

636 550

REPORT NUMBER 301L-GTL-03-002

**SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 301L
FUEL SYSTEM INTEGRITY**

**FUJI HEAVY INDUSTRIES LTD.
2003 SUBARU BAJA MPV
NHTSA NO. C35501**

**GENERAL TESTING LABORATORIES, INC.
1623 LEEDSTOWN ROAD
COLONIAL BEACH, VIRGINIA 22443**



JUNE 04, 2003

FINAL REPORT

PREPARED FOR

**U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
ROOM 6111 (NVS-220)
WASHINGTON, D.C. 20590**

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7. Author(s) Grant Farrand, Project Engineer Debbie Messick, Project Manager	8. Performing Organ. Rep# GTL-DOT-03-301L-002	
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16. Abstract Compliance tests were conducted on the subject, 2003 Subaru Baja MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301-02 for the determination of FMVSS 301 compliance. Test failures identified were as follows: NONE		
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SECTION 1

PURPOSE OF COMPLIANCE TEST

1.0 PURPOSE OF COMPLIANCE TEST

A 2003 Subaru Baja MPV was subjected to Federal Motor Vehicle Safety Standard (FMVSS) No. 301 testing to determine if the vehicle was in compliance with the requirements of the standard. The purpose of this standard is to reduce deaths and injuries occurring from fires that result from fuel spillage during and after motor vehicle crashes, and resulting from ingestion of fuels during siphoning.

1.1 The test vehicle was a 2003 Subaru Baja MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 4S4BT61C236102571

B. NHTSA No.: C35501

C. Manufacturer: FUJI HEAVY INDUSTRIES LTD.

D. Manufacture Date: 09/02

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 301 testing on May 15, 2003.

SECTION 2

COMPLIANCE TEST RESULTS SUMMARY

2.0 TEST RESULTS

All tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Procedure, TP-301-02 dated 8 November 1994 and General Testing Laboratories, Inc. (GTL) Test Procedure, TP-301-02, "Fuel System Integrity".

Based on the test performed, the 2003 Subaru Baja MPV appears to meet the lateral impact requirements of FMVSS 301 testing.

SECTION 3

COMPLIANCE TEST DATA

3.0 TEST RESULTS

The following data sheets document the results of testing on the 2003 Subaru Baja MPV.

SUMMARY OF RESULTS

Vehicle's NHTSA No.: C35501 Test Model: BAJATest Date.: 05/15/03 Time: 15:56 Temperature 77 ° F

Vehicle Model Year, Make, Model and Body Style:

2003 SUBARU BAJA PICKUPVehicle Test Weight: 4007 lbs.; Impact Velocity: 19.6 mph

Type of Front Occupant Restraint System Installed in Test Vehicle:

Driver's DSP: TYPE 2 BELT WITH FRONTAL AIR BAG IN STEERING WHEELRight Passenger's DSP: TYPE 2 BELT WITH FRONTAL AIR BAG IN DASHStoddard solvent spillage from Vehicle's Fuel System: None

REMARKS:

RECORDED BY: [Signature]APPROVED BY: P. MessickDATE: 05/15/03

DATA SHEET 1 **TEST VEHICLE SPECIFICATIONS**

TEST VEHICLE INFORMATION:

NHTSA No.: C35501
 Year/Make/Model/Body Style: 2003 SUBARU BAJA PICKUP
 Engine Data: 2.5 LITERS FLAT FOUR
 Transmission Data: 5 SPEED MANUAL
 Final Drive Data: AWD
 Major Options: CRUISE CONTROL, POWER MOONROOF, CD PLAYER
 Date Received: 03/20/03; Odometer Reading: 12 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: FUJI HEAVY INDUSTRIES LTD.
 Date of Manufacture: 09/02
 VIN: 4S4BT61C236102571

 GVWR: 2066 kg (4555 lbs.); GAWR Front: 1002 kg (2210 lbs.) GAWR Rear: 1064 kg (2345 lbs.)

DATA FROM VEHICLE'S TIRE PLACARD:

Location of Placard on Vehicle: DRIVER'S "B" PILLAR
 Tire Pressure With Maximum Capacity Vehicle Load —
 Front: 30 psi; Rear: 33 psi
 Recommended Tire Size: P225/60R16
 Recommended Load Range: _____
 Recommended Cold Tire Pressure: Front = 210 kPa (30 psi) Rear = 230 kPa (33 psi)
 Size of Tires on Test Vehicle: P225/60R16
 Type of Spare Tire: TEMPORARY

Vehicle Capacity Data —

Type of Front Seat(s): BUCKET
 Number of Occupants: Front = 2; Mid = 0 Rear = 2; Total = 4

A. VEHICLE CAPACITY WEIGHT (VCW) =	<u>800</u> lbs.
B. Number of Occupants x 150 lbs. =	<u>600</u> lbs.
RATED CARGO AND LUGGAGE WEIGHT (RCLW) = A - B =	<u>200</u> lbs.

RECORDED BY: [Signature]
 APPROVED BY: [Signature]

DATE: 05/14/03

DATA SHEET 2 PRE-TEST DATA

WEIGHT OF TEST VEHICLE:

A. As Received At Laboratory (Maximum Fluids) —

Right Front = 413.67 kg (912 lbs.) Right Rear = 379.20 kg (836 lbs.)

Left Front = 431.82 kg (952 lbs.) Left Rear = 361.51 kg (797 lbs.)

TOTAL FRONT = 845.49 kg (1864 lbs.) TOTAL REAR = 740.71 kg (1633 lbs.)

% of TOTAL = 53 % % of TOTAL = 47 %

TOTAL DELIVERED WEIGHT = 1586.21 kg (3497 lbs.)

B. Calculation of Target Test Weight —

1. Total Delivered Weight = 1586.21 kg (3497 lbs.)

2. Rated Cargo & Lugg. Weight (RCLW) = 90.71 kg (200 lbs.)

3. Weight of 2 Dummies (164 lbs. each) = 149 kg (328 lbs.)

TARGET TEST WEIGHT = 1 + 2 + 3 = 1825.70 kg (4025 lbs.)

C. Vehicle, Dummies and 136.07 kg (300 lbs.) of Cargo Weight —

Right Front = 443.15 kg (977 lbs) Right Rear = 469.01 kg (1034 lbs)

Left Front = 457.22 kg (1008 lbs) Left Rear = 448.14 kg (988 lbs)

TOTAL FRONT = 900.38 kg (1985 lbs) TOTAL REAR = 917.16 kg (2022 lbs)

% of TOTAL = 50 % % of TOTAL = 50 %

TOTAL TEST WEIGHT = 1817.54 kg (4007 lbs)

Weight of Ballast secured in cargo area = 136.07 kg (300 lbs)

Type of Ballast: SAND BAGS

Method of Securing Ballast: VEHICLE CARGO TIE DOWN HOOKS

Vehicle Components Removed for Weight Reduction:

NONE

DATA SHEET 2 PRE-TEST DATA CONTINUED

TEST VEHICLE ATTITUDE:

As Delivered — Right Front: 755 mm (29.7 inches)
 Left Front: 760 mm (29.9 inches)
 Right Rear: 752 mm (29.6 inches)
 Left Rear: 755 mm (29.7 inches)

As Tested — Right Front: 734 mm (28.8 inches)
 Left Front: 742 mm (29.2 inches)
 Right Rear: 718 mm (28.2 inches)
 Left Rear: 724 mm (28.5 inches)

Vehicle's Wheelbase = 2650 mm (104 inches)

FUEL SYSTEM DATA:

Fuel System Capacity Listed in Owner's Manual = 64 liters (16.9 gallons)
 Usable Capacity Figure Furnished By COTR = 64 liters (16.9 gallons)

Test Volume Range (91 to 94% of Usable Capacity) — 92.5%

58.21 liters (15.38 gallons) TO 60.15 liters (15.89 gallons)

ACTUAL TEST VOLUME = 59.05 liters (15.6 gallons) (with entire fuel system filled)

Test Fluid Type: Stoddard solvent
 Test Fluid Specific Gravity: .7583
 Test Fluid Kinematic Viscosity: 1.7 centistokes at 77° F
 Test Fluid Color: BLUE ("red" is preferred)
 Type of Vehicle Fuel Pump: ELECTRIC
 Electric Fuel Pump Operation with Ignition Switch ON and Engine OFF —
PUMP RUNS FOR 3 SECONDS AND THEN TURNS OFF UNLESS
ENGINE IS RUNNING.

Details of Fuel System: HIGH PRESSURE ELECTRIC FUEL PUMP
SUPPLY FUEL INJECTORS WITH LOW PRESSURE RETURN LINE TO
FUEL TANK.

REMARKS:

RECORDED BY: [Signature]

APPROVED BY: [Signature]

DATE: 05/14/03

DATA SHEET 3
POST IMPACT DATA

TYPE OF TEST: 301L
TEST DATE: 05/15/03 ; TIME: 15:56 ; TEMP.: 77 °F
VEH. NHTSA NO.: C35501 ; VIN: 4S4BT61C236102571

REQUIRED IMPACT VELOCITY RANGE: 18.9 to 19.9 mph

ACTUAL IMPACT VELOCITY: (speed traps located within 5 feet of impact plane)

Trap No. 1 = 19.6 mph

Trap No. 2 = 19.6 mph

Average Impact Speed = 19.6 mph

REMARKS:

RECORDED BY: 

DATE: 05/15/02

APPROVED BY: 

DATA SHEET 4
SUMMARY OF FMVSS 301 DATA

TEST VEHICLE NHTSA NO.: C35501 ; TEST DATE: 05/15/03

VEHICLE YEAR/MAKE/MODEL/BODY STYLE:

2003 SUBARU BAJA MPV

TYPE OF IMPACT: 301L

STODDARD SOLVENT SPILLAGE MEASUREMENT:

A. From impact until vehicle motion ceases —

Actual = 0 oz. Maximum Allowable = 1 ounce

B. For 5 minute period after vehicle motion ceases —

Actual = 0 oz. Maximum Allowable = 5 ounces

C. For next 25 minutes —

Actual = 0 oz. Maximum Allowable = 1 oz./minute

D. Provide Spillage Details: NONE

REMARKS:

RECORDED BY: [Signature]
APPROVED BY: [Signature]

DATE: 05/15/03

DATA SHEET 5 **STATIC ROLLOVER TEST DATA:**

A. Test Phase = 0° to 90°

Determination of Stoddard Solvent
 Collection Time Period:

1. Rollover Fixture 90° Rotation Time = 1
 minutes, 36 seconds

(Specified Range is 1 to 3
 minutes)

2. FMVSS 301 Position Hold
 Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 36 seconds

4. NEXT WHOLE MINUTE INTERVAL =
7 minutes

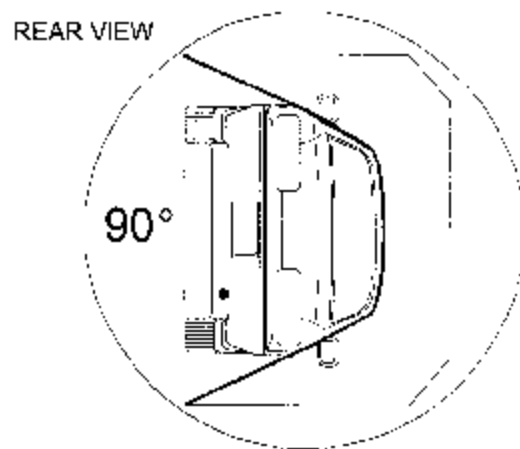
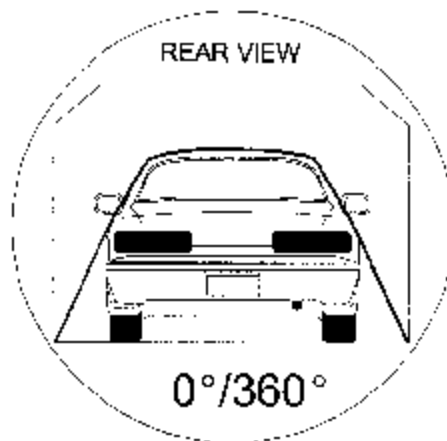
Actual Test Vehicle Stoddard Solvent
 Spillage:

1. First 5 minutes from onset of
 rotation = 0 oz.
 (5 oz. allowed)

2. 6th minute = 0 oz.
 (1 oz. allowed)

3. 7th minute = 0 oz.
 (1 oz. allowed)

4. 8th minute (if required) = N/A oz. (1 oz. allowed)



Provide Details of Stoddard Solvent Spillage Locations — NONE

DATA SHEET 5 CONTINUED

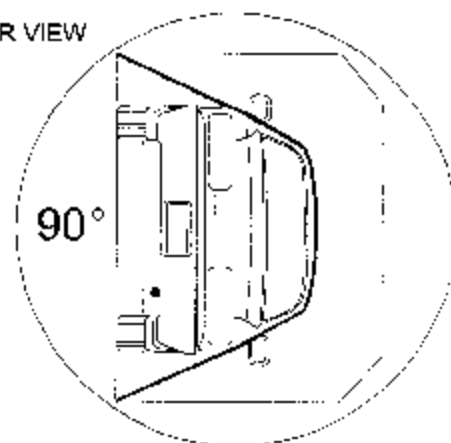
B. Test Phase = 90° to 180°

Determination of Stoddard
Solvent Collection Time Period:

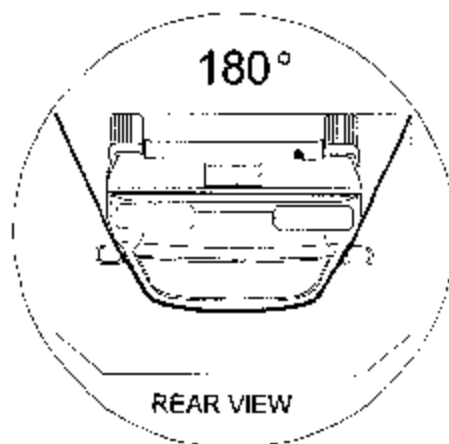
1. Rollover Fixture 90°

Rotation Time = 1 minutes,
37 seconds(Specified Range is 1 to 3
minutes)2. FMVSS 301 Position Hold
Time = 5 minutes, 0 seconds3. TOTAL = 6 minutes, 37 seconds4. NEXT WHOLE MINUTE INTERVAL =
7 minutesActual Test Vehicle Stoddard
Solvent Spillage:1. First 5 minutes from onset of
rotation = 0 oz.
(5 oz. allowed)2. 6th minute = 0 oz.
(1 oz. allowed)3. 7th minute = 0 oz.
(1 oz. allowed)4. 8th minute (if required) = N/A oz. (1 oz. allowed)Provide Details of Stoddard Solvent Spillage Locations — NONE

REAR VIEW

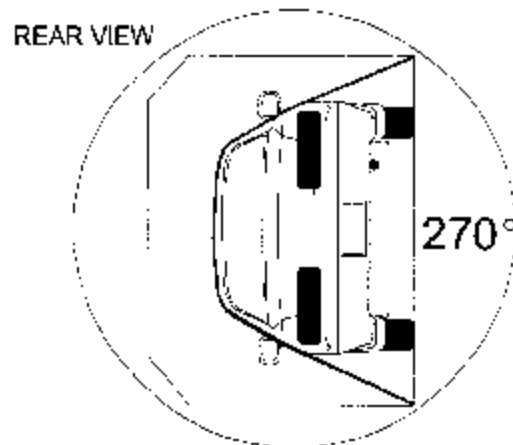
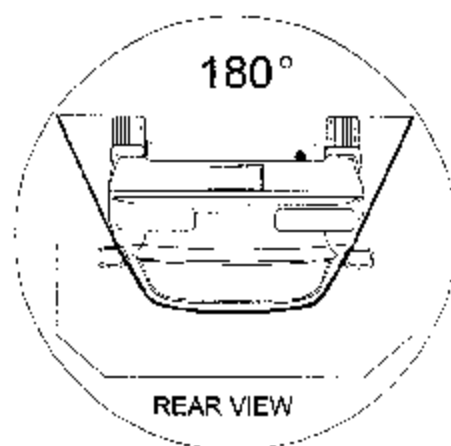


180°



DATA SHEET 5 CONTINUED

C. Test Phase = 180° to 270°

Determination of Stoddard
Solvent Collection Time Period:1. Rollover Fixture 90°
Rotation Time = 1 minutes,
29 seconds(Specified Range is 1 to 3
minutes)2. FMVSS 301 Position Hold
Time = 5 minutes, 0 seconds3. TOTAL = 6 minutes, 29 seconds4. NEXT WHOLE MINUTE
INTERVAL = 7 minutesActual Test Vehicle Stoddard
Solvent Spillage:1. First 5 minutes from onset of
rotation = 0 oz.
(5 oz. allowed)2. 6th minute = 0 oz.
(1 oz. allowed)3. 7th minute = 0 oz.
(1 oz. allowed)4. 8th minute (if required) = N/A oz. (1 oz. allowed)Provide Details of Stoddard Solvent Spillage Locations — NONE

DATA SHEET 5 CONTINUED

D. Test Phase = 270° to 360°

Determination of Stoddard
Solvent Collection Time Period:

1. Rollover Fixture 90°
Rotation Time = 1 minutes,
41 seconds

(Specified Range is 1 to 3
minutes)

2. FMVSS 301 Position Hold
Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 41 seconds

4. NEXT WHOLE MINUTE INTERVAL =
7 minutes

Actual Test Vehicle Stoddard
Solvent Spillage:

1. First 5 minutes from onset of
rotation = 0 oz.
(5 oz. allowed)

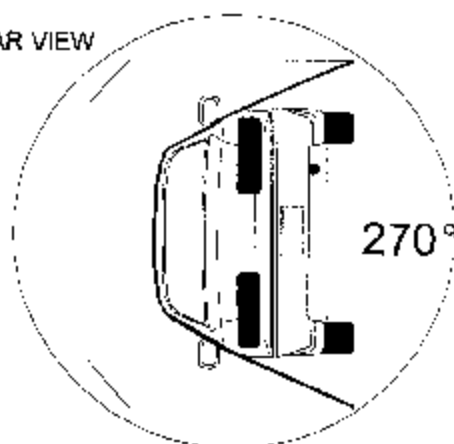
2. 6th minute = 0 oz.
(1 oz. allowed)

3. 7th minute = 0 oz.
(1 oz. allowed)

4. 8th minute (if required) = N/A oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE

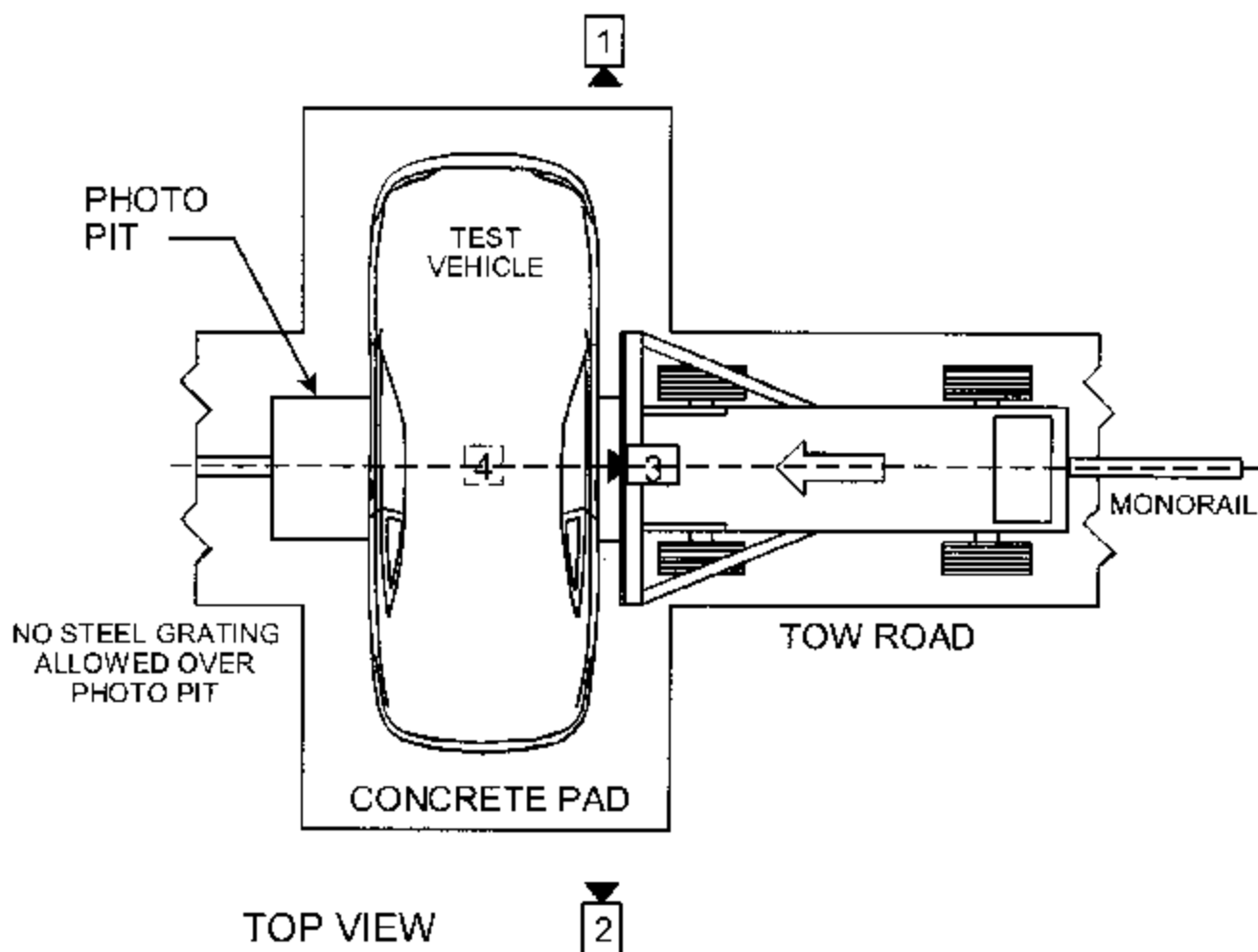
REAR VIEW



REAR VIEW



DATA SHEET 6
CAMERA LOCATION

VEHICLE NHTSA NO.: C35501TEST DATE: 05/15/03

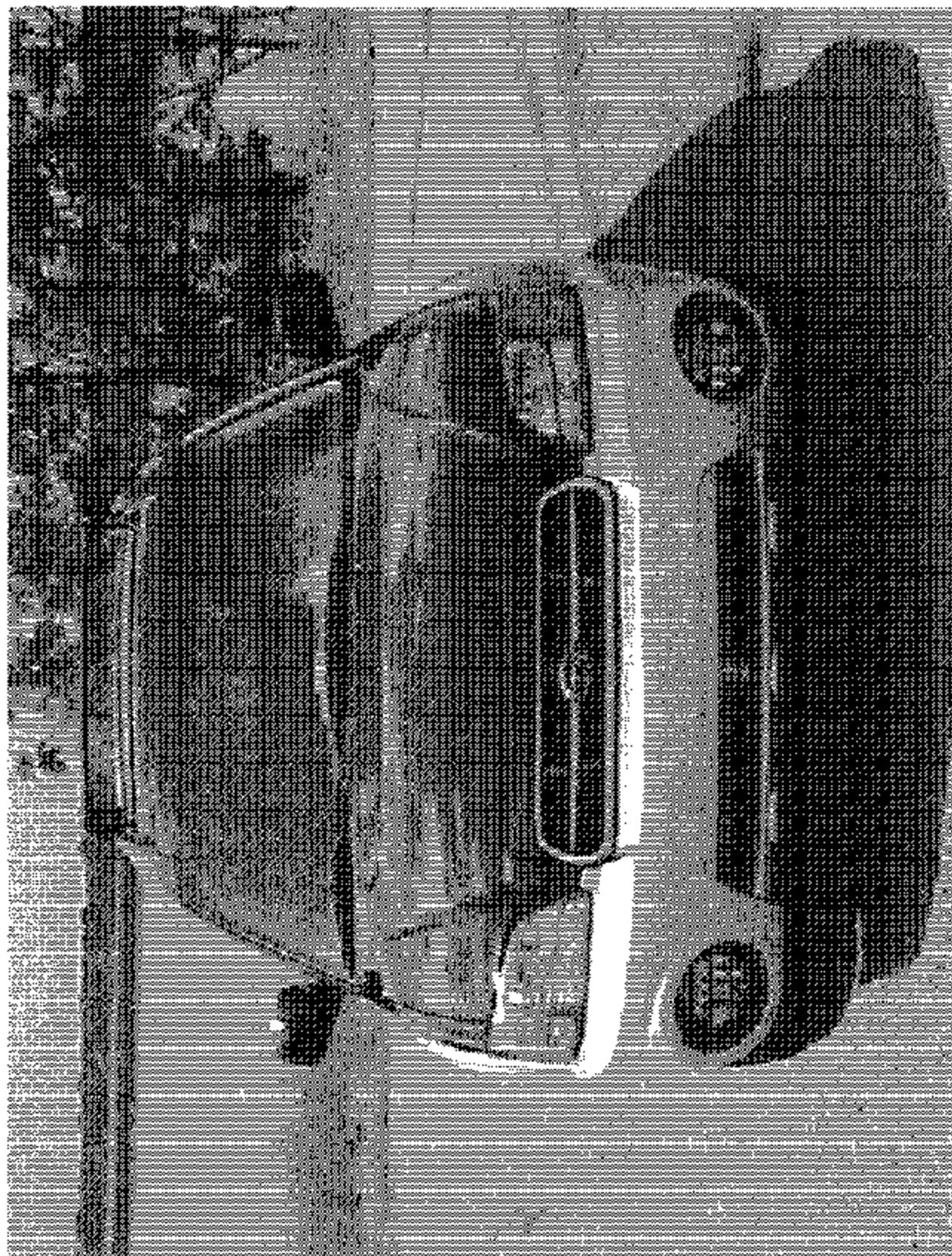
- CAMERA 1 – FRONT SIDE VIEW OF VEHICLE DURING CRASH
CAMERA 2 – REAR SIDE VIEW OF VEHICLE DURING CRASH
CAMERA 3 – OVERHEAD VIEW OF ENTIRE IMPACT
CAMERA 4 – UNDERBODY VIEW OF FUEL TANK LOCATED IN PIT

SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

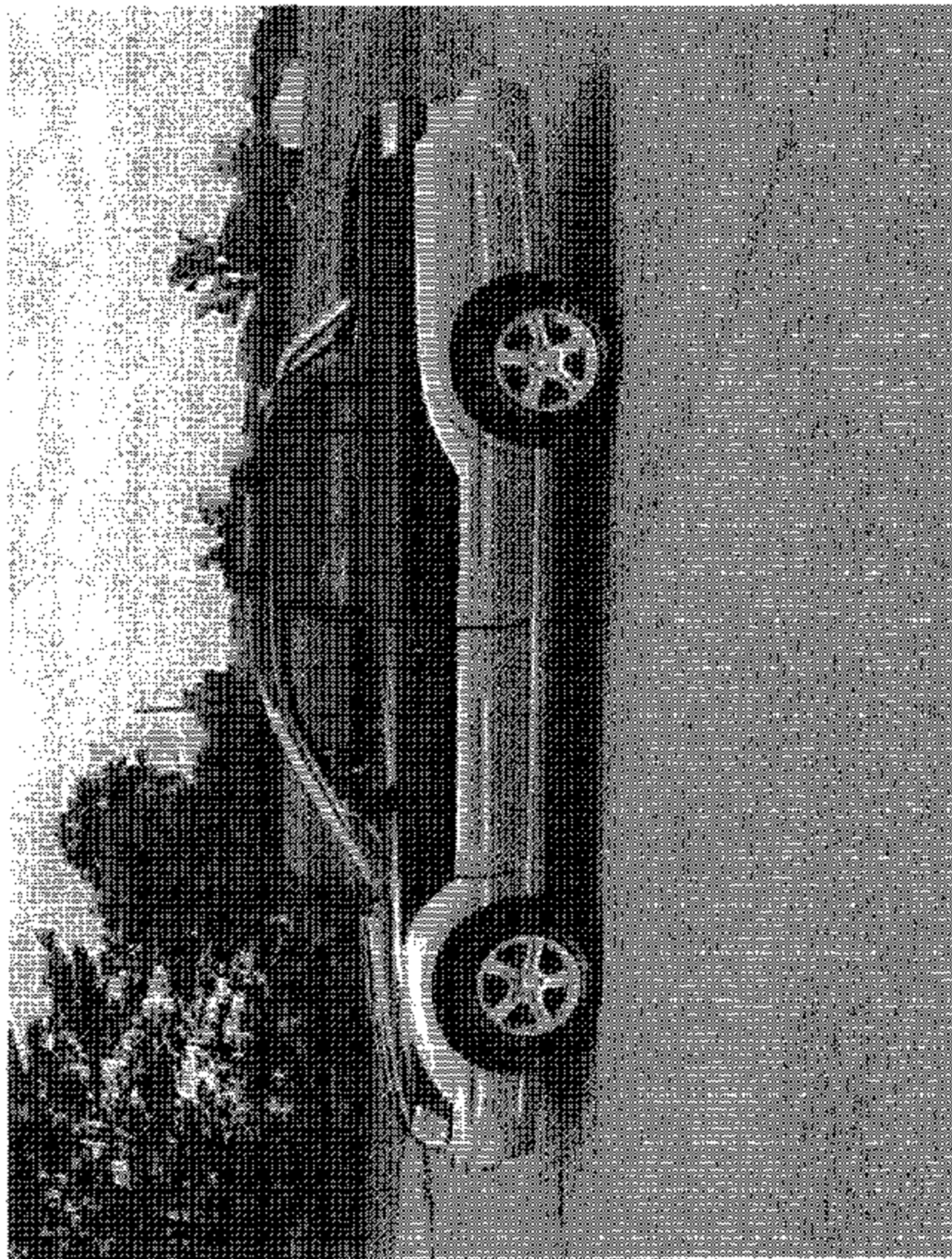
EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO.	CAL. DATE	NEXT CAL. DATE
COUNTER/TIMER	SYSTRON DONNER	19 353-10	04/03	04/04
COUNTER/TIMER	SYSTRON DONNER	19 353- 11	03/03	03/04
SPEED TRAP 2	GTL ST1	N/A	08/02	08/03
SPEED TRAP 3	GTL ST2	N/A	08/02	08/03
STOP WATCH	ACCUSPLIT	ACT 1 A&B	05/03	05/04
STOP WATCH	ACCUSPLIT	ACT 2 A&B	05/03	05/04
SCALES	INTERCOMP	199744	05/03	05/04
TIRE PRESSURE GAUGE	WEKSLER	0-100	05/03	05/04
STEEL SCALES	STARRETT	C416R	05/03	05/04
STEEL TAPE	STANLEY	GF2	05/03	05/04
LEVEL	STANLEY	42-449	05/03	05/04
TEMP. INDICATOR	OMEGA	B/5562/14/1	05/03	05/04
TEMP. RECORDER	OMEGA	B/5562/14/1	05/03	05/04
SCALES	FAIRBANKS	N/A	06/02	06/03

SECTION 5
PHOTOGRAPHS



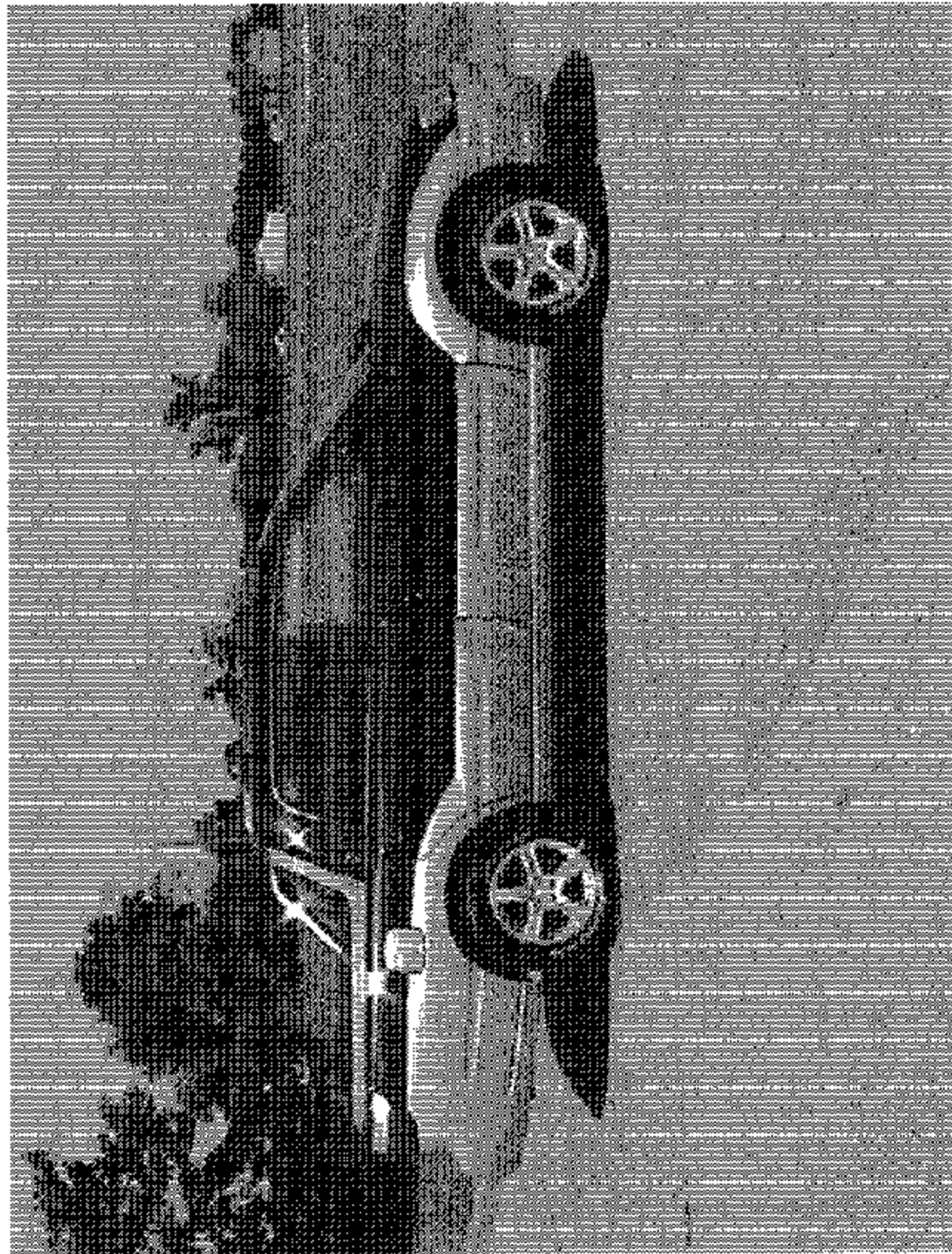
2003 SUBARU BAJA
NHISA NO. C35502
FMVSS NO. 301L

FIGURE 5.1
FRONT VIEW OF VEHICLE PRE-TEST



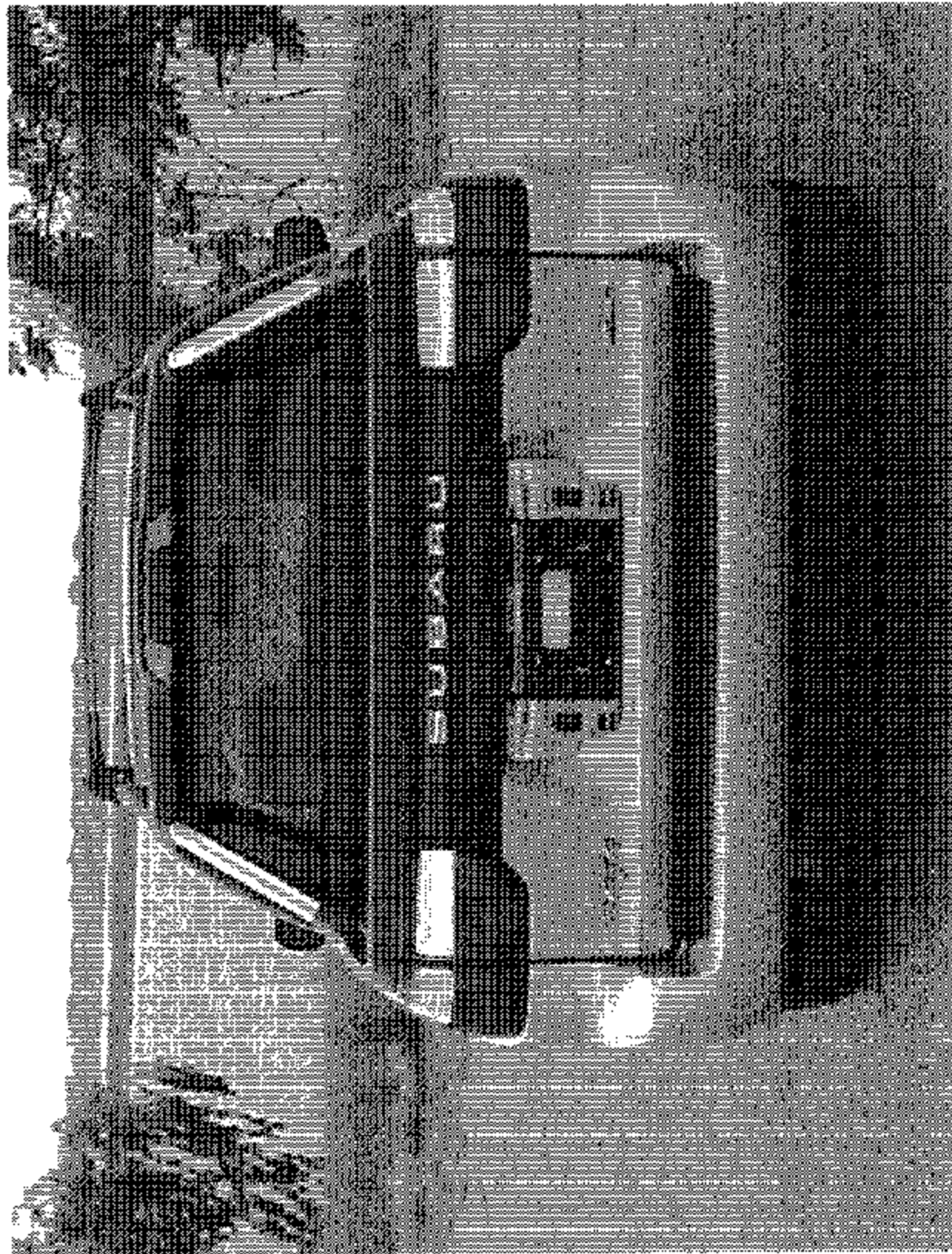
2003 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE 5.2
LEFT SIDE VIEW OF VEHICLE PRE-TEST



2003 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE 5.3
RIGHT SIDE VIEW OF VEHICLE PRE-TEST



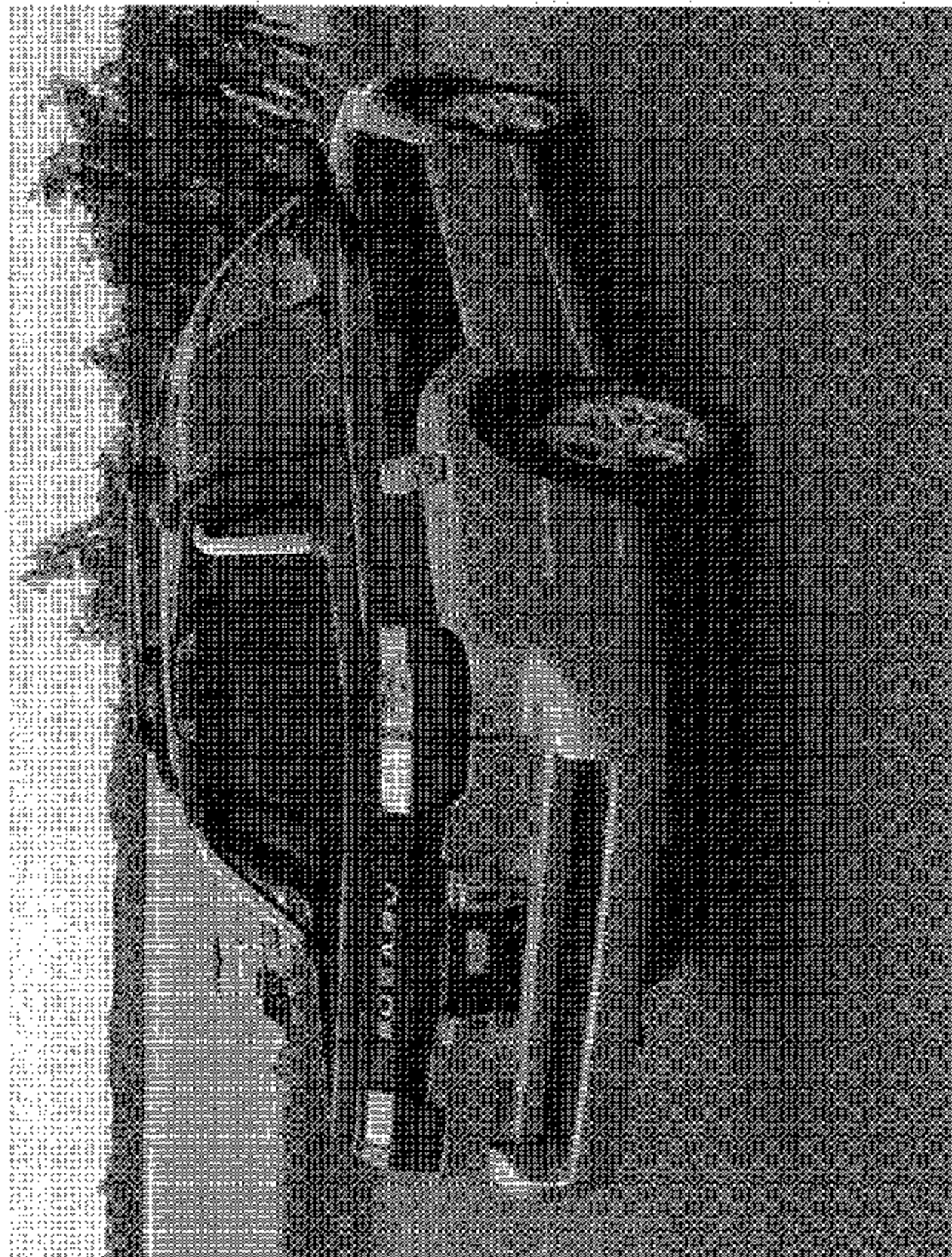
2003 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE 5.4
REAR VIEW OF VEHICLE PRE-TEST



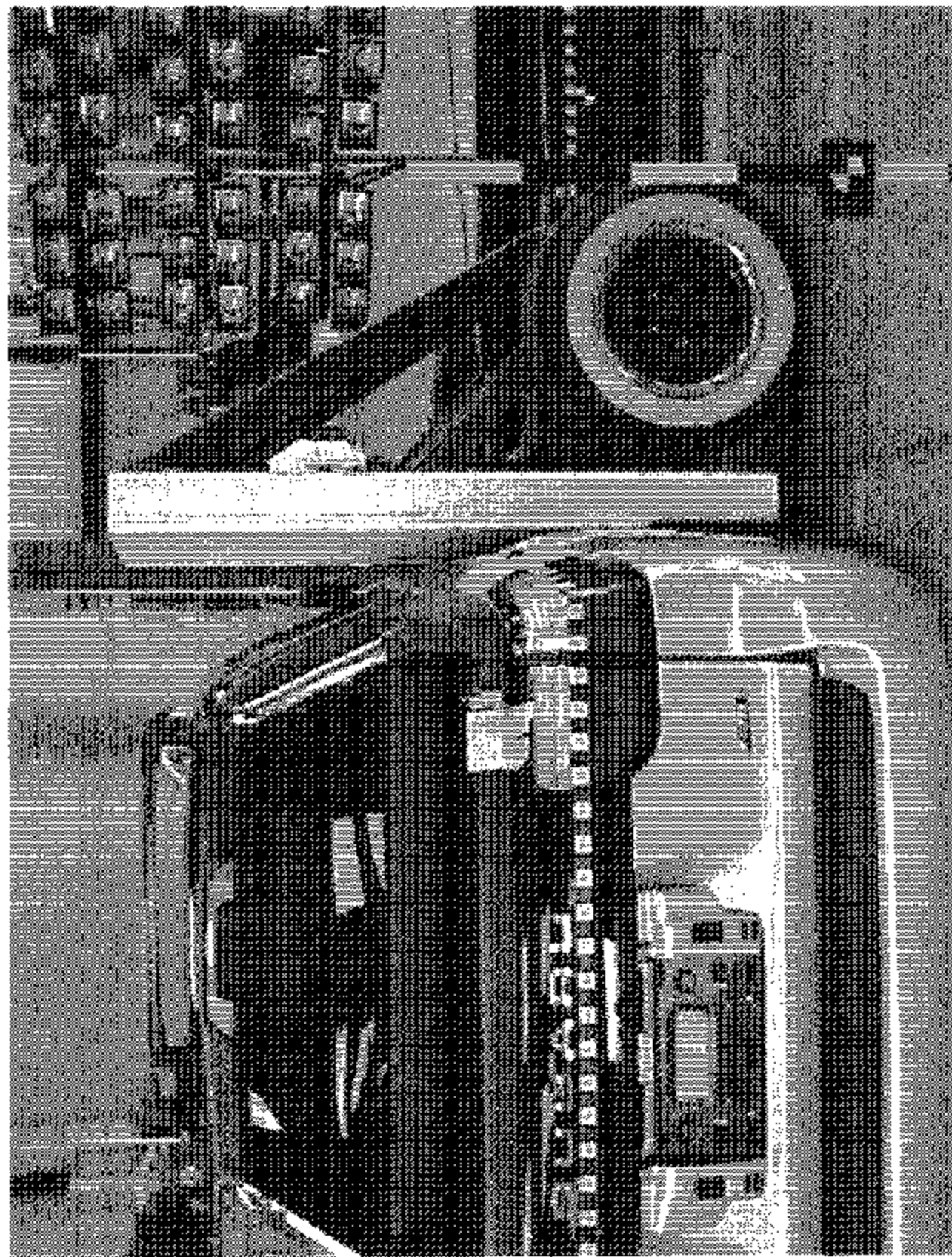
2003 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE S.5
¾ FRONTAL VIEW FROM LEFT SIDE
OF VEHICLE PRE-TEST



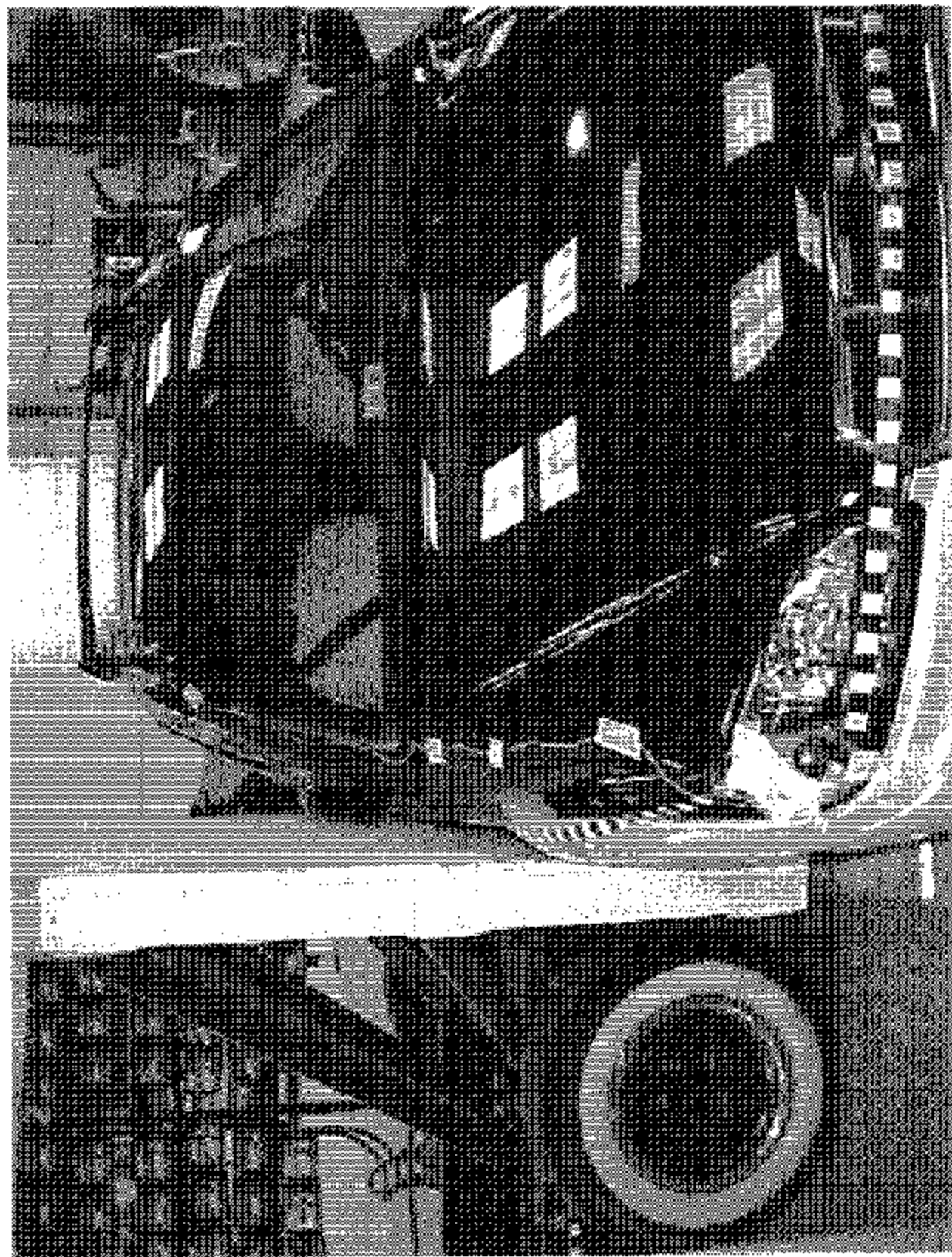
2003 SUBARU BAJA
NHISA NO. C35502
PMVSS NO. 301L

FIGURE 3.6
¾ REAR VIEW FROM RIGHT SIDE
OF VEHICLE PRE-TEST



2003 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE 5.7
LEFT VIEW OF VEHICLE/BARRIER
PRE-TEST



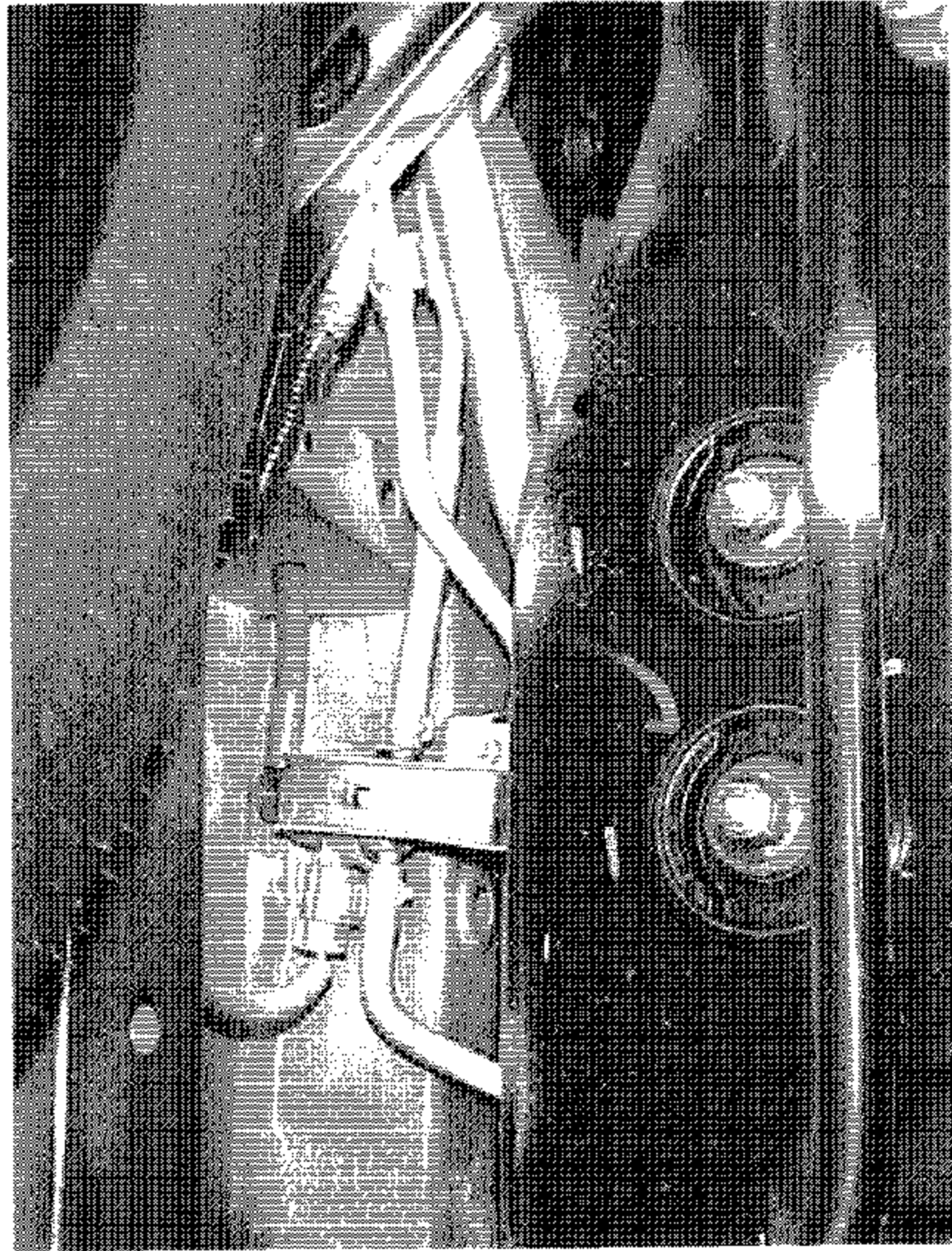
2003 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE 5.8
RIGHT VIEW OF VEHICLE/BARRIER
PRE-TEST



2003 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE 5.9
UNDERBODY VIEW OF FUEL FILL AND
VAPOR LINES PRE-TEST



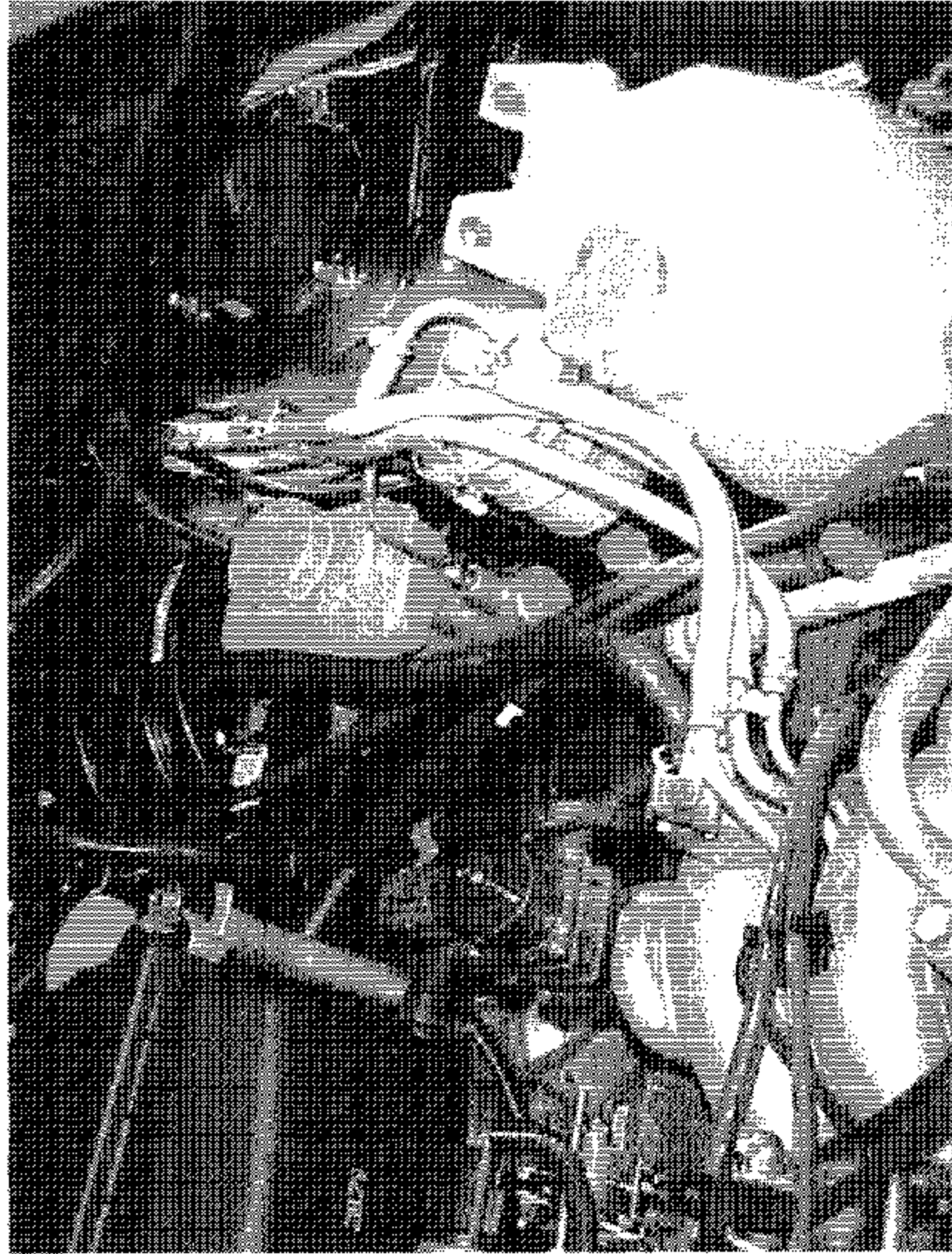
2003 SUBARU BAJA
NHISA NO. C35502
FMVSS NO. 301L

FIGURE 5.10
UNDERBODY VIEW OF FUEL LINES
PRE-TEST



2003 SUBARU BAJA
NHTSA NO. C35502
TMVSS NO. 301L

FIGURE 3.11
UNDERBODY VIEW OF FUEL LINES AT
TANK PRE-TEST



2003 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE 5.12
VIEW OF FUEL LINES AT ENGINE
PRE-TEST

MFD BY FUJI HEAVY INDUSTRIES LTD. DATE 9/02
GVWR 4551 LB (2065 KG) GVWPLF 2210 LB (1002 KG) R 235LB (106 KG)
THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE
SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT ON
THE DATE OF MANUFACTURE SHOWN ABOVE.

VIN: 4S43B1C23H12571

TYPE: WGV

ASSEMBLED BY SUBARU - ISUZU AUTOMOTIVE INC. MADE IN U.S.A.

2003 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE 3.13
VEHICLE CERTIFICATION LABEL

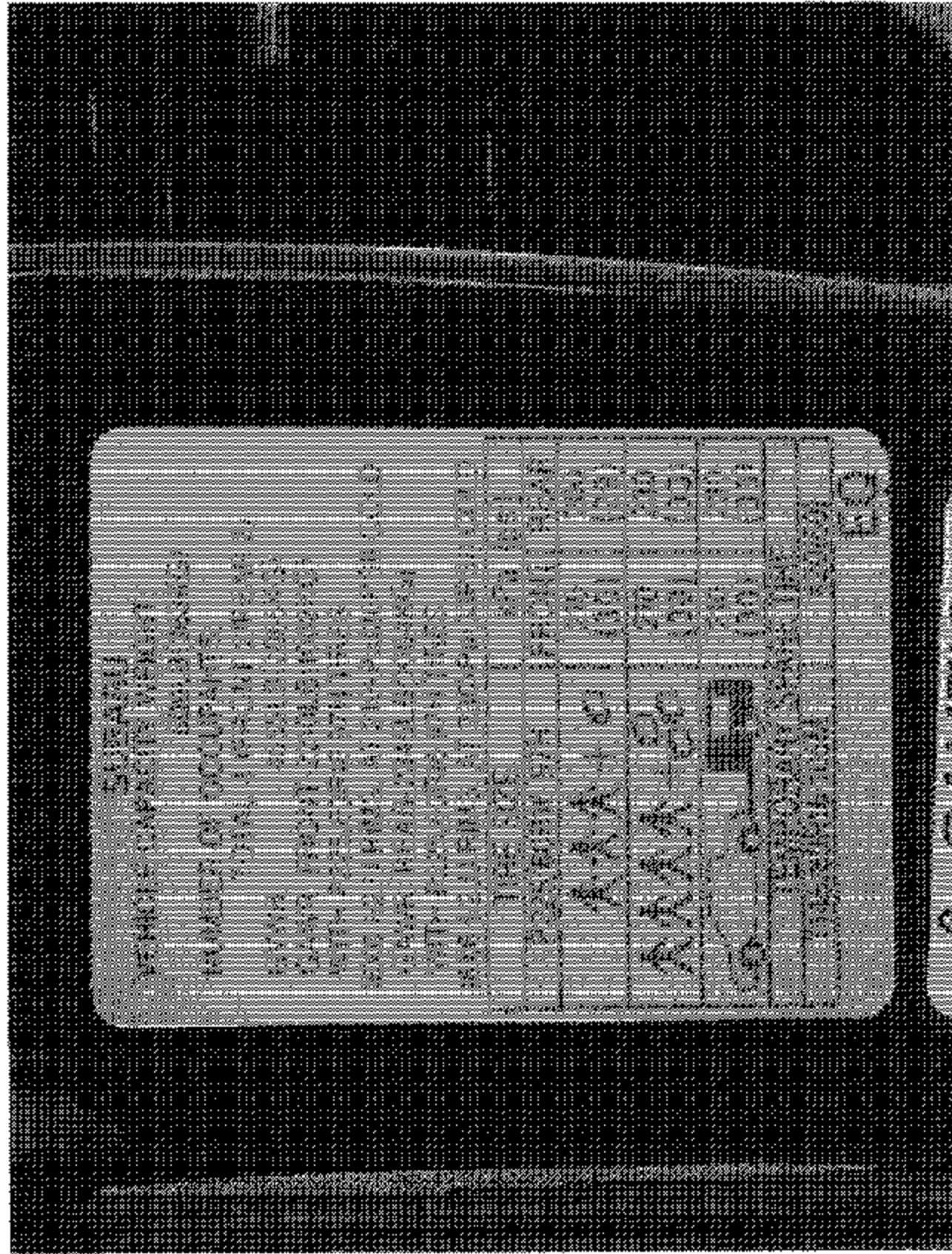
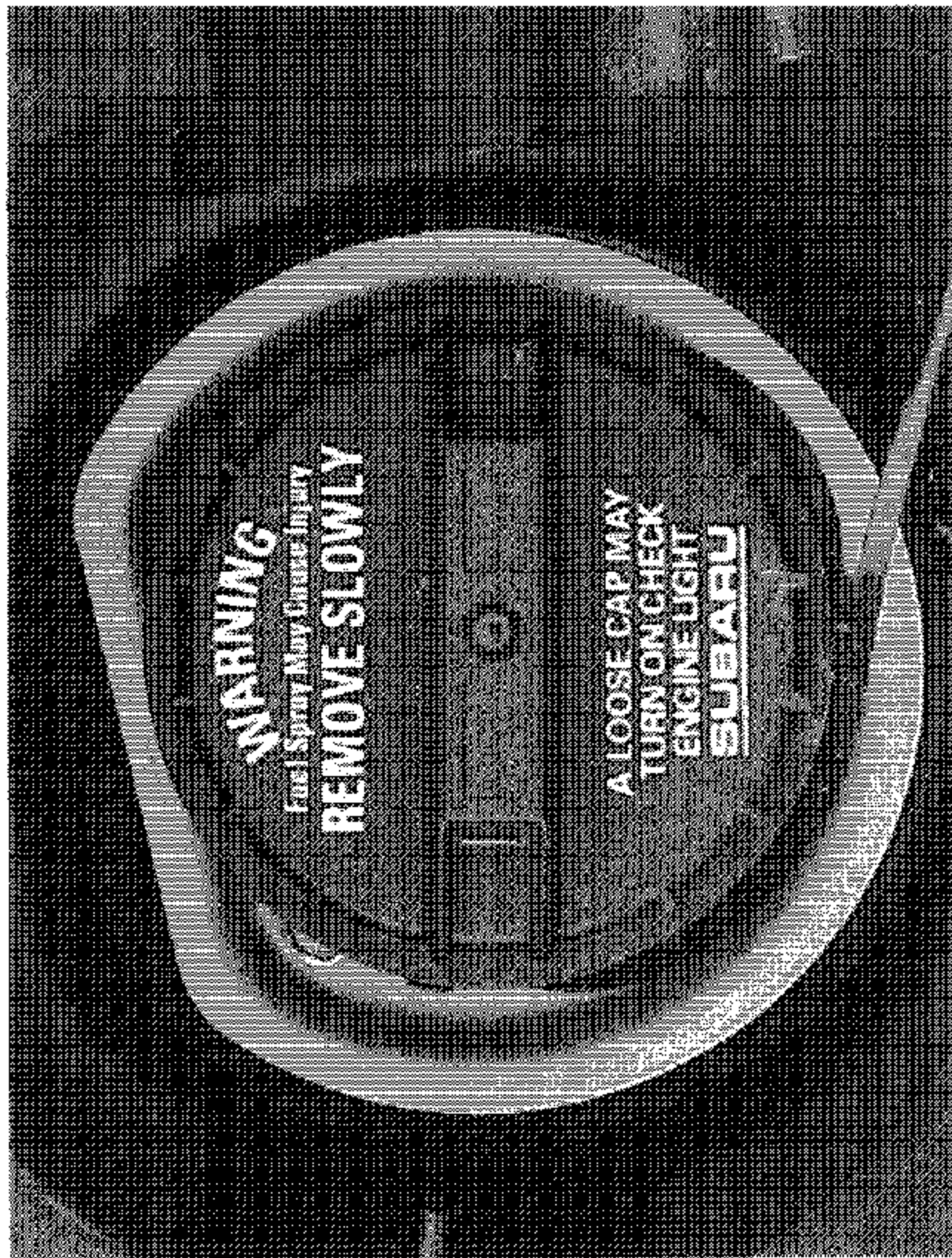


FIGURE 5.14
 VEHICLE TIRE INFORMATION LABEL



2003 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE 5.15
VEHICLE FUEL CAP PRE-TEST

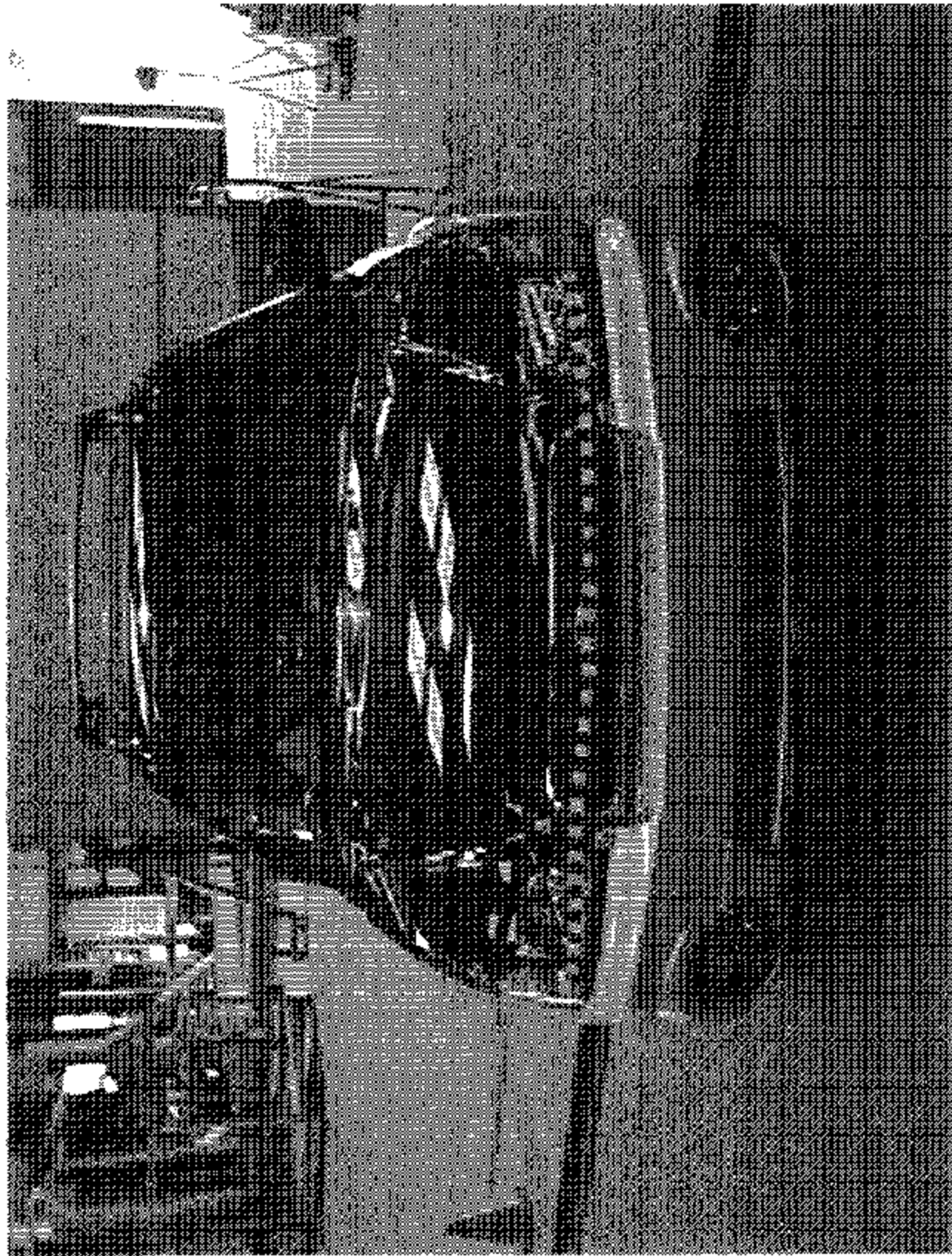
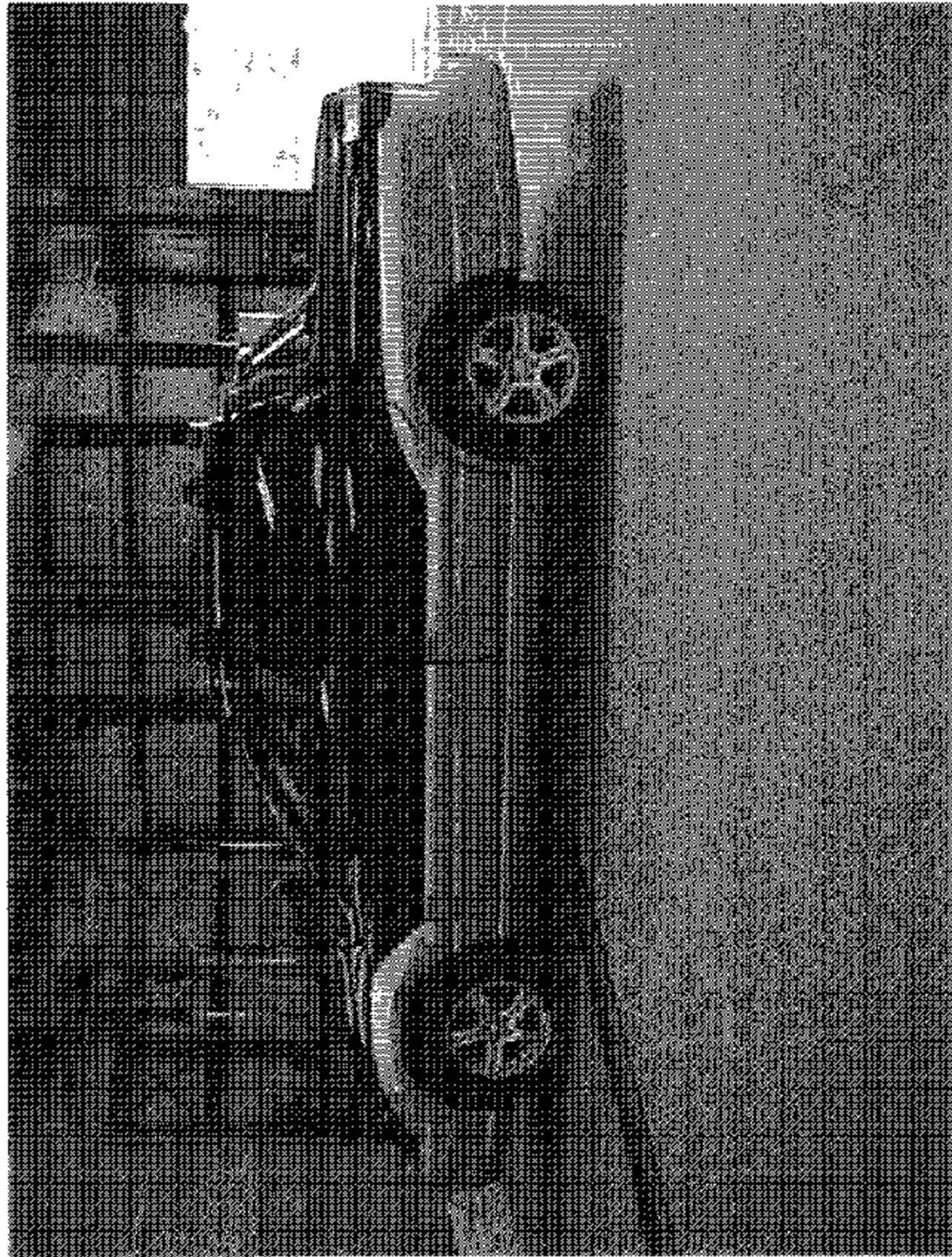


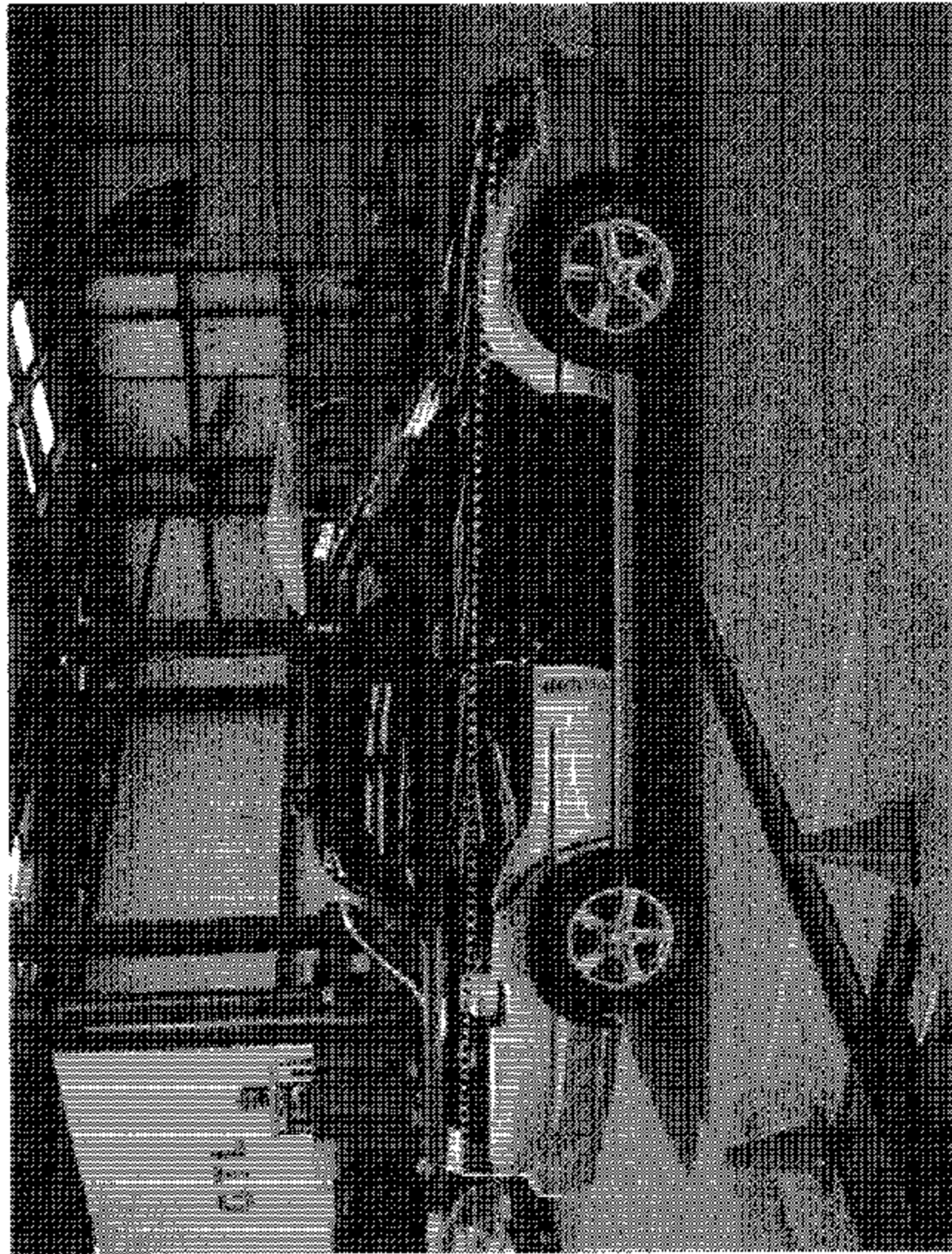
FIGURE 5.16
FRONT VIEW OF VEHICLE POST TEST

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FIGURE 5.17
LEFT SIDE VIEW OF VEHICLE POST TEST

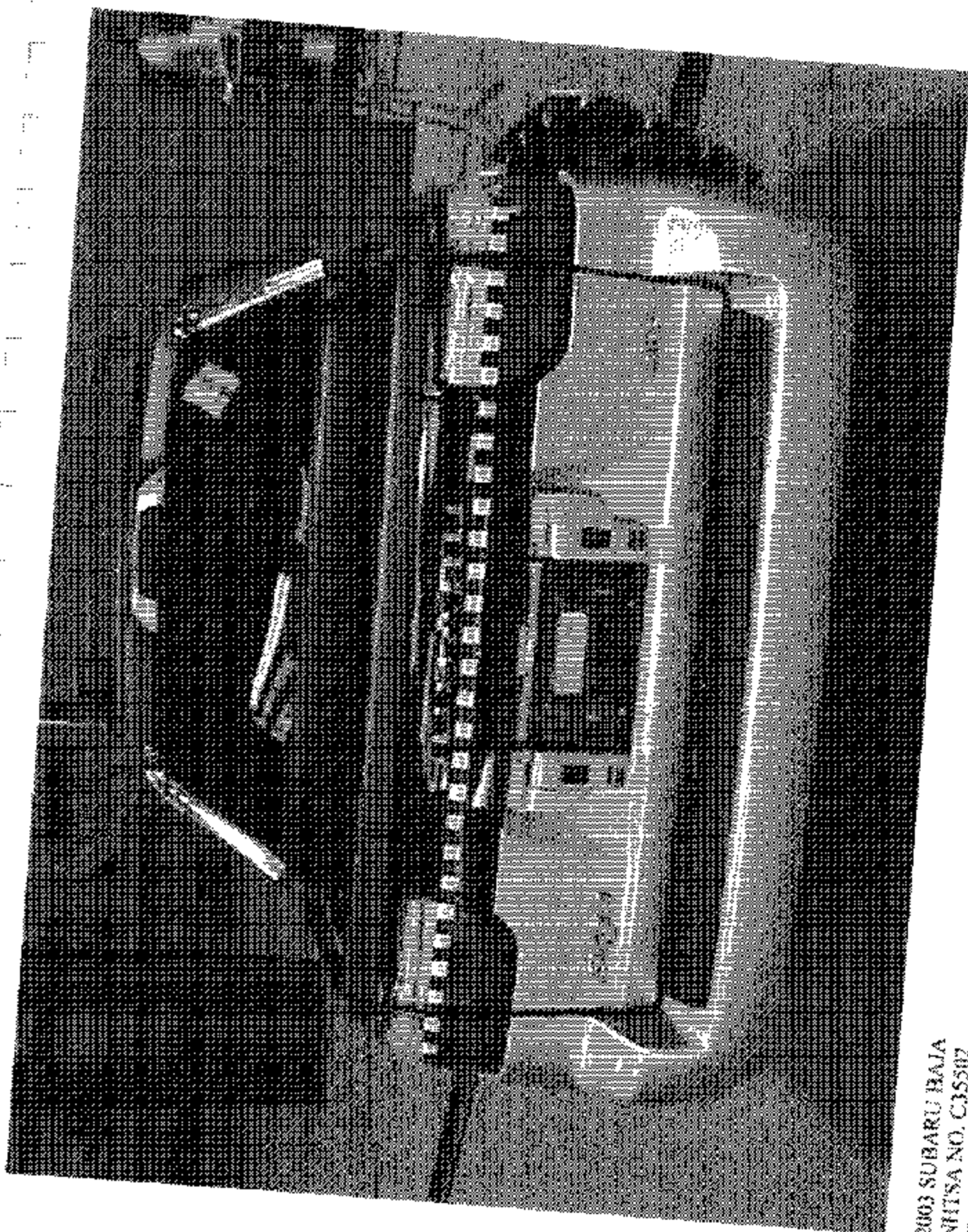


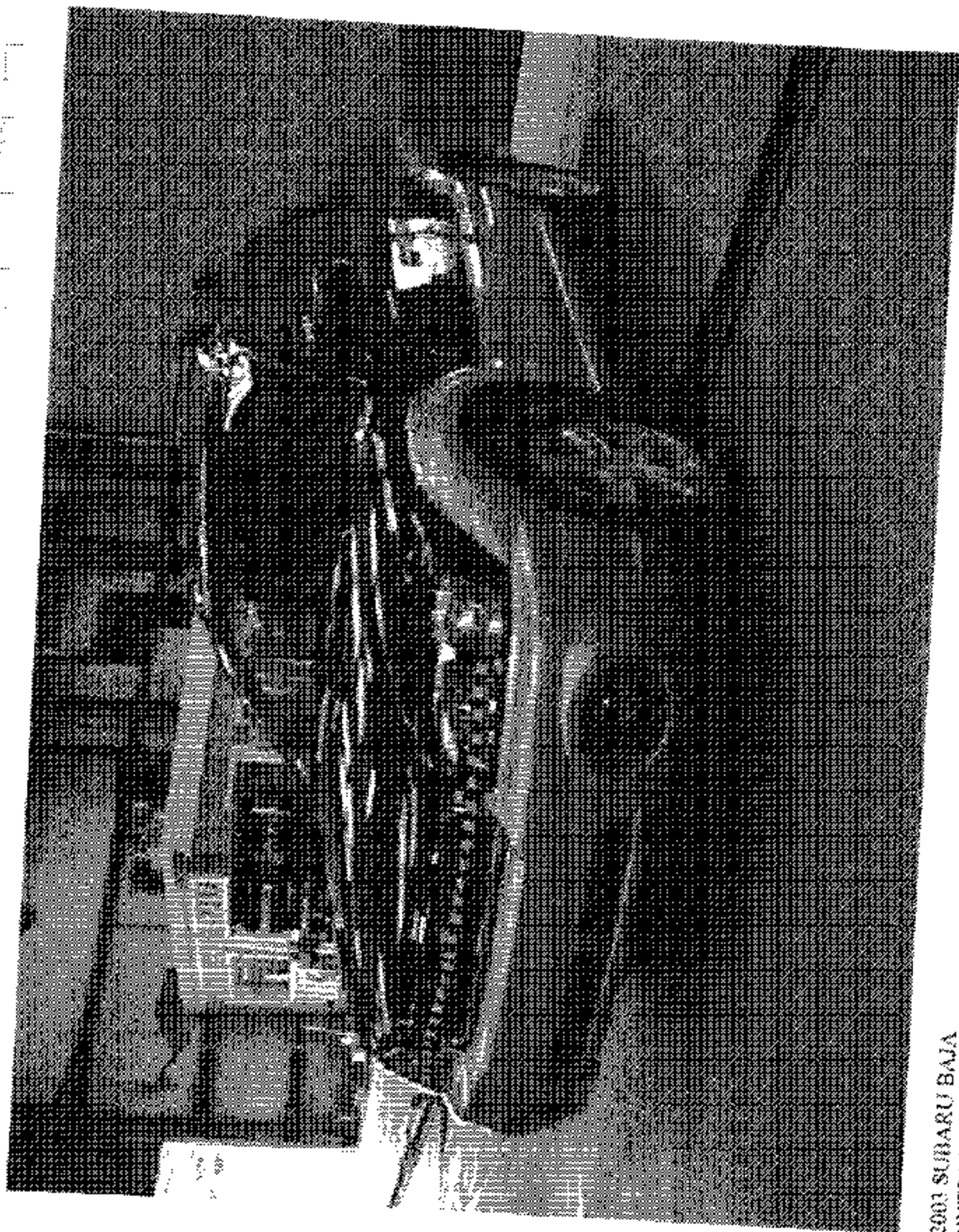
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FIGURE 5.18
RIGHT SIDE VIEW OF VEHICLE POST TEST

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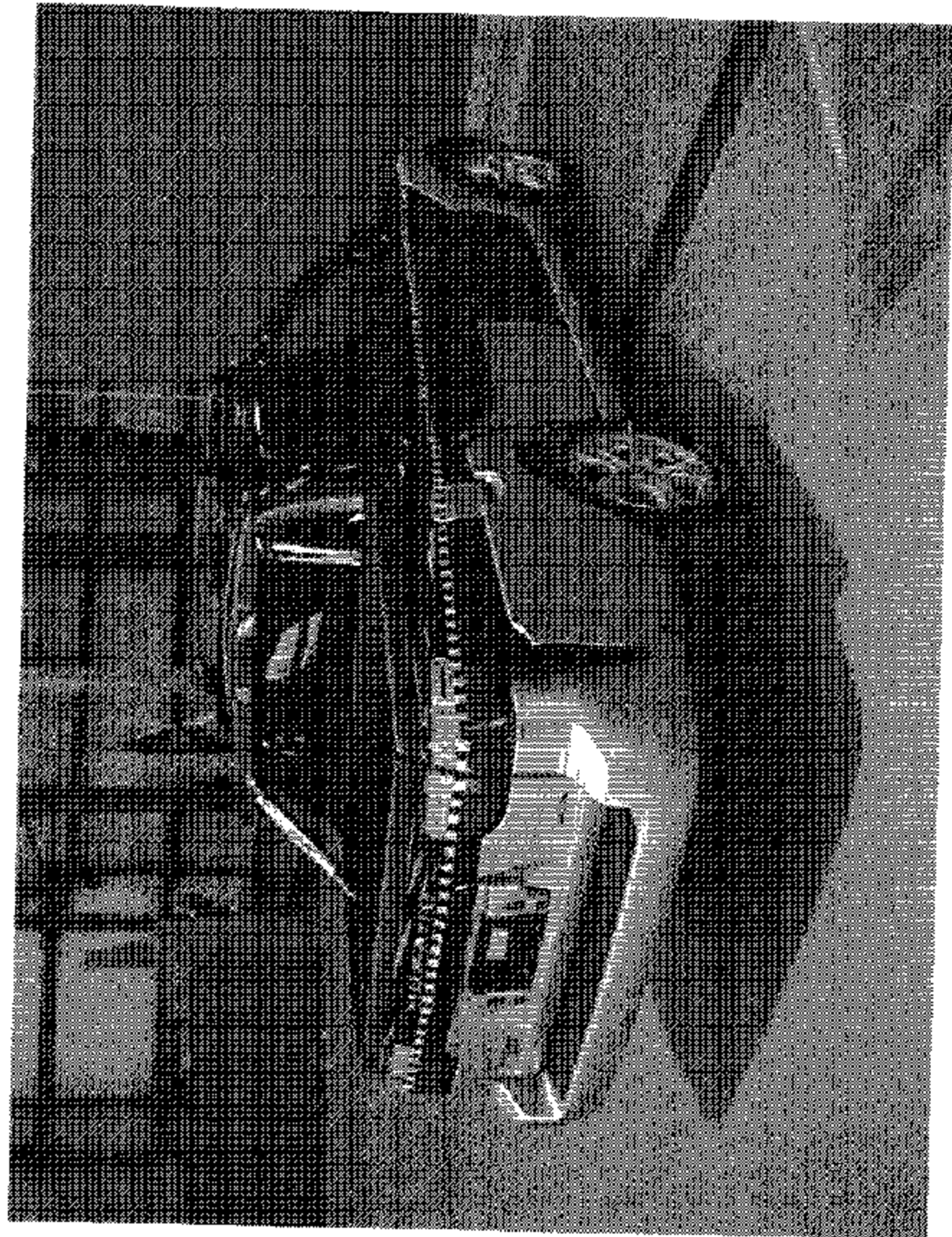
FIGURE 5.19
REAR VIEW OF VEHICLE POST TEST





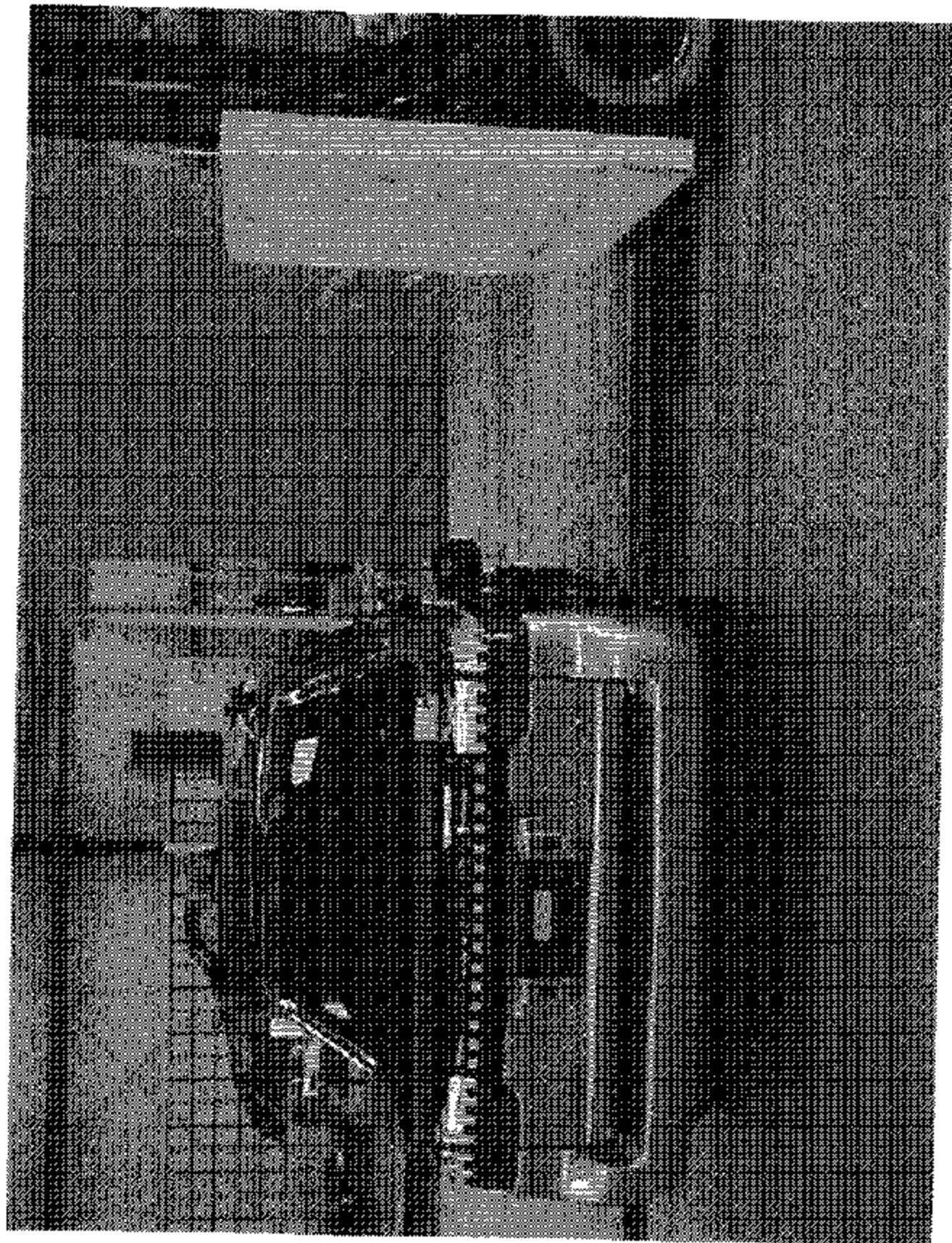
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FIGURE 5.20
¾ FRONTAL VIEW FROM LEFT SIDE
OF VEHICLE POST TEST



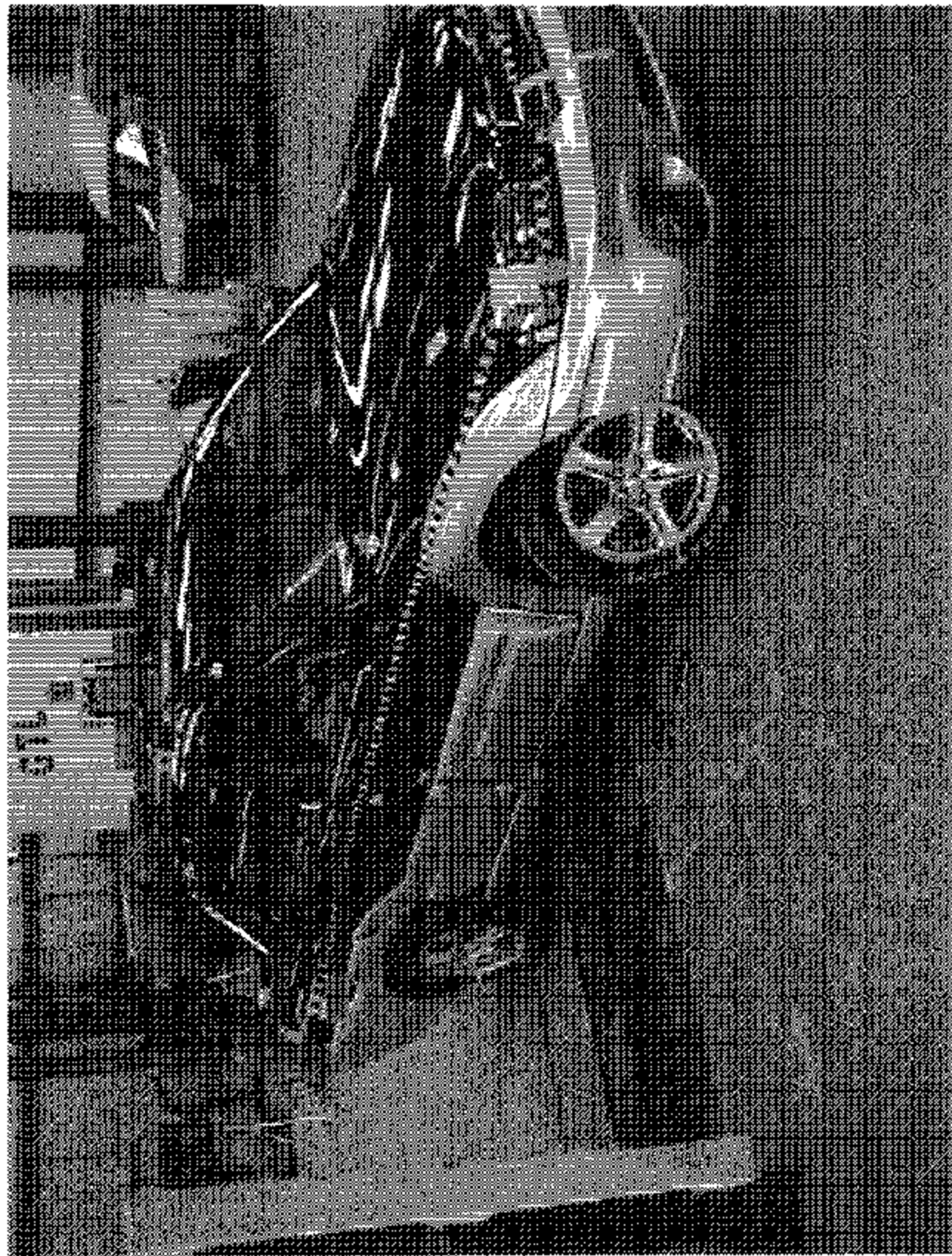
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FIGURE 5.21
¾ REAR VIEW FROM RIGHT SIDE
OF VEHICLE POST TEST



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FIGURE 5.22
LEFT VIEW OF VEHICLE/BARRIER
POST TEST



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FIGURE 5.23
RIGHT VIEW OF VEHICLE/BARRIER
POST TEST



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FIGURE 5.24
UNDERBODY VIEW OF FUEL TANK AND
VAPOR LINES POST TEST



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FIGURE 5.25
UNDERBODY VIEW OF FUEL FILL AND
VAPOR LINES POST TEST



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FIGURE 5.26
UNDERBODY VIEW OF FUEL LINES AT
TANK POST TEST



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FIGURE 5.27
VIEW OF FUEL LINES AT ENGINE
POST TEST

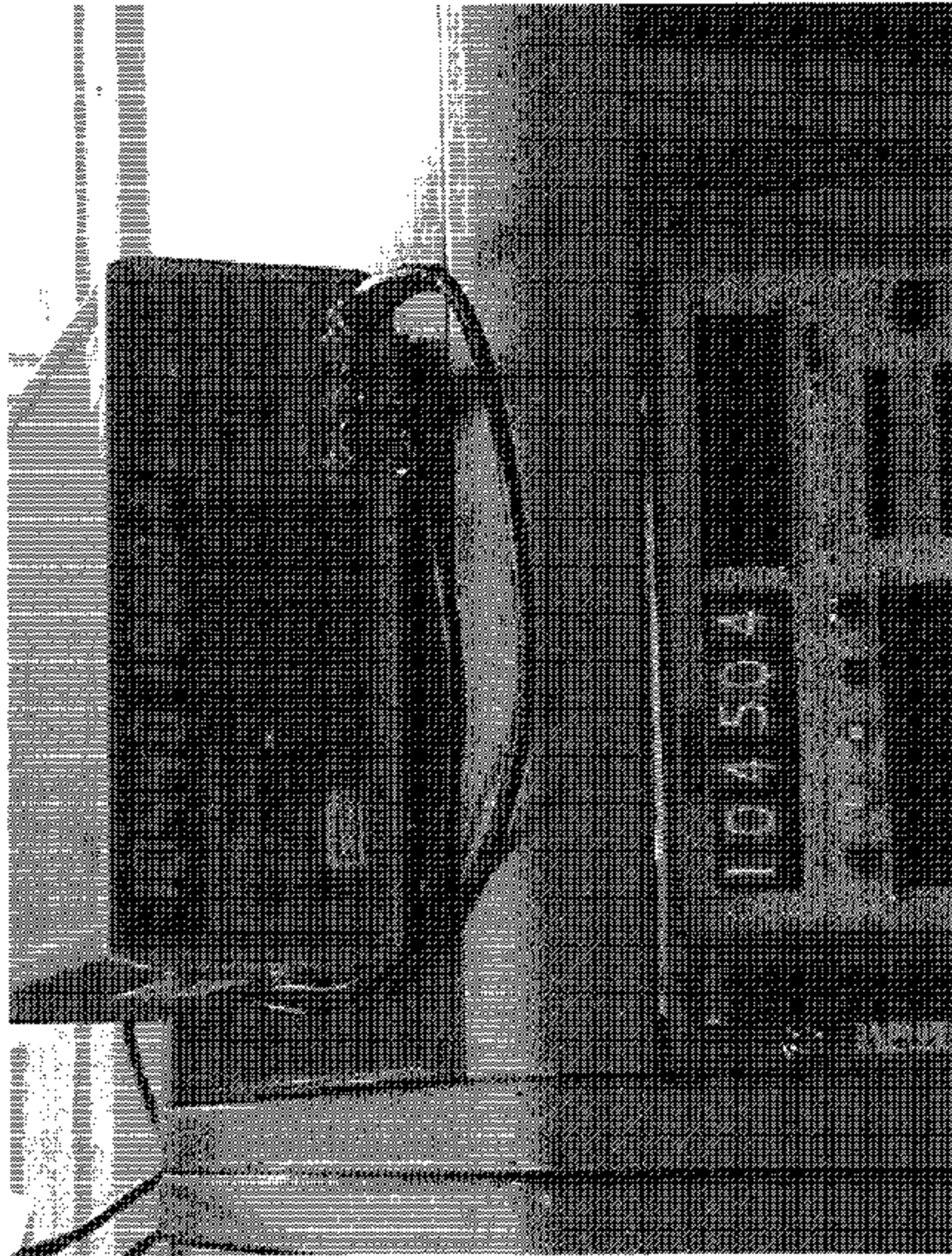
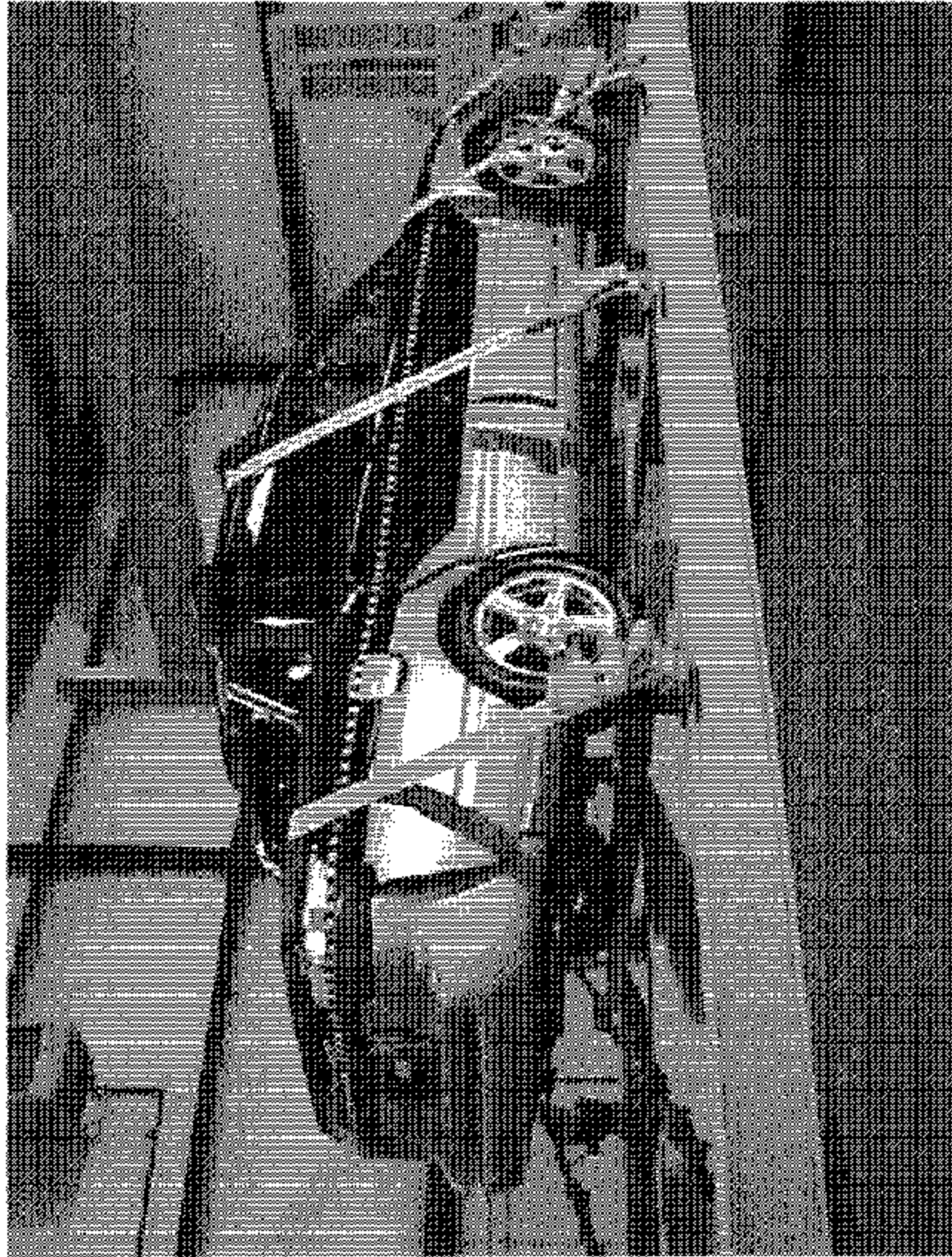


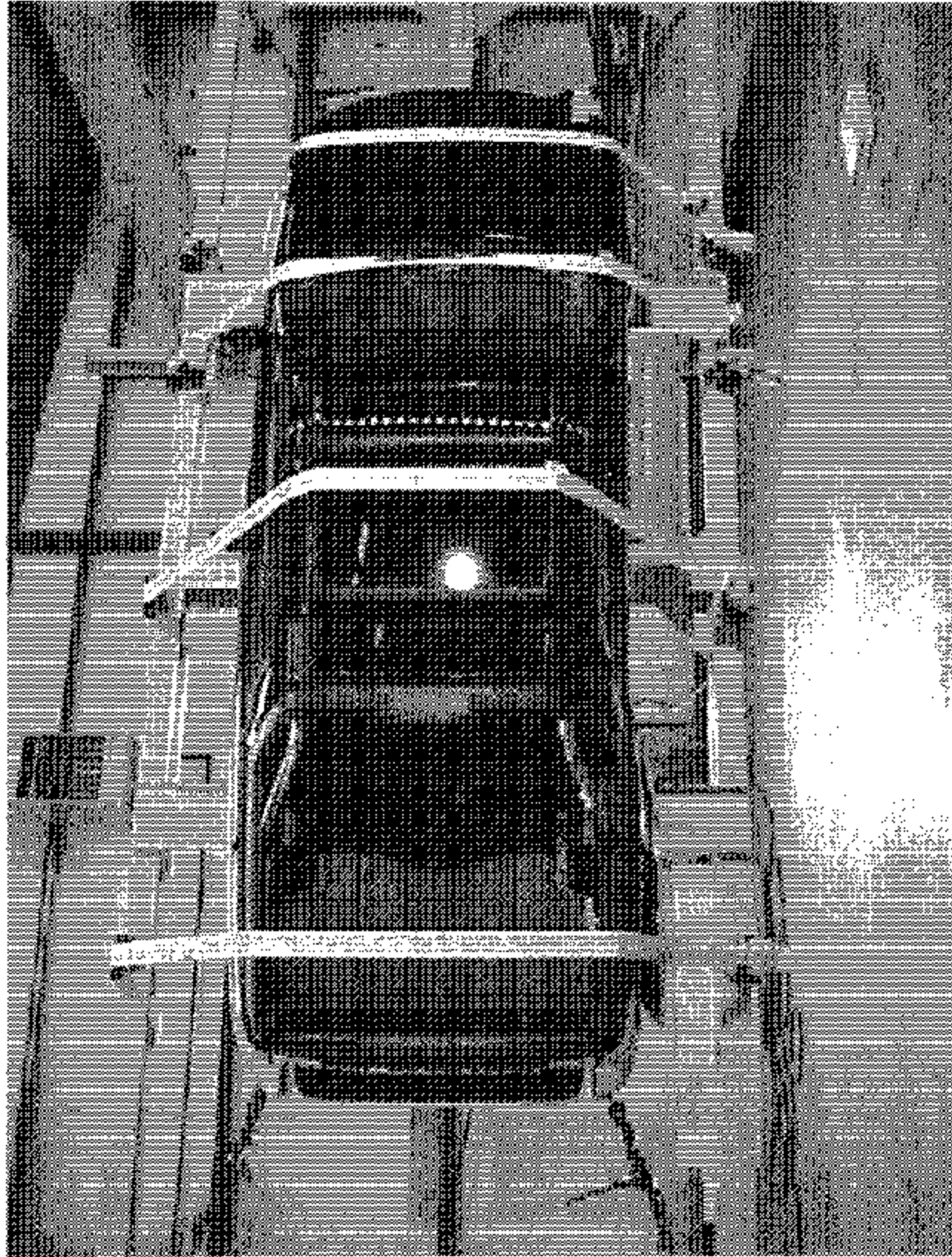
FIGURE 5.28
SPEED COUNTERS POST TEST

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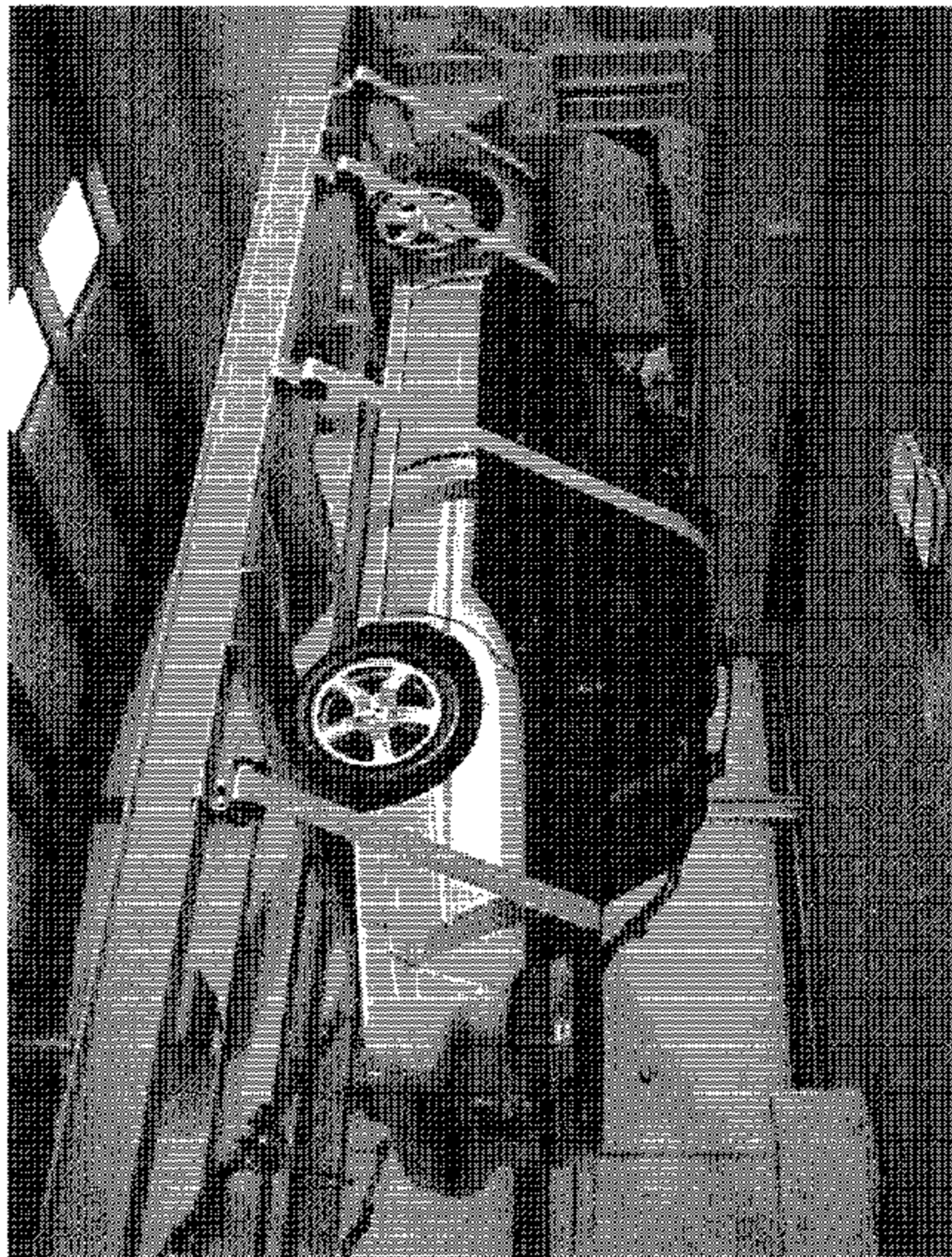
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FMVSS NO. 301L

FIGURE 5.29
VEHICLE IN ROLLOVER FIXTURE AT 6°



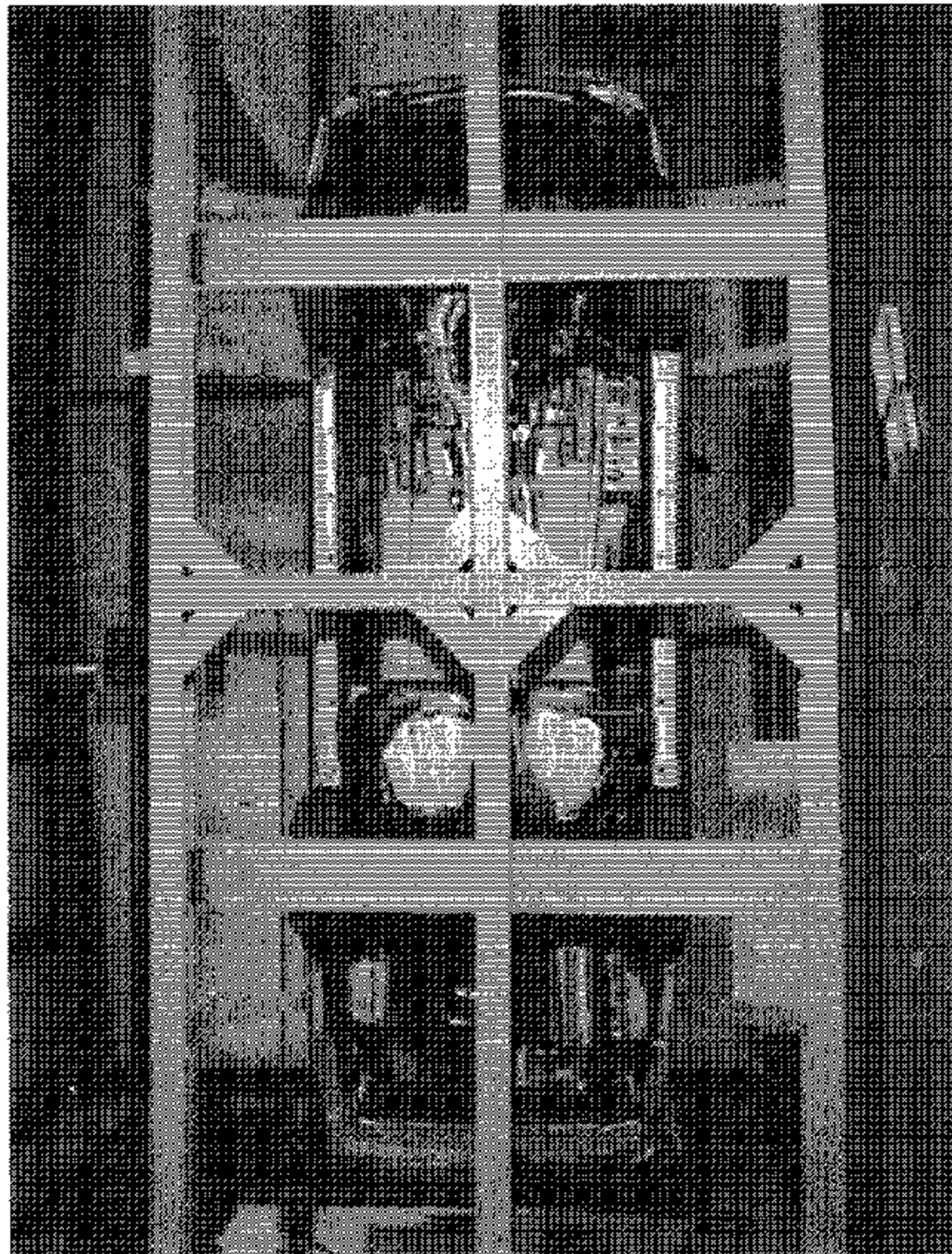
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FIGURE 5.30
VEHICLE IN ROLLOVER FIXTURE AT 90°



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FIGURE 5.31
VEHICLE IN ROLLOVER FIXTURE AT 180°

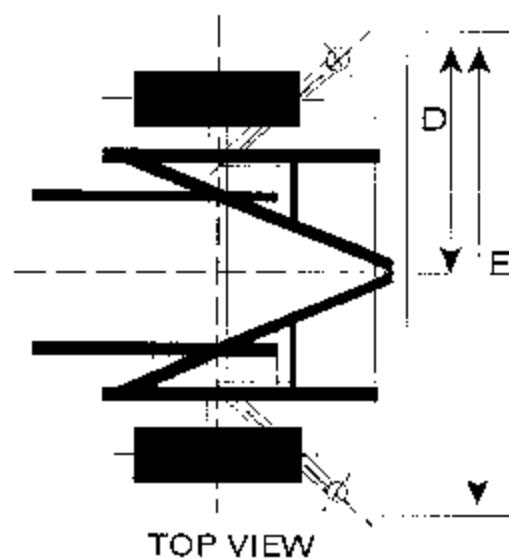
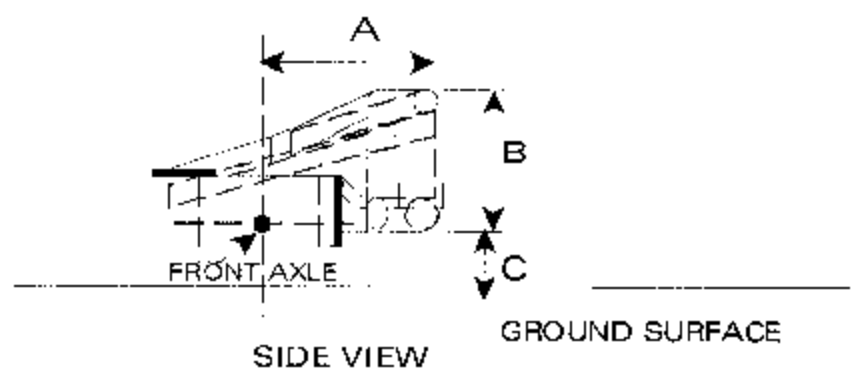


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FIGURE 5.32
VEHICLE IN ROLLOVER FIXTURE AT 270°

SECTION 6

BARRIER INFORMATION



DIMENSIONS SHOWN IN TABLE ON NEXT PAGE

NOTES:

1. Face Plate 0.50 in. (19mm) thick cold rolled steel
2. All Inner Reinforcements 4.0 x 2.0 x 0.19 in. (102 x 51 x 5mm) Steel Tubing
3. Impact Surface above shown without .75 x 48 x 96 in. Plywood Face attached

LETTER	INCHES	MILLIMETERS
A	20.5*	521*
B	60.0	1524
C	5.0	127
D	39.0	991
E	78.0	198

TEST SET-UP OF COMMON CARRIAGE WITH 60" x 78" FLAT FACE IMPACT SURFACE INSTALLED:

LEFT FRONT WEIGHT	<u>1081</u>
RIGHT FRONT WEIGHT	<u>1079</u>
LEFT REAR WEIGHT	<u>882</u>
RIGHT REAR WEIGHT	<u>873</u>

TOTAL WEIGHT	<u>3915</u>
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* EXCLUDING 3/4" PLYWOOD FACE

DIMENSIONS FOR GTL 60" x 78" FLAT FACE IMPACT SURFACE