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DOT Ø245

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APPROVED ENGINEERING TEST LABORATORIES / 1536 EAST VALENCIA / FULLERTON, CALIFORNIA 92631 / TEL. (714) 879-6110

A NATIONAL TECHNICAL SERVICES COMPANY

OCCUPANT RESPONSE AND VEHICLE ACCELERATION IN A 30 MPH FRONTAL BARRIER IMPACT TEST

TOYO KOGYO COMPANY LTD.
1979 MAZDA B2000 (LONG BODY) - PICK UP
NHTSA 790606

APPROVED ENGINEERING TEST LABORATORIES
1536 EAST VALENCIA DRIVE
FULLERTON, CALIFORNIA 92631

APRIL 1980

CONTRACT NUMBER DOT-HS-6-01477

FINAL REPORT

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U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF RESEARCH AND DEVELOPMENT
400 SEVENTH STREET S. W.
WASHINGTON, D. C. 20590

APPROVED ENGINEERING TEST LABORATORIES

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16. Abstract

A 1979 Mazda B2000 (Long Body) - Pick Up, NHTSA 790606, VIN-PE2M7-500074 was impact tested for compliance with FMVSS 212/219/301-75 (Windshield Mounting, Windshield Zone Intrusion, Fuel System Integrity) and documented in Report No. 212-AETL-79-008, 219-AETL-79-045, 301-AETL-79-110.

As a parallel non-conflicting effort, the anthropomorphic dummies and the test vehicle were instrumented with accelerometers to measure occupant response and vehicle acceleration. The results of this effort are documented herein.

The average test vehicle impact speed was 29.73 mph in the frontal (0°) mode.

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SECTION 1

SECTION 1

1.0 INTRODUCTION

The test was performed by Approved Engineering Test Laboratories under Contract Number DOT-HS-6-01477 in accordance with the Office of Vehicle Safety Compliance Laboratory Procedures.

The purpose of the effort documented herein was to acquire occupant response and vehicle acceleration data in a 1979 Mazda B2000 (Long Body) - Pick Up, NHTSA 790606 during a 30 mph frontal fixed barrier impact test. This effort was conducted in conjunction with Federal Motor Vehicle Safety Standard (FMVSS) 212 - "Windshield Mounting", 219 - "Windshield Zone Intrusion", and 301-75 "Fuel System Integrity" compliance test. These compliance tests were previously documented in NHTSA/OVSC Report Nos. 212-AETL-79-008, 219-AETL-79-045, 301-AETL-79-110. Only the occupant response and vehicle acceleration aspects of the test are covered in the report.

The scope of the vehicle test was expanded to accommodate the acquisition of occupant response and vehicle acceleration data. This was accomplished without creating any conflict with the Laboratory Procedures (TP219-02) issued by the Office of Vehicle Safety Compliance (OVSC). Specific

procedures used to obtain the additional data are outlined in the Office of Vehicle Safety Compliance Laboratory Procedures (TP212-01) and detailed in Section 4 of this report.

SECTION 2

SECTION 2

2.0 TEST SUMMARY

The 1979 Mazda B2000 (Long Body) - Pick Up was subjected to a frontal fixed barrier impact as required by Federal Motor Vehicle Safety Standard 212/219/301-75.

Color motion picture coverage of the vehicle impact are considered part of the accumulated pertinent data. Where applicable, still photographs are presented in this report; while the motion picture coverage was submitted separately with the compliance report.

TABLE I

SUMMARY OF TEST CONDITIONS

TEST VEHICLE INFORMATION:

Manufacturer: Toyo Kogyo Company LTD.

Make/Model: Mazda B2000 (Long Body)

Body Style: Pick Up Model Year: 1979

VIN: PE2M7-500074 Build Date: August 1978

NHTSA No.: 790606 Color: Orange

Engine Data: Four (4) Cylinders; 120.2 Cu. In. Displ.

Transmission Data: Five (5) Speed (XX) Manual ( ) Automatic

Major Options: None

VEHICLE ATTITUDE:

Delivered Attitude: LF 28.0 in.; RF 28.2 in.; LR 27.8 in.; RR 28.4

Test Attitude: LF 27.1 in.; RF 27.3 in.; LR 26.7 in.; RR 27.1

VEHICLE TIRE DATA:

Recommended Cold Tire Pressure: Front = 26 psi

(Up to Vehicle Load Capacity) Rear = 45 psi

Recommended Tire Size: 6.00 - 14 Load Range: unknown

Tires on Vehicle: 6.00 - 14 - w/s/w - Bridgestone

Spare Tire: X Yes; No; Space Saver: Yes; X No

TABLE Ia

SUMMARY OF TEST CONDITIONS (Cont'd)

TEST CONDITIONS:

Date of Test: April 3, 1980 Time of Test: 1432

Ambient Temperature: 71 °F at Impact Area

VEHICLE CAPACITY:

Type of Seats: X Bench; _____ Bucket; _____ Split Bench

Designated Seating Capacity: Front 2
Center 0
Rear 0
Total 2

Cargo: 1,202 lbs.

Total unknown lbs. (Vehicle Capacity Weight)

GVWR: 4,100 lbs. (Taken From Certification Label)

GAWR: Front 1,850 lbs.; Rear 2,530 lbs.

VEHICLE DELIVERED WEIGHT:

Left Front 704 lbs. Left Rear 627 lbs.
Right Front 666 lbs. Right Rear 572 lbs.
Total Front Weight 1,370 lbs. (53.3 % of Total Vehicle Weight)
Total Rear Weight 1,199 lbs. (46.7 % of Total Vehicle Weight)
Total Delivered Weight 2,569 lbs.

CALCULATED VEHICLE TEST WEIGHT: 3,197 lbs.
(With Required Dummies and 300 lbs. Cargo)

ACTUAL VEHICLE TEST WEIGHT:

Left Front 807 lbs. Left Rear 811 lbs.
Right Front 755 lbs. Right Rear 811 lbs.
Total Front Weight 1,562 lbs. (49.1 % of Total Vehicle Weight)
Total Rear Weight 1,622 lbs. (50.9 % of Total Vehicle Weight)
Total Test Weight 3,184 lbs.

SECTION 2

2.1 SUMMARY OF TEST RESULTS

The following data sheets summarize:

1. The occupant response data (Part 572 Dummy Data Sheet)

2. The vehicle acceleration data (Vehicle Structural Data Sheet)

3. The Pre and Post-Test vehicle dimensions data (Vehicle Structural Data Sheets)

More comprehensive data is presented in Appendix A in the form of computer-generated plots.

PART 572 DUMMY DATA

Vehicle 1979 Mazda B2000 Pick Up NHTSA No. 790606

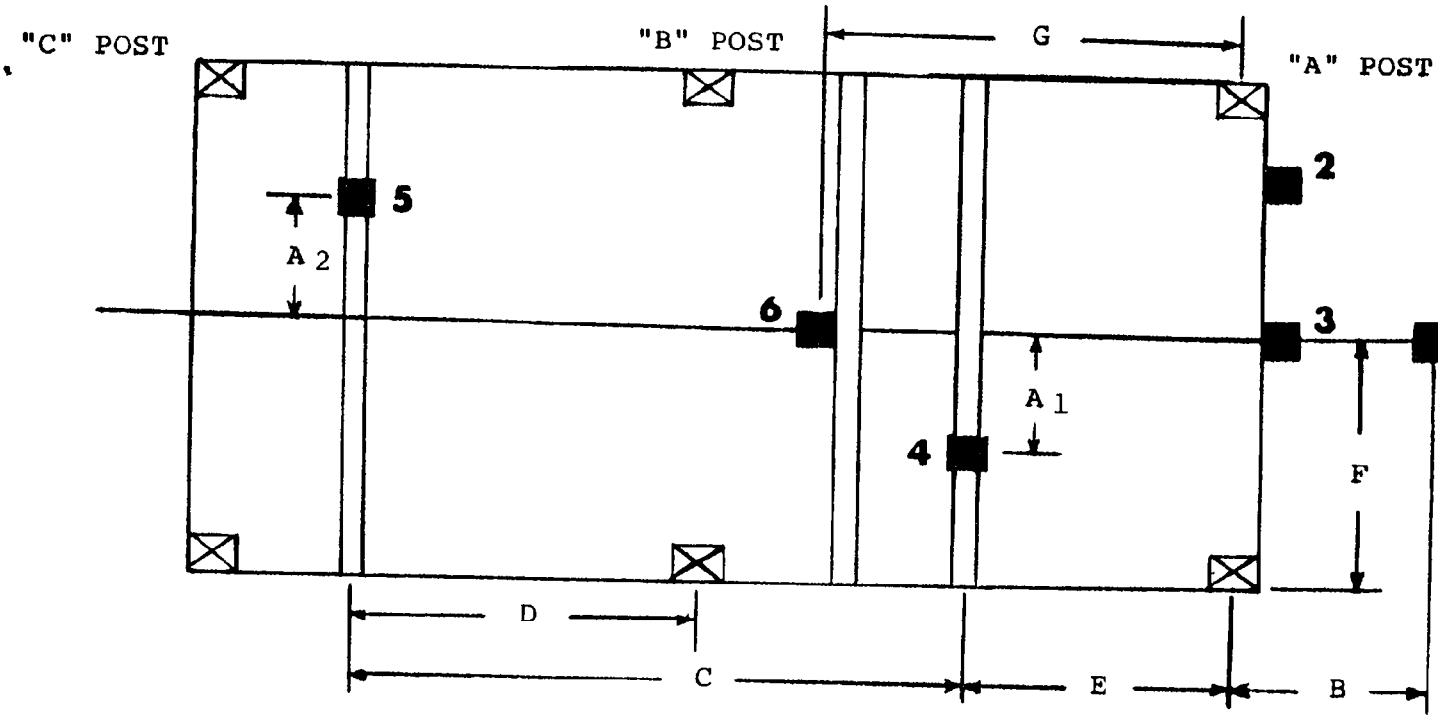
Driver S/N 0353 Passenger S/N 0354	DRIVER				PASSENGER			
	Positive* Direction		Negative* Direction		Positive* Direction		Negative* Direction	
	Peak G	Time (msec)	Peak G	Time (msec)	Peak G	Time (msec)	Peak G	Time (msec)
Head Acceleration								
Longitudinal	86.3	145.6	215.6	75.8	1.4	30.0	162.1	112.2
Lateral	18.7	71.8	40.9	144.4	6.8	165.6	28.4	112.4
Vertical	119.2	74.8	108.6	81.8	7.2	149.2	96.3	95.8
Resultant	243.0	75.8			178.9	112.4		
HIC	2887 (73 - 83 msec)				824 (60 - 115 msec)			
Chest Acceleration								
Longitudinal	12.0	200.0	95.2	81.6	2.1	187.4	43.2	87.2
Lateral	17.0	87.0	3.9	53.8	1.5	37.2	32.2	87.0
Vertical	17.4	86.6	32.4	58.6	13.1	146.8	17.8	71.8
Resultant	96.6	81.6			53.7	87.2		
Severity Index	741				367			
Femur Loads	(lb)	Time (msec)	(lb)	Time (msec)	(lb)	Time (msec)	(lb)	Time (msec)
Left	267	58.0	301	62.6	382	53.4	135	50.6
Right	95	40.8	2399	51.6	708	112.6	205	50.8
Belt Load								
Torso	1239	78.8	18	204.6	1349	87.2	4	170.6

Average Vehicle Impact Speed 29.73 mph

*Positive Direction - Longitudinal: Forward
Lateral: Leftward
Vertical: Upward
Femur: Tension

*Negative Direction - Longitudinal: Rearward
Lateral: Rightward
Vertical: Downward
Femur: Compression

VEHICLE STRUCTURAL DATA



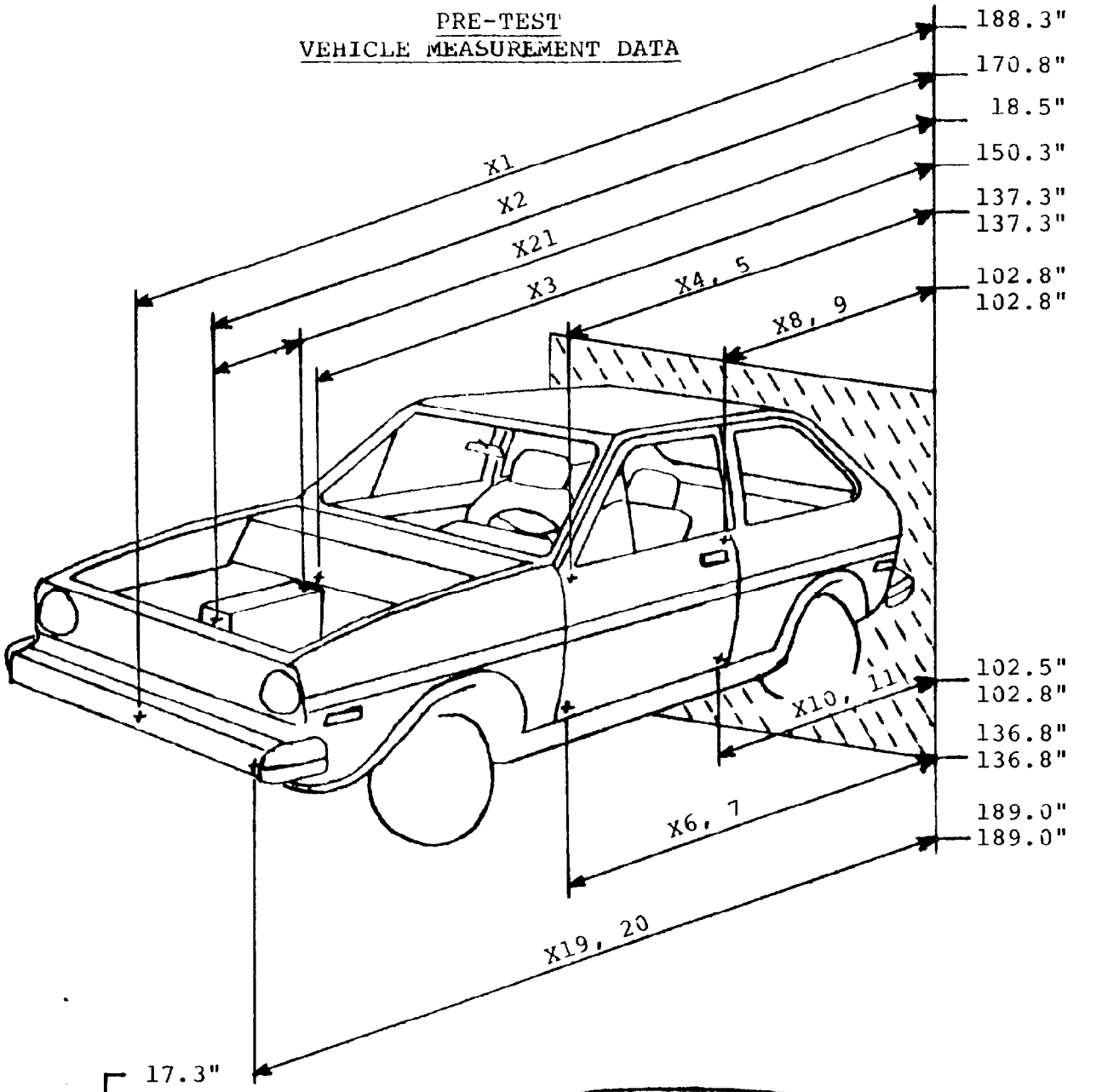
DIMENSIONS			
LOCATION	MEASUREMENT (IN.)	LOCATION	MEASUREMENT (IN.)
A	(A_1 - 18.5, A_2 - 19.0)	E	11.5
B	25.0	F	26.0
C	37.0	G	34.5
D	14.0		

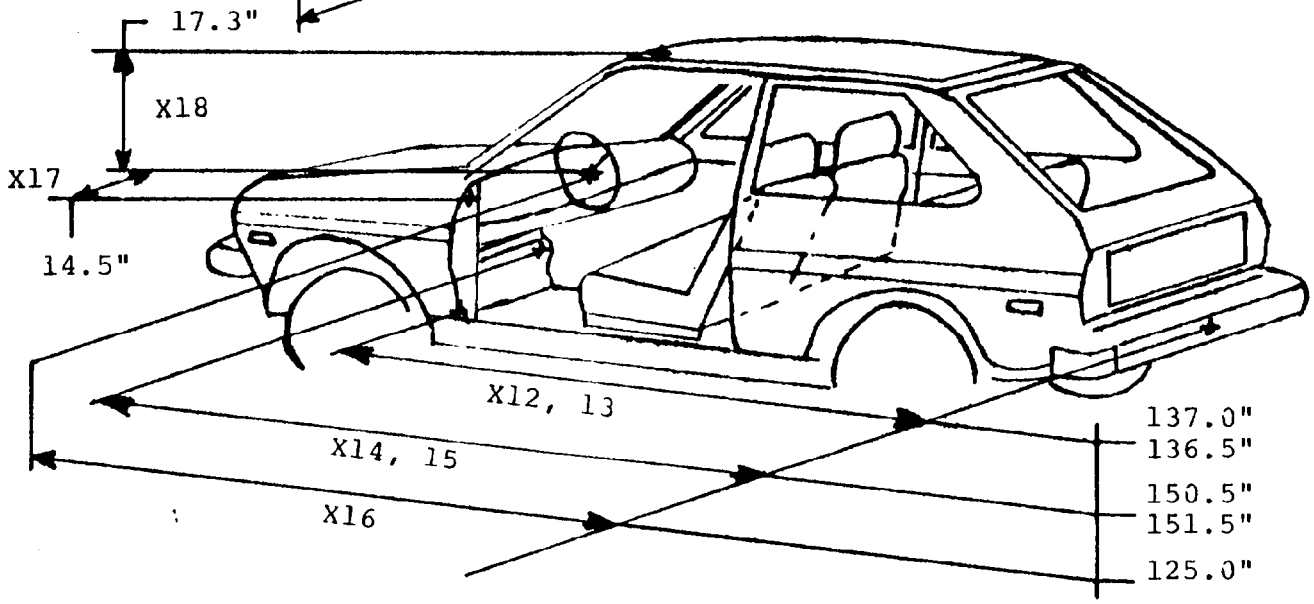
ACCELERATION PEAKS				
	POSITIVE* DIRECTION		NEGATIVE* DIRECTION	
ACCELEROMETER LOCATION	PEAK "G"	TIME (MSEC)	PEAK "G"	TIME (MSEC)
NO. 1 LONGITUDINAL	22.8	42.6	134.0	30.8
NO. 1 VERTICAL	27.7	32.2	34.0	42.0
NO. 2 LONGITUDINAL	34.8	52.2	110.7	45.6
NO. 2 VERTICAL	26.1	53.4	49.4	27.6
NO. 3 LONGITUDINAL	51.7	22.0	91.4	14.2
NO. 3 VERTICAL	21.7	11.2	44.6	35.0
NO. 4 LONGITUDINAL	5.6	156.4	54.8	48.0
NO. 4 VERTICAL	33.8	69.2	40.3	27.4
NO. 5 LONGITUDINAL	2.6	160.2	40.5	24.6
NO. 5 VERTICAL	29.6	48.6	35.7	26.0
NO. 6 LONGITUDINAL	5.8	160.0	83.1	46.2
NO. 6 LATERAL	14.7	25.4	14.8	18.2
NO. 6 VERTICAL	37.7	52.0	80.9	46.4

*POSITIVE DIRECTION - LONGITUDINAL: Forward; LATERAL: Leftward; VERTICAL: Upward

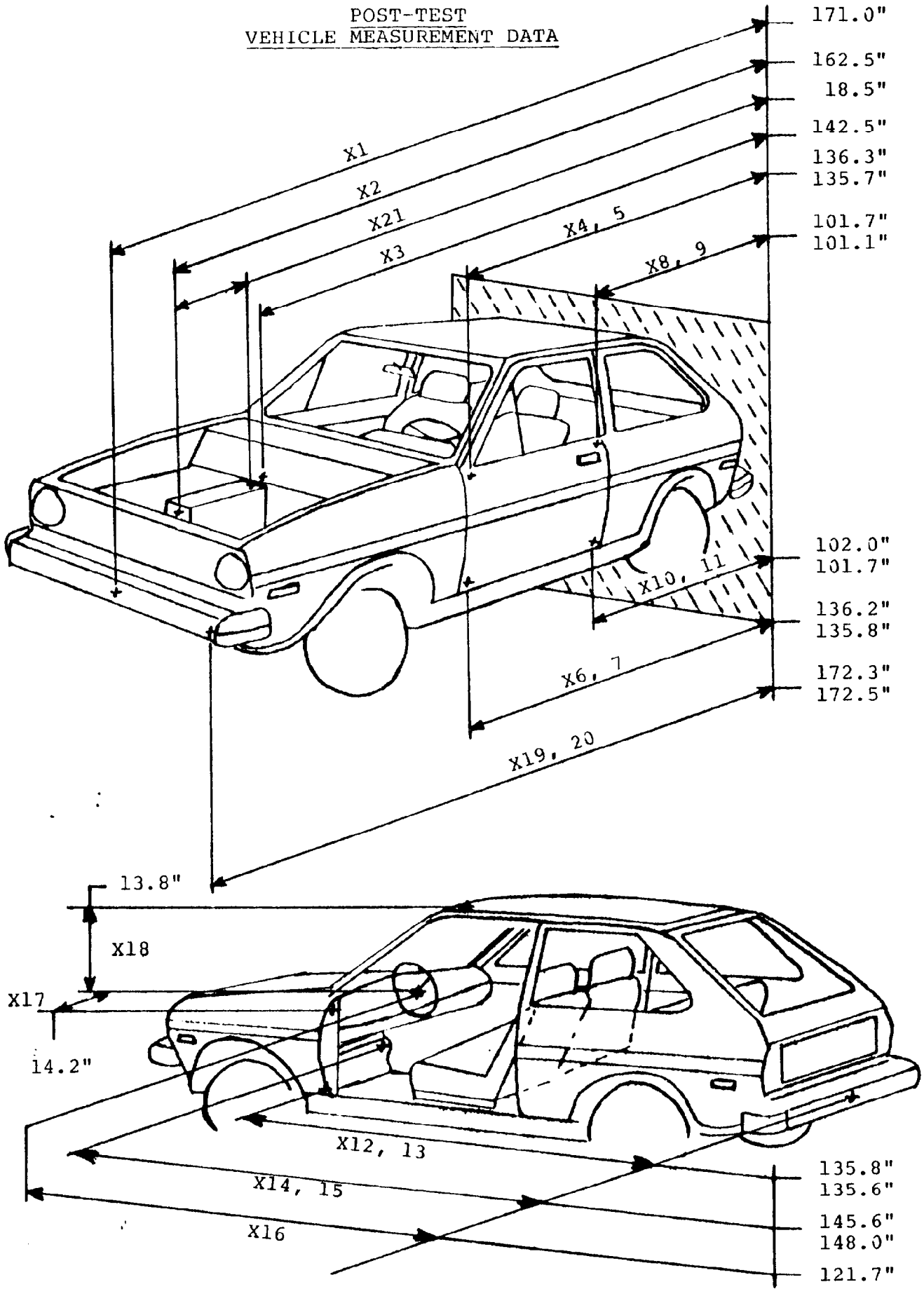
*NEGATIVE DIRECTION - LONGITUDINAL: Rearward; LATERAL: Rightward; VERTICAL: Downward

PRE-TEST
VEHICLE MEASUREMENT DATA





POST-TEST
VEHICLE MEASUREMENT DATA



SUMMARY

PRE-TEST AND POST-TEST VEHICLE DIMENSIONS

Measurement Point	Pre-Test	Post-Test	Difference
X1	188.3"	171.0"	17.3"
X2	170.8"	162.5"	8.3"
X3	150.3"	142.5"	7.8"
X4	137.3"	136.3"	1.0"
X5	137.3"	135.7"	1.6"
X6	136.8"	136.2"	0.6"
X7	136.8"	135.8"	1.0"
X8	102.8"	101.7"	1.1"
X9	102.8	101.1"	1.7"
X10	102.5"	102.0"	0.5"
X11	102.8"	101.7"	1.1"
X12	137.0"	135.8"	1.2"
X13	136.5"	135.6"	0.9"
X14	150.5"	145.6"	4.9"
X15	151.5"	148.0"	3.5"
X16	125.0"	121.7"	3.3"
X17	14.5"	14.2"	0.3"
X18	17.3"	13.8"	3.5"
X19	189.0"	172.3"	16.7"
X20	189.0"	172.5"	16.5"
X21	18.5"	18.5"	0.0"

SECTION 3

SECTION 3

3.0 TEST RESULTS AND PHOTOGRAPHS

The test vehicle performance was determined by a frontal fixed barrier impact at an average speed of 29.73 mph. The average vehicle static crush was 16.6 inches.

Post-impact inspection of the vehicle revealed almost all crush occurred forward of the cab "B" posts. The left and right frame rails buckled at the "A" post and the cargo box impacted the cab. The driver dummy impacted the steering wheel and dash assembly. The passenger dummy also impacted the dash assembly. The cab floor pan buckled and the dash assembly deformed from apparent cowl deformation/or dummy contact.

Figures 3-1 through 3-4 are pre-test and post-test views of the occupant compartment, restraint system, and test dummies.

Figure 3-1

1979 Mazda B2000 (Long Body) - Pick Up

NHTSA 790606

Pre-Test, Driver Dummy View

790606

Figure 3-2

1979 Mazda B2000 (Long Body) - Pick Up

NHTSA 790606

Pre-Test, Passenger Dummy View

90606

Figure 3-3

1979 Mazda B2000 (Long Body) - Pick Up

NHTSA 790606

Post-Impact, Driver Dummy View

790607

Figure 3-4

1979 Mazda B2000 (Long Bed) - Pick Up

NHTSA 790606

Post-Impact, Passenger Dummy View

SECTION 4

SECTION 4

4.0 TEST PROCEDURES

4.1 FIXED BARRIER IMPACT TEST

The procedures for conducting the frontal fixed barrier impact test are presented in detail in the FMVSS 212/219/301-75 "Windshield Mounting, Windshield Zone Intrusion, and Fuel System Integrity" report previously submitted to DOT-NHTSA Office of Vehicle Safety Compliance.

4.2 TEST DUMMY POSITIONING

The driver and right front passenger dummies were placed in the center of the seat cushion and pushed into the seat back. The shoulders were pushed back against the seat back and the head centered on the head restraint. The thighs were pushed down on the seat cushion and the heels placed on the floor pan. The thumbs and index fingers of the driver dummy were positioned around the steering wheel rim at the 3 and 9 o'clock position. The upper position of the passenger dummy arms were pushed against the seat back and the hands placed to the side of the thighs.

SECTION 4

4.3 DATA ACQUISITION AND REDUCTION

The data acquisition and analysis system used for acquiring occupant response and vehicle acceleration are shown schematically in Figure 4-1. A complete list of instrumentation is provided in Table 4-1. An itemized procedure for acquiring data is provided on Table 4-2.

Prior to the vehicle impact test the onboard instrumentation package is installed and a calibration and null reference check is performed to checkout all data analog devices including the FM magnetic tape recorders. The moment of impact trigger switch attached to the vehicle is also checked out. Immediately following vehicle impact a post-impact calibration and null reference check is performed.

The analog data is then played back into a Hewlett Packard Digital Fourier Analyzer (DFA) system using a HP 2100S mini computer with 35K word core storage. This system uses four program controlled analog filters which provides predigitizing filter capability of 60 db/octave above 1250 Hz.

SECTION 4

The DFA is a hard disc based system with standard HP design software for performing data acquisition and analysis functions. The HP software is programmed using direct keyboard functions to automate the data reduction process. The data is entered into temporary storage, four channels (one set) at a time with six total sets. Table 4-3 defines each data channel and data set. The data sets are divided into driver and passenger tape recorder groups to facilitate simultaneous data acquisition for the head, chest and vehicle accelerometers to assure appropriate calibration of injury criteria and vehicle dynamics. At the time of entry, test personnel enter the appropriate calibration for each data channel and the computer then scales the data appropriately. When all data has been acquired it is moved as a vehicle set to permanent storage on a removable magnetic disc. (Nine vehicle sets are stored on each magnetic disc. All magnetic discs and FM recorder tapes are retained on file at AETL).

SECTION 4

The only modification to the data at the time of permanent storage is the filtering and digitizing process of the FM recorder tape (2500 Hz) and the DFA (1250 Hz, 200 ms). Immediately after the data is moved to permanent storage it is recalled by the test personnel and plotted with the appropriate label and vehicle designation. As the data is recalled the DFA is programmed to automatically filter the data with the appropriate SAE filter. Figure 4-2 illustrates the SAE class 60, 180, 600 and 1000 filters applied to the data. These filters are in accordance with SAE J211a, Instrumentation for Impact Tests. The class 60 filter is applied to the vehicle acceleration and belt restraint forces. The class 180 filter is applied to the chest acceleration forces. The class 600 filter is applied to the femur forces and the class 1000 filter is applied to the head acceleration forces.

The SAE recommended filters are quadratic double pole filters with 65% damping and 12 db/octave rolloff. They are applied to the data using a Fast Fourier Transform (FFT) of the data, frequency domain multiplication, and inverse FFT operation on the product.

SECTION 4

It should be noted in Figure 4-2 that the predigitizing analog filter attenuates all signals above the 1250 Hz cutoff frequency. This has no effect on the class 60 or class 180 data. The class 600 data is within SAE J211a recommendation to 1900 Hz and -20 db. Above 1900 Hz the class 600 data is attenuated at 60 db/octave instead of 24 db/octave. This has very negligible effect on the class 600 data. The modification of class 1000 data by the predigitizing filter is attenuation of 60 db/octave above 1250 Hz instead of 24 db/octave above 1650 Hz. Examination of typical class 1000 data shows the high frequency components between 1250 Hz and 1650 Hz are uniformily less than 3 percent of the largest components at lower frequencys. The effect of the predigitizing filter has a very slight smoothing of the plotted data.

4.4 IMPACT DATA

All impact data is presented in computer plots of data digitized at 200 microseconds. Special SAE filters are applied to each data set. Each data plot includes labeling, defining the test vehicle, filter class, and the complete identification of the data plotted.

SECTION 4

4.4.1 DUMMY HEAD DATA

The dummy head accelerations are processed as class 1000 data, and the Head Injury Criteria (HIC) calculation is performed. The HIC calculations are maximized for start time (T1) and end time (T2), using a manual iteration routine, usually requiring about ten interations and between 5,000 and 10,000 combinations of start and end times. Data output is in the form of computer plots with the final HIC calculations. Listing of data value and HIC calculations are available, but not provided in the final report.

4.4.2 DUMMY CHEST DATA

The dummy chest accelerations are processed as class 180 data, and direct Chest Severity Index (CSI) calculations are performed. Data output is in the form of computer plots with the CSI calculations.

4.4.3 FEMUR LOAD DATA

The dummy femur loads are processed as class 600 data, and presented as computer plots.

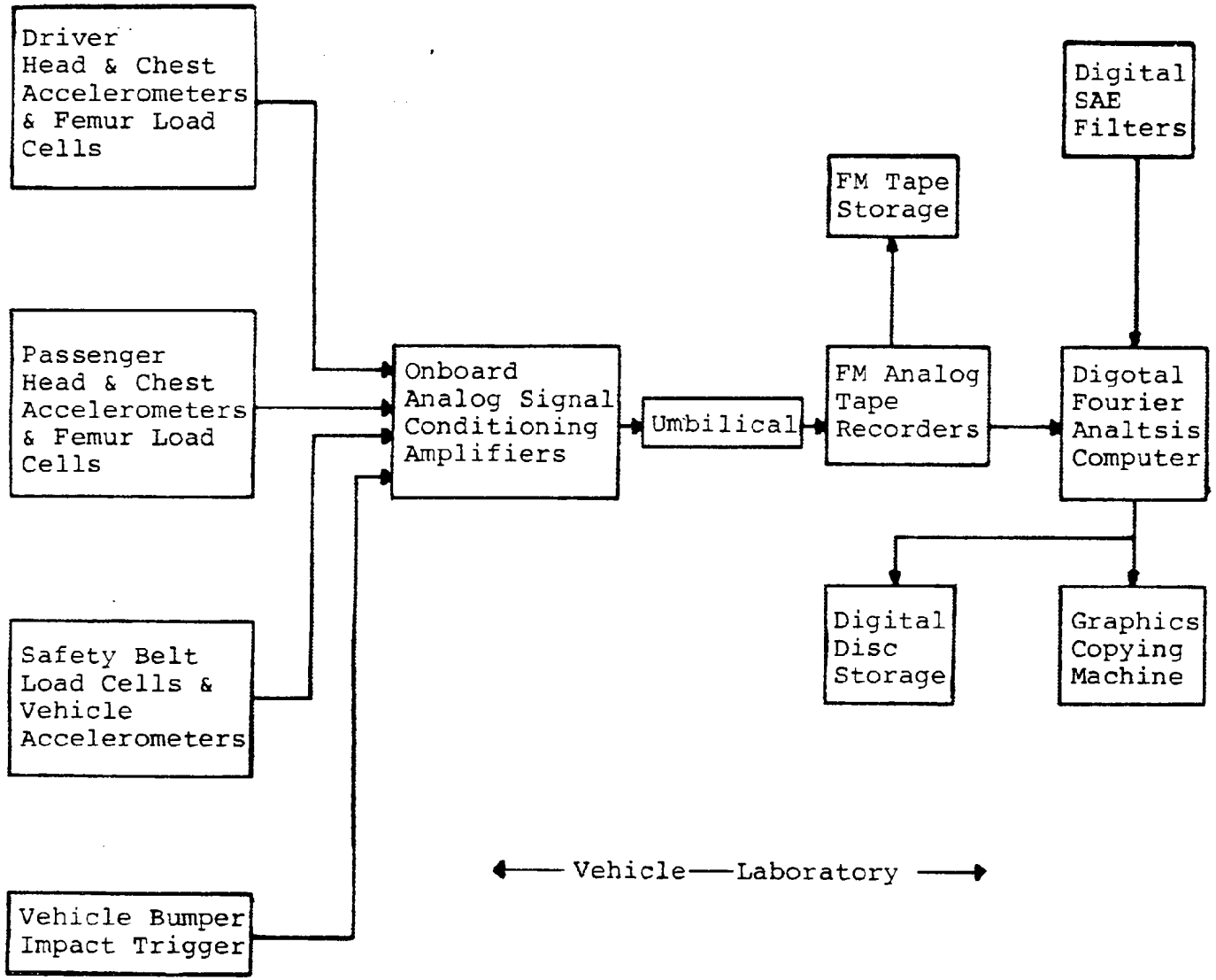
SECTION 4

4.4.4 RESTRAINT LOAD DATA

The dummy restraint loads are processed as class 60 data, and presented as computer plots.

4.4.5 VEHICLE ACCELERATION DATA

The vehicle accelerations are processed as class 60 data, and presented as computer plots. Additionally, the longitudinal vehicle acceleration is integrated to provide approximate vehicle velocity change and vehicle crush during the impact event.



VEHICLE AND OCCUPANT CRASH IMPACT DATA ACQUISITION SYSTEM

FIGURE 4-1

TABLE 4-1 INSTRUMENTATION FOR CRASH TEST

Instrument	Manufacturer	Model No.	Full Scale	Accuracy	Frequency Max.
Accelerometers, Head, Chest, Vehicle	Endevco	2262C-200	200g	±1%	3600 Hz
Load Cells, Femurs	GSE	2430	3000 lb	±1%	>3600 Hz
Load Cells, Safety Belts	GSE	2500	3000 lb	±1%	>3600 Hz
Contact Switch, Impact	AETL	-	2 V	-	<200 us rise time
FM Tape Recorder	Bell & Howell	4020	±2.8 V	47 db SNR	2500 Hz WB
Programmable Filter, All Data	Hewlett Packard	54440A	-	0.5%	1250 Hz, 60 db/oct
Analog-Digital Converter, All Data	Hewlett Packard	5466B	-	0.5%	200 us sampling
Analysis Computer All Analysis	Hewlett Packard	2100S	32 K Words	16 Bit Word	-
Disc Drive	Hewlett Packard	7900A	5 Meg Words	-	-

TABLE 4-2

DATA ACQUISITION AND REDUCTION PROCESS

STEP	DESCRIPTION
1	DA System Installation
2	DA System Pre-Impact Calibration
3	Impact Trigger Checkout
4	Vehicle Impact Performed
5	DA System Post-Impact Calibration
6	Data Reproduced From FM Tape Into Computer a) Data analog filtered at 1250 Hz b) Data digitized at 500 ms sample rate c) Data sychronized by impact trigger signal
7	Digitized Data Examined
8	Data Transfered Permanent Disc Storage
9	Appropriate SAE Filters Are Applied
10	Each Data Signal Plotted With Labels
11	Chest Severity Index Values Determined
12	Head Injury Criteria Values Determined
13	Vehicle Dynamics Evaluated (MPH & Crush)

TABLE 4-3

DATA DESIGNATIONS FOR VEHICLE CRASH IMPACT DATA ACQUISITION

DATA SET	TAPE NO.	CHANNEL NO.	DESCRIPTION
1	1	1	Driver Longitudingal Head Acceleration A_x
1	1	2	Driver Lateral Head Acceleration A_y
1	1	3	Driver Vertical Head Acceleration A_z
1	1	4	Driver Right Femur Force
2	1	5	Driver Longitudinal Chest Acceleration A_x
2	1	6	Driver Lateral Chest Acceleration A_y
2	1	7	Driver Vertical Chest Acceleration A_z
2	1	8	Driver Left Femur Force
3	1	9	Driver Restraint Belt Force
3	1	10	Longitudinal Vehicle Acceleration (Front) A_x
3	1	11	Longitudinal Vehicle Acceleration (Rear) A_x
3	1	12	Vertical Vehicle Acceleration (Rear) A_z
4	2	1	Passenger Longitudinal Head Acceleration A_x
4	2	2	Passenger Lateral Head Acceleration A_y
4	2	3	Passenger Vertical Head Acceleration A_z
4	2	4	Passenger Right Femur Force
5	2	5	Passenger Longitudinal Chest Acceleration A_x
5	2	6	Passenger Lateral Chest Acceleration A_y
5	2	7	Passenger Vertical Chest Acceleration A_z
5	2	8	Passenger Left Femur Force
6	2	9	Passenger Restraint Belt Force
6	2	10-12	Same as Tape 1, Ch's 10-12

COMPARISON PLOT OF SAE CLASS 60, 180, 600, 1000 FILTERS AND THE DATA ANALYSIS 1250 HZ PREDIGITIZING ANALOG FILTER.

SAE FILTERS ROLL OFF IS 12DB/OCT, ANALOG FILTER ROLL OFF IS 60DB/OCT

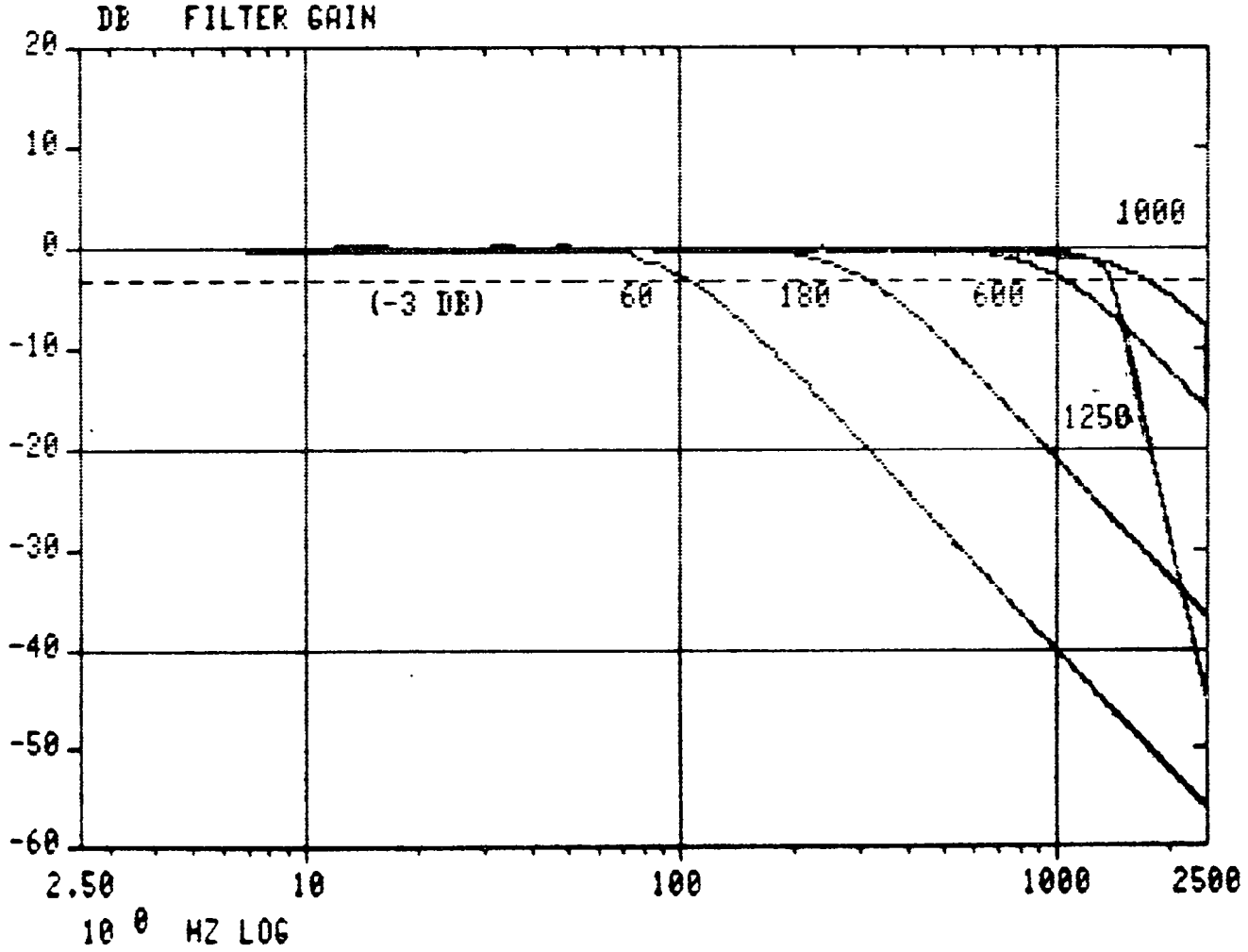


FIGURE 4-2

APPENDIX A

APPENDIX A

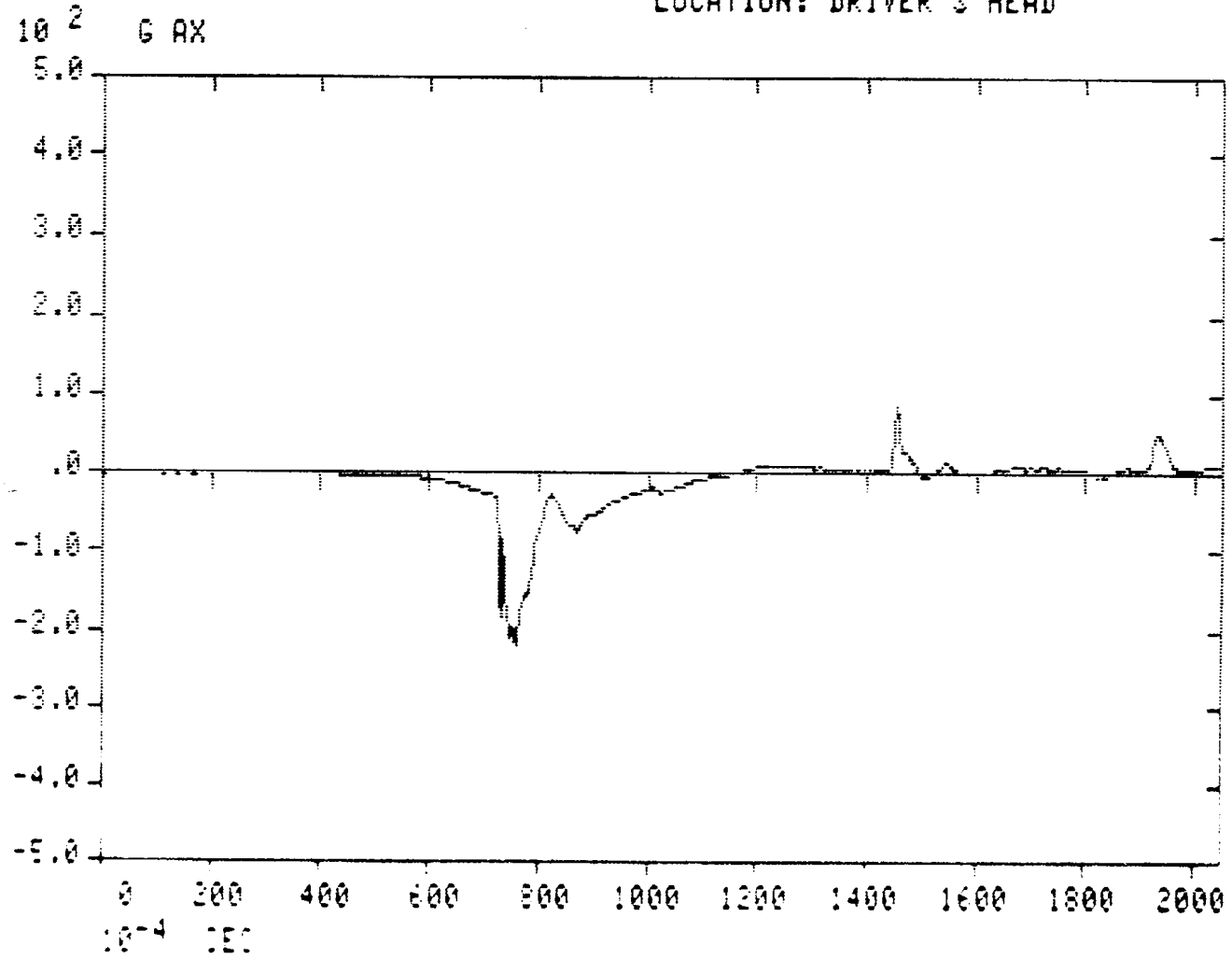
The following computer plots provide complete and comprehensive occupant response and vehicle acceleration during the impact event of the 1979 Mazda B2000 (Long Body) - Pick Up, NHTSA 790606.

DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 1000
ACCELEROMETER: TAPE 1, CH 1
DIRECTION: FORWARD
LOCATION: DRIVER'S HEAD

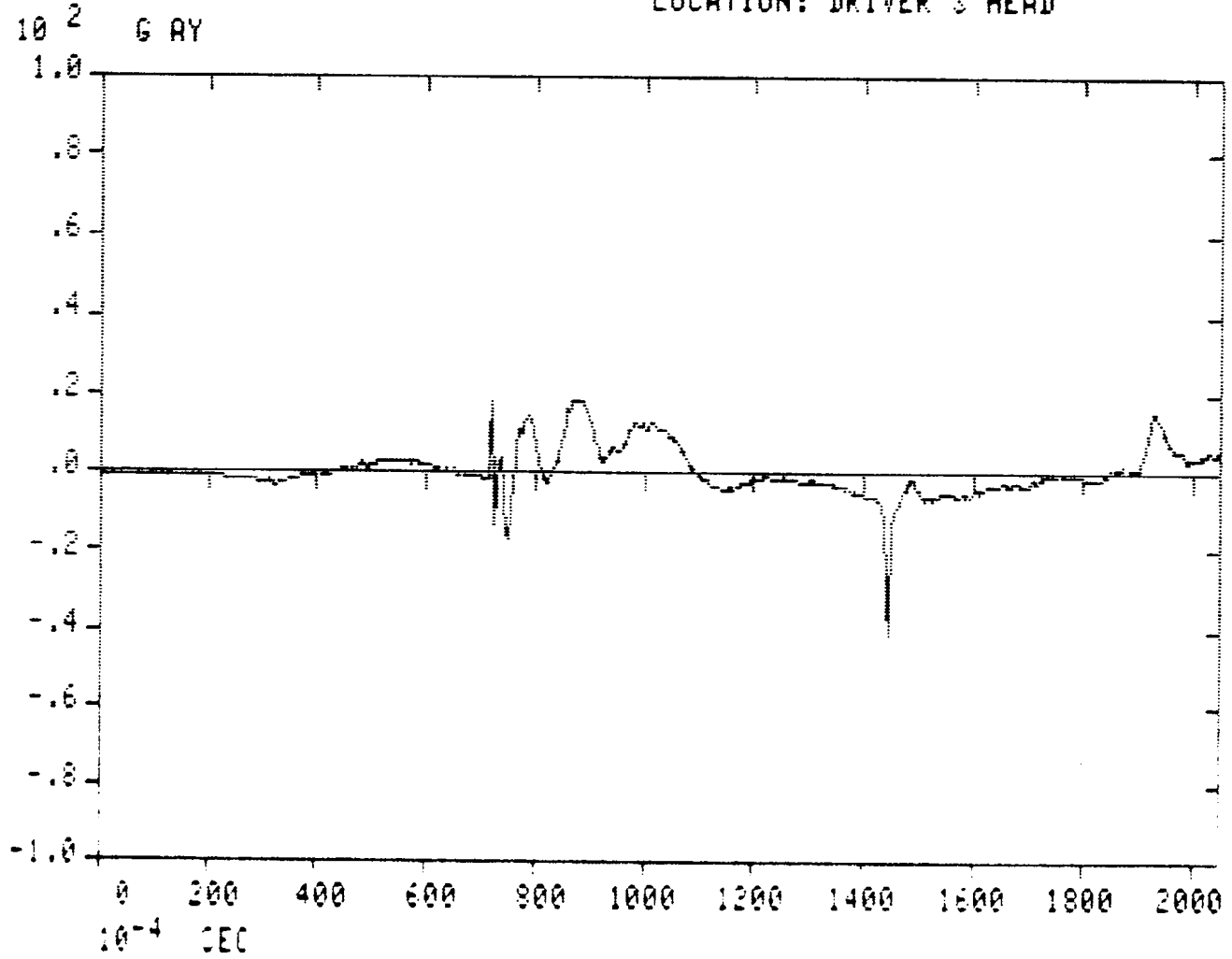


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 1000
ACCELEROMETER: TAPE 1, CH 2
DIRECTION: LEFT
LOCATION: DRIVER'S HEAD

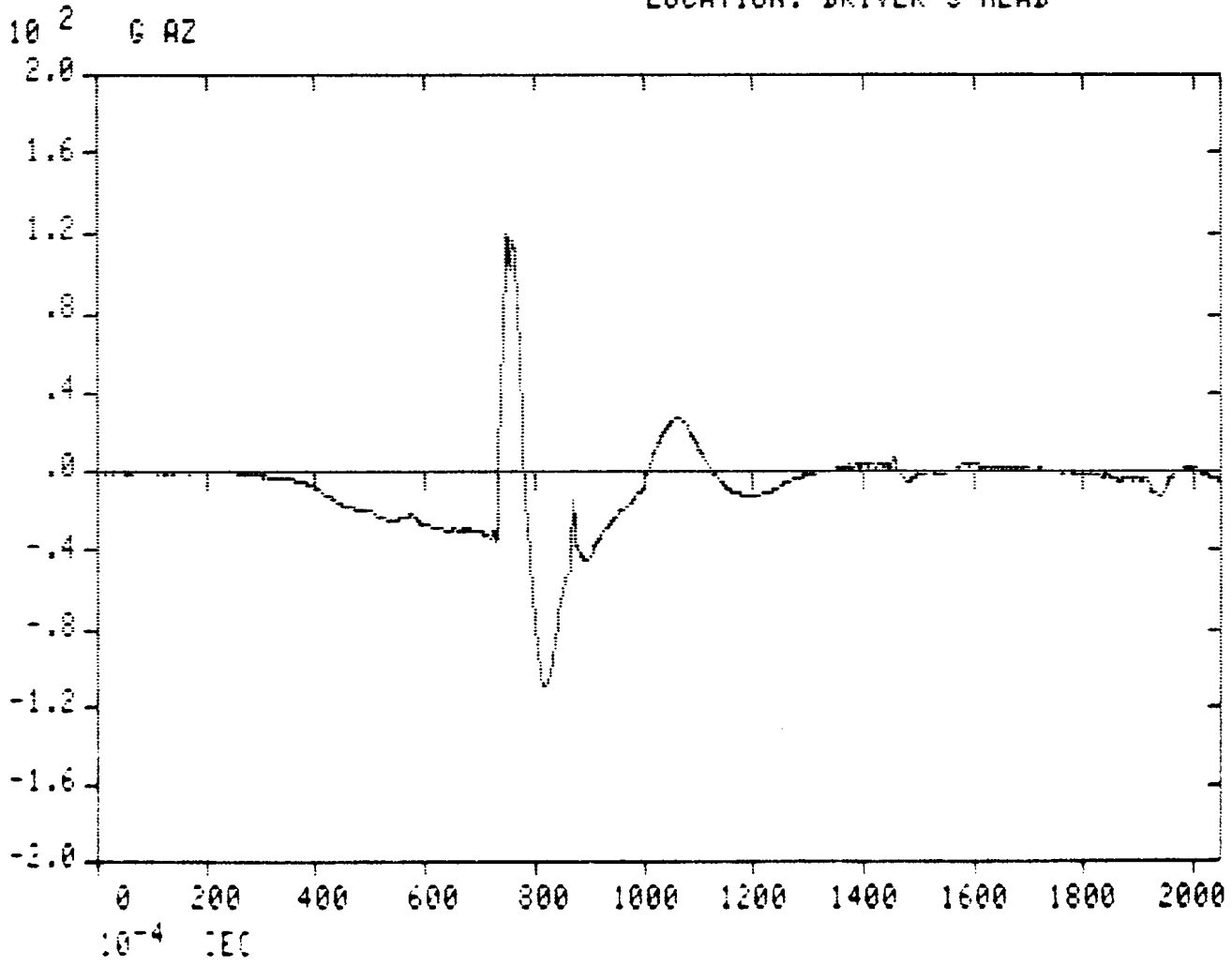


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. :141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 1000
ACCELEROMETER: TAPE 1, CH 3
DIRECTION: UPWARD
LOCATION: DRIVER'S HEAD

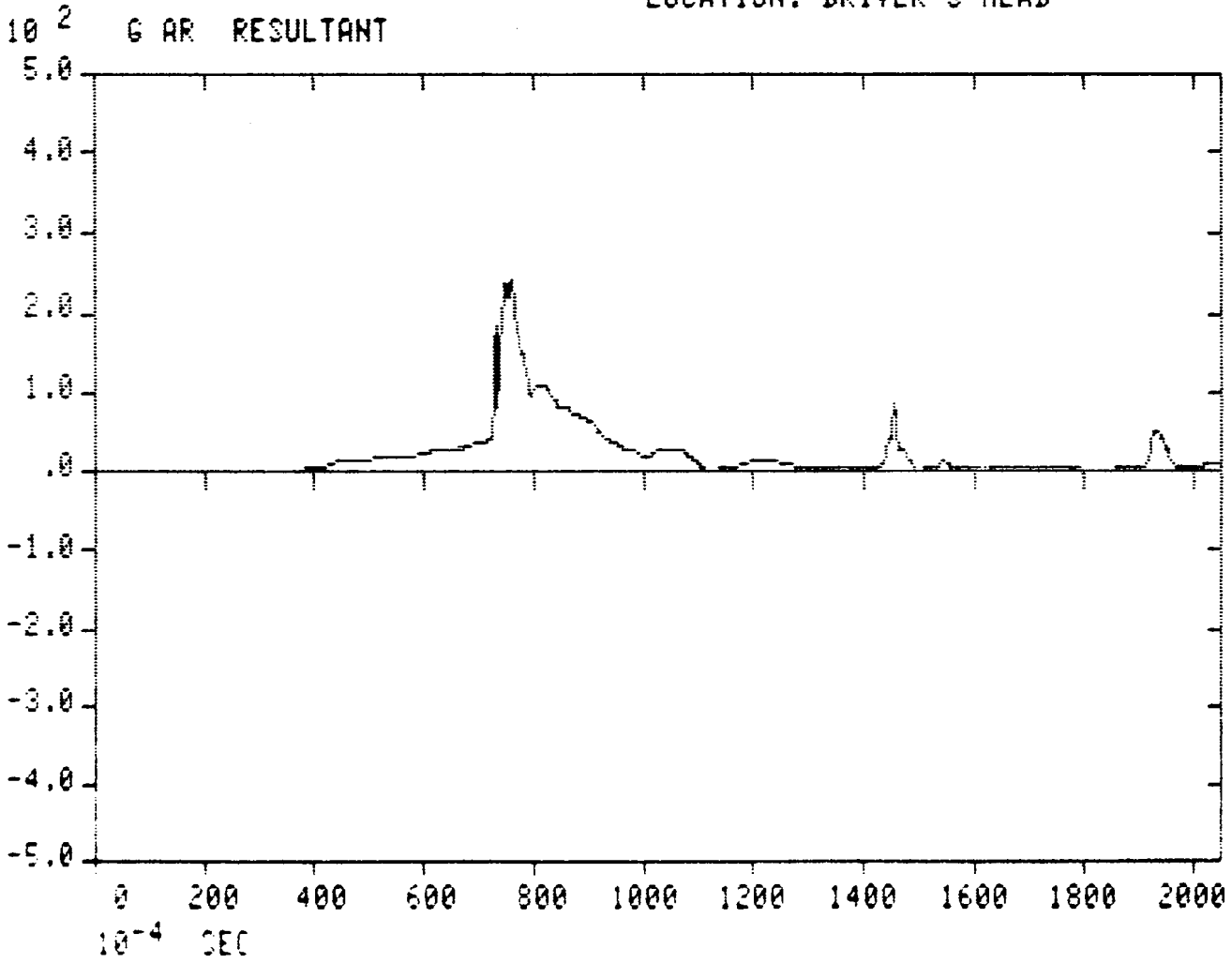


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 1000
ACCELEROMETER: TAPE 1, CH 1-3
DIRECTION: RESULTANT OF XYZ
LOCATION: DRIVER'S HEAD

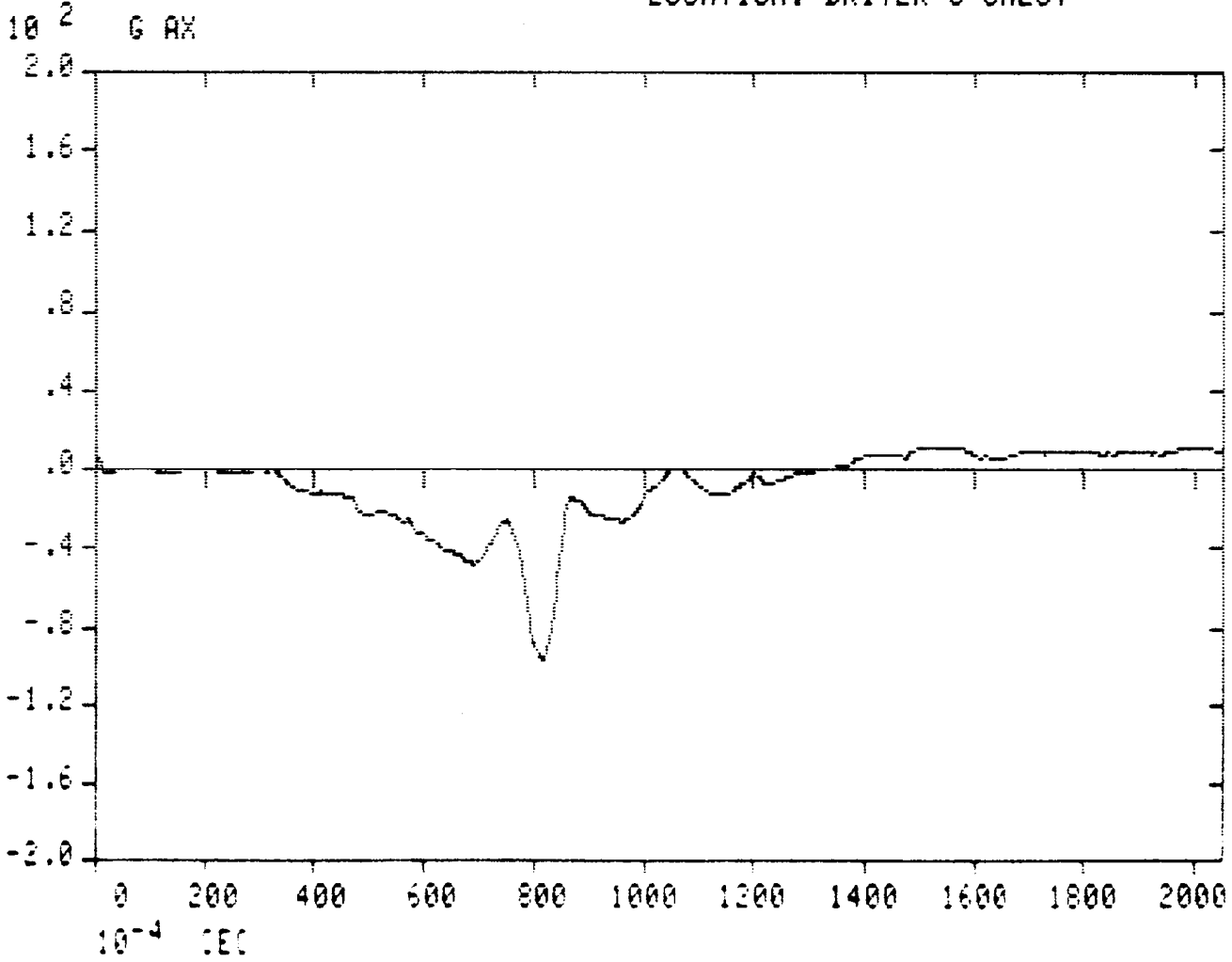


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 180
ACCELEROMETER: TAPE 1, CH 5
DIRECTION: FORWARD
LOCATION: DRIVER'S CHEST

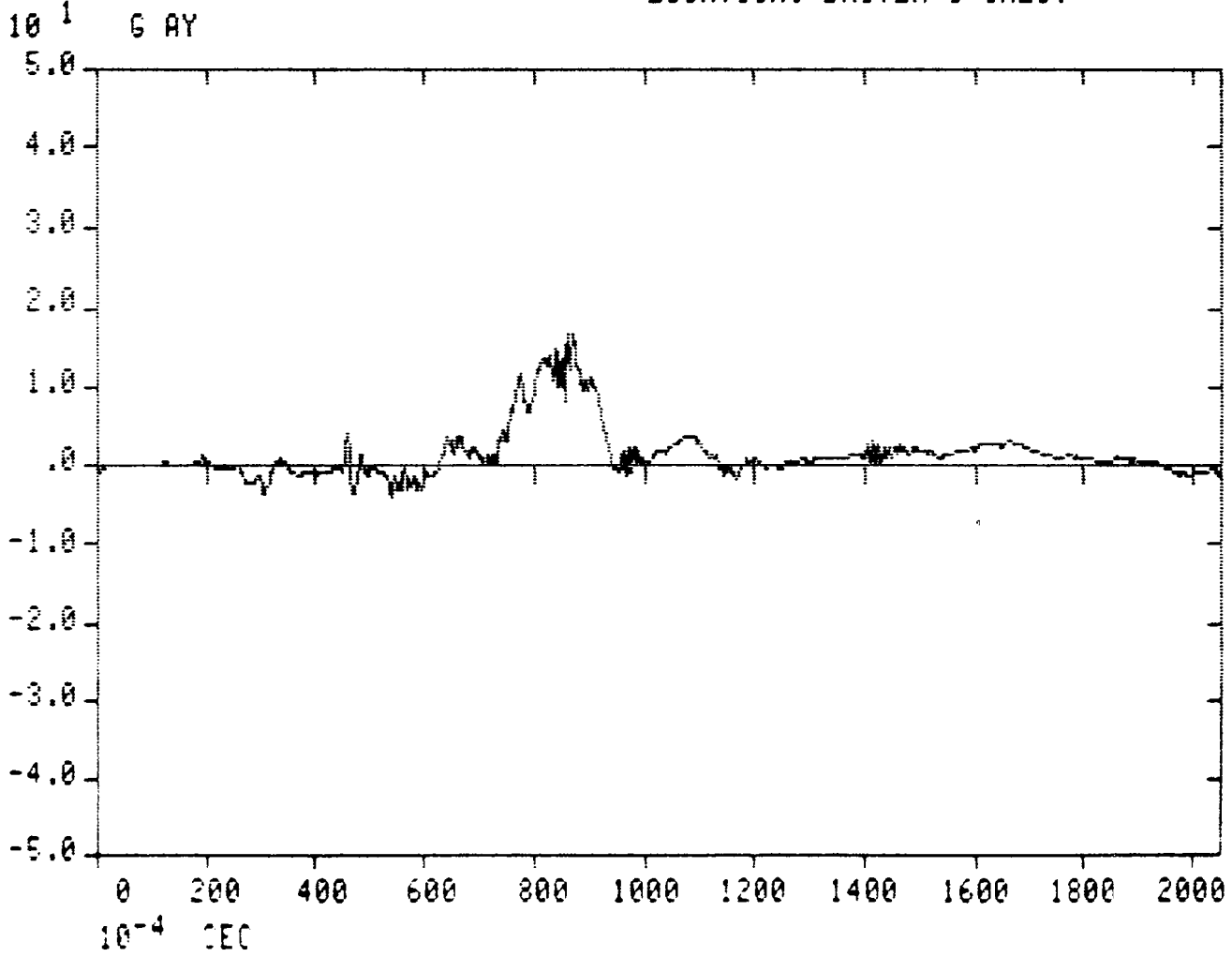


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 180
ACCELEROMETER: TAPE 1, CH 6
DIRECTION: LEFT
LOCATION: DRIVER'S CHEST

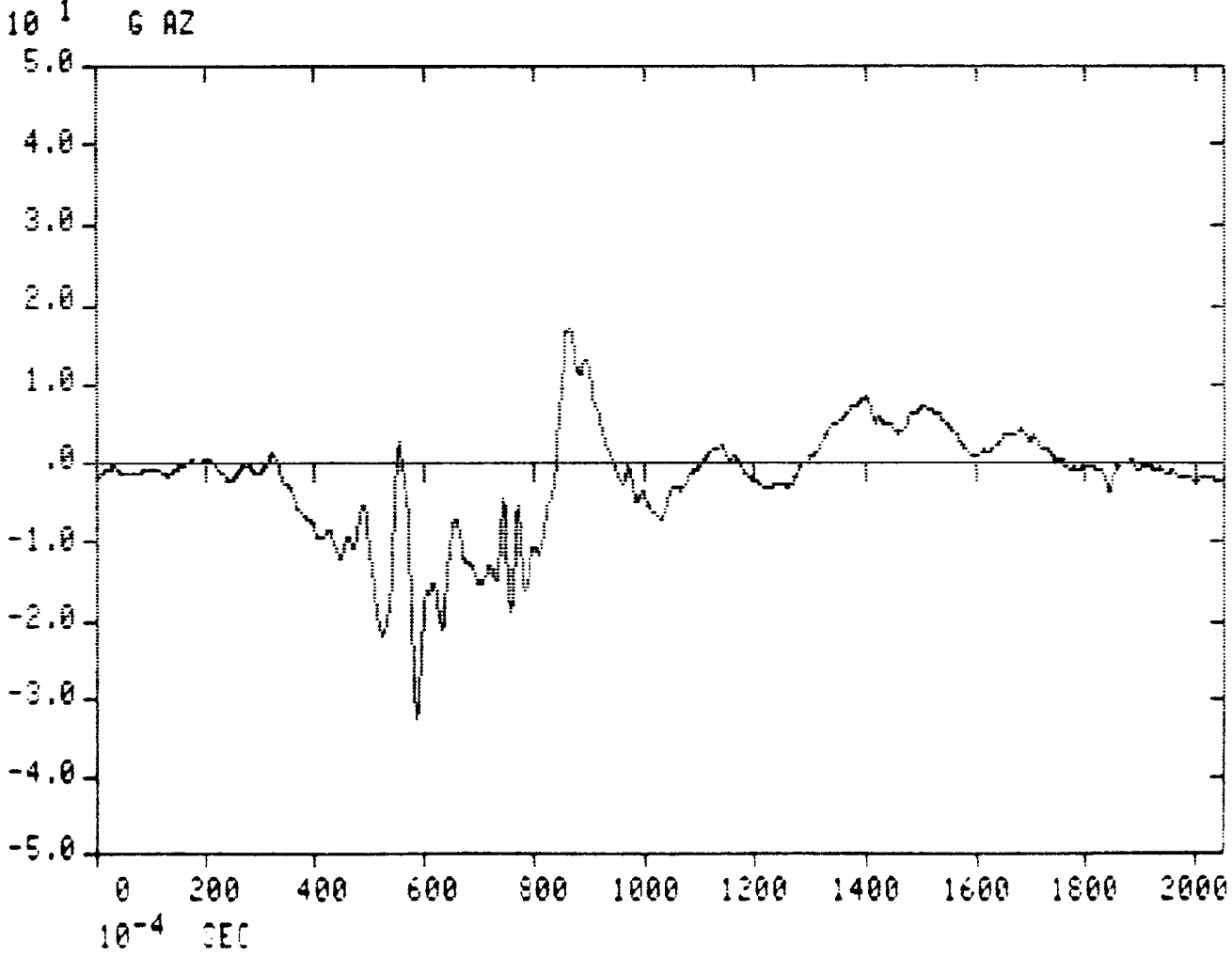


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 180
ACCELEROMETER: TAPE 1, CH 7
DIRECTION: UPWARD
LOCATION: DRIVER'S CHEST

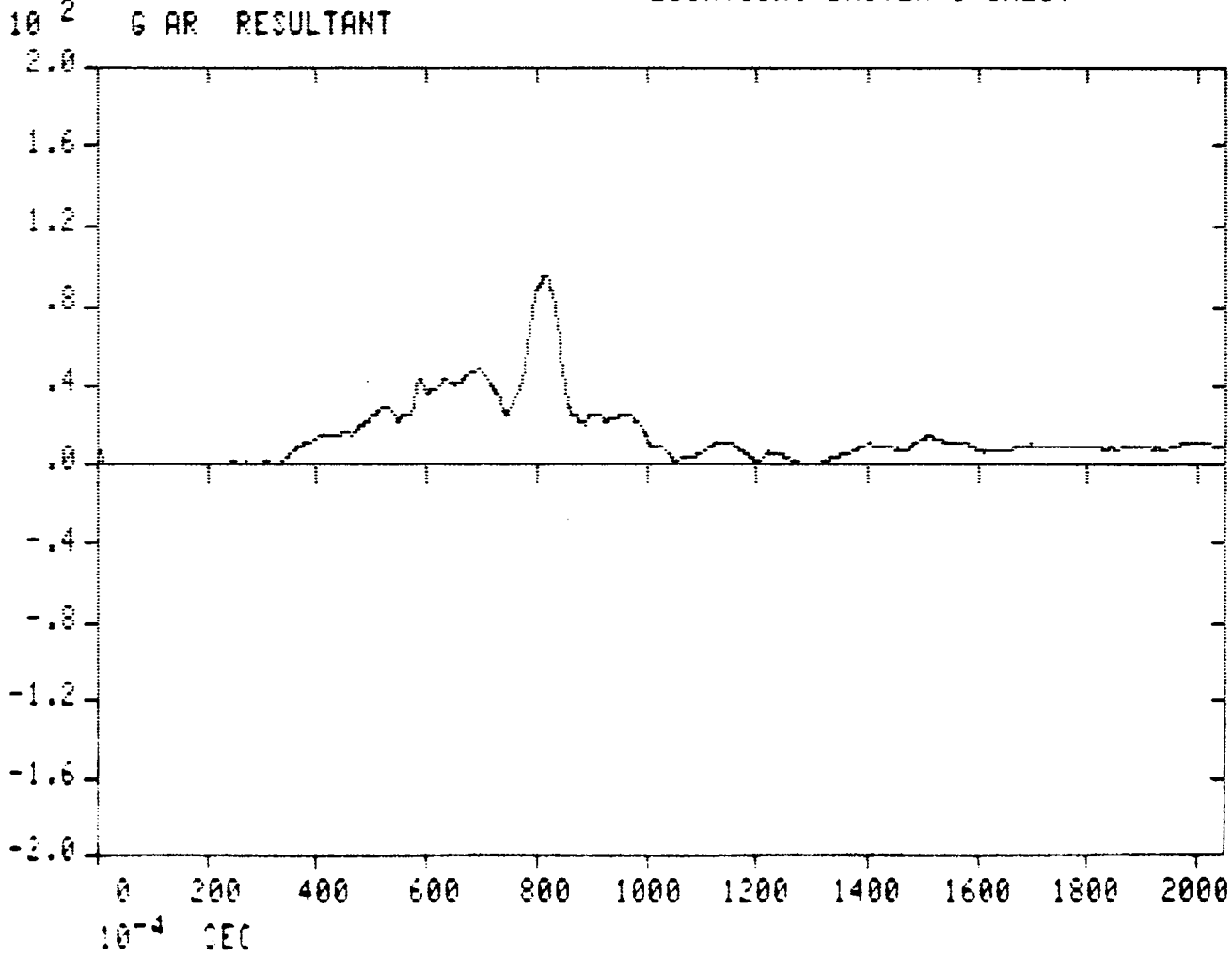


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. :141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 180
ACCELEROMETER: TAPE 1, CH 5-7
DIRECTION: RESULTANT OF XYZ
LOCATION: DRIVER'S CHEST

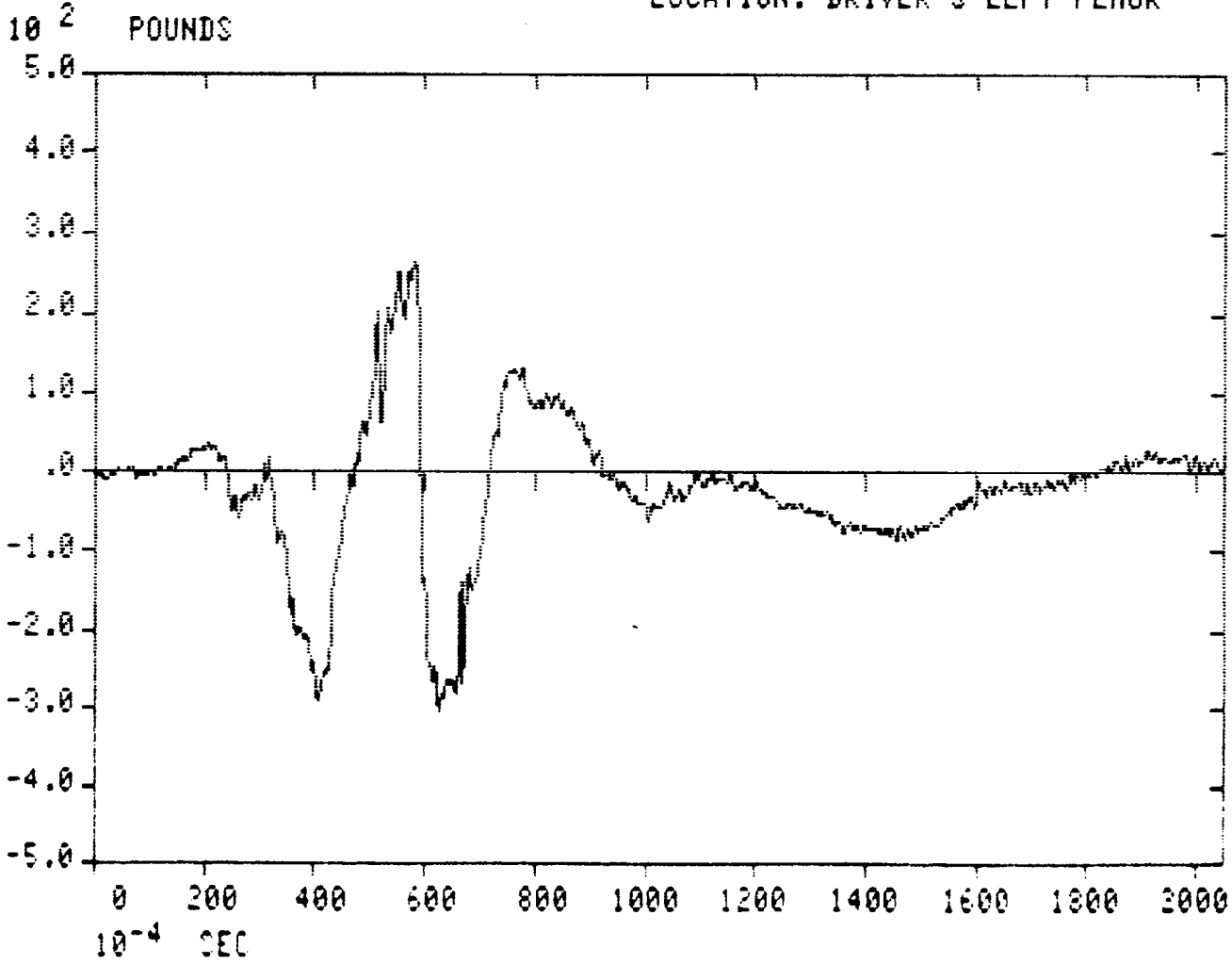


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 600
LOAD CELL: TAPE 1, CH 8
DIRECTION: TENSION
LOCATION: DRIVER'S LEFT FEMUR

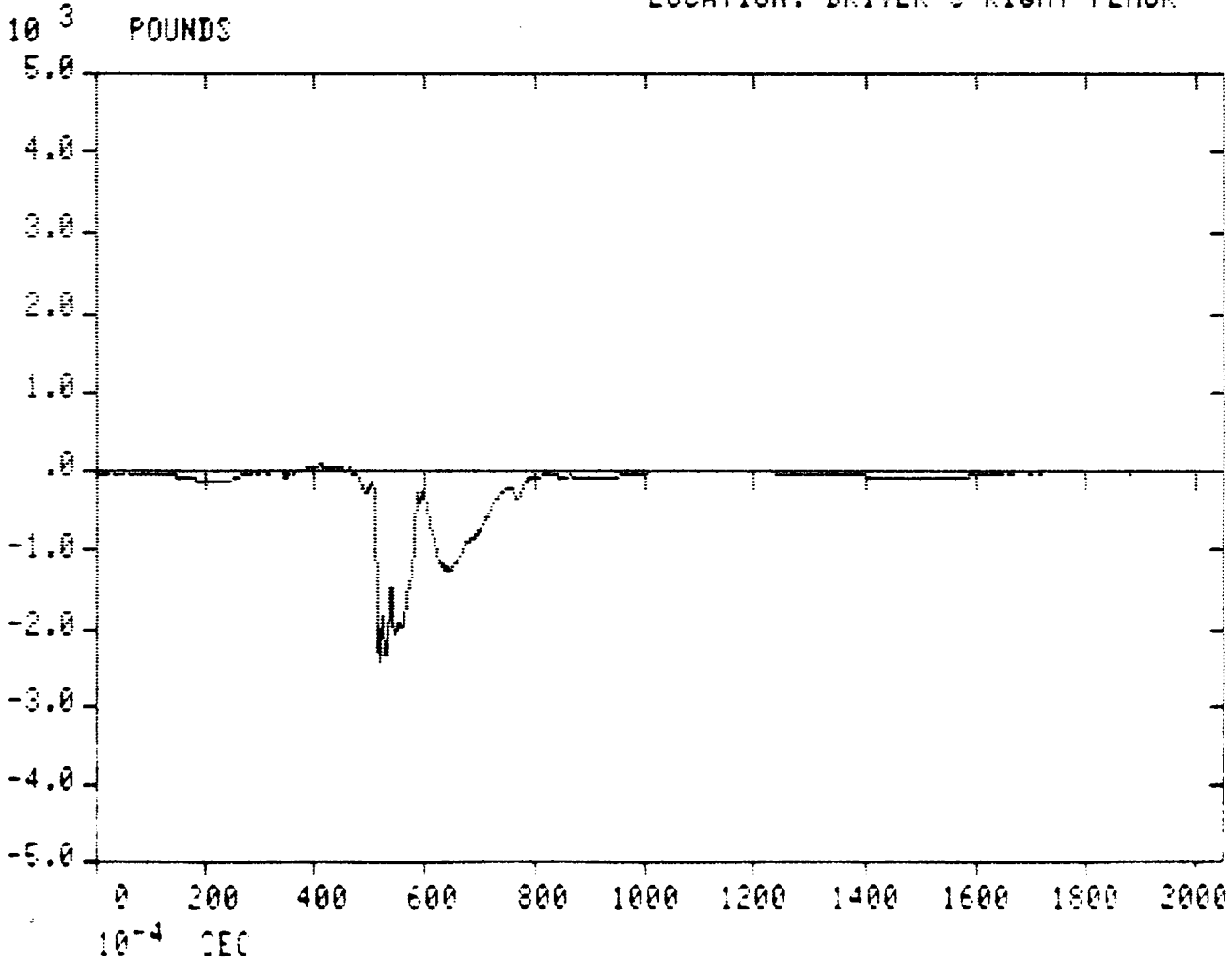


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 600
LOAD CELL: TAPE 1, CH 4
DIRECTION: TENSION
LOCATION: DRIVER'S RIGHT FEMUR

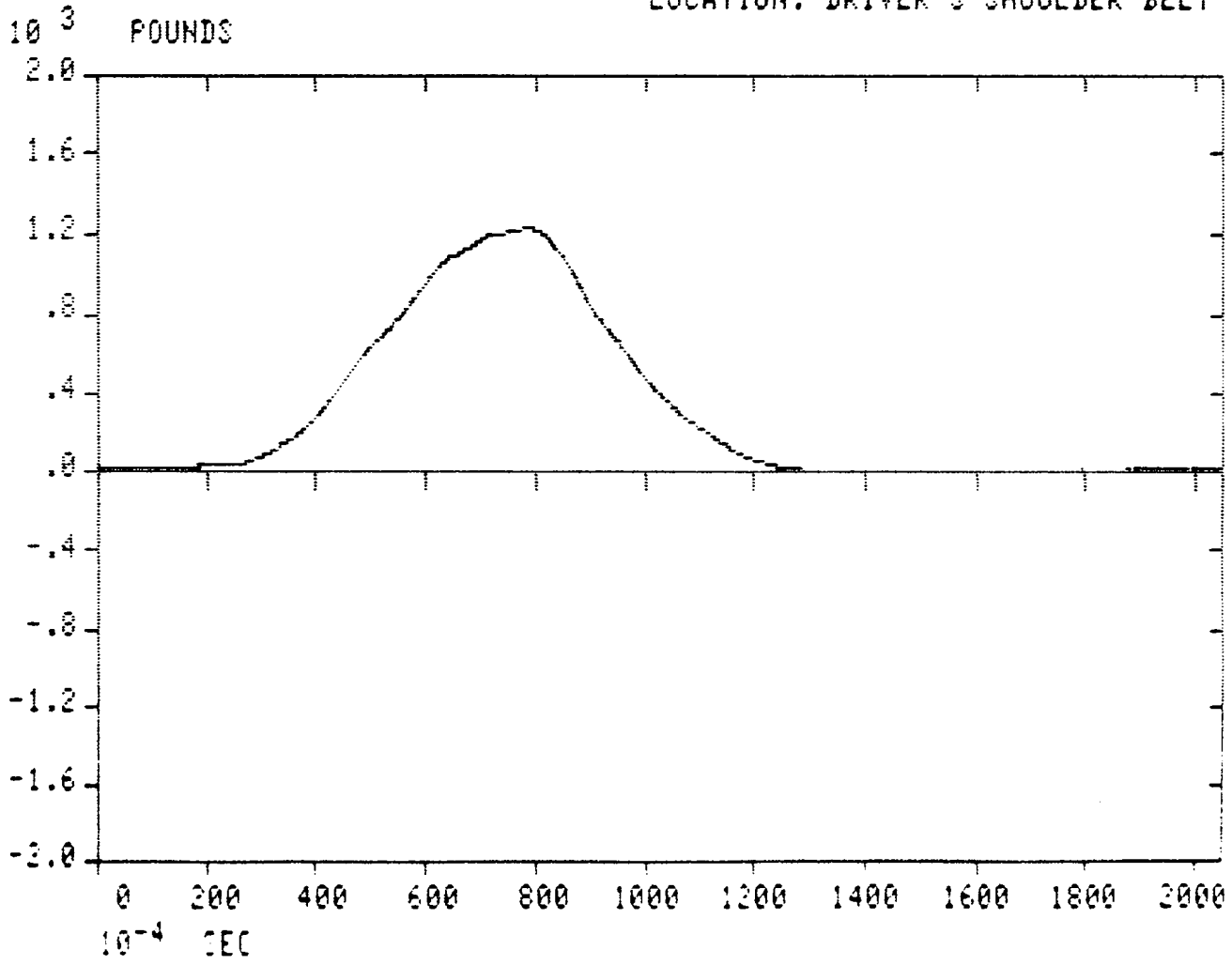


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 60
LOAD CELL: TAPE 1, CH 9
DIRECTION: TENSION
LOCATION: DRIVER'S SHOULDER BELT

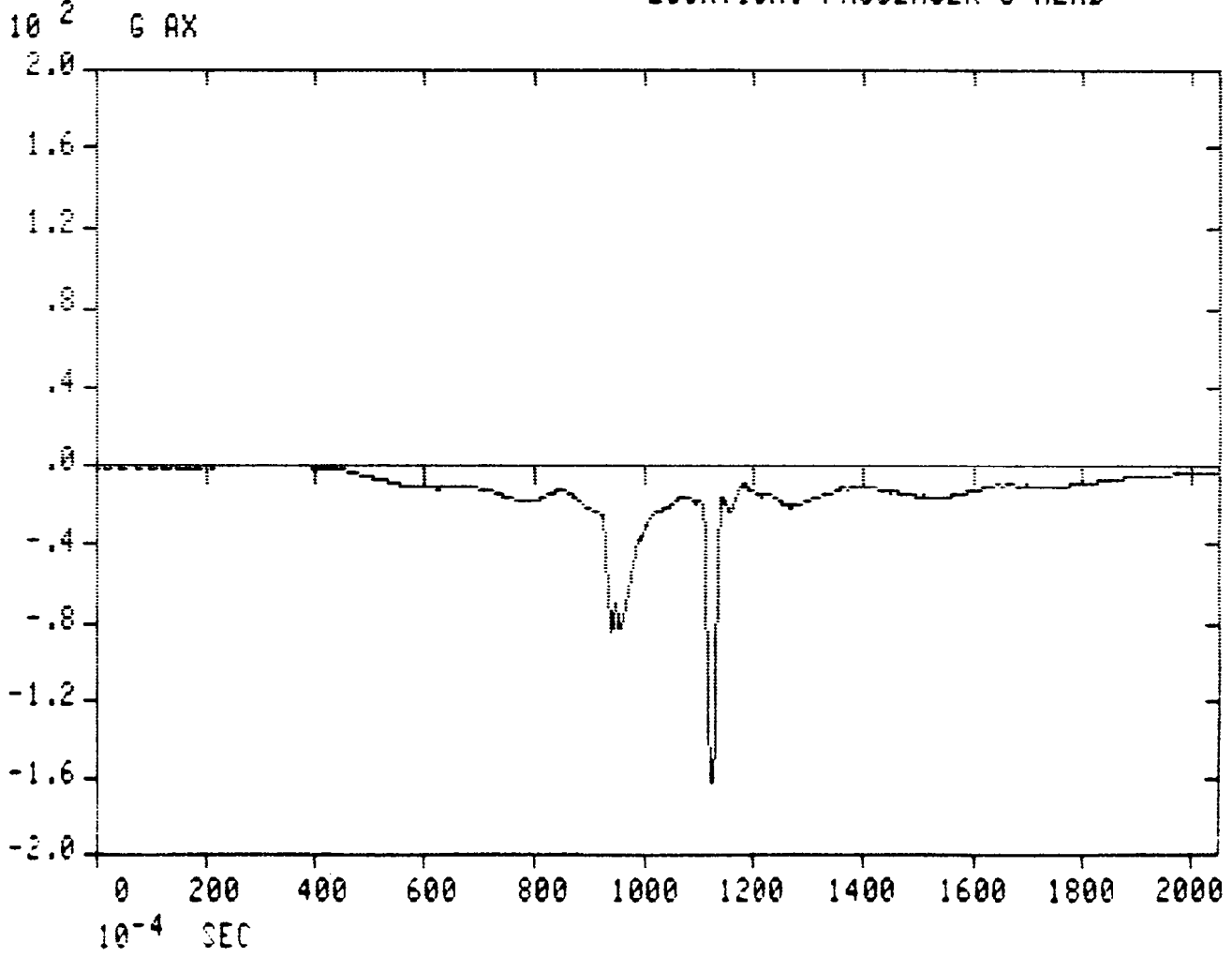


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 1000
ACCELEROMETER: TAPE 2, CH 1
DIRECTION: FORWARD
LOCATION: PASSENGER'S HEAD

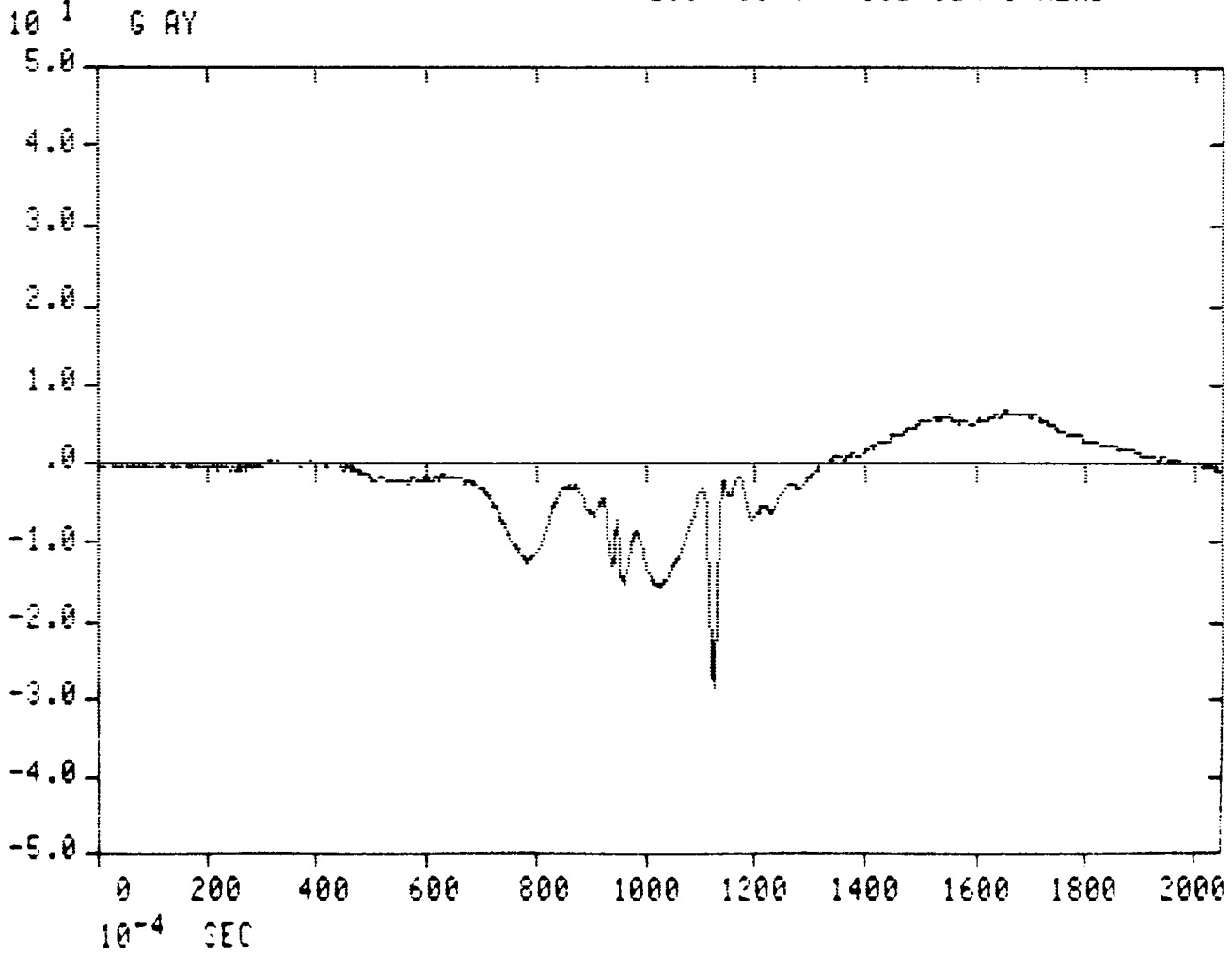


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 1000
ACCELEROMETER: TAPE 2, CH 2
DIRECTION: LEFT
LOCATION: PASSENGER'S HEAD

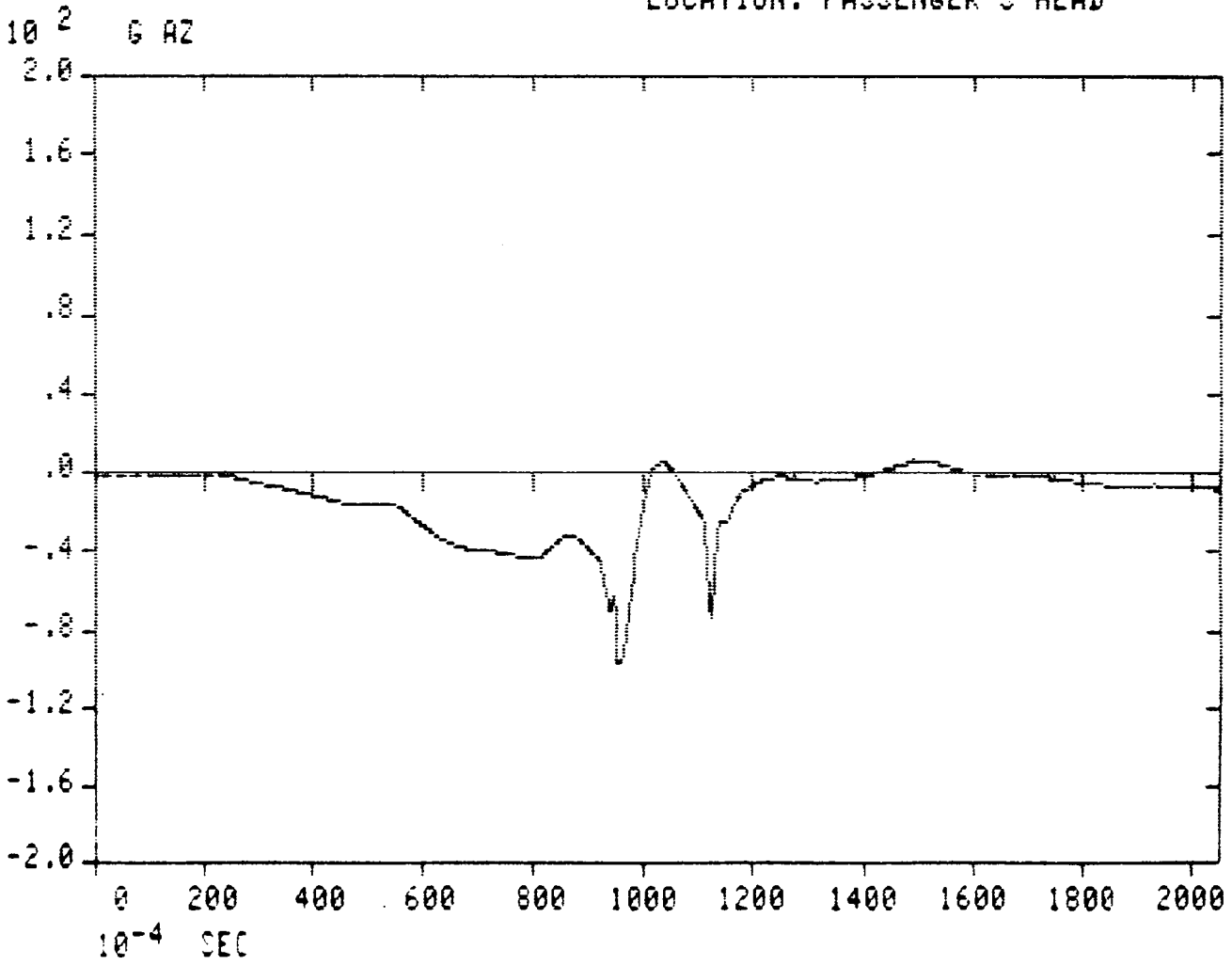


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 1000
ACCELEROMETER: TAPE 2, CH 3
DIRECTION: UPWARD
LOCATION: PASSENGER'S HEAD

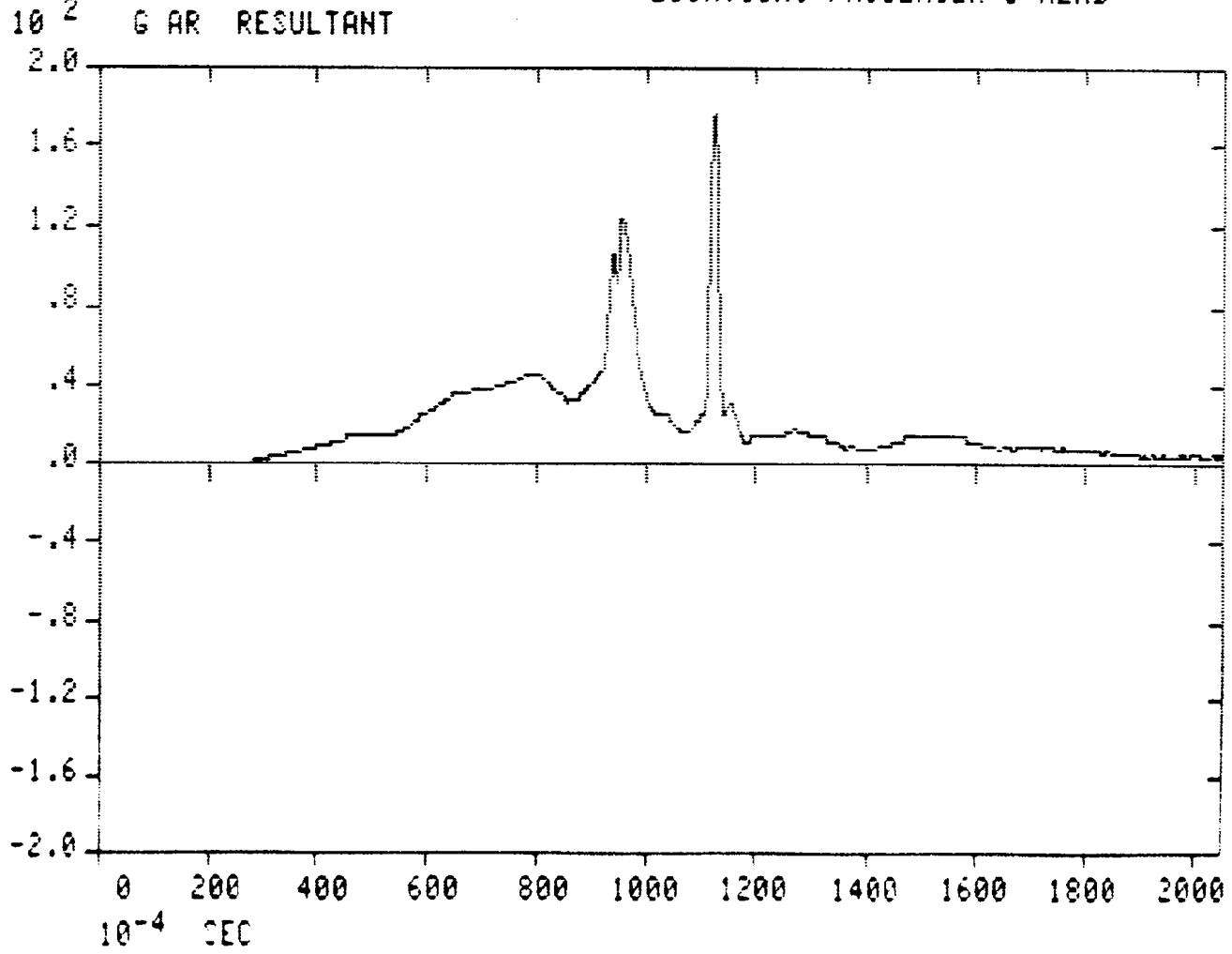


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 1000
ACCELEROMETER: TAPE 2, CH 1-3
DIRECTION: RESULTANT OF XYZ
LOCATION: PASSENGER'S HEAD

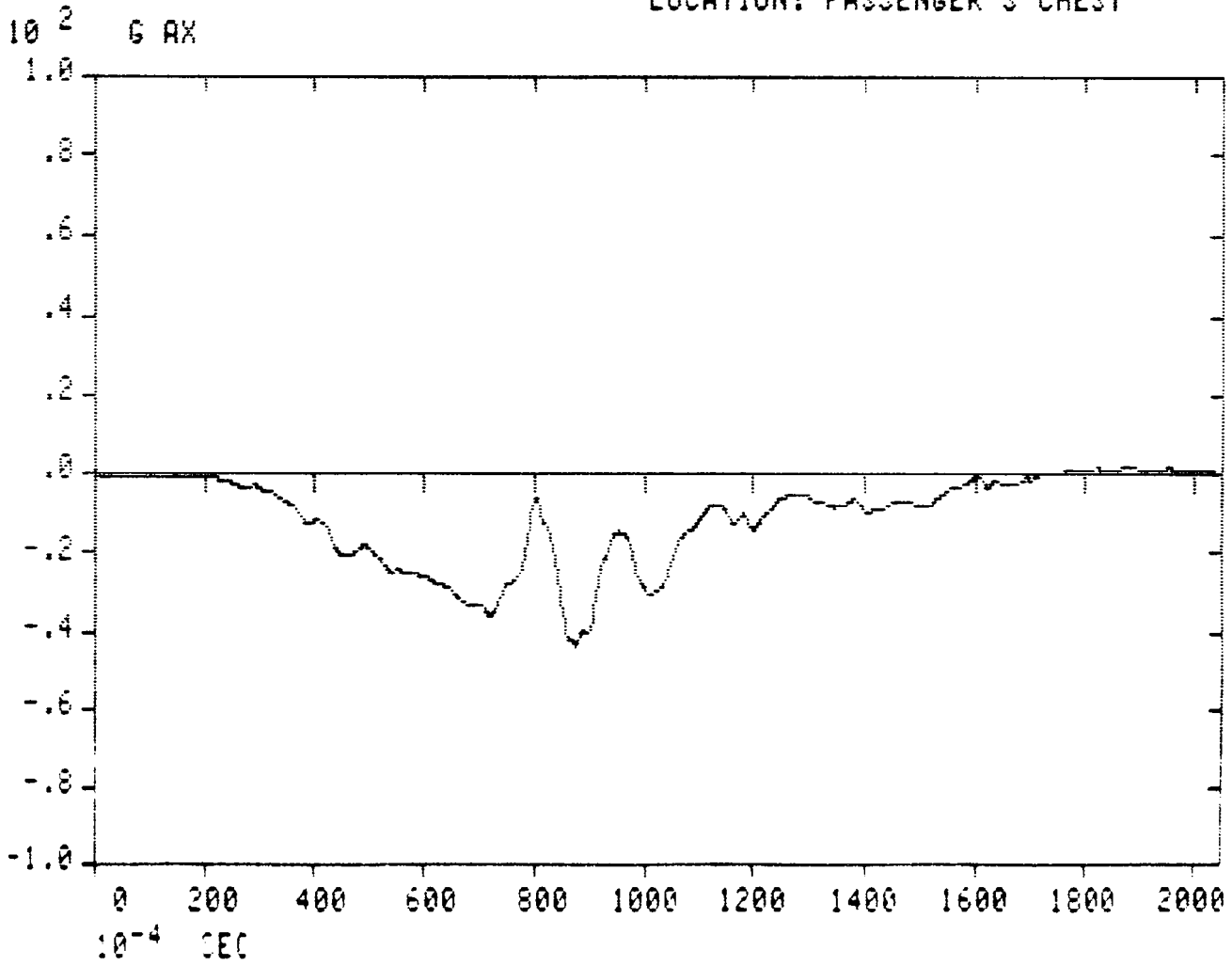


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 180
ACCELEROMETER: TAPE 2, CH 5
DIRECTION: FORWARD
LOCATION: PASSENGER'S CHEST

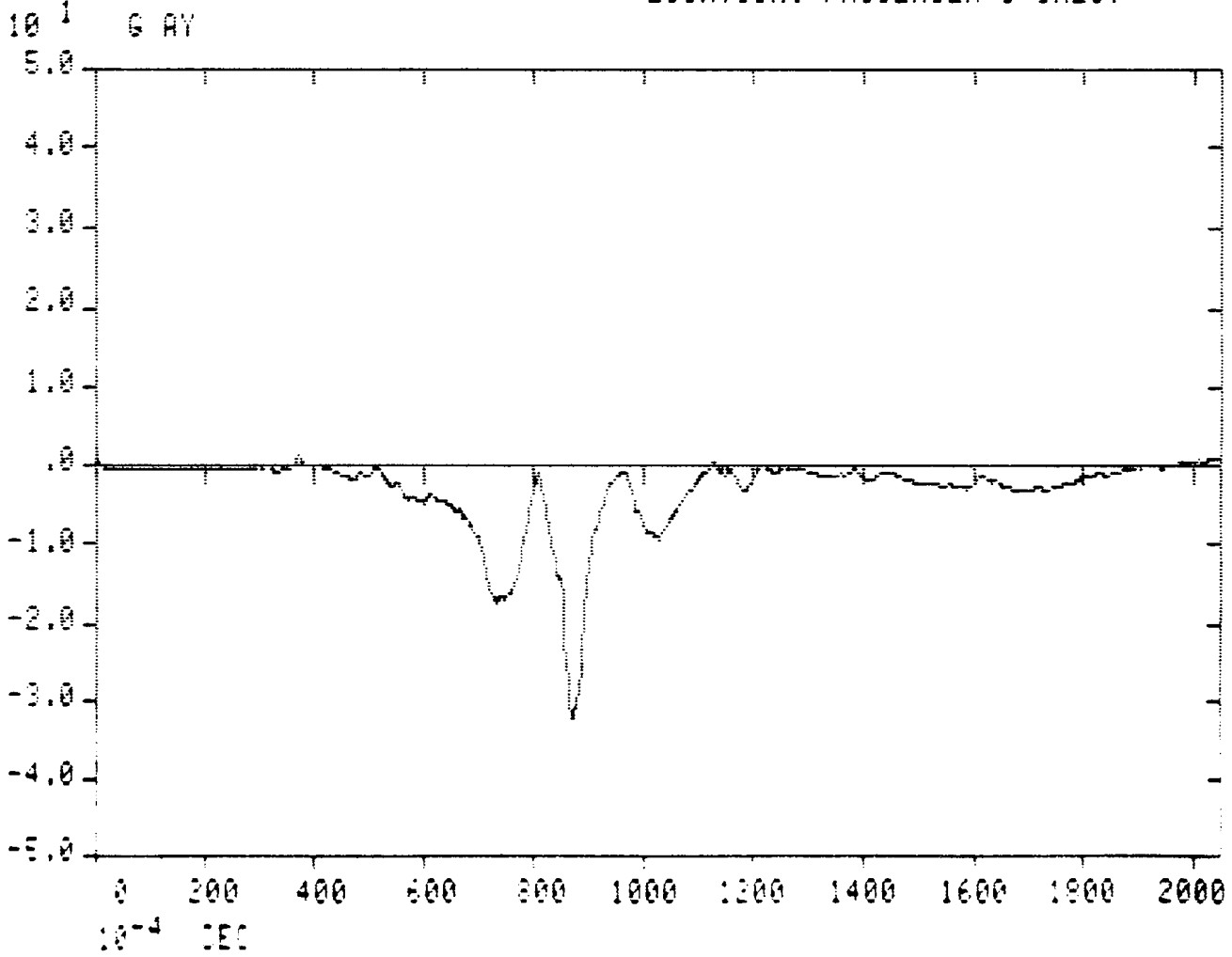


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 180
ACCELEROMETER: TAPE: 2, CH 6
DIRECTION: LEFT
LOCATION: PASSENGER'S CHEST

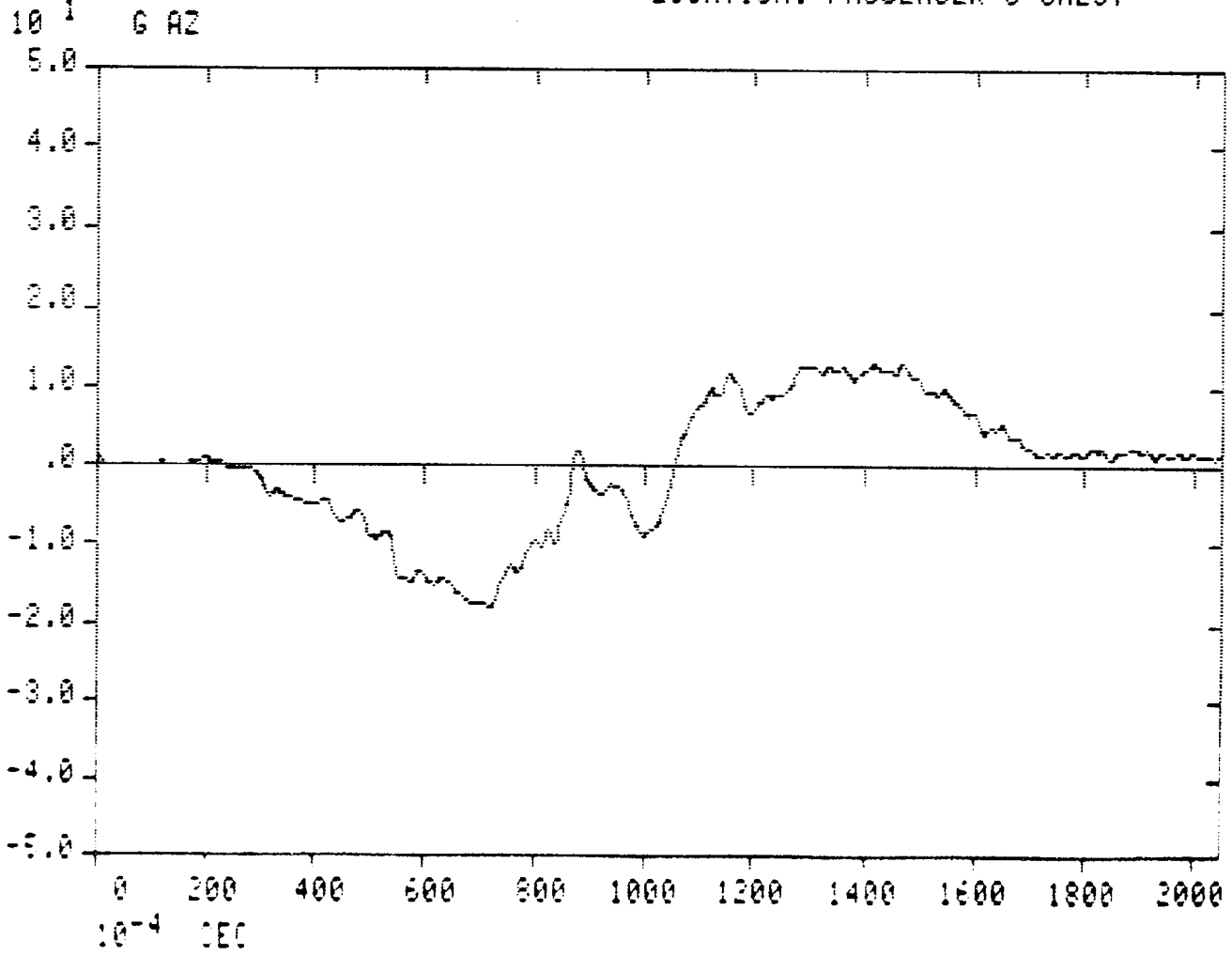


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 180
ACCELEROMETER: TAPE 2, CH 7
DIRECTION: UPWARD
LOCATION: PASSENGER'S CHEST

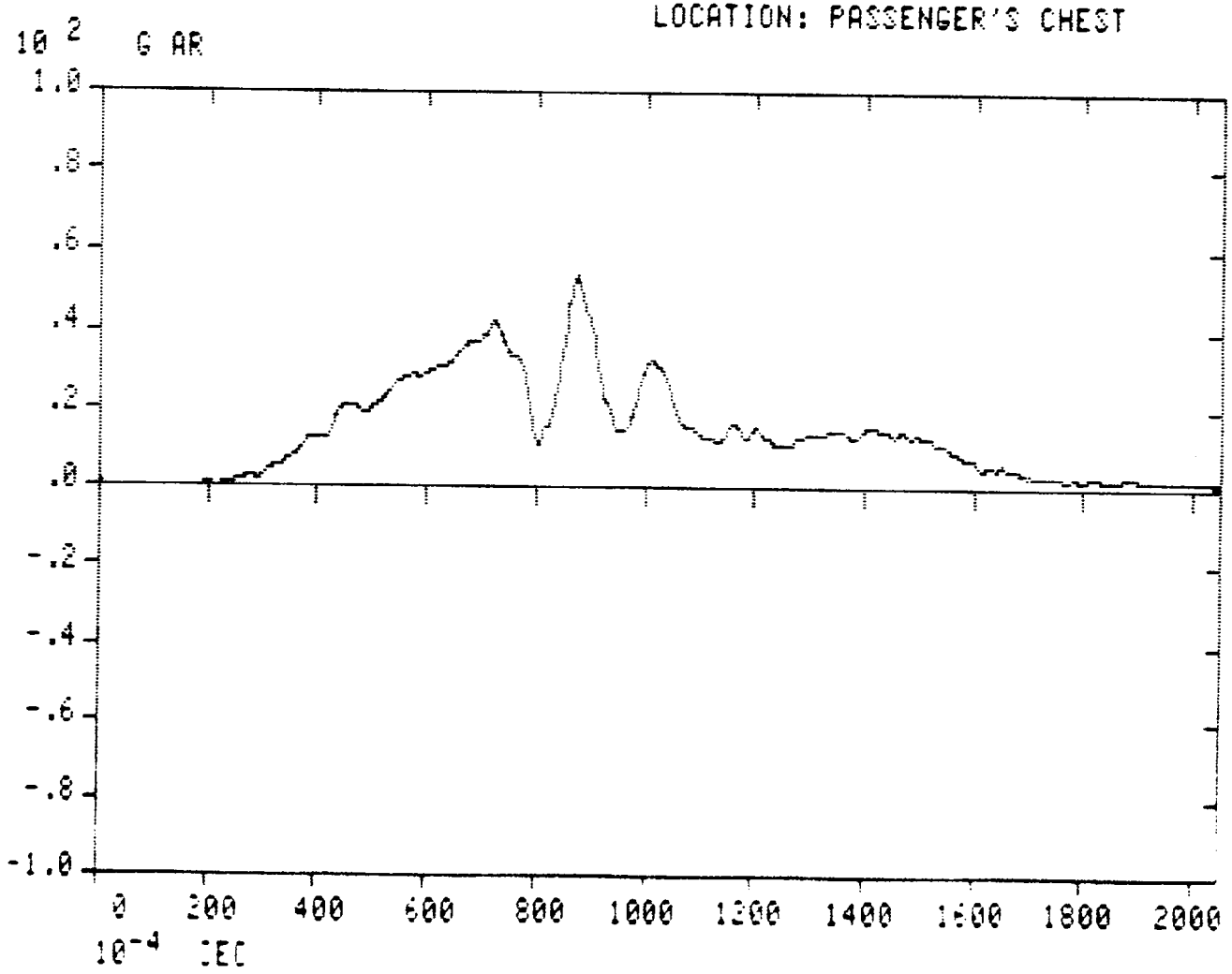


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 1000
ACCELEROMETER: TAPE 2, CH 5-7
DIRECTION: RESULTANT OF XYZ
LOCATION: PASSENGER'S CHEST

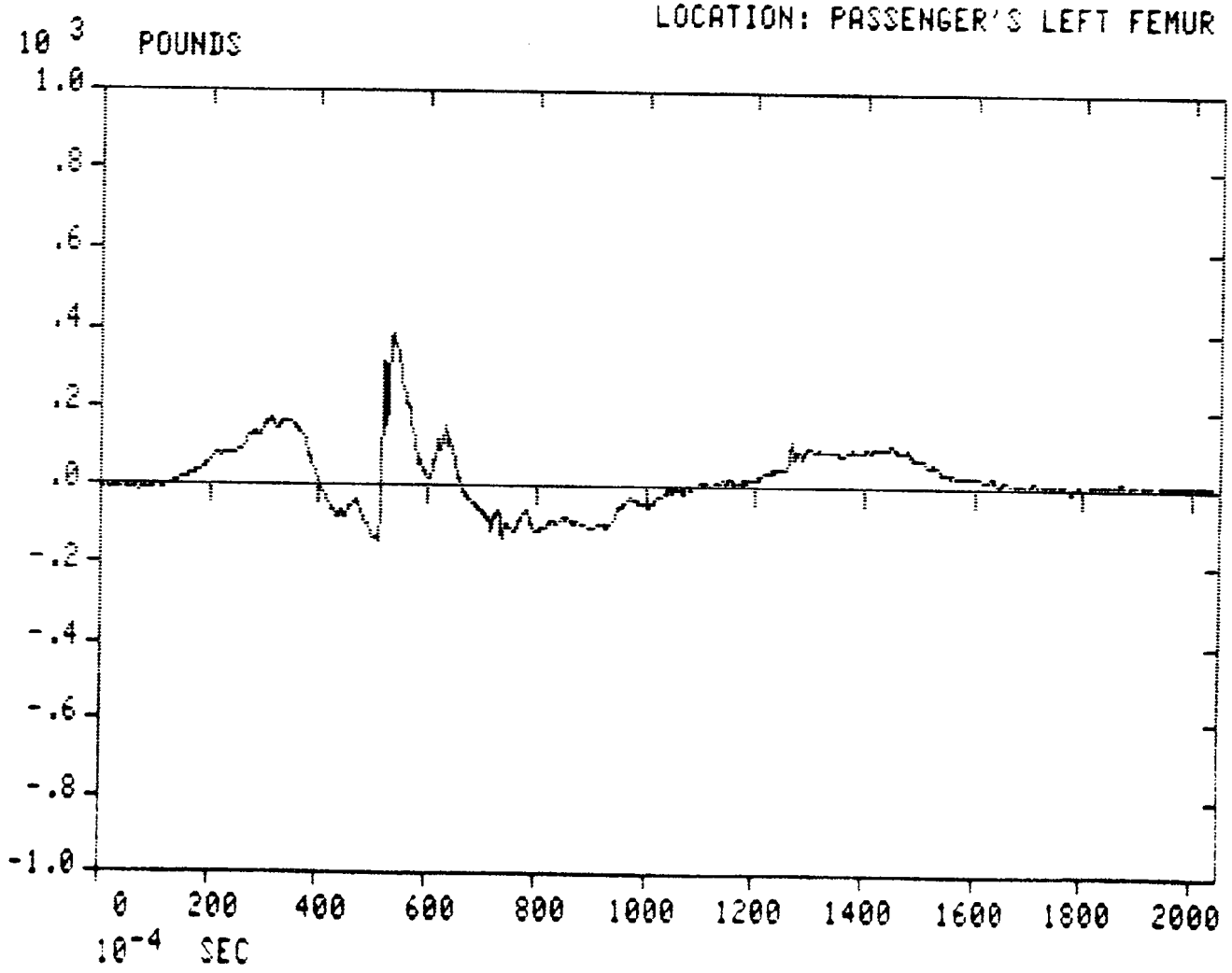


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 600
LOAD CELL: TAPE 2, CH 8
DIRECTION: TENSION
LOCATION: PASSENGER'S LEFT FEMUR

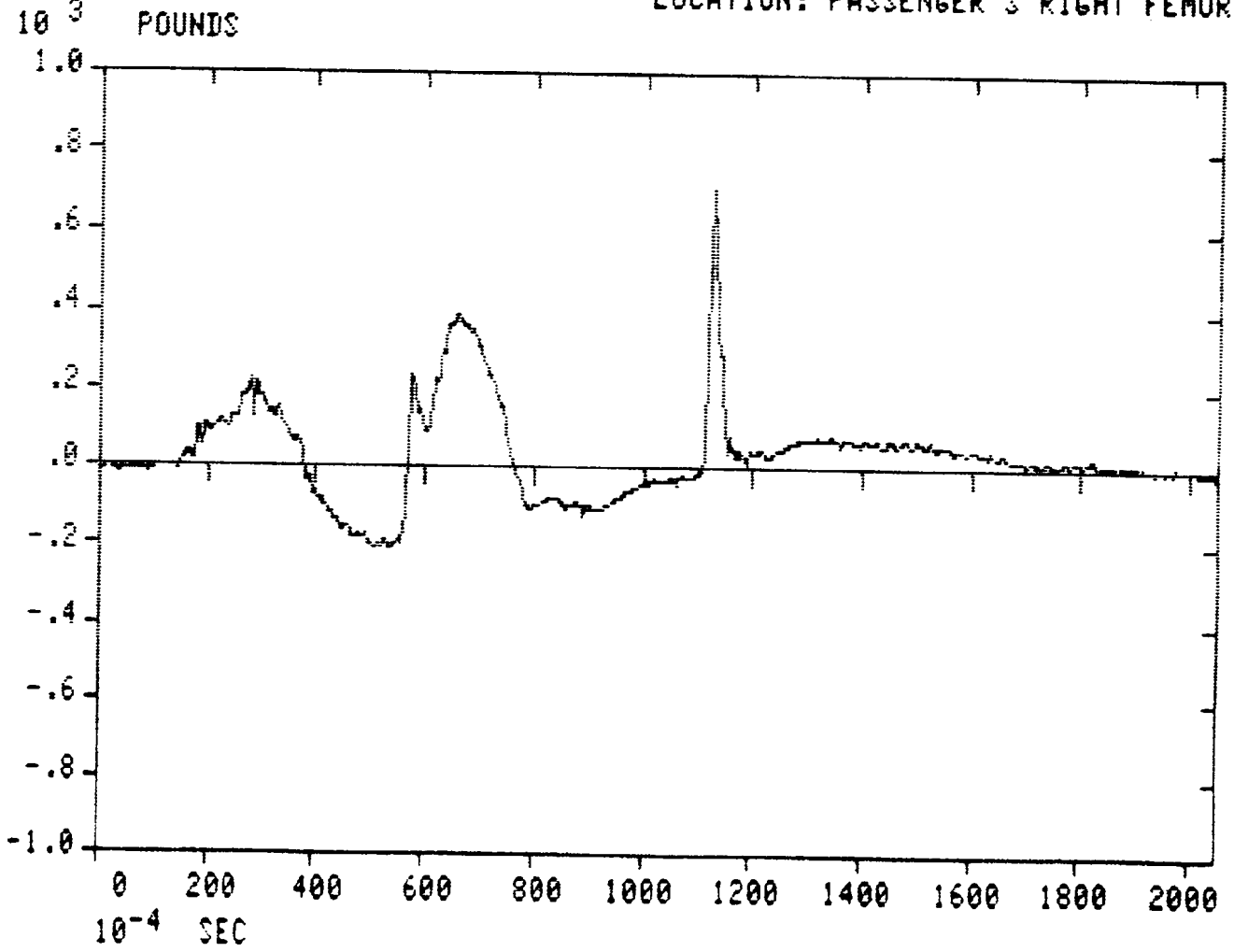


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 600
LOAD CELL: TAPE 2, CH 4
DIRECTION: TENSION
LOCATION: PASSENGER'S RIGHT FEMUR

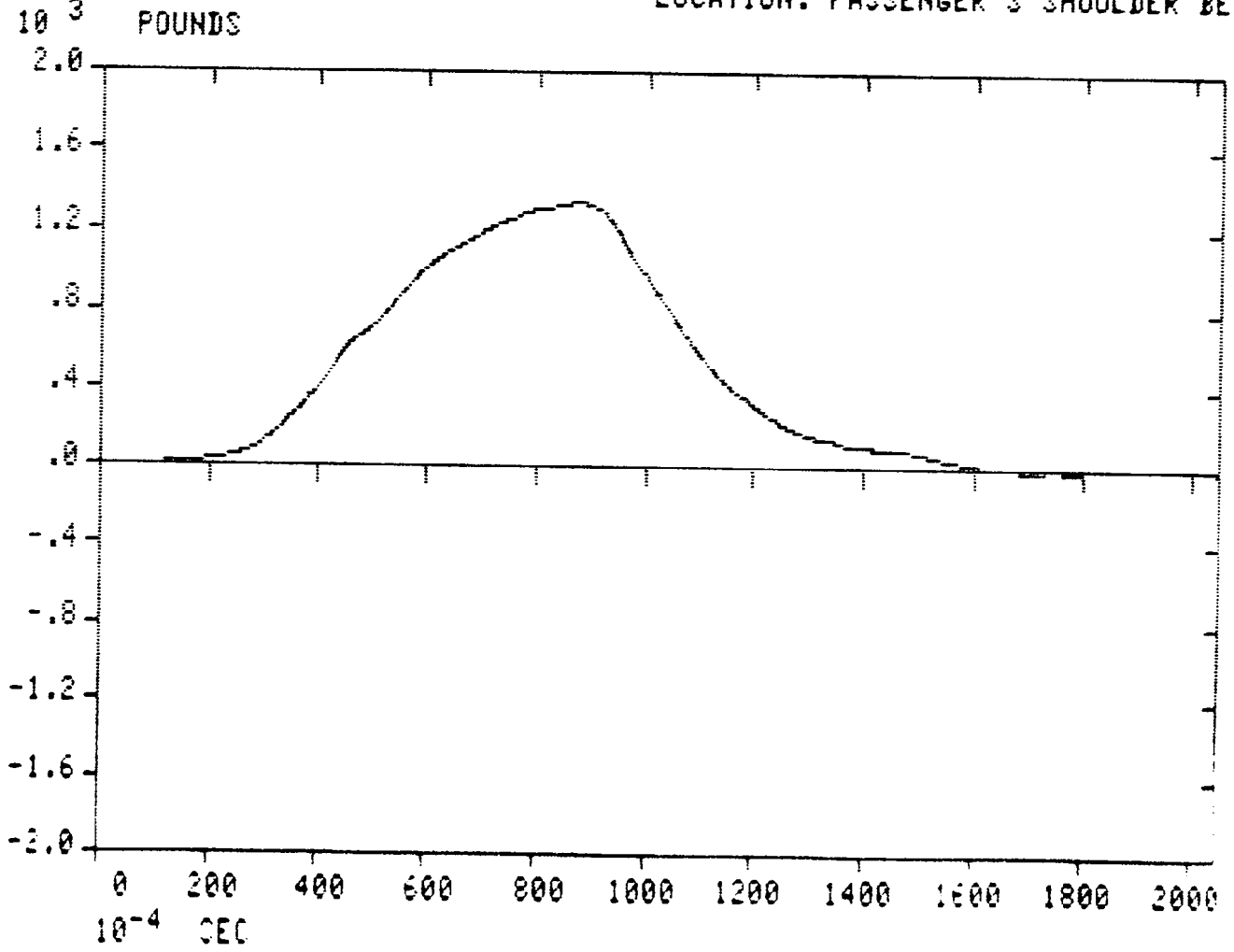


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. :141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 60
LOAD CELL: TAPE 2, CH 9
DIRECTION: TENSION
LOCATION: PASSENGER'S SHOULDER BELT

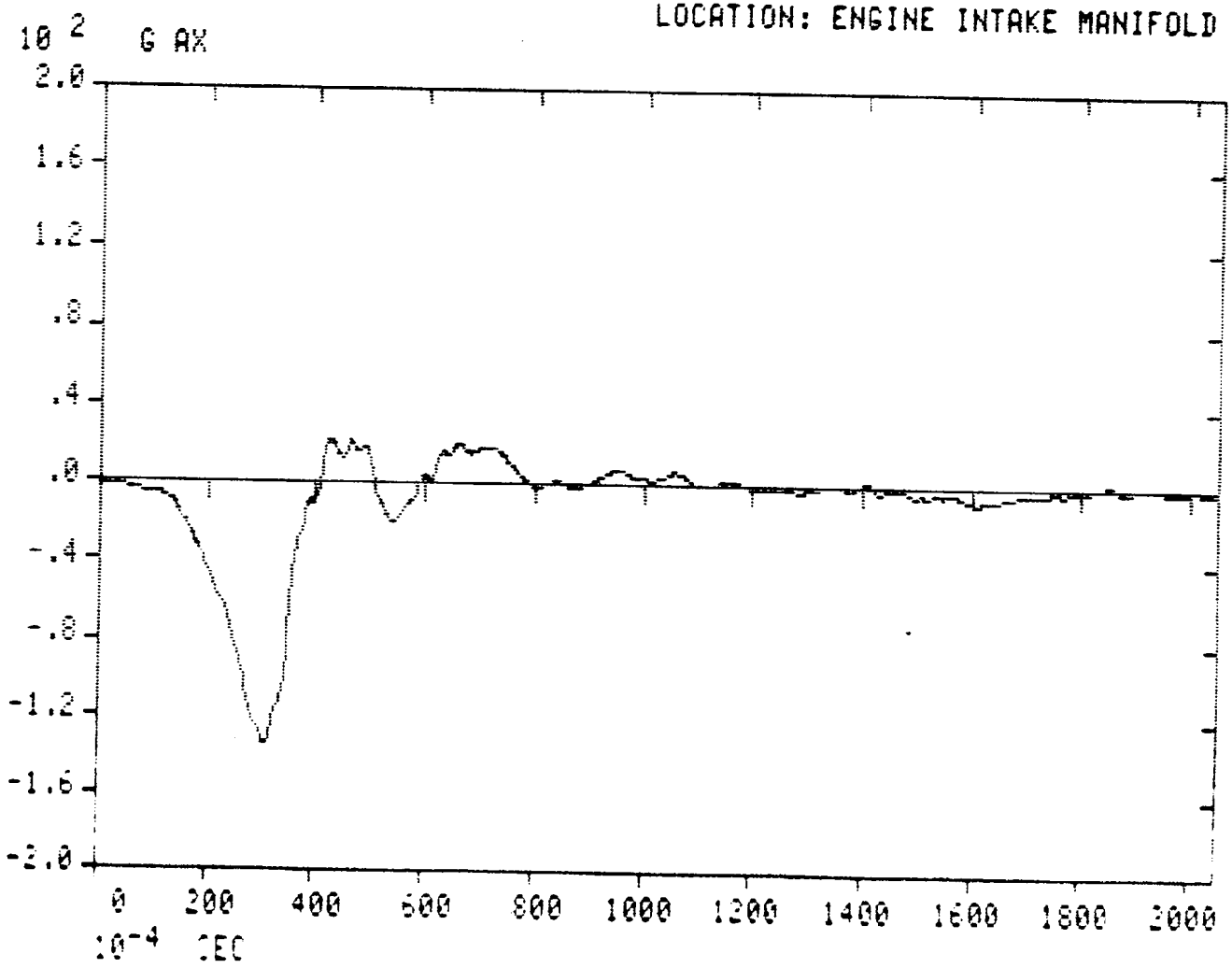


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 60
ACCELEROMETER: TAPE 3, CH 1
DIRECTION: FORWARD
LOCATION: ENGINE INTAKE MANIFOLD

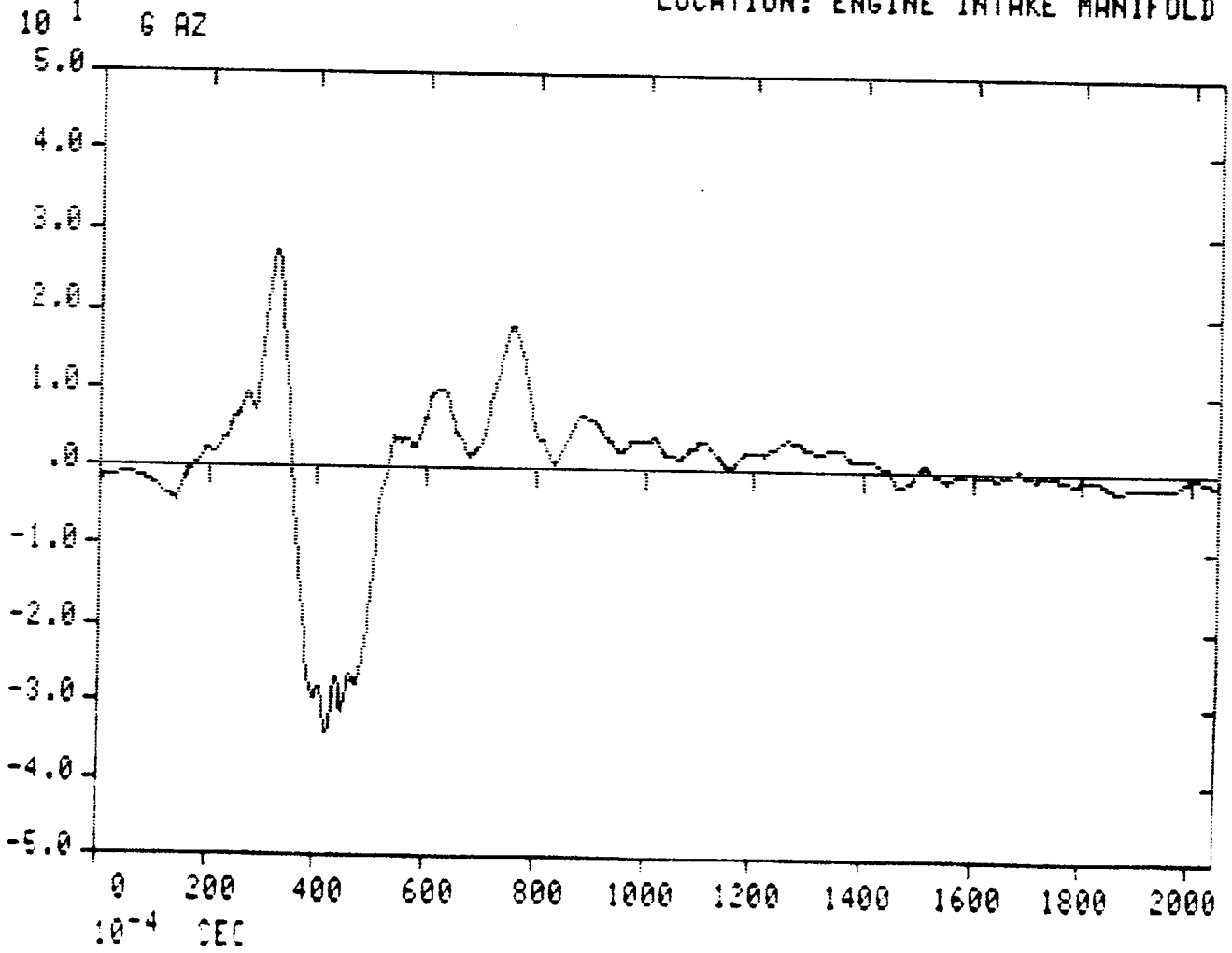


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 60
ACCELEROMETER: TAPE 3, CH 2
DIRECTION: UPWARD
LOCATION: ENGINE INTAKE MANIFOLD

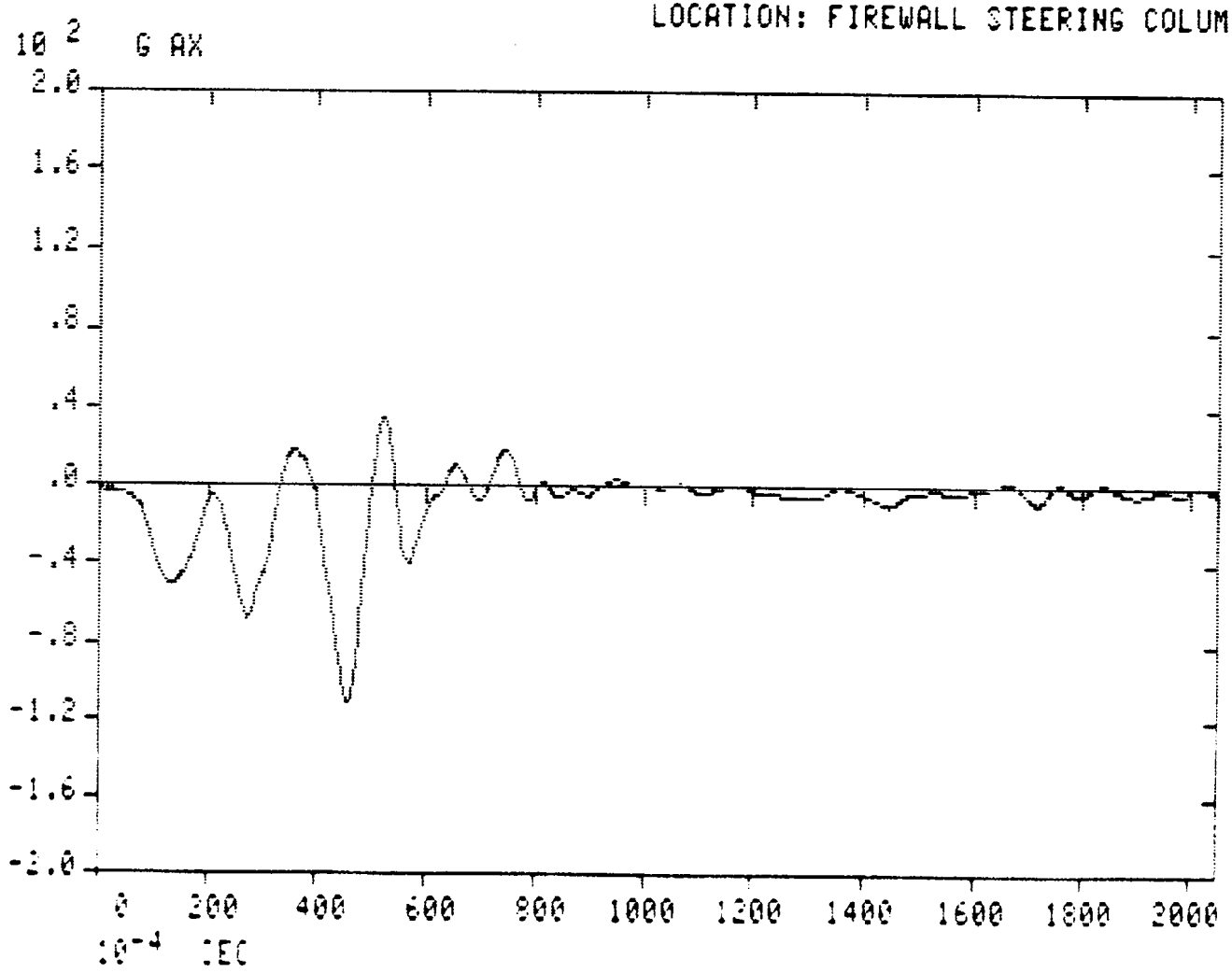


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 60
ACCELEROMETER: TAPE 2, CH 10
DIRECTION: FORWARD
LOCATION: FIREWALL STEERING COLUMN

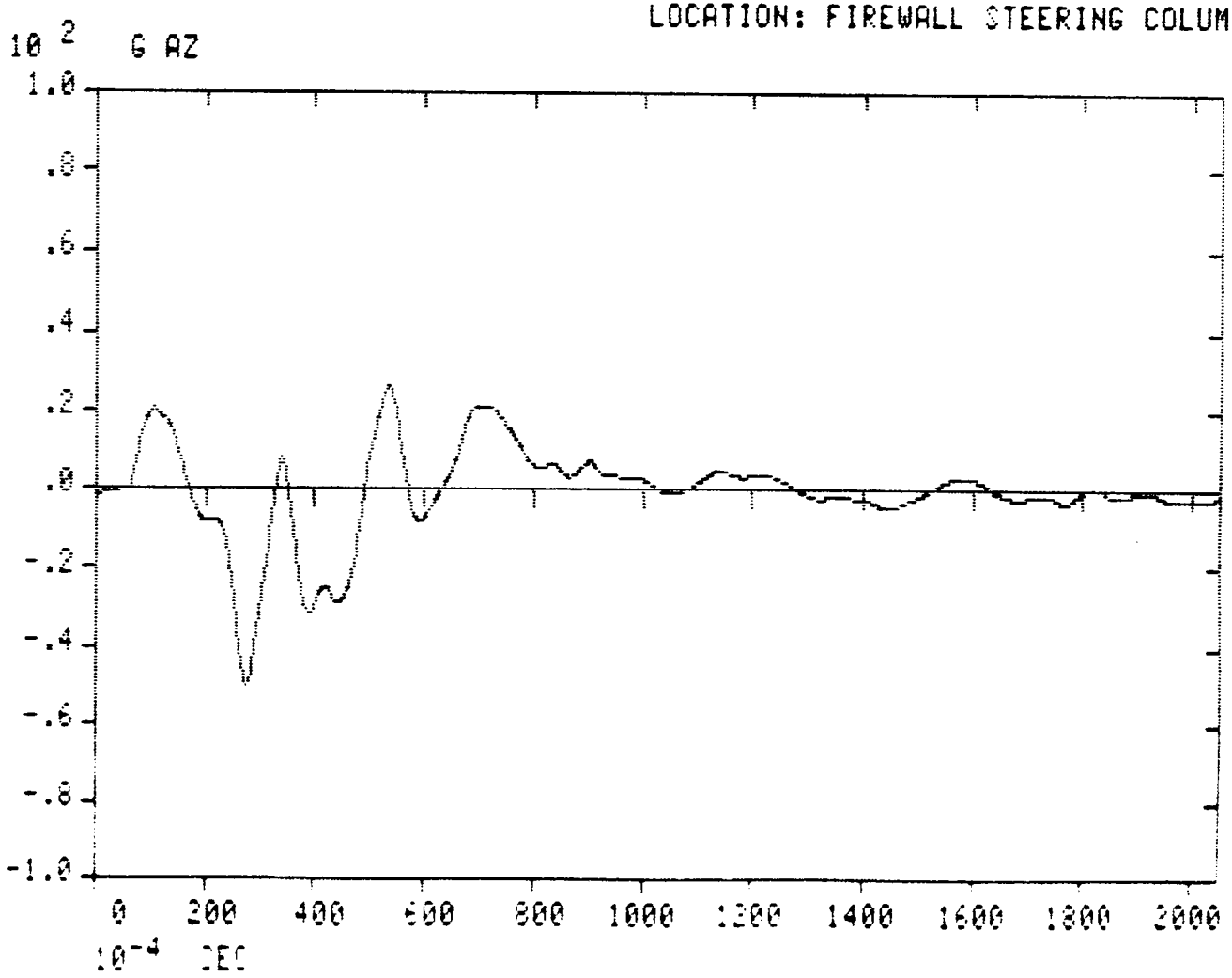


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. :141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 60
ACCELEROMETER: TAPE 2, CH 11
DIRECTION: UPWARD
LOCATION: FIREWALL STEERING COLUMN

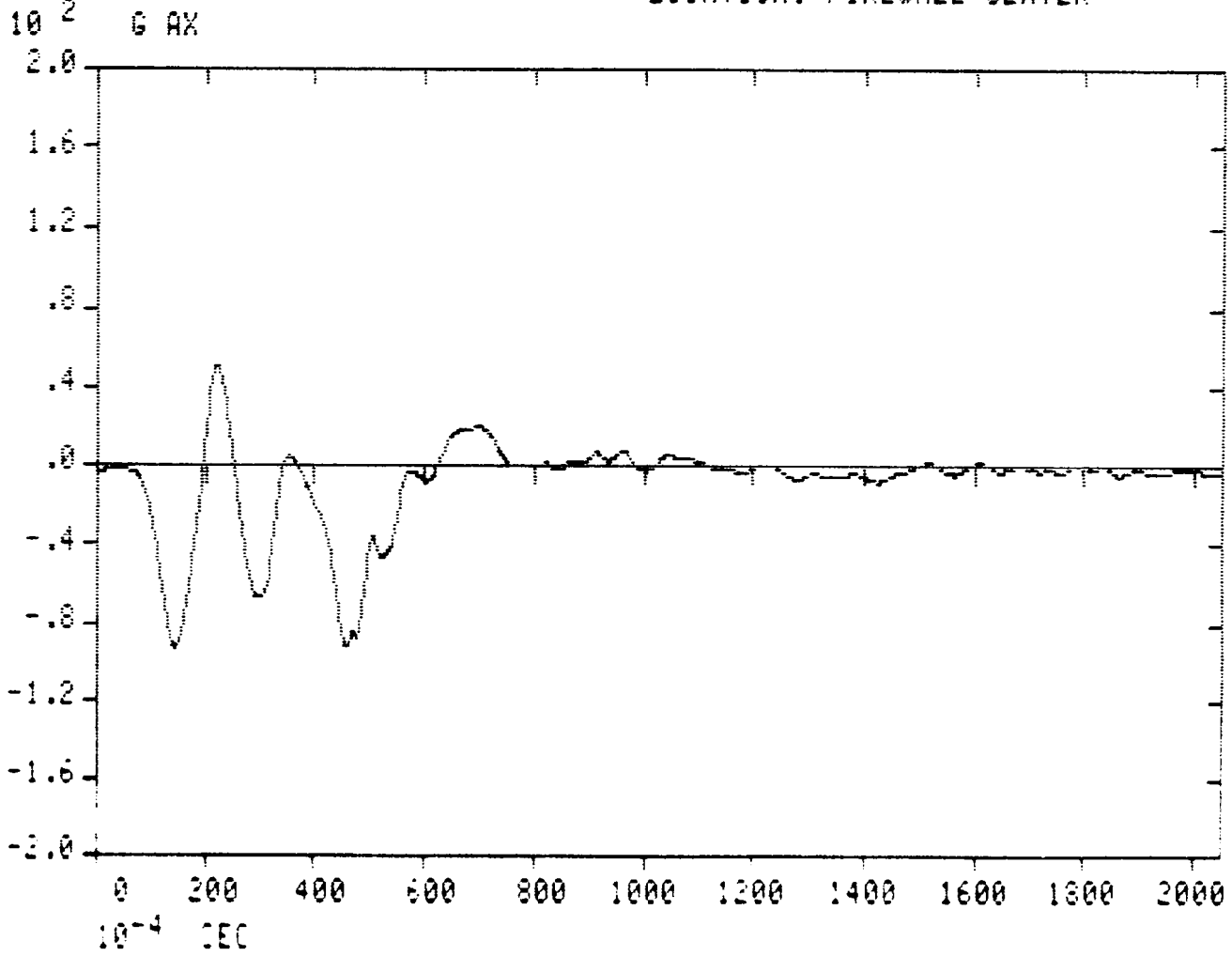


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. :141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 60
ACCELEROMETER: TAPE 2, CH 12
DIRECTION: FORWARD
LOCATION: FIREWALL CENTER

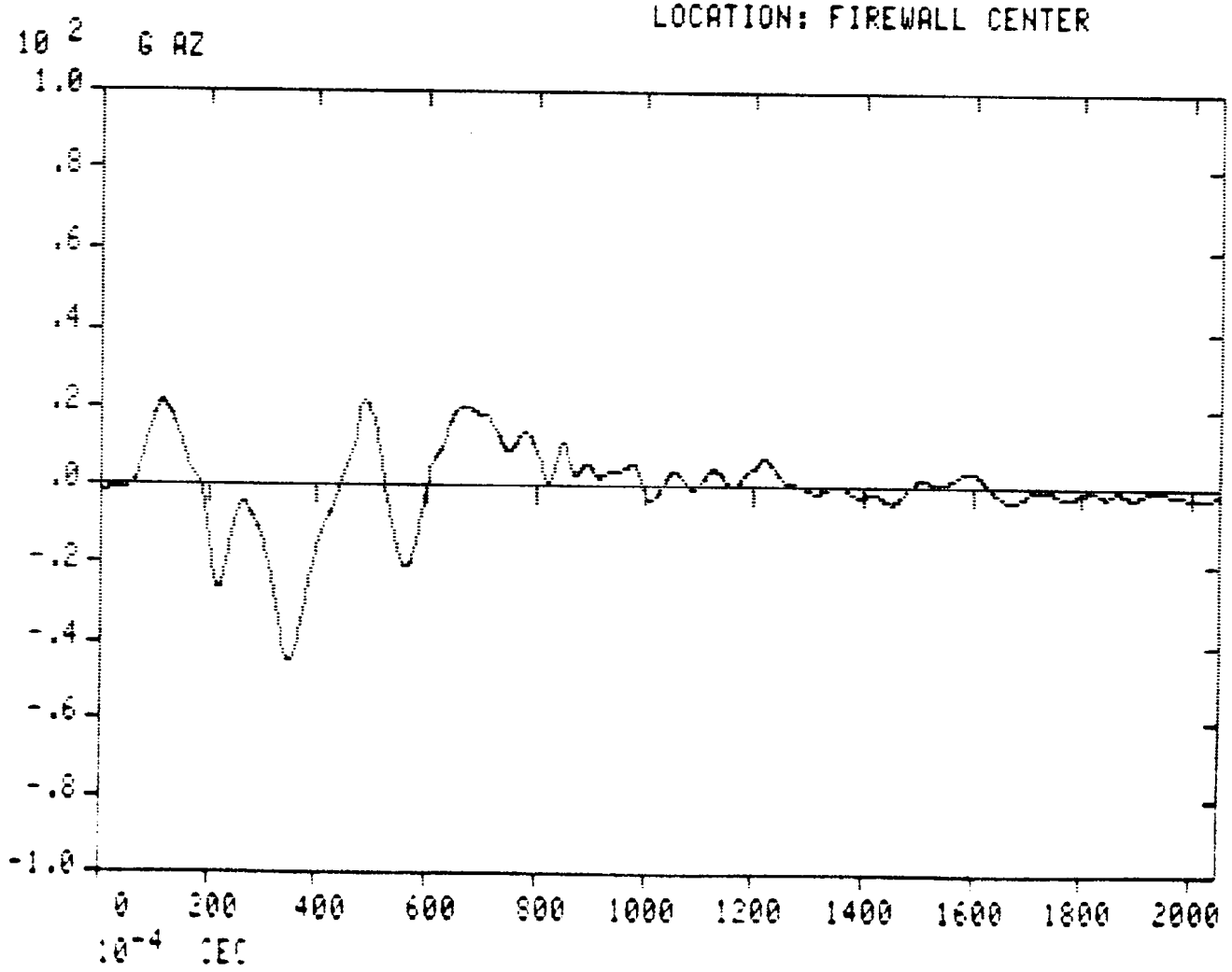


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 60
ACCELEROMETER: TAPE 2, CH 13
DIRECTION: UPWARD
LOCATION: FIREWALL CENTER

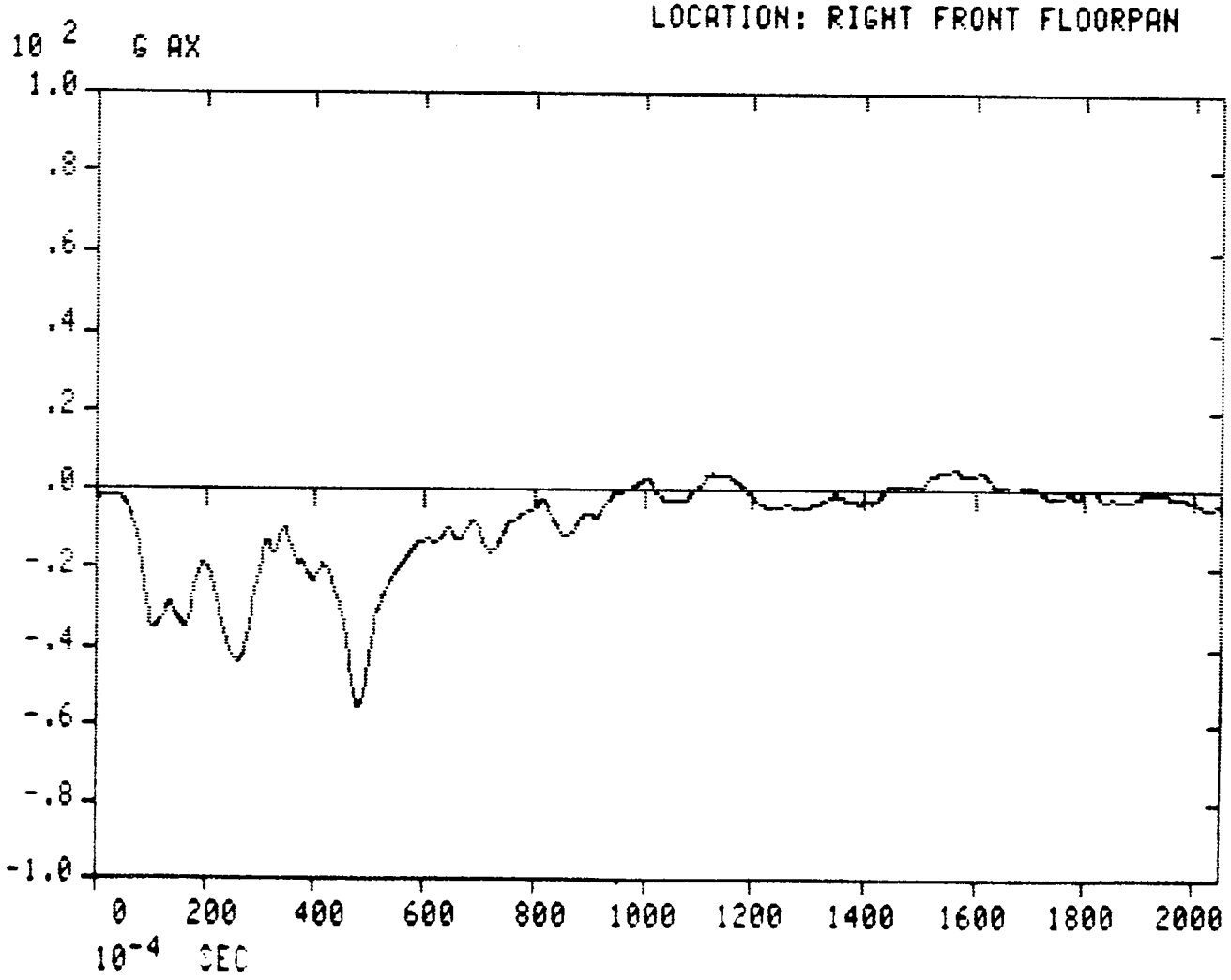


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 60
ACCELEROMETER: TAPE 1, CH 12
DIRECTION: FORWARD
LOCATION: RIGHT FRONT FLOORPAN

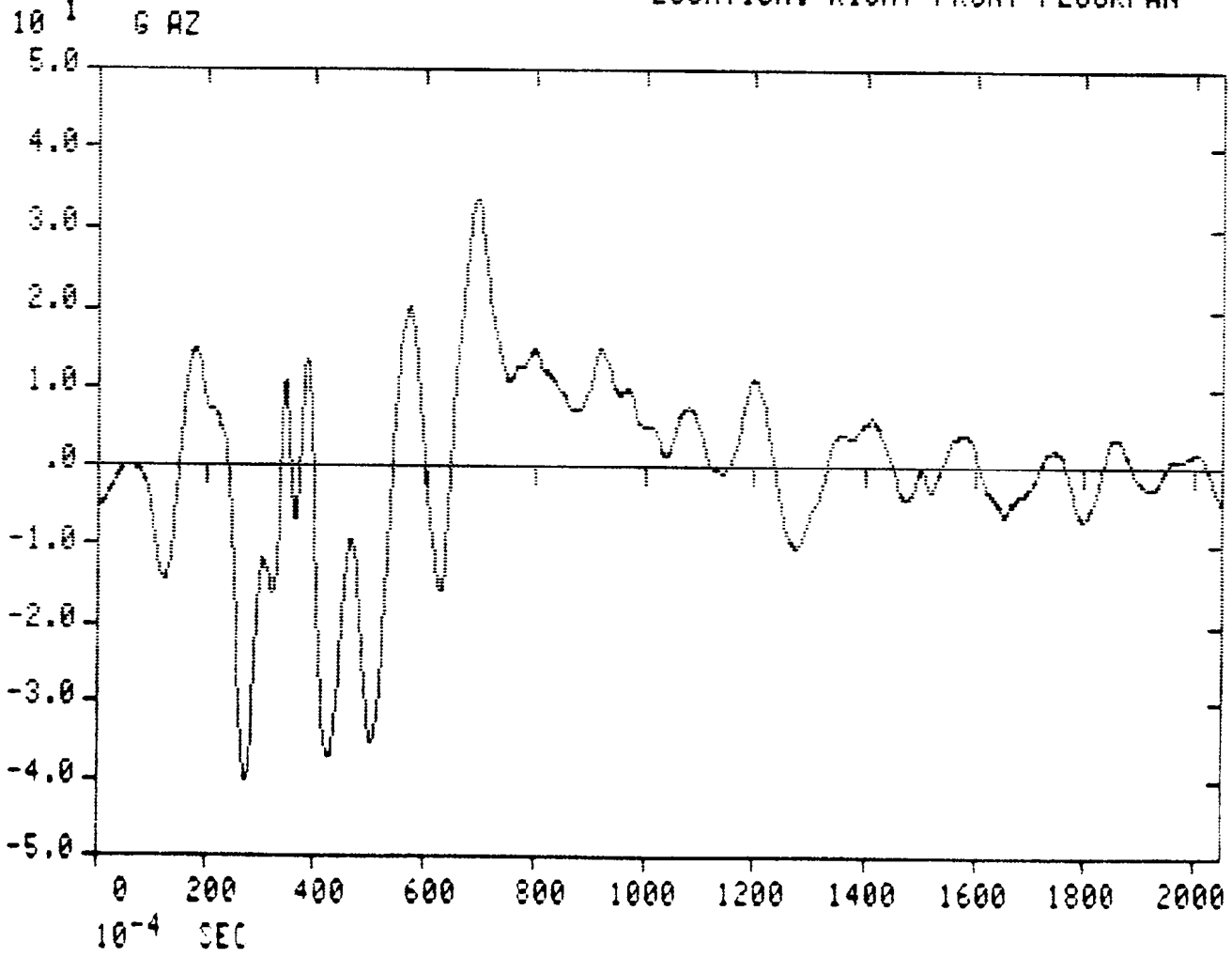


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. :141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 60
ACCELEROMETER: TAPE 1, CH 13
DIRECTION: UPWARD
LOCATION: RIGHT FRONT FLOORPAN

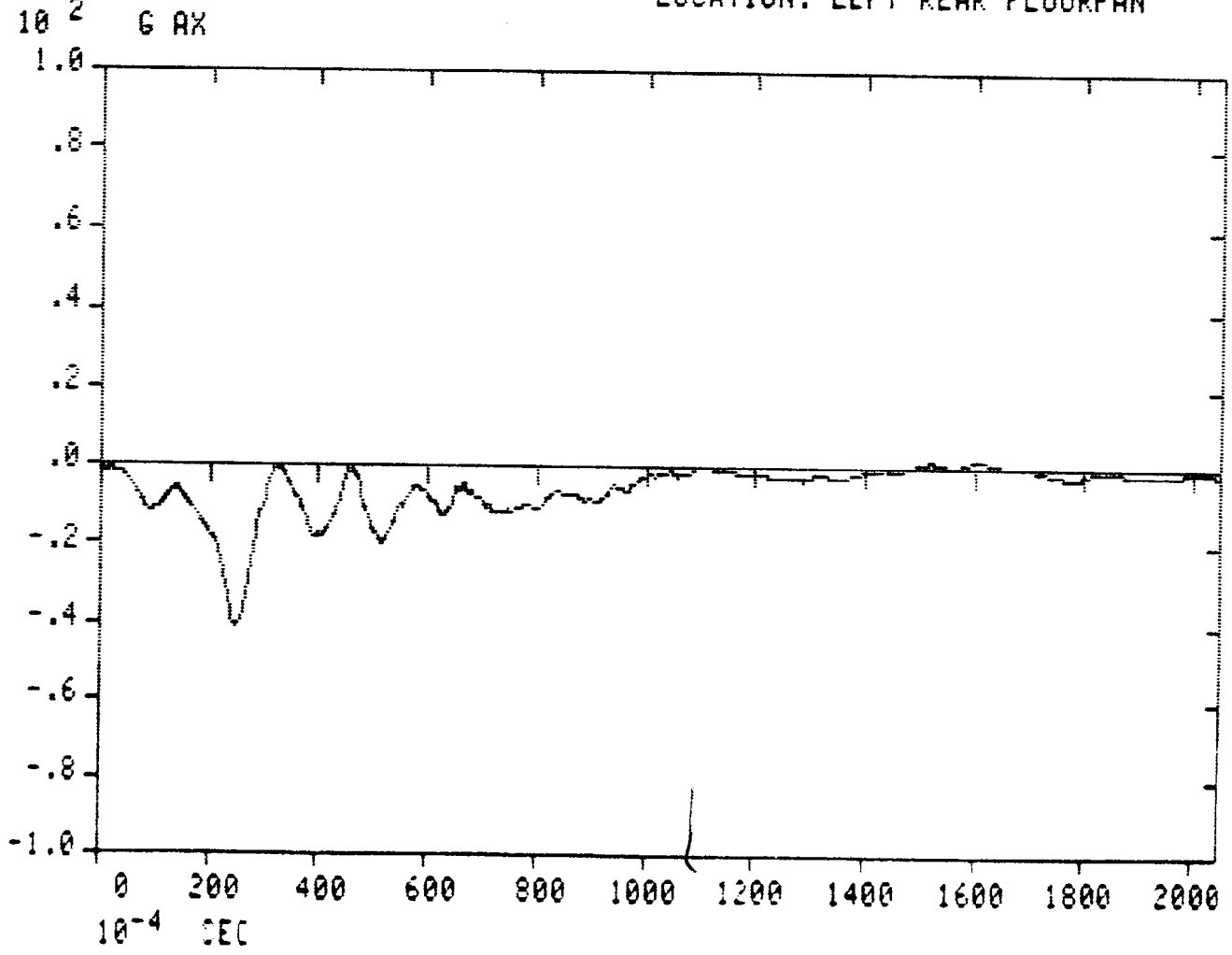


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. :141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 60
ACCELEROMETER: TAPE 1, CH 10
DIRECTION: FORWARD
LOCATION: LEFT REAR FLOORPAN

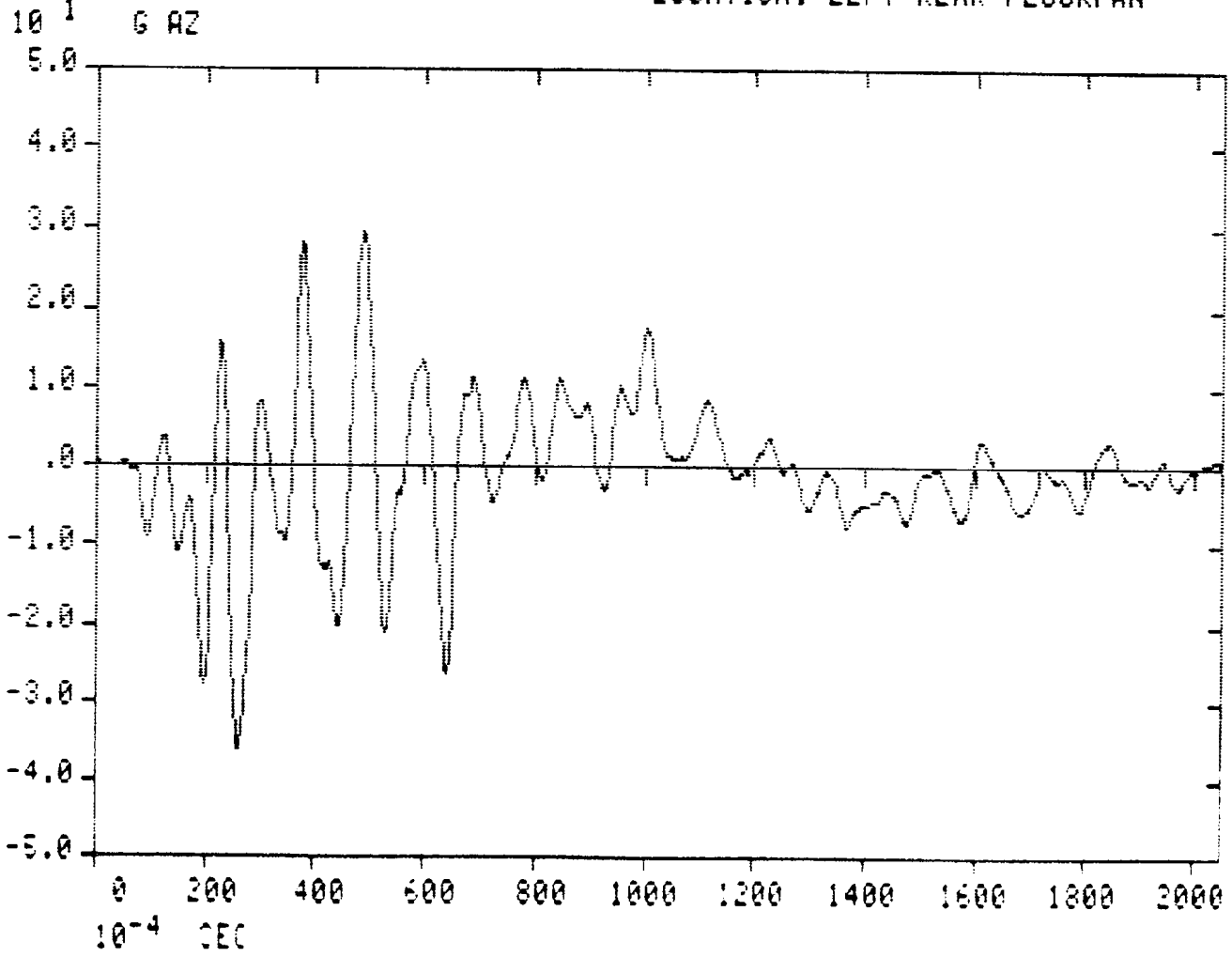


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. :141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-110
FILTER: CLASS 60
ACCELEROMETER: TAPE 1, CH 11
DIRECTION: UPWARD
LOCATION: LEFT REAR FLOORPAN

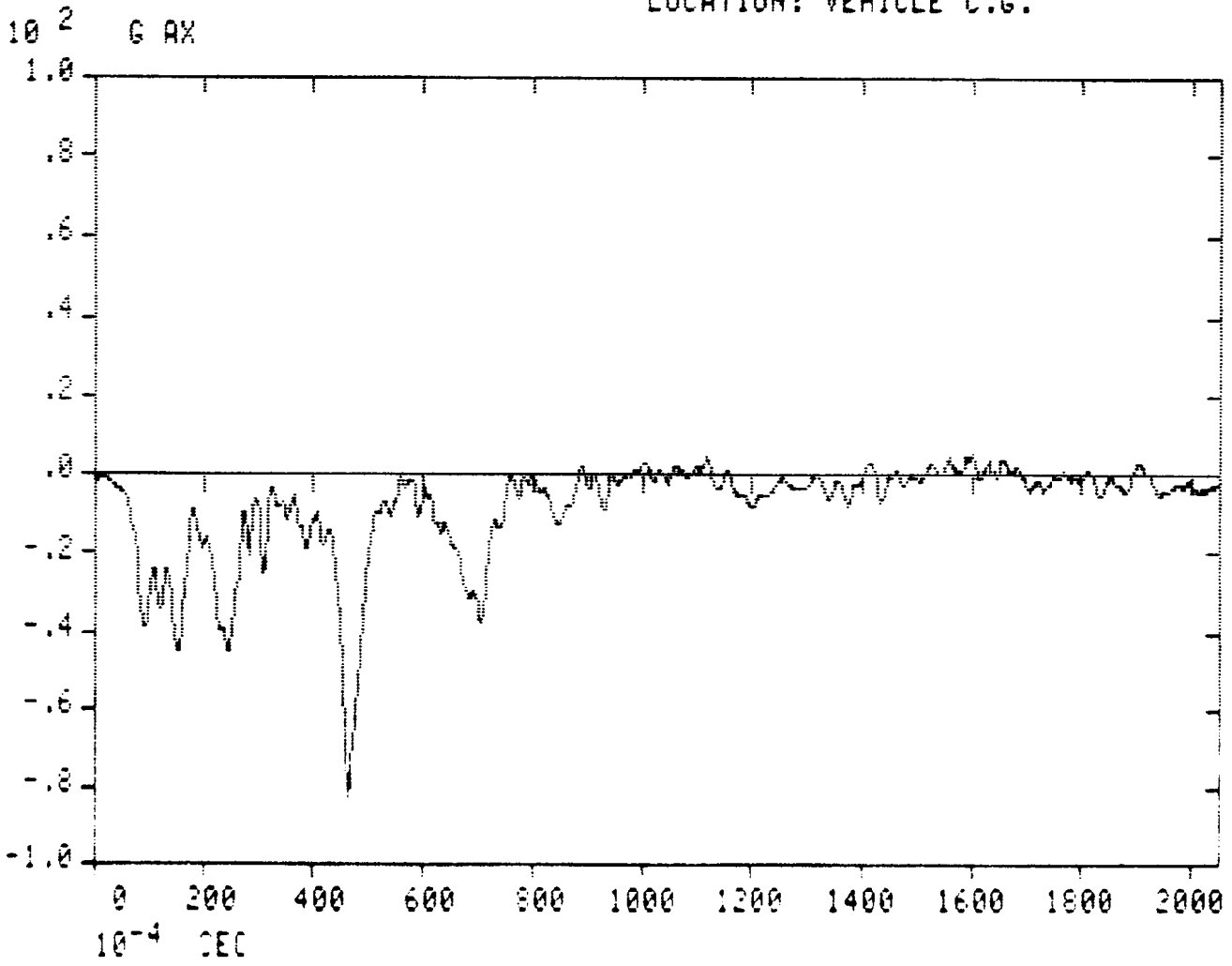


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 180
ACCELEROMETER: TAPE 3, CH 5
DIRECTION: FORWARD
LOCATION: VEHICLE C.G.

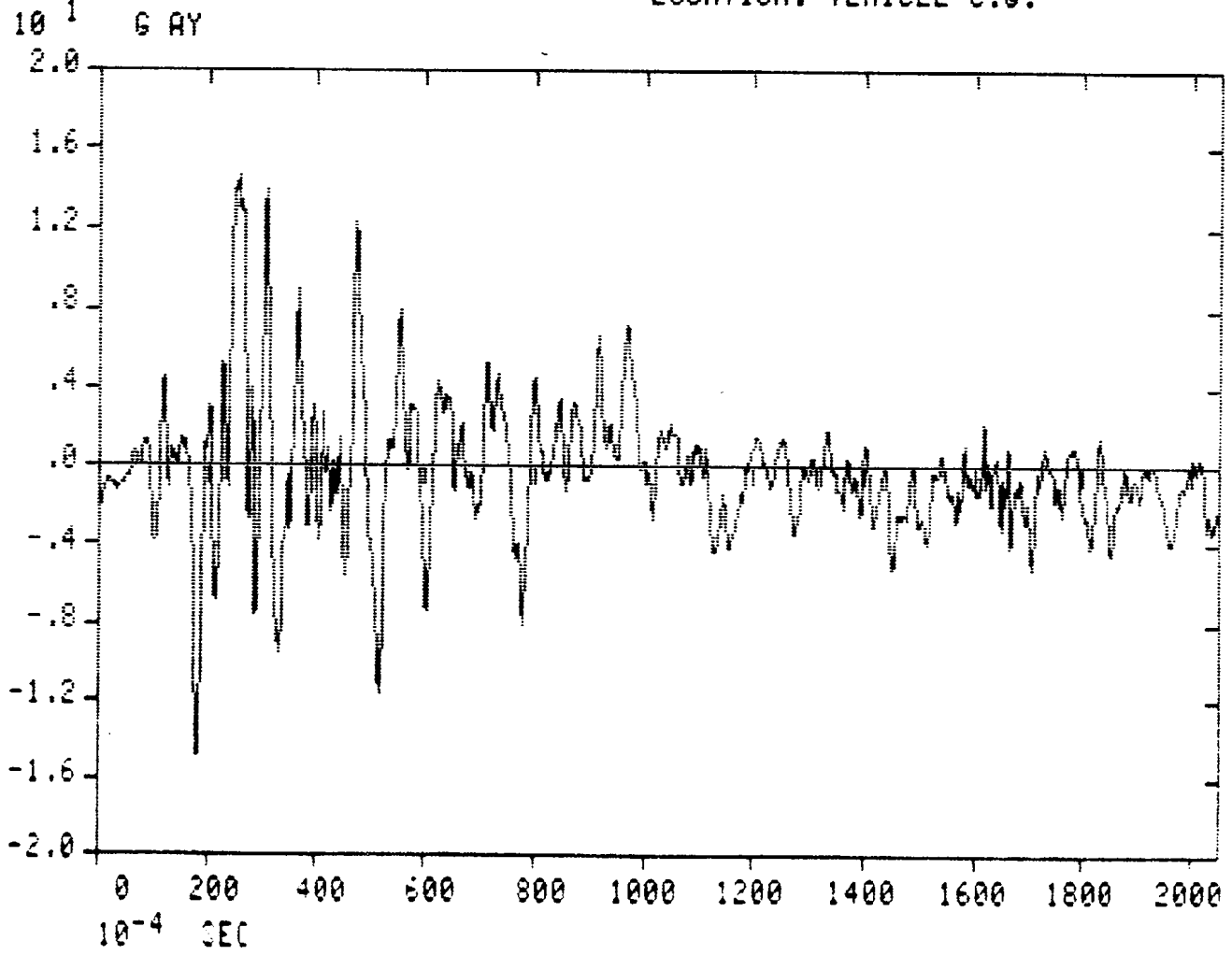


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

MJO NO. : 671-1489-110
FILTER: CLASS 180
ACCELEROMETER: TAPE 3, CH 6
DIRECTION: RIGHT
LOCATION: VEHICLE C.G.

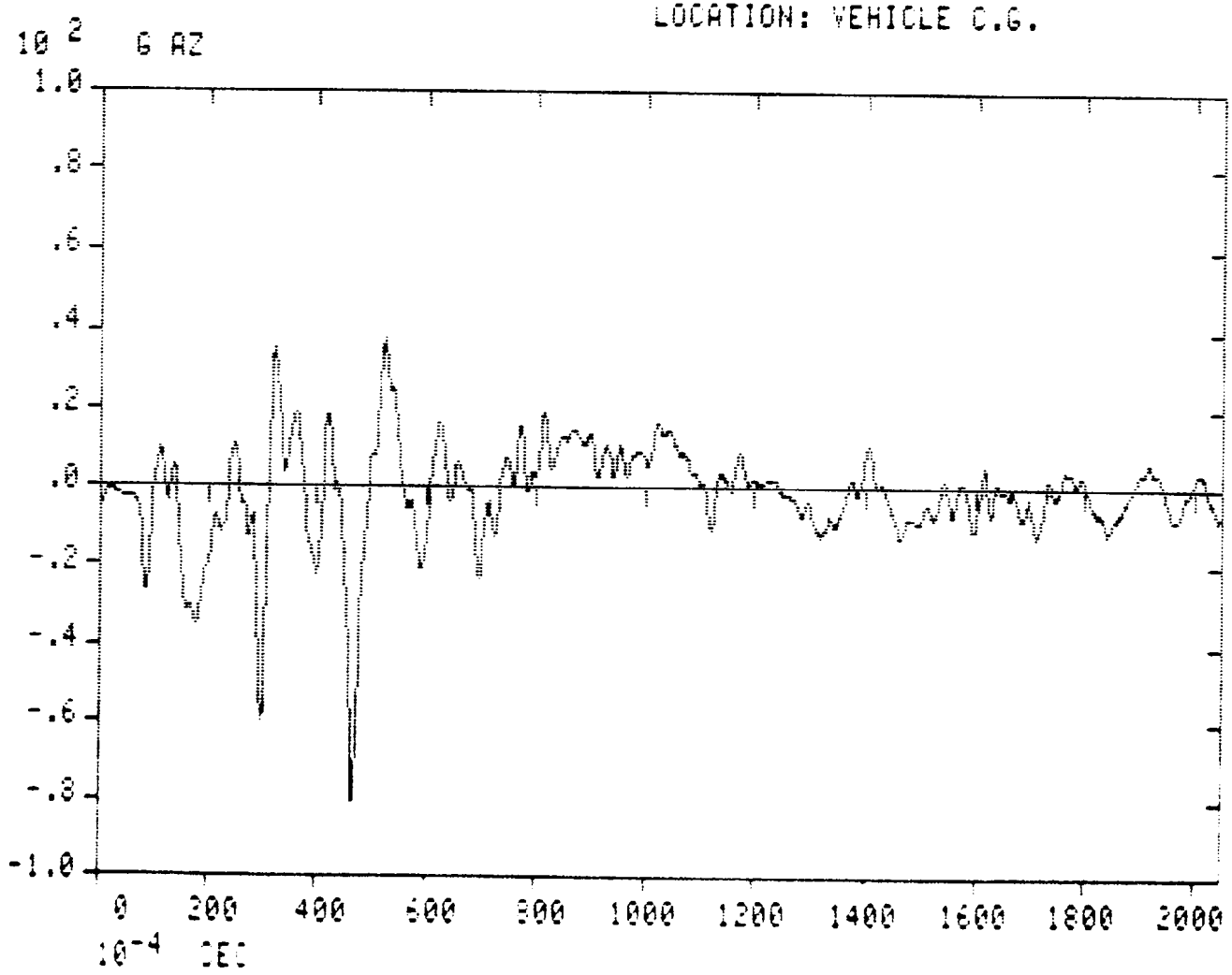


DOT CRASH PROGRAM

VEHICLE: MAZDA P/U
VEHICLE ID: NHTSA 790606
TEST FILE NO. : 141 FRONTAL 29.7 MPH
DATE: APRIL 3, 1980

APPROVED: ENGINEERING TEST LABS

MJO NO. : ET1-1499-110
FILTER: CLASS 180
ACCELEROMETER: TAPE 3, CH 7
DIRECTION: UPWARD
LOCATION: VEHICLE C.G.



APPROVED ENGINEERING TEST LABORATORIES

SERVICE FOR: U. S. Department of Transportation
National Highway Traffic Safety Administration
Office of Research and Development
400 Seventh Street S. W.
Washington, D. C. 20590

CONTRACT NUMBER: DOT-HS-6-01477

I hereby certify that the preceding report is true and correct to the best of my knowledge.

APPROVED ENGINEERING TEST LABORATORIES

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rmh