

HS-806939

DOT 4582

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.: 850830
TEST DATE: AUGUST 30, 1985
TEST CONDITIONS: MODIFIED STRUCTURE, DUMMY
SEATED 5 INCHES FROM HARD BOARD DOOR PANEL

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

Prepared By: B. L. Wade

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Manager, Impact Laboratory

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures
From 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 | 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 | 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 add 32) | degrees Fahrenheit | °F |

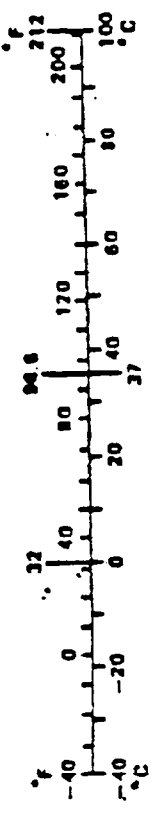


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SECTION 1.0
PURPOSE AND INTRODUCTION

PURPOSE

The main purpose of this test was to evaluate occupant responses in a vehicle with a modified A-post and B-post structure and a hardboard 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 August 30, 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 37.0 inches forward of the midpoint of the Ford LTD's wheelbase.

The vehicle contained structural modifications in the A-post and B-post areas. The front passenger inner door panel was replaced with a padded panel. A side impact dummy (SID) was seated in the right front passenger seat with its shoulder 5 inches from the hardboard door panel. 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: 1FABP39A1FG215183

BODY STYLE: 4-Door

MODEL YEAR: 1985

NHTSA NO.: DNA

COLOR: Blue

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

TRANSMISSION DATA: 3 speed Automatic

DATE VEHICLE RECEIVED: 8/20/85

ODOMETER READING: 374

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? NO (Test Modifications)
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 32 psi; REAR 32 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): General Ameriway XT Radial 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 | 813 | LBS. | RIGHT REAR | 676 | LBS. |
| LEFT FRONT | 788 | LBS. | LEFT REAR | 691 | LBS. |
| TOTAL FRONT WEIGHT | 1601 | LBS. | (53.9 % OF TOTAL VEHICLE WEIGHT) | | |
| TOTAL REAR WEIGHT | 1367 | LBS. | (46.1 % OF TOTAL VEHICLE WEIGHT) | | |
| TOTAL DELIVERED WEIGHT | 2968 | LBS. | | | |

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

| | | | | |
|---------------------|-------------|-------------|--------------|-------------|
| DELIVERED ATTITUDE: | RF 26 11/16 | ;LF 26 7/16 | ;RR 24 5/16 | ;LR 24 1/8 |
| PRE-TEST ATTITUDE: | RF 26 1/4 | ;LF 26 3/8 | ;RR 22 7/8 | ;LR 23 1/16 |
| POST-TEST ATTITUDE: | RF 26 1/16 | ;LF 25 5/16 | ;RR 21 13/16 | ;LR 21 3/4 |

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 100 LBS. CARGO:

| | | | | | |
|--------------------|------|------|----------------------------------|-----|------|
| RIGHT FRONT | 859 | LBS. | RIGHT REAR | 804 | LBS. |
| LEFT FRONT | 783 | LBS. | LEFT REAR | 796 | LBS. |
| TOTAL FRONT WEIGHT | 1642 | LBS. | (50.6% OF TOTAL VEHICLE WEIGHT) | | |
| TOTAL REAR WEIGHT | 1600 | LBS. | (49.4 % OF TOTAL VEHICLE WEIGHT) | | |
| TOTAL TEST WEIGHT | 3242 | 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 32 psi; REAR 32 psi
RECOMMENDED TIRE SIZE: P195/75R14 LOAD RANGE X B, C,
VEHICLE CAPACITY: TYPES OF SEATS: Front - Bench
Rear - Bench
NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 3 FRONT
3 REAR
CARGO LOAD 100 LBS. 6 TOTAL
TOTAL 1000 LBS.

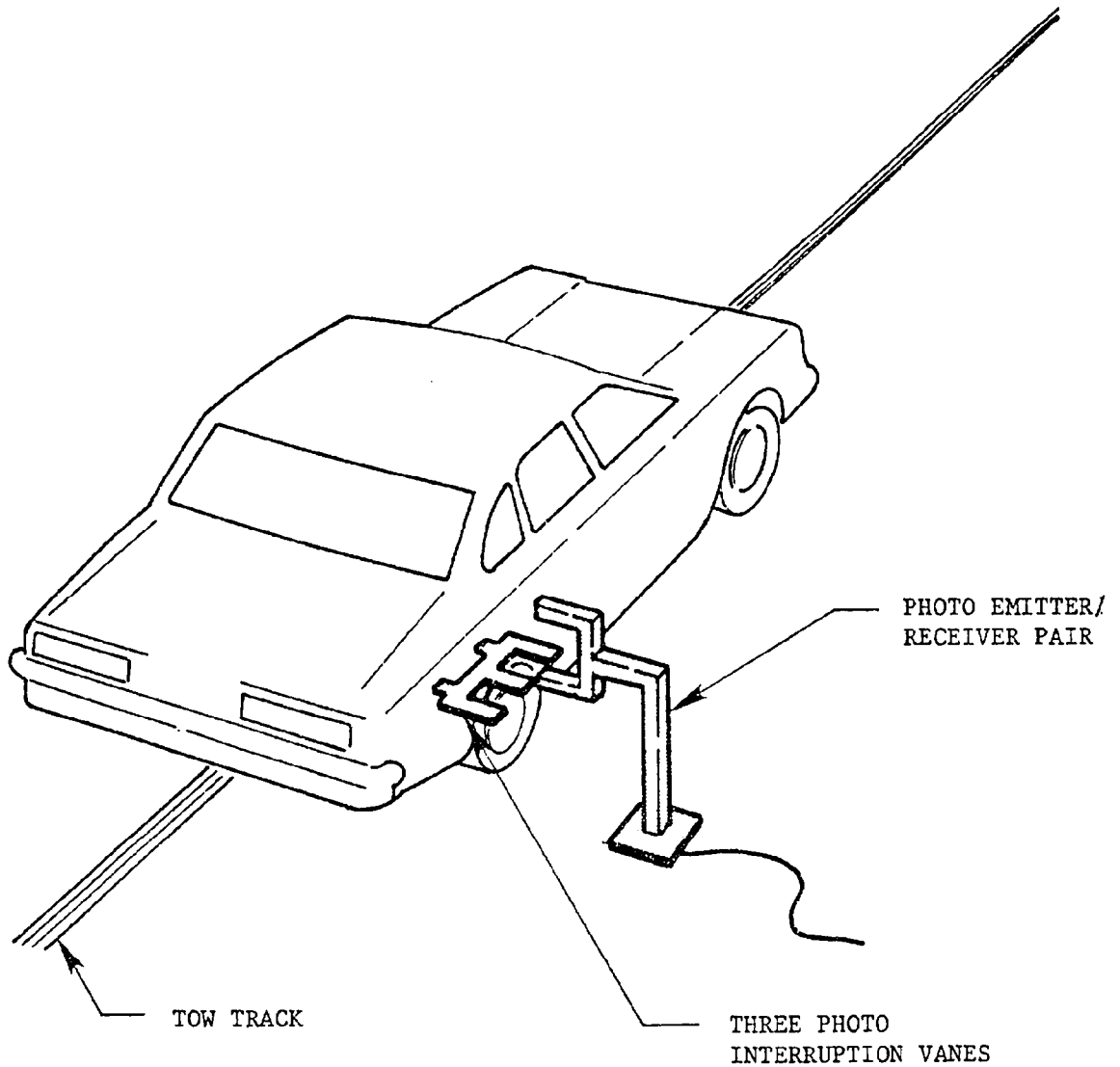
*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

VEHICLE TEST WEIGHT CALCULATION

$$\begin{aligned} \text{Test Weight} &= \text{Unloaded Delivered Weight} + \\ &\quad \text{Number of Dummies X 174 lbs.} + \\ &\quad \text{Cargo Weight} \\ &= 2968 + 1 \text{ X } 174 + 100 \text{ lbs.} \\ &= 3242 \text{ lbs.} \end{aligned}$$

To achieve test weight, the battery and the exhaust system were removed and 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 24 inches before impact.
The vanes have one foot spacing.

DUMMY TEMPERATURE CONTROL AND POSITIONING

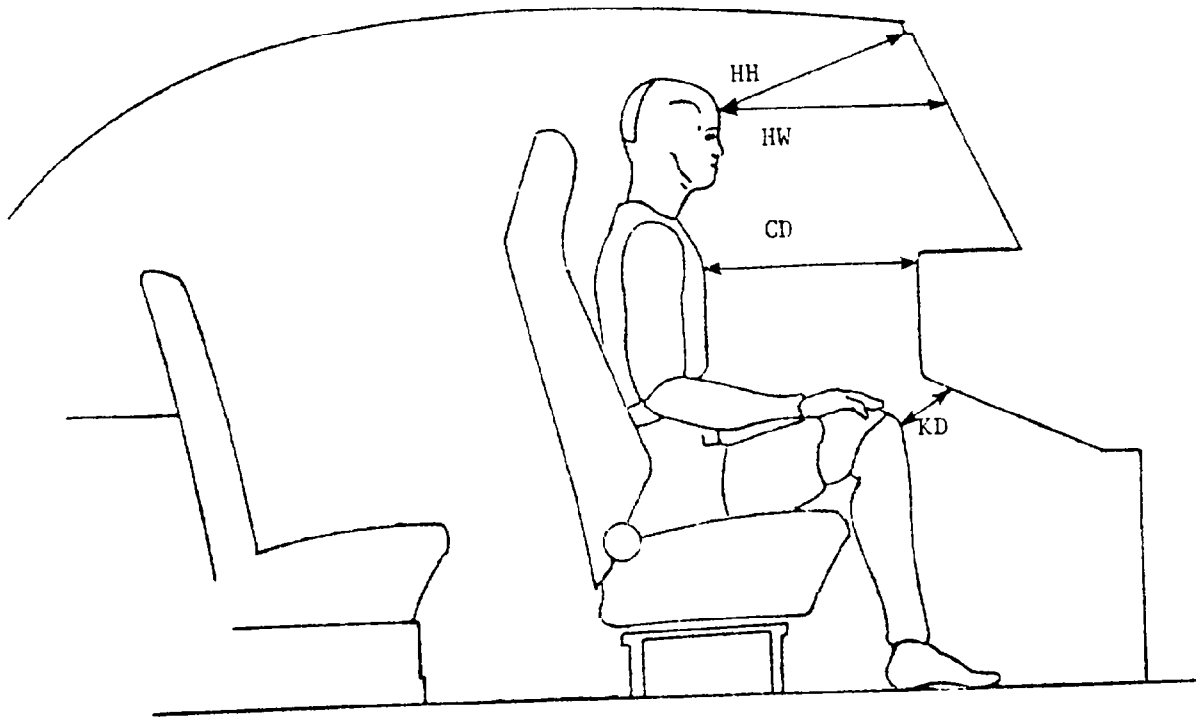
The vehicle was kept inside the temperature controlled crash test building until approximately 2 hours prior to the test. Temperature inside the vehicle and ambient temperature at the crash area were recorded. Dummy temperature while outside the crash test building was maintained portably until approximately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

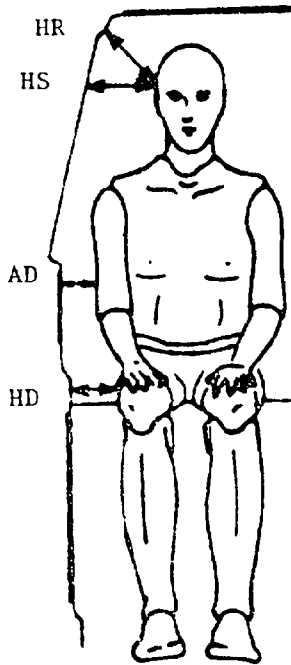


PASSENGER 119

| | |
|-----|---------|
| HH | 12 1/8 |
| HW | 19 3/8 |
| CD | 20 3/16 |
| KDL | 5 1/8 |
| KDR | 5 3/8 |

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSION



PASSENGER 119

| | |
|-----|-------|
| HR | 7 5/8 |
| HS | 9 1/4 |
| AD | 5 |
| HD, | 6 1/2 |

ALL MEASUREMENTS IN INCHES
 DUMMY LATERAL CLEARANCE DIMENSIONS

LOCATIONS OF OFFBOARD HIGH SPEED CAMERAS

| CAMERA NO. | X | Y | Z |
|------------|------------|-------------|--------|
| 7 | -6'11 1/2" | -25'10 1/2" | + 3'3" |
| 6 | -23'4 3/4" | +41'6 1/2" | + 3'1" |
| 5 | +1' | 0 | +40' |
| 4 | 0 | 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 | Documentary | Beaulieu | 12-120 | 24 | Documentary |
| 2 | R. Panning | Kodak | 16 | 24 | Real Time |
| 3 | Onboard MDB | Photosonic 1B | 13 | 1003 | View Impact |
| 4 | Overhead Tight | Photosonic 1B | 25 | 995 | View Impact |
| 5 | Overhead Wide | Photosonic 1B | 8 | 903 | Vehicle Crush |
| 6 | Right | Photosonic 1B | 25 | 995 | Vehicle Crush |
| 7 | Left | Photosonic 1B | 13 | 1003 | Vehicle Crush |
| 8 | Onboard Windshhield | Photosonic 1B | 8 | 993 | Dummy Kinematics |
| 9 | Onboard Roof | Photosonic 1B | 8 | 988 | Dummy Kinematics |
| 10 | Onboard Door | Photosonic 1B | 8 | 1000 | 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 | 7264 | AA33 |
| 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 | BA30 |
| 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 | AT26 |
| RFDYG2 | RIGHT FRONT DOOR-POSITION 2 | ACCEL. | ENDEVCO | 2264 | AS36 |
| 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 | 18836 |
| BRCXG | BARRIER REAR CROSS MEMBER | ACCEL. | B & H | 4-202-0001 | 19022 |
| 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: 850830
DATE OF TEST: August 30, 1985

TIME OF TEST: 12:42

WIND VELOCITY: 3-6 mph @ 306°

HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 76° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 80° F

DUMMY TEMPERATURE: 77° F

SUBJECT VEHICLE DATA

| | <u>ACTUAL</u> | <u>INTENDED</u> |
|----------------------------|---------------|-----------------|
| VEHICLE TEST WEIGHT (LBS.) | 3242 | 3242 |
| MDB TEST WEIGHT (LBS.) | 2991 | 2992 |
| MDB VELOCITY (MPH) | 33.5 | 33.5 |
| IMPACT POINT (INCHES) | 37.0 | 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.

SIDE IMPACT DUMMY DATA SUMMARY

| | <u>PASSENGER DUMMY</u> | | | |
|----------------------------|------------------------|-------------------|--------------------|---------------|
| | <u>POSITIVE</u> | | <u>NEGATIVE</u> | |
| | <u>DIRECTION*</u> | | <u>DIRECTION**</u> | |
| | <u>MAX</u> | <u>TIME</u> | <u>MAX</u> | <u>TIME</u> |
| | <u>(g)</u> | <u>(msec)</u> | <u>(g)</u> | <u>(msec)</u> |
| HEAD ACCELERATION | | | | |
| LONGITUDINAL | --- | --- Y | --- | --- Y |
| LATERAL | 17.95 | 42.75 | 34.53 | 53.63 |
| VERTICAL | 45.37 | 70.75 | 13.44 | 54.13 |
| RESULTANT | | 46.88 @ 70.38 | | |
| HIC | 171.37 | from 40.50 | to 117.12 | |
| DELTA V (MPH) | | -7.1 @ 143.75 | | |
| CHEST ACCELERATION | | | | |
| UPPER SPINE | | | | |
| LONGITUDINAL | 23.46 | 44.38 | 12.21 | 55.00 |
| LATERAL (P)**** | 29.40 | 70.00 | 73.02 | 44.38 |
| LATERAL (R)**** | 29.20 | 69.38 | 70.45 | 44.38 |
| VERTICAL | 5.98 | 85.00 | 11.97 | 35.00 |
| RESULTANT (P)**** | | 76.74 @ 44.38 | | |
| RESULTANT (R)**** | | 74.29 @ 44.38 | | |
| DELTA V (MPH)*** | | -20.9 @ 65.25 (P) | | |
| | | -19.4 @ 65.00 (R) | | |
| LOWER SPINE | | | | |
| LONGITUDINAL | 23.74 | 56.25 | 30.13 | 41.25 |
| LATERAL (P)*** | 18.40 | 60.00 | 116.39 | 40.63 |
| LATERAL (R)*** | 20.17 | 60.00 | 117.89 | 40.63 |
| VERTICAL | 2.57 | 180.00 | 22.55 | 43.75 |
| RESULTANT (P)**** | | 121.12 @ 41.25 | | |
| RESULTANT (R)**** | | 122.22 @ 40.63 | | |
| DELTA V (MPH)*** | | -26.4 @ 57.50 (P) | | |
| | | -25.9 @ 57.13 (R) | | |
| RIGHT UPPER RIB | | | | |
| LATERAL (P)**** | 9.23 | 82.50 | 53.60 | 35.63 |
| LATERAL (R)**** | 12.36 | 48.75 | 62.03 | 35.63 |
| DELTA V (MPH)*** | | -19.0 @ 78.50 (P) | | |
| | | -19.0 @ 78.88 (R) | | |
| RIGHT LOWER RIB | | | | |
| LATERAL (P)**** | 7.08 | 63.13 | 58.51 | 39.38 |
| LATERAL (R)**** | 7.04 | 63.13 | 59.76 | 38.13 |
| DELTA V (MPH)*** | | -21.7 @ 94.75 (P) | | |
| | | -22.4 @ 94.25 (R) | | |
| PELVIS ACCELERATION | | | | |
| LONGITUDINAL | 8.38 | 43.38 | 30.72 | 41.63 |
| LATERAL | 11.82 | 52.38 | 137.84 | 37.00 |
| VERTICAL | 8.42 | 43.75 | 23.05 | 41.75 |
| RESULTANT | | 138.24 @ 37.00 | | |
| DELTA V (MPH)*** | | -26.6 @ 50.50 | | |

SIDE IMPACT DUMMY DATA SUMMARY CONTD

PASSENGER DUMMY

| | POSITIVE DIRECTION* | | NEGATIVE DIRECTION** | |
|----------------|------------------------|----------------|-------------------------|----------------|
| | MAX (in) | TIME (msec) | MAX (in) | TIME (msec) |
| RIB DEFLECTION | --- | --- | 1.69 | 63.38 |

* 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

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

γ See TEST ANOMALIES

VISIBLE DUMMY CONTACT POINTS:

| | DRIVER DNA | PASSENGER 119 |
|------------|------------|-------------------------------|
| Head | _____ | <u>Right door window sill</u> |
| Chest | _____ | <u>Inner door panel</u> |
| Abdomen | _____ | <u>Inner door panel</u> |
| Left Knee | _____ | <u>Right knee</u> |
| Right Knee | _____ | <u>Inner door panel</u> |

DOOR OPENING:

| | LEFT | RIGHT |
|-------|---------------|-------------------------|
| Front | <u>Normal</u> | <u>Tools required *</u> |
| Rear | <u>Normal</u> | <u>DNA</u> |

SEAT MOVEMENT:

| | SEAT BACK FAILURE | SEAT SHIFT |
|-------|-------------------|-------------|
| Front | <u>None</u> | <u>None</u> |
| Rear | <u>None</u> | <u>None</u> |

GLAZING DAMAGE:

All right side door glass except rear wing window
was shattered. Right side of windshield was
shattered.

OTHER NOTABLE IMPACT EFFECTS:

* Right rear door was inoperable prior to the test due
to the structural modification. Therefore, no door
opening data was taken for that door.

DUMMY KINEMATIC SUMMARY

During impact, the dummy's right leg and torso contacted the door panel. The dummy's head moved to the right and down and struck the right door window sill while the hips translated to the left across the vehicle compartment. The dummy came to rest seated on the middle of the front bench seat and leaning against the driver's door.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

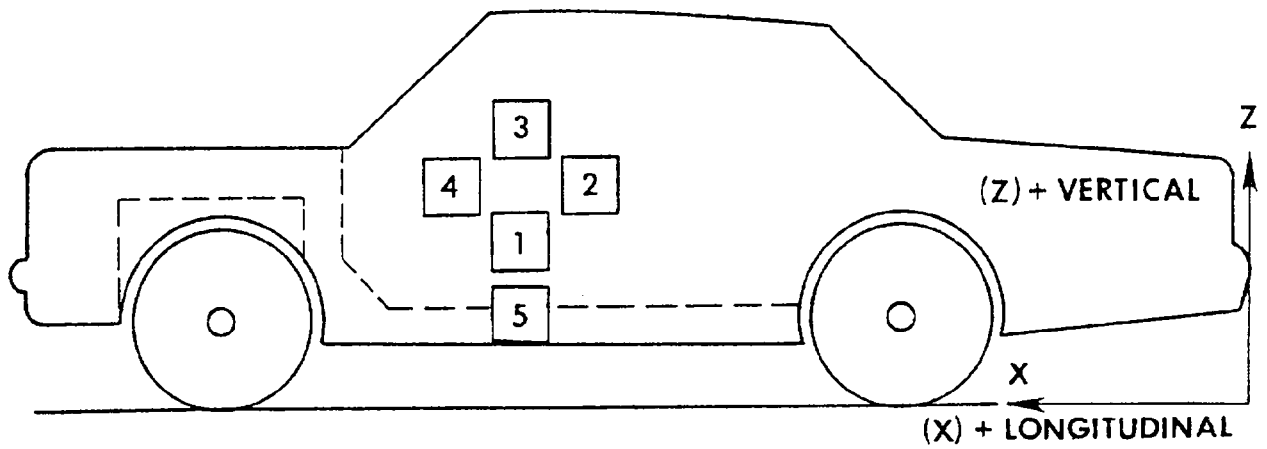
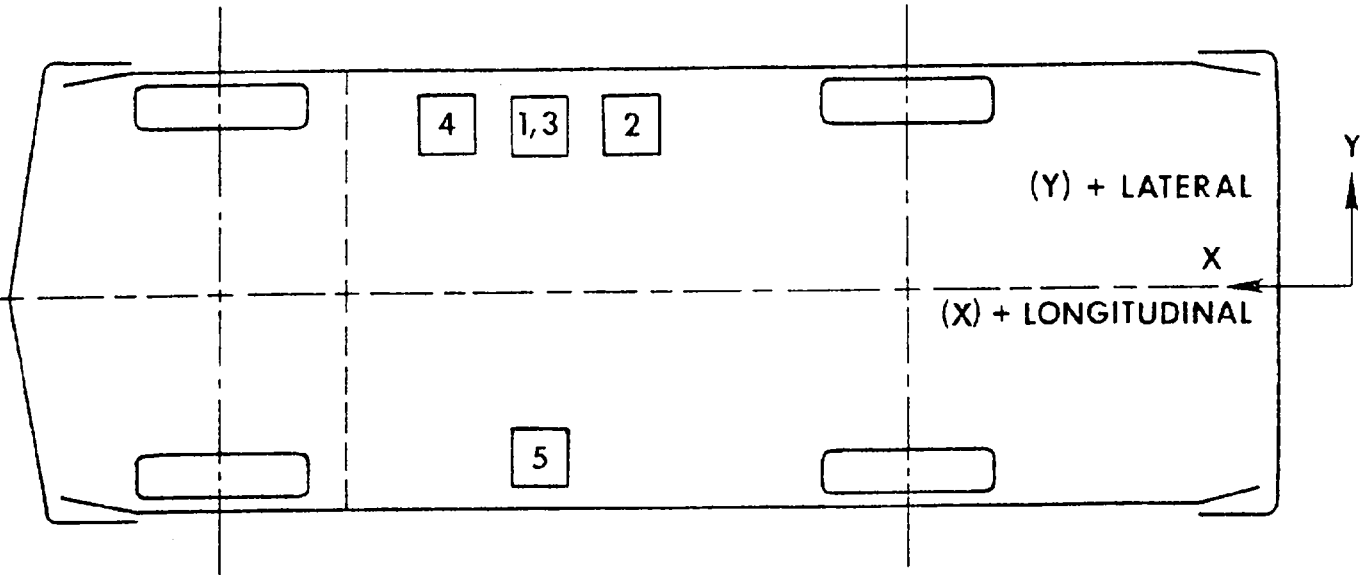
| NO. | LOCATION | X* | Y* | Z* | POSITIVE** DIRECTION | | NEGATIVE*** DIRECTION | |
|-----|---------------------------------------------------|-------|-------------|------------|-------------------------|----------------|--------------------------|----------------|
| | | | | | MAX (g) | TIME (msec) | MAX (g) | TIME (msec) |
| 1 | RIGHT FRONT DOOR CENTERLINE (LATERAL) | 112.5 | 28.8 | 22.6 | | | | |
| | $\Delta V =$ | | -28.7 mph @ | 24.36 msec | 173.59 | 30.00 | 151.32 | 12.50 |
| 2 | MIDREAR OF RIGHT FRONT DOOR (LATERAL) | 101.5 | 28.3 | 24.8 | | | | |
| | $\Delta V =$ | | -19.4 mph @ | 19.25 msec | 74.55 | 16.13 | 137.96 | 20.50 |
| 3 | UPPER RIGHT FRONT DOOR CENTERLINE (LATERAL) | 112.7 | 28.4 | 24.8 | | | | |
| | $\Delta V =$ | | -31.2 mph @ | 23.25 msec | 164.10 | 30.63 | 176.74 | 23.88 |
| 4 | MIDFRONT OF RIGHT FRONT DOOR (LATERAL) | 121.8 | 28.8 | 23.1 | | | | |
| | $\Delta V =$ | | -25.8 mph @ | 24.75 msec | 202.46 | 28.63 | 136.59 | 33.75 |
| 5 | LEFT SILL AT FRONT SEAT (LONGITUDINAL) | 119.3 | 26.2 | 11.8 | 3.99 | 58.75 | 6.16 | 23.75 |
| | (LATERAL) | | | | 3.72 | 60.63 | 30.95 | 13.00 |
| | (VERTICAL) | | | | 4.35 | 11.75 | 9.00 | 17.50 |
| | (RESULTANT) | | | | | 31.11 @ | 13.00 | |

* 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 | 11.8 | X | 17.8 | 17.7 | 17.6 | 17.6 | 17.6 | 17.5 | 17.5 | 17.4 | 17.4 | 17.8 | 17.5 | 17.3 | 17.2 | X |
| H-Point | 22.0 | X | 13.8 | 13.7 | 13.6 | 13.6 | 13.6 | 13.6 | 13.8 | 13.9 | 13.9 | 14.0 | 14.1 | 14.2 | 14.1 | X |
| Window Sill | 35.5 | | 15.9 | 16.0 | 16.0 | 16.0 | 16.2 | 16.2 | 16.3 | 16.6 | 16.5 | 16.6 | 16.8 | 16.8 | 16.9 | 17.0 |
| Window Top | 54.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.1 | 24.2 | 24.3 | 24.4 | 24.5 | X | X | X | X | X | X |

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

| | | | | | | | | | | | | | | | | |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Axle Height | 11.8 | X | 21.6 | 22.5 | 23.2 | 25.2 | 25.0 | 24.7 | 24.9 | 25.3 | 25.9 | 26.6 | 27.2 | 25.4 | 23.5 | X |
| H-Point | 22.0 | X | 24.8 | 28.4 | 27.9 | 27.1 | X | 26.0 | 26.7 | 26.5 | 26.2 | 25.9 | 25.4 | 24.5 | 22.9 | X |
| Window Sill | 35.5 | | 19.4 | 23.4 | 26.3 | 26.5 | 26.9 | 24.9 | 24.1 | 23.7 | 23.5 | 23.2 | 22.8 | 21.9 | 20.8 | 20.0 |
| Window Top | 54.0 | 26.6 | 26.7 | 26.9 | 27.2 | 29.6 | 27.9 | 27.8 | 28.0 | 28.1 | X | X | X | X | X | X |

30

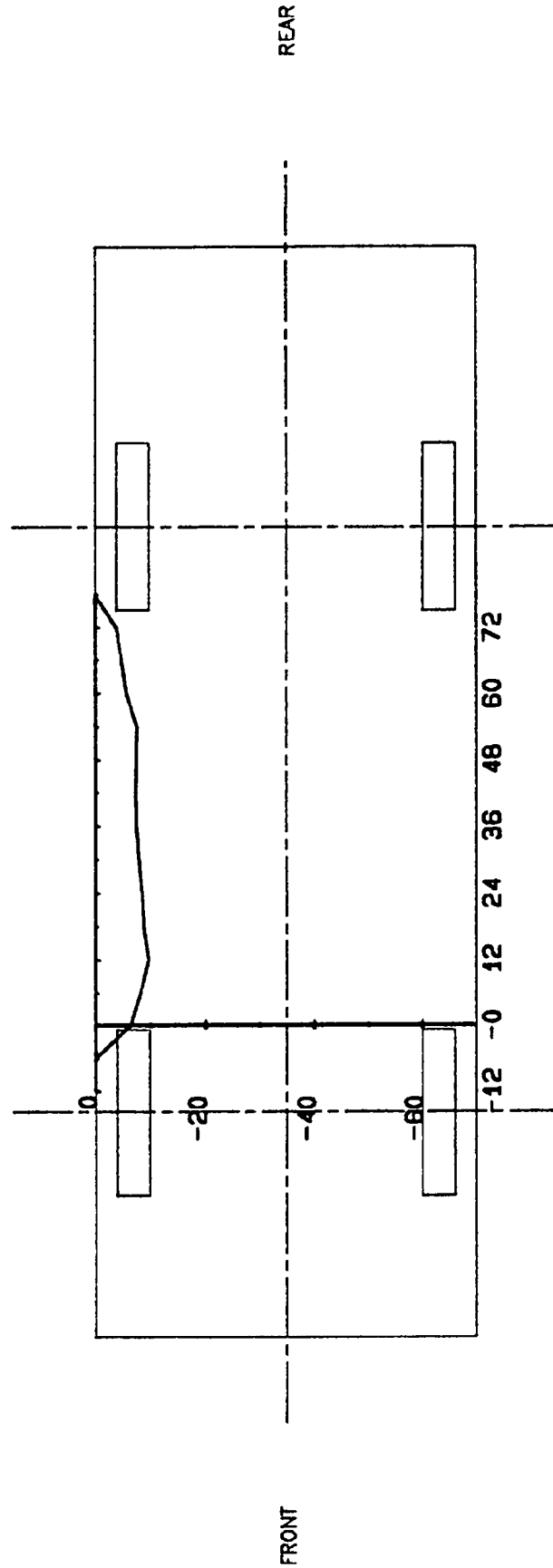
STATIC CRUSH (IN)

| | | | | | | | | | | | | | | | | |
|-------------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|
| Axle Height | 11.8 | X | 3.8 | 4.8 | 5.6 | 7.6 | 7.4 | 7.2 | 7.4 | 7.9 | 8.5 | 8.8 | 9.7 | 8.1 | 6.3 | X |
| H-Point | 22.0 | X | 11.0 | 14.7 | 14.3 | 13.5 | X | 12.4 | 12.9 | 12.6 | 12.3 | 11.9 | 11.3 | 10.3 | 8.8 | X |
| Window Sill | 35.5 | | 3.5 | 7.5 | 10.3 | 10.5 | 10.9 | 8.7 | 7.9 | 7.4 | 6.9 | 6.7 | 6.2 | 5.1 | 4.0 | 3.3 |
| Window Top | 54.0 | 2.6 | 2.7 | 2.9 | 3.2 | 5.5 | 3.7 | 3.5 | 3.6 | 3.6 | 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.

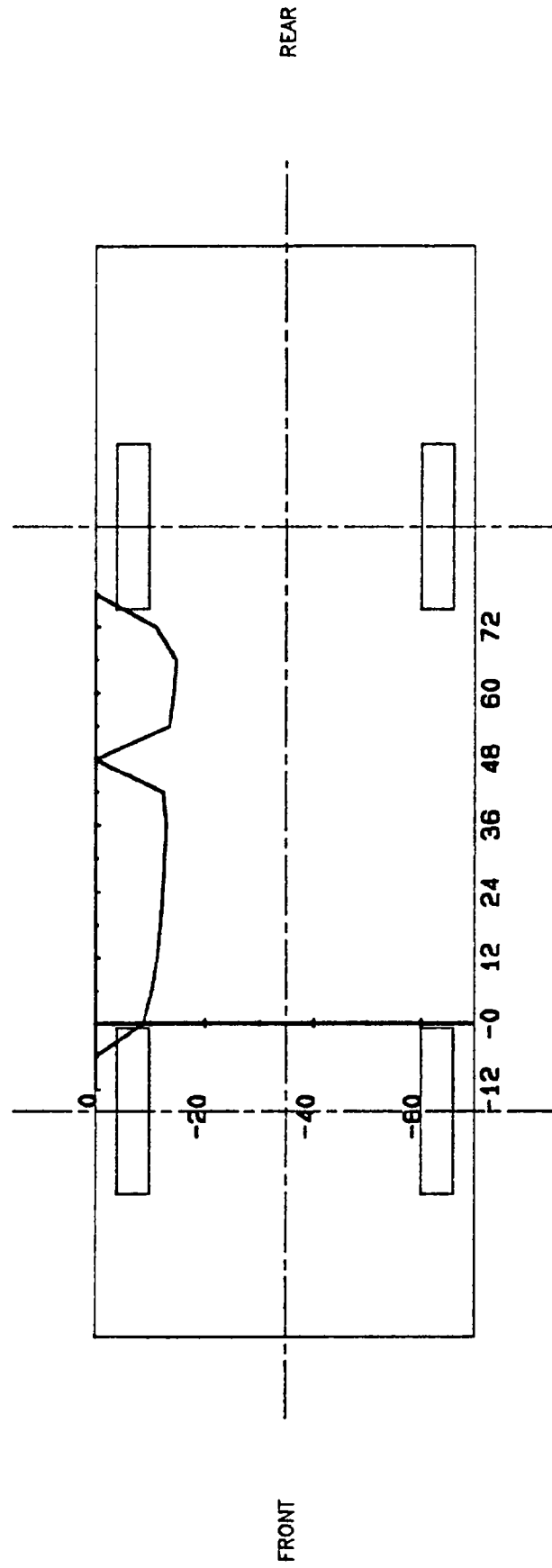
** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



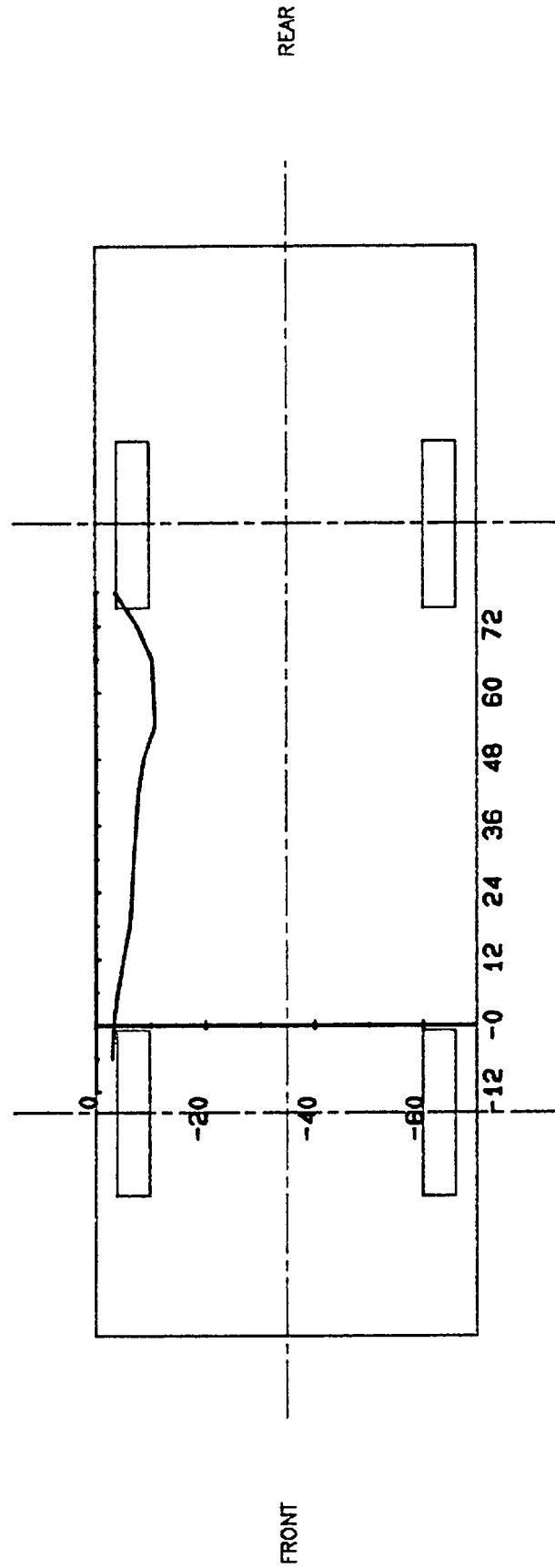
PROFILE LEVEL EQUALS AXLE HEIGHT WHICH IS 11.8" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



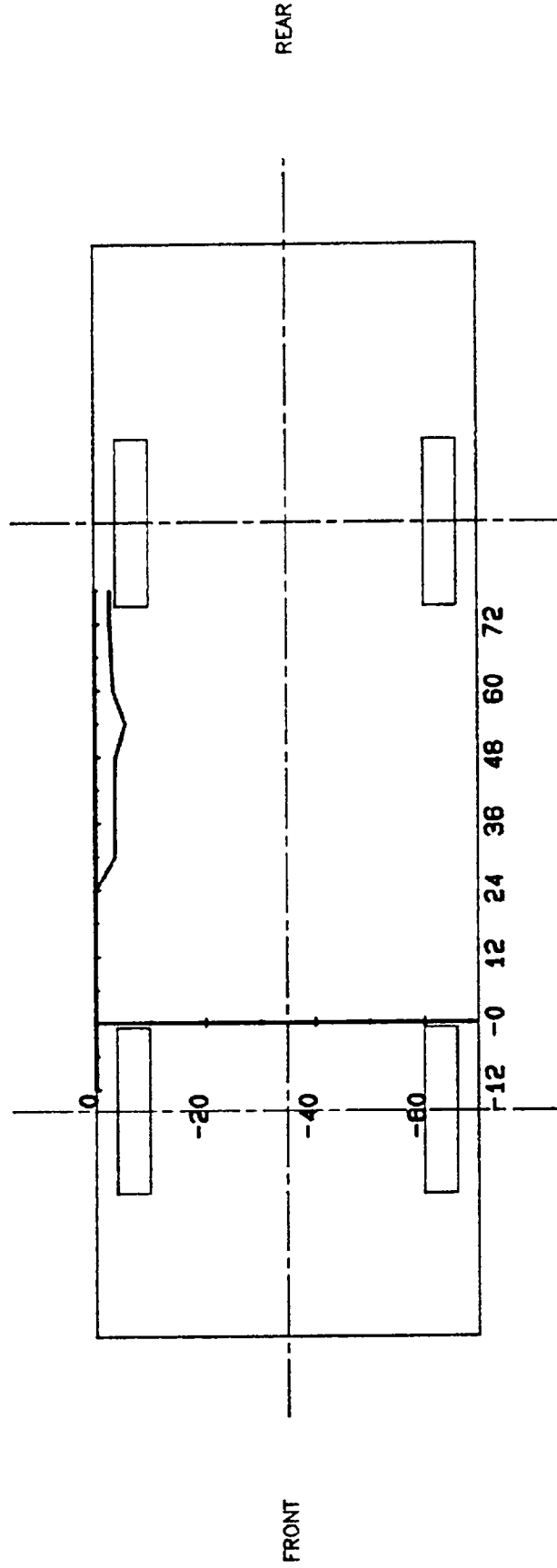
PROFILE LEVEL EQUALS H-POINT HEIGHT WHICH IS 22.0" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



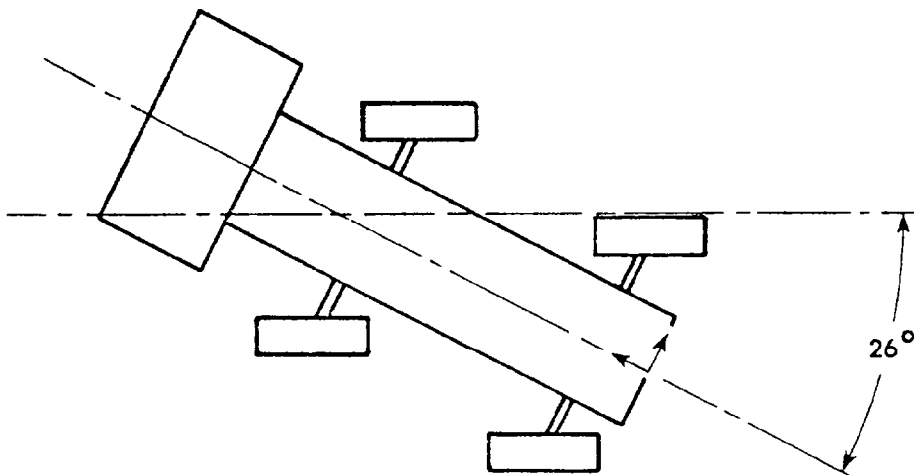
PROFILE LEVEL EQUALS WINDOW SILL HEIGHT WHICH IS 35.5" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT WHICH IS 54.0" 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) | Δ V = -20.9 mph @ 133.50 msec | | | --- | --- | 16.99 | 36.25 |
| | (LATERAL) | Δ V = 5.3 mph @ 133.50 msec | | | 8.40 | 29.13 | 1.77 | 144.50 |
| | (VERTICAL) | | | | 7.88 | 23.63 | 6.41 | 52.50 |
| | (RESULTANT) | | | | | 19.58 @ 30.88 | | |
| 2 | REAR FRAME MEMBER | 18.5 | -19.2 | 11.9 | | | | |
| | (LONGITUDINAL) | Δ V = -15.4 mph @ 133.50 | | | 1.19 | 271.38 | 13.63 | 42.50 |
| | (LATERAL) | Δ V = -.1 mph @ 133.50 | | | 3.34 | 105.13 | 6.19 | 22.50 |

* 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.

*No positive value in time interval of interest.

TEST ANOMALIES

The dummy's head X axis accelerometer, HEDXG2, recorded anomalous data during the test.

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 850830 10-SEP-85 13:00:53

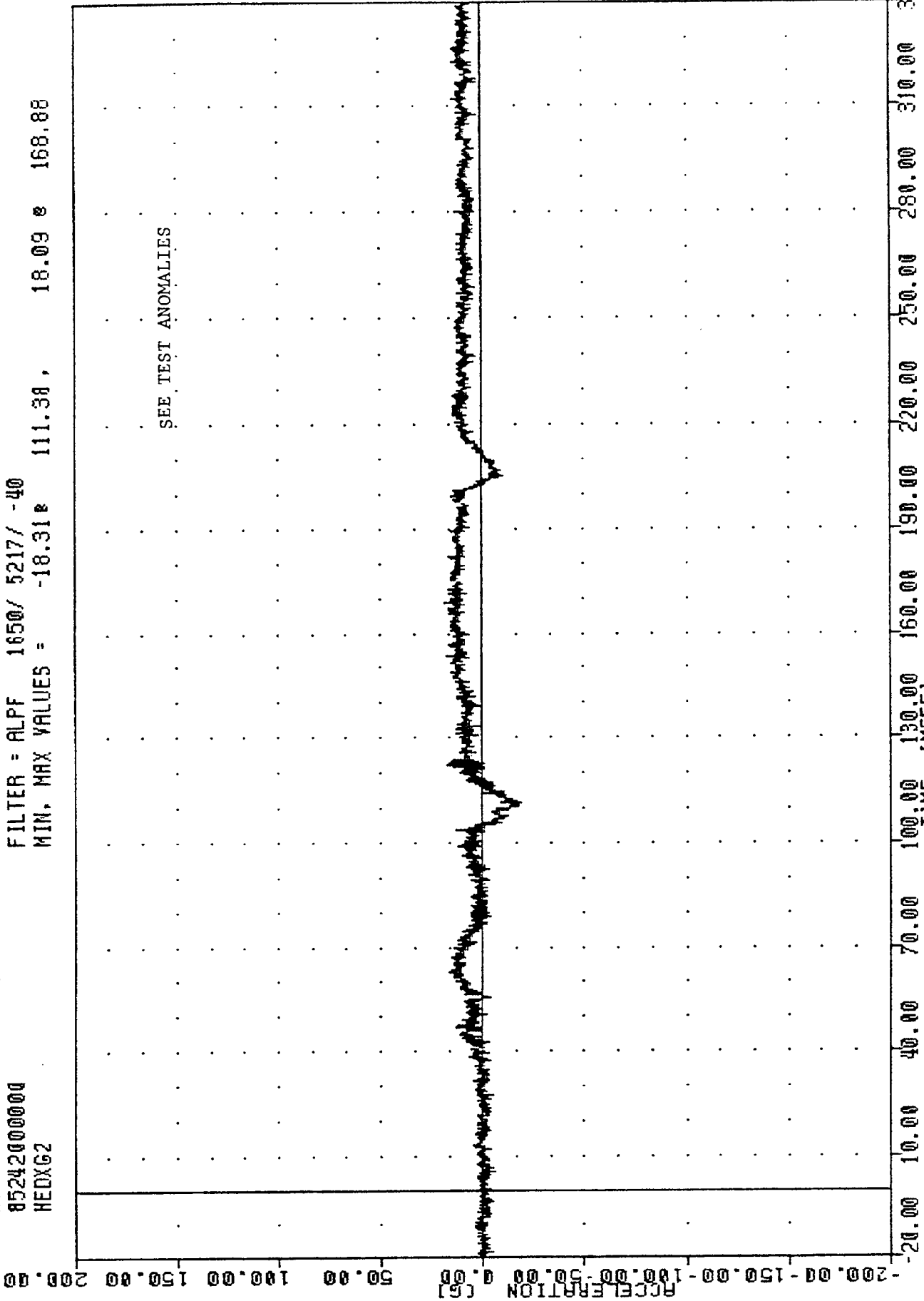
NYMA SIDE IMPACT TESTING

85242000000

HEDXG2

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -18.31e 111.30, 18.09 e 168.88

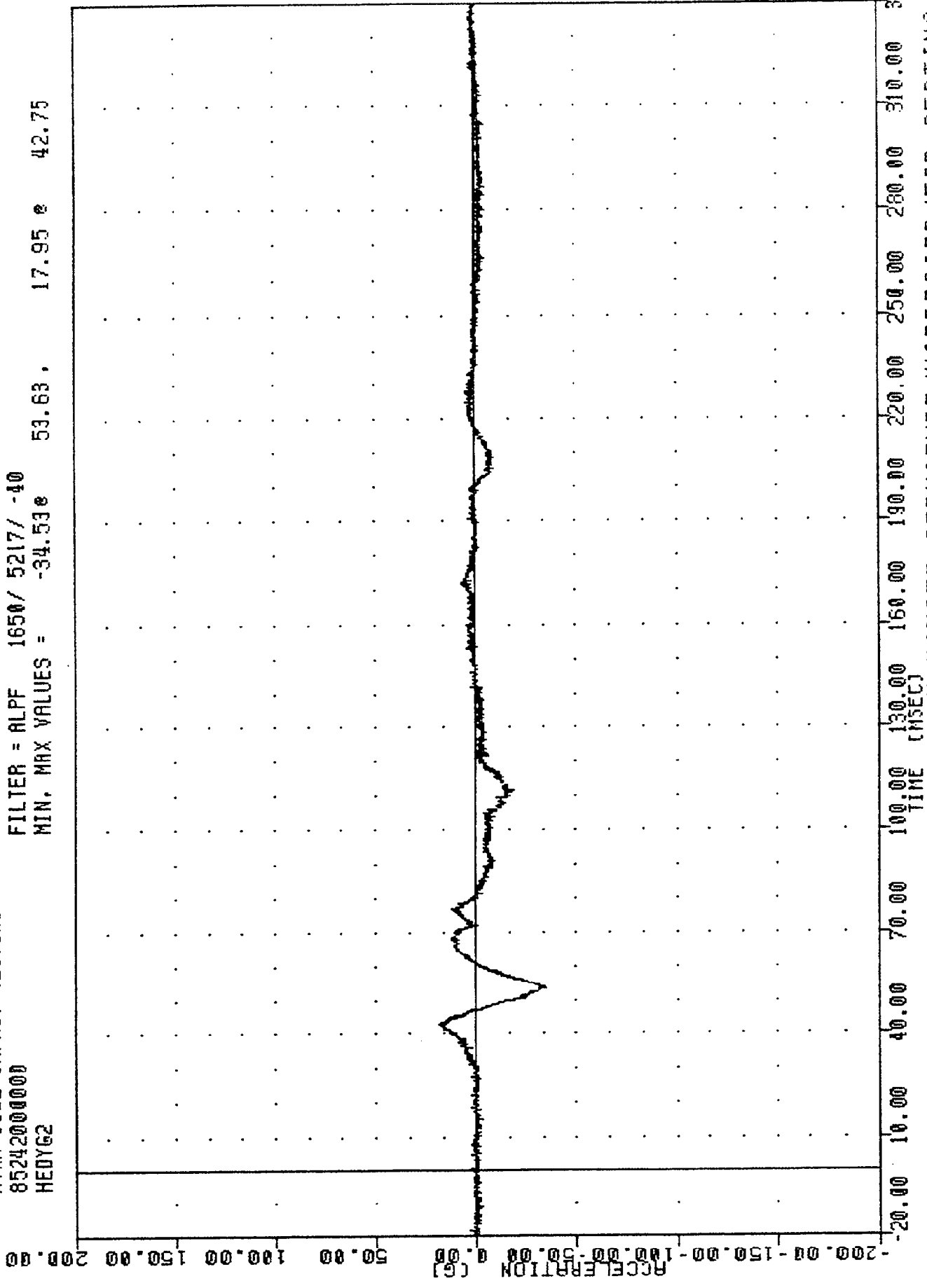


NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER HEAD ACCELERATION X AXIS

TRC
NYMA SIDE IMPACT TESTING
85242000000
HEDYG2

PLOT DATE 10-SEP-85 13:00:53

FILTER = ALPF 1650/ 5217/ -40
MIN. MAX VALUES = -34.53e 53.63, 17.95 e 42.75



NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER HEAD ACCELERATION Y AXIS

TAC 850830 10-SEP-85 13:00:53

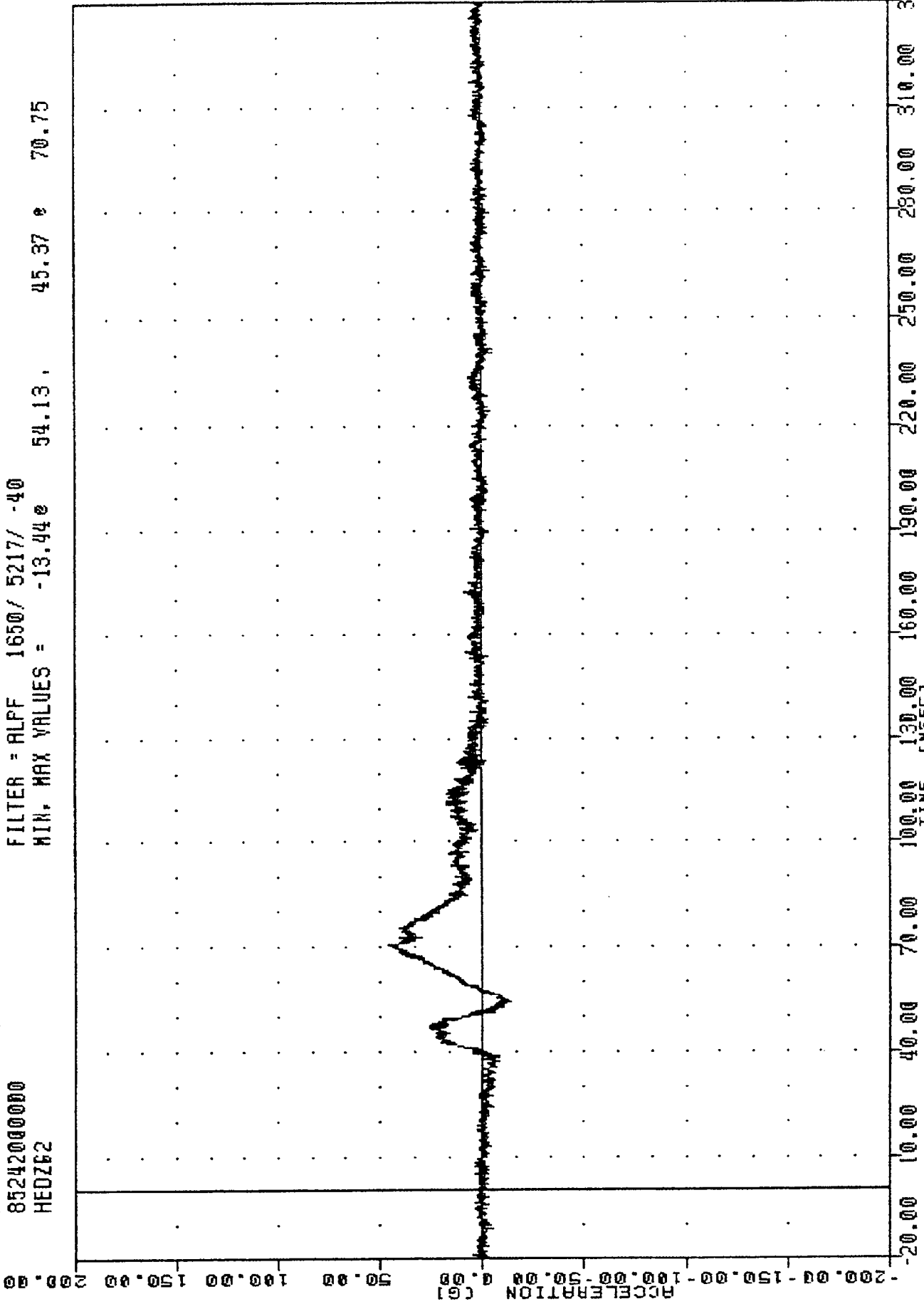
MVMA SIDE IMPACT TESTING

8524200000

HEDZ62

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -13.44e 54.13, 45.37 e 70.75



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER HEAD ACCELERATION Z AXIS

TRC

850830

PLOT DATE

10-SEP-85

13:00:53

NYMA SIDE IMPACT TESTING

85242000000

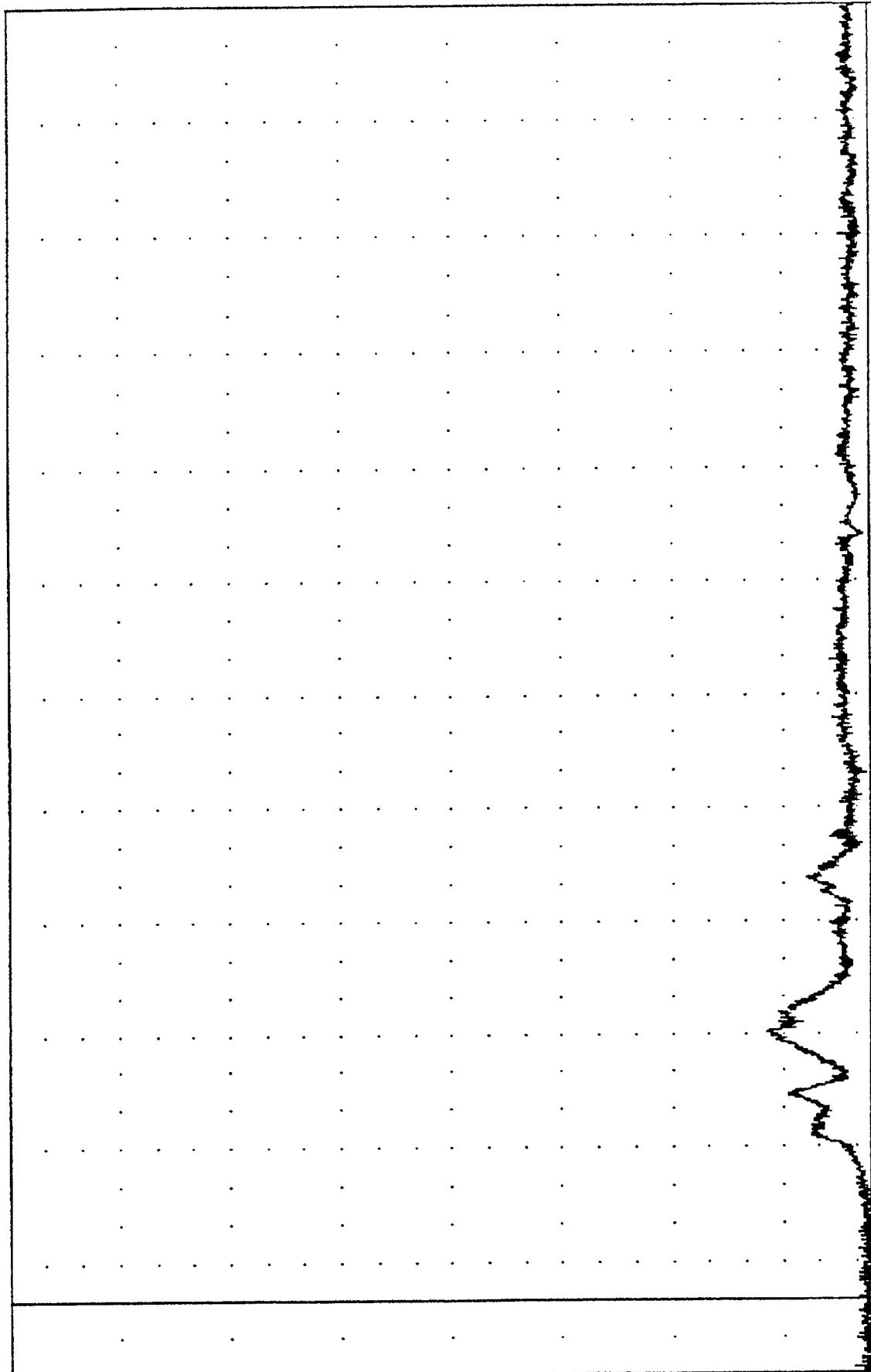
FILTER = ALPF 1650/ 5217/ -40

HEDRG2

MIN, MAX VALUES = 0.368 9.50,

46.88 e 70.38

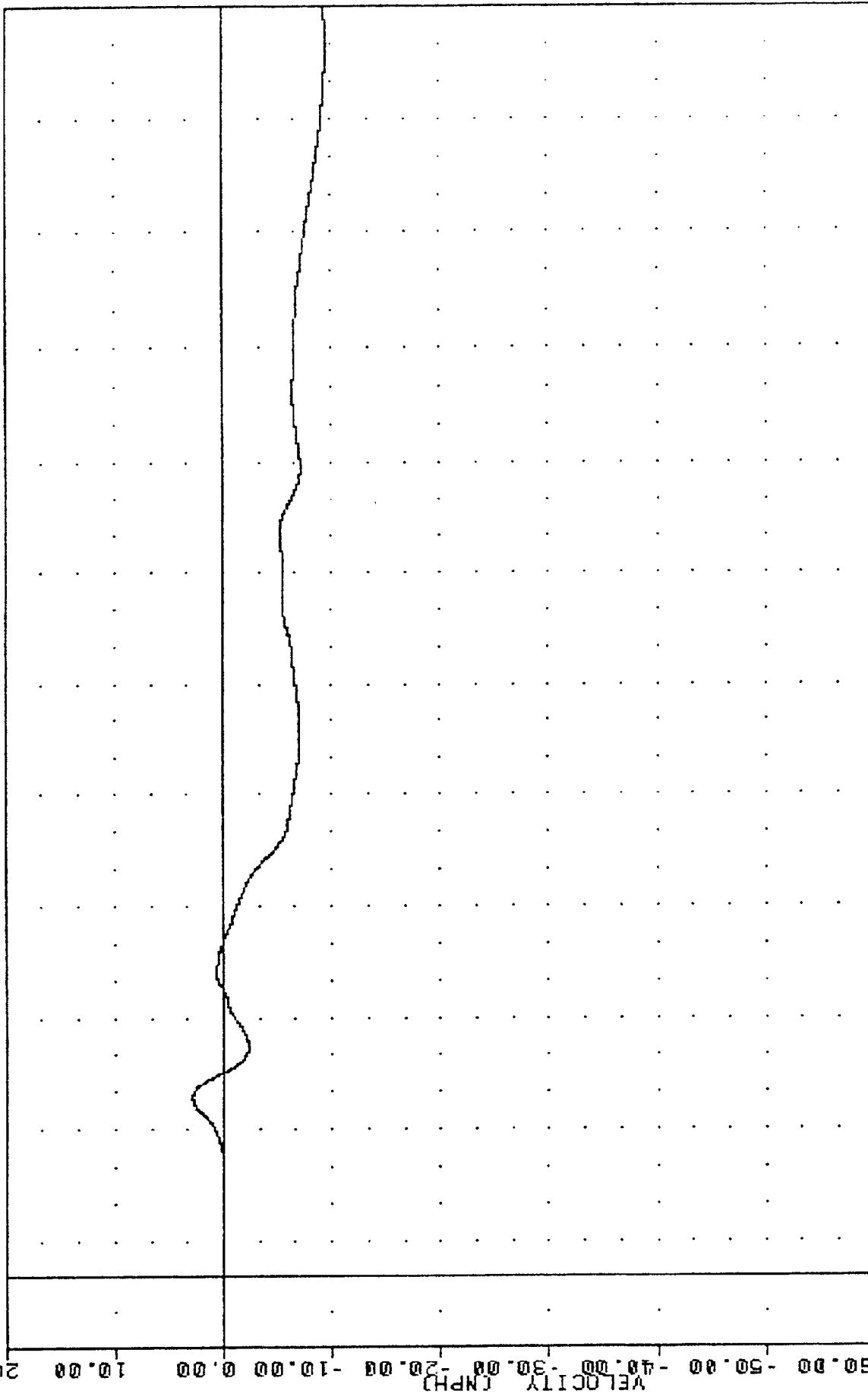
ACCELERATION (G) 10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00 390.00



TIME (MSEC) 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

NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER HEAD RESULTANT ACCELERATION

TRC 850630 PLOT DATE 10-SEP-80 12:59:56
 NVMA SIDE IMPACT TESTING
 85242000000
 HEDYV2
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -9.52 331.38 2.88 e 48.50

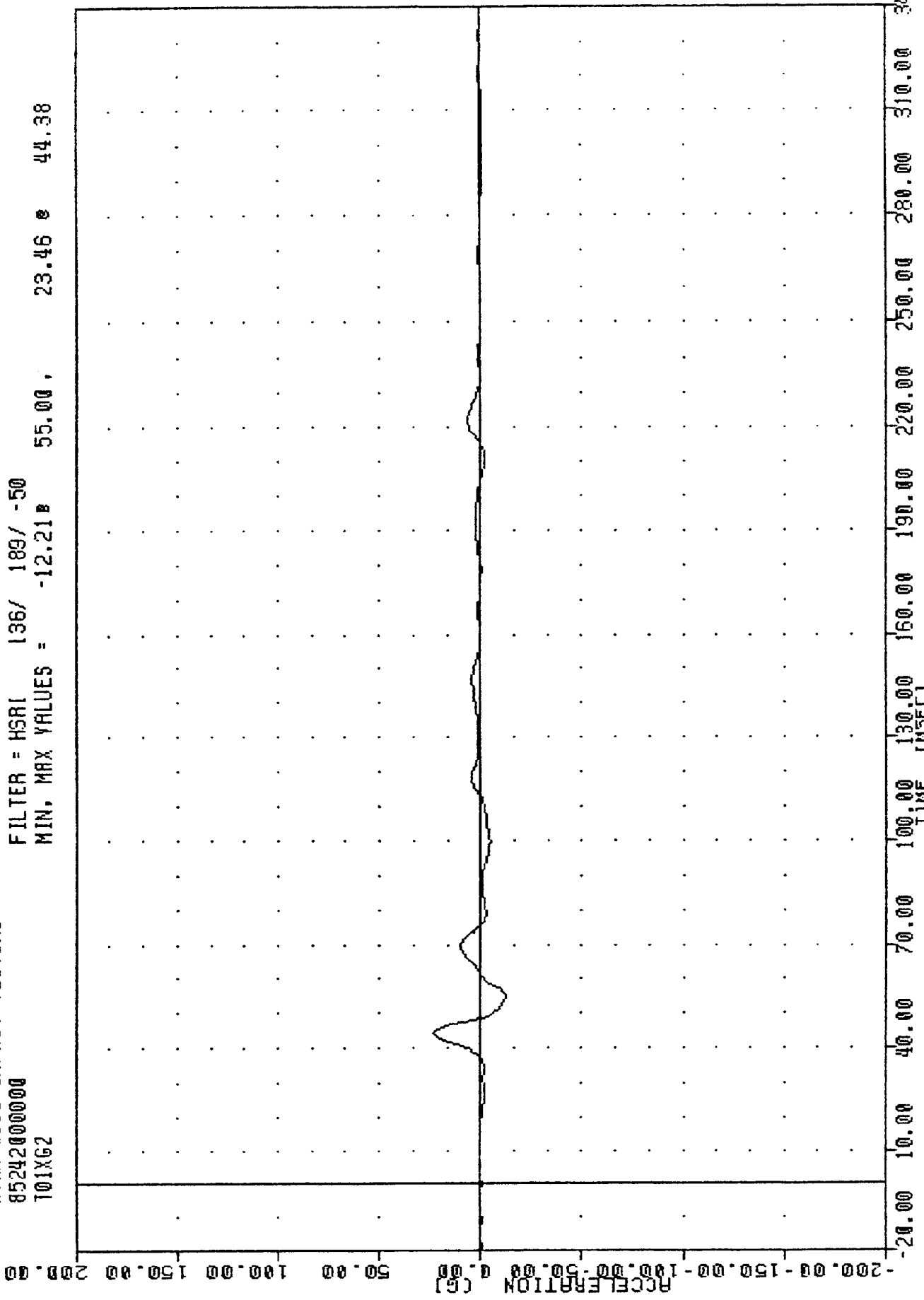


-50.00
 -40.00
 -30.00
 -20.00
 -10.00
 0.00
 10.00
 20.00
 VELOCITY (NPH)
 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00
 TIME (MSEC)
 MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 HEAD VELOCITY Y AXIS

TRC
 NYMA SIDE IMPACT TESTING
 85242000000
 T01XG2

PLOT DATE 10-SEP-85 12:59:08

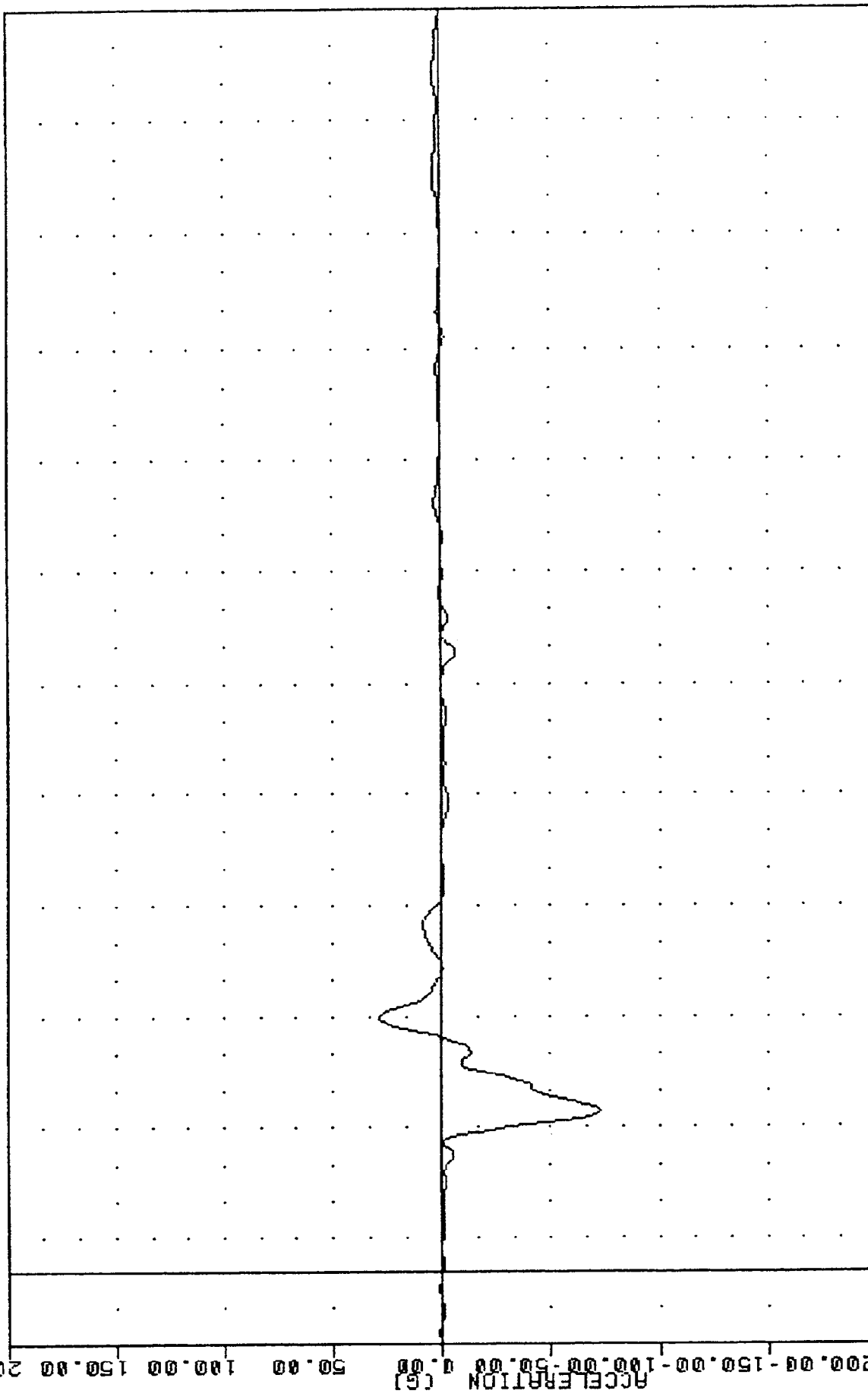
FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -12.21 55.00 23.46 44.38



NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER UPPER SPINE ACCELERATION X AXIS

TRC 850830 10-SEP-85 12:59:08
 MVNA SIDE IMPACT TESTING
 85242000000
 T01Y62

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -73.02e 44.38, 29.40 e 70.00

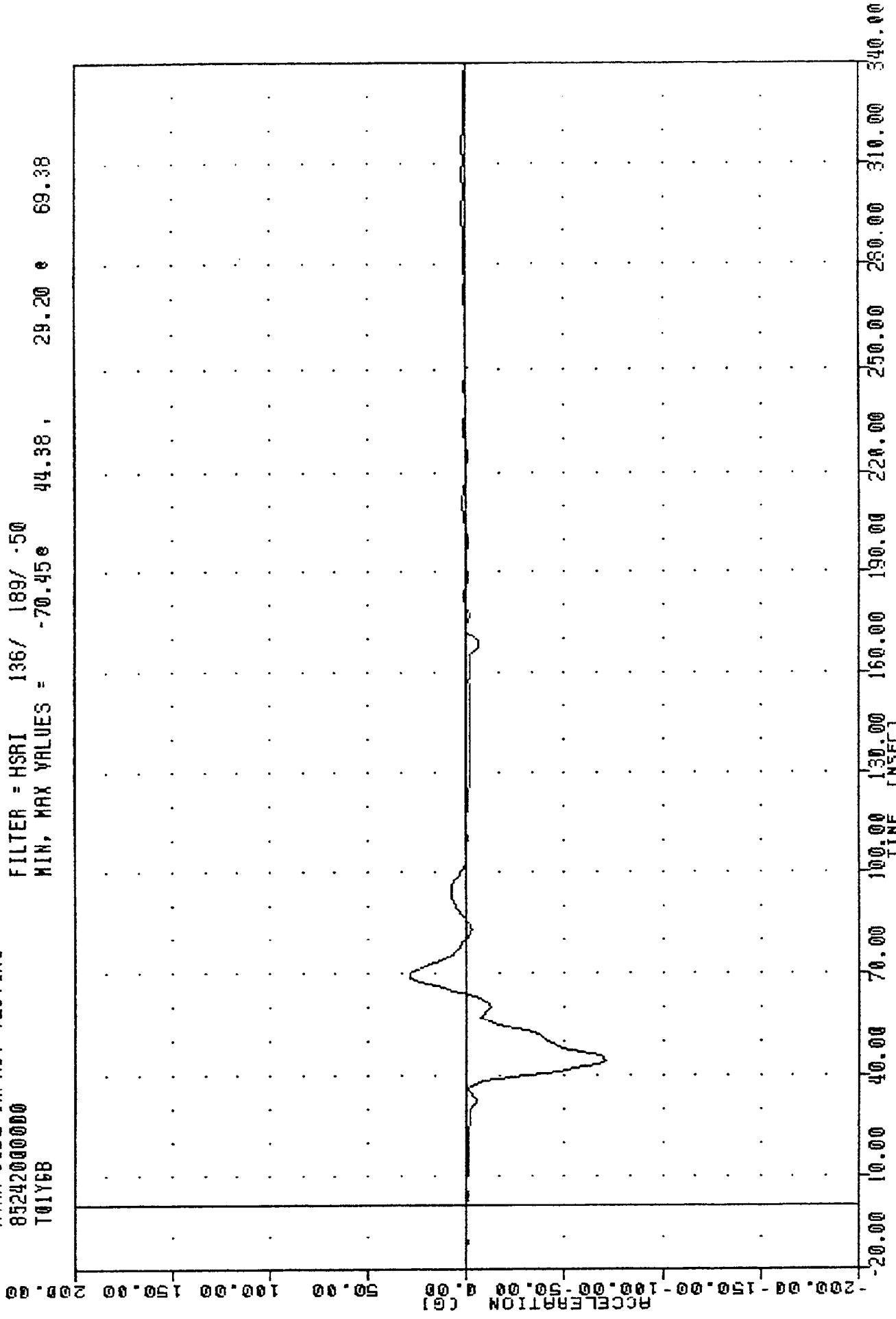


ACCELERATION (G)
 TIME (MSEC)
 MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER UPPER SPINE ACCELERATION Y AXIS

TAC 850630
 MVMA SIDE IMPACT TESTING
 85242000000
 T01Y6B

PLOT DATE 10-SEP-65 12:59:08

FILTER = HSRI 136/ 189/ .50
 MIN, MAX VALUES = -70.45e 44.38, 29.20 e 69.38



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

TRC

850830

PLOT DATE

10-SEP-85

12:59:08

MVMA SIDE IMPACT TESTING

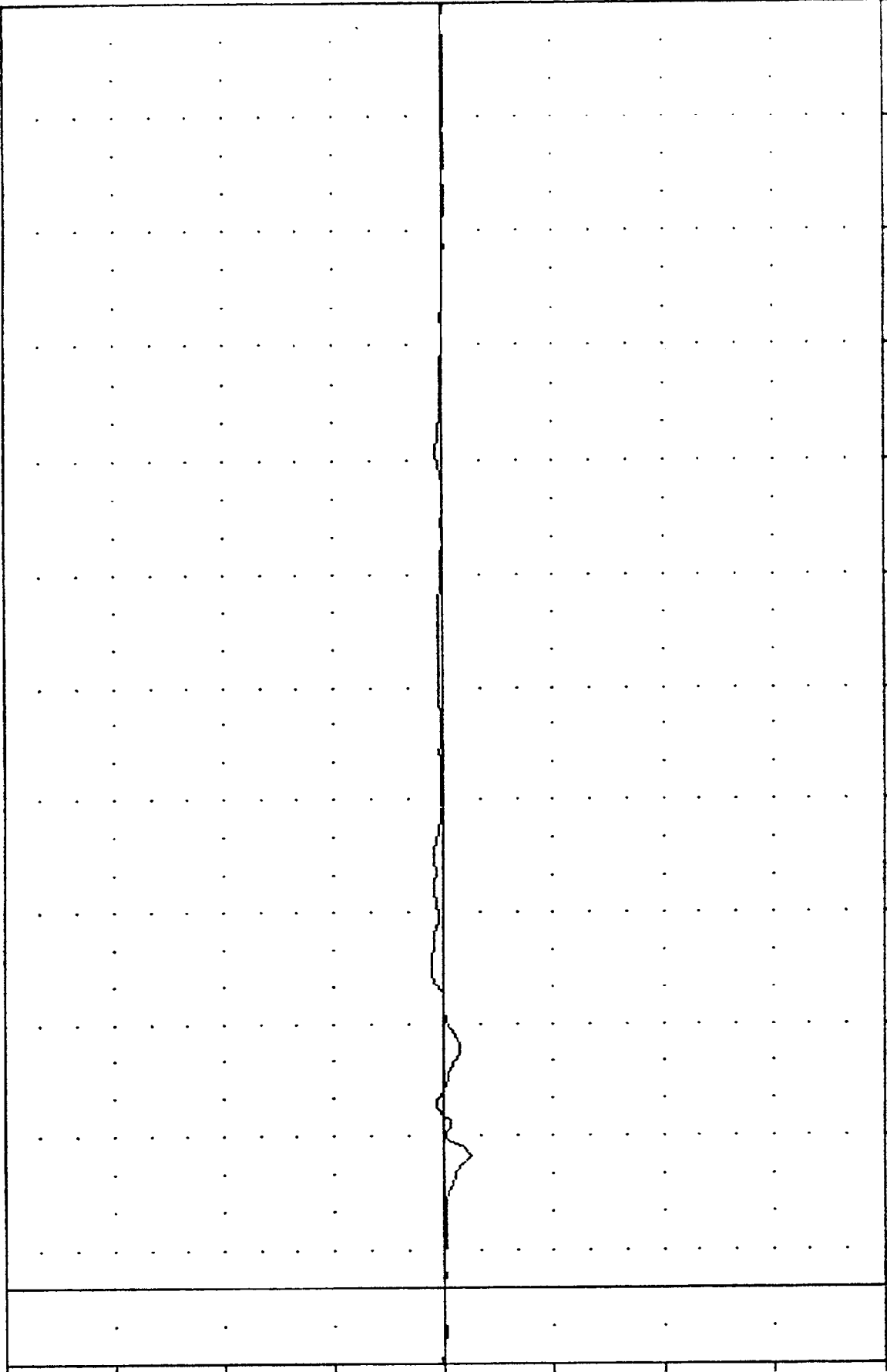
85242000000

FILTER = HSR1 136/ 189/ -50

T01ZG2

MIN, MAX VALUES = -11.97e 35.00, 5.98 e 85.00

ACCELERATION (G)

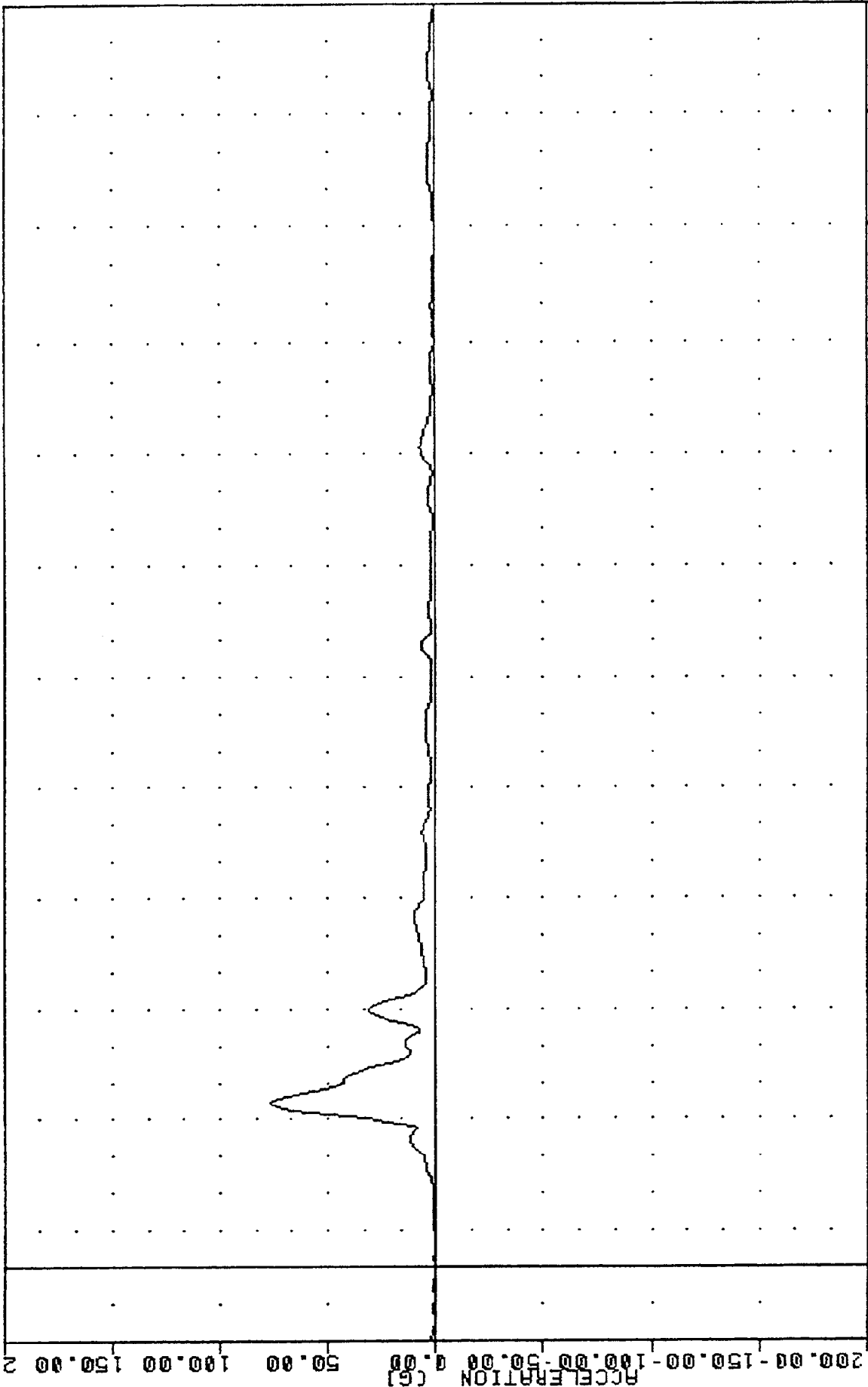


TIME (MSEC)

MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER UPPER SPINE ACCELERATION Z AXIS

TRC 800830 10-SEP-83 12:09:06
 MYMA SIDE IMPACT TESTING
 85242000000
 T01RG2

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.12e -14.37 , 76.74 e 44.38

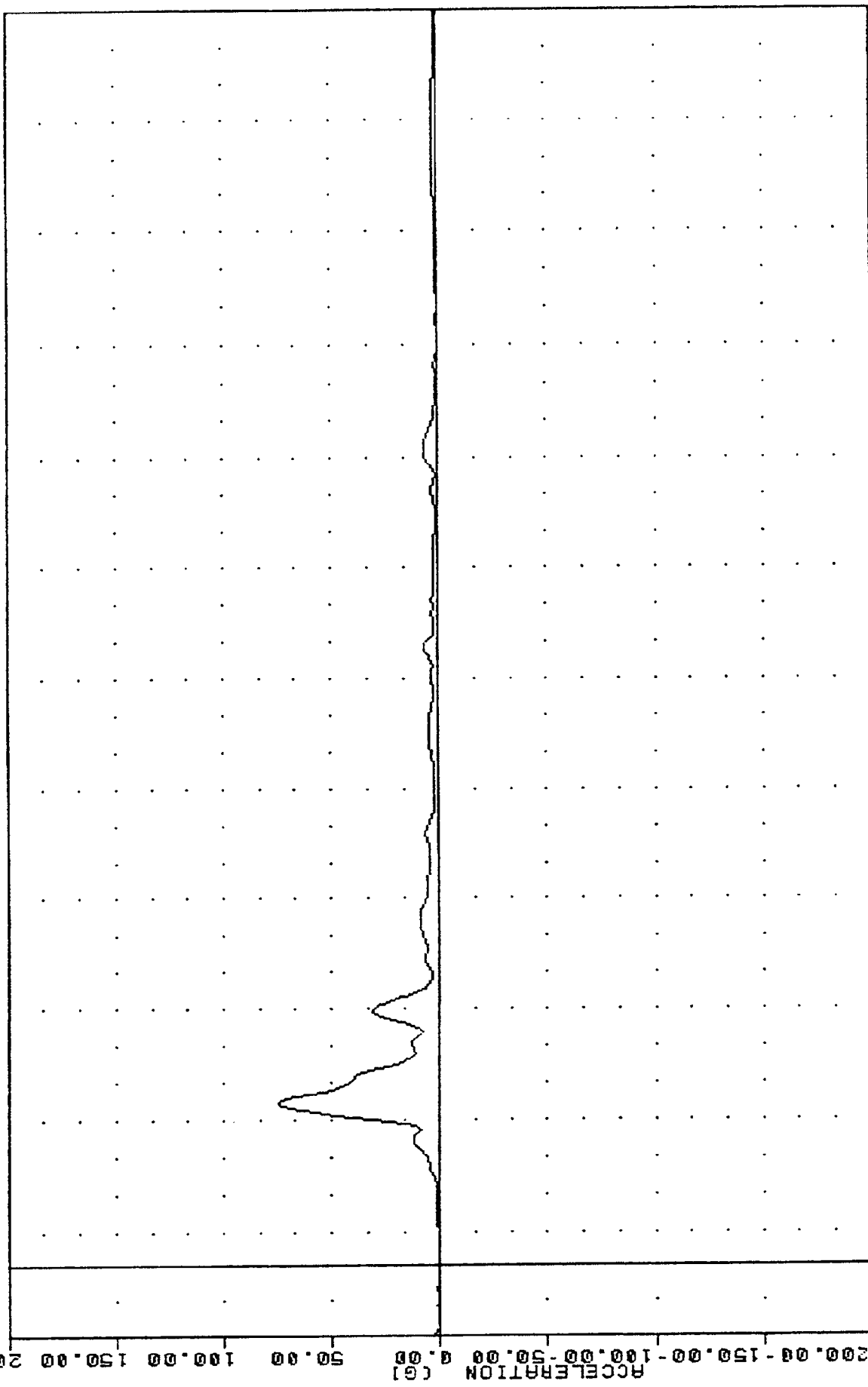


-200.00 150.00 100.00 50.00 0.00 -50.00 -100.00 -150.00 -200.00
 ACCELERATION (G)

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)

MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER UPPER SPINE RESULTANT ACCELERATION

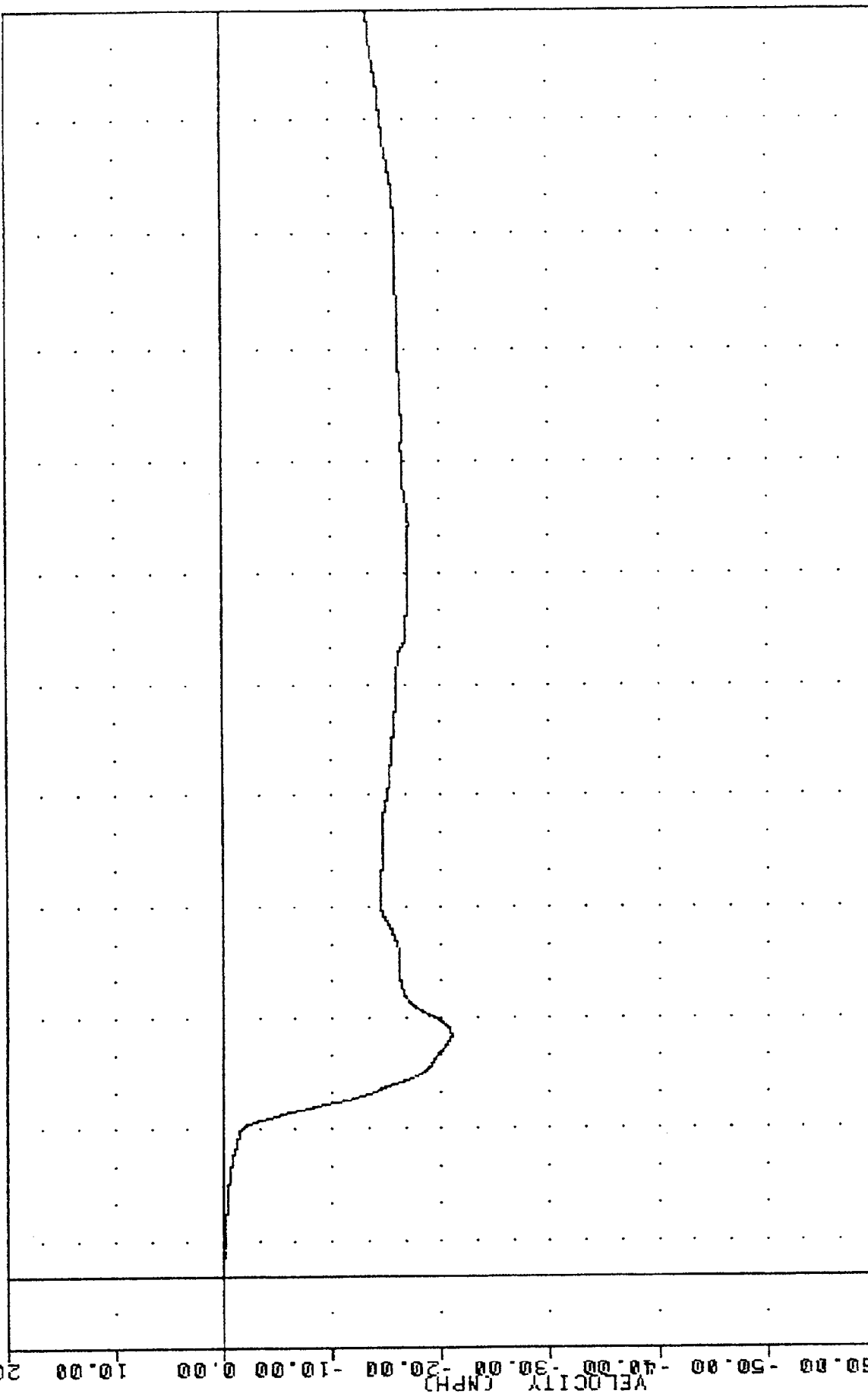
TRC 850830
 MYMA SIDE IMPACT TESTING
 85242000000
 T01R6B
 PLOT DATE 10-SEP-85 12:59:08
 FILTER = HSRI 136/ 189/ .50
 MIN, MAX VALUES = 0.14e -14.37, 74.29 e 44.38



-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)
 MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER UPPER SPINE RESULTANT ACCELERATION #2

TRC 850830 PLOT DATE 10-SEP-80 12:09:56
 MYNA SIDE IMPACT TESTING
 85242000000
 T01YV2

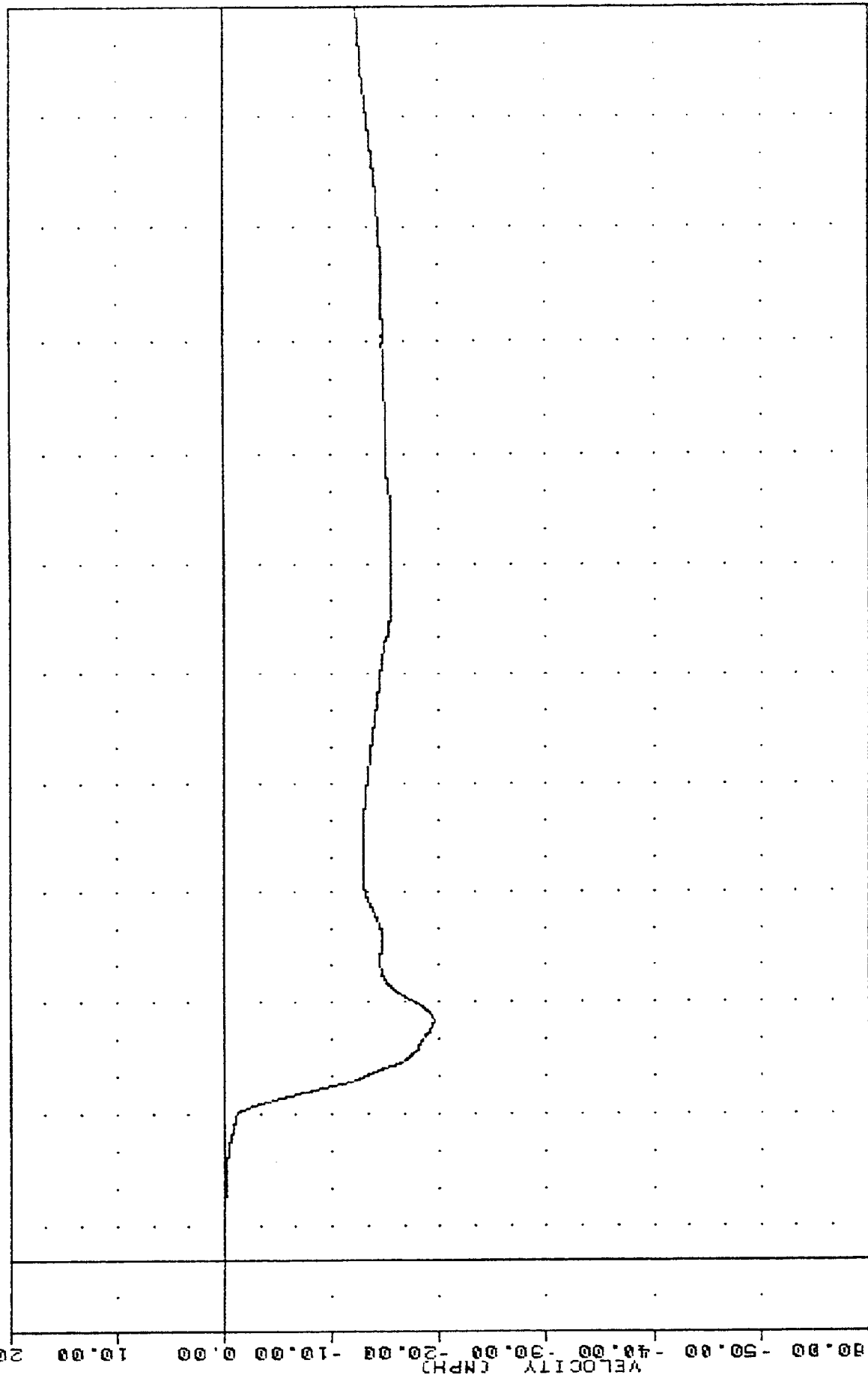
FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -20.92e 65.25, 0.06 e -14.13



20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-20.00 10.00 40.00 70.00 100.00 150.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)

MYNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 UPPER SPINE VELOCITY Y AXIS

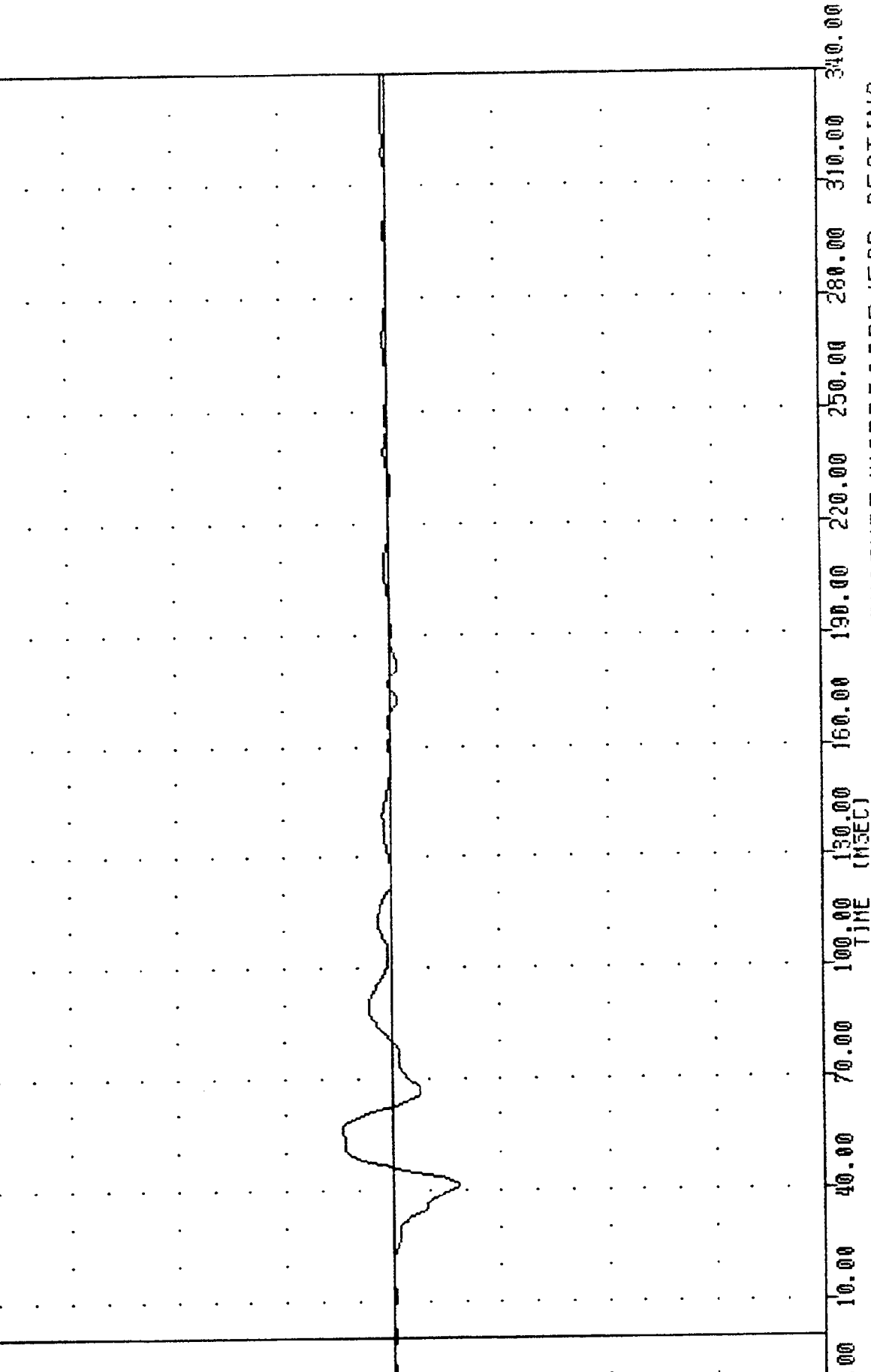
TRC 800830 PLOT DATE 10-SEP-85 12:59:56
 MYMA SIDE IMPACT TESTING
 85242000000
 T01YVB
 FILTER = BLPF 300 / 949 / -40
 MIN. MAX VALUES = -19.44e 65.00 . 0.07 e 1.13



-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
 VELOCITY (MPH)
 TIME (MSEC)
 MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 UPPER SPINE VELOCITY #2 Y AXIS

TRC
 NVMA SIDE IMPACT TESTING
 85242000000
 T12XG2

PLOT DATE 10-SEP-85 12:59:08
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -30.13 41.25, 23.74 56.25

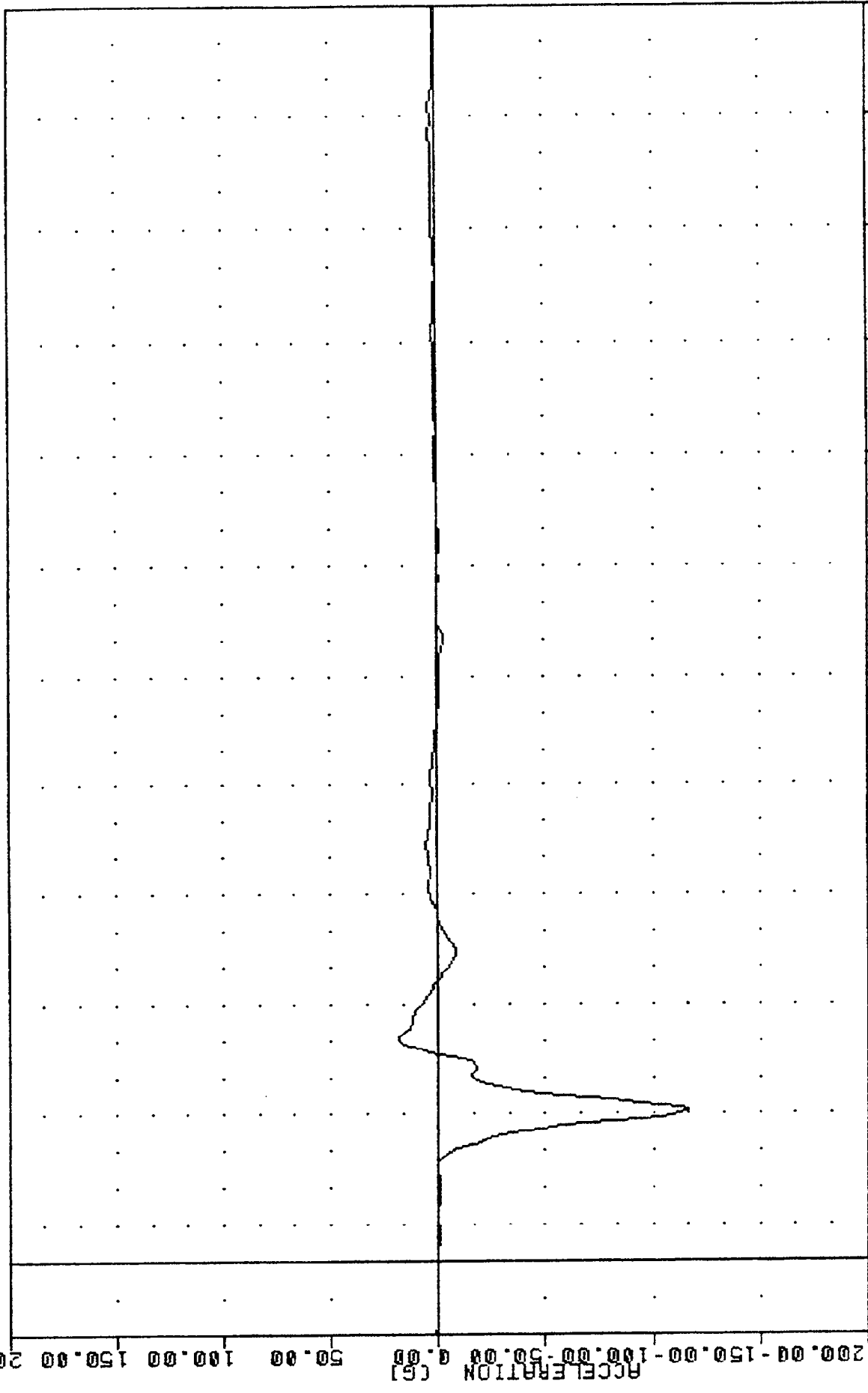


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER LOWER SPINE ACCELERATION X AXIS

TRC 854030 10-SEP-85 12:55:08

MYNA SIDE IMPACT TESTING
85242000000
T12YG2

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -116.39 40.63 18.40 60.00

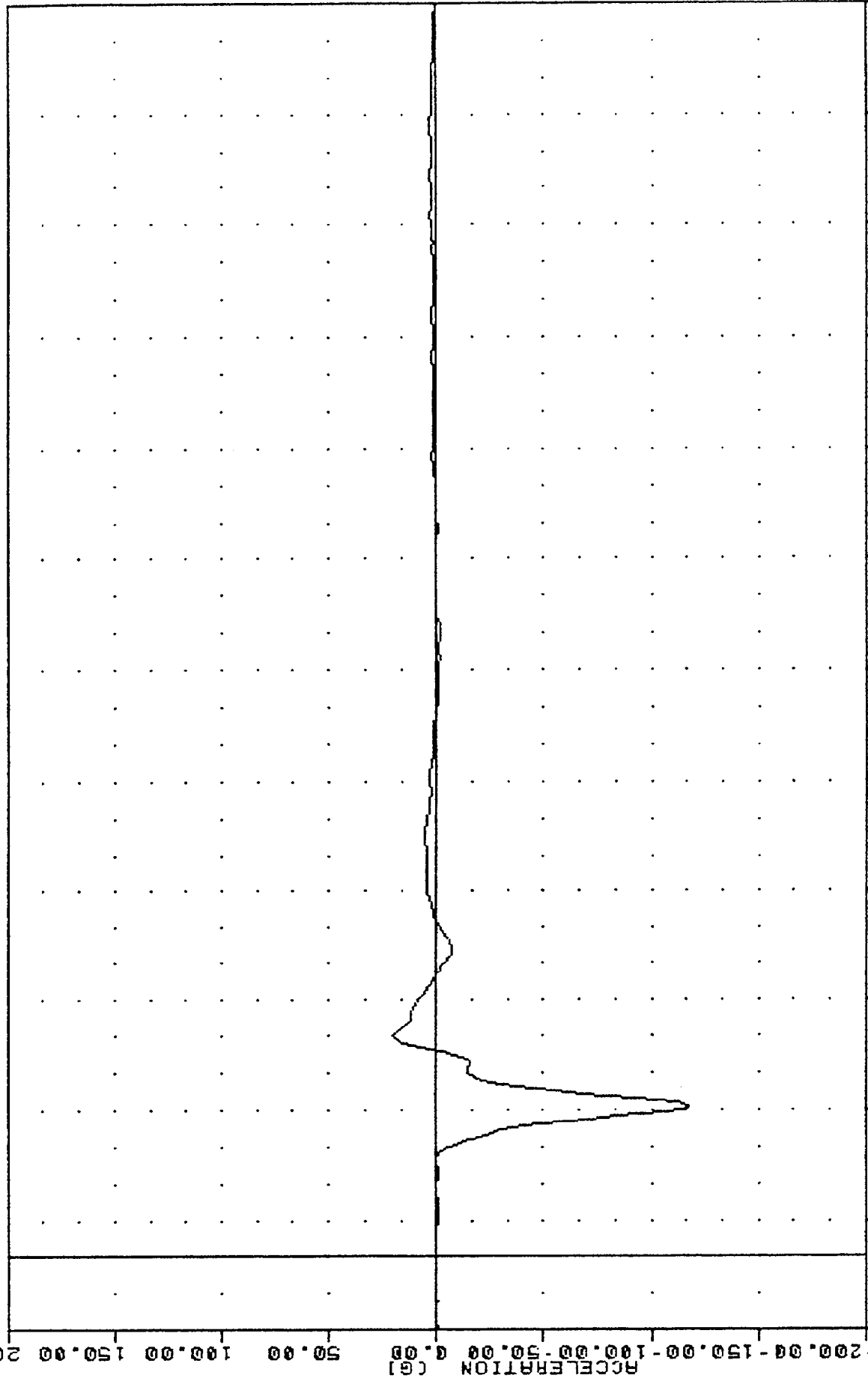


ACCELERATION (G)

TIME (MSEC)

MYNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER LOWER SPINE ACCELERATION Y AXIS

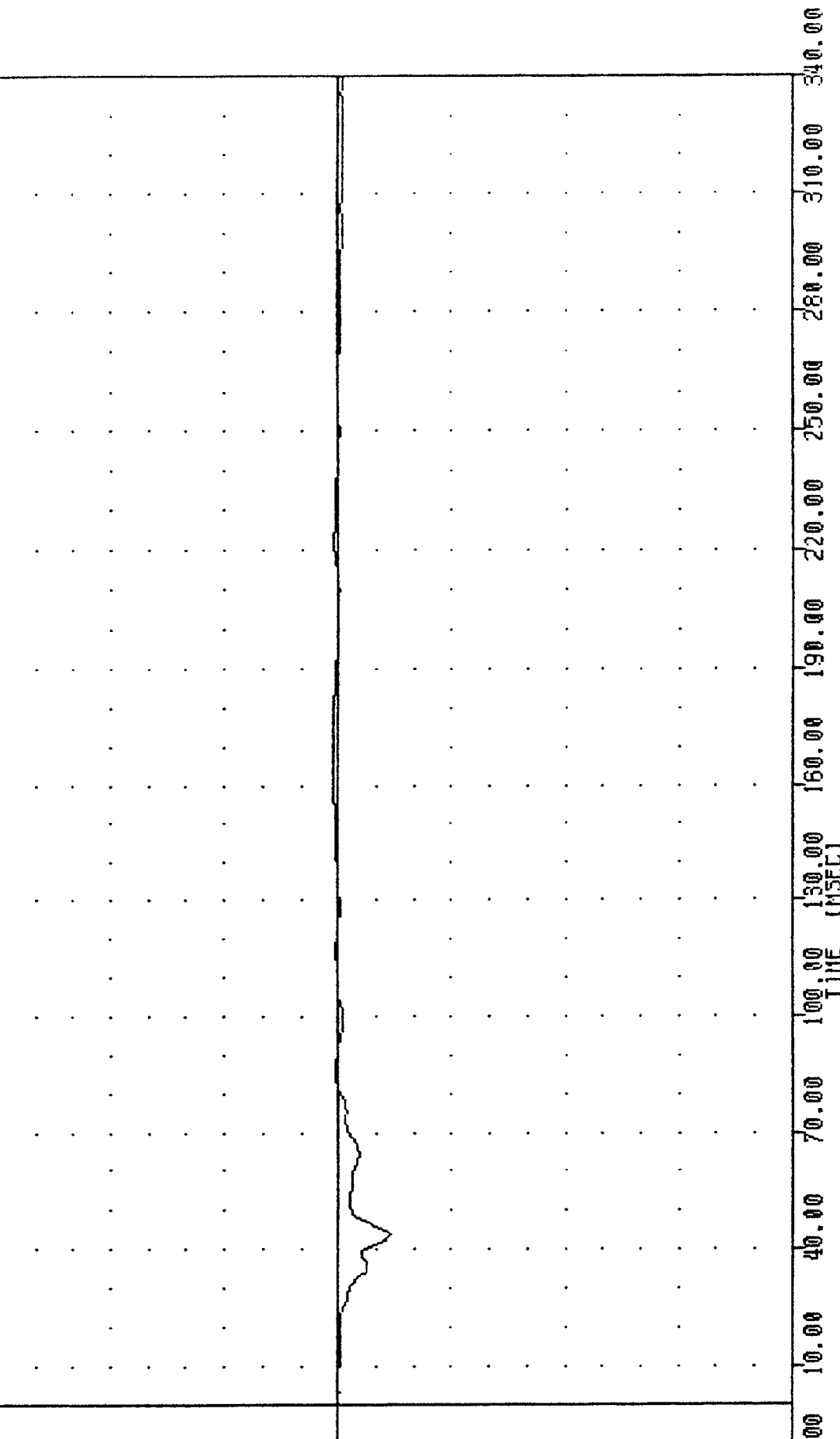
TRC 850830 10-SEP-85 12:55:08
 MYMA SIDE IMPACT TESTING
 85242000000
 T12Y6B
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -117.89 40.63 20.17 60.00



-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)
 ACCELERATION (G)
 MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER LOWER SPINE ACCELERATION -2 Y AXIS

RC 830050
 MVNA SIDE IMPACT TESTING
 85242000000
 T12Z62

PLOT DATE 10-SEP-85 12:33.08
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -22.55# 43.75, 2.57 # 180.00

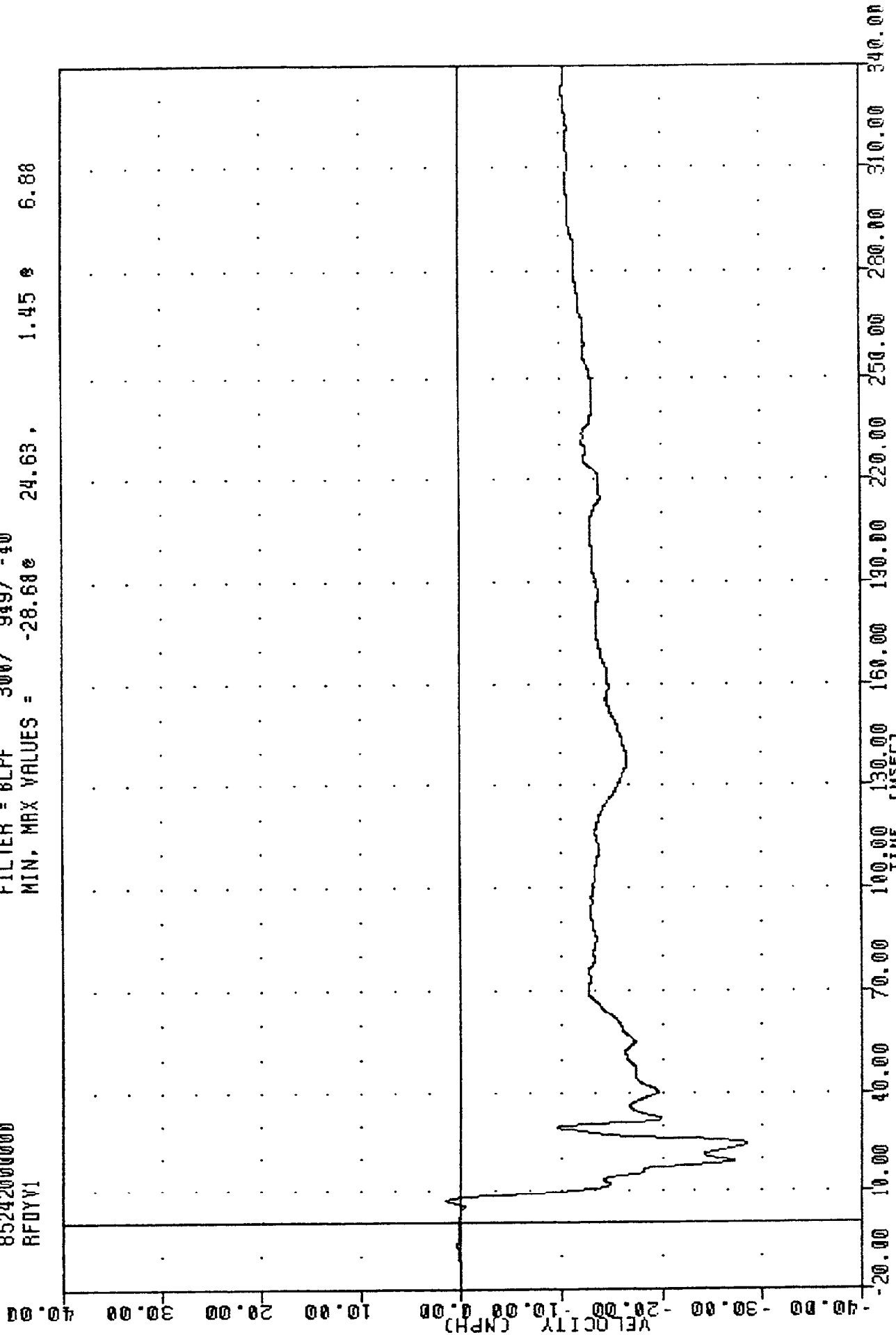


MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER LOWER SPINE ACCELERATION Z AXIS

TRC , 850830
MYNA SIDE IMPACT TESTING
8524200000
RF0YV1

PLOT DATE 10-SEP-85 12:59:56

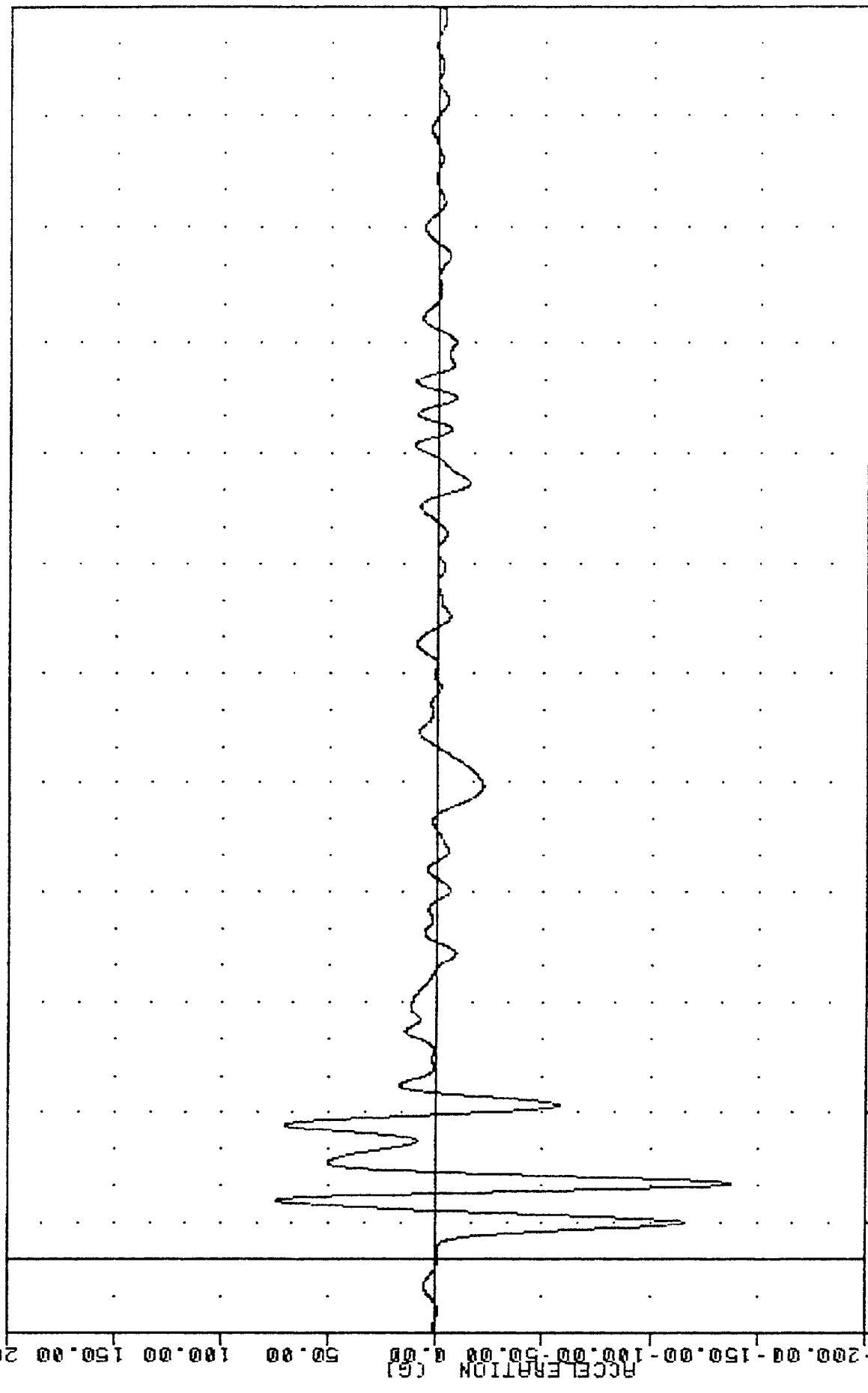
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -28.68e 24.63, 1.45 e 6.88



MYNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
RIGHT FRONT DOOR (POSITION 1) VELOCITY Y AXIS

TRC ██████████, 850830 ██████████ PLOT DATE 10-SEP-85 13:00:53
 MVNA SIDE IMPACT TESTING
 85242000000
 RFDY62

FILTER = 8LPF 100/ 316/ -40
 MIN. MAX VALUES = -137.96e 20.50, 74.55 e 16.13

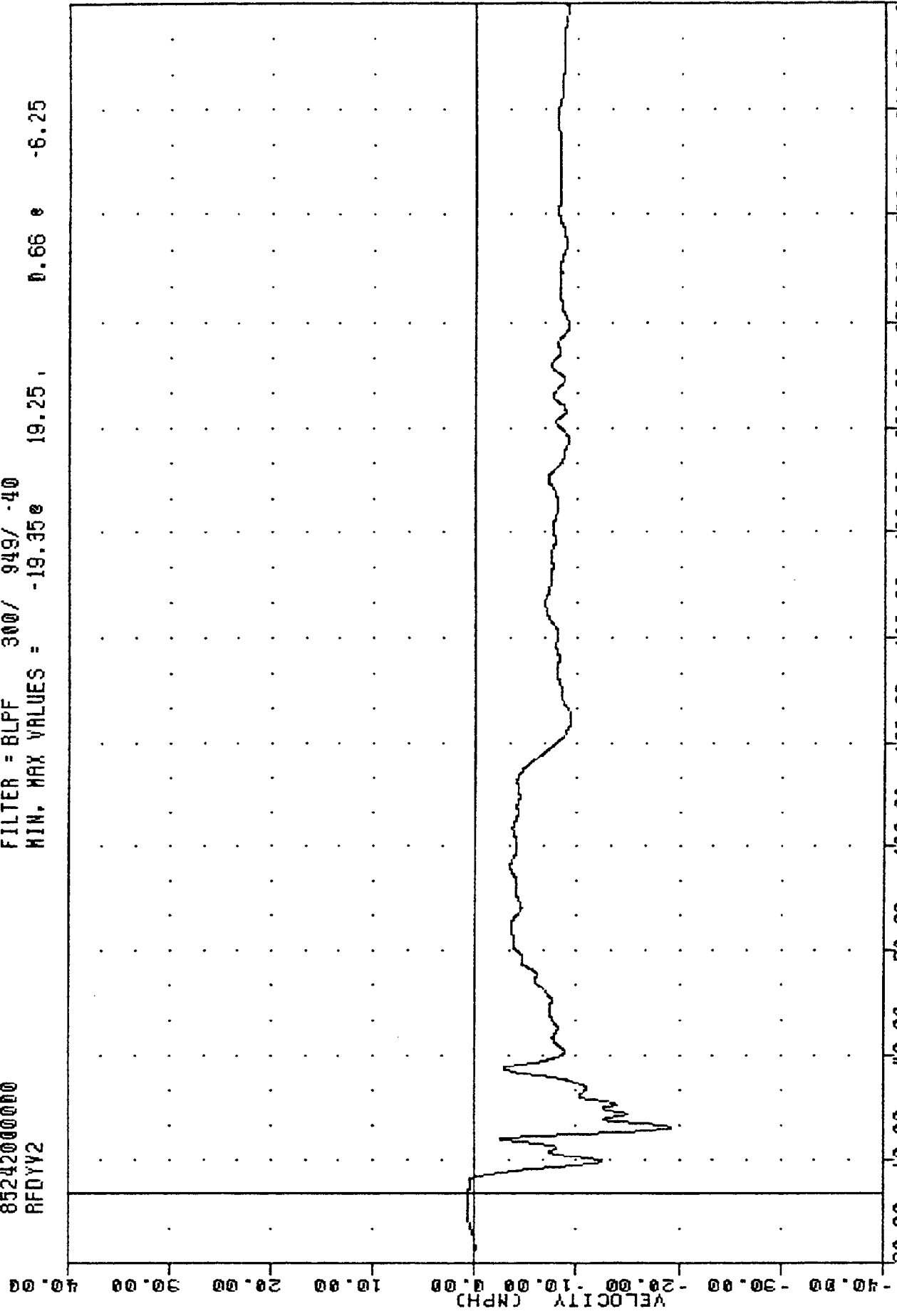


-20.00 10.00 40.00 70.00 100.00 130.00 150.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 VEHICLE RIGHT FRONT DOOR (POSITION 2) ACCELERATION Y AXIS

TAC [REDACTED], 850830
MVMA SIDE IMPACT TESTING
85242000000
RFDYV2

PLOT DATE 10-SEP-85 12:59:56

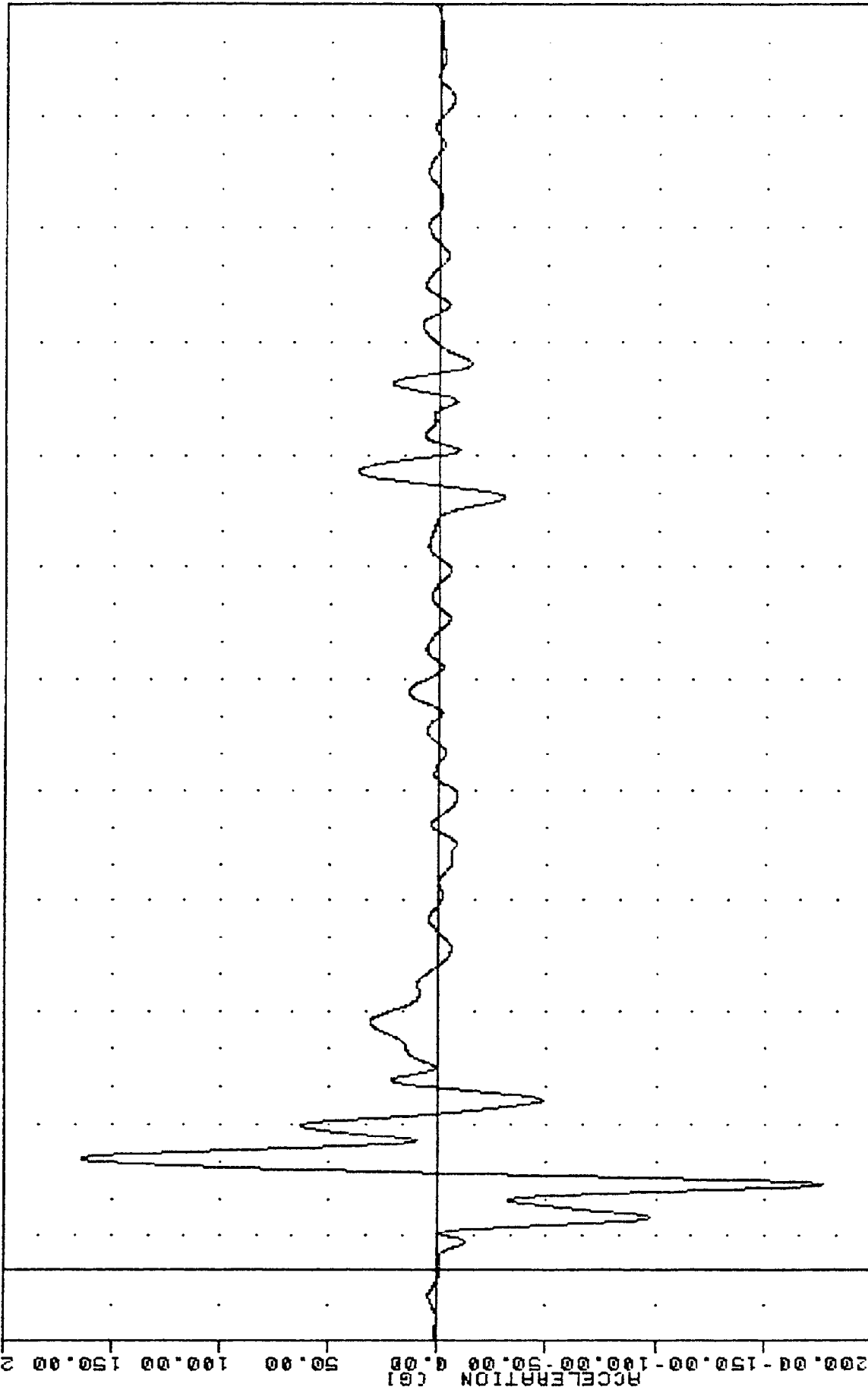
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -19.35 e 19.25, 0.66 e -6.25



40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-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)
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
RIGHT FRONT DOOR (POSITION 2) VELOCITY Y AXIS

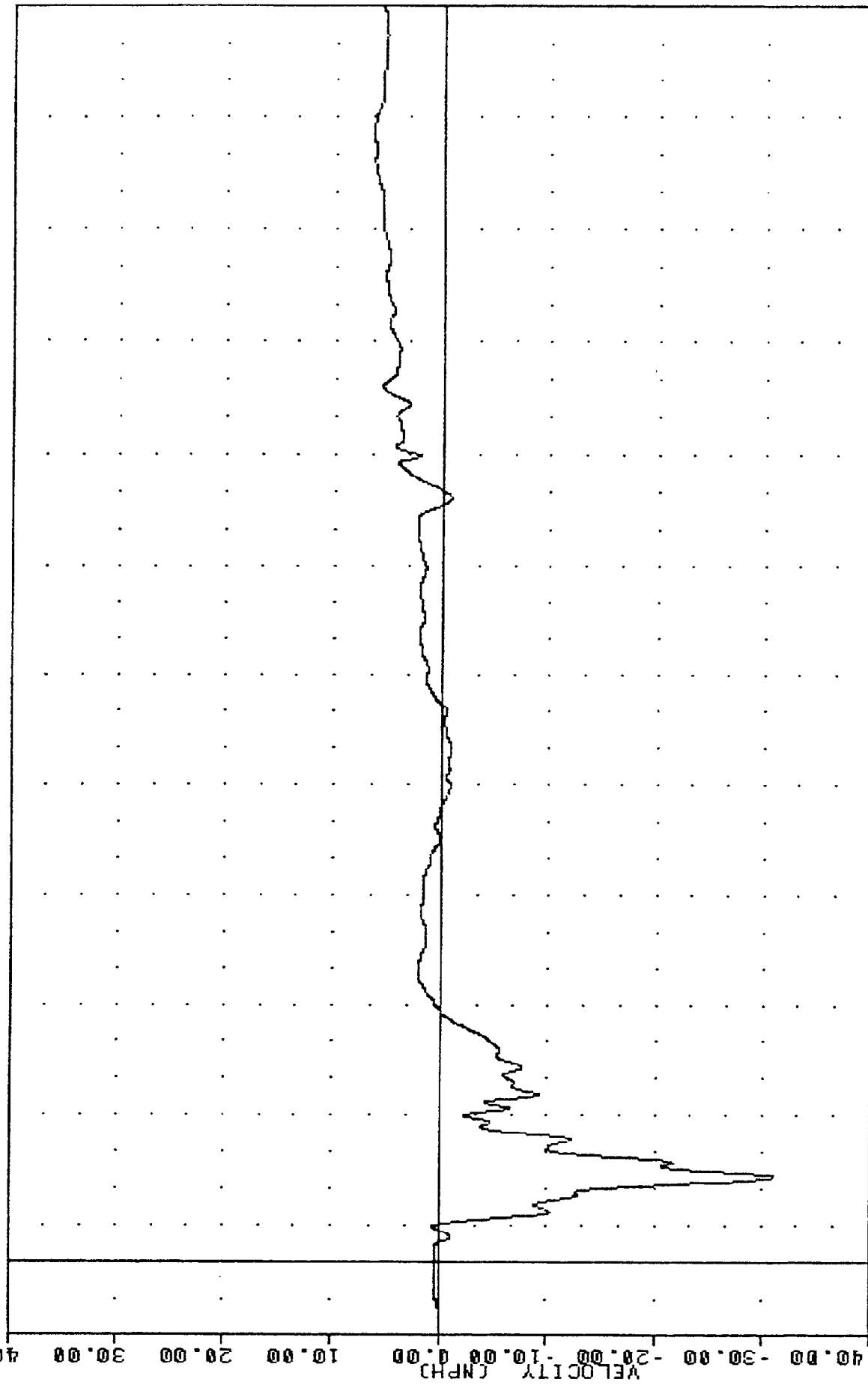
TAC 850830 PLOT DATE 10-SEP-85 13:00:53
MVMA SIDE IMPACT TESTING
85242000000
RFDY63

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -176.74e 23.88, 154.10 e 30.63



-200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00
ACCELERATION (G)
-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)
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
VEHICLE RIGHT FRONT DOOR (POSITION 3) ACCELERATION Y AXIS

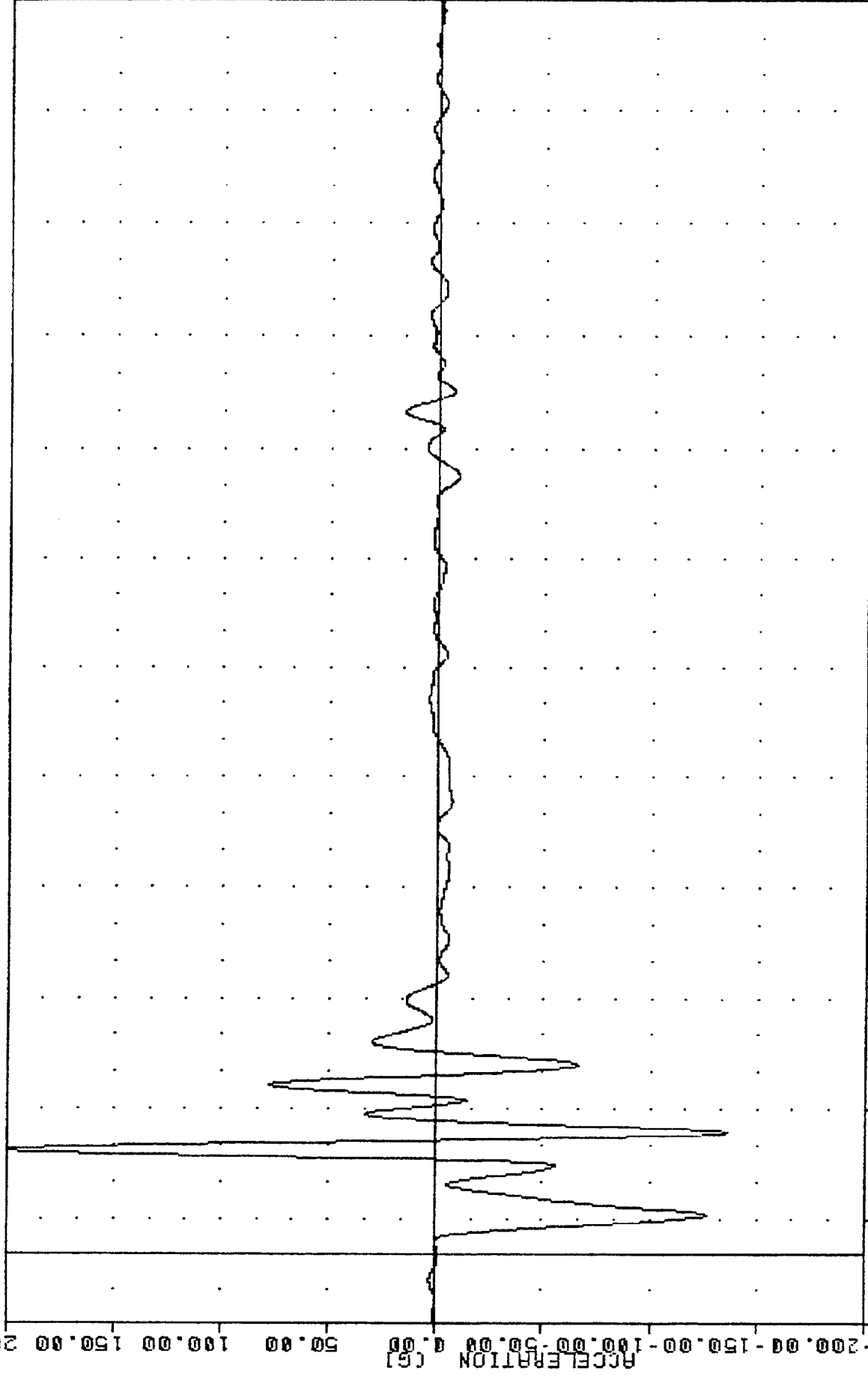
TRC ██████████, 8300630 ██████████ PLOT DATE 10-SEP-85 12:59:56 ██████████
 NYMA SIDE IMPACT TESTING
 85242000000
 AFDYV3
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -31.18 23.25, 6.62 304.75



-40.00
 -30.00
 -20.00
 -10.00
 0.00
 10.00
 20.00
 30.00
 40.00
 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
 NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 RIGHT FRONT DOOR (POSITION 3) VELOCITY Y AXIS

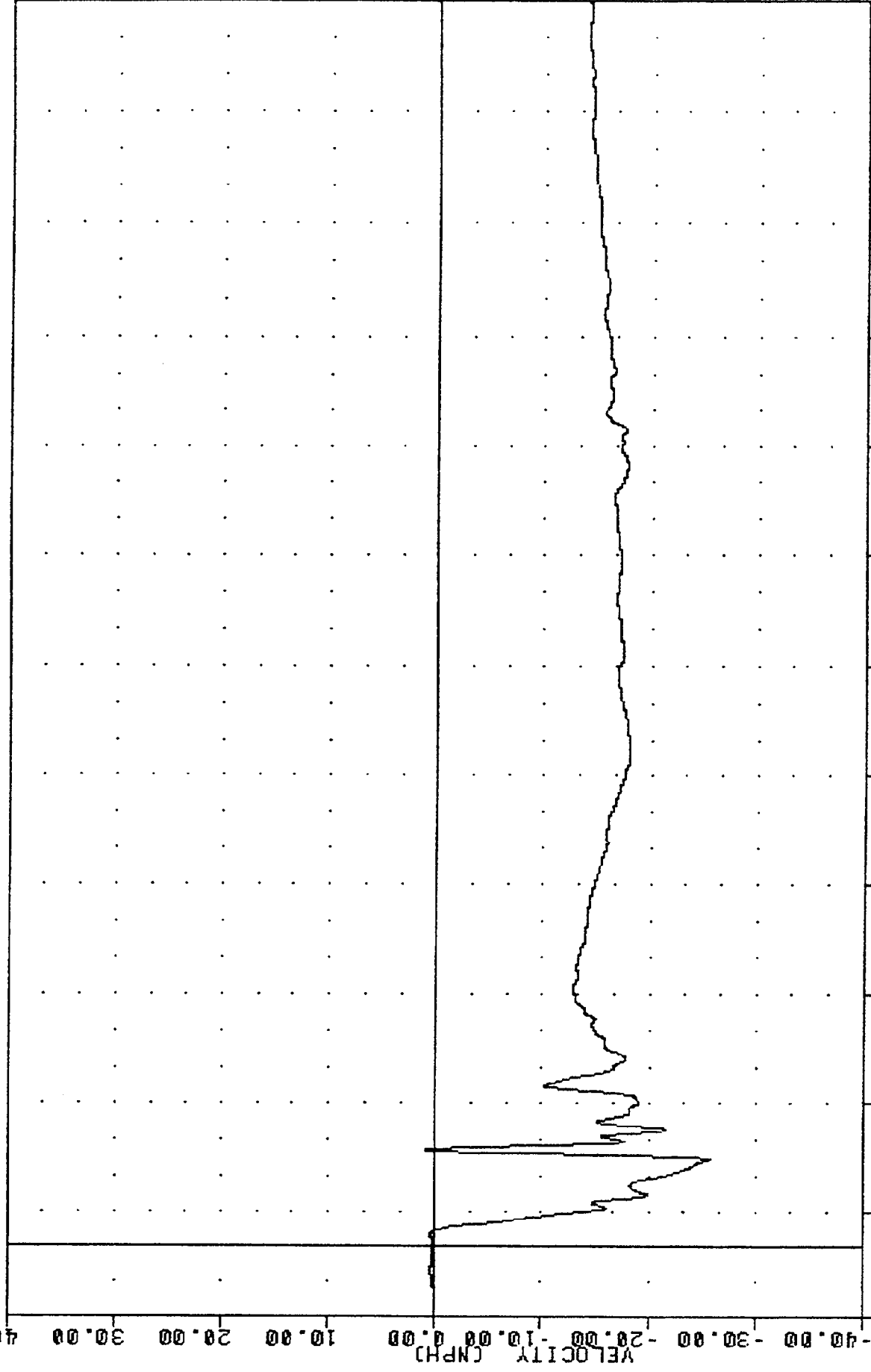
TRC 850830 PLOT DATE 10-SEP-85 13:00:53
 NYMA SIDE IMPACT TESTING
 85242000000
 AFDY64

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -136.598 33.75, 202.46 e 28.63



ACCELERATION (G)
 TIME (MSEC)
 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
 NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 VEHICLE RIGHT FRONT DOOR (POSITION 4) ACCELERATION Y AXIS

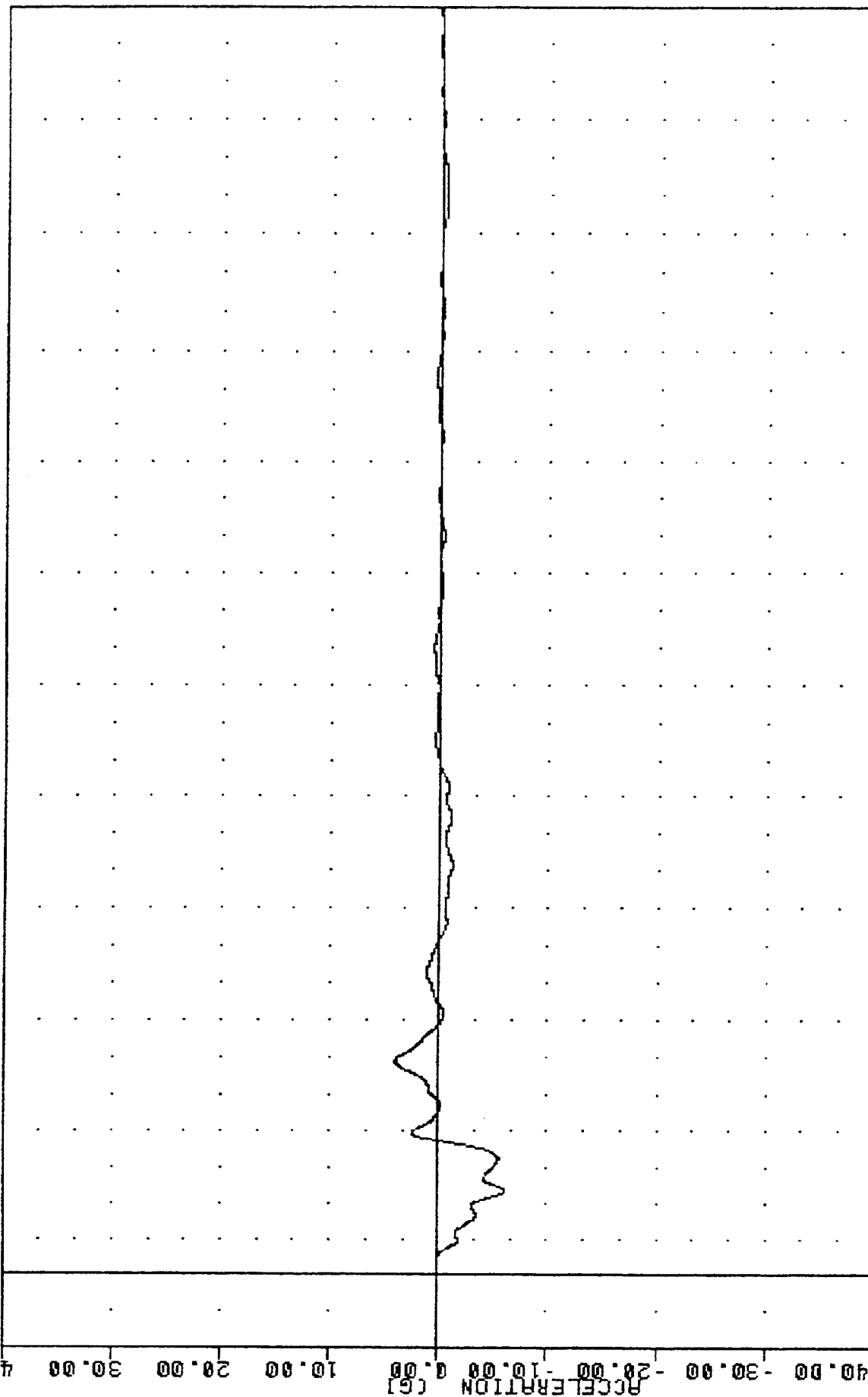
TRC [REDACTED], 830030 [REDACTED] PLOT DATE 10-SEP-85 12:59:56
 MVMA SIDE IMPACT TESTING
 85242000000
 RFOYV4
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -25.78e 24.75, 0.85 e 27.38



-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)
 MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 RIGHT FRONT DOOR (POSITION 4) VELOCITY Y AXIS

TRC [REDACTED], 850830 [REDACTED] PLOT DATE 10-SEP-85 13:00:53
 MVNA SIDE IMPACT TESTING
 85242000000
 LFSXG

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -6.16e 23.75, 3.99 e 58.75



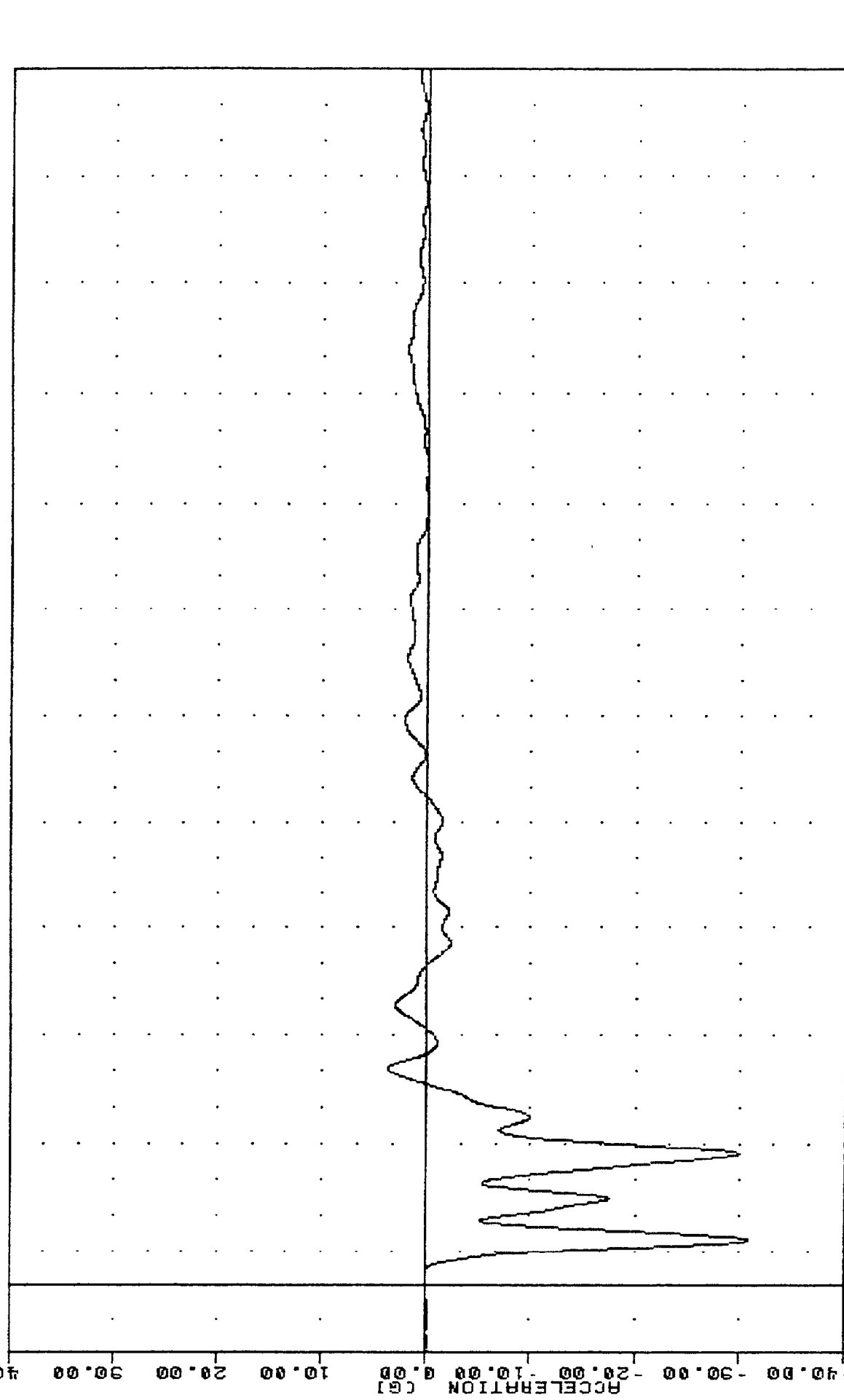
-40.00
-30.00
-20.00
-10.00
0.00
10.00
20.00
30.00
40.00

TIME (MSEC)

100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 VEHICLE LEFT FRONT SILL ACCELERATION X AXIS

ARC, 850830 PLOT DATE 10-SEP-85 13:00:53
MVMA SIDE IMPACT TESTING
85242000000
LFSYB
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -30.95e 13.00, 3.72 e 60.63

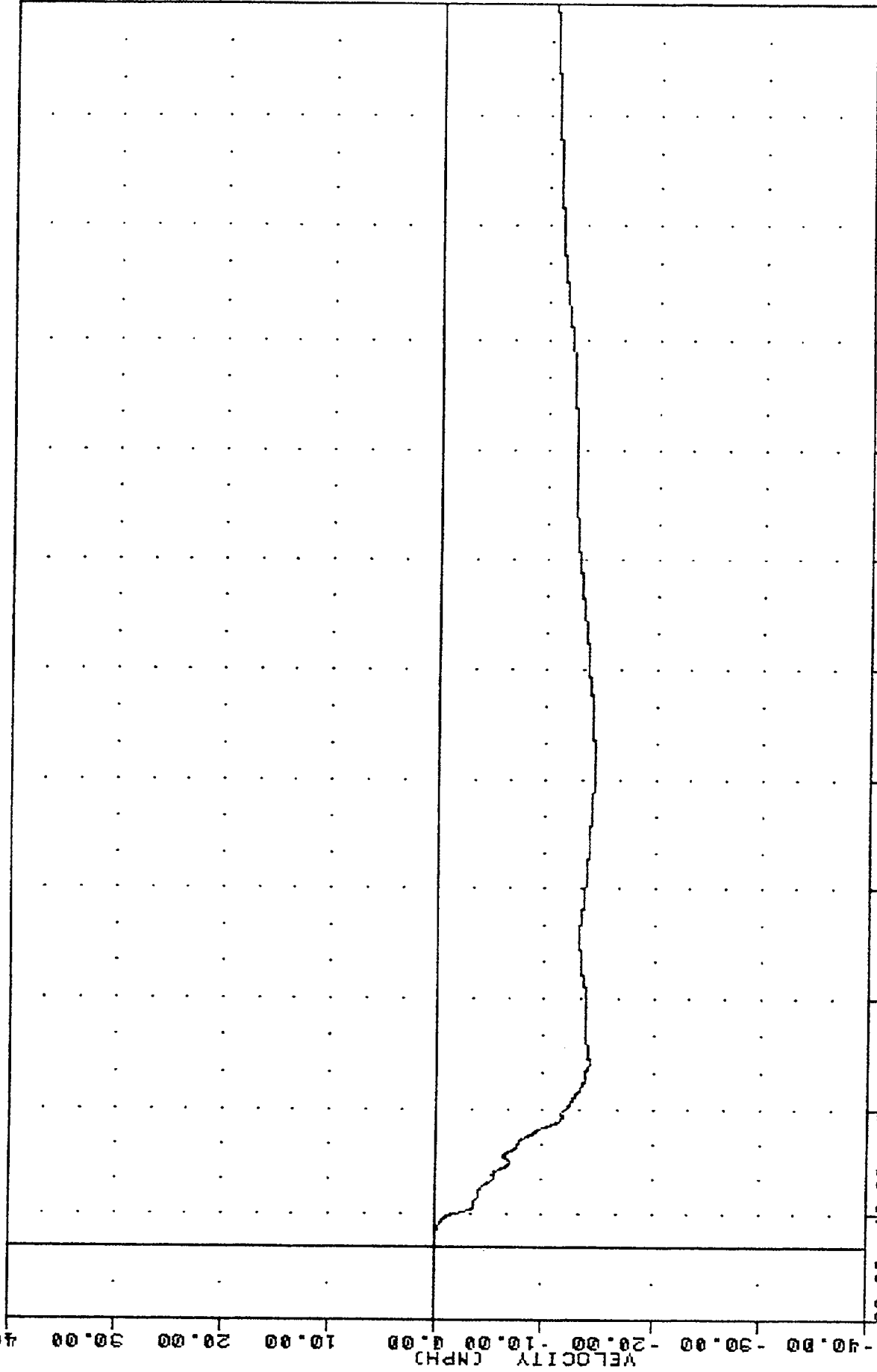


ACCELERATION (CG)
TIME (MSEC)
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS

TRC [REDACTED], [REDACTED]
MYMA SIDE IMPACT TESTING
85242000000
LFSYY

LOT DATE [REDACTED] 10-SEP-85 [REDACTED] 12.38.56

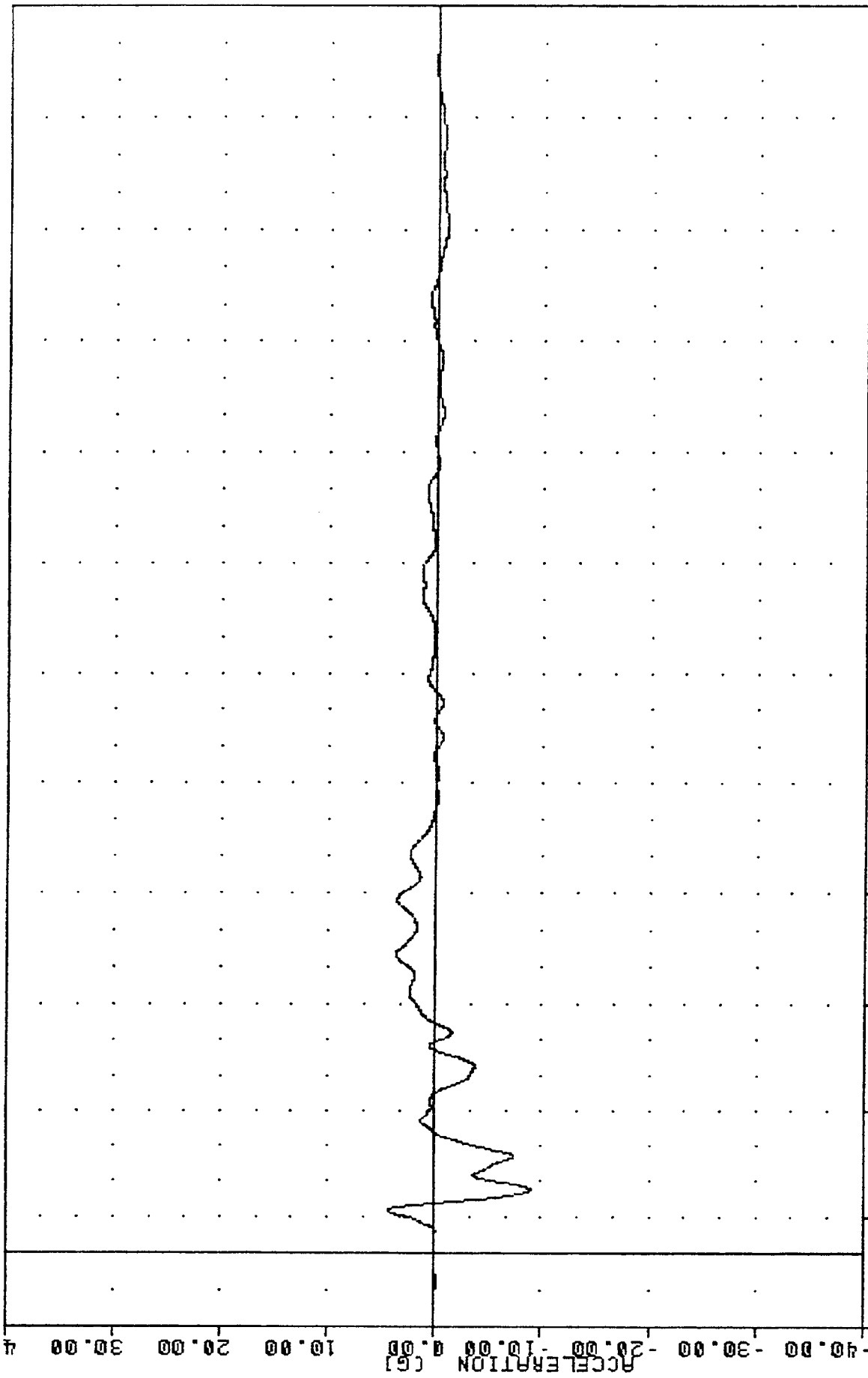
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -14.43e 134.63, 0.00 e -20.00



MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
LEFT FRONT SILL VELOCITY Y AXIS

TRC [REDACTED], 8300830 [REDACTED] PLOT DATE 10-SEP-85 13:00:53
 NVMA SIDE IMPACT TESTING
 85242000000
 LFSZG

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -9.00e 17.50, 4.35 e 11.75



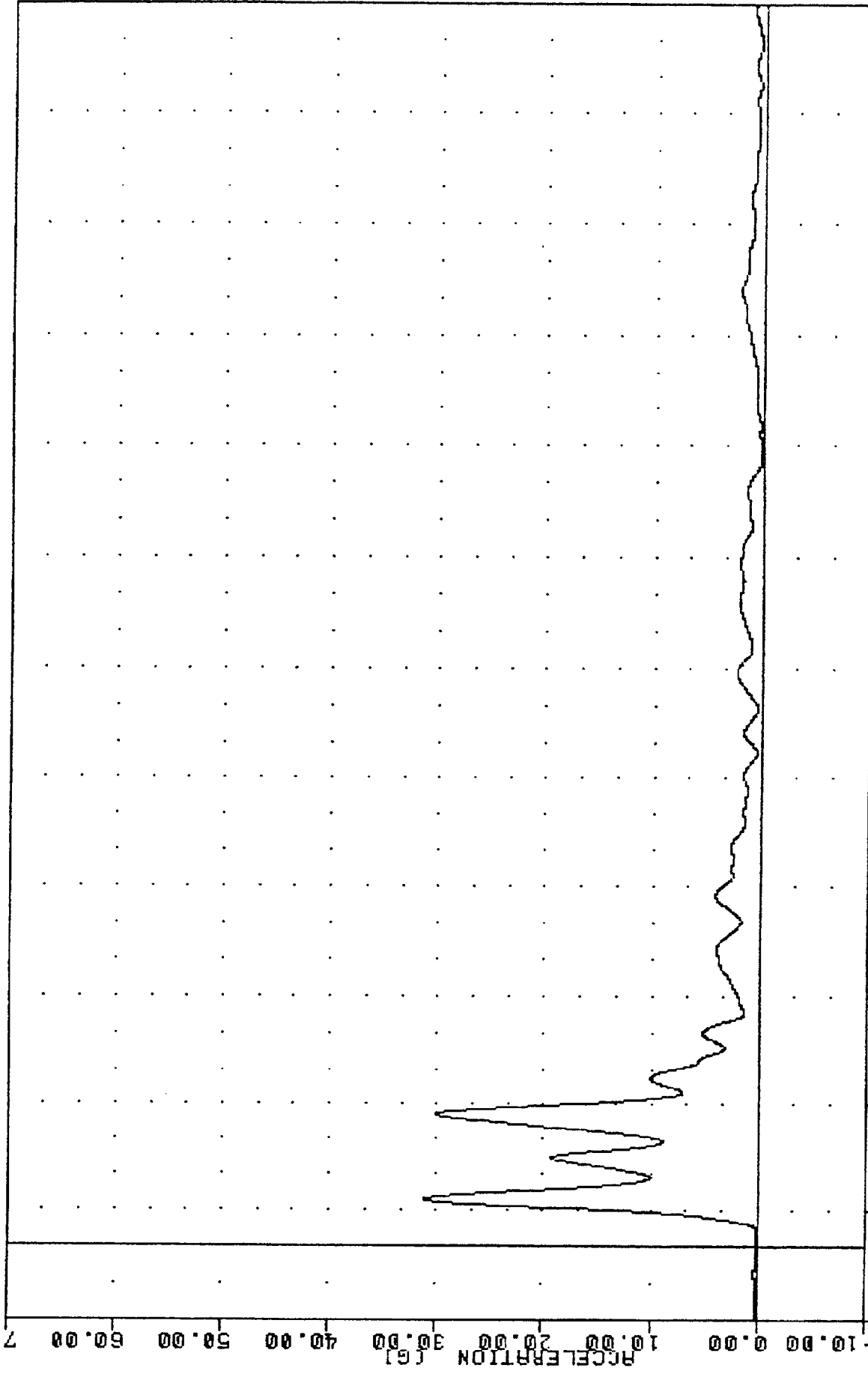
-40.00
 -30.00
 -20.00
 -10.00
 0.00
 10.00
 20.00
 30.00
 40.00
 -20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)

MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 VEHICLE LEFT FRONT SILL ACCELERATION Z AXIS

TRC [REDACTED], 0300.30 [REDACTED] PLOT DATE 10-SEP-85 13:00:53

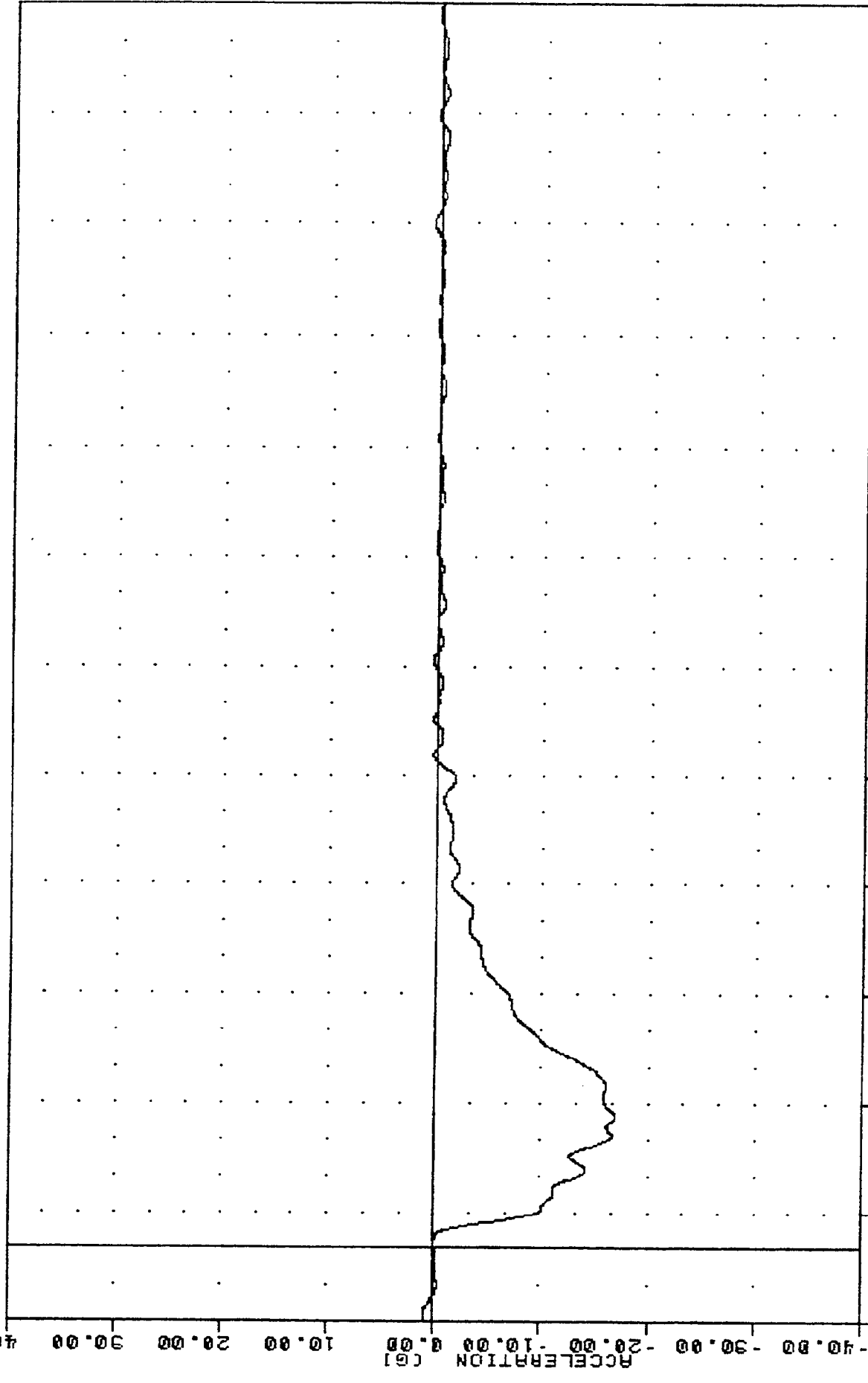
MYNA SIDE IMPACT TESTING
 85242000000
 LFSRG

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = 0.07e 4.75, 31.11 e 13.00



-10.00 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00
 ACCELERATION (G)
 -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)
 MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 VEHICLE LEFT FRONT SILL RESULTANT

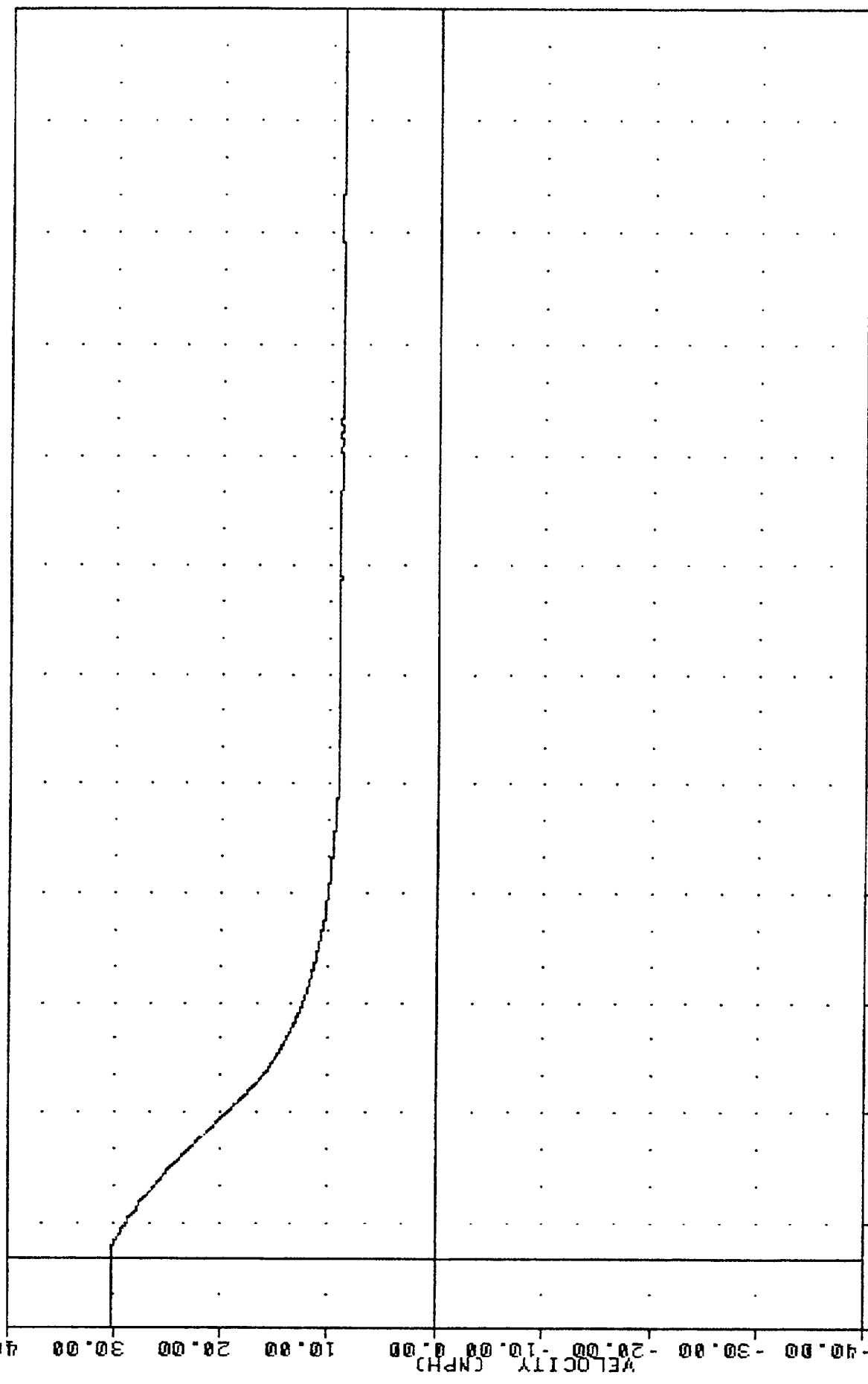
TAC [REDACTED], 830630 [REDACTED] PLOT DATE 10-SEP-85 13:00:53
 MYMA SIDE IMPACT TESTING
 85242000000
 BCGXB
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -16.99e 36.25, 0.90 e -17.75



-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
 ACCELERATION (G)
 TIME (MSEC)
 MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 BARRIER CENTER OF GRAVITY X AXIS

TRC 030330 PLOT DATE 10-SEP-85 12:59:56
 NYMA SIDE IMPACT TESTING
 85242000000
 BCGXV

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 8.85 328.63, 30.15 -16.88



40.00
 30.00
 20.00
 10.00
 0.00
 -10.00
 -20.00
 -30.00
 -40.00

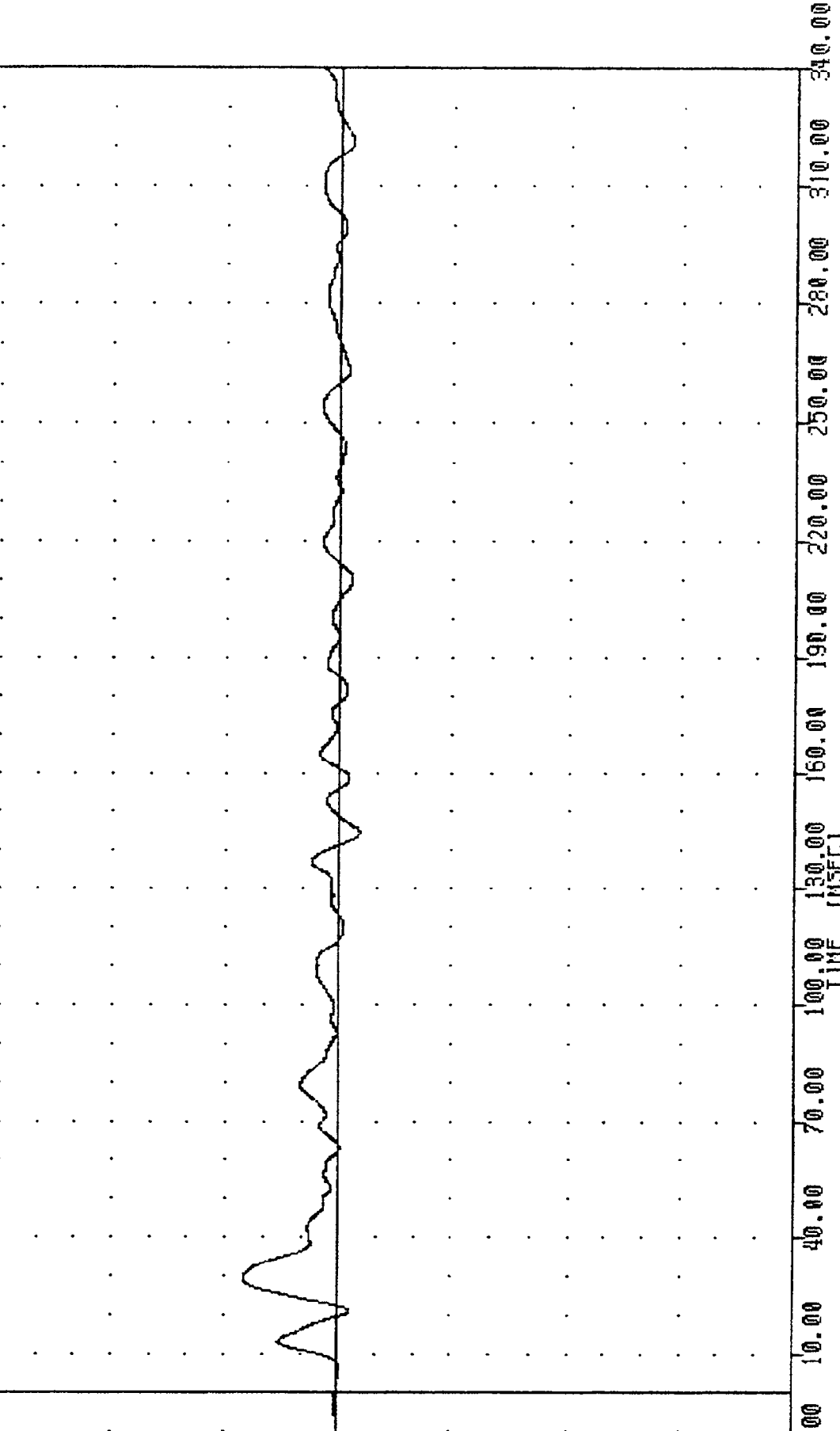
0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

TIME (MSEC)

NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 BARRIER CENTER OF GRAVITY VELOCITY X AXIS

JRC , 850830
 NVMA SIDE IMPACT TESTING
 85242000000
 BCGYG

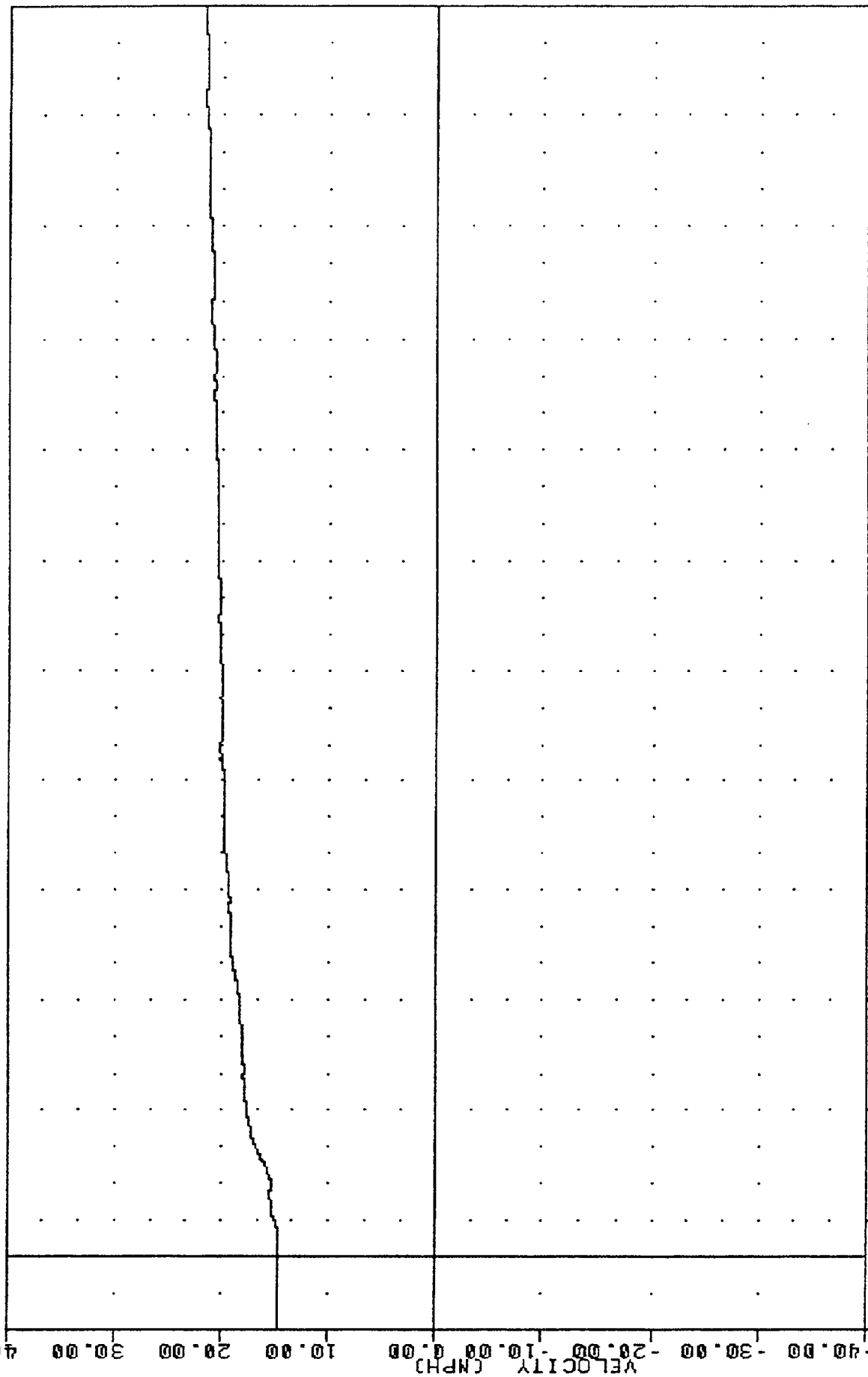
PLOT DATE 10-SEP-85 13:00:53
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -1.77e 144.50, 8.40 e 29.13



2.71

MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 BARRIER CENTER OF GRAVITY Y AXIS

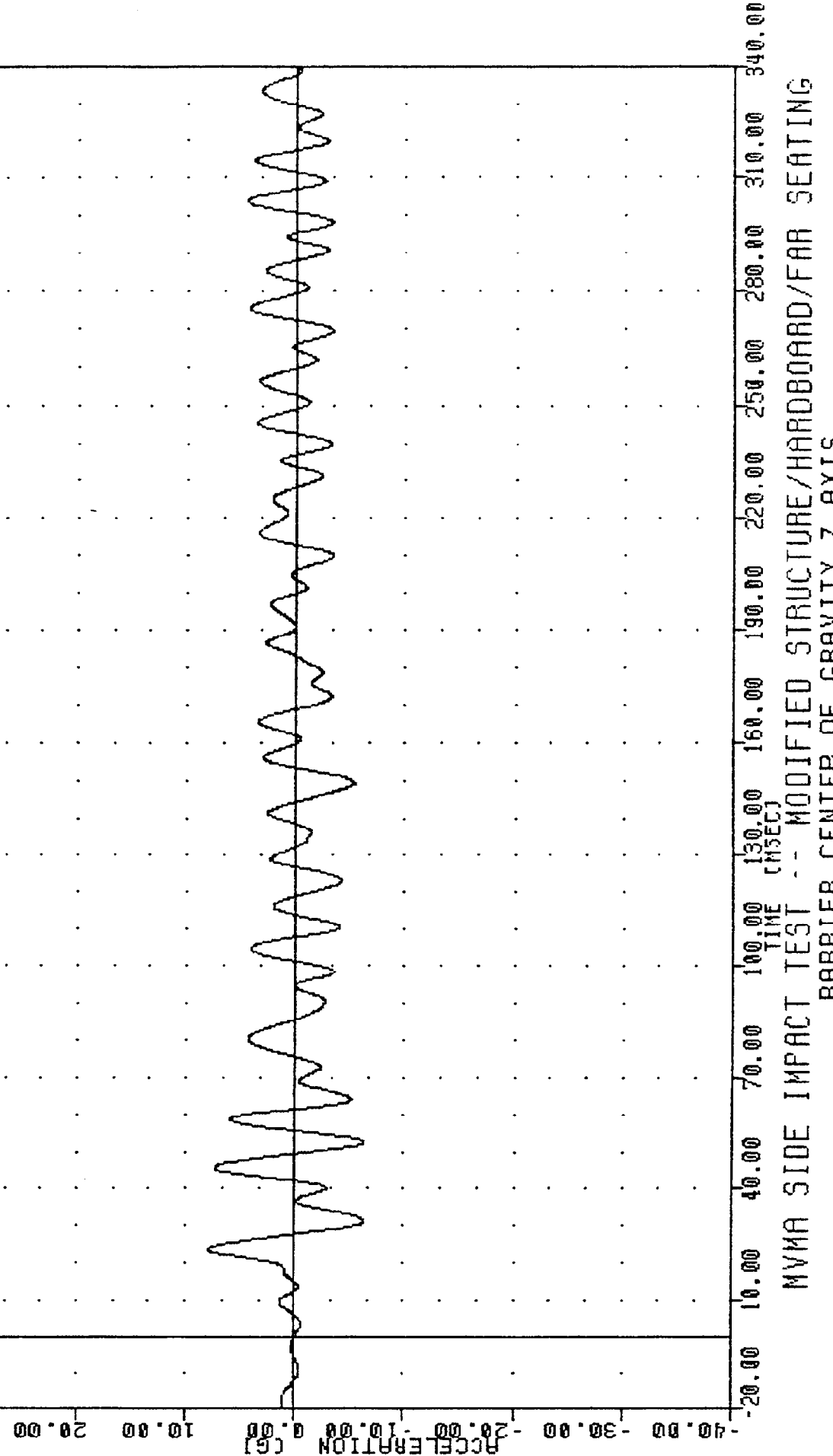
TRC [REDACTED], 850830 [REDACTED] PLOT DATE 10-SEP-85 12:59:56
 MVNA SIDE IMPACT TESTING
 85242000000
 BCGYV
 FILTER = 8LPF 300/ 919/ -10
 MIN. MAX VALUES = 14.70e -20.00, 21.80 e 340.00



-40.00
 -30.00
 -20.00
 -10.00
 0.00
 10.00
 20.00
 30.00
 40.00
 -20.00 10.00 40.00 70.00 100.00 130.00 150.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 BARRIER CENTER OF GRAVITY VELOCITY Y AXIS

TRC [REDACTED], 850830 [REDACTED]
 MYNA SIDE IMPACT TESTING
 85242000000
 BCGZG

PLOT DATE 10-SEP-85 13:00:53
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -6.41e 52.50, 7.88 e 23.63

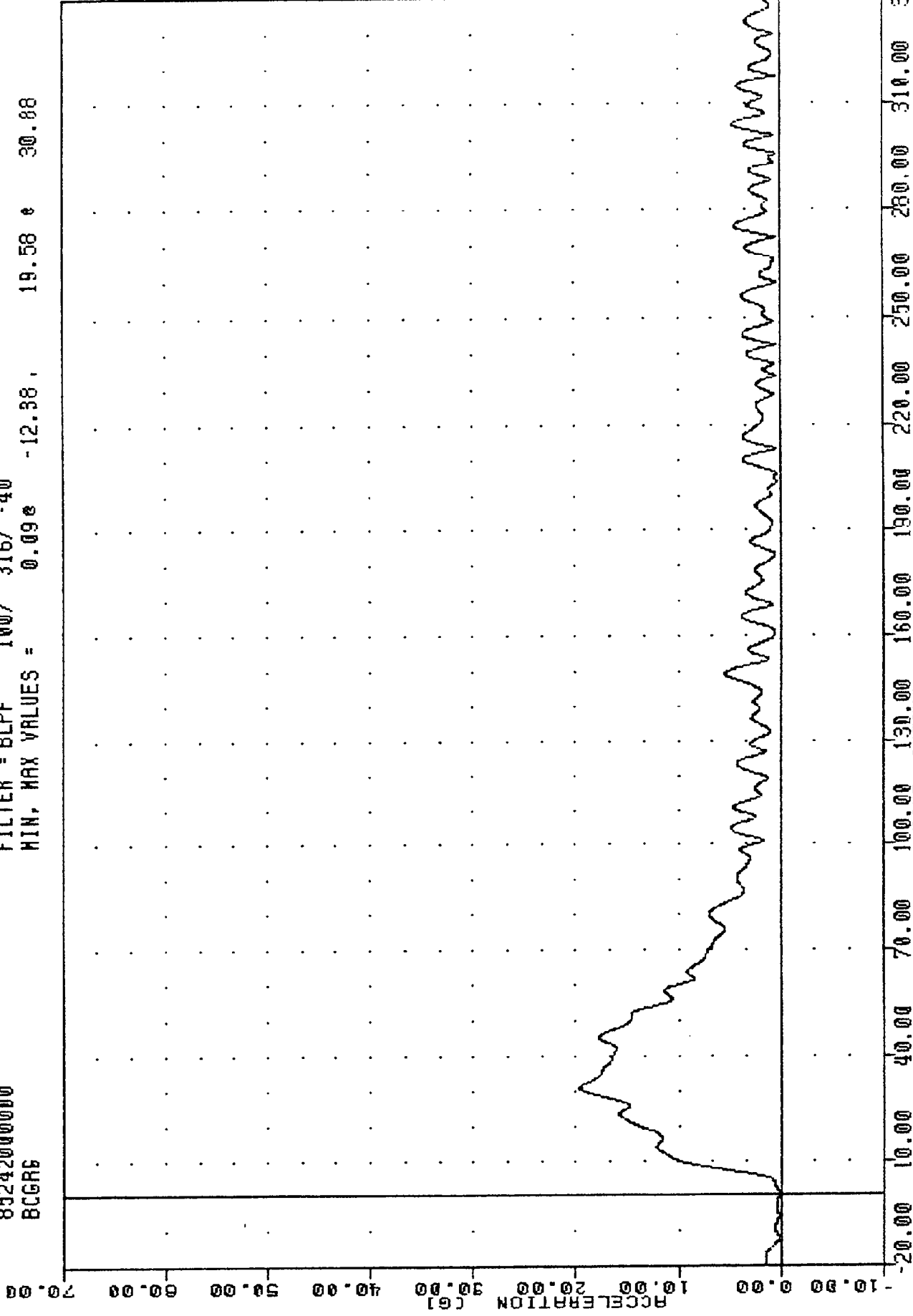


MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 BARRIER CENTER OF GRAVITY Z AXIS

TAC , 850830
MYMA SIDE IMPACT TESTING
85242000000
BCGR6

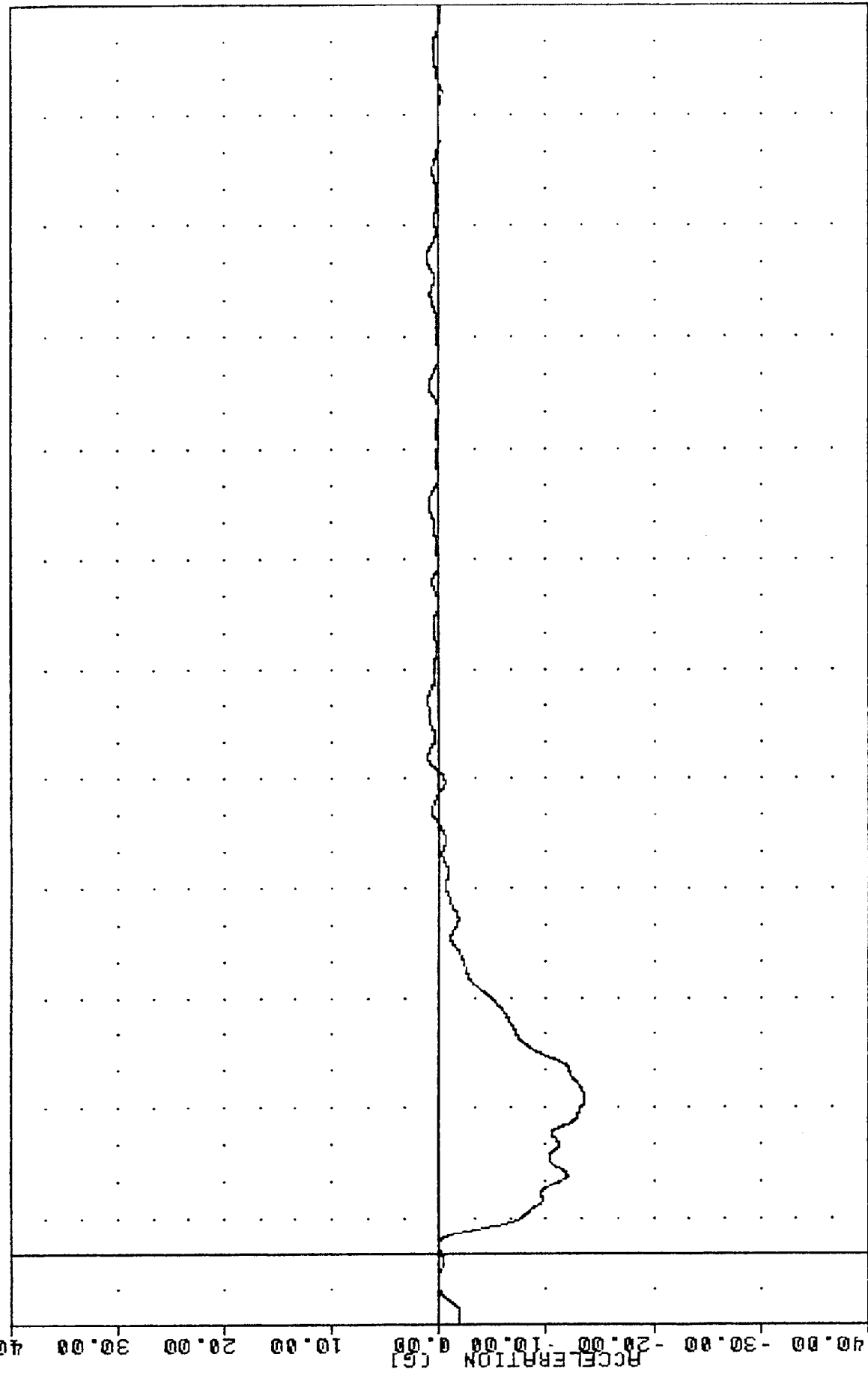
PLOT DATE 10-SEP-85 13:00:53

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = 0.09e -12.38, 19.58 e 30.88



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY RESULTANT ACCELERATION

TRC 850830
 NYMA SIDE IMPACT TESTING
 85242000000
 BRXG
 PLOT DATE 30-SEP-85 13:42:44
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -13.53% 42.50, 1.19 & 271.38

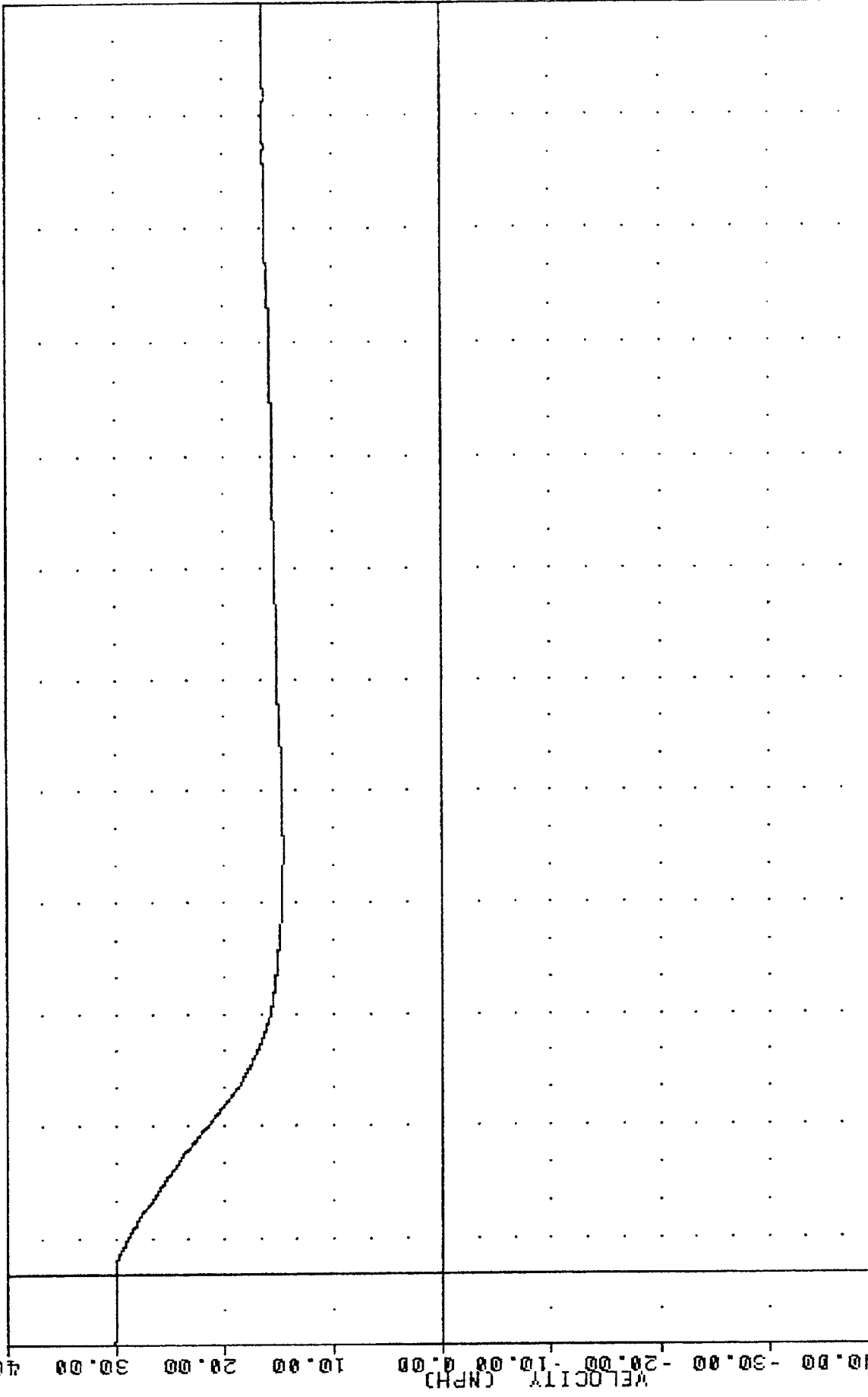


-40.00
 -30.00
 -20.00
 -10.00
 0.00
 10.00
 20.00
 30.00
 40.00
 ACCELERATION (G)

-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)

NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 BARRIER REAR CROSSMEMBER ACCELERATION X AXIS

TRC 850830 PLOT DATE 30-SEP-85 13:42:59
 NYMA SIDE IMPACT TESTING FILTER = BLPF 300/ 949/ -40
 85242000000 MIN, MAX VALUES = 14.55 116.25 30.10 20.00
 BRXY



-40.00
-30.00
-20.00
-10.00
0.00
10.00
20.00
30.00
40.00

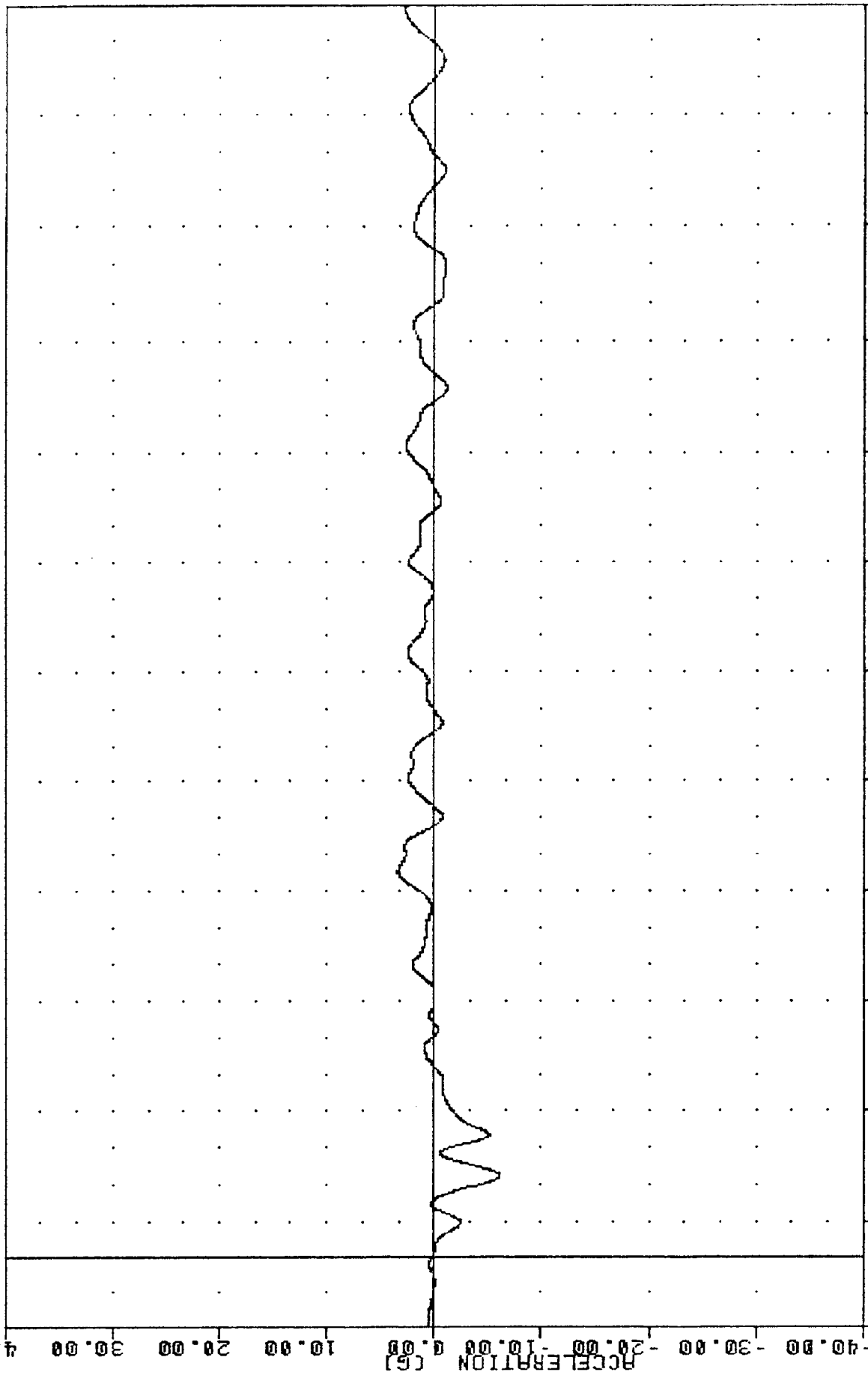
TIME (MSEC)

100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 BARRIER REAR CROSSMEMBER VELOCITY X AXIS

TRC
 850830
 MYNA SIDE IMPACT TESTING
 8524200000
 BRCYG

PLOT DATE 30-SEP-85 13:42:44
 FILTER = 8LPF 100/ 316/ -40
 MIN. MAX VALUES = -6.19e 22.50, 3.34 e 105.13



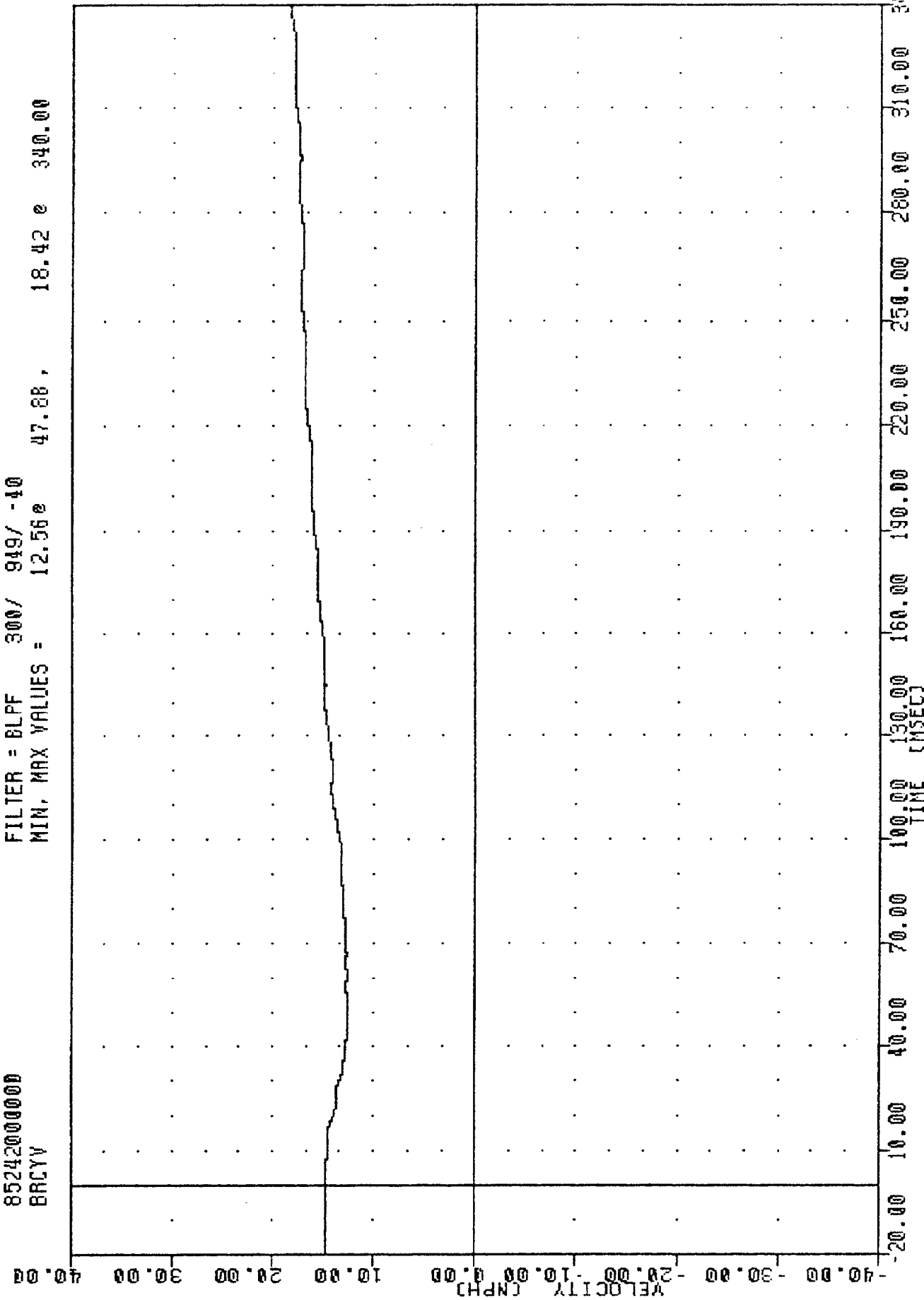
-40.00
 -30.00
 -20.00
 -10.00
 0.00
 10.00
 20.00
 30.00
 40.00

-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)

MYNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 BARRIER REAR CROSSMEMBER ACCELERATION Y AXIS

TRC 850830 PLOT DATE 30-SEP-85 13:42:59
 MVNA SIDE IMPACT TESTING
 85242000000
 BRCYV
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 12.56e 47.68 , 18.42 e 340.00



MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 BARRIER REAR CROSSMEMBER VELOCITY Y AXIS

APPENDIX B
DUMMY CERTIFICATION

PRE-TEST

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:

TRC Personnel

Checked By:

Gregg Wilks
Signature

12 Aug. 85
Date

VRTC Personnel

Checked and Approved for Testing By:

Signature

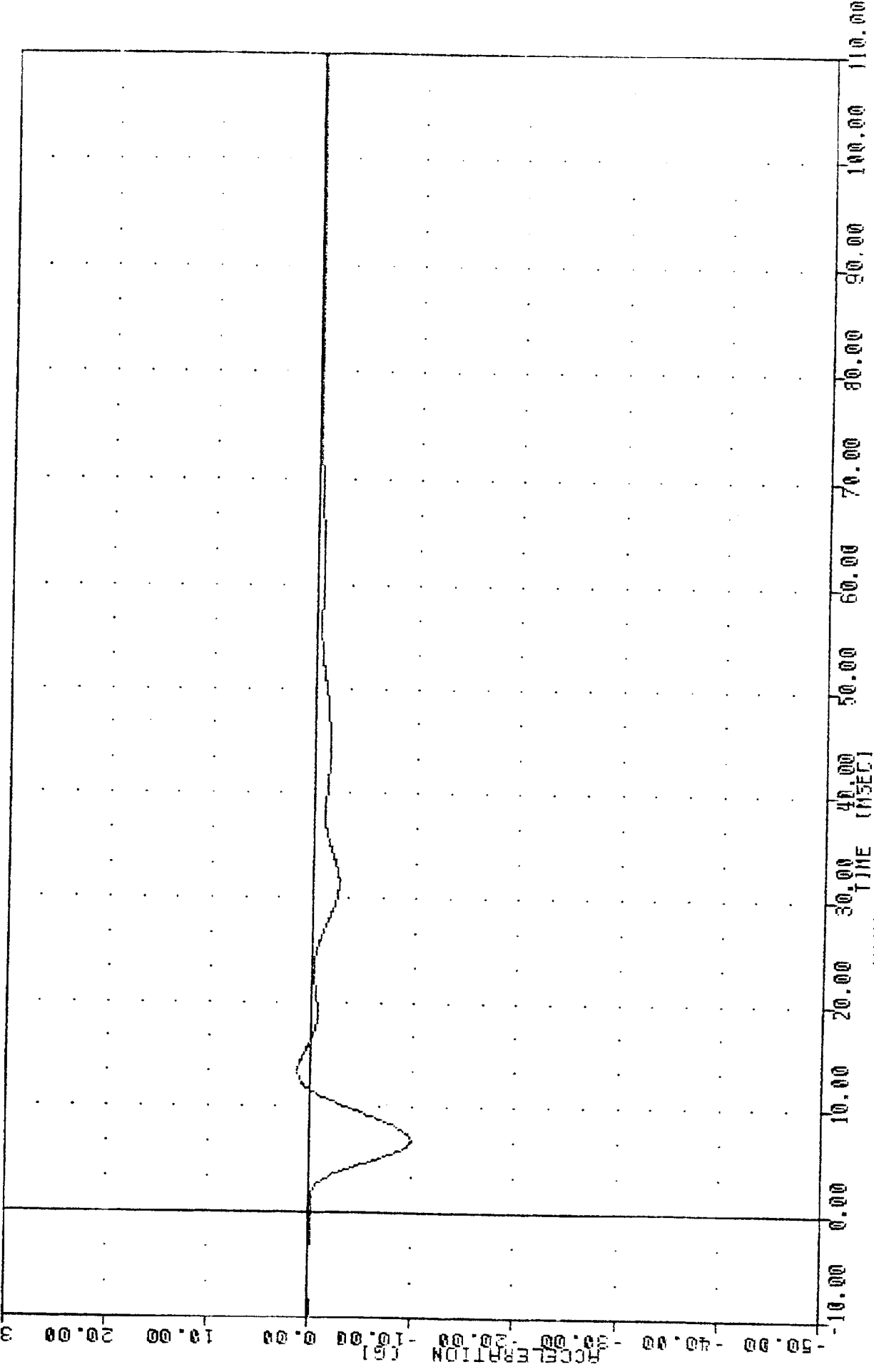
Date

SIDE IMPACT DUMMY CALIBRATION
 DUMMY SERIAL NUMBER 119
 CALIBRATION 08

| TEST/ DATE | CHANNEL | FILTER CLASS | PEAK ACCELERATION (g) SPECIFICATION* | TEST RESULT |
|-------------------|------------------------|-----------------|-----------------------------------------|-------------|
| HEAD 8/23/85 | HEAD Y-AXIS | 1000 | 150-175 | 161.99 |
| THORAX 8/29/85 | UPPER SPINE Y-AXIS | | | |
| | PRIMARY | 180 | 16-24.6 | 23.22 |
| | REDUNDANT | 180 | 16-24.6 | 23.00 |
| | LOWER SPINE Y-AXIS | | | |
| | PRIMARY | 180 | 17.6-26.4 | 18.85 |
| | REDUNDANT | 180 | 17.6-26.4 | 18.98 |
| | RIGHT UPPER RIB Y-AXIS | | | |
| | PRIMARY | 180 | 36-50 | 44.06 |
| REDUNDANT | 180 | 36-50 | 43.62 | |
| | RIGHT LOWER RIB Y-AXIS | | | |
| | PRIMARY | 180 | 36-50 | 45.49 |
| | REDUNDANT | 180 | 36-50 | 45.00 |
| PELVIS 8/23/85 | PELVIS Y-AXIS | 180 | 50-65 | 61.24 |

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

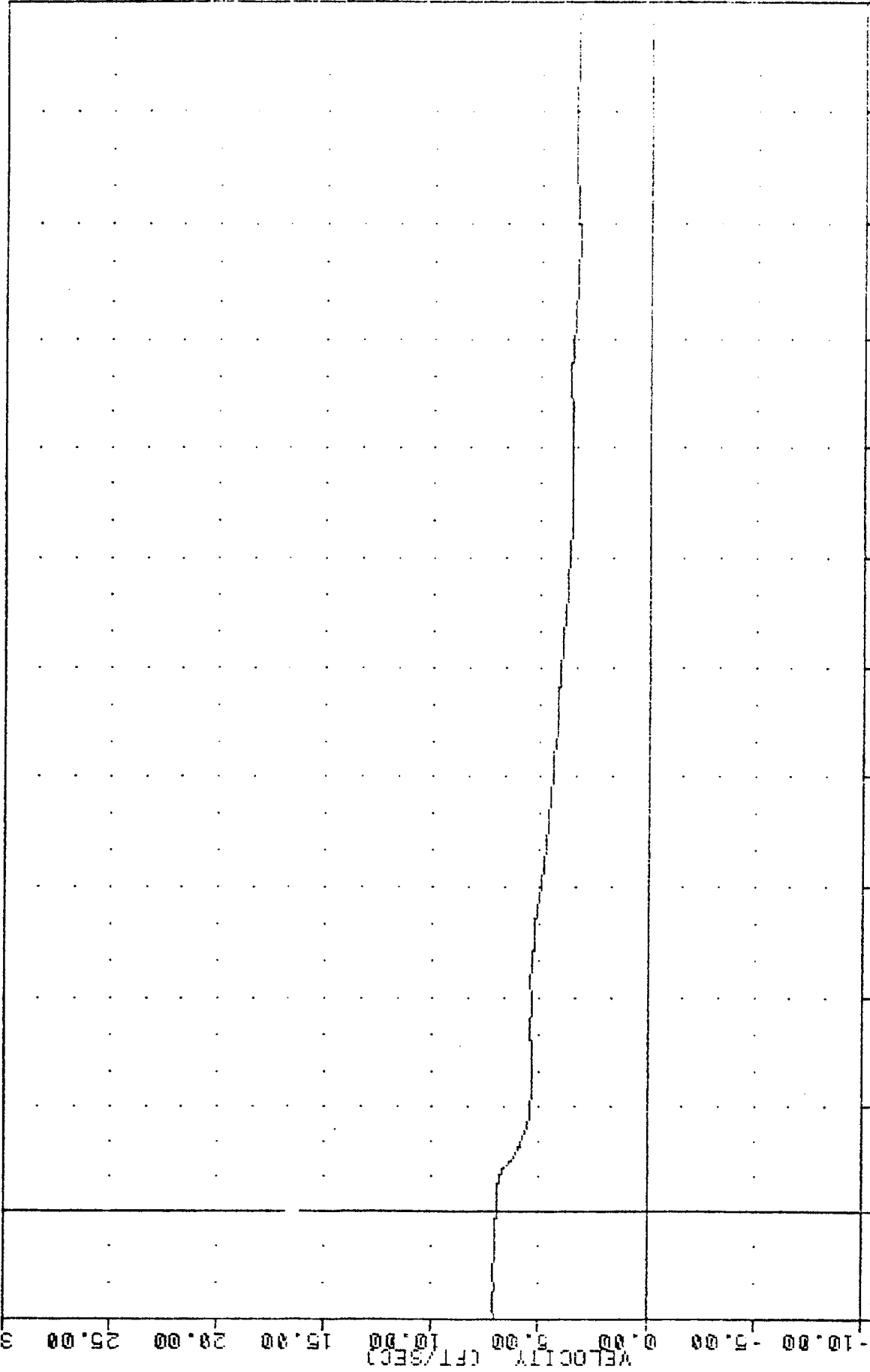
85235
 PISXG
 SH11908
 23 AUG 68
 6:56
 1.25 e 13.38
 6.88
 316 / -40
 -9.85 B
 FILTER = 6LPF
 MIN. MAX VALUES =



MYMA SIDE IMPACT DUMMY CALIBRATION
 PISTON ACCELERATION

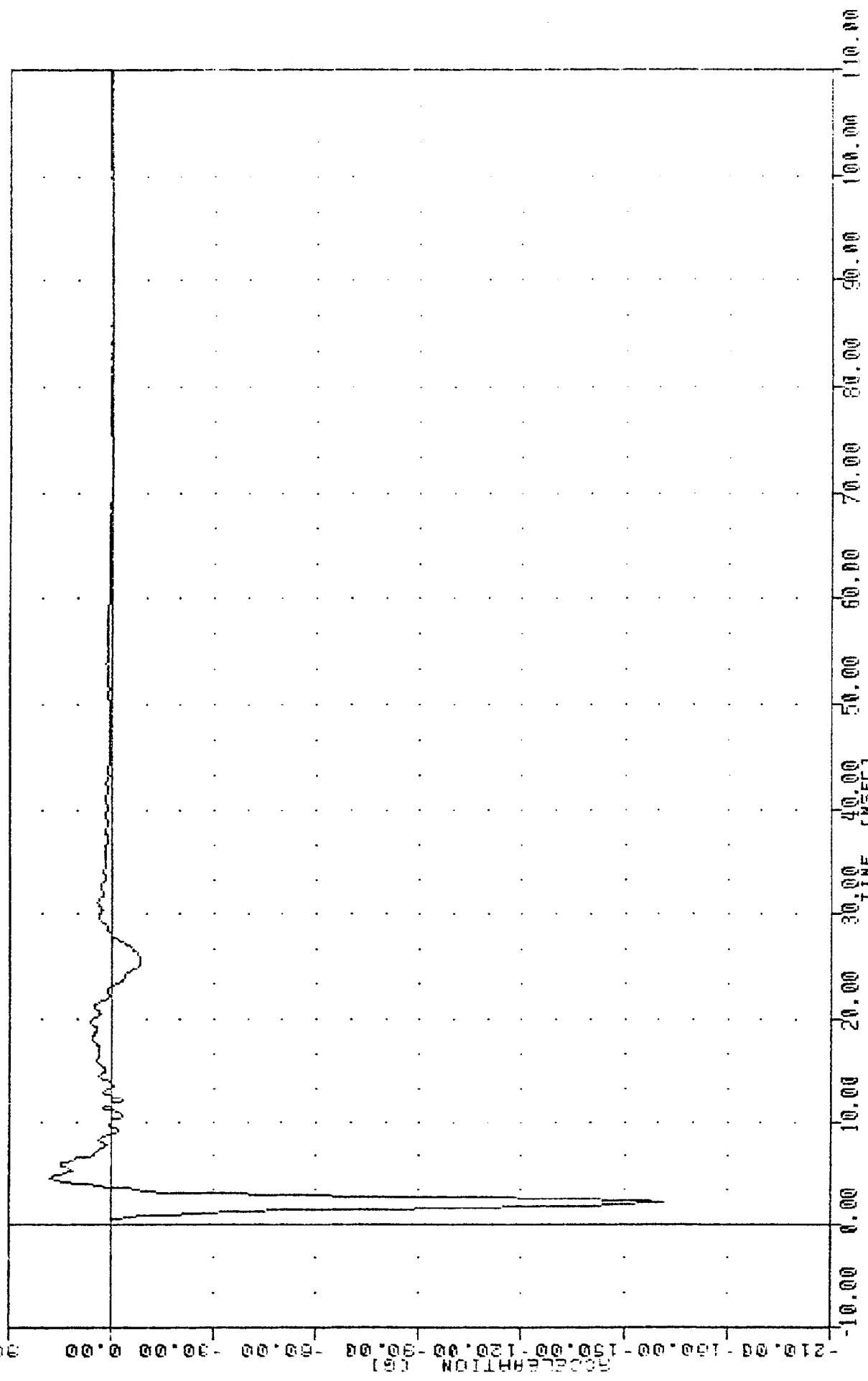
MVMA 1300 FLO... 23...-8...:56
 SID 119 HEAD IMPACT CAL 00
 85235
 PISXY

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 3.25e 88.75, 7.14 e -6.00



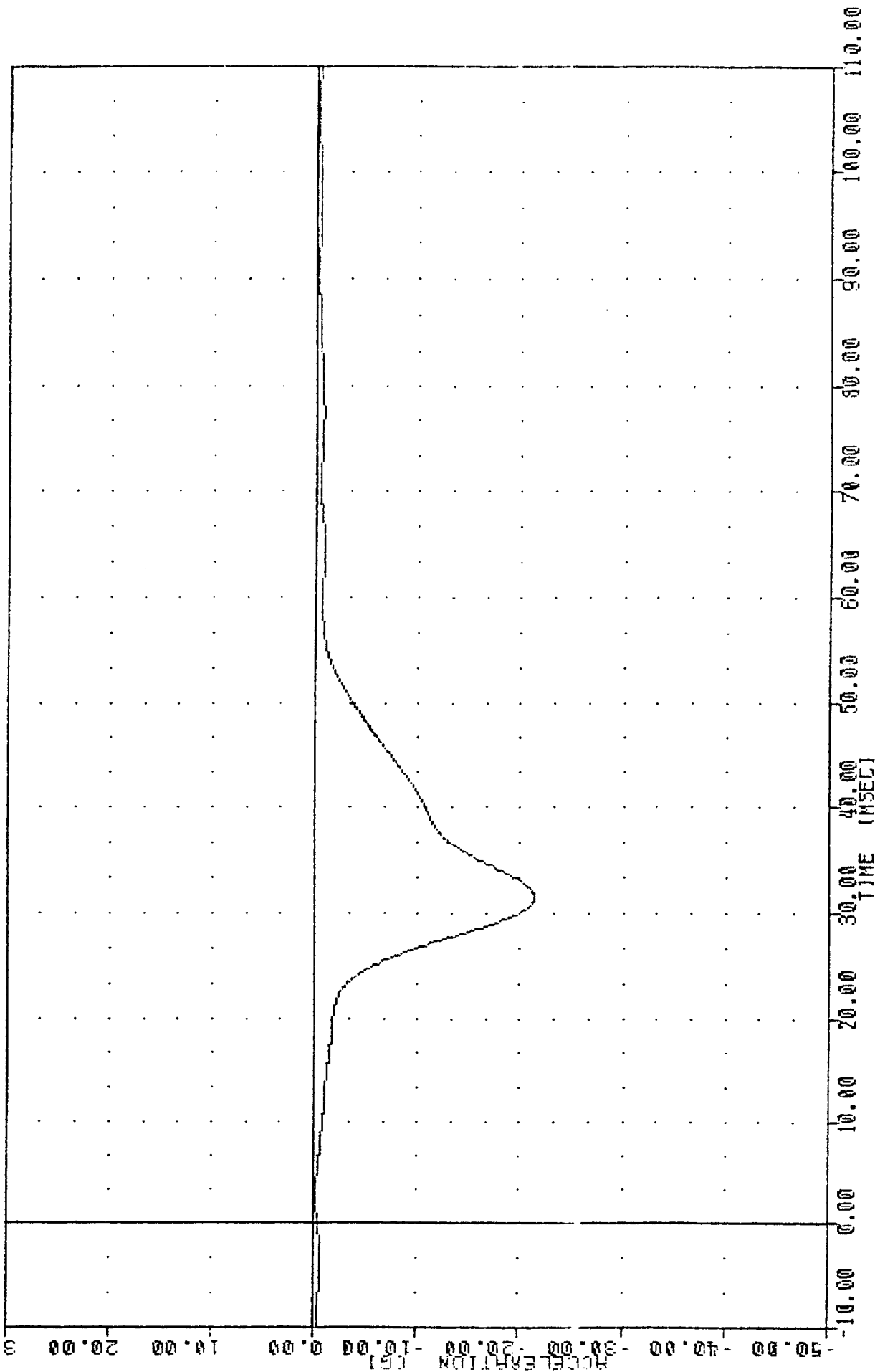
-10.00 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00
 TIME (MSEC)
 MVMA SIDE IMPACT DUMMY CALIBRATION
 PISTON VELOCITY

MVM, 5008, 23-85, 56
 SID 119 HEAD IMPACT CAL DB
 85235
 HEDY6
 FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -161.99 2.13, 17.77 4.38



MVM SIDE IMPACT DUMMY CALIBRATION
 HEAD ACCELERATION Y AXIS

DVTM 130-14014500 28-NOV-89 08:07:14
 85241 130-14014500 IMPACT CR 08
 FILTER = BLPF 100/ 3167 -40
 MIN, MAX VALUES = -21.41e 31.50, -0.17 e 2.88



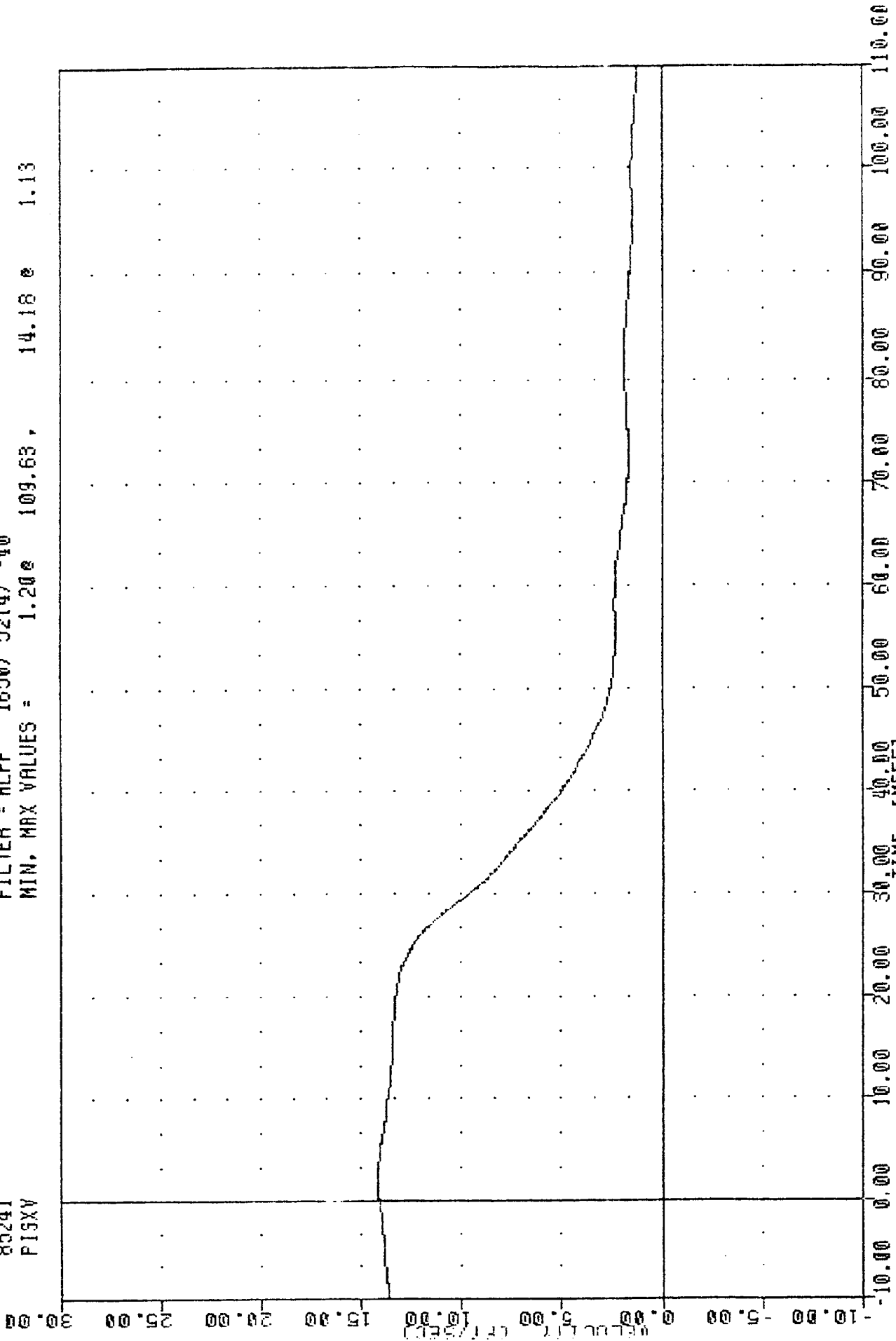
MVMA SIDE IMPACT DUMMY CALIBRATION
 PISTON ACCELERATION

MVMA
SID 119 THORAX IMPACT CAL 08
85241
PI5XY

PLOT DATE 29-AUG-85

09:57:17

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 1.20e 109.63 , 14.18 e 1.13



MVMA SIDE IMPACT DUMMY CALIBRATION
PISTON VELOCITY

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK PENDULUM TEST

PART 572

18-SEP-85

TEMPERATURE 69.00 F
MVMA HN11902

RELATIVE HUMIDITY 69.00 %
572 SN 119 HEAD/NECK CAL 02

| Test Parameter | Specification | Test Results |
|---------------------------|------------------|--------------|
| Pendulum velocity | 21.5 to 25.5 fps | 22.60 fps |
| Pendulum Deceleration: | | |
| T1 - T2: 5 - 20 G | 3 ms. max | 1.97 ms. |
| T2 - T3: 20 - 20 G | 25 - 30 ms. | 27.46 ms. |
| T3 - T4: 20 - 5 G | 10 ms. max | 6.51 ms. |
| Avg. G level T2 - T3 | 20 - 24 G | 22.58 G |
| Maximum Rotation Angle | 63 - 73 des. | 64.55 des. |
| Peak Head Resultant Accel | 26 G max | 21.06 G |

| Test Parameter | Specification | | Test Results | |
|-----------------------------|---------------|------------------------|---------------|------------------------|
| Rotation Angle (degrees) | Time (ms.) | Chordal Disp. (in.) | Time (ms.) | Chordal Disp. (in.) |
| 0 | -2.0 - +2.0 | -0.5 - +0.5 | 0.13 | 0.01 |
| 30 | 25.6 - 34.4 | 2.1 - 3.1 | 29.74 | 2.52 |
| 60 | 40.3 - 51.7 | 4.3 - 5.3 | 48.31 | 4.84 |
| max | 53.2 - 66.8 | 5.0 - 6.0 | 58.25 | 5.34 |
| 60 | 67.0 - 83.0 | 4.3 - 5.3 | 68.99 | 4.93 |
| 30 | 85.4 - 104.6 | 2.1 - 3.1 | 90.36 | 2.35 |
| 0 | 101.0 - 123.0 | -0.5 - +0.5 | 105.12 | 0.16 |

* DUMMY MEETS SPECIFICATIONS

TECHNICIAN Mary S. Phelps

TEST SUPERVISOR V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

18-SEP-85

TEMPERATURE 68 F
MVMA TL11902

RELATIVE HUMIDITY 67 %
572 SN 119 L.S.THORAX CAL 02

| LOW SPEED TEST | | |
|----------------------|--------------------|--------------|
| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
| PENDULUM VELOCITY | 13.86-14.14 FT/SEC | 14.14 FT/SEC |
| PEAK DEFLECTION | 1.1 INCHES MAX. | 1.00 INCHES |
| PEAK RESISTIVE FORCE | 1,450. POUNDS MAX. | 1354. POUNDS |
| INTERNAL HYSTERESIS | 50% - 70% | 61.6% |

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Ray S. Phelps

TEST SUPERVISOR V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

18-SEP-85

TEMPERATURE 68 F
MVMA TH11902

RELATIVE HUMIDITY 68 %
572 SN 119 H.S. THORAX CAL 02

| HIGH SPEED TEST | | |
|----------------------|--------------------|--------------|
| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
| PENDULUM VELOCITY | 21.78-22.22 FT/SEC | 22.22 FT/SEC |
| PEAK DEFLECTION | 1.7 INCHES MAX. | 1.48 INCHES |
| PEAK RESISTIVE FORCE | 2,250. POUNDS MAX. | 2111. POUNDS |
| INTERNAL HYSTERESIS | 50% - 70% | 62.7% |

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Harry S. Phelps

TEST SUPERVISOR V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

18-SEP-85

TEMPERATURE 68 F
LEFT KNEE
MVMA LK11902

RELATIVE HUMIDITY 68 %
572 SN 119 L.KNEE IMP CAL 02

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|--------------------------|--------------------|--------------|
| PROBE VELOCITY | 6.76 - 7.04 FT/SEC | 6.90 FT/SEC |
| PEAK KNEE IMPACT FORCE | 1850 - 2500 LBS. | 2117.51 LBS. |
| DURATION ABOVE 1000 LBS. | ≥ 1.7 MS. | 1.77 MS. |

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Harry L. Phelps*

TEST SUPERVISOR *V.L. Walters*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

18-SEP-85

TEMPERATURE 68 F
RIGHT KNEE
MUMA RK11902

RELATIVE HUMIDITY 68 %
572 SN 119 R.KNEE IMP CAL 02

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|--------------------------|--------------------|--------------|
| PROBE VELOCITY | 6.76 - 7.04 FT/SEC | 6.90 FT/SEC |
| PEAK KNEE IMPACT FORCE | 1850 - 2500 LBS. | 2039.53 LBS. |
| DURATION ABOVE 1000 LBS. | ≥ 1.7 MS. | 1.81 MS. |

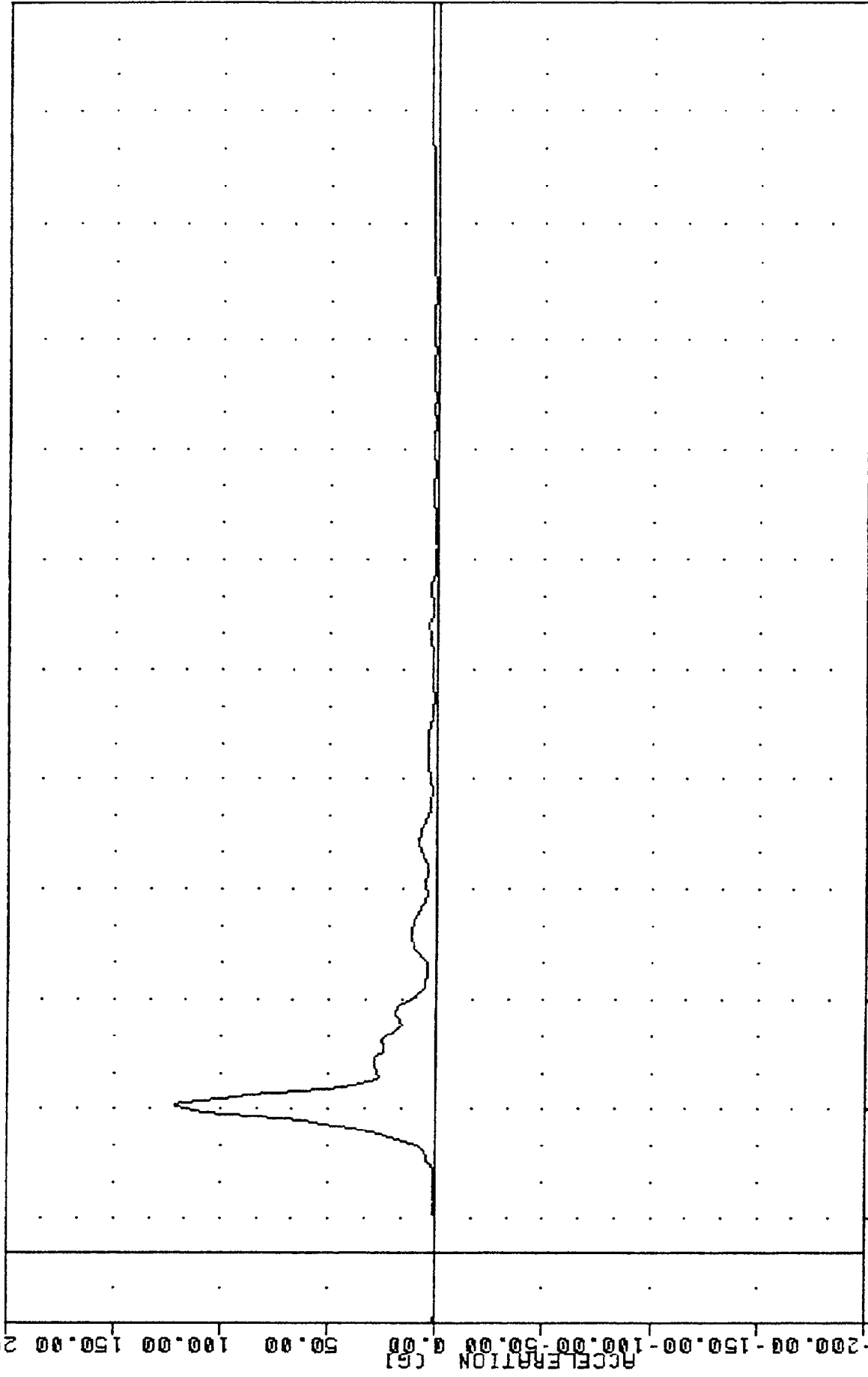
DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Harry S. Phelps*

TEST SUPERVISOR *V.L. Walters*

TR0 30 PLO DATE 10 SET-85 12:39:08
 MYNA SIDE IMPACT TESTING
 85242000000
 T12RG2

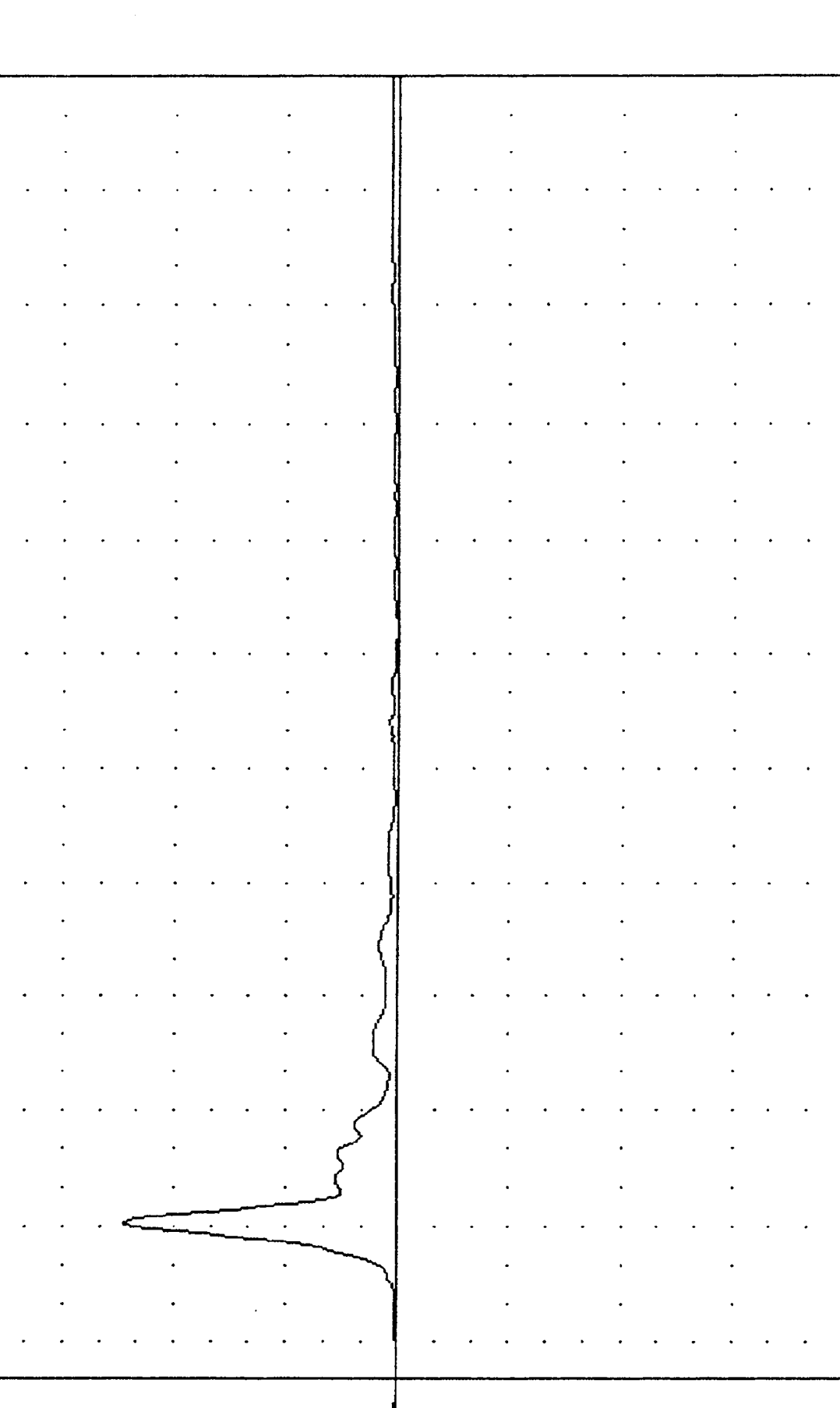
FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.14e -13.75, 121.12 e 41.25



-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 -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER LOWER SPINE RESULTANT ACCELERATION

TAC 85242000000
 MVMA SIDE IMPACT TESTING
 85242000000
 T12R6B

PLOT DATE 10-SEP-85 12:53:08
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.12 6.25 122.22 40.63

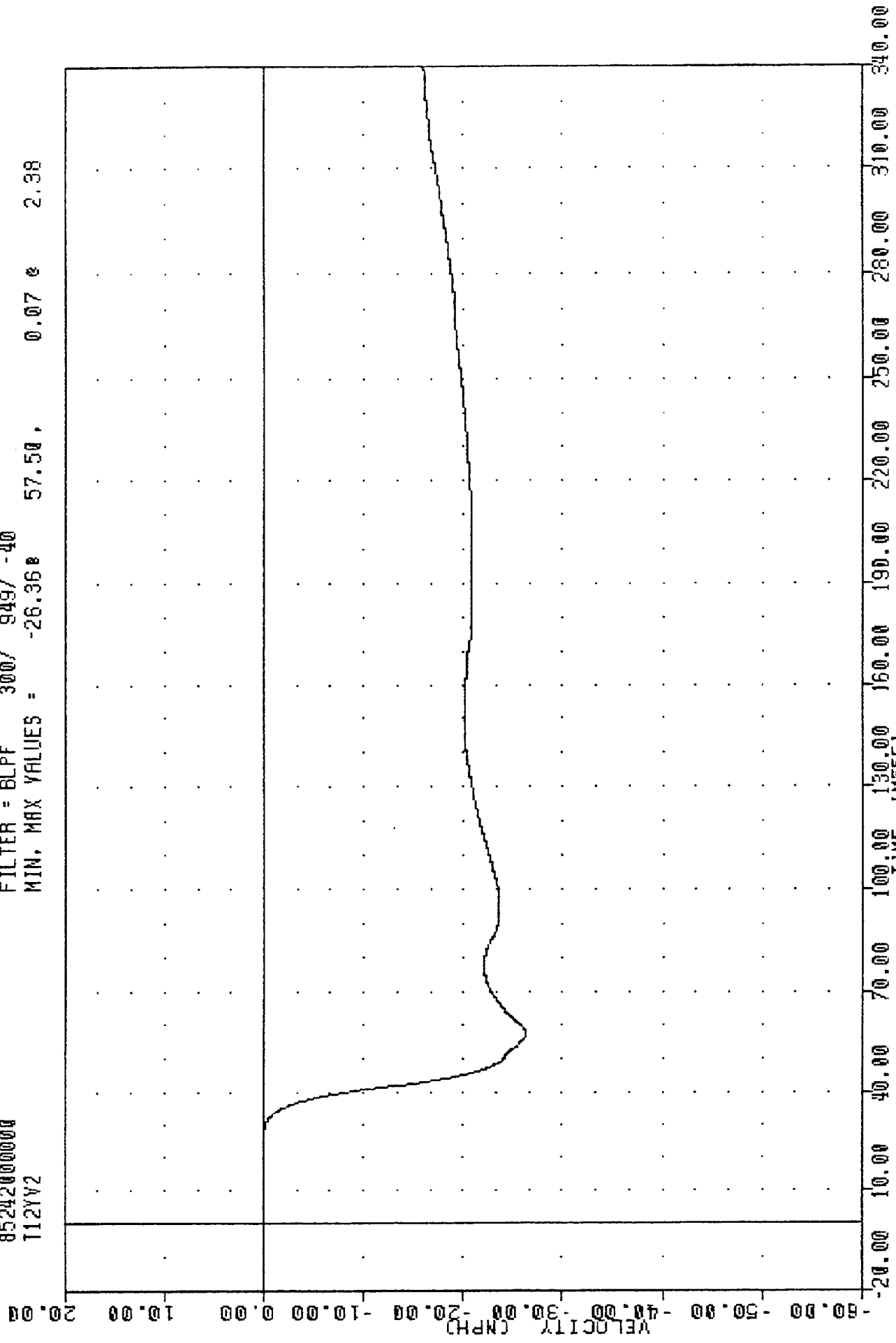


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER LOWER SPINE RESULTANT ACCELERATION #2

RC 830
 NVMA SIDE IMPACT TESTING
 85242000000
 T12YV2

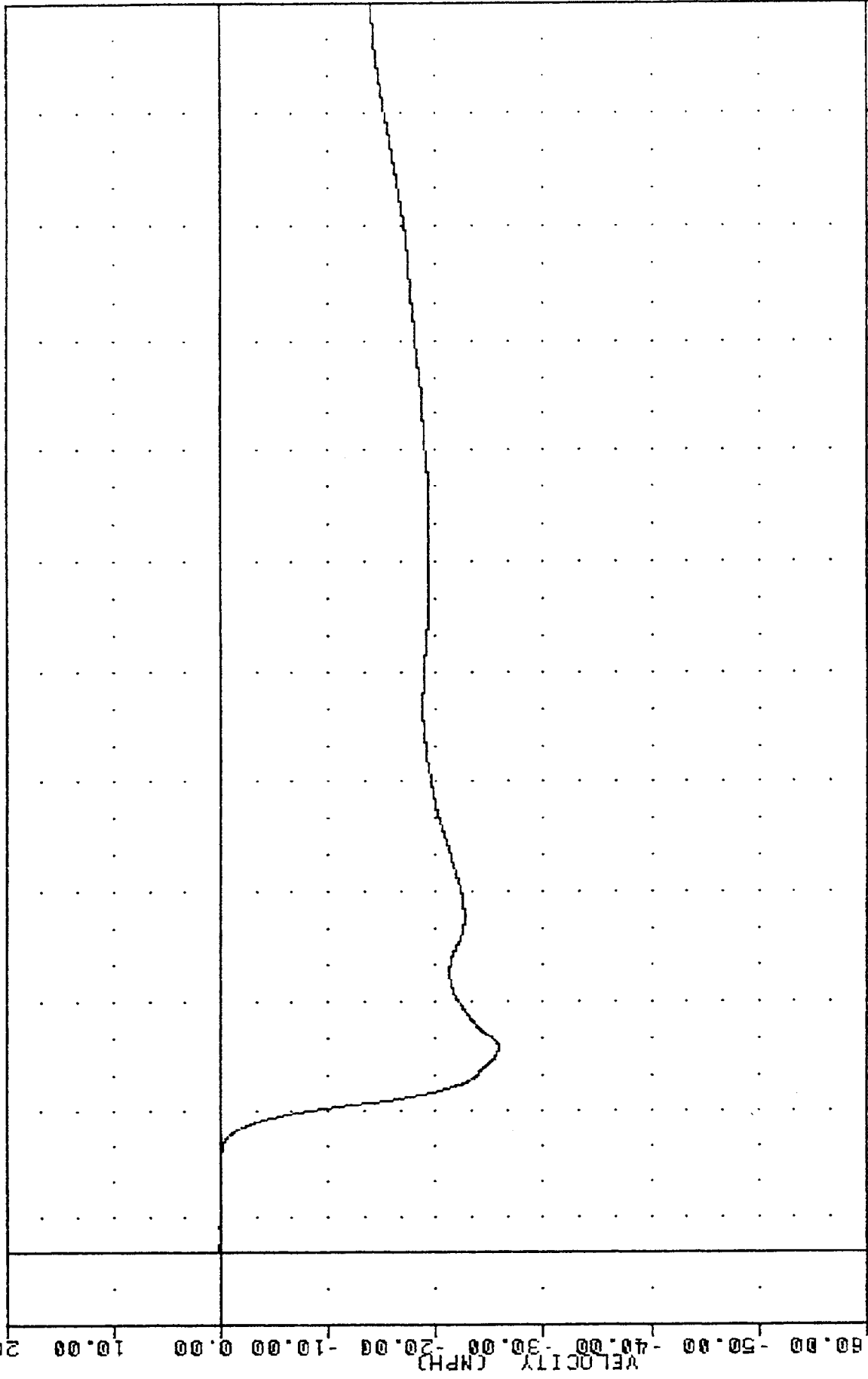
LOT DATE 10-05-85 12:56:56

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -26.36 57.50 0.07 2.38



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 LOWER SPINE VELOCITY Y AXIS

RC [REDACTED], 8530 [REDACTED] LOT DATE [REDACTED] 10-SEP-85 [REDACTED] 12-33-56 [REDACTED]
 MYNA SIDE IMPACT TESTING
 8524200000
 T12YVB
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -25.92e 57.13, 0.10 e 1.63

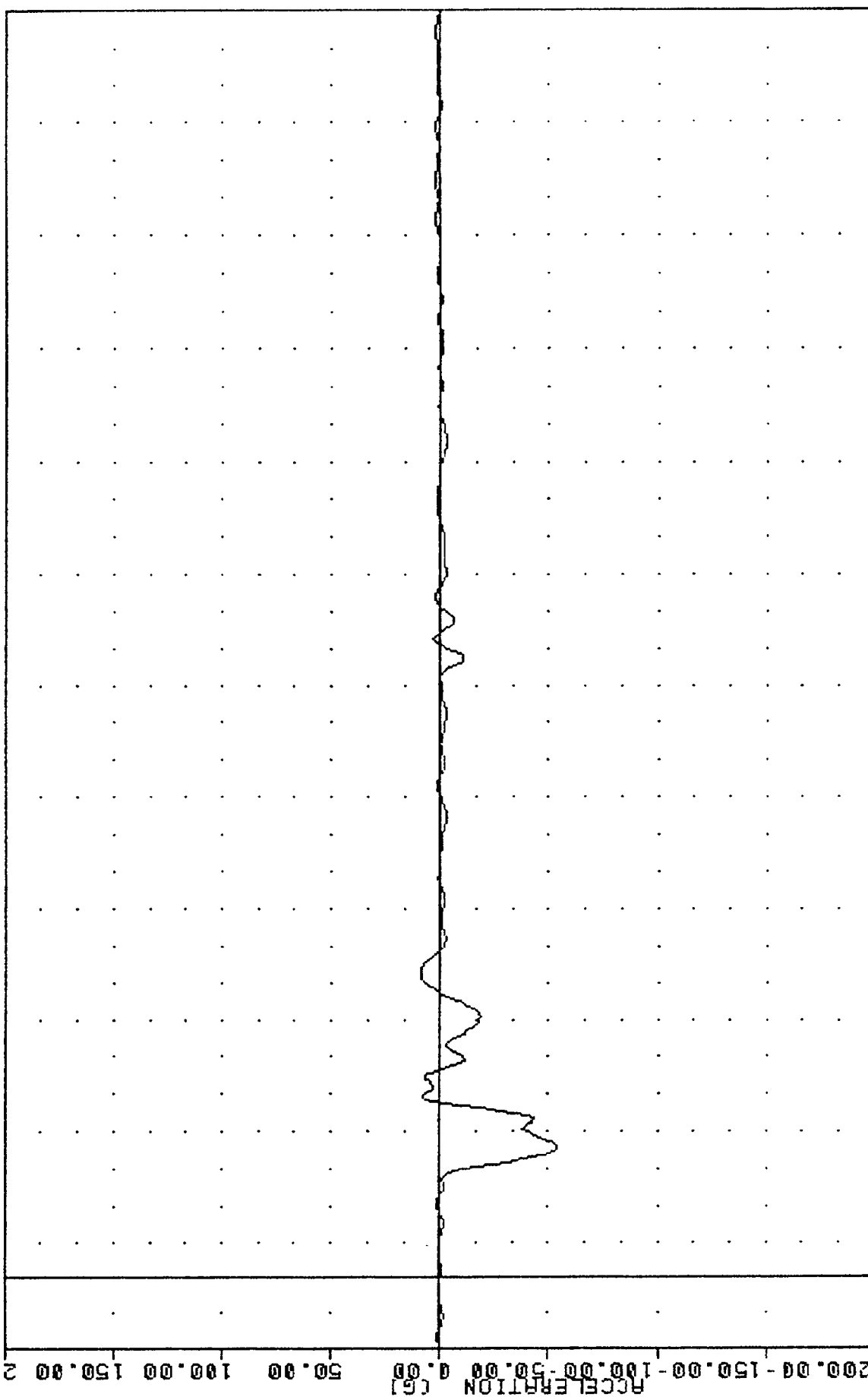


-60.00
 -50.00
 -40.00
 -30.00
 -20.00
 -10.00
 0.00
 10.00
 20.00
 VELOCITY (MPH)

-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)

MYNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 LOWER SPINE VELOCITY -2 Y AXIS

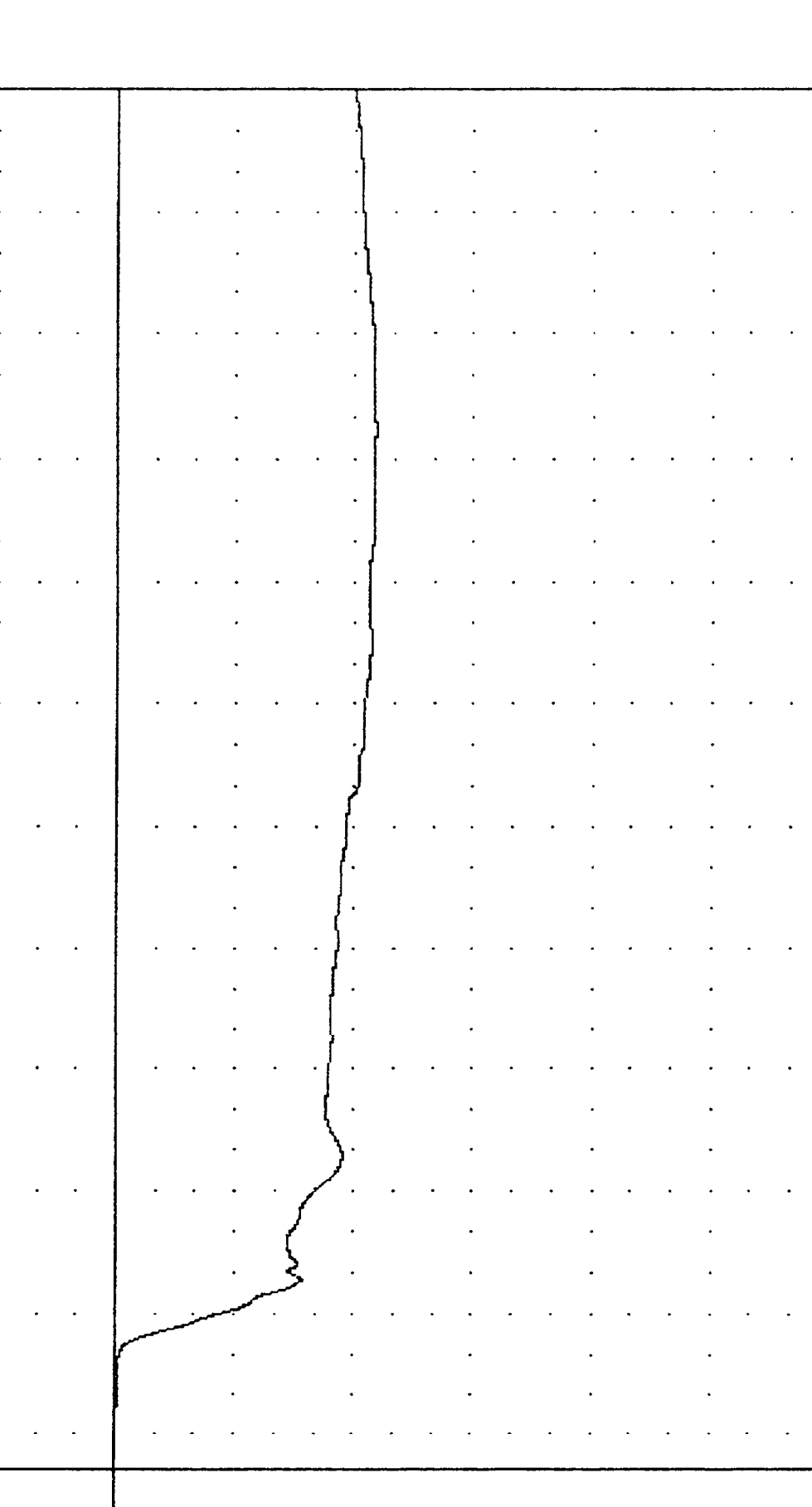
RC [REDACTED], 80030 [REDACTED] PLOT DATE 10-SEP-85 12:33:08
 NYMA SIDE IMPACT TESTING
 85242000000
 RURYG2
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -53.60 35.63, 9.23 82.50



-200.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 ACCELERATION (G)
 TIME (MSEC)
 NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER RIGHT UPPER RIB ACCELERATION Y AXIS

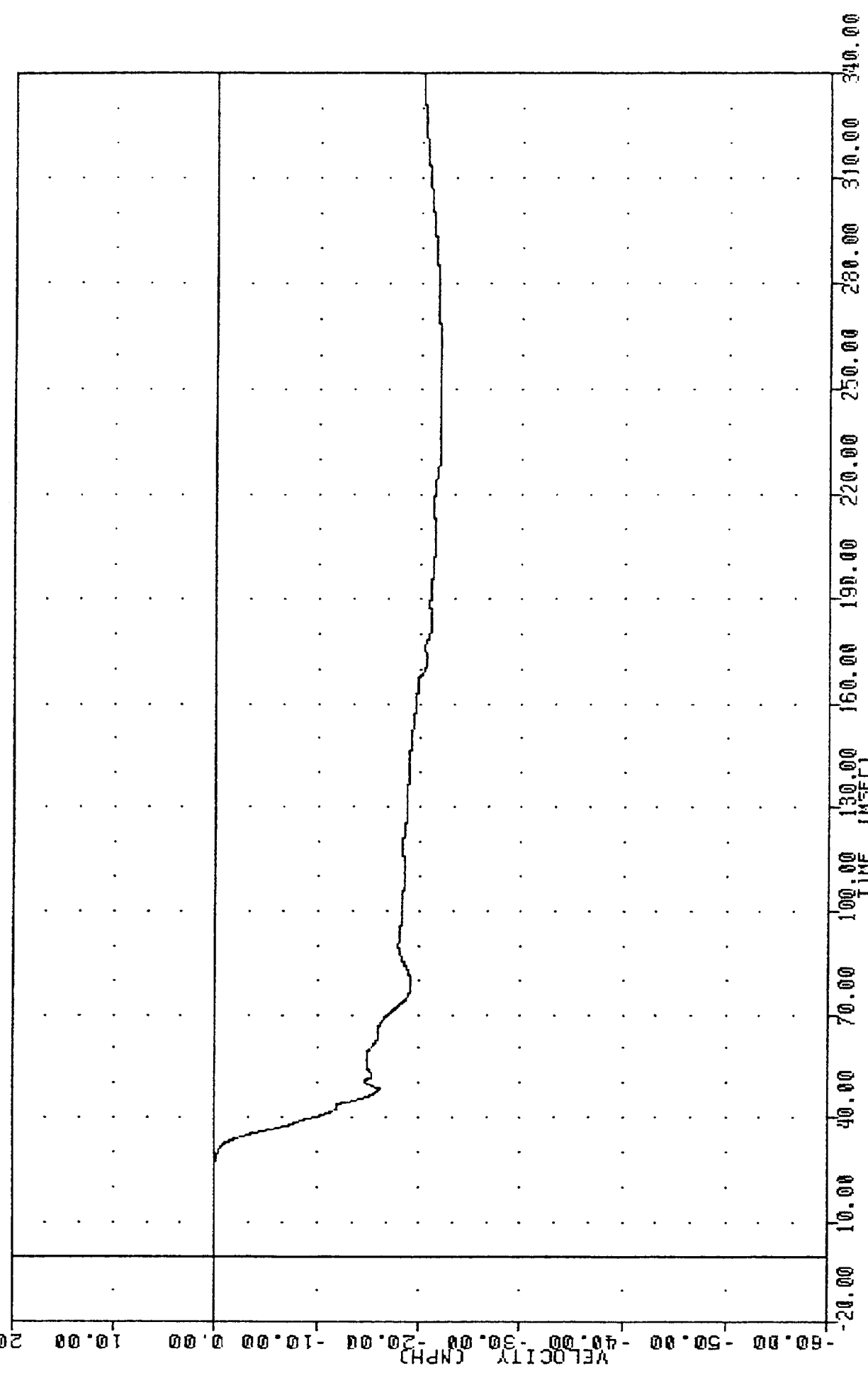
RC 85242000000
 MVMA SIDE IMPACT TESTING
 85242000000
 RURY2

PLOT TIME 10-SEP-85 12:53:56
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -21.79 257.25 D.12 14.50



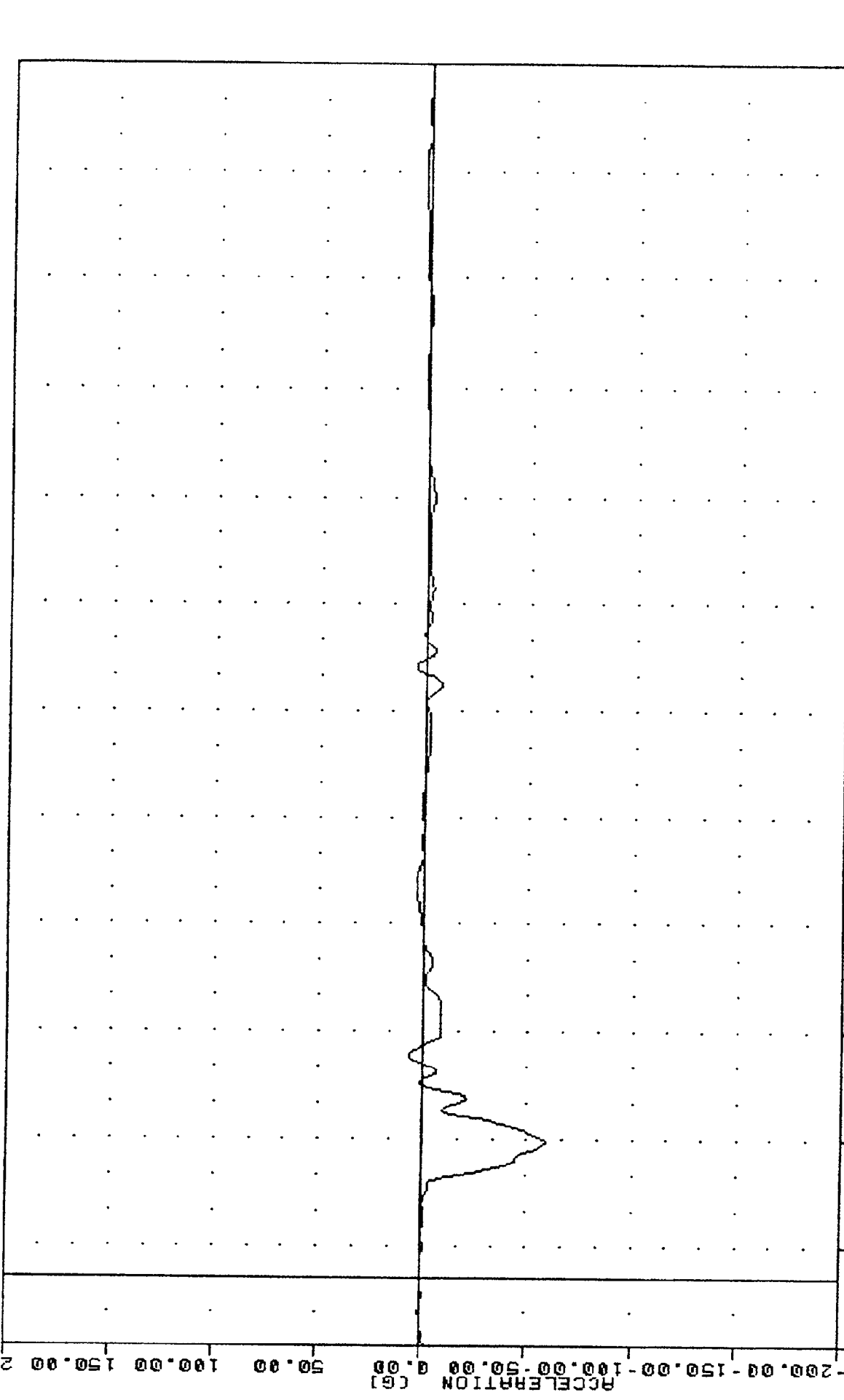
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 RIGHT UPPER RIB VELOCITY Y AXIS

RC 800030, 800030
 NVMA SIDE IMPACT TESTING
 85242000000
 RURYVB
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -21.94B 234.00, 0.06 e 1.50
 PLOT DATE 10-SEP-85 12:53:56



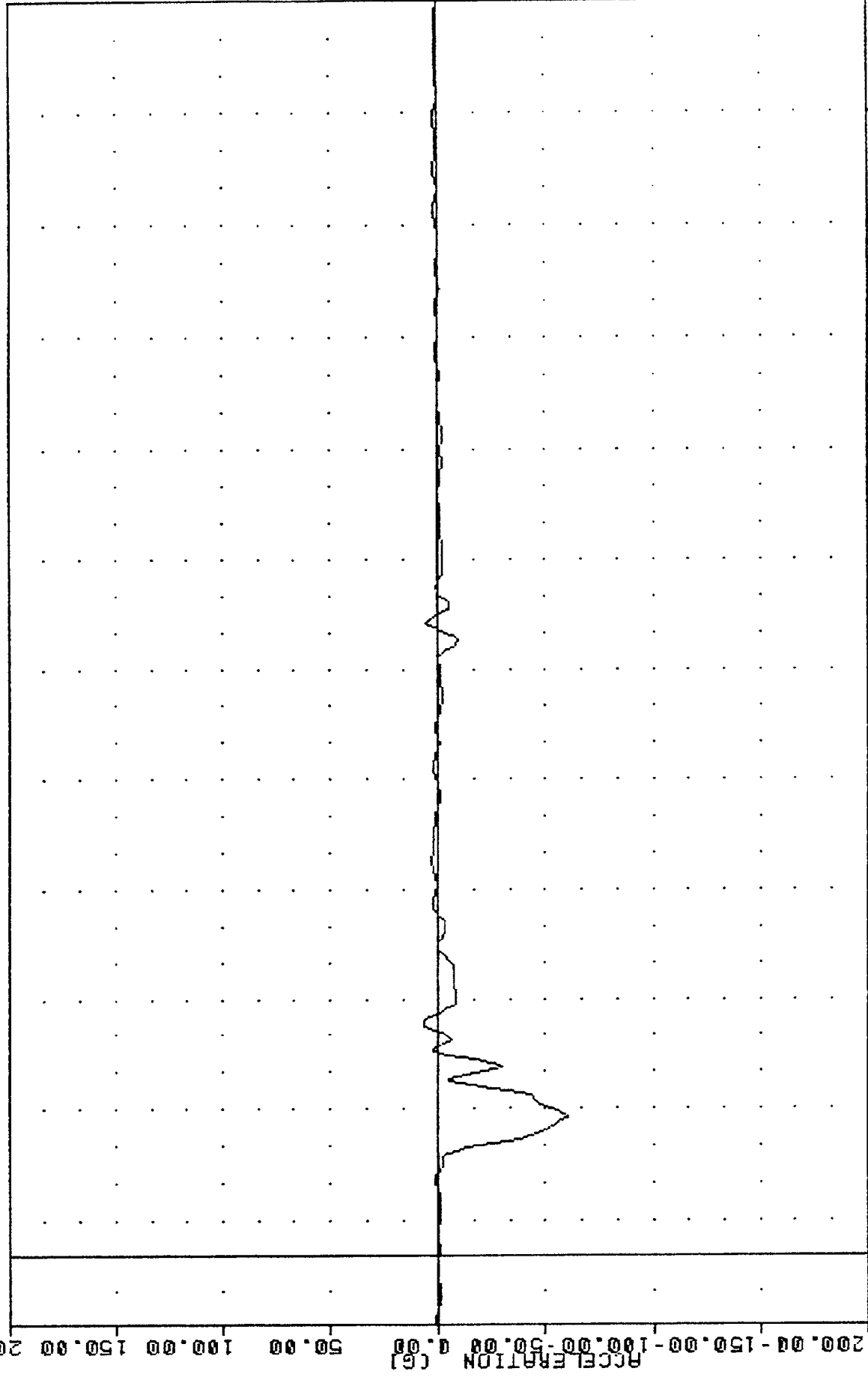
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 RIGHT UPPER RIB VELOCITY -2 Y AXIS

TRC [REDACTED] 30 [REDACTED] 10 [REDACTED] -85 [REDACTED] 12 [REDACTED] 08 [REDACTED]
 MYMA SIDE IMPACT TESTING
 85242000000
 RLRV62
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -58.81 39.38 7.08 63.13



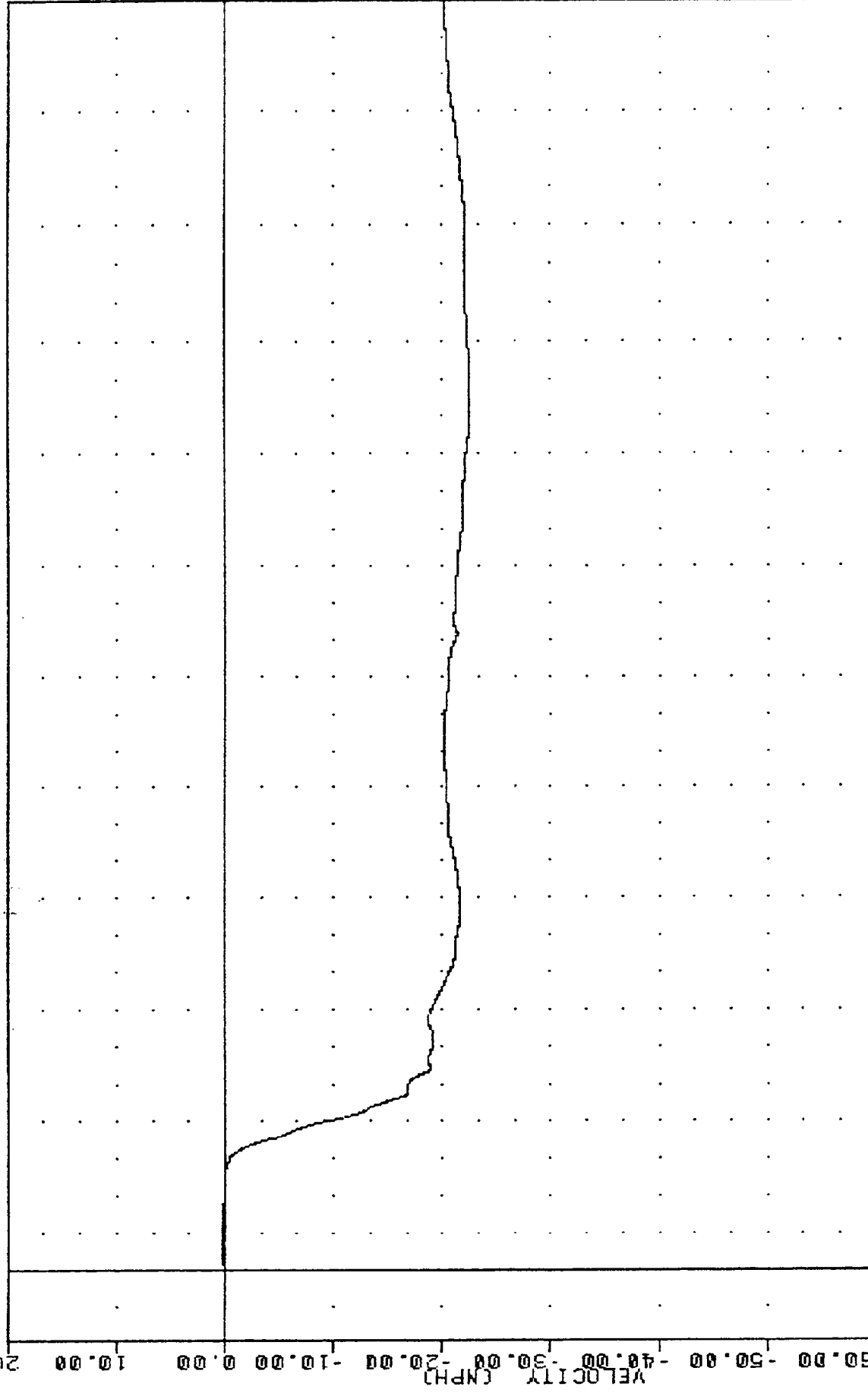
-200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00
 ACCELERATION (CG)
 -20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER RIGHT LOWER RIB ACCELERATION Y AXIS

RC [REDACTED], 800000 [REDACTED] LOT DATE [REDACTED] 10-30-85 [REDACTED] 12:00:00
 NVMA SIDE IMPACT TESTING
 85242000000
 ALRYGB
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -59.76 38.13, 7.04 e 63.13



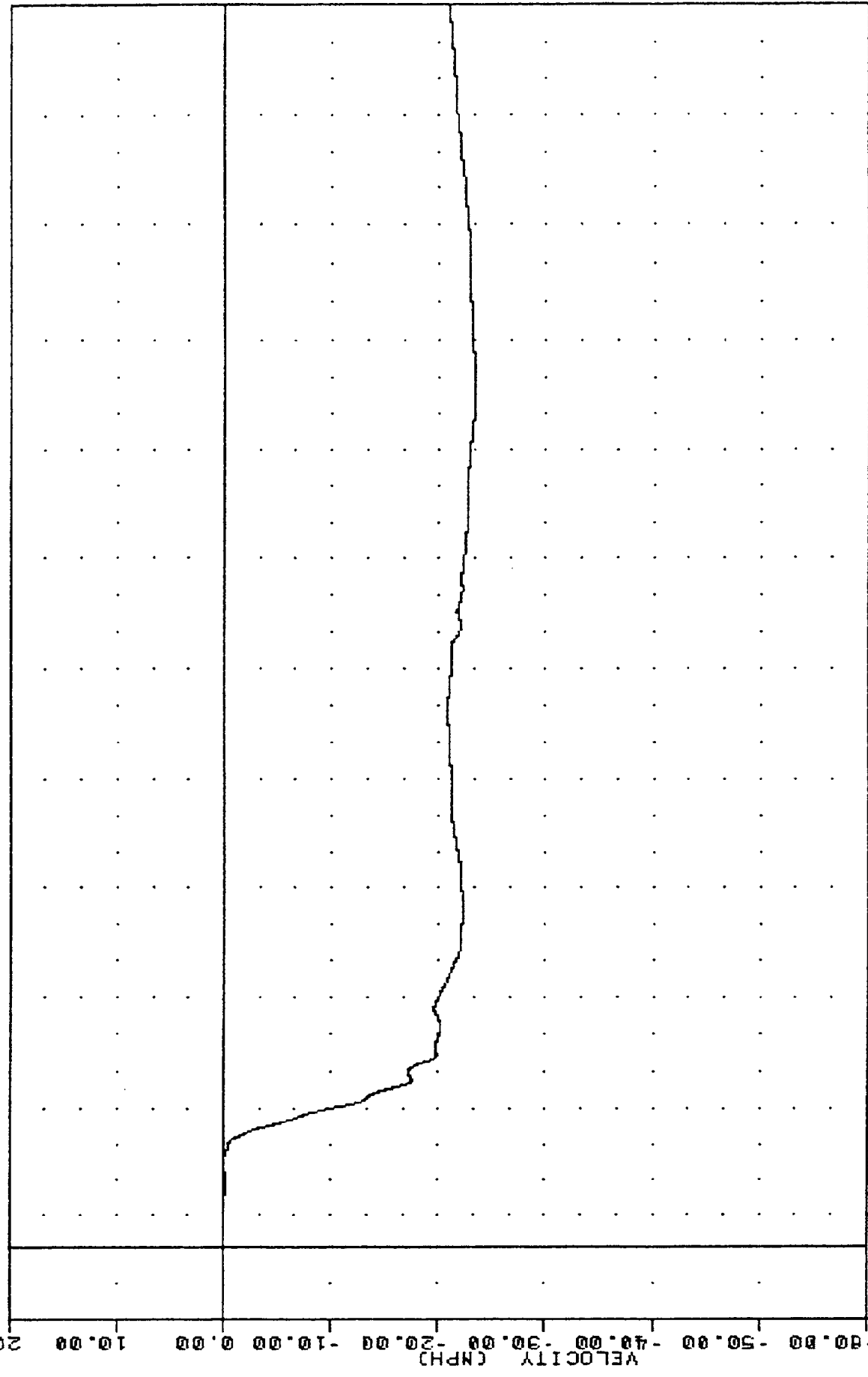
-200.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 ACCELERATION (G)
 TIME (MSEC)
 MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER RIGHT LOWER RIB ACCELERATION #2 Y AXIS

RC 850080 LOT DATE 10-SEP-85 12:59:56
 MVNA SIDE IMPACT TESTING
 85242000000
 RLAYV2
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -22.540 232.13, 0.14 7.50



-60.00 50.00 40.00 30.00 20.00 10.00 0.00 -10.00 -20.00 -30.00 -40.00 -50.00
 VELOCITY (MPH)
 0.00 30.00 60.00 90.00 120.00 150.00 180.00 210.00 240.00 270.00 300.00 330.00 340.00
 TIME (MSEC)
 MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 RIGHT LOWER RIB VELOCITY

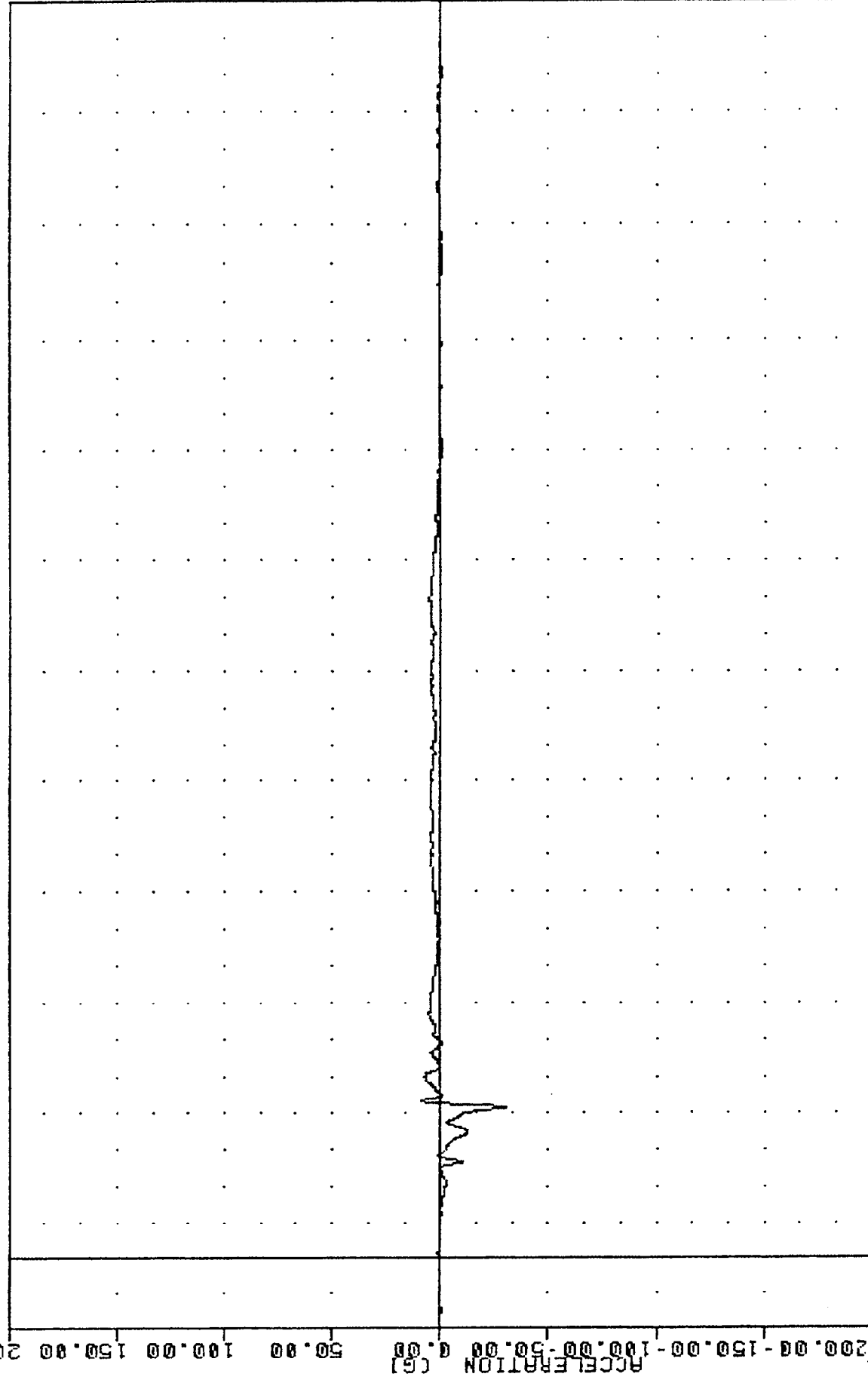
AC 850080 PLOT DATE 10-SEP-85 12:59:56
 MYMA SIDE IMPACT TESTING
 85242000000
 RLYYB
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -23.33e 243.63, 0.06 e -14.75



-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)
 MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 RIGHT LOWER RIB VELOCITY -2 Y AXIS

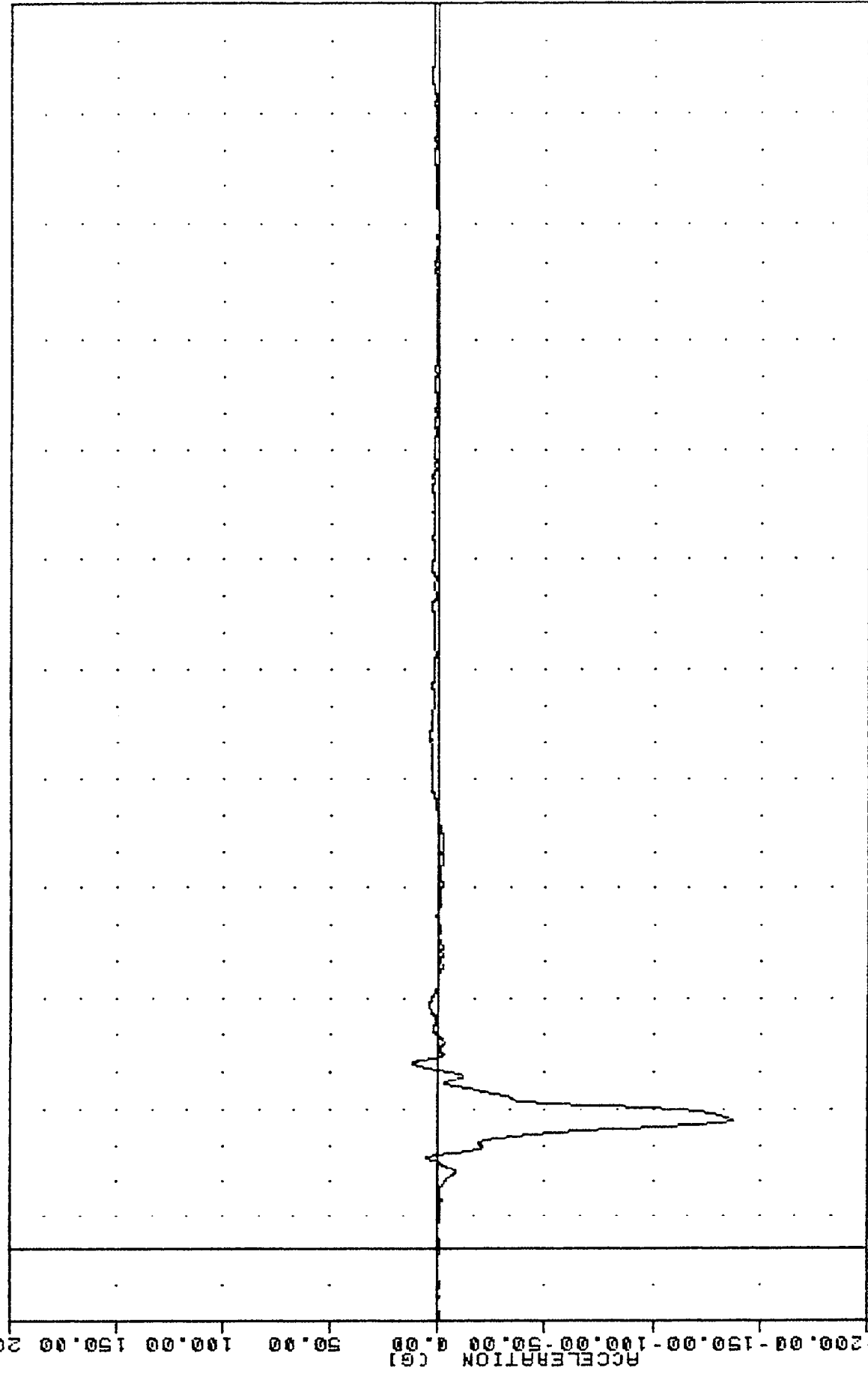
RC 850030 PLOT DATE 10-SEP-85 13:00:53
 MYMA SIDE IMPACT TESTING
 85242000000
 PEVX62

FILTER = 8LPF 300/ 949/ -40
 MIN, MAX VALUES = -30.72e 41.63, 8.38 e 43.38



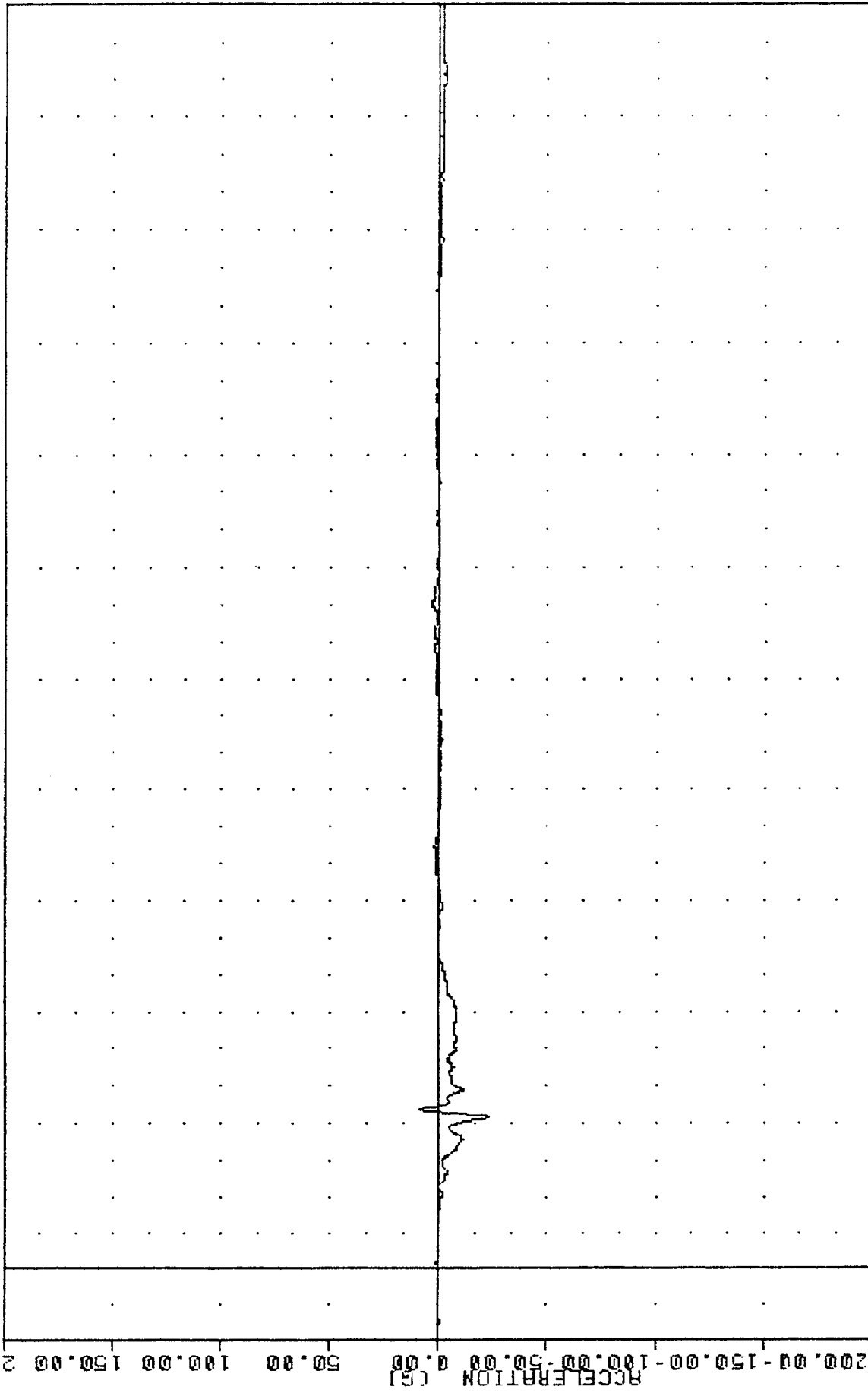
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER PELVIS ACCELERATION X AXIS

RC 85242000000
 MVMA SIDE IMPACT TESTING
 PEVY62
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -137.84e 37.00 , 11.82 e 52.38
 PLOT DATE 10-SEP-85 13:00:53



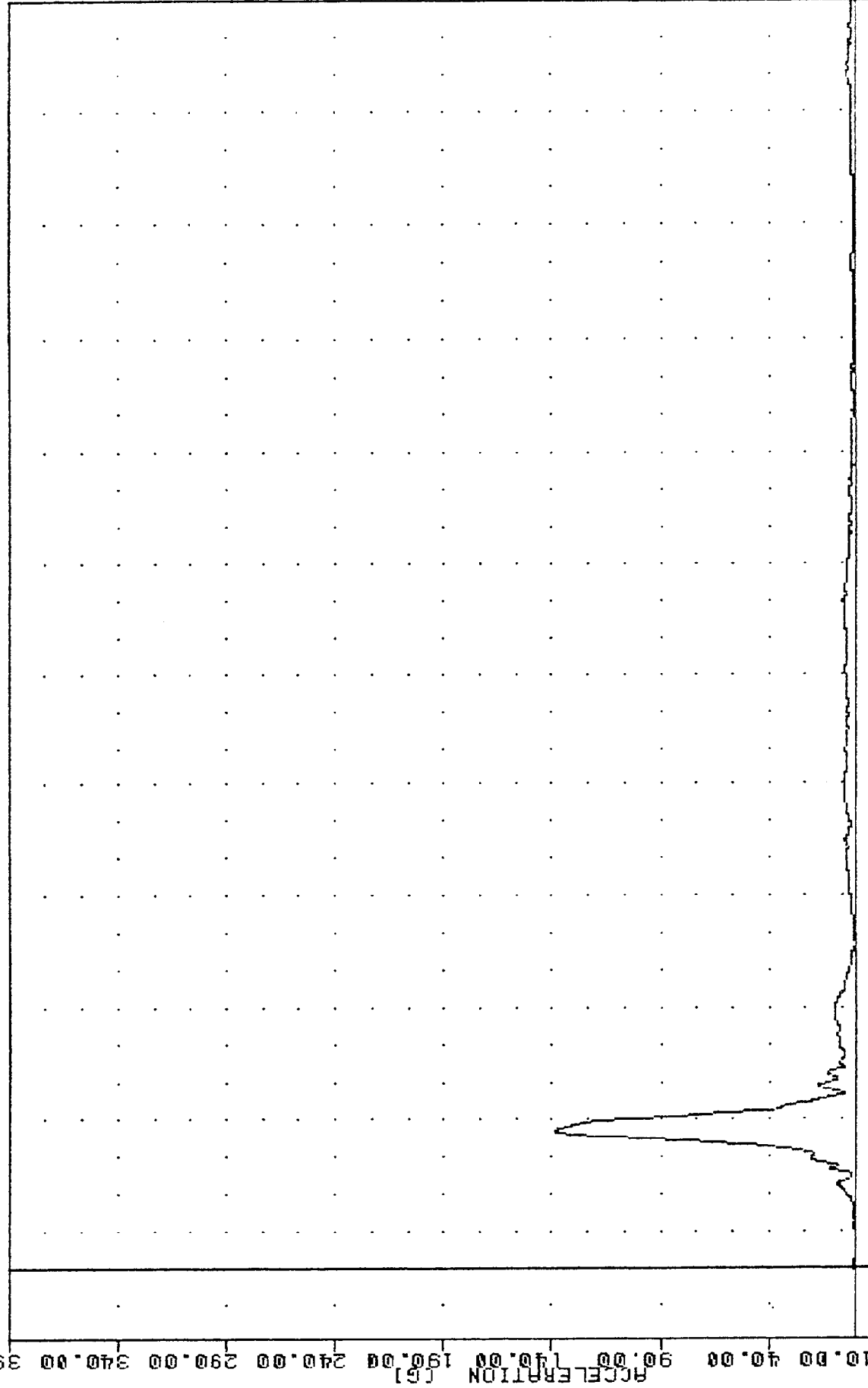
-200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00
 ACCELERATION (CG)
 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00
 TIME (MSEC)
 MVMA SIDE IMPACT TEST -- MODIFIED STRAUCURE/HARBOARD/FAR SEATING
 PASSENGER PELVIS ACCELERATION Y AXIS

TRC 800030 PLOT DATE 10-SEP-85 13:00:53
 MVMA SIDE IMPACT TESTING
 85242000000
 PEVZG2
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -23.05e 41.75. 8.42 e 43.75



-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 -- MODIFIED STRAUCURE/HARDBOARD/FAR SEATING
 PASSENGER PELVIS ACCELERATION Z AXIS

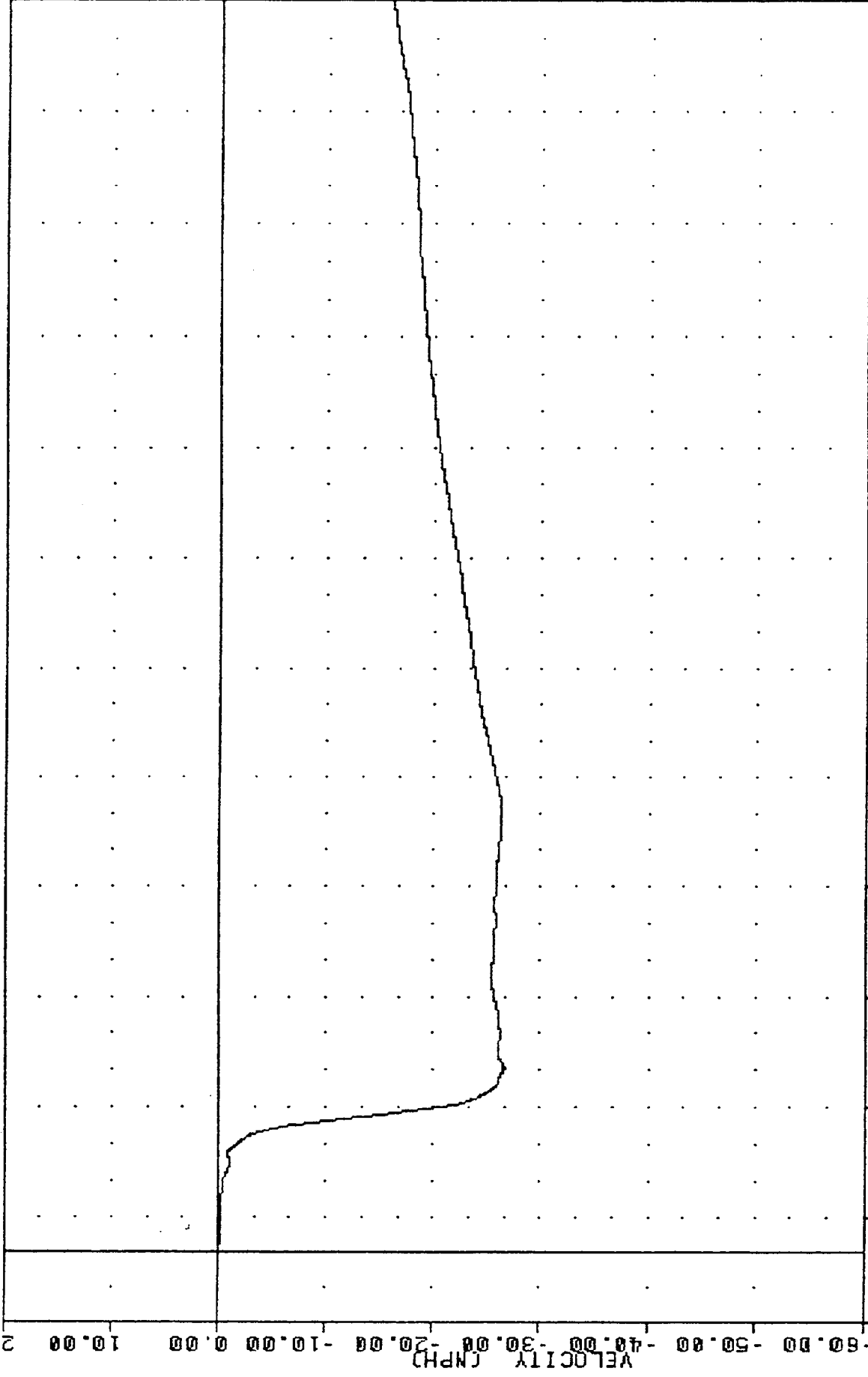
TRC ██████████, 800830 ██████████ PLOT DATE 10-SEP-85 13:00:53
 MVNA SIDE IMPACT TESTING
 85242000000
 PEYR62
 FILTER = BLFF 300/ 949/ -40
 MIN. MAX VALUES = 0.06g -16.25, 138.24 g 37.00



-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)
 MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER PELVIS RESULTANT ACCELERATION

TRC [REDACTED], 850830 [REDACTED] PLOT DATE 10-SEP-85 12:59:56
 NYMA SIDE IMPACT TESTING
 85242000000
 PEVYV2

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -26.64 50.50 0.00 e -20.00

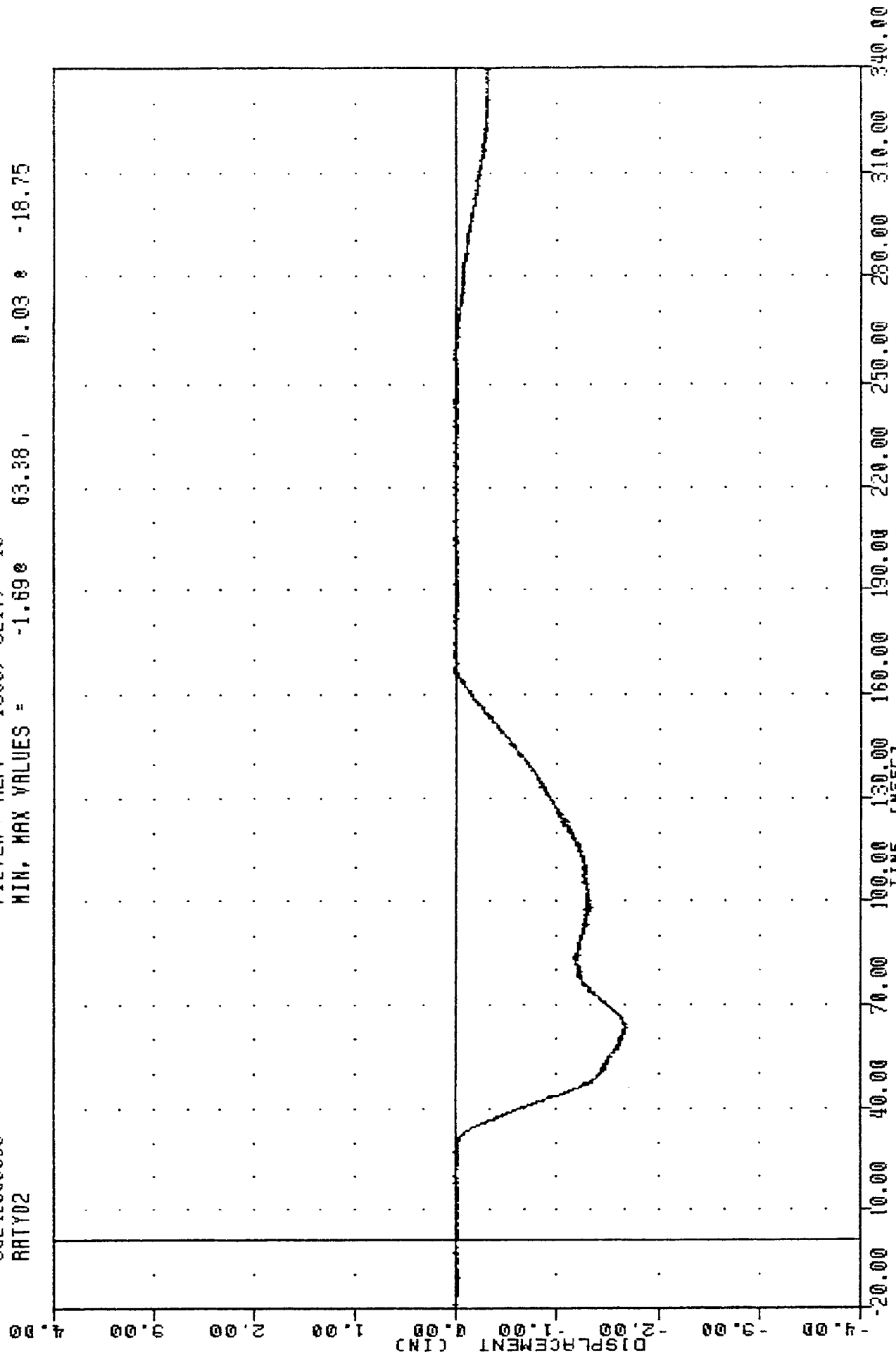


20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PELVIS VELOCITY Y AXIS

TAC
 850830
 MYMA SIDE IMPACT TESTING
 85242000000
 RRTY02

PLOT DATE 10-SEP-85 13:00:53

FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -1.59e 63.38 , 0.03 e -18.75



MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
 PASSENGER RIGHT RIB TO SPINE DISPLACEMENT INCHES

TAC , 850830

PLOT DATE 10-SEP-85 13:00:53

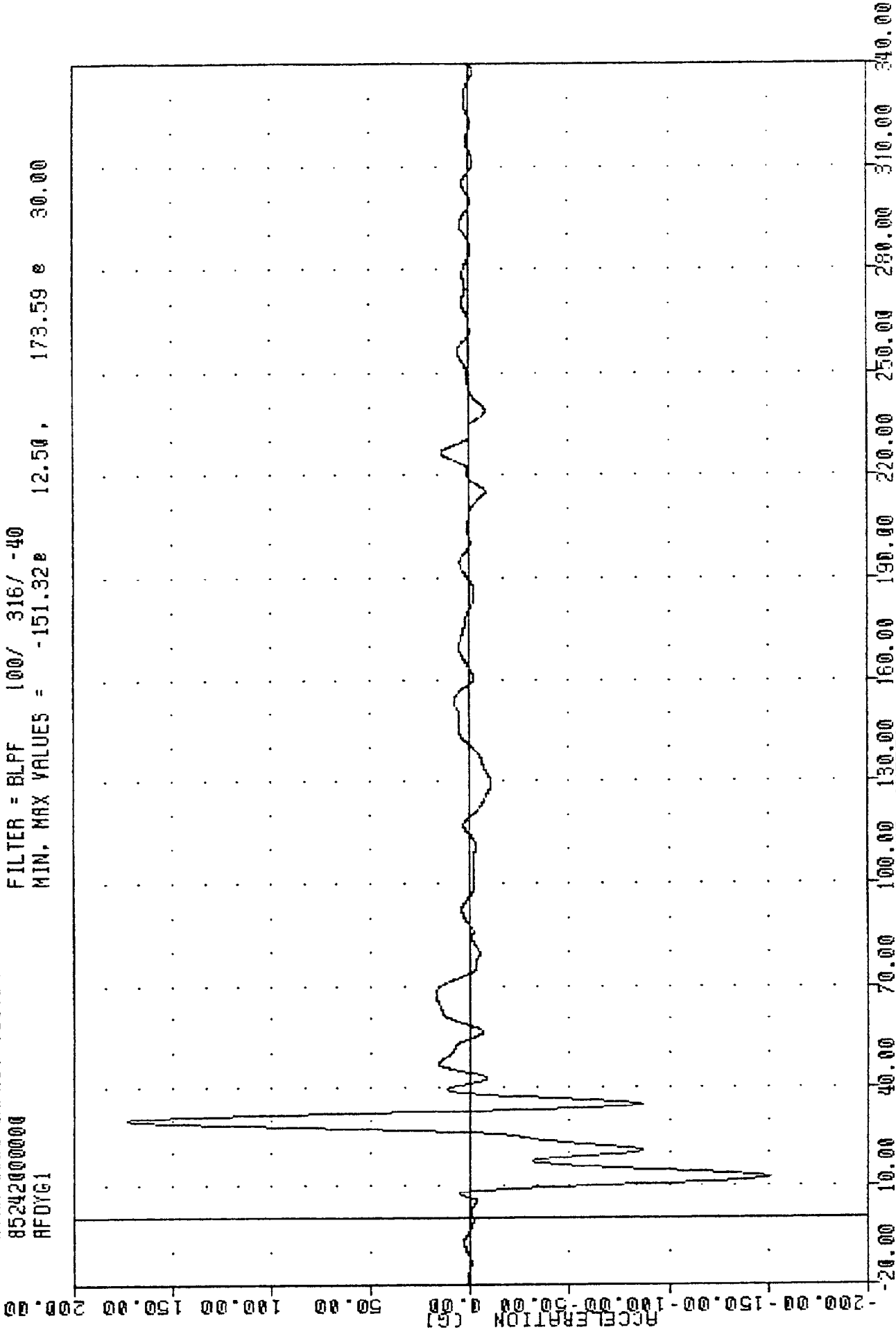
MVMA SIDE IMPACT TESTING

85242000000

AFDYG1

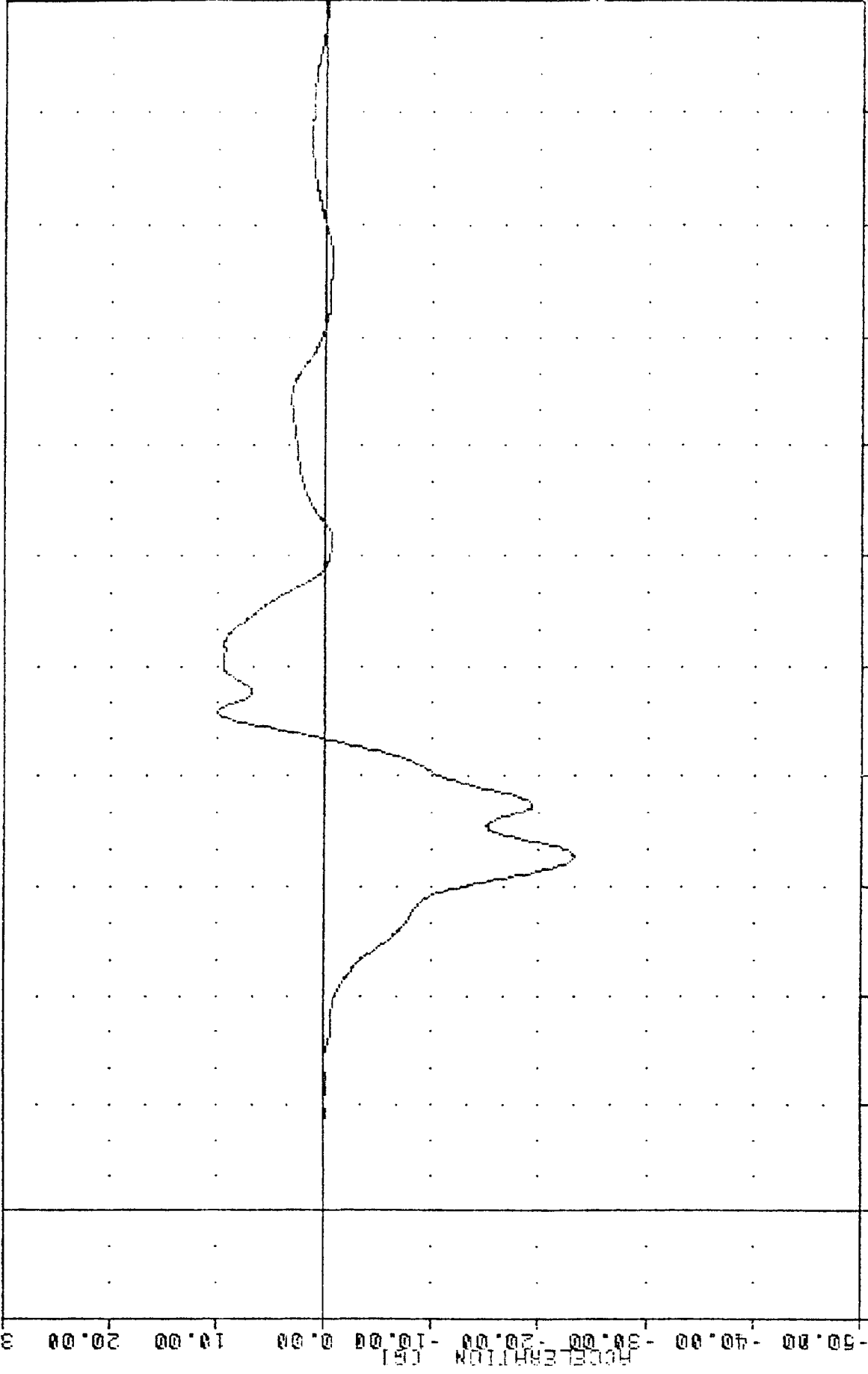
FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -151.32e 12.50, 173.59 e 30.00



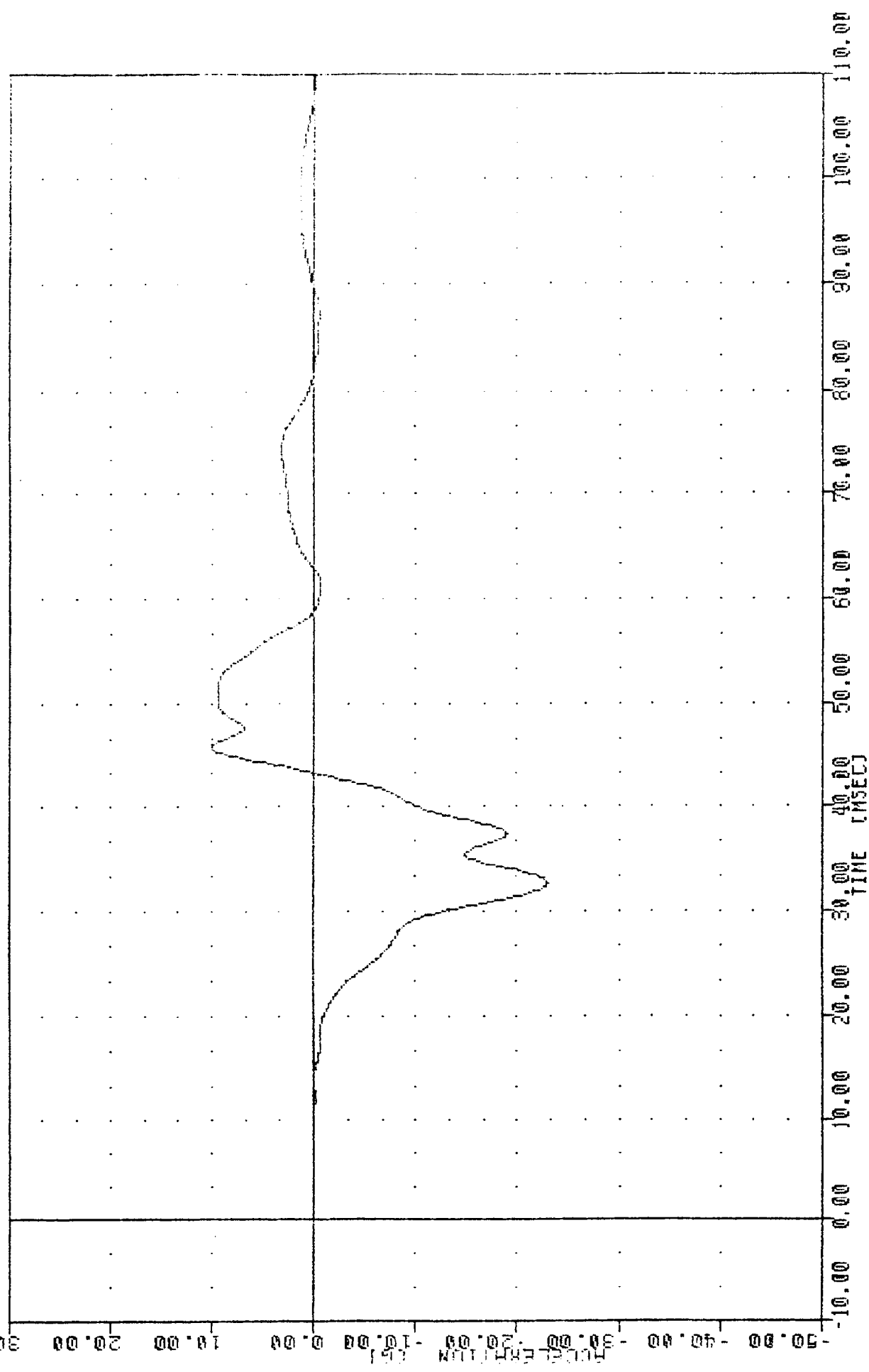
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/FAR SEATING
VEHICLE RIGHT FRONT DOOR (POSITION 1) ACCELERATION Y AXIS

NVMA
 SID 119 THORAX IMPACT CAL 08
 85241
 T01Y62
 ST11908
 FLOT DATE 29-AUG-85 09:57:17
 FILTER = BLFF 300/ 949/ -40
 MIN. MAX VALUES = -23.22 32.63, 9.94 45.75



MVMA SIDE IMPACT DUMMY CALIBRATION
 UPPER SPINE ACCELERATION Y AXIS -PRIMARY

ST11908
SID 119 THORAX IMPACT CAL 08
85241
T01YGB
PLOT DATE 29-AUG-85 09:57:17
MIN, MAX VALUES = -23.00e 32.63, 10.07 e 45.75

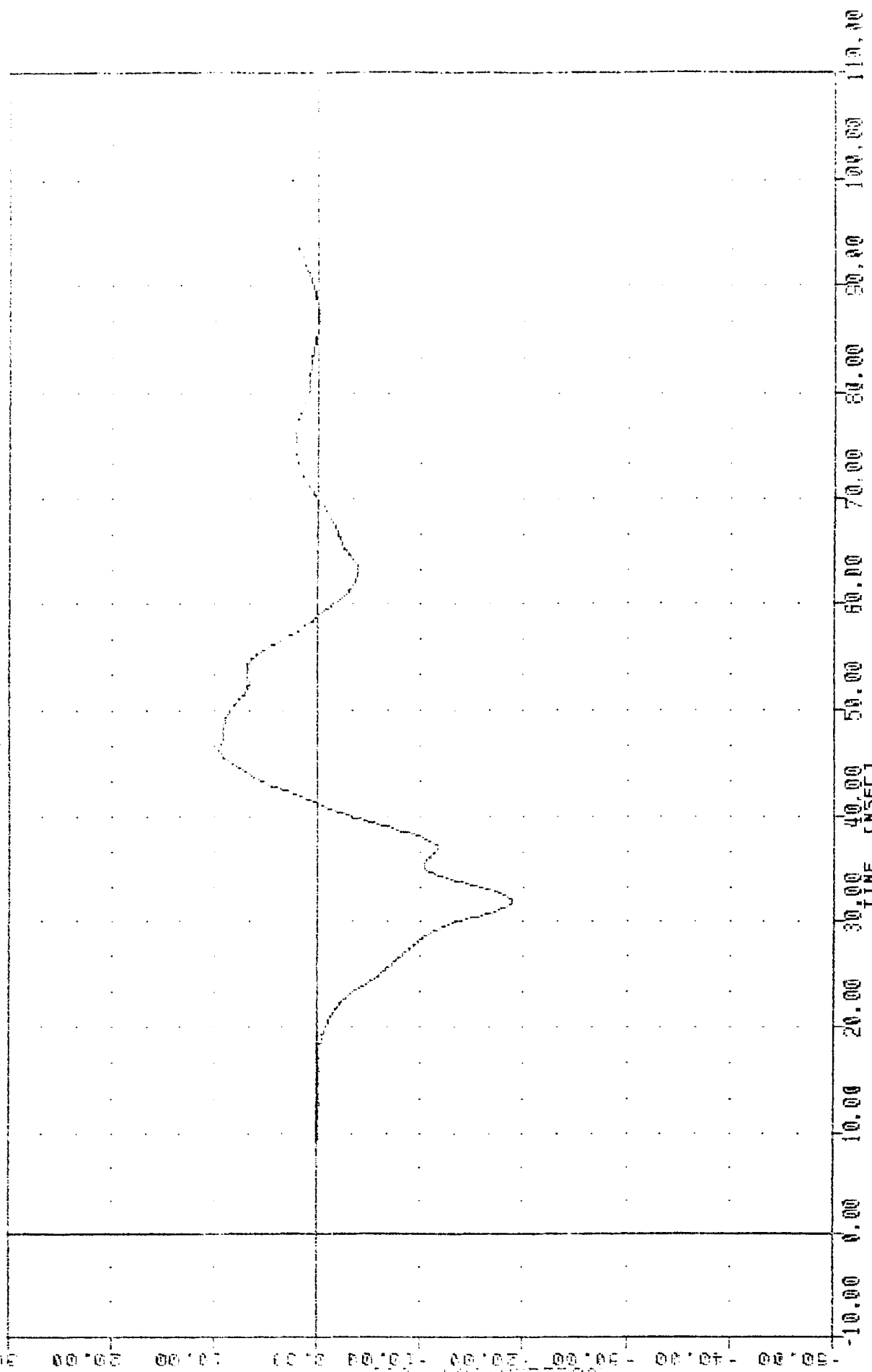


MVMA SIDE IMPACT DUMMY CALIBRATION
UPPER SPINE ACCELERATION Y AXIS -REDUNDANT

MVMA
SID 119 THORAX IMPACT CAL 08
85241
112162

PLOT DATE 29-AUG-85 08:57:17

FILTER = 6LPF 3007 9437 -40
MIN, MAX VALUES = 32.00, 9.51 46.25



MVMA SIDE IMPACT DUMMY CALIBRATION
LOWER SPINE ACCELERATION Y AXIS -PRIMARY

FLOT DATE 29-AUG-85 09:57:17

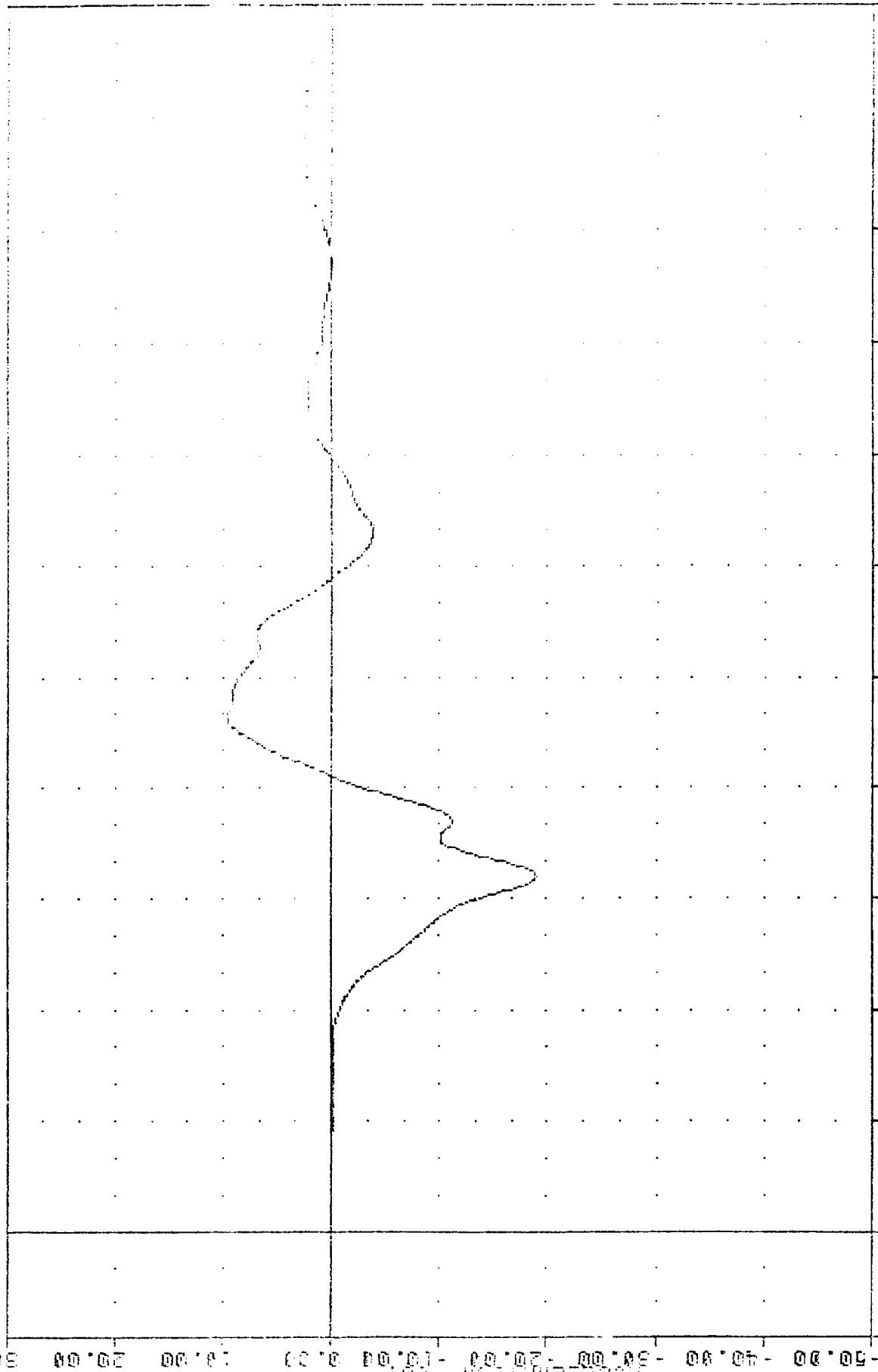
ST11908
SID 119 THORAX IMPACT CAL 00

FILTER = DLFF 300/ 349/ -40

MIN. MAX VALUES = -18.98e 32.00 . 9.54 e 45.25

85241
T12Y60

30.00



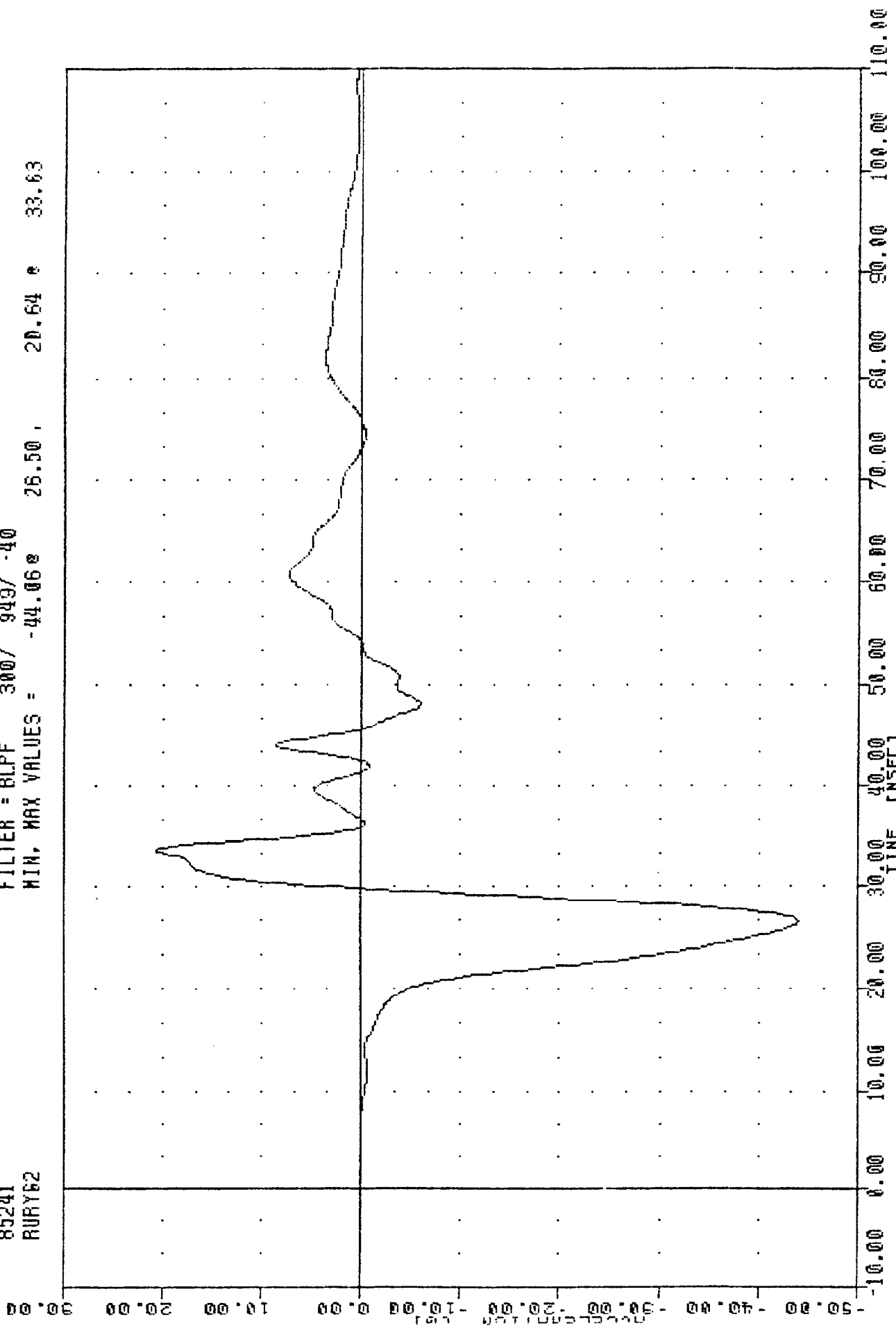
-10.00 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00

TIME (MSEC)
MVA SIDE IMPACT DUMMY CALIBRATION
LOWER SPINE ACCELERATION Y AXIS -REDUNDANT

MVMA
SID 119 THORAX IMPACT CAL 08
85241
RURY62

PLOT DATE 28-AUG-85 09:57:17

FILTER = BLPF 300 / 949 / -40
MIN, MAX VALUES = -44.06 e 20.64 e 33.63



MVMA SIDE IMPACT DUMMY CALIBRATION
RIGHT UPPER RIB ACCELERATION Y AXIS -PRIMARY

PLOT DATE 29-AUG-85 09:57:17

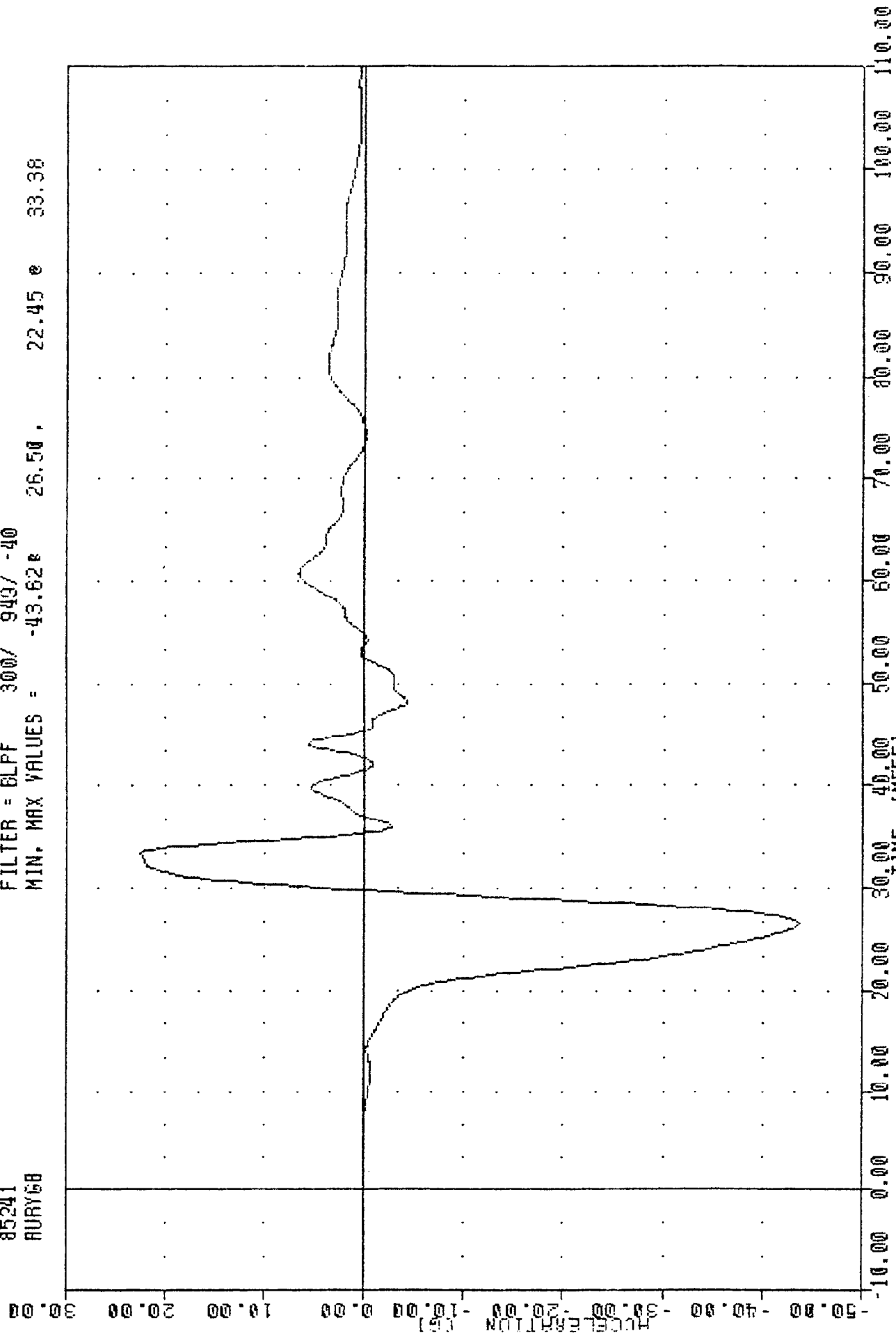
KYMA
SID 119 THORAX IMPACT CAL 08

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -43.62e 26.50 . 22.45 e 33.38

85241

RURY68

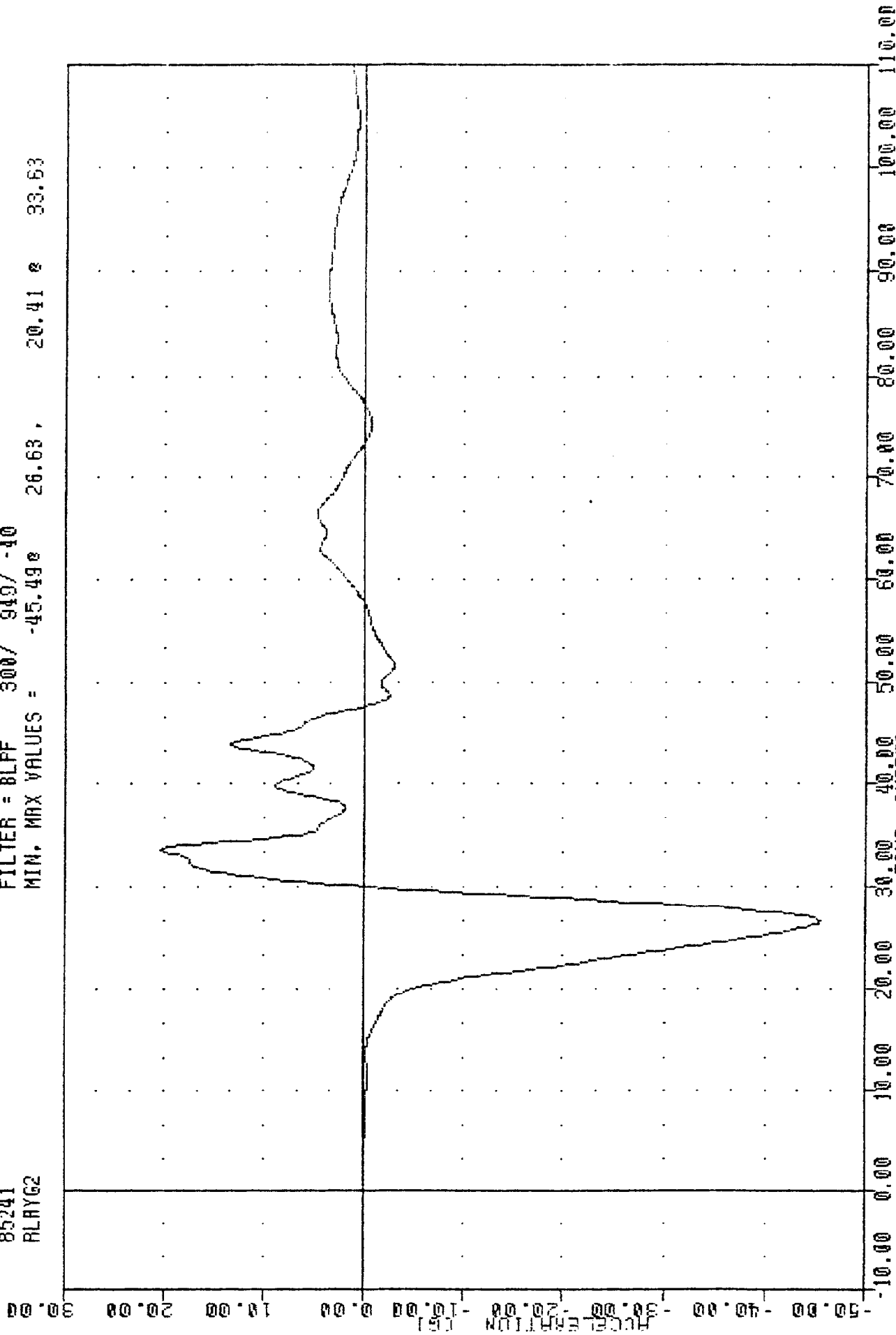


MVMA SIDE IMPACT DUMMY CALIBRATION
RIGHT UPPER RIB ACCELERATION Y AXIS -REDUNDANT

MVNA
SID 119 THORAX IMPACT CAL 00
85241
RLAYG2

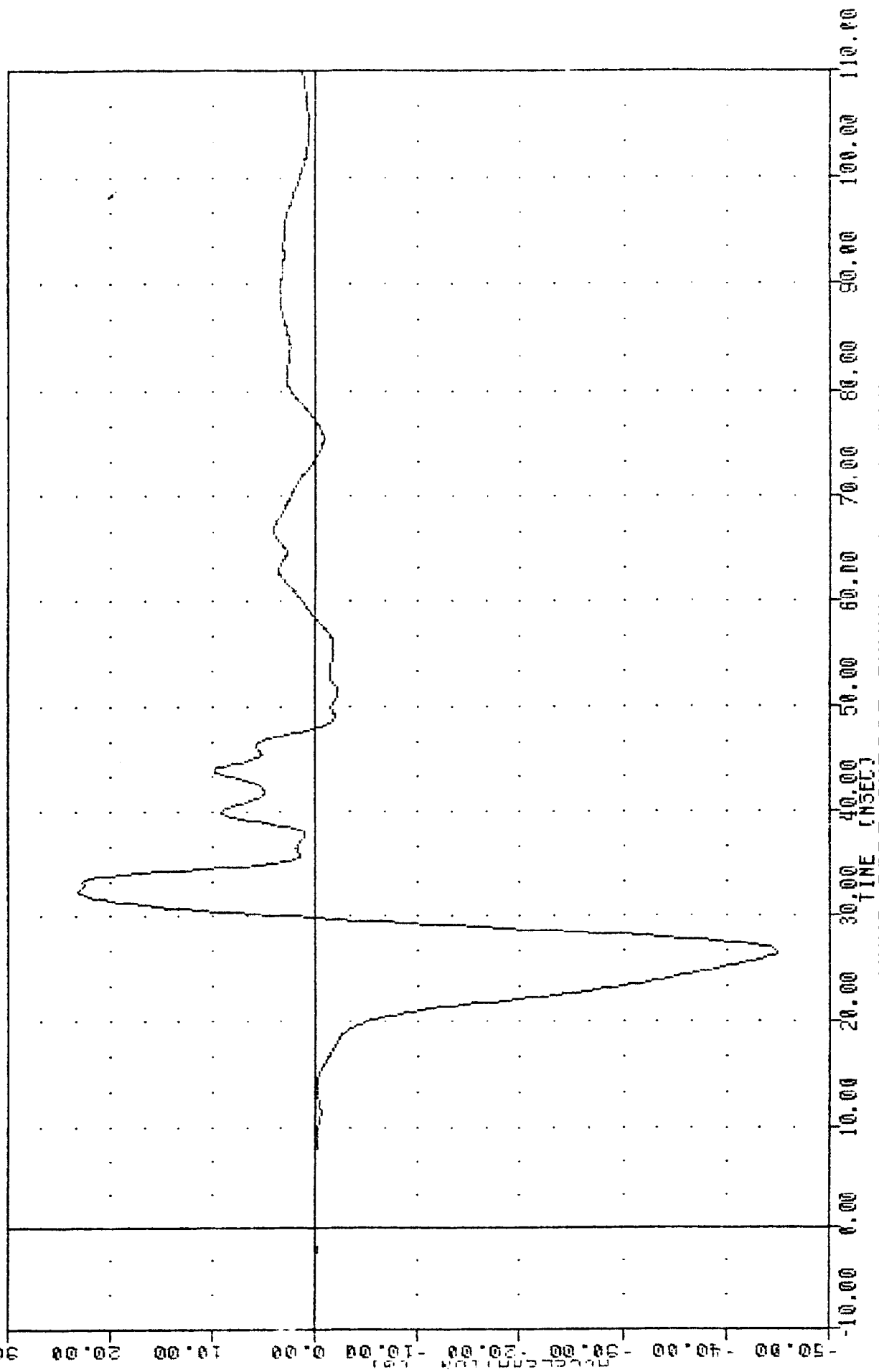
PLOT DATE 29-AUG-85 09:57:17

FILTER = BLFF 300/ 940/ -40
MIN. MAX VALUES = -45.490 26.63 , 20.41 0 33.53



MVNA SIDE IMPACT DUMMY CALIBRATION
RIGHT LOWER RIB ACCELERATION Y AXIS -PRIMARY

MVMA 7J11500
 SID 119 THORAX IMPACT CAL 00
 85241
 RLY68
 FLUT DATE 29 AUG 63 03:57:17
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -45.00e 26.50, 23.06 e 32.38

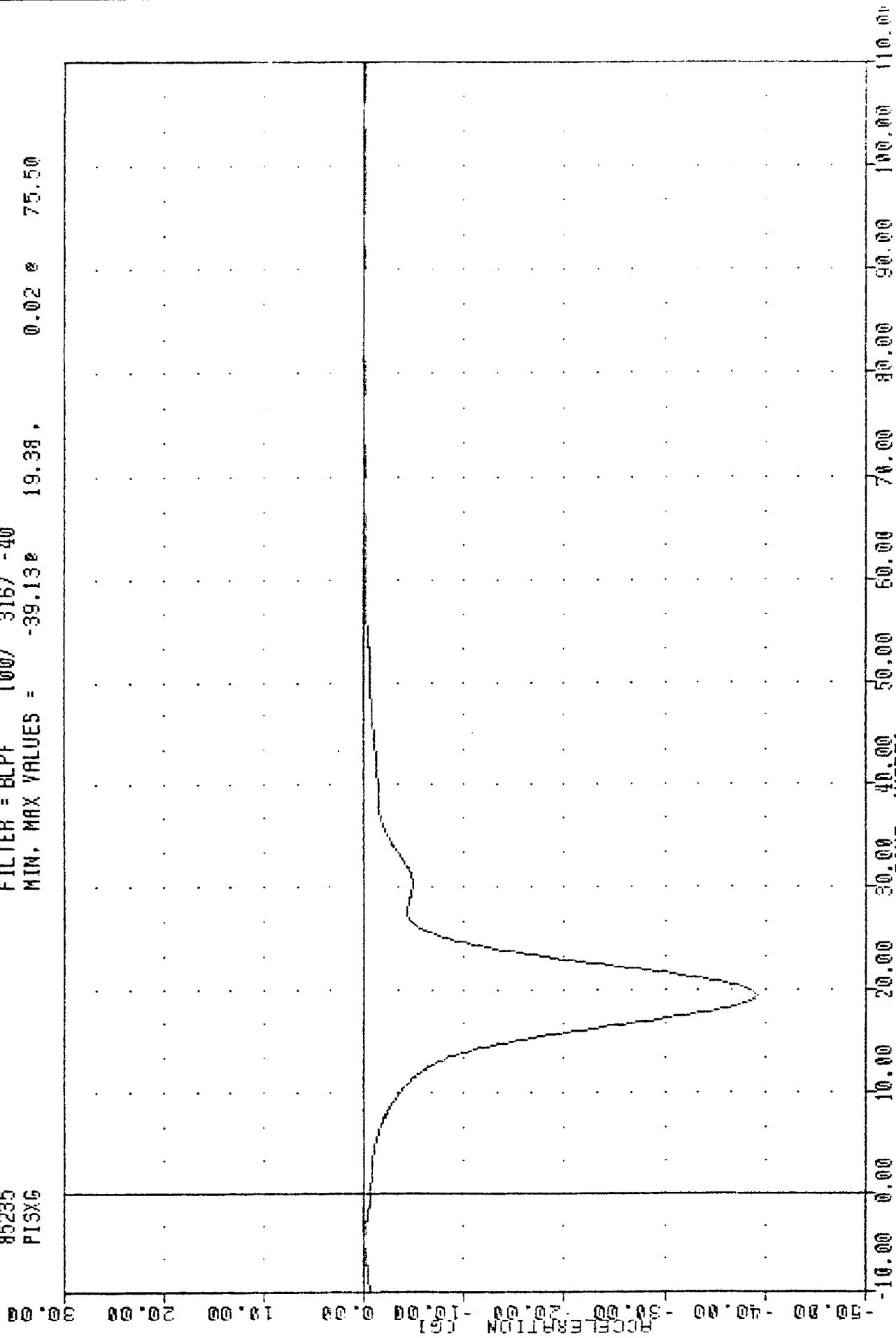


MVMA SIDE IMPACT DUMMY CALIBRATION
 RIGHT LOWER RIB ACCELERATION Y AXIS - REDUNDANT

NVMA
SID 119 PELVIC IMPACT CAL 00
85235
P15X6

PLOT DATE 23-AUG-85 13:09:34

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -39.13e 19.38e 0.02e 75.50



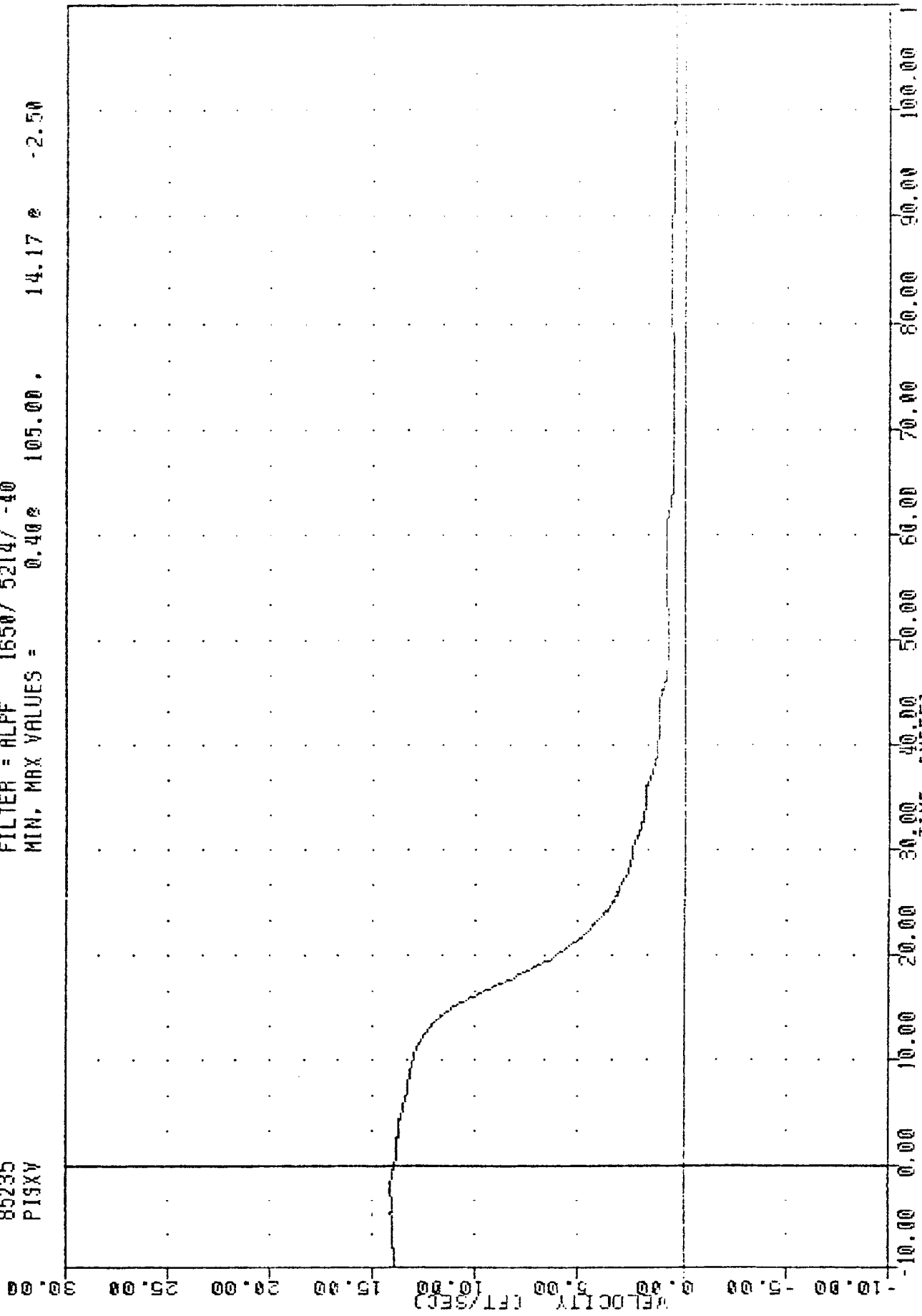
MVMA SIDE IMPACT DUMMY CALIBRATION
PISTON ACCELERATION

MYNA , SP11908
SID 119 PELVIC IMPACT CAL 08
85235
PIXY

PLOT DATE 23-AUG-85 13:09:34

FILTER = ALFF 1650/ 5214/ -40

MIN. MAX VALUES = 0.40g 105.00 , 14.17 g -2.50

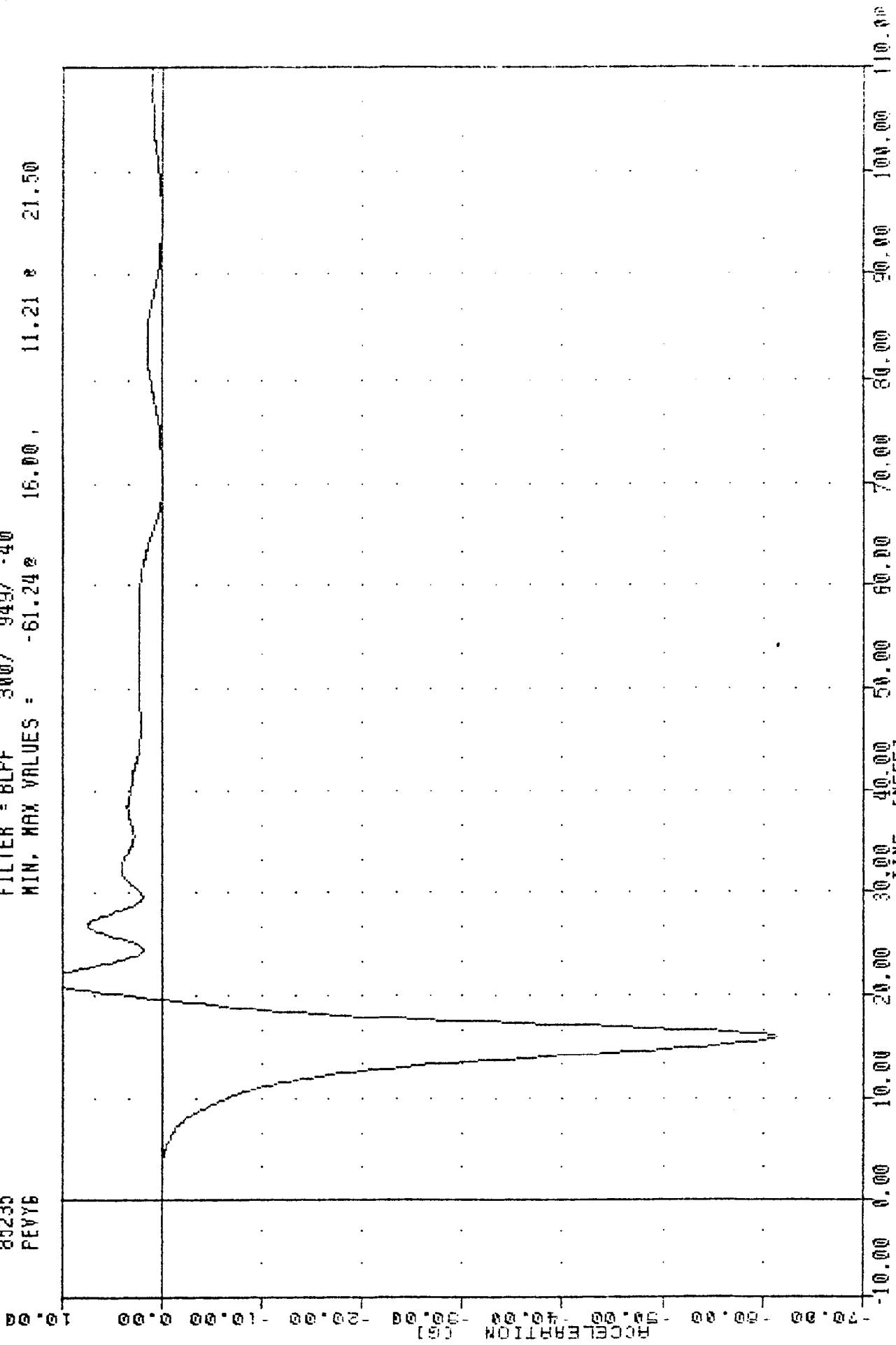


MYNA SIDE IMPACT DUMMY CALIBRATION
PIXY

MVMA
SID 119 PELVIC IMPACT CAL 08
85235
PEVY6

PLOT DATE 23-AUG-85 13:09:34

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -61.24e 16.00, 11.21 e 21.50



MVMA SIDE IMPACT DUMMY CALIBRATION
PELVIS ACCELERATION Y AXIS

POST-TEST
SIDE IMPACT DUMMY CALIBRATION

Side Impact Dummy
Damage Checklist

Dummy S/N 119

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

TRC Personnel
Checked By:

Greg Wilts
Signature Date 7-30-85

VRTC Personnel
Checked and Approved for Testing By:

Signature Date

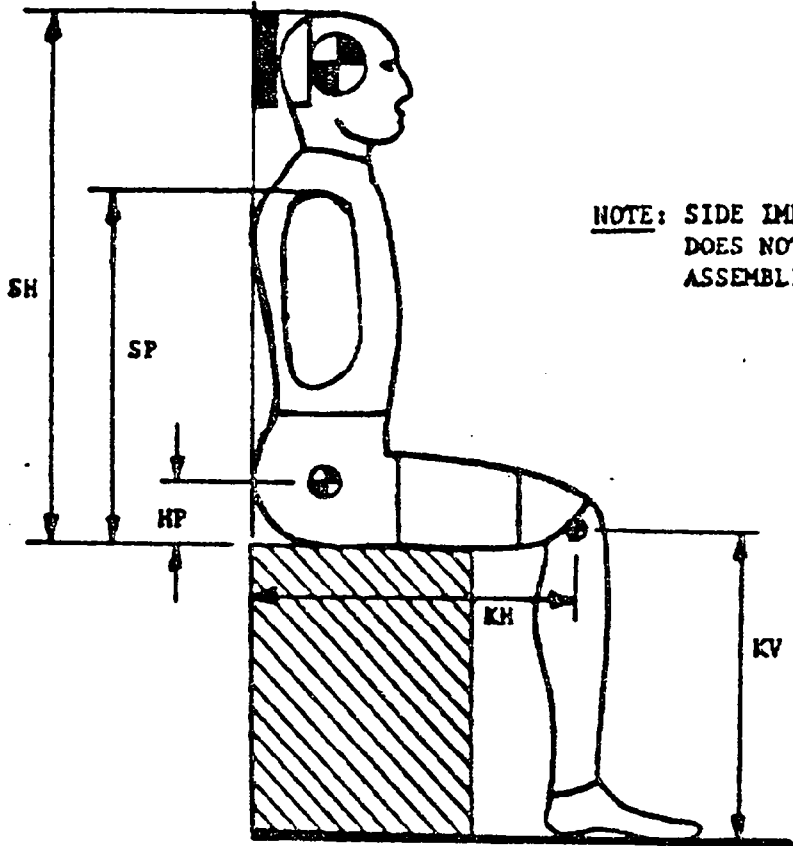
SIDE IMPACT DUMMY CALIBRATION
 DUMMY SERIAL NUMBER 119
 CALIBRATION 09

| TEST/ DATE | CHANNEL | FILTER CLASS | PEAK ACCELERATION (g) SPECIFICATION* | TEST RESULT |
|-------------------|------------------------|-----------------|-----------------------------------------|-------------|
| HEAD 8/30/85 | HEAD Y-AXIS | 1000 | 150-175 | 167.11 |
| THORAX 9/3/85 | UPPER SPINE Y-AXIS | | | |
| | PRIMARY | 180 | 16-24.6 | 24.11 |
| | REDUNDANT | 180 | 16-24.6 | 23.86 |
| | | | | |
| | LOWER SPINE Y-AXIS | | | |
| | PRIMARY | 180 | 17.6-26.4 | 19.92 |
| | REDUNDANT | 180 | 17.6-26.4 | 20.09 |
| | | | | |
| | RIGHT UPPER RIB Y-AXIS | | | |
| | PRIMARY | 180 | 36-50 | 43.05 |
| | REDUNDANT | 180 | 36-50 | 42.50 |
| | | | | |
| | RIGHT LOWER RIB Y-AXIS | | | |
| | PRIMARY | 180 | 36-50 | 45.38 |
| | REDUNDANT | 180 | 36-50 | 44.93 |
| PELVIS 8/30/85 | PELVIS Y-AXIS | 180 | 50-65 | 62.88 |

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

SIDE IMPACT DUMMY CONFIGURATION VERIFICATION TEST DATA

WHITSA DUMMY I.D. NO.: 1 1 9



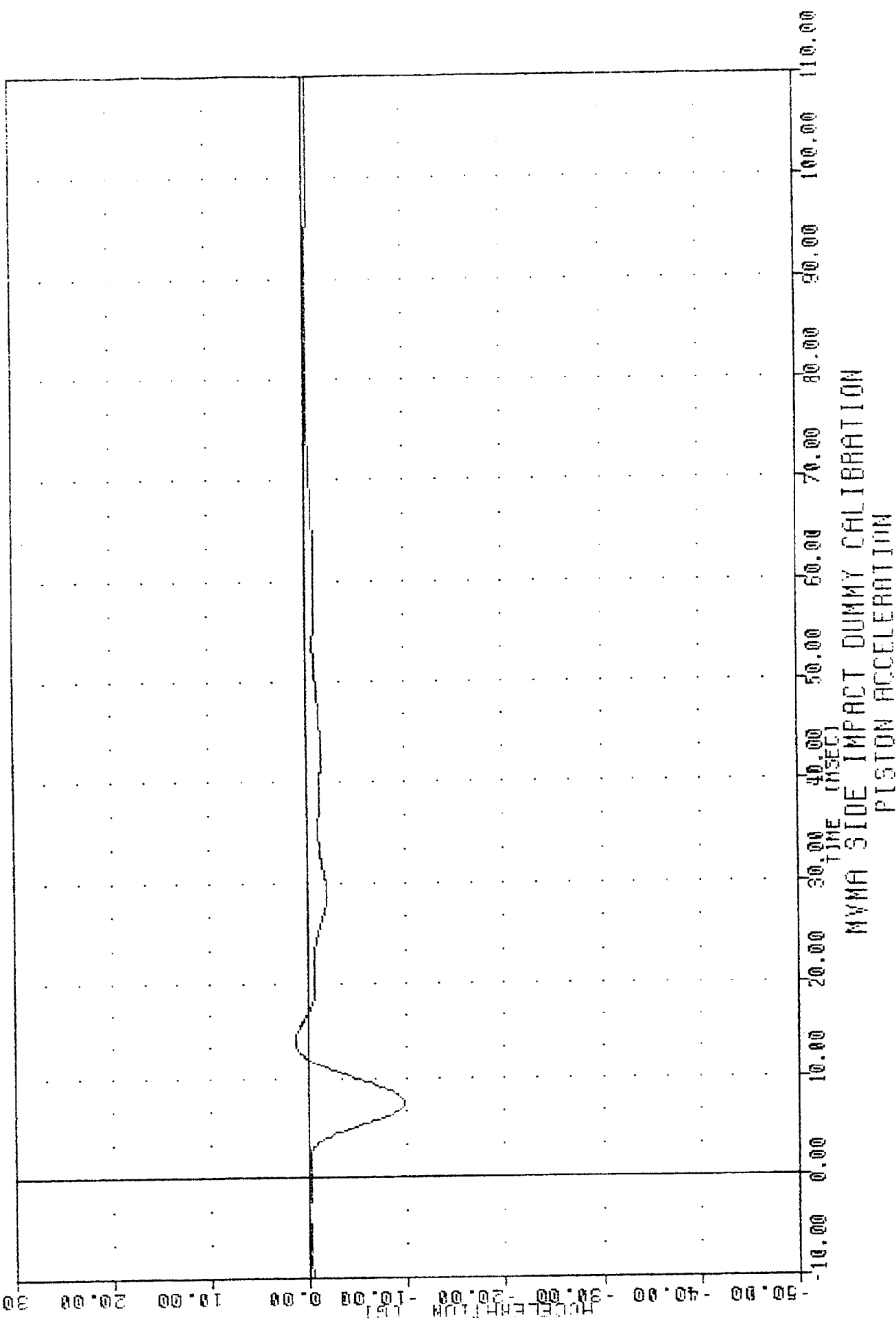
NOTE: SIDE IMPACT DUMMY (SID)
DOES NOT HAVE ANY ARM
ASSEMBLIES

| | P. 572 SPECIFICATION | PRE-TEST | POST-TEST |
|------------------------------------|----------------------|----------|-----------|
| DATE OF CONFIGURATION VERIFICATION | | DNA | 9/17/85 |
| VERIFICATION NUMBER FOR DUMMY* | | DNA | CAL. #2 |
| SH - Seated Height - - - - - | 35.6 to 35.8" | DNA | 35.1 |
| SP - Shoulder Height - - - | | DNA | DNA |
| HP - Hip Pivot Height - - - - - | 3.9" ref. | DNA | 3.9 |
| KH - Knee Pivot from back line - - | 20.1 to 20.7" | DNA | 20.6 |
| KV - Knee Pivot from floor - - - | 19.3 to 19.9" | DNA | 19.4 |
| SW - Shoulder Width - - - - - | | DNA | DNA |
| HW - Hip Width - - - - - | 14.0 to 15.4" | DNA | 14.6 |

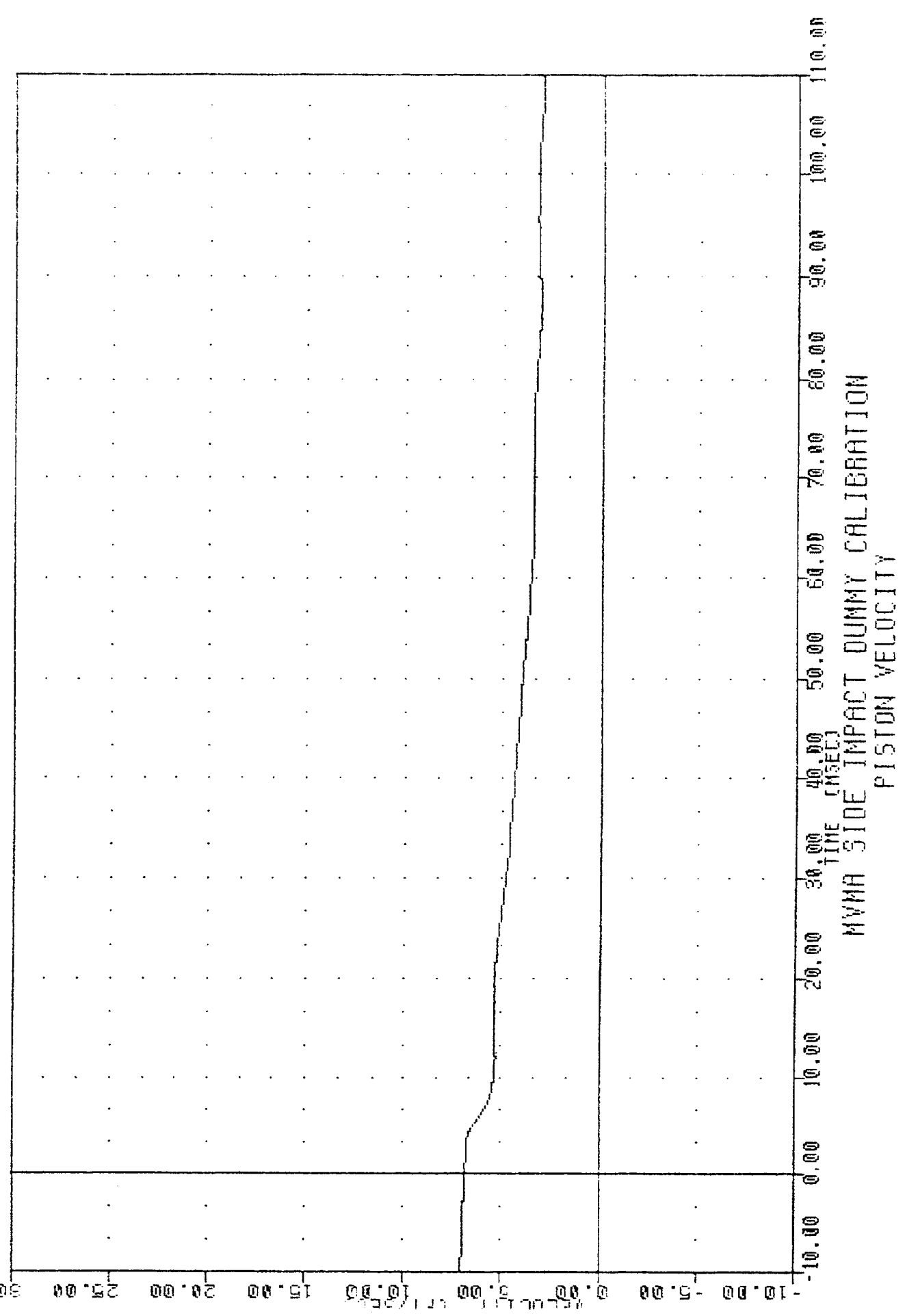
TECHNICIAN'S NAME: *Gary L. Phelps*

* Sequential number beginning with "1" at the start of each fiscal year's crash test program

NYMA
SID 119 HEAD IMPACT CAL 09
85242
PISX6
SH11909
30-AUG-88
16:10:30
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -9.708 7.50 1.39 e 14.00

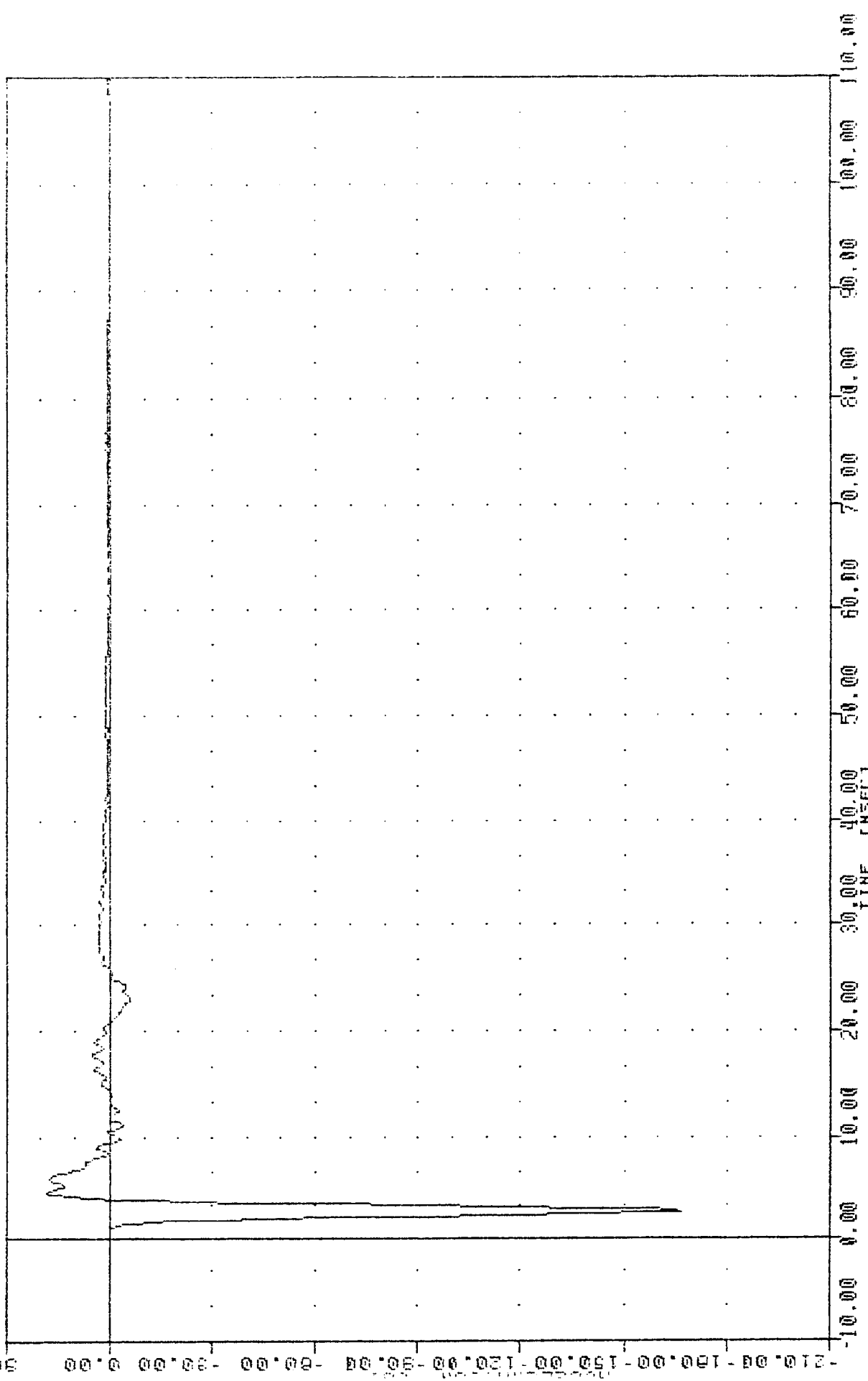


MVMA
 SID 119 HEAD IMPACT CAL 09
 85242
 P13XV
 SH1308
 30-AUG-85 16:10:40
 FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 2.99e 109.75, 7.01 e -9.88



MVMA
SID 119 HEAD IMPACT CAL 09
85242
HE076

PLOT DATE 30-AUG-85 16:10:40
FILTER = ALPF 1650 / 5214 / -40
MIN, MAX VALUES = -167.112 2.63 18.28 4.50



MVMA SIDE IMPACT DUMMY CALIBRATION
HEAD ACCELERATION Y AXIS

PLOT DATE 3-SEP-85 10:24:17

NYMA, ST11909
SID 119 THORAX IMPACT CAL 08

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -20.73 26.00, -0.15 83.13

85246
PISXG

30.00

20.00

10.00

0.00

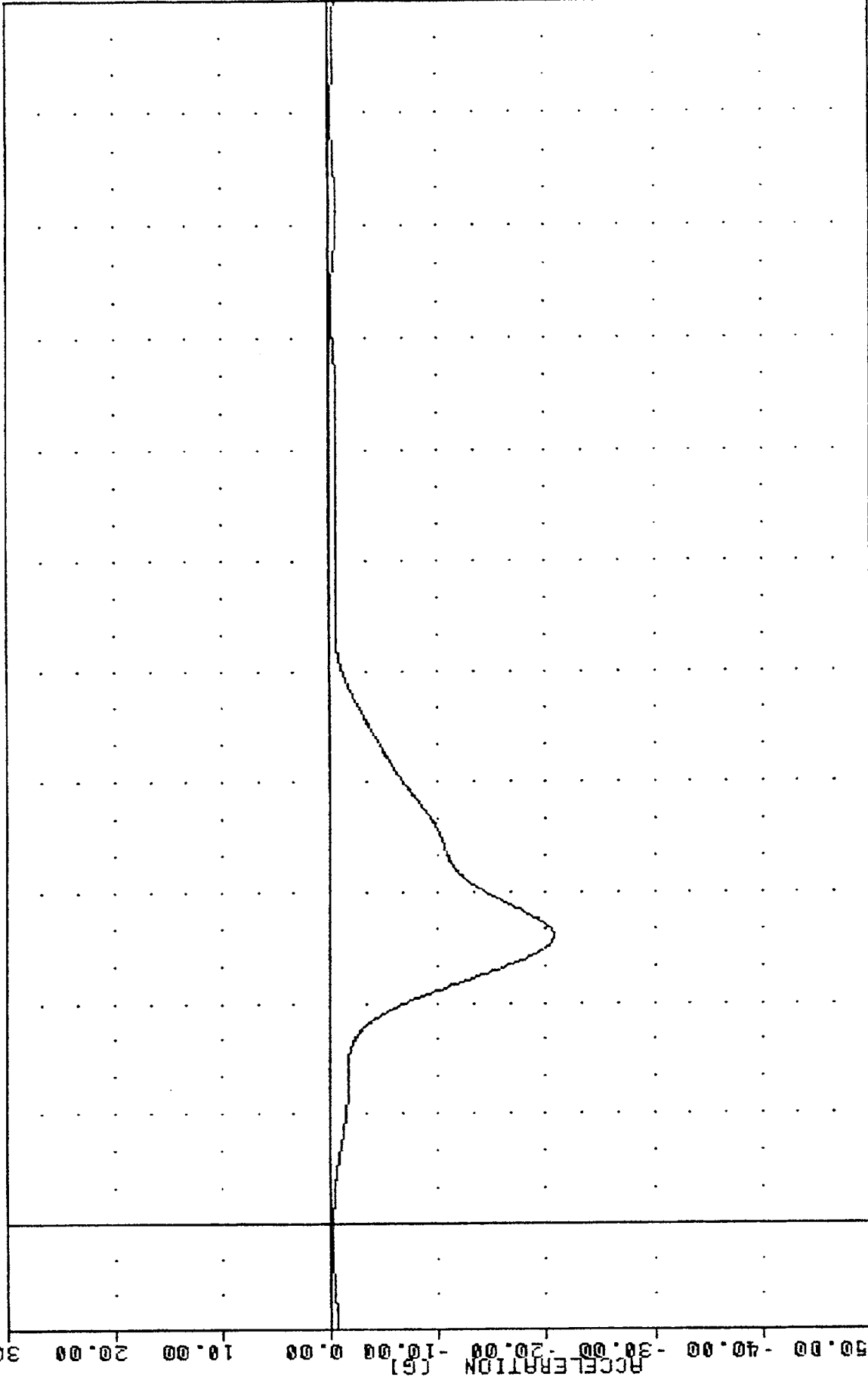
-10.00

-20.00

-30.00

-40.00

-50.00



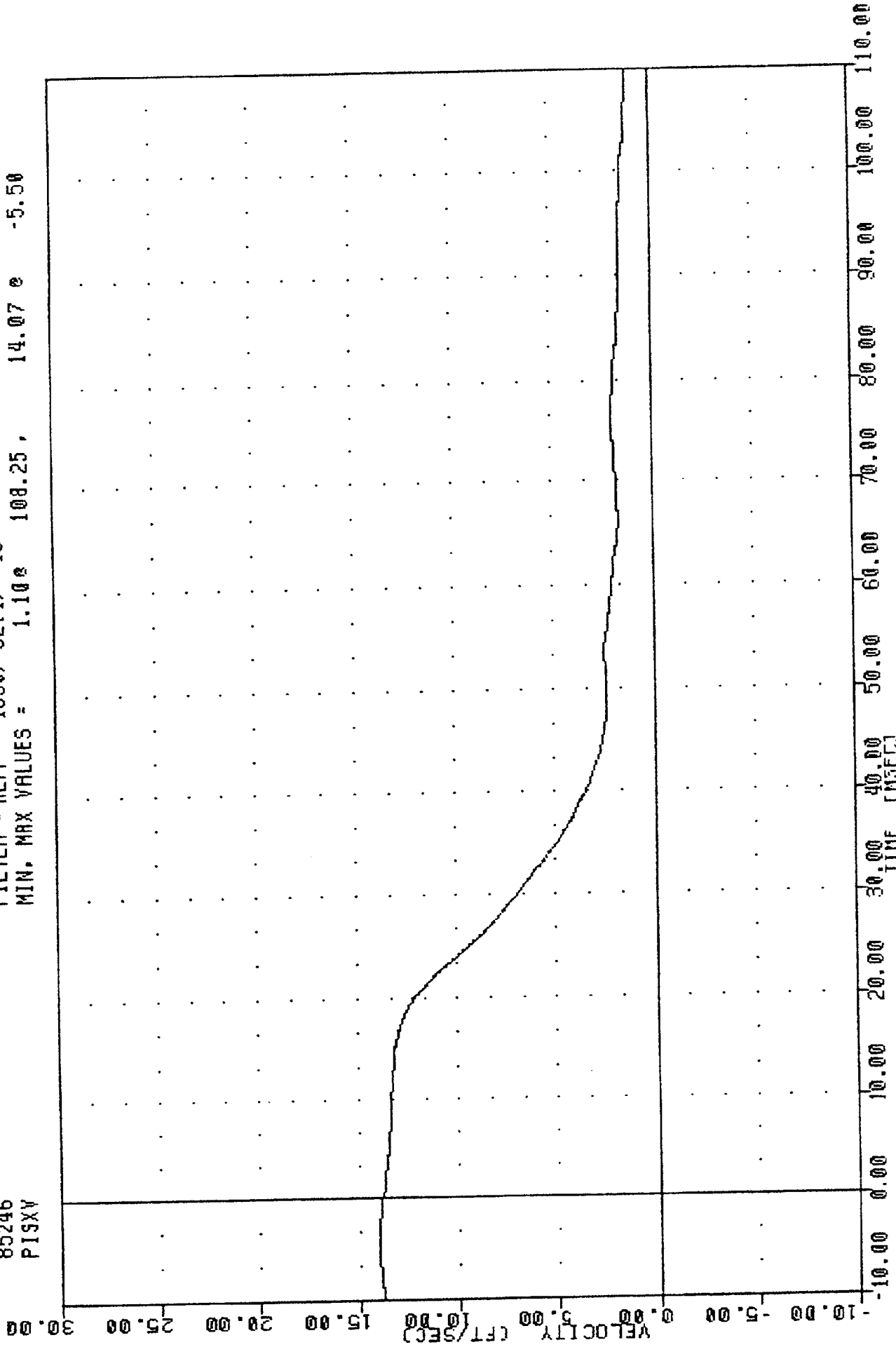
-10.00 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00

MVMA SIDE IMPACT DUMMY CALIBRATION
PISTON ACCELERATION

MYNA , ST11909
SID 119 THORAX IMPACT CAL 09
85246
PISXY

PLOT DATE 3-SEP-85 10:24:17

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 1.10e 108.25 , 14.07 e -5.50

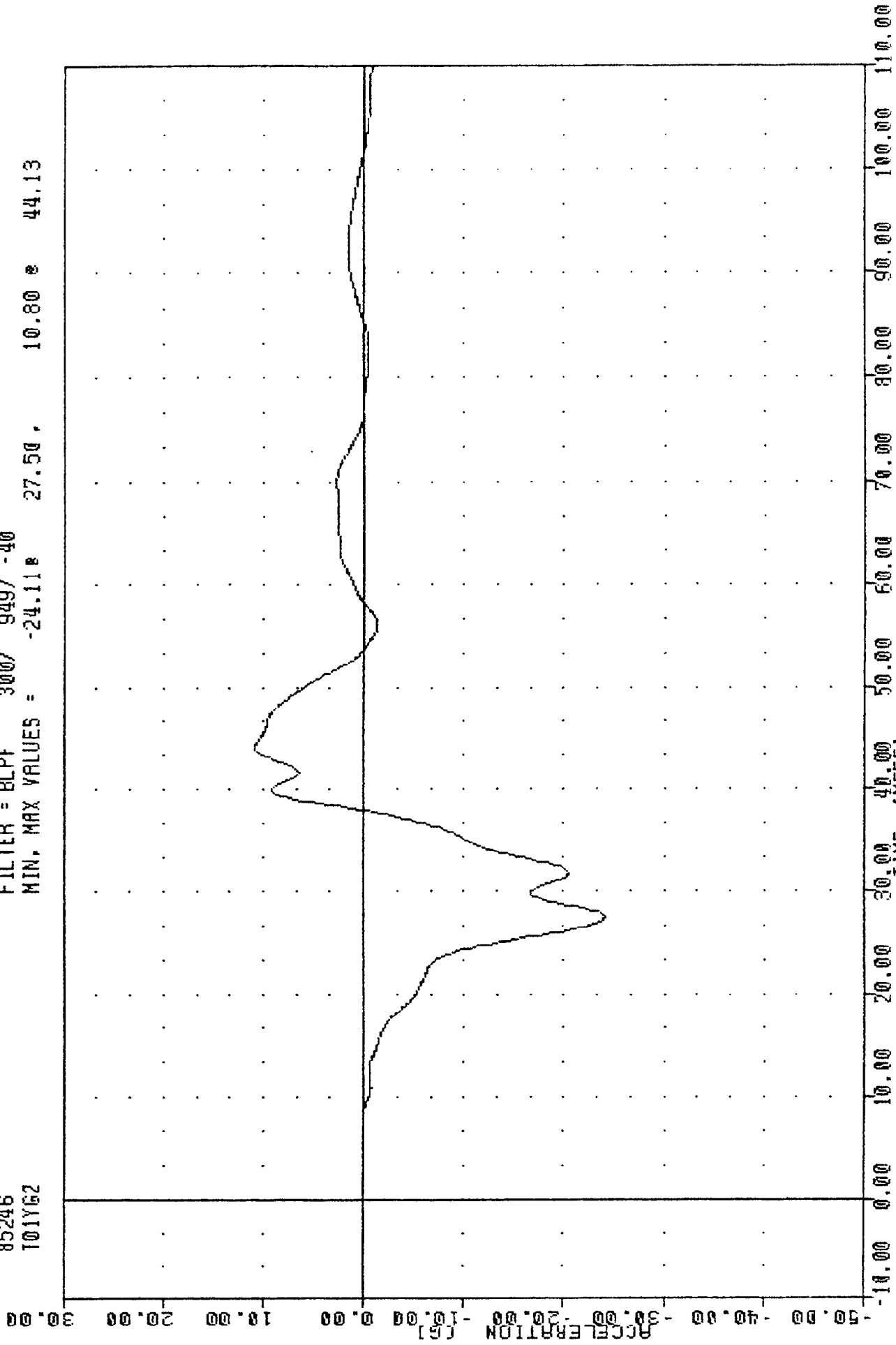


MYNA SIDE IMPACT DUMMY CALIBRATION
PISTON VELOCITY

NYMA
SID 119 THORAX IMPACT CAL 09
85246
T01Y62

PLOT DATE 3-SEP-85 10:24:17

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -24.11e 27.50e 10.80e 44.13

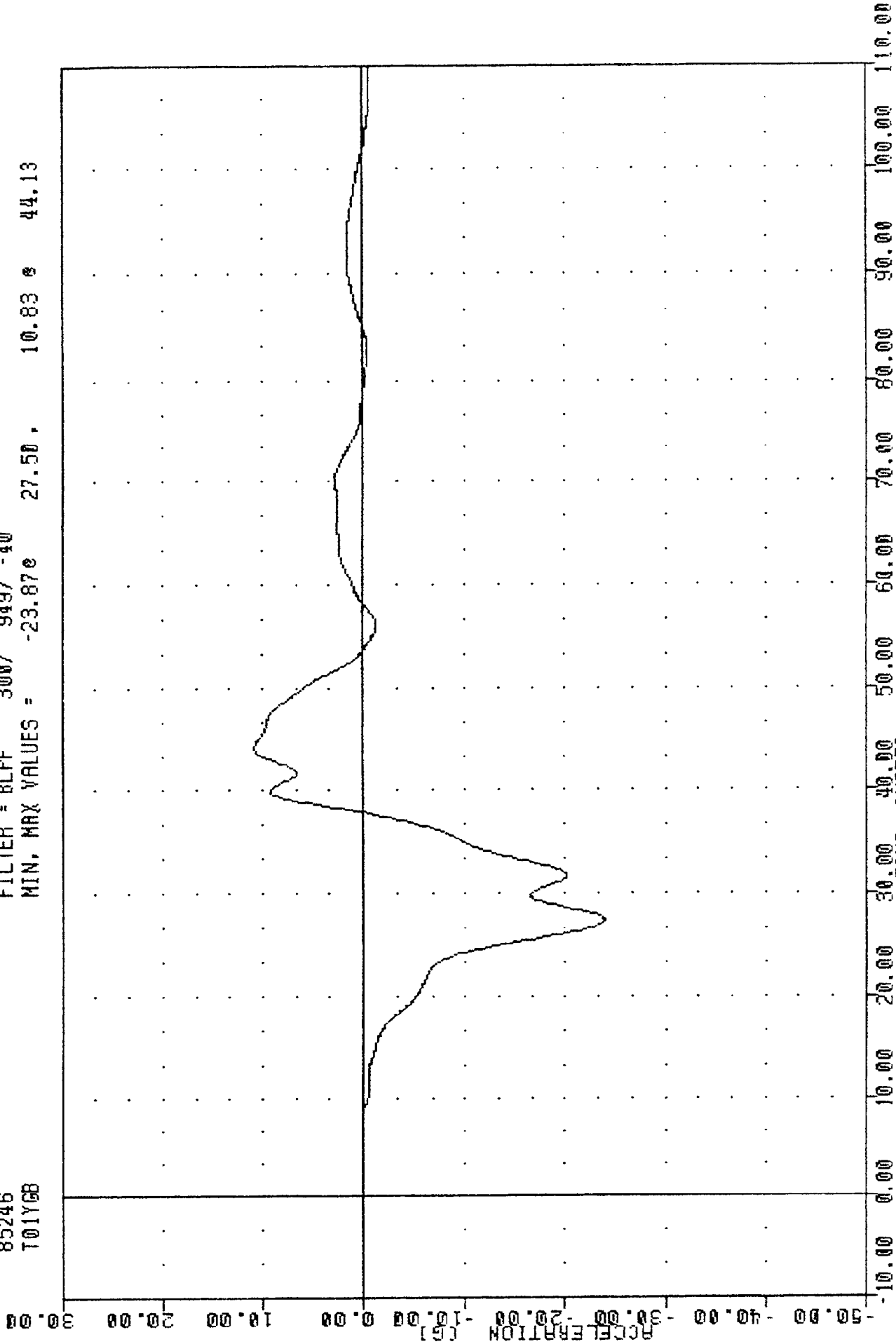


NYMA SIDE IMPACT DUMMY CALIBRATION
UPPER SPINE ACCELERATION Y AXIS - PRIMARY

MYMA ST11909
SID 119 THORAX IMPACT CAL 09
85246
T01YGB

PLOT DATE 3-SEP-85 10:24:17

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -23.87e 27.50, 10.83 e 44.13

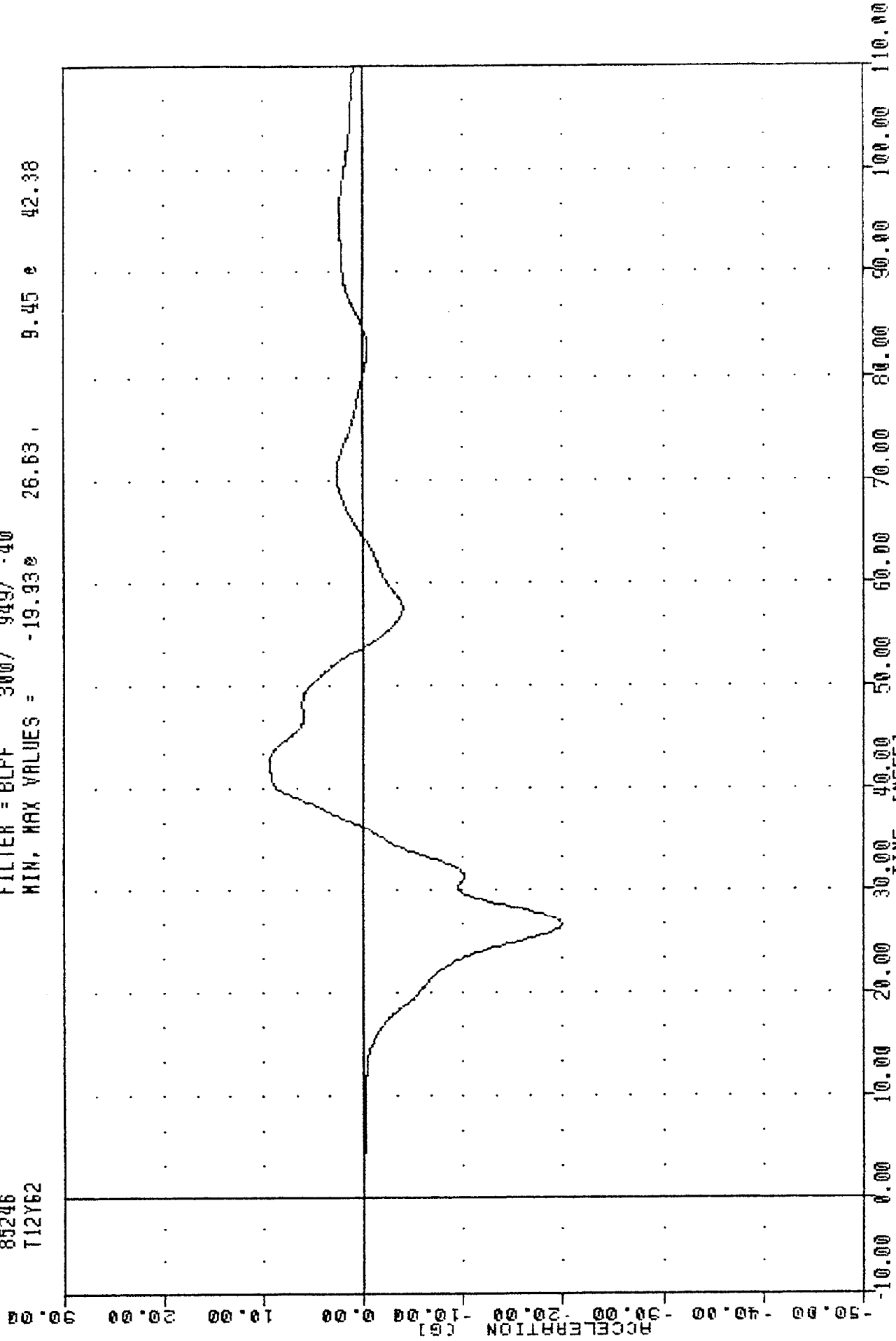


MYMA SIDE IMPACT DUMMY CALIBRATION
UPPER SPINE ACCELERATION Y AXIS -REDUNDANT

MVMA , ST11909
SID 119 THORAX IMPACT CAL 09
85246
T12Y62

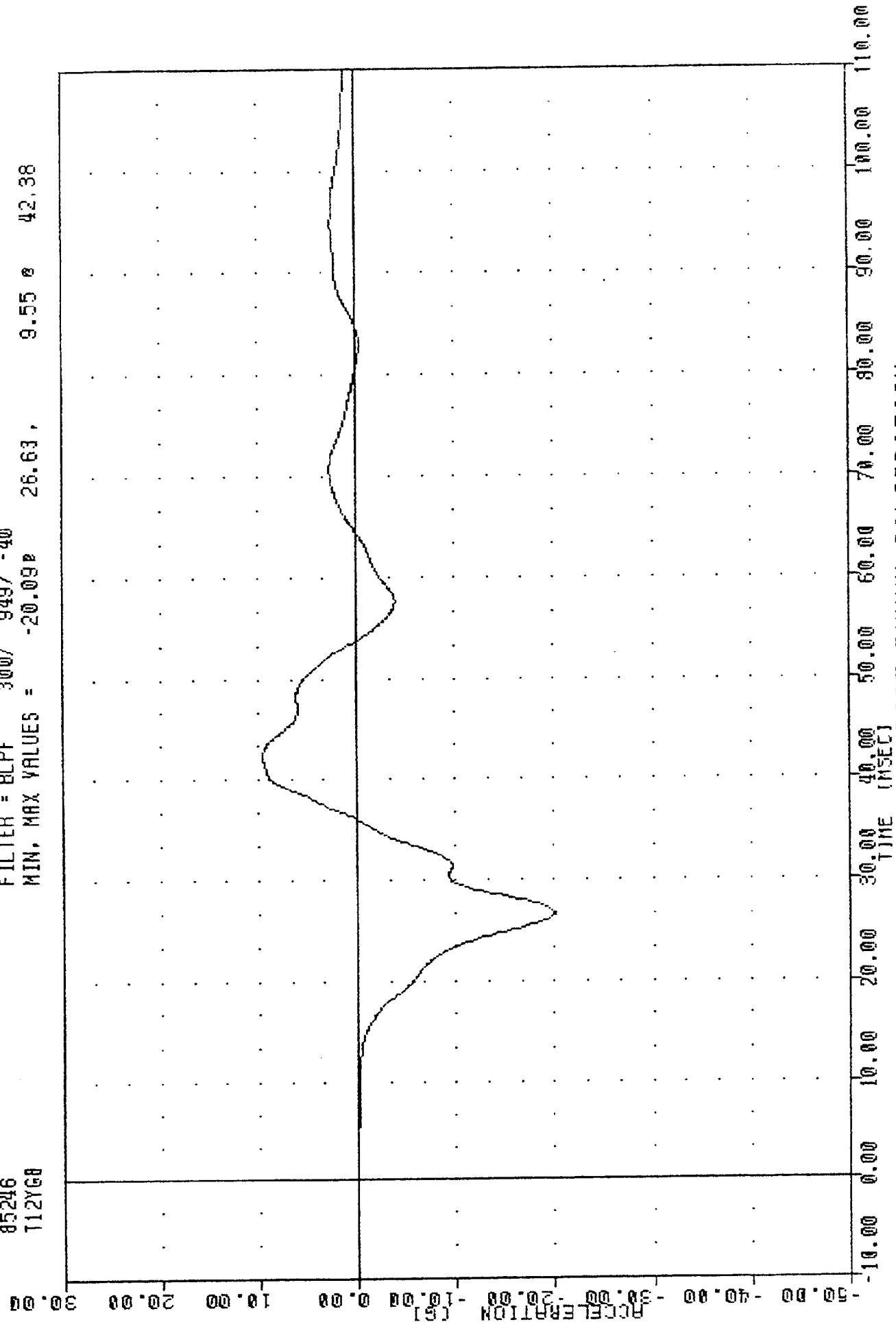
PLOT DATE 3-SEP-85 10:24:17

FILTER = BLFF 300/ 949/ -40
MIN, MAX VALUES = -19.93e 26.63, 9.45 e 42.38



MVMA SIDE IMPACT DUMMY CALIBRATION
LOWER SPINE ACCELERATION Y AXIS - PRIMARY

MVMA ST11909 3-SEP-85 10:24:17
SID 119 THORAX IMPACT CAL 09
85246
712YGB
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -20.09 26.63, 9.55 42.38

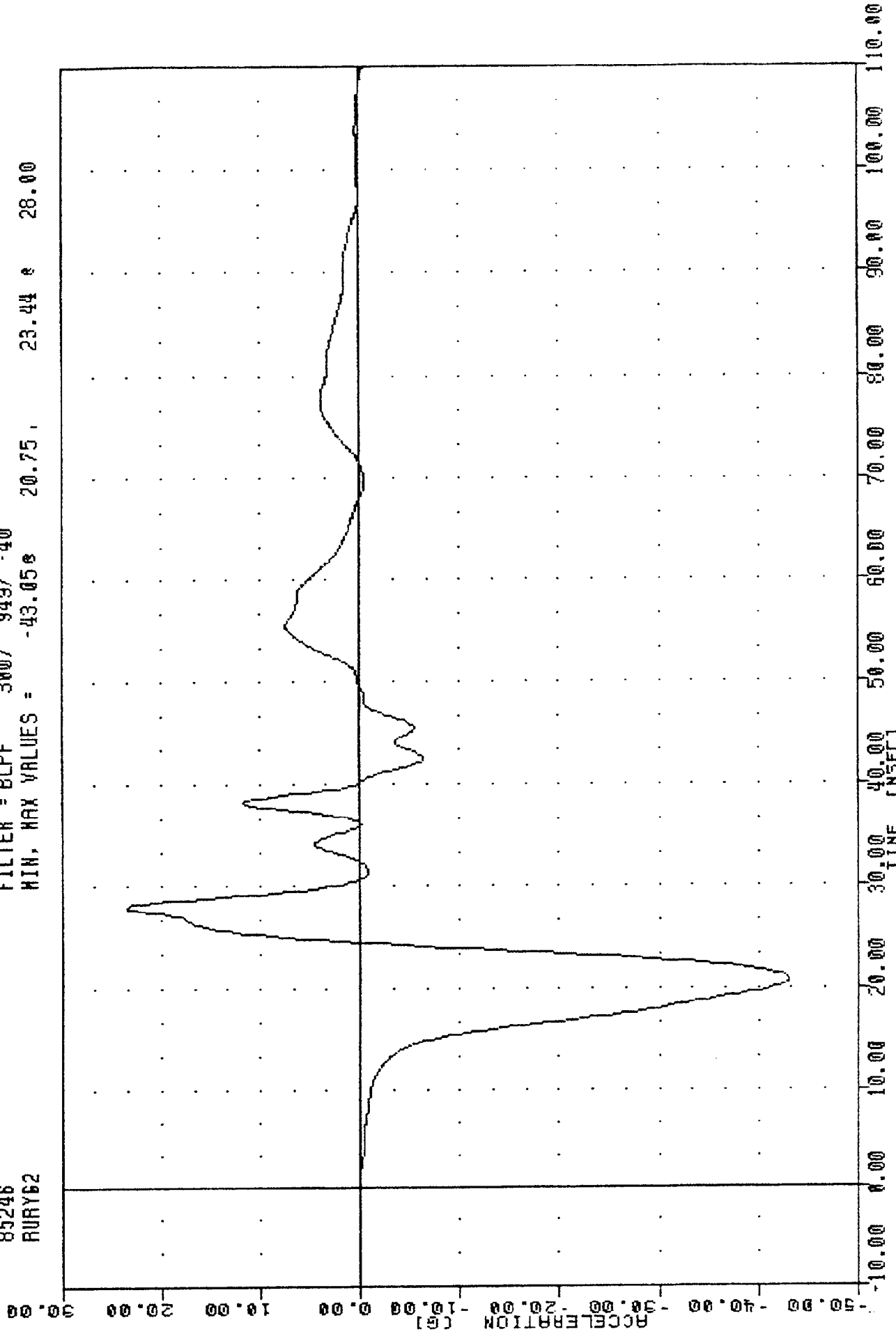


MVMA SIDE IMPACT DUMMY CALIBRATION
LOWER SPINE ACCELERATION Y AXIS - REDUNDANT

MYMA , ST11909
SID 118 THORAX IMPACT CAL 09
85246
RURY62

PLOT DATE 3-SEP-85 10:24:17

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -43.05e 20.75 , 23.44 e 28.00



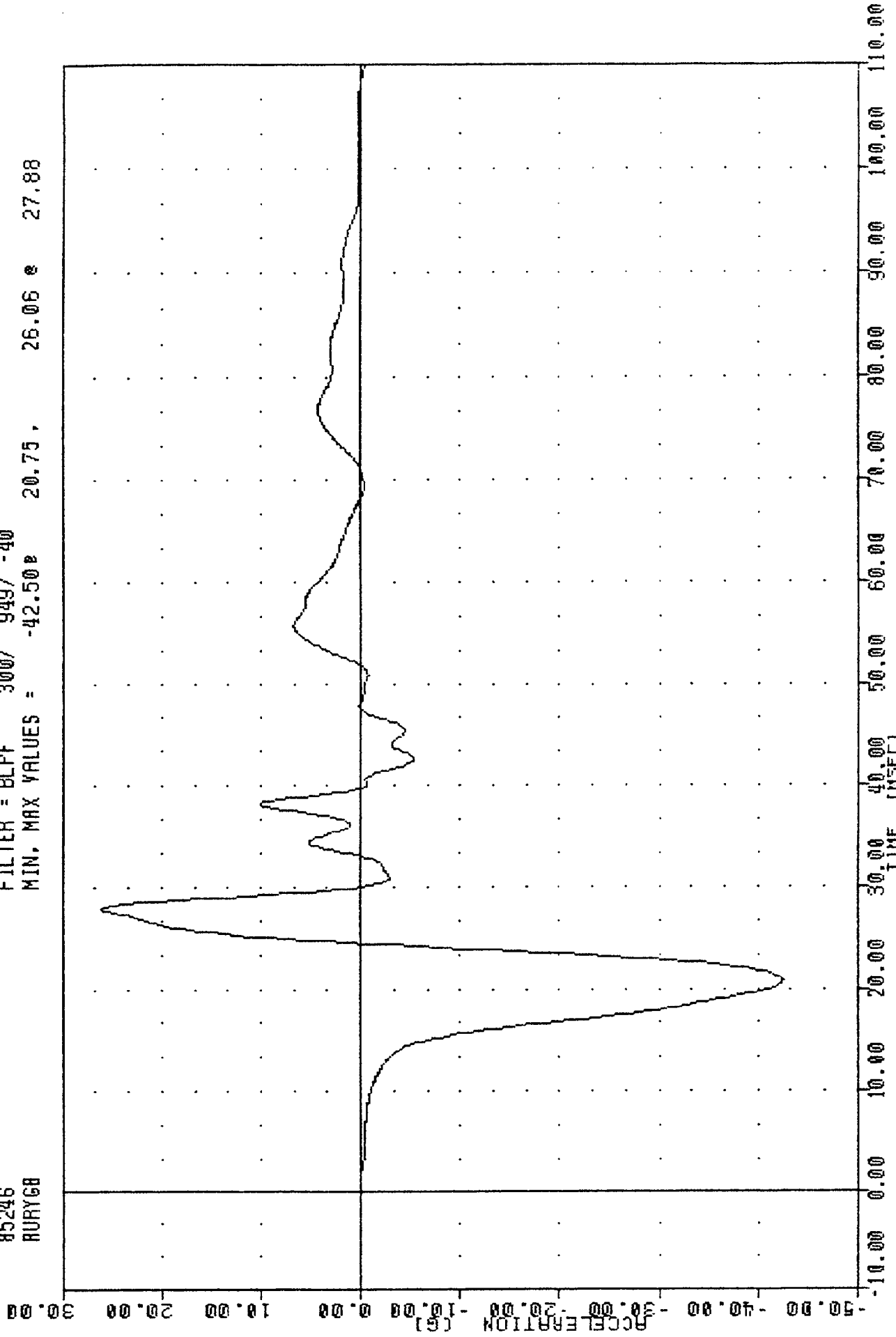
MYMA SIDE IMPACT DUMMY CALIBRATION
RIGHT UPPER RIB ACCELERATION Y AXIS -PRIMARY

PLOT DATE 3-SEP-85 10:24:17

NYMA, ST11909
SID 119 THORAX IMPACT CAL 08

85246
RURYGB
FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -42.50g 20.75, 26.06g 27.88



NYMA SIDE IMPACT DUMMY CALIBRATION
RIGHT UPPER RIB ACCELERATION Y AXIS -REDUNDANT

ST11909 3-SEP-85 10:24:17

MYNA , ST11909

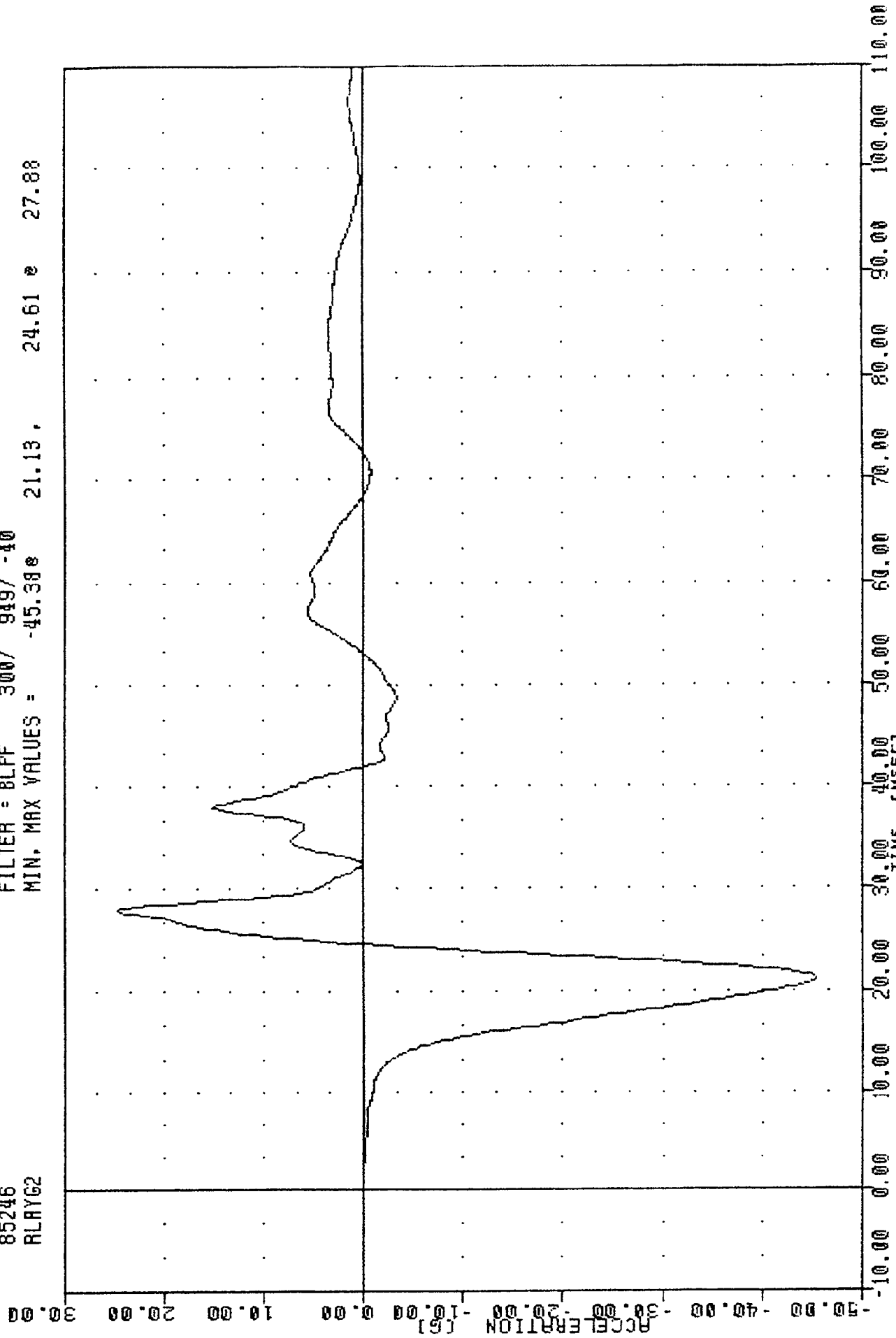
SID 119 THORAX IMPACT CAL 09

85246

FILTER = BLPF 300/ 949/ -40

RLAYG2

MIN. MAX VALUES = -45.38e 24.61 e 27.88

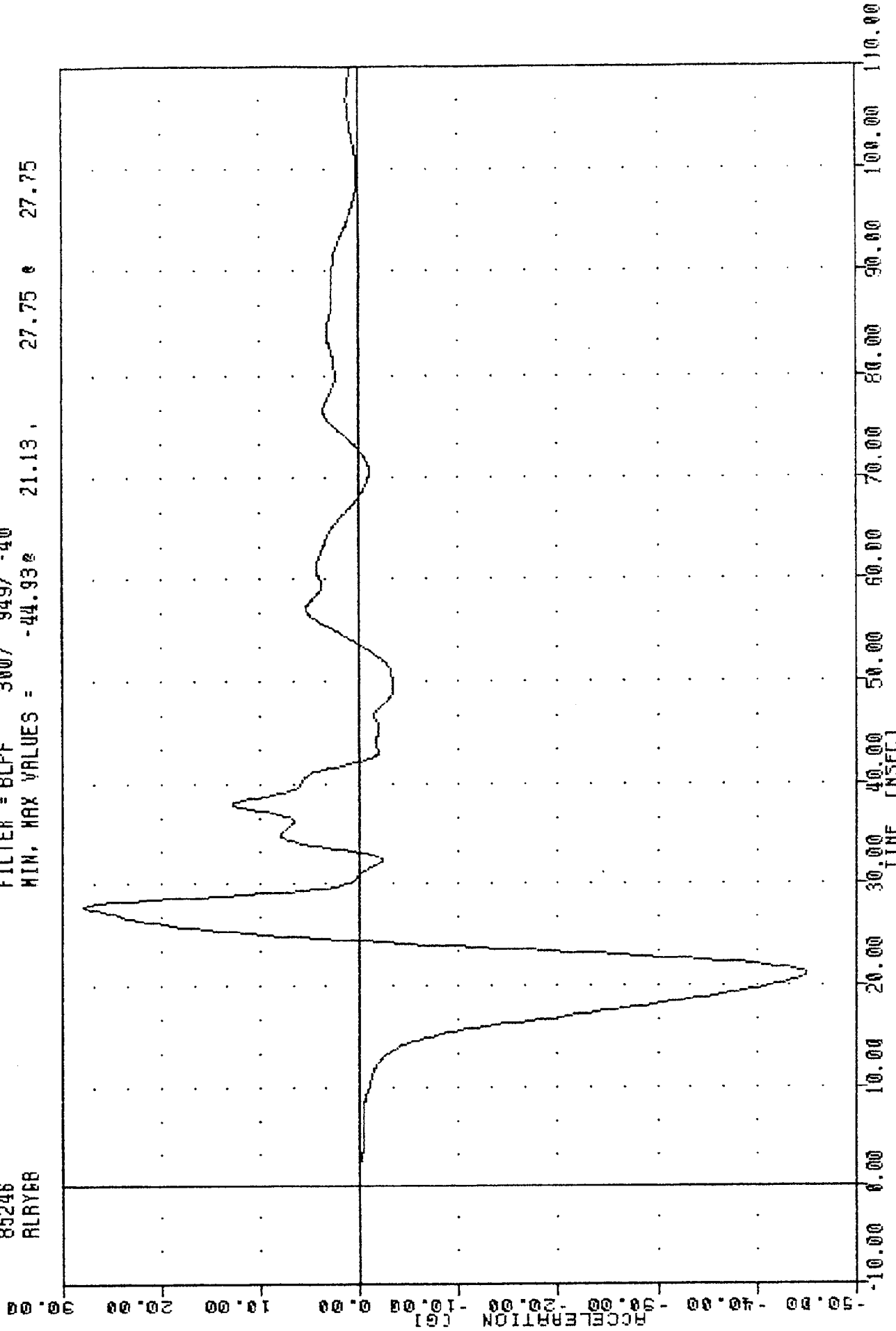


MYNA SIDE IMPACT DUMMY CALIBRATION
RIGHT LOWER RIB ACCELERATION Y AXIS -PRIMARY

MVMA
SID 118 THORAX IMPACT CAL 09
85246
ALRYEB

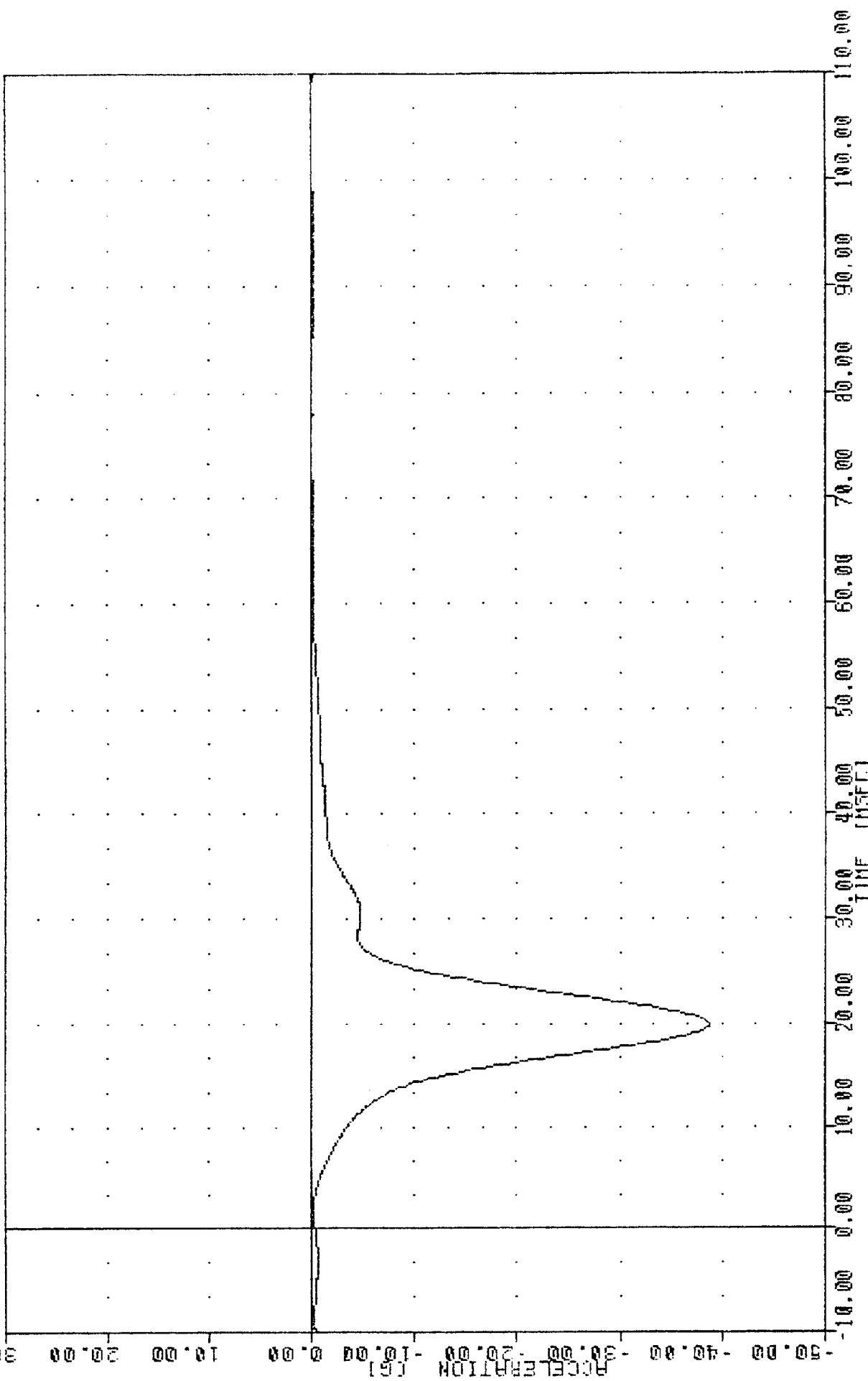
PLOT DATE 3-SEP-85 10:24:17

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -44.93e 21.13, 27.75 e 27.75



MVMA SIDE IMPACT DUMMY CALIBRATION
RIGHT LOWER RIB ACCELERATION Y AXIS - REDUNDANT

MYMA 3F11909 30-AUG-85 15:47:40
SID 119 PELVIC IMPACT CAL 09
85242
PISXG
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -38.798 19.88, -0.01 e 74.88



MYMA SIDE IMPACT DUMMY CALIBRATION
PISTON ACCELERATION

MVMA 7 SPI 505
 SID 119 PELVIC IMPACT CAL 08
 85242
 FISXV

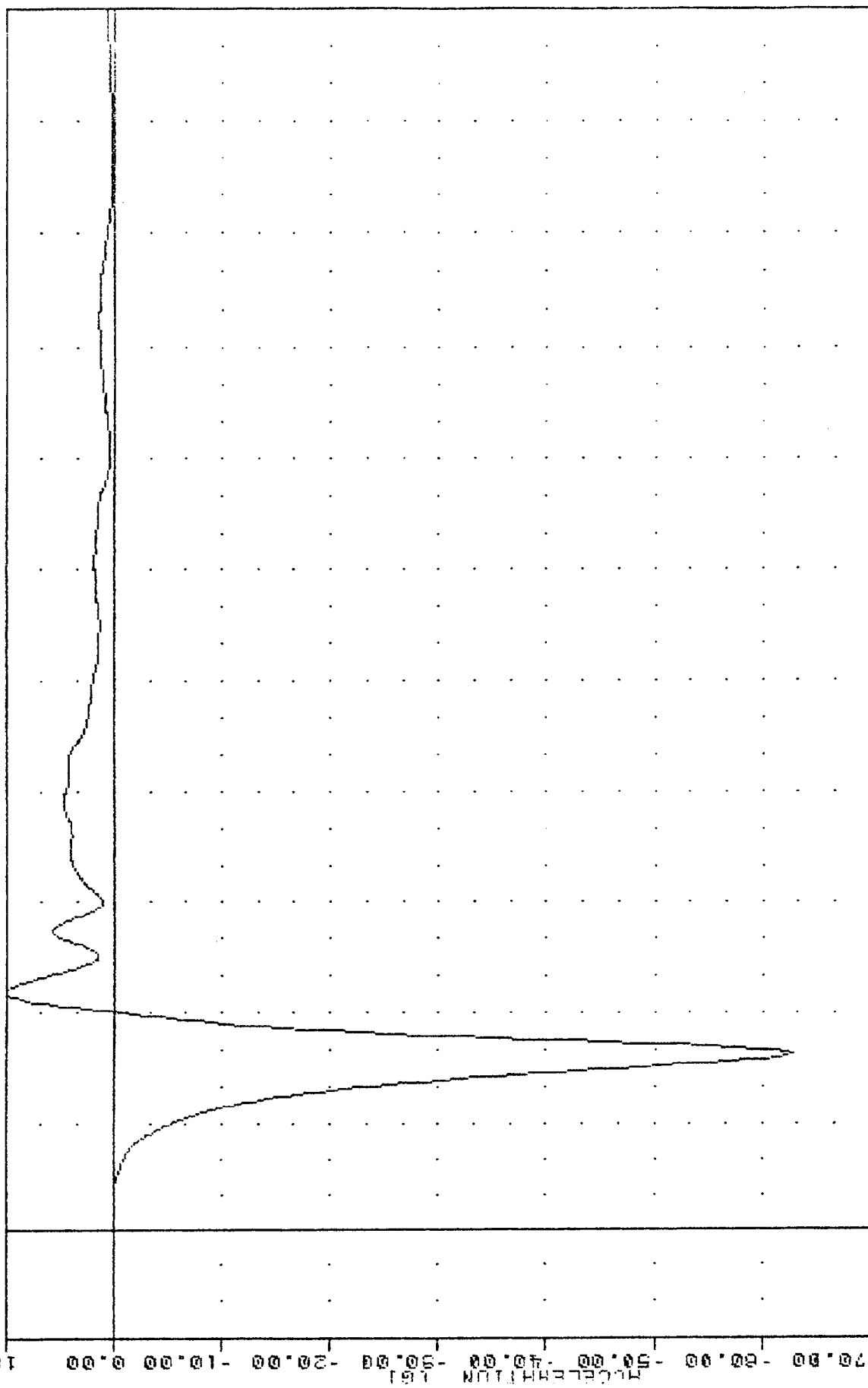
FEEL DATE 30 AUG 88 10:47:40

FILTER = ALPF 1650 / 5214 / -40
 MIN. MAX VALUES = 0.398 108.38 , 14.08 2 -4.68



-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
 TIME (MSEC)
 MVMA SIDE IMPACT DUMMY CALIBRATION
 PISTON VELOCITY

MWMA 7 SPJISWA 30 AUG 80 10:47:40
 SID 118 PELVIC IMPACT CAL 09
 85242
 PEVY6
 FILTER = 6LPF 300 / 949 / -40
 MIN, MAX VALUES = -62.88e 16.25 , 9.96 e 21.88



-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
 TIME (MSEC)
 MWMA SIDE IMPACT DUMMY CALIBRATION
 PELVIS ACCELERATION Y AXIS

POST-TEST

PART 572 DUMMY CALIBRATION

TRANSPORTATION RESEARCH CENTER OF OHIO

LUMBAR FLEXION TEST

PART 572

17-SEP-85

TEMPERATURE 70.00 F
MVMA LF11902

RELATIVE HUMIDITY 61.00 %
572/SID 119 LUMBAR FLEX CAL 02

| DEFLECTION | SPECIFICATION | TEST RESULTS |
|------------------|-------------------|--------------|
| 0 Deg. | 0 LBS | 0.00 LBS |
| 20 Deg | 22.00 - 34.00 LBS | 32.00 LBS |
| 30 Deg | 34.00 - 46.00 LBS | 43.00 LBS |
| 40 Deg | 46.00 - 58.00 LBS | 50.00 LBS |
| NET RETURN ANGLE | < 12 DEG | 11.78 DEG |

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Larry L. Phelps

TEST SUPERVISOR V.L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

ABDOMINAL COMPRESSION TEST

PART 572

17-SEP-85

TEMPERATURE 70.00 F
MVMA AB11902

RELATIVE HUMIDITY 61.00 %
572 SN 119 ABDOM COMPR CAL 02

| TEST CORRIDORS | | |
|----------------|-------------------|--------------|
| DISPLACEMENT | FORCE | TEST RESULTS |
| 0 IN. | 10 LBS | 10 LBS |
| .50 IN. | 23.00 - 36.00 LBS | 26.25 LBS |
| .75 IN. | 36.00 - 50.00 LBS | 37.97 LBS |
| 1.00 IN. | 50.00 - 63.00 LBS | 53.38 LBS |
| 1.30 IN. | 73.00 - 88.00 LBS | 78.85 LBS |

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Mary J. Phelps
TEST SUPERVISOR V.L. Walters

MVMA
ABXD
ABXF

572 SN 119 ARDOM
1650/ 5214/ -40
1650/ 5214/ -40

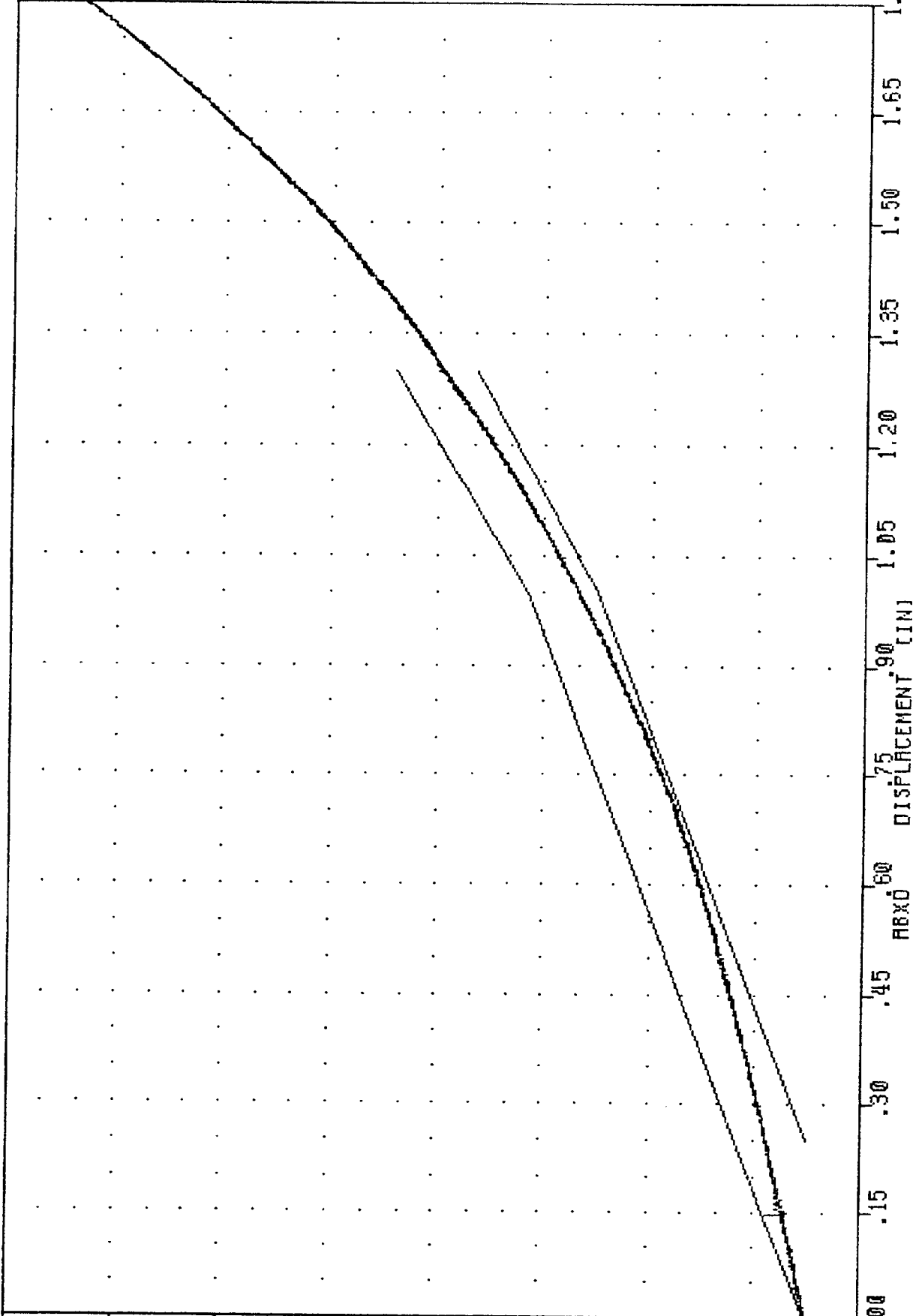
COMPR CAL 02
MIN, MAX =
MIN, MAX =

85260
0.00 B
9.85 B

PL0T DATE 17-SEP-85
0.00 ;
0.00 ;

16:24:36
149.40
1.81

ABXF FORCE (LB)
0.00 20.00 40.00 60.00 80.00 100.00 120.00 140.00 160.00 180.00



ABDOMINAL COMPRESSION VS DISPLACEMENT

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

PART 572

17-SEP-85

TEMPERATURE 70 F
MVMA HD11902

RELATIVE HUMIDITY 61 %
572 SN 119 HEAD DROP CAL 02

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---------------------------------|---------------|--------------|
| PEAK RESULTANT ACCELERATION | 210 - 260 G | 254.87 G |
| TIME ABOVE 100 G LEVEL | 0.9 - 1.5 MS | 1.15 MS |
| PEAK LATERAL ACCELERATION | 10 G MAX | 2.61 G |
| IS ACCELERATION CURVE UNIMODAL? | | YES |

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Harry L. Phelps*

TEST SUPERVISOR *V.L. Walters*