

TAPE # 278

J. HACKNEY

DOT 0278

Dynamic Science Report No. 301-DYS-81-004

REAR

NEW VEHICLE ASSESSMENT AND
STANDARDS ENFORCEMENT INDICANT
TESTING

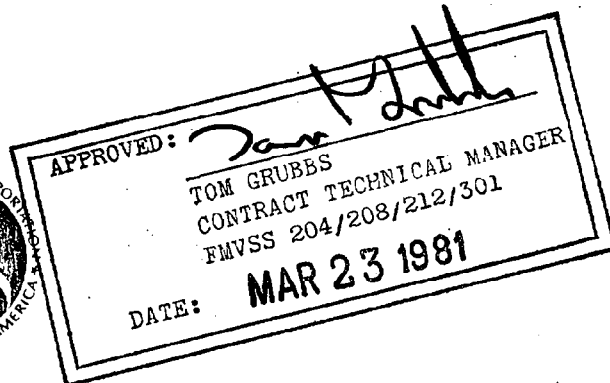
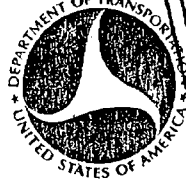
FMVSS 301-75

MITSUBISHI MOTOR COMPANY/CHRYSLER CORPORATION
1981 PLYMOUTH SAPPORO 2-DOOR HARDTOP

NHTSA 810522

Prepared by:

DYNAMIC SCIENCE, INC.
A Talley Industries Company
1850 West Pinnacle Peak Road
Phoenix, Arizona 85027



March 1981

FINAL REPORT

Prepared 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

DYNAMIC
SCIENCE, INC. | **Talley**
Industries

1850 West Pinnacle Peak Road · Phoenix, Arizona 85027
(602) 869-9331

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Prepared by Marta Poggi

Approved by E. Cascardi

Date March 5, 1981

Report Accepted by:

JOM GRUBBS

Contract Technical Manager
Office of Vehicle Safety Compliance

MAR 23 1981

Date _____

TECHNICAL REPORT STANDARD TITLE PAGE

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16. Abstract FMVSS 301-75, Standards Enforcement Test of a 1981 Plymouth Sapporo, NHTSA 810522, VIN JP3BD4379BY701217 was conducted at the Dynamic Science, Inc. Deer Valley Facility in Phoenix, Arizona, to determine compliance with the requirements of Standard 301. The moving barrier impacted the rear of the vehicle at a speed of 34.99 mph. The test date was January 19, 1981 and the ambient temperature was 63°F. The vehicle did not appear to comply with the (30 mph) requirements of FMVSS 301-75 as specified for the vehicle manufacture date.					
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol When You Know Multiply by To Find Symbol

LENGTH

in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km

AREA

in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
acres	acres	0.4	hectares	ha

MASS (weight)

oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	metric ton	t

(2000 lb)

VOLUME

tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
in ³	cubic inches	16	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³

TEMPERATURE (exact)

°F	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius	°C
----	--------------------	----------------------------	-----------------	----

Approximate Conversions from Metric Measures

Symbol When You Know Multiply by To Find Symbol

LENGTH

mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi

AREA

cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares	2.5	acres	

(10 000 m²)

MASS (weight)

g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton	1.1	short tons	

(1000 kg)

VOLUME

ml	milliliters	0.03	fluid ounces	fl oz
ml	milliliters	0.06	cubic inches	in ³
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³

TEMPERATURE (exact)

°C	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F
----	-----------------	-------------------	--------------------	----

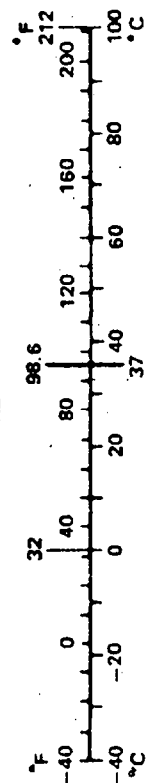


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SECTION 1
PURPOSE AND INTRODUCTION

PURPOSE

The purpose of the test was to subject a 1981 Plymouth Sapporo 2-door hardtop to the indicant test requirements of DOT Test Plan TP-212-02, April 1, 1980, Standard Enforcement Indicant Testing for FMVSS 301-75, "Fuel System Integrity." The vehicle was tested using test parameters which are in excess of the current upper limits of the subject FMVSS in order to obtain research and vehicle rating data. This test, therefore, can only be viewed as an "indicant" test by the Office of Vehicle Safety Compliance (OVSC).

INTRODUCTION

Section 2 contains General Test and Vehicle Parameter Data. Section 3 contains Compliance Related Data for FMVSS 301-75 Indicant Testing, together with photographs related to this test. Appendix A contains pre-test and post-test vehicle and dummy photographs. Appendix B contains Calcomp plots.

SECTION 2
GENERAL TEST AND VEHICLE PARAMETER DATA

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

GENERAL TEST AND VEHICLE PARAMETER DATA

PRE-IMPACT DATA

Make/Model: Plymouth Sapporo

Body Style: 2-Door Hardtop

Model Year: 1981

NHTSA No.: 810522

DSI No. 1145

Color: Silver

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Mitsubishi Motor Company

Date of Manufacture: 8/80; VIN: JP3BD4379BY701217

GVWR: 3745 lb; GAWR: Front = 1795 lb; Rear = 1950 lb

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL

Vehicle Capacity: FRONT REAR RECOMMENDED LOAD RANGE:

Tire Pressure: 24 psi 24 psi TIRE SIZE: B

175-70/SR14

Designated Seating: 2 Front 3 Rear 5 Total

Cargo load = 150 lb Is Spare Tire: Space Saver? No

TOTAL = 900 lb Standard Equipment? Yes

Engine: 4 Cylinder, In-Line Mounted, 2.6 litre displacement

Transmission: 3 speed, automatic, rear-wheel drive

Date Vehicle Received by Laboratory: 11/14/80; Odometer: 67.3

Dealer Name & Address: Lanker Chrysler-Plymouth, Inc.

4600 W. Glendale Ave., Glendale, AZ 85301

Remarks: Unmodified production vehicle with 3-point lap and torso restraint belts.

WEIGHT (LB) OF TEST VEHICLE AS RECEIVED (WITH MAX. FLUIDS) = UDW

Right Front = 701 lb Right Rear = 638 lb

Left Front = 764 lb Left Rear = 657 lb

TOTAL FRONT WEIGHT = 1465 lb (53.1 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1295 lb (46.9 % of Total Vehicle Weight)

TOTAL DELV. WEIGHT = 2760 lb

TARGET WEIGHT = UDW + Cargo Load + 328 lbs Dummies = 3238 lb

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 150 lb CARGO:

Right Front = 798 lb Right Rear = 545 lb

Left Front = 776 lb Left Rear = 531 lb

Total Front Weight = 1658 lb (51.1 % of Total Vehicle Weight)

Total Rear Weight = 1589 lb (48.9 % of Total Vehicle Weight)

Total Test Weight = 3247 lb

Weight of ballast secured in vehicle trunk area = 150 lb

VEHICLE ATTITUDE: (inches)

Delivered Attitude: RF 30.0 LF 30.0 RR 30.0 LR 30.0

Test Attitude: RF 29.1 LF 29.3 RR 28.8 LR 29.0

GENERAL TEST AND VEHICLE PARAMETER DATA (CONTD)

POST-TEST DATA

Type of Test: Rear (180°) Impact.
 Date of Test: 1/19/81 Time: 1427 Temperature 63 °F
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: Primary = 34.99 mph Secondary = 35.01 mph

Distance from the vehicle's rear bumper to barrier face entering the vehicle velocity measurement device is 5.0 feet and distance exiting the vehicle velocity measurement device is 1.0 foot.

VEHICLE REBOUND AND CRUSH (in.)

Vehicle Length:	Pre-test = R	<u>178.8</u>	L	<u>178.5</u>
	Post-test = R	<u>163.7</u>	L	<u>163.6</u>
	Crash = R	<u>15.1</u>	L	<u>14.9</u>

Distance from rear E of test vehicle to point of impact: 48 ft, 1 in.

VISIBLE DUMMY CONTACT POINTS

	Driver	Passenger
Head	<u>Rear seatback</u>	<u>Roof, rear seatback</u>
Chest	<u>None</u>	<u>None</u>
Abdomen	<u>None</u>	<u>None</u>
Left Knee	<u>None</u>	<u>None</u>
Right Knee	<u>None</u>	<u>None</u>

DOOR OPENING

Front		Rear	
Left	Right	Left	Right
<u>Tools</u>	<u>Tools</u>	<u>N/A</u>	<u>N/A</u>
<u>required</u>	<u>required</u>		

SEAT MOVEMENT

Seatback Failure	<u>X</u>	<u>X</u>	<u>Bottom pulled loose</u>
Seat Shift (in.)	<u>0.5</u>	<u>*</u>	

GLAZING DAMAGE

Backlight: No damage

OTHER NOTABLE IMPACT EFFECTS: Both rear wheels were pinned by
crushed sheetmetal and right rear wheel was 100% deflated during
impact. Trunk lid latch failed, permitting trunk lid to fold
severely. Frame rails were bent up to B pillars.

*9.0 plus clockwise rotation

SECTION 3

COMPLIANCE-RELATED DATA
FMVSS 301-75 INDICANT TESTING

The following data sheets and photographs document compliance data.

SUMMARY OF FMVSS 301-75 INDICANT DATA

PRE-IMPACT DATA

Make/Model: Plymouth Sapporo

Body Style: 2-Door Hardtop

Model Year: 1981

NHTSA No. 810522 DSI No. 1795 Color: Silver

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Mitsubishi Motor Company

Date of Manufacture: 8/80; VIN JP3BD4379BY701217

GVWR: 3745 lb; GAWR: Front = 1795 lb; Rear 1950 lb

POST-IMPACT DATA

Type of Test: Rear (180°) Impact

Date of Test: 1/19/81 Time: 1427 Temperature 63 °F

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: Primary = 34.99 mph Secondary = 35.01 mph

Test weight: 3247 lb Maximum crush: 16.1 in.

Rebound distance: 48 ft, 1 in.

FUEL SYSTEM DATA

Test Fluid: Stoddard Solvent Specific Gravity: 0.764

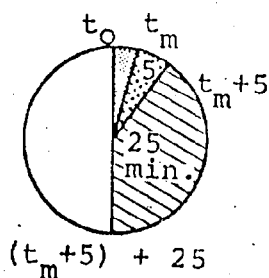
Temperature: 75°F Kinematic Viscosity: 0.99 centistokes

Test Volume: 14.3 U.S. gallons

Test vehicle fuel tank filled to 93% of "usable" plus "unusable" capacity with Stoddard Solvent and with electric fuel pump operating (if it will operate without engine operation) until start of static roll.

DETAILS OF FUEL SYSTEM: Rectangular metal fuel tank is mounted aft of the rear axle by flange bolts. Sender tubes exit top left side of tank and are filled by an electric fuel pump. The filler tube exits left side of tank and proceeds to body wall aft of left rear wheel where it is sealed by a twist cap and concealed by a hinged door.

FUEL SPILLAGE MEASUREMENT

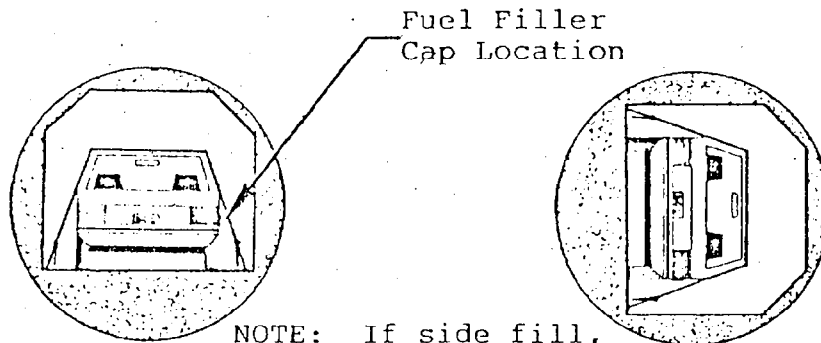


	ACTUAL	MAXIMUM ALLOWABLE
1. From impact until vehicle motion ceases	Estimated 0.5 oz	1 oz
2. For 5-minute period after vehicle motion ceases	Trace	5 oz
3. For next 25 minutes	None	1 oz/1 min

SOLVENT SPILLAGE DETAILS: Point of leakage was from left side tank mounting bolt. Source of leakage undetectable.

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA

TEST PHASE: 0° to 90° VEHICLE NHTSA NO. 810522



NOTE: If side fill, rotate so that filler cap is down.

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 40 sec +
(Spec. Range = 1 to 3 min)
FMVSS 301 Position Hold Time..... = 5 min, 0 sec =
Total..... = 6 min, 40 sec
Next Whole Minute Interval..... = 7 min

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	3.5 litres 94.34 oz	.75 litres 20.2 oz	.75 litres 20.2 oz	.75 litres 20.2 oz

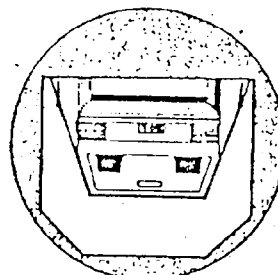
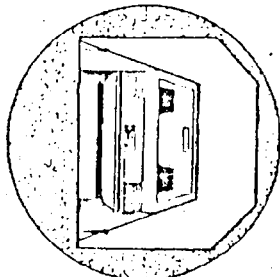
NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): Left rear shock absorber lower mount impacted tank severely enough to form a 0.25 in. diameter hole in the tank above the medial flange approximately 5 in. forward of left side mounting bolt.

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA

TEST PHASE: 90° to 180°

VEHICLE NHTSA NO. 810522



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 38 sec +
(Spec. Range = 1 to 3 min)

FMVSS 301 Position Hold Time..... = 5 min, 0 sec =

Total..... = 6 min, 38 sec

Next Whole Minute Interval..... = 7 min

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

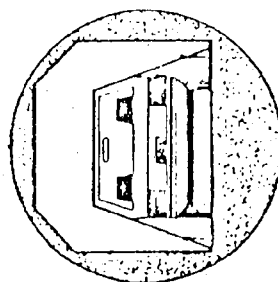
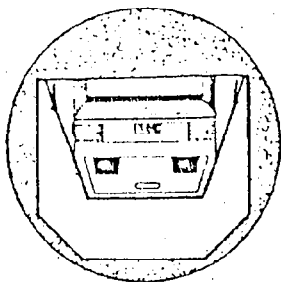
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	1.25 litres 168 oz	1.25 litres 33.7 oz	1.25 litres 33.7 oz	1.25 litres 33.7 oz

NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): Same as previous roll period. Some leakage into occupant compartment through rear seat area due to split wheelwells.

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA

TEST PHASE: 180° to 270° VEHICLE NHTSA NO. 810522



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 40 sec +
(Spec. Range = 1 to 3 min)

FMVSS 301 Position Hold Time..... = 5 min, 0 sec =

Total..... = 6 min, 40 sec

Next Whole Minute Interval..... = 7 min

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

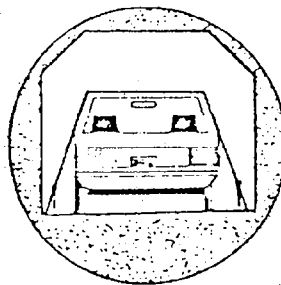
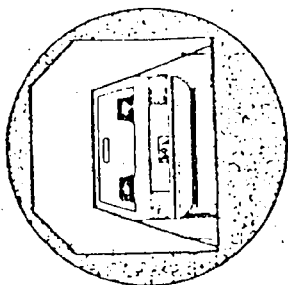
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	15.5 oz	trace	trace	---

NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): Same as previous roll period. Leakage into occupant compartment more severe, estimated at 30% of leakage collected.

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA

TEST PHASE: 270° to 360° VEHICLE NHTSA NO. 810522



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 36 sec +
(Spec. Range = 1 to 3 min)

FMVSS 301 Position Hold Time..... = 5 min, 00 sec =

Total..... = 6 min, 36 sec

Next Whole Minute Interval..... = 7 min

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	trace	trace	trace	---

NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): Same as previous roll period. Leakage diminishing at all locations.



FIGURE 3-2. POST-TEST FUEL TANK - 1981 PLYMOUTH SAPPORO -
NHSA 810522.

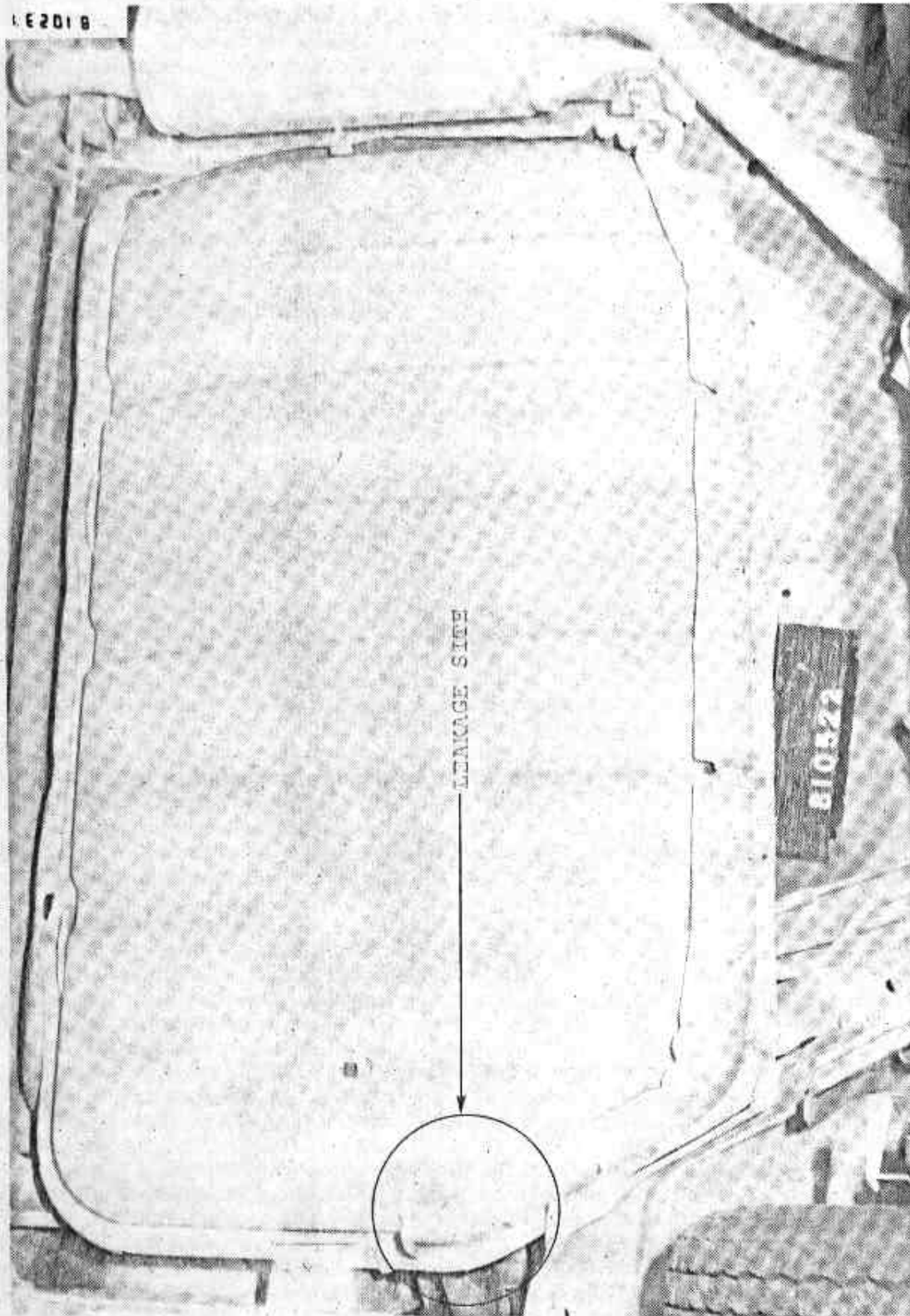


FIGURE 3-1. PRE-TEST FUEL TANK - 1981 PLYMOUTH SAPPORO -
NHTSA 810522.

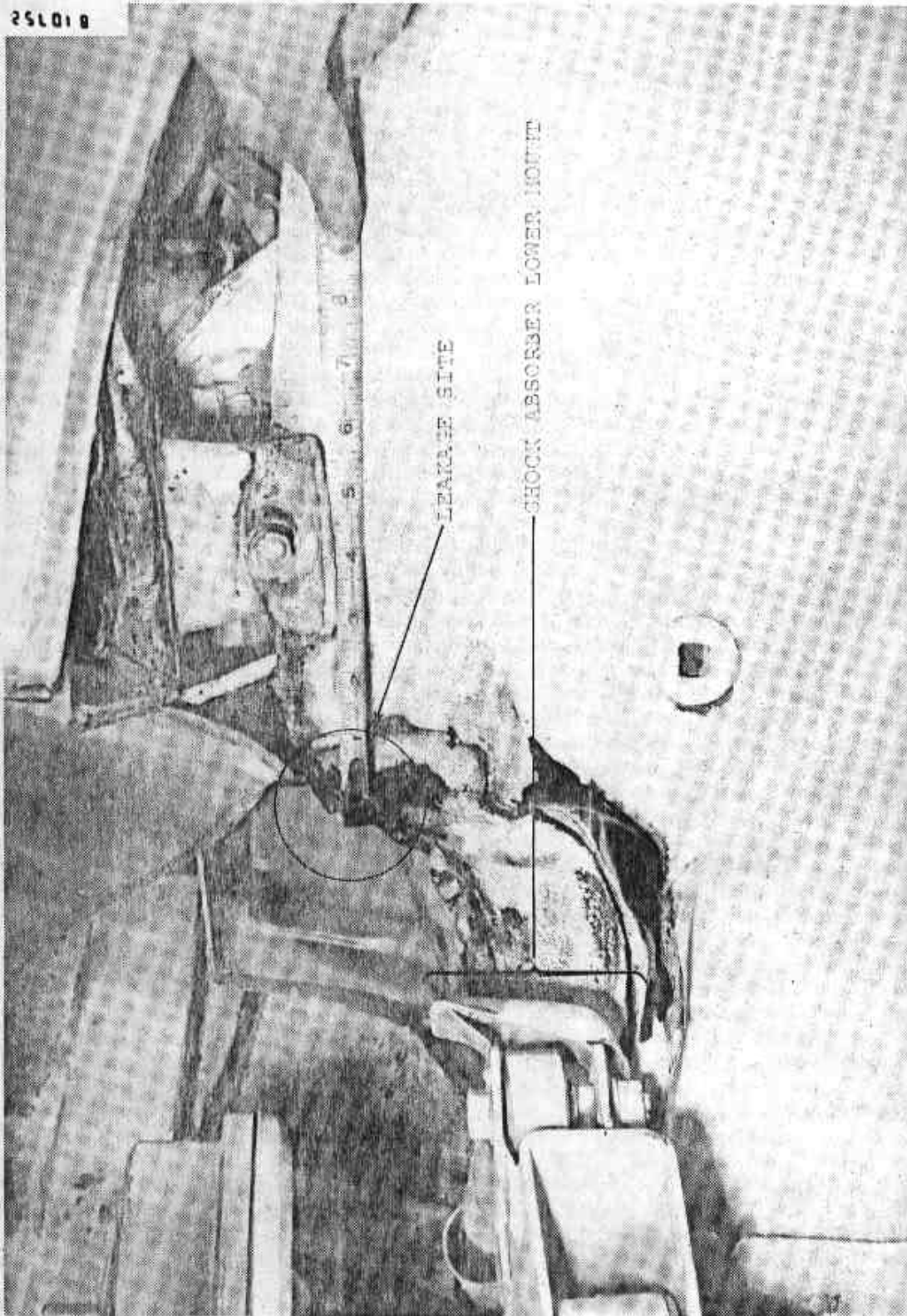


FIGURE 3-3. FUEL LEAKAGE SITE - 1981 PLYMOUTH: SAPPORO - WHTSA 810522.

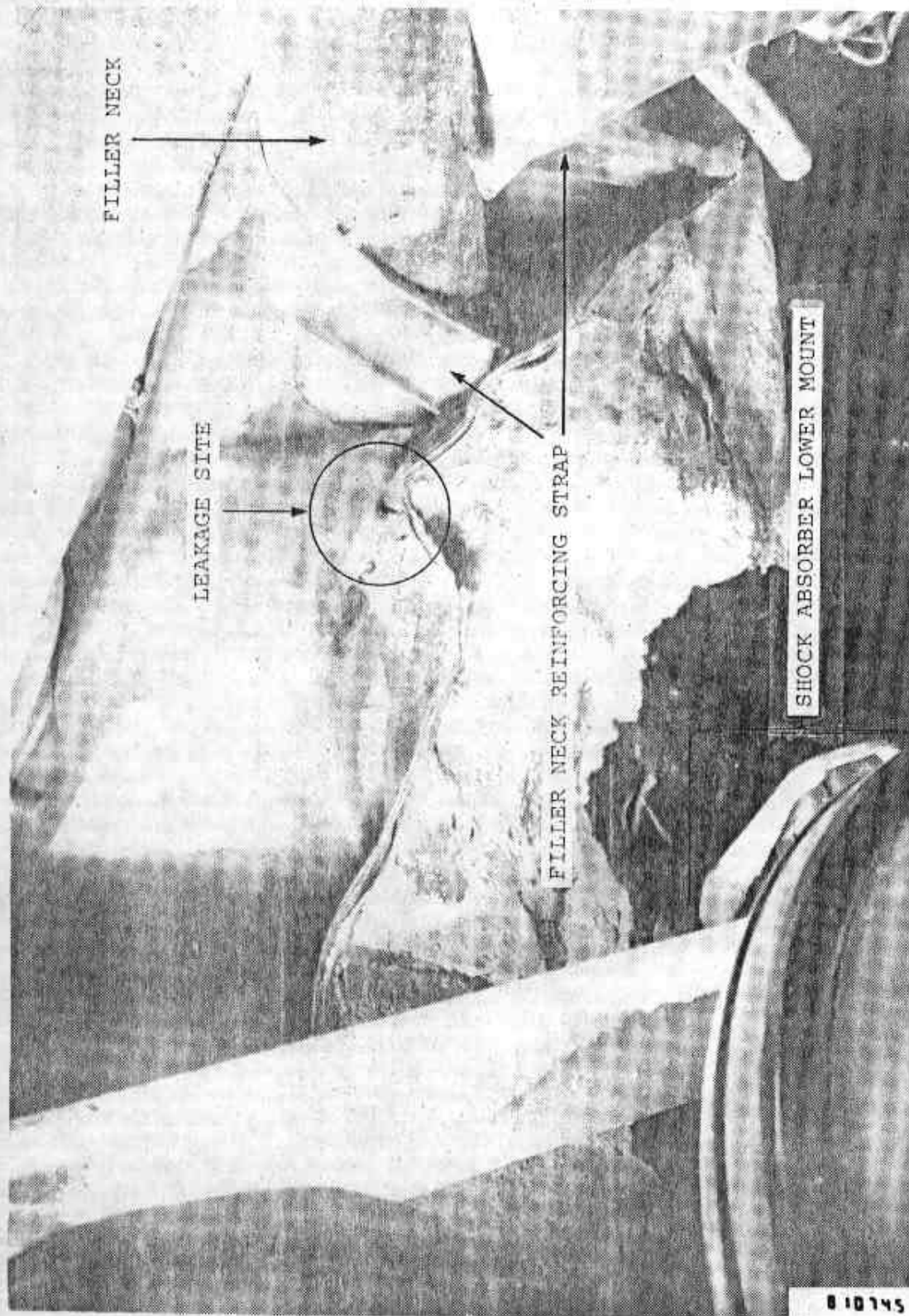


FIGURE 3-4. FUEL LEAKAGE SITE - 1981 PLYMOUTH SAPPORO - NHTSA 810522

SECTION 4
DATA REQUIRED BY R&D AND OAR

The following pages are included in this section:

1. Vehicle crush data
2. Accelerometer location and data summary
3. High-speed movie camera location and specification summary

Pertinent photographs are presented in Appendix A. Calcomp plots of vehicle accelerometer data are presented in Appendix B.

PRE/POST TEST STATIC MEASUREMENT DATA

PRE-IMPACT DATA

Make/Model Plymouth Sapporo
 Body Style 2-Door Hardtop Model Year 1981
 NHTSA No. 810522 DSI No. 1145 Color Silver

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer Mitsubishi Motor Company
 Date of Manufacture 8/80 VIN JP3BD4379BY701217
 GVWR 3745 lb; GAWR: Front = 1795 lb; Rear 1950 lb

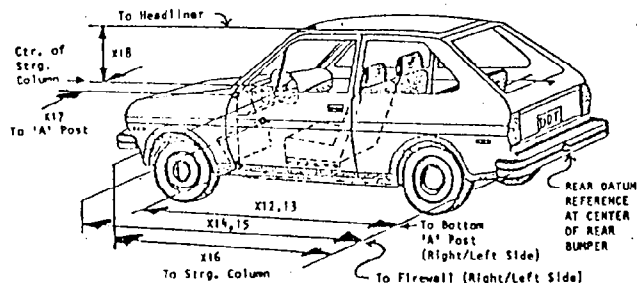
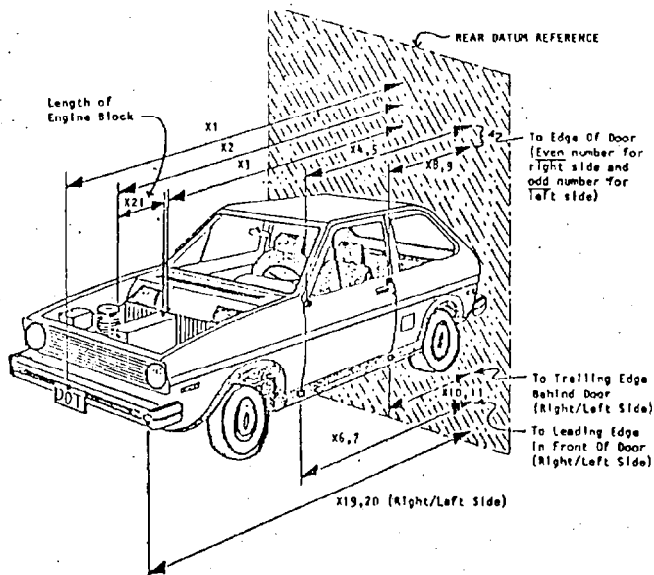
POST-IMPACT DATA

Type of Test: Rear (180°) Impact
 Date of Test: 1-19-81 Time: 1427 Temperature 63 °F
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: Primary = 34.99 mph Secondary = 35.01 mph
 Test Weight: 3247 lb; Static Crush: 16.1 in. Rebound: 48 ft 1 in.

Vehicle Profile Data

Measurements Referenced to Plan 16 feet rear of front Bumper E.

Location	Height	Vehicle Left (in.)				E	Vehicle Right (in.)		
		30.0	18.0	6.0	6.0		18.0	30.0	
Pre-test Profile (in.)									
Top of Rear Bumper	23.8	13.6	12.6	12.4	12.3	12.4	12.6	13.4	
Edge of Trunk	33.5	20.3	19.6	19.3	19.2	19.3	19.5	20.1	
Post-test Profile (in.)									
Top of Rear Bumper	19.1	28.4	28.4	28.5	28.4	28.3	28.3	28.3	
Edge of Trunk	28.3	31.0	33.7	33.7	33.2	33.3	33.9	31.8	
Post-test Static Crush (in.)									
Top of Rear Bumper	3.9	14.8	15.8	16.1	16.1	15.9	15.7	14.9	
Edge of Trunk	5.2	10.7	14.1	14.4	14.0	14.0	14.4	11.7	



PRE-/POST-TEST STATIC MEASUREMENT DATA

Vehicle: Plymouth Sapporo

NHTSA No.: 810522

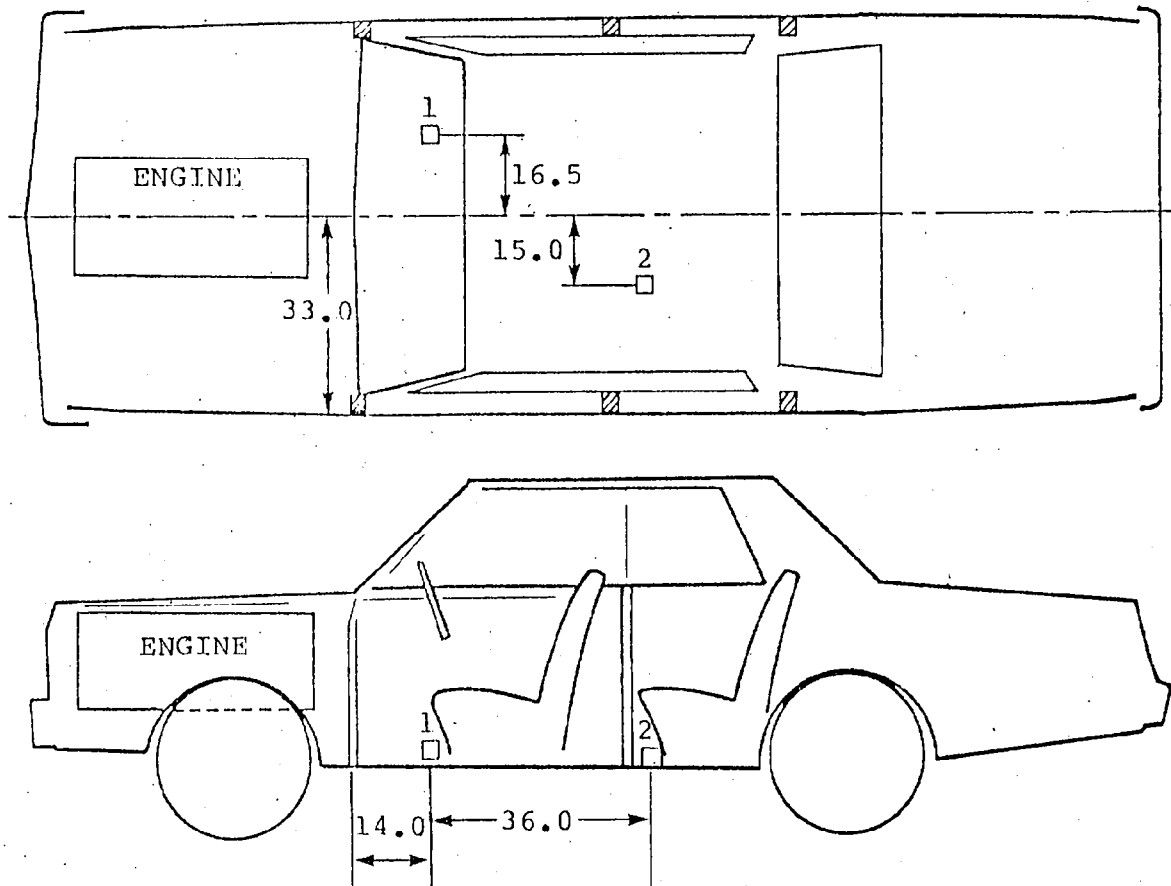
Test Date: 1/19/81

D.S. No.: 1145

Reference Dimension	Pre-test Measurement	Post-test Measurement	Change
X1*	179.7	163.8	15.9
X2			
X3			
X4			
X5			
X6			
X7			
X8*	105.0	104.8	0.2
X9*	104.3	104.5	0.2
X10			
X11			
X12			
X13			
X14			
X15			
X16			
X17			
X18			
X19*	178.5	163.6	14.9
X20*	178.8	163.7	14.8
X21			

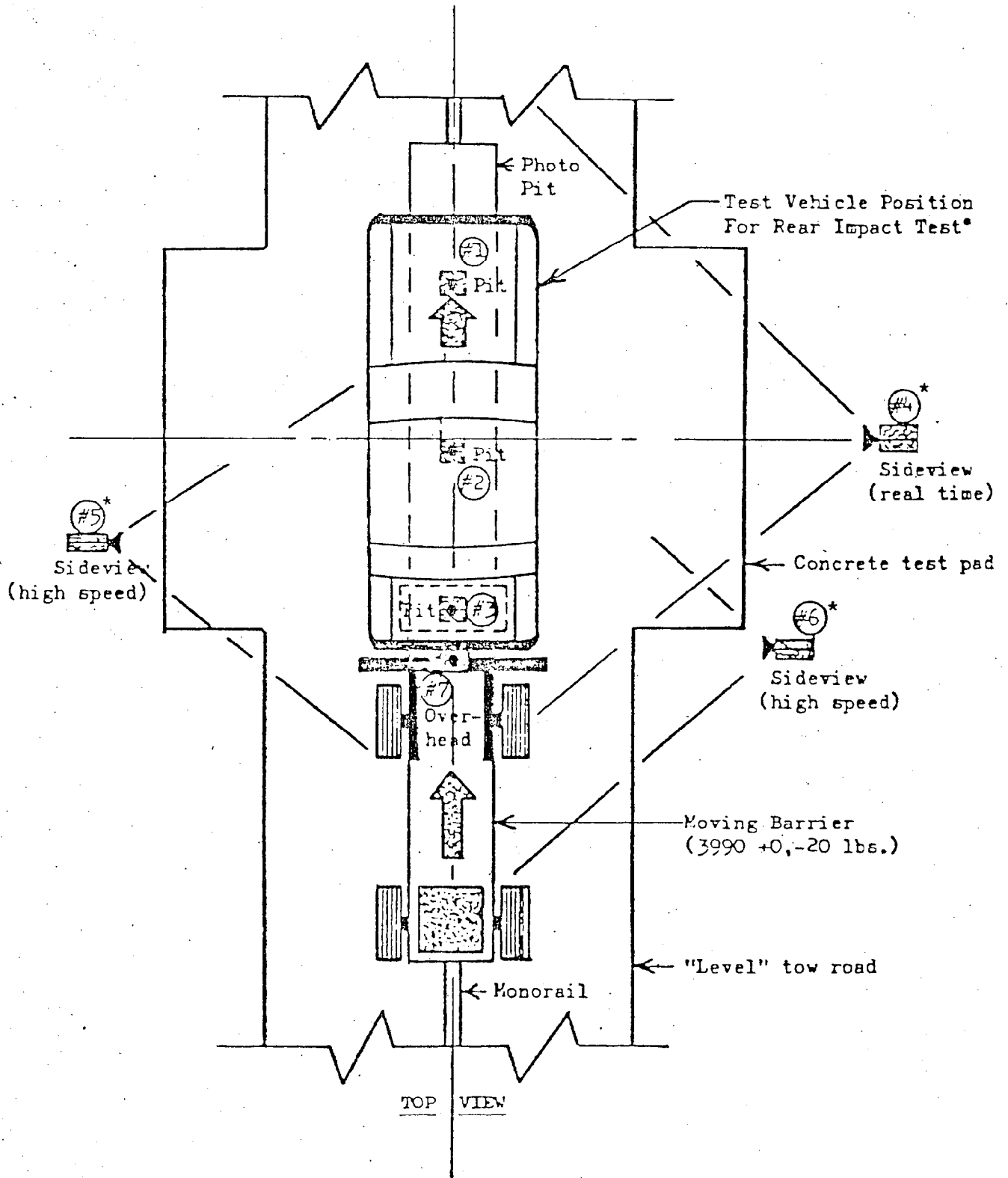
*Rear impact data requirements

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



VEHICLE ACCELEROMETER SUMMARY		DIRECTION			PEAK ACCELERATION (G) @ MSEC		
NO.	DESCRIPTION OF LOCATION	X	Y	Z	+	X	+
1	FRONT SEAT CROSSBEAM	✓			24.9	2.6	
					8	153	
2	REAR SEAT CROSSBEAM	✓			48.6	17.2	
					8	13	

CAMERA POSITIONS FOR REAR AND LATERAL IMPACTS
NOTE: Specific requirements shown on next page.



SUMMARY OF CAMERA LOCATIONS AND DESCRIPTIONS

Loc. No.	Location	Field of View	Lens Size	Frame Rate	Timing Speed	Ser No.	Impact Dist-X	Center-line Dist-Y	Camera Height
1	Pit	Engine underside and fuel pump	8mm	1000	100 HZ	7	12.0	0.0	-8.0
2	Pit	Overall underside	8mm	1000	100 HZ	4	8.0	0.0	-8.0
3	Pit	Fuel tank	8mm	1000	101 HZ	11	2.0	60.0	-8.0
4	Ground Based (Real Time)	Views entire right side	AR	24	N/A	1	5.0	60.0	6.0
5	Ground Based (Left)	Views entire left side of vehicle	25mm	1000	100 HZ	10	5.0	-20.0	3.0
6	Ground Based (Right)	Views entire right side of vehicle	13mm	1000	101 HZ	6	3.0	12.0	3.0
7	Overhead (Barrier)	Barrier-vehicle contact	8mm	1000	100 HZ	8	0.0	0.0	12.0

APPENDIX A
PHOTOGRAPHS

01034

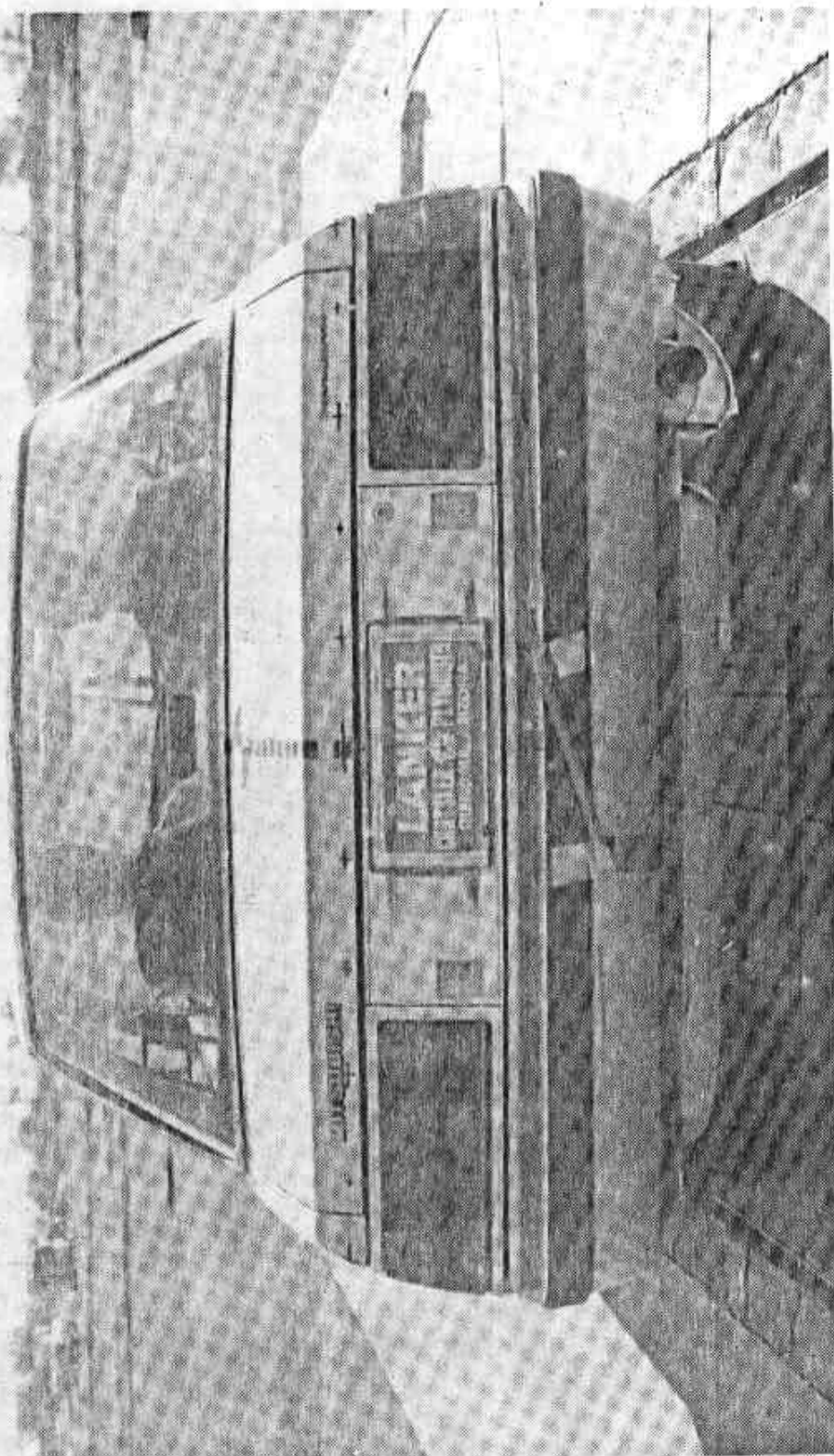


FIGURE A-1. PRE-TEST REAR VIEW - 1981 PLYMOUTH SAPPORO -
NHTSA 810522.

10353 ESE01 B

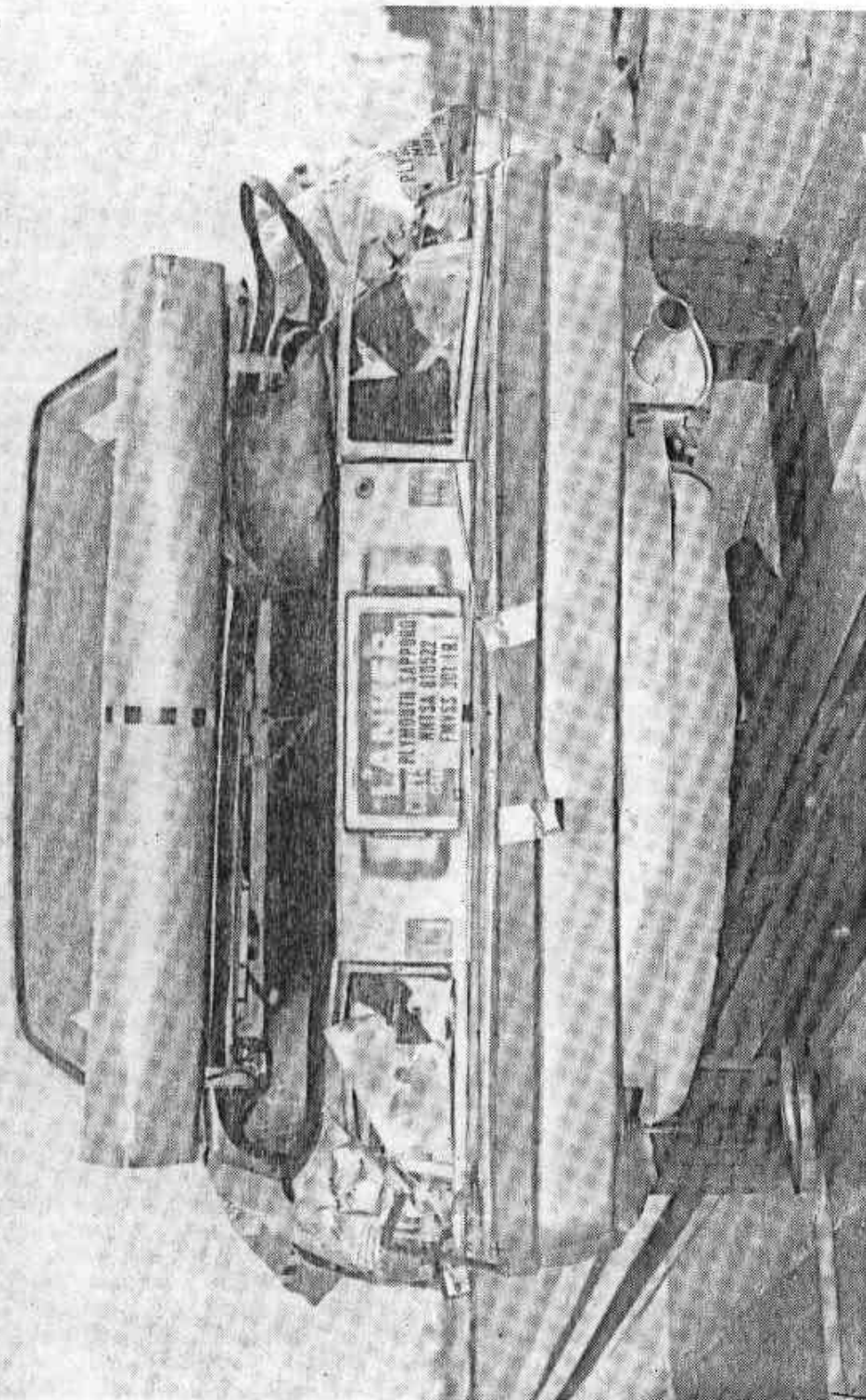


FIGURE A-2. POST-TEST REAR VIEW - 1981 PLYMOUTH SAPPORO -
WY334 810522.

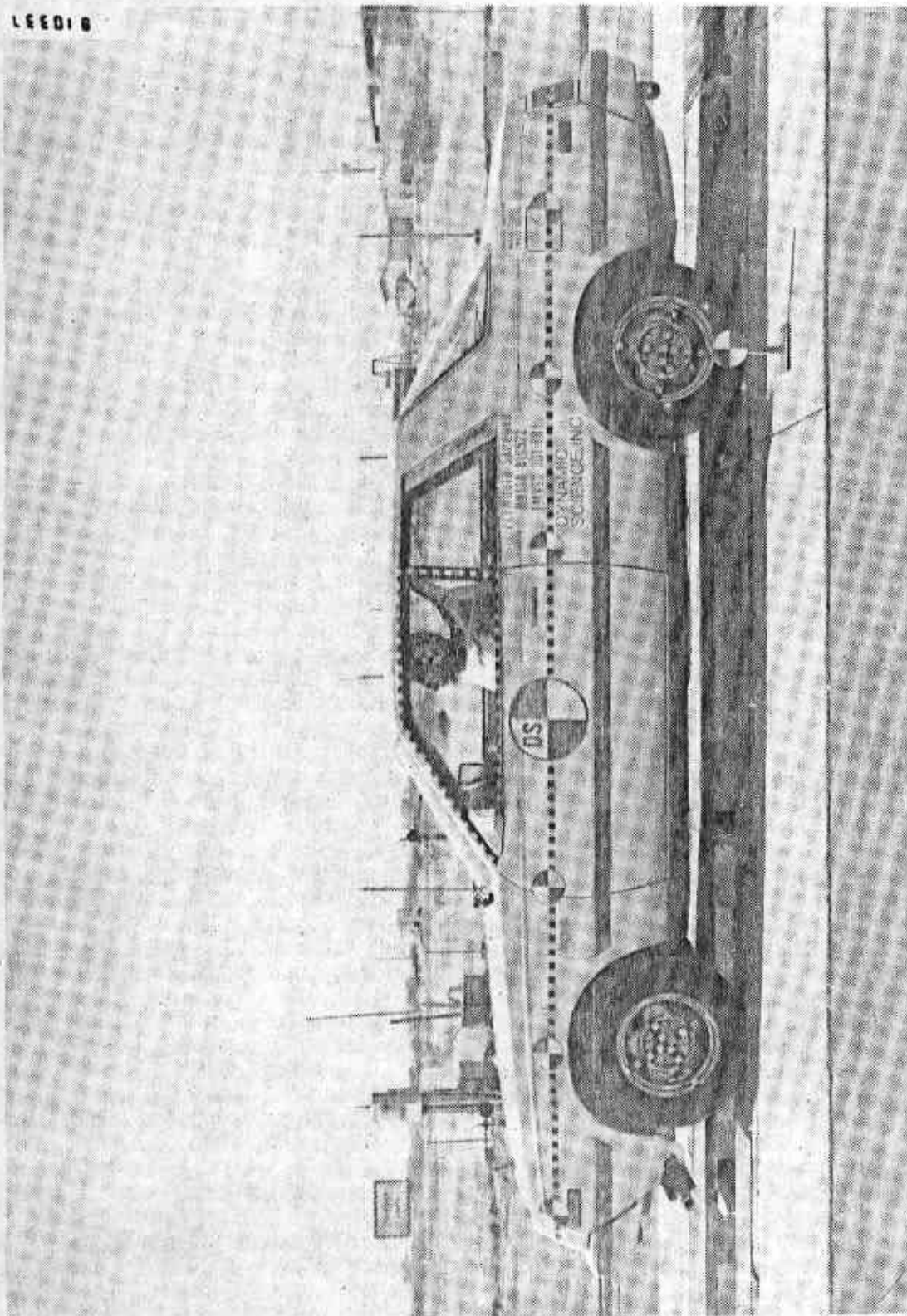


FIGURE A-3. PRE-TEST SIDE VIEW - 1981 PLYMOUTH SAPPORO -
NHTSA 310522.

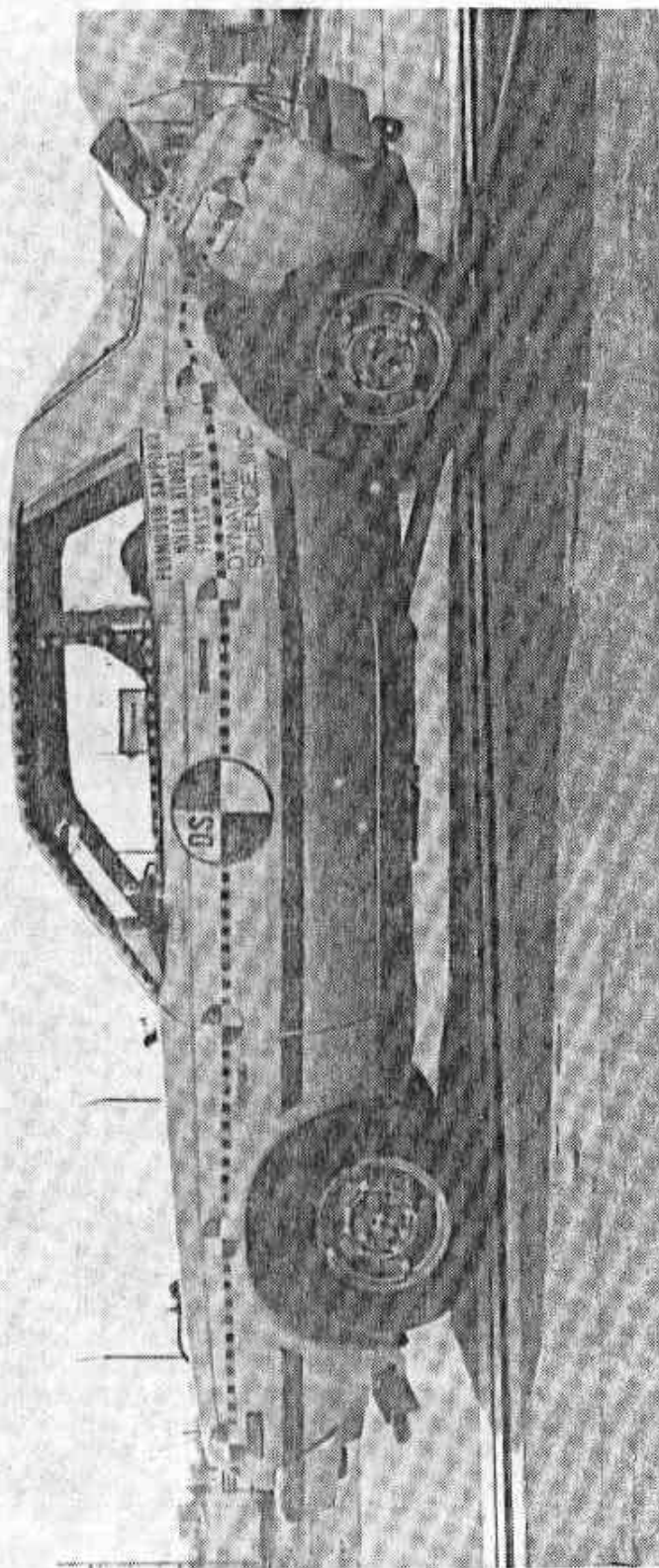


FIGURE A-4. POST-TEST SIDE VIEW - 1981 PLYMOUTH SAPPORO -
NHTSA 810522.

810406

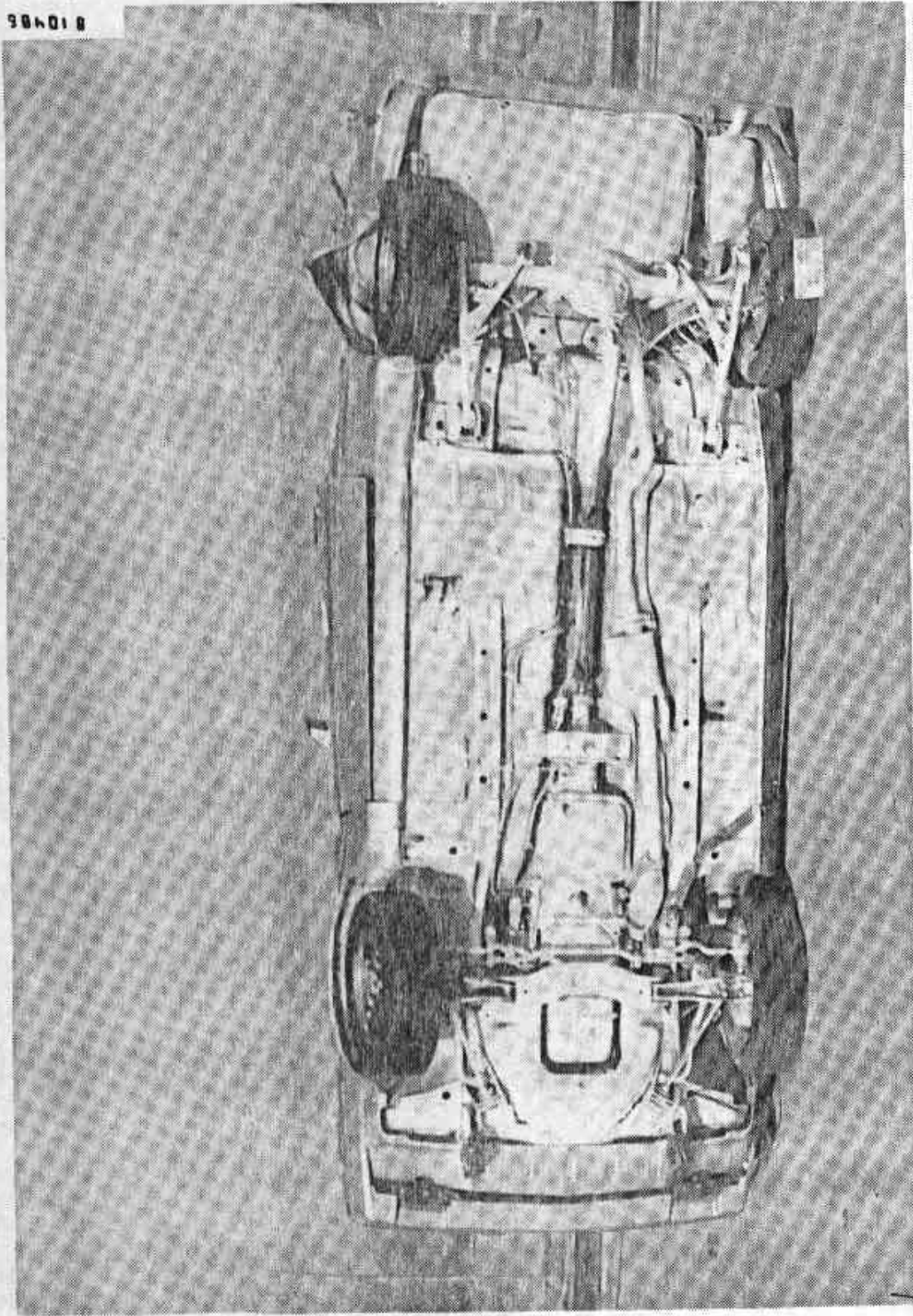


FIGURE A-5. POST-TEST OVERALL UNDERSIDE - 1981 PLYMOUTH SAPPHORO -
NHTSA 810522.

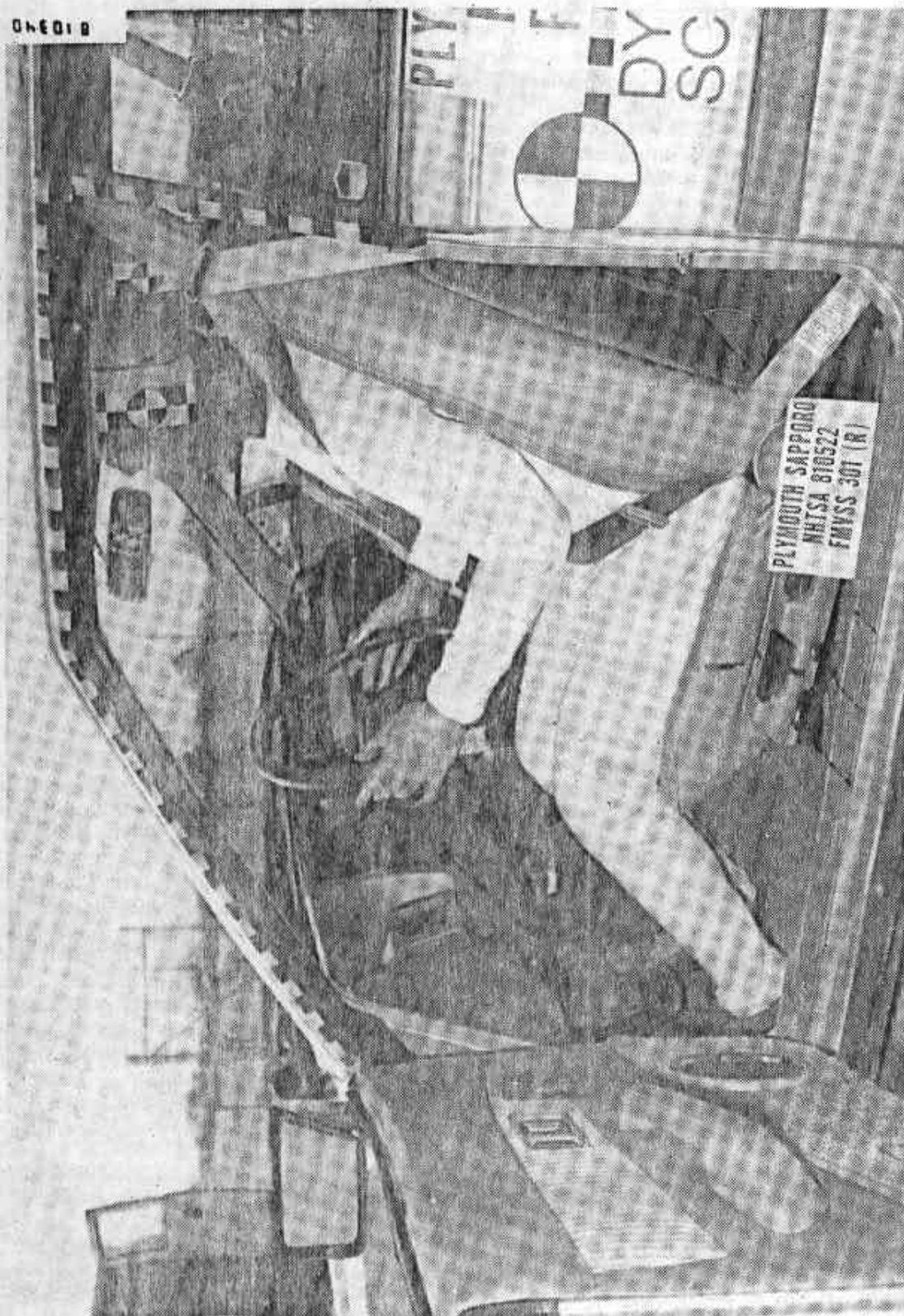


FIGURE A-6. PRE-TEST DRIVER DUMMY POSITION - 1981 PLYMOUTH SAPPORO -
NHTSA 810522.

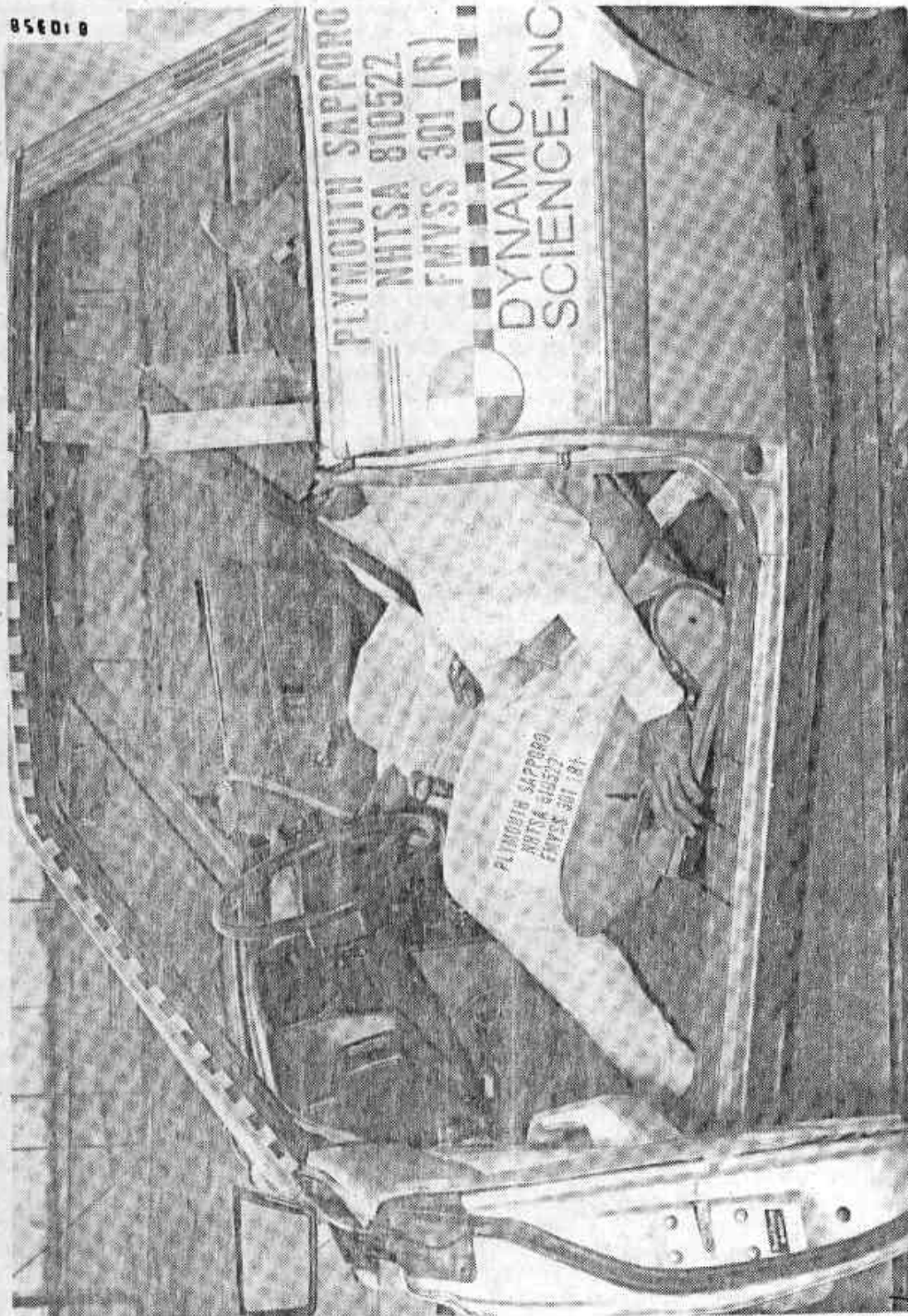


FIGURE A-7. POST-TEST DRIVER DUMMY POSITION - 1981 PLYMOUTH SAPPORO -
NHTSA 810522.

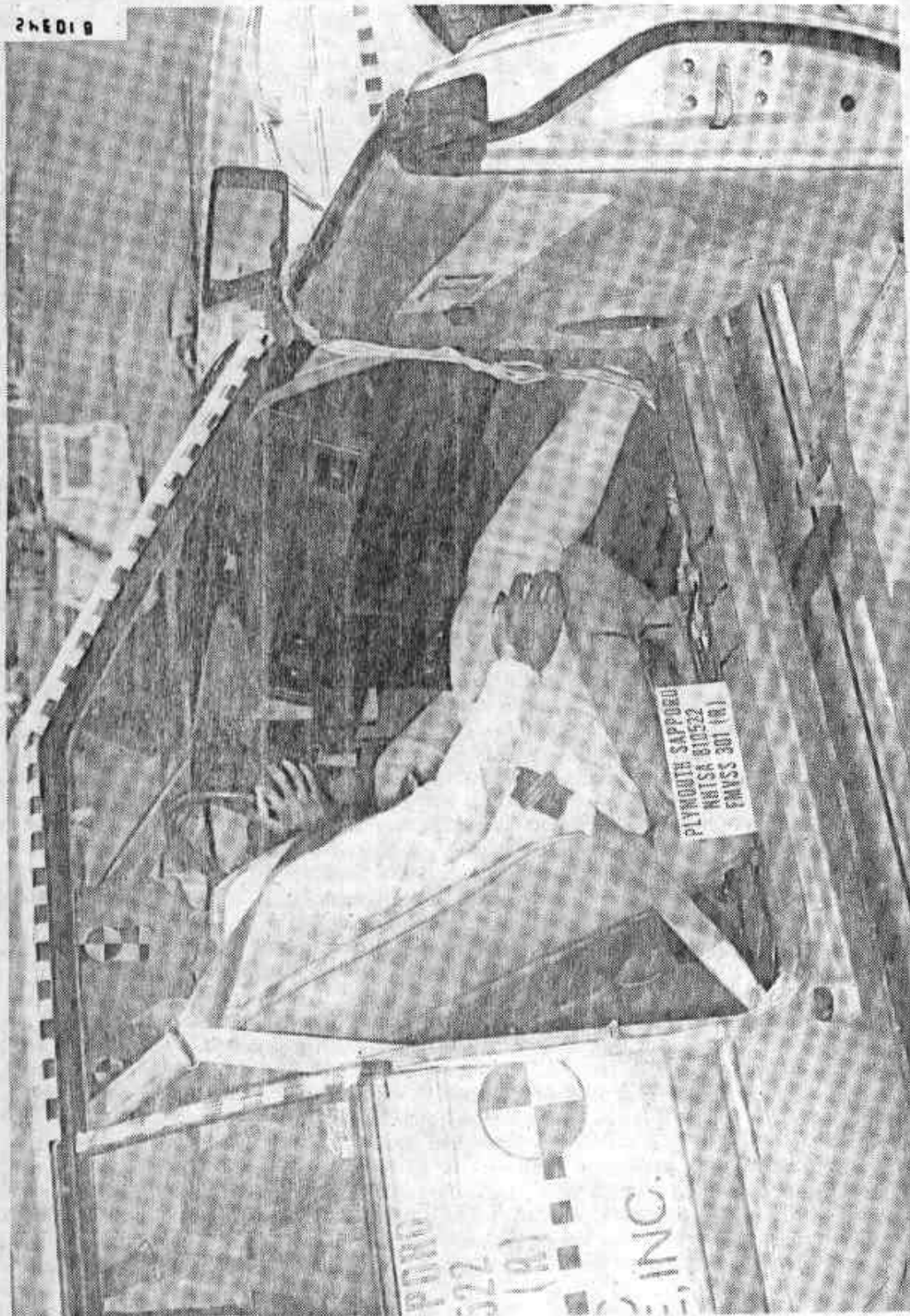


FIGURE A-8. PRE-TEST PASSENGER DUMMY POSITION - 1981 PLYMOUTH SAPPORO -
NHTSA 810522.

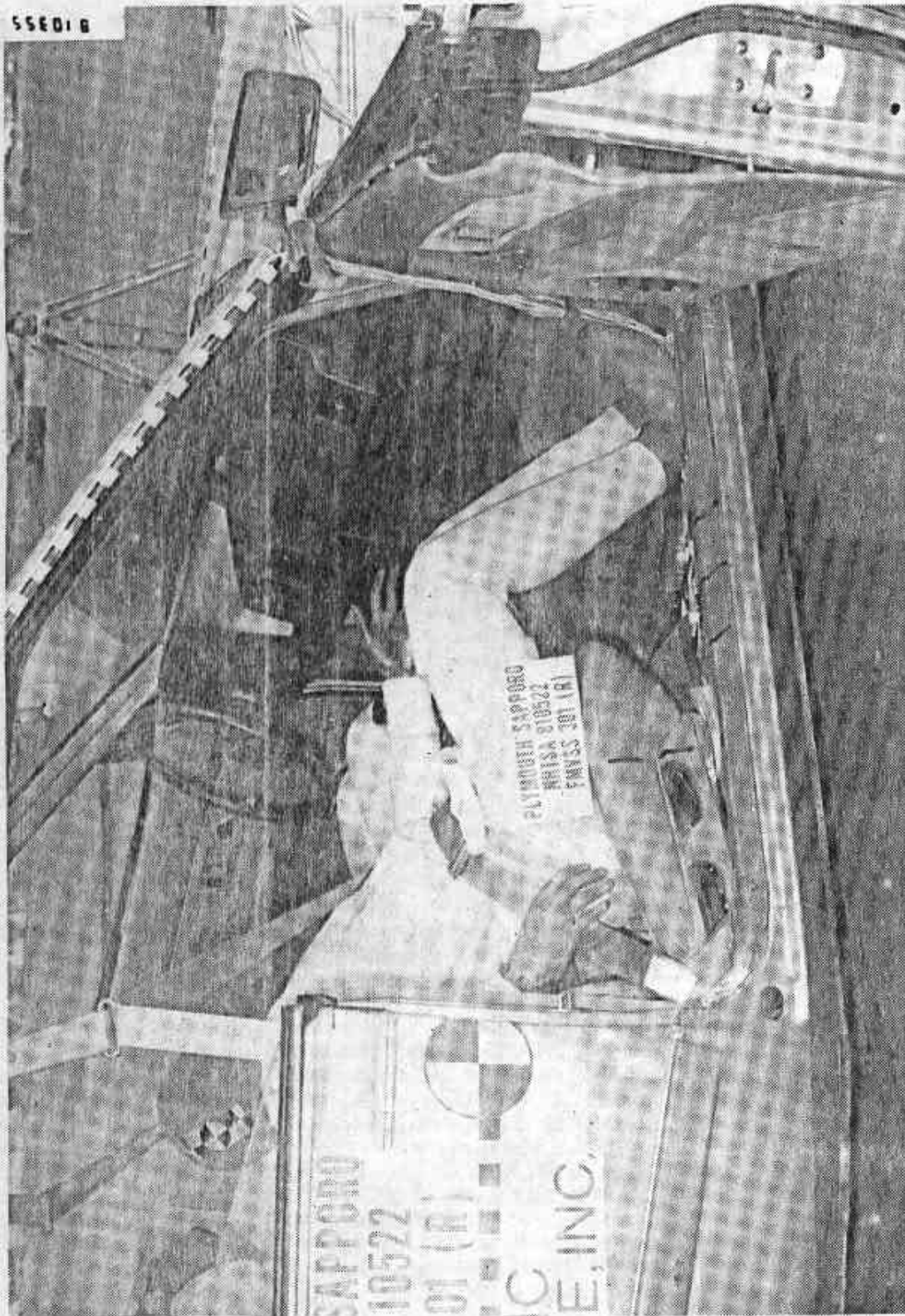


FIGURE A-9. POST-TEST PASSENGER DUMMY POSITION - 1981 PLYMOUTH SAPPORO -
NHTSA 810522.

APPENDIX B
CALCOMP PLOT PRESENTATION

Calcomp plots generated from the crash test data are presented on the following pages. All data will be recorded on magnetic tape for inclusion in the NHTSA crash test data base system. All data was filtered according to SAE J211. Plot legends and test anomalies are listed below:

PLOT LEGEND

<u>Vehicle Data*</u>	<u>Location</u>
LOC 1	Front Seat Area Acceleration (G)
LOC 2	Rear Seat Area Acceleration (G)
LOC 8	Moving Barrier C.G. Acceleration (G)

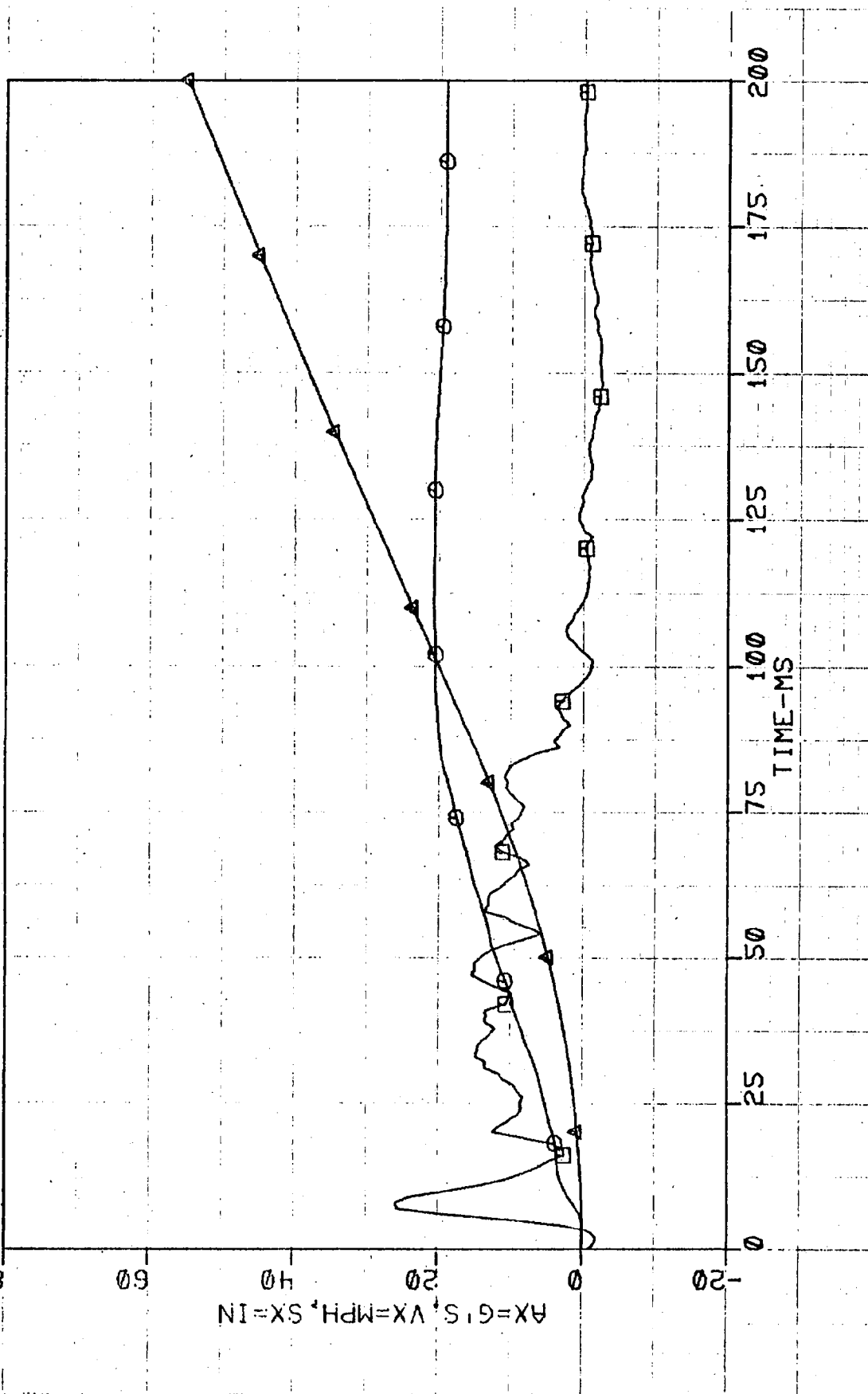
* Vehicle accelerometer location and data summarized on page 4-4.

Test Anomalies: None.

PLY SAPPORO LOC 1R

$\square = AX$ $\circ = VX$ $\Delta = SX$

AX=G'S, VX=MPH, SX=IN



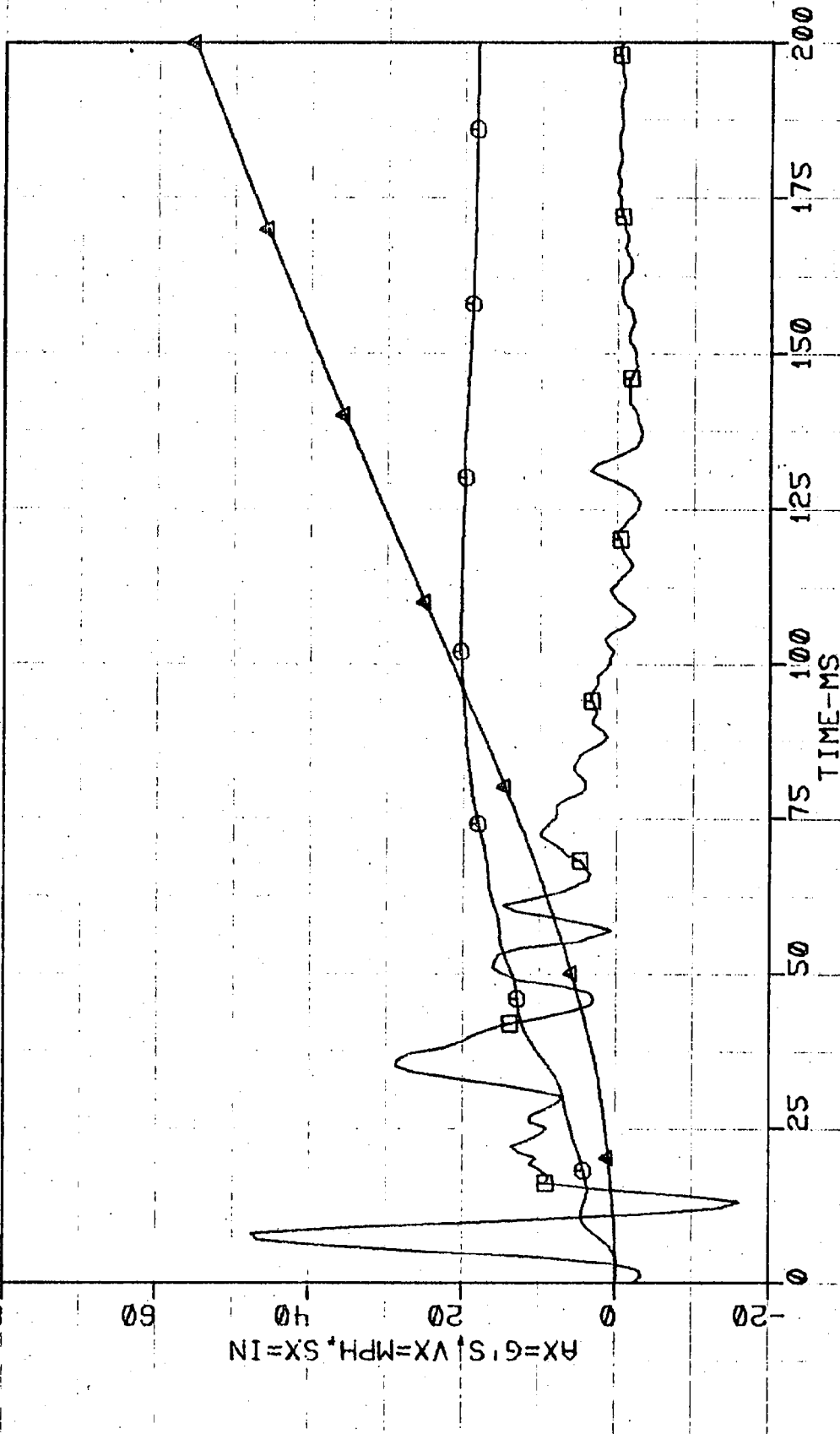
PLY SAPPORO LOC 2R

$\Delta = SX$

$\bigcirc = VX$

$\square = AX$

$AX = 6.1 S, VX = MPH, SX = IN$



PLY SAPPORO LOC 8

□ = AX ○ = VX △ = SX

AX=61'S, VX=MPH, SX=IN

