

REPORT NUMBER 225-GTL-03-005

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

**KIA MOTORS CORP.
2003 KIA SORENTO, MPV
NHTSA NO. C30505**

**GENERAL TESTING LABORATORIES, INC.
1623 LEEDSTOWN ROAD
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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Appendix B – Manufacturer's Data

SECTION 1

PURPOSE OF COMPLIANCE TEST

1.0 PURPOSE OF COMPLIANCE TEST

A 2003 Kia Sorento 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 Kia Sorento MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: KNDJD733835081536

B. NHTSA No.: C30505

C. Manufacturer: KIA MOTORS CORP.

D. Manufacture Date: 11/25/02

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 225 testing on August 7, 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 Kia Sorento 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)
5113	SFAD II Tether Strap	2 nd Row Right	9937	52.3
5114	SFAD I Tether Strap	2 nd Row Center	9937	41.3
5115	Lower Anchorage	2 nd Row Left	10,933	43.5

Table 2. General Test and Vehicle Parameter Data

VEH. MOD YR/MAKE/MODEL BODY	2003 Kia Sorento
VEH. NHTSA NO.	C30505
VIN	KNDJD733635081536
VEH. BUILD DATE	11/25/02
TEST DATE	08/07/03
TEST LABORATORY	GTL
OBSERVERS	Grant Farrand, Jimmy Latane

GENERAL INFORMATION:

Date Received: 05/08/03 Odometer Reading: 24

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Kia Motors Corp.

Date of Manufacture: 11/25/02 VIN: KNDJD733635081536

GVWR: 2480 kg GAWR FRONT: 1280 kg
GAWR REAR: 1500 kg

SECTION 3

COMPLIANCE TEST DATA

3.0 TEST RESULTS

The following data sheets document the results of testing on the 2003 Kia Sorento MPV.

DATA SHEET 1
CHILD RESTRAINT TETHER ANCHORAGE CONFIGURATION

VEH. MOD YR/MAKE/MODEL/BODY: 2003 KIA SORENTO MPV

VEH. NHTSA NO: C30505; VIN: KNDJD733635081536

VEH. BUILD DATE: 11/25/02; TEST DATE: AUGUST 7, 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:

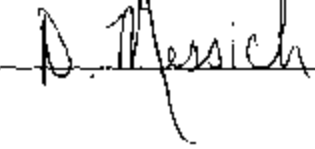
Front Seat= 2
Rear Seat= 3
Third Seat= N/A
Total= 5

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	YES	YES	YES	YES
	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: 

DATE: 08/07/03

APPROVED BY: 

DATA SHEET 2
CHILD RESTRAINT LOWER ANCHORAGES CONFIGURATION

VEH. MOD YR/MAKE/MODEL/BODY: 2003 KIA SORENTO MPV

VEH. NHTSA NO: C30505; VIN: KNDJD733635081536

VEH. BUILD DATE: 11/25/02; TEST DATE: AUGUST 7, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE

OBSERVED LOWER ANCHORAGE CONFIGURATION	SEAT POSITION			
		FRONT	REAR LEFT RIGHT	THIRD
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	N/A	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	YES	N/A
	Center	N/A	N/A	N/A
	Right	N/A	YES	N/A
Diameter of the bar (mm)	Left	N/A	5.94	N/A
	Center	N/A	N/A	N/A
	Right	N/A	5.94	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

DATA SHEET 2 CONTINUED
CHILD RESTRAINT LOWER ANCHORAGES CONFIGURATION

VEH. MOD YR/MAKE/MODEL/BODY: 2003 KIA SORENTO MPV

VEH. NHTSA NO: C30505; VIN: KNDJD733635081536

VEH. BUILD DATE: 11/25/02; TEST DATE: AUGUST 7, 2003

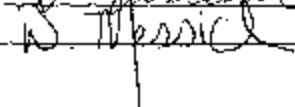
TEST LABORATORY: GENERAL TESTING LABORATORIES

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 32 MM	N/A
	Center	N/A	N/A	N/A
	Right	N/A	YES 32 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: 08/07/03

DATA SHEET 2 CONTINUED
CHILD RESTRAINT LOWER ANCHORAGES CONFIGURATION

VEH. MOD YR/MAKE/MODEL/BODY: 2003 KIA SORENTO MPV

VEH. NHTSA NO: C30505; VIN: KNDJD733635081536

VEH. BUILD DATE: 11/25/02; TEST DATE: AUGUST 7, 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*	BAR IS VISIBLE	N/A
	Center	N/A	N/A	N/A
	Right	N/A	BAR IS VISIBLE	N/A
Optional Marking: If guidance fixtures are used, the fixture(s) must be installed.	Left	N/A*	BAR IS VISIBLE	N/A
	Center	N/A	N/A	N/A
	Right	N/A	BAR IS VISIBLE	N/A

* DRIVER'S SEAT

RECORDED BY: *[Signature]*

DATE: 08/07/03

APPROVED BY: *[Signature]*

DATA SHEET 3
LOCATION AND DIMENSIONAL MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2003 KIA SORENTO MPV

VEH. NHTSA NO: C30505; VIN: KNDJD733635081536

VEH. BUILD DATE: 11/25/02; TEST DATE: AUGUST 7, 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=	<u>2</u>
Rear Seat=	<u>3</u>
Third Seat=	<u>N/A</u>
Total=	<u>5</u>

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	YES	NO	YES
	Right	YES	YES	YES

RECORDED BY: [Signature]

DATE: 08/07/03

APPROVED BY: [Signature]

DATA SHEET 3 CONTINUED
LOCATION AND DIMENSIONAL MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2003 KIA SORENTO MPV
 VEH. NHTSA NO: C30505; VIN: KNDJD733635081536
 VEH. BUILD DATE: 11/25/02; TEST DATE: AUGUST 7, 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	65	63	82	85	14°	0°	0°
	Center							
	Right	63	62	80	84	14°	0°	0°

RECORDED BY: [Signature]

DATE: 08/07/03

APPROVED BY: [Signature]

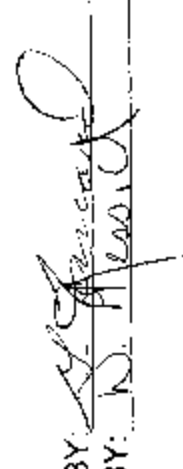
DATA SHEET 4
ANCHORAGE STATIC LOADING

VEH. MOD YR/MAKE/MODEL/BODY: 2003 KIA SORENTO MPV
 VEH. NHTSA NO: C30505; VIN: KNDJD733635081536
 VEH. BUILD DATE: 11/25/02; TEST DATE: AUGUST 7, 2003
 TEST LABORATORY: GENERAL TESTING LABORATORIES
 OBSERVERS: GRANT FARRAND, JIMMY LATANE
 TEST # 5113 & 5114

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	FIXED	28°	UP	0°	0.0	385 N/SEC	9937 N	41.3	41.3
	Right (if any)	FIXED	25°	UP	0°	0.0	385 N/SEC	9937 N	52.3	52.3
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: 
 APPROVED BY: 

DATE: 08/07/03

DATA SHEET 5
ANCHORAGE STATIC LOADING

VEH. MOD YR/MAKE/MODEL/BODY: 2003 KIA SORENTO MPV
 VEH. NHTSA NO: C30505; VIN: KNDJD733635081536
 VEH. BUILD DATE: 11/25/02; TEST DATE: AUGUST 8, 2003
 TEST LABORATORY: GENERAL TESTING LABORATORIES
 OBSERVERS: GRANT FARRAND, JIMMY LATANE

TEST # 5115

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°	423 N/SEC	10,933 N	43.5 mm	43.5 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 S9.4.1

DATE: 08/08/03

RECORDED BY: 

APPROVED BY: 

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

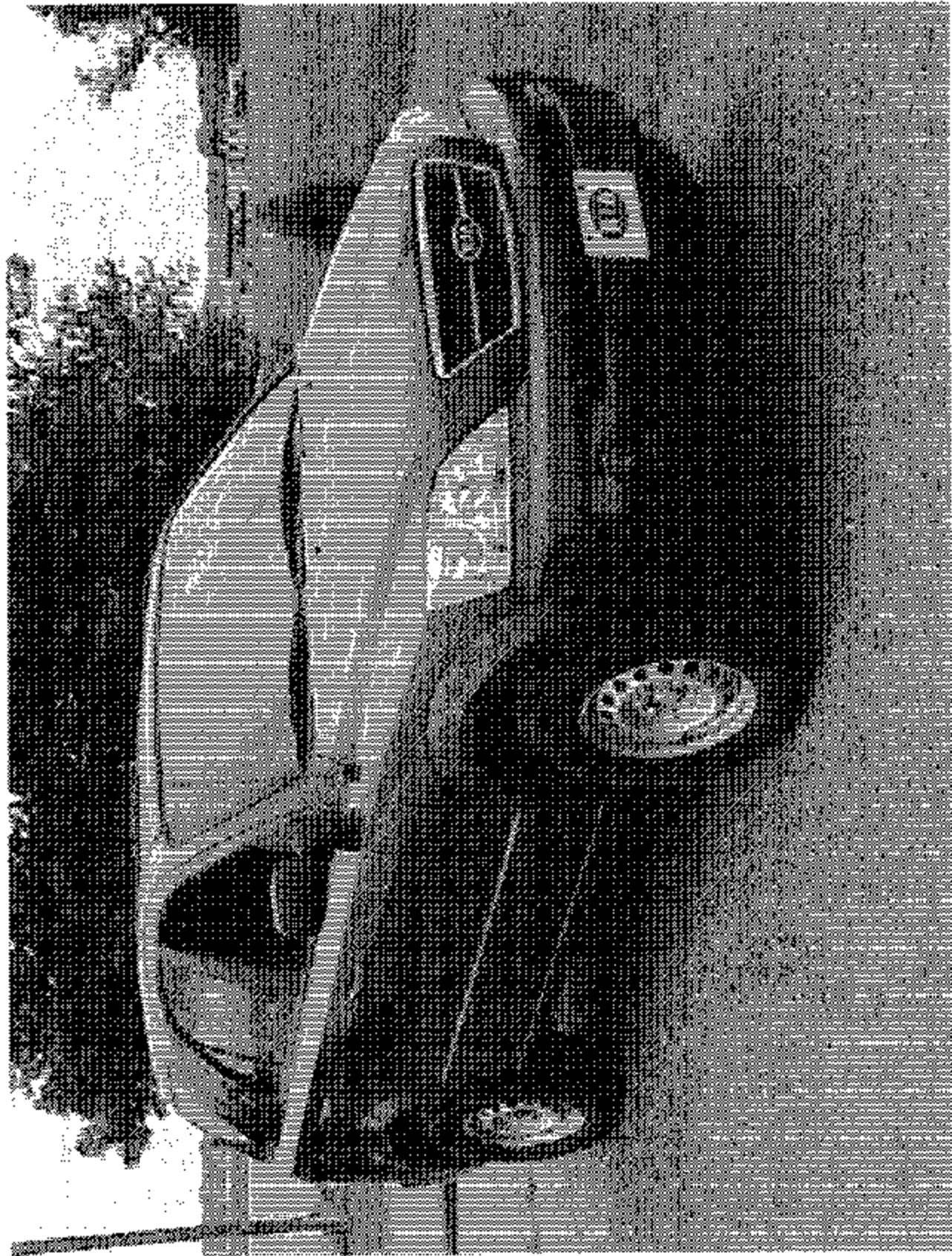


FIGURE 5.1
¾ FRONTAL RIGHT SIDE VIEW OF VEHICLE

2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

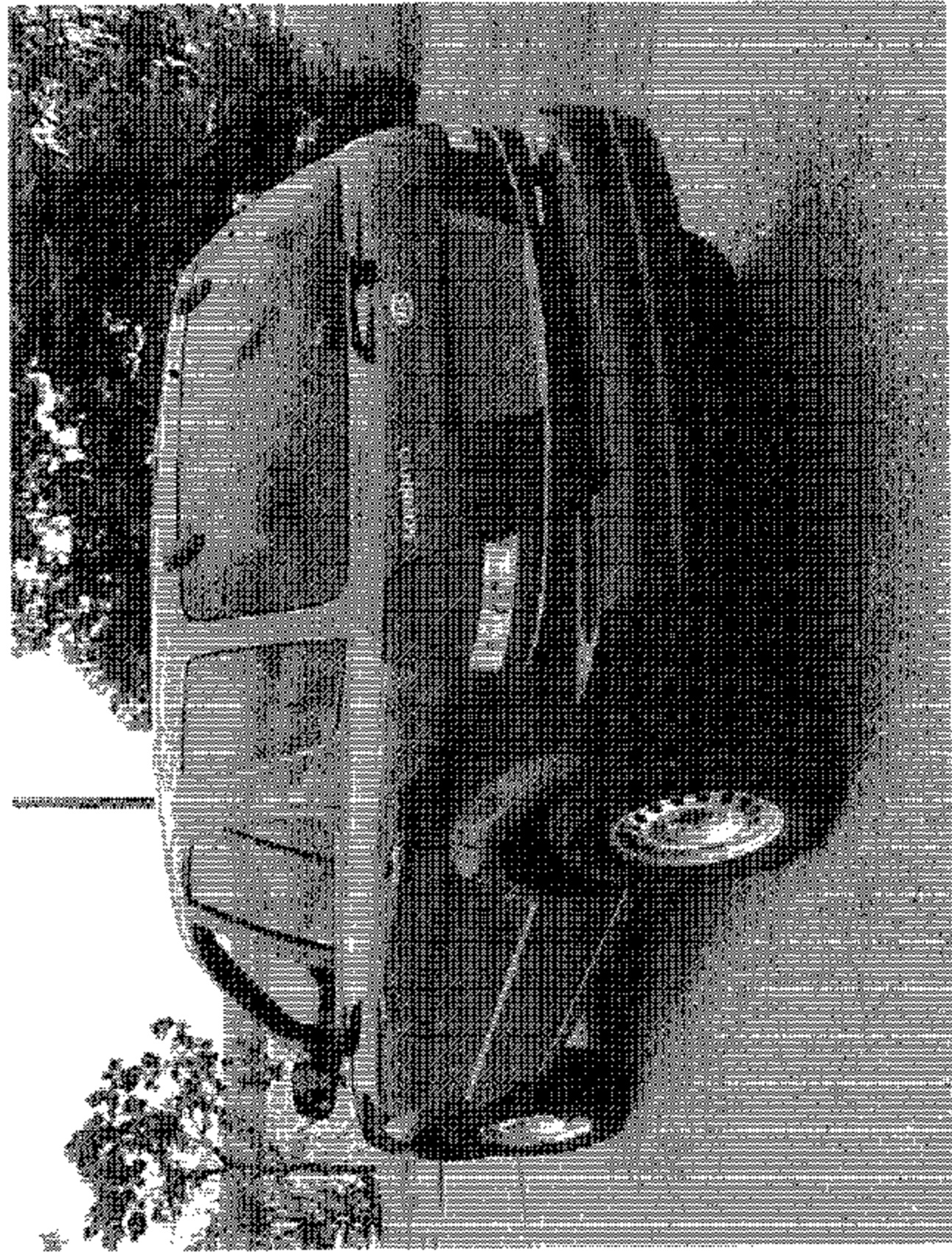


FIGURE 5.2
¾ REARWARD LEFT SIDE VIEW OF VEHICLE

2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

MADE BY KIA MOTORS CORP.

112502 5457 2822 3307 1500 1500

112502 5457 2822 3307 1500 1500

112502 5457 2822 3307 1500 1500

112502 5457 2822 3307 1500 1500

112502 5457 2822 3307 1500 1500

112502 5457 2822 3307 1500 1500

112502 5457 2822 3307 1500 1500

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112502 5457 2822 3307 1500 1500

112502 5457 2822 3307 1500 1500

2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

FIGURE 5.3
CLOSE-UP VIEW OF VEHICLE CERTIFICATION
LABEL

SORENTO

2WD	GVWR 2480KG(5467LB)	MANUFACTURED BY
4WD	GVWR 2580KG(5654LB)	(KIA) KIA MOTORS

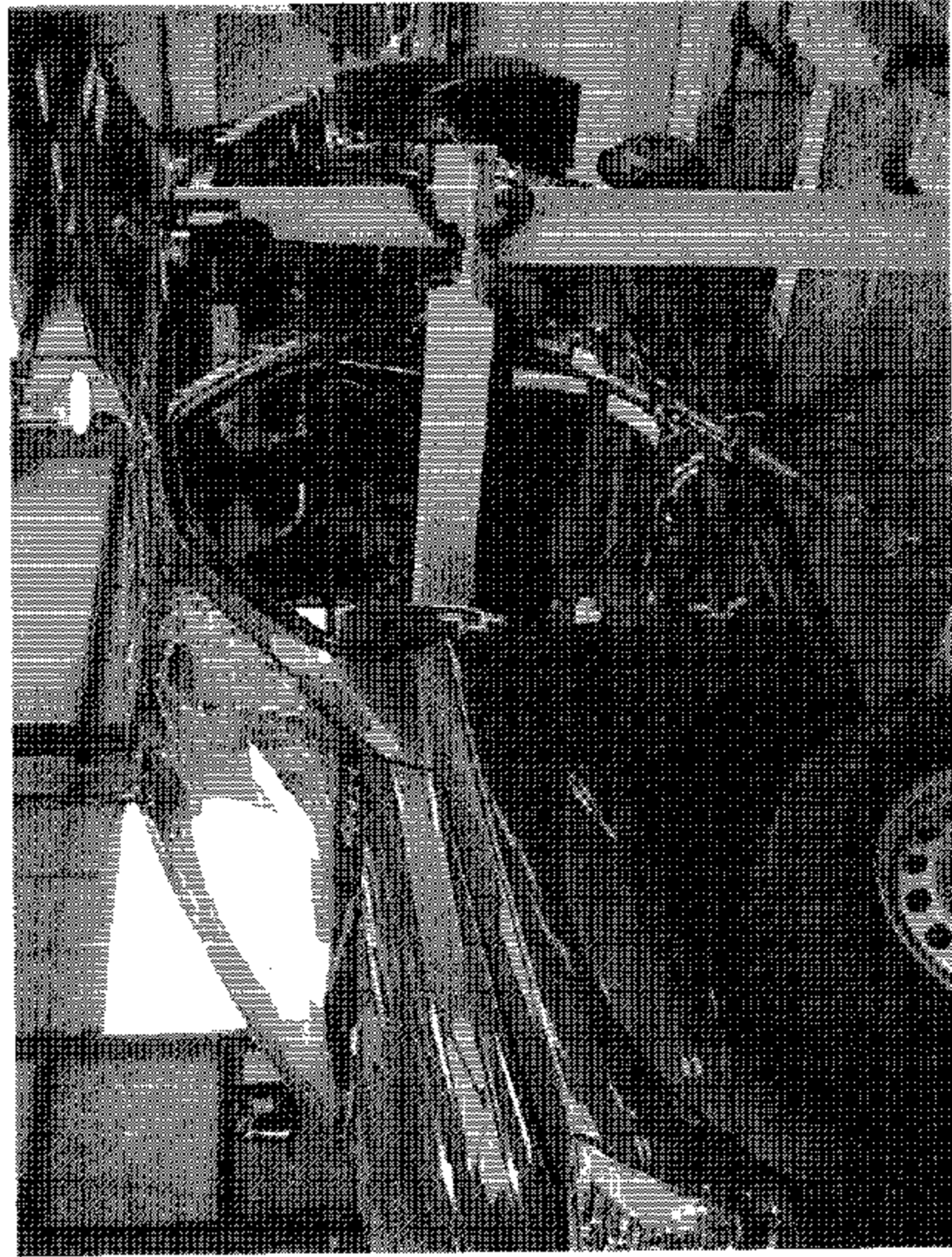
GAWR(FRONT) : 1280KG(2822LB) USING P245/70R16 TIRES
ON 16X7J J RIMS, INFLATE TO : 210KPA (30PSI) COLD

GAWR(REAR) : 1500KG(3307LB) USING P245/70R16 TIRES
ON 16X7J J RIMS, INFLATE TO : 210KPA (30PSI) COLD

SPARE(FULL SIZE) : P245/70R16 TIRES ON 16X7J RIM
INFLATE TO : 210KPA (30PSI) COLD

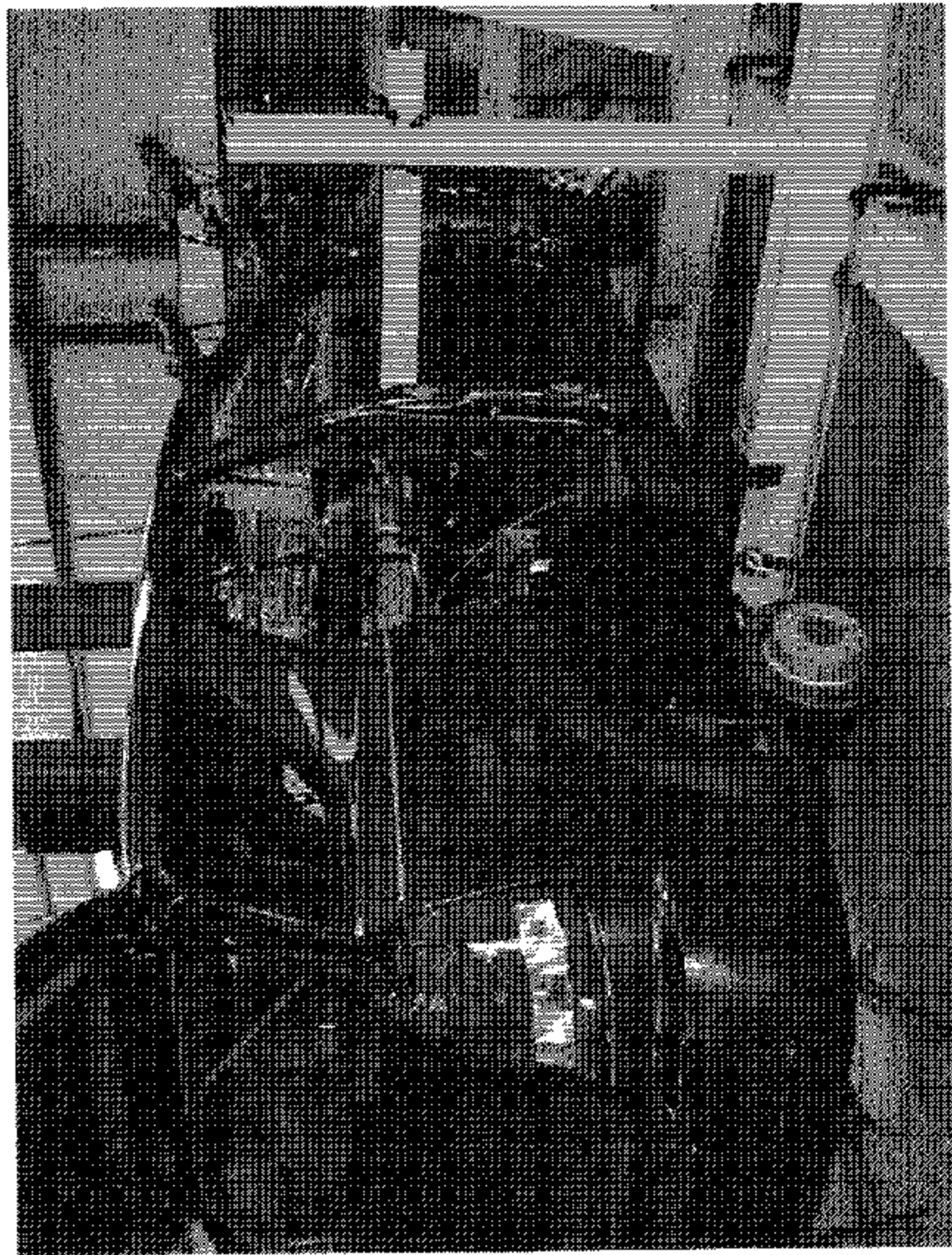
2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

FIGURE 6.4
CLOSE-UP VIEW OF VEHICLE TIRE
INFORMATION LABEL



2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 226

FIGURE 5.6
¾ FRONTAL LEFT SIDE VIEW OF TEST
VEHICLE WITH TEST APPARATUS IN PLACE



2003 KIA SORENTO
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FIGURE 5.6
% REARWARD RIGHT SIDE VIEW OF TEST
VEHICLE WITH TEST APPARATUS IN PLACE



FIGURE 5.7
RIGHT FRONT VEHICLE TIE DOWN

2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

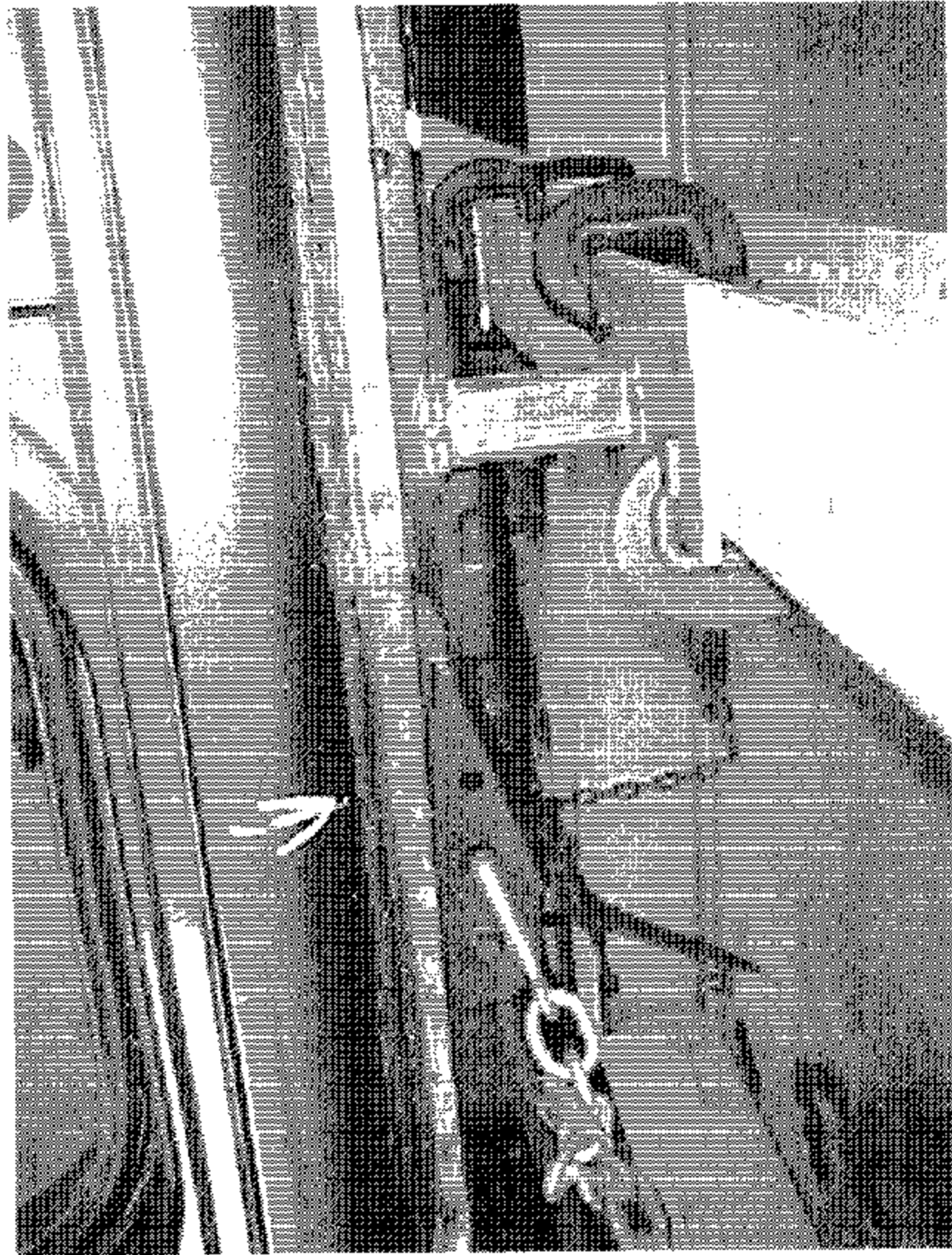


FIGURE 5.8
RIGHT REAR VEHICLE TIE DOWN

2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

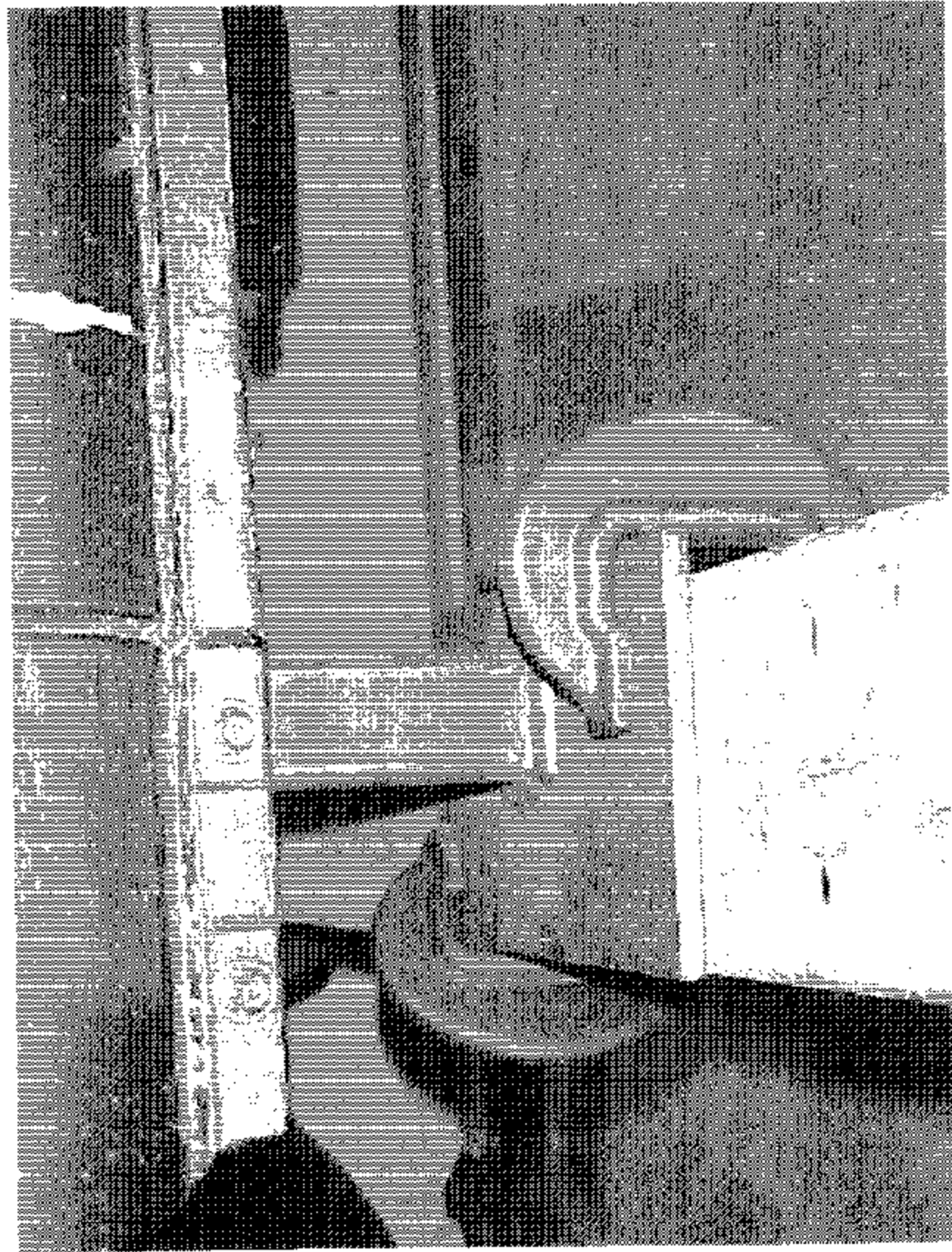


FIGURE 5.9
LEFT FRONT VEHICLE TIE DOWN

2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

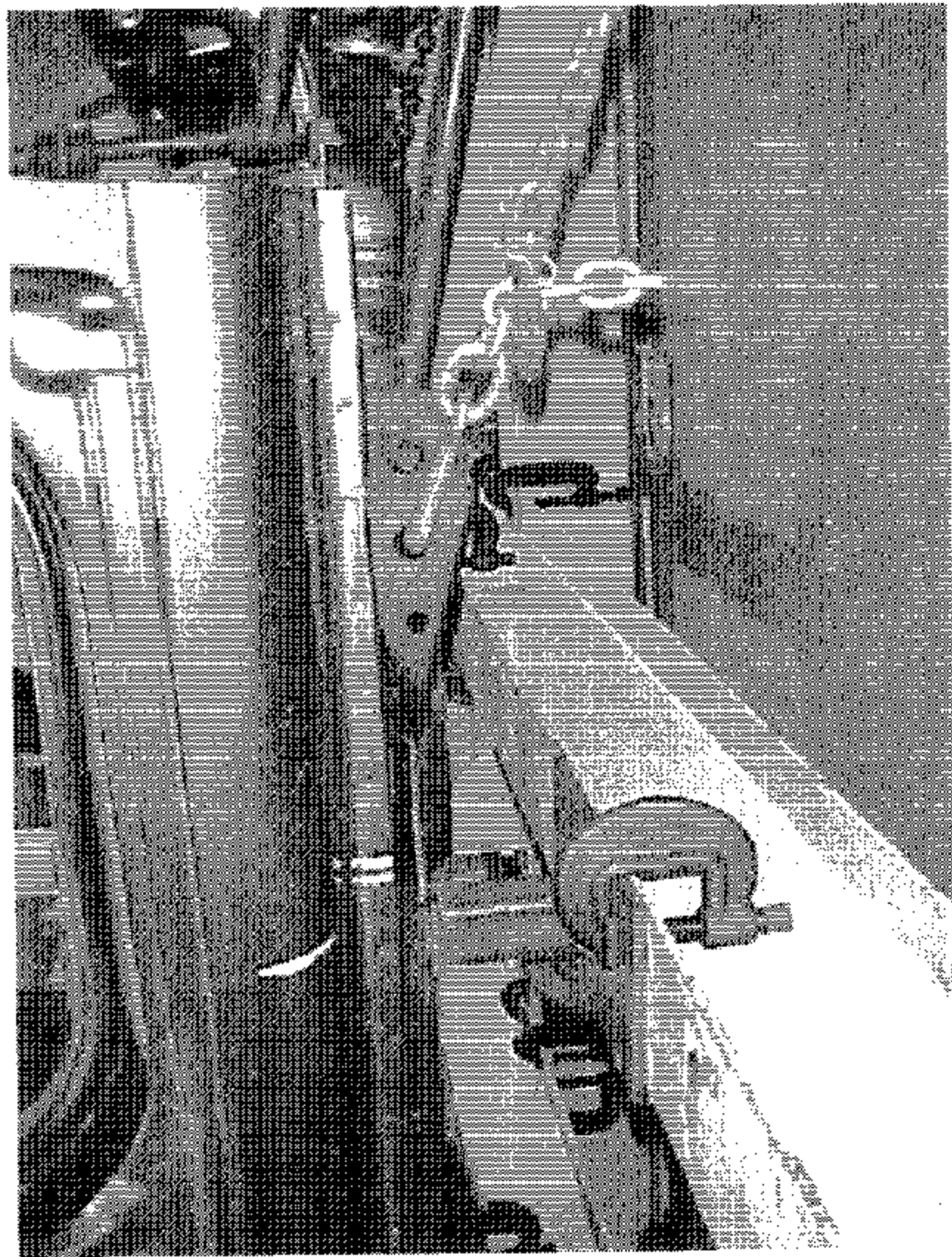
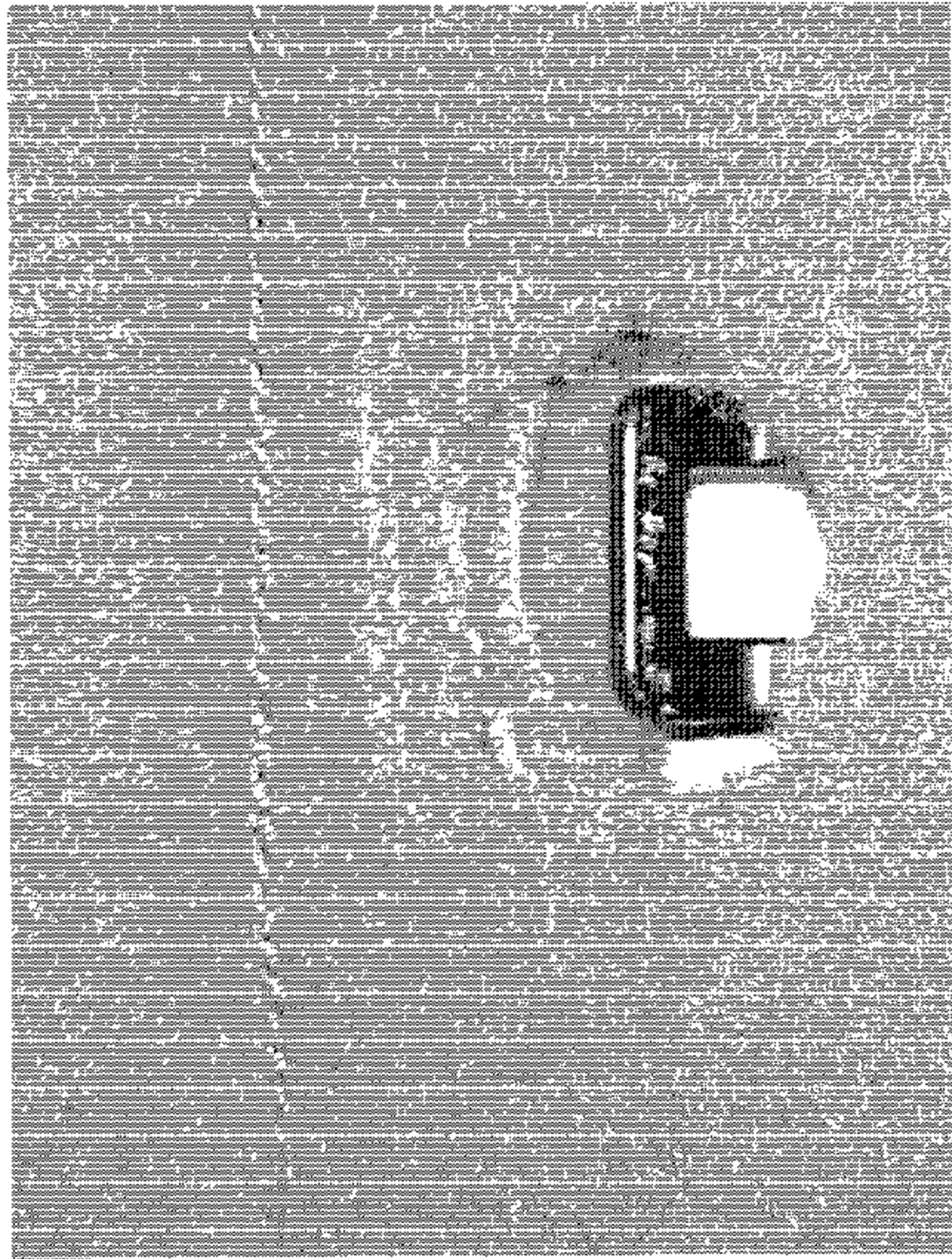


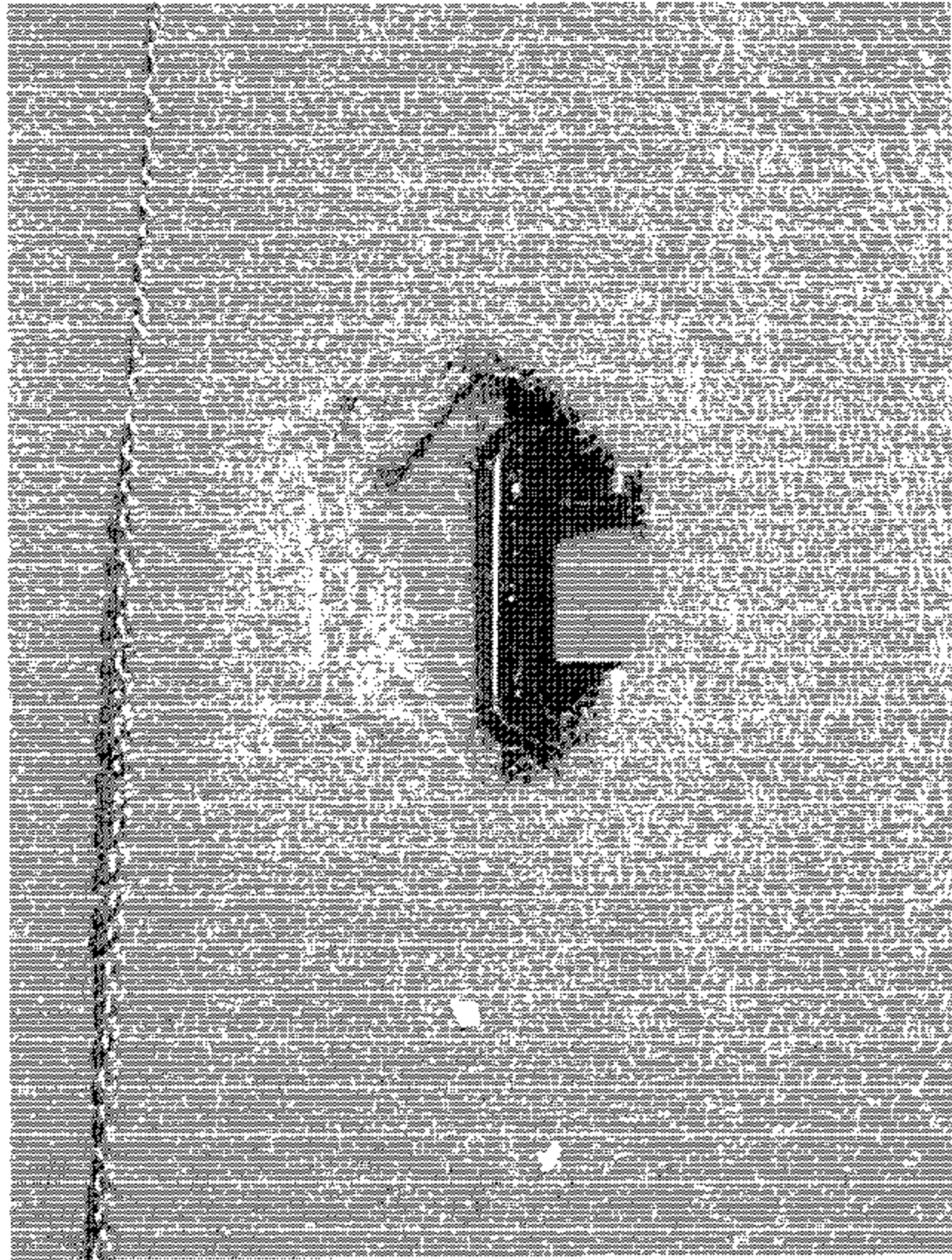
FIGURE 5.10
LEFT REAR VEHICLE TIE DOWN

2003 KIA SORENTO
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FMVSS NO. 225



2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

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



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

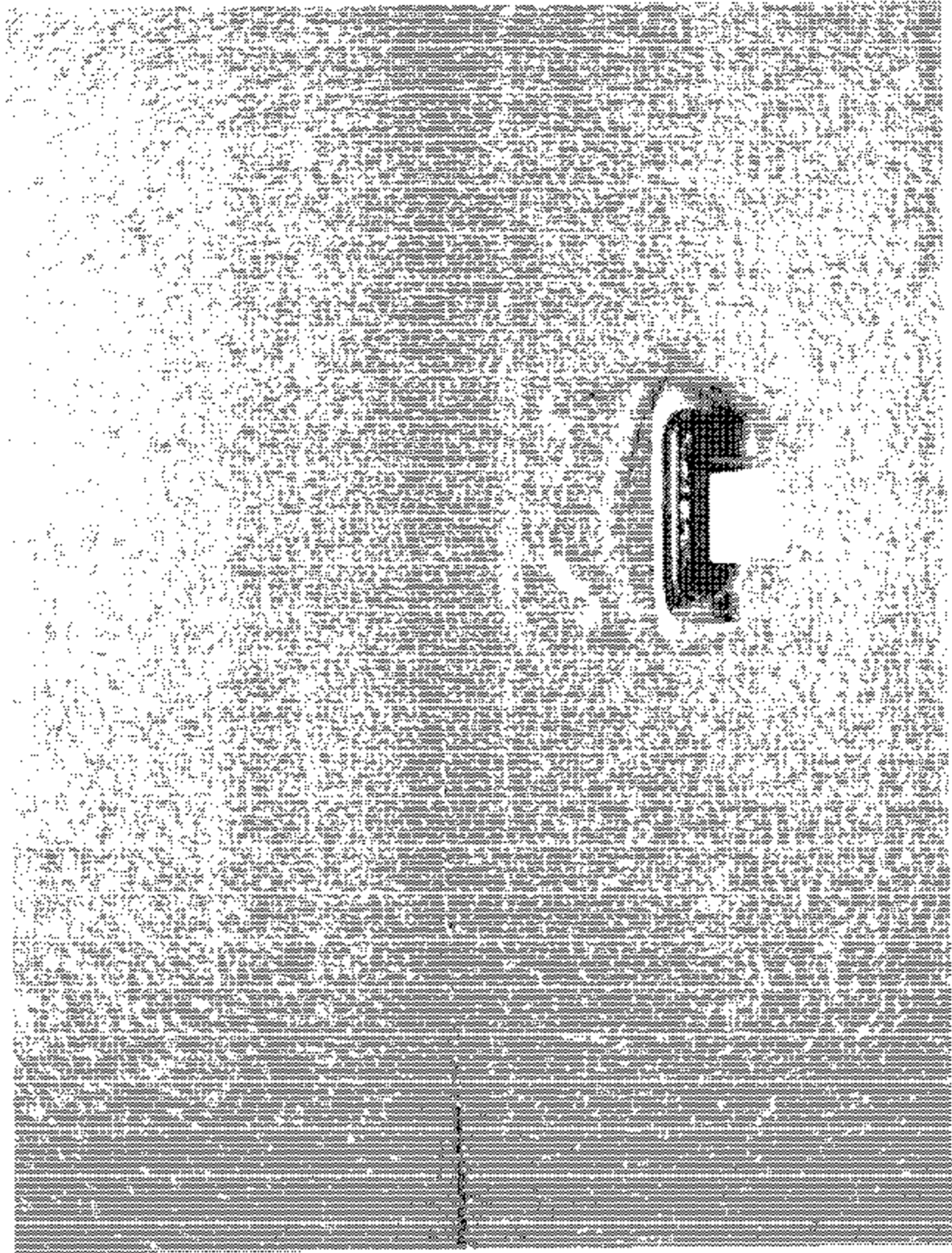
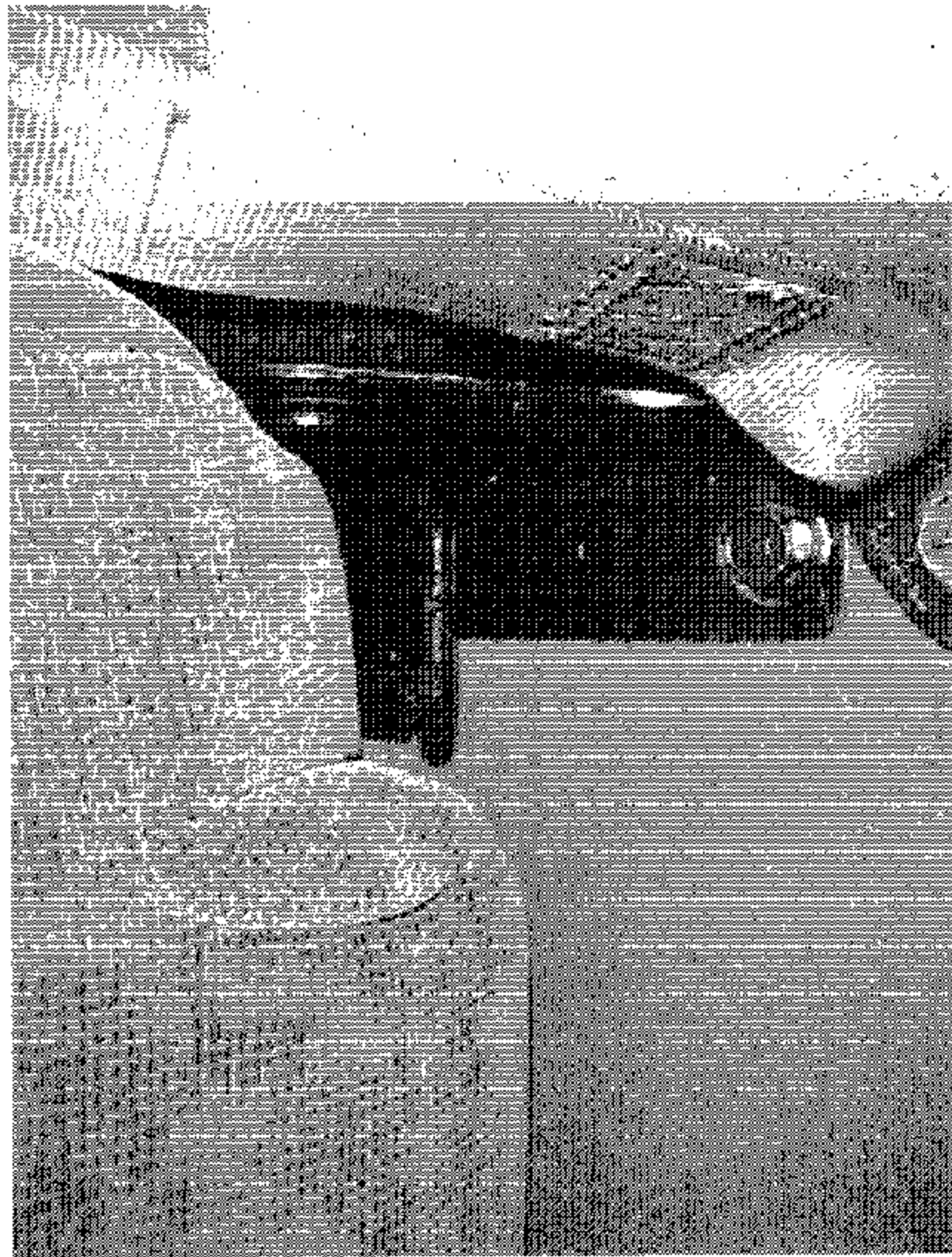


FIGURE 5.13
PRE-TEST FRONT VIEW OF 2ND ROW RIGHT
TOP TETHER ANCHOR

2003 KIA SORENTO
NHTSA NO. C30605
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NIHTSA NO. C30505
FMVSS NO. 225

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

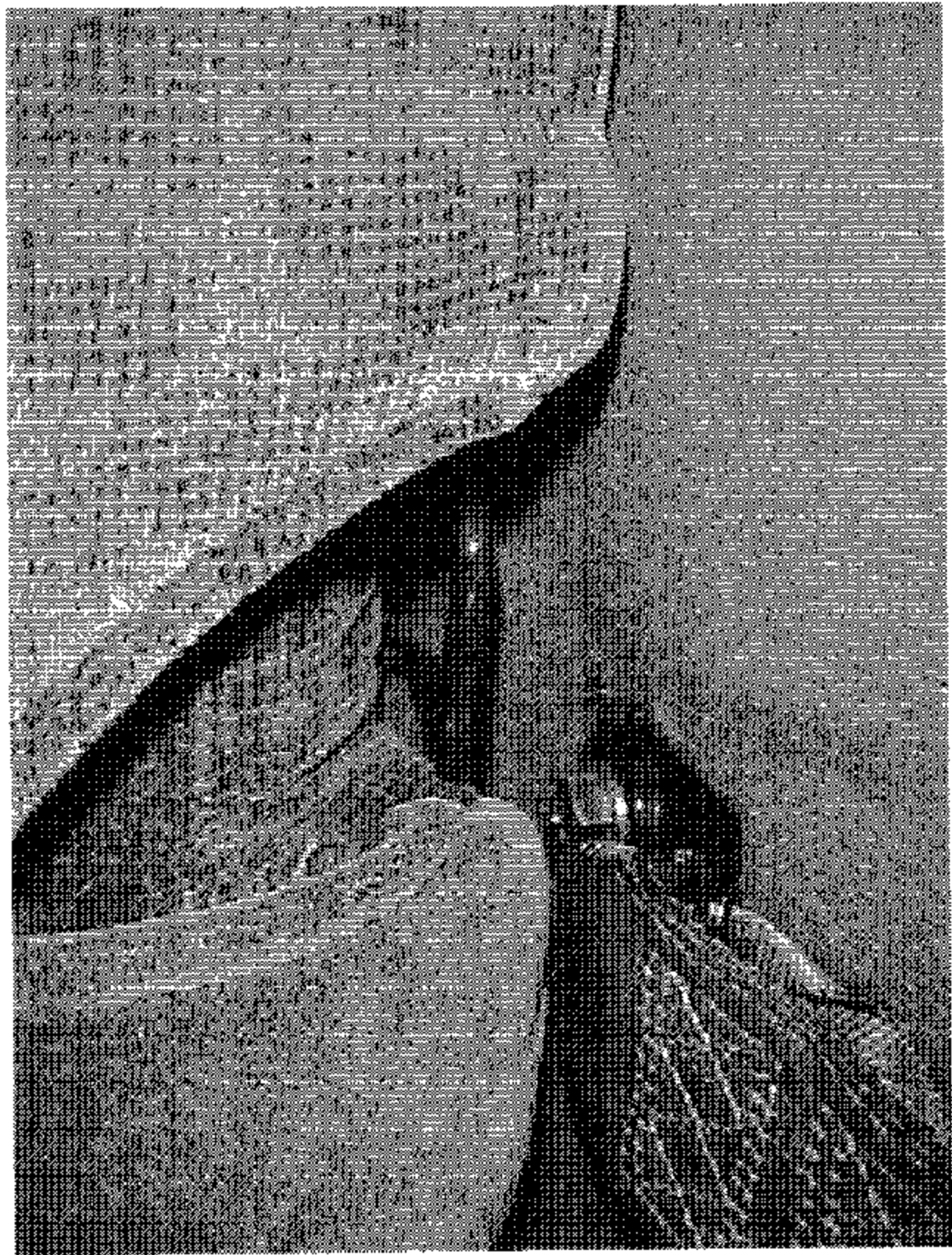
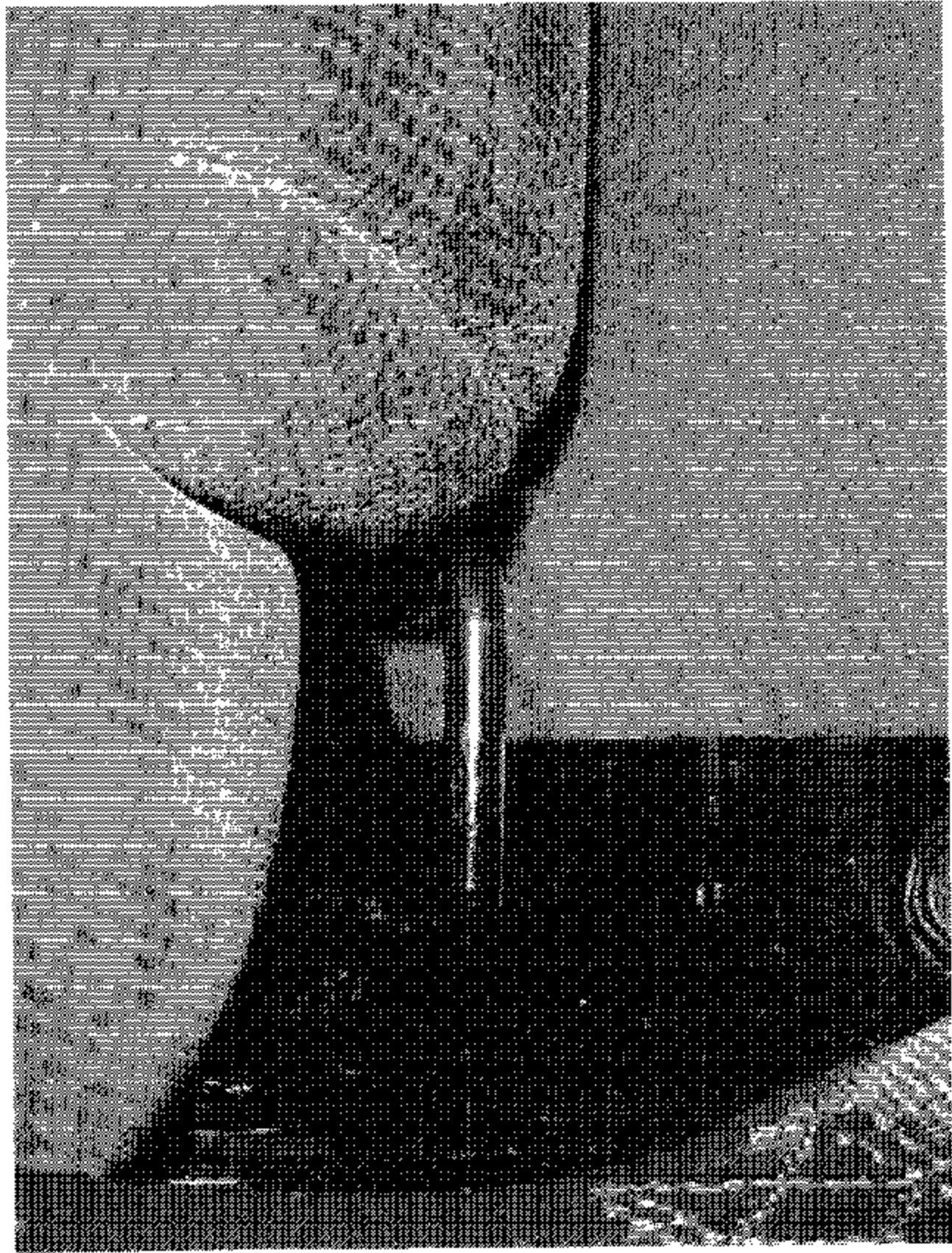


FIGURE 5.15
PRE-TEST FRONT VIEW OF 2ND ROW LEFT
INBOARD LOWER ANCHOR

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2003 KIA SORENTO
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FMVSS NO. 225

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

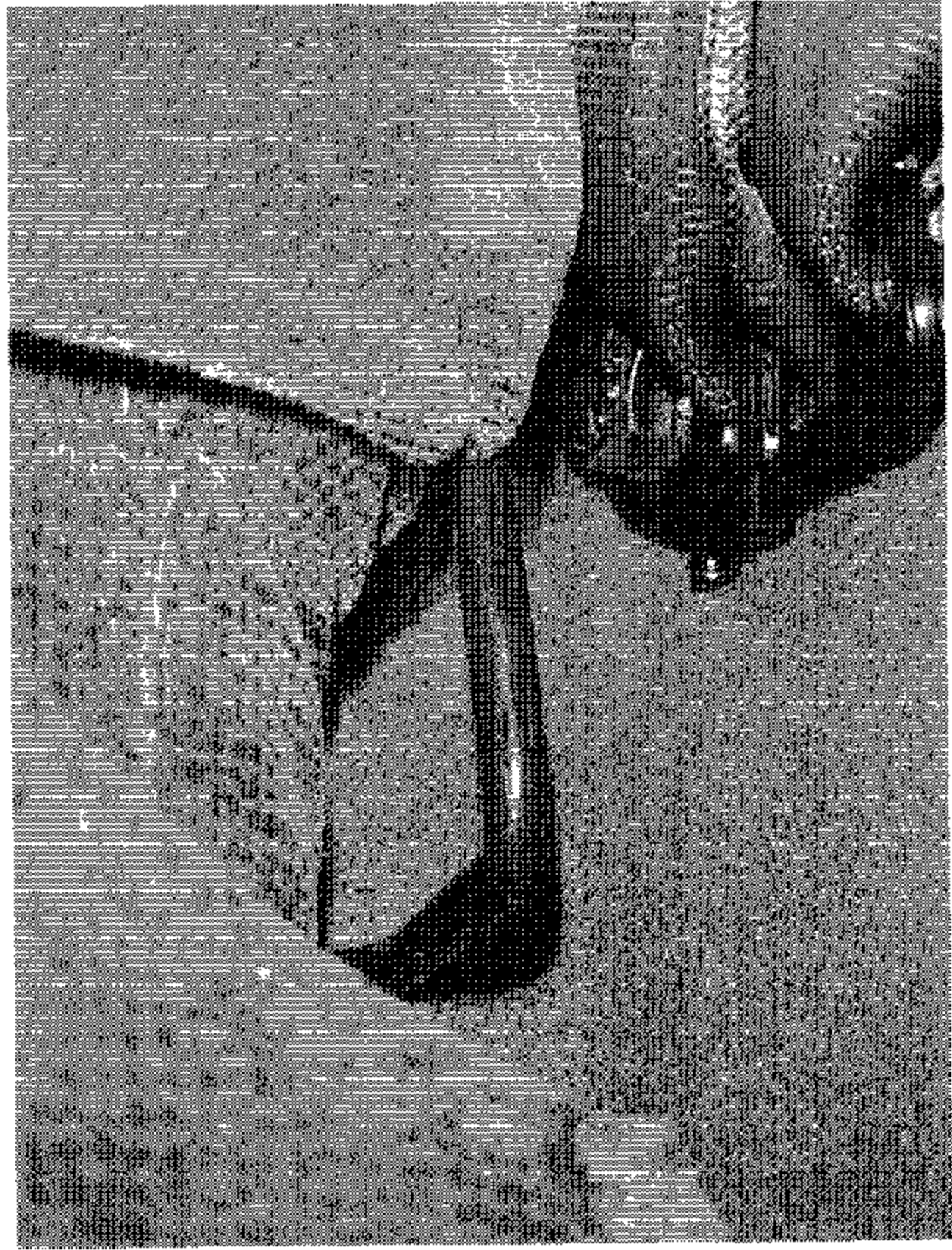


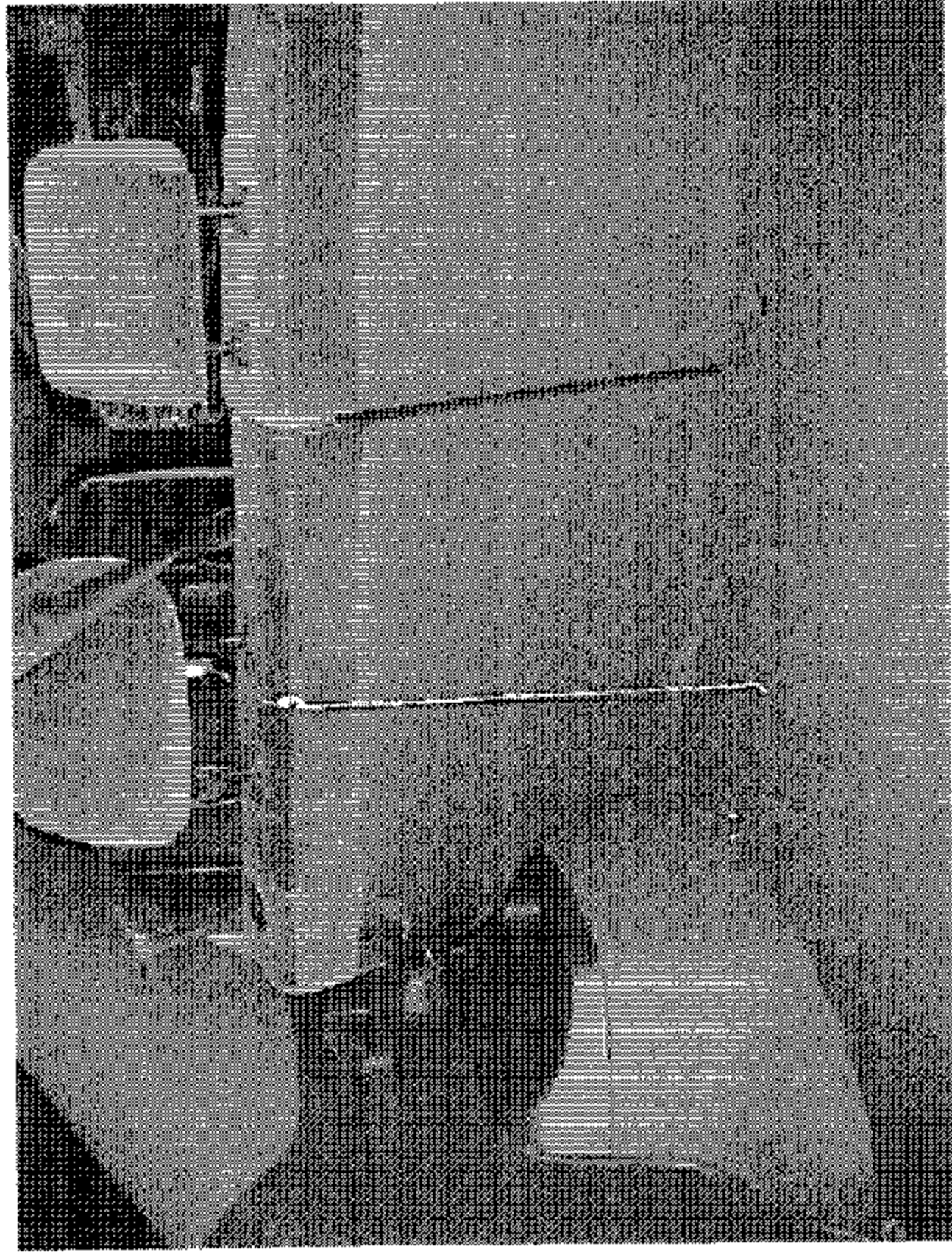
FIGURE 5.17
PRE-TEST FRONT VIEW OF 2ND ROW RIGHT
INBOARD LOWER ANCHOR

2003 KIA SORENTO
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2003 KIA SORENTO
NHTSA NO. C3D505
FMVSS NO. 225

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



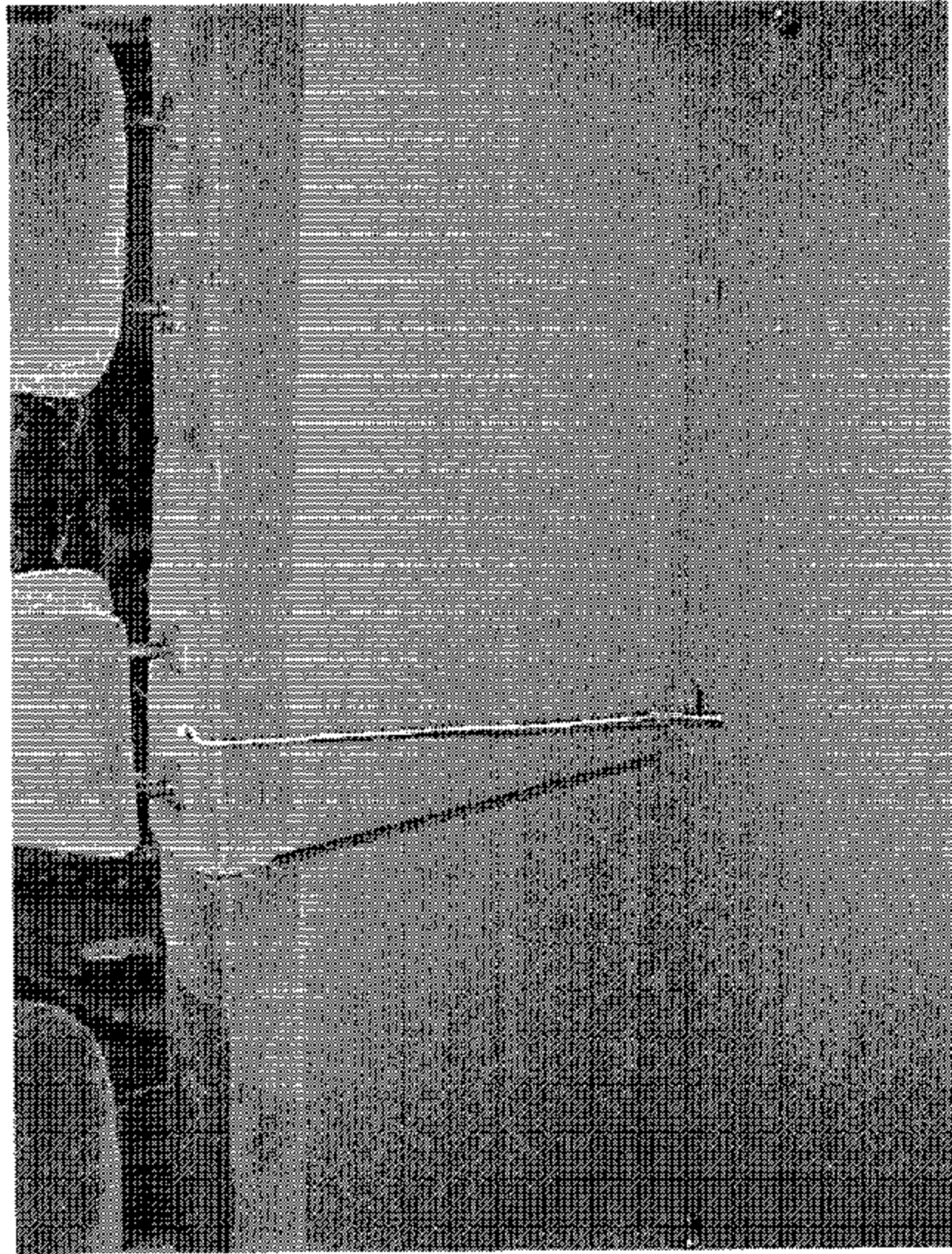
2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

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



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FMVSS NO. 225

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



2003 KIA SORENTO
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FMVSS NO. 225

FIGURE 5.21
VIEW OF 2D TEMPLATE IN 2ND ROW CENTER
SEAT

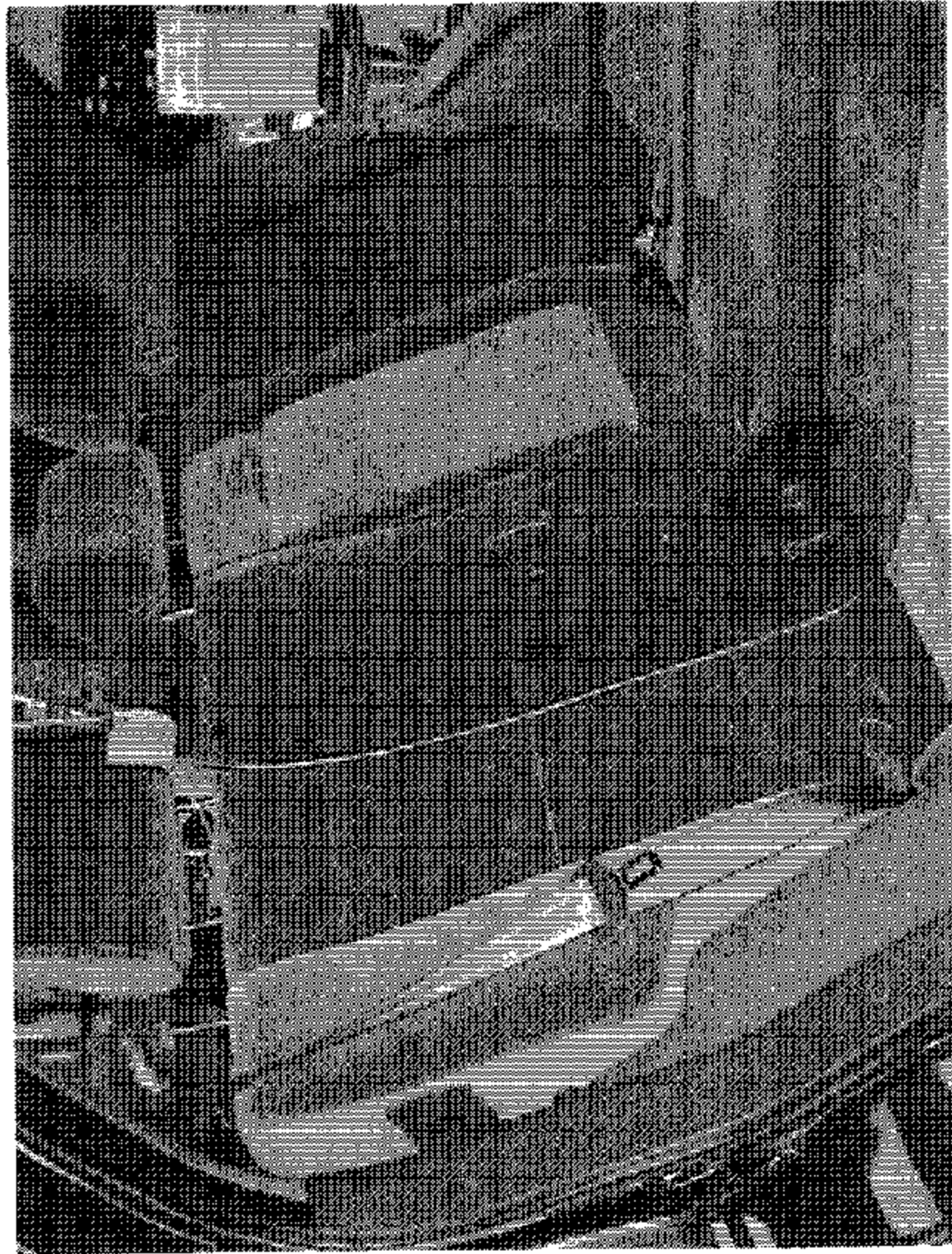
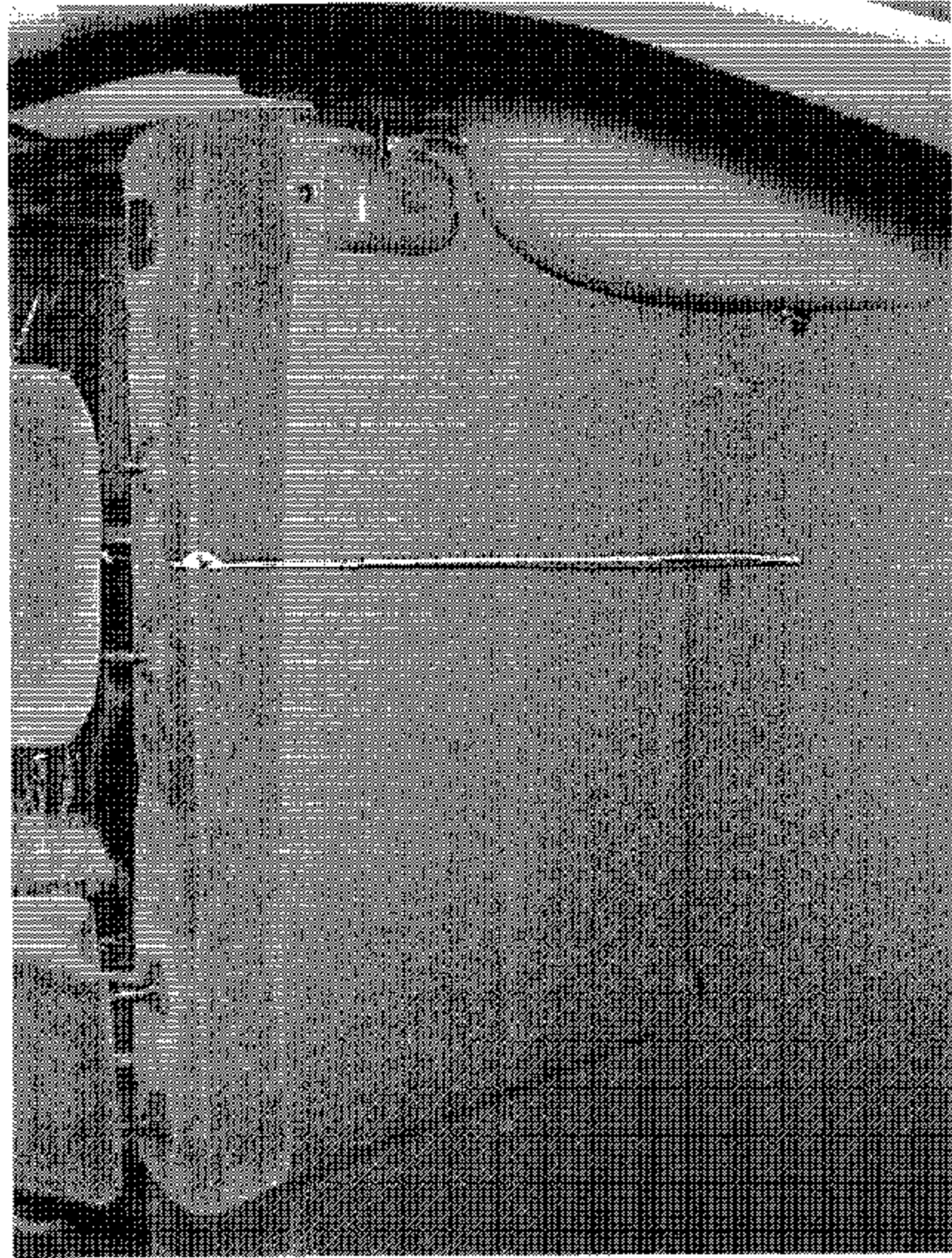


FIGURE 6.22
VIEW OF 2D TEMPLATE IN 2ND ROW RIGHT
SEAT

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FMVSS NO. 225



2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

FIGURE 5.23
VIEW OF 2D TEMPLATE IN 2ND ROW RIGHT
SEAT



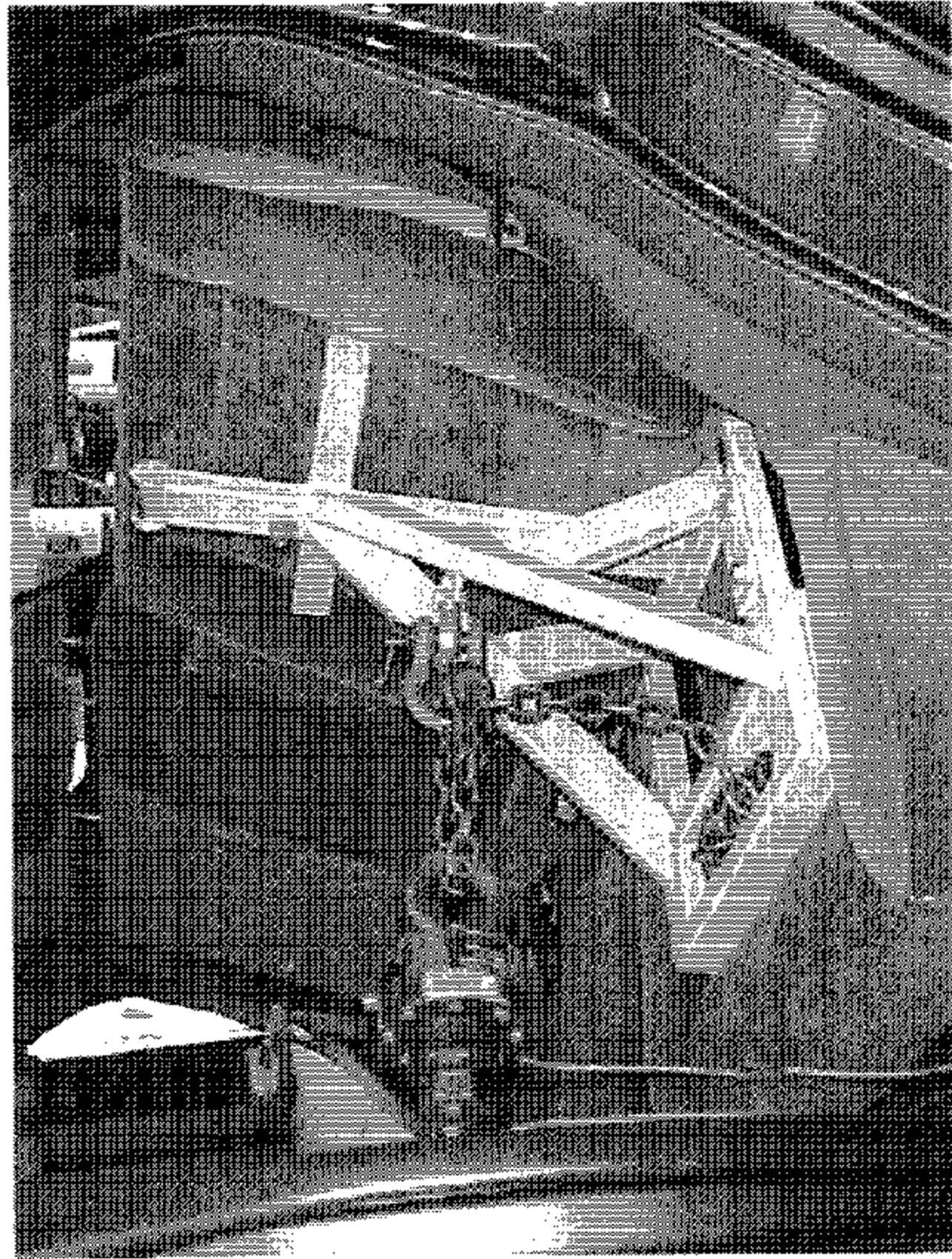
2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

FIGURE 5.24
VIEW OF CRF IN 2ND ROW LEFT SEAT



FIGURE 5.25
VIEW OF CRF IN 2ND ROW RIGHT SEAT

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2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

FIGURE 5.28
PRE-TEST SET-UP 2ND ROW LEFT POSITION

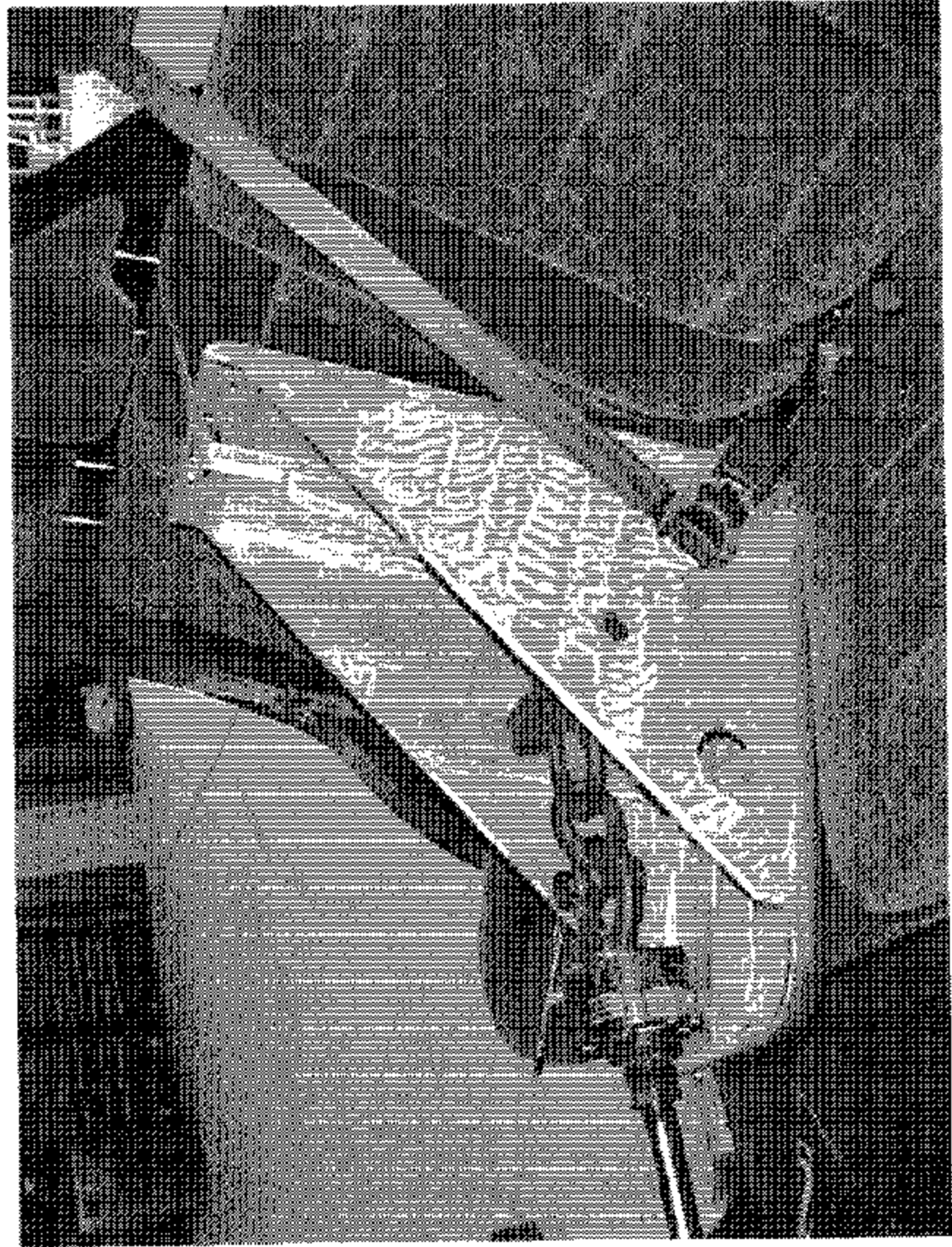
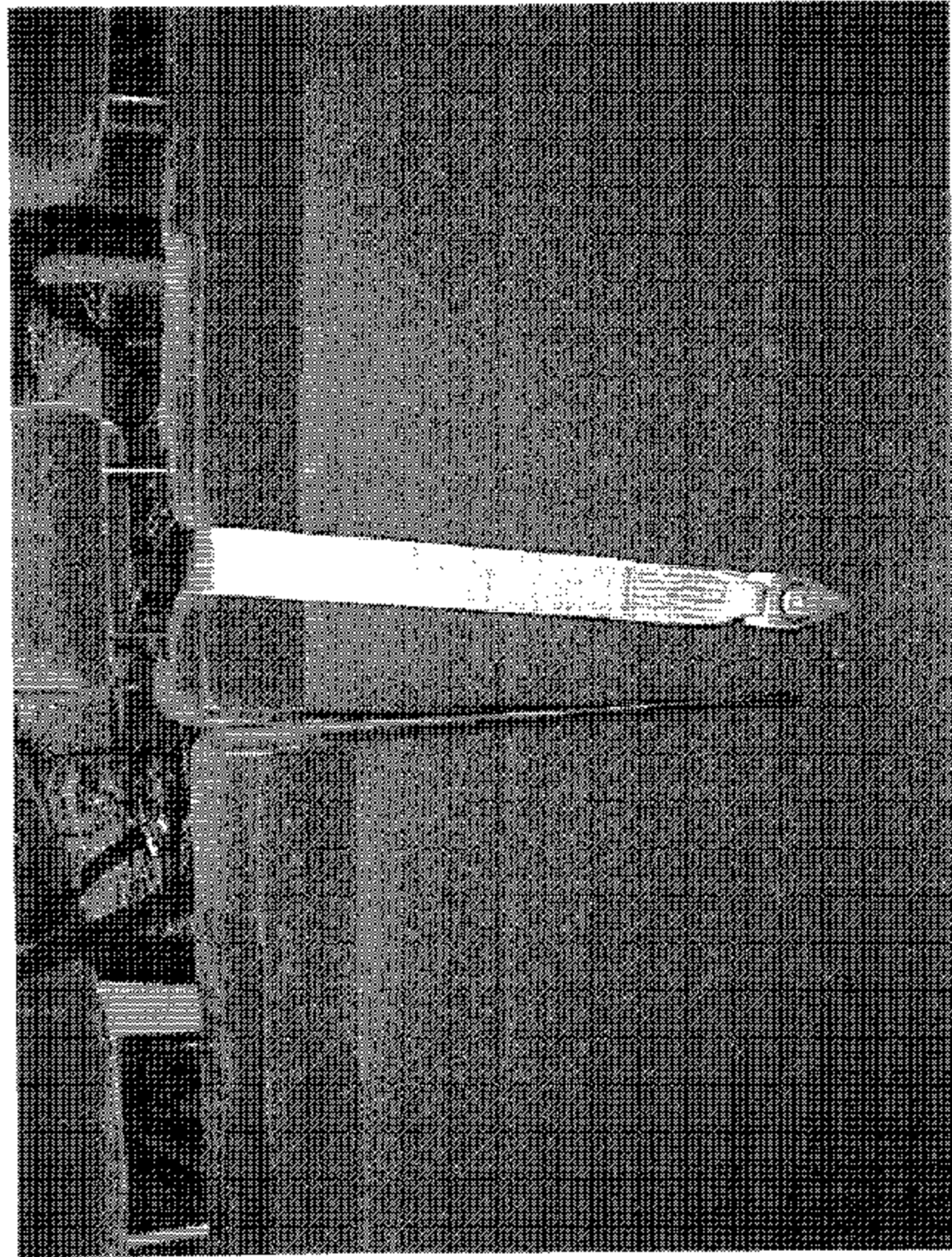


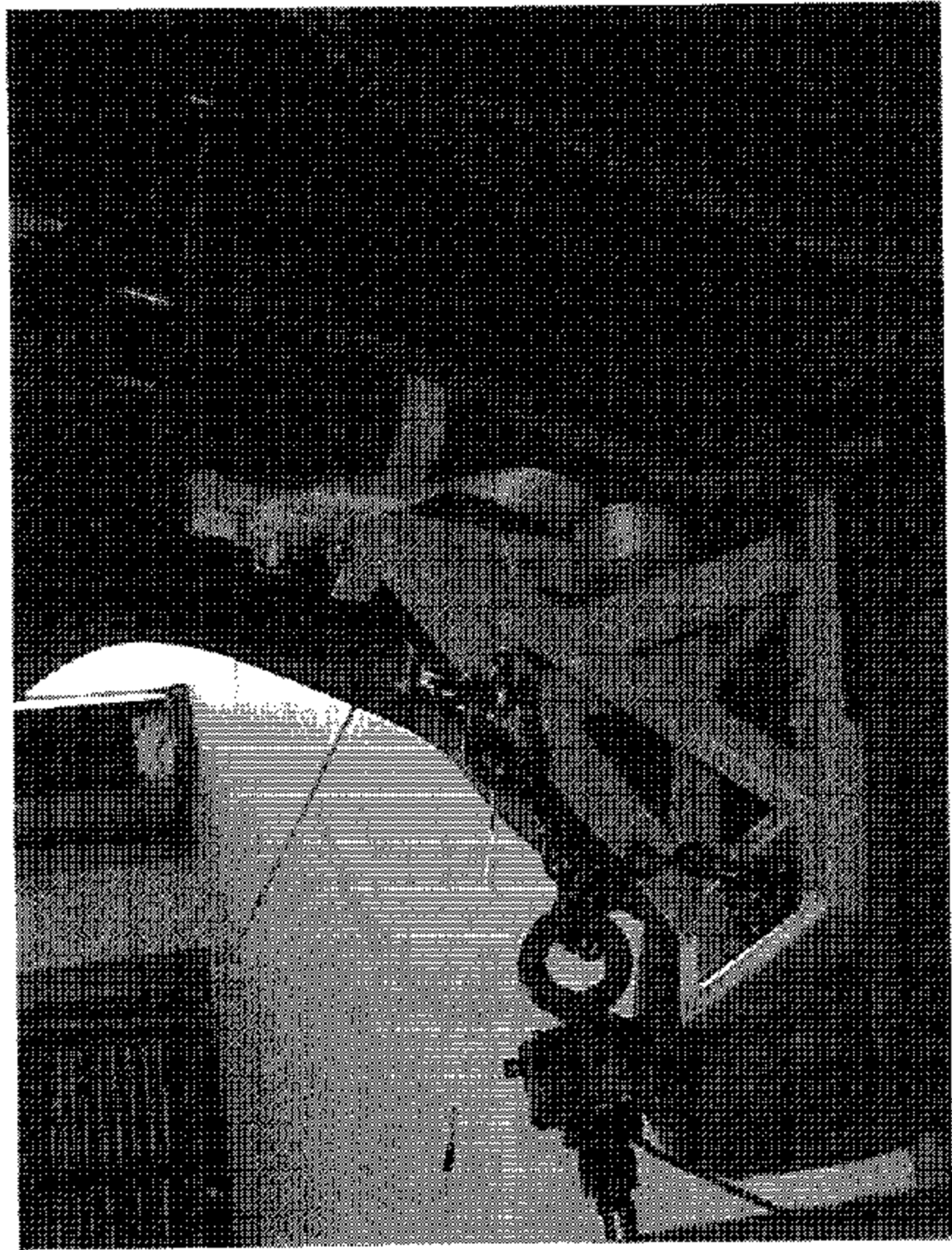
FIGURE 5.27
PRE-TEST SET-UP 2ND ROW CENTER POSITION

2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225



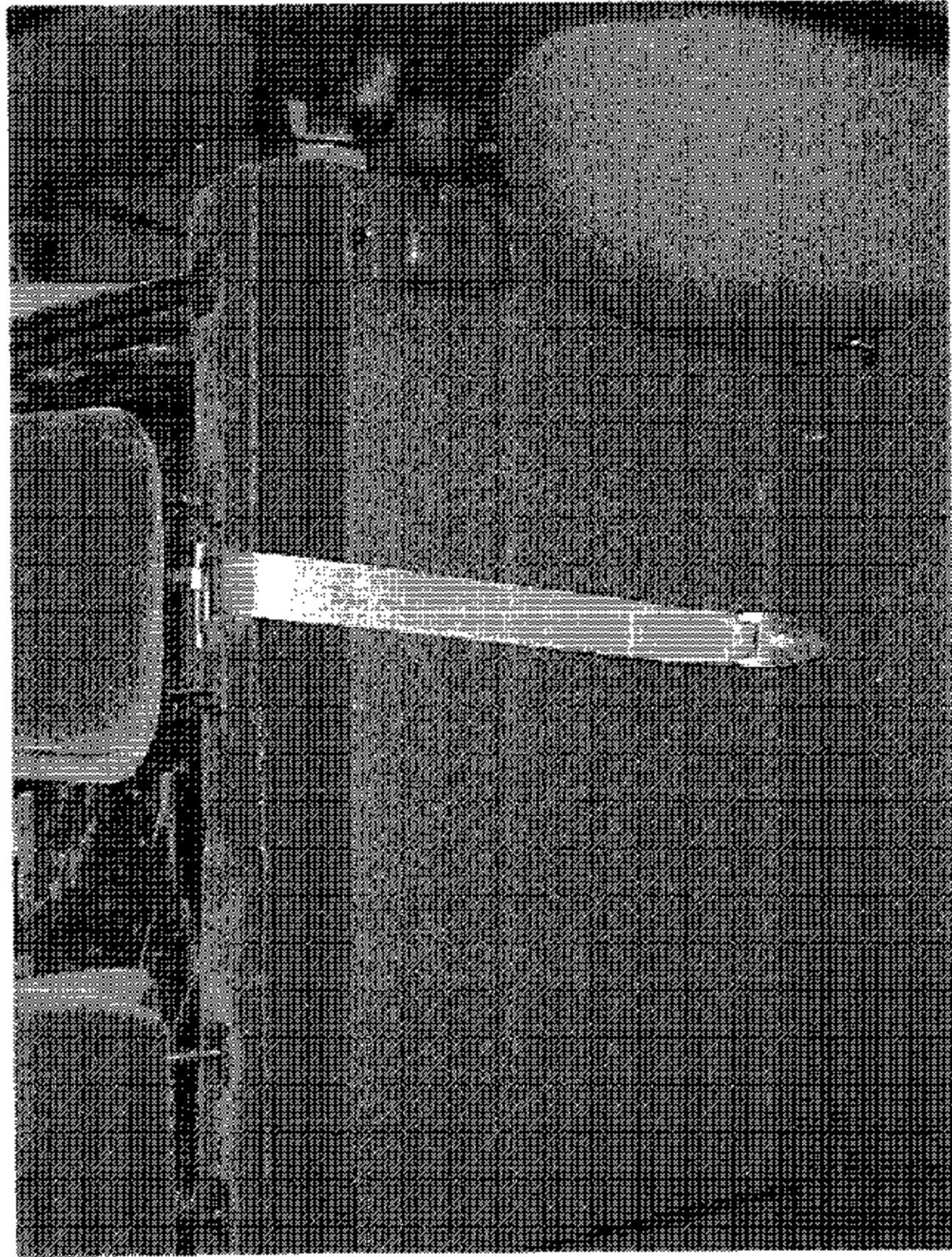
2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

FIGURE 5.28
PRE-TEST SET-UP 2ND ROW CENTER POSITION



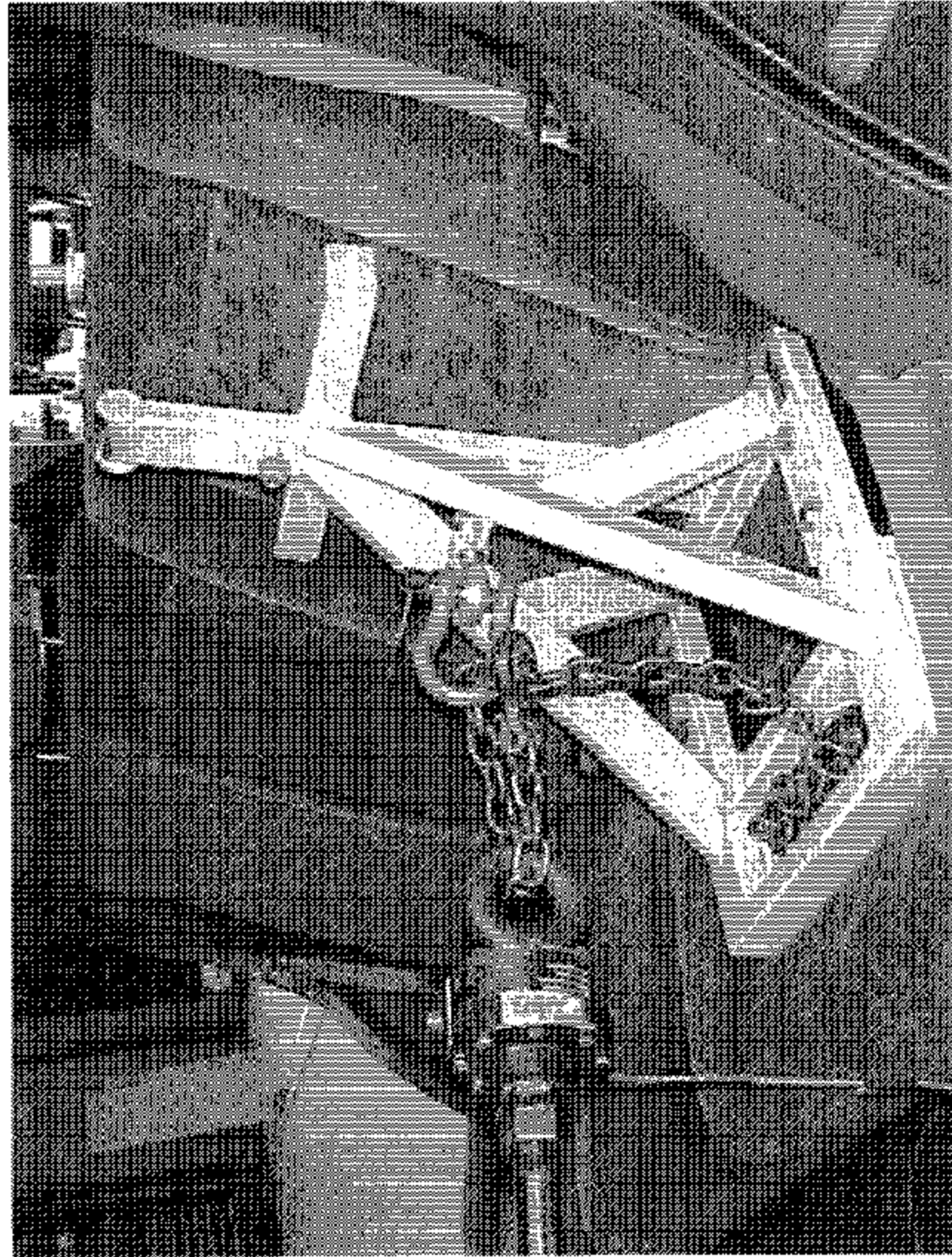
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FIGURE 5.29
PRE-TEST SET-UP 2ND ROW RIGHT POSITION



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FIGURE 5.30
PRE-TEST SET-UP 2ND ROW RIGHT POSITION



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NHTSA NO. C30505
FMVSS NO. 225

FIGURE 5.31
POST TEST 2ND ROW LEFT POSITION

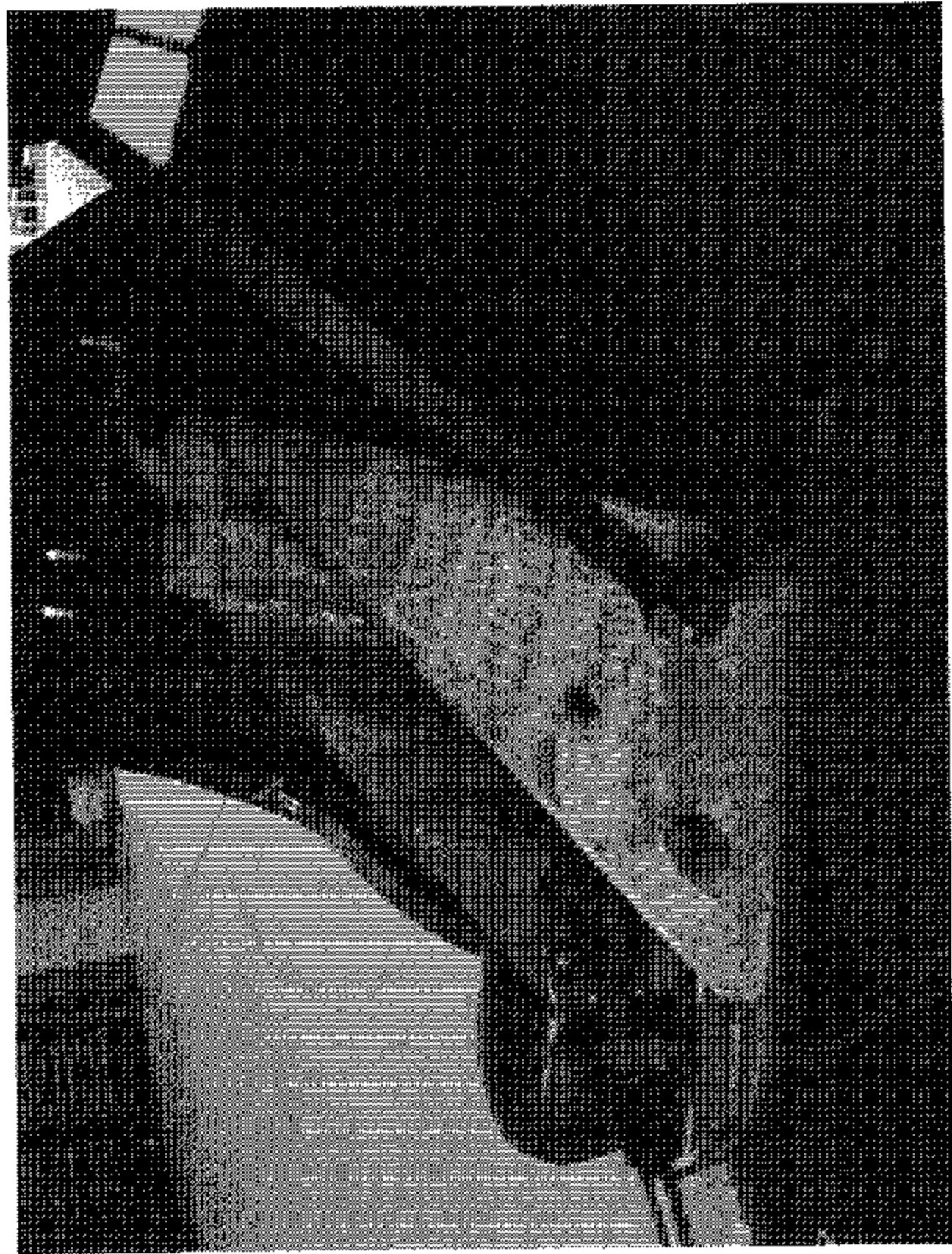
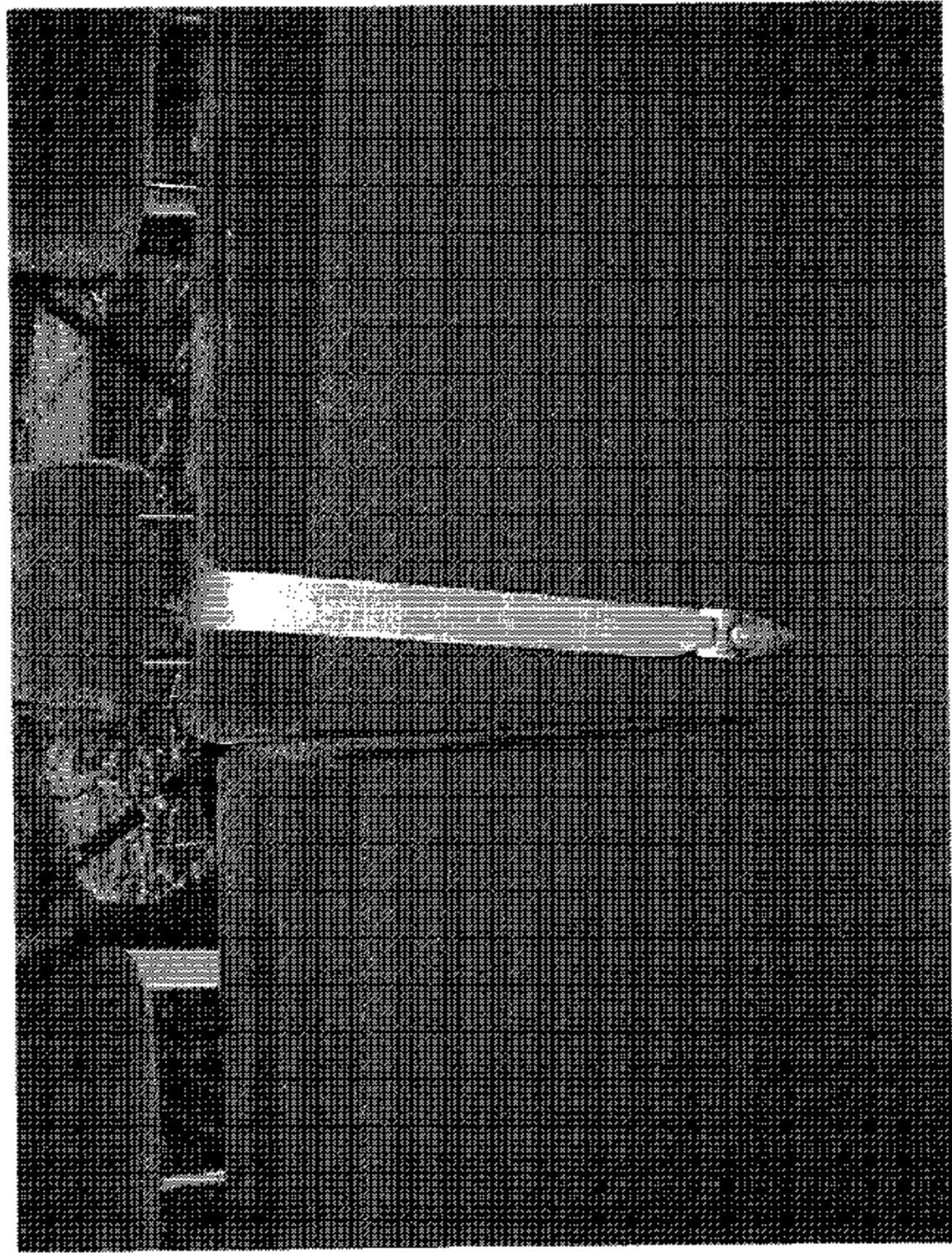


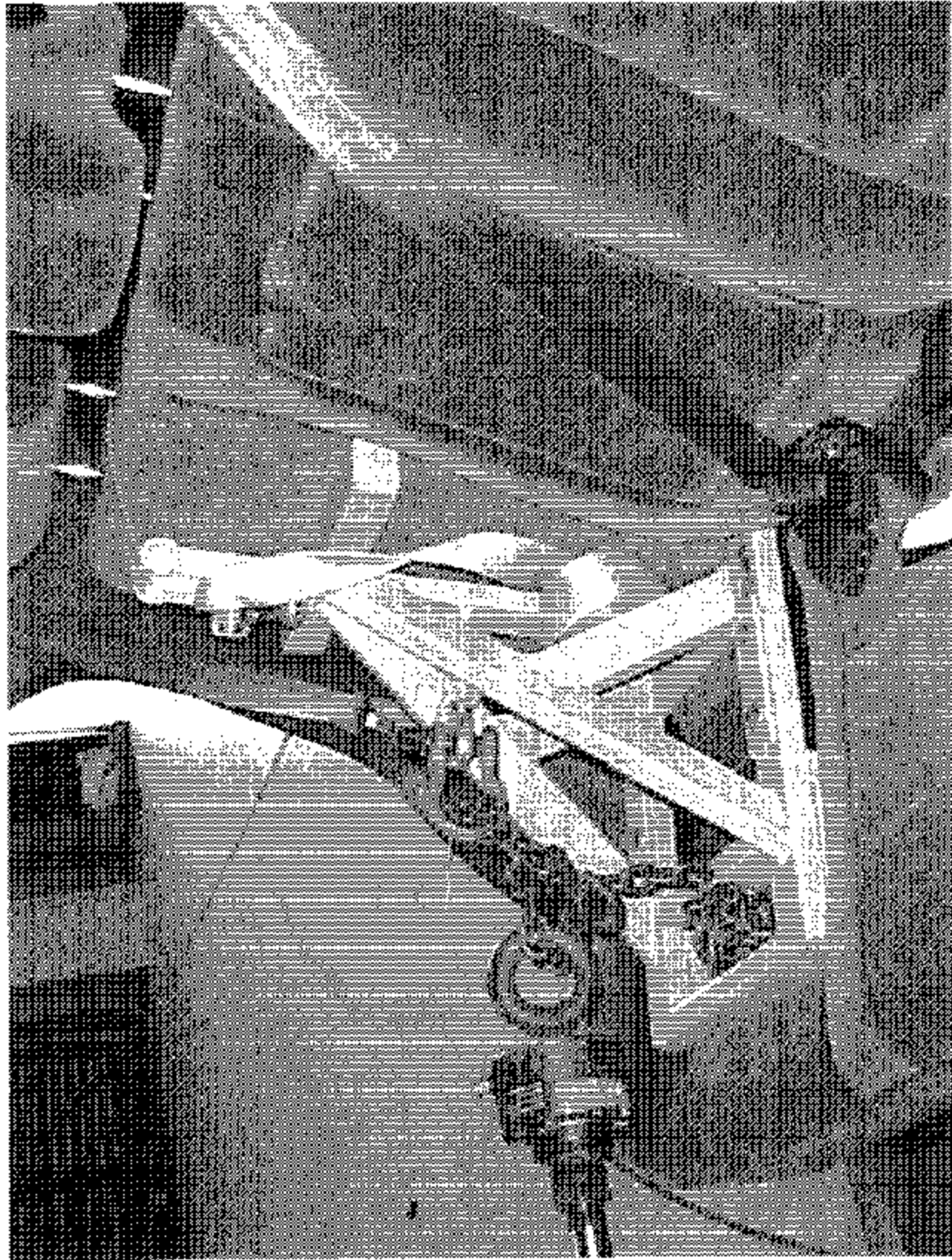
FIGURE 5.32
POST TEST 2ND ROW CENTER POSITION

2003 KIA SORENTO
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FMVSS NO. 225



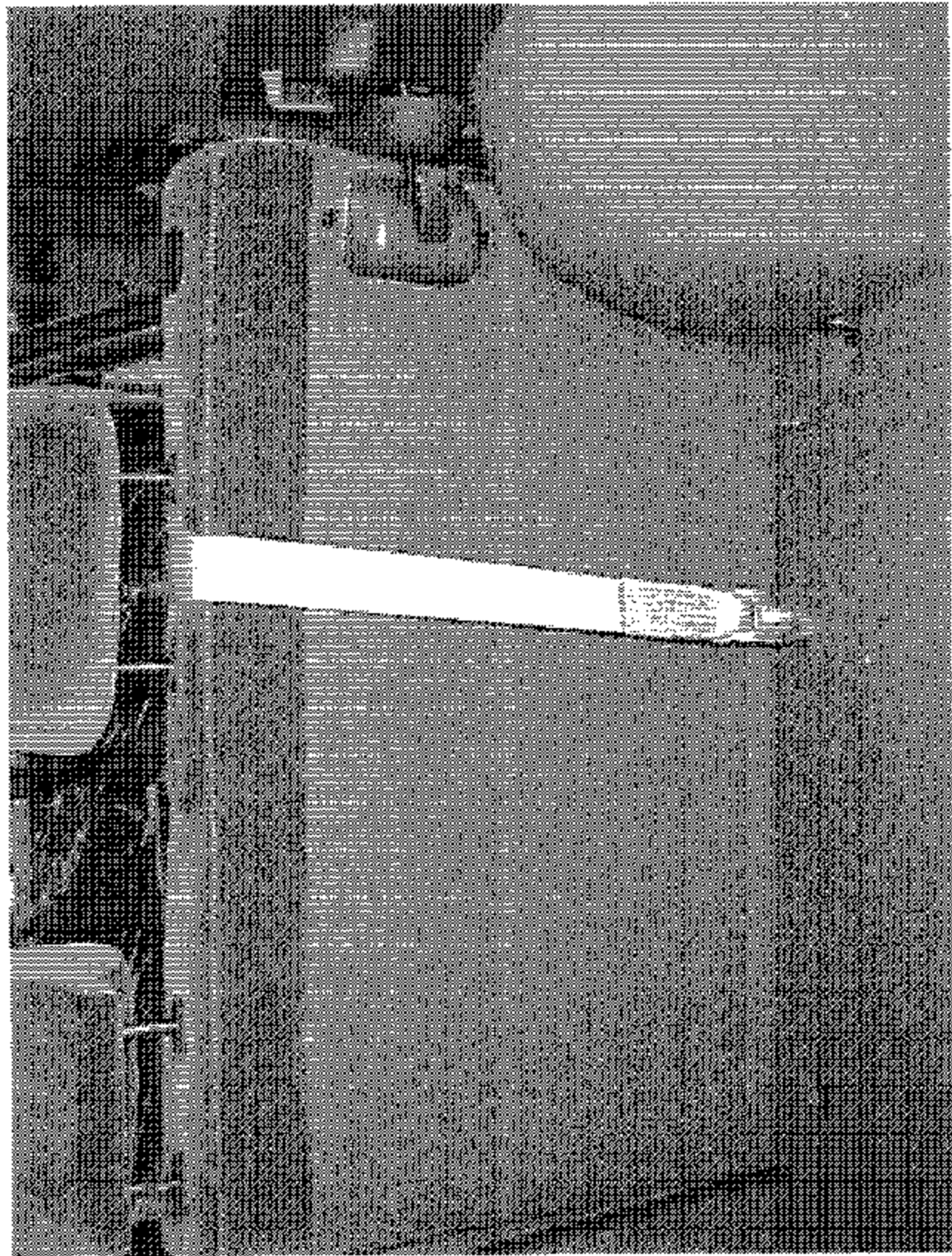
2003 KIA SORENTO
NIHTSA NO. C30505
FMVSS NO. 225

FIGURE 5.33
POST TEST 2ND ROW CENTER POSITION



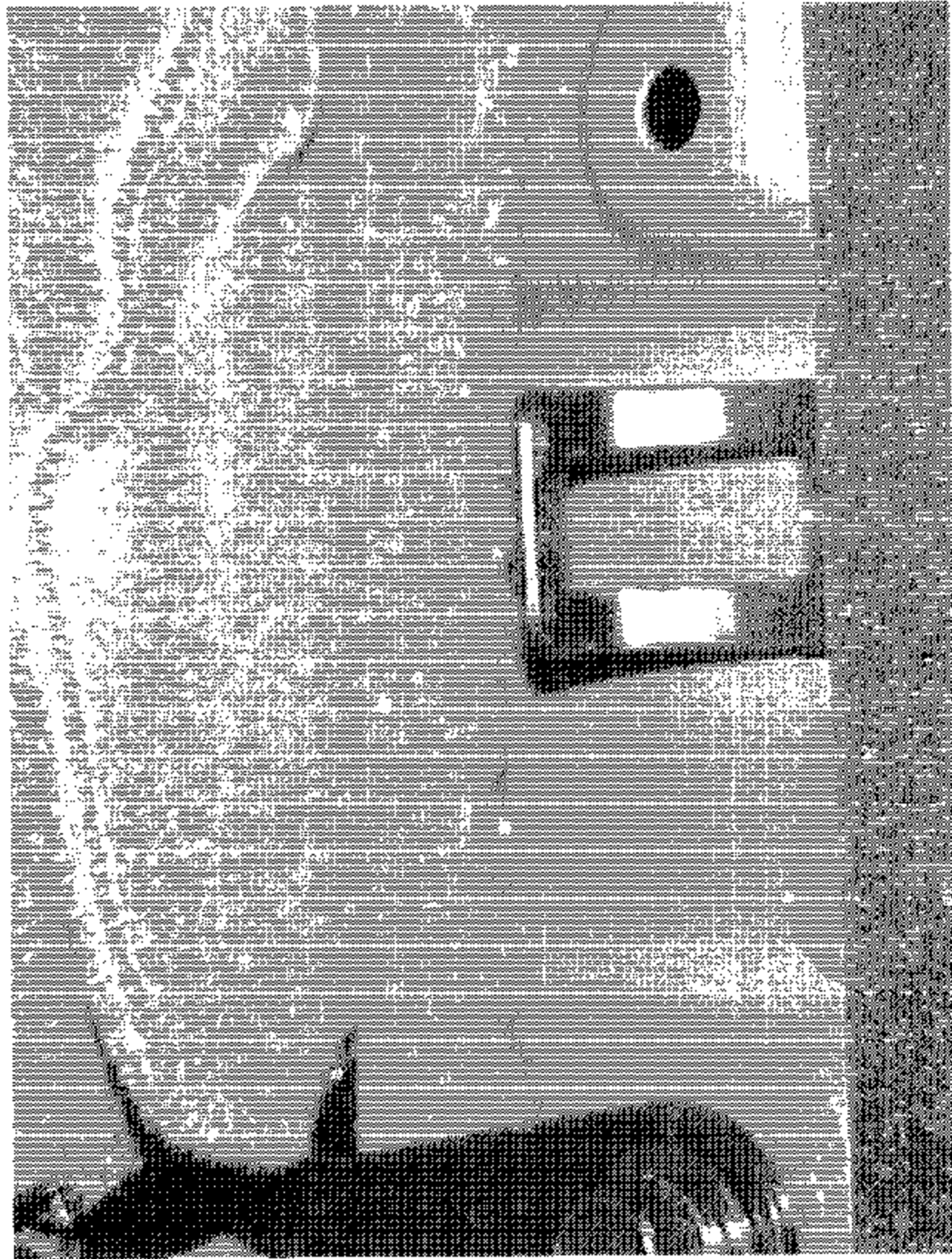
2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

FIGURE 5.34
POST TEST 2ND ROW RIGHT POSITION



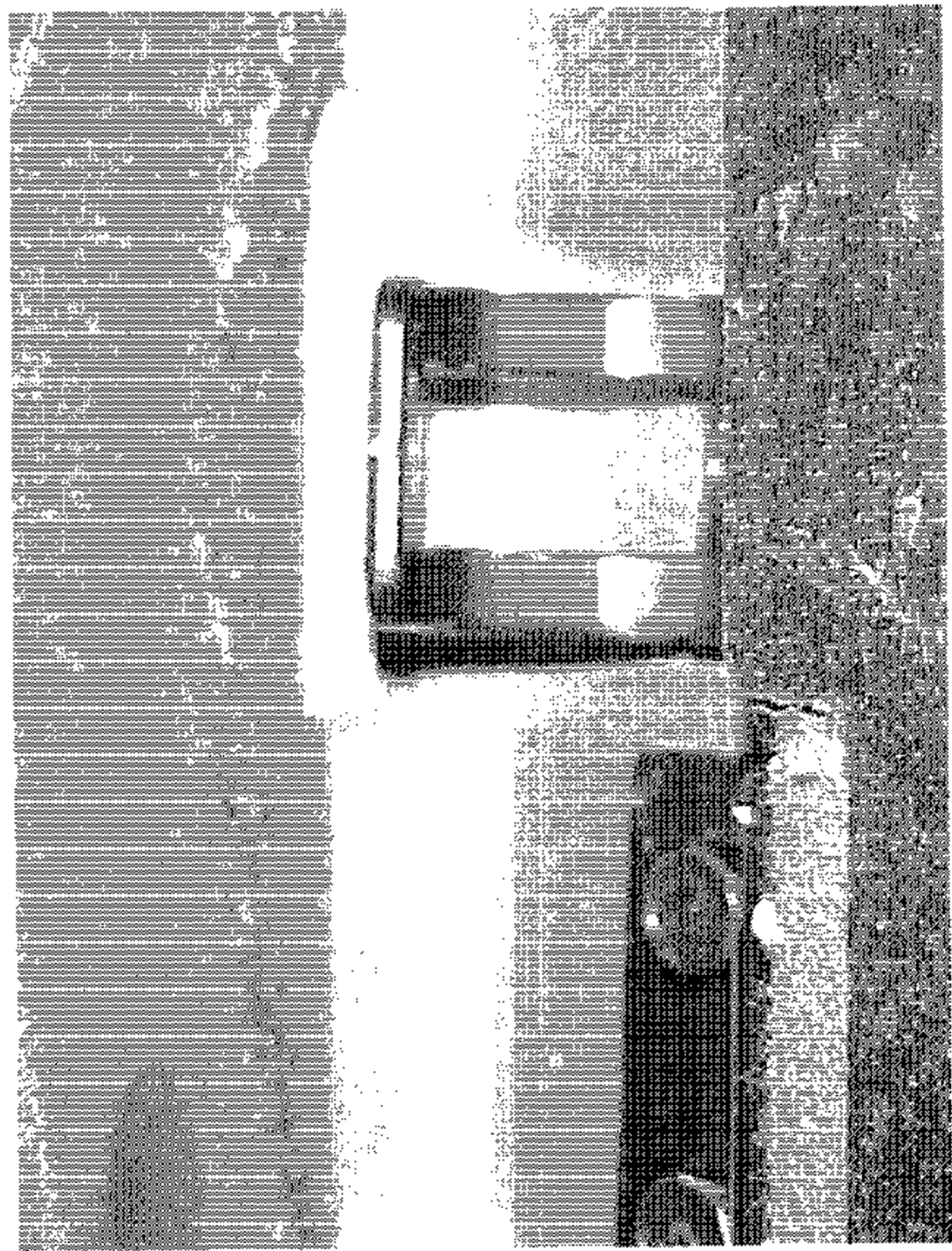
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FIGURE 5.35
POST TEST 2ND ROW RIGHT POSITION



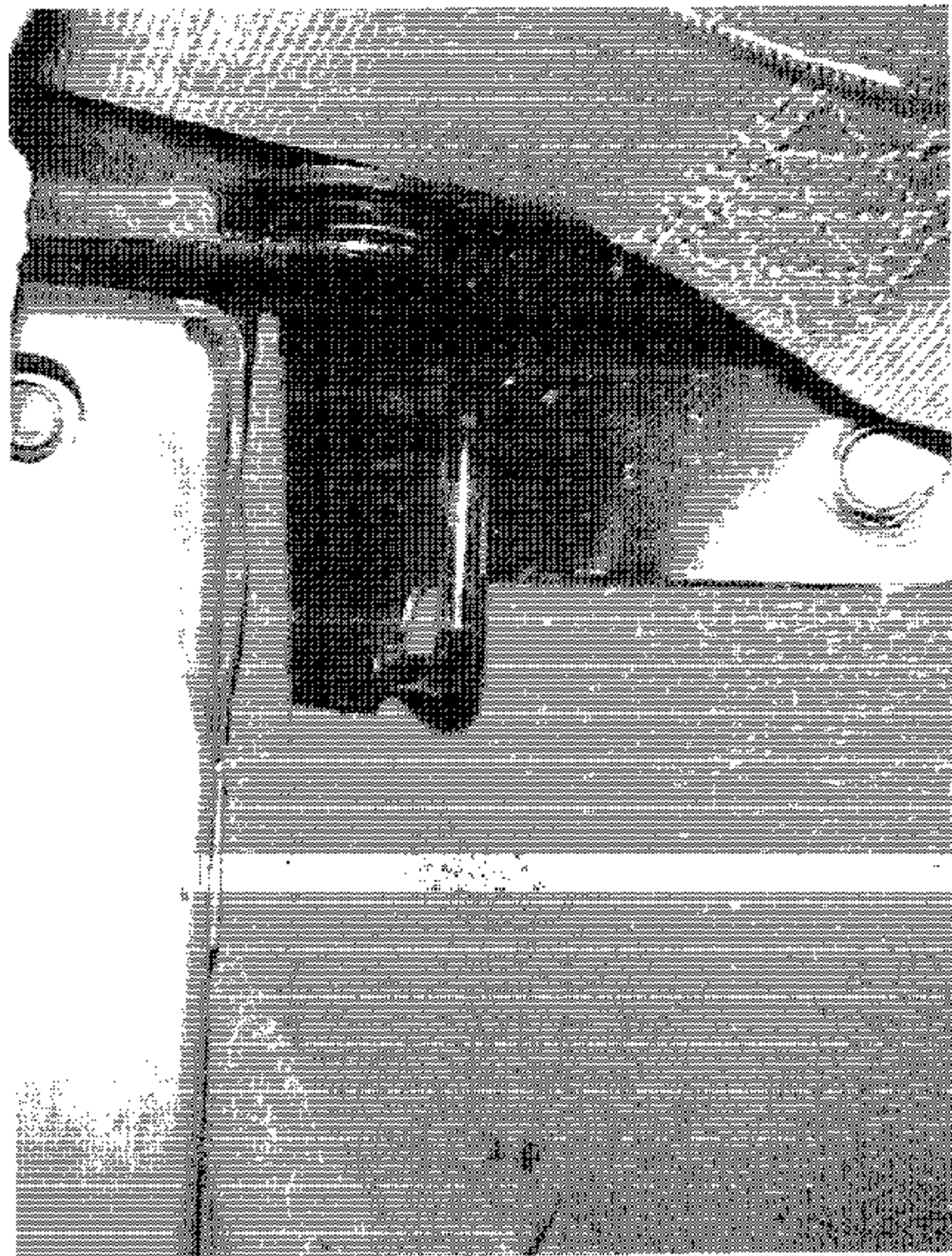
2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

FIGURE 5.36
POST TEST 2ND ROW CENTER TETHER
ANCHOR



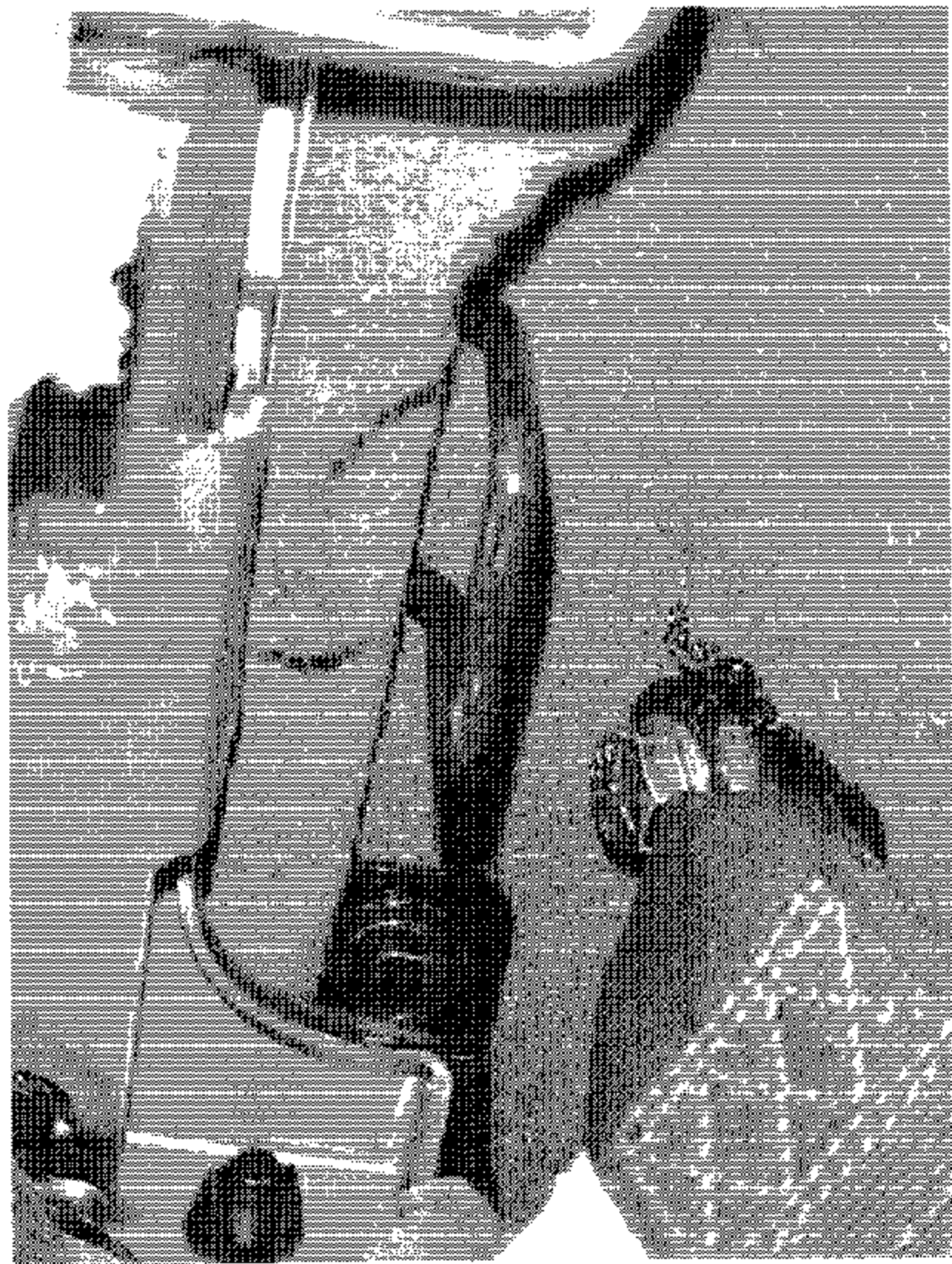
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FIGURE 5.37
POST TEST 2ND ROW RIGHT TETHER
ANCHOR



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FIGURE 5.38
POST TEST 2ND ROW LEFT OUTBOARD LOWER
ANCHOR



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FIGURE 5.39
POST TEST 2ND ROW LEFT INBOARD LOWER
ANCHOR

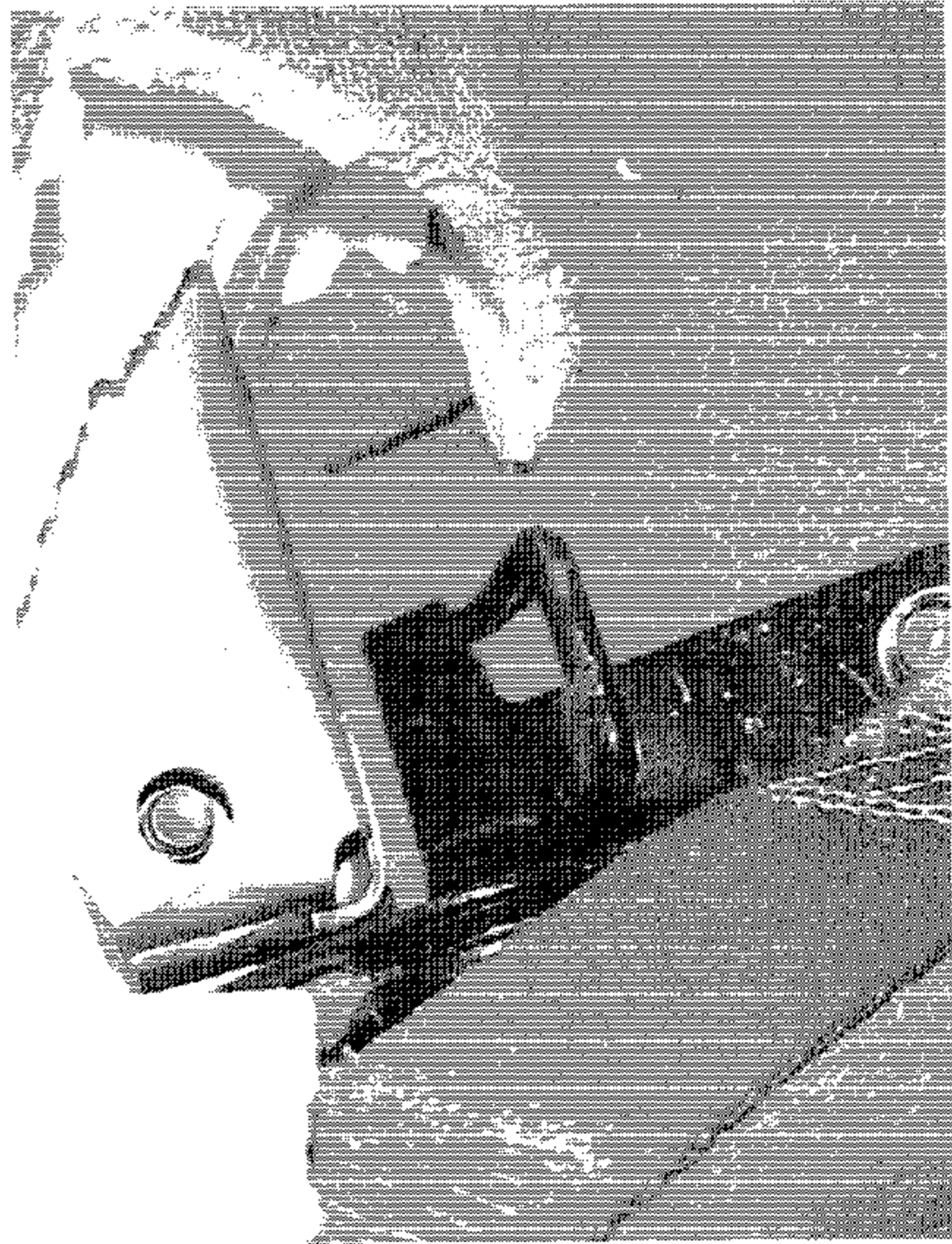
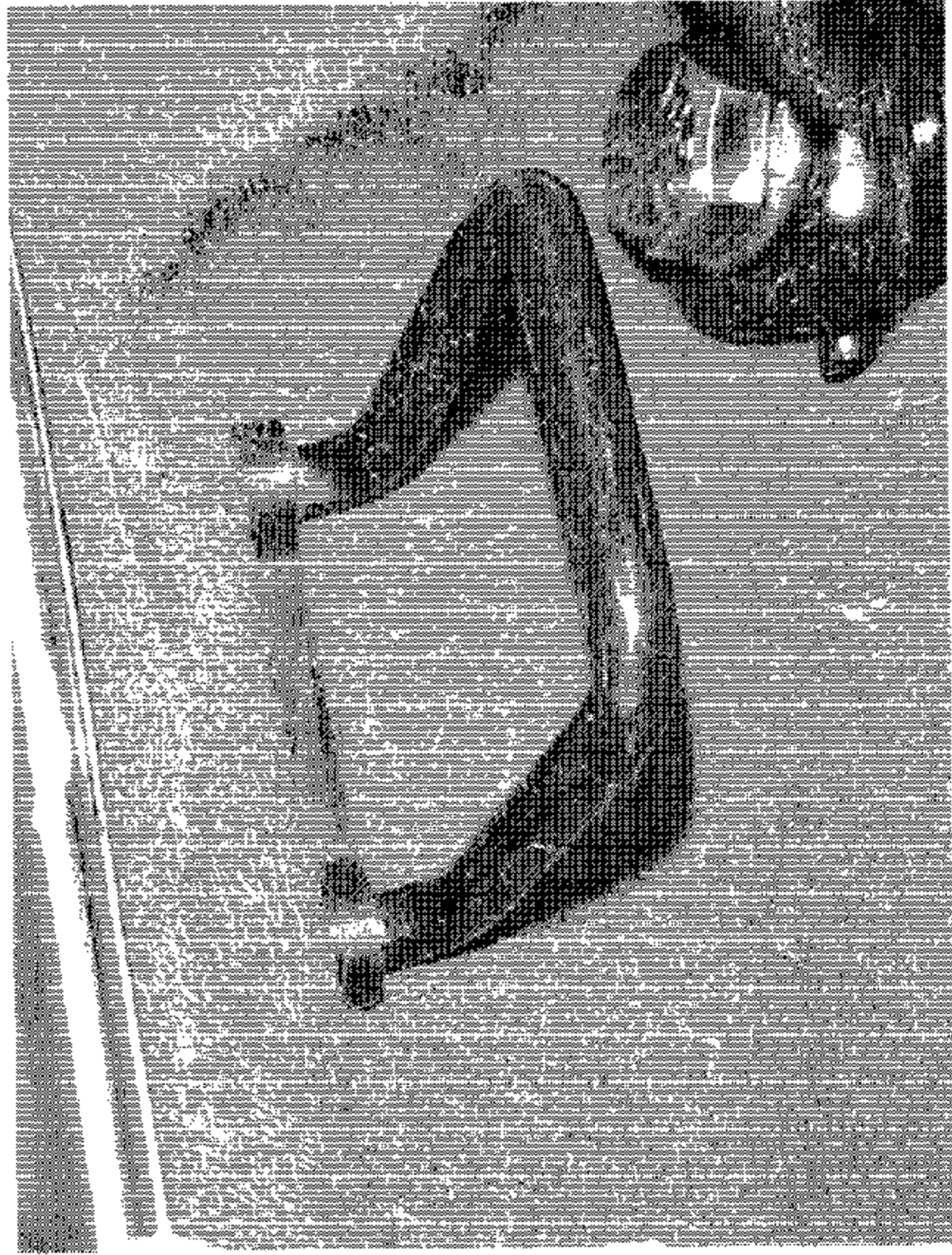


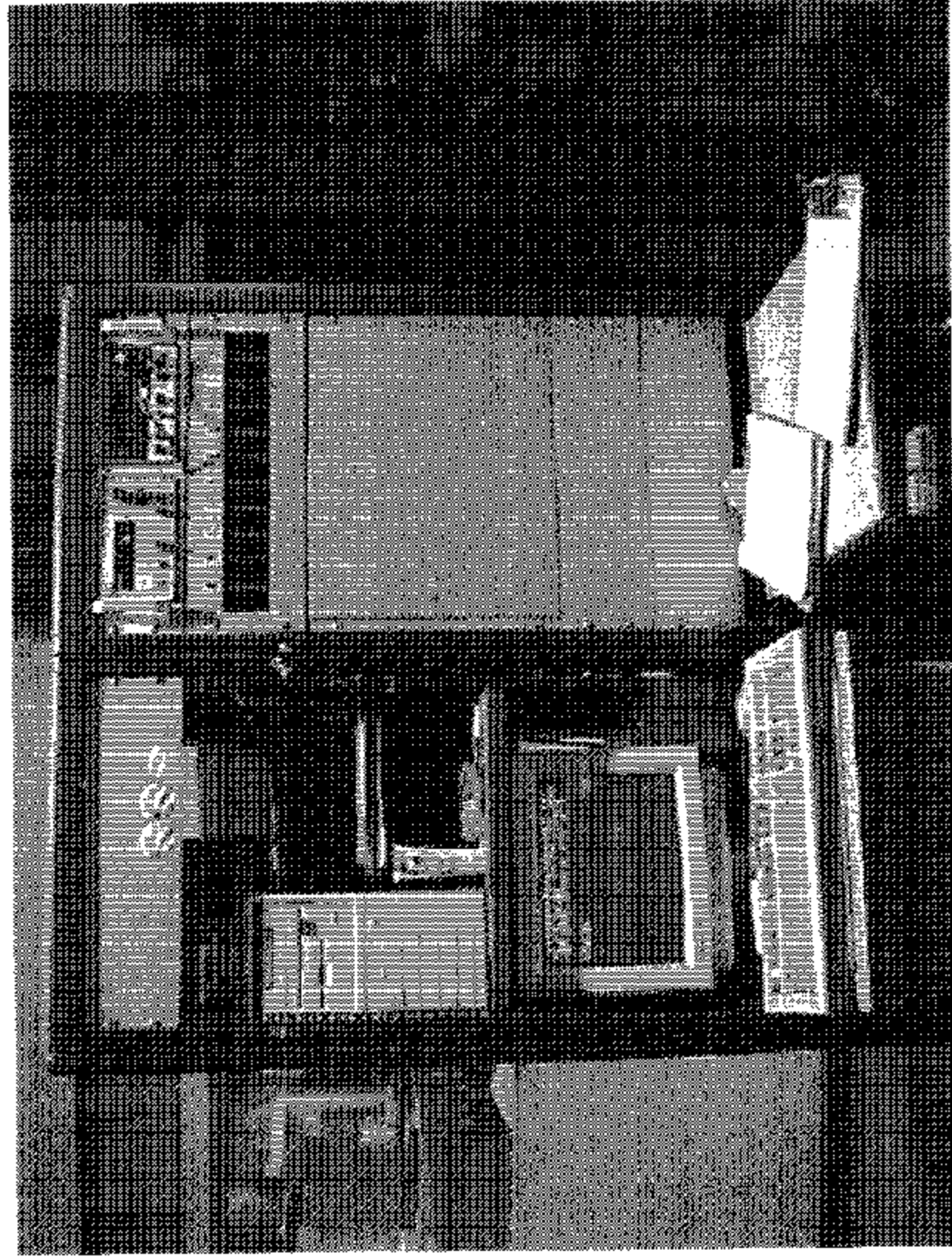
FIGURE 5.40
POST TEST 2ND ROW RIGHT OUTBOARD
LOWER ANCHOR

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FMVSS NO. 225

FIGURE 5.41
POST TEST 2ND ROW RIGHT INBOARD
LOWER ANCHOR



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FMVSS NO. 226

FIGURE 5.42
LOAD SYSTEM CONTROL AND DATA
RECORDING DEVICE IN TEST POSITION

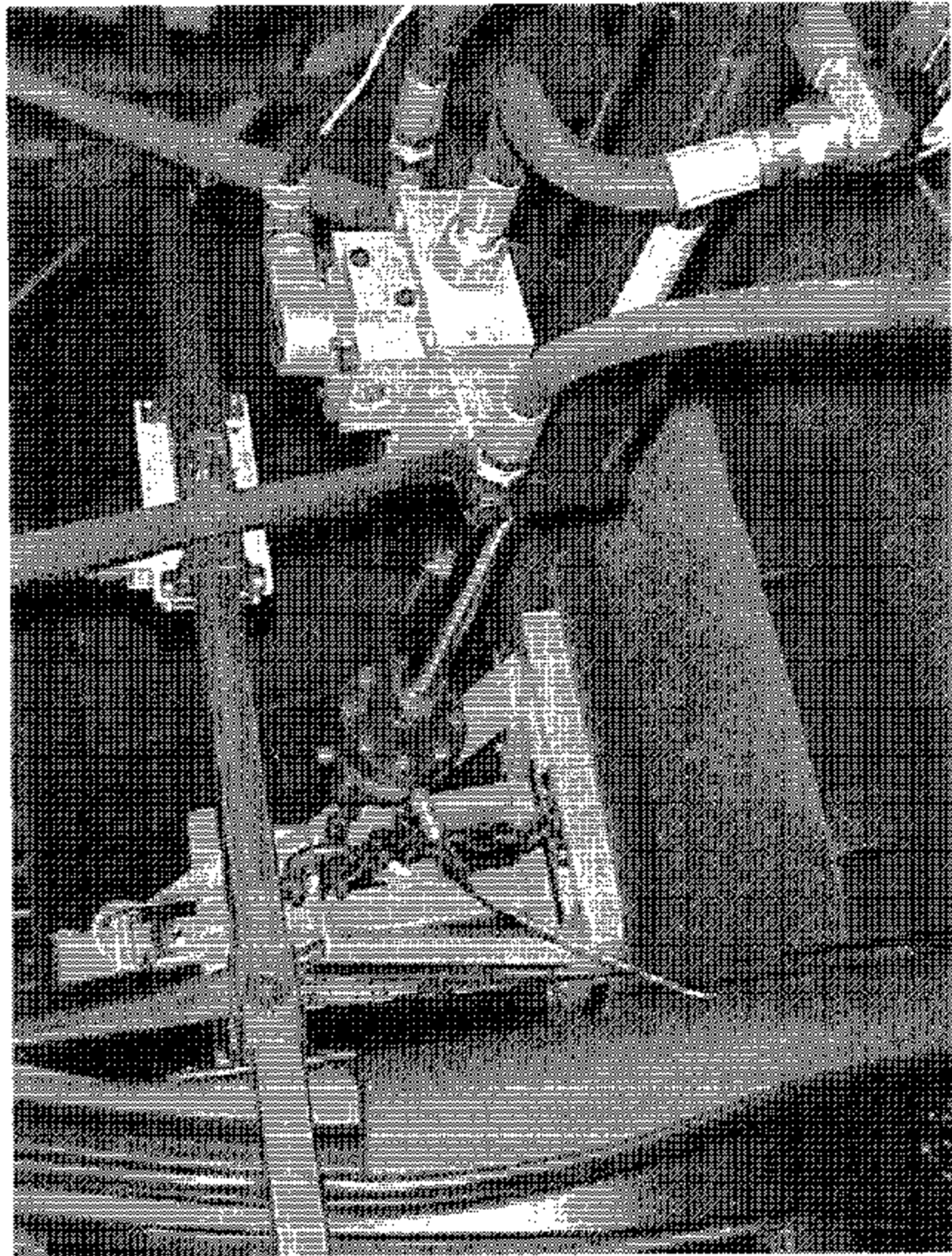


FIGURE 5.43
LOADING DEVICE WITH LOAD CELL AND TEST
FIXTURE IN TEST POSITION

2003 KIA SORENTO
NHTSA NO. C30505
FMVSS NO. 225

SECTION 6

PLOTS

FIGURE 6.1

2ND ROW RIGHT TOP TETHER ANCHOR

GTL 51113, NHTSA C30505

225 Child Restraint, S6.3.4

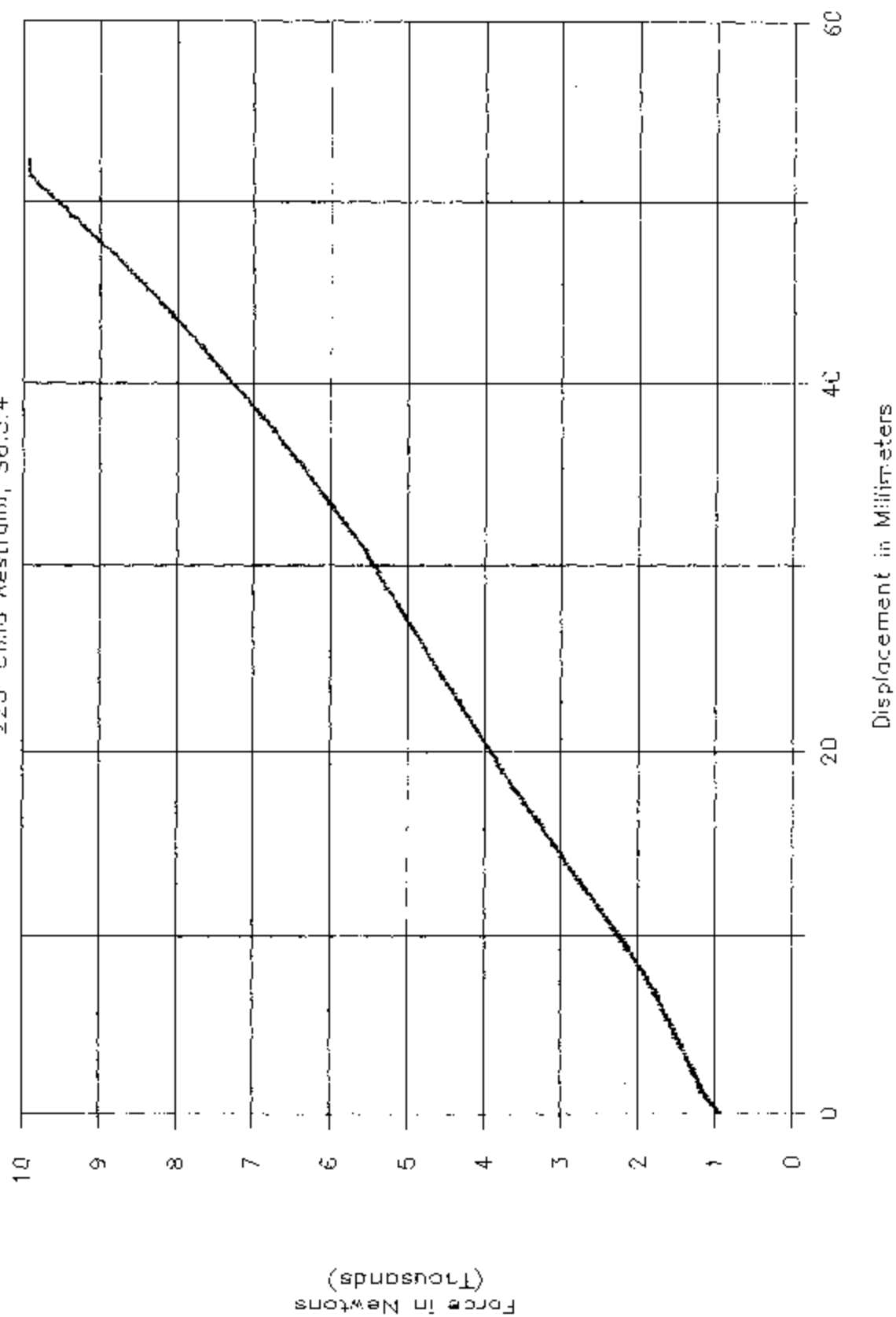


FIGURE 6.2

2ND ROW RIGHT TOP TETHER ANCHOR

GTL 5113, NHTSA C30505

225, Child Restraint, S6.3.4

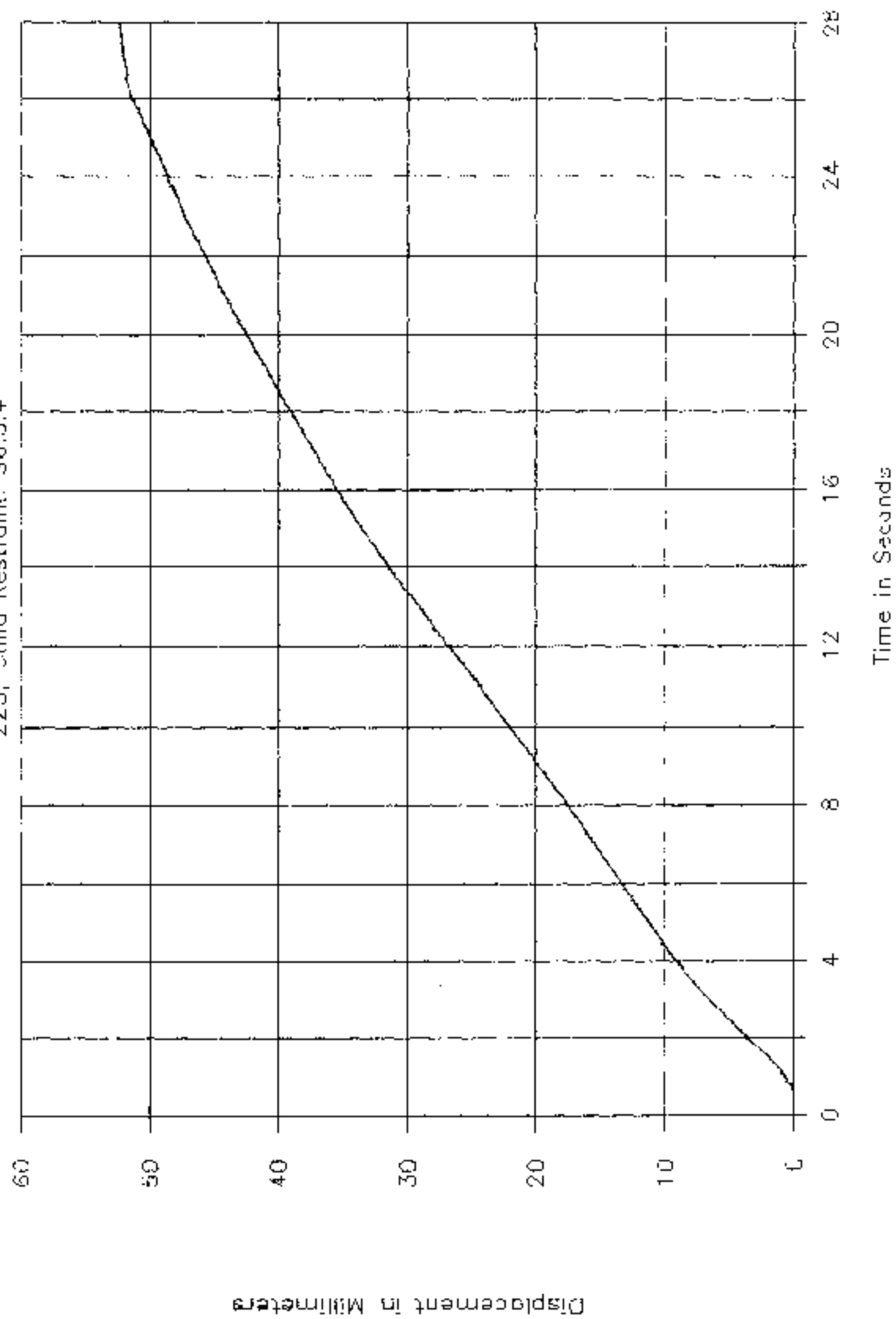


FIGURE 6.3

2ND ROW RIGHT TOP TETHER ANCHOR

GTL 5113, NHTSA C30505

225, Child Restraint, S6 3.4

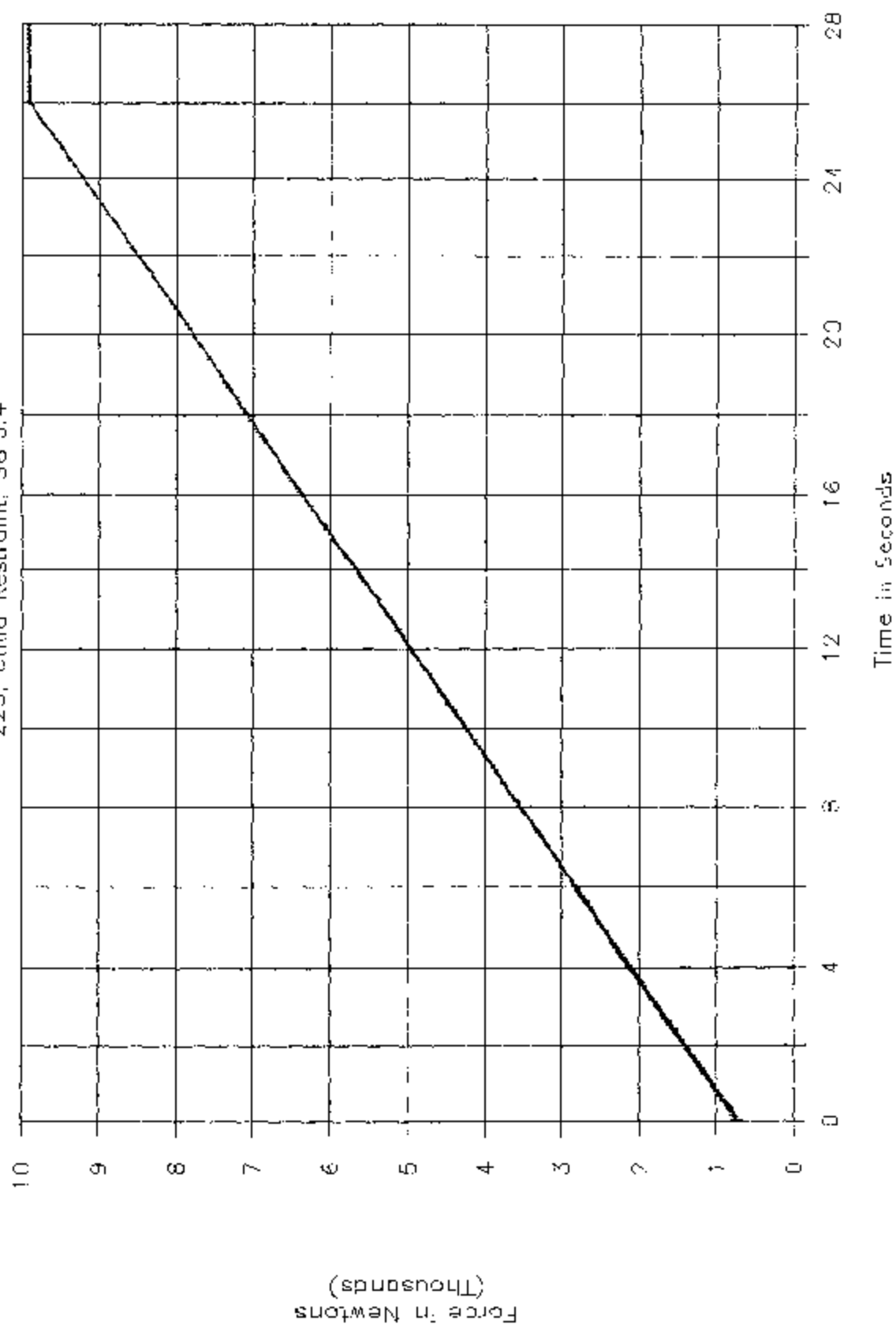


FIGURE 6.4

2ND ROW CENTER TOP TETHER ANCHOR

GTL 5114, NHTSA C30505

225, Child Restraint, S6.3.4

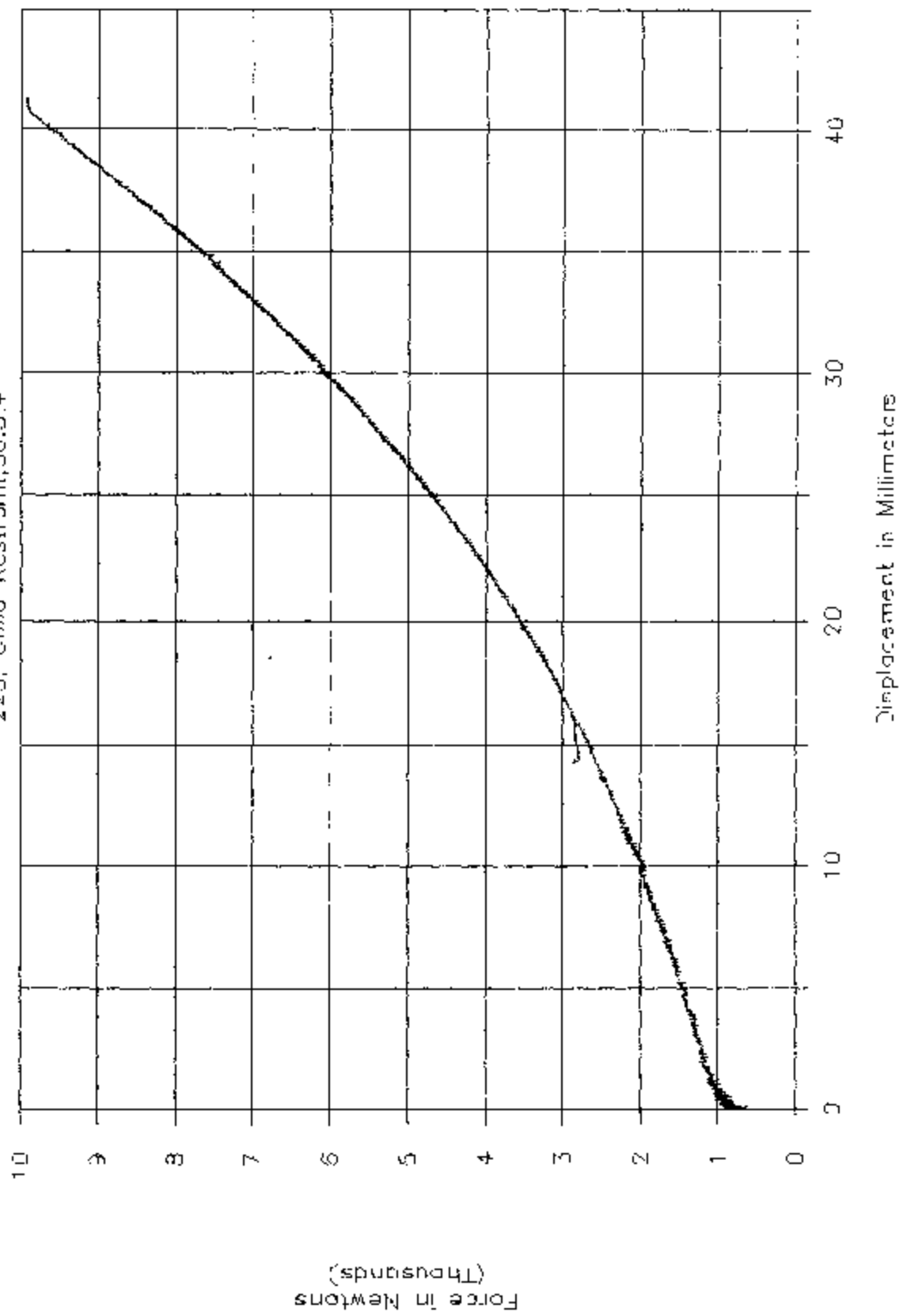


FIGURE 6.5

2ND ROW CENTER TOP TETHER ANCHOR

GTL 5114, NHTSA C30505

225, Child Restraint, S6.3.4

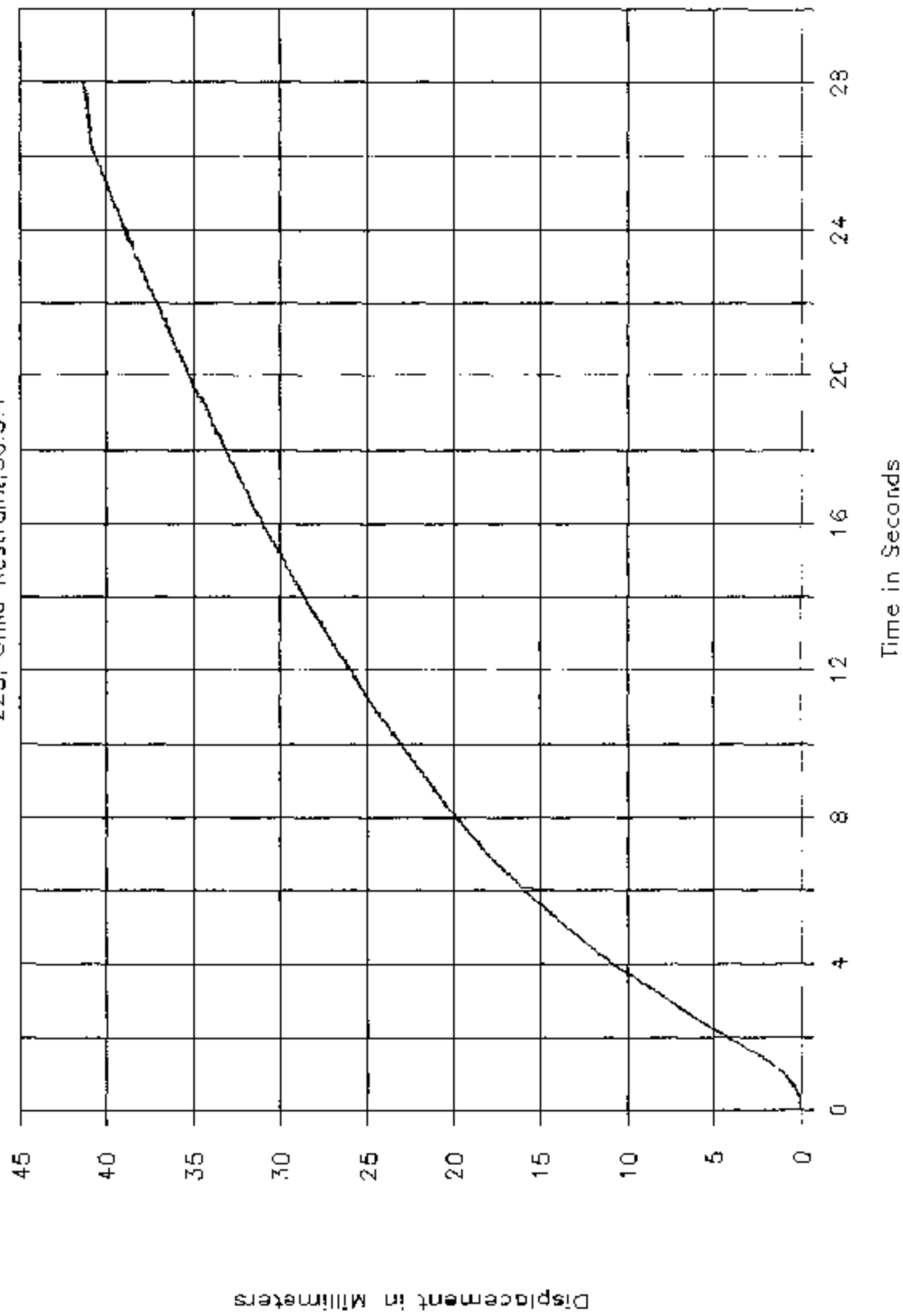


FIGURE 6.6

2ND ROW CENTER TOP TETHER ANCHOR

GTL 5114, NHTSA C3050.5

225, Child Restraint, S6.3.4

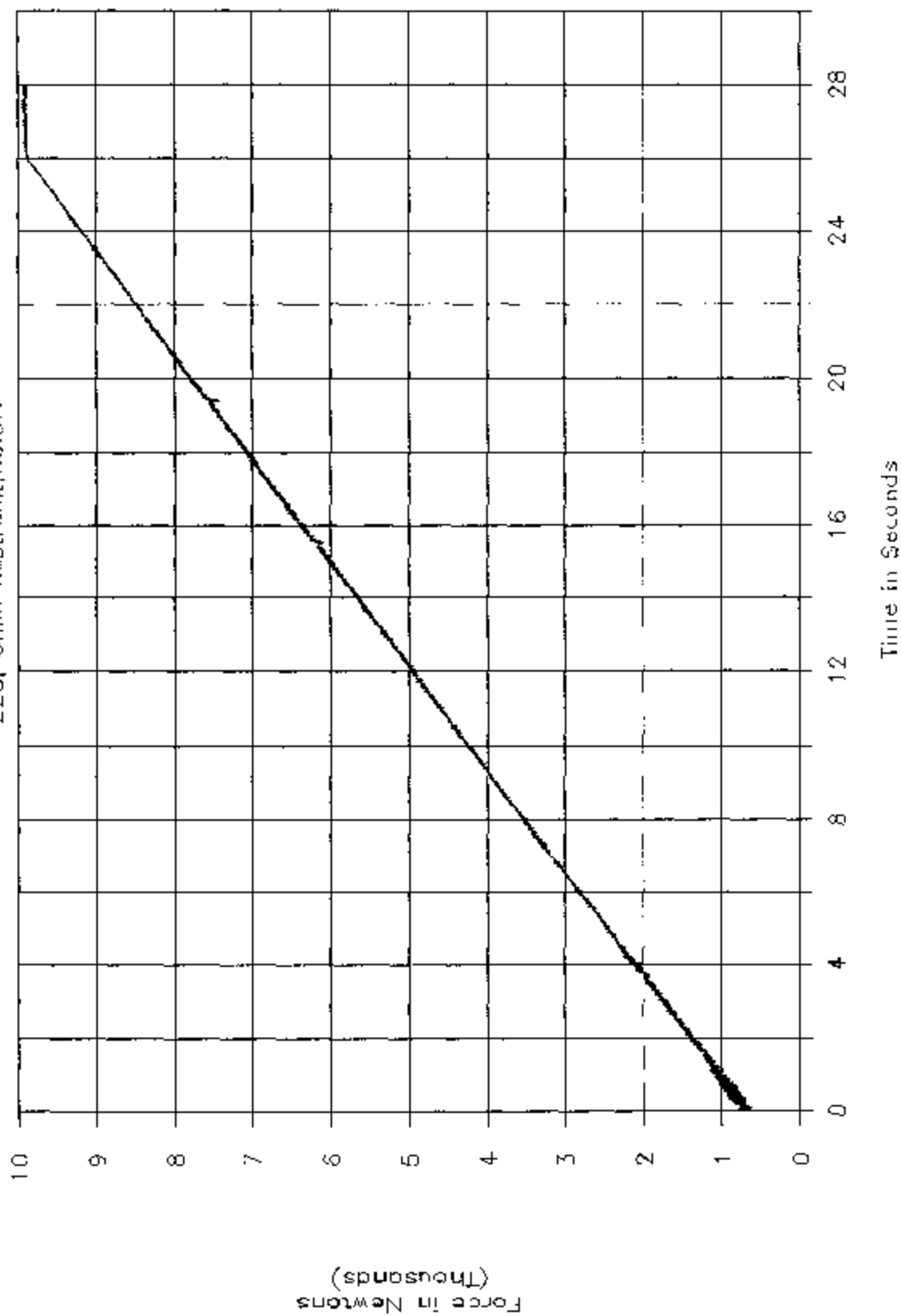


FIGURE 6.7
2ND ROW LEFT LOWER ANCHOR
GTL 5115, NHTSA C30505

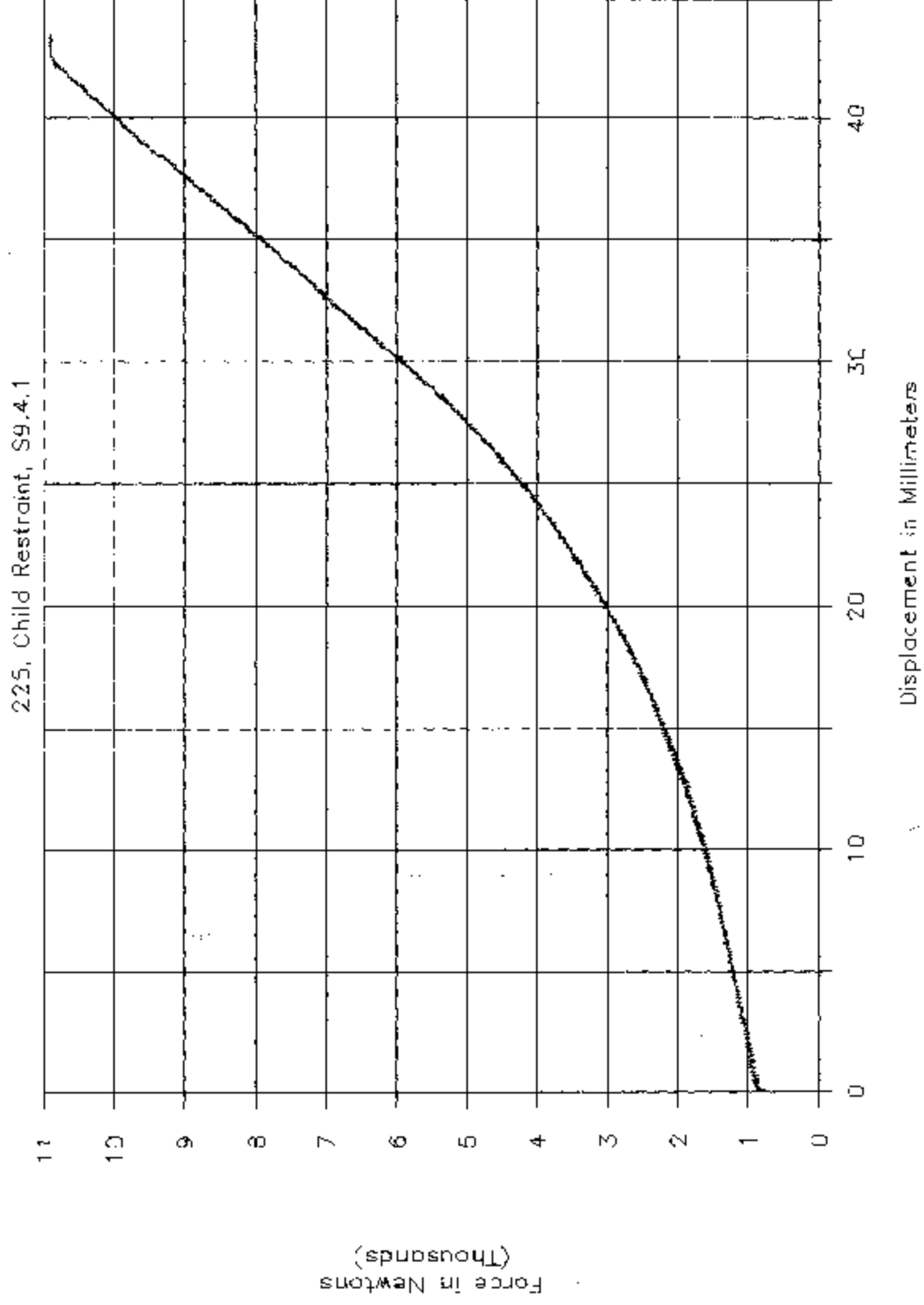


FIGURE 6.8
2ND ROW LEFT LOWER ANCHOR
GTL 5115, NHTSA C30505
225, Child Restraint, S9.4.1

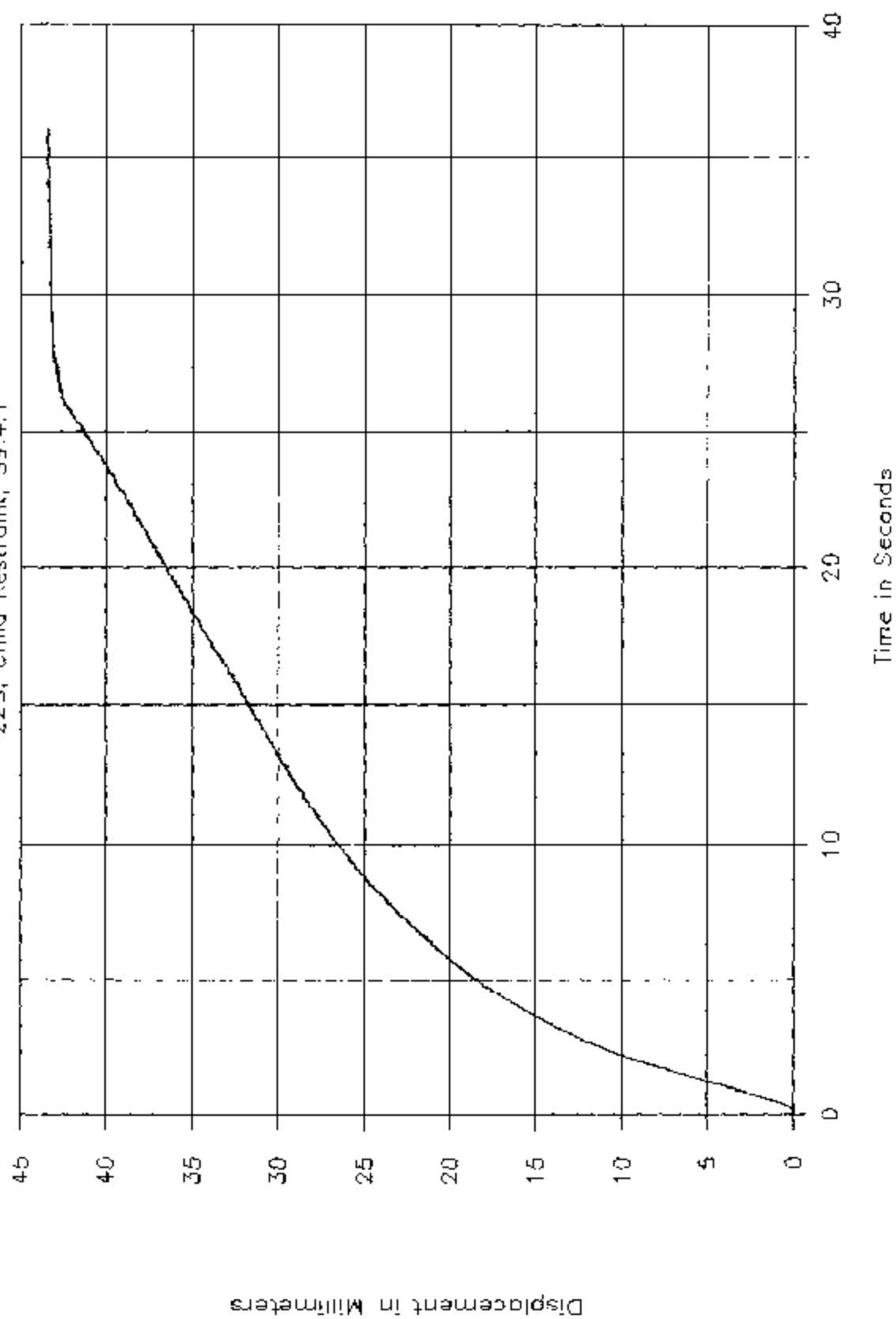
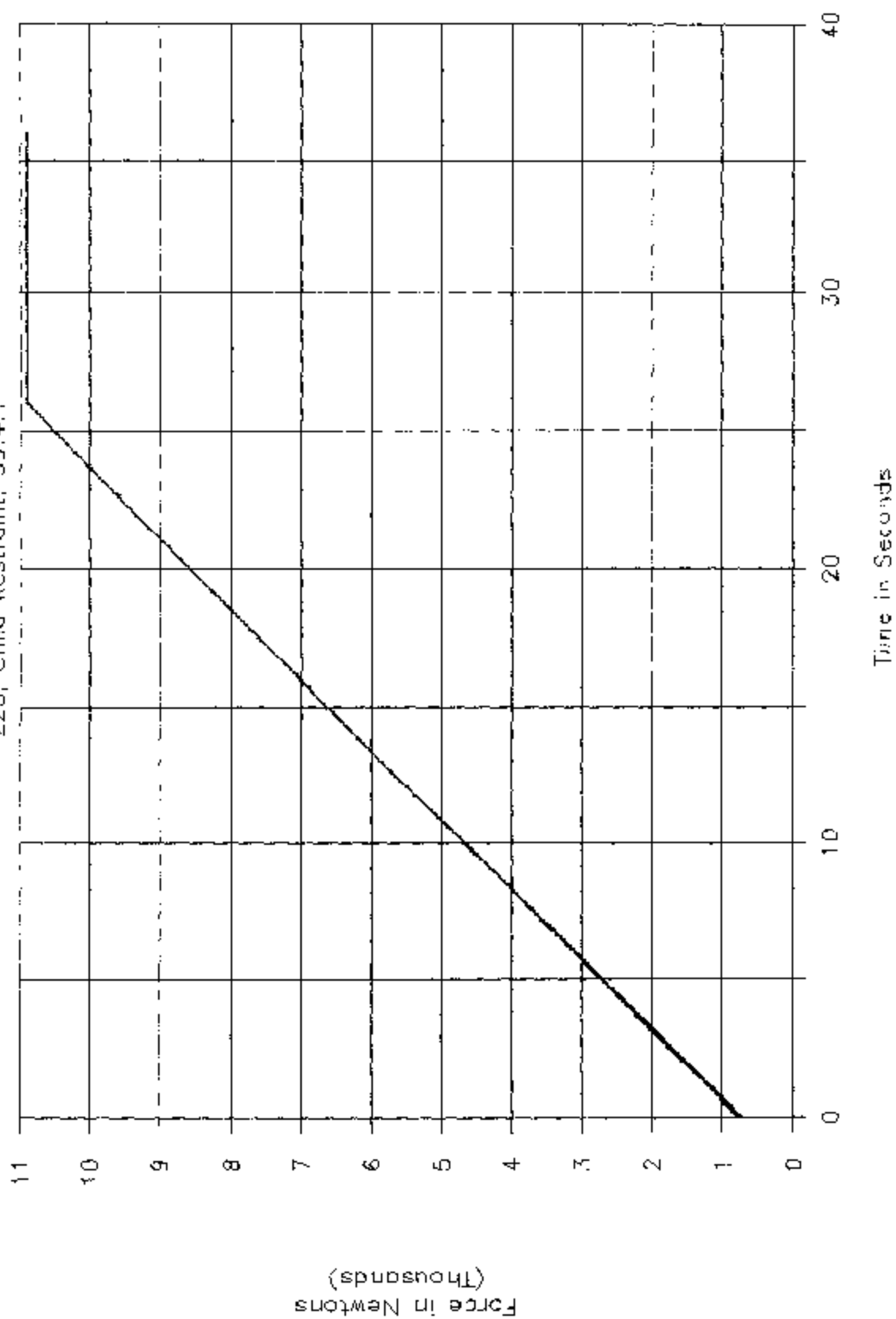


FIGURE 6.9

2ND ROW LEFT LOWER ANCHOR

GIL 5115, NHTSA C30505

225, Child Restraint, S9.4.1



APPENDIX A

OWNER'S MANUAL CHILD RESTRAINT INFORMATION

Installing a Child Restraint System in the Front Passenger Seat and Rear Seats

For safety reasons, we recommend that the child restraint system be used in the center rear seat. If the center rear seat is unavailable, a rear-facing child restraint may be installed in the rear outboard seats. **Never place a rear-facing child restraint in the front passenger seat, because of the danger that an inflating passenger side air bag could impact the rear-facing child restraint and kill the child.**

Since all four of passenger's safety belts move freely under normal conditions and only lock under extreme or emergency conditions (emergency lock mode), you must manually change these safety belts to the auto lock mode to secure a child restraint.

* NOTICE

The driver's safety belt incorporates the emergency lock mode only.

▲ WARNING - Restraint Instructions

Failure to observe this manual's instructions regarding child restraint systems and the instructions provided with the child restraint system could increase the chance and/or severity of injury in an accident.

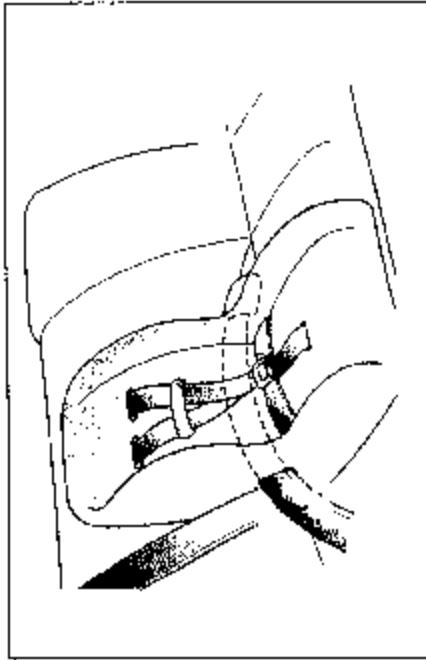
Knowing Your Vehicle



SI BUA304

▲ WARNING - Child Restraint Placement

Never use a rear-facing child restraint in the front passenger seat. In a collision the air bag inflates with great force. A child in a rear-facing restraint in the front passenger seat can be severely or fatally injured by the power of the air bag.



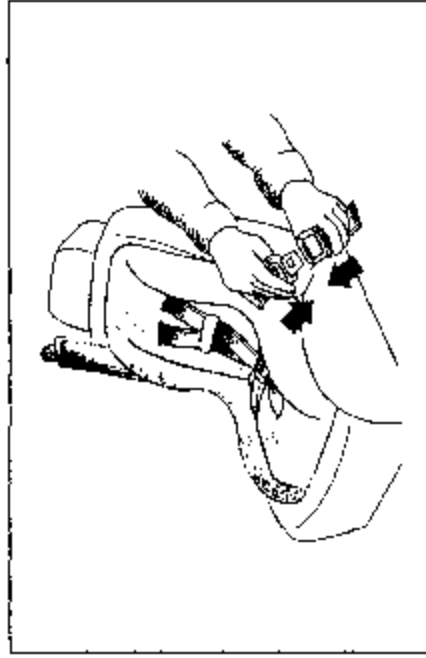
S2MS105305

Placing a Passenger Safety Belt Into The Auto Lock Mode

The use of the auto lock mode will ensure that the normal movement of the child in the vehicle does not cause the safety belt to be pulled out and loosen the firmness of its hold on the child restraint system. To secure a child restraint system in the front passenger seat or rear seats, use the following procedure.

Installing a Child Restraint System in the Front Seat and Rear Outboard Seats

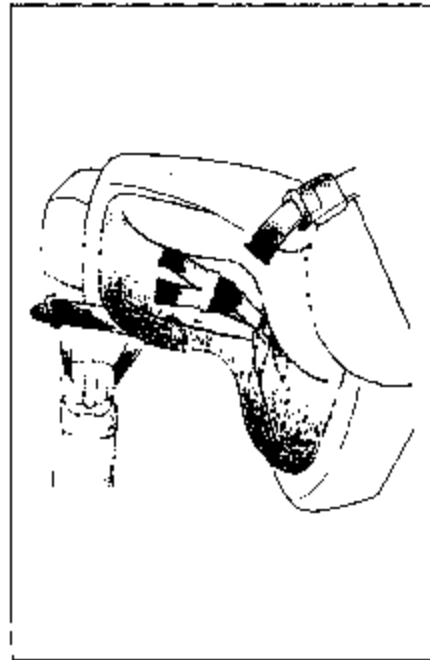
1. Place the child restraint system in the seat and route the lap/shoulder belt around or through the restraint, following the restraint manufacturer's instructions. Be sure the safety belt webbing is not twisted.



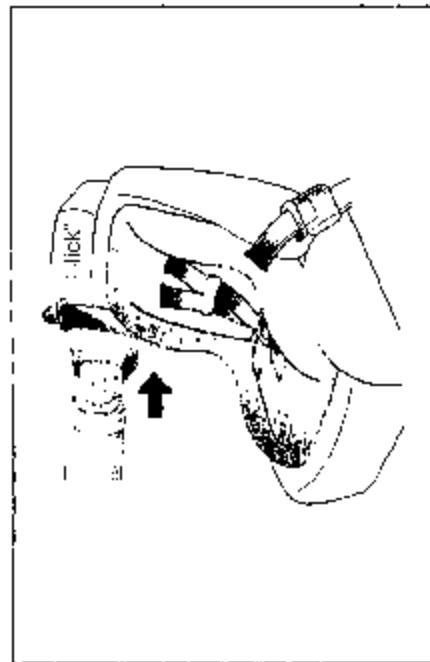
2. Fasten the lap/shoulder belt latch into the buckle. Listen for the distinct "click" sound.

Position the release button so that it is easy to access in case of an emergency.

Knowing Your Vehicle



3. Pull the shoulder portion of the safety belt all the way out. When the shoulder portion of the safety belt is fully extended, it will shift the retractor to the "Auto Lock" (child restraint) mode.



4. Slowly allow the belt to retract. Pull up on the shoulder webbing. A "clicking" or "ratcheting" sound will be heard as the belt retracts. This indicates the retractor is now in the automatic locking mode. Push down on the child restraint while you pull up on the belt in order to remove any slack in the belt.



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5. Before placing the child in the child restraint, forcibly try to push the seat from side to side and forward to make sure that the seat is securely held in place.
6. Double check that the retractor is in the automatic locking mode by trying to pull the shoulder portion of the safety belt out of the retractor. If you cannot pull the belt out of the retractor, it is in the automatic locking mode. If you can, repeat step 4.

To remove the child restraint, press the release button on the buckle and then pull the lap/shoulder belt out of the restraint and allow the safety belt to retract fully.

Knowing Your Vehicle

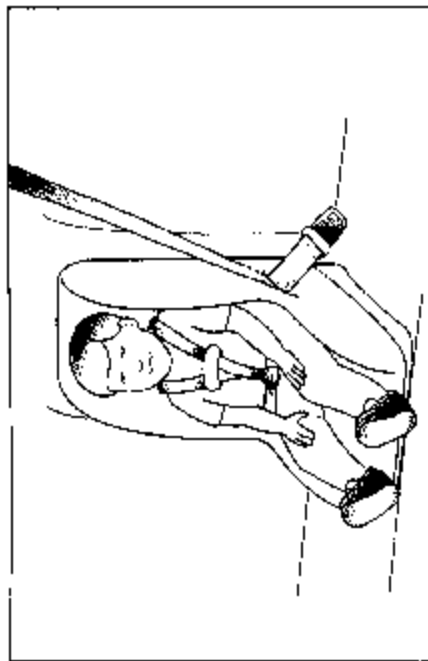
▲ WARNING - Auto Lock Mode

The lap/shoulder belt automatically returns to the "emergency lock mode" whenever the belt is allowed to retract fully. Therefore, the preceding seven steps must be followed each time a child restraint is installed.

If the safety belt is not placed in the "auto lock" mode, severe injury or death could occur to the child and/or other occupants in the vehicle in a collision, since the child restraint will not be effectively held in place.

*** NOTICE**

When the safety belt is allowed to retract to its fully stowed position, the retractor will automatically switch from the "Auto Lock" mode to the emergency lock mode for normal adult usage.

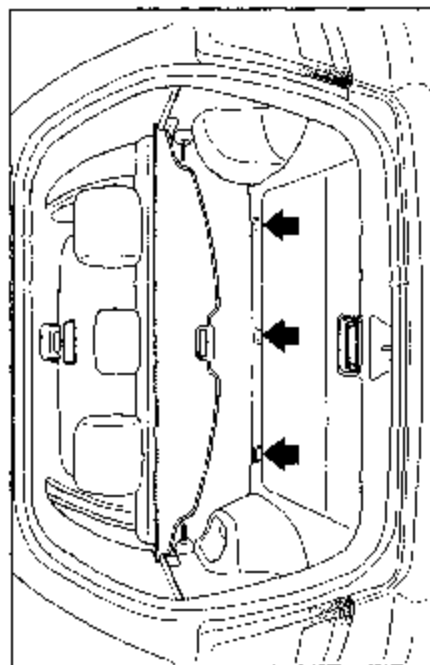


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Installing a Child Restraint System in the Rear Center Seat

To install a child restraint system in the rear center seat, do the following:

1. Pull the safety belt webbing and insert the tongue plate into the buckle.
2. Do the same procedure in the front seat and rear outboard seat on page 3-55.



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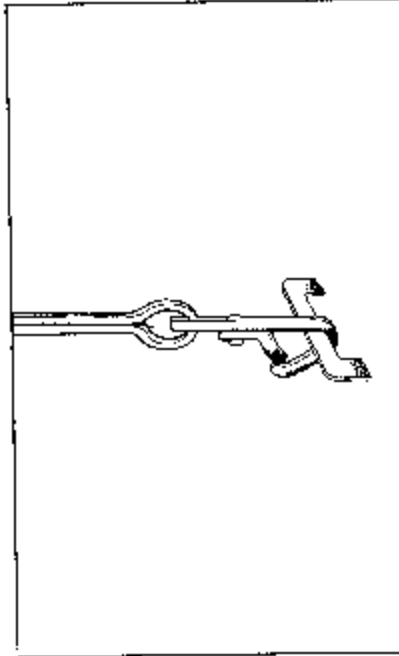
Child Restraint Anchor Position

Your vehicle is equipped with an anchor for securing the tether strap of a child restraint system (child seat). The child restraint anchor fittings are installed on the package tray behind the rear seat.

⚠ WARNING - Split Bench Seat

If your vehicle has a split-bench rear seat, installing a child restraint at the middle anchorage fitting is dangerous. The child seat tether may slide down between the split, making the seat insecure.

Knowing Your Vehicle



32BL6355

Tether Anchor Installation

▲ WARNING - Child Restraint

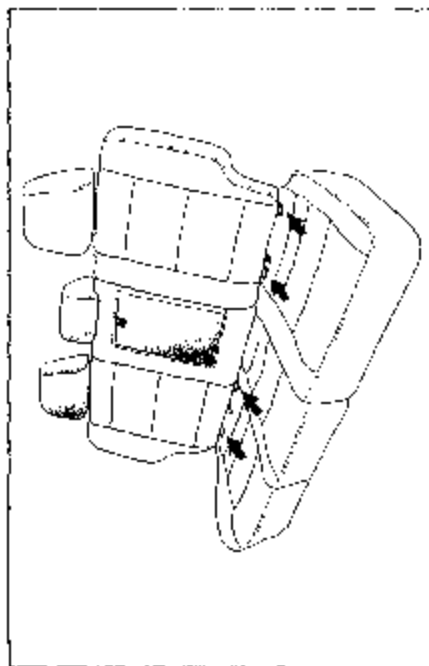
Check that the child restraint system is secure by pushing and pulling it in different directions. Incorrectly fitted child restraints may swing, twist, tip or come away causing death or injury.

▲ WARNING - Child Restraint Anchorage

Child restraint anchorages are designed to withstand only those loads imposed by correctly fitted child restraints. Under no circumstances are they to be used for adult seat belts or harnesses or for attaching other items or equipment to the vehicle.

▲ WARNING - Child Restraint Placement

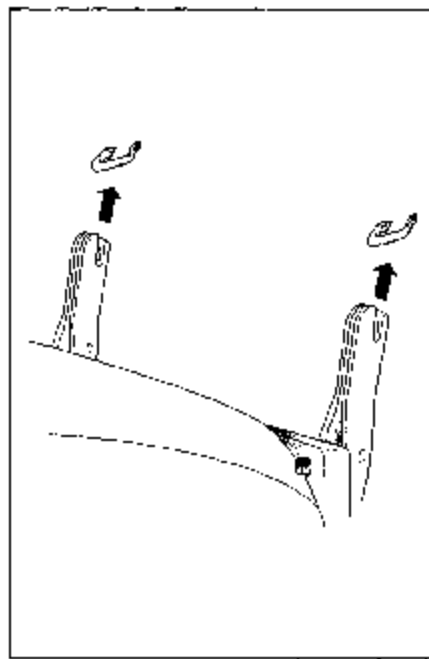
Never use a rear-facing child restraint in the front passenger seat. A child in a rear facing child restraint installed in the front passenger seat can be severely or fatally injured by an air bag which could impact the child restraint with great force when the air bag inflates.



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Child seat lower anchors

The lower anchors are located between rear seat and seatback.



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To attach the child seat to the lower anchor, insert the child seat latch into the lower anchor hold. Listen for the audible "Click" sound.

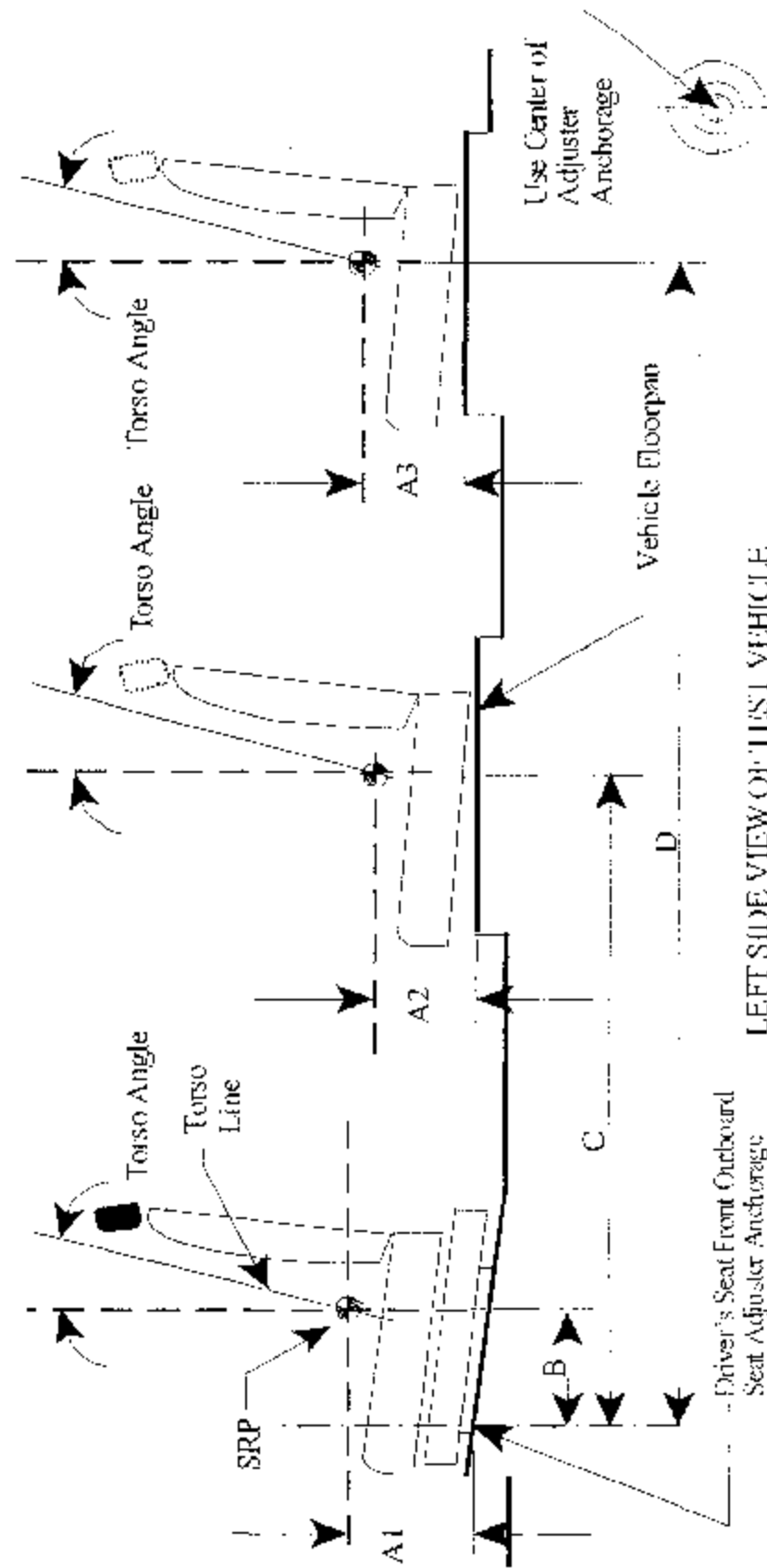
APPENDIX B

MANUFACTURER'S DATA

SEAT REFERENCE POINT (SRP) AND TORSO ANGLE DATA
FOR FMVSS 225

(All dimensions in mm)

Model Year: 03 ; Make: KIA ; Model: Sorento ; Body Style: SUV
 Seat Style: Front row: contoured (1+1 person) ; Second row: contoured (2+1 person) ; Third row: N/A



LEFT SIDE VIEW OF TEST VEHICLE

Table 1. Seating Positions and Torso Angles

030505

	Left (Driver Side)	Center (if any)	Right
A1	283	N/A	283
A2	180	190	180
A3	N/A	N/A	N/A
B	339	N/A	339
C	1149	1104	1149
D	N/A	N/A	N/A
Torso Angle (degree)	Front Row	23 degrees	23 degrees
	Second Row	25 degrees	25 degrees
	Third Row	N/A	N/A

Note: 1. All dimensions are in mm. If not, provide the unit used.

SEATING REFERENCE POINT FOR FMVSS 225

(All dimensions in mm)

Model Year: 03; Make: KIA; Model: Sorento; Body Style: SUV
 Seat Style: Front row: contoured (1+1 person); Second row: contoured (2+1 person); Third row: N/A

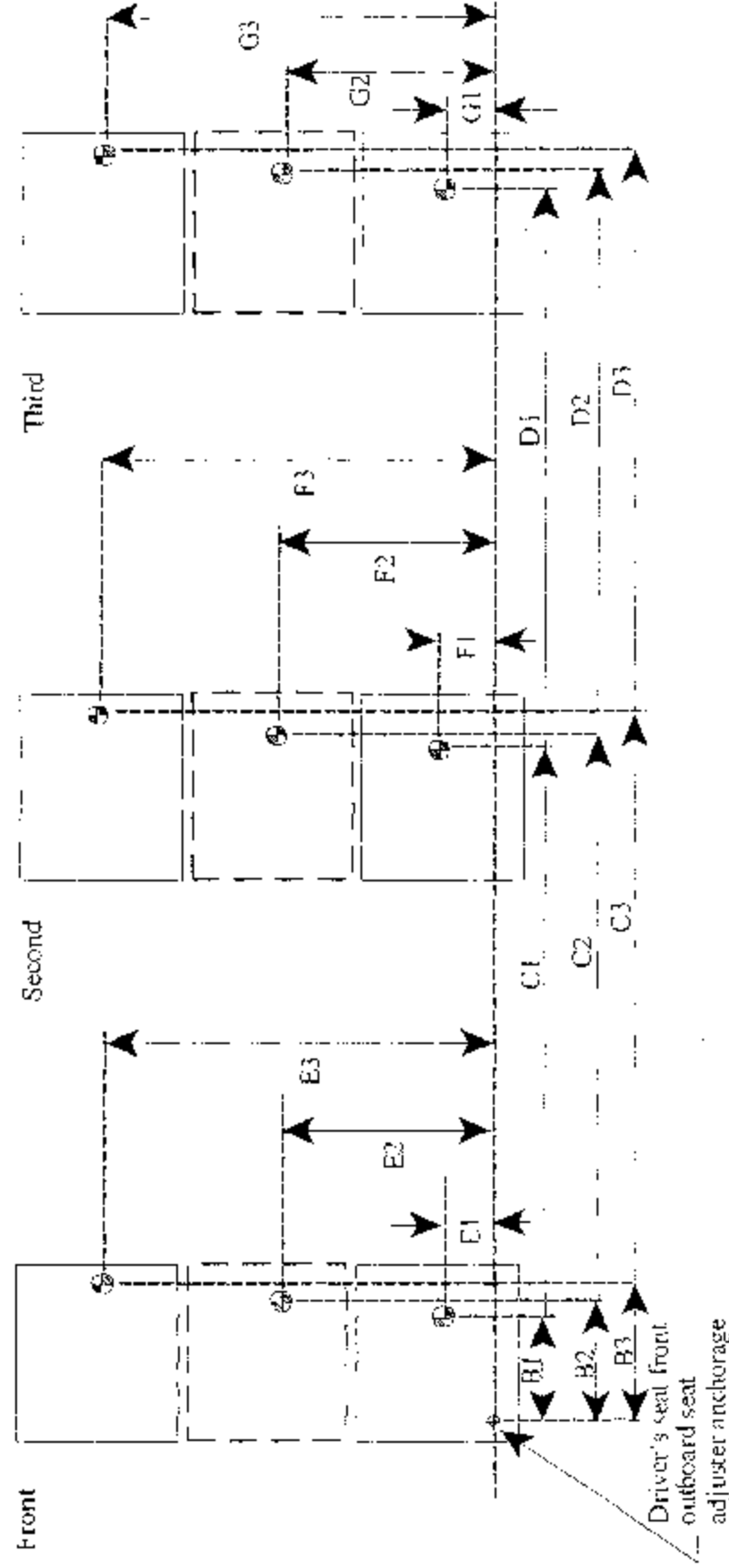


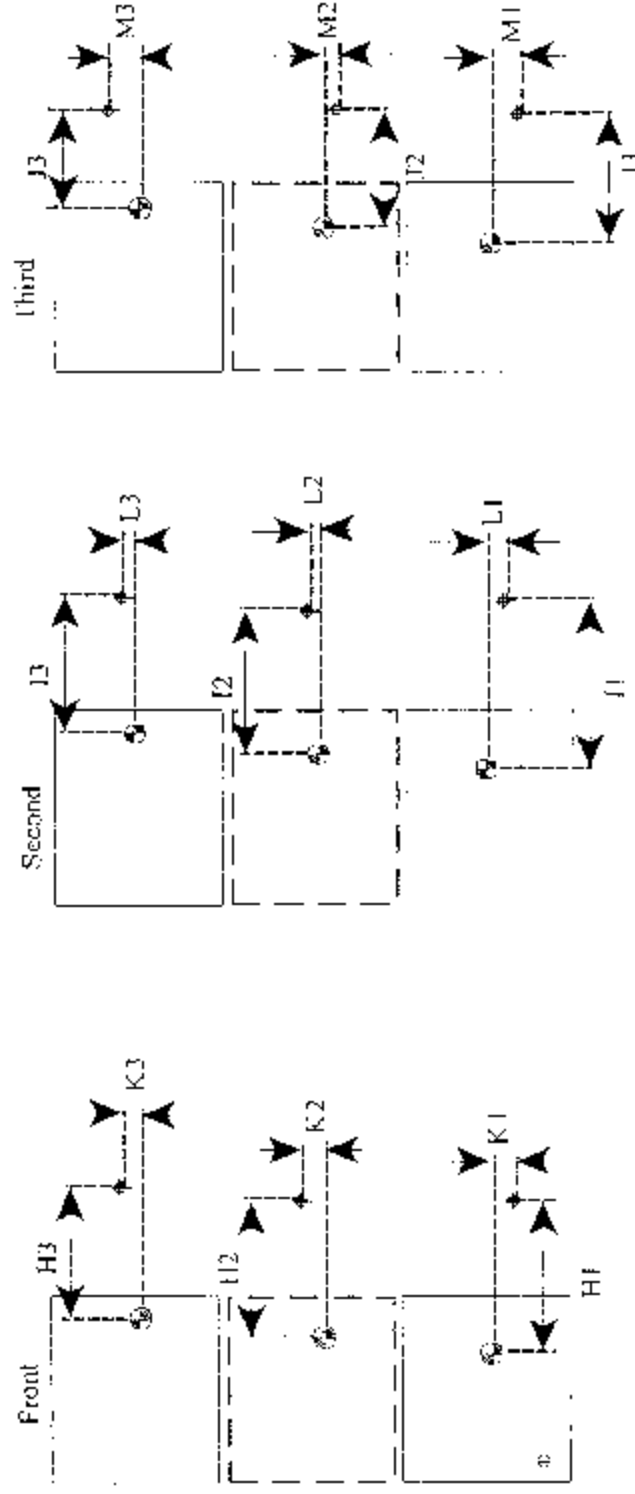
Table 2. Seating Reference Point and Tether Anchorage Locations

Seating Reference Point (SRP)		Distance from Driver's front outboard seat adjuster anchorage ¹
Front Row	B1	339
	E1	238
	B2	N/A
	E2	N/A
	B3	339
	E3	1038
Second Row	C1	1149
	F1	268
	C2	1104
	F2	638
	C3	1149
	F3	1008
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: 03; Make: KIA; Model: Sorento; Body Style: SUV
 Seat Style: Front row: contoured (1 +1 person); Second row: contoured (2+1 person); 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	305.5
	L1	-41.5
	I2	305.5
	L2	-35
	J2	305.5
	L3	-41.5
Third Row	J1	N/A
	M1	N/A
	J2	N/A
	M2	N/A
	J3	N/A
	M3	N/A

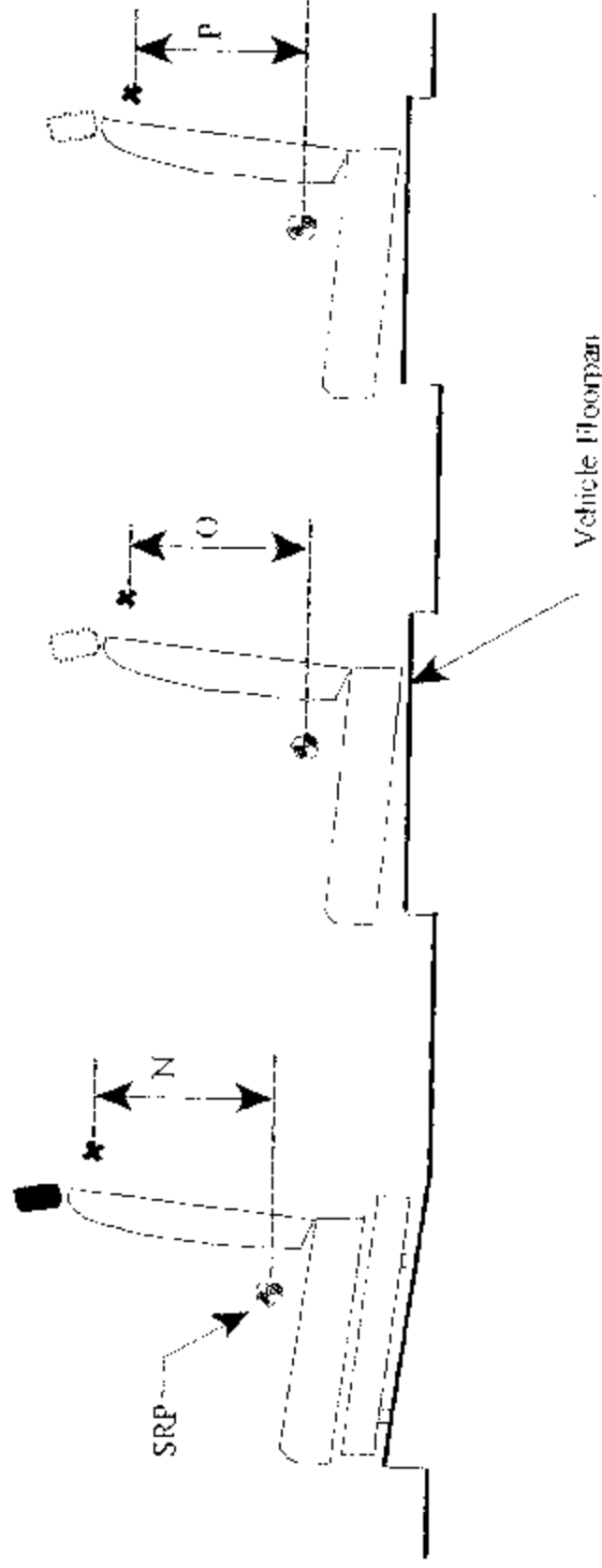
Note: 1. Use the center of anchorage.

TETHER ANCHORAGE LOCATIONS - VERTICAL

FOR FMVSS 225

(All dimensions in mm)

Model Year: 03; Make: KIA; Model: Sorento; Body Style: SUV
 Seat Style: Front row; contoured (1+1 person); Second row: contoured (2+1 person); Third row: N/A



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)	-66.4
	O2 (Center)	-76.4
	O3 (Right)	-66.4
Third Row	P1 (Left)	N/A
	P2 (Center)	N/A
	P3 (Right)	N/A

Note: 1. All dimensions are in mm. If not, provide the unit used.

Test Procedures Used for Compliance Tests

~~Bethesda Anchorage~~

Lower Anchorages

Seating Location	FMVSS Section(s) - Req.
Front	N/A
Center (if any)	N/A
Right (if any)	N/A
Left	S 9.4.1
Center	S 9.4.1
Right	S 9.4.1
Left	N/A
Center	N/A
Right	N/A
Left	N/A
Center	N/A
Right	N/A
Seating Location	FMVSS Section(s) - Req.
Front	N/A
Center (if any)	N/A
Right (if any)	N/A
Left	S 6.3.4
Center	S 6.3.4
Right (if any)	S 6.3.4
Left	N/A
Center	N/A
Right	N/A
Left	N/A
Center	N/A
Right	N/A

TETHER

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.

YES.
 - diameter : 6mm
 - length : 27mm
 - they can only be removed by use of a tool.
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.

YES
 - pitch : 14 degrees
 - roll : 0 degrees
 - yaw : 0 degrees
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.

YES
 - they are visible without any guidance fixtures.
4. **Location of Tether Anchorage:** Applicable section of FMVSS No. 225 for the option used for its certification.

Attached DWG-1
5. **Number of Tether Anchorage:** Applicable section of FMVSS No. 225 for the option used for its certification

Attached DWG-2

