



DOT 154

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

REPORT NO. 301-AETL-80-009-971-3882-9

NEW VEHICLE ASSESSMENT
AND
STANDARDS ENFORCEMENT INDICANT TESTING

FMVSS 301-75

GENERAL MOTORS CORPORATION
1980 OLDSMOBILE CUTLASS LS - 4 DOOR SEDAN
NHTSA 800111

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



SEPTEMBER 1980

FINAL REPORT

PREPARED FOR

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16. Abstract New Vehicle Assessment and Standards Enforcement Inducant Tests to the requirement of FMVSS 301-75, on a 1980 Oldsmobile Cutlass LS - 4 Door Sedan, NHTSA 800111, VIN-3R69HAR438366, was conducted at Approved Engineering Test Laboratories test facility in Fullerton, California. The moving barrier impact speed was 35.09 mph in the rear (0°) mode. Test date was July 29, 1980, and the ambient temperature was 97°F. The subject test vehicle appears to comply with all the requirements of FMVSS 301-75.			
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SECTION 1



SECTION 1

1.1 INTRODUCTION

This report contains information regarding a joint program for the Office of Vehicle Safety Compliance (OVSC), Office of Automotive Ratings (OAR), and Research and Development (R&D) for a vehicle assessment and standards enforcement indicant tests of fuel system integrity relative to Federal Motor Vehicle Safety Standard (FMVSS) No. 301-75. This test was performed under Contract Number DOT-HS-9-02273 by Approved Engineering Test Laboratories, 1536 East Valencia Drive, Fullerton, California, in accordance with the Office of Vehicle Safety Compliance (OVSC) Laboratory Procedures (TP212-02).

The specific purpose of this test was to obtain research and vehicle rating data in conjunction with fuel system integrity indicant data, when a vehicle is impacted in excess of the velocity (30 mph) requirements of FMVSS 301-75.

Section 2 contains general test and vehicle information, occupant/vehicle acceleration summary data, while Section 3 contains all compliance related data. Section 4 contains test dummy and vehicle measurements, along with camera positions. Section 5 describes ADPL's test facilities and data acquisition and reduction system.



SECTION 1

Appendix A contains additional photographs not related to vehicle compliance. Appendix B contains the computer generated plots, while Appendix C contains the dummy certification reports if applicable.

1.1 ADMINISTRATIVE DATA

A. References

1. Federal Motor Vehicle Safety Standard No. 301-75 "Fuel System Integrity" as published in the Federal Register, Volume 38, No. 22397, dated August 20, 1973.
2. National Highway Traffic Safety Administration - Office of Vehicle Safety Compliance Laboratory Procedures for Vehicle Assessment and Standards Enforcement Indicant Testing for "Windshield Mounting", FMVSS 212 - "Windshield Zone Intrusion", FMVSS 219 - "Fuel System Integrity", FMVSS 301-75, TP212-02, dated April 1, 1980.



SECTION 1

B. Description of Test Vehicle

1. 1980 Oldsmobile Cutlass LS - 4 Door Sedan
2. Vehicle Identification No.: 3R69HAR438366
3. NHTSA No.: 800111
4. Manufactured Date: November 1979
5. GVWR: 4,680 pounds

C. Dates

1. Vehicle Received: July 23, 1980
2. Start of Test: July 23, 1980
3. Completion of Test: July 29, 1980



SECTION 2



SECTION 2

2.0 GENERAL TEST INFORMATION AND SUMMARY DATA

The 1980 Oldsmobile Cutlass LS - 4 Door Sedan was subjected to a rear moving barrier impact and a static roll-over maneuver as required by Federal Motor Vehicle Safety Standard No. 301-75.

Two (2) Part 572 test dummies were positioned in each front designated outboard seating position and were restrained by the belt system in the test vehicle. Just prior to the impact event, the driver dummy head was painted with red chalk and the passenger dummy head painted with blue chalk to provide post-impact visual inspection of possible dummy head contact with interior components during the impact event.

TABLE 1

SUMMARY OF TEST CONDITIONS

TEST VEHICLE INFORMATION:

Manufacturer: General Motors Corporation
Make/Model: Oldsmobile Cutlass LS
Body Style: 4 Door Sedan Model Year: 1980
VIN: 3R69HAR438366 Build Date: November 1979
NHTSA No.: 800111 Color: Beige
Engine Data: Eight (8) Cylinders: 305.0 Cu. In. Displ.
Transmission Data: Three (3) Speed () Manual (x) Automatic
Major Options: Power Windows, Divided Front Seat, Air Condition, Tilt
Steering Wheel, AM Radio

VEHICLE ATTITUDE:

Delivered Attitude: LF 26.9 in.; RF 27.0 in.; LR 26.5 in.; RR 26.8 in.
Test Attitude: LF 26.1 in.; RF 25.9 in.; LR 25.3 in.; RR 25.1 in.

VEHICLE TIRE DATA:

Recommended Cold Tire Pressure: Front = 32 psi
(Up to Vehicle Load Capacity) Rear = 32 psi
Recommended Tire Size: P195/75R14 Load Range: unknown
Tires on Vehicle: P195/75R14 - w/s/w - Uniroyal
Spare Tire: X Yes; No; Space Saver: X Yes; No

Note: Spare T125/70D15 - Firestone

SUMMARY OF TEST CONDITIONS (Cont'd)

TEST CONDITIONS:Date of Test: July 29, 1980Time of Test: 1350Ambient Temperature: 97

°F at Impact Area

VEHICLE CAPACITY:Type of Seats: Bench; Bucket; X Split Bench

Designated Seating Capacity: Front 3
 Center 0
 Rear 3
 Total 6

Cargo: 160 lbs.Total 1,060 lbs. (Vehicle Capacity Weight)GVWR: 4,680 lbs. (Taken From Certification Label)GAWR: Front 2,330 lbs.; Rear 2,350 lbs.VEHICLE DELIVERED WEIGHT: (Fuel - 93% of NFC)Left Front 1,005 lbs.Left Rear 736 lbs.Right Front 1,012 lbs.Right Rear 758 lbs.Total Front Weight 2,017 lbs. (57.4 % of Total Vehicle Weight)Total Rear Weight 1,494 lbs. (42.6 % of Total Vehicle Weight)Total Delivered Weight 3,511 lbs.CALCULATED VEHICLE TEST WEIGHT: 3999 lbs.(With Required Dummies and 160 lbs. Cargo)ACTUAL VEHICLE TEST WEIGHT:Left Front 1,091 lbs.Left Rear 891 lbs.Right Front 1,094 lbs.Right Rear 907 lbs.Total Front Weight 2,185 lbs. (54.9 % of Total Vehicle Weight)Total Rear Weight 1,798 lbs. (45.1 % of Total Vehicle Weight)Total Test Weight 3,983 lbs.

SUMMARY OF TEST CONDITIONS (Cont'd)

TEST FLUID DATA:

Test Fluid Type: Red Standard Solvent ; Specific Gravity: 0.764

Kinematic Viscosity: 1.31

Nominal Fuel Capacity: 18.10 gals. (NFC)

Test Volume: 16.83 gals. (92-94% of NFC)

Fuel System Capacity: 18.00 gals.
(Data from Owner's Manual)

Electric Fuel Pump: Yes: X No; Fuel Injection: Yes: X No

Does Electric Fuel Pump Operate with Ignition Switch "On"

And the Engine Not Operating: Yes: NO; X N/A

Details of Fuel System: Fuel filler located rear center under trunk lid
recessed behind a hinged license plate door, fuel tank located horizontally
between frame side rails under trunk floor pan between rear bumper and
the differential.

VEHICLE TEST CONDITIONS:

Temperature in Occupant Compartment: N/A °F

Temperature of Windshield Glazing/Moulding: N/A °F

VEHICLE CRUSH AND REBOUND:

Overall Length of Test Vehicle: Pre-Test - Left 193.2 in.; Right 192.4 in.

Post-Test - Left 175.5 in.; Right 173.2 in.

Crush: Left 17.7 in.; Right 19.2 in.

Rebound (From Rigid Barrier Only): N/A in.

POST IMPACT SUMMARY

Vehicle 1980 Oldsmobile Cutlass LS

NHTSA No. B20111 Test Date July 29, 1980

TYPE OF TEST: ☐ 0° Frontal Impact
☐ 30° Oblique Impact (Driver/Passenger) Side
☒ Rear Impact

REQUIRED IMPACT VELOCITY RANGE: 34.5 to 35.5 mph

IMPACT VELOCITY: (Traps within 5 feet of impact event)

Trap 1 = 35.10 mph

Trap 2 = 35.08 mph

Average 35.09 mph

Actual distance from vehicle rear bumper to barrier face when entering timing trap 50.0 in.

Actual distance from vehicle rear bumper to barrier face when exiting timing trap 26.0 in.

VEHICLE STATIC CRUSH: Driver's Side = 17.7 inches

Passenger's Side = 19.2 inches

Average = 18.45 inches

Crush Details: Frame buckled under rear doors, roof buckled over both "C" posts, both dummies made contact with rear seat back.

VEHICLE REBOUND: (From rigid barrier only)

Driver's Side = N/A inches

Passenger's Side = N/A inches

Average = N/A inches



SECTION 3

SECTION 33.0 TEST DATA

The 1980 Oldsmobile Cutlass LS - 4 Door Sedan was subjected to a rear moving barrier impact and static rollover maneuver as required by Federal Motor Vehicle Safety Standard No. 301-75.

Color motion picture coverage of the impact along with the static rollover test 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 VI

POINT IMPACT SUMMARY

FUEL SYSTEM INTEGRITY - FMVSS 301-75

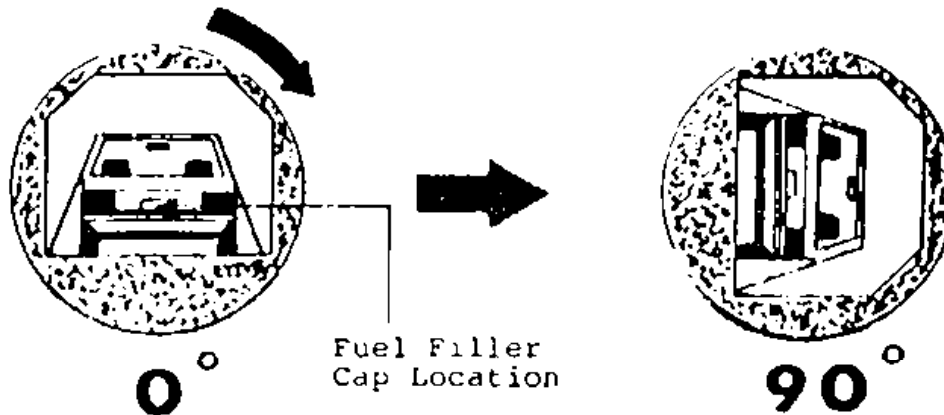
Vehicle 1980 Oldsmobile Cutlass LSNHTSA No. 800111 Test Date July 29, 1980

	Actual	Max. Allow.
Fuel spillage from impact until vehicle motion ceases.	- 0 -	1 ounce
Fuel spillage for 5 minute period following cessation of vehicle motion after impact.	- 0 -	5 ounces
Fuel spillage for next 25 minute period.	- 0 -	1 ounce/ 1 minute
Time duration from impact until start of rollover test periods.	30 min. 15 sec.	30 minutes

Fuel Spillage Location: Not Applicable

TABLE VII
FUEL SYSTEM INTEGRITY - FMVSS 301-75
STATIC ROLLOVER

Vehicle 1980 Oldsmobile Cutlass LS NHTSA No. 800111



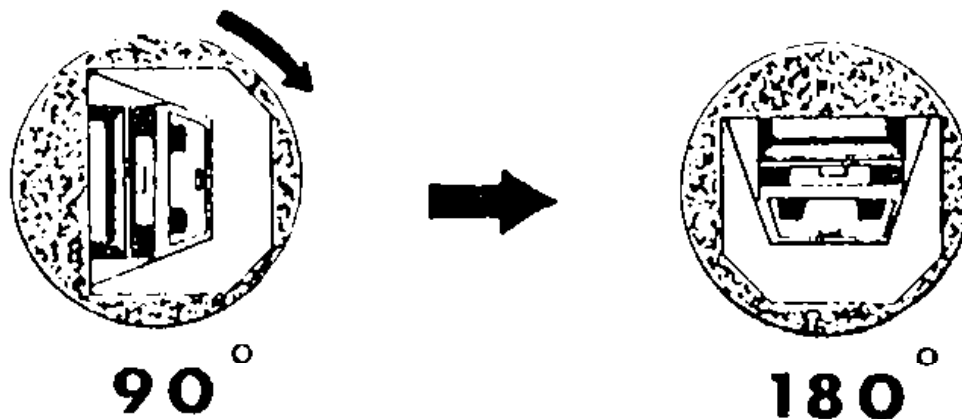
	Actual	Max. Allowed
Rollover fixture 90° rotation time	2 min. 15 sec.	1 to 3 Minutes
Fuel spillage during 5 minute period from onset of rotation	- 0 -	5 ounces
Fuel spillage during 6th minute period from onset of rotation	- 0 -	1 ounce
Fuel spillage during 7th minute period from onset of rotation	- 0 -	1 ounce

Fuel Spillage Location: Not Applicable

TABLE VIII

FUEL SYSTEM INTEGRITY - FMVSS 301-75

STATIC ROLLOVER

Vehicle 1980 Oldsmobile Cutlass LS NHTSA No. 800111

	Actual	Max. Allowed
Rollover fixture 90° rotation time	2 min. 10 sec.	1 to 3 Minutes
Fuel spillage during 5 minute period from onset of rotation	- 0 -	5 ounces
Fuel spillage during 6th minute period from onset of rotation	- 0 -	1 ounce
Fuel spillage during 7th minute period from onset of rotation	- 0 -	1 ounce

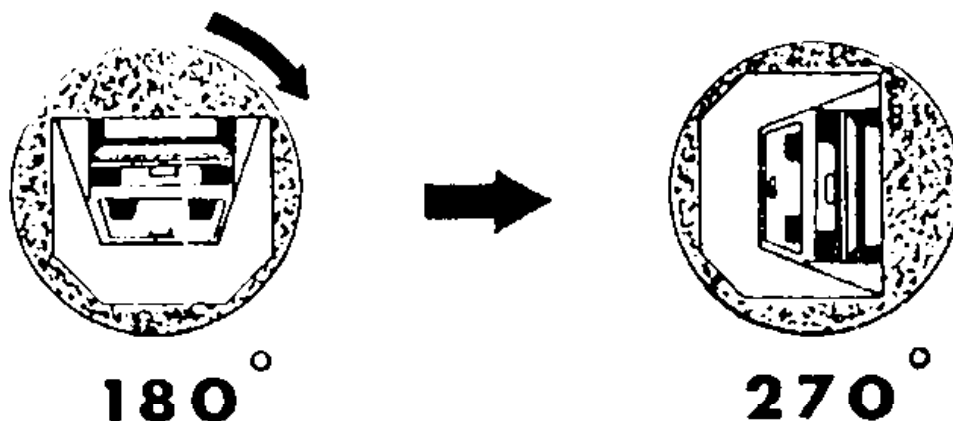
Fuel Spillage Location: Not Applicable

FUEL SYSTEM INTEGRITY - FMVSS 301-75

STATIC ROLLOVER

Vehicle 1980 Oldsmobile Cutlass LS

NHTSA No. 800111

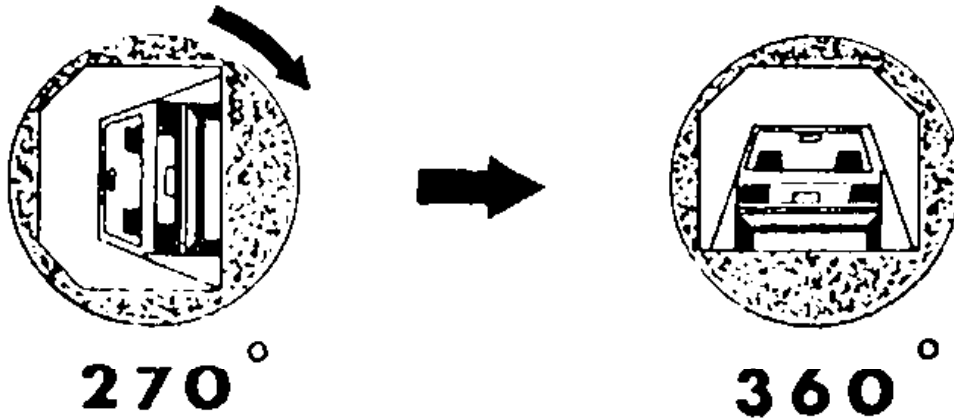


	Actual	Max. Allowed
Rollover fixture 90° rotation time	2 min. 16 sec.	1 to 3 Minutes
Fuel spillage during 5 minute period from onset of rotation	- 0 -	5 ounces
Fuel spillage during 6th minute period from onset of rotation	- 0 -	1 ounce
Fuel spillage during 7th minute period from onset of rotation	- 0 -	1 ounce

Fuel Spillage Location: Not Applicable

FUEL SYSTEM INTEGRITY - FMVSS 301-75

STATIC ROLLOVER

Vehicle 1980 Oldsmobile Cutlass LS NHTSA NO. 800111

	Actual	Max. Allowed
Rollover fixture 90° rotation time	2 min. 16 sec.	1 to 3 Minutes
Fuel spillage during 5 minute period from onset of rotation	- 0 -	5 ounces
Fuel spillage during 6th minute period from onset of rotation	- 0 -	1 ounce
Fuel spillage during 7th minute period from onset of rotation	- 0 -	1 ounce

Fuel Spillage Location: Not Applicable

SECTION 33.1 TEST RESULTS AND PHOTOGRAPHS

Post-impact inspection of the test vehicle revealed almost all crush occurred rearward of the front doors. The left and right frame rails buckled under the rear doors. Both rear tires were flat and the wheels were jammed. The roof buckled over both left and right "C" post and both rear doors were jammed. Both front seat backs bent backward unto the rear seat cushion. Both the driver and passenger dummy head made contact with the rear seat back cushion. The spare tire remained inflated.

No fuel spillage was recorded following the test vehicle impact, nor during the time period before the start of the rollover test. No fuel spillage was recorded during the rollover test increment time periods.

The 1980 Oldsmobile Cutlass LS - 4 Door Sedan test vehicle appears to comply with all the requirements of FMVSS 301-75.



Figure 3-1
1980 Oldsmobile Cutlass LS - 4 Door Sedan
NHTSA 800111
Pre-Test, Left Side View





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Figure 3-2

1980 Oldsmobile Cutlass LS - 4 Door Sedan

NHTSA 800111

Pre-Test, Full Rear View

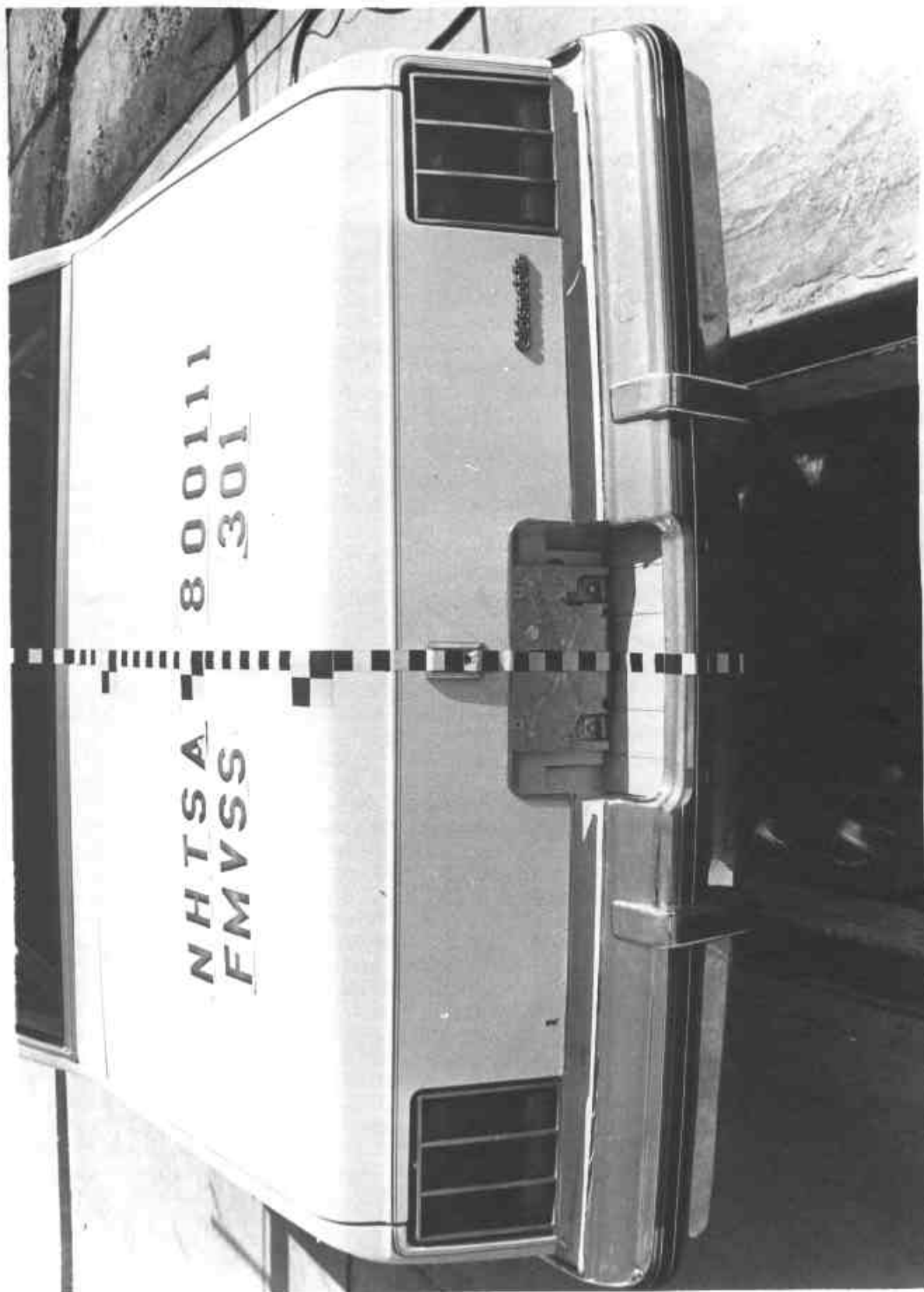
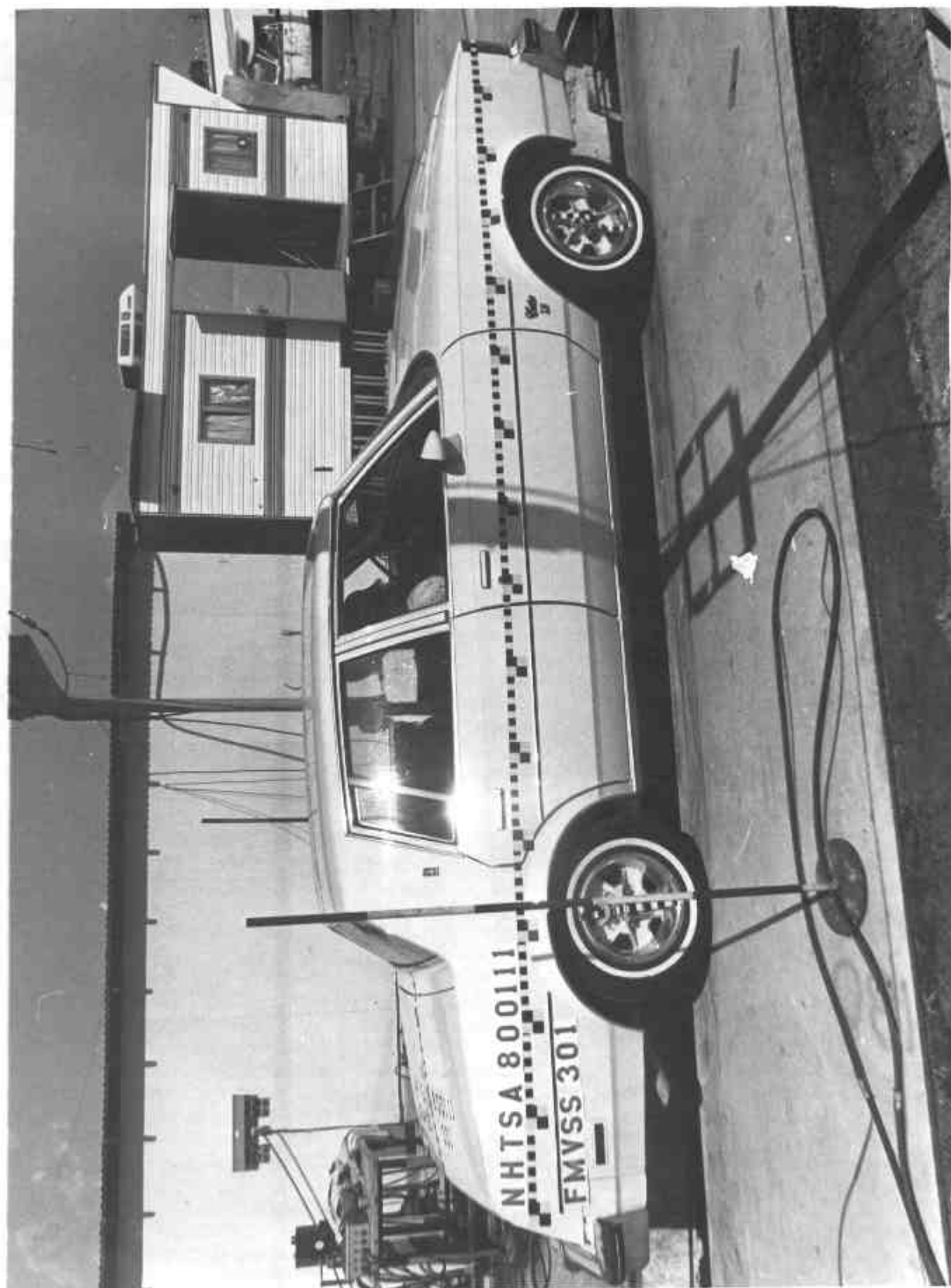




Figure 3-3
1980 Oldsmobile Cutlass LS - 4 Door Sedan
NHTSA 800111
Pre-Test, Right Side View





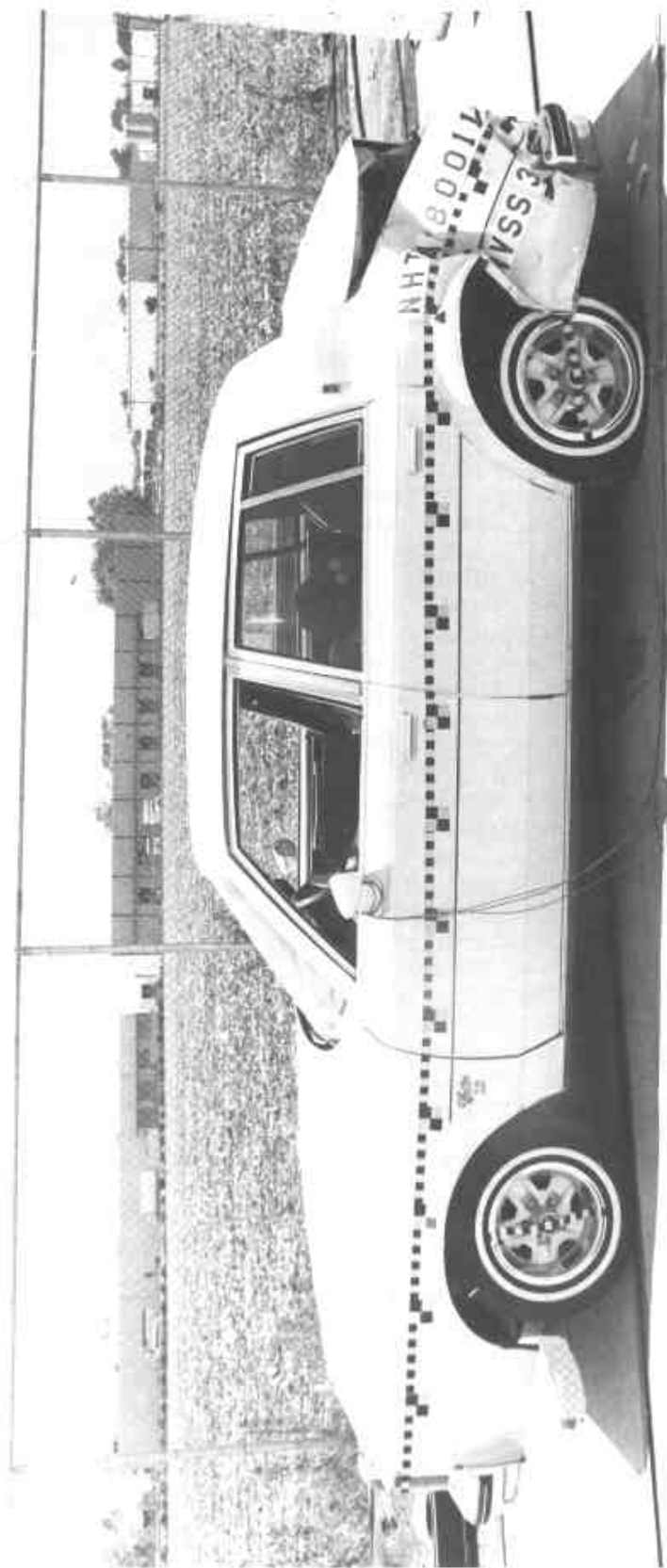
APPROVED ENGINEERING TEST LABORATORIES

Figure 3-4

1980 Oldsmobile Cutlass LS - 4 Door Sedan

NHTSA 800111

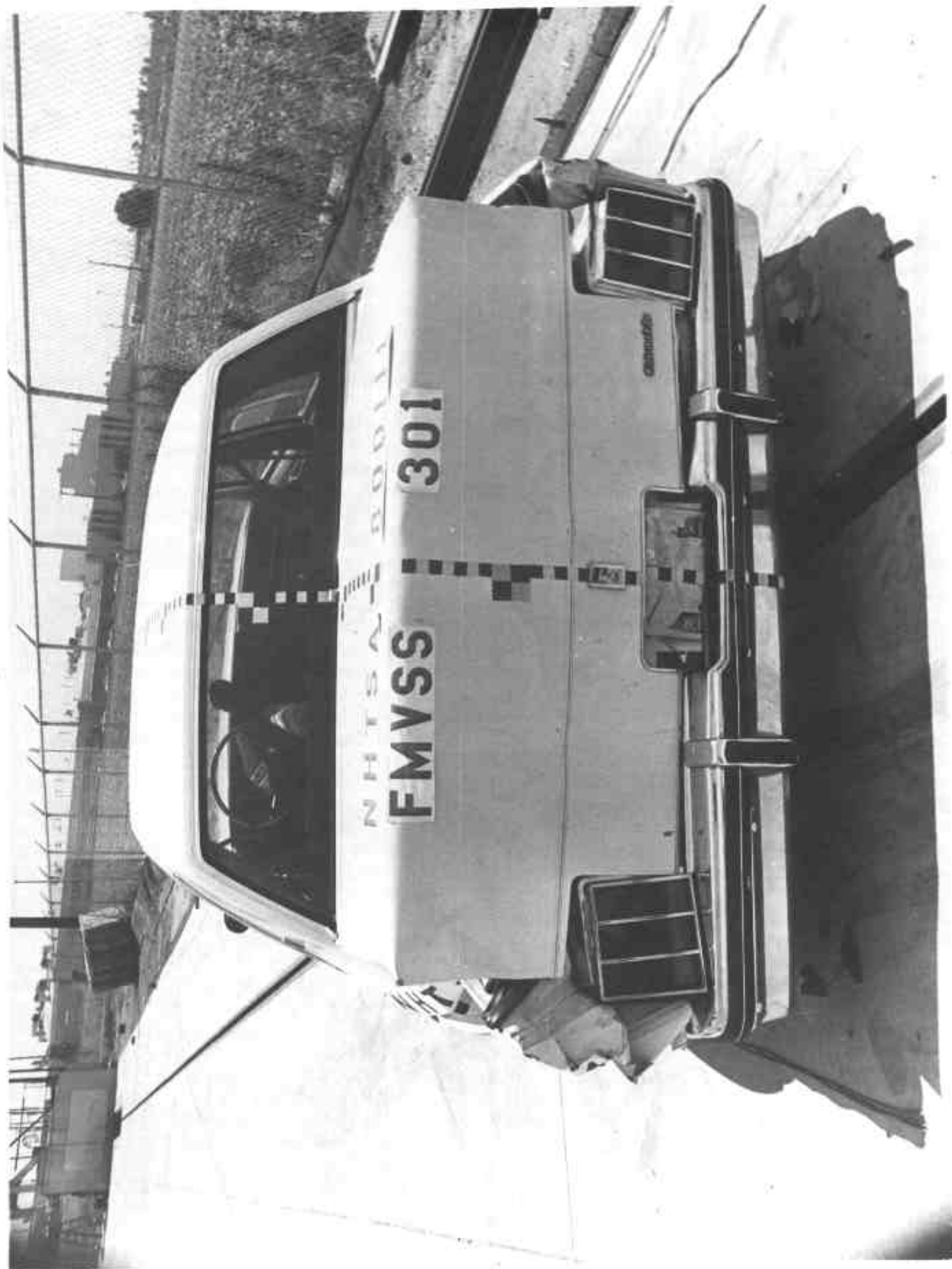
Post-Impact, Left Side View





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Figure 3-5
1980 Oldsmobile Cutlass LS - 4 Door Sedan
NHTSA 800111
Post-Impact, Full Rear View





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Figure 3-6
1980 Oldsmobile Cutlass LS - 4 Door Sedan
NHTSA 800111
Post-Impact, Right Side View





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Figure 3-7

1980 Oldsmobile Cutlass LS - 4 Door Sedan

NHTSA 800111

Post-Impact, Rollover Test, 90° Increment



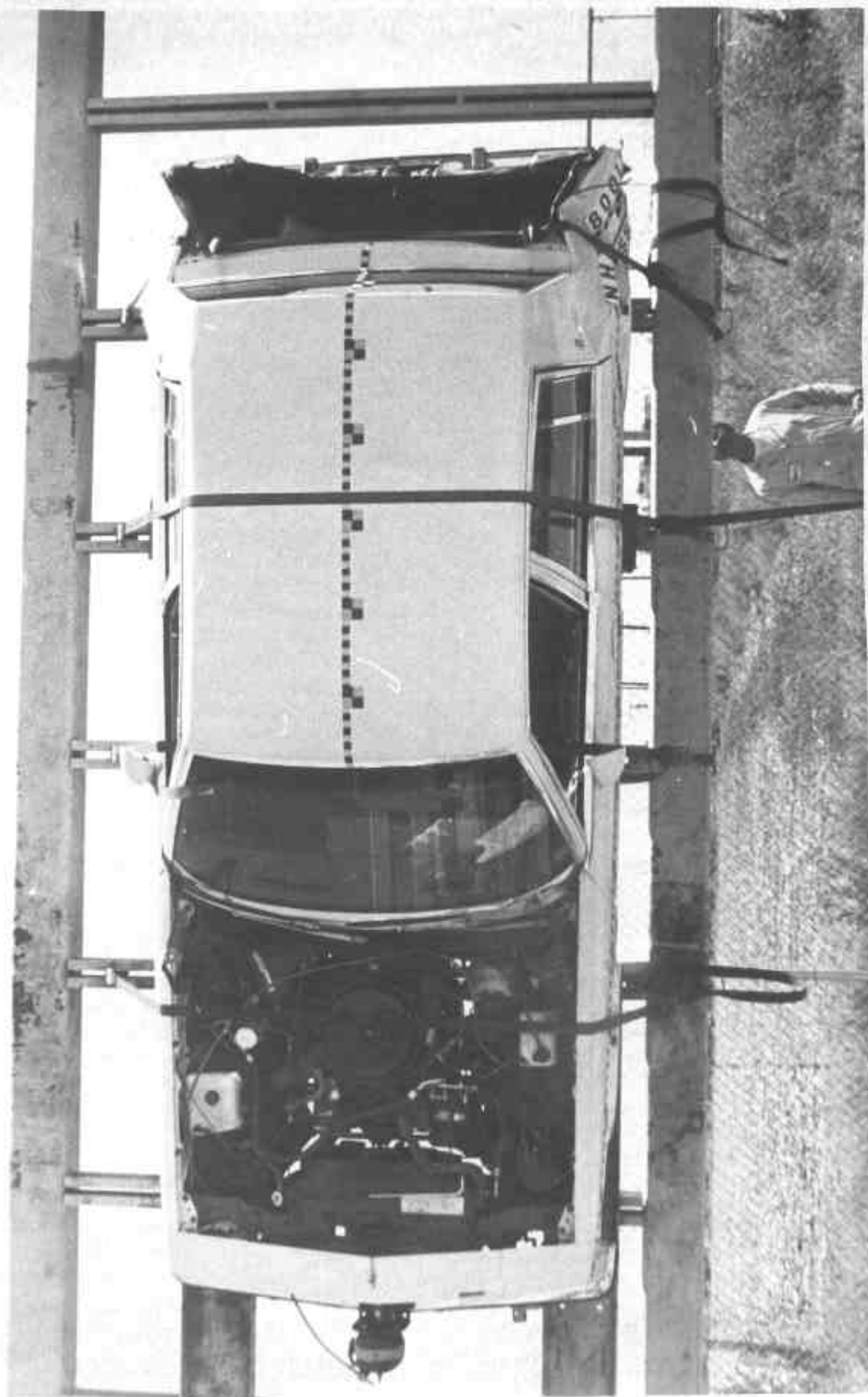


Figure 3-8

1980 Oldsmobile Cutlass LS - 4 Door Sedan

NHTSA 800111

Post-Impact, Rollover Test, 270° Increment





APPROVED ENGINEERING TEST LABORATORIES

SECTION 4



SECTION 4

4.0 OCCUPANT RESPONSE AND VEHICLE ACCELERATION SUMMARY DATA

The following data sheets summarize:

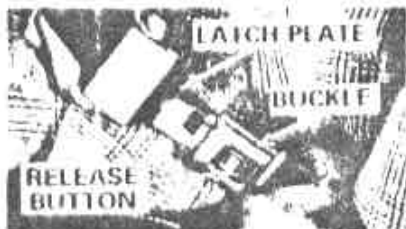
- A. The dummy position data (Part 572 Dummy Pre-Test Dummy Clearance Distances Sheet)
- B. The vehicle acceleration data (Vehicle Structural Data Sheet)
- C. The pre and post-test vehicle dimensions data (Vehicle Measurement Data Sheet)

More comprehensive data is presented in Appendix B in the form of computer plots.

MANUFACTURERS SEAT BELT INSTRUCTIONS

SEAT BELTS

To help lessen the chance of injury and/or the severity of injury in



accidents or sudden stops, General Motors urges that people riding in the car be properly restrained at all times, using the seat belts provided. This includes women that are pregnant and children of all ages. See the following pages for use of restraints by children and pregnant women.

FRONT SEAT
LAP-SHOULDER BELT:

- Close the front door fully (this activates the tension reliever).
- Adjust the front seat as needed and sit up straight and well back in the seat.

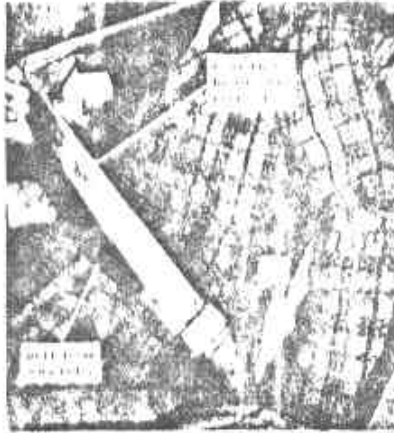


There are a number of ways the lap-shoulder belt may be put on easily. For example:

- The lap-shoulder belt may be put on using one hand by: (1) Holding the latch plate and pulling the belt as far as it will reach across your waist (see illustration). (2) Then, hold the latch plate at a right angle to the webbing. At the same time, slide it up the belt by raising it toward the upper outside corner of the windshield. (3) Finally, pull the latch plate down across your body and push it into the buckle until it clicks.
- One easy two-handed method is to hold the webbing just behind the latch plate using the hand nearest the belt. Then, bring it down across your body. While holding the webbing taut with one hand, slide the latch plate up the belt with the other hand. Finally, hold the latch plate and push it into the buckle until it clicks.

TABLE 4-1 (CONTINUED)

MANUFACTURERS SEAT BELT INSTRUCTIONS



- Position the "lap" portion of the belt across your hips as LOW ON THE THIGHS as possible. If the lap portion did not snug itself to your satisfaction, adjust it to a SNUG FIT by grasping the "shoulder" portion of the belt and pulling it UPWARD through the latch plate, until the lap portion is snug across the lap. This reduces the risk of sliding under the belt during an accident.

CAUTION: A snug fit with the lap belt positioned low on the hips is necessary to help lessen the chance and/or the severity of injury in an accident. This spreads the force of the lap belt over the strong hip bone instead of across the soft abdomen. To help lessen the chance and/or the severity of injury in an accident, never use the same belt for more than one person at a time, do not put the lap belt over the optional center armrest, if so equipped, do not wear belts twisted, and do not damage belts or let belt hardware become damaged by pinching them in the seat or door.

The shoulder portion of the front seat belt is designed to lock ONLY during a sudden stop or impact. At other times it is designed to move freely with the person.

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- For those who find the shoulder belt too snug, belt pressure against the chest can be reduced by using the tension reliever built into the retractor. To use this feature: (1) Start by pulling the belt outward far enough so that when you let go, it returns to the chest (Step "A"). (2) Then, adjust the belt tension by pulling down slightly on the shoulder portion of the belt and letting go (Step "B"). The LEAST amount of belt possible should be pulled from the retractor (about 25 millimeters or one inch) to minimize belt pressure.
- To release the tension reliever and get rid of slack, pull the shoulder belt out and let it retract. Or, lean far forward and then back.

CAUTION: Use the least amount of shoulder belt slack to minimize belt pressure. Too much belt slack could reduce the amount of protection because the belt may not be able to properly restrain you in an accident. Do NOT wear the shoulder portion of the belt under your arm nearest the door or other wise out of position. Such use could increase the chance and/or the severity of injury in an accident.

- To unfasten the belt, push in the button in the center of the buckle.

MANUFACTURERS SEAT BELT INSTRUCTIONS

- To stow the belt, pull it out about 150 millimeters (six inches) and let go. Hold the latch plate as it retracts to keep it from possibly striking people or things nearby. If you forget, the retractor is designed to rewind the belt when the front door is opened. If needed, slide the latch plate down the webbing to let the belt retract fully. Be sure that the belt is fully retracted and the latch plate is out of the way before closing the car door to help prevent damage to interior trim and the seat belt assembly.
- On 2-door models, a shoulder belt "pick-up" is attached to the side of the front seat or head restraint. The pick-up is designed to catch the shoulder belt and pull it forward when the front seatback is folded forward, to make it easier to enter the rear seat. (It is not intended that the shoulder belt pass through the pick-up.)

If the seat belt or reminder system does not work as described, see your dealer for service.



RESTRAINT OF PREGNANT WOMEN General Motors urges that pregnant women use a lap-shoulder belt whenever one is present. This will help lessen the chance of a pregnant woman and her unborn child being injured and/or will help reduce the severity of their injury in an accident. The lap belt should be used alone if a shoulder belt is not present. In either case, the lap belt should be worn as low and snug over the hips as possible, as advised for regular seat belt use. (See the preceding instructions.)

SEAT BELT TIGHT/BUZZER REMINDER When the key is turned to "RUN" or "START," a reminder light is designed to come on for four to eight seconds. It is to remind riders to fasten their seat belts.

If the driver's seat belt has not been buckled before turning the key to "RUN" or "START," a buzzer (or tone) is designed to sound for four to eight seconds (or until buckled) as a reminder.

TABLE 4-2

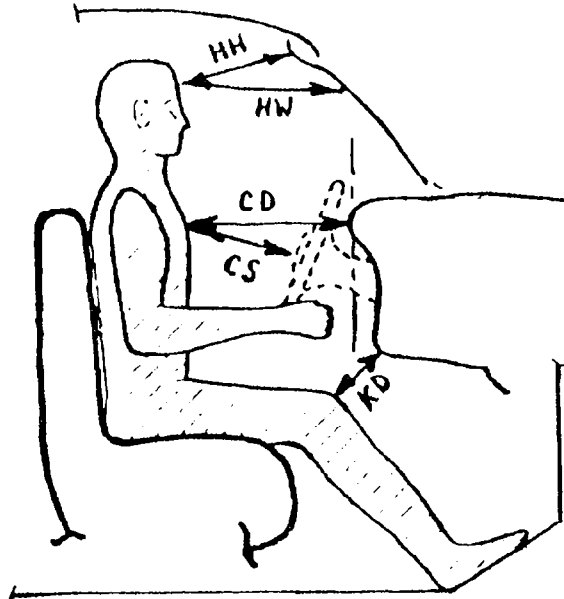
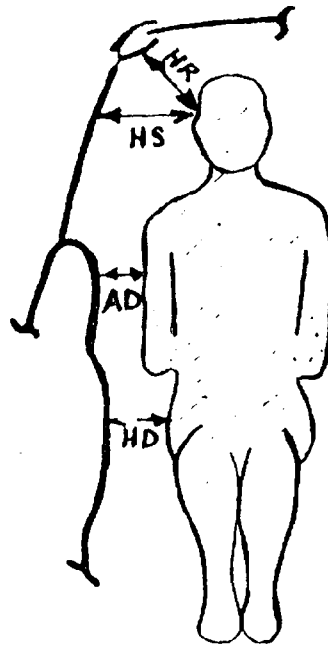
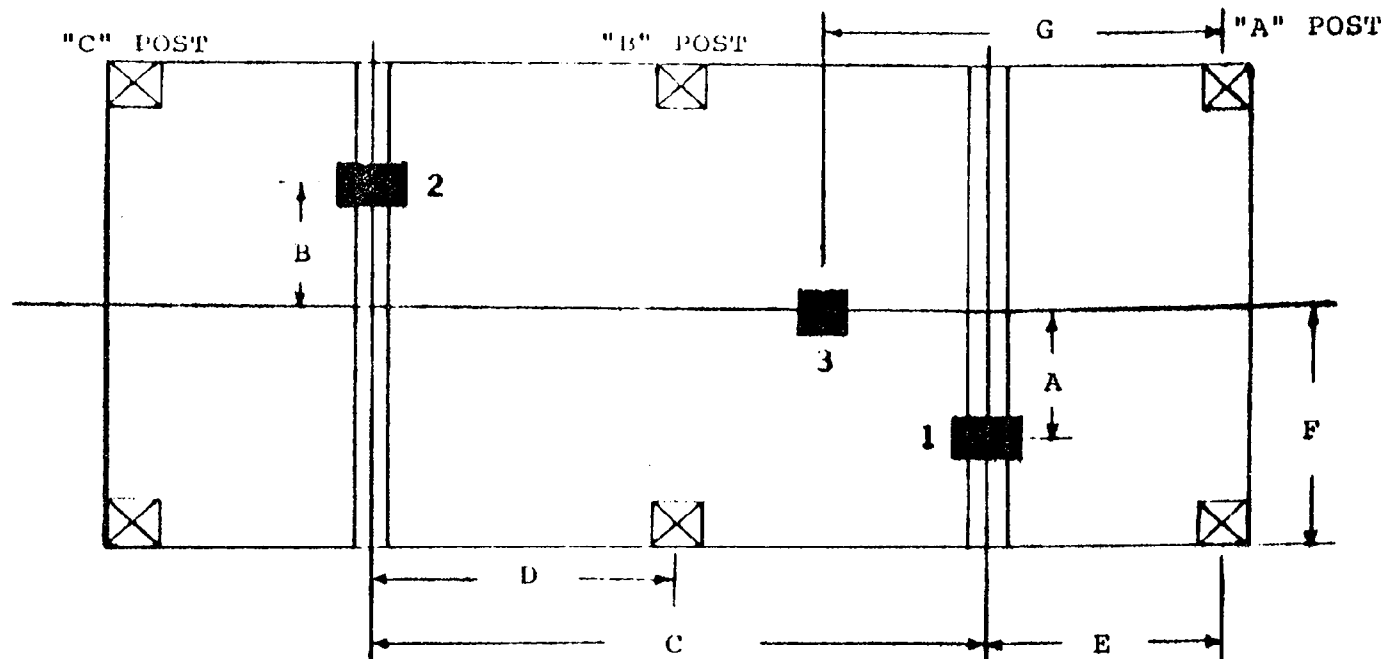
PART 5/2 DUMMY PRE-TEST CLEARANCE DISTANCESDRIVERHH = 15.5 in.HW = 23.0 in.HR = 7.2 in.HS = 10.5 in.CD = 22.3 in.CS = 14.5 in.AD = 5.5 in.HD = 5.8 in.KD = 9.6 in.PASSENGERHH = 15.3 in.HW = 24.0 in.HR = 7.5 in.HS = 10.3 in.CD = 27.0 in.AD = 5.2 in.HD = 5.7 in.KD = 8.5 in.

TABLE 4-3
VEHICLE STRUCTURAL DATA

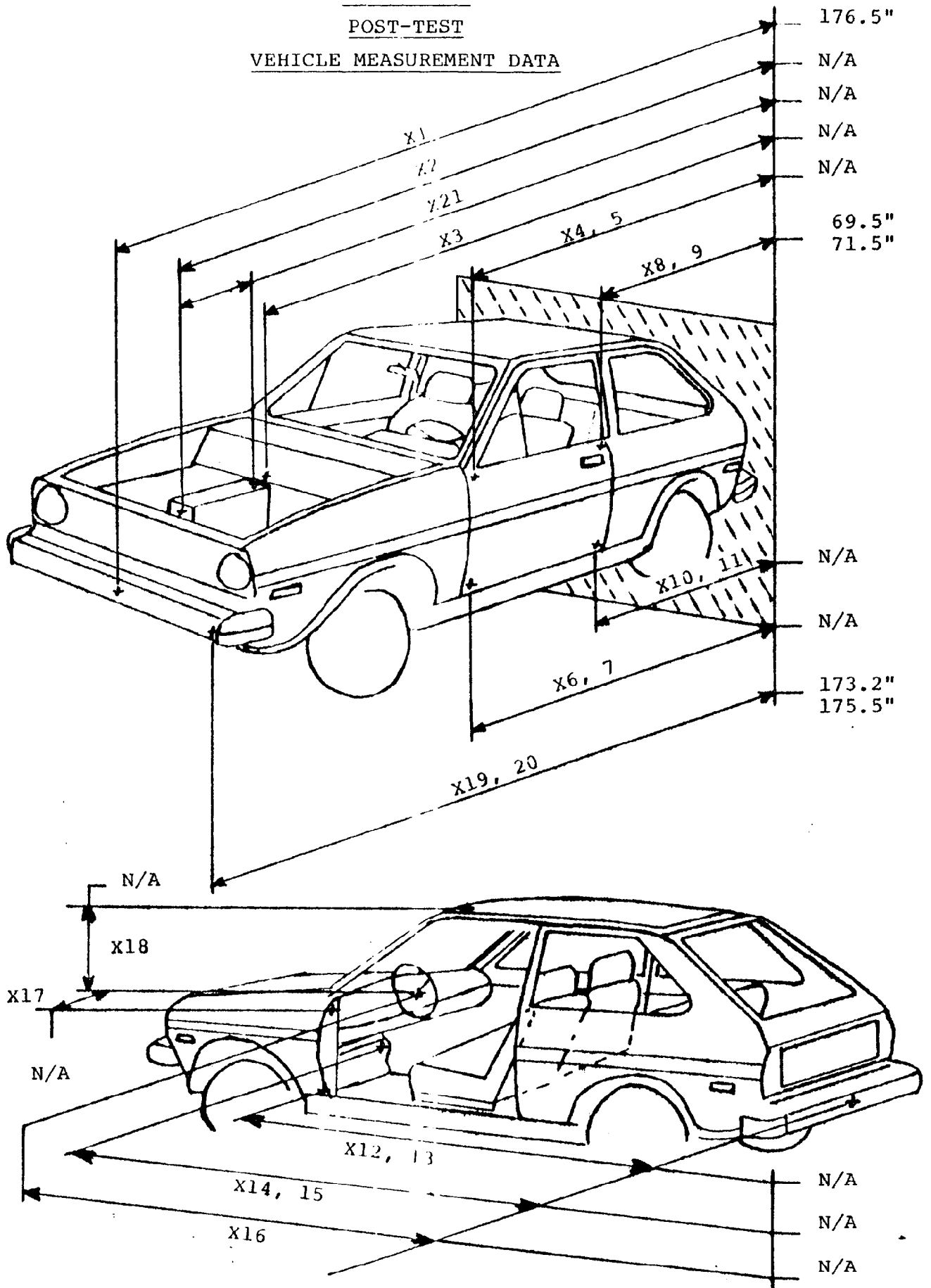
VEHICLE 1980 Oldsmobile Cutlass LS NHTSA NO. 800111



DIMENSIONS			
LOCATION	MEASUREMENT (IN.)	LOCATION	MEASUREMENT (IN.)
A	20.5	E	12.3
B	19.5	F	35.3
C	33.0	G	24.0
D	3.2		

ACCELERATION PEAKS				
ACCELEROMETER LOCATION	POSITIVE* DIRECTION		NEGATIVE* DIRECTION	
	PEAK "G"	TIME (MSEC)	PEAK "G"	TIME (MSEC)
NO. 1 LONGITUDINAL	20.3	65.0	3.7	137.0
NO. 2 LONGITUDINAL	22.8	45.0	3.6	22.0
NO. 3 LONGITUDINAL	23.3	84.0	10.5	110.0
*POSITIVE - LONGITUDINAL: FORWARD DIRECTION		*NEGATIVE - LONGITUDINAL: REARWARD DIRECTION		

TABLE 4-5
POST-TEST
VEHICLE MEASUREMENT DATA





APPROVED ENGINEERING TEST LABORATORIES

TABLE 4-6

SUMMARY

PRE-TEST AND POST-TEST VEHICLE DIMENSIONS

<u>Measurement Point</u>	<u>Pre-Test</u>	<u>Post-Test</u>	<u>Difference</u>
X1	196.3"	176.5"	19.8"
X8	89.3"	69.5"	19.8"
X9	89.4"	71.5"	17.9"
X19	192.4"	173.2"	19.2"
X20	193.2"	175.5"	17.7"

TABLE 4-1
FMVSS 301-75
CAMERA POSITIONS

VEHICLE 1980 Oldsmobile Cutlass LS

NHTSA NO. 800111

TEST DATE

July 29, 1980

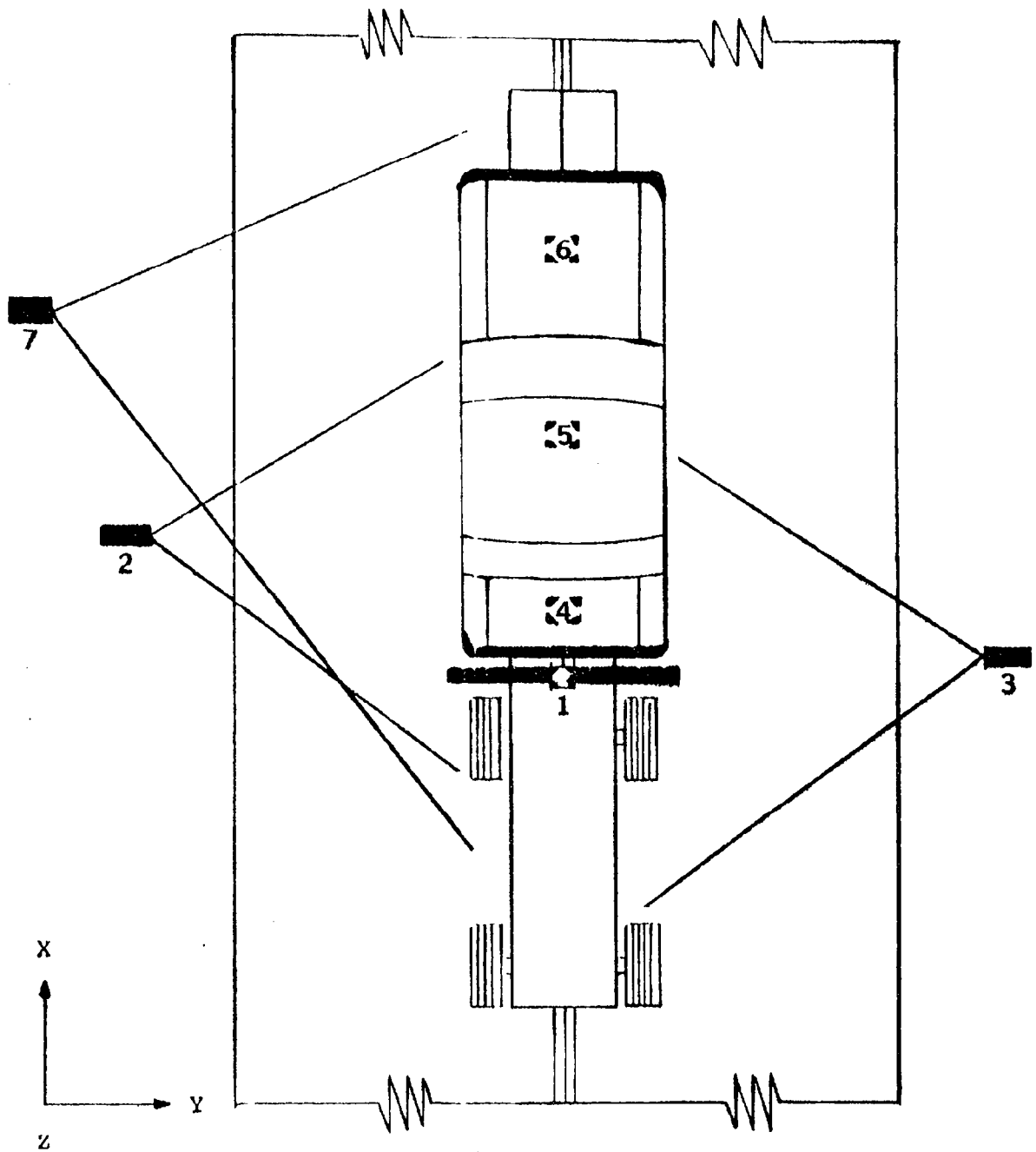


TABLE 4-8

FMVSS 301-75

CAMERA POSITIONS

VEHICLE 1980 Oldsmobile Cutlass LS

NHTSA NO. 800111

TEST DATE July 29, 1980

1. Photo-Sonics X 7.5"
 13mm 500FPS Y - 0 -
 Z 99.0"

2. Photo-Sonics X 71.0"
 13mm 500FPS Y 220.0"
 Z 40.5"

3. Photo-Sonics X 52.0"
 13mm 500FPS Y 188.0"
 Z 38.0"

4. Photo-Sonics X -20.0"
 13mm 500FPS Y 4.0"
 Z -45.0"

5. Photo-Sonics X 123.0"
 13mm 500 FPS Y - 0 -
 Z -33.0"

6. Photo-Sonics X 195.0"
 13mm 500FPS Y 2.0"
 Z -46.0"

7. Canon Scoopic
 12.5 - 75mm 24FPS
 - Documentary -



APPROVED ENGINEERING TEST LABORATORIES

SECTION 5



SECTION 5

5.0 TEST FACILITIES AND EQUIPMENT

Approved Engineering Test Laboratories (AETL) collision barriers, vehicle static rollover machine, and data processing/computer analysis test facilities are located at the Fullerton, California Division.

This section discusses these specialized facilities, along with associated equipment and instrumentation required for the performance of this test.

5.1 FRONTAL COLLISION BARRIER FACILITY

5.1.1 The frontal (fixed) collision barrier conforms to the requirements as set by the NHTSA Office of Vehicle Safety Compliance (OVSC) and as defined in the Laboratory Procedures for FMVSS 212/219/301-75, TP219-02, dated January 9, 1979, with the following special characteristics.

5.1.2 The fixed collision barrier is a steel clad, steel reinforced concrete block with a 6'4" X 12' face. The face is 1" steel plate faced with 3/4 inch plywood. The total mass of the structure is approximately 200,000 pounds, with a substantial portion below ground to provide resistance against sliding or tipping of the barrier during impact.



SECTION 5

5.1.3 The facility consists of a 500 foot concrete paved runway, with a steel monorail embedded in the approach surface. Two camera pits are provided to allow photographing the test vehicle at impact. One pit is located immediately in front of the fixed collision barrier and is 36 inches wide (expandable to 48 inches), 7 feet deep, and 23 feet long (3 feet of the pit length extends under the barrier face). The second (mid) pit with removable monorail section is located approximately 160 feet from the fixed collision barrier and is 43 inches wide, 7 feet deep, and 23 feet long.

5.1.4 Tow propulsion is provided by a fixed prime mover and continuous cable drive system located near the mid camera pit position. The power plant for the tow cable system is a 200 h.p. synchronous electric motor, coupled to an electronically controlled Eddy Current Clutch and a 4:1 gear reduction transfer assembly.

The endless 1/2 inch diameter steel tow cable is wrapped around the drive pulley and is tensioned by a pneumatic loaded idler wheel. The tow cable passes through the fixed collision barrier and around fixed idler pulleys to complete the loop. The test vehicle or moving collision barrier is towed by a dolly assembly attached to the vehicle.



SECTION 5

or moving collision barrier by a shear pin release mechanism. For a fixed collision barrier test, the test vehicle is towed within 20 feet of the fixed barrier, at which point the towing dolly assembly is disconnected from the test vehicle and the test vehicle proceeds under its own momentum for the final 20 feet to impact. For a moving collision barrier test, the moving collision barrier is towed within 5 feet of the test vehicle, at which point the towing dolly is disconnected from the moving collision barrier and the moving collision barrier proceeds under its own momentum for the final 5 feet to impact. Heavy steel stops actuate the tow cable release mechanism and prevent the towing dolly from continuing past the point of impact. The towing dolly is designed to fit inside the monorail such that it is constrained in the vertical and lateral directions, and capable of sliding freely along the monorail.

5.2 OBLIQUE ANGLE COLLISION BARRIER

5.2.1 The oblique angle collision barrier conforms to the requirements as set by NHTSA Office of Vehicle Safety Compliance (OVSC) Laboratory Procedures TP219-02, with the following special characteristics.



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5.2.2 The oblique angle collision barrier is constructed of a flat 1 1/2 inch steel plate faced with 3/4 inch plywood. The barrier face is 6' X 12' and is adjustable for left or right angle impacts by means of seven tubular gussets that attach to the standard fixed frontal collision barrier to form a rigid buttress structure.

5.3 MOVING COLLISION BARRIER

5.3.1 The moving collision barrier conforms to the requirements as set by Federal Motor Vehicle Safety Standard No. 208, Paragraph S8.2 with the following special characteristics.

5.3.2 The chassis is constructed of 12 inch steel channel with tubular frame gussets. The flat impacting face plate is 1/2 inch steel plate faced with 3/4 inch plywood. The face plate is reinforced with 6 inch steel channel horizontally welded to the chassis to form a rigid symmetrical structure. A camera boom extends above the barrier face plane to provide a view of barrier to vehicle impact. The barrier assembly weighs 3,977 pounds and has a four wheel electric brake system.



SECTION 5

5.4 VEHICLE STATIC ROLLOVER MACHINE

5.4.1 The vehicle static rollover machine conforms to the requirements as set by the NHTSA Office of Vehicle Safety Compliance (OVSC) Laboratory Procedures TP219-02 with the following special characteristics.

5.4.2 The vehicle static rollover machine is constructed of 10 inch square tube with adjustable wheelbase and tread width platforms to accommodate the various test vehicles. The total usable platform area is 8 feet wide and 25 feet long with special design feature to accomodate vehicles with a gross vehicle weight rating (GVWR) of 10,000 pounds or less with various body configuration heights to 12 feet. The test vehicle can be rotated left or right and can turn each 90° rotational increment in approximately two (2) minutes.

5.5 IMPACT VELOCITY MEASUREMENT

The test vehicle impact velocity is measured by two (2) separate certification timing trap systems located within five (5) feet of the vehicle to fixed collision barrier face and to one side on the approach apron. Each timing



SECTION 5

trap system contains two (2) optical beams, mounted twenty four (24) inches apart, in a mechanical housing assembly providing a start-stop signal to a digital display counter. As the test vehicle traverses the impact apron, a blade attached to the test vehicle rear fender interrupts each optical beam providing the precise measurement of time interval for the test vehicle to advance the known distance between the optical beams. Each interval of time measurement is stored in the digital display counter and photographically recorded.

The moving collision barrier impact velocity is measured by two (2) separate certification timing trap systems located within five (5) feet of the moving collision barrier to vehicle impact location and to one side on the approach apron. Each timing trap system contains two (2) optical beams, mounted twenty-four (24) inches apart, in a mechanical housing assembly providing a start-stop signal to a digital display counter. As the moving barrier traverses the impact apron, a blade attached to the moving barrier side interrupts each optical beam providing the precise measurement of time interval for the moving barrier to advance the known distance between the optical beams. Each interval of time measurement is stored in the digital display counter and photographically recorded.



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5.6 PHOTOGRAPHIC COVERAGE

5.6.1 Because FMVSS 212/219/301-75 may be a combined test, it is necessary that all photographic coverage of the test vehicle be done at one time with specific photographs to document the areas for Vehicle Safety Compliance consideration; windshield area and the fuel system. Each report will utilize only those photographs pertaining to the Vehicle Safety Compliance Test being reported.

5.6.2 FIXED BARRIER IMPACT TEST

Motion picture coverage of the event employs seven (7) 16mm 1B Photo-Sonics cameras and four (4) 16mm 51 Redlake Locam cameras using color film at 500 frames per second (fps).

Also a 16mm Canon Scoopic 24 frames per second (fps) camera with color film is used to record vehicle pre-test condition, vehicle in-run, impact, and post-impact vehicle conditions including the rollover increments for documentary purposes. The eleven (11) high speed cameras are located at stationary positions near the point of impact. One is an overhead camera mounted on a tower above the fixed barrier face on centerline of the test vehicle at impact. Its field of view includes the barrier face and the front of the vehicle to a point about one foot aft of the windshield. A second and third camera are mounted on top of the fixed barrier with



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their field of view concentrating on the windshield area (FMVSS 212/219). The fourth and fifth cameras each have a side view of the test vehicle at impact. The sixth, seventh, eight, and ninth cameras are located adjacent to the test vehicle front passengers compartment and positioned to photograph motion of each test dummy at impact. The tenth and eleventh cameras are located in the pit and positioned to photograph the underside of the engine compartment and fuel tank area.

5.6.3 MOVING BARRIER IMPACT TEST

Motion picture coverage of the event employs four (4) 16mm 1B Photo Sonics cameras and two (2) 16mm 51 Redlake Locam cameras using color film at 500 frames per second (fps). Also a 16mm Canon Scoopic 24 frames per second (fps) camera with color film is used to record vehicle pre-test condition, barrier in-run, impact, and post-impact vehicle conditions including the rollover increments for documentary purposes. Five (5) of the high speed cameras are located at stationary positions near the point of impact. Three (3) cameras are located in the pit and positioned to photograph the underside of the engine compartment, with overlapping field of views, aft to the fuel tank area. The fourth and fifth cameras each have a side view of the test vehicle at impact.



SECTION 5

The sixth camera is attached to the moving collision barrier to photograph the contact between the barrier and the test vehicle.

5.6.4 TIME PULSE GENERATOR

Time data from two (2) sources are contained in the high speed film coverage. The first is a time reference of 100 pulse per second (pps) light emitting diode event mark along the film edge. This pulse is generated by the time pulse generator and fed to all high speed cameras. Thus, it is possible to relate film data to a real time base. The second time record is an indication of time zero (moment of impact). This is accomplished by a trip switch and event mark system. The trip switch is positioned at the impact point so that it triggers the light emitting diode event mark along the film edge at the moment of bumper-barrier contact. Thus, the particular film frame corresponding to the point of impact is clearly indicated on all the high speed film.



SECTION 5

5.7 DATA ACQUISITION AND REDUCTION

The data acquisition and analysis system used for acquiring occupant response and vehicle acceleration are shown schematically in Figure 5-1. A complete list of instrumentation is provided in Table 5-1. An itemized procedure for acquiring data is provided on Table 5-2.

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 32K word core storage. This system uses four program controlled analog filters which provides pre-digitizing filter capability of 60 db/octave above 1250 Hz.



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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 eight total sets. Table 5-3 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. (Eight vehicle sets are stored on each magnetic disc. All magnetic discs and FM recorder tapes are retained on file at AETL).

The only modifications to the data at the time of permanent storage is the filtering and digitizing process of the FM tape recorder (2500 Hz) and the DFA (2000 Hz sampling for a 500 ms window). After the data is moved to permanent storage it is recalled by test personnel and plotted with the appro-



SECTION 5

priate labels and vehicle designation. As the data is recalled, the DFA is programmed to automatically apply the appropriate SAE filter where applicable.

A 1250 Hz predigitizing analog filter with a rolloff of 60 db/octave, shown in figure 5-2, was applied to all data. Also shown in figure 5-2 are SAE class 60 and class 180 filters. These filters are in accordance with SAE J211A, Instrumentation for Impact Tests. These SAE recommended filters are quadratic double pole with 65% damping and a 12 db/octave rolloff. They are applied using a fast fourier transform of the data, frequency domain multiplication, and an inverse fast fourier transform of the product. The class 60 filters is applied to vehicle acceleration and belt restraint forces. The class 180 filter is applied to chest acceleration. SAE filters were not applied to head accelerations and femur forces.

5.7.1 IMPACT DATA

All impact data is presented in computer plots of data digitized at 500 microseconds. Special SAE filters are applied to appropriate data sets. Each data plot includes labeling, defining the test vehicle, filter class, and the complete identification of the data plotted.



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5.7.1.2 DUMMY HEAD DATA

The dummy head accelerations are processed 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 iterations 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.

5.7.1.3 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.

5.7.1.4 FEMUR LOAD DATA

The dummy femur loads are processed and presented as computer plots.



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5.7.1.5 RESTRAINT LOAD DATA

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

5.7.1.6 VEHICLE ACCELERATION DATA

The vehicle accelerations are processed as class 60 data,
and presented as computer plots.

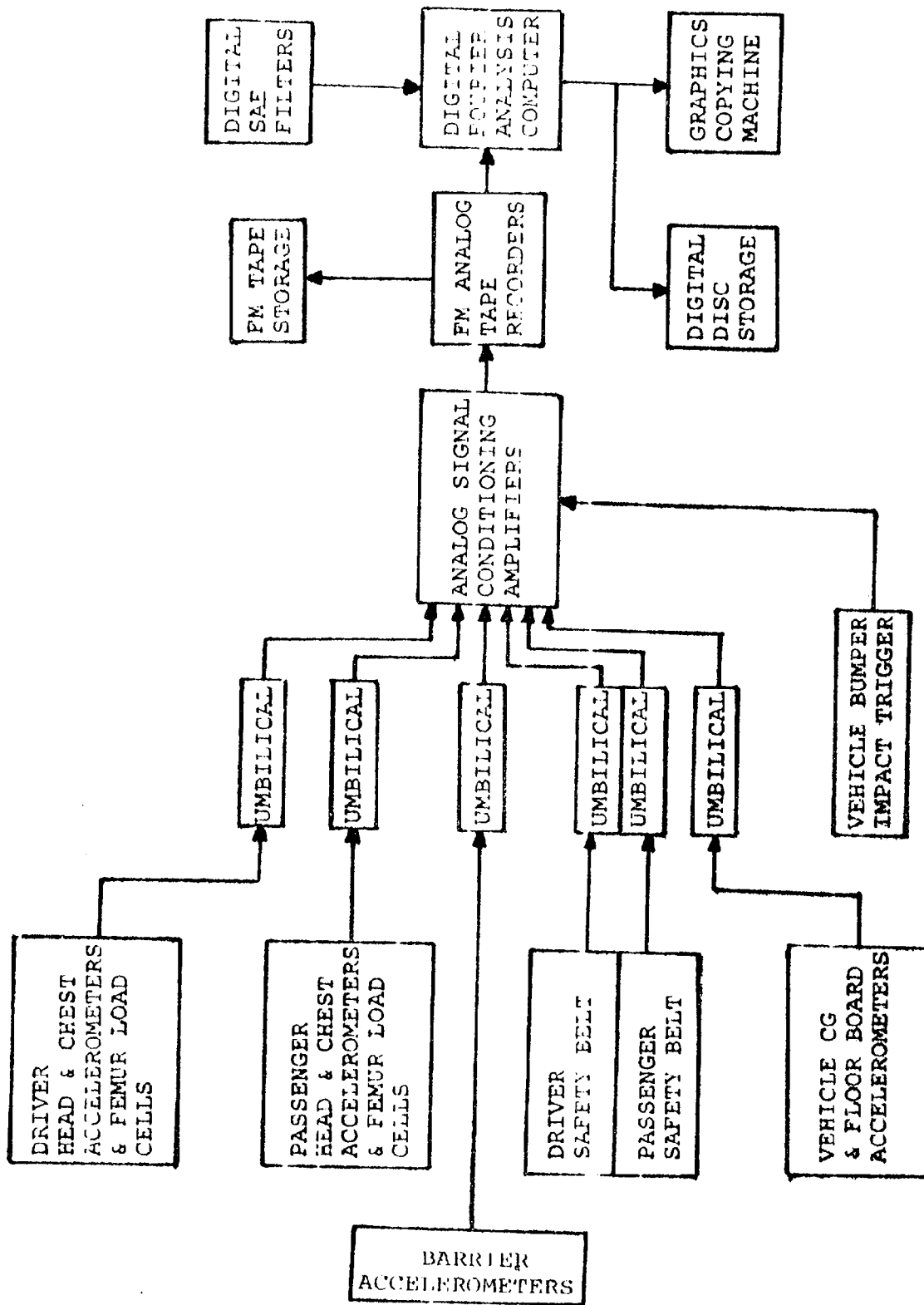


FIGURE 5-1

TABLE 5.1 INSTRUMENTATION FOR CRASH TEST

<u>Instrument</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Full Scale</u>	<u>Accuracy</u>	<u>Frequency Max.</u>
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 WE
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	-	-



APPROVED ENGINEERING TEST LABORATORIES

TABLE 5-2

DATA ACQUISITION AND REDUCTION PROCESS

<u>STEP</u>	<u>DESCRIPTION</u>
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 Transferred 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

TABLE 5-3

DATA DESIGNATIONS FOR VEHICLE CRASH IMPACT DATA ACQUISITION

DATA SET	TAPE NO.	CHANNEL NO.	DESCRIPTION
1	1	1	Driver Longitudinal Head Acceleration Ax
1	1	2	Driver Lateral Head Acceleration Ay
1	1	3	Driver Vertical Head Acceleration Az
1	1	4	Driver Right Femur Force
2	1	5	Driver Longitudinal Chest Acceleration Ax
2	1	6	Driver Lateral Chest Acceleration Ay
2	1	7	Driver Vertical Chest Acceleration Az
2	1	8	Driver Left Femur Force
3	1	9	Driver Restraint Belt Force
3	1	10	Vehicle Vertical CG Acceleration Az
3	1	11	Vehicle Lateral CG Acceleration Ay
3	1	12	Vehicle Longitudinal CG Acceleration Ax
4	1	13	Left Rear Floor Pan Longitudinal Acceleration Ax
4	1	14	Left Rear Floor Pan Vertical Acceleration Az
5	2	1	Passenger Longitudinal Head Acceleration Ax
5	2	2	Passenger Lateral Head Acceleration Ay
5	2	3	Passenger Vertical Head Acceleration Az
5	2	4	Passenger Right Femur Force
6	2	5	Passenger Longitudinal Chest Acceleration Ax
6	2	6	Passenger Lateral Chest Acceleration Ay
6	2	7	Passenger Vertical Chest Acceleration Az
6	2	8	Passenger Femur Force
7	2	9	Passenger Restraint Belt Force
7	2	10	Barrier Lateral Acceleration Ay
7	2	11	Barrier Longitudinal Acceleration Ax
7	2	12	Barrier Vertical Acceleration Az
8	2	13	Right Front Floor Pan Longitudinal Acceleration Ax
8	2	14	Right Front Floor Pan Vertical Acceleration Az

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

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

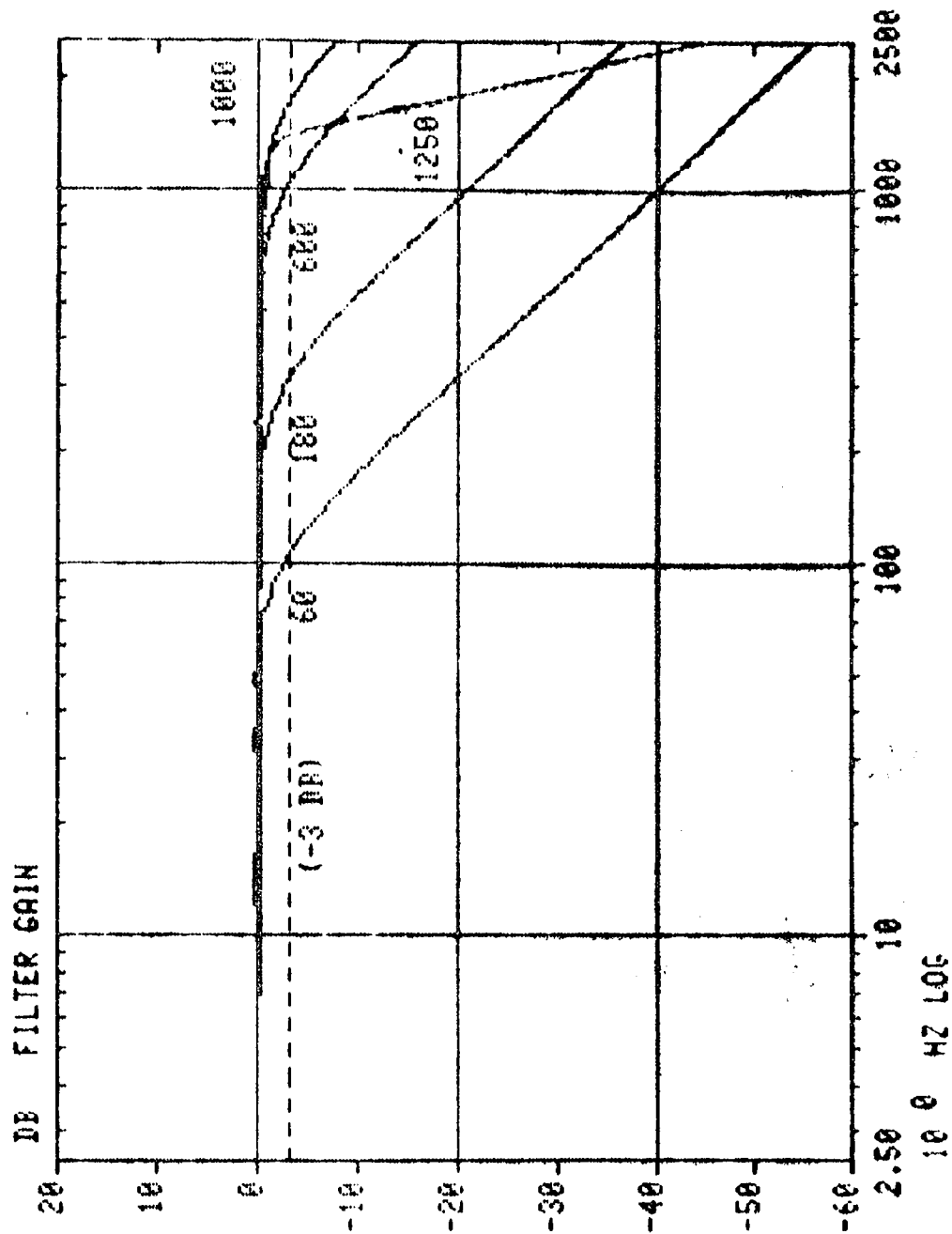


FIGURE 5-2



APPROVED ENGINEERING TEST LABORATORIES

APPENDIX A



APPROVED ENGINEERING TEST LABORATORIES

APPENDIX A

The following photographs are pre and post test dummy positions and interior compartment locations of dummy contact during the impact event.



APPROVED ENGINEERING TEST LABORATORIES

Figure A-1
1980 Oldsmobile Cutlass LS - 4 Door Sedan
NHTSA 800111
Pre-Test, Driver Dummy View





APPROVED ENGINEERING TEST LABORATORIES

Figure A-2
1980 Oldsmobile Cutlass LS - 4 Door Sedan
NHTSA 800111
Pre-Test, Passenger Dummy View





APPROVED ENGINEERING TEST LABORATORIES

Figure A-3
1980 Oldsmobile Cutlass LS - 4 Door Sedan
NHTSA 800111
Post-Impact, Driver Dummy View





APPROVED ENGINEERING TEST LABORATORIES

Figure A-4
1980 Oldsmobile Cutlass LS - 4 Door Sedan
NHTSA 800111
Post-Impact, Driver Dummy Contact Area





Figure A-5
1980 Oldsmobile Cutlass LS - 4 Door Sedan
NHTSA 800111
Post-Impact, Passenger Dummy Contact Area



APPENDIX B



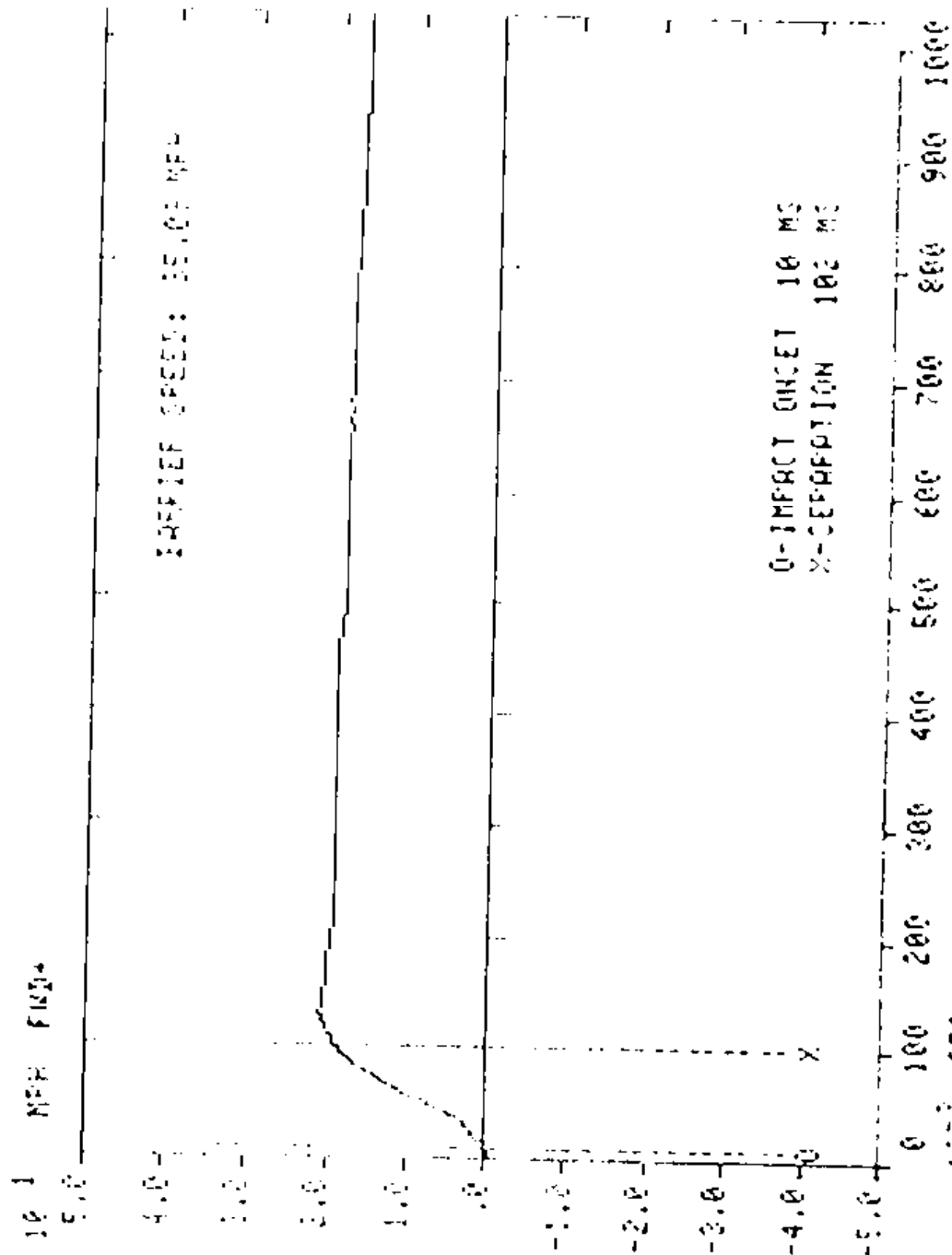
APPENDIX B

The following computer plots provide complete and comprehensive vehicle acceleration during the rear moving barrier impact test of a 1980 Oldsmobile Cutlass LS - 4 Door Sedan, NHTSA 800111.

VEHICLE LEFT REAR FLOORPLATE VELOCITY

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Figure 6

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| Year | Percentage of Population Aged 15 and Over Who Are Illiterate |
|------|--|
| 1900 | 80 |
| 1910 | 40 |
| 1920 | 35 |
| 1930 | 25 |
| 1940 | 18 |
| 1950 | 12 |
| 1960 | 10 |

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2020-2021 | 2021-2022 | 2022-2023 | 2023-2024

DATE RECEIVED: 09/07/2014



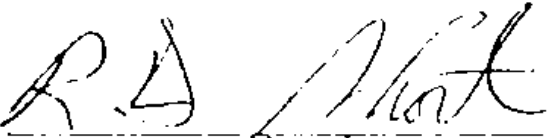
APPROVED ENGINEERING TEST LABORATORIES

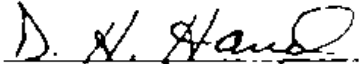
SERVICE FOR: U. S. Department of Transportation
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
400 Seventh Street S. W.
Washington, D. C. 20590

CONTRACT NUMBER: DOT-HIS-9-02273

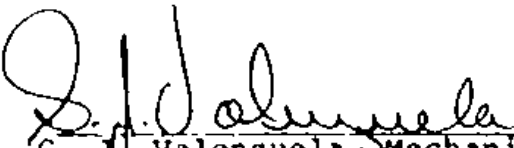
I hereby certify that the preceding report is true and correct to the best of my knowledge.

APPROVED ENGINEERING TEST LABORATORIES


R. D. Short, Division Manager


D. H. Hand, Project Engineer


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


G. J. Valenzuela, Mechanical
Department Supervisor


R. J. McKelligott, P.E.,
Quality Assurance Manager

VIS4

DATE: 6-AUG-93

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
CRASH AUTOMOBILE RESEARCH SYSTEM
DYNAMIC CRASH FILE CATALOG

PAGE: 1

SELECTION CRITERION
VEH08

VERSION 1 DATA

TABLE OF CONTENTS

| HARD COPY REFERENCE NUMBER | CONTRACT NUMBER | TEST PERFORMER | TEST TITLE |
|----------------------------|-----------------|----------------|-------------------------|
| 154 | DOT-HS-9-02273 | HTC | FMVSS301-75 REAR IMPACT |

DATE: 6-AUG-93

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
CRASH AUTOMOBILE RESEARCH SYSTEM
DYNAMIC CRASH FILE CATALOG

PAGE: 2

SELECTION CRITERION
VEHDB

VERSION 1 DATA

TEST INFORMATION
FOR TEST 154

Test Title: FMVSS301-75 REAR IMPACT

Test Date: 29-JUL-80

Entry Date: 25-SEP-80

Hard Copy Reference Number: 154

Contract Number: DOT-HS-9-02273

Test Performer: NTS - CALIFORNIA

Test Reference Number: 3882-009

Test Configuration: IMPACTOR INTO VEHICLE

Test Type: NEW CAR ASSESSMENT TEST

Test Objectives: NEW VEHICLE ASSESSMENT AND STANDARDS ENFORCEMENT INDICANT TESTING

Closing Speed: 56.49 KPH

Impact Angle: 180

Test Track Surface: CONCRETE

Test Track Conditions: DRY

Impact Point: 0.0000 mm

Offset Distance: 0.0000 mm

Recorder Type: FM TAPE RECORDER

Data Link To Recorder: UMBILICAL CABLE

System Of Measurement: ENGLISH

Ambient Temperature: 36.1 C

Description Of Other Anomalies:

Total Curves: 4

SELECTION CRITERION
VEH08

VERSION 1 DATA

VEHICLE INFORMATION
FOR TEST 154

Vehicle Identification Number: 1

Make: HMTSA Model: FLAT IMPACTOR Year: 99 Test Weight: 1803.9 KG
Engine Type: NOT APPLICABLE Engine Displacement: 999999999999
Transmission Type: NOT APPLICABLE Body Type: NOT APPLICABLE
Vehicle Length: 3657.5999 mm Vehicle Width: 1524.0000 mm Wheelbase: 3048.0000 mm
Vehicle C.G. Distance Behind Front Axle: 999.9000 mm
Steering Column Collapse Mechanism: NOT APPLICABLE Steering Column Attachment To Dash: NOT APPLICABLE
Vehicle Modification Indicator: RESEARCH VEHICLE
General Description Of Vehicle Modifications:
PDOF Angle: 999 Travel Angle: 0 Vehicle Speed: 56.49 XPM Vehicle Damage Index: 99999999
Bumper Engagement: NOT APPLICABLE
Sill Engagement: NOT APPLICABLE A-Pillar Engagement: NOT APPLICABLE
Length Of Direct Contact Damage: 9999.9004 mm Maximum Crush Distance: 999.9000 mm
Distance Between Center Of Damage Area And C.G. Axis: 999.9000 mm
Point Number 1: 999.9000 mm Point Number 2: 999.9000 mm Point Number 3: 999.9000 mm
Point Number 4: 999.9000 mm Point Number 5: 999.9000 mm Point Number 6: 999.9000 mm
Angle Of Moving Test Cart: 0
Vehicle Orientation On Moving Cart: 0

DATE: 6-AUG-93

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
CRASH AUTOMOBILE RESEARCH SYSTEM
DYNAMIC CRASH FILE CATALOG

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SELECTION CRITERION
VEHDB

VERSION 1 DATA

VEHICLE INFORMATION
FOR TEST 154

Vehicle Identification Number: 2

Make: OLDSMOBILE Model: CUTLASS Year: 80 Test Weight: 1806.7 KG

Engine Type: V8 INLINE FRONT Engine Displacement: 305.0 CU.IN.

Transmission Type: AUTOMATIC - REAR WHEEL DRIVE Body Type: FOUR DOOR SEDAN

Vehicle Length: 4991.0996 mm Vehicle Width: 1816.1000 mm Wheelbase: 2743.2000 mm

Vehicle C.G. Distance Behind Front Axle: 1242.0601 mm

Steering Column Collapse Mechanism: OTHER

Steering Column Attachment To Dash: UNKNOWN

Vehicle Modification Indicator: PRODUCTION VEHICLE

General Description Of Vehicle Modifications:

PDOF Angle: 180 Travel Angle: 0

Vehicle Speed: 0.00 KPH Vehicle Damage Index: 068DEW3

Bumper Engagement: NOT APPLICABLE

Sill Engagement: NOT APPLICABLE

A-Pillar Engagement: NOT APPLICABLE

Length Of Direct Contact Damage: 1803.4000 mm Maximum Crush Distance: 520.7000 mm

Distance Between Center Of Damage Area And C.G. Axis: 0.0000 mm

Point Number 1: 449.5800 mm Point Number 2: 482.6000 mm Point Number 3: 495.3000 mm

Point Number 4: 520.7000 mm Point Number 5: 513.0800 mm Point Number 6: 487.6800 mm

Angle Of Moving Test Cart: 0

Vehicle Orientation On Moving Cart: 0

DATE: 6-AUG-93

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
CRASH AUTOMOBILE RESEARCH SYSTEM
DYNAMIC CRASH FILE CATALOG

PAGE: 5

SELECTION CRITERION
VEND8

VERSION 1 DATA

OCCUPANT INFORMATION
FOR TEST 156

Vehicle Containing Occupant: 2

Seating Position: LEFT FRONT SEAT

Seat Position: CENTER POSITION

Occupant Type: PART 572 DUMMY

Dummy Size Percentile: OTHER

Age: 0

Height: 999.000 mm

Weight: 0.0 KG

Sex: MALE

Manufacturer Of Dummy And Serial Number:

HUMANOID SYSTEMS SN-0353

Clearance Distances:

Head To Windshield Header: 393.7000 mm
Head To Side Header: 182.8800 mm
Chest To Dash: 566.6200 mm
Arm To Door: 139.7000 mm
Knees To Dash: 243.8400 mm

Head To Windshield: 584.2000 mm
Head To Side Window: 266.7000 mm
Chest To Steering Wheel: 568.3000 mm
Hip To Door: 147.3200 mm

Primary Restraint: 3 POINT BELT

Air Bag/Belt Deployment: NOT APPLICABLE

Secondary Restraint: DASH/PANEL

Head Contact Region: SEAT BACK

Chest Or Abdomen Contact Region: UNKNOWN

Leg Contact Region: UNKNOWN

Head Injury: 0.000

Upper Boundary: 0.000

Low Boundary: 0.000

DATE: 6-AUG-93

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
CRASH AUTOMOBILE RESEARCH SYSTEM
DYNAMIC CRASH FILE CATALOG

PAGE: 6

SELECTION CRITERION
VEHDB

VERSION 1 DATA

OCCUPANT INFORMATION
FOR TEST 154

Vehicle Containing Occupant: 2

Seating Position: RIGHT FRONT SEAT

Occupant Type: PART 572 DUMMY

Dummy Size Percentile: 50 PERCENTILE

Age: 0 Height: 999.000 mm

Weight: 0.0 KG Sex: MALE

Manufacturer Of Dummy And Serial Number:

HUMANOID SYSTEMS SN-0354

Clearance Distances:

Head To Windshield Header: 388.6200 mm
Head To Side Header: 190.5000 mm
Chest To Dash: 685.8000 mm
Arm To Door: 132.0800 mm
Knees To Dash: 215.9000 mm

Head To Windshield: 609.6000 mm
Head To Side Window: 261.6200 mm
Chest To Steering Wheel: 999.9000 mm
Hip To Door: 144.7800 mm

Primary Restraint: 3 POINT BELT

Air Bag/Belt Deployment: NOT APPLICABLE

Secondary Restraint: DASH PANEL

Head Contact Region: SEAT BACK

Chest Or Abdomen Contact Region: UNKNOWN

Leg Contact Region: UNKNOWN

Head Injury: 0.000
Low Boundary: 0.000

Upper Boundary: 0.000

SELECTION CRITERION
VEND8

VERSION 1 DATA

INSTRUMENTATION INFORMATION
FOR TEST 154

| Sensor Type | Veh. No | Occupant Attachment | Region Attached | Axis | Crve No. | HFP | HLP | DAS. | Pref. Freq. | Data Quality |
|---------------|---------|---------------------|--------------------|------|----------|-----|-----|------|-------------|--------------|
| ACCELEROMETER | 1 | NOT APPLICABLE | OTHER | XG | 1 | 0 | 999 | AM | 1250 | |
| ACCELEROMETER | 2 | NOT APPLICABLE | OTHER | XG | 2 | 0 | 999 | AM | 1250 | |
| ACCELEROMETER | 2 | NOT APPLICABLE | FLOORPAN - LEFT RE | XG | 3 | 0 | 999 | AM | 1250 | |
| ACCELEROMETER | 2 | NOT APPLICABLE | FLOORPAN - RIGHT F | XG | 4 | 0 | 999 | AM | 1250 | |

25-MAY-96 12:37:57

Integ Run Report

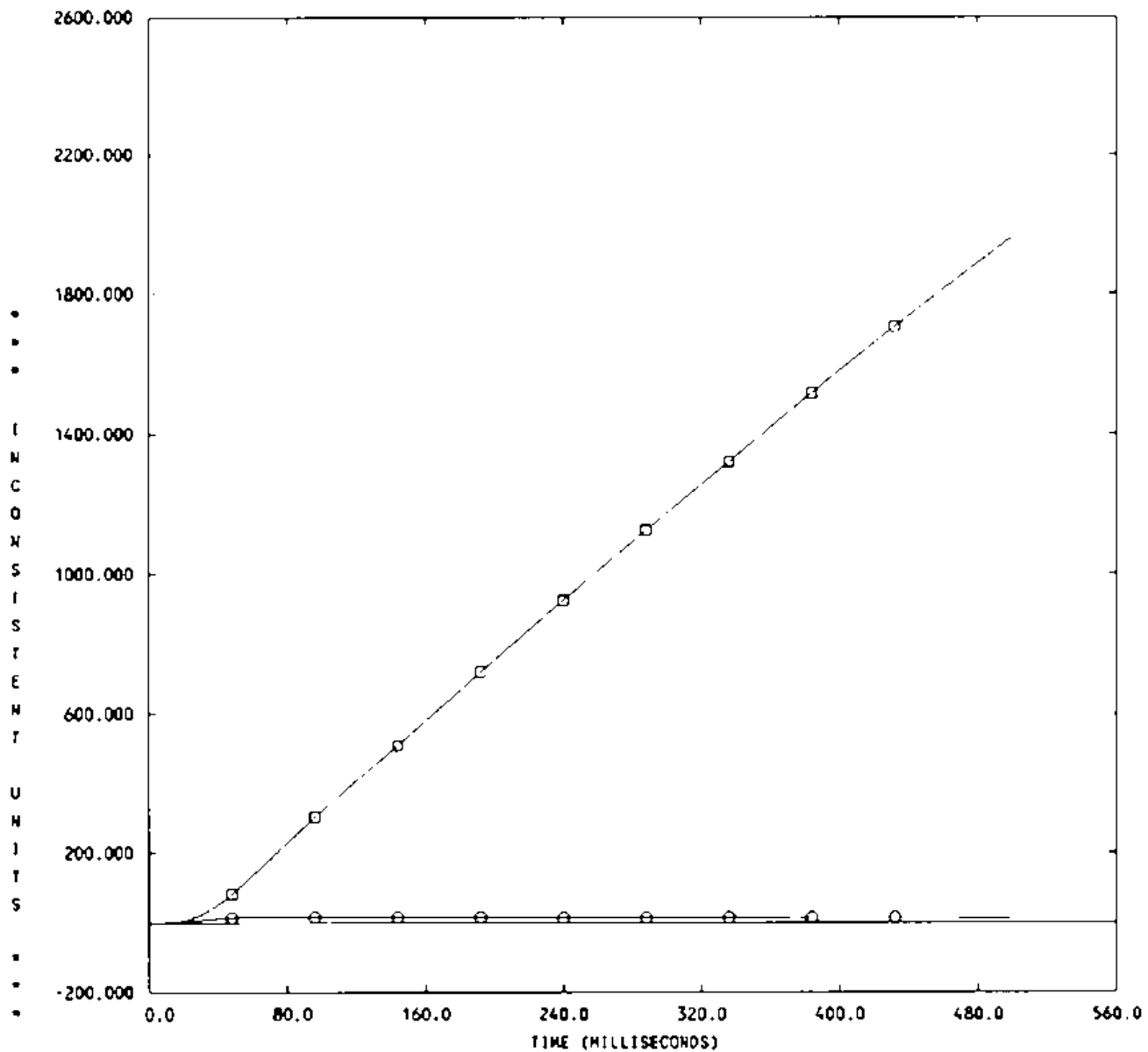
| Test / Curve | Veh. / Occ. | Veh./Comp. / Sensor Attachment | Axis | Independent Data | Dependent Data | Cutoff / Status |
|--|-------------|--------------------------------|-------|-----------------------------|-----------------|------------------------|
| Reading: UDSS\$VEM08_ROOT:[V100,V154]V0154AA0.003;1 | | | | | | |
| 154 | 2 | 80 OLD\$MOBILE CUTLASS | XG | ACCELERATION
G'S | TIME
SECONDS | 1250.00
AS MEASURED |
| 3 | A | FLOORPAN - LEFT REAR | | | | |
| Writing: OPER\$TMP_ROOT:[MCAPS154\$20E007C2]V0154VC0.003;1 | | | | | | |
| 154 | 2 | 80 OLD\$MOBILE CUTLASS | XG | VELOCITY
KILOMETERS/HOUR | TIME
SECONDS | 1250.00
COMPUTED |
| 3 | A | FLOORPAN - LEFT REAR | | | | |
| Writing: OPER\$TMP_ROOT:[MCAPS154\$20E007C2]V0154OC0.003;1 | | | | | | |
| 154 | 2 | 80 OLD\$MOBILE CUTLASS | XG | DISPLACEMENT
MILLIMETERS | TIME
SECONDS | 1250.00
COMPUTED |
| 3 | A | FLOORPAN - LEFT REAR | | | | 25-MAY-96 12:38:23 |
| | | | Integ | Run Report | | |

| Test / Curve | Veh. / Occ. | Veh./Comp. / Sensor Attachment | Axis | Independent Data | Dependent Data | Cutoff / Status |
|--|-------------|--------------------------------|------|-----------------------------|-----------------|------------------------|
| Reading: UDSS\$VEM08_ROOT:[V100,V154]V0154AA0.003;1 | | | | | | |
| 154 | 2 | 80 OLD\$MOBILE CUTLASS | XG | ACCELERATION
G'S | TIME
SECONDS | 1250.00
AS MEASURED |
| 3 | A | FLOORPAN - LEFT REAR | | | | |
| Writing: OPER\$TMP_ROOT:[MCAPS154\$20E007C2]V0154VC0.003;2 | | | | | | |
| 154 | 2 | 80 OLD\$MOBILE CUTLASS | XG | VELOCITY
KILOMETERS/HOUR | TIME
SECONDS | 1250.00
COMPUTED |
| 3 | A | FLOORPAN - LEFT REAR | | | | |
| Writing: OPER\$TMP_ROOT:[MCAPS154\$20E007C2]V0154OC0.003;2 | | | | | | |
| 154 | 2 | 80 OLD\$MOBILE CUTLASS | XG | DISPLACEMENT
MILLIMETERS | TIME
SECONDS | 1250.00
COMPUTED |
| 3 | A | FLOORPAN - LEFT REAR | | | | |

HTS TEST 154, OCCUPANT 1 HEAD, CHEST, VEH X VELOCITY

V01540C0.003 3882-009 ITV 80 OLDSMOBILE CUTLASS VEH2 □
 OCCUPANT A FLOORPAN - LEFT REAR XG AXIS 1250Hz

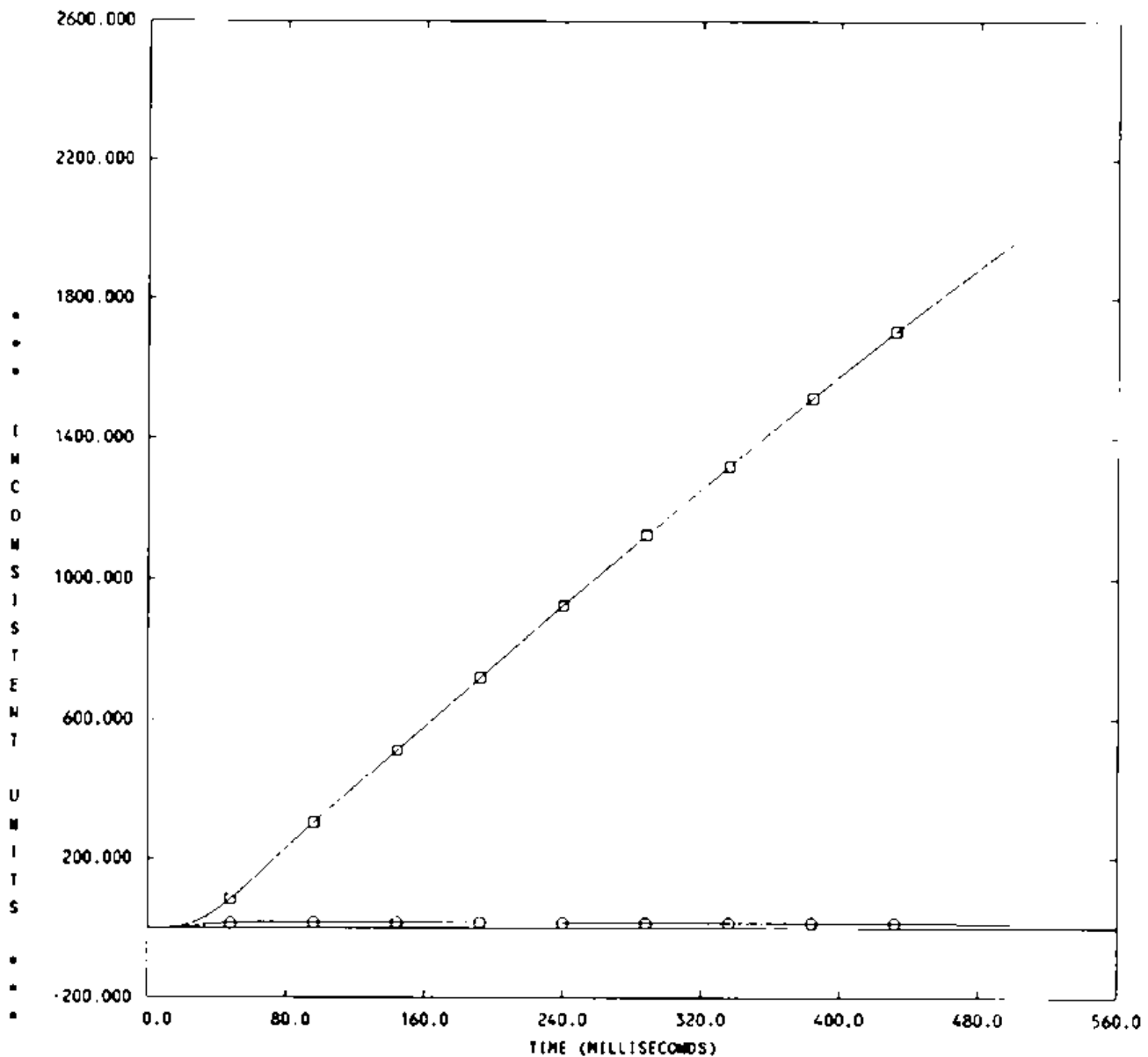
V0154VC0.003 3882-009 ITV 80 OLDSMOBILE CUTLASS VEH2 □
 OCCUPANT A FLOORPAN - LEFT REAR XG AXIS 1250Hz



NYS TEST 156, OCCUPANT 2 HEAD, CHEST, VEH X VELOCITY

V0154DC0.003 3882-009 ITV 80 OLDSMOBILE CUTLASS VEH2 □
 OCCUPANT A FLOORPAN - LEFT REAR XG AXIS 1250Hz

V0154VC0.003 3882-009 ITV 80 OLDSMOBILE CUTLASS VEH2 ○
 OCCUPANT A FLOORPAN - LEFT REAR XG AXIS 1250Hz



File: V0154AFD.003

NYS - CALIFORNIA 3082-009 56.5 kph ITV

80 OLDSMOBILE CUTLASS FOUR DOOR SEDAN

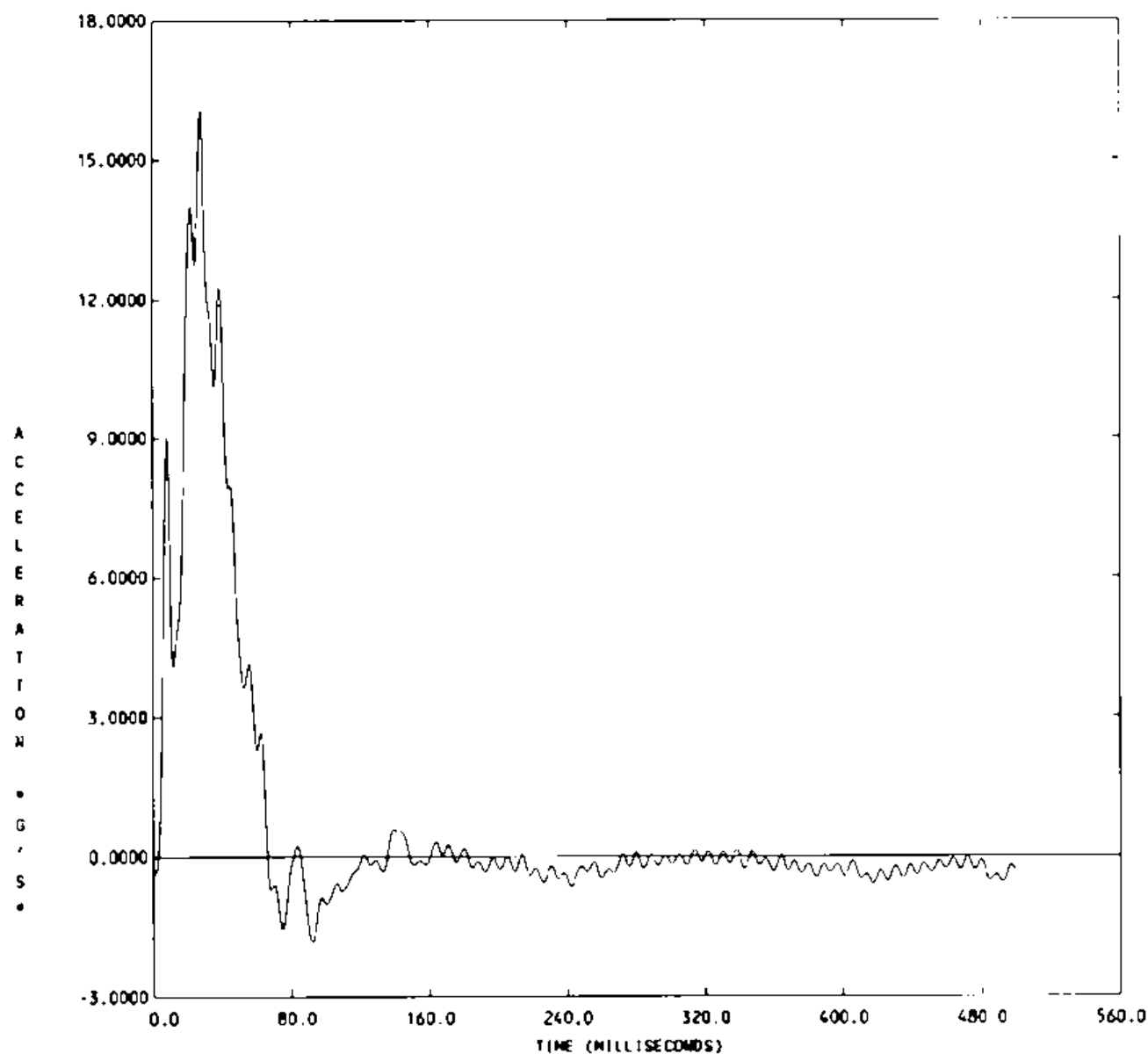
Vehicle number: 2

Occupant location, type: A

Sensor Attachment: FLOORPAN - LEFT REAR Axis: XG

Status: FILTERED YMIN = -1.8162 at 92.500

Filter cutoff: 100 Hz YMAX = 16.046 at 28.000



File: V0154AA0.001

MTS - CALIFORNIA 3882-009 56.5 kph ITV

0 NHTSA FLAT IMPACTOR CUTLASS

Vehicle number: 1

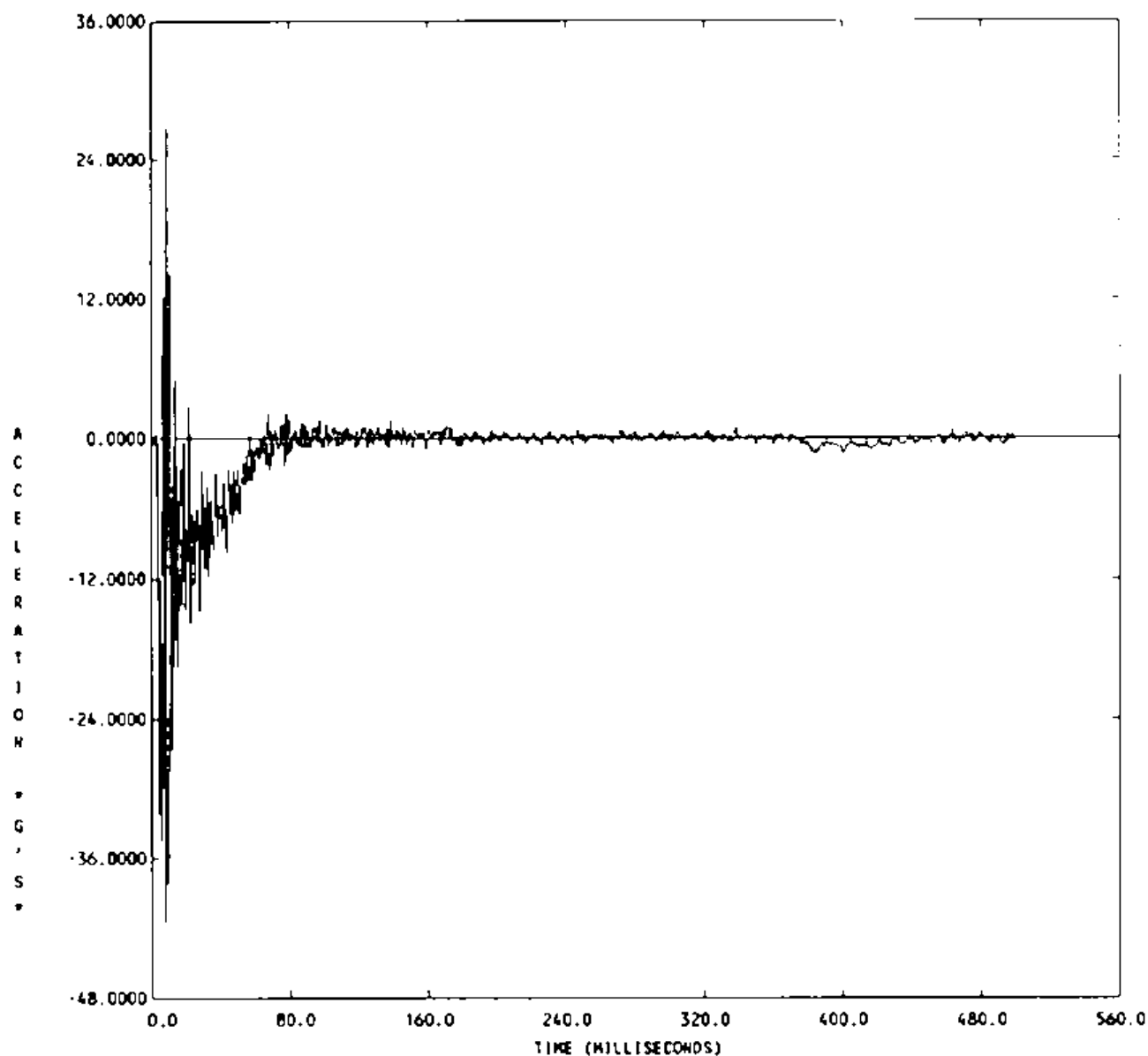
Occupant location, type: A

Sensor Attachment: OTHER

Axis: XG

Status: AS MEASURED YMIN = -41.656 at 8.000

Filter cutoff: 1250 Hz YMAX = 26.793 at 9.000



File: V0154AA0.D02

NTS - CALIFORNIA 3882-009 56.5 kph 17V

80 OLDSMOBILE CUTLASS FOUR DOOR SEDAN

Vehicle number: Z

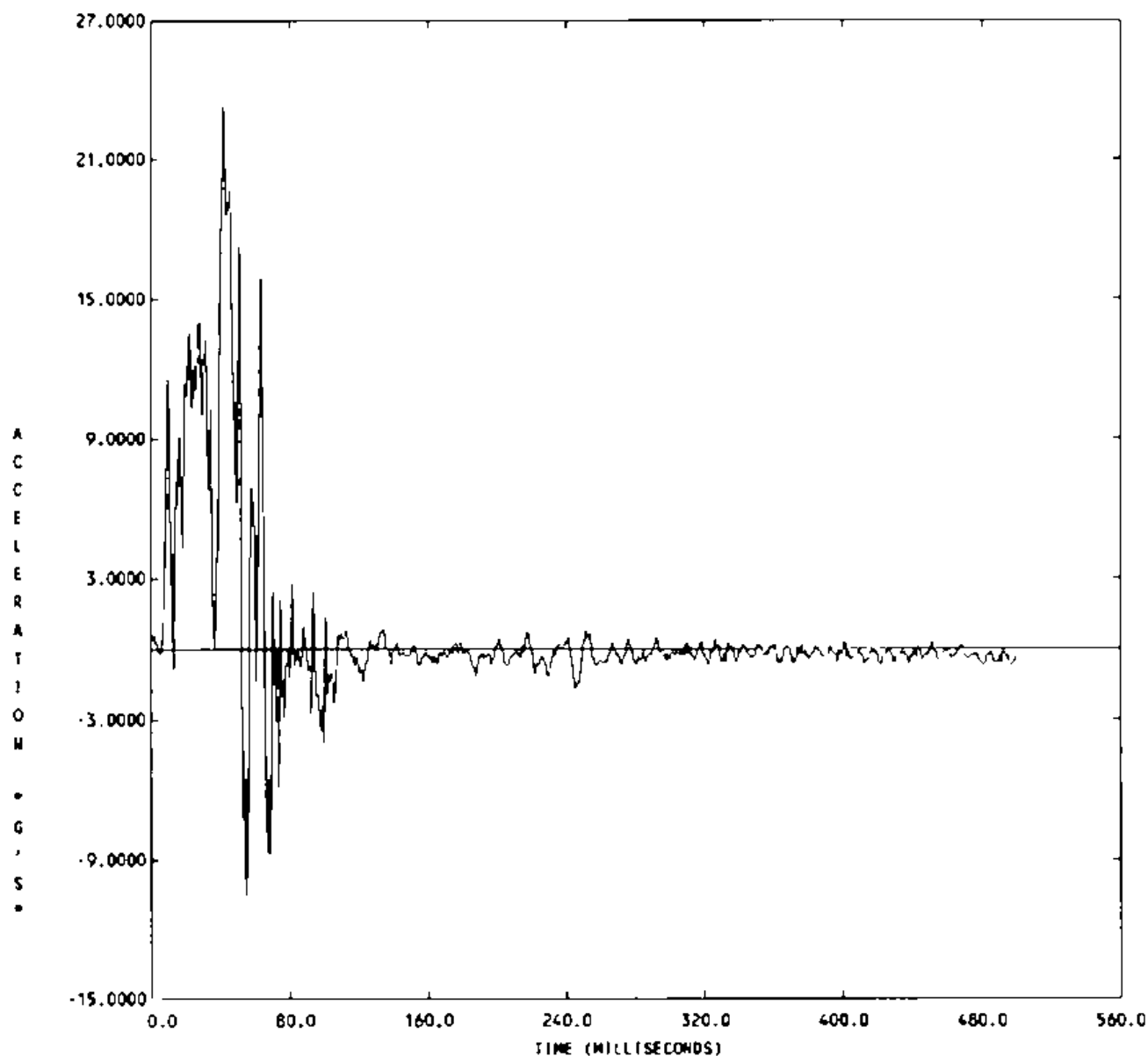
Occupant location, type: A

Sensor Attachment: OTHER

Axis: XG

Status: AS MEASURED YMIN = -10.507 at 55.000

Filter cutoff: 1250 Hz YMAX = 23.316 at 42.000



File: V0154AA0.003

NTS - CALIFORNIA 3882-009 56.5 kph 11V

80 OLDSMOBILE CUTLASS FOUR DOOR SEDAN

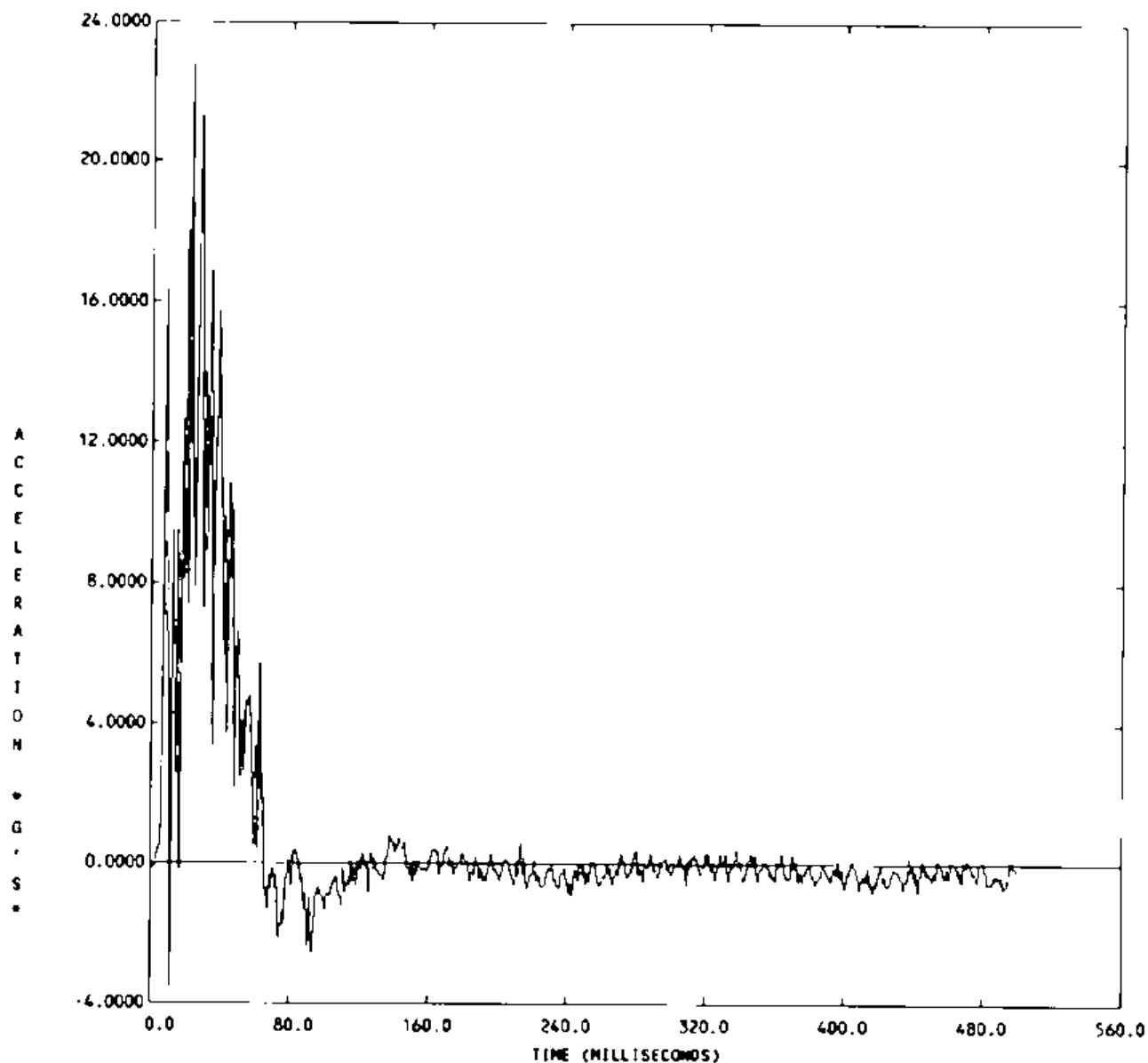
Vehicle number: 2

Occupant location, type: A

Sensor Attachment: FLOORPAM - LEFT REAR Axis: XG

Status: AS MEASURED YMIN = -3.5860 at 11.000

Filter cutoff: 1250 Hz YMAX = 22.829 at 22.500



File: VD154AA0.D06

NTS - CALIFORNIA 3882-009 56.5 kph ITV

80 OLDSMOBILE CUTLASS FOUR DOOR SEDAN

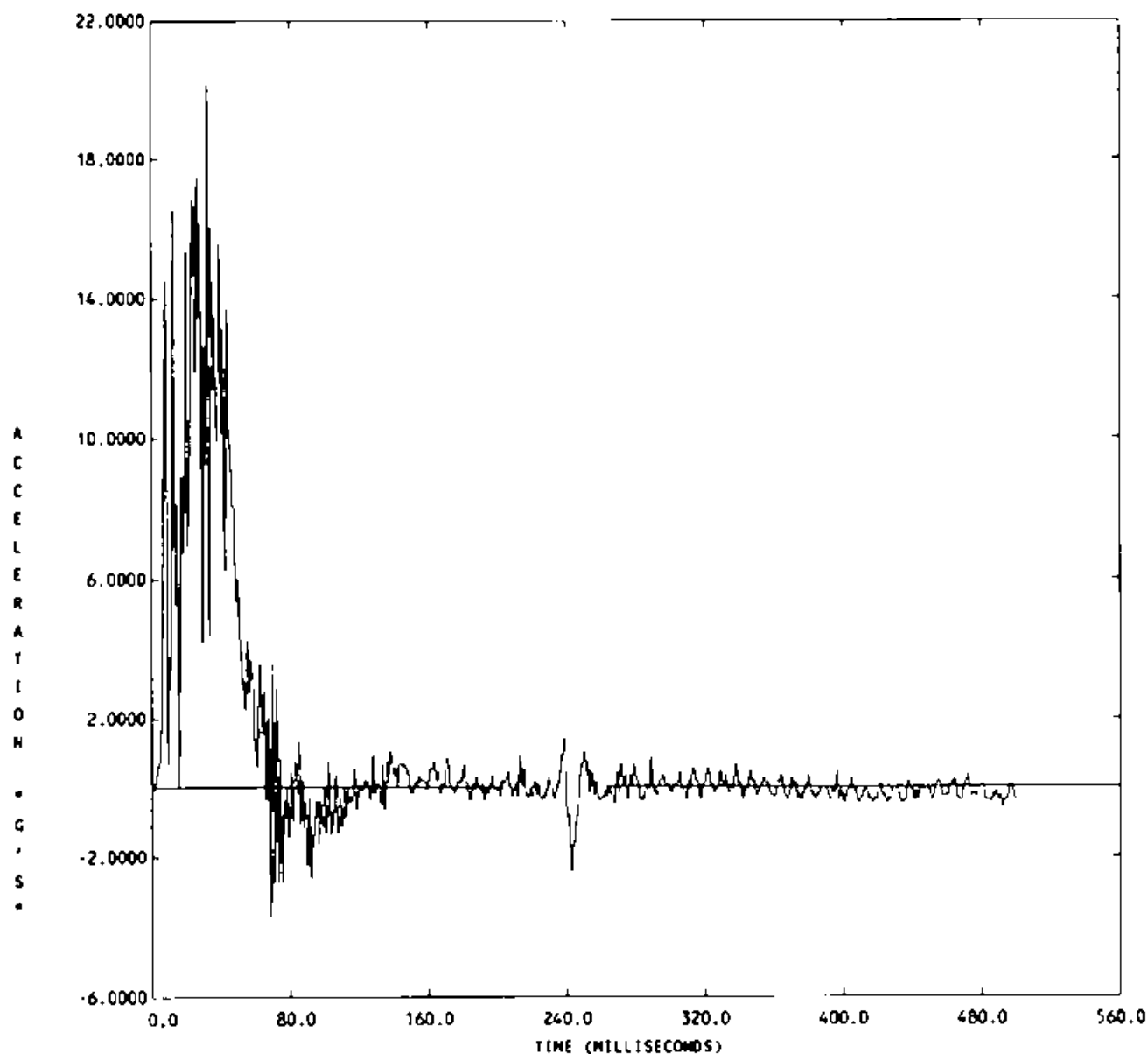
Vehicle number: 2

Occupant location, type: A

Sensor Attachment: FLOORPAN - RIGHT FRONT Axis: XG

Status: AS MEASURED YMIN = -3.7005 at 68.500

Filter cutoff: 1250 Hz YMAX = 20.251 at 32.500



File: V0154AFD.001

HTS - CALIFORNIA 3882-009 56.5 kph ITV

0 MHTSA FLAT IMPACTOR CUTLASS

Vehicle number: 1

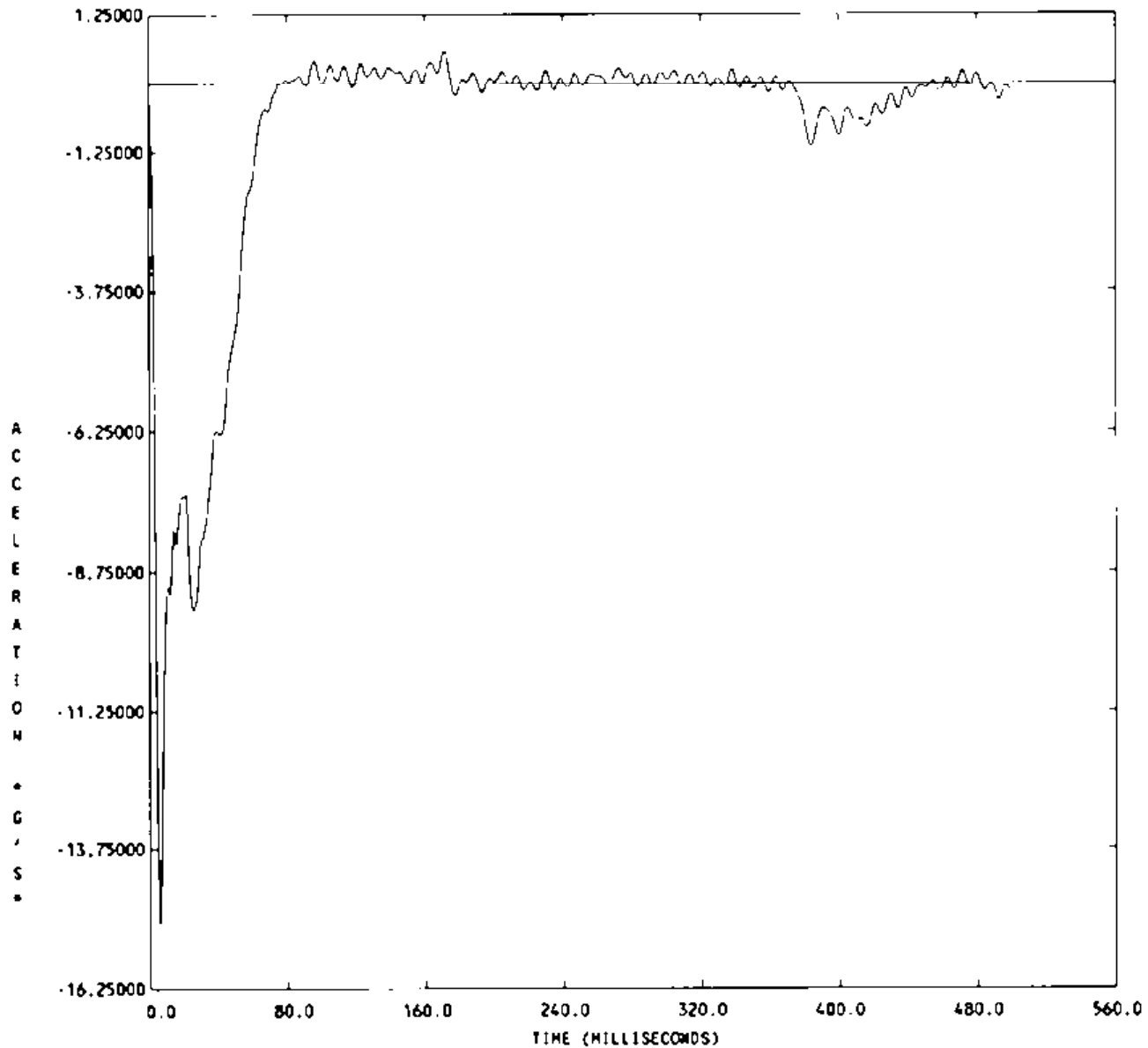
Occupant location, type: A

Sensor Attachment: OTHER

Axis: XG

Status: FILTERED YMIN = -15.066 at 6.000

Filter cutoff: 100 Hz TMAX = 0.59684 at 171.500



File: V0154AFD.002

MTS - CALIFORNIA 3882-009 56.5 kph ITV

BO OLDSMOBILE CUTLASS FOUR DOOR SEDAN

Vehicle number: 2

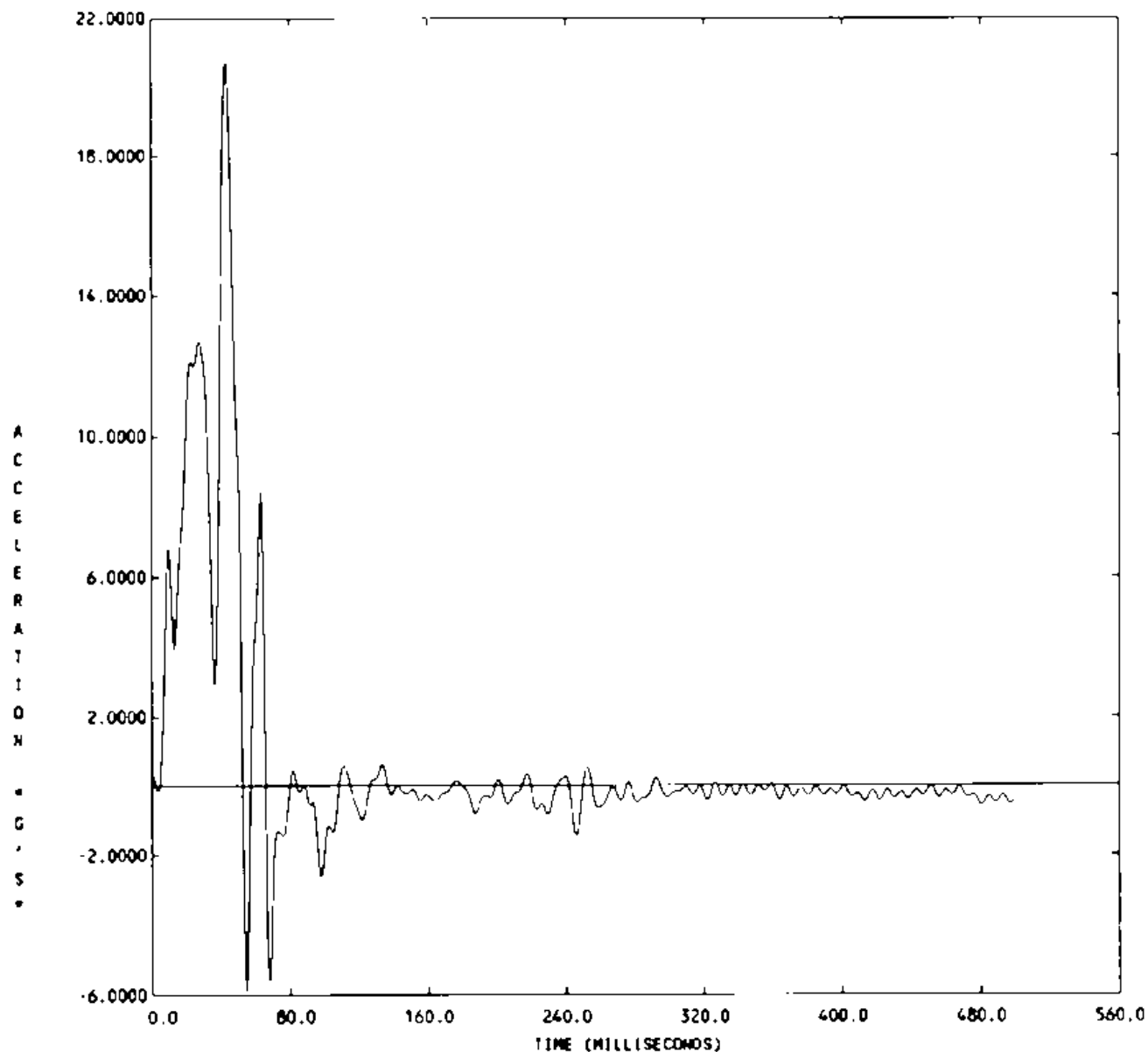
Occupant location, type: A

Sensor Attachment: OTHER

Axis: XG

Status: FILTERED YMIN = -5.8778 at 54.500

Filter cutoff: 100 Hz YMAX = 20.744 at 43.000



File: V01S4AFD.003

MTS - CALIFORNIA 3882-009 56.5 kph ITV

80 OLDSMOBILE CUTLASS FOUR DOOR SEDAN

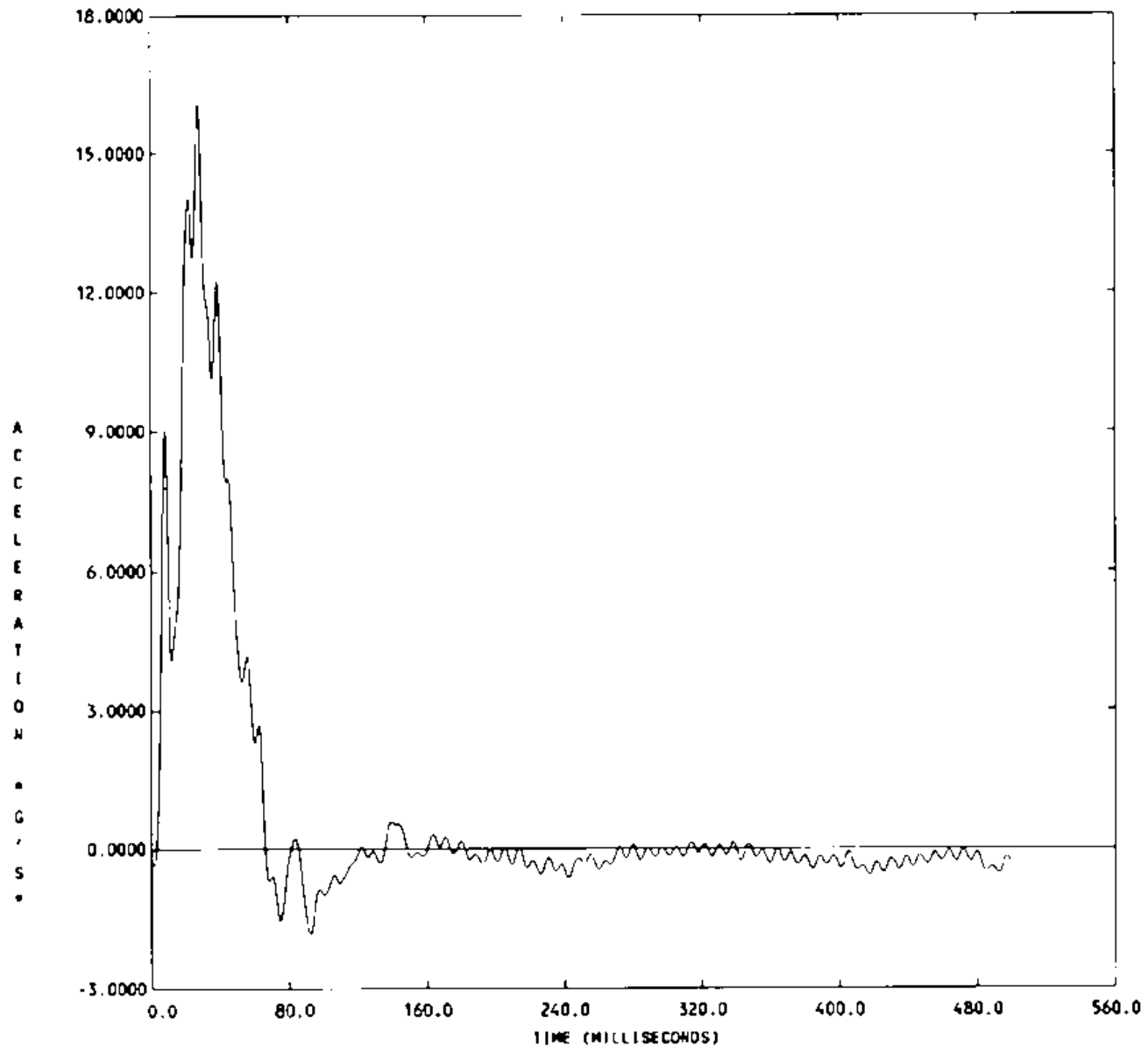
Vehicle number: 2

Occupant location, type: A

Sensor Attachment: FLOORPAN - LEFT REAR Axis: XG

Status: FILTERED YMIN = -1.8162 at 92.500

Filter cutoff: 100 Hz YMAX = 16.046 at 28.000



File: V0154AFD.004

NTS - CALIFORNIA 3882-009 56.5 kph 1TV

80 OLDSMOBILE CUTLASS FOUR DOOR SEDAN

Vehicle number: 2

Occupant location, type: A

Sensor Attachment: FLOORPAN - RIGHT FRONT Axis: XG

Status: FILTERED YMIN = -1.7656 at 243.500

Filter cutoff: 100 Hz YMAX = 14.685 at 25.500

