

HS-806933 DOT 4854

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MVMA SIDE IMPACT TESTING

MDB-TO-CAR SIDE IMPACT TEST OF
A 26° CRABBED MOVING DEFORMABLE BARRIER
TO A 1985 FORD LTD
AT 33.5 MPH

PREPARED BY:
TRANSPORTATION RESEARCH CENTER OF OHIO
ST. RT. 33 LOGAN COUNTY
EAST LIBERTY, OHIO 43319

TEST REPORT
TEST NO.: 850703
TEST DATE: JULY 3, 1985
TEST CONDITIONS: BASELINE STRUCTURE, DUMMY
SEATED 5 INCHES FROM PADDED DOOR PANEL

PREPARED FOR:
MGA RESEARCH CORPORATION
12790 MAIN ROAD
AKRON, NEW YORK 14001-0071

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Prepared By:

B. L. Wade

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Project Engineer

Transportation Research Center of Ohio

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J. F. Shultis

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
acres	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	metric ton	t
	(2000 lb)			
VOLUME				
tsp	teaspoons	5	milliliters	ml.
Tbsp	tablespoons	15	milliliters	ml.
in ³	cubic inches	16	milliliters	ml.
fl oz	fluid ounces	30	milliliters	ml.
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius	°C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares	2.5	acres	
	(10 000 m ²)			
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton	1.1	short tons	
	(1000 kg)			
VOLUME				
ml.	milliliters	0.03	fluid ounces	fl oz
ml.	milliliters	0.06	cubic inches	in ³
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	degrees Celsius	9/5 (then degrees add 32)	degrees Fahrenheit	°F

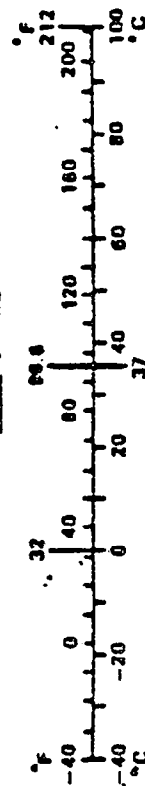


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SECTION 1.0
PURPOSE AND INTRODUCTION

PURPOSE

The main purpose of this test was to evaluate occupant responses to a padded door panel in a 90° side impact crash test.

INTRODUCTION

A stationary 1985 Ford LTD 4-door sedan was impacted on the right side by a Moving Deformable Barrier (MDB) on July 3, 1985. The test was to simulate an intersection collision with the striking vehicle travelling at 30 mph and the struck vehicle travelling at 15 mph. The orientation angle of the striking vehicle was 90° clockwise 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 Ford LTD at 33.5 mph with the MDB's wheels crabbed counterclockwise to 26°. The actual test speed was 33.5 mph and the actual leading edge of contact was 35.0 inches forward of the midpoint of the Ford LTD's wheelbase.

The vehicle was a baseline model with no structural modification. The front passenger inner door panel was replaced with a padded hardboard panel. The padding was five inches thick at dummy torso height and six inches thick at the pelvis and leg height. A side impact dummy (SID) was seated in the right front passenger seat with its shoulder just touching the door padding.

Section 2 contains test parameter data. Section 3 contains crash test data. Appendix A contains Data Plots. Appendix B contains Dummy Certification Data.

SECTION 2.0
TEST PARAMETER DATA

This section includes the following information:

1. General Test Vehicle Information
2. Dummy Temperature Control and Positioning Data
3. High Speed Camera Information
4. Transducer Information

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Ford LTD

VIN: 1FABP39AXFG214517

BODY STYLE: 4-Door Sedan

MODEL YEAR: 1985

NHTSA NO.: DNA

COLOR: Midnight Blue

ENGINE DATA: TYPE: Inline CYLINDERS: 4 DISPLACEMENT 140 cu. in.

TRANSMISSION DATA: Automatic

DATE VEHICLE RECEIVED: 6/19/85

ODOMETER READING: 9

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	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: Ford Motor Company

DATE OF MANUFACTURE: 4/85

GVWR: 4225 LBS.,

GAWR: FRONT 2103 LBS., REAR 2255 LBS.

VEHICLE TIRE DATA

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

TIRES ON VEHICLE (MFGR. & LINE, SIZE): General P195/75R14

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	785	LBS.	RIGHT REAR	668	LBS.
LEFT FRONT	807	LBS.	LEFT REAR	675	LBS.
TOTAL FRONT WEIGHT	1592		LBS. (54.2 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1343		LBS. (45.8 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	2935		LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 27 1/16	;LF 26 9/16	;RR 25 1/8	;LR 25 1/4
PRE-TEST ATTITUDE:	RF 26 3/8	;LF 26 1/4	;RR 23	;LR 23 1/2
POST-TEST ATTITUDE:	RF 26 1/8	;LF 25 3/4	;RR 21 1/2	;LR 22 1/2

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 105 LBS. CARGO:

RIGHT FRONT	834	LBS.	RIGHT REAR	821	LBS.
LEFT FRONT	770	LBS.	LEFT REAR	789	LBS.
TOTAL FRONT WEIGHT	1604		LBS. (49.9 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1610		LBS. (50.1 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	3214		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 ACTUAL

TEST VOLUME: 14.9 GALLONS

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 16.0 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? DNA

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: P195/75R14 LOAD RANGE X B, C,

VEHICLE CAPACITY:

TYPES OF SEATS:

Front - Split Bench
Rear - Bench

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 3 FRONT

3 REAR

CARGO LOAD 100 LBS.

6 TOTAL

TOTAL 1000 LBS.

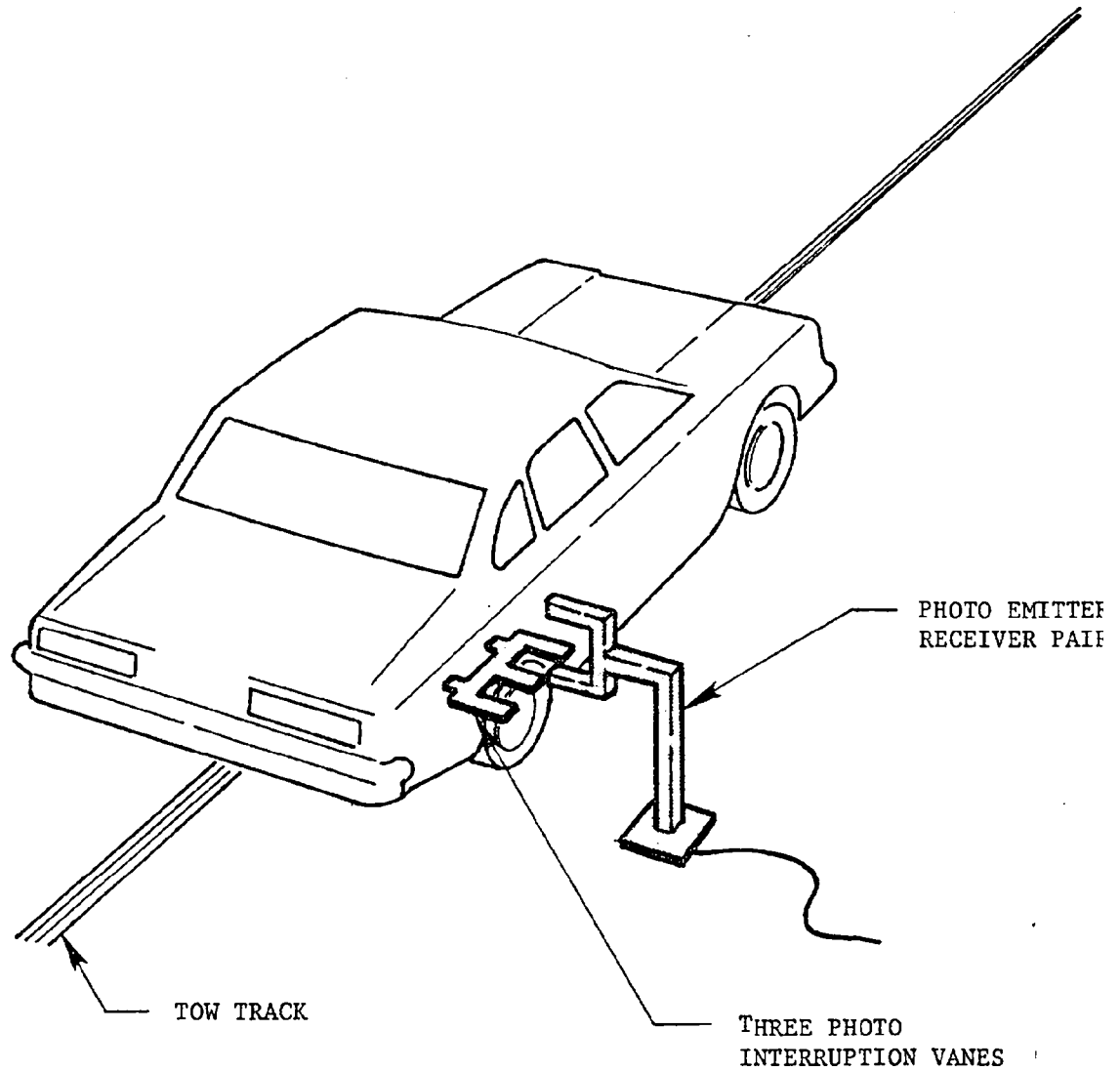
*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

VEHICLE TEST WEIGHT CALCULATION

$$\begin{aligned}\text{Test Weight} &= \text{Unloaded Delivered Weight} + \\ &\quad \text{Number of Dummies X 174 lbs.} + \\ &\quad \text{Cargo Weight} \\ &= 2935 + 1 \times 174 + 100 \text{ lbs.} \\ &= 3209 \text{ lbs.}\end{aligned}$$

To achieve test weight, 14.9 gallons of Stoddard Solvent were added in the fuel tank. The weight of the test vehicle was measured by placing each wheel on a Force Plate manufactured by K.J. Law Engineers, Inc., Detroit, Michigan.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears emitter/receiver two inches before impact.

The vanes have one foot spacing.

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.

SIDE IMPACT DUMMY SEATING PROCEDURE

The following is an outline of the Side Impact Dummy Seating Procedure which is currently being developed.

1. The seat is placed in the midpoint of the fore to aft adjustment.
2. The H-point location of the NHTSA Side Impact Dummy (SID) is located by using the SAE three-dimensional H-point machine (SAE J826 APR80 - 50TH Percentile Male Configuration). The H-point machine is positioned in the right front outboard designated seating position such that the midsagittal plane is vertical and longitudinal. The H-point is located and documented using Sections 4 through 6 of SAE Standard J826 APR80.
3. The H-point machine is removed and the SID is positioned in the right front passenger seat such that its right shoulder is either five inches from or against the hardboard or padded inner door panel. The knees are initially set 11 1/2 inches apart, measured between the outer surfaces of the knee pivot bolt heads, if possible. The H-point is then positioned to within 1/2 inch of the coordinates of the H-point machine H-point location found in Step 2 by applying force in the appropriate direction to the dummy's lower torso. If the dummy's upper torso does not rest against the seatback, position the torso without moving the H-point so the upper torso does rest against the seatback. The dummy's feet are then positioned such that the heels rest on the floorpan and the feet are on the toeboard. If the dummy's feet will not reach the toeboard, the feet are positioned such that the feet are at right angles to the lower legs. If wheelhouse projections interfere with the above positioning of the feet, the heel is placed on the floorpan with the foot perpendicular to the lower leg by twisting the foot about the ankle.
4. Prior to the crash test the dummy's longitudinal and lateral head locations are rechecked. The dummy is then visually checked.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

MFR./MAKE/MODEL: Ford LTD

FRONT SEAT TYPE: BENCH
BUCKET
X SPLIT BENCH

ADJUSTER TYPE: X MANUAL
POWER

BUCKET SEAT BACK TYPE: X FIXED
ADJUSTABLE

TECHNICIANS:
 1. B. Fishbaugh

POSITIONING DATE: 7/5/85

2. D. Carpenter

AMBIENT TEMP: 70 °F TIME: 9:00

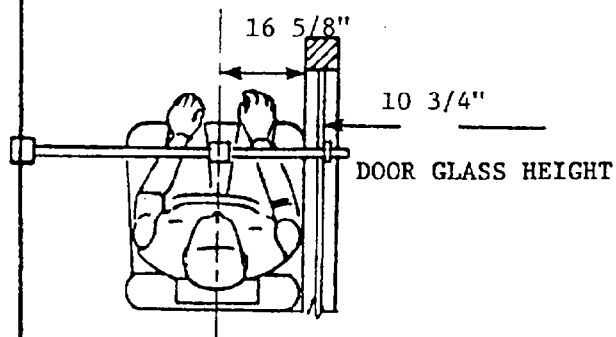
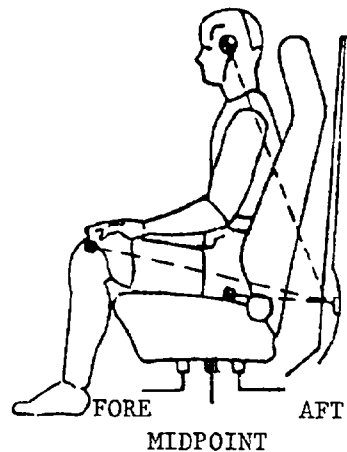
3. G. Watters

FRONT PASSENGER DUMMY # 119

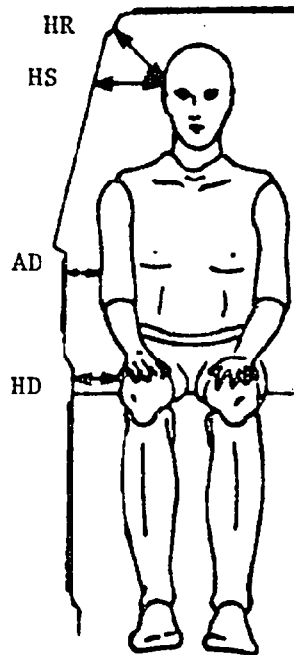
19 15/16" HEAD
3" TARGET*

25 1/2" KNEE
86" JOINT

APPROX.
12 3/4" "H"
112" POINT



*All passenger dummy dimensions referenced to top of front door striker bolt and all angles referenced to vertical.

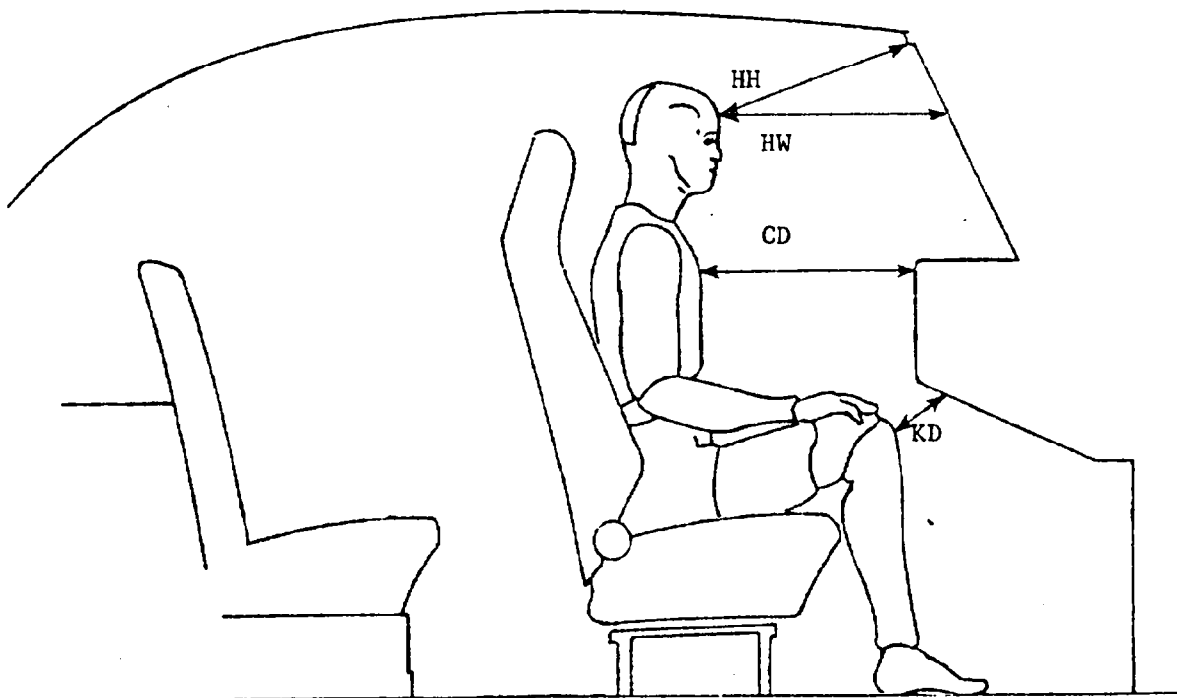


PASSENGER
119

HR	11 1/2
HS	14 15/16
AD	5
HD,	6

ALL MEASUREMENTS IN INCHES

DUMMY LATERAL CLEARANCE DIMENSIONS



PASSENGER
119

HH	12 9/16
HW	18 15/16
CD	19 5/8
KDL	4 1/8
KDR	5 1/8

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSION

LOCATIONS OF OFFBOARD HIGH SPEED CAMERAS

CAMERA NO.	X	Y	Z
1	-6'11 1/2"	-25'10 1/2"	+ 3'3"
2	-23'4 3/4"	+41'6 1/2"	+ 3'1"
5	0	0	+40'
6	+1'	0	+40'

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

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1		Beaulieu	18-86	24	Documentary
2	Panning	Kodak	16	24	Real Time
3	MDB Wide	Photosonic 1B	13	985	View Impact
4	Overhead Tight	Photosonic 1B	25	907	View Impact
5	Overhead Wide	Photosonic 1B	8	920	Vehicle Crush
6	Right	Photosonic 1B	25	1005	Vehicle Crush
7	Left	Photosonic 1B	13	962	Vehicle Crush
8	Onboard Windshield	Photosonic 1B	8	1000	Dummy Kinematics
9	Onboard Roof	Photosonic 1B	8	1000	Dummy Kinematics
10	Onboard Door	Photosonic 1B	8	988	Dummy Kinematics

TRANSDUCER INFORMATION

PARAMETER BEING MEASURED	LOCATION	TYPE OF TRANSDUCER	MFGR	MODEL NUMBER	SERIAL NUMBER
HEDXG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	2264	AY95
HEDYG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	2264	BA26
HEDZG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	2264	BA30
T01XG2	UPPER SPINE	ACCEL.	ENDEVCO	2264	AR93
T01YG2	UPPER SPINE	ACCEL.	ENDEVCO	2264	AN61
T01YGB	UPPER SPINE	ACCEL.	ENDEVCO	2264	AZ77
T01ZG2	UPPER SPINE	ACCEL.	ENDEVCO	2264	AN37
T12XG2	LOWER SPINE	ACCEL.	ENDEVCO	2264	AZ55
T12YG2	LOWER SPINE	ACCEL.	ENDEVCO	2264	BA64
T12YGB	LOWER SPINE	ACCEL.	ENDEVCO	2264	AZ74
T12ZG2	LOWER SPINE	ACCEL.	ENDEVCO	2264	AR86
RURYG2	RIGHT UPPER RIB	ACCEL.	ENDEVCO	2264	AR82
RURYGB	RIGHT UPPER RIB	ACCEL.	ENDEVCO	2264	AZ24
RLRYG2	RIGHT LOWER RIB	ACCEL.	ENDEVCO	2264	AN60
RLRYGB	RIGHT LOWER RIB	ACCEL.	ENDEVCO	2264	AY78
PEVXG2	PELVIS	ACCEL.	ENDEVCO	2264	AR78
PEVYG2	PELVIS	ACCEL.	ENDEVCO	2264	AN01
PEVZG2	PELVIS	ACCEL.	ENDEVCO	2264	AJ35
RRTYD2	RIGHT RIB TO SPINE DISPLACEMENT	LINEAR POT.	BOURNS	5184	4081-191
RFDYG1	RIGHT FRONT DOOR-POSITION 1	ACCEL.	ENDEVCO	2264	AJ42
RFDYG2	RIGHT FRONT DOOR-POSITION 2	ACCEL.	ENDEVCO	2264	AP56
RFDYG3	RIGHT FRONT DOOR-POSITION 3	ACCEL.	ENDEVCO	2264	BC29
RFDYG4	RIGHT FRONT DOOR-POSITION 4	ACCEL.	ENDEVCO	7264	AN86
LFSXG	LEFT FRONT SILL	ACCEL.	B & H*	4-202-0001	18840
LFSYG	LEFT FRONT SILL	ACCEL.	B & H	4-202-0001	18236
LFSZG	LEFT FRONT SILL	ACCEL.	B & H	4-202-0001	18837
BCGXG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18851
BCGYG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18859
BCGZG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18847
BRCXG	BARRIER REAR CROSS MEMBER	ACCEL.	B & H	4-202-0001	19002
BRCYG	BARRIER REAR CROSS MEMBER	ACCEL.	B & H	4-202-0001	18237

*Bell & Howell

SECTION 3.0
CRASH TEST DATA

The following pages are included in this section:

1. Test conditions
2. Dummy accelerometer data summary
3. Dummy contact points and kinematic summary
4. Vehicle accelerometer locations and data summary
5. Vehicle static crush table and profiles
6. Deformable moving barrier accelerometer locations and data
summary
7. Test anomalies

TEST CONDITIONS

TEST NUMBER: 850703

DATE OF TEST: July 3, 1985

TIME OF TEST:

WIND VELOCITY:

HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 72° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 77° F

DUMMY TEMPERATURE: 75° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
VEHICLE TEST WEIGHT (LBS.)	3214	3209
MDB TEST WEIGHT (LBS.)	2991	2992
MDB VELOCITY (MPH)*	33.5	33.5
IMPACT POINT (INCHES)**	35.0	37.0

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		
SERIAL NO.:			119		
INSTRUMENTATION:					
HEAD ACCEL.:			3		
CHEST ACCEL.:			12		
FEMUR L.C.'S:			0		
OTHER:			3 Pelvis		
			1 Rib Disp.		

RESTRAINT SYSTEM: Dummy was unrestrained

* As measured over final one foot of travel.

** As measured forward of the midpoint of the test vehicle's wheelbase

SIDE IMPACT DUMMY DATA SUMMARY

	PASSENGER DUMMY			
	POSITIVE		NEGATIVE	
	DIRECTION*		DIRECTION**	
	MAX	TIME	MAX	TIME
	(g)	(msec)	(g)	(msec)
HEAD ACCELERATION				
LONGITUDINAL	7.39	156.25	25.54	98.88
LATERAL	18.99	224.25	20.90	54.13
VERTICAL	47.89	68.75	4.61	27.63
RESULTANT		50.07 @ 69.13		
HIC	274.75	from 41.00 to 228.25		
DELTA V (MPH)		-16.2 @ 159.00		
CHEST ACCELERATION				
UPPER SPINE				
LONGITUDINAL	15.34	55.63	10.18	73.13
LATERAL (P)****	16.77	65.63	53.76	39.38
LATERAL (R)****	17.54	65.63	51.89	39.38
VERTICAL	5.27	53.12	10.24	63.75
RESULTANT (P)		55.66 @ 39.38		
RESULTANT (R)		53.85 @ 39.38		
DELTA V (MPH)***		-24.0 @ 63.75 (P)		
		-22.1 @ 63.63 (R)		
LOWER SPINE				
LONGITUDINAL	11.58	100.00	21.02	65.63
LATERAL (P)	11.26	106.87	63.84	38.75
LATERAL (R)	11.04	107.50	77.35	38.75
VERTICAL	4.24	93.13	10.22	63.13
RESULTANT (P)		67.16 @ 38.75		
RESULTANT (R)		80.11 @ 38.75		
DELTA V (MPH)		-25.2 @ 60.00 (P)		
		-30.4 @ 60.25 (R)		
RIGHT UPPER RIB				
LATERAL (P)	10.96	199.37	60.81	33.75
LATERAL (R)	13.39	200.00	63.85	33.75
DELTA V (MPH)		-19.9 @ 65.75 (P)		
		-20.4 @ 66.13 (R)		
RIGHT LOWER RIB				
LATERAL (P)	14.68	68.75	42.49	31.88
LATERAL (R)	17.71	200.00	48.64	31.88
DELTA V (MPH)		-20.7 @ 67.63 (P)		
		-21.3 @ 67.63 (R)		
PELVIS ACCELERATION				
LONGITUDINAL	10.03	88.13	29.80	49.63
LATERAL	27.68	85.63	59.86	51.38
VERTICAL	7.96	38.50	10.50	61.25
RESULTANT		60.49 @ 51.38		
DELTA V (MPH)		-25.6 @ 70.38		

SIDE IMPACT DUMMY DATA SUMMARY CONTD

	PASSENGER DUMMY			
	POSITIVE		NEGATIVE	
	DIRECTION*		DIRECTION**	
	MAX	TIME	MAX	TIME
	(in)	(msec)	(in)	(msec)
RIB DEFLECTION †	0.06	194.13	2.03	62.00

* LONGITUDINAL: FORWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

**LONGITUDINAL: REARWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD

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

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

†Compression: Negative

VISIBLE DUMMY CONTACT POINTS:

	DRIVER DNA	PASSENGER 119
Head	_____	Door Padding _____
Chest	_____	Door Padding _____
Abdomen	_____	Door Padding _____
Left Knee	_____	Right Knee _____
Right Knee	_____	Door Hard Board Panel _____

DOOR OPENING:

	LEFT	RIGHT
Front	Normal _____	Tools Required _____
Rear	Normal _____	Tools Required _____

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	No _____	No _____
Rear	No _____	No _____

GLAZING DAMAGE:

Front windshield was cracked _____

All right side door glass was broken _____

OTHER NOTABLE IMPACT EFFECTS:

Center arm rest fell down _____

DUMMY KINEMATIC SUMMARY

Upon impact, the dummy's right shoulder and right leg contacted the door padding. The dummy's head rotated down toward the right door window sill and struck the top of the door padding. The dummy then rebounded across the front occupant compartment and came to rest with buttocks on the middle of the seat with the torso leaning to the dummy's left.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

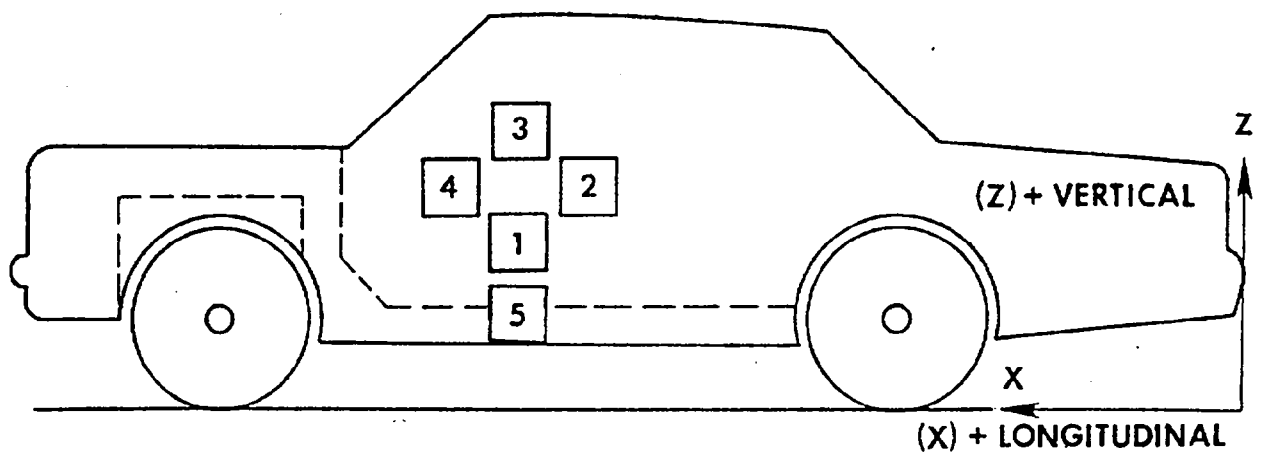
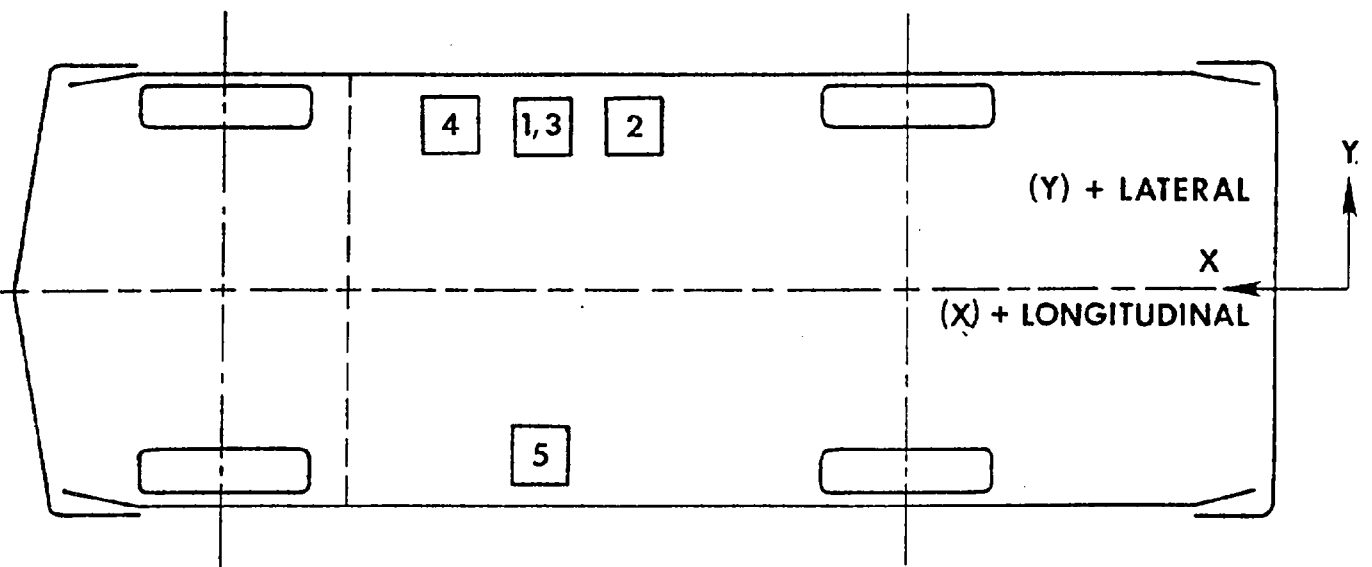
NO.	LOCATION	X*	Y*	Z*	POSITIVE** DIRECTION		NEGATIVE*** DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	RIGHT FRONT DOOR CENTERLINE (LATERAL) $\Delta V = -23.4$ mph @ 21.38 msec	112.0	28.8	22.5	91.58	29.25	129.95	13.75
2	MIDREAR OF RIGHT FRONT DOOR (LATERAL) $\Delta V = -22.5$ mph @ 27.38 msec	101.5	28.6	22.4	22.25	36.13	126.36	10.00
3	UPPER RIGHT FRONT DOOR CENTERLINE (LATERAL) $\Delta V = -21.4$ mph @ 23.63 msec	112.5	28.5	29.5	162.01	30.25	79.39	24.25
4	MIDFRONT OF RIGHT FRONT DOOR (LATERAL) $\Delta V = -21.3$ mph @ 15.00 msec	121.8	28.3	23.2	50.33	24.63	132.03	11.25
5	LEFT SILL AT FRONT SEAT (LONGITUDINAL) (LATERAL) $\Delta V = -13.5$ mph @ 135.75 msec (VERTICAL) (RESULTANT)	119.3	-26.4	13.9	3.14 3.15 5.86	54.38 90.50 67.25 25.03 @ 33.25	7.36 24.97 6.64	24.88 33.25 44.88

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

LONGITUDINAL: FORWARD *LONGITUDINAL: REARWARD
LATERAL: RIGHTWARD LATERAL: LEFTWARD
VERTICAL: DOWNWARD VERTICAL: UPWARD

All measurements of accelerometer locations in inches.

VEHICLE ACCELEROMETER PLACEMENT



VEHICLE EXTERIOR PROFILES AND STATIC CRUSH

ZERO DISTANCE AT PROJECTED IMPACT POINT*

LOCATION	HEIGHT (in)	78	72	66	60	54	48	42	36	30	24	18	12	6	0	6
		PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)														
Axle Height	12.4	X	17.4	17.2	17.1	17.1	17.0	16.8	16.8	16.8	16.8	16.7	16.7	16.6	16.5	X
H-Point	22.6	12.6	13.2	13.2	13.1	13.1	13.0	13.1	13.1	13.2	13.2	13.2	13.4	13.4	13.4	X
Window Sill	36.8	15.8	15.8	15.8	15.8	15.8	15.6	15.7	15.8	15.8	15.8	15.9	16.0	16.1	16.2	16.4
Window Top	54.6	24.0	23.9	23.8	23.8	23.7	23.8	23.8	24.0	24.0	X	X	X	X	X	X

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

Axle Height	12.4	X	23.7	24.0	24.6	26.2	28.0	28.7	29.7	30.2	30.5	30.2	30.8	25.8	23.4	X
H-Point	22.6	18.9	31.9	33.4	34.0	34.4	31.9	31.2	30.7	30.0	29.4	28.9	28.2	25.2	22.1	X
Window Sill	36.8	22.9	27.8	31.0	30.7	30.6	28.0	27.4	27.1	26.9	26.8	25.4	23.5	21.1	20.8	20.5
Window Top	54.6	27.4	27.6	28.7	28.0	28.4	29.1	28.9	28.9	28.8	X	X	X	X	X	X

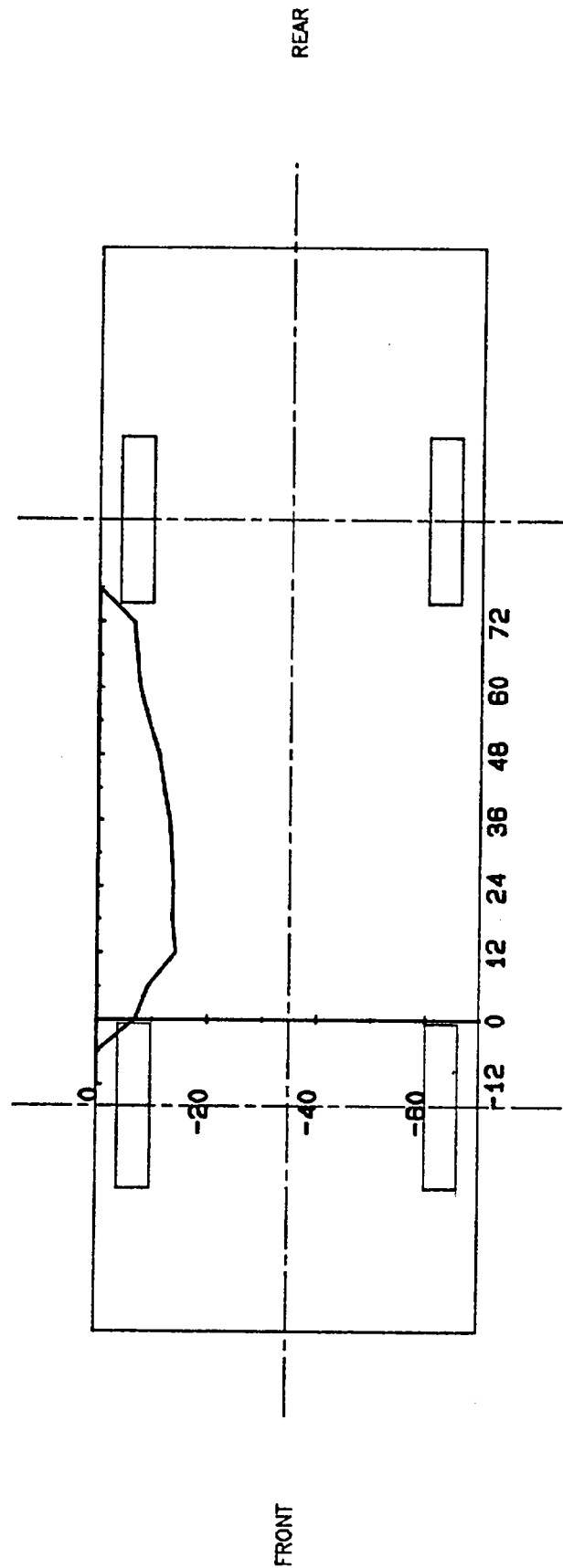
STATIC CRUSH (IN)

Axle Height	12.4	X	6.3	6.8	7.5	9.1	11.0	11.9	12.9	13.4	13.7	13.5	14.1	9.2	6.9	X
H-Point	22.6	6.3	18.7	20.2	20.9	21.3	18.9	18.1	17.6	16.8	16.2	15.7	14.8	11.8	8.7	X
Window Sill	36.8	7.1	12.0	15.2	14.9	14.8	12.4	11.7	11.3	11.1	11.0	9.5	7.5	5.0	4.6	4.1
Window Top	54.6	3.4	3.7	4.9	4.2	4.7	5.3	5.1	4.9	4.8	X	X	X	X	X	X

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

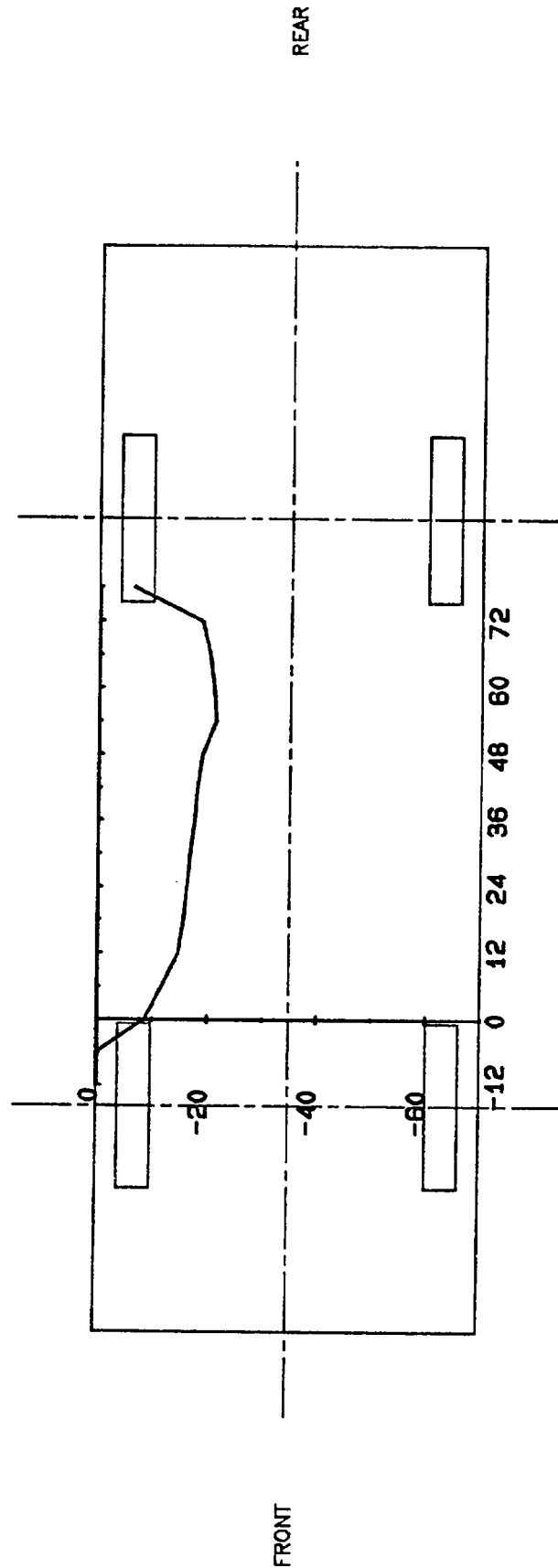
** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



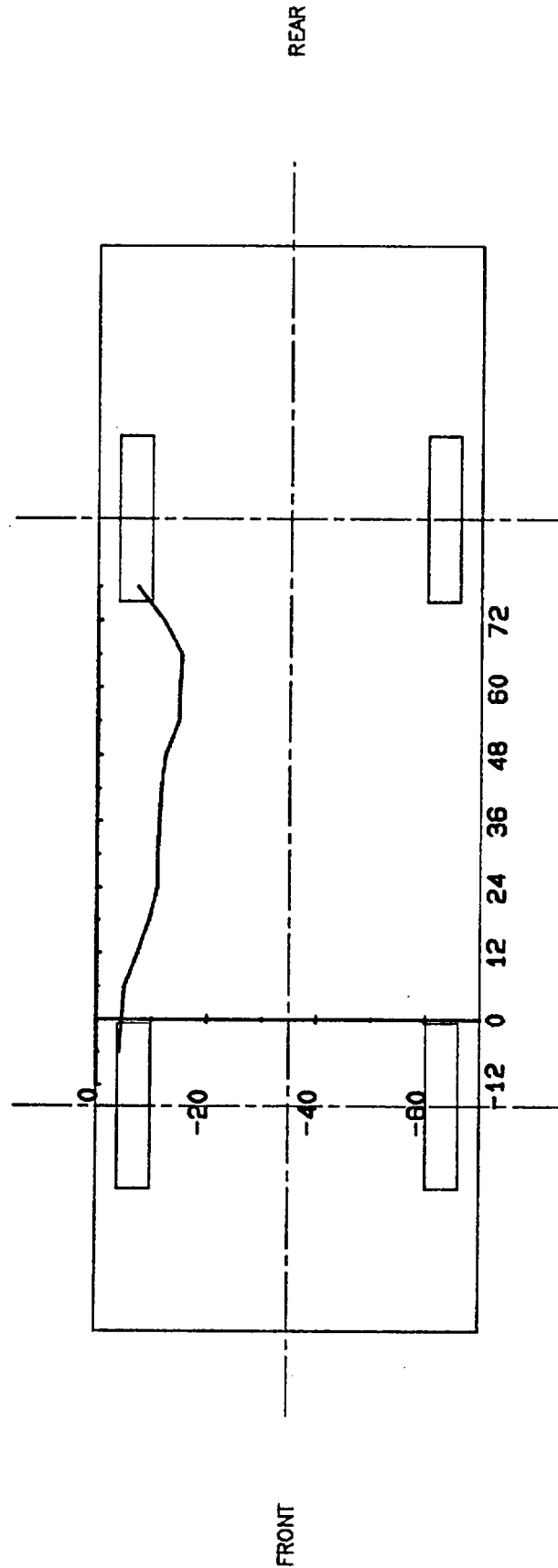
PROFILE LEVEL EQUALS AXLE HEIGHT WHICH IS 12.4" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



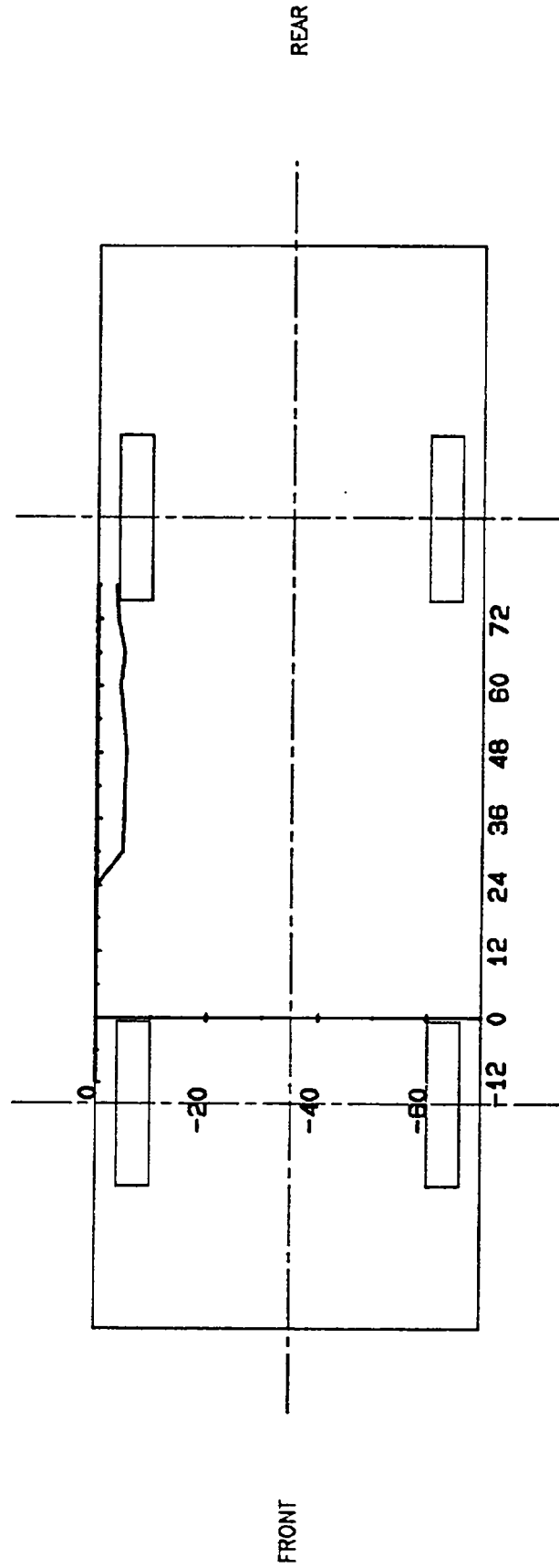
PROFILE LEVEL EQUALS H-POINT HEIGHT WHICH IS 22.6" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



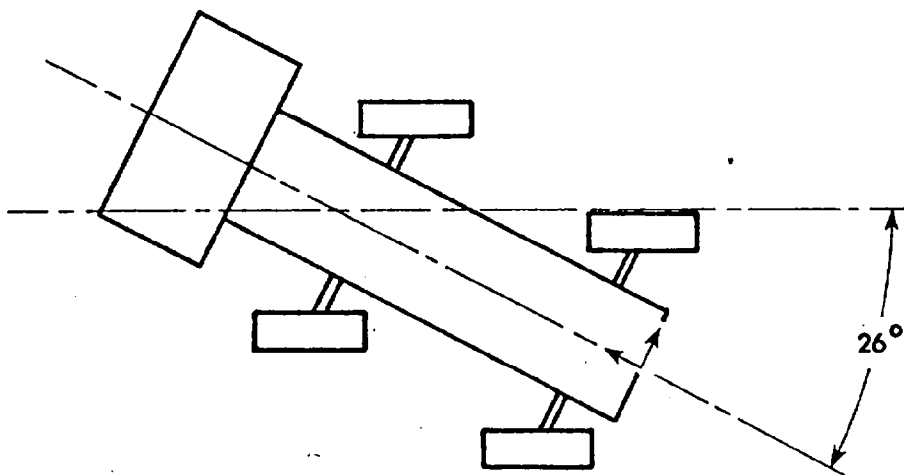
PROFILE LEVEL EQUALS WINDOW SILL HEIGHT WHICH IS 36.8" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT WHICH IS 54.6" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

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	73.0	0.9	11.9				
	(LONGITUDINAL) $\Delta V = -19.6$ mph @ 170.38 msec				---	--- ^x	13.07	30.88
	(LATERAL) $\Delta V = 5.5$ mph @ 170.38 msec				8.15	29.50	---	--- ^ε
	(VERTICAL)				4.84	46.88	---	--- ^ε
	(RESULTANT)					15.34 @ 30.50		
2	REAR FRAME MEMBER	18.5	-19.2	11.9				
	(LONGITUDINAL) $\Delta V = -14.1$ mph @ 170.38 msec				---	--- ^x	10.27	41.88
	(LATERAL) $\Delta V = 0.5$ mph @ 170.38 msec				4.33	117.00	4.59	37.25

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

LONGITUDINAL: FORWARD *LONGITUDINAL: REARWARD
 LATERAL: RIGHTWARD LATERAL: LEFTWARD
 VERTICAL: DOWNWARD VERTICAL: UPWARD

All measurements of accelerometer locations in inches.

^x There were no positive values in the time interval of interest.

^ε There were no negative values in the time interval of interest.

APPENDIX A

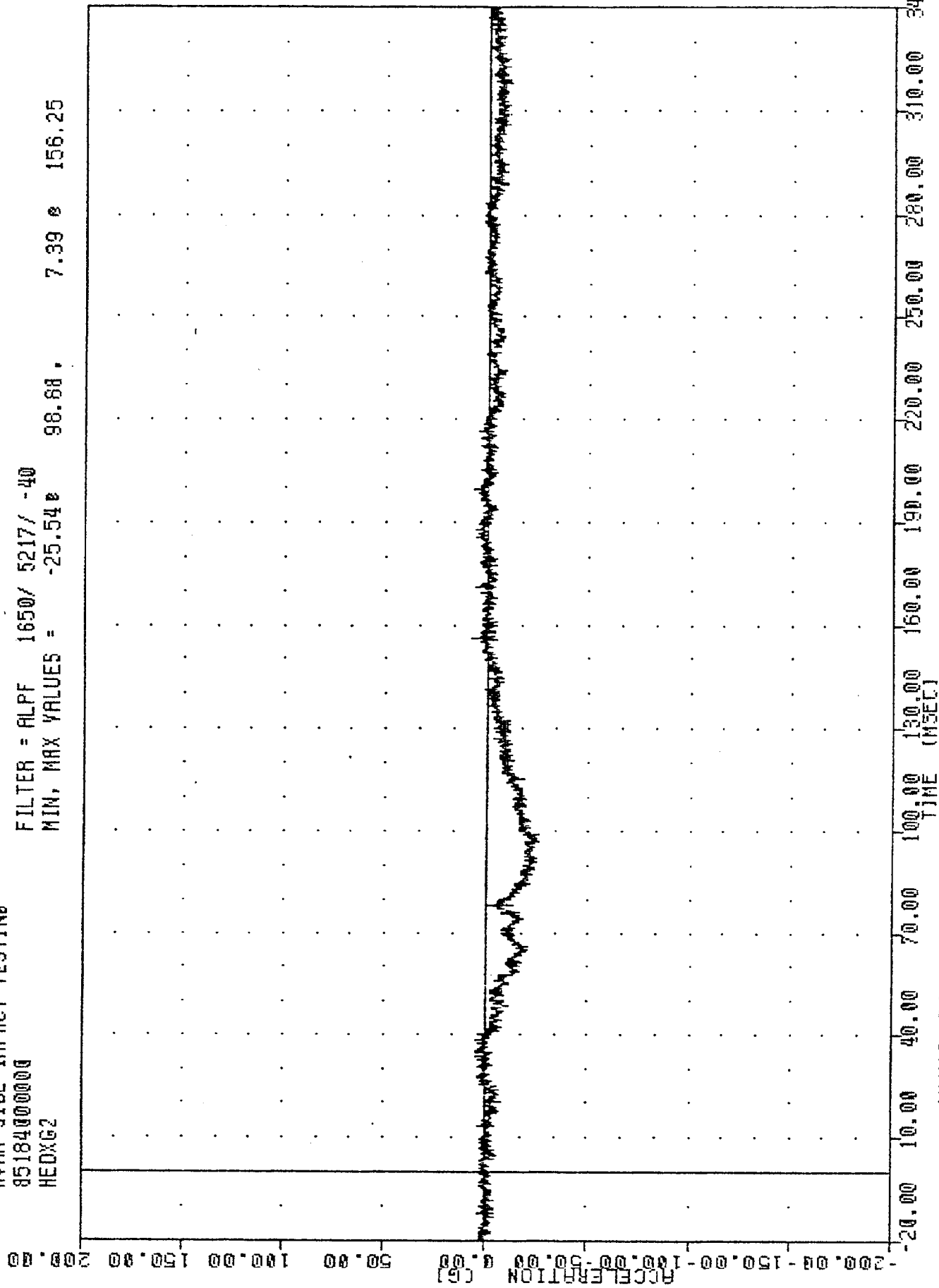
DATA PLOTS

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.

TRC
 NVMA SIDE IMPACT TESTING
 85184000000
 HEDXG2

PLOT DATE 24-JUL-85 13:32:19

FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -25.54 98.68, 7.39 156.25



NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER SEAT ACCELERATION V NVTC

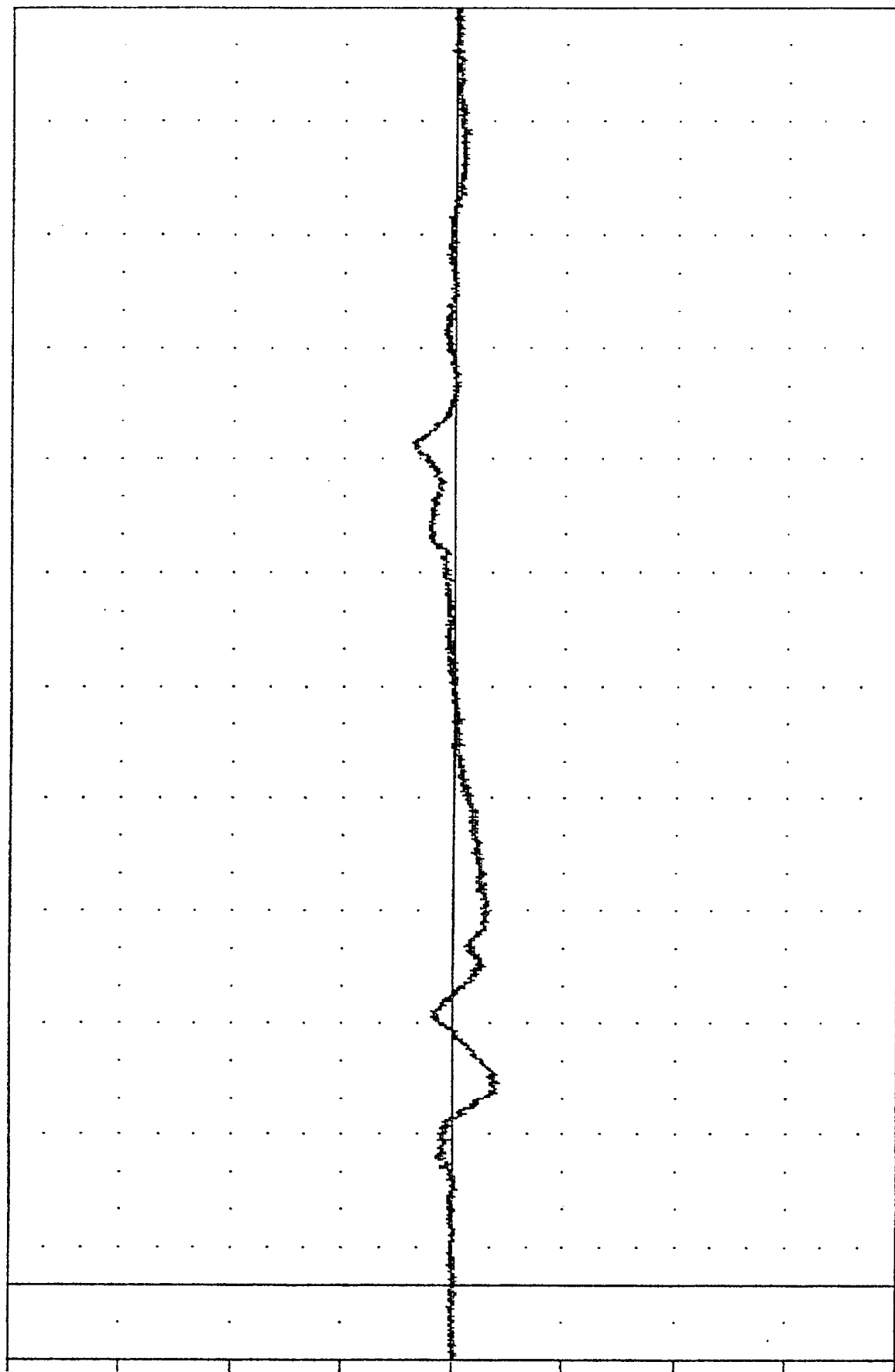
TRC
MVNA SIDE IMPACT TESTING
85184000000
HEDYG2

PLOT DATE 24-JUL-85 13:32:19

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -20.90e 54.13, 18.99 e 224.25

ACCELERATION (G)



-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

MVNA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
PASSENGER HEAD ACCELERATION V DOTS

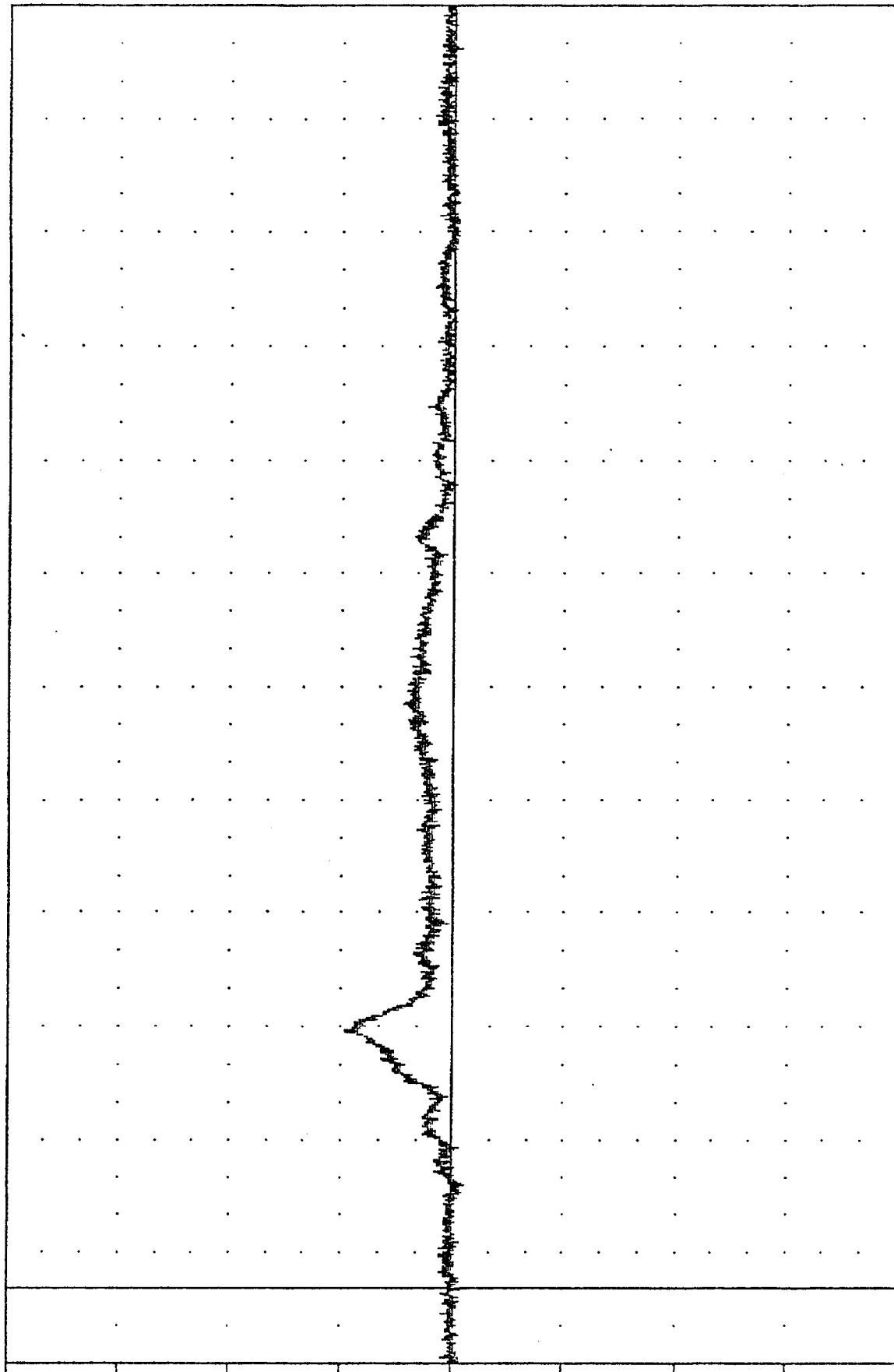
TAC
MVMA SIDE IMPACT TESTING
85184000000
HEDZ62

PLOT DATE 24-JUL-85 13:32:19

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -4.61g 27.63g 47.89g 68.75g

4-V
ACCELERATION (G)



-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)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADOED/FAR SEATING
PASSENGER HEAD ACCELERATION 7 AXIS

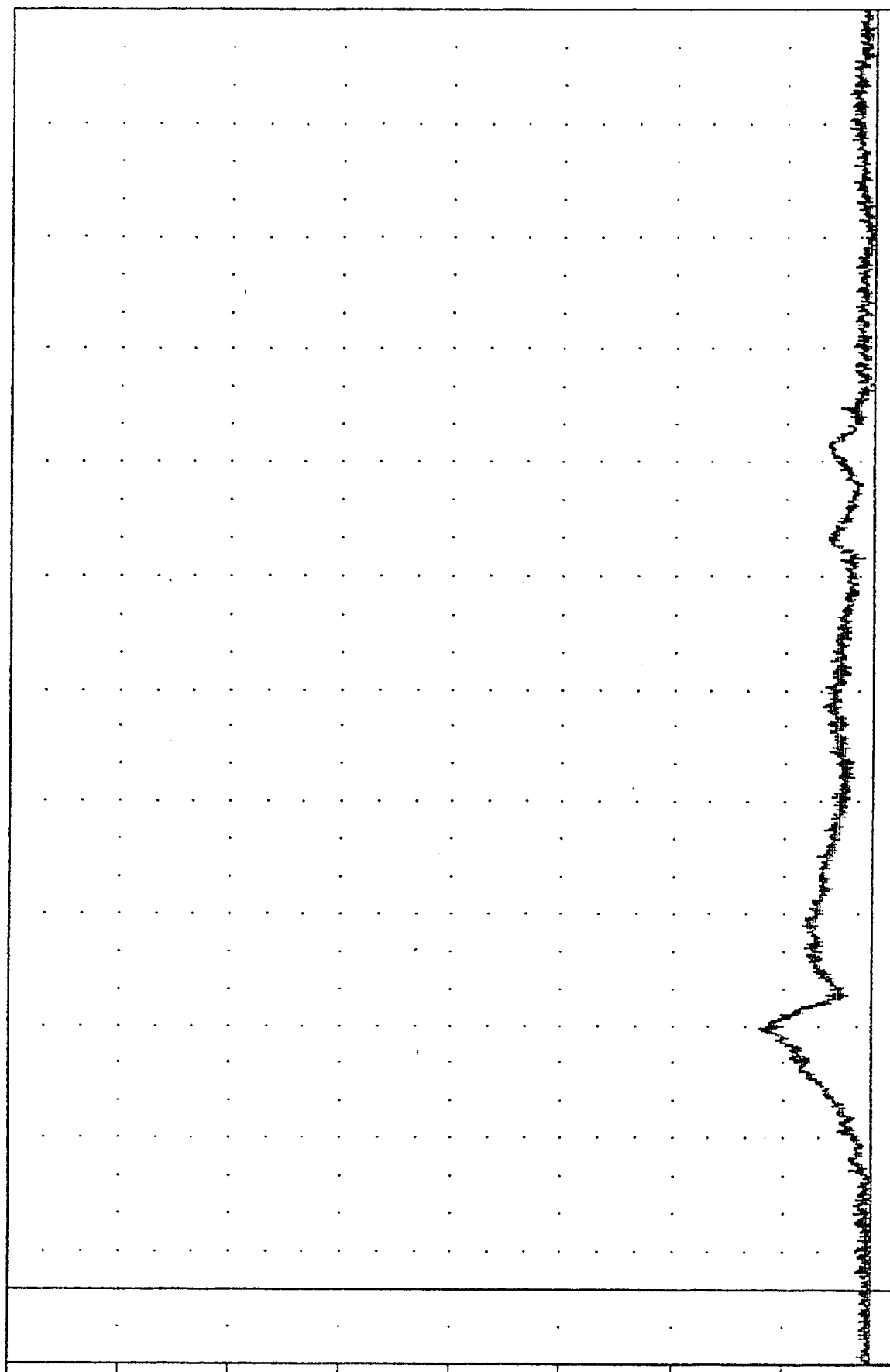
TRC
 NVMA SIDE IMPACT TESTING
 85184000000
 HEDRG2

PLOT DATE 24-JUL-85 13:32:19

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = 0.17g 3.38, 50.07 g 69.13

ACCELERATION (g)
 -10.00
 -40.00
 -90.00
 -140.00
 -190.00
 -240.00
 -290.00
 -340.00
 -390.00



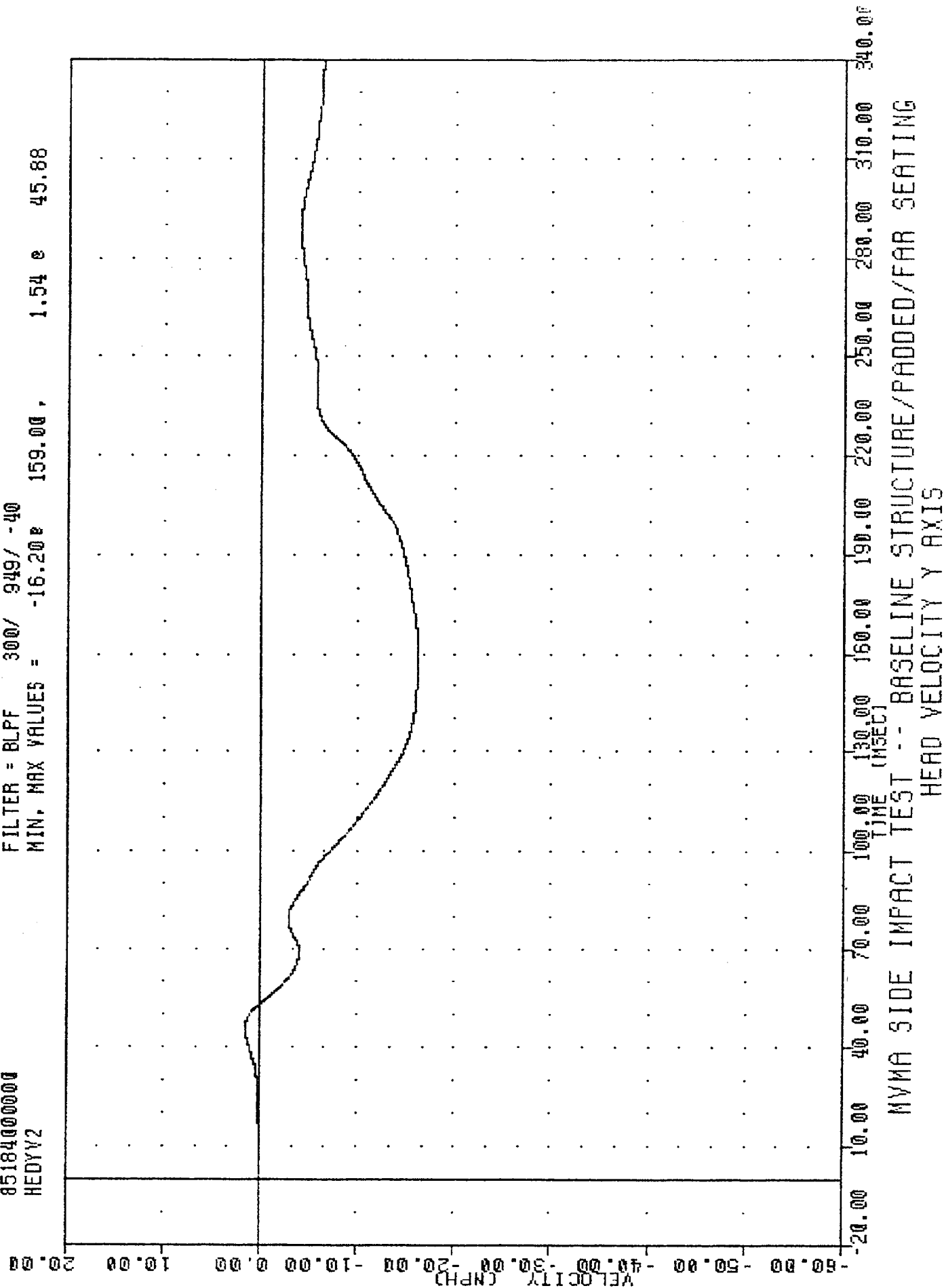
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (msec)

NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER HEAD RESIDUANT ACCELERATION

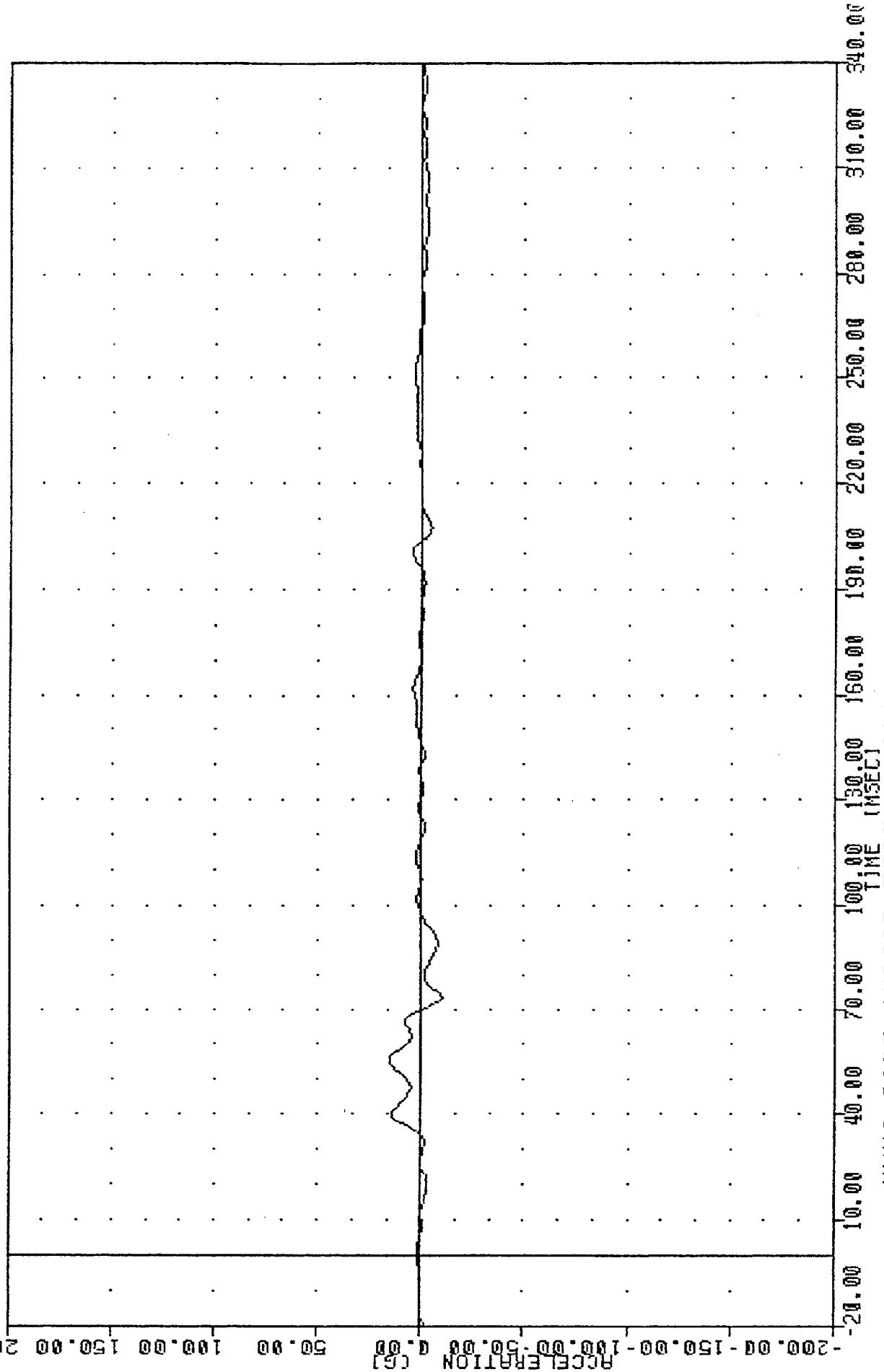
TRC
 NVMA SIDE IMPACT TESTING
 85184000000
 HEDYV2

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -16.20e 159.00, 1.54 e 45.88



TRC 850703
 NYMA SIDE IMPACT TESTING
 85184000000
 101X62
 PLOT DATE 9-JUL-85 11:42:25
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -10.18 73.13 15.34 55.63



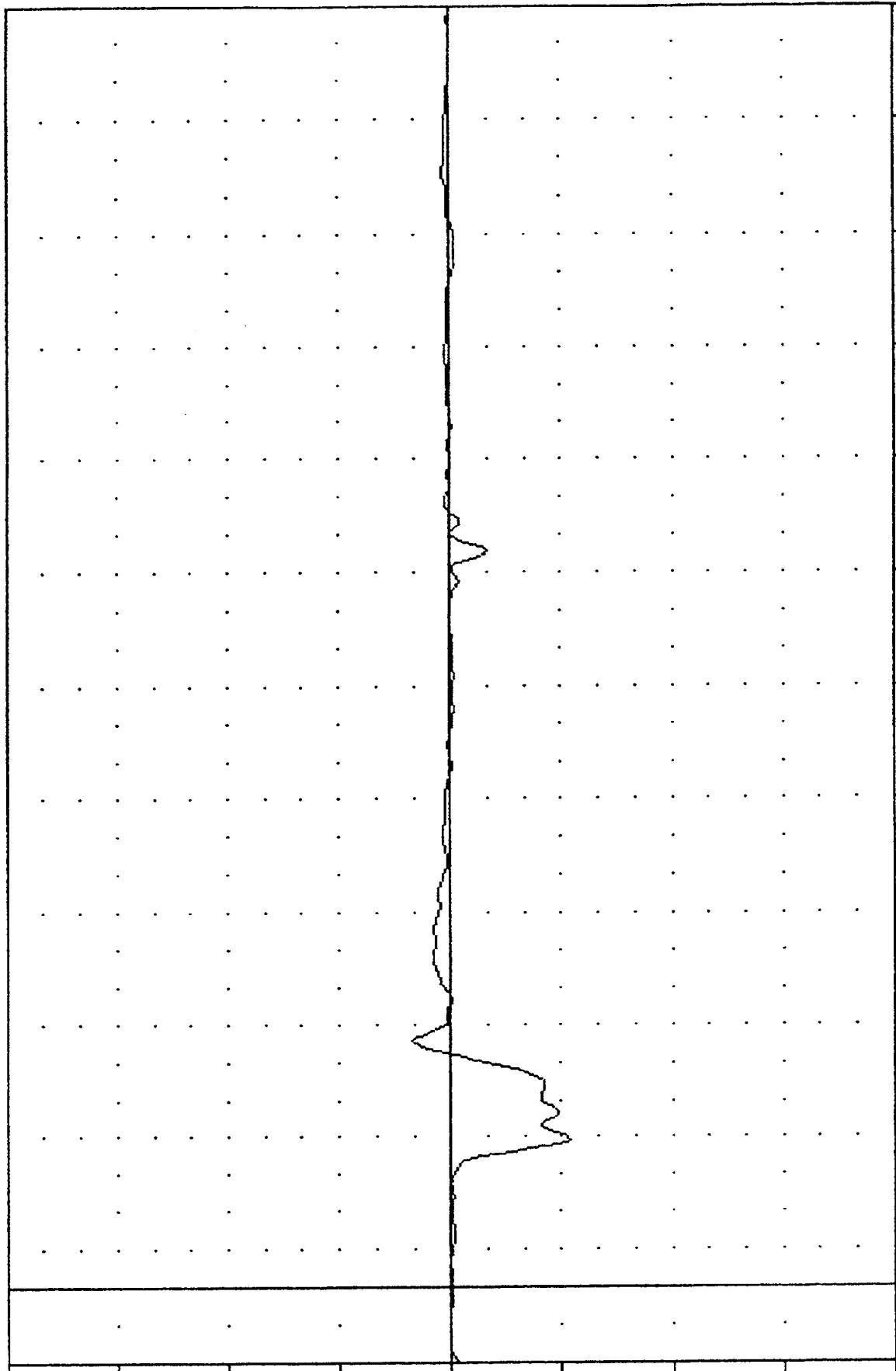
NYMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER UPPER SPINE ACCELERATION X AXIS

TRC
 85184000000
 T01YG2

PLOT DATE 9-JUL-85 11:42:25

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -53.76 39.38 , 16.77 65.63

ACCELERATION (G)



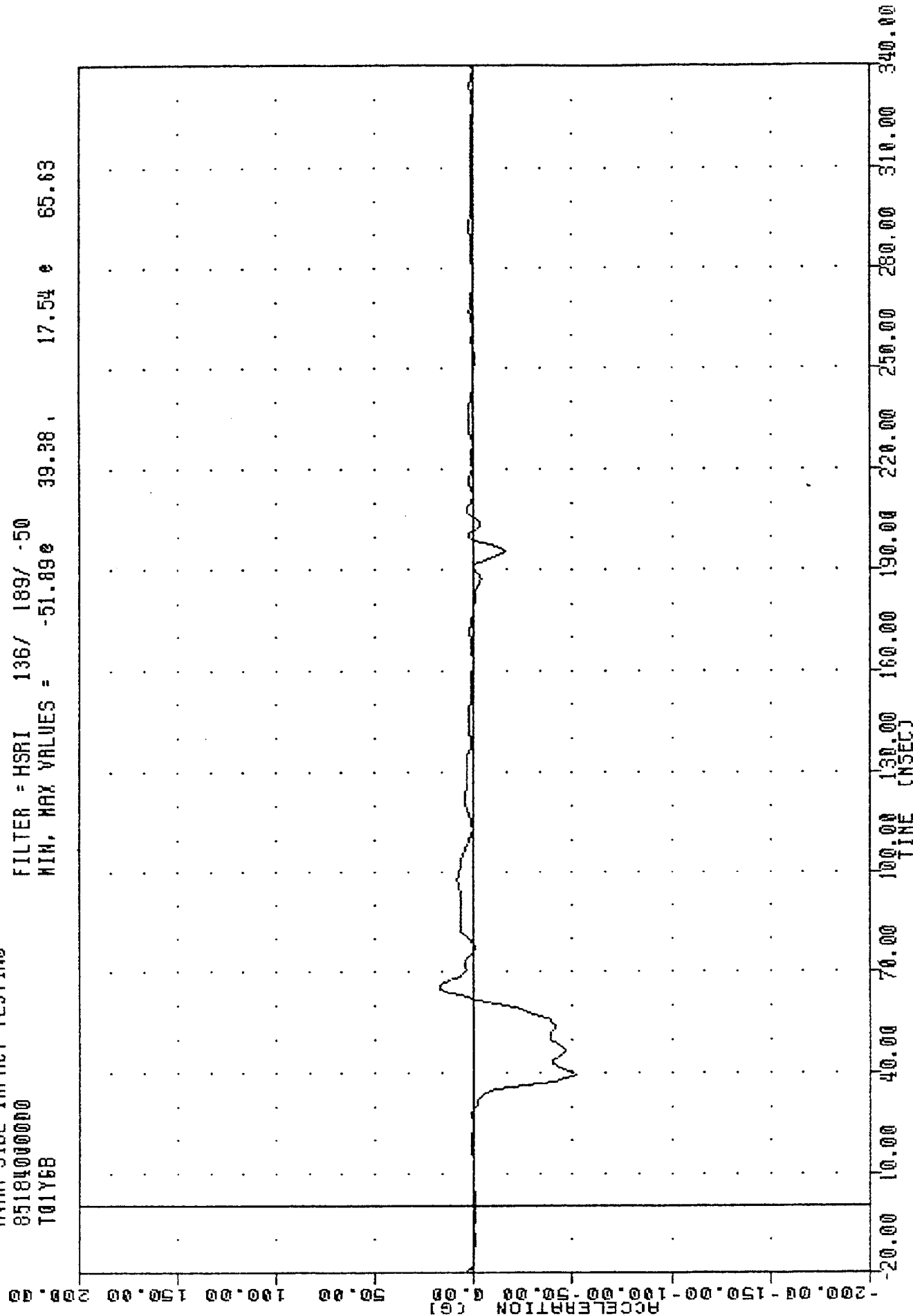
TIME (MSEC)

MYMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER UPPER SPINE ACCELERATION Y AXIS

TAC
 , 850703
 MVMA SIDE IMPACT TESTING
 8518400000
 T01Y68

PLOT DATE 9-JUL-85 11:42:25

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -51.890 39.38 , 17.54 0 65.63



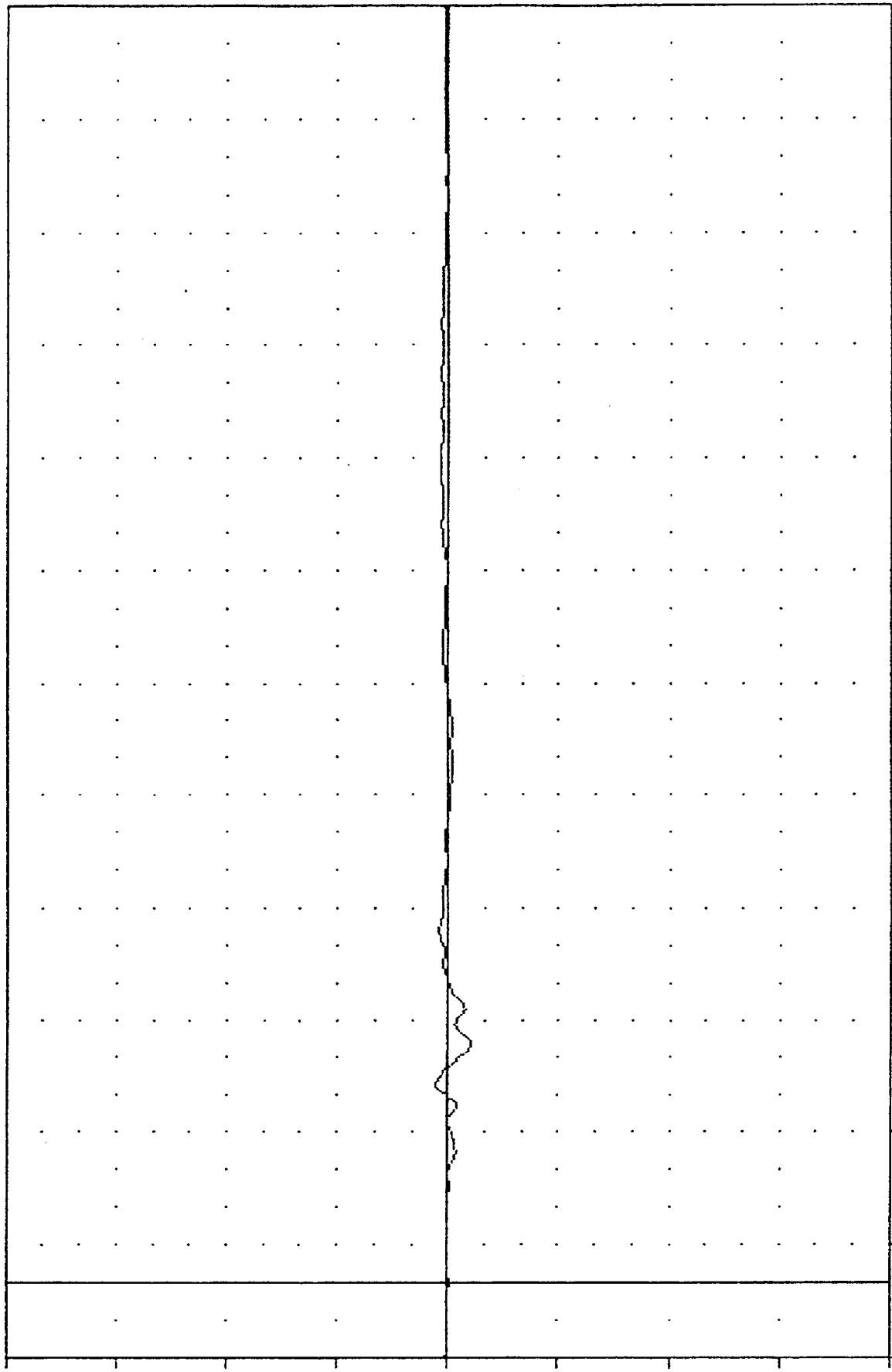
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER UPPER SPINE ACCELERATION -2 Y AXIS

TRC , 850703
 NVMA SIDE IMPACT TESTING
 85184000000
 T01ZG2

PLOT DATE 9-JUL-85 11:42:25

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -10.24e 63.75, 5.27 e 53.12

ACCELERATION (G)



TIME (MSEC)

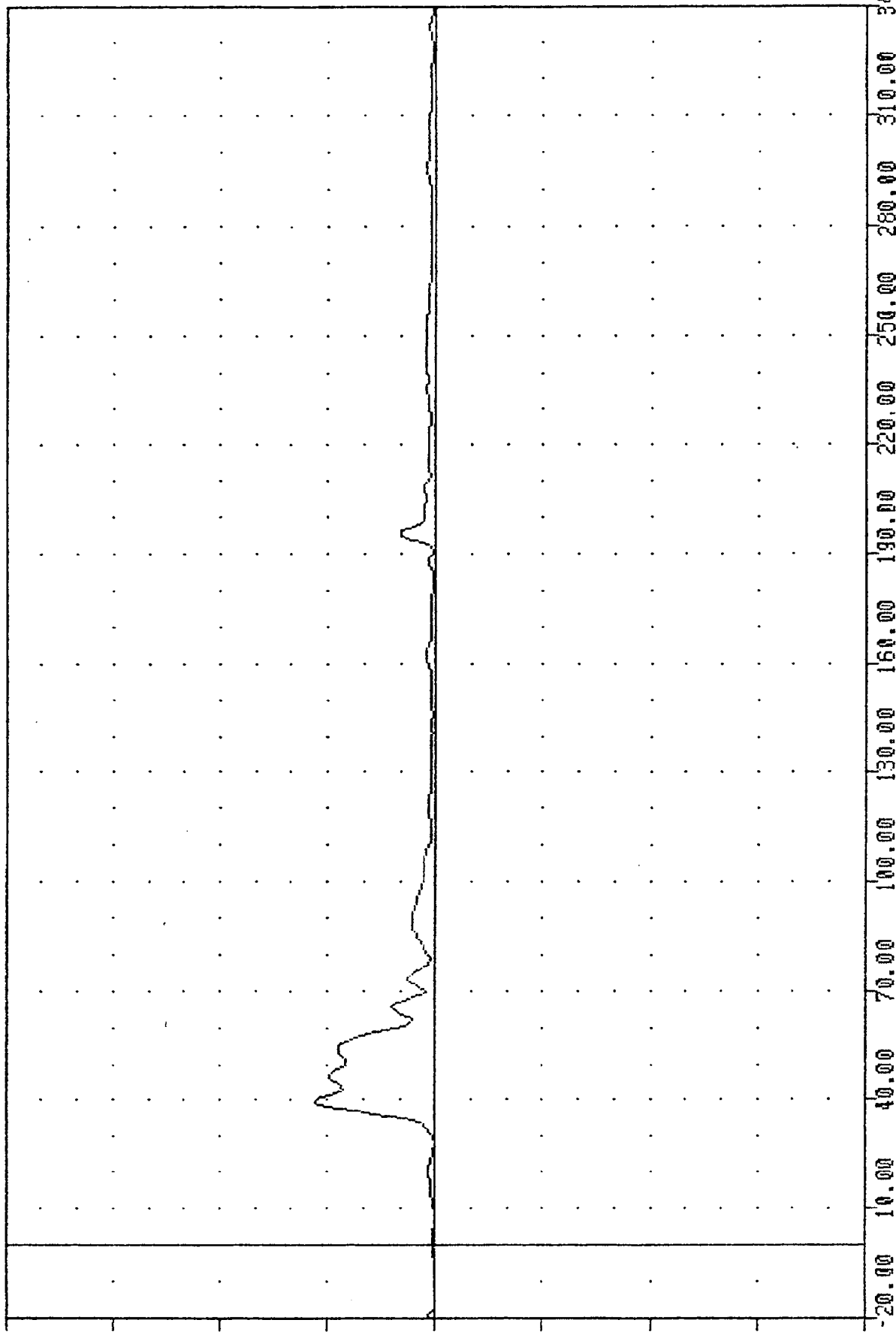
NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER UPPER SPINE ACCELERATION Z AXIS

TRC
 850703
 MVNA SIDE IMPACT TESTING
 85184000000
 T01R62

PLOT DATE 8-JUL-85 11:42:25

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.198 -16.25, 55.66 39.38

ACCELERATION (G)

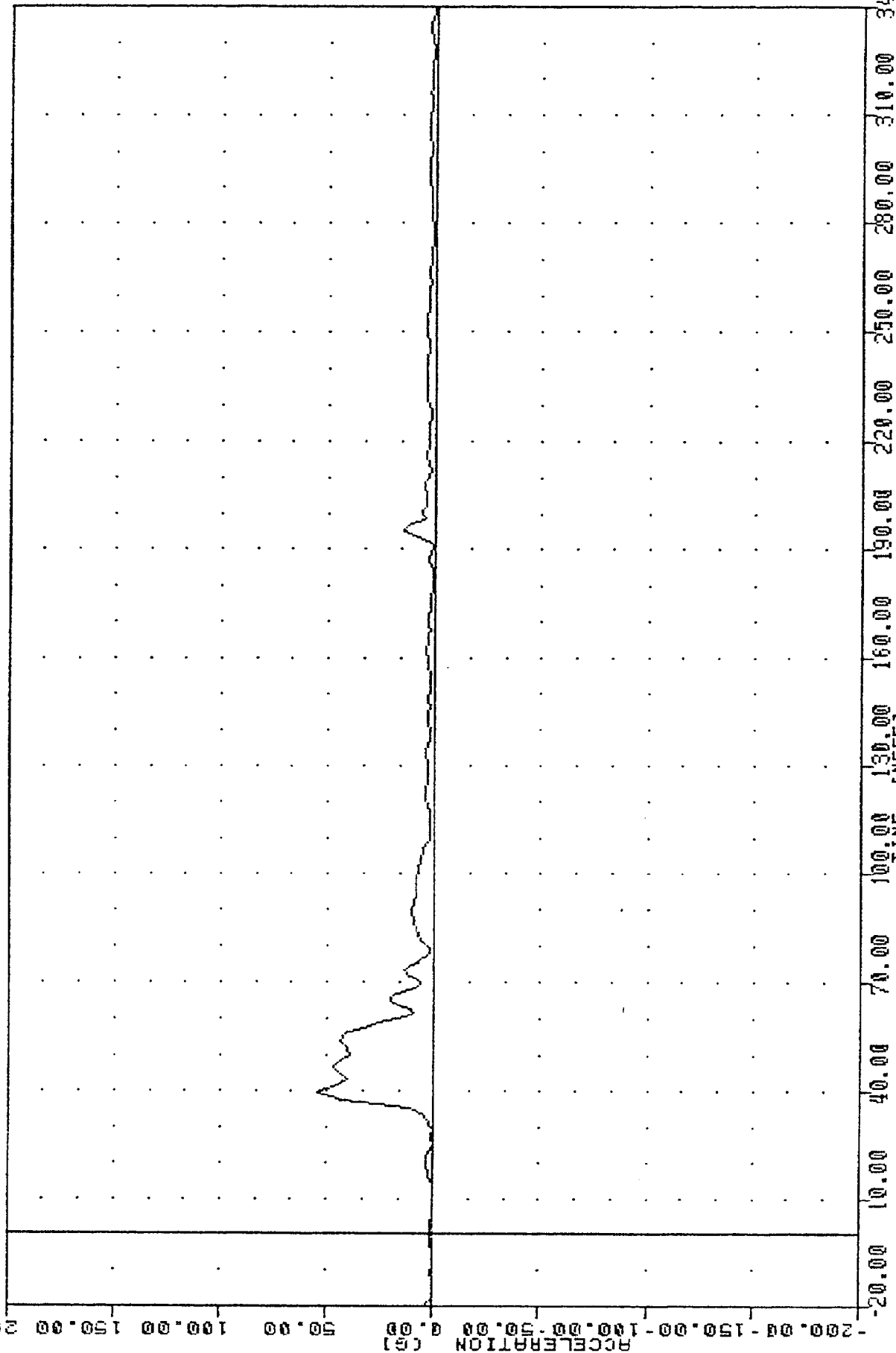


MVNA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER UPPER SPINE RESULTANT ACCELERATION

THC
 85184000000
 T01R5B

850703
 MVMA SIDE IMPACT TESTING
 85184000000
 T01R5B

PLOT DATE 9-JUL-85 11:42:25
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.13e -16.87, 53.85 39.38



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER UPPER SPINE RESULTANT ACCELERATION #2

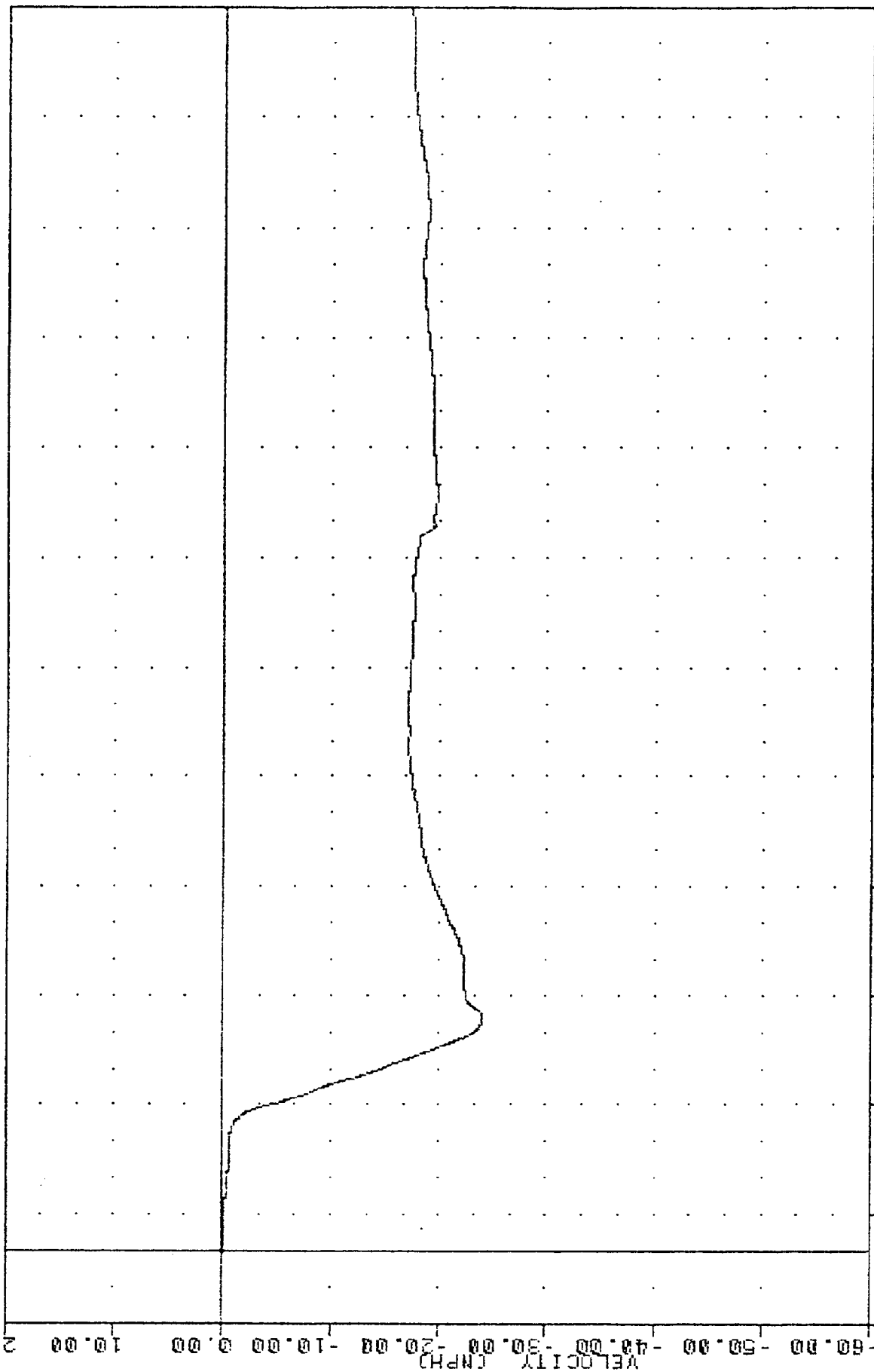
TRC , 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 T01YV2

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -24.02e 63.75, 0.00 e -20.00

20.00



-60.00 -50.00 -40.00 -30.00 -20.00 -10.00 0.00 10.00 20.00

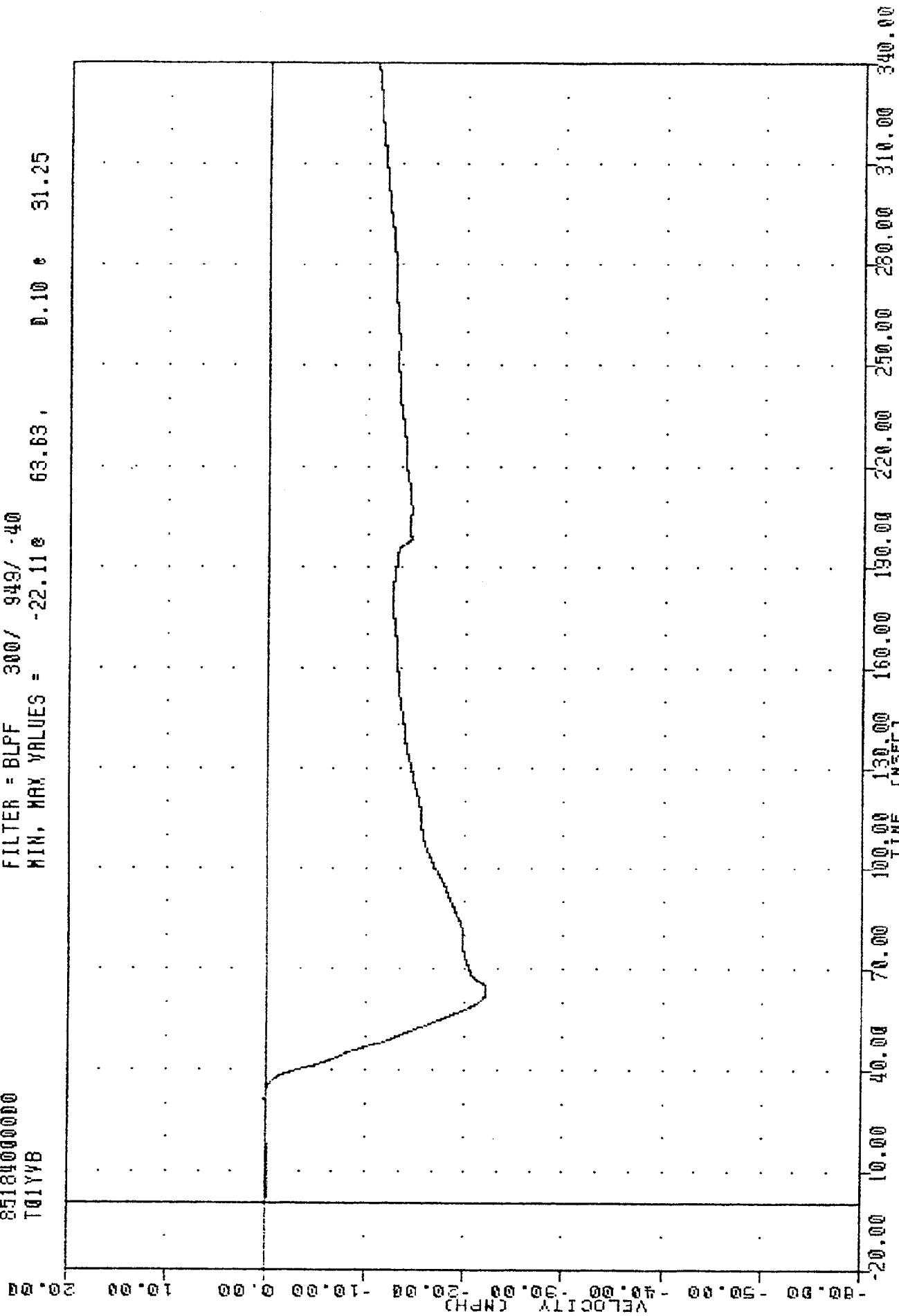
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 IIPPER SPTRF WFINCITY Y AYTS

TAC 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 T01YVB

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -22.110 63.63, 0.10 31.25



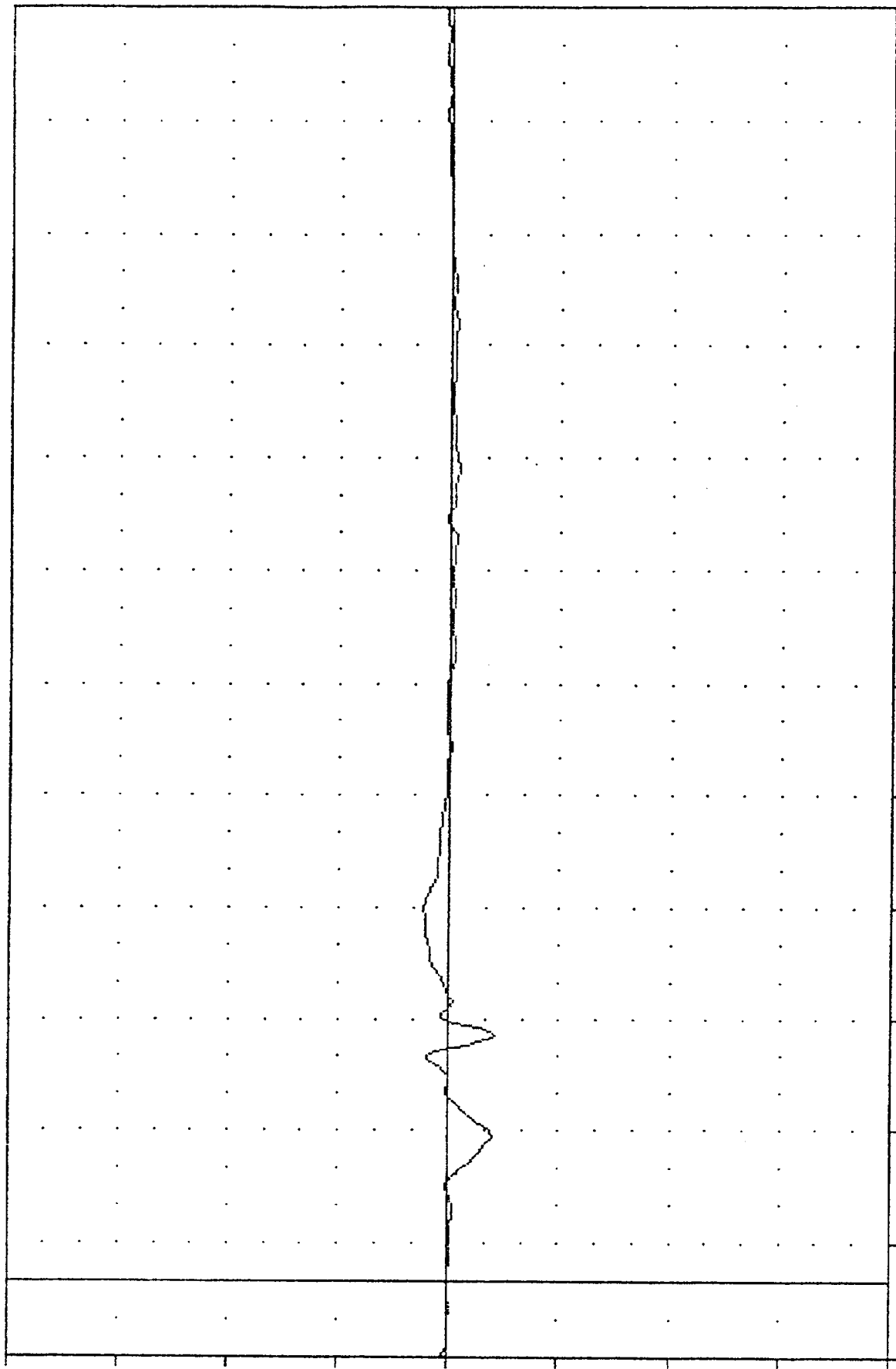
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 UPPER SPINE VELOCITY - Z Y AXIS

TRC
 MVMA SIDE IMPACT TESTING
 85184000000
 T12XG2

PLOT DATE 9-JUL-85 11:42:25

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -21.028 65.63, 11.58 & 100.00

ACCELERATION, G



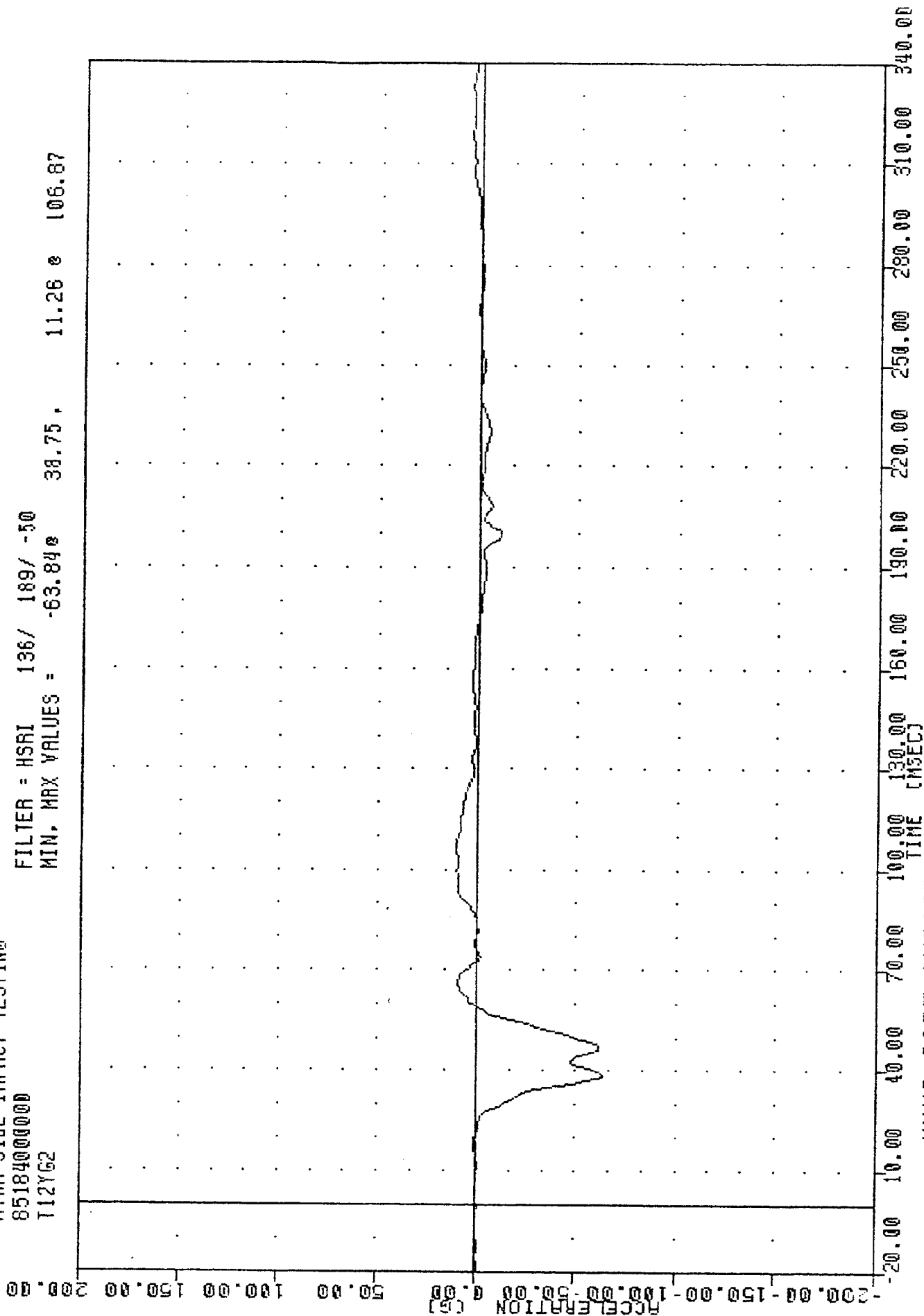
TIME (MSEC)

MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER LOWER SPINE ACCELERATION X AXIS

TRC
 MYMA SIDE IMPACT TESTING
 85184000000
 T12Y62

PLOT DATE 8-JUL-85 11:42:25

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -63.84g 38.75, 11.26 g 106.87



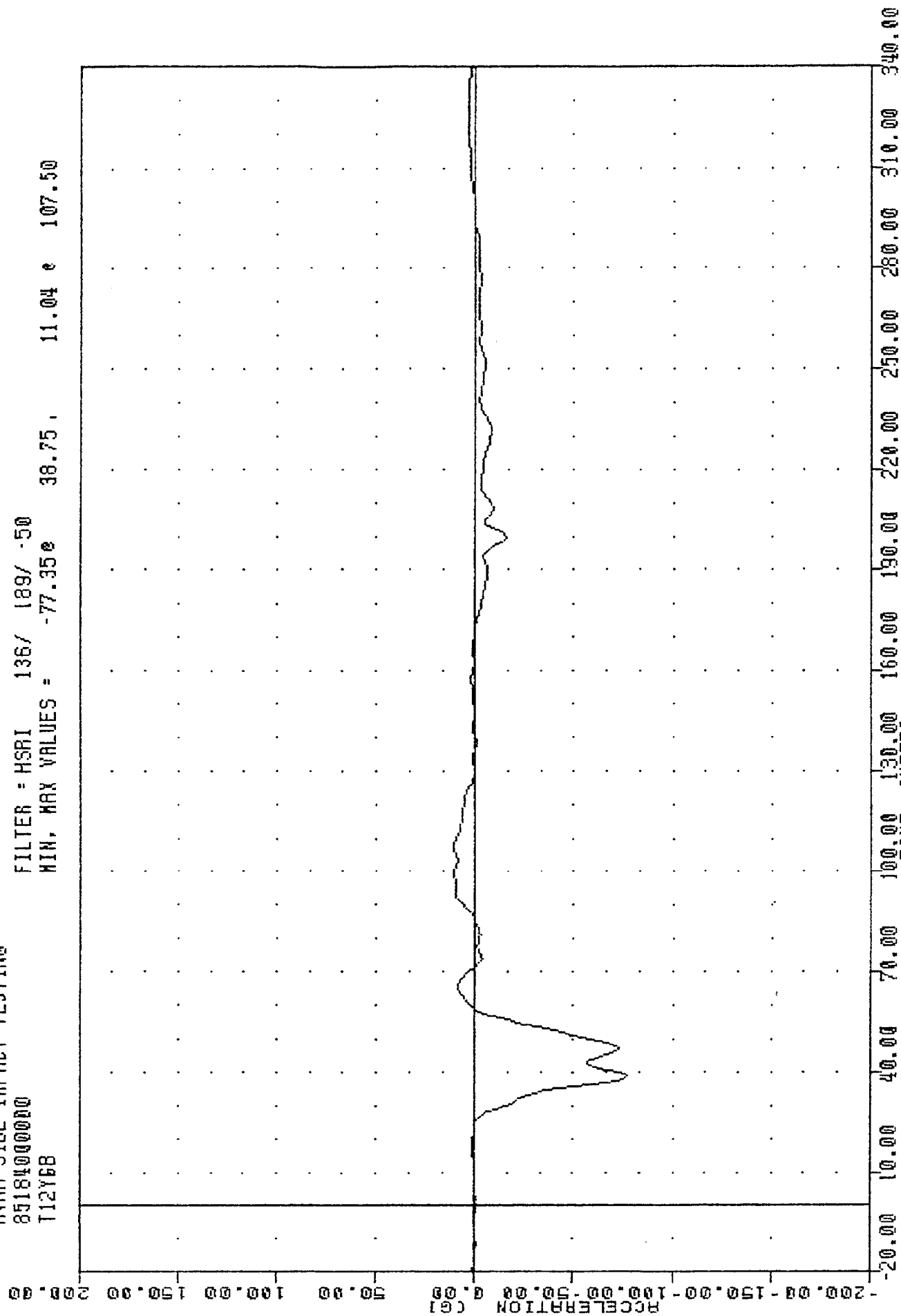
MYMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER LOWER SPINE ACCELERATION Y AXIS

TAC
 MVMA SIDE IMPACT TESTING
 85184000000
 T12Y68

PLOT DATE 9-JUL-85 11:42:25

FILTER = HSRI 136/ 189/ .50

MIN, MAX VALUES = -77.350 38.75, 11.04 e 107.50



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER LOWER SPINE ACCELERATION -2 Y AXIS

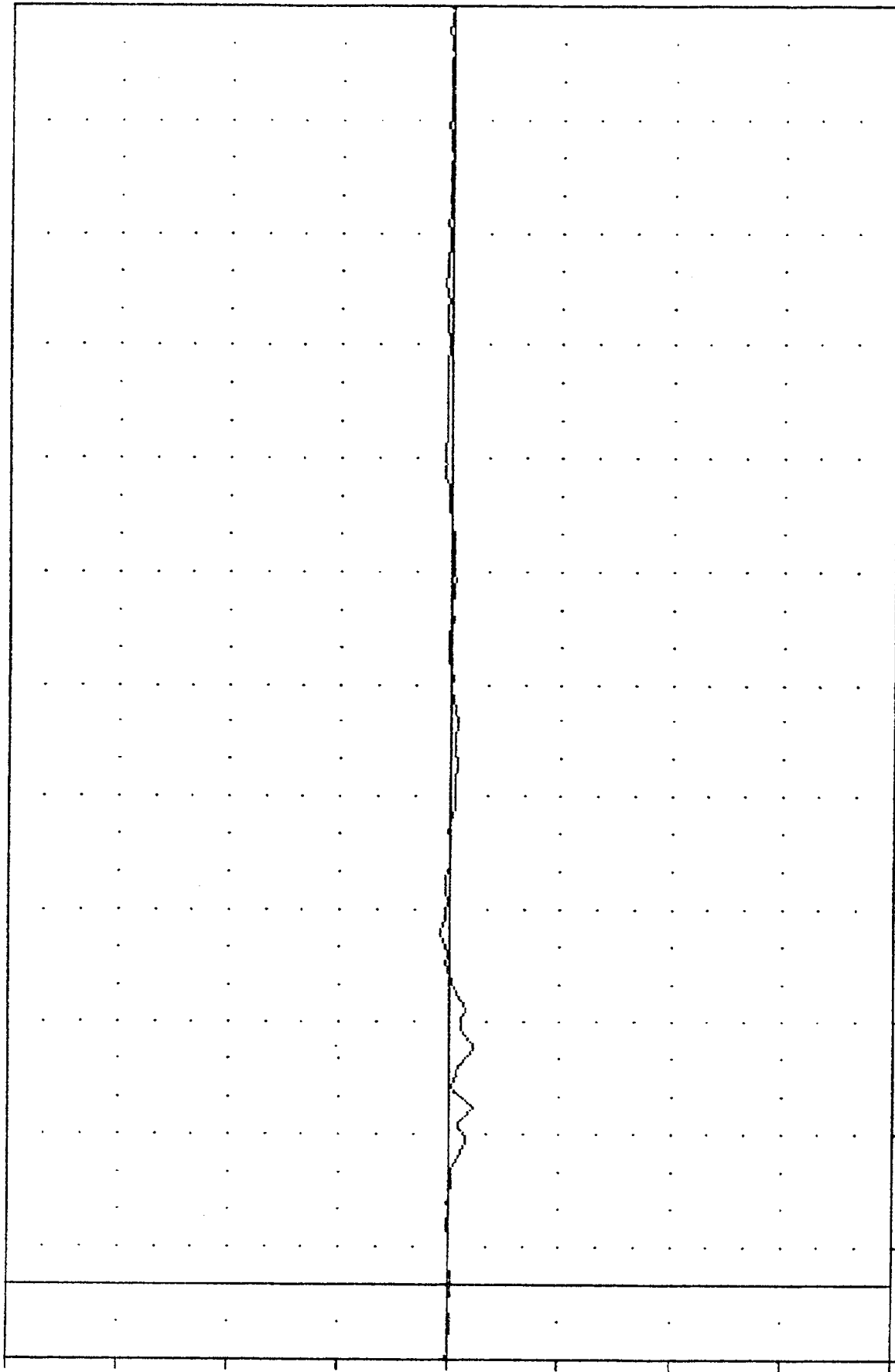
TRC
 NVMA SIDE IMPACT TESTING
 85184000000
 T12762

PLOT DATE 9-JUL-85 11:42:25

FILTER = HSRL 136/ 189/ -50

MIN. MAX VALUES = -10.22 63.13, 4.24 93.13

ACCELERATION (G)



-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

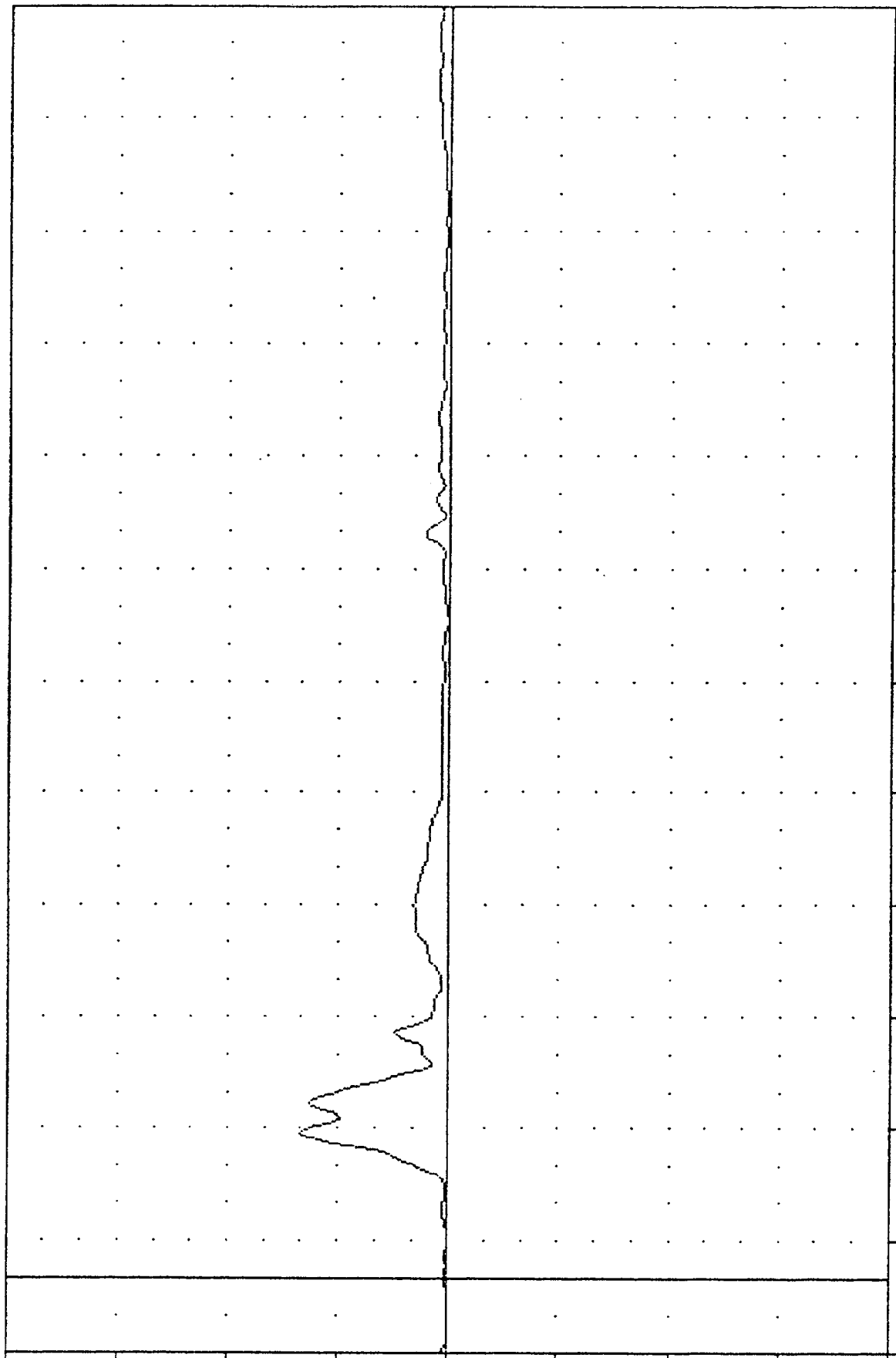
TIME (MSEC)
 NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER LOWER SPINE ACCELERATION 7 DAYS

TRC 850703
 MVNA SIDE IMPACT TESTING
 85184000000
 T12RG2

PLOT DATE 9-JUL-85 11:42:25

FILTER = HSRI 136/ 183/ -50
 MIN, MAX VALUES = 0.260 -15.63, 67.16 38.75

ACCELERATION (G)



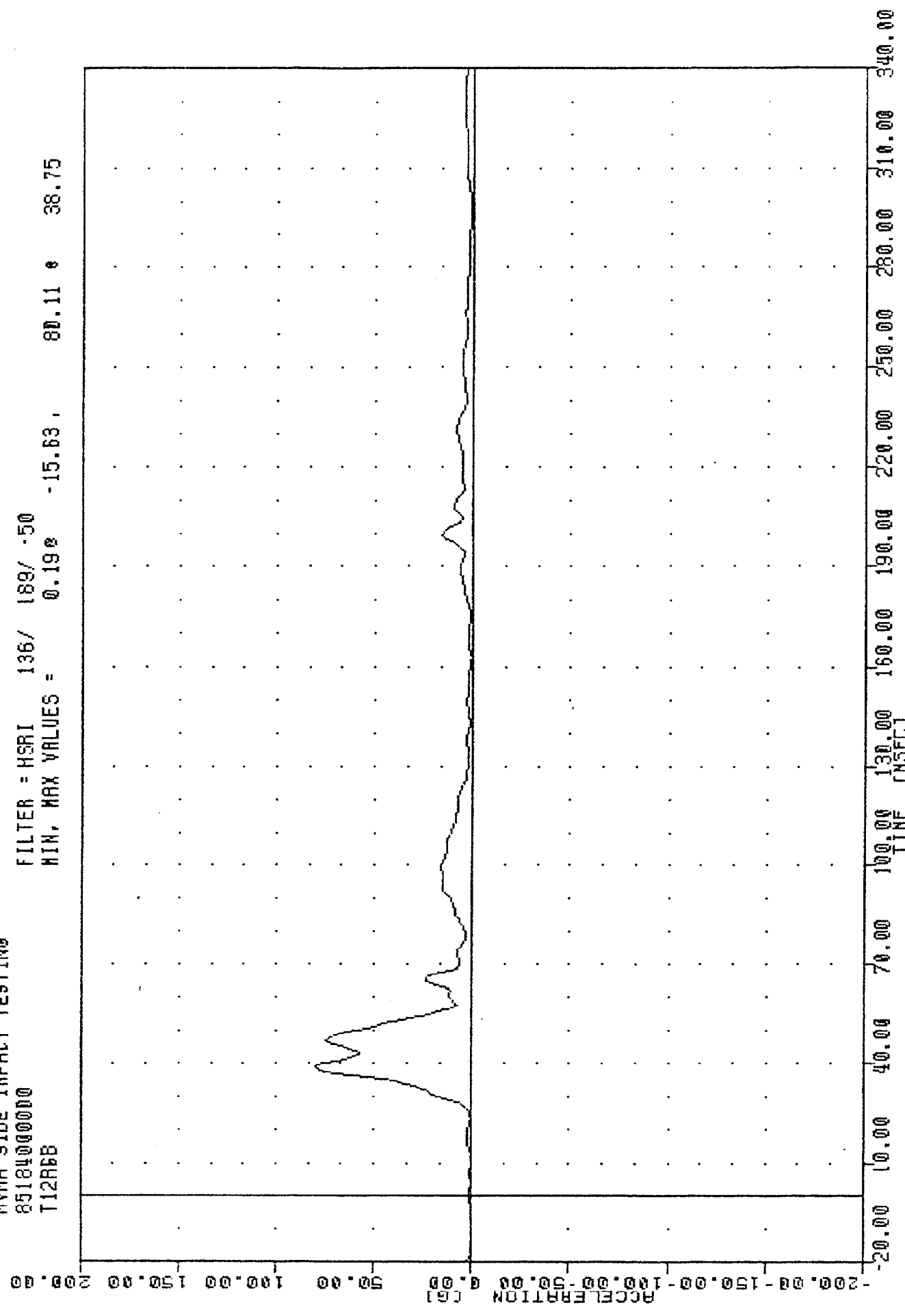
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

MVNA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER LOWER SPINE RESULTANT ACCELERATION

TRC
 MVMA SIDE IMPACT TESTING
 25124000000
 T12R6B

PLOT DATE 9-JUL-85 11:42:25

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.192 -15.63, 80.11 38.75



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER LOWER SPINE RESULTANT ACCELERATION #2

TRC
 NVMA SIDE IMPACT TESTING
 85184000000
 T12YV2

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -25.20e 60.00, 0.18 e 22.63

20.00

10.00

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

-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)

BASELINE STRUCTURE/PADDED/FAR SEATING

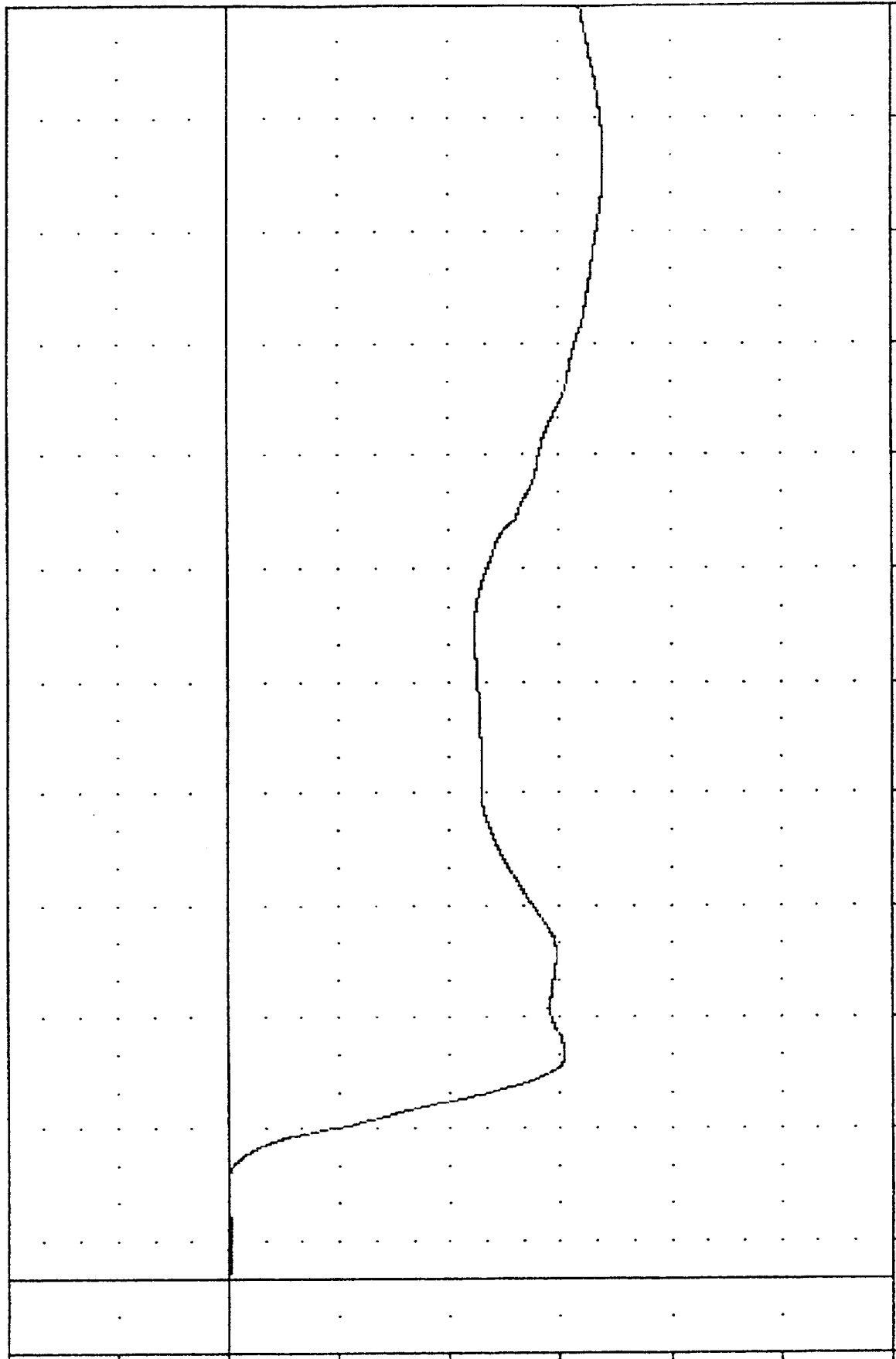
LOWER SPINE VELOCITY Y AXIS

TRC
 85184000000
 T12YVB

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -34.01e 297.38 , 0.05 e 24.50

VELOCITY (MPH)



TIME (MSEC)
 MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 LOWER SPINE VELOCITY -2 Y AXIS

PLC 850703

MYMA SIDE IMPACT TESTING

85184000000

RURYG2

PLOT DATE

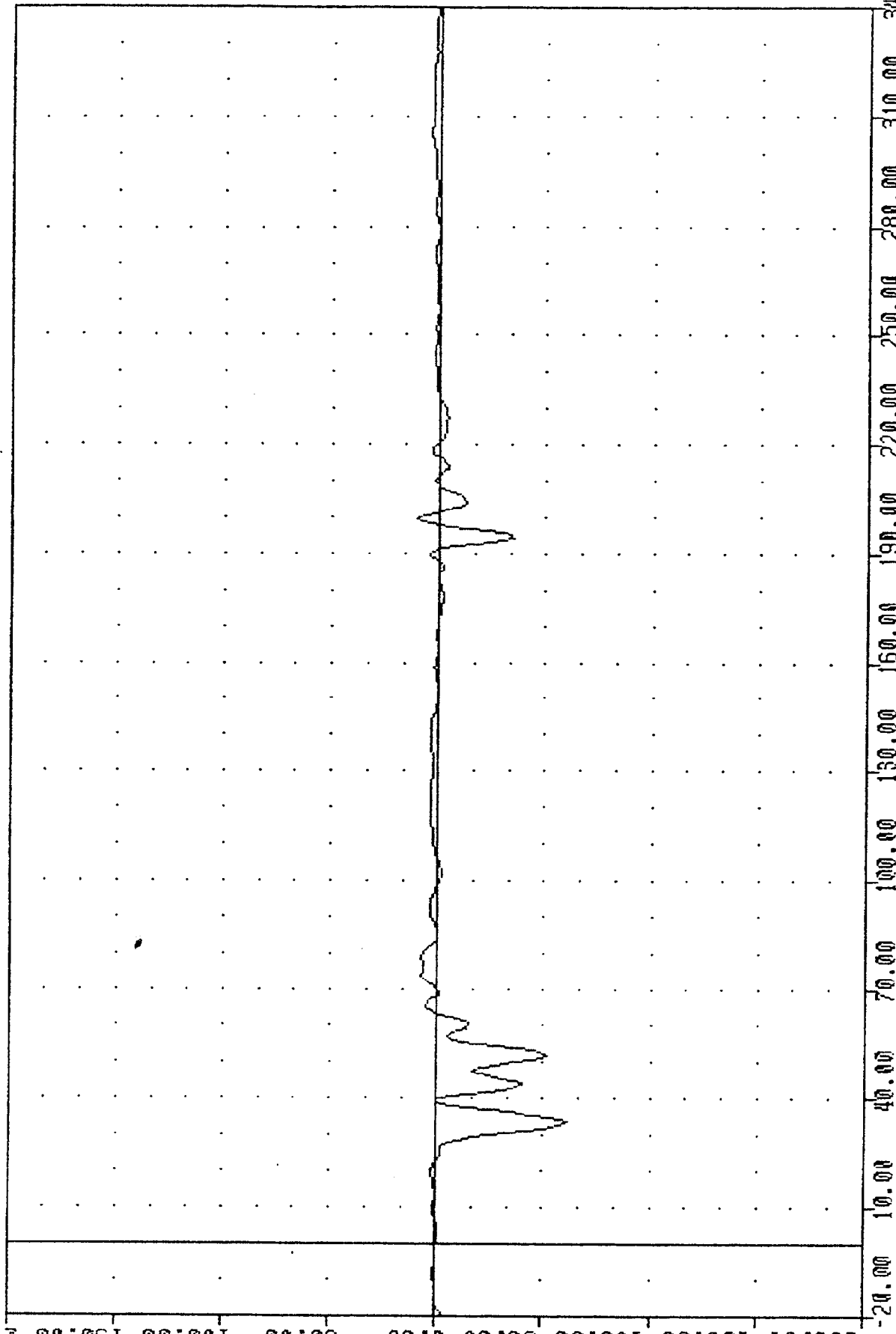
9-JUL-85

11:42:25

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -60.81 33.75, 10.96 199.37

ACCELERATION (G)



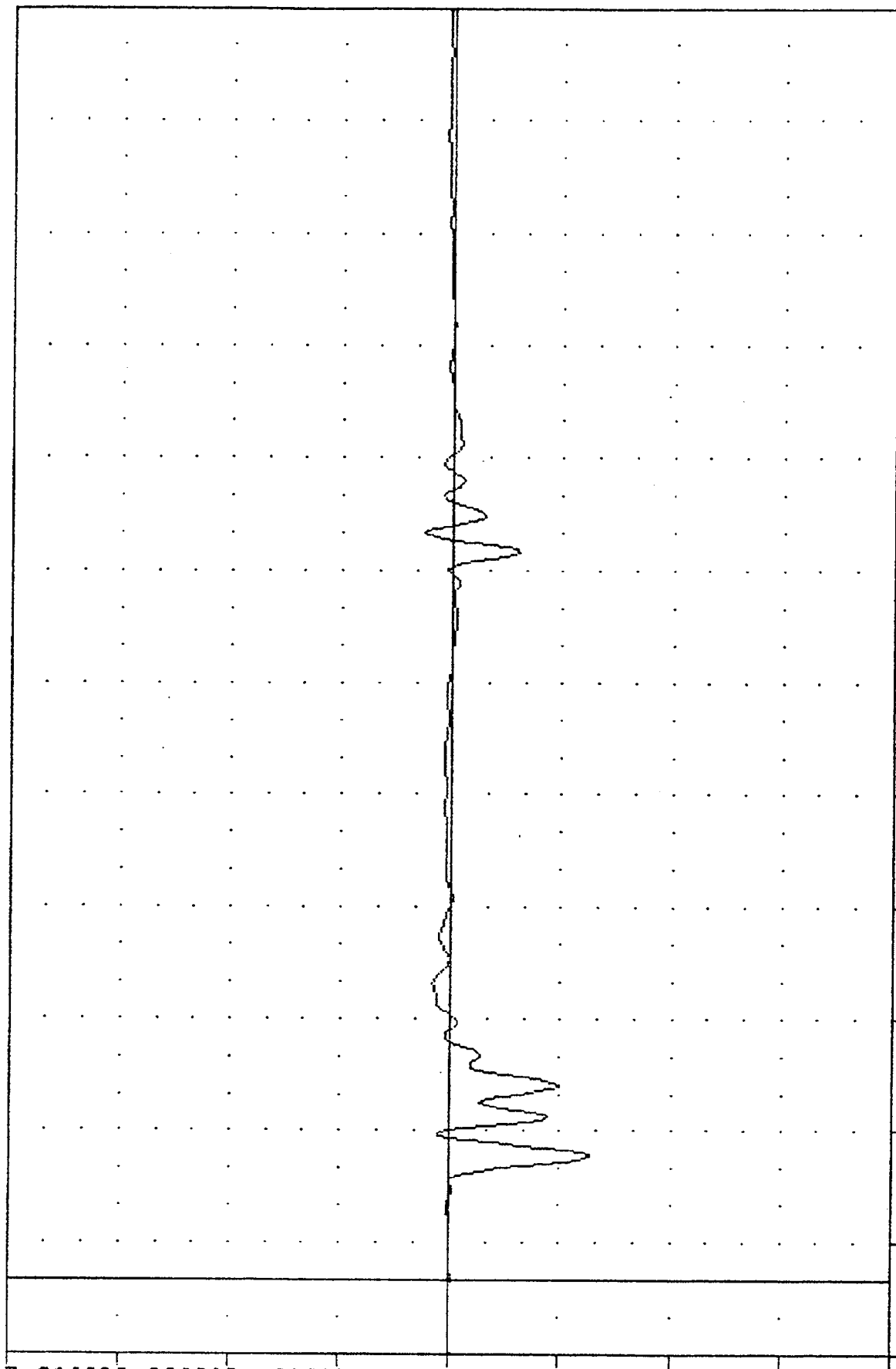
MYMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
PASSENGER RIGHT UPPER RIB ACCELERATION Y AXIS

TRC 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 RURYGB

PLOT DATE 9-JUL-85 11:42:25

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -63.850 33.75, 13.39 200.00

ACCELERATION (G)

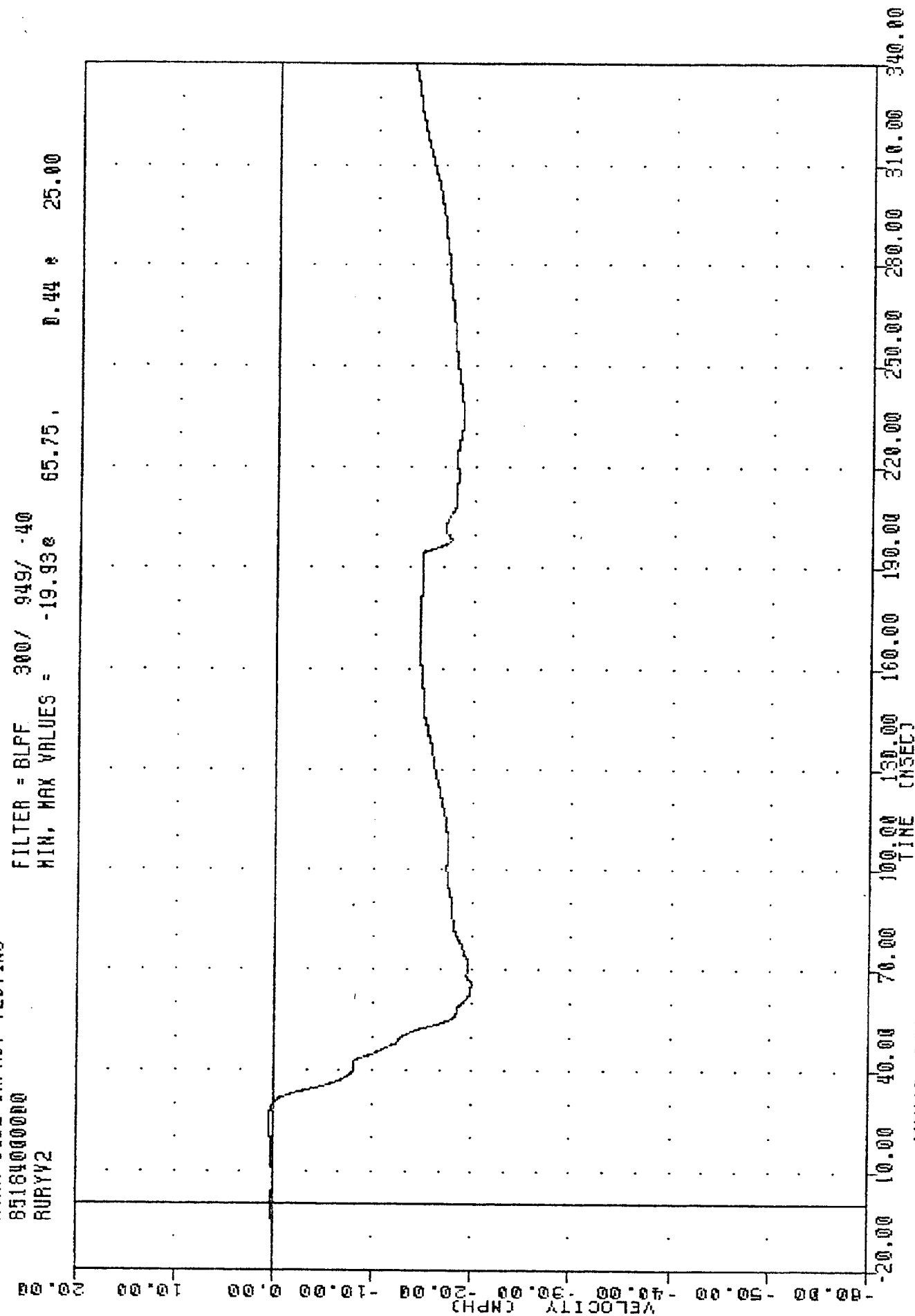


TIME (MSEC)

MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER RIGHT UPPER RIB ACCELERATION -2 Y AXIS

THC
 85184000000
 RURYV2
 MYMA SIDE IMPACT TESTING
 85184000000

PLOT DATE 9-JUL-85 12:26:42
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -19.93e 65.75, 0.44 e 25.00



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 RIGHT UPPER AIR VELOCITY Y AXIS

TRC 850703

NVMA SIDE IMPACT TESTING

85184000000

RURYVB

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -20.368 66.13, 0.06 e 24.88

20.00

10.00

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

-70.00

-80.00

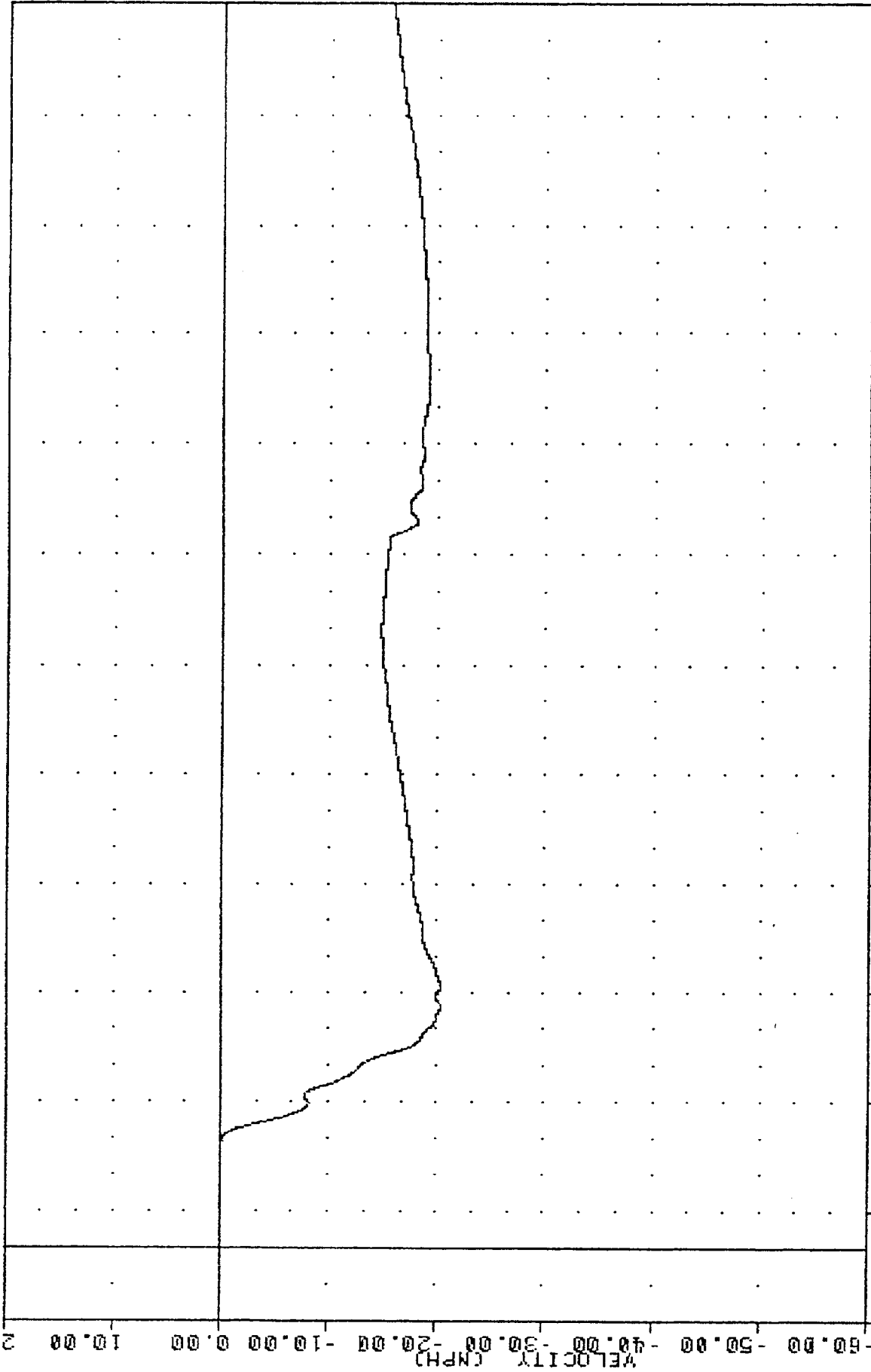
-90.00

-100.00

-110.00

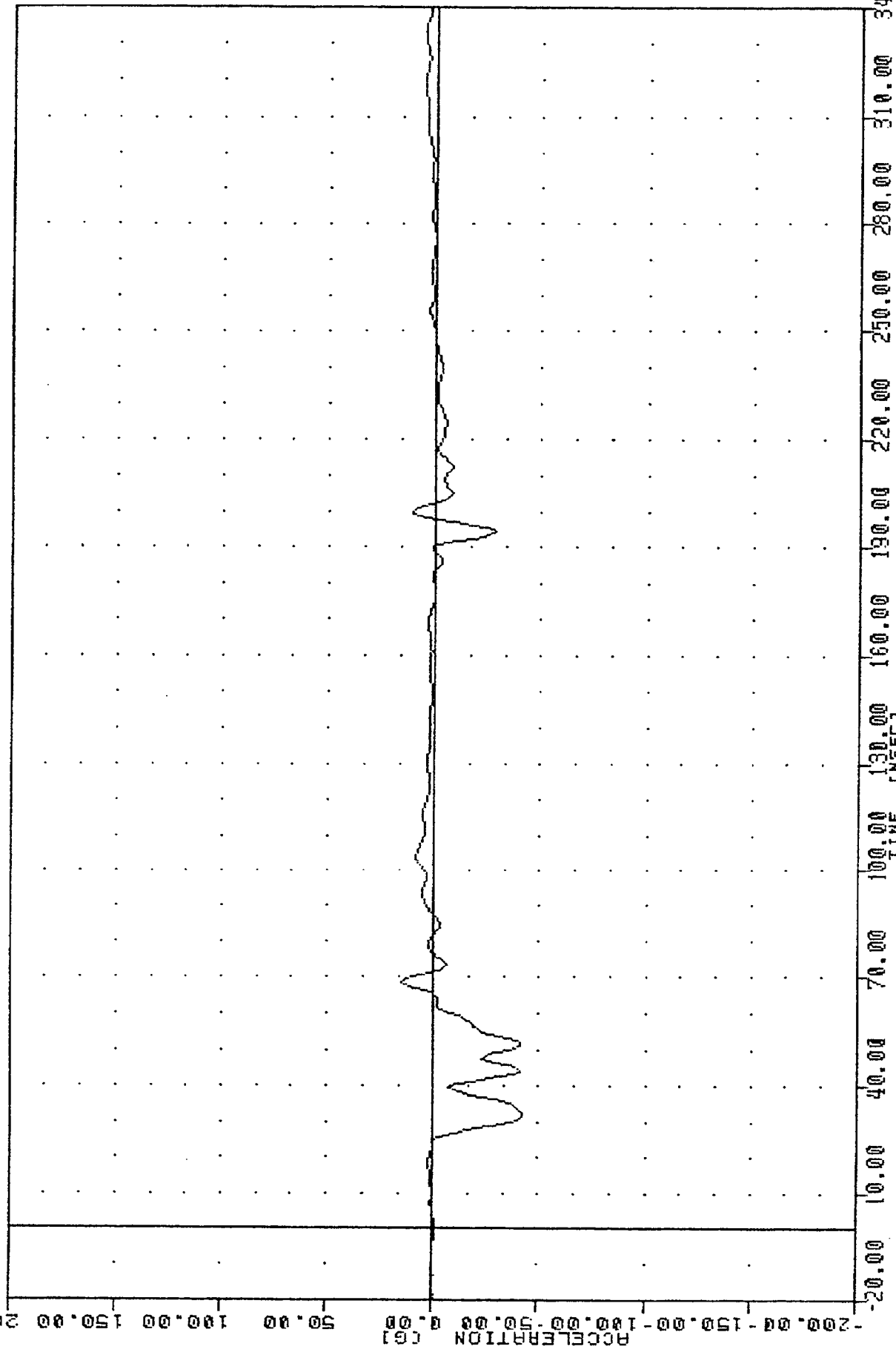
-120.00

A-26



NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
RIGHT UPPER RIB VELOCITY -2 Y AXIS

THC
 MVMA SIDE IMPACT TESTING
 85184000000
 RLRY62
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -42.498 31.88 14.68 68.75
 PLOT DATE 9-JUL-85 11:42:25



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER RIGHT LOWER RIB ACCELERATION Y AXIS

TRC 850703

NVMA SIDE IMPACT TESTING

95184000000

ALRYGB

PLOT DATE

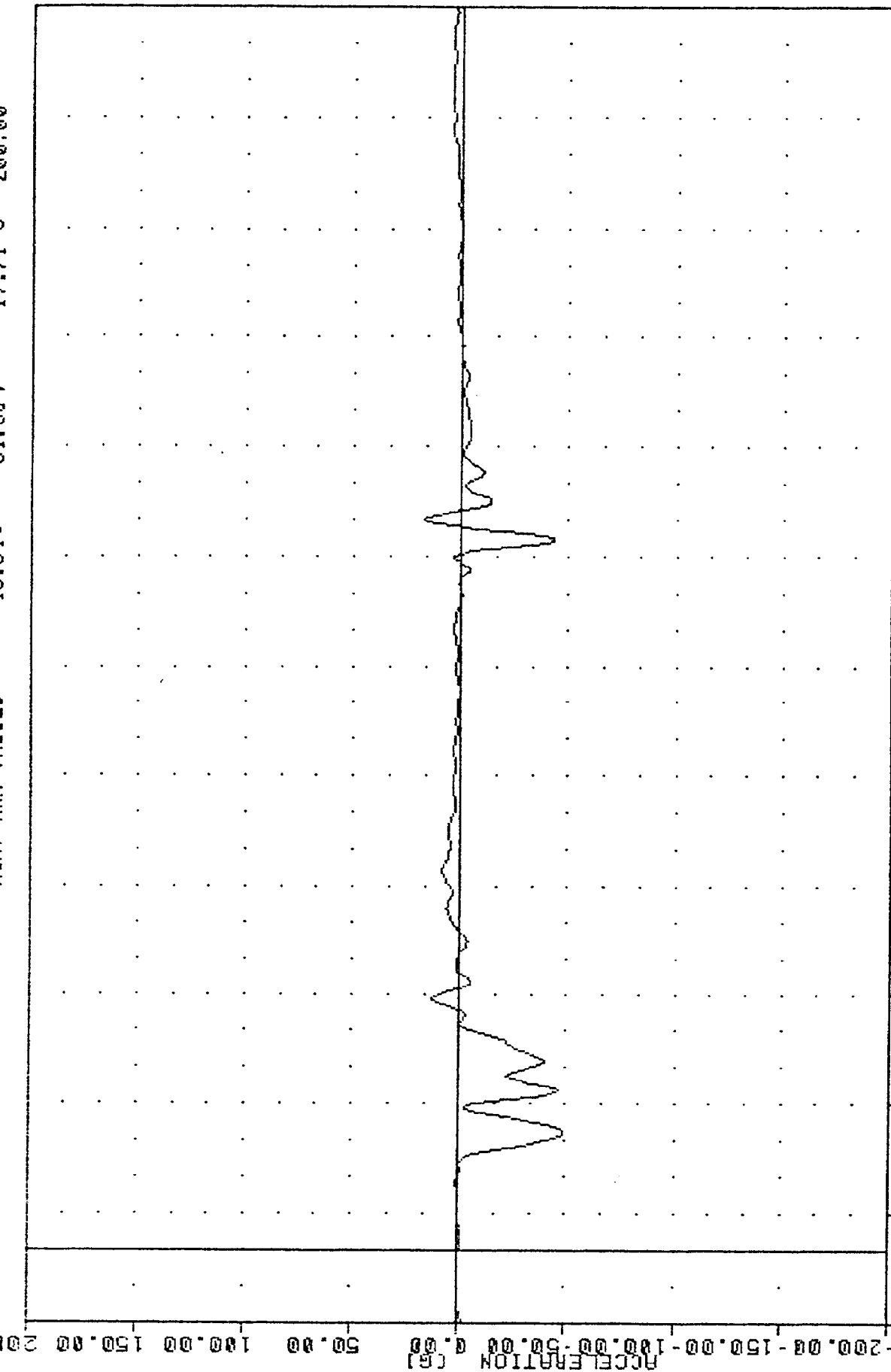
9-JUL-85

11:42:25

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -48.648 31.88, 17.71 @ 200.00

200.00



-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

NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
PASSENGER RIGHT LOWER RIB ACCIFRATION -> Y AXIS

TRC , 850703
 MVNA SIDE IMPACT TESTING
 85184000000
 RLAYV2

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -20.74e 67.63, 0.23 e 24.63

20.00

10.00

0.00

-10.00

-20.00

-30.00

-40.00

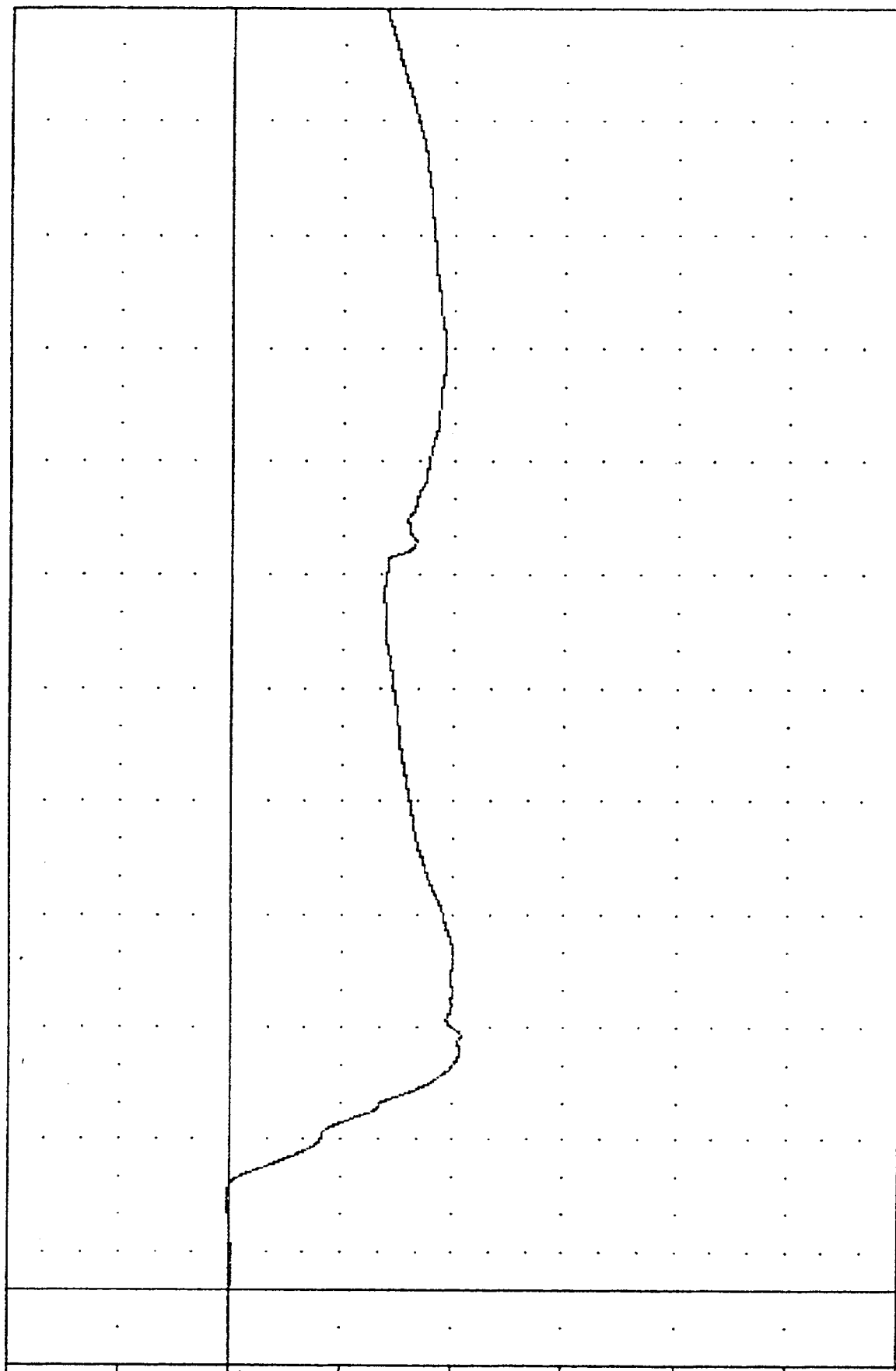
-50.00

-60.00

-70.00

-80.00

VELCITY (MPH)

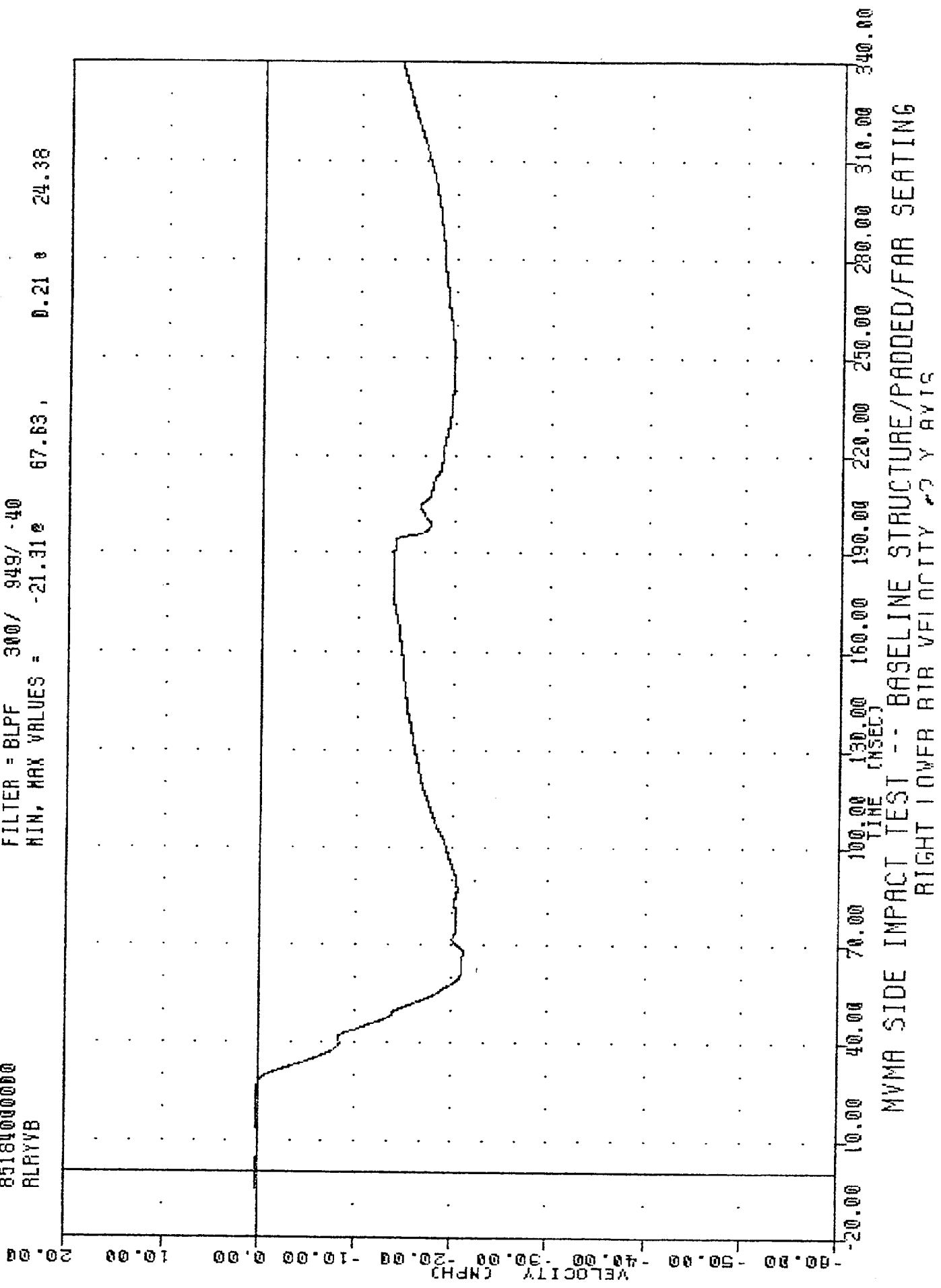


-20.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

MVNA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 RIGHT INWFA AIR VELOCITY

TAC
 851840000000
 RLRYYB

850703
 MVMA SIDE IMPACT TESTING
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -21.31e 67.63, 0.21 e 24.38

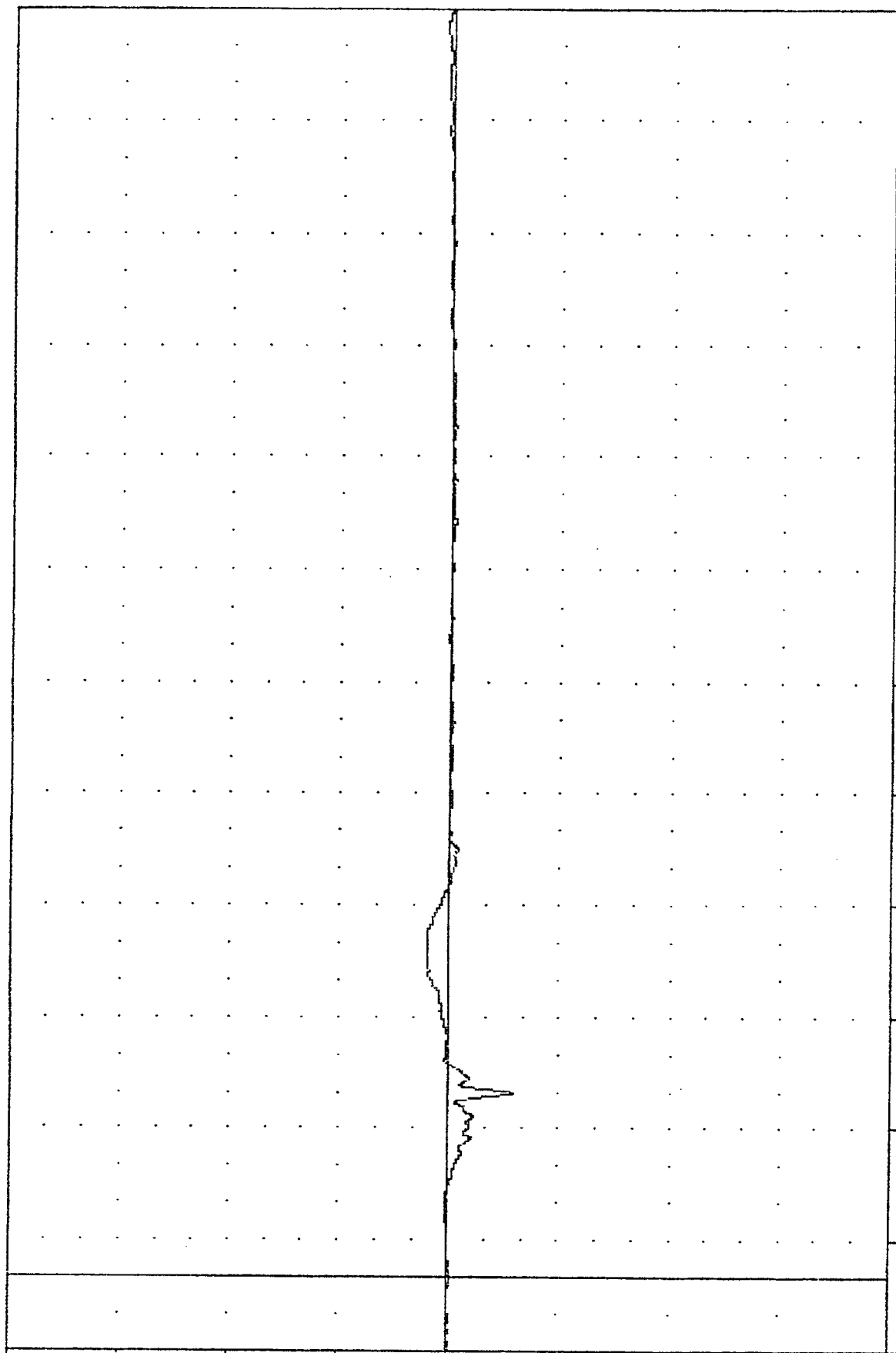


TRC
MVNA SIDE IMPACT TESTING
85184000000
PEVXG2

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -29.800 49.63, 10.03 88.13

ACCELERATION (G)



200.00 150.00 100.00 50.00 0.00 -50.00 -100.00 -150.00 -200.00

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

MVNA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
PASSENGER PEWIS ACCELERATION Y AXIS

TAC
 MWMA SIDE IMPACT TESTING
 85184000000
 PEVY62

PLOT DATE 24-JUL-85 13:32:19

FILTER = 6LPF 300/ 949/ -40

MIN. MAX VALUES = -59.86 51.38 27.68 85.63

200.00

150.00

100.00

50.00

0.00

-50.00

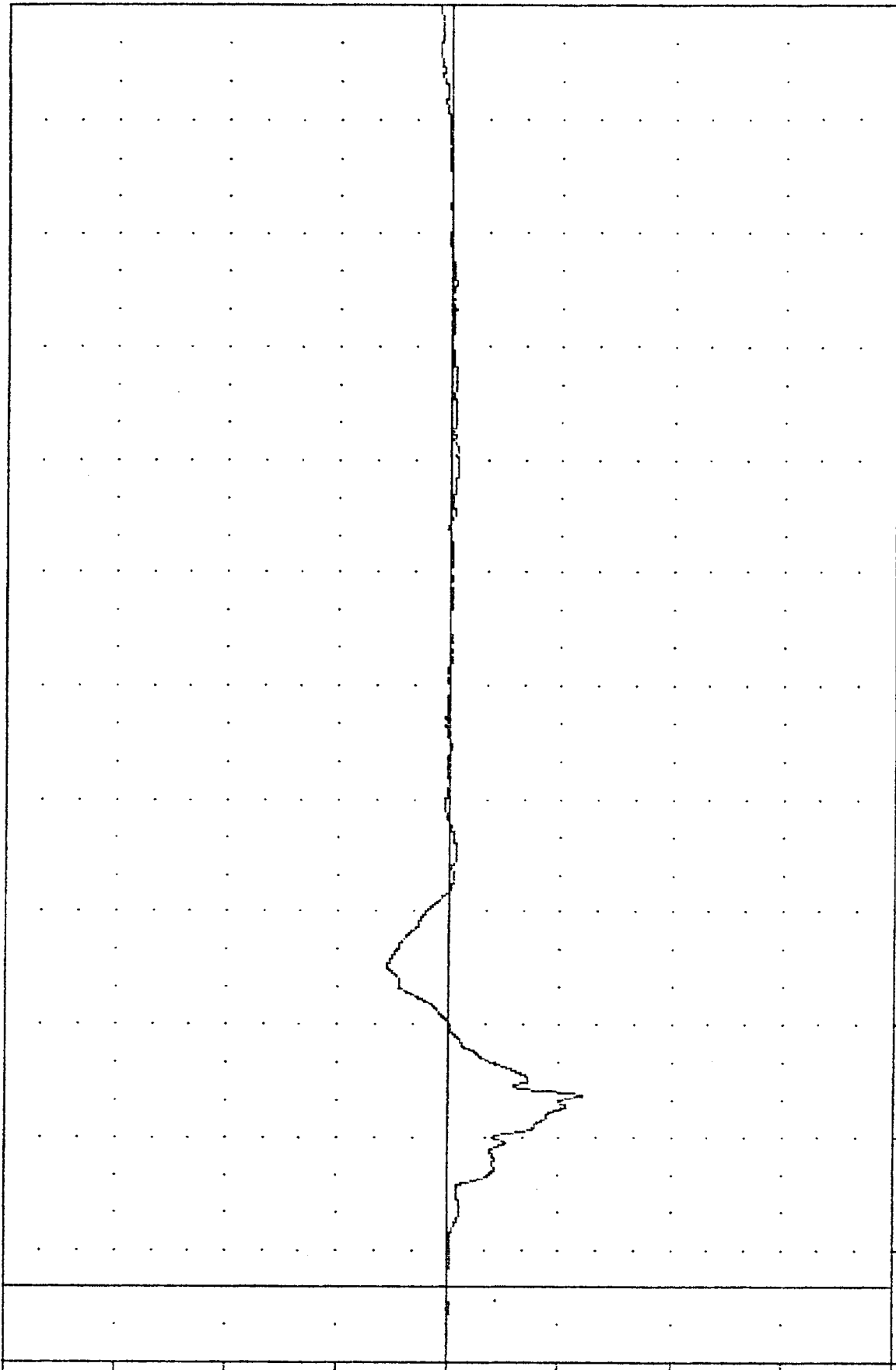
-100.00

-150.00

-200.00

ACCELERATION (G)

A-32



-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

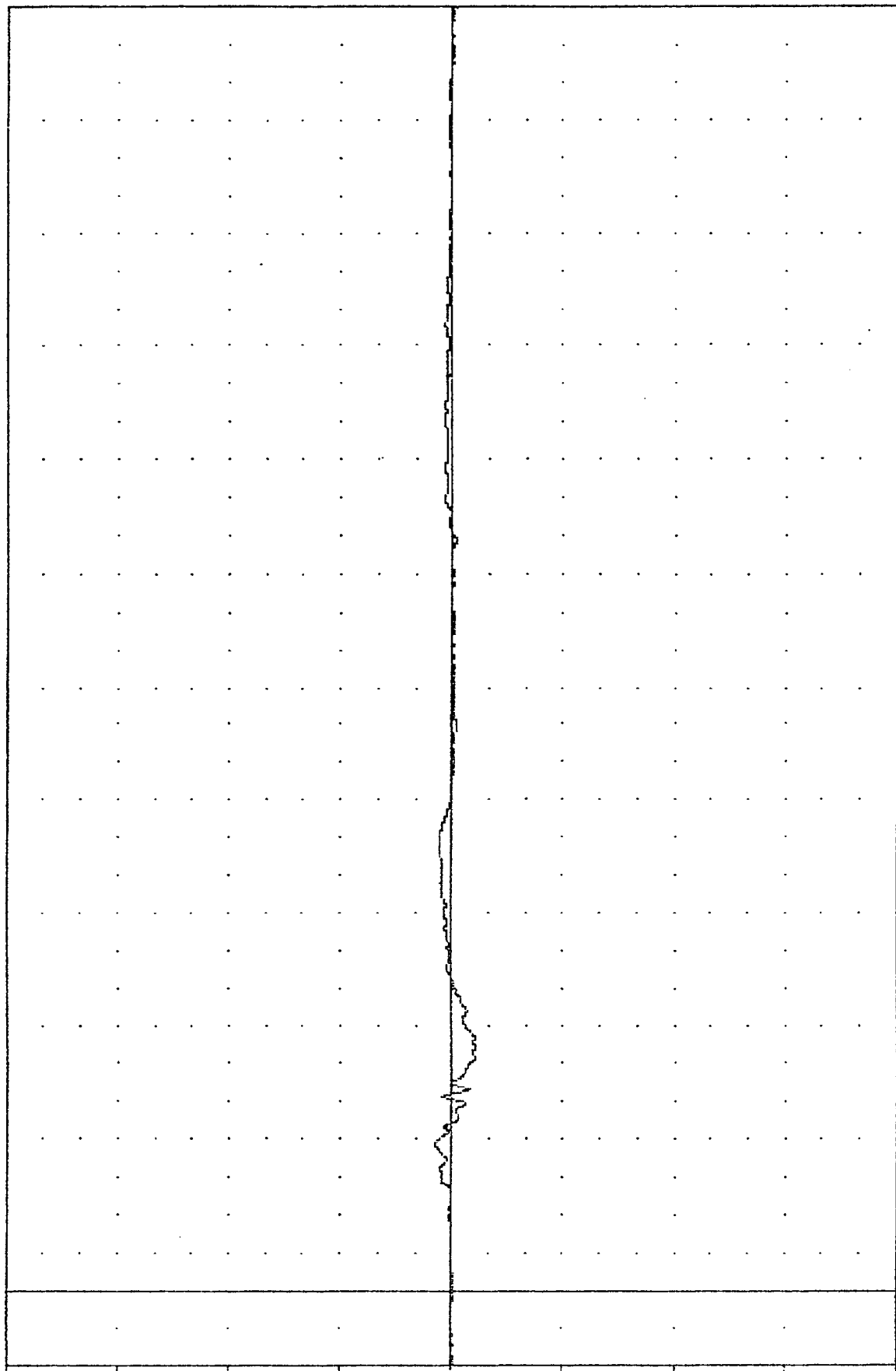
MWMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER DEWIRE ACCELERATION X OUT

TRC 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 PEVZG2

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -10.50e 61.25, 7.96 e 38.50

A-33
 ACCELERATION (G)
 -200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00



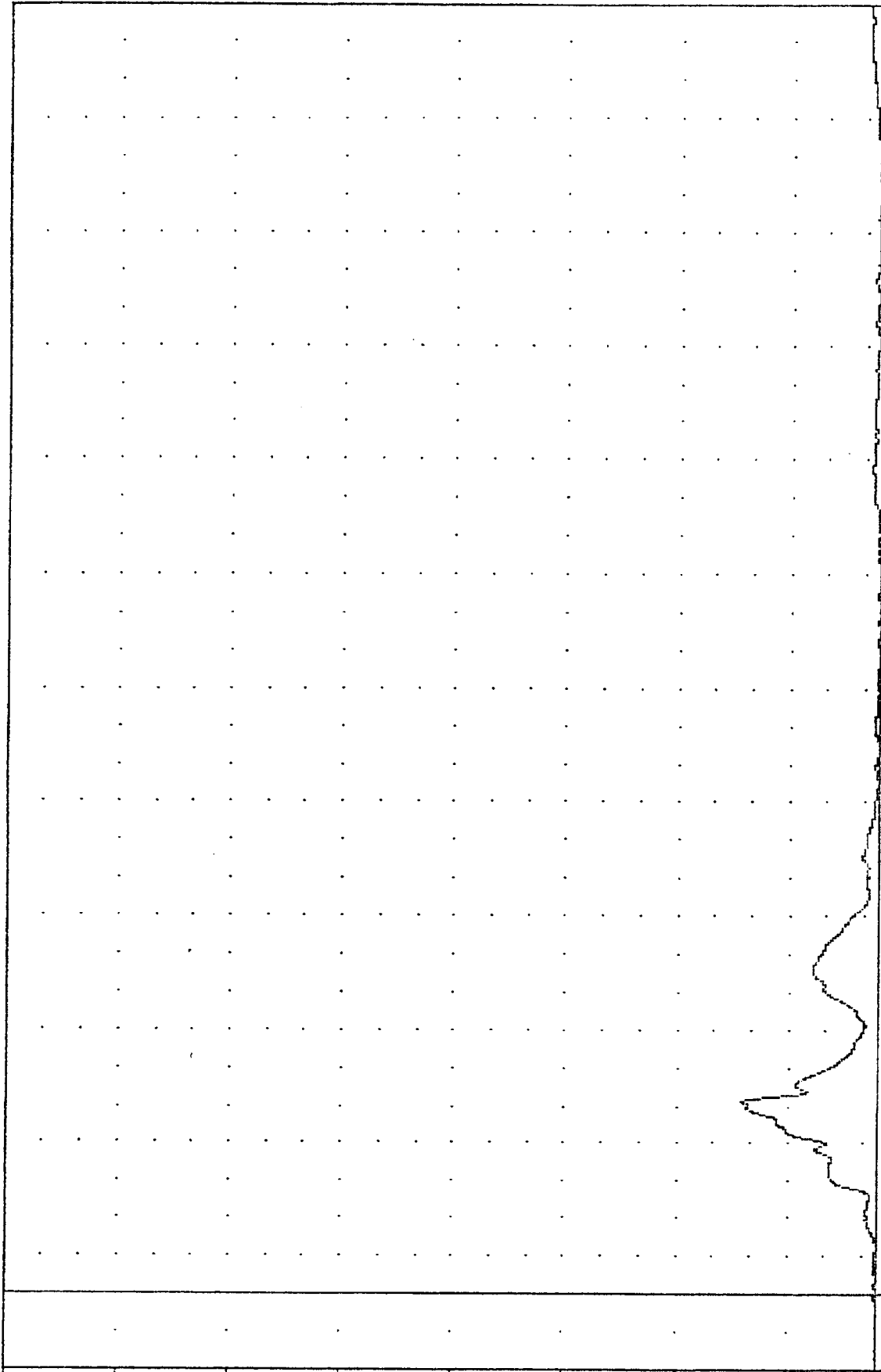
TIME (MSEC)
 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00
 MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 NOISE/RECORDING DELETED ACCIDENTAL POSITION 7 0010

TRC
 MVNA SIDE IMPACT TESTING
 85184000000
 PEVR62

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLFF 300/ 949/ -40
 MIN. MAX VALUES = 0.03e -15.75, 60.49 e 51.38

ACCELERATION (G)
 -10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00 390.00



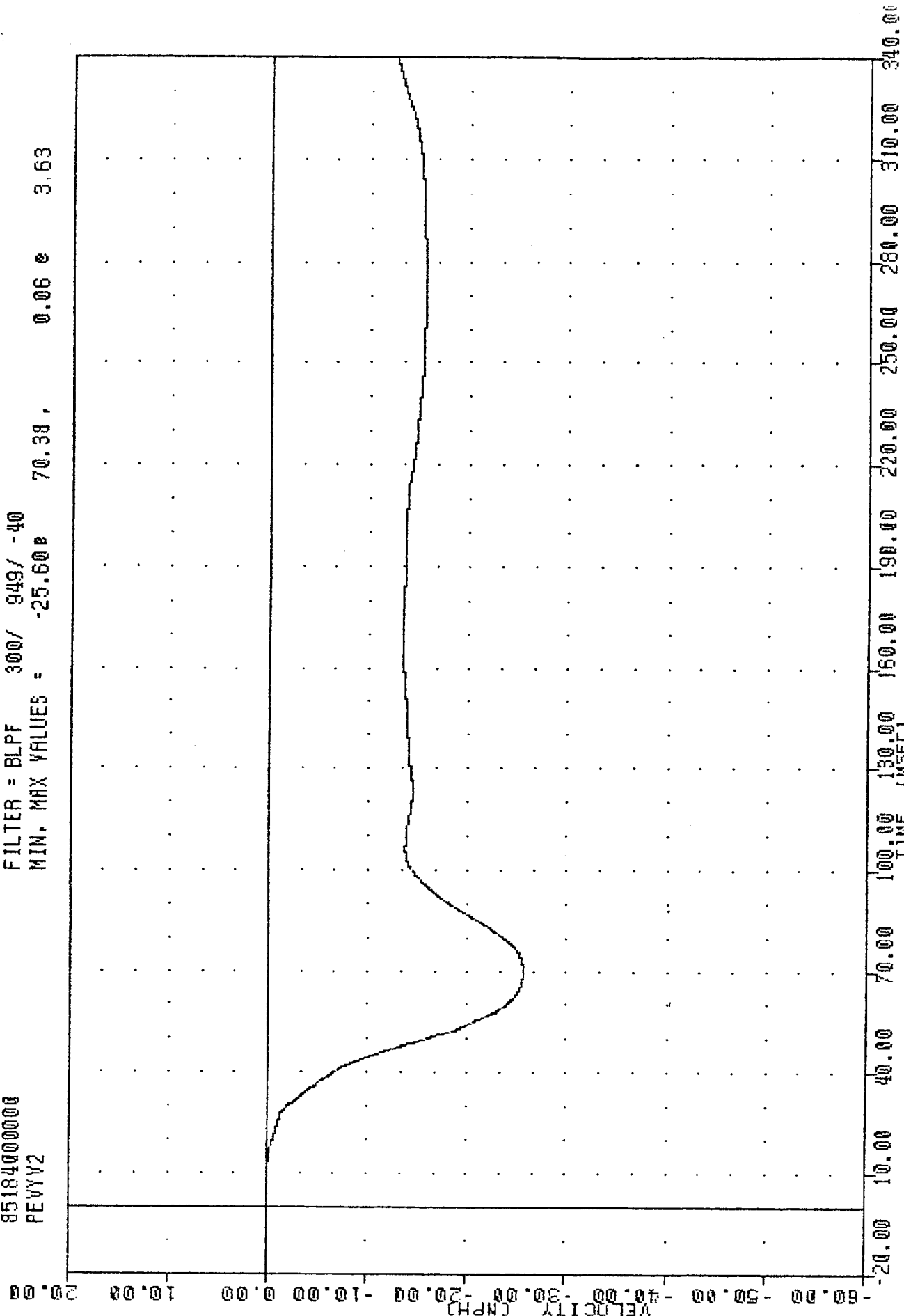
0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

MVNA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER PRIVATE RESIDENT OFFICE/EDITION

TRC
 NYMA SIDE IMPACT TESTING
 85184000000
 PEVYV2

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -25.60 70.38 , 0.06 3.63



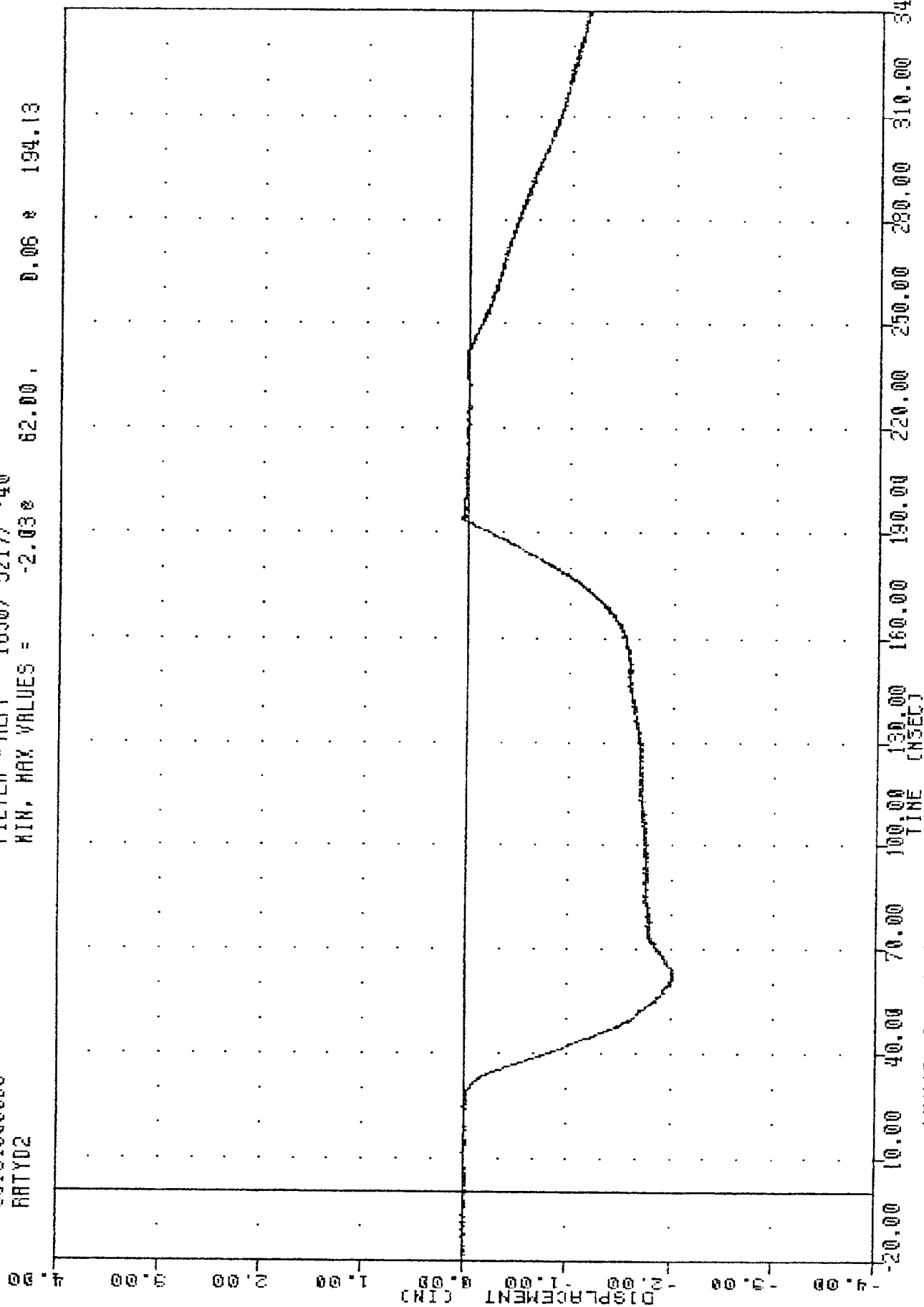
NYMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PELVIS VELOCITY Y AXIS

TAC
 MVMA SIDE IMPACT TESTING
 85184000000
 RRTYD2

PLOT DATE 24-JUL-85 13:32:19

FILTER = ALFF 1650/ 5217/ -40

KIN, MAX VALUES = -2.038 62.00, 0.06 194.13



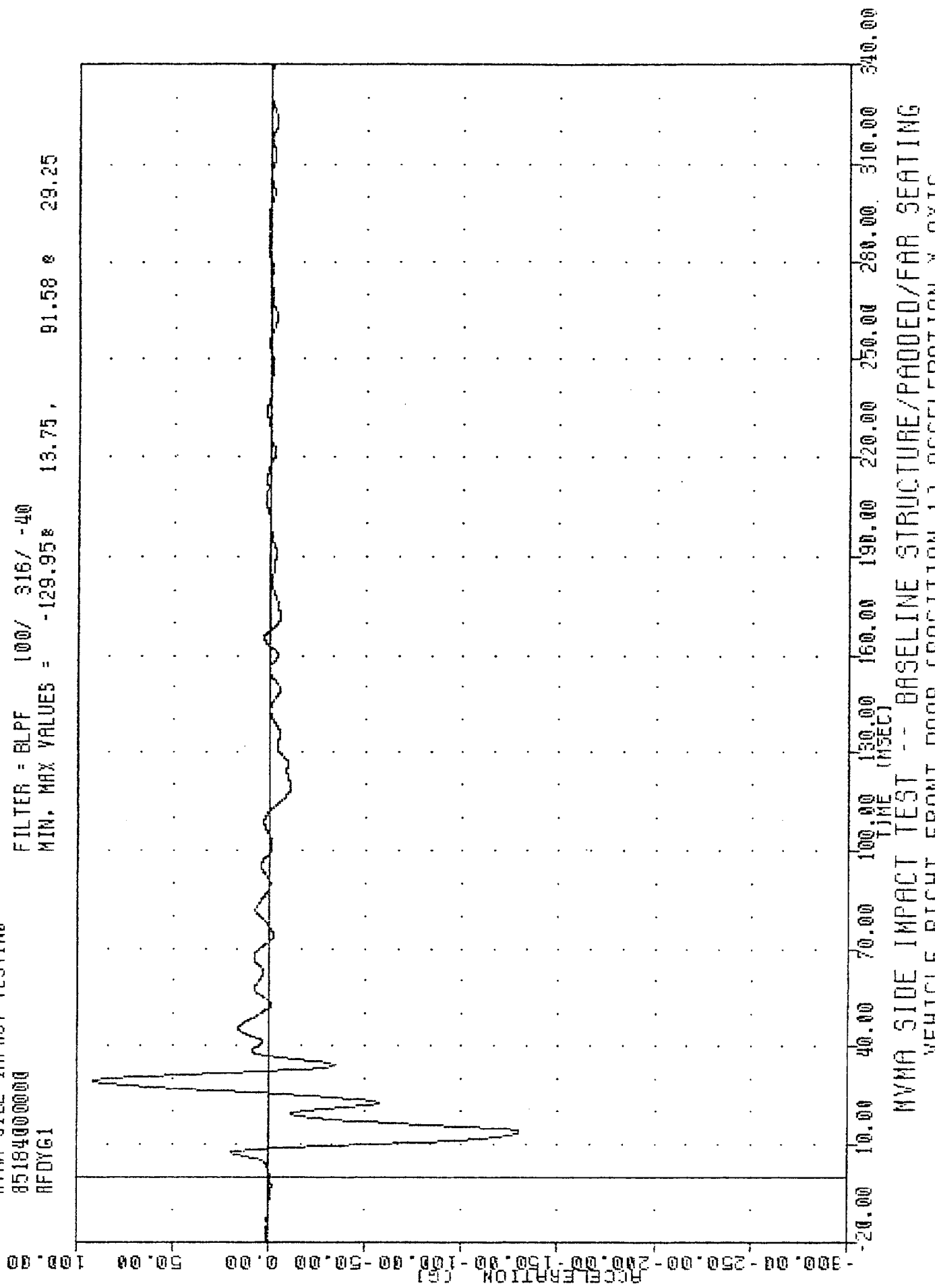
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 PASSENGER RIGHT DID TO CRASH DISCREPANCY INQUIRY

TRC , 850703
 NVMA SIDE IMPACT TESTING
 85184000000
 RFDY61

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -129.95 13.75, 91.58 29.25

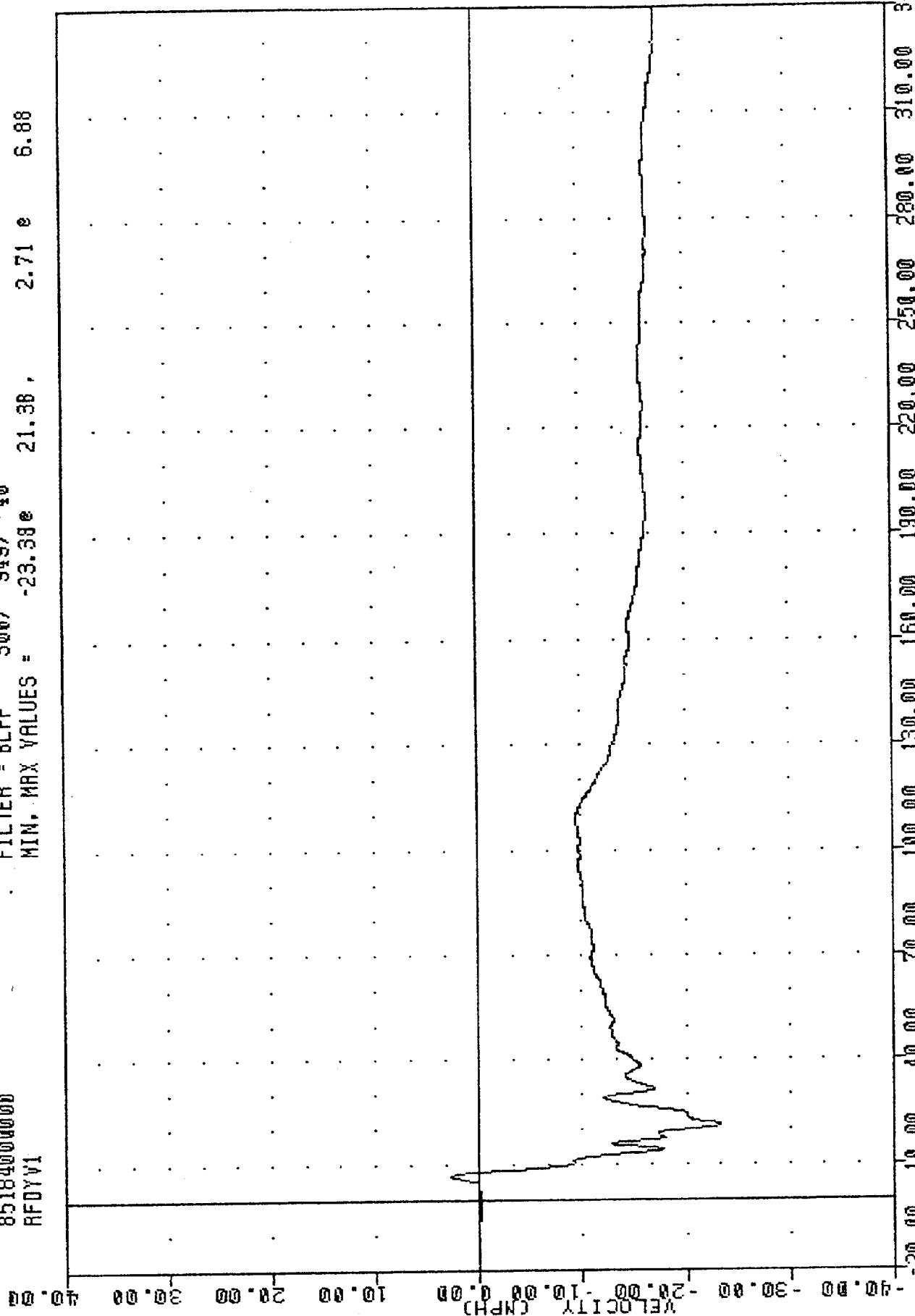


NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 VEHICLE BDCUT COUNT FROM POSITION 13 OCCUPATION 13 NVMA

TRC , 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 RFDYV1

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -23.38e 21.38 , 2.71 e 6.88



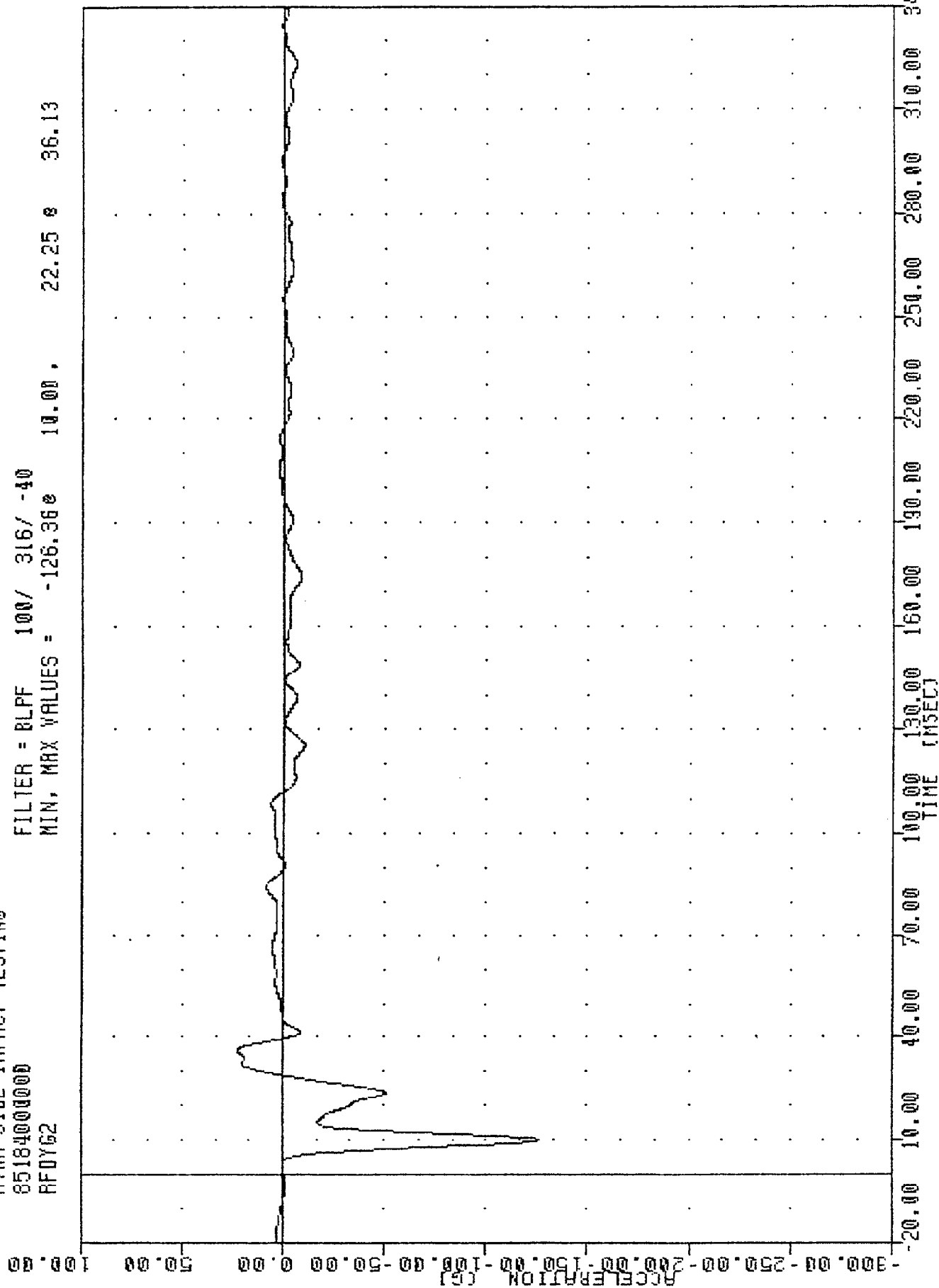
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 DIGIT COUNT FROM POSITION 11 VELOCITY Y AXIS

TRC , 850703
 MYNA SIDE IMPACT TESTING
 85184000000
 RFDY62

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -126.36 10.00, 22.25 36.13

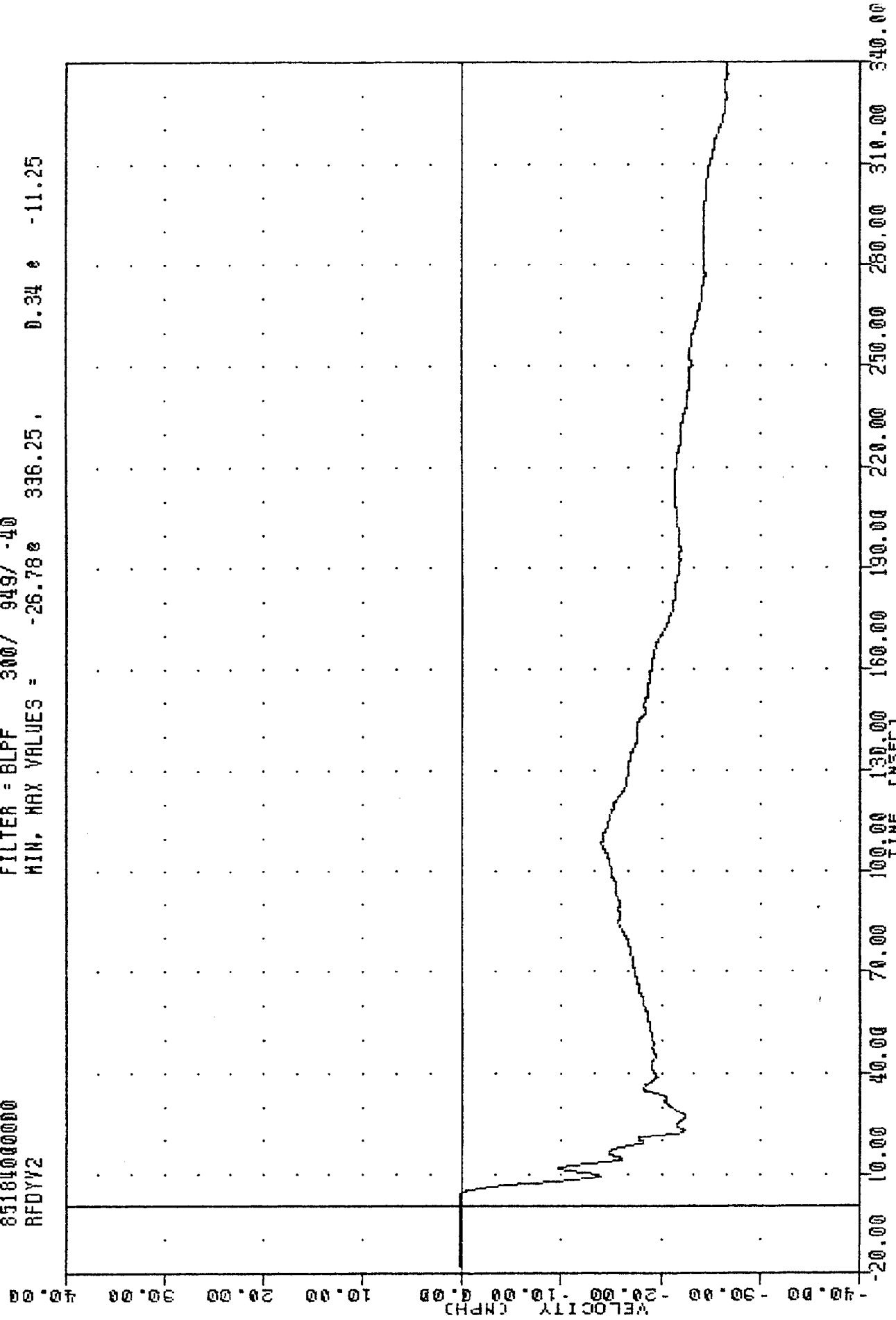


MYNA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING

TAC , 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 RFDYV2

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -26.78 336.25 , 0.34 -11.25



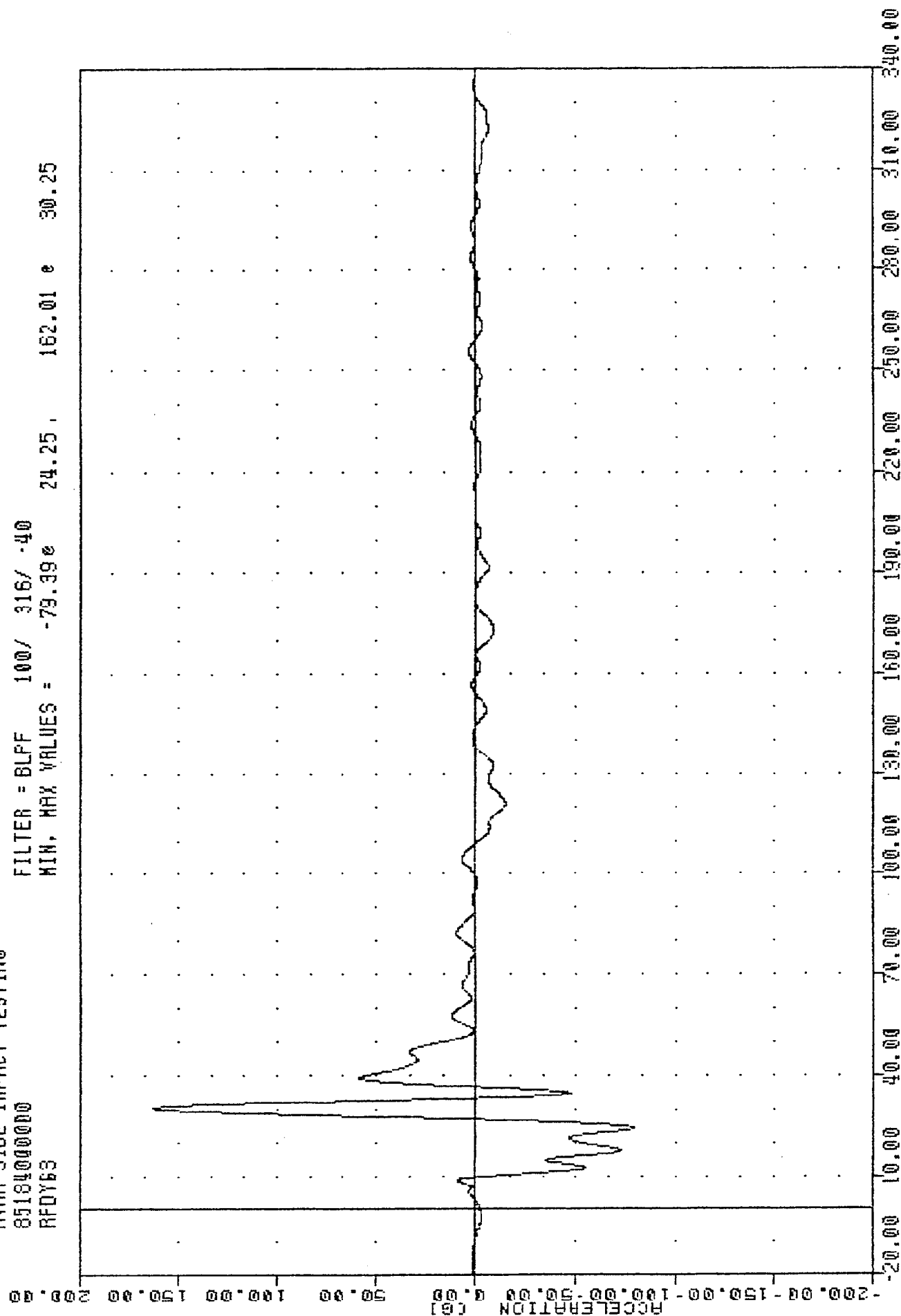
A-40

MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 RIGHT FRONT DOOR POSITION 21 VELOCITY Y AXIS

TAC 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 RFDY63

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -79.39e 24.25, 162.01 e 30.25



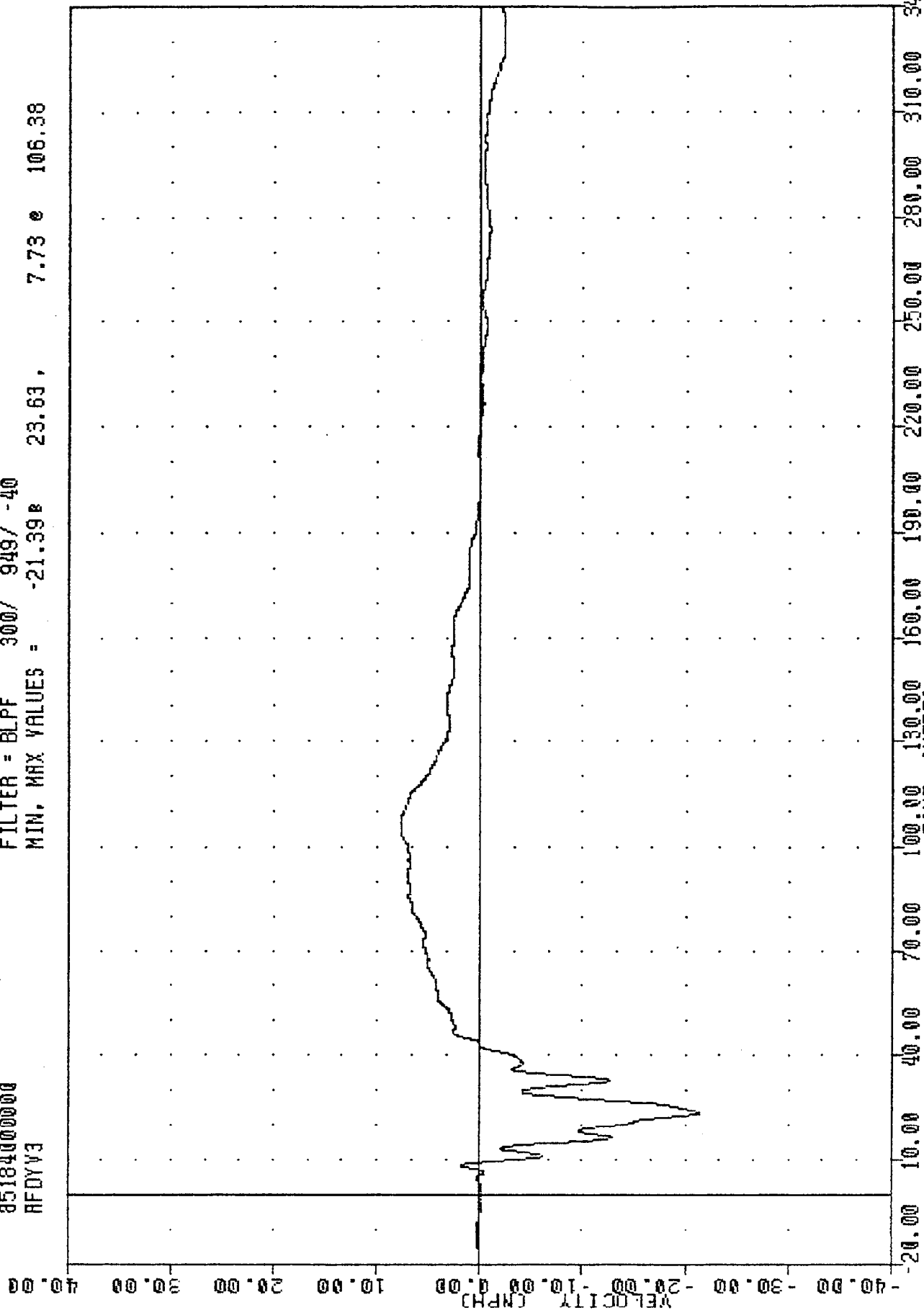
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING

TRC , 850703
 NVMA SIDE IMPACT TESTING
 8518400000
 RFDYV3

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -21.39 23.63, 7.73 e 106.38



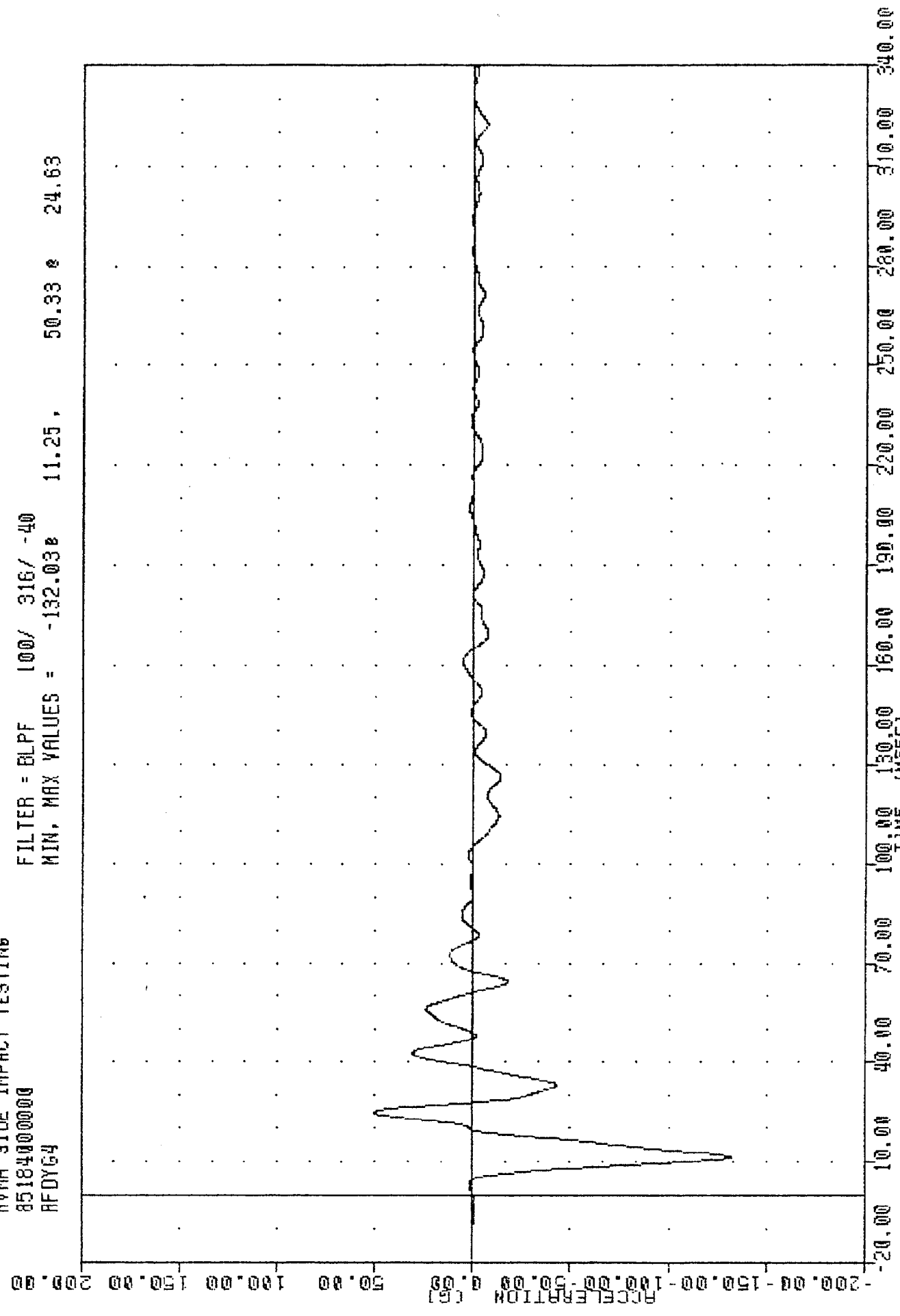
NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 RIGHT FRONT ROOR POSITION 31 VELOCITY Y AXIS

TRC , 850703
 NVMA SIDE IMPACT TESTING
 85184000000
 RFDY64

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -132.03g 11.25, 50.33 g 24.63



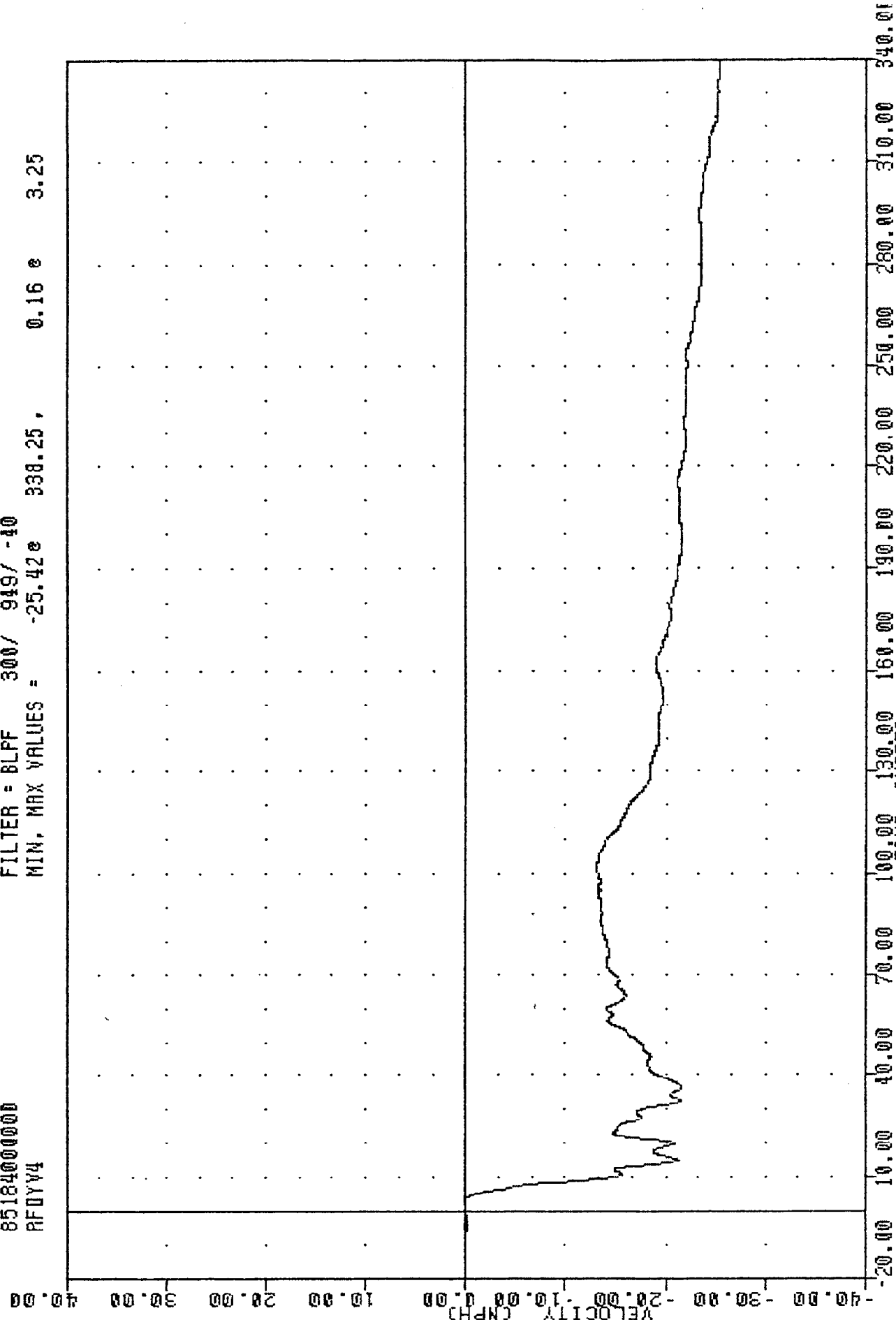
A-43

NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 VEHICLE BECUT COUNT FROM CONDITION IN OCCUPATION V NVTG

TRC 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 RFDYV4

PLOT DATE 9-JUL-85 12:26:42

FILTER = 8LPF 300/ 949/ -40
 MIN, MAX VALUES = -25.42e 338.25, 0.16 e 3.25



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 RIGHT FRONT DOOR CPOSITION 4) VELOCITY Y AXIS

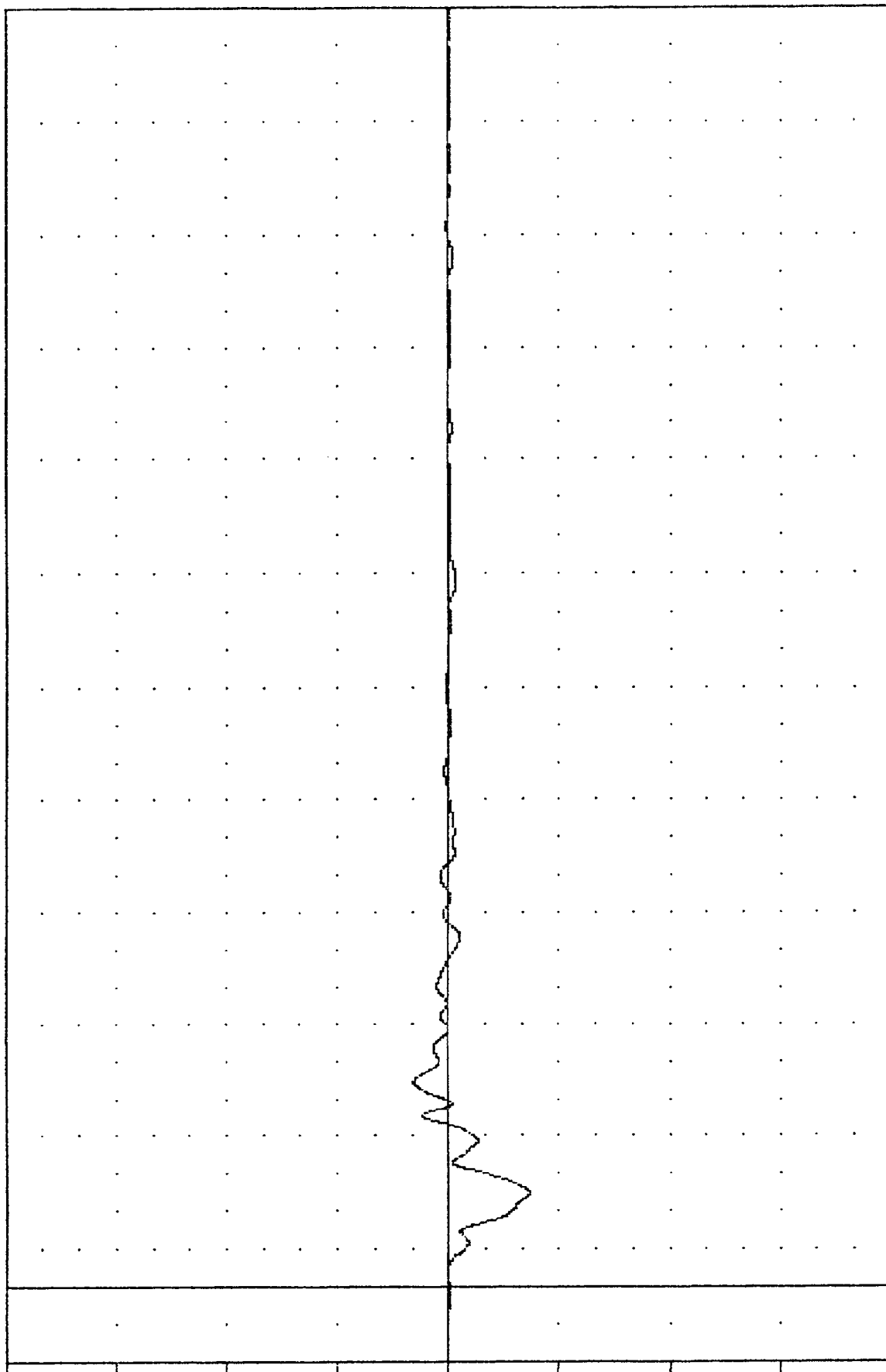
TRC , 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 LF3XG

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -7.36e 24.88, 3.14 e 54.38

ACCELERATION (G)



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING

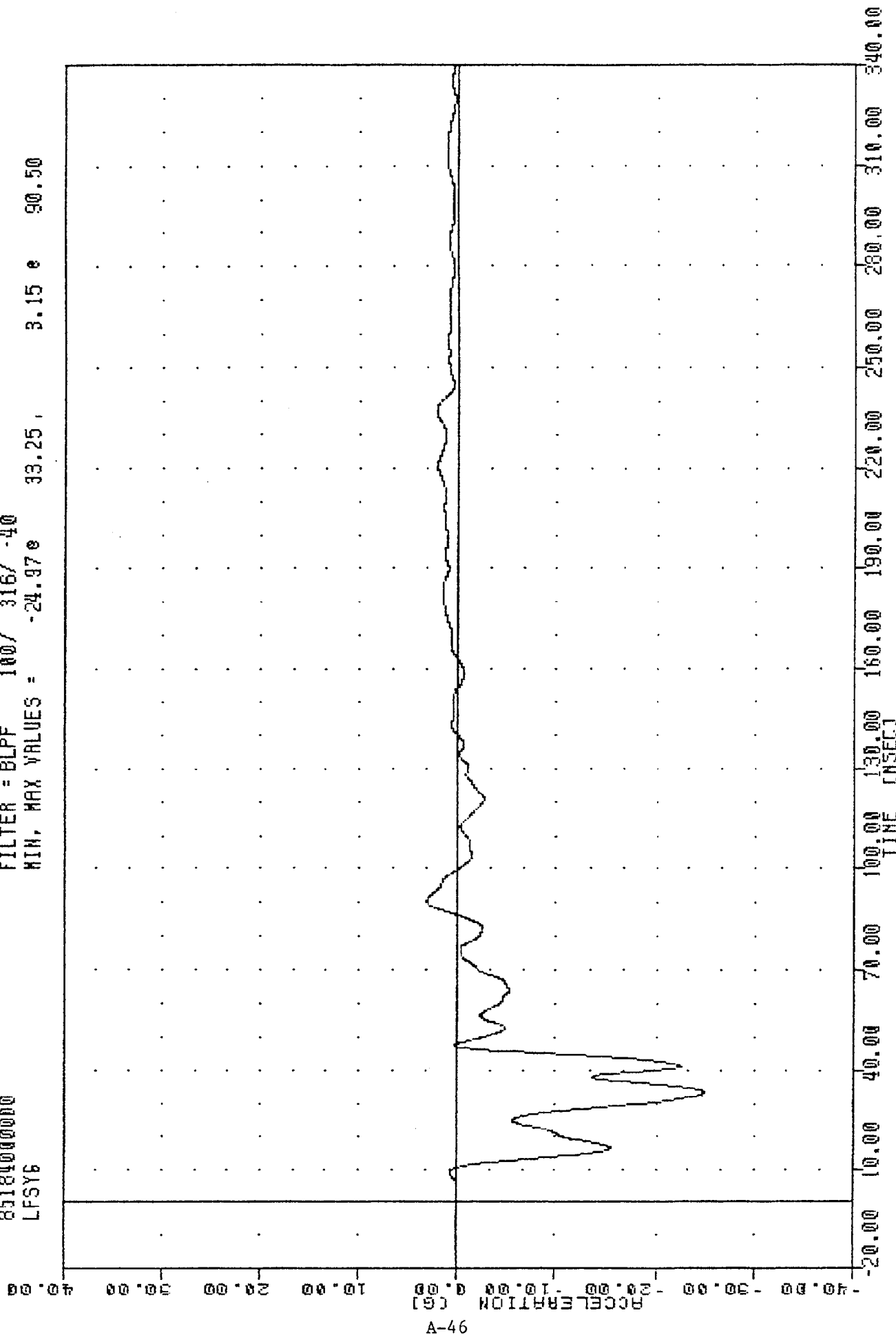
VEHICLE FEET FRONT CR11 ACCELERATION V OVTC

TAC , 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 LFSY6

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -24.97e 33.25, 3.15 e 90.50



A-46

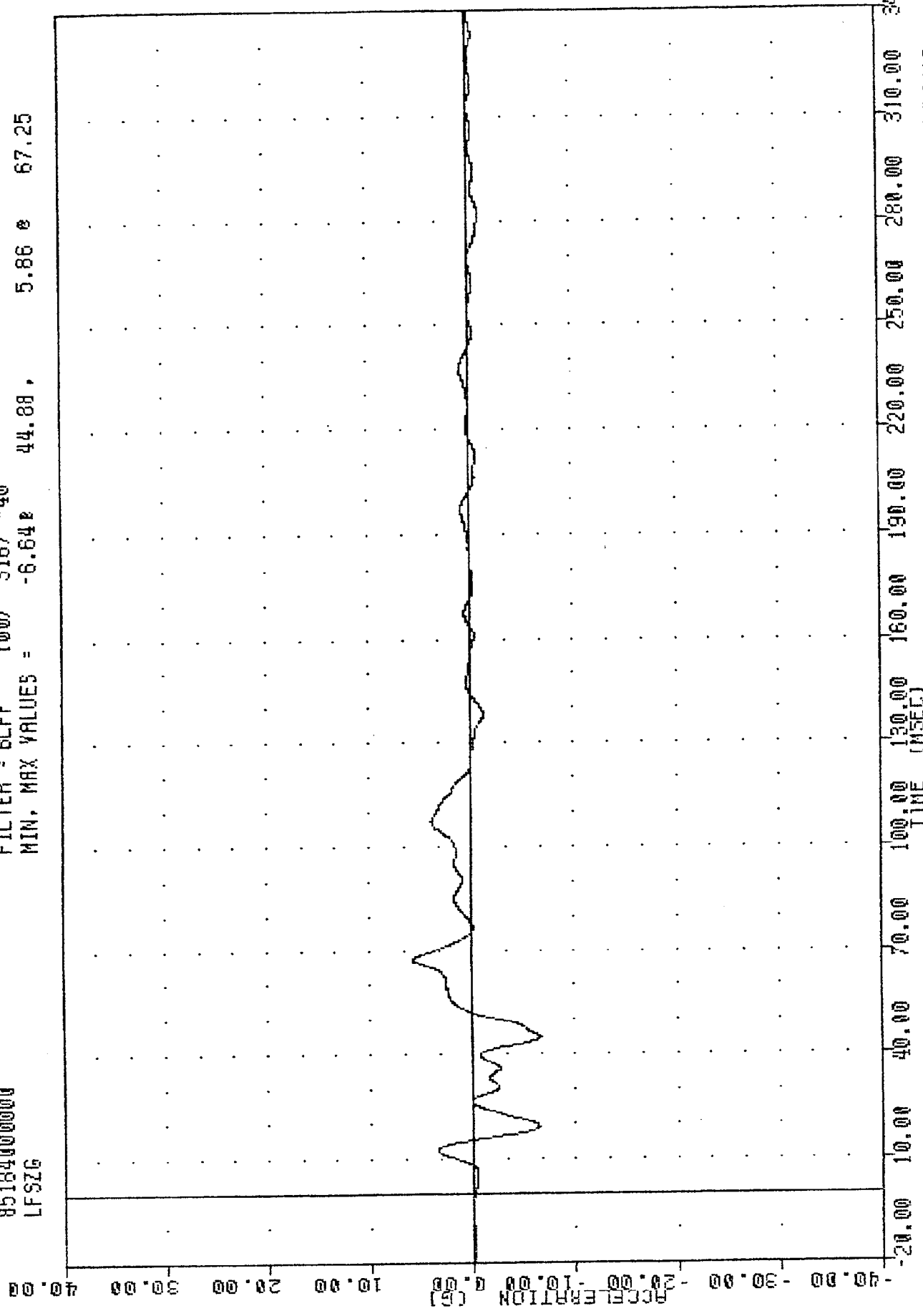
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 VEHICLE LEFT FRONT CHASSIS ACCELERATION Y AXIS

TRC
 NYMA SIDE IMPACT TESTING
 85184000000
 LFSZG

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -6.64e 44.88, 5.86 e 67.25



NYMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING

TRC , 850703
 MVNA SIDE IMPACT TESTING
 85184000000
 LF3RG

PLOT DATE 24-JUL-85 13:32:19

FILTER = 8LPF 100/ 318/ -40

MIN, MAX VALUES = 0.072 -7.75, 25.03 & 33.25

70.00

60.00

50.00

40.00

30.00

20.00

10.00

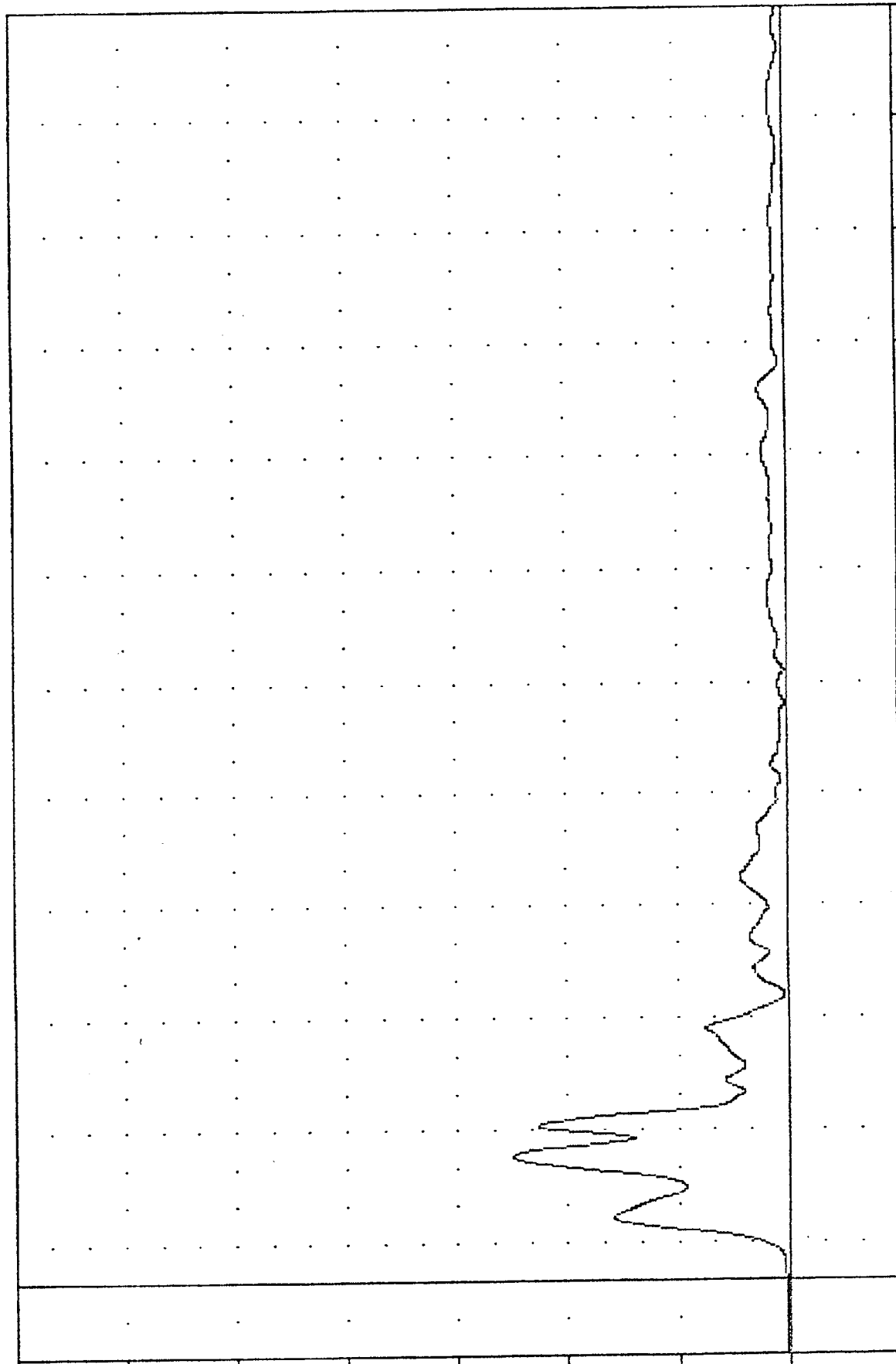
0.00

-10.00

-20.00

ACCELERATION (g)

A-48



-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)

MVNA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING

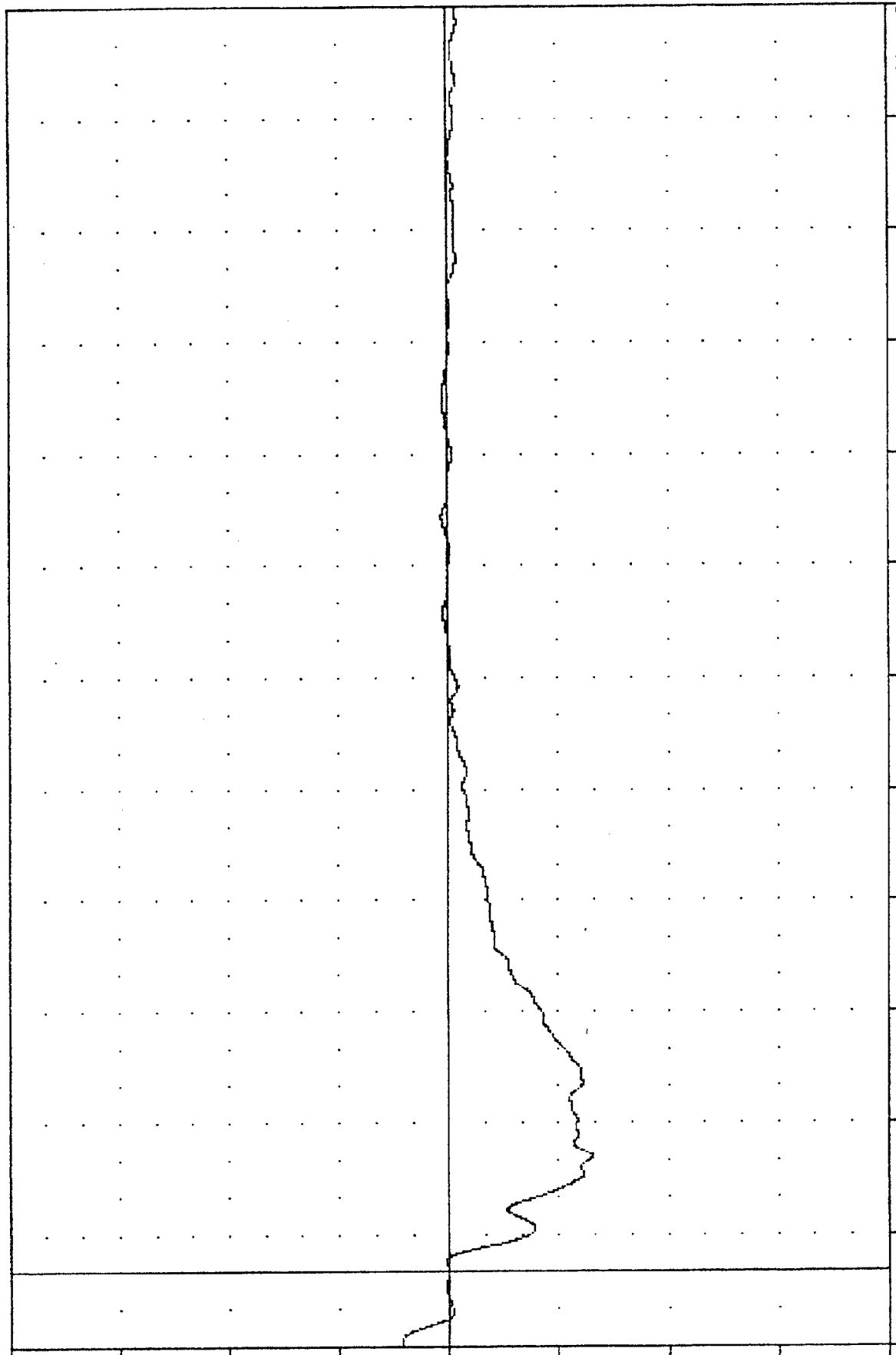
TAC , 850703
 MWMA SIDE IMPACT TESTING
 85184000000
 BCGXS

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -13.07g 30.88, 4.28 g -18.25

ACCELERATION (G)



A-49

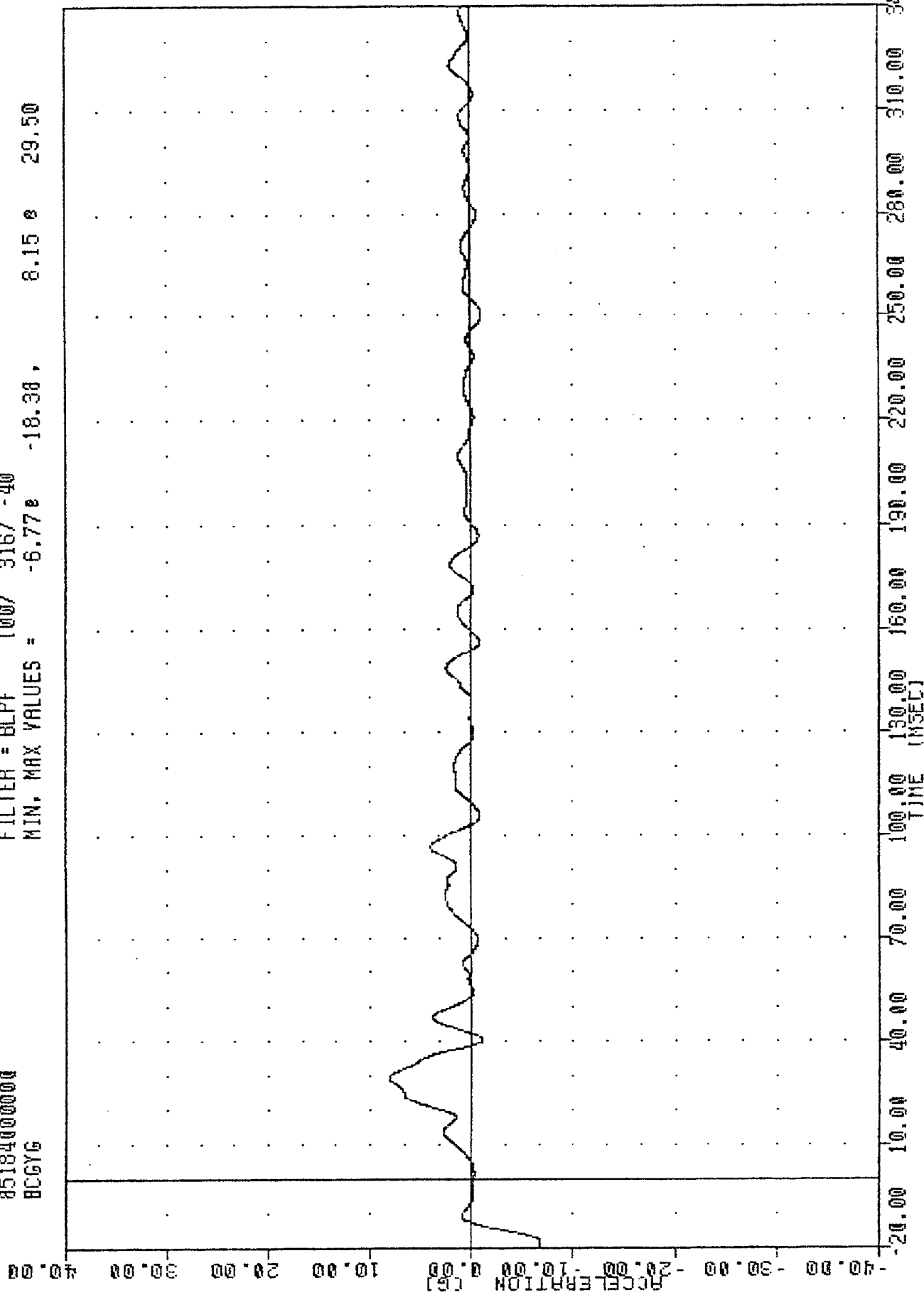
MWMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADOED/FAR SEATING
 DODDIED CENTER OF GRAVITY Y AXIS

TRC .850703
 NVMA SIDE IMPACT TESTING
 85184000000
 BCGYG

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -6.77% -18.30, 8.15% 29.50



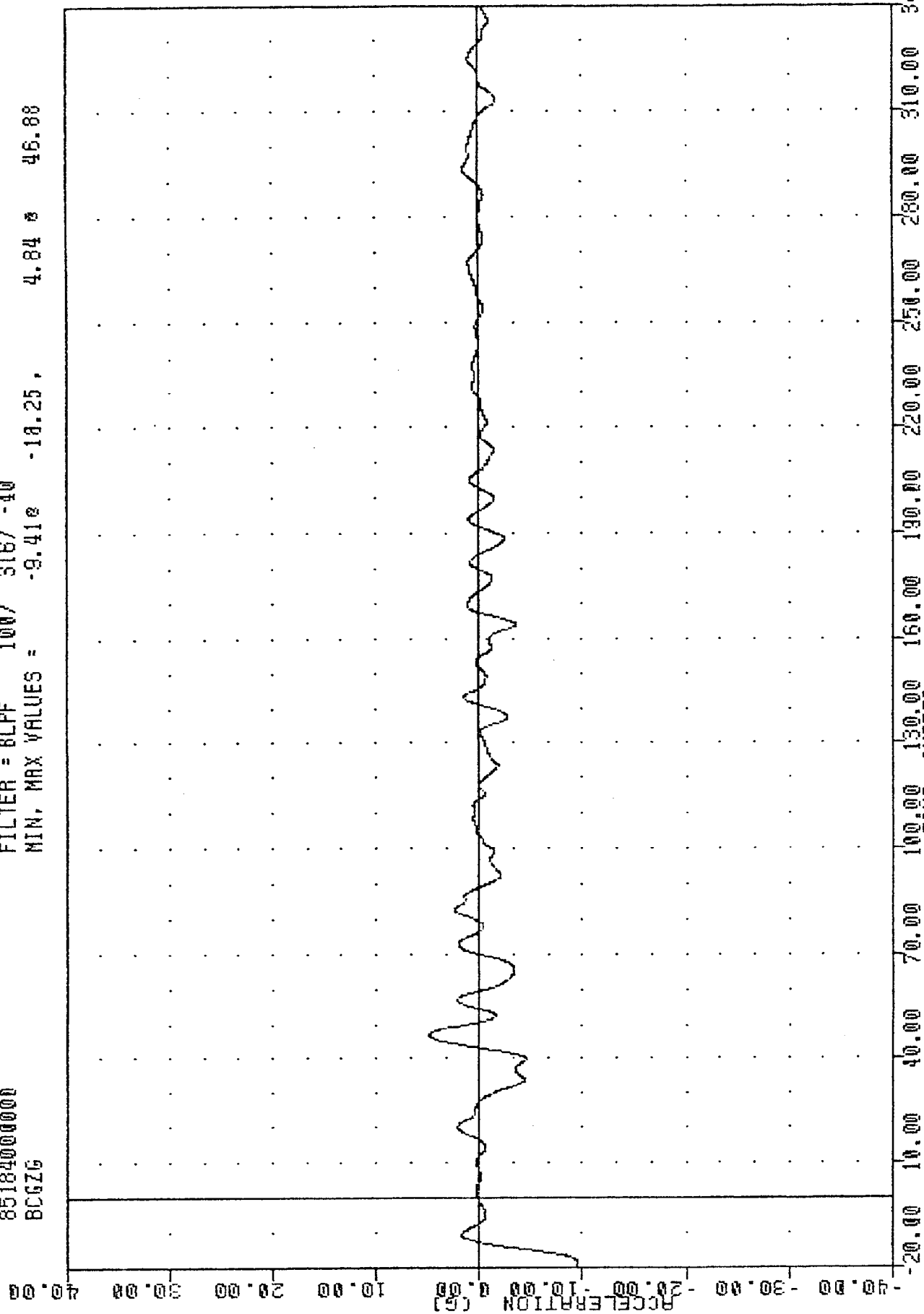
NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 DOTTED CENTER OF CROUITY V OYIC

TRC , 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 BCGZG

PLOT DATE 24-JUL-85 13:32:19

FILTER = 8LFF 100/ 316/ -40

MIN, MAX VALUES = -9.41e -10.25, 4.84 e 46.88



A-51

MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING

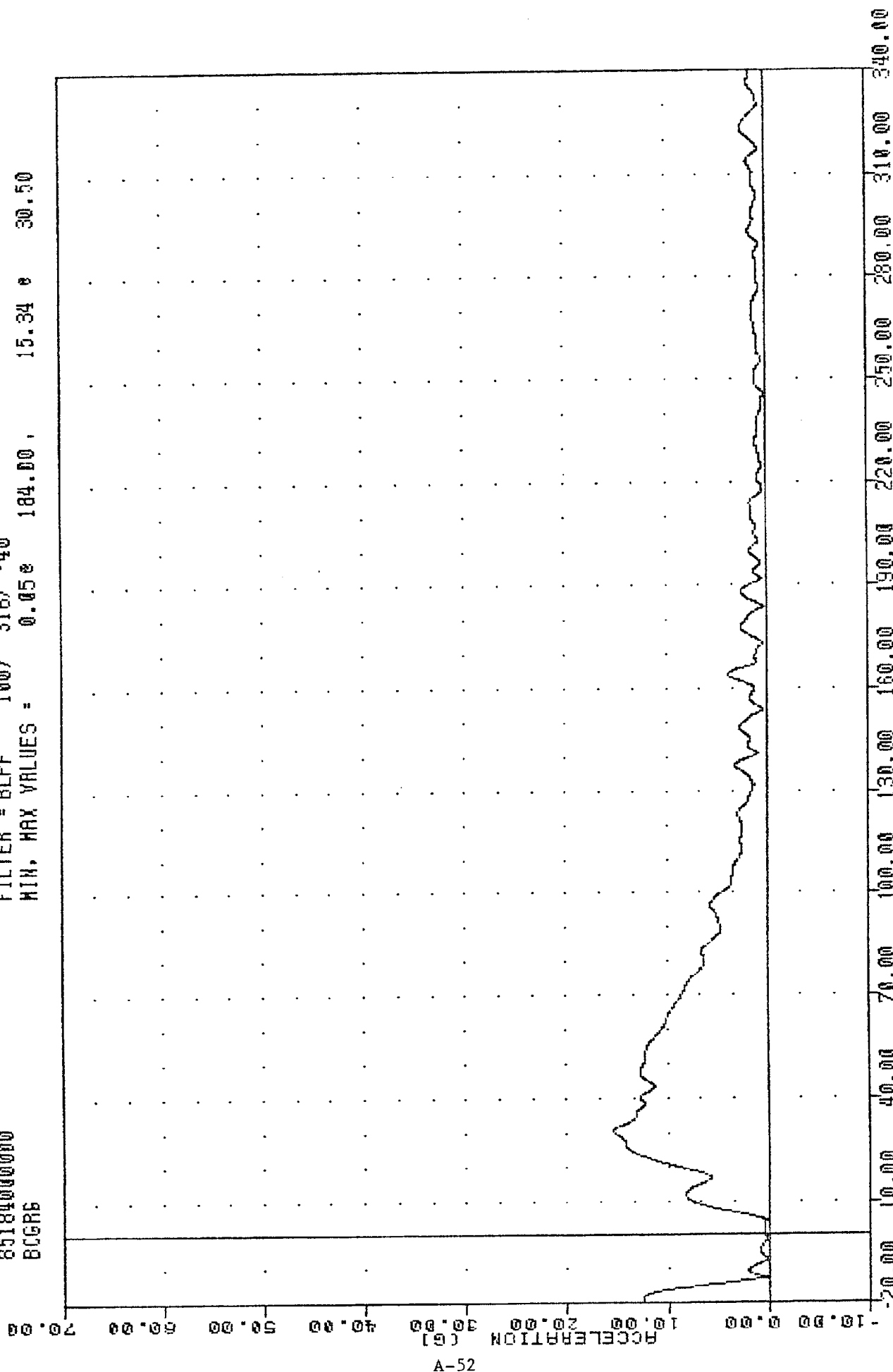
ROSTER CENTER OF GRAVITY 7.075

TAC , 850703
 NVMA SIDE IMPACT TESTING
 85184000000
 BCGRS

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = 0.05e 184.00, 15.34 e 30.50



A-52

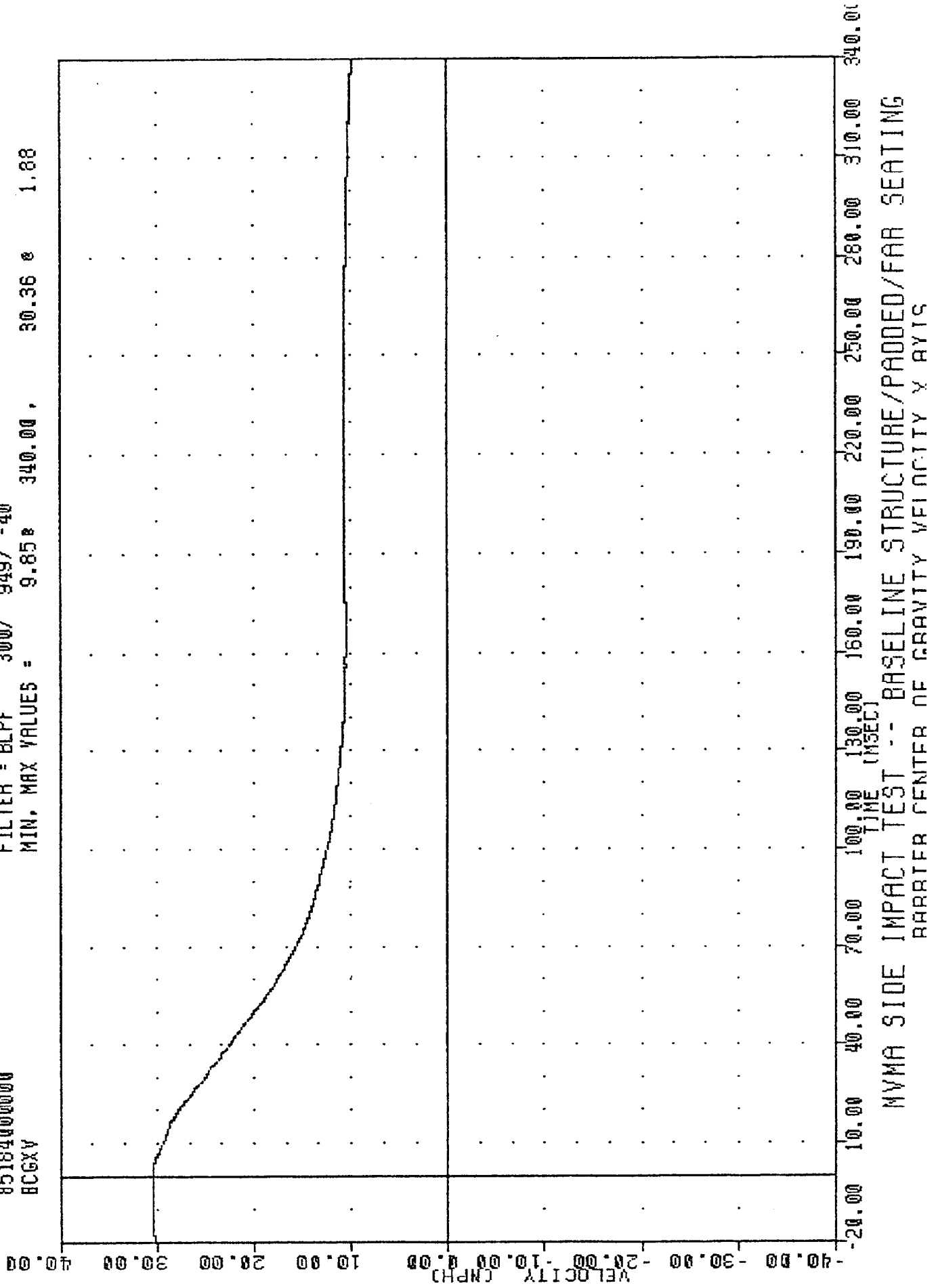
NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING

TRC , 850703
 NYMA SIDE IMPACT TESTING
 85184000000
 BCGXV

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40

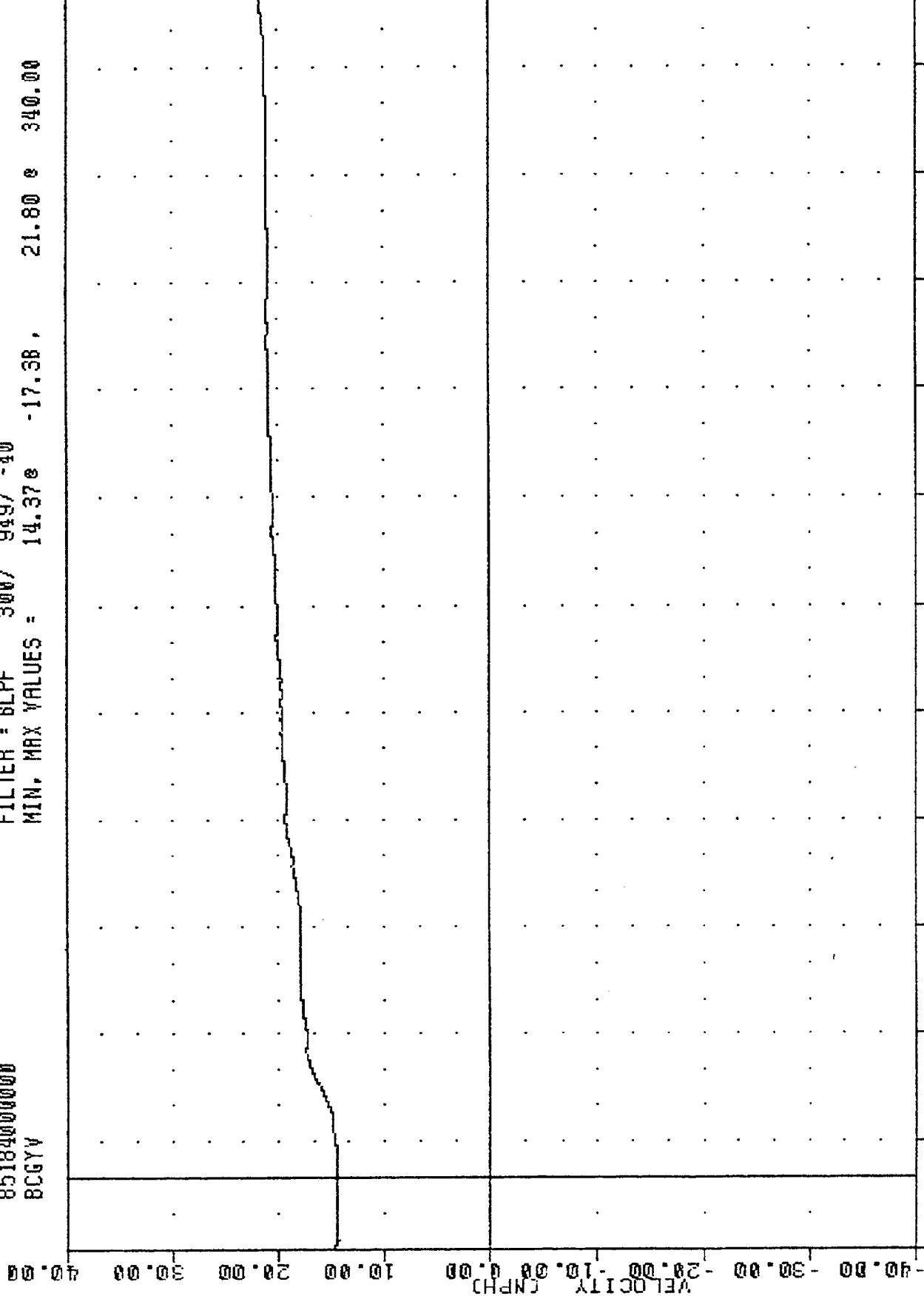
MIN. MAX VALUES = 9.858 340.00 , 30.36 e 1.88



TRC
MVNA SIDE IMPACT TESTING
85184000000
BCGYV

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = 14.37e -17.38, 21.80 e 340.00



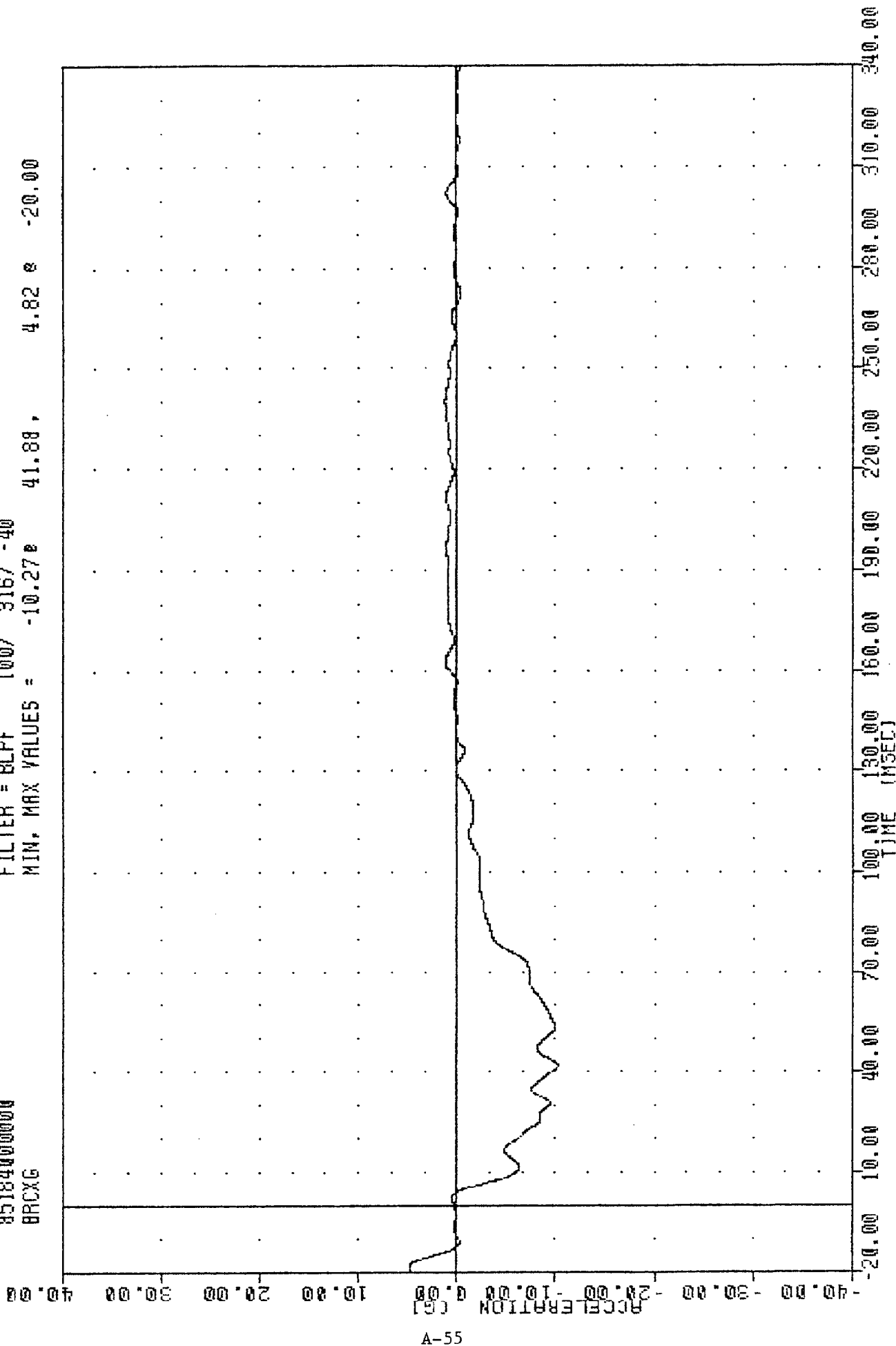
MVNA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
DODDIED CENTER OF CROUITY VELOCITY V DVTG

TRC , 850703
 NVMA SIDE IMPACT TESTING
 85184000000
 BRXG

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -10.27e 41.88, 4.82 e -20.00



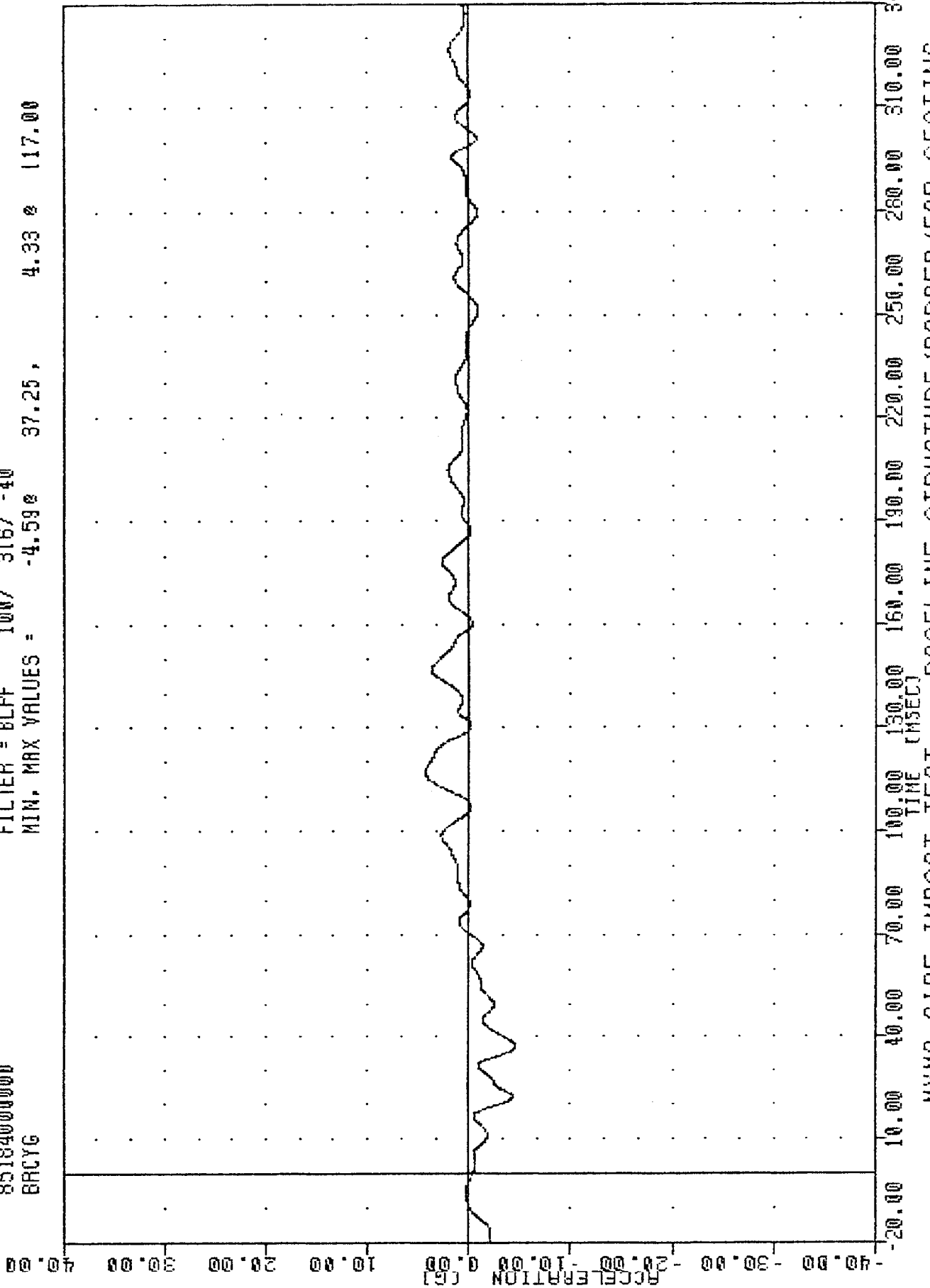
NVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING

TRC , 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 BR0YG

PLOT DATE 24-JUL-85 13:32:19

FILTER = BLFF 100/ 316/ -40

MIN. MAX VALUES = -4.59e 37.25, 4.33 e 117.00



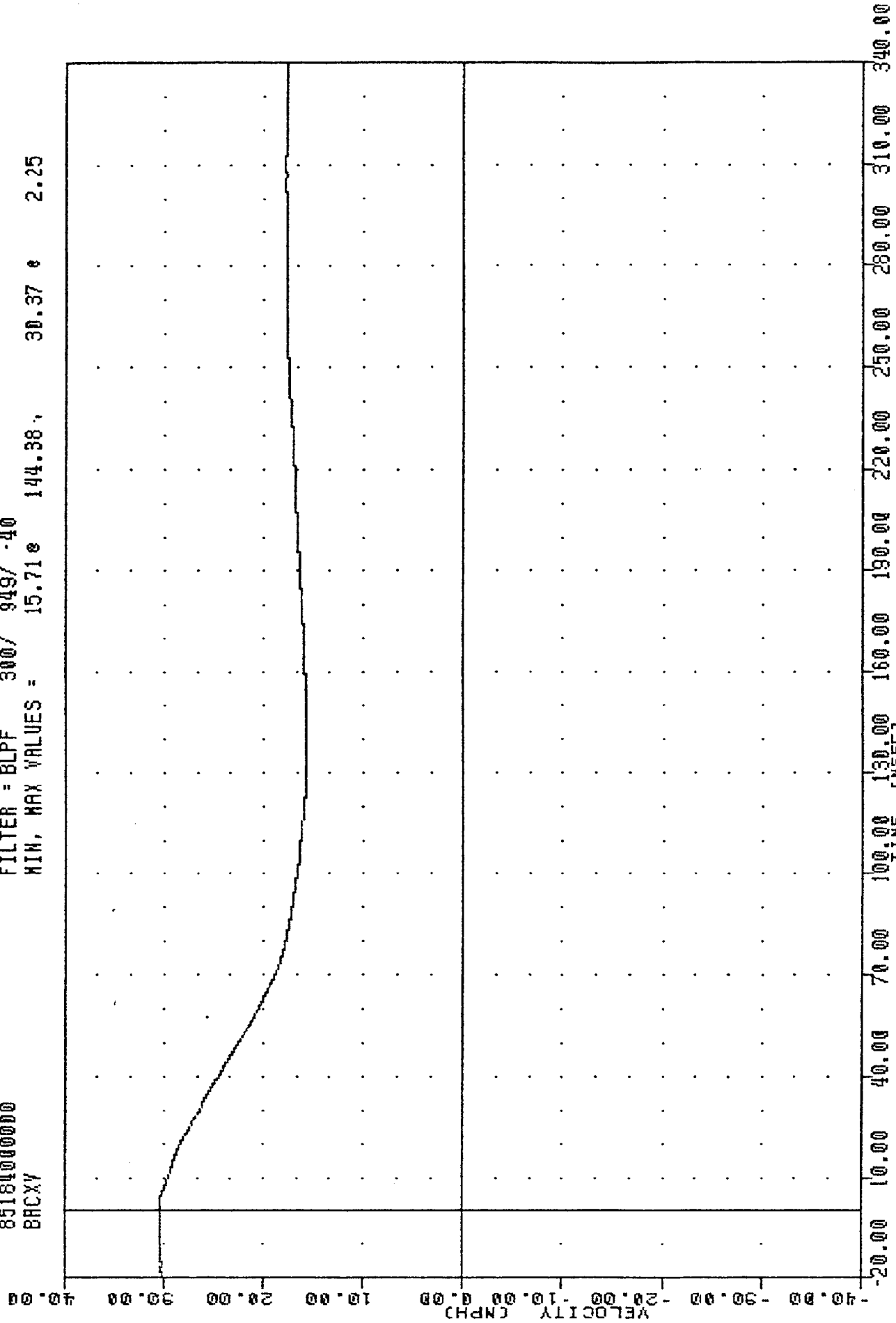
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADOED/FAR SEATING

TAC , 850703
 MVMA SIDE IMPACT TESTING
 85184000000
 BRXY

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = 15.71 144.38 30.37 2.25



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 BARRIER REAR CROSSMEMBER VELOCITY V BYTS

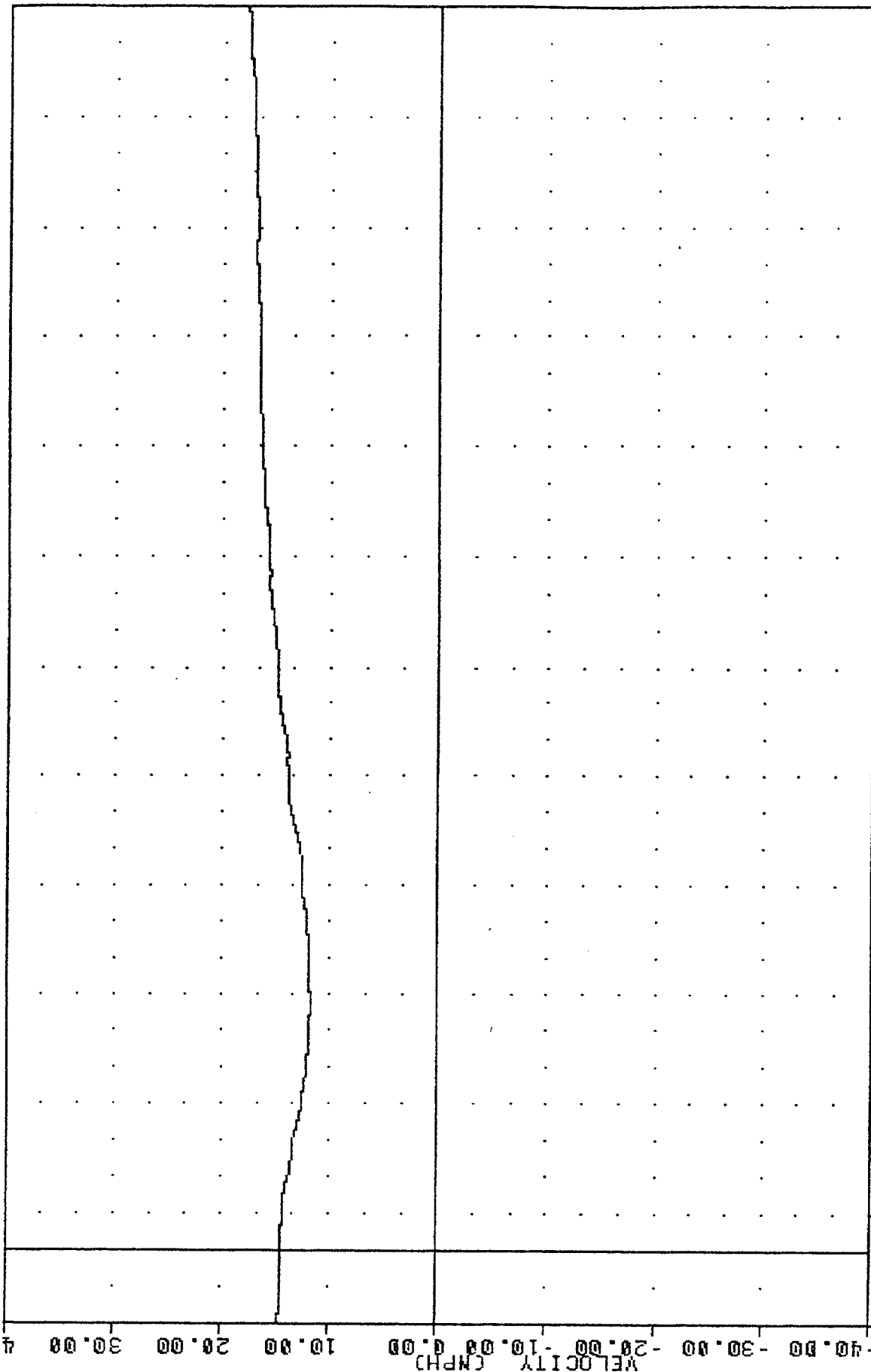
TRC
 MVMA SIDE IMPACT TESTING
 85184000000
 BRCTV

PLOT DATE 9-JUL-85 12:26:42

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = 11.78 66.75, 17.78 339.63

VELOCITY (MPH)



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/PADDED/FAR SEATING
 BARRIER REAR TRANSDUCER VELOCITY V BYTC

APPENDIX B
DUMMY CERTIFICATION

SIDE IMPACT DUMMY CALIBRATION

Side Impact Dummy
Damage Checklist

Dummy S/N 119

<u>OK</u>	<u>Damaged</u>	
<u>X</u>	<u> </u>	Outer skin on entire dummy (gashes, rips, etc.)
<u>X</u>	<u> </u>	Head - Gashes, rips, general appearance, etc.
<u>X</u>	<u> </u>	Neck - broken or cracks in rubber
<u>X</u>	<u> </u>	Spine - broken or cracks in rubber
<u>X</u>	<u> </u>	Ribs - check all ribs for damage (bent or broken), damping material separation.
<u>X</u>	<u> </u>	Rib Attach Leather - breaks in leather at ribs
<u>X</u>	<u> </u>	Bourns Pot. - bent shaft - electrical discontinuity
<u>X</u>	<u> </u>	Accelerometer Leads - torn cables
<u>X</u>	<u> </u>	Accelerometer Mountings (Head, Thorax, Pelvis) - check for secure mounting
<u>X</u>	<u> </u>	Retrofit Kit (Calspan) - check for bent brackets, sagging rib cage
<u>X</u>	<u> </u>	Thorax support wire and springs - check for damage
<u>X</u>	<u> </u>	Overall smooth stroking of thorax left to right (no interference)
<u>X</u>	<u> </u>	Other

If upon visual examination, damage is apparent in any of these areas, a VRTC representative is to be consulted for a decision on repair or replacement of parts.

Repair or Replacement Approved By:

Signature

Date

Comments on repair or replacement of parts:

Visual all O. K.

TRC Personnel

Checked By:

Gregg Wills
Signature

6/4/85
Date

VRTC Personnel

Checked and Approved for Testing By:

Signature

Date

SIDE IMPACT DUMMY CALIBRATION
DUMMY SERIAL NUMBER 119

TEST/ DATE	CHANNEL	FILTER CLASS	PEAK ACCELERATION (g)	
			SPECIFICATION*	TEST RESULT
HEAD 6/5/85	HEAD Y-AXIS	1000	150-175	166.35
THORAX 6/5/85	RIGHT UPPER RIB Y-AXIS PRIMARY	180	36-50	41.48
	RIGHT LOWER RIB Y-AXIS PRIMARY	180	36-50	41.25
	REDUNDANT	180	36-50	41.05
	UPPER SPINE Y-AXIS PRIMARY	180	16-24.6	21.03
	LOWER SPINE Y-AXIS PRIMARY	180	17.6-26.4	17.89
	REDUNDANT	180	17.6-26.4	18.15
PELVIS 6/5/85	PELVIS Y-AXIS	180	50-65	63.27

*Side impact test specifications currently in use by VRTC-NHTSA.

PART 572 CALIBRATION

NYMA , SH11903 PLOT DATE 12-JUN-85 10:16:40

SID 119/017 HEAD IMPACT CAL 03

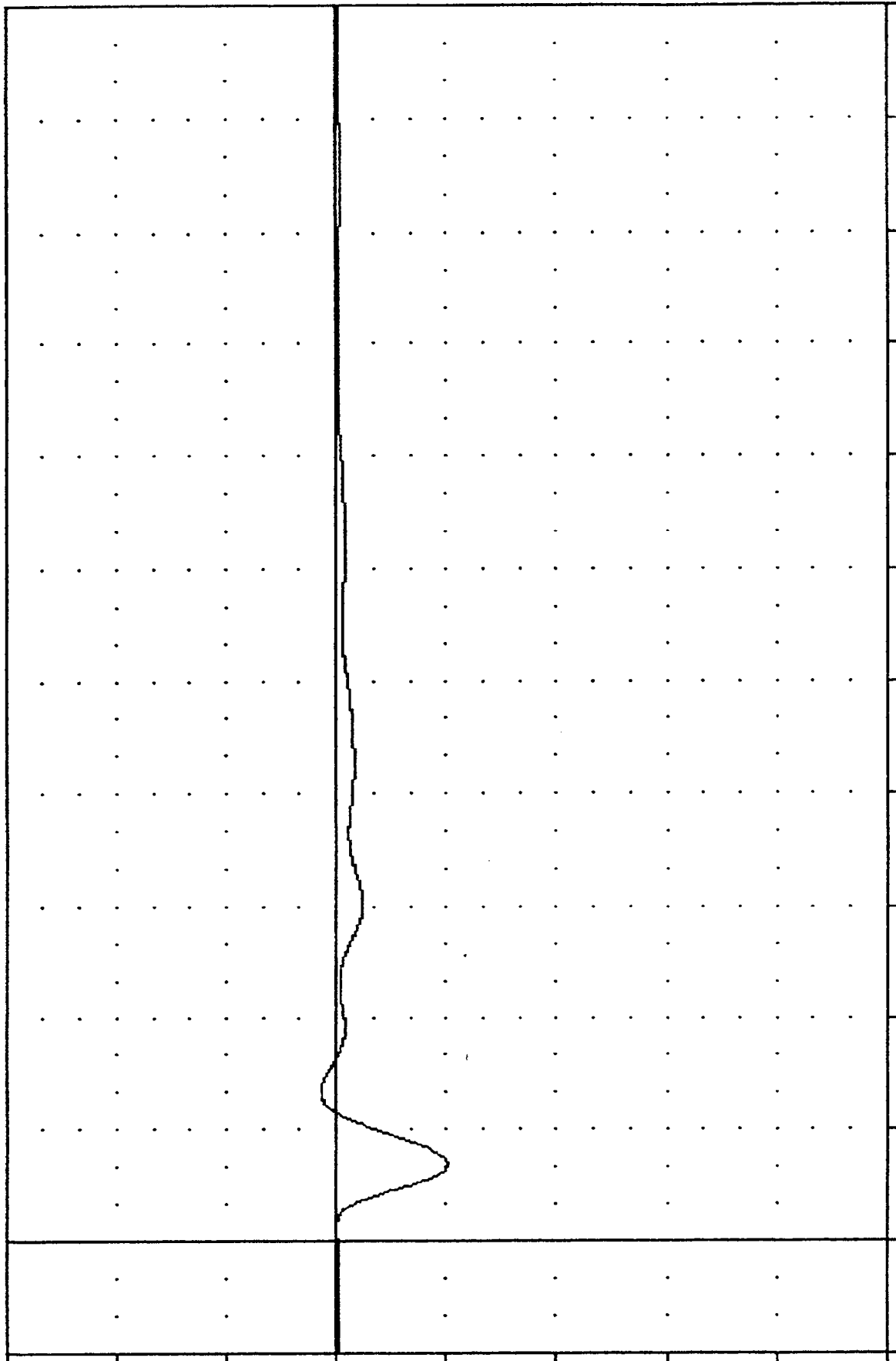
85156

FILTER = BLPF 100/ 316/ -40

PISXG

MIN, MAX VALUES = -10.17e 6.88, 1.37e 13.38

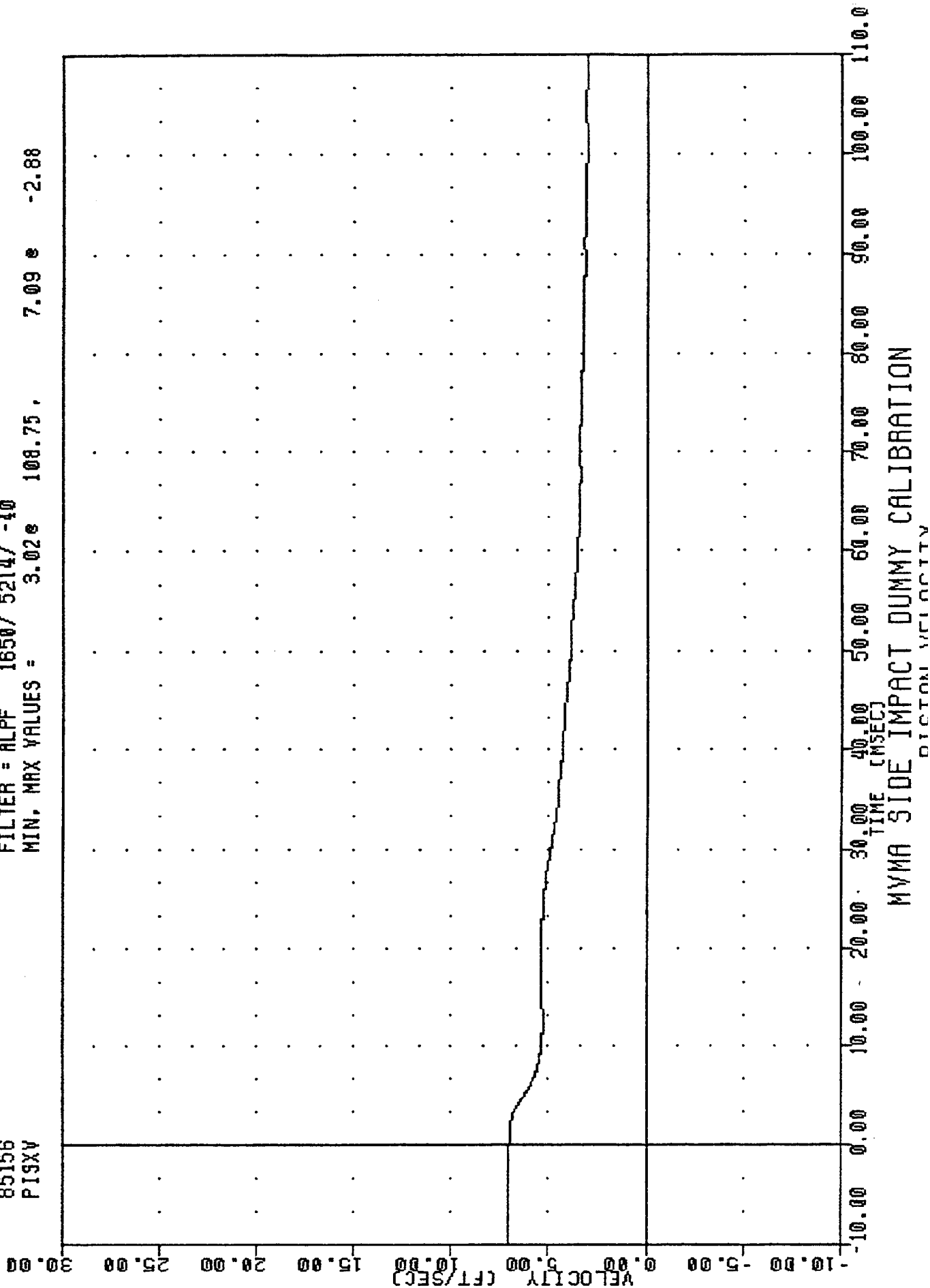
ACCELERATION (G)



NYMA SIDE IMPACT DUMMY CALIBRATION

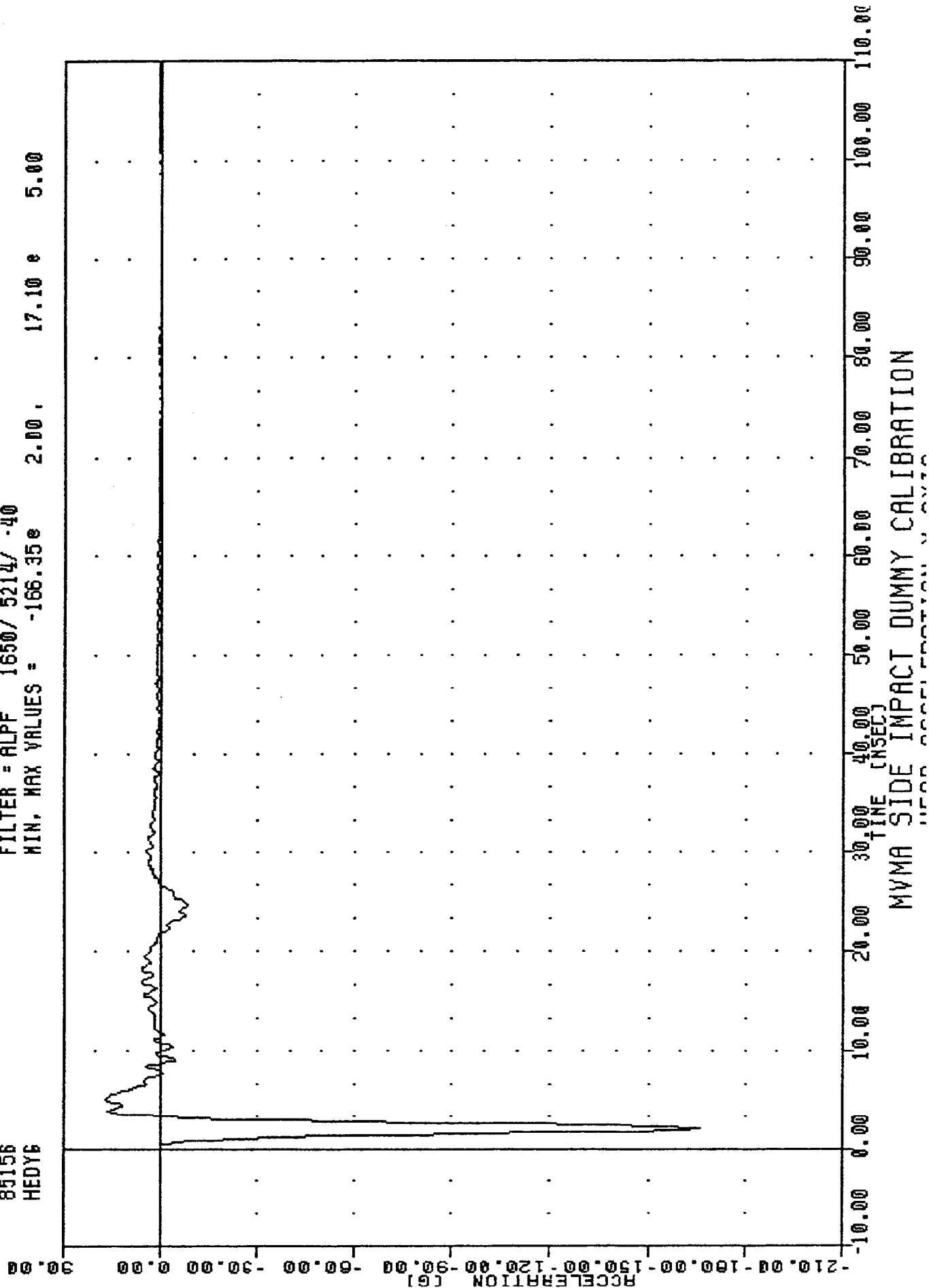
NYMA SIDE IMPACT DUMMY CALIBRATION

MVNA , SH11903 PLOT DATE 12-JUN-85 10:16:40
 SID 119/017 HEAD IMPACT CAL 03
 85156 FILTER = ALPF 1650/ 5214/ -40
 PIXV MIN, MAX VALUES = 3.02e 108.75, 7.09 e -2.88



MVMA SIDE IMPACT DUMMY CALIBRATION
 DISTANCE VELOCITY

MVMA SH11903 PLOT DATE 12-JUN-85 10:16:40
 SID 119/017 HEAD IMPACT CAL 03
 85156
 HEDY6
 FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -166.35e 2.00, 17.10 e 5.00

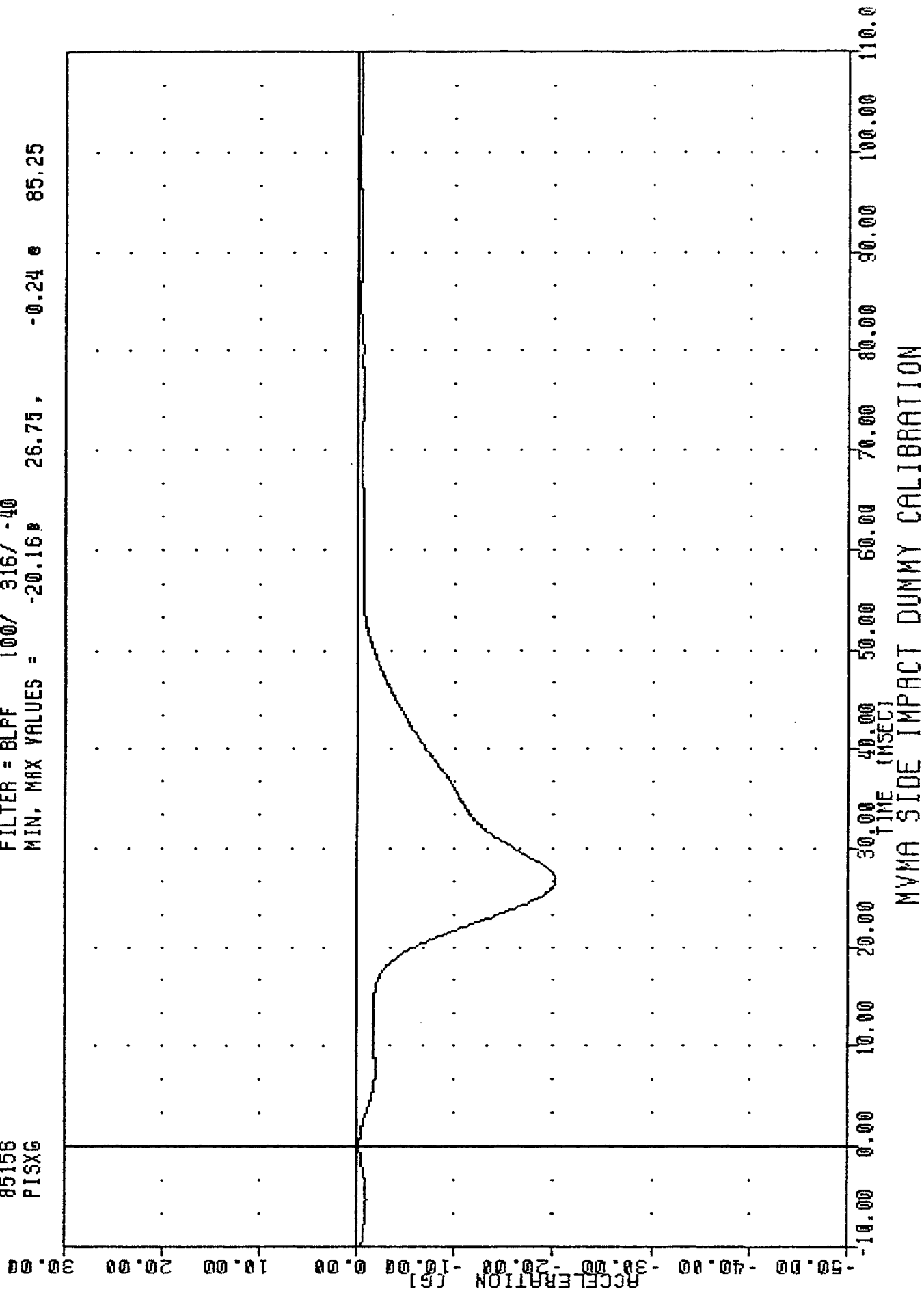


NVMA , ST11903
 SID 119 THORAX IMPACT CAL 03
 85156
 PISXG

PLOT DATE 14-JUN-85 10:15:42

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -20.16 26.75, -0.24 85.25



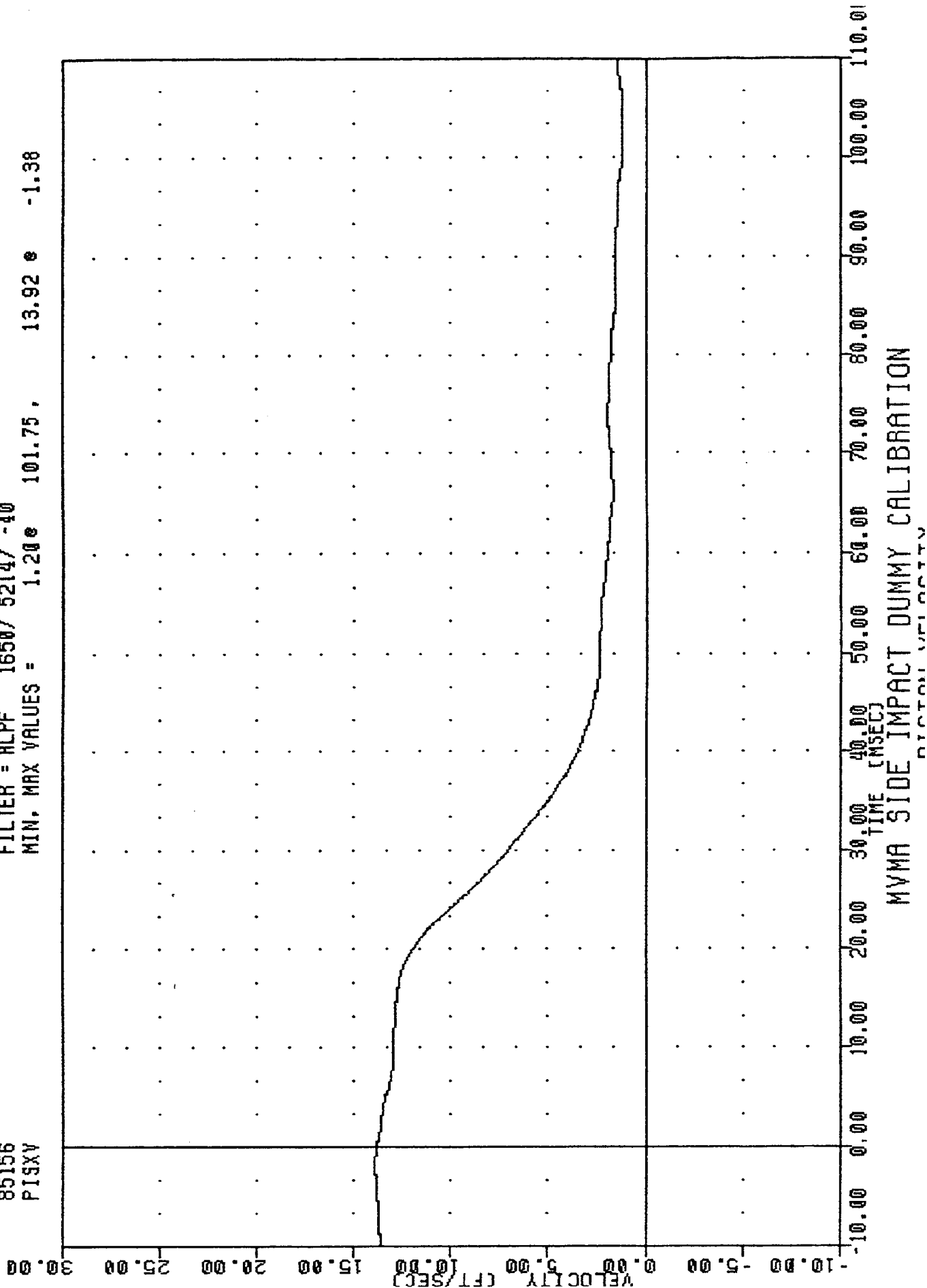
MVMA SIDE IMPACT DUMMY CALIBRATION

MVNA , ST11903
 SID 119 THORAX IMPACT CAL 03
 85156
 PISXY

PLOT DATE 12-JUN-85 09:20:50

FILTER = ALPF 1650/ 5214/ -40

MIN. MAX VALUES = 1.20e 101.75, 13.92 e -1.38



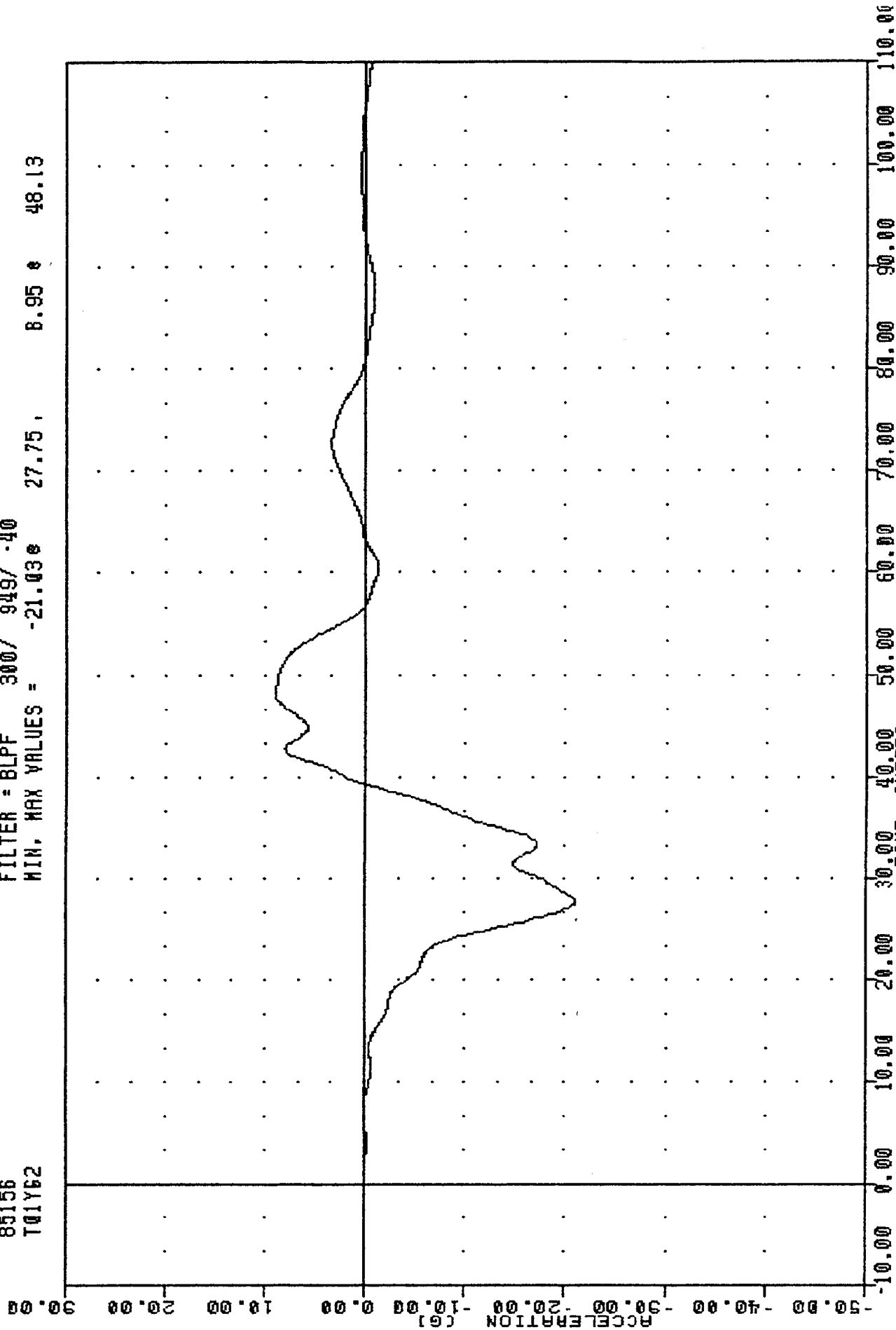
MVMA SIDE IMPACT DUMMY CALIBRATION
 DISTANCE VELOCITY

MYMA , ST11903
 SID 119 THORAX IMPACT CAL 03
 85156
 T01Y62

PLOT DATE 12-JUN-85 09:20:50

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -21.03e 27.75, 8.95 e 48.13



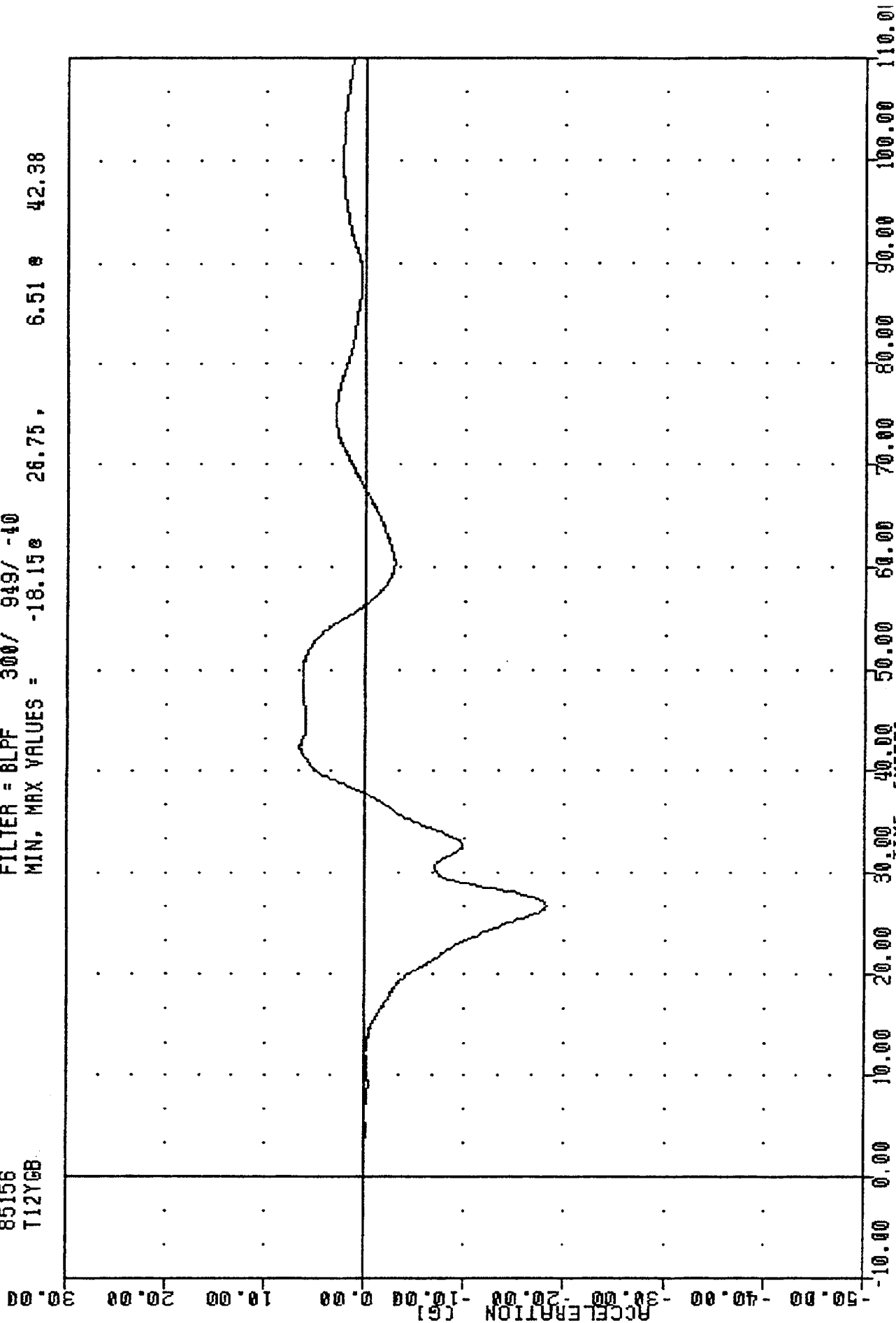
MVMA SIDE IMPACT DUMMY CALIBRATION
 UNDER CRASH ACCIDENTATION V. AUTO. RETURN

MVNA , ST11903
 SID 119 THORAX IMPACT CAL 03
 85156
 T12YGB

PLOT DATE 12-JUN-85 09:20:50

FILTER = 8LPF 300/ 949/ -40

MIN, MAX VALUES = -18.15e 26.75, 6.51 e 42.38



MVMA SIDE IMPACT DUMMY CALIBRATION

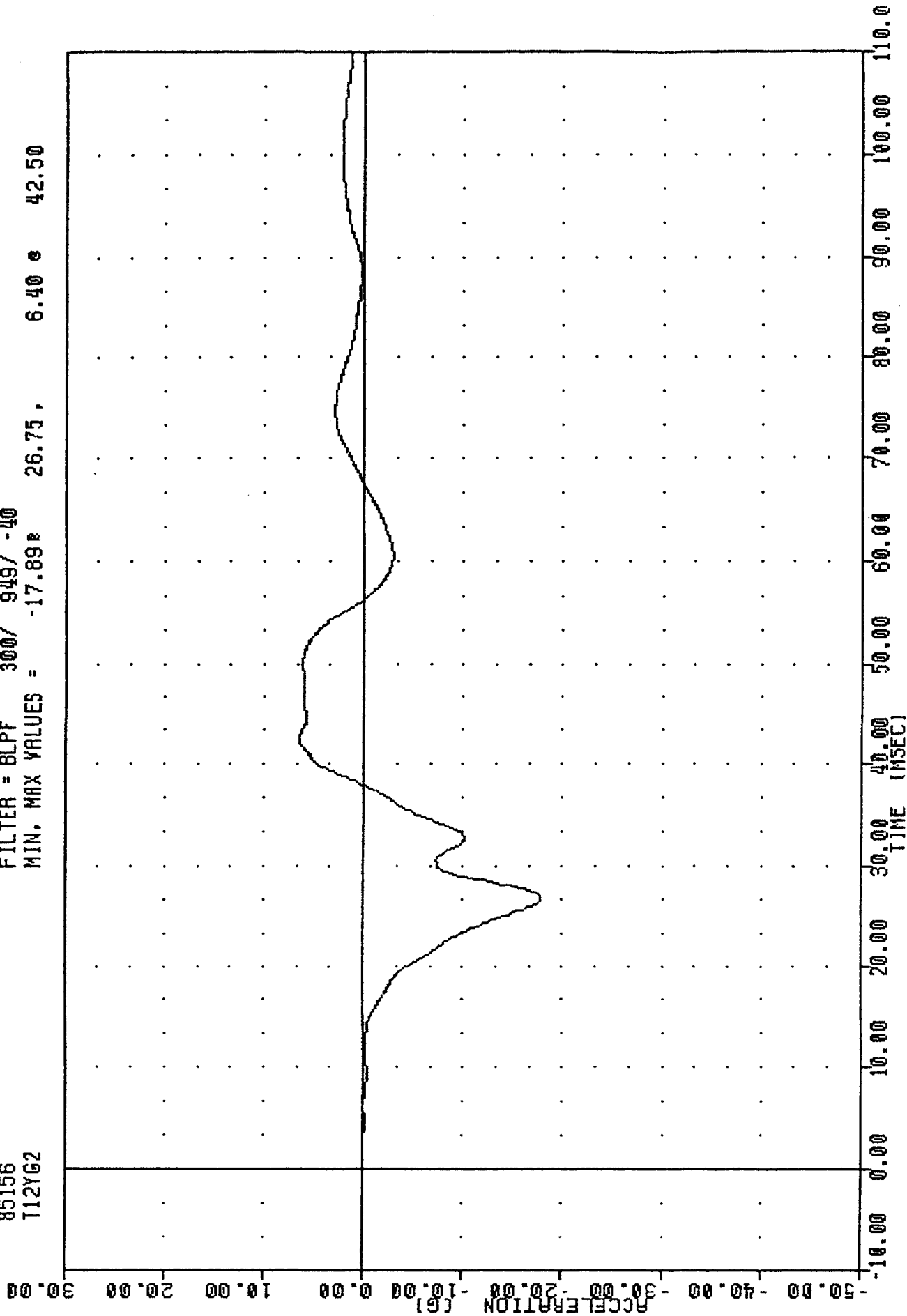
UNITS: G, TIME: msec, POSITION: Y, AUTO: RECALIBRATE

NVMA
 SID 119 THORAX IMPACT CRL 03
 85156
 T12YG2

PLOT DATE 12-JUN-85 09:20:50

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -17.89 26.75, 6.40 42.50



MVMA SIDE IMPACT DUMMY CALIBRATION

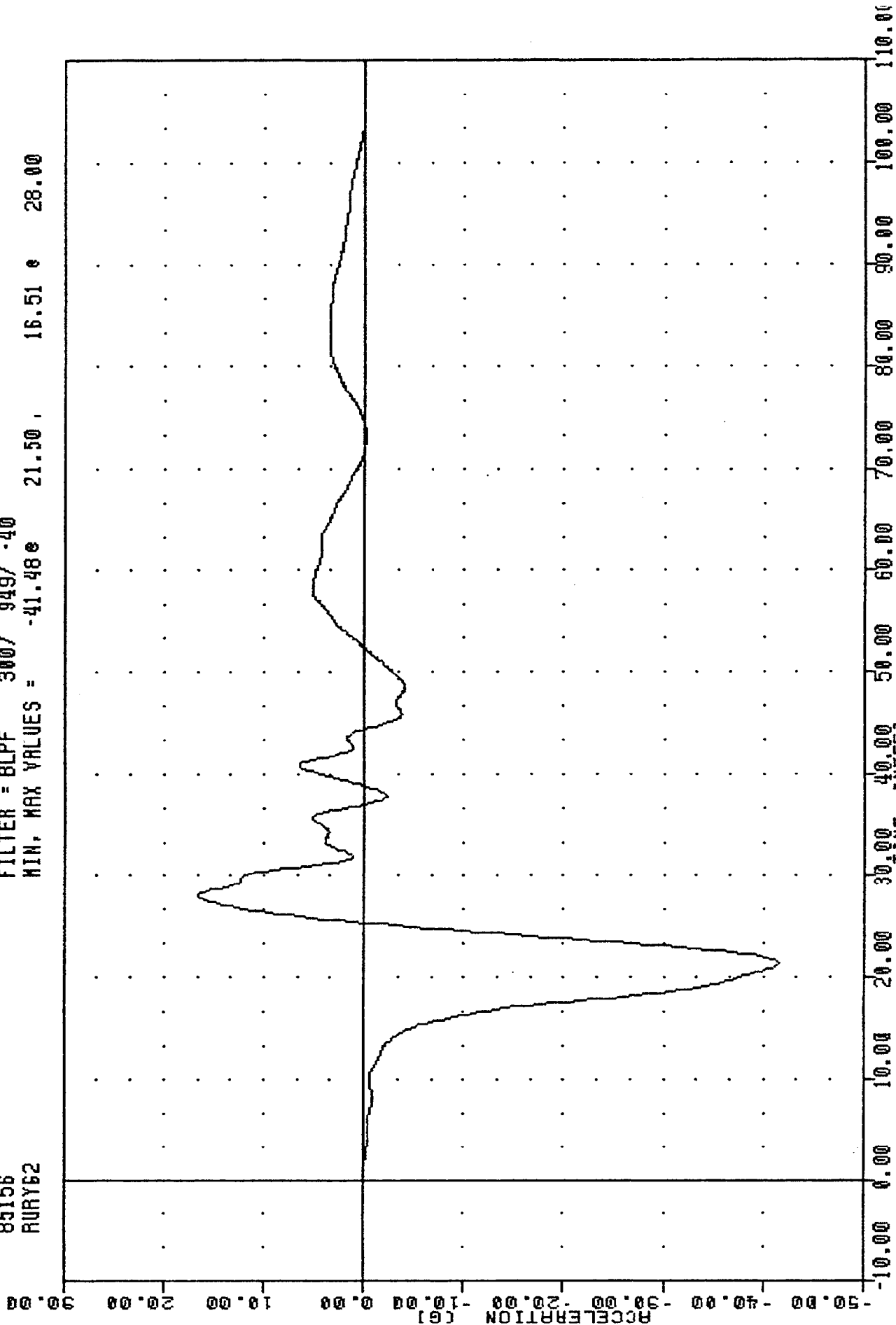
LOWER CDRINE ORIENTATION V DVC - DDIMODV

MVMA , ST11903
 SID 118 THORAX IMPACT CAL 03
 85156
 RURY62

PLOT DATE 12-JUN-85 09:20:50

FILTER = BLPF 300/ 949/ .40

MIN, MAX VALUES = -41.48e 21.50 , 16.51 e 28.00



MVMA SIDE IMPACT DUMMY CALIBRATION

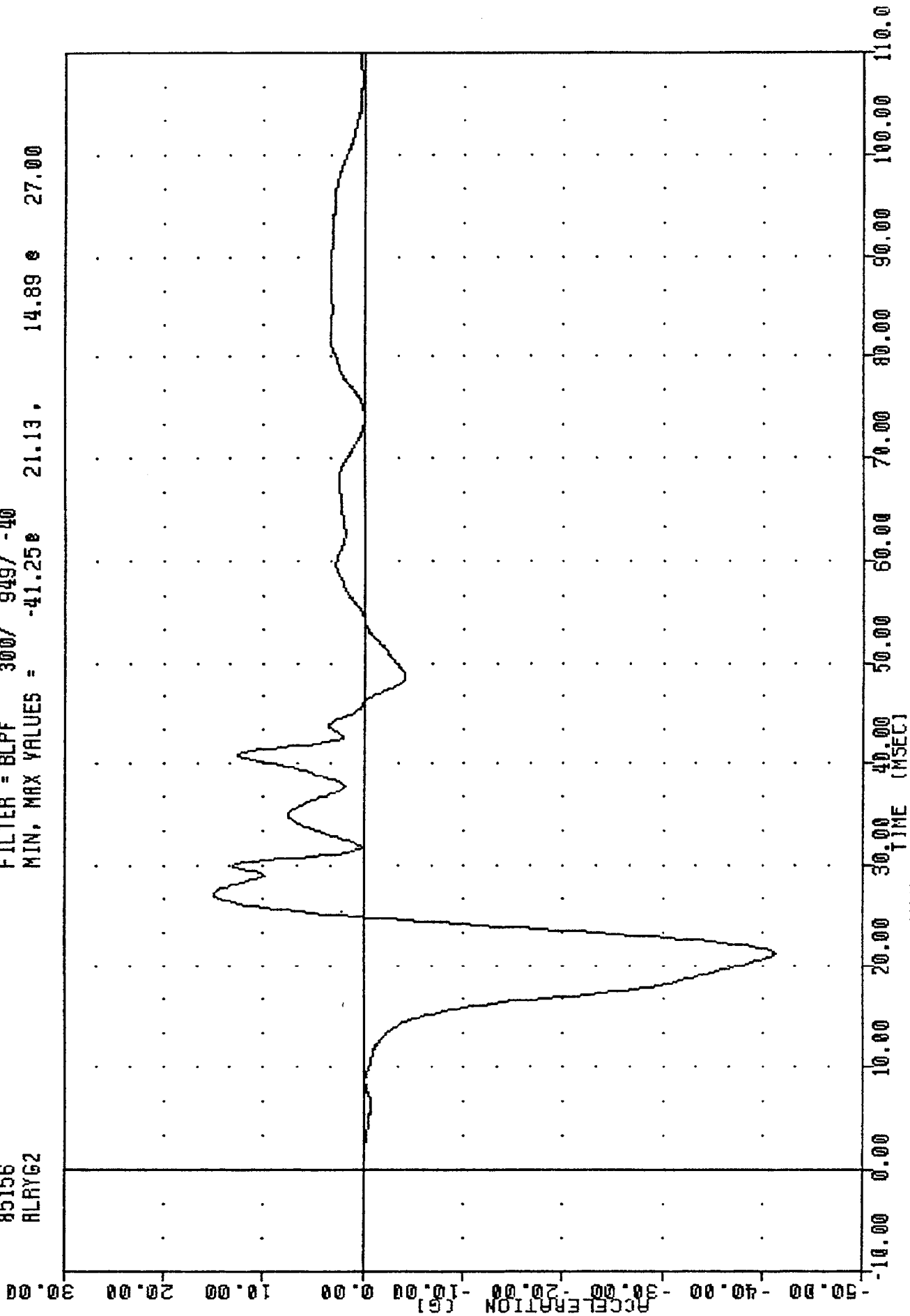
RIGHT UPPER RIB OCCUPANT PROTECTION SYSTEM

NYMA , ST11903
 SID 119 THORAX IMPACT CRL 03
 85156
 ALRY62

PLOT DATE 12-JUN-85 09:20:50

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -41.250 21.13, 14.89 27.00



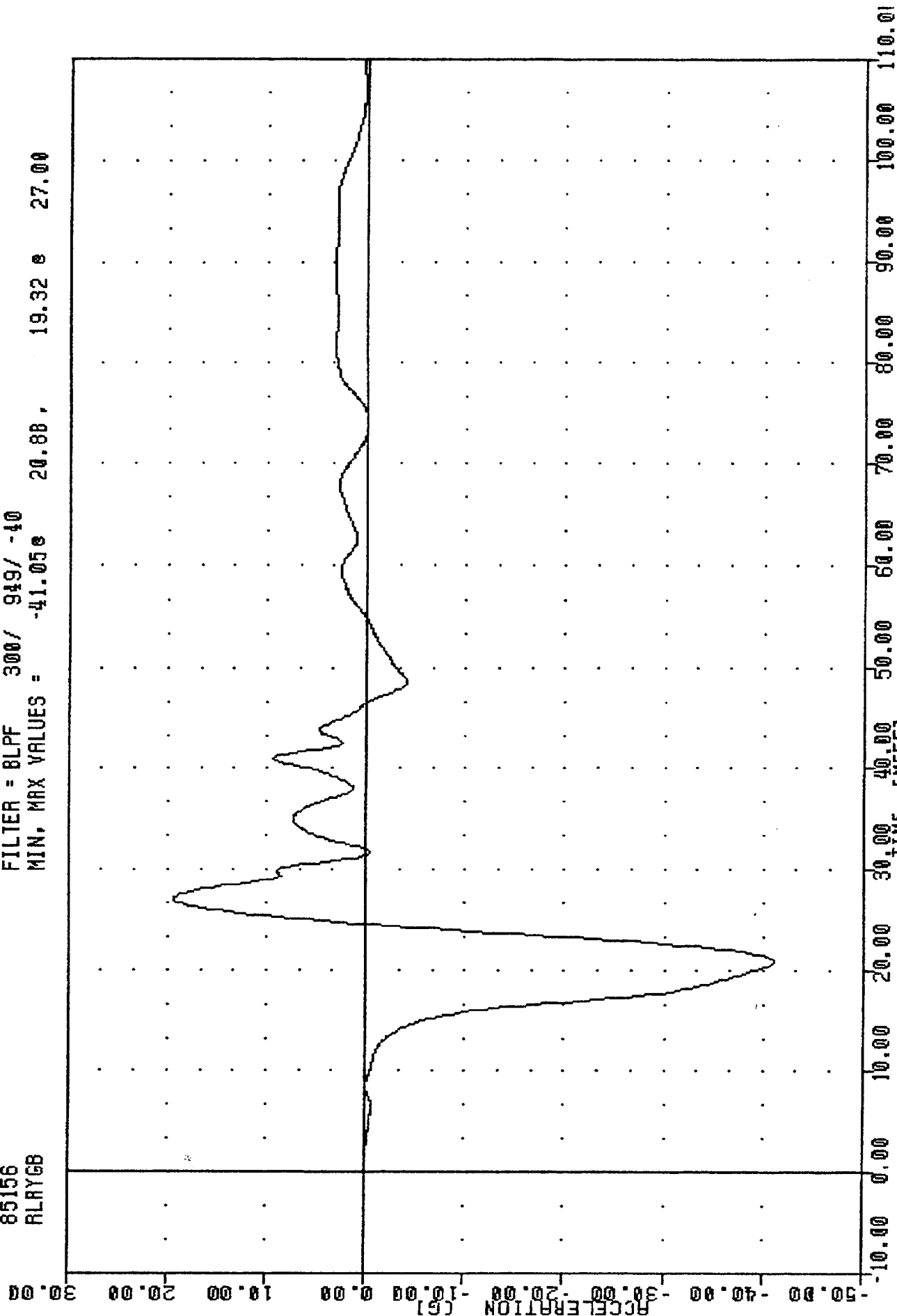
MVMA SIDE IMPACT DUMMY CALIBRATION
 RIGHT LOWER RIB OFFICE BOTTOM Y AXIS -DDTMOOV

MVNA , ST11903
 SID 119 THORAX IMPACT CAL 03
 85156
 RLYGB

PLOT DATE 12-JUN-85 09:20:50

FILTER = 8LPF 300/ 949/ -40

MIN, MAX VALUES = -41.05e 20.88, 19.32 e 27.00



MVNA SIDE IMPACT DUMMY CALIBRATION

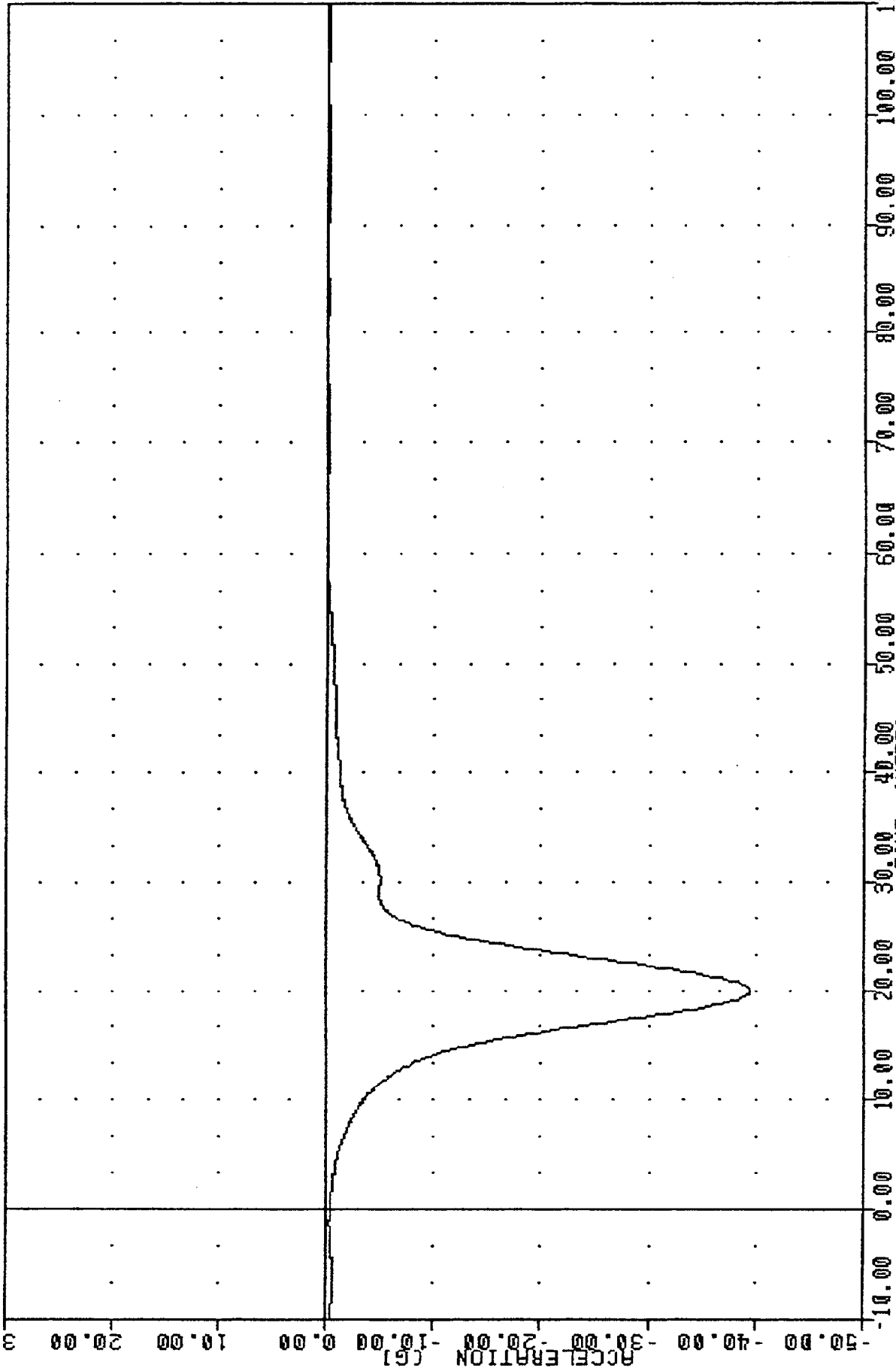
RIGHT INFLER AIR ACCELERATION V BYIC -DUMINOMIT

NVMA
SID 119 PELVIC IMPACT CAL 03
85156
PISXG

PLOT DATE 14-JUN-85 10:15:42

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -39.518 19.88, 0.06 e 61.13

ACCELERATION (G)

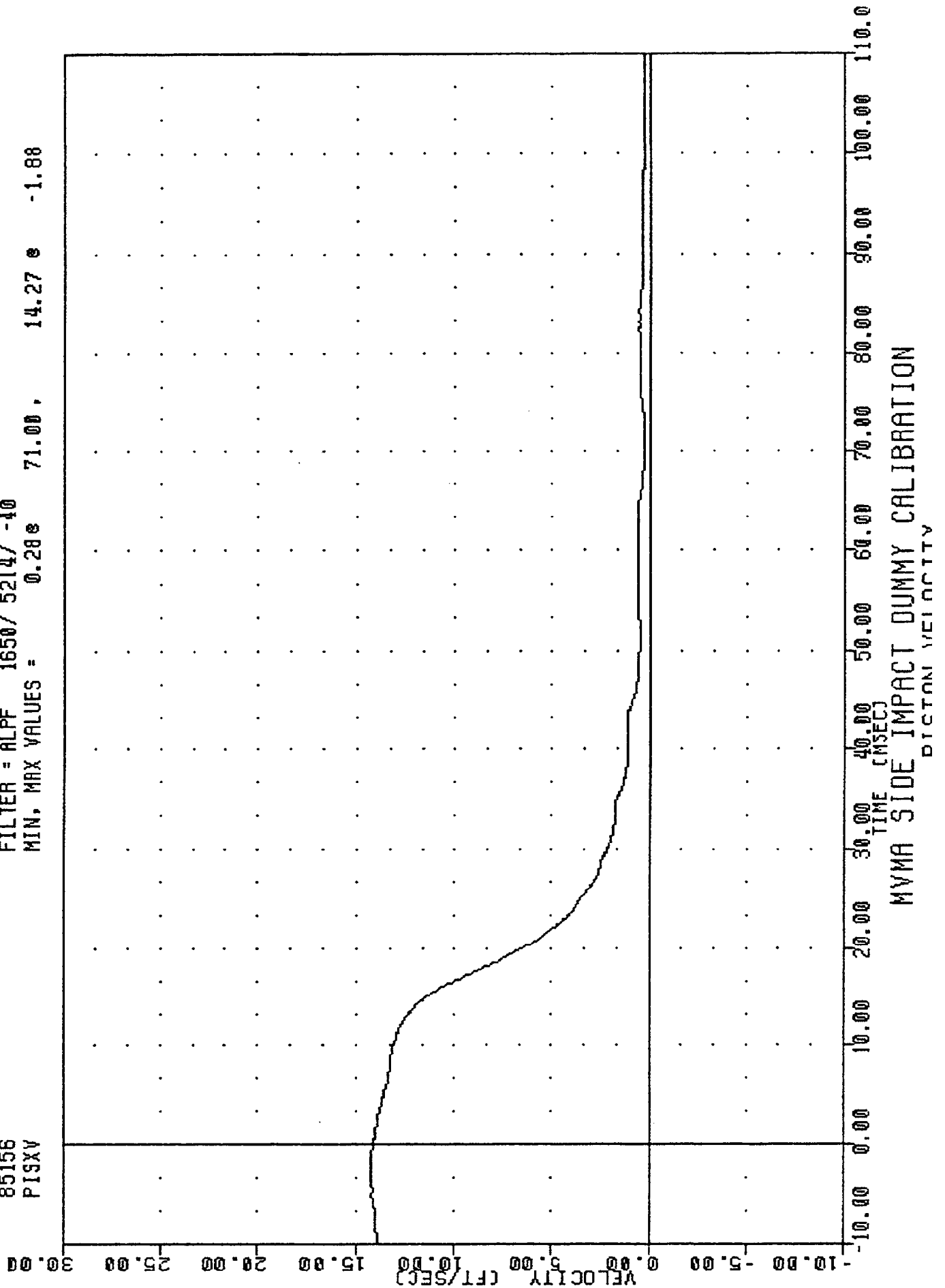


MVMA SIDE IMPACT DUMMY CALIBRATION
PISTON ACCELERATION

MYMA
 SID 119 PELVIC IMPACT CAL 03
 85156
 PISXV

PLOT DATE 12-JUN-85 09:20:02

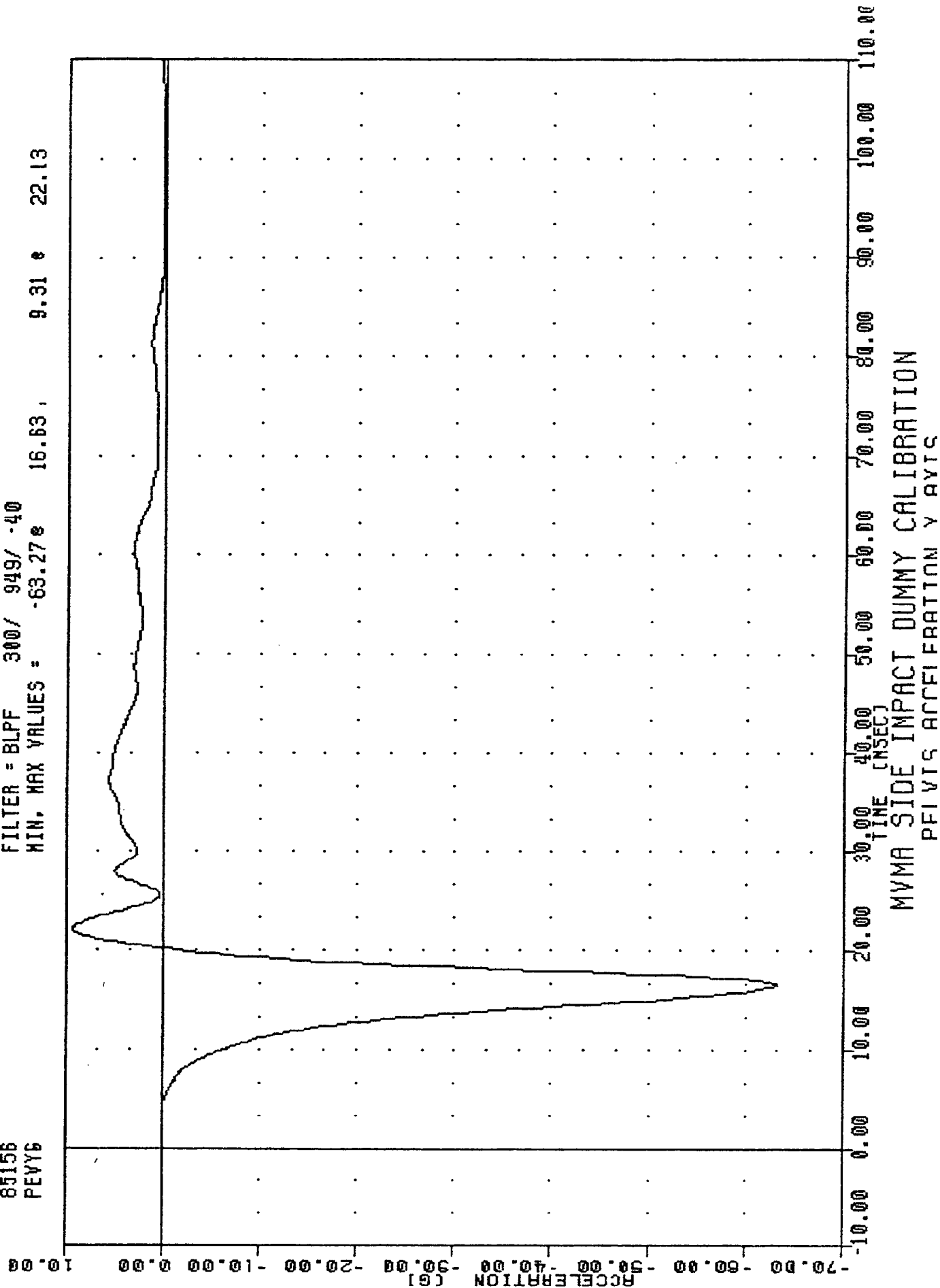
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.28 71.00, 14.27 -1.88



MYMA , SP11903
 SID 119 PELVIC IMPACT CAL 03
 85156
 PEVY6

PLOT DATE 12-JUN-85 09:20:02

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -63.27 16.63 9.31 22.13



MYMA SIDE IMPACT DUMMY CALIBRATION
 PELVIC ACCELERATION Y AXIS