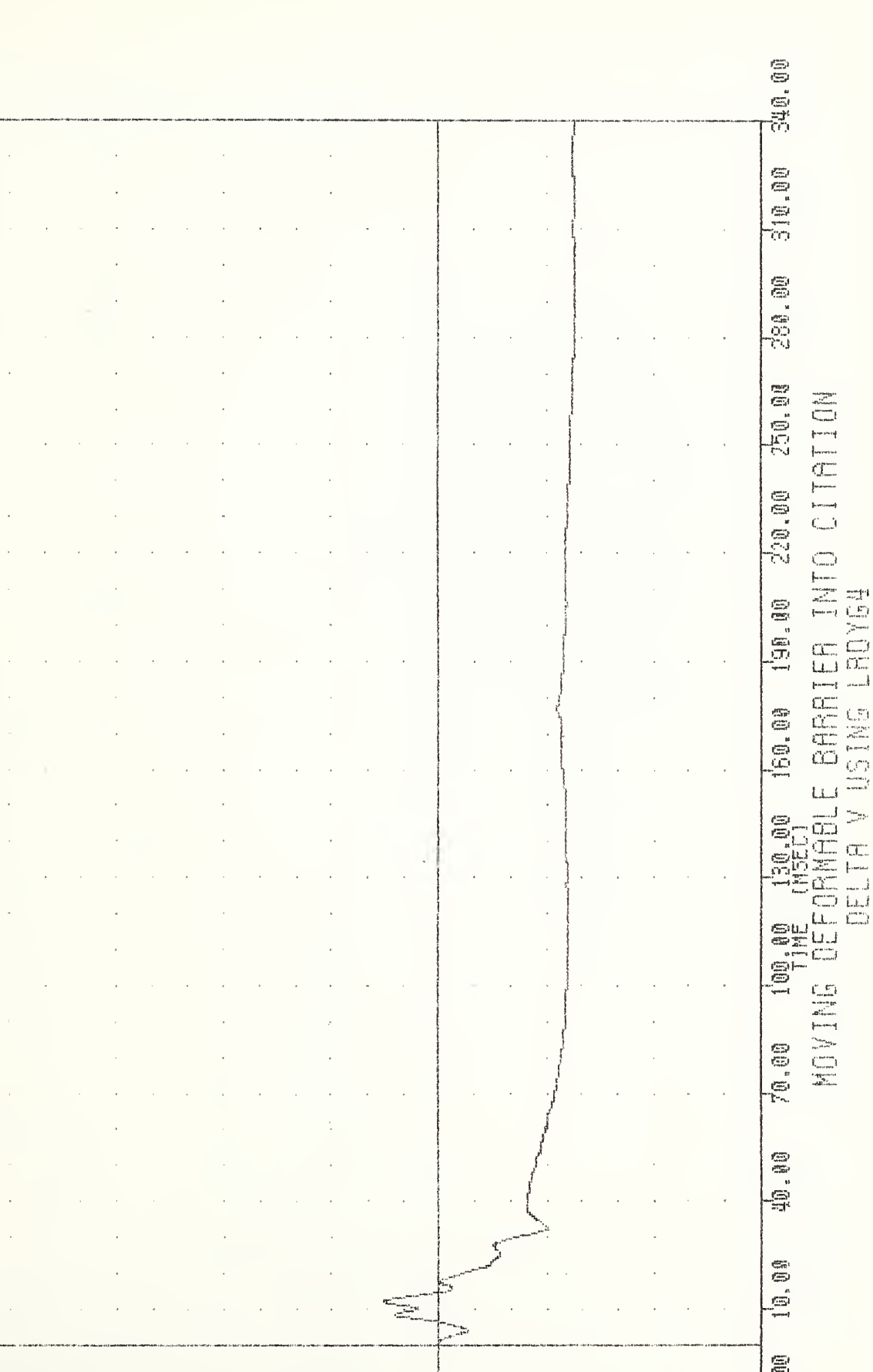
FLUT Dnie 27-DEC-63 10:28:07
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -115.13e 17.00, 109.31 e 9.63



MOVING DEFORMABLE BARRIER INTO CITATION
 VEHICLE LEFT REAR DOOR (POSITION 10) ACCELERATION Y AXIS

TRC , 801219
 SIDE PROTECTION - 2DR/4DR
 83253000000
 LRDYV4

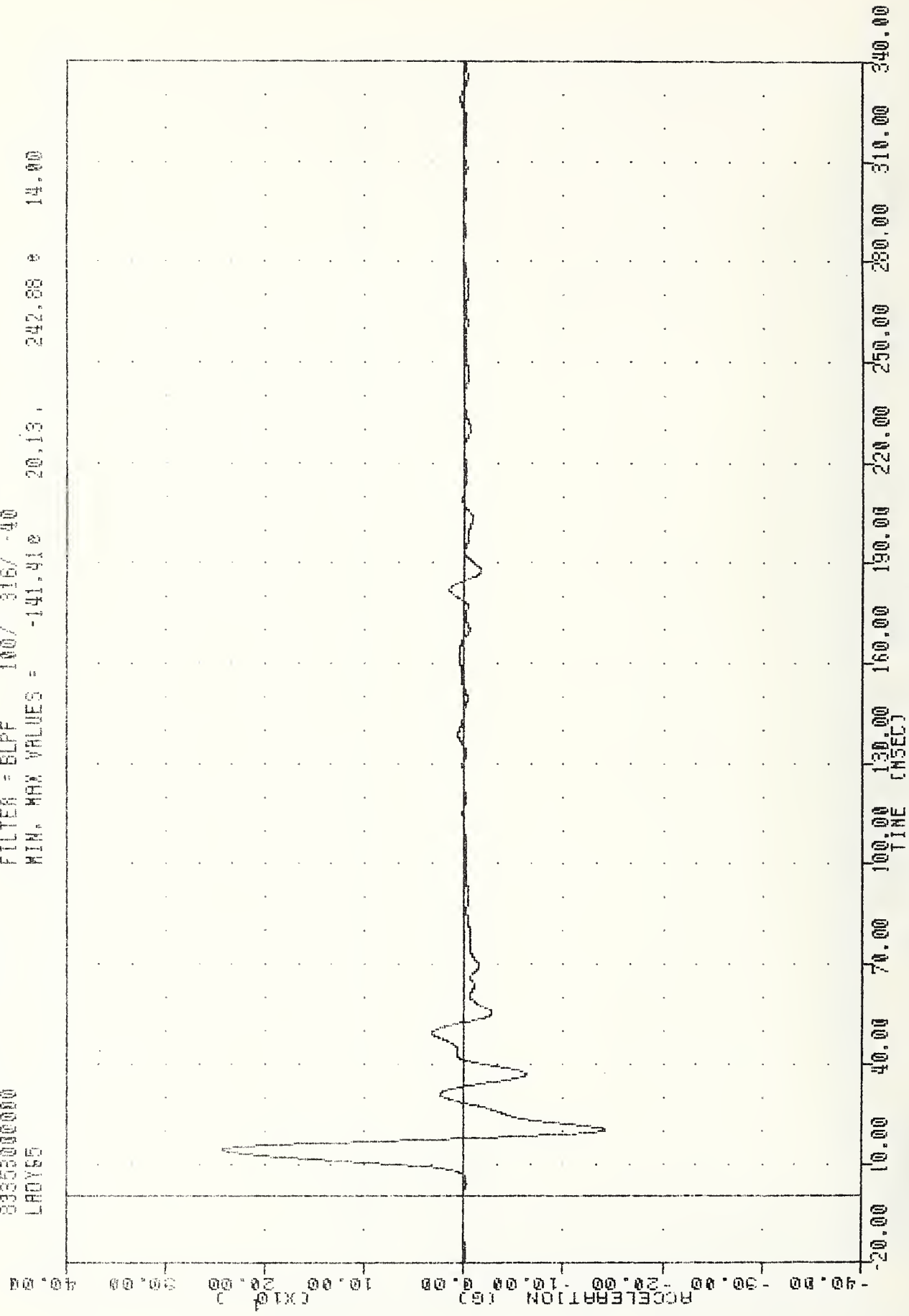
PLOT DATE 27-DEC-88 13:21:05
 FILTER = BLFF 300/ 949/ -40
 MIN. MAX VALUES = -25.25 299.13 10.42 12.13



MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA V USING LRDYV4

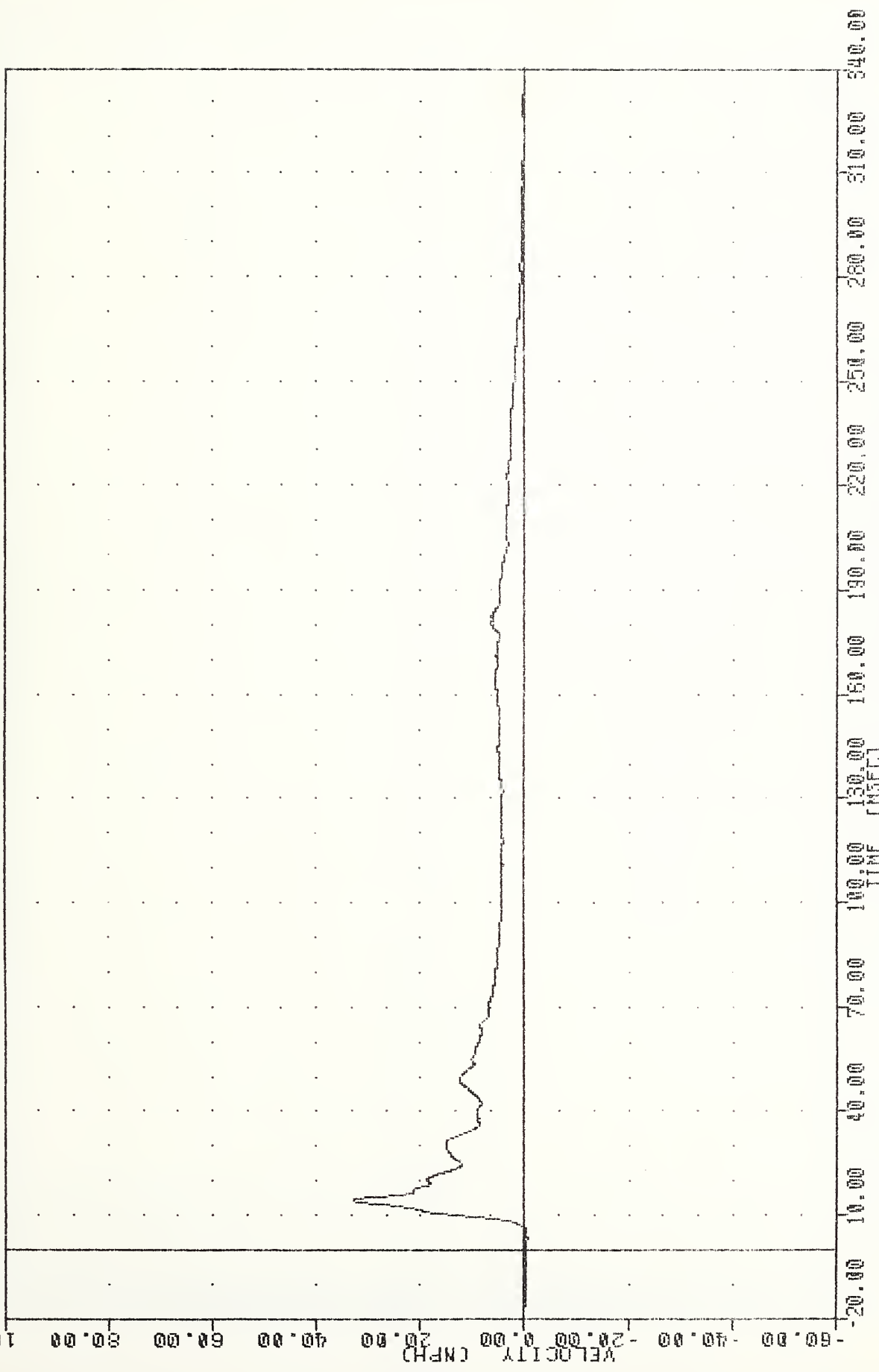
PLUJ DATE 27-DEC-83 10:28:07
FILTER = 5LFF 100/ 315/ -40
MIN. MAX VALUES = -141.41e 20.13, 242.88 e 14.00

IHC 831218
SIDE PROTECTION - 206/40R
8335000000
LADY55



MOVING DEFORMABLE BARRIER INTO CITATION
VEHICLE LEFT REAR DOOR (POSITION 11) ACCELERATION Y AXIS

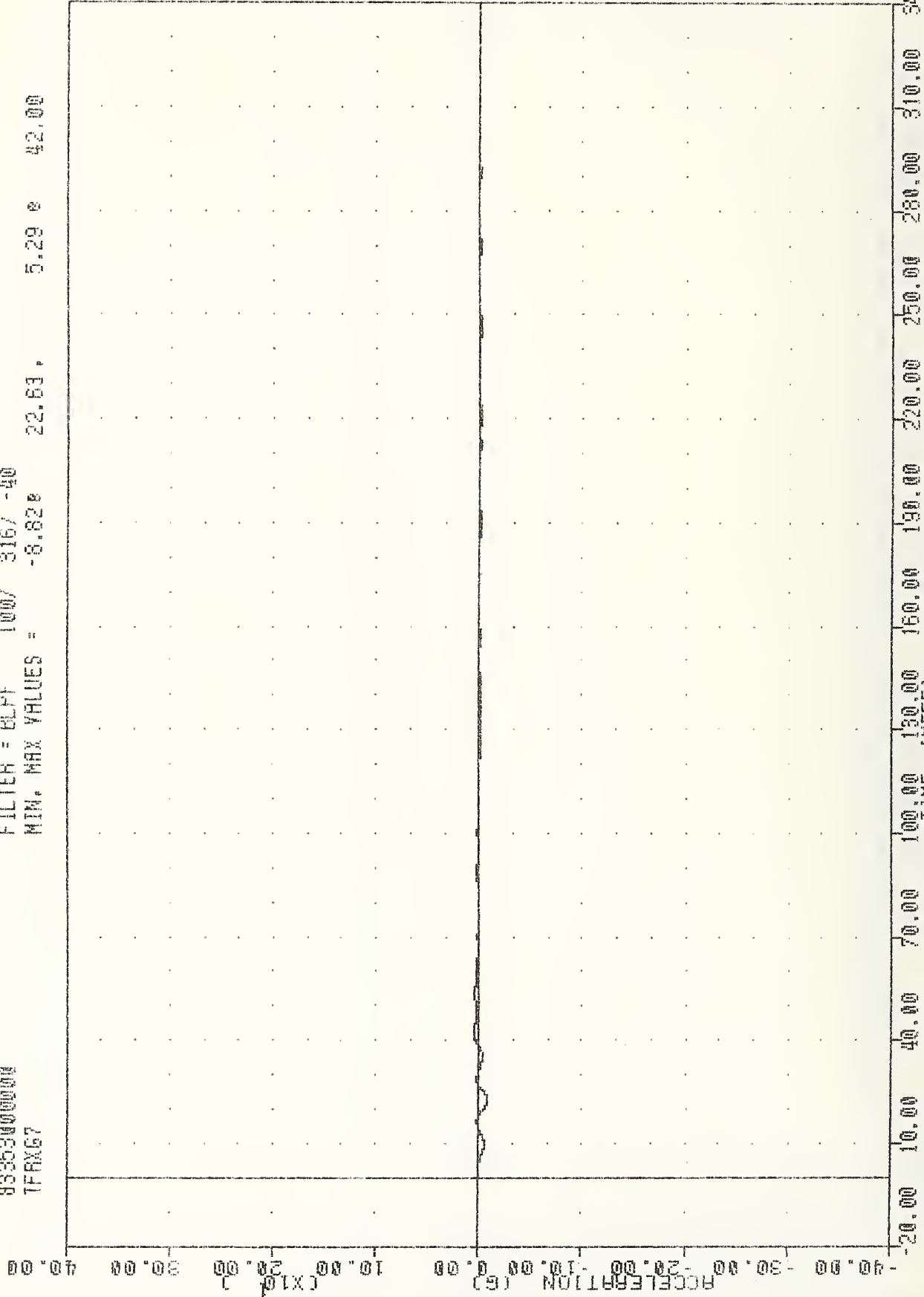
TRC , 831219 PLOT DATE 27-DEC-83 13:22:05
 SIDE PROTECTION - 2DR/4DR
 83353000000
 LROYV5
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -0.51e 3.13, 33.04 e 14.25



MOVING DEFORMABLE BARRIER INTO CITATION
 DELTA V USING LROYV5

IHC
 83353000000
 TFRX67

PLUT DATE 27-DEL-65 10:28:00/
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -8.820 5.290 42.00



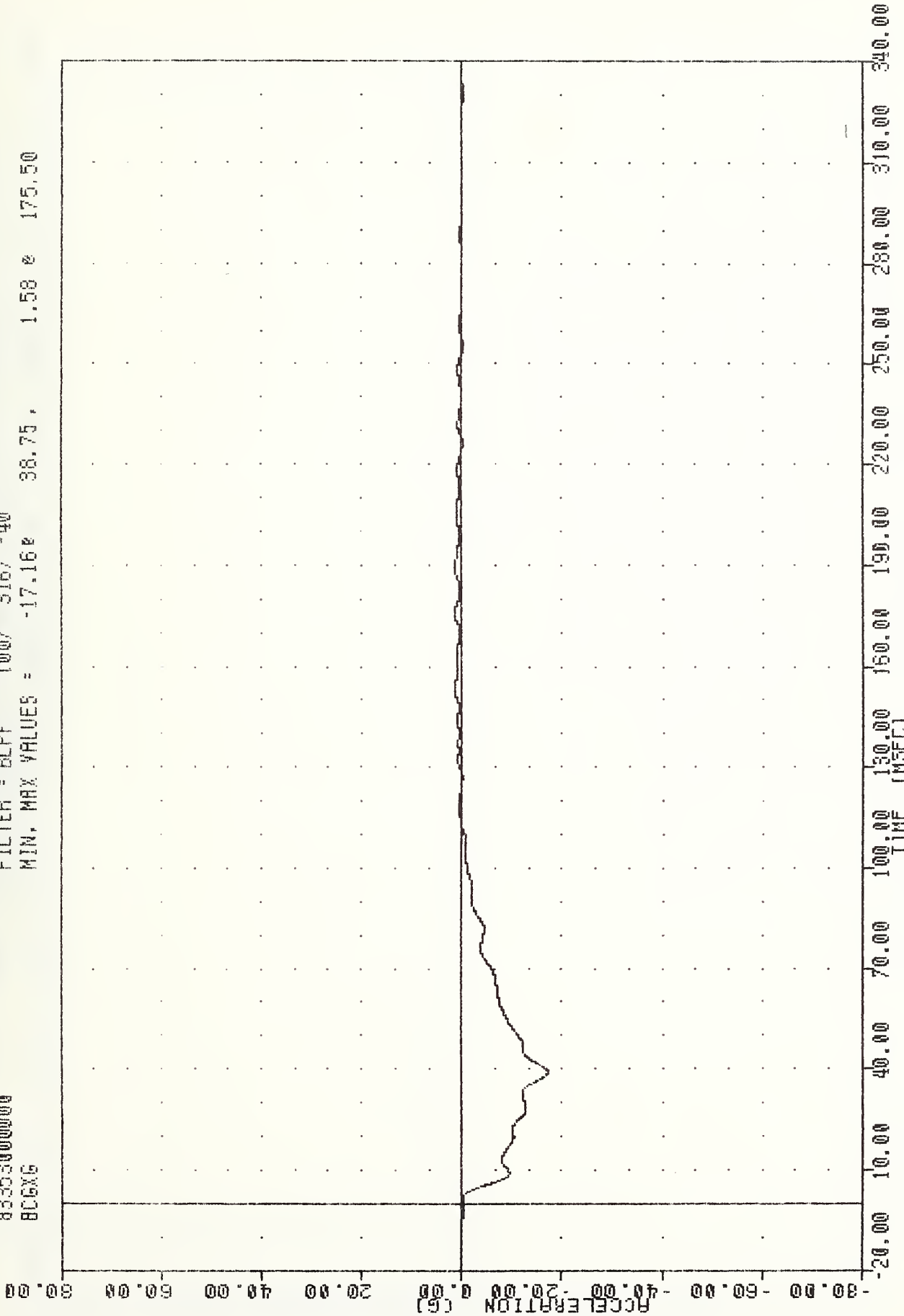
MOVING DEFORMABLE BARRIER INTO CITATION
 VEHICLE TRUNK FLOOR RIGHT ACCELERATION X AXIS

INL 031219
SIDE PROTECTION - 20R/40R
83353000000
BCGXG

PLUT DATE 27-DEC-85 10:28:07

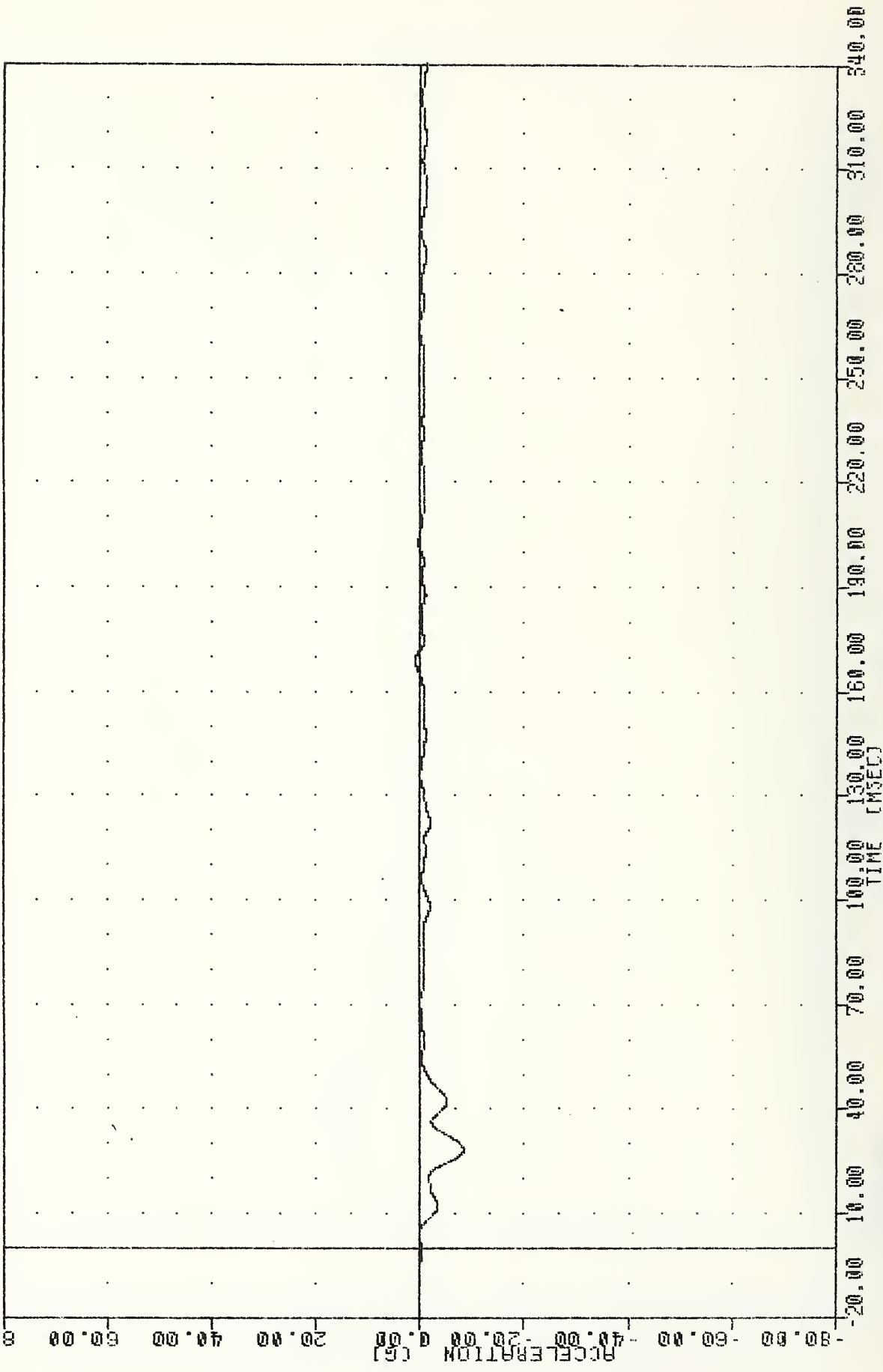
FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -17.16e 38.75, 1.58 e 175.50



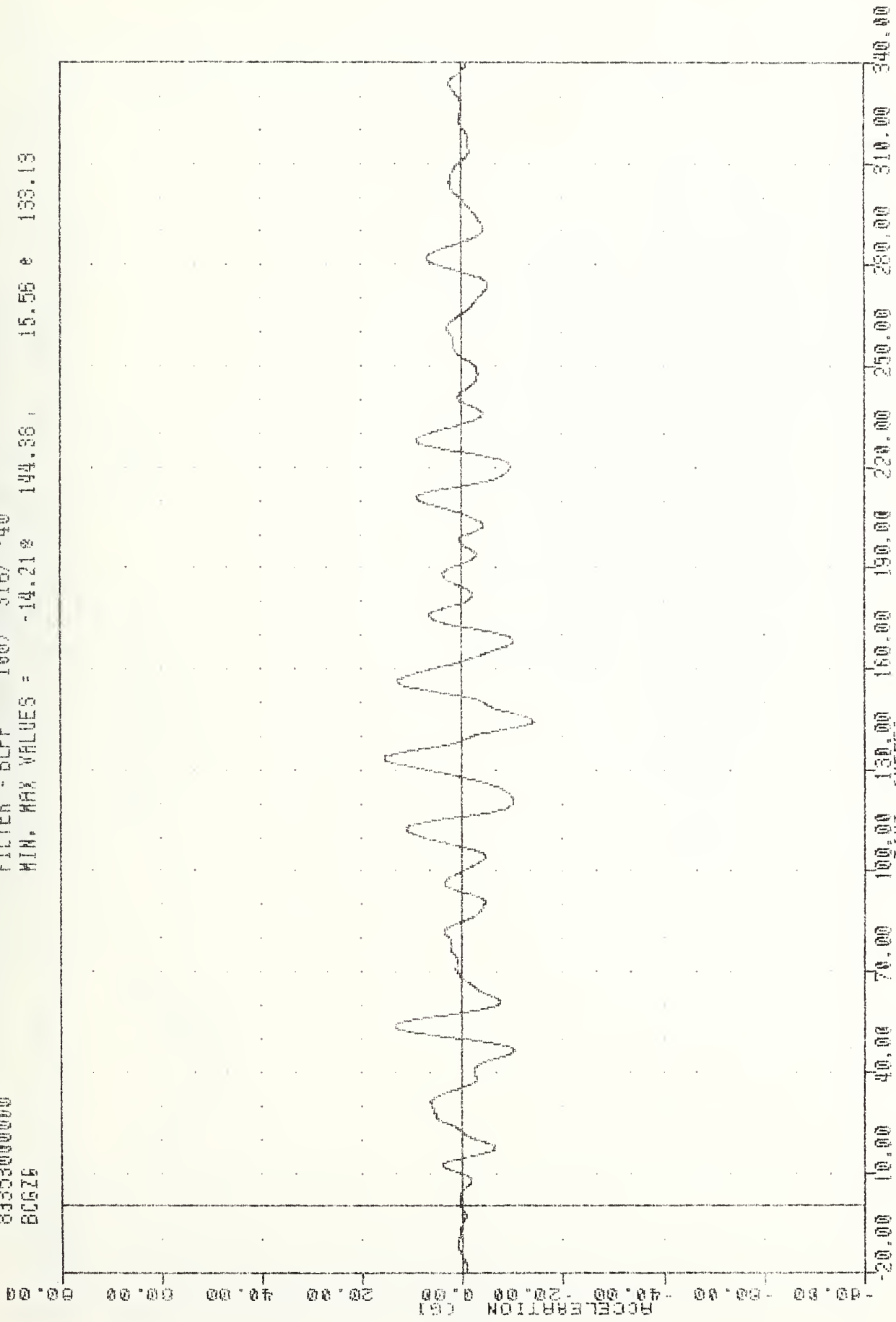
MOVING DEFORMABLE BARRIER INTO CITATION
BARRIER CENTER OF GRAVITY X AXIS

IHC 831219 PLUT DATE 2/-DEC-83 10:28:07
 SIDE PROTECTION - 20R/40R
 83353000000
 BCGYG
 FILTER = 8LPF 100/ 316/ -40
 MIN, MAX VALUES = -8.27% 28.25, 0.97 @ 168.75



MOVING DEFORMABLE BARRIER INTO CITATION
 BARRIER CENTER OF GRAVITY Y AXIS

14L 031219 27-DEC-00 10:28:07
 PLU1 011C
 SIDE PROTECTION - 20R/4DR
 833530000000
 BCGZ6
 FILTER = 6LPF 100/ 316/ -40
 MIN. MAX VALUES = -14.21% 144.36 15.56 e 133.13



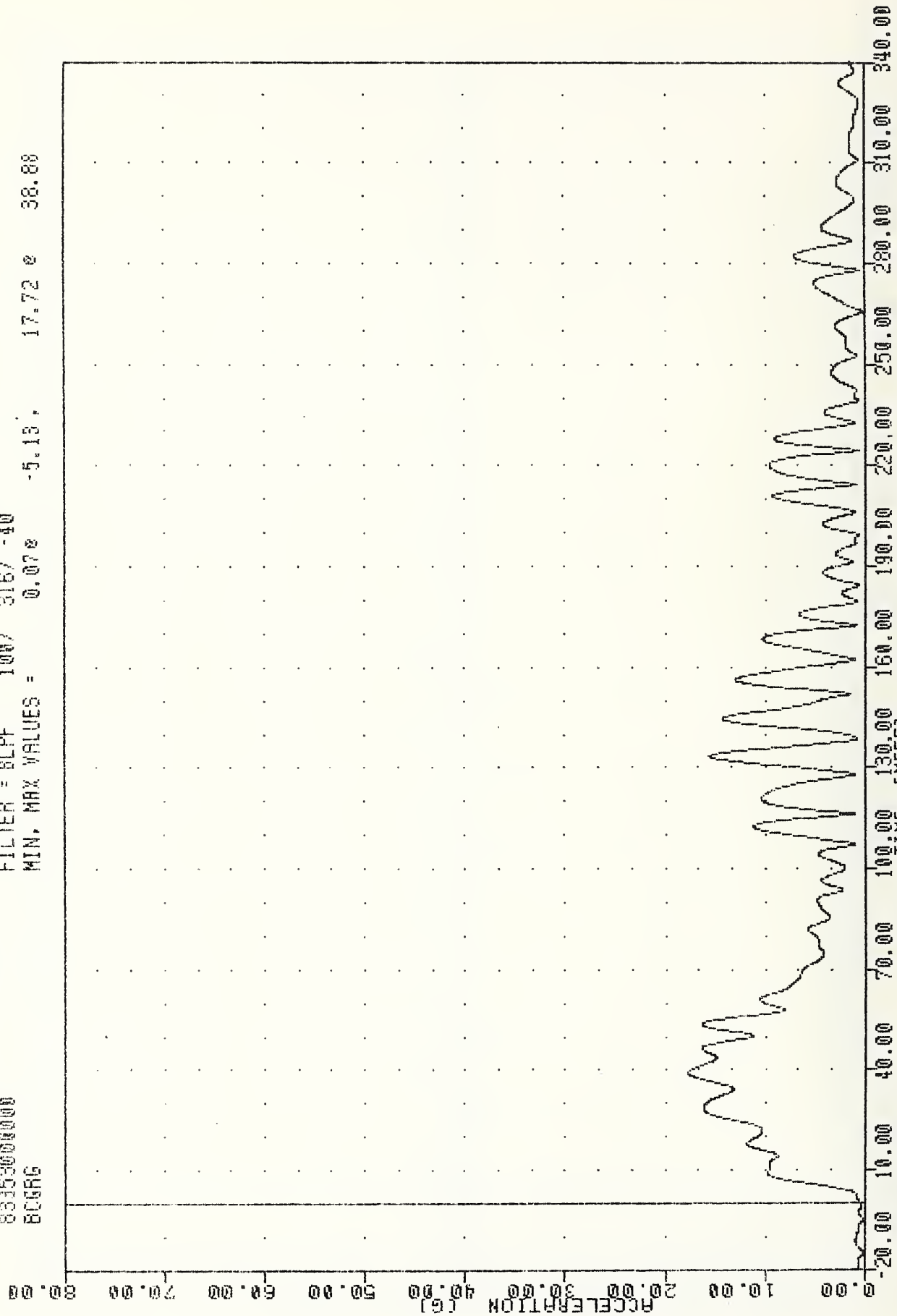
MOVING DEFORMABLE BARRIER INTO CITATION
 BARRIER CENTER OF GRAVITY Z AXIS

TRC 831219
SIDE PROTECTION - 2DR/3DR
83153000000
BCGRG

PLUT DATE 27-DEC-88 11:15:47

FILTER = 8LFF 100/ 316/ -40

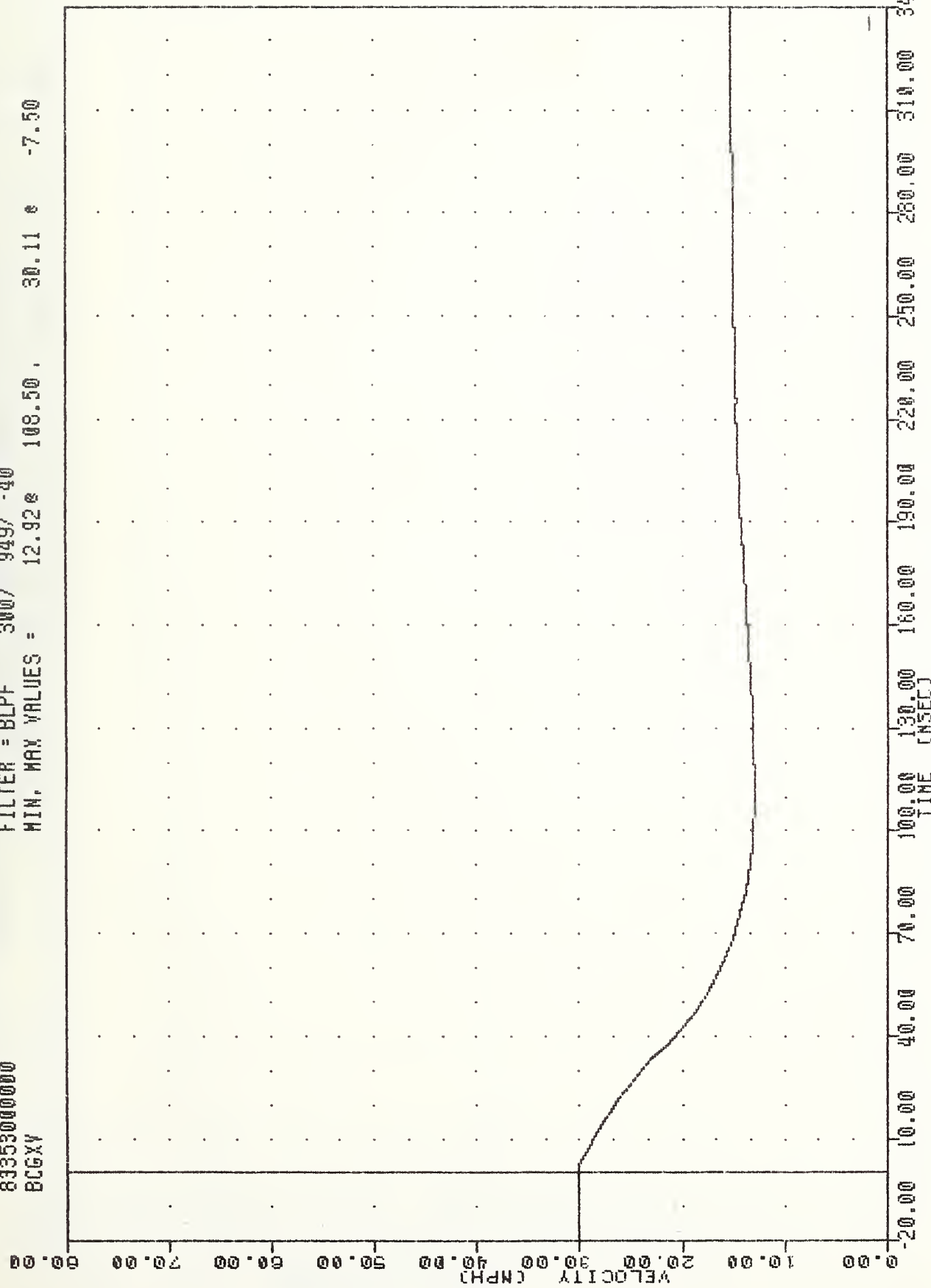
MIN. MAX VALUES = 0.07e -5.13e 17.72 e 38.88



MOVING DEFORMABLE BARRIER INTO CITATION
BARRIER CG RESULTANT

iAC .831219
SIDE PROTECTION - 20R/4DR
83353000000
BCGXV

PLOT DATE 27-DEC-83 13:22:05
FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = 12.92 108.50 30.11 -7.50



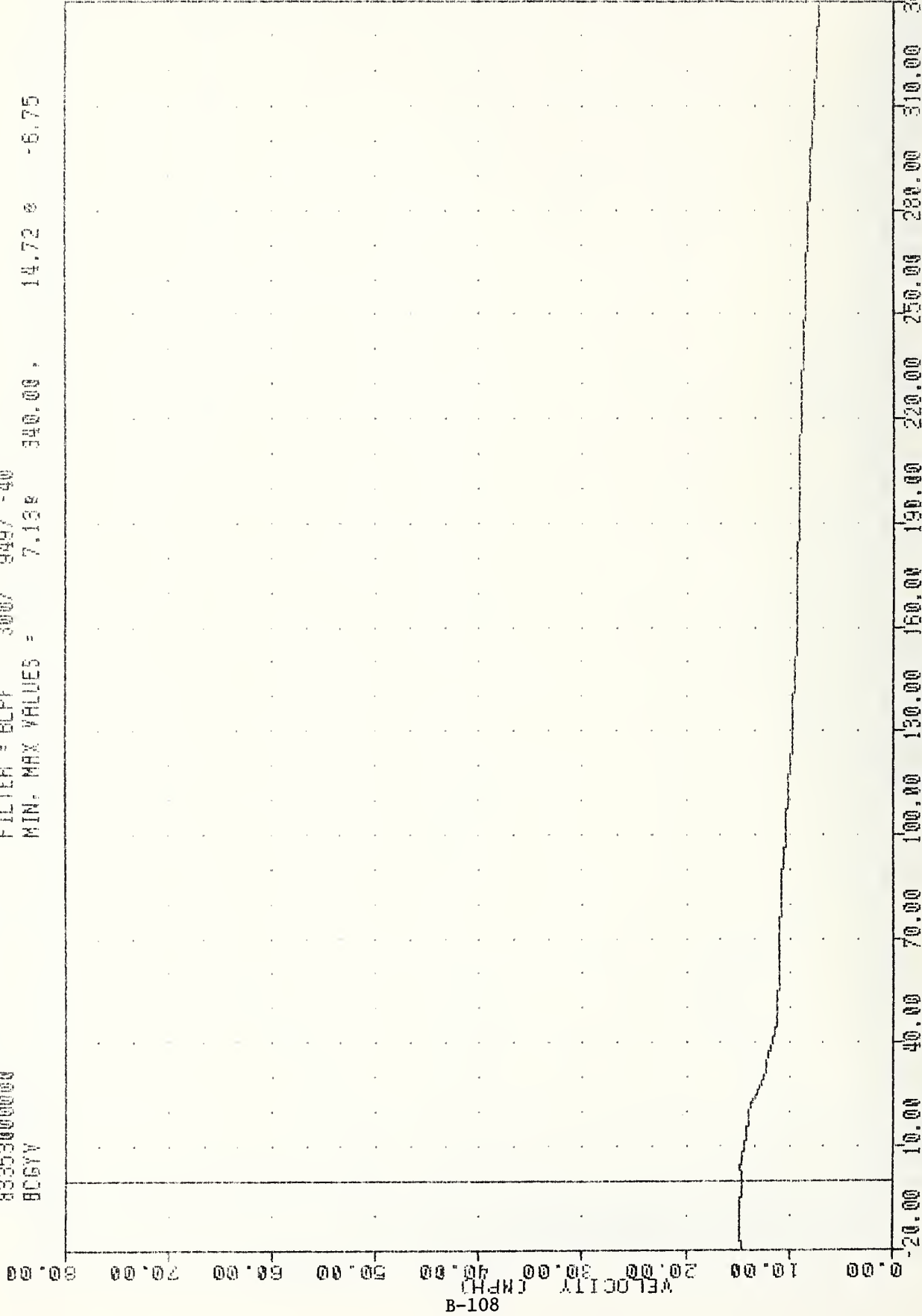
B-107

MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING BCGXG

TRC 811219
SIDE PROTECTION - 20R/40R
83353000000
BC6YV

PL01 UNTE 27-JUL-83 13:24:05

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = 7.13% 340.00 14.72 % -6.75



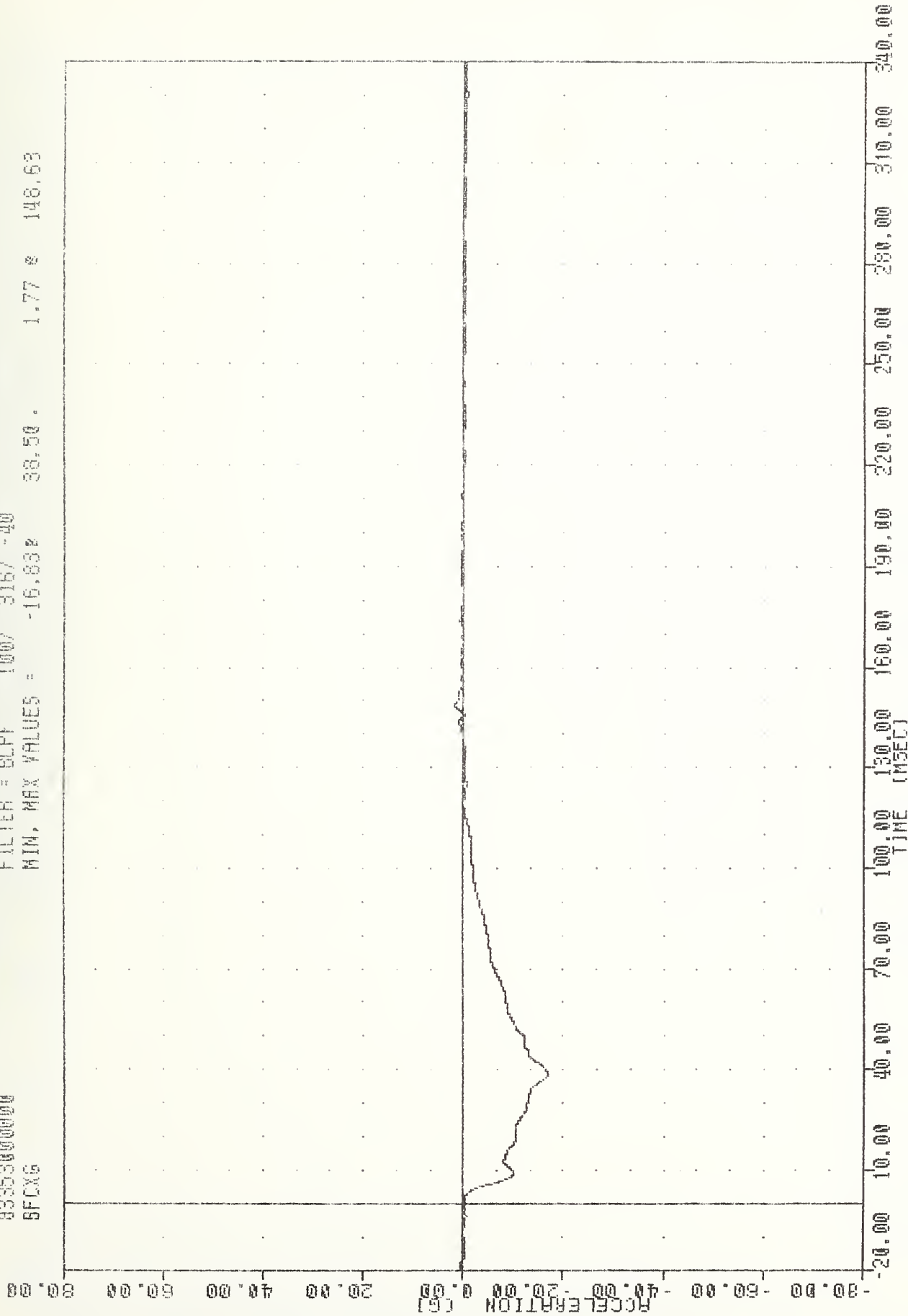
MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING BC6YS

TRC .831219
SIDE PROTECTION - 20R/40R
83353000000
6FCX6

PLUT DATE 27-DEC-83 10:26:07

FILTER = BLFF 100/ 316/ -40

MIN. MAX VALUES = -16.83% 38.50 . 1.77 s 148.63

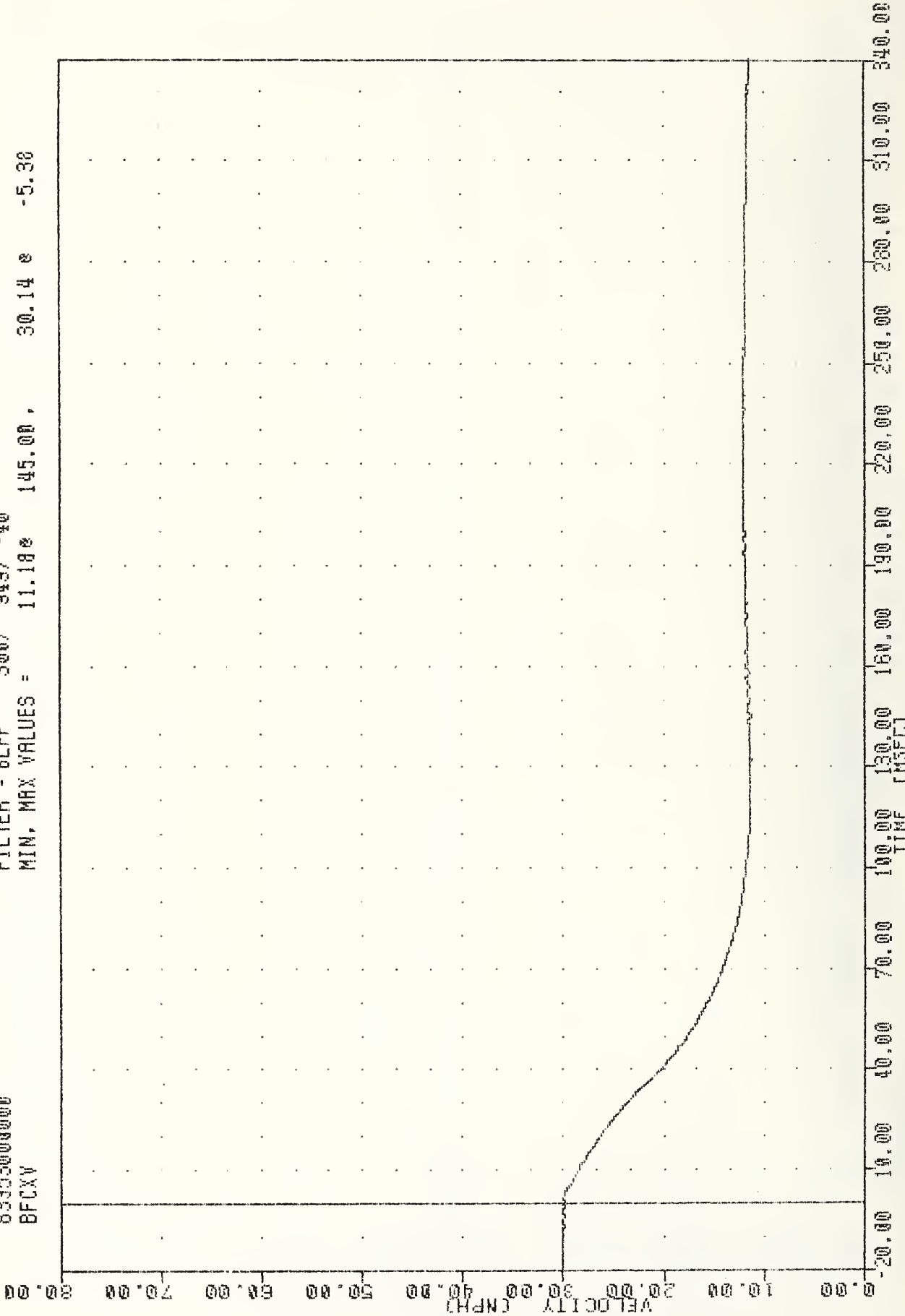


MOVING DEFORMABLE BARRIER INTO CITATION
BARRIER FRONT CROSSMEMBER ACCELERATION X AXIS

TRC 831219
SIDE PROTECTION - 20R/4DR
8335300000
BFCXV

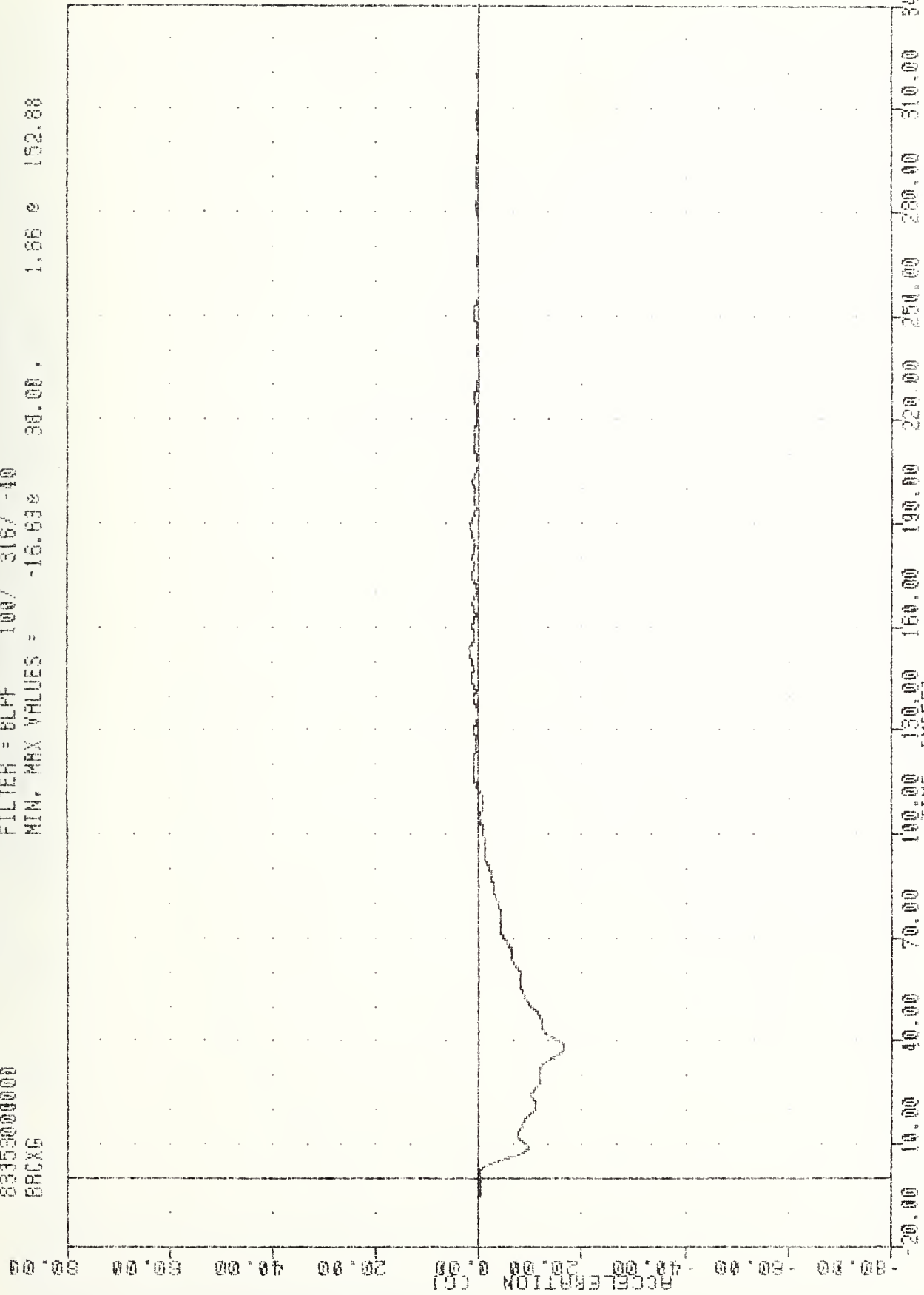
PLOT UHTE 27-DEC-83 13:22:05

FILTER = 8LFF 300/ 949/ -40
MIN. MAX VALUES = 11.18e 145.00 , 30.14 e -5.38



MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING BFCXG

INL , 831219
 PLUF DATE 27-DEC-83 14:28:57
 SIDE PROTECTION - 20R/4DR
 83353000000
 BRXG
 FILTER = 8LFF 100/ 316/ -40
 MIN. MAX VALUES = -16.63% 38.00, 1.86 % 152.88

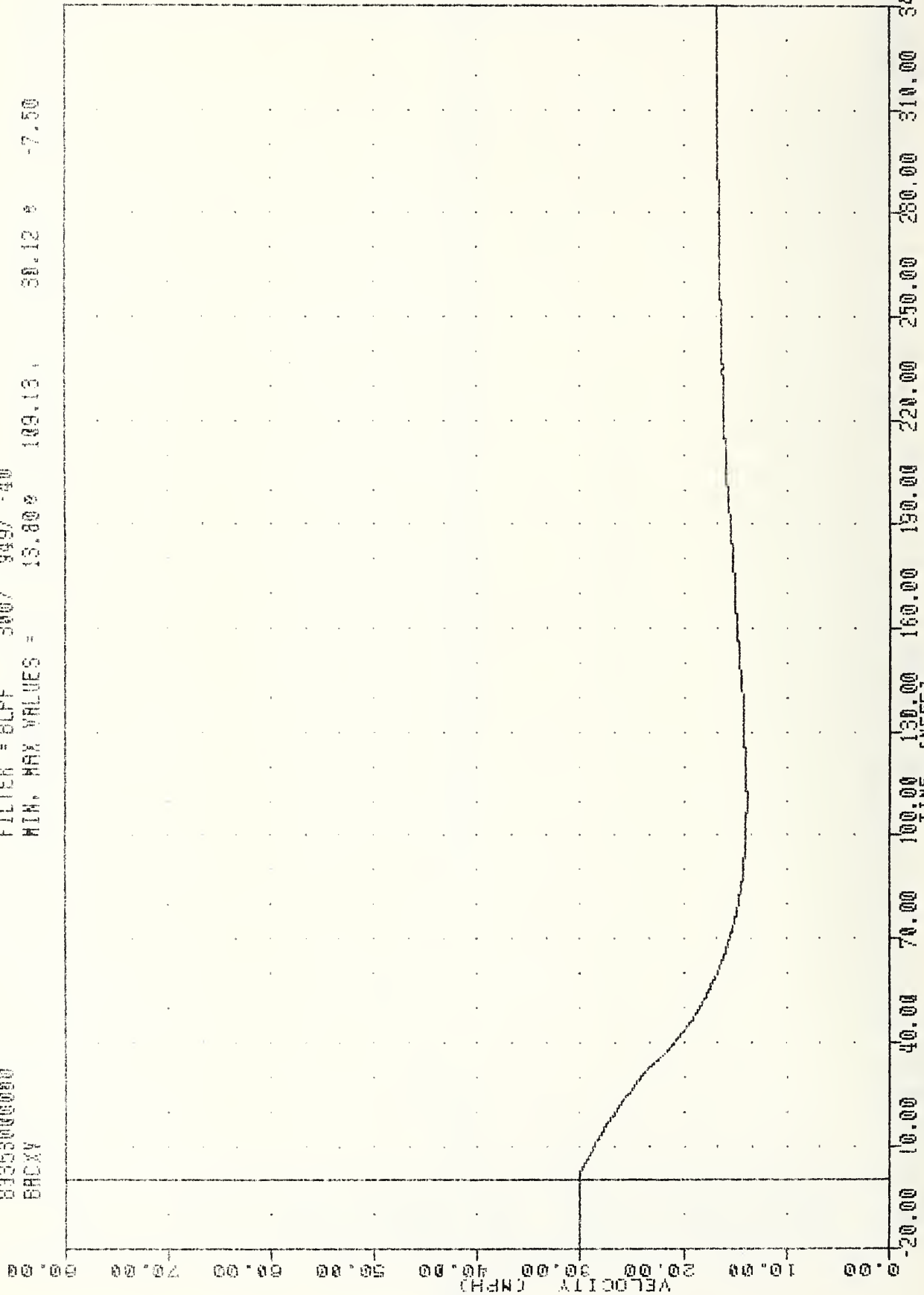


MOVING DEFORMABLE BARRIER INTO CITATION
 BARRIER REAR CROSSMEMBER ACCELERATION Y AXIS

180
SIDE PROTECTION - 20R/40R
8355000000
BRXGY

PLOT UNIT 27-DEC-83 13:22:05

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = 13.80% 109.13, 38.12 % -7.50

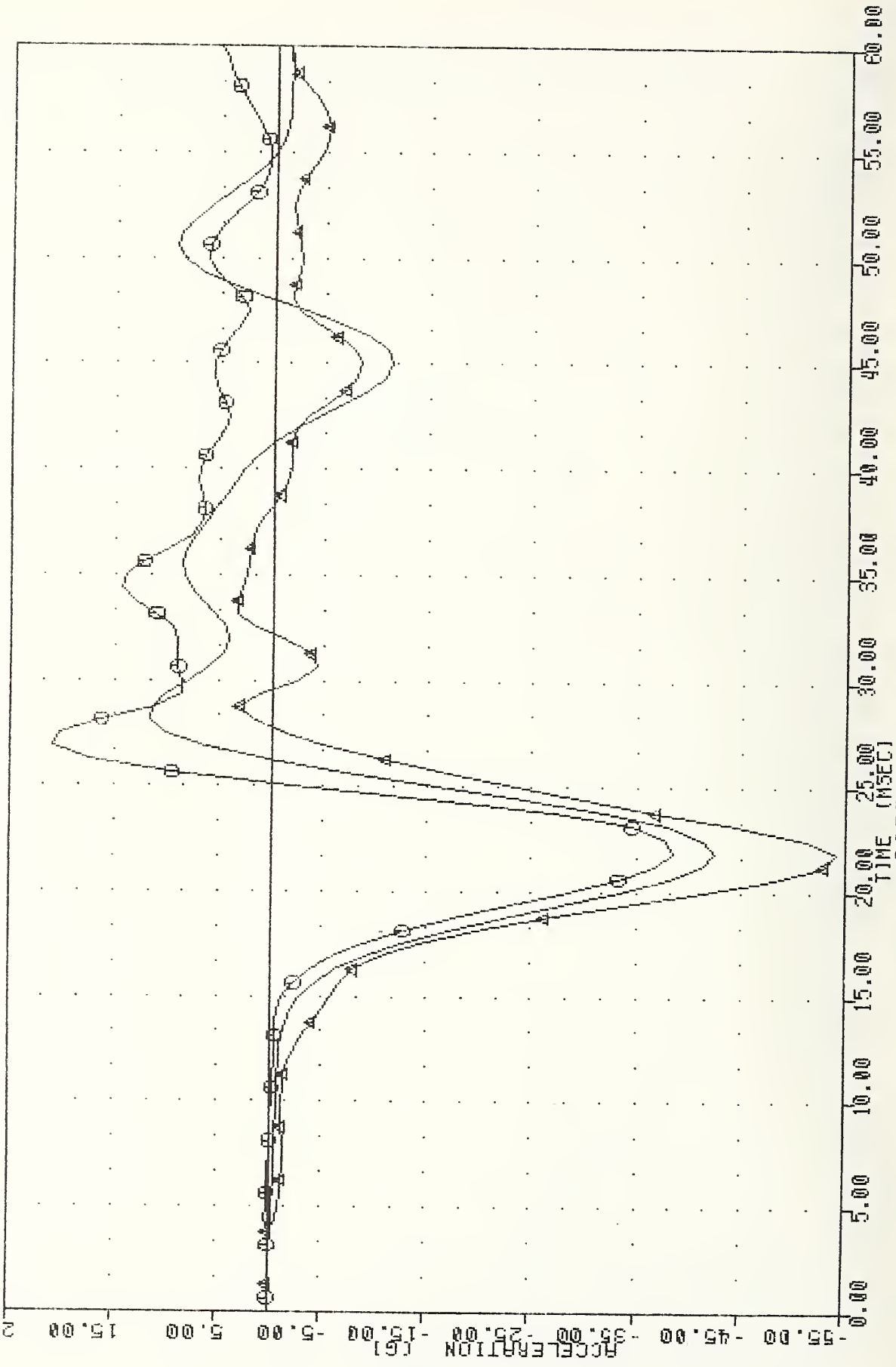


B-112

MOVING DEFORMABLE BARRIER INTO CITATION
DELTA V USING BRXGY

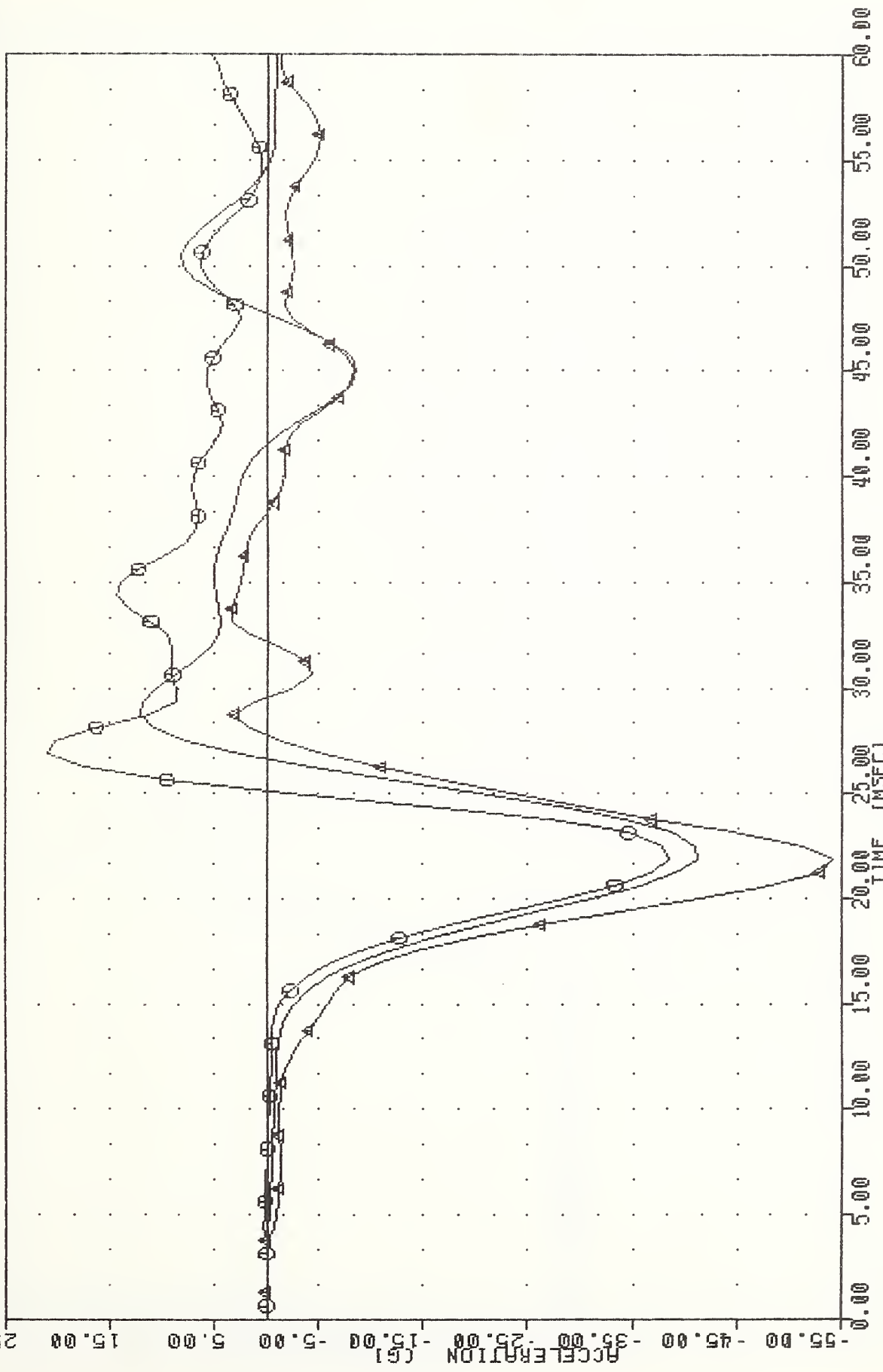
APPENDIX C
DUMMY CERTIFICATION

VRIC SRL91 • SIM0677 SID THORAX 6 BODY S16 CAL 77 83348 PLOT DATE 15-DEC-83 09:03:55
 LURYGA FILTER : HSRI 136/ 189/ -50 MIN. MAX = -42.56 e 21.25 e 11.66 e 27.50
 MN-250 0 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -38.44 e 21.25 e 20.92 e 26.25
 MN-250 4 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -54.08 e 21.25 e 3.31 e 33.13



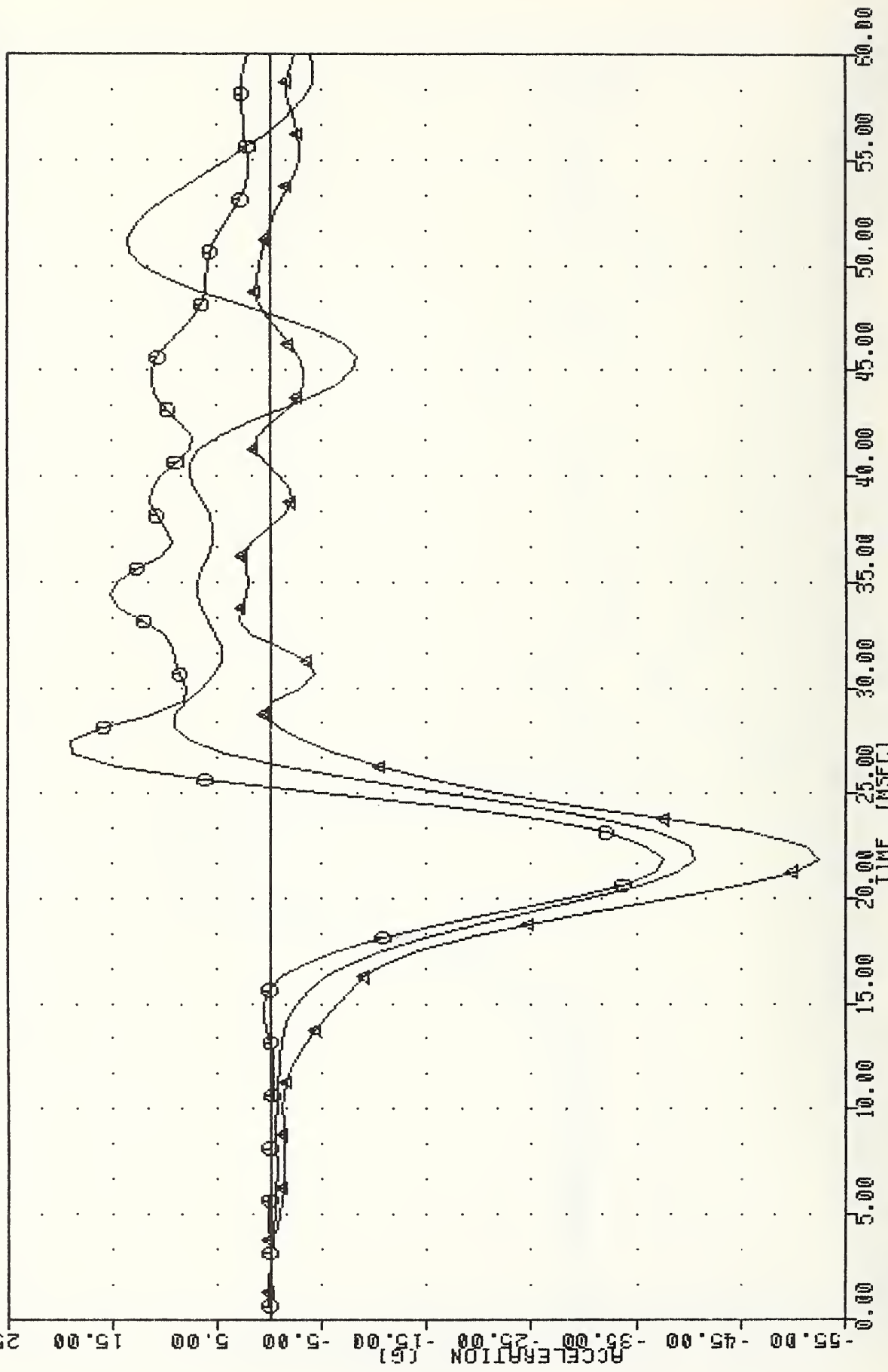
SIDE IMPACT TEST (006)
 LEFT UPPER RIB ACCELERATION Y AXIS -A

WRTC SAL91 , SIM0677 SID THORAX 6 BODY 318 CAL 77 83348 PLOT DATE 15-DEC-83 09:06:51
 LURYGI FILTER = HSRI 136/ 189/ -50 MIN. MAX = -41.18 e 21.25 12.09 e 26.13
 MN-2SD 0 FILTER = HSRI 136/ 189/ -50 MIN. MAX = -38.44 e 21.25 20.92 e 26.25
 MN-2SD 4 FILTER = HSRI 136/ 189/ -50 MIN. MAX = -54.08 e 21.25 3.31 e 33.13



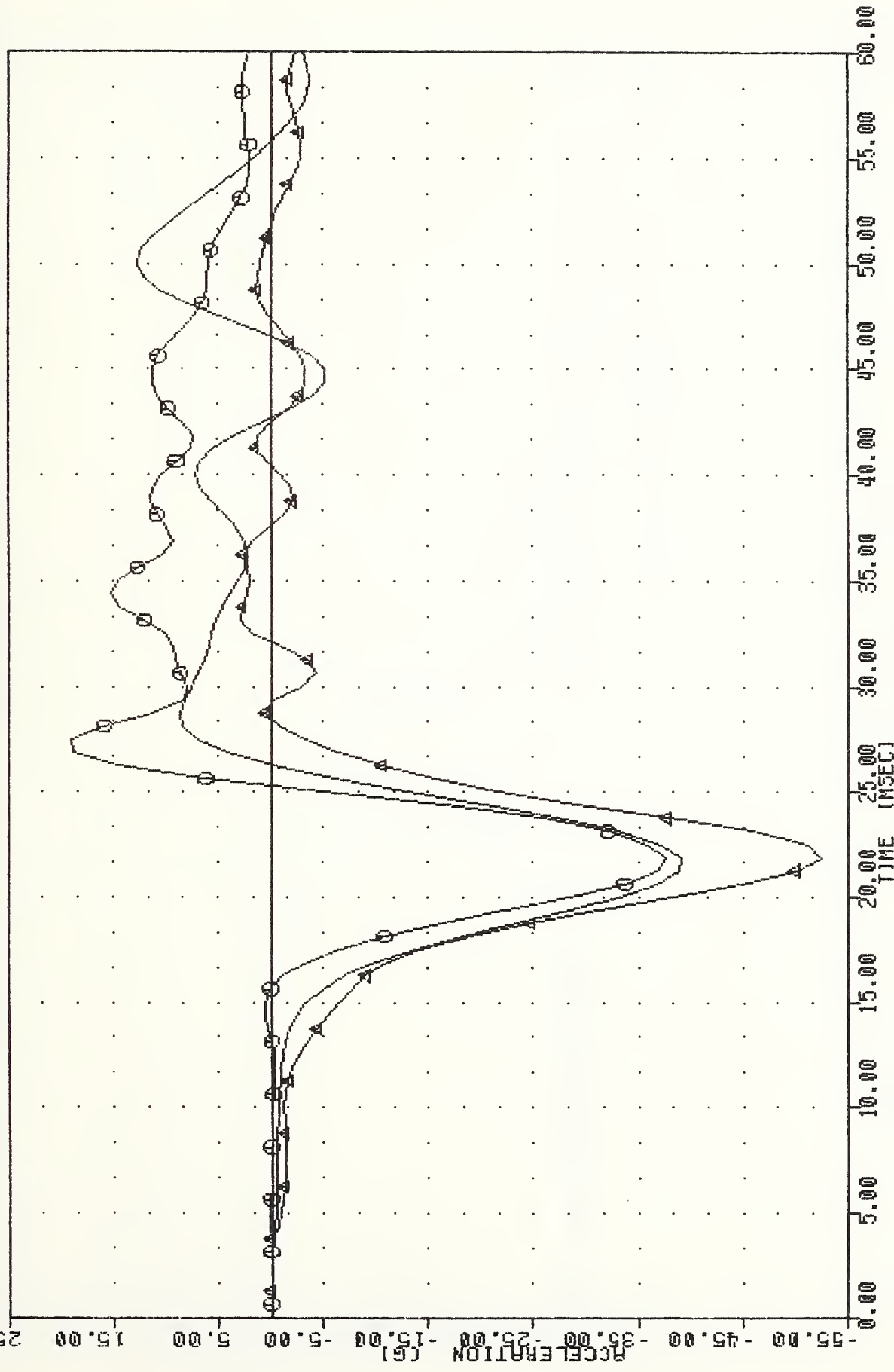
SIDE IMPACT TEST (006)
 LEFT UPPER RIB ACCELERATION Y AXIS - 1

VRTC SRL91 SID THORAX 6 BODY 318 CAL 77 83348 15-DEC-83 09:19:42
 LLYGA FILTER : HSRI 136/ 189/ -50 MIN. MAX = -40.70 e 13.52 e 50.63
 MN-2SD 0 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -37.66 e 19.00 e 26.87
 MN-2SD 4 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -52.52 e 2.94 e 32.50



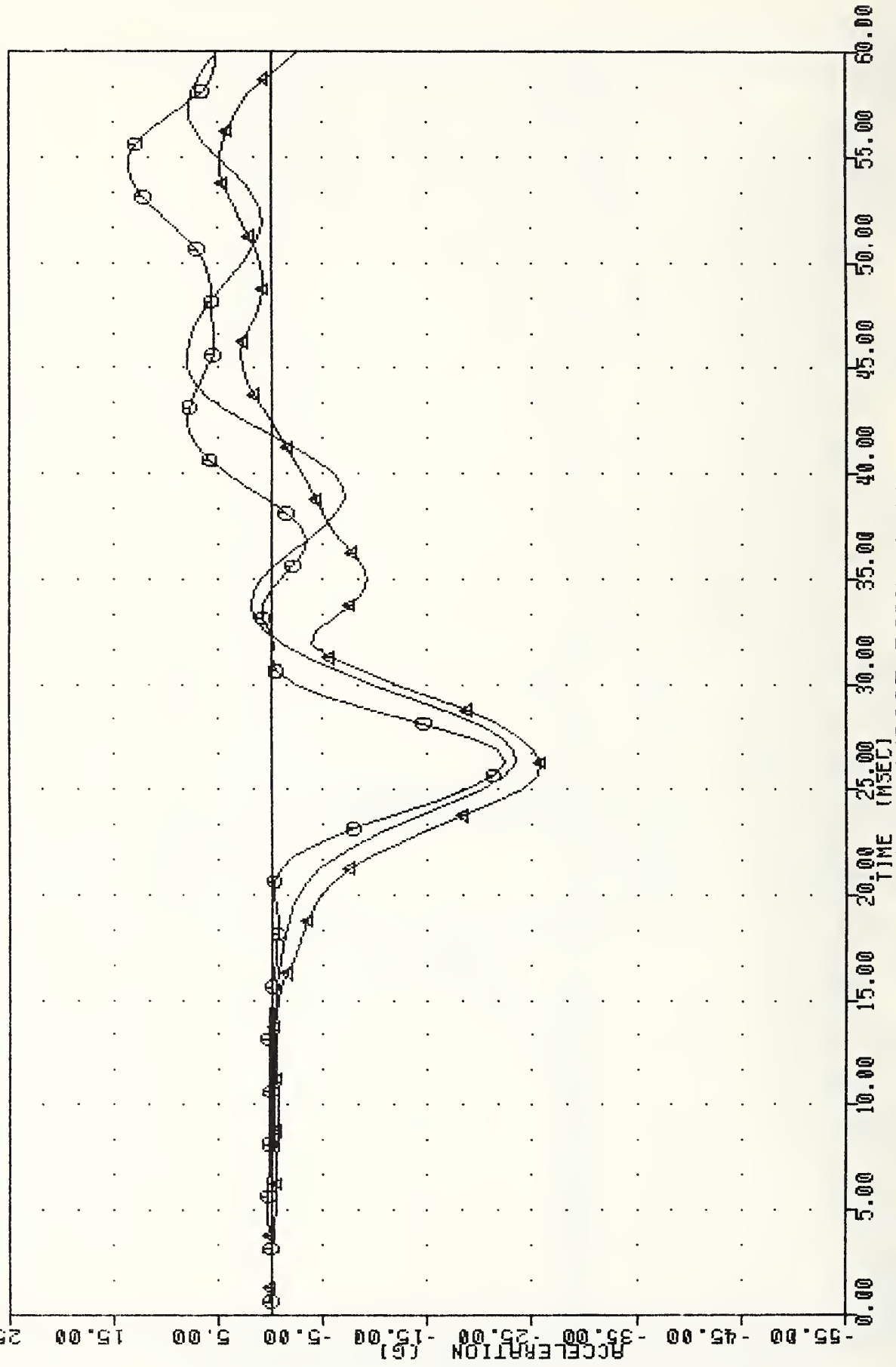
SIDE IMPACT TEST (006)
 LEFT LOWER RIB ACCELERATION Y AXIS - A

VRTC SRL91 , SINO677 SID THORAX 6 BODY 318 CAL 77 83348 15-DEC-83 09:05:07
 LLRY61 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -39.11 e 21.25 12.64 e 49.37
 MN-250 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -37.66 e 21.25 19.00 e 26.87
 MN-250 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -52.52 e 21.25 2.94 e 32.50



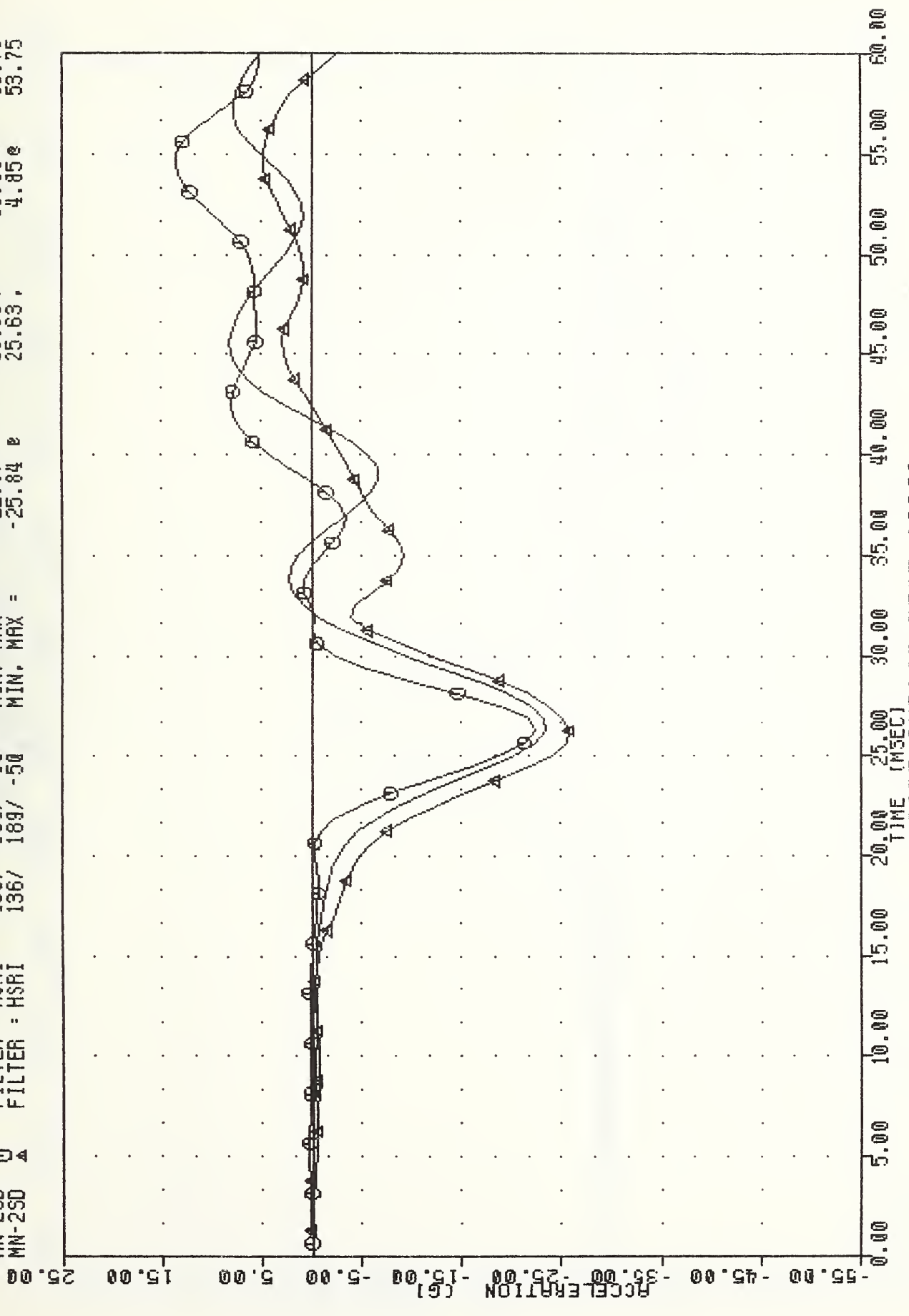
SIDE IMPACT TEST (006)
 LEFT LOWER RIB ACCELERATION Y AXIS - 1

VRTC SRU91 SID THORAX 6 BODY 316 CAL 77 83348 15-DEC-83 09:15:51
 T12YGA FILTER : HSRI 136/ 189/ -50 MIN, MAX = -23.35 8.02 45.00
 MN-2SD 0 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -22.37 13.54 53.75
 MN-2SD 4 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -25.84 4.85 53.75



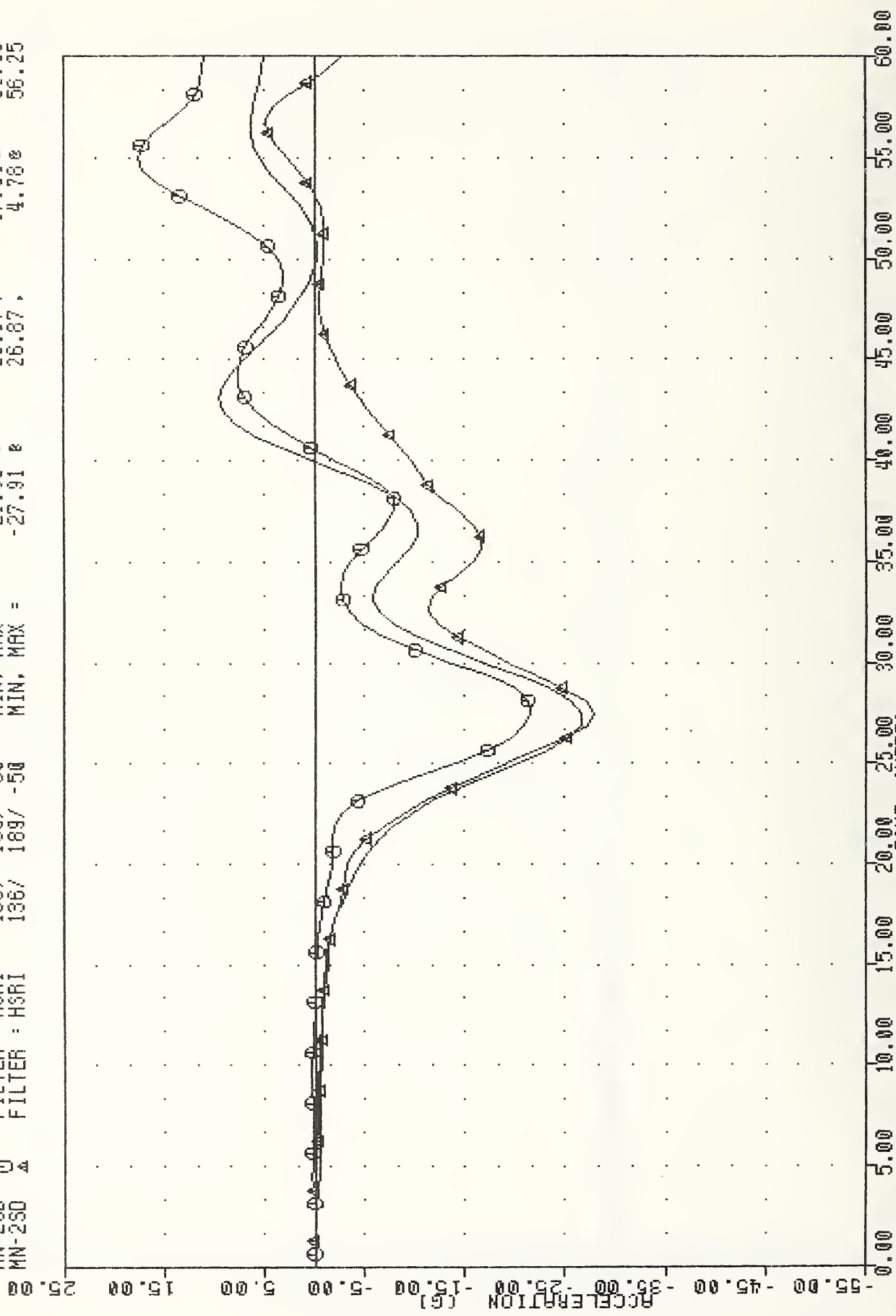
SIDE IMPACT TEST (0006)
 LOWER SPINE ACCELERATION Y AXIS - A

YRIC SRL91 , SIO0677 SID THORAX 6 BODY 318 CAL 77 83348 15-DEC-83 09:11:15
 T12YGI FILTER = HSRI 136/ 189/ -50 MIN, MAX = -23.43 25.63 8.08 45.00
 MN-2SD 0 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -22.37 25.63 13.54 53.75
 MN-2SD A FILTER = HSRI 136/ 189/ -50 MIN, MAX = -25.84 25.63 4.85 53.75



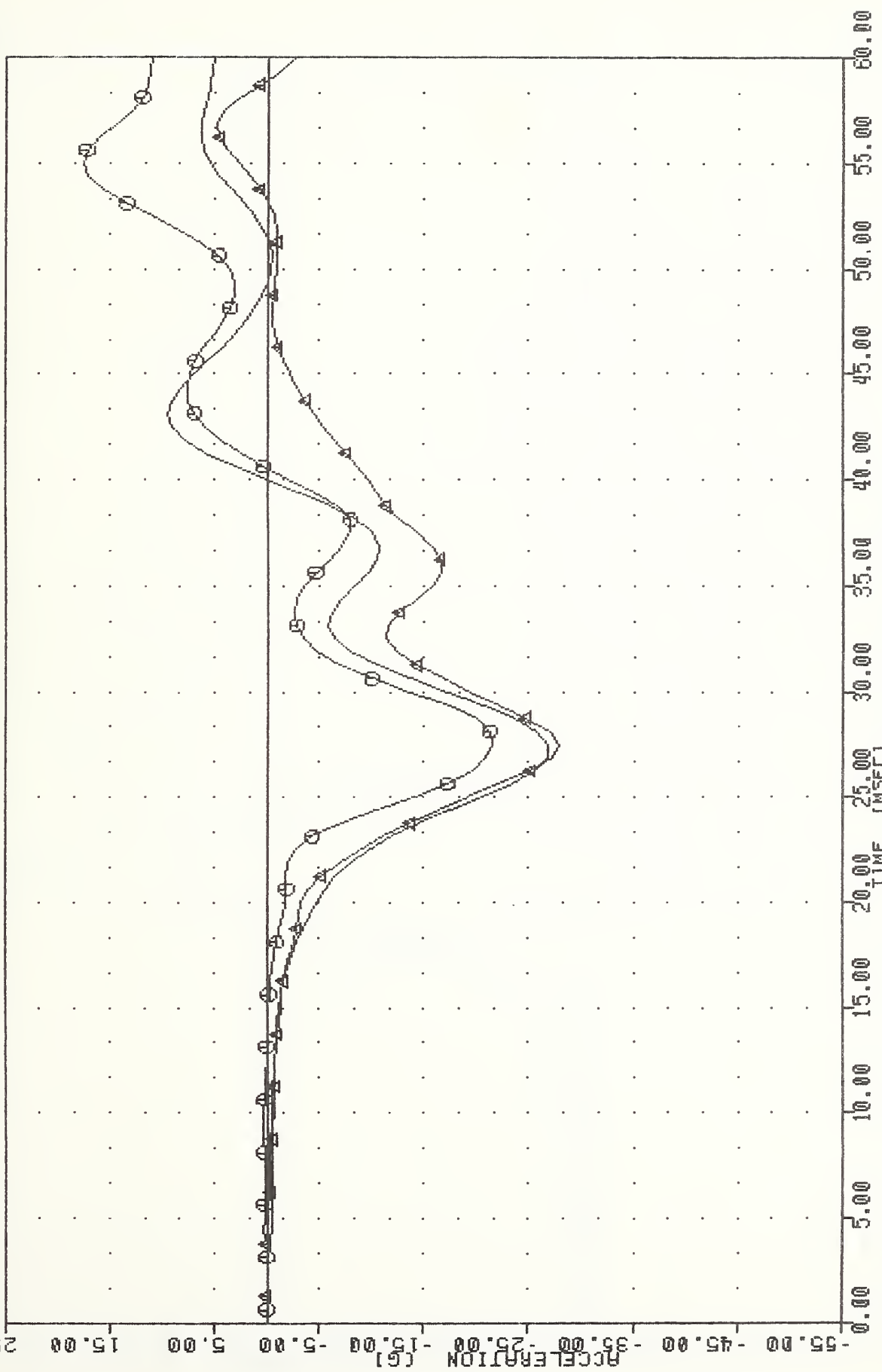
SIDE IMPACT TEST (006)
 LOWER SPINE ACCELERATION Y AXIS -1

WHFC SML91 SID IHURAX 6 BODY 318 CHL 77 83348 26.87 9.40 09:01:10
 TOIY61 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -26.62 9.40 42.50
 MN-2SD 0 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -21.58 17.54 54.38
 MN-2SD 4 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -27.91 4.78 56.25



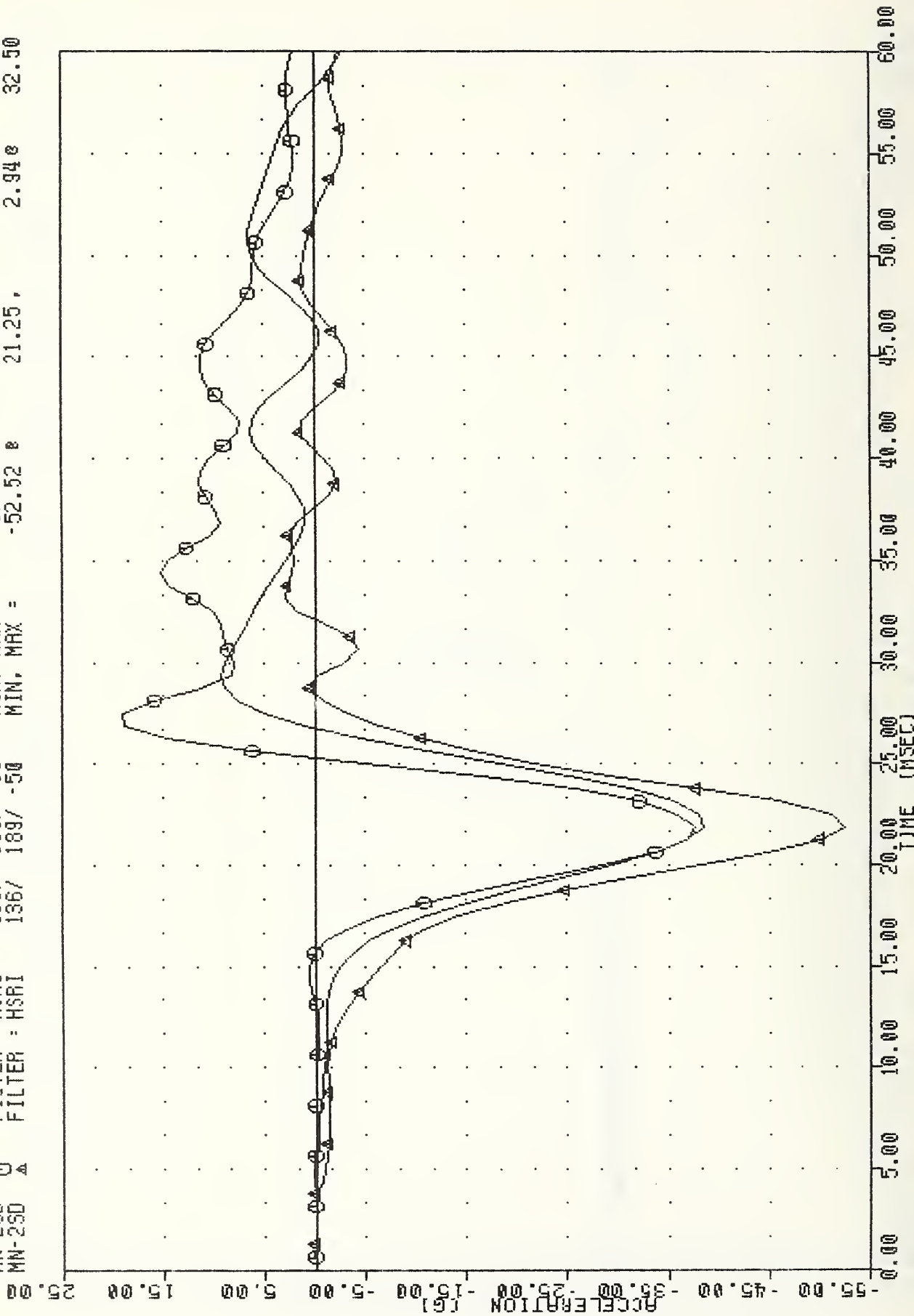
SIDE IMPACT TEST (006)
 UPPER SPINE ACCELERATION Y AXIS -1

VHF C 5HL91 • S100677 SID IHURAX 6 6001 318 LAL 77 83348 PLUT DATE 15-DEC-83 09:02:57
 TOIYGA FILTER = HSRI 136/ 189/ -50 MIN. MAX = -26.90 e 26.87 9.37 e 42.50
 MN-2SD 0 FILTER = HSRI 136/ 189/ -50 MIN. MAX = -21.58 e 26.87 17.54 e 54.98
 MN-2SD Δ FILTER = HSRI 136/ 189/ -50 MIN. MAX = -27.91 e 26.87 4.78 e 56.25



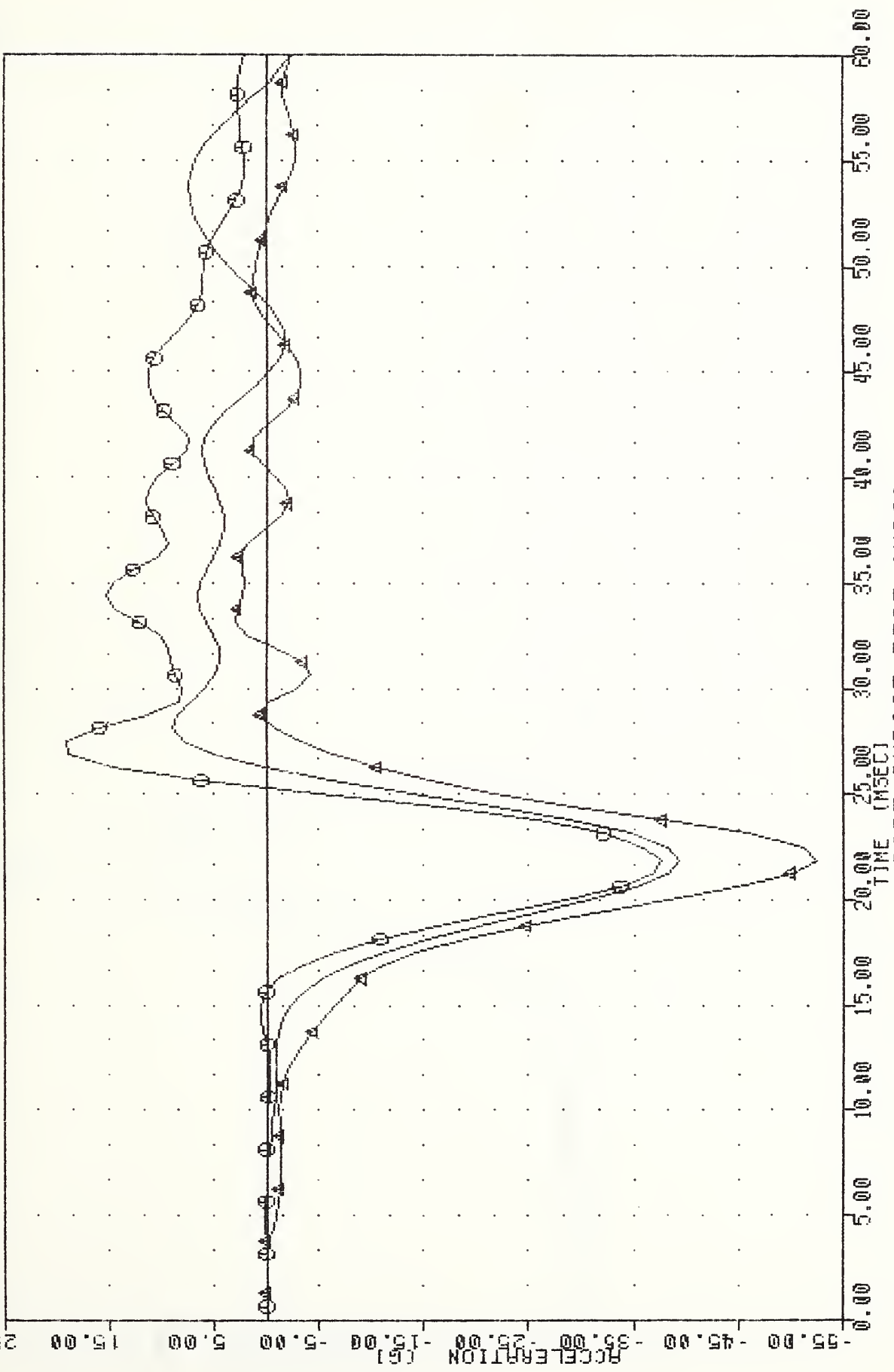
SIDE IMPACT TEST (0006)
 UPPER SPINE ACCELERATION Y AXIS -A

VRTC SRL91 , SIM0276 SID THORAX U02 BODY 830 CAL 76 83348 PLOT DATE 15-DEC-83 09:14:59
 LLRYGA FILTER = HSRI 136/ 189/ -50 MIN, MAX = -38.43 e 21.25 e 9.18 e 26.75
 MN-2SD 0 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -37.66 e 21.25 e 19.00 e 26.87
 MN-2SD A FILTER = HSRI 136/ 189/ -50 MIN, MAX = -52.52 e 21.25 e 2.94 e 32.50



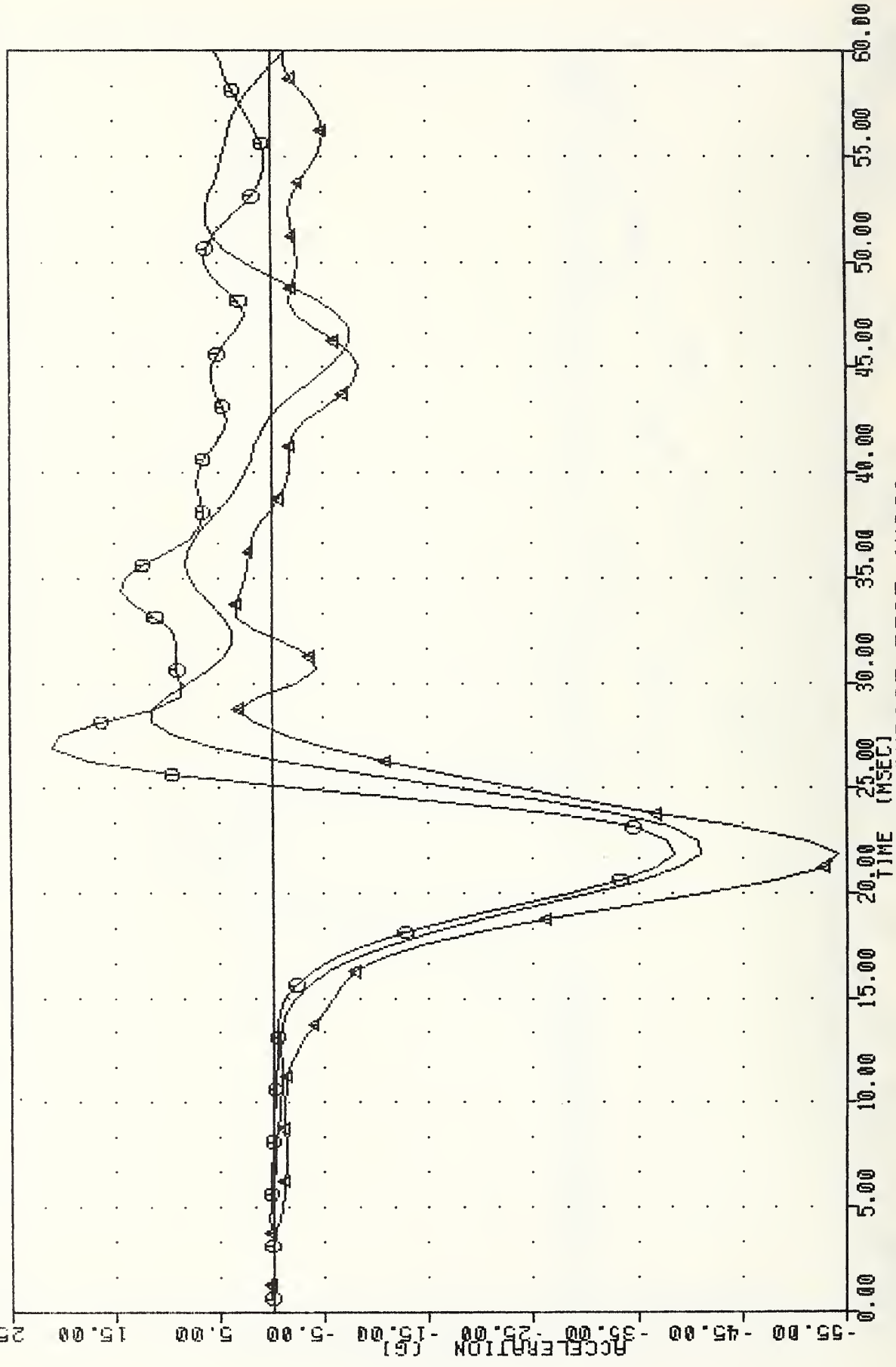
SIDE IMPACT TEST (U02)
 LEFT LOWER RIB ACCELERATION Y AXIS - A

WRTC SRL91 , SIU0276 SID THORAX U02 BODY 830 CAL 76 83348 PLOT DATE 15-DEC-63 09:09:47
 LLY61 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -39.41 e 21.25 e 8.70 e 27.50
 MN-250 0 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -37.68 e 21.25 e 19.00 e 26.87
 MN-250 4 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -52.52 e 21.25 e 2.94 e 32.50



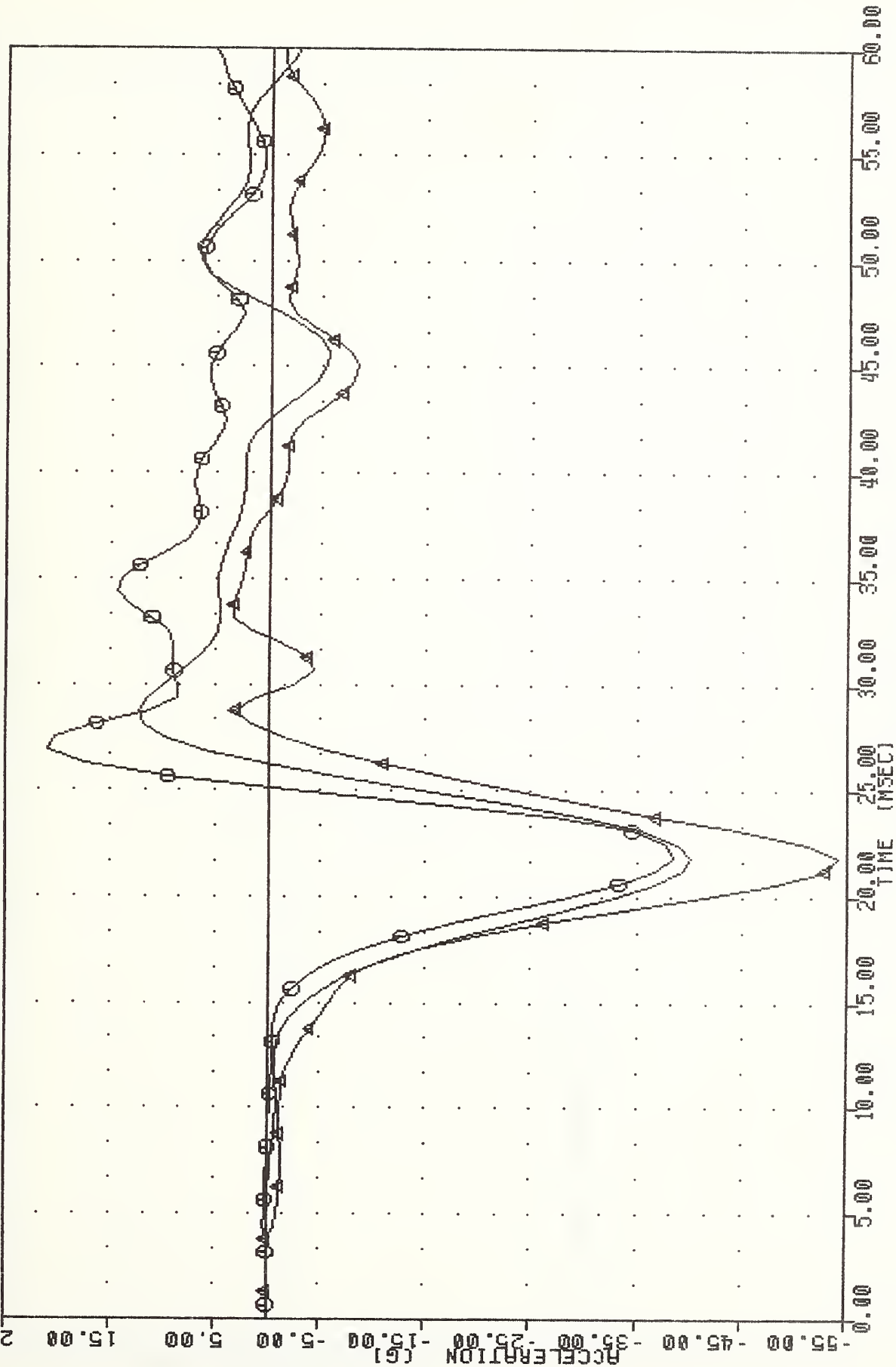
SIDE IMPACT TEST (U02)
 LEFT LOWER RIB ACCELERATION Y AXIS -1

VRTC SRL91 , STU0276 SID THORAX UN2 600Y 830 CAL 76 83348 PLOT DATE 15-DEC-83 09:18:58
 LURYGA FILTER : HSRI 136/ 169/ -50 MIN, MAX = -41.01 21.25 11.30 26.13
 MN-2SD FILTER : HSRI 136/ 169/ -50 MIN, MAX = -38.44 21.25 20.82 26.25
 MN-2SD FILTER : HSRI 136/ 169/ -50 MIN, MAX = -54.08 21.25 3.31 33.13



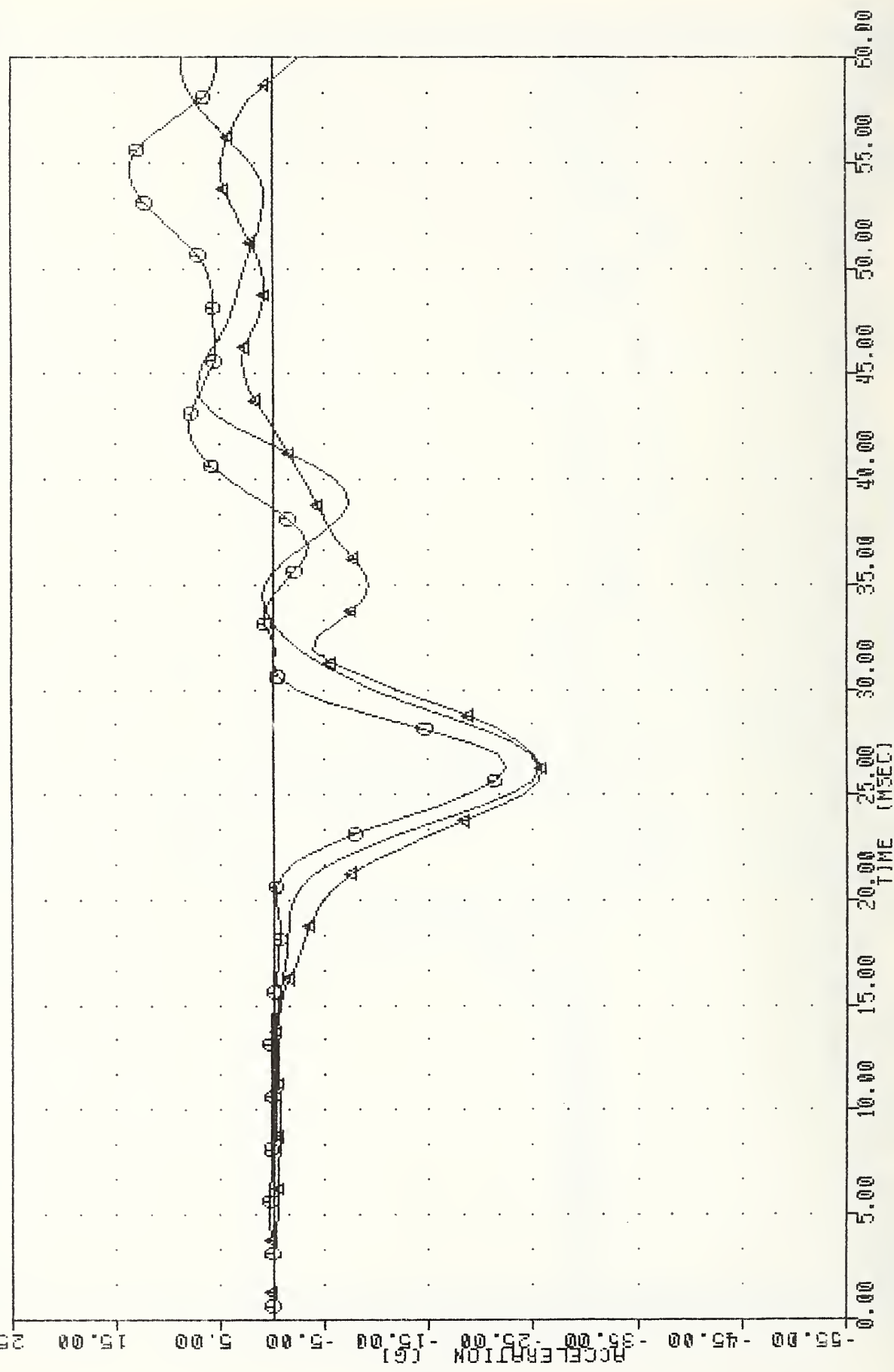
SIDE IMPACT TEST (U02)
 LEFT UPPER RIB ACCELERATION Y AXIS - A

VRIC SRL91 • SIU0276 SID THORAX U02 BODY 830 CAL 76 83348 PLOT DATE 15-DEC-83 09:21:07
 LURY61 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -40.16 e 12.25 e 28.13
 MN-2SD 0 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -38.44 e 20.92 e 26.25
 MN-2SD A FILTER : HSRI 136/ 189/ -50 MIN, MAX = -54.08 e 3.31 e 33.13



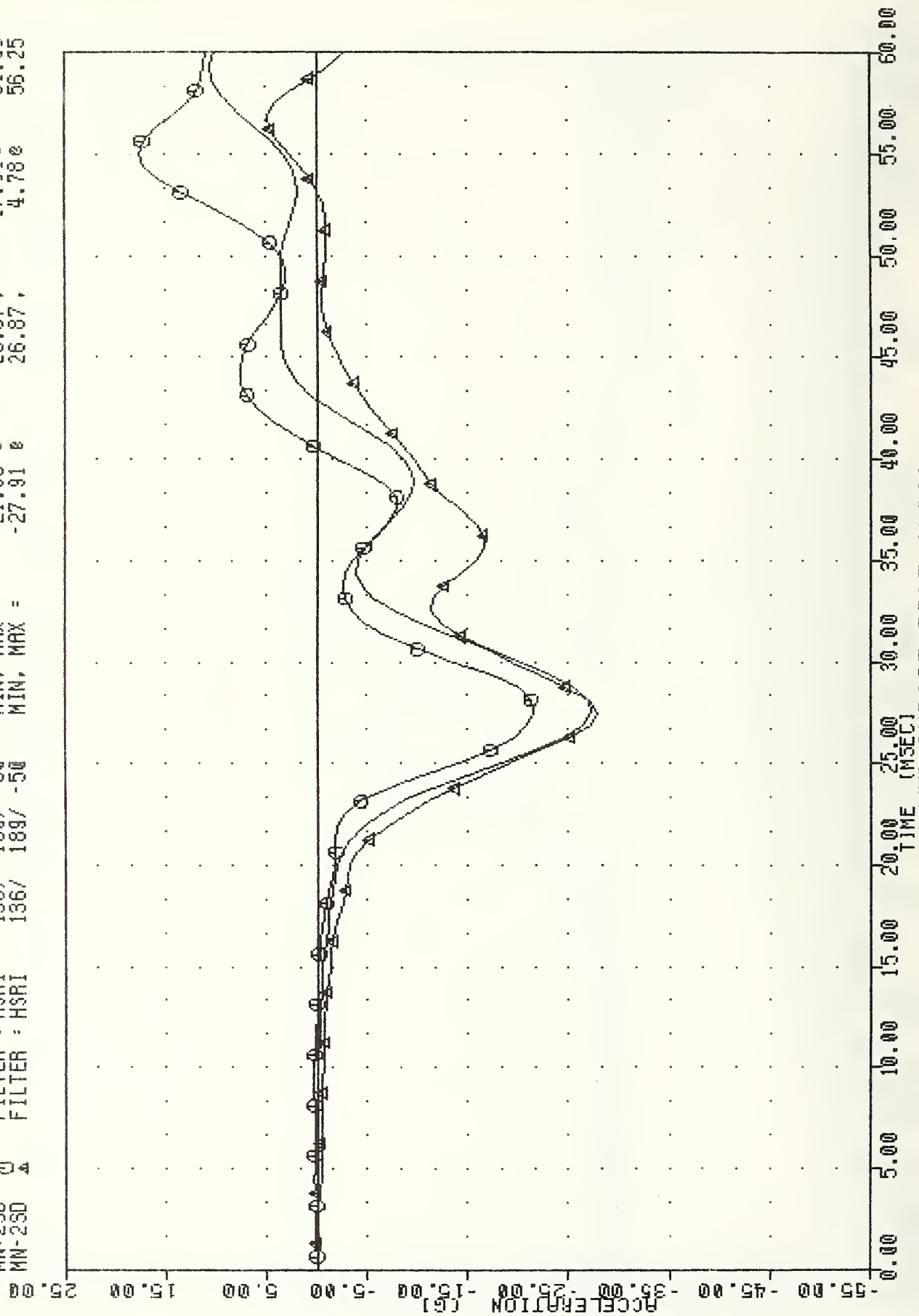
SIDE IMPACT TEST (U02)
 LEFT UPPER RIB ACCELERATION Y AXIS - 1

VRTC SRL91 .S100276 SID THORAX U02 BODY 830 CAL 76 83348 PLOT DATE 15-DEC-83 09:07:47
 T127GA FILTER : HSRI 136/ 189/ -50 MIN. MAX = -25.59 e 25.63 8.62 e 59.38
 MN-2SD 0 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -22.37 e 25.63 13.84 e 53.76
 MN-2SD 4 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -25.84 e 25.63 4.85 e 53.75



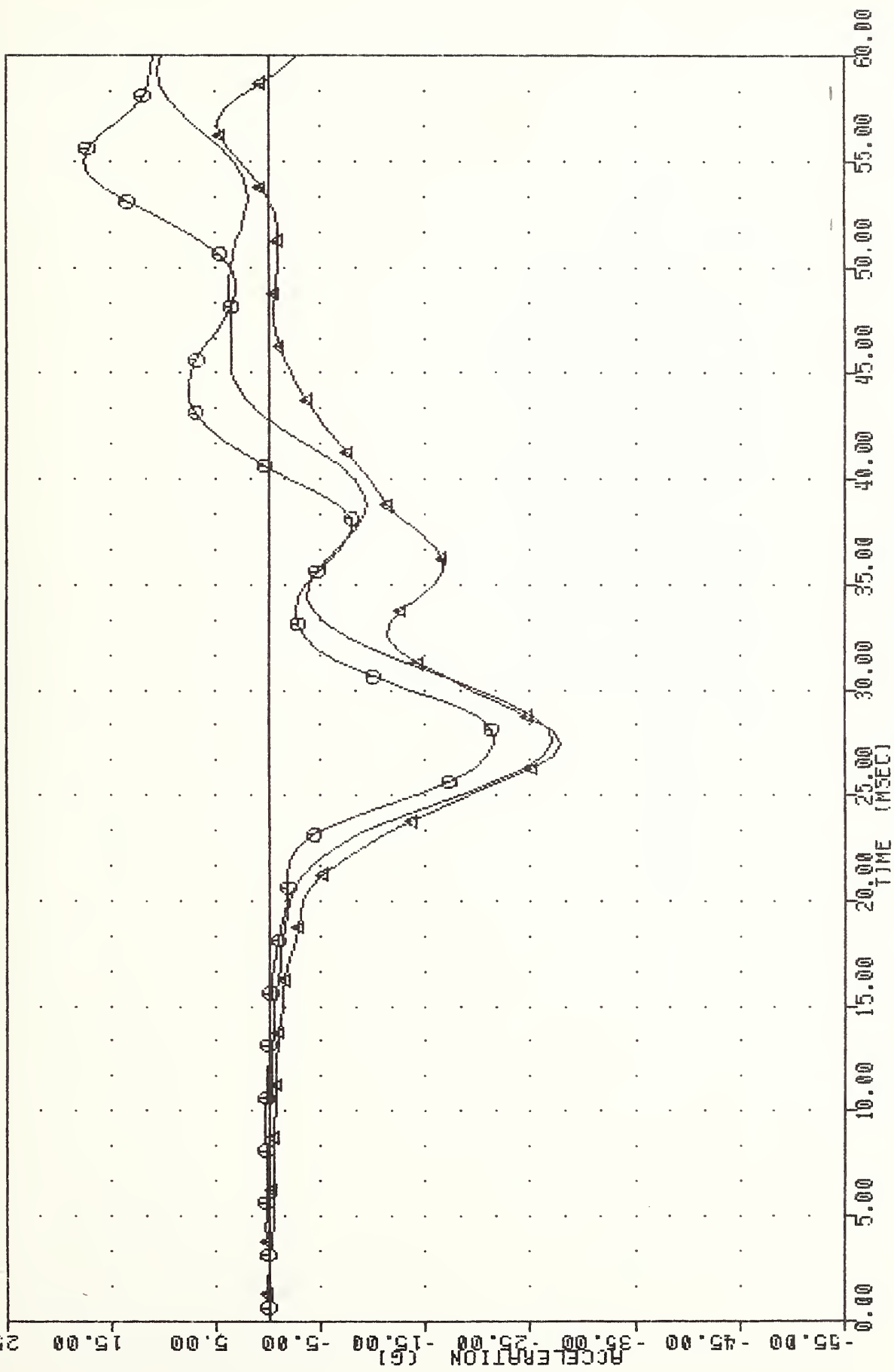
SIDE IMPACT TEST (U02)
 LOWER SPINE ACCELERATION Y AXIS -A

WRTC SRL91 , SIU0276 SID THORAX U02 BODY 830 CAL 76 83348 FLOT DATE 15-DEC-83 09:03:59
 TOYGA FILTER : HSRI 136/ 189/ -50 MIN, MAX = -27.28 e 10.46 e 58.75
 MN-2SD 0 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -21.58 e 17.54 e 54.38
 MN-2SD 4 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -27.91 e 26.87 e 56.25



SIDE IMPACT TEST (U02)
 UPPER SPINE ACCELERATION Y AXIS -A

VRFC SRA191 , SIM0276 SID THORAX U02 BODY 830 CAL 76 83348 PLOT DATE 15-DEC-83 09:02:03
 TO1Y6I FILTER : HSRI 136/ 189/ -50 MIN, MAX = -27.03 56.75
 MN-250 0 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -21.58 54.38
 MN-250 4 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -27.91 56.25



SIDE IMPACT TEST (U02)
 UPPER SPINE ACCELERATION Y AXIS -1

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Stultz, J.

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