

REPORT NUMBER 225-GTL-03-003

**SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 225
CHILD RESTRAINT ANCHORAGE SYSTEMS
LOWER AND TETHER ANCHORAGES**

**TOYOTA MOTOR CORPORATION
2003 TOYOTA HIGHLANDER, MPV
NHTSA NO. C35103**

**GENERAL TESTING LABORATORIES, INC.
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COLONIAL BEACH, VIRGINIA 22443**



NOVEMBER 3, 2003

FINAL REPORT

PREPARED FOR

**U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
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WASHINGTON, D.C. 20590**

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16. Abstract Compliance tests were conducted on the subject, 2003 Toyota Highlander MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-225T and TP-225L for the determination of FMVSS 225 compliance. Test failures identified were as follows: NONE		
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TABLE OF CONTENTS

SECTION		PAGE
1	Purpose of Compliance Test	1
2	Compliance Test Results Summary	2
3	Compliance Test Data	3
4	Test Equipment List	12
5	Photographs	13
	5.1 ¾ Frontal Right Side View of Vehicle	
	5.2 ¾ Rearward Left Side View of Vehicle	
	5.3 Close-up View of Vehicle Certification Label	
	5.4 Close-up View of Vehicle Tire Information Label	
	5.5 ¾ Frontal Left Side View of Test Vehicle with Test Apparatus in Place	
	5.6 ¾ Rearward Right Side View of Test Vehicle with Test Apparatus in Place	
	5.7 Right Front Vehicle Tie Down	
	5.8 Right Rear Vehicle Tie Down	
	5.9 Left Front Vehicle Tie Down	
	5.10 Left Rear Vehicle Tie Down	
	5.11 Pre-Test Front View of 2 nd Row Left Top Tether Anchor	
	5.12 Pre-Test Front View of 2 nd Row Right Top Tether Anchor	
	5.13 Pre-Test Front View of 2 nd Row Left Outboard Lower Anchor	
	5.14 Pre-Test Front View of 2 nd Row Left Inboard Lower Anchor	
	5.15 Pre-Test Front View of 2 nd Row Right Outboard Lower Anchor	
	5.16 Pre-Test Front View of 2 nd Row Right Inboard Lower Anchor	
	5.17 View of 2D Template in 2 nd Row Left Seat	
	5.18 View of 2D Template in 2 nd Row Left Seat	
	5.19 View of 2D Template in 2 nd Row Right Seat	
	5.20 View of 2D Template in 2 nd Row Right Seat	
	5.21 View of CRF in 2 nd Row Left Seat	
	5.22 View of CRF in 2 nd Row Right Seat	
	5.23 Pre-Test Set-up 2 nd Row Left Position	
	5.24 Pre-Test Set-up 2 nd Row Right Position	
	5.25 Pre-Test Set-up 2 nd Row Right Position	
	5.26 Post Test 2 nd Row Left Position	
	5.27 Post Test 2 nd Row Right Position	
	5.28 Post Test 2 nd Row Right Position	
	5.29 Post Test 2 nd Row Right Tether Anchor	
	5.30 Post Test 2 nd Row Left Outboard Lower Anchor	
	5.31 Post Test 2 nd Row Left Inboard Lower Anchor	
	5.32 Post Test 2 nd Row Right Outboard Lower Anchor	
	5.33 Post Test 2 nd Row Right Inboard Lower Anchor	
	5.34 Load System and Data Recording Device in Test Position	
	5.35 Loading Device with Load Cell and Test Fixture in Test Position	

TABLE OF CONTENTS (continued)

6	Plots	49
6.1	2 nd Row Right Top Tether Anchor, GTL 5108	
6.2	2 nd Row Right Top Tether Anchor, GTL 5108	
6.3	2 nd Row Right Top Tether Anchor, GTL 5108	
6.4	2 nd Row Left Lower Anchor, GTL 5109	
6.5	2 nd Row Left Lower Anchor, GTL 5109	
6.6	2 nd Row Left Lower Anchor, GTL 5109	
Appendix A – Owner's Manual Child Restraint Information		
Appendix B – Manufacturer's Data		

SECTION 1

PURPOSE OF COMPLIANCE TEST

1.0 PURPOSE OF COMPLIANCE TEST

A 2003 Toyota Highlander MPV was subjected to Federal Motor Vehicle Safety Standard (FMVSS) No. 225 testing to determine if the vehicle was in compliance with the requirements of the standard. The purpose of this standard is to establish requirements for child restraint anchorage systems to ensure their proper location and strength for the effective securing of child restraints, to reduce the likelihood of the anchorage systems' failure and to increase the likelihood that child restraints are properly secured and thus more fully achieve their potential effectiveness in motor vehicles.

1.1 The test vehicle was a 2003 Toyota Highlander MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: JTEGD21A530058515

B. NHTSA No.: C35103

C. Manufacturer: TOYOTA MOTOR CORPORATION

D. Manufacture Date: 01/03

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 225 testing on August 6, 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 Procedures, TP-225T dated 3 May 2001 and TP-225L dated 11, June, 2001.

Based on the test performed, the 2003 Toyota Highlander MPV appears to meet the requirements of FMVSS 225 testing. Strength and displacement summary data are provided below:

Table 1. Summary Data for Strength and Displacement

GTL Test #	Fixture Type	Seating Position	Max. Load (N)	Displacement (mm)
5108	SFAD II Tether Strap	2 nd Row Right	9937	44.9
5109	Lower Anchorage	2 nd Row Left	7922	41.9

Table 2. General Test and Vehicle Parameter Data

VEH. MOD YR/MAKE/MODEL BODY	2003 Toyota Highlander
VEH. NHTSA NO.	C35103
VIN	JTEGD21A530058515
VEH. BUILD DATE	01/03
TEST DATE	08/06/03
TEST LABORATORY	GTL
OBSERVERS	Grant Farrand, Jimmy Latane

GENERAL INFORMATION:

Date Received: 03/12/03 Odometer Reading: 107

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Toyota Motor Corporation

Date of Manufacture: 01/03 VIN: JTEGD21A530058515

GVWR: 2260 kg GAWR FRONT: 1300 kg
GAWR REAR: 1240 kg

SECTION 3

COMPLIANCE TEST DATA

3.0 TEST RESULTS

The following data sheets document the results of testing on the 2003 Toyota Highlander MPV.

DATA SHEET 1 CHILD RESTRAINT TETHER ANCHORAGE CONFIGURATION

VEH. MOD YR/MAKE/MODEL/BODY: 2003 TOYOTA HIGHLANDER MPV

VEH. NHTSA NO: C35103; VIN: JTEGD21A530058515

VEH. BUILD DATE: 01/03; TEST DATE: JUNE 3, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE

Number of DSP's in Test Vehicle As Stated on Tire Label using Figures for Maximum Vehicle Loading:

Front Seat= 2

Rear Seat= 3

Third Seat= N/A

Total= 5

SEATING POSITION		OBSERVED CONFIGURATION			
		Permit the attachment of a tether hook	Accessible without the need for any tool other than a screwdriver or coin	Ready for use without the need for any tools	Sealed to prevent the entry of exhaust fumes
Front	Left	N/A	N/A	N/A	N/A
	Center	N/A	N/A	N/A	N/A
	Right	N/A	N/A	N/A	N/A
Second	Left	YES	YES	YES	YES
	Right	N/A	N/A	N/A	N/A
	Center	YES	YES	YES	YES
Third	Left	N/A	N/A	N/A	N/A
	Center	N/A	N/A	N/A	N/A
	Right	N/A	N/A	N/A	N/A

REMARKS:

RECORDED BY: *G. Farrand*

DATE: 06/03/03

APPROVED BY: *D. Messick*

DATA SHEET 2

CHILD RESTRAINT LOWER ANCHORAGES CONFIGURATION

VEH. MOD YR/MAKE/MODEL/BODY: 2003 TOYOTA HIGHLANDER MPV

VEH. NHTSA NO: C35103; VIN: JTEGD21A530058515

VEH. BUILD DATE: 01/03; TEST DATE: JUNE 3, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE

OBSERVED LOWER ANCHORAGE CONFIGURATION	SEAT POSITION				
		FRONT	REAR		THIRD
			LEFT	RIGHT	
Above anchorage permanently marked with a circle not less than 13 mm in Dia.; and whose color contrasts with its background; and its center is not less than 50 mm and not more than 75 mm above the bar, and in the vertical longitudinal plane that passes through the center of the bar.	Left	N/A	*	NO	N/A
	Center	N/A	NO	NO	N/A
	Right	N/A	NO	*	N/A
Each of the bars is visible, without the compression of the seat cushion or seat back, when the bar is viewed, in a vertical longitudinal plane passing through the center of the bar, along a line marking an upward 30 degree angle with a horizontal plane.	Left	N/A	NO	NO	N/A
	Center	N/A	N/A		N/A
	Right	N/A	NO	NO	N/A
Diameter of the bar (mm)	Left	N/A	6.09		N/A
	Center	N/A	N/A		N/A
	Right	N/A	6.09		N/A
Inspect if the bars are straight, horizontal and transverse	Left	N/A	YES		N/A
	Center	N/A	N/A		N/A
	Right	N/A	YES		N/A

* 15 mm x 25 mm sewn in tag which says "LATCH" on one side and "ISOFIX" on the other side.

DATA SHEET 2 CONTINUED
CHILD RESTRAINT LOWER ANCHORAGES CONFIGURATION

VEH. MOD YR/MAKE/MODEL/BODY: 2003 TOYOTA HIGHLANDER MPV

VEH. NHTSA NO: C35103; VIN: JTEGD21A530058515

VEH. BUILD DATE: 01/03; TEST DATE: JUNE 3, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE

OBSERVED LOWER ANCHORAGE CONFIGURATION	SEAT POSITION			
		FRONT	REAR	THIRD
Inspect if the centroidal longitudinal axes are collinear within 5 degrees.	Left	N/A*	YES	N/A
	Center	N/A	N/A	N/A
	Right	N/A	YES	N/A
Inspect the inside surface of the bar that is straight and horizontal section of the bars, and determine they are not less than 25 mm, but not more than 40 mm in length.	Left	N/A*	YES 36 MM	N/A
	Center	N/A	N/A	N/A
	Right	N/A	YES 36 MM	N/A
Inspect if the bars can be connected to, over their entire inside length by the connectors of child restraint system.	Left	N/A*	YES CRF FITS	N/A
	Center	N/A	N/A	N/A
	Right	N/A	YES CRF FITS	N/A
Measure the distance between the center of the length of one bar to the center of the length of the other bar. The requirement is 280 mm $\pm$ 1 mm.	Left	N/A*	280	N/A
	Center	N/A	N/A	N/A
	Right	N/A	280	N/A
Inspect if the bars are an integral and permanent part of the vehicle.	Left	N/A*	YES	N/A
	Center	N/A	N/A	N/A
	Right	N/A	YES	N/A
Inspect if the bars are rigidly attached to the vehicle. If feasible, hold the bar firmly with two fingers and gently pull.	Left	N/A*	YES	N/A
	Center	N/A	N/A	N/A
	Right	N/A	YES	N/A

* DRIVER'S SEAT

RECORDED BY: 

APPROVED BY: 

DATE: 06/03/03

DATA SHEET 2 CONTINUED
CHILD RESTRAINT LOWER ANCHORAGES CONFIGURATION

VEH. MOD YR/MAKE/MODEL/BODY: 2003 TOYOTA HIGHLANDER MPV
 VEH. NHTSA NO: C35103; VIN: JTEGD21A530058515
 VEH. BUILD DATE: 01/03; TEST DATE: JUNE 3, 2003
 TEST LABORATORY: GENERAL TESTING LABORATORIES
 OBSERVERS: GRANT FARRAND, JIMMY LATANE

OBSERVED LOWER ANCHORAGE CONFIGURATION	SEAT POSITION			
		FRONT	REAR	THIRD
Optional Marking: At least one anchorage bar (when deployed for use, if storable anchorages), one guidance fixture, or one seat marking is visible	Left	N/A*	YES	N/A
	Center	N/A	N/A	N/A
	Right	N/A	YES	N/A
Optional Marking: If guidance fixtures are used, the fixture(s) must be installed.	Left	N/A*	NO	N/A
	Center	N/A	N/A	N/A
	Right	N/A	NO	N/A

* DRIVER'S SEAT

RECORDED BY: [Signature]

DATE: 06/03/03

APPROVED BY: [Signature]

DATA SHEET 3
LOCATION AND DIMENSIONAL MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2003 TOYOTA HIGHLANDER MPV

VEH. NHTSA NO: C35103; VIN: JTEGD21A530058515

VEH. BUILD DATE: 01/03; TEST DATE: JUNE 4, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE

Number of DSP's in Test Vehicle As Stated on Tire Label using Figures for Maximum Vehicle Loading:

Front Seat= 2
 Rear Seat= 3
 Third Seat= N/A
 Total= 5

SEAT POSITION FOR TETHER		LOCATION OF DSPs	TETHER ANCHORAGE LOCATION	
		TETHER OBSERVED	REQUIRED	MEASURED Is it in the required zone?
FRONT	Left	NO	NO	N/A
	Center	NO	NONE	N/A
	Right	NO	NO	N/A
SECOND	Left	YES	YES	YES
	Center	NO	NO	N/A
	Right	YES	YES	YES

RECORDED BY: *[Signature]*

DATE: 06/04/03

APPROVED BY: *[Signature]*

DATA SHEET 3 CONTINUED
LOCATION AND DIMENSIONAL MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2003 TOYOTA HIGHLANDER MPV

VEH. NHTSA NO: C35103 VIN: JTEGD21A530058515

VEH. BUILD DATE: 01/03 TEST DATE: JUNE 4, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE

Number of DSP's in Test Vehicle As Stated on Tire Label using Figures for Maximum Vehicle Loading: Front Seat= 2 Rear Seat 3 Third Seat= N/A Total= 5

SEAT POSITION FOR LOWER ANCHORAGE		PRESENCE OF ANCHORAGES				COMMENTS		
		REQUIRED		OBSERVED				
FRONT		NONE		NONE		N/A		
REAR		2		2		LEFT & RIGHT		
THIRD		N/A		N/A		N/A		
SEAT POSITIONS FOR LOWER ANCHORAGES		LOCATION OF ANCHORAGE				COMMENTS		
		MEASURED FROM "Z" (mm)		MEASURED FROM "SRP" (mm)				
		Left	Right	Left	Right	PITCH	ROLL	YAW
FRONT	Left	N/A		N/A		DRIVER'S SEAT		
	Center	N/A		N/A				
	Right	N/A		N/A				
REAR	Left	37	36	148	148	14°	0°	0°
	Center							
	Right	36	36	147	147	14°	0°	0°

RECORDED BY: 

DATE: 06/04/03

APPROVED BY: 

DATA SHEET 4
ANCHORAGE STATIC LOADING

VEH. MOD YR/MAKE/MODEL/BODY: 2003 TOYOTA HIGHLANDER MPV
 VEH. NHTSA NO: C35103; VIN: JTEGD21A530058515
 VEH. BUILD DATE: 01/03; TEST DATE: AUGUST 6, 2003
 TEST LABORATORY: GENERAL TESTING LABORATORIES
 OBSERVERS: GRANT FARRAND, JIMMY LATANE
 TEST # 5108

TETHER ANCHORAGE- WITH SFAD:

SEATING POSITION	Seat, Seat Back & Head Restraint positions			Type of SFAD used	Angle	Initial location	Onset rate	Force Applied	Final location	Horizontal Displacement
	Seat	Seat Back	Head Restraint							
Front	Driver	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Center	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Right	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Second	Left	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Center	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Right (if any)	FIXED	25°	UP	0°	0.0	385 N/SEC	9937 N	44.9	44.9
Third	Left	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Center	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Right	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

REMARKS: TESTED TO S6.3.4

RECORDED BY:  DATE: 08/06/03

APPROVED BY: 

DATA SHEET 5
ANCHORAGE STATIC LOADING

VEH. MOD YR/MAKE/MODEL/BODY: 2003 TOYOTA HIGHLANDER MPV
 VEH. NHTSA NO: C35103; VIN: JTEGD21A530058515
 VEH. BUILD DATE: 01/03; TEST DATE: AUGUST 6, 2003
 TEST LABORATORY: GENERAL TESTING LABORATORIES
 OBSERVERS: GRANT FARRAND, JIMMY LATANE

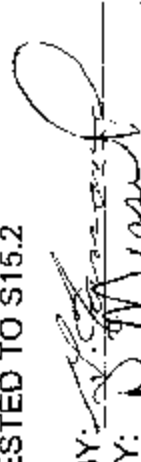
TEST # 5109

LOWER ANCHORAGE- FORWARD FORCE APPLICATION:

SEATING POSITION	Seat, Seat Back & Head Restraint positions			Measured Angles		Initial location	Onset rate	Force Applied	Final location	Displacement
	Seat	Seat Back	Head Restraint	Vertical	Horizontal					
Front	Driver	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Center	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Right	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rear	Left	FIXED	25°	UP	10°	0.0	8000 N/SEC	7922 N	41.9 mm	41.9 mm
	Center	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Right (if any)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Third	Left	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Center	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Right	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

REMARKS: TESTED TO S15.2

DATE: 08/06/03

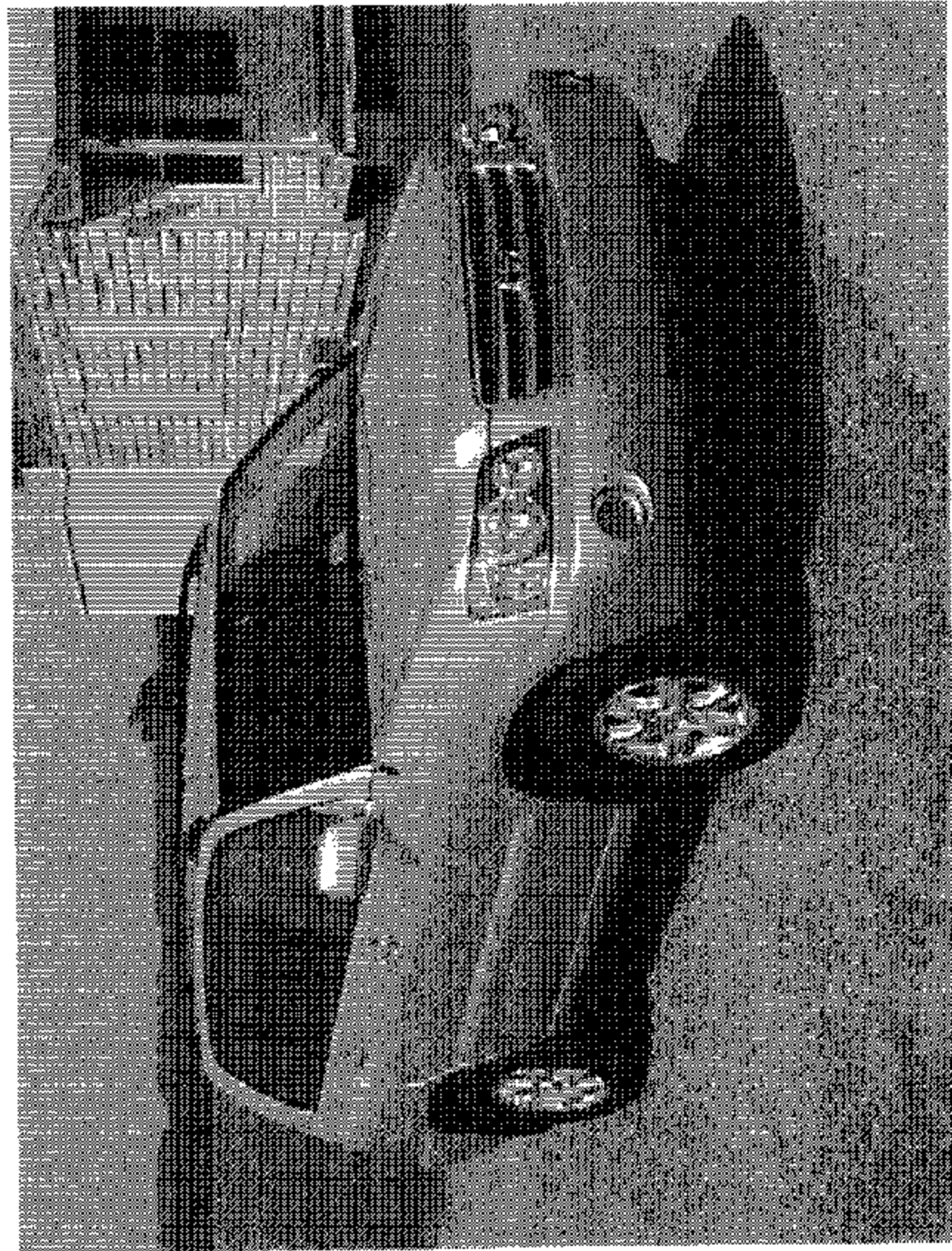
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SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

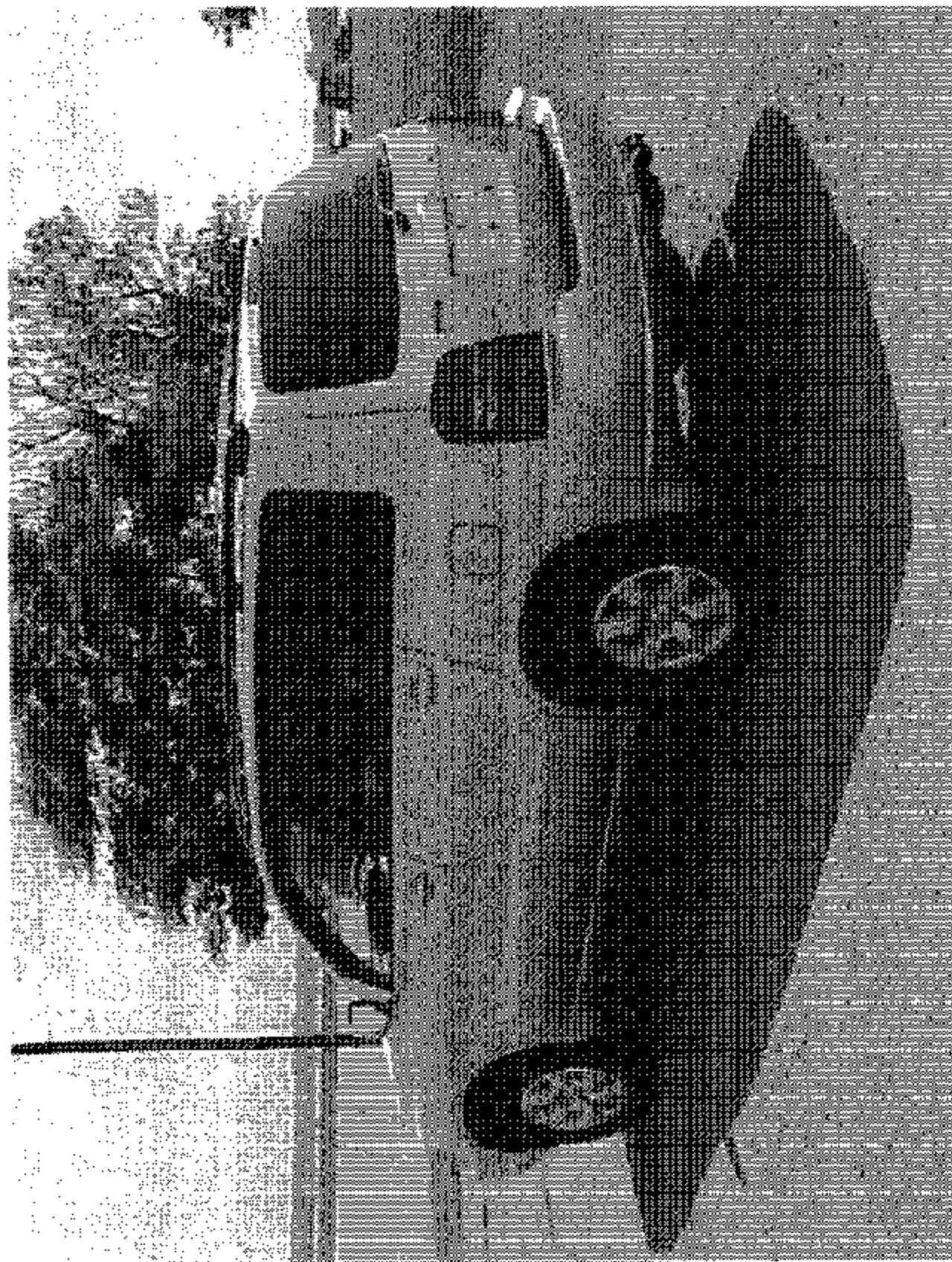
EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO.	CAL. DATE	NEXT CAL. DATE
COMPUTER	AT&T	486DX266	BEFORE USE	BEFORE USE
LOAD CELL	REVERE	1353	06/03	06/04
LINEAR TRANSDUCER	CELESCO	69	BEFORE USE	BEFORE USE
LINEAR TRANSDUCER	CELESCO	70	BEFORE USE	BEFORE USE
LINEAR TRANSDUCER	CELESCO	71	BEFORE USE	BEFORE USE
LEVEL	STANLEY	42-449	04/03	04/04
FORCE GAUGE	CHATILLON	8761	BEFORE USE	BEFORE USE
CALIPER	N/A	Q9322365	BEFORE USE	BEFORE USE

SECTION 5
PHOTOGRAPHS



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.1
¾ FRONTAL RIGHT SIDE VIEW OF VEHICLE



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.2
¾ REARWARD LEFT SIDE VIEW OF VEHICLE

MFG BY TOYOTA MOTOR CORPORATION

DATE 01/03

GWR 2260KG (4985LB)

GARR PET 1300KG (2865LB) WITH P225/70R16 TIRES

16X6 1-2JJ RIMS AT 210KPA (30PSI) COLD

1240KG (2735LB) WITH P225/70R16 TIRES

16X6 1-2JJ RIMS AT 210KPA (30PSI) COLD

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR
VEHICLE SAFETY AND EMISSION STANDARDS IN EFFECT
ON THE DATE OF MANUFACTURE SHOWN ABOVE

VEG021A530059515 MPV

ACU3DL-BWPMKA

C-TR 1C0/FG14

A-TH 1C2A

MADE IN JAPAN

U241E

NO. 872

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.3
CLOSE-UP VIEW OF VEHICLE CERTIFICATION
LABEL

TIRE-LOADING

INFORMATION

CHARGE MAXIMALE DU VEHICULE

12045 1925 LBS (RES)

PERSONNES AVANT 2 ADULTES & TOTALS

DIMENSION DES PNEUS P225/65R18 TOTALS

PRESSION DE PNEUS 35 PSI (RES)

POIDS MAXIMAL DU VEHICULE CHARGE

AVANT 2100 LBS AGRESSE TIRER

POUR DE PLUS AMPLER DETAIL

Voir le manuel du propriétaire

48030

VEHICLE CAPACITY WEIGHT

12045 1925 LBS

PERSONS UP TO 2 ADULTS TOTAL

TIRE SIZE P225/65R18 TOTAL

TIRES PRESSURE 35 PSI (RES)

UP TO VEHICLE CAPACITY WEIGHT

FOR 2100 LBS AGRESSE TIRER

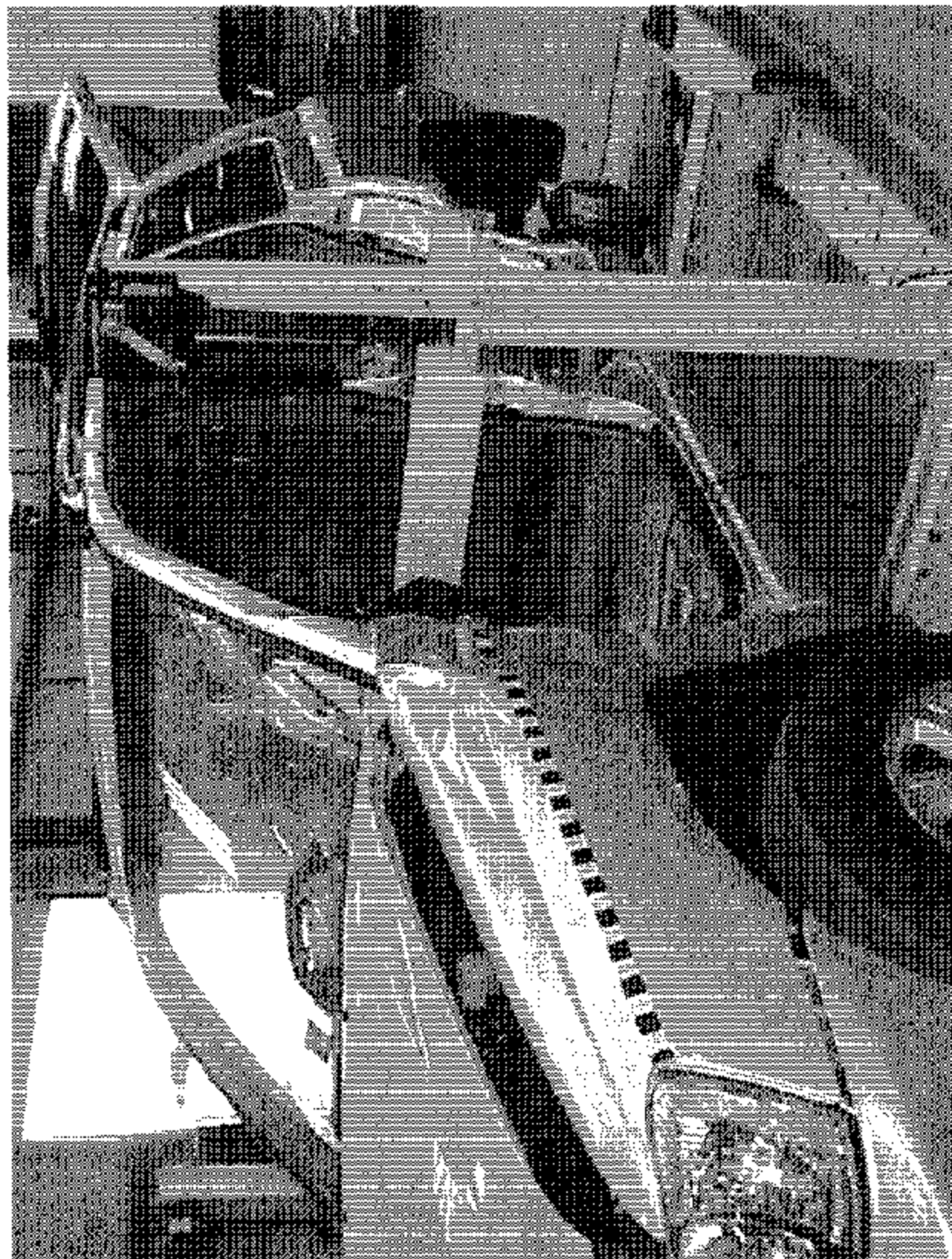
SEE OWNER'S MANUAL FOR

ADDITIONAL INFORMATION

03

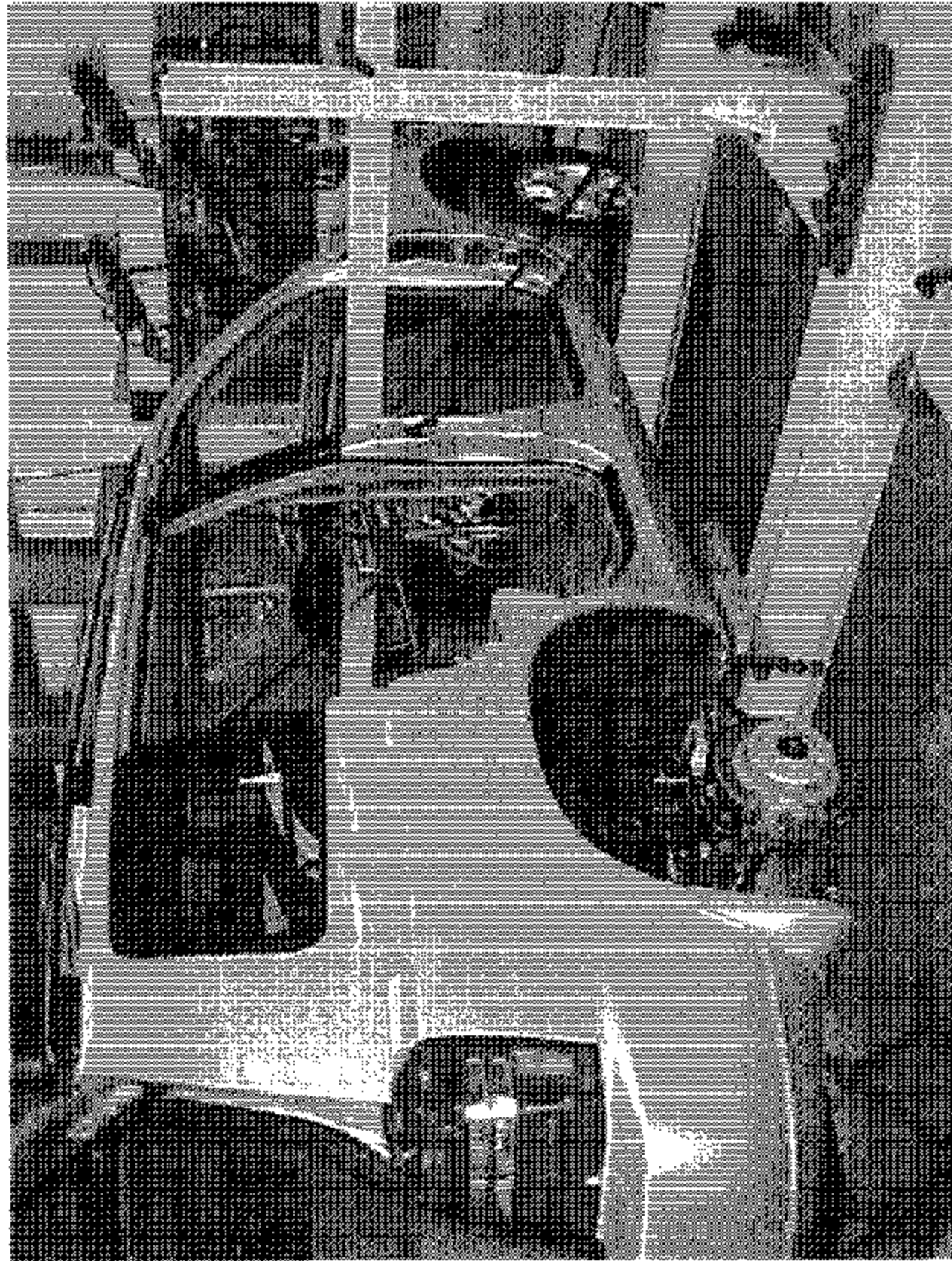
2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.4
CLOSE-UP VIEW OF VEHICLE TIRE
INFORMATION LABEL



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.5
¾ FRONTAL LEFT SIDE VIEW OF TEST VEHICLE
WITH TEST APPARATUS IN PLACE



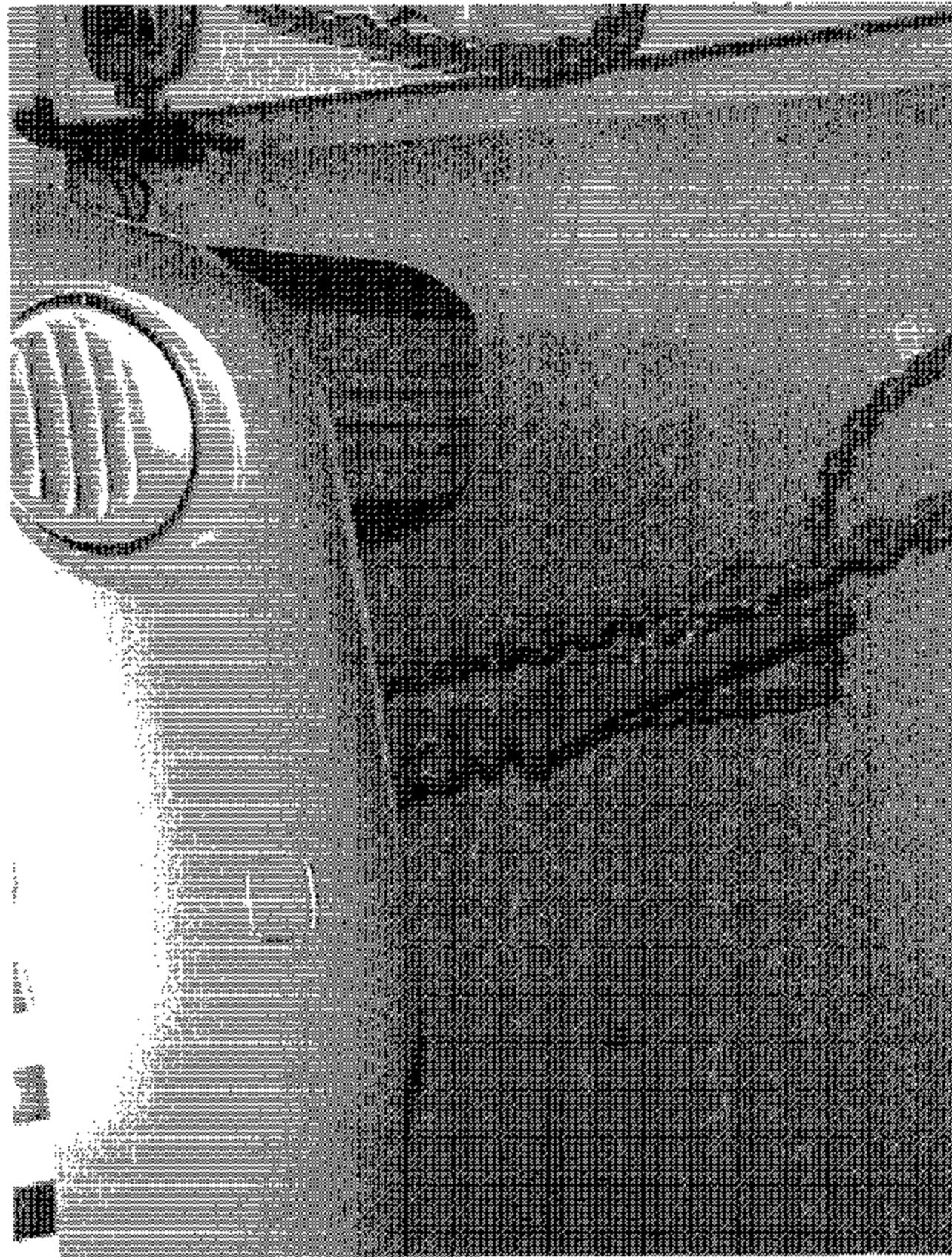
2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.6
¾ REARWARD RIGHT SIDE VIEW OF TEST
VEHICLE WITH TEST APPARATUS IN PLACE



FIGURE 5.7
RIGHT FRONT VEHICLE TIE DOWN

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.9
LEFT FRONT VEHICLE TIE DOWN

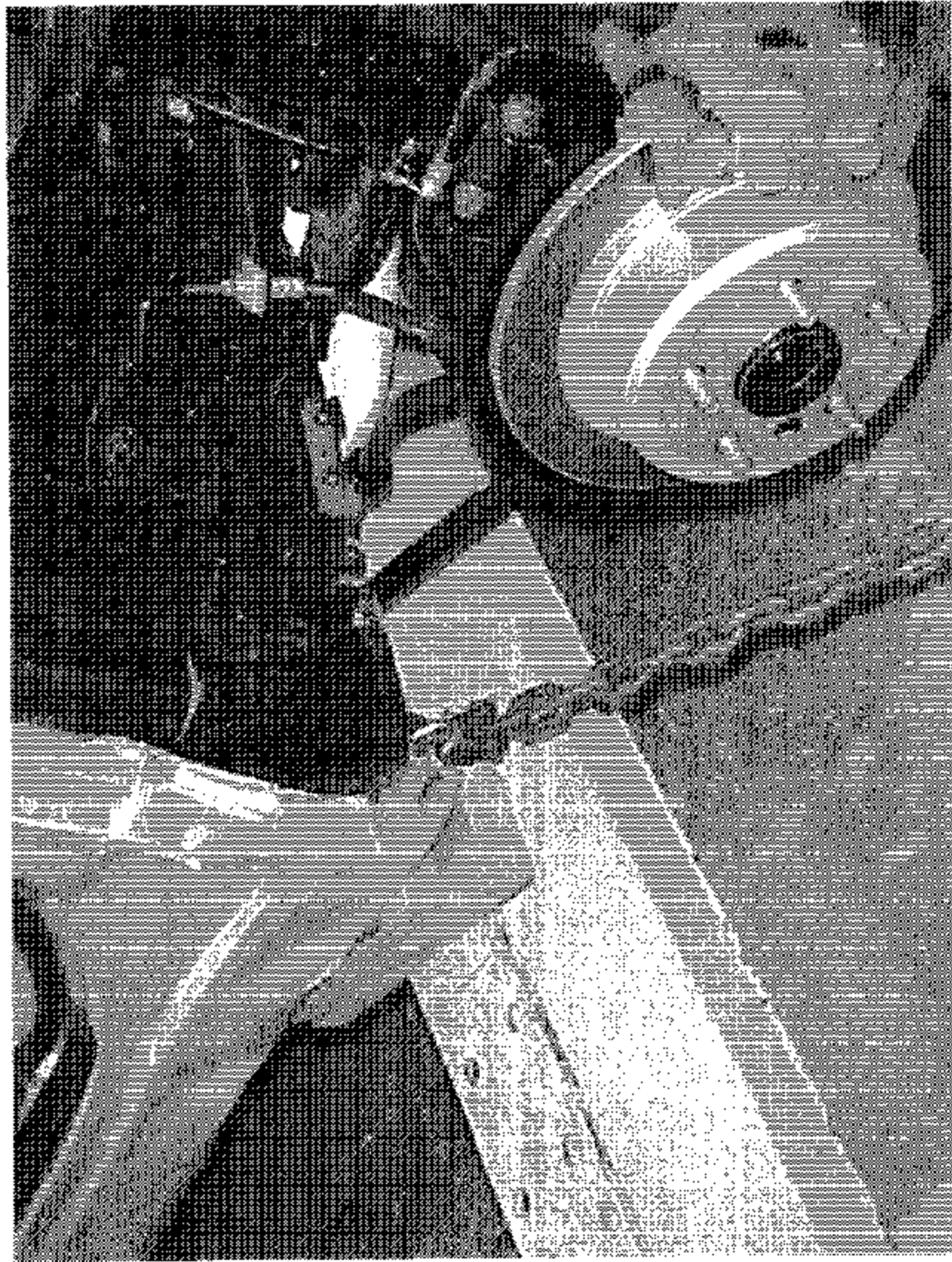
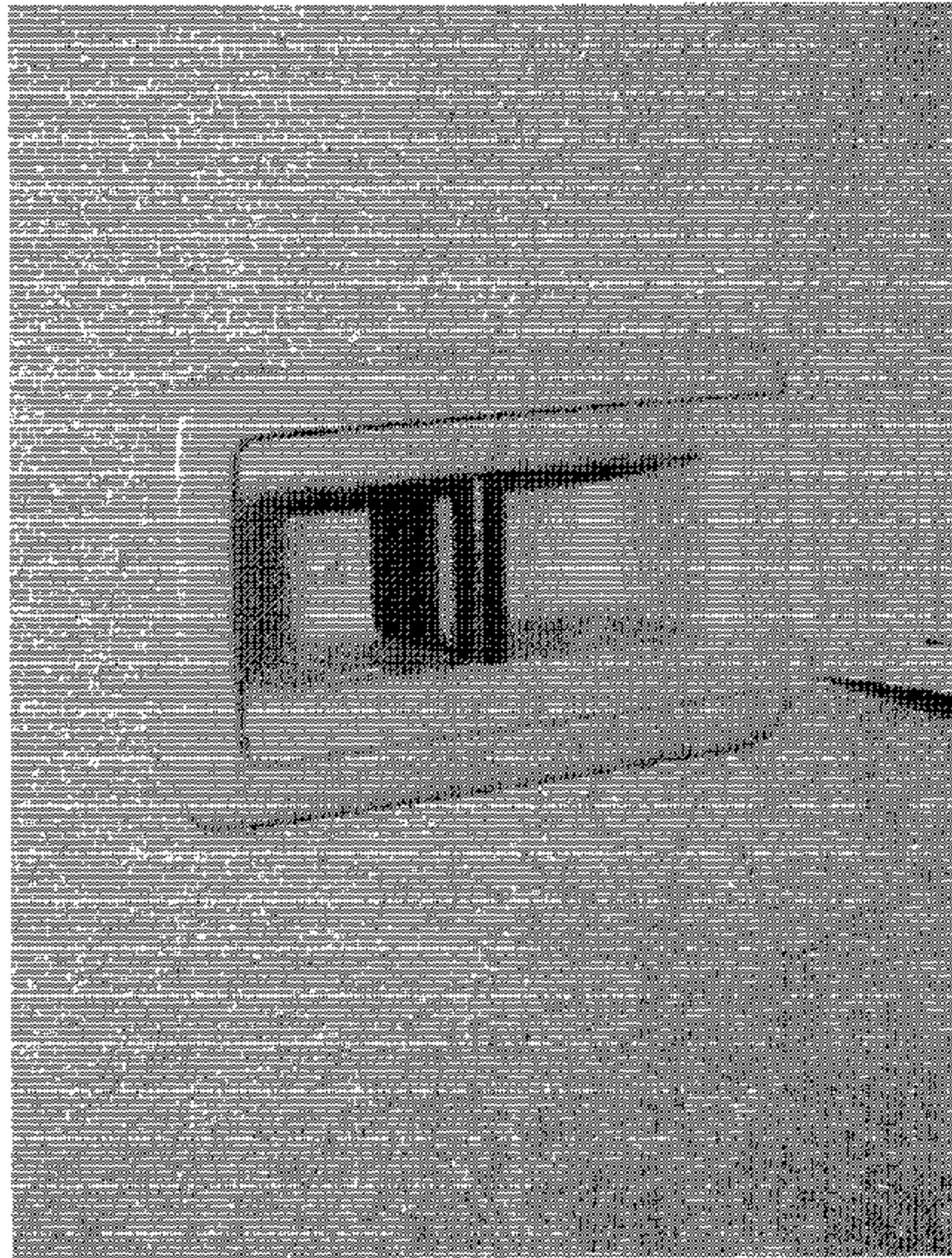


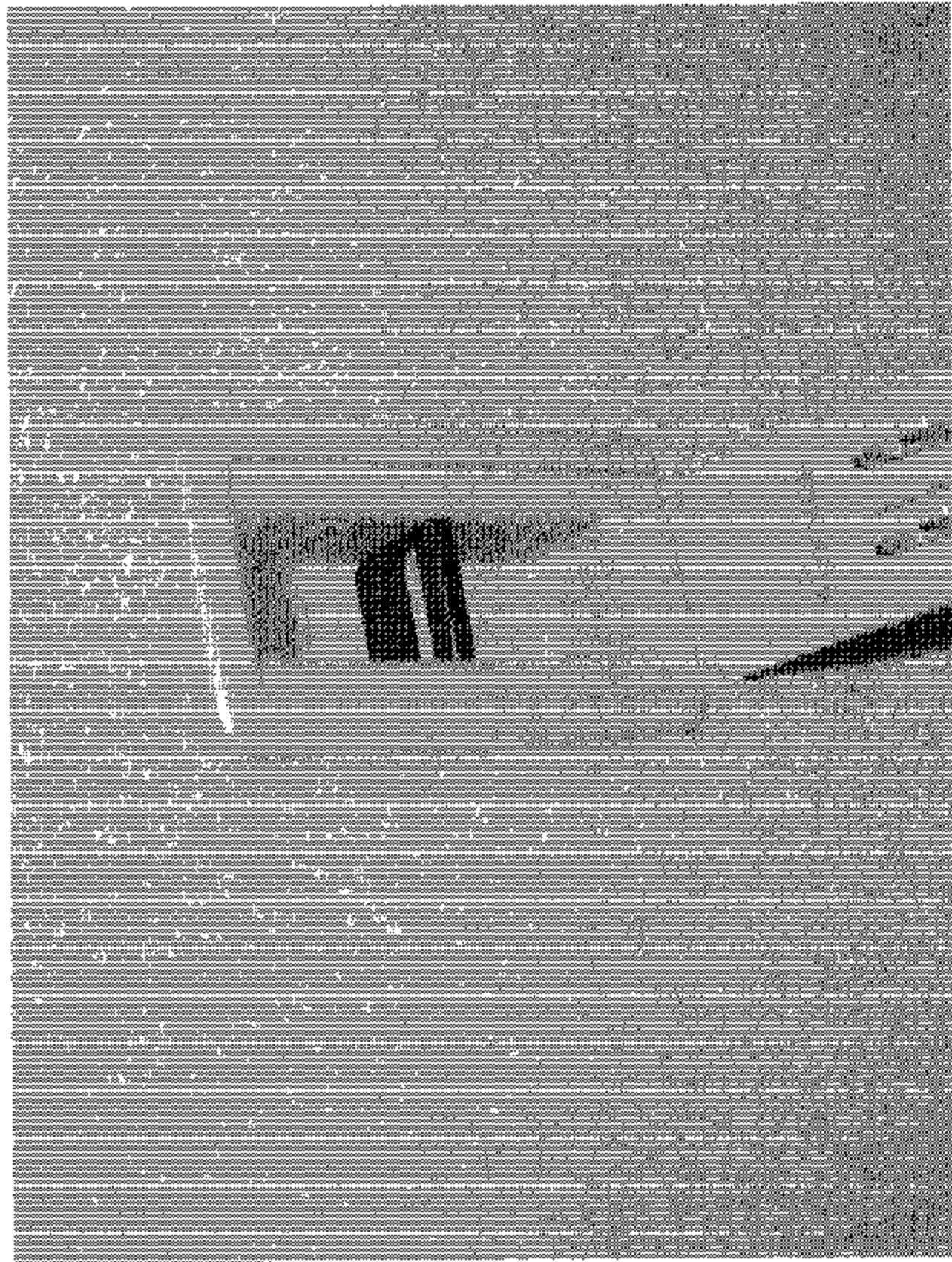
FIGURE 5.10
LEFT REAR VEHICLE TIE DOWN

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225



2003 TOYOTA HIGHLANDER
NIHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.11
PRE-TEST FRONT VIEW OF 2ND ROW LEFT
TOP TETHER ANCHOR



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.12
PRE-TEST FRONT VIEW OF 2ND ROW RIGHT
TOP TETHER ANCHOR

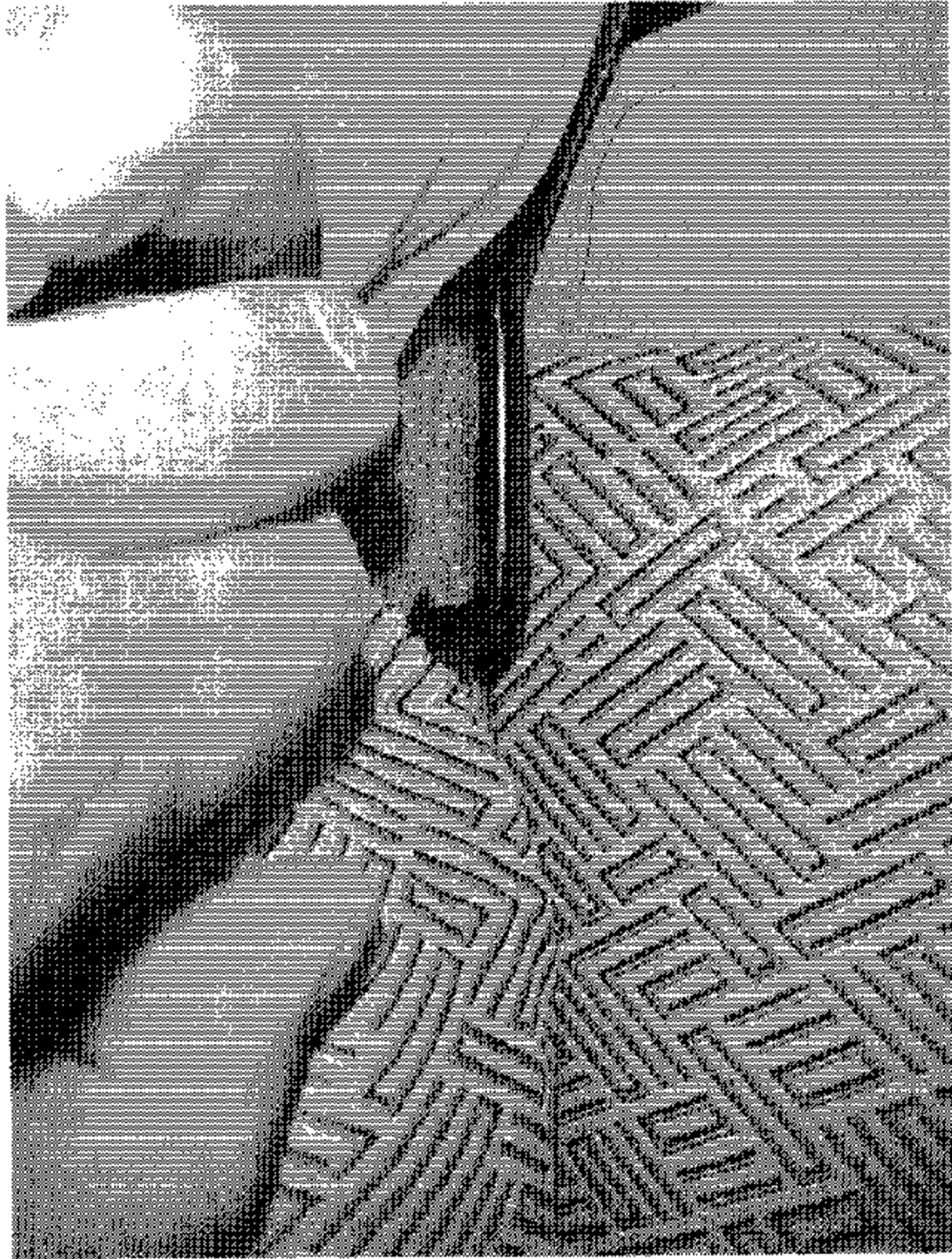
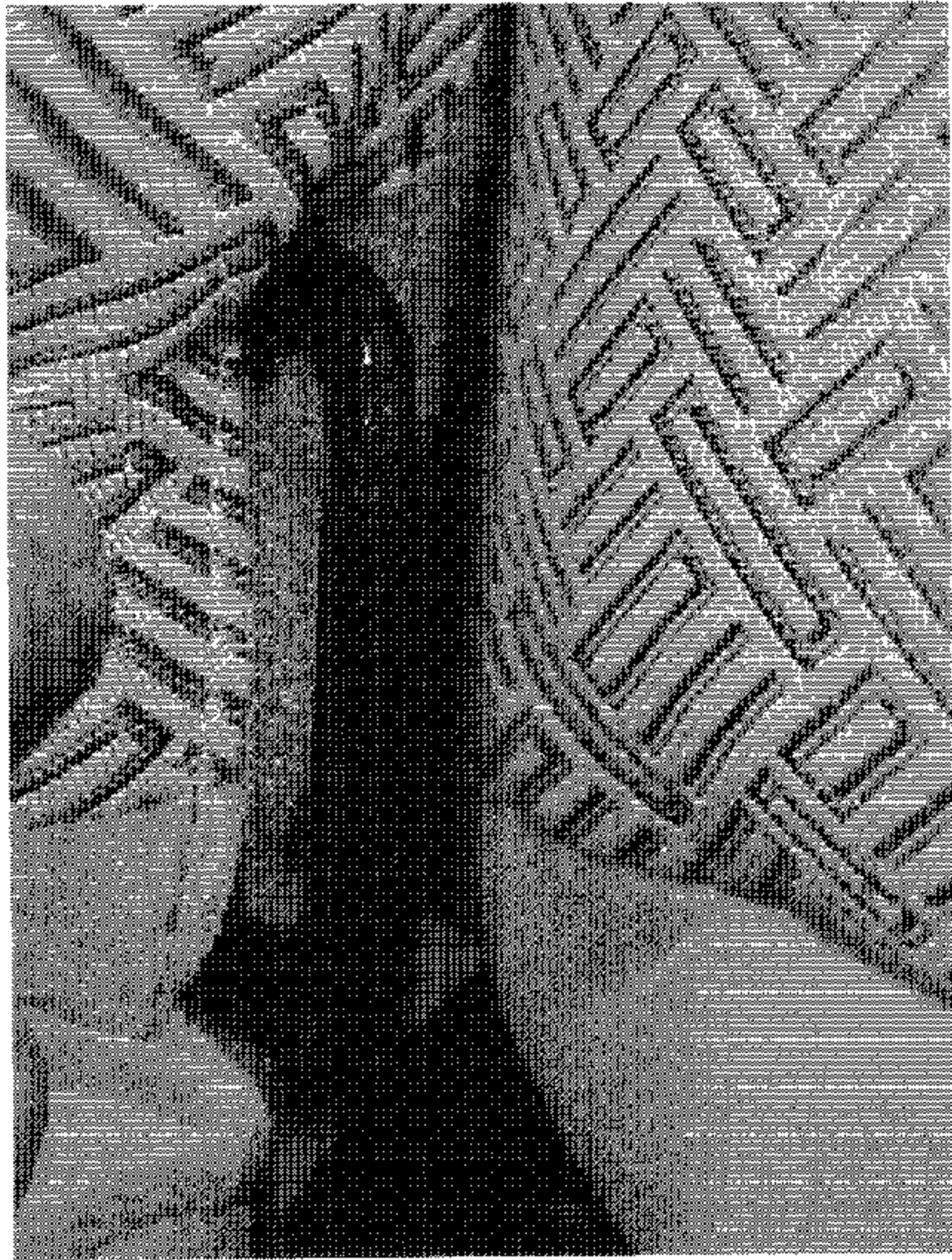


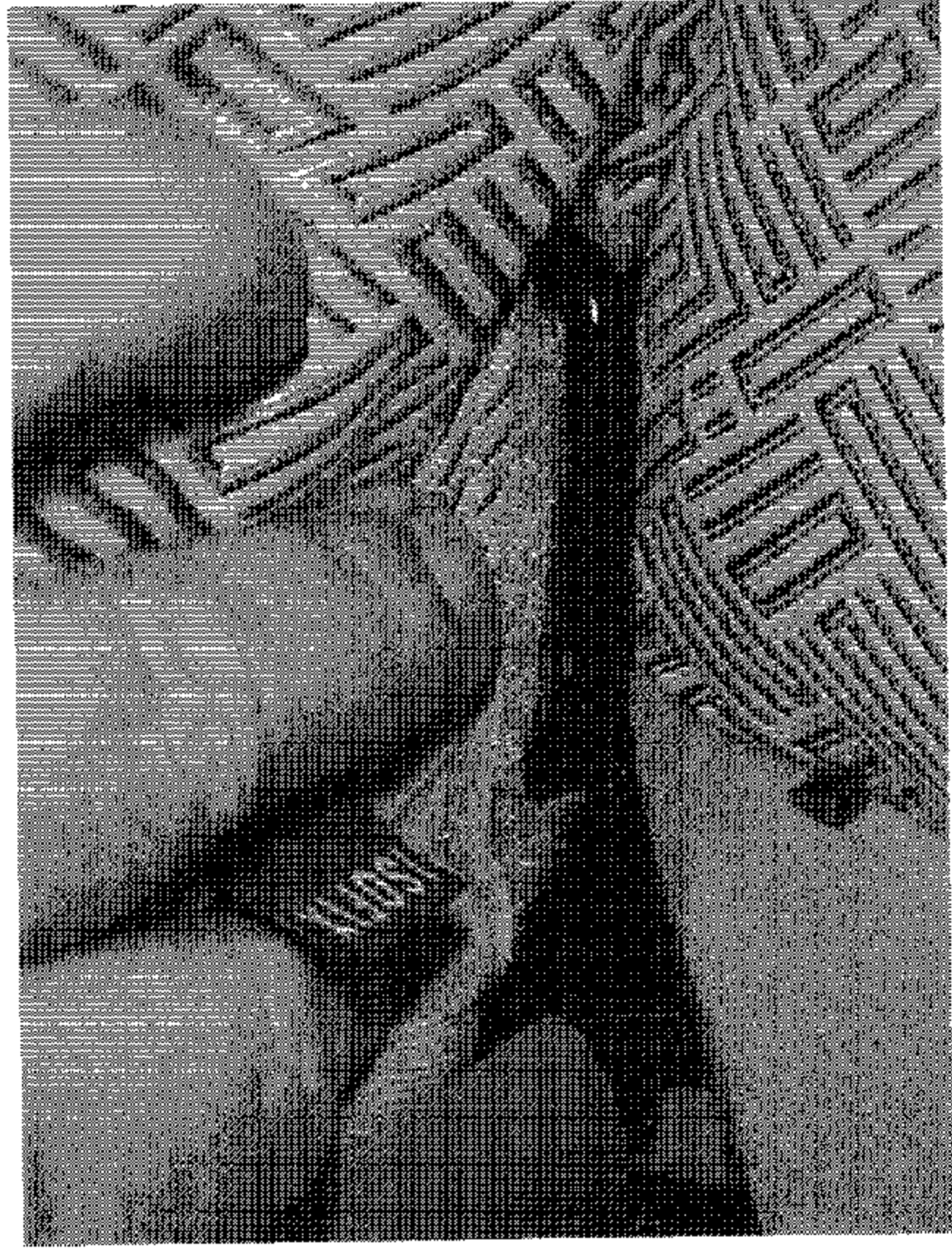
FIGURE 5.13
PRE-TEST FRONT VIEW OF 2ND ROW LEFT
OUTBOARD LOWER ANCHOR

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.14
PRE-TEST FRONT VIEW OF 2ND ROW LEFT
INBOARD LOWER ANCHOR



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.15
PRE-TEST FRONT VIEW OF 2ND ROW RIGHT
OUTBOARD LOWER ANCHOR

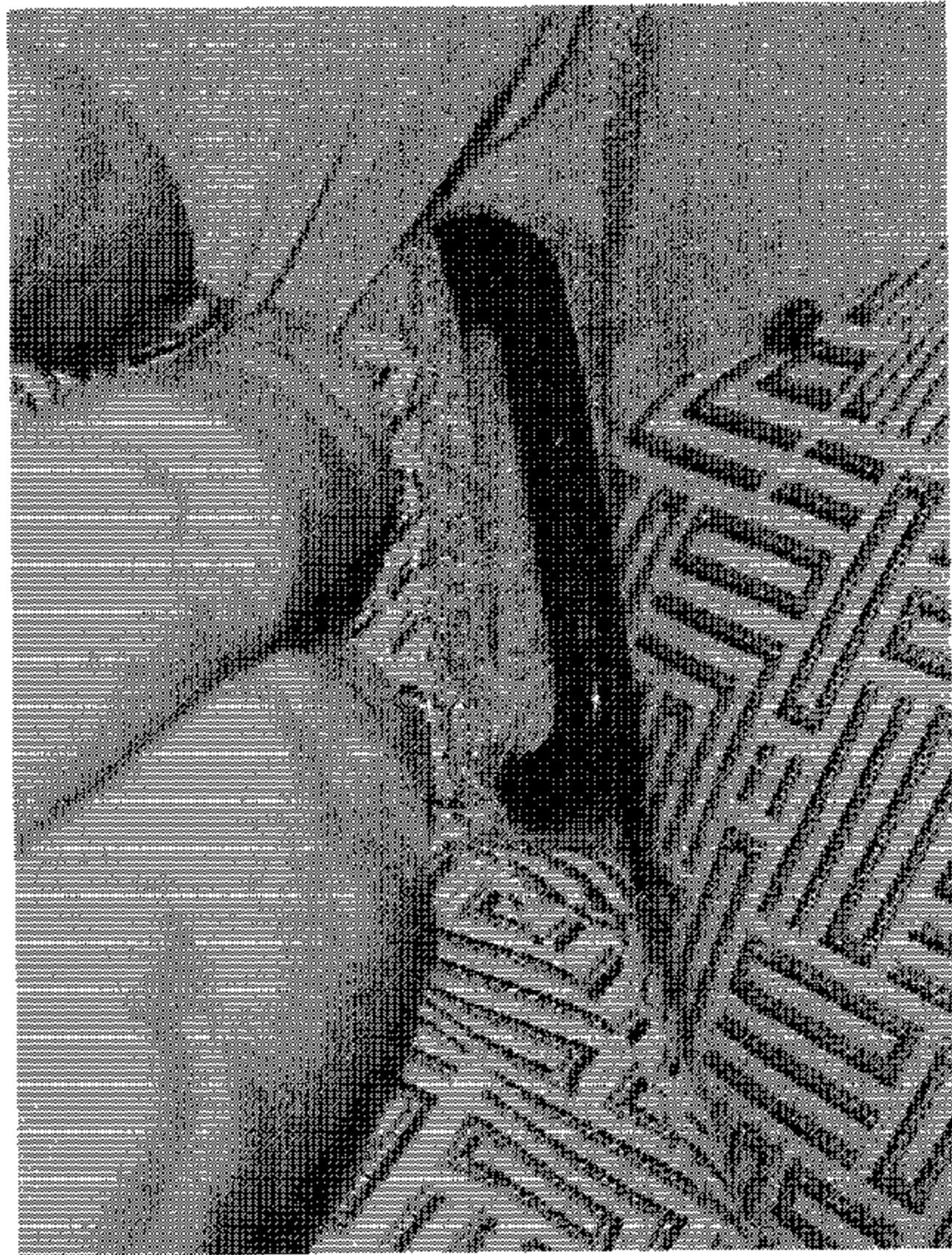


FIGURE 5.16
PRE-TEST FRONT VIEW OF 2ND ROW RIGHT
INBOARD LOWER ANCHOR

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

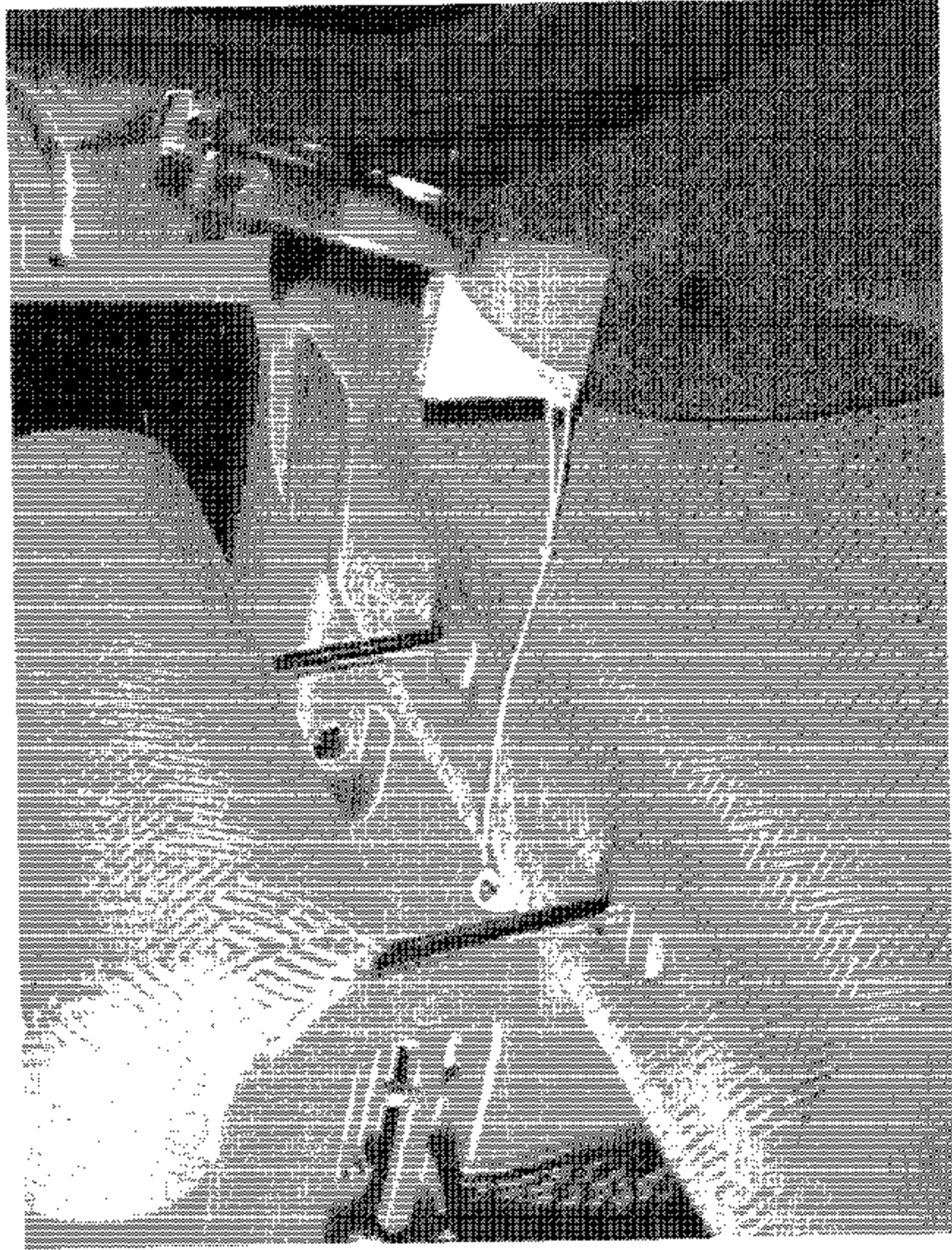


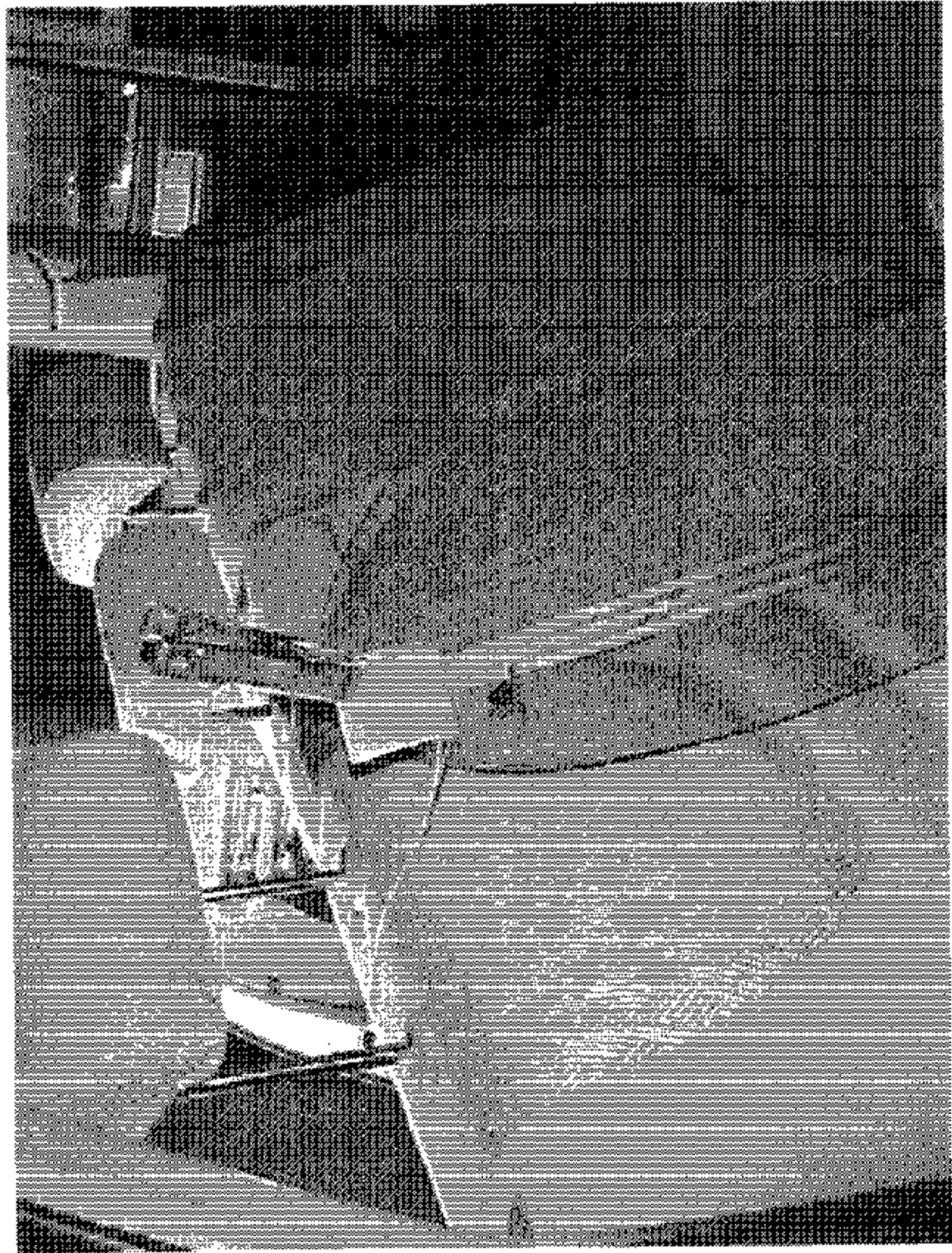
FIGURE 5.17
VIEW OF 2D TEMPLATE IN 2ND ROW LEFT SEAT

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225



FIGURE 5.18
VIEW OF 2D TEMPLATE IN 2ND ROW LEFT SEAT

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.19
VIEW OF 2D TEMPLATE IN 2ND ROW RIGHT
SEAT

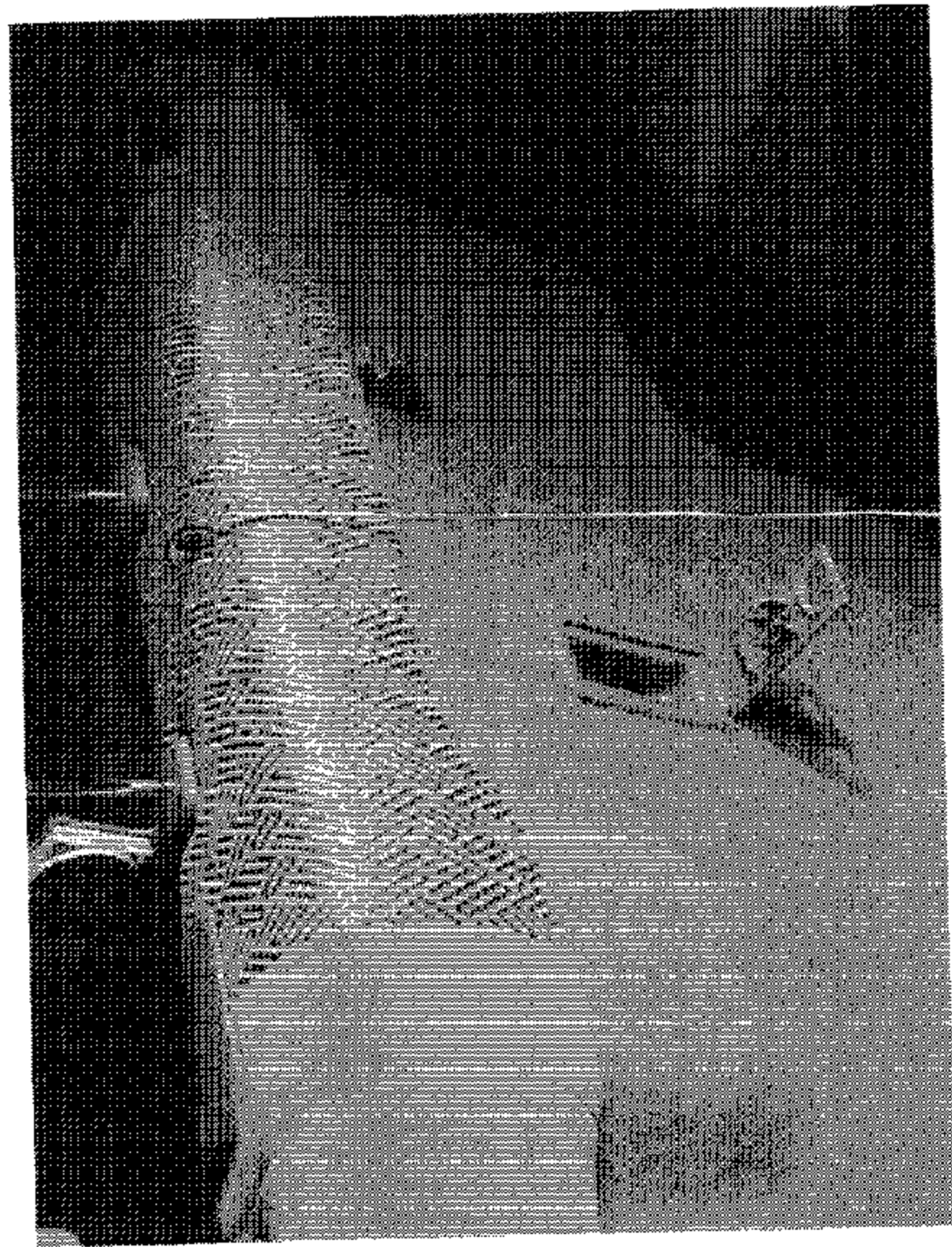


FIGURE 5.20
VIEW OF 2D TEMPLATE IN 2ND ROW RIGHT
SEAT

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225



FIGURE 5.21
VIEW OF CRF IN 2ND ROW LEFT SEAT

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

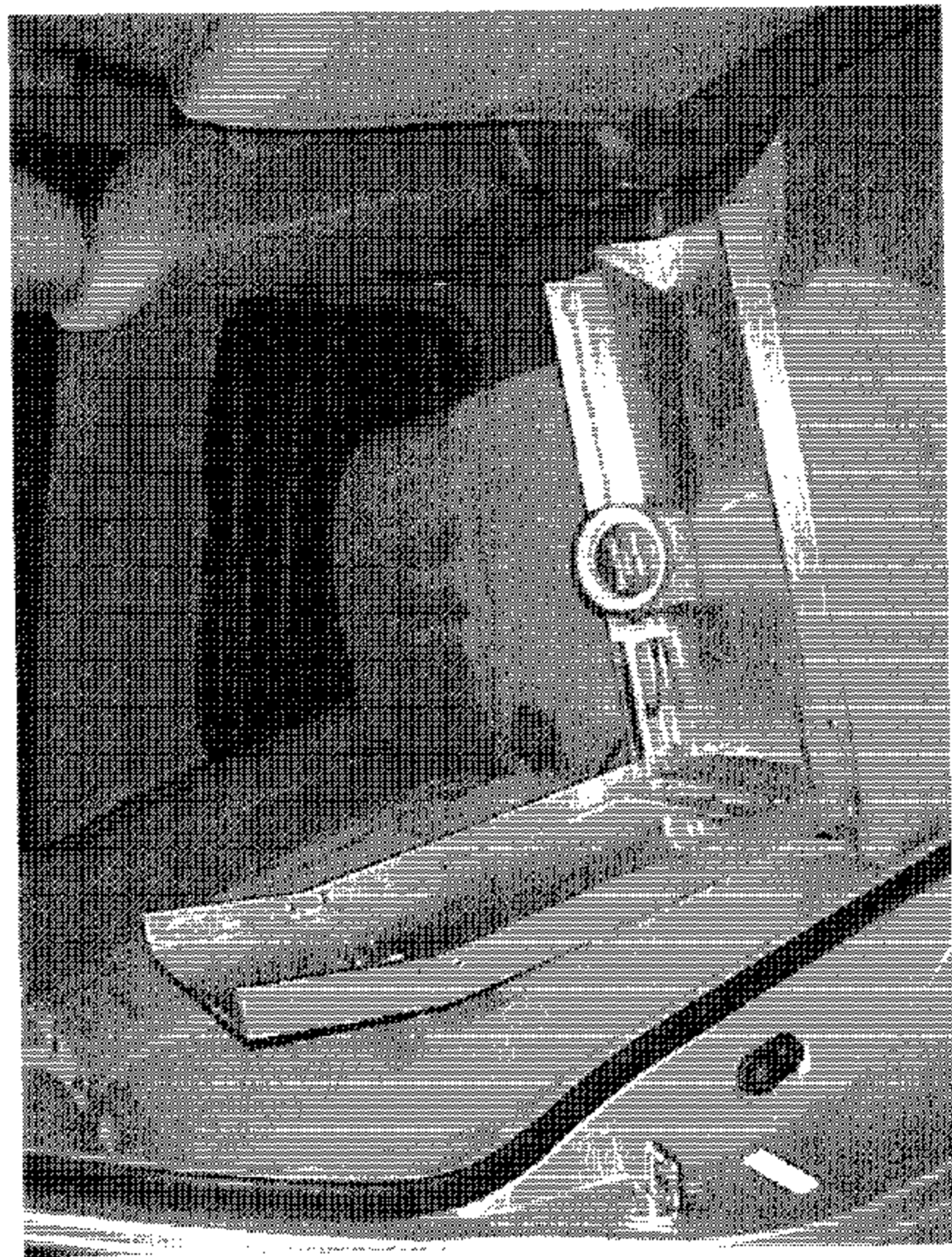


FIGURE 5.22
VIEW OF CRF IN 2ND ROW RIGHT SEAT

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

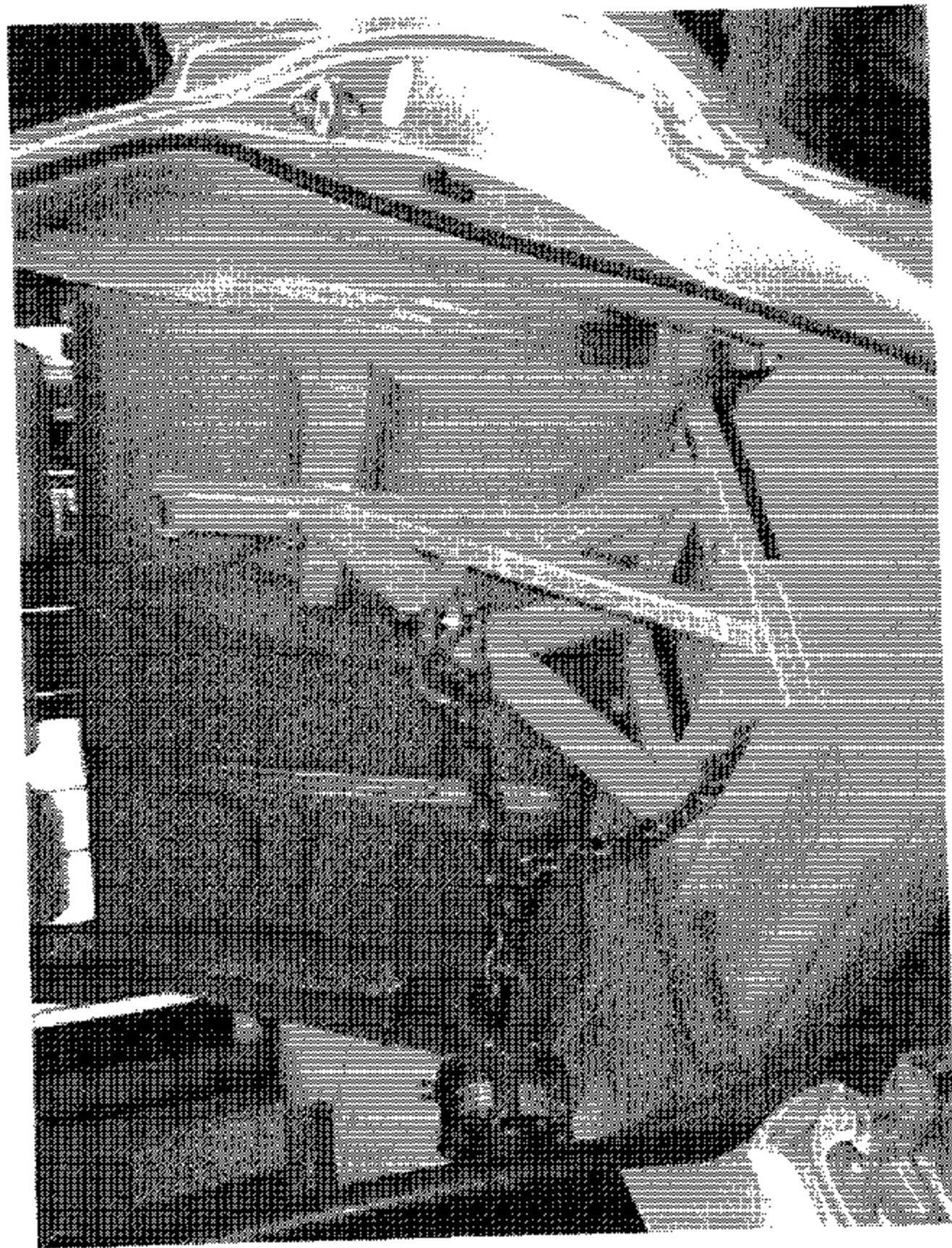


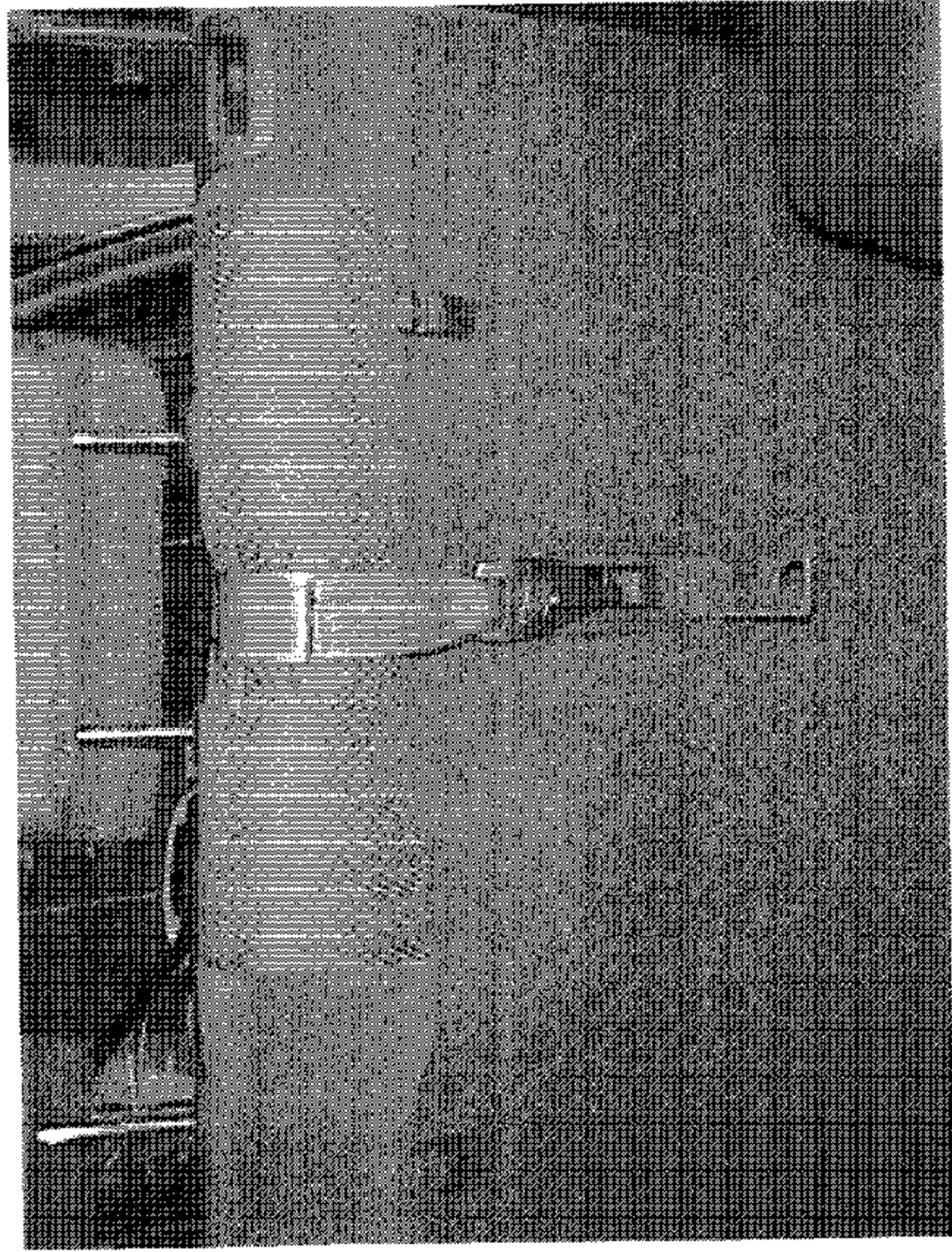
FIGURE 5.23
PRE-TEST SET-UP 2ND ROW LEFT POSITION

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.24
PRE-TEST SET-UP 2ND ROW RIGHT POSITION



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.25
PRE-TEST SET-UP 2ND ROW RIGHT POSITION

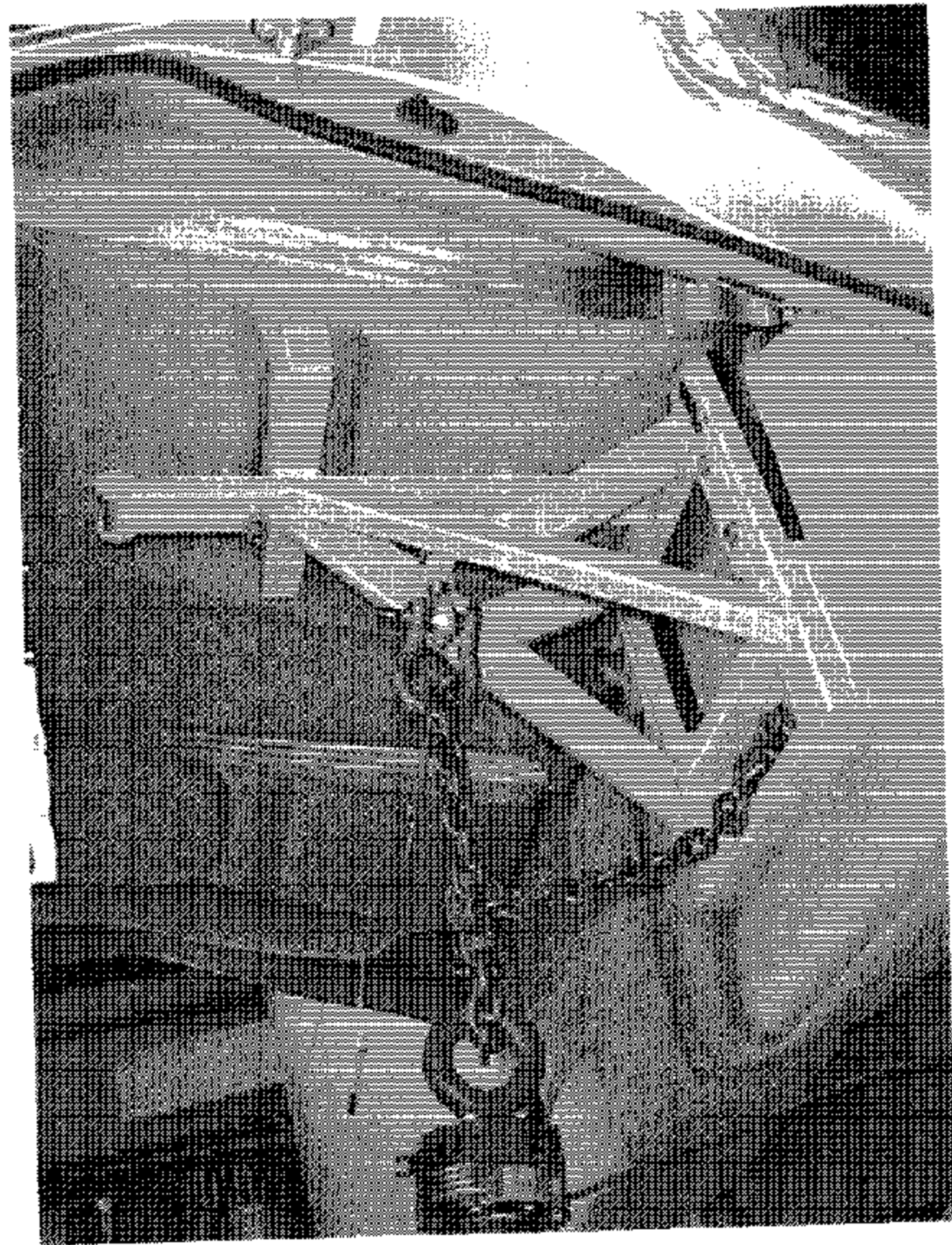
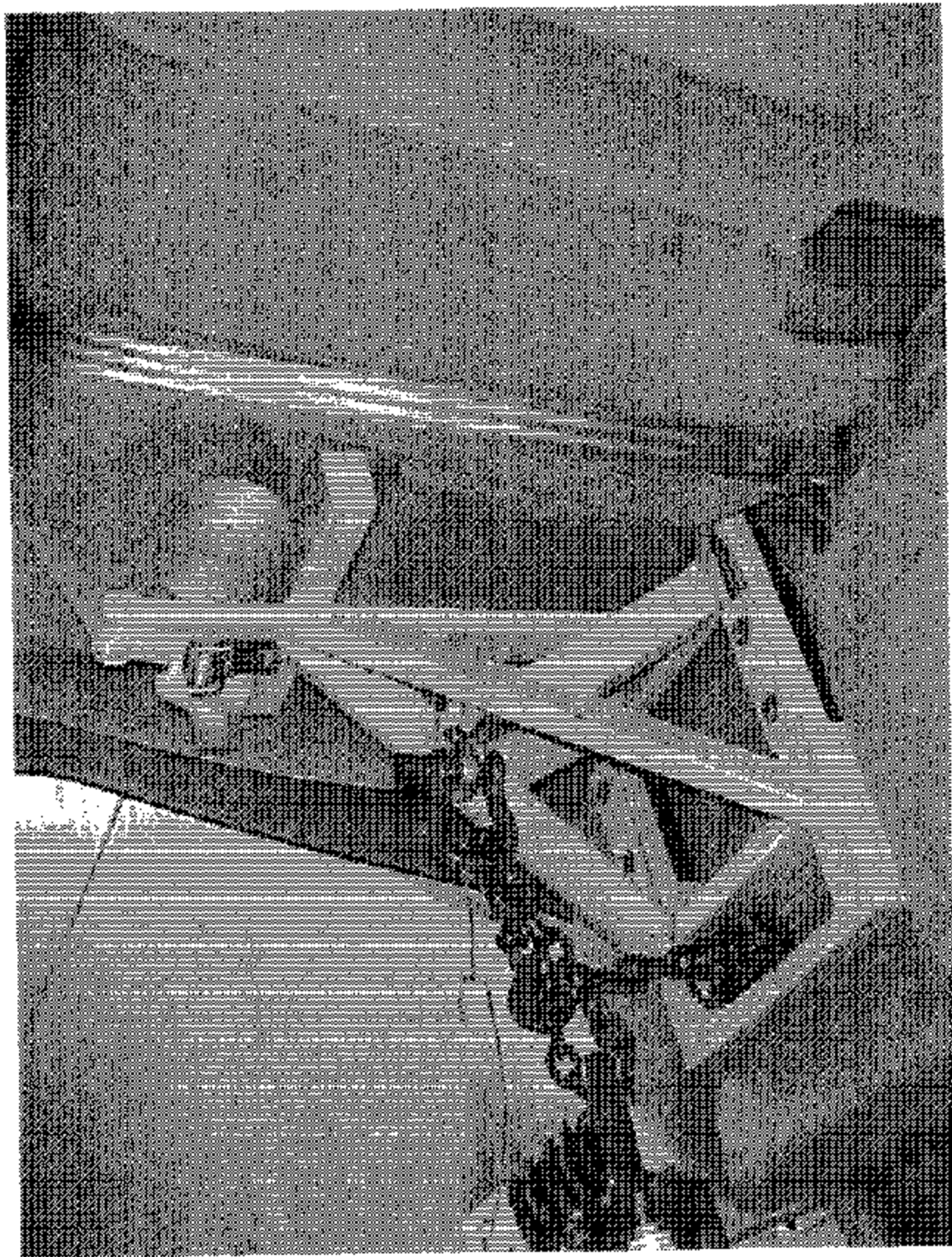


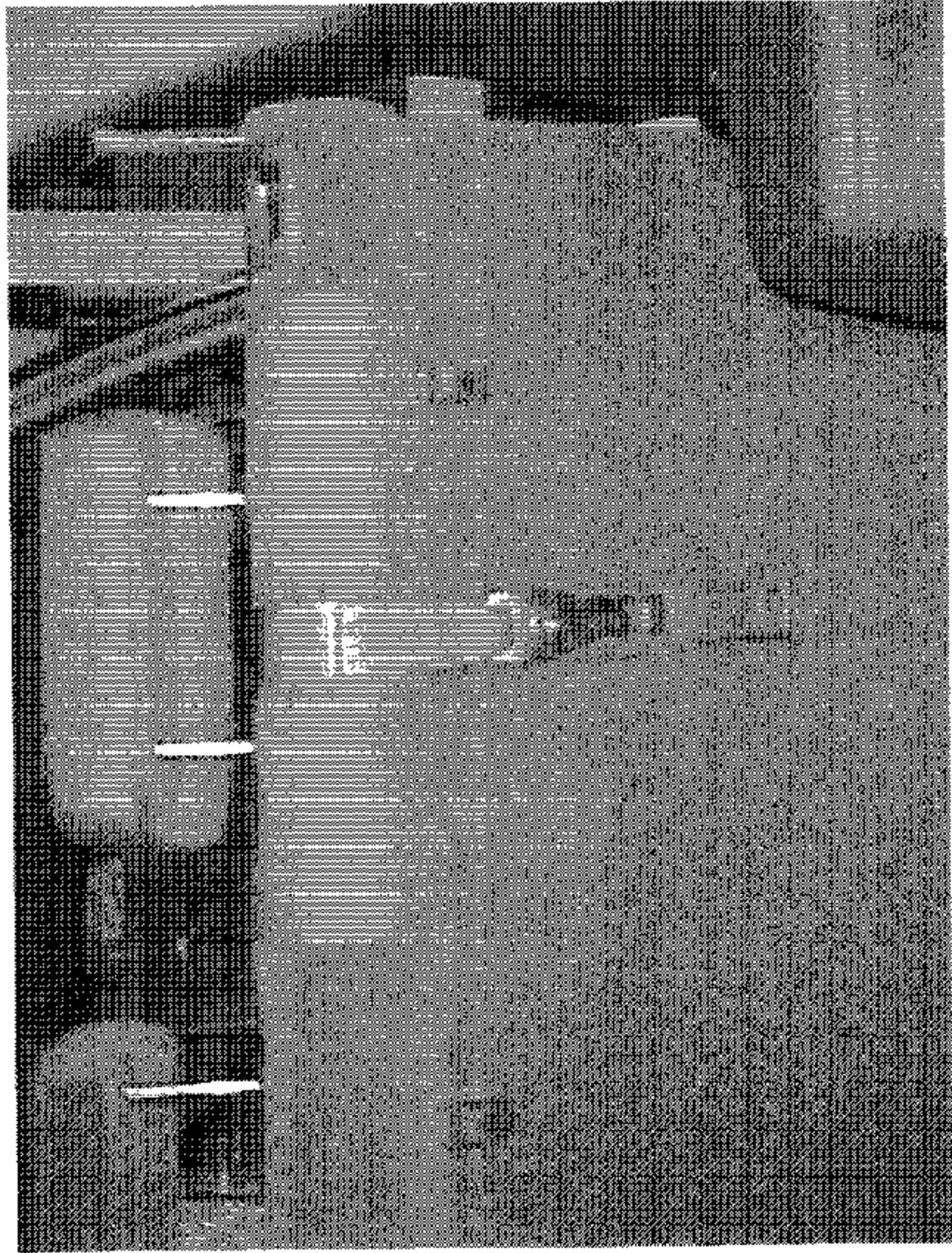
FIGURE 5.26
POST TEST 2ND ROW LEFT POSITION

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.27
POST TEST 2ND ROW RIGHT POSITION



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.28
POST TEST 2ND ROW RIGHT POSITION

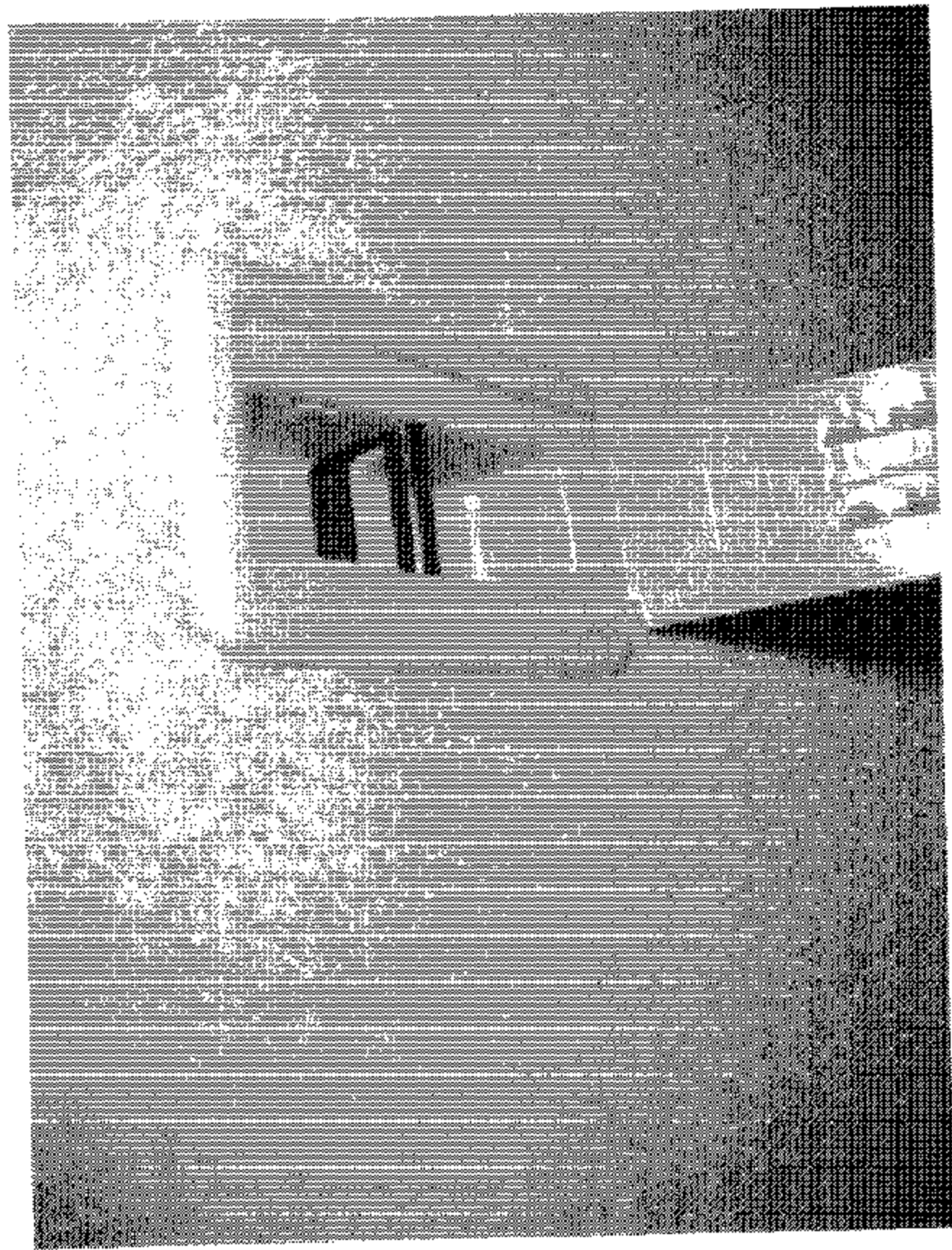
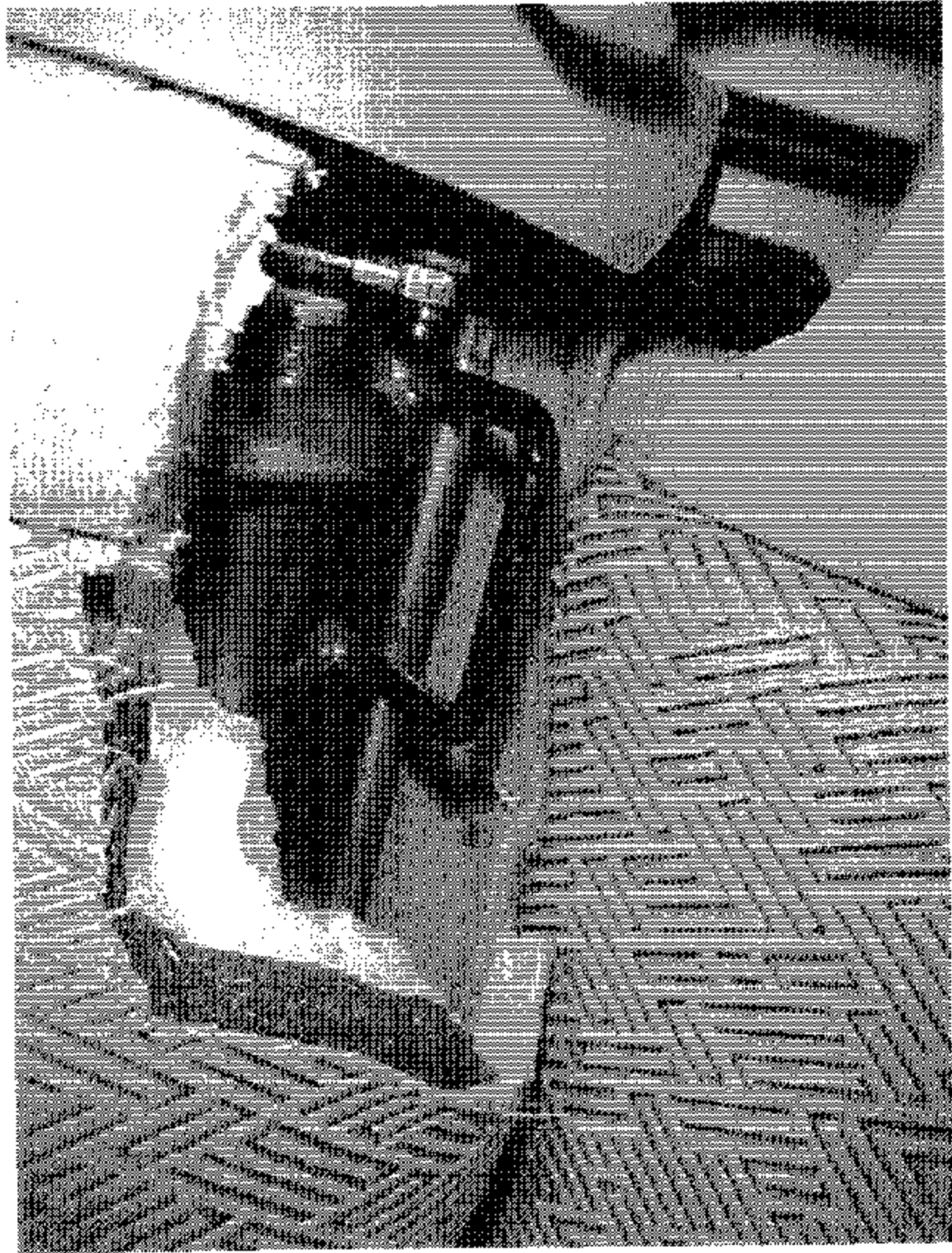


FIGURE 5 29
POST TEST 2ND ROW RIGHT TETHER
ANCHOR

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.30
POST TEST 2ND ROW LEFT OUTBOARD LOWER
ANCHOR

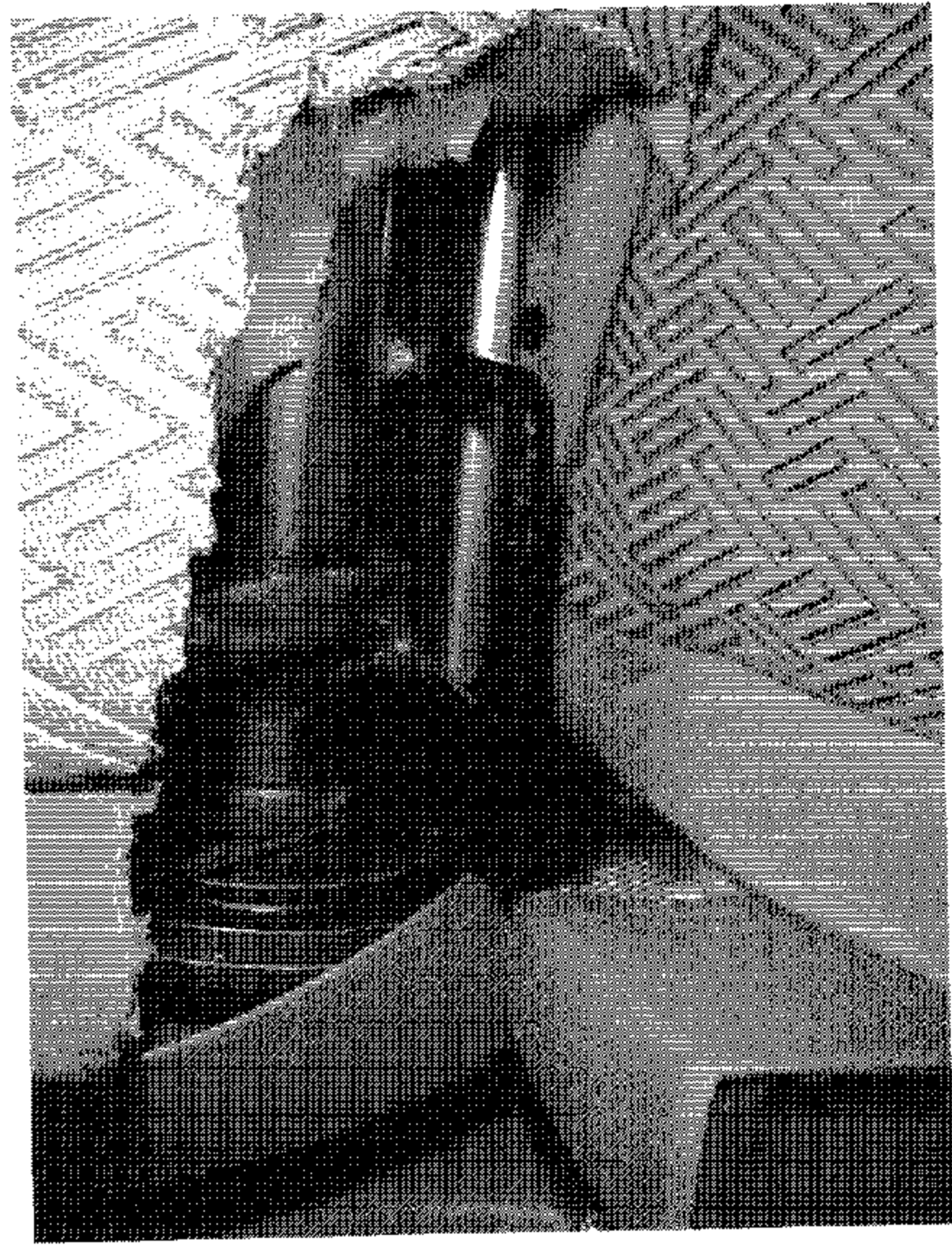
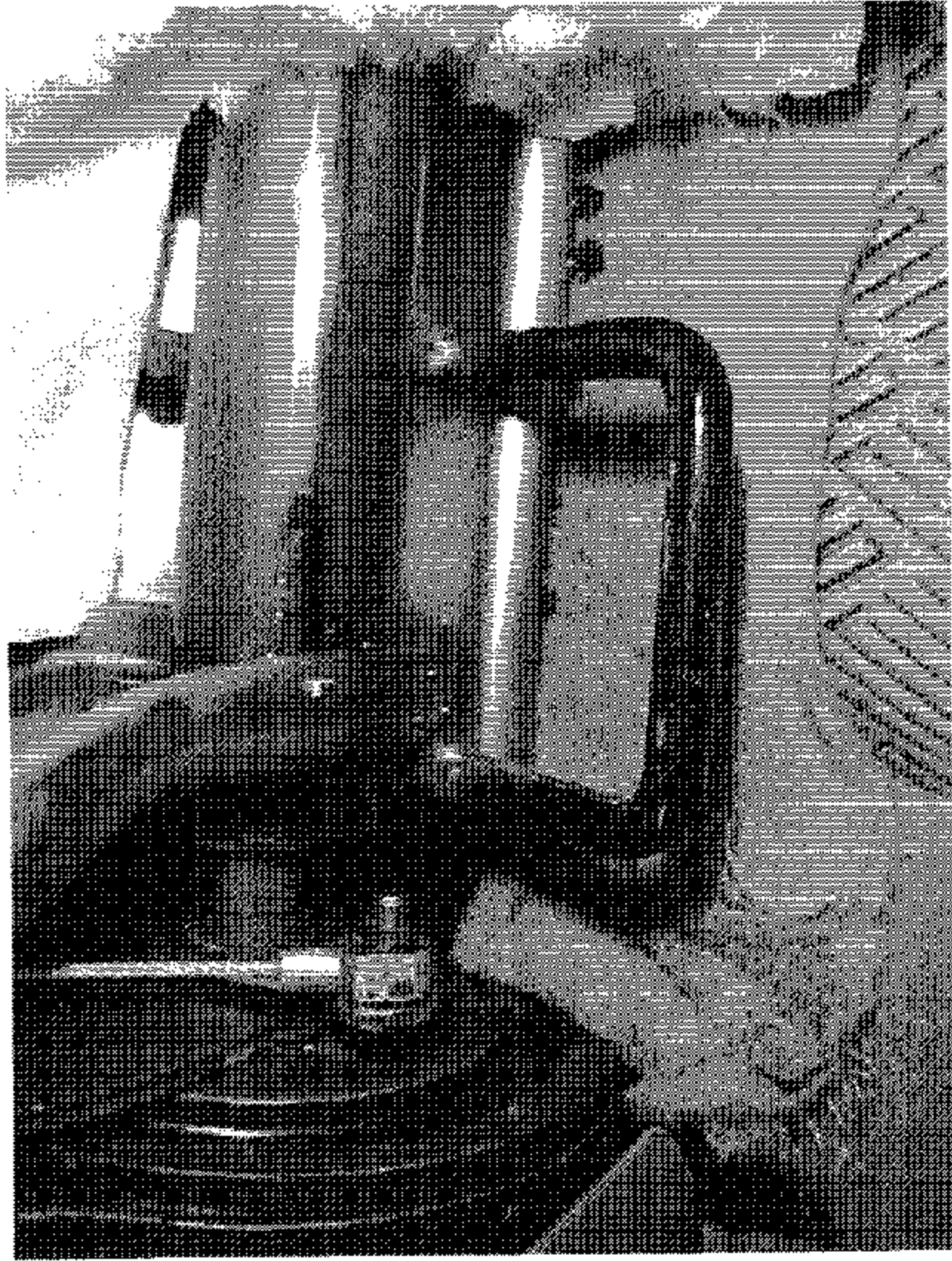


FIGURE 5.31
POST TEST 2ND ROW LEFT INBOARD LOWER
ANCHOR

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.32
POST TEST 2ND ROW RIGHT OUTBOARD
LOWER ANCHOR

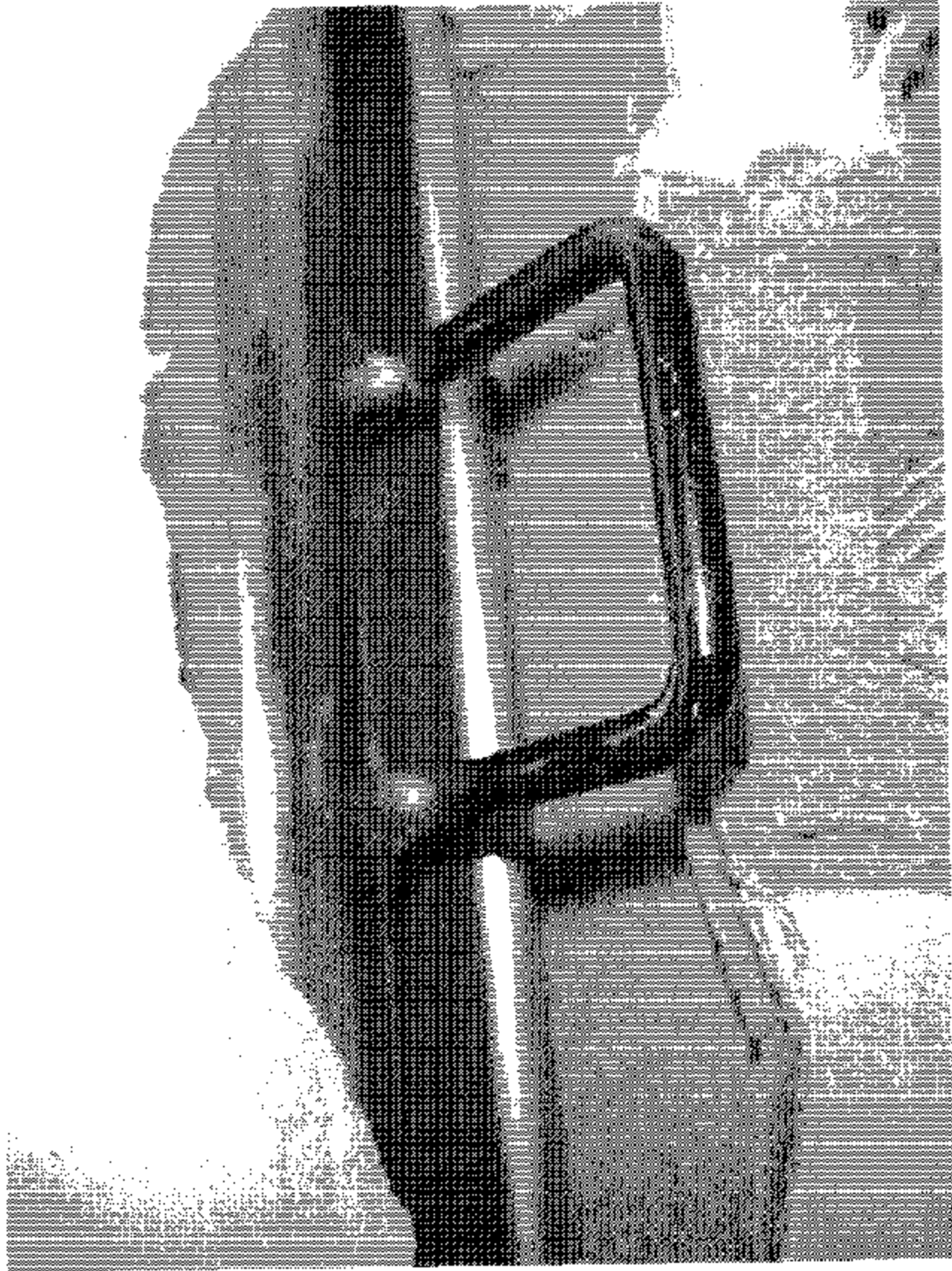
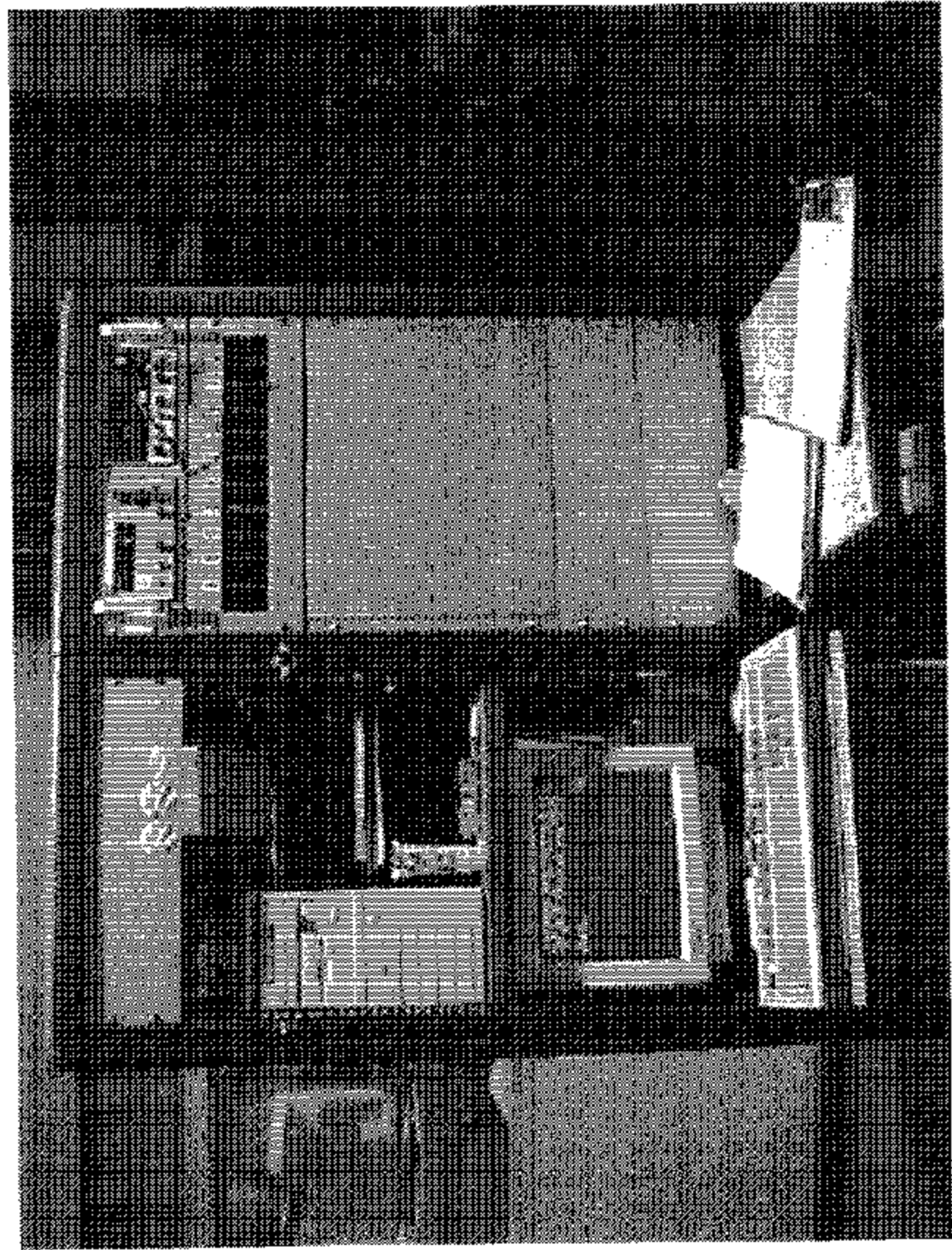


FIGURE 5.33
POST TEST 2ND ROW RIGHT INBOARD
LOWER ANCHOR

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225



2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

FIGURE 5.34
LOAD SYSTEM CONTROL AND DATA
RECORDING DEVICE IN TEST POSITION

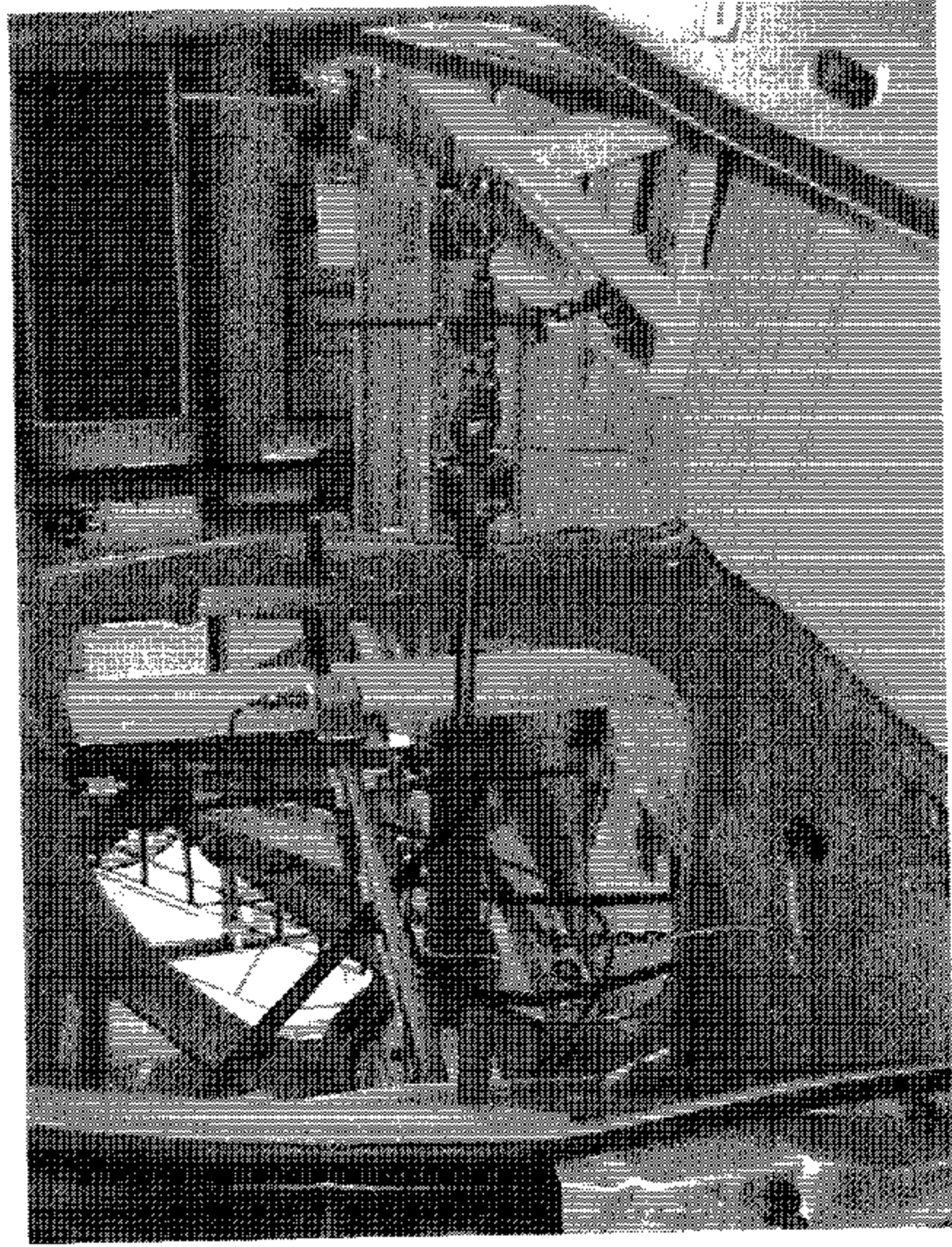


FIGURE 5.35
LOADING DEVICE WITH LOAD CELL AND TEST
FIXTURE IN TEST POSITION

2003 TOYOTA HIGHLANDER
NHTSA NO. C35103
FMVSS NO. 225

SECTION 6

PLOTS

FIGURE 6.1

2ND ROW RIGHT TOP TETHER ANCHOR

GTL 5108, NHTSA C35103

225, Child Restraint, S6.3

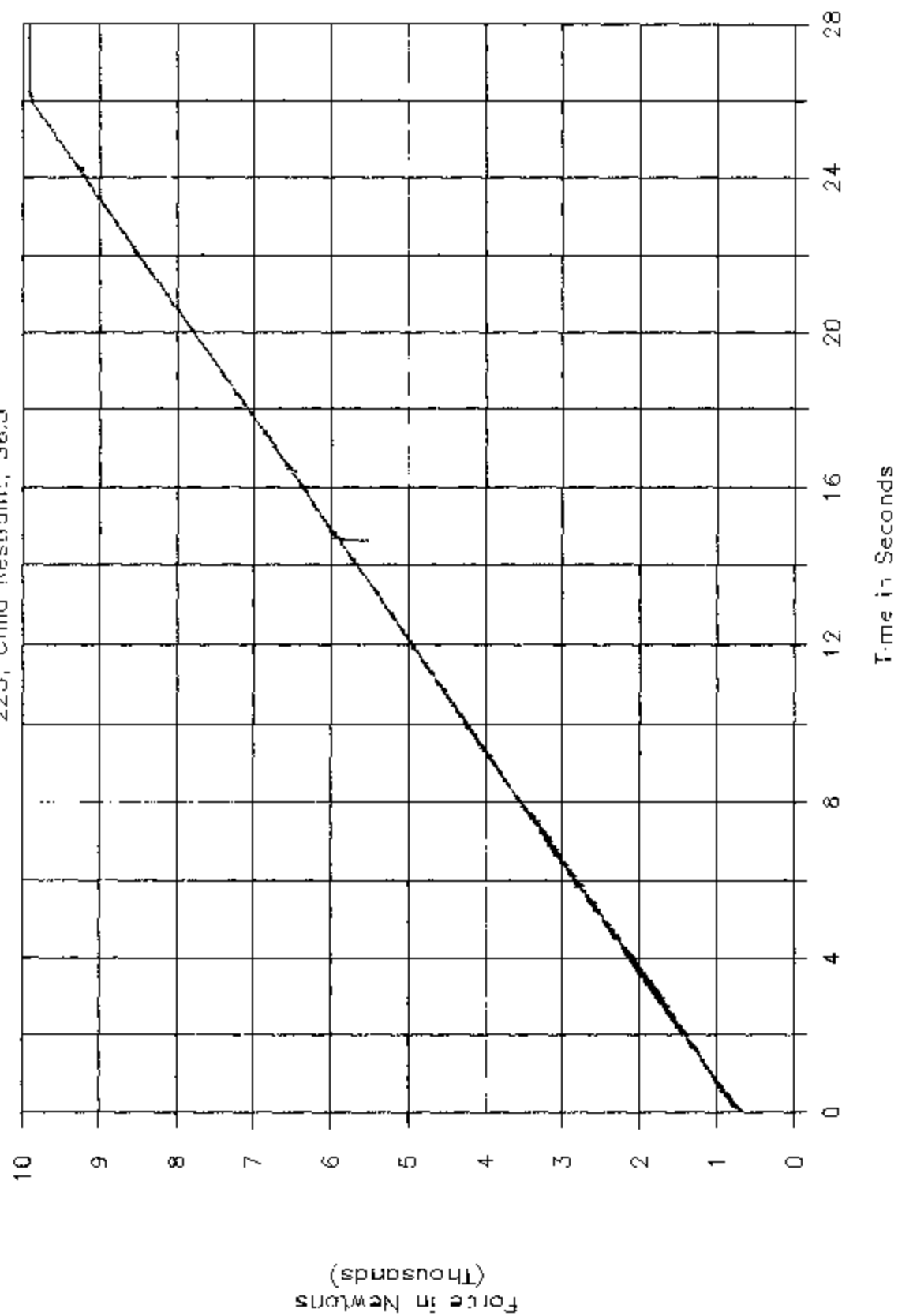


FIGURE 6.2

2ND ROW RIGHT TOP TETHER ANCHOR

GTL 5108, NHTSA C35103

225, Child Restraint, S6.3

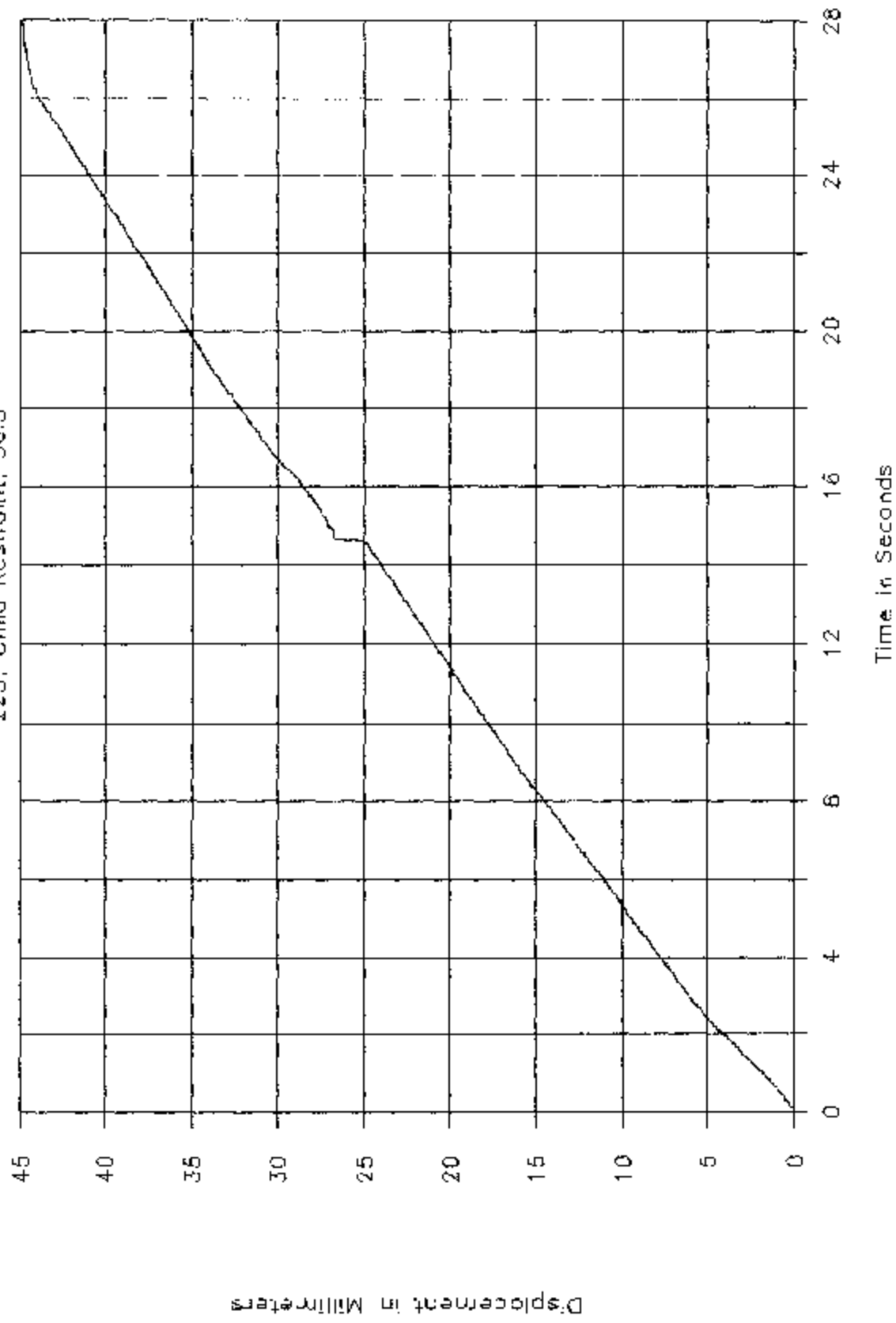


FIGURE 6.3

2ND ROW RIGHT TOP TETHER ANCHOR
GTL 5108, NHTSA C35103

225, Child Restraint, S6.3

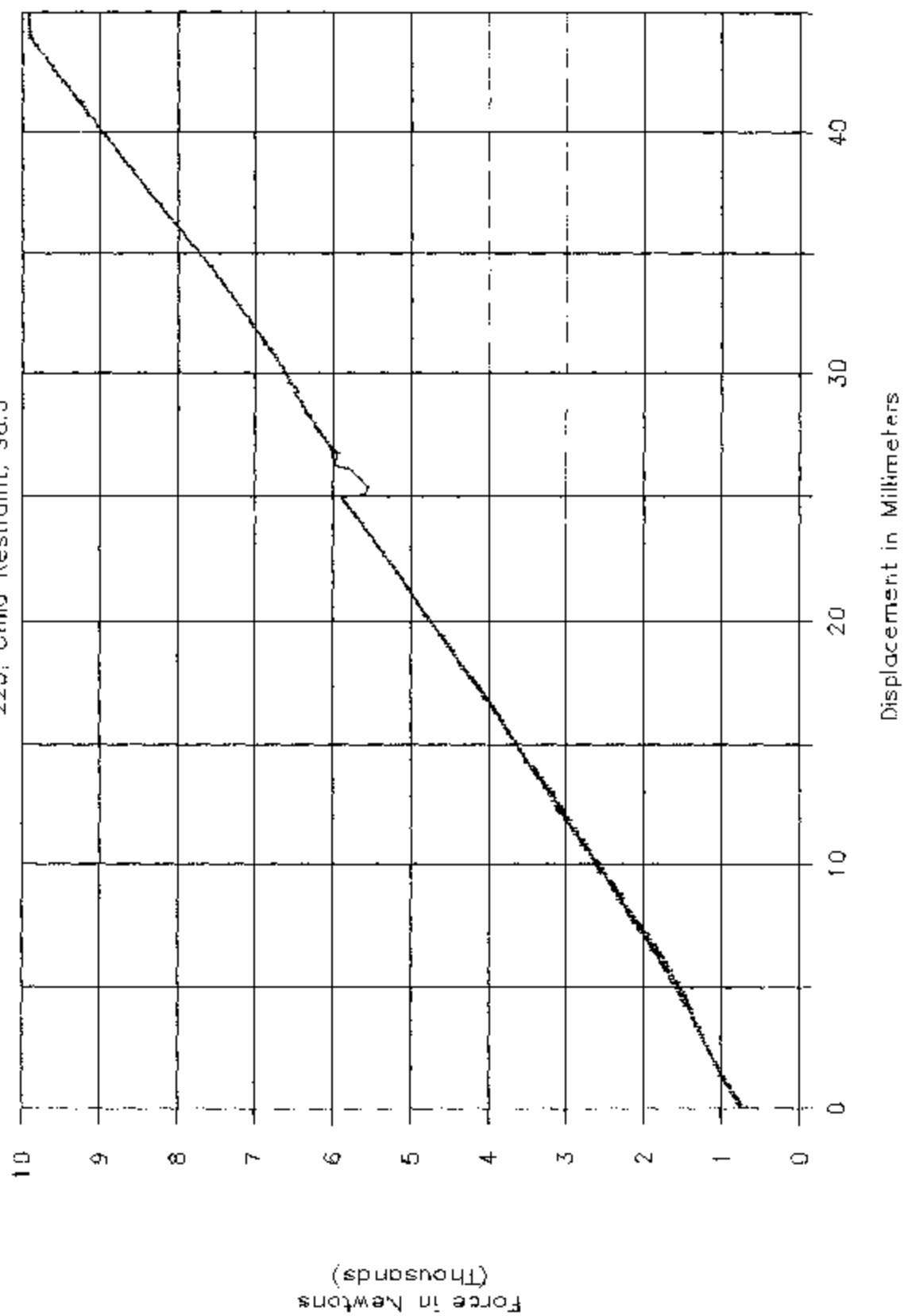


FIGURE 6.4

2ND ROW LEFT LOWER ANCHOR

GTL 5109, NHTSA C35103

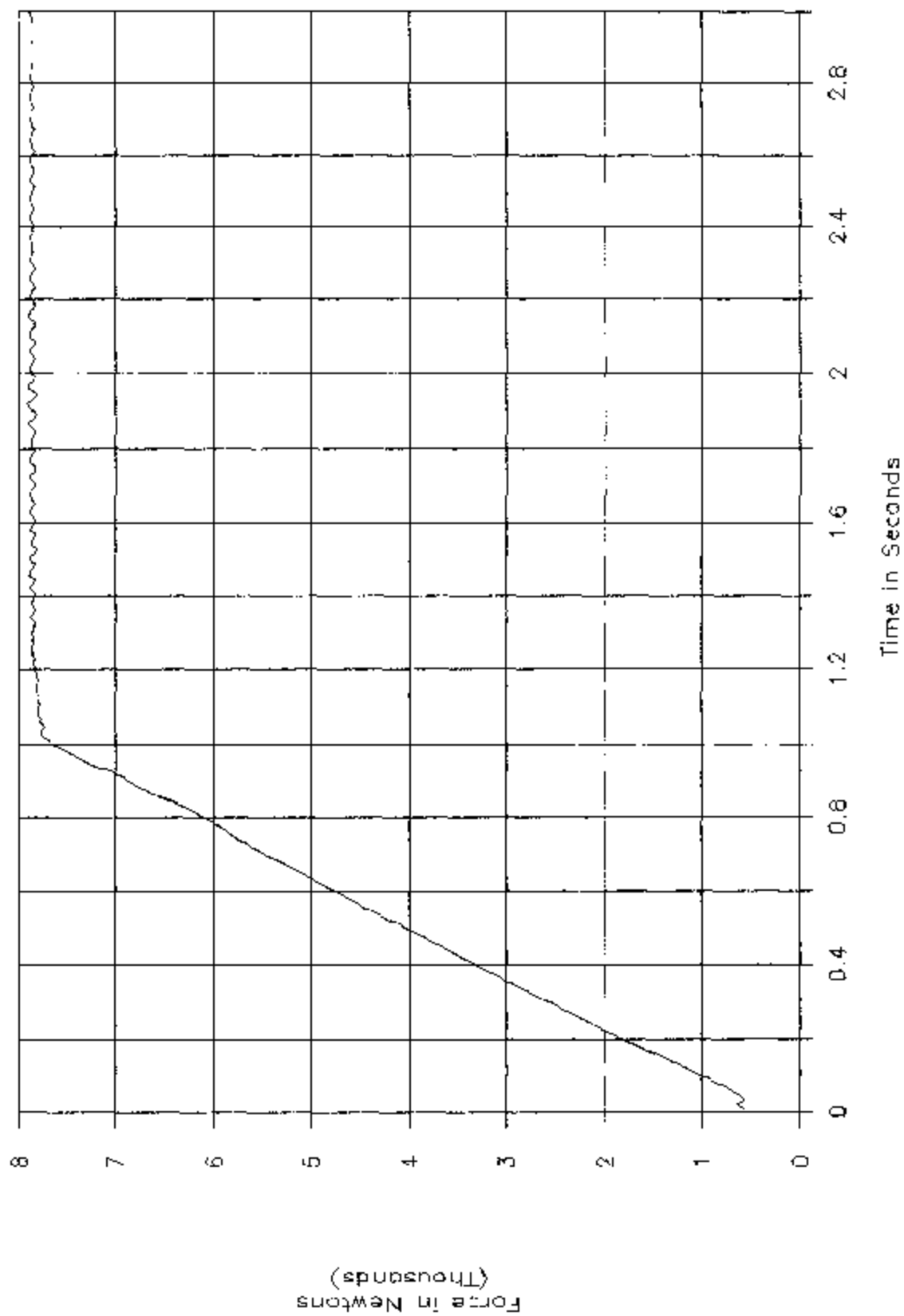


FIGURE 6.5

2ND ROW LEFT LOWER ANCHOR

GTL 5109, NHTSA C35103

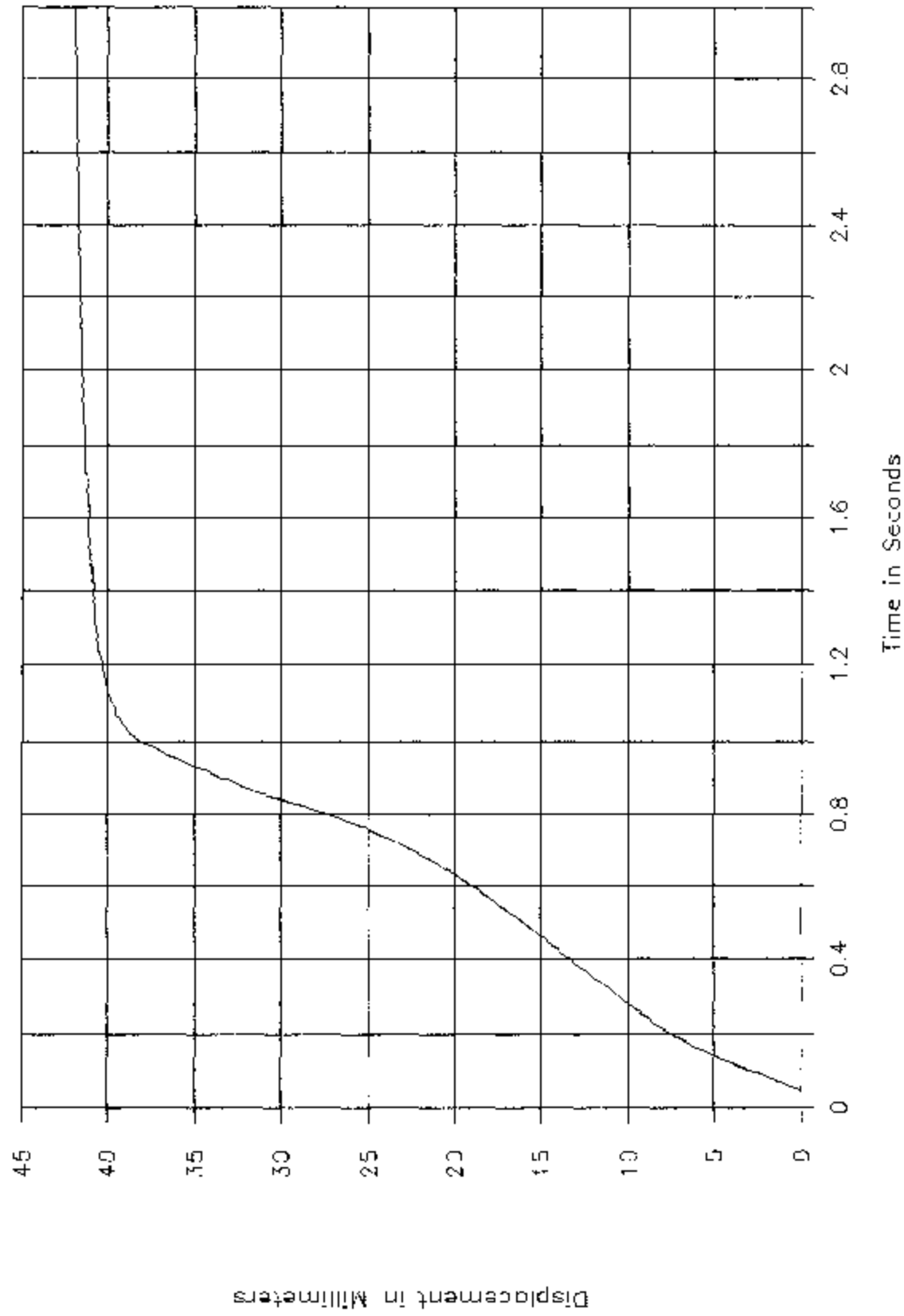
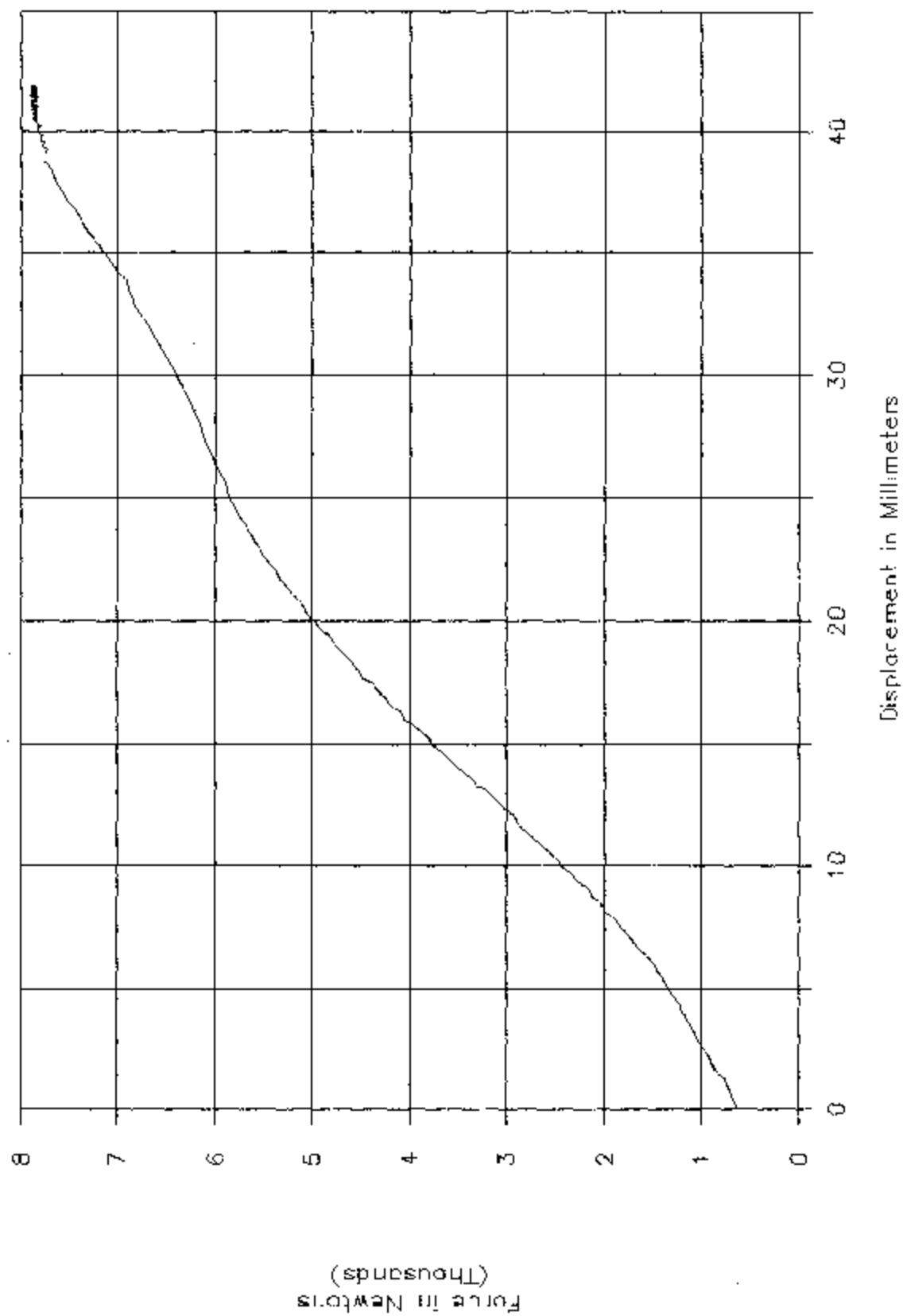


FIGURE 6.6

2ND ROW LEFT LOWER ANCHOR
GTL 5109, NHTSA C35103



APPENDIX A

OWNER'S MANUAL CHILD RESTRAINT INFORMATION

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—Child restraint system

● On vehicles with side airbags, do not allow the child to lean against the front door or around the front door even if the child is seated in the child restraint system. It is dangerous if the side airbags inflate, because the impact could cause death or serious injury to the child.

● Make sure that you have complied with all installation instructions provided by the child restraint manufacturer and that the system is properly secured.

A child restraint system for a small child or baby must itself be properly restrained on the seat with the lap portion of the lap/shoulder belt. You must carefully consult the manufacturer's instructions which accompany the child restraint system.

To provide proper restraint use a child restraint system following the manufacturer's instructions about the appropriate age and size of the child for the child restraint system.

Install the child restraint system correctly following the instructions provided by its manufacturer. General directions are also provided under the following illustrations.

The child restraint system should be installed on the rear seat. According to accident statistics, the child is safer when properly restrained in the rear seat than in the front seat.

⚠ CAUTION

- Never install a rear-facing child restraint system on the front seat. In the event of an accident, the force of the rapid inflation of the airbag can cause death or serious injury if a rear-facing child restraint system is installed on the front seat.
- Unless it is unavoidable, do not install a forward-facing child restraint system on the front seat.
- A forward-facing child restraint system should be allowed to be installed on the front passenger seat only when it is unavoidable. Always move the seat as far back as possible, because the force of the deploying front passenger airbag could cause death or serious injury to the child.
- On vehicles with side airbags, do not allow the child to lean against the front door or around the front door even if the child is seated in the child restraint system. It is dangerous if the side airbags inflate, because the impact could cause death or serious injury to the child.

• After installing the child restraint system, make sure it is secured in place following the manufacturer's instructions. If it is not restrained securely, it may cause death or serious injury to the child in the event of a sudden stop or accident.

When not using the child restraint system, keep it secured with the seat belt or place it somewhere other than the passenger compartment. This will prevent it from injuring passengers in the event of a sudden stop or accident.

—Types of child restraint system

Child restraint systems are classified into the following 3 types depending on the child's age and size.

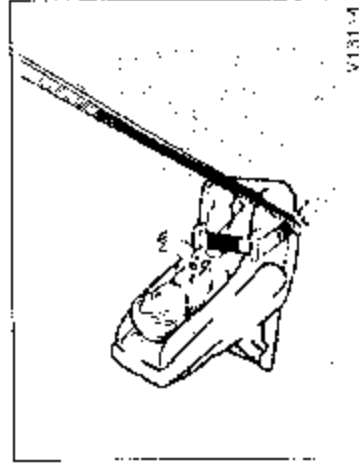
- (A) Infant seat
- (B) Convertible seat
- (C) Booster seat

Install the child restraint system following the instructions provided by its manufacturer.

Your vehicle has anchor brackets for securing the top strap of a child restraint system.

For instructions about how to use the anchor bracket, see "Using a top strap" on page 80 in this section.

The child restraint lower anchorages approved for your vehicle may also be used. See "Installation with child restraint lower anchorages" on page 82 in this section.



(A) Infant seat

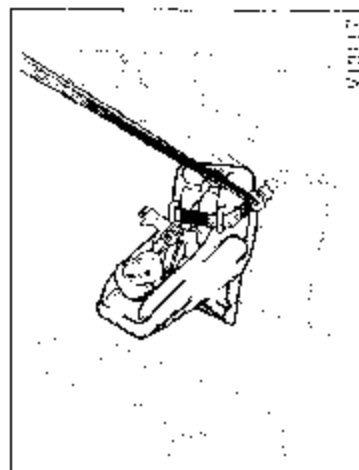


(B) Convertible seat

—Installation with seat belt

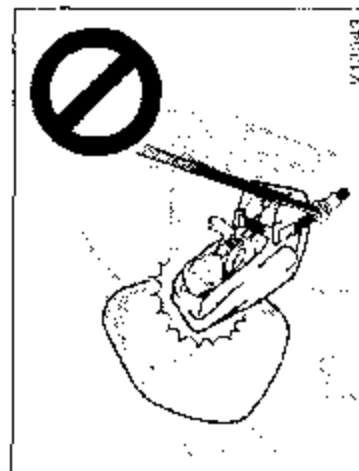


(C) Booster seat



(A) INFANT SEAT INSTALLATION

An infant seat is used in rear-facing position only.



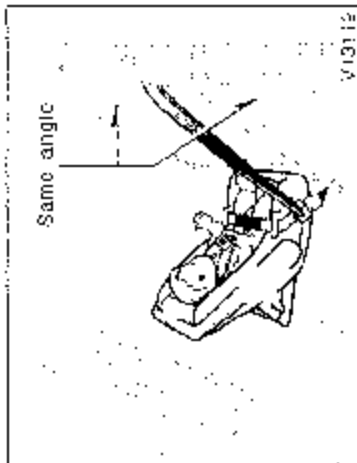
CAUTION

- Never install a rear-facing child restraint system on the front passenger seat because the force of the rapid inflation of the front passenger airbag can cause death or serious injury to the child.

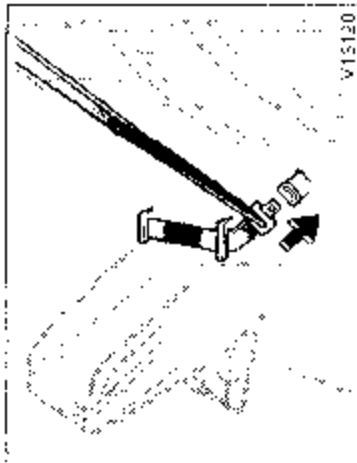


• Do not install a child restraint system on the rear seat if it interferes with the lock mechanism of the front seats. This can cause death or serious injury to the child and front passenger in case of sudden braking or a collision.

• If the driver's seat position does not allow sufficient space for safe installation, install the child restraint system on the rear right seat.



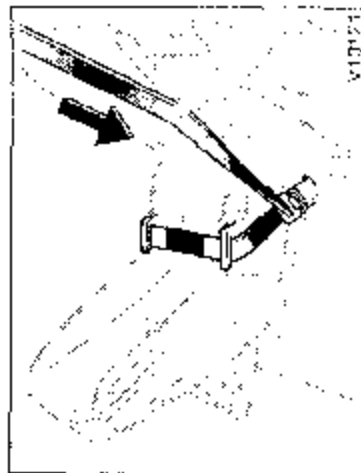
• When installing a child restraint system in the rear center position, align both seatbacks at the same angle. Otherwise, the child restraint system cannot be securely restrained and this may cause death or serious injuries in a collision.



1. Run the lap and shoulder belt through or around the infant seat following the instructions provided by its manufacturer and insert the tab into the buckle taking care not to twist the belt. Keep the lap portion of the belt tight.

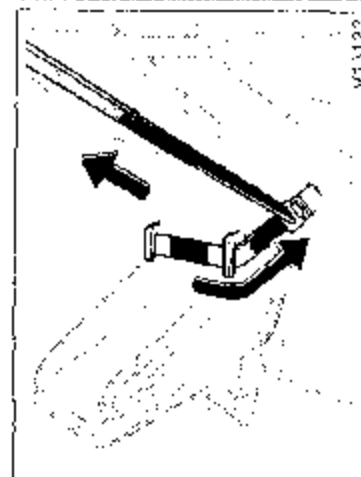
CAUTION

- After inserting the tab, make sure the tab and buckle are locked and that the lap and shoulder portions of the belt are not twisted.
- Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.
- If the seat belt does not function normally, it cannot protect your child from injury. Contact your Toyota dealer immediately. Do not use the child restraint system until the seat belt is fixed.

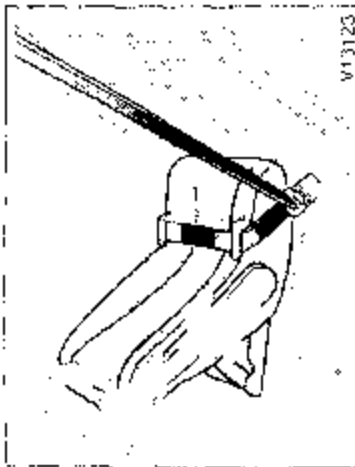


2. Fully extend the shoulder belt to put it in the lock mode. When the belt is then retracted even slightly it cannot be extended.

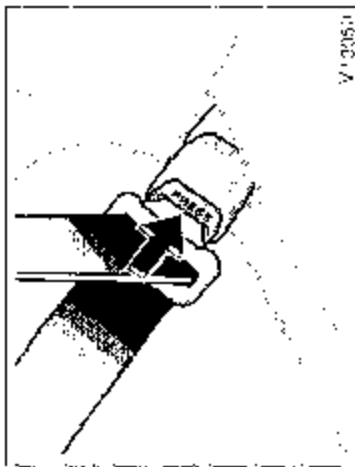
To hold the infant seat securely make sure the belt is in the lock mode before letting the belt retract.



3. While pressing the infant seat firmly against the seat cushion and seatback let the shoulder belt retract as far as it will go to hold the infant seat securely.



V13123



V13125



V13124

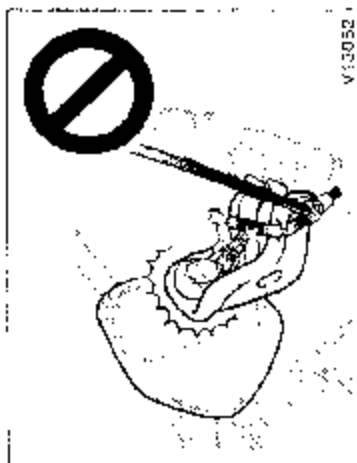
CAUTION

Push and pull the child restraint system in different directions to be sure it is secure. Follow all the installation instructions provided by its manufacturer.

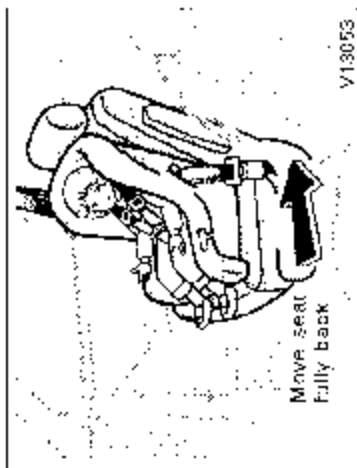
(B) CONVERTIBLE SEAT INSTALLATION

A convertible seat is used in forward facing or rear-facing position depending on the child's age and size. When installing, follow the manufacturer's instruction about the applicable child's age and size as well as directions for installing the child restraint system.

4. To remove the infant seat, press the buckle-release button and allow the belt to retract completely. The belt will move freely again and be ready to work for an adult or older child passenger.



V13052



Move seat
fully back

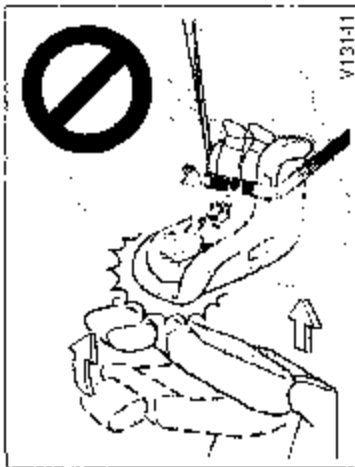
V13053

- On vehicles with side airbags, do not allow the child to lean against the front door or around the front door even if the child is seated in the child restraint system. It is dangerous if the side airbags inflate, because the impact could cause death or serious injury to the child.

CAUTION

- Never install a rear-facing child restraint system on the front passenger seat because the force of the rapid inflation of the front passenger airbag can cause death or serious injury to the child.

- A forward-facing child restraint system should be allowed to be installed on the front passenger seat only when it is unavoidable. Always move the seat as far back as possible, because the force of the deploying front passenger airbag could cause death or serious injury to the child.



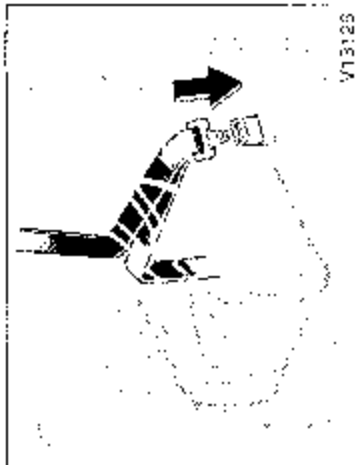
V13141

- Do not install a child restraint system on the rear seat if it interferes with the lock mechanism of the front seats. This can cause death or serious injury to the child and front passenger in case of sudden braking or a collision.
- If the driver's seat position does not allow sufficient space for safe installation, install the child restraint system on the rear right seat.



V13035

- When installing a child restraint system on the rear center position, align both seatbacks at the same angle. Otherwise, the child restraint system cannot be securely restrained and this may cause death or serious injuries in a collision.



V13126

- 1 Run the lap and shoulder belt through or around the convert bie seat following the instructions provided by its manufacturer and insert the tab into the buckle taking care not to twist the belt. Keep the lap portion of the belt tight.

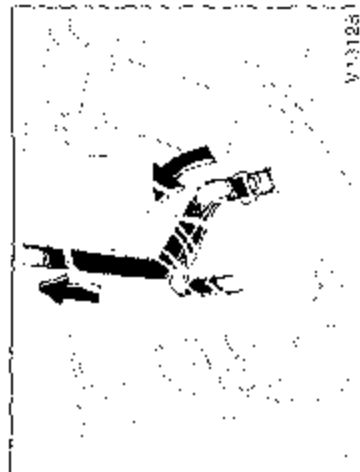
CAUTION

- After inserting the tab, make sure the tab and buckle are locked and that the lap and shoulder portions of the belt are not twisted.
- Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.
- If the seat belt does not function normally, it cannot protect your child from injury. Contact your Toyota dealer immediately. Do not use the child restraint system until the seat belt is fixed.

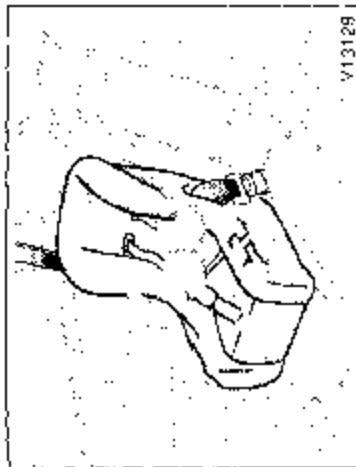


- 2 Fully extend the shoulder belt to put it in the lock mode. When the belt is then retracted slightly, it cannot be extended.

To hold the convertible seat securely, make sure the belt is in the lock mode before letting the belt retract.

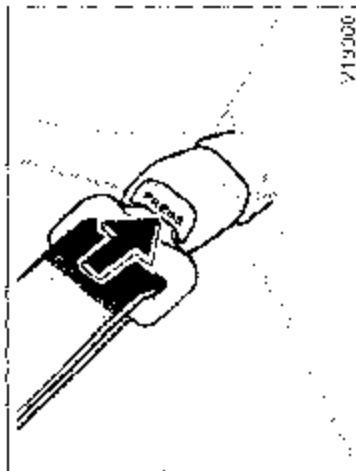


- 3 While pressing the convertible seat firmly against the seat cushion and seatback, let the shoulder belt retract as far as it will go to hold the convertible seat securely.

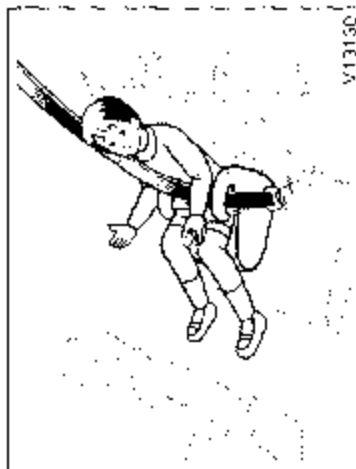


CAUTION

Push and pull the child restraint system in different directions to be sure it is secure. Follow all the installation instructions provided by its manufacturer.

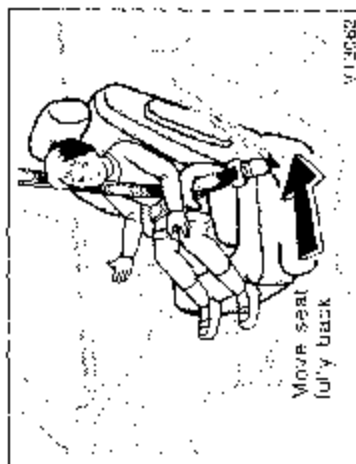


4. To remove the convertible seat, press the buckle-release button and allow the belt to retract completely. The belt will move freely again and be ready to work for an adult or older child passenger.

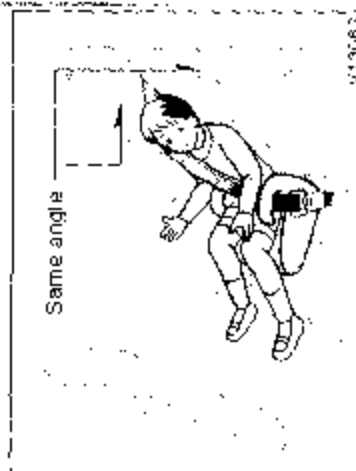


(C) BOOSTER SEAT INSTALLATION

A booster seat is used in forward-facing position only.



- On vehicles with side airbags, do not allow the child to lean against the front door or around the front door even if the child is seated in the child restraint system. It is dangerous if the side airbags inflate, because the impact could cause death or serious injury to the child.



⚠ CAUTION

- A forward-facing child restraint system should be allowed to be installed on the front passenger seat only when it is unavoidable. Always move the seat as far back as possible, because the force of the deploying front passenger airbag could cause death or serious injury to the child.

- When installing a child restraint system on the rear center position, align both seatbacks at the same angle. Otherwise, the child restraint system cannot be securely restrained and this may cause death or serious injuries in a collision.



1. Sit the child on a booster seat. Run the lap and shoulder belt through or around the booster seat and child following the instructions provided by its manufacturer and insert the tab into the buckle taking care not to twist the belt.

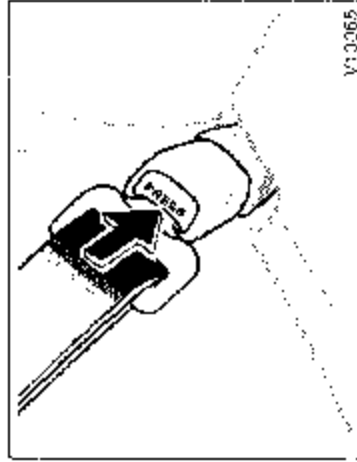
Make sure the shoulder belt is correctly across the child's shoulder and that the tab is positioned as low as possible on child's hips. See "Seat belts" on page 47 for details.

CAUTION

- Always make sure the shoulder belt is positioned across the center of child's shoulder. The belt should be kept away from child's neck, but not falling off child's shoulder. Failure to do so could reduce the amount of protection in an accident and cause serious injuries in a collision.
- Both high-positioned lap belts and loose-fitting belts could cause serious injuries due to sliding under the lap belt during a collision or other unintended. Keep the lap belt positioned as low on a child's hips as possible.
- For child's safety, do not place the shoulder belt under child's arm.
- After inserting the tab, make sure the tab and buckle are locked and that the lap and shoulder portions of the belt are not twisted.
- Do not insert coins, clips, etc. in the buckle as this may prevent your child from properly latching the tab and buckle.

• If the seat belt does not function normally, it cannot protect your child from injury. Contact your Toyota dealer immediately. Do not use the child restraint system until the seat belt is fixed.

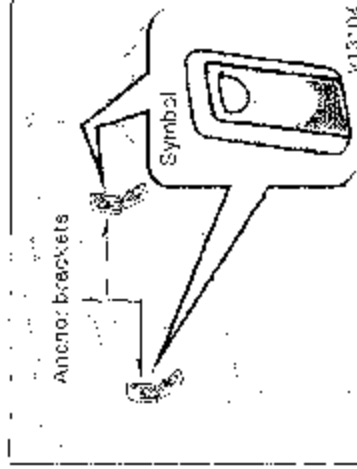
—Using a top strap



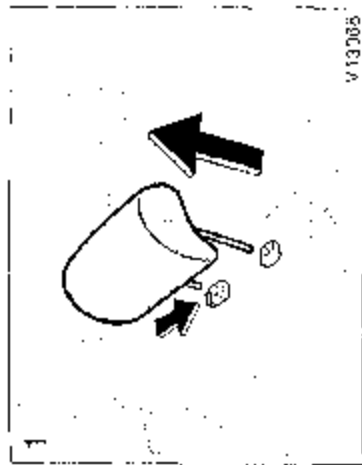
2. To remove the child restraint system, press the buckle-release button and allow the belt to retract.



- Follow the procedure below for a child restraint system that requires the use of a top strap.



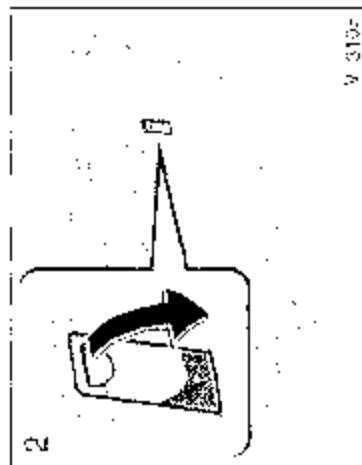
- Use the anchor brackets behind the rear seatbacks to attach the top strap. Anchor brackets are installed for both out side rear seating positions. This symbol indicates the location of user ready anchor brackets.



V13005

TO USE THE ANCHOR BRACKET:

1. Remove the head restraint.



V 3135

2. Open the anchor bracket cover with the symbol as shown in the illustration.



V13133

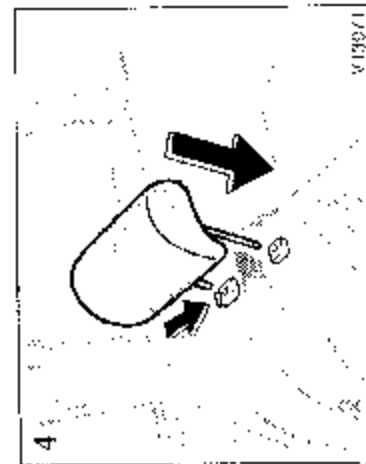
3. Fix the child restraint system with the seat belt.

Latch the hook onto the anchor bracket and tighten the top strap.

For instructions to install the child restraint system, see 'Child restraint' on page 67 in this section.

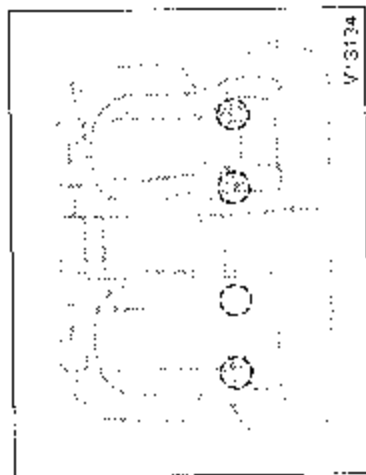
 CAUTION
Make sure the top strap is securely latched, and check that the child restraint system is secure by pushing and pulling it in different directions. Follow all the installation instructions provided by its manufacturer.

—Installation with child
restraint lower anchorages



4. Replace the head restraint.

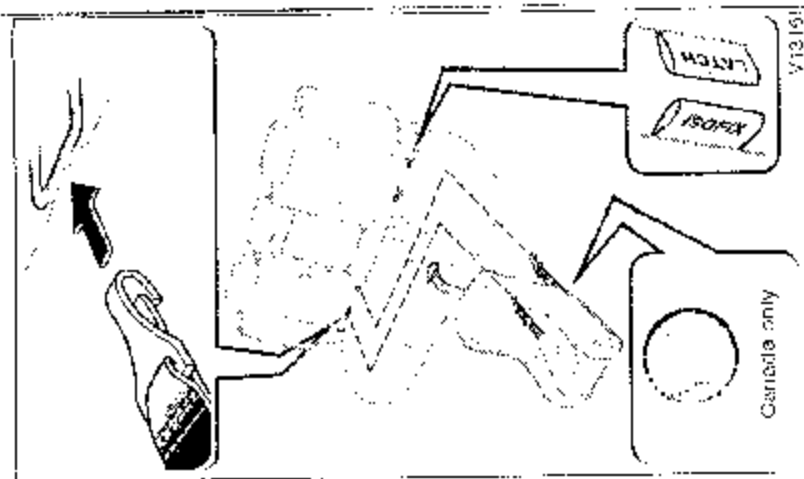
Be sure to close the cover when the anchor bracket is not in use.



Lower anchorages for the child restraint systems complying with the FMVSS225 or CMVSS210.2 specifications are installed in the rear seat.

The anchorages are installed in the clearance between the seat cushion and seat-back of both outside rear seats.

Child restraint systems complying with the FMVSS225 or CMVSS210.2 specification can be fixed to these anchorages. In this case, it is not necessary to fix the child restraint system with a seat belt or the vehicle



Type A

For owners in Canada

The symbol on a child restraint system indicates the presence of a lower connector system.

CHILD RESTRAINT SYSTEM INSTALLATION

Type A—

1. Widen the clearance between the seat cushion and seatback a little and confirm the position of the lower anchorages below the tag in the seatback.

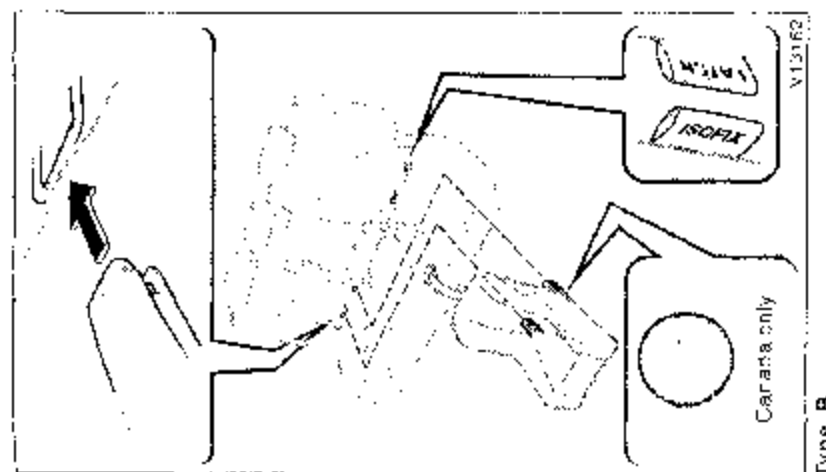
2. Latch the hooks of lower straps onto the anchorages and tighten the lower straps.

Type B—

1. Widen the clearance between the seat cushion and seatback a little and confirm the position of the lower anchorages below the tag in the seatback.

2. Latch the buckles onto the anchorages.

If your child restraint system has a top strap, it should be anchored. (For the installation of the top strap, see "Using a top strap" on page B3 in this section.)



For the installation details, refer to the instruction manual equipped with each product.

CAUTION

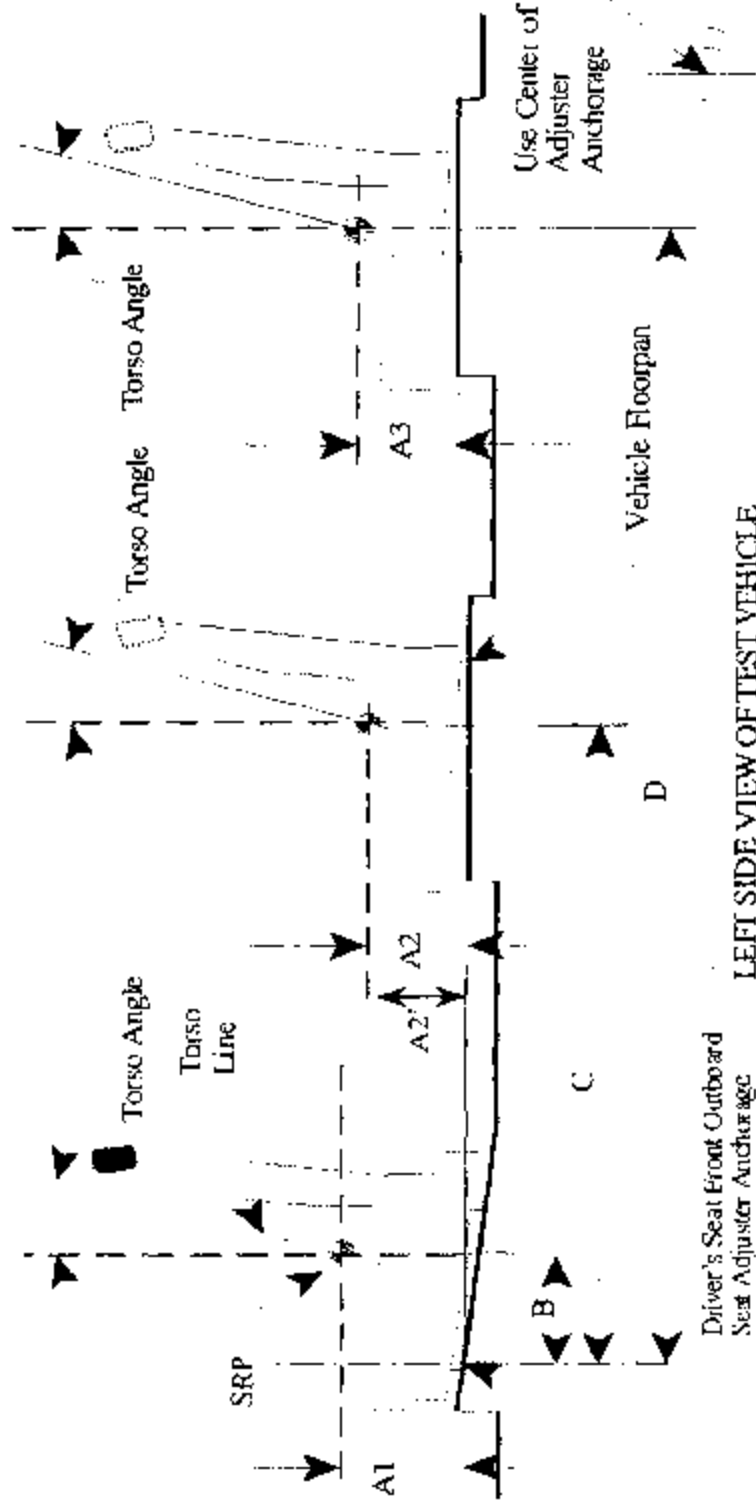
- When using the lower anchorages for the child restraint system, be sure that there are no irregular objects around the anchorages or that the seat belt is not caught.
- Push and pull the child restraint system in different directions to be sure it is secure. Follow all the installation instructions provided by its manufacturer.
- After securing the child restraint system, never recline the seat.
- Do not install a child restraint system on the rear seat if it interferes with the lock mechanism of the front seats. This can cause death or serious injury to the child and front passenger in case of sudden braking or a collision.

APPENDIX B

MANUFACTURER'S DATA

SEAT REFERENCE POINT (SRP) AND TORSO ANGLE DATA
FOR FMVSS 225
(All dimensions in mm)

Model Year: 2003 ; Make: TOYOTA ; Model: HIGHLANDER ; Body Style: 4DOOR WAGON
Seat Style: Front row: SEPARATE ; Second row: 6/4 SPLIT BENCH ; Third row: N/A



LEFT SIDE VIEW OF TEST VEHICLE

035103
(67L)

Table 1. Seating Positions¹ and Torso Angles

	Left (Driver Side)	Center (if any)	Right
A1	(Driver) 281.9	N/A	(Front Passenger) 281.9
A2 ^(*)	291.9	328.9	291.9
A3	N/A	N/A	N/A
B	362.5	N/A	362.5
C	1215.5	1193.5	1215.5
D	N/A	N/A	N/A
Torso Angle (degree)	Front Row	21	21
	Second Row	25	25
	Third Row	N/A	N/A

Note: 1. All dimensions are in mm. If otherwise, the unit is provided.

(*) A2^{*} are the dimensions from the driver's seat front outboard seat adjuster anchorage.

SEATING REFERENCE POINT
FOR FMVSS 225
(All dimensions in mm)

Model Year: 2003 ; Make: TOYOTA ; Model: HIGHLANDER ; Body Style: 4DOOR WAGON
Seat Style: Front row: SEPARATE ; Second row: 6:4 SPLIT BENCH ; Third row: N/A

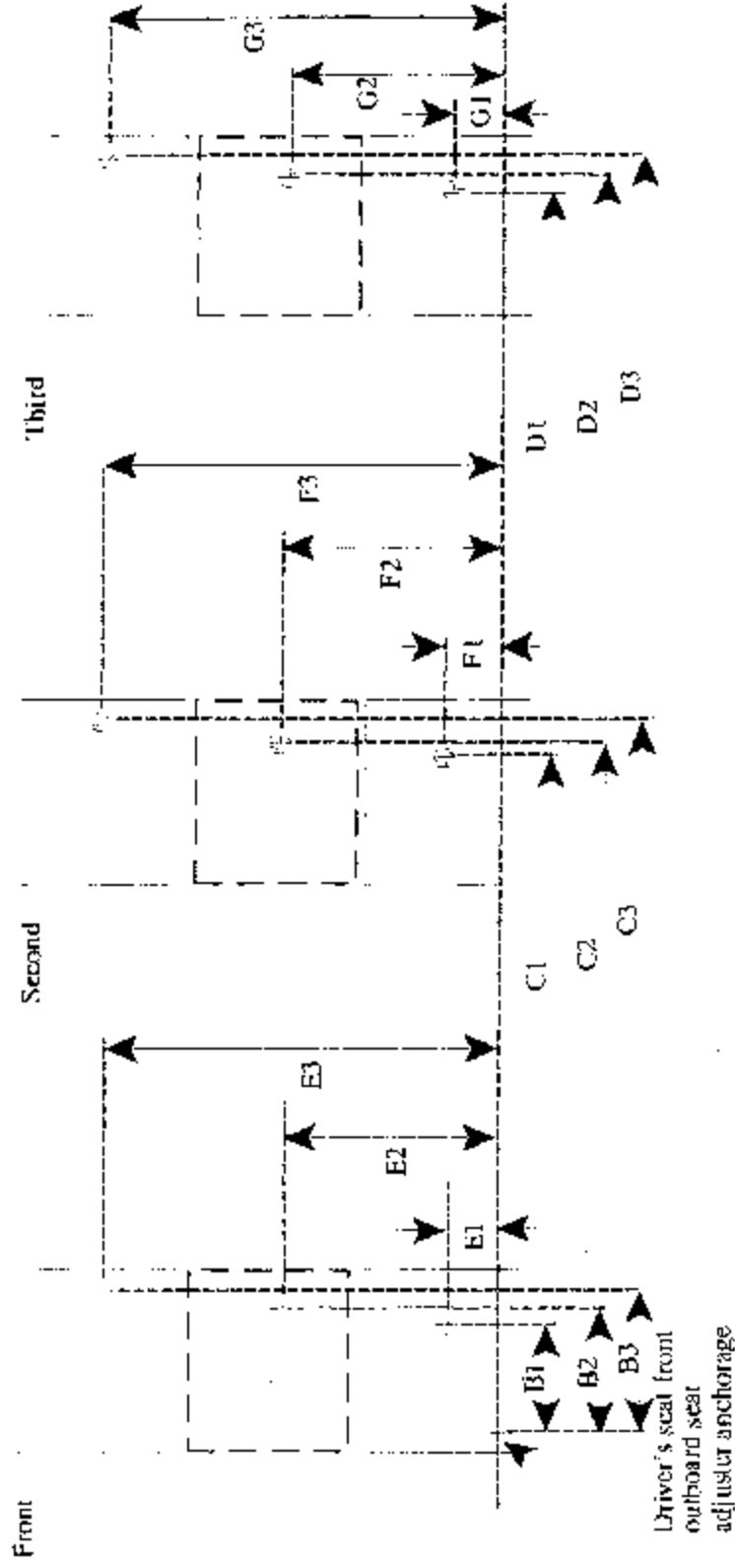


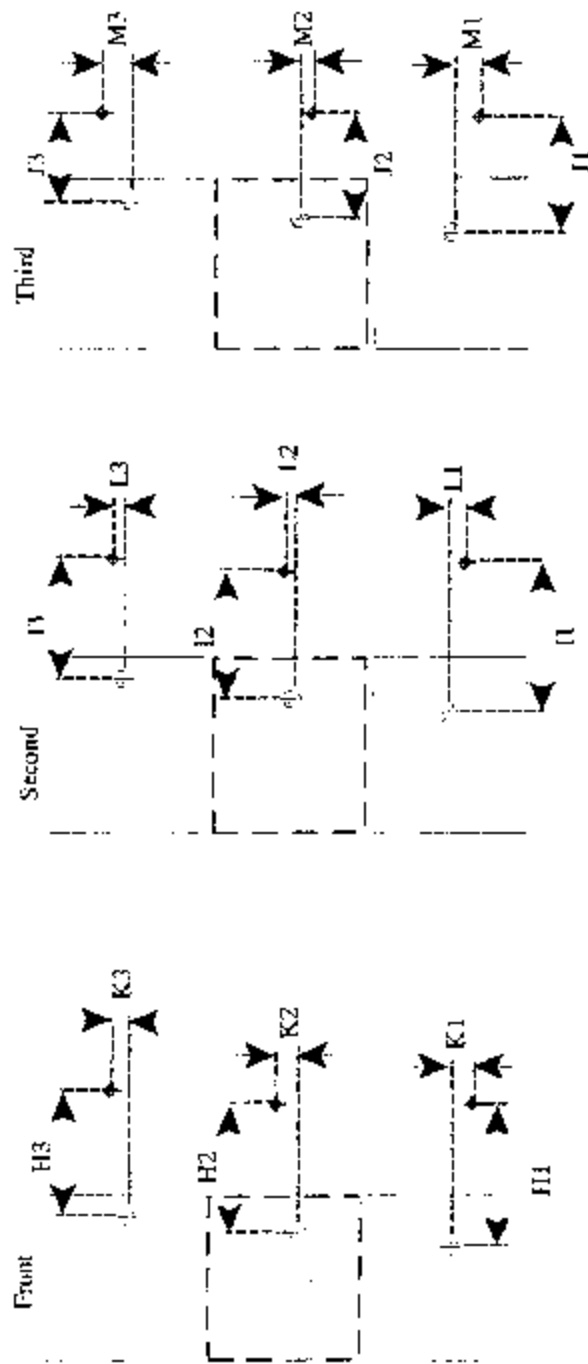
Table 2. Seating Reference Point and Tether Anchorage Locations

Seating Reference Point (SRP)		Distance from Driver's front outboard seat adjuster anchorage ¹
Front Row	B1	362.5
	E1	221.5
	B2	N/A
	E2	N/A
	B3	362.5
	E3	981.5
Second Row	C1	1215.5
	F1	251.5
	C2	1193.5
	F2	601.5
	C3	1215.5
	F3	951.5
Third Row	D1	N/A
	G1	N/A
	D2	N/A
	G2	N/A
	D3	N/A
	G3	N/A

Note: 1. Use the center of anchorage.

TETHER ANCHORAGE LOCATIONS
FOR FMVSS 225
(All dimensions in mm)

Model Year: 2003 ; Make: TOYOTA ; Model: HIGHLANDER ; Body Style: 4DOOR WAGON
Seat Style: Front row: SEPARATE ; Second row: 6/4 SPLIT BENCH ; Third row: N/A



SRP

Tether anchorage

Note: 1. The location shall be measured at the center of the bar.

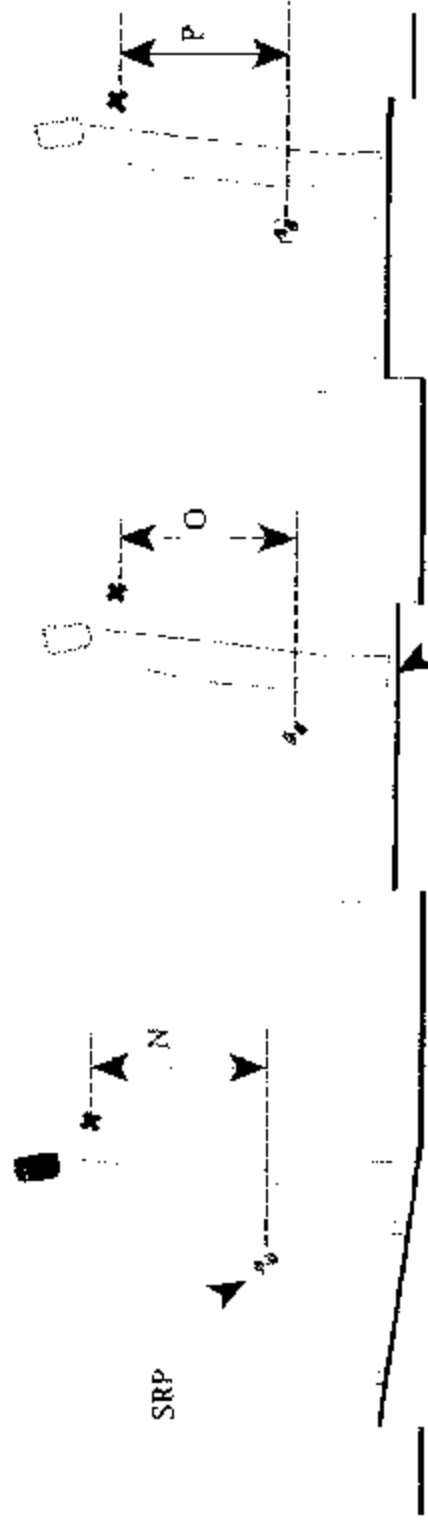
Table 3 Seating Reference Point and Tether Anchorage Locations

Seating Reference Point (SRP)	Distance from SRP	
Front Row	H1	N/A
	K1	N/A
	H2	N/A
	K2	N/A
	H3	N/A
	K3	N/A
Second Row	I1	354.1
	L1	0
	I2	N/A
	L2	N/A
	I3	354.1
	L3	0
Third Row	J1	N/A
	M1	N/A
	J2	N/A
	M2	N/A
	J3	N/A
	M3	N/A

Note: 1. Use the center of anchorage.

TETHER ANCHORAGE LOCATIONS - VERTICAL
FOR FMVSS 225
(All dimensions in mm)

Model Year: 2003 ; Make: TOYOTA ; Model: HIGHLANDER ; Body Style: 4DOOR WAGON
Seat Style: SEPARATE ; Second row: 6:4 SPLIT BENCH ; Third row: N/A



Vehicle Floorpan

LEFT SIDE VIEW OF TEST VEHICLE

Table 4. Vertical Dimension For The Tether Anchorage

Seating Row	Vertical Distance from Seating Reference Point
Front Row	N1 (Driver) N/A
	N2 (Center) N/A
	N3 (Right) N/A
Second Row	O1 (Left) 287.7
	O2 (Center) N/A
	O3 (Right) 287.7
Third Row	P1 (Left) N/A
	P2 (Center) N/A
	P3 (Right) N/A

Note: 1. All dimensions are in mm. If otherwise, units are provided.

Test Procedures Used for Compliance Tests

Tether Anchorages

Seating Location	FMVSS Section(s) - Req.
Front	Driver
	Center (if any)
	Right (if any)
Second	Left
	Center
	Right (if any)
Third	Left
	Center
	Right
Fourth	Left
	Center
	Right

Lower Anchorages

Seating Location	FMVSS Section(s) - Req.
Front	Driver
	Center (if any)
	Right (if any)
Second	Left
	Center
	Right
Third	Left
	Center
	Right
Fourth	Left
	Center
	Right

For each anchorage system, provide the following information:

1. **Lower Anchorage Dimensions:** Whether the anchorages are certified with S15.1.2.1 of FMVSS No. 225.

Response: Yes, the anchorages are certified with S15.1.2.1.

2. **Lower Anchorage Location:** Whether the anchorages are certified with S15.1.2.2 of FMVSS No. 225. If the anchorages are certified with S15.1.2.2, provide the pitch, roll and yaw angles.

Response: Yes, the anchorages are certified with S15.1.2.2.

The pitch, roll and yaw design angles (degree)

Pitch angles	18.5
Roll angles	0
Yaw angles	0

3. **Lower Anchorage Marking and Conspicuity:** Whether the anchorages are certified with S15.4 of FMVSS No. 225. If guidance fixtures are used, provide the location of the seating systems that are equipped with the guidance fixture.

Response: Yes, the anchorages are certified with S15.4.
Guidance fixture are not used.

4. **Location of Tether Anchorage:** Applicable section of FMVSS No. 225 for the option used for its certification.

Response: S6.2.1

5. **Number of Tether Anchorage:** Applicable section of FMVSS No. 225 for the option used for its certification

Response: S4.5.(c)