

BREED AIR BAG PROGRAM

760-n
DOT 761-B

1980 FORD LTD BUMPER TEST AT 4.7 MPH AND
CRASH TEST INTO A FIXED POLE AT 29.9 MPH

PREPARED BY:
VEHICLE RESEARCH AND TEST CENTER
ST. RT. 33 LOGAN COUNTY
EAST LIBERTY, OHIO 43319



FINAL REPORT
SEPTEMBER 1984

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
400 SEVENTH STREET, S.W.
WASHINGTON, D.C. 20590

Prepared By: Laura Bell

L. J. Bell

Project Engineer

Transportation Research Center of Ohio

Approved By: Richard W. Runyon

R. W. Runyon

Project Manager

Transportation Research Center of Ohio

Approved By: Robert C. Esser

R. C. Esser

Project Engineer

Vehicle Research & Test Center

Report Accepted By: Andrew S. Detrick

A. G. Detrick

Vehicle Research & Test Center

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle BREED AIR BAG PROGRAM 1980 FORD LTD BUMPER TEST AT 4.7 MPH AND CRASH TEST INTO A FIXED POLE AT 29.9 MPH		5. Report Date SEPTEMBER 1984	
		6. Performing Organization Code	
		8. Performing Organization Report No. 840808	
7. Author(s) L. Bell, Project Engineer, TRCO		10. Work Unit No. (TRAIS)	
9. Performing Organization Name and Address Vehicle Research and Test Center St. Rt. 33, Logan County East Liberty, Ohio 43319		11. Contract or Grant No. DTNH22-82-A-08401	
		13. Type of Report and Period Covered FINAL REPORT August 1984	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh Street, S.W. Washington, DC 20590		14. Sponsoring Agency Code	
15. Supplementary Notes			
16. Abstract This test report documents a crash test conducted under NHTSA Contract DTNH22-82-A-08401 involving a 1980 Ford LTD 4-door sedan retrofitted with a Breed air bag and a knee bolster. Modifications were made to the vehicle by adding a reinforced front bumper. The test vehicle underwent a 4.7 mph bumper test on August 8, 1984 at an ambient temperature of 84°F. The vehicle was then impacted into a fixed, rigid pole at 29.9 mph. Vehicle accelerations and air bag sensors were measured for the bumper test. For the pole test, vehicle accelerations, air bag sensors and occupant responses were measured. All testing was conducted at the TRCO Crash Test Facility in East Liberty, Ohio.			
17. Key Words Pole Test Breed Air Bag Occupant Response		18. Distribution Statement Available from: Technical Reference Division, National Highway Traffic Safety Administration Room 5108, Nassif Building 400 Seventh Street, S.W. Washington, DC 20590	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 122	22. Price

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

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

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares	2.5	acres	acres
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton	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 degrees add 32)	Fahrenheit	°F

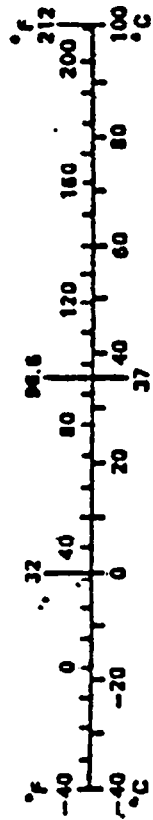


TABLE OF CONTENTS

	<u>Page</u>
1.0 PURPOSE AND INTRODUCTION	1-1
2.0 GENERAL TEST AND VEHICLE PARAMETER DATA	2-1
3.0 DATA REQUIRED BY R&D	3-1
APPENDIX A PHOTOGRAPHS - TEST 840808A	A-1
APPENDIX B PHOTOGRAPHS - TEST 840808B	B-1
APPENDIX C DATA PLOT PRESENTATION - TEST 840808A	C-1
APPENDIX D DATA PLOT PRESENTATION - TEST 840808B	D-1

LIST OF PHOTOGRAPHS

<u>Figure</u>	<u>Page</u>
A-1. PRE-TEST CLOSEUP - VIEW 1	A-2
A-2. PRE-TEST CLOSEUP - VIEW 2	A-2
A-3. POST-TEST CLOSEUP - VIEW 1	A-3
A-4. POST-TEST CLOSEUP - VIEW 2	A-3
B-1. PRE-TEST OVERALL - VIEW 1	B-2
B-2. PRE-TEST OVERALL - VIEW 2	B-2
B-3. PRE-TEST OVERALL - VIEW 3	B-3
B-4. PRE-TEST OVERALL - VIEW 4	B-3
B-5. PRE-TEST OVERHEAD	B-4
B-6. PRE-TEST CLOSEUP	B-4
B-7. PRE-TEST DRIVER DUMMY - VIEW 1	B-5
B-8. PRE-TEST DRIVER DUMMY - VIEW 2	B-5
B-9. PRE-TEST DRIVER DUMMY - VIEW 3	B-6
B-10. PRE-TEST DRIVER DUMMY CLOSEUP - VIEW 1	B-6
B-11. PRE-TEST DRIVER DUMMY CLSOEUP - VIEW 2	B-7
B-12. POST-TEST OVERALL - VIEW 1	B-7
B-13. POST-TEST OVERALL - VIEW 2	B-8
B-14. POST-TEST OVERALL - VIEW 3	B-8
B-15. POST-TEST OVERALL - VIEW 4	B-9
B-16. POST-TEST OVERALL - VIEW 5	B-9
B-17. POST-TEST CLOSEUP	B-10
B-18. POST-TEST DRIVER DUMMY - VIEW 1	B-10
B-19. POST-TEST DRIVER DUMMY - VIEW 2	B-11
B-20. POST-TEST DRIVER DUMMY - VIEW 3	B-11

LIST OF PHOTOGRAPHS CONTD

<u>Figure</u>	<u>Page</u>
B-21. POST-TEST DRIVER DUMMY - VIEW 4	B-12
B-22. POST-TEST DRIVER DUMMY CLOSEUP - VIEW 1	B-12
B-23. POST-TEST DRIVER DUMMY CLOSEUP - VIEW 2	B-13
B-24. POST-TEST STEERING COLUMN DAMAGE	B-13
B-25. POST-TEST VEHICLE DAMAGE	B-14

SECTION 1.0
PURPOSE AND INTRODUCTION

PURPOSE

The purpose of this crash test was to demonstrate the effectiveness of the Breed All Mechanical Air Bag System and knee restraint when retrofitted in a vehicle modified by the addition of a reinforced front bumper. The vehicle was tested using conditions in excess of those currently contained in a Federal Motor Vehicle Safety Standard.

INTRODUCTION

A 1980 Ford LTD 4-door Sedan which was supplied by NHTSA underwent a 4.7 mph bumper test on August 8, 1984 and then was towed into a fixed, rigid pole at 29.9 mph. These tests were conducted to determine the firing velocity of the air bag and to demonstrate the effectiveness of the Breed air bag and knee restraint system when used without the vehicle's production belt restraint. The intended test speeds were 4.8 and 30 mph respectively; actual speeds were 4.7 and 29.9 mph.

Section 2 contains General Test and Vehicle Parameter Data. Section 3 contains data required by R & D. Appendix A contains pre-test and post-test vehicle photographs for test 840808A. Appendix B contains pre-test and post-test vehicle and dummy photographs for test 840808B. Appendix C contains Data Plots for test 840808A. Appendix D contains Data Plots for test 840808B.

SECTION 2.0
GENERAL TEST AND VEHICLE PARAMETER DATA

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

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Ford LTD

VIN: OU61F131104

BODY STYLE: 4-Door Sedan

MODEL YEAR: 1980

NHTSA NO.: R & D

COLOR: Tan

ENGINE DATA: TYPE: V8 CYLINDERS: 8 DISPLACEMENT 302 CID

TRANSMISSION DATA: 3-speed Automatic

DATE VEHICLE RECEIVED: 7/23/84

ODOMETER READING: 53039

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	Yes	AIR CONDITIONING	Yes
RADIO	Yes	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: Front right bumper dented

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

VEHICLE MANUFACTURED BY: Ford Motor Company

DATE OF MANUFACTURE: 3/80

GVWR: 5337 LBS.,

GAWR: FRONT 2687 LBS., REAR 2700 LBS.

VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 31 psi; REAR 35 psi

TIRES ON VEHICLE (MFG. & LINE, SIZE): Michelin X 205/75 R 14

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 4

IS SPARE TIRE "SPACE SAVER"? No

IS SPARE TIRE STANDARD EQUIPMENT? No

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

RIGHT FRONT	1100	LBS.	RIGHT REAR	810	LBS.
LEFT FRONT	1070	LBS.	LEFT REAR	790	LBS.
TOTAL FRONT WEIGHT	2170		LBS. (57.6 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1600		LBS. (42.4 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	3770		LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 27 1/2	;LF 27 3/4	;RR 27 1/2	;LR 27 3/4
PRE-TEST ATTITUDE:	RF 27 7/16	;LF 27 1/8	;RR 25 9/16	;LR 24 3/4
POST-TEST ATTITUDE:	RF 29 7/16	;LF 27	;RR 25 1/16	;LR 25 5/16

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 200 LBS. CARGO:

RIGHT FRONT	1090	LBS.	RIGHT REAR	1030	LBS.
LEFT FRONT	1110	LBS.	LEFT REAR	1030	LBS.
TOTAL FRONT WEIGHT	2200		LBS. (51.6 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	2060		LBS. (48.4 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	4260		LBS.		

WEIGHT OF BALLAST SECURED IN VEHICLE TRUNK AREA: 390 LBS.

TEST FLUID DATA

TEST FLUID TYPE: RED STODDARD SOLVENT #2; SPEC. GRAVITY: 0.764
 KINEMATIC VISCOSITY: 0.99 CENTISTOKES
 "USEABLE" CAPACITY*: NA GALLONS
 TEST VOLUME: 0 GALLONS (92-94% OF USEABLE)
 FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 19.0 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?

FOR FRONTAL IMPACTS, DISTANCE FROM FRONT OF TEST VEHICLE TO BARRIER AFTER
 IMPACT: CENTER: 26 1/8 ;R NA ;L NA

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

TEST CONDITIONS

TEST NUMBER: 840808A
 DATE OF TEST: 8/8/84 TIME OF TEST: 10:45
 WIND VELOCITY: 2 - 4 mph 234° SW HUMIDITY: 44%
 AMBIENT TEMPERATURE AT IMPACT AREA: 84°F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
TEST WEIGHT (LBS.)	4260	4269
VEHICLE ORIENTATION (DEGREES)	0	0
VEHICLE VELOCITY (mph)	4.7	4.8

DUMMIES - DNA

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

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 200 LBS. CARGO:

RIGHT FRONT	1090	LBS.	RIGHT REAR	1030	LBS.
LEFT FRONT	1110	LBS.	LEFT REAR	1030	LBS.
TOTAL FRONT WEIGHT	2200		LBS. (51.6 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	2060		LBS. (48.7 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	4260	LBS.			

WEIGHT OF BALLAST SECURED IN VEHICLE TRUNK AREA: 125 LBS.

TEST VOLUME: 17.0 GALLONS (92-94% OF USABLE)

TEST CONDITIONS

TEST NUMBER: 840808B

DATE OF TEST: 8/8/84

TIME OF TEST: 15:00

WIND VELOCITY: 2 - 4 mph 234° SW

HUMIDITY: 44%

AMBIENT TEMPERATURE AT IMPACT AREA:

84°F

TEMPERATURE IN OCCUPANT COMPARTMENT:

84°F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
TEST WEIGHT (LBS.)	4260	4269
VEHICLE ORIENTATION (DEGREES)	0	0
VEHICLE VELOCITY (mph)	29.9	30.0

DUMMIES

	<u>DRIVER</u>	<u>MIDDLE PASSENGER</u>	<u>RT. FRONT PASSENGER</u>	<u>LEFT REAR PASSENGER</u>	<u>RT. REAR PASSENGER</u>
TYPE:	572				
SERIAL NO.:	187				
INSTRUMENTATION:					
HEAD ACCEL.:	Yes				
CHEST ACCEL.:	Yes				
FEMUR L.C.'S:	Yes				
OTHER:	Pelvis				

RESTRAINT SYSTEM: Breed Air Bag and Knee Bolster

VISIBLE DUMMY CONTACT POINTS:

	DRIVER 187	PASSENGER DNA
Head	<u>Airbag</u>	_____
Chest	<u>Airbag</u>	_____
Abdomen	<u>Airbag</u>	_____
Left Knee	<u>Bolster</u>	_____
Right Knee	<u>Bolster</u>	_____

DOOR OPENING:

	LEFT	RIGHT
Front	<u>Normal</u>	<u>Tools Required</u>
Rear	<u>Normal</u>	_____

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	<u>None</u>	<u>Tipped To Front</u>
Rear	<u>DNA</u>	<u>DNA</u>

GLAZING DAMAGE:

Windshield cracked.

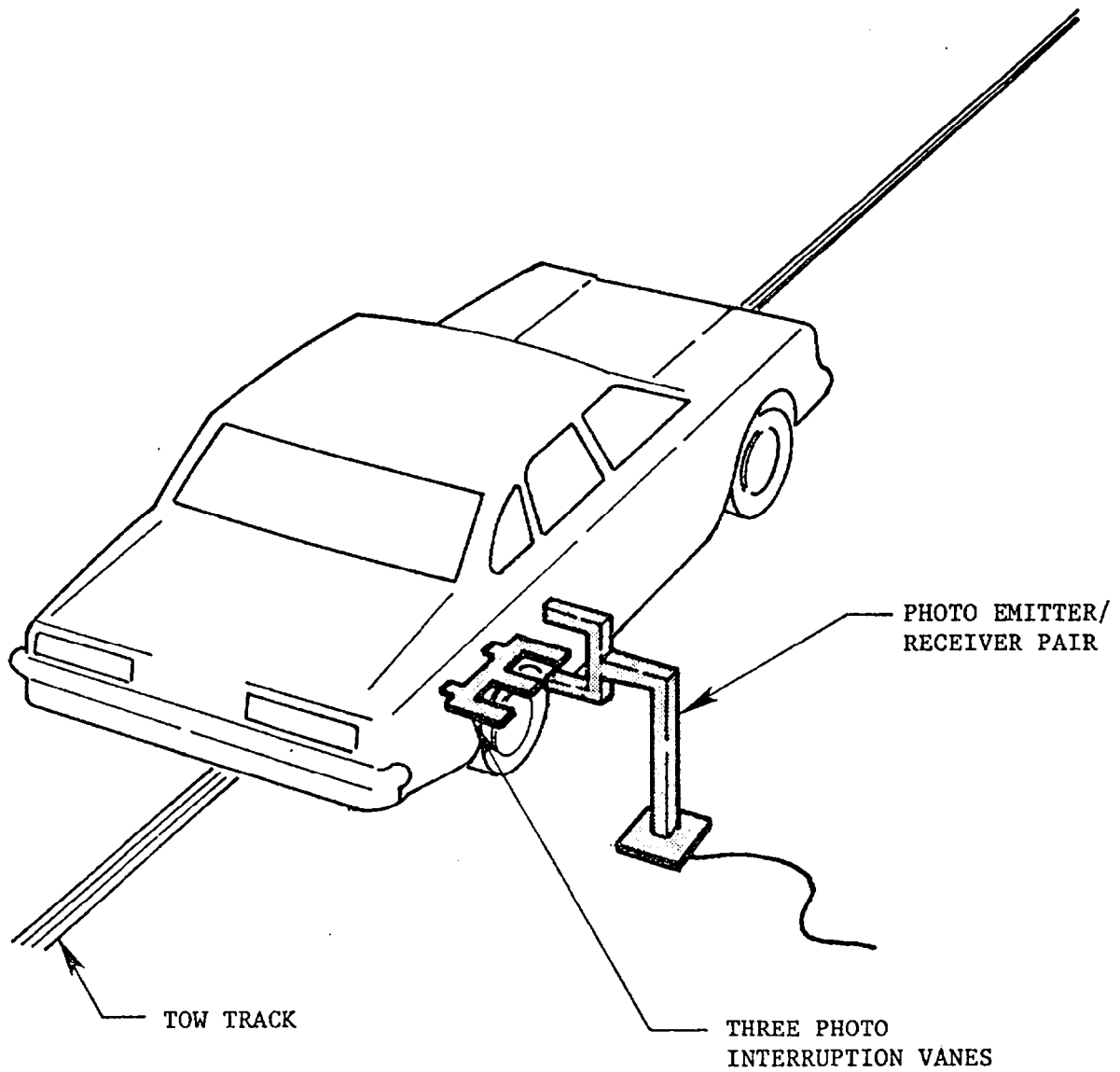
OTHER NOTABLE IMPACT EFFECTS:

Pole intruded into vehicle approximately 36 inches at

the center front. Roof buckled at top of B-Pillar on

both sides.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane is located two inches before impact.

The vanes have one foot spacing.

VEHICLE TEST WEIGHT CALCULATION

Test Weight = Unloaded Delivered Weight +
 Number of Dummies X 164 lbs. +
 Cargo Weight
 = 3905 + 1 X 165 + 200 lbs.
 = 4269 lbs.

To achieve test weight, 390 pounds of sand ballast was added for Test 840808A. For Test 840808B, 125 pounds of sand ballast and 17.0 gallons of stoddard solvent were added. The weight of the test vehicle was measured by placing each wheel on a Loadmeter Corporation Hiway Loadometer.

TEST ANOMALIES

The cable to the dummy's chest acceleration channel on the "Z" axis, CSTZG1, separated at approximately 232 msec. Therefore, the resultant acceleration for the dummy's chest is also questionable.

SECTION 3.0
DATA REQUIRED BY R&D

The following pages are included in this section:

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

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle was kept inside the temperature controlled crash test building until approximately 30 minutes prior to the test. Temperature inside the vehicle and ambient temperature in the crash building 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 dummy in the test vehicle.

DUMMY PLACEMENT AND POSITIONING

PART 572 DUMMY

DRIVER DSP

PASSENGER DSP

HEAD	Surface of transverse instrument mounting platform is horizontal & midsagittal plane falls in longitudinal plane.	Surface of transverse instrument mounting platform is horizontal & midsagittal plane falls in longitudinal plane.
UPPER TORSO	Placed against seat back. Midsagittal plane is vertical & longitudinal & passes through center point of steering wheel rim.	Placed against seat back. Midsagittal plane is vertical, longitudinal, & the same distance from vehicle longitudinal centerline as driver dummy midsagittal plane.
UPPER ARMS	Initially placed against seat back & tangent to side of upper torso. Push arms rearward into seat back with bending at elbows.	Initially placed against seat back & tangent to side of upper torso. Push arms rearward into seat back with bending at elbows. Remains tangent.
LOWER ARMS	Initially placed against the outside of the thighs. Centerline as close as possible in a vertical plane.	Initially placed against the outside of the thighs. Centerline as close as possible in a vertical plane.
HAND PALMS	Palms contact outer part of steering wheel rim at horizontal centerline.	Palms contact the outsides of the thighs.
HAND THUMBS	Placed over steering wheel rim.	
HAND LITTLE FINGERS		Barely in contact with the seat cushion.
LOWER TORSO	Centered on bucket seat cushion. Midsagittal plane is vertical & longitudinal. For bench seat, midsagittal plane is vertical & longitudinal & passes through center point of plane described by steering wheel rim.	Centered on bucket seat cushion. Midsagittal plane is vertical & longitudinal. For bench seat, midsagittal plane is vertical, and same distance from vehicle longitudinal centerline as driver dummy midsagittal plane.
UPPER LEGS (thighs or femurs)	Placed against seat cushion. Plane defined by femur and tibia centerlines is as close as possible to vertical.	Placed against seat cushion. Plane defined by femur and tibia centerlines is as close as possible to vertical.
RIGHT KNEE	Knees initially set 14.5" apart between pivot bolt head outer surfaces.	Located so that plane defined by femur and tibia centerlines is as close as possible to vertical.

DUMMY PLACEMENT AND POSITIONING (CONTINUED)

PART 572

DUMMY

DRIVER DSP

PASSENGER DSP

LEFT KNEE Outer surface of pivot
bolt head is 5.9" from
midsagittal plane of
dummy.

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

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

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

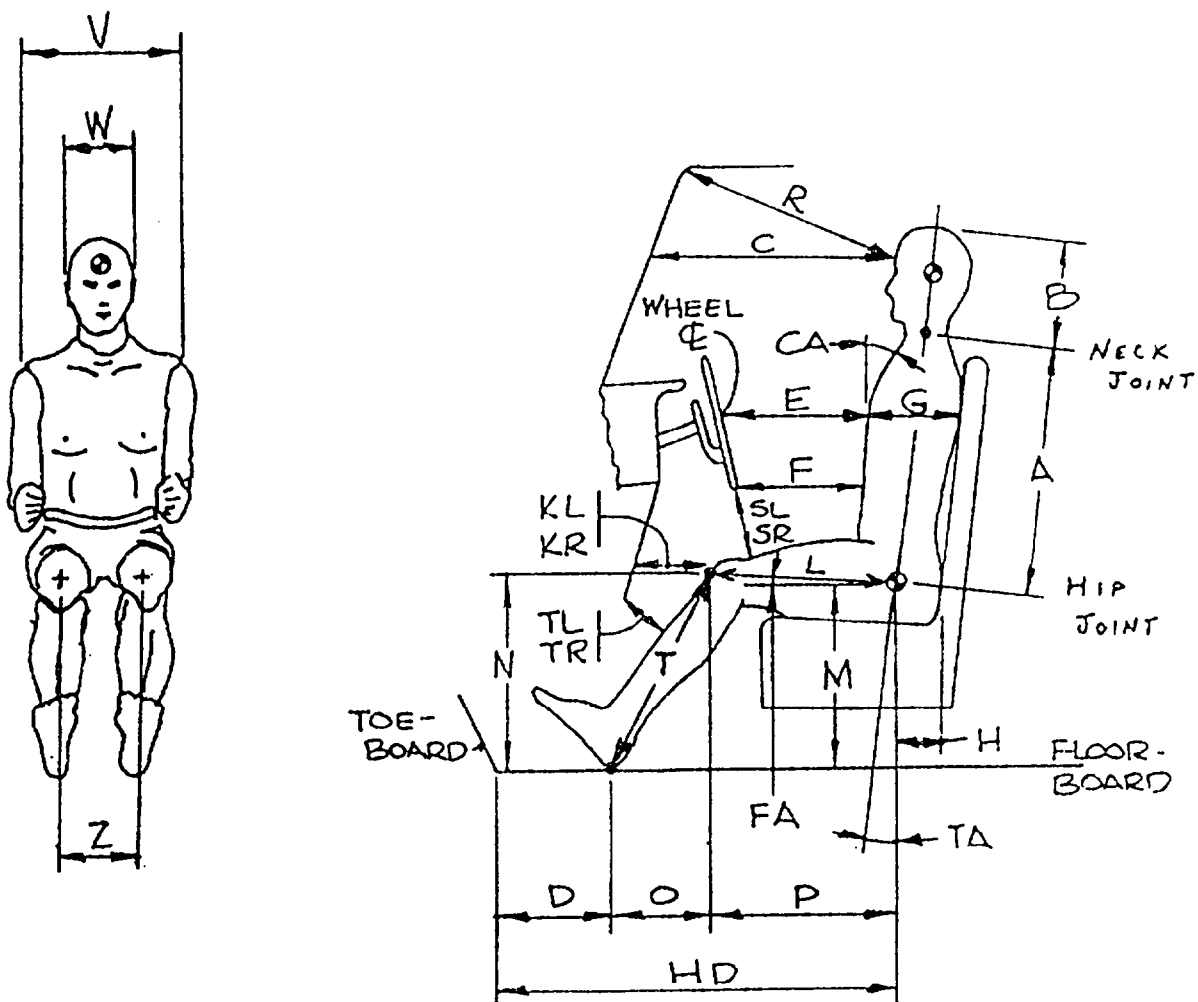
Located as above.

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

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

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

BREED VERSION (Not Standard)



Seat @ Mid-Postion

ALL MEASUREMENTS TO THE NEAREST 1/4 INCH, AND WHOLE DEGREE.

Measurements A,B,L are parallel to the dummy inclination; SL,SR,TL,TR,R are "shortest distance" measurements; all the rest are horizontal and vertical.

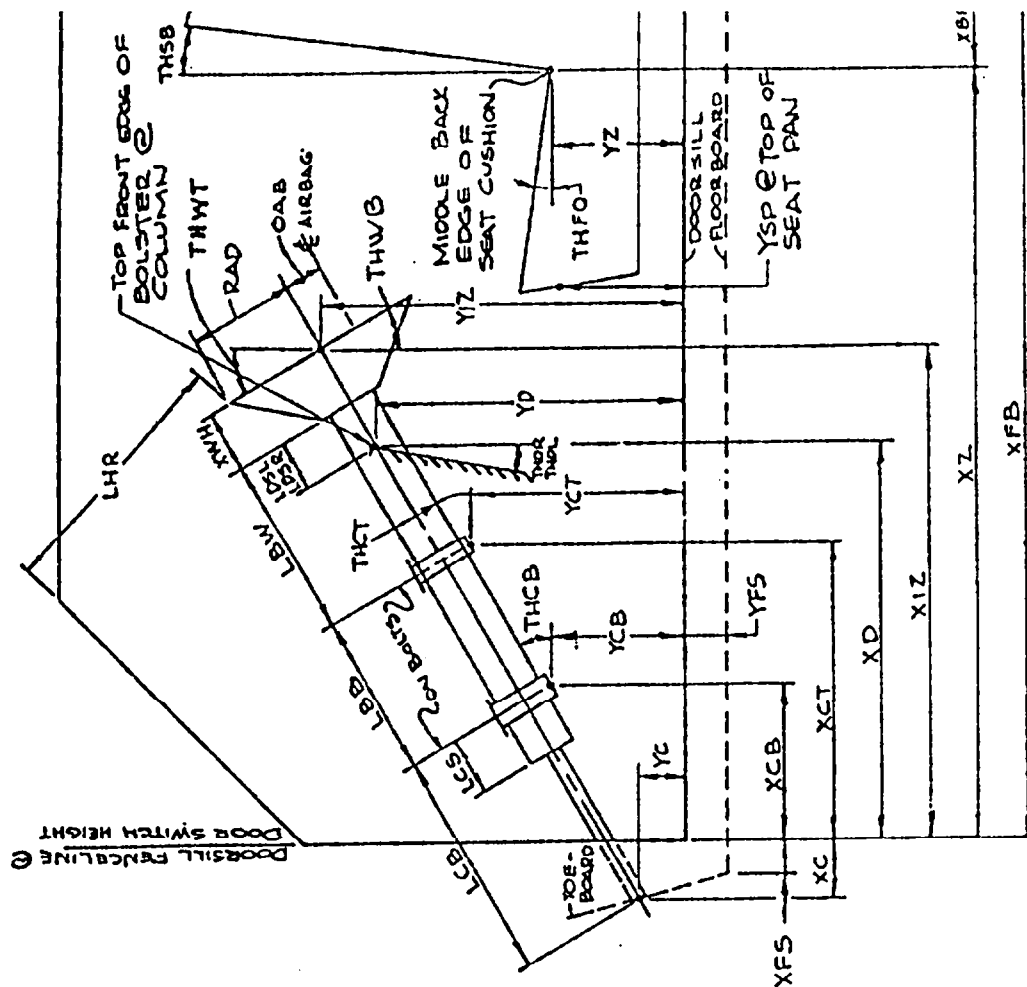
A = 22.0	B = 9.25	KL = 4.25	L = 18.0	T = 18.75
C = 24.0	E = 11.25	KR = 4.50	G = 9.50	
M = 9.5	N = 13.50	F = 6.50	P = 18.0	
R = 16.75	V = 17.50	O = 13.25	Z = 10.75	
HD = 37.0	CA = 22 °	W = 6.25	FA = 10 °	
D = 6.75	TR = 2.25	TA = 11 °	SR = 4.0	
H = 4.75	TL = 1.75	I = 16.0	SL = 3.50	

CAR PARAMETERS, PRE & POST TEST

	PRE	POST		PRE	POST
LBW=	14.5	14.5	YD=	10.0	9.0
LBB=	9.0	8.75	YD=	15.75	16.75
LGB=	8.0	5.50	UDSL=	5.50	---
XC=	14.0	10.0	UDSL=	5.5	---
YC=	7.75	9.0	YBP=	1.50	---
YL=	22.0	27.0	YFB=	36.0	35.50
YL=	17.5	13.75	YFS=	6.0	4.75
YL=	34.5	34.0	LHR=	10.50	8.25
YL=	4.75	5.25	YSP=	3.25	2.25
THCT=	22.0	40.0	YFS=	2.75	4.25
THCB=	22.0	30.0	LCS=	1.25	1.75
THWT=	22.0	40.0	QAB=	0.75	0.75
THWB=	22.0	37.0	XCB=	-7.25	-5.75
THFO=	10.0	7.0	YCB=	10.50	11.0
THSB=	25.0	20.0	XCT=	0.75	2.0
THOL=	34.0	30.0	YCT=	14.0	15.25
THOR=	32.0	30.0			

	Post			
	N	S	E	W
QD=	7.38	7.13	7.38	7.38
XW/H=	4.13	4.0	4.25	4.25

ALL DIMENSIONS TO NEAREST 1/4 INCH ± WHOLE DEGREE



DUMMY KINEMATIC SUMMARY

DRIVER

During impact, the dummy rotated forward until the upper torso and head contacted and were enfolded by the air bag. The dummy rebounded from the air bag, rotating to the right.

Also during impact, the dummy's knees were forced forward into the knee bolster crushing into the dash.

The dummy came to rest leaning across the front occupant compartment and facing forward.

PART 572 DUMMY DATA SUMMARY

TEST NO. 840808B

	DRIVER DUMMY			
	POSITIVE DIRECTIONS*		NEGATIVE DIRECTIONS**	
	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
HEAD ACCELERATION				
LONGITUDINAL	3.05	48.38	28.97	98.00
LATERAL	8.31	123.75	15.50	149.13
VERTICAL	12.94	98.00	12.49	129.38
RESULTANT		31.77 max @	98.00	
HIC		187.43 from	74.63 to	152.75
DELTA V (MPH)		-38.3 @	180.00	
DELTA X (INCHES)		-29.9 @	180.00	
CHEST ACCELERATION				
LONGITUDINAL	3.11	159.38	45.23	127.13
LATERAL	2.79	93.50	13.45	143.75
VERTICAL	---	--- Y	---	--- Y
RESULTANT		46.08 max @	127.00 Y	
DELTA V (MPH)		-38.8 @	155.88	
DELTA X (INCHES)		-33.2 @	180.00	
PELVIS ACCELERATION				
LONGITUDINAL	1.09	179.50	49.85	87.75
LATERAL	15.54	77.63	10.95	71.75
VERTICAL	14.30	75.63	10.62	146.63
RESULTANT		50.61 @	87.75	
DELTA V (MPH)		-36.7 @	170.88	
DELTA X (INCHES)		-36.9 @	180.00	
FEMUR FORCE***				
LEFT	138.22	42.38	1338.96	76.75
RIGHT	109.00	42.38	1301.02	97.38

* LONGITUDINAL: FORWARD
 LATERAL: RIGHTWARD
 VERTICAL: DOWNWARD

** LONGITUDINAL: REARWARD
 LATERAL: LEFTWARD
 VERTICAL: UPWARD

*** COMPRESSION: NEGATIVE

Y SEE TEST ANOMALIES

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY
TEST NO. 840808A

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	STEERING COLUMN HUB POSTERIOR	124.0	-15.0	32.5				
		$\Delta V = -4.5 \text{ mph @ } 107.13 \text{ msec}$			1.23	176.88	5.14	47.38
		$\Delta X = -6.8 \text{ in @ } 180.00 \text{ msec}$						
	LATERAL INFERIOR RESULTANT				1.70 5.39	95.25 57.38 7.49 @	1.39 2.38 57.50	116.00 144.25
2	LEFT B PILLAR LONGITUDINAL	100.75	-29.5	13.5				
		$\Delta V = -5.3 \text{ mph @ } 116.25 \text{ msec}$			0.66	180.00	6.15	41.88
		$\Delta X = -8.2 \text{ in @ } 180.00 \text{ msec}$						
	LATERAL VERTICAL RESULTANT				0.95 0.93	42.50 59.13 6.22 @	0.89 0.39 41.88	49.50 51.88
3	RIGHT B PILLAR LONGITUDINAL	99.5	30.0	15.5				
		$\Delta V = -5.4 \text{ mph @ } 111.63 \text{ msec}$			0.69	130.50	6.42	42.38
		$\Delta X = -8.2 \text{ in @ } 180.00 \text{ msec}$						
	LATERAL VERTICAL RESULTANT				0.65 0.89	68.75 25.63 6.43 @	0.86 0.56 42.38	31.50 90.75
4	FIREWALL LONGITUDINAL	151.0	25.5	30.0				
		$\Delta V = -4.9 \text{ mph @ } 166.75 \text{ msec}$			0.68	180.00	5.53	35.50
		$\Delta X = -7.4 \text{ in @ } 180.00 \text{ msec}$						
5	RIGHT FENDER WELL INNER LONGITUDINAL	185.5	29.5	32.0				
		$\Delta V = -5.0 \text{ mph @ } 108.63 \text{ msec}$			0.70	175.13	5.76	46.00
		$\Delta X = -7.6 \text{ in @ } 180.00 \text{ msec}$						

* REFERENCE: X - REAR BUMPER (+ FORWARD), Y - VEHICLE CENTERLINE (+ TO RIGHT)
Z - GROUND (+ UP)

ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS IN INCHES

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY
TEST NO. 840808B

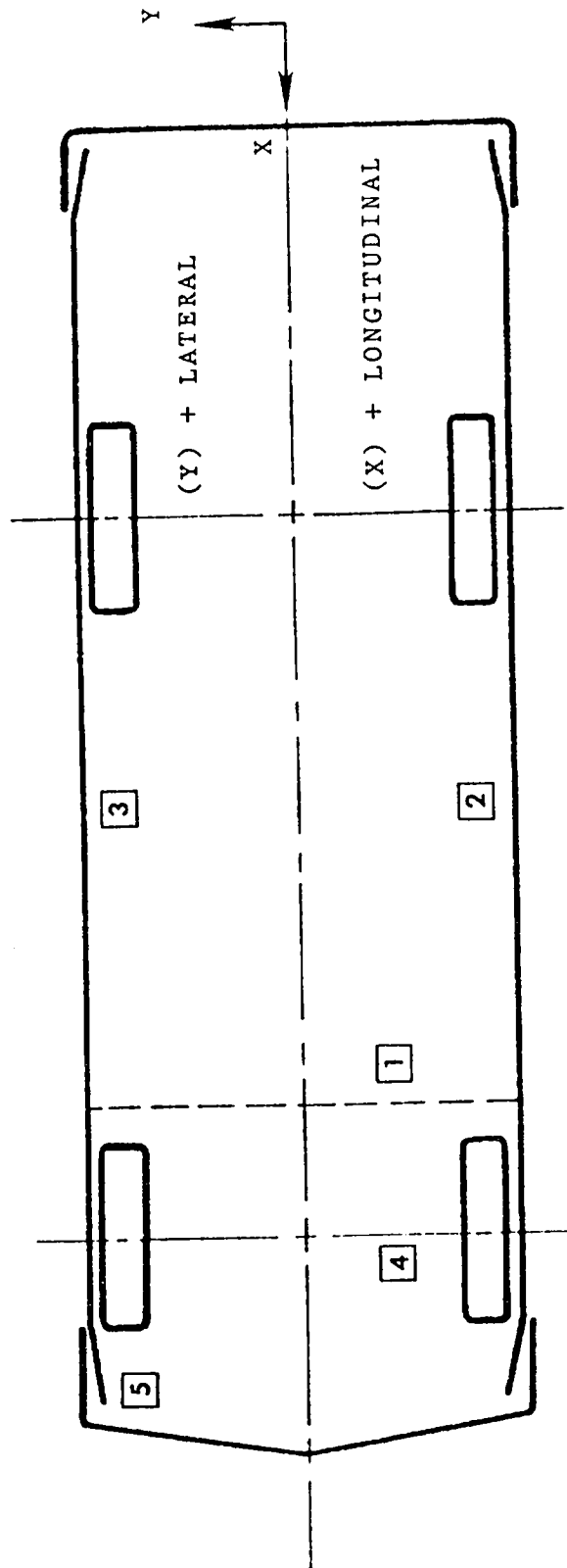
NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	STEERING COLUMN HUB POSTERIOR	124.0	-15.0	32.5				
		$\Delta V = -24.1 \text{ mph @ } 178.25 \text{ msec}$			5.80	90.75	32.76	74.75
		$\Delta X = -30.6 \text{ in @ } 180.00 \text{ msec}$						
	LATERAL				15.91	138.88	17.58	77.50
	INFERIOR				42.17	115.25	21.95	72.88
	RESULTANT					42.31 @	115.13	
2	LEFT B PILLAR	100.8	-29.5	13.5				
	LONGITUDINAL	$\Delta V = -34.2 \text{ mph @ } 162.50 \text{ msec}$			1.55	169.88	24.52	72.88
		$\Delta X = -41.7 \text{ in @ } 180.00 \text{ msec}$						
	LATERAL				8.95	95.13	10.50	64.25
	VERTICAL				7.82	58.63	9.16	114.50
	RESULTANT					24.73 @	72.88	
3	RIGHT B PILLAR	99.5	30.0	15.5				
	LONGITUDINAL	$\Delta V = -34.7 \text{ mph @ } 164.63 \text{ msec}$			2.27	180.00	25.93	92.75
		$\Delta X = -41.5 \text{ in @ } 180.00 \text{ msec}$						
	LATERAL				8.23	34.25	14.09	86.75
	VERTICAL				9.63	91.00	11.95	113.00
	RESULTANT					27.30 @	92.25	
4	FIREWALL	151.0	25.5	30.0				
	LONGITUDINAL	$\Delta V = -34.0 \text{ mph @ } 168.50 \text{ msec}$			6.30	32.88	38.12	100.00
		$\Delta X = -41.3 \text{ in @ } 180.00 \text{ msec}$						
5	RIGHT FENDER WELL INNER	185.5	29.5	32.0				
	LONGITUDINAL	$\Delta V = -35.4 \text{ mph @ } 170.13 \text{ msec}$			7.26	35.13	31.10	83.63
		$\Delta X = -43.7 \text{ in @ } 180.00 \text{ msec}$						

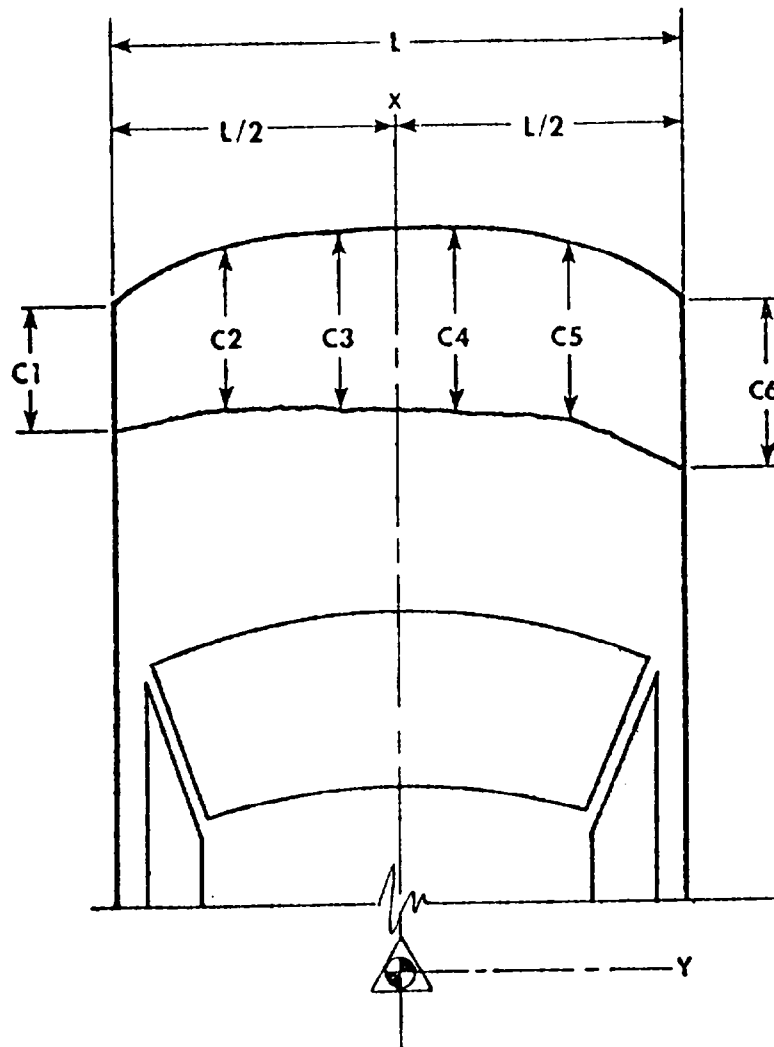
AIR BAG FIRING TIME $\pm$ 39 msec

* REFERENCE: X - REAR BUMPER (+ FORWARD), Y - VEHICLE CENTERLINE (+ TO RIGHT)
Z - GROUND (+ UP)

ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS IN INCHES

VEHICLE ACCELEROMETER LOCATIONS





NOTE: C1 through C6 are spaced equally apart

VEHICLE 1980 FORD LTD

<u>PRE-TEST</u>	<u>POST-TEST</u>	<u>CRUSH</u>
L <u>71.88</u>	L <u>48.0</u>	L <u>-23.88</u>
C1 <u>40.13</u>	C1 <u>38.50</u>	C1 <u>-1.63</u>
C2 <u>39.63</u>	C2 <u>51.31</u>	C2 <u>11.68</u>
C3 <u>38.25</u>	C3 <u>63.38</u>	C3 <u>25.13</u>
C4 <u>38.25</u>	C4 <u>70.75</u>	C4 <u>32.50</u>
C5 <u>39.63</u>	C5 <u>57.94</u>	C5 <u>18.31</u>
C6 <u>40.38</u>	C6 <u>44.38</u>	C6 <u>4.00</u>
D <u>DNA</u>	D <u>DNA</u>	D <u>DNA</u>

Reference line 16' forward of rear axle centerline

HIGH SPEED CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Onboard - Window	Photosonic 1B	8	1000	Dummy kinematics
2	Onboard - Window	Photosonic 1B	8	1000	Dummy kinematics
3	Left Side	Photosonic 1B	25	1000	Vehicle kinematics
4	Left Wide View	Photosonic 1B	13	1000*	Overall impact
5	Right Closeup	Photosonic 1B	25	1000*	Vehicle crush
6	Overhead	Photosonic 1B	17	1000	Vehicle kinematics

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

* Camera did not run due to power failure.

APPENDIX A

PHOTOGRAHS - TEST 840808A

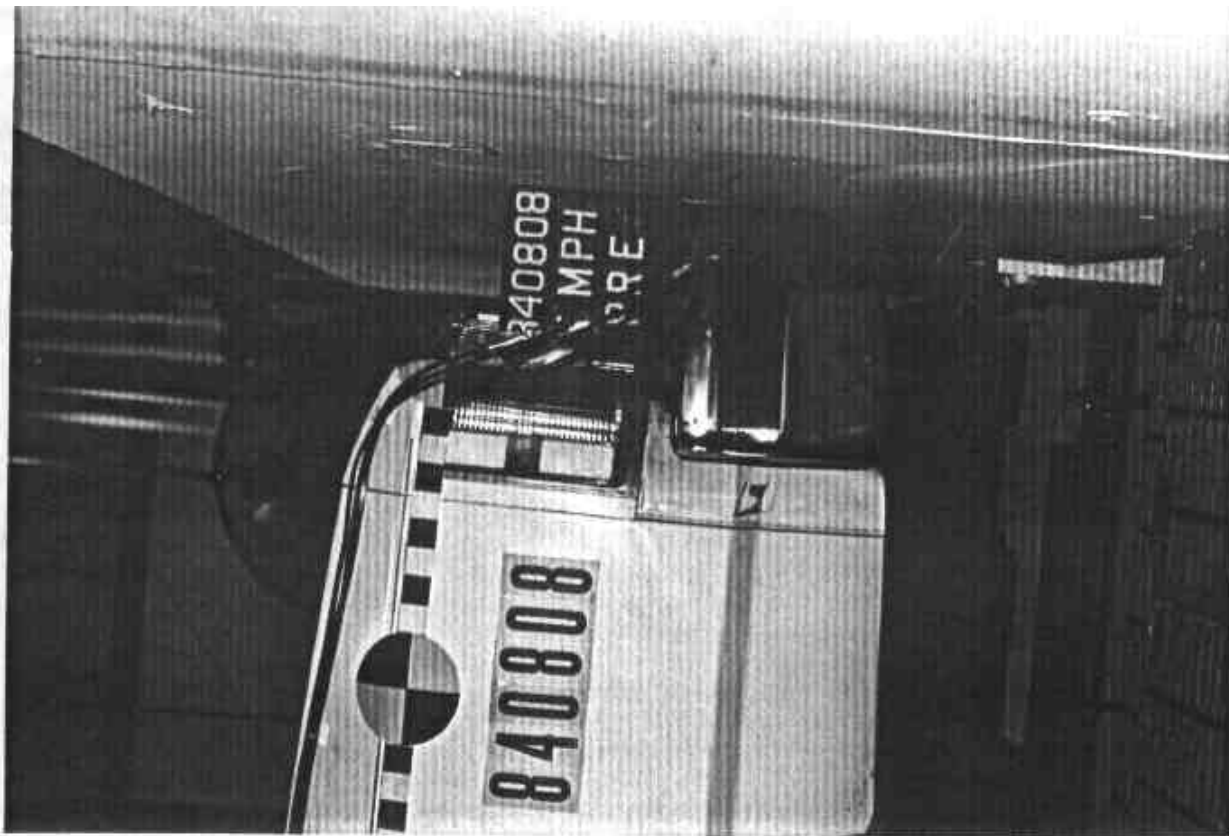


Figure A-1. PRE-TEST CLOSEUP - VIEW 1

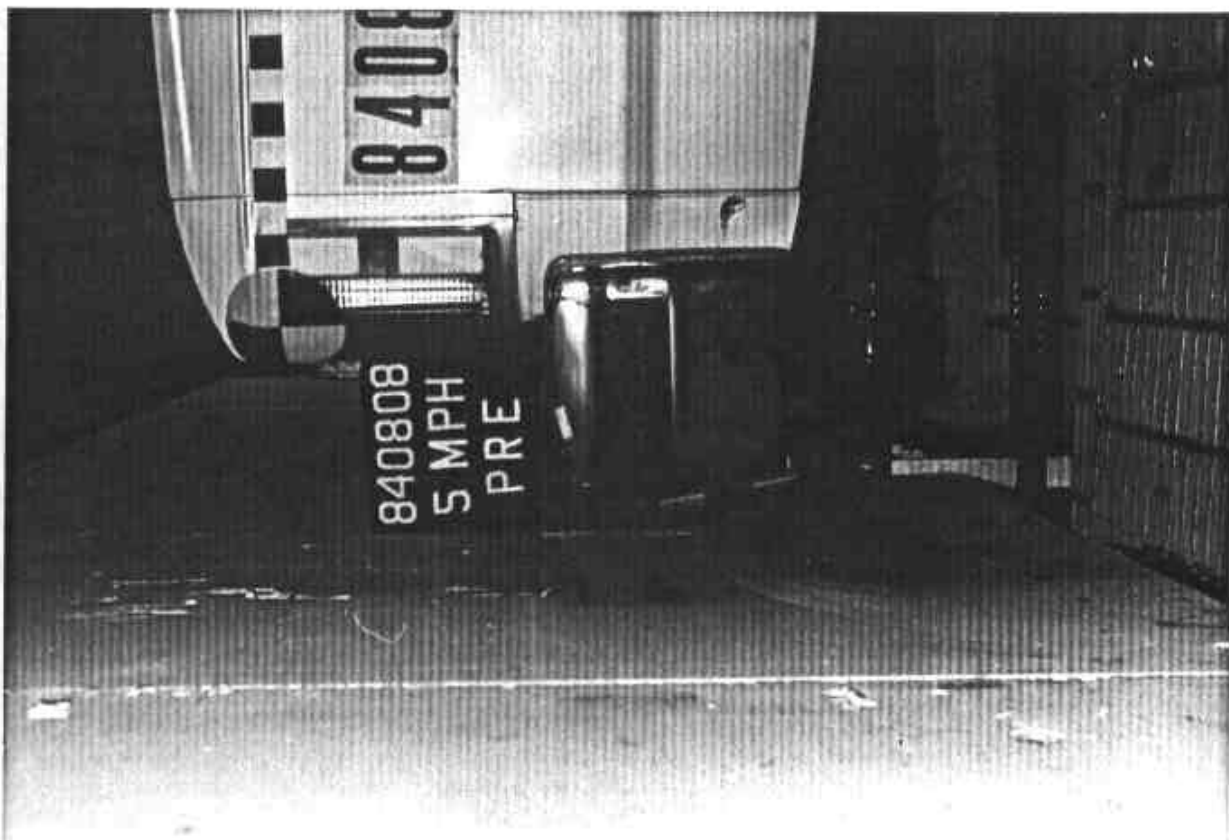


Figure A-2. PRE-TEST CLOSEUP - VIEW 2
A-2

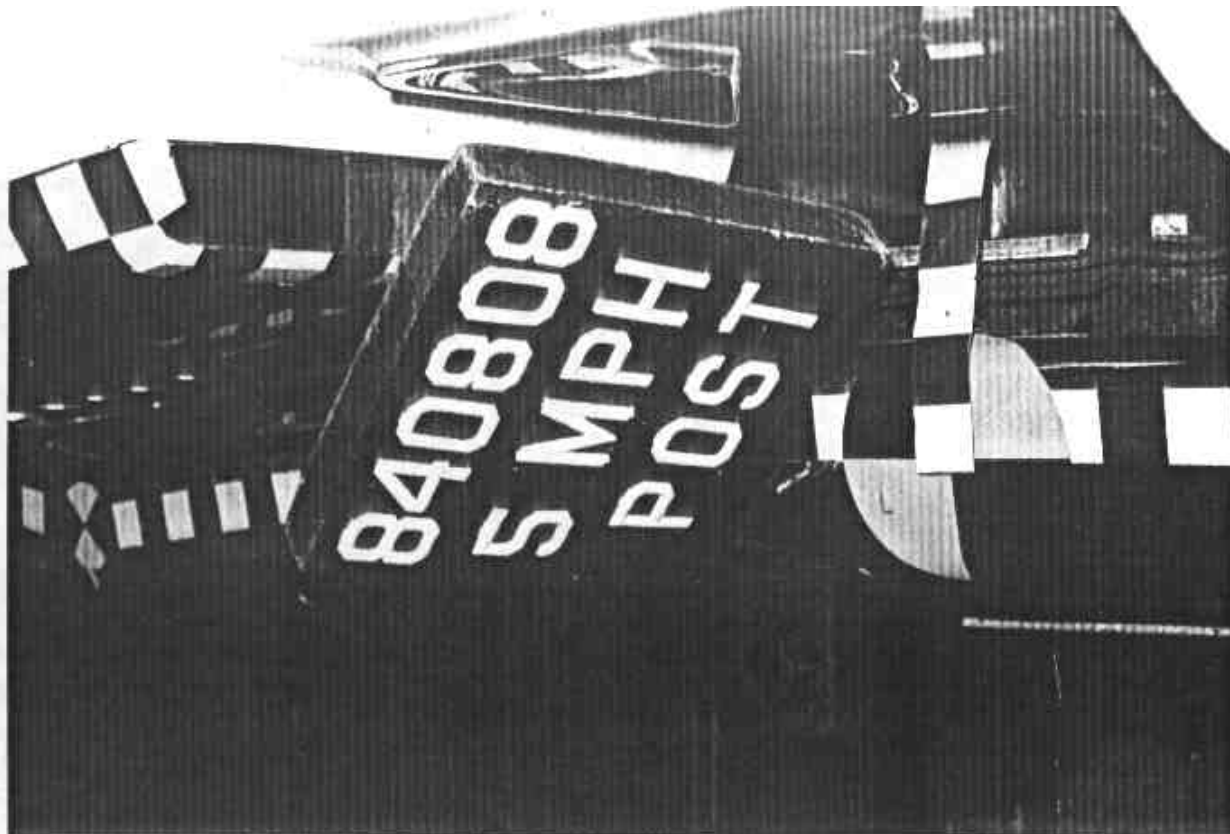


Figure A-3. POST-TEST CLOSEUP - VIEW 1

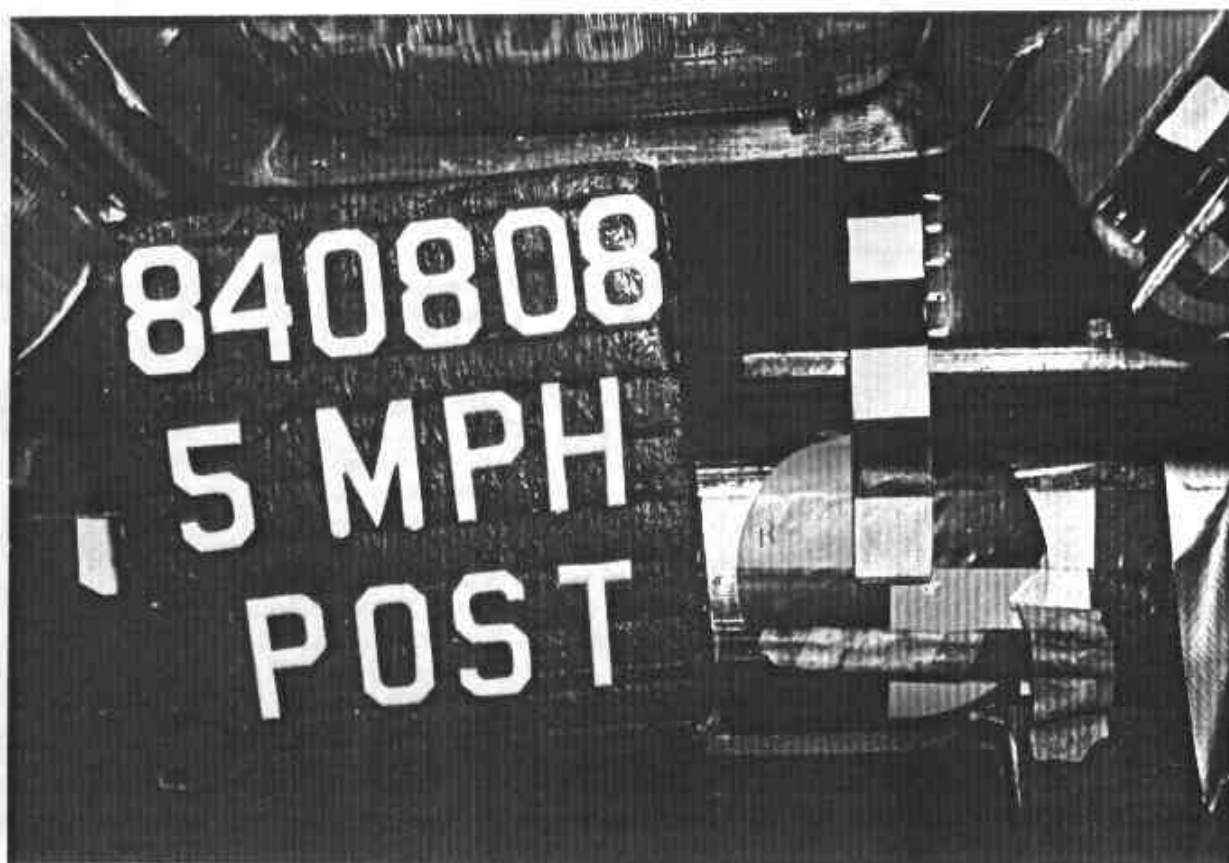


Figure A-4. POST-TEST CLOSEUP - VIEW 2
A-3

APPENDIX B
PHOTOGRAPHS - TEST 840808B



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



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



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

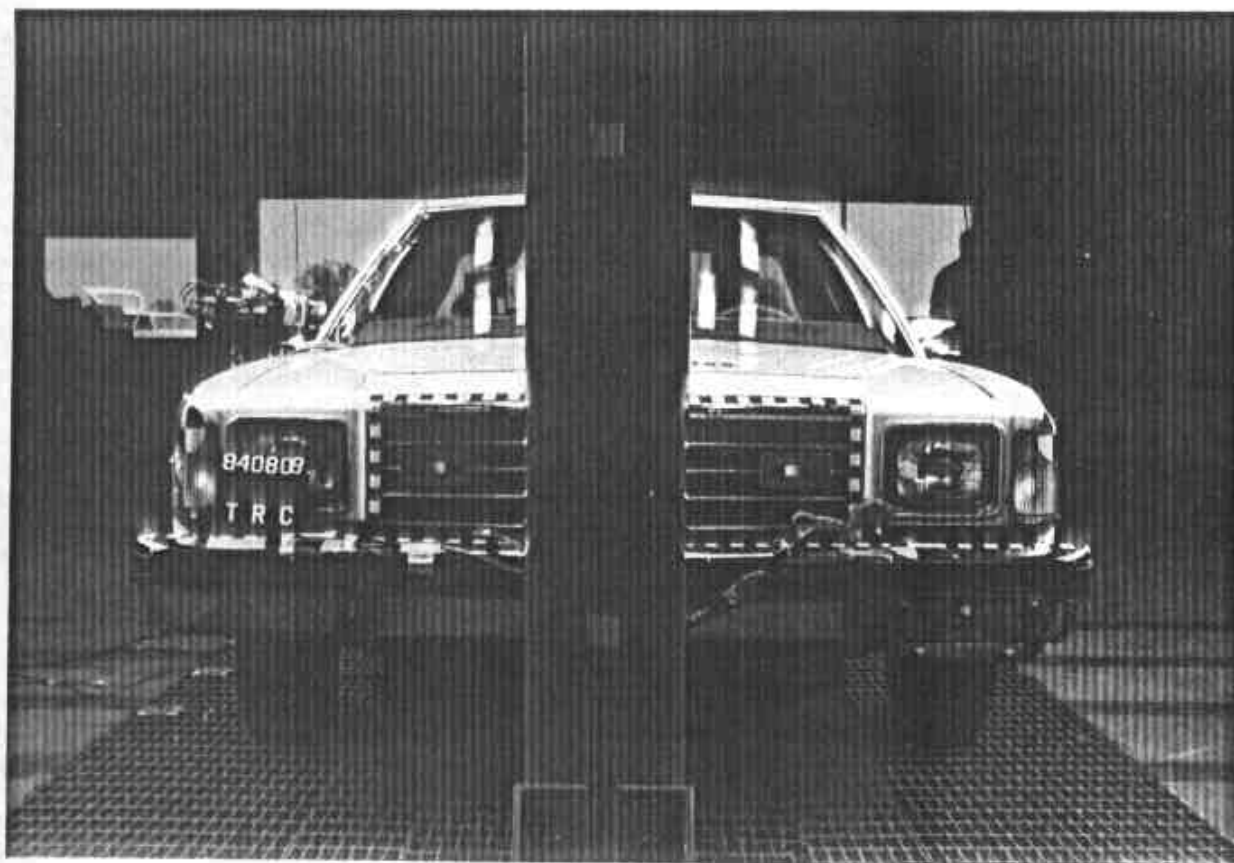


Figure B-4. PRE-TEST OVERALL - VIEW 4
B-3

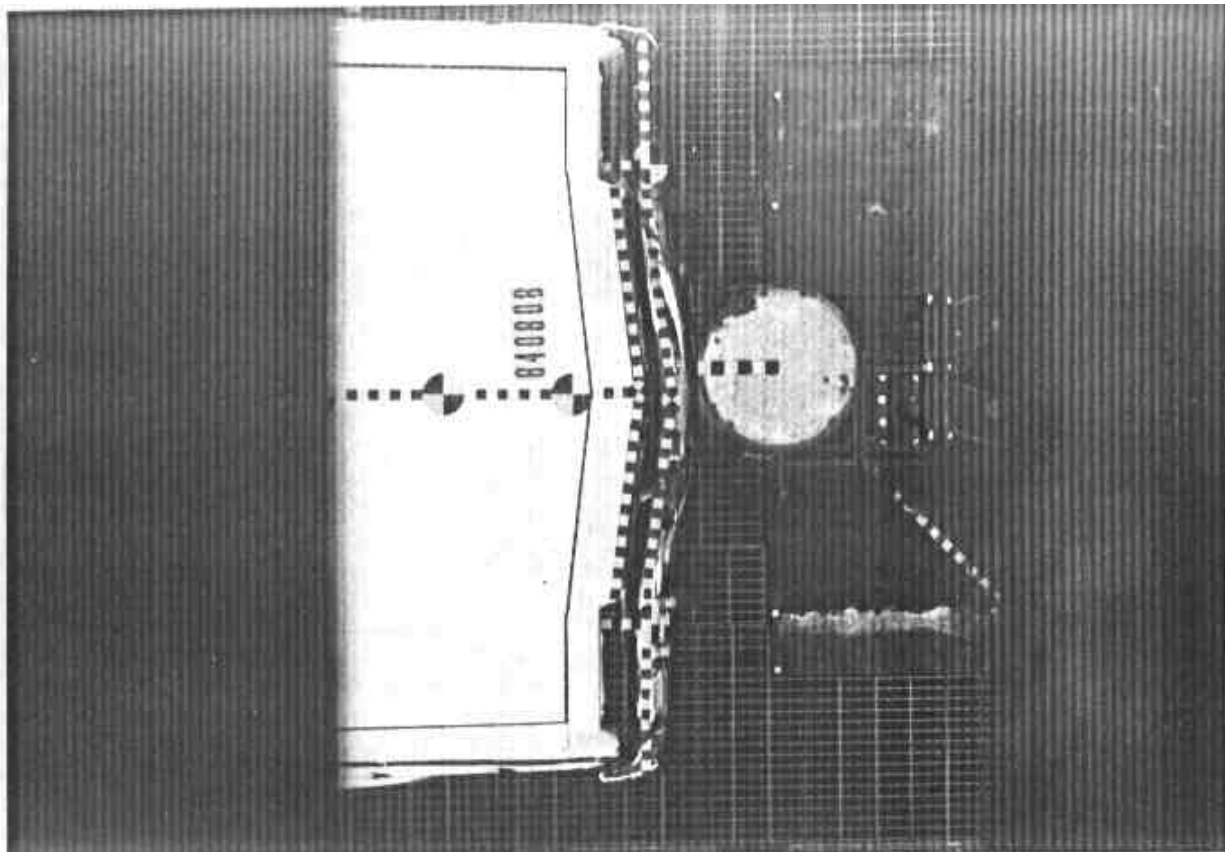


Figure B-5. PRE-TEST OVERHEAD

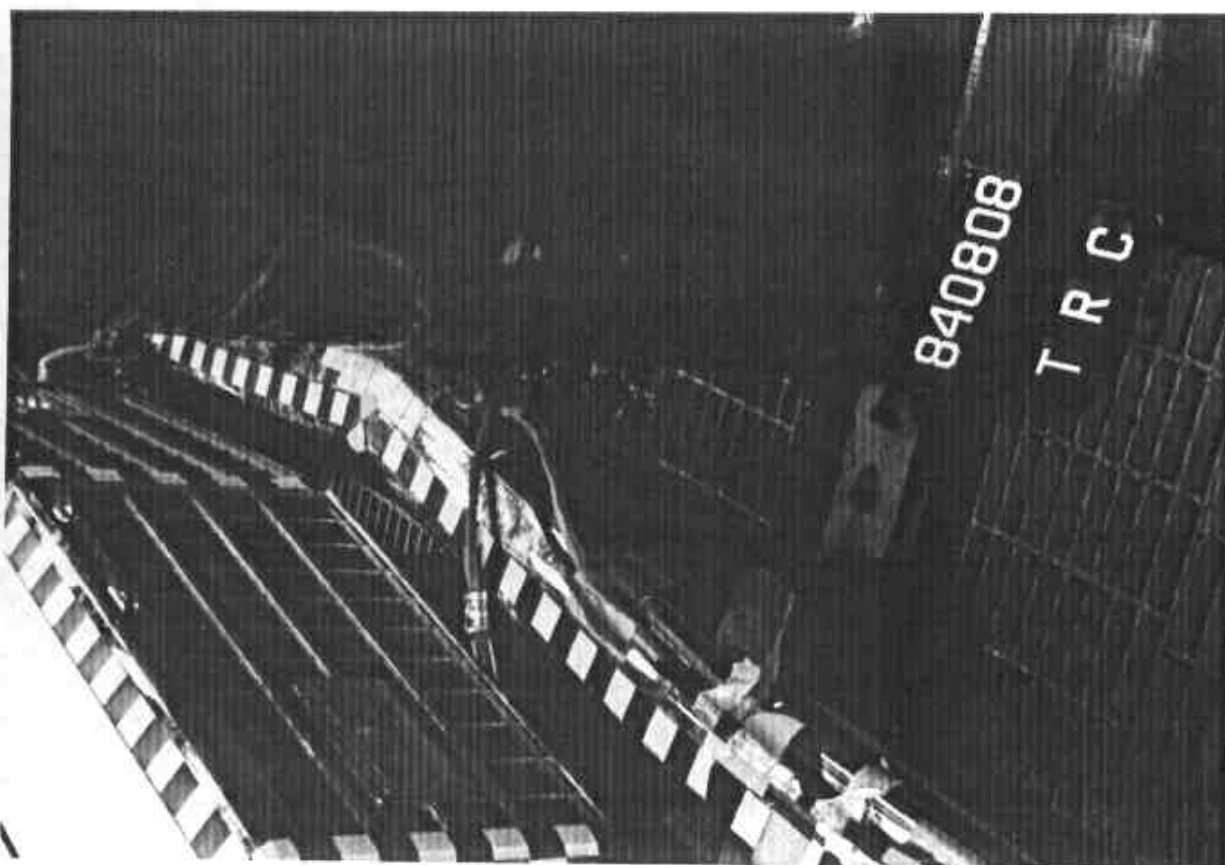


Figure B-6. PRE-TEST CLOSEUP
B-8



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

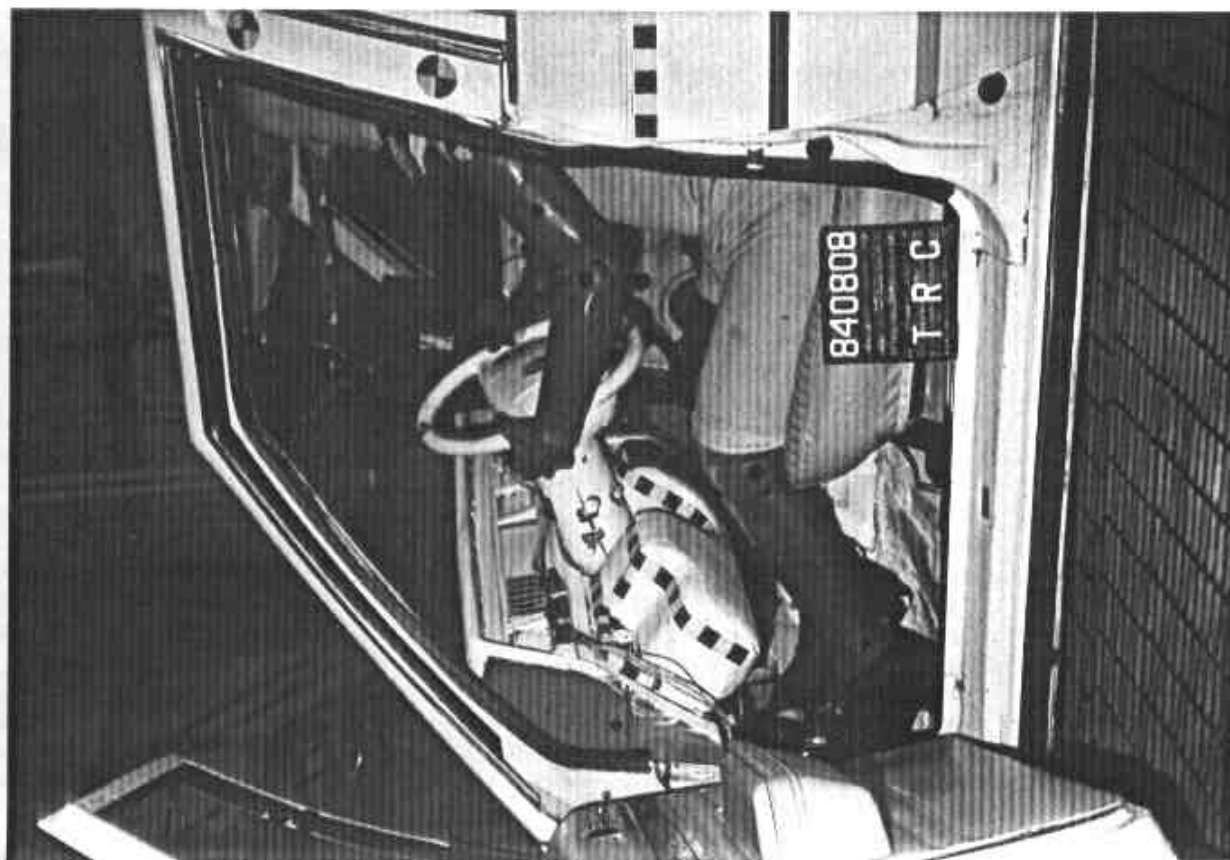


Figure B-8. PRE-TEST DRIVER DUMMY - VIEW 2
B-5

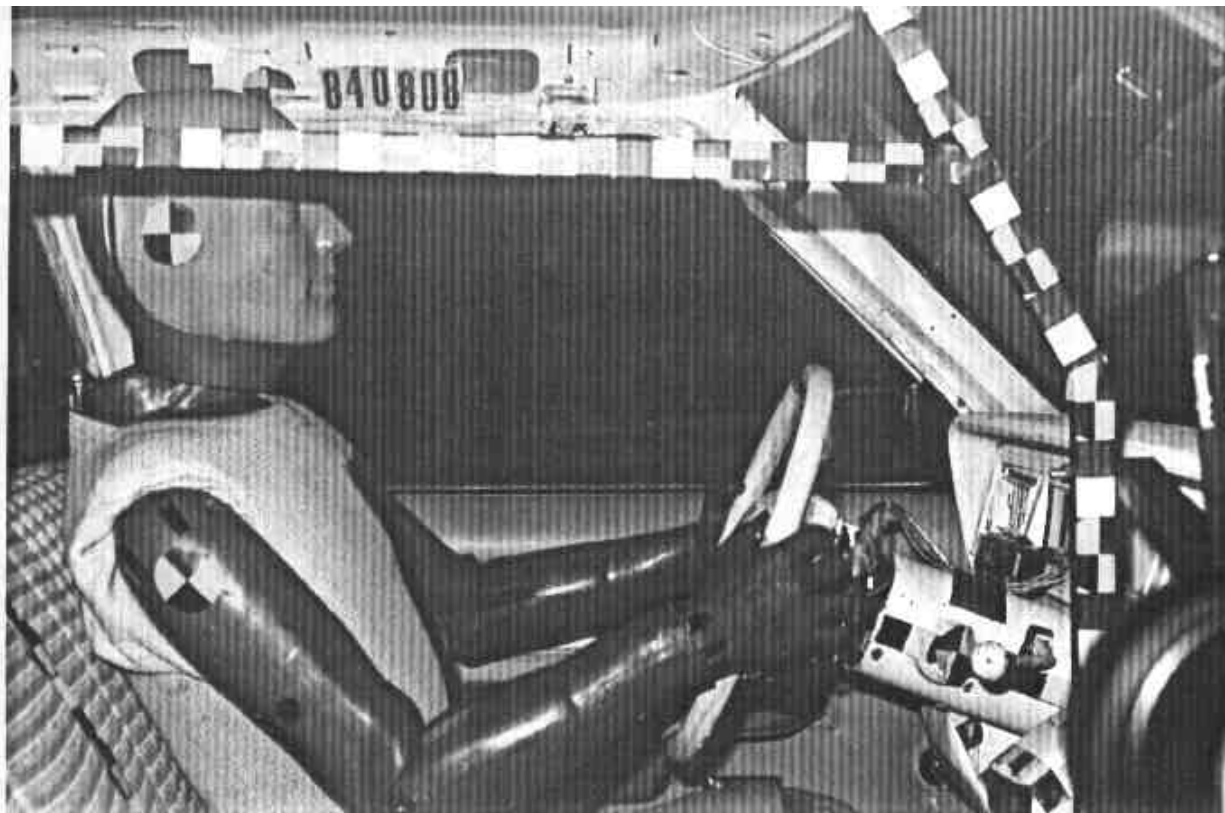


Figure B-9. PRE-TEST DRIVER DUMMY - VIEW 3

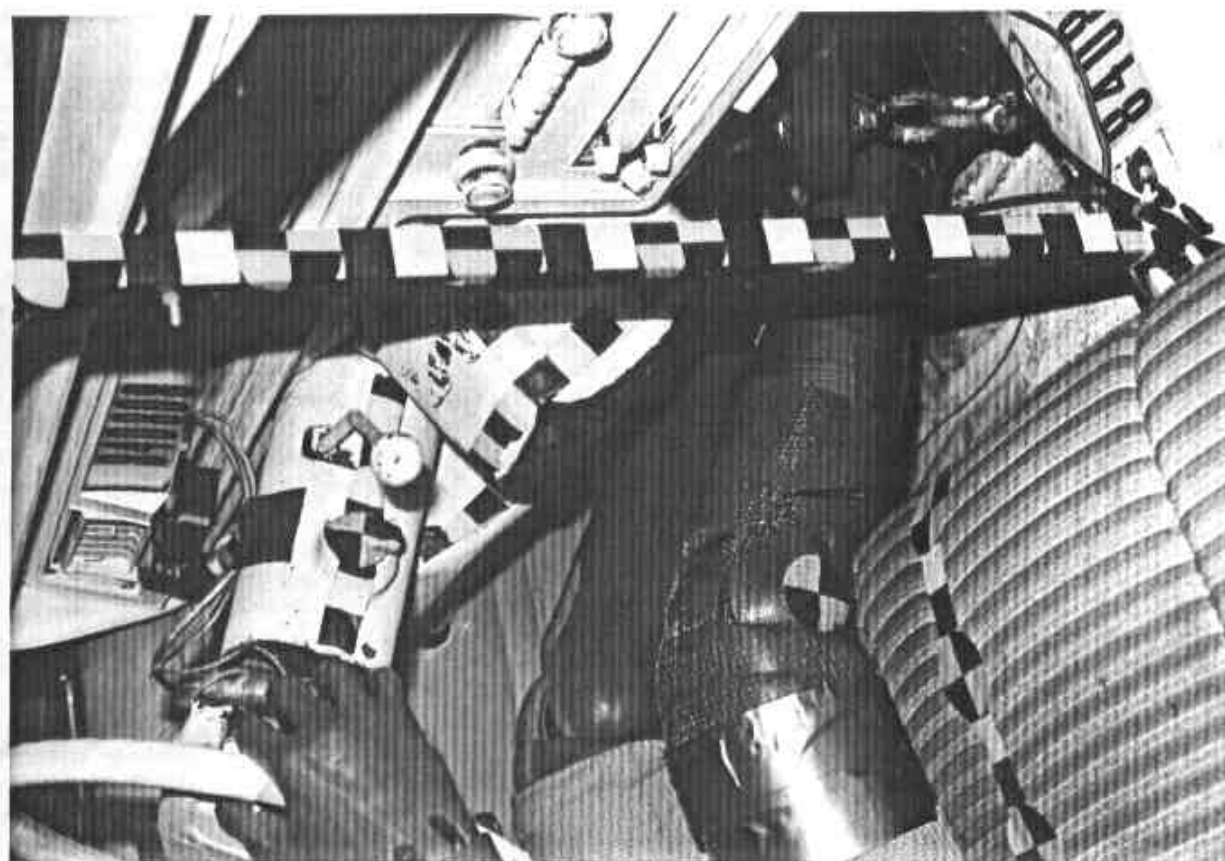


Figure B-10. PRE-TEST DRIVER DUMMY CLOSEUP - VIEW 1
B-6



Figure B-11. PRE-TEST DRIVER DUMMY CLOSEUP - VIEW 2



Figure B-12. POST-TEST OVERALL - VIEW 1
B-7



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

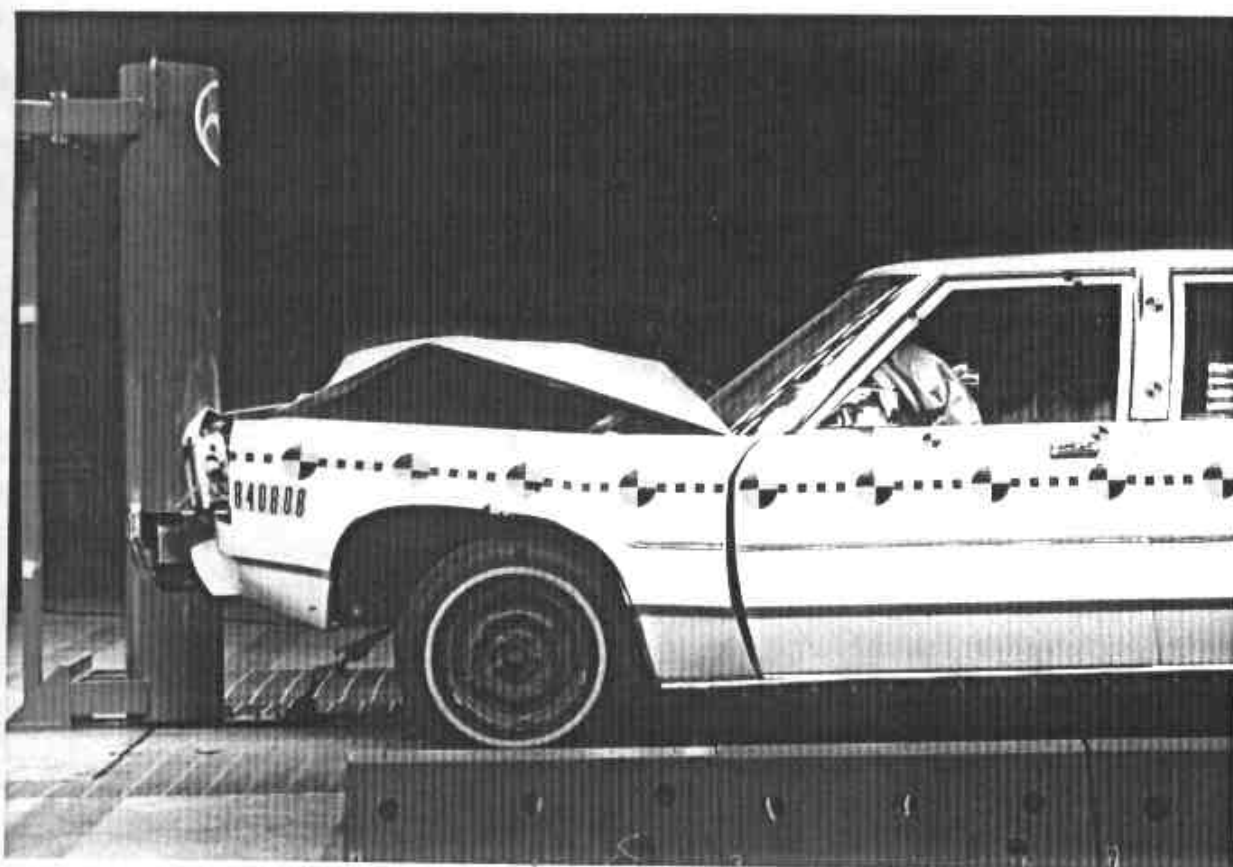


Figure B-14. POST-TEST OVERALL - VIEW 3

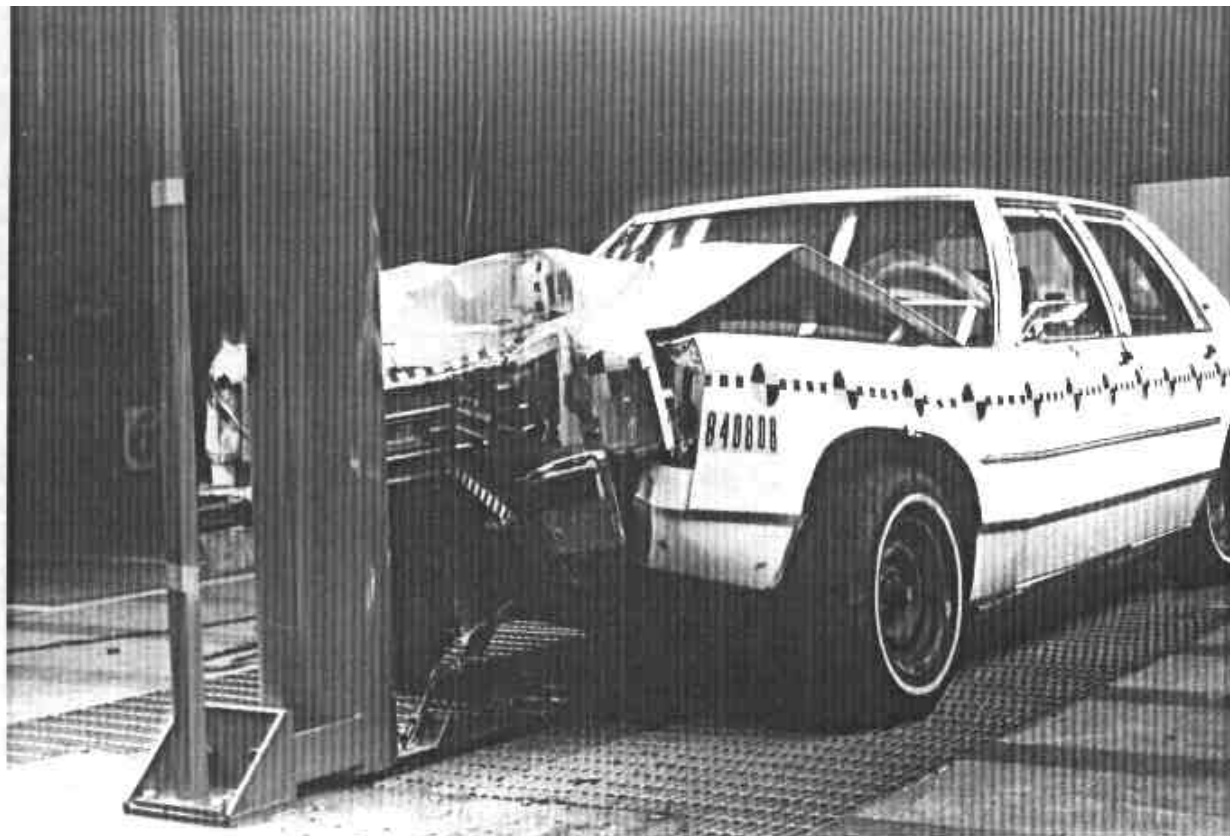


Figure B-15. POST-TEST OVERALL - VIEW 4



Figure B-16. POST-TEST OVERALL - VIEW 5
B-9



Figure B-17. POST-TEST CLOSEUP



Figure B-18. POST-TEST DRIVER DUMMY - VIEW 1
B-10



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

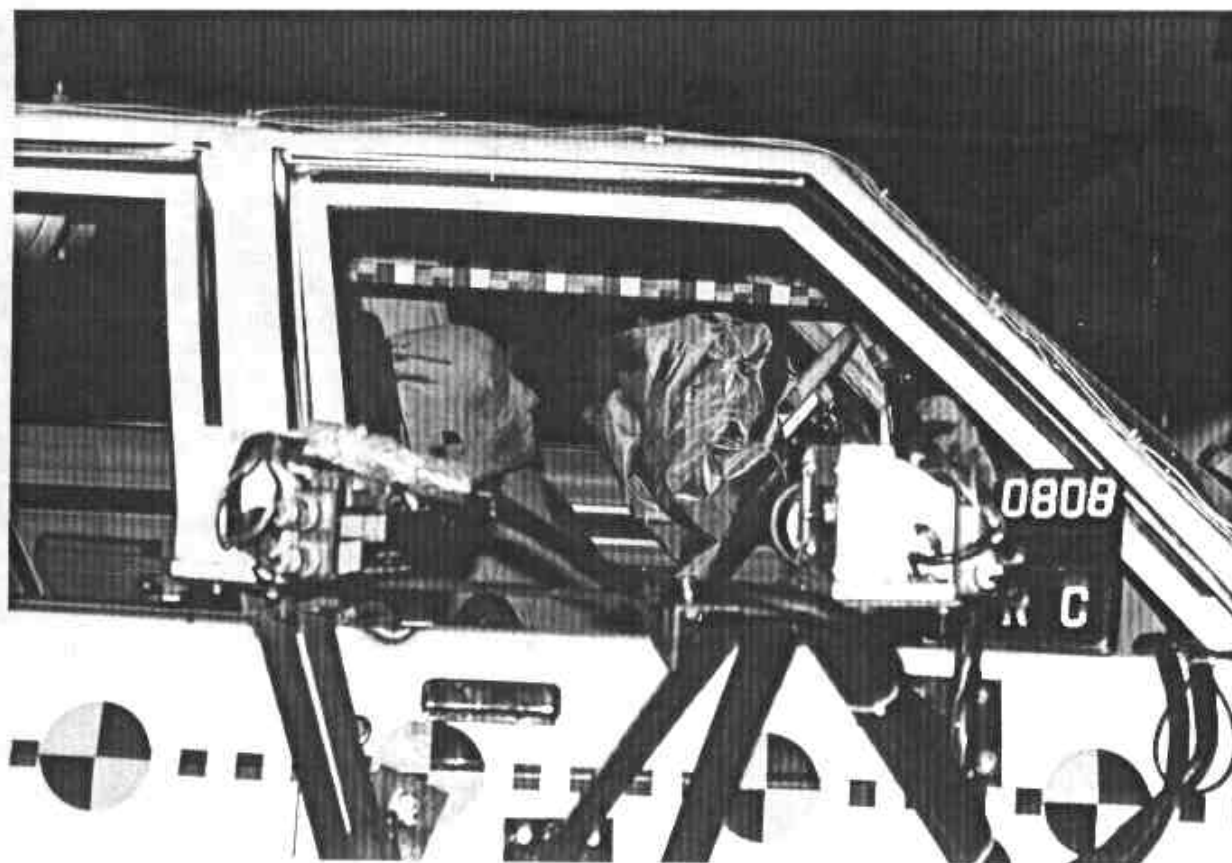


Figure B-20. POST-TEST DRIVER DUMMY - VIEW 3

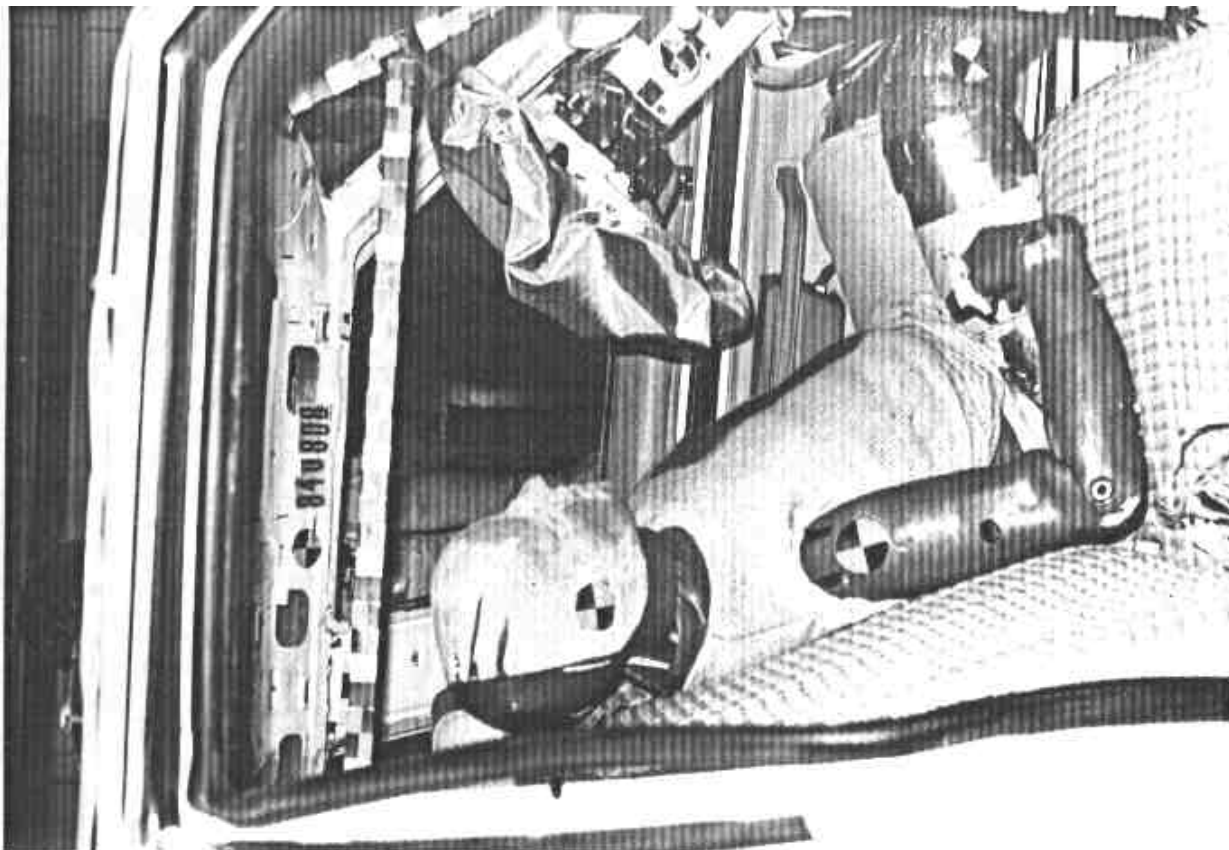


Figure B-21. POST-TEST DRIVER DUMMY - VIEW 4

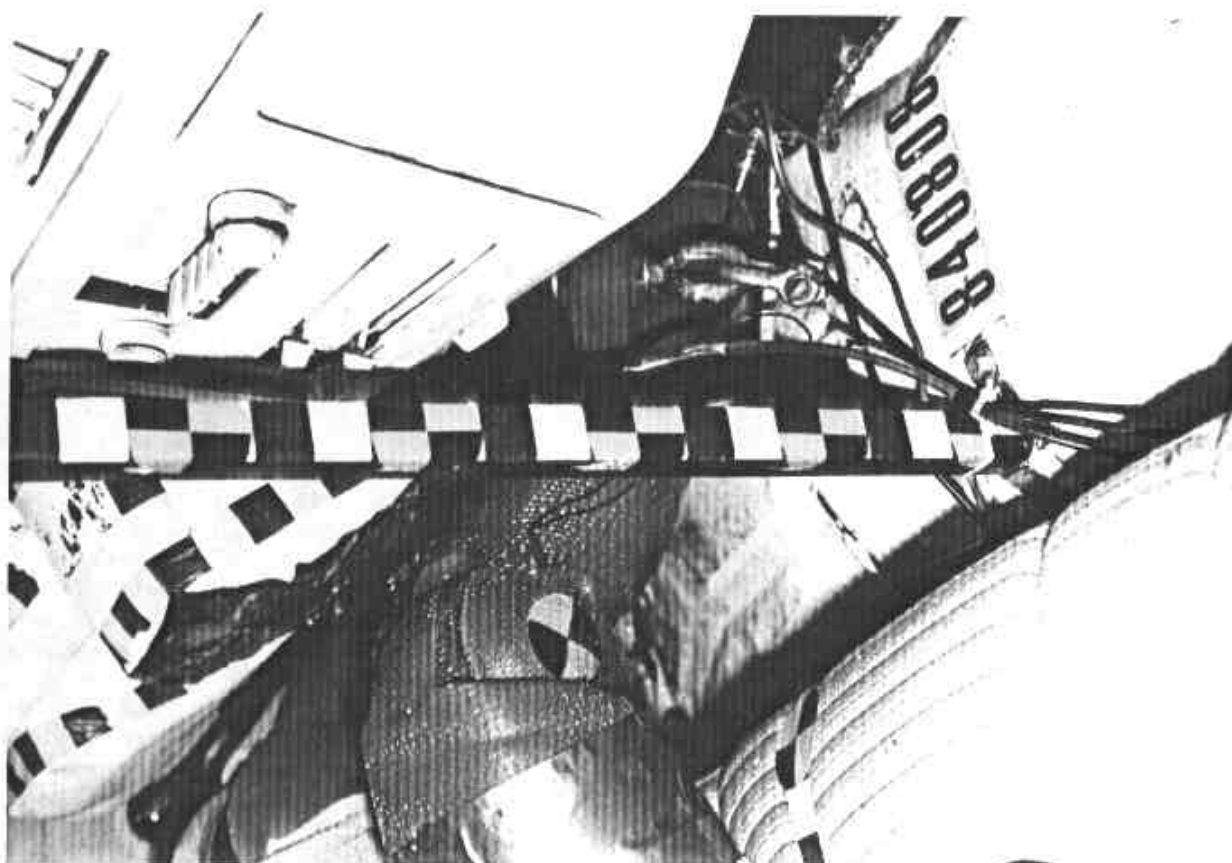


Figure B-22. POST-TEST DRIVER DUMMY CLOSEUP - VIEW 1
B-12

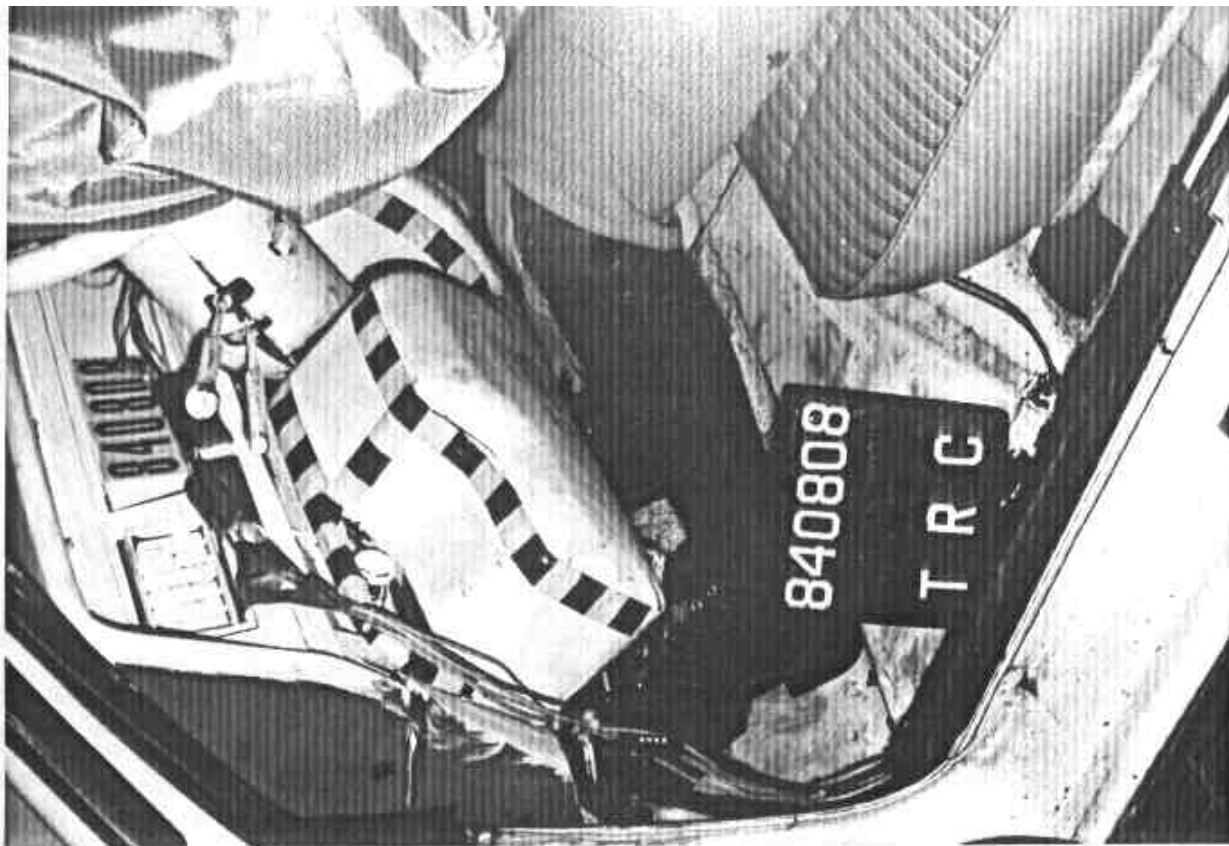


Figure B-23. POST-TEST DRIVER DUMMY CLOSEUP - VIEW 2

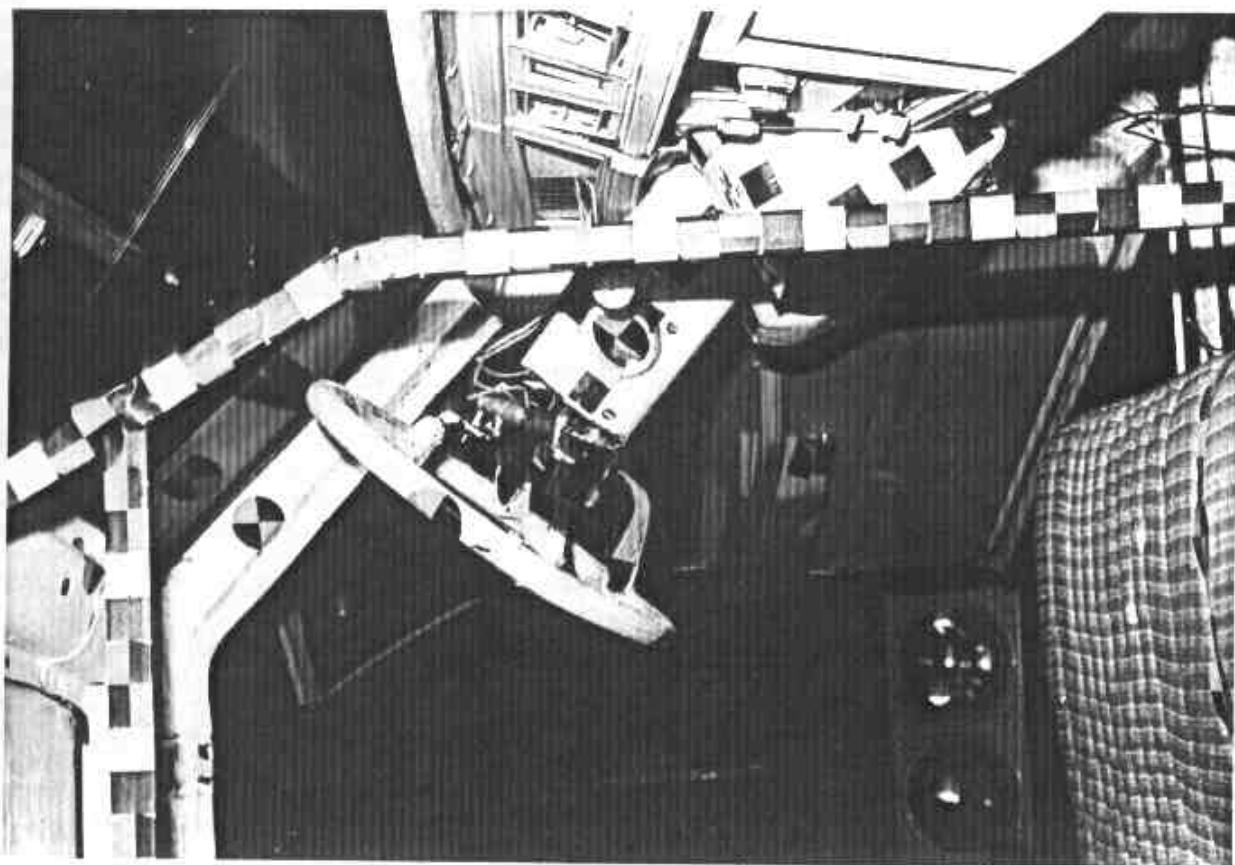


Figure B-24. POST-TEST STEERING COLUMN DAMAGE
B-13



Figure B-25. POST-TEST VEHICLE DAMAGE

APPENDIX C

DATA PLOT PRESENTATION - TEST 840808A

Data plots generated from the bumper 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.

FILTER = BLPF 100/ 316/ -40

842210800000

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1941

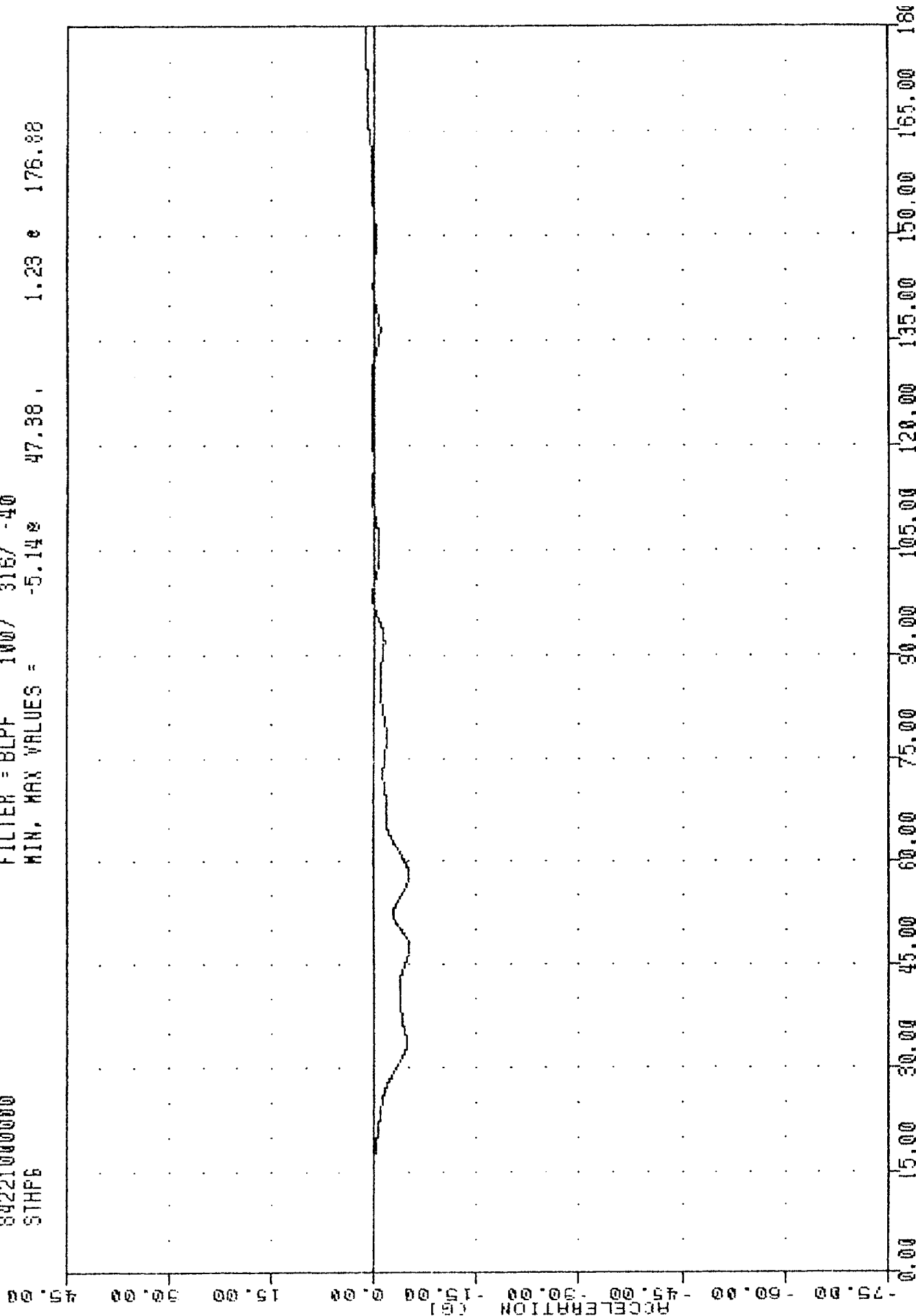
DT- 1916

21
22
23
24
25

00
00
00
00

231

135.02



FORD LTD INTO FIXED BARRIER
STEERING COLUMN HUB ACCELERATION POSTERIOR.

842210000000

STHLG

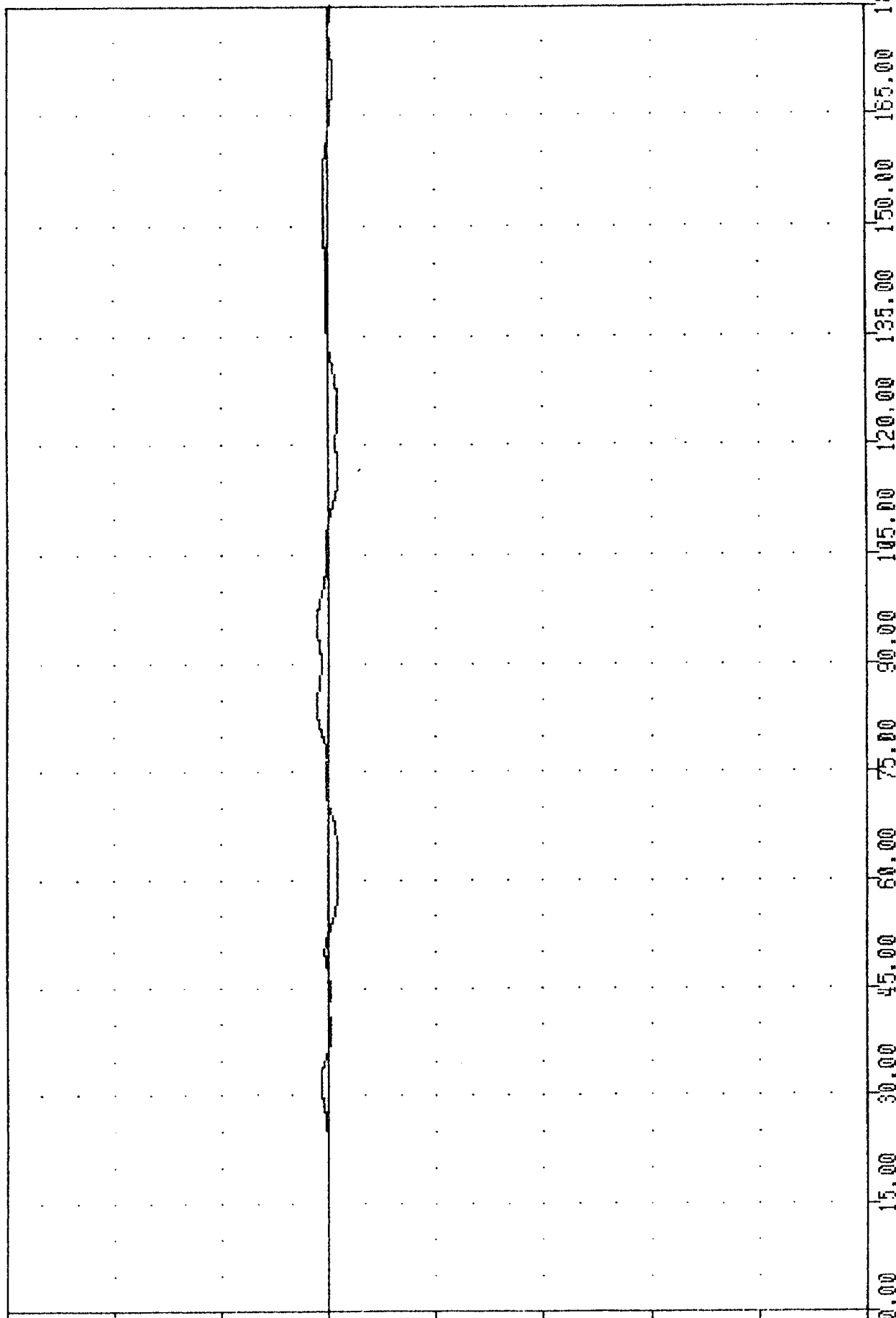
842210000000

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -1.39e 116.00, 1.70 e 95.25

C-3

ACCELERATION (G)



FORD LTD INTO FIXED BARRIER
STEERING COLUMN HUB ACCELERATION LATERAL

GREEN HINDS PROGRAM

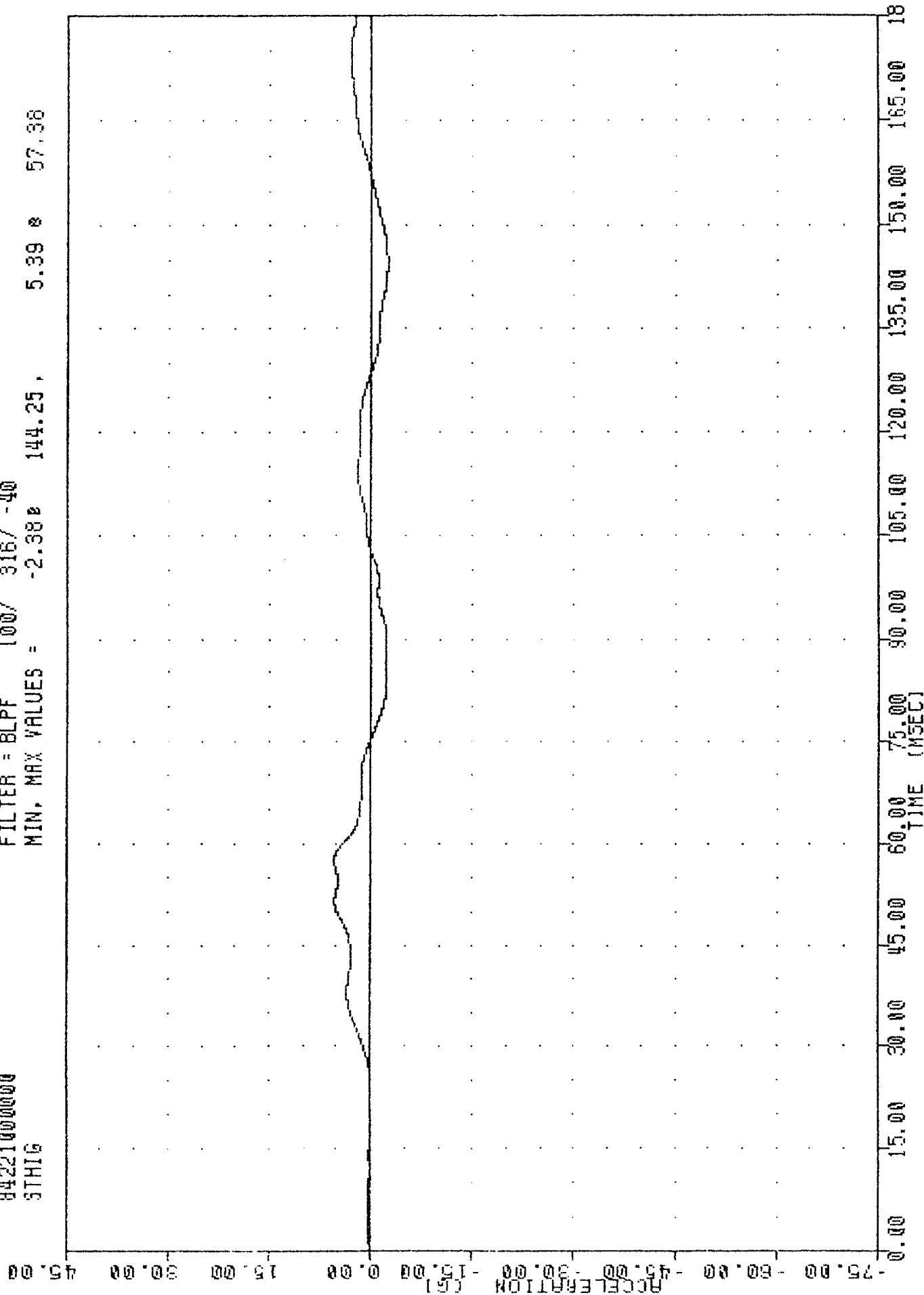
84221000000

STHIG

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -2.388 144.25, 5.39 57.38

C-4



FORD LTD INTO FIXED BARRIER
STEERING COLUMN HUB ACCELERATION INFERIOR.

842210000000

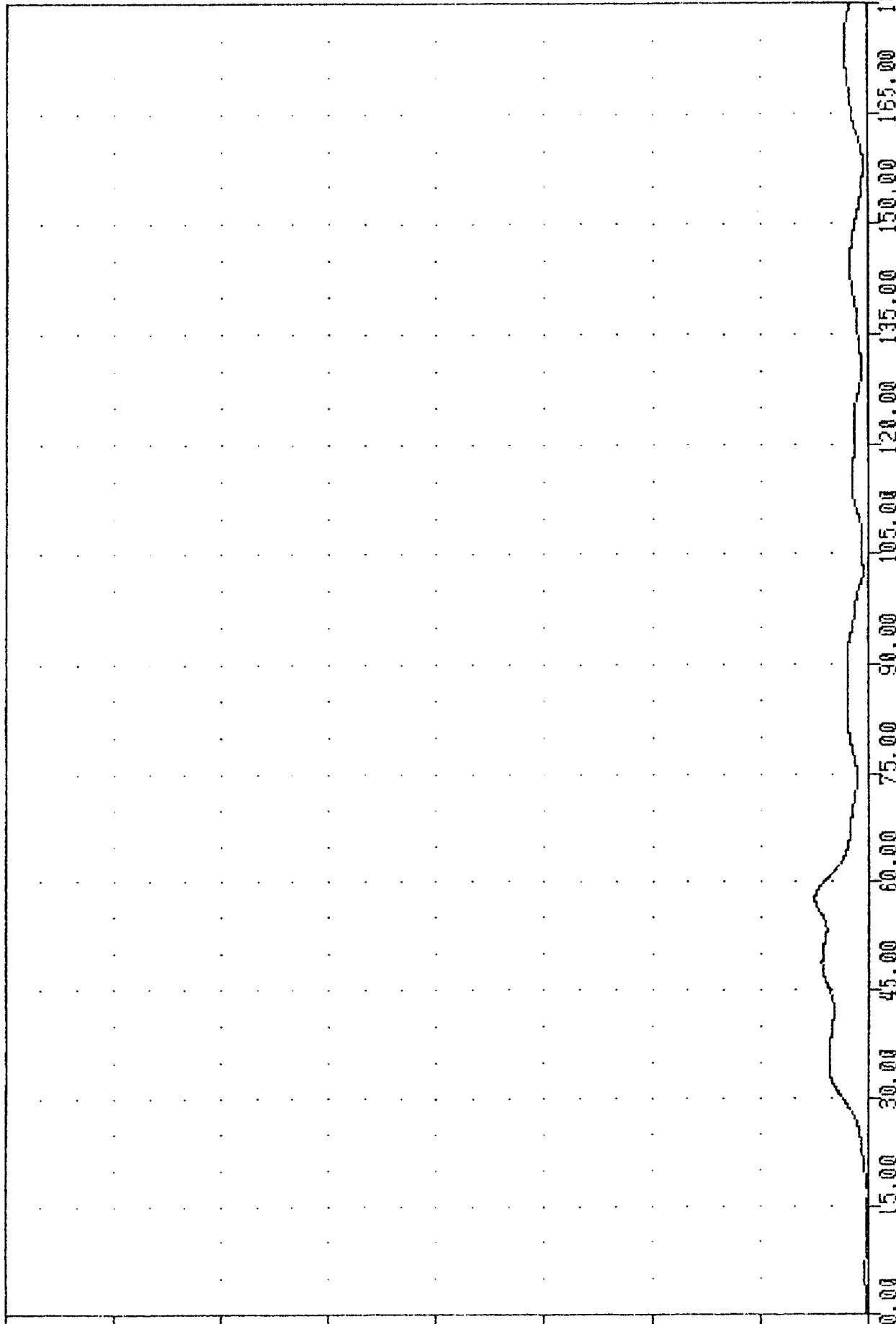
STHRB

FILTER = BLPF 100/ 316/ -40

HIN, MAX VALUES = 0.000

7.49 0 57.50

ACCELERATION (G)



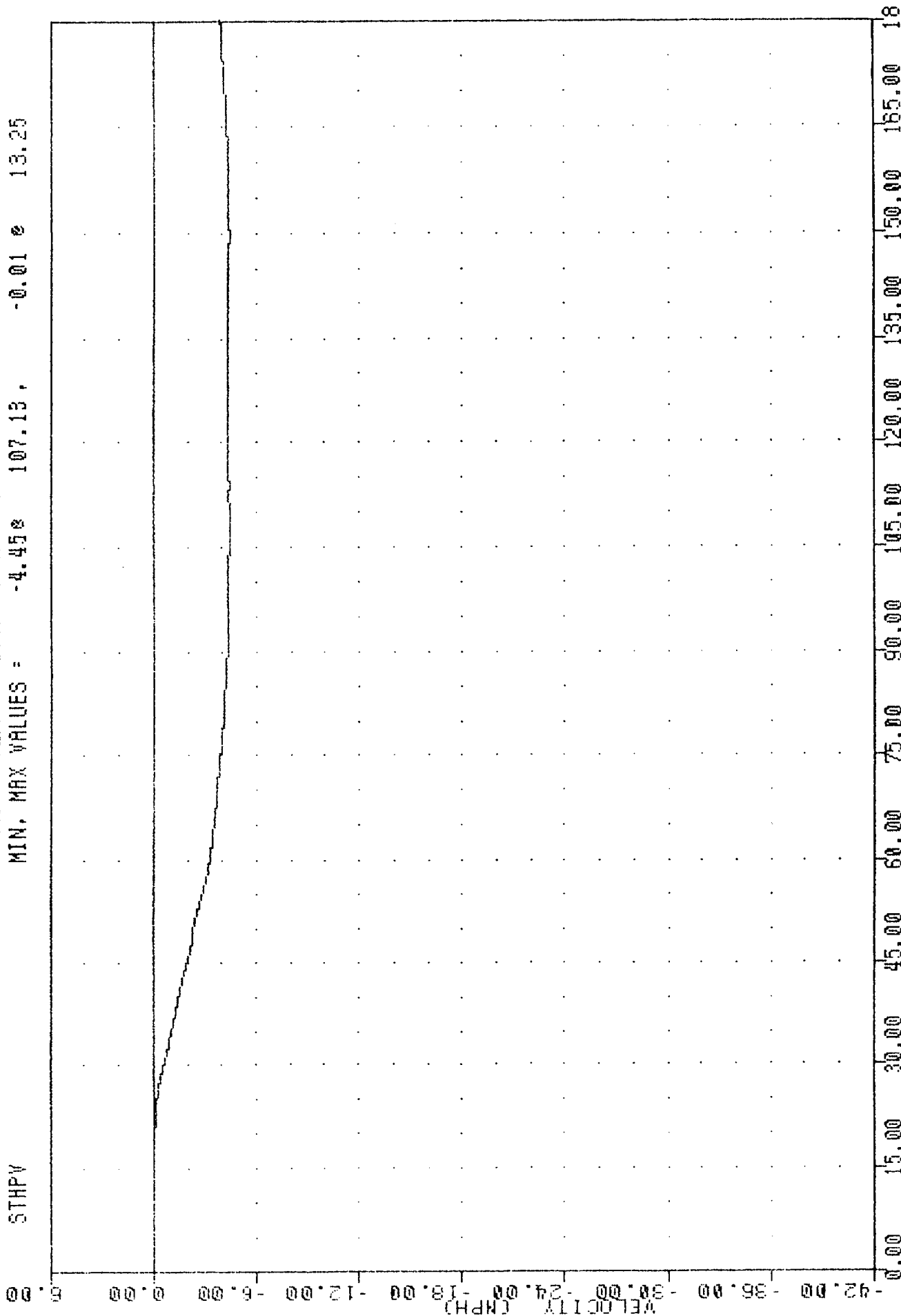
FORD LTD INTO FIXED BARRIER
STEERING COLUMN HUB RESULTANT

842210000000

STHPV

FILTER = 8LPF 300/ 949/ -40

MIN. MAX VALUES = -4.45 107.13, -0.01 13.25



SHLW DATAING PROGRAM

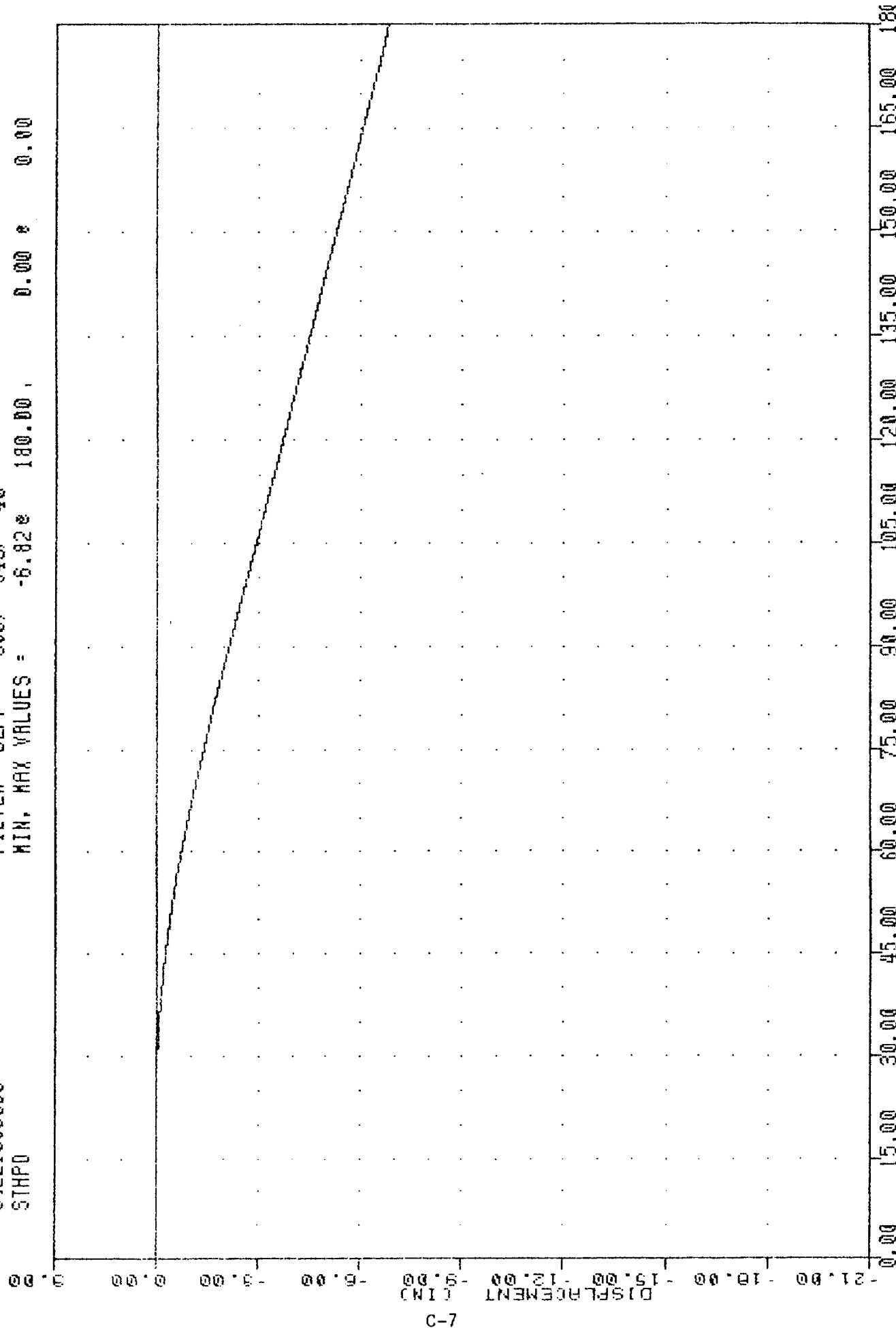
84221000000

STHP0

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -6.82 180.00 ,

0.00 0.00



FORD LTD INTO FIXED BARRIER

DELTA X USING STHPV

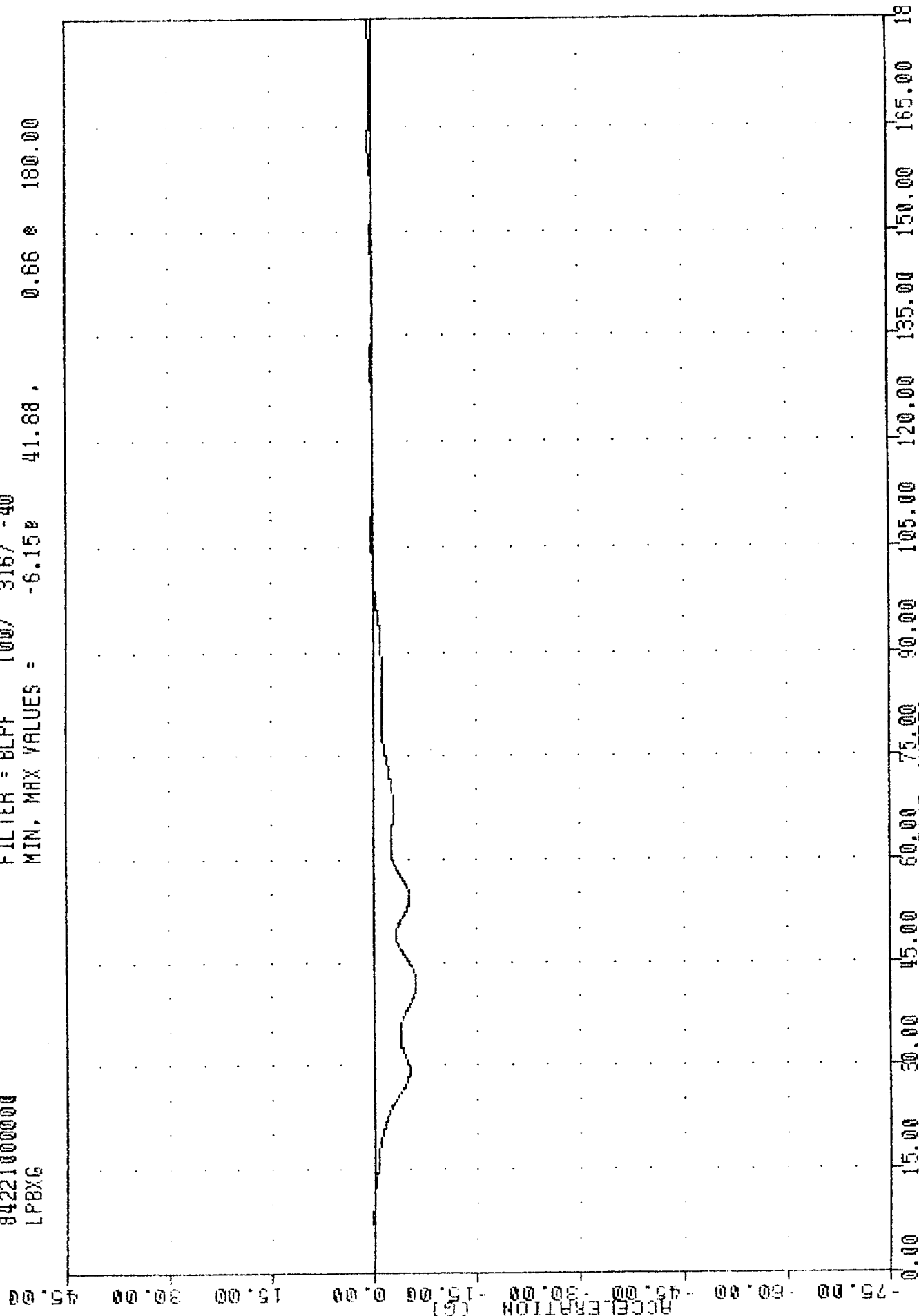
BREED AIRBAG PROGRAM

842210000000

LPBXC

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -6.15e 41.88, 0.66 e 180.00



FORD LTD INTO FIXED BARRIER
LEFT B PILLAR ACCELERATION X AXIS

BRUED HINBHS FRUGHHM

84221000000

LPBYG

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -0.898 49.50 ,

0.95 8 42.50

45.00

30.00

15.00

0.00

-15.00

-30.00

-45.00

-60.00

-75.00

0.00

15.00

30.00

45.00

60.00

75.00

90.00

105.00

120.00

135.00

150.00

165.00

180.00

6-3

ACCELERATION (G)

TIME (MSEC)

FORD LTD INTO FIXED BARRIER
LEFT B PILLAR ACCELERATION Y AXIS

BREED HIRSHS PROGRAM

842210000000

LP826

FILTER = SLPF 100/ 316/ -40

MIN. MAX VALUES = -0.390 51.88 0.93 59.13

45.00

30.00

15.00

0.00

-15.00

-30.00

-45.00

-60.00

-75.00

01-C

ACCELERATION (G)

0.00

15.00

30.00

45.00

60.00

75.00

90.00

105.00

120.00

135.00

150.00

165.00

180.00

195.00

210.00

225.00

240.00

255.00

270.00

285.00

300.00

315.00

330.00

345.00

360.00

375.00

390.00

405.00

420.00

435.00

450.00

TIME (MSEC)

FORD LTD INTO FIXED BARRIER
LEFT B PILLAR ACCELERATION Z AXIS

842210000000

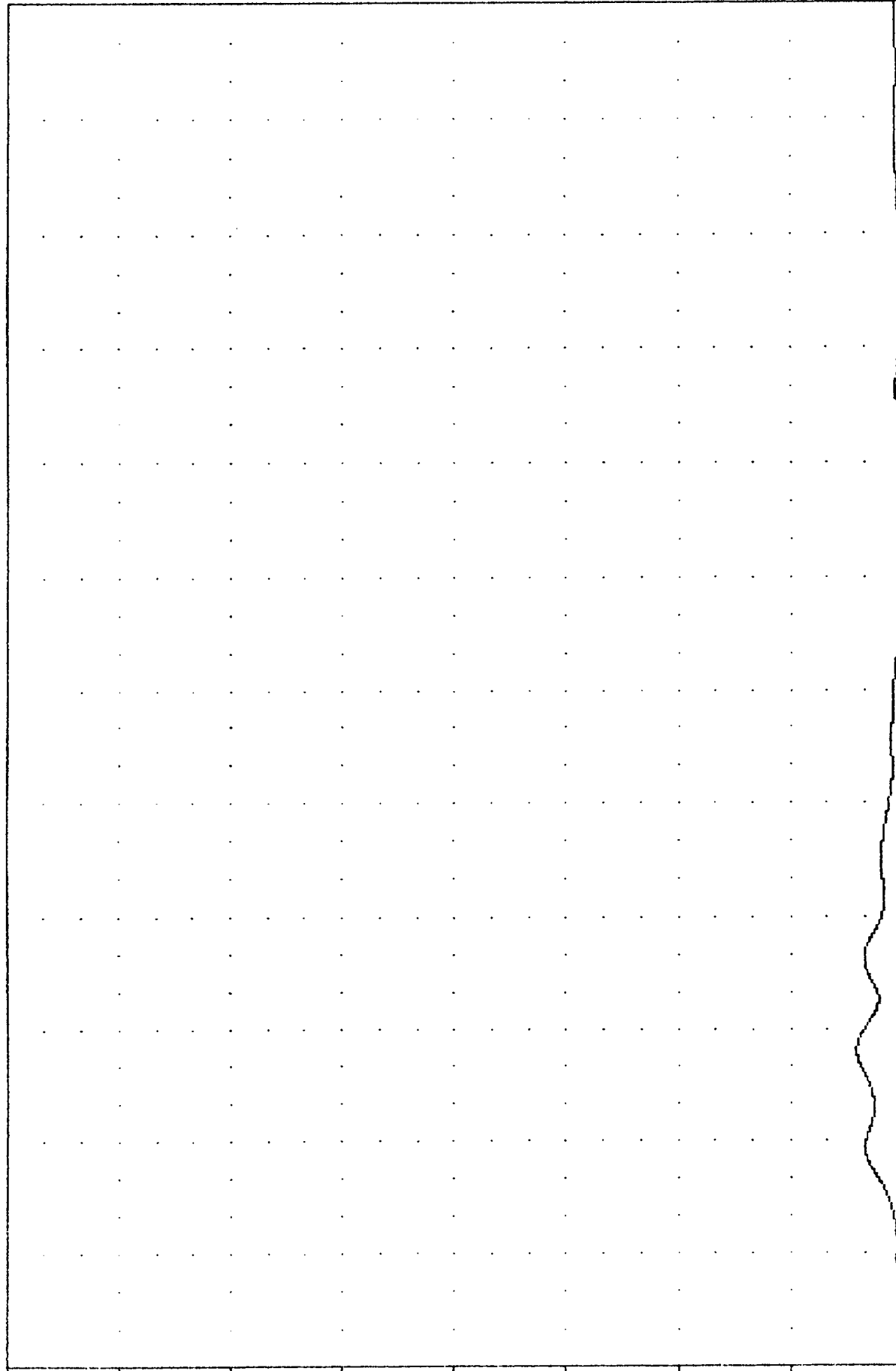
LPBRG

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = 0.10 137.38 ,

6.22 41.88

ACCELERATION (G)



0.00 15.00 30.00 45.00 60.00 75.00 90.00 105.00 120.00 135.00 150.00 165.00 180.00

TIME (MSEC)

FORD LTD INTO FIXED BARRIER

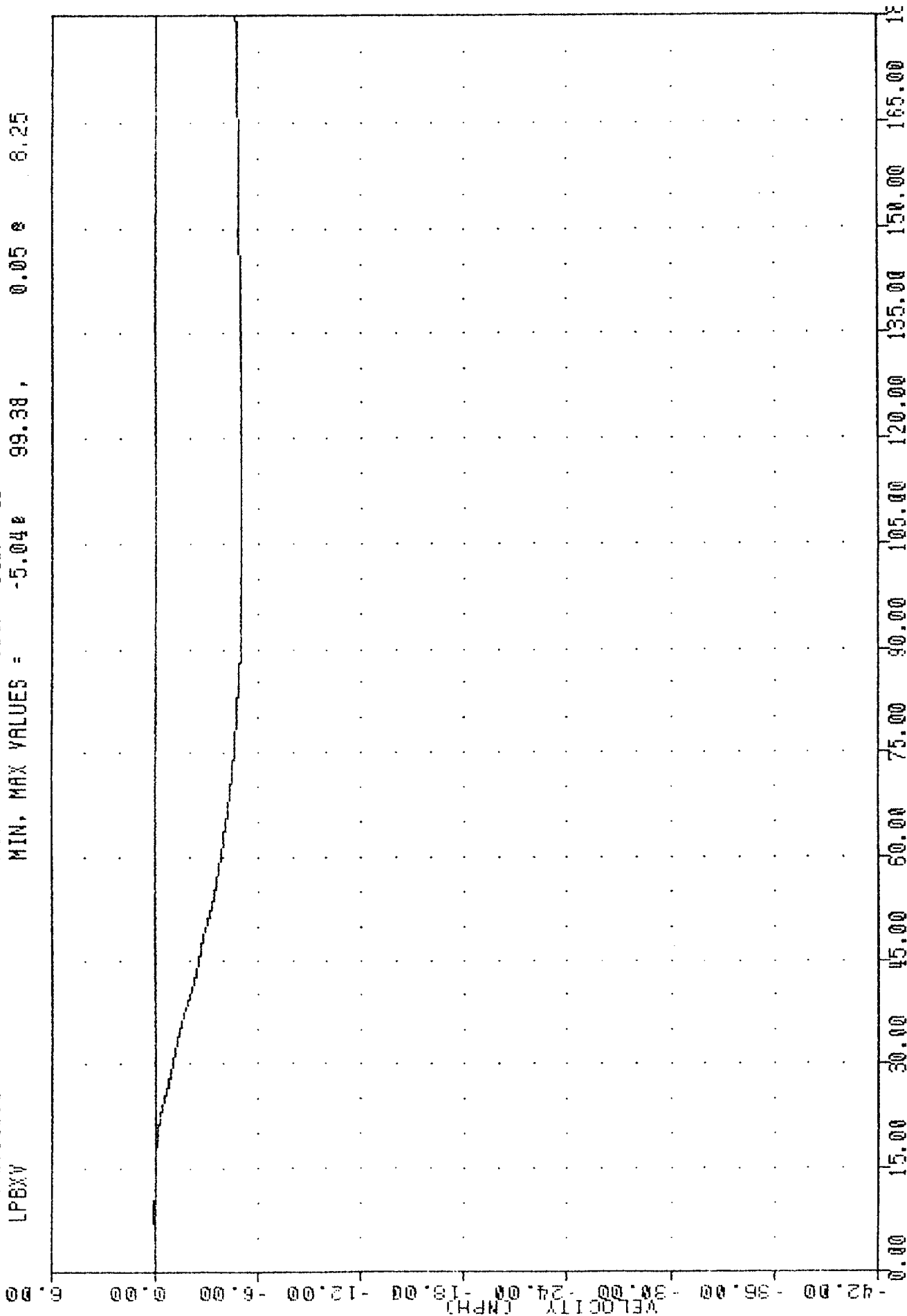
LEFT B PILLAR RESULTANT

007-1576 3003 JDLB = H31713

007-1576 3003 JDLB = H31713

	MIN.	MAX	VALUES	=	-5.04	99.38	0.05	8	8.25
--	------	-----	--------	---	-------	-------	------	---	------

	MIN.	MAX	VALUES	=	-5.04	99.38	0.05	8	8.25
--	------	-----	--------	---	-------	-------	------	---	------



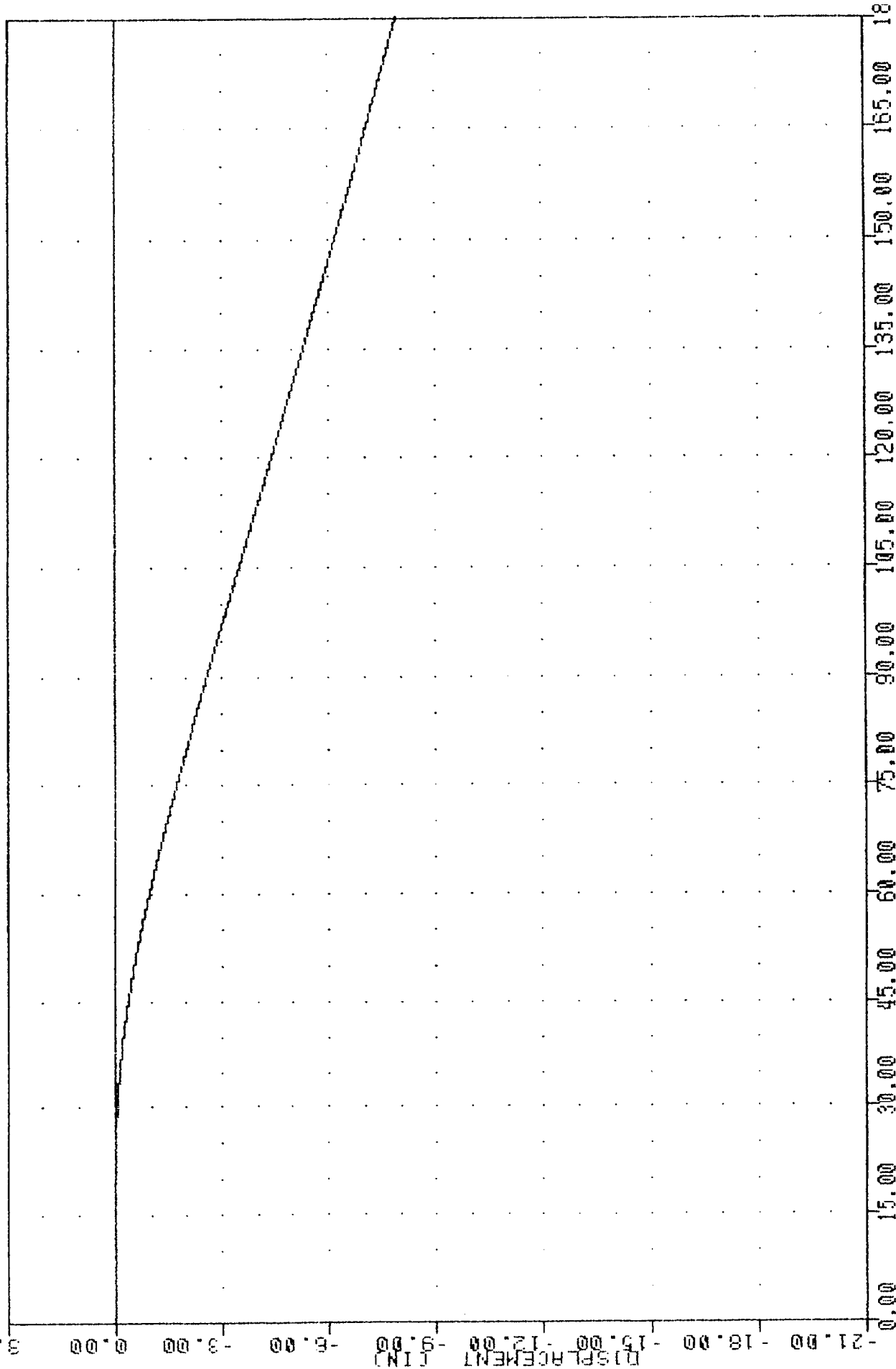
FORD LTD INTO FIXED BARRIER

DELTA V USING LPBXG

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -7.91% 180.00, 0.01% 13.75

000000012275

04897



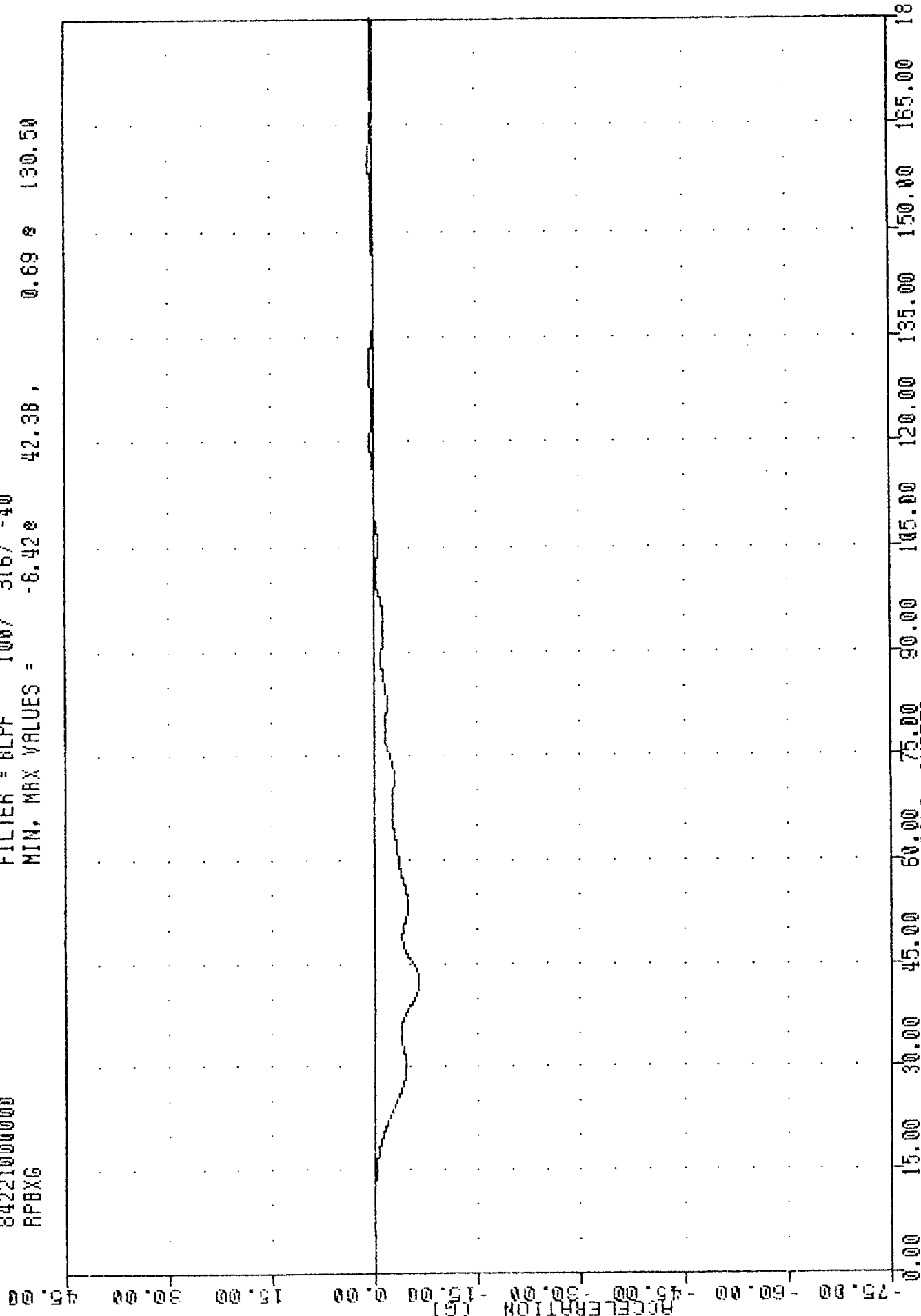
TIME (MSEC)	30.00	100.00	120.00
FORD LTD INTO FIXED BARRIER			
DELTA X USING LPBXV			

842210000000

RPBXG

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -6.42 42.38 , 0.69 130.50



FORD LTD INTO FIXED BARRIER
RIGHT B PILLAR ACCELERATION X AXIS

GREEN HINCHES PROGRAM

84221000000

RPBYE

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -0.862

31.50, 0.65 e 68.75

C-15

ACCELERATION (G)

TIME (MSEC)

FORD LTD INTO FIXED BARRIER
RIGHT B PILLAR ACCELERATION Y AXIS

842210000000

RPBZG

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES =

-0.56%

90.75,

0.89%

25.63

91-C

ACCELERATION (G)

45.00 30.00 15.00 0.00 -15.00 -30.00 -45.00 -60.00 -75.00

0.00 15.00 30.00 45.00 60.00 75.00 90.00 105.00 120.00 135.00 150.00 165.00 180.00

TIME (MSEC)

FORD LTD INTO FIXED BARRIER
RIGHT B PILLAR ACCELERATION Z AXIS

BREED HIRING PROGRAM

84221000000

RPBRG

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = 0.038 113.88 6.43 42.38

120.00

105.00

90.00

75.00

60.00

45.00

30.00

15.00

0.00

0.00

15.00

30.00

45.00

60.00

75.00

90.00

105.00

120.00

135.00

150.00

165.00

180.00

195.00

210.00

225.00

240.00

255.00

270.00

285.00

300.00

315.00

330.00

345.00

360.00

375.00

390.00

405.00

420.00

17-C

ACCELERATION (G)

TIME (MSEC)

FORD LTD INTO FIXED BARRIER

RIGHT B PILLAR RESULTANT

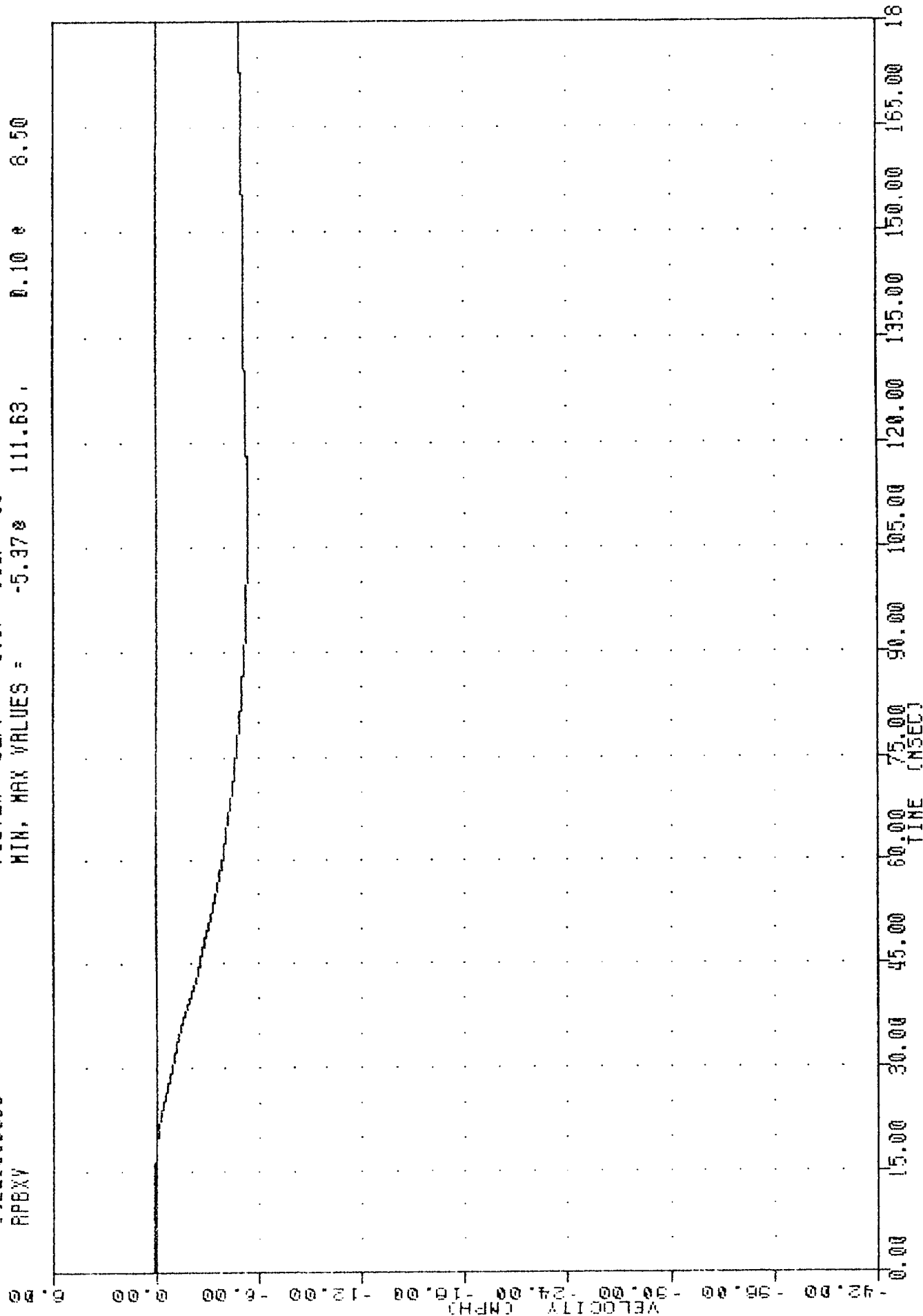
BREED AIRBAG PROGRAM

84221000000

RFBXY

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -5.37e 111.63, 0.10 e 8.50



81-C

FORD LTD INTO FIXED BARRIER
DELTA V USING RFBXG

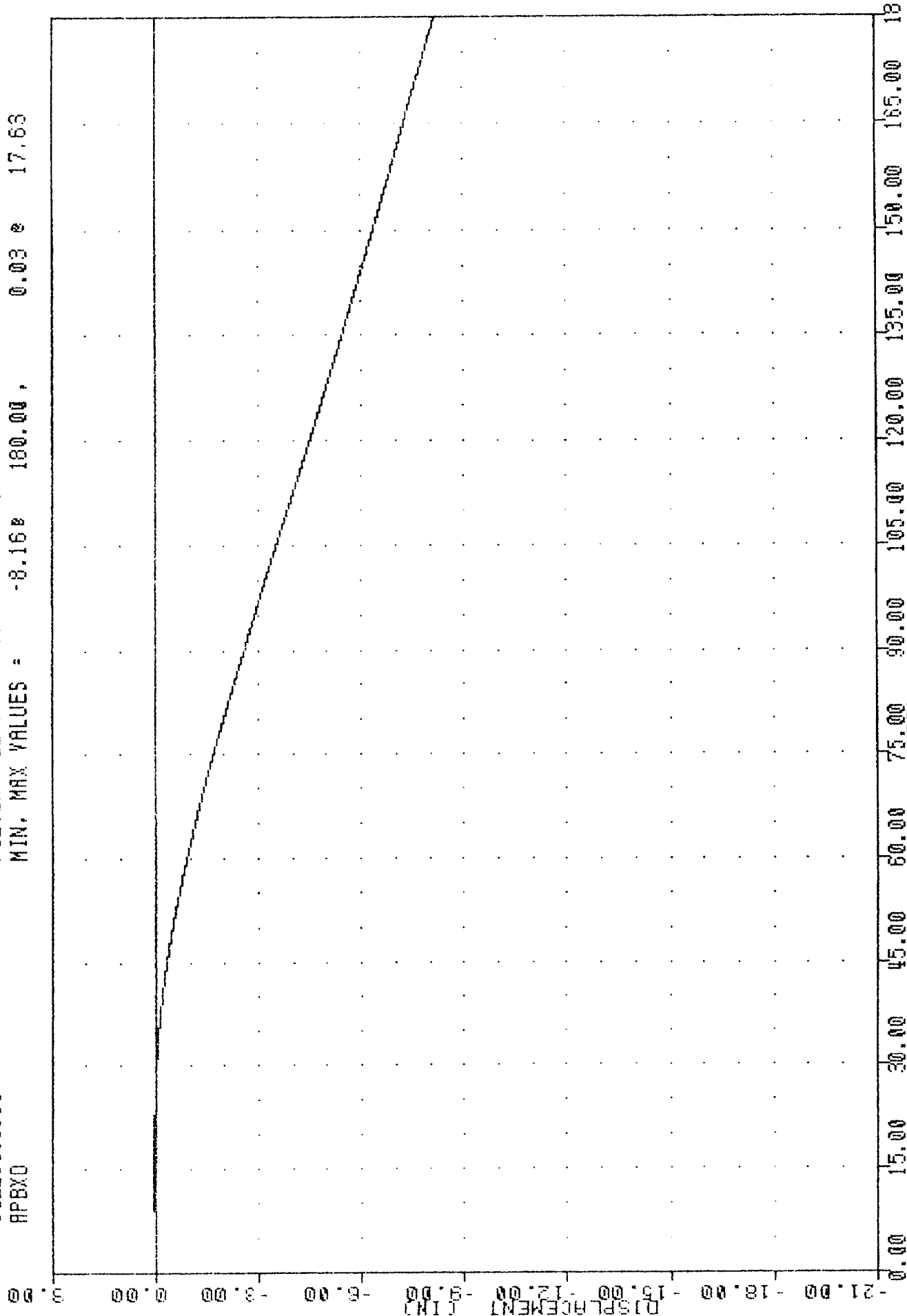
BRUCE HINDS PROGRAM

84221000000

RPBXO

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -8.16E 180.00, 0.03 E 17.63



FORD LTD INTO FIXED BARRIER

DELTA X USING RPBXX

842210000000

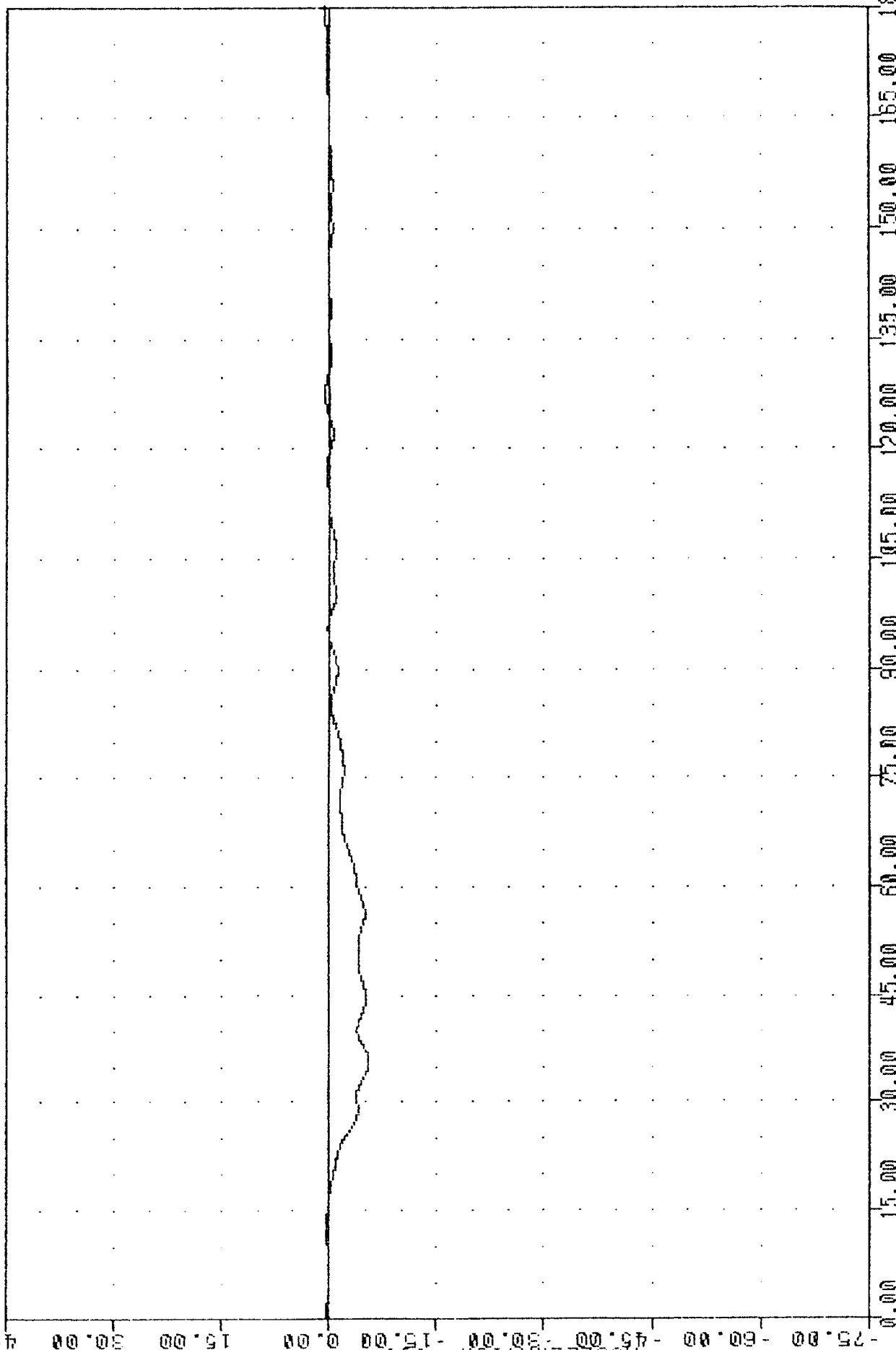
FWLXG

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -5.53e 35.50,

0.68 e 180.00

ACCELERATION (G)



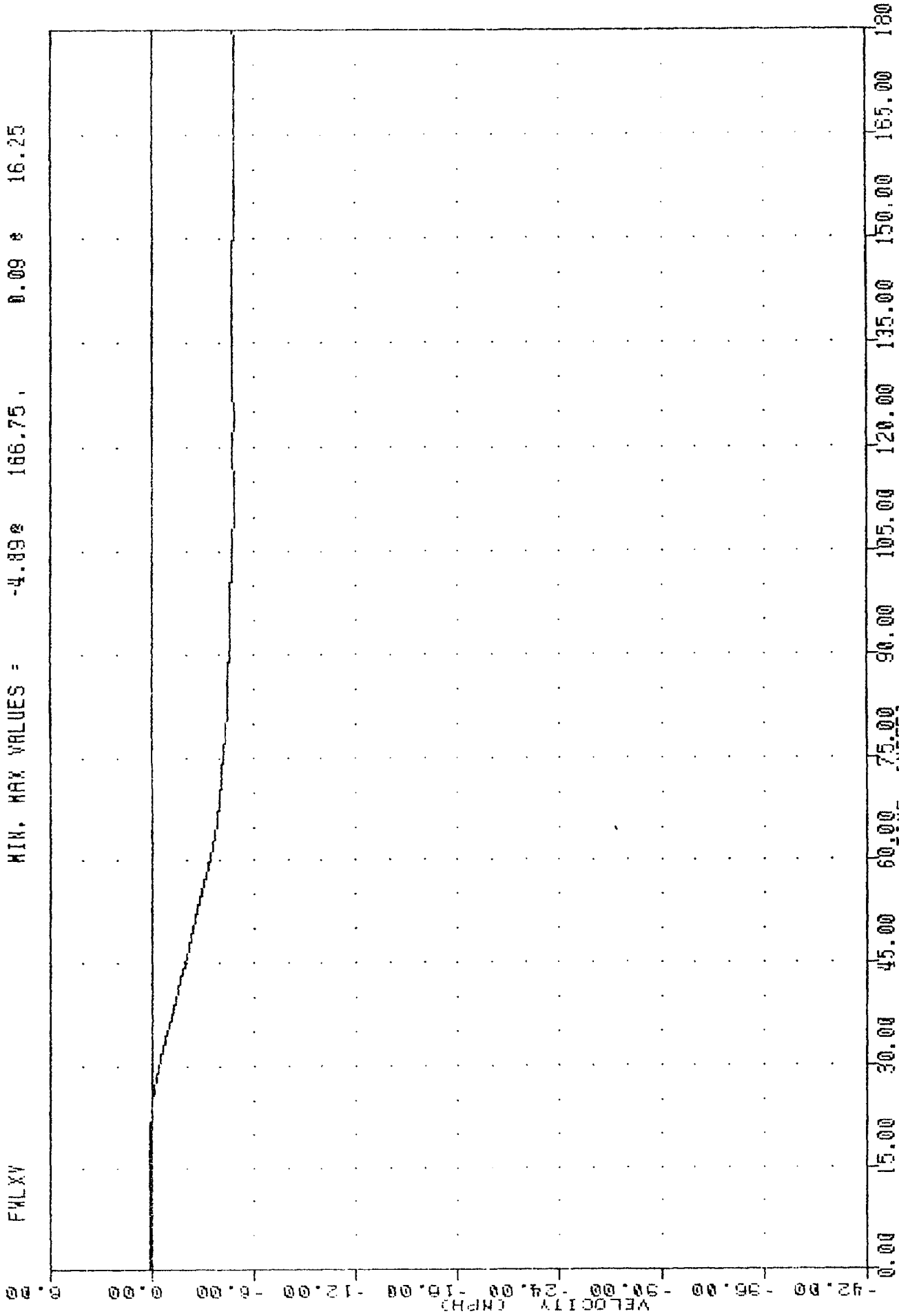
0.00 15.00 30.00 45.00 60.00 75.00 90.00 105.00 120.00 135.00 150.00 165.00 180.00

FORD LTD INTO FIXED BARRIER
FIREWALL ACCELERATION X AXIS

842210000000
FWLXV

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -4.89 166.75

0.09 16.25



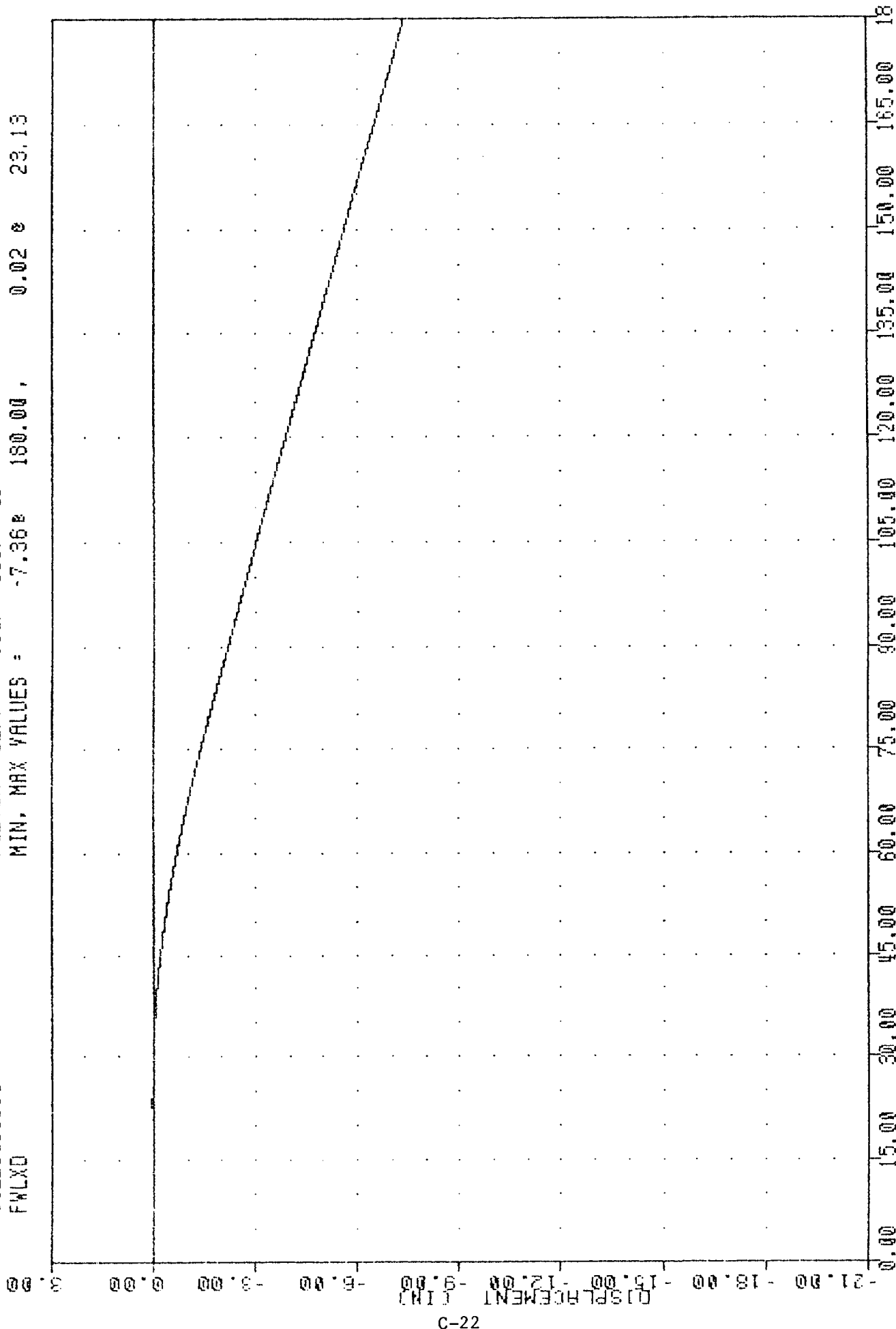
FORD LTD INTO FIXED BARRIER
DELTA V USING FWLXG

84221000000

FWLXD

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -7.36% 180.00, 0.02 % 23.13



FORD LTD INTO FIXED BARRIER
DELTA X USING FWLXV

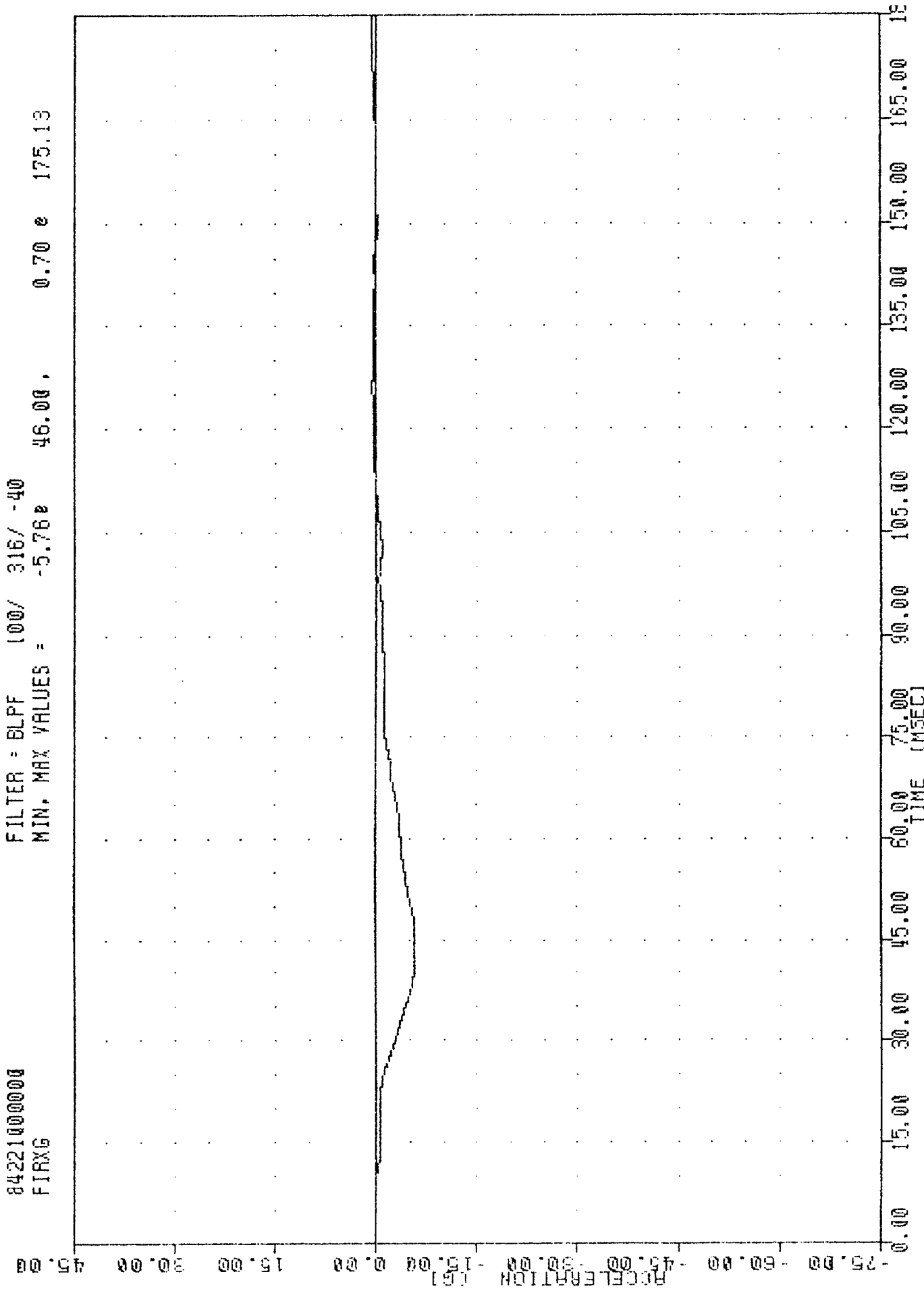
SPEED HISTORY PROGRAM

84221000000

FIRXG

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -5.76e 46.00, 0.70 e 175.13



FORD LTD INTO FIXED BARRIER
RIGHT FENDER WELL INNER ACCELERATION X AXIS

842210000000

FIRXY

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -5.04e 108.63, 0.06 e 6.75

FIRXY

0.00

0.00

0.00

-6.00

-12.00

-18.00

-24.00

-30.00

-36.00

-42.00

C-24

VELOCITY (MPH)

0.00 15.00 30.00 45.00 60.00 75.00 90.00 105.00 120.00 135.00 150.00 165.00 18

TIME

(MSEC)

FORD LTD INTO FIXED BARRIER

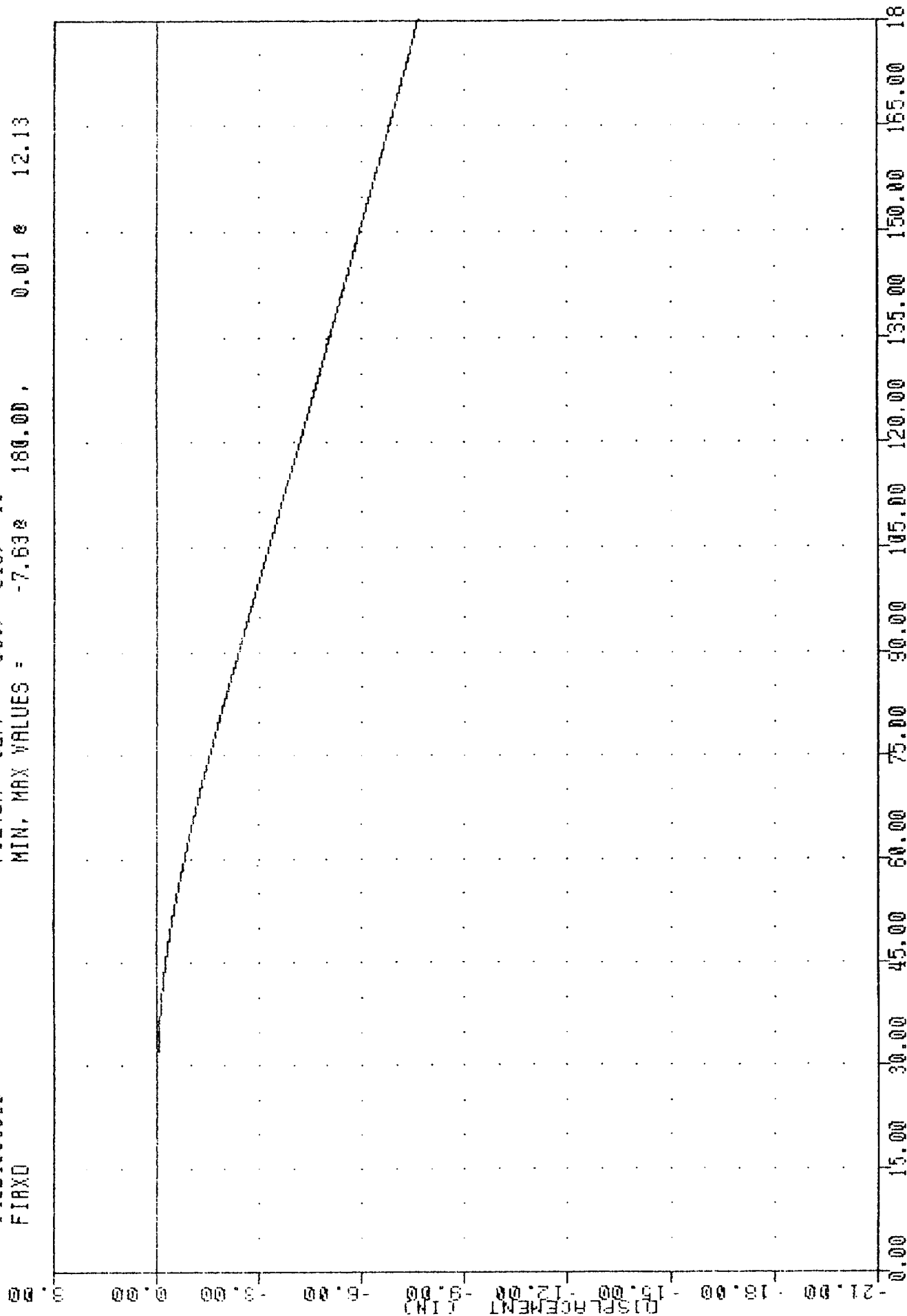
DELTA V USING FIRXG

842210000000

FIRXD

FILTER = 8LPF 300/ 949/ -40

MIN, MAX VALUES = -7.632 180.00, 0.01 & 12.13



FORD LTD INTO FIXED BARRIER
DELTA X USING FIAXV

GREEN HINDING PROGRAM

84221000000

ABTP

FILTER = ALPF 1650/ 5217/ -40

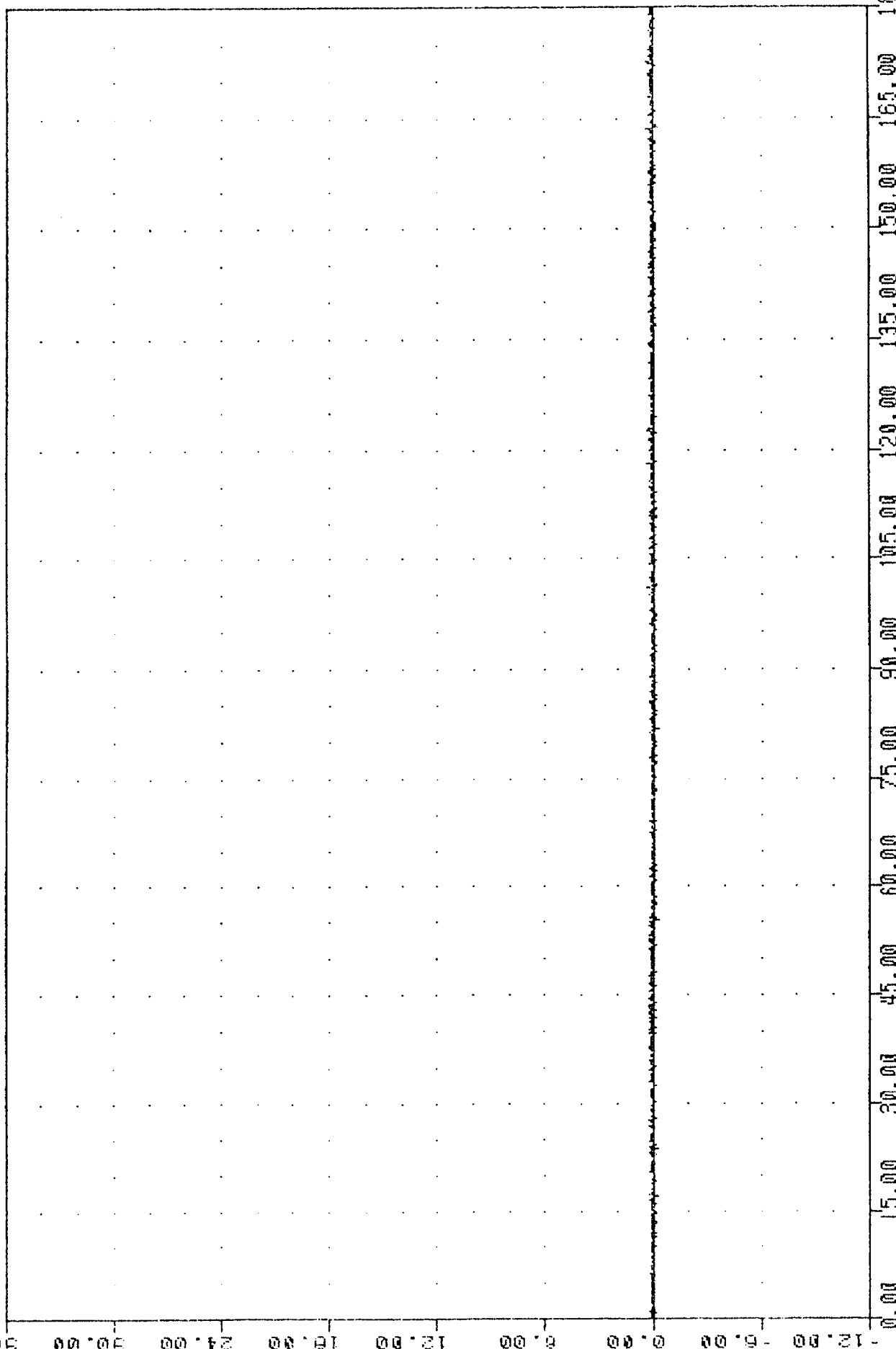
MIN, MAX VALUES = -0.28e

81.63 ,

0.32 e 117.88

92-C

PRESSURE (PSIG)



FORD LTD INTO FIXED BARRIER
PRESSURE TRANSDUCER

84221000000

ABTF

FILTER = BLPF 1000/ 3162/ -40

MIN. MAX VALUES = -67.94e

46.63,

41.20 e 81.38

40.00

30.00

20.00

10.00

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

-70.00

-80.00

-90.00

-100.00

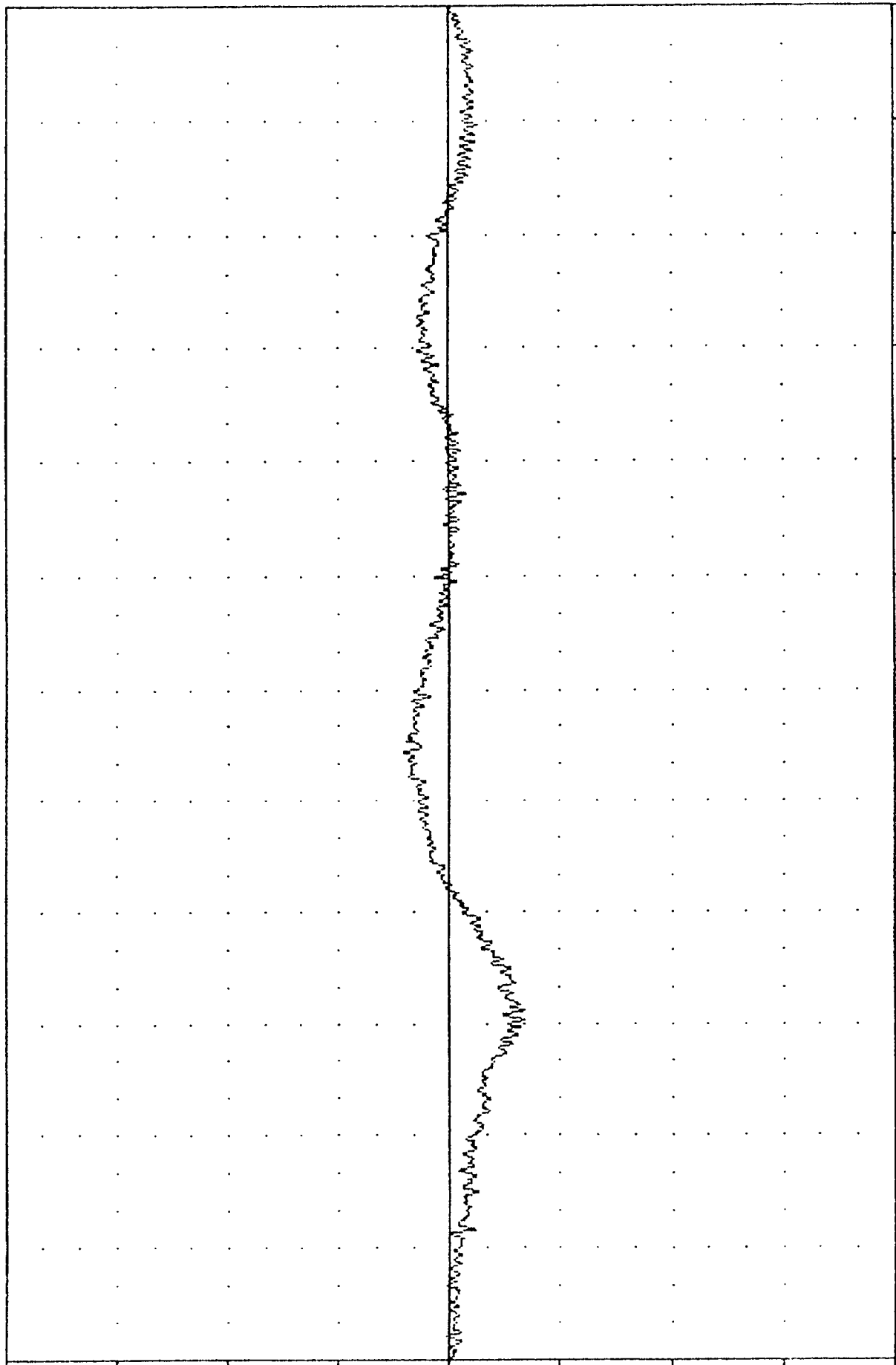
-110.00

-120.00

-130.00

-140.00

C-27



STEERING COLUMN CABLE LOAD

FORD LTD INTO FIXED BARRIER

STEERING COLUMN CABLE LOAD

החשבונית מס' 84221000000

84221000000

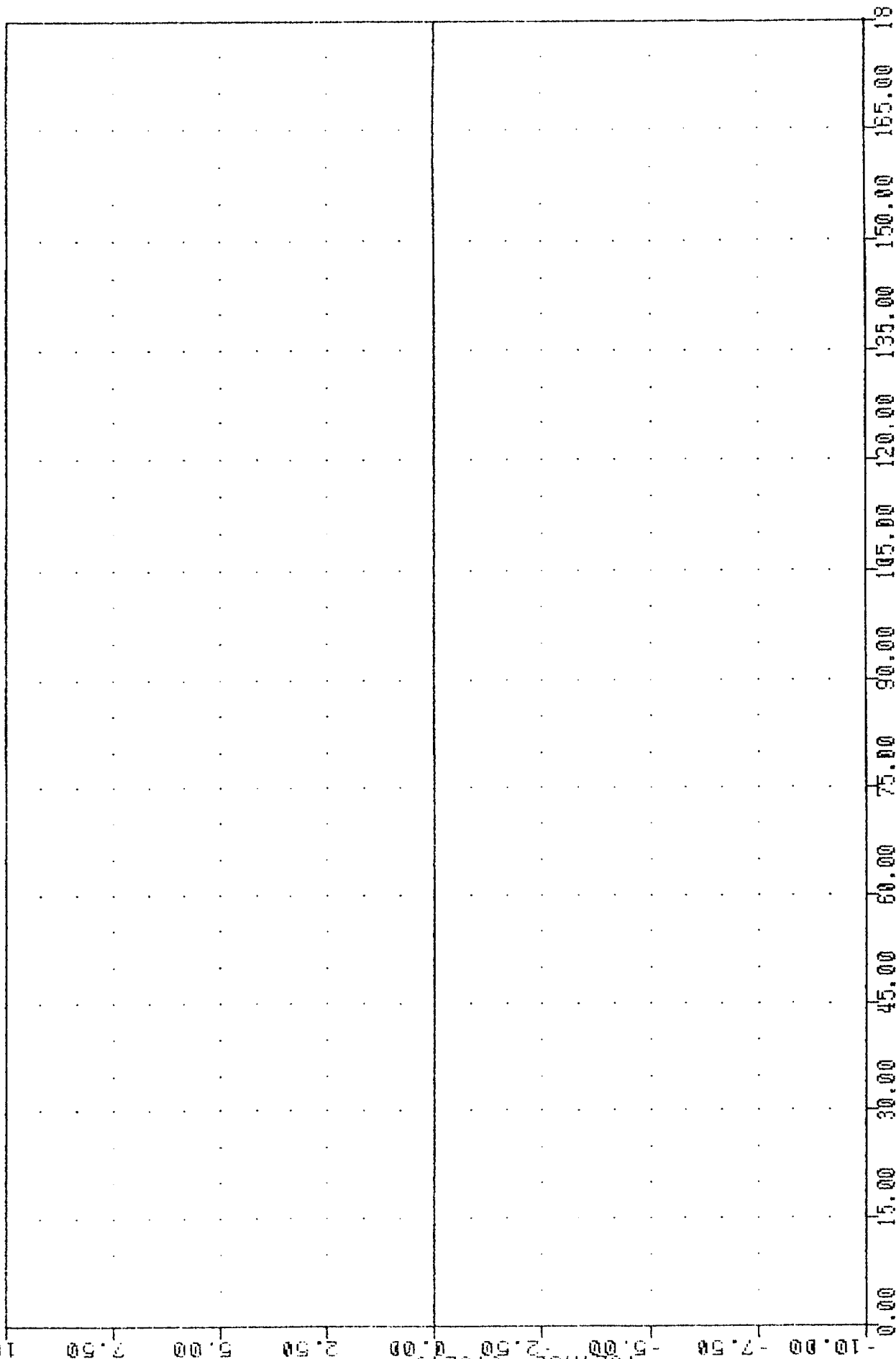
ABT1

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -10.000 0.00 , -10.00 0.00

C-28

VOLTAGE (VOLTS)



FORD LTD INTO FIXED BARRIER
POMEI STANDARD SENSOR

842210000000

842210000000

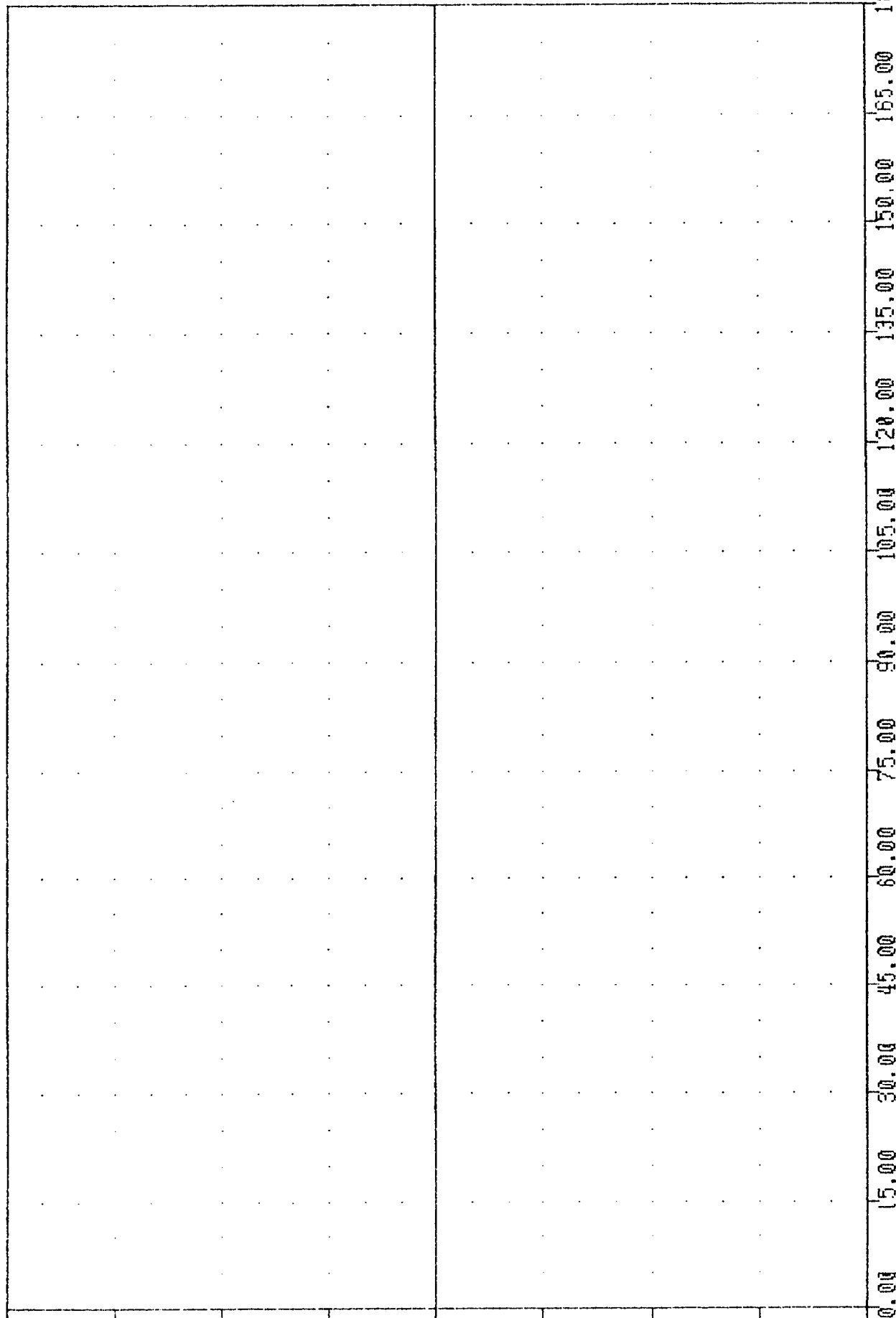
842210000000

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -10.00 0.00 -10.00 0.00

C-29

VOLTAGE (VOLTS)



FORD LTD INTO FIXED BARRIER
ROMEO GAS SENSOR

842210000000

842210000000

ABT3

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -10.000 0.75, -9.88 0 11.75

C-30

10.00

7.50

5.00

2.50

0.00

-2.50

-5.00

-7.50

-10.00

0.00

15.00

30.00

45.00

60.00

75.00

90.00

105.00

120.00

135.00

150.00

165.00

18

TIME (MSEC)

FORD LTD INTO FIXED BARRIER

AIRBAG IGNITION

842210000000

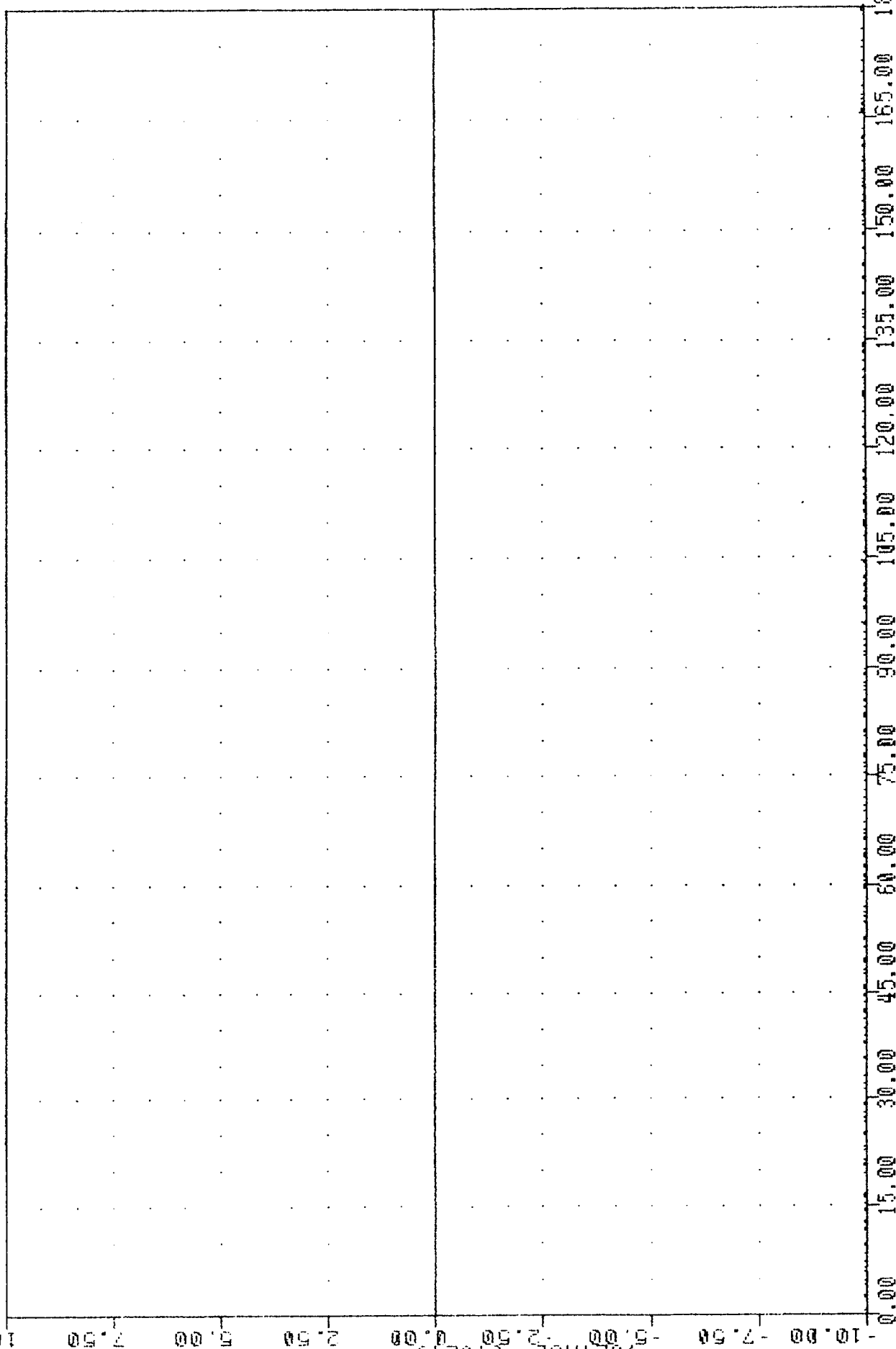
ABT4

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -10.00e 0.00, -9.92 e 165.50

c-31

VOLTAGE (VOLTS)



FORD LTD INTO FIXED BARRIER

BREED B PILLAR SENSOR

APPENDIX D

DATA PLOT PRESENTATION - TEST 840808B

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.

BREED AIRBAG PROGRAM

84221000000

HEDXG1

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -28.978

98.00 ,

3.05 s

48.38

45.00

30.00

15.00

0.00

0.00

15.00

30.00

45.00

60.00

75.00

90.00

105.00

120.00

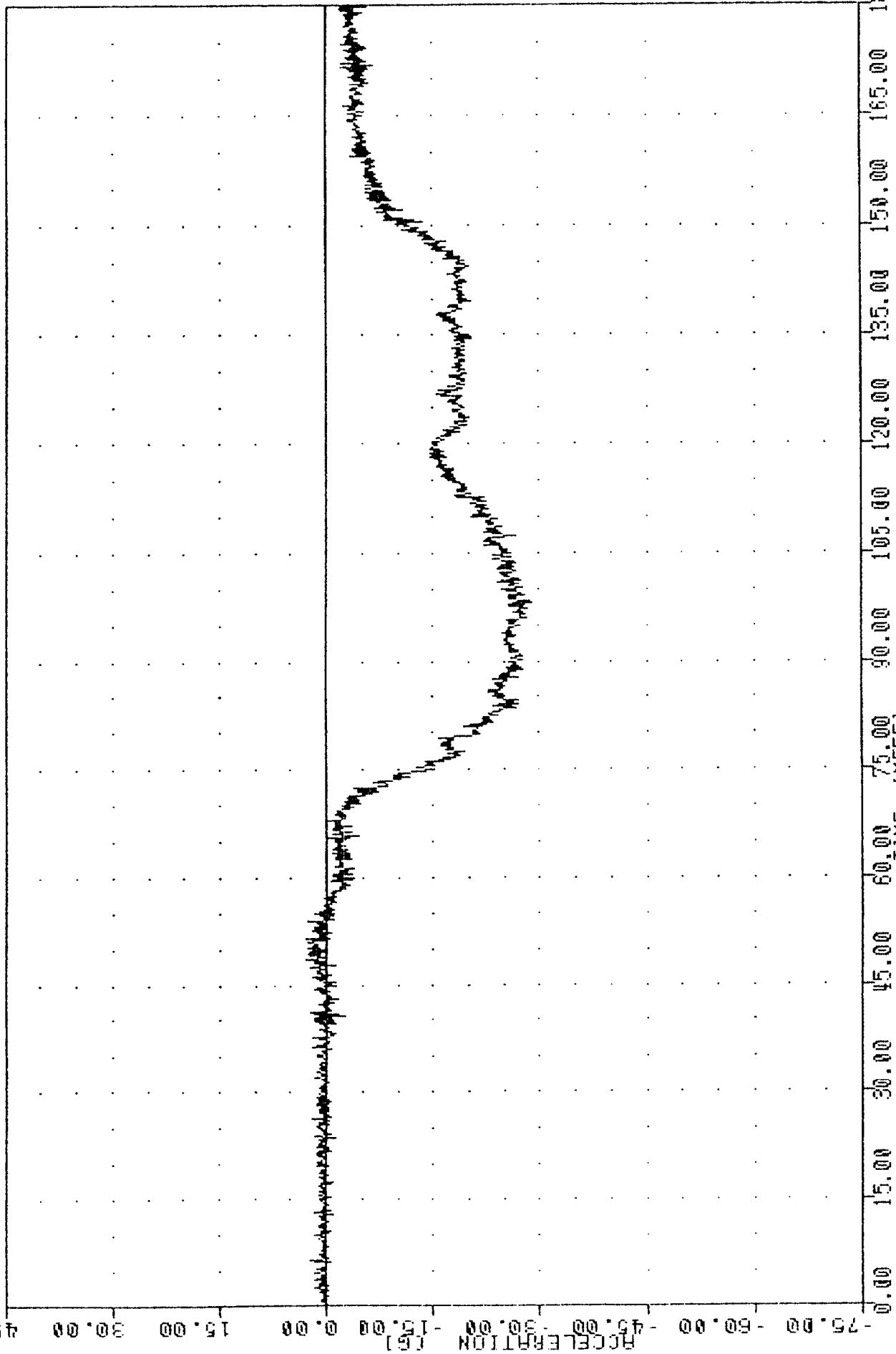
135.00

150.00

165.00

180.00

D-2



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DRIVER HEAD ACCELERATION X AXIS

BREED AIRBAG PROGRAM

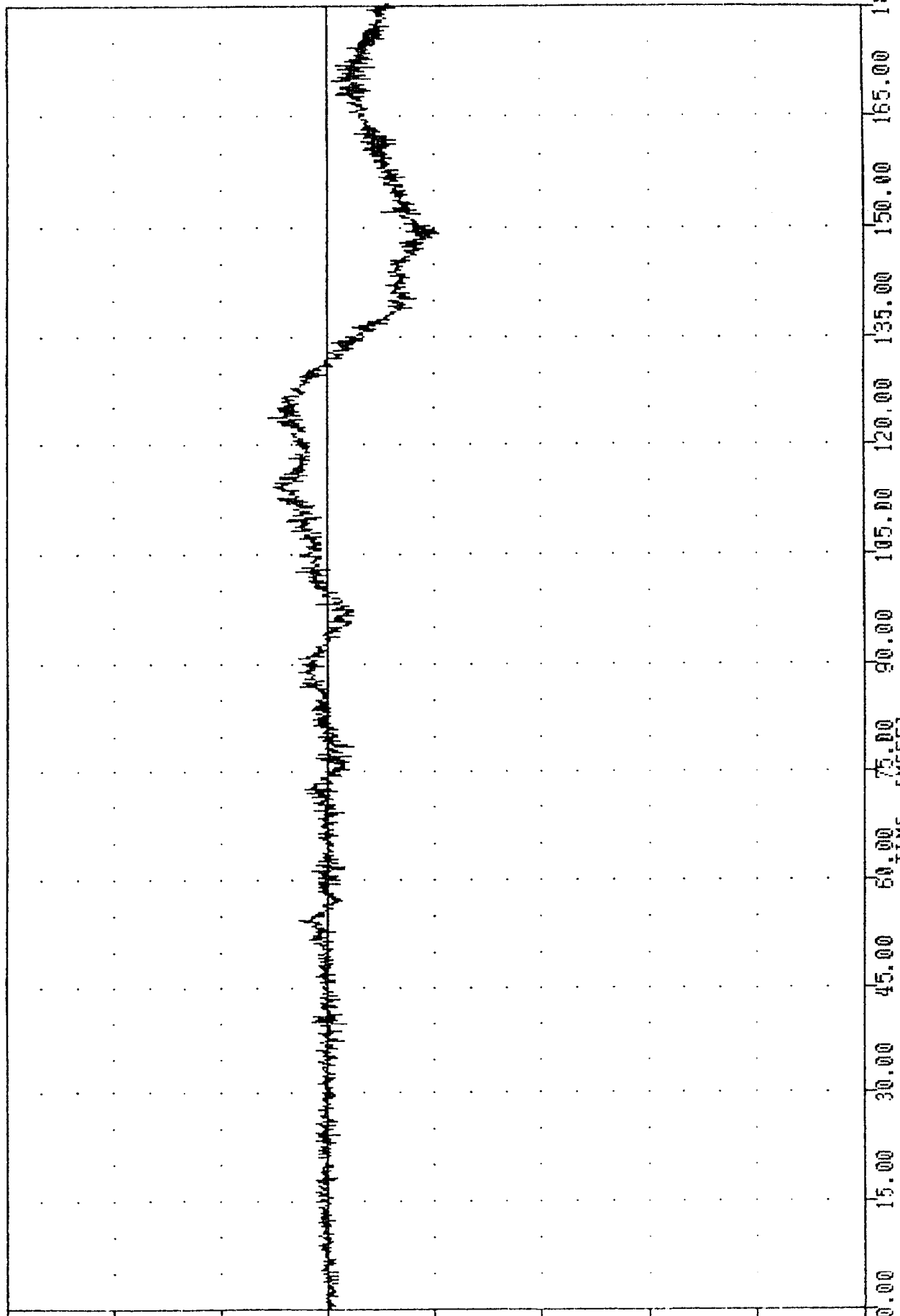
84221000000

HEDY61

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -15.50e 149.13, 8.31 e 123.75

ACCELERATION (G)



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DRIVER HEAD ACCELERATION Y AXIS

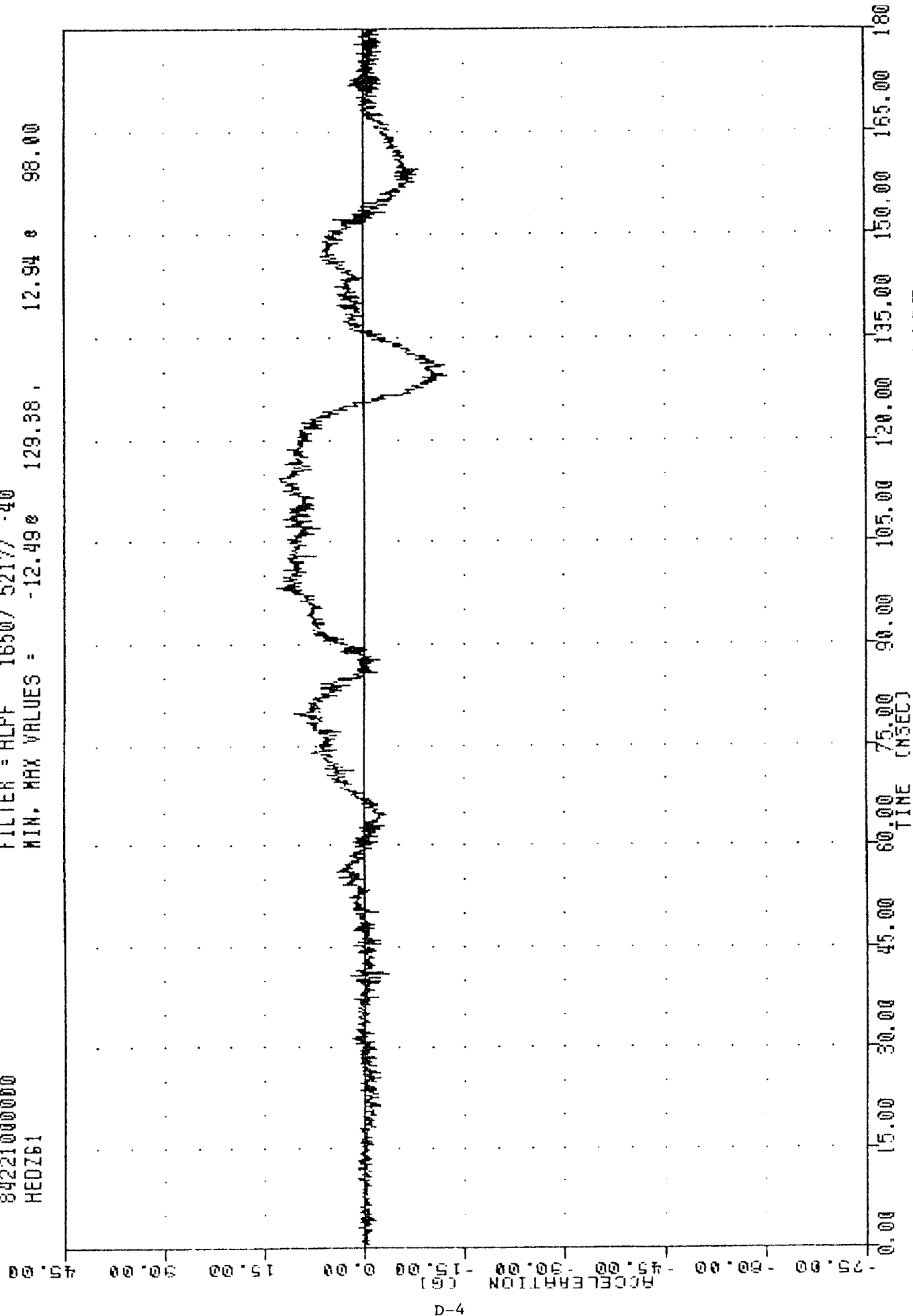
BREED AIRBAG PROGRAM

84221000000

HEDZ61

FILTER = ALPF 1650/ 5217/ -40

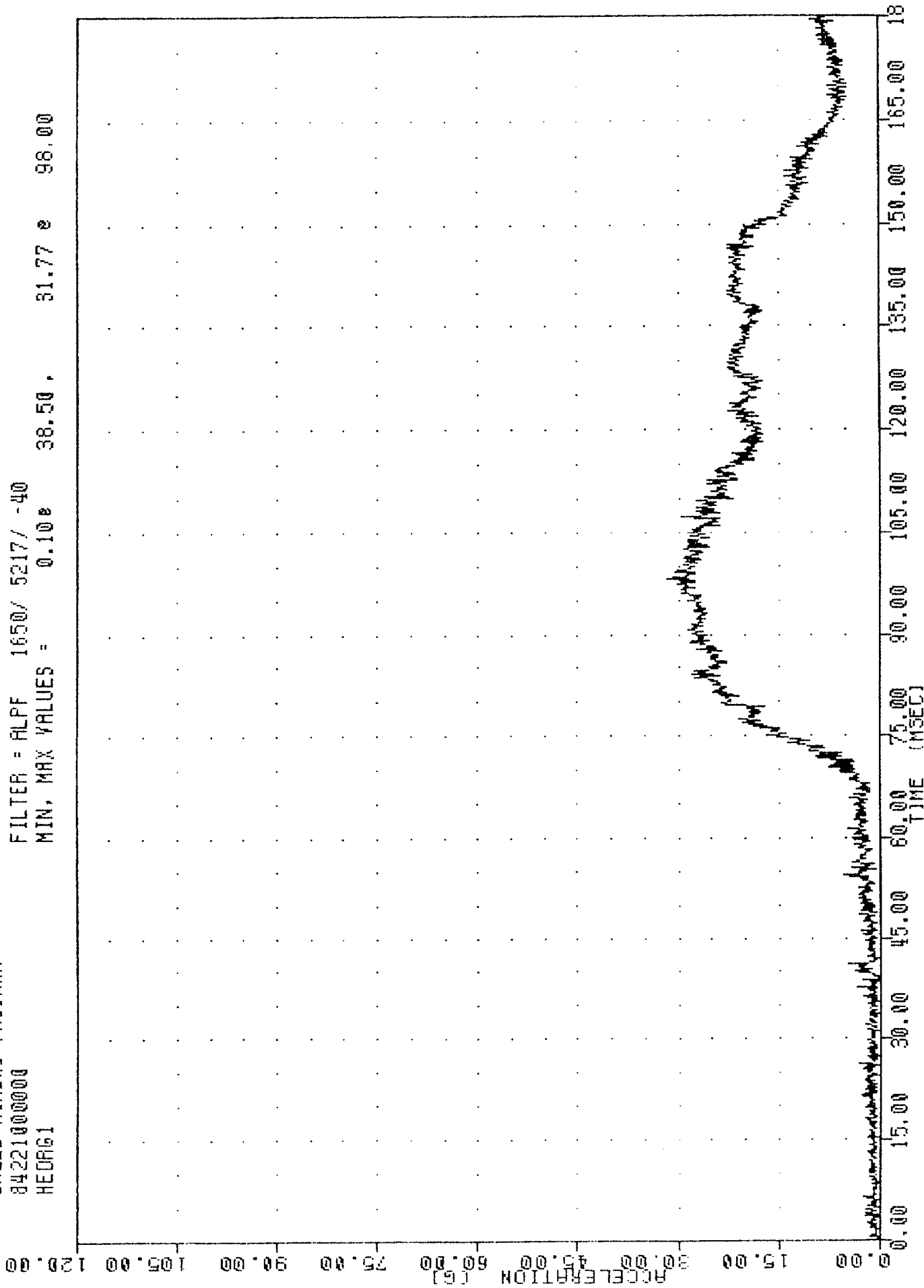
MIN. MAX VALUES = -12.49e 129.38, 12.94 e 98.00



FORD LTD 30 MPH CENTERLINE POLE IMPACT
DRIVER HEAD ACCELERATION Z AXIS

BREED AIRBAG PROGRAM
84221000000
HEADG1

FILTER = ALPF 1650/ 5217/ -40
MIN. MAX VALUES = 0.10e 31.77 e 96.00



FORD LTD 30 MPH CENTERLINE POLE IMPACT
DRIVER HEAD RESULTANT

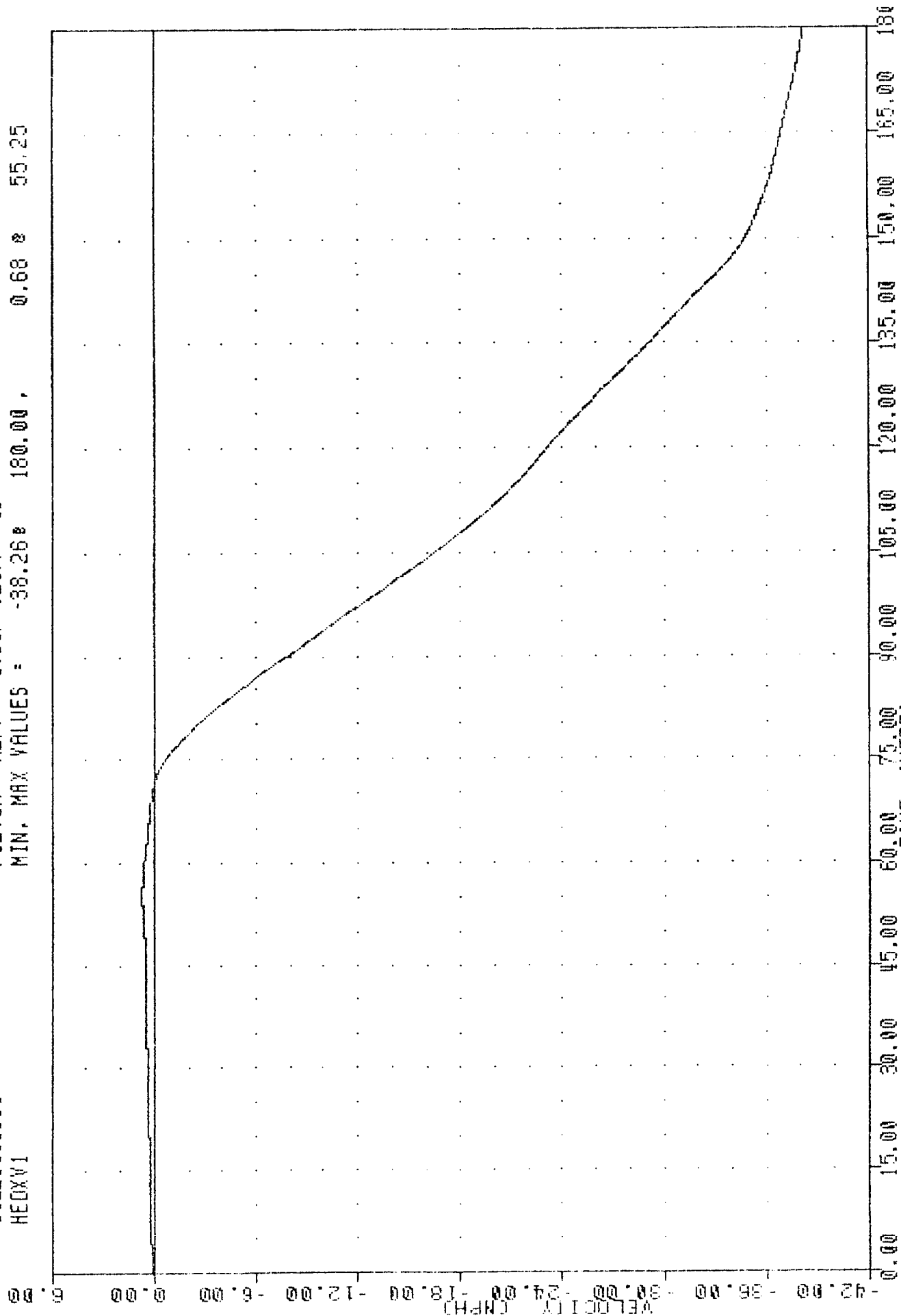
BREED AIRBAG PROGRAM

842210000000

HEDXV1

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -38.26 180.00 , 0.68 55.25



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DELTA V USING HEDXGI

BREED AIRBAG PROGRAM

84221000000

HEXD1

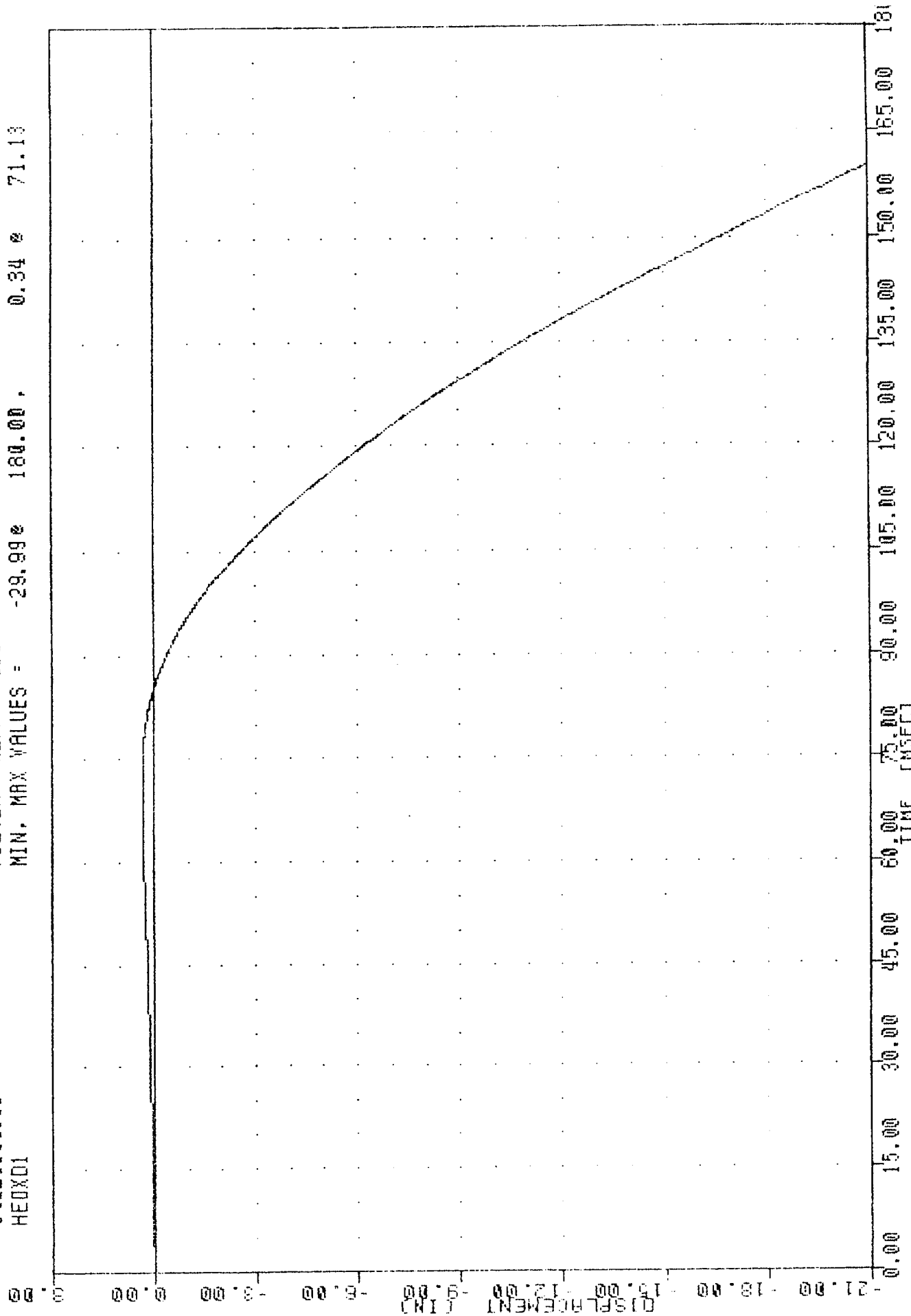
FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -29.99e

180.00,

0.34 e

71.13



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DELTA X USING HEDXV1

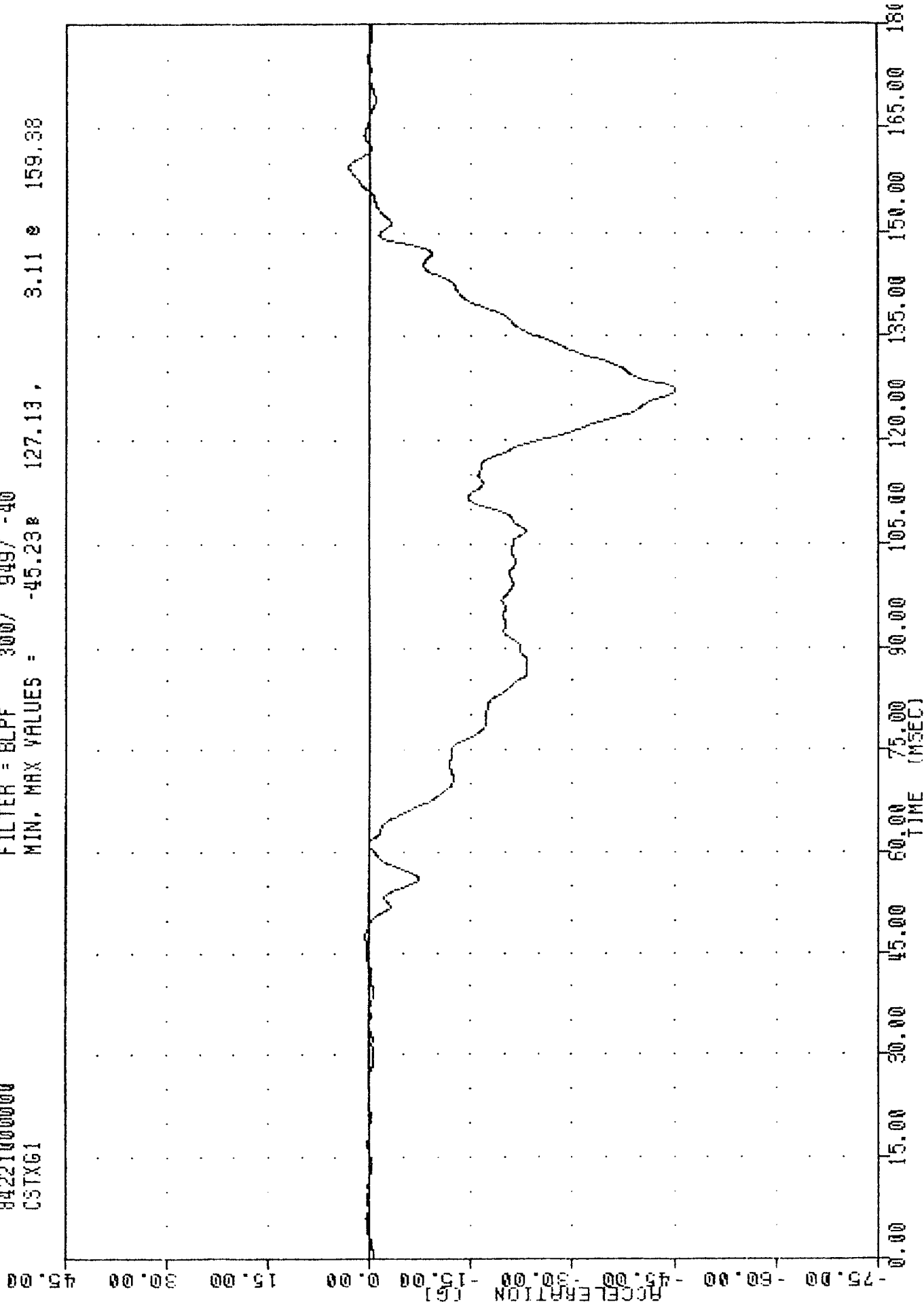
BREED AIRBAG PROGRAM

84221000000

CSTXG1

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -45.23 127.13 , 3.11 159.38



FORD LTD 30 MPH CENTERLINE POLE IMPACT
DRIVER CHEST ACCELERATION X AXIS

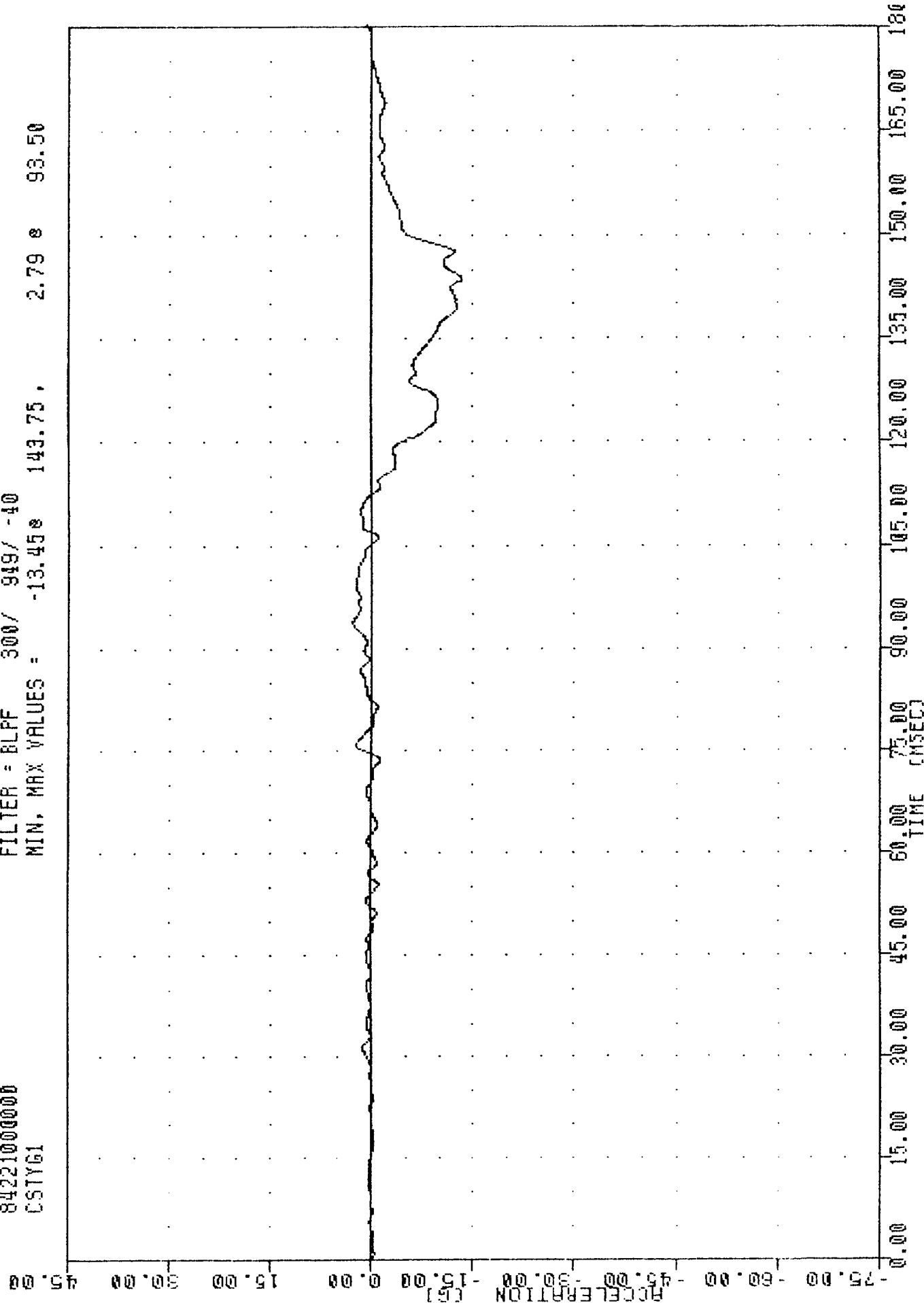
BREED AIRBAG PROGRAM

84221000000

CSTY61

FILTER = BLPF 300/ 919/ -40

MIN. MAX VALUES = -13.458 143.75, 2.79 s 93.50



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DRIVER CHEST ACCELERATION Y AXIS

BREED AIRBAG PROGRAM

84221000000

CSTZG1

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -412.908 38.00 , 0.88 8.50

50.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

SEE TEST ANOMALIES

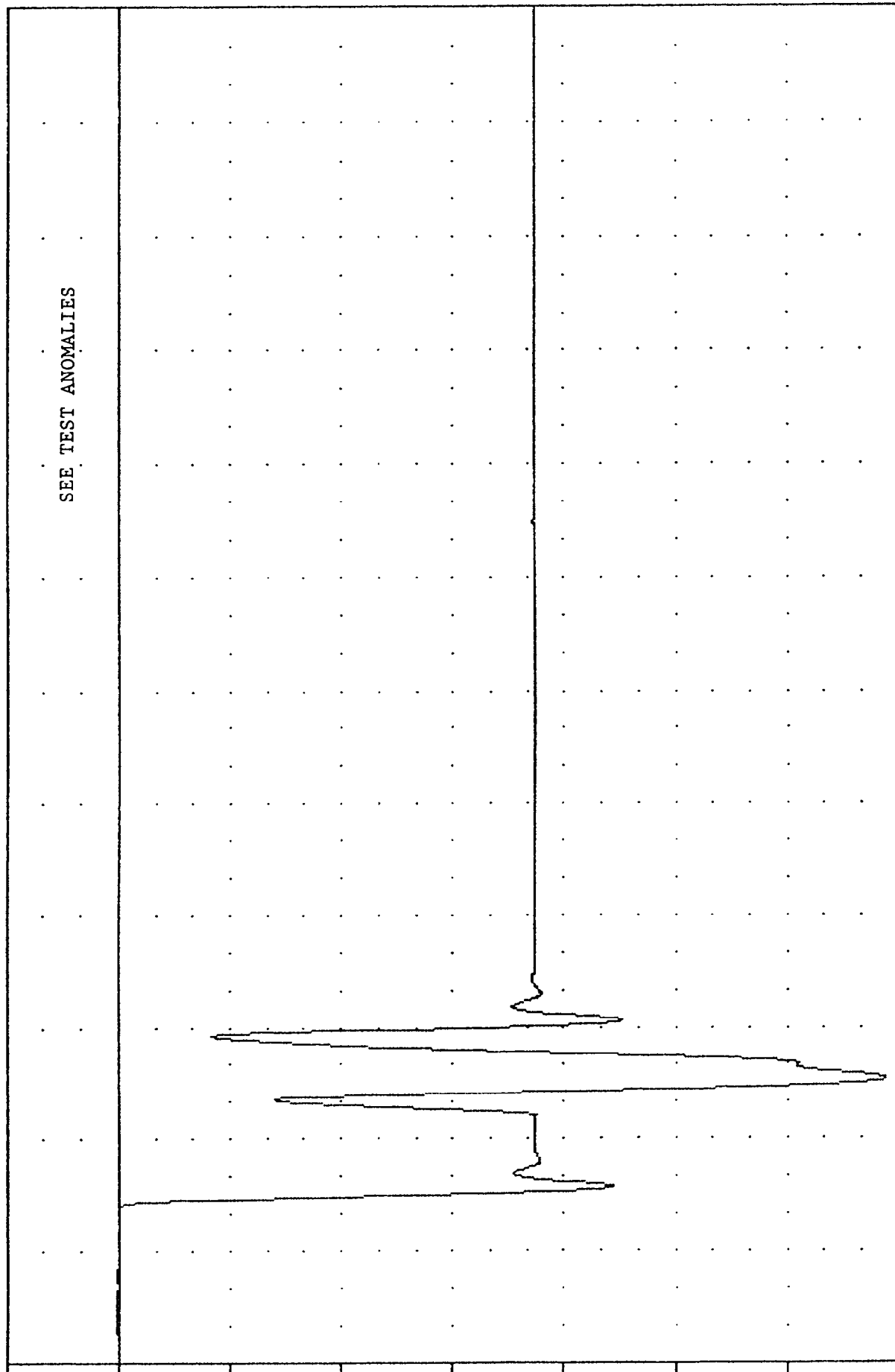
D-10

ACCELERATION (G)

0.00 15.00 30.00 45.00 60.00 75.00 90.00 105.00 120.00 135.00 150.00 165.00 180

TIME (MSEC)

FORD LTD 30 MPH CENTERLINE POLE IMPACT
DRIVER CHEST ACCELERATION Z AXIS



BREED AIRBAG PROGRAM

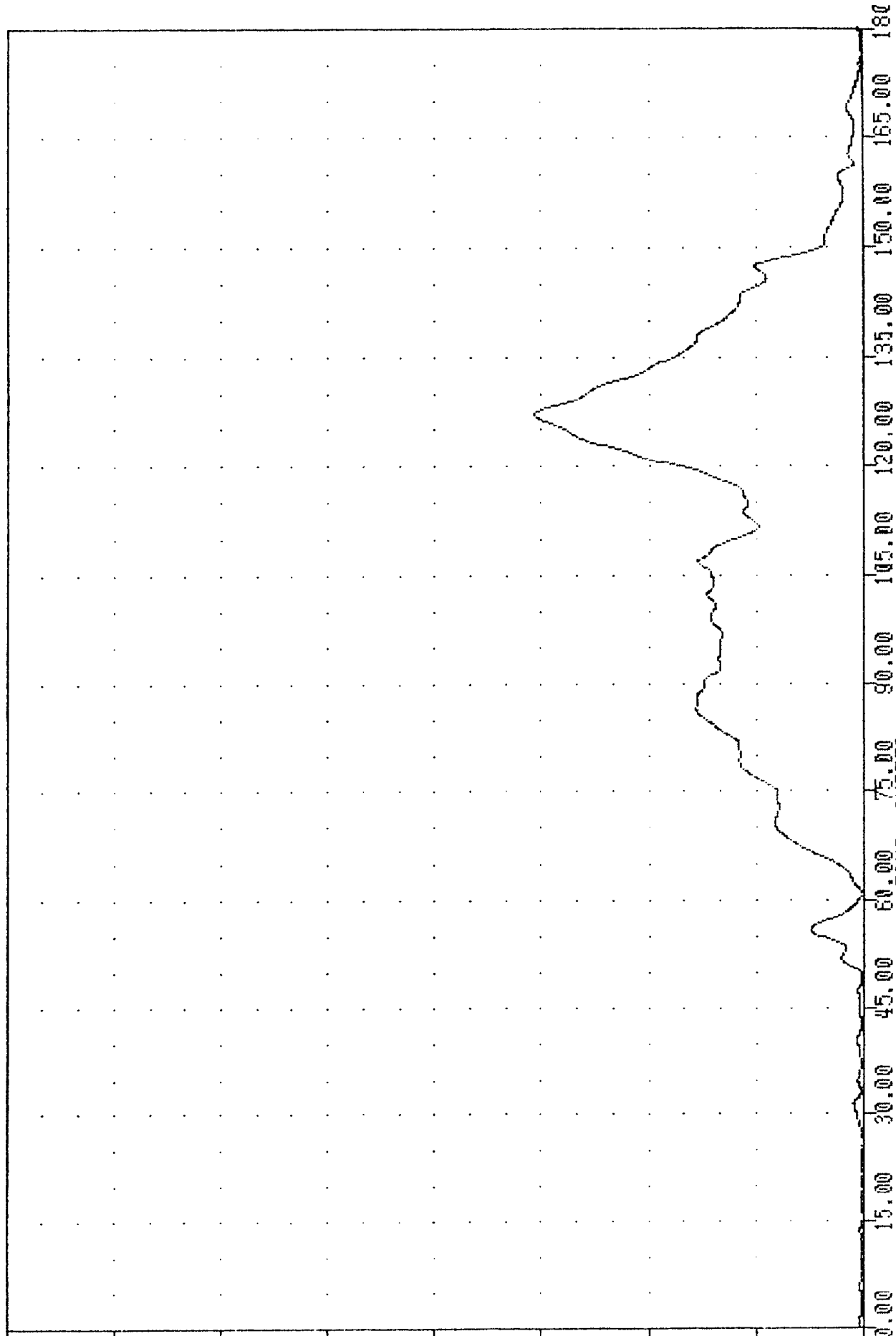
84221000000

CSTRG1

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = 0.020 176.38, 46.08 127.00

ACCELERATION (G)



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DRIVER CHEST RESULTANT

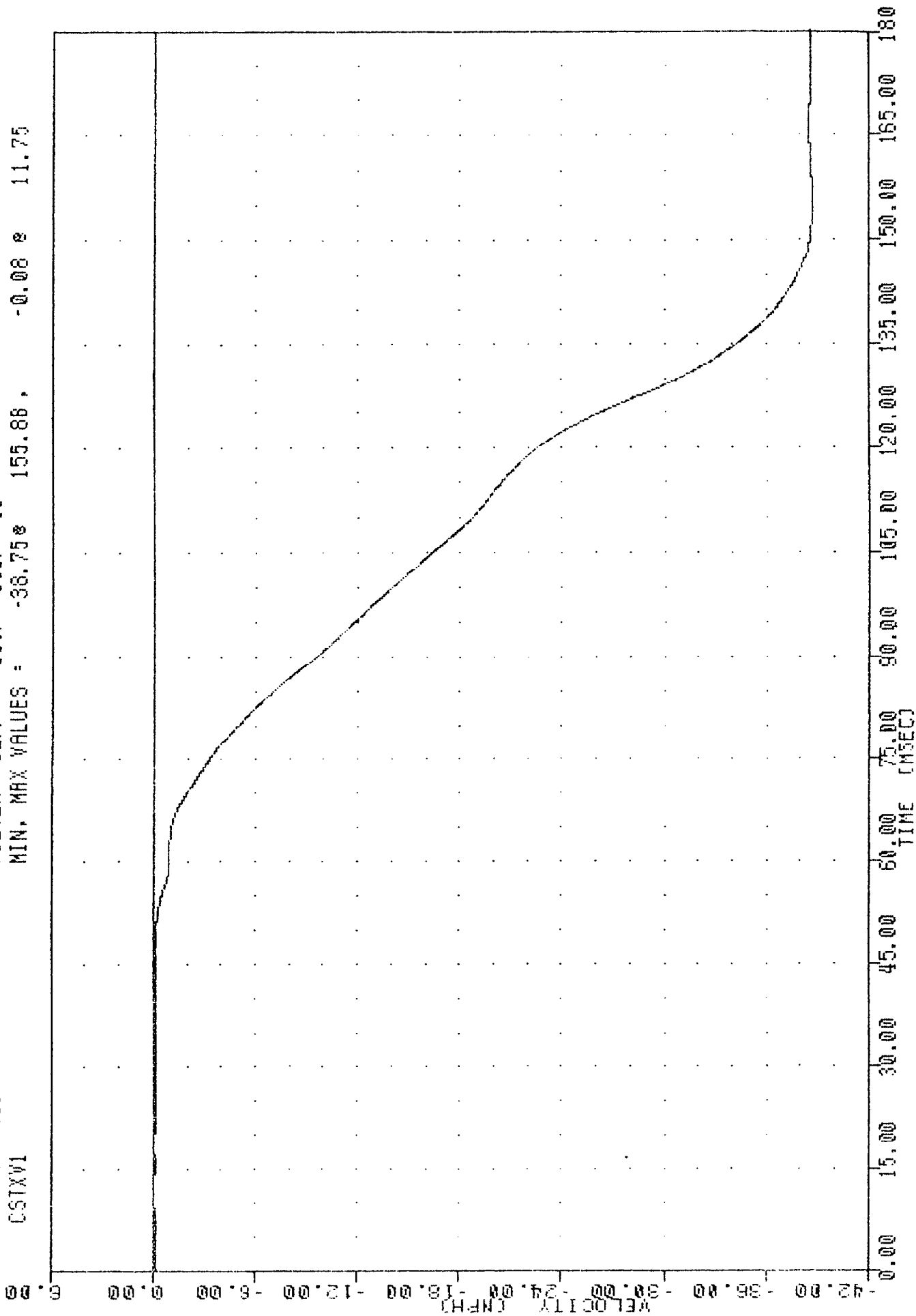
BAEED AIRBAG PROGRAM

84221000000

CSTXV1

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -38.75° 155.86 , -0.08 ° 11.75



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DELTA V USING CSTX61

BREED AIRBAG PROGRAM

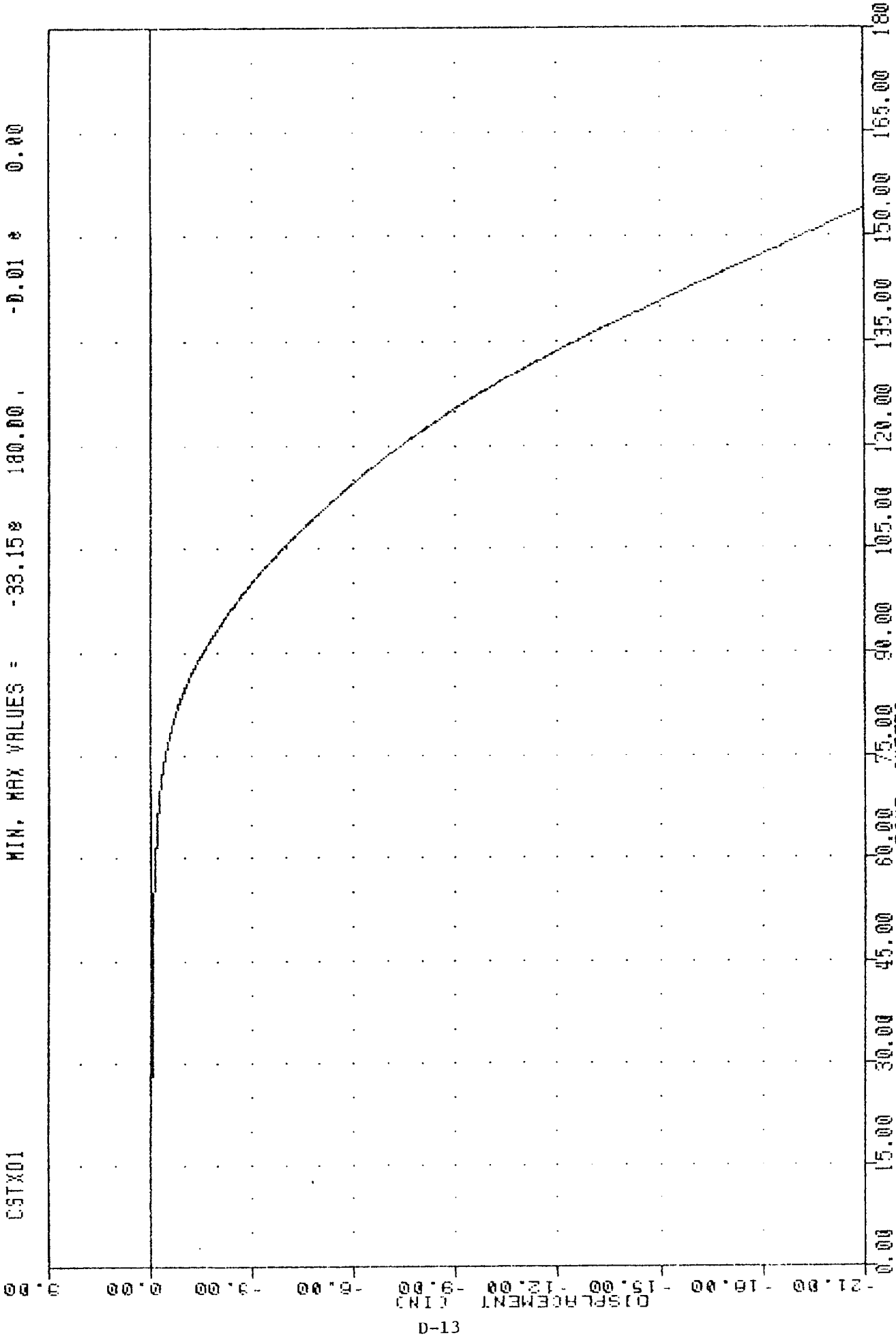
84221000000

CSTXD1

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -33.15 180.00

-0.01 e 0.00



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DELTA X USING CSTXVI

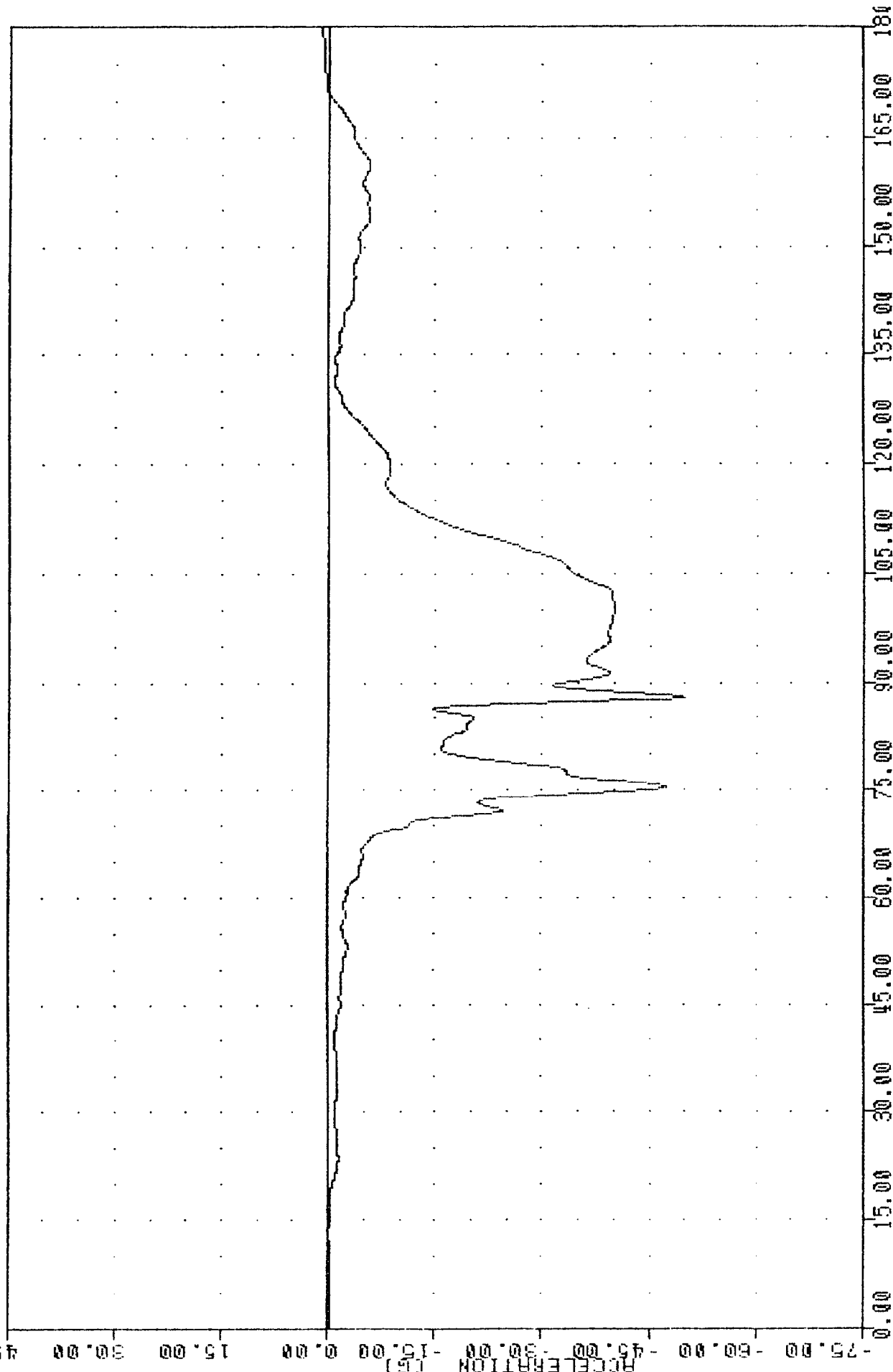
BREED AIRBAG PROGRAM

84221000000

PEVXG1

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -49.85 87.75, 1.09 179.50



FORD LTD 30 MPH CENTERLINE POLE IMPACT
DRIVER PELVIS ACCELERATION X AXIS

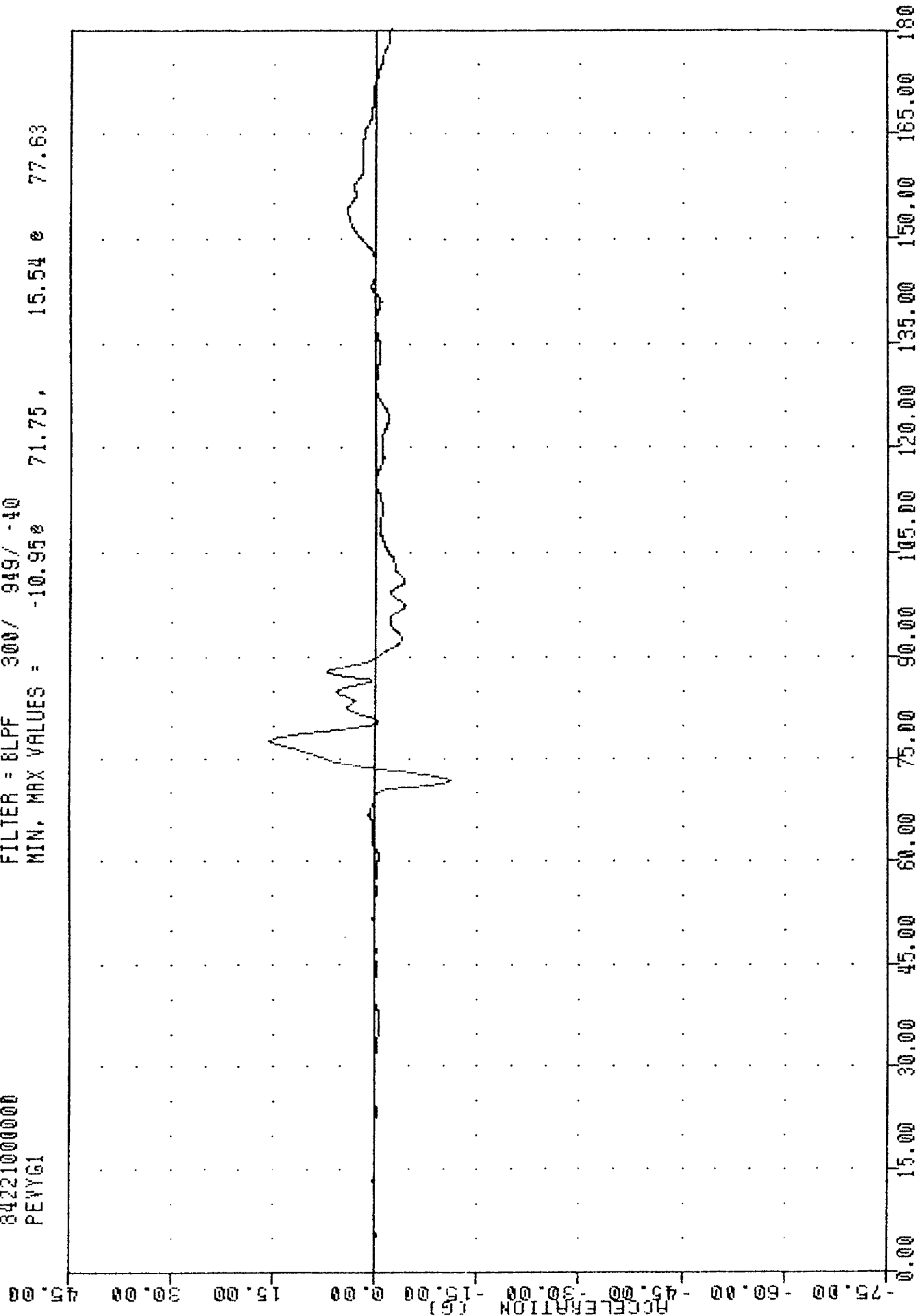
BREED AIRBAG PROGRAM

84221000000

PEVY61

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -10.950 71.75, 15.54 0 77.63



FORD LTD 30 MPH CENTERLINE POLE IMPACT
DRIVER PELVIS ACCELERATION Y AXIS

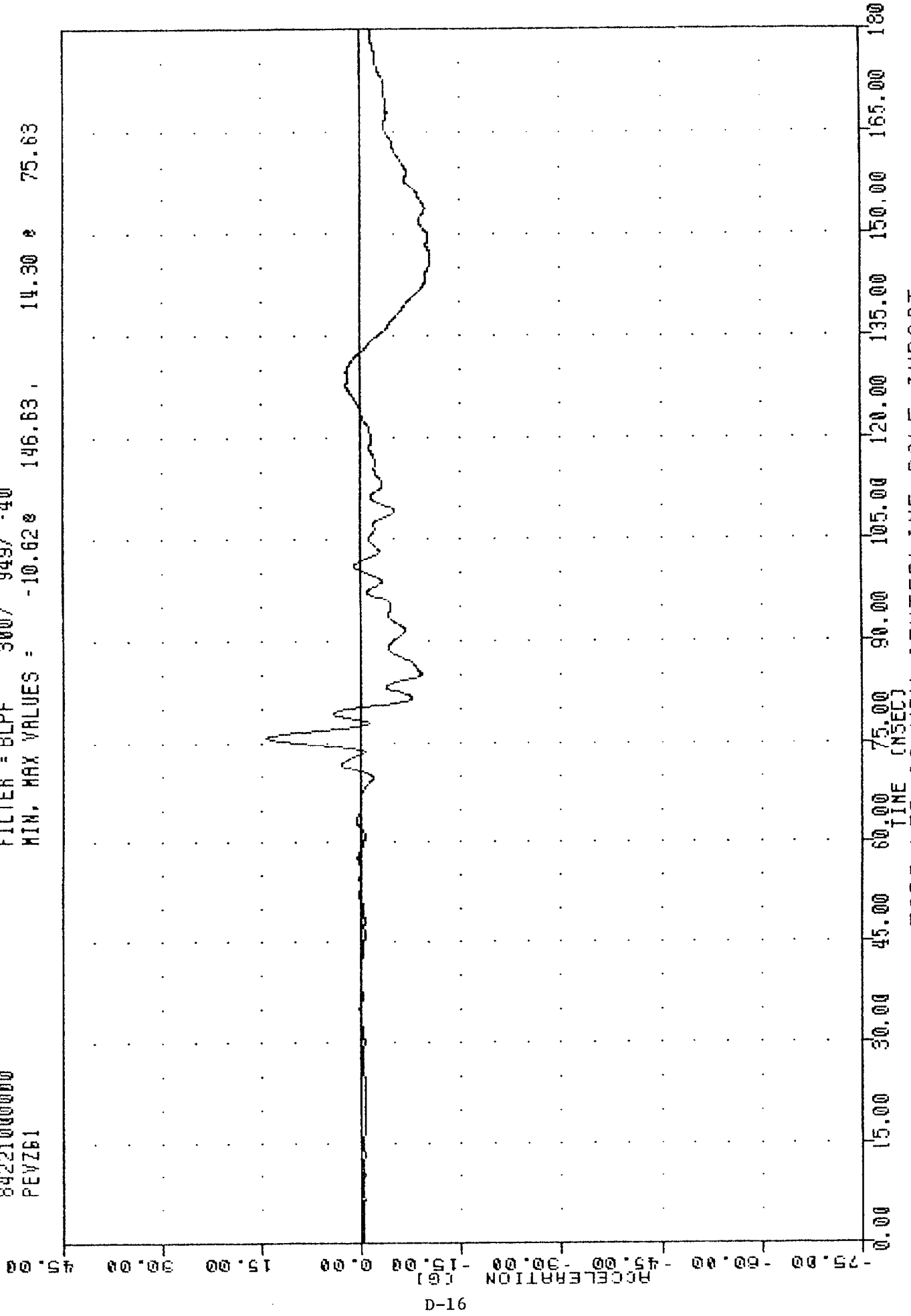
BREED AIRBAG PROGRAM

842210000000

PEVZ61

FILTER = BLPF 300/ 949/ -40

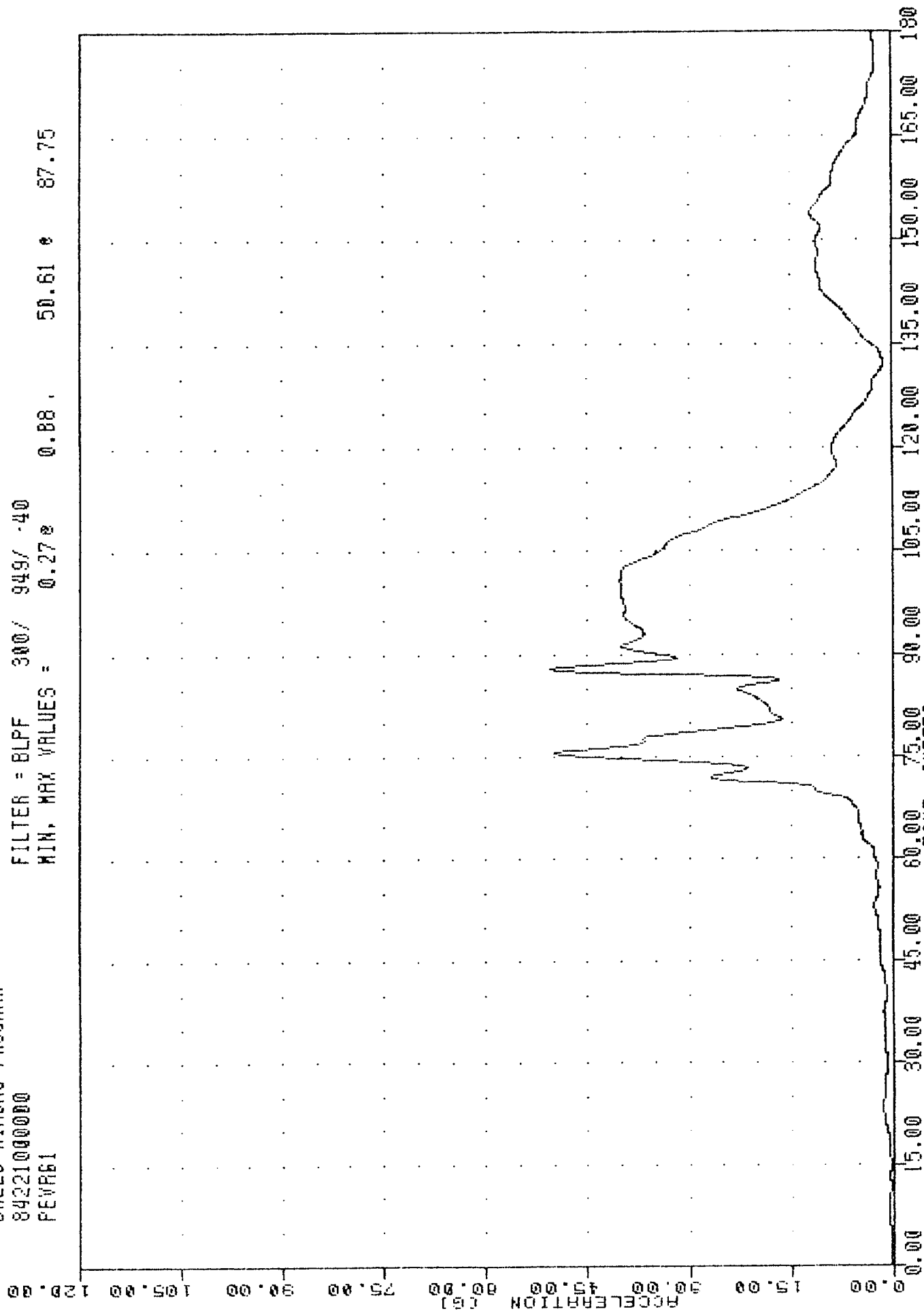
MIN. MAX VALUES = -10.62 146.63, 14.30 75.63



FORD LTD 30 MPH CENTERLINE POLE IMPACT
DRIVER PELVIS ACCELERATION Z AXIS

BREED AIRBAG PROGRAM
 84221000000
 PEVR61

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 0.27 0.88 50.61 87.75



FORD LTD 30 MPH CENTERLINE POLE IMPACT
 DRIVER PELVIS RESULTANT

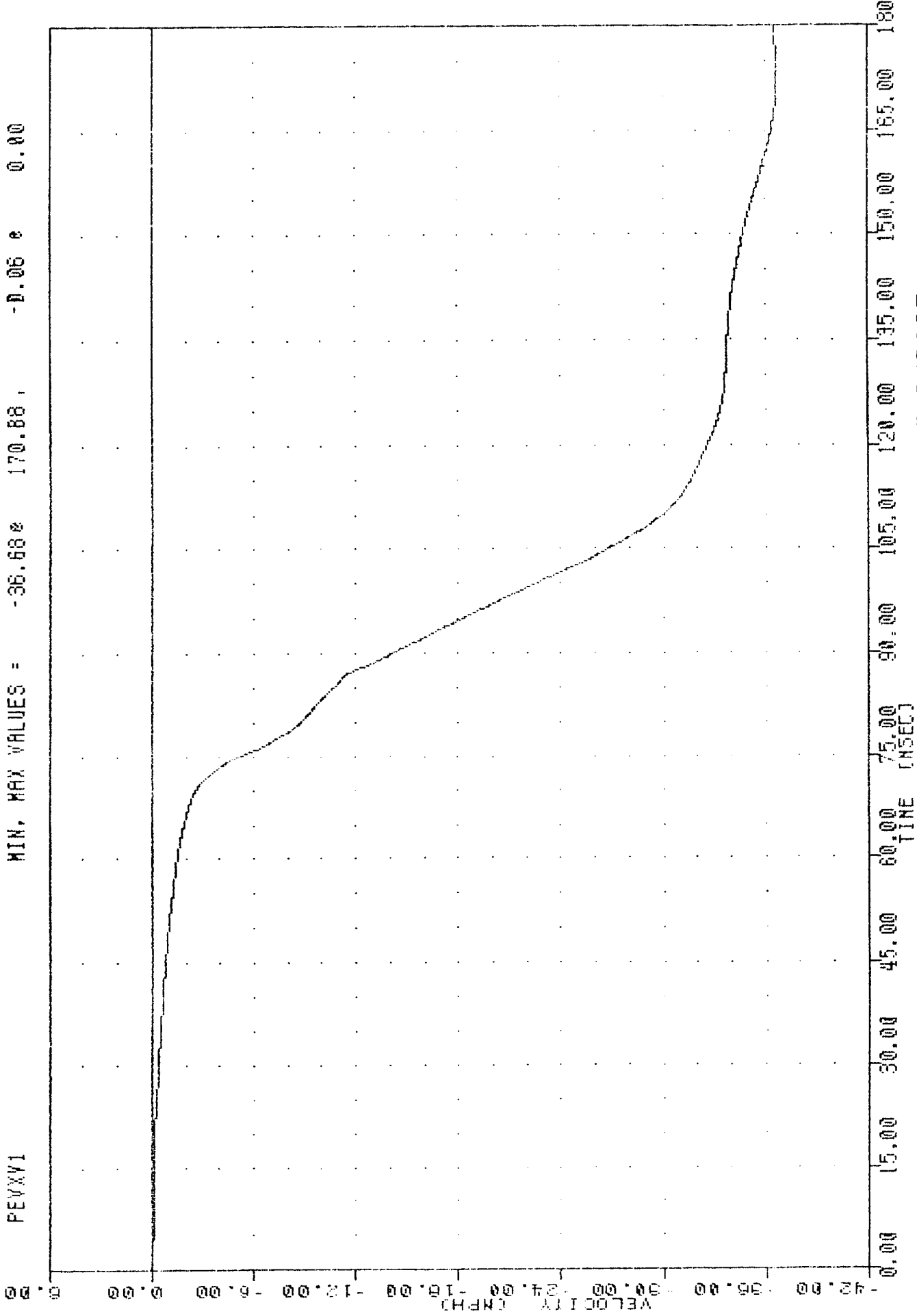
BREED AIRBAG PROGRAM

84221000000

PEVXV1

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -36.68 170.88 , -0.06 0.00



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DELTA V USING PEVXG1

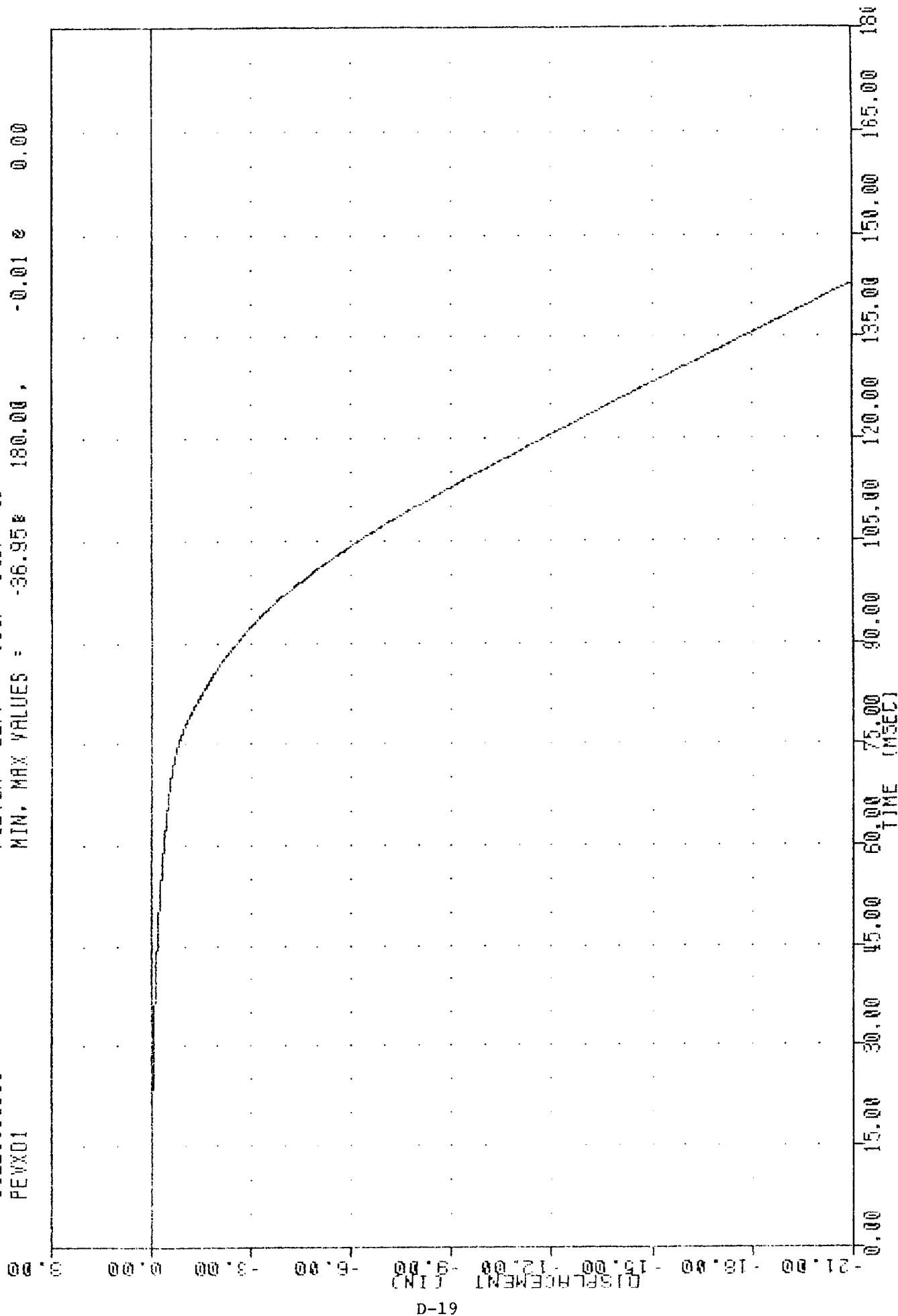
BAEED AIRBAG PROGRAM

84221000000

PEVX01

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -36.95% 180.00, -0.01% 0.00



FORD LTD 30 MPH CENTERLINE POLE IMPACT
DELTA X USING PEVXV1

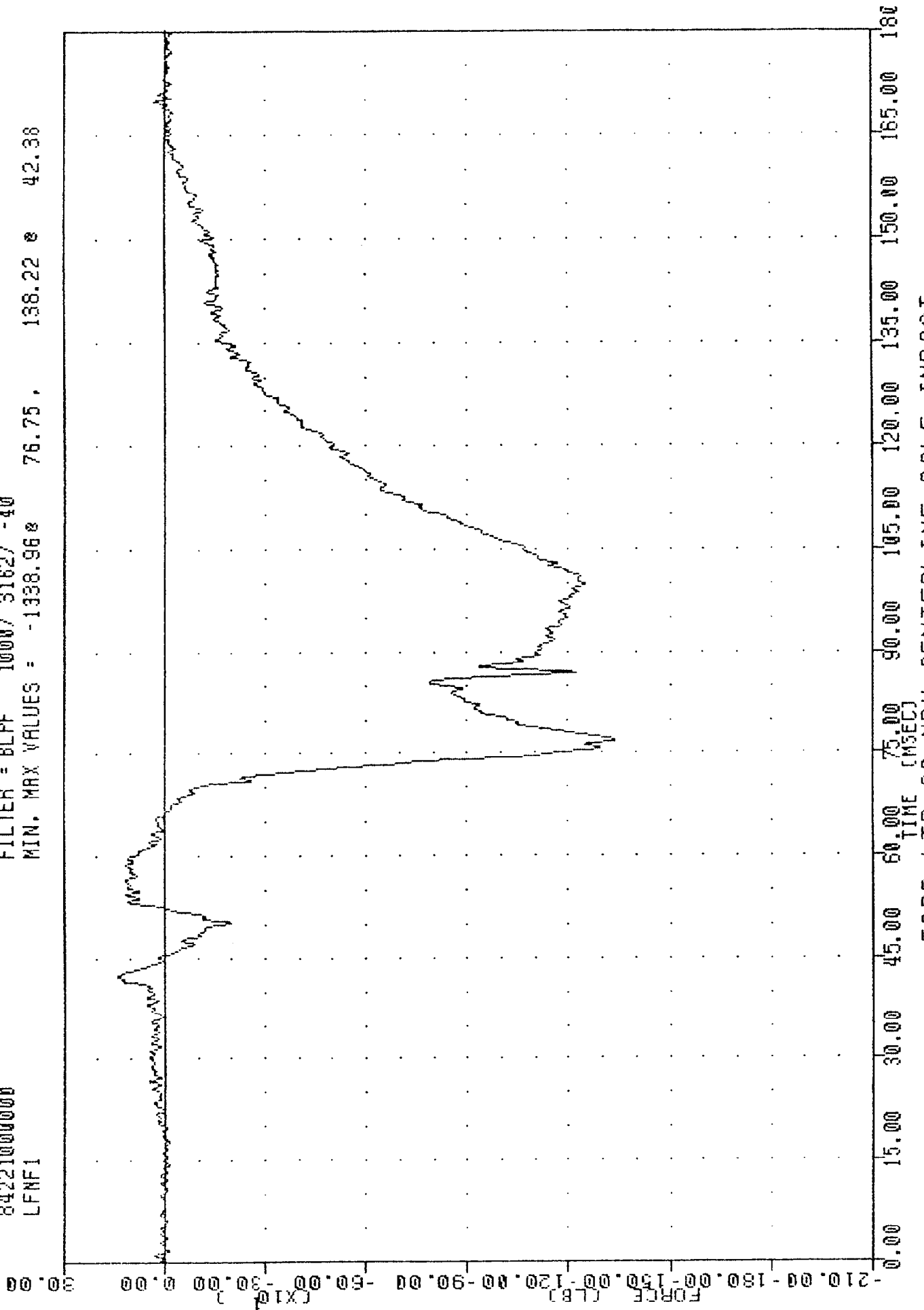
BREED AIRBAG PROGRAM

84221000000

LFNF1

FILTER = BLPF 1000/ 3162/ -40

MIN. MAX VALUES = -1338.968 76.75, 138.22 42.38



FORD LTD 30 MPH CENTERLINE POLE IMPACT
DRIVER LEFT FEMUR LOAD CELL

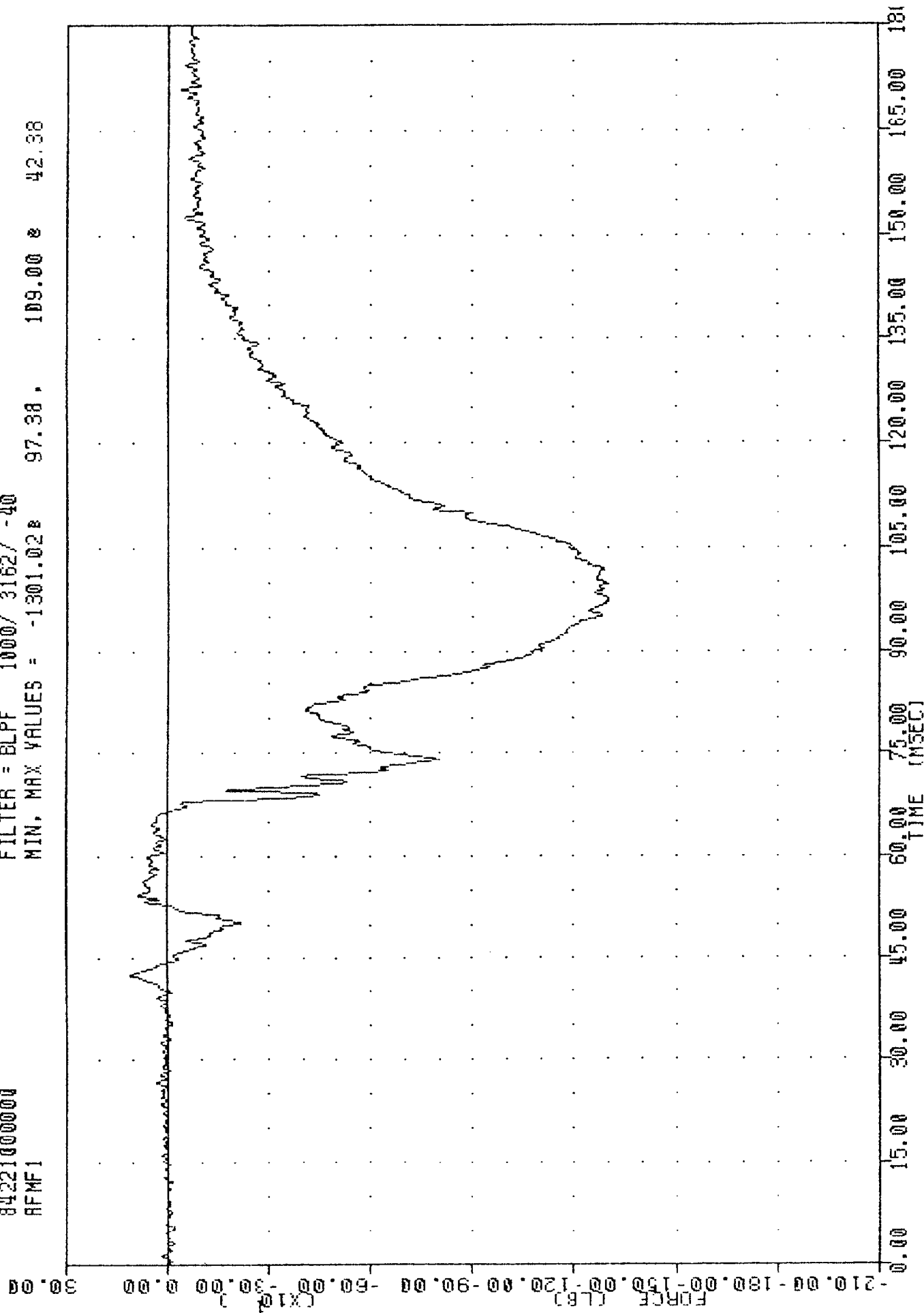
BREED AIRBAG PROGRAM

84221000000

AFMF1

FILTER = BLPF 1000/ 3162/ -40

MIN, MAX VALUES = -1301.028 97.38, 109.00 & 42.38



FORD LTD 30 MPH CENTERLINE POLE IMPACT
DRIVER RIGHT FEMUR LOAD CELL

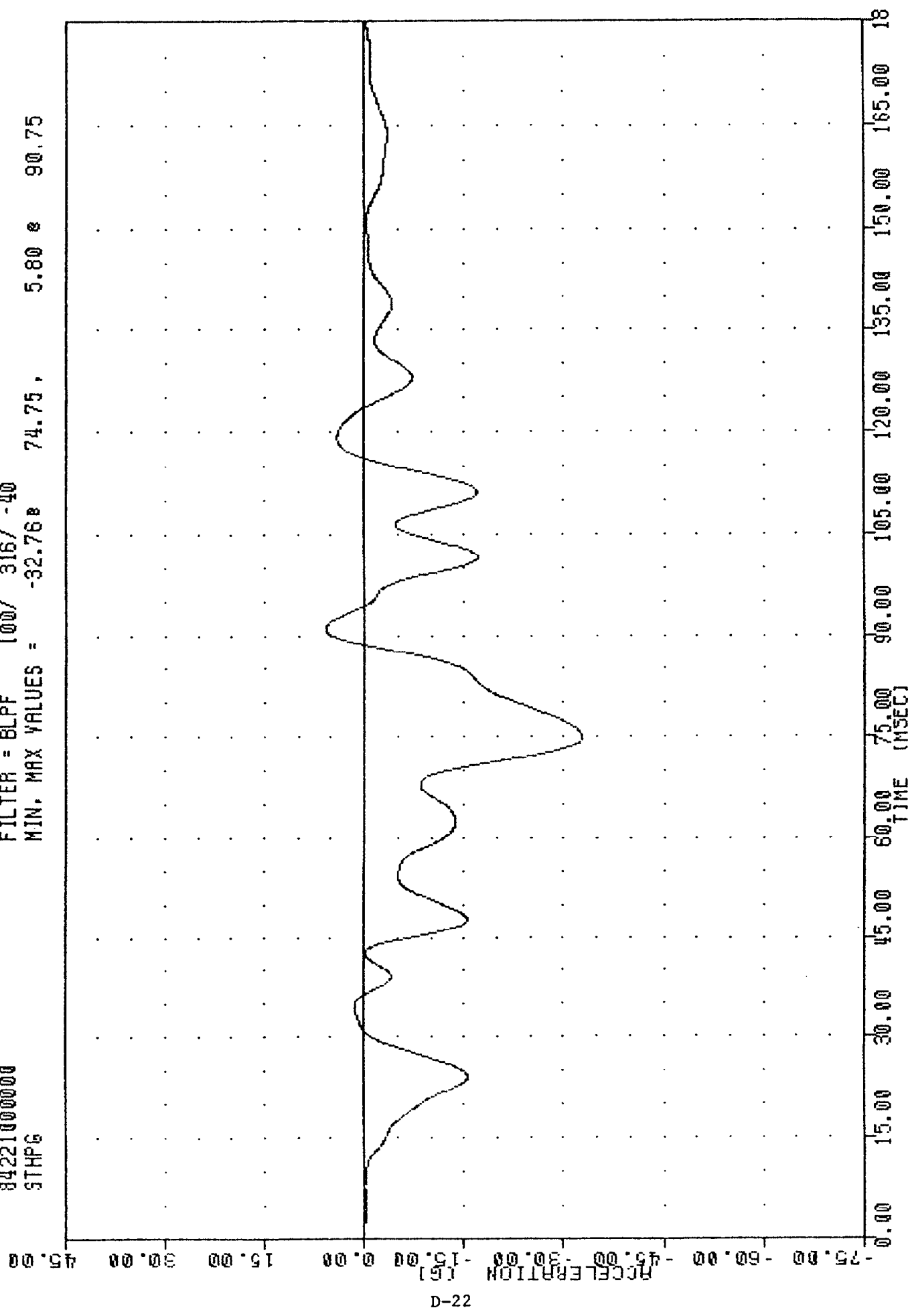
BREED AIRBAG PROGRAM

84221000000

STHPG

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -32.76 74.75, 5.80 90.75



FORD LTD 30 MPH CENTERLINE POLE IMPACT
STEERING COLUMN HUB ACCELERATION POSTERIOR.

BREED AIRBAG PROGRAM

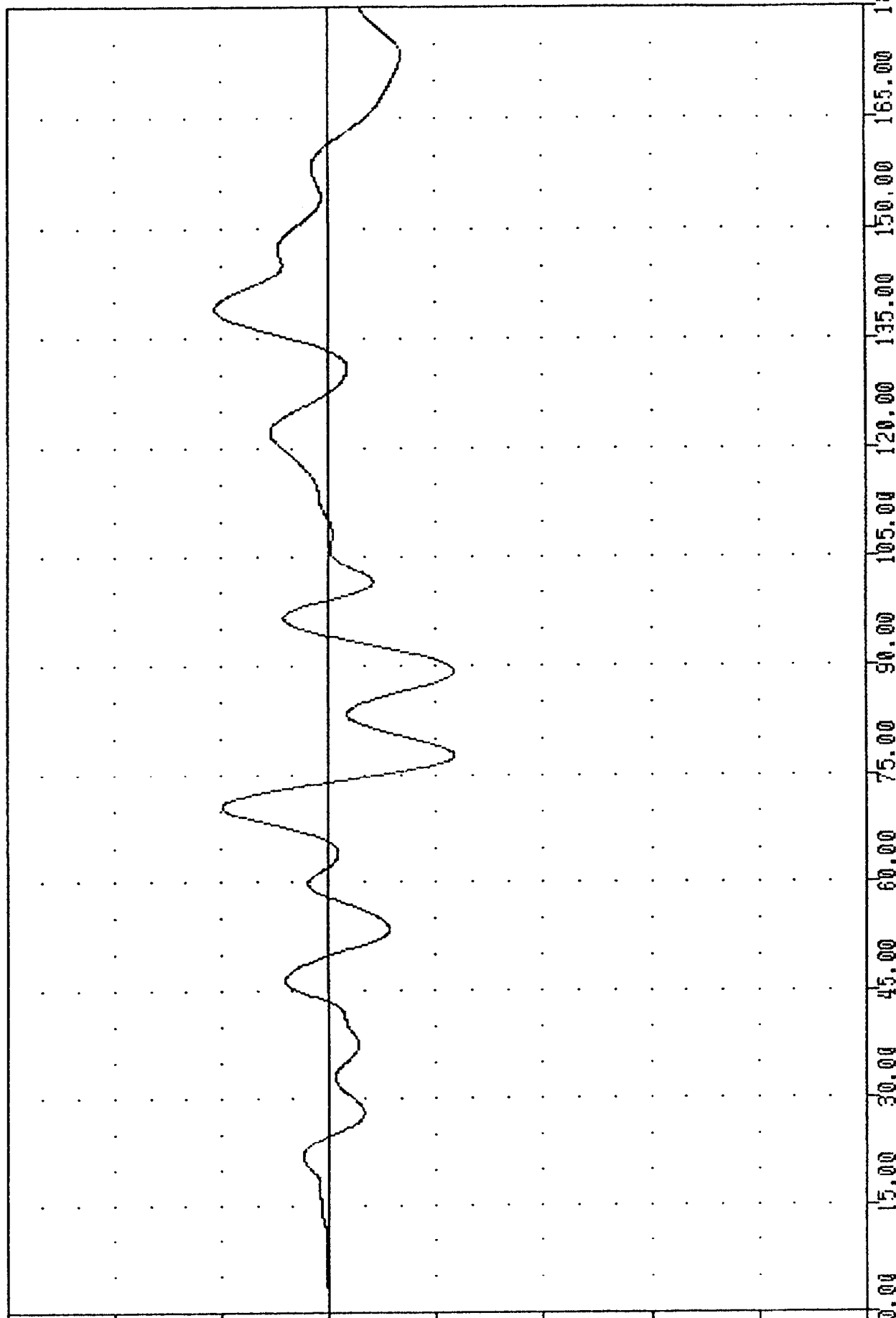
84221000000

STHLS

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -17.538 77.50 , 15.91 & 138.88

ACCELERATION (G)



FORD LTD 30 MPH CENTERLINE POLE IMPACT
STEERING COLUMN HUB ACCELERATION LATERAL

BREED AIRBAG PROGRAM

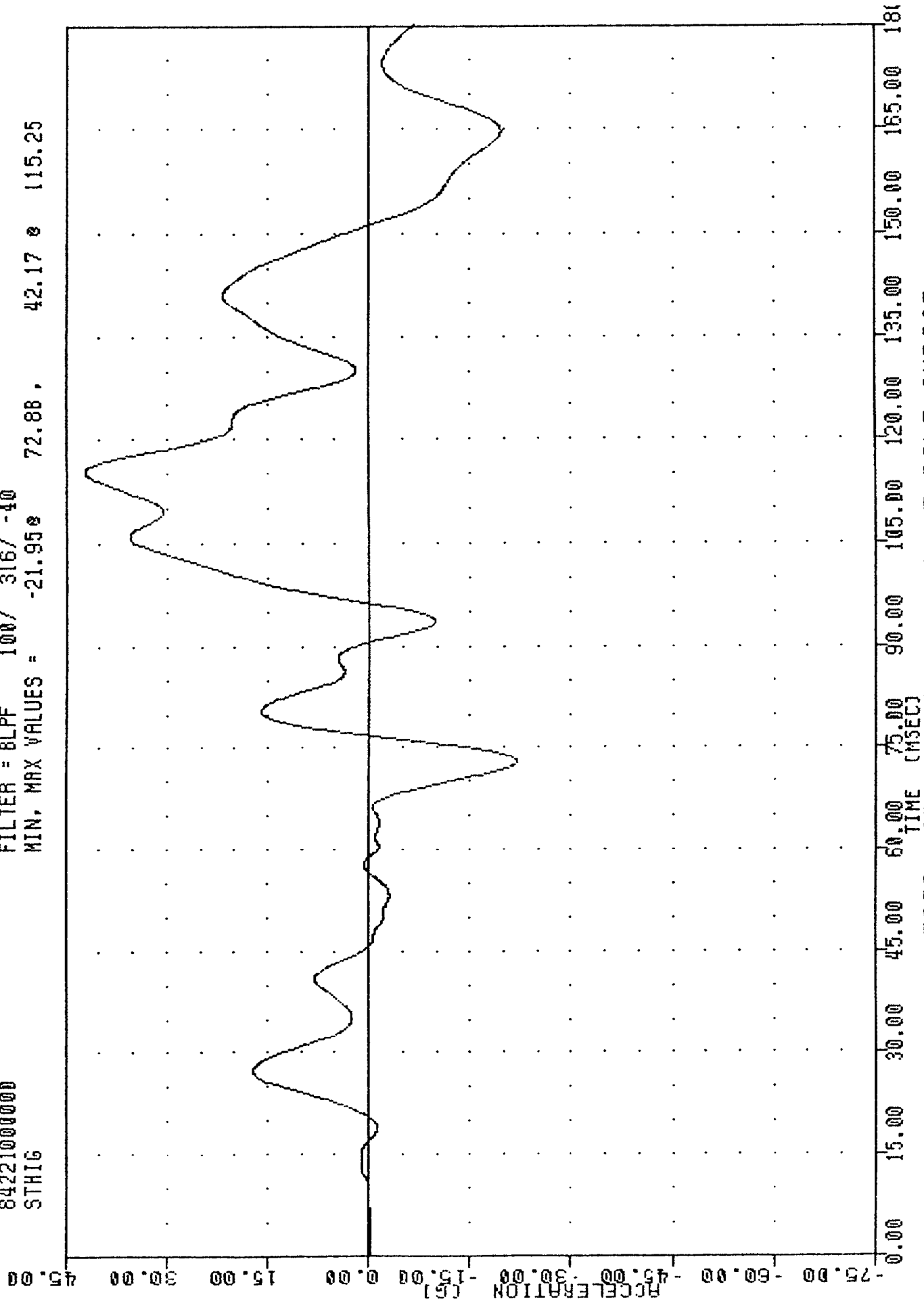
84221000000

STHIG

FILTER = 8LPF 100/ 316/ -40

MIN, MAX VALUES = -21.95g

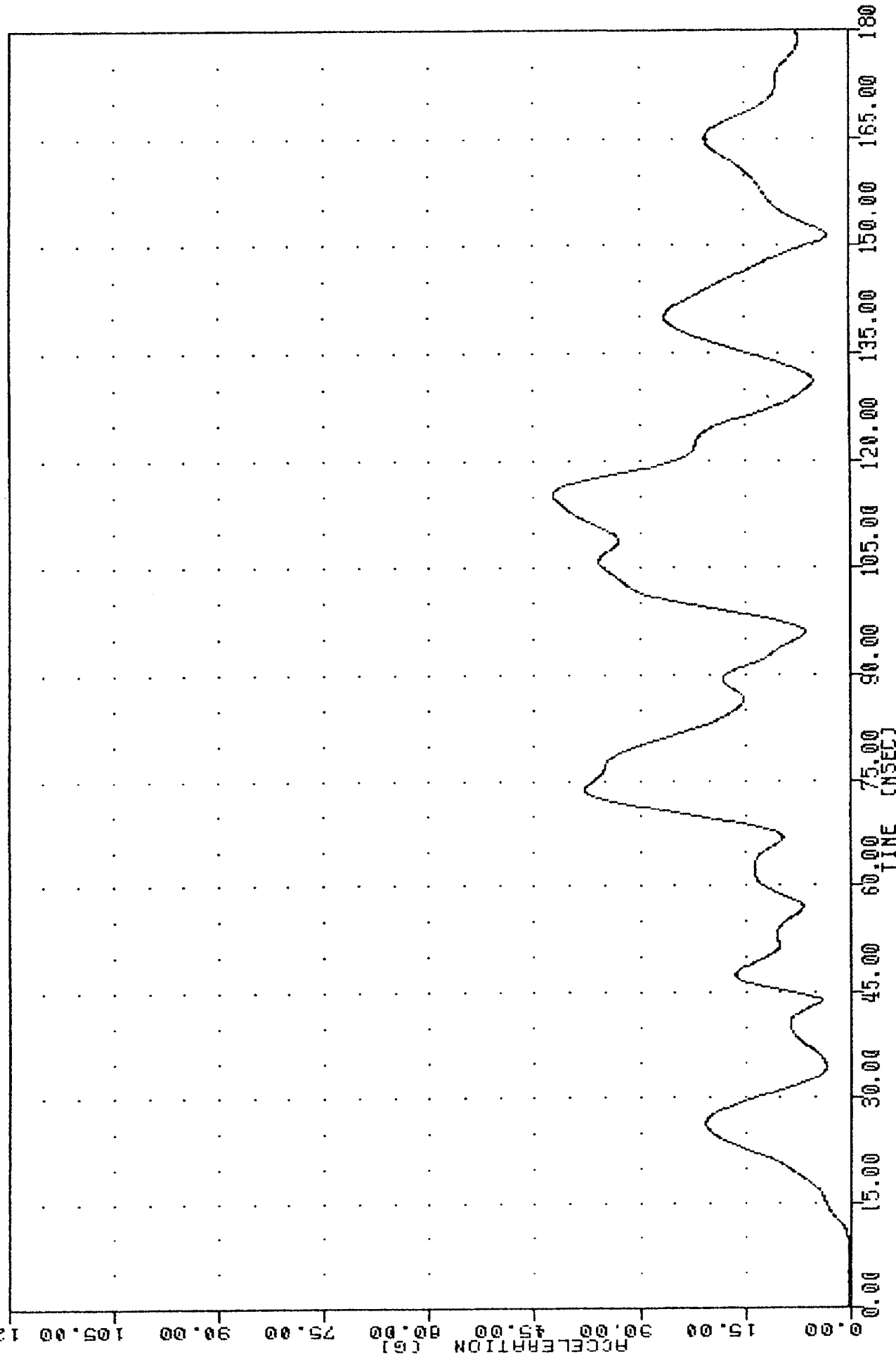
72.88, 42.17 g 115.25



FORD LTD 30 MPH CENTERLINE POLE IMPACT
STEERING COLUMN HUB ACCELERATION INFERIOR

BREED AIRBAG PROGRAM
84221000000
STHR6

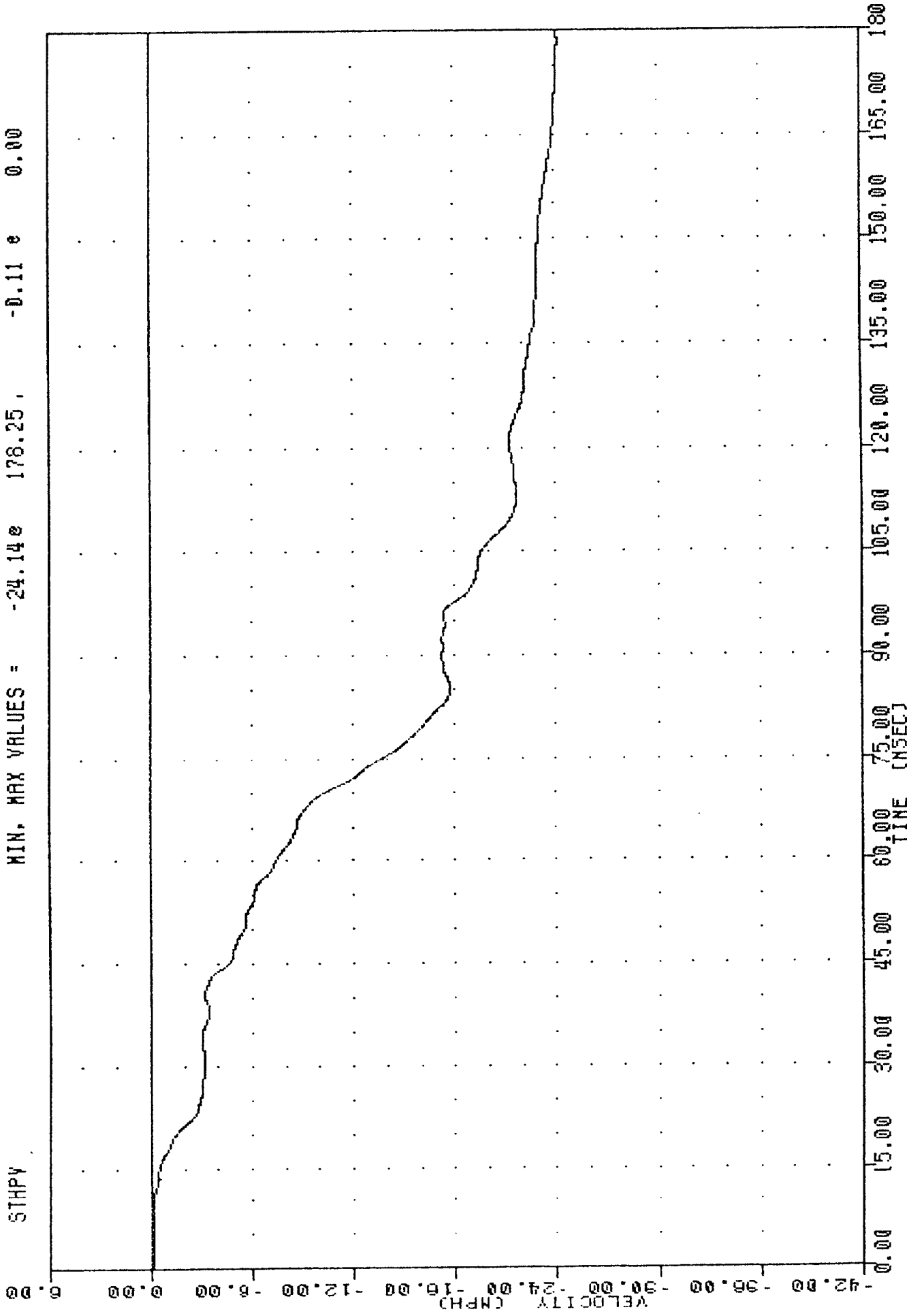
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = 0.26e 2.25. 42.31 e 115.13



FORD LTD 30 MPH CENTERLINE POLE IMPACT
STEERING COLUMN HUB RESULTANT

BREED AIRBAG PROGRAM
 84221000000
 STHPV

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -24.14e 176.25, -0.11 e 0.00



FORD LTD 30 MPH CENTERLINE POLE IMPACT
 DELTA V USING STHPG

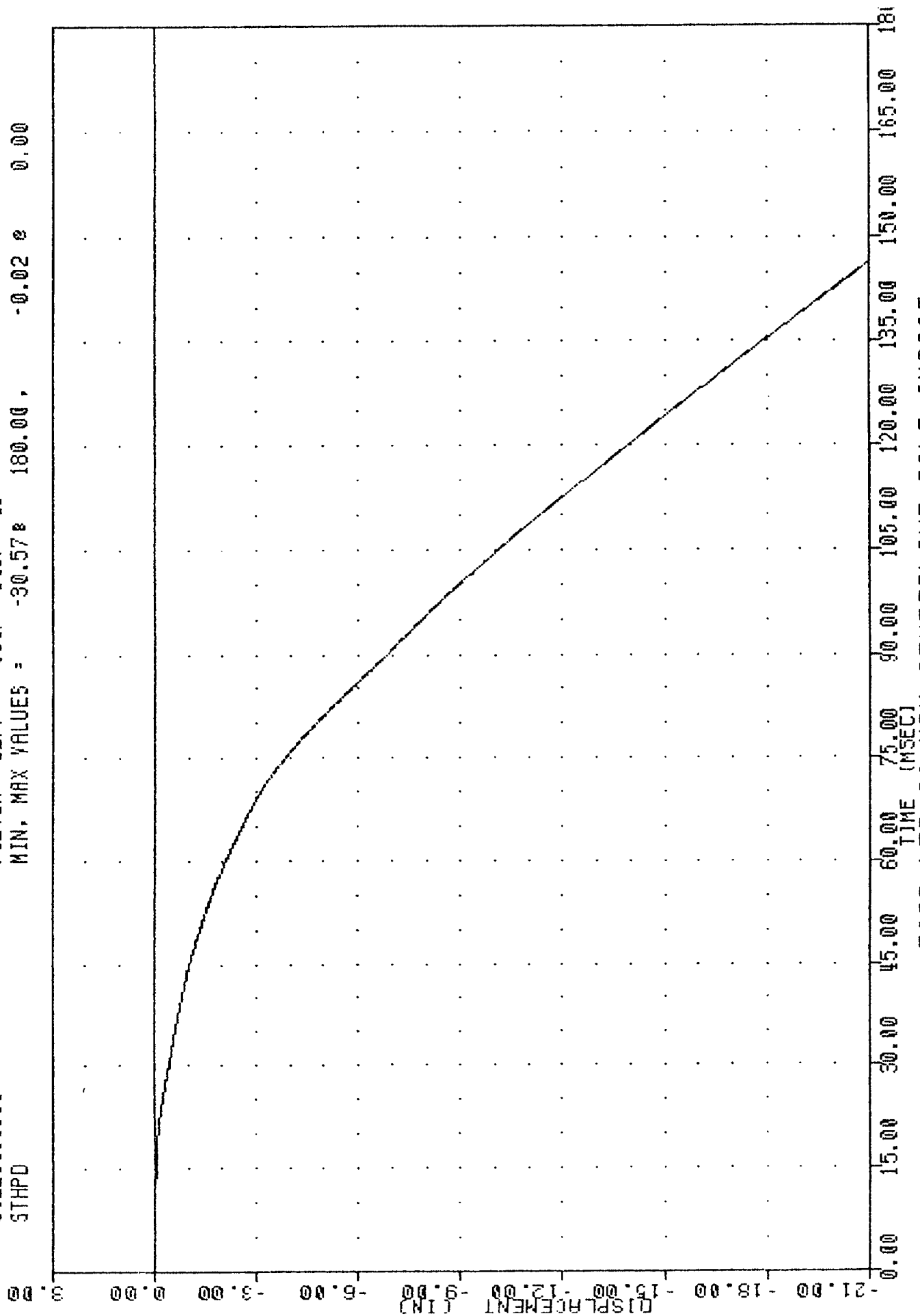
BREED AIRBAG PROGRAM

84221000000

STHPD

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -30.57 180.00, -0.02 0.00



FORD LTD 30 MPH CENTERLINE POLE IMPACT
DELTA X USING STHPV

BREED AIRBAG PROGRAM

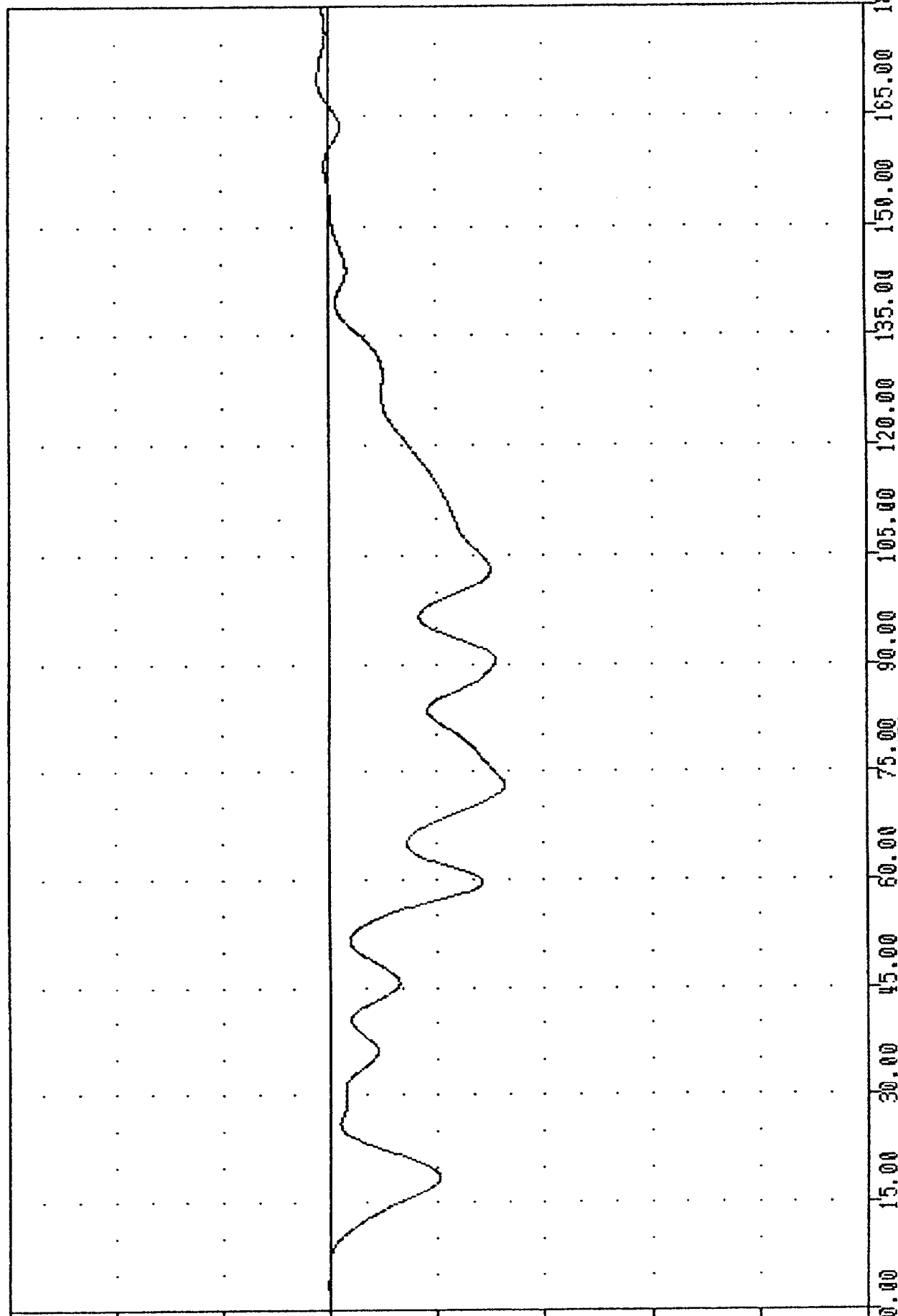
84221000000

LPBXG

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -24.52 72.88, 1.55 169.88

ACCELERATION (G)



FORD LTD 30 MPH CENTERLINE POLE IMPACT
LEFT B PILLAR ACCELERATION X AXIS

BREED AIRBAG PROGRAM

84221000000

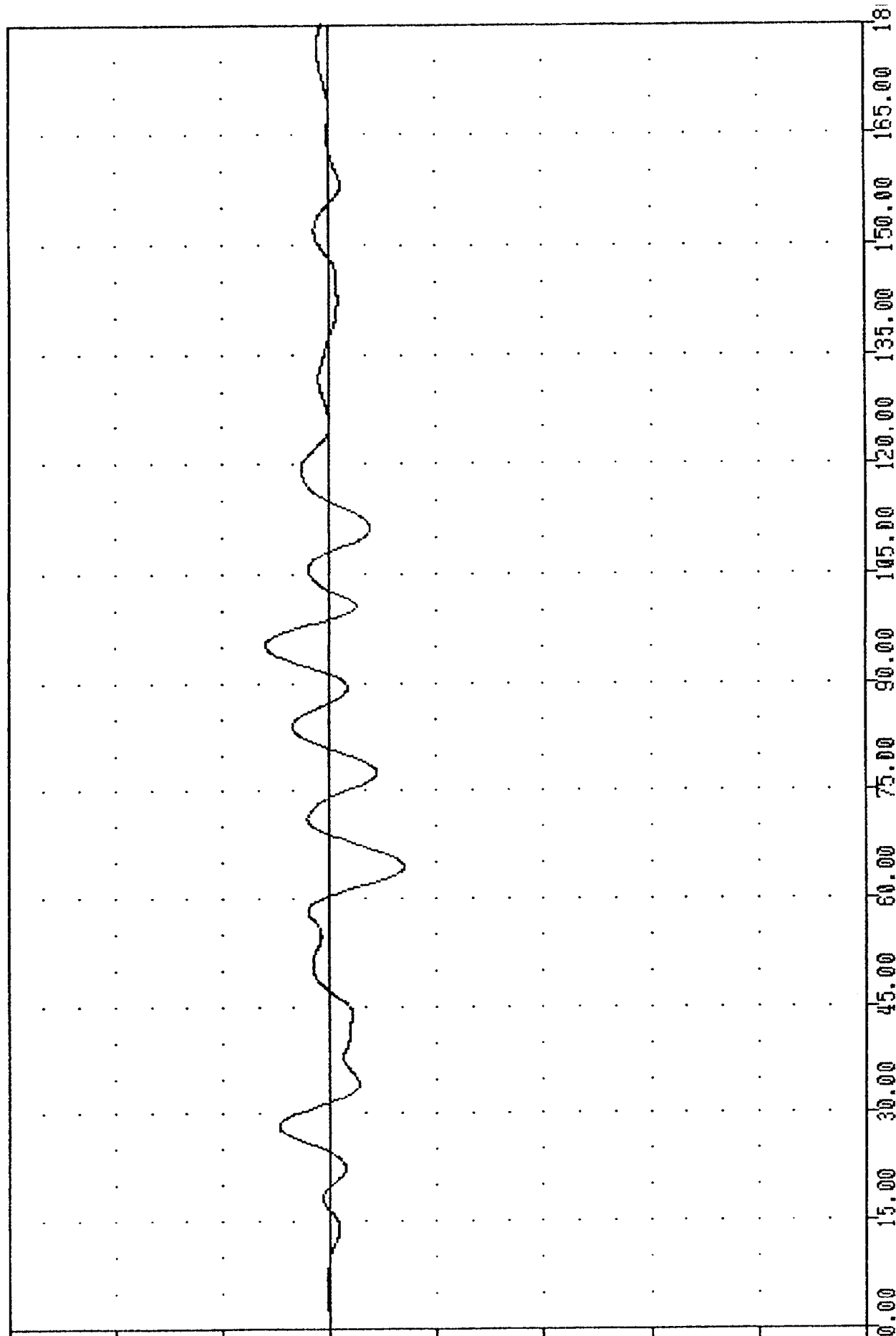
LPBYG

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -10.500 64.25, 8.95 95.13

ACCELERATION (G)

D-29



FORD LTD 30 MPH CENTERLINE POLE IMPACT
LEFT B PILLAR ACCELERATION Y AXIS

BREED AIRBAG PROGRAM

84221000000

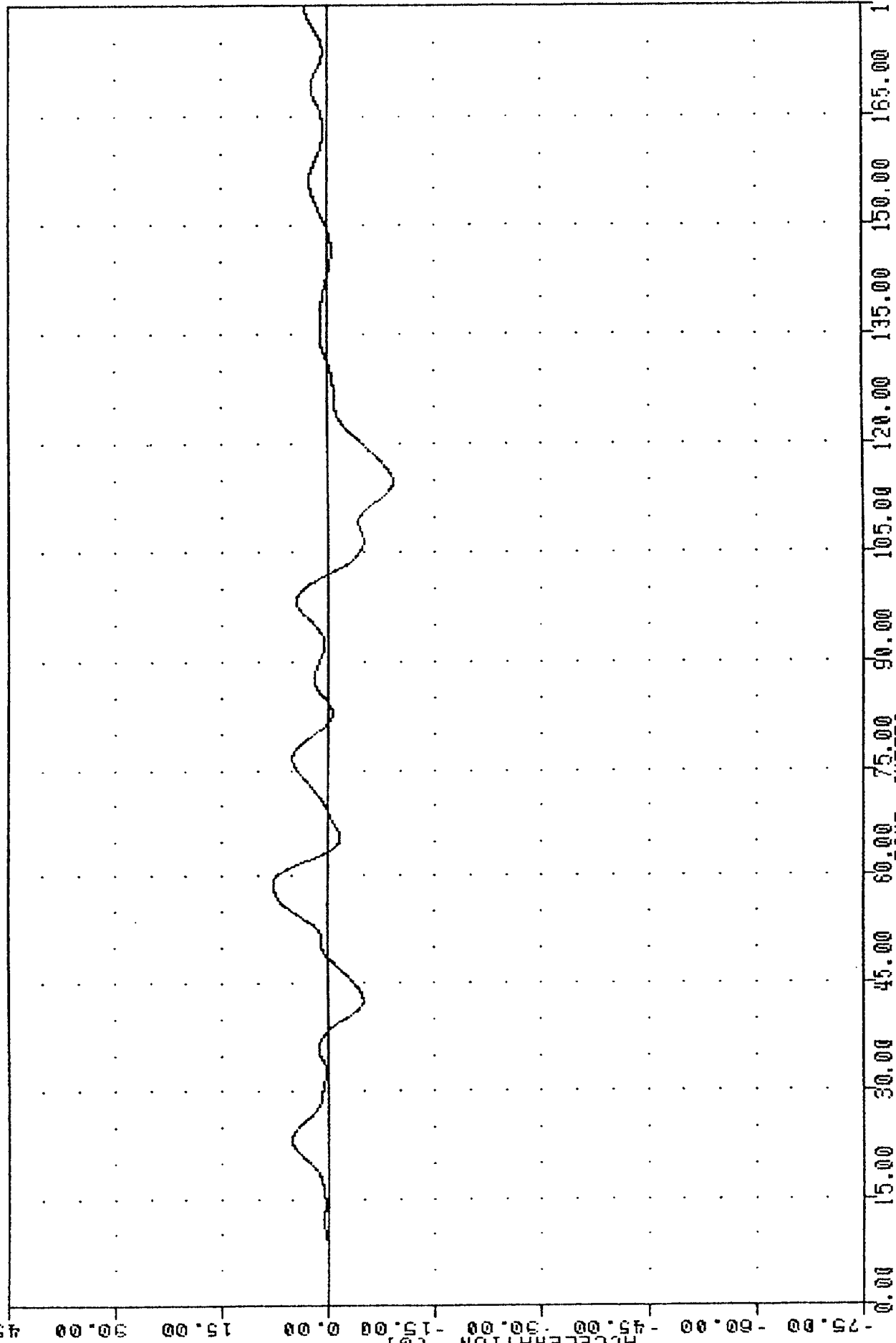
LPBZ6

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -9.16e 114.50, 7.82 e 58.63

ACCELERATION (G)

D-30



TIME (msec)

FORD LTD 30 MPH CENTERLINE POLE IMPACT

LEFT B PILLAR ACCELERATION Z AXIS

BREED AIRBAG PROGRAM

84221000000

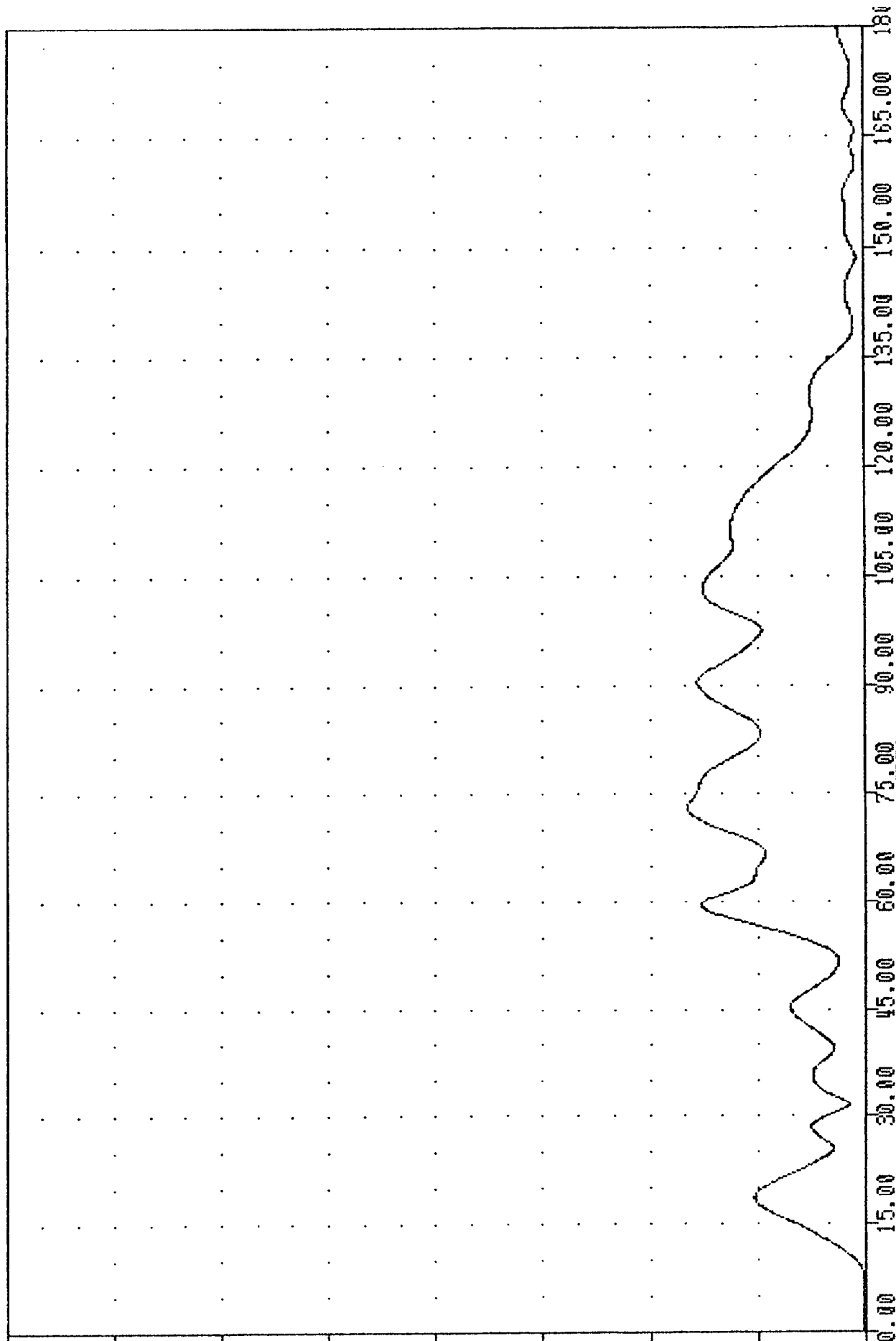
LPBRG

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = 0.17e 0.00, 24.73 e 72.88

ACCELERATION (G)

D-31



FORD LTD 30 MPH CENTERLINE POLE IMPACT
LEFT B PILLAR RESULTANT

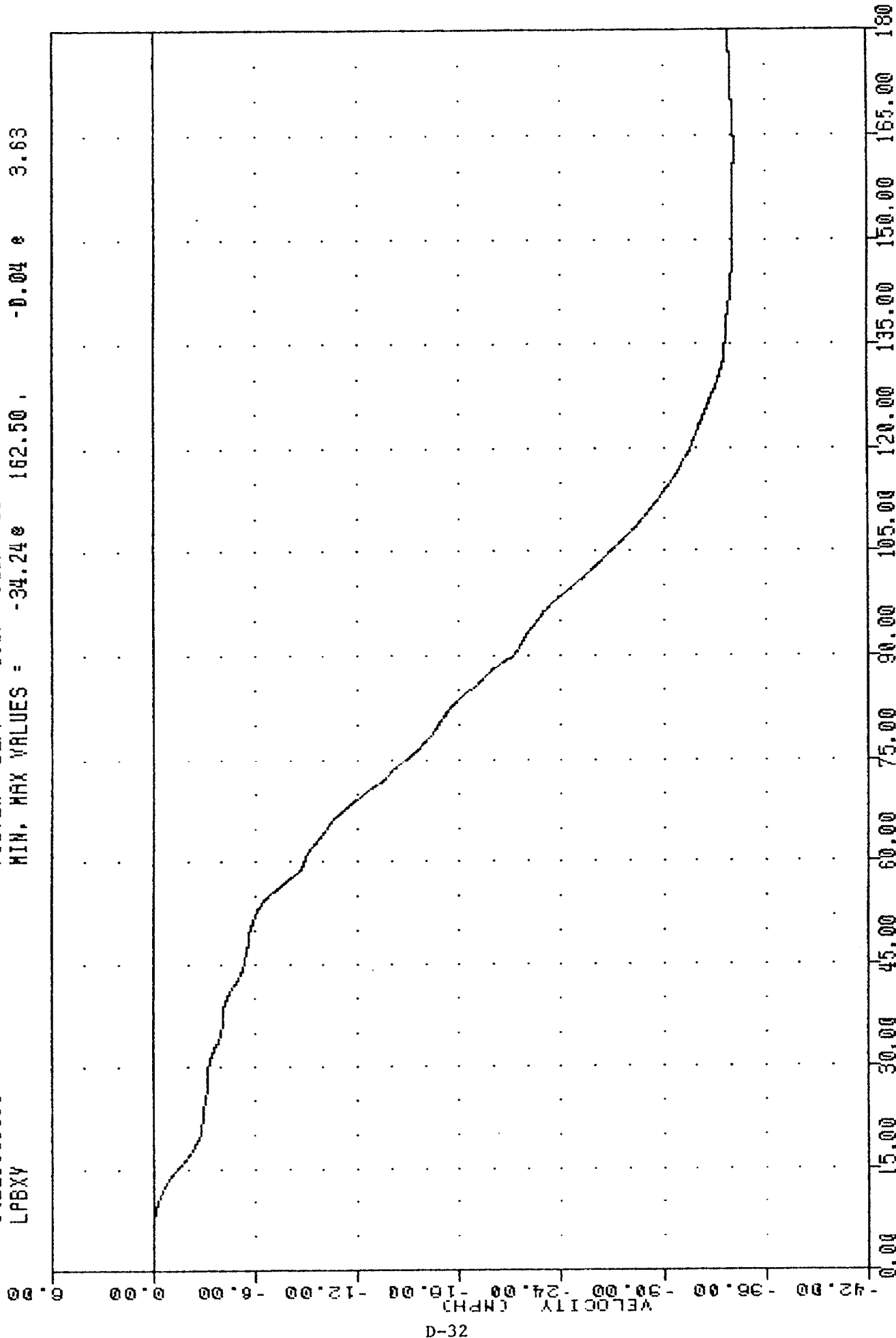
BREED AIRBAG PROGRAM

84221000000

LPBXV

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -34.24 162.50 -0.04 3.63



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DELTA V USING LPBXG

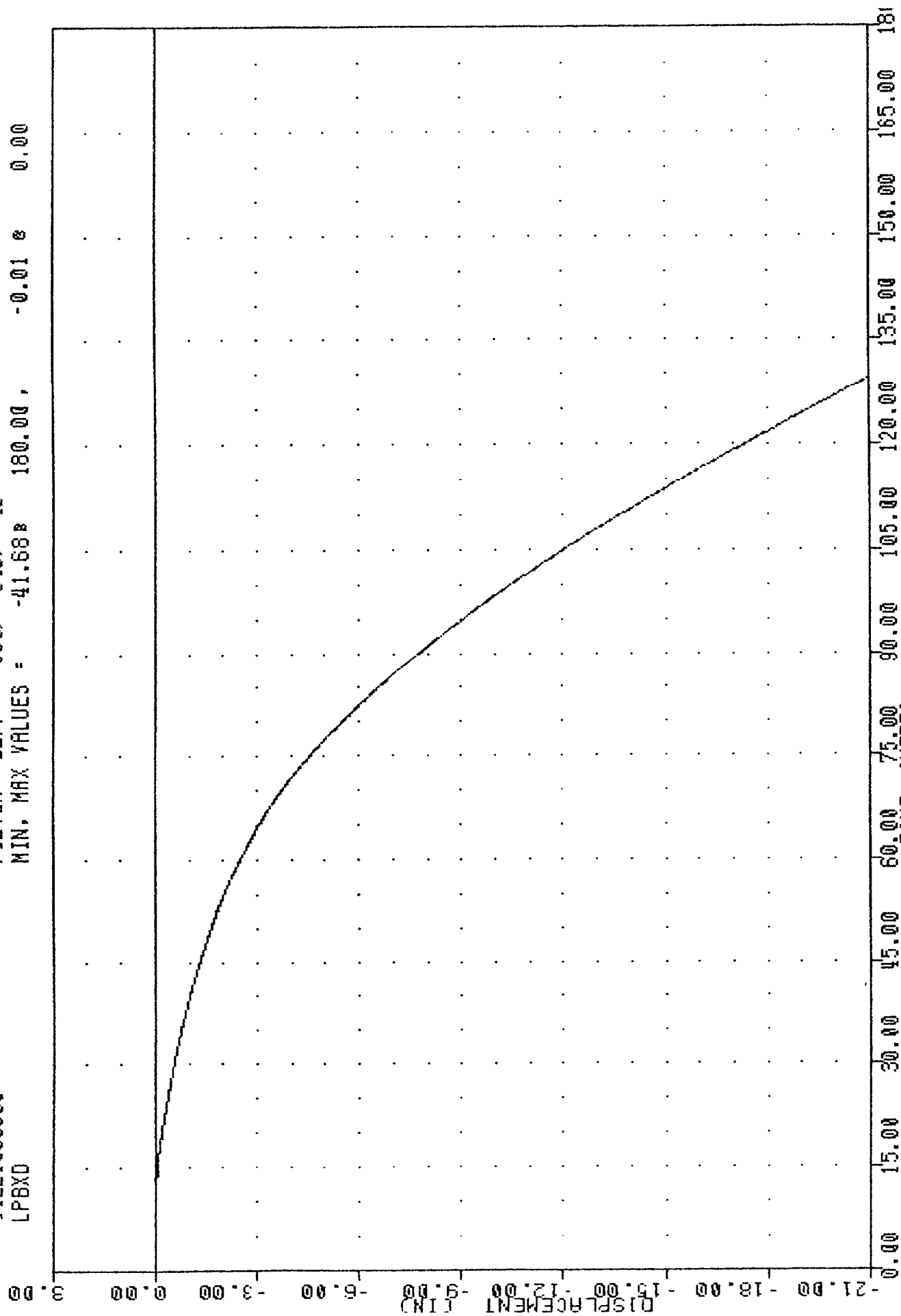
BREED AIRBAG PROGRAM

84221000000

LPBXD

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -41.58 180.00 , -0.01 0.00



FORD LTD 30 MPH CENTERLINE POLE IMPACT
DELTA X USING LPBXV

BREED AIRBAG PROGRAM

84221000000

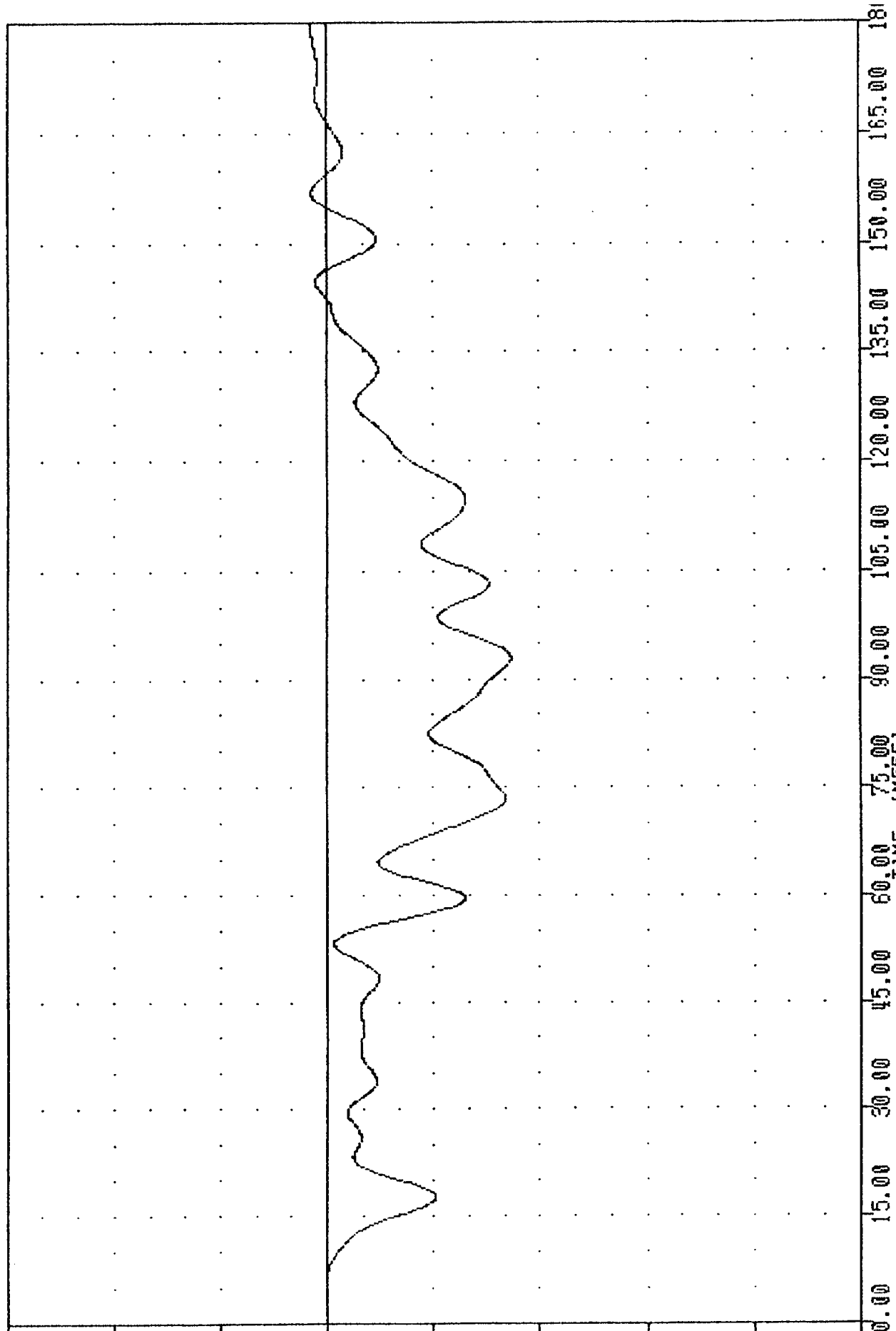
APBXG

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -25.93 92.75, 2.27 e 180.00

ACCELERATION (G)

D-34



FORD LTD 30 MPH CENTERLINE POLE IMPACT

RIGHT B PILLAR ACCELERATION X AXIS

BREED AIRBAG PROGRAM

84221000000

RPBYG

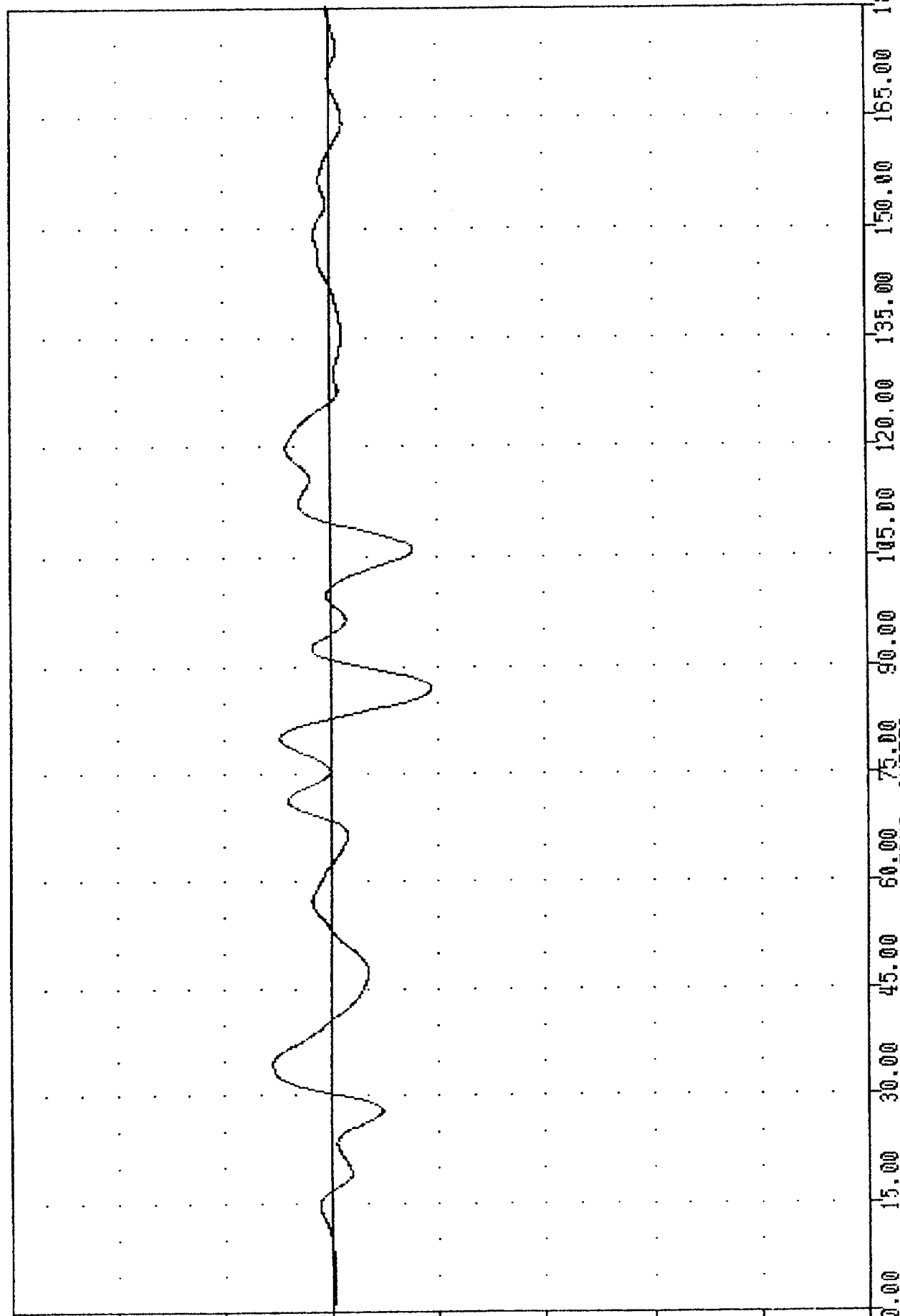
FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -14.09g 86.75,

8.23 g 34.25

ACCELERATION (G)

D-35



TIME (msec)

FORD LTD 30 MPH CENTERLINE POLE IMPACT

RIGHT B PILLAR ACCELERATION Y AXIS

BREED AIRBAG PROGRAM

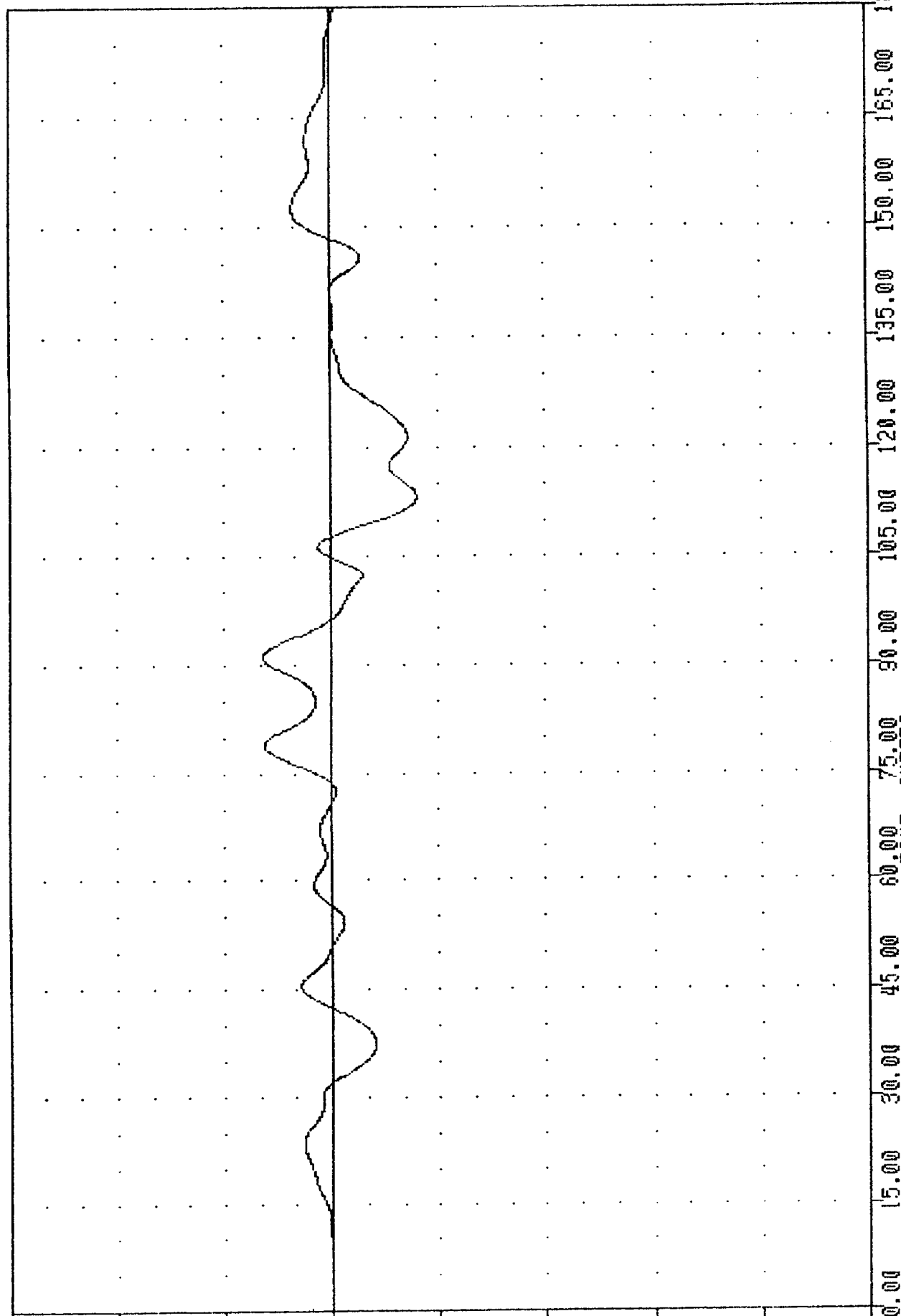
84221000000

RPBZG

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -11.95e 113.00 , 9.63 e 91.00

ACCELERATION (G)



FORD LTD 30 MPH CENTERLINE POLE IMPACT
RIGHT B PILLAR ACCELERATION Z AXIS

BREED AIRBAG PROGRAM

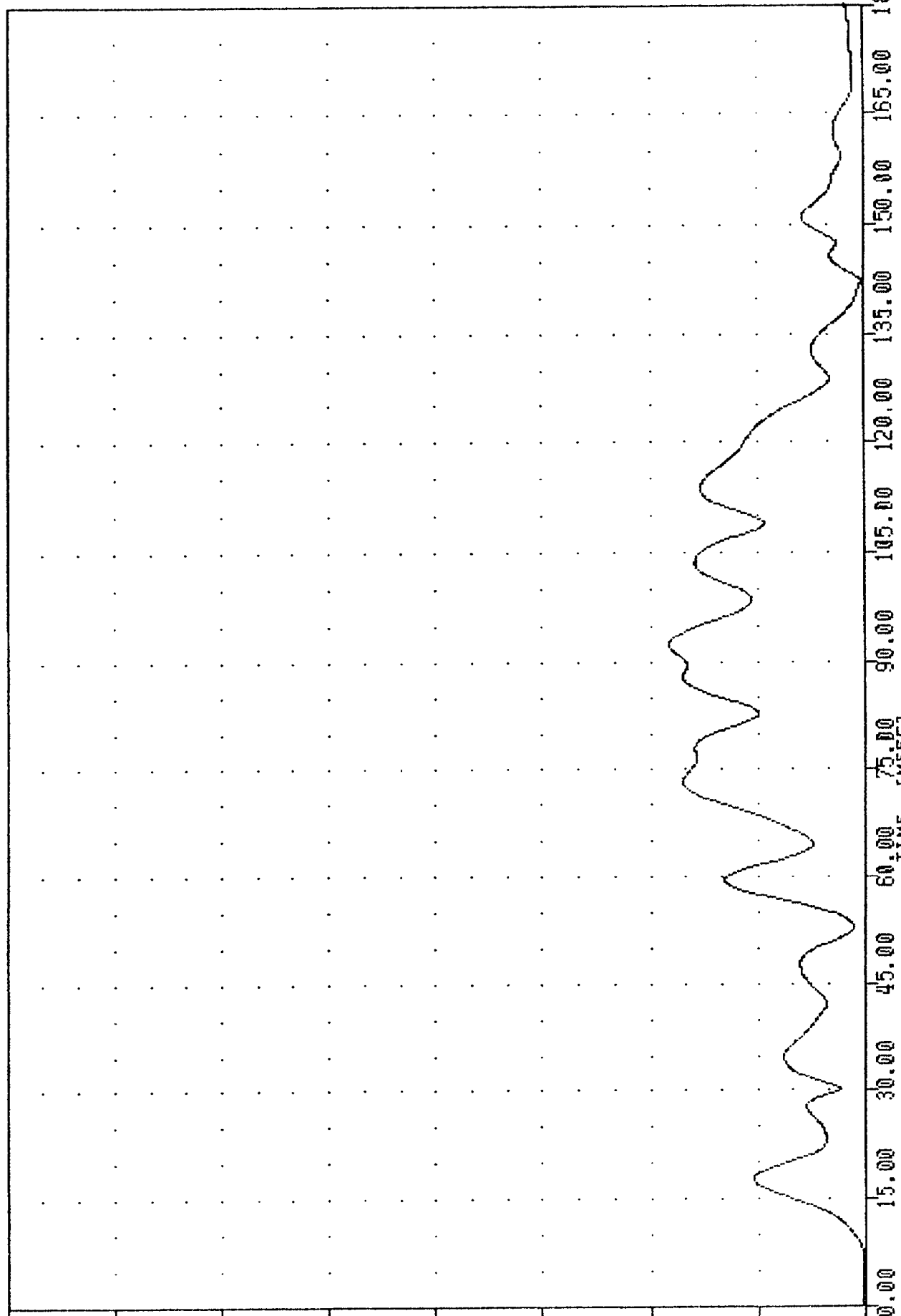
84221000000

RPBRC

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = 0.18e 142.13, 27.30 e 92.25

ACCELERATION (G)



FORD LTD 30 MPH CENTERLINE POLE IMPACT
RIGHT B PILLAR RESULTANT

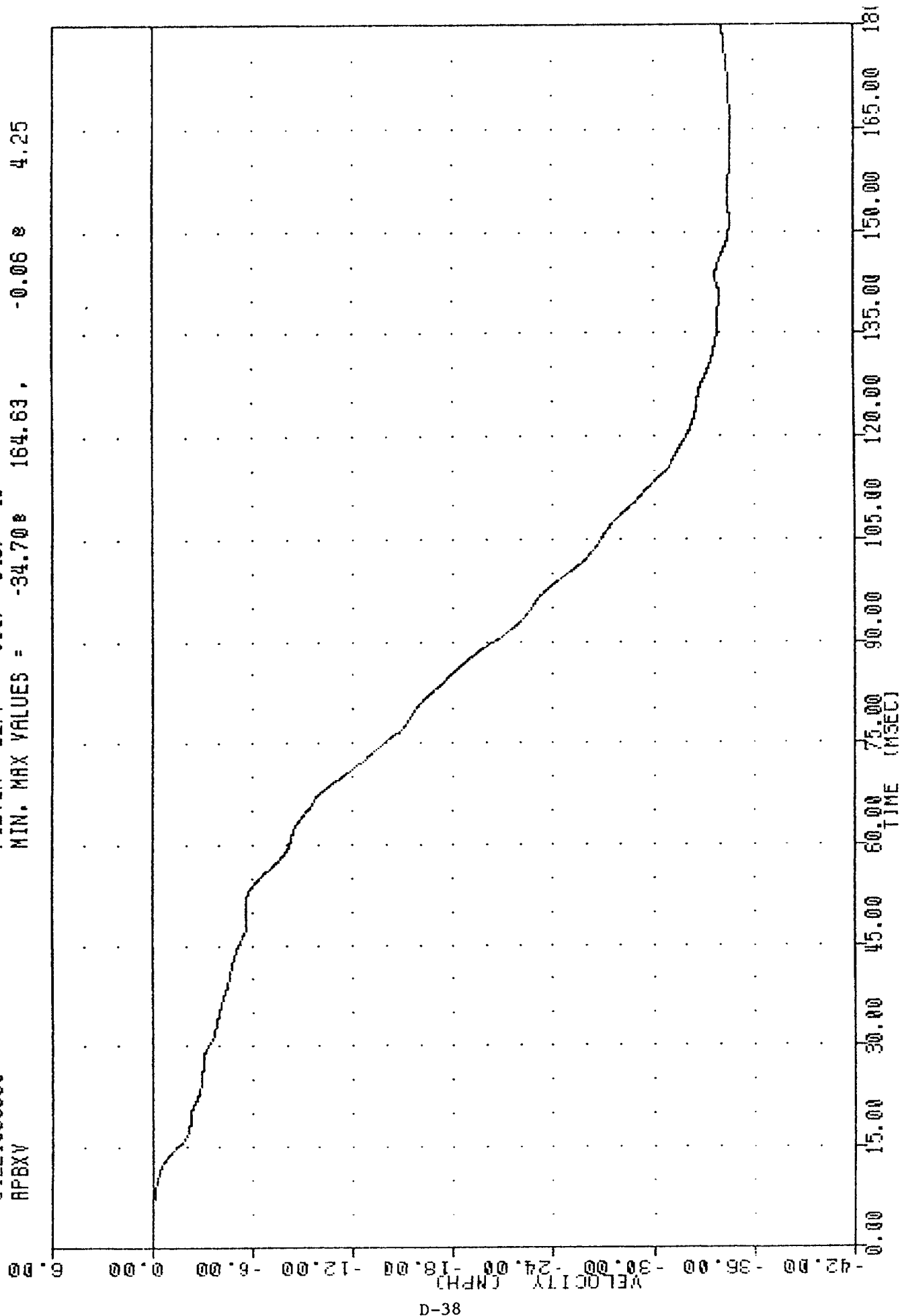
BREED AIRBAG PROGRAM

84221000000

RPBXV

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -34.70° 164.63, -0.06 s 4.25



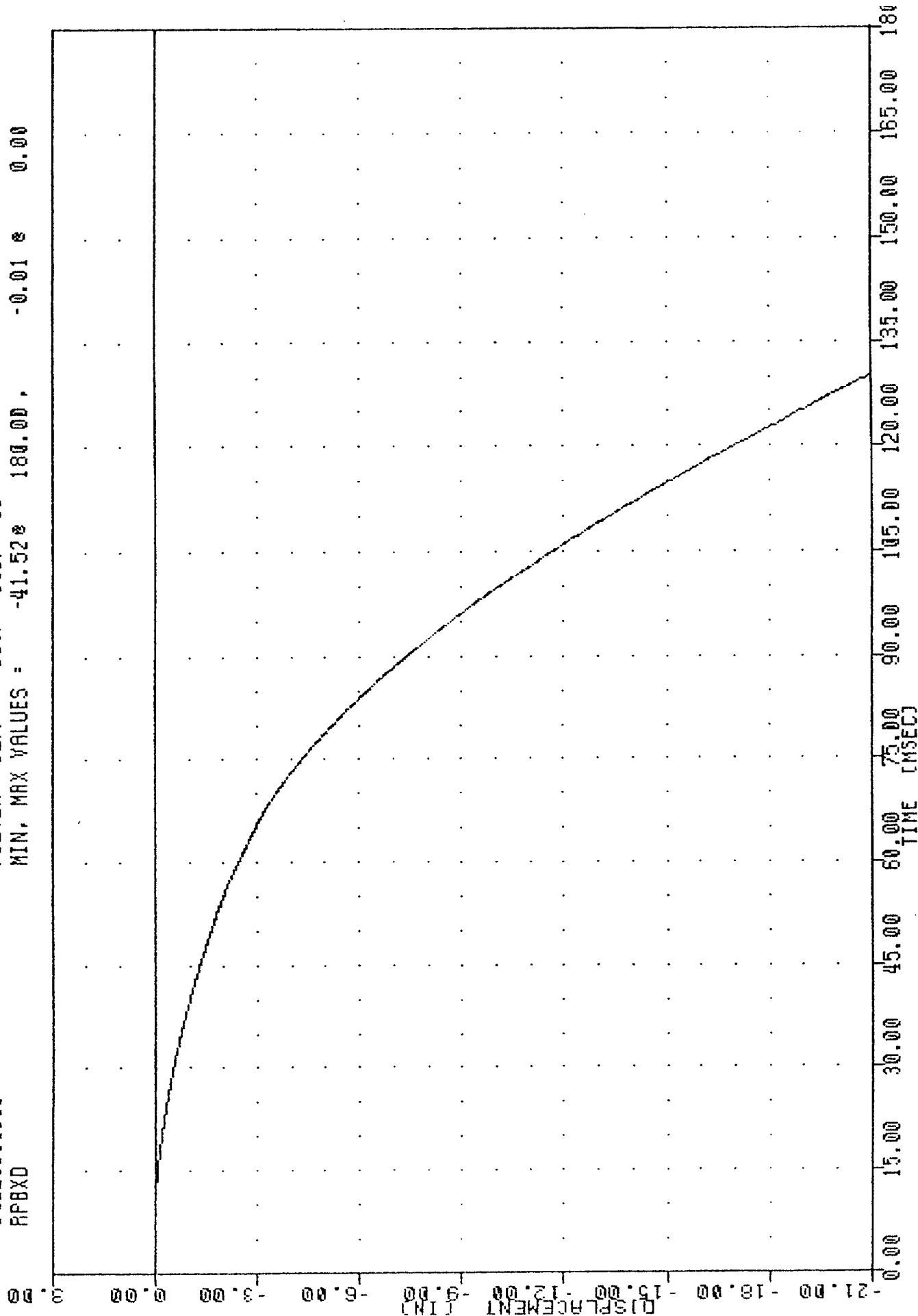
BREED AIRBAG PROGRAM

84221000000

RPBXD

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -41.52° 180.00, -0.01 s 0.00



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DELTA X USING RPBXV

BREED AIRBAG PROGRAM

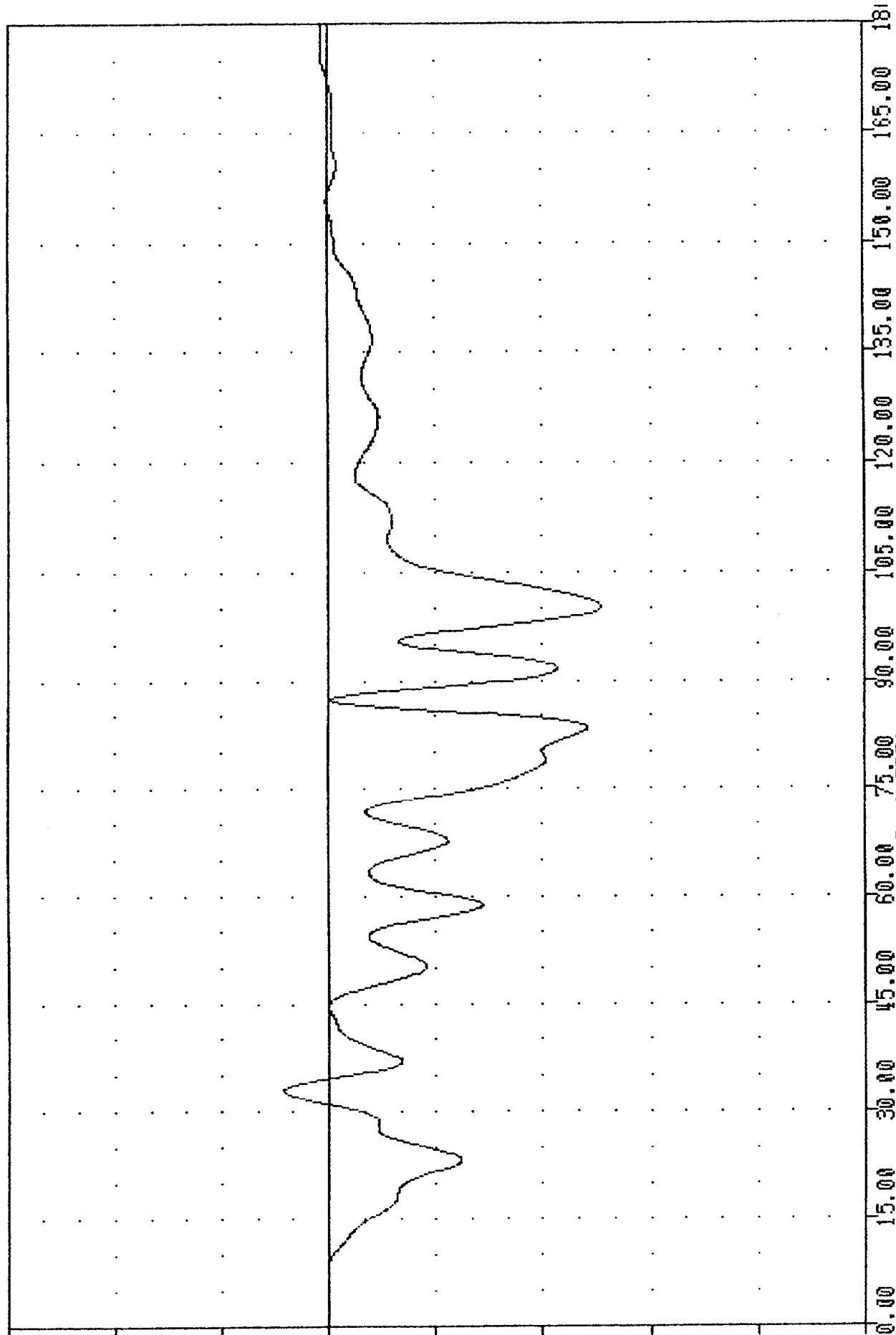
84221000000

FWLXG

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -38.128 100.00 , 6.30 32.88

ACCELERATION (G)



FORD LTD 30 MPH CENTERLINE POLE IMPACT
FIREWALL ACCELERATION X AXIS

BREED AIRBAG PROGRAM

84221000000

FWLXY

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -34.00e 168.50, 0.04 e 7.75

5.00

0.00

-6.00

-12.00

-18.00

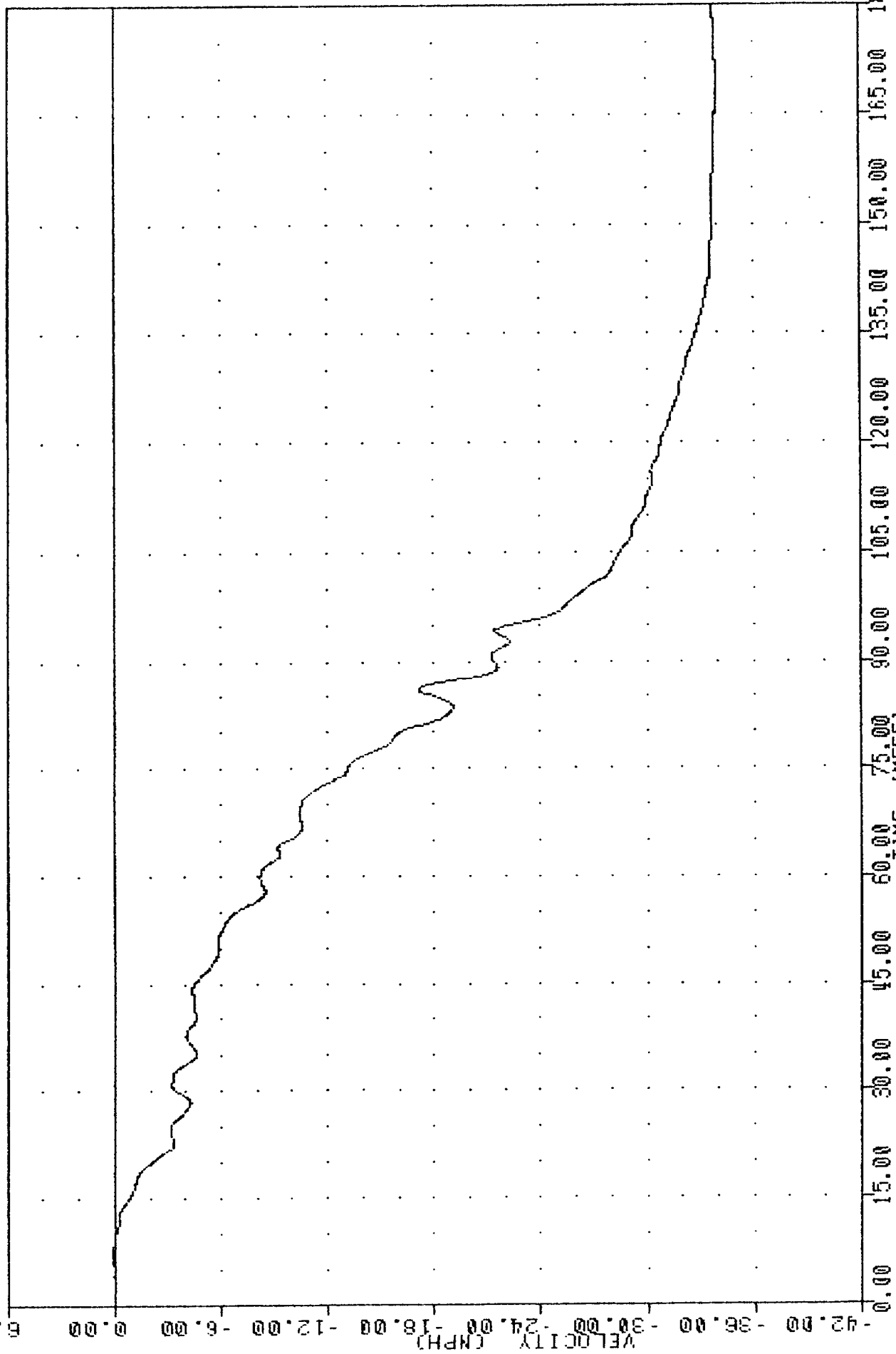
-24.00

-30.00

-36.00

-42.00

D-41



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DELTA V USING FWLXG

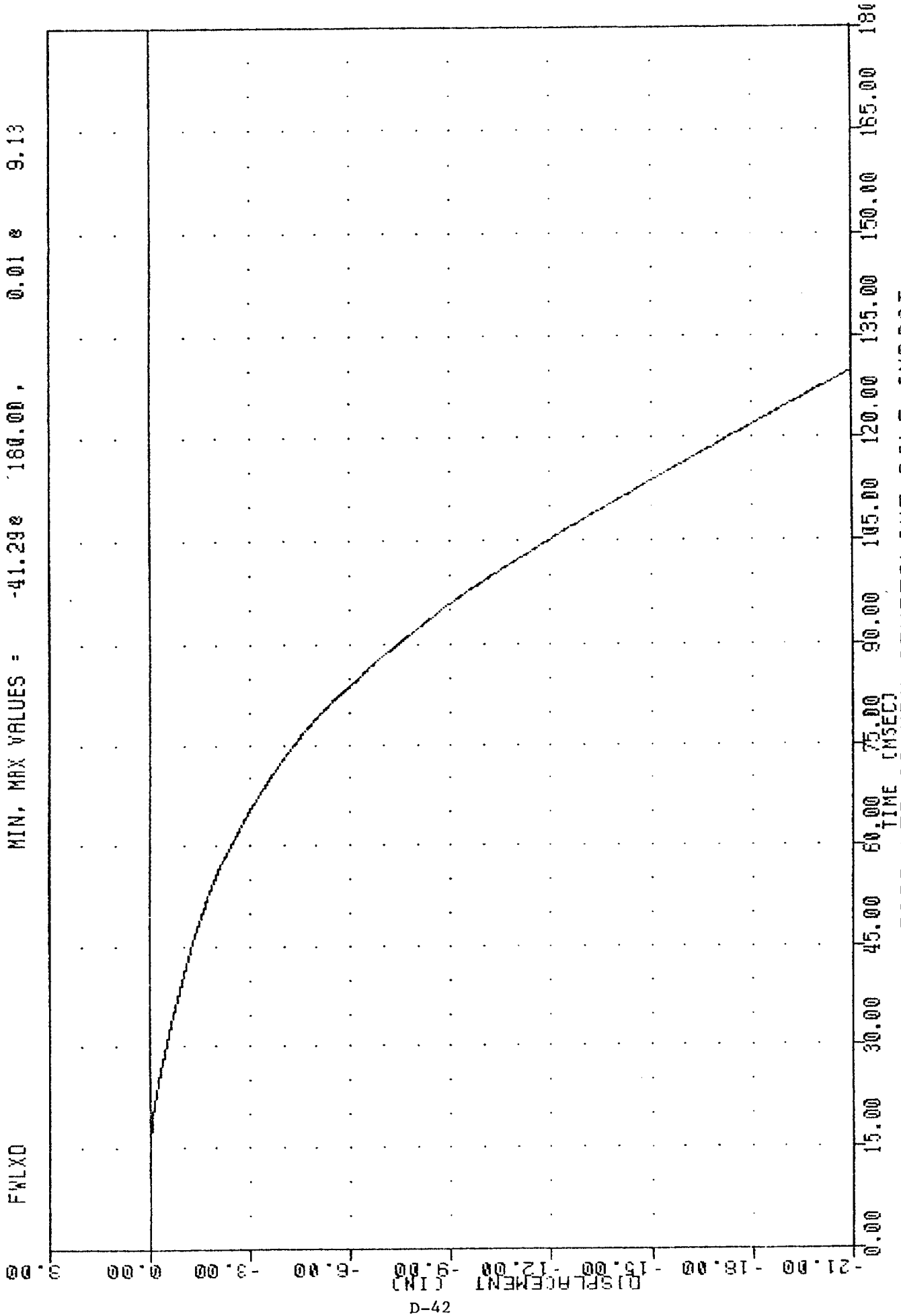
BREED AIRBAG PROGRAM

84221000000

FWLXD

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -41.29e 180.00, 0.01 e 9.13



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DELTA X USING FWLXV

BREED AIRBAG PROGRAM

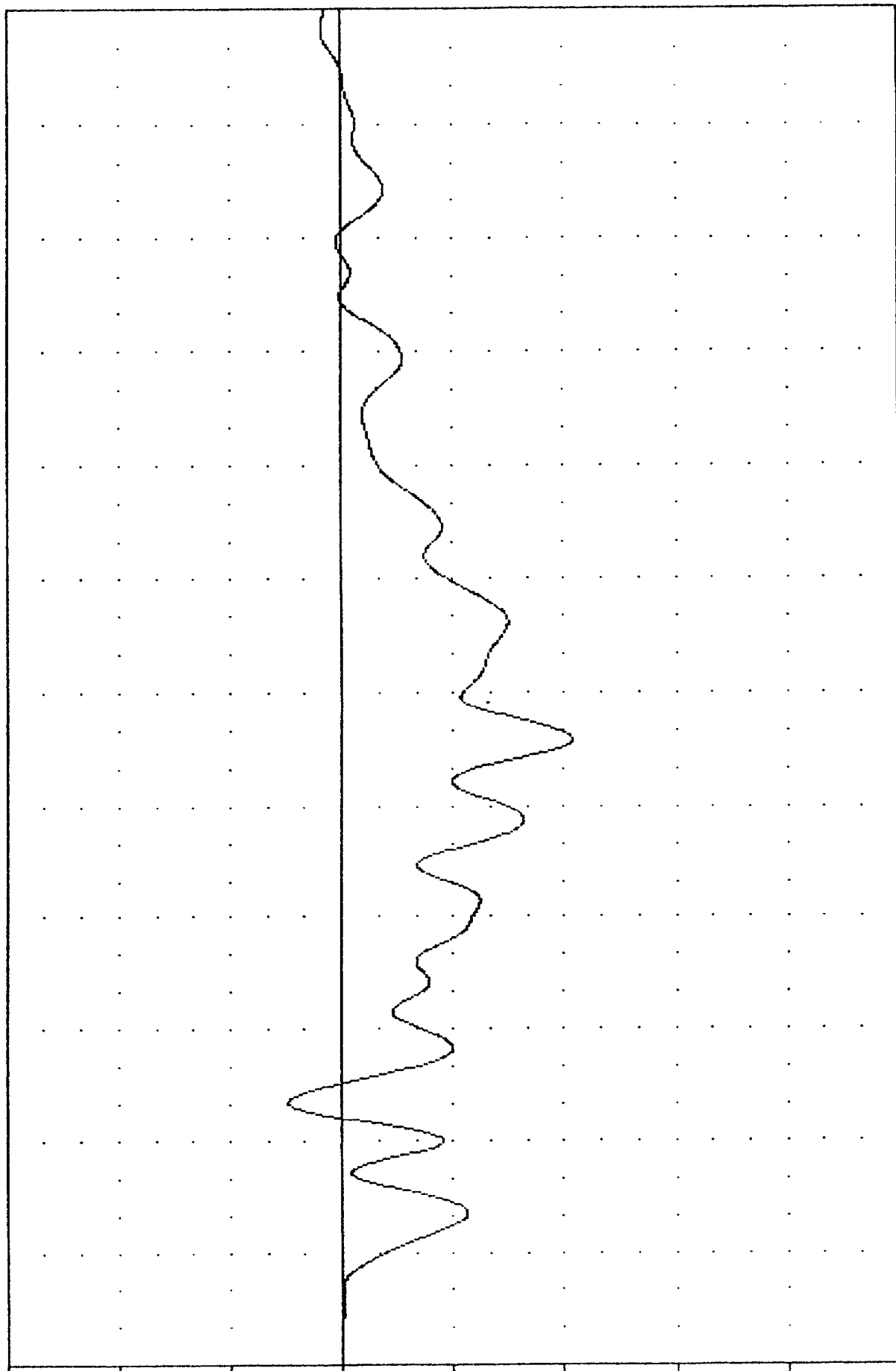
842210000000

FIRX6

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -31.10e 83.63, 7.26 e 35.13

ACCELERATION (G)



0.00 15.00 30.00 45.00 60.00 75.00 90.00 105.00 120.00 135.00 150.00 165.00 180

FORD LTD 30 MPH CENTERLINE POLE IMPACT
RIGHT FENDER WELL INNER ACCELERATION X AXIS.

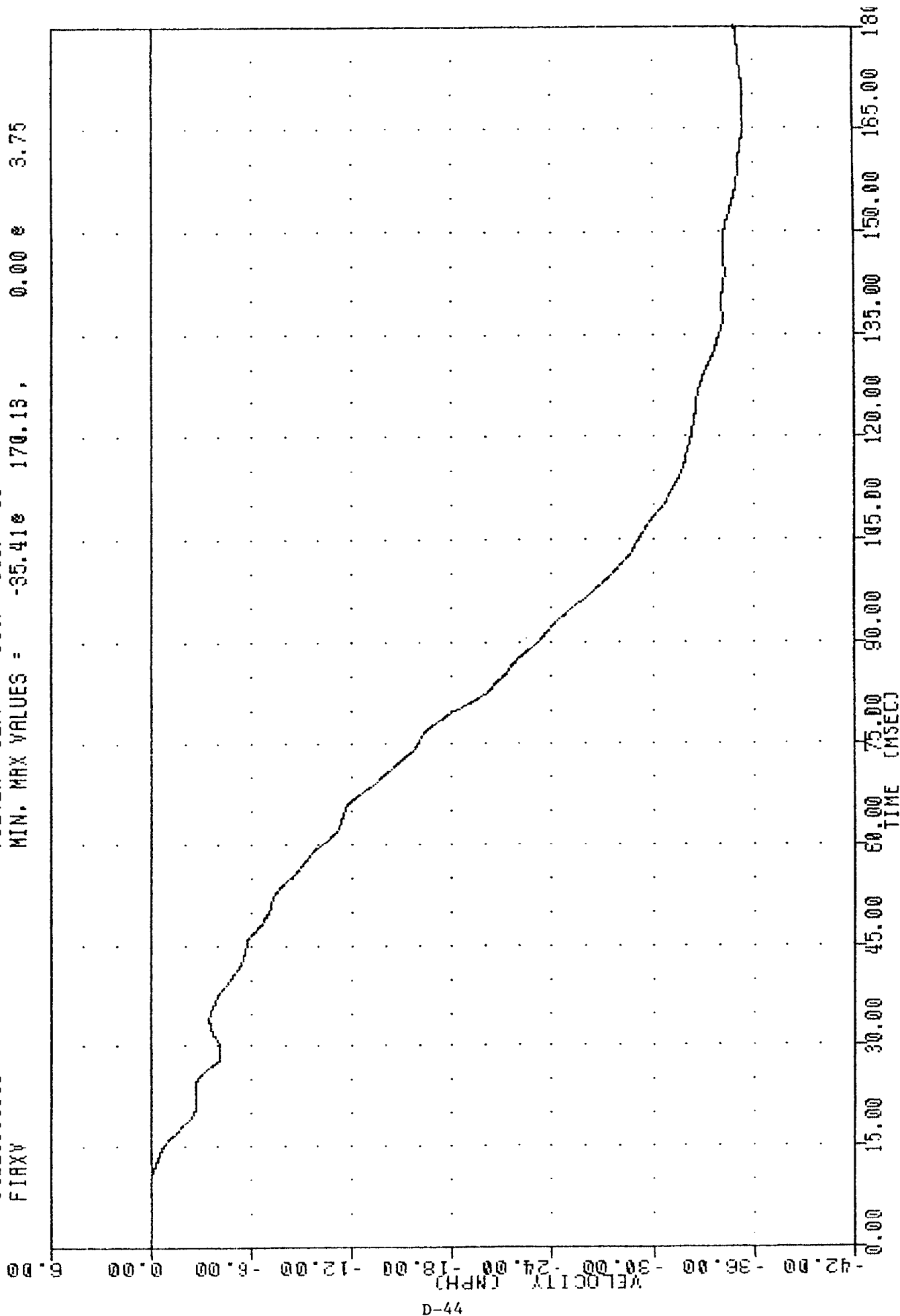
BREED AIRBAG PROGRAM

84221000000

FIRSV

FILTER = BLPF 300/ 949/ -10

MIN. MAX VALUES = -35.410 170.13, 0.00 e 3.75



FORD LTD 30 MPH CENTERLINE POLE IMPACT

DELTA V USING FILXG

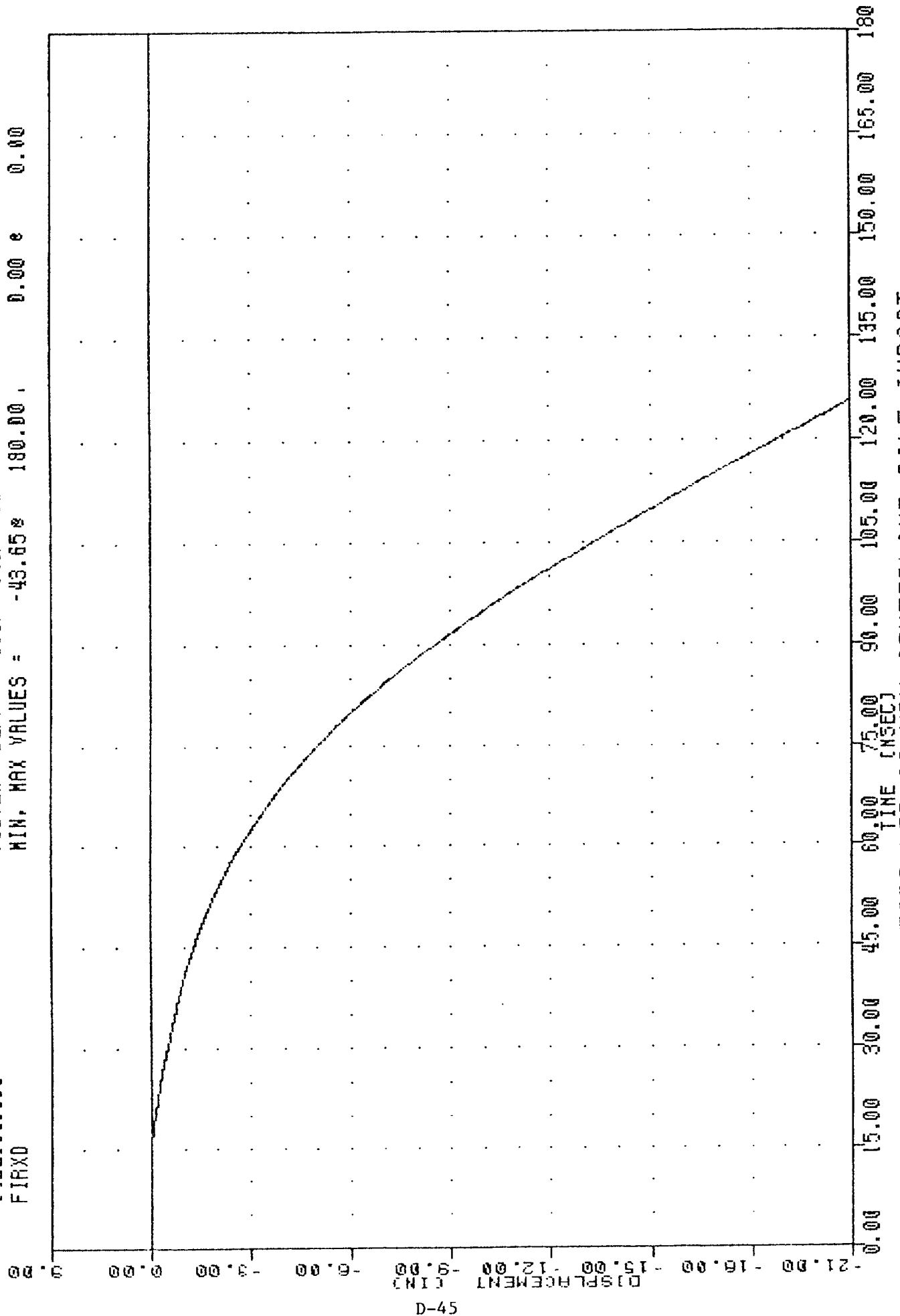
BREED AIRBAG PROGRAM

84221000000

FIRXD

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -43.65% 180.00, 0.00 e 0.00



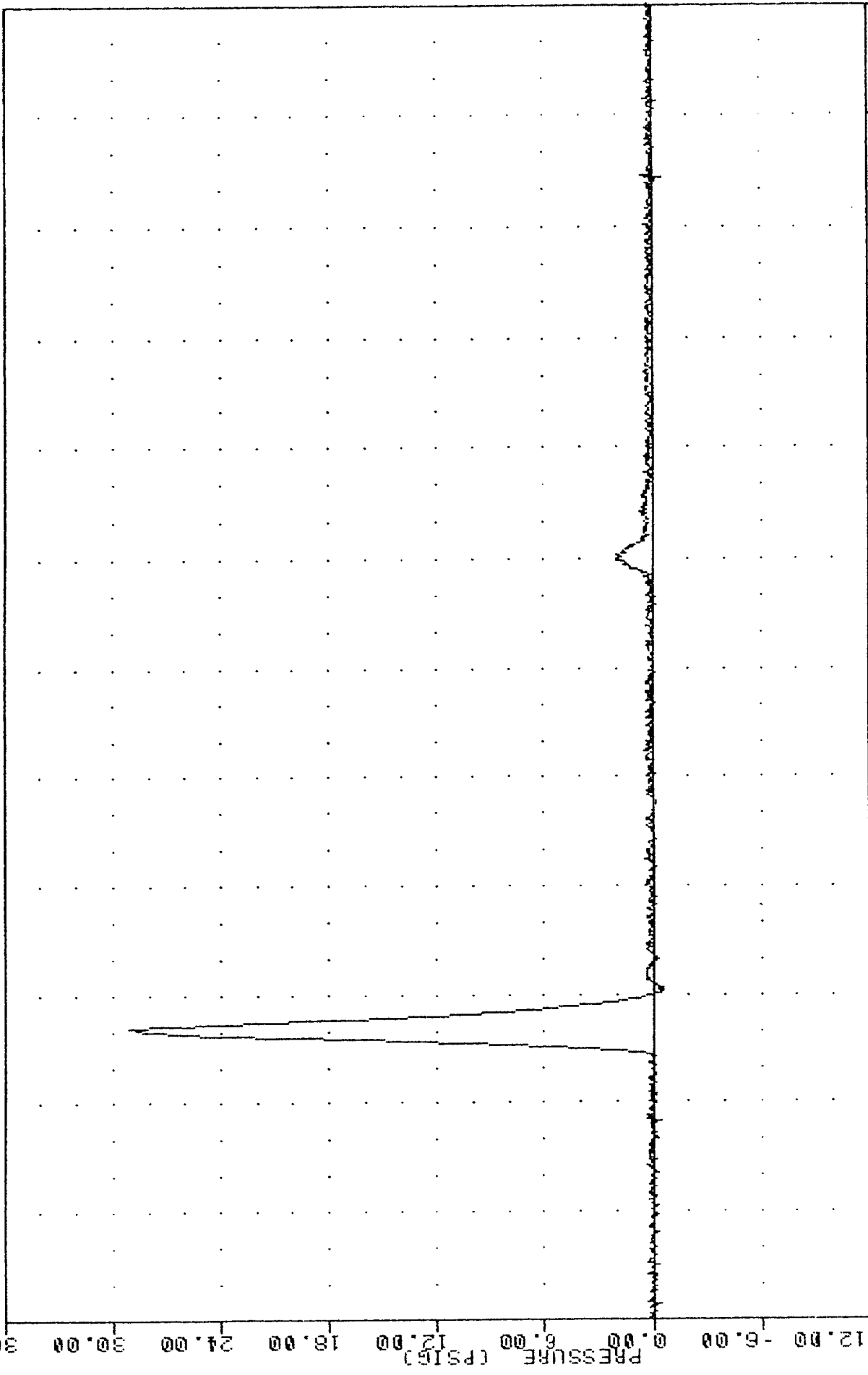
FORD LTD 30 MPH CENTERLINE POLE IMPACT

DELTA X USING FILXW

BREED AIRBAG PROGRAM
84221000000
ABTP

FILTER = ALPF 1650/ 5217/ -40
MIN. MAX VALUES = -0.60e 45.63 , 29.04 e 40.25

36.00



-12.00
-6.00
0.00
6.00
12.00
18.00
24.00
30.00
36.00

0.00 15.00 30.00 45.00 60.00 75.00 90.00 105.00 120.00 135.00 150.00 165.00 180.00

TIME CMSEC

FORD LTD 30 MPH CENTERLINE POLE IMPACT
PRESSURE TRANSDUCER

BREED AIRBAG PROGRAM

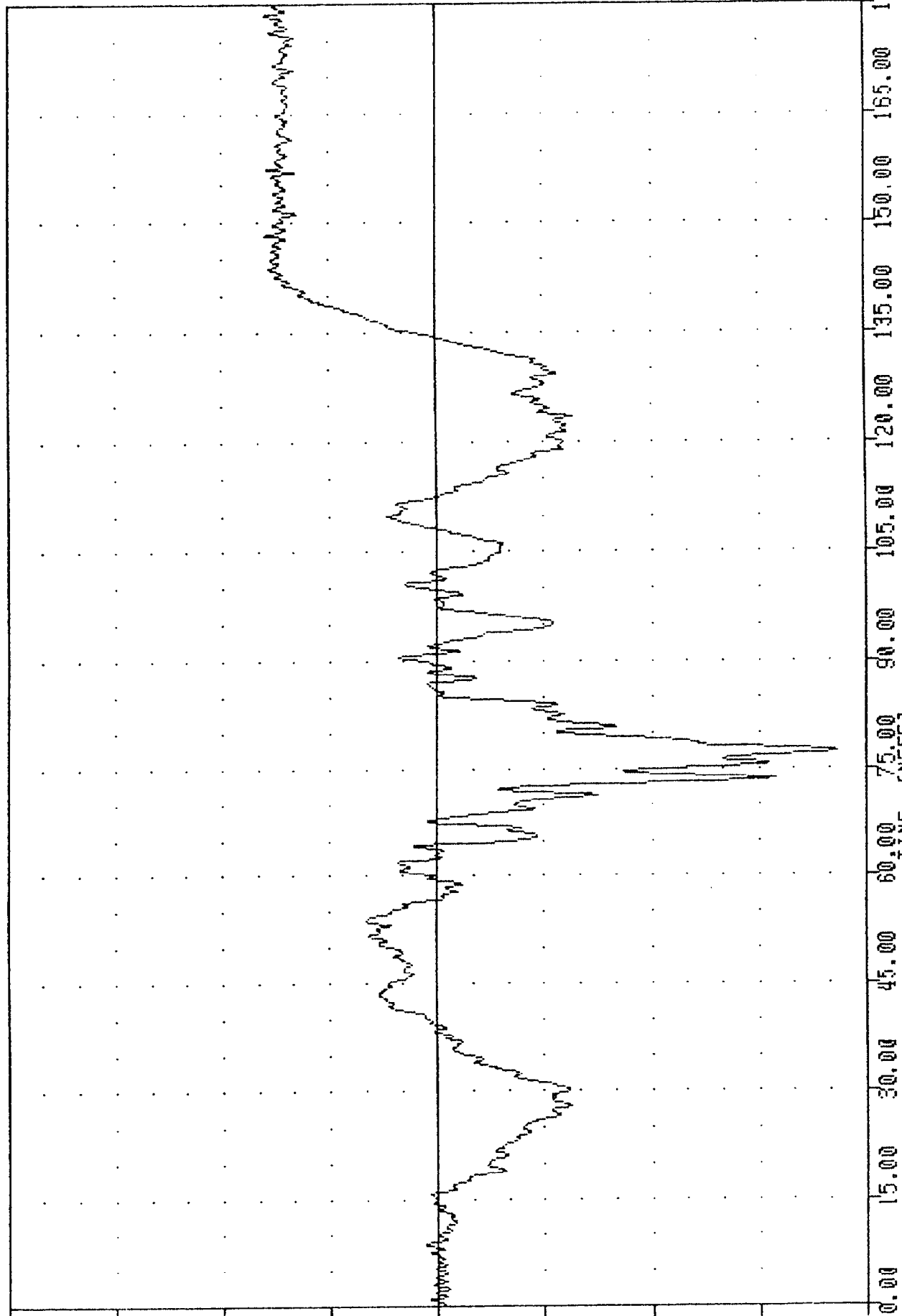
84221000000

ABTF

FILTER = BLPF 1000/ 3162/ -40

MIN. MAX VALUES = -373.27 77.25 160.17 148.25

FORCE (LB) (X10³)



FORD LTD 30 MPH CENTERLINE POLE IMPACT
STEERING COLUMN CABLE LOAD

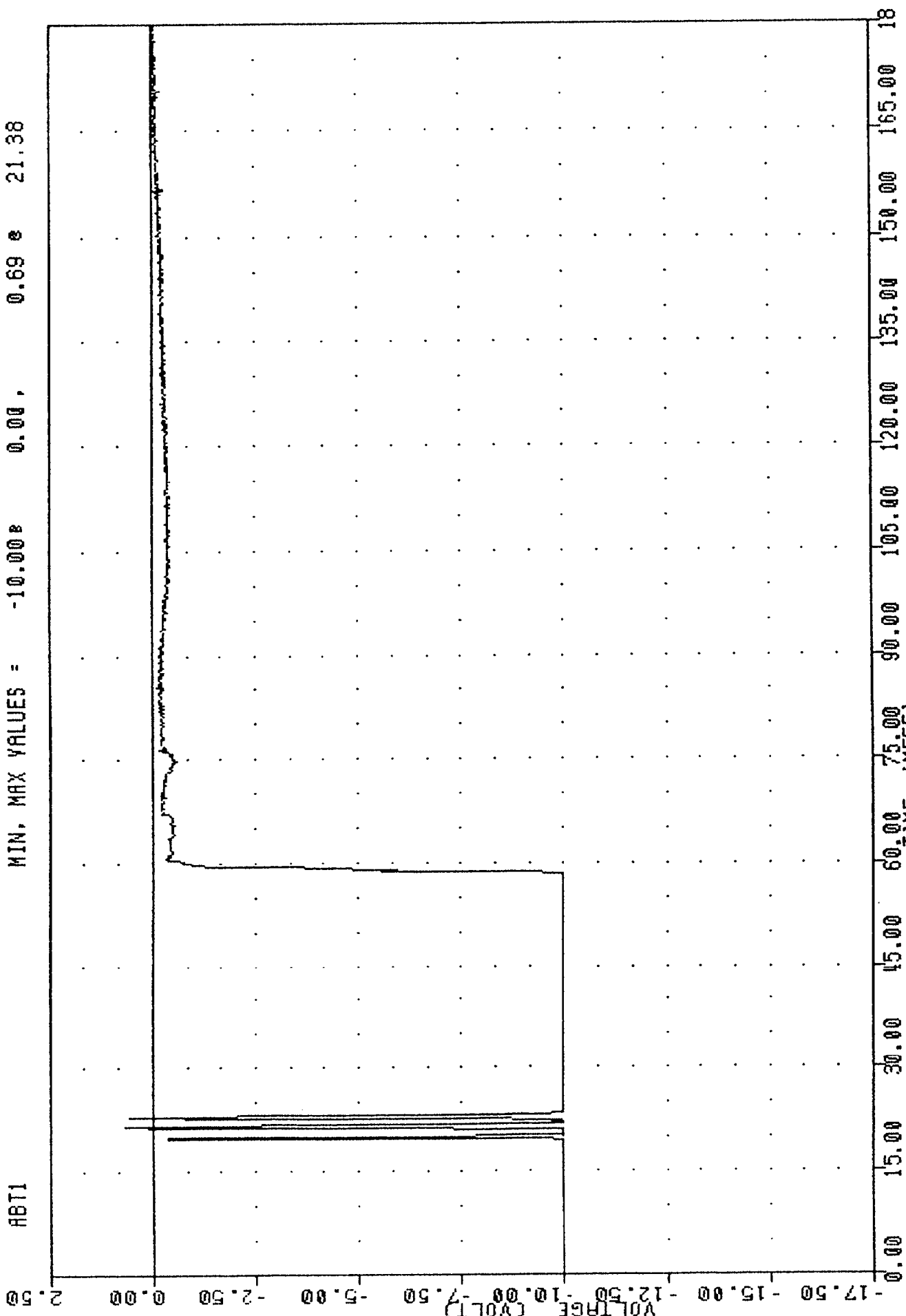
BREED AIRBAG PROGRAM

84221000000

ABT1

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -10.00 0.00 , 0.69 e 21.38



D-48

FORD LTD 30 MPH CENTERLINE POLE IMPACT
ROMEO STANDARD SENSOR

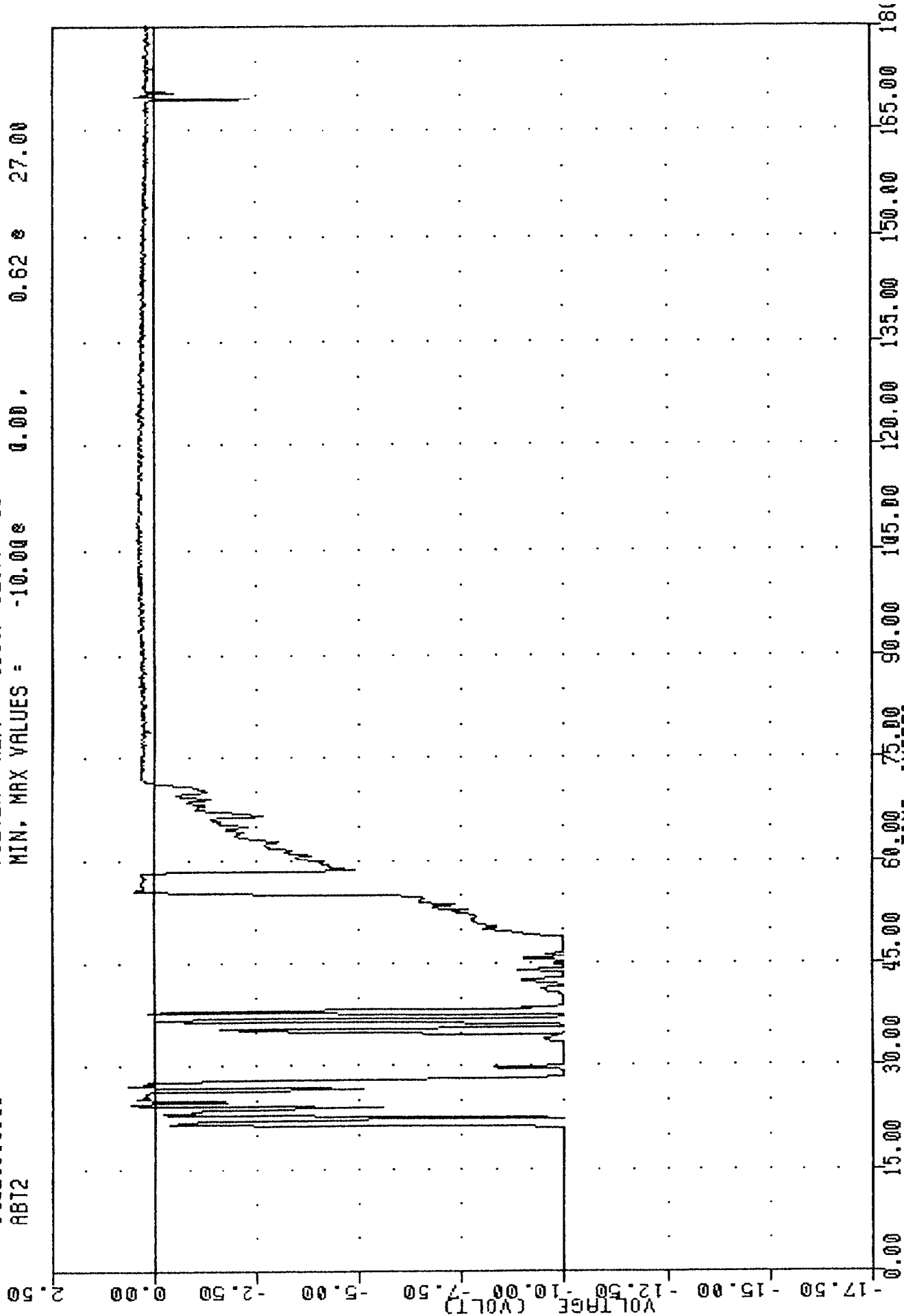
BREED AIRBAG PROGRAM

84221000000

ABT2

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -10.00e 0.00, 0.62 e 27.00



FORD LTD 30 MPH CENTERLINE POLE IMPACT
ROMEO GAS SENSOR

BREED AIRBAG PROGRAM

84221000000

ABT3

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -10.00 6.25 10.00 25.25

20.00

15.00

10.00

5.00

0.00

D-50

-5.00

-10.00

-15.00

-20.00

VOLTAGE (VOLT)

0.00

15.00

30.00

45.00

60.00

75.00

90.00

105.00

120.00

135.00

150.00

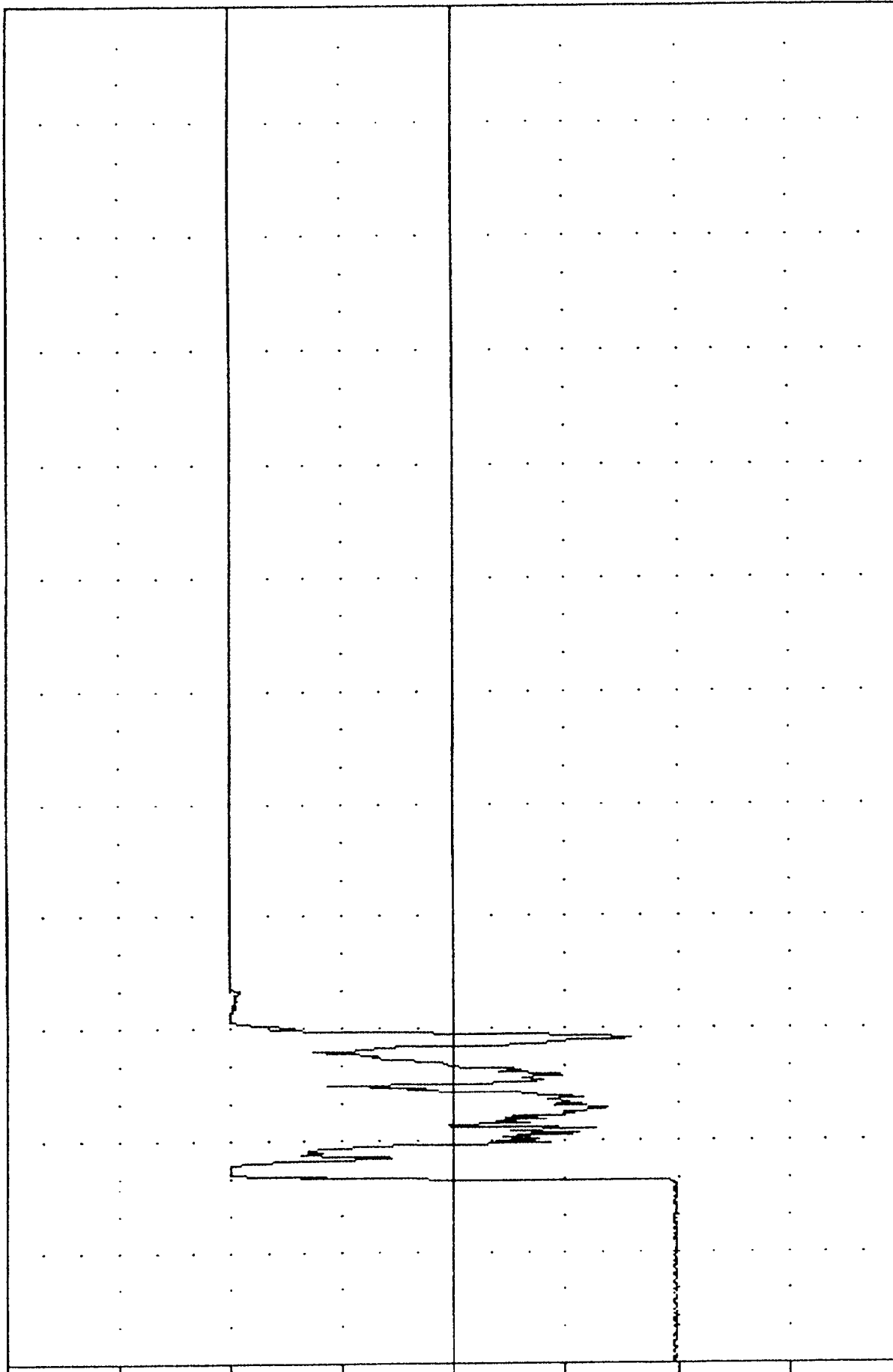
165.00

180

TIME (NSEC)

FORD LTD 30 MPH CENTERLINE POLE IMPACT

AIRBAG IGNITION



BREED AIRBAG PROGRAM

84221000000

ABT4

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -10.00 0.88 ,

-0.32 e 20.50

10.00

7.50

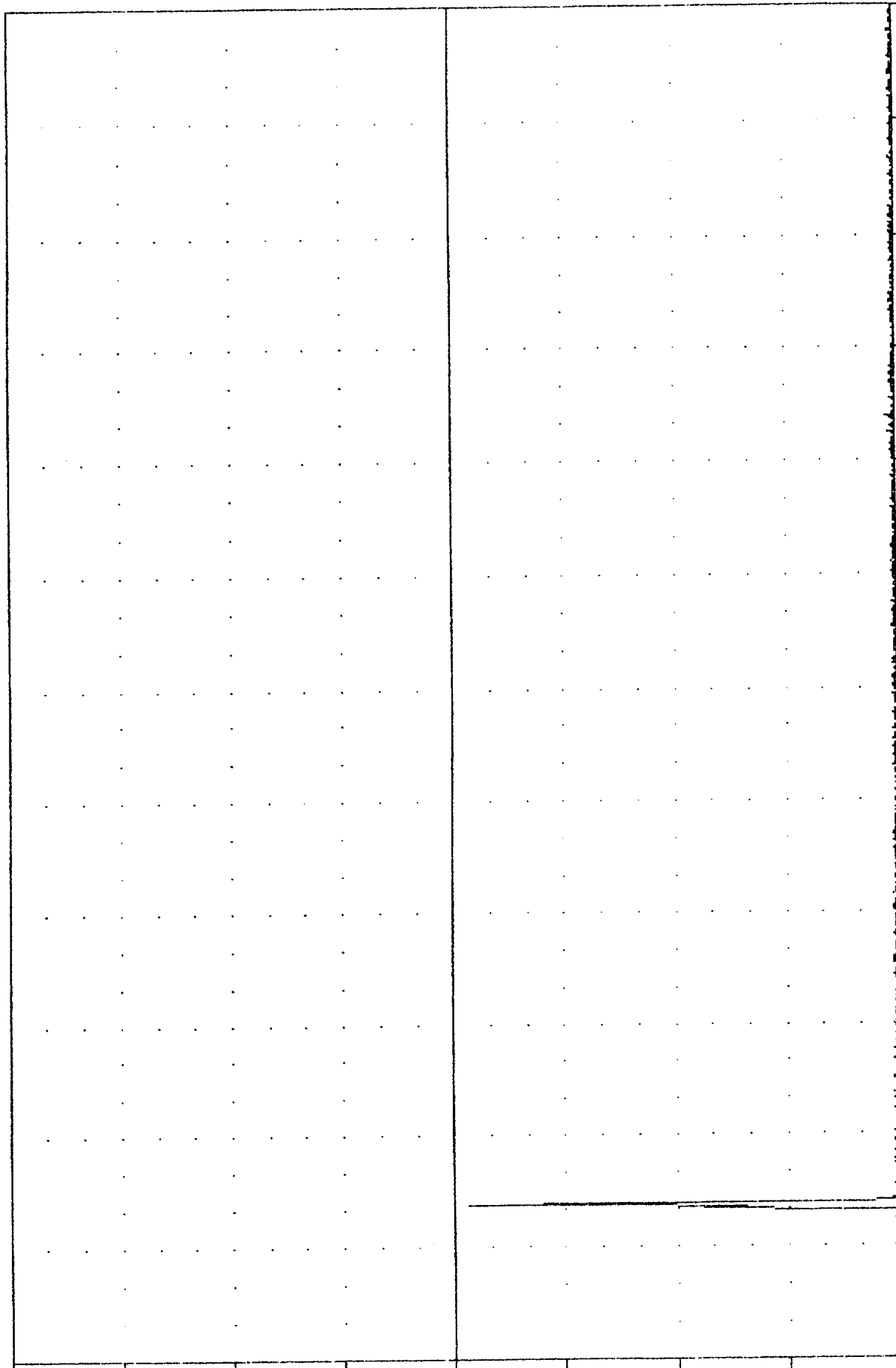
5.00

2.50

0.00

D-51

VOLTAGE (VOLT)



TIME (MSEC)

0.00 15.00 30.00 45.00 60.00 75.00 90.00 105.00 120.00 135.00 150.00 165.00 180.00

FORD LTD 30 MPH CENTERLINE POLE IMPACT

BREED B PILLAR SENSOR