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Grant Farrand, Project Engineer
Debbie Messick, Project Manager

8. Performing Organ. Rep#
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1623 Leedstown Road
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June 13, 2005

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16. Abstract
Indicant tests were conducted on the subject 2005 Toyota Avalon passenger car in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-207-09 for the determination of FMVSS 207 compliance. Test failures identified were as follows:
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<td>7</td>
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1.0 PURPOSE OF INDICANT TEST

A 2005 Toyota Avalon 4-door passenger car was subjected to the following tests to
determine the effects of the newly developed FMVSS 207/210 force application devices
(FAD) (a.k.a. Tommy (FAD 1) and Tommy Jr (FAD 2) as compared to the current
FMVSS 207/210 seat belt body blocks.

1.1 TEST VEHICLE

The test vehicle was a 2005 Toyota Avalon 4-door passenger car. Nomenclature
applicable to the test vehicle are:

A. Vehicle Identification Number: 4T1BK36B75U024613

B. NHTSA No.: C55104

C. Manufacturer: TOYOTA MOTOR MANUFACTURING, KENTUCKY, INC.

D. Manufacture Date: 03/05

1.2 TEST DATE

The test vehicle was subjected to testing on June 13, 2005.
SECTION 2
TEST PROCEDURE AND SUMMARY OF RESULTS

2.0 GENERAL

The 2005 Toyota Avalon 4-door passenger car, NHTSA No. C55104, was subjected to testing on June 13, 2005.

2.1 TEST PROCEDURE

FAD Positioning Procedure:

1. Place seat in full rearward and full downward position.
2. Set seatback angle per manufacturers recommendation.
3. Identify and mark the centerline of the seat and seat back for each seating position.
4. Place the FAD so the midsagittal plane of the FAD contains the centerline for both the seat and back support of the seat. (Centerline of Body aligns with the centerline of the seat)
5. Rotate torso forward.
6. Push on pelvis parallel to surface of seating surface so the back of the pelvis is solidly against the seat back.
7. Rotate the torso up against the seatback while holding the pelvis in place.
8. Push on torso at center of gravity, perpendicular to the seat back with a force of 40 pounds.
9. Attach seatbelt and position the seatbelt so lap belt is over the FAD’s hips and the shoulder strap over the torso (chest).
10. If seatbelts need to be replaced with wire rope, install ratchet-type-belt tensioner on B-pillar between D-Ring and retractor and remove excess belt from the retractor. If a second retractor is installed on the lap belt, install a second ratchet type-belt tensioner between the FAD and the lap belt retractor.
11. Attach one actuator to the torso pull yoke and one to the pelvis eyelet.

Pull Test Procedure:

1. Connect load cells and actuators to the FAD’s so they pull in a plane that is inclined 10° ± 4° above the horizontal. The applied load shall be parallel to the vehicle’s centerline ± 3°. Also connect the standard test blocks in accordance with FMVSS 207/210 compliance testing.
2. Take pre-test photographs.
3. Ramp to holding load within 30 seconds.
4. Take photographs
5. Hold the maximum force for a period of not less than ten seconds.
6. Take post test photographs.
SECTION 2 Continued

Test Configuration for Toyota Avalon 5 Passenger Sedan:

1. LF FAD1
2. RF Standard Blocks
3. LR Standard Blocks
4. CR FAD2
5. RR FAD1

2.2 SUMMARY OF RESULTS

The test results are provided in Section 3, Test Data.
SECTION 3
TEST DATA

3.0 DATA

The following items were noted during the conduct of these tests.

1. The new FMVSS 207/210 FAD (Tommy Blocks) are much easier to position and set for lap and shoulder belts than the current FMVSS 207/210 body blocks.

2. The current FMVSS 207/210 shoulder belt body block wants to slide down and rest on top of the lower body block. This is no longer a problem with the new FMVSS 207/210 FAD (Tommy Blocks).

3. The new FMVSS 207/210 FAD (Tommy Blocks) appear to be more “seat belt friendly” than the current FMVSS 207/210 body blocks. i.e: A remote chance of breakage of the lap belt buckle due to bending around the corner of the current FMVSS 207/210 lap belt body block and less pay-out of shoulder belt during the test due to the torso being connected to the lap on the new FMVSS 207/210 FAD (Tommy Blocks).

4. Using existing body block, pay-out of seat belt webbing due to load limiters causes hydraulic test load application cylinders to bottom-out and test cannot be completed without resetting and starting the test over again. The resetting of the hydraulic test load application cylinders was not necessary using the new proposed FMVSS 207/210 FAD (Tommy Blocks).

5. This vehicle appears to meet the requirements of FMVSS 210 when tested with current FMVSS 207/210 body blocks and the proposed FMVSS 207/210 FAD force application device (a.k.a.) Tommy (FAD 1) and Tommy Jr. (FAD 2).
DATA SHEET 1
LAP AND SHOULDERS BELT ASSEMBLY ANCHORAGE LOADING

VEHICLE MAKE/MODEL/BODY STYLE: 2005 TOYOTA AVALON PASSENGER CAR
VEHICLE NHTSA NO.: C55104 ; VIN: 4T1BK36E75U024613
LABORATORY: GENERAL TESTING LABORATORIES
TEST DATE: 06/13/05
OBSERVERS: G. Ferrand, J. Latane

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<th>MAXIMUM LOAD REQUIREMENT</th>
<th>APPLIED LOAD</th>
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<td>FRONT</td>
<td>Left Lap</td>
<td>3000 lbs, -10, -50</td>
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<tr>
<td></td>
<td>Left Shoulder</td>
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<td>2972</td>
</tr>
<tr>
<td></td>
<td>Right Lap</td>
<td>3000 lbs, -10, -50</td>
<td>2977</td>
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<td></td>
<td>Right Shoulder</td>
<td>3000 lbs, -10, -50</td>
<td>2990</td>
</tr>
<tr>
<td>REAR</td>
<td>Left Lap</td>
<td>3000 lbs, -10, -50</td>
<td>2975</td>
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<tr>
<td></td>
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<td>Right Shoulder</td>
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<td>2977</td>
</tr>
<tr>
<td></td>
<td>Center Lap</td>
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REMARKS:

RECORDED BY: [Signature]
DATE: 06/13/05
APPROVED BY: [Signature]
## DATA SHEET 2
**SEAT BELT ASSEMBLY LOAD ANGLE MEASUREMENT**

**VEHICLE MAKE/MODEL/BODY STYLE:** 2005 TOYOTA AVALON PASSENGER CAR  
**VEHICLE NHTSA NO.:** C55104  
**VIN:** 4T1BK38B75U024613  
**LABORATORY:** GENERAL TESTING LABORATORIES  
**TEST DATE:** 06/13/05  
**OBSERVERS:** G. Farrand, J. Latane

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<tr>
<th>TYPE</th>
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<tr>
<td>LAP BELT</td>
<td>Load Application Angle (degrees)</td>
<td>From Side View Horizontal 10 ± 4</td>
<td>11° 8° N/A 8° 11° 8°</td>
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<td>From Plan View Vehicle Centerline 0 ± 3</td>
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<td>Load Application Angle (degrees)</td>
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<td></td>
<td></td>
<td>From Plan View Vehicle Centerline 0 ± 3</td>
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**REMARKS:**

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**DATE:** 06/13/05

**APPROVED BY:** [Signature]
## SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

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GTL 5305, NHTSA C55104

210, Lap Belt, Row 1 Left DSP.

Load in Pounds (Thousands)

Time in Seconds
GTL 5305, NHTSA C55104

210, Lap Belt, Row 1 Right DSP.

Load in Pounds (Thousands)

Time in Seconds
GTL 5305, NHTSA C55104

210. Shoulder Belt, Row 1 Left DSP.

Load in Pounds (Thousands)

Time in Seconds
GTL 5306, NHTSA C55104

210, Lap Belt, Row 2 Left DSP.
GTL 5306, NHTSA C55104

210, Shoulder Belt, Row 2 Left DSP.

Load in Pounds (Thousands)

Time in Seconds

0  10  20  30  40
0.2  0.4  0.6  0.8  1.0  1.2  1.4  1.6  1.8  2.0  2.2  2.4  2.6  2.8  3.0
GTL 5306, NHTSA C55104

210, Lap Belt, Row 2 Right DSP.

Load in Pounds (Thousands)

Time in Seconds
GTL 5306, NHTSA C55104

210, Shoulder Belt, Row 2 Right DSP.

Load in Pounds (Thousands)

Time in Seconds
GTL 5306, NHTSA C55104

210, Lap Belt, Row 2 Center DSP.

Graph showing the relationship between load in pounds (thousands) and time in seconds.
GTL 5306, NHTSA C55104

210, Shoulder Belt, Row 2 Center DSP.

Load in Pounds (Thousands)

Time in Seconds