

FINAL REPORT NUMBER: SPNCAP-TRC-14-010

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**Toyota Motor Manufacturing, Texas, Inc.
2014 Toyota Tundra CrewMax
NHTSA NUMBER: M20145116**

**PREPARED BY:
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Report Date: April 11, 2014

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NVS-111
1200 New Jersey Ave, SE
Room W43-410
Washington, D.C. 20590**

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Approval Date: April 11, 2014

FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

FINAL REPORT ACCEPTANCE BY OCWS:

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Date: _____

Technical Report Documentation Pagepa

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16. Abstract A 32.2 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject vehicle, a 2014 Toyota Tundra CrewMax, in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on February 26, 2014. The impact velocity was 32.28 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21° C. The test vehicle's post-test maximum crush was 396 mm at Level 2. The test or target vehicle's performance is given below: <table border="1"> <thead> <tr> <th></th> <th>Unit</th> <th>Threshold</th> <th>Front SID-IIs</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆):</td> <td>NA</td> <td>1000</td> <td>396</td> </tr> <tr> <td>Resultant Lower Spine Acceleration:</td> <td>g's</td> <td>82</td> <td>34.2</td> </tr> <tr> <td>Total Pelvic Force: (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>3031.7</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>18.6</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45</td> <td>15.2</td> </tr> </tbody> </table> The door struck by the pole did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.					Unit	Threshold	Front SID-IIs	Head Injury Criteria (HIC ₃₆):	NA	1000	396	Resultant Lower Spine Acceleration:	g's	82	34.2	Total Pelvic Force: (sum of acetabular and iliac forces)	N	5525	3031.7	Maximum Thoracic Rib Deflection	mm	38	18.6	Maximum Abdomen Rib Deflection	mm	45	15.2
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																									
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SECTION 1

TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY14 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00125. The purpose of this test is to generate comparative side impact performance in a 2014 Toyota Tundra CrewMax manufactured by Toyota Motor Manufacturing, Texas, Inc.. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated September 2013.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a model year 2014 Toyota Tundra CrewMax. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.28 km/h. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, OH, on February 26, 2014. Pre-test and post-test photographs of the test vehicle and the side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated September 2013. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

- Head CG Triaxial Accelerometers
- Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
- Abdomen Upper and Lower Rib Displacement Potentiometers
- Lower Spine (T12) Triaxial Accelerometers
- Iliac Load Cell
- Acetabulum Load Cell

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report.

Injury readings for the SID-IIs dummy were recorded as follows:

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)	NA	1000	396
Lower Spine Acceleration	G	82	34.2
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3031.7
Maximum Thoracic Rib Deflection	mm	38*	18.6
Maximum Abdominal Rib Deflection	mm	45*	15.2

* Proposed IARV

Supplemental restraint information is given below:

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes		
Knee Airbag	Yes	Yes		
Curtain	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	N/A
Pelvis Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	No	No	N/A
Other	No	N/A	No	N/A

GENERAL COMMENTS

None

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20145116	Traction Control System (TCS)	Yes
Model Year	2014	Auto-Leveling System	No
Make	Toyota	Automatic Door Locks (ADL)	Yes
Model	Tundra	Power Window Auto-Reverse	Yes
Body Style	Pick Up Crew Max	Other Optional Feature	N/A
VIN	5TFEM5F19EX072689	Driver Front Airbag	Yes
Body Color	Gray	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	71 mi	Driver Head/Torso Airbag	No
Engine Displacement (L)	4.6	Driver Torso Airbag	No
Type/No. Cylinders	Gas/8	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Front/Longitudinal	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	6	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	RWD	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	No
Power Seats	No	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
		Other Safety Restraint	N/A

Does owner's manual provide instructions to turn off automatic door locks?

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Manufacturing, Texas, Inc.	GVWR (kg)	3080
Date of Manufacturer	11/13	GAWR Front (kg)	1765
Vehicle Type	Truck	GAWR Rear (kg)	1835

VEHICLE SEATING AND WEIGHT CAPACITY DATA

	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	3	3	N/A	6
Vehicle Capacity Weight (VCW) (kg)				582
DSC X 68.04 kg				408.2
Rated Cargo and Luggage Weight (RCLW) (kg)				173.8 ¹

VEHICLE SEAT TYPE

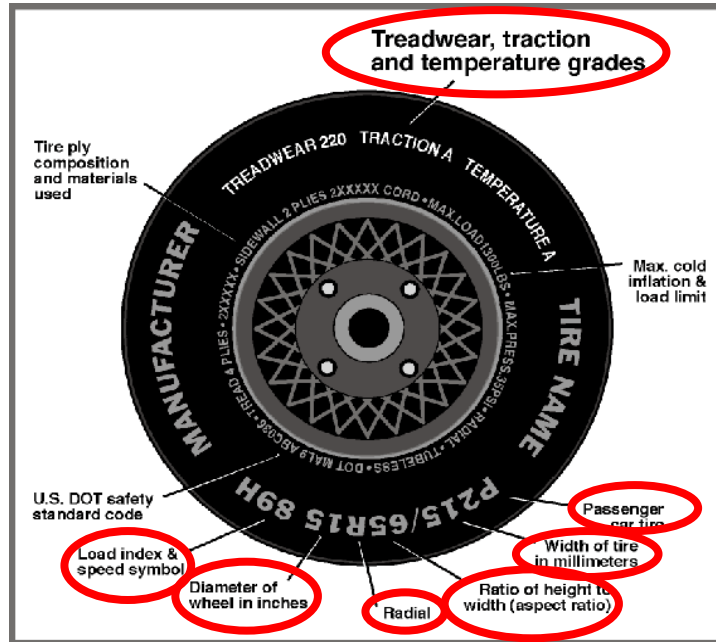
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	N/A	N/A	Yes		N/A	Yes	N/A
Rear or Second Row Seat	N/A	N/A	Yes	N/A	Yes	N/A	N/A
Third row seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

¹ Rated cargo and luggage weight (RCLW) is limited to 136.0 kg or 300 lbs.

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	210	230
Recommended Tire Size	P255/70R18	P255/70R18
Tire Size on Vehicle	P255/70R18	P255/70R18
Tire Manufacturer	Michelin	Michelin
Tire Model	LTX M/S ²	LTX M/S ²
Treadwear	720	720
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	112T	112T
Tire Material	Polyester, Polyamide & Steel	Polyester, Polyamide & Steel
DOT Safety Code Left	APYU 003X 4413	APYU 003X 4413
DOT Safety Code Right	APYU 003X 4413	APYU 003X 4413

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	234	234	234	234
Tire Placard	kPa	210	210	230	230
Owner's Manual	kPa	N/A	N/A	N/A	N/A
As Tested	kPa	210	210	230	230

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	694.6	562.6		710.6	611.0		711.6	651.0	
Right	kg	644.2	529.0		683.0	602.4		658.6	609.2	
Ratio	%	55.1	44.9		53.5	46.5		52.1	47.9	
Totals	kg	1338.8	1091.6	2430.4	1393.6	1213.4	2607.0	1370.2	1260.2	2630.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total As Delivered Weight (UVW)	kg	2430.4
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	49.0
Rated Cargo/Luggage Weight (RCLW)	kg	136.0 ¹
Calculated Vehicle Target Weight (TVTW)	kg	2615.4

(A)
 (B)
 (C)
 (A+B+C)

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)? ☒ YES ☐ NO

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: Steel plate mounted in cargo bed	25.9
Components removed: None	0.0

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	Deg.	-0.3	-0.3	-0.3	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg.	-0.4	-0.3	0.0	Yes
Front Bumper-Line Angle (left-to-right)**	Deg.	-0.5	0.0	-0.4	No
Rear Bumper-Line Angle (left-to-right)**	Deg.	+0.4	+0.3	0.0	Yes
Vehicle CG (Aft of Front Axle)	mm	1662	1722	1773	
Vehicle CG (Left (+) / Right (-) from longitudinal Centerline)	mm	+30	+12	+32	

*ND=Nose Down (-), NU=Nose Up (+) **LD=Left Down (-), LU=Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for "Meets Requirements".

¹ Rated cargo and luggage weight (RCLW) is limited to 136.0 kg or 300 lbs.

DATA SHEET NO. 2

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2014 Toyota Tundra CrewMax

NHTSA No.: M20145116

Test Program: SPNCAP Side Impact

Test Date: 2/26/14

SEAT POSITIONING

The driver seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max.	Min.	Mid
Driver Seat	Fixed	N/A	14.4
Front Passenger Seat	Fixed	N/A	15.0
Front Center Seat*	Fixed	N/A	11.4
Struck Side Rear Seat	Fixed	N/A	13.4
Non-Struck Side Rear Seat	Fixed	N/A	14.3
Rear Center Seat*	Fixed	N/A	12.7

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rearmost	Mid- Fore/Aft	Forward- Most
Driver Seat	14.4	319	Max	N/A	N/A	N/A
			Mid	317	318	319
			Min	N/A	N/A	N/A
Front Passenger Seat	15.0	331	Max	N/A	N/A	N/A
			Mid	329	330	331
			Min	N/A	N/A	N/A
Front Center Seat*	11.4	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Struck Side Rear Seat	13.4	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	14.3	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	12.7	Fixed	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A

* If applicable.

DATA SHEET NO. 2 (CONTINUED)**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA**

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14

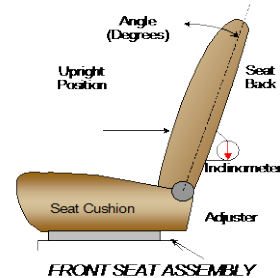
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240	25	0	0
Front Passenger Seat	240	25	0	0
Front Center Seat*	Fixed	N/A	Fixed	N/A
Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

* If applicable.

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck-side rear passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1. For the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back is set to match the struck-side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detent*
Driver Seat w/ Seated Dummy	56.6	29	10.2 fwd	1
Front Passenger Seat	56.7	29	9.1	1
Front Center Seat*	13.8	8	0	0
Struck Side Rear Seat	Fixed	N/A	15.9	N/A
Non-Struck Side Rear Seat	Fixed	N/A	16.2	N/A
Rear Center Seat*	Fixed	N/A	25.9	N/A

* If applicable.

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted with the information provided by the manufacturer on Form No. 1

	Total # of Positions	Placed in Position #
Driver Seat	4, numbered from 0 to 3	0, Uppermost

HEAD RESTRAINT ADJUSTMENT

Head restraints are adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	3, numbered from 0 to 2	2, Lowermost

DATA SHEET NO. 2 (CONTINUED)**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA**

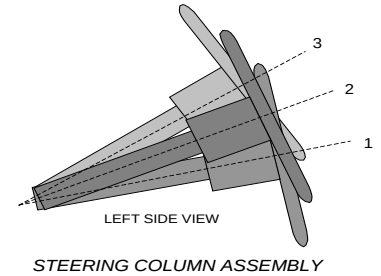
Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14

STEERING COLUMN ADJUSTMENT

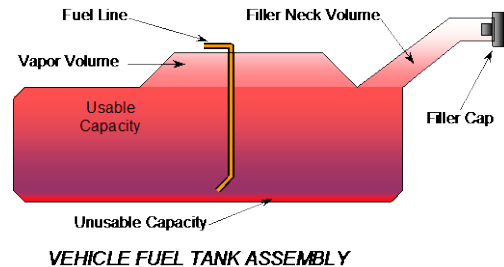
Steering wheel and column adjustments are made so that the steering wheel geometric locus it describes when moved through its full range of motion.

	Degrees	Fore/Aft Position, mm
Lowermost, Position No. 1	24.0	Fixed
Geometric Center, Position No. 2	27.3	Fixed
Uppermost, Position No. 3	30.6	Fixed
Telescoping Steering Wheel Travel		Fixed
Test Position	27.3	Fixed

**FUEL PUMP**

Describe the fuel pump type, detail about how it operates and the location of the fuel filler neck:

Fuel tank is located in front of the rear axle. Filler neck enters the left side of the tank. Cap is on left rear quarter panel. Fuel pump will run when engine is running. Also, it will run briefly when ignition key is turned to the "ON" position without starting the engine.

**FUEL TANK CAPACITY**

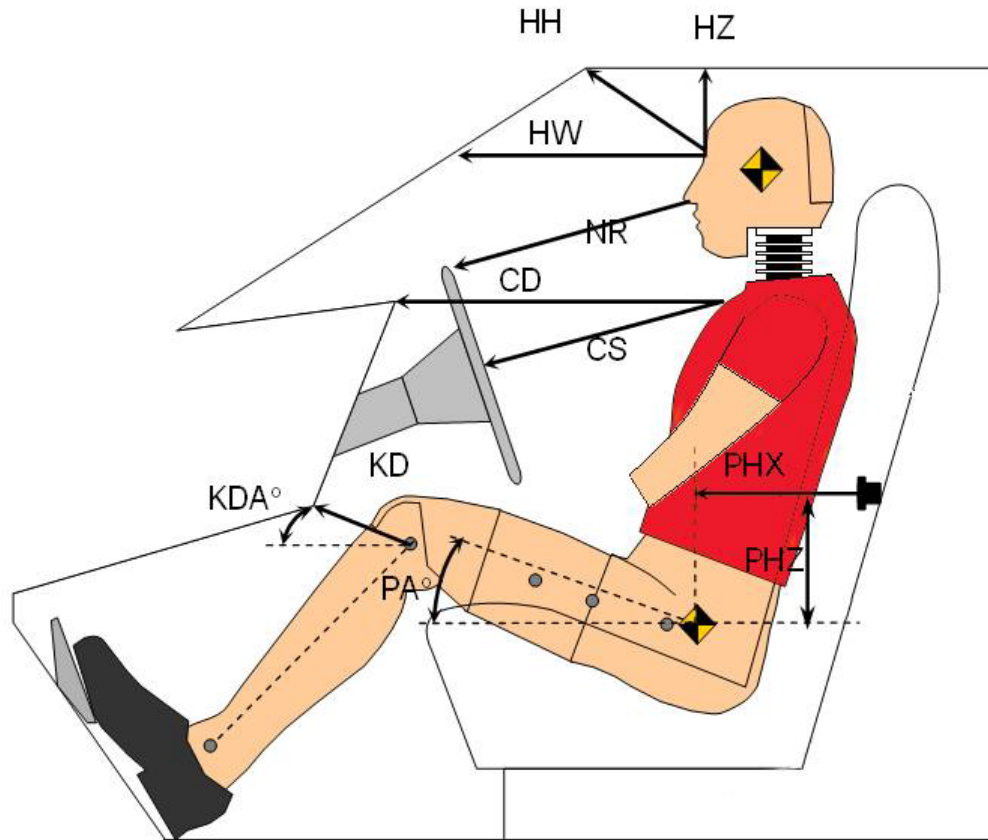
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	99.9
Usable Capacity of "Optional" Tank (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	100.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	92.9
Actual Amount of Solvent Used in Test	92.9
1/3 of Usable Capacity	33.3

Is the Actual Amount of Solvent Used in the test equal to 93% +/- 1% of the Usable Capacity stated on Form No. 1? X YES ☐ NO

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14

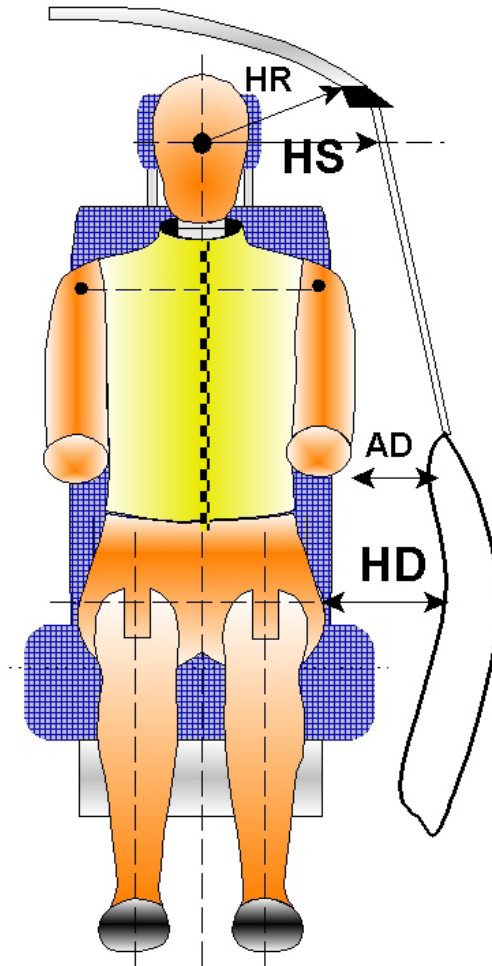


Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	335	
HW	Head to Windshield	628	
HZ	Head to Visor	222	
NR	Nose to Rim	243	
CD	Chest to Dashboard	430	
CS	Chest to Steering Wheel	185	
KDL/KDLA°	Left Knee to Dash	118	25.0
KDR/KDRA°	Right Knee to Dash	117	25.0
PAX°	Pelvic Tilt Angle (X-axis)		0.4
PAY°	Pelvic Tilt Angle (Y-axis)		21.6
PHX	Hip Point to Striker (X-Axis)	392	
PHZ	Hip Point to Striker (Z-Axis)	32	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Toyota Tundra CrewMax
Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
Test Date: 2/26/14

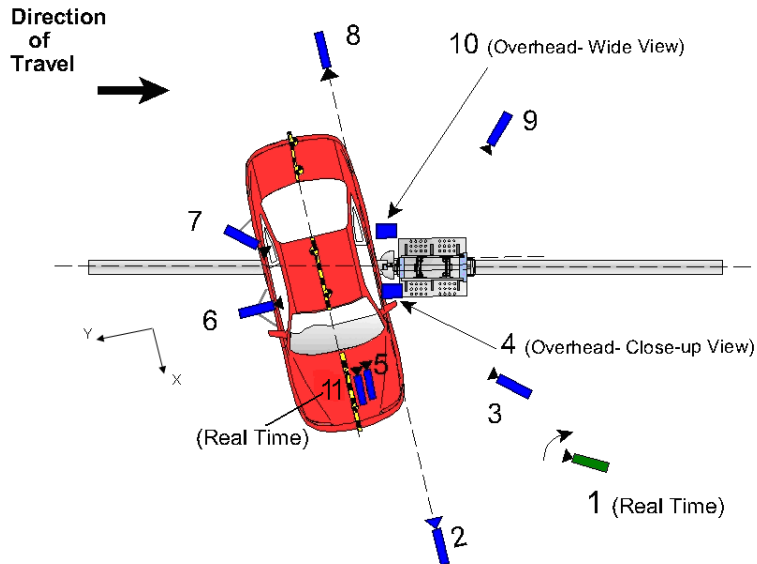


Code	Measurement Description	Length (mm)
HR	Head to Side Header	277
HS	Head to Side Window	380
AD	Arm to Door	176
HD	Hip Point to Door	205

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14



REFERENCE: (from point of impact for X and Y; from ground for Z)
 + X = Forward of vehicle, + Y = Right of vehicle, + Z = Down

Camera No.	View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real time (24-30 fps) pan view of impact				Zoom	30
2	Front ground level – impact view	6333	0	-1324	Zoom	1000
3	Impact side 45° – forward pole view	3917	-1199	-1246	Zoom	1000
4	Overhead Close-up view of impact	-435	340	-5691	50	1000
5	Onboard – dummy front view				12.5	1000
6	Onboard – dummy side view				8.5	1000
7	Onboard – dummy rear oblique view				6	1000
8	Rear ground level – impact view	-6827	-640	-1349	Zoom	1000
9	Impact side 45° – rearward pole view	-2858	-3008	-1383	Zoom	1000
10	Overhead wide view of impact	-270	0	-5692	20	1000
11	Real time dummy front view				Zoom	30

All measurements accurate to +/- 6 mm.

NOTE: Vehicle was at a 75° angle to the rigid pole.

If applicable, explain why camera(s) did not run: Not Applicable

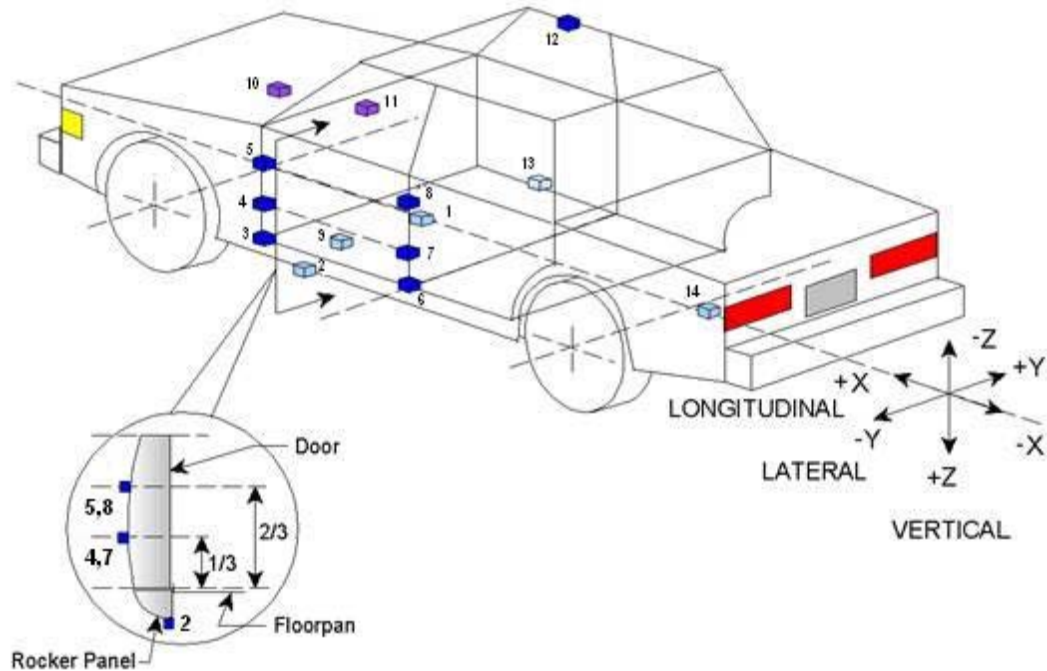
INSTRUMENTATION

	Number of Channels
Driver Dummy	16
Vehicle Structure	18
Pole Load Cells	8
TOTAL	42

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14



	Accelerometer/Sensor Location			
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3970	20	-718
2	Left Floor Sill	3980	-810	-520
3	A-Pillar Sill	4272	-810	-543
4	A-Pillar Low	4350	-905	-547
5	A-Pillar Mid	4380	-890	-1166
6	B-Pillar Sill	3090	-790	-530
7	B-Pillar Low	3200	-900	-660
8	B-Pillar Mid	3185	-906	-1221
9	Driver Seat Track	3570	-645	-526
10	Engine Top	5040	0	-1116
11	Firewall	4785	-70	-1253
12	Right Roof	3175	750	-1855
13	Right Floor Sill	3958	840	-516
14	Rear Floorpan	1050	0	-814

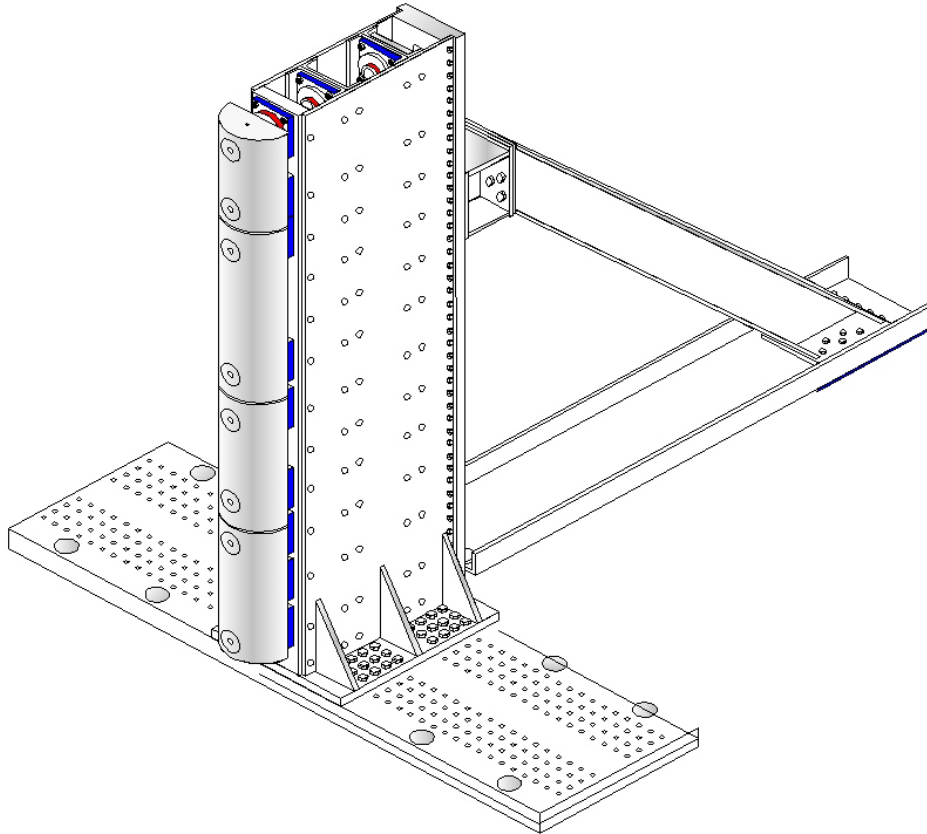
Reference: X - Test Vehicle Rear Bumper (+ forward)
 Y - Test Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2014 Toyota Tundra CrewMax
Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
Test Date: 2/26/14

FOIL 300K RIGID POLE



Load Cell Locations	
ID	Height From Top of Carrier (mm)
1	87
2	468
3	648
4	978
5	1168
6	1651
7	1816
8	2057

**DATA SHEET NO. 8
POST TEST OBSERVATIONS**

Test Vehicle: 2014 Toyota Tundra CrewMax
Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
Test Date: 2/26/14

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver SID-IIs Dummy
Face	Front Airbag; SCAB
Top of Head	SCAB
Left Side of Head	SCAB
Back of Head	None
Left Shoulder	Torso/Pelvis Bag
Upper Torso	Seat Bolster
Lower Torso	Seat Bolster
Left Hip	Torso/Pelvis Bag
Left Knee	N/A

POST TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other Door
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	No	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	Yes	No	No
If Door Opened at Striker, Record Width of Opening at Striker (mm)	N/A	N/A	N/A	N/A	N/A

* Indicate "Yes", "No", or "NA".

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	No	No	No
Seat Disengagement from Floor pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No
Seat Back Collapse	No	No	No	No

* Indicate "Yes", "No", or "NA".

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Major deformation
Sill Separation	None visible
Windshield Damage	Broken
Side Window Damage	Left front shattered and left rear undamaged
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side (Driver)		Struck Side (Rear Passenger)	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	Yes		
Knee Airbag	Yes	Yes		
Curtain	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	No	No	N/A
Other	No	N/A	No	N/A

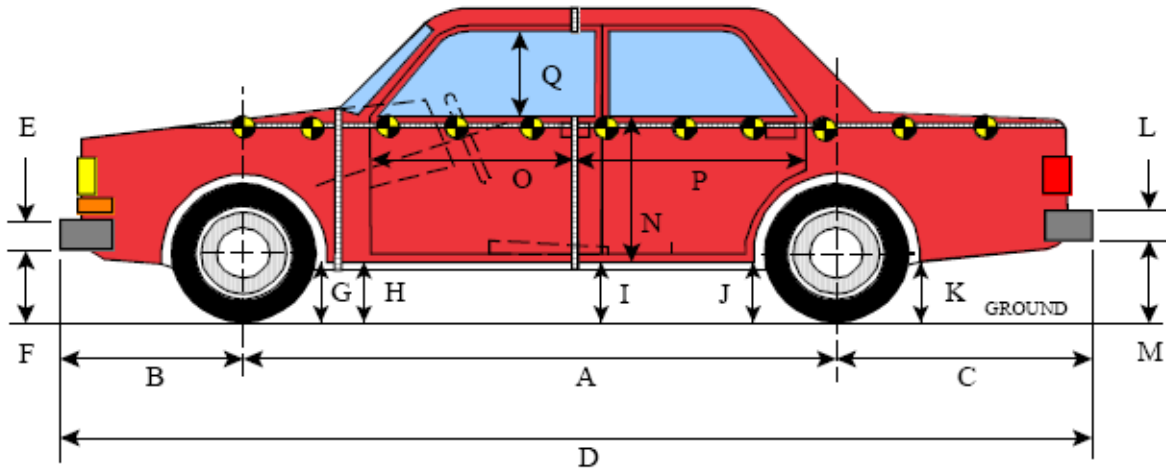
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1178
Actual Impact Point (Aft of Front Axle)	mm		1182
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 of Intended Impact point	-4
Angle Between Vehicle's Longitudinal Centerline and Line of Motion	degrees	75 +/- 3	75
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.28
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.26

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14



LEFT SIDE VIEW

All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3 mm

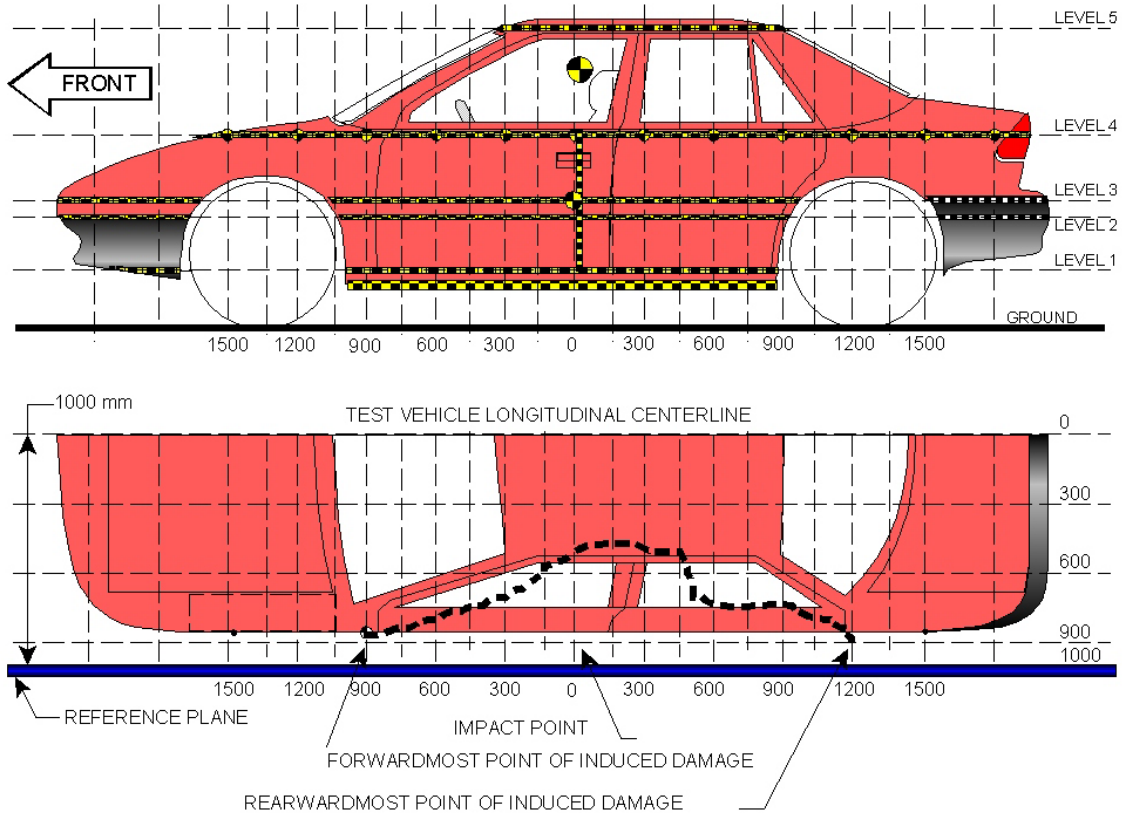
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3700	3687	13
B	Front Axle to Front Surface of Vehicle	890	890	0
C	Rear Axle to Rear Surface of Vehicle	1210	1190	20
D	Total Length at Centerline	5800	5812	-12
E	Front Bumper Thickness	255	255	0
F	Front Bumper Bottom to Ground	420	411	9
G	Sill Height at Front Wheel Well	442	454	-12
H	Sill Height at Front Door Leading Edge	440	455	-15
I	Sill Height at B-Pillar	470	489	-19
J1	Sill Height at Rear Wheel Well	474	521	-47
J2	Pinch Weld Height at Rear Wheel Well	390	439	-49
K	Sill Height Aft of Rear Wheel Well	468	520	-52
L	Rear Bumper Thickness	210	210	0
M	Rear Bumper Bottom to Ground	488	540	-52
N	Sill Height to Bottom of Front Window Sill	925	933	-8
O	Front Door Leading Edge to Impact CL	610	604	6
P	Rear Door Trailing Edge to Impact CL	1738	1610	128
Q	Front Window Opening	493	458	35
R	Right Side Length	5715	5728	-13
S	Left Side Length	5715	5705	10
T	Vehicle Width at "B" Pillars	2030	2020	10

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14



NOTE: All measurements are in millimeters (mm)

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	516	306	0
2	Occupant H-Point	888	396	0
3	Mid-Door	945	383	0
4	Window Sill	1277	359	0
5	Window Top	1853	150	150

NOTE: The above measurements should be taken along the vertical impact reference line. Vehicle measurements forward of the vertical impact reference line are negative.

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14

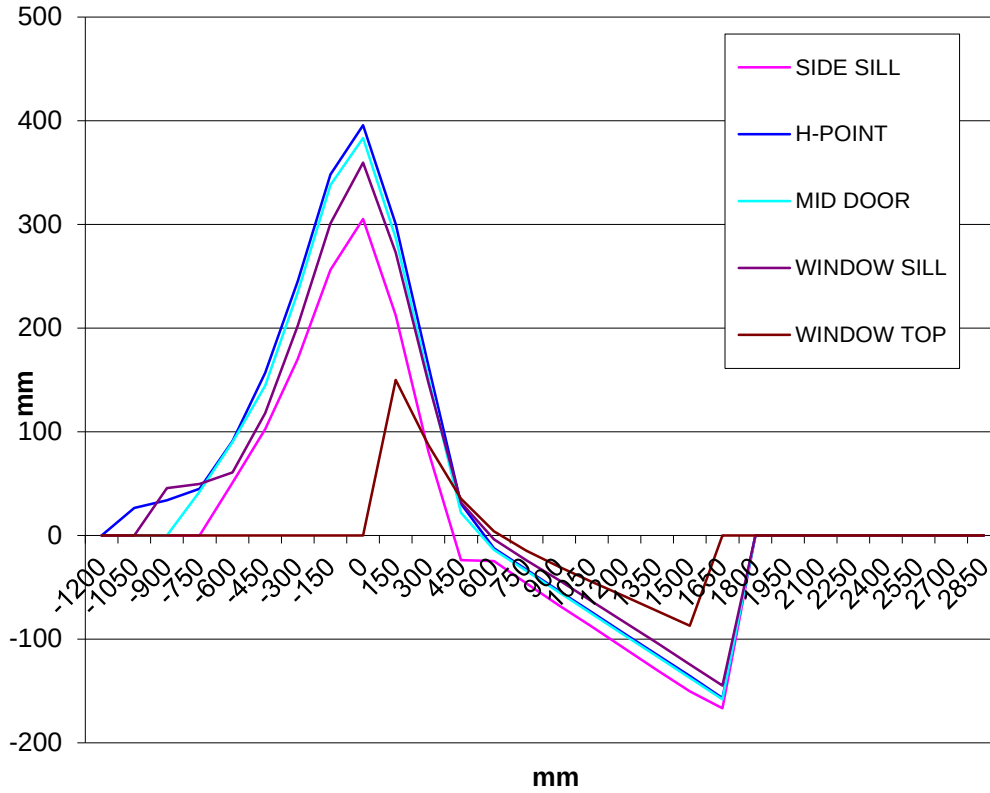
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	1026	0	900	0	0	992	0	855	0	0	34	0	45	0
-750	0	1024	1027	917	0	0	979	985	867	0	0	45	42	50	0
-600	997	1019	1021	930	0	946	928	931	869	0	51	91	90	61	0
-450	975	1017	1013	937	0	873	860	869	819	0	102	157	144	118	0
-300	975	1018	1013	944	0	805	773	779	741	0	170	245	234	203	0
-150	977	1019	1014	950	0	720	671	676	649	0	257	348	338	301	0
0	978	1021	1015	954	0	672	625	632	595	0	306	396	383	359	0
150	978	1022	1016	959	688	766	721	729	686	538	212	301	287	273	150
300	978	1022	1017	963	709	897	859	865	815	621	81	163	152	148	88
450	979	1023	1018	966	716	1002	992	996	934	681	-23	31	22	32	35
600	978	1023	1018	970	720	1002	1035	1032	973	716	-24	-12	-14	-3	4
750	977	1022	1017	972	721	1023	1055	1052	996	735	-46	-33	-35	-24	-14
900	975	1022	1016	974	720	1043	1075	1071	1017	751	-68	-53	-55	-43	-31
1050	973	1021	1015	975	721	1061	1095	1090	1038	765	-88	-74	-75	-63	-44
1200	970	1020	1014	975	720	1079	1114	1110	1059	779	-109	-94	-96	-84	-59
1350	967	1018	1012	975	718	1097	1134	1129	1079	790	-130	-116	-117	-104	-72
1500	965	1017	1011	976	713	1115	1153	1148	1100	800	-150	-136	-137	-124	-87
1650	963	1015	1009	975	0	1129	1172	1167	1120	0	-166	-157	-158	-145	0
1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Toyota Tundra CrewMax
Test Program: SPNCAP Side Impact

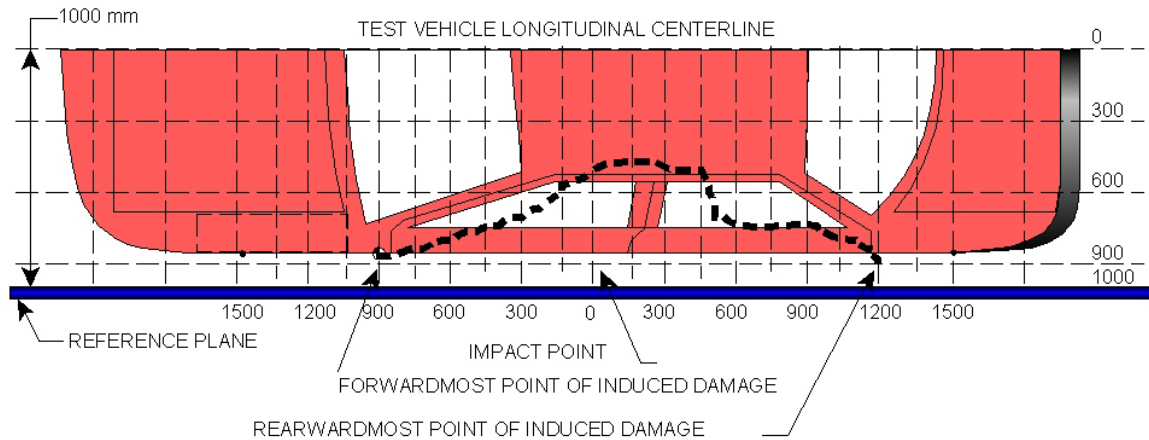
NHTSA No.: M20145116
Test Date: 2/26/14



DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2014 Toyota Tundra CrewMax
 Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
 Test Date: 2/26/14



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	600	5	716	720	0
2	150	2	721	1022	301
3	-150	2	671	1019	348
4	-450	2	860	1017	157
5	-750	4	867	917	50
6	-1050	2	998	1024	0

¹ DPD 1 and 6 defined as zero crush since the crush doesn't extend to the end of the vehicle.

DATA SHEET NO. 12

FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2014 Toyota Tundra CrewMax

NHTSA No.: M20145116

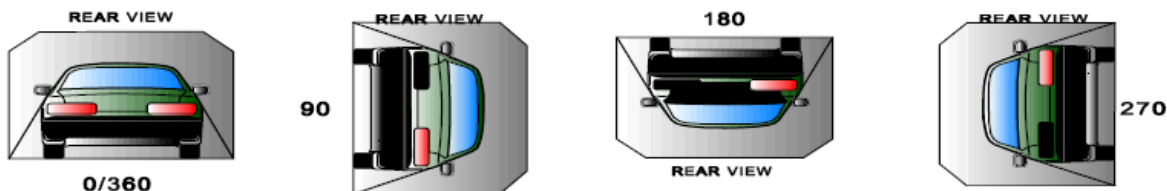
Test Program: SPNCAP Side Impact

Test Date: 2/26/14

Test Time: 15:20 Temperature: 20.9°C

- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 ounce)
- B. For the 5 minute period after motion ceases: 0
(Maximum allowable is 5 ounces)
- C. For the following 25 minutes: 0
(Maximum allowable is 1 ounce/minute)
- D. Spillage Deta1LS: None

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0 to 90	90	330	420
90 to 180	90	330	840
180 to 270	90	330	1260
270 to 360	90	330	1680

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	0	0	0	N/A
90 to 180	0	0	0	N/A
180 to 270	0	0	0	N/A
270 to 360	0	0	0	N/A

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0 to 90	None
90 to 180	None
180 to 270	None
270 to 360	None

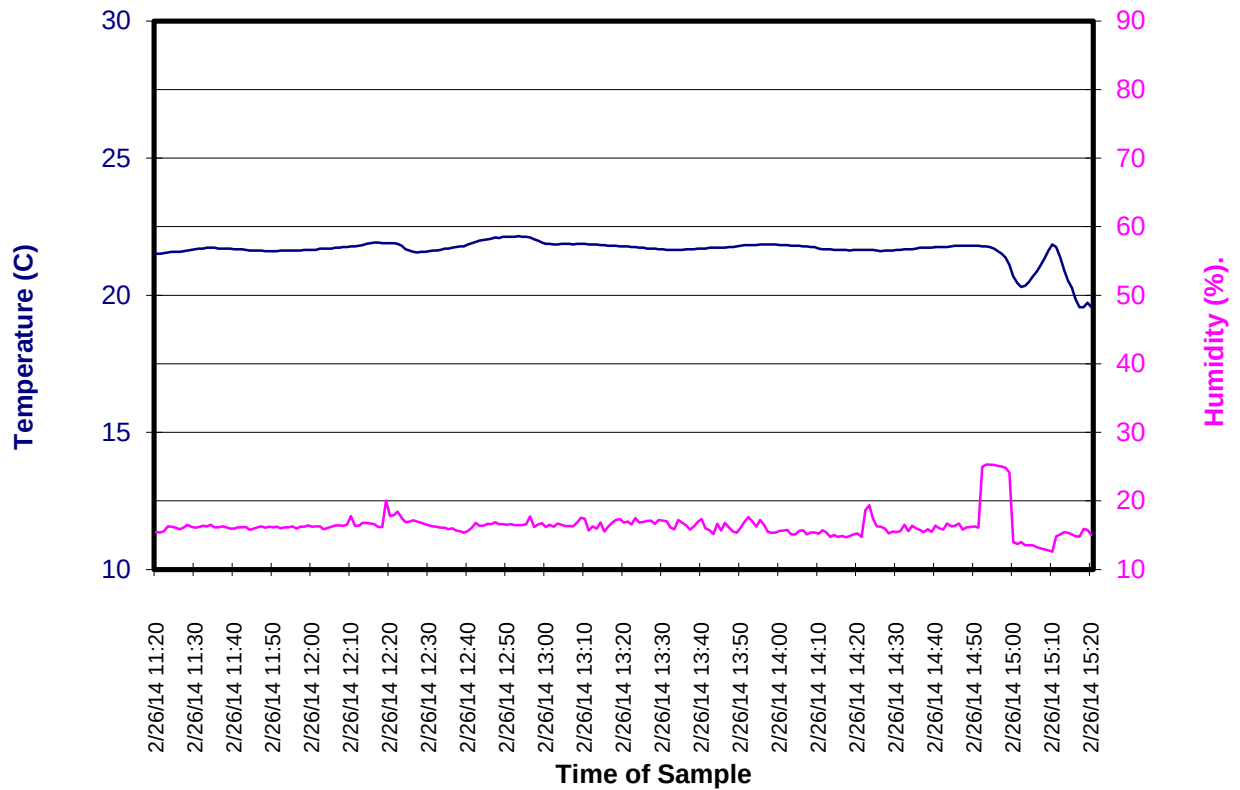
DATA SHEET NO. 13

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2014 Toyota Tundra CrewMax
Test Program: SPNCAP Side Impact

NHTSA No.: M20145116
Test Date: 2/26/14

**M20145116 2014 Toyota Tundra CrewMax
75 Degree Oblique Rigid Pole Impact 140226; Test Time 15:20**



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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2	As Delivered Left Rear 3-4 View of Test Vehicle	A-4
3	Pre-Test Frontal View of Test Vehicle	A-5
4	Post-Test Frontal View of Test Vehicle	A-5
5	Pre-Test Left Front 3-4 View of Test Vehicle	A-6
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23	Pre-Test Left Side View of Dummy Showing Belt and Chalking	A-15
24	Pre-Test Left Side View of Dummy Shoulder and Door Top View	A-15
25	Post-Test Left Side View of Dummy Shoulder and Door Top View	A-16
26	Pre-Test Front View of Seat Back Prior to Dummy Positioning	A-16
27	Pre-Test Front View of Dummy Head and Shoulders in Relation to Head Restraint	A-17
28	Pre-Test Front View of Seat Pan Prior to Dummy Positioning	A-17
29	Pre-Test Overhead View of Dummy Thighs on Seat Pan	A-18
30	Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket	A-18
31	Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level	A-19
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37	Pre-Test Close-Up Left Side View of Driver Seat Track	A-22
38	Pre-Test Close-Up Left Side View of Driver Seat Back	A-22
39	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-23
40	Pre-Test Dummy and Door Clearance View	A-23
41	Post-Test Dummy and Door Clearance View	A-24
42	Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment	A-24
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44	Pre-Test Inner Driver Door Panel View	A-25
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46	Post-Test Dummy Close-Up Head Contact with Vehicle View	A-26
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48	Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View	A-27
49	Post-Test Dummy Close-Up Torso Contact with Side Airbag View	A-28
50	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-28
51	Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View	A-29
52	Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View	A-29
53	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-30
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55	Close-Up View of Vehicle's Certification Label	A-31
55a	Close-up View of Vehicle Reduced Load Carrying Capacity Label	A-31
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59	Pre-Test Pole Barrier Side View	A-33
60	Post-Test Pole Barrier Side View	A-34
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66	FMVSS No. 301 Static Rollover 270 Degrees	A-37
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69	Monroney Label	A-38
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71	Post-Test View of Shattered Vehicle Inner Door Panel	A-39



001 As Delivered Right Front 3-4 View of Test Vehicle



002 As Delivered Left Rear 3-4 View of Test Vehicle



003 Pre-Test Frontal View of Test Vehicle



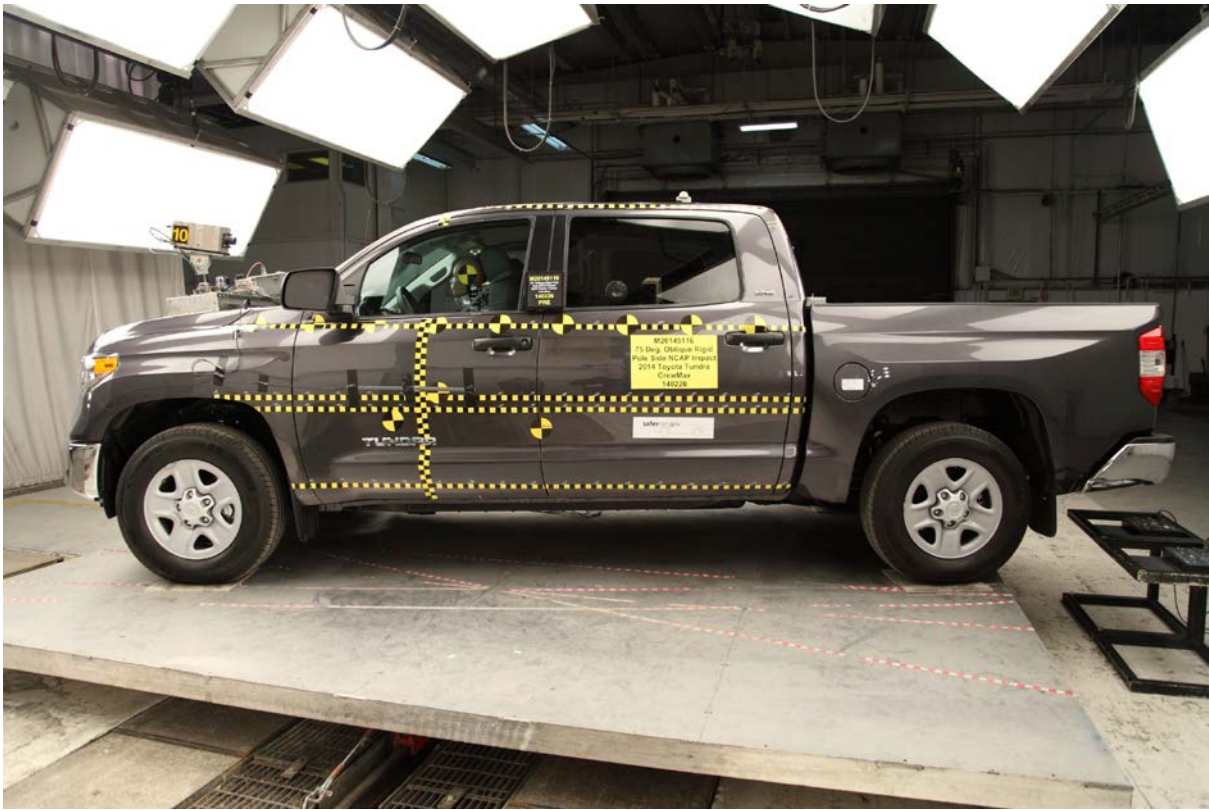
004 Post-Test Frontal View of Test Vehicle



005 Pre-Test Left Front 3-4 View of Test Vehicle



006 Post-Test Left Front 3-4 View of Test Vehicle



007 Pre-Test Left Side View of Test Vehicle



008 Post-Test Left Side View of Test Vehicle



009 Pre-Test Left Rear 3-4 View of Test Vehicle



010 Post-Test Left Rear 3-4 View of Test Vehicle



011 Pre-Test Rear View of Test Vehicle



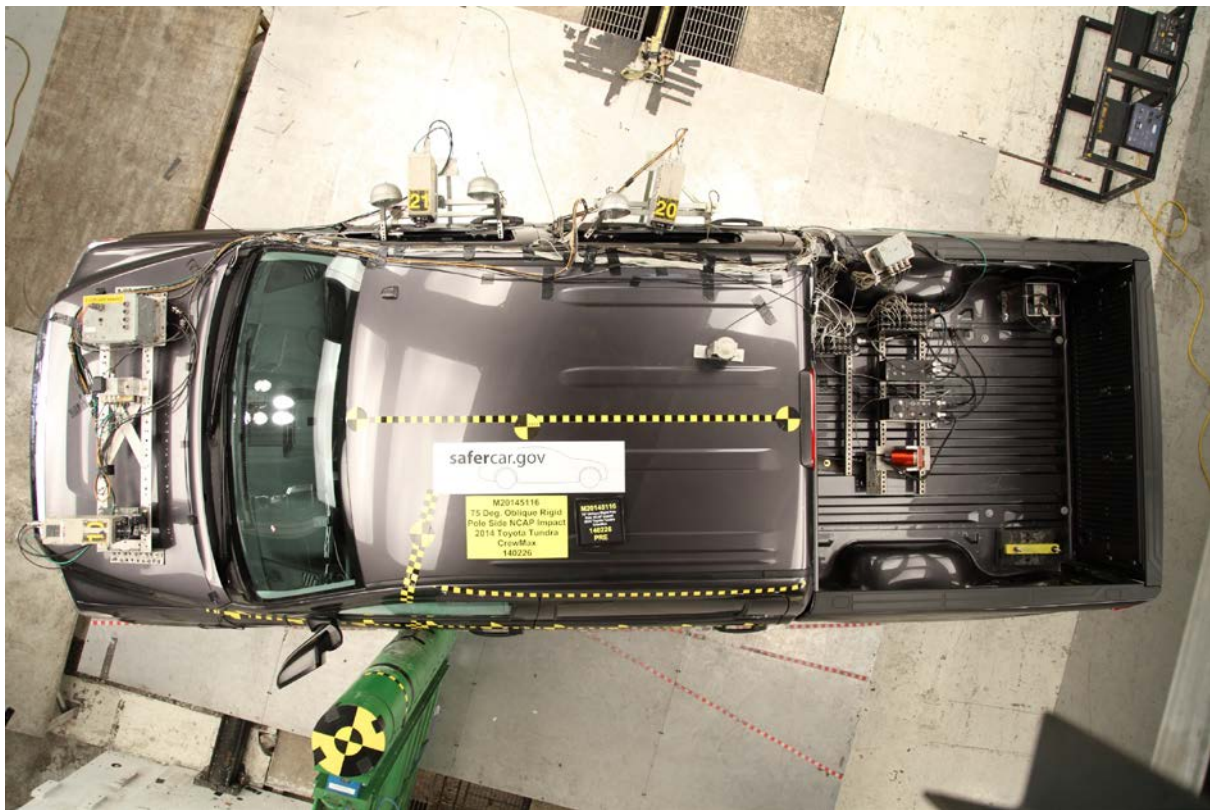
012 Post-Test Rear View of Test Vehicle



013 Pre-Test Right Side View of Test Vehicle



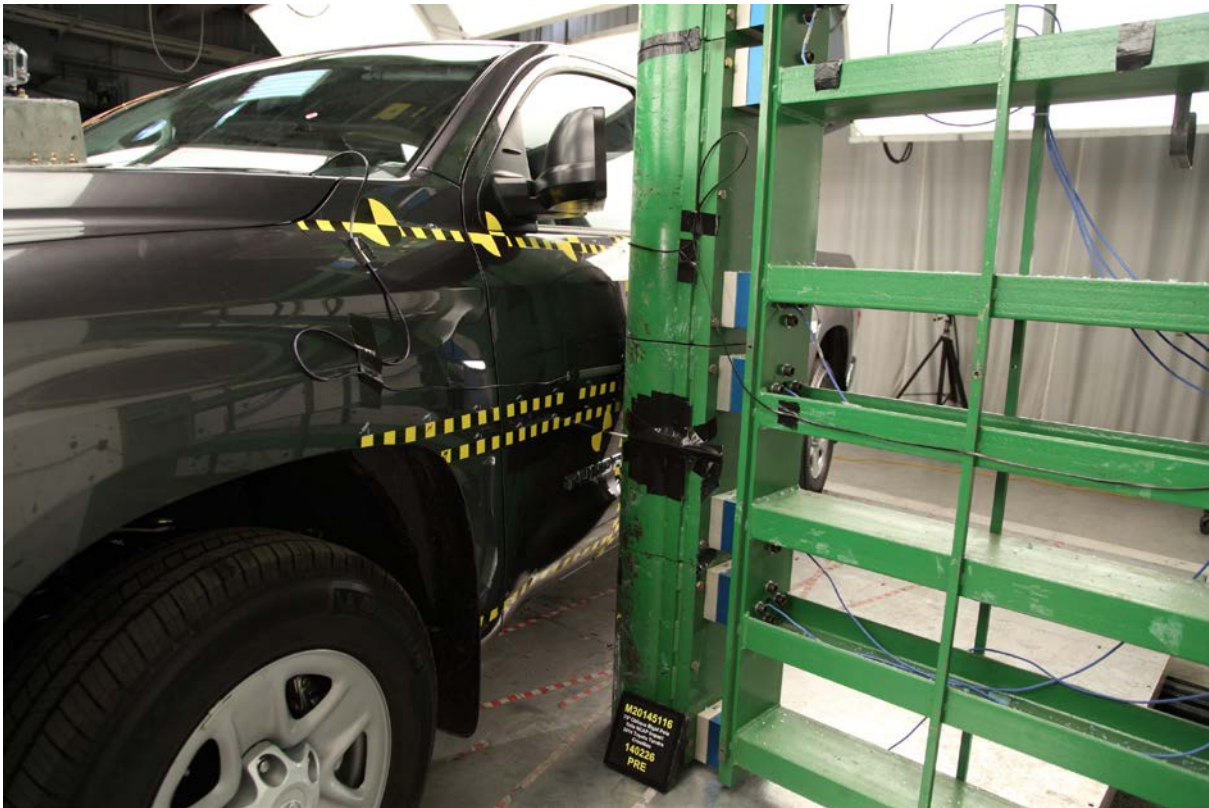
014 Post-Test Right Side View of Test Vehicle



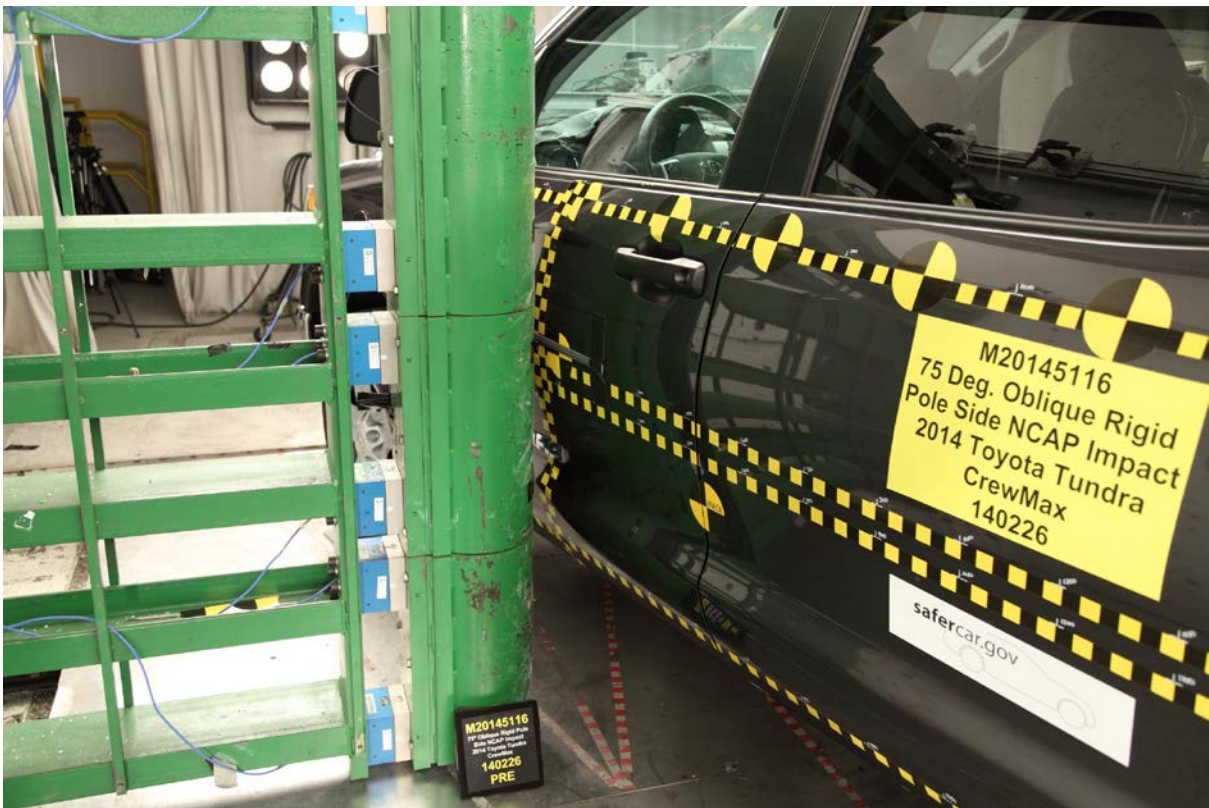
015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area



017 Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



018 Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



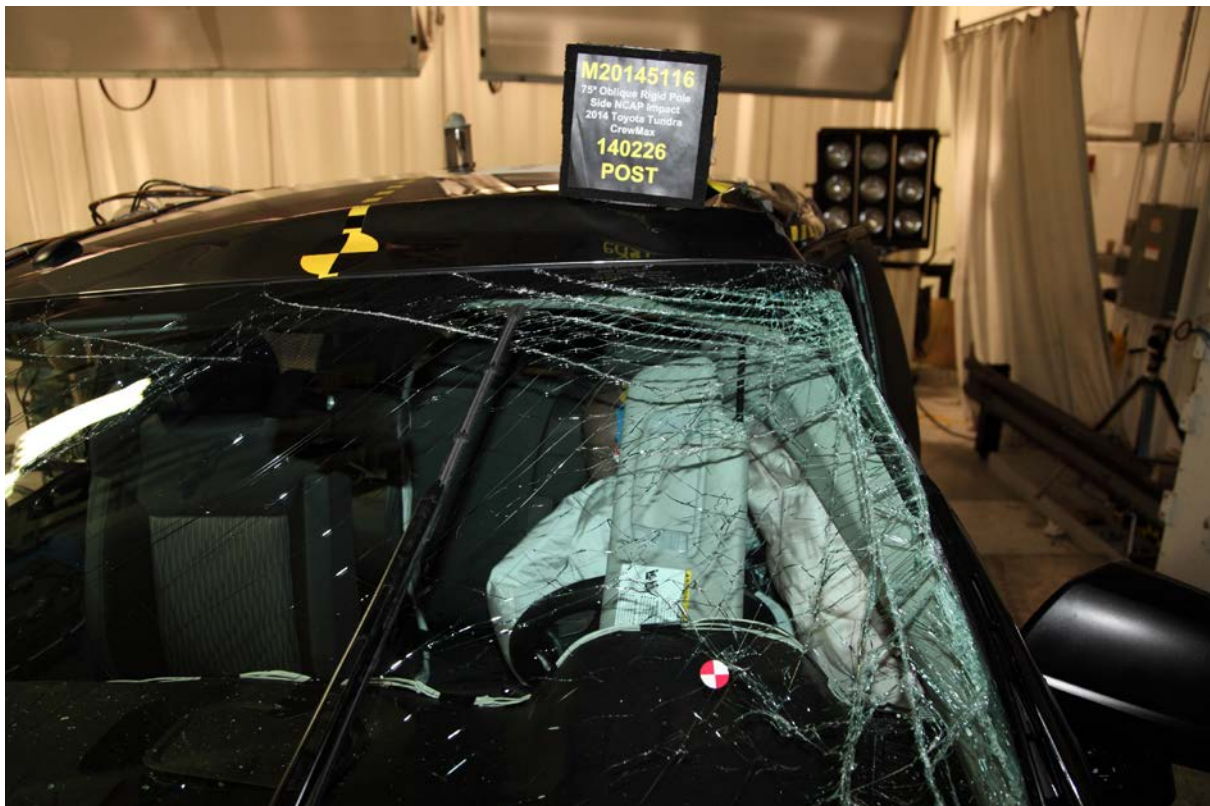
019 Pre-Test Close-Up View of Impact Point Target



020 Post-Test Close-Up View of Impact Point Target Showing Impact Location



021 Pre-Test Front Close-Up View of Dummy Head and Chest



022 Post-Test Front Close-Up View of Dummy



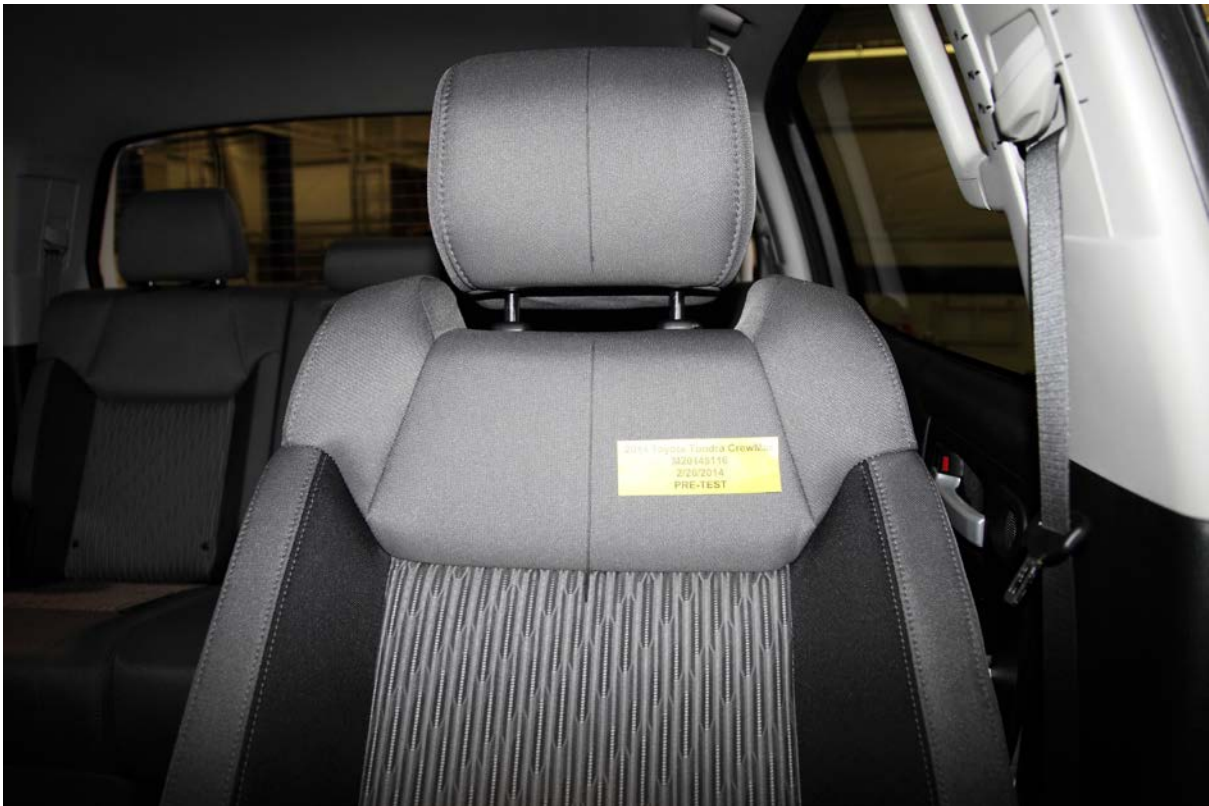
023 Pre-Test Left Side View of Dummy Showing Belt and Chalking



024 Pre-Test Left Side View of Dummy Shoulder and Door Top View



025 Post-Test Left Side View of Dummy Shoulder and Door Top View



026 Pre-Test Front View of Seat Back Prior to Dummy Positioning



027 Pre-Test Front View of Dummy Head and Shoulders in Relation to Head Restraint



028 Pre-Test Front View of Seat Pan Prior to Dummy Positioning



029 Pre-Test Overhead View of Dummy Thighs on Seat Pan



030 Pre-Test Left Side View of Dummy Neck Showing Position of Adjustable Neck Bracket



031 Pre-Test Left Side View of Dummy Head Showing Dummy Head is Level



032 Pre-Test Placement of Dummy Feet



033 Pre-Test View of Belt Anchorage for Dummy



034 Pre-Test Left Side View of Steering Wheel



035 Pre-Test View of Disengaged Parking Brake



036 Pre-Test View of Parking Brake



037 Pre-Test Close-Up Left Side View of Driver Seat Track



038 Pre-Test Close-Up Left Side View of Driver Seat Back



039 Pre-Test Close-Up View of Driver Seat Back or Head Restraint



040 Pre-Test Dummy and Door Clearance View



041 Post-Test Dummy and Door Clearance View



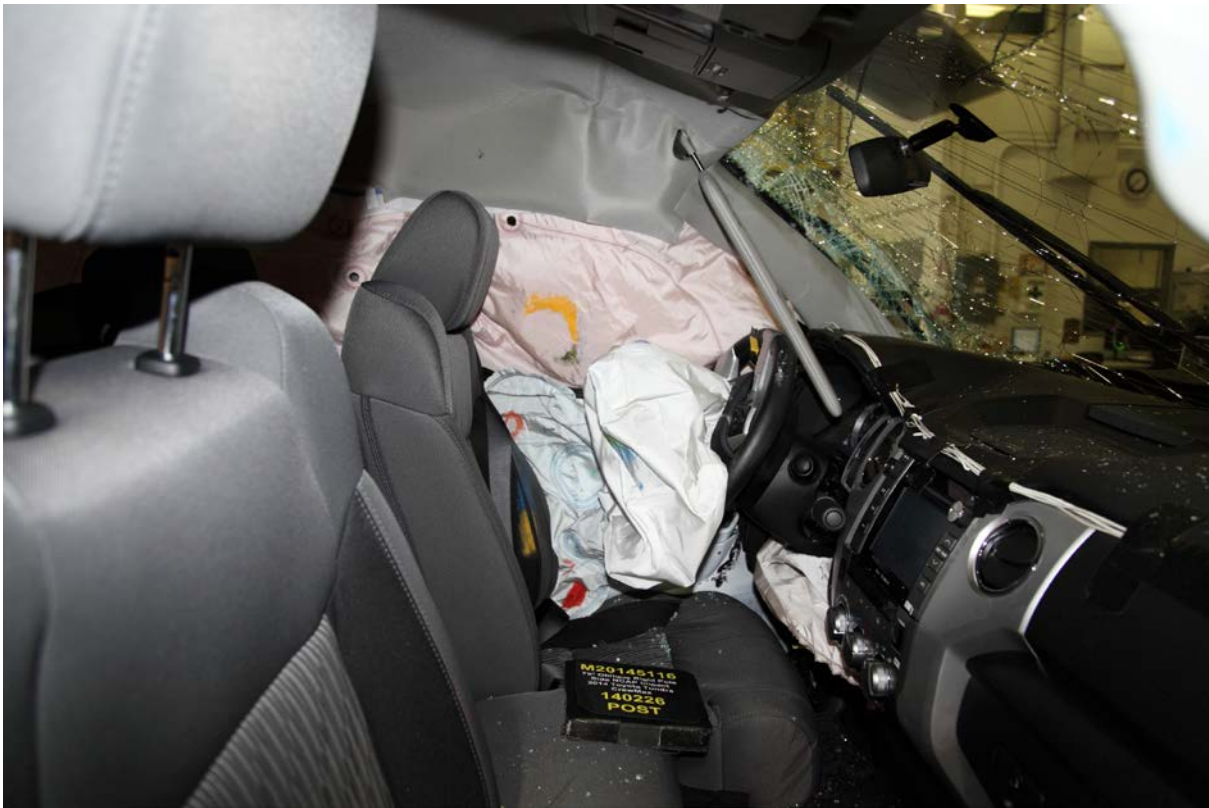
042 Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



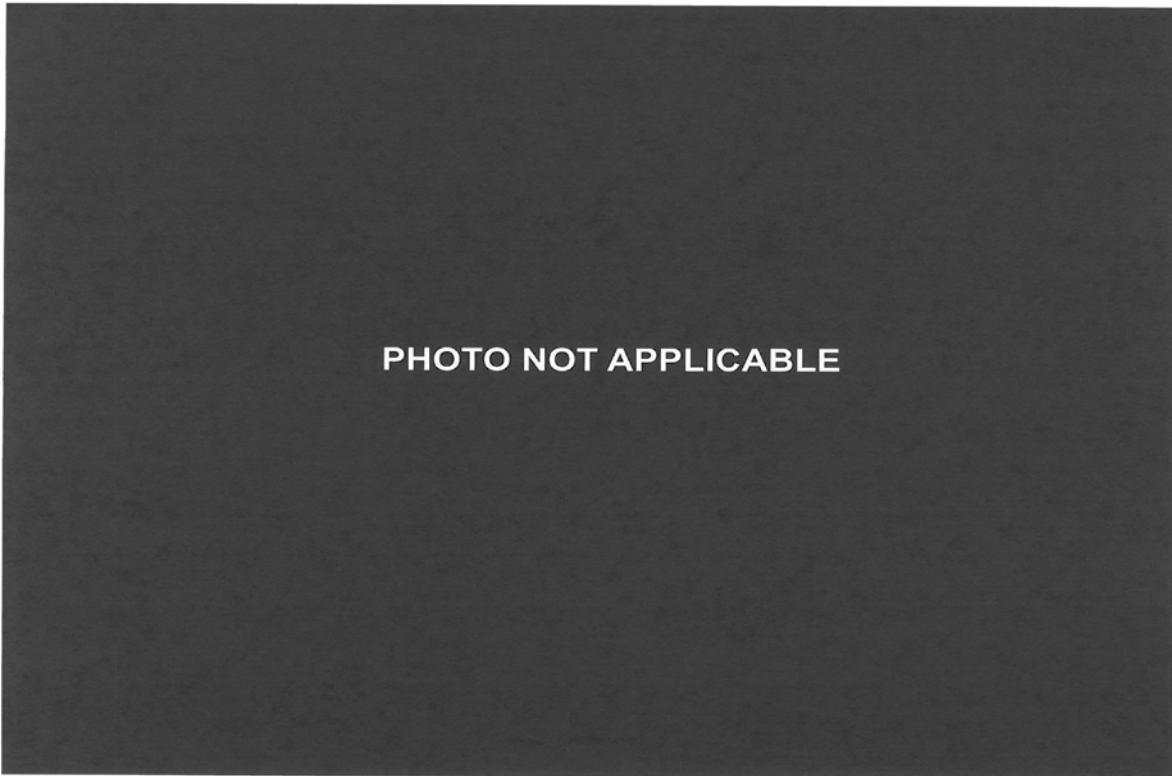
043 Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



044 Pre-Test Inner Driver Door Panel View



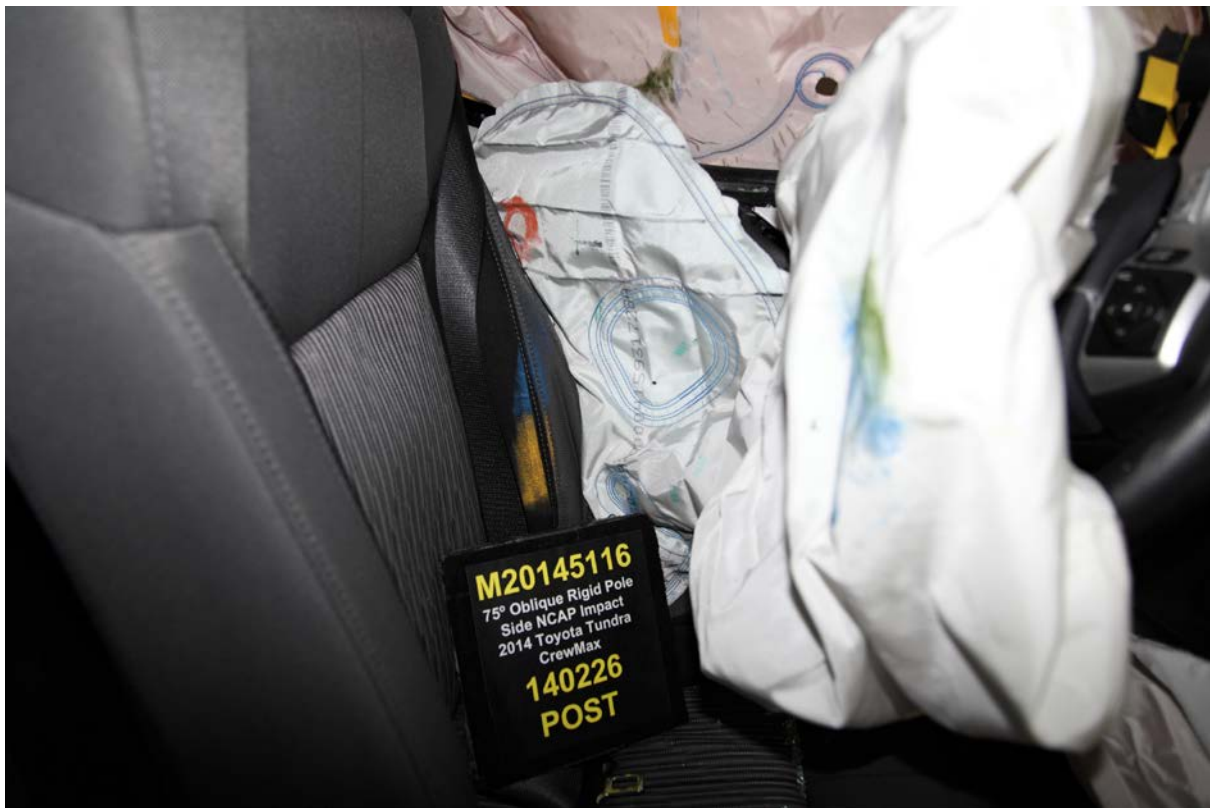
045 Post-Test Inner Driver Door Panel View Showing Dummy Contact Location



046 Post-Test Dummy Close-Up Head Contact with Vehicle View



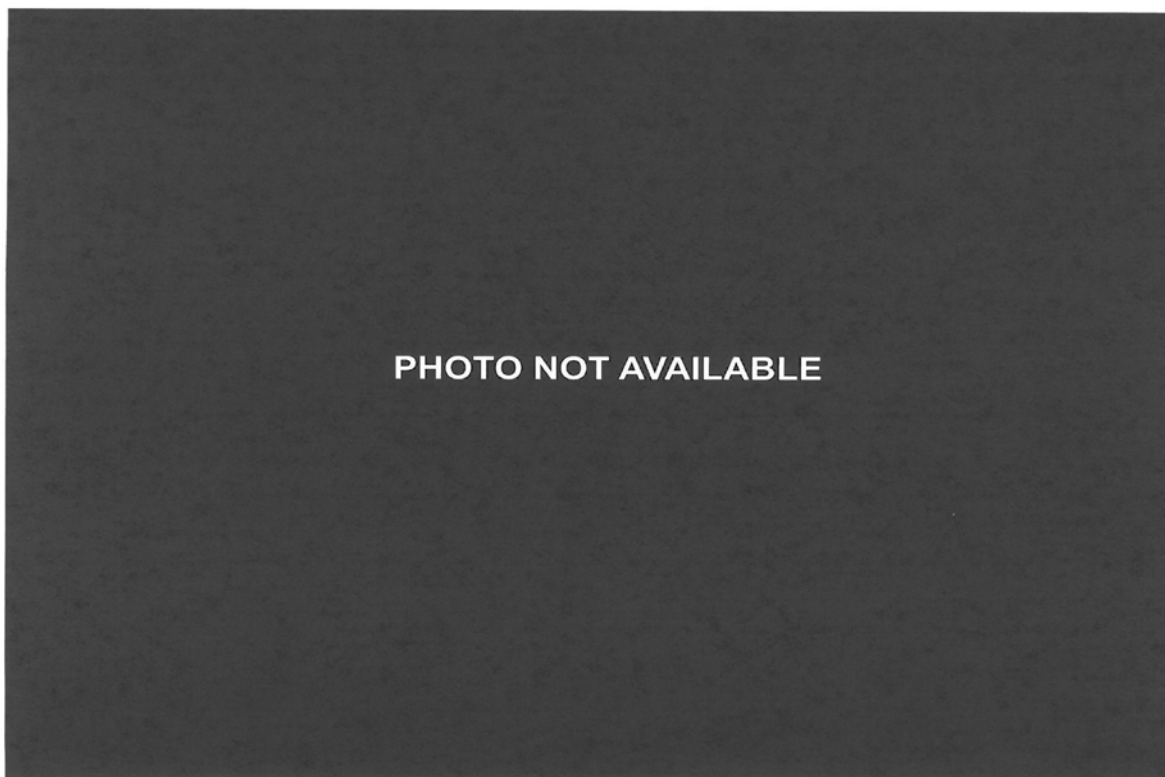
047 Post-Test Dummy Close-Up Head Contact with Side Airbag View



048 Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



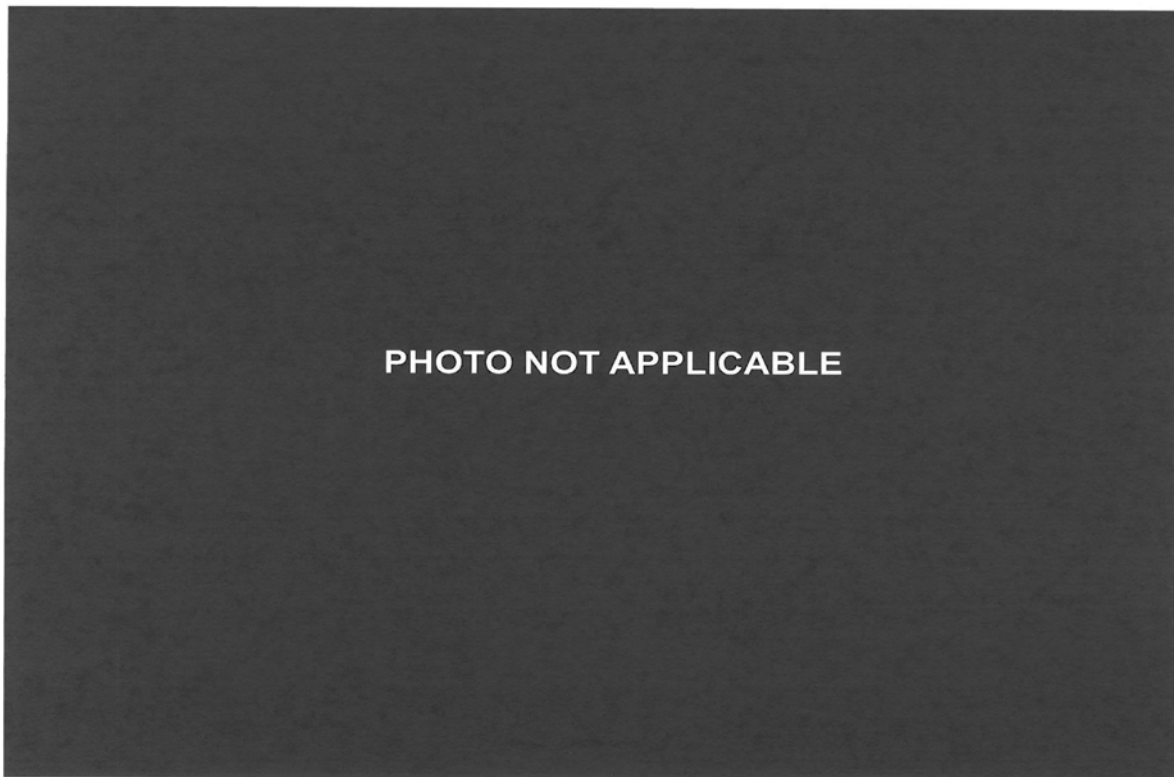
049 Post-Test Dummy Close-Up Torso Contact with Side Airbag View



050 Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



051 Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



052 Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



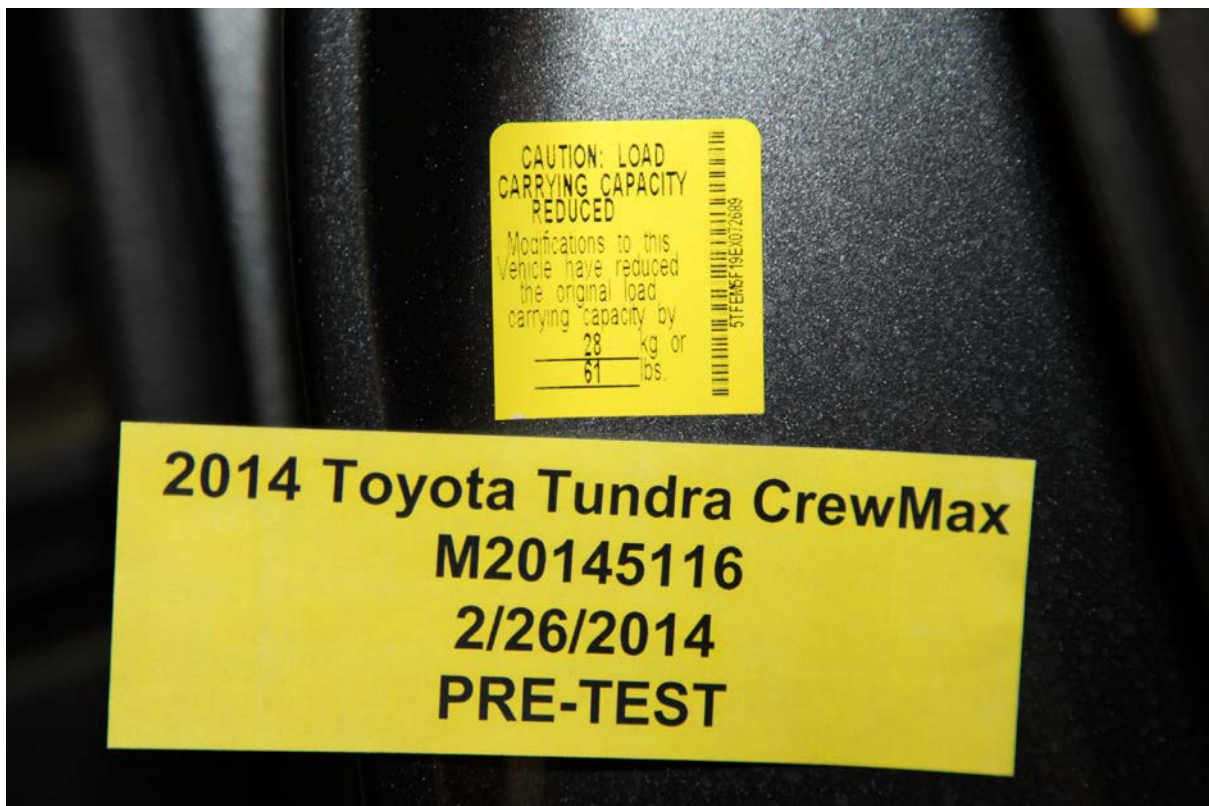
053 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



054 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



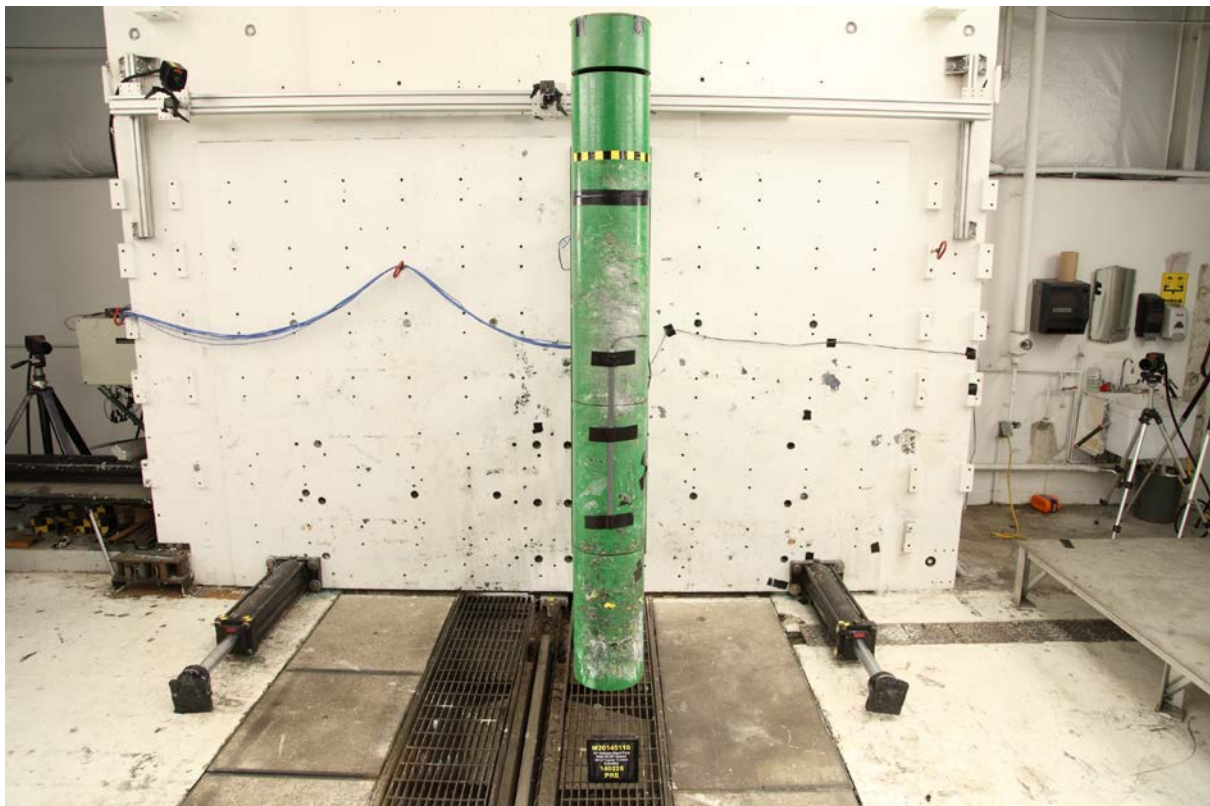
055 Close-Up View of Vehicle Certification Label



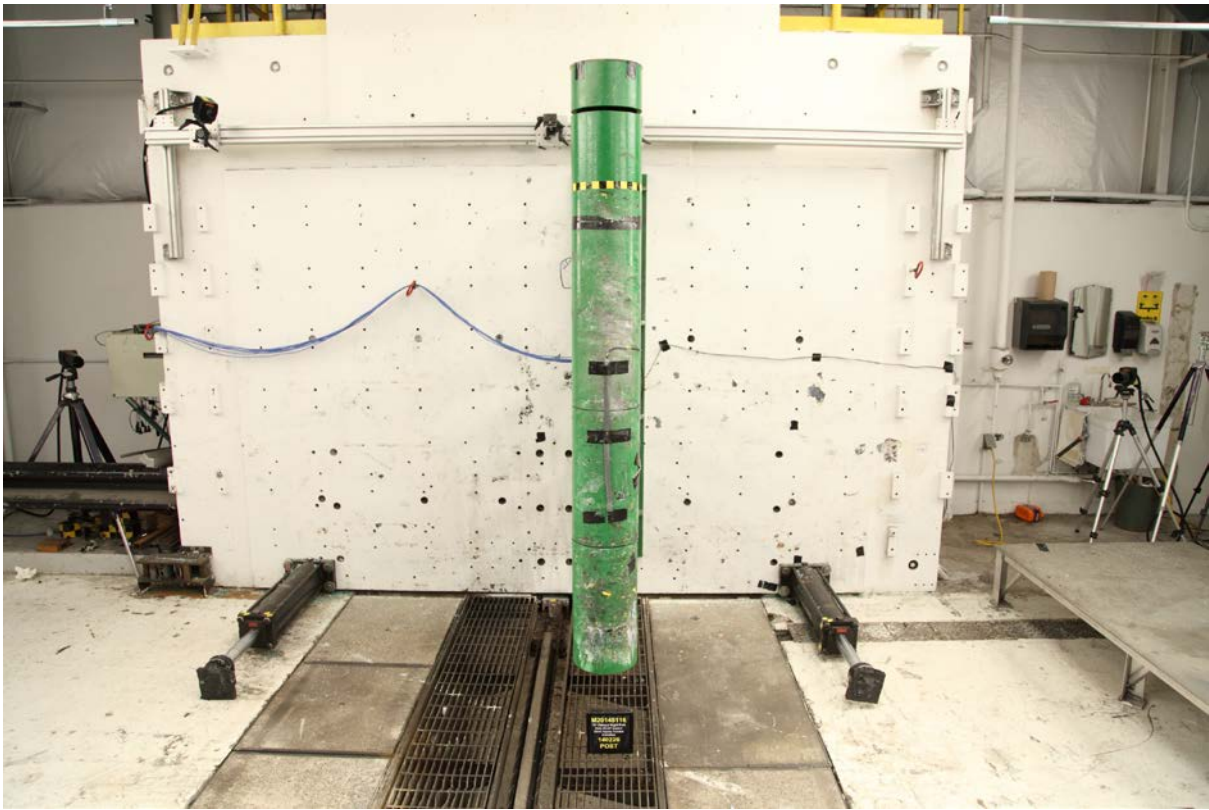
055a Close-up View of Vehicle Reduced Load Carrying Capacity Label



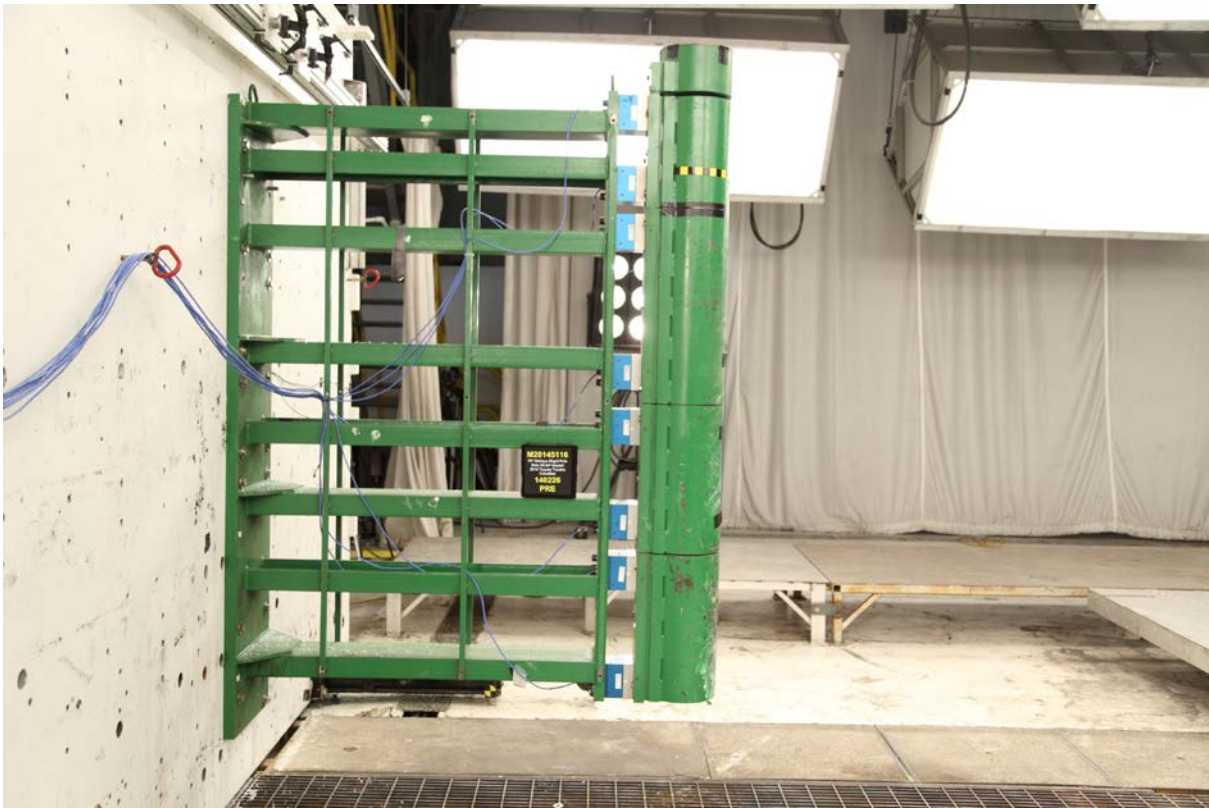
056 Close-Up View of Vehicle Tire Information Placard or Label



057 Pre-Test Pole Barrier Front View



058 Post-Test Pole Barrier Front View



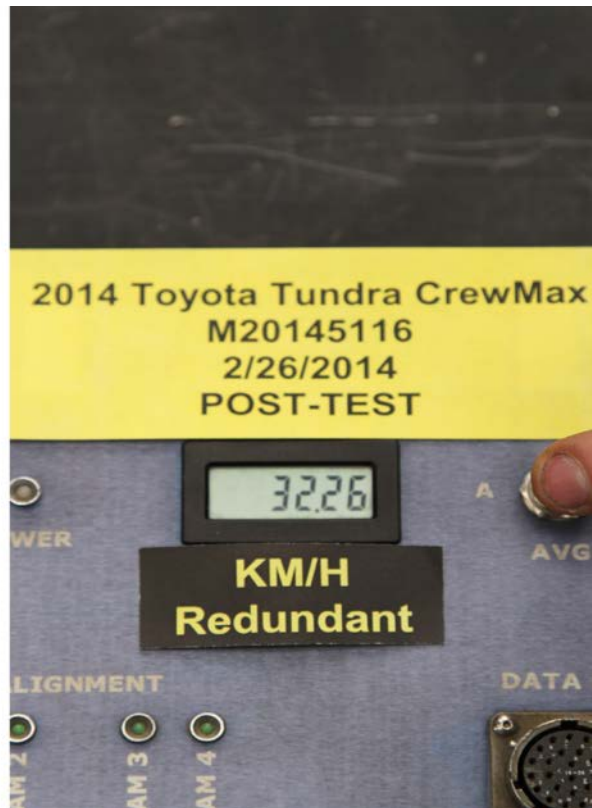
059 Pre-Test Pole Barrier Side View



060 Post-Test Pole Barrier Side View



061 Pre-Test Ballast View



062 Post-Test Primary and Redundant Speed Trap Read-Out



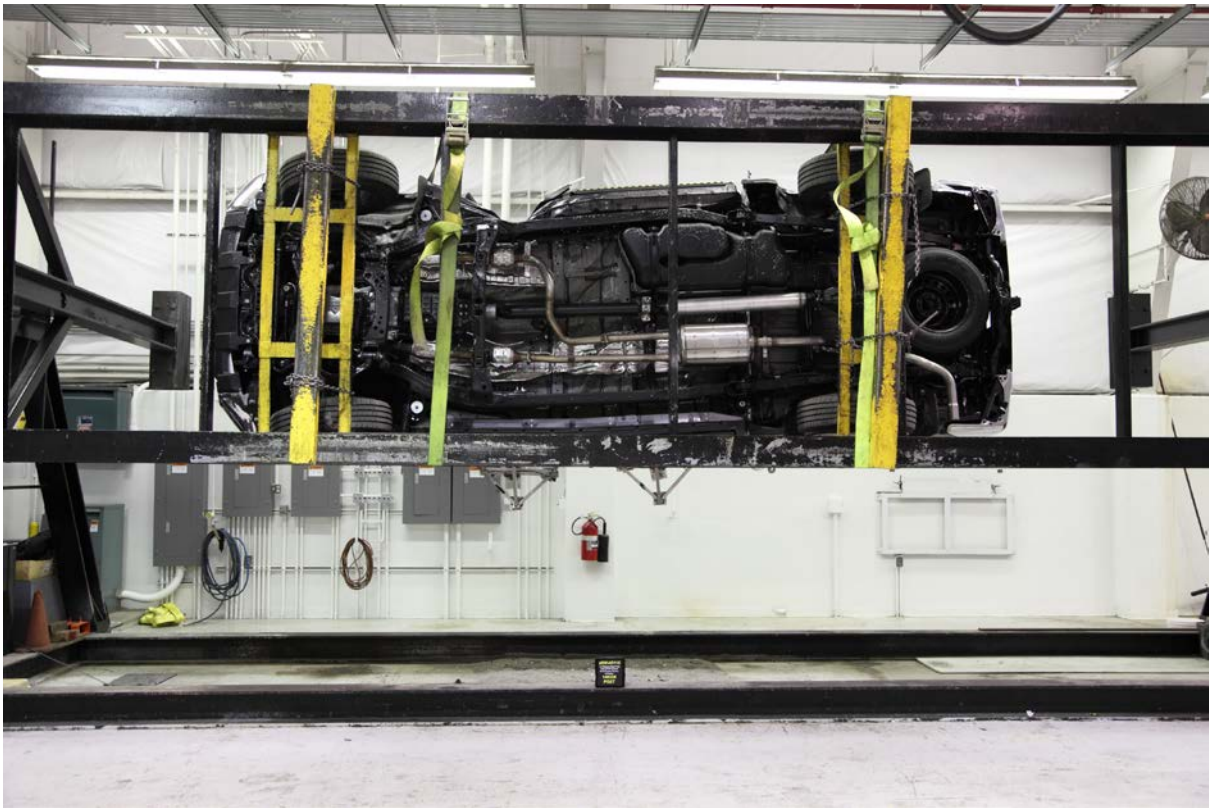
063 FMVSS No. 301 Static Rollover 0 Degrees



064 FMVSS No. 301 Static Rollover 90 Degrees



065 FMVSS No. 301 Static Rollover 180 Degrees



066 FMVSS No. 301 Static Rollover 270 Degrees



067 FMVSS No. 301 Static Rollover 360 Degrees



068 Impact Event

[illegible]

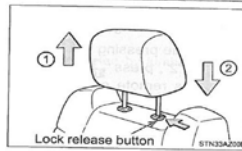
069 Monroney Label

Head restraints

Head restraints are provided for all seats.

Front seats

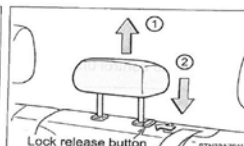
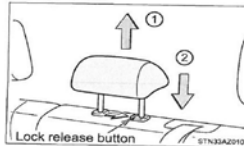
- ① Up
Pull the head restraints up.
- ② Down
Push the head restraint down while pressing the lock release button.



Rear seats

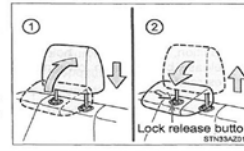
Center seat

- ① Up
Pull the head restraints up.
 - ② Down
Push the head restraint down while pressing the lock release button.
- Double Cab models ► CrewMax models



Outer seat

- ① To use
Lift up the head restraint back to the neutral position and then push the head restraint down.
- ② To fold
Lift up the head restraint while pressing the right lock release button, and fold it forward.



Removing the head restraints

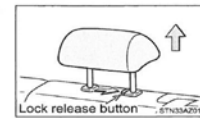
► Front seats and center rear seat (CrewMax models)

Pull the head restraint up while pressing the lock release button.



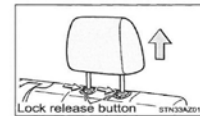
► Center rear seat (Double Cab models)

Pull the head restraint up while pressing the lock release button.



► Outer rear seat (Double Cab and CrewMax models)

Pull the head restraint up while pressing both lock release buttons.



070 Head Restraint Use and Adjustment Information from Vehicle Owner Manual

PHOTO NOT APPLICABLE

071 Post-Test View of Shattered Vehicle Inner Door Panel

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

No.	Description	Page
1	Driver Head Acceleration (X) vs. Time	B-4
2	Driver Head Acceleration (Y) vs. Time	B-4
3	Driver Head Acceleration (Z) vs. Time	B-4
4	Driver Head Acceleration Resultant vs. Time	B-4
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-5
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-5
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-5
8	Driver Lower Spine T12 Acceleration Resultant vs. Time	B-5
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-6
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-6
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-6

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at:

www.nhtsa.dot.gov.

Additional Driver Dummy Instrumentation Data

Driver Head Acceleration (X) Redundant
Driver Head Acceleration (Y) Redundant
Driver Head Acceleration (Z) Redundant
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection (Y)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
 Left Floor Sill Acceleration (Y)
 Left A-Pillar Sill Acceleration (Y)
 Left Lower A-Pillar Acceleration (Y)
 Left Mid A-Pillar Acceleration (Y)
 Left B-Pillar Sill Acceleration (Y)
 Left Lower B-Pillar Acceleration (Y)
 Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
 Engine Top Acceleration (X)
 Engine Top Acceleration (Y)
 Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

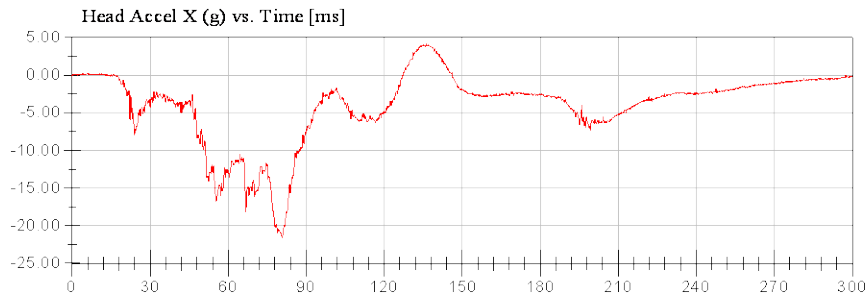
NHTSA

Test Lab: CTF

Test Number: 140226 (M20145116)

Position #1 SID IIs Dummy (D18818)

Test Date: 02/26/2014

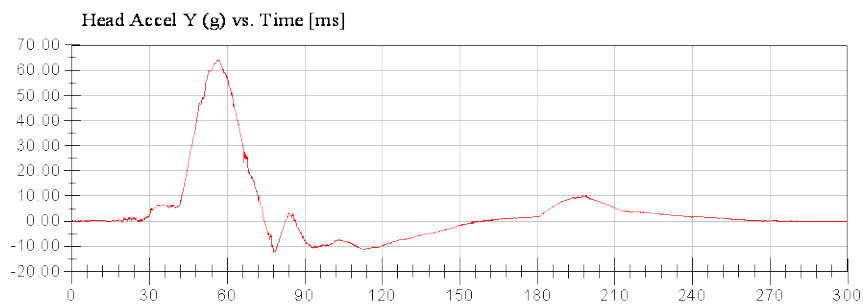


<Max>

4.17 g at 136.24 ms

<Min>

-21.60 g at 80.80 ms

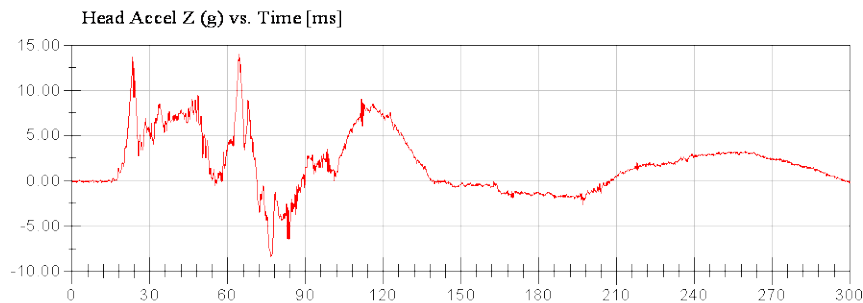


<Max>

64.27 g at 56.24 ms

<Min>

-12.35 g at 78.08 ms

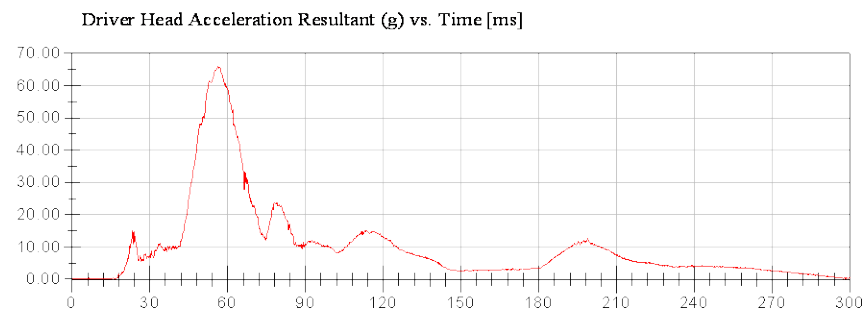


<Max>

14.09 g at 64.48 ms

<Min>

-8.41 g at 76.64 ms



<Max>

66.05 g at 56.24 ms

<Min>

0.04 g at 0.56 ms



NHTSA

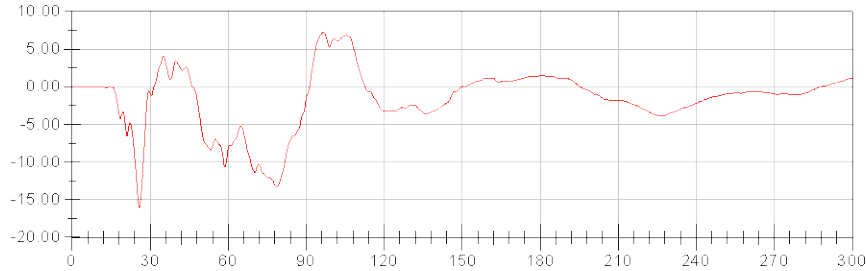
Position #1 SID IIs Dummy (D18818)

Test Date: 02/26/2014

Test Lab: CTF

Test Number: 140226 (M20145116)

Abdominal Spine X (T12) (g) vs. Time [ms]



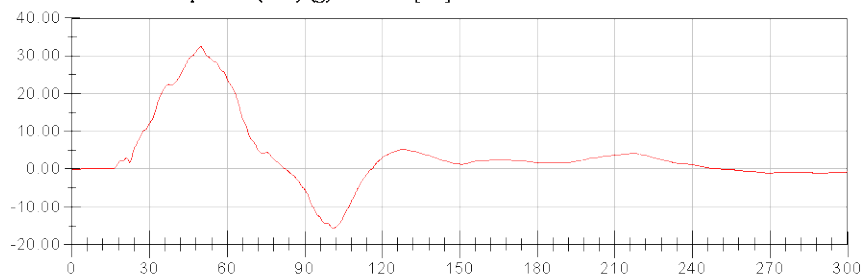
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7.21 g at 96.56 ms

<Min>

-16.13 g at 25.76 ms

Abdominal Spine Y (T12) (g) vs. Time [ms]



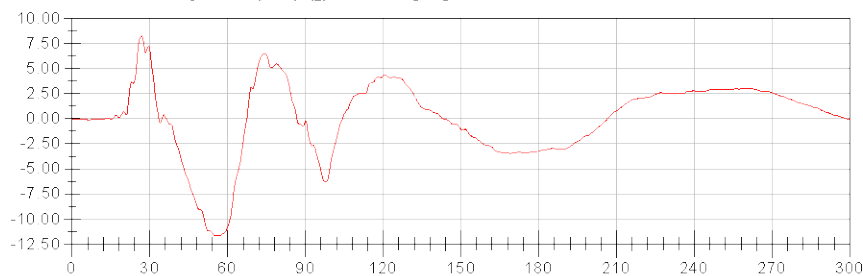
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32.41 g at 49.76 ms

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-15.70 g at 101.04 ms

Abdominal Spine Z (T12) (g) vs. Time [ms]



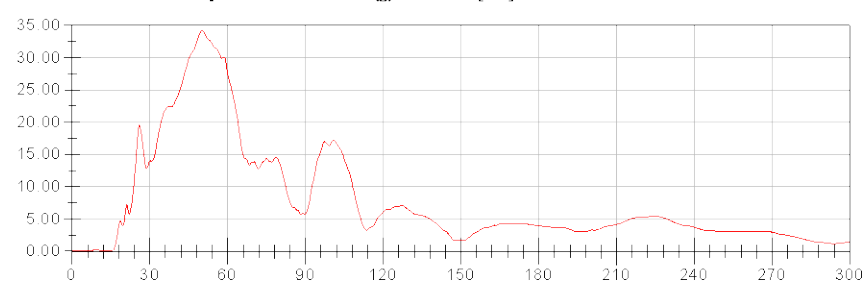
<Max>

8.24 g at 26.80 ms

<Min>

-11.70 g at 56.80 ms

Driver Lower Spine T12 Resultant (g) vs. Time [ms]



<Max>

34.21 g at 50.08 ms

<Min>

0.06 g at 14.32 ms



NHTSA

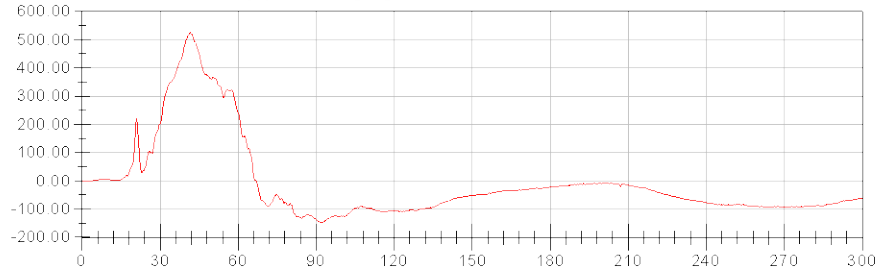
Test Lab: CTF

Test Number: 140226 (M20145116)

Position #1 SID IIs Dummy (D18818)

Test Date: 02/26/2014

Left Iliac Force Y (N) vs. Time [ms]



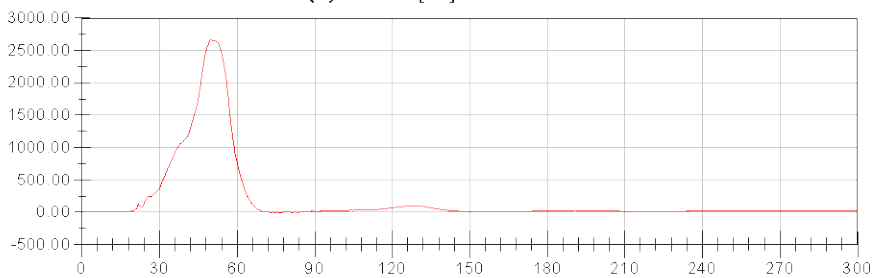
<Max>

526.28 N at 41.52 ms

<Min>

-148.08 N at 91.68 ms

Left Acetabulum Force Y (N) vs. Time [ms]



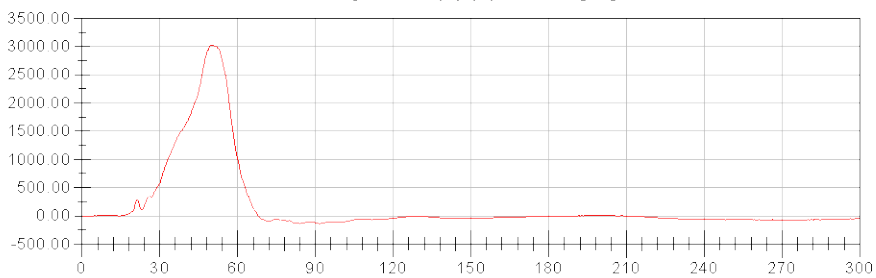
<Max>

2,667.24 N at 50.00 ms

<Min>

-8.89 N at 81.52 ms

Driver Total Pelvis Force on Impact Side (Y) (N) vs. Time [ms]



<Max>

3,031.68 N at 50.08 ms

<Min>

-136.86 N at 91.68 ms



APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS
SID-IIs (Driver) Dummy
Description

Table 1. External Measurements

Table 2. Head Drop Test

Resultant Head Acceleration (G's) vs. Time (ms)
Head (X) Acceleration (G's) vs. Time (ms)
Head (Y) Acceleration (G's) vs. Time (ms)
Head (Z) Acceleration (G's) vs. Time (ms)

Table 3. Lateral Neck Pendulum Test

Pendulum Velocity (m/s) vs. Time (ms)
Flexion Angle (°) vs. Time (ms)
Moment About Occipital Condyle (Nm) vs. Time (ms)

Table 4. Shoulder Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Shoulder Displacement (mm) vs. Time (ms)
Upper Spine Acceleration (G's) vs. Time (ms)

Table 5. Thorax (With Arm) Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Shoulder Displacement (mm) vs. Time (ms)
Upper Rib Displacement (mm) vs. Time (ms)
Middle Rib Displacement (mm) vs. Time (ms)
Lower Rib Displacement (mm) vs. Time (ms)
Upper Spine Acceleration (G's) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)

Table 6. Thorax (Without Arm) Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Upper Rib Displacement (mm) vs. Time (ms)
Middle Rib Displacement (mm) vs. Time (ms)
Lower Rib Displacement (mm) vs. Time (ms)
Upper Spine Acceleration (G's) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)

Table 7. Abdomen Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Upper Abdominal Rib Displacement (mm) vs. Time (ms)
Lower Abdominal Rib Displacement (mm) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)

Table 8. Pelvis Plug Quasi-Static Test (Optional*)

Table 9. Pelvis Acetabulum Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Pelvis (Y) Acceleration (G's) vs. Time (ms)
Acetabulum Force (N) vs. Time (ms)

Table 10. Pelvis Iliac Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Pelvis (Y) Acceleration (G's) vs. Time (ms)
Iliac Force (N) vs. Time (ms)

Pre-Test Calibration Sheets
Driver S/N DI8818

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. DI8818 Calibration No.13

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	782	Yes
B	Shoulder Pivot Height	437.0 - 453.0	442	Yes
C	H-Point Height	79.0 - 89.0	82	Yes
D	H-Point from Seat Back	141.0 - 151.0	142	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	130	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	182	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	534	Yes
L	Popliteal Height	343.0 - 369.0	352	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	399	Yes
N	Buttock Popliteal Length	416.0 - 442.0	427	Yes
O	Chest Depth without Jacket	195.0 - 211.0	203	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	313	Yes
R	Arm Length	249.0 - 259.0	255	Yes
S	Knee Joint to seat Back	478.0 - 493.0	484	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	350	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	867	Yes
Z	Waist Circumference	761.0 - 791.0	775	Yes

Technician



Approved



Revised 9/29/2005



Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. DI8818 Certification No. 13-1

Test Date: 2/20/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	128.1 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.1 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 10:31:44 232

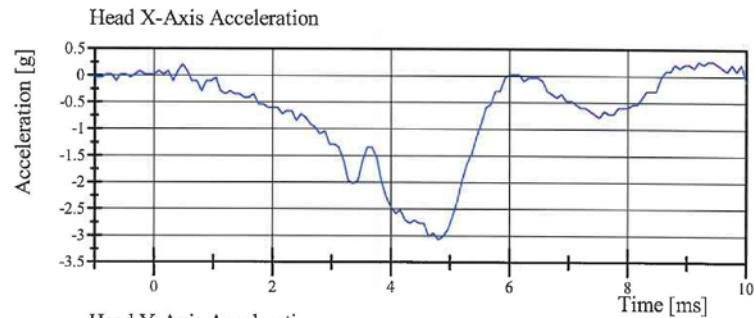


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. DI8818 Certification No. 13-1

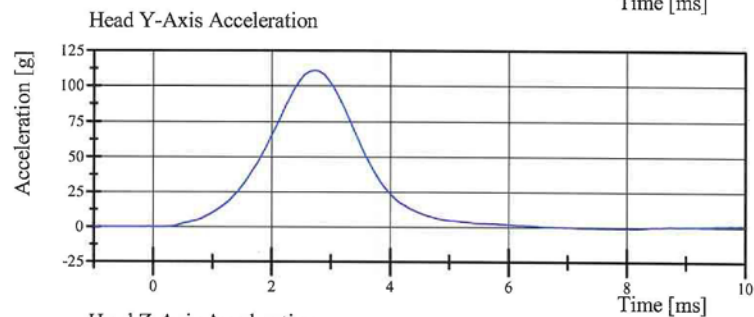
Test Date: 2/20/2014



Filter Class: CFC_1000

Max: 0.3 g at 9.2 ms

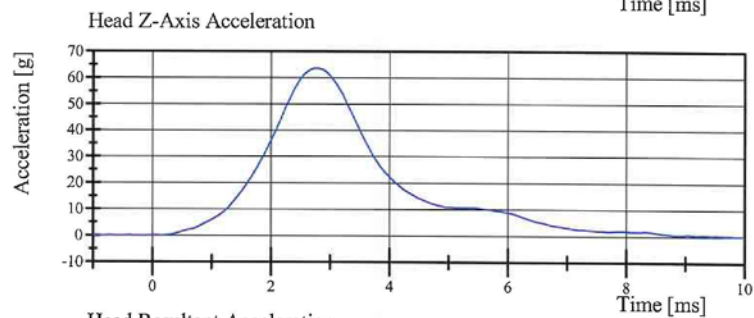
Min: -3.1 g at 4.8 ms



Filter Class: CFC_1000

Max: 111.1 g at 2.7 ms

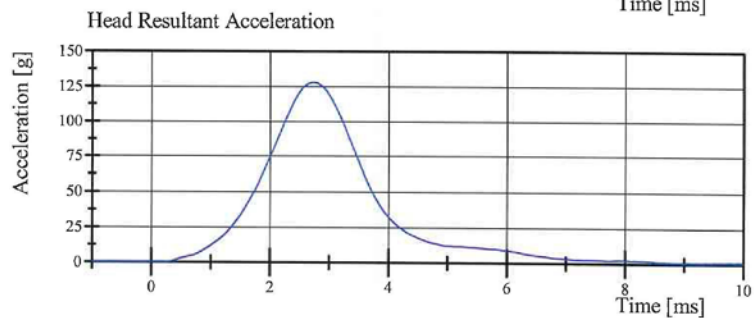
Min: -1.1 g at 8.1 ms



Filter Class: CFC_1000

Max: 63.6 g at 2.7 ms

Min: -0.0 g at -1.0 ms



Filter Class: CFC_1000

Max: 128.1 g at 2.7 ms

Min: 0.0 g at -1.0 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 10:31:54 232



Transportation Research Center Inc.

Left Lateral Neck

SID II's Serial No. DI8818 Certification No. 13-3

Test Date: 2/20/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.590 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.478 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.601 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.812 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.743 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.774 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-74.7 deg	Yes
Time of Peak	50 - 70 ms	67.2 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.9 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	116.5 ms	Yes

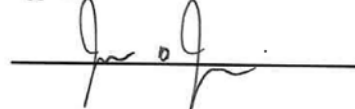
Test meets specifications.

Comments:

Technician



Approved



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 13:09:33 640

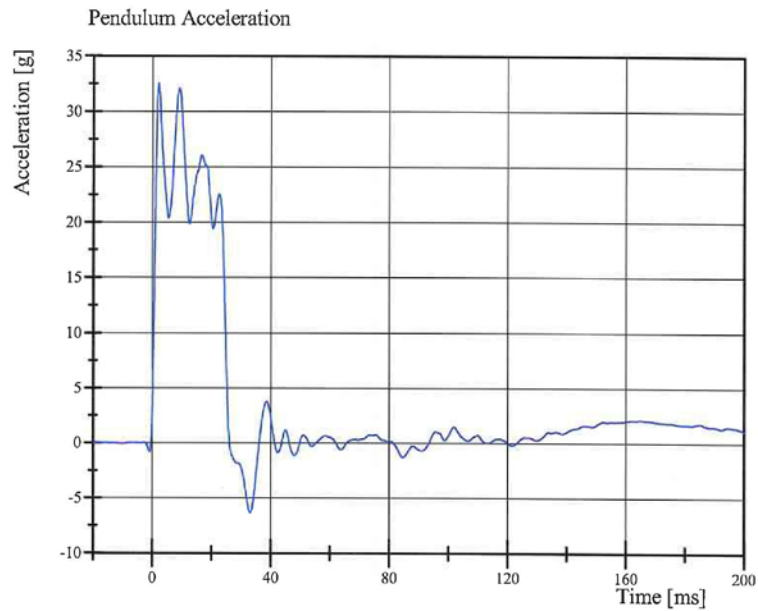


Transportation Research Center Inc.

Left Lateral Neck

SID II_s Serial No. DI8818 Certification No. 13-3

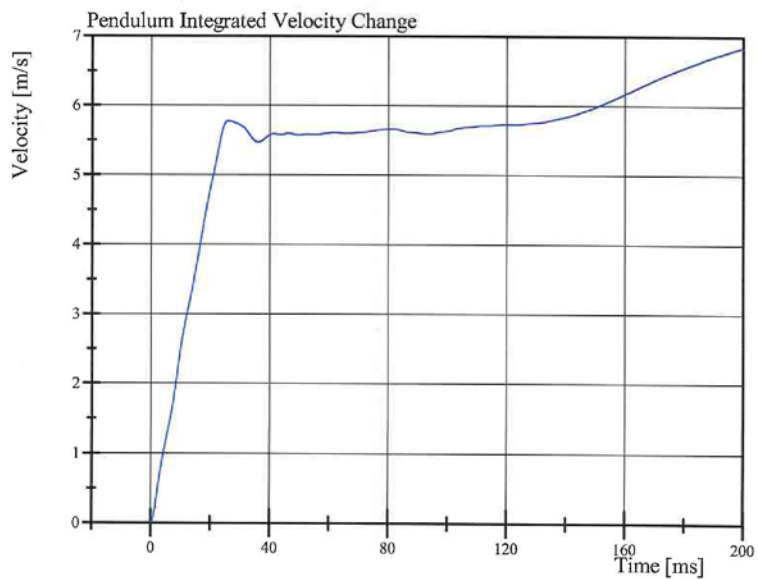
Test Date: 2/20/2014



Filter Class: CFC_180

Max: 32.5 g at 2.1 ms

Min: -6.3 g at 33.1 ms



Filter Class: CFC_180

Max: 6.8 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 13:09:40 640

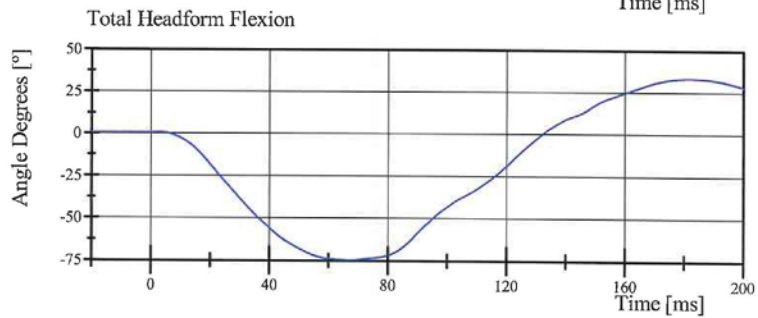
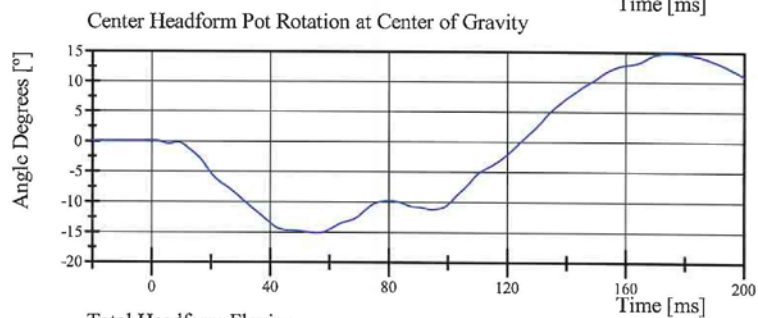
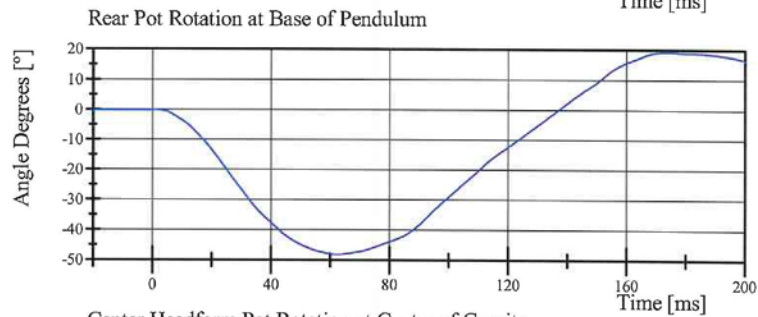
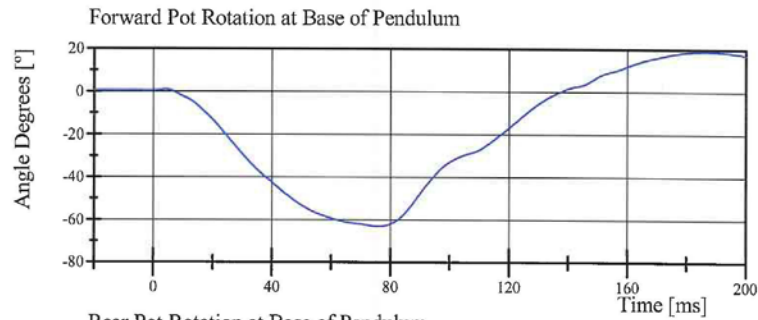


Transportation Research Center Inc.

Left Lateral Neck

SID II_s Serial No. DI8818 Certification No. 13-3

Test Date: 2/20/2014



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 13:09:41 640

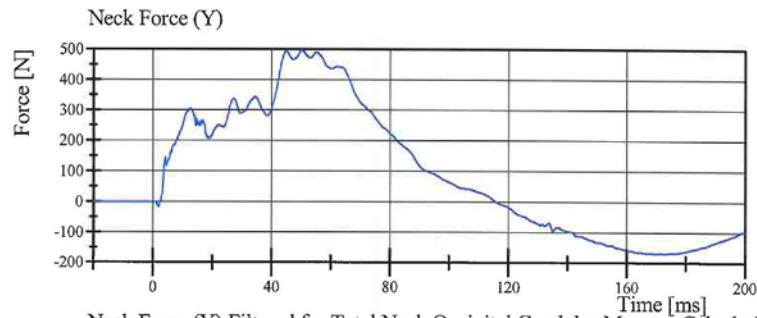


Transportation Research Center Inc.

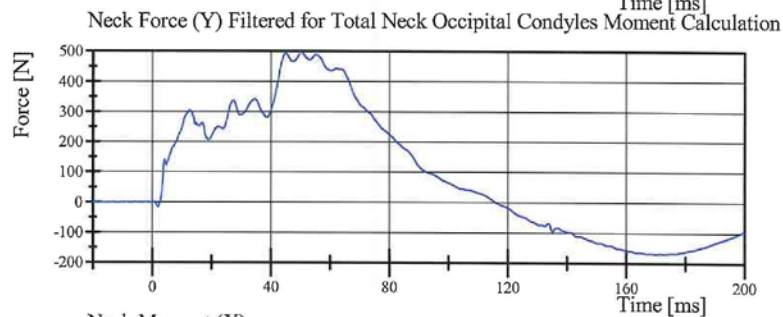
Left Lateral Neck

SID II_s Serial No. DI8818 Certification No. 13-3

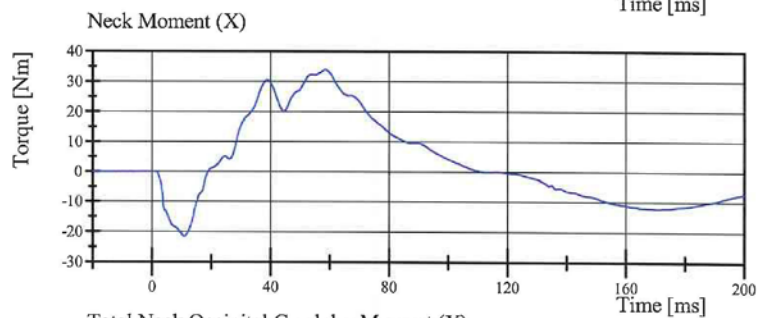
Test Date: 2/20/2014



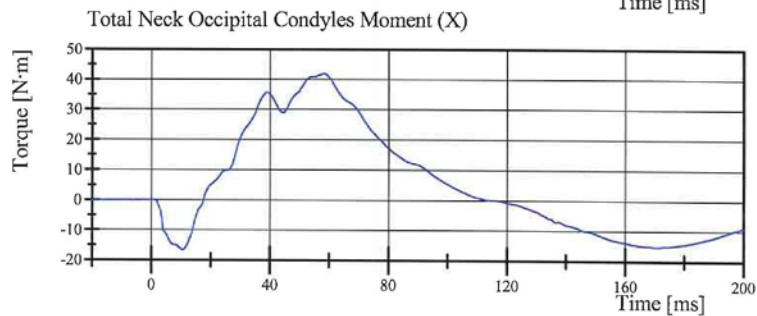
Filter Class: CFC_1000
Max: 499.6 N at 50.4 ms
Min: -170.6 N at 169.3 ms



Filter Class: CFC_600
Max: 497.1 N at 50.3 ms
Min: -170.2 N at 170.2 ms



Filter Class: CFC_600
Max: 34.0 Nm at 58.5 ms
Min: -21.5 Nm at 10.9 ms



Filter Class: Without_(Consta
Max: 41.9 N·m at 58.2 ms
Min: -16.6 N·m at 10.5 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 13:09:42 640



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. DI8818 Certification No. 13-1

Test Date: 2/20/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-14.4 g	Yes
Shoulder Displacement	28 - 37 mm	32.3 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	19.0 g	Yes

Test meets specifications.

Comments:

Technician


Approved


Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 10:37:14 818

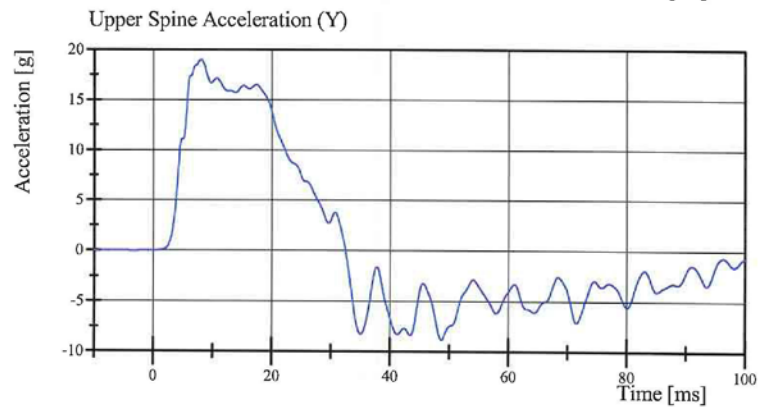
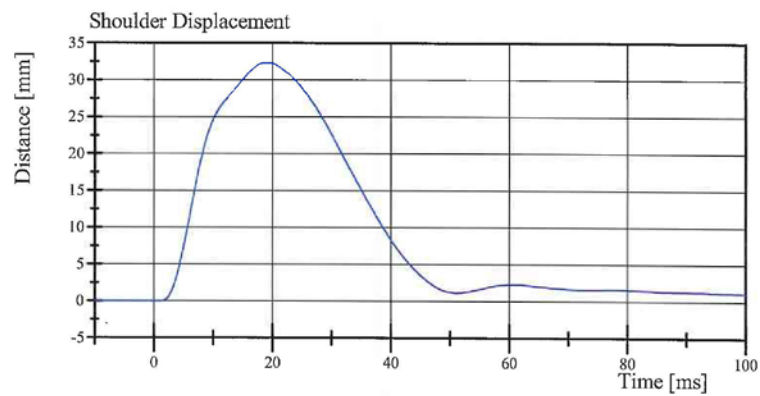
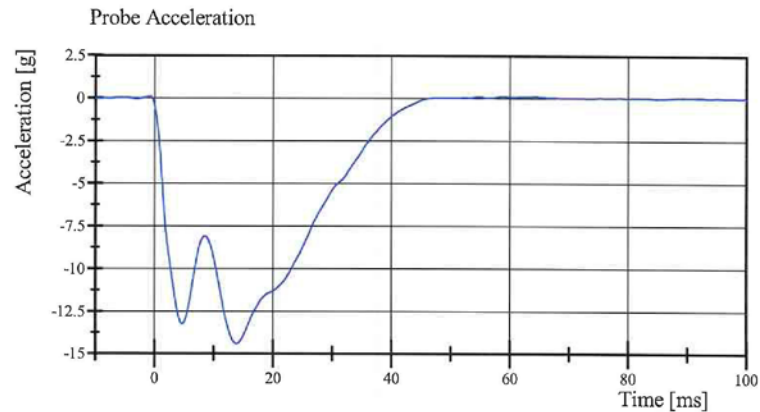


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. DI8818 Certification No. 13-1

Test Date: 2/20/2014



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 10:37:23 818



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. DI8818 Certification No. 13-1
Test Date: 2/20/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.739 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.5 g	Yes
Shoulder Displacement	31 - 40 mm	38.3 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	29.8 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.9 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	32.9 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.8 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	35.3 g	Yes

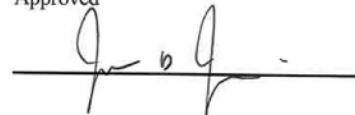
Test meets specifications.

Comments:

Technician



Approved



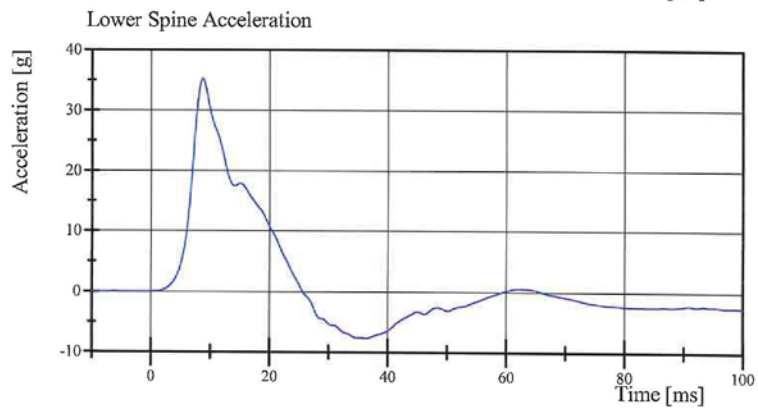
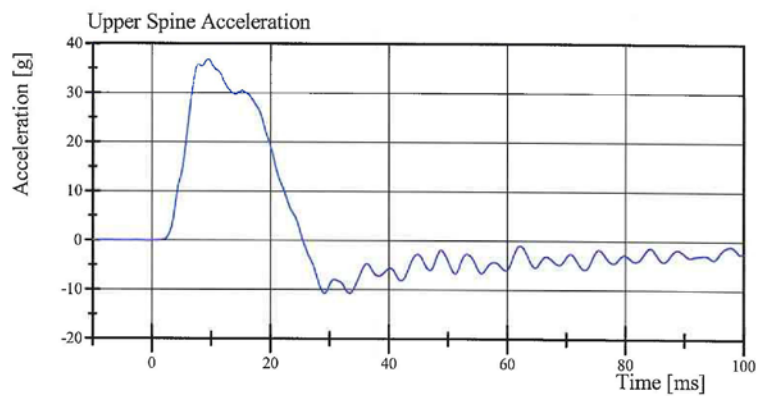
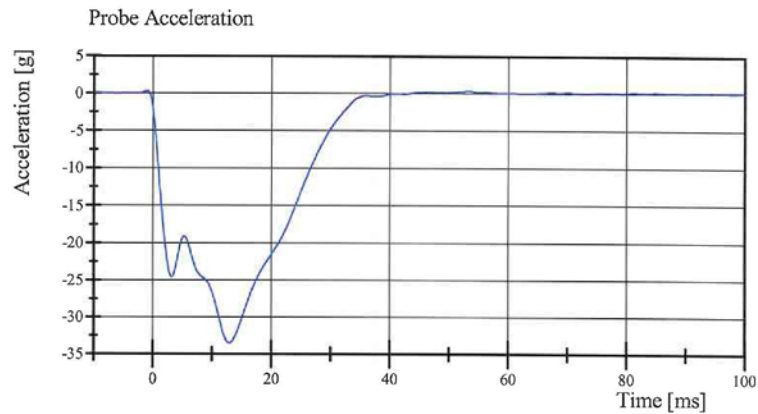
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 11:39:14 614



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID II_s Serial No. DI8818 Certification No. 13-1
Test Date: 2/20/2014



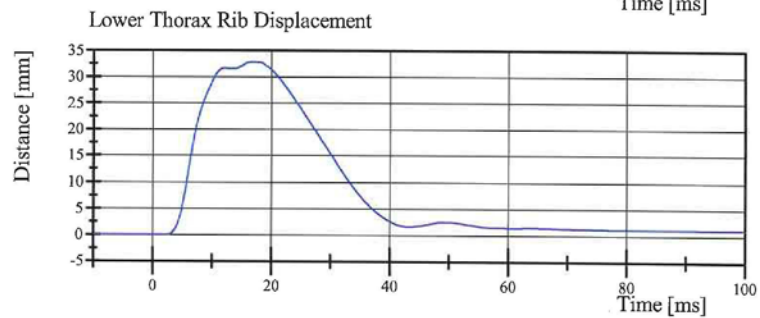
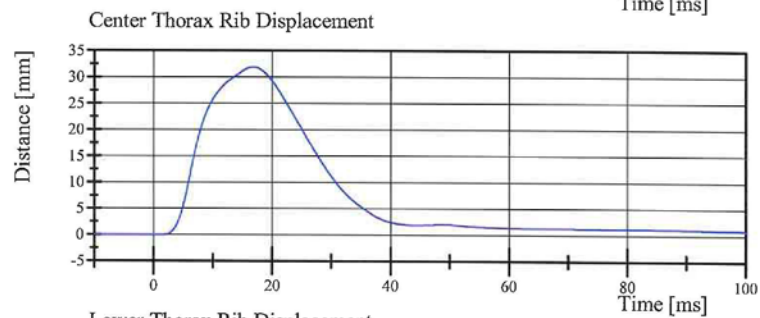
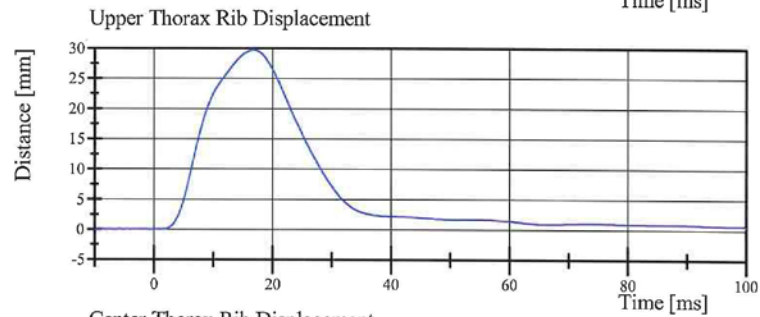
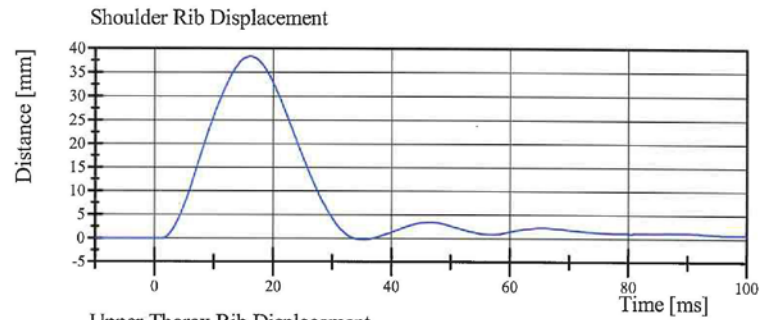
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 11:39:23 614



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID II_s Serial No. DI8818 Certification No. 13-1
Test Date: 2/20/2014



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 11:39:24 614



Transportation Research Center Inc.

Left Lateral Thorax without Arm

SID IIs Serial No. DI8818 Certification No. 13-1

Test Date: 2/20/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.239 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.7 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.7 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.1 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.0 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.1 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.2 g	Yes

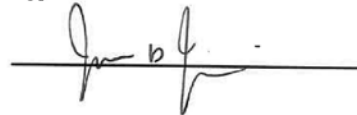
Test meets specifications.

Comments:

Technician



Approved



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 11:14:02 849

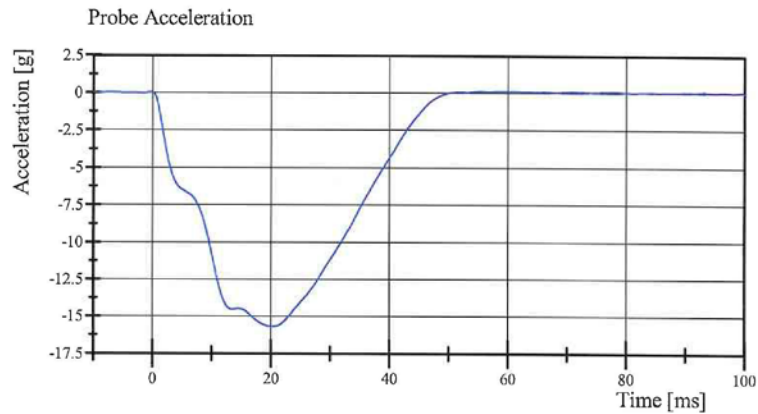


Transportation Research Center Inc.

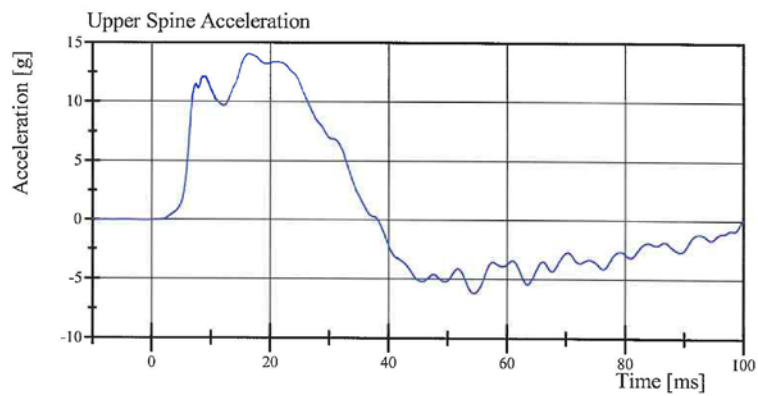
Left Lateral Thorax without Arm

SID II_s Serial No. DI8818 Certification No. 13-1

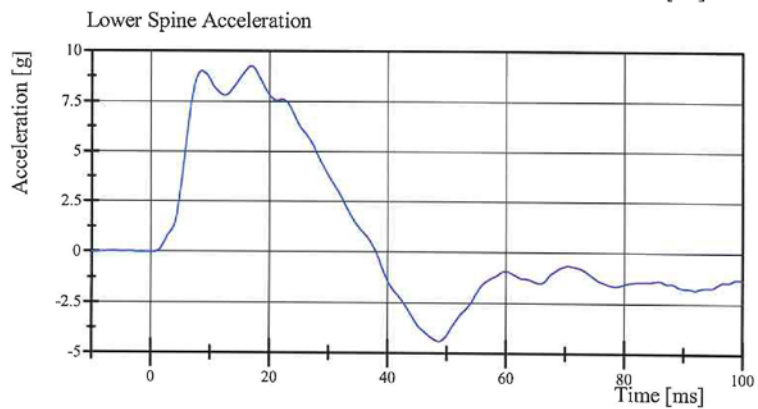
Test Date: 2/20/2014



Filter Class: CFC_180
Max: 0.1 g at 55.4 ms
Min: -15.7 g at 20.2 ms



Filter Class: CFC_180
Max: 14.1 g at 16.3 ms
Min: -6.2 g at 54.5 ms



Filter Class: CFC_180
Max: 9.2 g at 17.0 ms
Min: -4.4 g at 48.6 ms

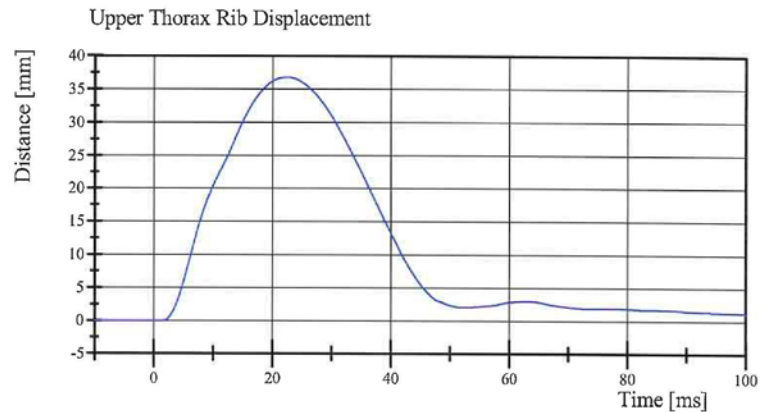
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 11:14:10 849

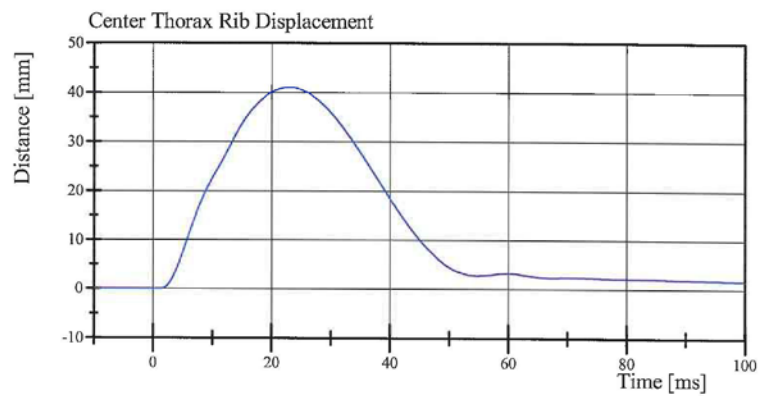


Transportation Research Center Inc.

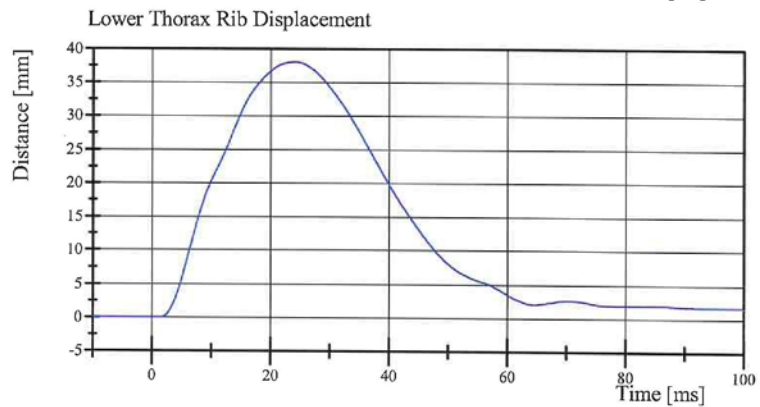
Left Lateral Thorax without Arm
SID II Serial No. DI8818 Certification No. 13-1
Test Date: 2/20/2014



Filter Class: CFC_600
Max: 36.7 mm at 22.4 ms
Min: -0.0 mm at -1.9 ms



Filter Class: CFC_600
Max: 41.1 mm at 23.0 ms
Min: -0.0 mm at -9.8 ms



Filter Class: CFC_600
Max: 38.0 mm at 24.0 ms
Min: -0.0 mm at -1.7 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 11:14:11 849



Transportation Research Center Inc.

Left Lateral Abdomen

SID II's Serial No. DI8818 Certification No. 13-1

Test Date: 2/20/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.4 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	39.3 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	35.8 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	11.35 g	Yes

Test meets specifications.

Comments:

Technician


Approved


Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 10:49:12 649

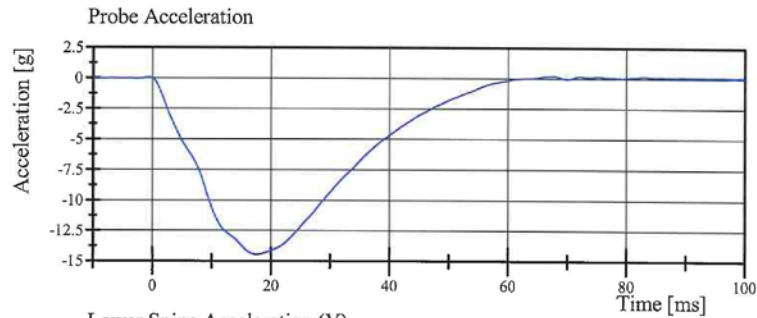


Transportation Research Center Inc.

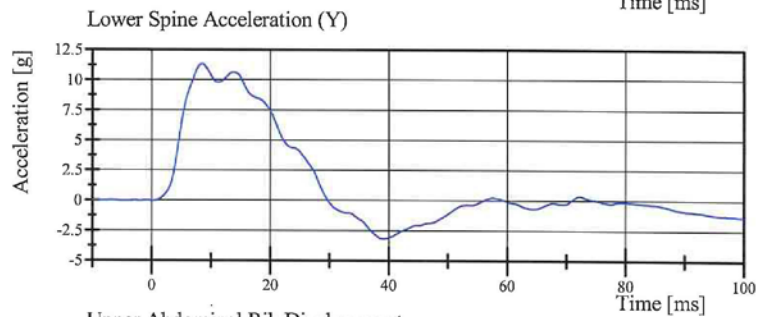
Left Lateral Abdomen

SID II_s Serial No. DI8818 Certification No. 13-1

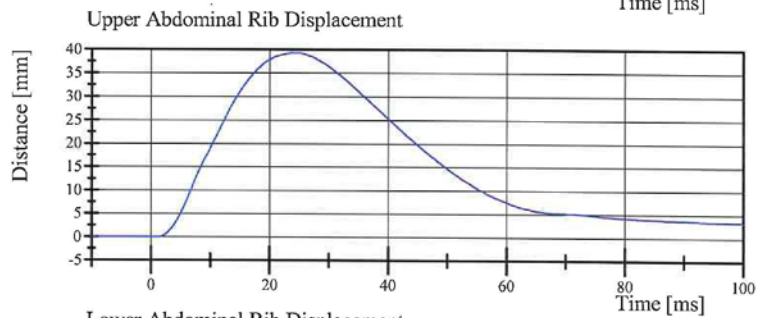
Test Date: 2/20/2014



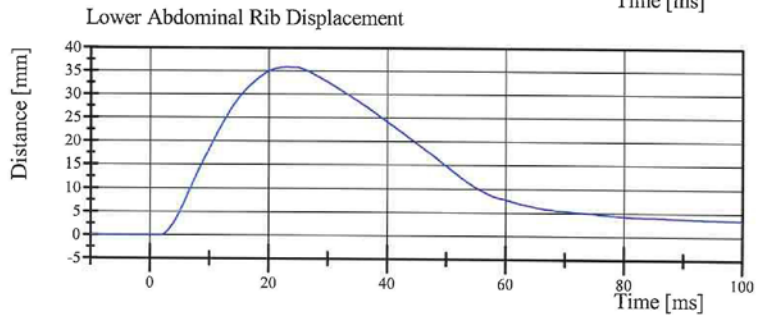
Filter Class: CFC_180
Max: 0.2 g at 67.6 ms
Min: -14.4 g at 17.6 ms



Filter Class: CFC_180
Max: 11.3 g at 8.5 ms
Min: -3.2 g at 39.0 ms



Filter Class: CFC_600
Max: 39.3 mm at 24.3 ms
Min: -0.0 mm at 1.4 ms



Filter Class: CFC_600
Max: 35.8 mm at 23.0 ms
Min: -0.0 mm at 1.8 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 10:49:20 649



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. DI8818 Certification No. 13-1

Test Date: 2/20/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.67 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-42.60 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.1 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,910.0 N	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 12:43:36 433

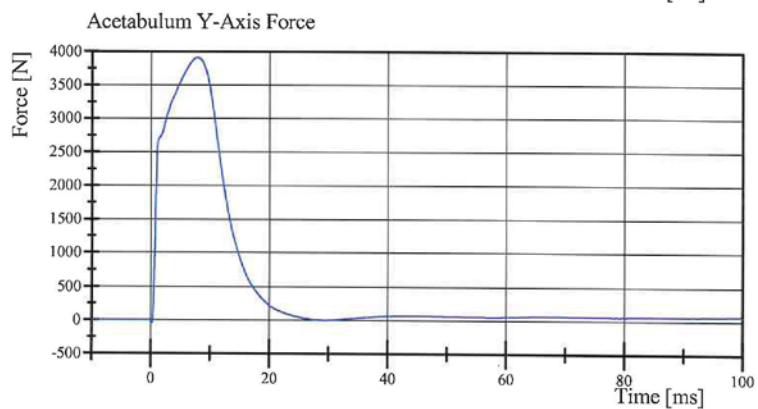
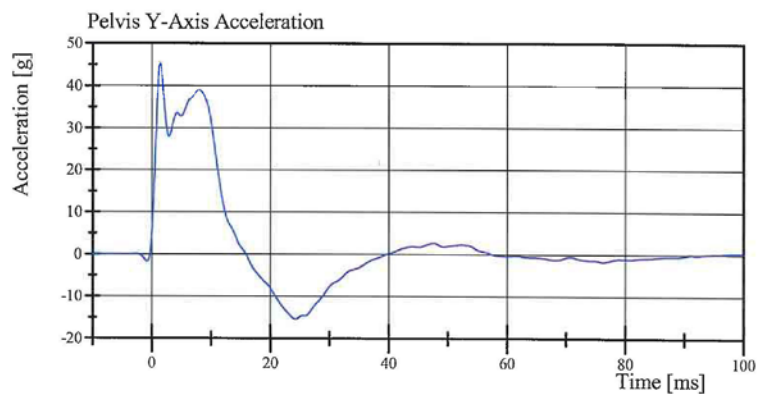
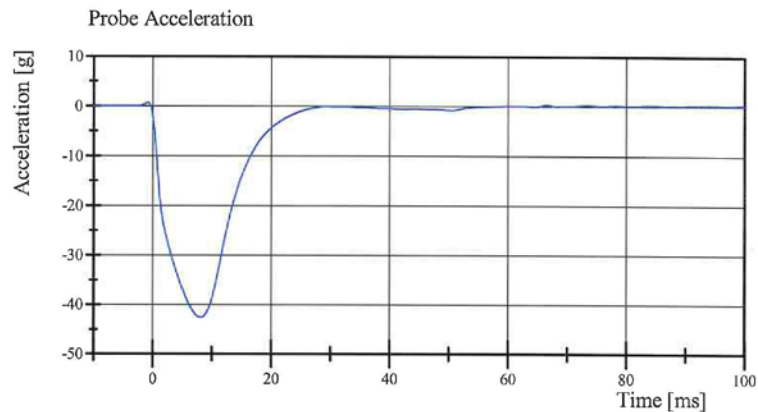


Transportation Research Center Inc.

Left Lateral Pelvis

SID II_s Serial No. DI8818 Certification No. 13-1

Test Date: 2/20/2014



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 12:43:45 433



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. DI8818 Certification No. 13-1

Test Date: 2/20/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-42.5 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	33.4 g	Yes
Iliac Force	4,100 - 5,100 N	4,966.6 N	Yes

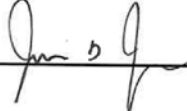
Test meets specifications.

Comments:

Technician



Approved



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 09:33:43 667

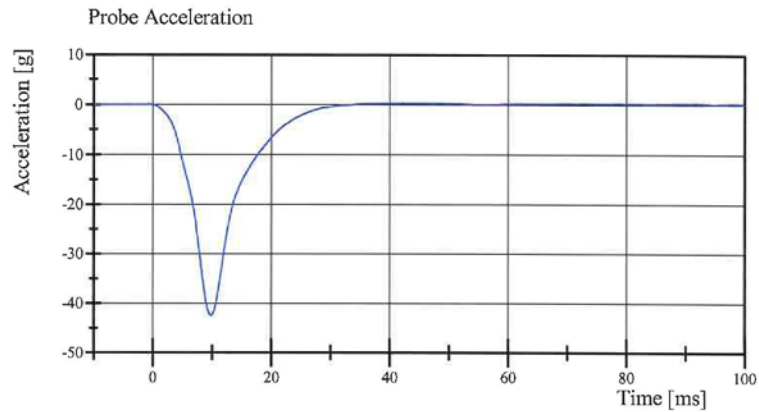


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. DI8818 Certification No. 13-1

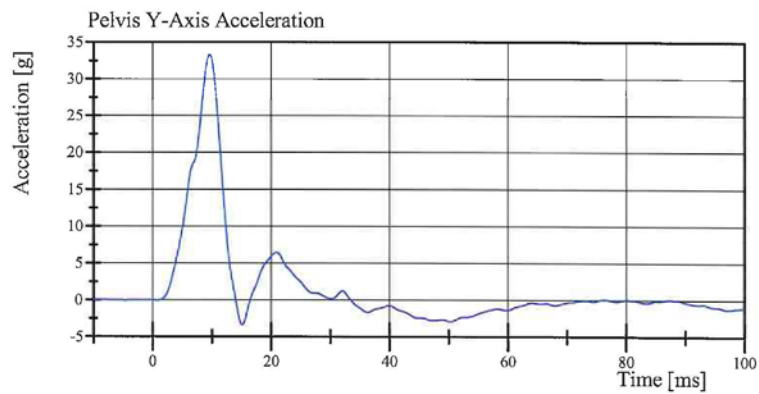
Test Date: 2/20/2014



Filter Class: CFC_180

Max: 0.3 g at 42.2 ms

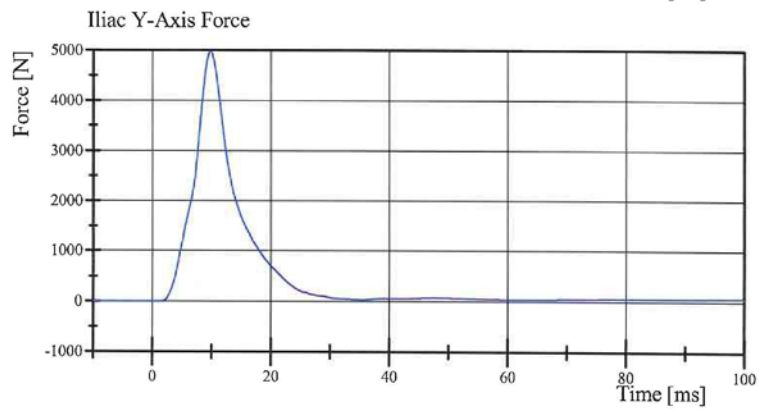
Min: -42.5 g at 9.8 ms



Filter Class: CFC_180

Max: 33.4 g at 9.6 ms

Min: -3.4 g at 15.1 ms



Filter Class: CFC_600

Max: 4,966.6 N at 9.8 ms

Min: -0.6 N at -6.8 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.20.2014 09:33:51 667



Driver S/N DI8818

Post-Test Calibration Sheets

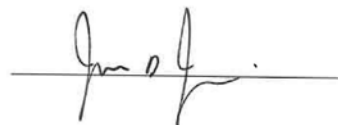
Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. DI8818 Calibration No.14

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	781	Yes
B	Shoulder Pivot Height	437.0 - 453.0	440	Yes
C	H-Point Height	79.0 - 89.0	82	Yes
D	H-Point from Seat Back	141.0 - 151.0	142	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	131	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	182	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	534	Yes
L	Popliteal Height	343.0 - 369.0	352	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	399	Yes
N	Buttock Popliteal Length	416.0 - 442.0	427	Yes
O	Chest Depth without Jacket	195.0 - 211.0	202	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	313	Yes
R	Arm Length	249.0 - 259.0	255	Yes
S	Knee Joint to seat Back	478.0 - 493.0	484	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	350	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	867	Yes
Z	Waist Circumference	761.0 - 791.0	775	Yes

Technician



Approved



Revised 9/29/2005



Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. DI8818 Certification No. 14-1

Test Date: 2/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	130.7 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	3.5 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 10:46:27 234

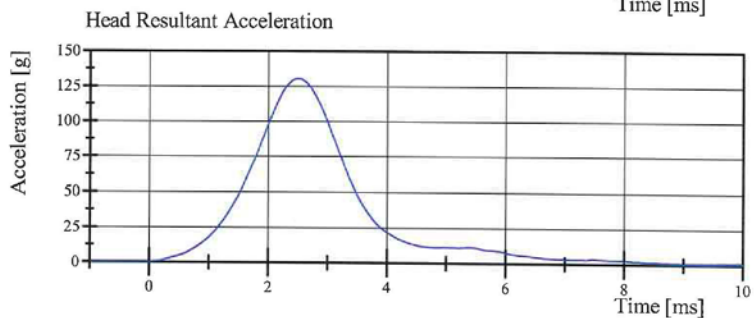
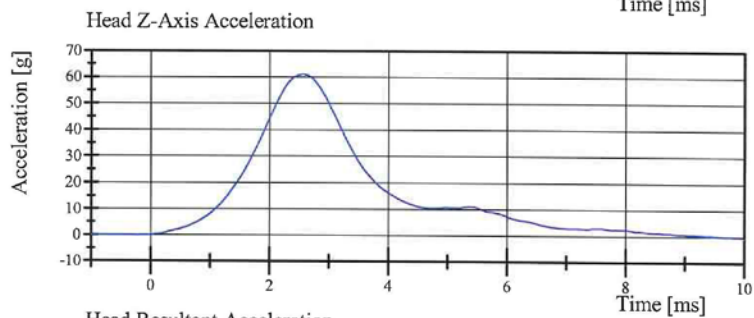
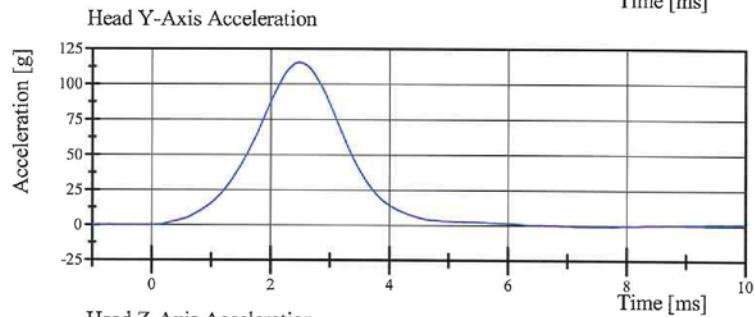
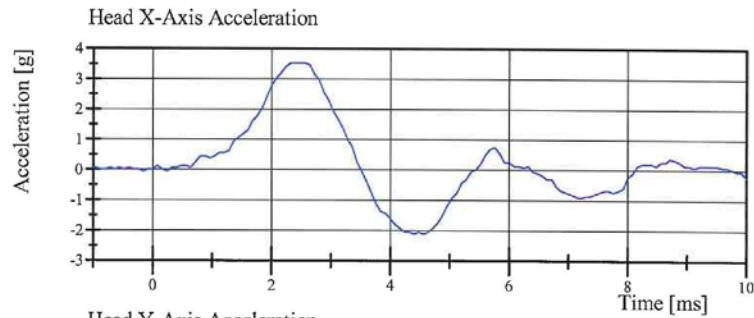


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. DI8818 Certification No. 14-1

Test Date: 2/27/2014



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 10:46:36 234



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. DI8818 Certification No. 14-1

Test Date: 2/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.597 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.589 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.914 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.294 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.775 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.786 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-73.0 deg	Yes
Time of Peak	50 - 70 ms	64.5 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N-m	41.6 N-m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N-m	102 - 126 ms	109.8 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 10:48:36 633

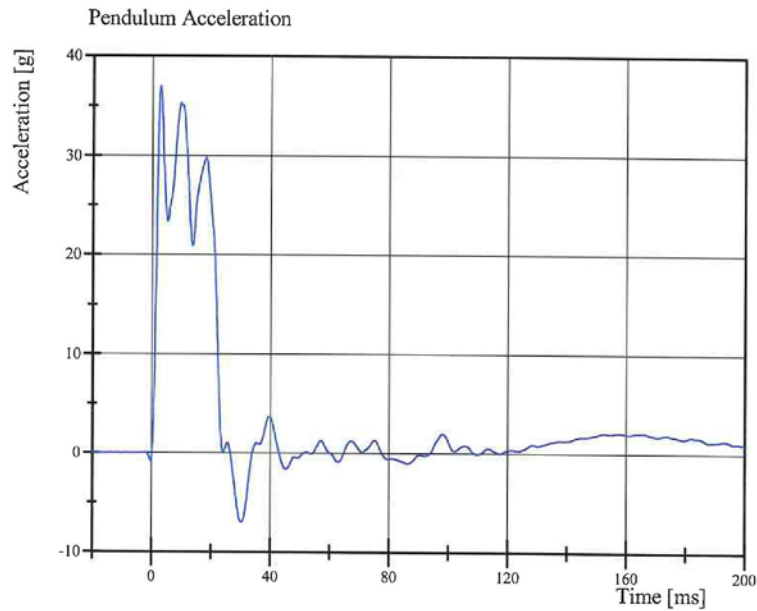


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. DI8818 Certification No. 14-1

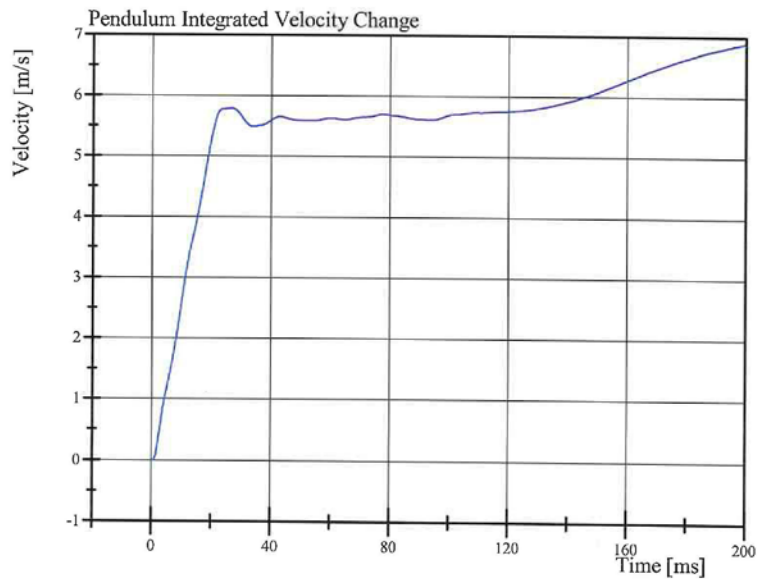
Test Date: 2/27/2014



Filter Class: CFC_180

Max: 36.9 g at 2.7 ms

Min: -7.0 g at 30.3 ms



Filter Class: CFC_180

Max: 6.9 m/s at 200.0 ms

Min: -0.0 m/s at 0.2 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 10:48:47 633

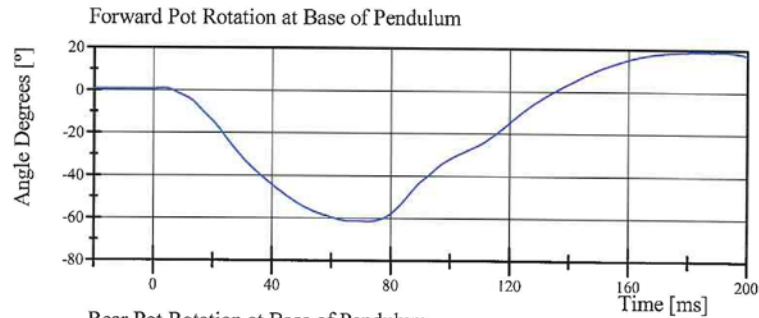


Transportation Research Center Inc.

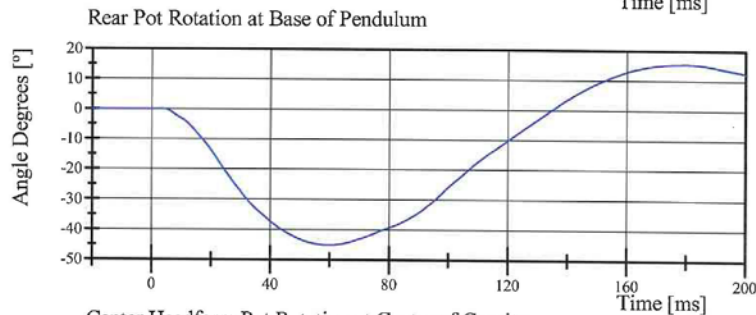
Left Lateral Neck

SID IIs Serial No. DI8818 Certification No. 14-1

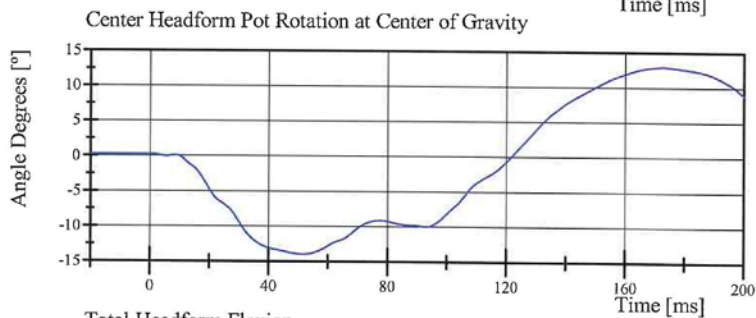
Test Date: 2/27/2014



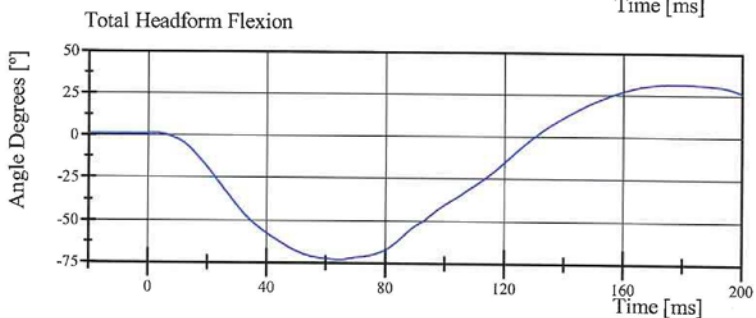
Filter Class: CFC_60
Max: 18.8 ° at 182.6 ms
Min: -61.5 ° at 72.2 ms



Filter Class: CFC_60
Max: 15.4 ° at 179.9 ms
Min: -45.1 ° at 59.5 ms



Filter Class: CFC_60
Max: 12.9 ° at 172.6 ms
Min: -14.0 ° at 51.5 ms



Filter Class: CFC_60
Max: 31.3 ° at 176.6 ms
Min: -73.0 ° at 64.5 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 10:48:48 633

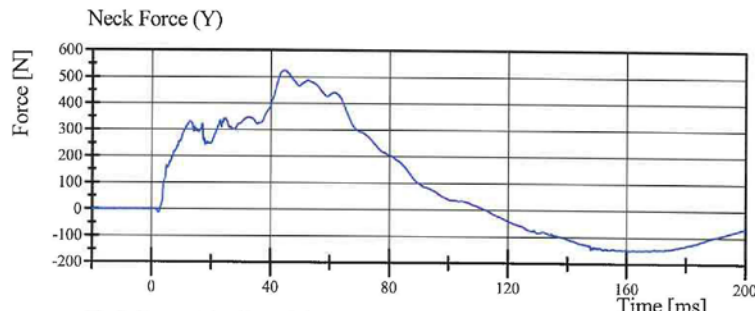


Transportation Research Center Inc.

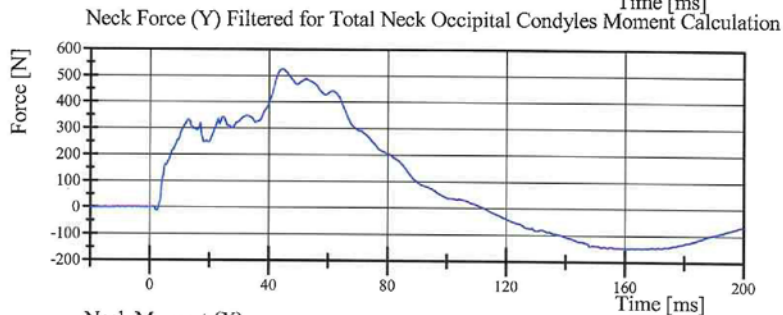
Left Lateral Neck

SID II_s Serial No. DI8818 Certification No. 14-1

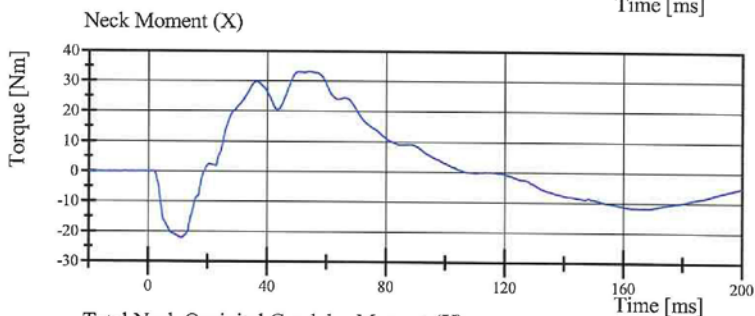
Test Date: 2/27/2014



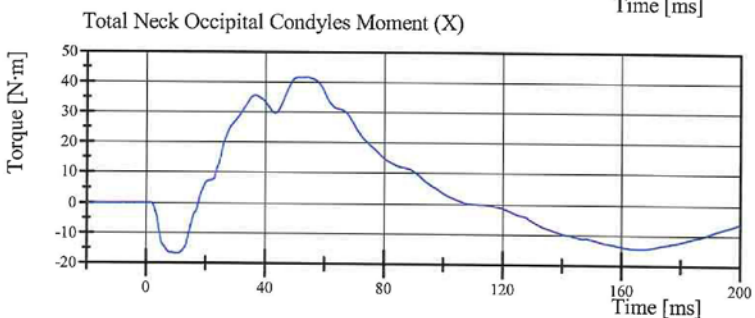
Filter Class: CFC_1000
Max: 524.3 N at 44.6 ms
Min: -151.7 N at 161.0 ms



Filter Class: CFC_600
Max: 523.7 N at 44.5 ms
Min: -151.4 N at 163.4 ms



Filter Class: CFC_600
Max: 33.2 Nm at 54.5 ms
Min: -22.0 Nm at 11.1 ms



Filter Class: Without_(Consta
Max: 41.6 N·m at 54.2 ms
Min: -16.8 N·m at 9.9 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 10:48:49 633



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. DI8818 Certification No. 14-1

Test Date: 2/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-14.8 g	Yes
Shoulder Displacement	28 - 37 mm	32.1 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.5 g	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 12:24:49 830

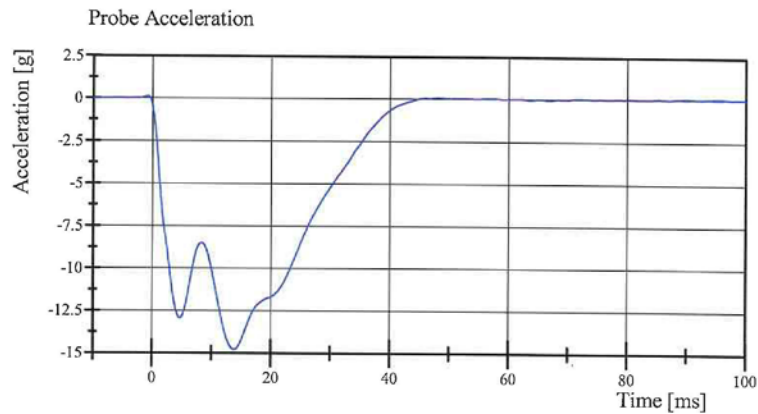


Transportation Research Center Inc.

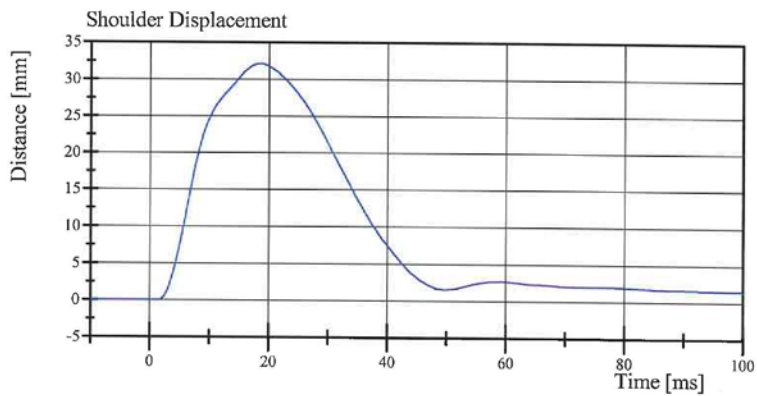
Left Lateral Shoulder

SID IIs Serial No. DI8818 Certification No. 14-1

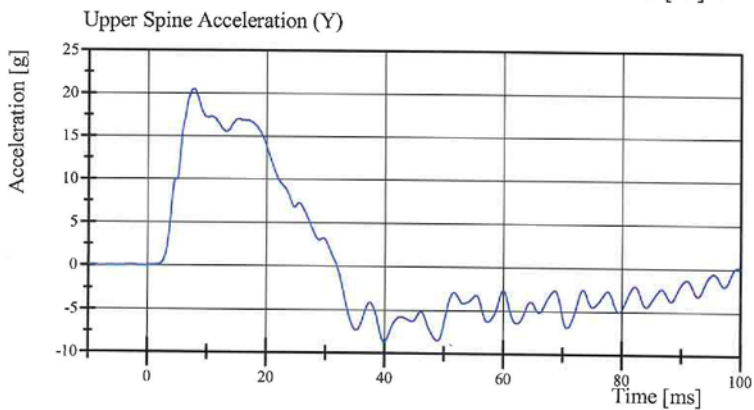
Test Date: 2/27/2014



Filter Class: CFC_180
Max: 0.1 g at -0.9 ms
Min: -14.8 g at 13.8 ms



Filter Class: CFC_600
Max: 32.1 mm at 18.5 ms
Min: -0.0 mm at 1.4 ms



Filter Class: CFC_180
Max: 20.5 g at 7.8 ms
Min: -8.7 g at 39.9 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 12:24:57 830



Transportation Research Center Inc.

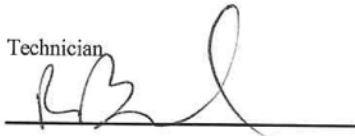
Left Lateral Thorax with Arm
SID IIs Serial No. DI8818 Certification No. 14-1
Test Date: 2/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.742 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.9 g	Yes
Shoulder Displacement	31 - 40 mm	37.7 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	28.7 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.1 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	32.3 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	37.9 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	35.1 g	Yes

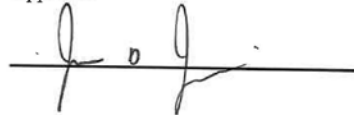
Test meets specifications.

Comments:

Technician



Approved



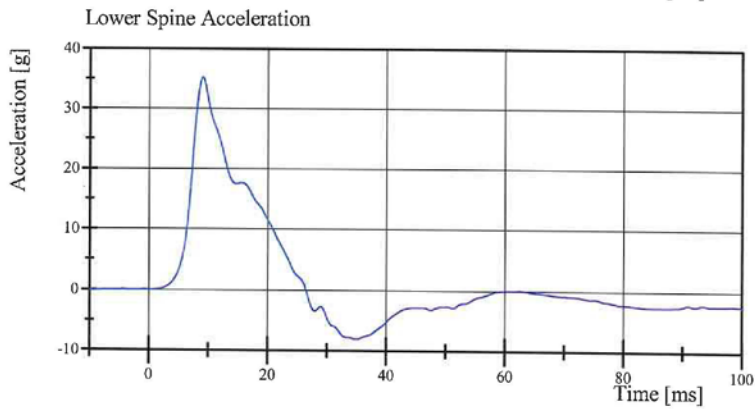
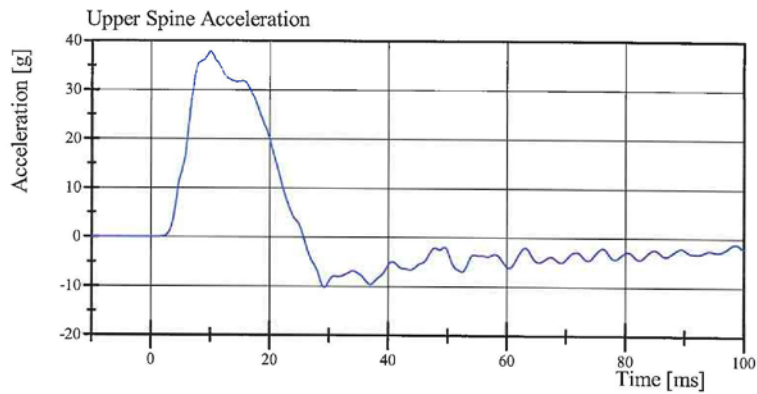
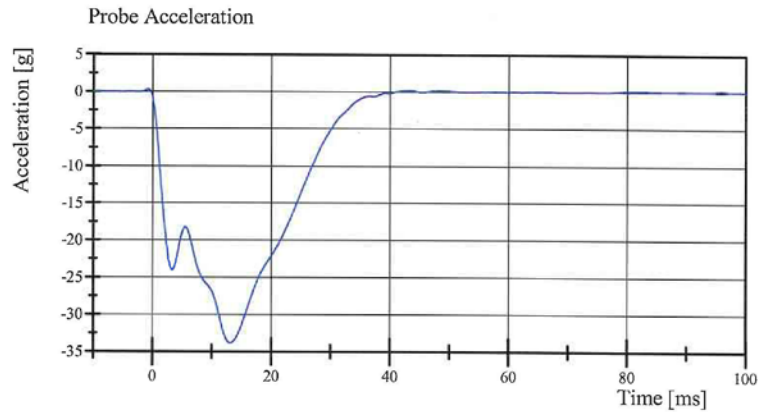
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 13:31:30 604



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. DI8818 Certification No. 14-1
Test Date: 2/27/2014



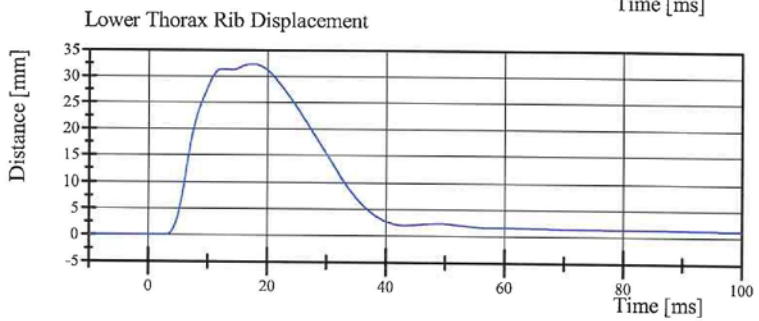
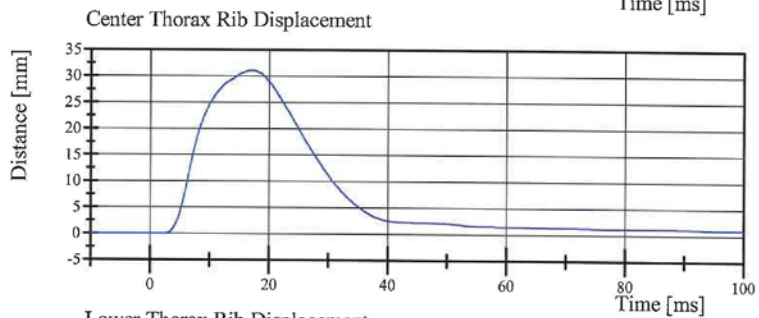
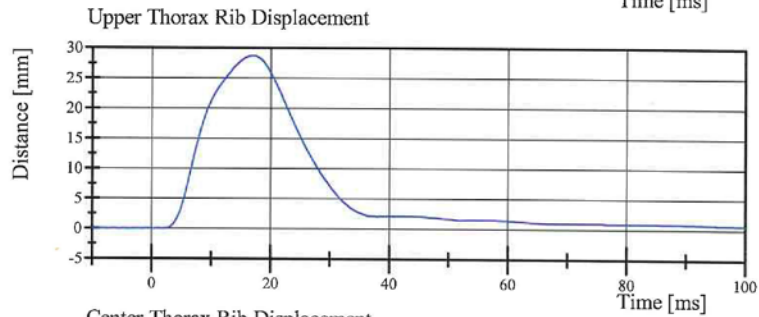
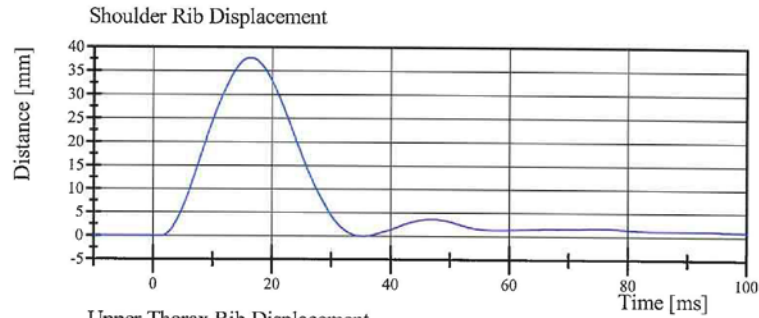
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 13:31:39 604



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. DI8818 Certification No. 14-1
Test Date: 2/27/2014



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 13:31:40 604



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. DI8818 Certification No. 14-1
Test Date: 2/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.233 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.8 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	34.8 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.1 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	38.4 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.3 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.5 g	Yes

Test meets specifications.

Comments:

Technician



Approved



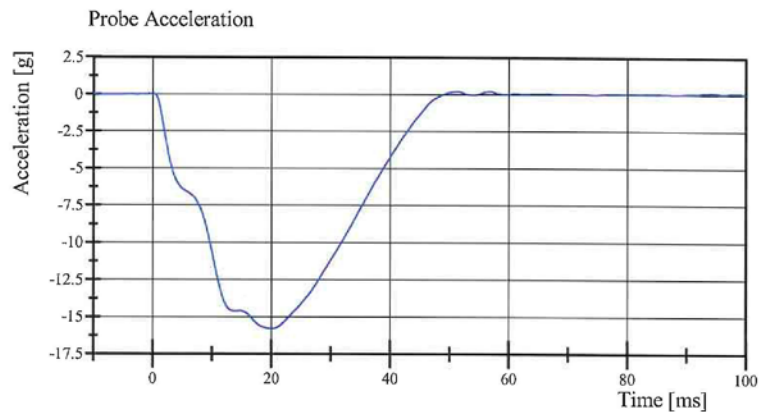
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 12:57:05 824

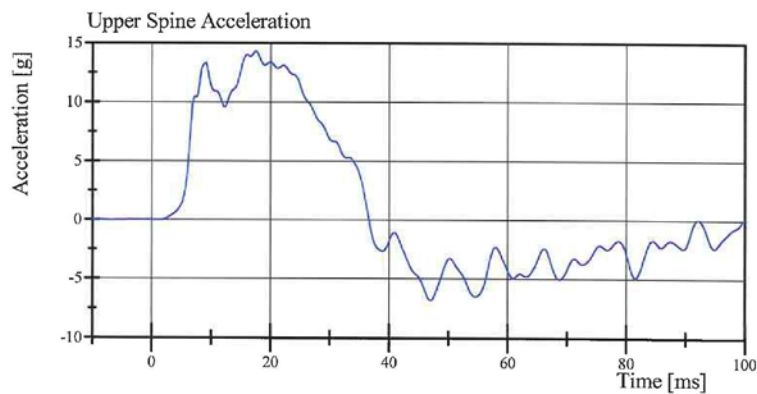


Transportation Research Center Inc.

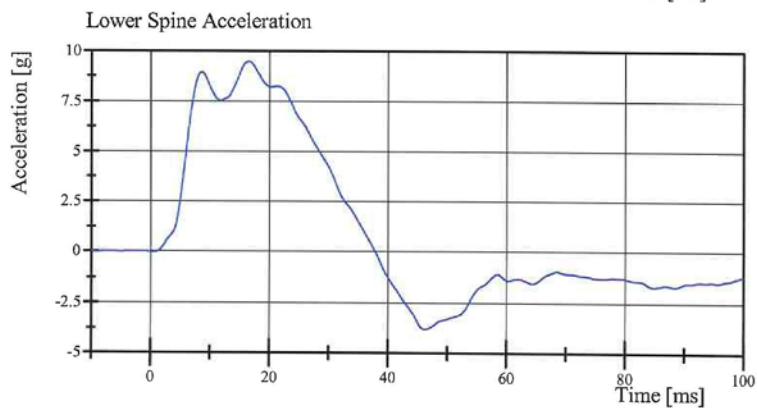
Left Lateral Thorax without Arm
SID II's Serial No. DI8818 Certification No. 14-1
Test Date: 2/27/2014



Filter Class: CFC_180
Max: 0.2 g at 56.7 ms
Min: -15.8 g at 20.0 ms



Filter Class: CFC_180
Max: 14.3 g at 17.5 ms
Min: -6.8 g at 47.0 ms



Filter Class: CFC_180
Max: 9.5 g at 16.5 ms
Min: -3.8 g at 46.2 ms

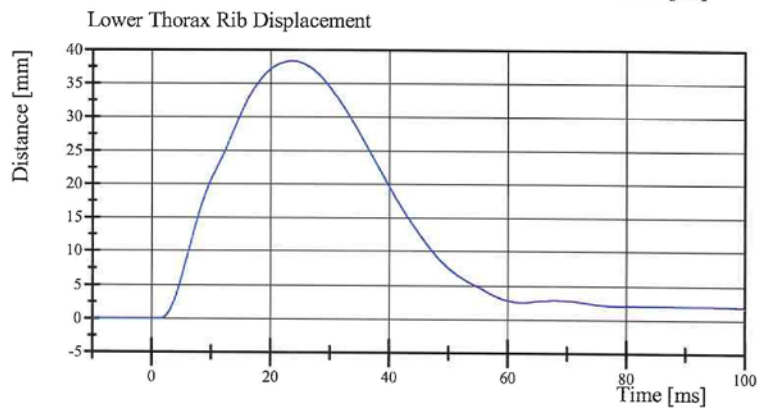
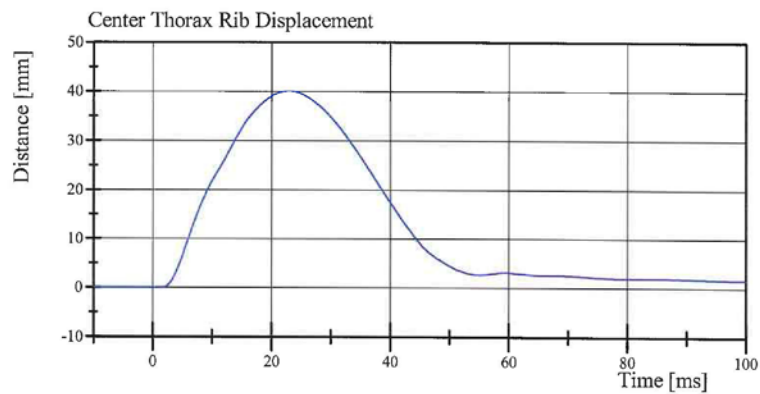
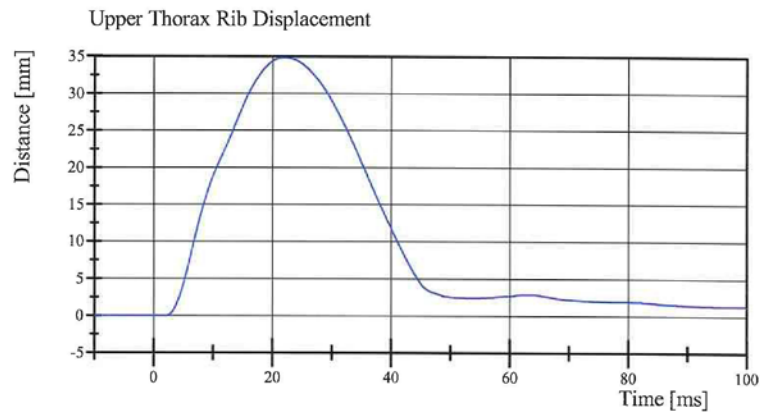
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 12:57:14 824



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID II_s Serial No. DI8818 Certification No. 14-1
Test Date: 2/27/2014



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 12:57:15 824



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. DI8818 Certification No. 14-1

Test Date: 2/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.8 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	38.5 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	35.1 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	11.24 g	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 12:37:58 632

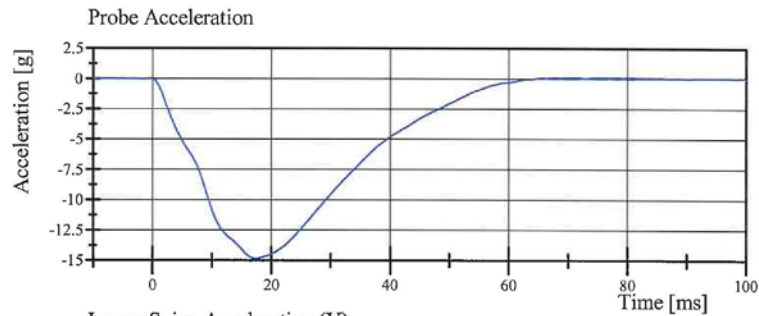


Transportation Research Center Inc.

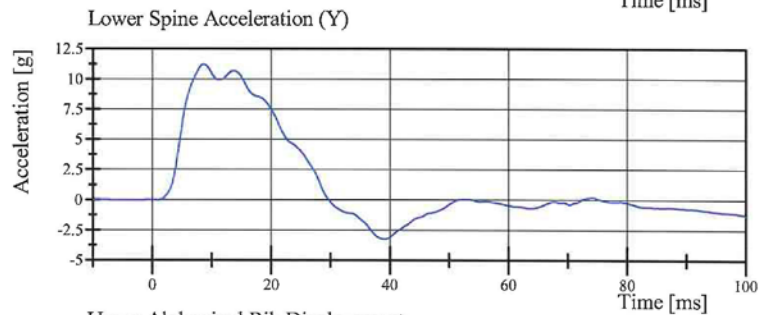
Left Lateral Abdomen

SID IIs Serial No. DI8818 Certification No. 14-1

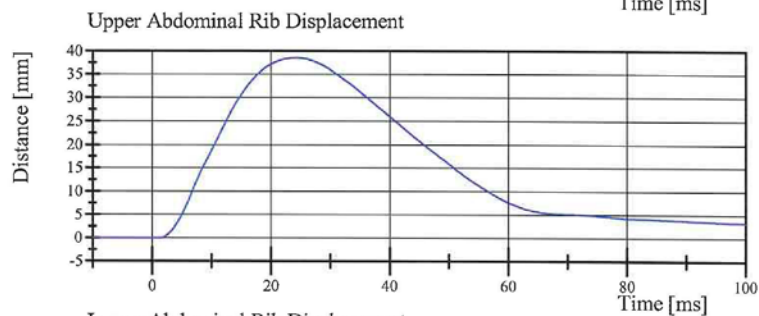
Test Date: 2/27/2014



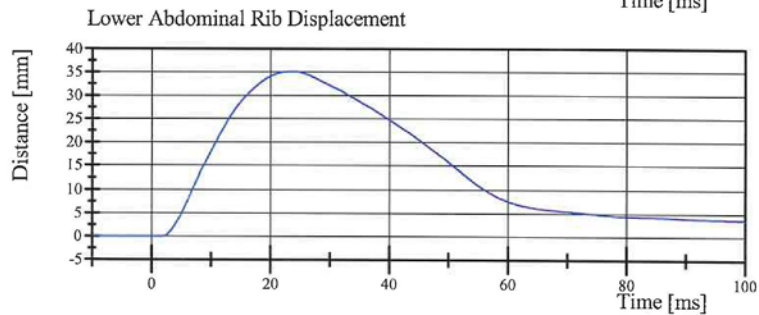
Filter Class: CFC_180
Max: 0.1 g at 78.2 ms
Min: -14.8 g at 17.4 ms



Filter Class: CFC_180
Max: 11.2 g at 8.6 ms
Min: -3.3 g at 39.1 ms



Filter Class: CFC_600
Max: 38.5 mm at 24.2 ms
Min: -0.0 mm at -3.1 ms



Filter Class: CFC_600
Max: 35.1 mm at 23.3 ms
Min: -0.0 mm at 1.8 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 12:38:06 632



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. DI8818 Certification No. 14-1

Test Date: 2/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-42.3 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	31.8 g	Yes
Iliac Force	4,100 - 5,100 N	4,946.3 N	Yes

Test meets specifications.

Comments:

Technician



Approved



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 11:27:17 616

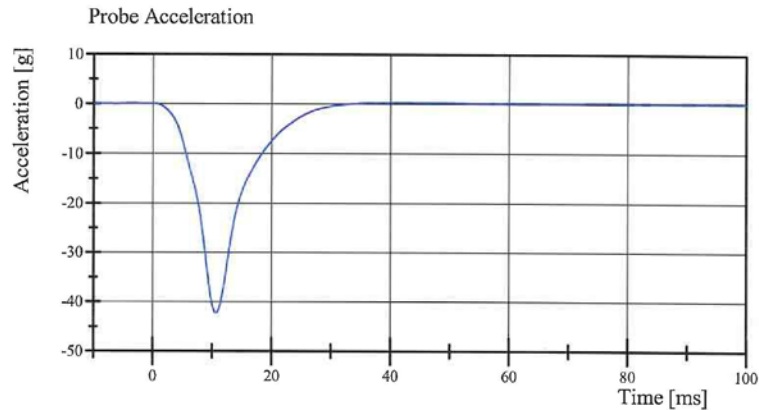


Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. DI8818 Certification No. 14-1

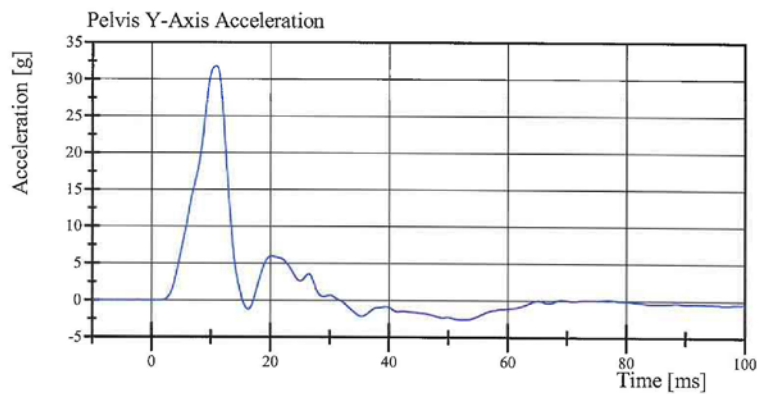
Test Date: 2/27/2014



Filter Class: CFC_180

Max: 0.3 g at 42.9 ms

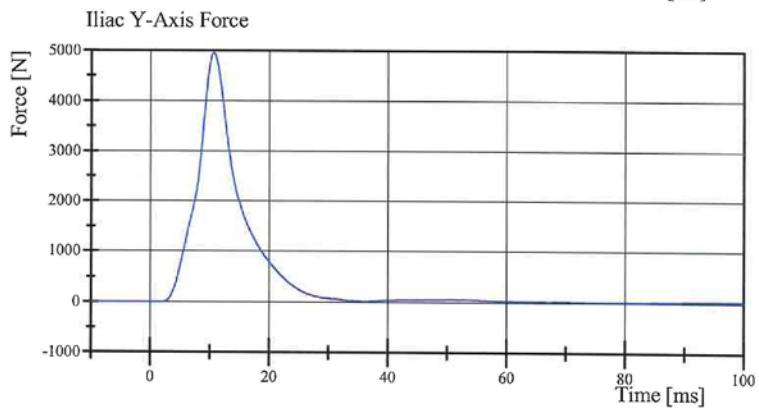
Min: -42.3 g at 10.6 ms



Filter Class: CFC_180

Max: 31.8 g at 10.9 ms

Min: -2.6 g at 52.9 ms



Filter Class: CFC_600

Max: 4,946.3 N at 10.6 ms

Min: -0.6 N at -4.6 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 11:27:25 616



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. DI8818 Certification No. 14-1

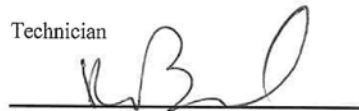
Test Date: 2/27/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.67 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-45.32 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	40.2 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,235.9 N	Yes

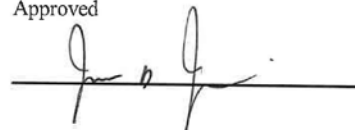
Test meets specifications.

Comments:

Technician



Approved



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 14:50:52 426

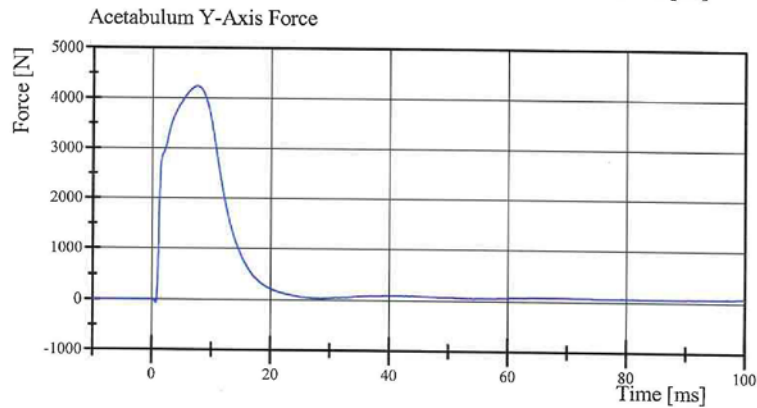
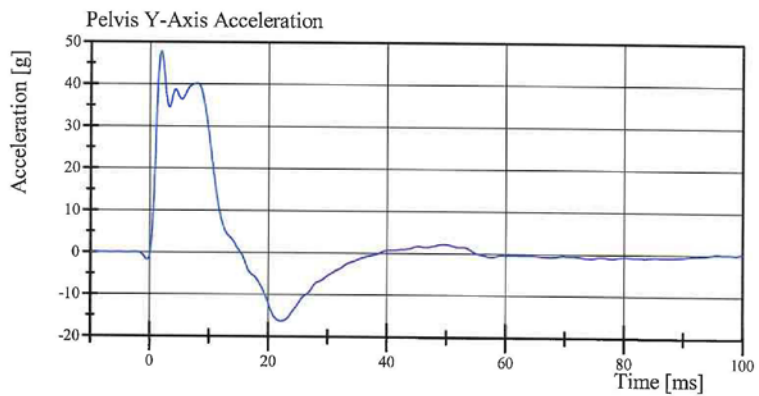
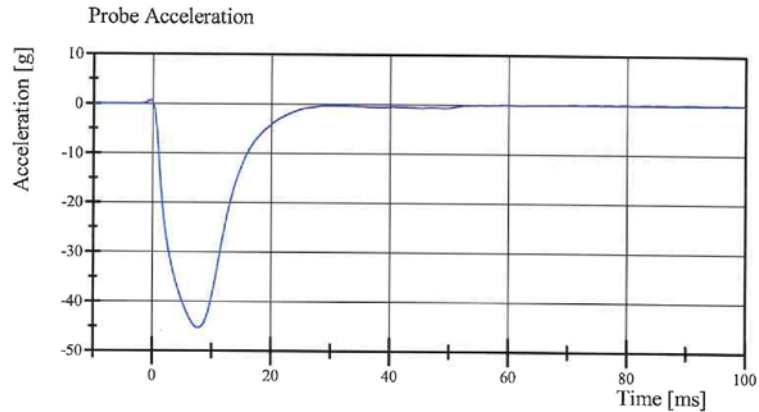


Transportation Research Center Inc.

Left Lateral Pelvis

SID II_s Serial No. DI8818 Certification No. 14-1

Test Date: 2/27/2014



Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

02.27.2014 14:51:00 426



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N DI8818			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	J32214	Endevco	9-Dec-2013
				Y	J27040	Endevco	9-Dec-2013
				Z	AGAC4	Endevco	9-Dec-2013
Displacement Potentiometers	Shoulder		Y	N/A	N/A	N/A	
	Thoracic Rib	Upper	Y	3787-047	Servo	10-Dec-2013	
		Middle	Y	3745-01815	Servo	10-Dec-2013	
		Lower	Y	03745-01803	Servo	10-Dec-2013	
	Abdominal Rib	Upper	Y	3745-01811	Servo	10-Dec-2013	
		Lower	Y	3787-051	Servo	18-Dec-2013	
Lower Spine Accelerometers (T12)				X	P64150	Endevco	9-Dec-2013
				Y	P64142	Endevco	4-Dec-2013
				Z	P64100	Endevco	7-Feb-2014
Acetabulum Load Cell				Y	235-FY	FTSS	6-Nov-2013
Iliac Wing Load Cell				Y	113-FY	FTSS	6-Nov-2013
Pelvis Plug (struck side)					63320	FTSS	24-Jan-2013
Pelvis Plug (non-struck side)					63609	FTSS	15-Feb-2013

TABLE 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P80488	Endevco	4-Feb-2014
Vehicle Center of Gravity	Y	P81087	Endevco	5-Nov-2013
Vehicle Center of Gravity	Z	P81647	Endevco	14-Nov-2013
Left Floor Sill	Y	P81598	Endevco	13-Nov-2013
A-Pillar Sill	Y	P81041	Endevco	17-Sep-2013
A-Pillar Low	Y	P82004	Endevco	5-Nov-2013
A-Pillar Mid	Y	P81093	Endevco	5-Nov-2013
B-Pillar Sill	Y	P82275	Endevco	12-Nov-2013
B-Pillar Low	Y	P78111	Endevco	15-Nov-2013
B-Pillar Mid	Y	P78116	Endevco	9-Jan-2014
Driver Seat	Y	P80478	Endevco	15-Oct-2013
Engine Top	X	P80472	Endevco	15-Oct-2013
Engine Top	Y	P81596	Endevco	13-Nov-2013
Firewall	Y	MS23047	Measurement Specialties	20-Feb-2014
Right Roof	Y	P80933	Endevco	5-Nov-2013
Right Floor Sill	Y	MS23267	Measurement Specialties	24-Feb-2014
Rear Floor Pan	X	P79310	Endevco	10-Feb-2014
Rear Floor Pan	Y	P80140	Endevco	18-Feb-2014

TABLE 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	5763-87-FX	Denton	9-Dec-2013
Load Cell 2	5763-97-FX	Denton	9-Dec-2013
Load Cell 3	5763-84-FX	Denton	9-Dec-2013
Load Cell 4	5764-81-FX	Denton	9-Dec-2013
Load Cell 5	5763-89-FX	Denton	9-Dec-2013
Load Cell 6	5763-77-FX	Denton	9-Dec-2013
Load Cell 7	5764-89-FX	Denton	9-Dec-2013
Load Cell 8	5764-77-FX	Denton	9-Dec-2013