FINAL REPORT NUMBER 225-MGA-06-007

SAFETY COMPLIANCE TESTING FOR FMVSS 225
"Child Restraint Anchorage Systems"

TOYOTA MOTOR CORPORATION
2006 TOYOTA HIGHLANDER
NHTSA No. C65101

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083

Test Date: August 21, 2006
Report Date: September 29, 2006

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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Approval Date: 09/29/2006

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: Edward Chan Digitally signed by Edward Chan DN: CN = Edward Chan, C = US Date: 2006.09.29 08:03:52 -04'00'

Acceptance Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

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4. Title and Subtitle Final Report of FMVSS 225 Compliance Testing of a 2006 Toyota Highlander, NHTSA No. C65101		5. Report Date September 29, 2006 6. Performing Organization Code MGA	
7. Author(s) Helen A. Kaleto, Laboratory Manager Melanie Schick, Project Engineer Brad Reaume, Test Personnel		8. Performing Organization Report No. 225-MGA-06-007	
9. Performing Organization Name and Address MGA Research Corporation 446 Executive Drive Troy, Michigan 48083		10. Work Unit No. 11. Contract or Grant No. DTNH22-02-D-11043	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance (NVS-220) 400 Seventh Street, SW Room 6111 Washington, DC 20590		13. Type of Report and Period Covered Final Test Report 14. Sponsoring Agency Code NVS-220	
15. Supplementary Notes			
16. Abstract A compliance test was conducted on the subject 2006 Toyota Highlander, NHTSA No. C65101, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-225-01 for the determination of FMVSS 225 compliance. The tests were conducted at MGA Research Corporation in Troy, Michigan on August 21, 2006. Test failures identified were as follows: NONE The data recorded indicates that the 2006 Toyota Highlander tested appears to meet the requirements of FMVSS 225.			
17. Key Words Compliance Testing Safety Engineering FMVSS 225 2006 Toyota Highlander		18. Distribution Statement Copies of this report are available From: NHTSA Technical Reference Division, Mail Code: NPO-230 400 Seventh Street, SW, Room PL-403 Washington, D.C. 20590 Telephone No. (202) 366-4946	
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Form DOT F 1700.7 (8-70)

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1.0 PURPOSE AND PROCEDURE

PURPOSE

The child restraint anchorage testing results presented in this report are part of the Federal Motor Vehicle Safety Standard (FMVSS) No. 225 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by MGA Research Corporation (MGA) under Contract No. DTNH22-02-D-11043. The purpose of the testing was to determine if the subject vehicle, a 2006 Toyota Highlander, NHTSA No. C65101 meets the performance requirements of FMVSS No. 225, "Child Restraint Anchorage Systems."

PROCEDURE

This testing was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure TP-225-01 (4/11/05) and MGA's Laboratory Test Procedure, MGATP225GOV (6/23/06).

The front occupant compartment consisted of two (2) adjustable outboard bucket seats and the rear occupant compartment consisted of a 2nd row three-passenger 60/40 split-bench seat. Each 2nd row outboard seating position was equipped with a child restraint anchorage system (one tether and two lower anchorages). The 2nd row center seating position was equipped with a tether anchorage. The center-to-center spacing between the 2nd row outboard lower anchorages was approximately 800 mm. Each 2nd row outboard seating position was tested with the SFADII fixture and the 2nd row center seating position was tested with the SFADI fixture.

2.0 COMPLIANCE TEST AND DATA SUMMARY

TEST SUMMARY

The testing was conducted at MGA in Troy, Michigan on August 21, 2006.

Based on the test results, the 2006 Toyota Highlander appears to meet the requirements of FMVSS No. 225 for this testing.

The SFADII at the 2nd row left seating position sustained a maximum force of 11,255 N and held the required load for 3 seconds. The total displacement from point "X" on the SFADII for the 2nd row left seating position was 70 mm. The SFADII at the 2nd row right seating position sustained a maximum force of 16,256 N and held the required load for 3 seconds. The SFADI at the 2nd row center seating position sustained a maximum force of 15,259 N and held the required load for 2 seconds.

DATA SUMMARY

Strength and displacement summary data are provided below. Data for the configuration and the location of each child restraint anchorage system are provided in Section 5.0. Photographs are found in Section 6.0 and test plots are found in Section 7.0.

Table 1. Summary Data for Strength and Displacement

MGA Test #	Fixture Type	Test Configuration	Seating Position	Max. Load (N)	Displacement (mm)
SB6368	SFADII	Forward	2nd Row Left	11,255	70
		Forward w/Tether	2nd Row Right	16,256	N/A
SB6369	SFADI	Forward	2nd Row Center	15,259	N/A

N/A indicates that the displacement criteria does not apply to this test.

3.0 TEST VEHICLE INFORMATION

Table 2. General Test and Vehicle Parameter Data

VEH. MOD YR/MAKE/MODEL/BODY	2006 Toyota Highlander
VEH. NHTSA NO.	C65101
VIN	JTEGD21AX60140034
COLOR	Sonora Gold Pearl
VEH. BUILD DATE	11/2005
TEST DATE	August 21, 2006
TEST LABORATORY	MGA Research Corporation
OBSERVERS	Melanie Schick, Brad Reaume, Kenney Godfrey

GENERAL INFORMATION:

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Toyota Motor Corporation

Date of Manufacture: 11/05; VIN: JTEGD21AX60140034

GVWR: 5360 lbs; GAWR FRONT: 2865 lbs

GAWR REAR: 2950 lbs

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 30 psi REAR: 30 psi

Recommended Tire Size: P225/70R16

Recommended Cold Tire Pressure:

FRONT: 30 psi REAR: 30 psi

Size of Tire on Test Vehicle: P225/70R16

Size of Spare Tire: P225/70R16

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench ____; Bucket __X__; Split Bench ____

Number of Occupants: Front __2__; Middle __3__; Rear __N/A__; TOTAL __5__.

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

MGA Research Corporation 446 Executive Drive Troy, Michigan 48083	
Test Equipment Used for Testing	**Calibration Due Date**
MGA Hydraulic Test Frame	N/A
Two (2) Load Cell 10,000 lb Capability	S/N 662 (12/20/06), S/N 304 (12/20/06)
String Potentiometer	Calibrated at each use (S/N F1603959A)
Hydraulic Pump	N/A
MGA CRF Fixture	N/A
MGA SFADI	N/A
MGA SFADII	N/A
MGA 2-Dimensional Template	N/A
Linear Scale	S/N TPM544 (08/08/07)
MGA Data Acquisition System	N/A
Digital Calipers	S/N MGA00058 (09/09/06)
Force Gauge	S/N MGA00647 (05/26/07)
Inclinometer (Digital)	S/N MGA00060 (02/09/07)

5.0 DATA

Table 3. Child Restraint Tether Anchorage Configuration

Seating Position		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 Row		N/A	N/A	N/A	N/A
Second Row	LH	Yes	Yes	Yes	Yes
	Ctr.	Yes	Yes	Yes	Yes
	RH	Yes	Yes	Yes	Yes
Third Row		N/A	N/A	N/A	N/A

Note: AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225-01.

REMARKS: NONE.

Table 4. Child Restraint Lower Anchorage Configuration

OBSERVED LOWER ANCHORAGE CONFIGURATION	SEAT POSITION				
		FRONT ROW	SECOND ROW		THIRD ROW
			I/B	O/B	
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 100 mm above the bar, and in the vertical longitudinal plane that passes through the center of the bar.	LH	N/A	57	58	N/A
	Ctr		N/A		
	RH		58	58	
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.	LH	N/A	No		N/A
	Ctr		N/A		
	RH		No		
Diameter of the bar (mm)	LH	N/A	5.98	5.95	N/A
	Ctr		N/A		
	RH		5.99	5.96	
Inspect if the bars are straight, horizontal and transverse	LH	N/A	Yes		N/A
	Ctr		N/A		
	RH		Yes		
Optional Marking: At least one anchorage bar (when deployed for use, if storable anchorages), one guidance fixture, or one seat marking is visible.	LH	N/A	N/A		N/A
	Ctr				
	RH				
Optional Marking: If guidance fixtures are used, the fixture(s) must be installed.	LH	N/A	N/A		N/A
	Ctr				
	RH				
Measure the distance between Point "Z" of the CRF and the front surface of the anchorage bar (mm)	LH	N/A	55		N/A
	Ctr		N/A		
	RH		55		
Measure the distance between the SRP to the front of the anchorage bar (mm)	LH	N/A	165	165	N/A
	Ctr		N/A		
	RH		157	157	

Table 4. Child Restraint Lower Anchorage Configuration (continued)

OBSERVED LOWER ANCHORAGE CONFIGURATION	SEAT POSITION				
		FRONT ROW	SECOND ROW		THIRD ROW
			I/B	O/B	
Inspect if the centroidal longitudinal axes are collinear within 5 degrees	LH	N/A	Yes		N/A
	Ctr		N/A		
	RH		Yes		
Inspect if 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 60 mm in length (mm).	LH	N/A	29.1	29.2	N/A
			41.0	40.8	
	Ctr		N/A		
	RH		30.7	30.8	
			41.7	41.1	
Inspect if the bars can be connected to, over their entire inside length by the connectors of child restraint system.	LH	N/A	Yes		N/A
	Ctr		N/A		
	RH		Yes		
Inspect if the bars are an integral and permanent part of the vehicle.	LH	N/A	Yes		N/A
	Ctr		N/A		
	RH		Yes		
Inspect if the bars are rigidly attached to the vehicle. If feasible, hold the bar firmly with two fingers and gently pull.	LH	N/A	Yes		N/A
	Ctr		N/A		
	RH		Yes		

PITCH, YAW, & ROLL INFORMATION

SEAT POSITION	PITCH (deg)	YAW (deg)	ROLL (deg)
2nd Row Left	15.0	No Data	0.2
2nd Row Center	N/A	N/A	N/A
2nd Row Right	14.4	No Data	0.4

N/A indicates that there were no lower anchorages in the 2nd row center seating position.

Note: AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225-01.

REMARKS: NONE

Table 5. Tether Location and Dimensional Measurements

SEAT POSITION FOR TETHER		TETHER ANCHORAGE LOCATION Located in the required zone?
Front Row		N/A
Second Row	LH	Yes
	Ctr.	Yes
	RH	Yes
Third Row		N/A

Note: AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225-01.

REMARKS: NONE

Table 6. Tether Anchorage Static Loading and Displacement

SEAT POSITION		Seat, Seat Back, & Head Restraint Positions			Type of SFAD Used	Angle (deg)	Initial Location (mm)	Onset Rate (N/sec.)	Force Applied (N)	Max. Load (N)	Final Location (mm)	Horiz. Displ. (mm)
		Seat	Seat Back	Is There a H/R?								
Front Row		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Second Row	LH	Full Rwd	Most Upright	Yes	II	10	17	387	11,000	11,255*	87	70
	Ctr.			Yes	I	10	N/A	535	15,000	15,259*	N/A	N/A
	RH			Yes	II	10	N/A	535	15,000	16,256*	N/A	N/A
Third Row		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225-01.

REMARKS: * Applied force exceeded the force specified in the test procedure.

6.0 PHOTOGRAPHS

6.1 Front view

6.2 Rear view

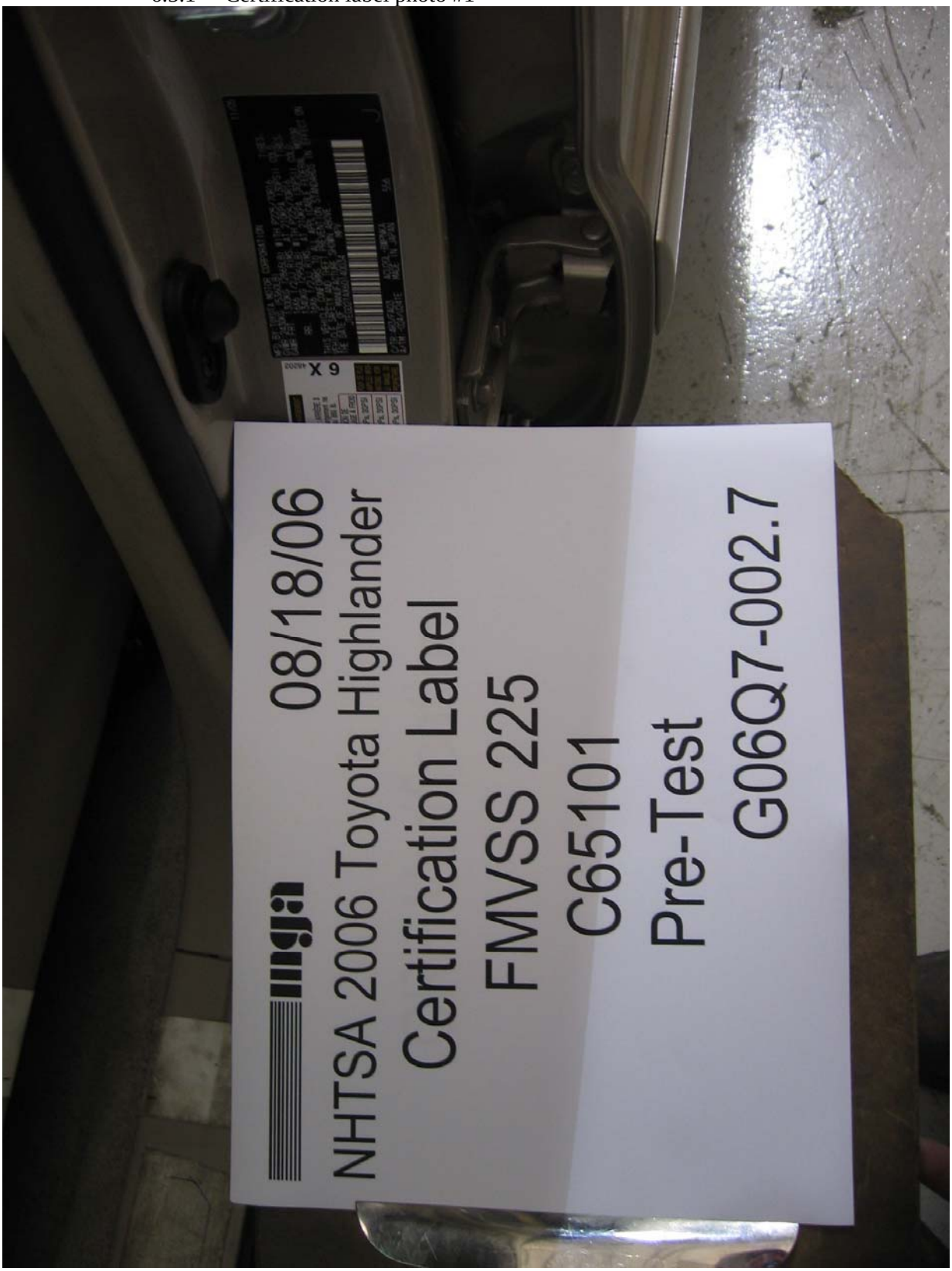

HIGHLANDER
TOYOTA
make the choice
SUBURBAN
mga
NHTSA 2006 Toyota Highlander
Rear View
FMVSS 225
C65101
Pre-Test
08/18/06
G06Q7-002.7

6.3 ¾ Front left view

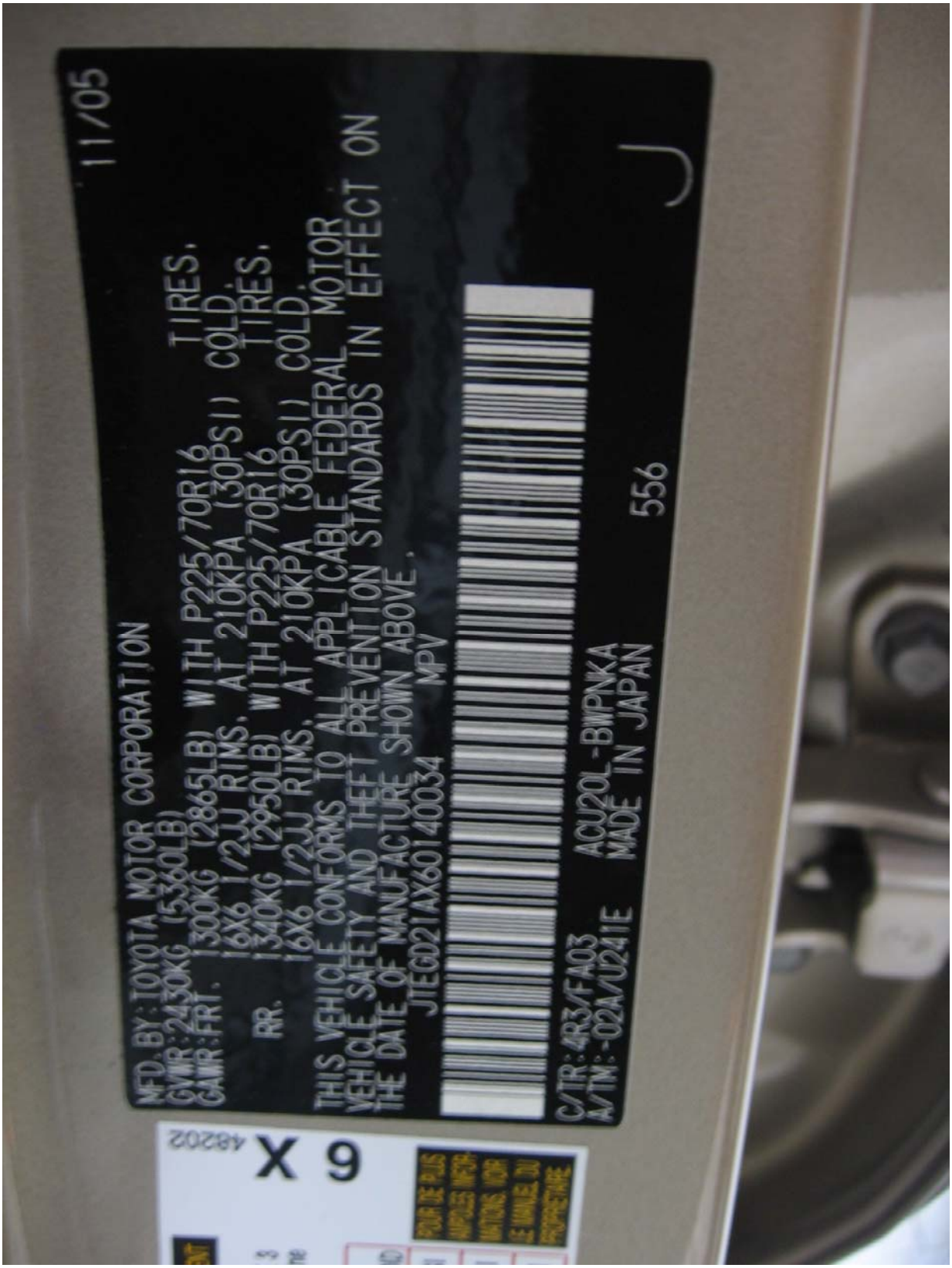
6.4 ¾ Front right view

6.5 Test vehicle's certification label

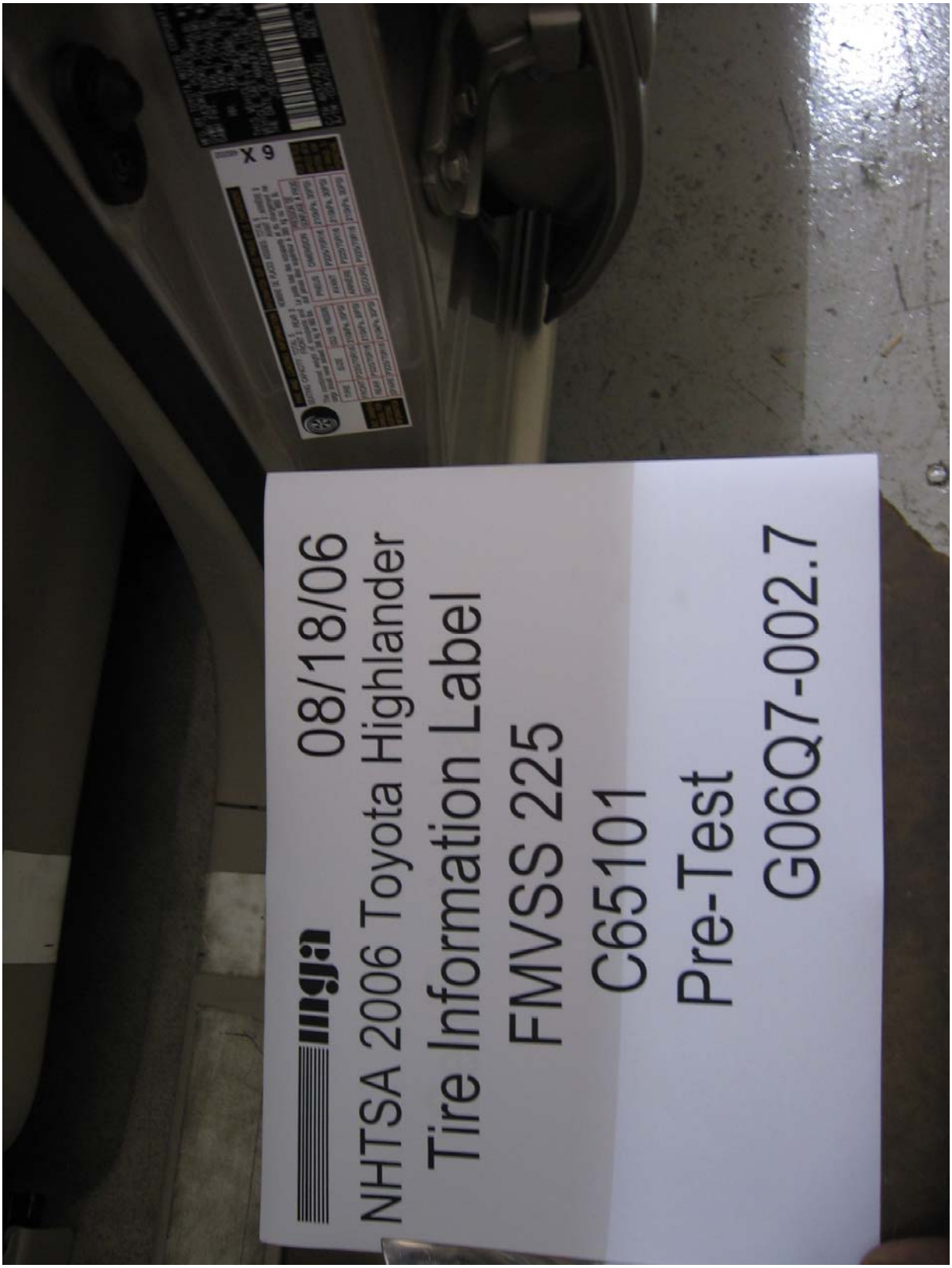
6.5.1 Certification label photo #1



6.5.2 Certification label photo #2



6.5.3 Tire information label photo #1



6.5.4 Tire information label photo #2

6.6 Vehicle tie down at each tie down location

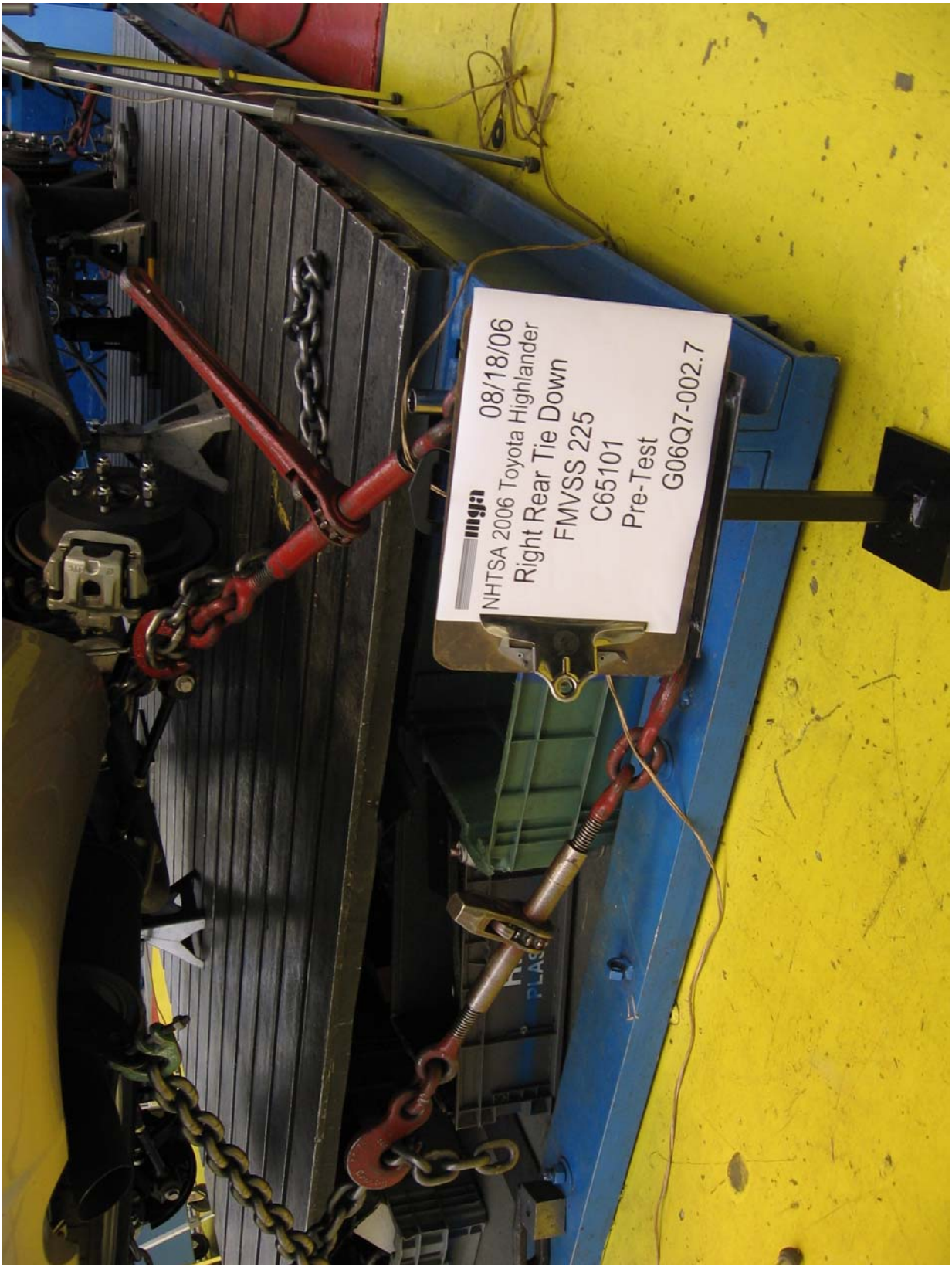
6.6.1 Front under vehicle

6.6.2 Left front

6.6.3 Left rear

6.6.4 Right front

6.6.5 Right rear



6.7 2-dimensional template

6.7.1 LH position photo #1

6.7.2 LH position photo #2

6.7.3 Center position photo #1

6.7.4 Center position photo #2

6.7.5 RH position photo #1

6.7.6 RH position photo #2

6.8 CRF verification

6.8.1 LH position photo #1

6.8.2 RH position photo #1

6.9 ¾ Front view of test vehicle with test apparatus in place

6.9.1 ¾ Front left view of SFADII test 1 of 2

6.9.2 ¾ Front right view of SFADII test 1 of 2

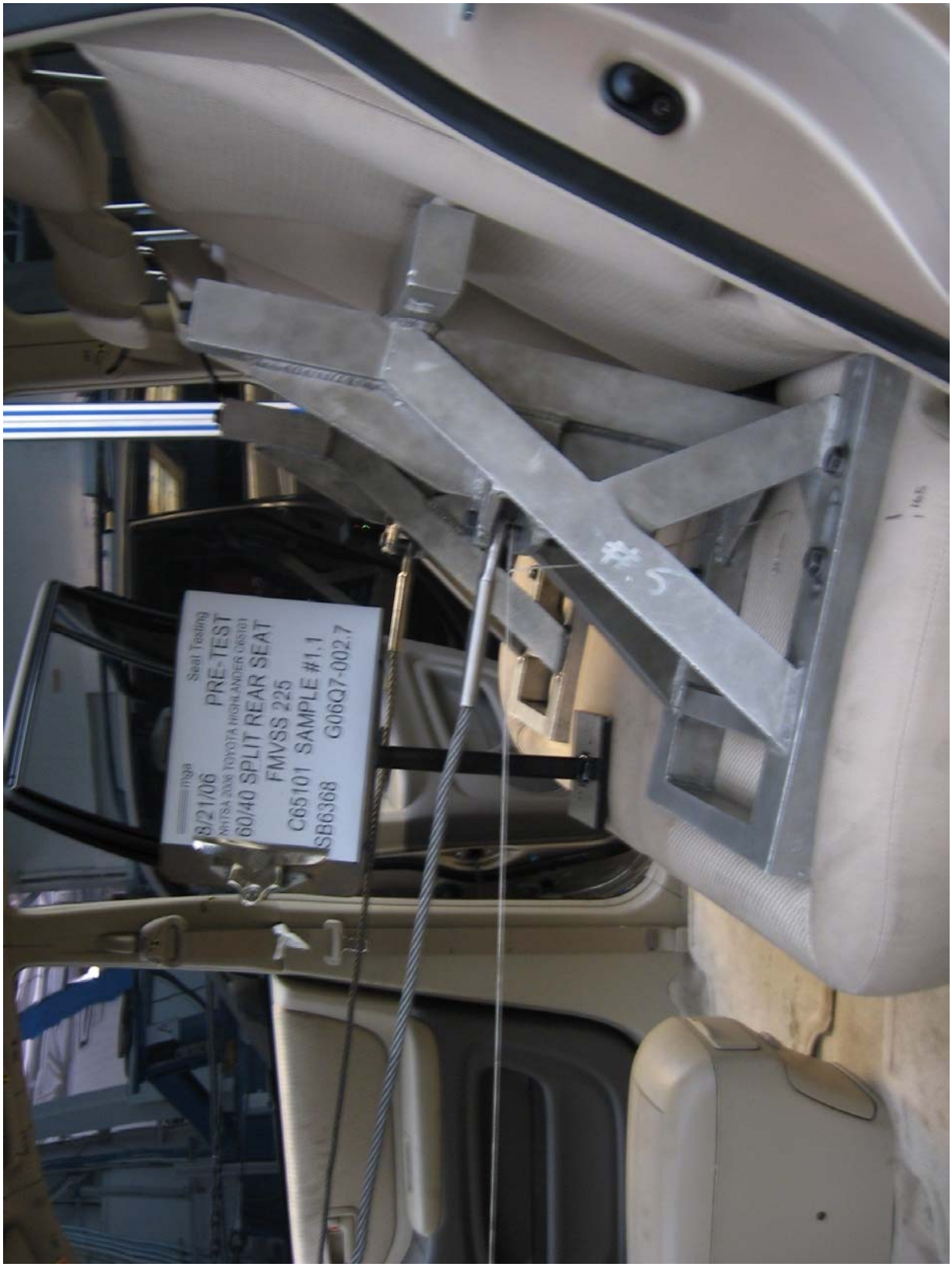
6.9.3 ¾ Front left view of SFADI test 2 of 2

6.9.4 ¾ Front right view of SFADI test 2 of 2

6.10 Pre-test views of each child restraint anchorage system installed in the vehicle

6.10.1 Pre-test photo #1 of SFADII test 1 of 2

6.10.2 Pre-test photo #2 of SFADII test 1 of 2



6.10.3 Pre-test photo #3 of SFADII test 1 of 2

6.10.4 Pre-test photo #4 of SFADI test 2 of 2

6.10.5 Pre-test photo #5 of SFADI test 2 of 2

6.10.6 Pre-test photo #6 of SFADI test 2 of 2

6.10.7 Pre-test photo #7 of SFADI test 2 of 2

6.11 Post-test condition of each child restraint anchorage system

6.11.1 Post-test photo #1 of SFADII test 1 of 2

6.11.2 Post-test photo #2 of SFADII test 1 of 2

6.11.3 Post-test photo #3 of SFADII test 1 of 2

6.11.4 Post-test photo #4 of SFADII test 1 of 2

6.11.5 Post-test photo #5 of SFADII test 1 of 2

6.11.6 Post-test photo #6 of SFADII test 1 of 2

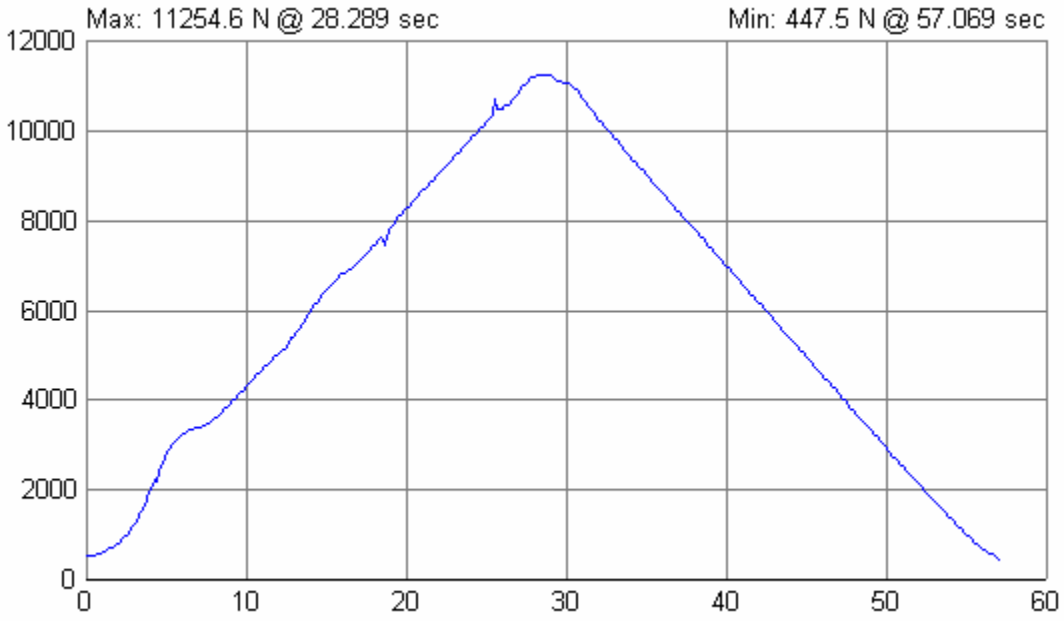
6.11.7 Post-test photo #7 of SFADII test 1 of 2

6.11.8 Post-test photo #8 of SFADI test 2 of 2

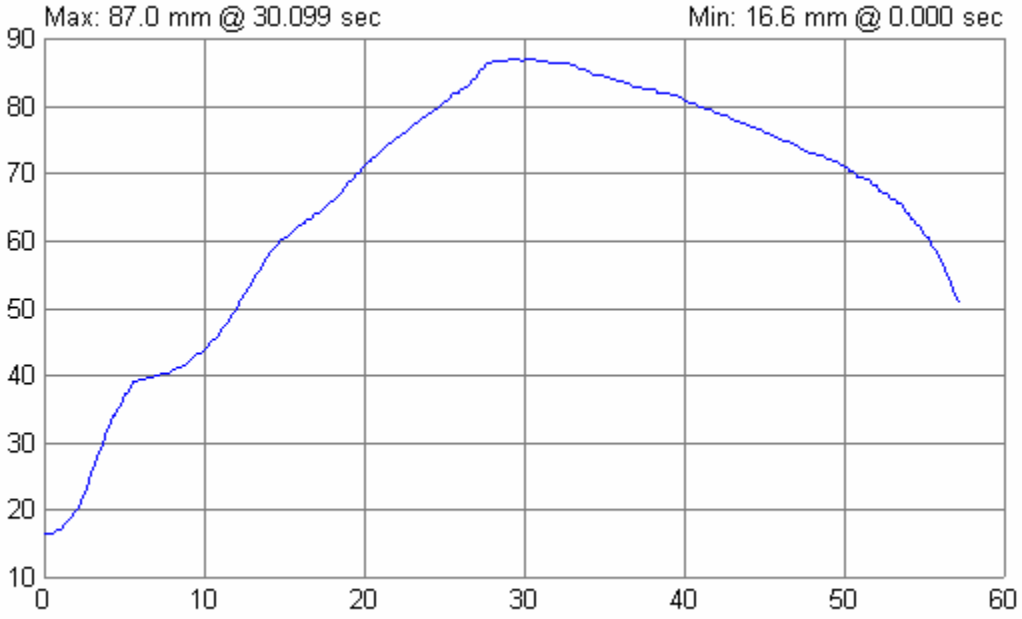
6.11.9 Post-test photo #9 of SFADI test 2 of 2

6.11.10 Post-test photo #10 of SFADI test 2 of 2

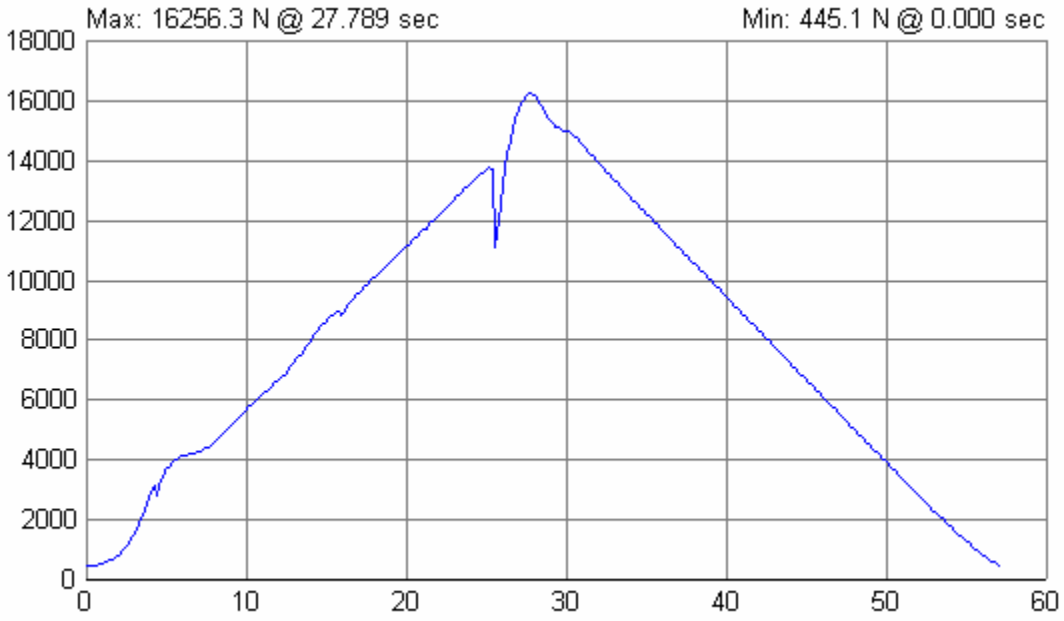
7.0 PLOTS



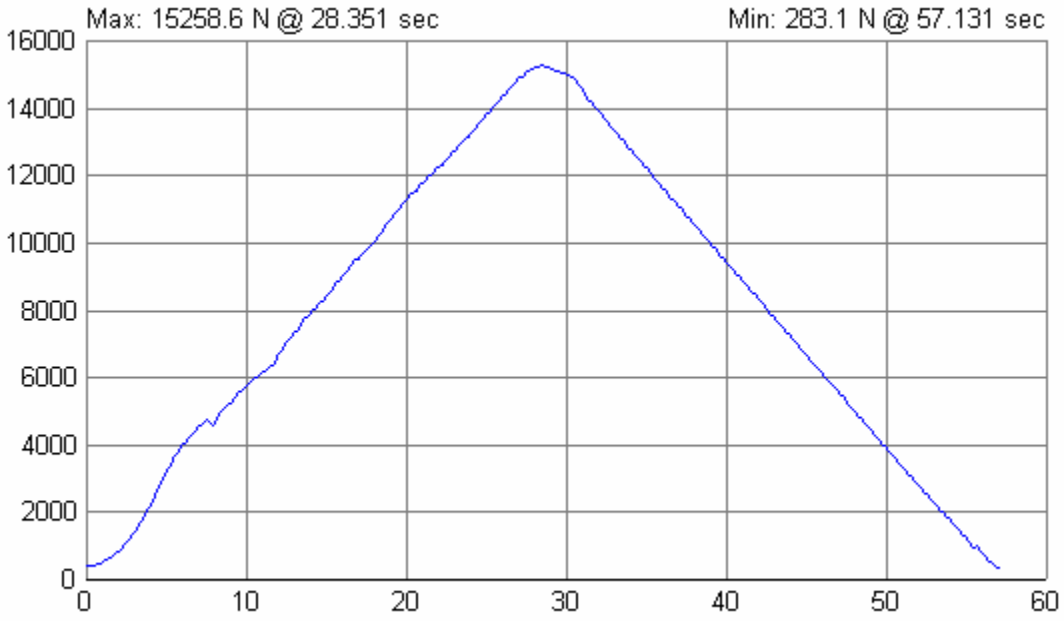
Run# SB6368: Lower Anchor Test (S9.4.1)-RS 40% Load (N) vs. Time (sec)



Run# SB6368: 40% SFAD X Displacement (mm) vs. Time (sec)



Run# SB6368: Top Tether Test (S6.3.4)-RS 60% O/B Load (N) vs. Time (sec)



Run# SB6369: Top Tether Test (S6.3.4)-RS 60% I/B Load (N) vs. Time (sec)

8.0 REPORT of VEHICLE CONDITION

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

CONTRACT No.: DTNH22-02-D-11043 DATE: August 21, 2006

From: MGA Research Corporation, 446 Executive Drive, Troy, MI 48083

To: NHTSA, OVSC, NVS-220

The following vehicle has been subjected to compliance testing for FMVSS No. 201U and 225

The vehicle was inspected upon arrival at the laboratory for the test and found to contain all of the equipment listed below. All variances have been reported within 2 working days of vehicle arrival, by letter, to the NHTSA Industrial Property Manager (NAD0-30), with a copy to the OVSC COTR. The vehicle is again inspected, after the above test has been conducted, and all changes are noted below. The final condition of the vehicle is also noted in detail.

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Toyota Highlander

VEH. NHTSA NO.: C65101 VIN: JTEGD21AX60140034

COLOR: Sonora Gold Pearl

ODOMETER READINGS: ARRIVAL 28 miles Date: 05/10/06

COMPLETION 29 miles Date: 08/21/06

PURCHASE PRICE: $22,807 DEALER'S NAME: Suburban Collection

ENGINE DATA: 4 Cylinders 2.4 Liters ____ Cubic Inches

TRANSMISSION DATA: X Automatic ____ Manual No. of Speeds 4

FINAL DRIVE DATA: ____Rear Drive X Front Drive ____4 Wheel Drive

CHECK APPROPRIATE BOXES FOR VEHICLE EQUIPMENT:

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Melanie Schick, Brad Reaume, Kevin Schmitzer

X	Air Conditioning	X	Traction Control	X	Clock
X	Tinted Glass		All Wheel Drive	X	Roof Rack
X	Power Steering	X	Speed Control	X	Console
X	Power Windows	X	Rear Window Defroster	X	Driver Air Bag
X	Power Door Locks		Sun Roof or T-Top	X	Passenger Air Bag
	Power Seat(s)	X	Tachometer	X	Front Disc Brakes
X	Power Brakes	X	Tilt Steering Wheel	X	Rear Disc Brakes
X	Antilock Brake System	X	AM/FM/Compact Disc		Other

REMARKS:

Salvage only.

Equipment that is no longer on the test vehicle as noted on previous pages:

All equipment inventoried and placed in vehicle.

Explanation for equipment removal:

Windshield and front seats were removed before conducting the testing.

Test Vehicle Condition:

Salvage only.

RECORDED BY: Melanie Schick, Kenney Godfrey DATE: August 21, 2006

APPROVED BY: Brad Reaume

APPENDIX A
OWNERS MANUAL CHILD RESTRAINT SYSTEMS

- **Do not let a rear passenger lift the front passenger seat with their feet or press on the seatback with their legs.**
- **Do not put objects under the front passenger seat.**
- **Child restraint systems installed on the second seat should not contact the front seatbacks.**
- **When it is unavoidable to install the forward-facing child restraint system on the front passenger seat, install the child restraint system on the front passenger seat in the proper order. (As for the installation order, see "—Installation with seat belt" on page 92 in this Section.)**
- **Do not remove the front seats.**
- **Do not kick the front passenger seat or subject it to severe impact. Otherwise, the SRS warning light may come on to indicate a malfunction of the detection system. In this case, contact your Toyota dealer immediately.**

The "AIRBAG ON" indicator light may be illuminated (the front passenger airbag and side airbag on the front passenger seat may deploy) even if observing the above cautions, when a child sits in, or a forward-facing child restraint system is installed on the front passenger seat. Refer to all the cautions in "SRS airbags" on page 68 and "Child restraint" on page 89 in this Section.

Child restraint—
—Child restraint precautions

Toyota strongly urges the use of appropriate child restraint systems for children.

The laws of all 50 states in the U.S.A. and Canada now require the use of a child restraint system.

Your vehicle conforms to SAEJ1819.

If a child is too large for a child restraint system, the child should sit in the rear seat and must be restrained using the vehicle's seat belt. See "Seat belts" on page 57 in this Section for details.

⚠ CAUTION

- **For effective protection in automobile accidents and sudden stops, a child must be properly restrained, using a seat belt or child restraint system depending on the age and size of the child. Holding a child in your arms is not a substitute for a child restraint system. In an accident, the child can be crushed against the windshield, or between you and the vehicle's interior.**

- **Toyota strongly urges use of a proper child restraint system which conforms to the size of the child, 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.**
- **Never install a rear-facing child restraint system on the front passenger seat even if the "AIRBAG OFF" indicator light is illuminated. In the event of an accident, the force of the rapid inflation of the front passenger airbag can cause death or serious injury to the child if the rear-facing child restraint system is installed on the front passenger 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 even if the "AIRBAG OFF" indicator light is illuminated, because the front passenger airbag could inflate with considerable speed and force. Otherwise, the child may be killed or seriously injured.**
- **On vehicles with side airbags and curtain shield airbags, do not allow the child to lean his/her head or any part of his/her body against the door or the area of the seat, front or rear pillar or roof side rail from which the side airbags or curtain shield airbags deploy even if the child is seated in the child restraint system. It is dangerous if the side airbag and/or curtain shield airbag inflate, and the impact could cause death or serious injury to the child.**

- **Do not use the seat belt extender when installing a child restraint system on the front or rear passenger seat. If installing a child restraint system with the seat belt extender connected to the seat belt, the seat belt will not securely hold the child restraint system, which could cause death or serious injury to the child or other passengers in the event of collision.**
- **Make sure that you have complied with all installation instructions provided by the child restraint manufacturer and that the system is properly secured. If it is not secured properly, it may cause death or serious injury to the child in the event of a sudden stop or accident.**

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—Child restraint system

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.

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.

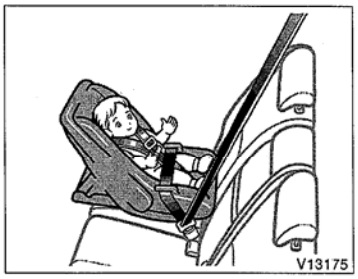
(A) Infant seat
(B) Convertible seat
(C) Booster seat

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

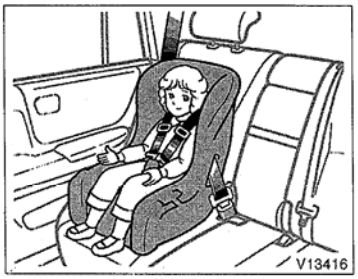
Your vehicle has anchor brackets for securing the top strap of a child restraint system.

For instructions about how to use the anchor bracket, see "—Using a top strap" on page 103 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 105 in this Section.



(A) Infant seat



(B) Convertible seat

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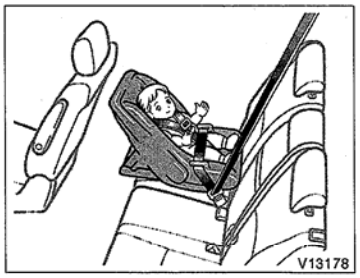
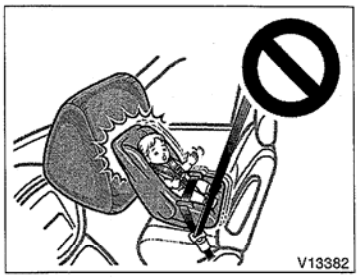
—Installation with seat belt

(C) Booster seat



(A) INFANT SEAT INSTALLATION

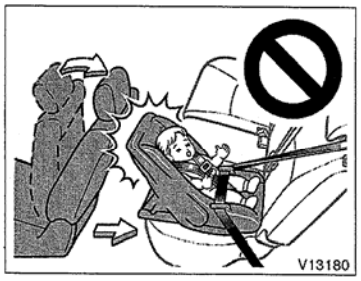
An infant seat must be used in rear-facing position only.



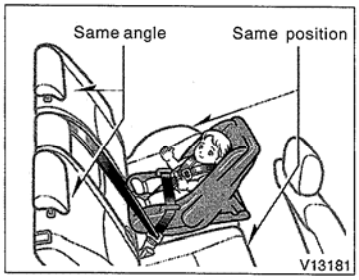
⚠ CAUTION

- **Never install a rear-facing child restraint system on the front passenger seat even if the "AIRBAG OFF" indicator light is illuminated. In the event of an accident, the impact of the rapid inflation of the front passenger airbag could cause death or serious injury to the child if the rear-facing child restraint system is installed on the front passenger seat.**

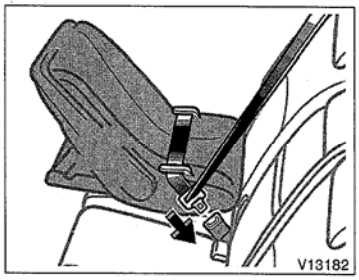
92



- **Do not install a child restraint system on the second (or third) seat if it interferes with the lock mechanism of the front (or second) seats. Otherwise, the child or front (or second) seat occupant(s) may be killed or seriously injured 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 right second seat.**



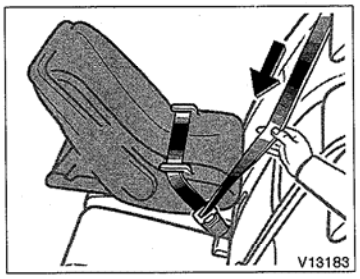
- **When installing a child restraint system in the second seat center position, adjust both seat cushions to the same position and align both seatbacks at the same angle. Otherwise, the child restraint system cannot be securely restrained and this may cause death or serious injuries in a collision.**



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.

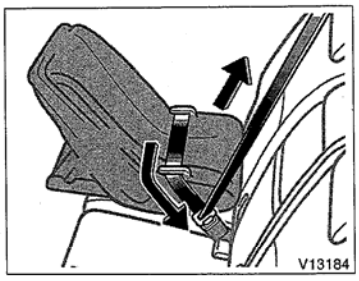
⚠ CAUTION

- **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 your child from properly latching the tab and buckle.**
- **If the seat belt does not function normally, it cannot protect your child from death or serious injury. Contact your Toyota dealer immediately. Do not install the child restraint system on the seat 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.

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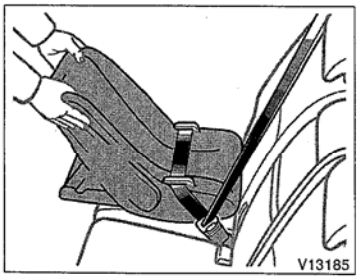
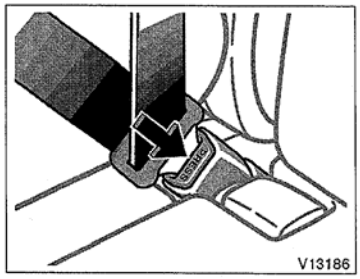
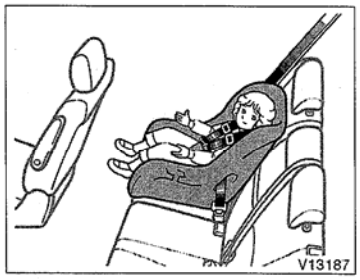


⚠ CAUTION

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 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.



(B) CONVERTIBLE SEAT INSTALLATION

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

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Install the child restraint system on the front passenger seat only when it is unavoidable. Your vehicle is equipped with a front passenger occupant classification system. In order to activate the occupant classification system correctly, install the forward-facing child restraint system on the front passenger seat in the following order:

1. Turn the ignition key to the "ON" position.
2. Move the front passenger seat to the rearward position.
3. Put the child restraint system on the front passenger seat without putting your weight on the front passenger seat.
4. Insert the seat belt tab into the seat belt buckle.
5. 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 seat securely, make sure the belt is in the lock mode before letting the belt retract.
6. 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.

7. Put a child on the child restraint system and secure the child, complying with the instructions provided by the child restraint system manufacturer.

The "AIRBAG OFF" indicator light should be illuminated when the ignition key is "ON" and the child is in the child restraint system after following these procedures. The "AIRBAG OFF" indicator light indicates the SRS front passenger airbag and side airbag on the passenger side will not deploy. If the "AIRBAG ON" indicator light is illuminated, remove the child restraint system and reinstall it with the ignition key in the "ACC" or "LOCK" position. If the "AIRBAG ON" indicator light is illuminated when the ignition key is turned to the "ON" position, then the SRS front passenger airbag and side airbag on the passenger side may deploy in an accident. Do not drive the vehicle in this condition. Remove the child restraint system and contact your Toyota dealer.

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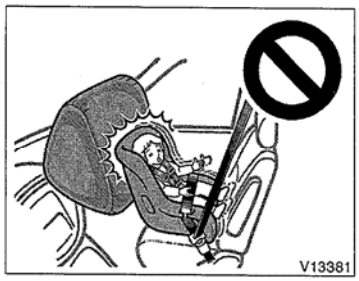
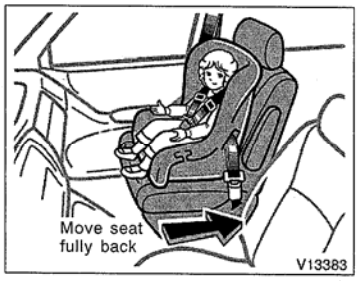
⚠ CAUTION

- **Never install a rear-facing child restraint system on the front passenger seat. A forward-facing child restraint system should only be installed on the front passenger seat when unavoidable. If you must install the child restraint system on the front passenger seat, put the seat in its most rearward position, and install the forward-facing child restraint system in the proper order. Otherwise, the front passenger occupant classification system can not detect the presence of the child restraint system and the front passenger airbag and side airbag on the front passenger seat could deploy.**



- **Never install a rear-facing child restraint system on the front passenger seat even if the "AIRBAG OFF" indicator light is illuminated. In the event of an accident, the impact of the rapid inflation of the front passenger airbag could cause death or serious injury to the child if the rear-facing child restraint system is installed on the front passenger 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 even if the "AIRBAG OFF" indicator light is illuminated, because the front passenger airbag could inflate with considerable speed and force. Otherwise, the child may be killed or seriously injured.**

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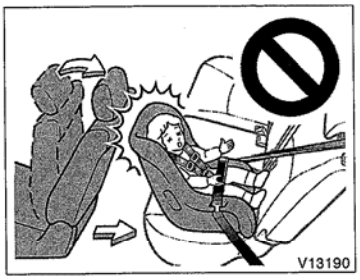
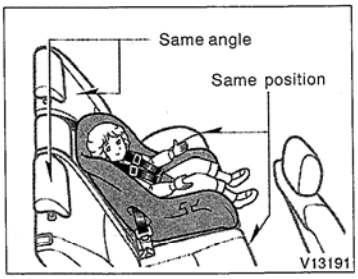
- **On vehicles with side airbags and curtain shield airbags, do not allow the child to lean his/her head or any part of his/her body against the door or the area of the seat, front or rear pillar or roof side rail from which the side airbags or curtain shield airbags deploy even if the child is seated in the child restraint system. It is dangerous if the side airbag and/or curtain shield airbag inflate, and the impact could cause death or serious injury to the child.**



- **Do not install a child restraint system on the second (or third) seat if it interferes with the lock mechanism of the front (or second) seats. Otherwise, the child or front (or second) seat occupant(s) may be killed or seriously injured 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 right second seat.**



- **When installing a child restraint system in the second seat center position, adjust both seat cushions to the same position and 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.**

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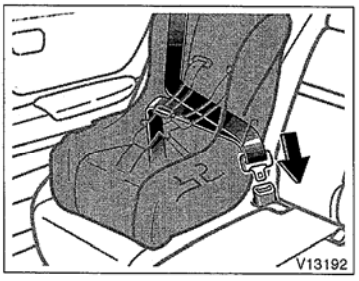
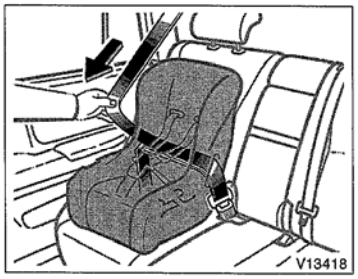


1. Run the lap and shoulder belt through or around the convertible seat following the instructions provided by its manufacturer and insert the tab into the buckle taking care not to twist the belt. Keep the lap portion of the belt tight.

⚠ CAUTION

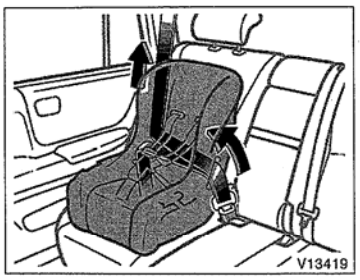
- **After inserting the tab, make sure the tab and buckle are locked and that the lap and shoulder portions of the belt are not twisted.**
- **Do not insert coins, clips, etc. in the buckle as this may prevent your child from properly latching the tab and buckle.**
- **If the seat belt does not function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



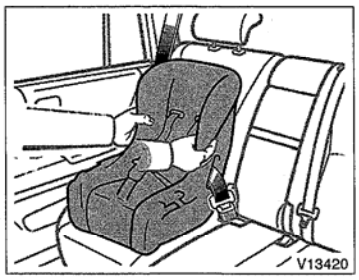
2. Fully extend the shoulder belt to put it in the lock mode. When the belt is then retracted even slightly, it cannot be extended.

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

99

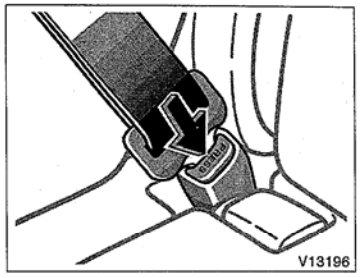


3. While pressing the convertible seat firmly against the seat cushion and seatback, let the shoulder belt retract as far as it will go to hold the convertible seat securely.

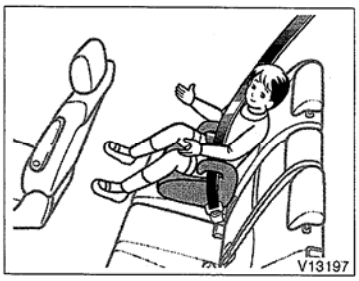


⚠ CAUTION

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.

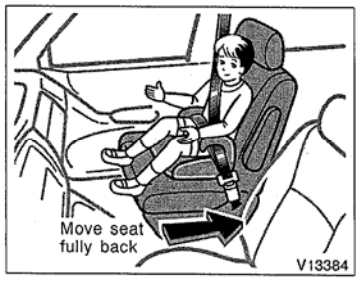


4. To remove the convertible seat, press the buckle release button and allow the belt to retract completely. The belt will move freely again and be ready to work for an adult or older child passenger.



(C) BOOSTER SEAT INSTALLATION

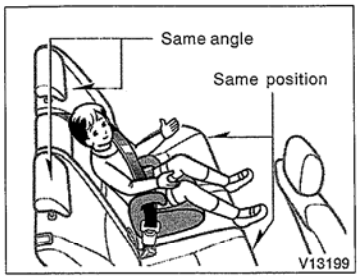
A booster seat must be used in forward-facing position only.



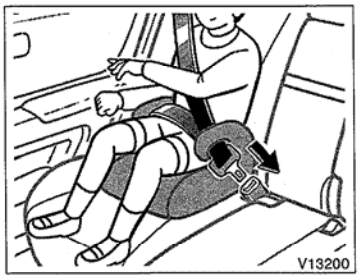
⚠ CAUTION

- **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 even if the "AIRBAG OFF" indicator light is illuminated, because the front passenger airbag could inflate with considerable speed and force. Otherwise, the child may be killed or seriously injured.**

- **On vehicles with side airbags and curtain shield airbags, do not allow the child to lean his/her head or any part of his/her body against the door or the area of the seat, front or rear pillar or roof side rail from which the side airbags or curtain shield airbags deploy even if the child is seated in the child restraint system. It is dangerous if the side airbag and/or curtain shield airbag inflate, and the impact could cause death or serious injury to the child.**



• When installing a child restraint system in the second seat center position, adjust both seat cushions to the same position and 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 across the 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 lap belt is positioned as low as possible on the child's hips. See "Seat belts" on page 57 in this Section 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. Otherwise, the child may be killed or seriously injured in case of sudden braking or a collision.**
- **Both high-positioned lap belts and loose-fitting belts could cause death or serious injuries due to sliding under the lap belt during a collision or other unintended event. 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.**

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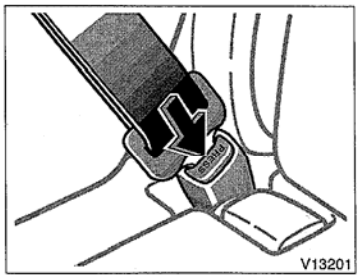
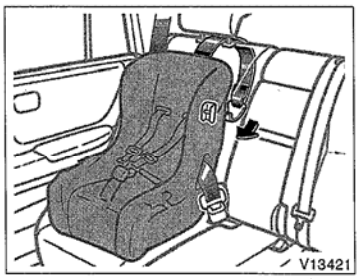
• If the seat belt does not function normally, it cannot protect your child from death or serious injury. Contact your Toyota dealer immediately. Do not install the child restraint system on the seat until the seat belt is fixed.



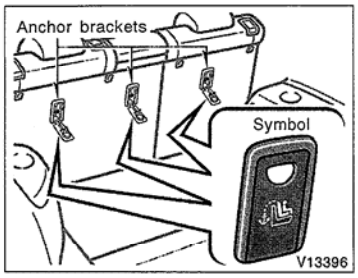
2. To remove the booster seat, press the buckle release button and allow the belt to retract.

—Using a top strap



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

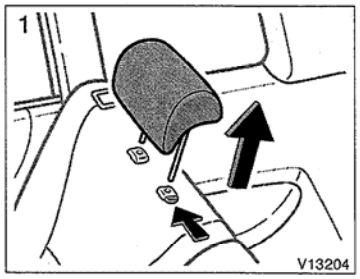
103



Use the anchor brackets behind the second seat seatbacks to secure the top strap.

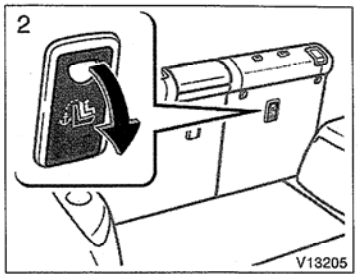
Anchor brackets are installed for each seating position of the second seat.

This symbol indicates the locations of user ready anchor brackets.



TO USE THE ANCHOR BRACKET:

1. Remove the head restraint.



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

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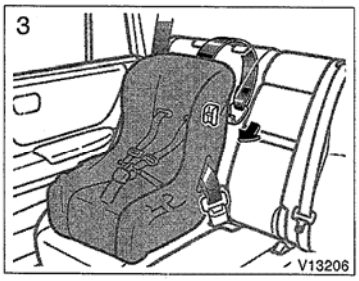


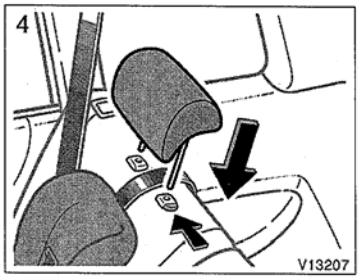
3. Fix the child restraint system with the seat belt.

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 89 in this Section.

⚠ CAUTION

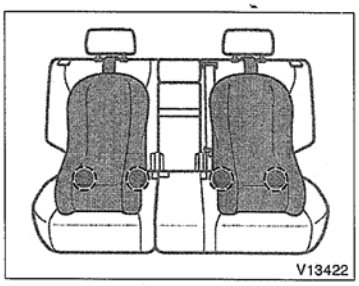
Make sure the top strap is securely latched, and check that the child restraint system is secure by pushing and pulling it in different directions. Follow all the installation instructions provided by its manufacturer.



4. Replace the head restraint and lift it up to the uppermost lock position.

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

—Installation with child restraint lower anchorages



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

The anchorages are installed in the seat cushion of both outside second seats.

Child restraint systems complying with the FMVSS213 or CMVSS213 specification can be fixed to these anchorages. In this case, it is not necessary to fix the child restraint system with a seat belt on the vehicle.

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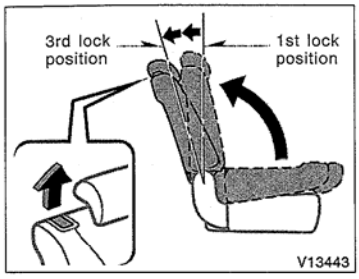
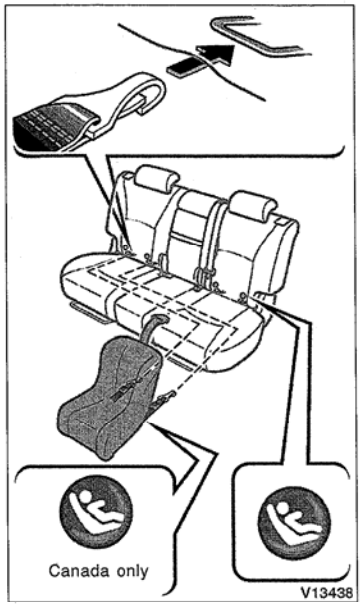


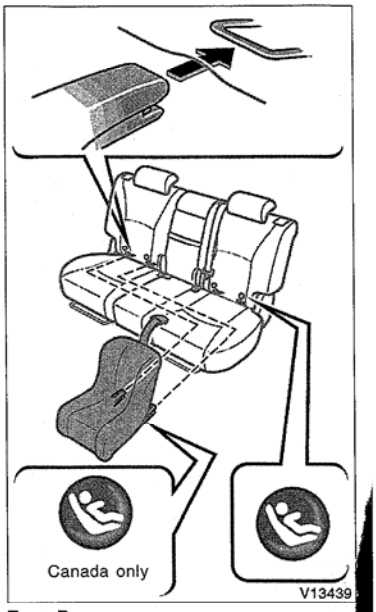
CHILD RESTRAINT SYSTEM INSTALLATION

1. **Fold down the seatback and back to the 1st lock position (most upright position) until it locks into place. Adjust the seatback to the 3rd lock position.**

Make sure the seatback is locked securely.



Type A



Type B

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2. **Widen the gap between the seat cushion and seatback slightly and confirm the position of the lower anchorages near the button on the seatback.**
3. **Type A—Latch the hooks of lower straps onto the anchorages and tighten the lower straps.**

   Type B—Latch the buckles onto the anchorages.

For owners in Canada—The symbol on a child restraint system indicates the presence of a lower connector system.

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 103 in this Section.)

For 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.**
- **When using the lower anchorages for the child restraint system, ensure that the seat is moved to the rear-most position, with the seatback close to the child restraint system.**
- **After securing the child restraint system, never slide or recline the seat.**
- **Do not install a child restraint system on the second seat if it interferes with the lock mechanism of the front seats. Otherwise, the child or front seat occupant(s) may be killed or seriously injured in case of sudden braking or a collision.**

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APPENDIX B
MANUFACTURER'S DATA (OVSC FORM 14)

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SEAT REFERENCE POINT (SgRP) AND TORSO ANGLE DATA
FOR FMVSS 225
(All dimensions in mm[1])

Model Year: 2006 ; Make: TOYOTA ; Model: HIGH LANDER ; Body Style: 5DOOR WAGON
Seat Style: Front row: SEPARATE ; Second row: 4:2:4 SPLIT BENCH ; Third row: BENCH

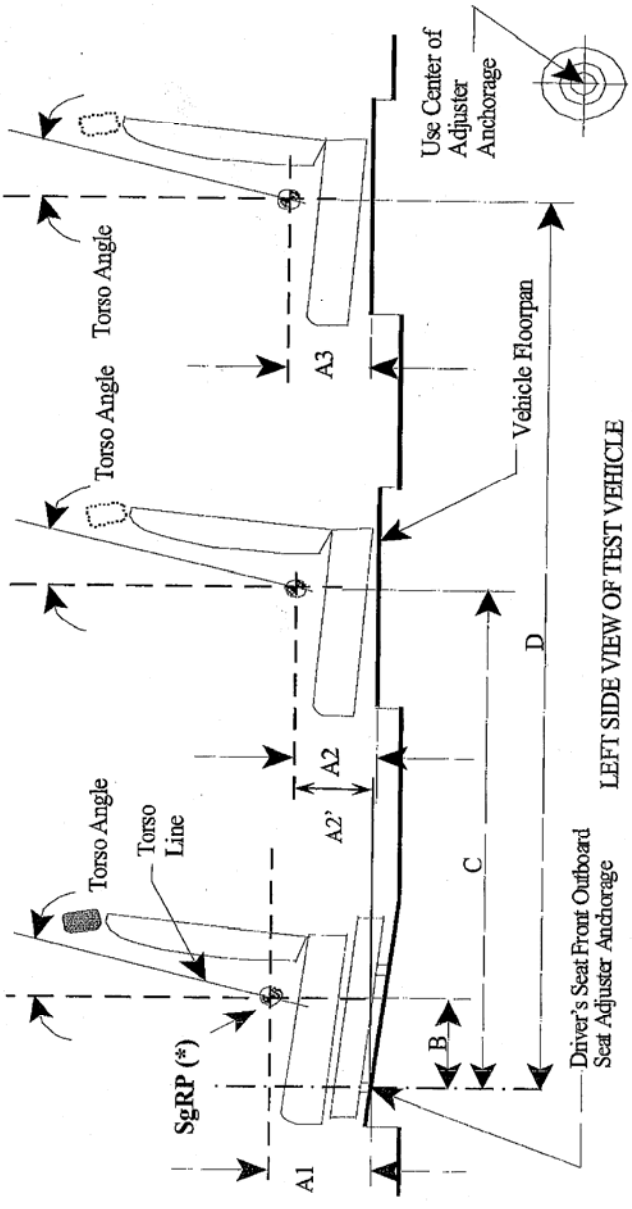

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Table 1. Seating Positions[1] and Torso Angles

		Left (Driver Side)	Center (if any)	Right
A1		(Driver) 280	N/A	(Front Passenger) 280
A2' (*)		293.9	330.9	293.9
A3		350.1	N/A	350.1
B		362.5	N/A	362.5
C		1215.5	1183.5	1215.5
D		1935.5	N/A	1935.5
Torso Angle (degree)	Front Row	21	N/A	21
	Second Row	25	25	25
	Third Row	20	N/A	20

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

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

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

Model Year: 2006 ; Make: TOYOTA ; Model: HIGH LANDER ; Body Style: 5DOOR WAGON
Seat Style: Front row: SEPARATE ; Second row: 4:2:4 SPLIT BENCH ; Third row: BENCH

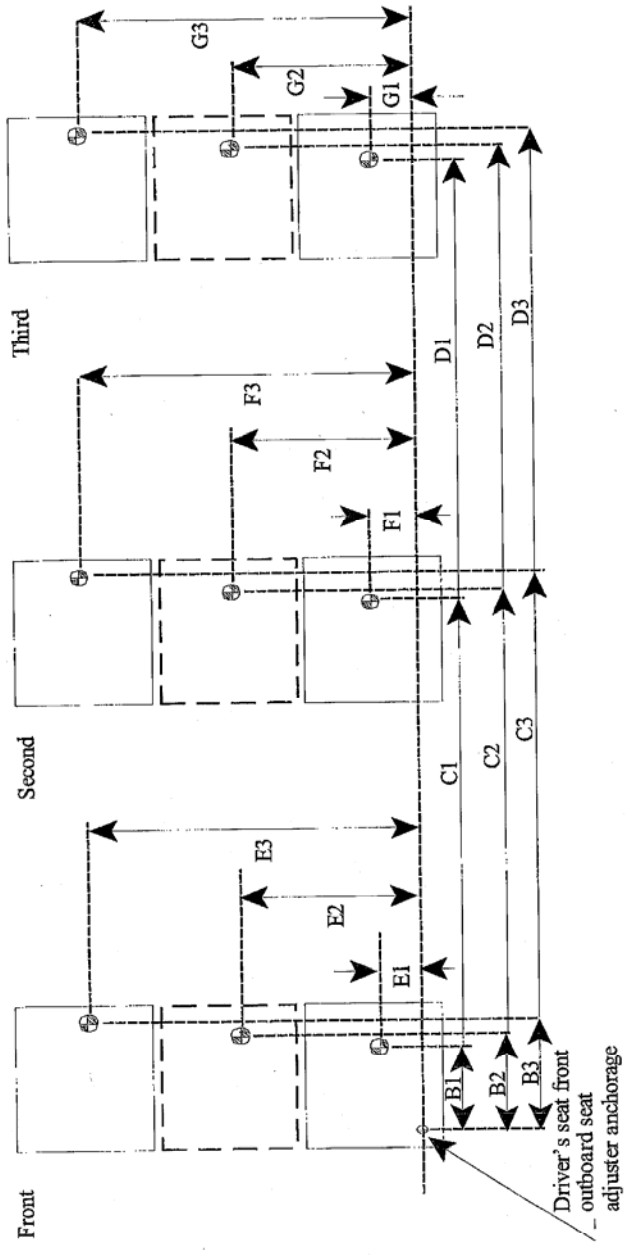

Table 2. Seating Reference Point and Tether Anchorage Locations

Seating Reference Point (SgRP)		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	226.5
	C2	1183.5
	F2	601.5
	C3	1215.5
	F3	976.5
Third Row	D1	1935.5
	G1	351.5
	D2	N/A
	G2	N/A
	D3	1935.5
	G3	851.5

Note: 1. Use the center of anchorage.

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

Model Year: 2006 ; Make: TOYOTA ; Model: HIGH LANDER ; Body Style: 5DOOR WAGON
Seat Style: Front row: SEPARATE , Second row: 4:2:4 SPLIT BENCH ; Third row: BENCH

⊕: SgRP
Φ: 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 (SgRP)	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	389.2
	L1	0
	I2	421.2
	L2	0
	I3	389.2
	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.

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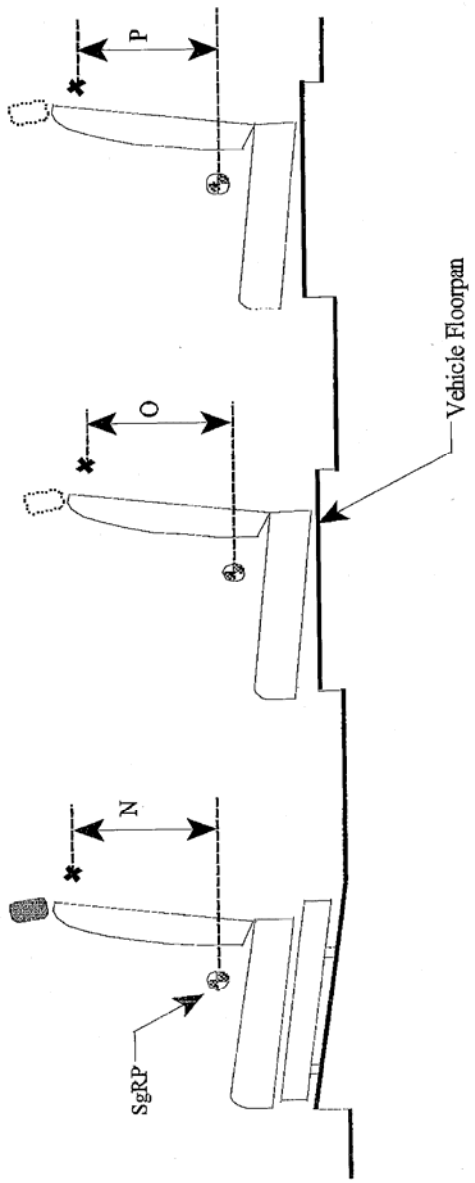
TETHER ANCHORAGE LOCATIONS - VERTICAL
FOR FMVSS 225
(All dimensions in mm)

Model Year: 2006 ; Make: TOYOTA ; Model: HIGH LANDER ; Body Style: 5DOOR WAGON
Seat Style: Front row: SEPARATE ; Second row: 4:2:4 SPLIT BENCH ; Third row: BENCH



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)	320.4
	O2 (Center)	283.4
	O3 (Right)	320.4
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.

For each vehicle, provide the following information:

1. **How many designated seating positions exist in the vehicle?**

Response 1:

The 2006 Toyota Highlander equipped with a third row seat has 7 DSP's. When the 2006 Toyota Highlander is not equipped with a third row seat, it has 5 DSP's.

2. **How many designated seating positions are equipped with lower anchorages and tether anchorages? Specify which position(s).**

Response 2:

The two outboard DSPs in the second row are equipped with lower anchorages and tether anchorages. (With and without third row seat)

3. **How many designated seating positions are equipped with tether anchorages? Specify which position(s).**

Response 3:

The three DSPs in the second row are equipped with tether anchorages. (With and without third row seat)

4. **Lower Anchorage Marking and Conspicuity:** Whether the anchorages are certified to S9.5(a) or S9.5(b) of FMVSS 225.

Response 4:

All anchorages installed in the 2006 Toyota Highlander are certified to S9.5(a) of FMVSS 225.