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.: 850617
TEST DATE: JUNE 17, 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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Prepared By: _____

B. L. Wade

Project Engineer

Transportation Research Center of Ohio

Approved By: _____ 7/15/75

J. F. Shultis

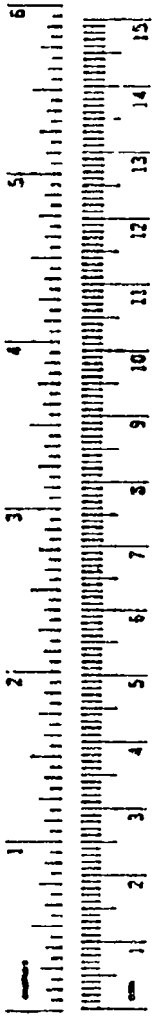
Manager, Impact Laboratory

Transportation Research Center of Ohio

METRIC CONVERSION FACTORS

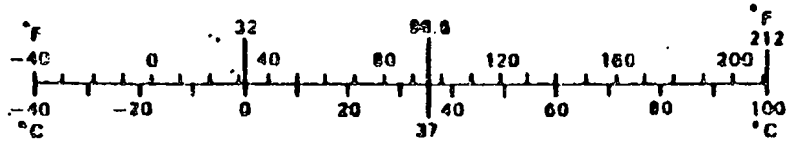
Approximate Conversions to Metric Measures

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 17, 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 37.0 inches forward of the midpoint of the Ford LTD's wheelbase.

The vehicle was a baseline model with no structural modification. The front passenger inner door panel was replaced with 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: 1FABP39A6FG214515

BODY STYLE: 4-Door Sedan MODEL YEAR: 1985

NHTSA NO.: DNA COLOR: Midnight Blue

ENGINE DATA: TYPE: Inline CYLINDERS: 4 DISPLACEMENT 140 CID

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 30 psi; REAR 30 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Ameri Way 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	803	LBS.	RIGHT REAR	690	LBS.
LEFT FRONT	807	LBS.	LEFT REAR	672	LBS.
TOTAL FRONT WEIGHT	1610	LBS.	(54.2 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1362	LBS.	(45.8 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	2972	LBS.			

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 26 3/4	;LF 26 1/2	;RR 24 5/16	;LR 24 1/2
PRE-TEST ATTITUDE:	RF 25 15/16	;LF 25 7/8	;RR 22 3/4	;LR 23 3/16
POST-TEST ATTITUDE:	RF 25 5/16	;LF 25 1/4	;RR 21 5/8	;LR 22 13/16

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 88 LBS. CARGO:

RIGHT FRONT	873	LBS.	RIGHT REAR	799	LBS.
LEFT FRONT	776	LBS.	LEFT REAR	786	LBS.
TOTAL FRONT WEIGHT	1649	LBS.	(51.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1585	LBS.	(49.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	3234	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: Bench

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

CARGO LOAD 100 LBS.

TOTAL 1000 LBS.

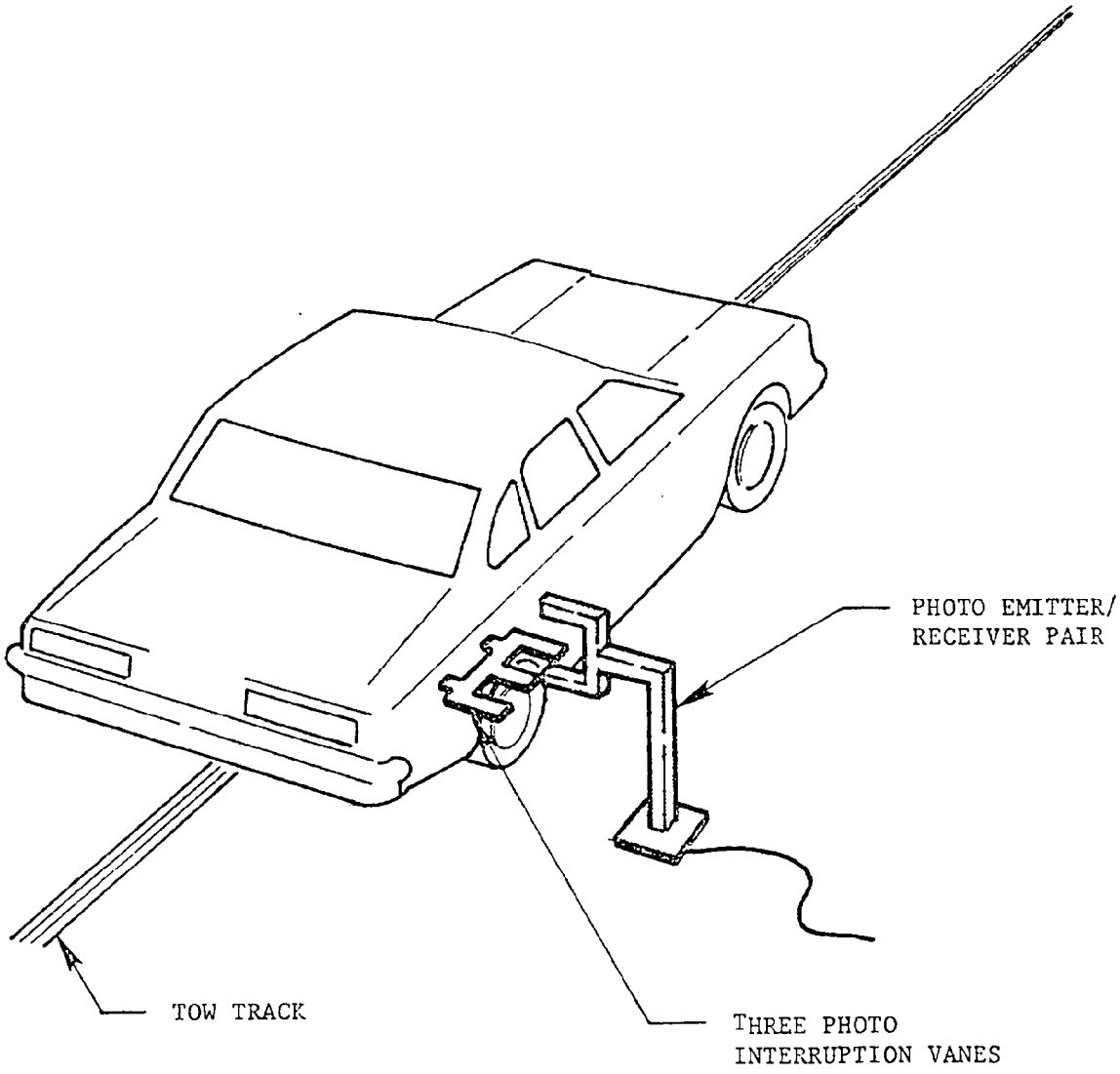
*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

VEHICLE TEST WEIGHT CALCULATION

Test Weight = Unloaded Delivered Weight +
Number of Dummies X 174 lbs. +
Cargo Weight
= 2972 + 1 X 174 + 100 lbs.
= 3234 lbs.

To achieve test weight, the muffler, tail pipe, air pump, alternator and battery 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: X BENCH
___ BUCKET
___ SPLIT BENCH

ADJUSTER TYPE: X MANUAL
___ POWER

BUCKET SEAT BACK TYPE: X FIXED
___ ADJUSTABLE

TECHNICIANS:
1. G. Watters
2. B. Miller
3. J. Clarridge

POSITIONING DATE: 6/17/85

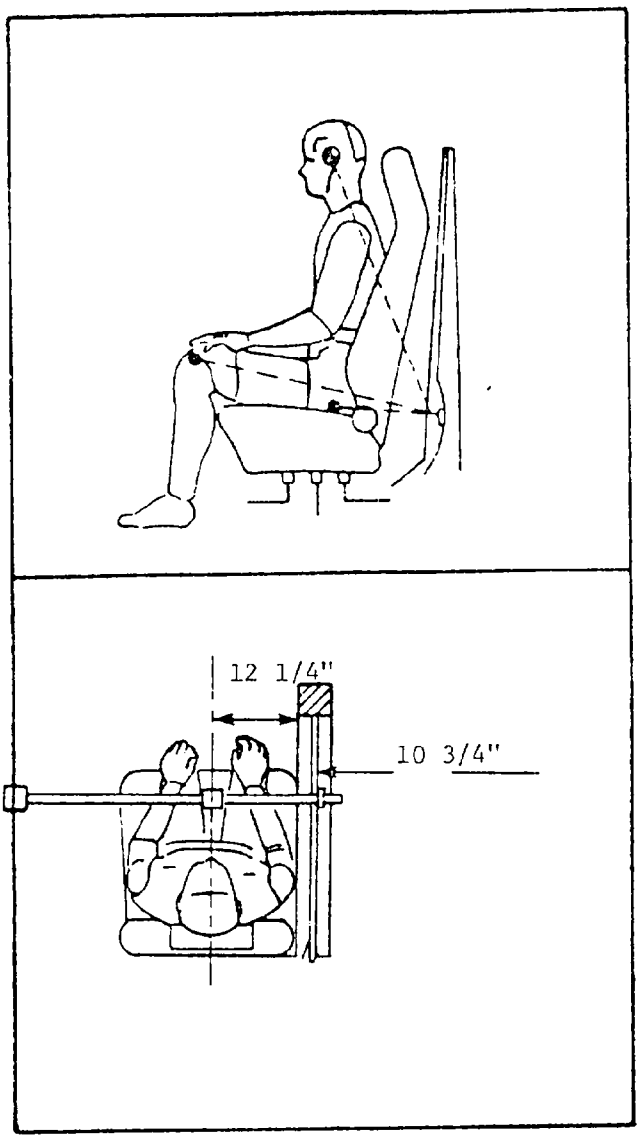
AMBIENT TEMP: 70 °F TIME: 10:30

FRONT PASSENGER DUMMY # 016

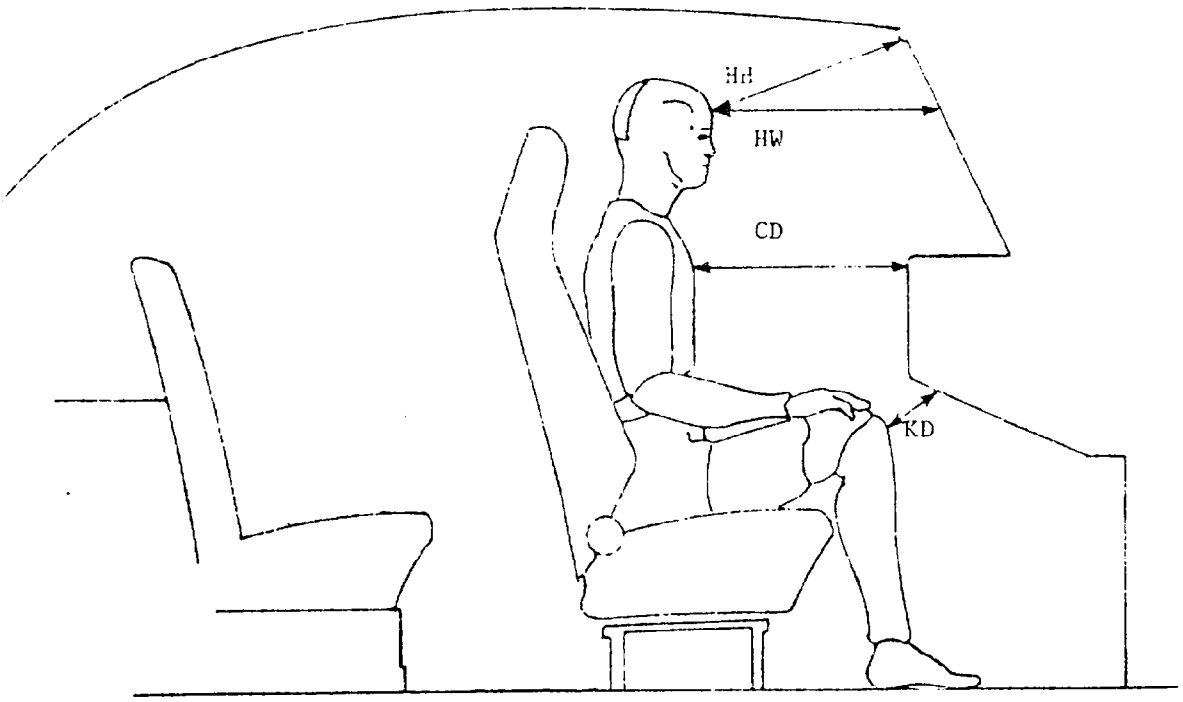
20 7/16" / 4° HEAD TARGET*

24 7/8" / 92° KNEE JOINT

APPROX.
10 15/16" / 116° "H" POINT



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

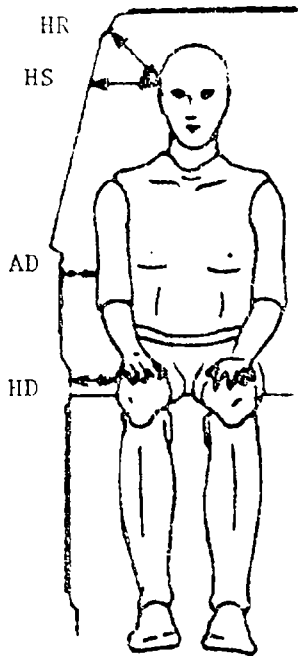


PASSENGER
016

HH	12 9/16
HW	18 3/4
CD	20 1/4
KDL	5 9/16
KDR	5 15/16

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSION



	PASSENGER 016
HR	6 15/16
HS	9 3/16
AD	5
HD	6 1/8

ALL MEASUREMENTS IN INCHES

DUMMY LATERAL CLEARANCE DIMENSIONS

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	495	View Impact
4	Overhead Tight	Photosonic 1B	25	432	View Impact
5	Overhead Wide	Photosonic 1B	8	480	Vehicle Crush
6	Right	Photosonic 1B	25	500	Vehicle Crush
7	Left	Photosonic 1B	13	450	Vehicle Crush
8	Onboard Windshield	Photosonic 1B	8	1002	Dummy Kinematics
9	Onboard Roof	Photosonic 1B	8	988	Dummy Kinematics
10	Onboard Door	Photosonic 1B	8	992	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	19002
BRCYG	BARRIER REAR CROSS MEMBER	ACCEL.	B & H	4-202-0001	18237

*Bell & Howell

SECTION 3.0
CRASH TEST DATA

The following pages are included in this section:

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

TEST CONDITIONS

TEST NUMBER: 850617

DATE OF TEST: June 17, 1985 TIME OF TEST: 14:50

WIND VELOCITY: 2-4 mph 180° S HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 70° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 74° F

DUMMY TEMPERATURE: 75° F

SUBJECT VEHICLE DATA

	ACTUAL	INTENDED
VEHICLE TEST WEIGHT (LBS.)	3234	3246
MDB TEST WEIGHT (LBS.)	2991	2992
MDB VELOCITY (MPH)*	33.4	33.5
IMPACT POINT (INCHES)**	37.0	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	65.30	195.38	21.28	75.38
LATERAL	41.69	193.63	37.56	52.25
VERTICAL	30.93	66.38	18.61	200.00
RESULTANT		78.08 @ 194.63		
HIC	234.55	from 34.00 to 202.38		
DELTA V (MPH)		-16.1 @ 190.88		
CHEST ACCELERATION				
UPPER SPINE				
LATERAL	47.02	68.13	80.42	42.50
VERTICAL	11.54	36.88	12.16	32.50
DELTA V (MPH)***		-24.2 @ 65.25		
LOWER SPINE				
LONGITUDINAL	32.78	55.63	34.10	41.25
LATERAL (P)****	21.26	66.25	123.08	37.50
LATERAL (R)	21.09	65.63	115.21	38.13
DELTA V (MPH)		-30.9 @ 56.75 (P)		
		-29.1 @ 56.50 (R)		
RIGHT UPPER RIB				
LATERAL (P)	11.19	82.50	50.45	32.50
DELTA V (MPH)		-21.8 @ 74.00		
RIGHT LOWER RIB				
LATERAL (P)	16.56	71.25	74.70	38.75
LATERAL (R)	15.22	71.25	72.24	38.75
DELTA V (MPH)		-23.6 @ 81.88 (P)		
		-24.4 @ 81.88 (R)		
PELVIS ACCELERATION				
LONGITUDINAL	12.31	81.63	30.87	38.50
LATERAL	19.00	87.13	143.10	33.63
VERTICAL	14.61	40.88	53.78	38.75
RESULTANT		146.30 @ 33.50		
DELTA V (MPH)		-27.7 @ 61.13		

SIDE IMPACT DUMMY DATA SUMMARY CONTD

	PASSENGER DUMMY			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)
RIB DEFLECTION †	0.01	24.38	1.76	122.00

* 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

VISIBLE DUMMY CONTACT POINTS:

	DRIVER DNA	PASSENGER 016
Head		Side Header
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: Door glass was broken out of right front door and right rear door main window. Front windshield 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 appeared to contact the right front door window sill. Upon rebound, the dummy became airborn as its head hit the side header and then the headliner. The dummy came to rest with its buttocks on the middle of the seat, leaning to the right with its head resting on the right front window sill.

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)	111.0	27.8	30.6	45.18	28.13	169.40	14.00
	ΔV = 21.9 mph @ 14.38 msec							
2	MIDREAR OF RIGHT FRONT DOOR (LATERAL)	100.8	28.0	25.4	49.96	27.88	113.99	10.13
	ΔV = 26.0 mph @ 23.50 msec							
3	UPPER RIGHT FRONT DOOR CENTERLINE (LATERAL)	112.0	28.2	23.5	137.21	38.13	106.70	18.13
	ΔV = -23.6 mph @ 26.13 msec							
4	MIDFRONT OF RIGHT FRONT DOOR (LATERAL)				---	--- α	---	--- α
5	LEFT SILL AT FRONT SEAT	117.0	27.2	12.8				
	(LONGITUDINAL)				3.42	44.63	6.45	24.25
	(LATERAL)				4.20	46.63	23.31	32.25
	(VERTICAL)				4.39	58.75	5.95	18.88
	(RESULTANT)					23.84 @ 32.38		
	ΔV = -13.9 mph @ 145.38 msec							

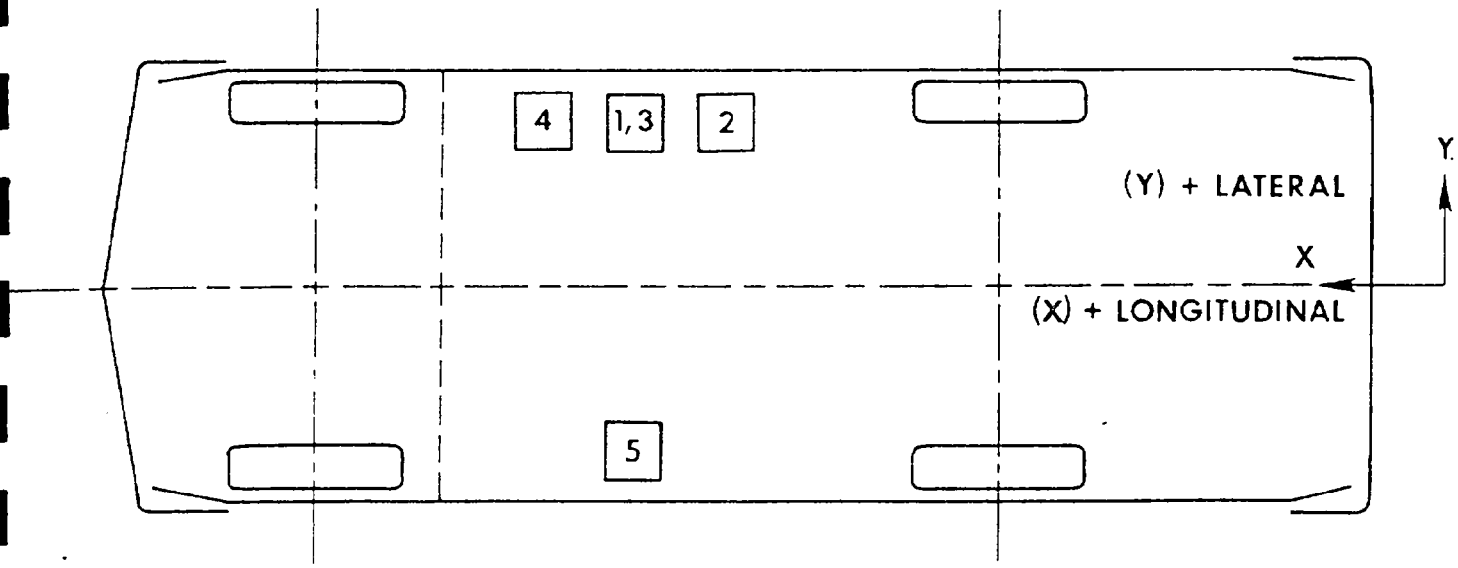
* Reference: X - Rear Bumper (+ Forward), Y - Vehicle Centerline (+ To Right), Z - Ground Level (+ Up)

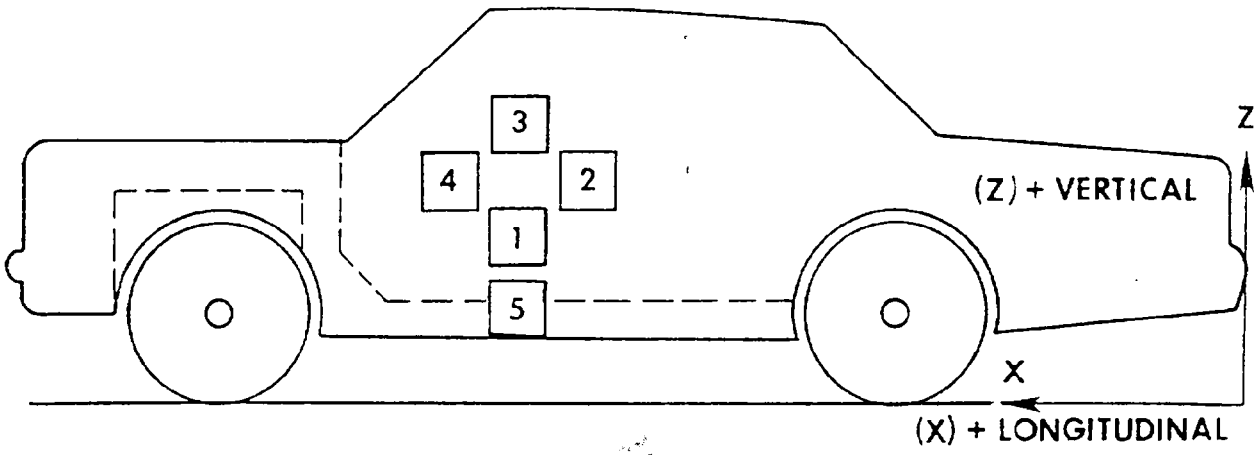
**LONGITUDINAL:	FORWARD	***LONGITUDINAL:	REARWARD
LATERAL:	RIGHTWARD	LATERAL:	LEFTWARD
VERTICAL:	DOWNWARD	VERTICAL:	UPWARD

All measurements of accelerometer locations in inches.

α There was no instrumentation at this location.

VEHICLE ACCELEROMETER PLACEMENT





VEHICLE EXTERIOR PROFILES AND STATIC CRUSH

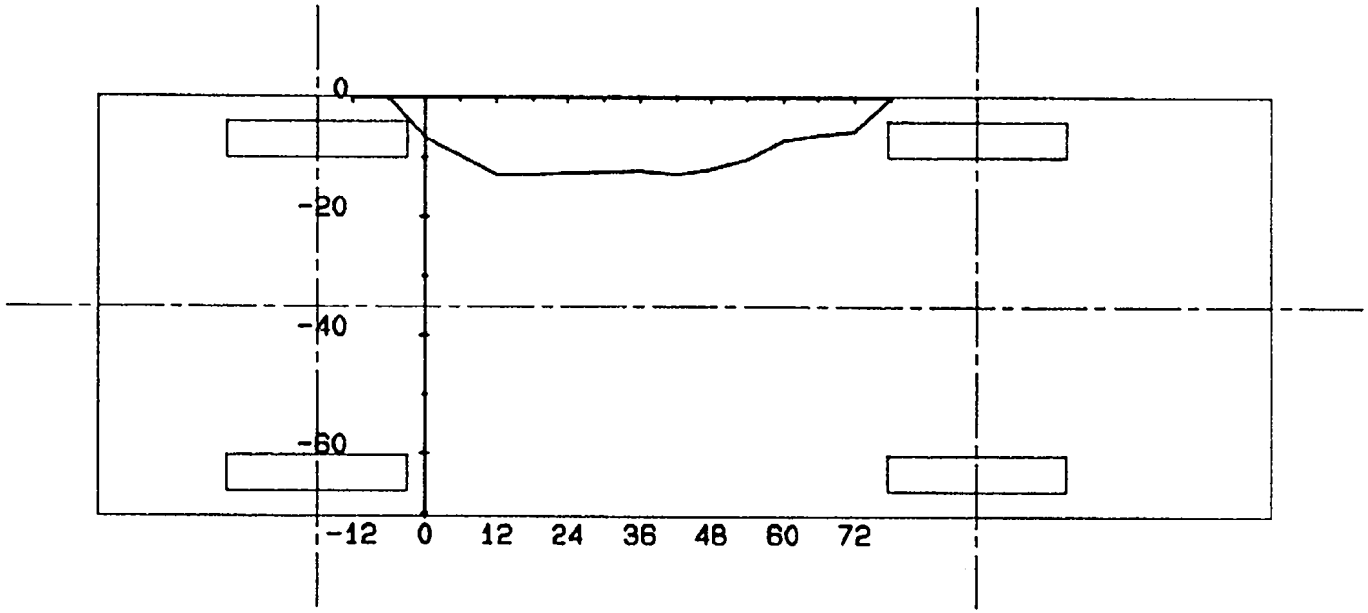
ZERO DISTANCE AT PROJECTED IMPACT POINT*

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	12.1	X	18.1	18.0	17.9	17.8	17.7	17.6	17.6	17.5	17.5	17.5	17.4	17.4	17.3	X
H-Point	22.3	13.2	13.9	13.9	13.8	13.8	13.8	13.8	13.9	13.9	13.9	14.0	14.1	14.1	14.0	X
Window Sill	36.3	16.4	16.3	16.3	16.3	16.3	16.2	16.3	16.3	16.3	16.4	16.4	16.4	16.4	16.7	16.9
Window Top	55.0	24.9	24.4	24.3	24.3	24.4	24.4	24.5	24.7	24.9	25.1	X	X	X	X	X
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)																
Axle Height	12.1	X	23.8	24.3	25.1	28.2	29.7	30.5	30.0	30.0	30.1	30.4	30.3	27.1	24.0	X
H-Point	22.3	19.5	31.1	33.7	33.7	33.8	33.7	31.5	30.9	30.3	29.8	29.2	28.6	27.4	24.9	X
Window Sill	36.3	22.1	27.0	31.5	30.9	30.6	29.3	28.1	27.9	27.8	27.8	26.3	24.9	21.6	21.3	20.9
Window Top	55.0	27.8	27.4	27.8	28.2	28.6	28.9	29.3	29.3	29.6	30.0	X	X	X	X	X
STATIC CRUSH (IN)																
Axle Height	12.1	X	5.7	6.3	7.2	10.4	12.0	12.9	12.4	12.5	12.6	12.9	12.9	9.7	6.7	X
H-Point	22.3	6.3	17.2	19.8	19.9	20.0	19.9	17.7	17.0	16.4	15.9	15.2	14.5	13.3	10.9	X
Window Sill	36.3	5.7	10.7	15.2	14.6	14.3	13.1	11.8	11.6	11.5	11.4	9.9	8.5	5.2	4.6	4.0
Window Top	55.0	2.9	3.0	3.5	3.9	4.2	4.5	4.8	4.6	4.7	4.9	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.

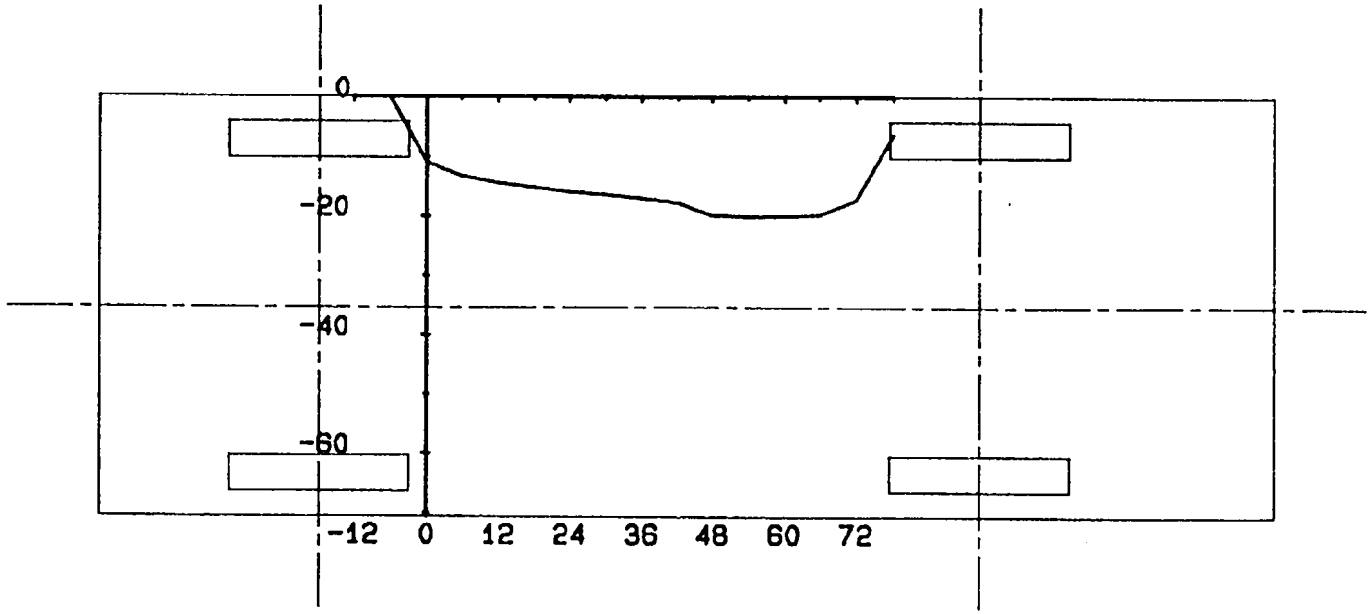
** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



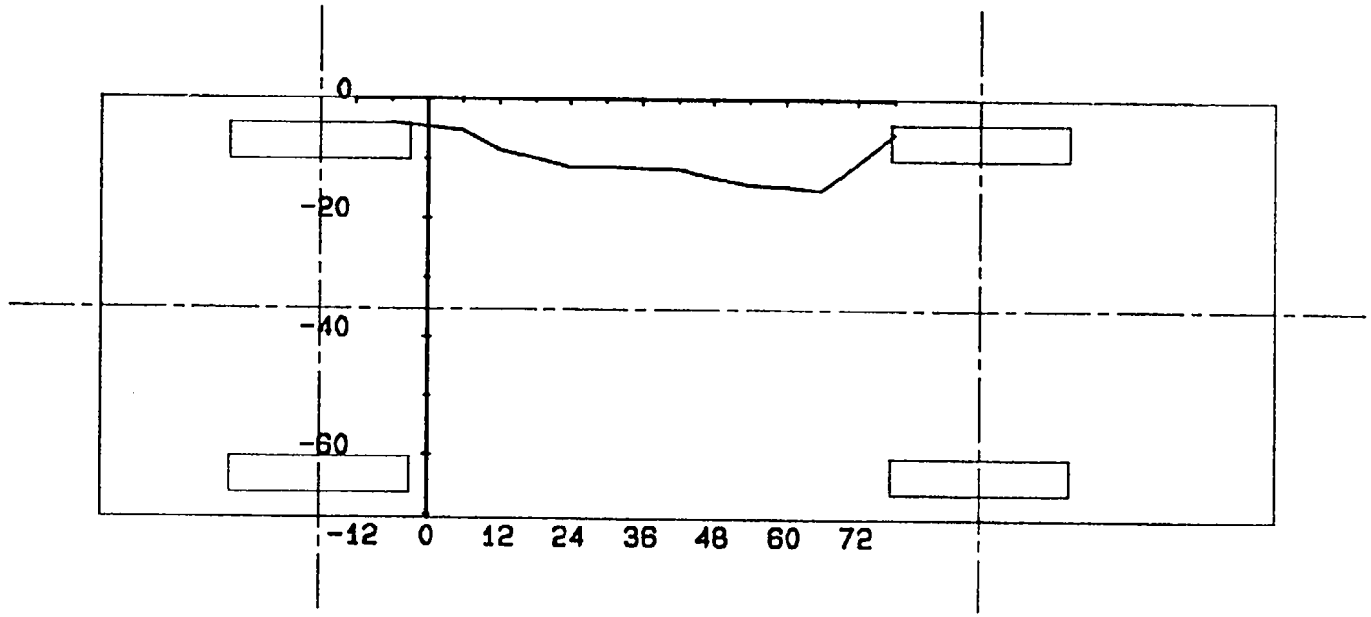
PROFILE LEVEL EQUALS AXLE HEIGHT WHICH IS 12.1 " ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



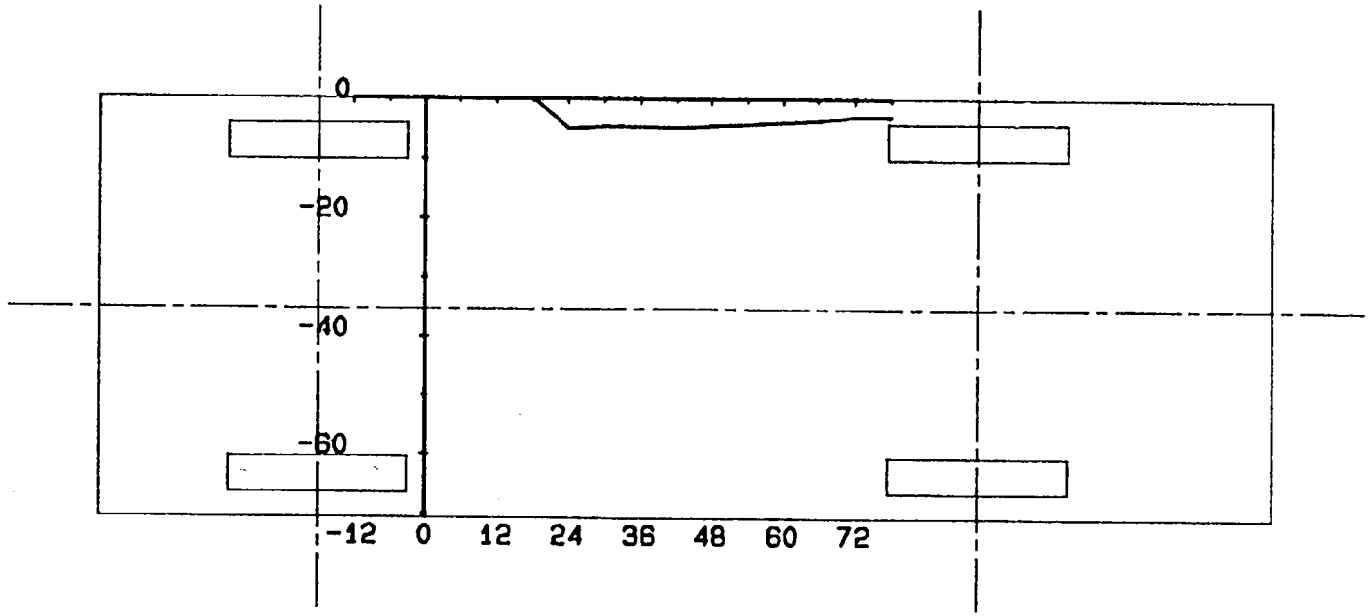
PROFILE LEVEL EQUALS H-POINT HEIGHT WHICH IS 22.3 " ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



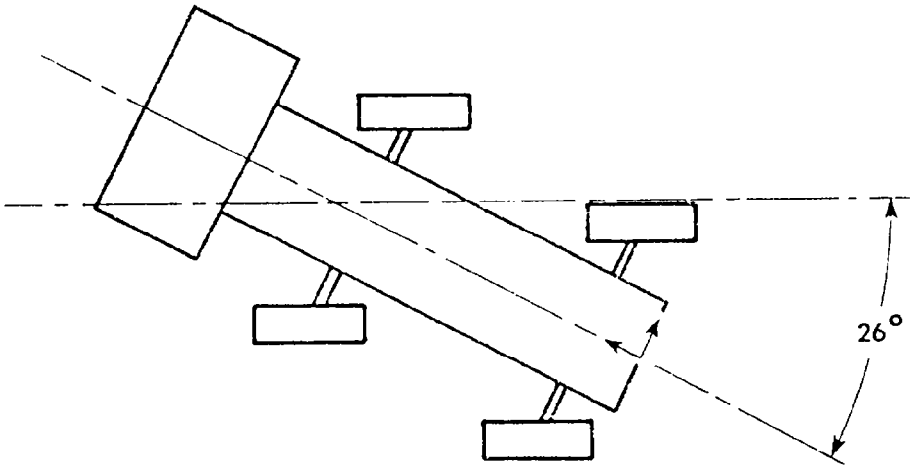
PROFILE LEVEL EQUALS WINDOW SILL HEIGHT WHICH IS 36.3 " ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT WHICH IS 55.0 " 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 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 = -20.1 mph @ 163.00 msec				0.53	224.13	16.45	33.75
	(LATERAL) Δ V = 5.5 mph @ 163.00 msec				8.14	32.50	1.89	61.00
	(VERTICAL)				6.42	45.63	7.36	32.13
	(RESULTANT)					19.12 @ 33.13		
2	REAR FRAME MEMBER	18.5	-19.2	11.9				
	(LONGITUDINAL) Δ V = -14.1 mph @ 163.00 msec				1.52	226.25	10.98	27.50
	(LATERAL) Δ V = 0.7 mph @ 163.00 msec				3.53	135.50	6.38	23.25

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

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

All measurements of accelerometer locations in inches.

TEST ANOMALIES

Data was lost on the dummy's lower spine redundant accelerometer, T12YGB, after 115 milliseconds due to cabling failure.

APPENDIX A

DATA PLOTS

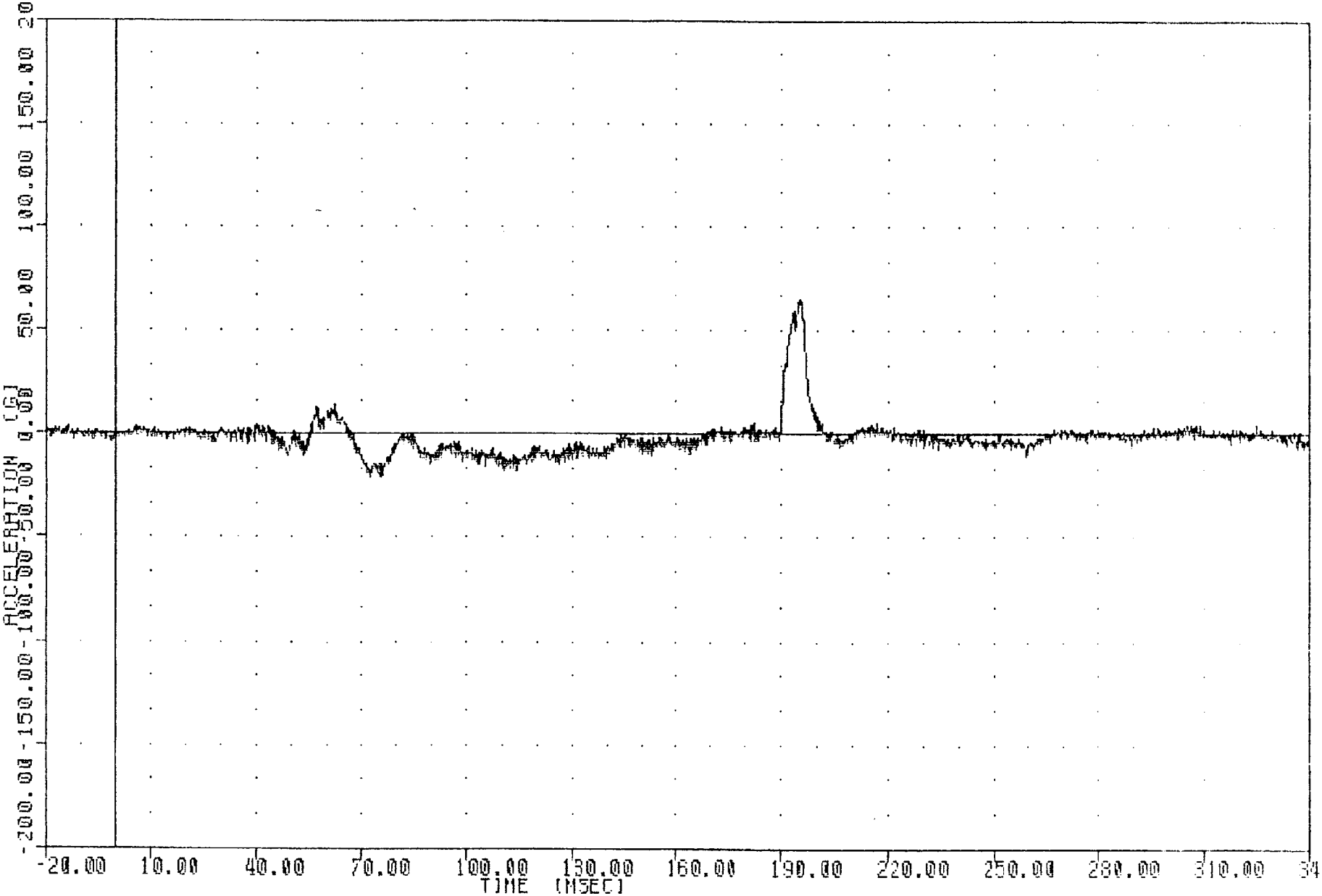
Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. All data were filtered according to SAE J211, except that dummy thorax data were filtered using the HSRI filter.

TRC , 850617 PLOT DATE 20-JUN-85 14:46:49

MVMA SIDE IMPACT TESTING

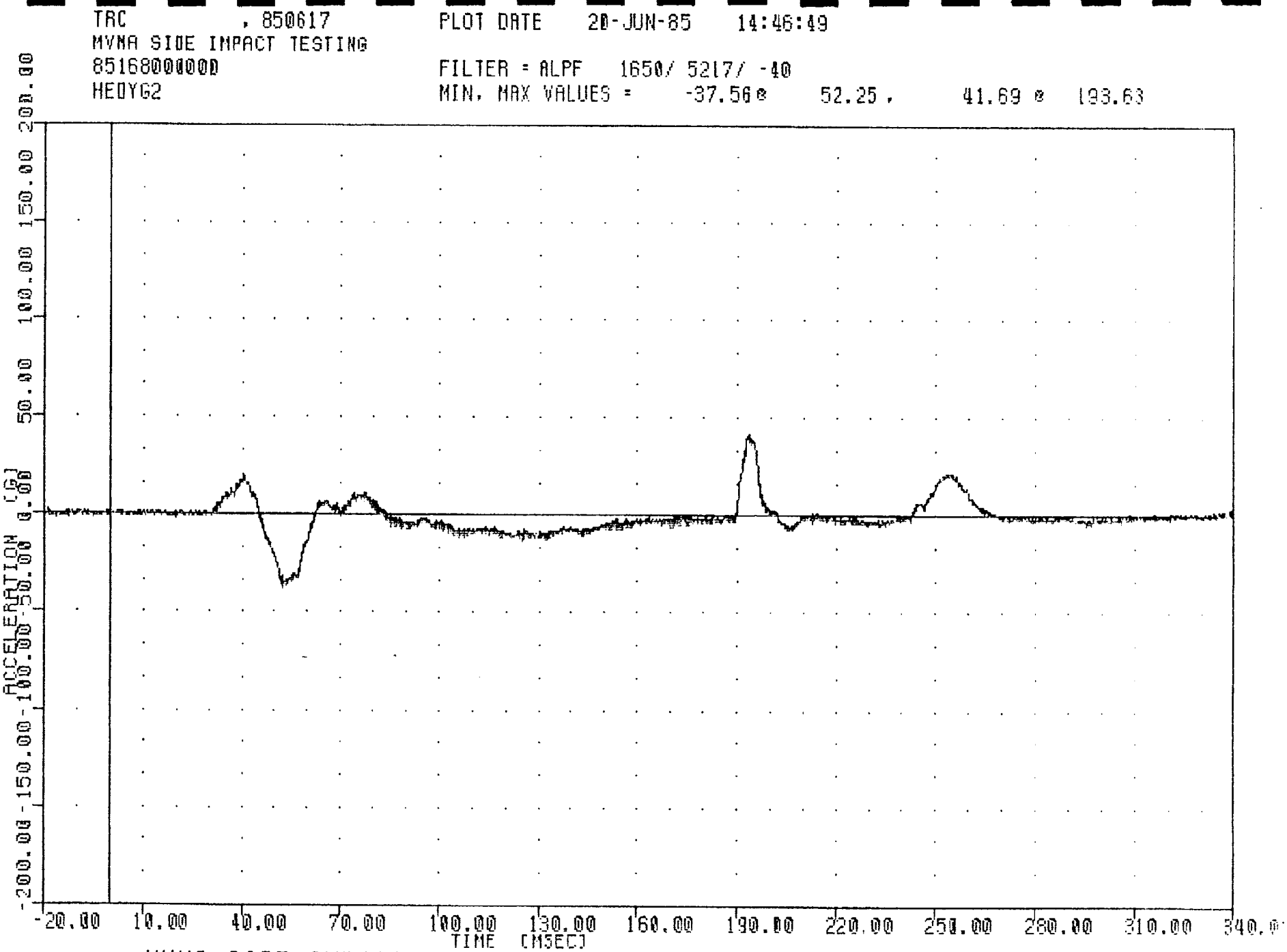
85168000000 FILTER = ALPF 1650/ 5217/ -40

HEDXG2 MIN, MAX VALUES = -21.28 @ 75.38 , 85.30 @ 195.38

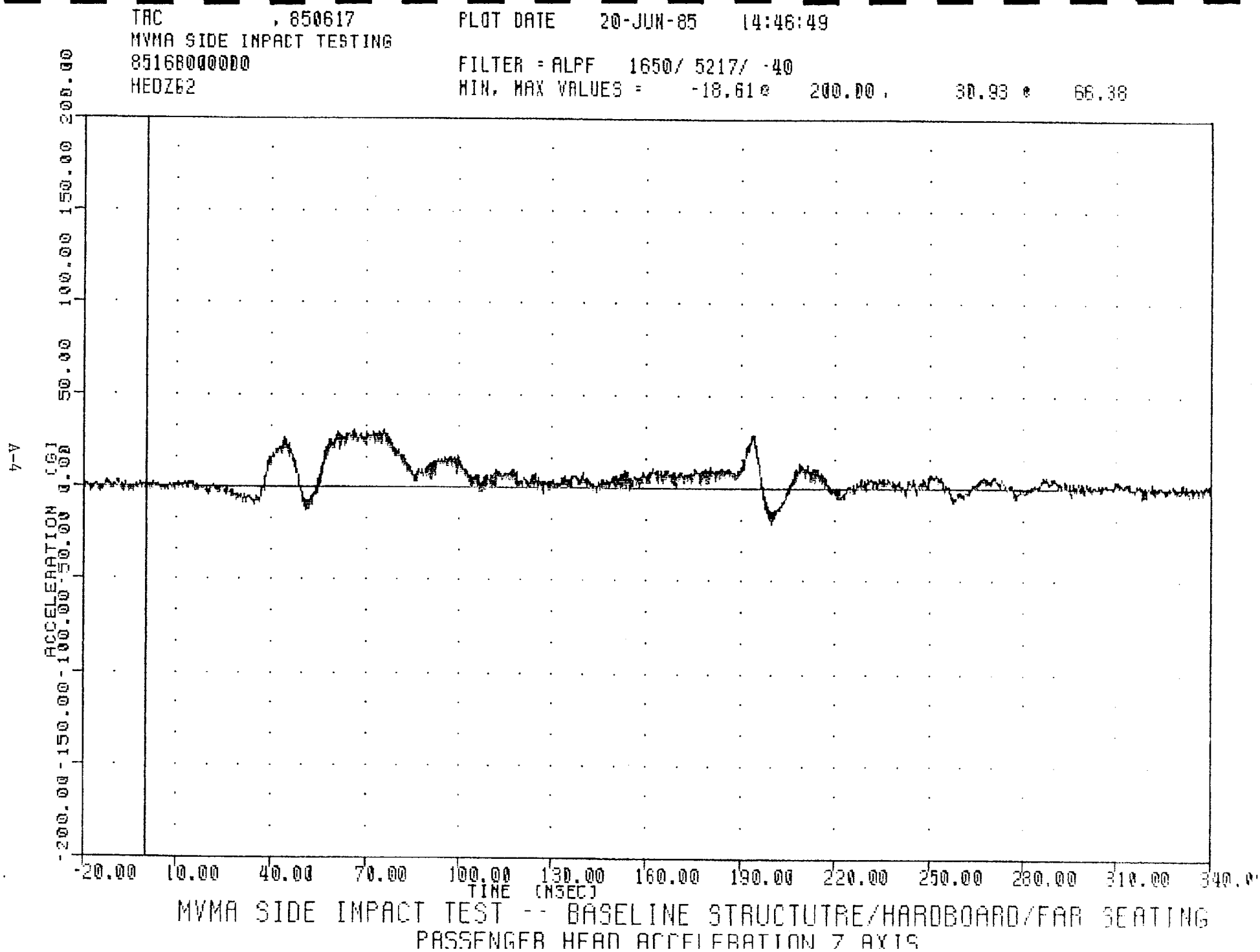


MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING

PASSENGER HEAD ACCELERATION X AXIS



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



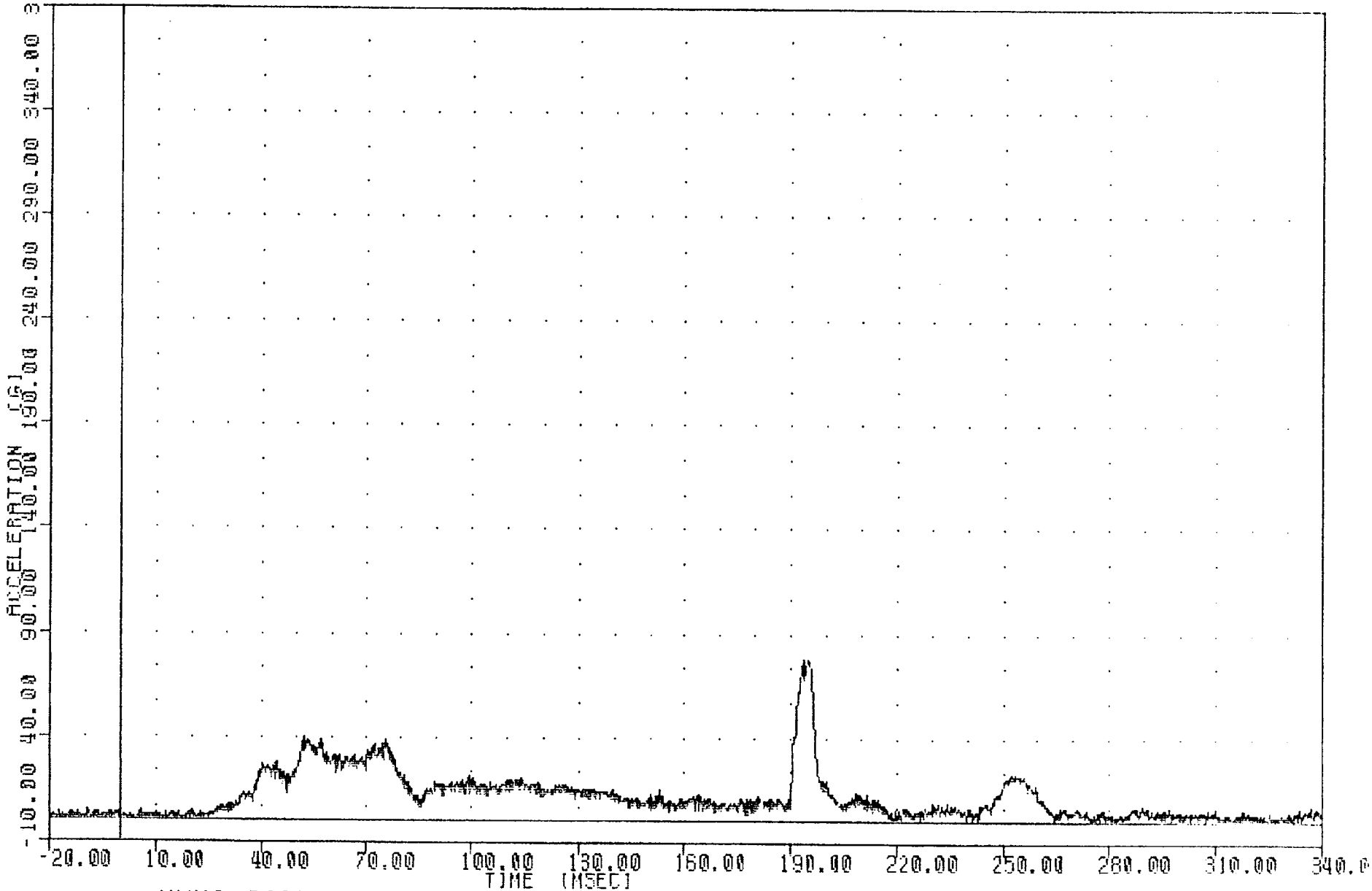
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
PASSENGER HEAD ACCELERATION Z AXIS

TRC , 850617 PLOT DATE 20-JUN-85 14:46:49

NVMA SIDE IMPACT TESTING

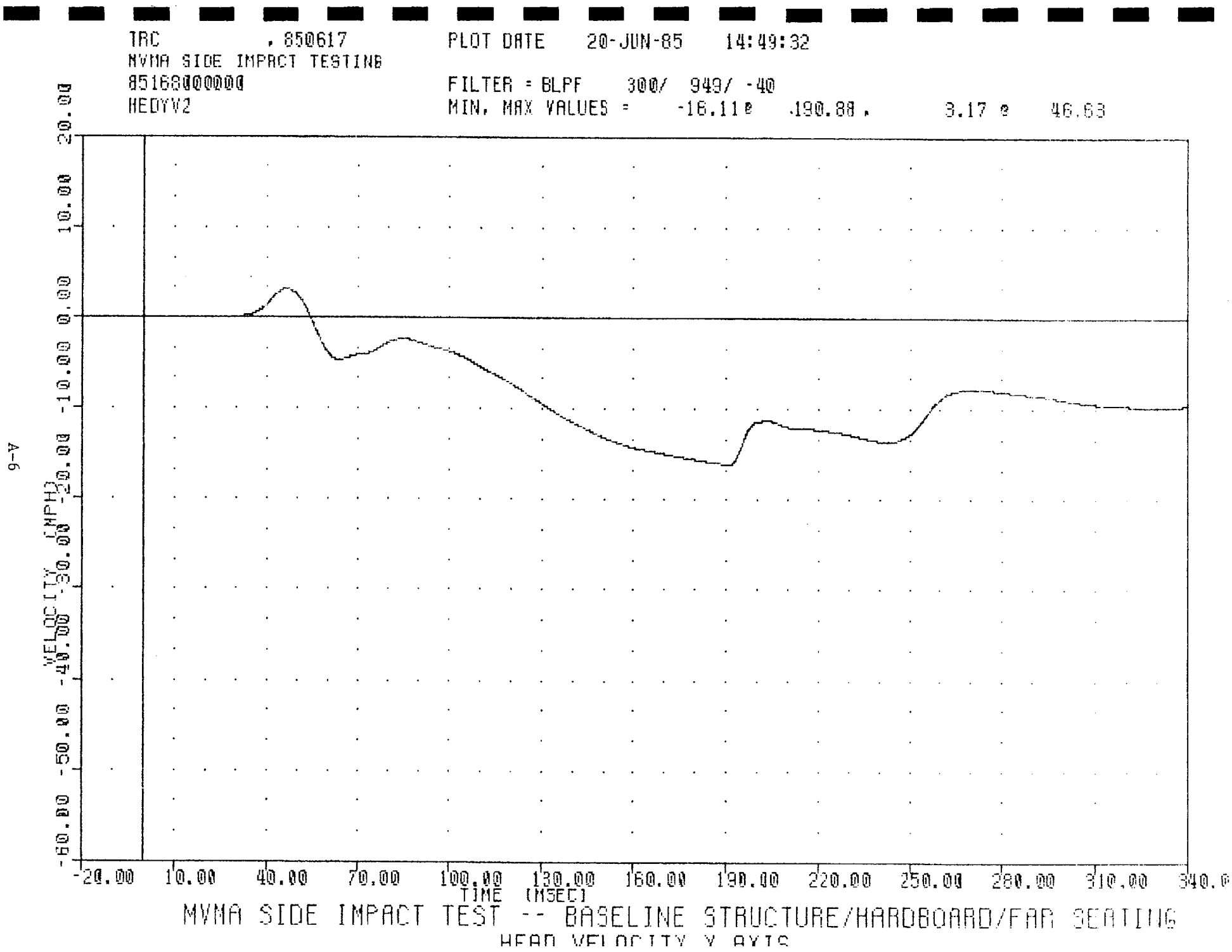
85168000000 FILTER = ALPF 1650/ 5217/ -40

HEDRG2 MIN, MAX VALUES = 0.20 @ 5.63 , 78.08 @ 194.63

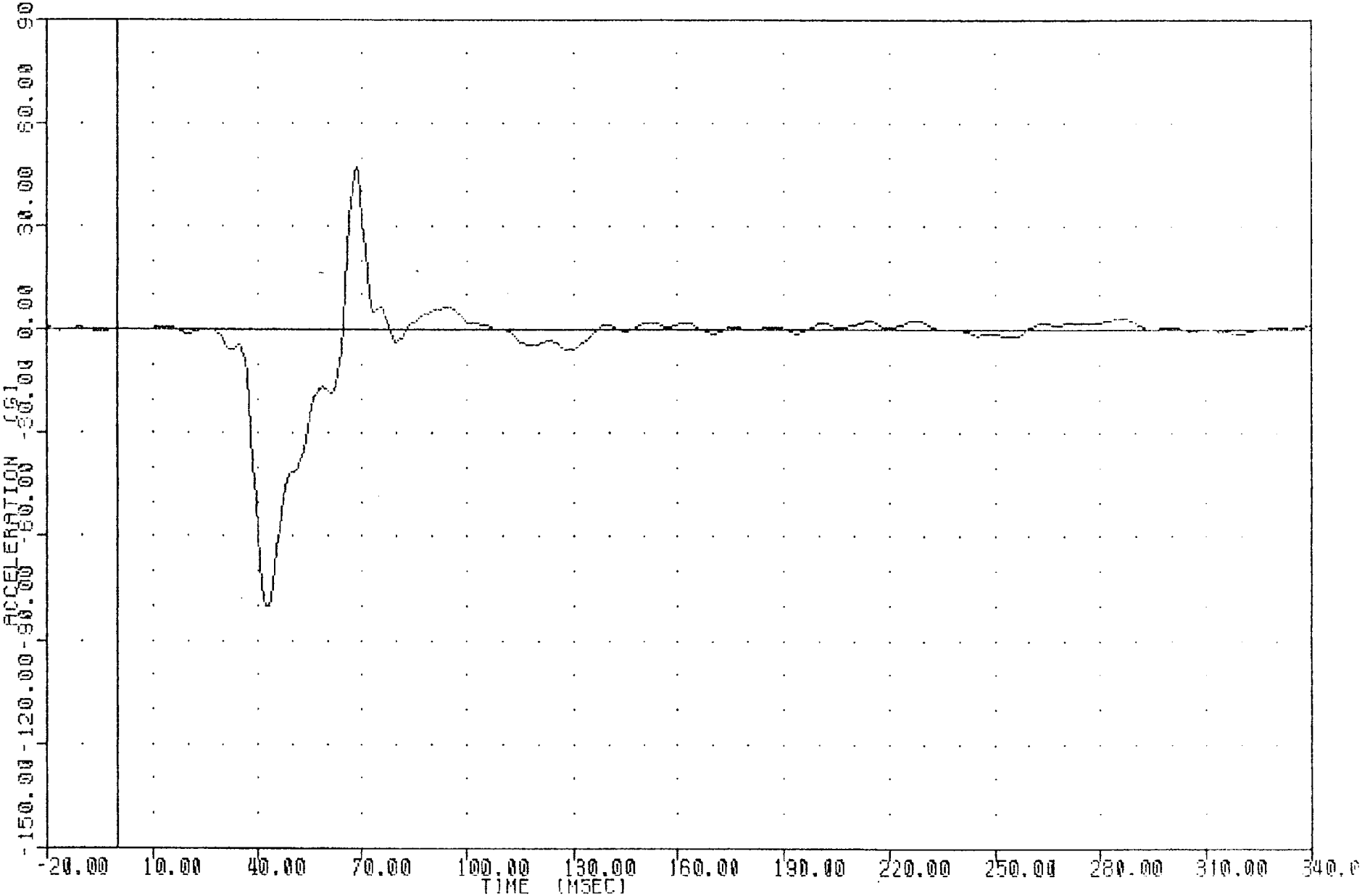


NVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING

PASSENGER HEAD RESULTANT ACCELERATION

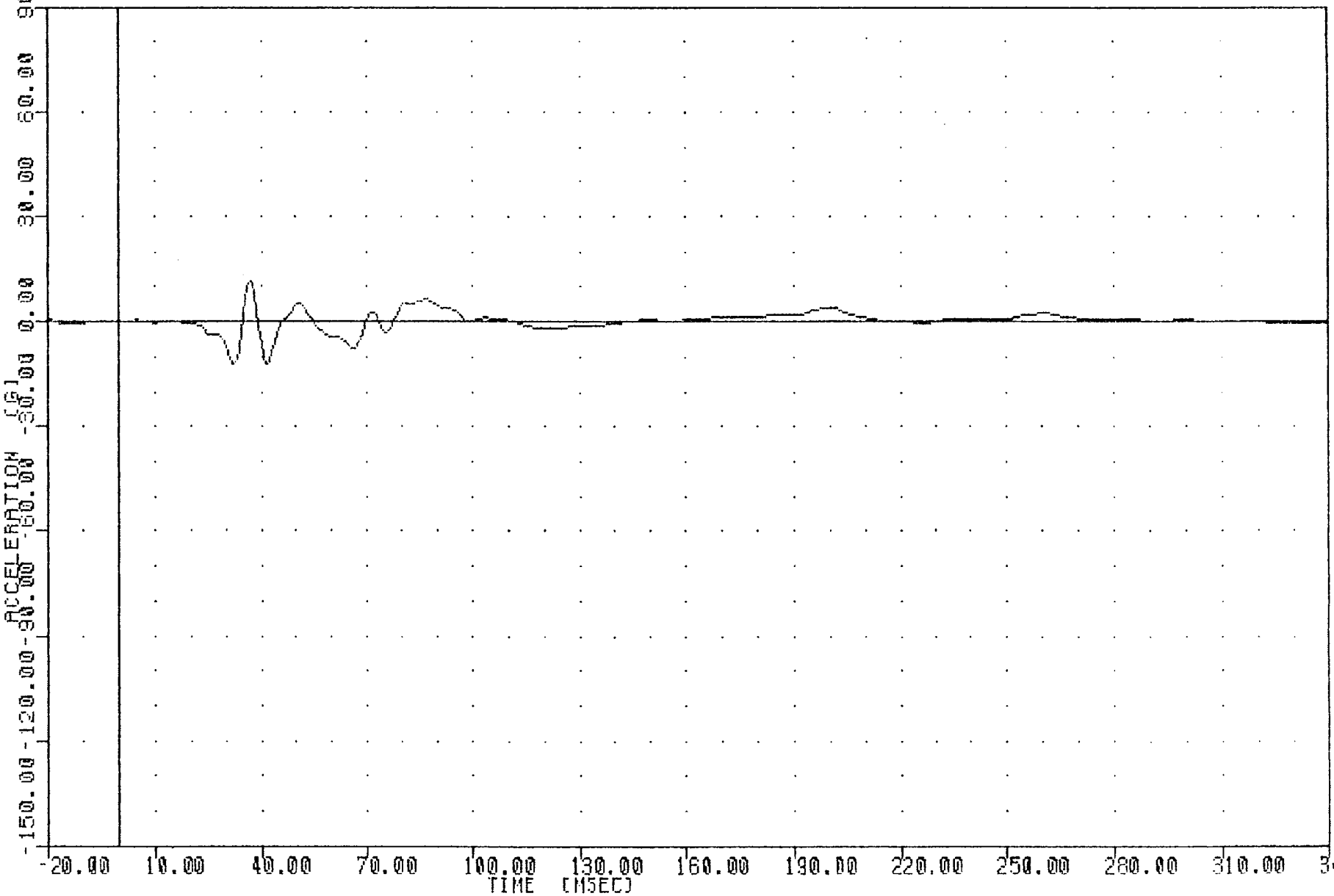

TRC , 850617
PLOT DATE 20-JUN-85 14:49:32
NVMA SIDE IMPACT TESTING
851680000000
FILTER = BLPF 300/ 949/ -40
HEDYV2
MIN, MAX VALUES = -16.11 @ 190.88 , 3.17 @ 46.63
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
VELOCITY (MPH)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.0
TIME (MSEC)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
HEAD VELOCITY X AXIS

TRC , 850617 PLOT DATE 21-JUN-85 09:37:08
NVMA SIDE IMPACT TESTING
85168@@@@@@ FILTER = HSRI 136/ 189/ -50
T01YG2 MIN, MAX VALUES = -60.42 @ 42.50 , 47.02 @ 68.13

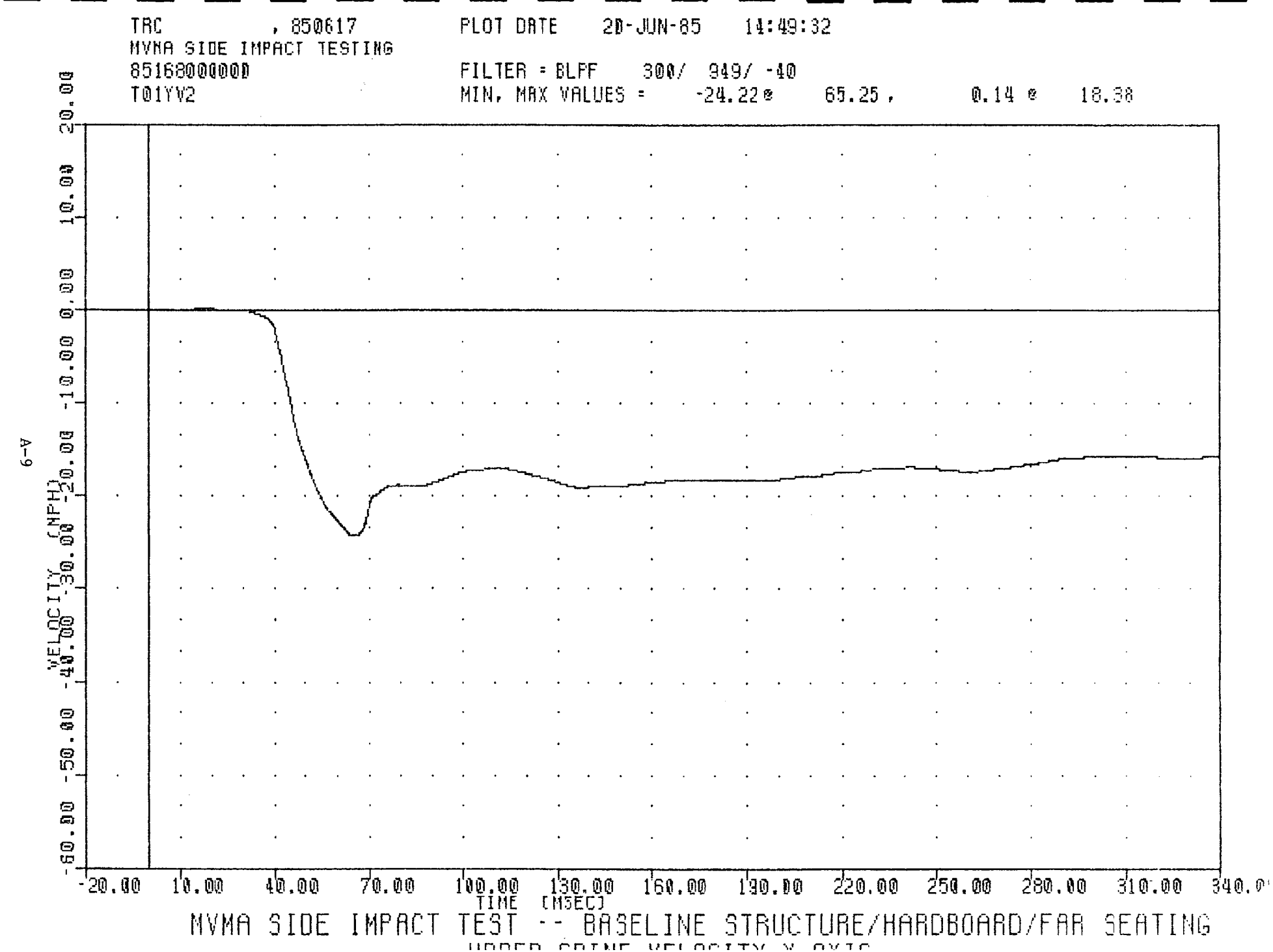


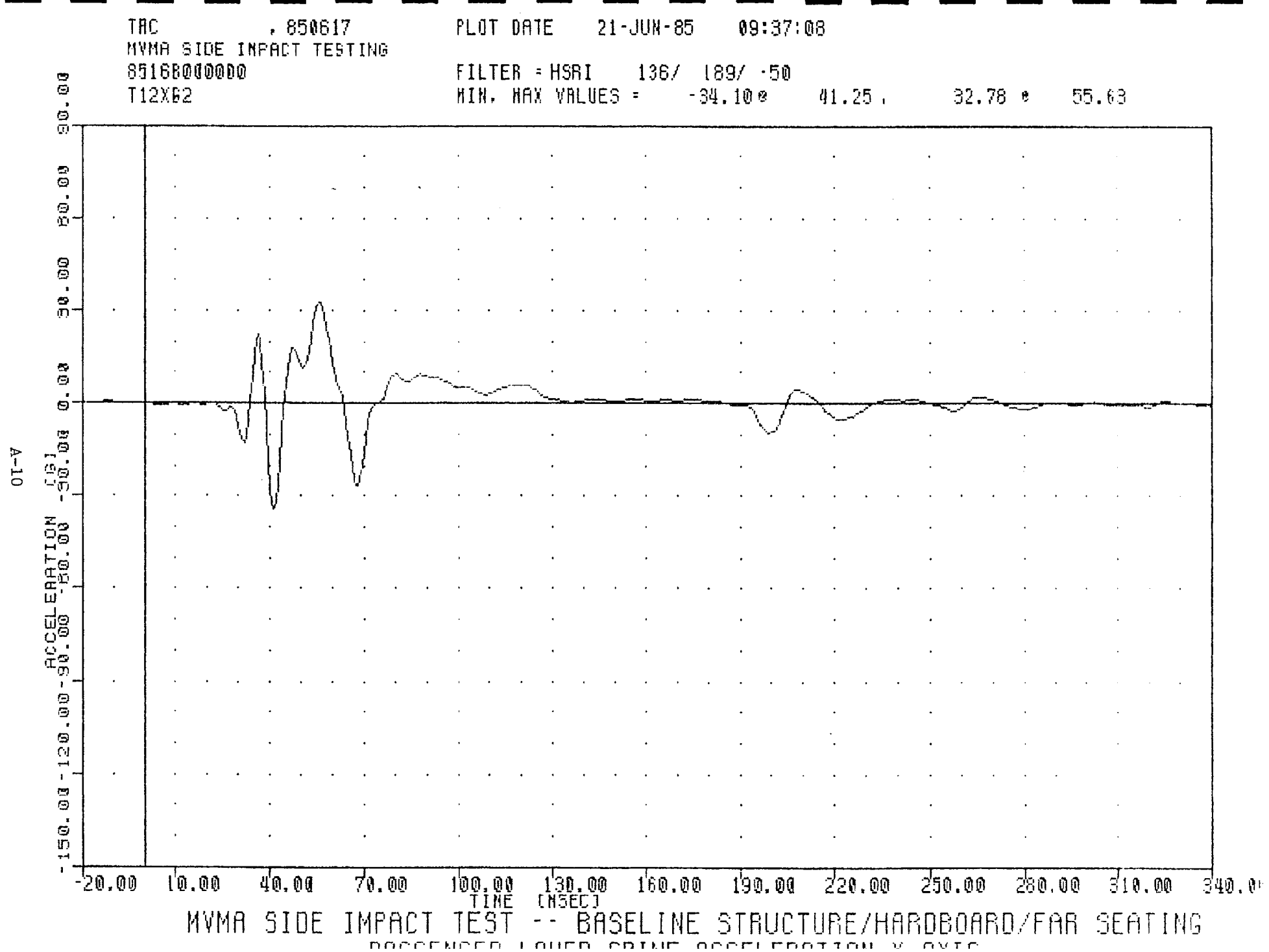
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER UPPER SPINE ACCELERATION Y AXIS

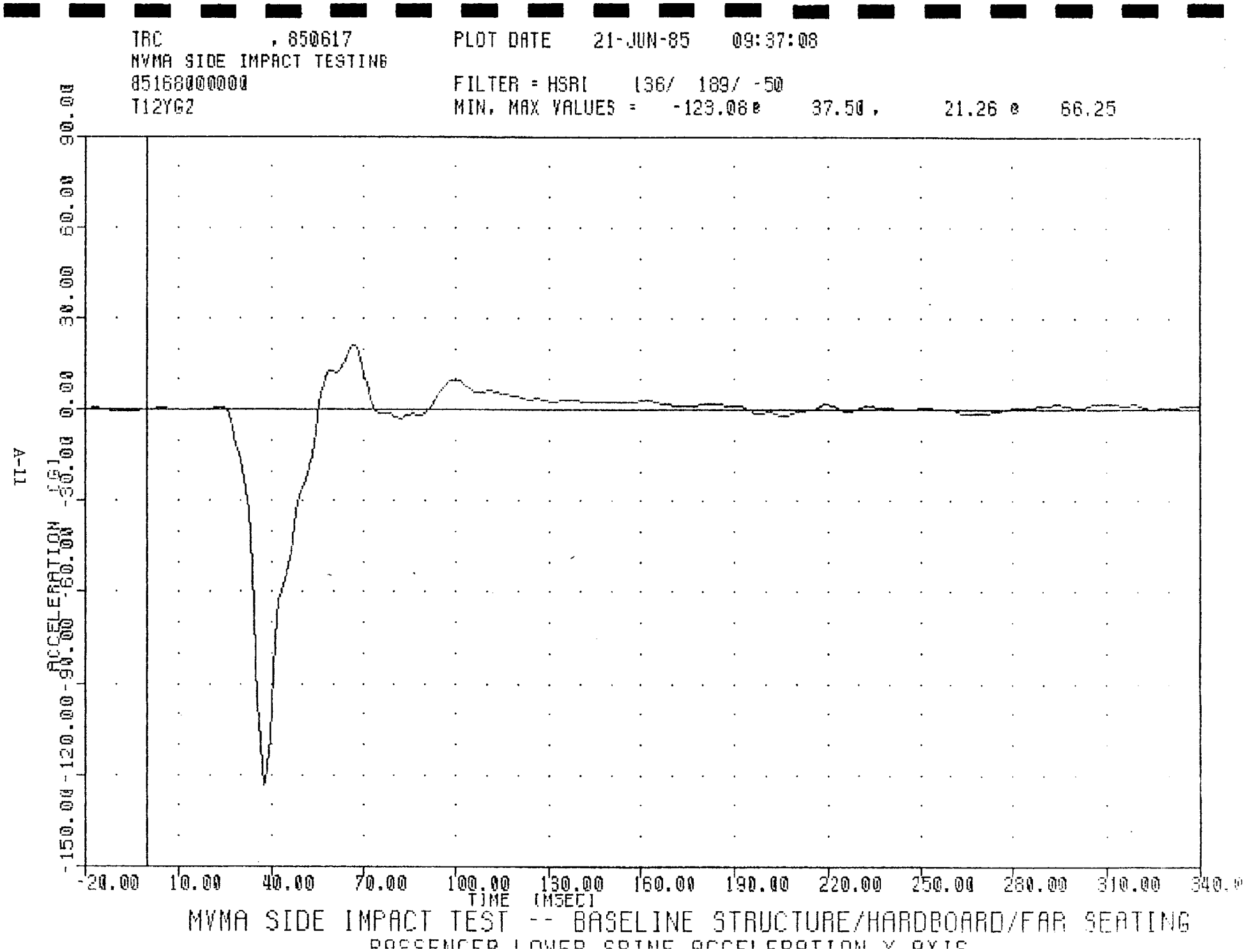
TRC , 850617 PLOT DATE 21-JUN-85 09:37:08
MVMA SIDE IMPACT TESTING
85168000000 FILTER = HSRI 136/ 189/ -50
T01ZG2 MIN, MAX VALUES = -12.16 @ 32.50 , 11.54 @ 36.88

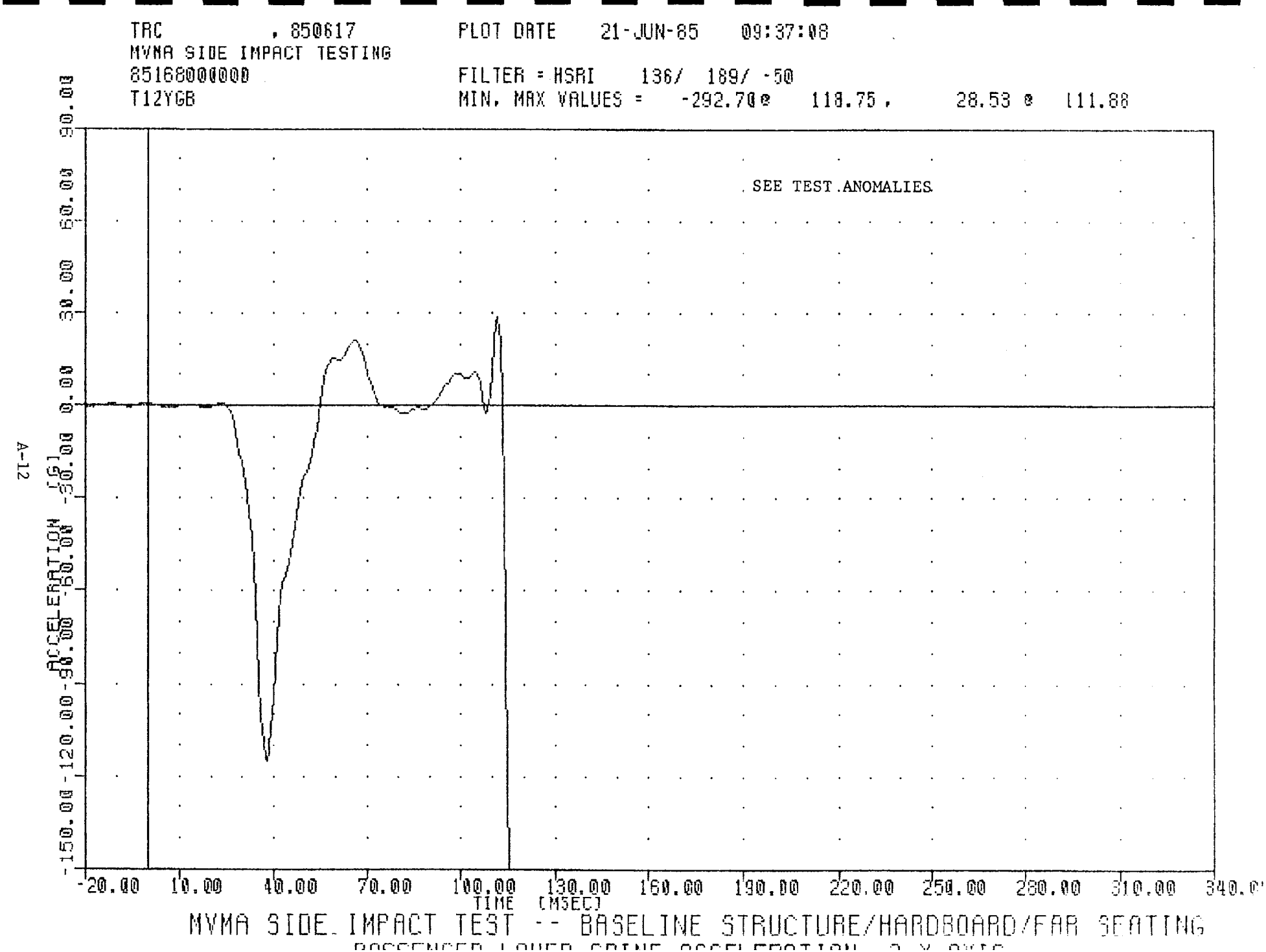


MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER UPPER CRIME ACCELERATION Z AXIS


TRC , 850617
PLOT DATE 20-JUN-85 14:49:32
MVMA SIDE IMPACT TESTING
85168000000
FILTER = BLFF 300/ 949/ -40
T01YV2
MIN, MAX VALUES = -24.22 @ 65.25 , 0.14 @ 18.38
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
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
340.0
TIME (MSEC)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING


TAC , 850617
PLOT DATE 21-JUN-85 09:37:08
MVMA SIDE IMPACT TESTING
85168@@@@@@
FILTER = HSRI 136/ 189/ -50
T12X62
MIN, MAX VALUES = -34.10 @ 41.25 , 32.78 @ 55.63
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
340.00
TIME (MSEC)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER LOWER SPINE ACCELERATION X AXIS

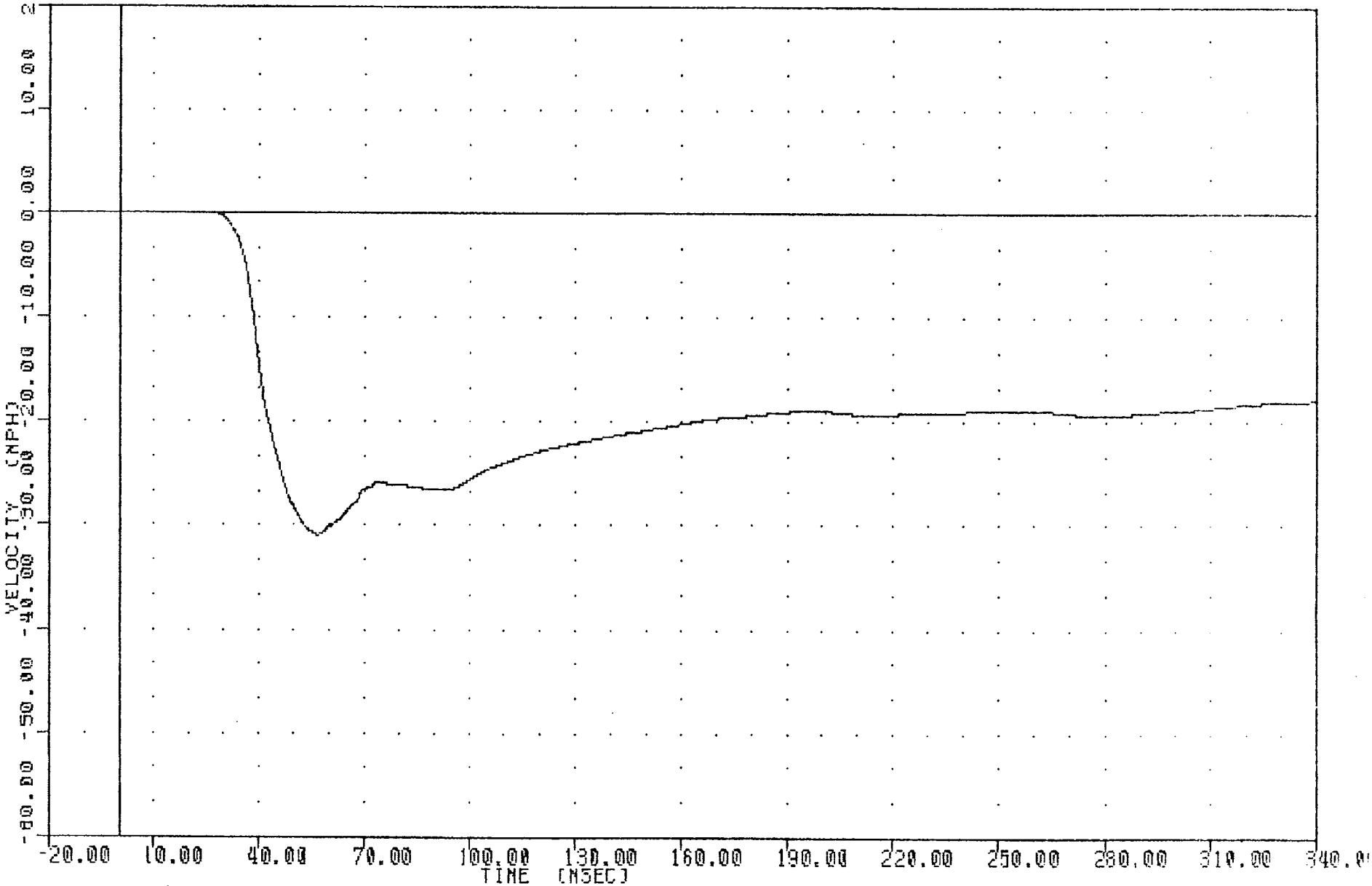

TRC , 850617
PLOT DATE 21-JUN-85 09:37:08
NVMA SIDE IMPACT TESTING
85168000000
FILTER = HSRI [36/ 189/ -50
T12YG2
MIN, MAX VALUES = -123.08 @ 37.50 , 21.26 @ 66.25
90.00
60.00
30.00
0.00
-30.00
-60.00
-90.00
-120.00
-150.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER LOWER SPINE ACCELERATION Y AXIS



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

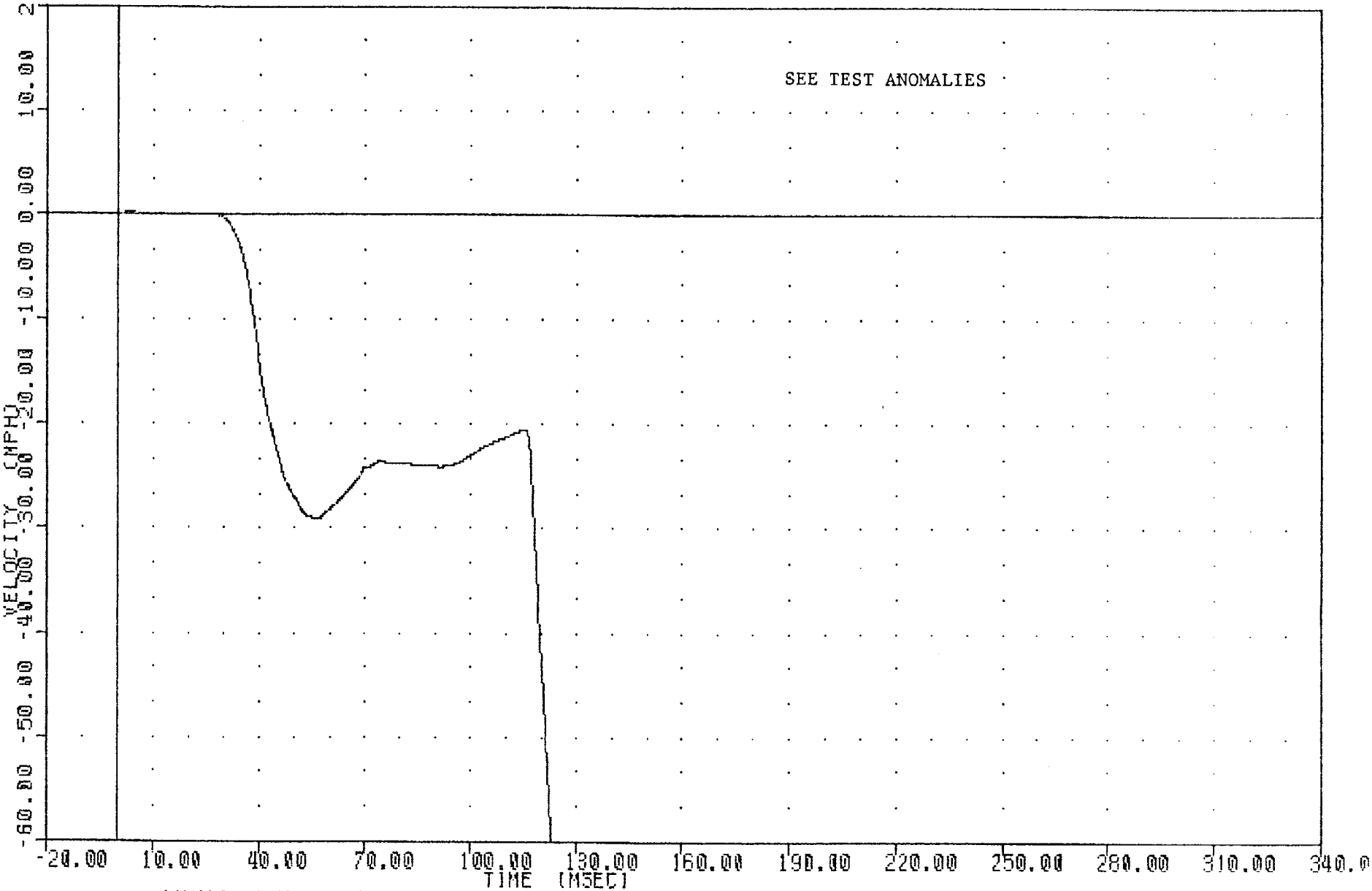
PASSENGER LOWER SPINE ACCELERATION, X AXIS

TRC , 850617 PLOT DATE 20-JUN-85 14:49:32
MVMA SIDE IMPACT TESTING
85168000000 FILTER = BLPF 300/ 949/ -40
T12YY2 MIN, MAX VALUES = -30.89 @ 56.75 , 0.04 @ -13.50



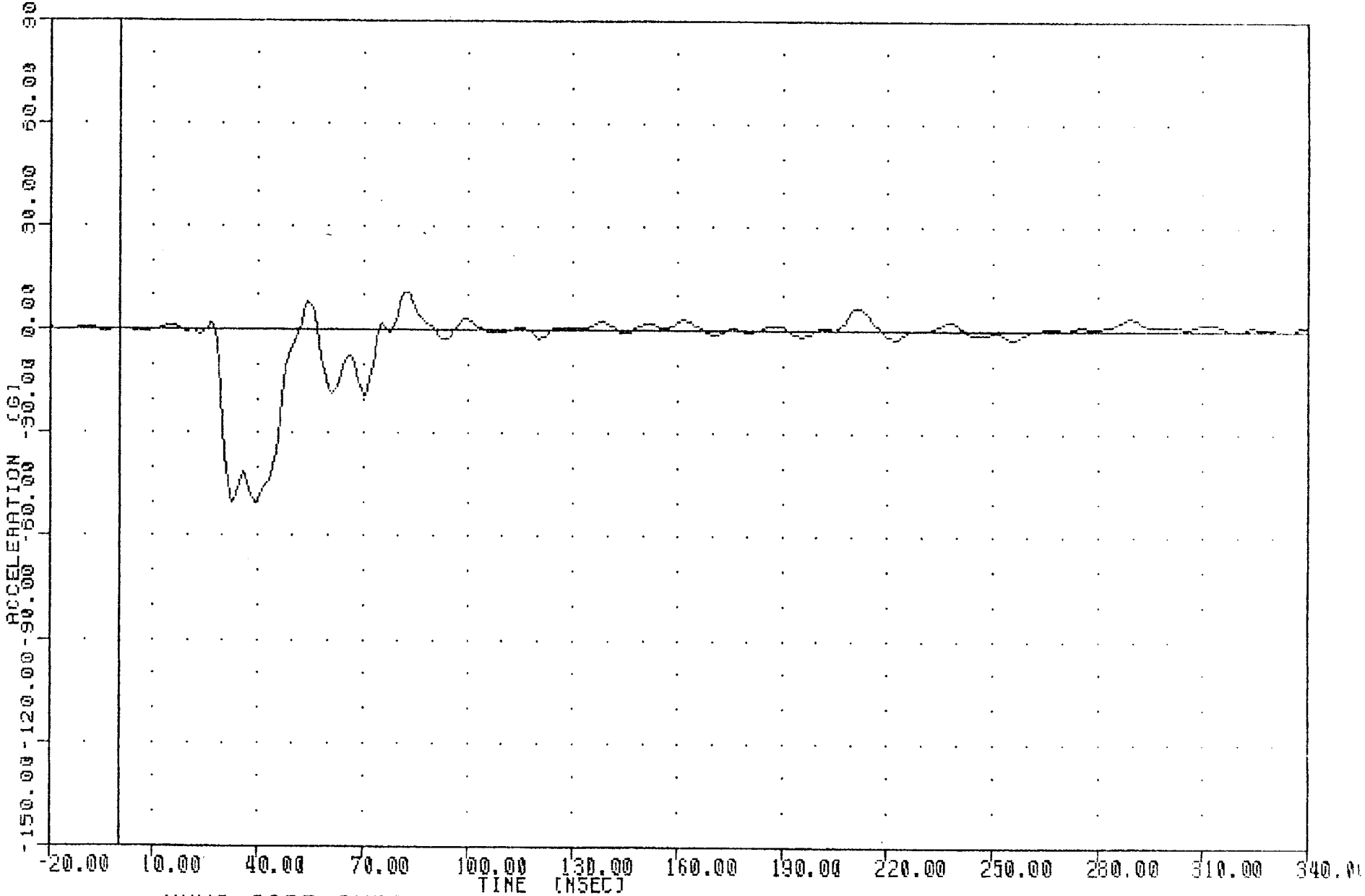
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
LOWER SPINE VELOCITY Y AXIS

TRC , 850617 PLOT DATE 20-JUN-85 14:49:32
NVMA SIDE IMPACT TESTING
851680000000 FILTER = BLPF 300/ 949/ -40
T12YVB MIN, MAX VALUES = -1348.04 @ 340.00 , 0.11 @ 3.13



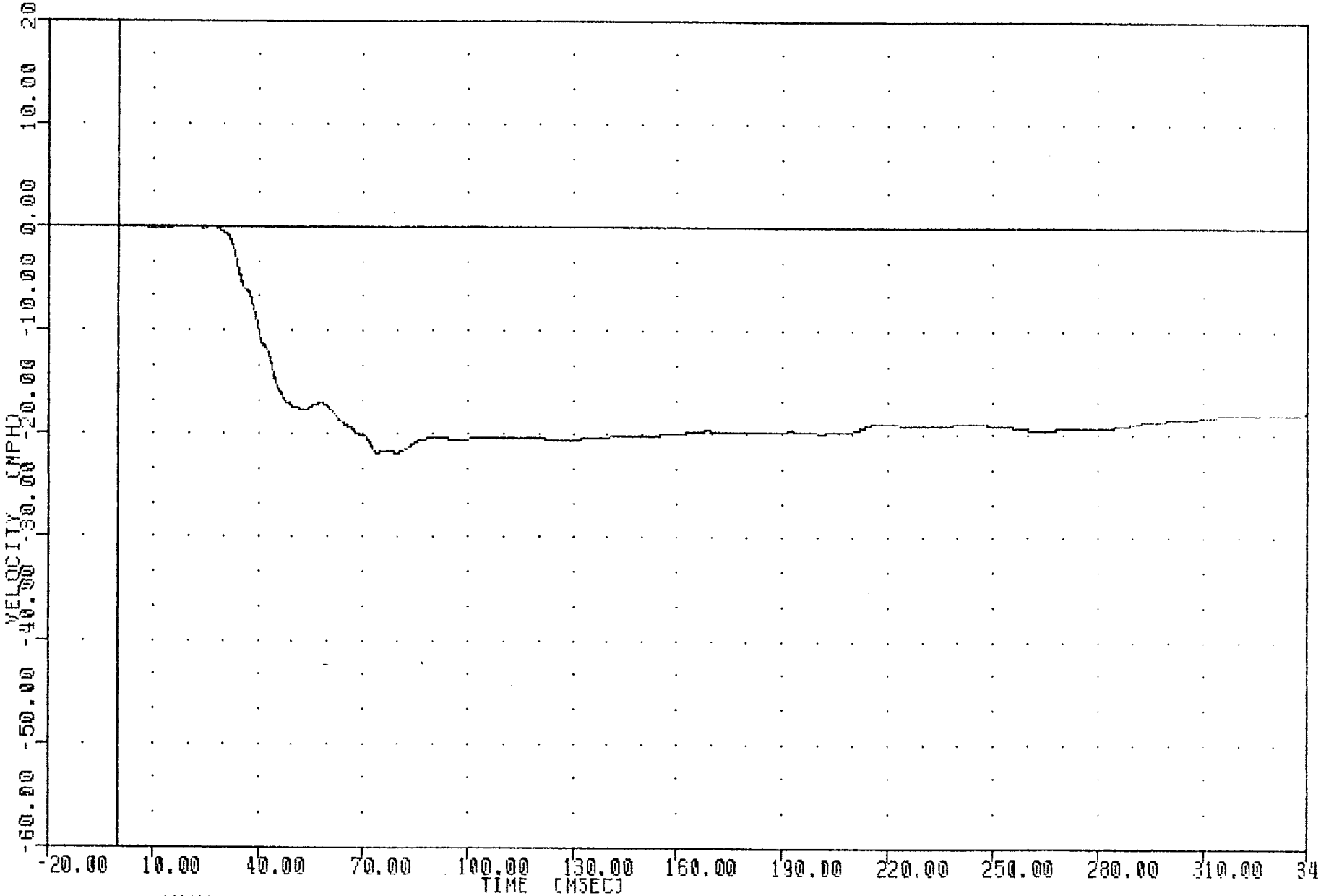
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
LOWER SPINE VELOCITY -2 Y AXIS

TRC , 850617 PLOT DATE 21-JUN-85 09:37:08
MVMA SIDE IMPACT TESTING
8516B0@@@@@@ FILTER = HSRI 136/ 189/ -50
RURY62 MIN, MAX VALUES = -50.45 @ 32.50 , 11.19 @ 82.50



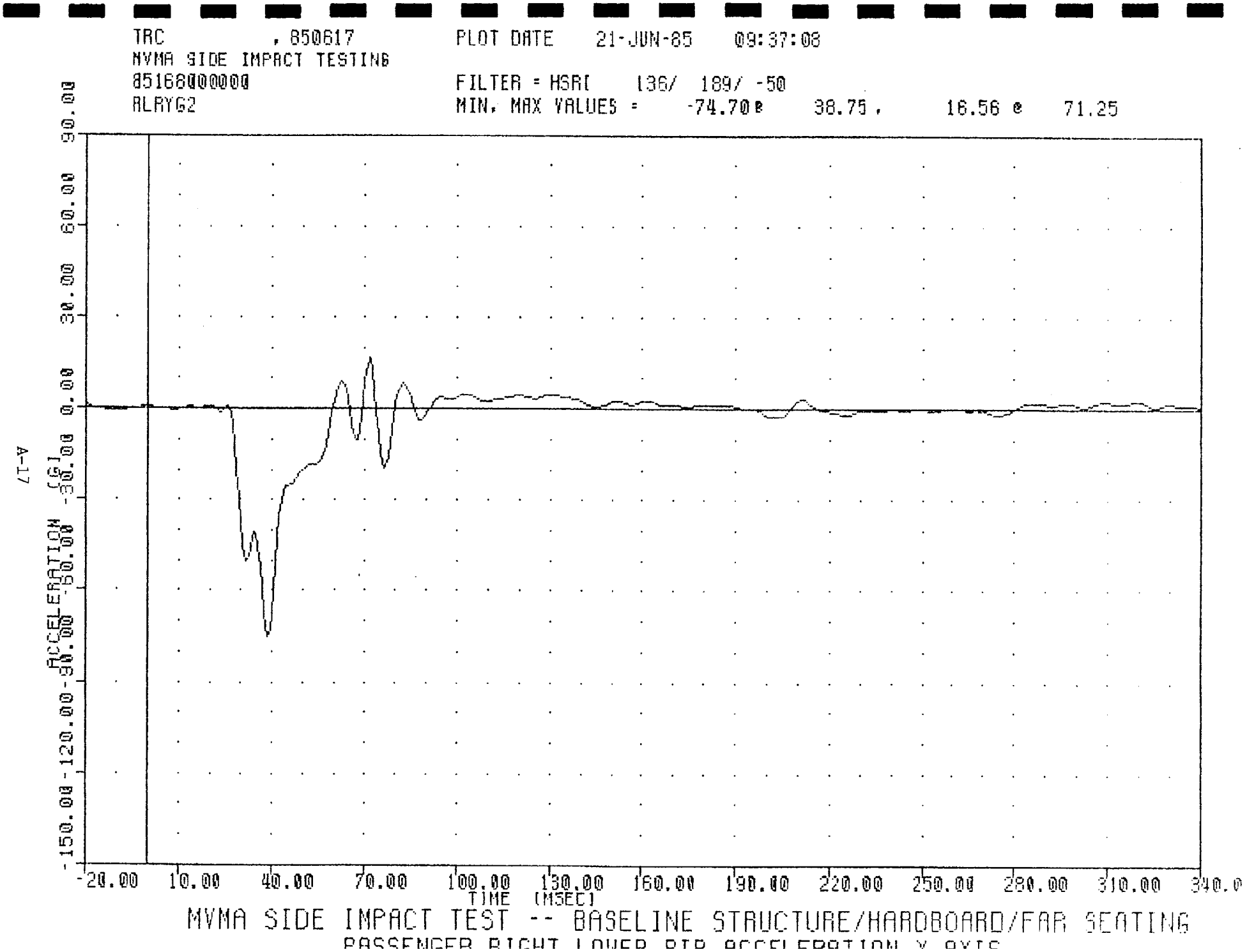
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER RIGHT UPPER RIB ACCELERATION Y AXIS

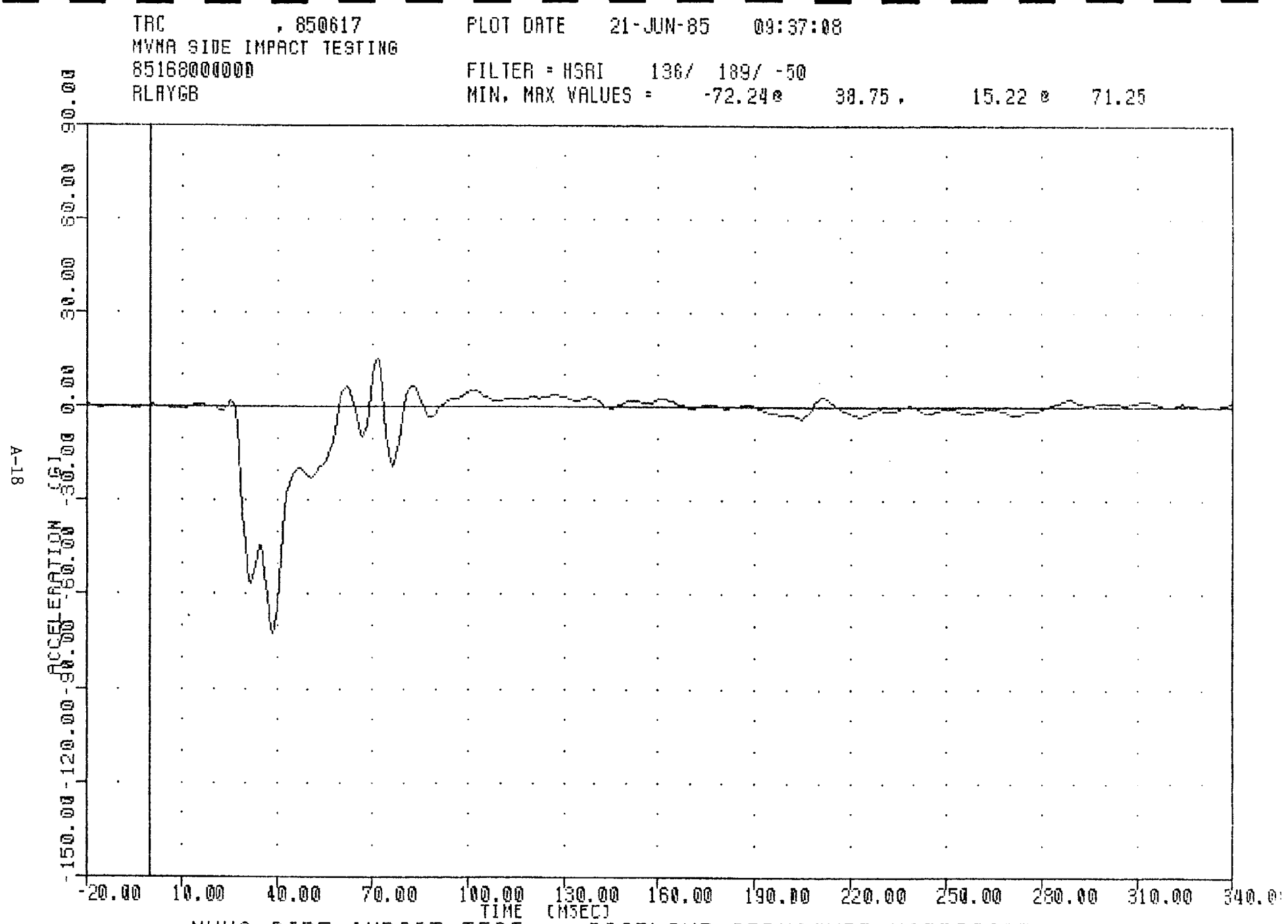
TRC , 850617 PLOT DATE 20-JUN-85 14:49:32
MVMA SIDE IMPACT TESTING
851680000000 FILTER = BLPF 300/ 949/ -40
RUAYV2 MIN, MAX VALUES = -21.79@ 74.00 , 0.02 @ -5.88



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

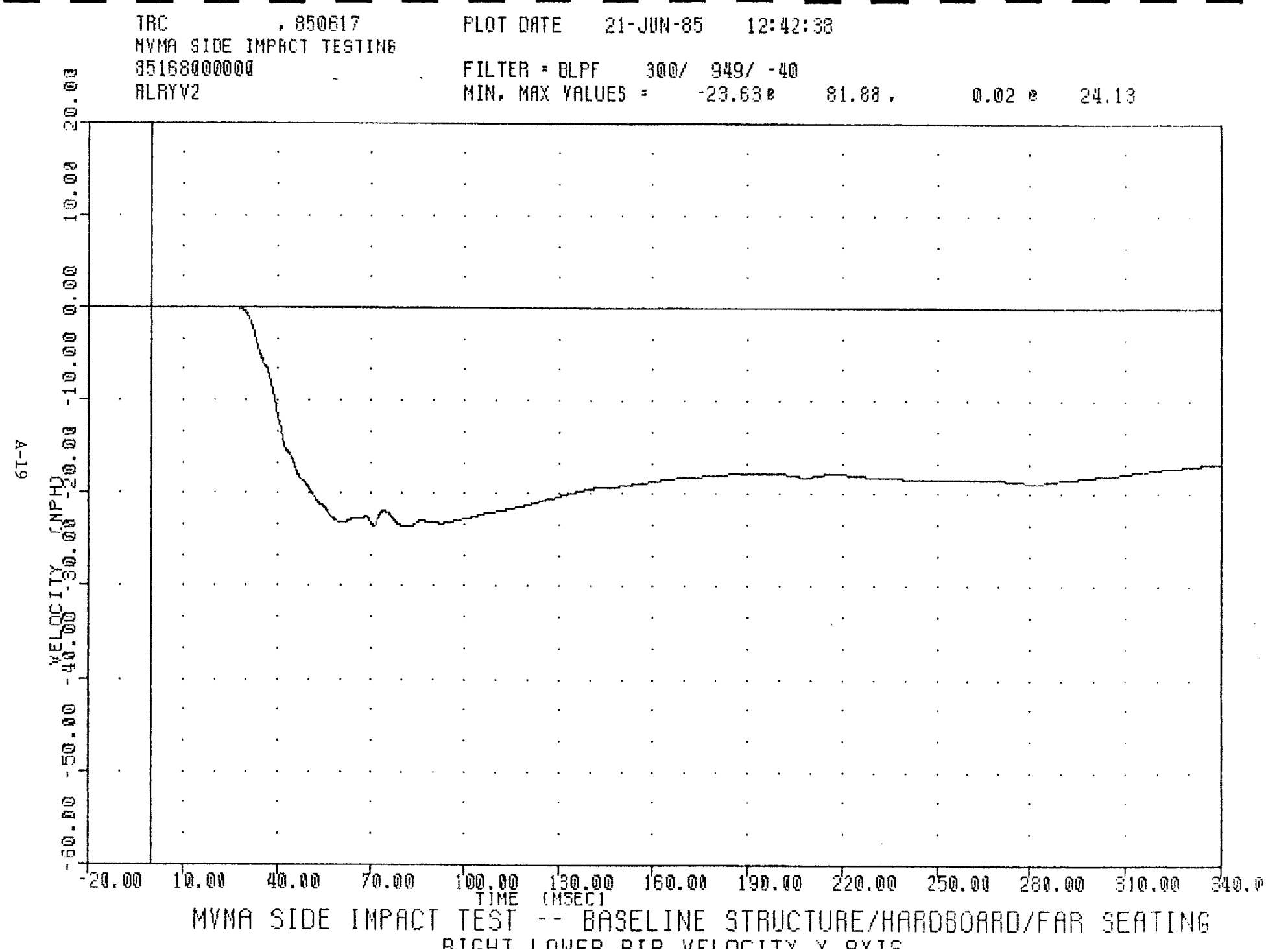
RIGHT UPPER RIB VELOCITY X AXIS

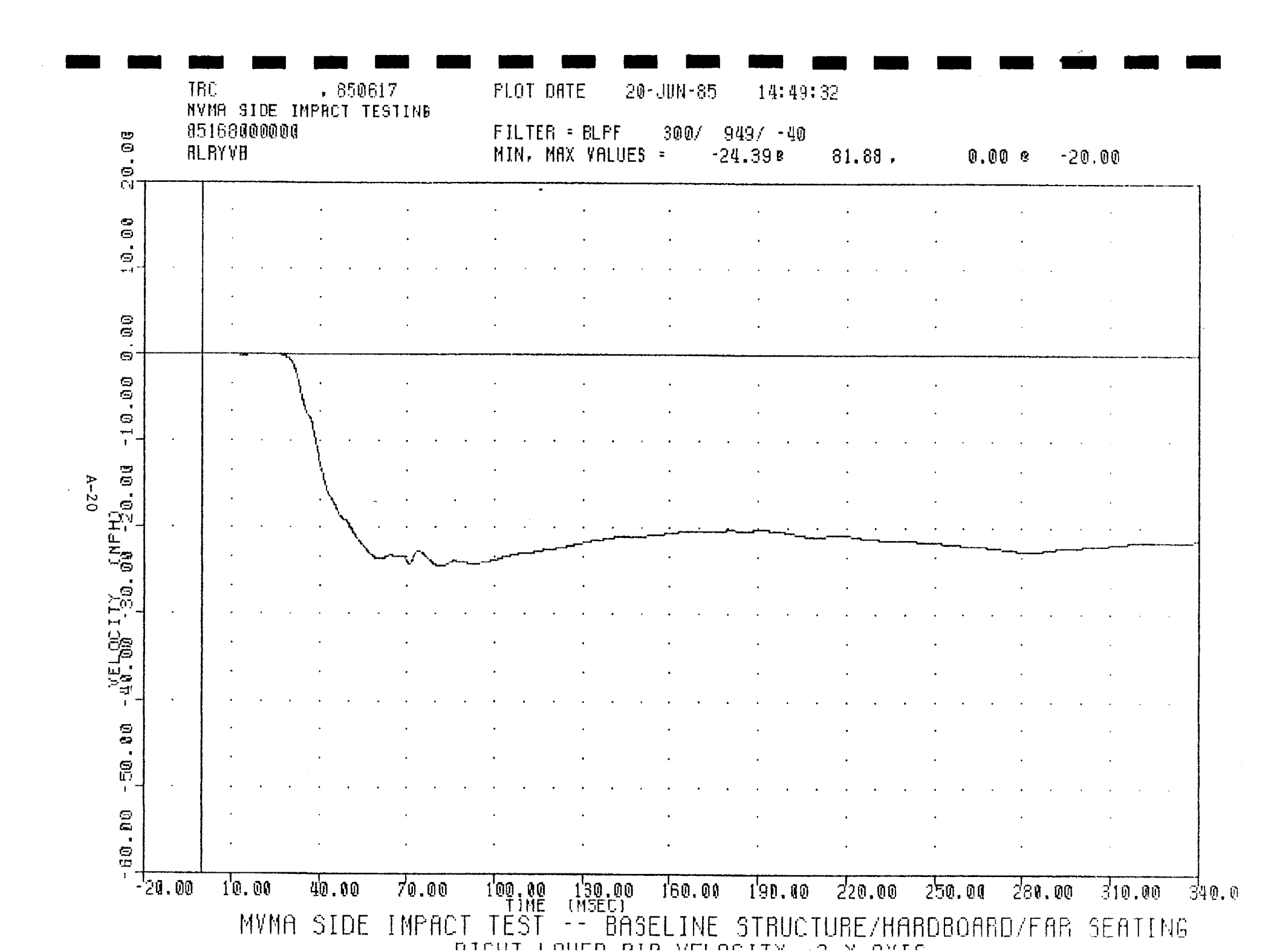

TRC , 850617
PLOT DATE 21-JUN-85 09:37:08
NVMA SIDE IMPACT TESTING
851680000000
FILTER = HSRI 136/ 189/ -50
RLRYG2
MIN, MAX VALUES = -74.70 @ 38.75 , 16.56 @ 71.25
90.00
60.00
30.00
0.00
-30.00
-60.00
-90.00
-120.00
-150.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.0
TIME (MSEC)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
PASSENGER RIGHT LOWER RIB ACCELERATION Y AXIS

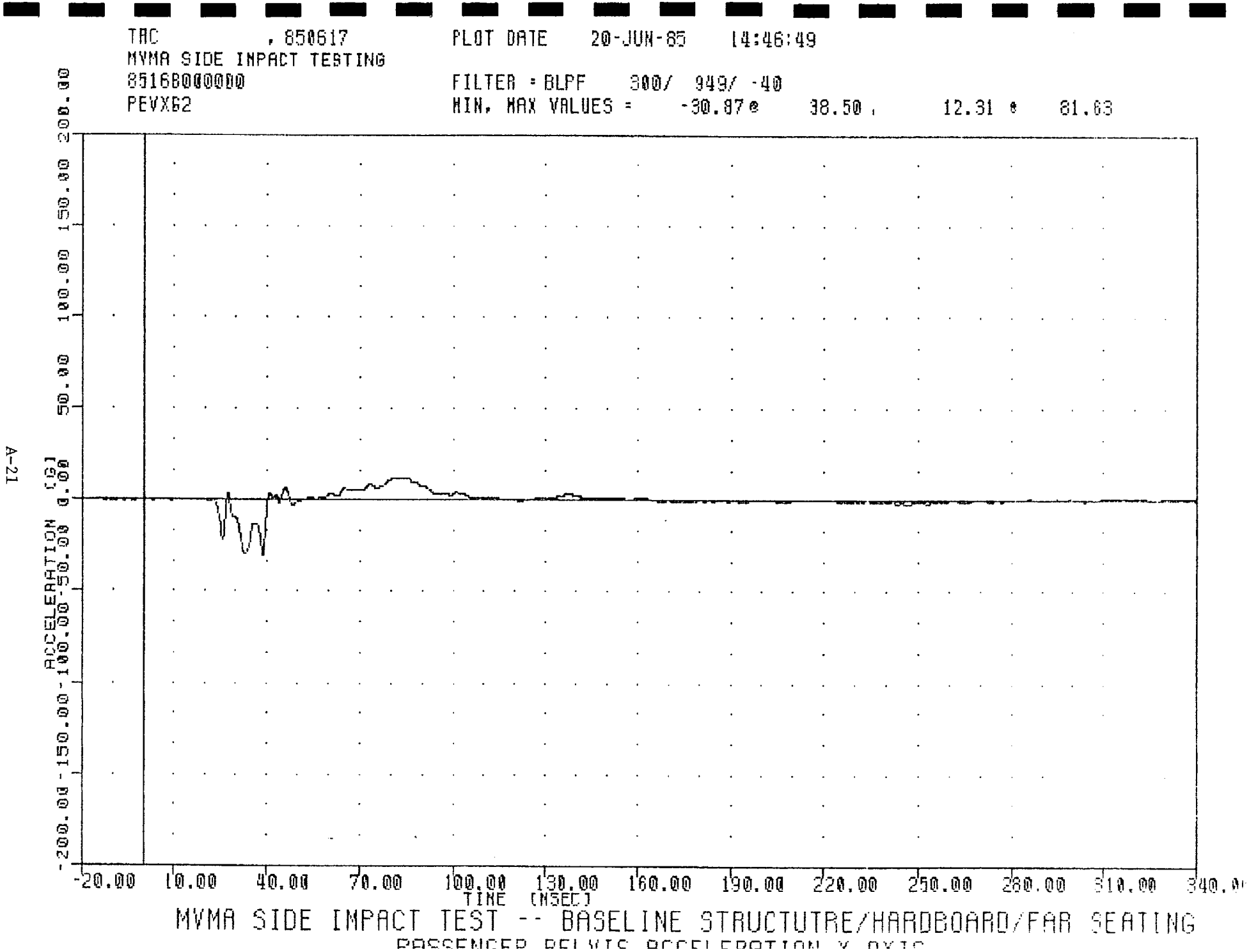


MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING

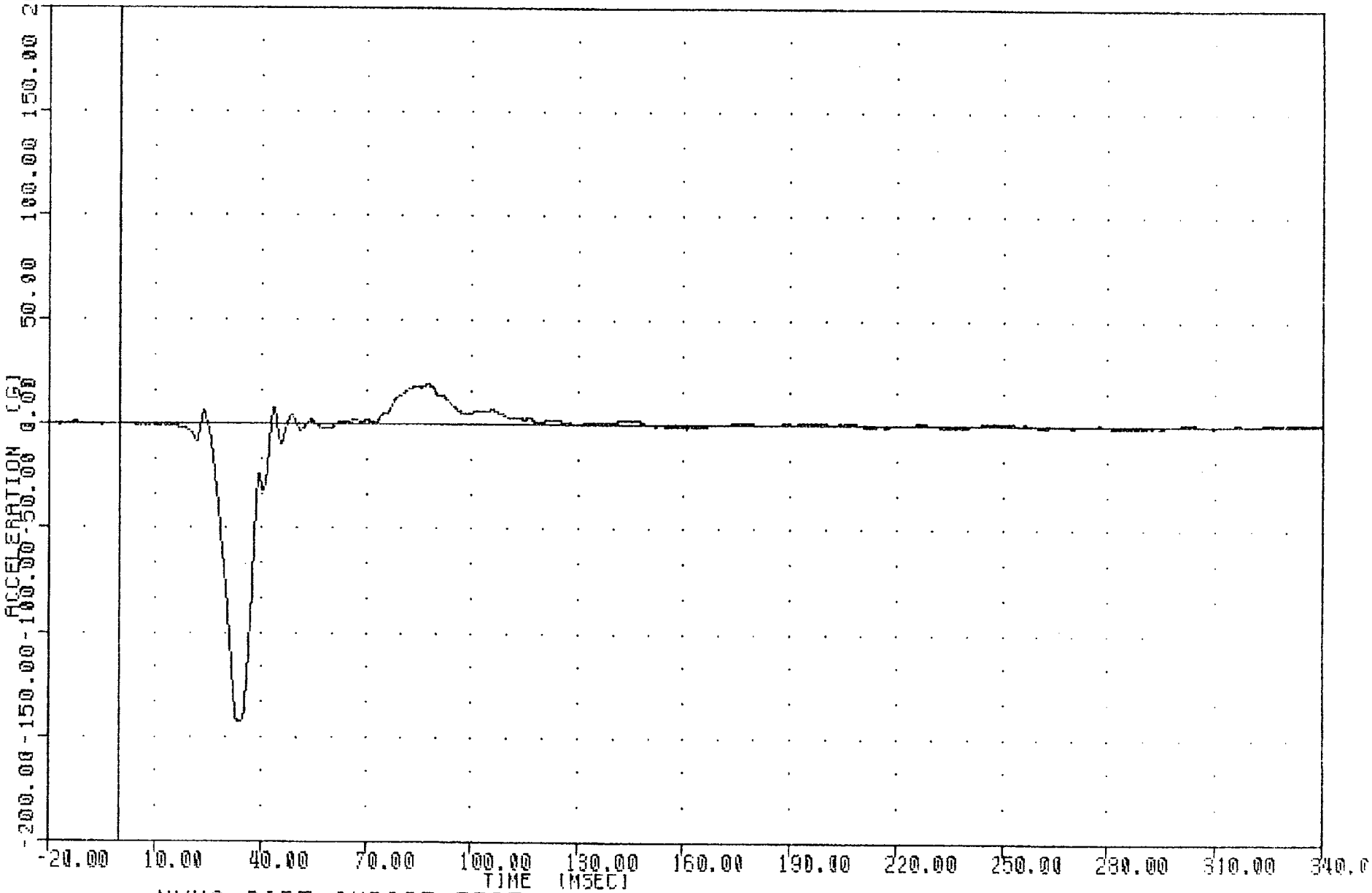
PASSENGER RIGHT LOWER RIB ACCELERATION -Z Y AXIS


TRC , 850617
PLOT DATE 21-JUN-85 12:42:38
NVMA SIDE IMPACT TESTING
85168000000
FILTER = BLPF 300/ 949/ -40
RLRYV2
MIN, MAX VALUES = -23.63 @ 81.88 , 0.02 @ 24.13
VELOCITY (MPH)
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
340.0
TIME (MSEC)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
RIGHT LOWER RIB VELOCITY X AXIS


TRC , 850617
PLOT DATE 20-JUN-85 14:49:32
NVMA SIDE IMPACT TESTING
85168000000
FILTER = BLPF 300/ 949/ -40
RLRYVB
MIN, MAX VALUES = -24.39 @ 81.88 , 0.00 @ -20.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
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
340.0
TIME (MSEC)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING

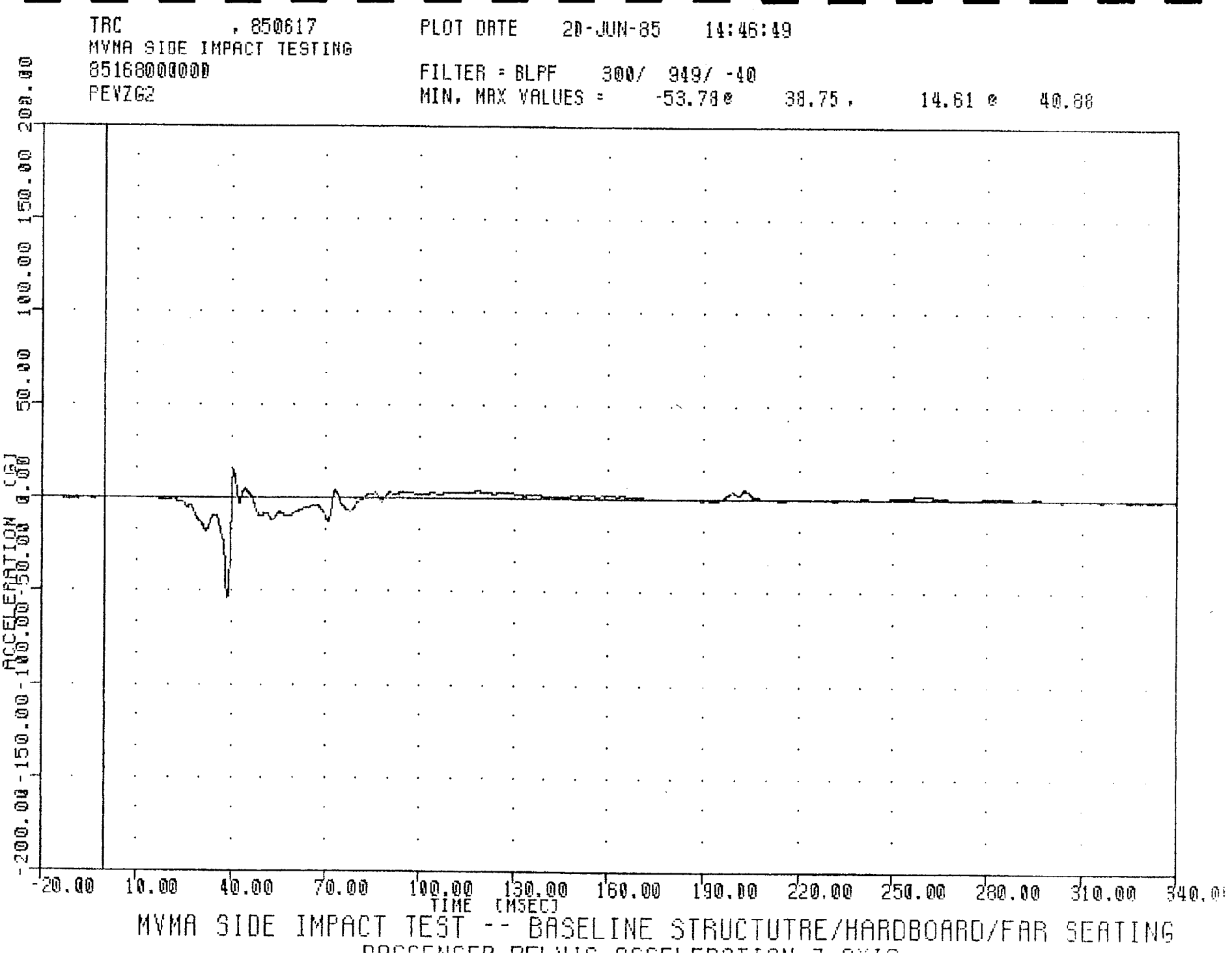

TAC , 850617
PLOT DATE 20-JUN-85 14:46:49
MVMA SIDE IMPACT TESTING
85168Q00000
FILTER = BLPF 300/ 949/ -40
PEVX62
MIN, MAX VALUES = -30.87@ 38.50 , 12.31 @ 81.63
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
PASSENGER PELVIC ACCELERATION X AXIS

TRC , 850617 PLOT DATE 20-JUN-85 14:46:49
NVMA SIDE IMPACT TESTING
851680000000 FILTER = BLPF 300/ 949/ -40
PEVYG2 MIN. MAX VALUES = -143.10 @ 33.63 , 19.00 @ 87.13



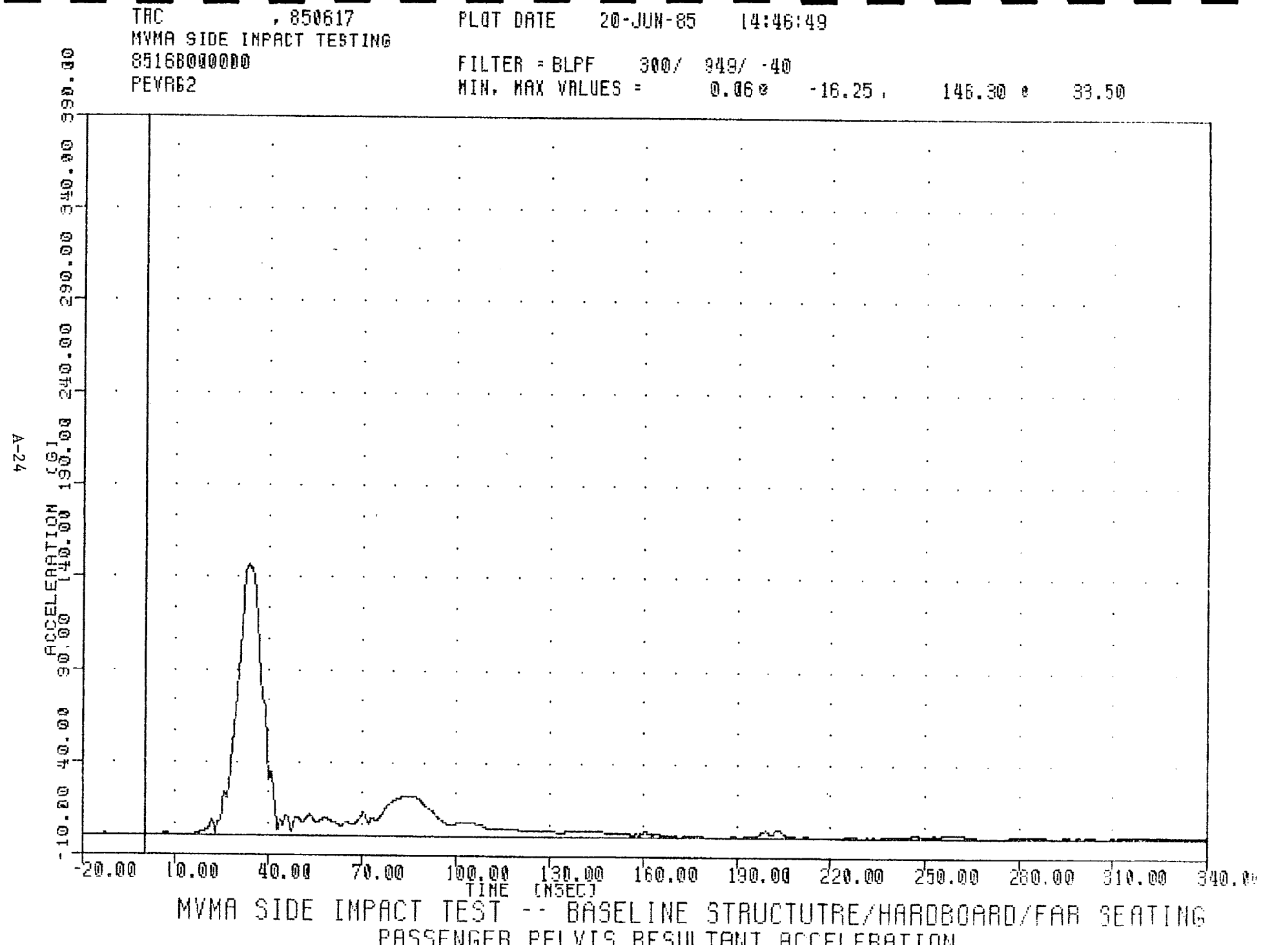
NVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING

PASSENGER PELVIS ACCELERATION X AXIS



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

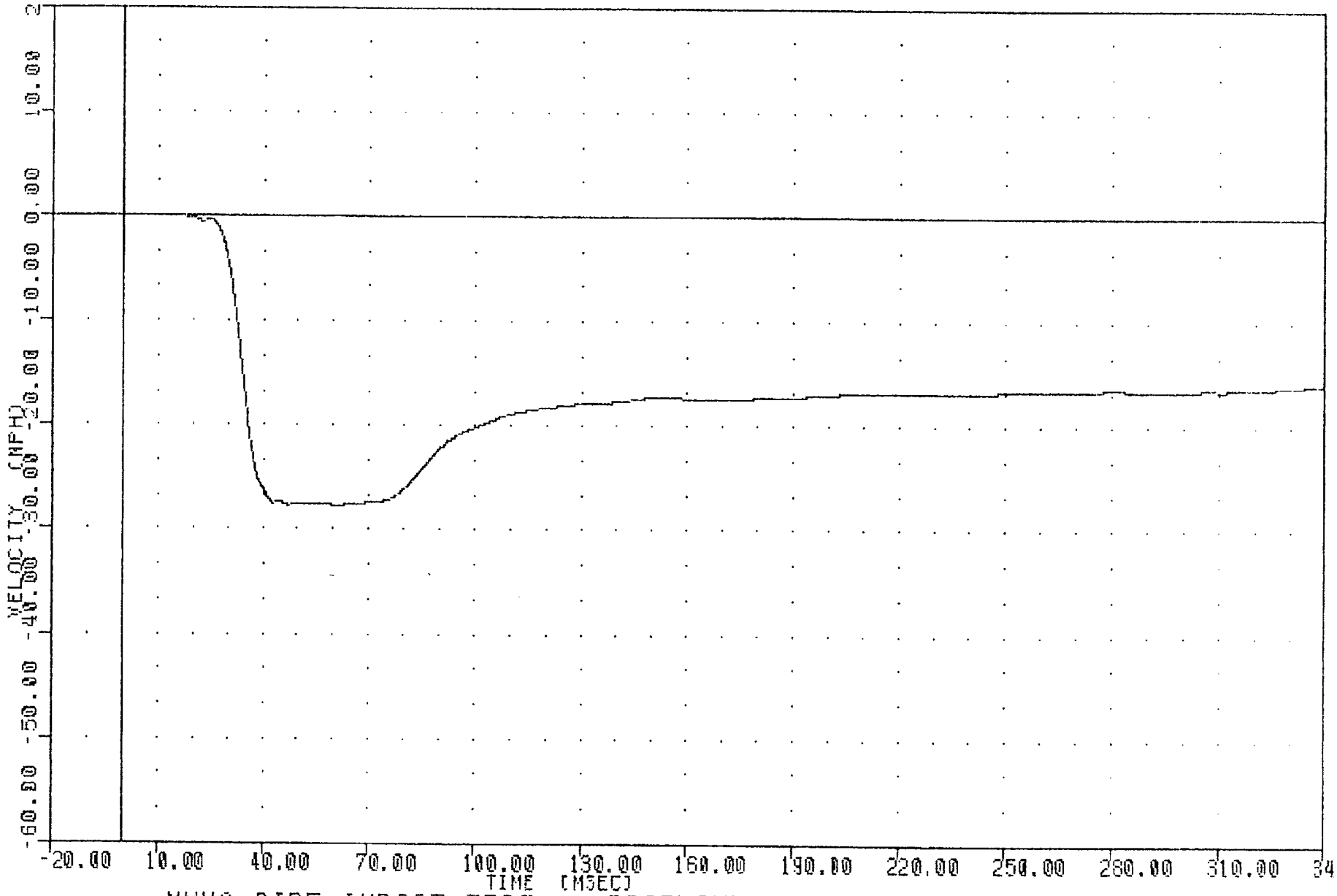
PASSENGER PELVIS ACCELERATION X AXIS



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

PASSENGER PELVIS RESULTANT ACCELERATION

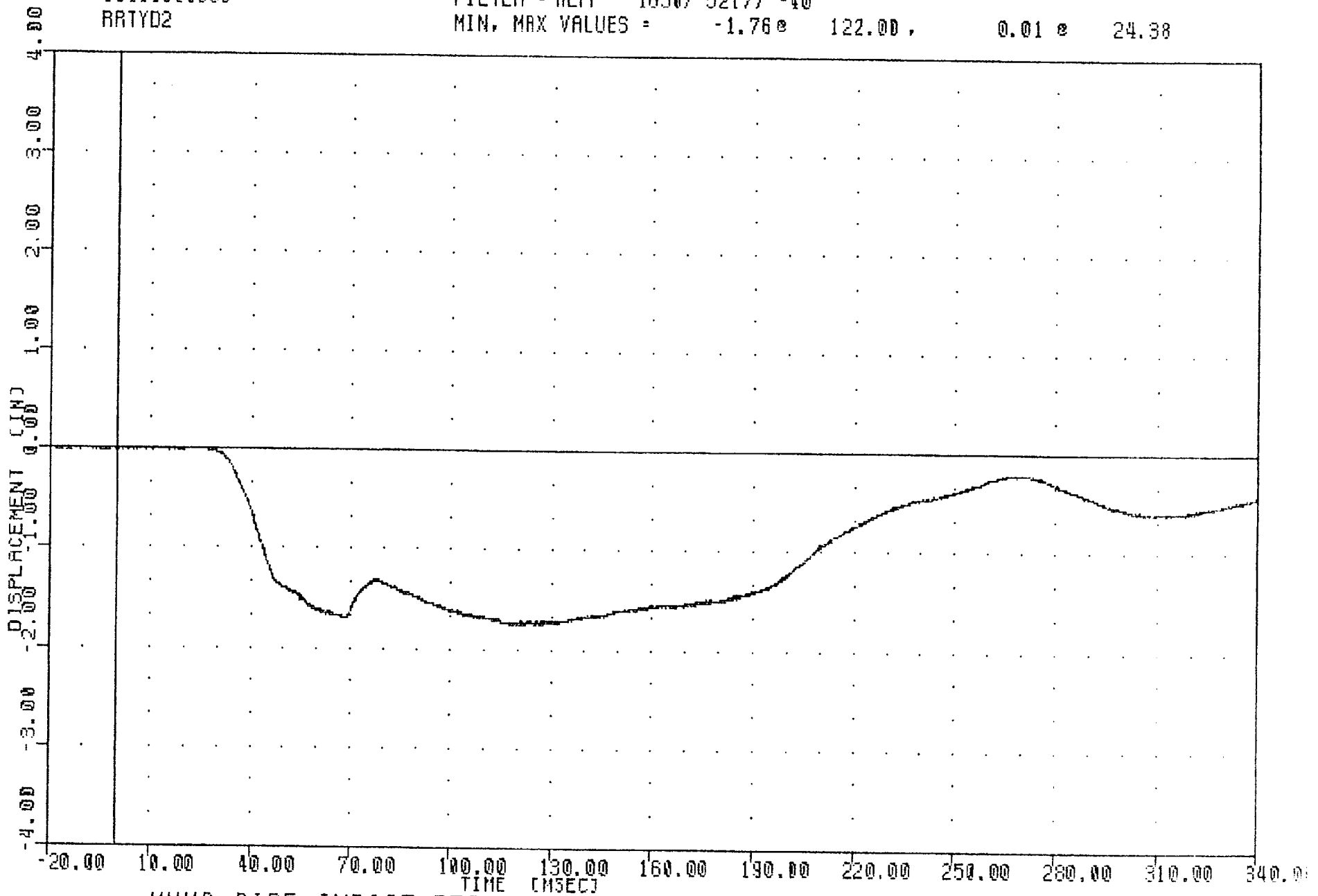
TRC . 850617 PLOT DATE 20-JUN-85 14:49:32
MVMA SIDE IMPACT TESTING
851680@@@@@ FILTER = BLPF 300/ 949/ -40
PEYYV2 MIN. MAX VALUES = -27.74@ 61.13 , 0.09 @ 3.75



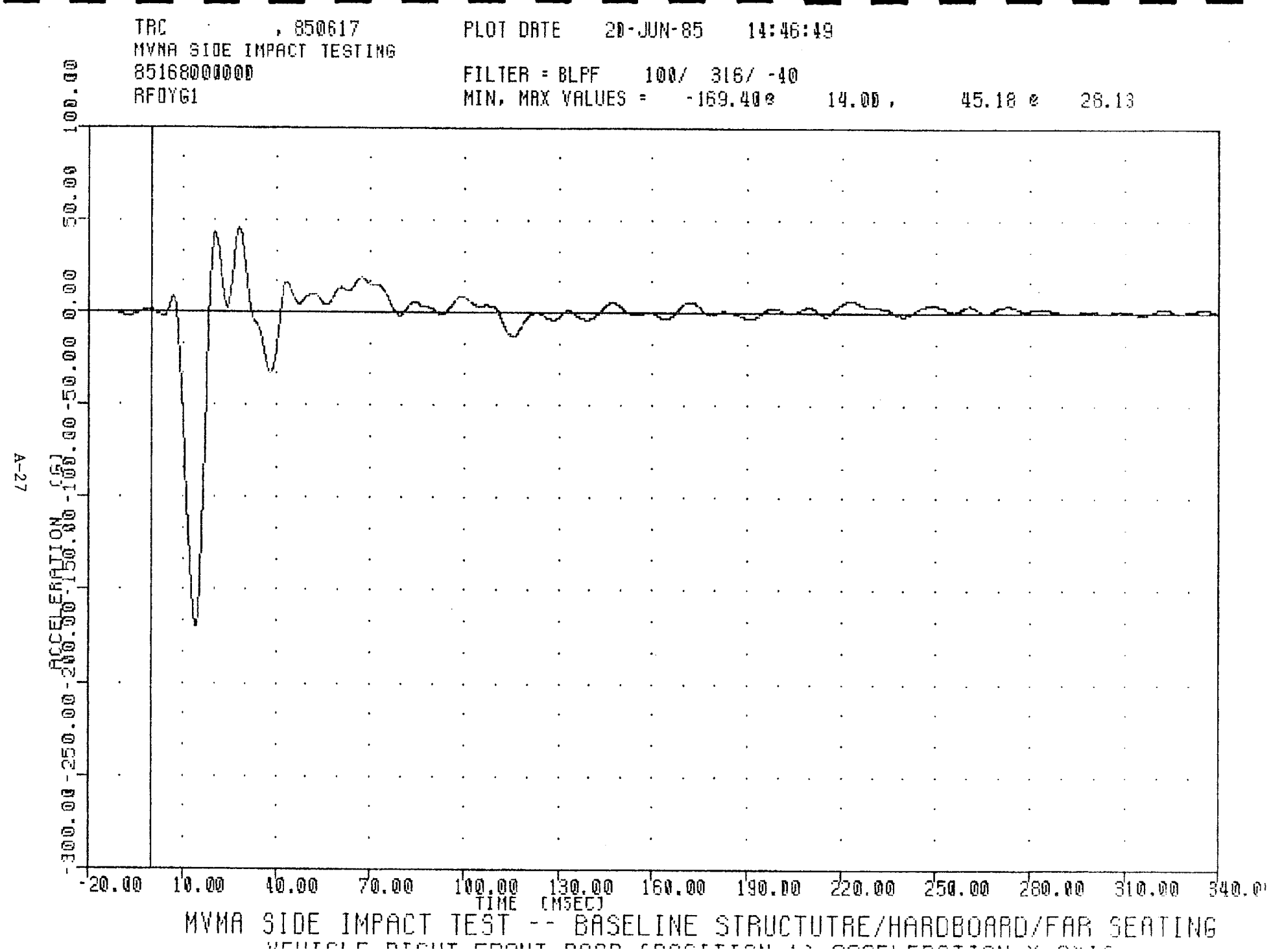
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING

PELVIS VELOCITY X AXIS

TRC , 850617 PLOT DATE 20-JUN-85 14:46:49
MVMA SIDE IMPACT TESTING
851680000D
RRTYD2
FILTER = ALPF 1650/ 5217/ -40
MIN, MAX VALUES = -1.76 @ 122.00 , 0.01 @ 24.38

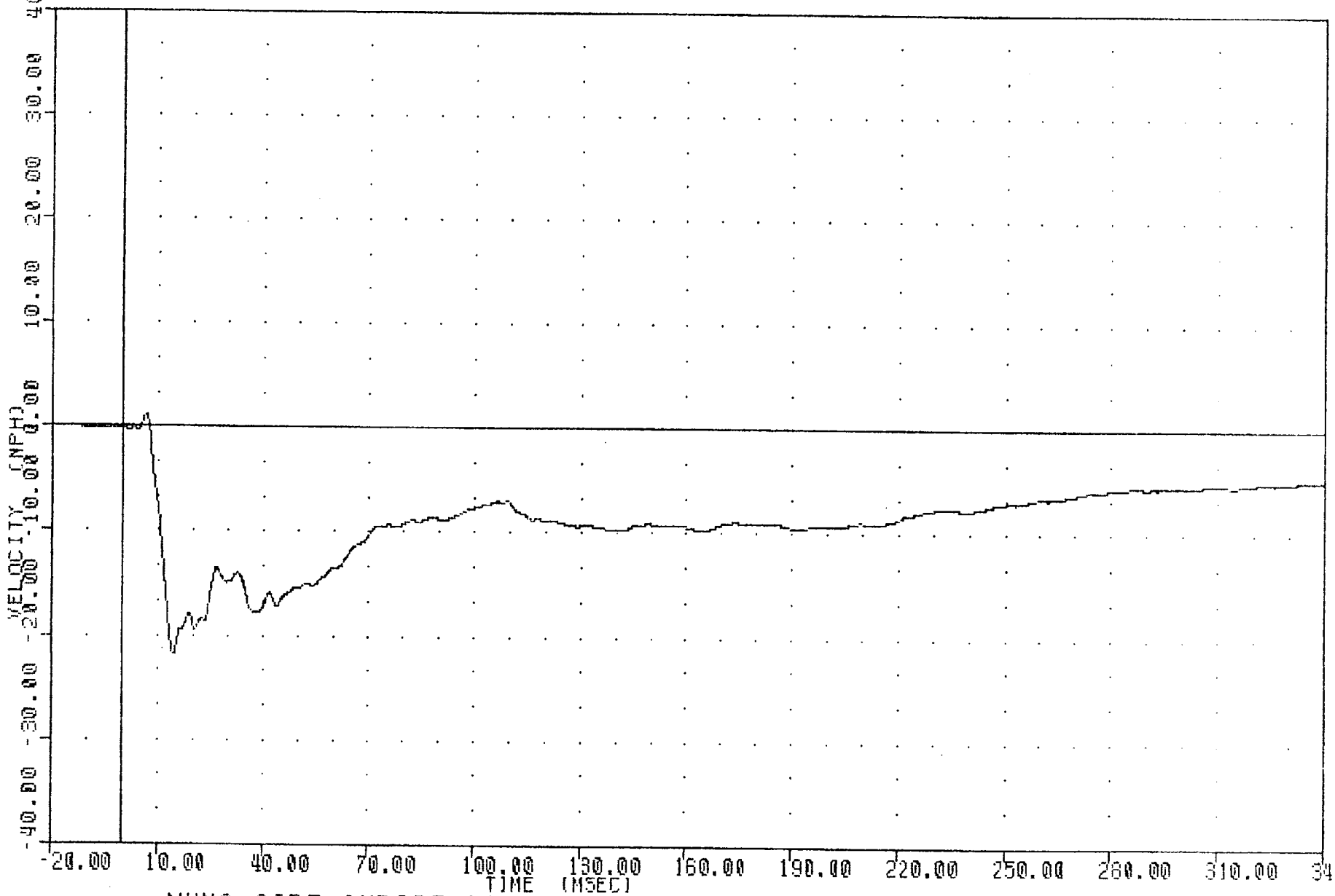


MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
PASSENGER RIGHT RIB TO SPINE DISPLACEMENT INCHES



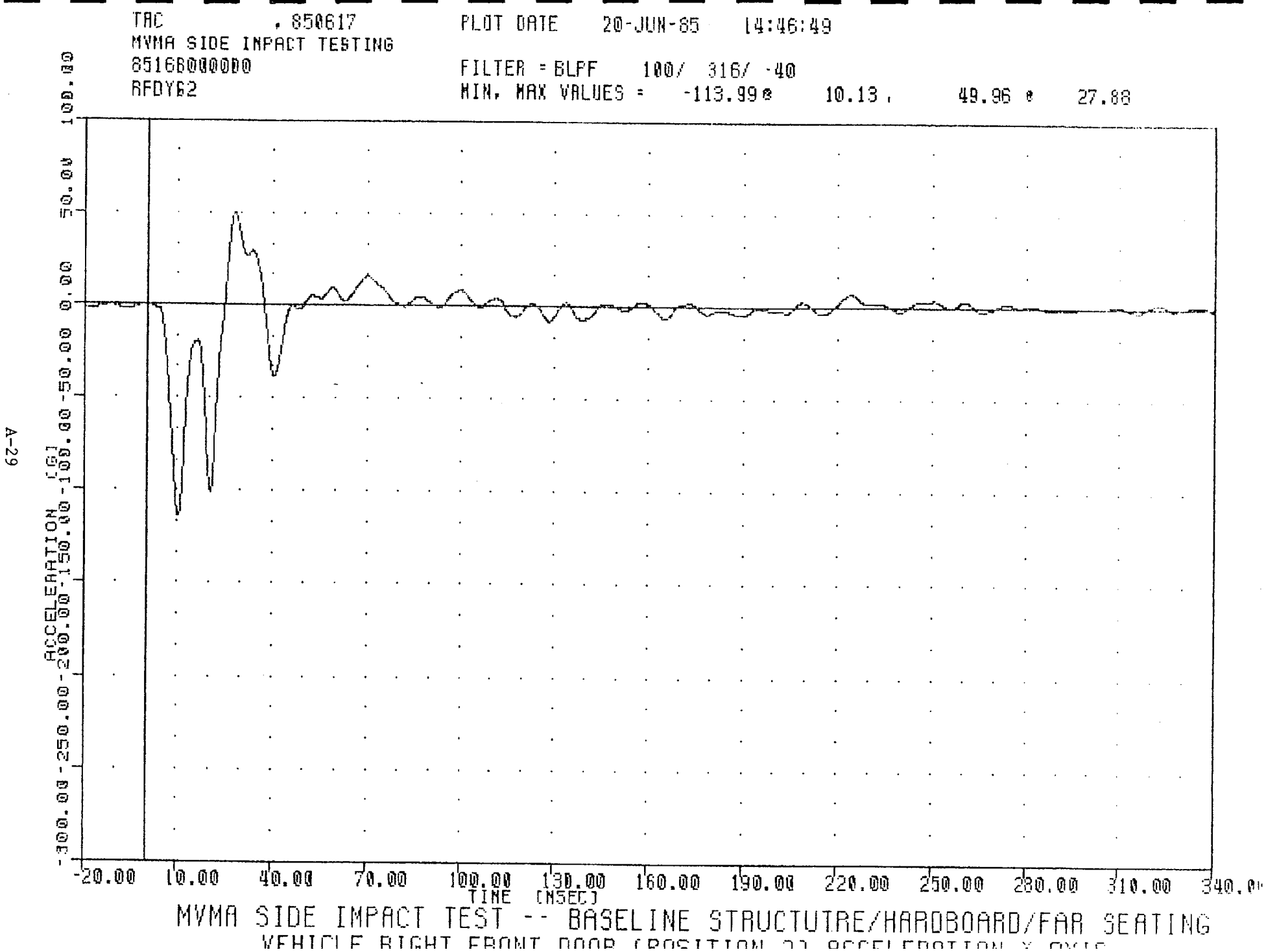
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING

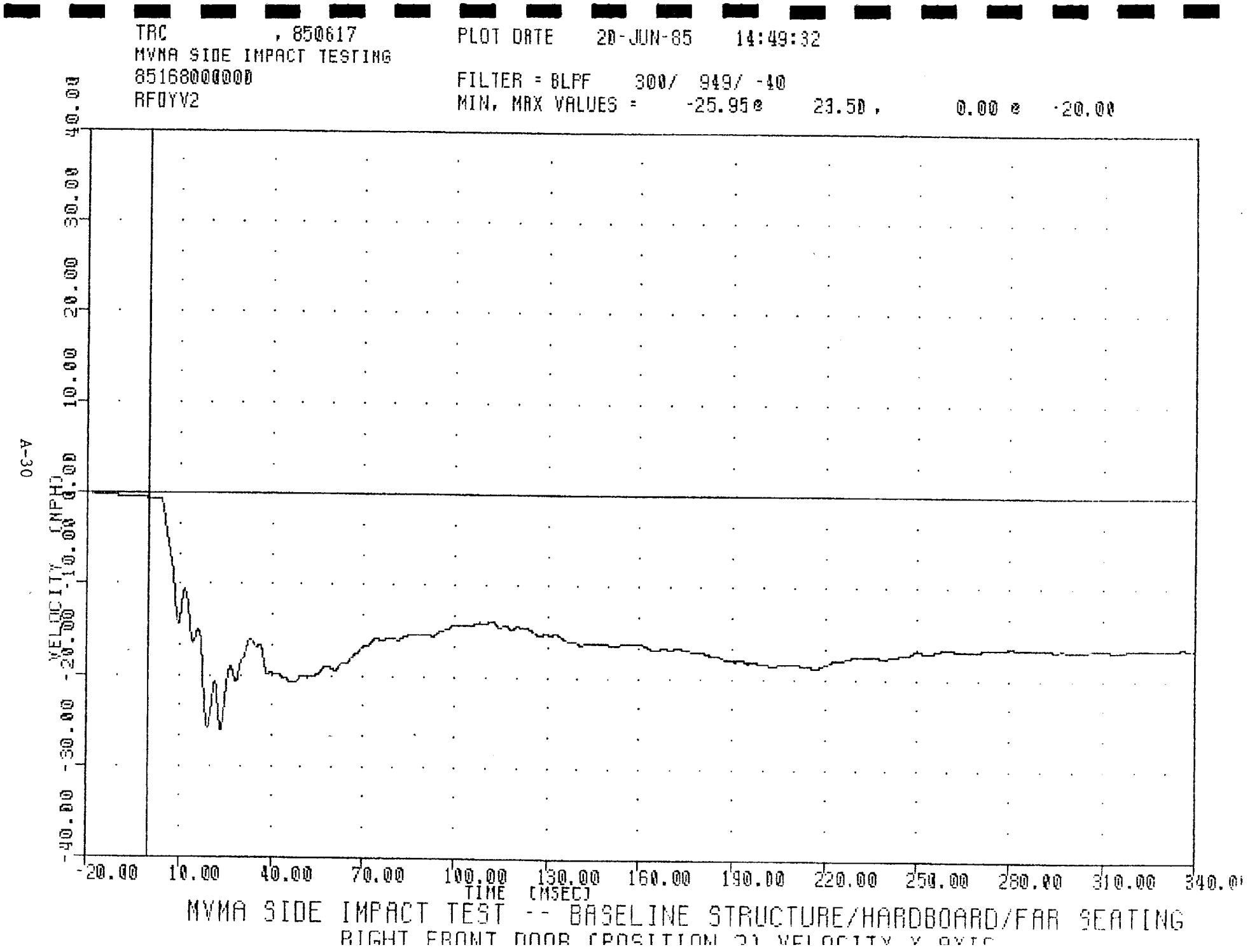
TRC , 850617 PLOT DATE 20-JUN-85 14:49:32
NVMA SIDE IMPACT TESTING
851680000000 FILTER = BLPF 300/ 949/ -40
RFDYV1 MIN, MAX VALUES = -21.89 @ 14.38 , 1.14 @ 6.50

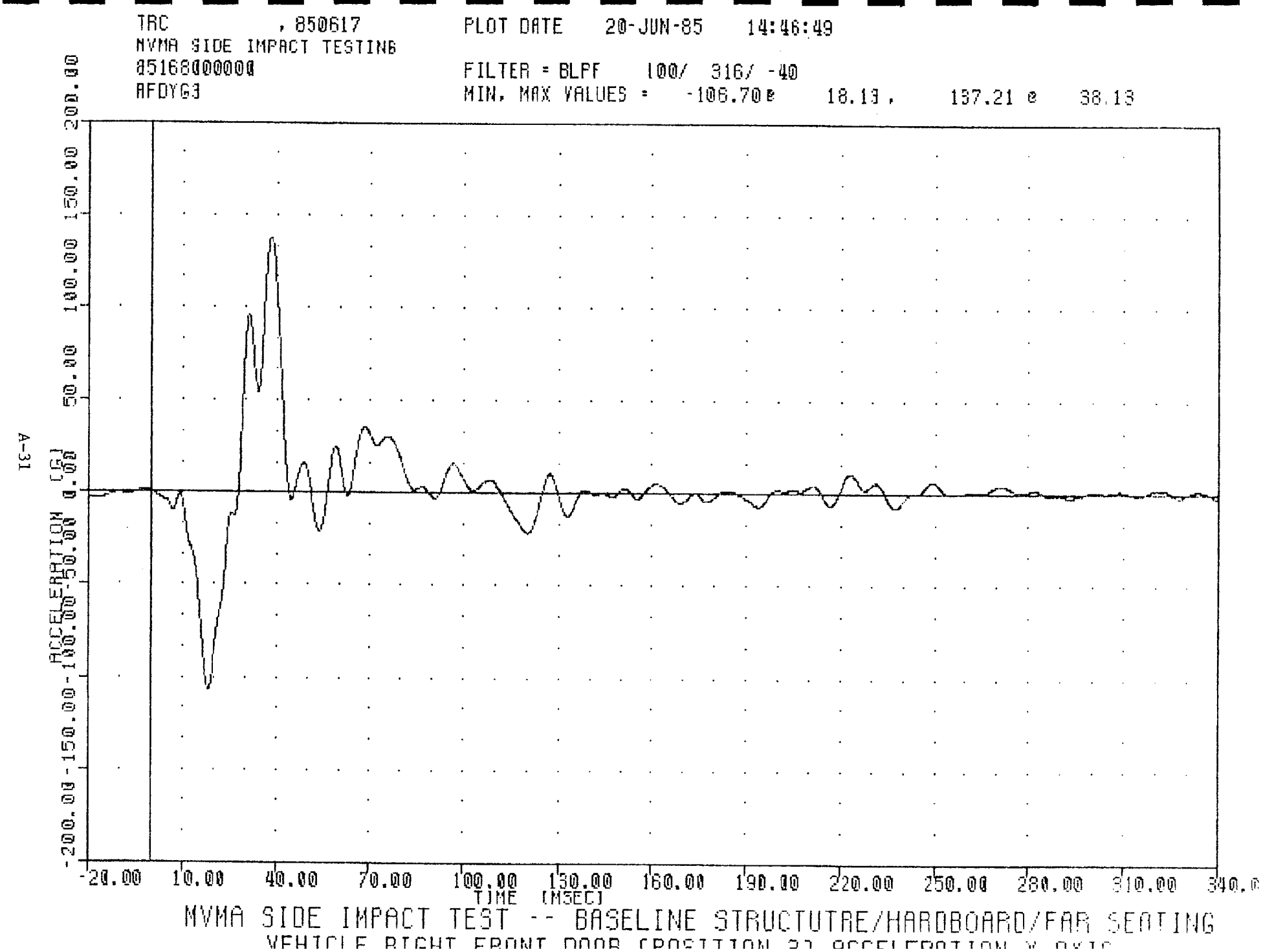


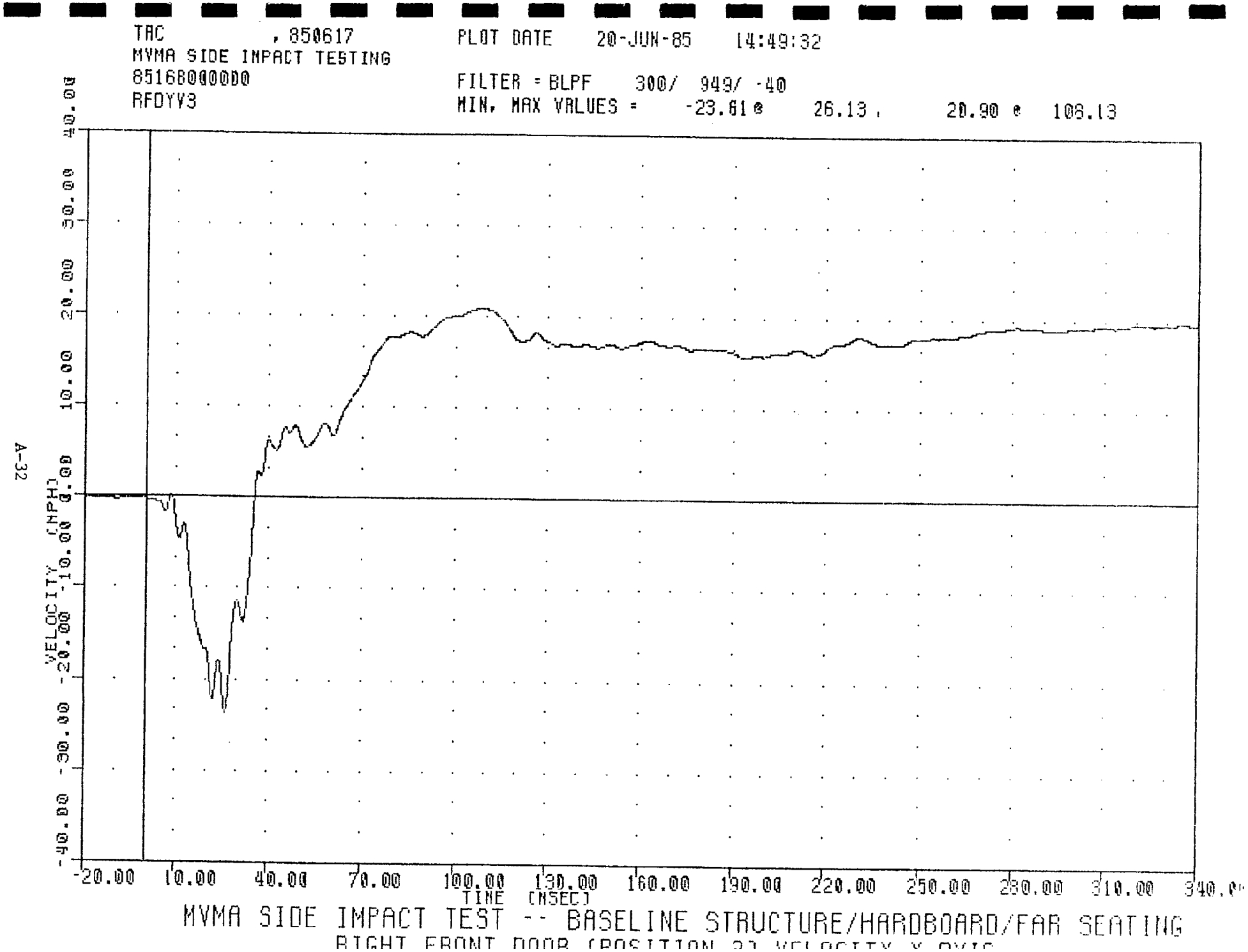
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING

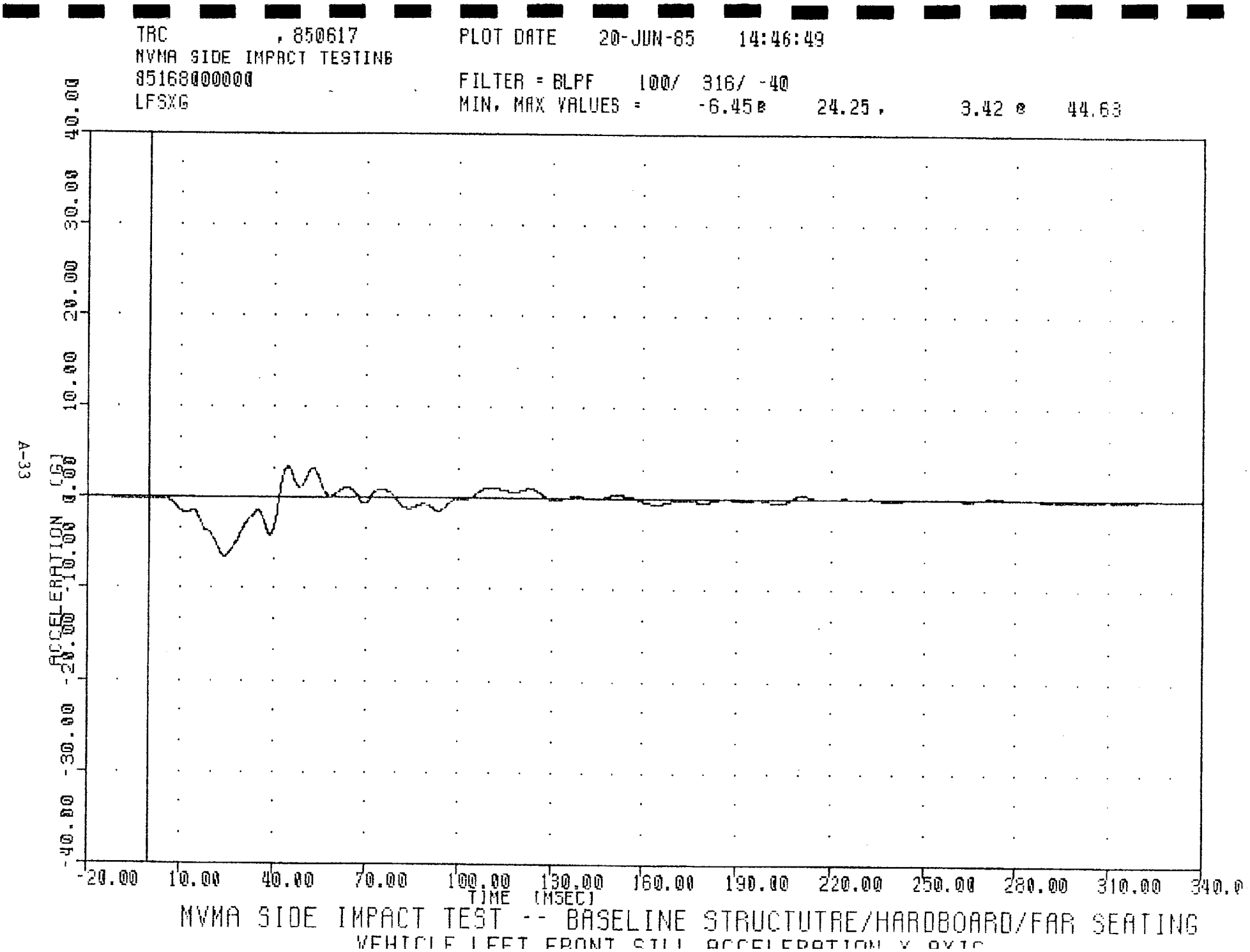
RIGHT FRONT DOOR ACCELERATION (G) VELOCITY X AXIS


TAC . 850617
PLOT DATE 20-JUN-85 14:46:49
MVMA SIDE IMPACT TESTING
85168000000
FILTER = BLPF 100/ 316/ -40
RFDY62
MIN, MAX VALUES = -113.99 @ 10.13 , 49.96 @ 27.88
ACCELERATION (G)
100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
-250.00
-300.00
-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 -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
VEHICLE RIGHT FRONT DOOR (POSITION 2) ACCELERATION X AXIS

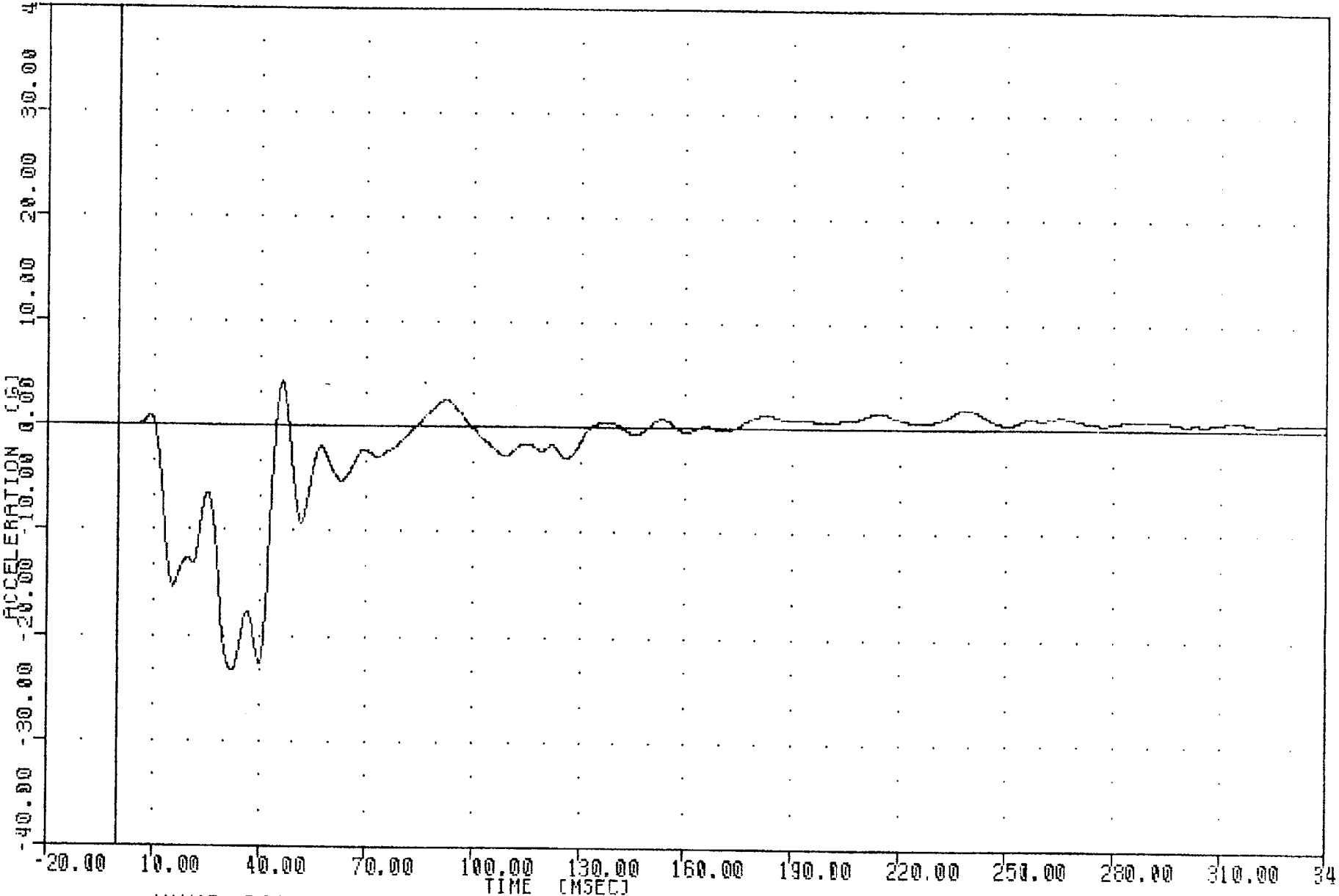

TRC , 850617
PLOT DATE 20-JUN-85 14:49:32
MVMA SIDE IMPACT TESTING
85168000000
FILTER = BLPF 300/ 949/ -40
RFDYV2
MIN, MAX VALUES = -25.95 @ 23.50 , 0.00 @ -20.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
VELOCITY (MPH)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
RIGHT FRONT DOOR (POSITION 2) VELOCITY X AXIS


TRC , 850617
PLOT DATE 20-JUN-85 14:46:49
NVMA SIDE IMPACT TESTING
851680000000
FILTER = BLPF 100/ 316/ -40
RFDYG3
MIN, MAX VALUES = -106.70 @ 18.13 , 137.21 @ 38.13
ACCELERATION (G)
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
NVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
VEHICLE RIGHT FRONT DOOR (POSITION 2) ACCELERATION Y AXIS


TAC , 850617
MVMA SIDE IMPACT TESTING
851680000D0
RFOYV3
PLOT DATE 20-JUN-85 14:49:32
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -23.61 @ 26.13 , 20.90 @ 108.13
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
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)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
RIGHT FRONT DOOR (POSITION 2) VELOCITY X AXIS

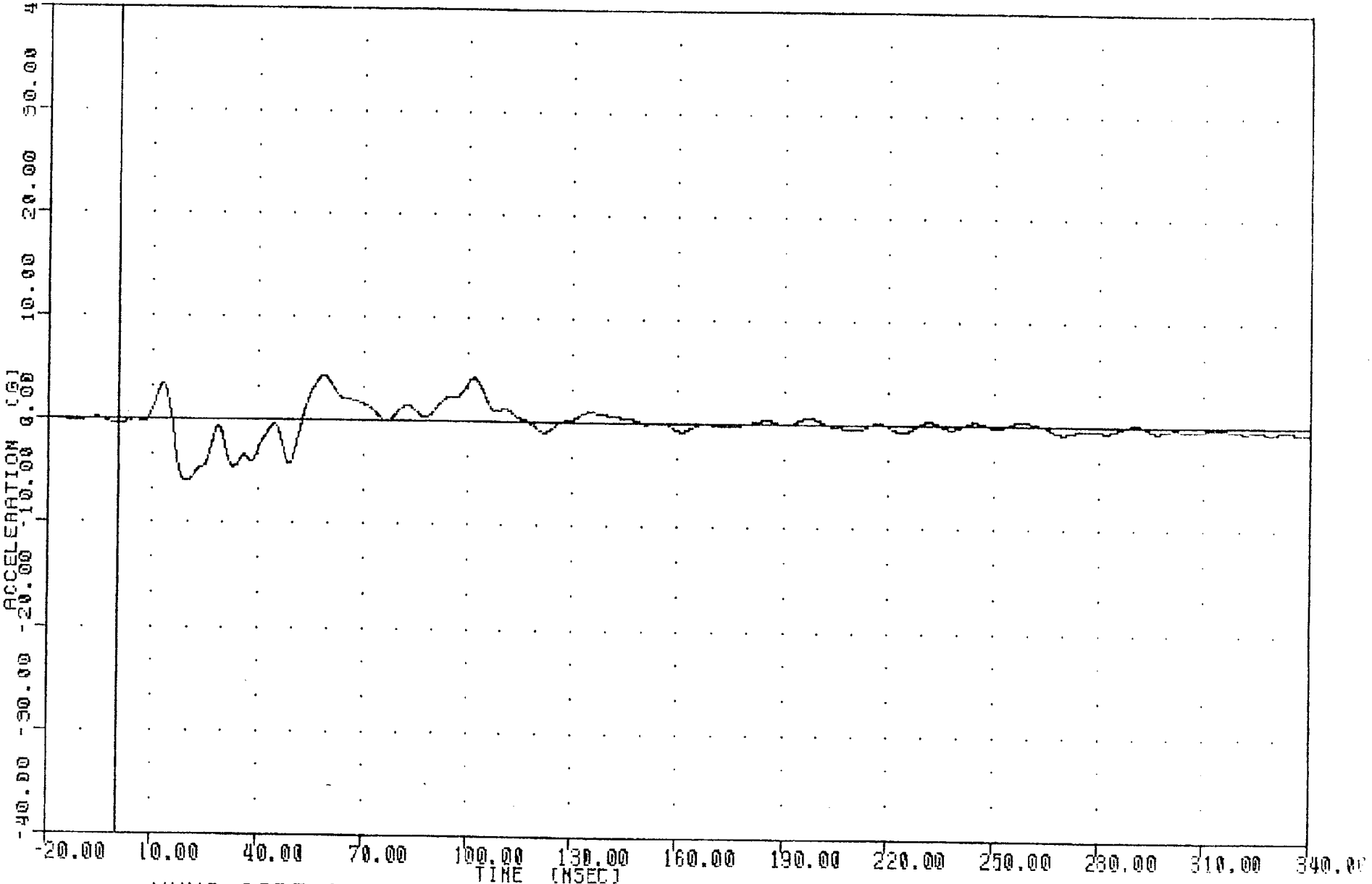

TRC , 850617
PLOT DATE 20-JUN-85 14:46:49
NVMA SIDE IMPACT TESTING
851680000000
FILTER = BLPF 100/ 316/ -40
LFSXG
MIN, MAX VALUES = -6.45 @ 24.25 , 3.42 @ 44.63
ACCELERATION (G)
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.0
TIME (MSEC)
NVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
VEHICLE LEFT FRONT SILL ACCELERATION X AXIS

TRC , 850617 PLOT DATE 20-JUN-85 14:46:49
MVMA SIDE IMPACT TESTING
851680@@@@D FILTER = BLPF 100/ 316/ -40
LFSYG MIN, MAX VALUES = -23.31@ 32.25 , 4.20 @ 46.63

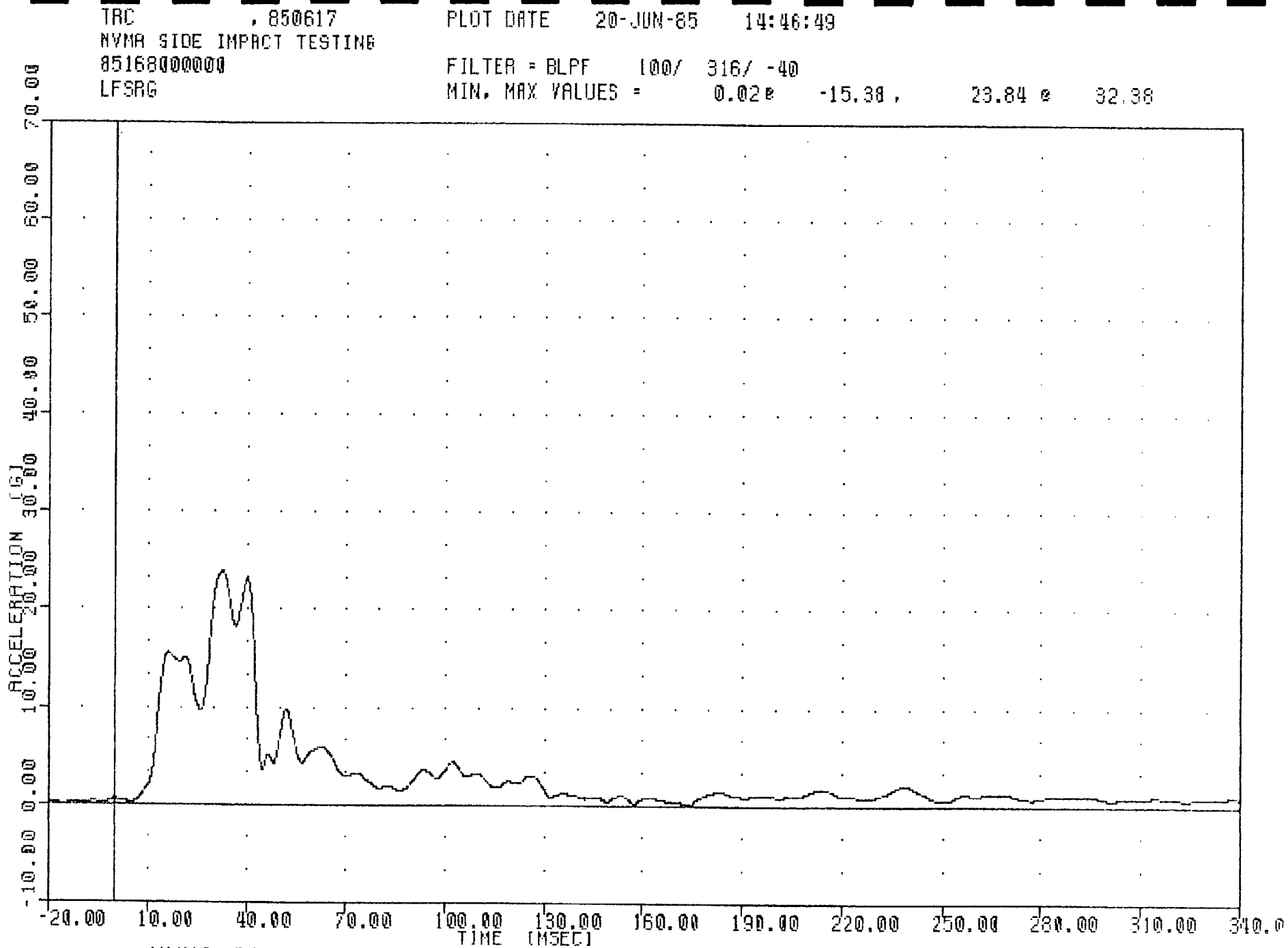


MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
VEHICLE LEFT FRONT SILL ACCELERATION X AXIS

TRC , 850617 PLOT DATE 20-JUN-85 14:46:49
MVMA SIDE IMPACT TESTING
851680000000 FILTER = BLPF 100/ 316/ -40
LFSZ6 MIN, MAX VALUES = -5.95@ 18.88 , 4.39 @ 58.75



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



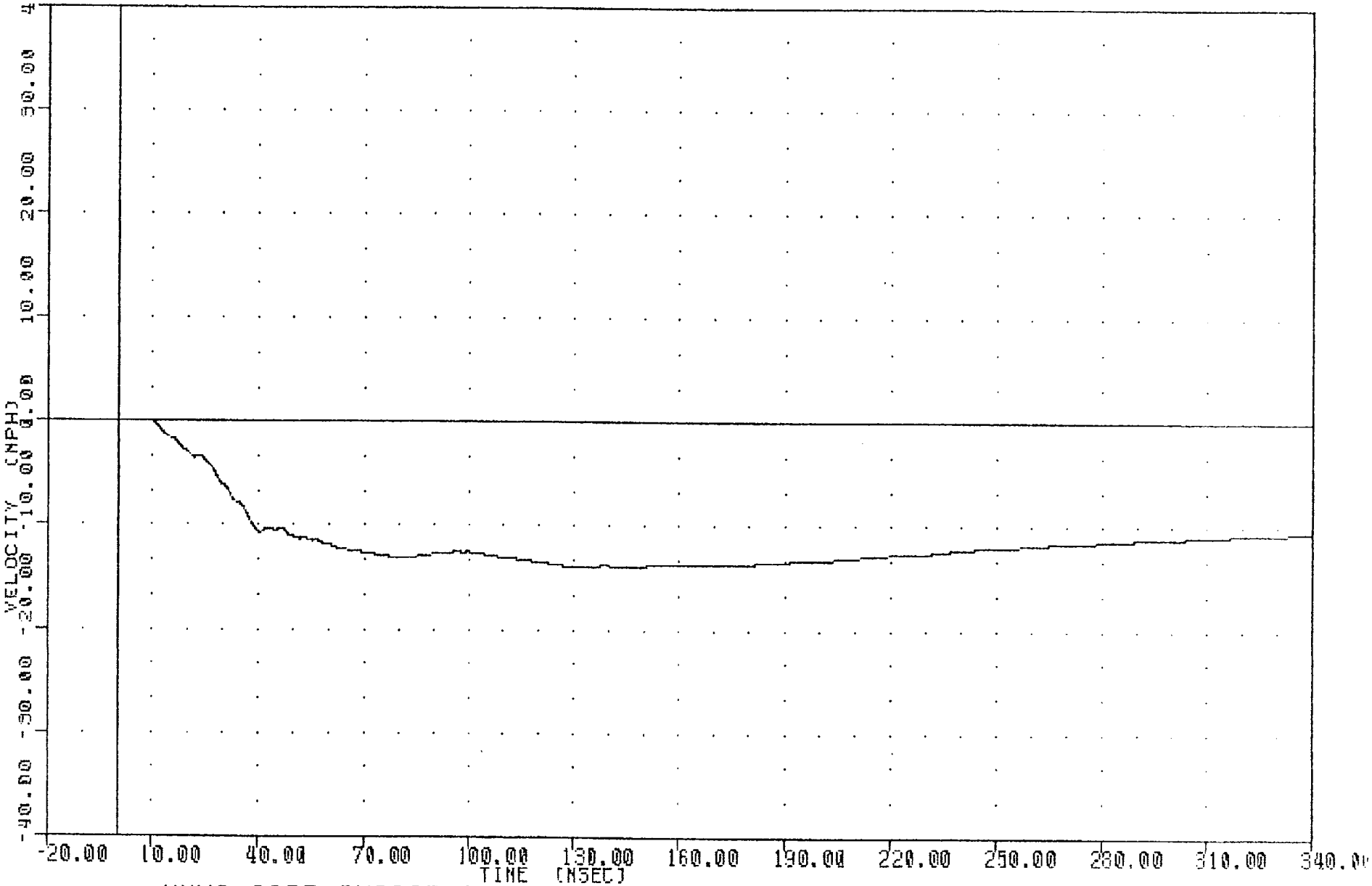
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
VEHICLE LEFT FRONT SILL RESULTANT

TRC , 850617 PLOT DATE 20-JUN-85 14:49:32

MVMA SIDE IMPACT TESTING

851680000D0 FILTER = BLPF 300/ 949/ -40

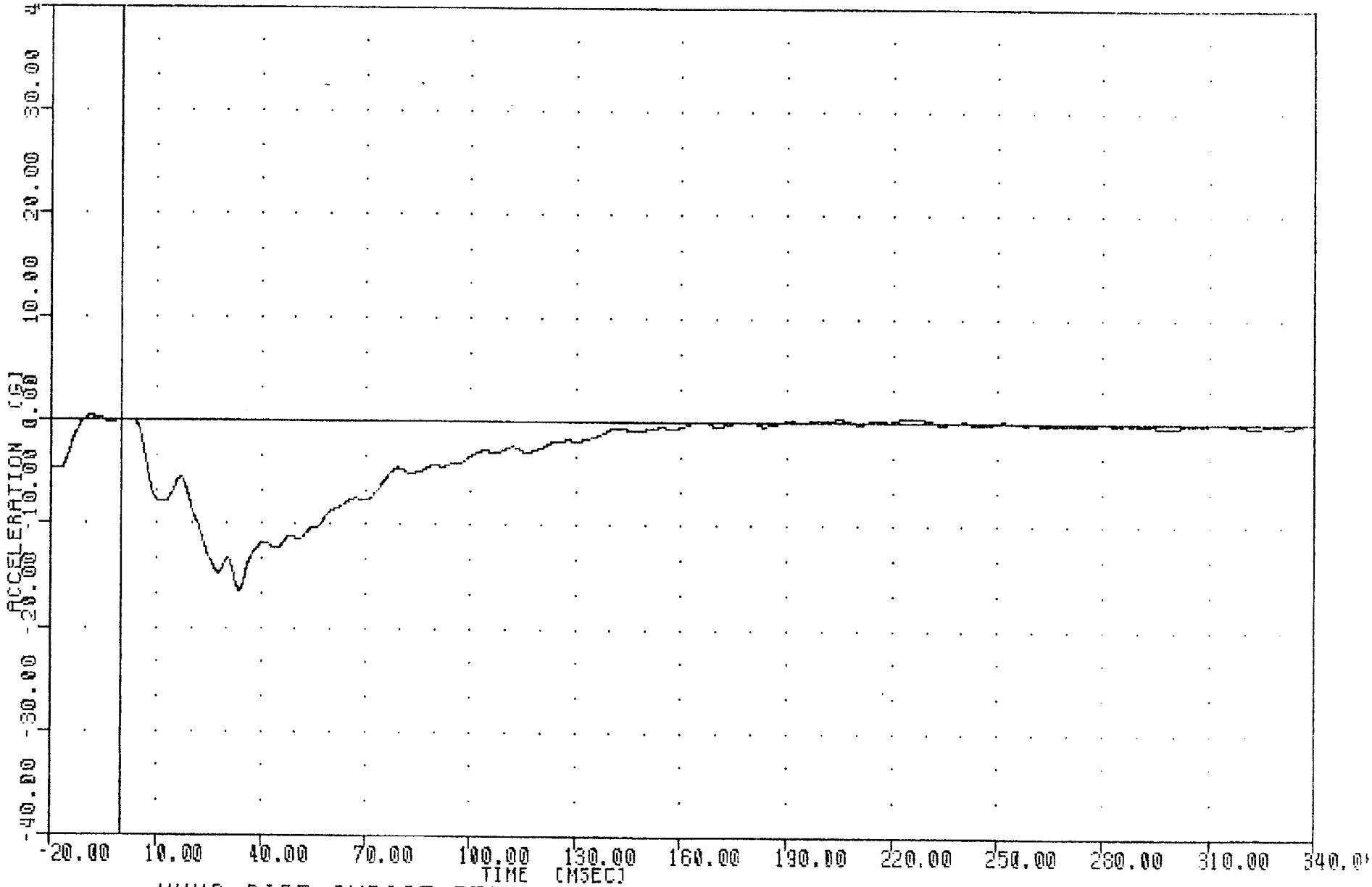
LFSYV MIN, MAX VALUES = -13.90 @ 145.38 , 0.14 @ 8.75



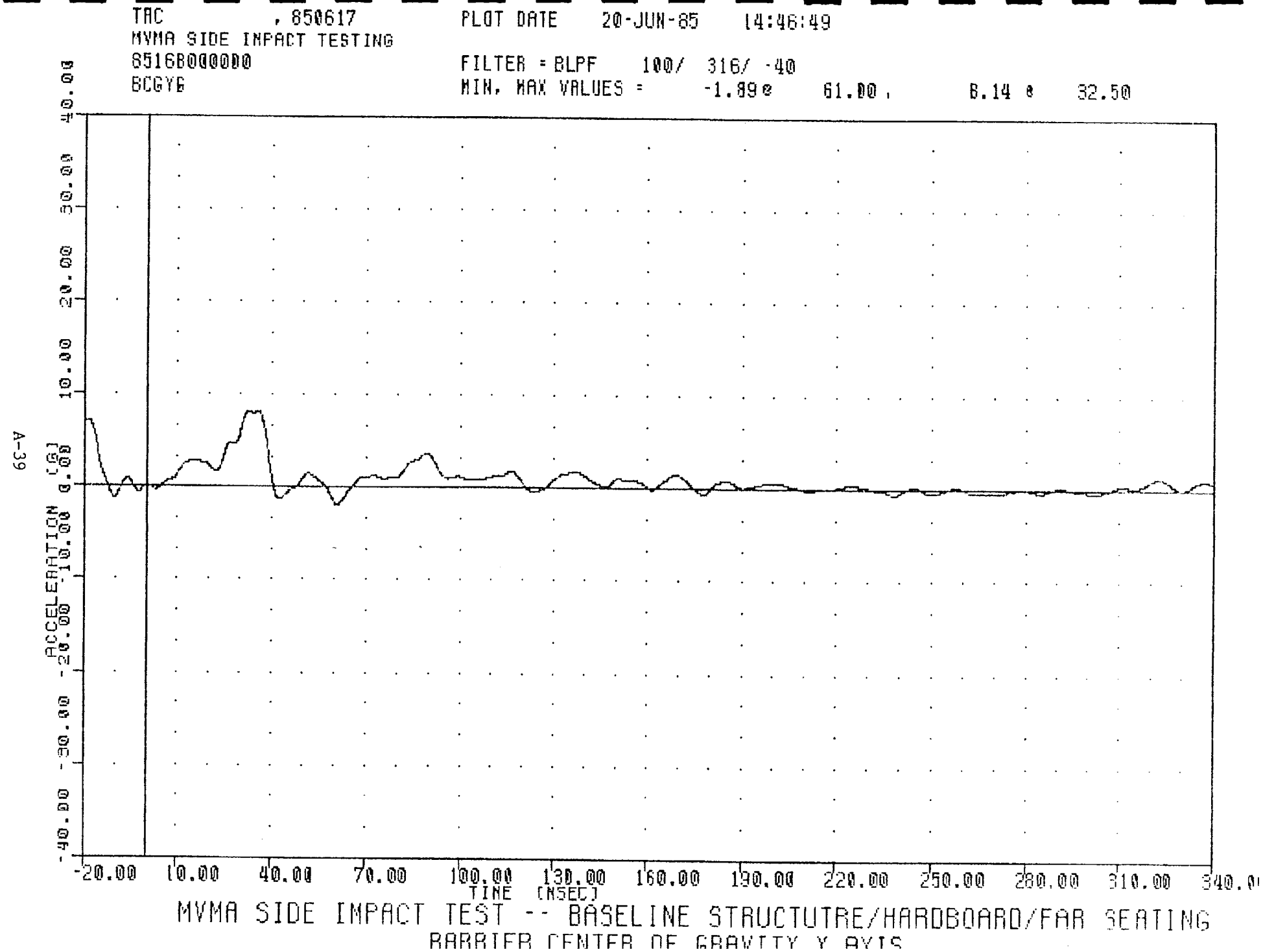
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING

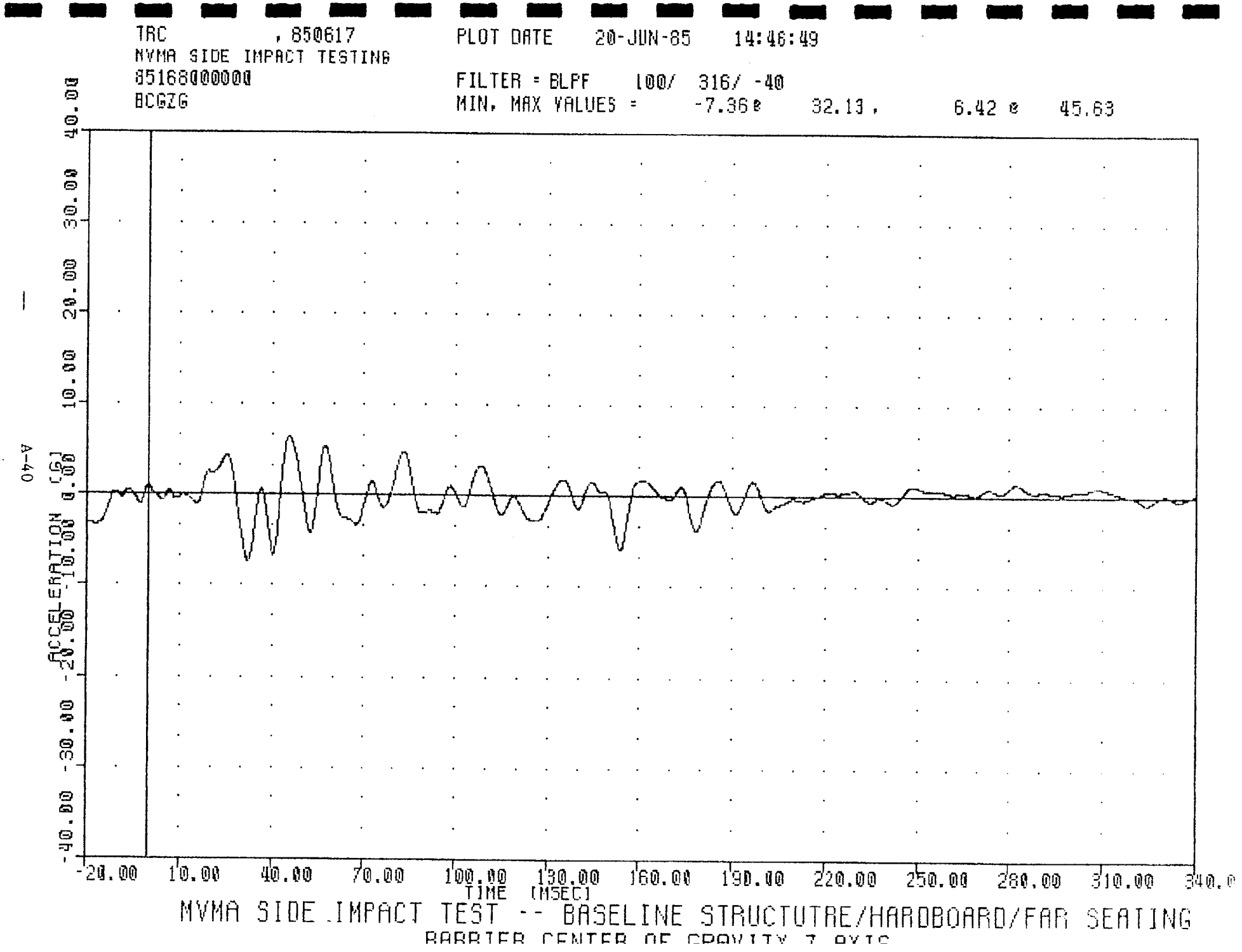
LEFT FRONT SILL VELOCITY Y AXIS

TRC , 850617 PLOT DATE 20-JUN-85 14:46:49
MVMA SIDE IMPACT TESTING
851680000000
BCGXG
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -16.45 @ 33.75 , 0.53 @ 224.13

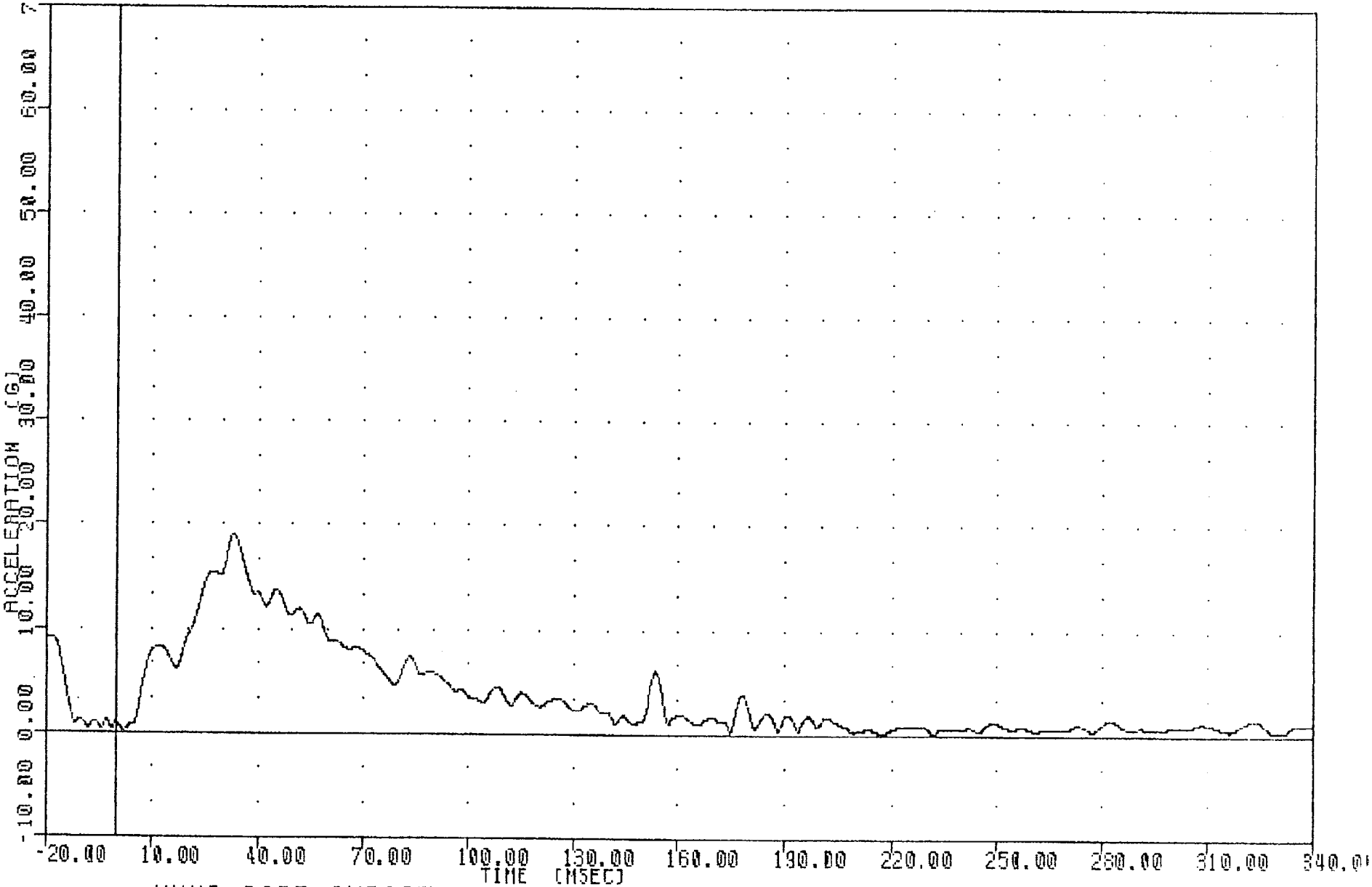


MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY X AXIS


TRC , 850617
MVMA SIDE IMPACT TESTING
8516B0000000
BCGYB
PLOT DATE 20-JUN-85 14:46:49
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -1.89 @ 61.00 , 8.14 @ 32.50
ACCELERATION (G)
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 -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY Y AXIS

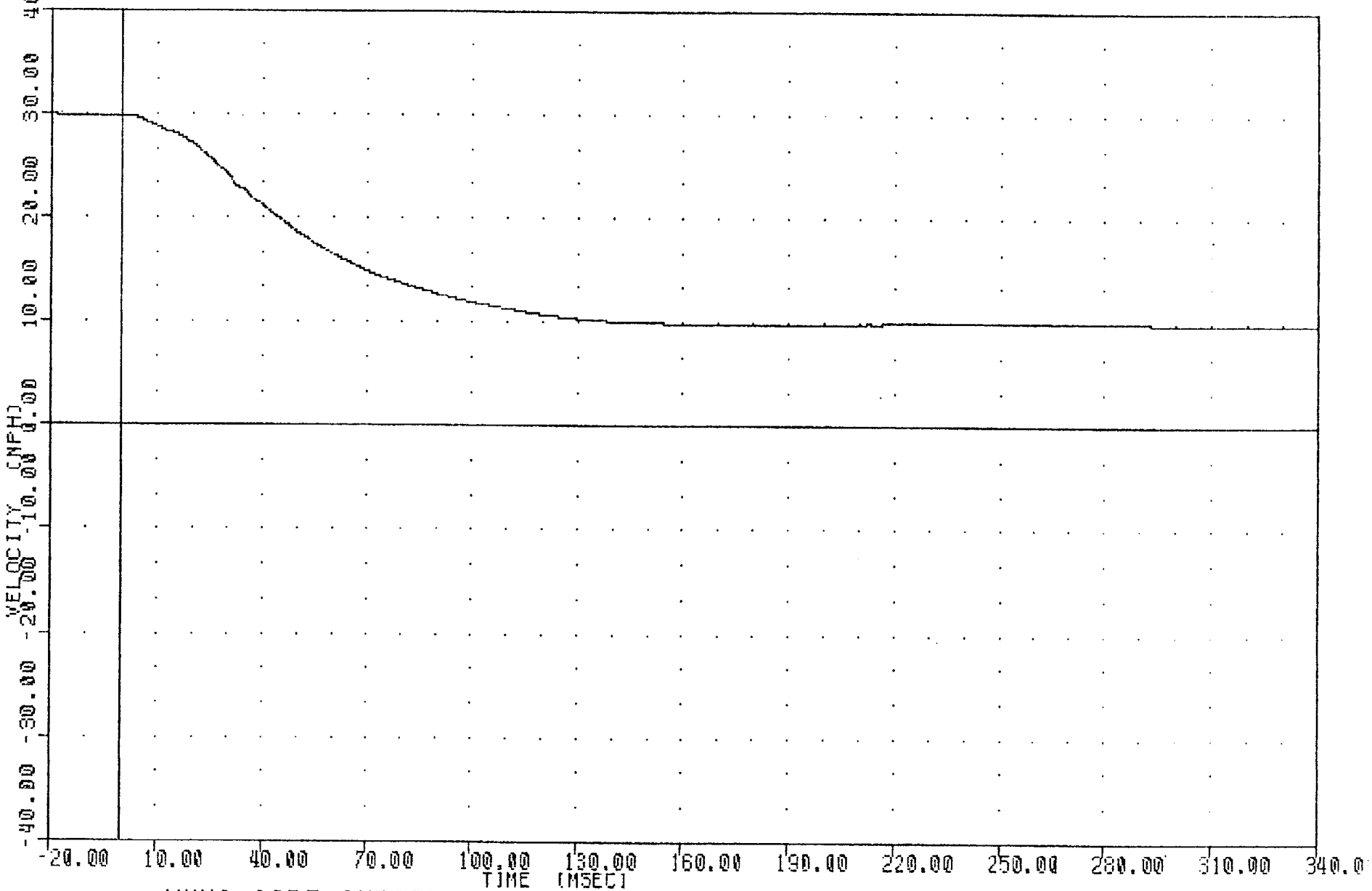

TRC , 850617
PLOT DATE 20-JUN-85 14:46:49
NVMA SIDE IMPACT TESTING
851680@0000
FILTER = BLPF 100/ 316/ -40
BCGZG
MIN, MAX VALUES = -7.36 @ 32.13 , 6.42 @ 45.63
ACCELERATION [G]
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.0
TIME [MSEC]
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY Z AXIS

TRC , 850617 PLOT DATE 20-JUN-85 14:46:49
MVMA SIDE IMPACT TESTING
85168000000 FILTER = BLPF 100/ 316/ -40
BCGRG MIN, MAX VALUES = 0.08@ 232.13 , 19.12 @ 33.13



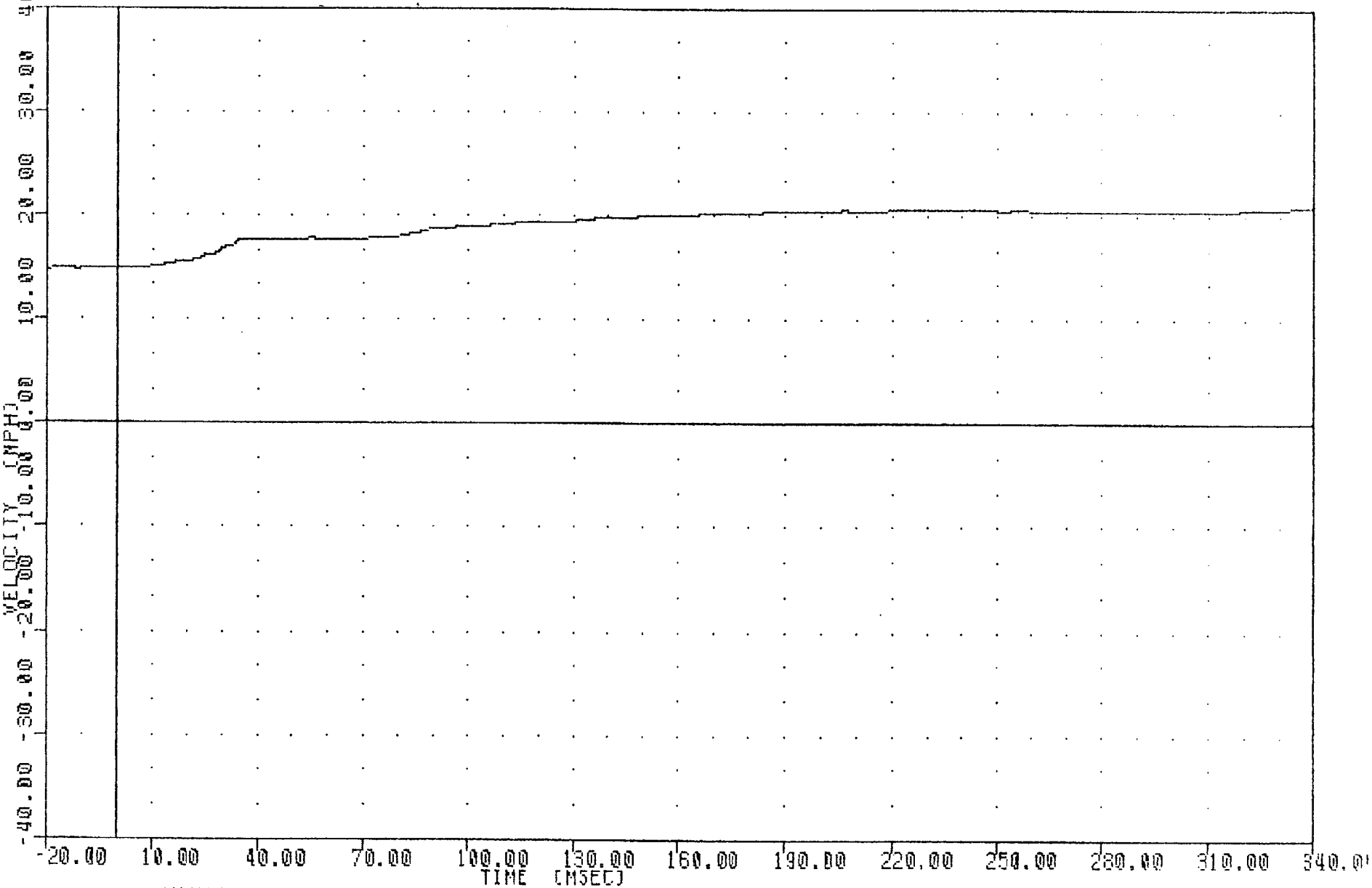
MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY RESULTANT ACCELERATION

TRC , 850617 PLOT DATE 20-JUN-85 14:49:32
MVMA SIDE IMPACT TESTING
85168000000 FILTER = BLPF 300/ 949/ -40
BCGXV MIN, MAX VALUES = 9.72 @ 335.13 , 30.00 @ -20.00

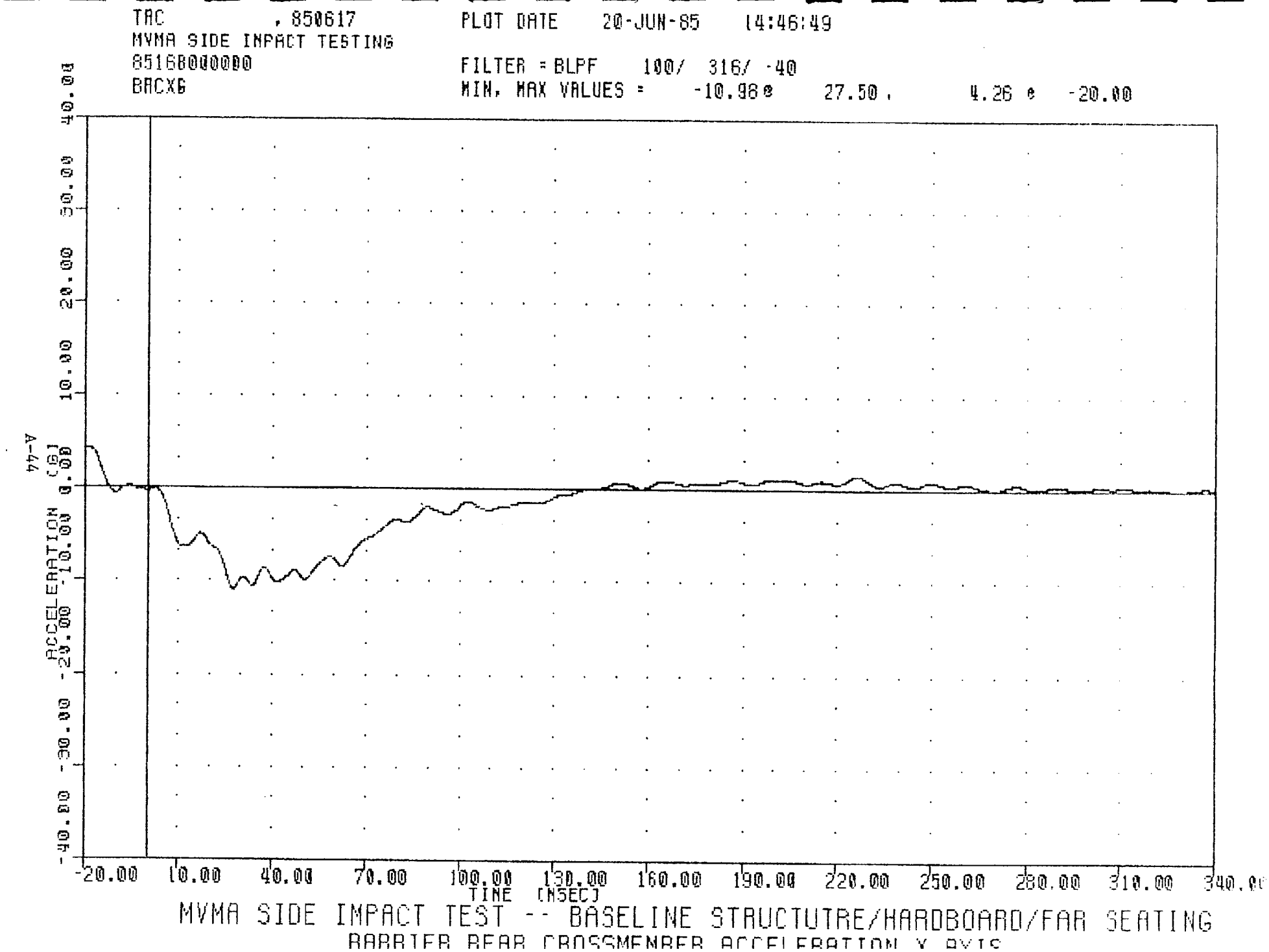


MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY VELOCITY X AXIS

TRC , 850617 PLOT DATE 20-JUN-85 14:49:32
MVMA SIDE IMPACT TESTING
85168000000 FILTER = BLPF 300/ 949/ -40
BCGYV MIN, MAX VALUES = 14.60 @ -20.00 , 20.85 @ 340.00

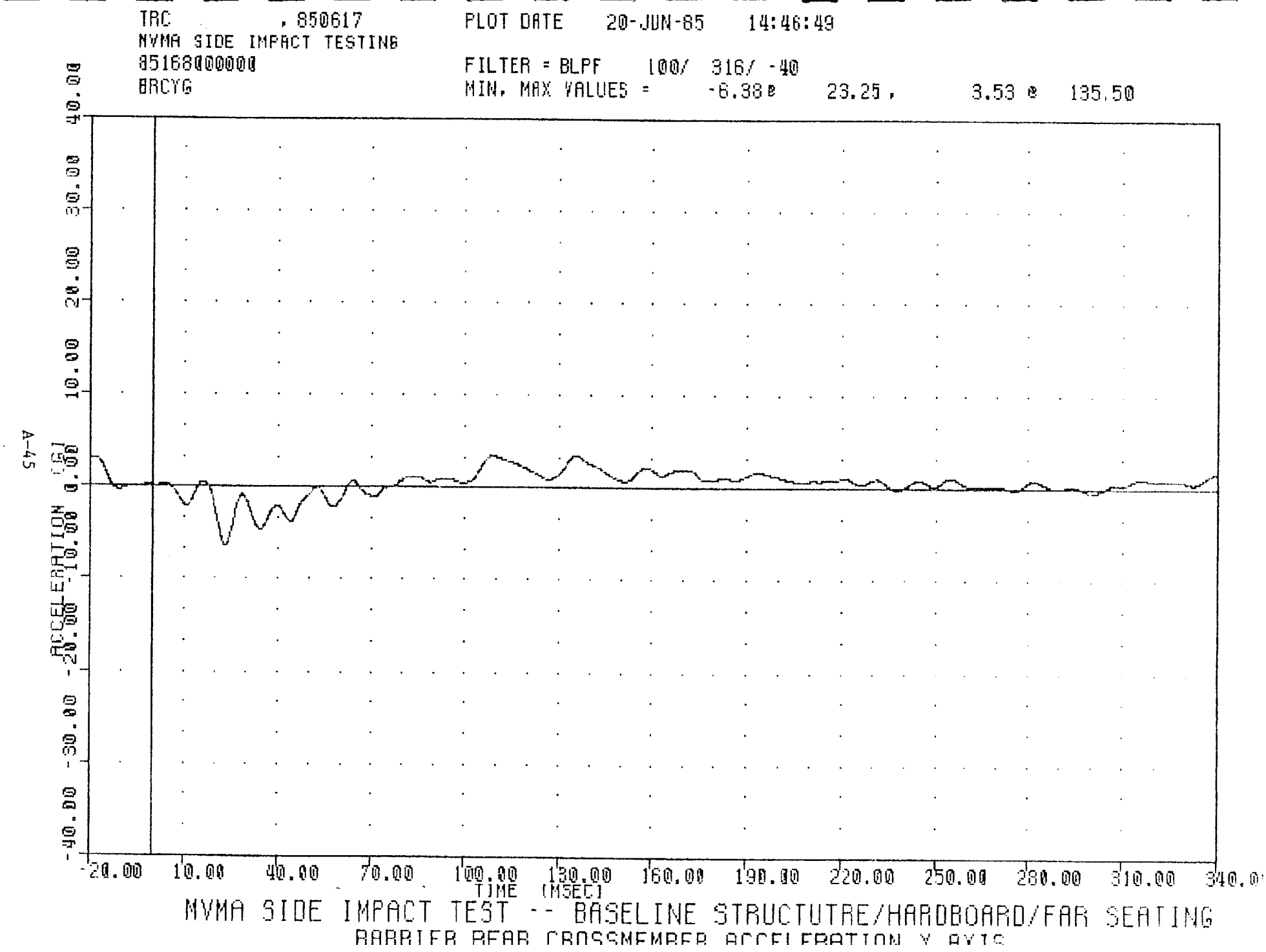


MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
BARRIER CENTER OF GRAVITY VELOCITY Y AXIS

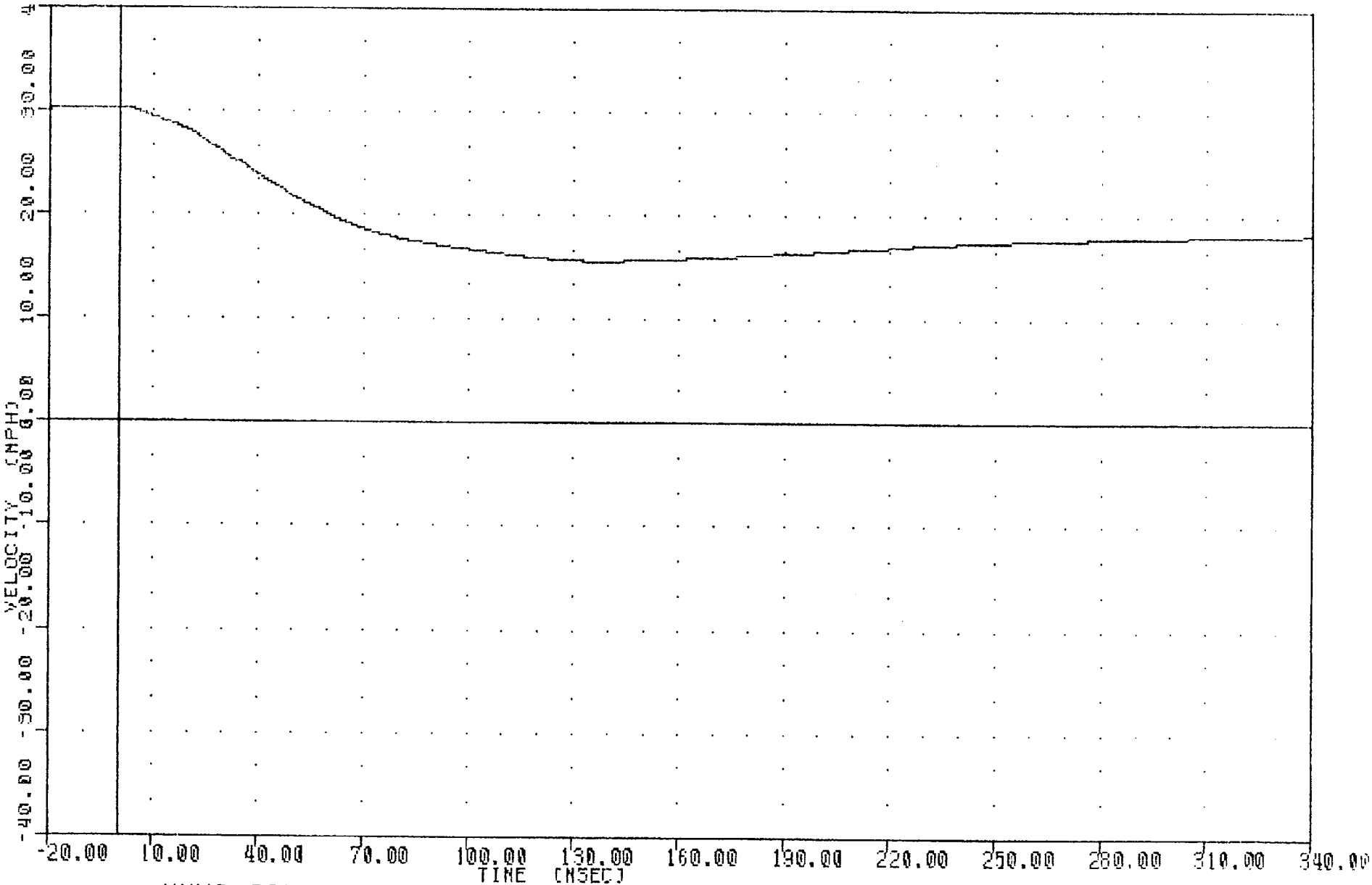


MVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING

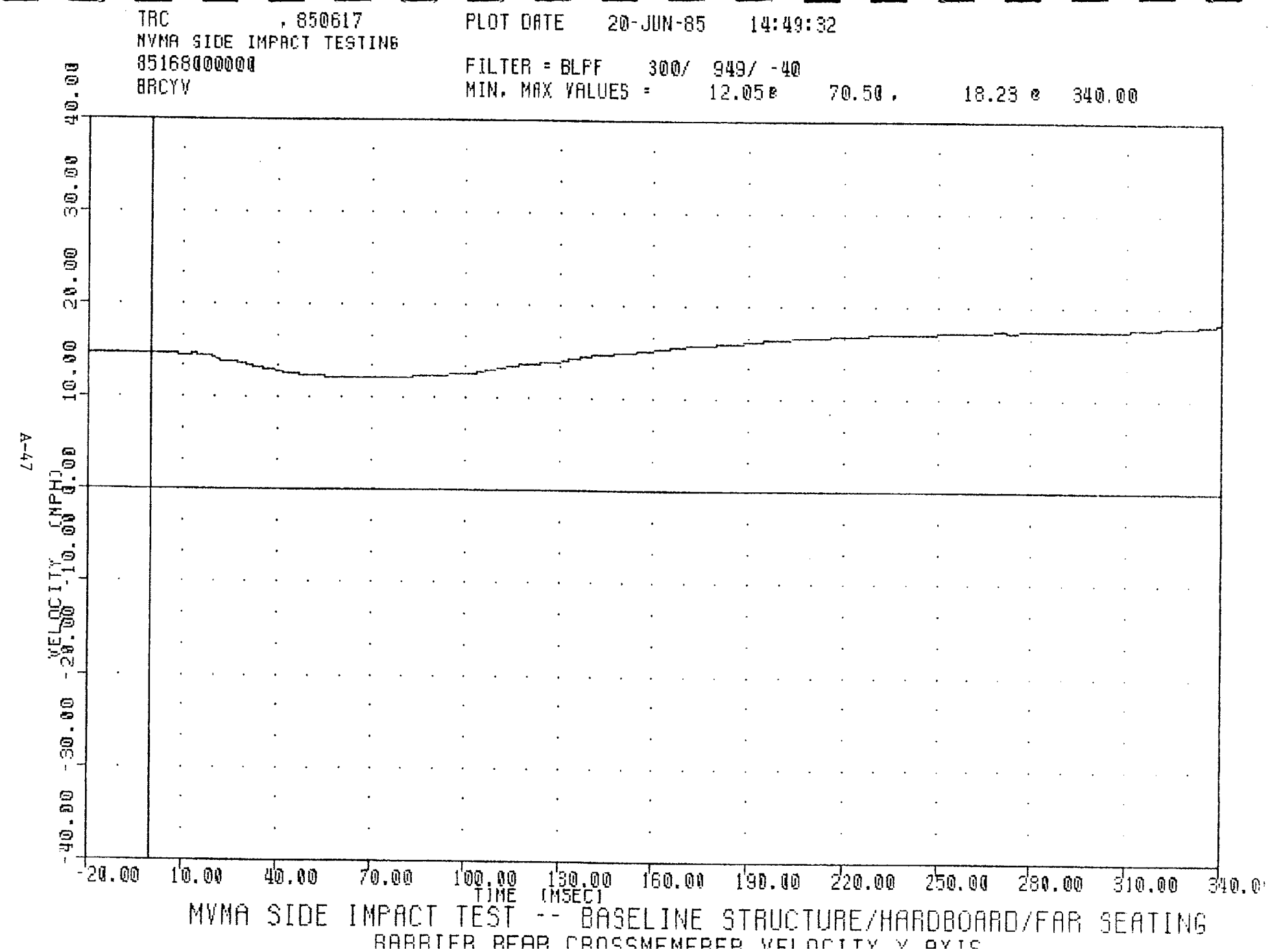
BARRIER REAR CROSSMEMBER ACCELERATION X AXIS


TRC , 850617
PLOT DATE 20-JUN-85 14:46:49
NVMA SIDE IMPACT TESTING
851680@0000
FILTER = BLPF 100/ 316/ -40
BRCYG
MIN, MAX VALUES = -6.38 @ 23.25 , 3.53 @ 135.50
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)
NVMA SIDE IMPACT TEST -- BASELINE STRUCTUTRE/HARDBOARD/FAR SEATING
BARRIER REAR CROSSMEMBER ACCELERATION Y AXIS

TRC , 850617 PLOT DATE 20-JUN-85 14:49:32
MVMA SIDE IMPACT TESTING
85168000000 FILTER = BLPF 300/ 949/ -40
BACXV MIN, MAX VALUES = 15.62 @ 135.63 , 30.22 @ -7.75



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


TRC , 850617
NVMA SIDE IMPACT TESTING
851680000000
BRCYV
PLOT DATE 20-JUN-85 14:49:32
FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = 12.05 @ 70.50 , 18.23 @ 340.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
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
340.0
TIME (MSEC)
MVMA SIDE IMPACT TEST -- BASELINE STRUCTURE/HARDBOARD/FAR SEATING
BARRIER REAR CROSSMEMBER VELOCITY X AXIS

APPENDIX B

DUMMY CERTIFICATION

SIDE IMPACT DUMMY CALIBRATION

SIDE IMPACT DUMMY CALIBRATION
DUMMY SERIAL NUMBER 016
CALIBRATION 02

TEST/ DATE	CHANNEL	FILTER CLASS	PEAK ACCELERATION (g) SPECIFICATION*	TEST RESULT
HEAD 6/14/85	HEAD Y-AXIS	1000	150-175	162.41
THORAX 6/14/85	UPPER SPINE Y-AXIS			
	PRIMARY	180	16-24.6	22.84
	REDUNDANT	180	16-24.6	DNA
	LOWER SPINE Y-AXIS			
	PRIMARY	180	17.6-26.4	19.35
	REDUNDANT	180	17.6-26.4	19.68
	RIGHT UPPER RIB Y-AXIS			
	PRIMARY	180	36-50	37.36
	REDUNDANT	180	36-50	DNA
	RIGHT LOWER RIB Y-AXIS			
	PRIMARY	180	36-50	38.81
	REDUNDANT	180	36-50	38.78
PELVIS 6/13/85	PELVIS Y-AXIS	180	50-65	47.42

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

"SID" Dummy Damage Checklist SID016

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

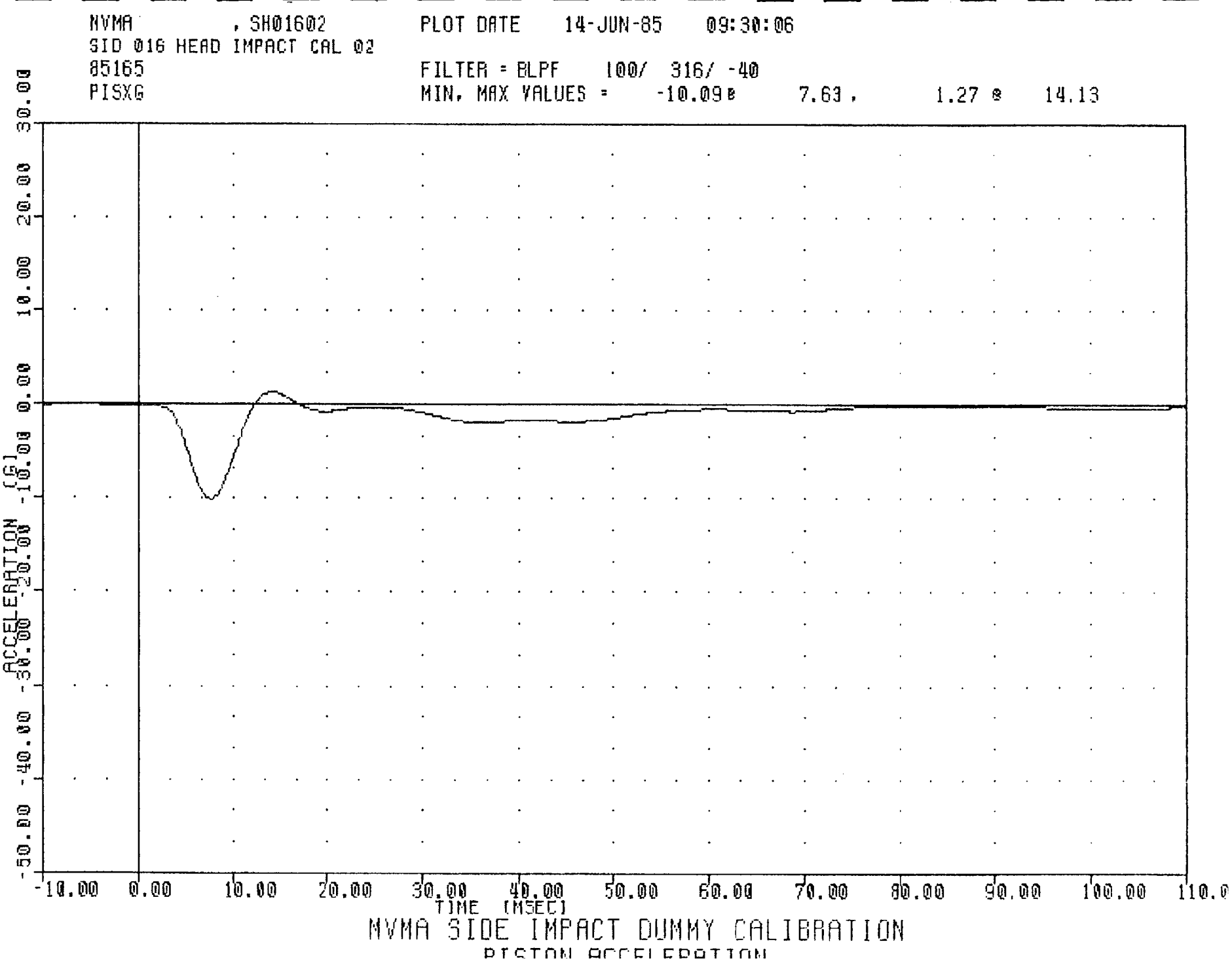
TRC Personnel
Checked By:

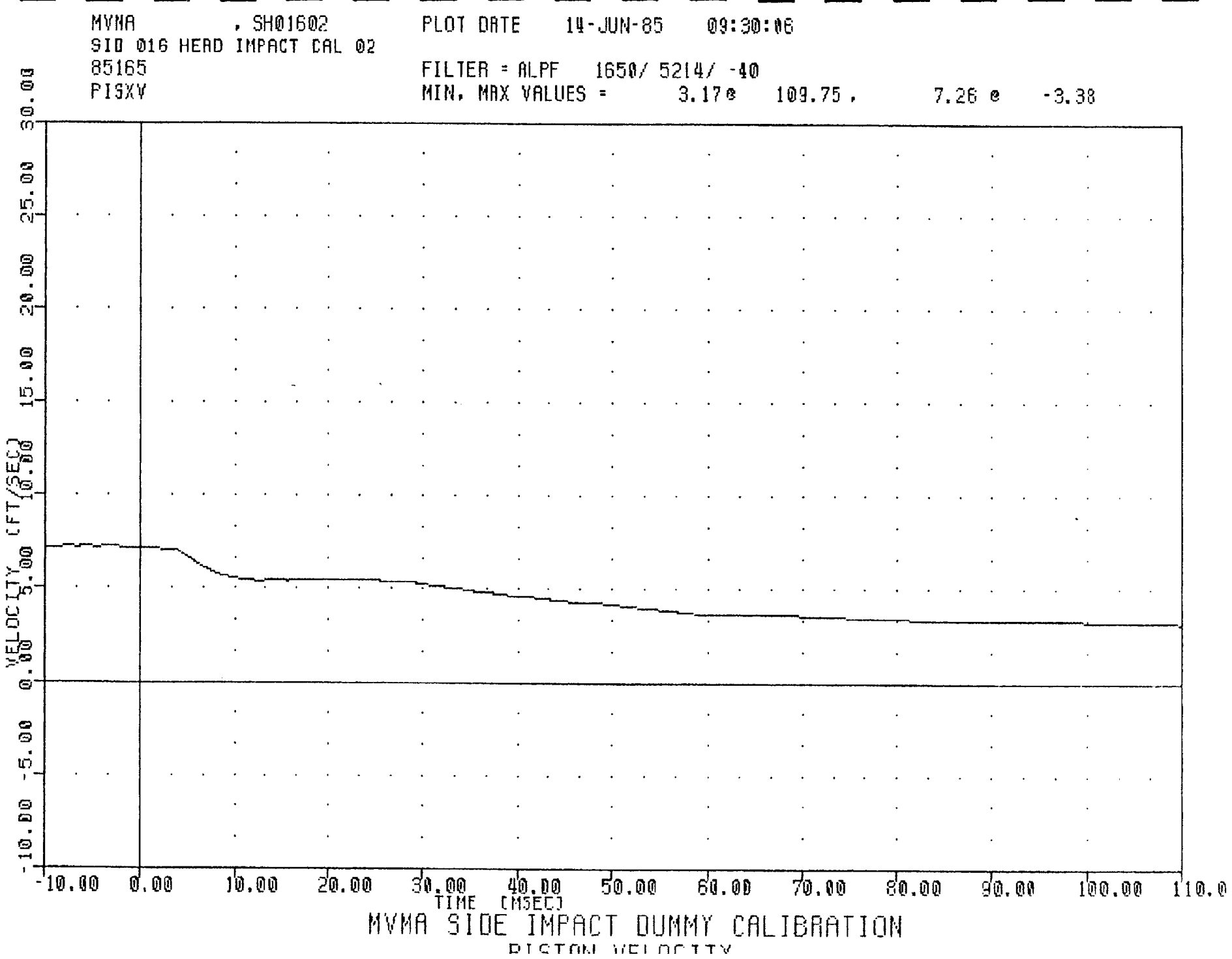
Signature 13 JUN 85
Date

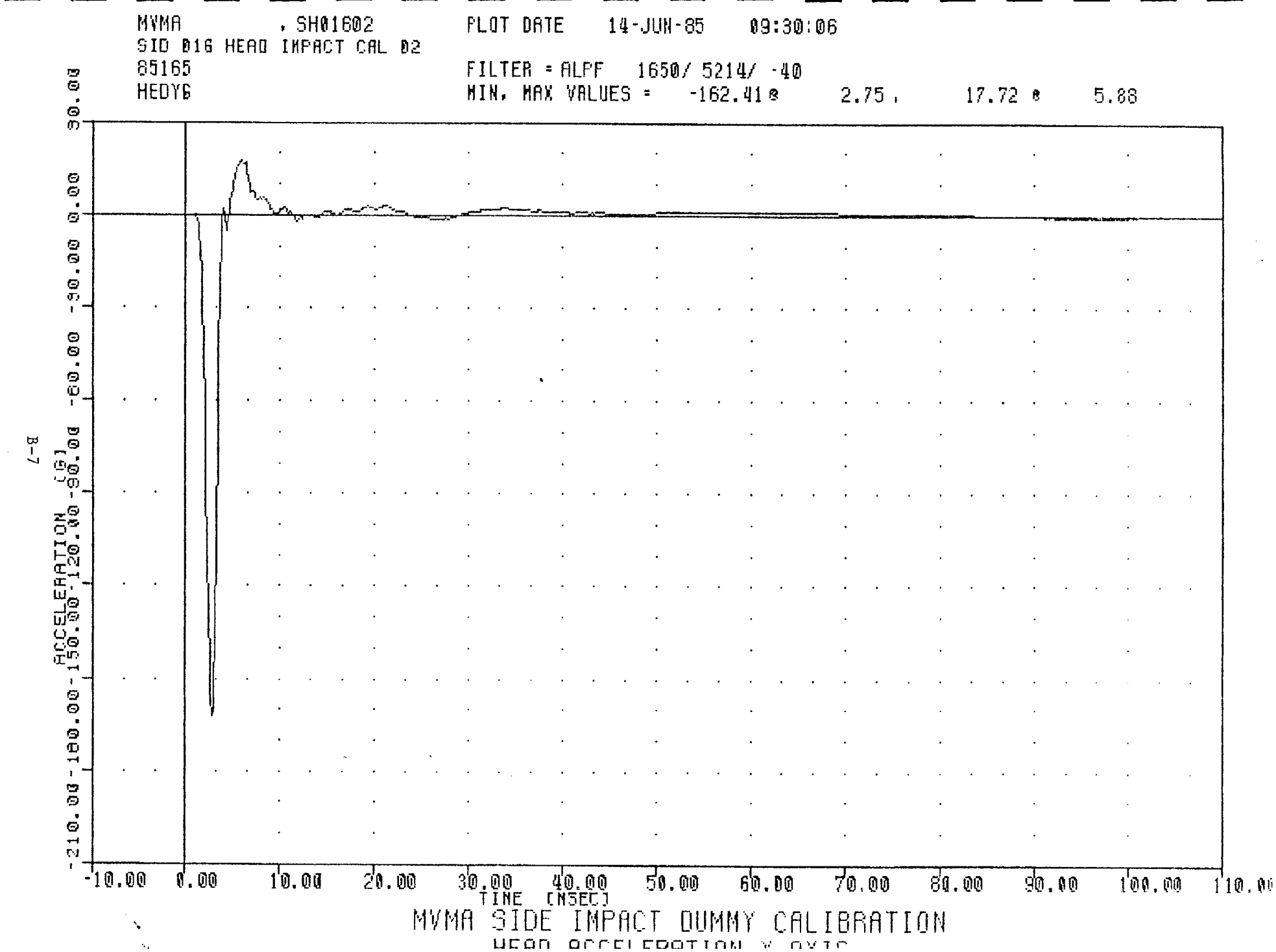
VRTC Personnel
Checked and Approved for Testing BY:

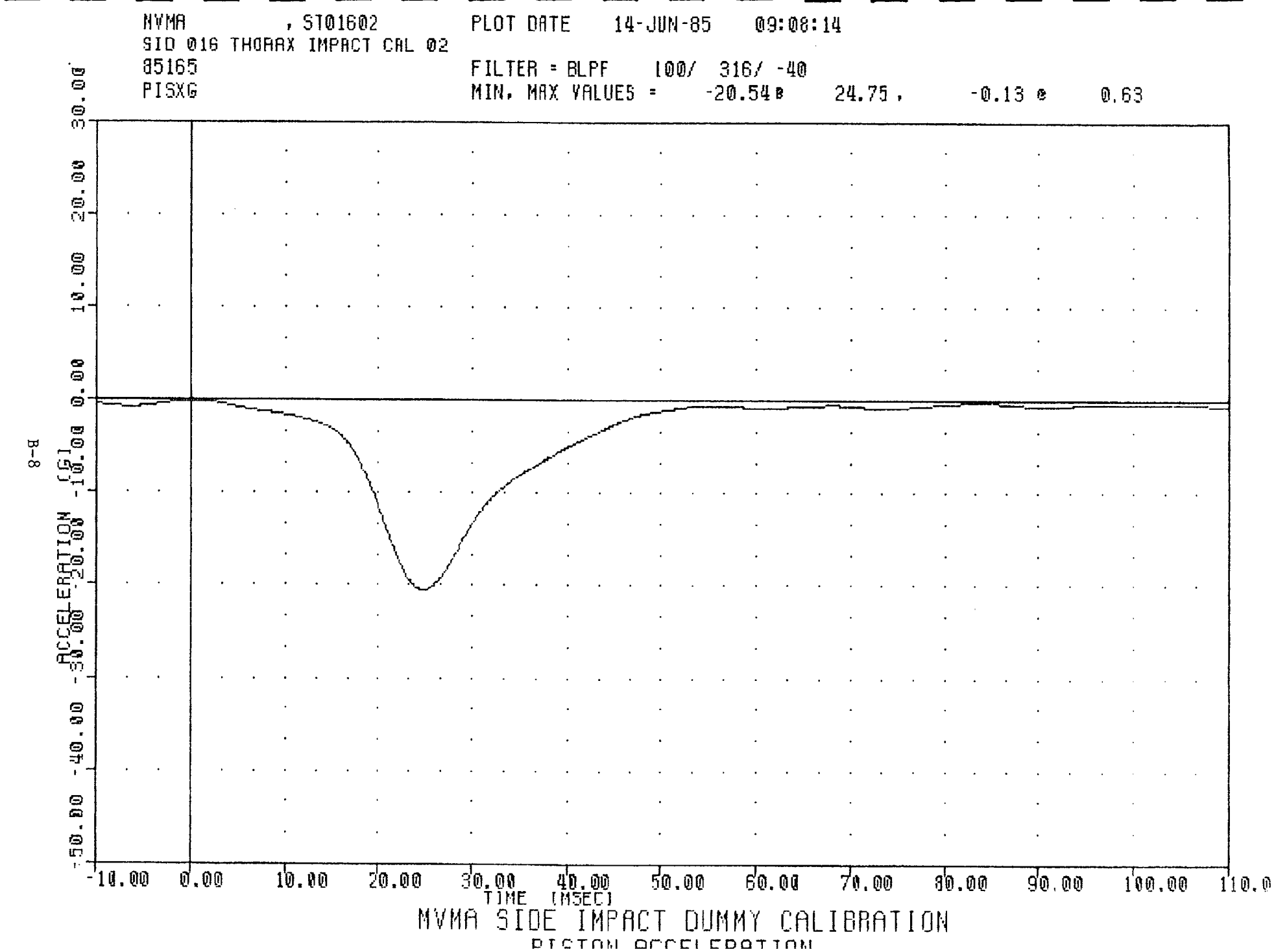
_____ _____

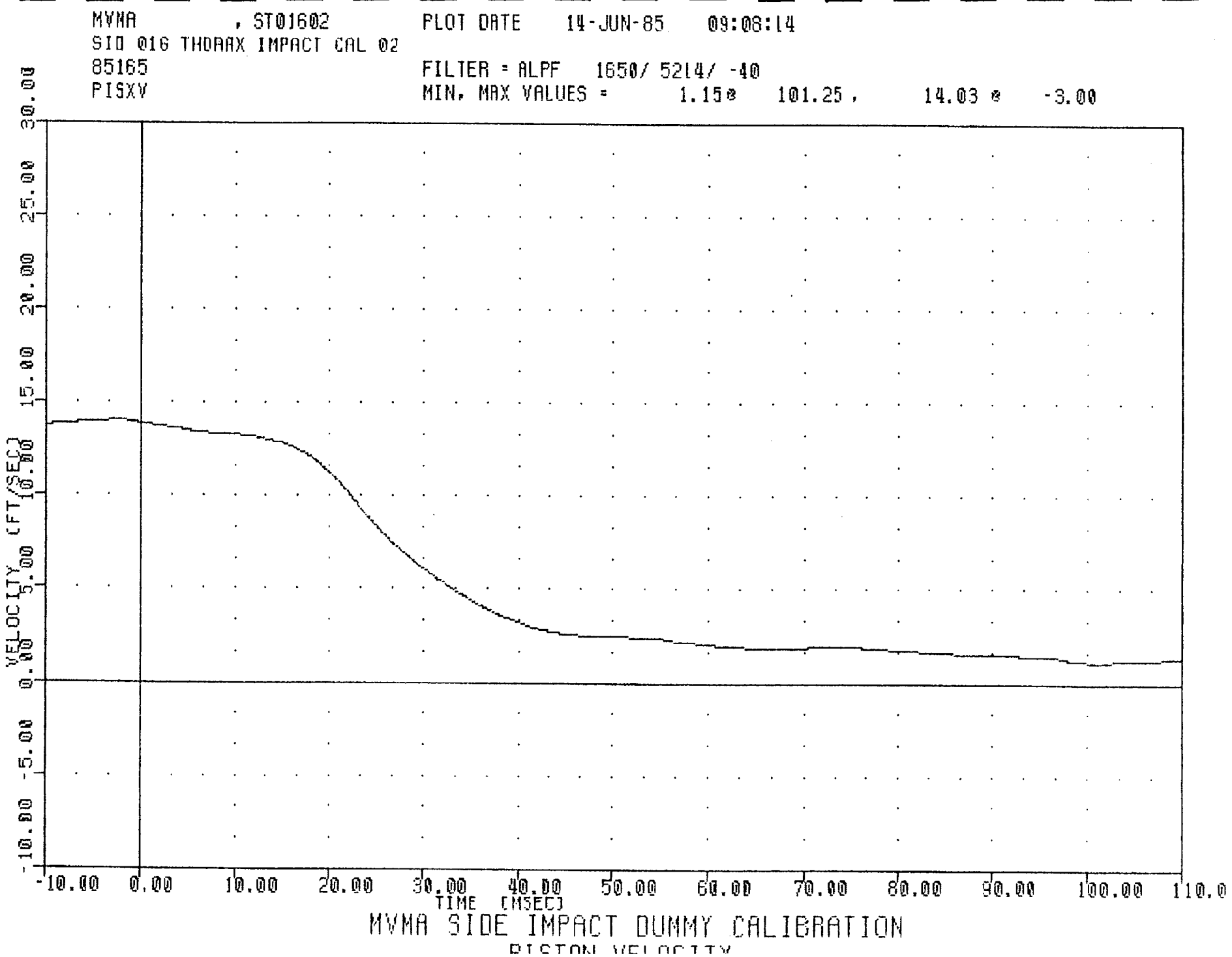
Signature Date

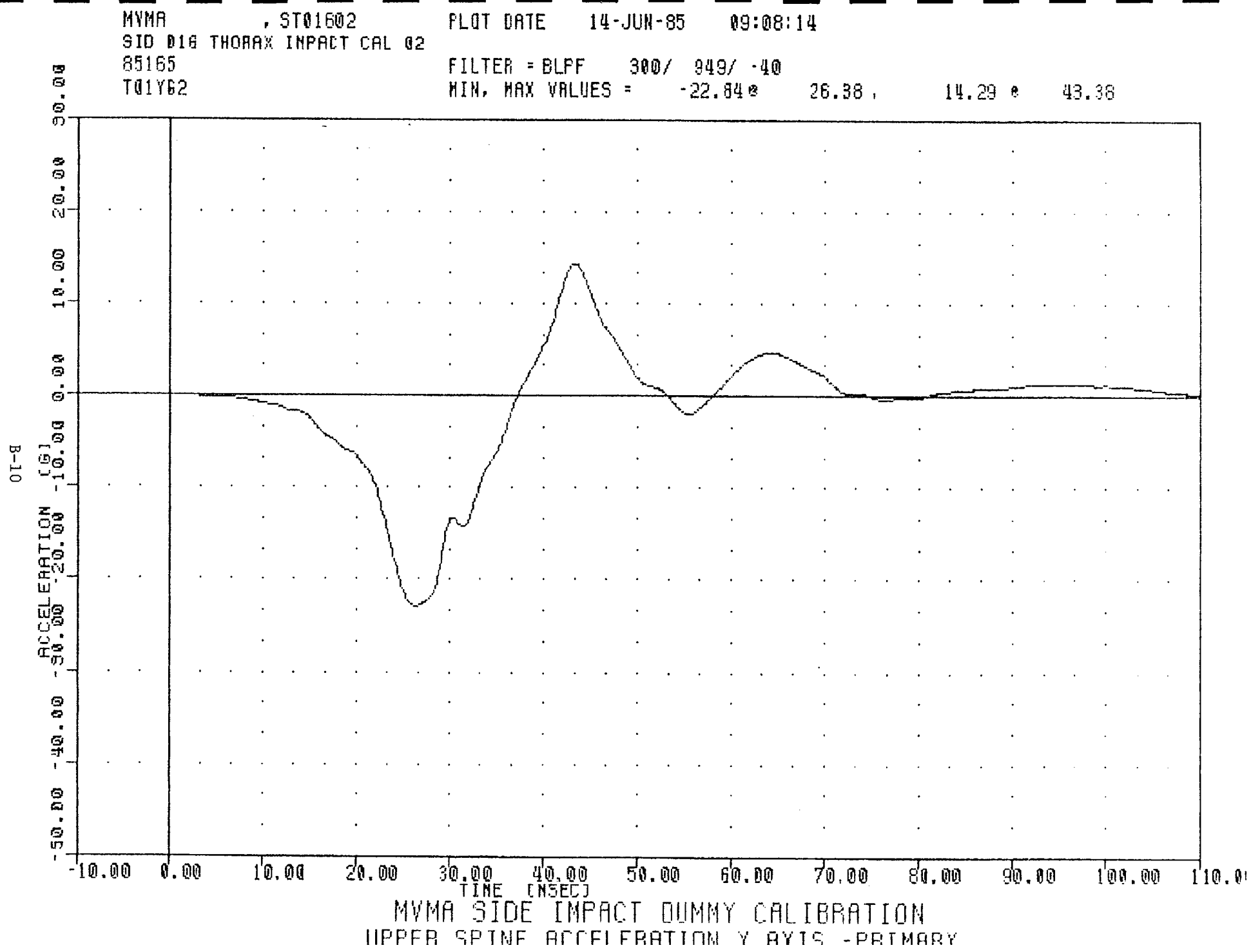

NVMA , SH01602
PLOT DATE 14-JUN-85 09:30:06
SID 016 HEAD IMPACT CAL 02
85165
FILTER = BLPF 100/ 316/ -40
PISXG
MIN, MAX VALUES = -10.09 @ 7.63 , 1.27 @ 14.13
ACCELERATION (G)
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.0
TIME (MSEC)
NVMA SIDE IMPACT DUMMY CALIBRATION
PISTON ACCELERATION


MVMA , SH01602
PLOT DATE 14-JUN-85 09:30:06
SID 016 HEAD IMPACT CAL 02
85165
FILTER = ALPF 1650/ 5214/ -40
PISXV
MIN, MAX VALUES = 3.17 @ 109.75 , 7.26 @ -3.38
VELOCITY (FT/SEC)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-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 VELOCITY

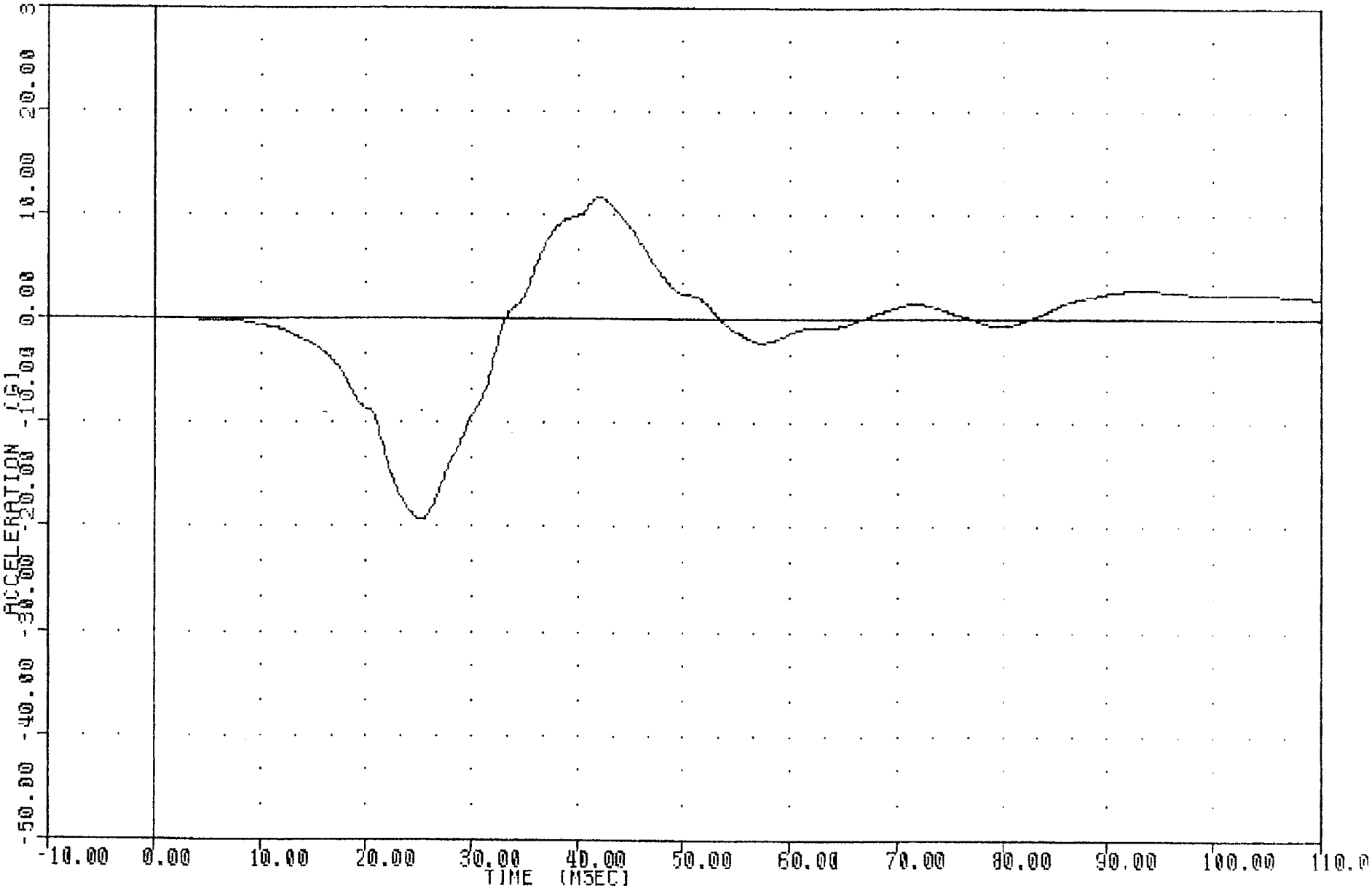

MVMA , SH01602
SID 016 HEAD IMPACT CAL 02
85165
HEDY6
PLOT DATE 14-JUN-85 09:30:06
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -162.41 @ 2.75 , 17.72 @ 5.68
ACCELERATION (G)
30.00
0.00
-30.00
-60.00
-90.00
-120.00
-150.00
-180.00
-210.00
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
TIME (MSEC)
MVMA SIDE IMPACT DUMMY CALIBRATION
HEAD ACCELERATION Y AXIS


NVMA , ST01602
PLOT DATE 14-JUN-85 09:08:14
SID 016 THORAX IMPACT CAL 02
85165
PISXG
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -20.54 @ 24.75 , -0.13 @ 0.63
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
PISTON ACCELERATION

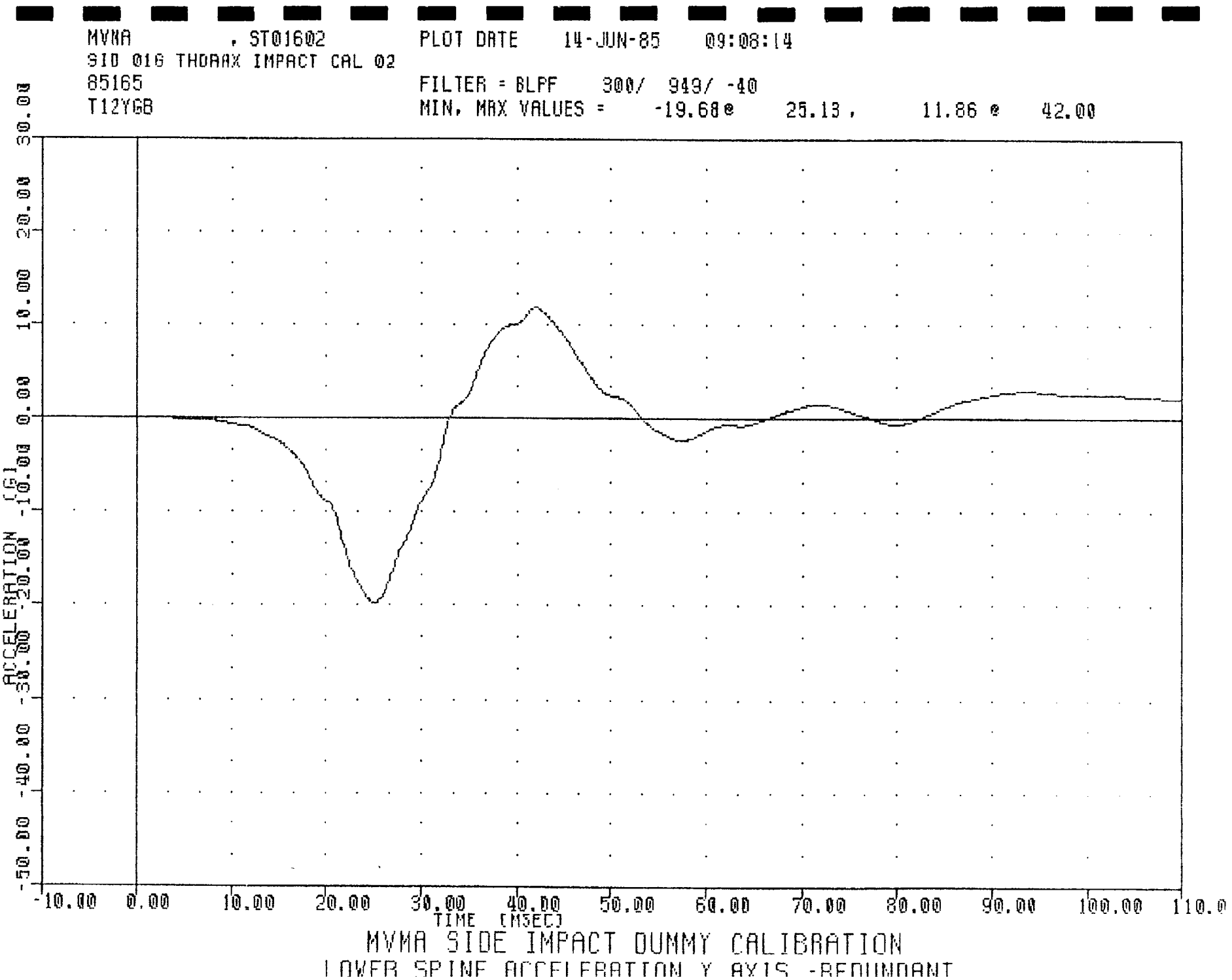

MVMA , ST01602
SID 016 THORAX IMPACT CAL 02
85165
PISXV
PLOT DATE 14-JUN-85 09:08:14
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 1.15@ 101.25 , 14.03 @ -3.00
VELOCITY (FT/SEC)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.0
TIME (MSEC)
MVMA SIDE IMPACT DUMMY CALIBRATION
PISTON VELOCITY


MVMA , ST01602
SID 016 THORAX INPACT CAL 02
85165
T01Y62
PLOT DATE 14-JUN-85 09:08:14
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -22.84 @ 26.38 , 14.29 @ 43.38
ACCELERATION (G)
90.00
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

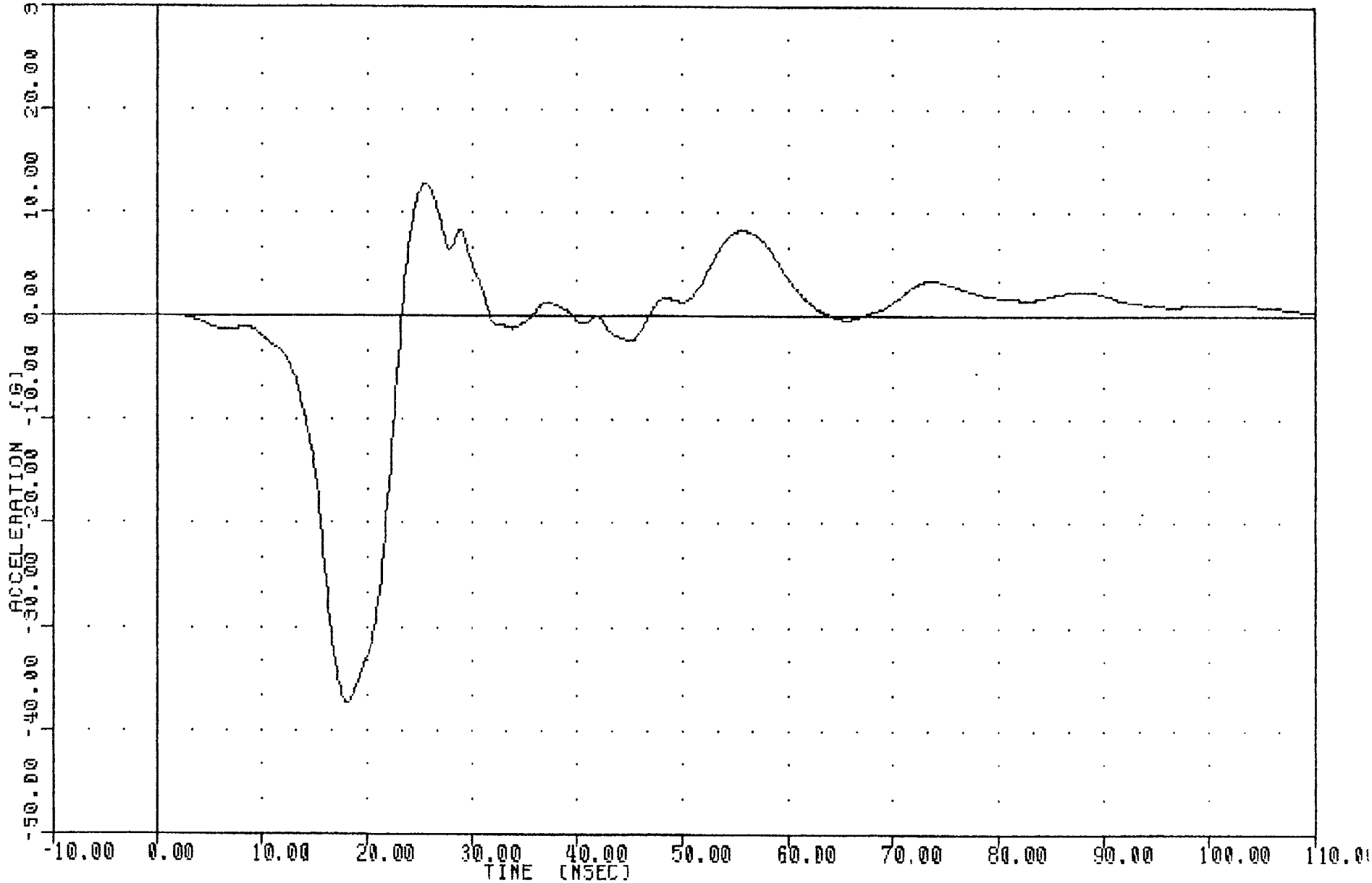
NVMA , ST01602 PLOT DATE 14-JUN-85 09:08:14
SID 016 THORAX IMPACT CAL 02
85165
T12YG2
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -19.35 @ 25.13 , 11.69 @ 42.00



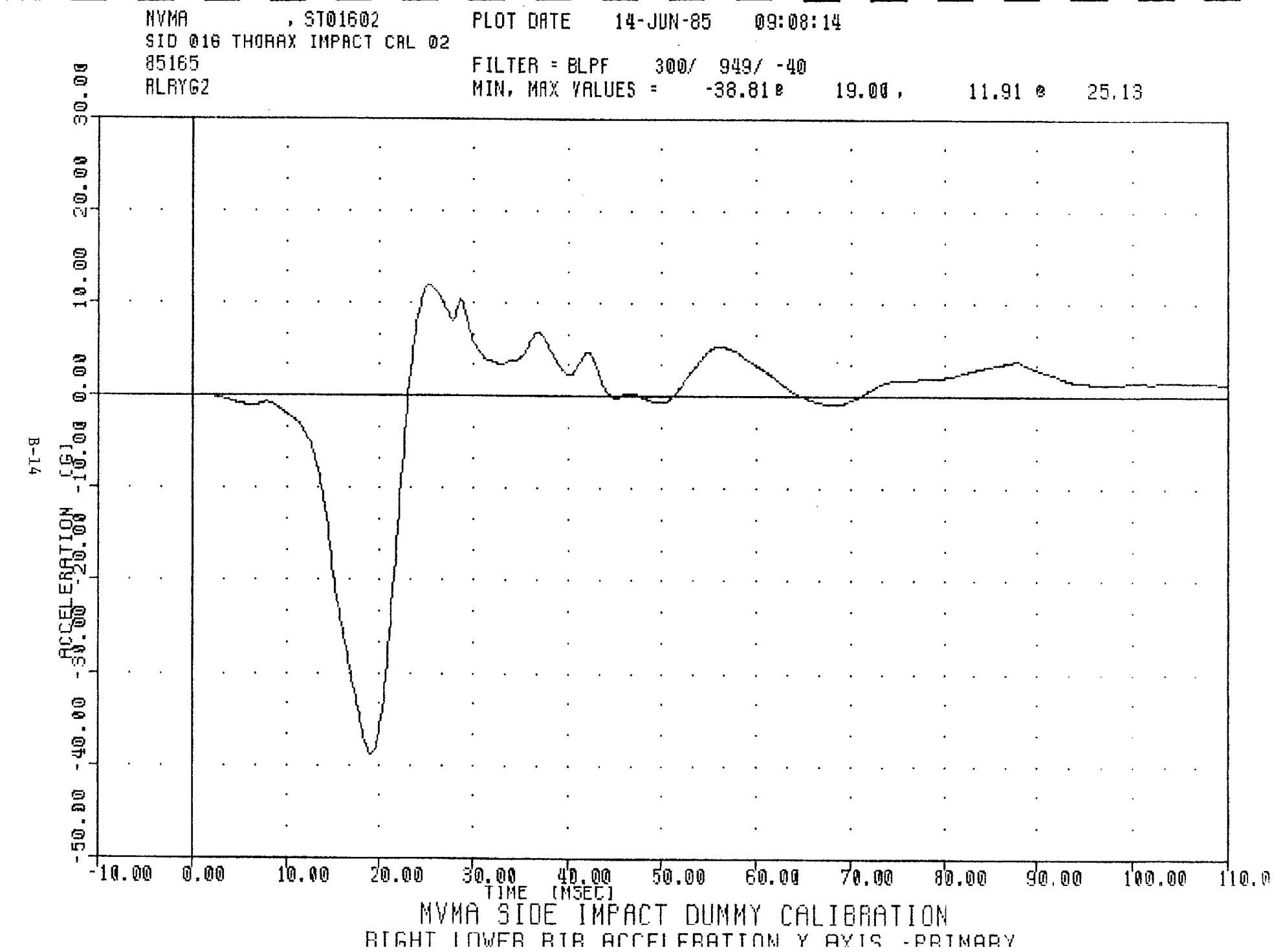
MVMA SIDE IMPACT DUMMY CALIBRATION
LOWER SPINE ACCELERATION Y AXIS -PRIMARY

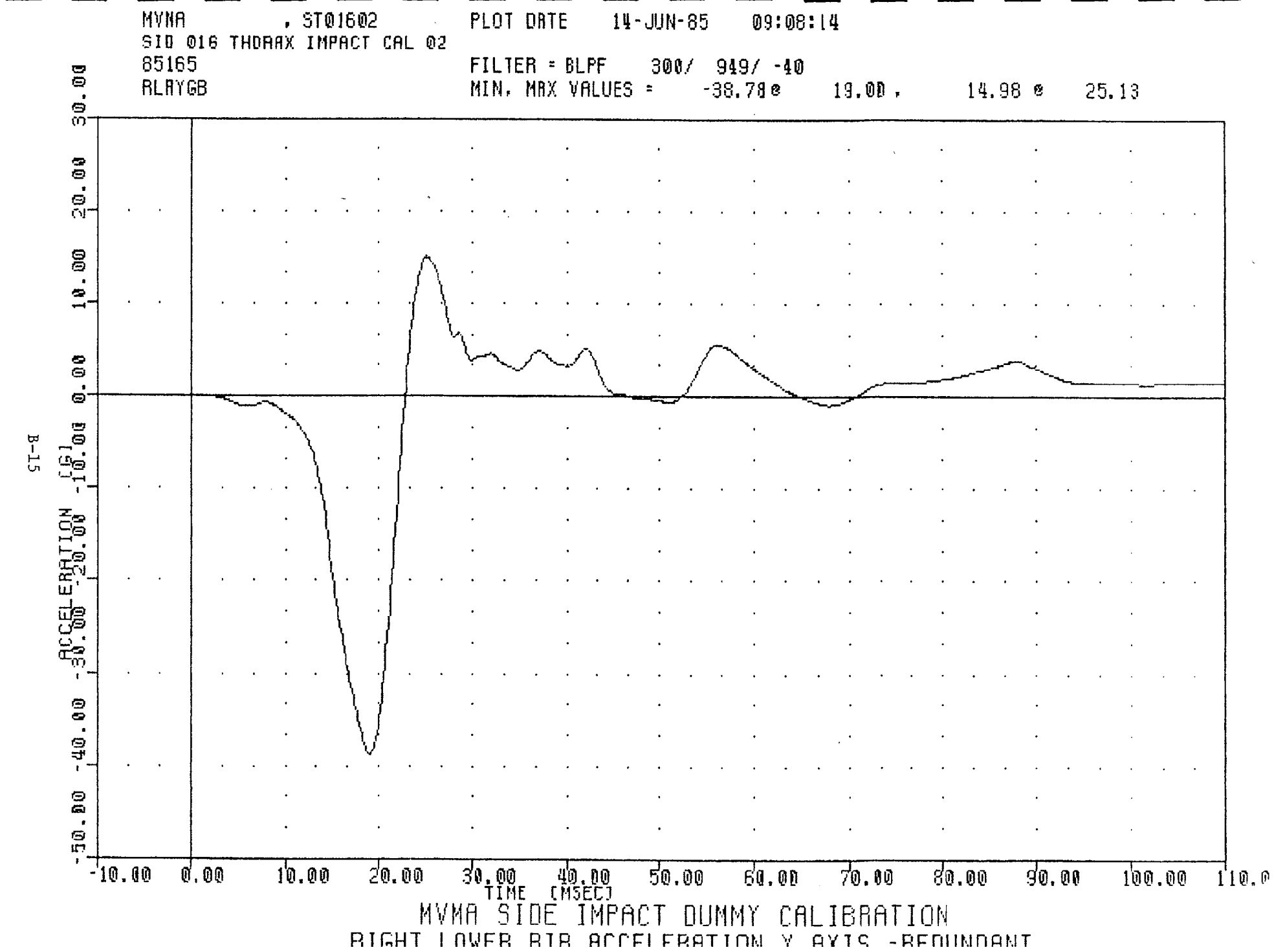

MVMA , ST01602
SID 016 THORAX IMPACT CAL 02
85165
T12YGB
PLOT DATE 14-JUN-85 09:08:14
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -19.68 @ 25.13 , 11.86 @ 42.00
ACCELERATION (G)
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.0
TIME (MSEC)
MVMA SIDE IMPACT DUMMY CALIBRATION
LOWER SPINE ACCELERATION Y AXIS -REDUNDANT

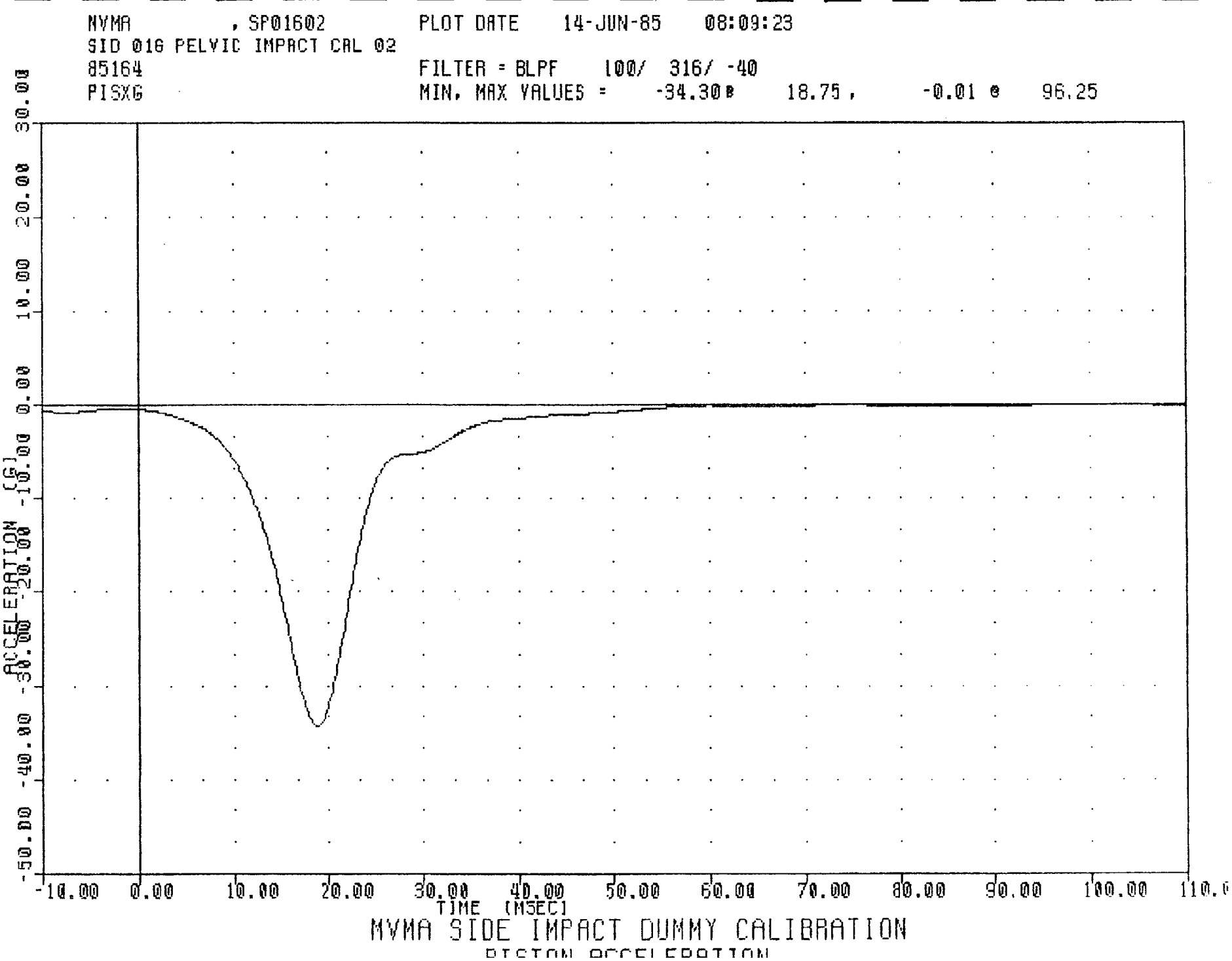
MVMA , ST01602 PLOT DATE 14-JUN-85 09:08:14
SID D1G THORAX IMPACT CAL 02
85165 FILTER = BLPF 300/ 949/ -40
RURY62 MIN, MAX VALUES = -37.36 @ 18.13 , 12.76 @ 25.63

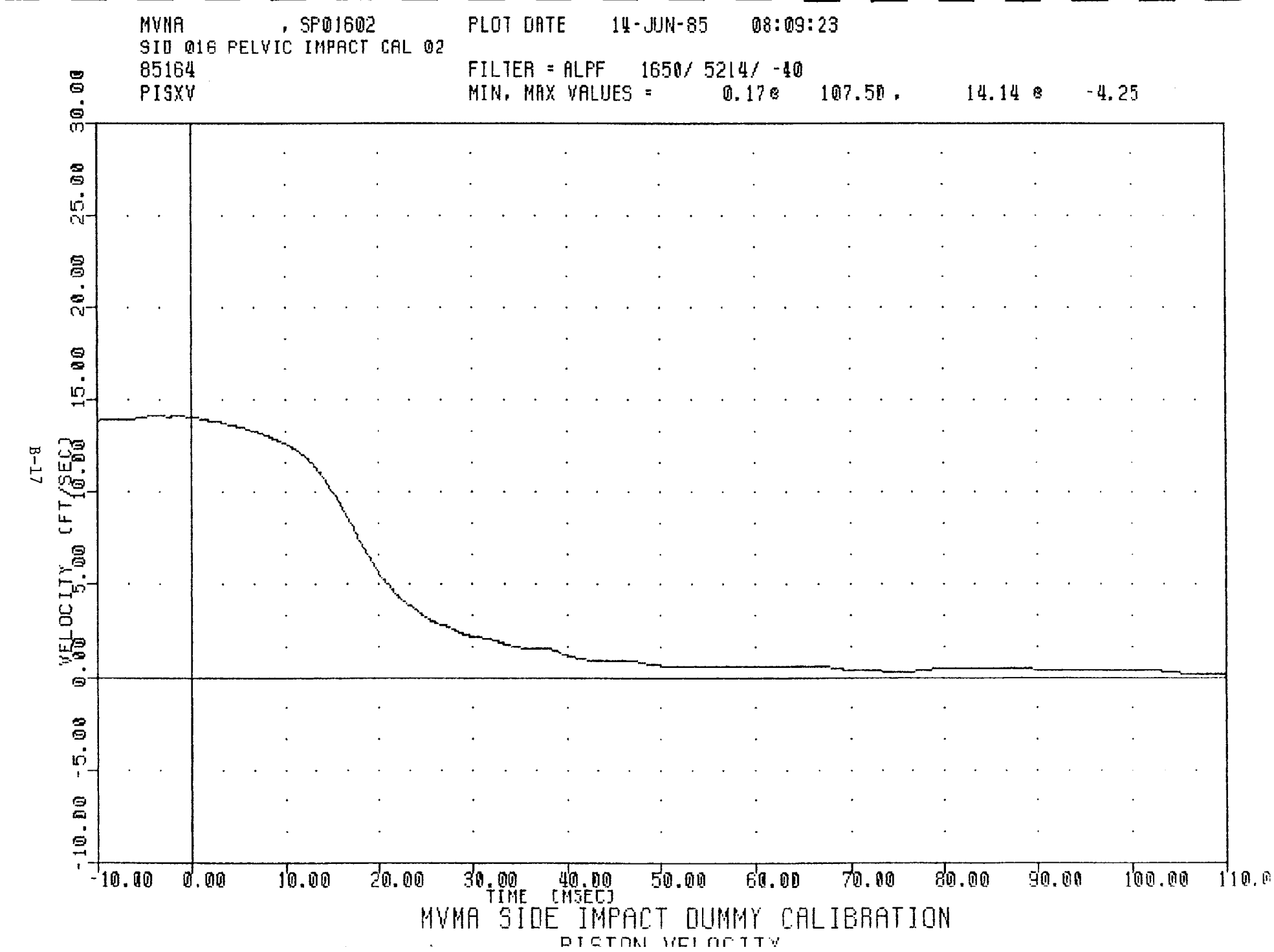


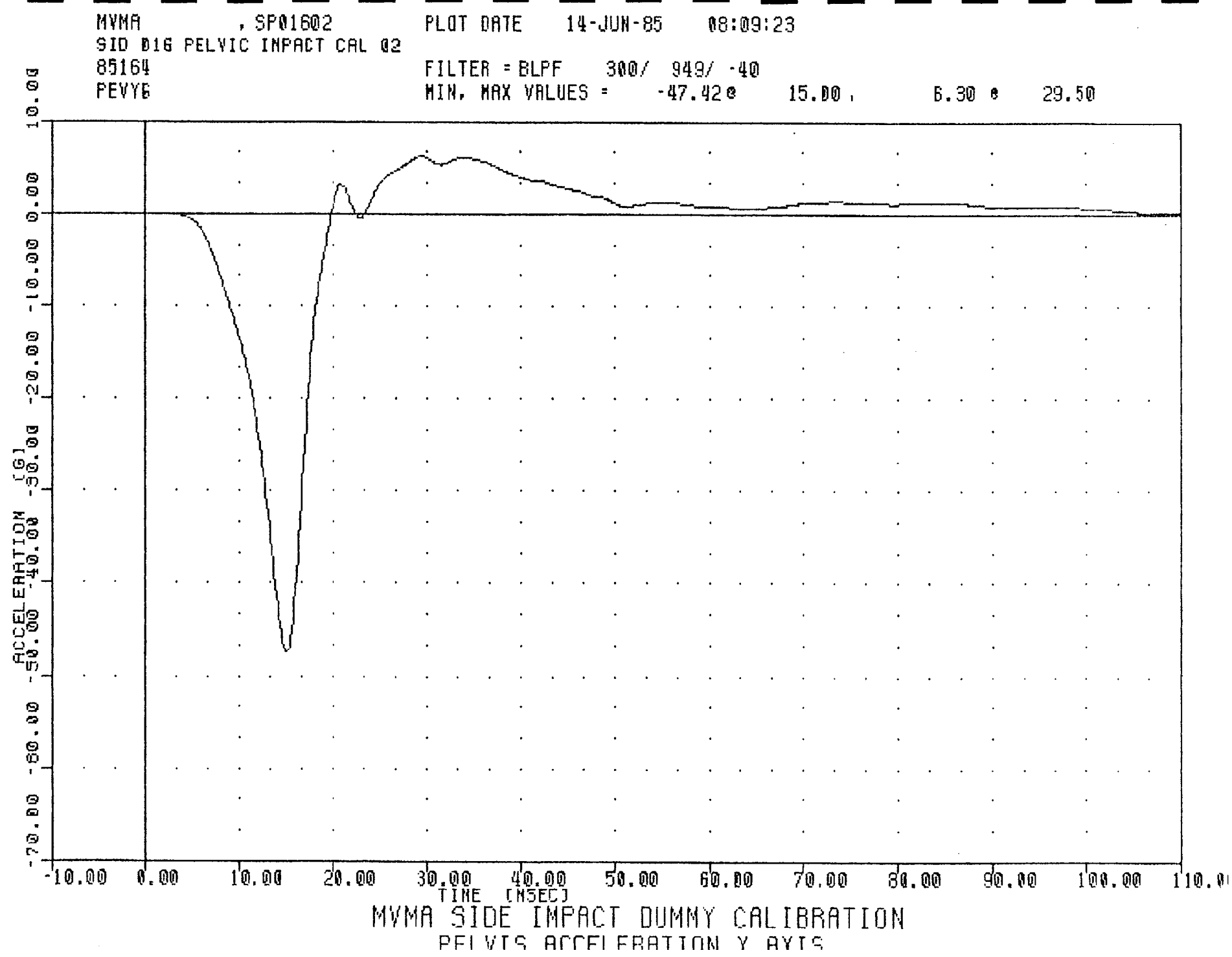
MVMA SIDE IMPACT DUMMY CALIBRATION
RIGHT UPPER RIB ACCELERATION Y AXIS -PRIMARY


NVMA , ST01602
SID @16 THORAX IMPACT CAL 02
85165
RLRYG2
PLOT DATE 14-JUN-85 09:08:14
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -38.81 @ 19.00 , 11.91 @ 25.13
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 Y AXIS -PRIMARY


MVMA , ST01602
SID 016 THDRAX IMPACT CAL 02
85165
RLAYGB
PLOT DATE 14-JUN-85 09:08:14
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -38.78 @ 19.00 , 14.98 @ 25.13
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
RIGHT LOWER RIB ACCELERATION Y AXIS -REDUNDANT


NVMA , SP01602 PLOT DATE 14-JUN-85 08:09:23
SID 018 PELVIC IMPACT CAL 02
85164 FILTER = BLPF 100/ 316/ -40
PISXG MIN, MAX VALUES = -34.30 @ 18.75 , -0.01 @ 96.25
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
PISTON ACCELERATION


MVMA , SP01602
PLOT DATE 14-JUN-85 08:09:23
SID 016 PELVIC IMPACT CAL 02
85164
FILTER = ALPF 1650/ 5214/ -40
PISXV
MIN, MAX VALUES = 0.17@ 107.50 , 14.14 @ -4.25
VELOCITY (FT/SEC)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-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 VELOCITY


MVMA , SP01602
PLOT DATE 14-JUN-85 08:09:23
SID 016 PELVIC INPACT CAL 02
85164
FILTER = BLPF 300/ 949/ -40
PEVY6
MIN, MAX VALUES = -47.42 @ 15.00 , 6.30 @ 29.50
ACCELERATION [G]
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00
-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
PELVIS ACCELERATION Y AXIS