HS-806130

851

DOT 851

MVMA SIDE IMPACT TESTING

MDB-TO-CAR SIDE IMPACT TEST OF
A 26° CRABBED MOVING DEFORMABLE BARRIER
TO A 1985 FORD LTD
AT 33.4 MPH

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

TEST REPORT
TEST NO.: 850607
TEST DATE: JUNE 7, 1985
TEST CONDITIONS: BASELINE STRUCTURE, DUMMY
SEATED 5 INCHES FROM HARDBOARD DOOR PANEL

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

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12790 MAIN ROAD
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Prepared By: _____

B. L. Wade

Project Engineer

Transportation Research Center of Ohio

Approved By: _____

J. F. Shultis

Manager, Impact Laboratory

Transportation Research Center of Ohio

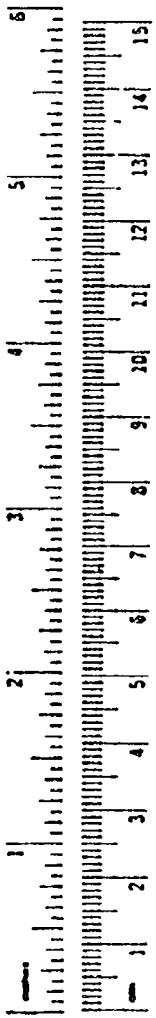
METRIC CONVERSION FACTORS

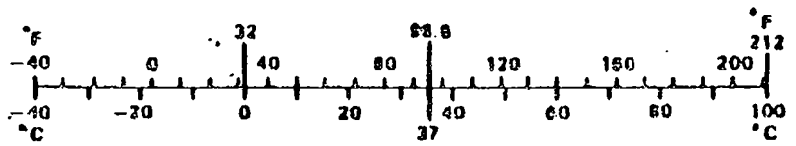
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	metric ton	t
	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 (10 000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton (1000 kg)	1.1	short tons	
	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 to a hardboard door panel in a 90^{o} 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 June 7, 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^{o} 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^{o}. The actual test speed was 33.4 mph and the actual leading edge of contact was 36.6 inches forward of the midpoint of the Ford LTD's wheelbase.

The vehicle was a baseline model with no structural modification. The front passenger inner door panel was replaced with hardboard and a side impact dummy (SID) was seated in the right front passenger seat with its shoulder five inches from the hardboard.

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: 1FABP39A4FG214514

BODY STYLE: 4-Door Sedan MODEL YEAR: 1985

NHTSA NO.: DNA COLOR: Midnight Blue

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

TRANSMISSION DATA: Automatic

DATE VEHICLE RECEIVED: 4/24/85 ODOMETER READING: 3

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

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

REMARKS:

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

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

VEHICLE MANUFACTURED BY: Ford Motor Company

DATE OF MANUFACTURE: 4/85

GVWR: 4225 LBS.,

GAWR: FRONT 2103 LBS., REAR 2255 LBS.

VEHICLE TIRE DATA

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

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Americaway 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	803	LBS.	RIGHT REAR	698	LBS.
LEFT FRONT	807	LBS.	LEFT REAR	660	LBS.
TOTAL FRONT WEIGHT	1610	LBS. (54.2 % OF TOTAL VEHICLE WEIGHT)			
TOTAL REAR WEIGHT	1358	LBS. (45.8 % OF TOTAL VEHICLE WEIGHT)			
TOTAL DELIVERED WEIGHT	2968	LBS.			

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 26 1/2	;LF 26 1/4	;RR 24 1/2	;LR 24 3/8
PRE-TEST ATTITUDE:	RF 26 1/4	;LF 26 1/8	;RR 22 7/8	;LR 23 1/2
POST-TEST ATTITUDE:	RF 26 5/16	;LF 25 7/8	;RR 22 1/8	;LR 22 11/16

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 119 LBS. CARGO:

RIGHT FRONT	826	LBS.	RIGHT REAR	845	LBS.
LEFT FRONT	800	LBS.	LEFT REAR	790	LBS.
TOTAL FRONT WEIGHT	1626	LBS. (49.9 % OF TOTAL VEHICLE WEIGHT)			
TOTAL REAR WEIGHT	1635	LBS. (50.1 % OF TOTAL VEHICLE WEIGHT)			
TOTAL TEST WEIGHT	3261	LBS.			

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

TEST FLUID DATA

TEST FLUID TYPE: RED STODDARD SOLVENT 2; SPEC. GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: NA GALLONS ACTUAL

TEST VOLUME: 14.9 GALLONS

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 16.0 GALLONS

DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: No FUEL INJECTION: No

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? DNA

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

VEHICLE LOAD (UP TO CAPACITY): FRONT 30 psi; REAR 30 psi

RECOMMENDED TIRE SIZE: P195/75R14 LOAD RANGE X B, C,

VEHICLE CAPACITY: TYPES OF SEATS: Split Bench

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 3 FRONT
3 REAR
6 TOTAL

CARGO LOAD 100 LBS.

TOTAL 1000 LBS.

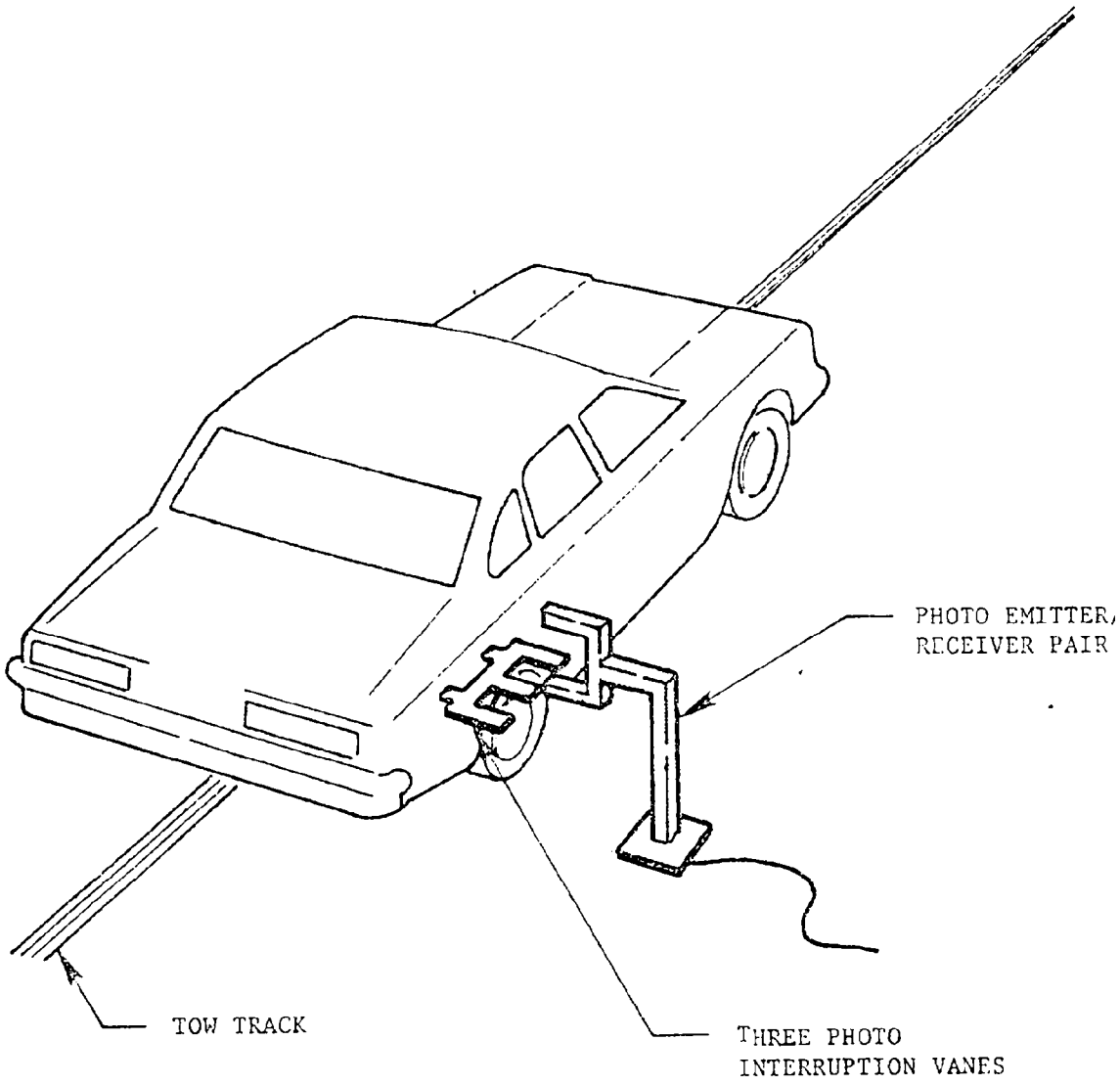
*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

VEHICLE TEST WEIGHT CALCULATION

Test Weight = Unloaded Delivered Weight +
Number of Dummies X 174 lbs. +
Cargo Weight
= 2968 + 1 X 174 + 100 lbs.
= 3242 lbs.

To achieve test weight, the muffler and tail pipe 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 two inches before impact.

The vanes have one foot spacing.

DUMMY TEMPERATURE CONTROL AND POSITIONING

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

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

SIDE IMPACT DUMMY SEATING PROCEDURE

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

1. The seat is placed in the midpoint of the fore to aft adjustment.

2. The H-point location of the NHTSA Side Impact Dummy (SID) is located by using the SAE three-dimensional H-point machine (SAE J826 APR80 - 50TH Percentile Male Configuration). The H-point machine is positioned in the right front outboard designated seating position such that the midsaggital plane is vertical and longitudinal. The H-point is located and documented using Sections 4 through 6 of SAE Standard J826 APR80.

3. The H-point machine is removed and the SID is positioned in the right front passenger seat such that its right shoulder is either five inches from or against the hardboard or padded inner door panel. The knees are initially set 11 1/2 inches apart, measured between the outer surfaces of the knee pivot bolt heads, if possible. The H-point is then positioned to within 1/2 inch of the coordinates of the H-point machine H-point location found in Step 2 by applying force in the appropriate direction to the dummy's lower torso. If the dummy's upper torso does not rest against the seatback, position the torso without moving the H-point so the upper torso does rest against the seatback. The dummy's feet are then positioned such that the heels rest on the floorpan and the feet are on the toeboard. If the dummy's feet will not reach the toeboard, the feet are positioned such that the feet are at right angles to the lower legs. If wheelhouse projections interfere with the above positioning of the feet, the heel is placed on the floorpan with the foot perpendicular to the lower leg by twisting the foot about the ankle.

4. Prior to the crash test the dummy's longitudinal and lateral head locations are rechecked. The dummy is then visually checked.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

MFR./MAKE/MODEL: Ford LTD

FRONT SEAT TYPE: ___ BENCH
___ BUCKET
_X_ SPLIT BENCH

ADJUSTER TYPE: _X_ MANUAL
___ POWER

BUCKET SEAT BACK TYPE: _X_ FIXED
___ ADJUSTABLE

TECHNICIANS:
1. D. Carpenter
2. G. Watters
3. B. Fishbaugh

POSITIONING DATE: 6/7/85

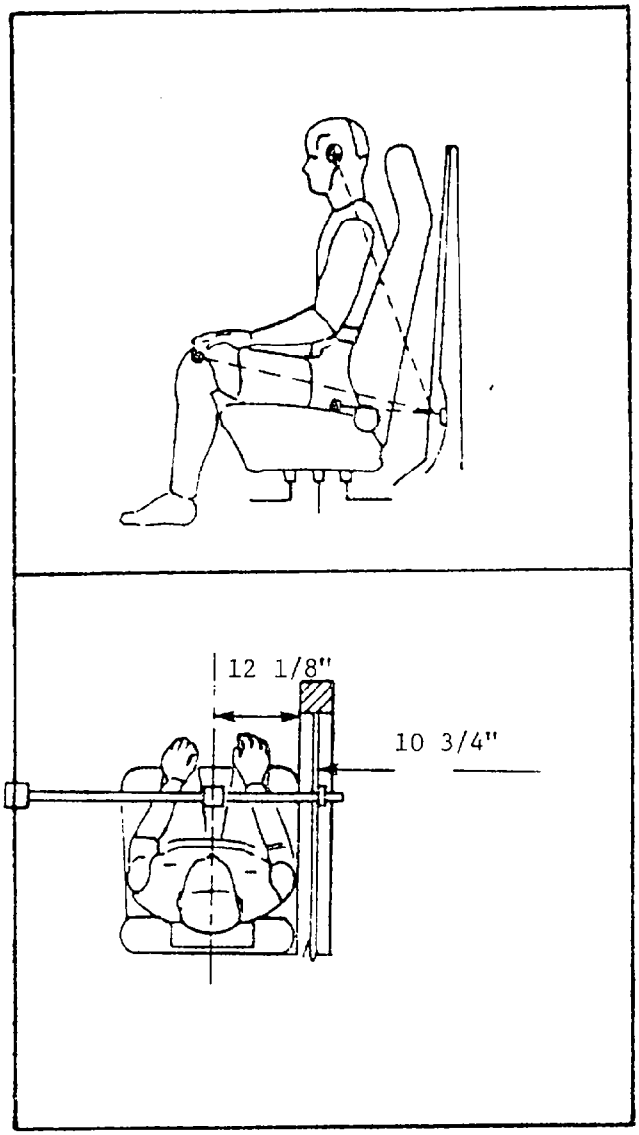
AMBIENT TEMP: 64 °F TIME: 10:30

FRONT PASSENGER DUMMY # 016

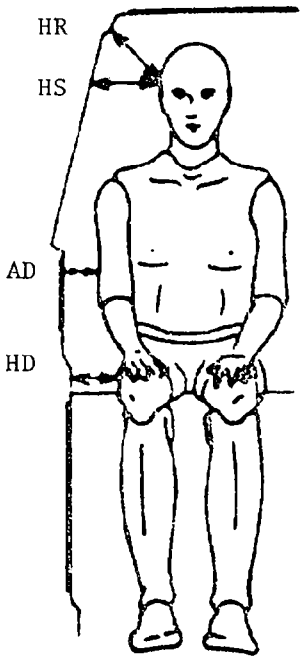
21 1/8 " HEAD
3 ° TARGET*

25 3/16 " KNEE
88 ° JOINT

APPROX.
11 " "H"
115 ° POINT



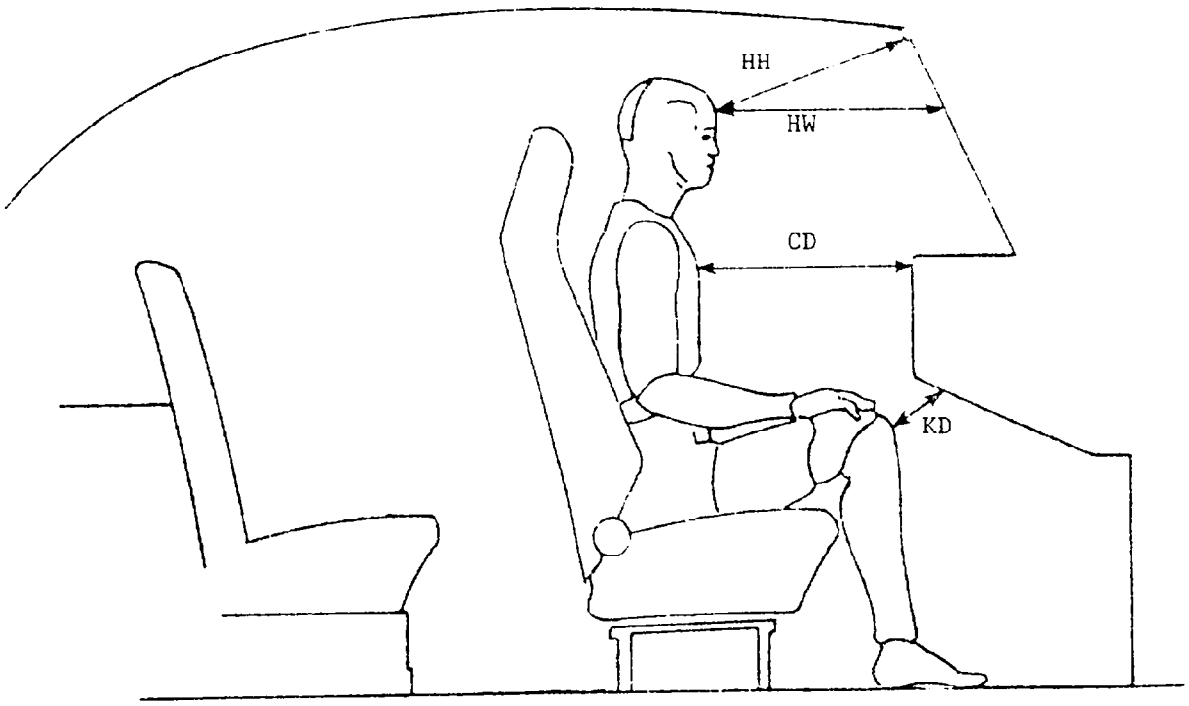
*All passenger dummy dimensions referenced to top of front door striker bolt and all angles referenced to vertical.



	PASSENGER 016
HR	6 7/8
HS	9 1/4
AD	5
HD	6

ALL MEASUREMENTS IN INCHES

DUMMY LATERAL CLEARANCE DIMENSIONS



PASSENGER
016

HH	12 1/2
HW	18 7/8
CD	20 1/4
KDL	5 5/8
KDR	5 1/2

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSION

LOCATIONS OF OFFBOARD HIGH SPEED CAMERAS

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

Origin of Coordinate System is Point of Impact

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

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1		Beaulieu	18-86	24	Documentary
2	Right-Panning	Kodak	16	24	Real time
3	MDB Wide	Photosonic 1B	13	998	View Impact
4	Overhead Tight	Photosonic 1B	25	920	View Impact
5	Overhead Wide	Photosonic 1B	8	920	Vehicle Crush
6	Right	Photosonic 1B	25	995	Vehicle Crush
7	Left	Photosonic 1B	13	995	Vehicle Crush
8	Onboard Windshield	Photosonic 1B	8	1000	Dummy Kinematics
9	Onboard Roof	Photosonic 1B	8	1005	Dummy Kinematics
10	Onboard Door	Photosonic 1B	8	998	Dummy Kinematics

TRANSDUCER INFORMATION

PARAMETER BEING MEASURED	LOCATION	TYPE OF TRANSDUCER	MFGR	MODEL NUMBER	SERIAL NUMBER
HEDXG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	2264	AY95
HEDYG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	2264	BA26
HEDZG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	2264	BA30
T01YG2	UPPER SPINE	ACCEL.	ENDEVCO	2264	AN61
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
RURYG2	RIGHT UPPER RIB	ACCEL.	ENDEVCO	2264	AR82
RLRYG2	RIGHT LOWER RIB	ACCEL.	ENDEVCO	2264	AN60
RLRYGB	RIGHT LOWER RIB	ACCEL.	ENDEVCO	2264	AY78
PEVXG2	PELVIS	ACCEL.	ENDEVCO	2264	AR78
PEVYG2	PELVIS	ACCEL.	ENDEVCO	2264	AN01
PEVZG2	PELVIS	ACCEL.	ENDEVCO	2264	AJ35
RRTYD2	RIGHT RIB TO SPINE DISPLACEMENT	LINEAR POT.	BOURNS	5184	4081-191
RFDYG1	RIGHT FRONT DOOR-POSITION 1	ACCEL.	ENDEVCO	2264	AJ42
RFDYG2	RIGHT FRONT DOOR-POSITION 2	ACCEL.	ENDEVCO	2264	AP56
RFDYG3	RIGHT FRONT DOOR-POSITION 3	ACCEL.	ENDEVCO	2264	BC29
LFSXG	LEFT FRONT SILL	ACCEL.	B & H*	4-202-0001	18840
LFSYG	LEFT FRONT SILL	ACCEL.	B & H	4-202-0001	18236
LFSZG	LEFT FRONT SILL	ACCEL.	B & H	4-202-0001	18837
BCGXG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18851
BCGYG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18859
BCGZG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18847
BRCXG	BARRIER REAR CROSS MEMBER	ACCEL.	B & H	4-202-0001	18240
BRCYG	BARRIER REAR CROSS MEMBER	ACCEL.	B & H	4-202-0001	19002

*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 summmary
5. Vehicle static crush table and profiles
6. Deformable moving barrier accelerometer locations and data summary
7. Test anomalies

TEST CONDITIONS

TEST NUMBER: 850607

DATE OF TEST: June 7, 1985 TIME OF TEST: 14:00

WIND VELOCITY: 0-2 mph 171° SE HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 68° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 78° F

DUMMY TEMPERATURE: 73° F

SUBJECT VEHICLE DATA

	ACTUAL	INTENDED
VEHICLE TEST WEIGHT (LBS.)	3261	3242
MDB TEST WEIGHT (LBS.)	2991	2992
MDB VELOCITY (MPH)*	33.4	33.5
IMPACT POINT (INCHES)**	36.6	37.0

DUMMIES

	DRIVER	MIDDLE PASSENGER	RT. FRONT PASSENGER	LEFT REAR PASSENGER	RT. REAR PASSENGER
TYPE:			SID		
SERIAL NO.:			016		
INSTRUMENTATION:					
HEAD ACCEL.:			3		
CHEST ACCEL.:			8		
FEMUR L.C.'S:			0		
OTHER:			3 Pelvis 1 Rib Disp.		

RESTRAINT SYSTEM: Dummy was unrestrained

* As measured over final one foot of travel.

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

SIDE IMPACT DUMMY DATA SUMMARY

	PASSENGER DUMMY			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
HEAD ACCELERATION				
LONGITUDINAL	38.99	176.63	49.51	105.88
LATERAL	53.26	176.38	37.20	104.63
VERTICAL	43.13	68.63	17.40	180.63
RESULTANT		67.99 @ 176.38		
HIC		--- from --- to --- Y		
DELTA V (MPH)		-34.2 @ 172.25		
CHEST ACCELERATION				
UPPER SPINE				
LATERAL	40.78	69.38 Y	64.39	46.25 Y
VERTICAL	19.57	36.88	13.64	41.87
DELTA V (MPH)***		-20.4 @ 65.75		
LOWER SPINE				
LONGITUDINAL	23.05	56.25	29.73	41.87
LATERAL (P)****	14.30	60.63 Y	99.72	39.38 Y
LATERAL (R)	16.44	60.63 Y	92.59	39.38 Y
DELTA V (MPH)		-14.2 @ 57.25 (P)		
		-6.9 @ 56.25 (R)		
RIGHT UPPER RIB				
LATERAL (P)	7.85	84.38 Y	68.97	38.13 Y
DELTA V (MPH)		-23.8 @ 79.00		
RIGHT LOWER RIB				
LATERAL (P)	9.71	73.13 Y	70.65	39.38 Y
LATERAL (R)	10.36	73.13 Y	71.30	39.38 Y
DELTA V (MPH)		-14.7 @ 93.00 (P)		
		-12.5 @ 92.63 (R)		
PELVIS ACCELERATION				
LONGITUDINAL	---	--- Y	---	--- Y
LATERAL	19.32	85.88 Y	148.93	34.25 Y
VERTICAL	6.91	116.75	43.11	38.75
RESULTANT		149.48 @ 34.25		
DELTA V (MPH)		-30.5 @ 45.63		

SIDE IMPACT DUMMY DATA SUMMARY CONTD

PASSENGER DUMMY

	POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)
RIB DEFLECTION †	---	--- ×	1.82	116.38

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

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

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

† Compression: Negative

ϒ See Test Anomalies

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

VISIBLE DUMMY CONTACT POINTS:

	DRIVER DNA	PASSENGER 116
Head		Window Sill, B-Pillar, Headliner
Chest		Inner Door Panel
Abdomen		Inner Door Panel
Left Knee		Right Knee
Right Knee		Inner Door Panel

DOOR OPENING:

	LEFT	RIGHT
Front	Normal	Tools Required
Rear	Normal	Tools Required

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	No	No
Rear	No	No

GLAZING DAMAGE: All right side door glass was shattered. Winshield was cracked.

OTHER NOTABLE IMPACT EFFECTS:

DUMMY KINEMATIC SUMMARY

During impact, the dummy's right leg and right side of the torso contacted the inner door panel. The dummy's head rotated to the right about the neck until it hit the window sill of the right front door. Upon rebound, the dummy became airborn as its head impacted the headliner. The dummy came to rest sitting near the middle of the seat, leaning to the right.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE** DIRECTION MAX (g)	POSITIVE** DIRECTION TIME (msec)	NEGATIVE*** DIRECTION MAX (g)	NEGATIVE*** DIRECTION TIME (msec)
1	RIGHT FRONT DOOR CENTERLINE (LATERAL)	112.0	28.5	22.6				
	ΔV = --- mph @ --- msec γ				---	--- γ	---	--- γ
2	MIDREAR OF RIGHT FRONT DOOR (LATERAL)	101.4	28.3	24.6				
	ΔV = 25.6 mph @ 19.50 msec				80.52	32.25	113.63	10.50
3	UPPER RIGHT FRONT DOOR CENTERLINE (LATERAL)	113.0	28.5	29.6				
	ΔV = 29.7 mph @ 25.38 msec				197.42	32.25	117.09	22.50
4	MIDFRONT OF RIGHT FRONT DOOR (LATERAL)				---	--- α	---	--- α
5	LEFT SILL AT FRONT SEAT	118.0	-26.8	11.3				
	(LONGITUDINAL)				3.59	54.25	8.29	26.50
	(LATERAL) ΔV = -13.8 mph @ 128.13 msec				2.50	94.13	27.37	40.75
	(VERTICAL)				4.66	105.50	7.58	42.88
	(RESULTANT)					28.25 @ 40.75		

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

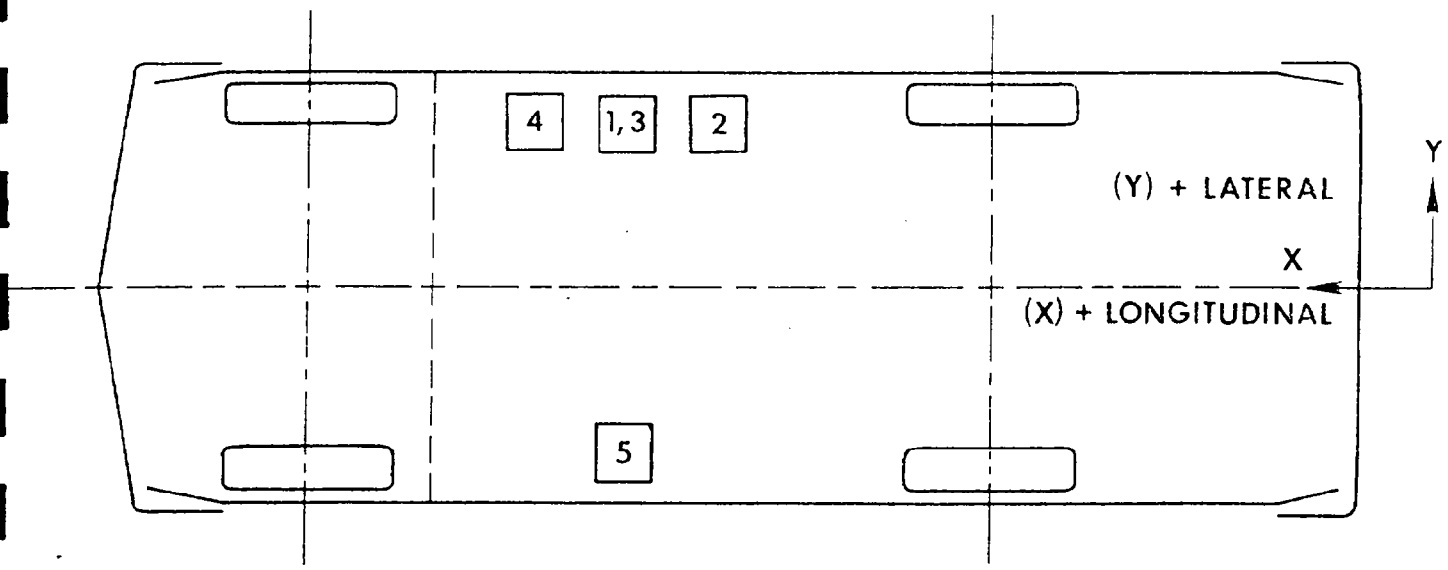
**LONGITUDINAL:	FORWARD	***LONGITUDINAL:	REARWARD
LATERAL:	RIGHTWARD	LATERAL:	LEFTWARD
VERTICAL:	DOWNWARD	VERTICAL:	UPWARD

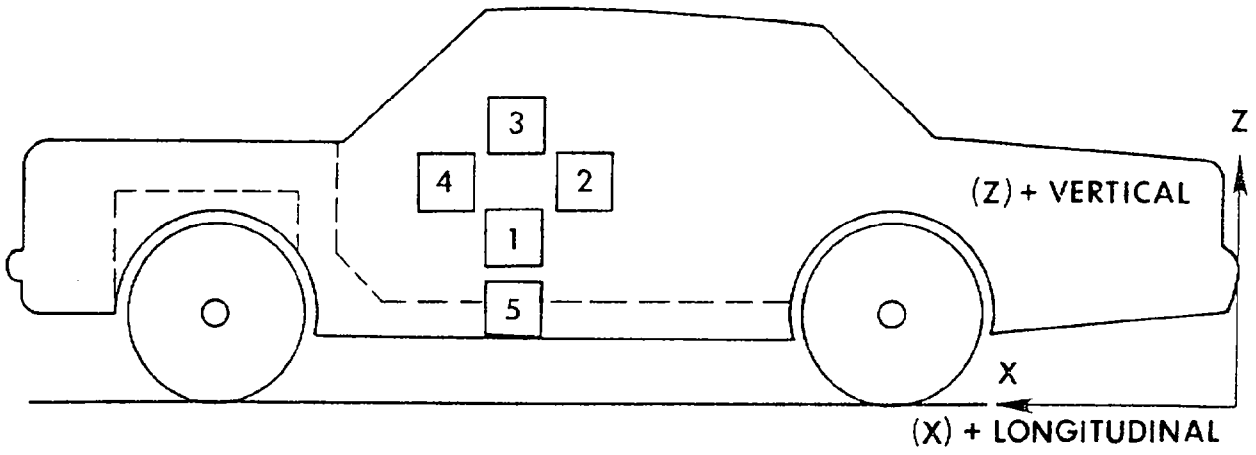
All measurements of accelerometer locations in inches.

α There was no instrumentation at this location.

γ See TEST ANOMALIES

VEHICLE ACCELEROMETER PLACEMENT





VEHICLE EXTERIOR PROFILES AND STATIC CRUSH

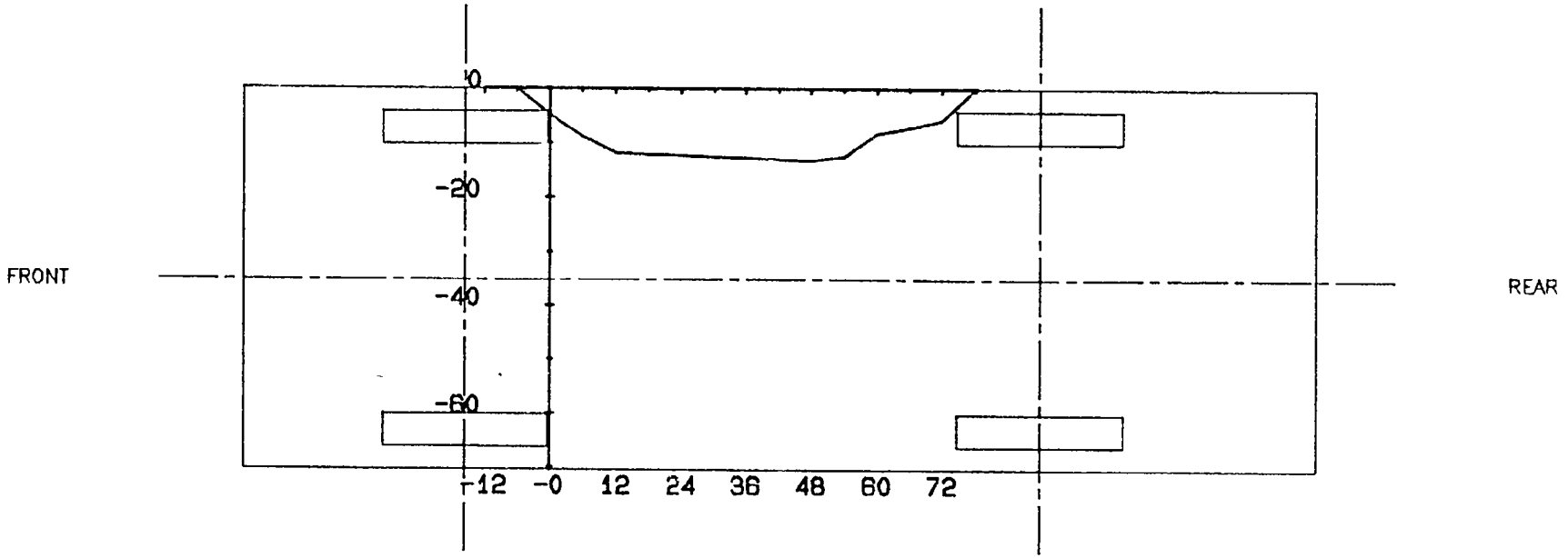
ZERO DISTANCE AT PROJECTED IMPACT POINT*

LOCATION	HEIGHT (in)	78	72	66	60	54	48	42	36	30	24	18	12	6	0	6
PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)																
Axle Height	12.5	X	17.7	17.5	17.4	17.4	17.3	17.3	17.3	17.2	17.2	17.2	17.2	17.2	17.6	X
H-Point	22.8	12.8	13.6	13.5	13.5	13.4	13.4	13.4	13.9	13.7	13.8	13.8	13.9	14.0	14.3	X
Window Sill	36.6	15.8	15.7	15.8	15.8	15.8	15.8	15.9	16.0	16.1	16.1	16.2	16.3	16.5	16.8	16.8
Window Top	55.4	24.3	23.8	23.7	23.9	23.8	23.9	24.0	24.1	24.6	24.8	X	X	X	X	X
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)																
Axle Height	12.5	X	23.5	24.6	25.7	29.9	30.5	30.4	30.1	29.8	29.5	29.3	29.1	26.1	22.3	X
H-Point	22.8	18.5	31.4	33.5	33.4	33.2	32.8	30.9	30.5	29.9	29.7	29.1	28.4	26.9	23.5	X
Window Sill	36.6	21.9	26.5	31.5	30.8	30.6	30.4	27.9	27.6	27.2	26.9	25.9	24.4	21.5	20.9	20.4
Window Top	55.4	27.9	27.7	28.0	28.5	29.0	29.4	29.9	29.8	29.7	29.8	X	X	X	X	X
STATIC CRUSH (IN)																
Axle Height	12.5	X	5.8	7.1	8.3	12.5	13.2	13.1	12.8	12.6	12.3	12.1	11.9	8.9	4.7	X
H-Point	22.8	5.7	17.8	20.0	19.9	19.8	19.4	17.5	16.6	16.2	15.9	15.3	14.5	12.9	9.2	X
Window Sill	36.6	6.1	10.8	15.7	15.0	14.8	14.6	12.0	11.6	11.1	10.8	9.7	8.1	5.0	4.1	3.6
Window Top	55.4	3.6	3.9	4.3	4.6	5.2	5.5	5.9	5.7	5.1	5.0	X	X	X	X	X

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

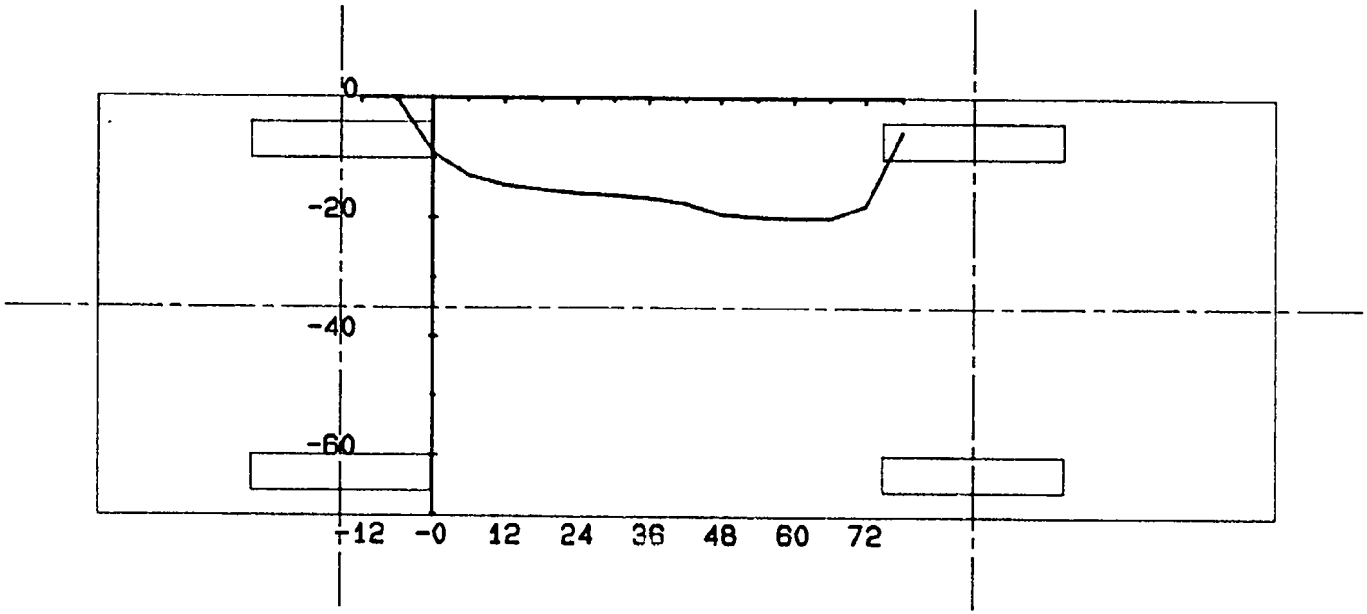
** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



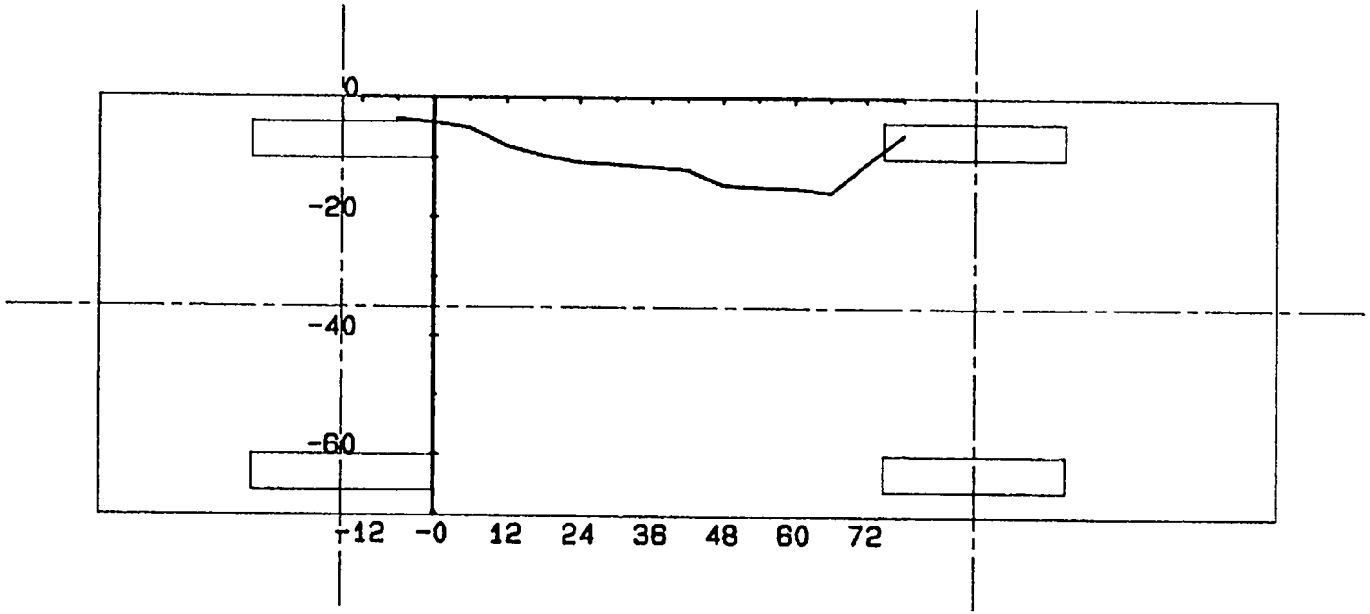
PROFILE LEVEL EQUALS AXLE HEIGHT WHICH IS 12.5 " ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



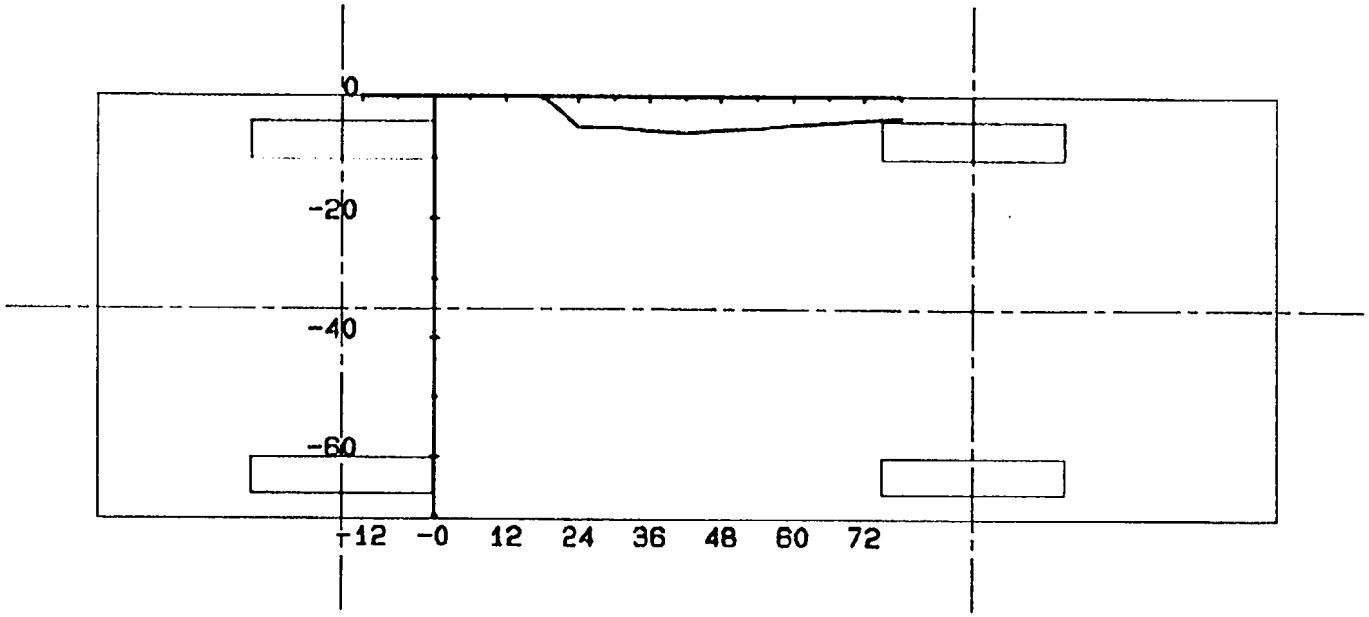
PROFILE LEVEL EQUALS H-POINT HEIGHT WHICH IS 22.8 " ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



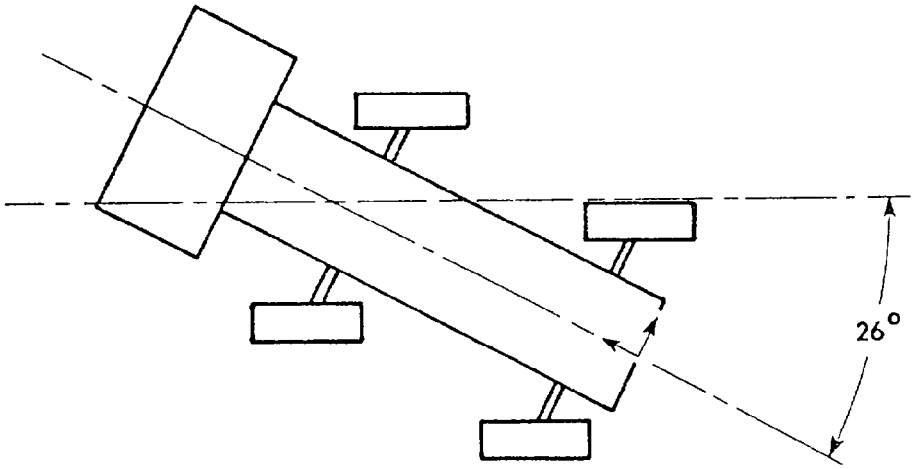
PROFILE LEVEL EQUALS WINDOW SILL HEIGHT WHICH IS 36.6 " ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT WHICH IS 55.4 " 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 MAX (g)	POSITIVE DIRECTION TIME (msec)	NEGATIVE DIRECTION MAX (g)	NEGATIVE DIRECTION TIME (msec)
1	CENTER OF GRAVITY	73.0	0.9	11.9				
	(LONGITUDINAL)	Δ V = -19.4 mph @ 143.50 msec			0.75	165.38	15.49	38.88
	(LATERAL)	Δ V = 4.6 mph @ 143.50 msec			7.30	31.88	2.17	65.00
	(VERTICAL)				3.90	46.13	5.86	32.38
	(RESULTANT)					17.58 @ 32.25		
2	REAR FRAME MEMBER	18.5	-19.2	11.9				
	(LONGITUDINAL)	Δ V = -14.9 mph @ 143.50 msec			1.77	201.38	13.18	40.00
	(LATERAL)	Δ V = -0.7 mph @ 143.50 msec			3.20	136.50	5.46	23.63

* 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.

TEST ANOMALIES

Minimum or maximum acceleration followed by a Y on the dummy data summary indicates that the preceeding minimum or maximum may be in error due to anomalous spikes which did not filter out. The following channels are affected:

TO1YG2, Upper Spine Lateral Acceleration
T12YG2, Lower Spine Primary Lateral Acceleration
T12YGB, Lower Spine Redundant Lateral Acceleration
RURYG2, Right Upper Rib Lateral Acceleration
RLRYG2, Right Lower Rib Primary Lateral Acceleration
RLRYGB, Right Lower Rib Redundant Lateral Acceleration
PEVYG2, Pelvis Lateral Acceleration
PEVXG2, Pelvis Longitudinal Acceleration.

The Right Front Door Position 1 Accelerometer, RFDYG1, did not record accurate data due to a shift in the data.

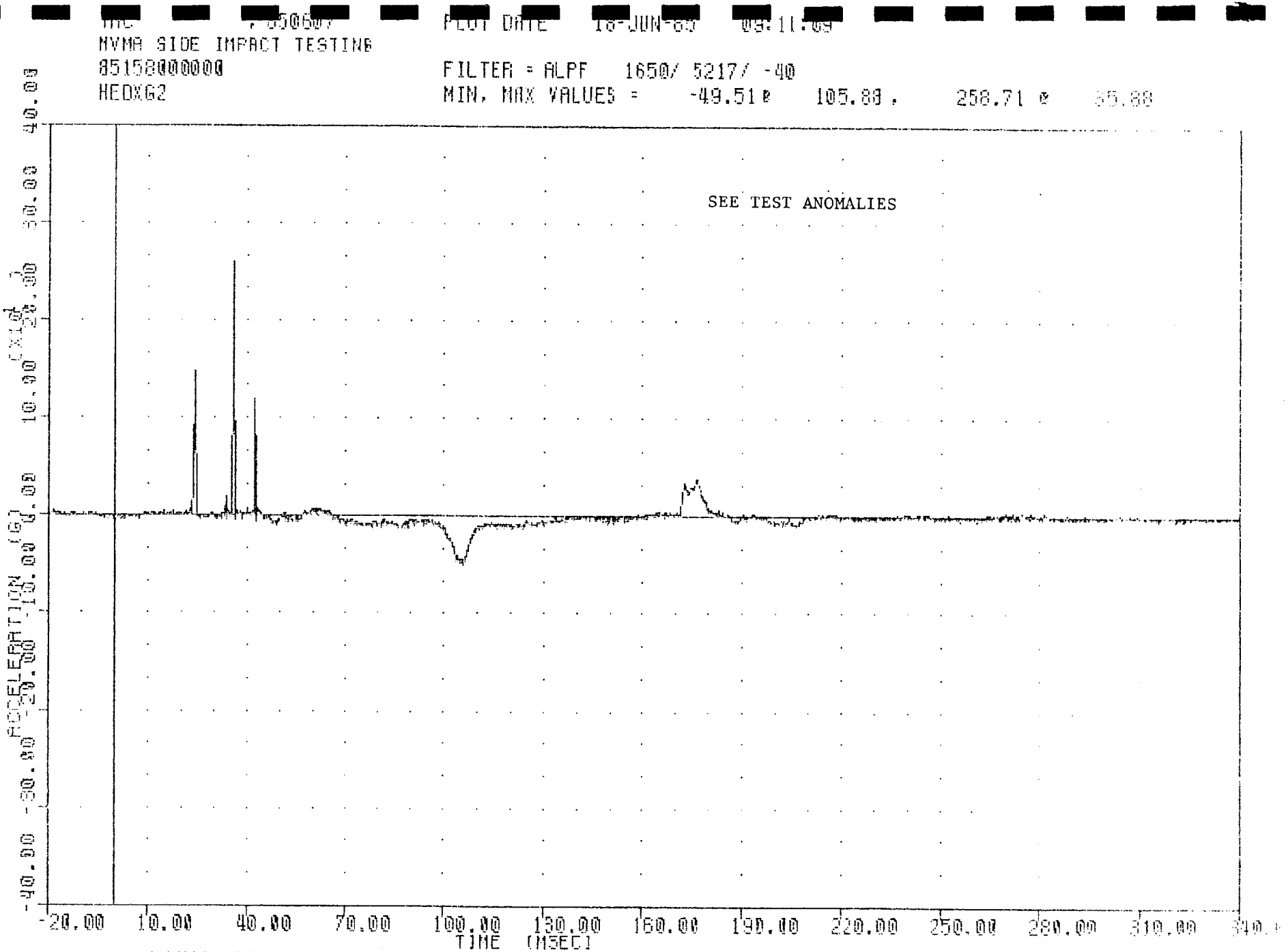
The following channels also contained anomalous spikes:

HEDXG2, Head Longitudinal Acceleration
HEDYG2, Head Lateral Acceleration
HEDZG2, Head Vertical Acceleration
RRTYD2, Right Rib To Spine Displacement

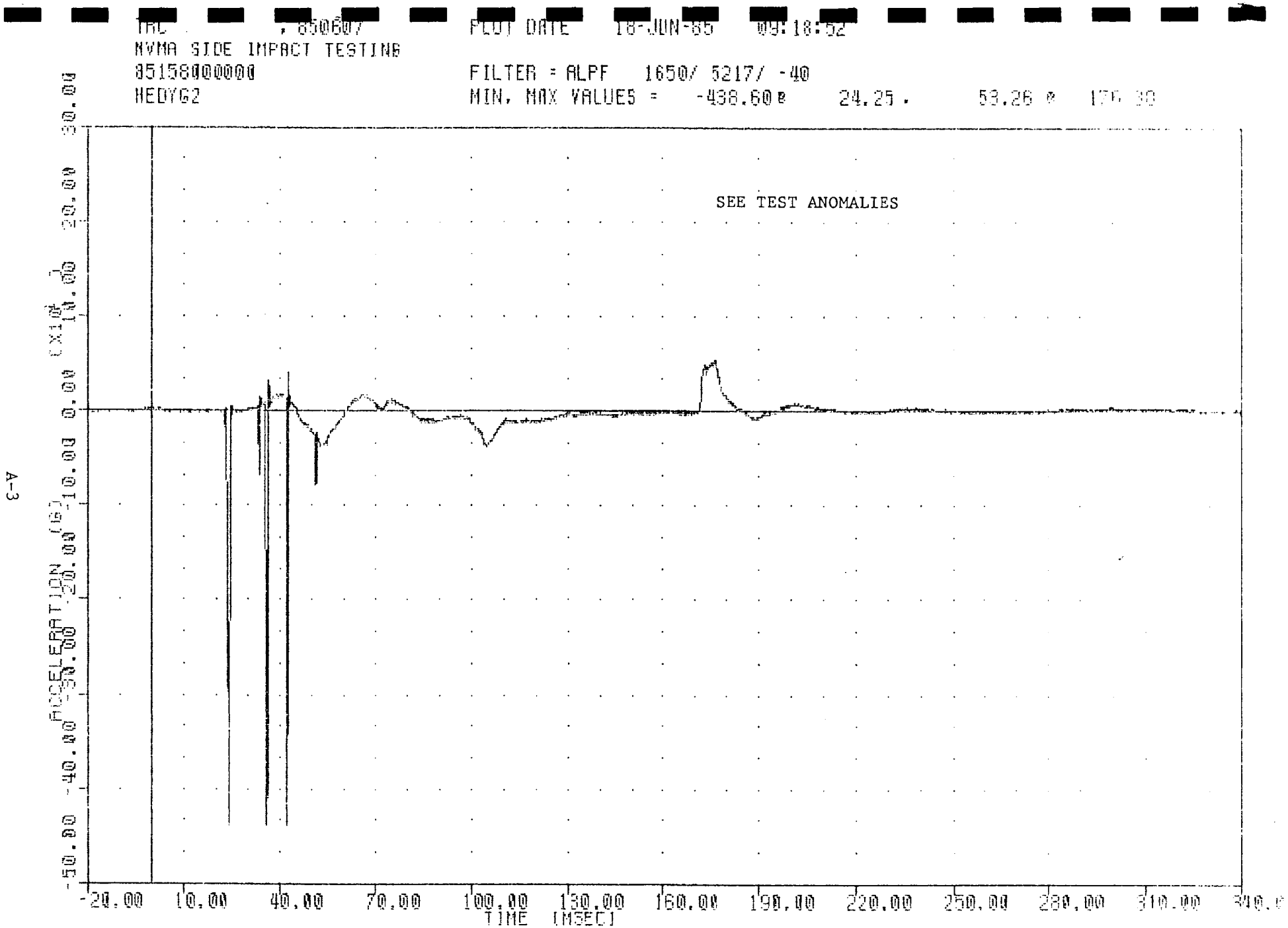
APPENDIX A

DATA PLOT PRESENTATION

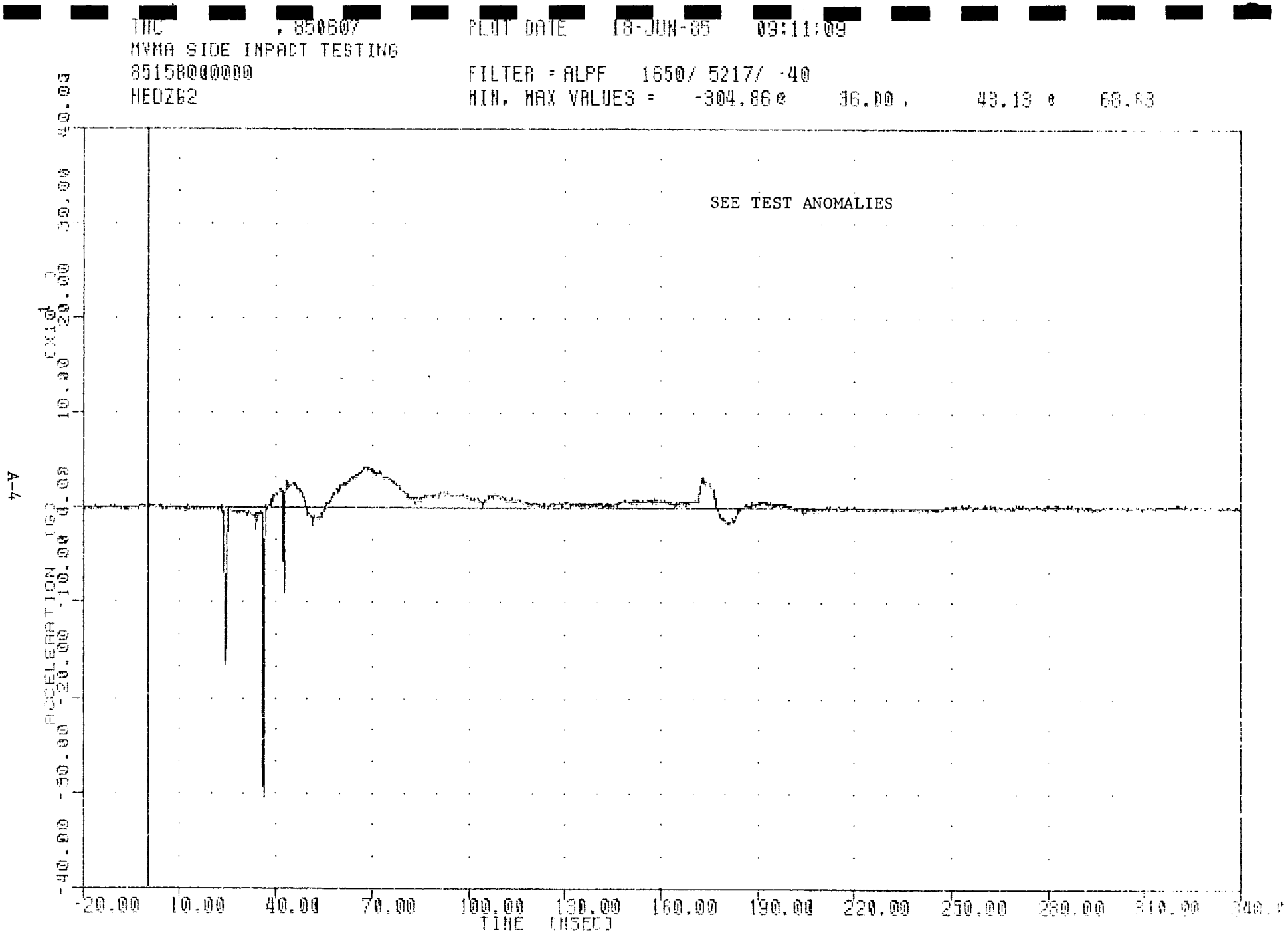
Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. All data were filtered according to SAE J211, except that dummy thorax data were filtered using the HSRI filter.



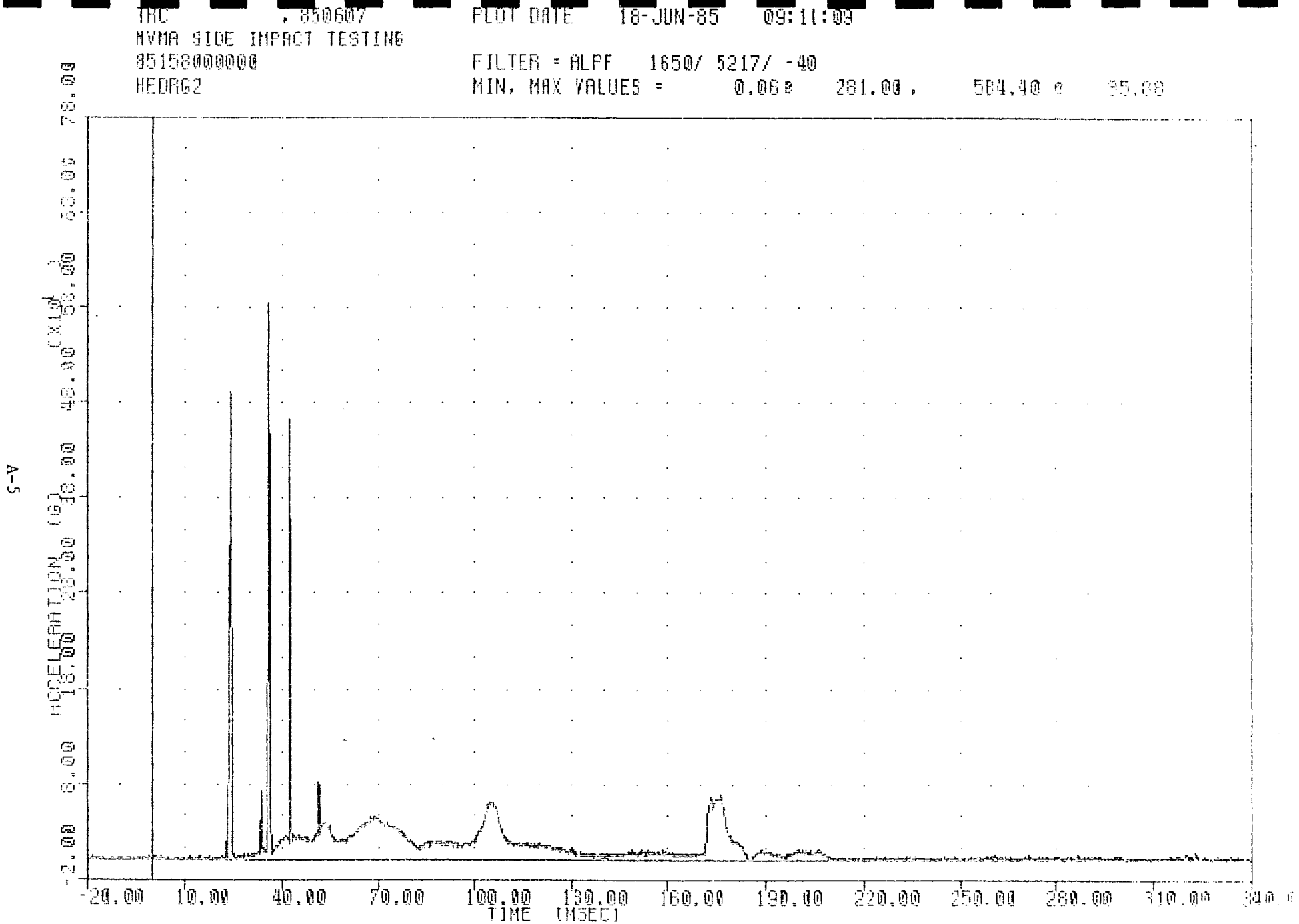
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAM SEATING
PASSENGER HEAD ACCELERATION X AXIS



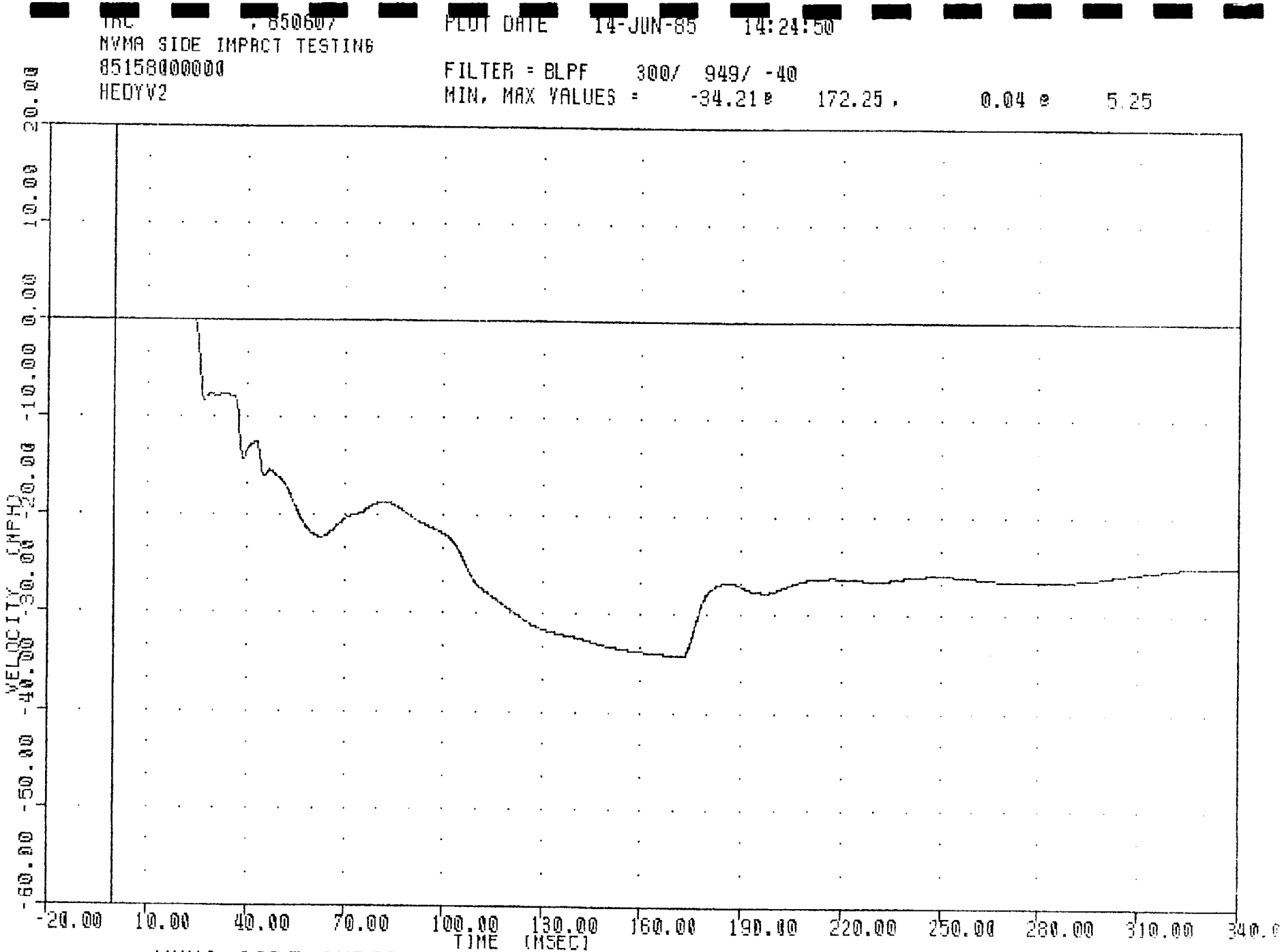
NVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
PASSENGER HEAD ACCELERATION Y AXIS



MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
PASSENGER HEAD ACCELERATION Z AXIS

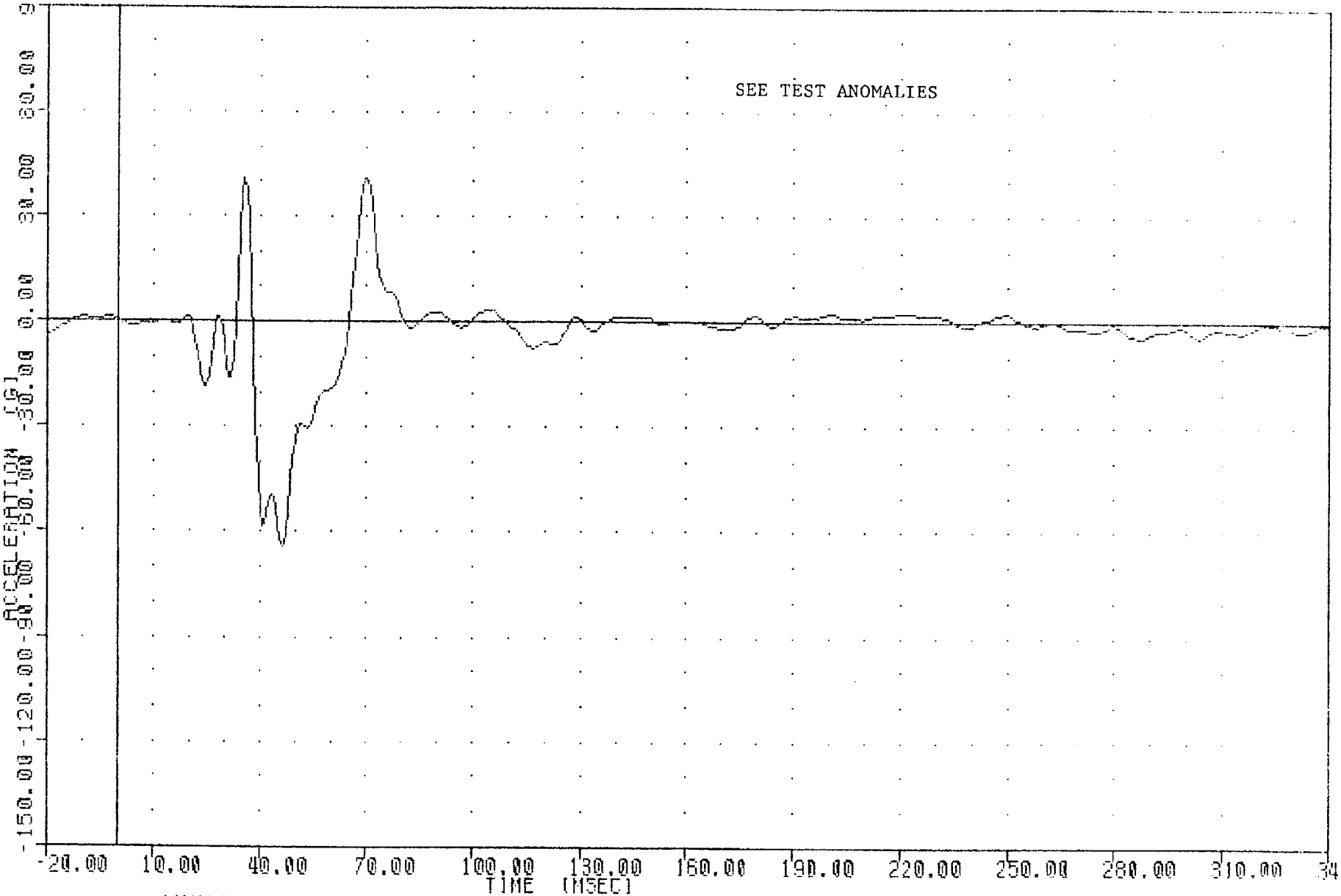


NVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAM SEATING
PASSENGER HEAD RESULTANT ACCELERATION

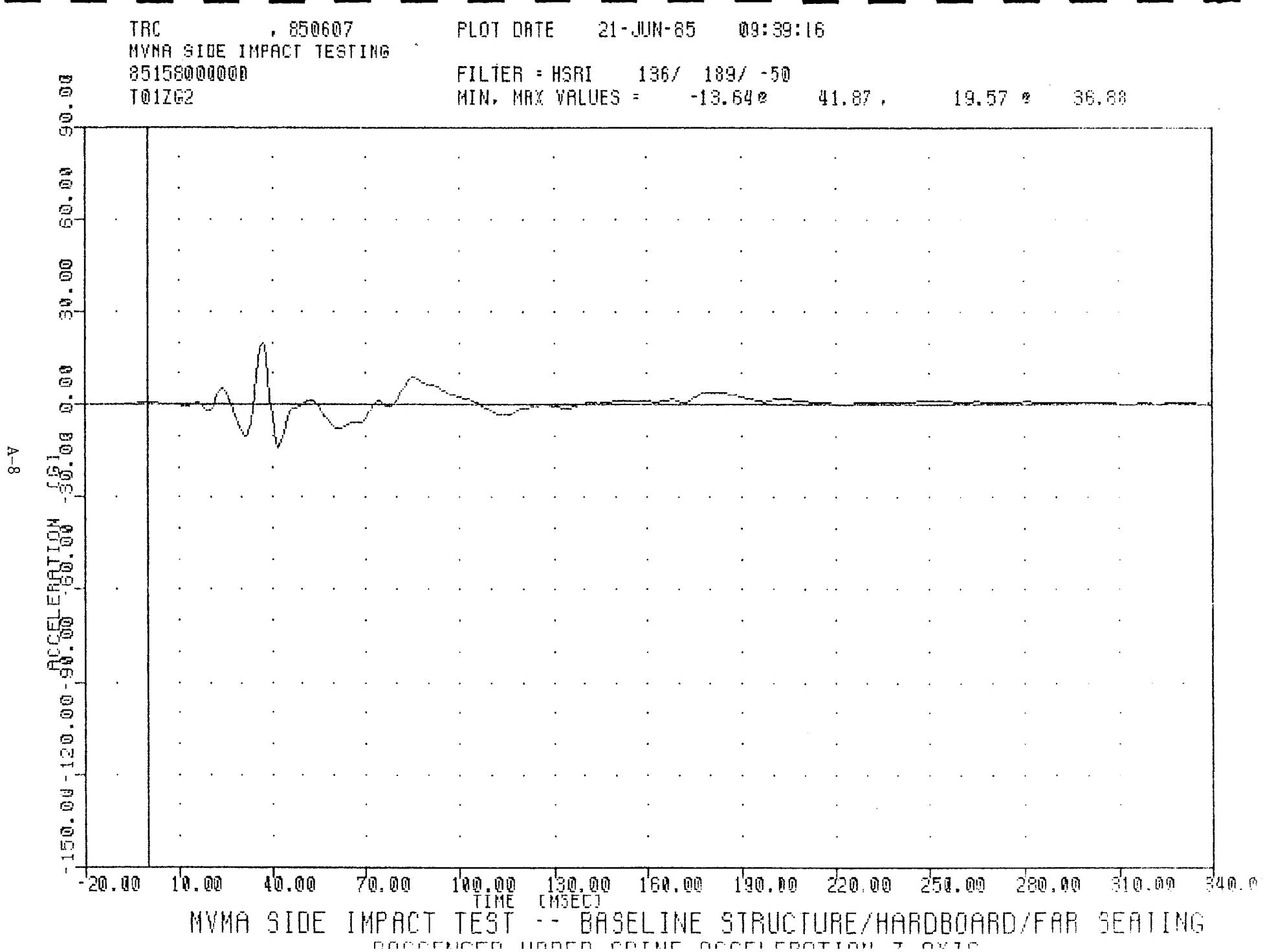


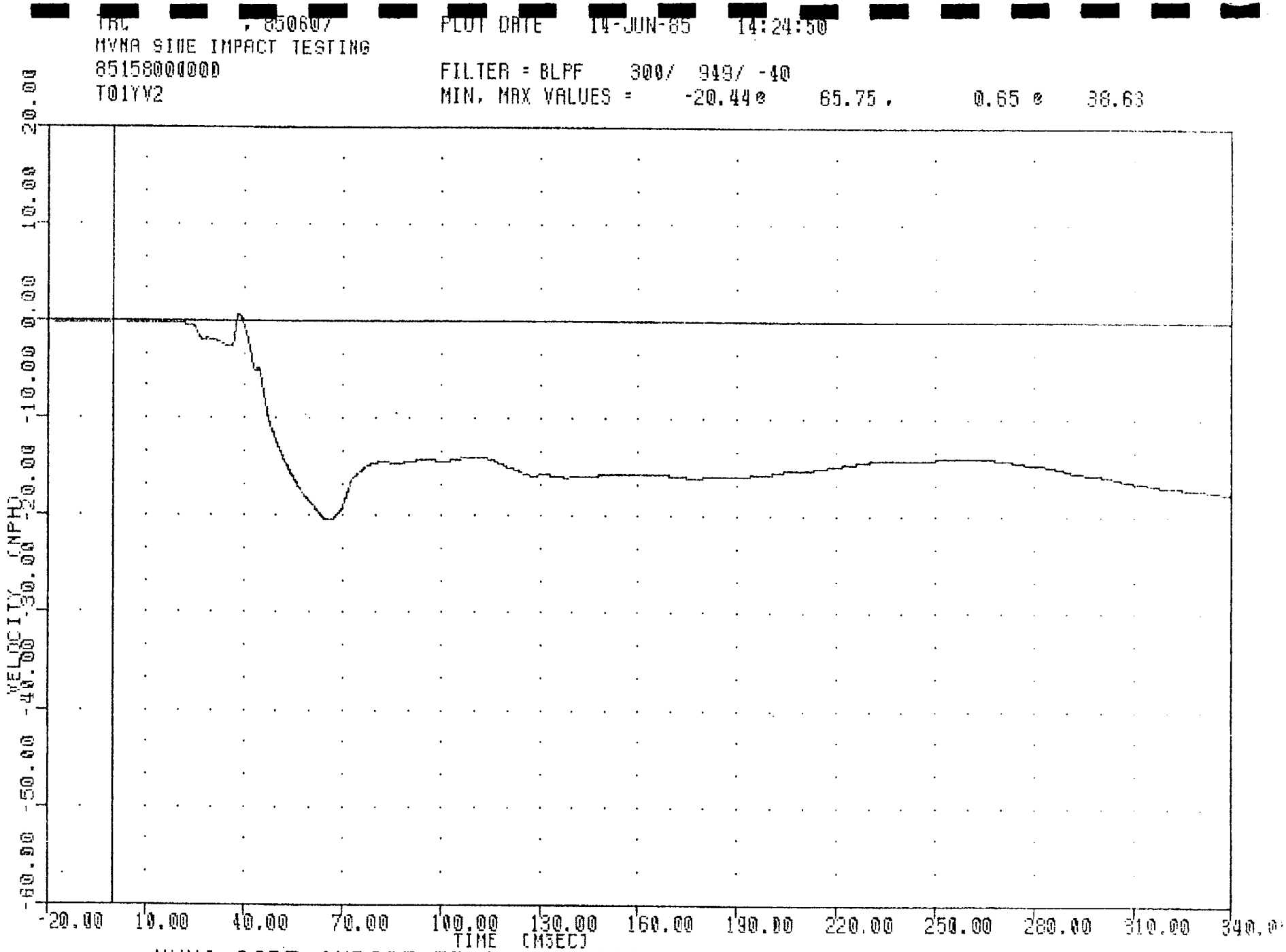
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
HEAD VELOCITY Y AXIS

TRC , 850607 PLOT DATE 21-JUN-85 09:39:16
NVMA SIDE IMPACT TESTING
851580@@@@@@
T01YG2 FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -64.39@ 46.25 , 40.78 @ 69.38



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


TRC , 850607
PLOT DATE 21-JUN-85 09:39:16
MVMA SIDE IMPACT TESTING
85158000000
FILTER = HSRI 136/ 189/ -50
T01ZG2
MIN, MAX VALUES = -13.64@ 41.87 , 19.57 @ 36.88
90.00
60.00
30.00
0.00
-30.00
-60.00
-90.00
-120.00
-150.00
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
340.0
TIME (MSEC)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING



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

TRC , 850607 PLOT DATE 21-JUN-85 09:39:16
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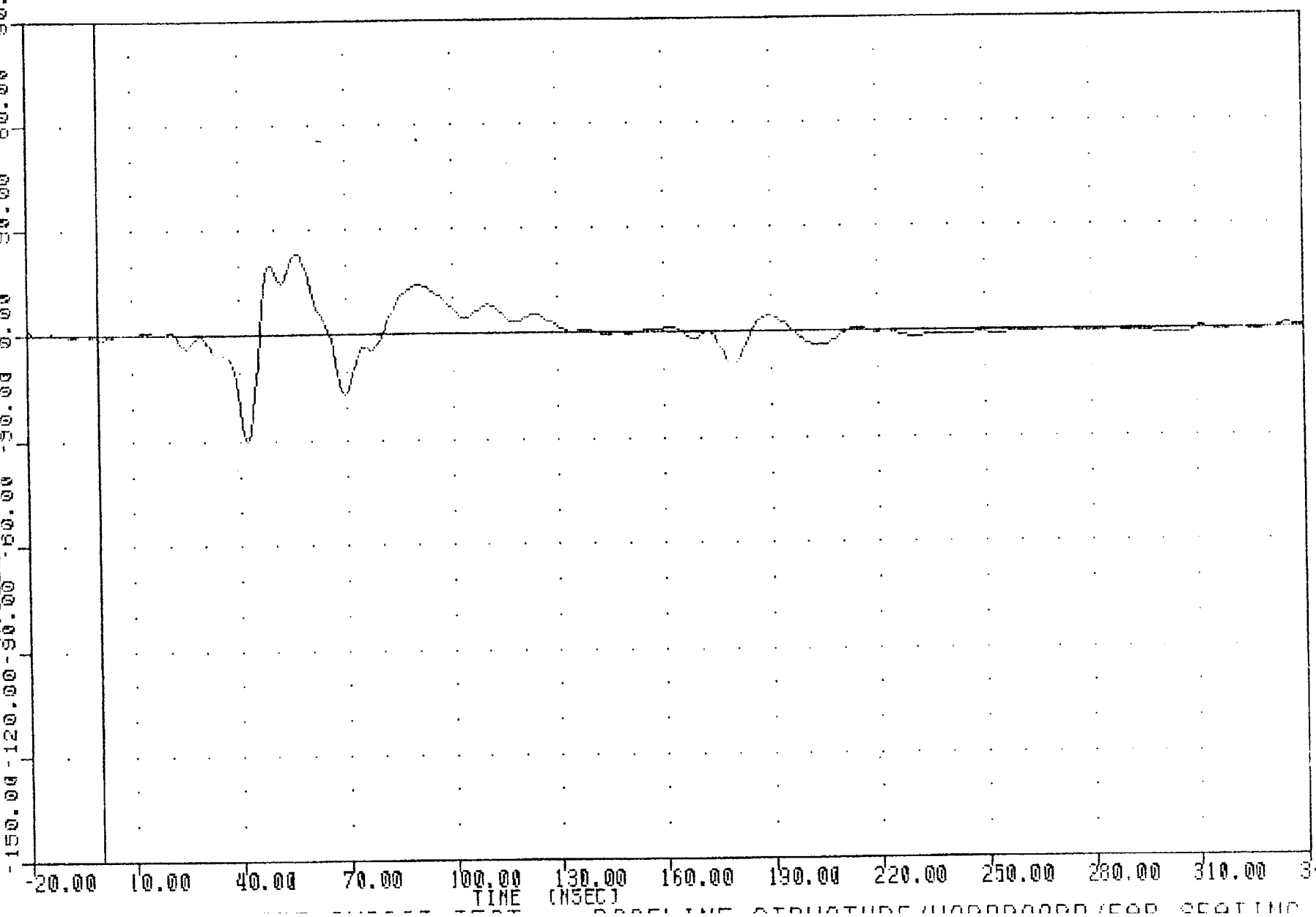
85158000000 FILTER = HSRI 136/ 189/ -50
T12X62 MIN, MAX VALUES = -29.73 @ 41.87 , 23.05 @ 56.25

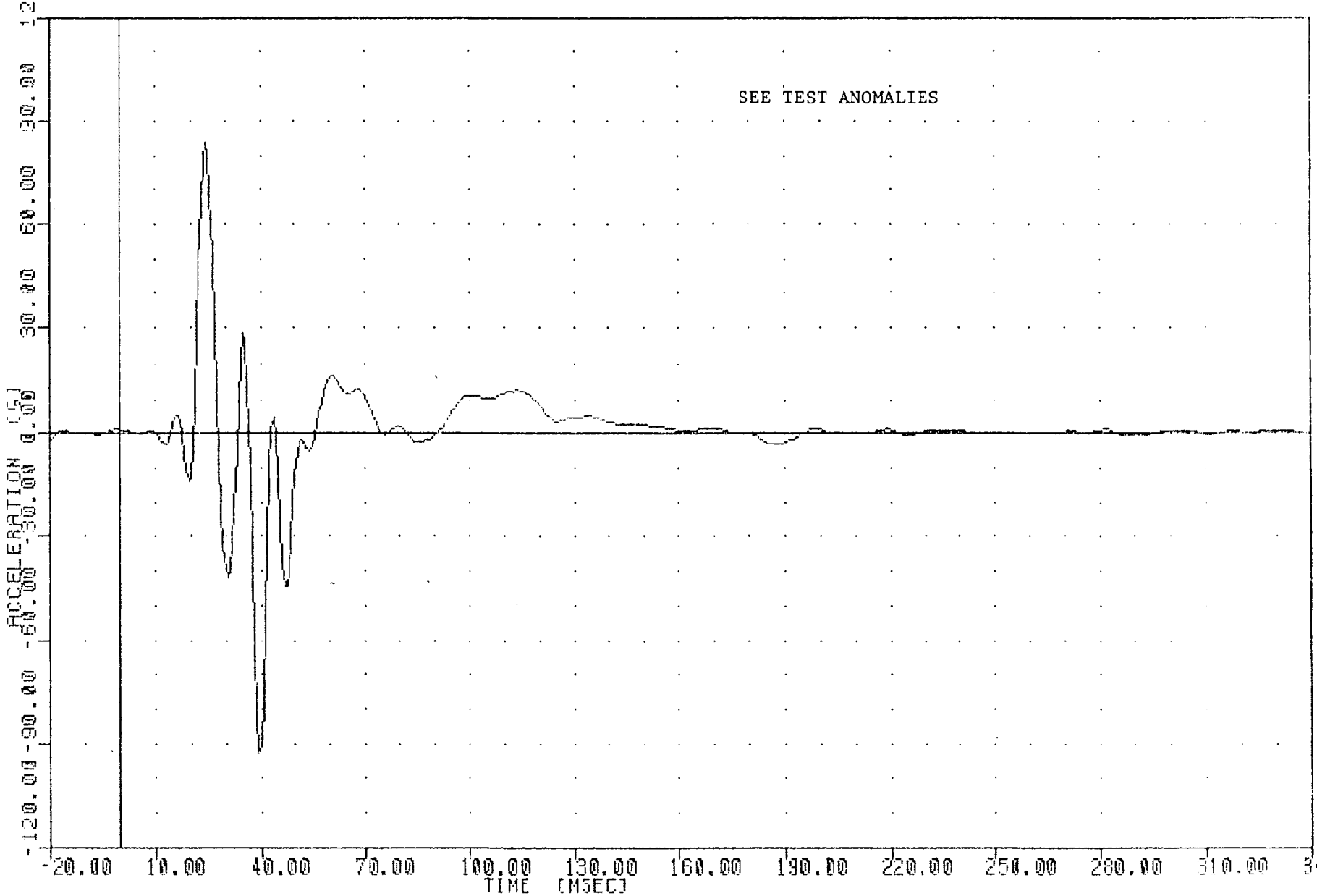


TRC , 850607 PLOT DATE 21-JUN-85 09:39:16

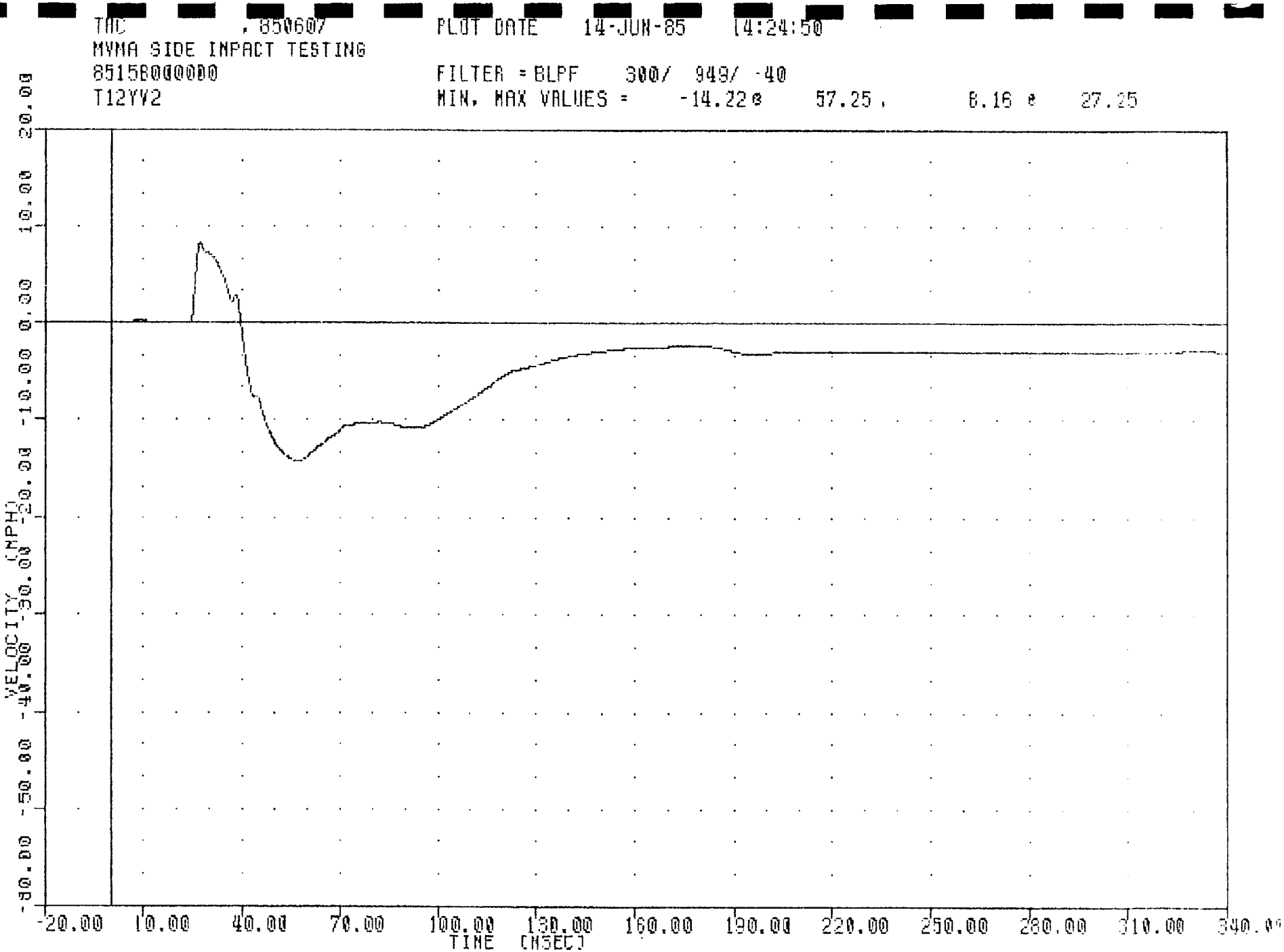
MVMA SIDE IMPACT TESTING

851580@@@@@ FILTER = HSRI 136/ 189/ -50

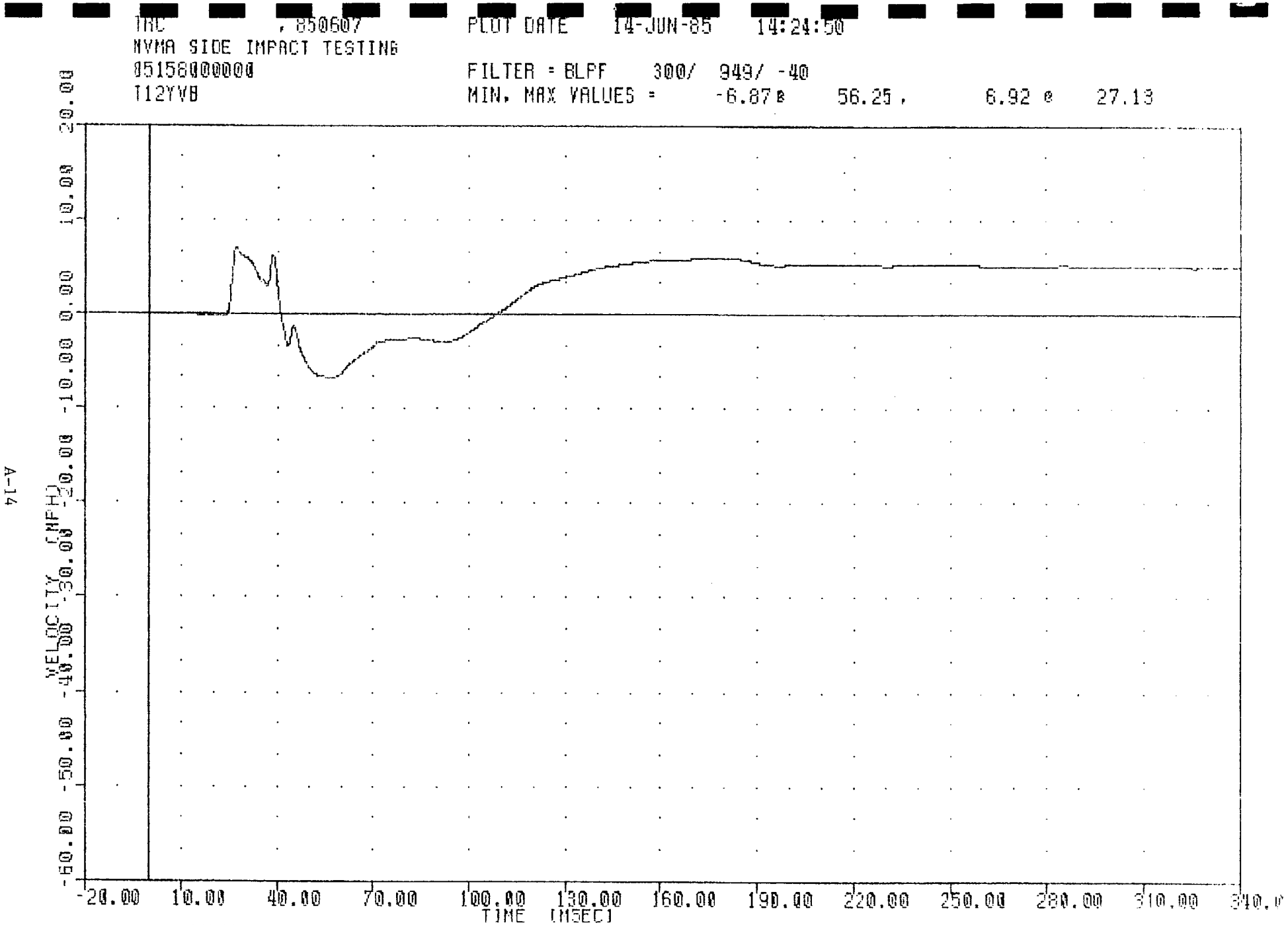
T12YGB MIN, MAX VALUES = -92.59@ 39.38 , 83.79 @ 24.38



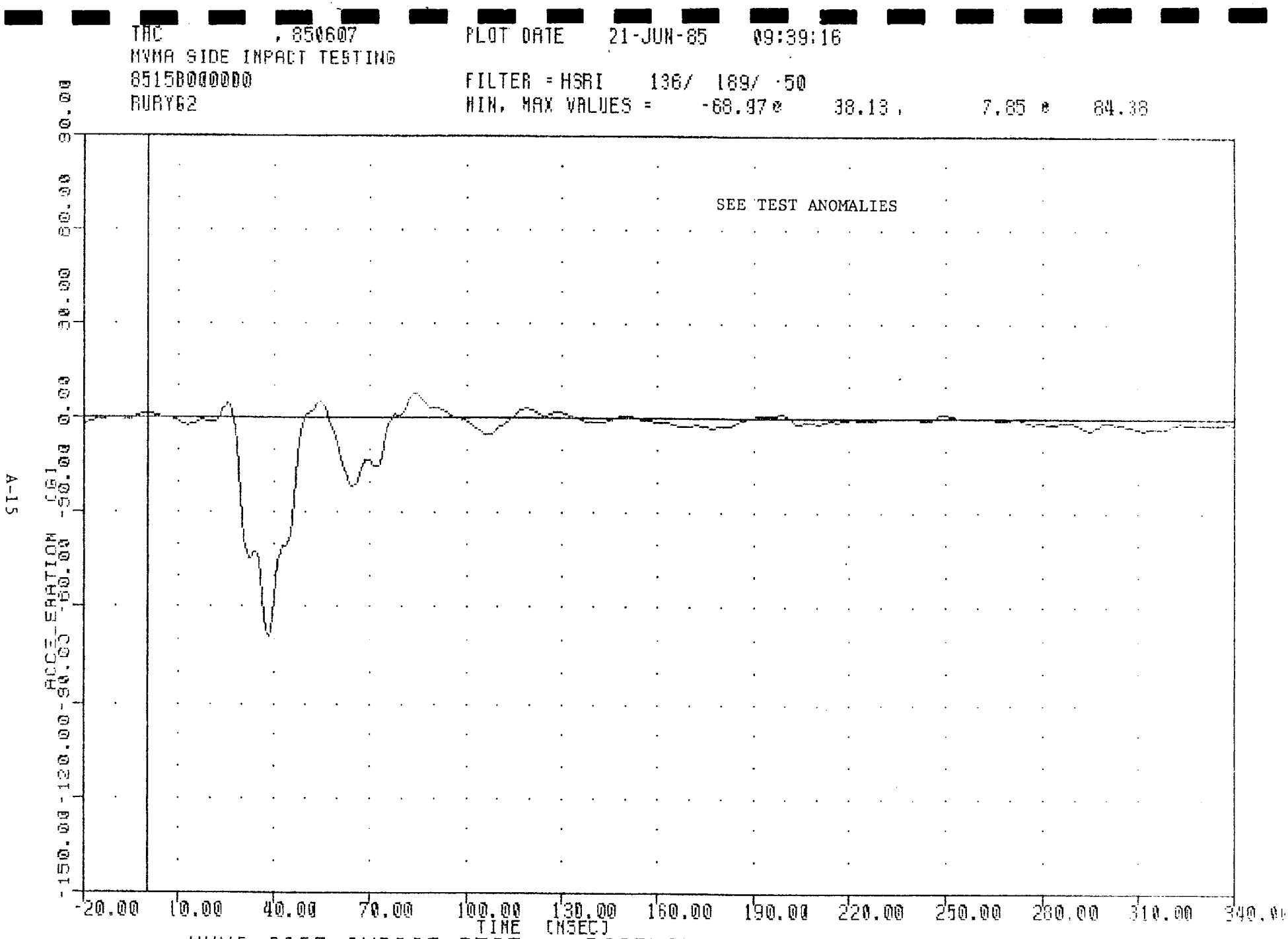
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING



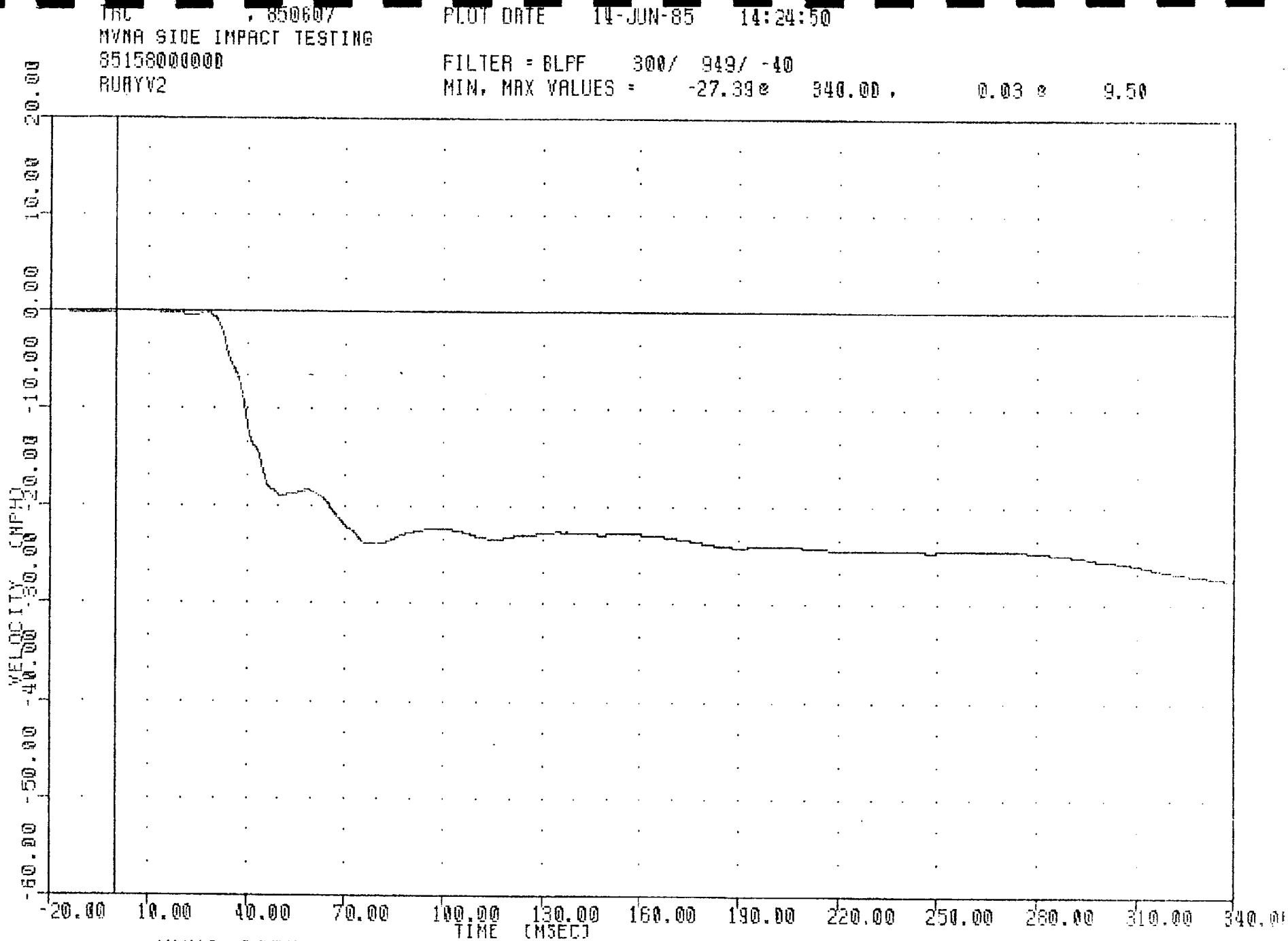
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
LOWER SPINE VELOCITY Y AXIS



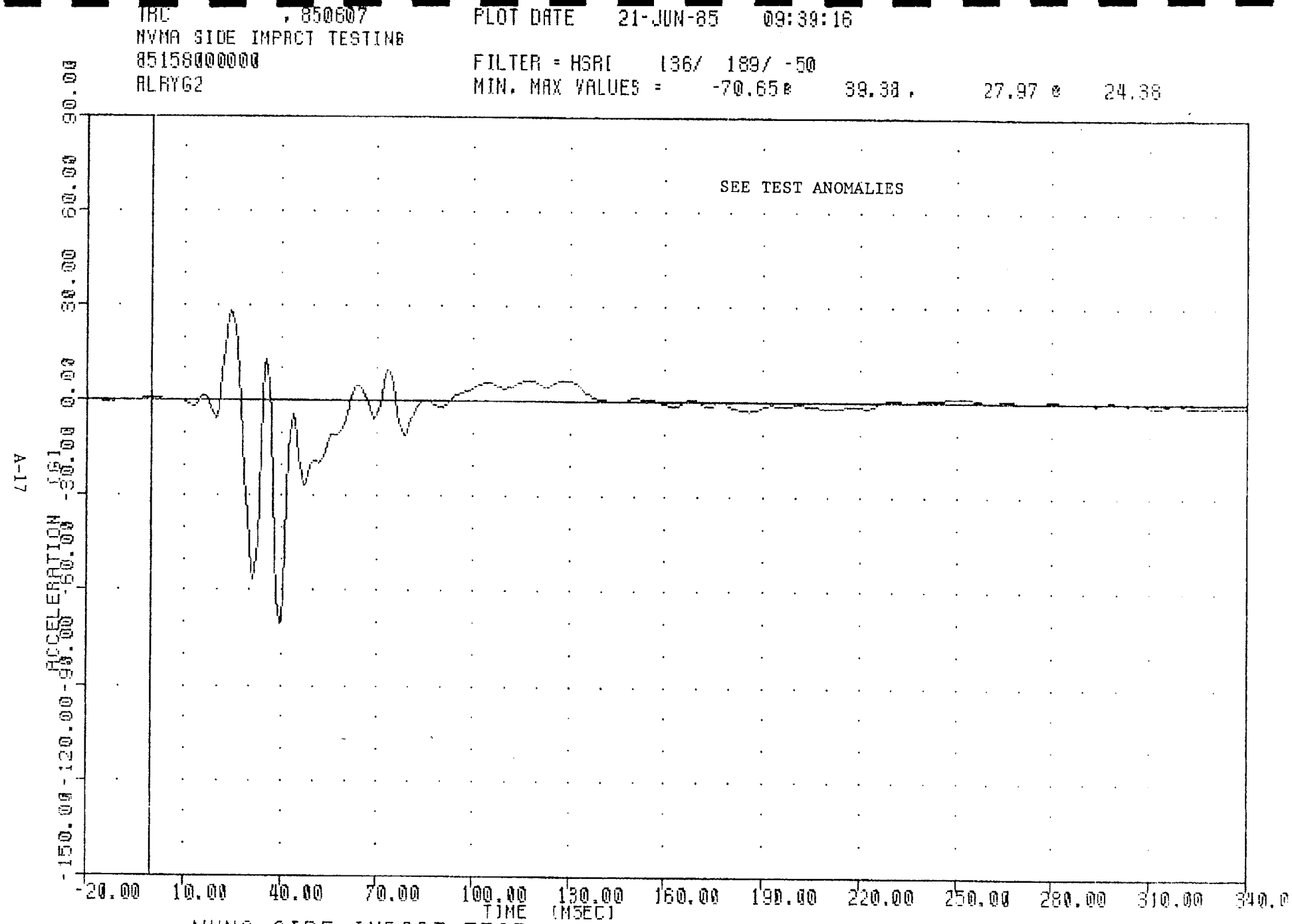
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
LOWER SPINE VELOCITY #2 Y AXIS



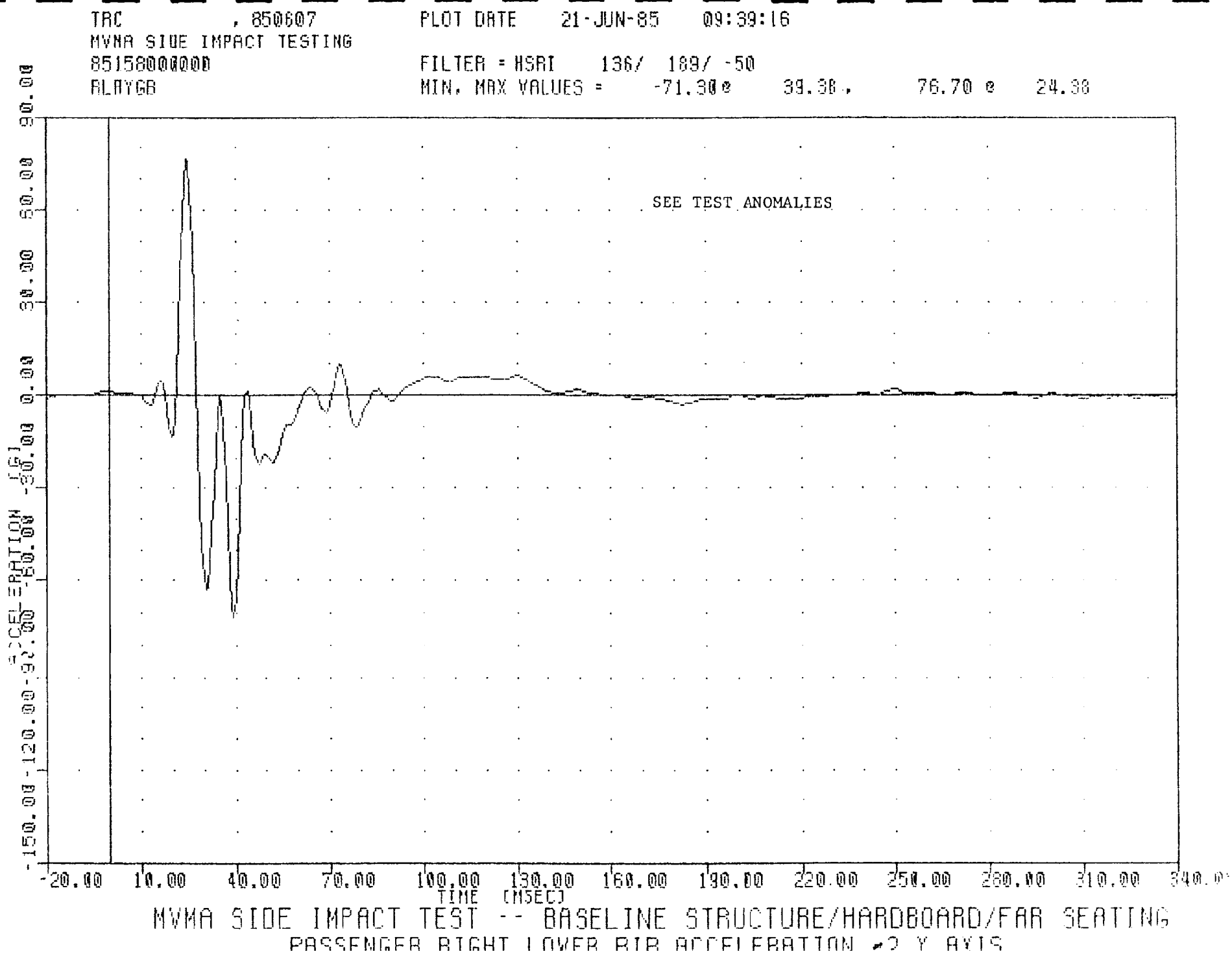
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER RIGHT UPPER RIB ACCELERATION Y AXIS



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

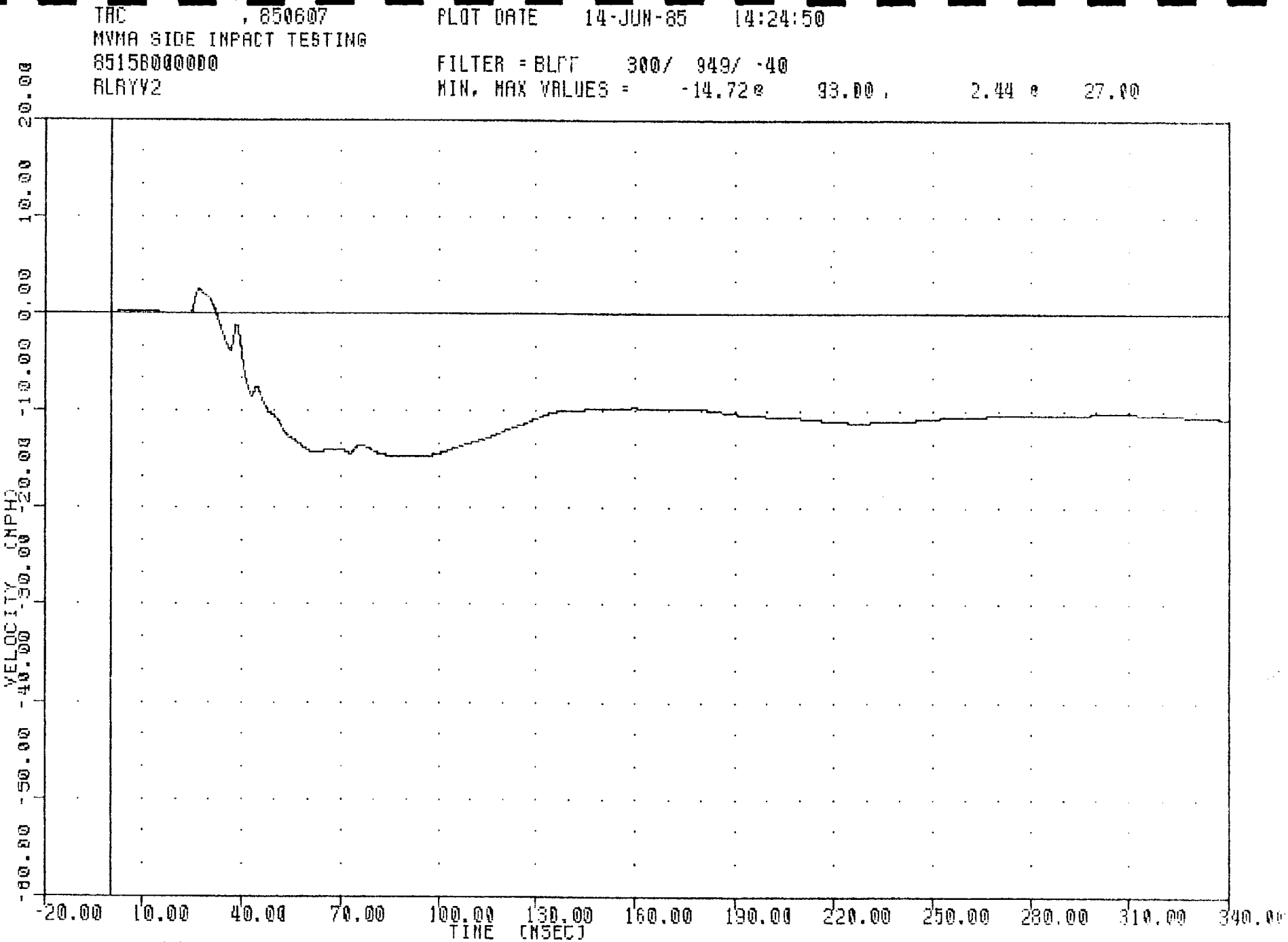


MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER RIGHT LOWER RIB ACCELERATION Y AXIS

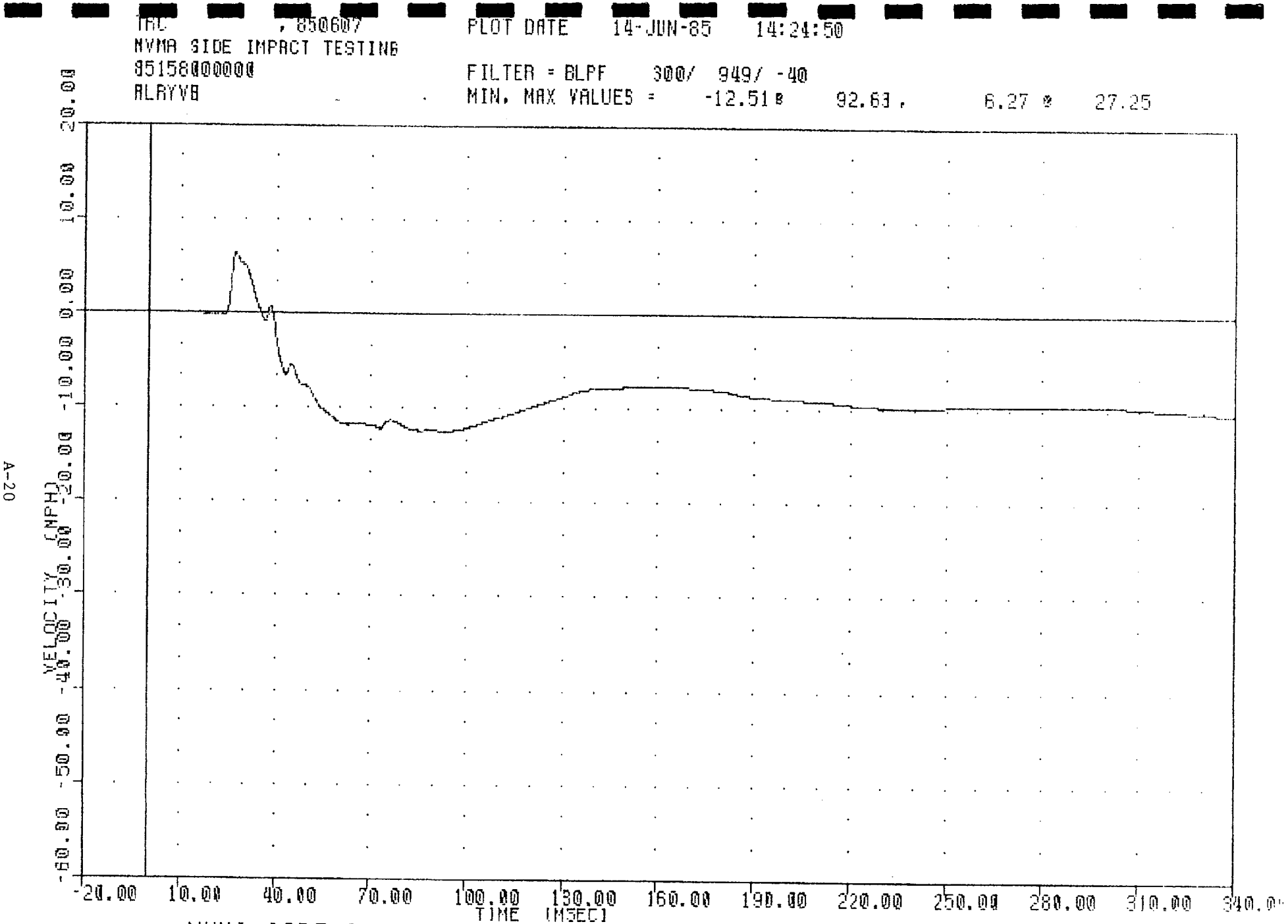


MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING

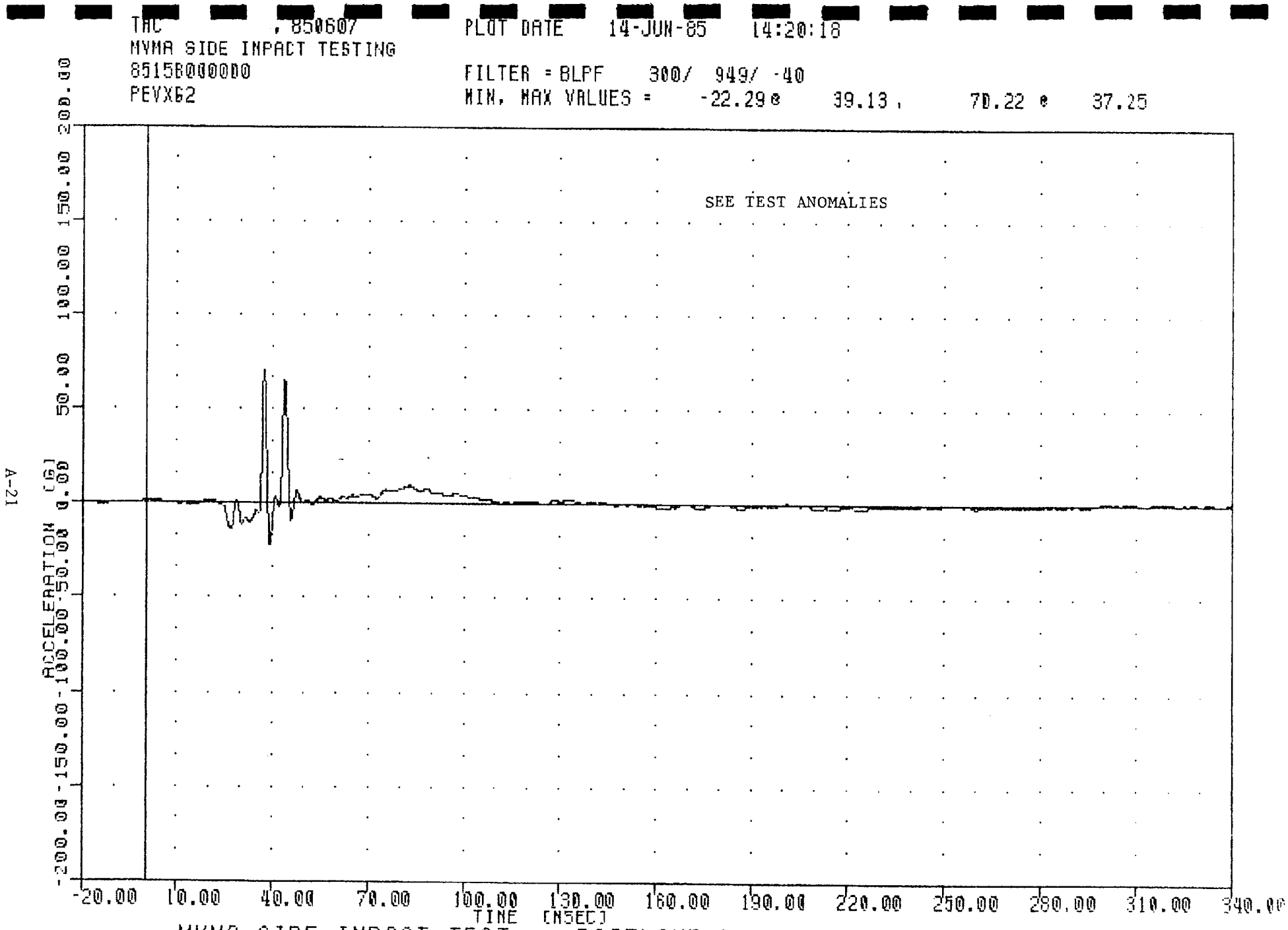
PASSENGER RIGHT LOWER RIB ACCELERATION #2 Y AXIS



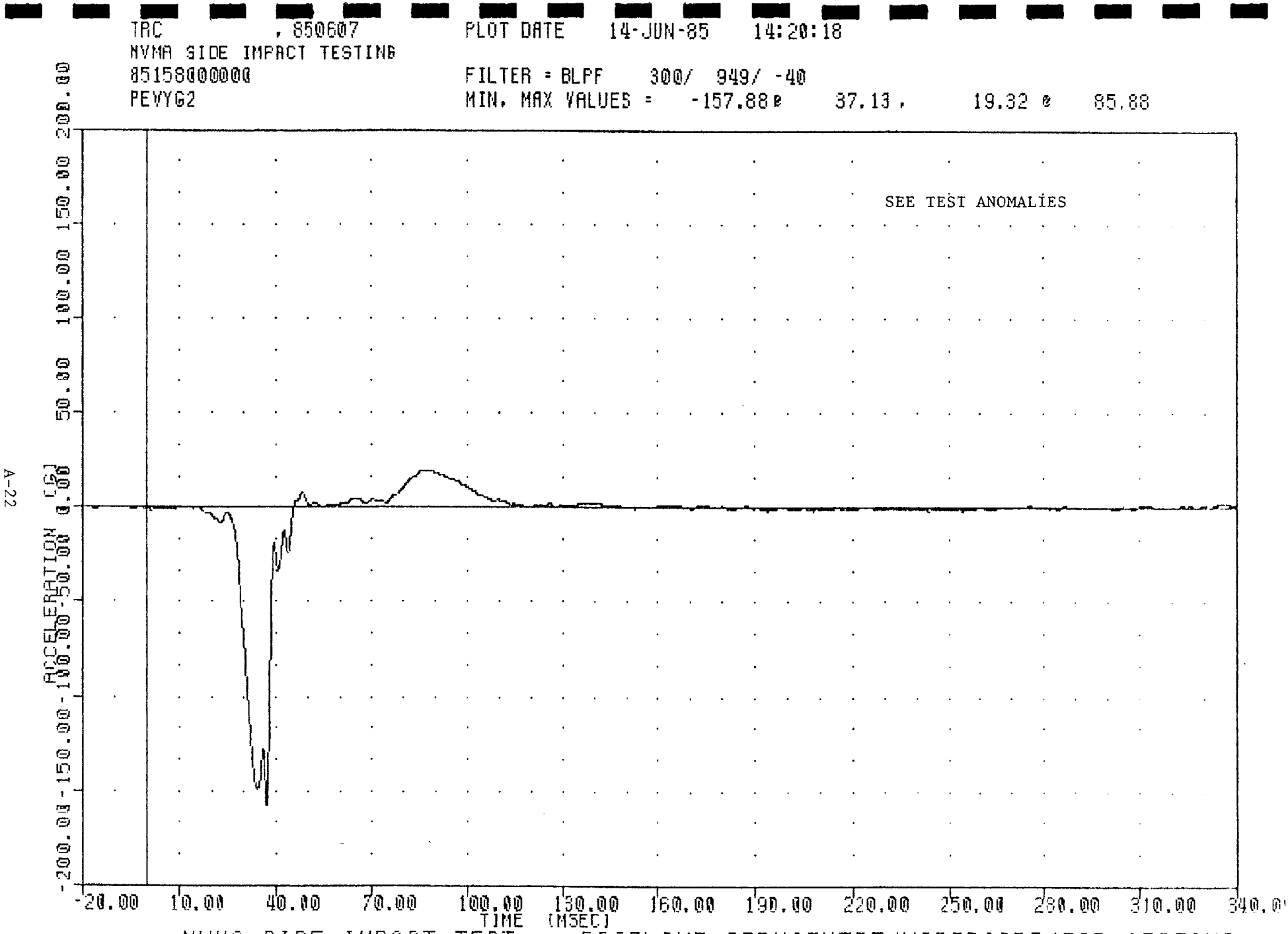
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
RIGHT LOWER RIB VELOCITY



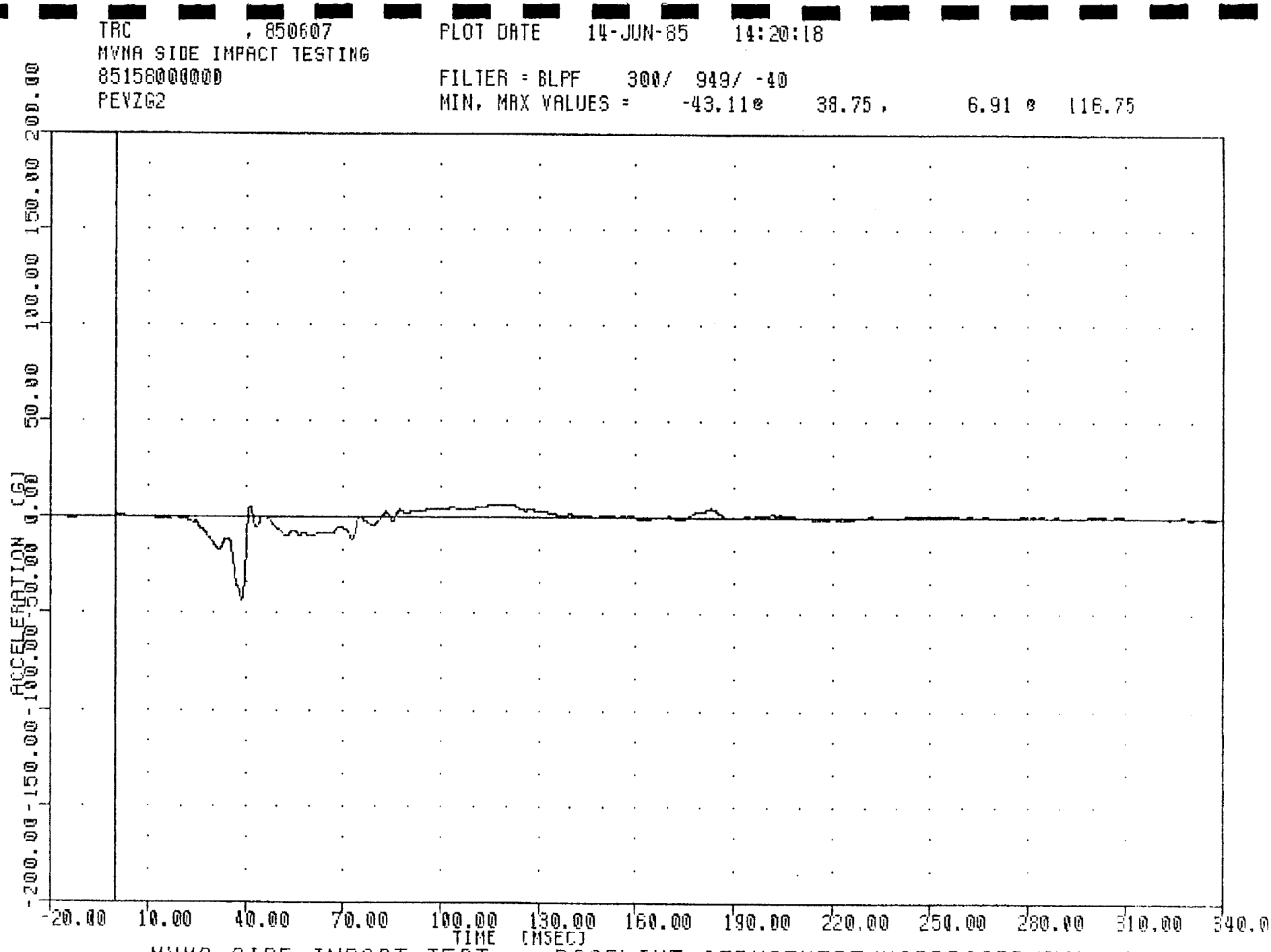
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
RIGHT LOWER RIB VELOCITY -2 Y AXIS



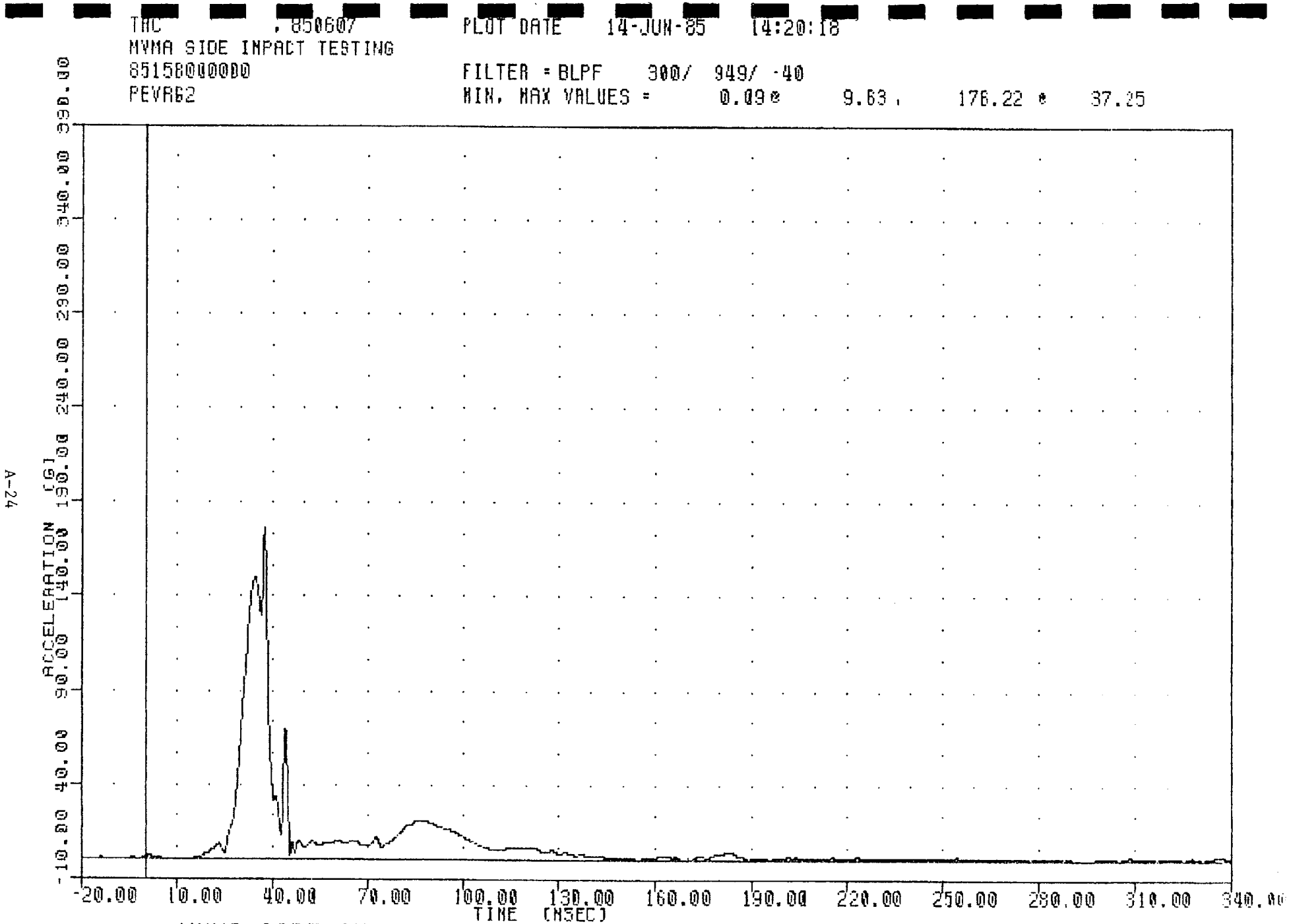
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
PASSENGER PELVIS ACCELERATION X AXIS



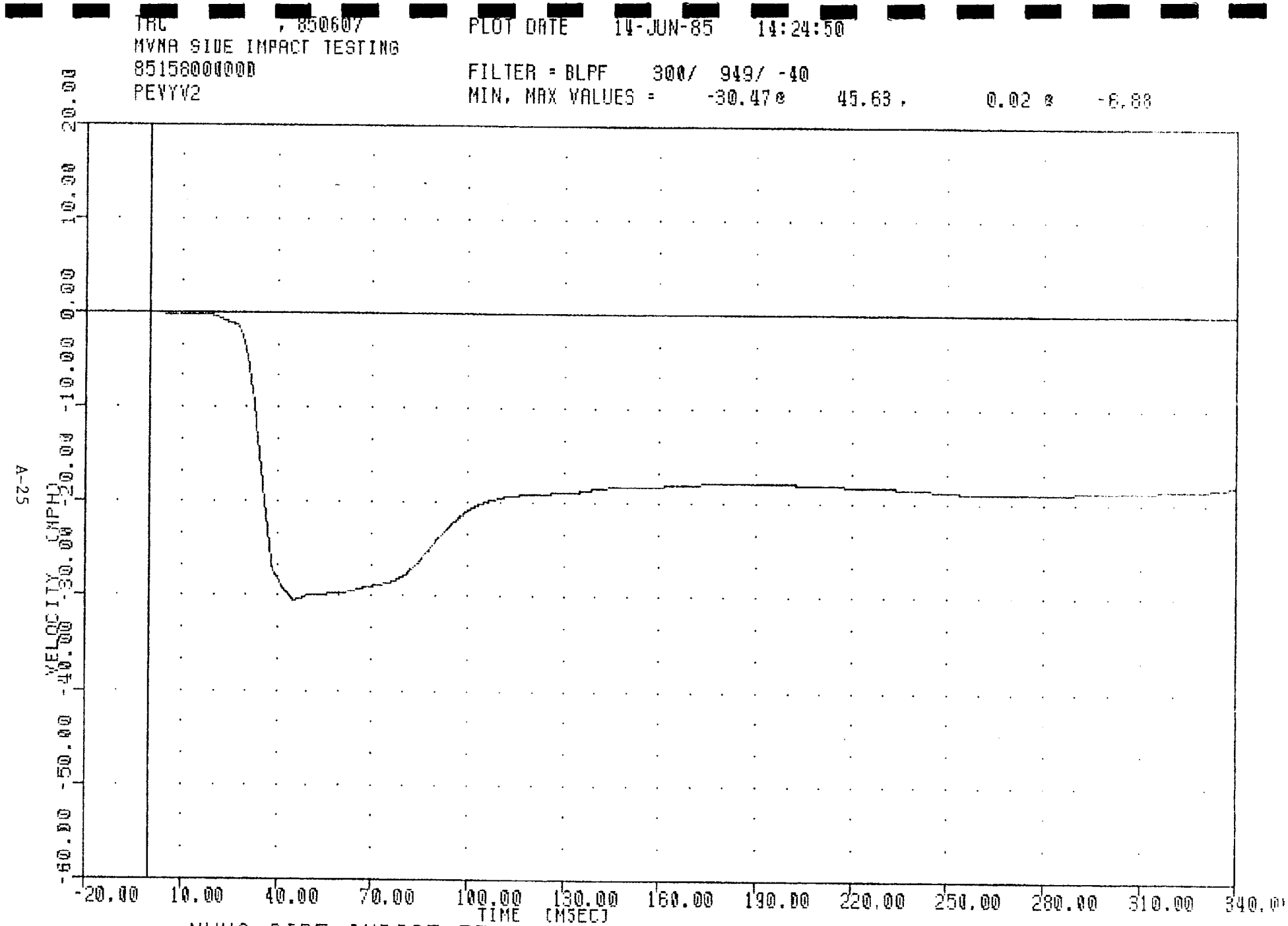
NVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
PASSENGER PELVIS ACCELERATION Y AXIS



MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
PASSENGER PELVIS ACCELERATION Z AXIS

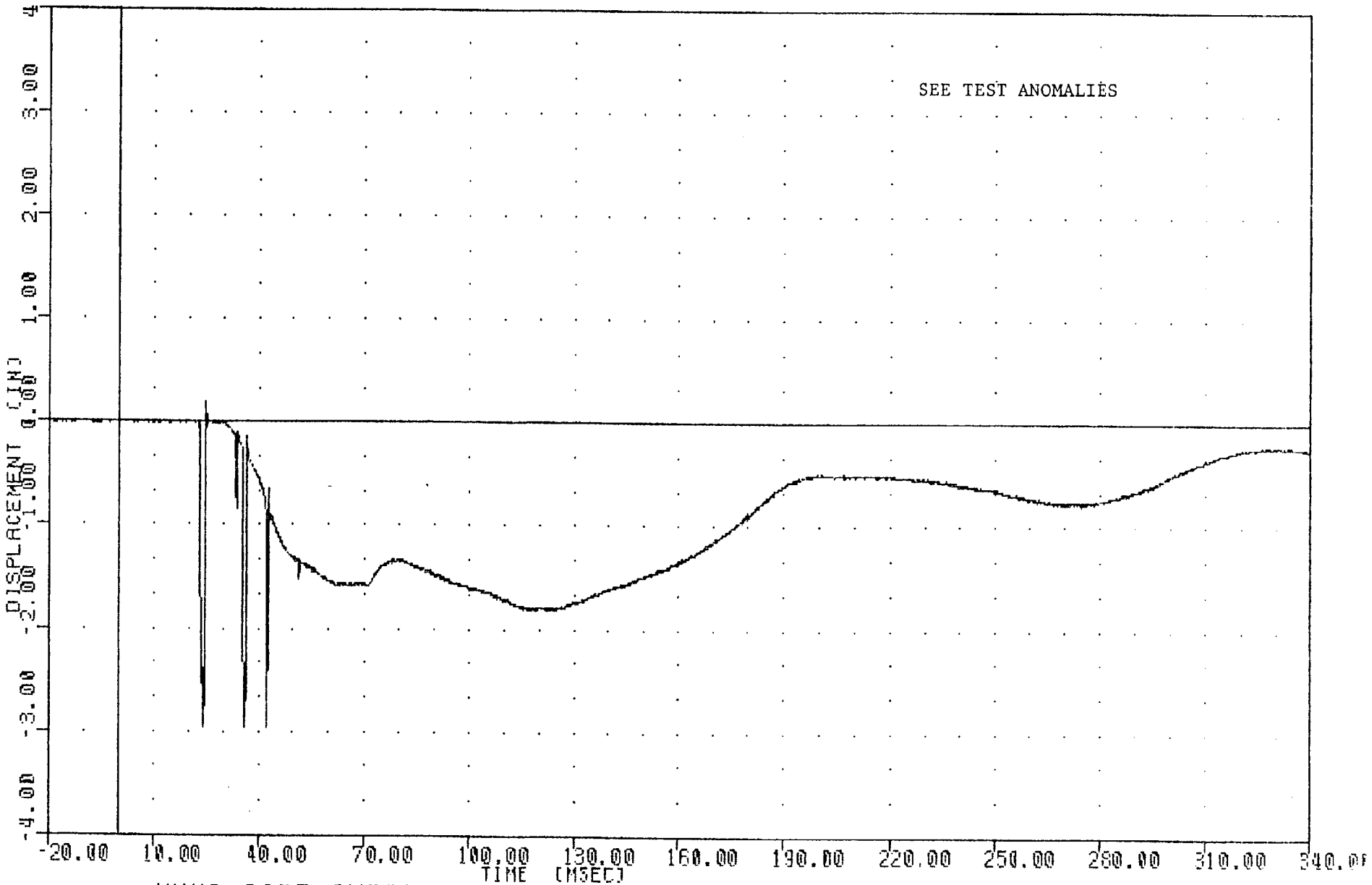


MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
PASSENGER PELVIS RESULTANT ACCELERATION

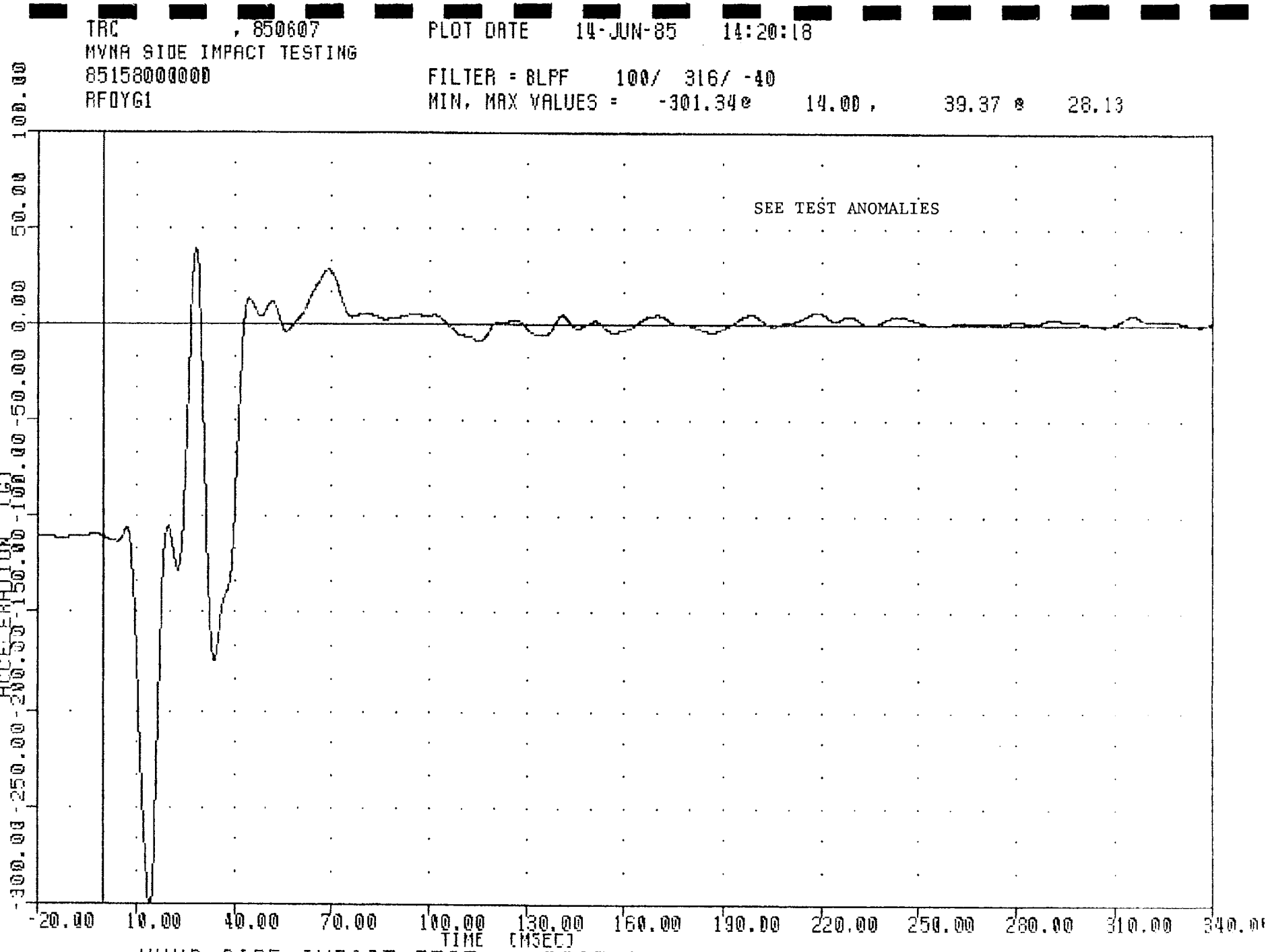


MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
PELVIS VELOCITY Y AXIS

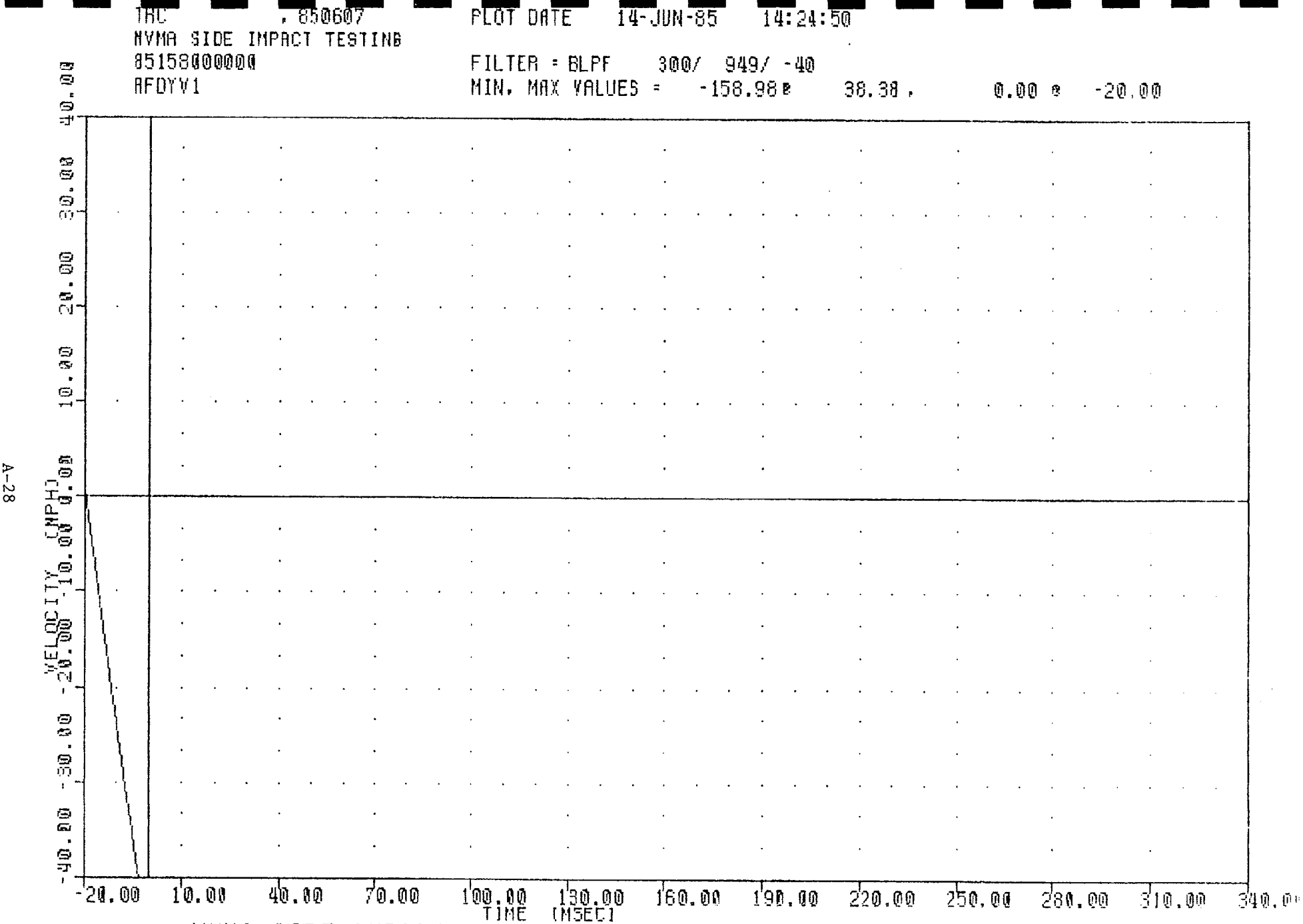
TRC , 850607 PLOT DATE 14-JUN-85 14:20:18
MVMA SIDE IMPACT TESTING
S5158000000 FILTER = ALPF 1650/ 5217/ -40
RRTYD2 MIN, MAX VALUES = -2.97@ 24.25 , 0.20 @ 25.00



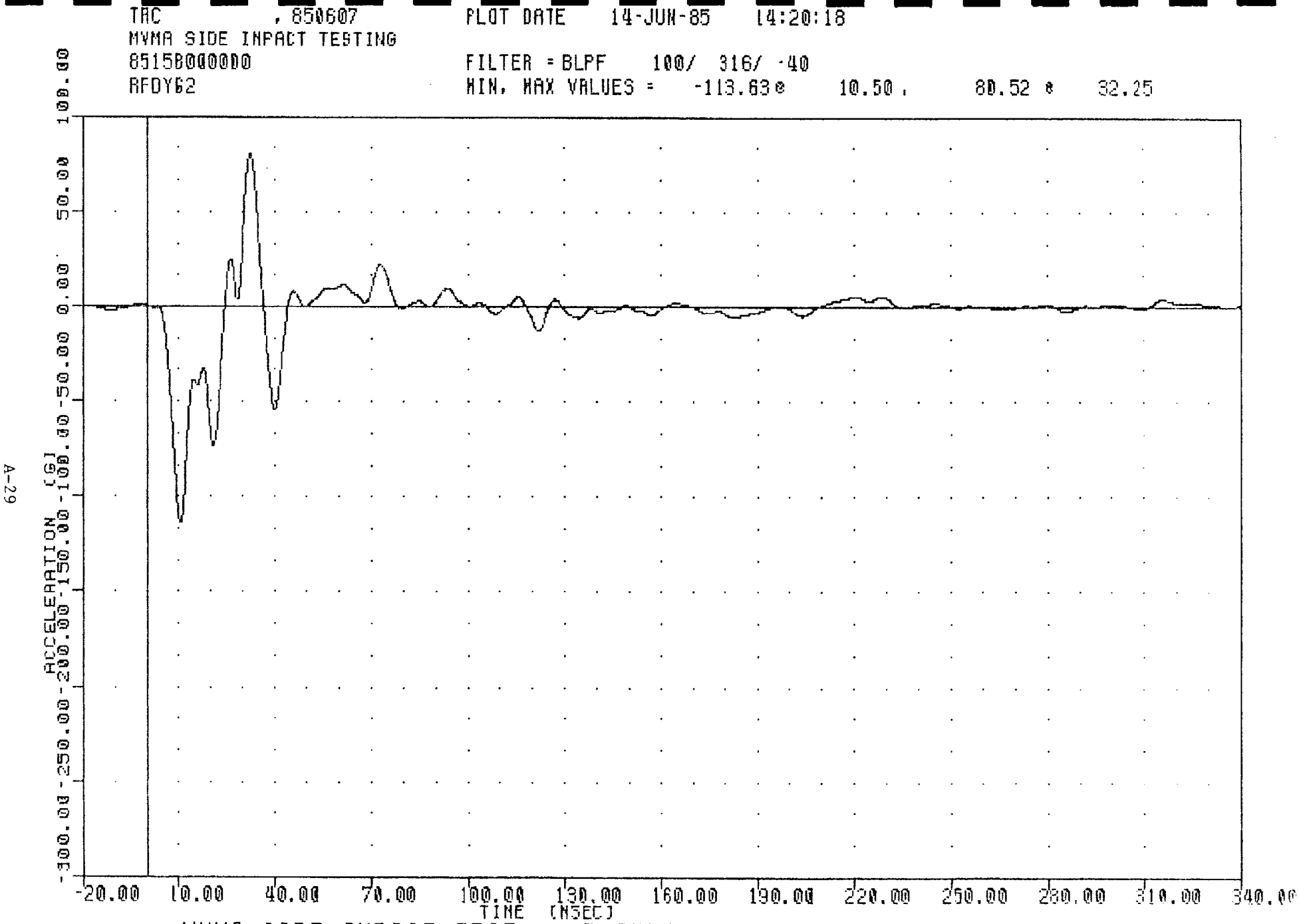
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
PASSENGER RIGHT RIB TO SPINE DISPLACEMENT INCHES



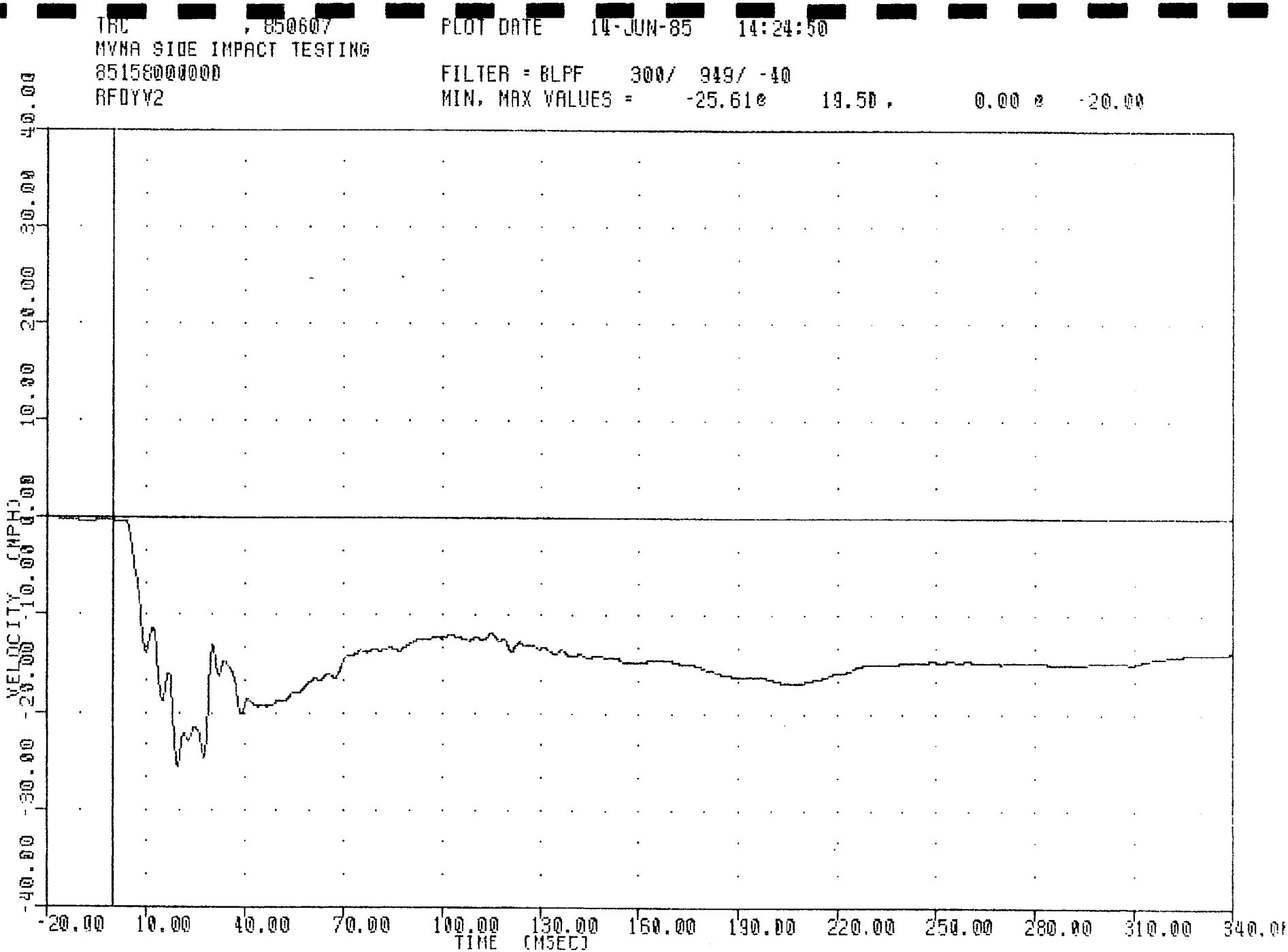
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
VEHICLE RIGHT FRONT DOOR (POSITION 1) ACCELERATION Y AXIS



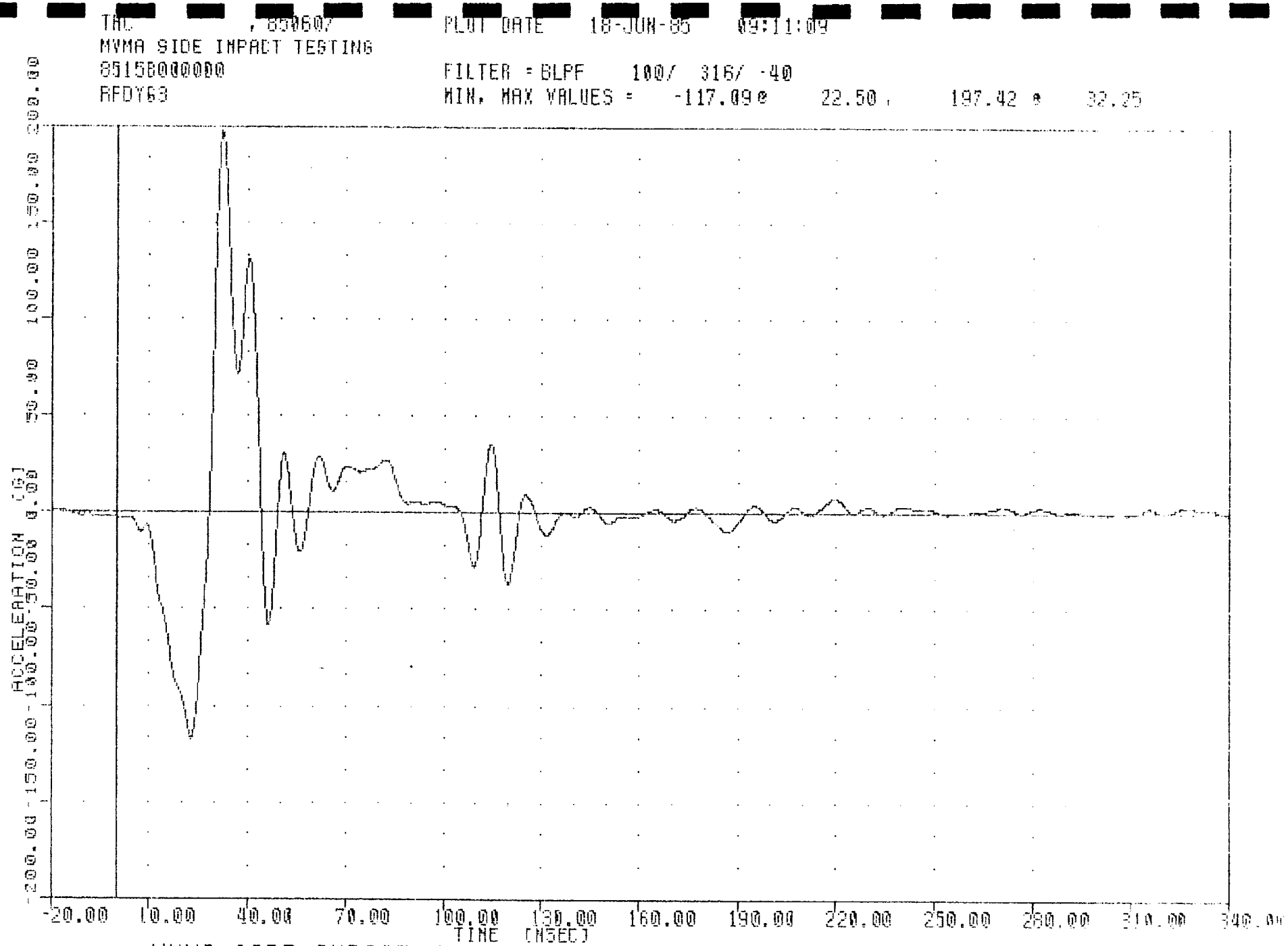
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
RIGHT FRONT DOOR (POSITION 1) VELOCITY Y AXIS



MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
VEHICLE RIGHT FRONT DOOR (POSITION 2) ACCELERATION Y AXIS

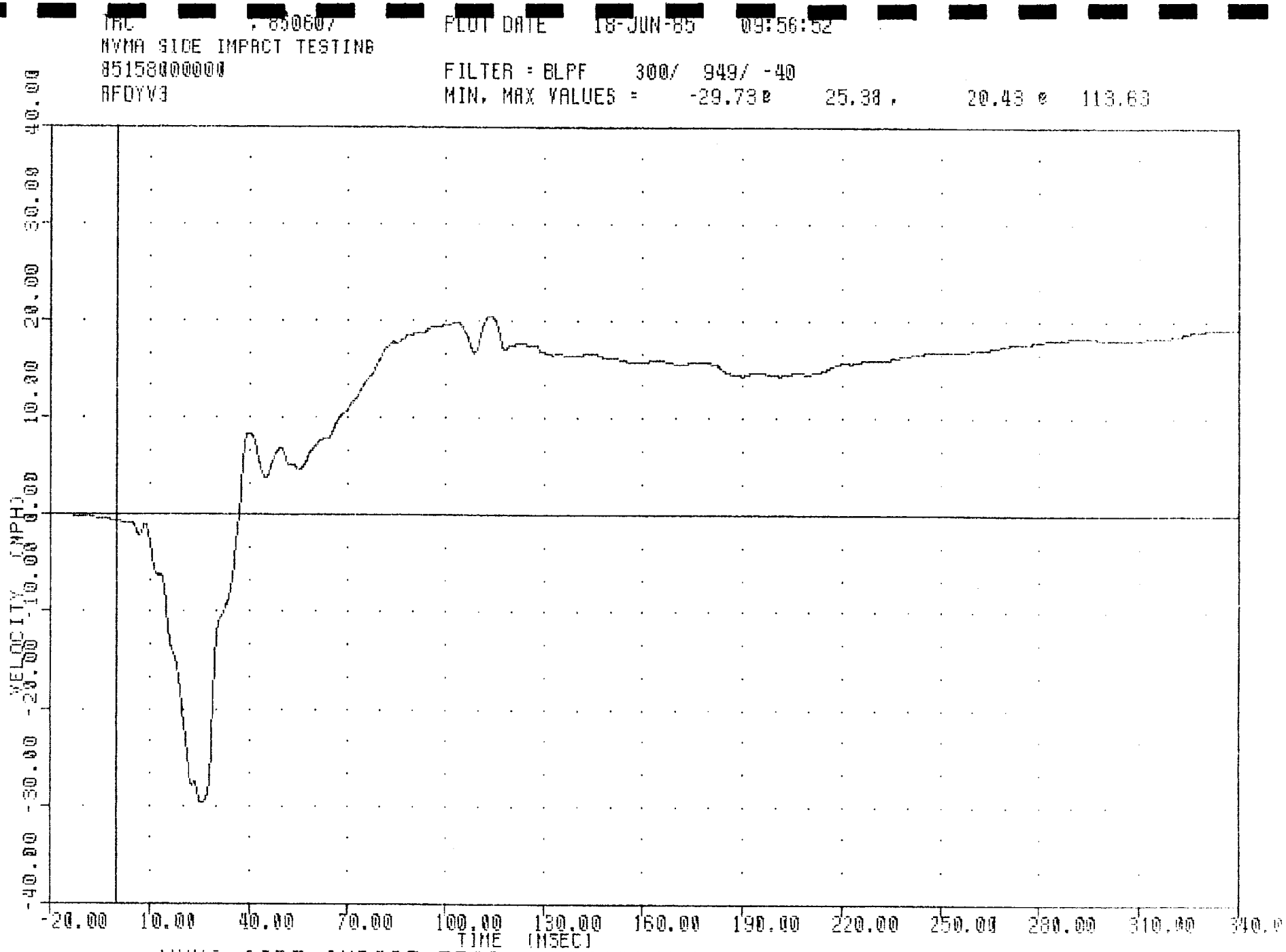


MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
RIGHT FRONT DOOR (POSITION 2) VELOCITY Y AXIS

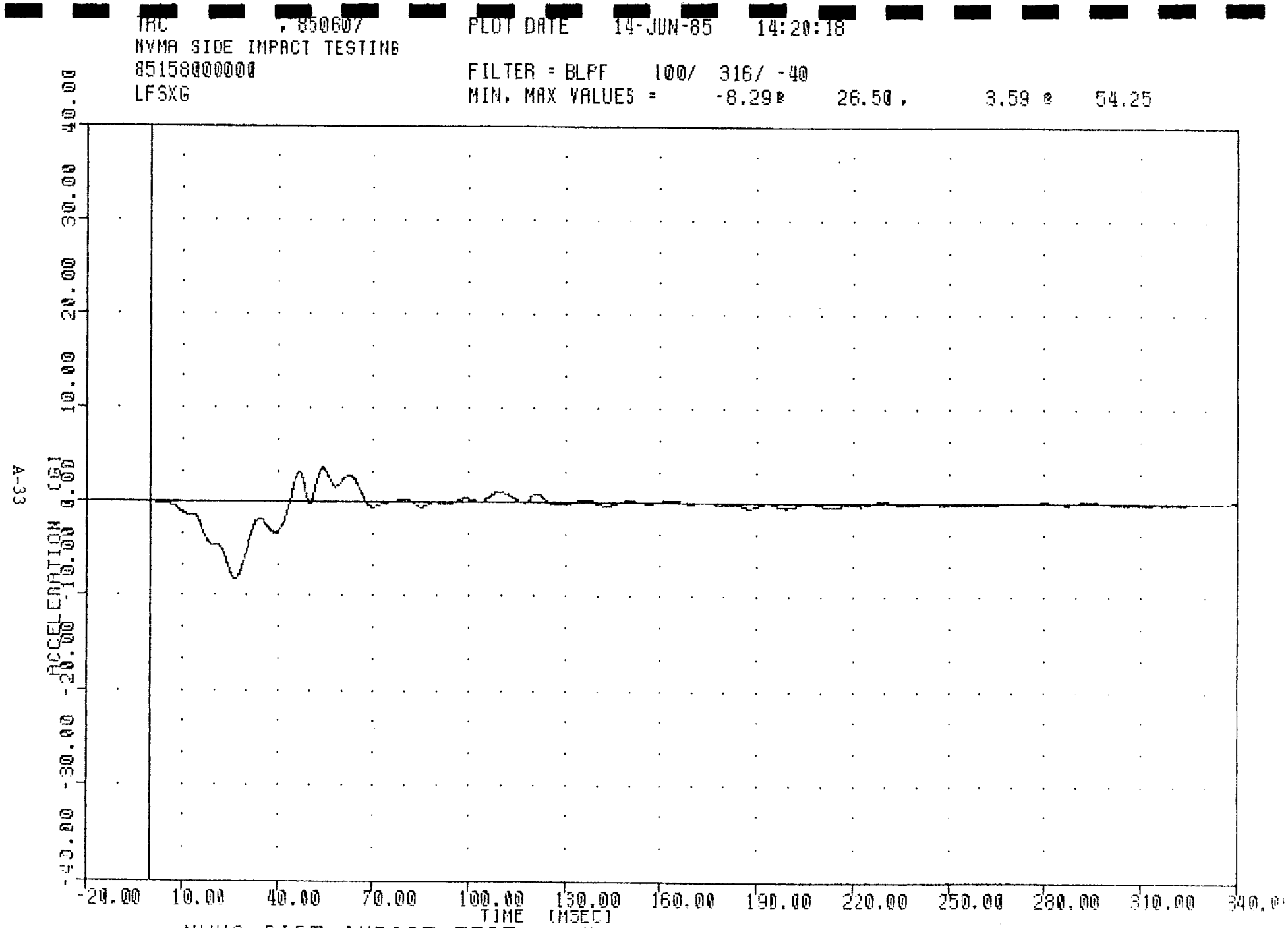


MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR [illegible]

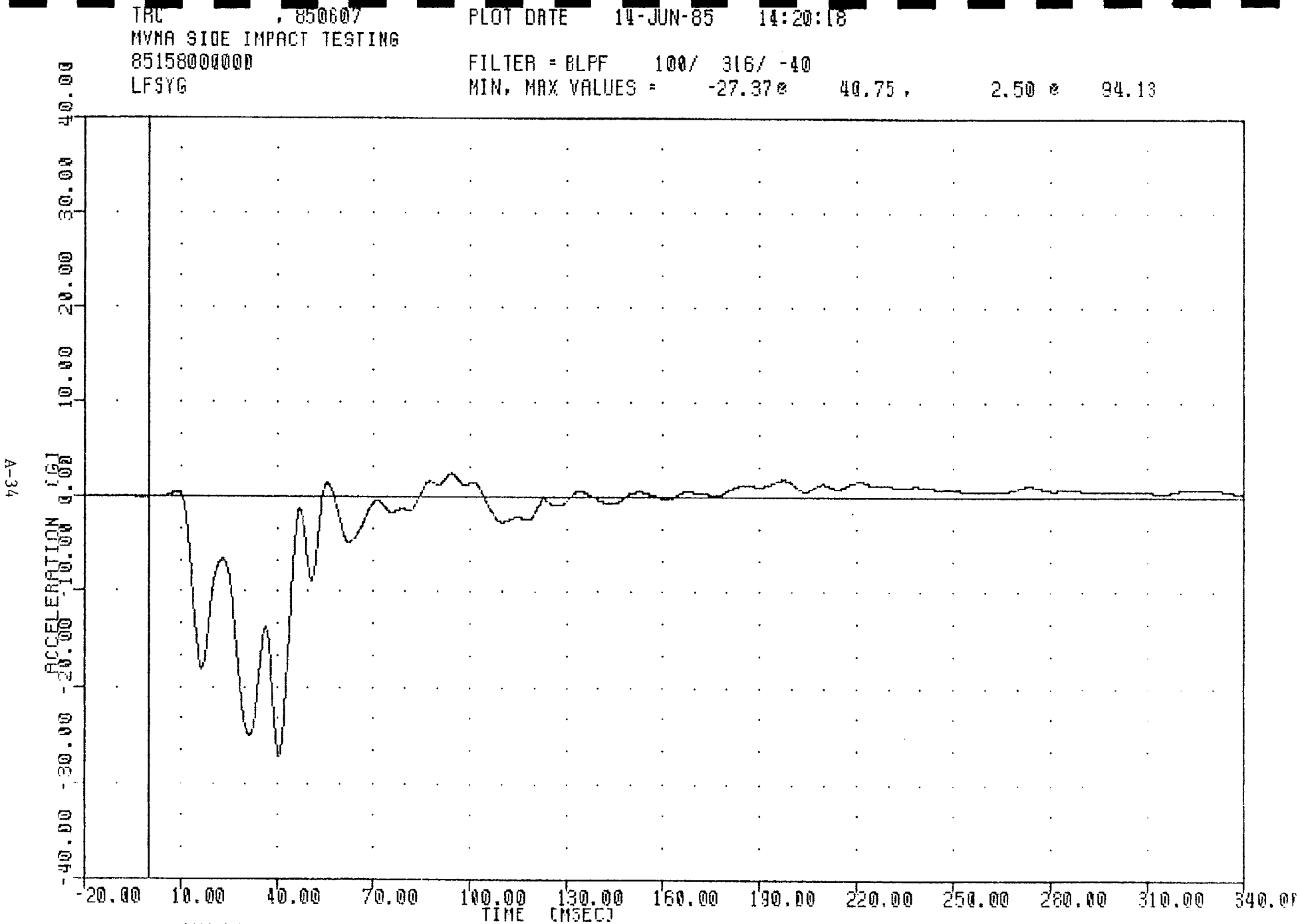
VEHICLE RIGHT FRONT DOOR (POSITION 3) ACCELERATION [illegible]



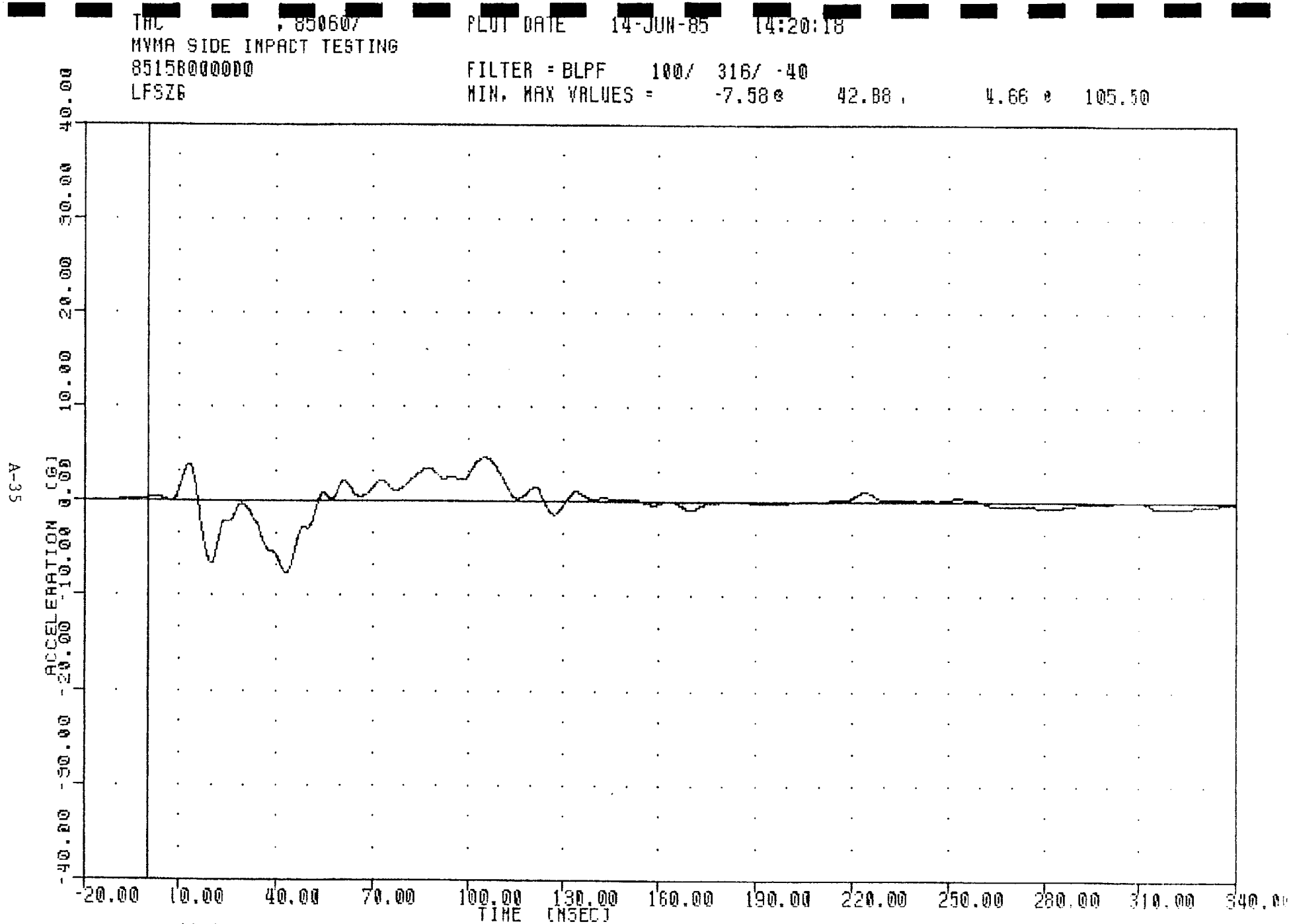
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
RIGHT FRONT DOOR (POSITION 3) VELOCITY Y AXIS



NVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
VEHICLE LEFT FRONT SILL ACCELERATION X AXIS

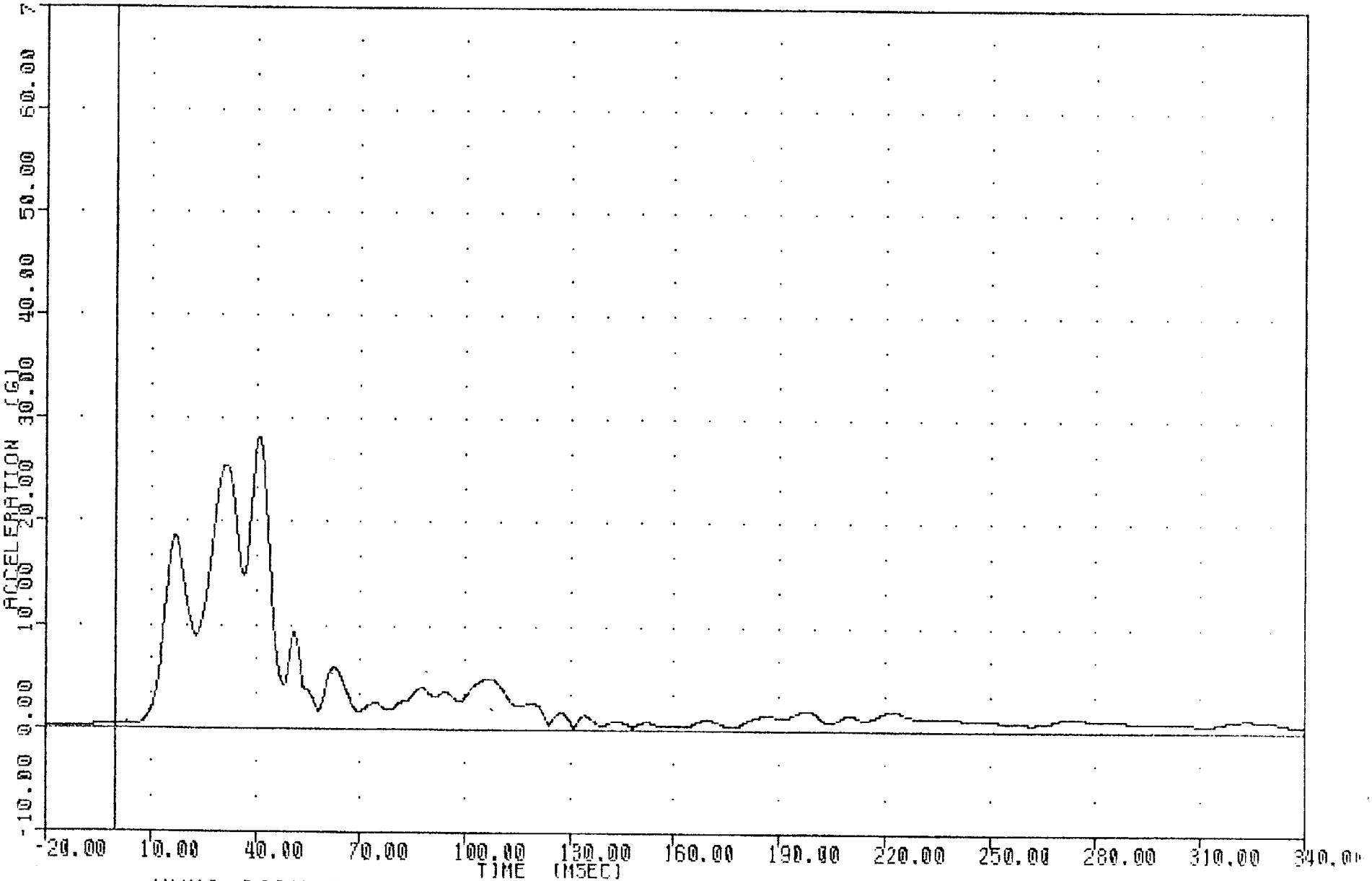


MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS

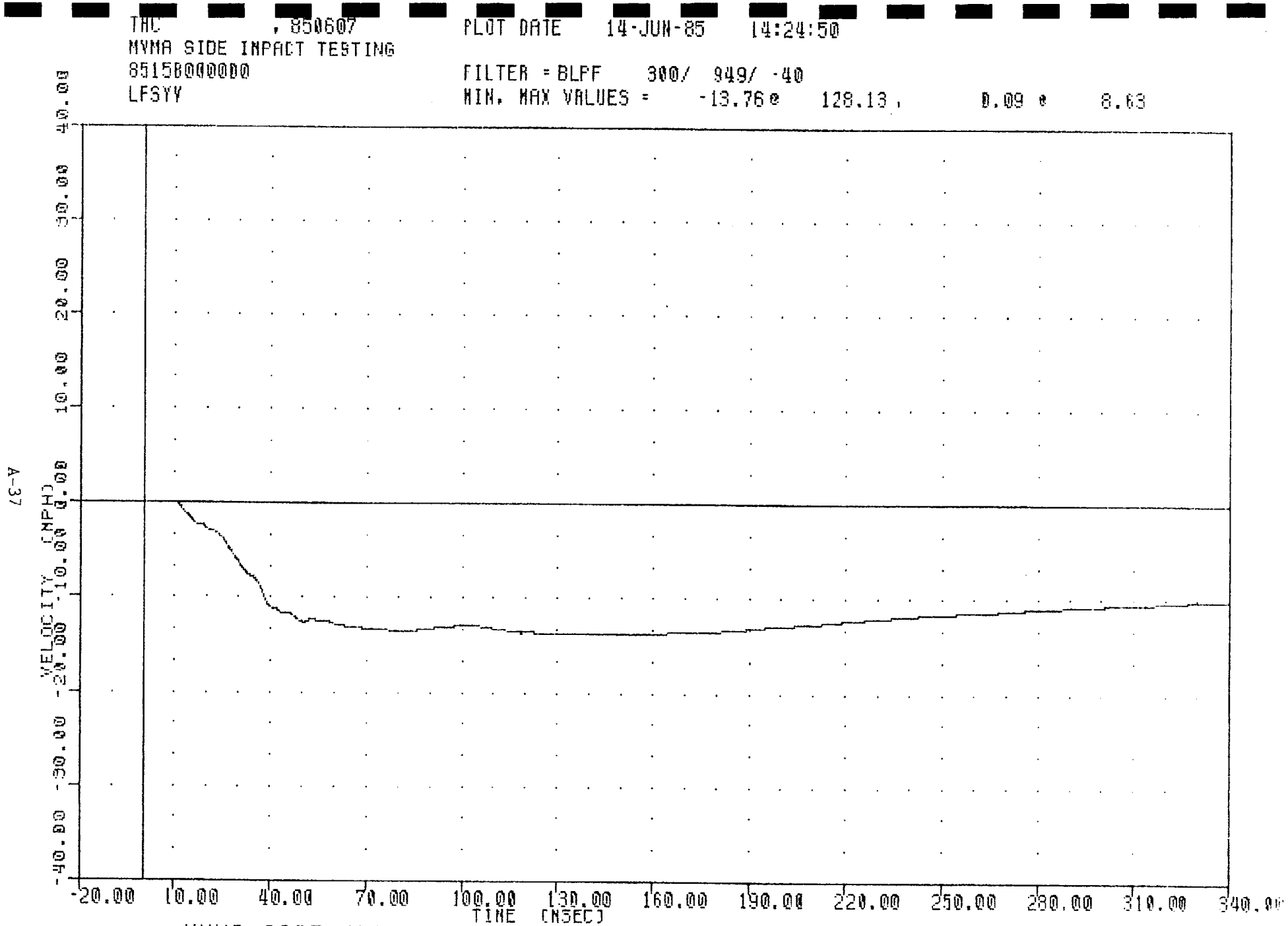


MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
VEHICLE LEFT FRONT SILL ACCELERATION Z AXIS

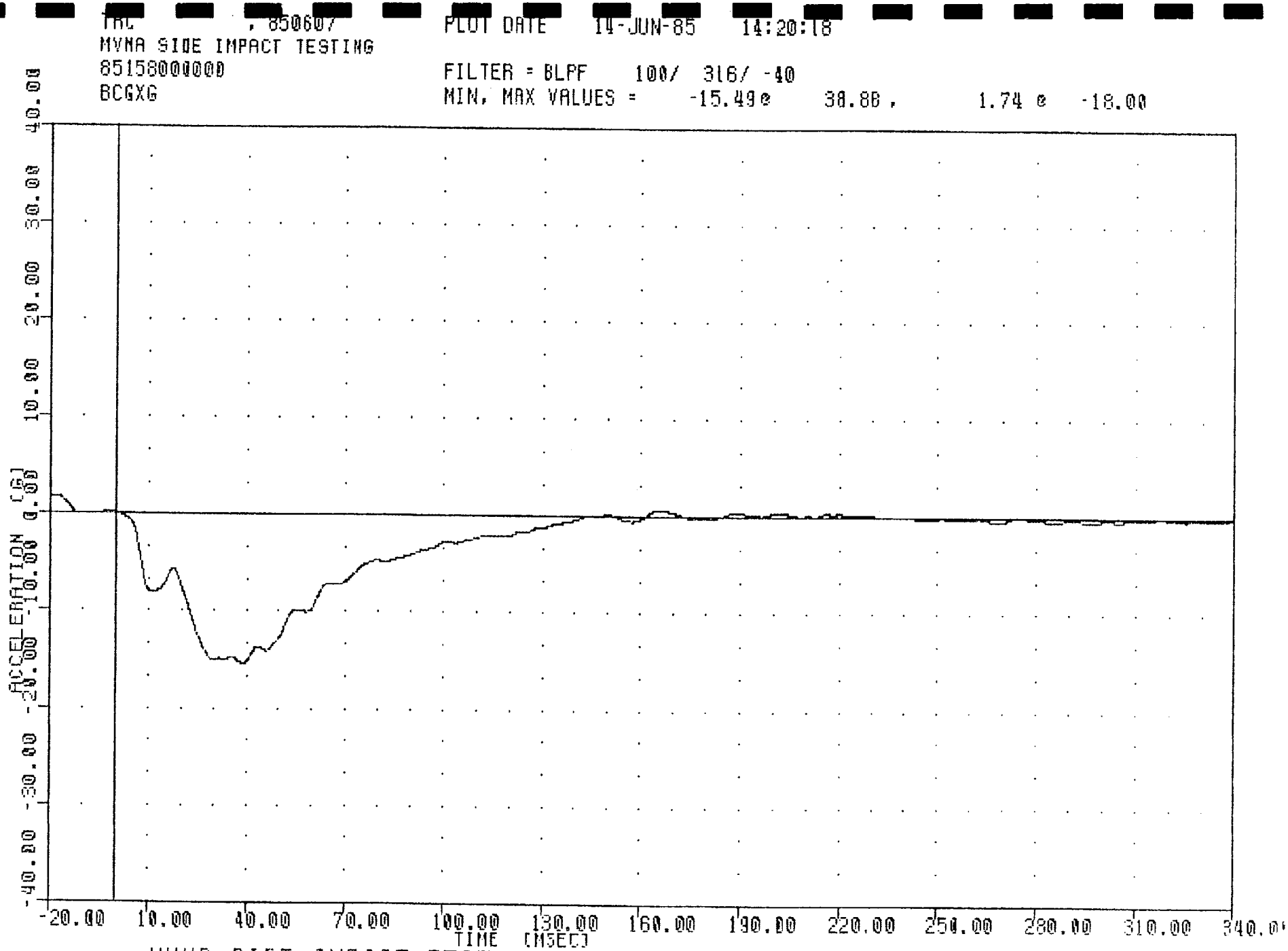
TRC , 850607 PLOT DATE 14-JUN-85 14:20:18
NVMA SIDE IMPACT TESTING
85158@@@@@@ FILTER = BLPF 100/ 316/ -40
LFSRG MIN, MAX VALUES = 0.08@ -16.5@ , 28.25 @ 40.75



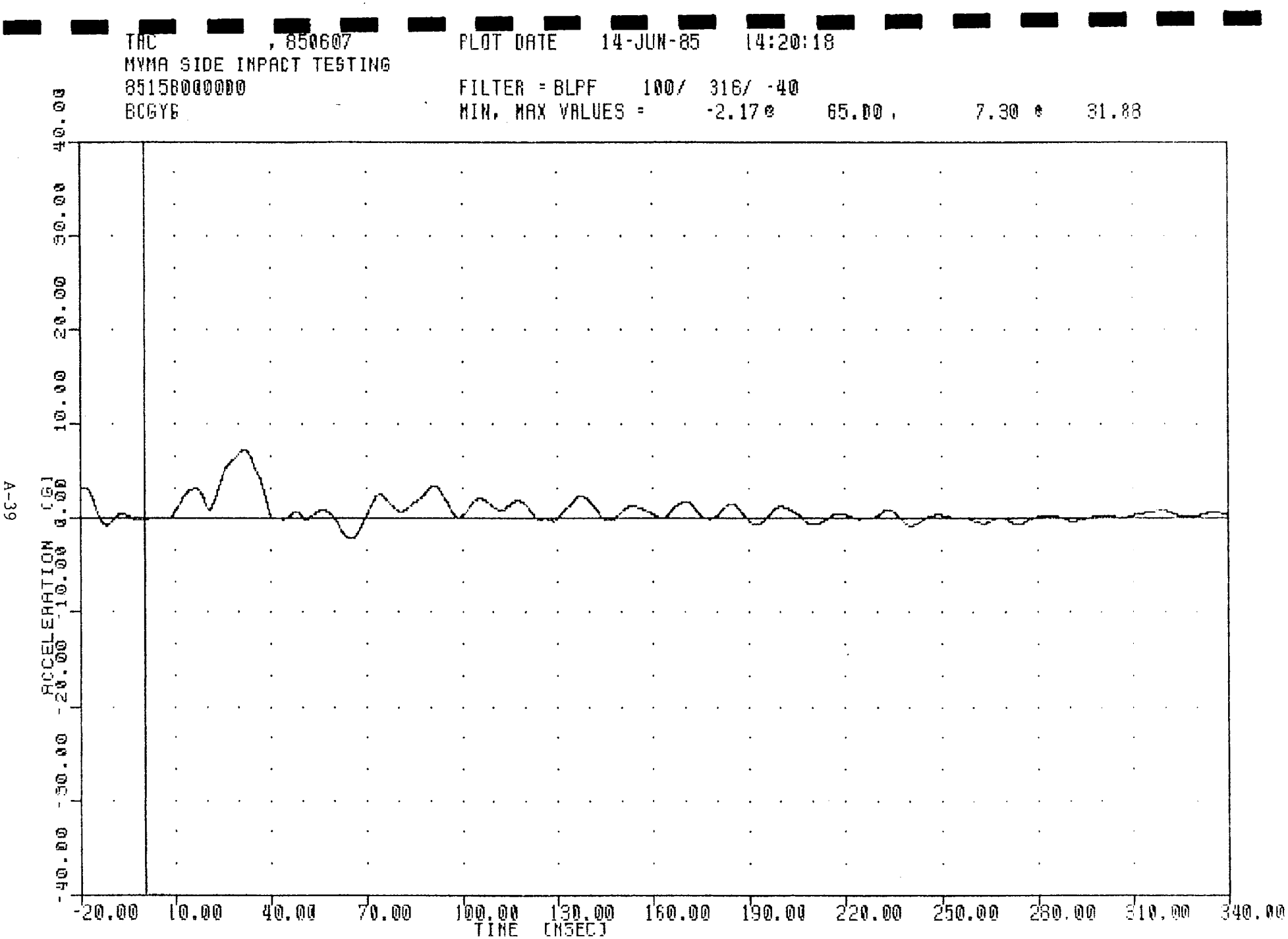
NVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
VEHICLE LEFT FRONT SILL RESULTANT



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
LEFT FRONT SILL VELOCITY Y AXIS

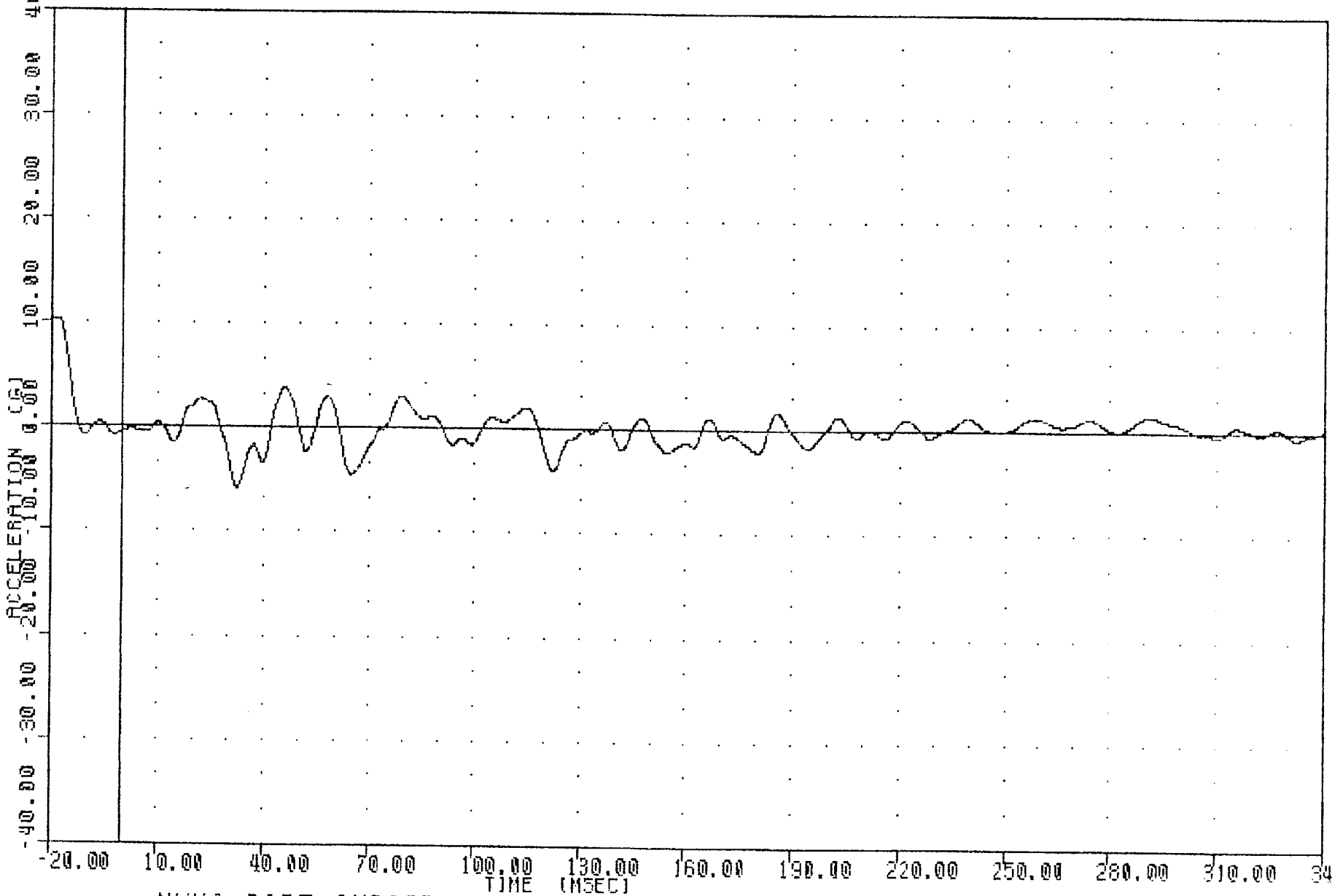


MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY X AXIS

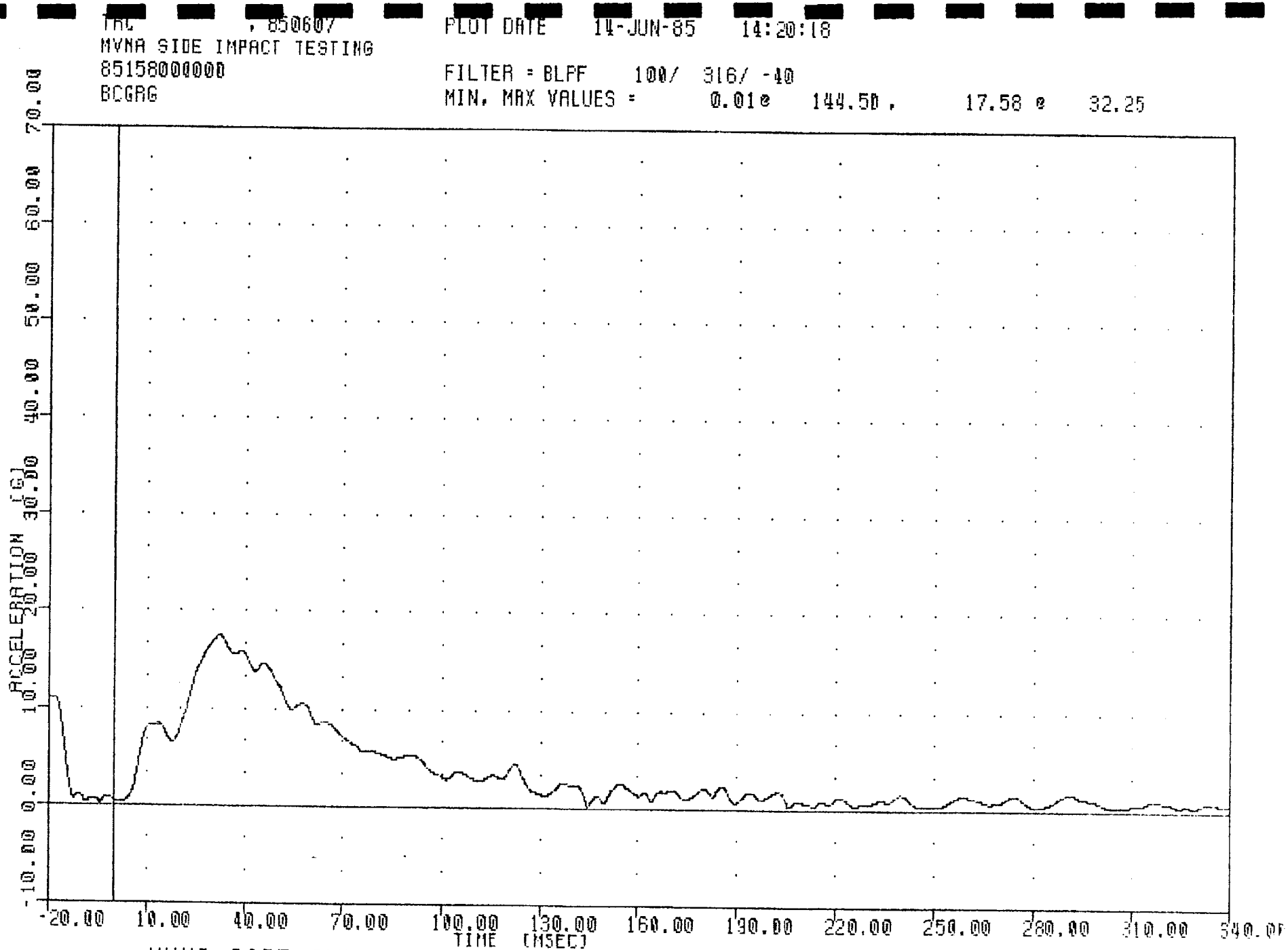


MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY Y AXIS

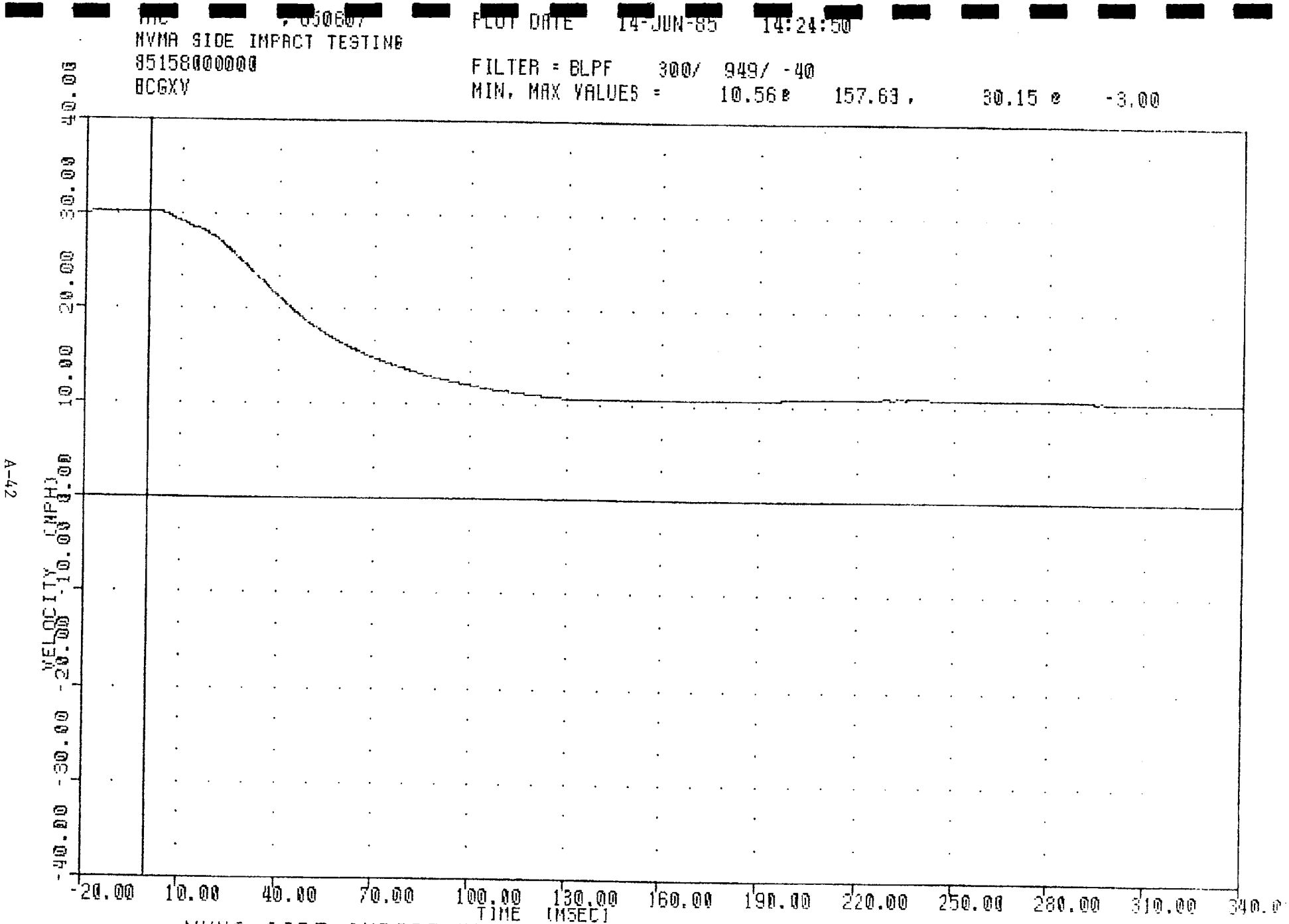
TRC , 850607 PLOT DATE 14-JUN-85 14:20:18
MVMA SIDE IMPACT TESTING
851580000000 FILTER = BLPF 100/ 316/ -40
BCGZG MIN, MAX VALUES = -5.86 @ 32.38 , 10.34 @ -20.00



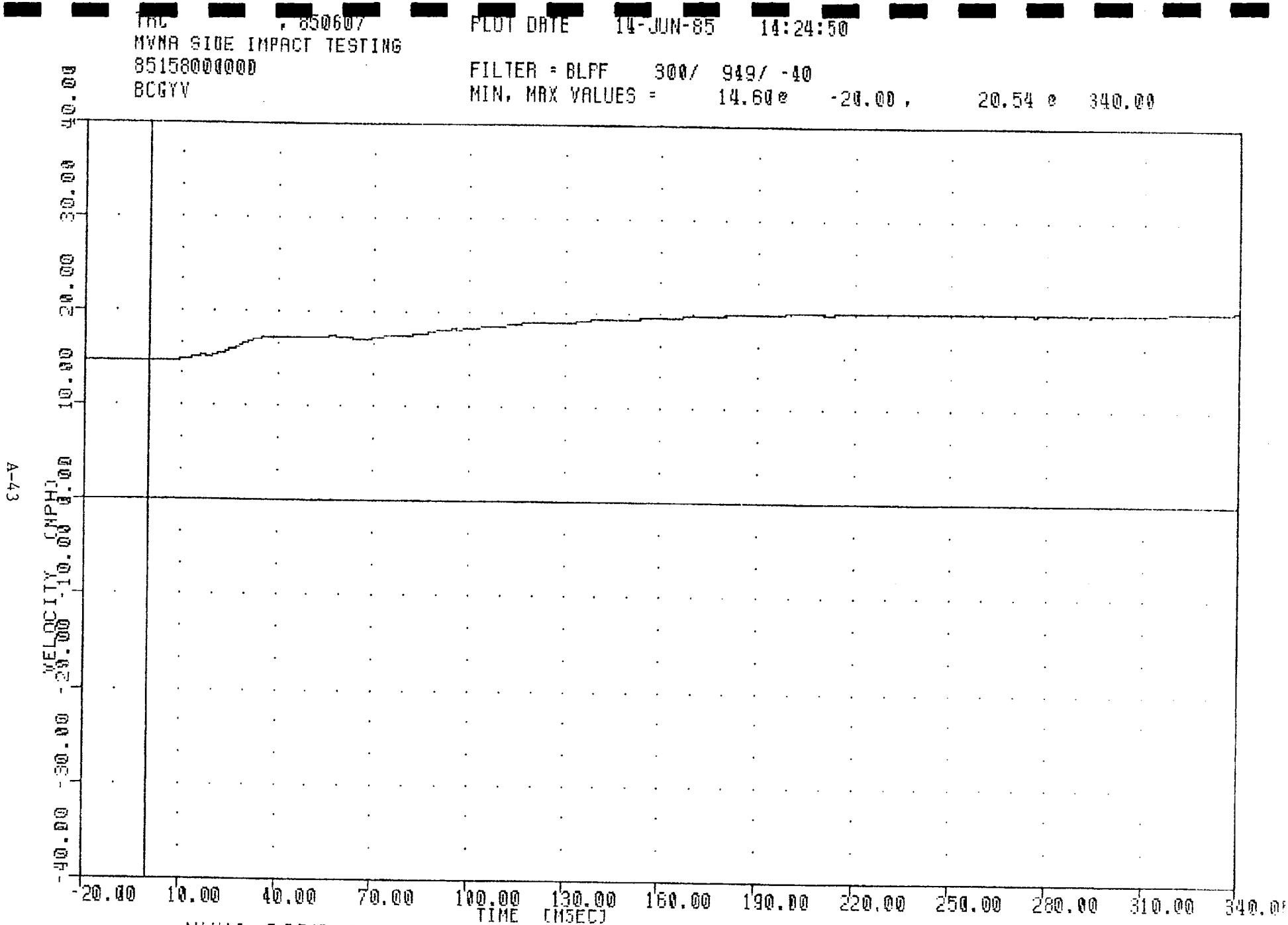
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY Z AXIS



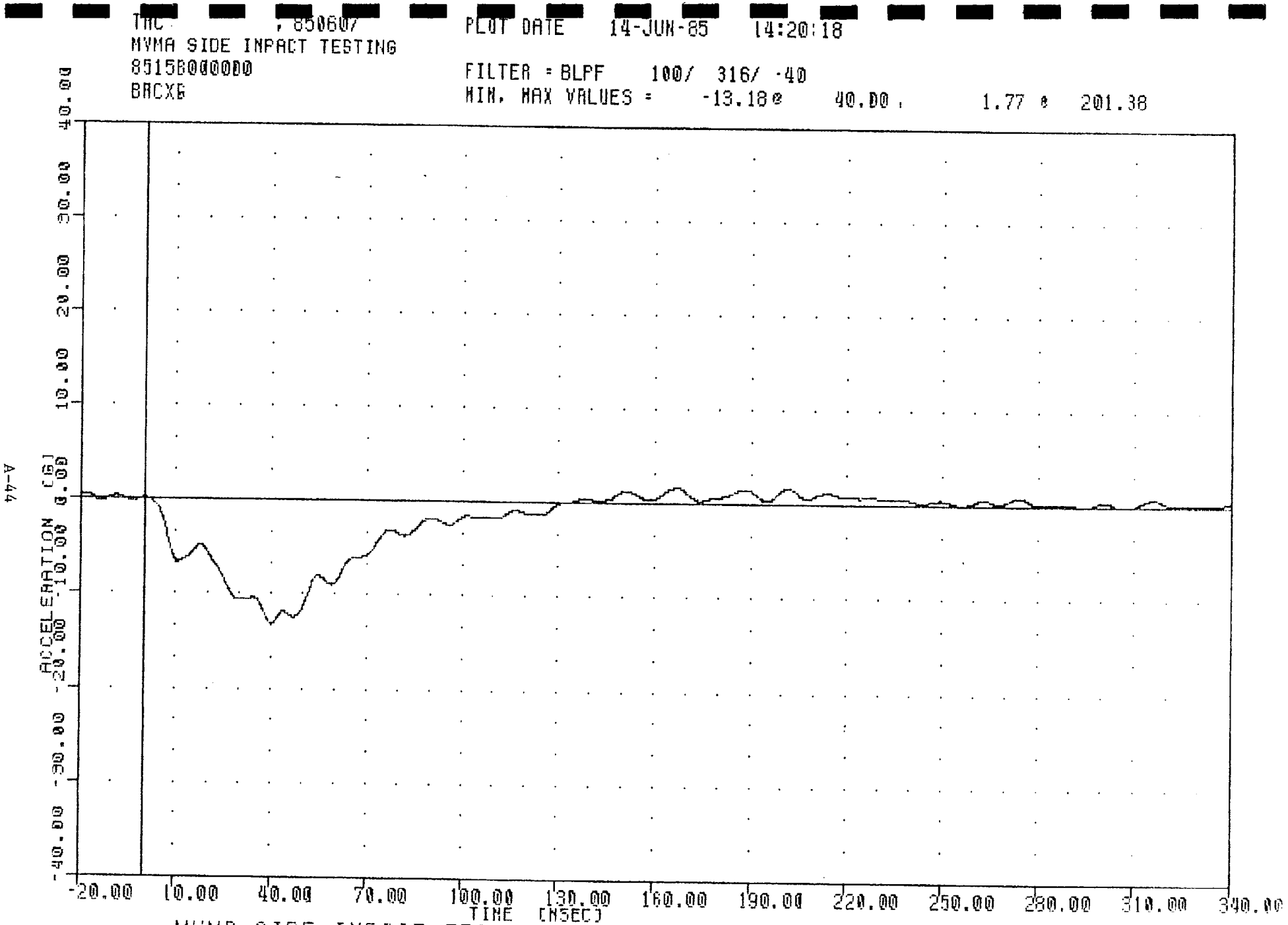
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY RESULTANT ACCELERATION



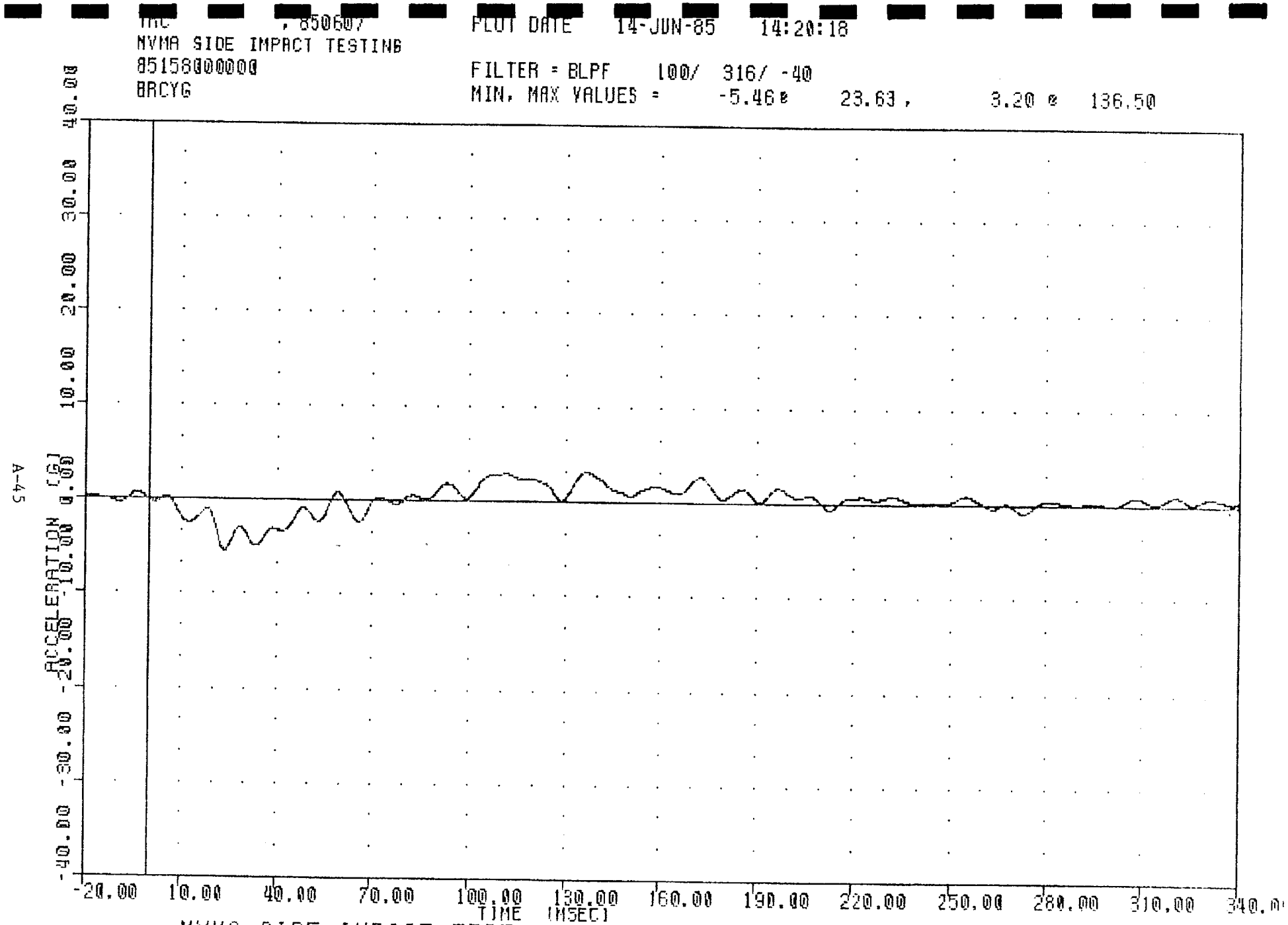
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY VELOCITY X AXIS



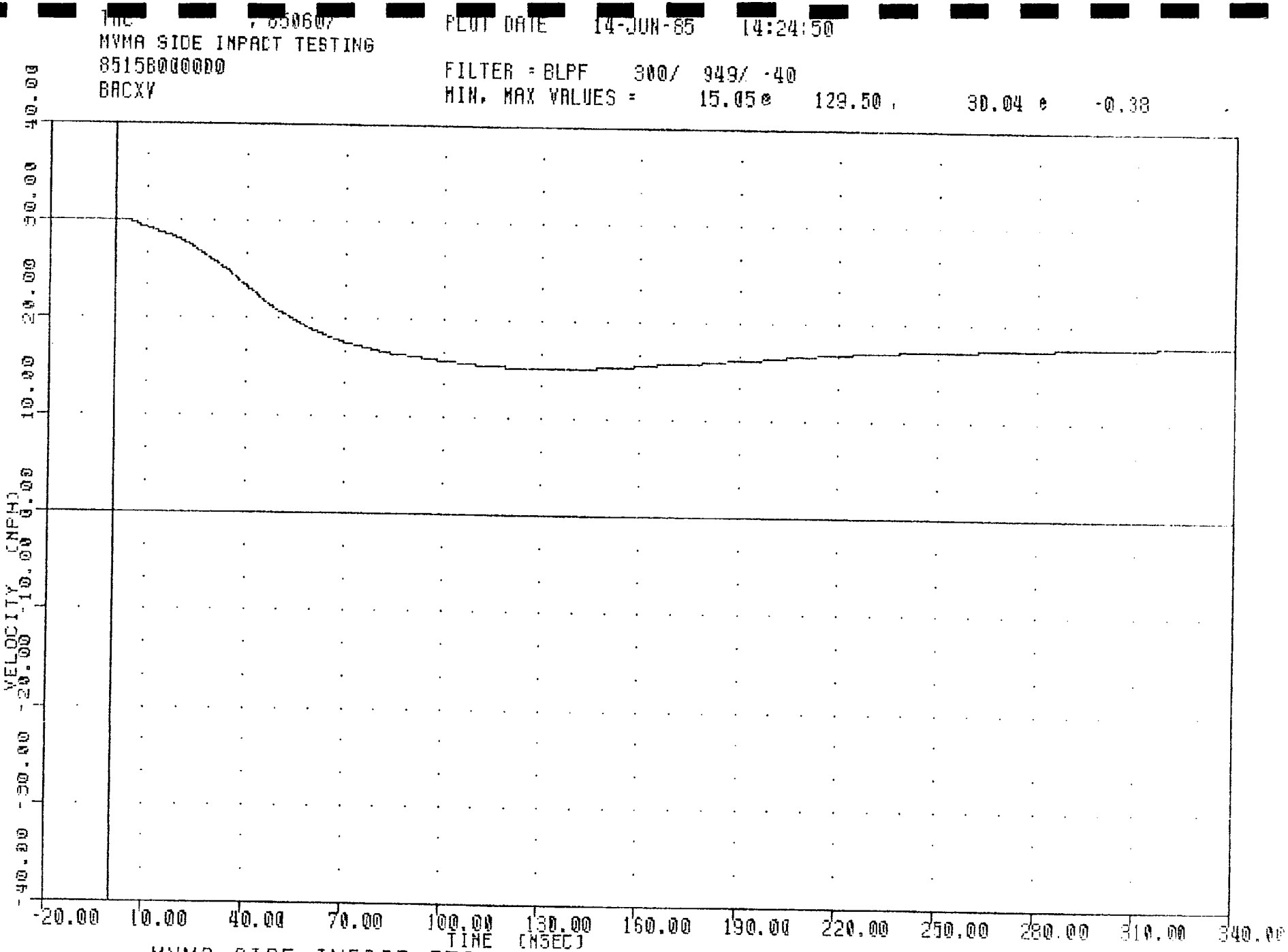
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY VELOCITY Y AXIS



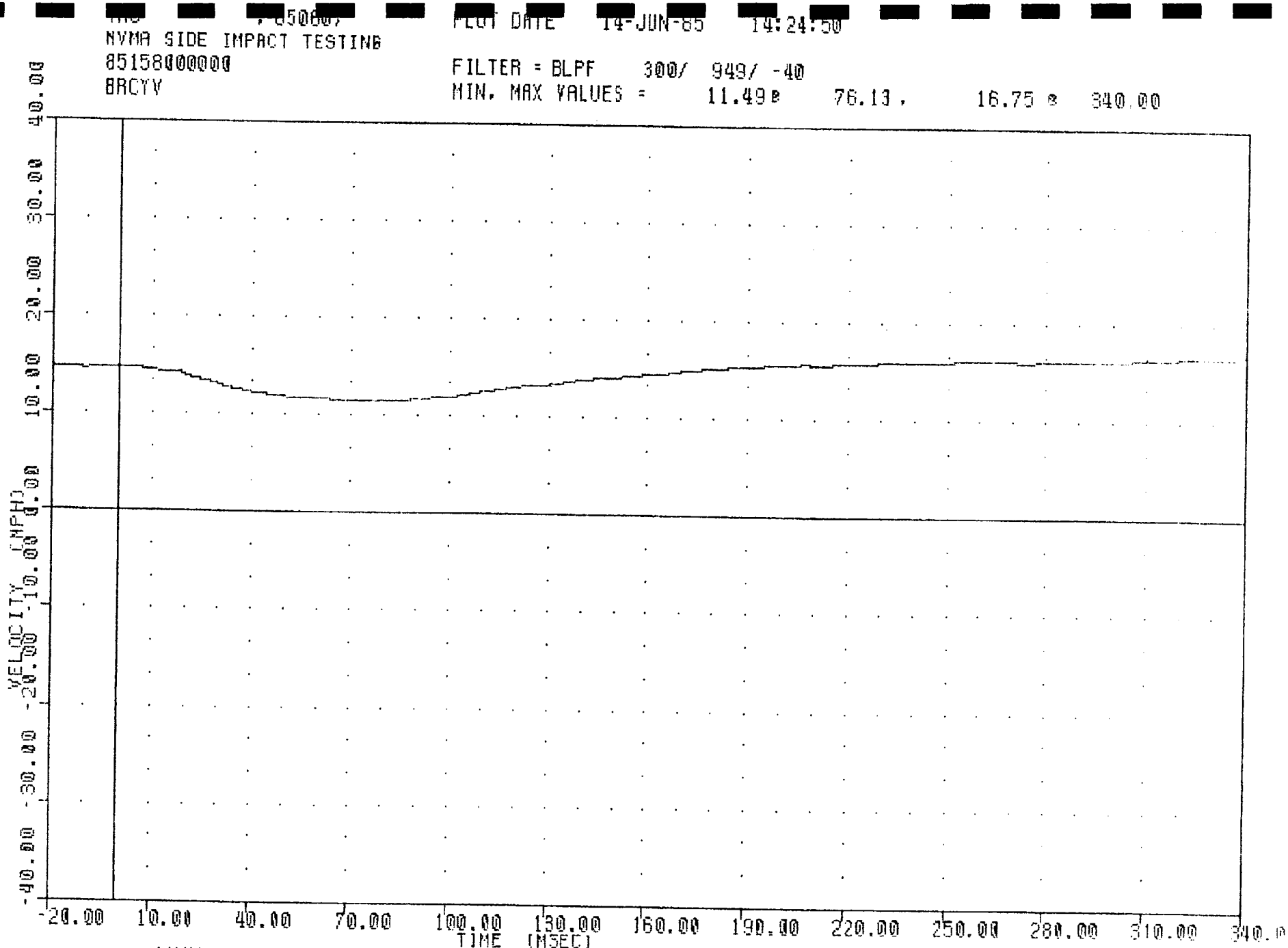
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
BARRIER REAR CROSSMEMBER ACCELERATION X AXIS



MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
BARRIER REAR CROSSMEMBER ACCELERATION Y AXIS



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
BARRIER REAR CROSSMEMBER VELOCITY X AXIS



MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
BARRIER REAR CROSSMEMEBER VELOCITY Y AXIS

APPENDIX B

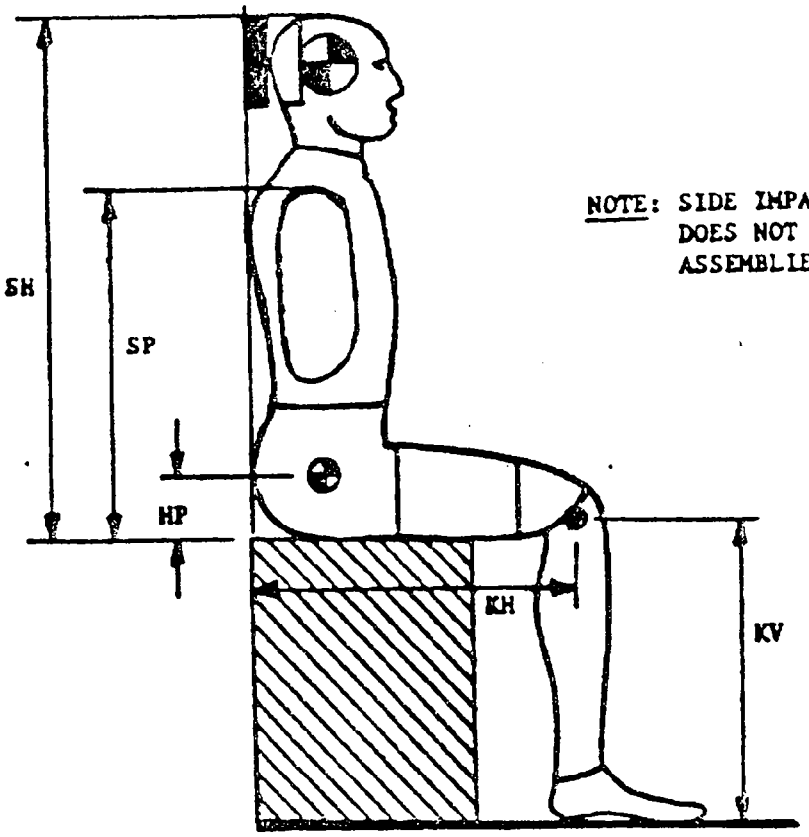
DUMMY CERTIFICATION

PART 572 DUMMY CALIBRATIONS

SIDE IMPACT DUMMY CONFIGURATION VERIFICATION TEST DATA

NHTSA DUMMY I.D. NO.: 0 1 6

5-10-85



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

	P.572 SPECIFICATION	PRE-TEST	POST-TEST
DATE OF CONFIGURATION VERIFICATION		5-10-85	
VERIFICATION NUMBER FOR DUMMY*		016-01	
SH - Seated Height- - - - - - - -	35.6 to 35.8"	35.7	
SP - Shoulder Height- - - -			
HP - Hip Pivot Height - - - - - -	3.9" ref.	3.9	
KH - Knee Pivot from back line- -	20.1 to 20.7"	20.5	
KV - Knee Pivot from floor- - - -	19.3 to 19.9"	19.4	
SW - Shoulder Width - - - - - - -		17.7	
HW - Hip Width- - - - - - - - - -	14.0 to 15.4"	14.7	

TECHNICIAN'S NAME: Mary Phelps

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

TRANSPORTATION RESEARCH CENTER OF OHIO

LUMBAR FLEXION TEST

PART 572 09-MAY-85

TEMPERATURE 69.00 F
MVMA LF01601

RELATIVE HUMIDITY 59.00 %
572/SID 016 LUMBAR FLEX CAL 01

DEFLECTION	SPECIFICATION	TEST RESULTS
0 Des.	0 LBS	0.00 LBS
20 Des	22.00 - 34.00 LBS	34.00 LBS
30 Des	34.00 - 46.00 LBS	45.00 LBS
40 Des	46.00 - 58.00 LBS	57.00 LBS
NET RETURN ANGLE	< 12 DEG	3.14 DEG

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Mary L. Phelps

TEST SUPERVISOR K. L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

ABDOMINAL COMPRESSION TEST

PART 572 10-MAY-85

TEMPERATURE 69.00 F
MVMA AB01601

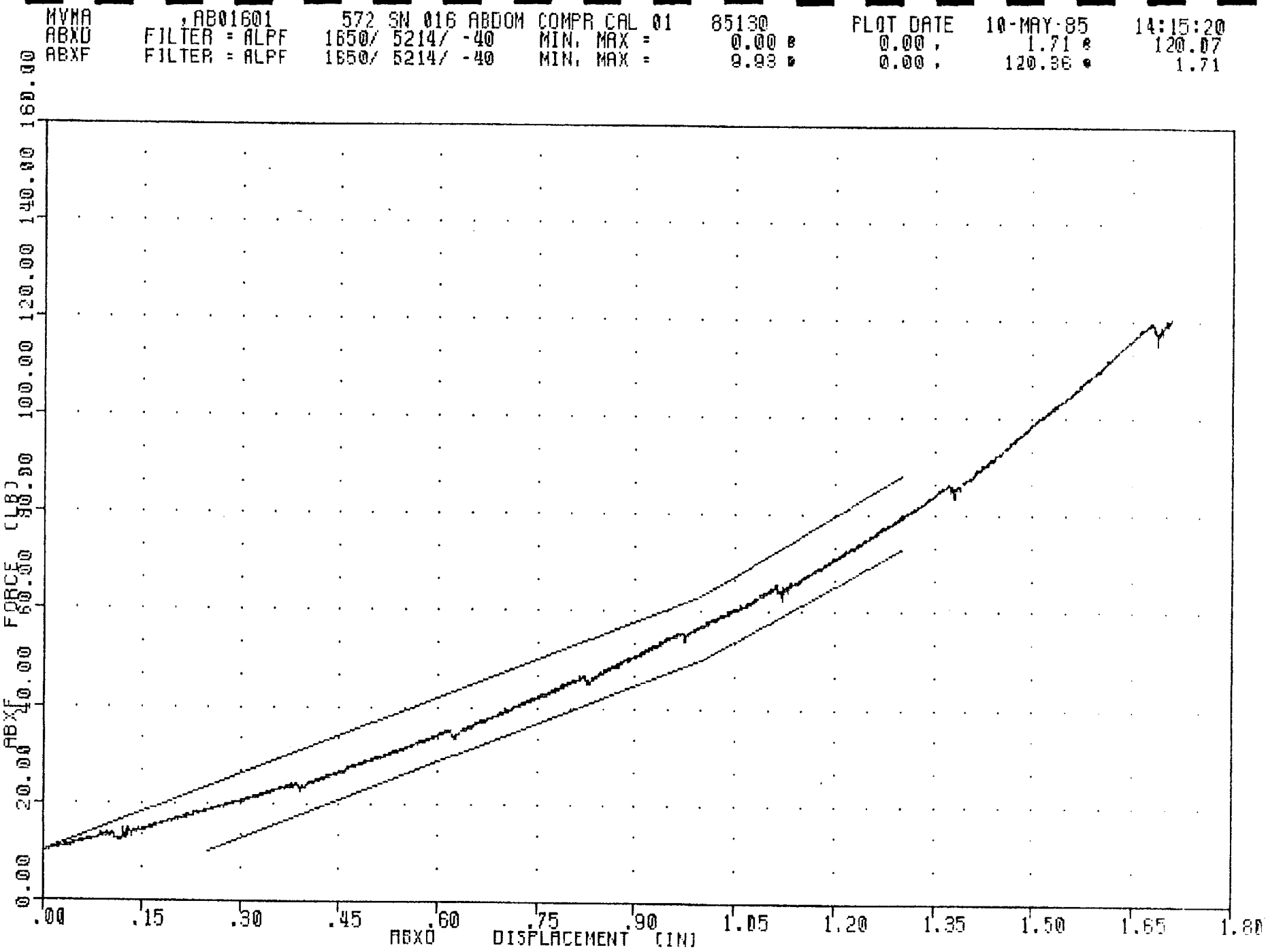
RELATIVE HUMIDITY 65.00 %
572 SN 016 ABDOM COMPR CAL 01

TEST CORRIDORS DISPLACEMENT	FORCE	TEST RESULTS
0 IN.	10 LBS	10 LBS
.50 IN.	23.00 - 36.00 LBS	28.77 LBS
.75 IN.	36.00 - 50.00 LBS	41.77 LBS
1.00 IN.	50.00 - 63.00 LBS	56.82 LBS
1.30 IN.	73.00 - 88.00 LBS	79.17 LBS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Mary L. Phelps

TEST SUPERVISOR K. L. Watters



ABDOMINAL COMPRESSION VS DISPLACEMENT

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

PART 572 09-MAY-85

TEMPERATURE 69 F RELATIVE HUMIDITY 59 %
MVMA HD01601 572 SN 016 HEAD DROP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PEAK RESULTANT ACCELERATION	210 - 260 G	258.51 G
TIME ABOVE 100 G LEVEL	0.9 - 1.5 MS	1.15 MS
PEAK LATERAL ACCELERATION	10 G MAX	5.69 G
IS ACCELERATION CURVE UNIMODAL?		YES

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR K. L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK PENDULUM TEST

PART 572 13-MAY-85

TEMPERATURE 69.00 F RELATIVE HUMIDITY 70.00 %
MVMA HN01601 572 SN 016 HEAD/NECK CAL 01

Test Parameter	Specification	Test Results
Pendulum velocity	21.5 to 25.5 fps	22.86 fps
Pendulum Deceleration:		
T1 - T2: 5 - 20 G	3 ms. max	1.91 ms.
T2 - T3: 20 - 20 G	25 - 30 ms.	29.15 ms.
T3 - T4: 20 - 5 G	10 ms. max	4.78 ms.
Avg. G level T2 - T3	20 - 24 G	22.02 G
Maximum Rotation Angle	63 - 73 deg.	65.26 deg.
Peak Head Resultant Accel	26 G max	23.73 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	0.00
30	25.6 - 34.4	2.1 - 3.1	31.10	2.63
60	40.3 - 51.7	4.3 - 5.3	48.25	4.90
max	53.2 - 66.8	5.0 - 6.0	61.25	5.42
60	67.0 - 83.0	4.3 - 5.3	71.07	4.99
30	85.4 - 104.6	2.1 - 3.1	92.24	2.40
0	101.0 - 123.0	-0.5 - +0.5	106.07	0.16

* DUMMY MEETS SPECIFICATIONS

TECHNICAN Gary L. Phelps

TEST SUPERVISOR K. L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572 13-MAY-85

TEMPERATURE 69 F RELATIVE HUMIDITY 68 %
MVMA TL01601 572 SN 016 L.S.THORAX CAL 01

TEST PARAMETER	LOW SPEED TEST SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	13.86-14.14 FT/SEC	14.14 FT/SEC
PEAK DEFLECTION	1.1 INCHES MAX.	0.91 INCHES
PEAK RESISTIVE FORCE	1,450. POUNDS MAX.	1297. POUNDS
INTERNAL HYSTERESIS	50% - 70%	61.1%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR K. L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572 13-MAY-85

TEMPERATURE 69 F RELATIVE HUMIDITY 69 %
MVMA TH01601 572 SN 016 H.S.THORAX CAL 01

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC
PEAK DEFLECTION	1.7 INCHES MAX.	1.47 INCHES
PEAK RESISTIVE FORCE	2,250. POUNDS MAX.	1971. POUNDS
INTERNAL HYSTERESIS	50% - 70%	61.4%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR W. L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572 14-MAY-85

TEMPERATURE 70 F RELATIVE HUMIDITY 70 %
RIGHT KNEE
MVMA RK01601 572 SN 016 R.KNEE IMP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	1855.33 LBS.
DURATION ABOVE 1000 LBS.	>=1.7 MS.	1.84 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR K.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572 14-MAY-85

TEMPERATURE 70 F RELATIVE HUMIDITY 69 %
LEFT KNEE
MUMA LK01601 572 SN 016 L.KNEE IMP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	1850.94 LBS.
DURATION ABOVE 1000 LBS.	>=1.7 MS.	1.87 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Mary L. Phelps

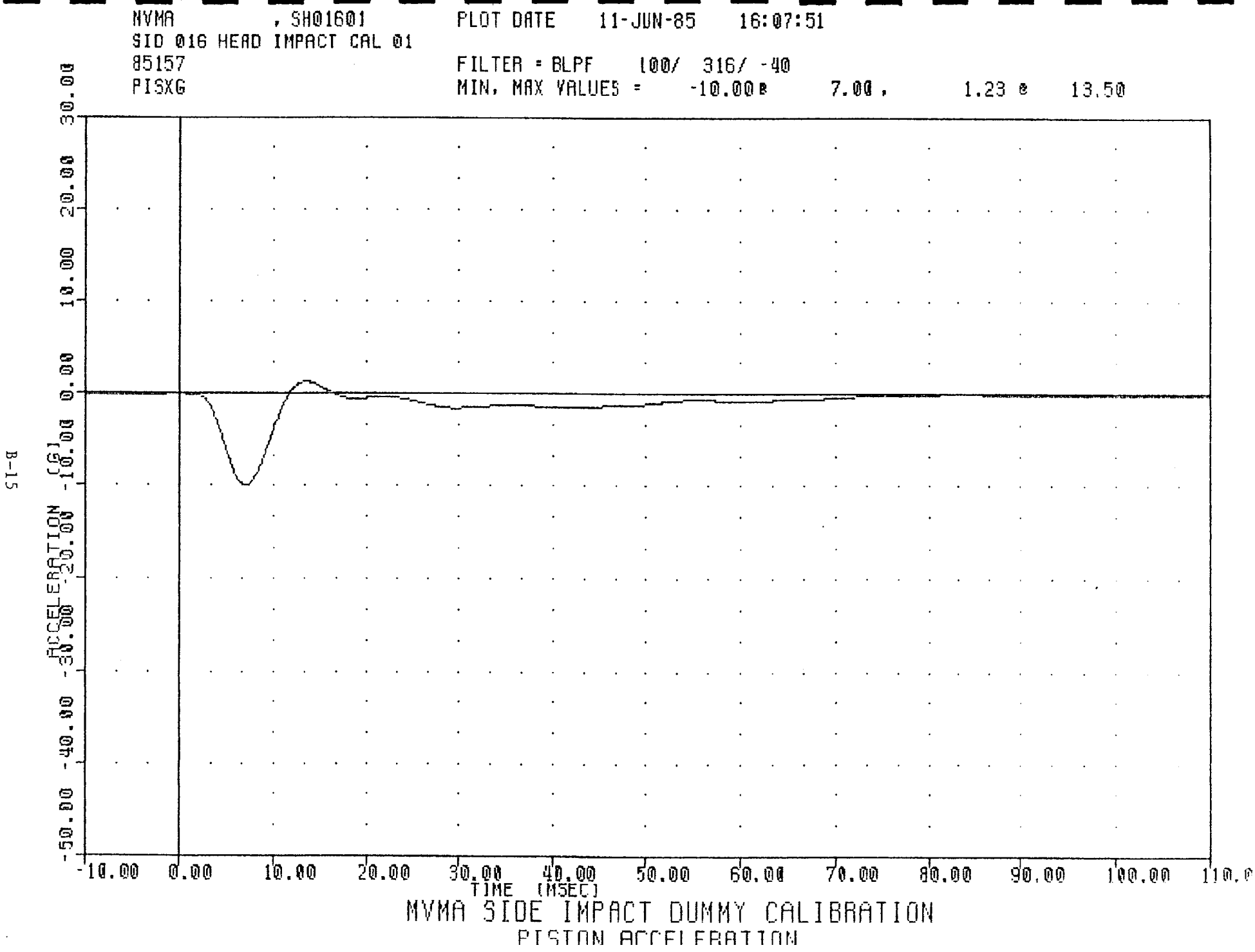
TEST SUPERVISOR K.L. Watters

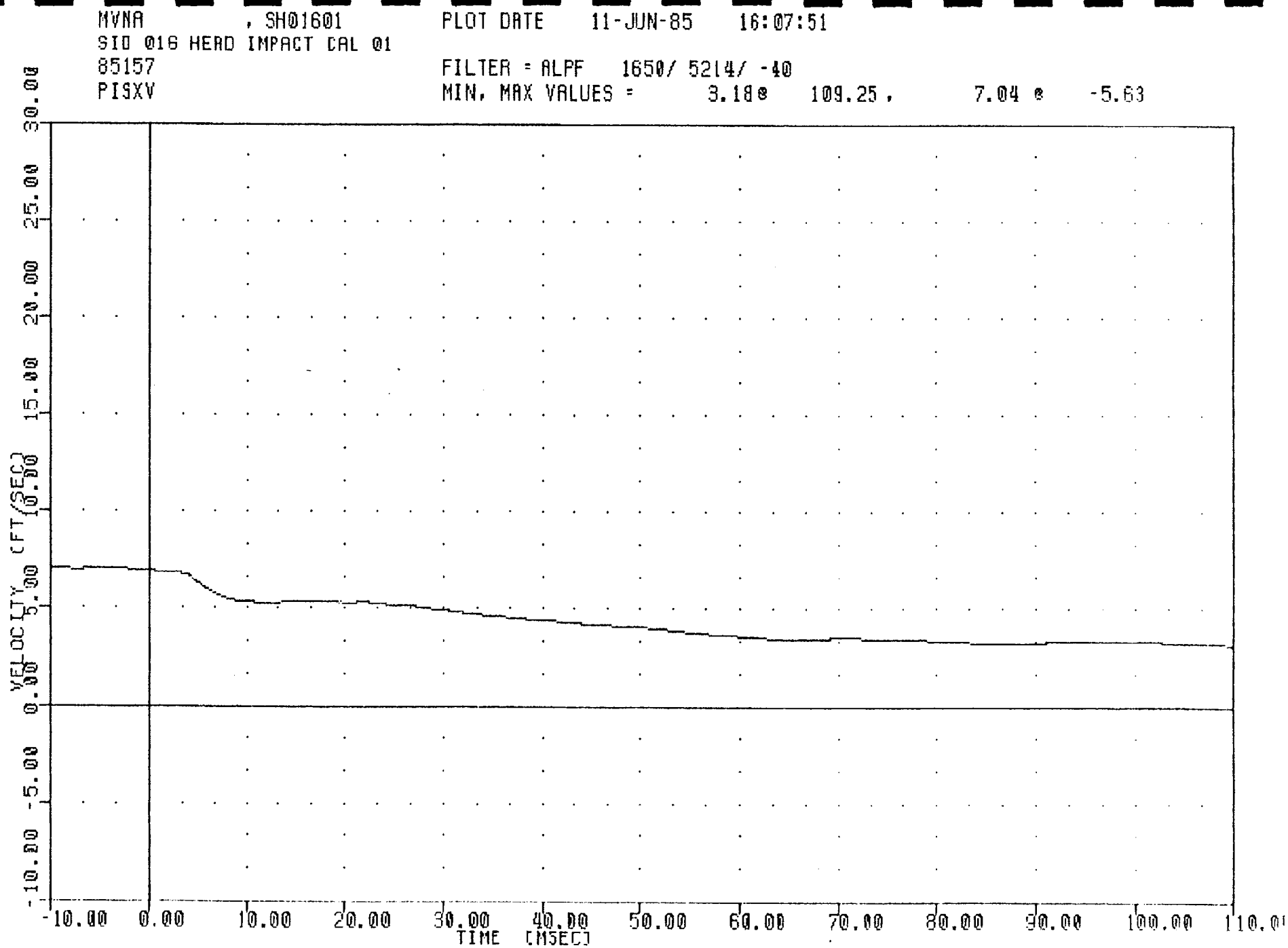
SIDE IMPACT DUMMY CALIBRATIONS

SIDE IMPACT DUMMY CALIBRATION
DUMMY SERIAL NUMBER 016
CALIBRATION 01

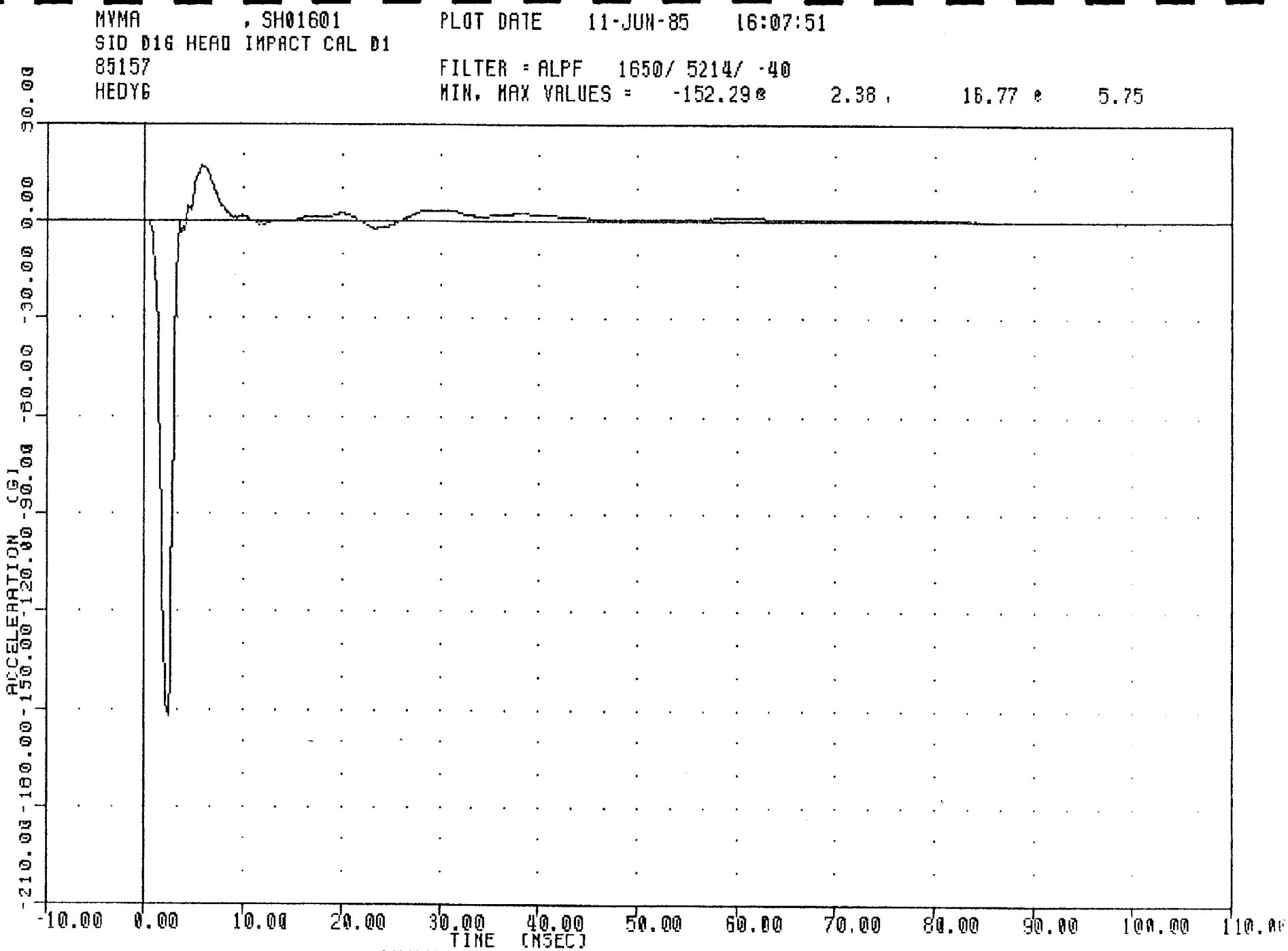
TEST/ DATE	CHANNEL	FILTER CLASS	PEAK ACCELERATION (g) SPECIFICATION*	TEST RESULT
HEAD 6/6/85	HEAD Y-AXIS	1000	150-175	152.29
THORAX 6/7/85	UPPER SPINE Y-AXIS			
	PRIMARY	180	16-24.6	23.64
	REDUNDANT	180	16-24.6	DNA
	LOWER SPINE Y-AXIS			
	PRIMARY	180	17.6-26.4	19.77
	REDUNDANT	180	17.6-26.4	19.98
	RIGHT UPPER RIB Y-AXIS			
	PRIMARY	180	36-50	37.68
	REDUNDANT	180	36-50	DNA
	RIGHT LOWER RIB Y-AXIS			
	PRIMARY	180	36-50	38.78
	REDUNDANT	180	36-50	38.85
PELVIS 5/9/85	PELVIS Y-AXIS	180	50-65	44.06

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


NVMA , SH01601
PLOT DATE 11-JUN-85 16:07:51
SID 016 HEAD IMPACT CAL 01
85157
FILTER = BLPF 100/ 316/ -40
PISXG
MIN, MAX VALUES = -10.00 @ 7.00 , 1.23 @ 13.50
ACCELERATION (G)
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
110.0
TIME (MSEC)
MVMA SIDE IMPACT DUMMY CALIBRATION
PISTON ACCELERATION

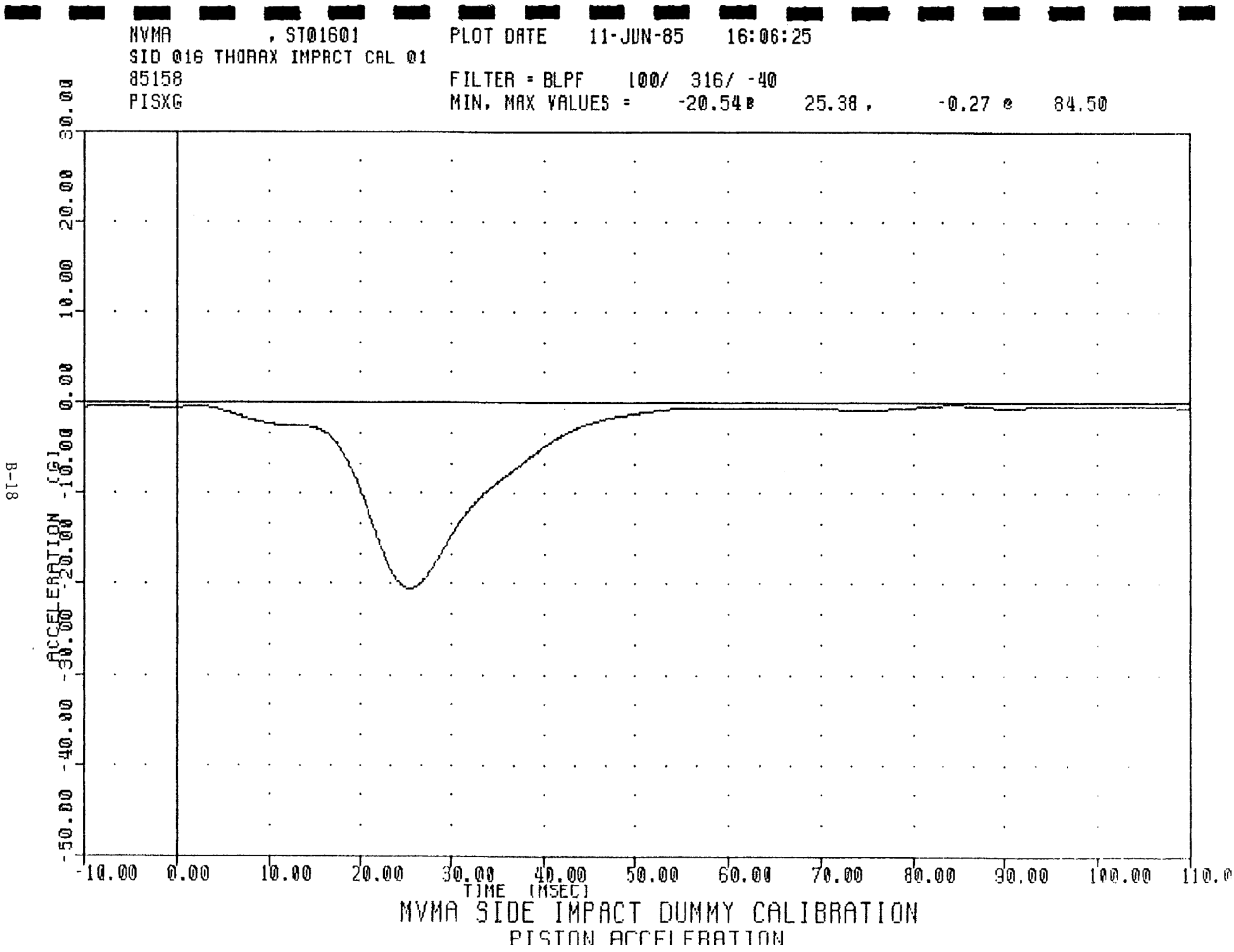


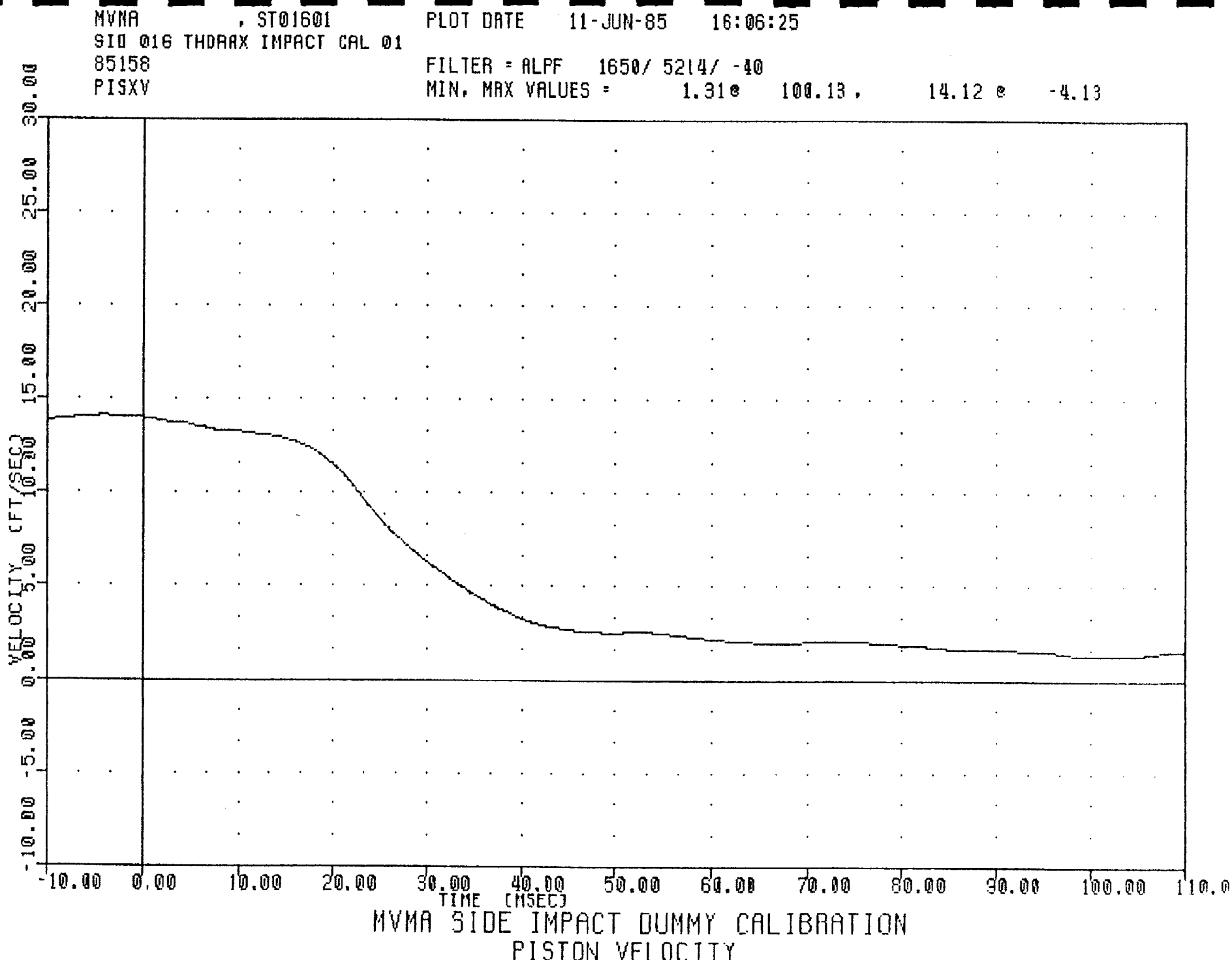
MVMA SIDE IMPACT DUMMY CALIBRATION
PISTON VELOCITY



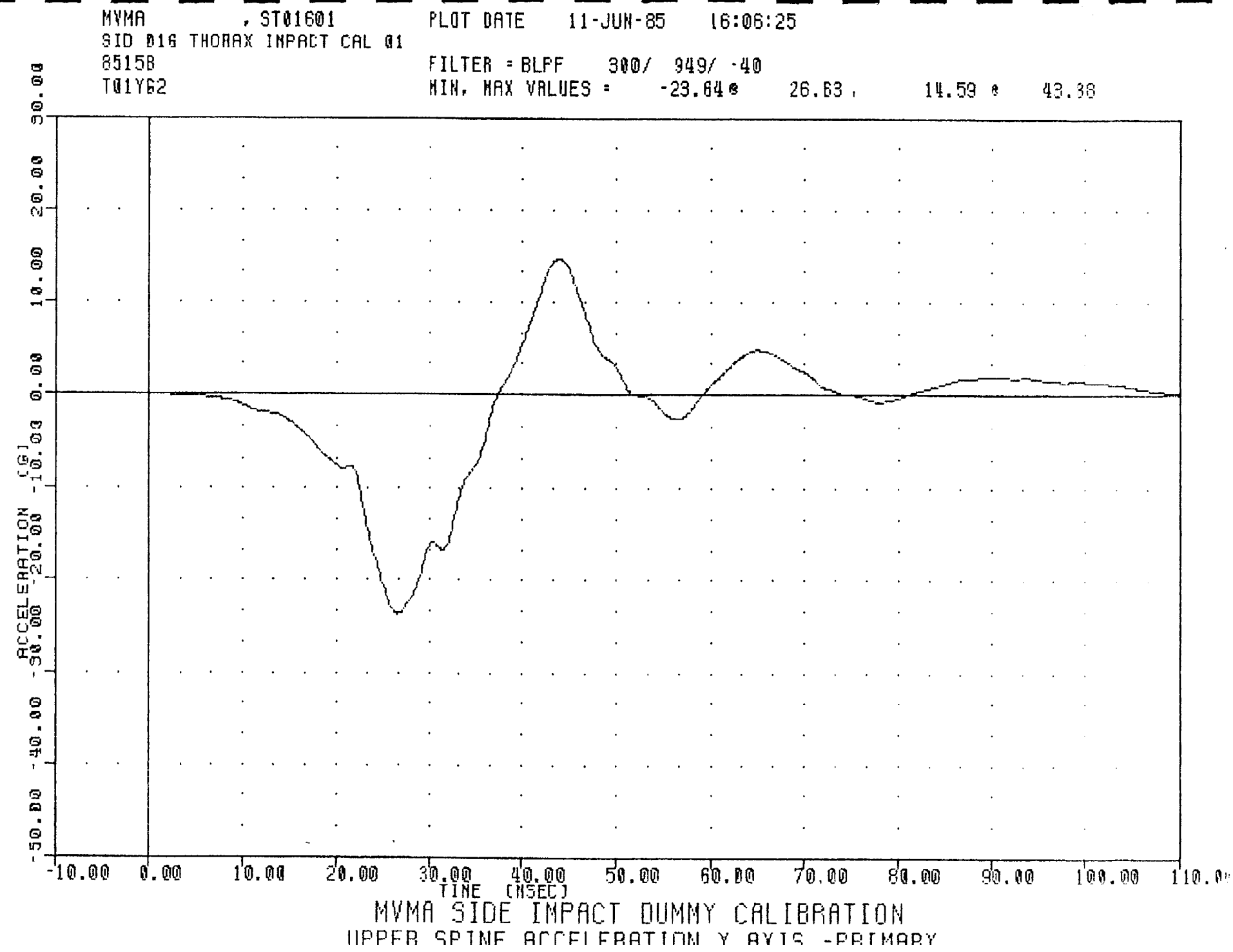
MVMA SIDE IMPACT DUMMY CALIBRATION

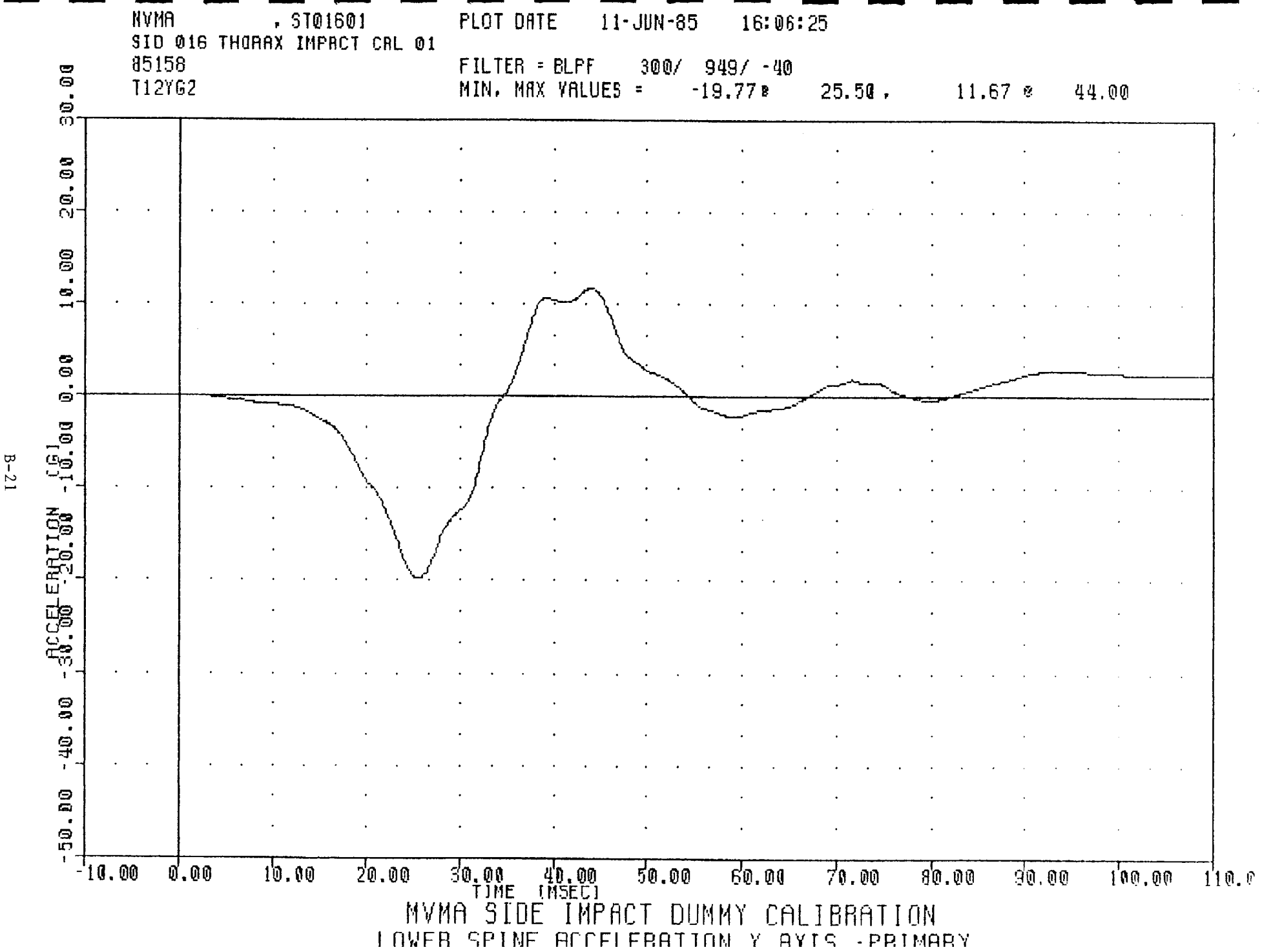
HEAD ACCELERATION Y AXIS


NVMA , ST01601
PLOT DATE 11-JUN-85 16:06:25
SID @16 THORAX IMPACT CAL @1
85158
FILTER = BLPF 100/ 316/ -40
PISXG
MIN, MAX VALUES = -20.54 @ 25.38 , -0.27 @ 84.50
ACCELERATION (G)
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
110.0
TIME (MSEC)
MVMA SIDE IMPACT DUMMY CALIBRATION
PISTON ACCELERATION

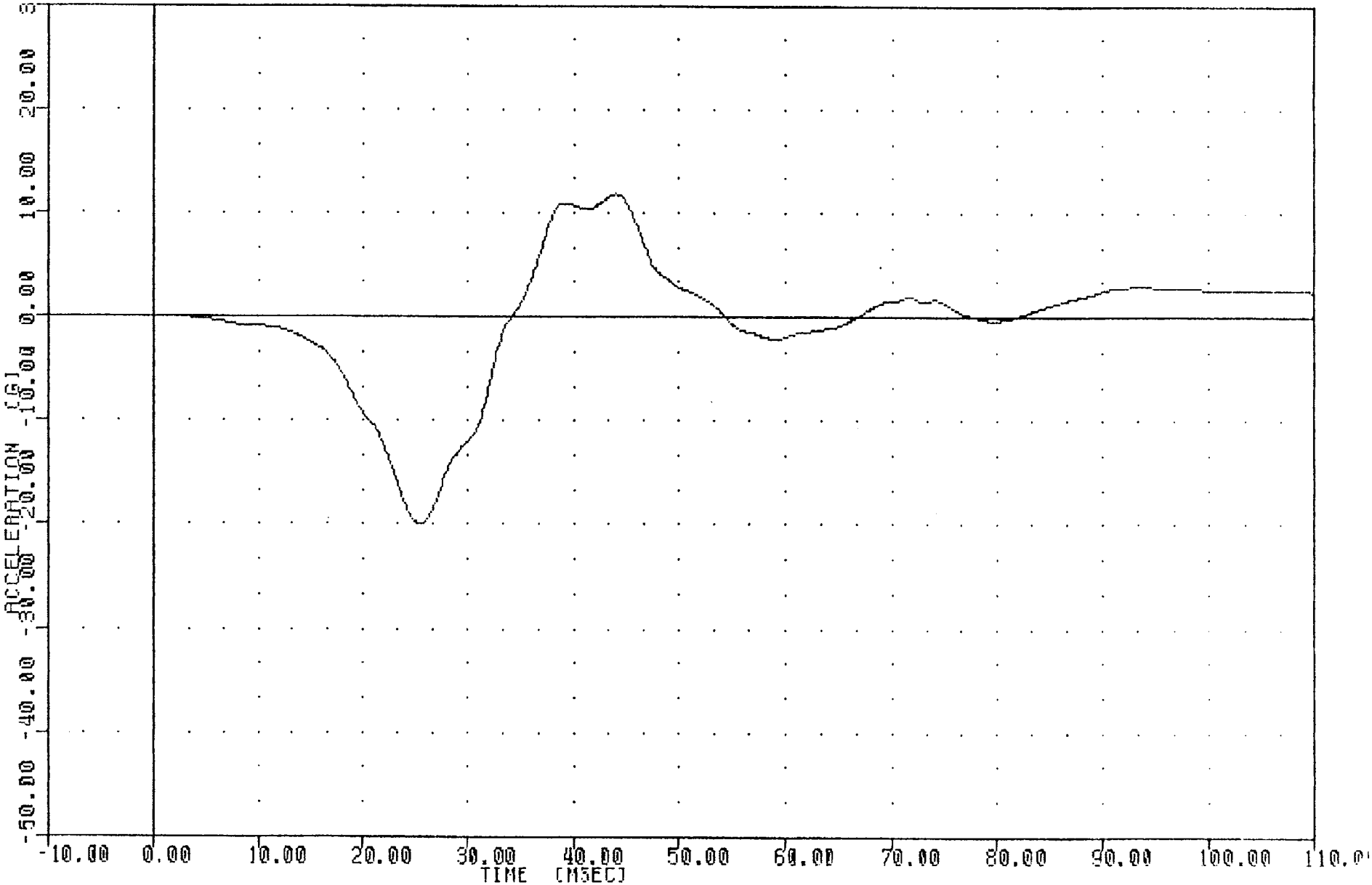


MVMA SIDE IMPACT DUMMY CALIBRATION
PISTON VELOCITY


MVMA , ST01601
SID 016 THORAX IMPACT CAL 01
8515B
T01Y62
PLOT DATE 11-JUN-85 16:06:25
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -23.64 @ 26.83 , 14.59 @ 43.38
ACCELERATION (G)
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
TIME (MSEC)
MVMA SIDE IMPACT DUMMY CALIBRATION
UPPER SPINE ACCELERATION Y AXIS -PRIMARY

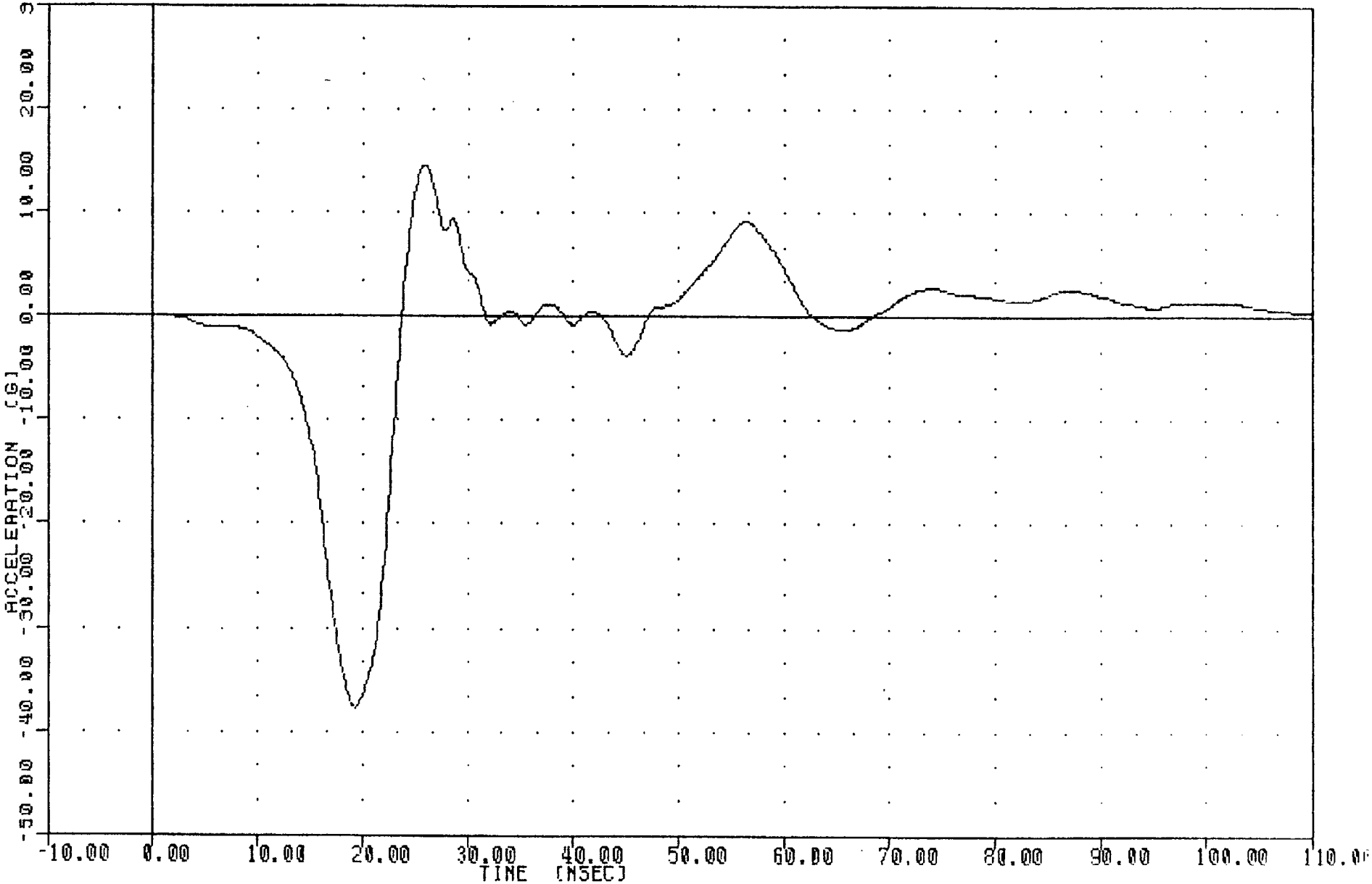

NVMA , ST01601
SID 016 THORAX IMPACT CAL 01
85158
T12YG2
PLOT DATE 11-JUN-85 16:06:25
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -19.77 @ 25.50 , 11.67 @ 44.00
ACCELERATION [G]
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.0
TIME [MSEC]
NVMA SIDE IMPACT DUMMY CALIBRATION
LOWER SPINE ACCELERATION Y AXIS -PRIMARY

MVMA , ST01601 PLOT DATE 11-JUN-85 16:06:25
SID 016 THDAAX IMPACT CAL 01
85158 FILTER = BLPF 300/ 949/ -40
T12YGB MIN, MAX VALUES = -19.98 @ 25.50 , 11.81 @ 44.00

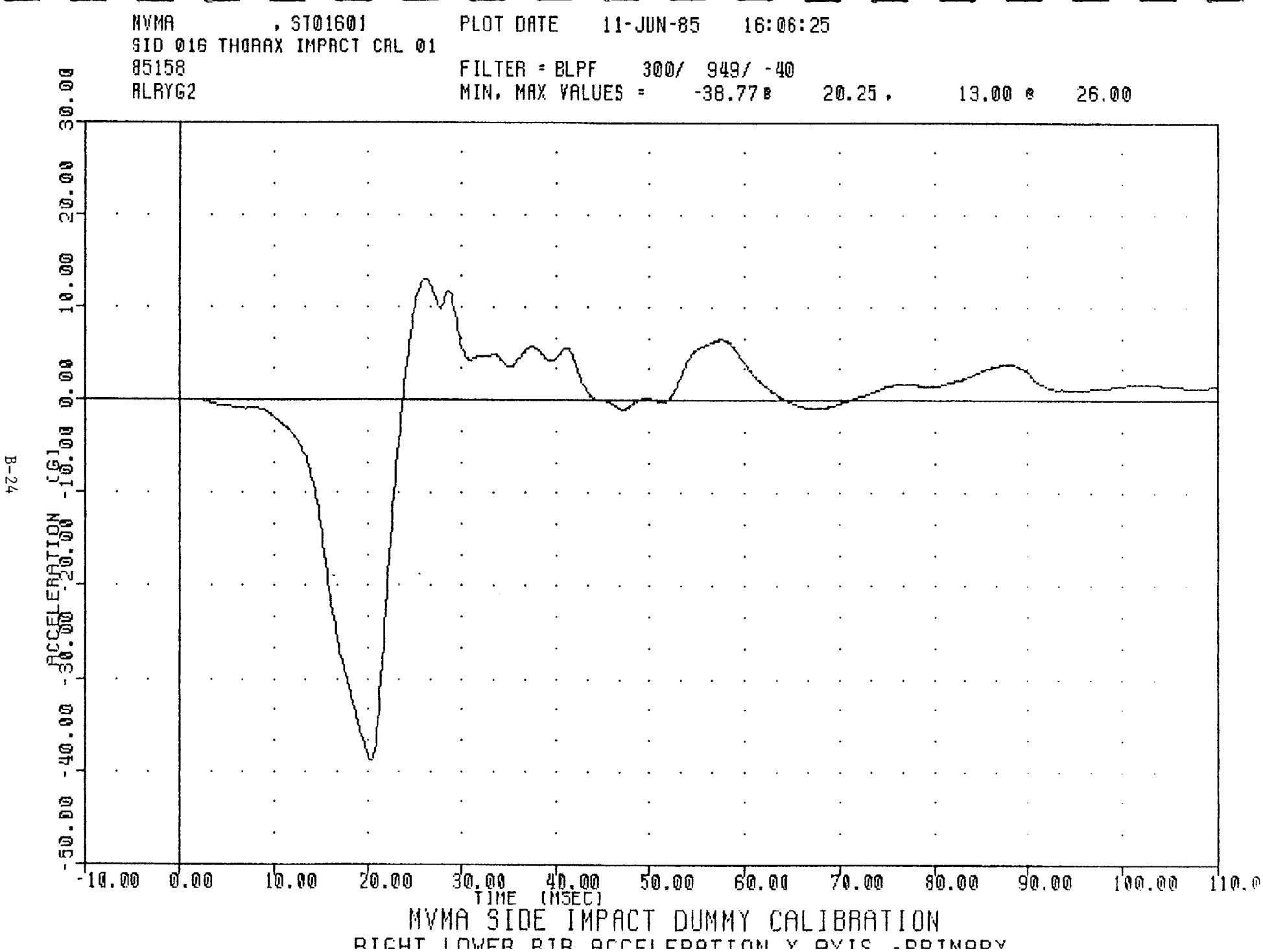


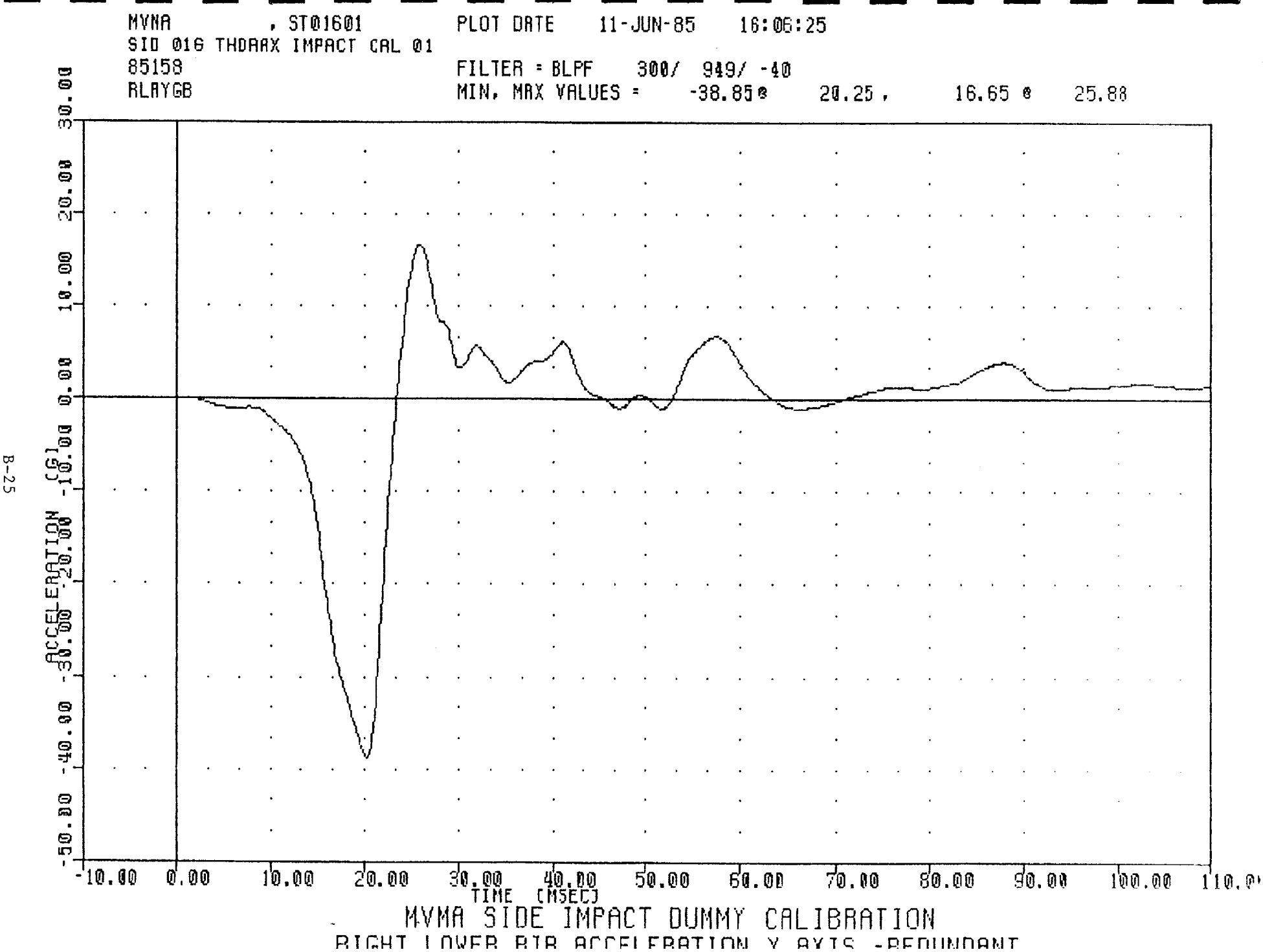
MVMA SIDE IMPACT DUMMY CALIBRATION
LOWER SPINE ACCELERATION Y AXIS -REDUNDANT

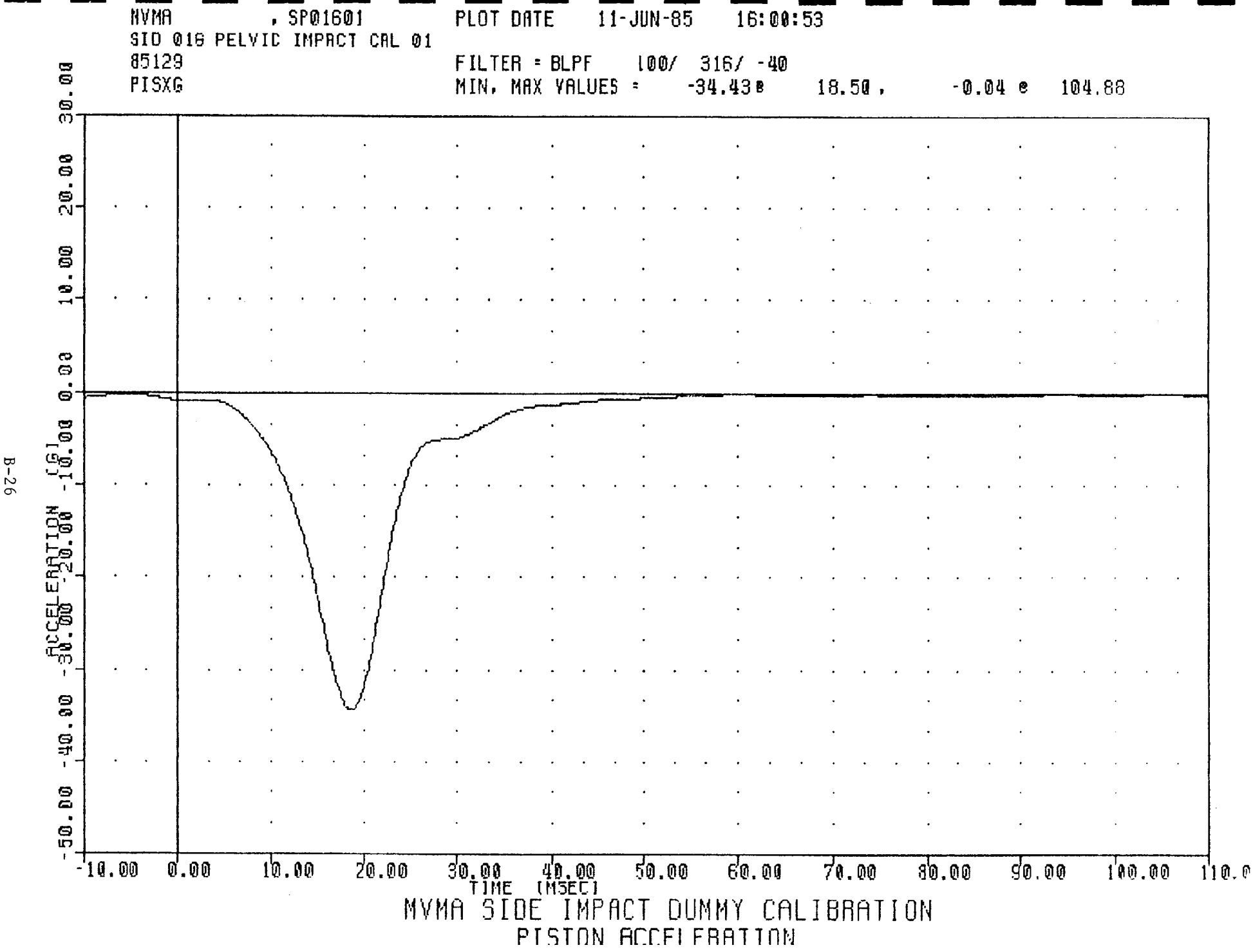
MVMA , ST01601 PLOT DATE 11-JUN-85 16:06:25
SID D16 THORAX INPACT CAL 01
8515B FILTER = BLPF 300/ 949/ -40
RURY62 MIN, MAX VALUES = -37.68 @ 19.25 , 14.52 @ 25.88

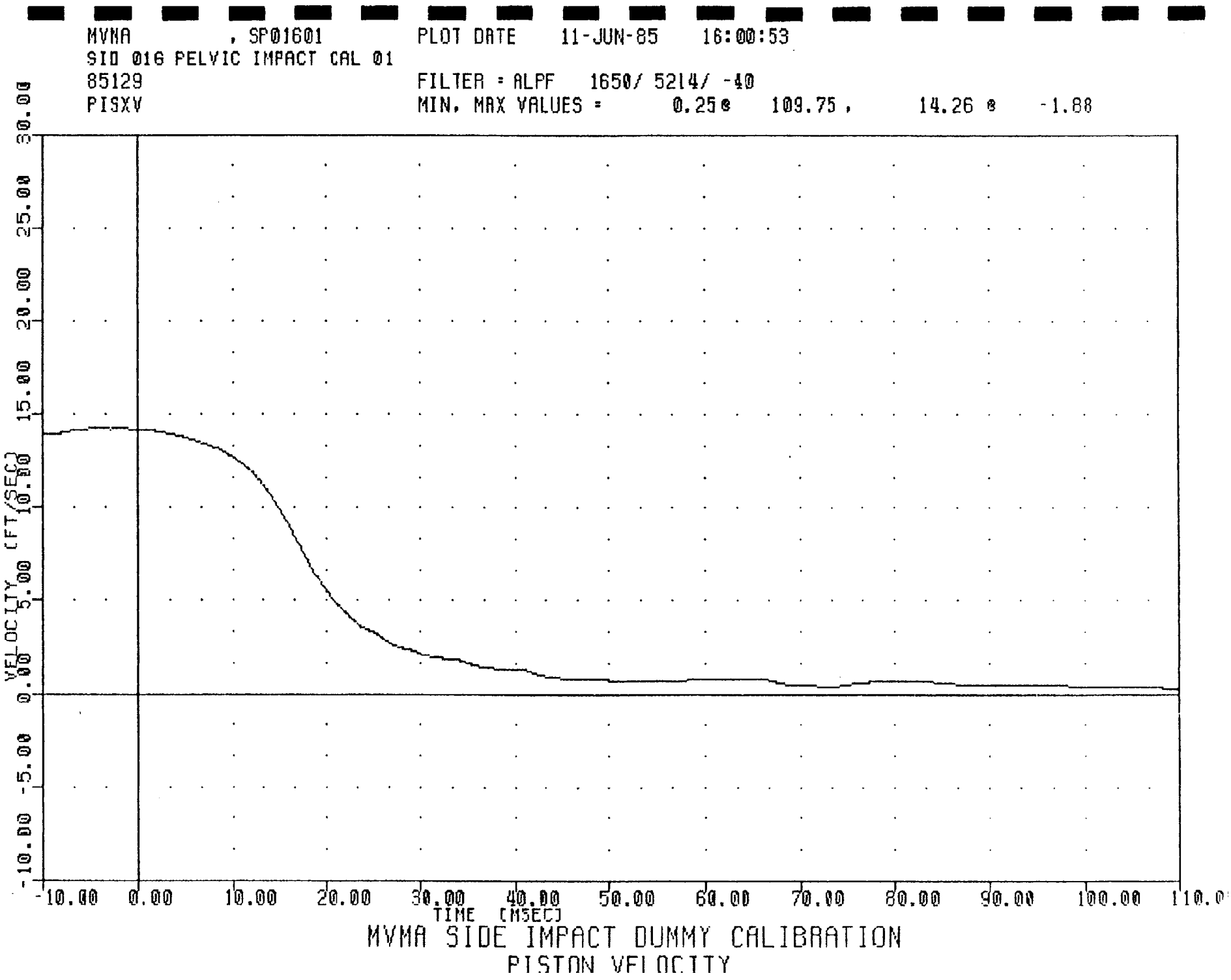


MVMA SIDE IMPACT DUMMY CALIBRATION
RIGHT UPPER RIB ACCELERATION Y AXIS -PRIMARY

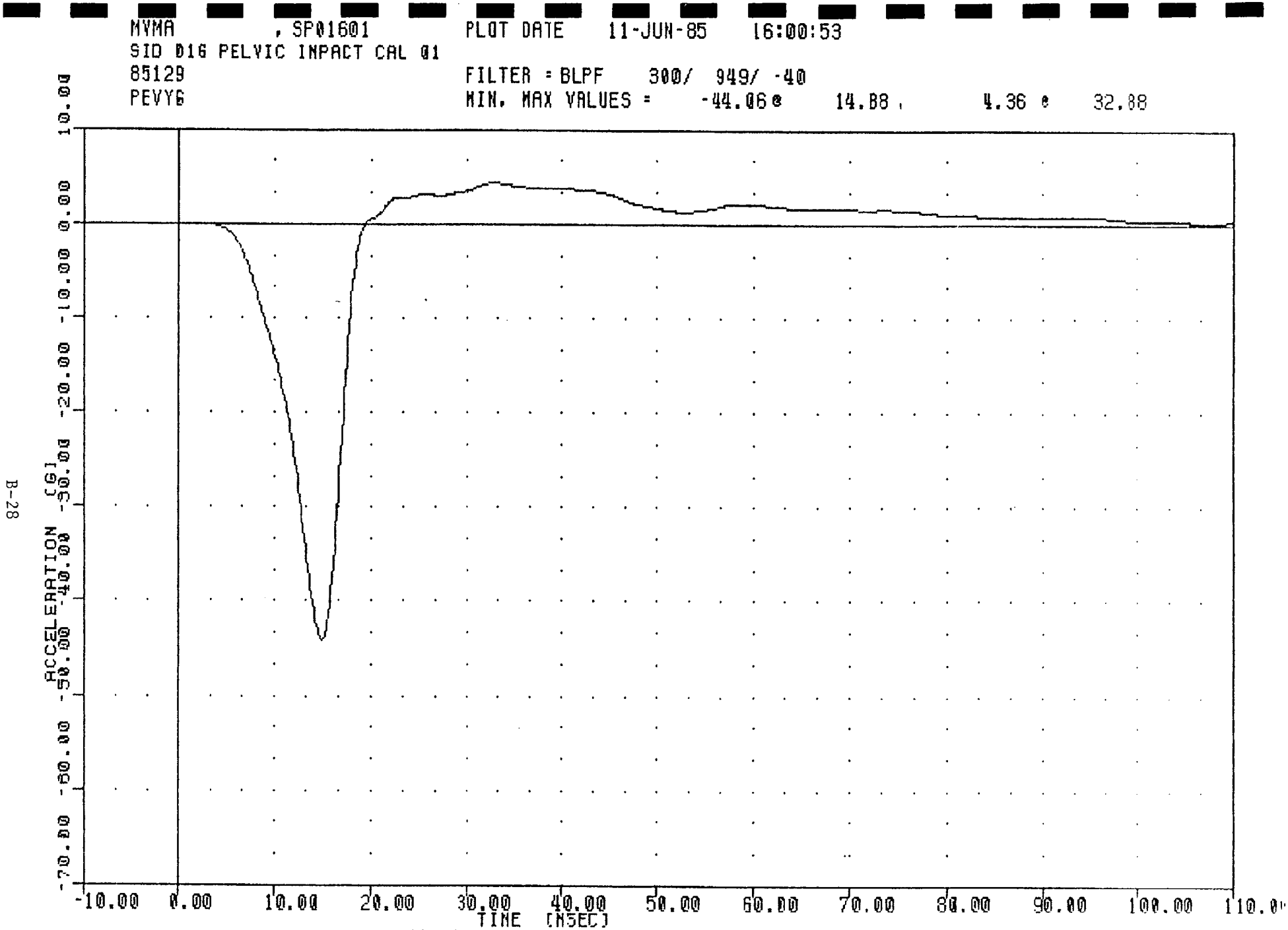

NVMA , ST01601 PLOT DATE 11-JUN-85 16:06:25
SID 016 THORAX IMPACT CAL 01
85158
RLRYG2
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -38.77 @ 20.25 , 13.00 @ 26.00
ACCELERATION (G)
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.0
TIME (MSEC)
NVMA SIDE IMPACT DUMMY CALIBRATION
RIGHT LOWER RIB ACCELERATION X AXIS -PRIMARY


MVMA , ST01601 PLOT DATE 11-JUN-85 16:06:25
SID 016 THDARX IMPACT CAL 01
85158 FILTER = BLPF 300/ 949/ -40
RLAYGB MIN, MAX VALUES = -38.85 @ 20.25 , 16.65 @ 25.88
ACCELERATION (G)
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
TIME (MSEC)
MVMA SIDE IMPACT DUMMY CALIBRATION
RIGHT LOWER RIB ACCELERATION Y AXIS -REDUNDANT


NVMA , SP01601 PLOT DATE 11-JUN-85 16:00:53
SID 016 PELVIC IMPACT CAL 01
85129
PISXG
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -34.43 @ 18.50 , -0.04 @ 104.88
ACCELERATION (G)
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
110.0
TIME (MSEC)
MVMA SIDE IMPACT DUMMY CALIBRATION
PISTON ACCELERATION



MVMA SIDE IMPACT DUMMY CALIBRATION
PISTON VELOCITY



MVMA SIDE IMPACT DUMMY CALIBRATION
PELVIS ACCELERATION Y AXIS