

**SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 110(INDICANT)
TIRE SELECTION AND RIMS**

**TOYOTA MOTOR MANUFACTURING INDIANA INC.
2003 TOYOTA SEQUOIA LIMITED, MPV
NHTSA NO. C35112**

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



SEPTEMBER 10, 2003

FINAL REPORT

PREPARED FOR

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

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By: Dillie Messich
Approved By: M. A. Ofor
Approval Date: 09/10/03

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: Jim Turner
Acceptance Date: 9/15/03

1. Report No. 110(IND)-GTL-03-011	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Final Report of FMVSS 110 (Indicant) Test of 2003 TOYOTA SEQUOIA LIMITED MPV NHTSA No. C35112	5. Report Date SEPTEMBER 10, 2003 August 28, 2003	6. Performing Organ. Code GTL
7. Author(s) Grant Farrand, Project Engineer Debbie Messick, Project Manager	8. Performing Organ. Rep# GTL-DOT-03-110(INDICANT)-011	
9. Performing Organization Name and Address General Testing Laboratories, Inc. 1623 Leedstown Road Colonial Beach, Va 22443	10. Work Unit No. (TRAIS)	11. Contract or Grant No. DTNH22-01-C-11025
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Admin. Safety Enforcement Office of Vehicle Safety Compliance (NVS-220) 400 7 th Street, S.W., Room 6111 Washington, DC 20590	13. Type of Report and Period Covered Final Test Report June 11, 2003	14. Sponsoring Agency Code NVS-120 & NVS 220
15. Supplementary Notes		
16. Abstract This test was conducted on the subject, 2003 Toyota Sequoia Limited MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-110-02 (partial), to gather data relating to the normal load requirements specified in FMVSS 110. NHTSA's Office of Safety Performance Standards requested this data to support the agency's TREAD tire rulemaking efforts.		
17. Key Words Vehicle Testing Safety Engineering FMVSS 110	18. Distribution Statement Copies of this report are available from NHTSA NHTSA Technical Reference Div., Rm. 5108 (NPO-230) 400 7 th St., S.W. Washington, DC 20590 Telephone No. (202) 366-4946	
19. Security Classif. (of this report) UNCLASSIFIED	21. No. of Pages 24	22. Price
20. Security Classif. (of this page) UNCLASSIFIED		

TABLE OF CONTENTS

SECTION		PAGE
1	Introduction	1
2	Test Procedure and Summary of Results	2
3	Test Data	3
4	Test Equipment List	10
5	Photographs	11
	5.1 ¾ Frontal View of Vehicle	
	5.2 Vehicle's Certification and Tire Information Label	
	5.3 Vehicle's Separate Tire Information Label	
	5.4 Tire Showing Brand, Size, Load Index and Speed Symbol	
	5.5 Tire Showing Model	
	5.6 Tire Showing Max Load Rating and Max Inflation Pressure	
	5.7 Tire Showing Serial Number	
	5.8 Vehicle Ballasted to Simulate Normal Load Condition	

APPENDIX – Normal Load Occupation Distribution

SECTION 1

INTRODUCTION

1.0 PURPOSE OF INDICANT TEST

A 2003 Toyota Sequoia Limited MPV was subjected to a FMVSS No. 110 (Indicant) test intended to gather data relating to the normal load requirements specified in FMVSS 110. NHTSA's Office of Safety Performance Standards requested this data to support the agency's TREAD tire rulemaking efforts.

1.1 TEST VEHICLE

The test vehicle was a 2003 Toyota Sequoia Limited MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 5TDBT48A23S184296

B. NHTSA No.: C35112

C. Manufacturer: TOYOTA MOTOR MANUFACTURING INDIANA INC.

D. Manufacture Date: 03/03

1.2 TEST DATE

The test vehicle was subjected to testing on June 11, 2003.

SECTION 2

TEST PROCEDURE AND SUMMARY OF RESULTS

2.0 TEST PROCEDURE

The vehicle was inspected, photographed and filled with fuel. It was then weighed to establish total curb weight and the weights of all wheels were measured and recorded. The vehicle was then ballasted to its normal load condition (refer to appendix) and the weights of all wheels were measured and recorded. Tire information labeling data and tire sidewall data were recorded.

This indicant test did not include any other requirements in FMVSS 110.

2.1 SUMMARY OF RESULTS

Currently FMVSS 110 applies only to passenger cars. The subject Toyota Sequoia Limited is a multipurpose passenger vehicle (MPV) and therefore it is not required to meet FMVSS 110 requirements. It was subjected to the normal load testing as executed for FMVSS 110 compliance verification for information only.

SECTION 3 TEST DATA

DATA SHEET 1
SUMMARY

VEHICLE MAKE/MODEL/BODY STYLE: 2003 TOYOTA SEQUOIA LIMITED MPV

VEHICLE NHTSA NO.: C35112 ; VIN: 5TDBT48A23S184296

LABORATORY: GENERAL TESTING LABORATORIES

TEST DATE: 06/11/03

REQUIREMENT	YES/NO
The vehicle is equipped with tires that meet the requirements of FMVSS 109 or FMVSS 119.	<u>YES</u>
The vehicle normal load on the tire is not greater than the high speed performance test load specified in FMVSS 109 paragraph S5.5 or FMVSS 119 paragraph S7.4.	<u>YES</u>
For passenger cars, the tire information placard is permanently affixed to the glove compartment door or equally accessible location; and displays the required information (FMVSS 110, S4.3).	<u>N/A</u>
For vehicles other than passenger cars, a combined certification/ tire information label or separate tire information label is permanently affixed to either the hinge pillar, door-latch post or to the inward-facing surface of the door next to the driver's seating position (FMVSS 120, S5.3).	<u>YES</u>

REMARKS:

RECORDED BY:

DATE: 06/11/03

APPROVED BY:

DATA SHEET 2

TEST VEHICLE INFORMATION/RECEIVING INSPECTION

LABORATORY: GENERAL TESTING LABORATORIES DATE: 06/11/03
 VEHICLE MODEL YEAR/MAKE/MODEL/BODY STYLE: 2003 TOYOTA SEQUOIA LIMITED MPV

MANUFACTURE DATE: 03/03 NHTSA NO.: C35112 BODY COLOR: WHITE

VIN: 5TDBT48A23S184296 VEHICLE TYPE: MPV

GVWR 2994 kg (6600 lbs) GAWR(Fr) 1434 kg (3160 lbs) GAWR(Rr) 1769 kg (3900 lbs)

BELTED SEATING POSITIONS: FRONT 2 MID 3 REAR 3 OTHER N/A

ENGINE DATA: 8 Cylinders 4.7 Liters Cubic Inches

TRANSMISSION DATA: X Automatic Manual 4 No. of Speeds

FINAL DRIVE DATA: Rear Drive Front Drive X 4 Wheel Drive

INSTALLED TIRE DATA: Size - P285/65R17 Mfr. - DUNLOP

CHECK APPROPRIATE BOXES FOR VEHICLE EQUIPMENT/MAKE SURE ALL OPTIONS ON WINDOW STICKER ARE LISTED:

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

ARE ALL OPTIONS LISTED ON "WINDOW STICKER" PRESENT ON THE TEST VEHICLE:
 (YES/NO) Yes

REMARKS:

RECORDED BY: *M. A. G. B.*

DATE: 06/11/03

APPROVED BY: *D. Messica*

DATA SHEET 3
CURB WEIGHT WITH OPTIONS AND NORMAL LOAD

VEHICLE MAKE/MODEL/BODY STYLE: 2003 TOYOTA SEQUOIA LIMITED MPV
 VEHICLE NHTSA NO.: C35112 ; VIN: 5TDBT48A23S184296
 LABORATORY: GENERAL TESTING LABORATORIES
 TEST DATE: 06/11/03

Full Fluid Levels:

Fuel Full; Coolant Full; Other Fluids Full

Tire Pressure: LF 220 KPA (32 psi) LR 220 KPA (32 psi)
 RF 220 KPA (32 psi) RR 220 KPA (32 psi)

A. MEASURED CURB WEIGHT WITH INSTALLED OPTIONS AND ACCESSORIES

LF 659 KG (1453 LB) LR 566 KG (1247LB)
 RF 584 KG (1288 LB) RR 590 KG (1300LB)
 Front Axle 1243 KG (2741 LB) Rear Axle 1155 KG (2547LB)
 Total Vehicle 2399 KG (5288 LB)

B. MEASURED VEHICLE WEIGHT IN NORMAL LOAD CONDITION

(1) Seating Capacity (from Tire Information Placard) = N/A
 Seating Capacity (# of belted seating positions) = 8

(2) Normal Load # of Occupants from Appendix
 Occupant Distribution: Front Seat- 2 Second Seat- 1
 Third Seat - N/A Fourth Seat- N/A

(3) Total Normal Occupant Load 204 KG (450 LB)
 (# of occupants x 68 KG per occupant)

(4) Measured Normal Load on each Wheel and Axles (Sum)

LF 707 KG (1559 LB) LR 617 KG (1361 LB)
 RF 633 KG (1395 LB) RR 642 KG (1415 LB)
 Frt Axle 1340 KG (2954 LB) Rr Axle 1259 KG (2776 LB)
 Total Vehicle 2599 KG (5730 LB)

DATA SHEET 3 -- CONTINUED

- (5) Calculated Vehicle Normal Load on the Tire
 Front Tires (measured front axle normal load/2) = 670 KG (1477 LB)
 Rear Tires (measured front axle normal load/2) = 630 KG (1388 LB)
- (6) High Speed Test Load from () FMVSS 109 (S5.5), or (X) FMVSS 119 (S7.4)

	Front	Rear
(a) Installed Tire Size	<u>P265/65R17</u>	<u>P265/65R17</u>
Max. Load Rating on Sidewall	<u>1060 KG(2337 LBS)</u>	<u>1060KG(2337LBS)</u>
Reduced Sidewall Load Rating (if applicable)*	<u>964 KG(2125 LBS)</u>	<u>964 KG(2125 LBS)</u>
High Speed Test Load (88% of sidewall max. load rating)	<u>848 KG(1870 LBS)</u>	<u>848 KG(1870 LBS)</u>
(b) Optional Tire Size(s)	<u>NONE</u>	<u>NONE</u>

* If a passenger car tire is installed on a multipurpose passenger vehicle (MPV), truck or bus, the tire's load rating shall be reduced by dividing by 1.10.

REMARKS: The Vehicle Normal Load on the Tire is not greater than the High Speed Test Load.

RECORDED BY: M. A. B. B. B.

DATE: 06/11/03

APPROVED BY: D. Messick

DATA SHEET 4
TIRE INFORMATION LABEL OR PLACARD

VEHICLE MAKE/MODEL/BODY STYLE: 2003 TOYOTA SEQUOIA LIMITED MPV
 VEHICLE NHTSA NO.: C35112 ; VIN: 5TDBT48A23S184296
 LABORATORY: GENERAL TESTING LABORATORIES
 TEST DATE: 06/11/03

A. Vehicle Type from Certification Label: MPV

B. Identify Vehicle Labeling:

Vehicle has a combined Certification Tire Information Label ☒ Yes ☐ No
 Is Label Permanently Affixed: ☒ Yes ☐ No
 Label Location: Driver's Side "B" Pillar
 Description of Label: Vinyl

Vehicle has a separate Tire Information Label or Placard ☒ Yes ☐ No
 Is Label Permanently Affixed: ☒ Yes ☐ No
 Label Location: Driver's Side "B" Pillar
 Description of Label: Vinyl

C. Enter Information from Combined or Separate Tire Information Label/Placard

Vehicle Capacity Weight - N/A(see remarks)

Designated Seating Capacity (DSC) - N/A(see remarks)
 Expressed In—

(1) Total No. of Occupants ☐ Yes ☐ No

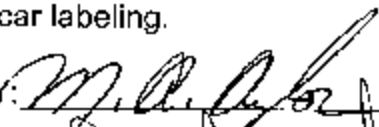
(2) Terms of Occupants for Each Seat Location ☐ Yes ☐ No

Manufacturer's Recommended Tire Size(s) and Cold Tire Inflation Pressure(s) for Maximum Load Vehicle Weight:

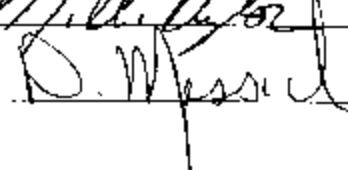
P265/65R17 FRONT - 220 kPa (32 psi)
 REAR - 220 kPa (32 psi)

Manufacturer's Recommended Tire Size(s) and Cold Tire Inflation Pressure(s) for Other Load Conditions: NONE

REMARKS: The vehicle labeling requirements of FMVSS 120 for an MPV do not include Vehicle Capacity Weight (VCW) or Designated Seating Capacity (DSP) as required by FMVSS 110 passenger car labeling.

RECORDED BY: 

DATE: 06/11/03

APPROVED BY: 

DATA SHEET 5
VEHICLE TIRE DATA

VEHICLE MAKE/MODEL/BODY STYLE: 2003 TOYOTA SEQUOIA LIMITED MPV
 VEHICLE NHTSA NO.: C35112 ; VIN: 5TDBT48A23S184296
 LABORATORY: GENERAL TESTING LABORATORIES
 TEST DATE: 06/11/03

All tires on the vehicle are the same size: (Yes/No) Yes

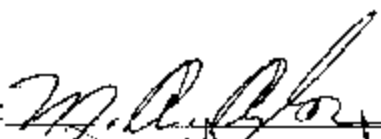
INFORMATION FROM TIRE SIDEWALL:

Right Front Tire

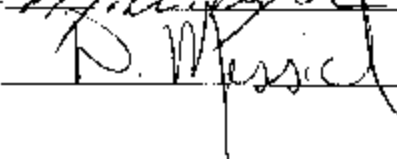
Tire Size Designation	<u>P265/65R17</u>
Tire Load Index/Speed Symbol	<u>110S</u>
Maximum Inflation Pressure	<u>350 kPa (51 psi)</u>
Maximum Load Rating	<u>1060 KG (2337 LBS.)</u>
Mfr. Name or Brand & Code	<u>DUNLOP GRANDTREK</u>
Tube or Tubeless	<u>TUBELESS</u>
Treadwear/Traction/Temp. Grades	<u>300/B/B</u>
Sidewall (Plies & Composition)	<u>2 PLY POLYESTER</u>
Tread (Plies & Composition)	<u>2 PLY POLYESTER</u> <u>2 PLY STEEL</u> <u>1 PLY NYLON</u>
Serial Number: Right Front -	<u>DOT-DBAH D5AR 0903</u>

Tire has "DOT" markings: (X) YES () NO () UNDETERMINED

REMARKS:

RECORDED BY: 

DATE: 06/11/03

APPROVED BY: 

SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO.	CAL. DATE	NEXT CAL. DATE
PAD SCALES	#1 199744LF	199744LF	06/02	06/03
	#2 199744RF	199744RF	06/02	06/03
	#3 199744LR	199744LR	06/02	06/03
	#4 199744RR	19974RR	06/02	06/03
PRESSURE GAGE	WESKLER	0-100	05/03	05/04
SURFACE LEVEL	GTL	N/A	BEFORE USE	BEFORE USE

SECTION 5 PHOTOGRAPHS



2003 TOYOTA 3500VH LIMITED
NHISANO 035812
PLATES NO. 110 (MEXICAN)

FIGURE 5.1
% FRONTAL VIEW OF VEHICLE

FIGURE 5.2
VEHICLES CERTIFICATION AND TIRE
INFORMATION LABEL

2003 TOYOTA SEQUOIA LIMITED
NHTSA NO. C05112
EPAVSS NO. 110 (INDICANT)

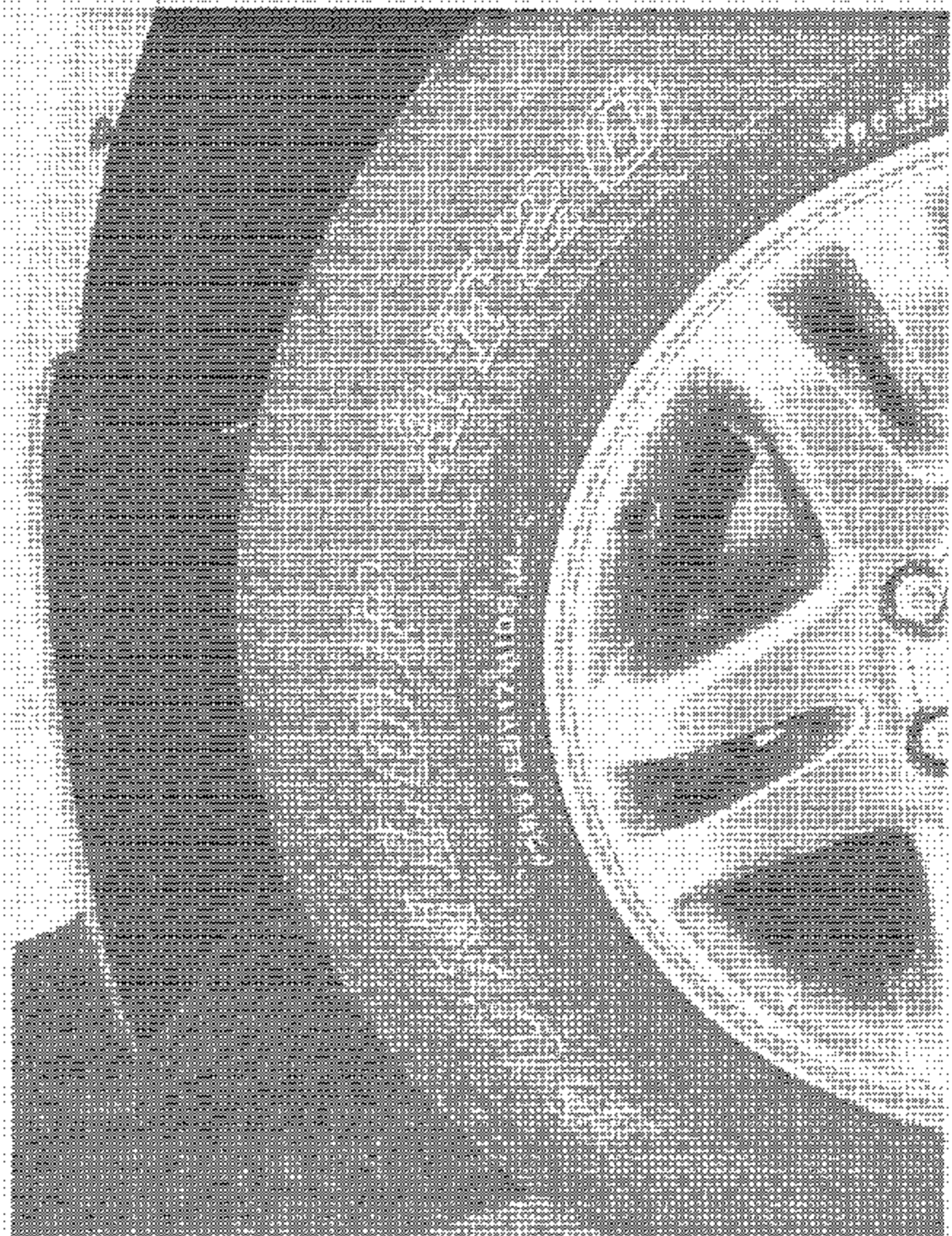


FIGURE 5-4
TOYOTA CAMRY
TIRE SHOWING BRAND, SIZE, LOAD INDEX, AND
SPEED SYMBOL

FIGURE 5-5
TIRE SHOWING BRAND, SIZE, LOAD INDEX, AND
SPEED SYMBOL



2002 TOYOTA SEQUOIA LIMITED
NHTSA NO. C35112
RVSS NO. 140 (INDICANT)

FIGURE 65
TIRE SHOWING MODEL



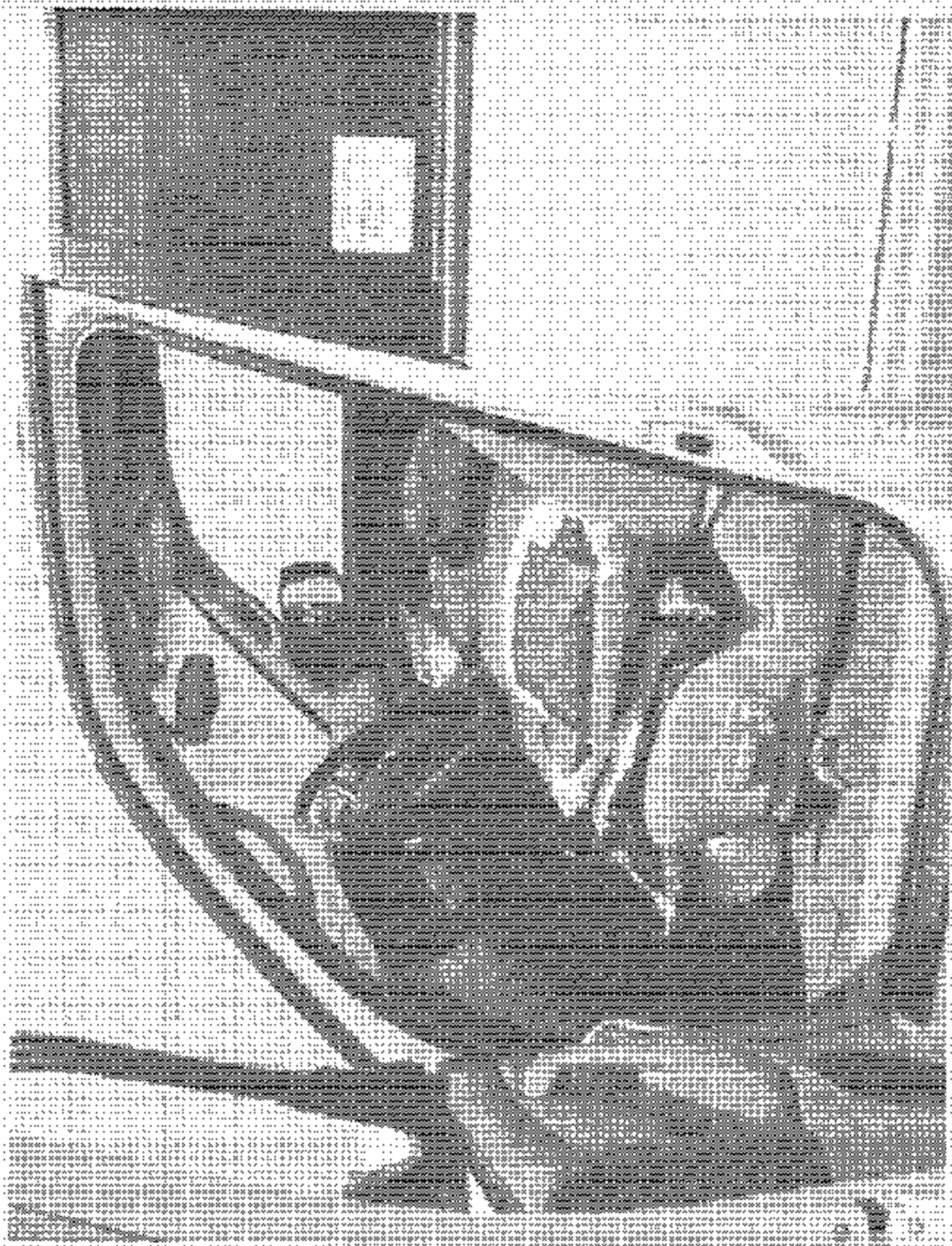
2003 TOYOTA SEQUOIA LIMITED
MFRSA NO. 06512
P195S NO. 110 (INDICANT)

FIGURE 56
TIRE SHOWING MAX LOAD RATING AND MAX
INFLATION PRESSURE



2003 TOYOTA SEQUOIA LIMITED
NHTSA NO. 635112
FMVSS NO. 110 (INDICANT)

FIGURE 57
FIRE SHOWING SERIAL NUMBER



2005 TOYOTA SEQUOIA LIMITED
NHTSA NO. C85112
FMVSS NO. 110 (INDICANT)

FIGURE 5.8
VEHICLE BALLASTED TO SIMULATE MINIMAL
LOAD CONDITION

APPENDIX

**Table 1 – Occupant Loading and Distribution for Vehicle Normal Load for
Various Designated Seating Capacities**

Designated Seating Capacities, numbers of Occupants	Vehicle normal load, number of occupants	Occupant distribution in a normally loaded vehicle
2 through 4	2	2 in front
5 through 10	3	2 in front, 1 in second seat
11 through 15	5	2 in front, 1 in second seat, 1 in third seat, 1 in fourth seat
16 through 22	7	2 in front, 2 in second seat, 2 in third seat, 1 in fourth seat

NOTE: For the indicant test each seat was adjusted to its full down and mid forward to aft position with the seat back adjusted to a 25° reclined angle. Each designated seat position was ballasted with 54 KG (120 LBS) in the seat and 14 KG (30 LBS) on the floor directly in front of the respective seat position.