DOT ϕ 328

AETL

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 LEFT OBLIQUE IMPACT TEST

FORD MOTOR COMPANY
1978 FORD MUSTANG II - 2 DOOR HARDTOP
NHTSA 780206

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

JUNE 1979

CONTRACT NUMBER DOT-HS-6-01477

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF RESEARCH AND DEVELOPMENT
2100 SECOND STREET S. W.
WASHINGTON, D. C. 20590

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	14. Sponsoring Agency Code

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Approved: S. J. Valenzuela Mechanical Department Supervisor
Approved Engineering Test Labs.

16. Abstract

A 1978 Ford Mustang II - 2 Door Hardtop, NHTSA 780206, VIN-8R02Y119900, was impact tested for compliance with FMVSS 301-75 (Fuel System Integrity) and documented in Report No. 301-AETL-78-077.

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 vehicle impact speed was 29.565 mph in a left oblique (30°) 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 1978 Ford Mustang II - 2 Door Hardtop, NHTSA 780206 during a 30 mph left oblique fixed barrier impact test. This effort was conducted in conjunction with Federal Motor Vehicle Safety Standard (FMVSS) 301-75 - "Fuel System Integrity" compliance test. This compliance test was previously documented in NHTSA/OVSC Report No. 301-AETL-78-077. Only the occupant response and vehicle acceleration aspects of the test are covered in this 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 (TP219-01) issued by the Office of Vehicle Safety Compliance (OVSC). Specific procedures used to obtain the additional data are detailed in Section 4.

SECTION 2

SECTION 2

2.0 TEST SUMMARY

The 1978 Ford Mustang II - 2 Door Hardtop was subjected to a left oblique fixed barrier impact as required by Federal Motor Vehicle Safety Standard 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 is submitted separately.

TABLE I

SUMMARY OF TEST CONDITIONS

TEST VEHICLE IDENTIFICATION:

Manufacturer: Ford Motor Company

Make/Model: Ford Mustang II

Body Style: 2 Door Hardtop Model Year: 1978

VIN: 8R02Y119900 Build Date: November 1977

NHTSA No.: 780206 Color: Yellow

Engine Data: Four (4) Cylinders; 140 Cu. In. Displ.

Transmission Data: Four (4) Speed (XX) Manual ( ) Automatic

Major Options: Power Brakes, Power Steering, AM-FM Stereo Radio

VEHICLE ATTITUDE:

Delivered Attitude: LF 25.0 in.; RF 25.6 in.; LR 25.1 in.; RR 25.1

Test Attitude: LF 24.5 in.; RF 25.0 in.; LR 23.8 in.; RR 23.8

VEHICLE TIRE DATA:

Recommended Cold Tire Pressure: Front = 24 psi

(Up to Vehicle Load Capacity) Rear = 24 psi

Recommended Tire Size: 195/70R13 Load Range: B

Tires on Vehicle: 195/70R13-w/s/w - Goodyear

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

TABLE Ia

SUMMARY OF TEST CONDITIONS (Cont'd)

TEST CONDITIONS:

Date of Test: 25 May 1979 Time of Test: 1550

Ambient Temperature: 89 °F at Impact Area

VEHICLE CAPACITY:

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

Designated Seating Capacity: Front 2
Center 0
Rear 2
Total 4

Cargo: 100 lbs.

Total: 700 lbs. (Vehicle Capacity Weight)

GVWR: 3,861 lbs. (Taken From Certification Label)

GAWR: Front 1,942 lbs.; Rear 1,935 lbs.

VEHICLE DELIVERED WEIGHT: (Fluids to Capacity)

Left Front 794 lbs. Left Rear 615 lbs.
Right Front 769 lbs. Right Rear 630 lbs.
Total Front Weight 1,563 lbs. (55.7 % of Total Vehicle Weight)
Total Rear Weight 1,245 lbs. (44.3 % of Total Vehicle Weight)
Total Delivered Weight 2,808 lbs.

CALCULATED VEHICLE TEST WEIGHT: 3,236 lbs.
(With Required Dummies and 100 lbs. Cargo)

ACTUAL VEHICLE TEST WEIGHT:

Left Front 863 lbs. Left Rear 751 lbs.
Right Front 849 lbs. Right Rear 764 lbs.
Total Front Weight 1,712 lbs. (53.1 % of Total Vehicle Weight)
Total Rear Weight 1,515 lbs. (46.9 % of Total Vehicle Weight)
Total Test Weight 3,227 lbs.

SUMMARY OF TEST CONDITIONS (Cont'd)

PRE-TEST DUMMY POSITIONS:

MEASUREMENT	DRIVER S/N S06	PASSENGER S/N S04
Dummy Centerline to Vehicle Center line	13.3 in.	13.1 in.
Nose to Upper Rim of Steering Wheel	16.3 in.	
Nose to Windshield (Horizontal Distance)		21.6 in.
Left Knee to Closest Point on Lower Panel	5.5 in.	6.3 in.
Right Knee to Closest Point on Lower Panel	5.4 in.	7.0 in.
Ankle Distance	10.0 in.	7.0 in.
Knee Distance	8.0 in.	7.0 in.

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.

2.2 INSTRUMENTATION MALFUNCTION

The vehicle longitudinal accelerometer (Tape 1, channel 11) lost data response during first 45 milliseconds due to malfunction in magnetic tape recorder channel.

PART 572 DUMMY DATA

Vehicle 1978 Ford Mustang II NHTSA No. 780206

Driver S/N S06 Passenger S/N S04	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	2.0	189.4	103.7	102.6	1.2	60.0	42.6	127.0
Lateral	8.7	117.8	10.2	155.6	0.8	48.6	21.0	130.8
Vertical	3.0	102.6	50.7	112.8	1.2	27.0	38.4	119.2
Resultant	103.6	102.6			57.4	122.2		
HIC	638.9 (99-134 msec)				424.9 (84-179 msec)			
Chest Acceleration								
Longitudinal	0.5	13.4	39.4	104.8	0.9	194.8	34.8	121.2
Lateral	2.1	109.8	17.5	103.0	2.9	118.4	14.7	120.2
Vertical	4.8	91.2	6.4	102.2	7.4	160.4	11.7	97.2
Resultant	42.5	104.0			37.0	121.2		
Severity Index	202				216			
Femur Loads	(lb)	Time (msec)	(lb)	Time (msec)	(lb)	Time (msec)	(lb)	Time (msec)
Left	144	55.8	442	76.6	203	79.2	158	50.2
Right	37	42.6	722	73.0	233	88.6	114	50.2
Belt Load								
Torso	985	106.0			1228	121.6		

Average Vehicle Impact Speed 29.565 **mph**

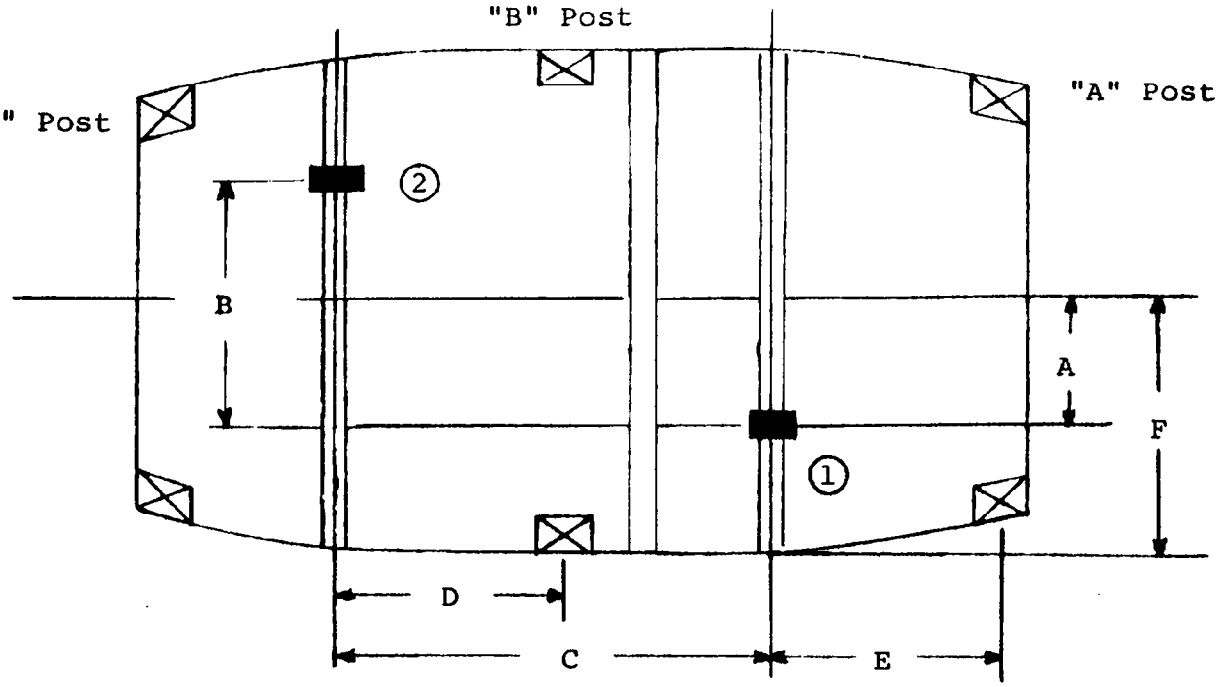
*Positive Direction - Longitudinal: Forward
Lateral: Leftward
Vertical: Upward
Femur: Tension

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

VEHICLE STRUCTURAL DATA

Vehicle: 1978 Ford Mustang II NHTSA No. 780206

Average Vehicle Impact Speed 29.565 mph; Test Weight 3,227 lbs



DIMENSIONS			
LOCATION	MEASUREMENT (in.)	LOCATION	MEASUREMENT (in.)
A	16.8	D	11.0
B	18.1	E	8.3
C	30.0	F	70.4

Steering Column Movement Rearward 1.5", Leftward 1.5", Downward 0.2"
Vehicle Rebound Distance 10.0 in.
Overall Vehicle Crush 12.7 in

Acceleration Peaks

LOCATION	Positive* Direction		Negative* Direction	
	Peak G	Time (msec)	Peak G	Time (msec)
No. 1 Longitudinal	1.9	4.6	28.1	82.2
No. 2 Longitudinal	1.4	192.0	17.5	86.4
No. 2 Lateral	N/A	N/A	N/A	N/A
No. 2 Vertical	35.6	31.8	26.5	37.8

Positive Direction - Longitudnal: Forward
Lateral: Leftward
Vertical: Upward

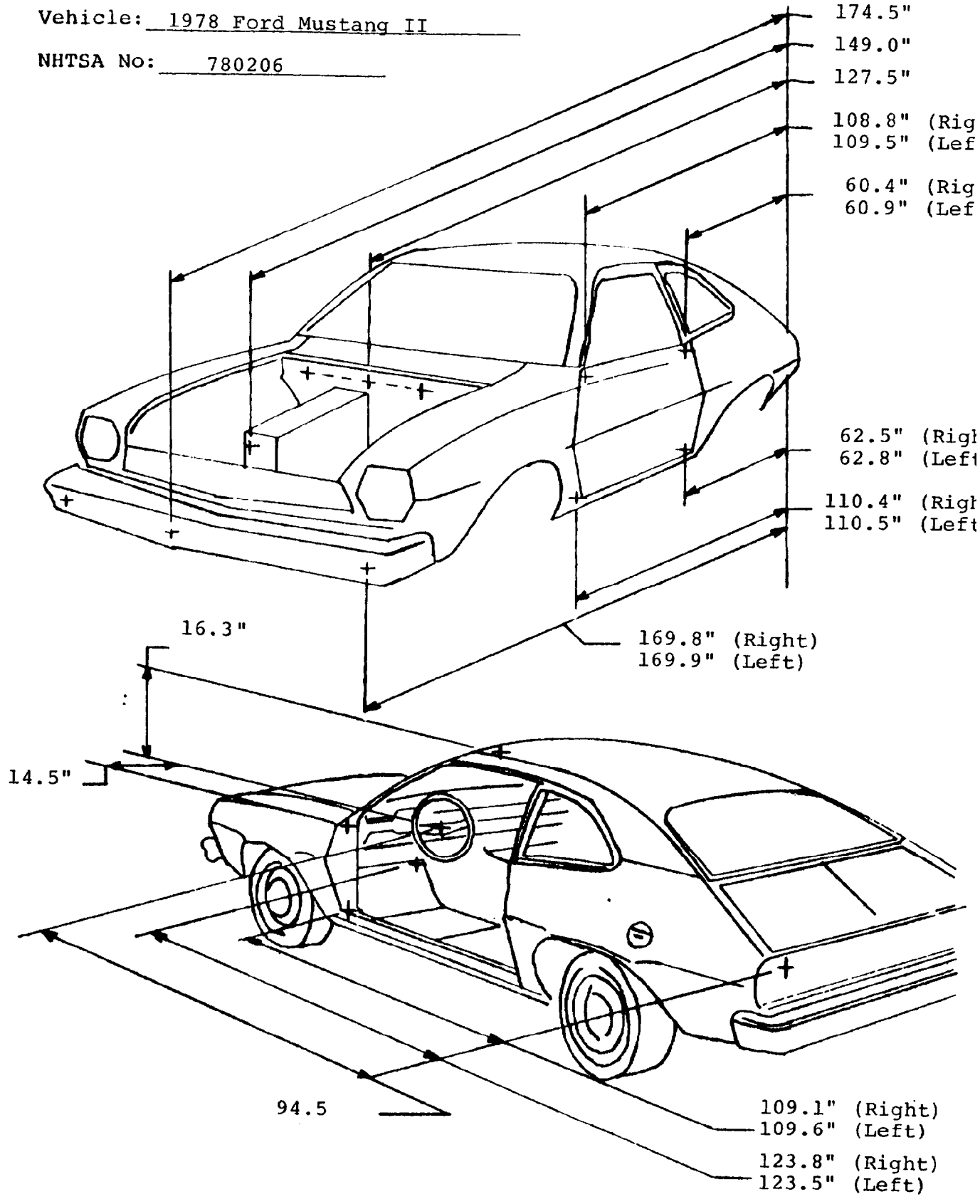
Negative Direction - Longitudnal: Rearward
Lateral: Rightward
Vertical: Downward

PRE-TEST

VEHICLE STRUCTURAL DATA

Vehicle: 1978 Ford Mustang II

NHTSA No: 780206

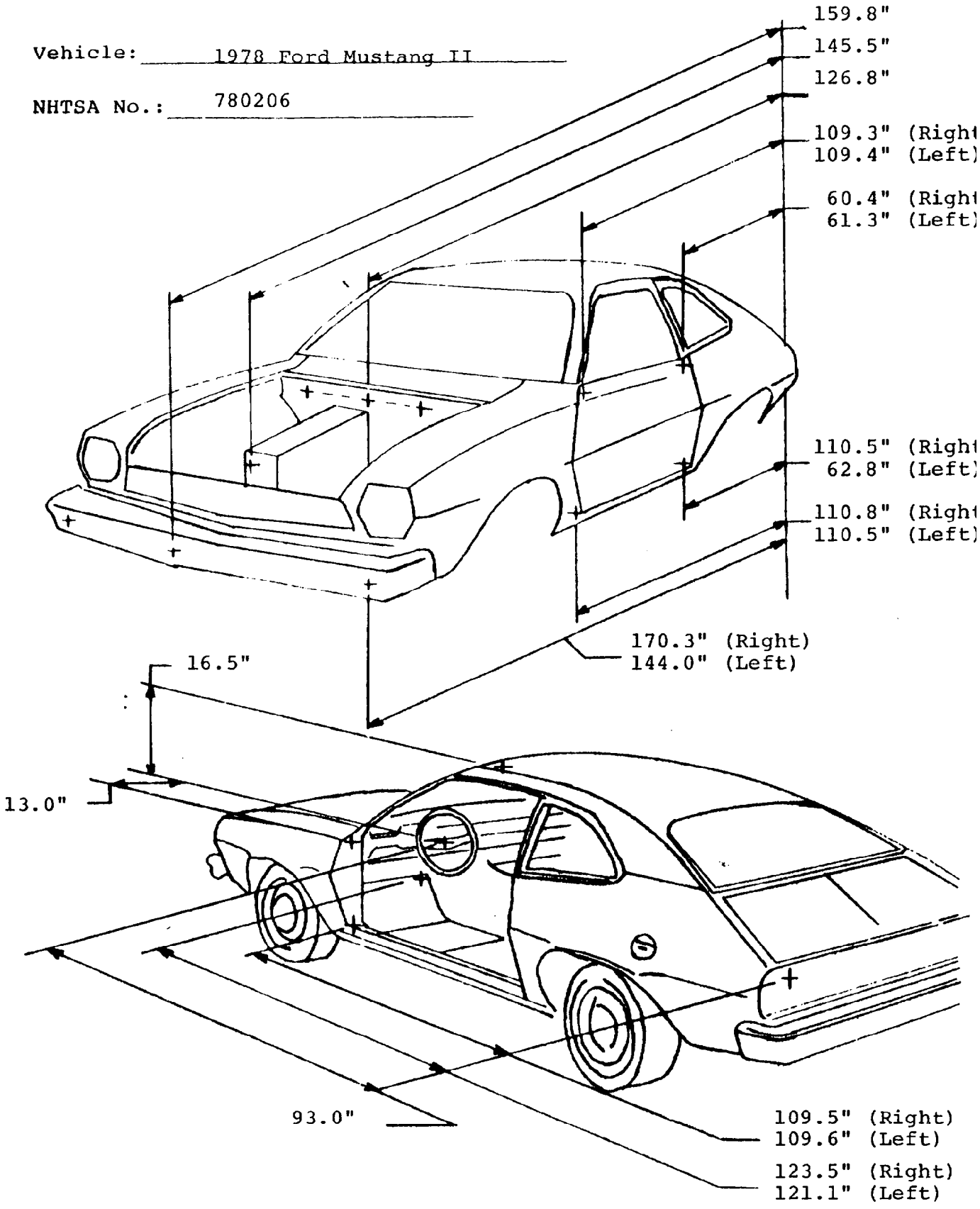


POST-TEST

VEHICLE STRUCTURAL DATA

Vehicle: 1978 Ford Mustang II

NHTSA No.: 780206



SECTION 3

SECTION 3

3.0 TEST RESULTS AND PHOTOGRAPHS

The test vehicle performance was determined by a left oblique fixed barrier impact at an average speed of 29.565 mph. The vehicle rebound distance from the barrier face was 10.0 inches and the average vehicle static crush was 12.7 inches.

Post-impact inspection of the vehicle revealed almost all crush occurred forward of the left door. The hood buckled up in the middle and the left front fender pushed back into the door. The left frame rail buckled in the vicinity of the "A" post and the windshield was unbroken. The driver dummy impacted the steering wheel assembly and the lower dash assembly.

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

Figure 3-1

1978 Ford Mustang II - 2 Door Hardtop

NHTSA 780206

Pre-Test, Driver Dummy View


907.0RL

Figure 3-2

1978 Ford Mustang II - 2 Door Hardtop

NHTSA 780206

Pre-Test, Passenger Dummy View

Figure 3-3

1978 Ford Mustang II - 2 Door Hardtop

NHTSA 780206

Post-Impact, Driver Dummy View

Figure 3-4

1978 Ford Mustang II - 2 Door Hardtop

NHTSA 780206

Post-Impact, Passenger Dummy View

SECTION 4

SECTION 4

4.0 TEST PROCEDURES

4.1 FIXED BARRIER IMPACT TEST

The procedures for conducting the fixed barrier impact test are presented in detail in the FMVSS 219 "Windshield Zone Intrusion" and FMVSS 301-75 "Fuel System Integrity" reports 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. The thumbs and index fingers of the driver dummy were positioned around the steering wheel rim at the 3 and 9 o'clock positions. The upper portion 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 was installed and a calibration and null reference check was performed to checkout all data analog devices including the FM magnetic tape recorders. The moment of impact trigger switch attached to the vehicle was also checked out. Immediately following vehicle impact a post-impact calibration and null reference check was performed.

The analog data was 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 used four program controlled analog filters which provided predigitizing filter capability of 60 db/octave above 1250 Hz.

The DFA is a hard disc based system with standard HP design software for performing data acquisition and analysis functions. The HP software was programmed using direct keyboard program functions to automate the data reduction process. The data was entered into temproary 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 were divided into driver and passenger tape recorder groups to facilitate simultaneous data acquisition for the head, chest

SECTION 4

4.3 DATA ACQUISITION AND REDUCTION (COND'T)

and vehicle accelerometers to assure appropriate calibration of injury criteria and vehicle dynamics. At the time of entry, test personnel entered the appropriate calibration for each data channel and the computer then scaled the data appropriately. When all data had been acquired it was 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).

The only modification to the data at the time of permanent storage was the filtering and digitizing process of the FM recorder tape (2500 Hz) and the DFA (1250 Hz, 200 ms). Immediately after the data was moved to permanent storage it was recalled by the test personnel and plotted with the appropriate label and vehicle designation. As the data was recalled the DFA was 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 was applied to the vehicle acceleration and belt restraint forces. The class 180 filter was applied to the chest acceleration forces. The class 600 filter was applied to the femur forces and the class 1000 filter was applied to the head acceleration forces.

SECTION 4

4.3 DATA ACQUISITION AND REDUCTION (CONT'D)

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.

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 was attenuated at 60 db/octave instead of 24 db/octave. This had 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 were 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 were processed as class 1000 data, and the Head Injury Criteria (HIC) calculation was performed. The HIC calculations were 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 were processed as class 180 data, and direct Chest Severity Index (CSI) calculations were performed. Data output is in the form of computer plots with the CSI calculations.

4.4.3 FEMUR LOAD DATA

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

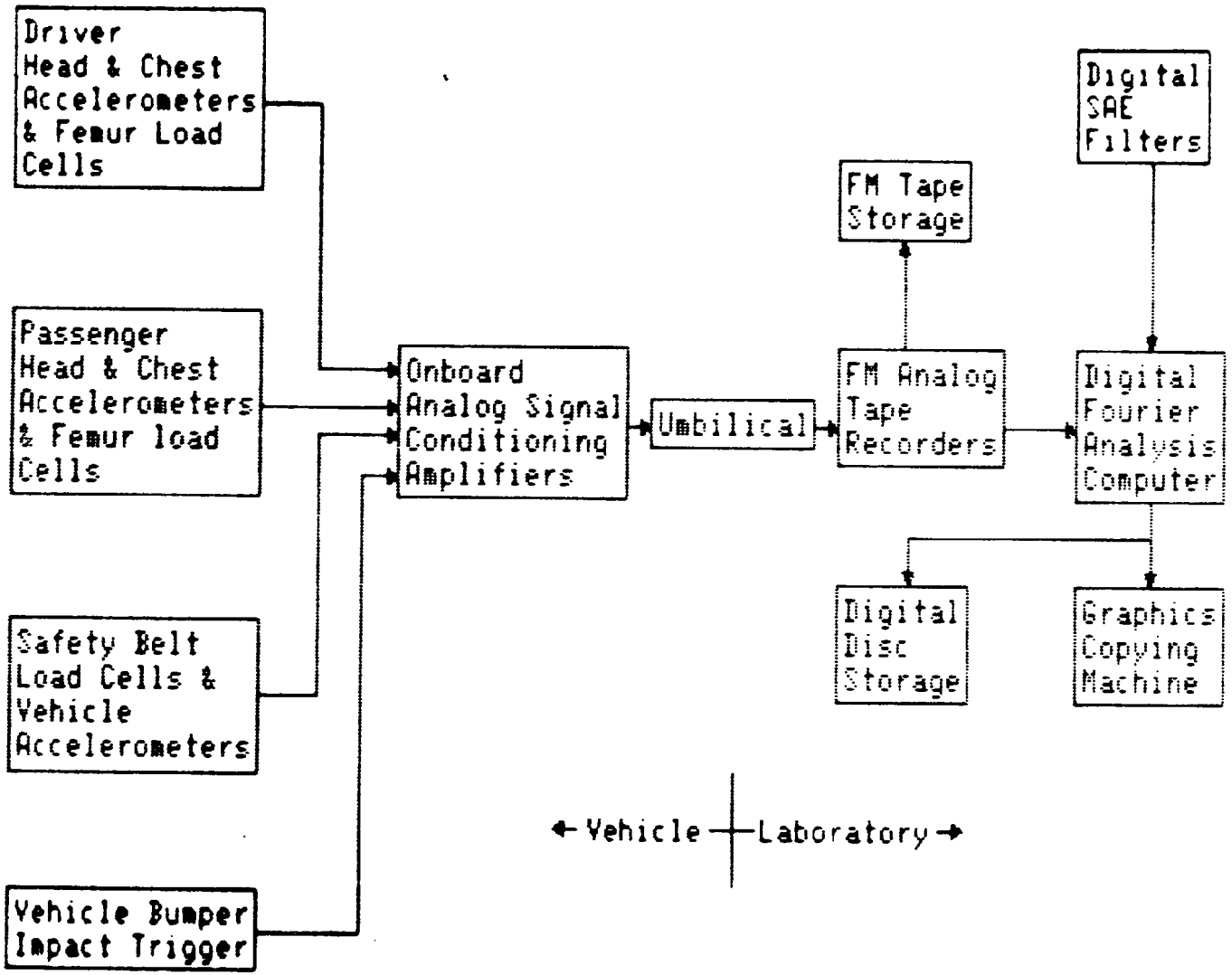
4.4.4 RESTRAINT LOAD DATA

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

SECTION 4

4.4.5 VEHICLE ACCELERATION DATA

The vehicle accelerations were processed as class 60 data, and presented as computer plots. Additionally, the longitudinal vehicle acceleration was 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 200 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 Lables
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

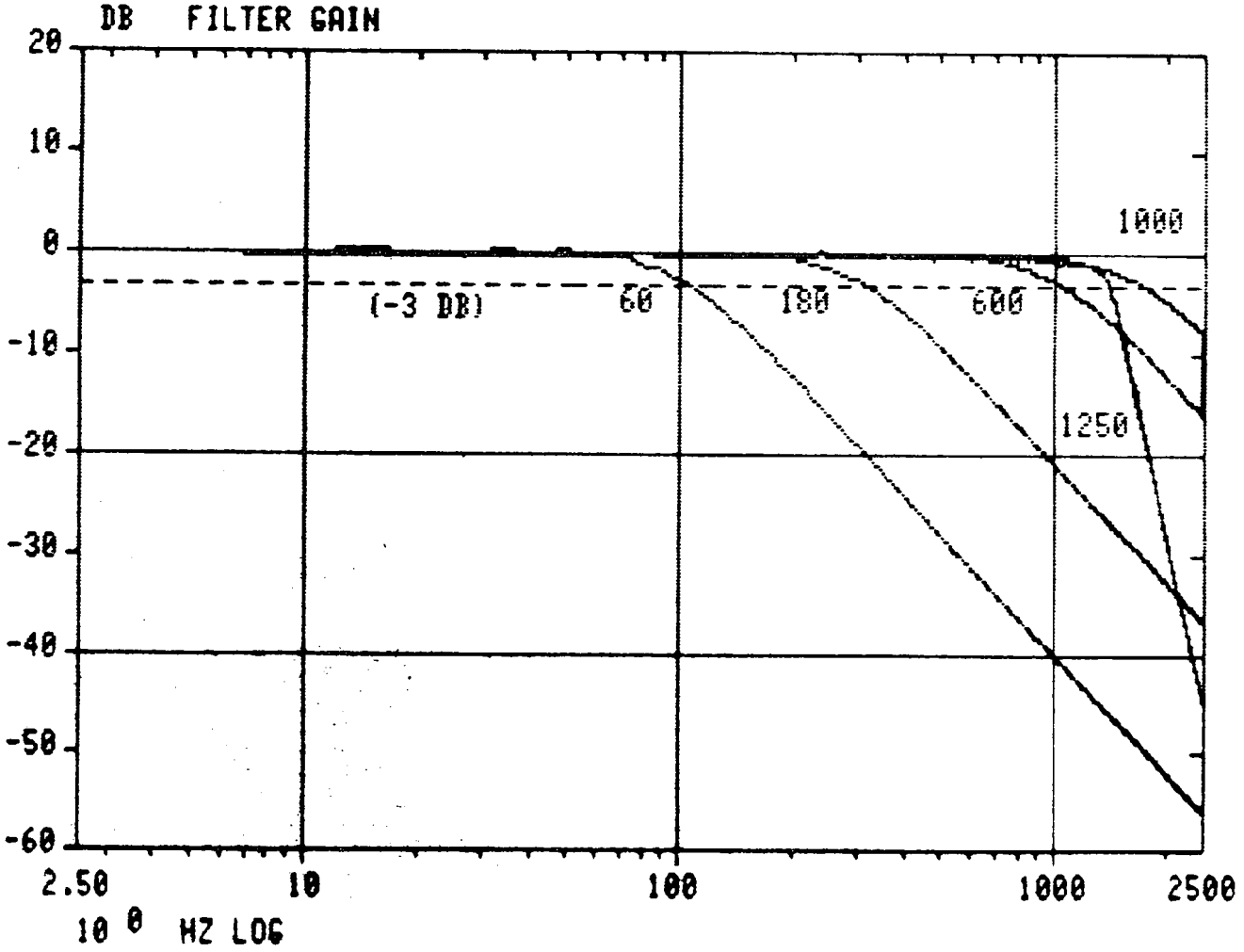


FIGURE 4-2

APPENDIX A

APPENDIX A

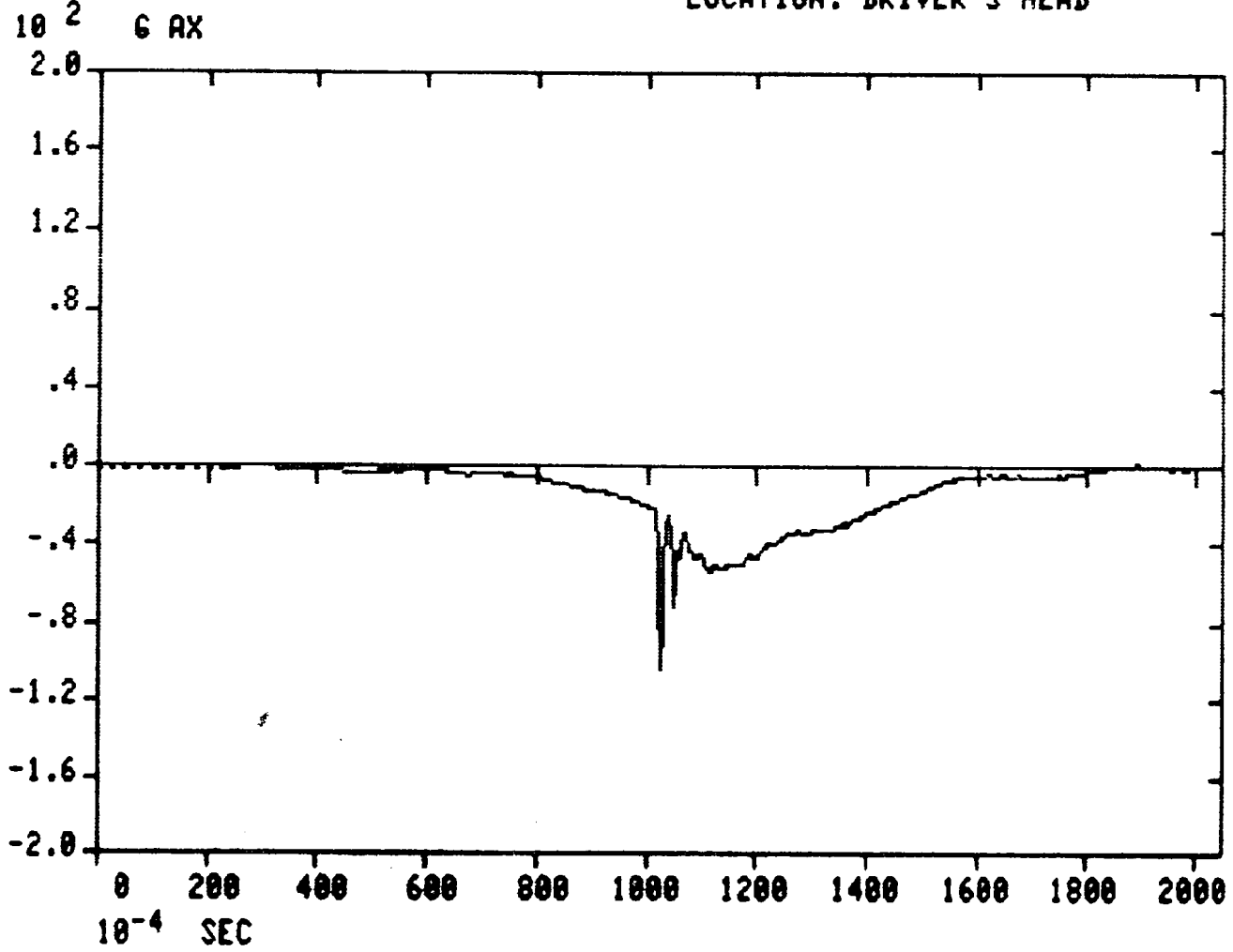
The following computer plots provide complete and comprehensive occupant response and vehicle acceleration during the impact event.

DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 1000
ACCELEROMETER: TAPE 1, CH 1
DIRECTION: FORWARD
LOCATION: DRIVER'S HEAD

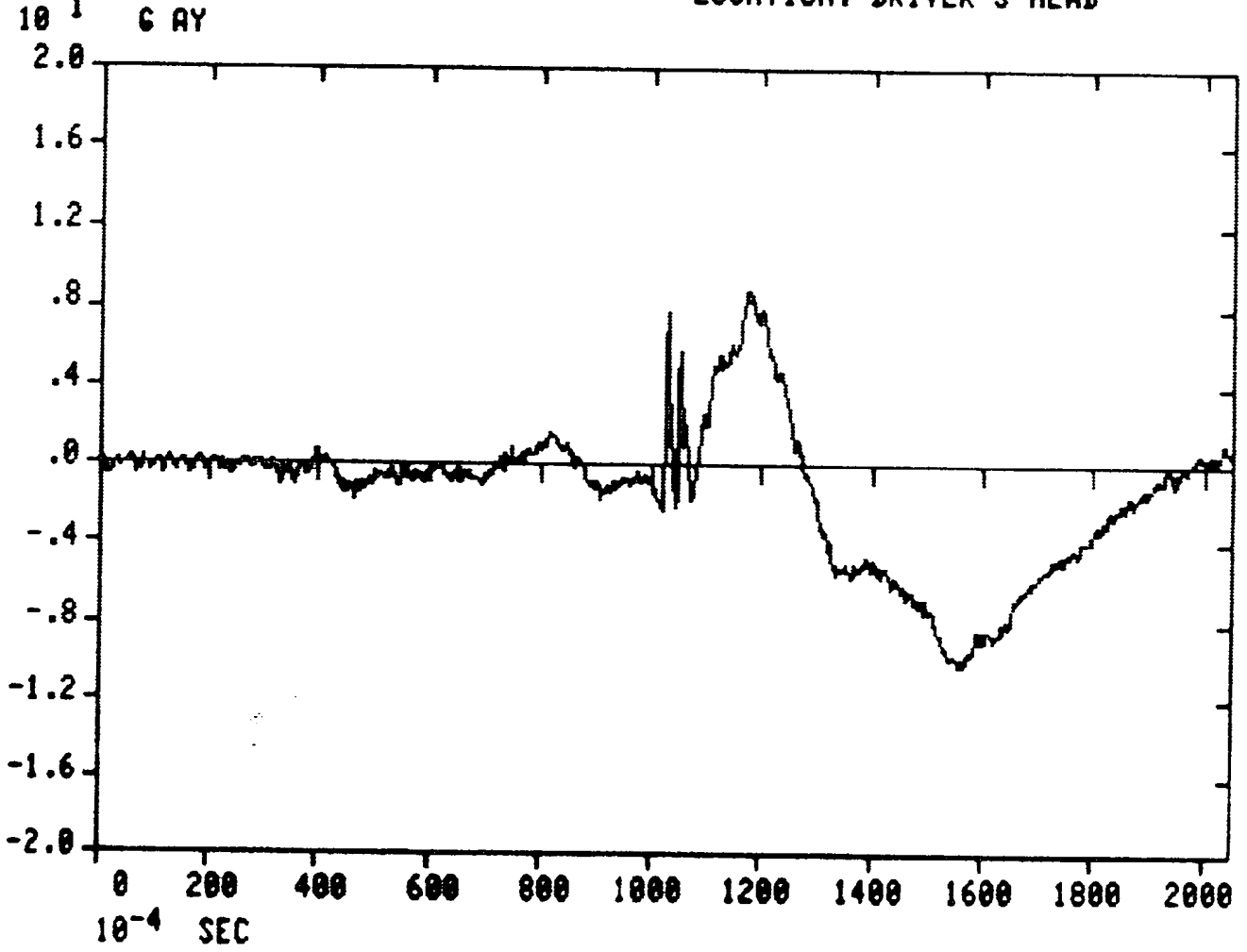


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 1000
ACCELEROMETER: TAPE 1, CH 2
DIRECTION: LEFT
LOCATION: DRIVER'S HEAD

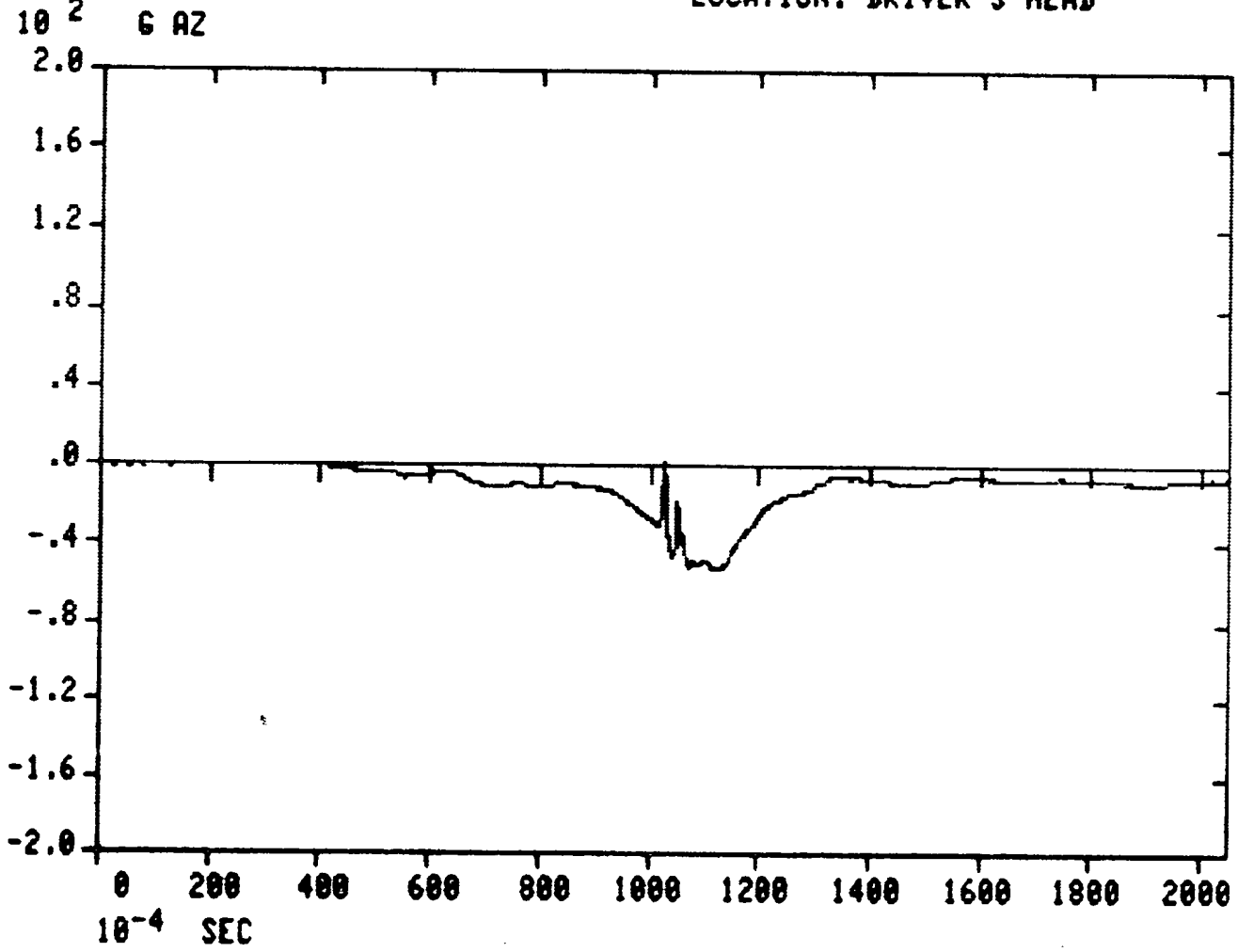


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 1000
ACCELEROMETR: TAPE 1, CH 3
DIRECTION: UPWARD
LOCATION: DRIVER'S HEAD

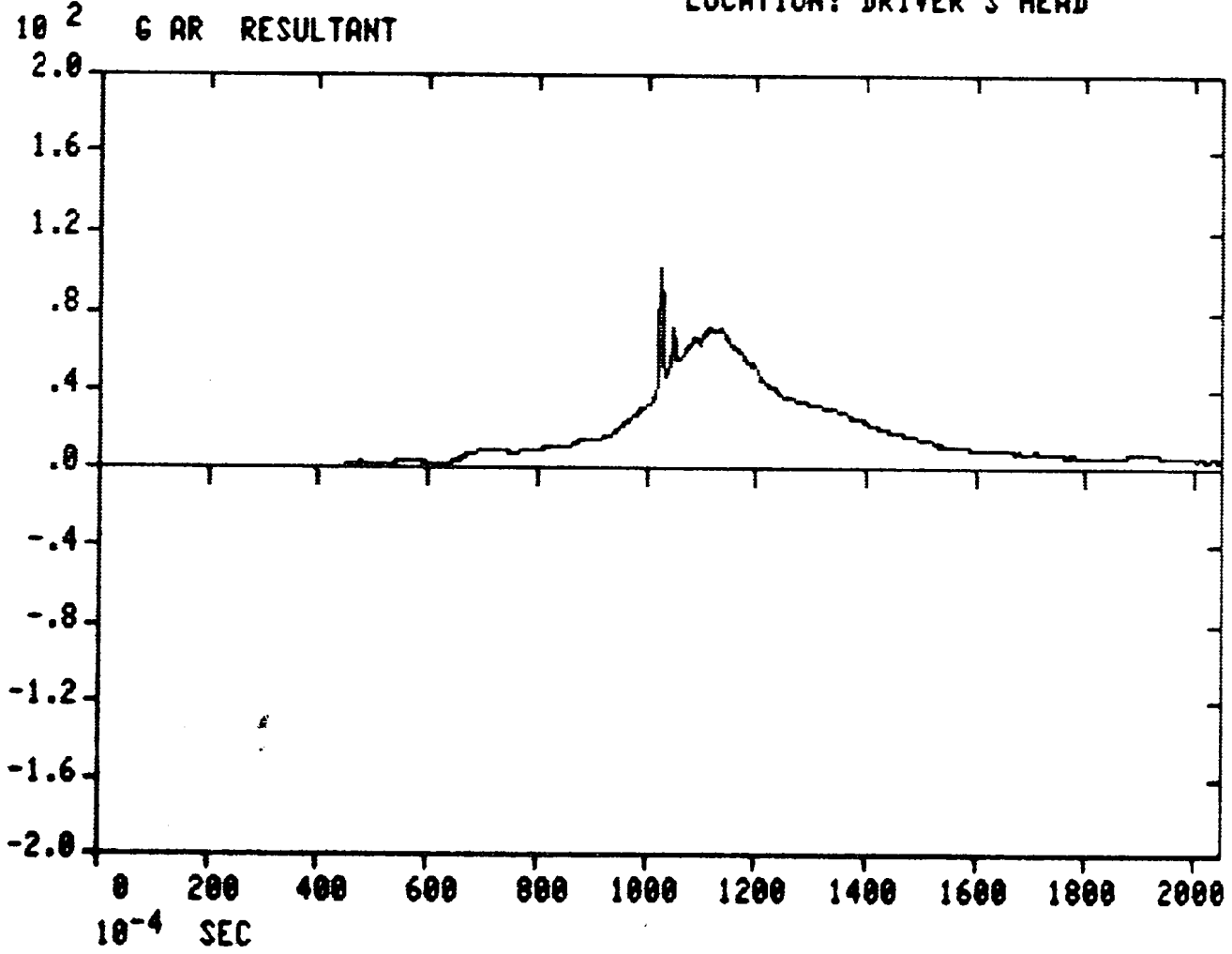


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 1000
ACCELEROMETER: TAPE 1, CH 1-3
DIRECTION: RESULTANT OF XYZ
LOCATION: DRIVER'S HEAD

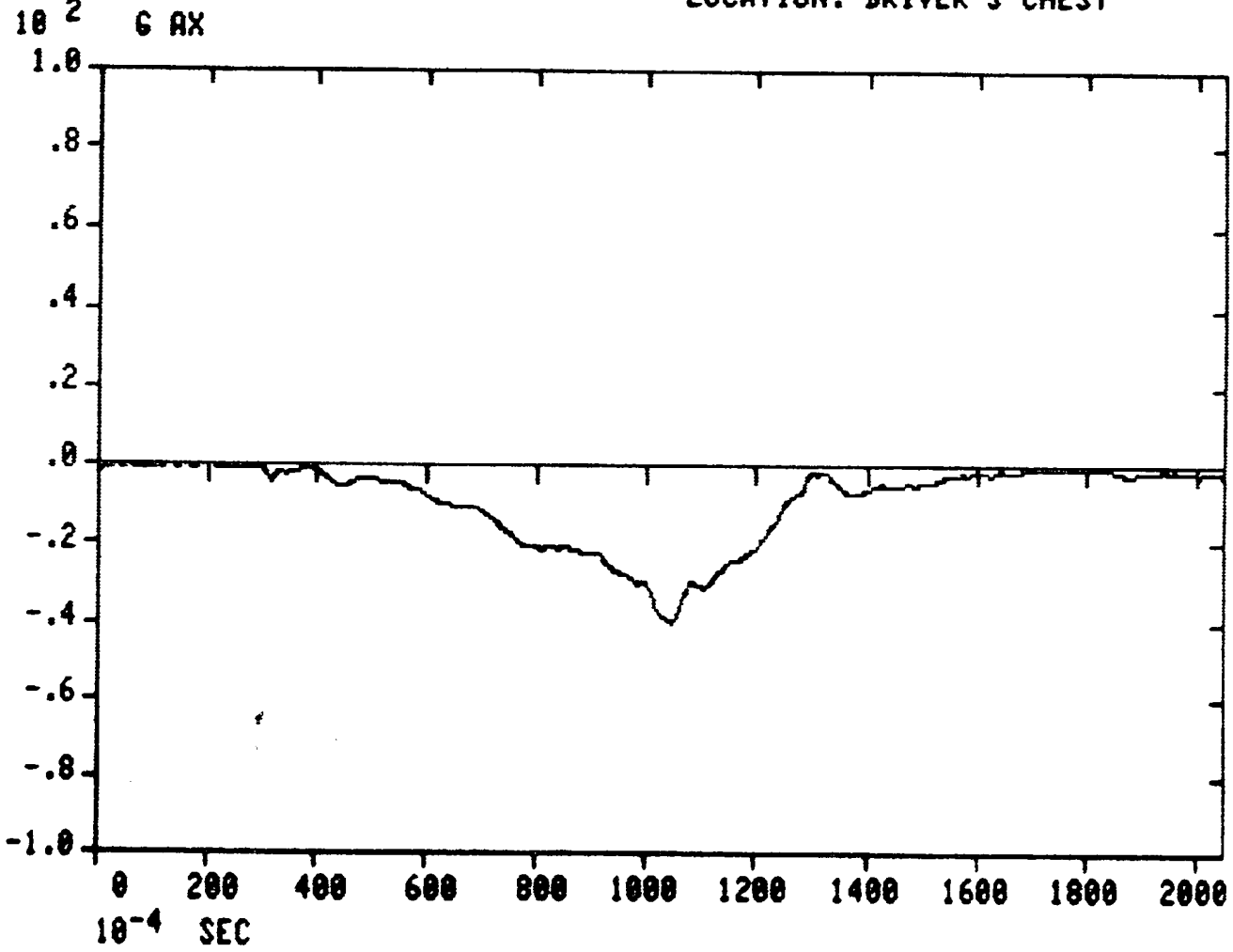


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 180
ACCELEROMETER: TAPE 1, CH 5
DIRECTION: FORWARD
LOCATION: DRIVER'S CHEST

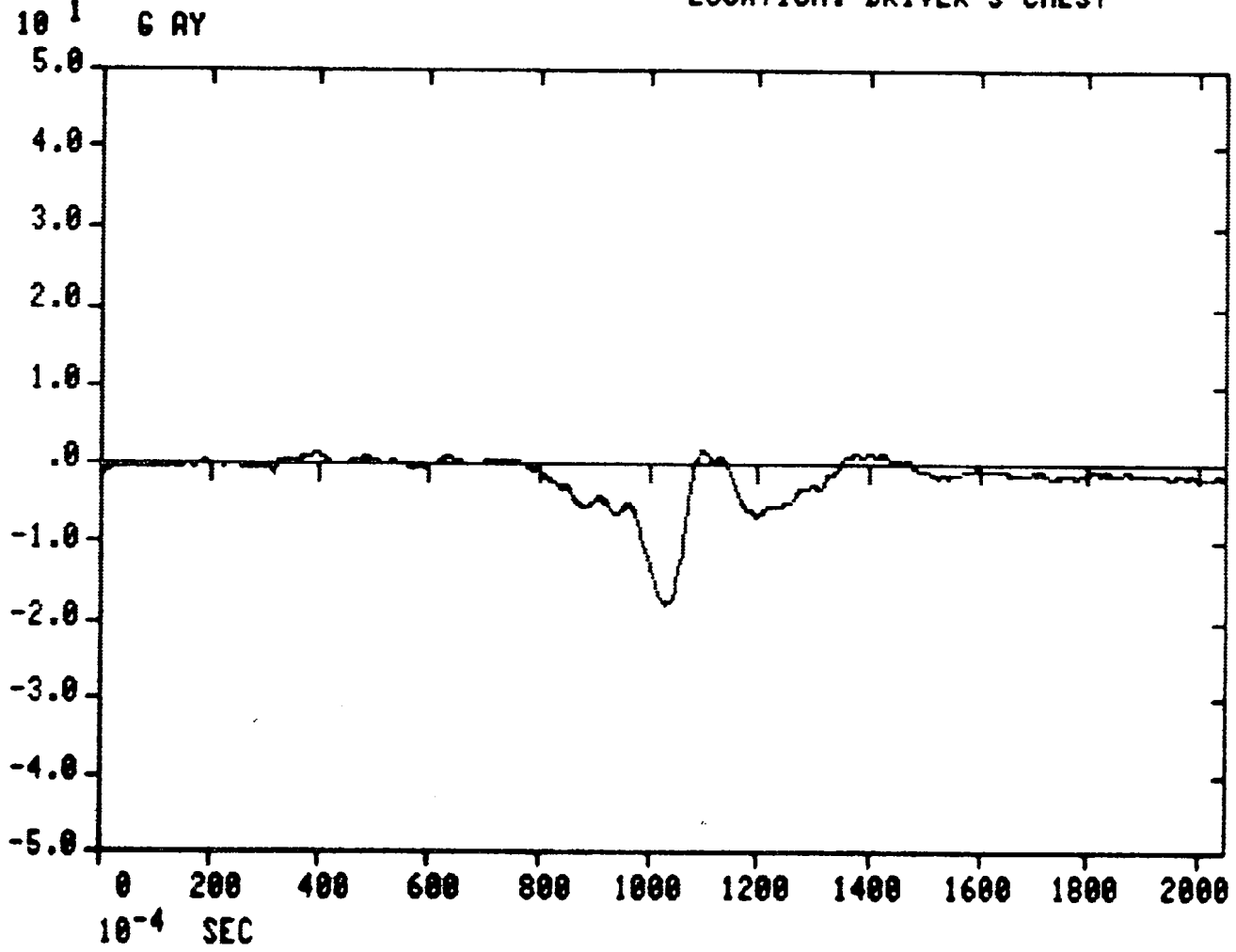


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 180
ACCELEROMETER: TAPE 1, CH 6
DIRECTION: LEFT
LOCATION: DRIVER'S CHEST

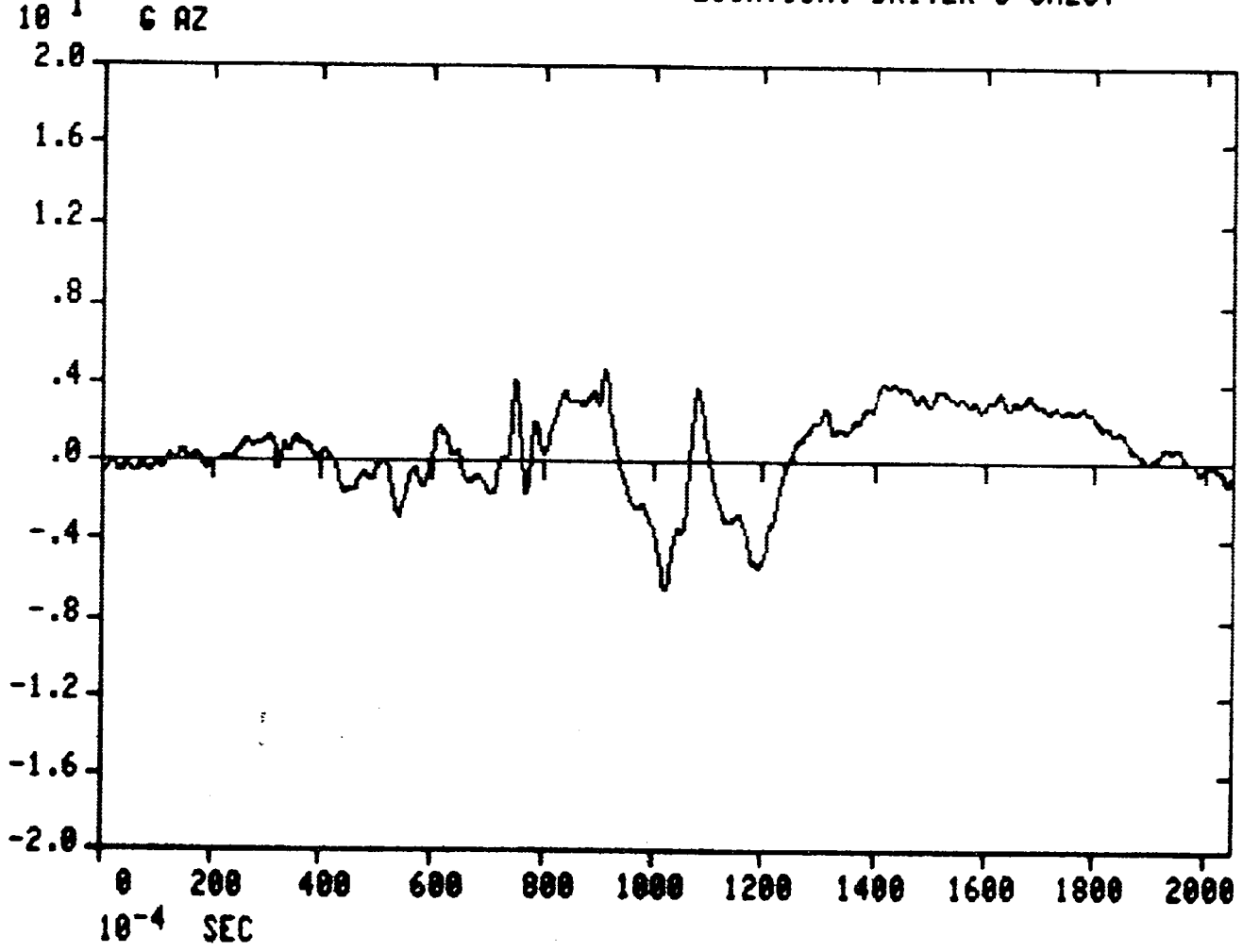


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 180
ACCELEROMETER: TAPE 1, CH 7
DIRECTION: UPWARD
LOCATION: DRIVER'S CHEST

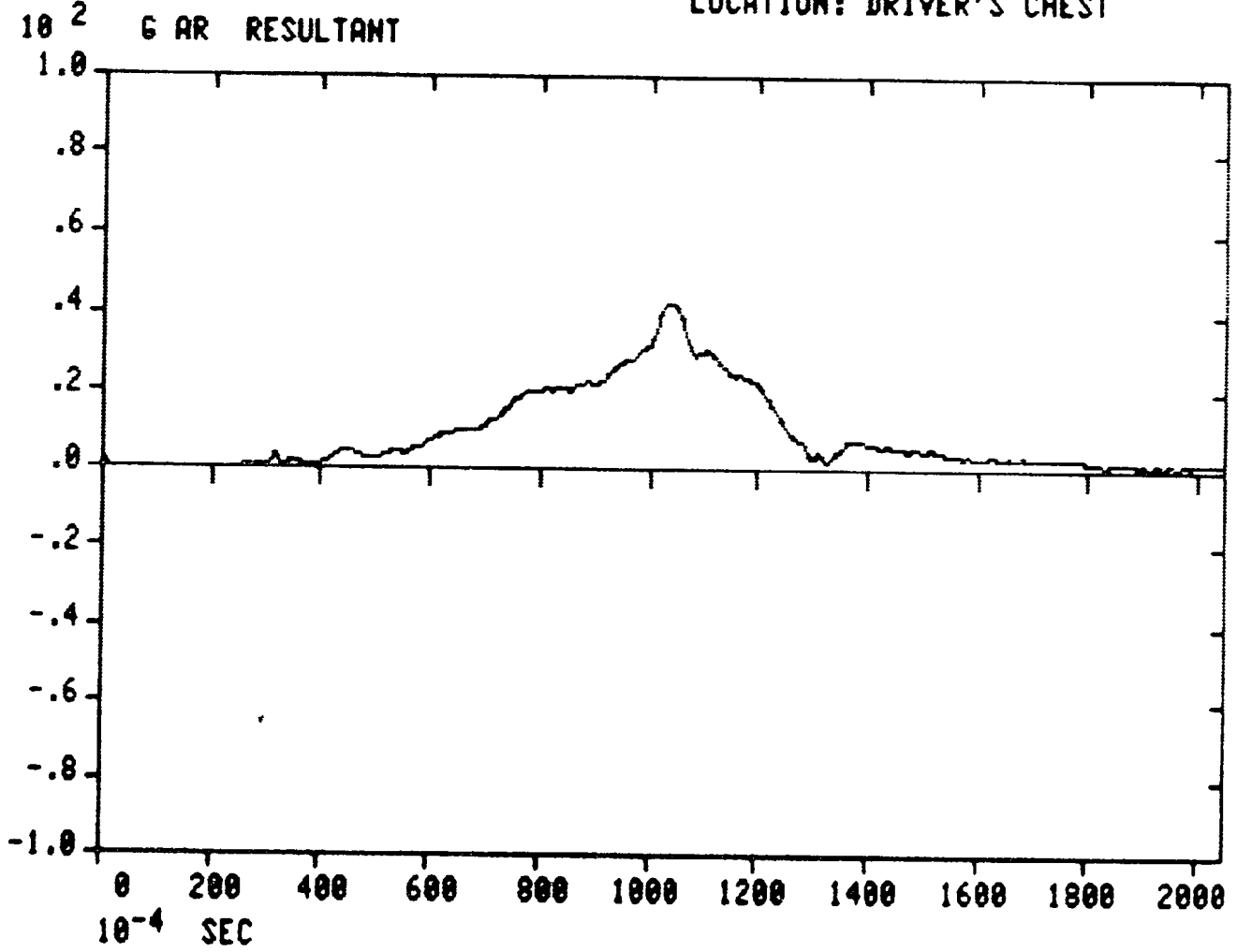


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 180
ACCELEROMETER: TAPE 1, CH 5-7
DIRECTION: RESULTANT OF XYZ
LOCATION: DRIVER'S CHEST

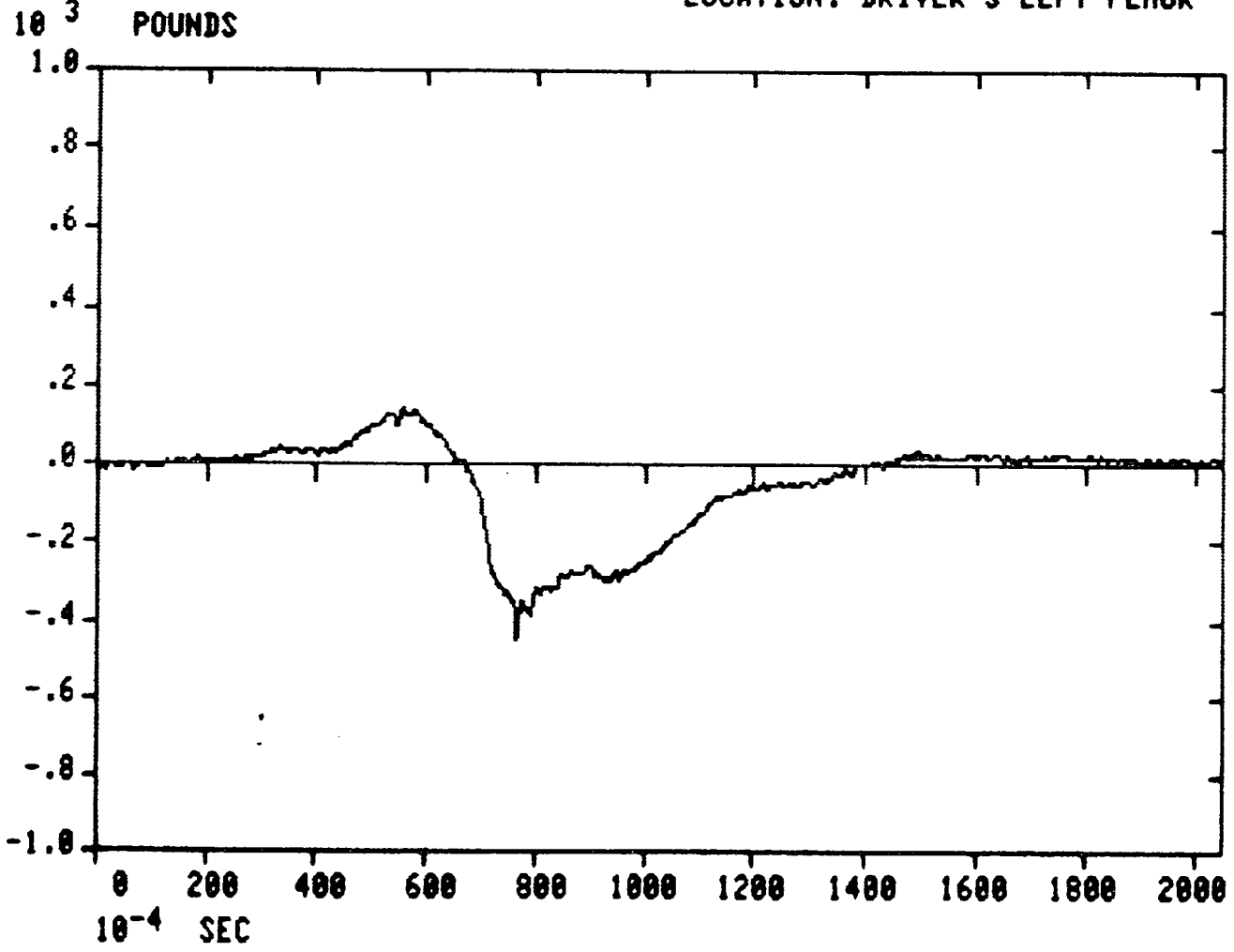


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 600
LOAD CELL: TAPE 1, CH 8
DIRECTION: TENSION
LOCATION: DRIVER'S LEFT FEMUR

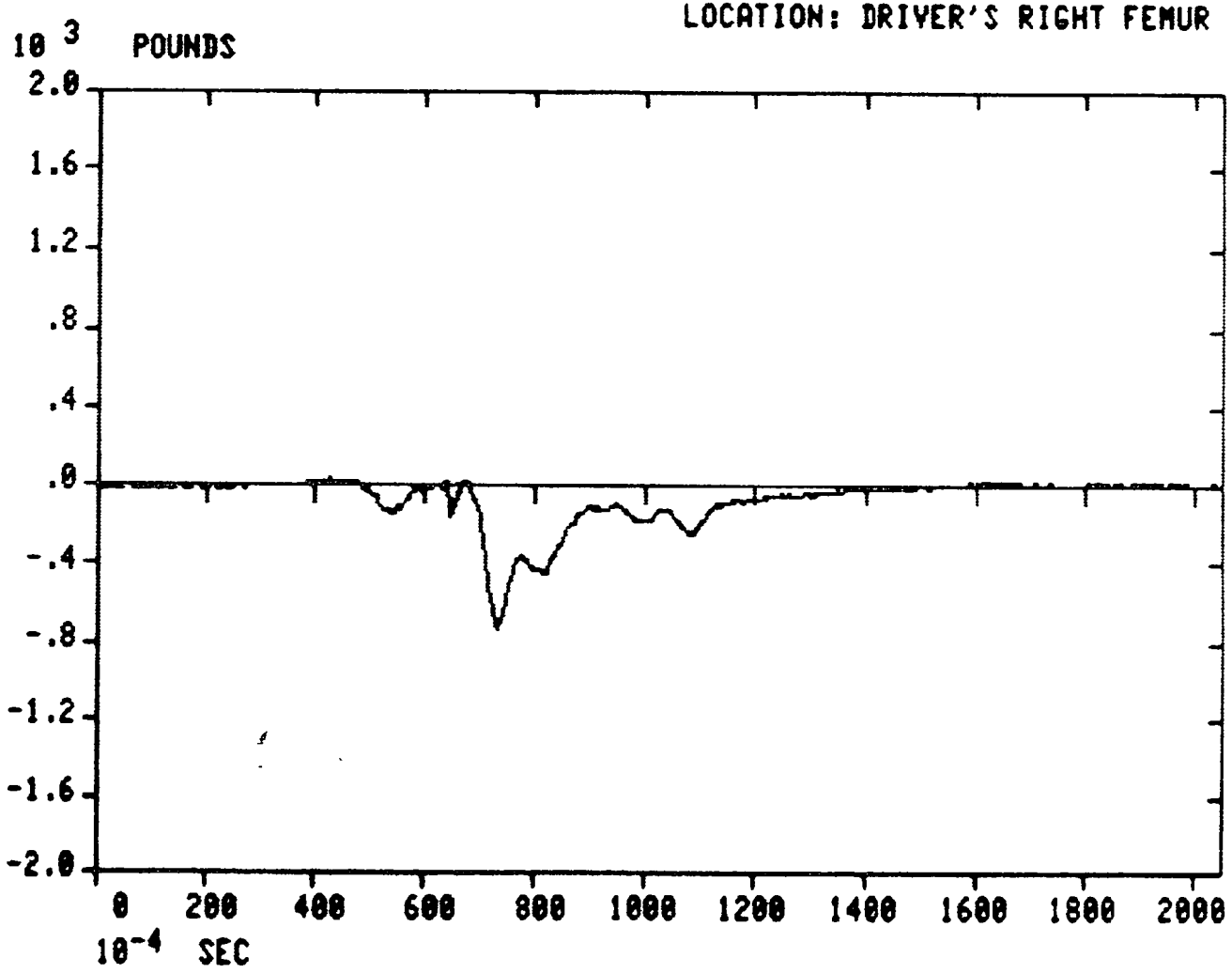


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 600
LOAD CELL: TAPE 1, CH 4
DIRECTION: TENSION
LOCATION: DRIVER'S RIGHT FEMUR

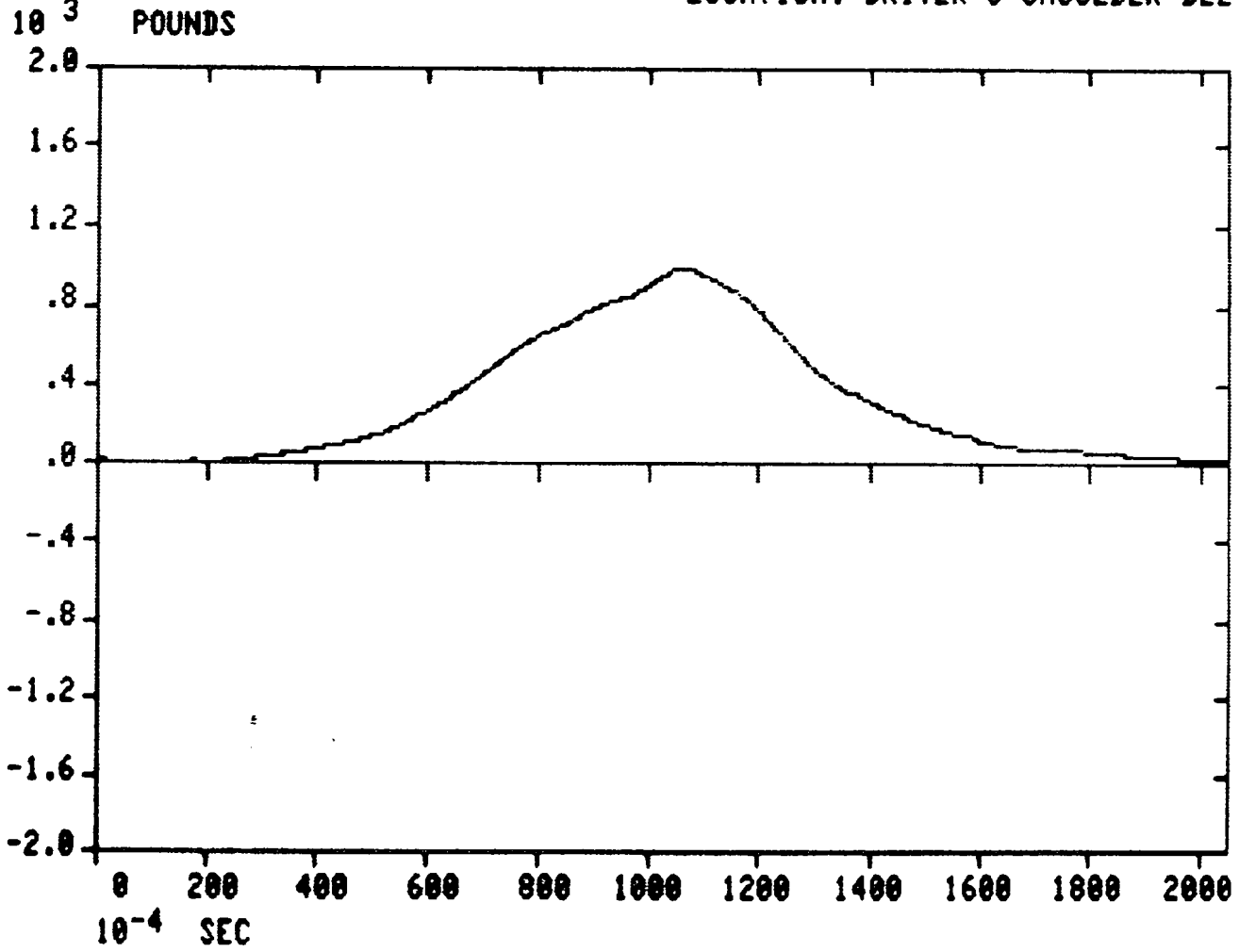


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 60
LOAD CELL: TAPE 1, CH 9
DIRECTION: TENSION
LOCATION: DRIVER'S SHOULDER BELT

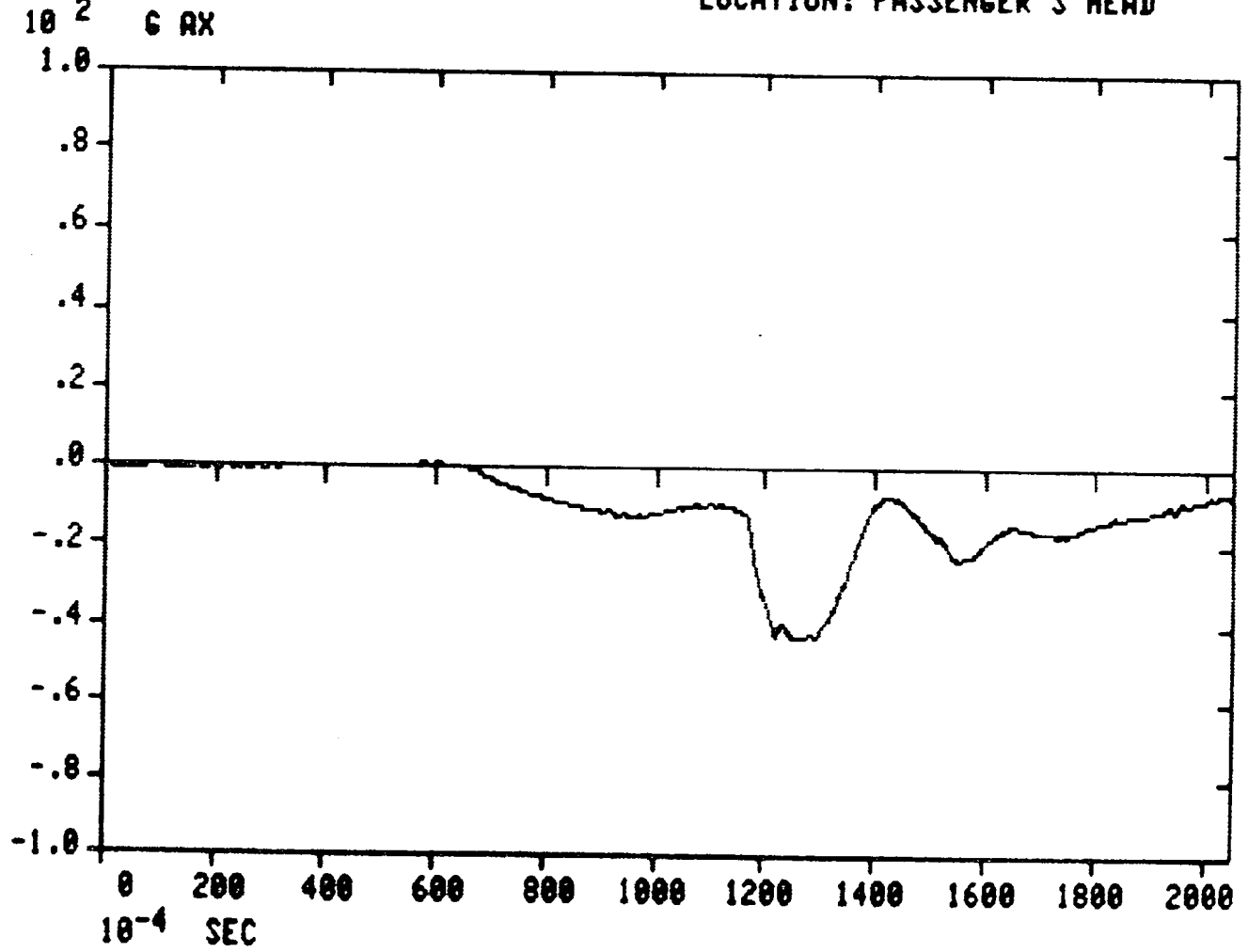


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 1000
ACCELEROMETER: TAPE 2, CH 1
DIRECTION: FORWARD
LOCATION: PASSENGER'S HEAD

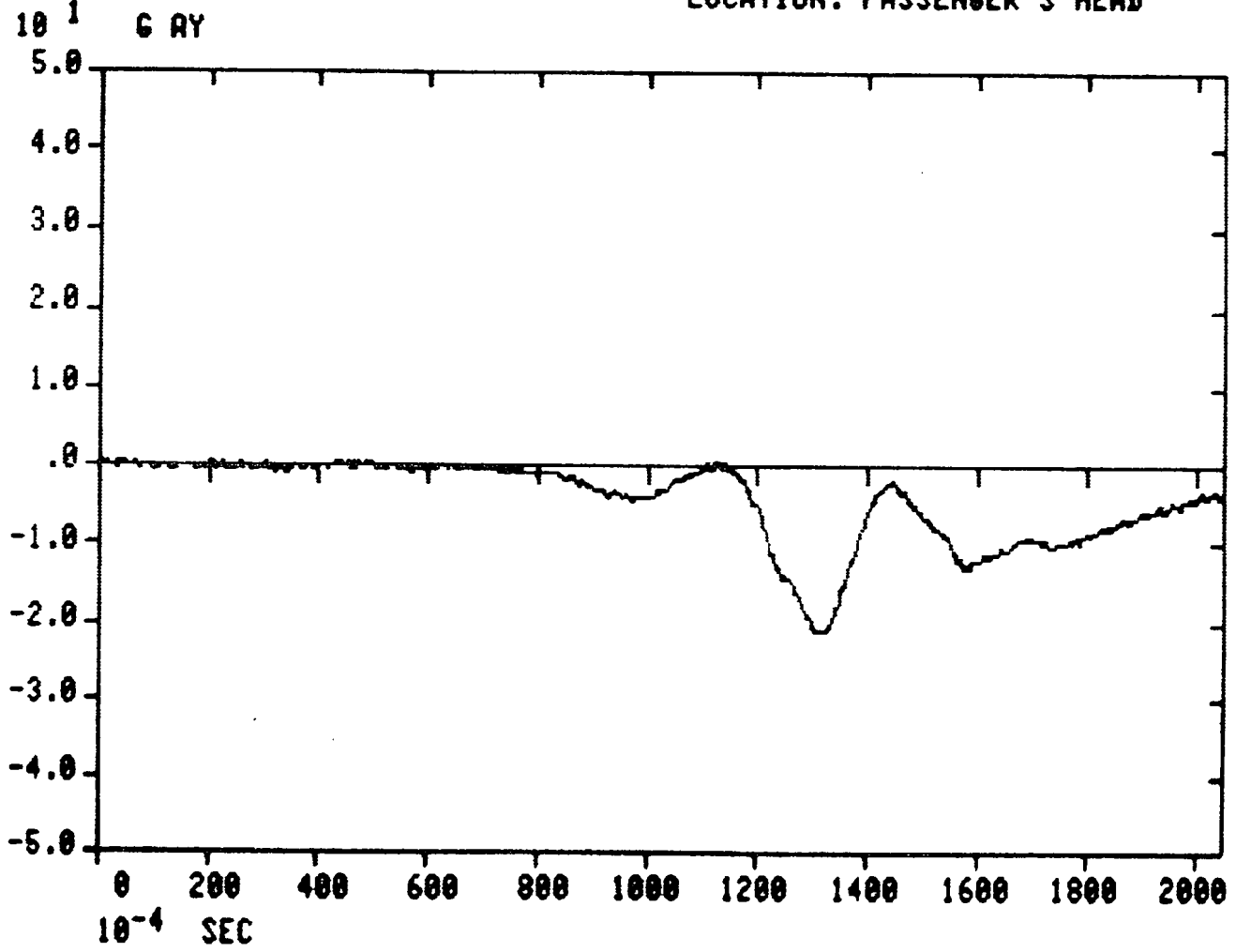


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 1000
ACCELEROMETER: TAPE 2, CH 2
DIRECTION: LEFT
LOCATION: PASSENGER'S HEAD

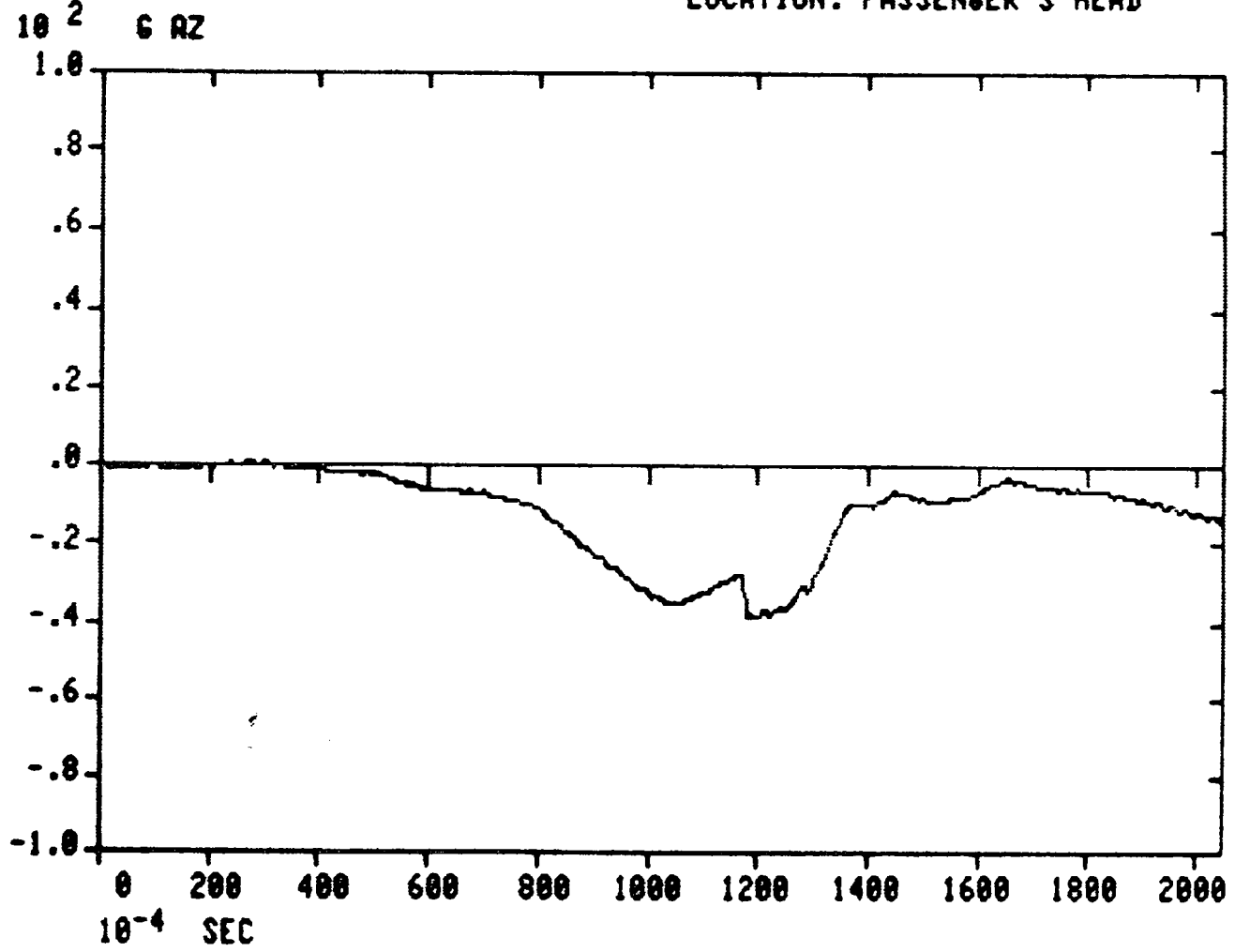


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 1000
ACCELEROMETER: TAPE 2, CH 3
DIRECTION: UPWARD
LOCATION: PASSENGER'S HEAD

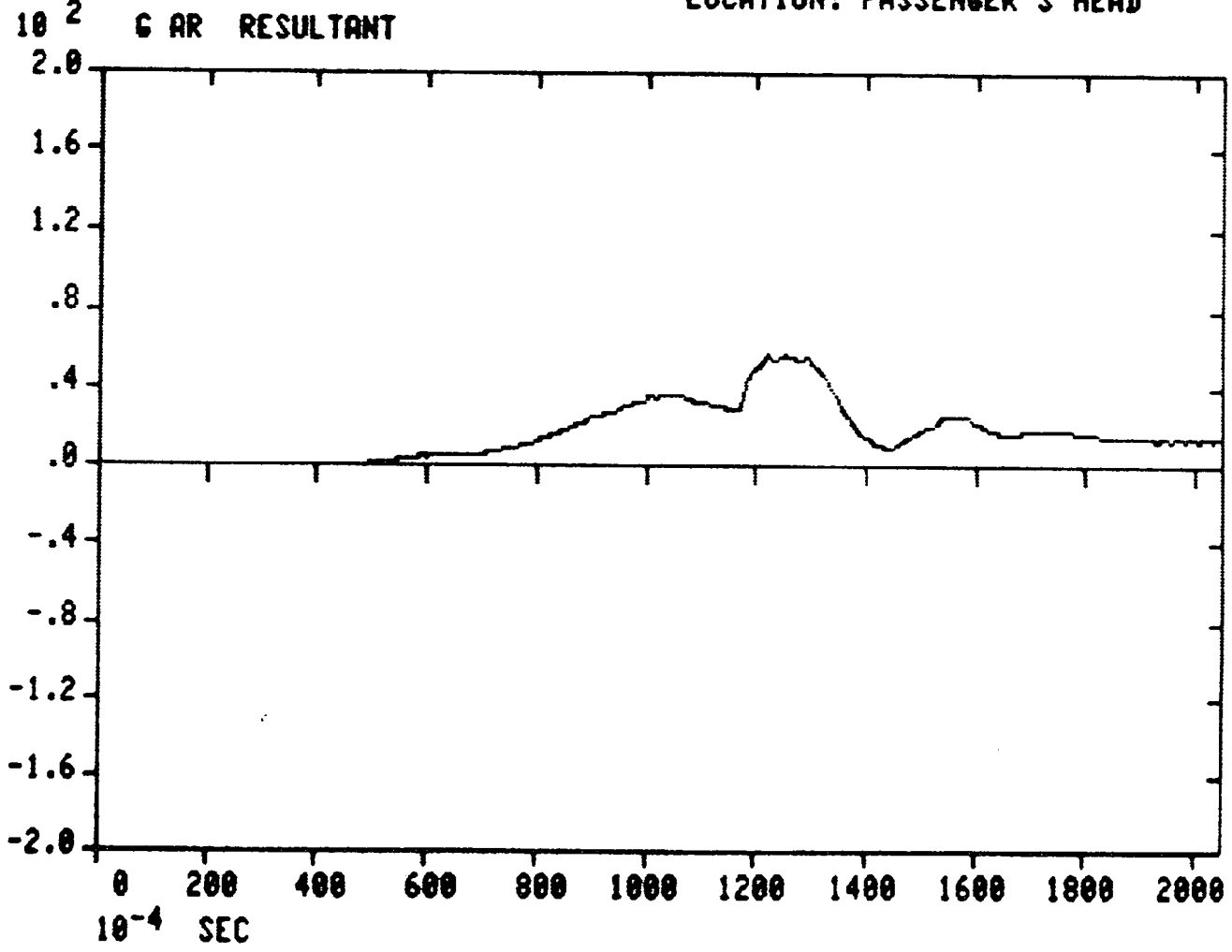


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 1000
ACCELEROMETER: TAPE 2, CH 1-3
DIRECTION: RESULTANT OF XYZ
LOCATION: PASSENGER'S HEAD

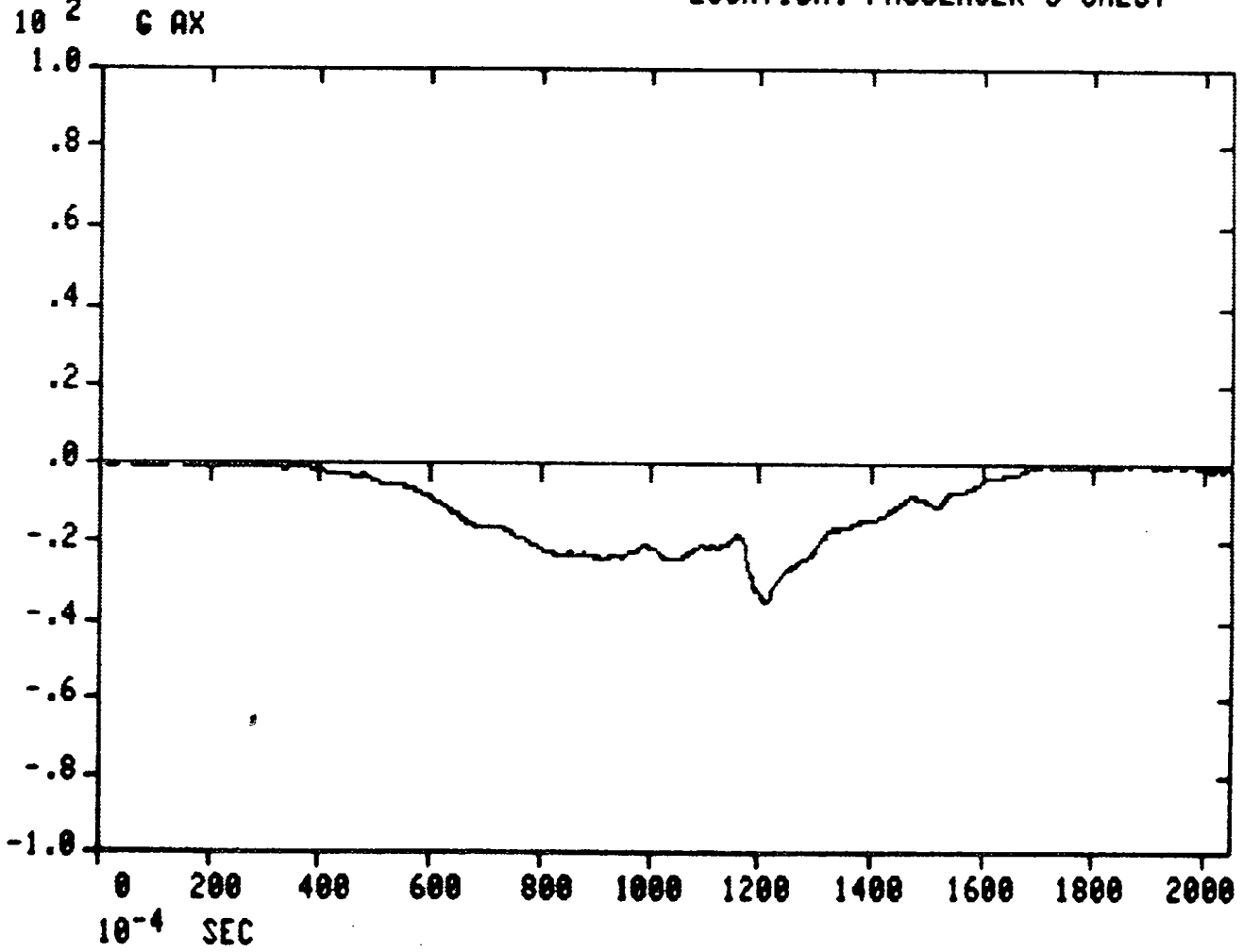


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 180
ACCELEROMETER: TAPE 2, CH 5
DIRECTION: FORWARD
LOCATION: PASSENGER'S CHEST

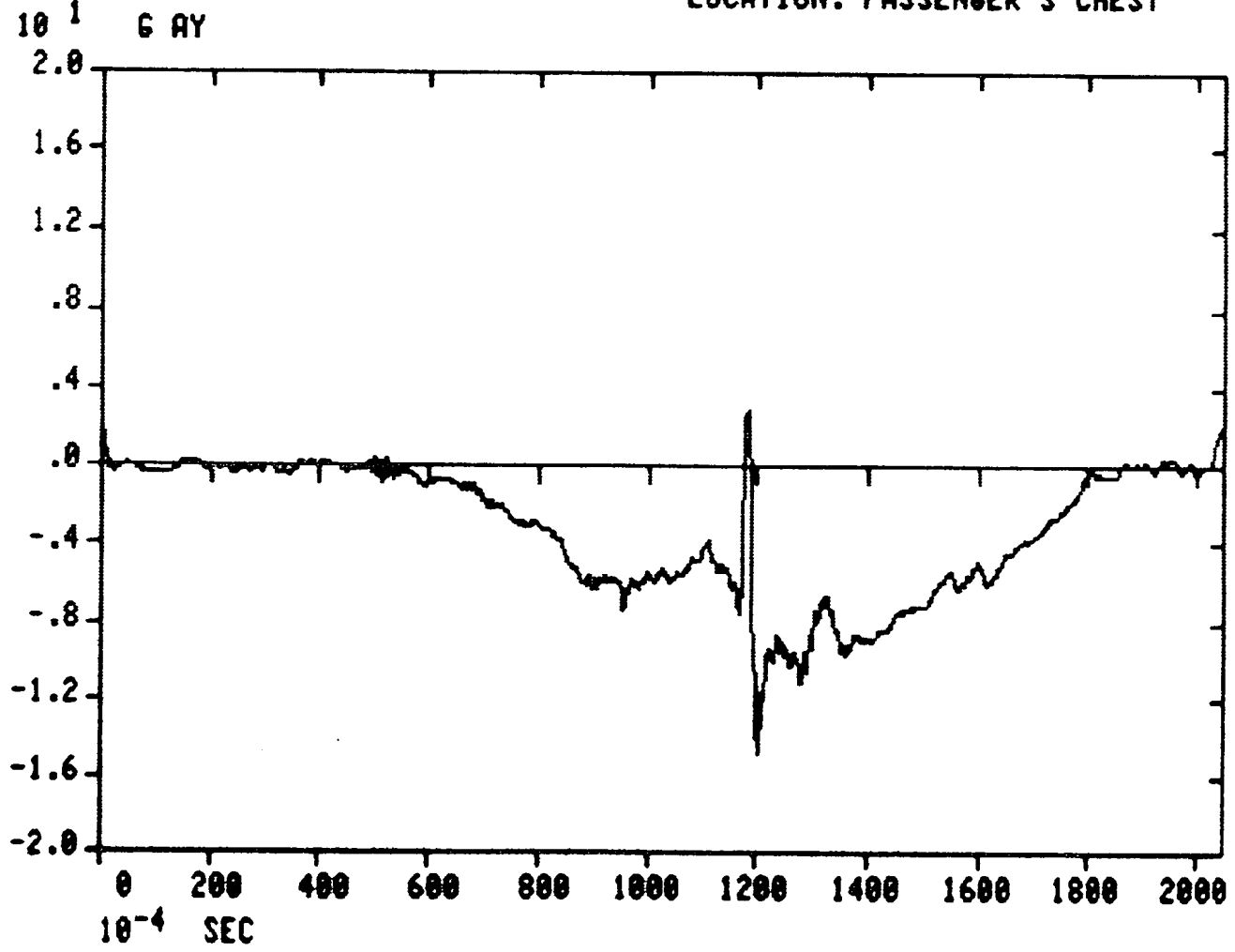


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 180
ACCELEROMETER: TAPE: 2, CH 6
DIRECTION: LEFT
LOCATION: PASSENGER'S CHEST

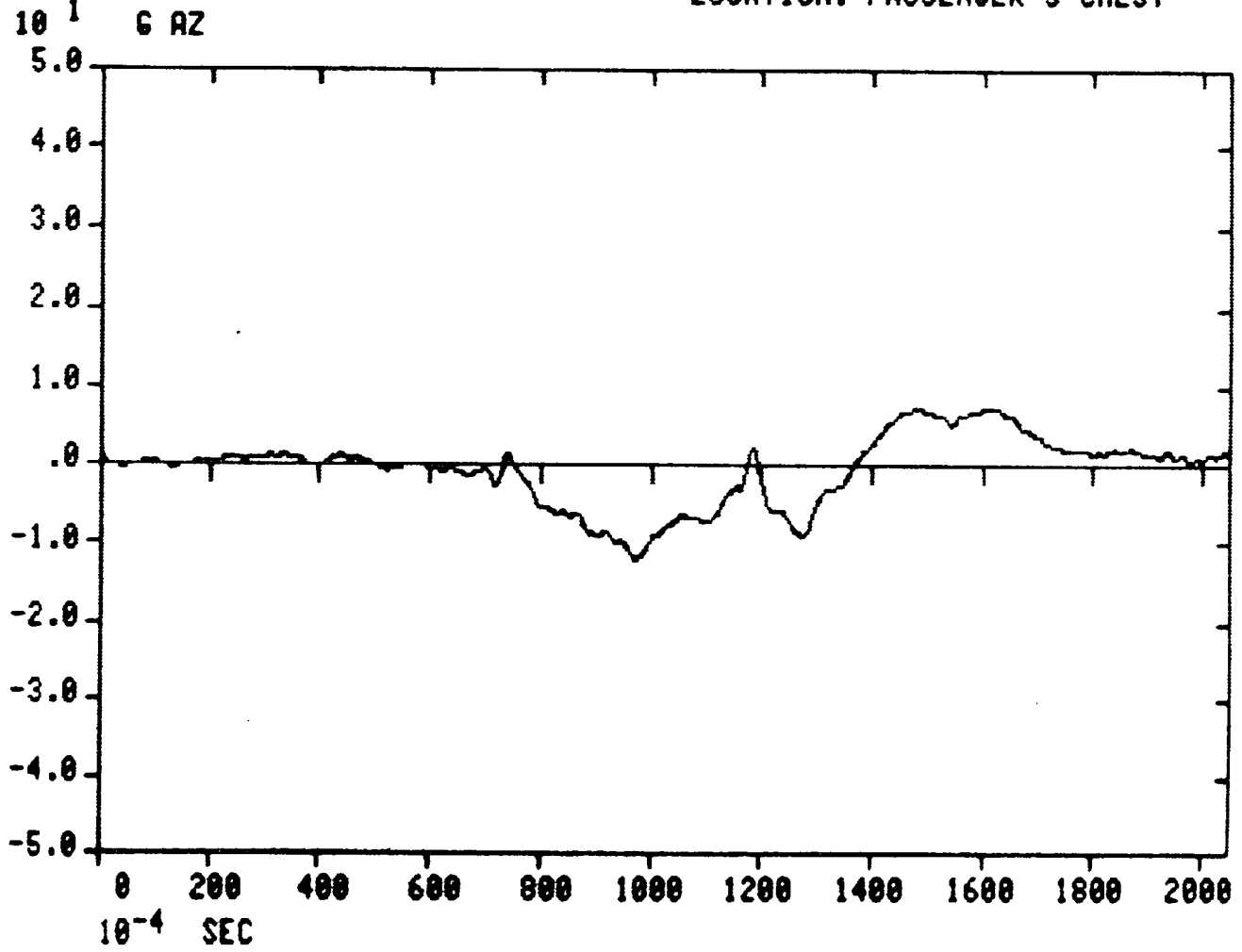


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 180
ACCELEROMETER: TAPE 2, CH 7
DIRECTION: UPWARD
LOCATION: PASSENGER'S CHEST

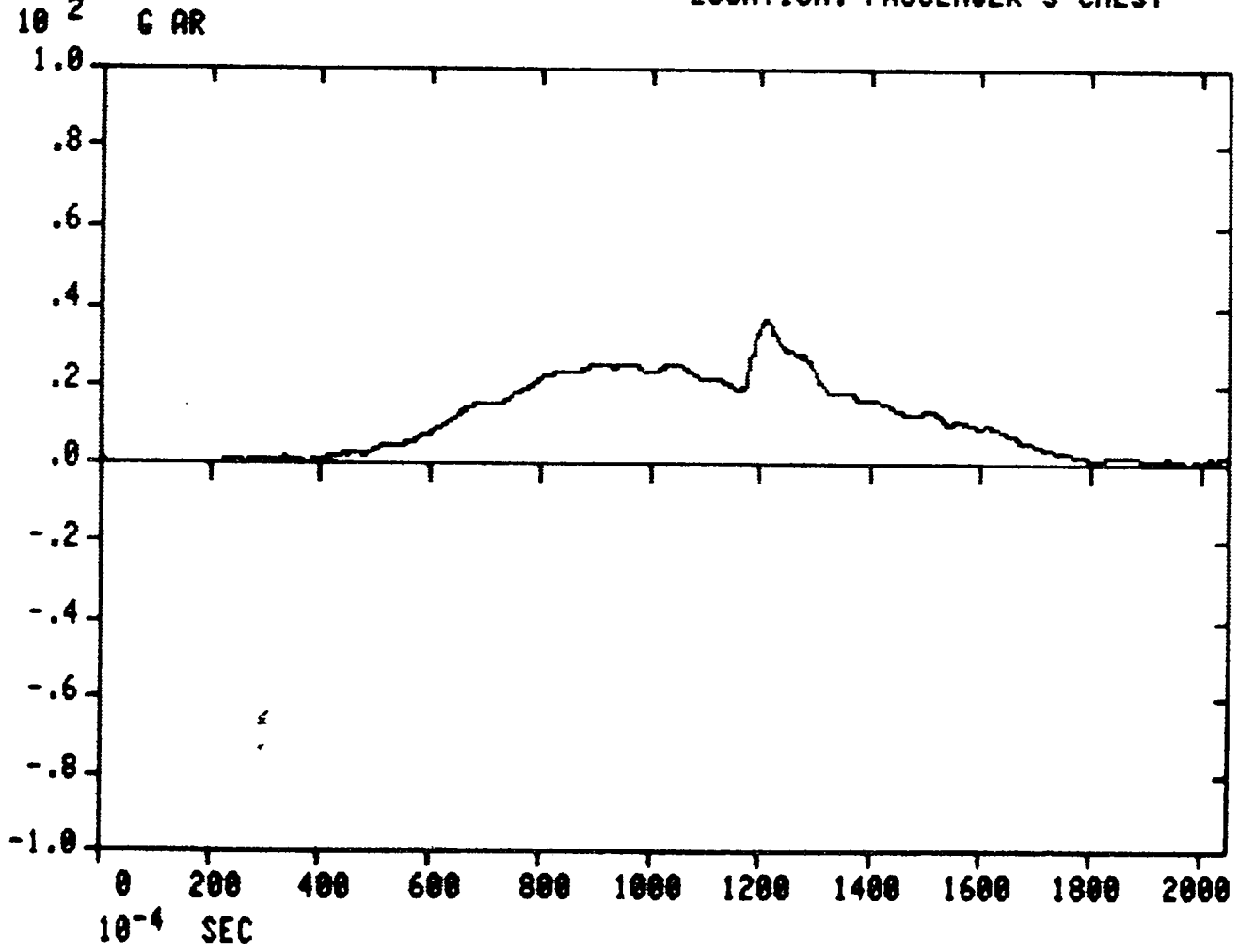


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 1000
ACCELEROMETER: TAPE 2, CH 5-7
DIRECTION: RESULTANT OF XYZ
LOCATION: PASSENGER'S CHEST

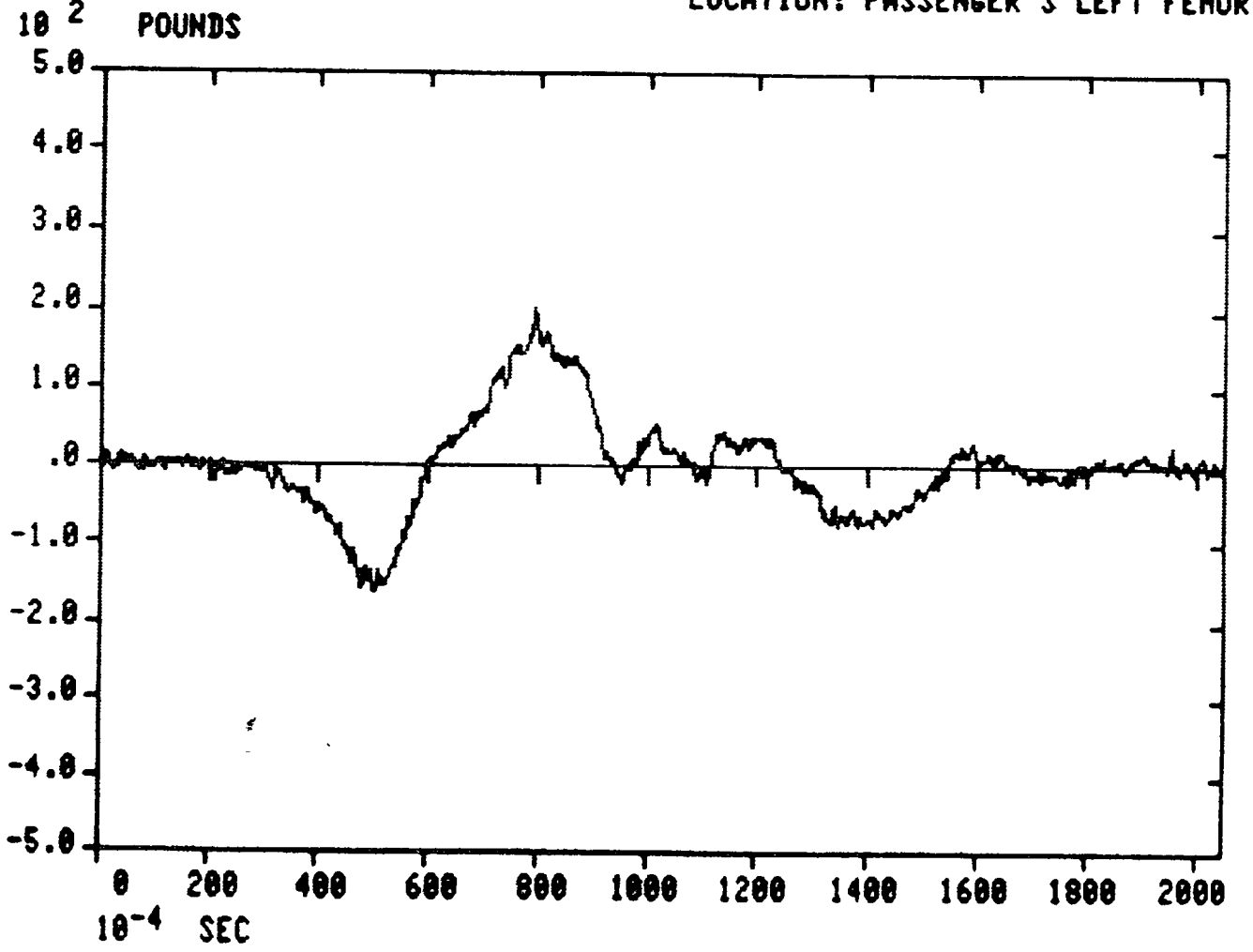


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 600
LOAD CELL: TAPE 2, CH 8
DIRECTION: TENSION
LOCATION: PASSENGER'S LEFT FEMUR

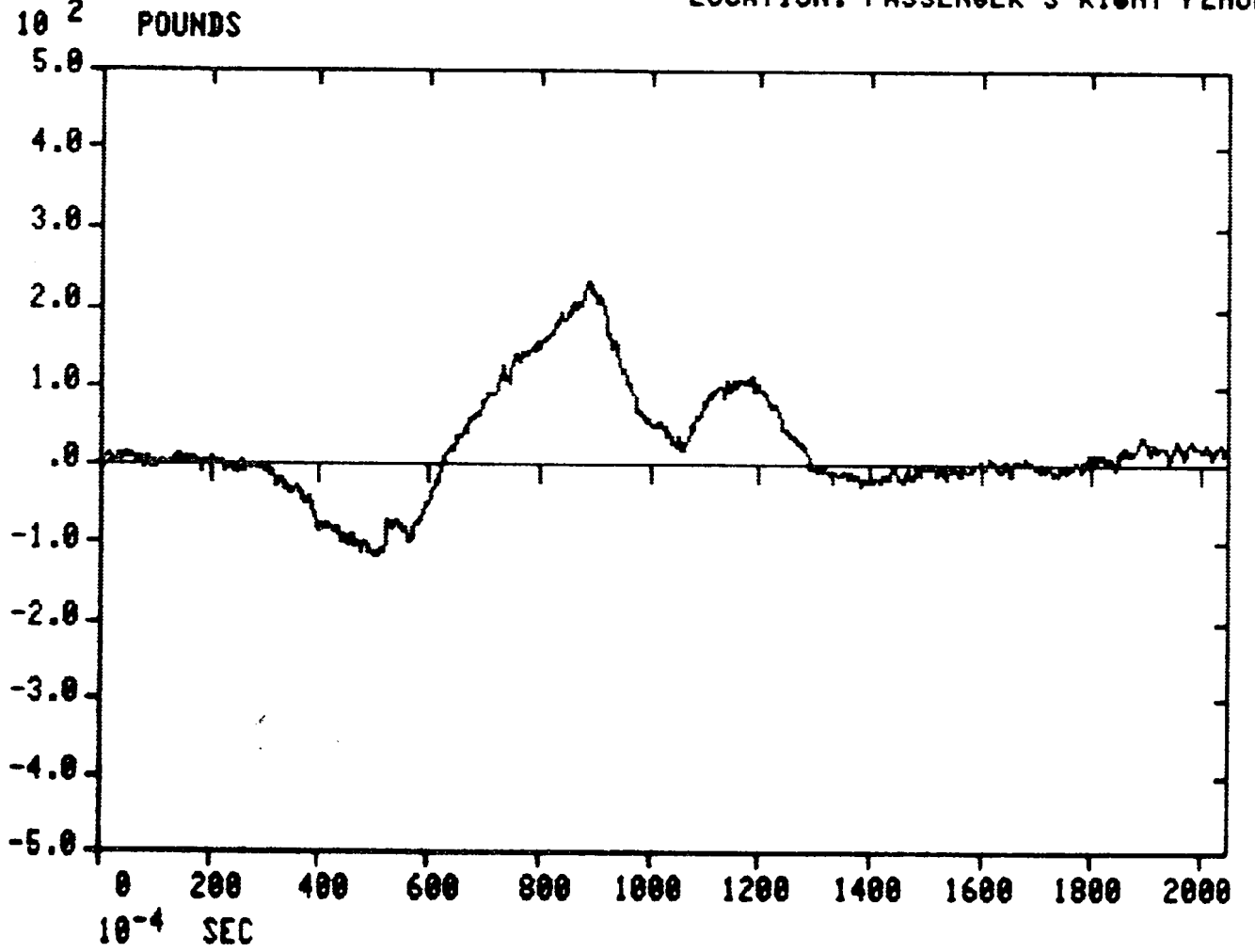


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 600
LOAD CELL: TAPE 2, CH 4
DIRECTION: TENSION
LOCATION: PASSENGER'S RIGHT FEMUR

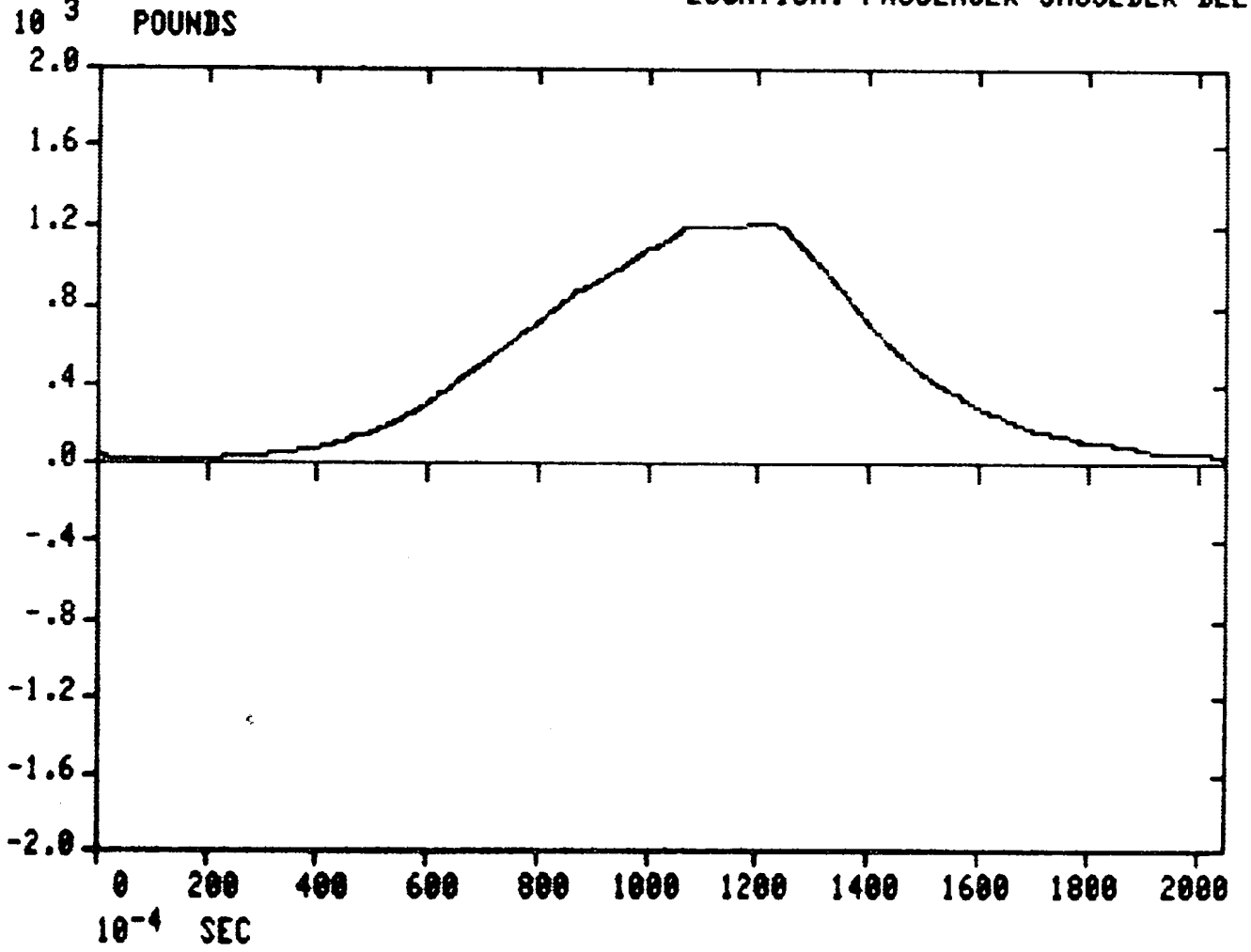


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

MJO NO. : 671-1489-77
FILTER: CLASS 60
LOAD CELL: TAPE 2, CH 9
DIRECTION: TENSION
LOCATION: PASSENGER SHOULDER BELT

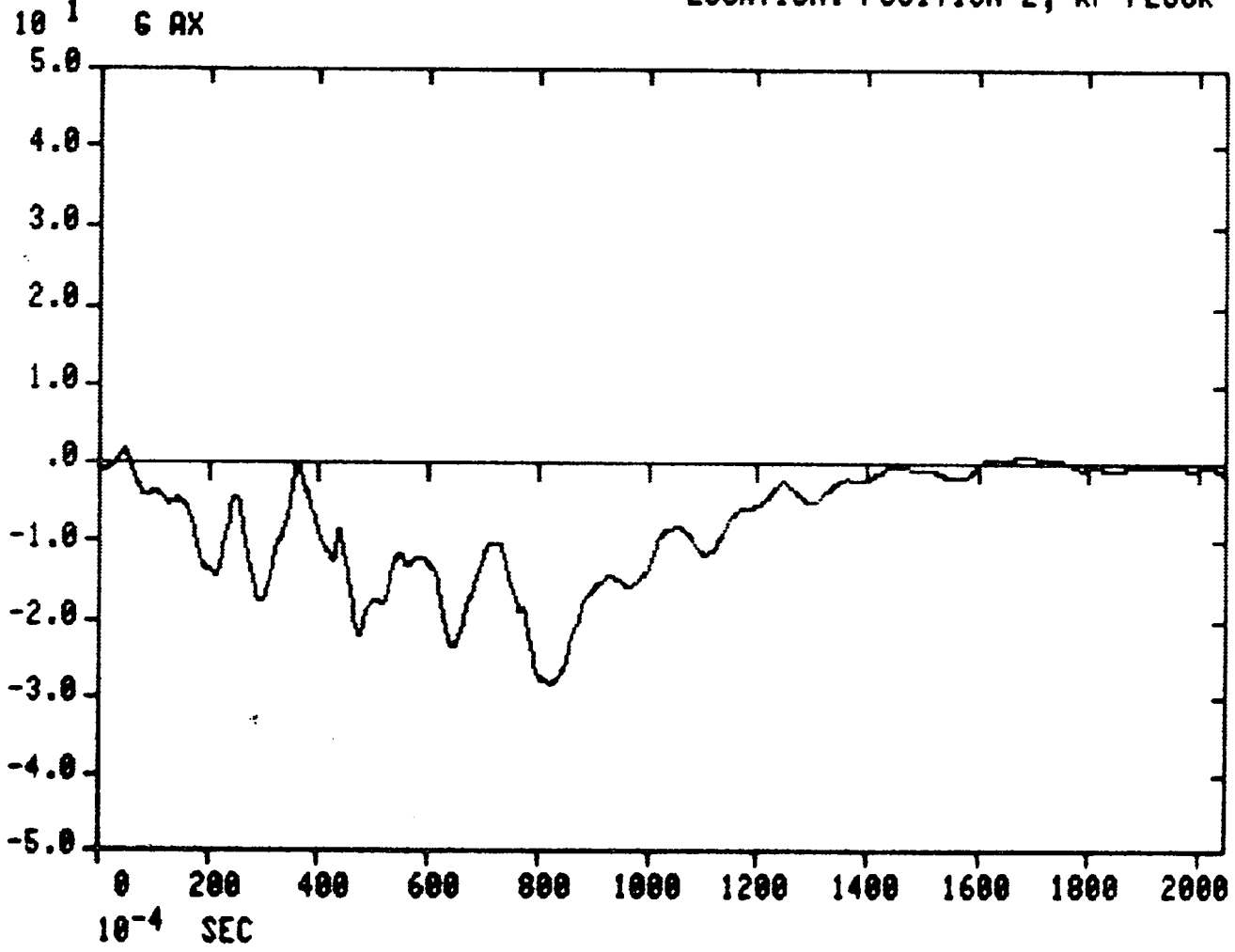


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 60
ACCELEROMETER: TAPE 1, CH 10
DIRECTION: FORWARD
LOCATION: POSITION 2, RF FLOOR

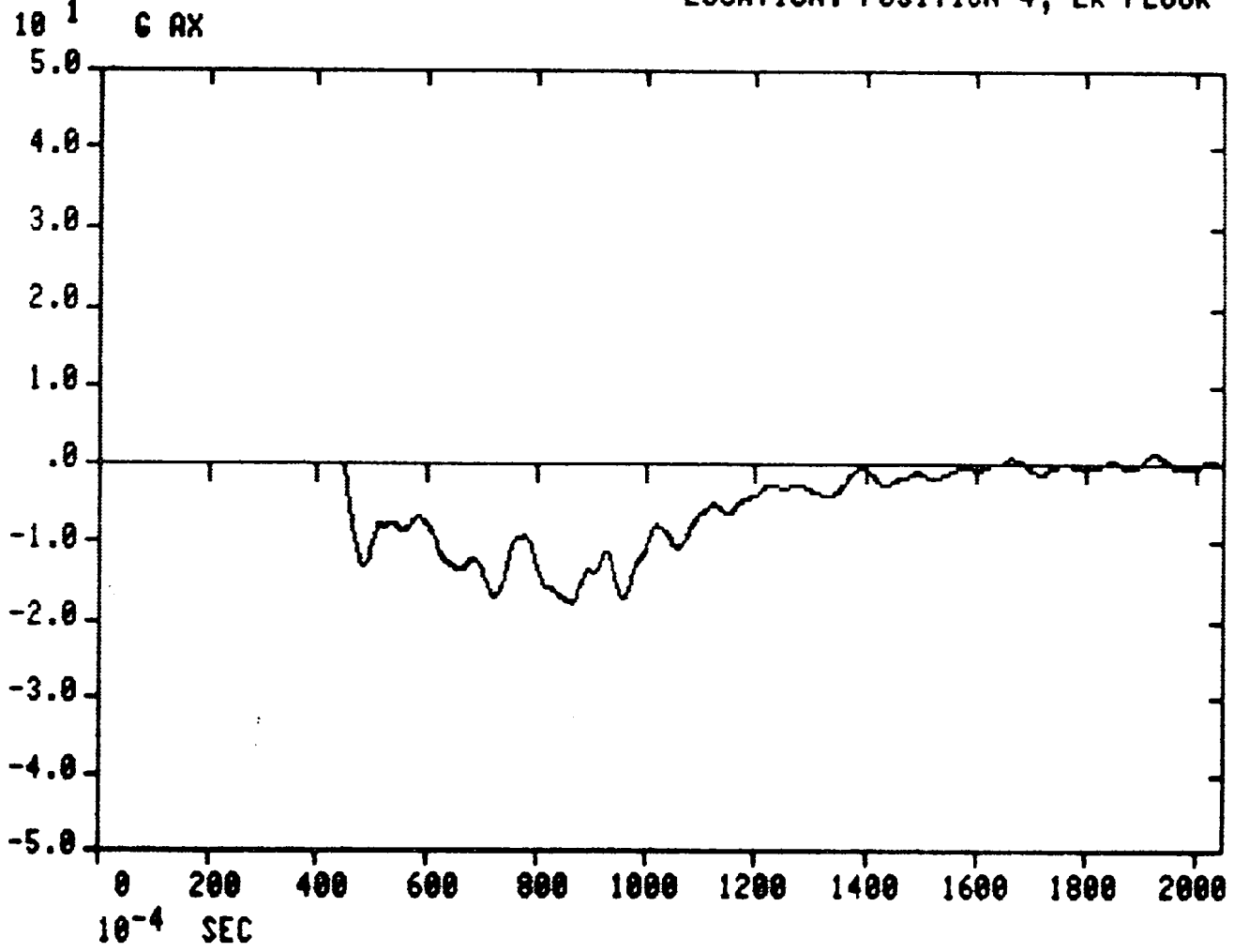


DOT CRASH PROGRAM

APPROVED ENGINEERING TEST LABS

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

MJO NO. : 671-1489-77
FILTER: CLASS 60
ACCELEROMETER: TAPE 1, CH 11
DIRECTION: FORWARD
LOCATION: POSITION 4, LR FLOOR

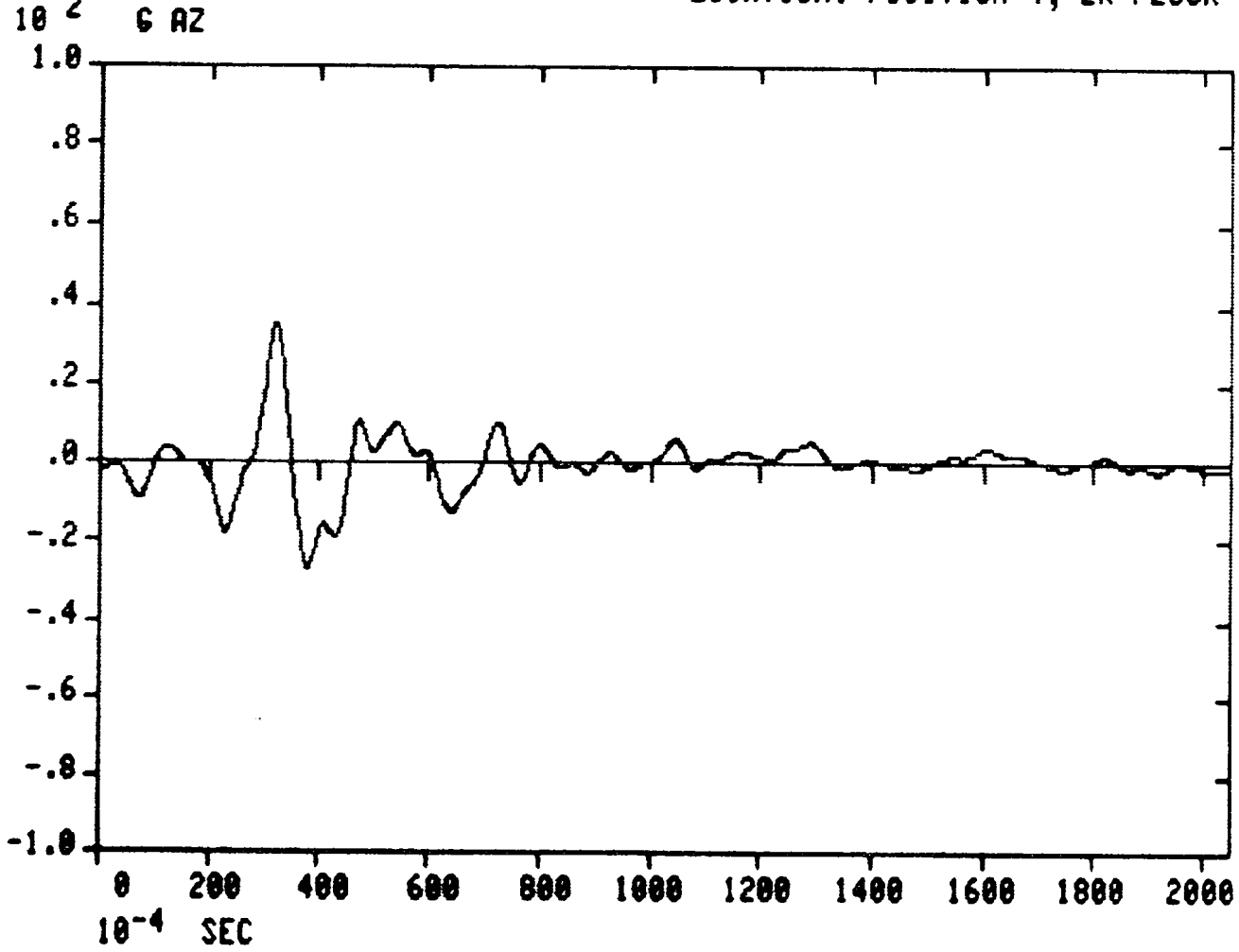


DOT CRASH PROGRAM

VEHICLE: FORD MUSTANG 2DR
VEHICLE ID: NHTSA 780206
TEST FILE NO. : 103
DATE: MAY 25, 1979

APPROVED ENGINEERING TEST LABS

MJO NO. : 671-1489-77
FILTER: CLASS 60
ACCELEROMETER: TAPE 1, CH 12
DIRECTION: UPWARD
LOCATION: POSITION 4, LR FLOOR



APPROVED ENGINEERING TEST LABORATORIES

SERVICE FOR: U. S. Department of Transportation
National Highway Traffic Safety Administration
Office of Research and Development
2100 Second Street S. W.
Washington, D. C. 20590

PURCHASE ORDER 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

R. D. Short, Division Manager

D. H. Hand, Project Engineer

R. E. Allen, Dynamics
R & D Department Manager

G. J. Valenzuela, Mechanical
Department Supervisor

R. J. McKelligott,
Quality Assurance Manager

rmh