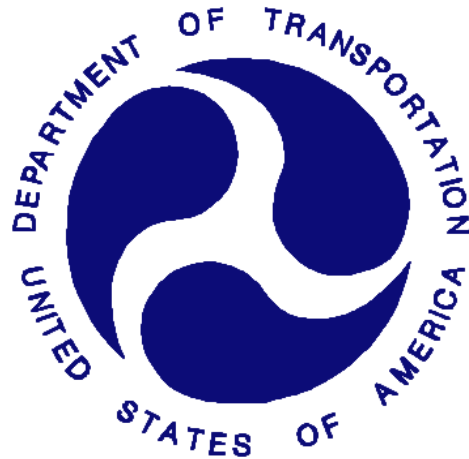


REPORT NUMBER: SPNCAP-MGA-2014-021

**NEW CAR ASSESSMENT PROGRAM (NCAP)
Side Impact Pole Test**

**TOYOTA MOTOR MANUFACTURING, INDIANA, INC.
2014 Toyota Sienna LE Minivan
NHTSA No.: O20145103**

**MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105**



Test Date: October 22, 2013

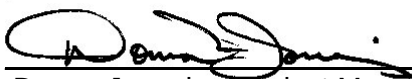
Final Report Date: November 18, 2013

FINAL REPORT

**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, DC 20590**

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Prepared by: 
Donna Janovicz, Project Manager

Approved by: 
Ben Fischer, Project Engineer

Approval Date: November 18, 2013

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

Technical Report Documentation Page

1. Report No. SPNCAP-MGA-2014-021	2. Government Accession No.	3. Recipient's Catalog No.																													
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of a 2014 Toyota Sienna LE Minivan, NHTSA No.: O20145103		5. Report Date November 18, 2013																													
		6. Performing Organization Code MGA																													
7. Author(s) Donna Janovicz, Project Manager Ben Fischer, Project Engineer		8. Performing Organization Report No. SPNCAP-MGA-2014-021																													
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		10. Work Unit No.																													
		11. Contract or Grant No. DTNH22-09-D-00124																													
12. Sponsoring Agency Name and Address United States Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NVS-111) 1200 New Jersey Ave, SE, Room W43-410 Washington, DC 20590		13. Type of Report and Period Covered: Final Test Report October 22, 2013 to November 18, 2013																													
		14. Sponsoring Agency Code NVS-111																													
15. Supplementary Notes																															
16. Abstract A 32.20 km/h, 75° oblique impact Side NCAP Test was conducted on the subject 2014 Toyota Sienna LE Minivan 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. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on October 22, 2013. The impact velocity was 32.1 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 20.9°C. The test vehicle post-test maximum crush was 412 mm at level 3. The test vehicle's performance was as follows: <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="4" style="text-align: left;">Driver ATD (SID-IIs)</th> </tr> <tr> <th style="text-align: left;">Measurement Description</th> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>311</td> </tr> <tr> <td style="text-align: left;">Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td>34</td> </tr> <tr> <td style="text-align: left;">Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>2847</td> </tr> <tr> <td style="text-align: left;">Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>16</td> </tr> <tr> <td style="text-align: left;">Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45*</td> <td>15</td> </tr> </tbody> </table> *Proposed IARV The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.				Driver ATD (SID-IIs)				Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	311	Resultant Lower Spine Acceleration	Gs	82	34	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2847	Maximum Thoracic Rib Deflection	mm	38*	16	Maximum Abdomen Rib Deflection	mm	45*	15
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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, SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																													
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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2014 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00124. The purpose of this test is to generate comparative side impact performance in a 2014 Toyota Sienna LE Minivan. 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 2014 Toyota Sienna LE Minivan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.1 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin, on October 22, 2013. Pre-test and post-test photographs of the test vehicle and 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:

Primary and Redundant Head CG Triaxial Accelerometers
Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
Abdomen Upper Rib 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. Appendix D contains the test equipment and instrumentation calibration data.

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

Measurement Description	Driver ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	311
Resultant Lower Spine Acceleration	Gs	82	34
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2847
Maximum Thoracic Rib Deflection	mm	38*	16
Maximum Abdominal Rib Deflection	mm	45*	15

*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	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	No	No	
Seat Belt Load Limiter	Yes		No	
Other				

The test data can be found on the NHTSA website at www.nhtsa.dot.gov

GENERAL COMMENTS

Left Lower A-Post Y is questionable from 25-35ms

Left Mid A-Post Y is questionable from 25-35ms

Left Mid B-Post Y is questionable from 20-35ms

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Toyota Sienna LE Minivan
Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
Test Date: 10/22/2013

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20145103	Traction Control System (TCS)	Yes
Model Year	2014	Auto-Leveling System	No
Make	Toyota	Automatic Door Locks (ADL)	Yes
Model	Sienna	Power Window Auto-Reverse	Yes
Body Style	MPV	Other Optional Feature	N/A
VIN	5TDKK3DC8ES410624	Driver Front Airbag	Yes
Body Color	Silver Sky Metallic	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	76 / 47	Driver Head/Torso Airbag	No
Engine Displacement (L)	3.5	Driver Torso Airbag	No
Type/No. Cylinders	6	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Lateral	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	Front	Rear Pass. Torso Airbag	No
Roof Rack	Yes	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	Yes	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, Indiana, Inc.	GVWR (kg)	2715
Date of Manufacture	09/13	GAWR Front (kg)	1405
Vehicle Type	MPV	GAWR Rear (kg)	1405

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	3	8	(A)
Capacity Weight (VCW) (kg)				609	(B)
DSC x 68.04 kg				544	(A-B)
Rated Cargo and Luggage Weight (RCLW) (kg)				65	

VEHICLE SEAT TYPE

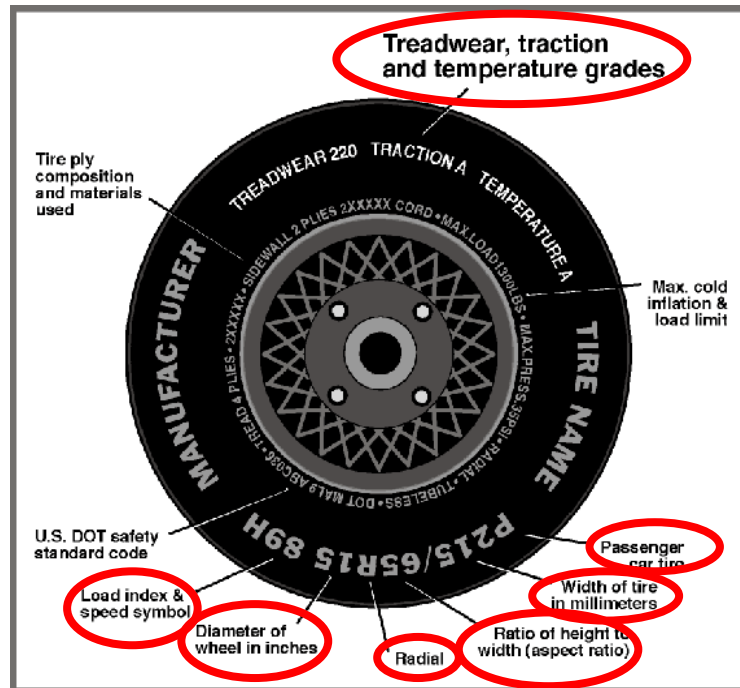
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						Manual	Power
Front Seat	X						X
Rear or Second Row			X			w/lever	
Third Row Seat			X		X		

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

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
 Test Date: 10/22/2013

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P235/60R17	P235/60R17
Tire Size on Vehicle	P235/60R17	P235/60R17
Tire Manufacturer	Firestone	Firestone
Tire Model	FR710	FR710
Treadwear	560	560
Traction	A	A
Temperature Grade	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	100T	100T
Tire Material	Rubber	Rubber
DOT Safety Code Left	W2OU CKD 2913	W2OU CKD 2913
DOT Safety Code Right	W2OU CKD 2913	W2OU CKD 2913

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

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
 Test Date: 10/22/2013

TEST PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kpa	240	240	240	240
Tire Placard	kpa	240	240	240	240
Owner's Manual	kpa				
As Tested	kpa	240	240	240	240

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	571.6	435.5		590.6	473.6		585.6	492.2	
Right	kg	557.9	427.7		577.4	461.3		564.3	468.1	
Ratio	%	56.7	43.3		55.5	44.5		54.5	45.5	
Totals	kg	1129.5	863.2	1992.7	1168.0	934.9	2102.9	1149.9	960.3	2110.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1992.7	(A)
Actual Weight of 1 P572V ATD (SID-IIs) ATD Used	kg	52.2	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	65	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2109.9	(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**

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	-0.2	Yes
Front Pass. Sill Angle (front-to-rear)*	deg	-0.6	-0.6	-0.5	Yes
Front Bumper Angle (left-to-right)**	deg	-0.6	-0.6	-0.6	Yes
Rear Bumper Angle (left-to-right)**	deg	-0.4	-0.4	-0.4	Yes
Vehicle CG (Aft of Front Axle)	mm	1308	1343	1374	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	9	10	18	

*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.

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast (if any)	0.0
Right taillight, right side mirror, cargo area plastic trim and carpet from behind third row.	10.4

Test height adjustable suspension setting, if applicable:

Not Applicable

DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
 Test Date: 10/22/2013

SEAT POSITIONING

The driver's 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	18.8	6.4	12.6
Front Passenger Seat	Fixed	Fixed	Fixed
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rear- most	Mid- Fore/Aft	Forward- Most
Driver Seat	12.6	23	Max	46	46	46
	12.6	23	Mid	23	23	23
	12.6	23	Min	0	0	0
Front Passenger Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed

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

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

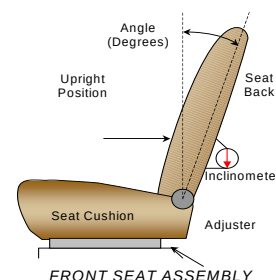
NHTSA No. O20145103
 Test Date: 10/22/2013

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-most Position	
	mm	Detents	mm	Detent
Driver Seat	240		0	
Front Passenger Seat	240	24 (1 st as 0)	0	0 (1 st as 0)
Front Center Seat				
Struck Side Rear Seat	370	23 (1 st as 0)	370	23 (1 st as 0)
Non-Struck Side Rear Seat	370	23 (1 st as 0)	370	23 (1 st as 0)
Rear Center Seat	370	23 (1 st as 0)	370	23 (1 st as 0)

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 Vertical	
	Degrees	Detents	Degree	Detent
Driver Seat w/Seated Dummy	52.0		-8.0	
Front Passenger Seat	56.4	27 (1 st as 1)	-7.5	0 (1 st as 0)
Front Center Seat				
Struck Side Rear Seat	23.5	12 (1 st as 1)	-6.0	0 (1 st as 0)
Non-Struck Side Rear Seat	23.5	12 (1 st as 1)	-6.0	0 (1 st as 0)
Rear Center Seat	23.5	12 (1 st as 1)	-6.0	0 (1 st as 0)

Seat back angles measured on headrest post guide.

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	4 detents (1 st as 1)	3 (uppermost as 0)

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	Lowest

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

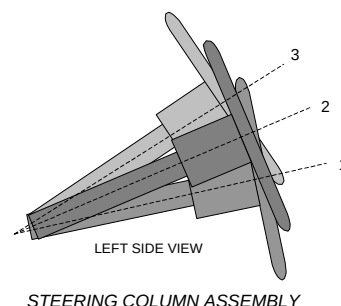
Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
 Test Date: 10/22/2013

STEERING COLUMN ADJUSTMENT

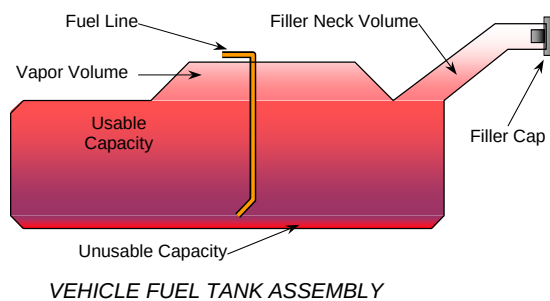
Steering wheel and column adjustments are made so that the steering wheel geometric locus is described when it moves through its full range of motion.

	Degrees	Fore/Aft Position (mm)
Lowermost, Position 1	66.6	245
Geometric Center, Position 2	64.1	225
Uppermost, Position 3	61.6	205
Telescoping Steering Wheel Travel		40
Test Position	64.1	225



FUEL PUMP

Describe the fuel pump type, details about how it operates and the location of the fuel filler pipe. The vehicle is equipped with an electric fuel pump. Any time the key is turned to the "ON" position, the pump will run for a couple seconds. The fuel pipe is on the left side.



FUEL TANK CAPACITY DATA

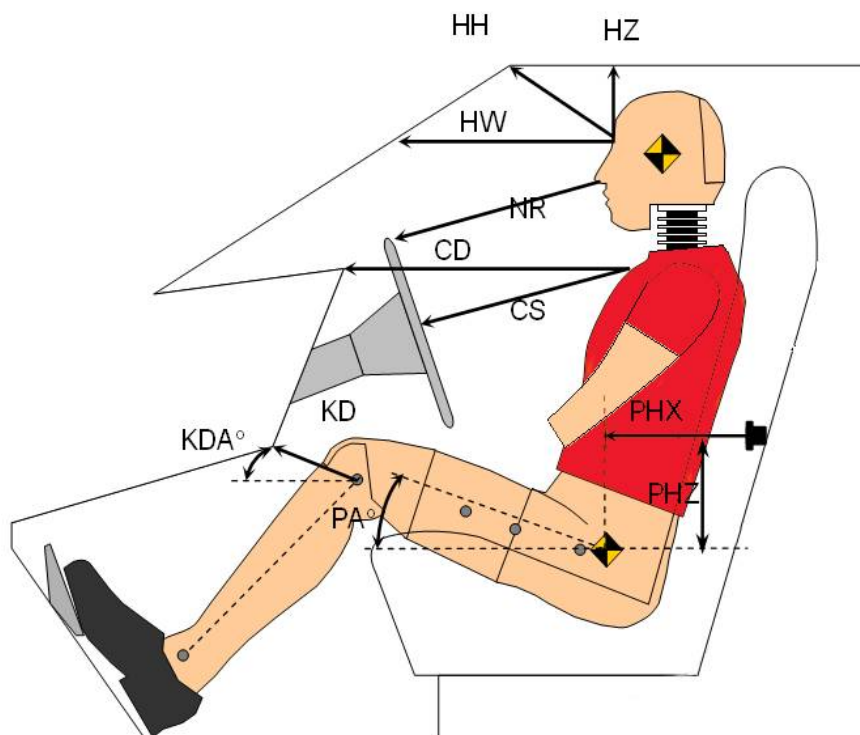
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	78.0
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	79.1
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	72.5
Actual Amount of Solvent Used	72.5
1/3 of Usable Capacity	26.0

Is the actual amount of solvent used in the test equal to 93% $\pm$ 1% of the Usable Capacity stated in Form No. 1? **YES**

.DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
 Test Date: 10/22/2013



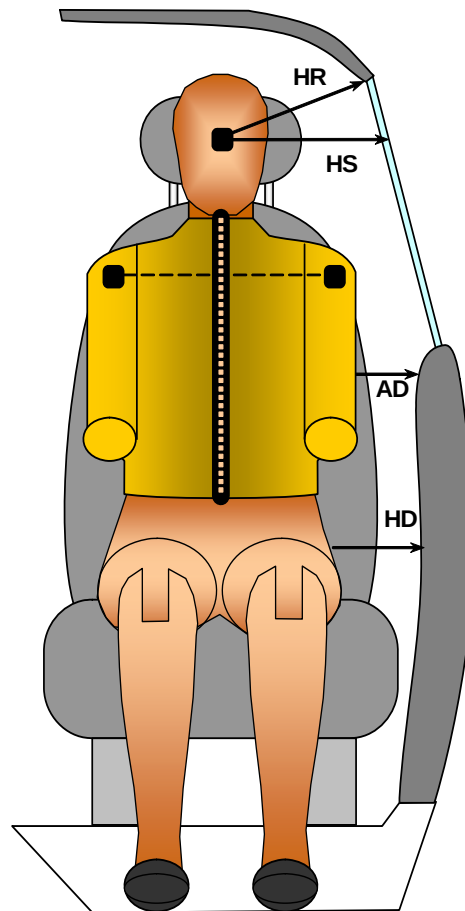
LEFT SIDE VIEW

Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	311	
HW	Head to Windshield	659	
HZ	Head to Roof Liner	254	
NR	Nose to Rim	257	
CD	Chest to Dashboard	410	
CS	Chest to Steering Wheel	86	
KDL/KDAL°	Left Knee to Dash	114	24.6
KDR/KDAR°	Right Knee to Dash	119	38.2
PAX°	Pelvic Tilt Angle (X-Axis)		19.6
PAY°	Pelvic Tilt Angle (Y-Axis)		-0.6
PHX	Hip Point to Striker (X-Axis)	386	
PHZ	Hip Point to Striker (Z-Axis)	139	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
 Test Date: 10/22/2013



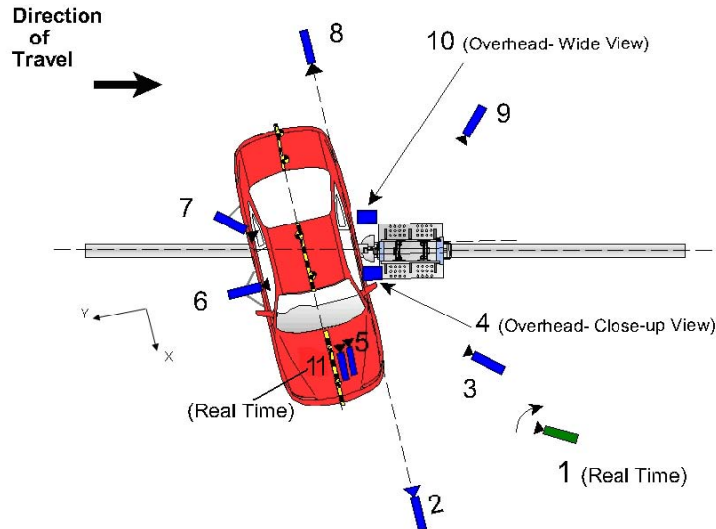
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver
		Length (mm)
HR	Head to Side Header	281
HS	Head to Side Window	380
AD	Arm to Door	183
HD	Hip Point to Door	158

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
 Test Date: 10/22/2013



Reference: (from Point of Impact for X and Y; from Ground for Z):
 +X = Forward of Impact, + Y = Right of Impact, +Z = Down

Camera No.	View	Coordinates (mm)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real-Time Pan View					30
2	Front Ground Level	-70	5320	-1670	24	1000
3	Impact Side 45° Forward	-2520	5320	-1670	20	1000
4	Overhead Closeup	70	0	-4530	50	1000
5	Onboard – Driver Front				16	1000
6	Onboard – Driver Side				8	1000
7	Onboard – Driver Rear				8	1000
8	Rear Ground Level	-50	-5440	-1690	24	1000
9	Impact Side 45° Rearward	-3420	-3270	-1760	20	1000
10	Overhead Wide View	540	0	-4610	14	1000
11	Real-Time Dummy Front View					30

* All measurements accurate to ± 6 mm

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

Explain why camera(s) did not operate as intended: None

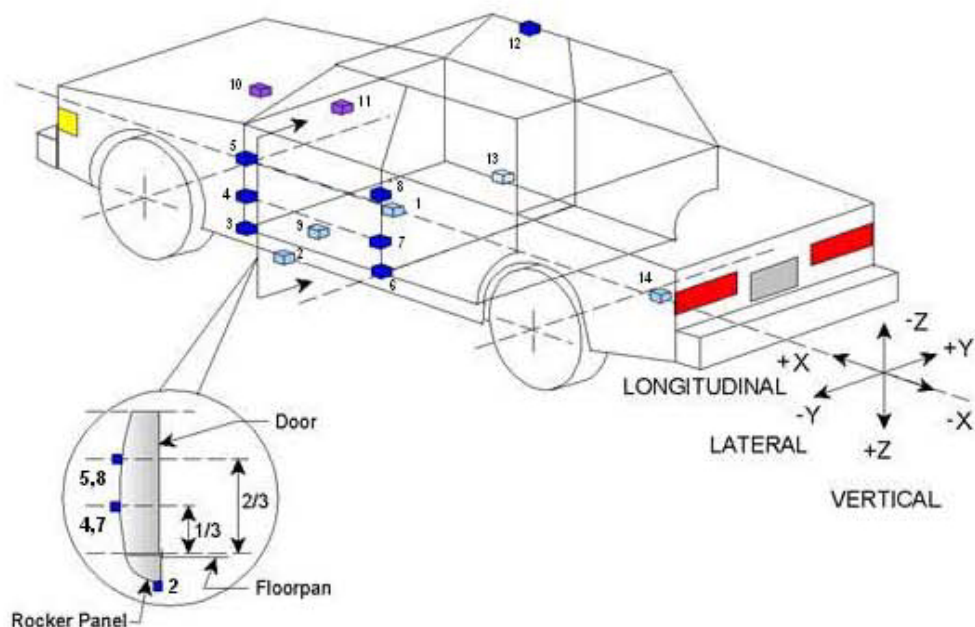
INSTRUMENTATION

	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 Sienna LE Minivan
Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
Test Date: 10/22/2013



	Accelerometer Location			
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2824	0	-335
2	Left Floor Sill	3174	-833	-225
3	A Pillar Sill	3657	-832	-225
4	A Pillar Low	3674	-913	-637
5	A Pillar Mid	3683	-905	-862
6	B Pillar Sill	2602	-833	-232
7	B Pillar Low	2561	-810	-658
8	B Pillar Mid	2561	-820	-857
9	Driver Seat Track	2790	-420	-435
10	Engine Top	4422	0	-808
11	Firewall	4294	0	-1065
12	Right Roof	2624	610	-1716
13	Right Floor Sill	3142	833	-235
14	Rear Floorpan	246	-40	-333

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 Sienna LE Minivan
Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
Test Date: 10/22/2013



254 mm Diameter Rigid Pole

Load Cell Locations	
ID	Height From Impact Surface (mm)
1	182
2	470
3	698
4	986
5	1212
6	1641
7	1854
8	2053

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2014 Toyota Sienna LE Minivan
Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
Test Date: 10/22/2013

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Driver SID-IIs Dummy
Face	Curtain Airbag
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag
Back of Head	Curtain Airbag, Headrest
Left Shoulder	Side Airbag, Seatback
Upper Torso	Side Airbag, Seatback
Lower Torso	Side Airbag, Seatback
Left Hip	Side Airbag
Left Knee	None

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other Door
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	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	No	No	No
If Door Opened at Striker, Record Width of Opening at Striker (mm)	N/A	N/A	N/A	N/A	N/A

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	Cracked
Side Window Damage	Left Front Window Broken
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST-TEST OBSERVATIONS

Test Vehicle: 2014 Toyota Sienna LE Minivan
Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
Test Date: 10/22/2013

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	No	No	
Seat Belt Load Limiter	Yes		No	
Other				

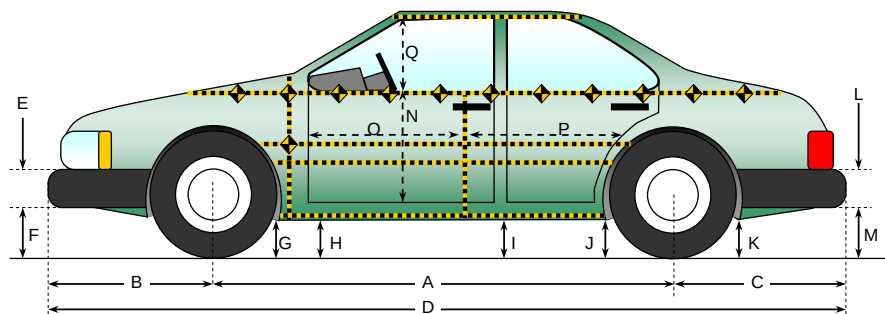
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1133
Actual Impact Point (Aft of Front Axle)	mm		1131
Horizontal Offset (+forward / -rearward)	mm	+/- 38 of Intended Impact Point	+2
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.1
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.1

DATA SHEET NO. 9 **VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2014 Toyota Sienna LE Minivan
Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
Test Date: 10/22/2013



All measurements in (mm) with tolerance of ± 3 mm

LEFT SIDE VIEW

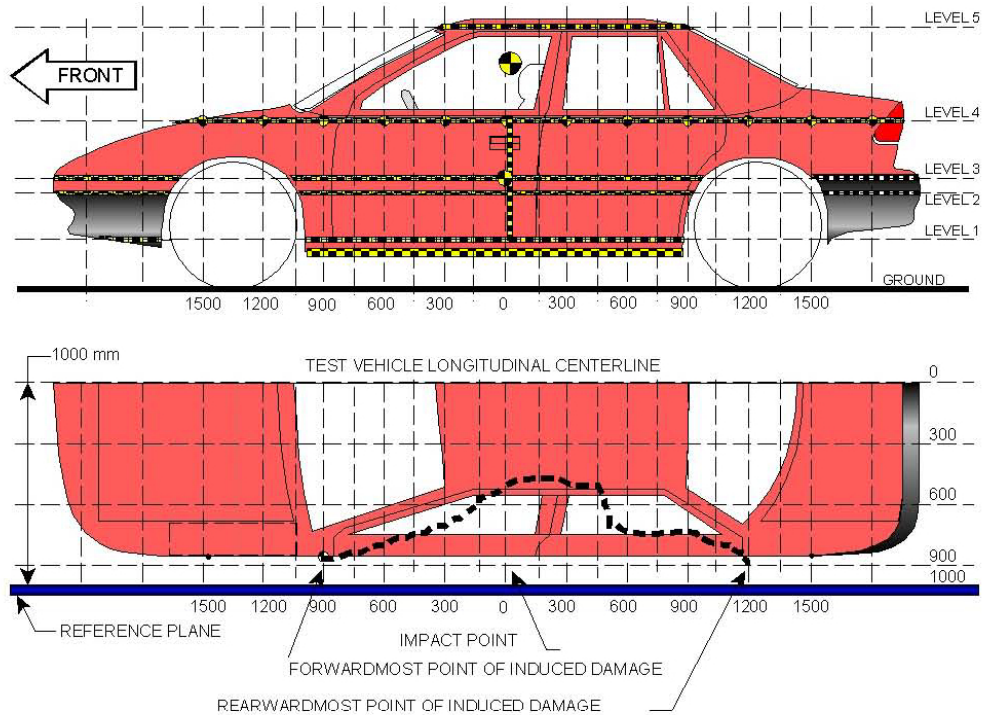
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3020	2945	75
B	Front Axle to FSOV	964	1028	-64
C	Rear Axle to RSOV	1106	1106	0
D	Total Vehicle Length at Centerline	5090	5079	11
E	Front Bumper Thickness	120	120	0
F	Front Bumper Bottom to Ground	228	277	-49
G	Sill Height at Front Wheel Well	218	223	-5
H	Sill Height at Front Door Leading Edge	219	221	-2
I	Sill Height at B-Pillar	230	244	-14
J1	Sill Height at Rear Wheel Well	226	223	3
J2	Pinch Weld Height at Rear Wheel Well	228	226	2
K	Sill Height Aft of Rear Wheel Well	247	247	0
L	Rear Bumper Thickness	140	140	0
M	Rear Bumper Bottom to Ground	342	333	9
N	Sill Height to Bottom of Front Window Sill	845	863	-18
O	Front Door Leading Edge to Impact CL	856	588	268
P	Rear Door Trailing Edge to Impact CL	1641	1762	-121
Q	Front Window Opening	492	457	35
R	Right Side Length	3895	3906	-11
S	Left Side Length	3895	3764	131
T	Vehicle Width at B-Pillars	1986	1957	29

DATA SHEET NO. 10 **VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
 Test Date: 10/22/2013



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

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	306	351	0
2	Mid Door	696	404	0
3	Occupant Hip Point	763	412	0
4	Window Sill	1049	375	0
5	Window Top	1640	198	0

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

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
 Test Date: 10/22/2013

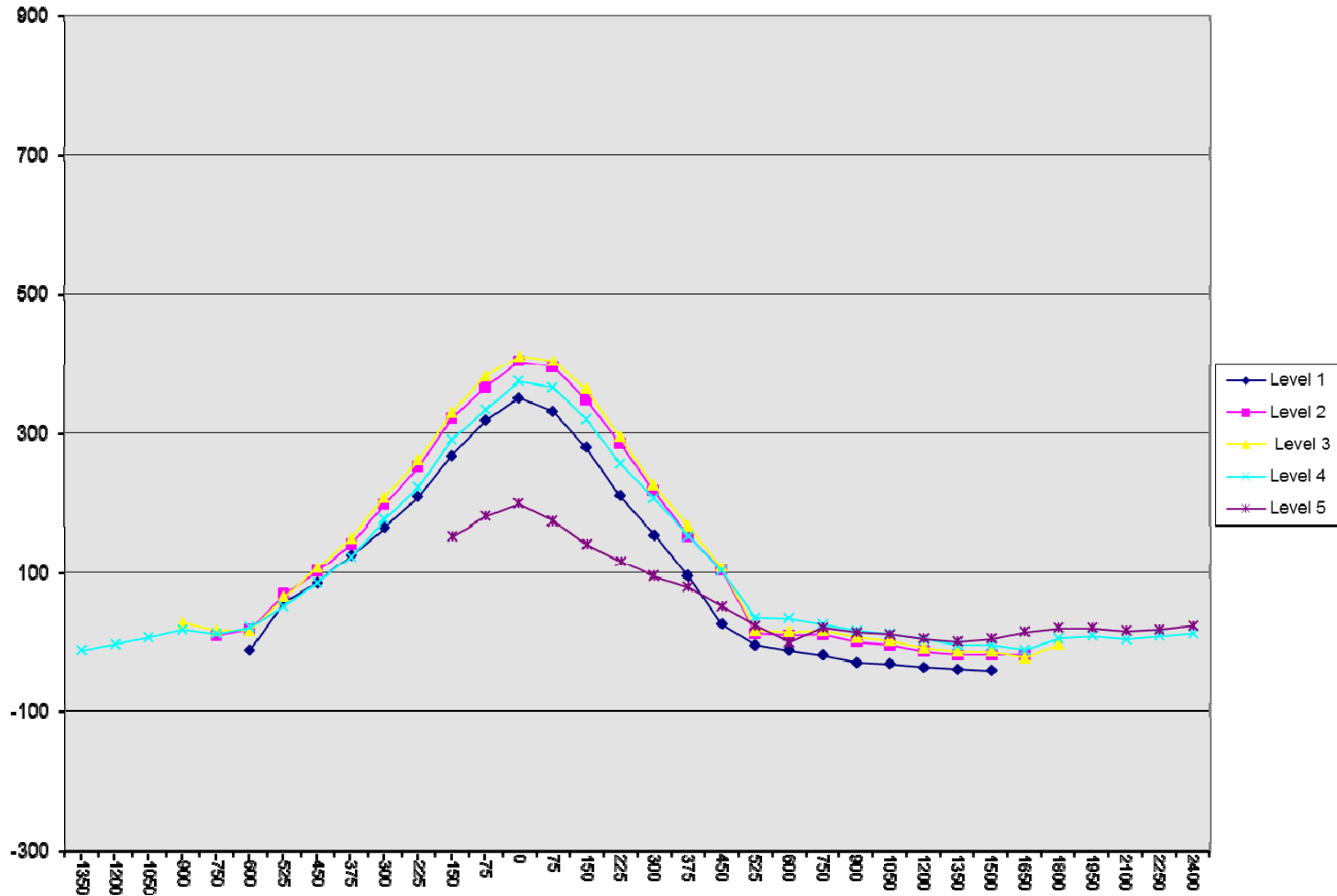
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1350				252					241					-11	
-1200				216					214					-2	
-1050				191					199					8	
-900			98	176				127	195				29	19	
-750		99	101	170			110	119	183			11	18	13	
-600	134	105	109	166		124	124	127	189		-10	19	18	23	
-525	132	110	109	164		190	180	175	217		58	70	66	53	
-450	139	110	108	162		225	212	215	248		86	102	107	86	
-375	144	108	107	162		270	250	257	286		126	142	150	124	
-300	146	108	106	159		311	305	313	335		165	197	207	176	
-225	147	108	106	156		355	359	367	378		208	251	261	222	
-150	148	107	104	154	393	415	428	433	444	545	267	321	329	290	152
-75	148	106	103	156	384	466	472	476	489	564	318	366	383	333	180
0	148	105	103	148	374	499	509	515	523	572	351	404	412	375	198
75	146	105	102	146	373	477	502	507	512	547	331	397	405	366	174
150	146	104	101	144	370	425	452	465	464	511	279	348	364	320	141
225	146	104	101	139	368	355	389	395	395	485	209	285	294	256	117
300	146	104	101	135	366	300	320	326	341	461	154	216	225	206	95
375	146	104	101	135	364	241	257	268	288	444	95	153	167	153	80
450	146	103	101	131	364	173	207	209	234	417	27	104	108	103	53
525	146	103	100	128	362	143	117	118	164	387	-3	14	18	36	25
600	148	103	100	125	363	137	114	116	160	364	-11	11	16	35	1
750	149	104	101	127	361	131	116	119	154	383	-18	12	18	27	22
900	149	105	101	119	361	121	107	109	137	376	-28	2	8	18	15
1050	151	106	101	118	364	121	103	104	131	376	-30	-3	3	13	12
1200	151	108	104	118	368	116	96	97	123	374	-35	-12	-7	5	6
1350	145	109	105	120	371	107	92	93	117	373	-38	-17	-12	-3	2
1500	130	111	107	120	373	90	94	95	117	379	-40	-17	-12	-3	6
1650		112	105	122	378		95	84	112	394		-17	-21	-10	16
1800			99	125	381			97	132	402			-2	7	21
1950				129	388				139	409				10	21
2100				132	395				137	412				5	17
2250				136	404				146	423				10	19
2400				143	412				157	437				14	25

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 pile 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 Sienna LE Minivan
Test Program: NCAP Side Pole Impact Test

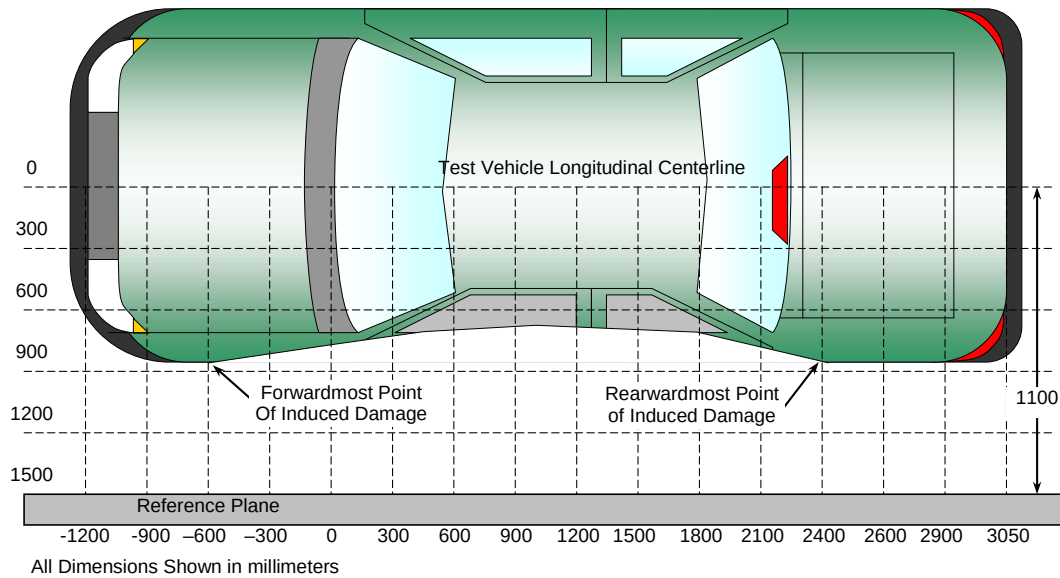
NHTSA No. O20145103
Test Date: 10/22/2013



DATA SHEET NO. 11 **VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
 Test Date: 10/22/2013



TOP VIEW

DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	600	3	100	188	88
2	330	3	101	378	277
3	60	3	102	602	500
4	-210	3	105	480	375
5	-480	3	108	294	186
6	-750	3	101	199	98

DATA SHEET NO. 12
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

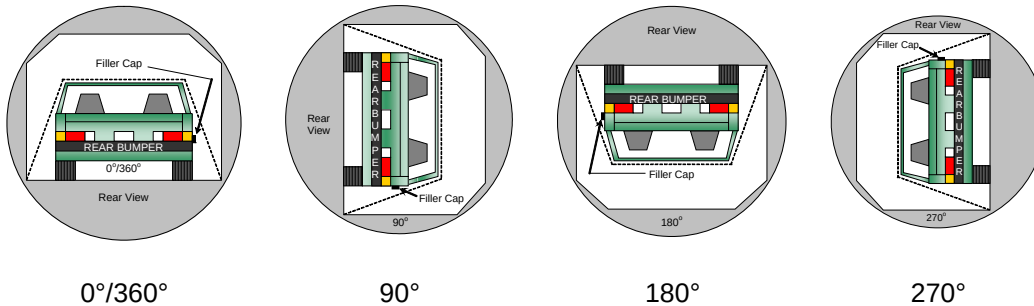
NHTSA No. O20145103
 Test Date: 10/22/2013

Test Time: 10:35 am

Temperature: 20.9°C

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

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	109	300	409
90° to 180°	111	300	411
180° to 270°	111	300	411
270° to 360°	109	300	409

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

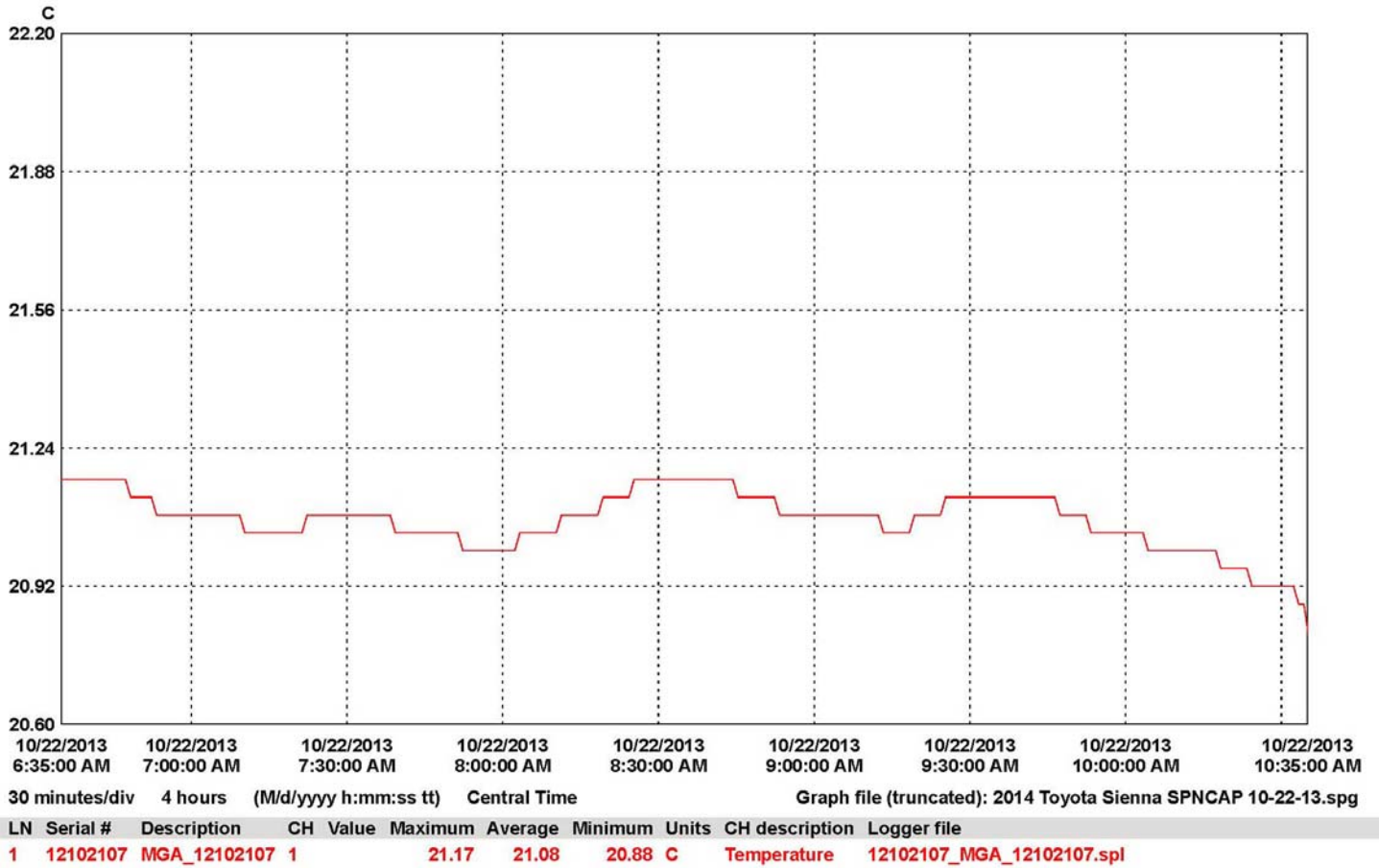
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

DATA SHEET NO. 13
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2014 Toyota Sienna LE Minivan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. O20145103
 Test Date: 10/22/2013



APPENDIX A
PHOTOGRAPHS

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As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



Pre-Test Frontal View of Test Vehicle



Post-Test Frontal View of Test Vehicle



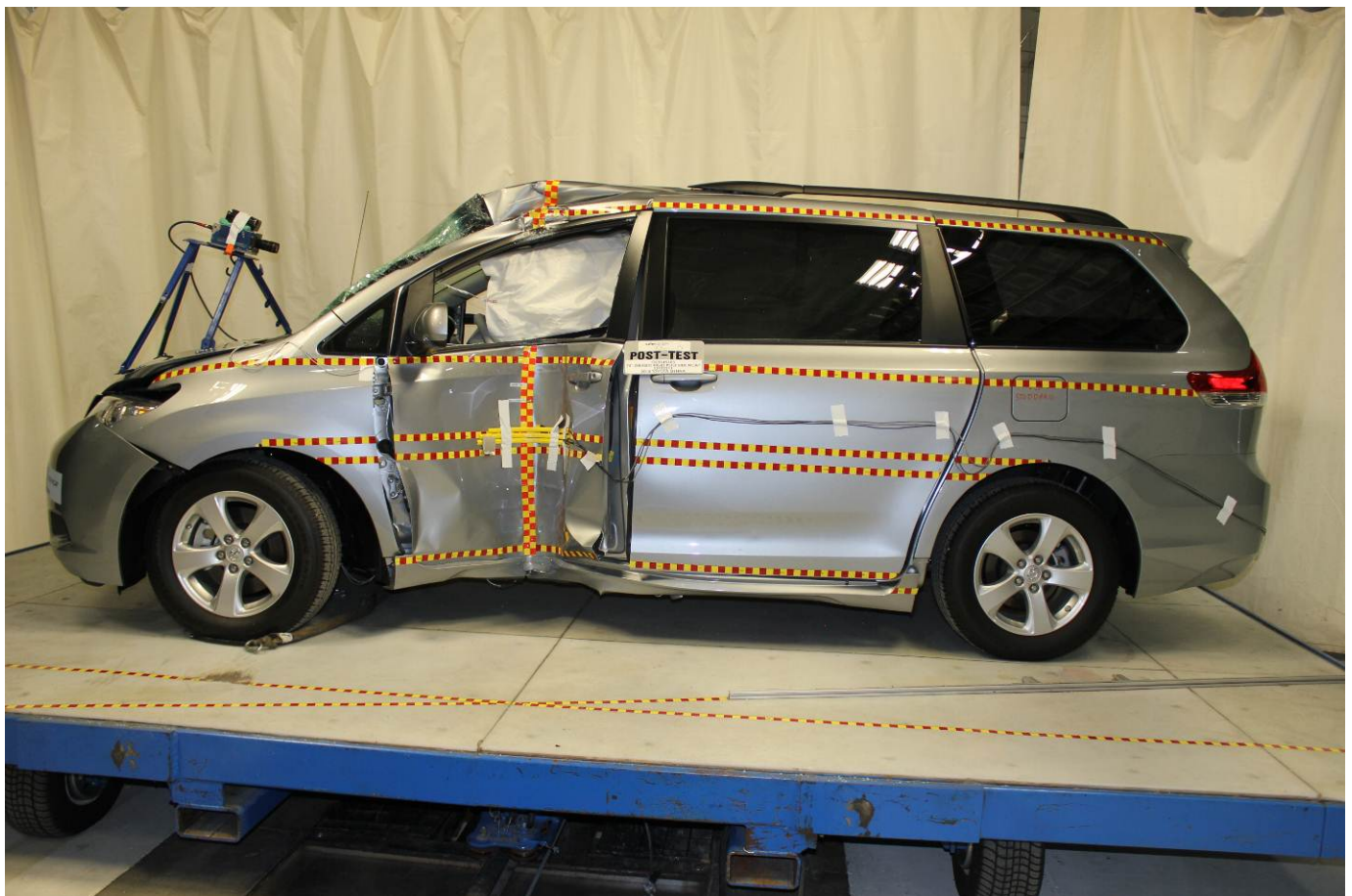
Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle



Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle



Pre-Test Overhead View of Test Area



Post-Test Overhead View of Test Area



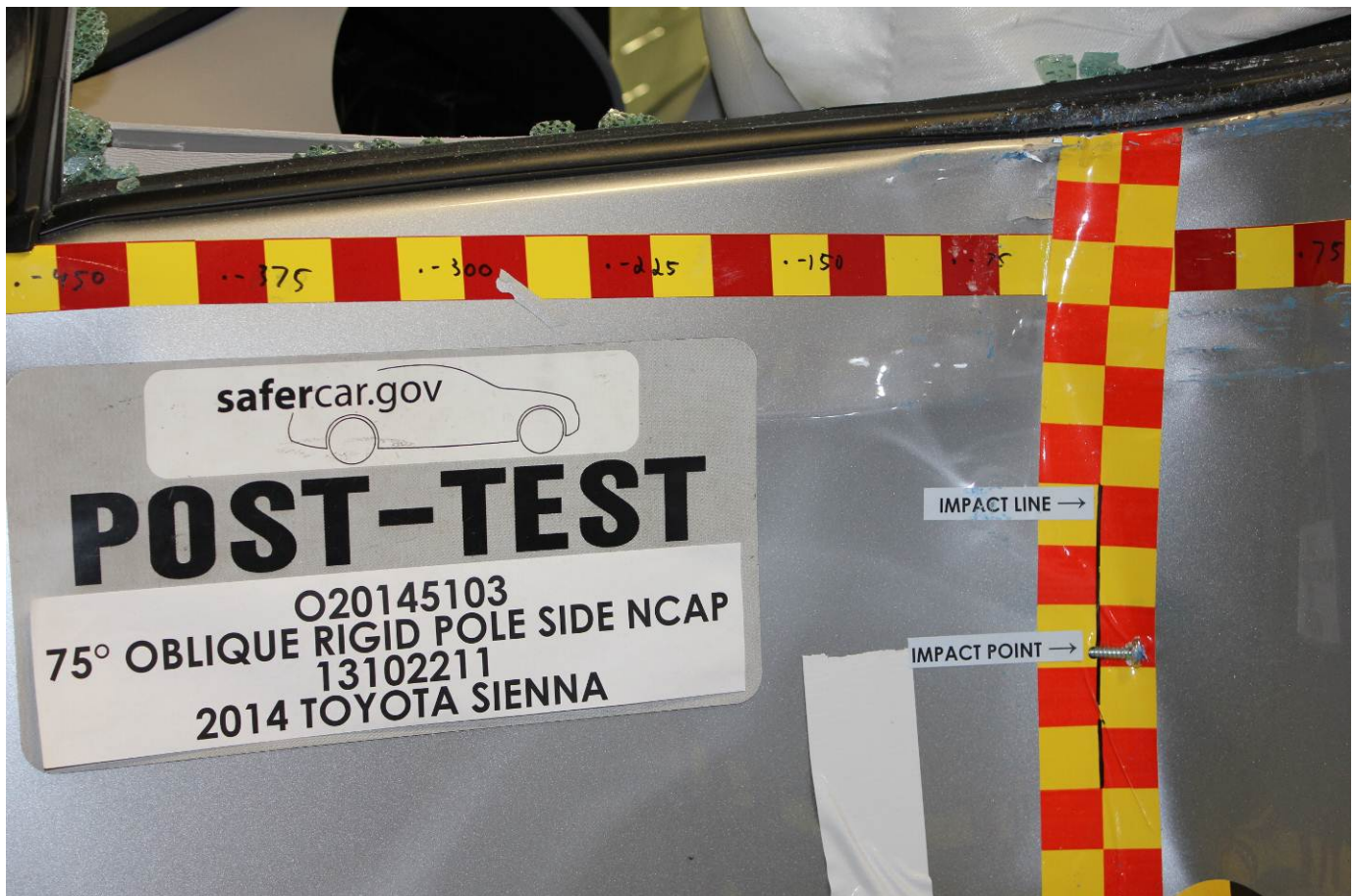
Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



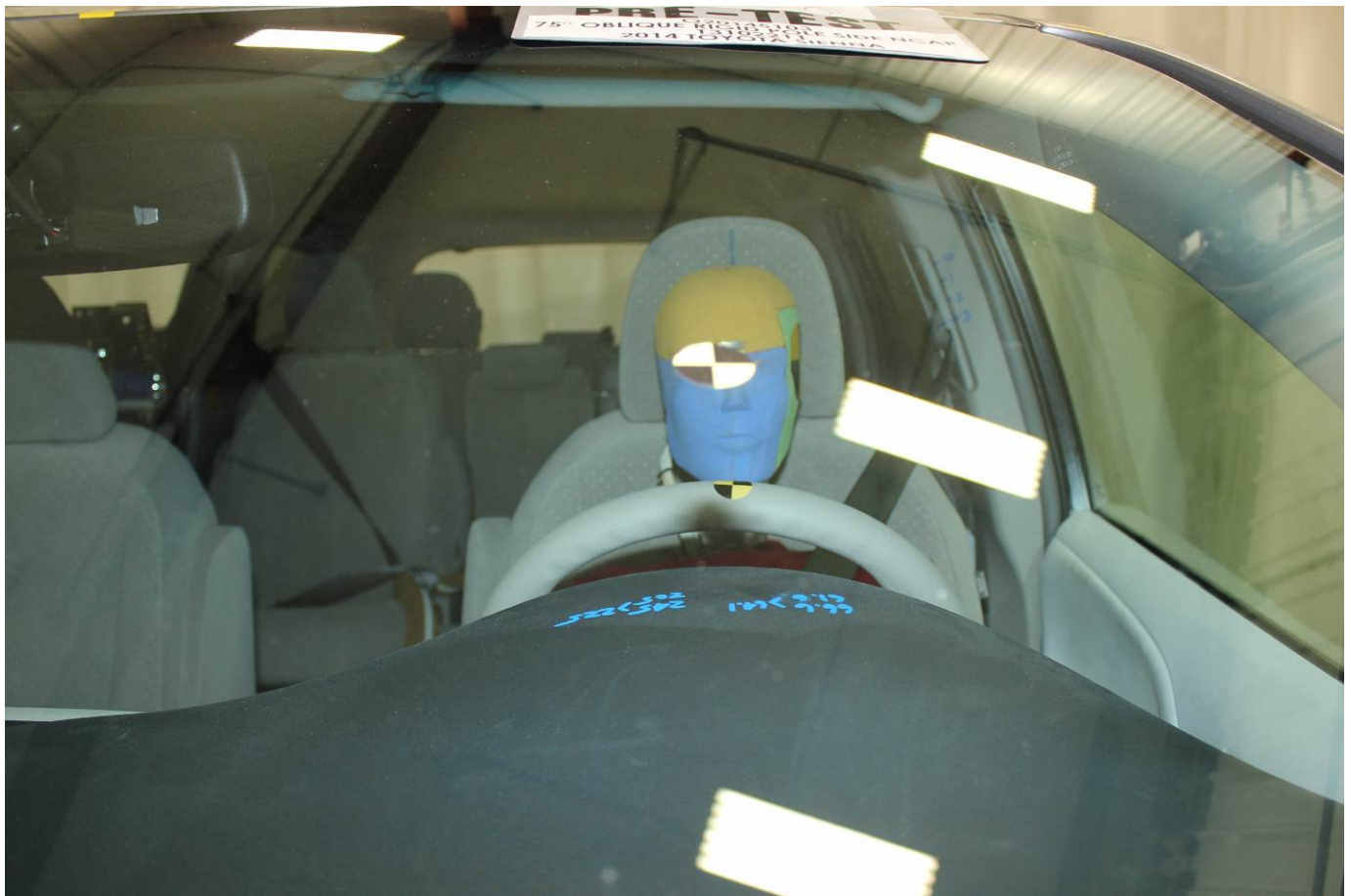
Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



Pre-Test Close-Up View of Impact Point Target



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



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



Post-Test Front Close-Up View of Dummy



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



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



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



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



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



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



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



Pre-Test Overhead View of Dummy Thighs on Seat Pan



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



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



Pre-Test Placement of Dummy's Feet



Pre-Test View of Belt Anchorage for Dummy



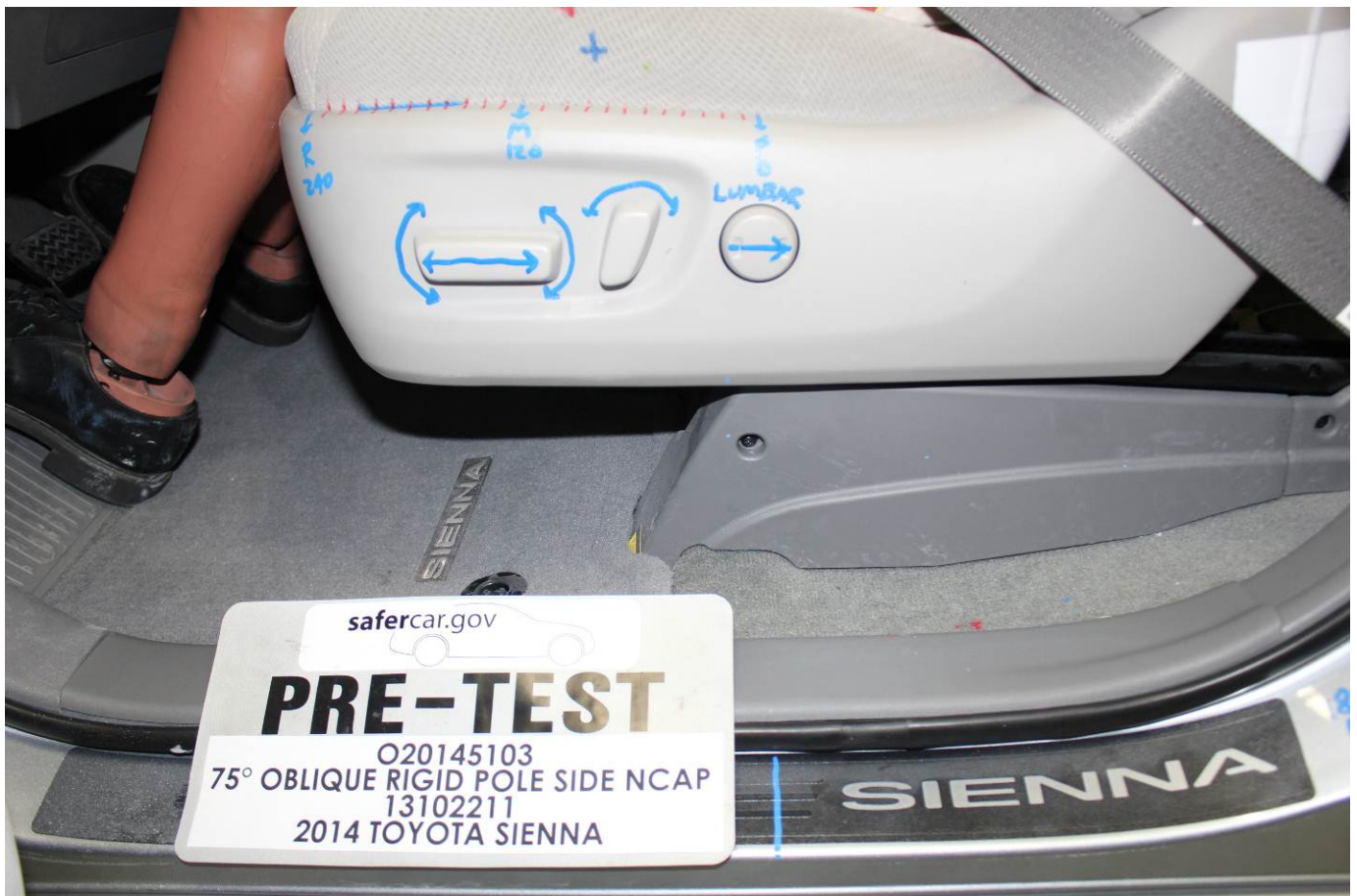
Pre-Test Left Side View of Steering Wheel



Pre-Test View of Disengaged Parking Brake



Pre-Test View of Parking Brake



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



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



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



Pre-Test Dummy and Door Clearance View



Post-Test Dummy and Door Clearance View



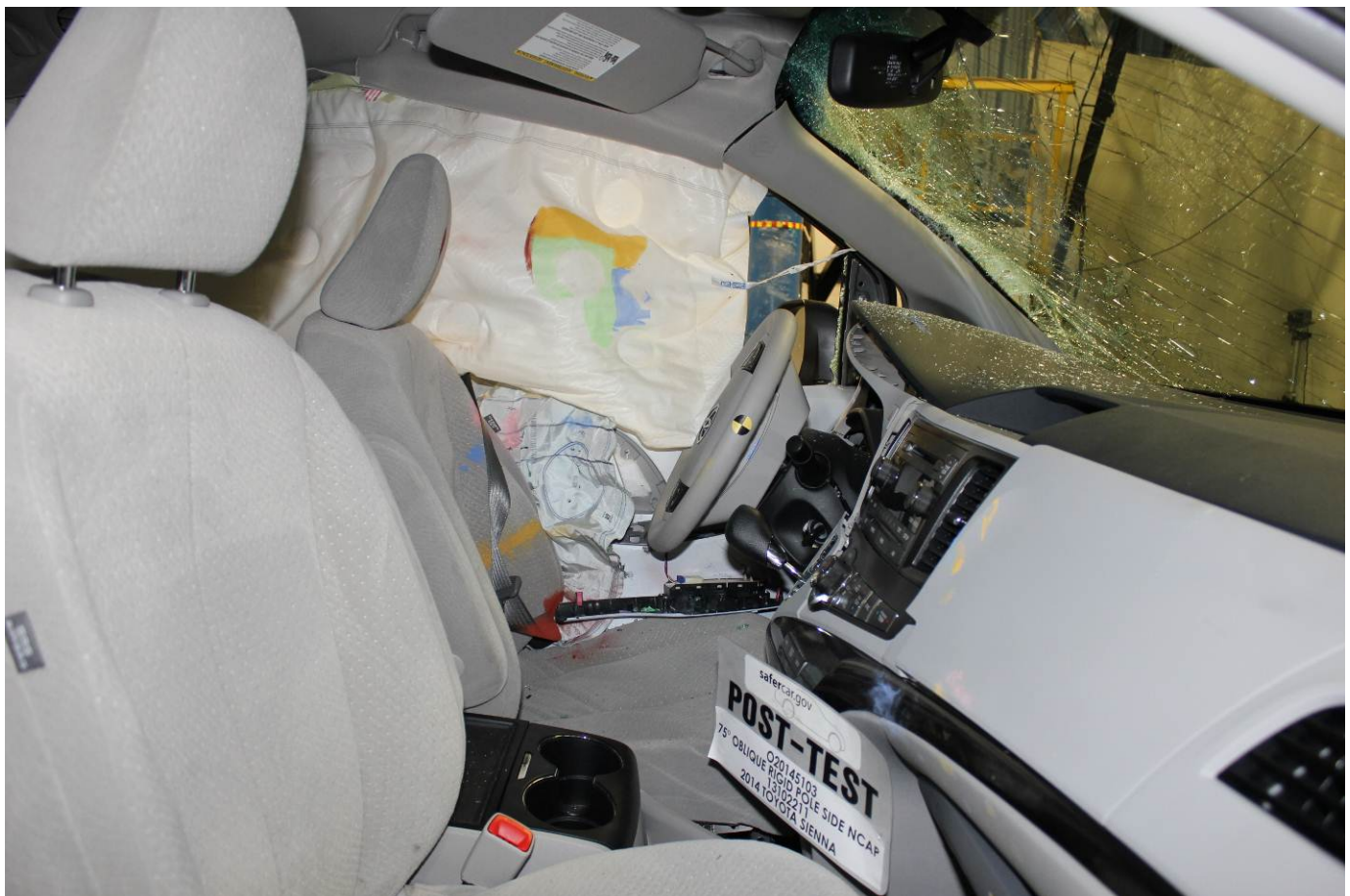
Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



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



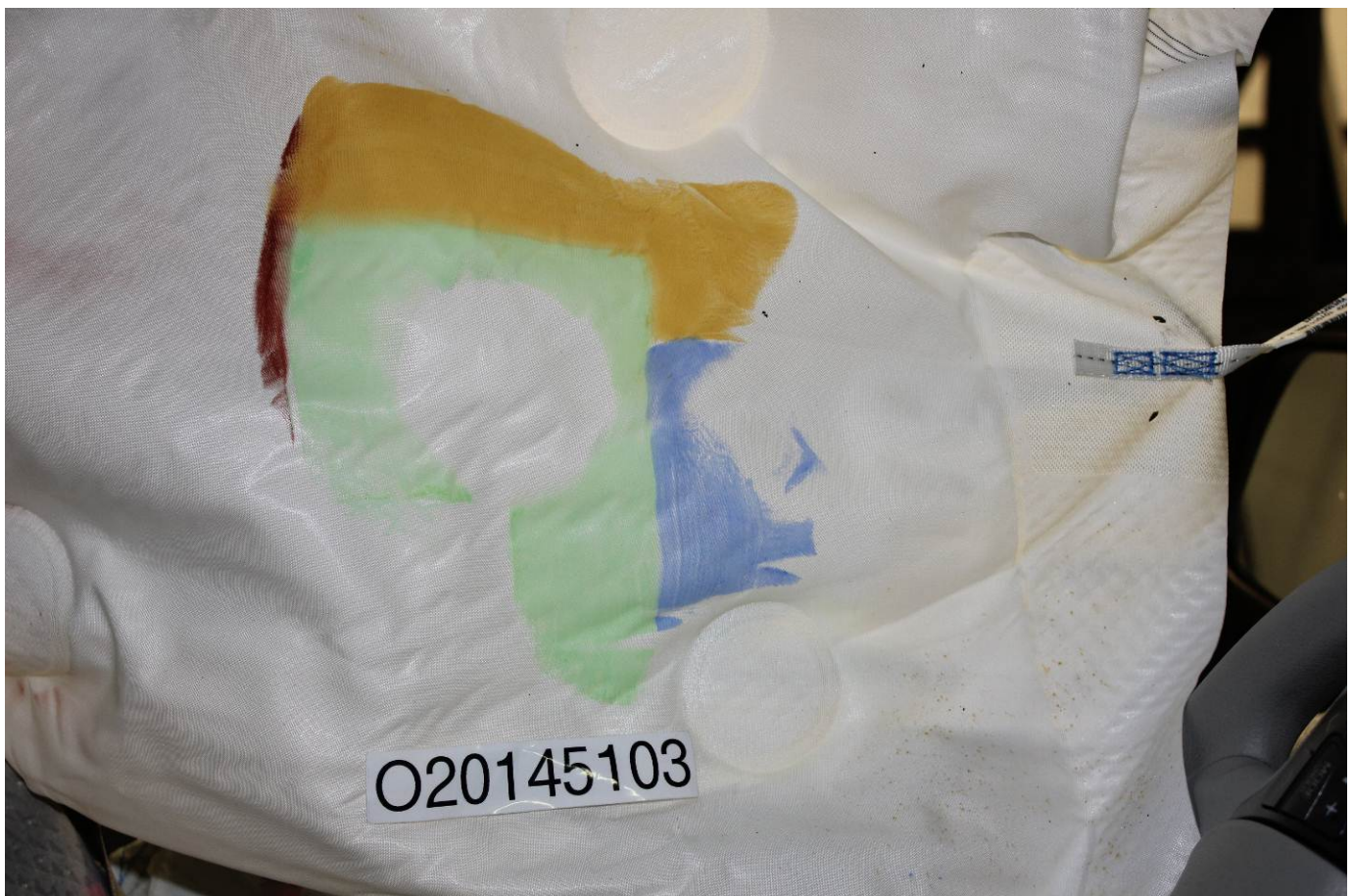
Pre-Test Inner Door Panel View



Post-Test Inner Door Panel View Showing Dummy Contact Location



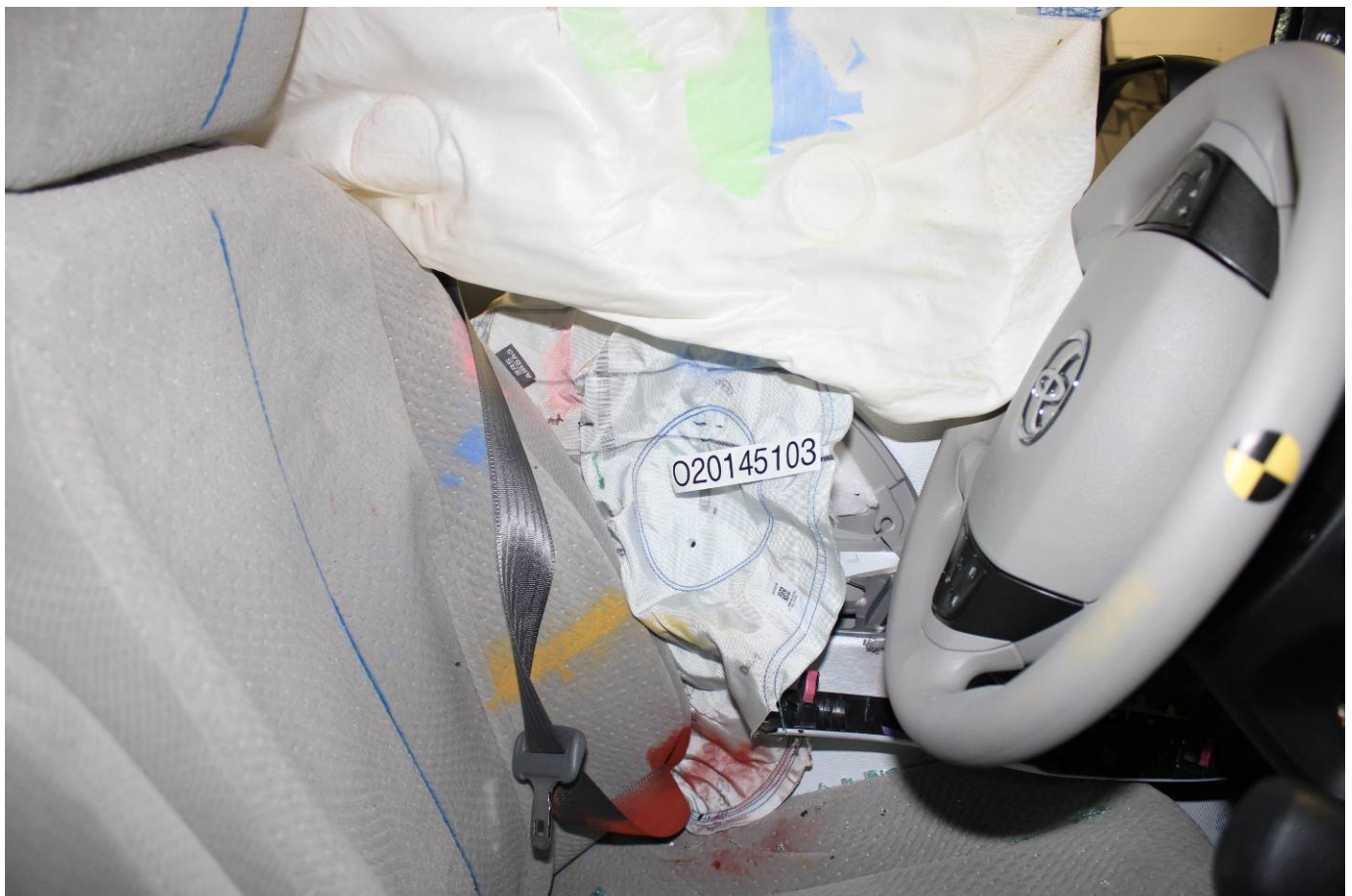
Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



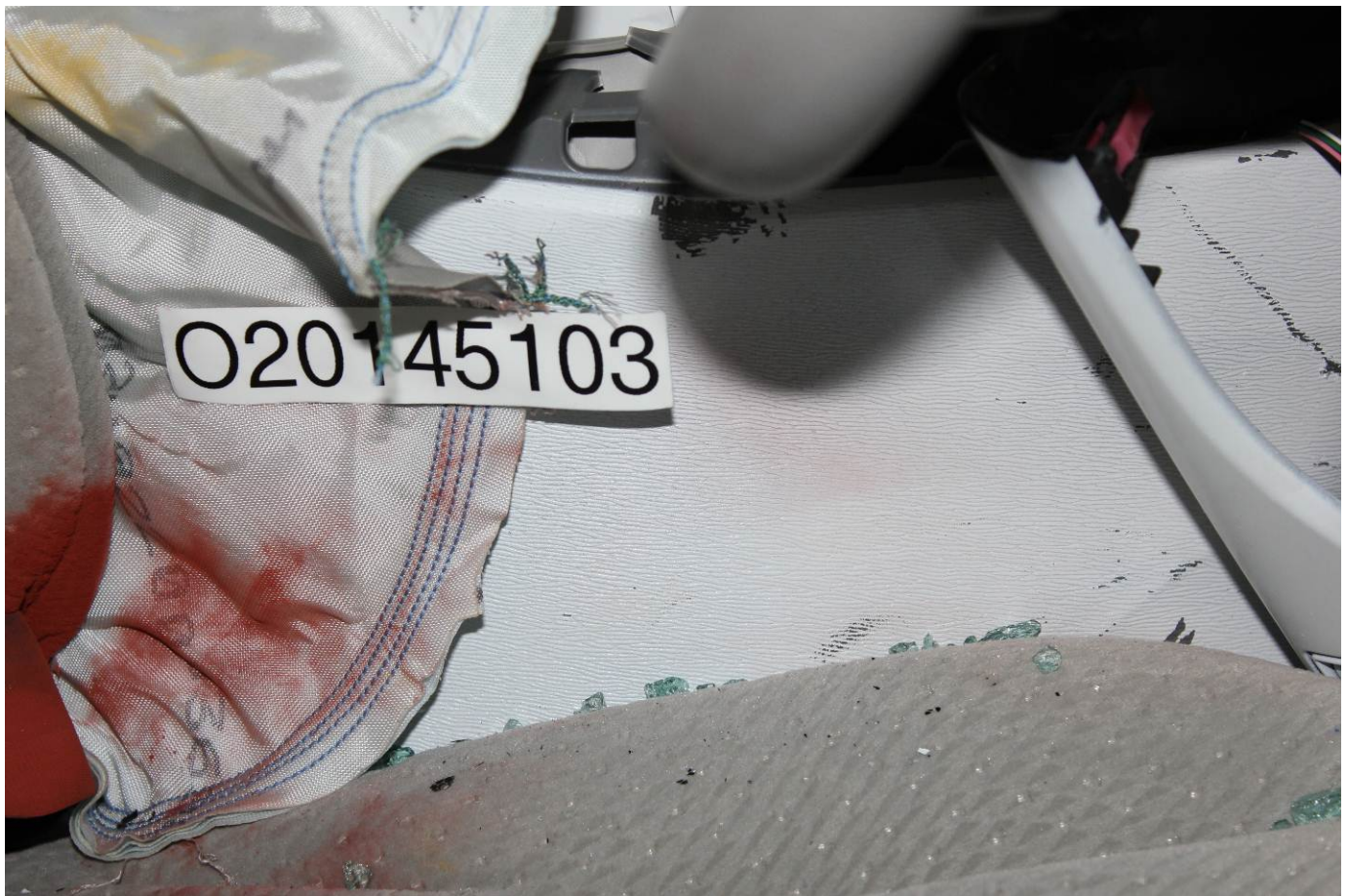
Post-Test Dummy Close-Up Head Contact with Side Air Bag View



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



Post-Test Dummy Close-Up Torso Contact with Side Air Bag View



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



Post-Test Dummy Close-Up Pelvis Contact with Side Air Bag View

PHOTOGRAPH NOT APPLICABLE

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



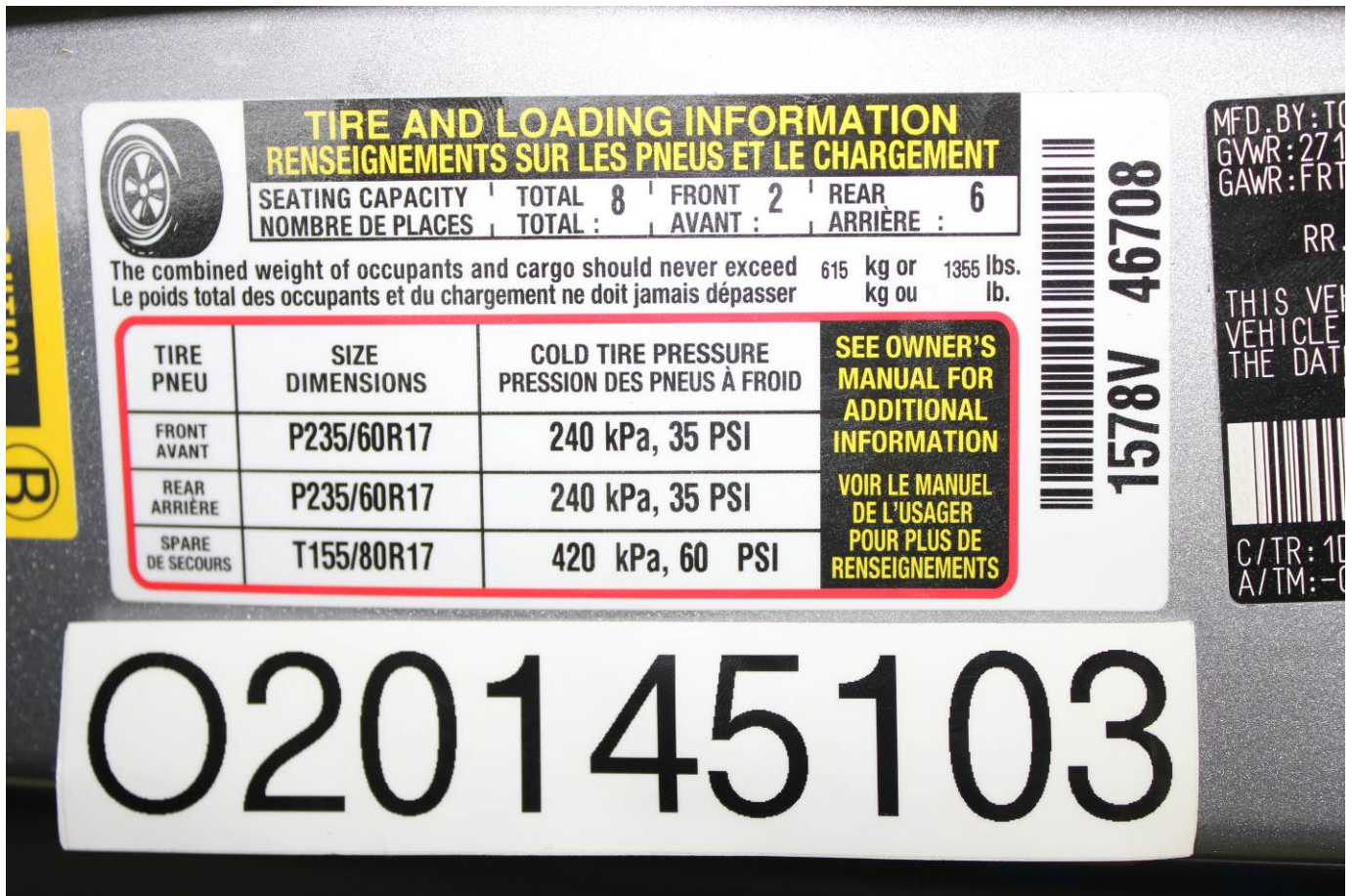
Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



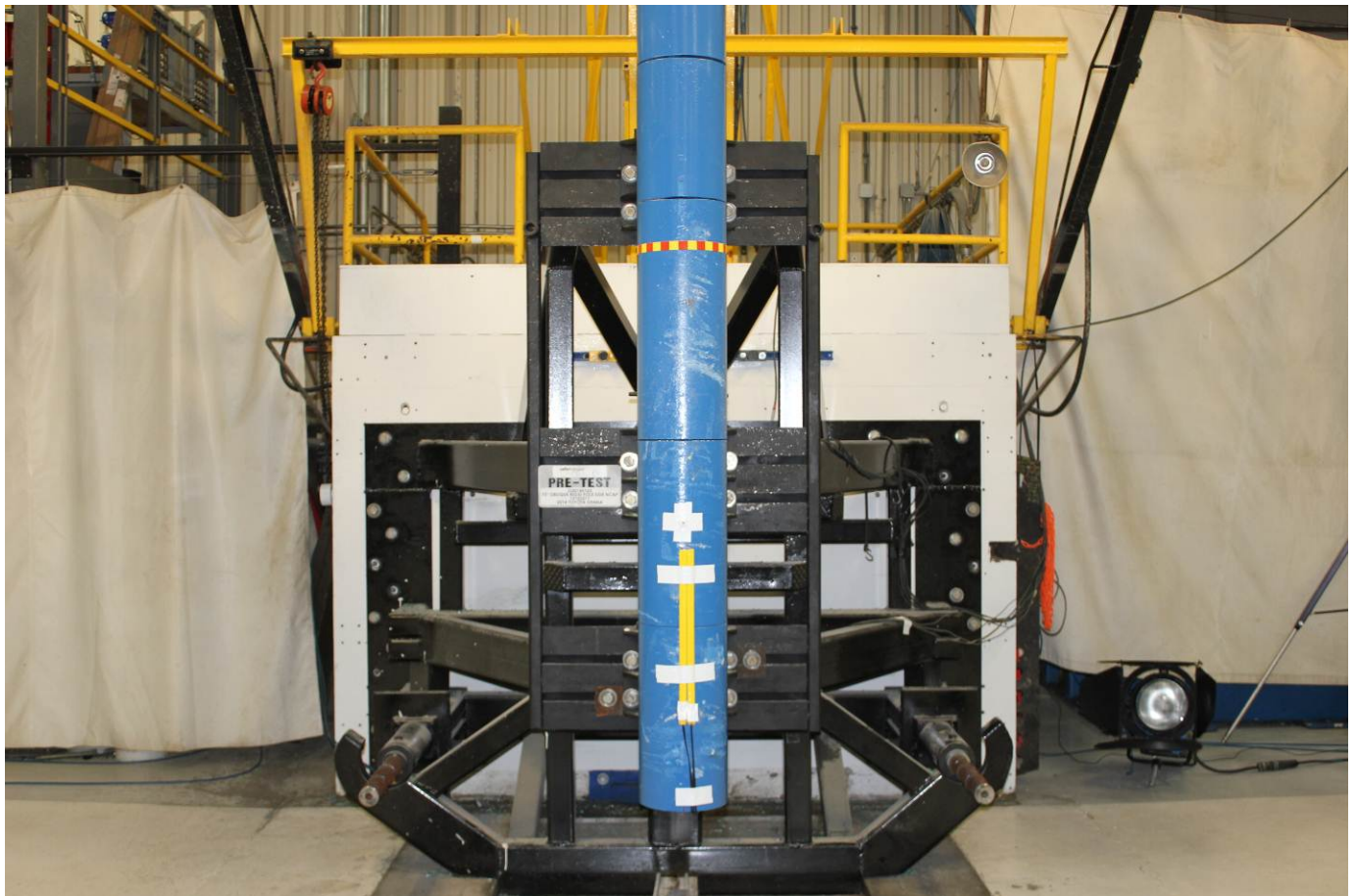
Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Close-Up View of Vehicle's Certification Label



Close-Up View of Vehicle's Tire Information Placard or Label



Pre-Test Pole Barrier Front View



Post-Test Pole Barrier Front View



Pre-Test Pole Barrier Side View



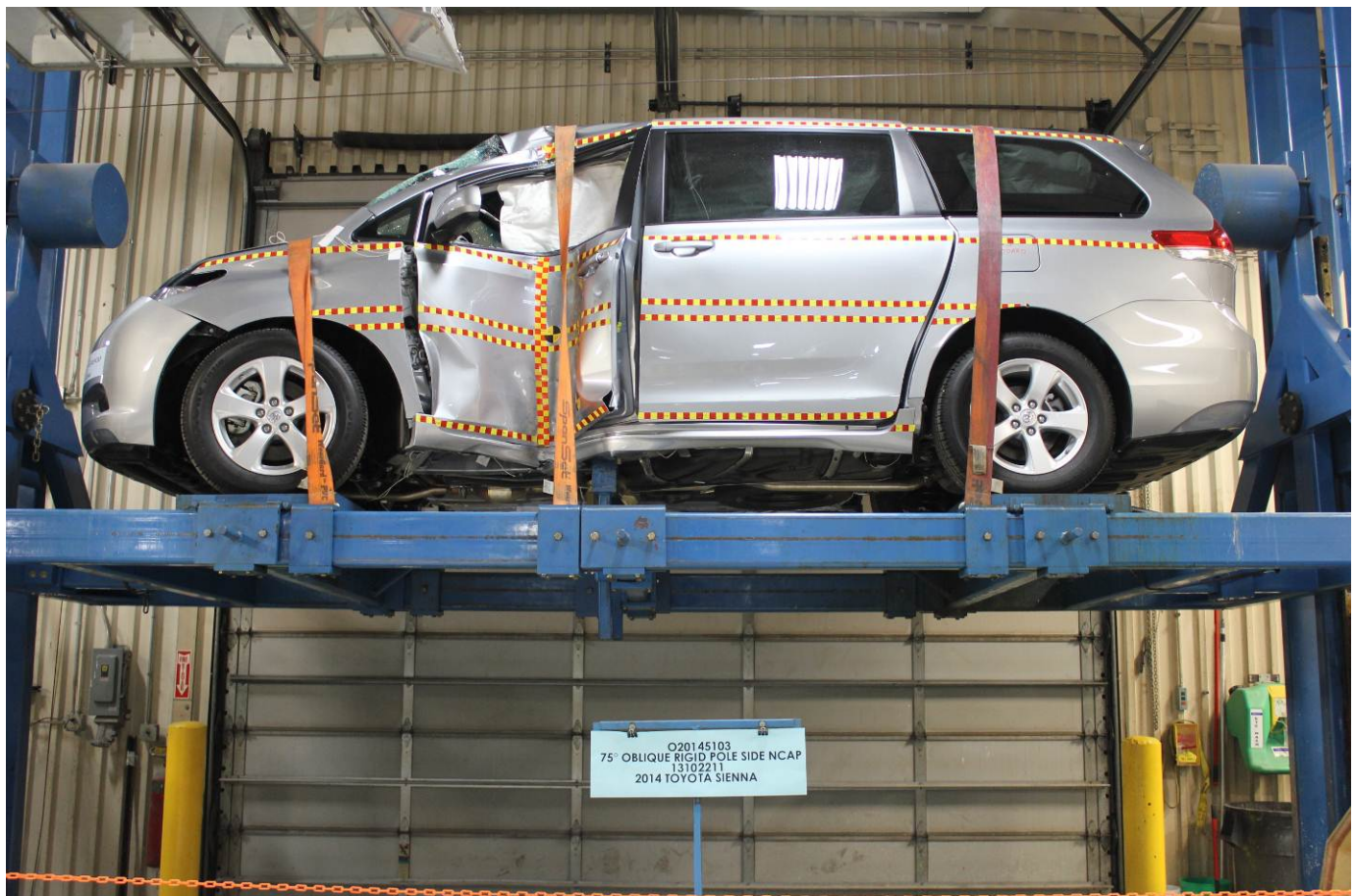
Post-Test Pole Barrier Side View

PHOTOGRAPH NOT APPLICABLE

Pre-Test Ballast View



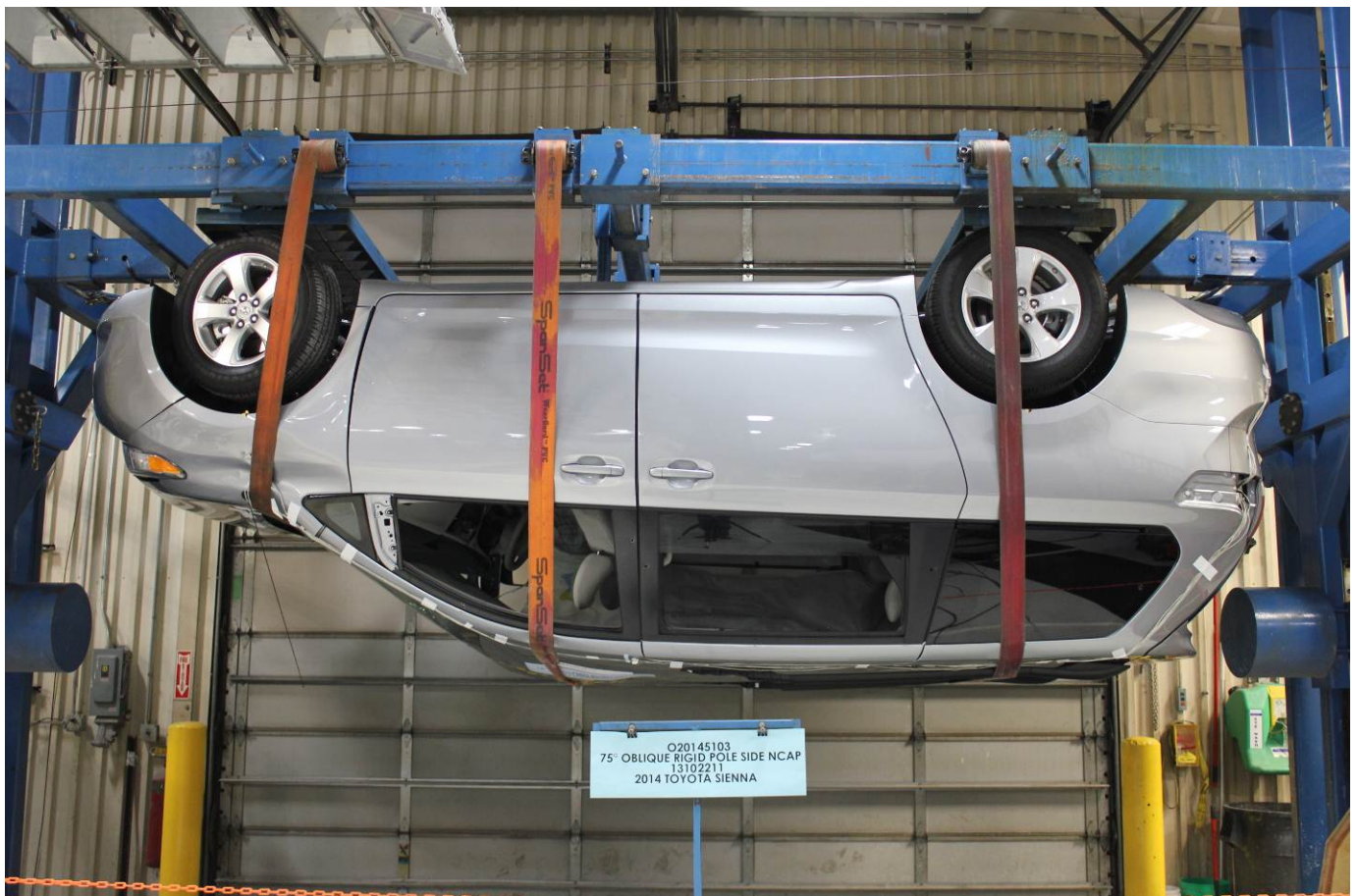
Post-Test Primary and Redundant Speed Trap Read-Out



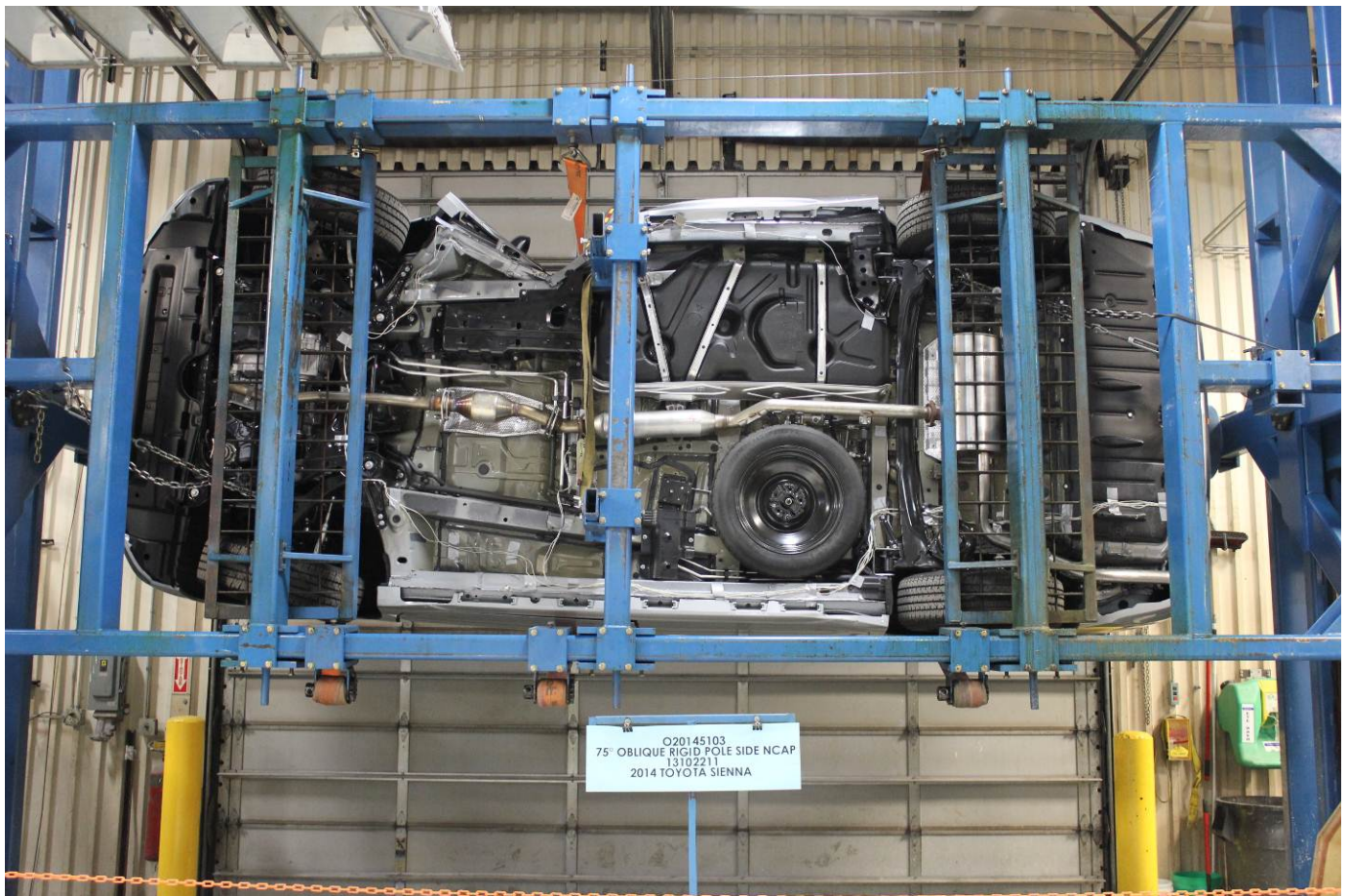
FMVSS No. 301 Static Rollover 0 Degrees



FMVSS No. 301 Static Rollover 90 Degrees



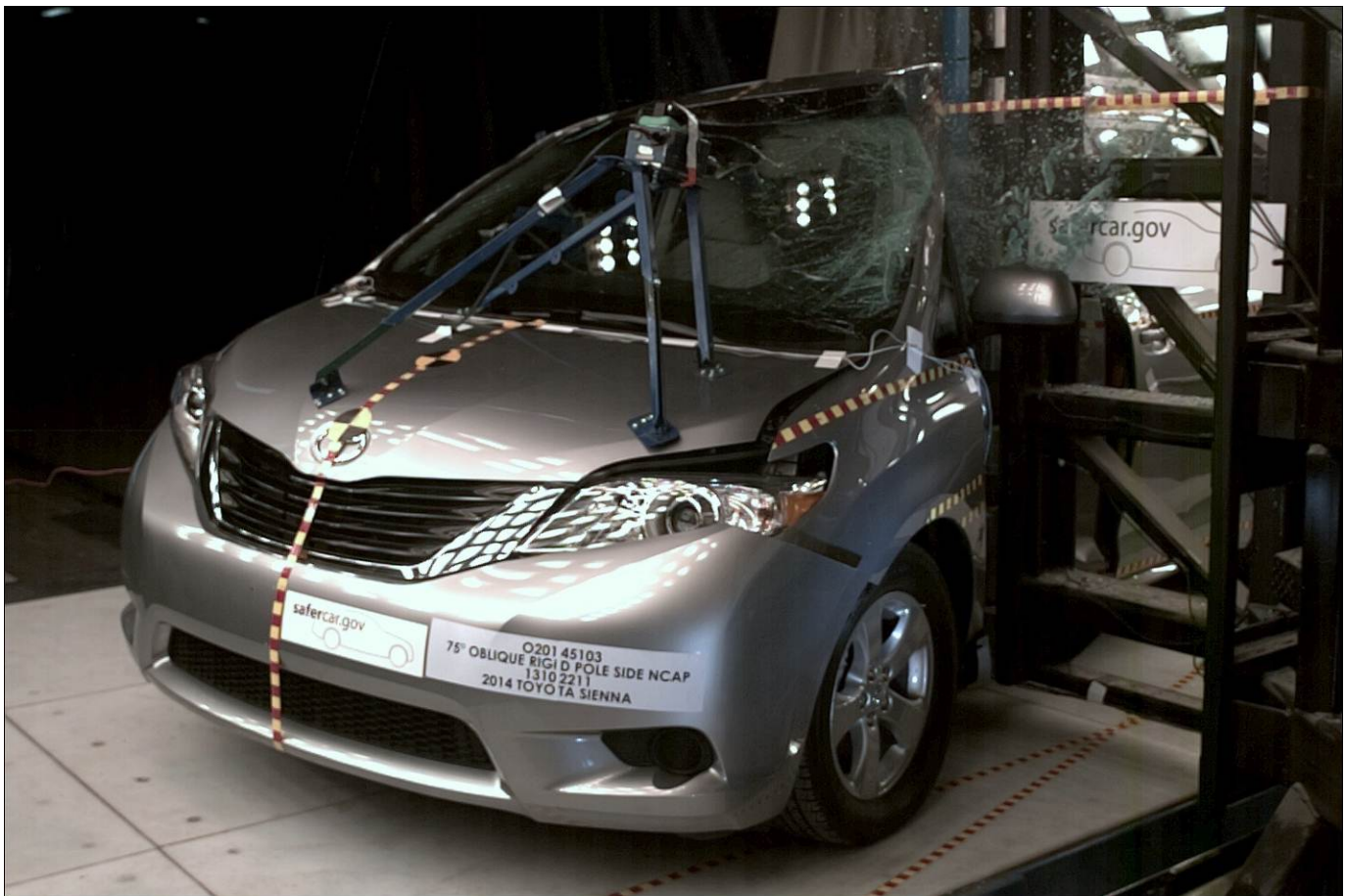
FMVSS No. 301 Static Rollover 180 Degrees



FMVSS No. 301 Static Rollover 270 Degrees



FMVSS No. 301 Static Rollover 360 Degrees



Impact Event

TOYOTA
Let's Go Places

DESC: **SIENNA LE 3.5L** FWD 8 PSGR
VIN: **5TDKK3DC8ES410624**
YR/MDL: 2014/5338A
CLR: SILVER SKY METALLIC/FC14 (01D8/14)
PORT/PLANT: Princeton, IN/TMMI RAILHEAD:

STANDARD EQUIPMENT

MECHANICAL & PERFORMANCE

- 3.5L D4HC 24-valve Dual VVT-i V6
- 5-Speed Electronically Controlled Auto Overdrive Trans. w/ Intelligence (ECT-i)
- Electric Power Steering
- Power-assisted Ventilated Front and Rear Disc Brakes w/ Star Safety System
- 17" 5-spoke Alloy W/PS3/60R17 Tires

SAFETY & CONVENIENCE

- Star Safety System: Enhanced Vehicle Stability Control, Traction Control, Anti-lock Brake System, Electronic Brake-force Distribution, Brake Assist & Smart Stop Technology
- 8-point Seatbelts w/ALR & ELR Pass Belts
- Fr Seatbelt Pretensioners/Force Limiters
- Dr & Fr Pass: Active Headrests, Advanced Airbag System, Seat-mounted Side Airbags and 3-row Side Curtain Airbags
- Driver's Knee Airbag
- Energy Absorbing Collapsible Str Column
- Reinforced Steel Unitized Body
- LATCH/Low Anchor & Tethers for Children for Outboard 2nd Row & 3rd Row Ctr Seats
- Child-protector Sliding Door Locks

EXTERIOR

- Dual Power Sliding Side Doors
- Privacy Glass on Rear Side Windows

INTERIOR

- Cruise Control and Eco Driving Indicator
- 3.5-inch Multi-Info Disp w/Backup Camera
- Easy Clean Fabric 8-way Pwr Dr Captain's Chair w/ Pwr Lumbar, 4-way Front Pass Captain's Chair
- Removable Easy Clean 2nd-Row Captain's Chairs w/Reclining Ctr Seat, Tie Up and Long Slide
- 60/40 Split 3-Row 3rd RowTM w/One-Action
- Tri Zone Cl Cntrl w/Ind Temp Settings
- AM/FM/MP3 CD Player, 6 Spkrs, SKM w/90-day Trial, Aux Audio Jack, USB Port, Auto Sound Leveling, Bluetooth Wireless
- Power Windows w/Auto Up/Down
- **Full Tank of Gas**

MANUFACTURER'S SUGGESTED RETAIL PRICE \$30,490.00

OPTIONAL EQUIPMENT

FE	80 State Emissions	
CF	Carpet Floor Mats/Door Sill Protector	330.00

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.	Driver Passenger	★★★★★
Side Crash Based on the risk of injury in a side impact.	Front seat Rear seat	Not Rated Not Rated
Rollover Based on the risk of rollover in a single-vehicle crash.		★★★★★

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

EPA DOT Fuel Economy and Environment

Fuel Economy

21 MPG
combined city/hwy
4.8 gallons per 100 miles

Measures range from 10 to 24 MPG.
The best vehicle rates 121 MPG.

You spend \$1,000 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$2,500

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

Smog Rating (tailpipe only)

1 5 10 Best

The vehicle emits 429 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions, both more at higher engine speeds.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 23 MPG and costs \$11,660 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.50 per gallon. 15,000 miles per year is the gallon equivalent vehicle emissions is a significant cause of climate change and smog.

fuel economy.gov
Calculate personalized estimates and compare vehicles

Gasoline Vehicle

Search by VIN

QR Code

DELIVERY PROCESSING AND HANDLING FEE 860.00

TOTAL \$31,680.00

The New Vehicle Limited Warranty provides 3-year/50,000 mile basic coverage. See dealer for more information. Coverage, plus 5-year/unlimited mile corrosion perforation coverage. See Warranty and Maintenance Guide for details. An extended service contract may be available for the vehicle.

Ask dealer for details.
Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service. Gasoline, license and title fees, applicable federal, state and local taxes and dealer and distributor installed options and accessories are not included in the manufacturer's suggested retail price.

Toyota Care, which covers normal factory scheduled maintenance for two years or 25,000 miles, whichever occurs first, is included as part of the sales price of the vehicle for qualifying buyers. See dealer for details on availability and insurance details.

Dealer Name / Address: 12137
CLASSIC TOYOTA
515 N. GREEN BAY ROAD
WAUKESHA IL 60085

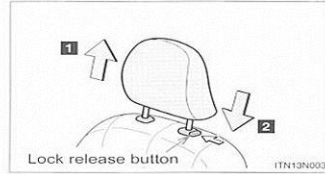
Ship to:

Monroney Label

1-3. Adjustable components (seats, mirrors, steering wheel) Head restraints

Head restraints are provided for all seats.

Front and second outside seats



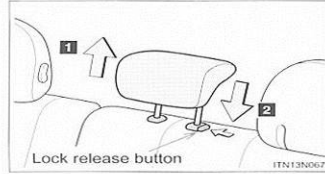
1 Up

Pull the head restraints up.

2 Down

Push the head restraint down while pressing the lock release button.

Second center* and third center seats



1 Up

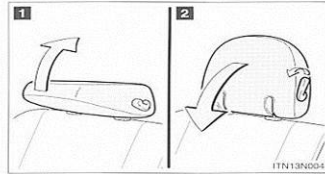
Pull the head restraints up.

2 Down

Push the head restraint down while pressing the lock release button.

*: 8-passenger models only

Third outside seats



1 To use

Pull the head restraints up.

2 To fold

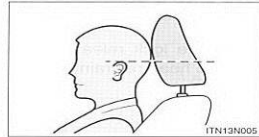
Push the head restraint down while pressing the lever downward.

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Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

1-3. Adjustable components (seats, mirrors, steering wheel)

■ Adjusting the height of the head restraints



Make sure that the head restraints are adjusted so that the center of the head restraint is closest to the top of your ears.

■ Adjusting the center seat head restraints

Always raise the head restraint one level from the stowed position when using.

■ Removing the head restraints



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

The head restraint of third outside seat can not be removed.

1
Before driving

127

Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

■ Installing the head restraints (front, second and third center seats)



Align the head restraint with the installation holes and push it down to the lock position.

Press and hold the lock release button when lowering the head restraint.

⚠ CAUTION

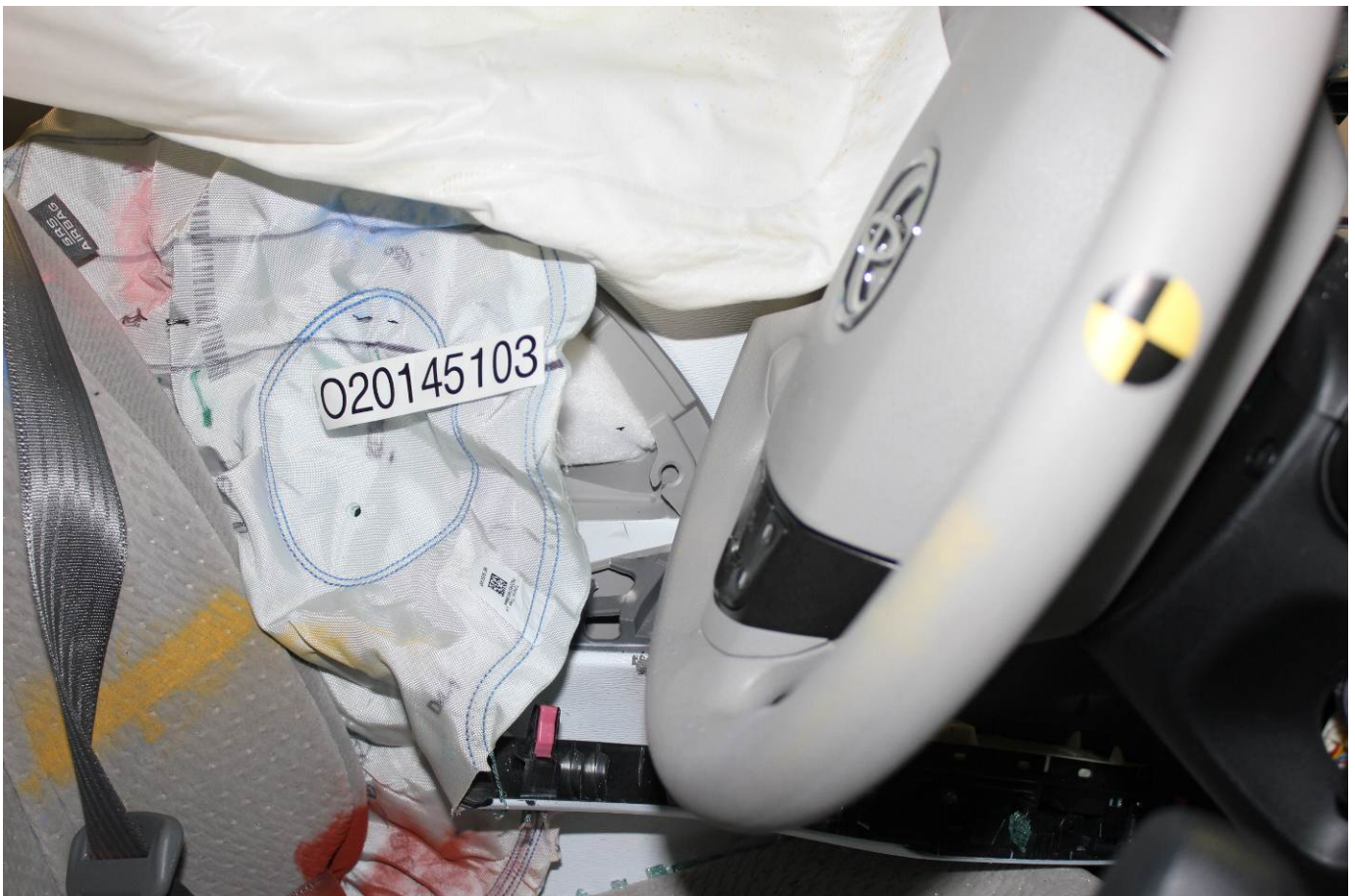
■ Head restraint precautions

Observe the following precautions regarding the head restraints. Failure to do so may result in death or serious injury.

- Use the head restraints designed for each respective seat.
- Adjust the head restraints to the correct position at all times.
- After adjusting the head restraints, push down on them and make sure they are locked in position.
- Do not drive with the head restraints removed.

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Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



Post-Test View of Shattered Vehicle Inner Door Panel

APPENDIX B
DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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

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 CG Redundant Acceleration (X) vs. Time

Driver Head CG Redundant Acceleration (Y) vs. Time

Driver Head CG Redundant Acceleration (Z) vs. Time

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)

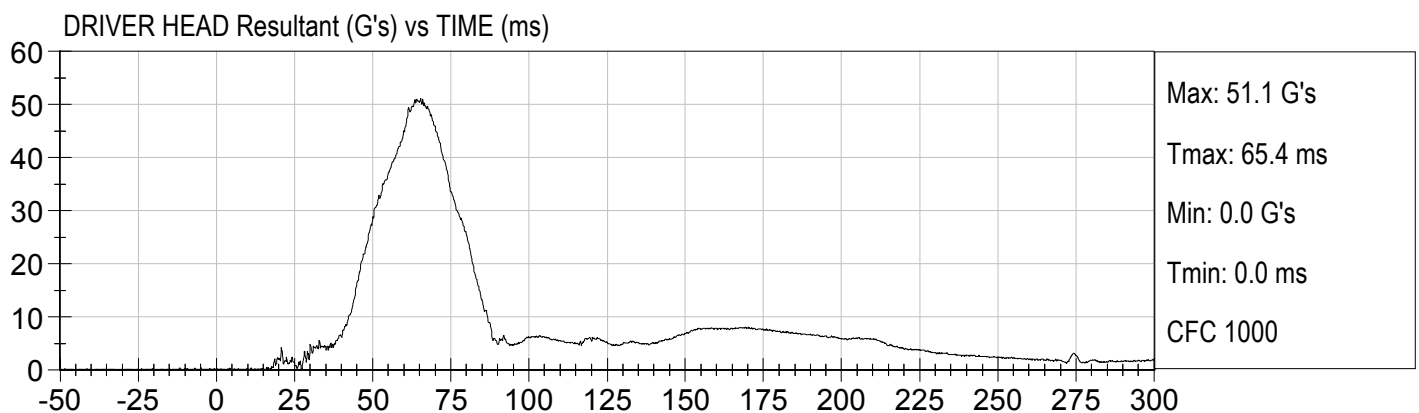
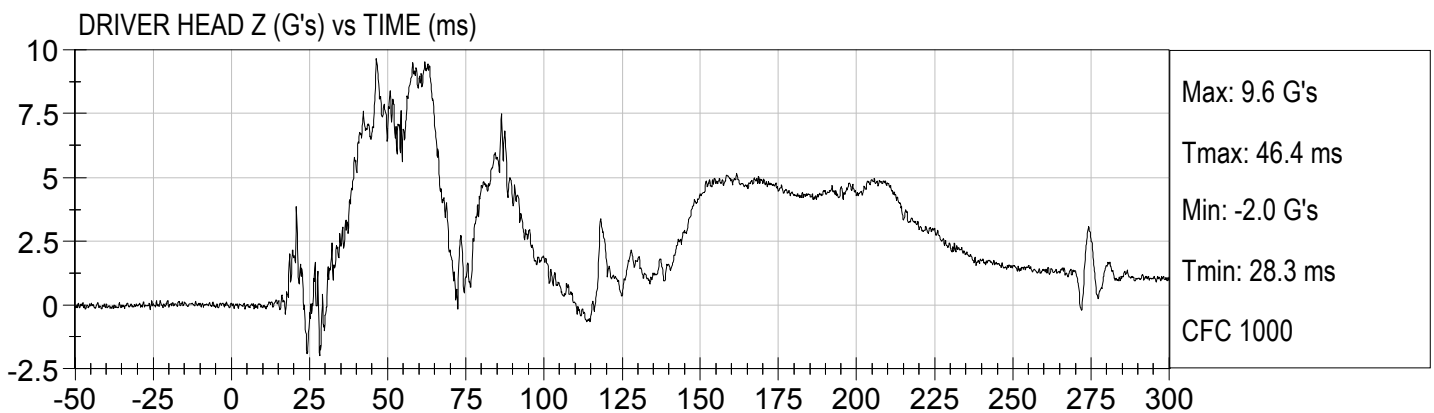
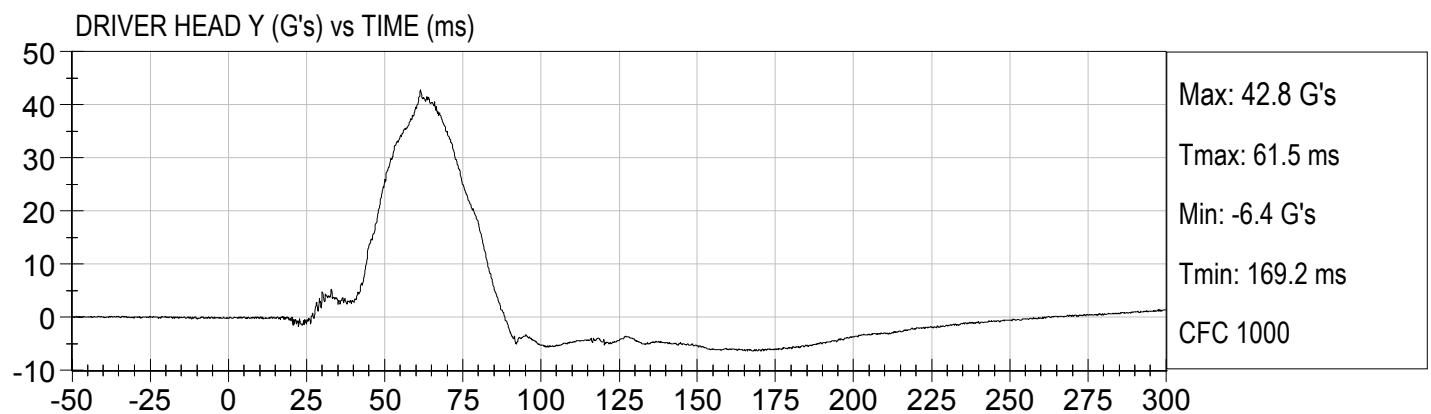
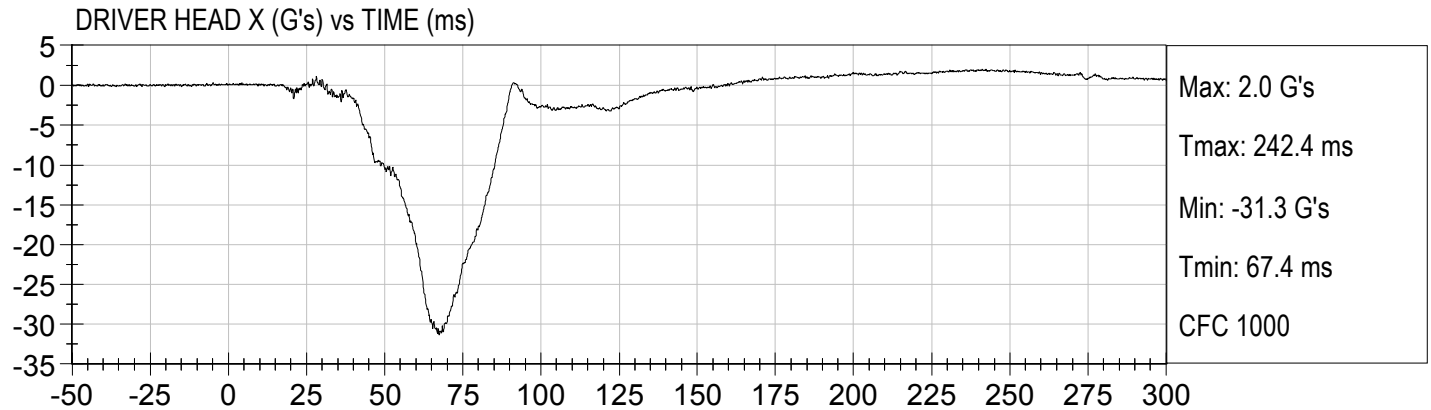
Load Cell Pole Barrier #4 Force (Y)

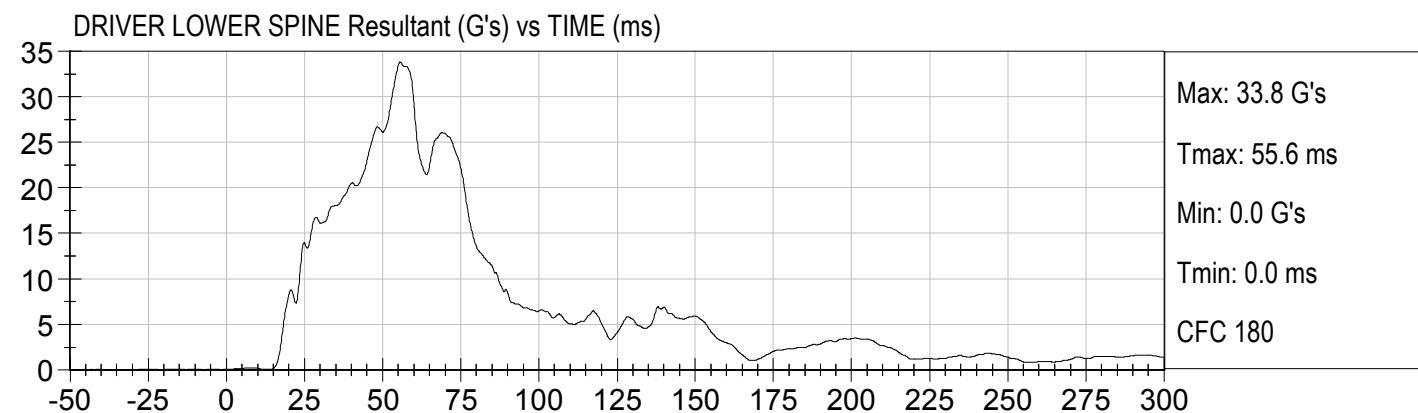
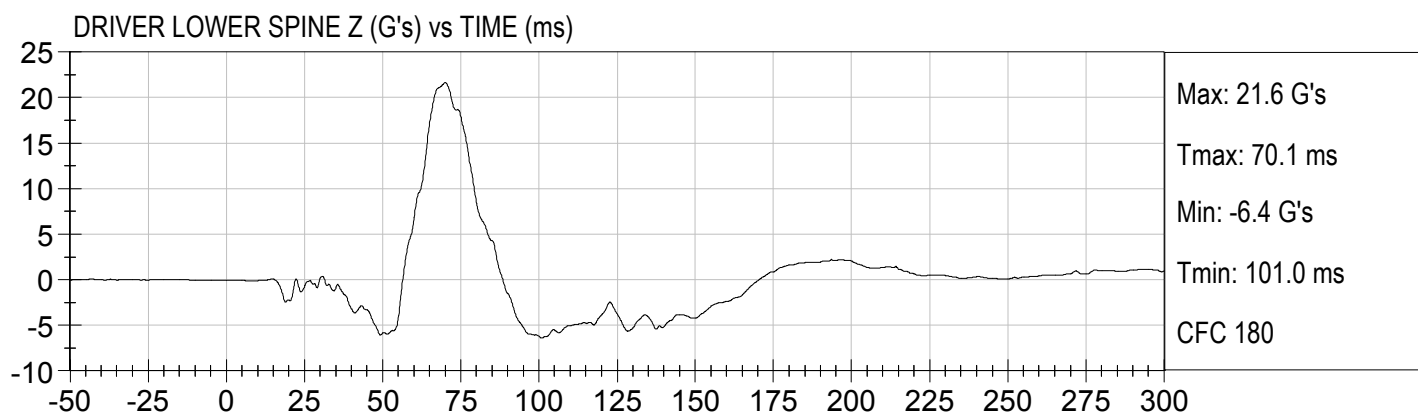
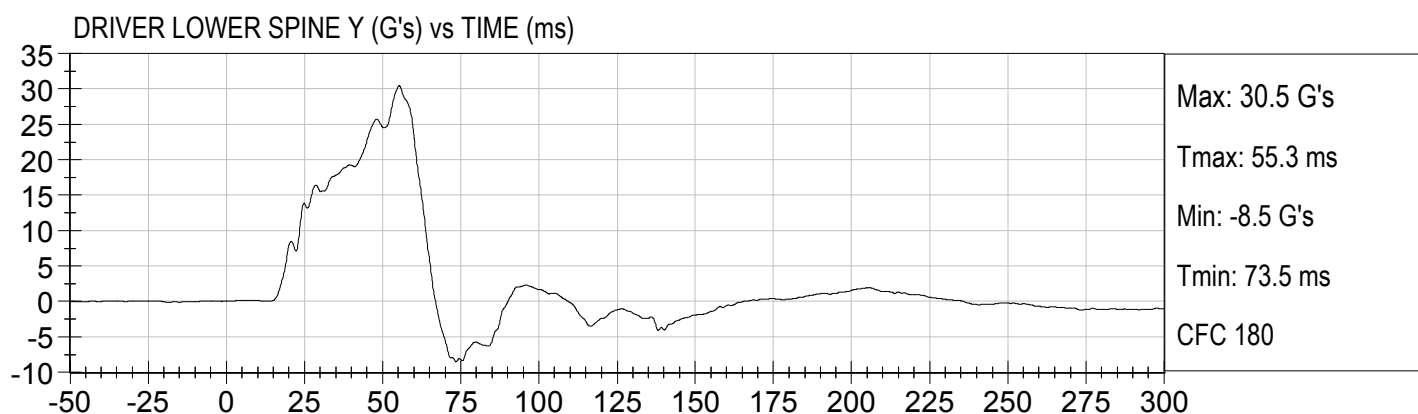
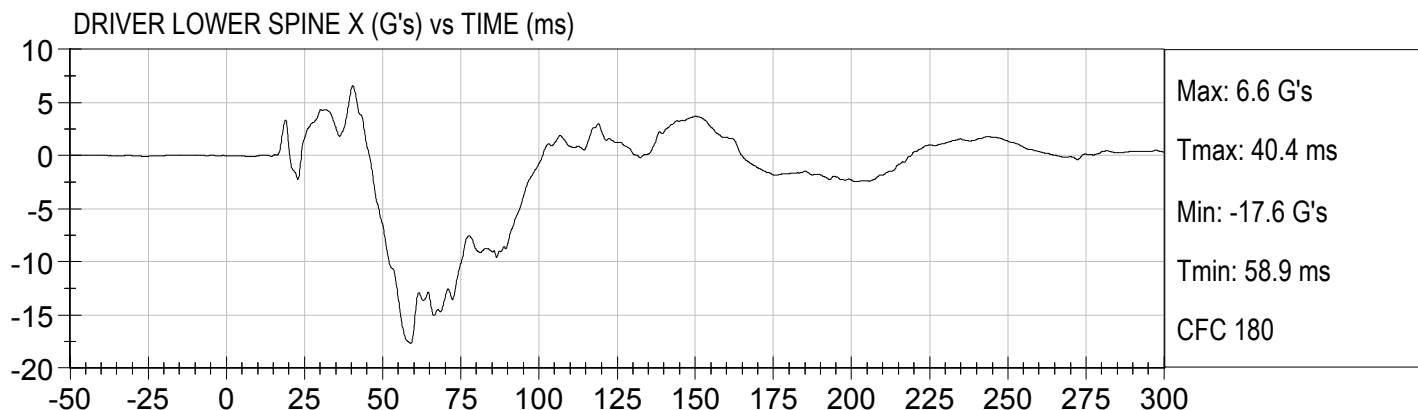
Load Cell Pole Barrier #5 Force (Y)

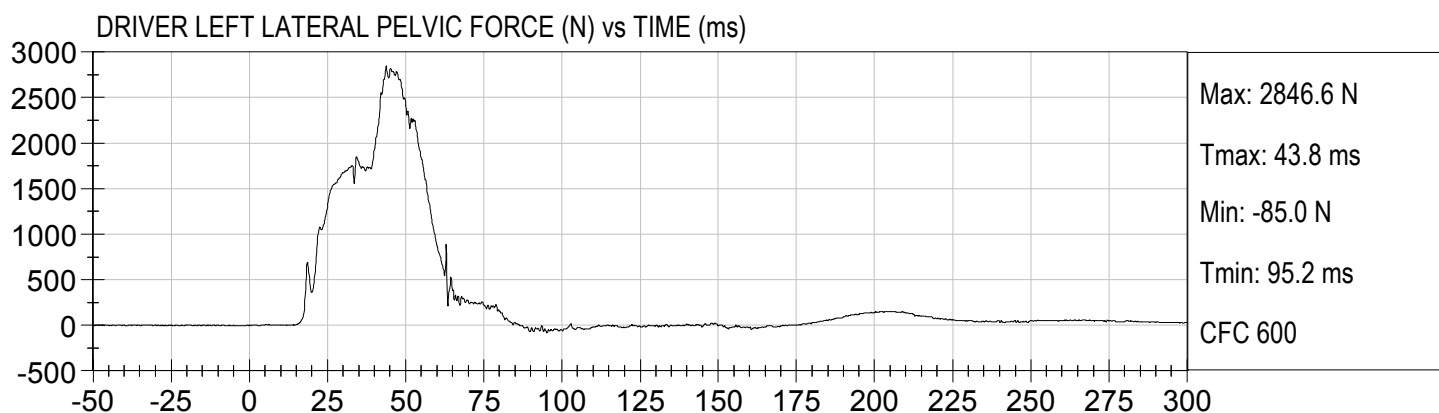
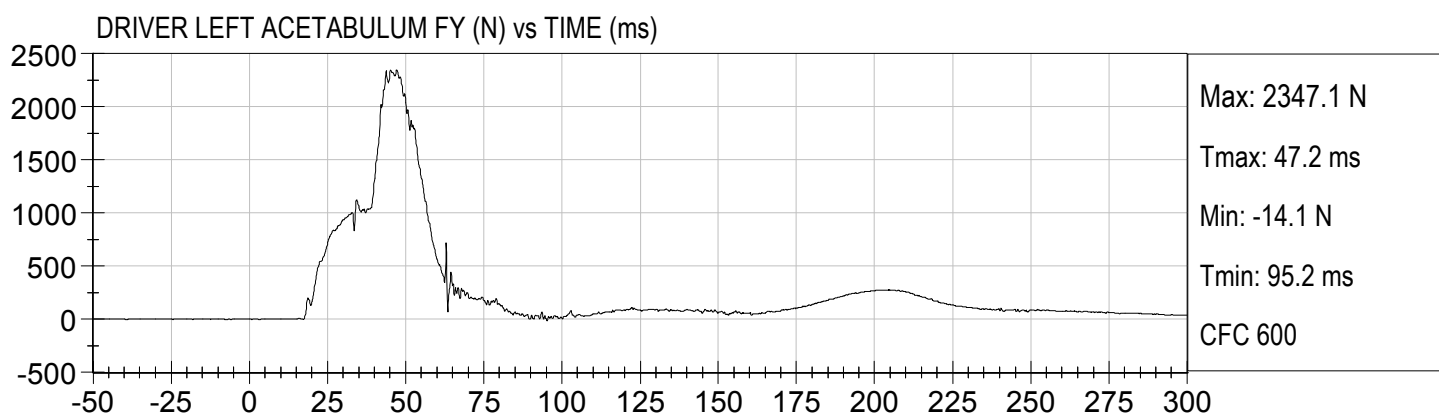
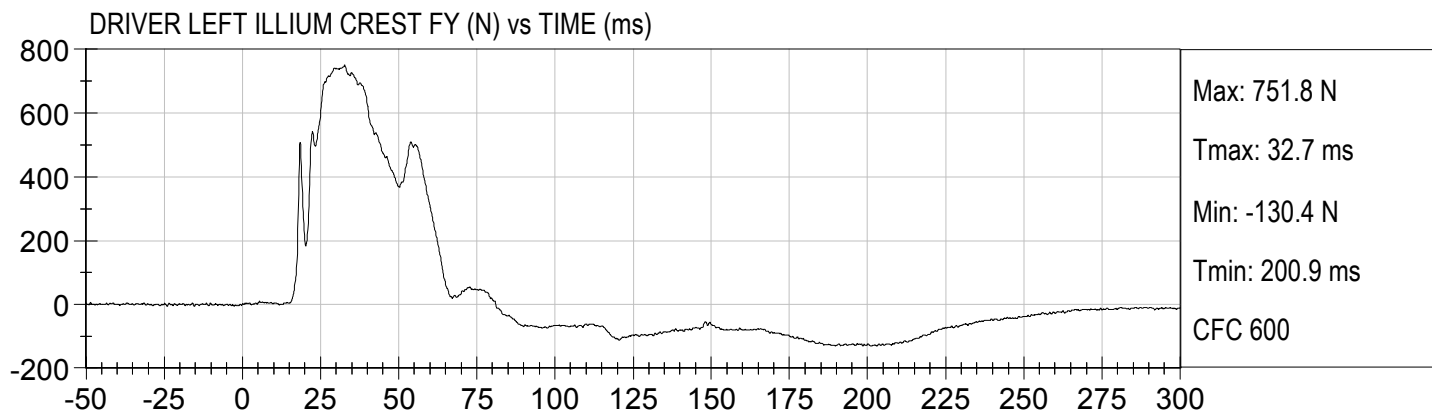
Load Cell Pole Barrier #6 Force (Y)

Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)







APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

SID-IIsD External Measurements
SN: 306

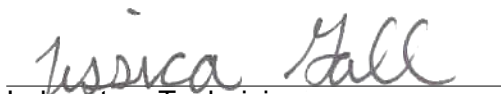
No.	Name	Spec. (mm)	Result	Pass/Fail
A	Sitting Height	772 - 788	785	Pass
B	Shoulder Pivot Height	437 - 453	449	Pass
C	H-point Height	79 - 89	86	Pass
D	H-point from Seatback	141 - 151	147	Pass
E	Shoulder Pivot from Backline	97 - 107	99	Pass
F	Thigh Clearance	119 -135	120	Pass
G	Head Breadth	140 - 148	141	Pass
H	Head Back from Backline	40 - 46	45	Pass
I	Head Depth	178 - 188	182	Pass
J	Head Circumference	541 - 551	550	Pass
K	Buttock to Knee Length	514 - 540	538	Pass
L	Popliteal Height	343 - 369	349	Pass
M	Knee Pivot to Floor Height	392 - 409	394	Pass
N	Buttock Popliteal Length	416 - 442	435	Pass
O	Chest Depth w/o Jacket	195 - 211	198	Pass
P	Foot Length	216 - 232	222	Pass
Q	Hip Breadth (w/ pelvic plugs)	313 - 323	317	Pass
R	Arm Length	249 - 259	250	Pass
S	Knee Joint to Seatback	477 - 493	483	Pass
V	Shoulder Width	341 - 357	351	Pass
W	Foot Width	78 - 94	82	Pass
Y	Chest Circumference w/ jacket	851 - 881	863	Pass
Z	Waist Circumference	761 - 791	782	Pass

MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

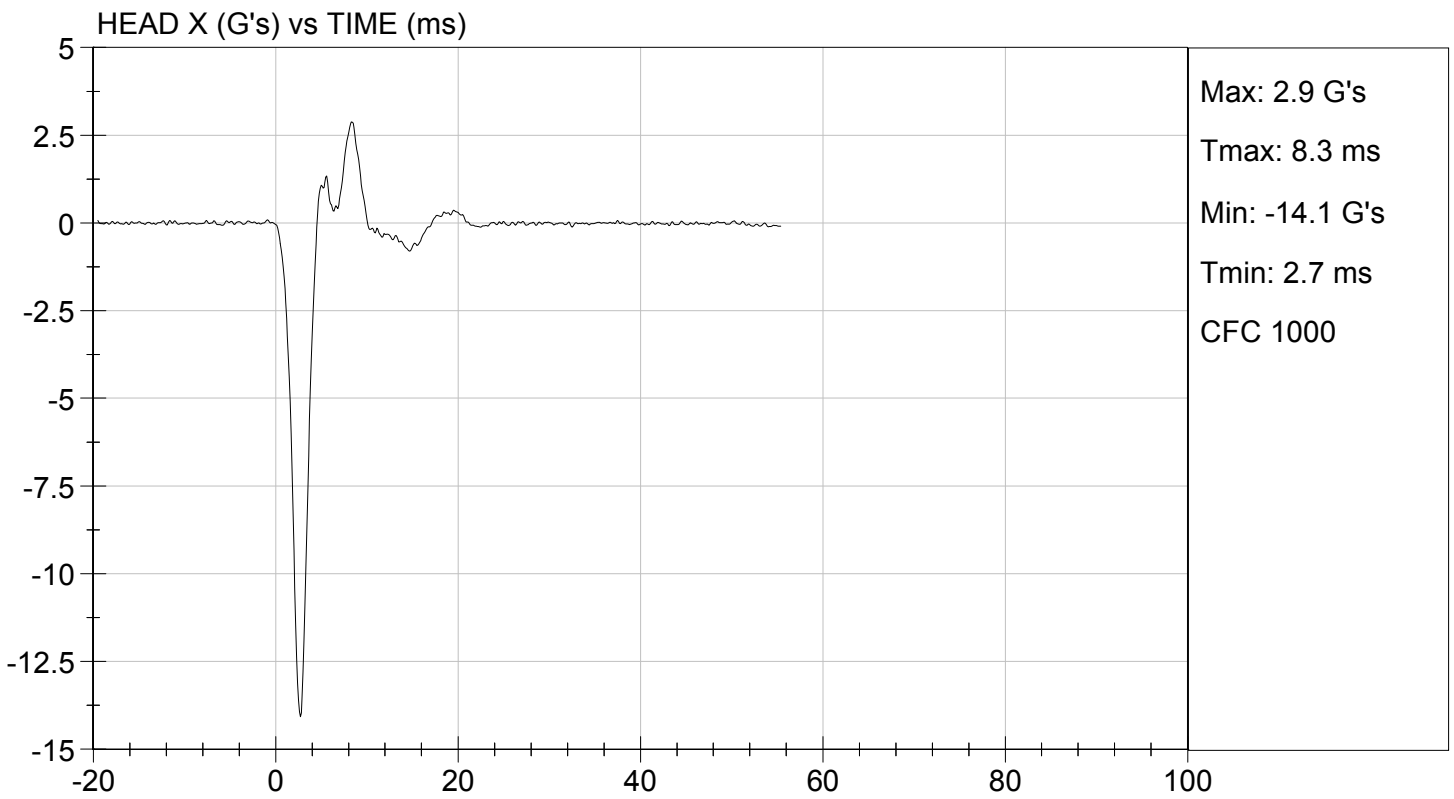
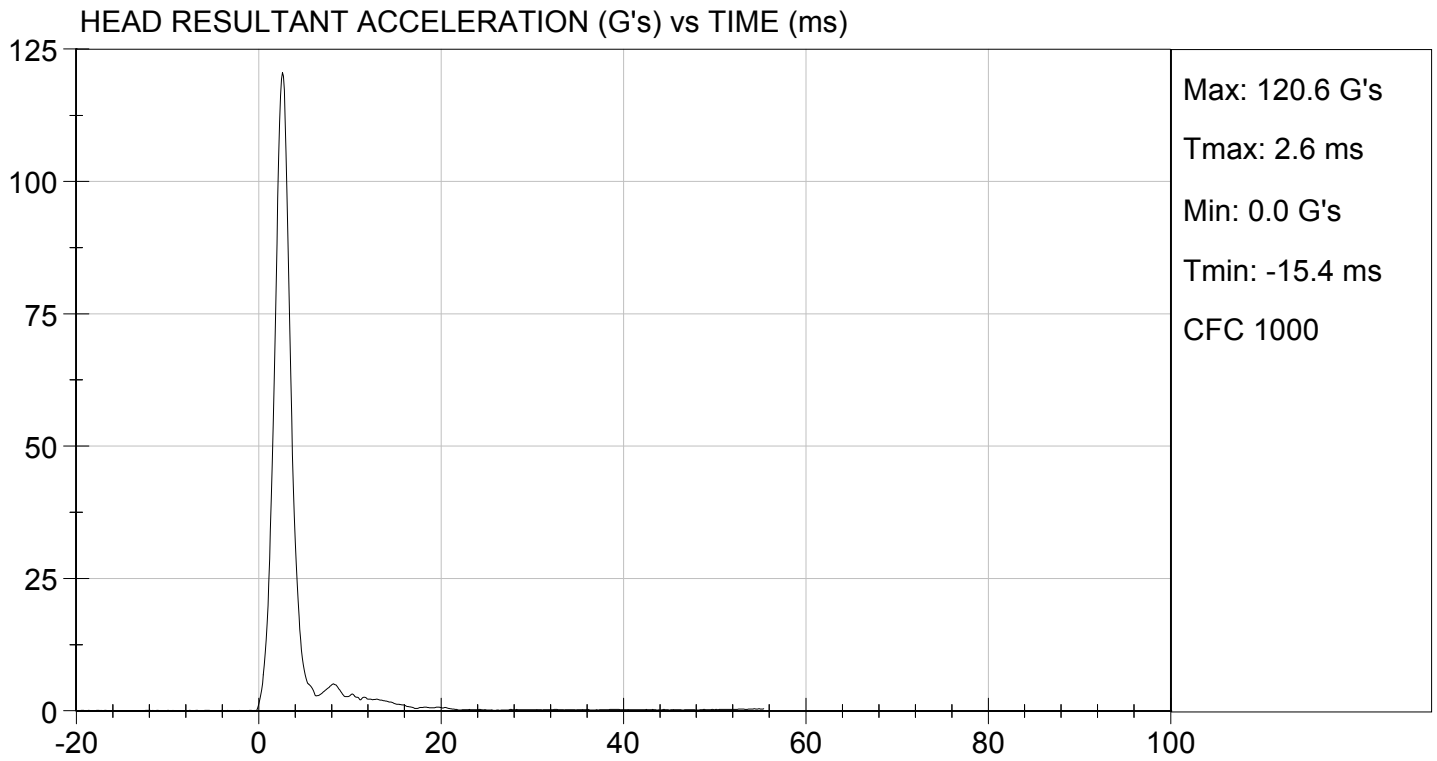
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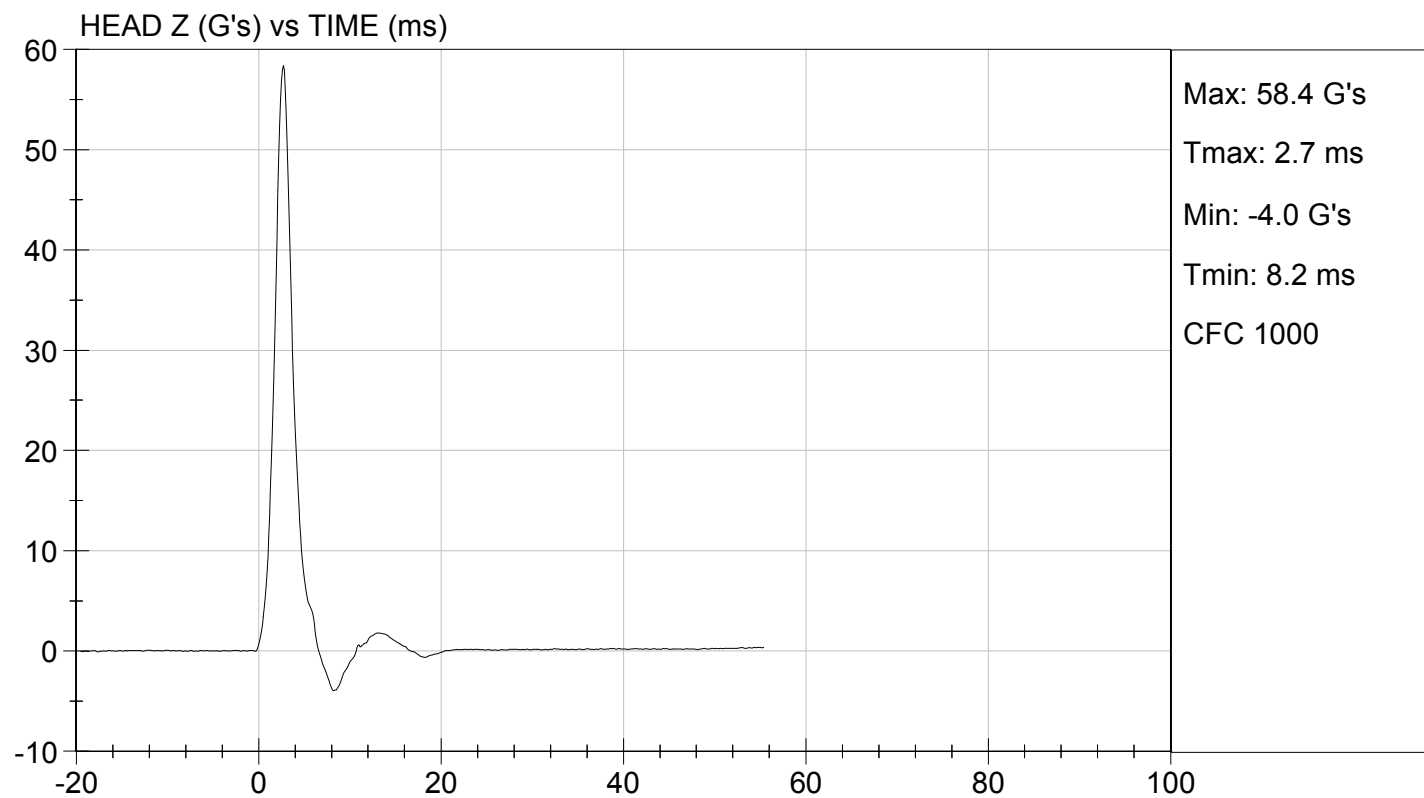
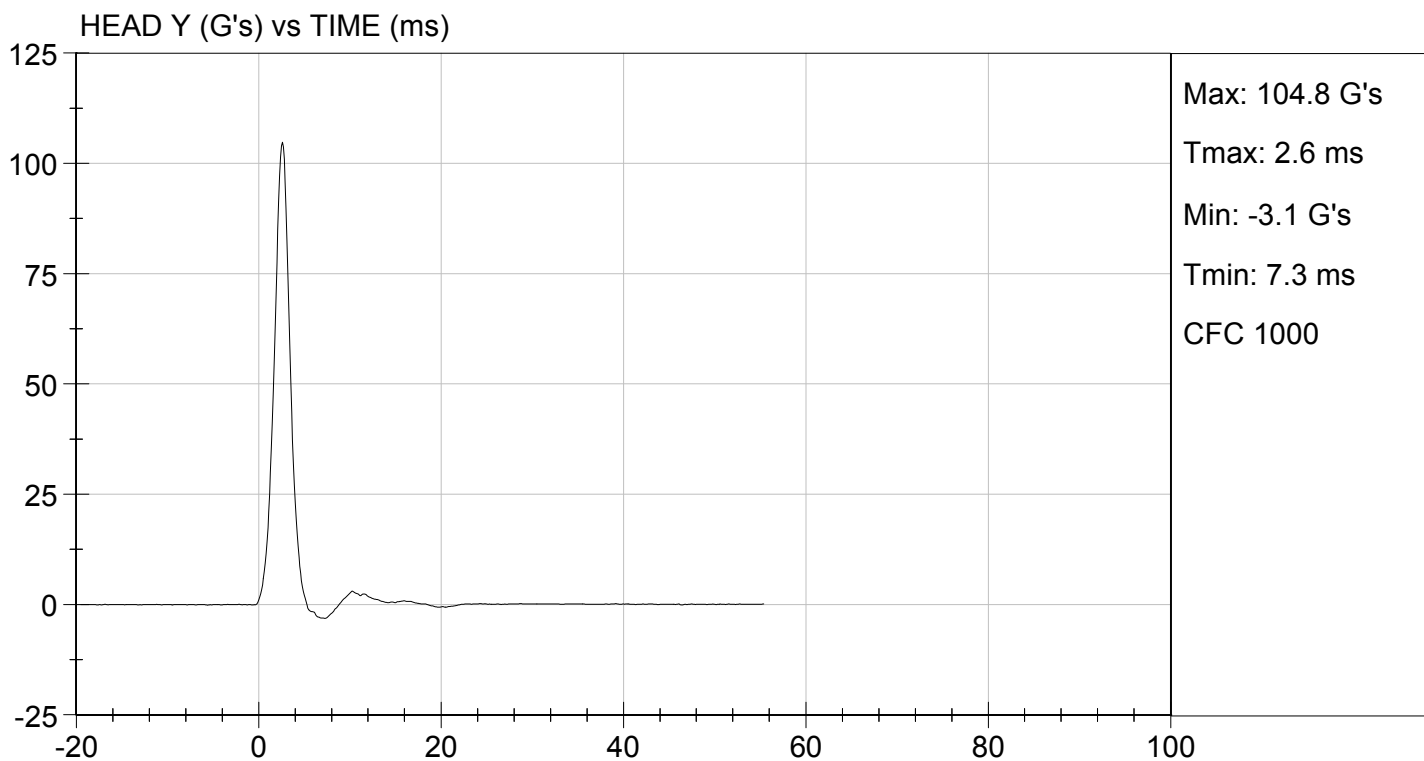
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Peak Resultant Acceleration	G's	115 to 137	121	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-14.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results			Pass	


Laboratory Technician

09/20/2013
Test Date


Approved By



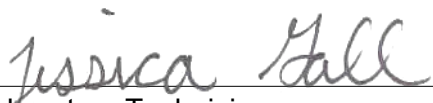


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D133212

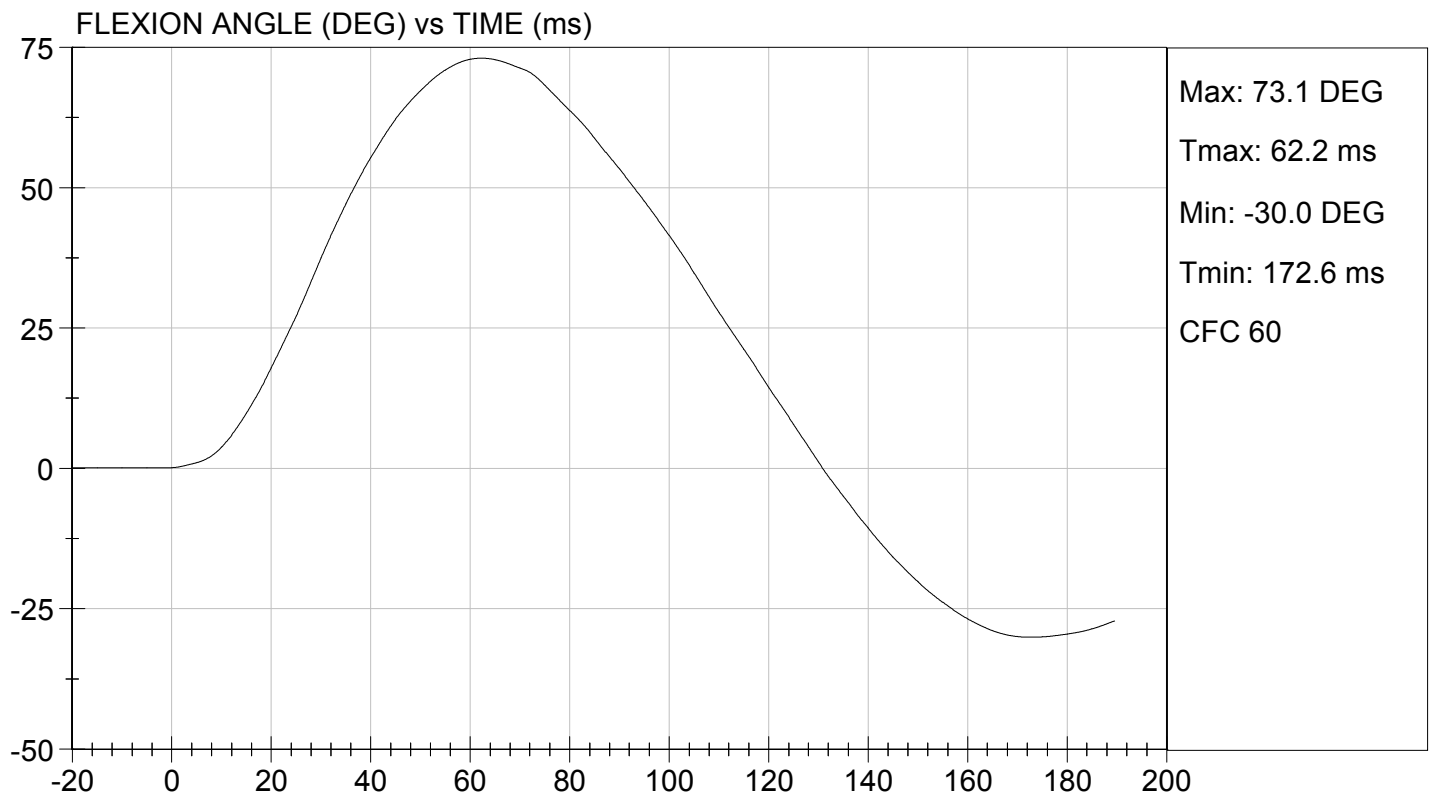
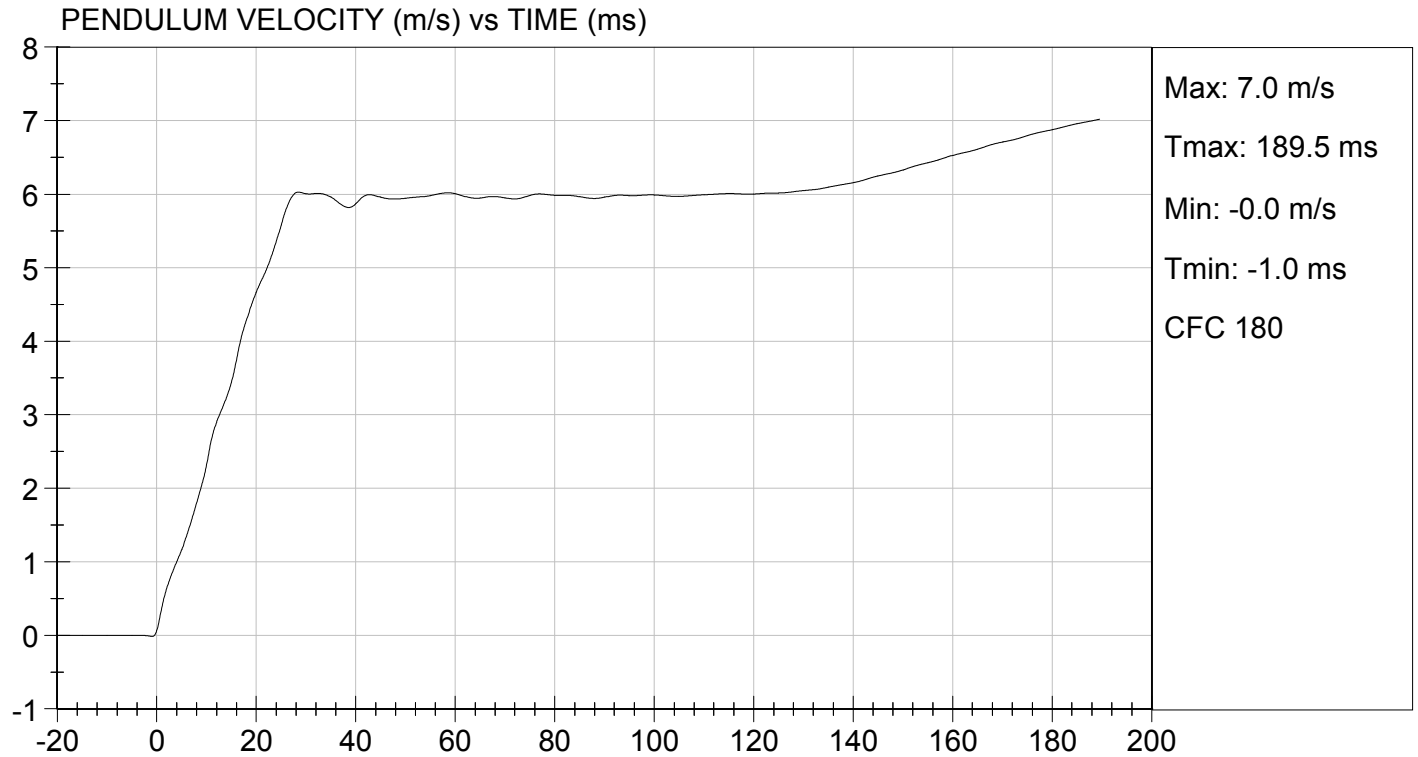
Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.1	Pass
Humidity		%	10 to 70	48	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.32	Pass
	15 ms	m/s	3.30 to 4.10	3.44	Pass
	20 ms	m/s	4.40 to 5.40	4.67	Pass
	25 ms	m/s	5.40 to 6.10	5.58	Pass
	25-100 ms	m/s	5.50 to 6.20	6.03	Pass
Maximum D-Plane Rotation		deg	71 to 81	73	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	62	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-40	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	115	Pass
Overall Test Results					Pass


 Laboratory Technician

09/20/2013

Test Date

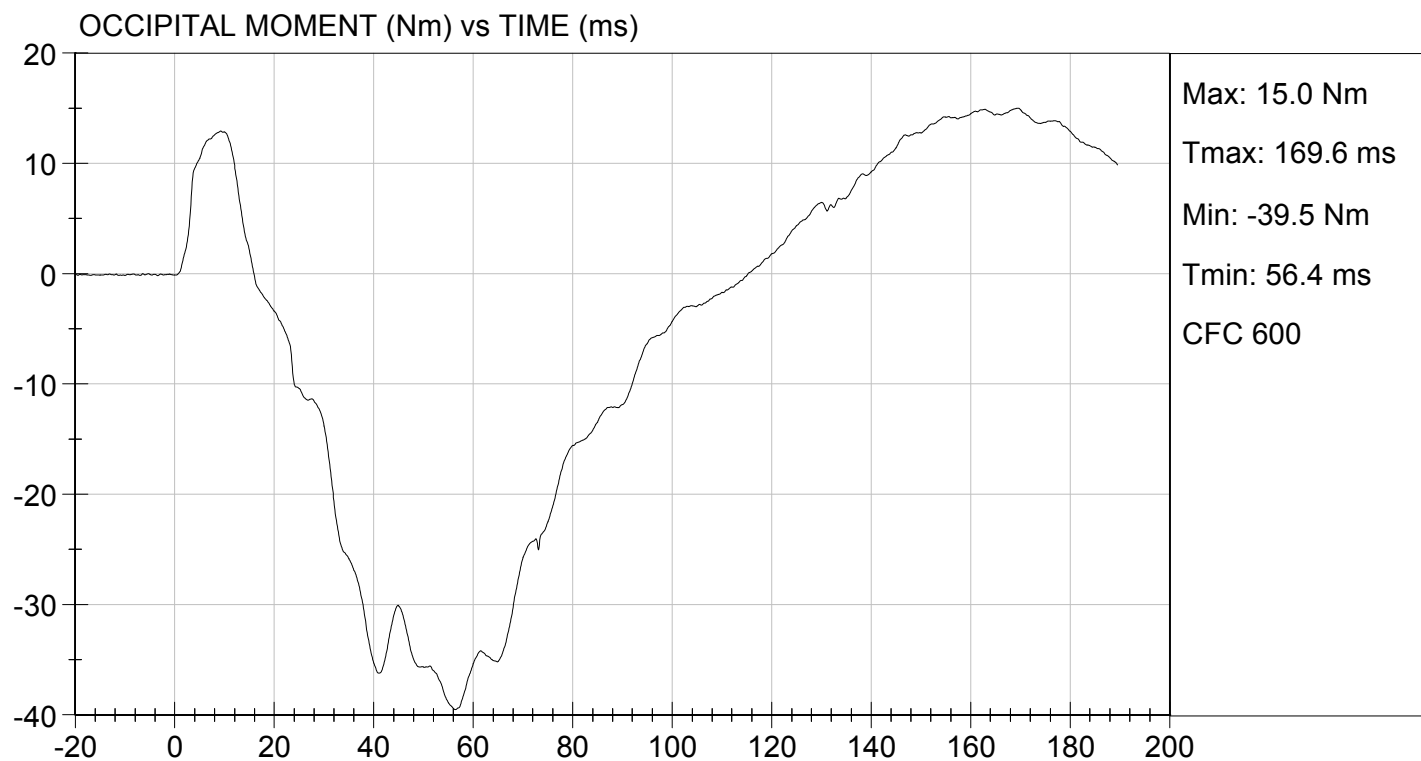

 Approved By





TEST DESC: NECK BENDING
VELOCITY: 18.31 ft/s, 5.58 m/s

TEST DATE: 09/20/2013
TEST #: D133212

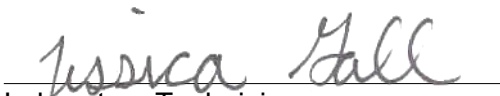


MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test ID: D133213

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results			Pass	


Laboratory Technician

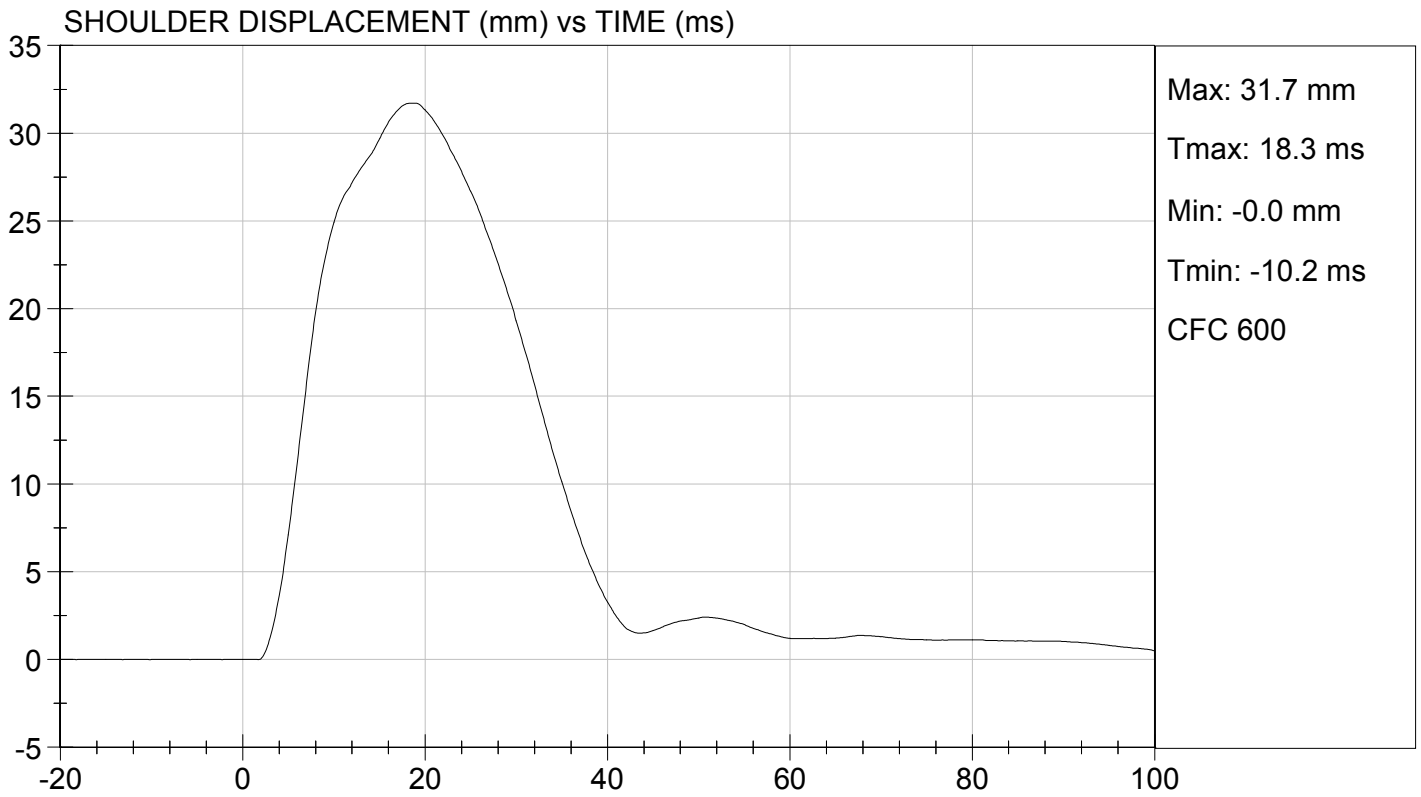
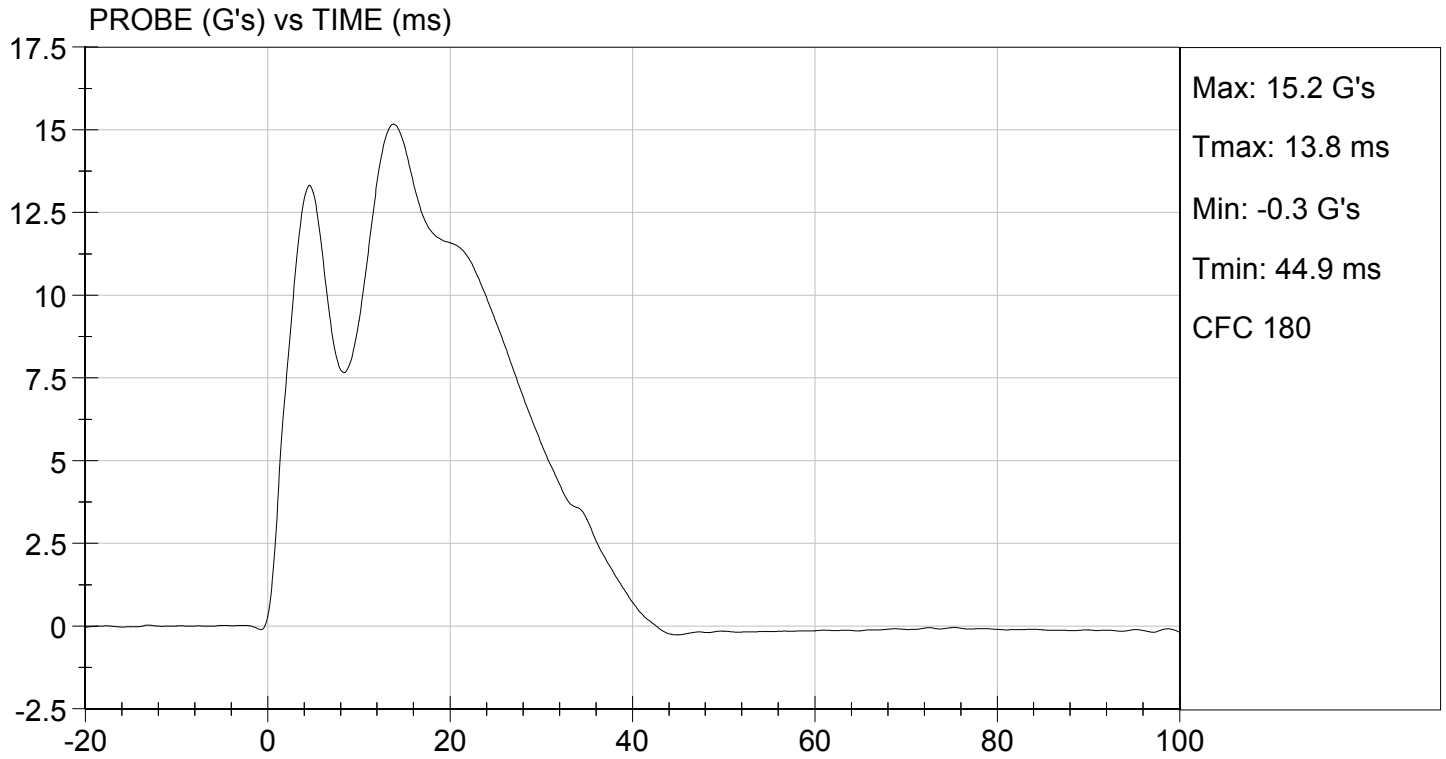
09/20/2013
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.36 ft/s, 4.38 m/s

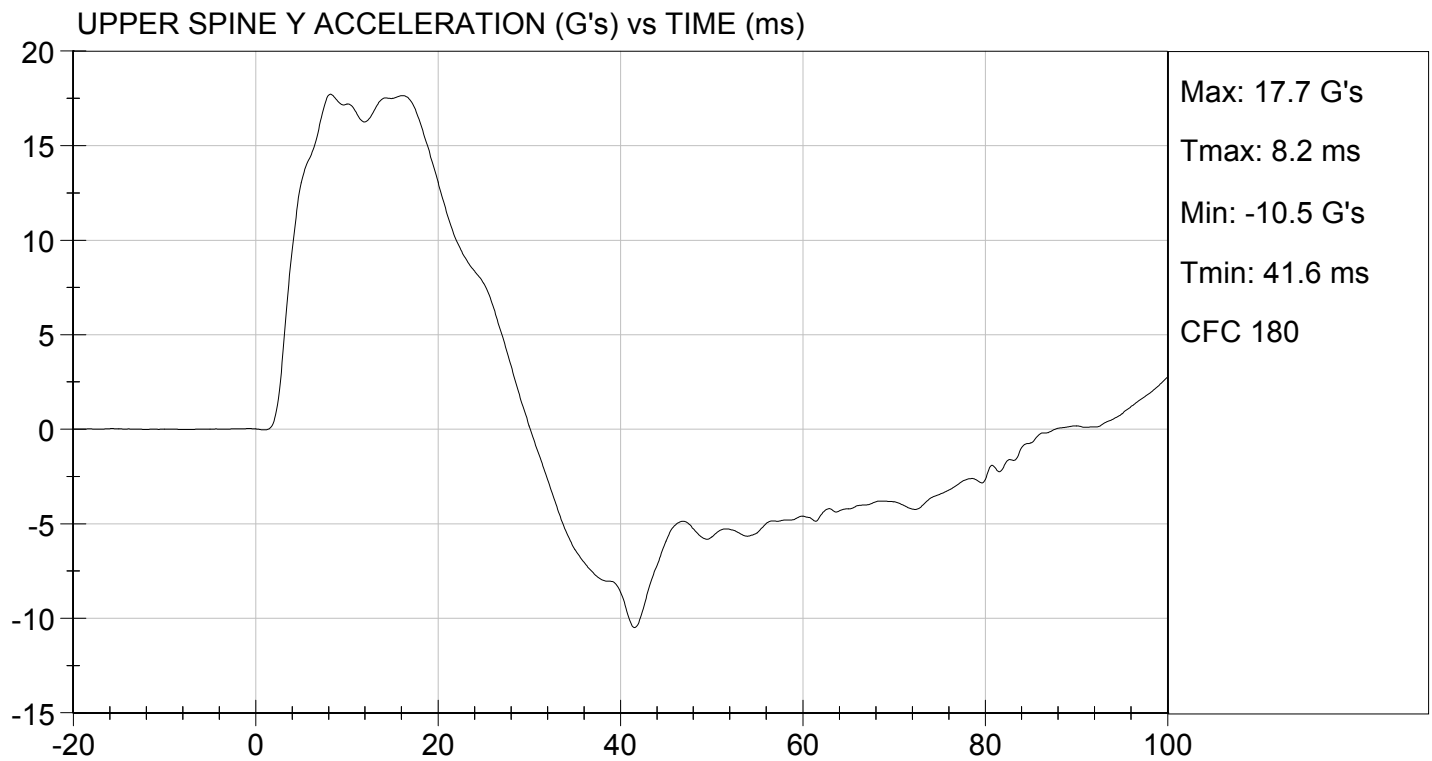
TEST DATE: 09/20/2013
TEST #: D133213





TEST DESC: SHOULDER IMPACT
VELOCITY: 14.36 ft/s, 4.38 m/s

TEST DATE: 09/20/2013
TEST #: D133213



MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

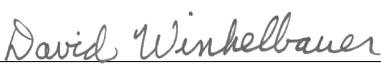
ATD Serial No: 306

Test I.D: D133214

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.8	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	31	Pass
Shoulder Displacement	mm	31 to 40	34	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	35	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	37	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	29	Pass
Overall Test Results				Pass


 Laboratory Technician

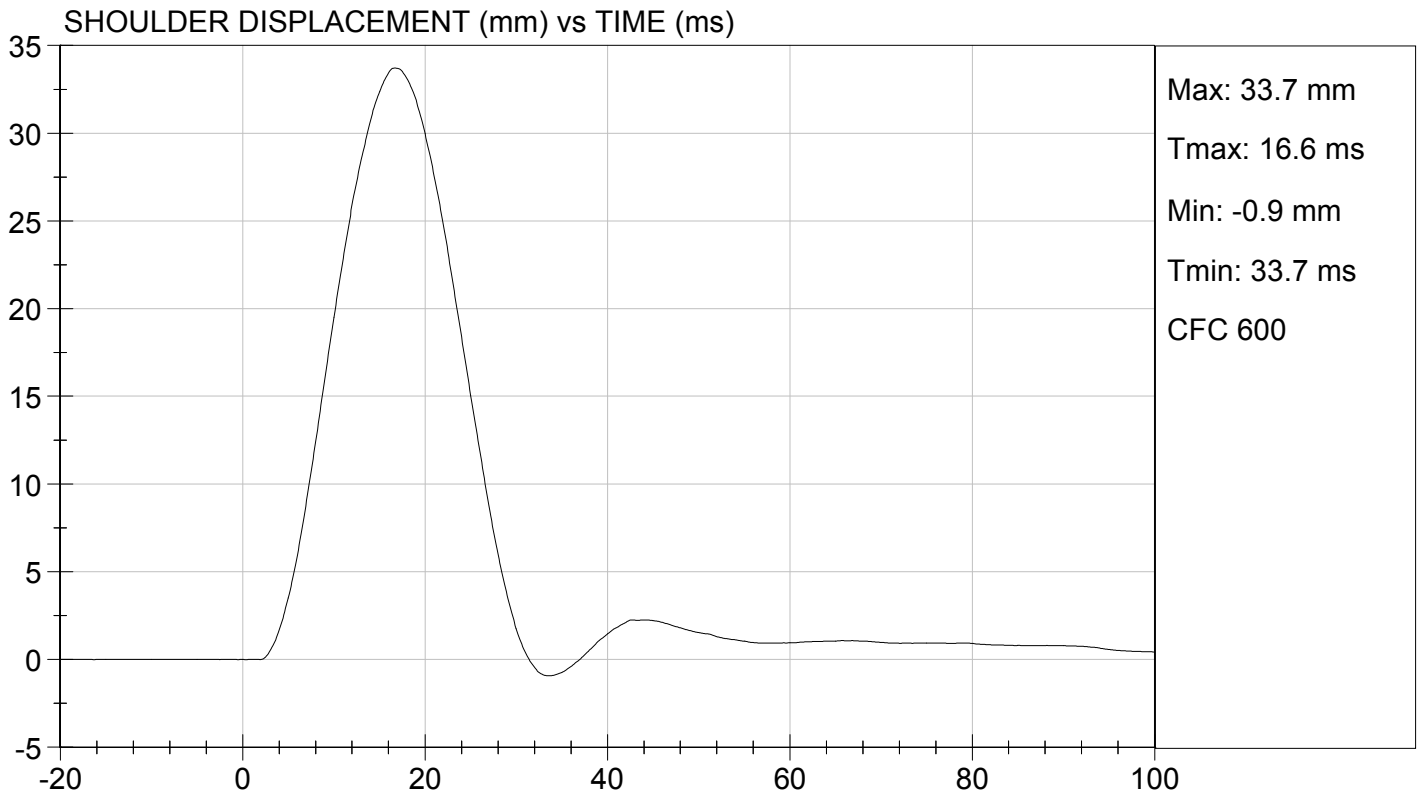
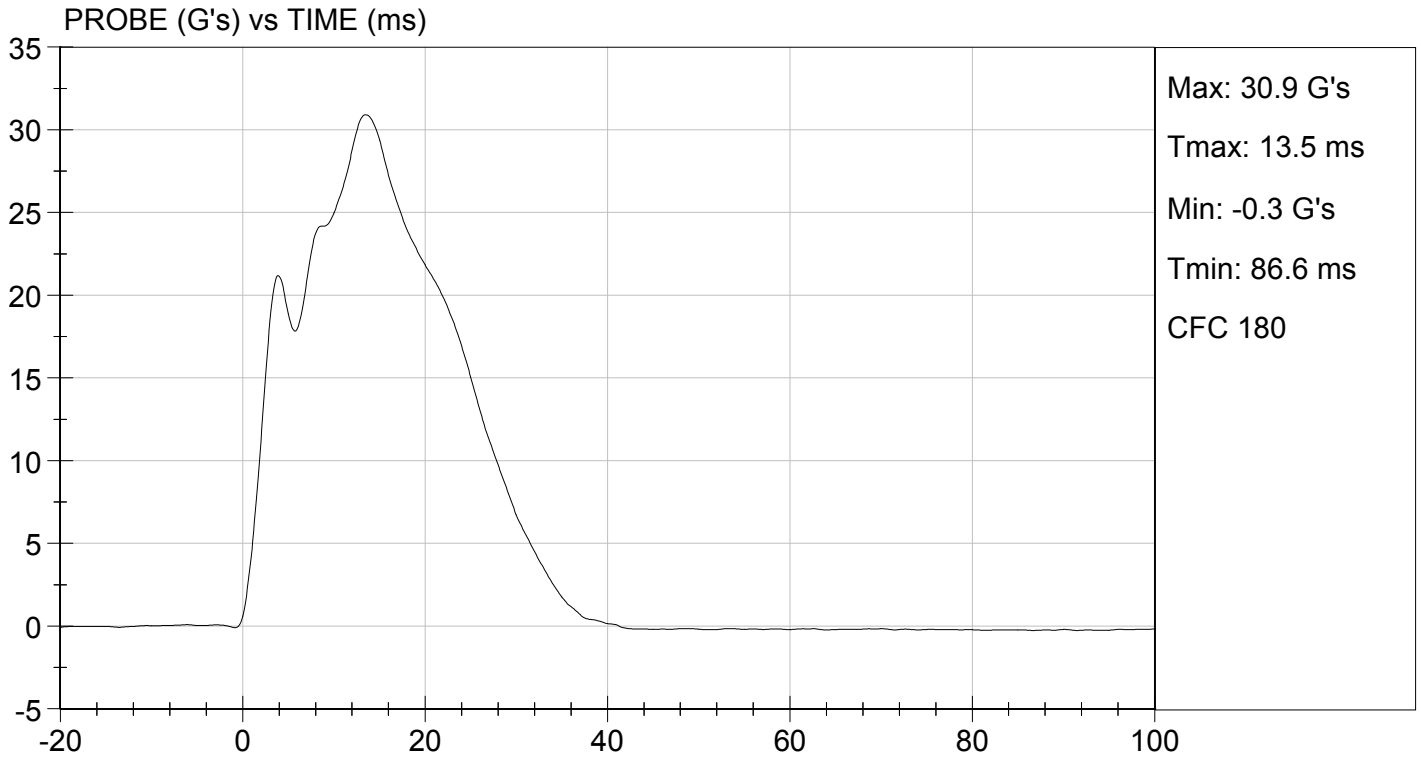
09/20/2013
 Test Date


 Approved By



TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

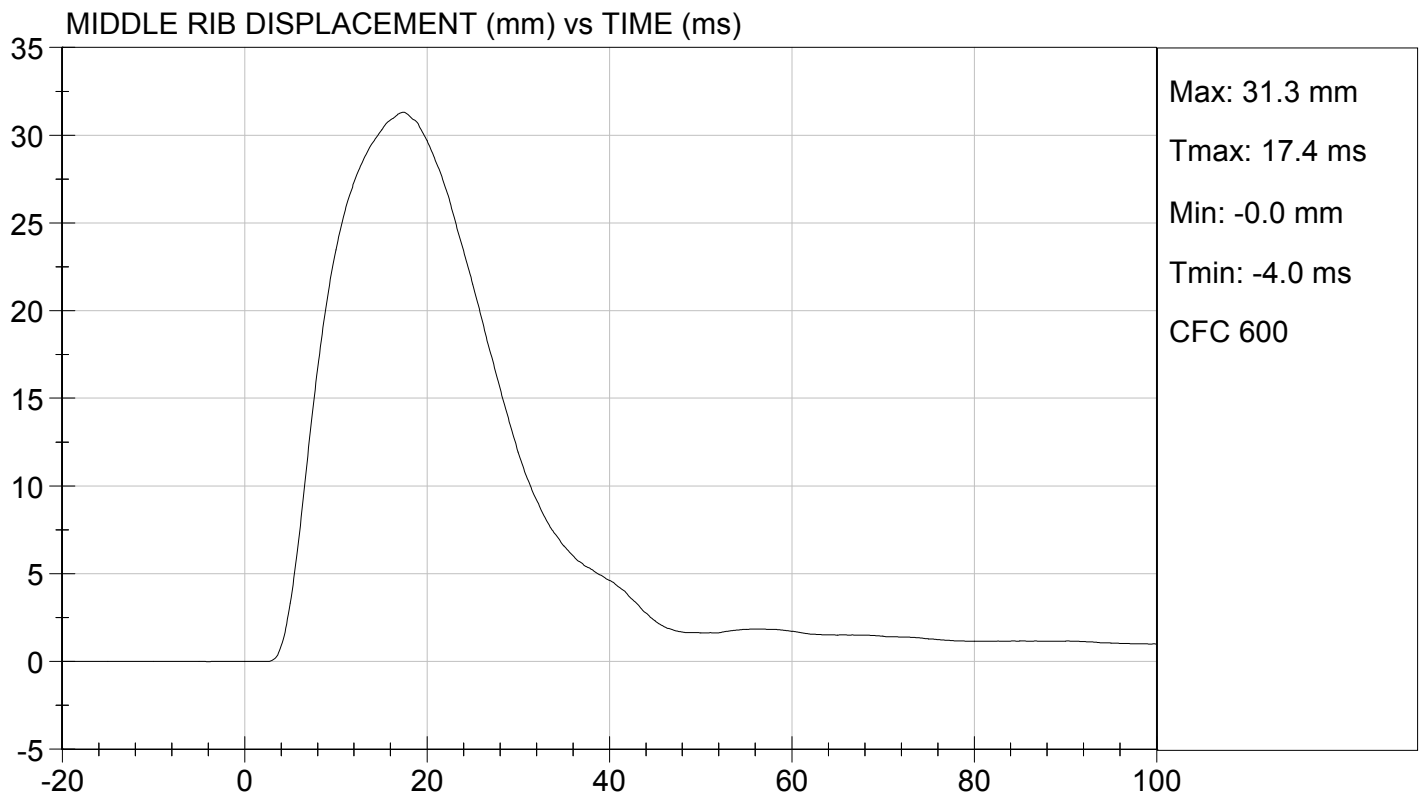
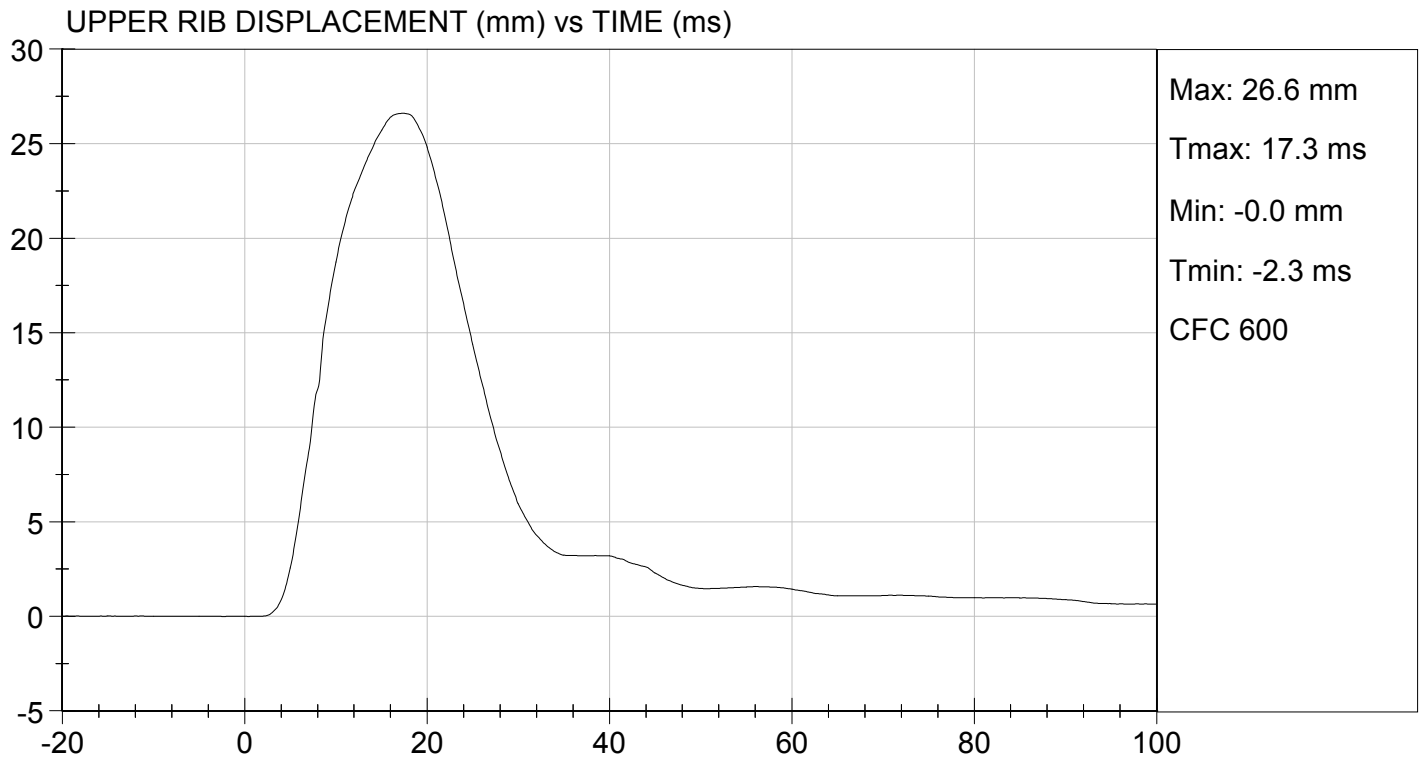
TEST DATE: 09/20/2013
TEST #: D133214





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

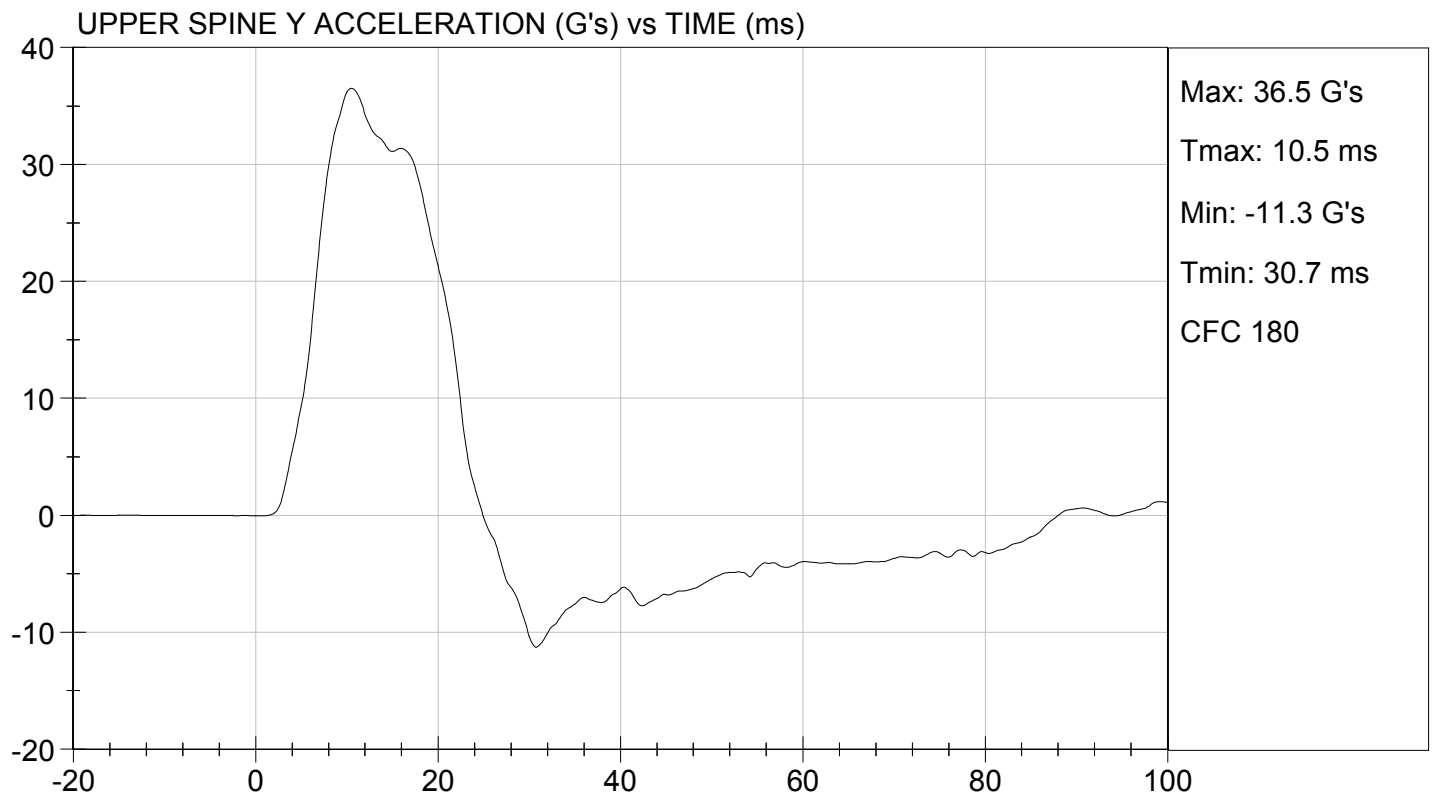
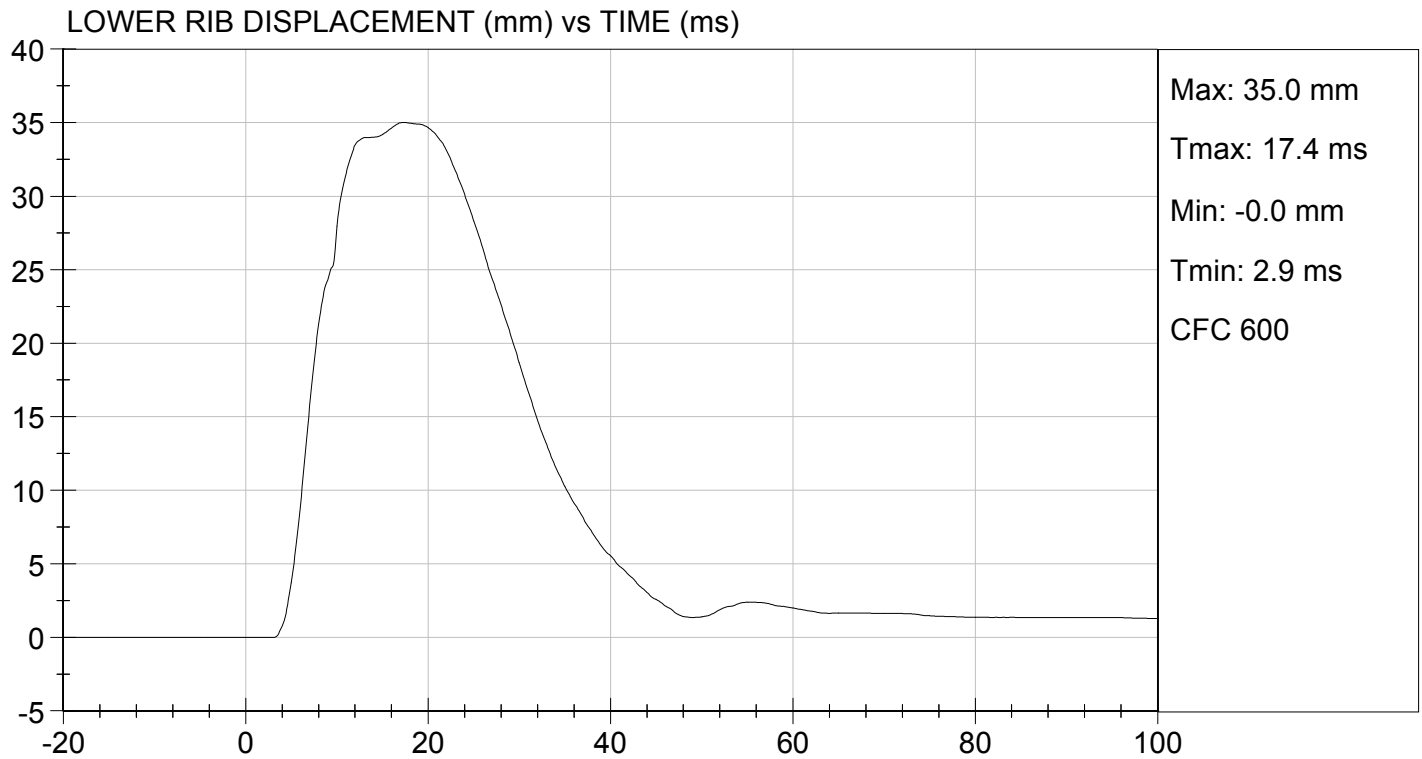
TEST DATE: 09/20/2013
TEST #: D133214





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

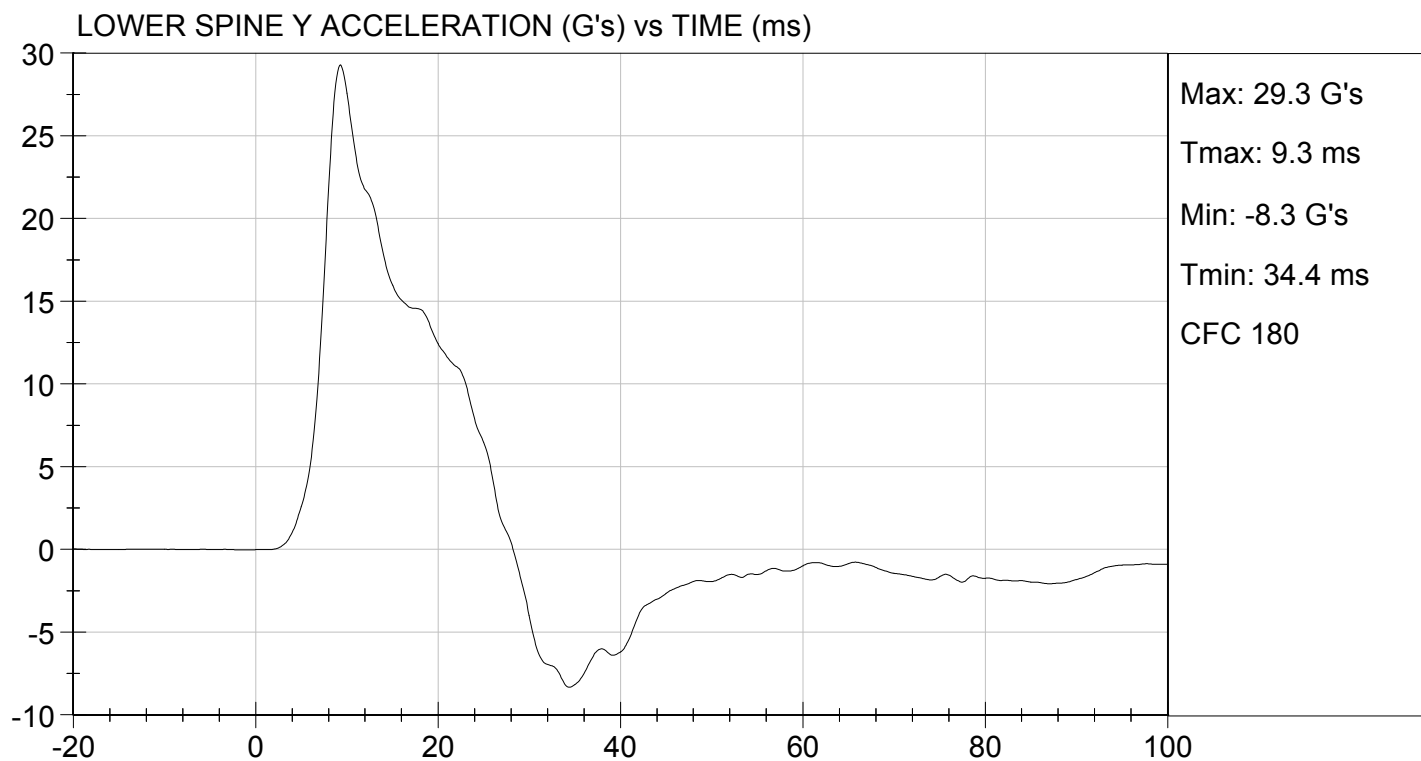
TEST DATE: 09/20/2013
TEST #: D133214





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 09/20/2013
TEST #: D133214

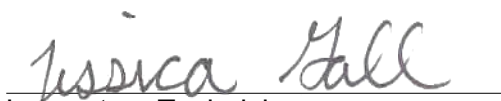


MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

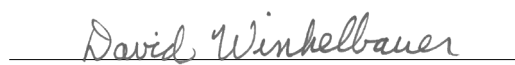
Test I.D: D133215

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.8	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	14 to 18	16	Pass
Upper Rib Displacement	mm	32 to 40	33	Pass
Middle Rib Displacement	mm	39 to 45	40	Pass
Lower Rib Displacement	mm	35 to 43	40	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	10	Pass
Overall Test Results				Pass


Laboratory Technician

09/20/2013

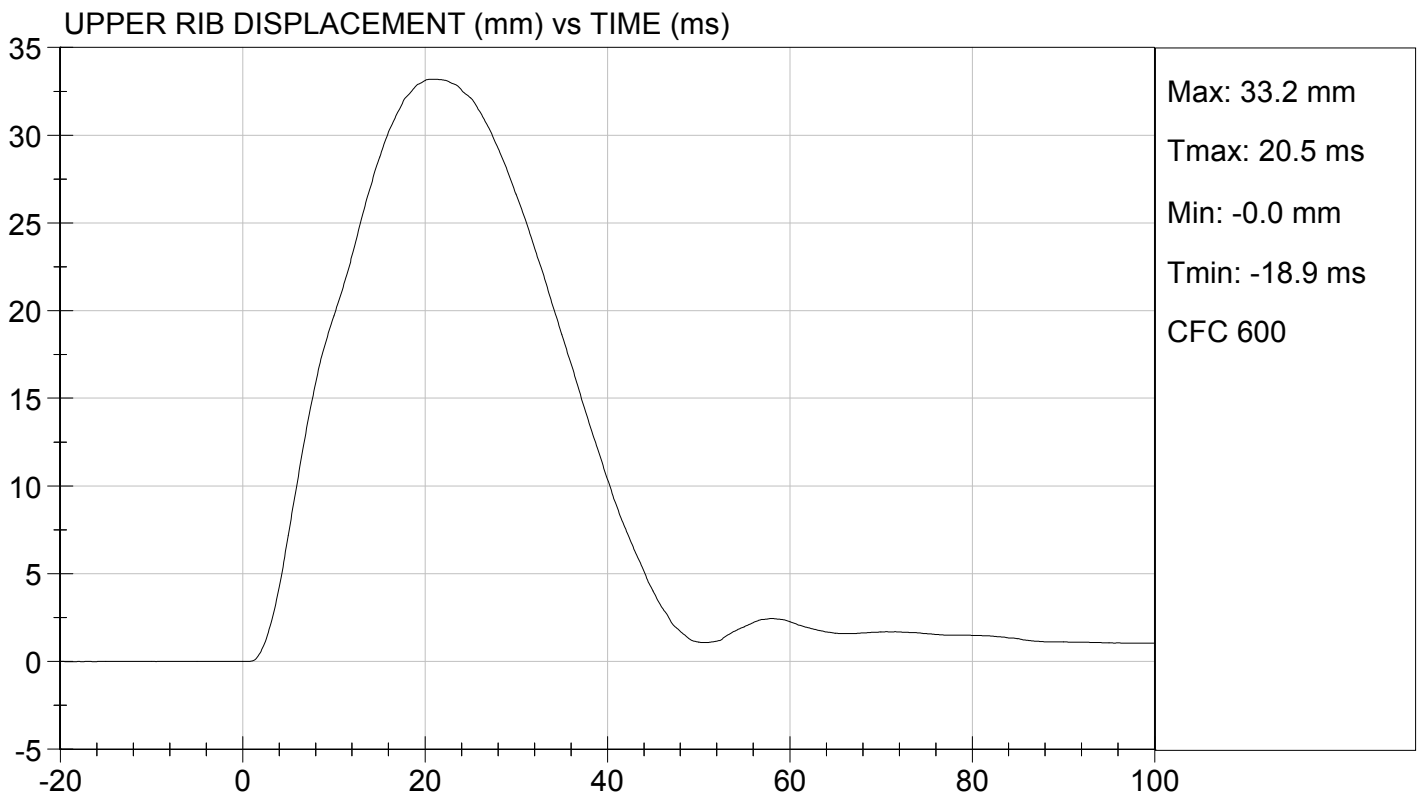
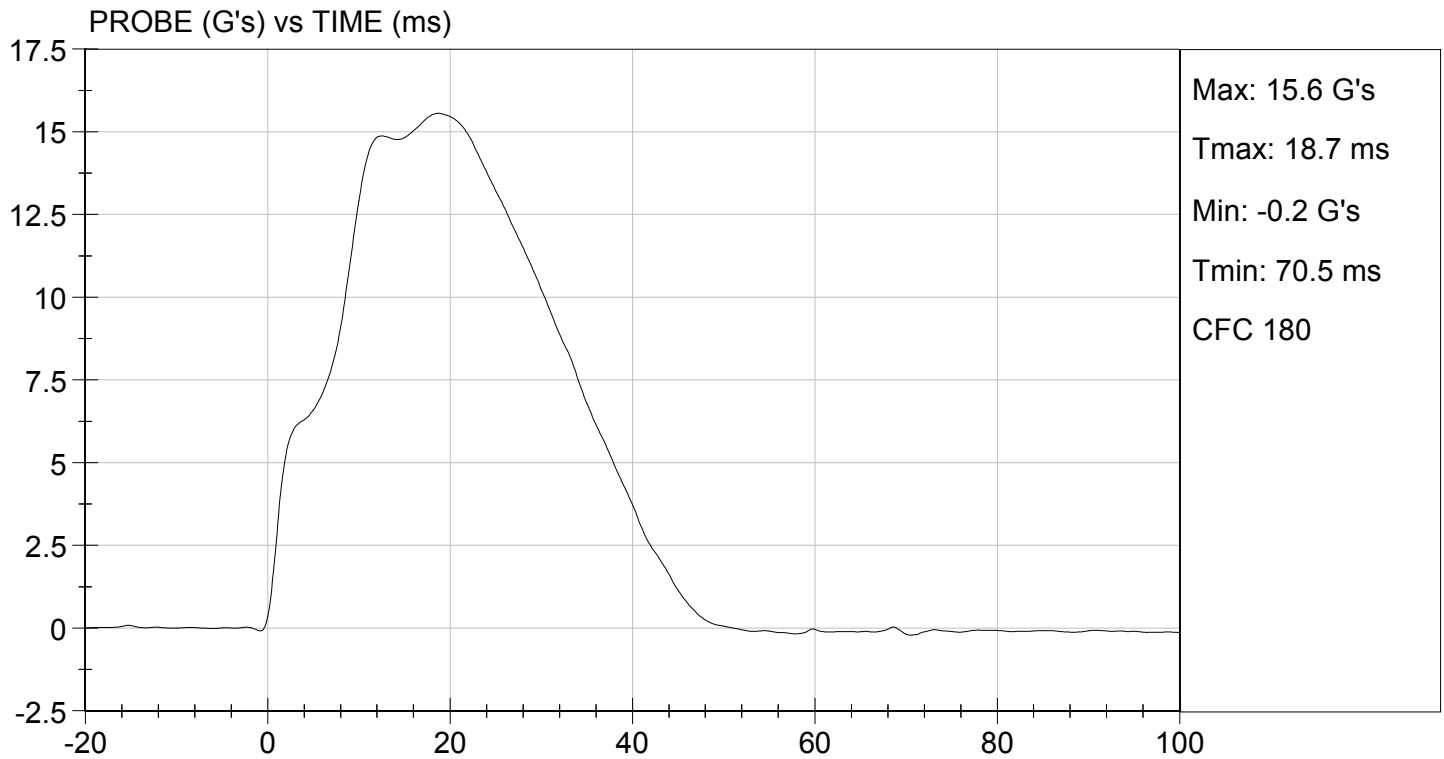
Test Date


Approved By



TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/20/2013
TEST #: D133215

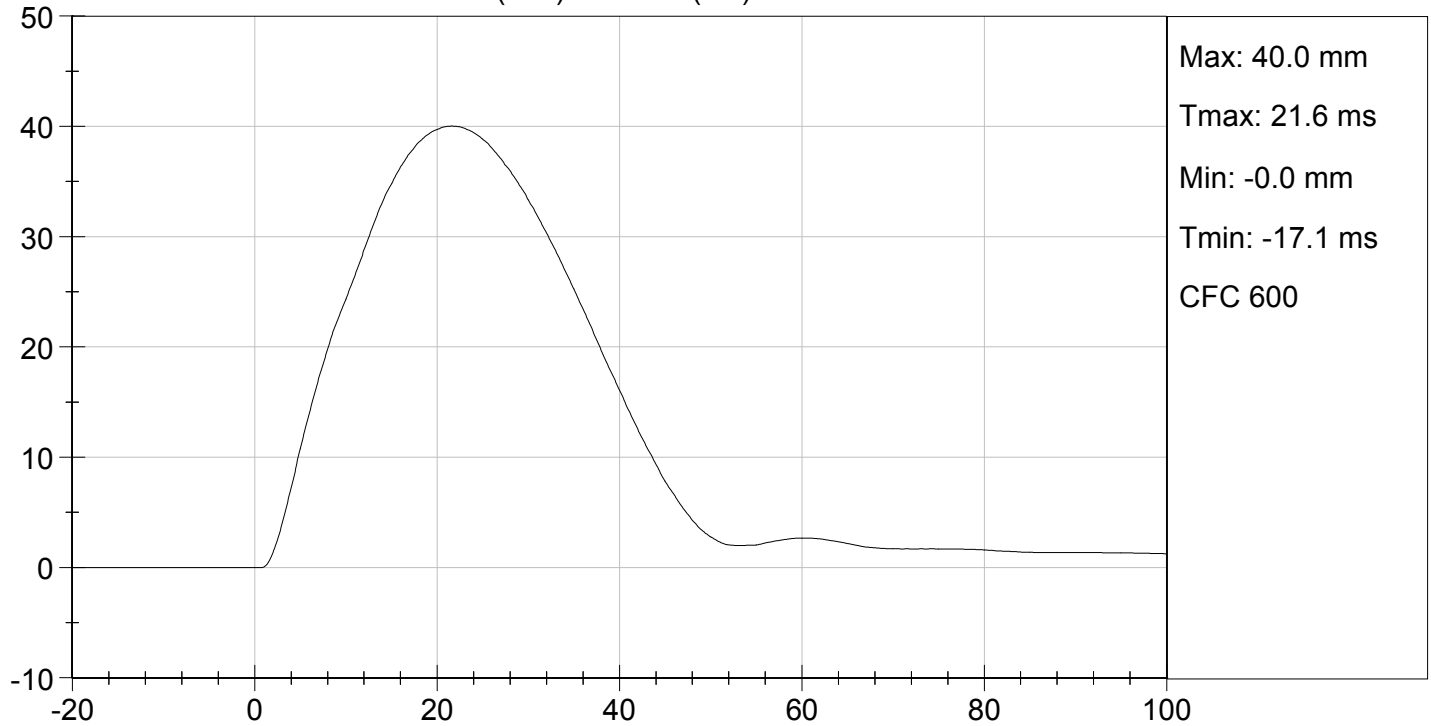




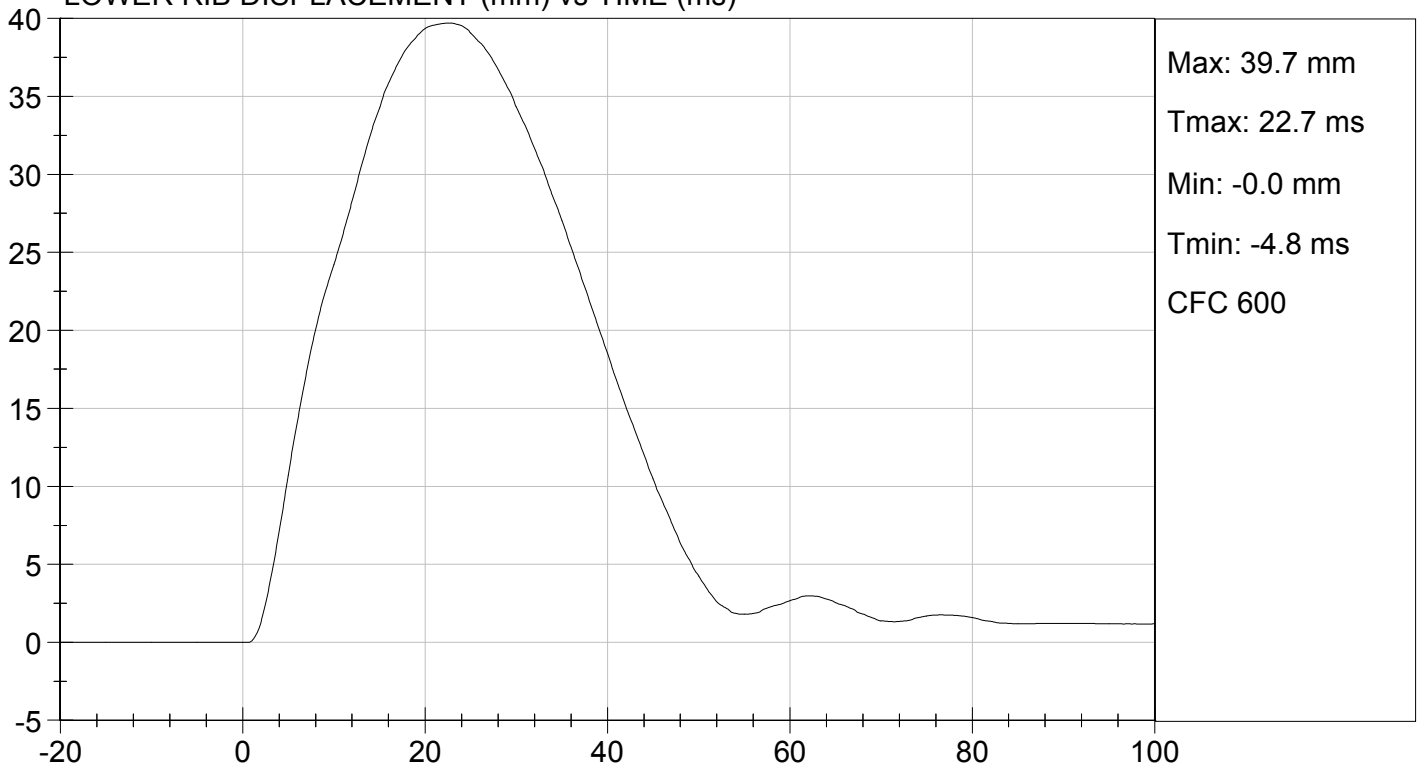
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/20/2013
TEST #: D133215

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

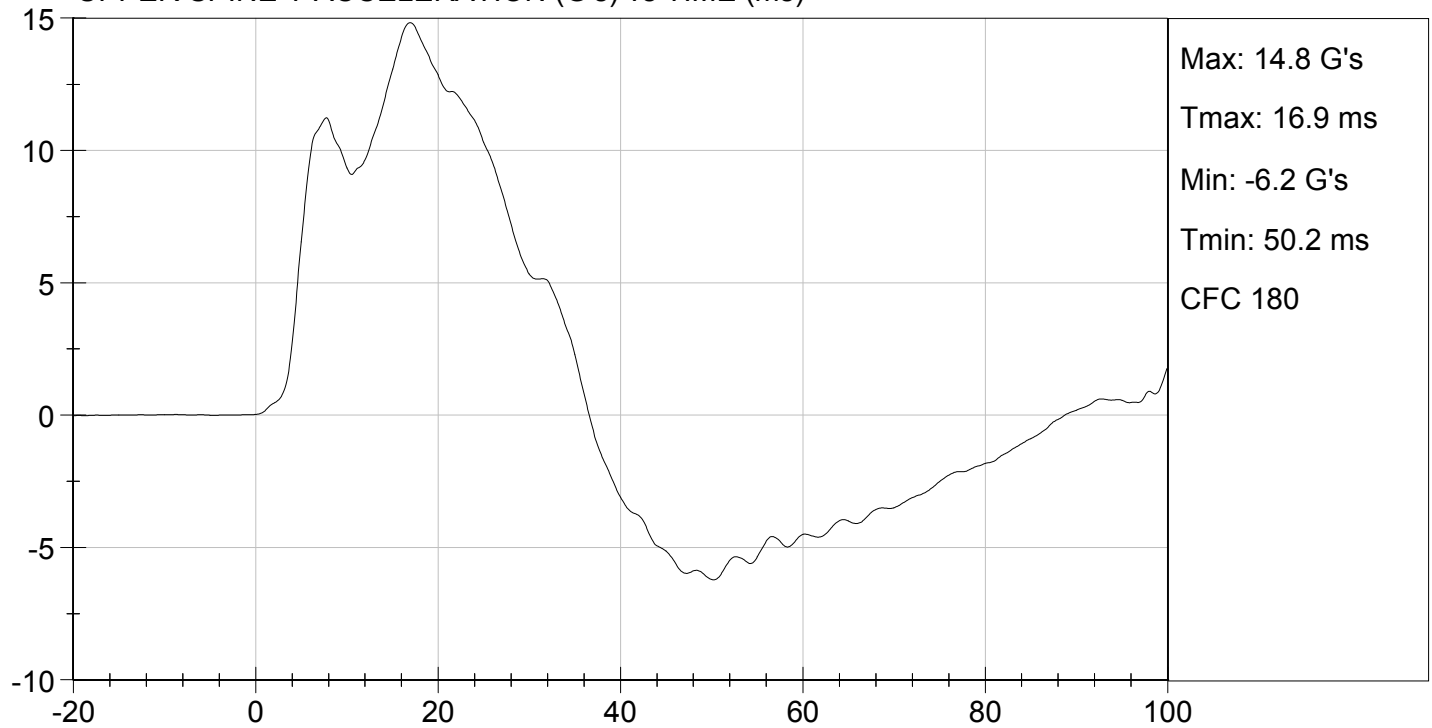




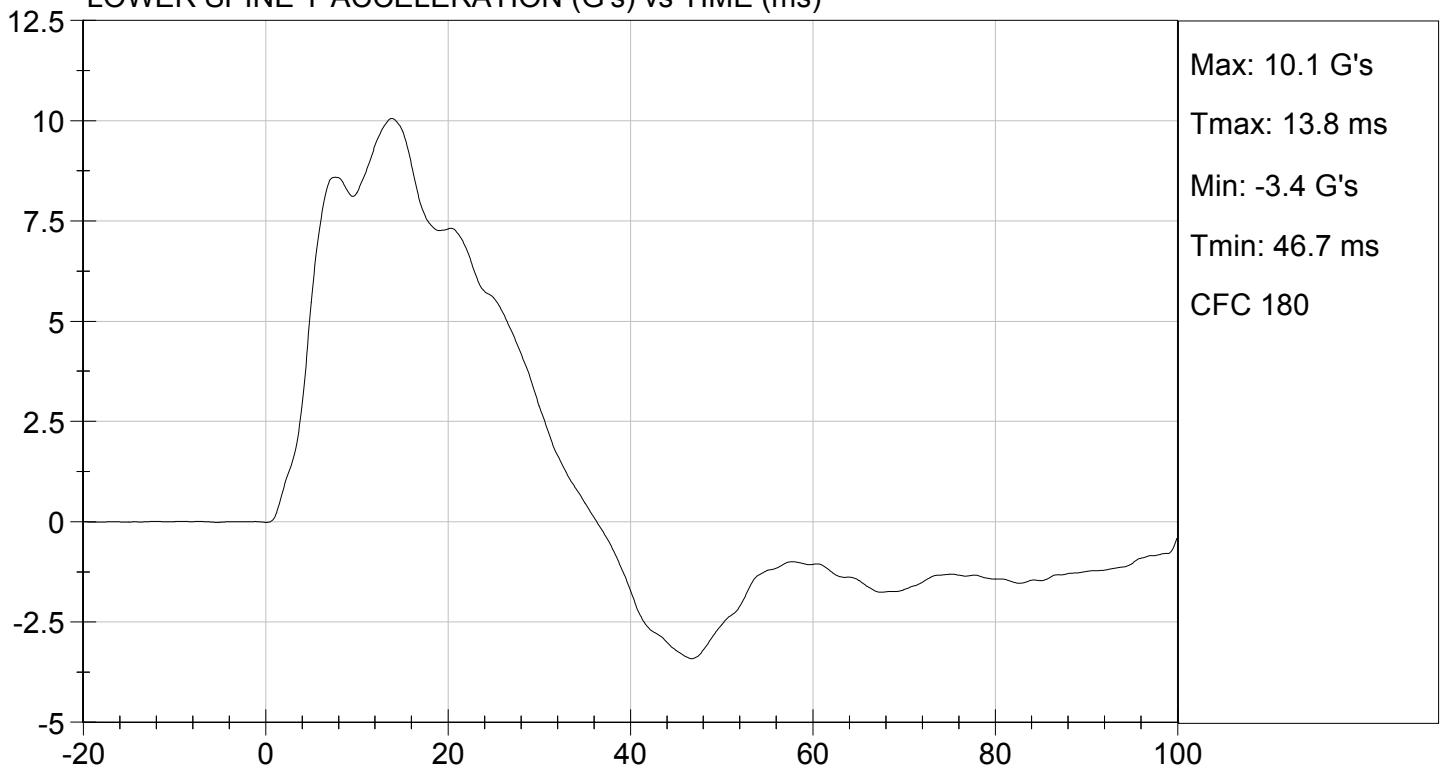
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/20/2013
TEST #: D133215

UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



LOWER SPINE Y ACCELERATION (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

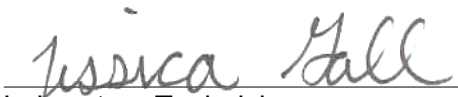
ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D133216

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.8	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	12 to 16	13	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	43	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	37	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
Overall Test Results				Pass


Laboratory Technician

09/20/2013

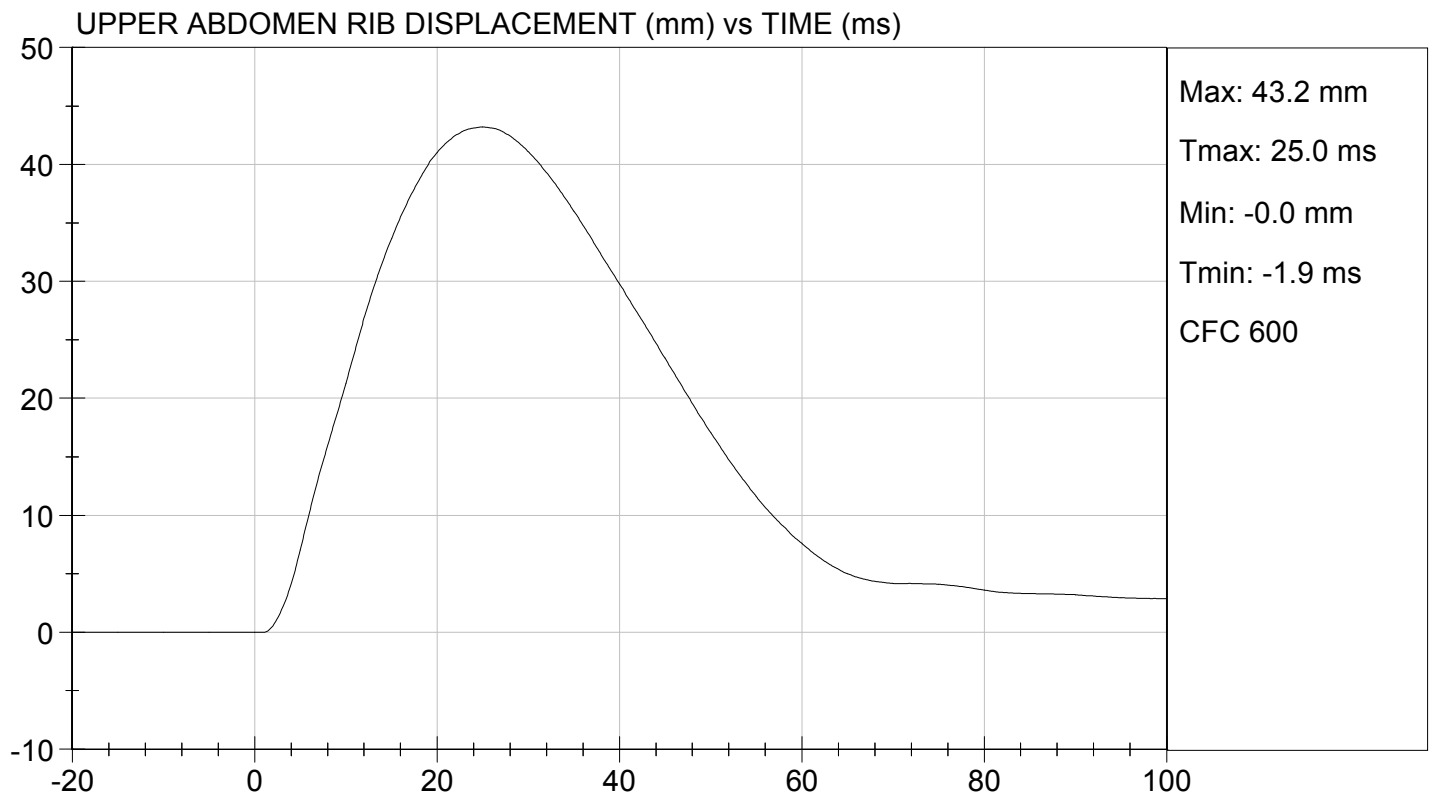
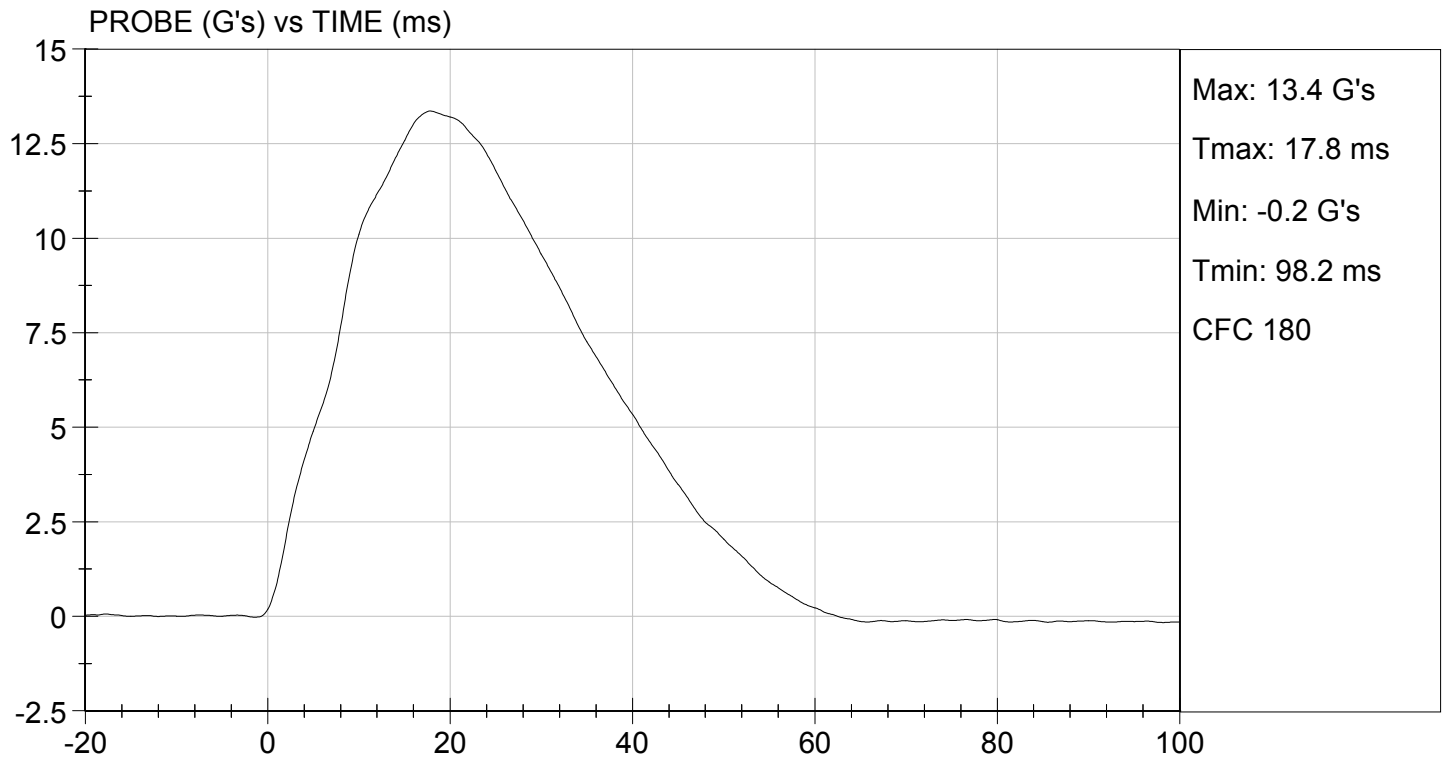
Test Date


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/20/2013
TEST #: D133216

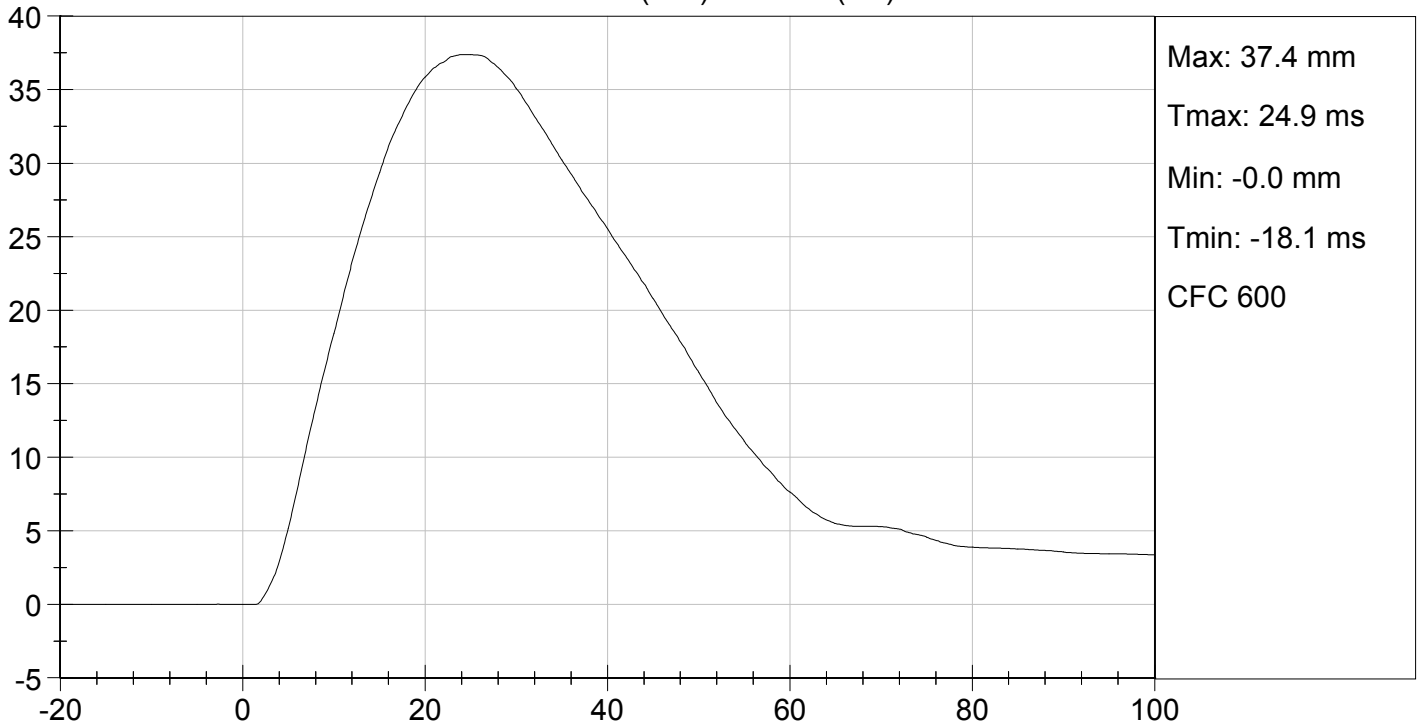




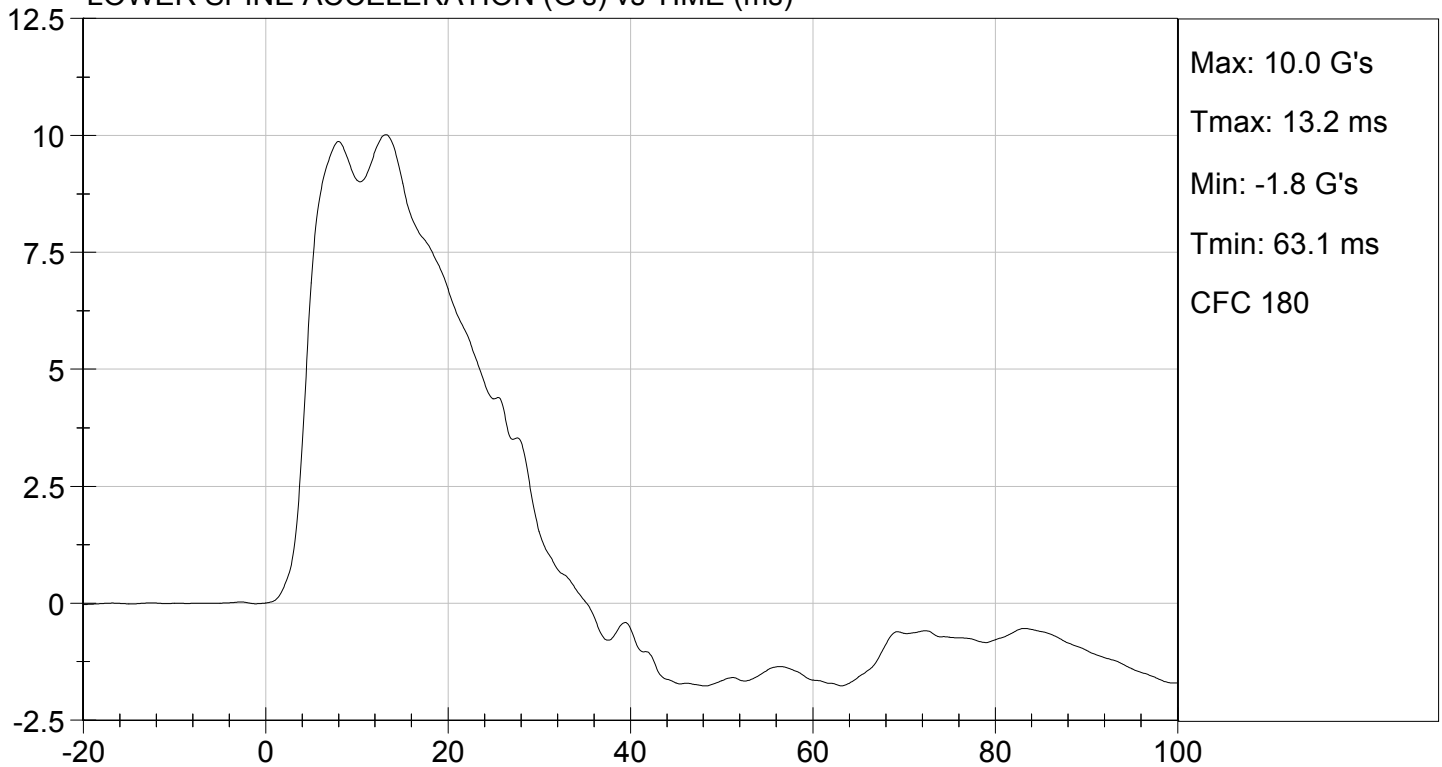
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/20/2013
TEST #: D133216

LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER SPINE ACCELERATION (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

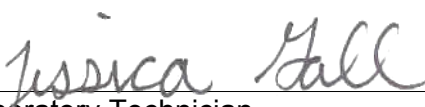
PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D133217

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	48	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	38 to 47	46	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	40	Pass
Peak Acetabulum Force	N	3600 to 4300	4,240	Pass
Overall Test Results				Pass


Laboratory Technician

09/20/2013

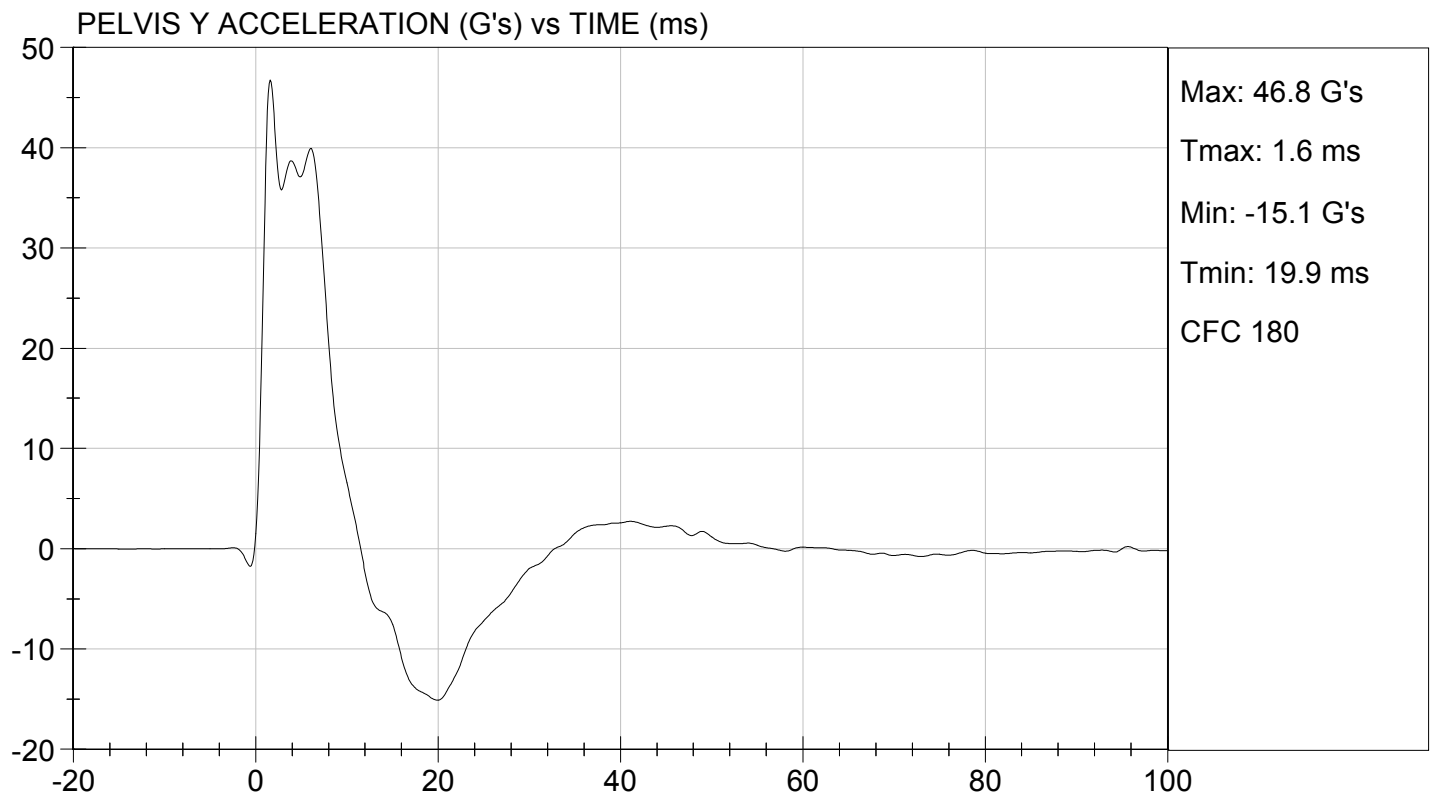
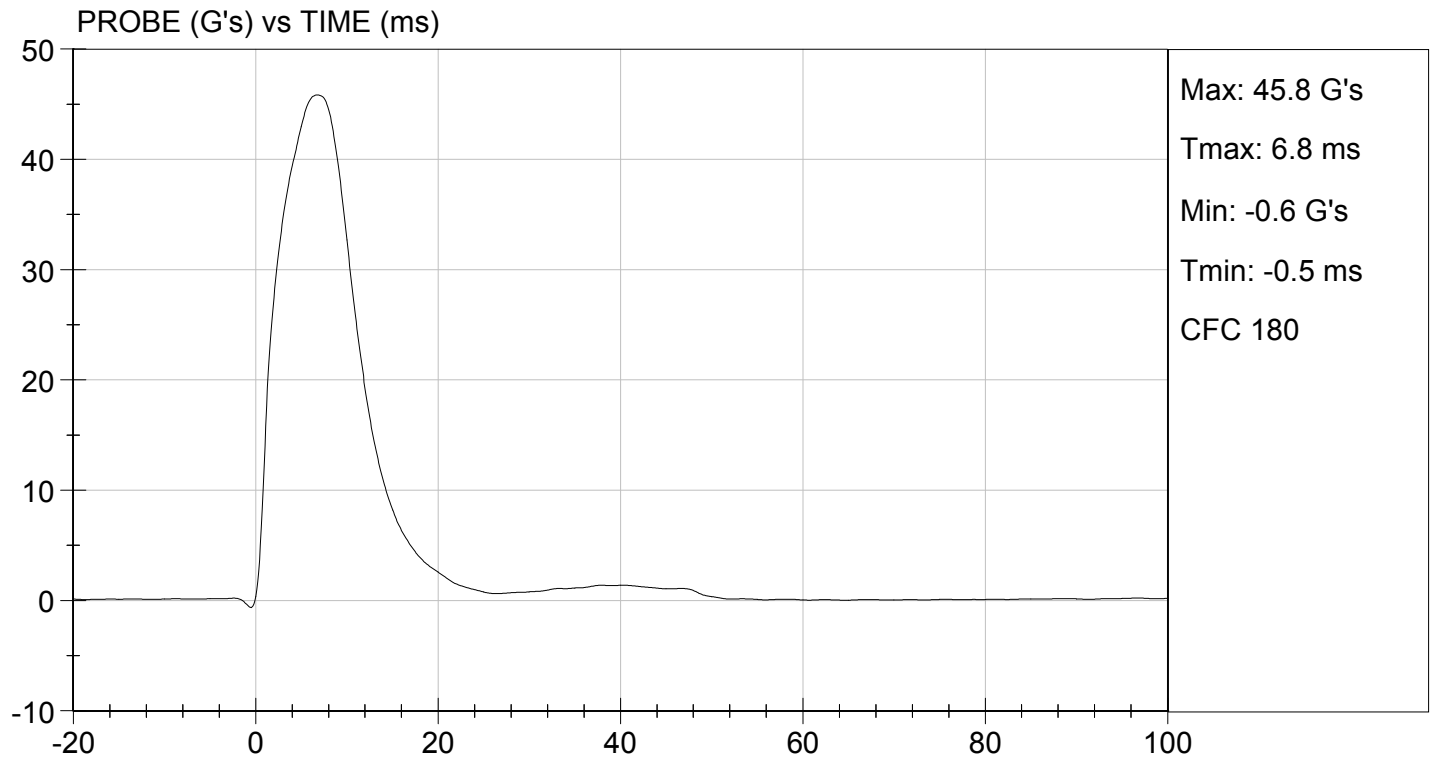
Test Date


Approved By



TEST DESC: PELVIS IMPACT
VELOCITY: 22.22 ft/s, 6.77 m/s

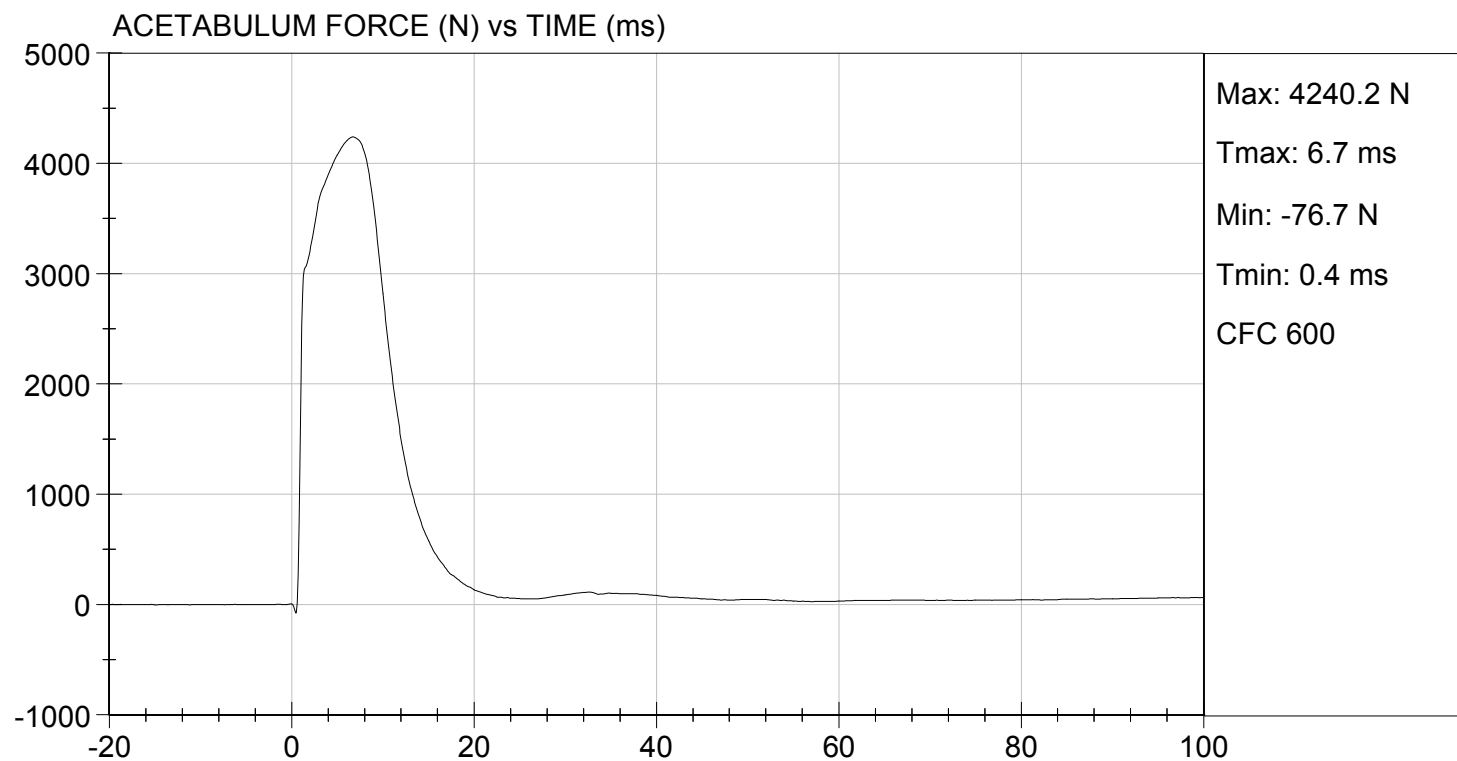
TEST DATE: 09/20/2013
TEST #: D133217





TEST DESC: PELVIS IMPACT
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 09/20/2013
TEST #: D133217



MGA RESEARCH CORPORATION

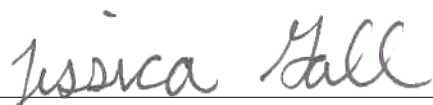
ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D133218

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	48	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	36 to 45	39	Pass
Pelvis Y Acceleration	G's	28 to 39	31	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,732	Pass
Overall Test Results				Pass


Laboratory Technician

09/20/2013

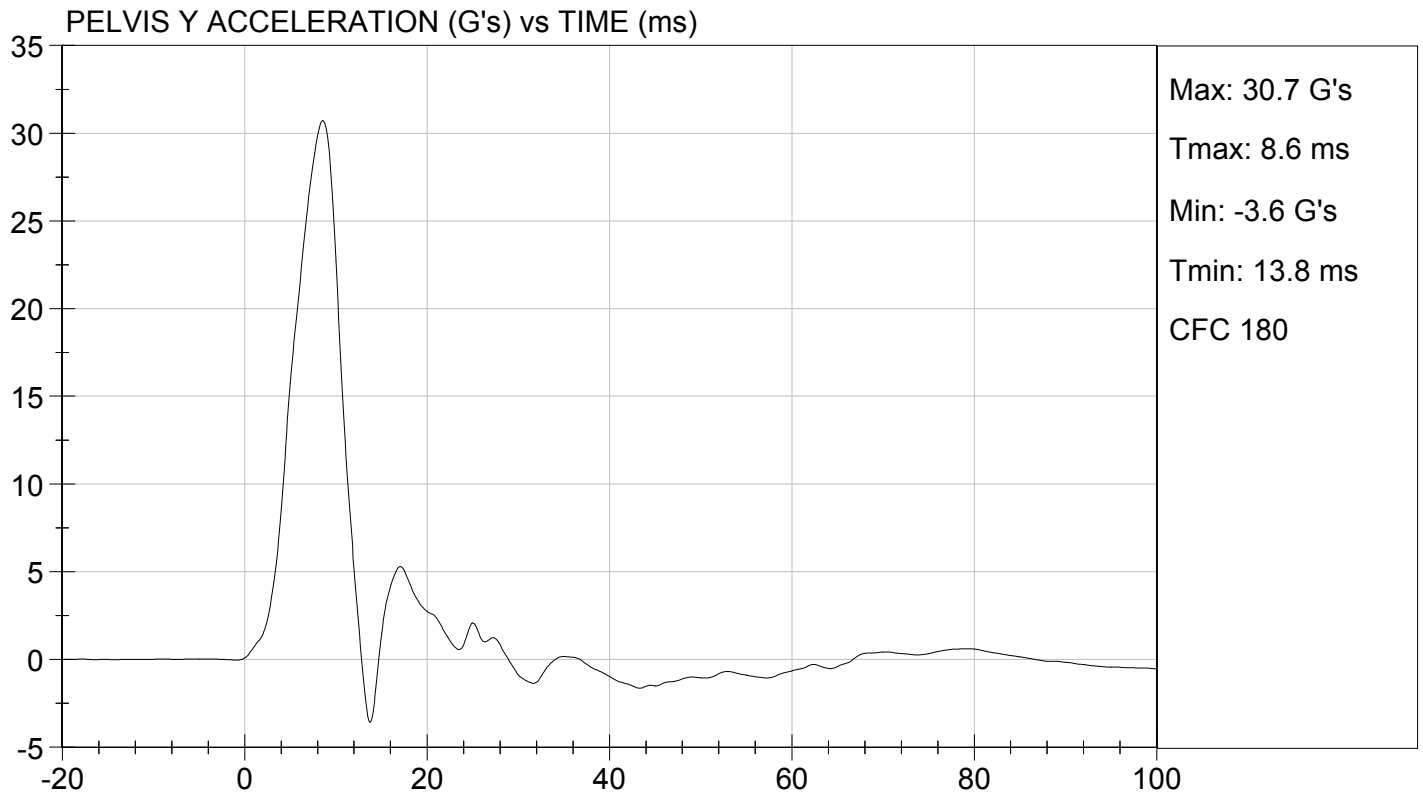
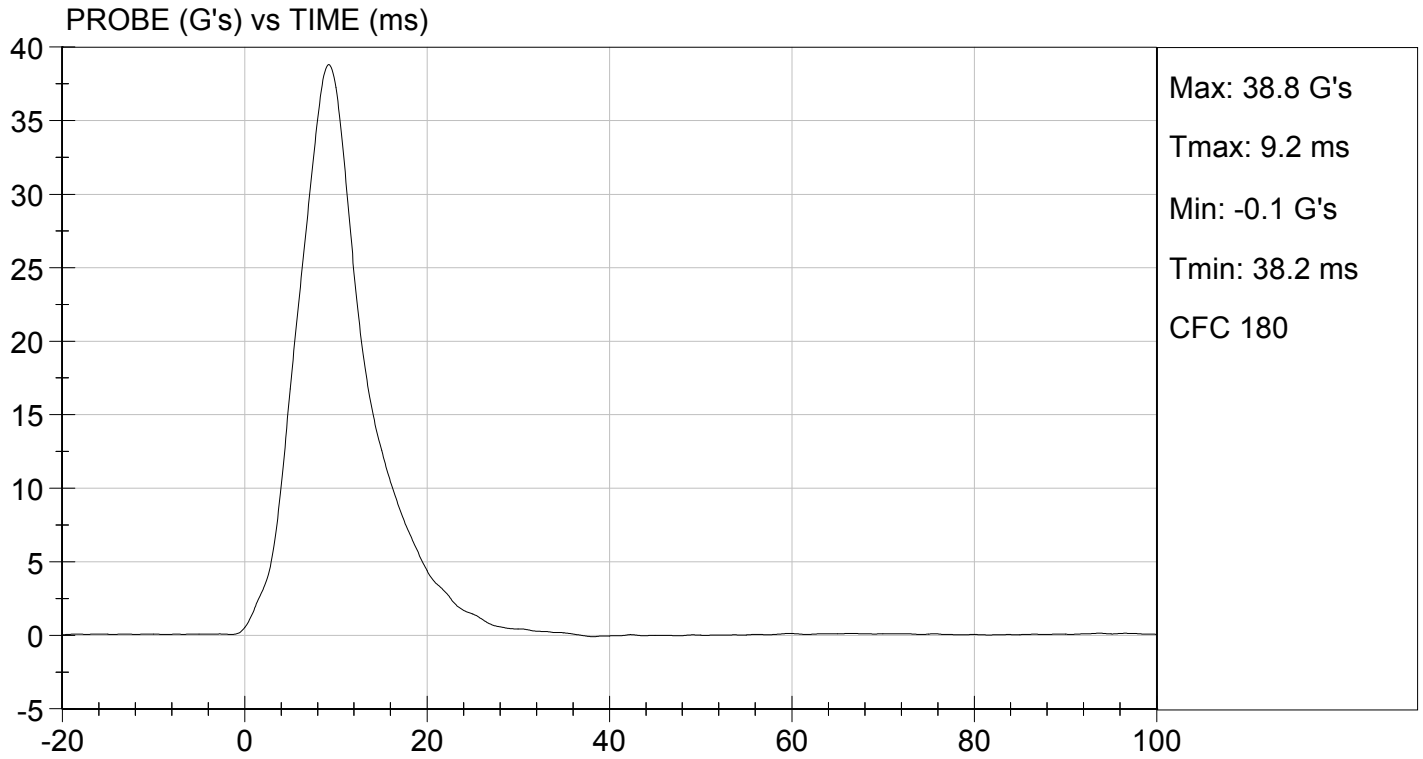
Test Date


Approved By



TEST DESC: ILLIAC
VELOCITY: 14.25 ft/s, 4.34 m/s

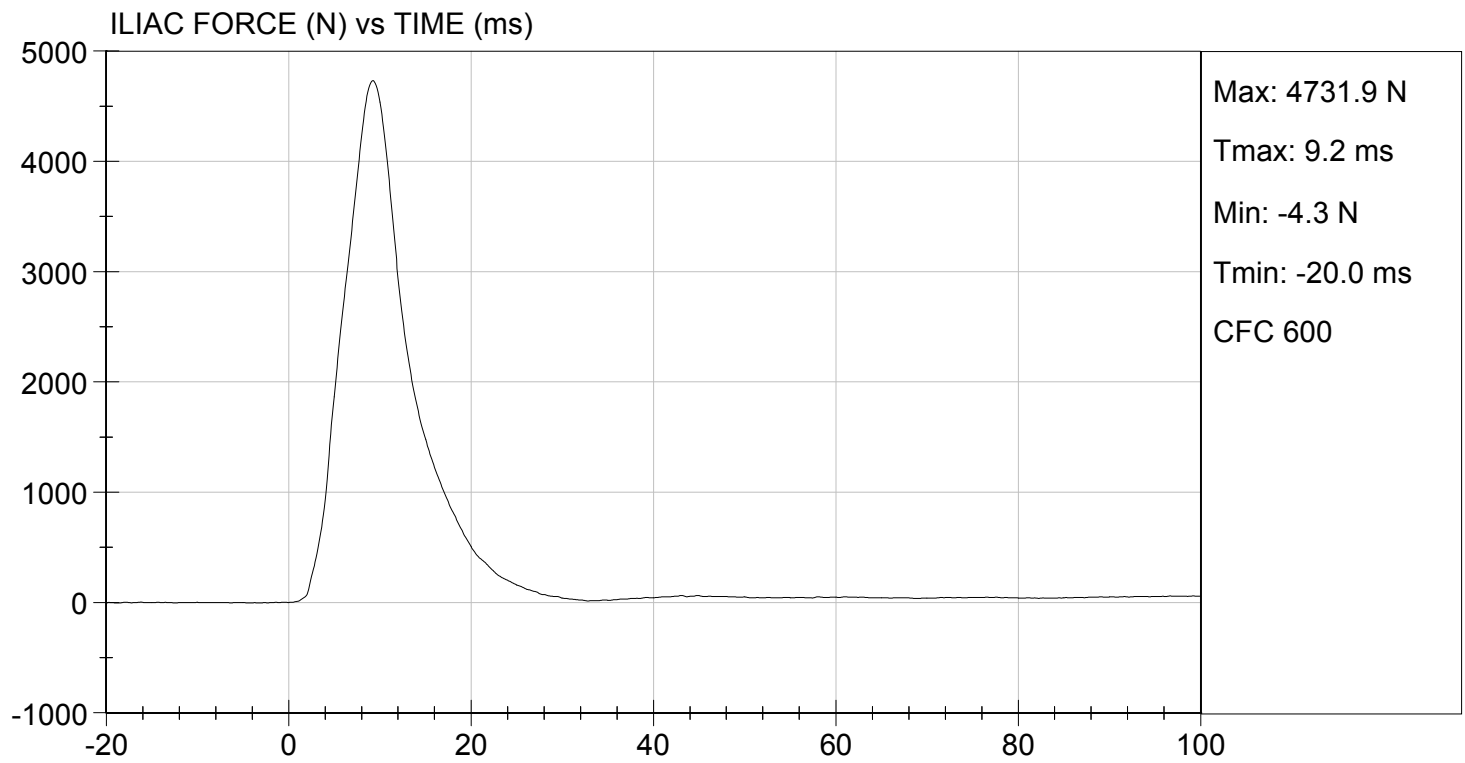
TEST DATE: 09/20/2013
TEST #: D133218





TEST DESC: ILLIAC
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 09/20/2013
TEST #: D133218



MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

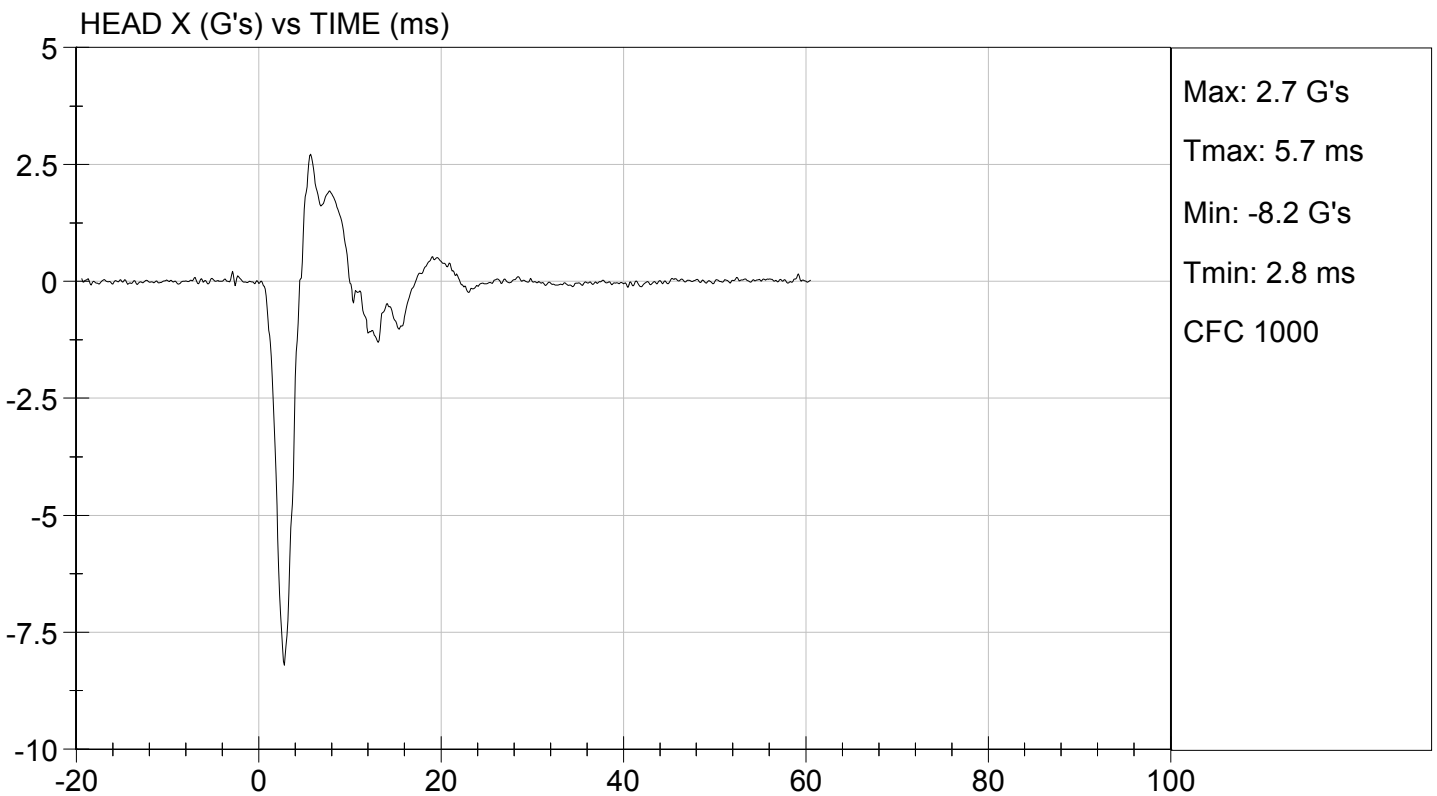
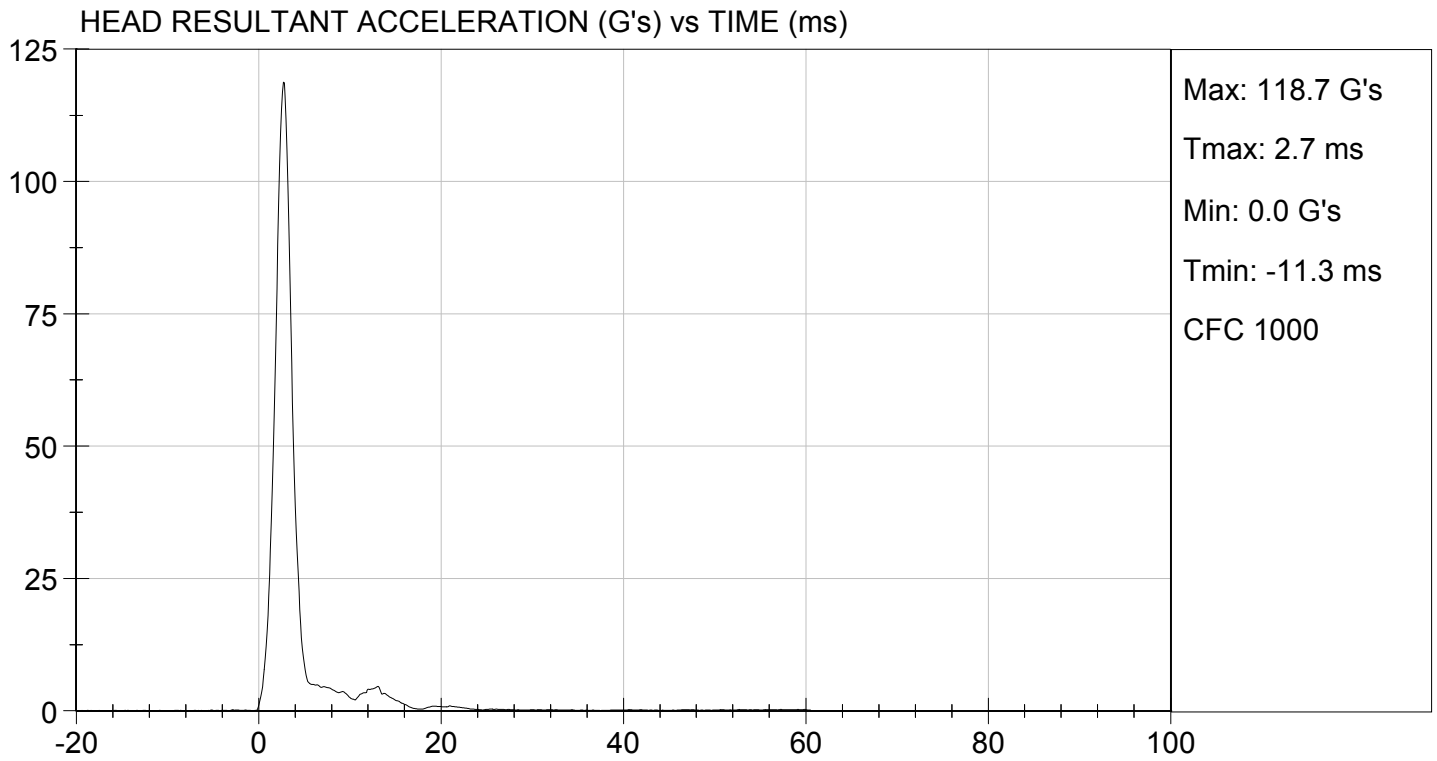
Test ID: D133541

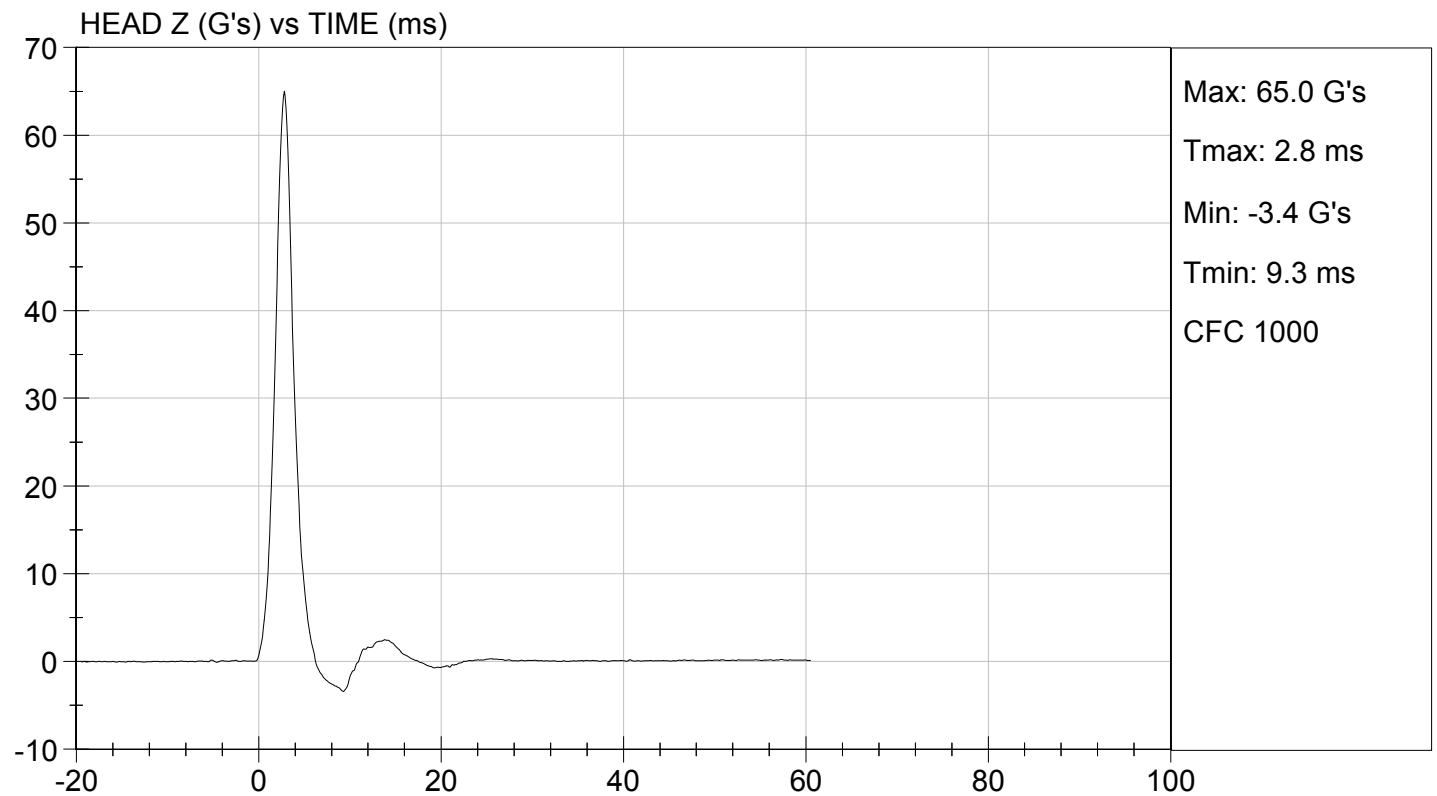
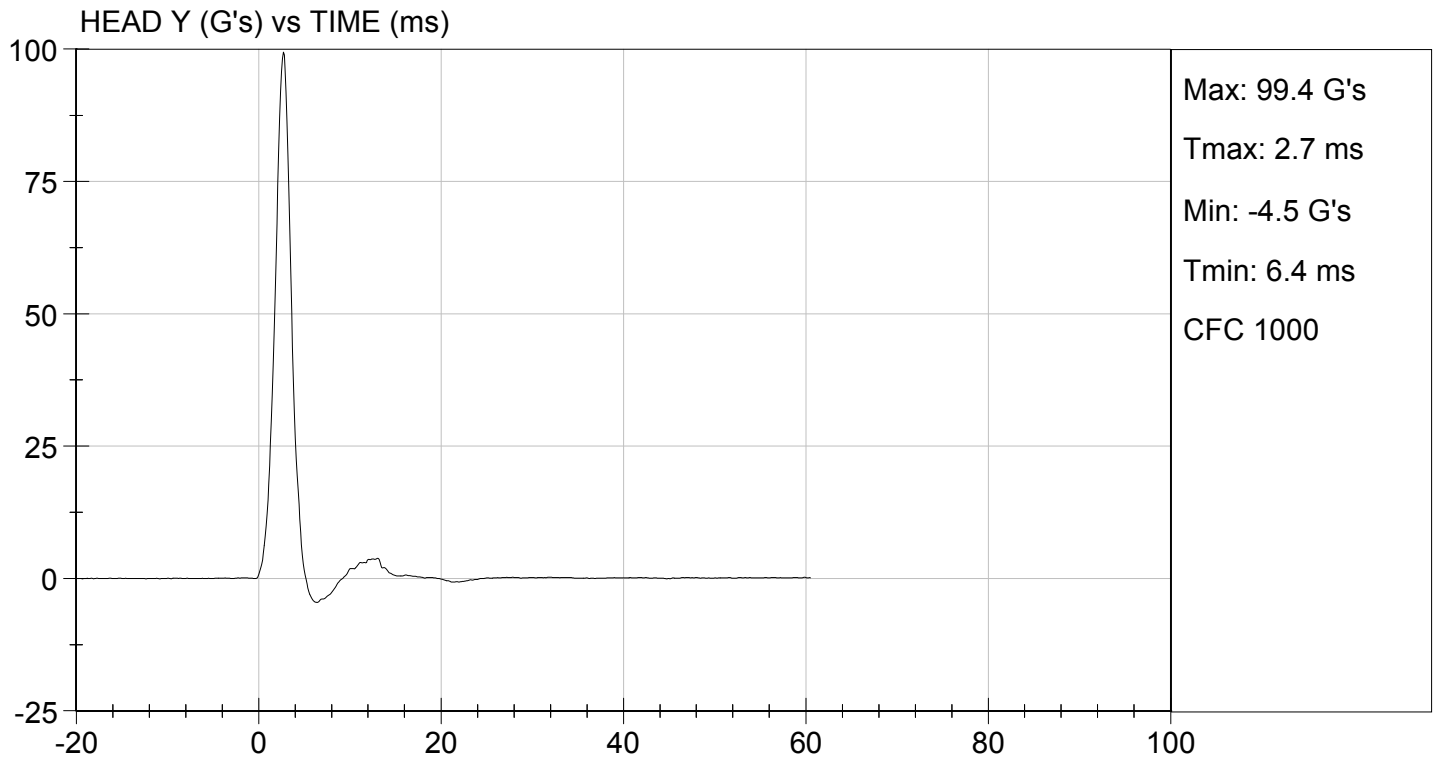
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Peak Resultant Acceleration	G's	115 to 137	119	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-8.2	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results			Pass	


Laboratory Technician

10/22/2013
Test Date


Approved By



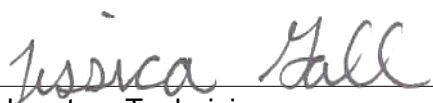


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D133542

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.5	Pass
Humidity		%	10 to 70	23	Pass
Impact Velocity		m/s	5.51 to 5.63	5.63	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.30	Pass
	15 ms	m/s	3.30 to 4.10	3.38	Pass
	20 ms	m/s	4.40 to 5.40	4.47	Pass
	25 ms	m/s	5.40 to 6.10	5.40	Pass
	25-100 ms	m/s	5.50 to 6.20	5.76	Pass
Maximum D-Plane Rotation		deg	71 to 81	79	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	64	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-41	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	119	Pass
Overall Test Results				Pass	


 Laboratory Technician

10/23/2013

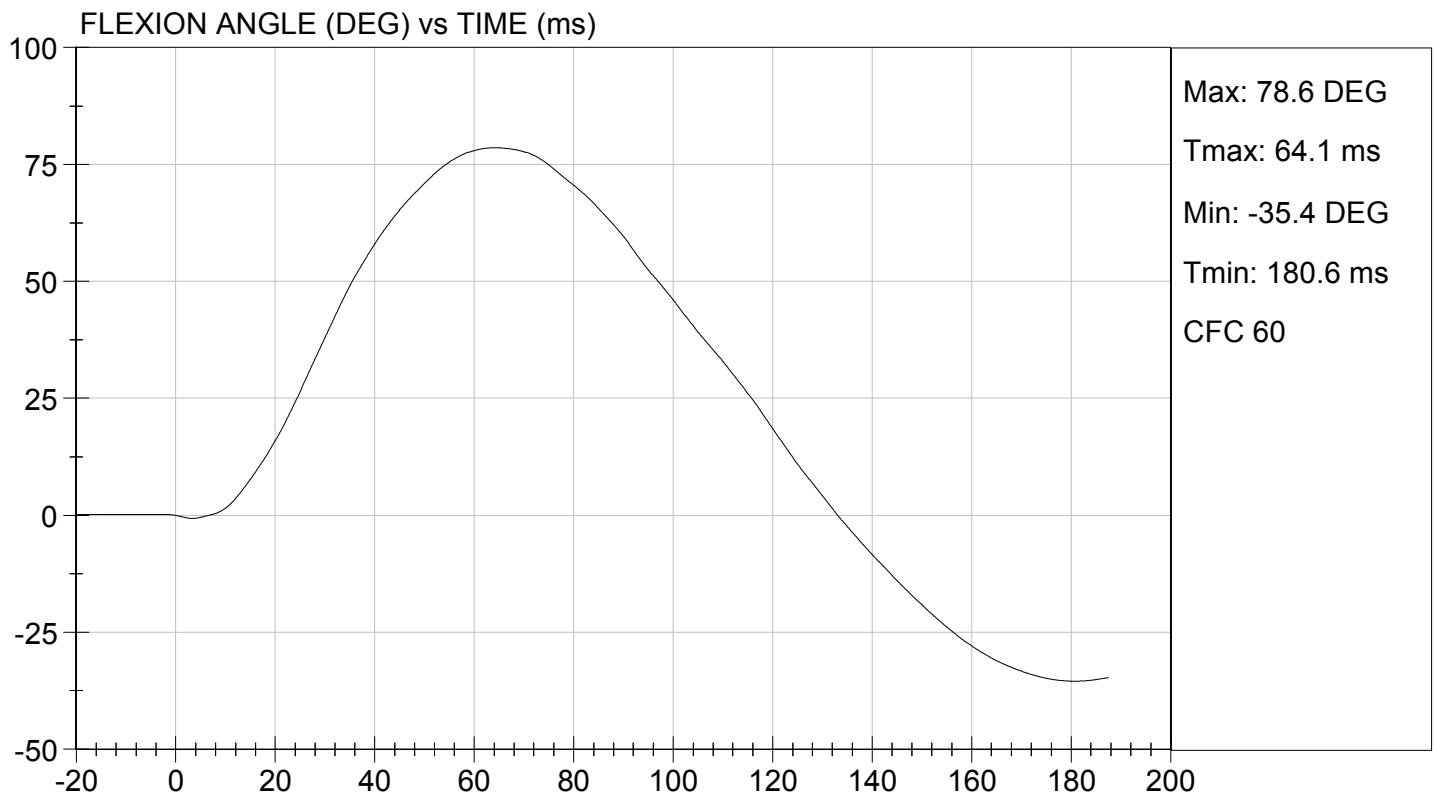
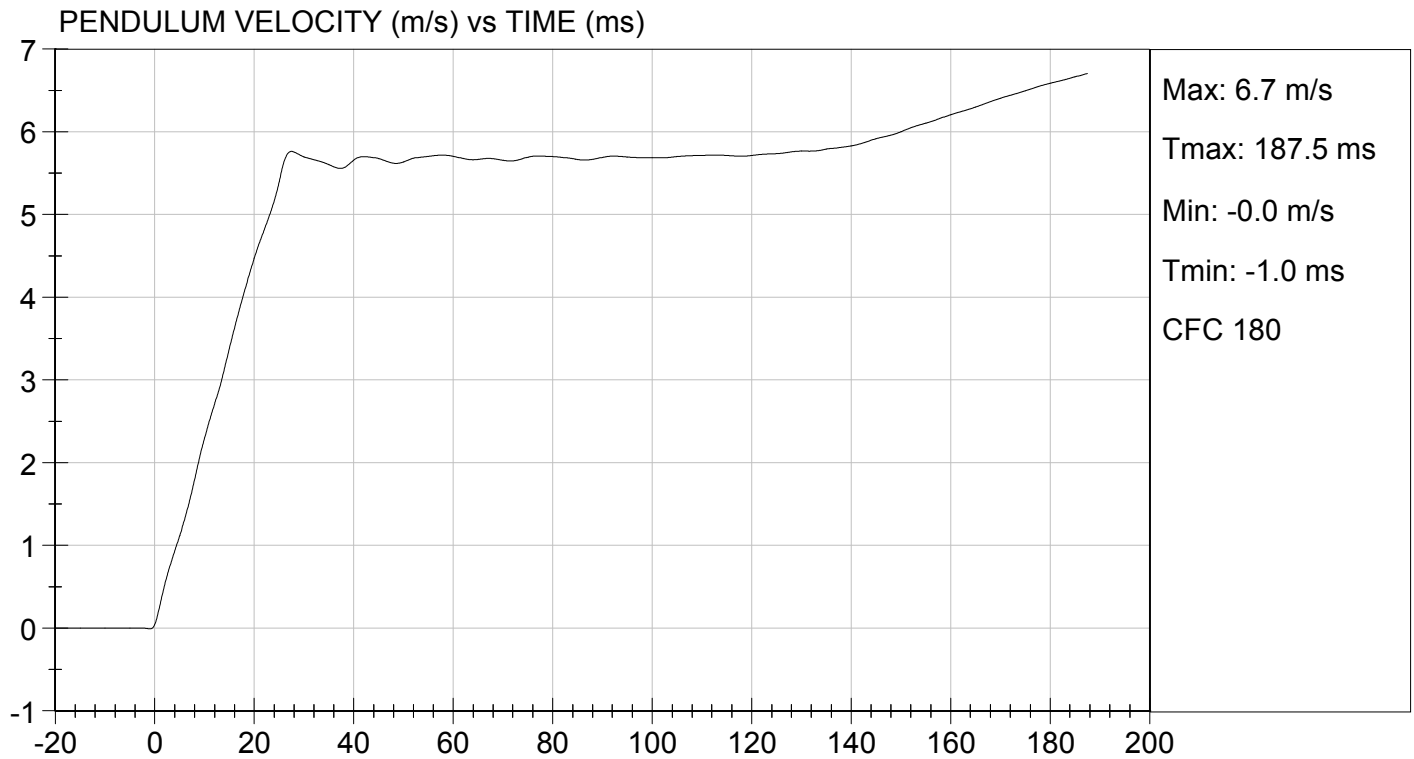
Test Date


 Approved By



TEST DESC: NECK BENDING
VELOCITY: 18.47 ft/s, 5.63 m/s

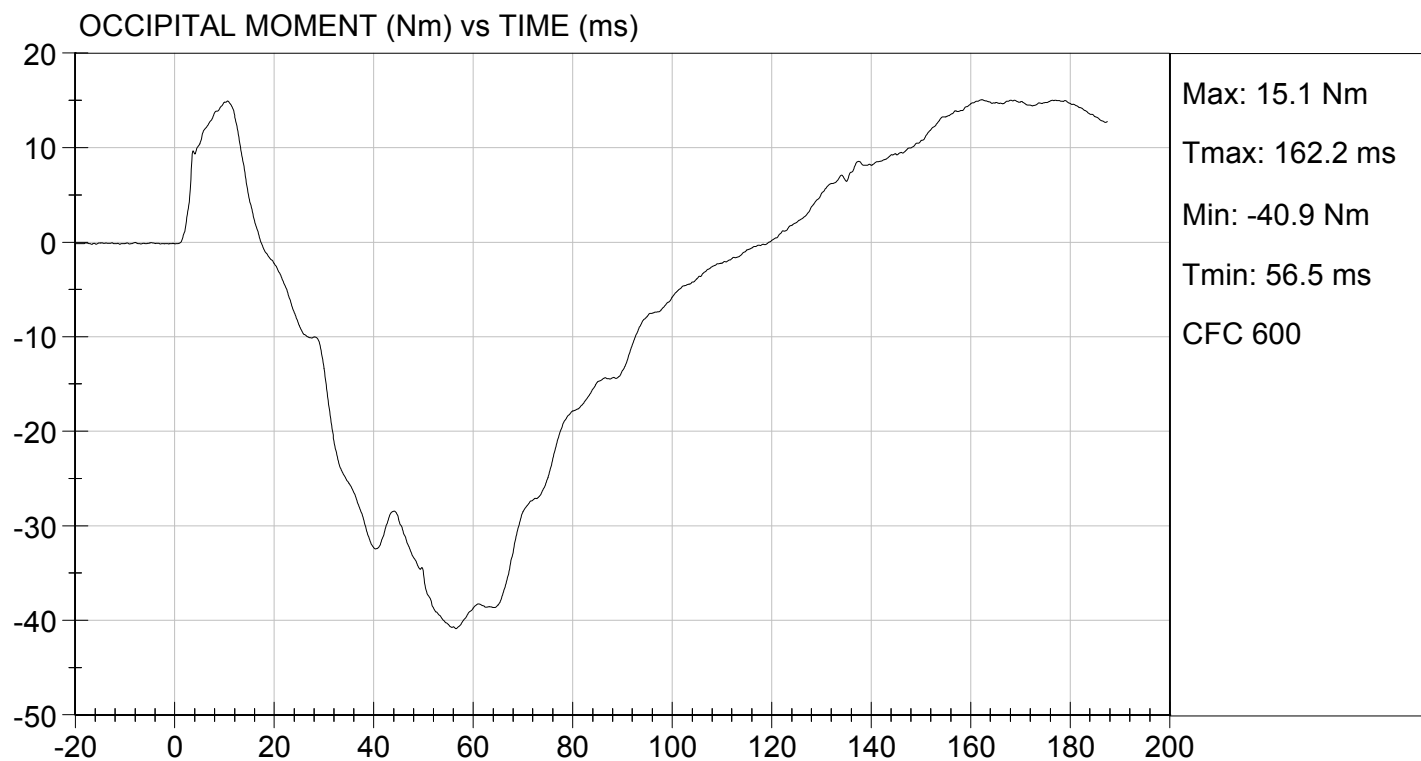
TEST DATE: 10/23/2013
TEST #: D133542





TEST DESC: NECK BENDING
VELOCITY: 18.47 ft/s, 5.63 m/s

TEST DATE: 10/23/2013
TEST #: D133542



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test ID: D133543

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

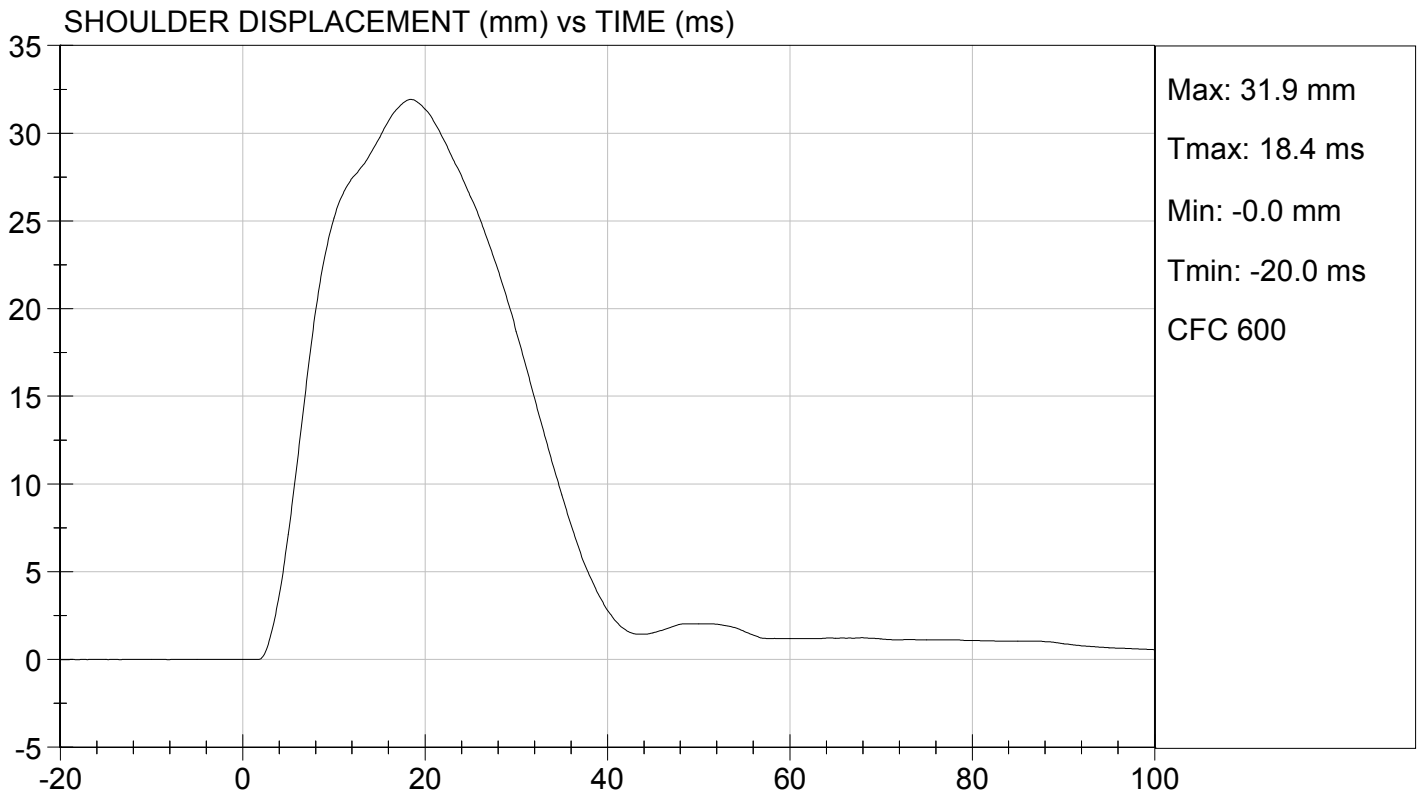
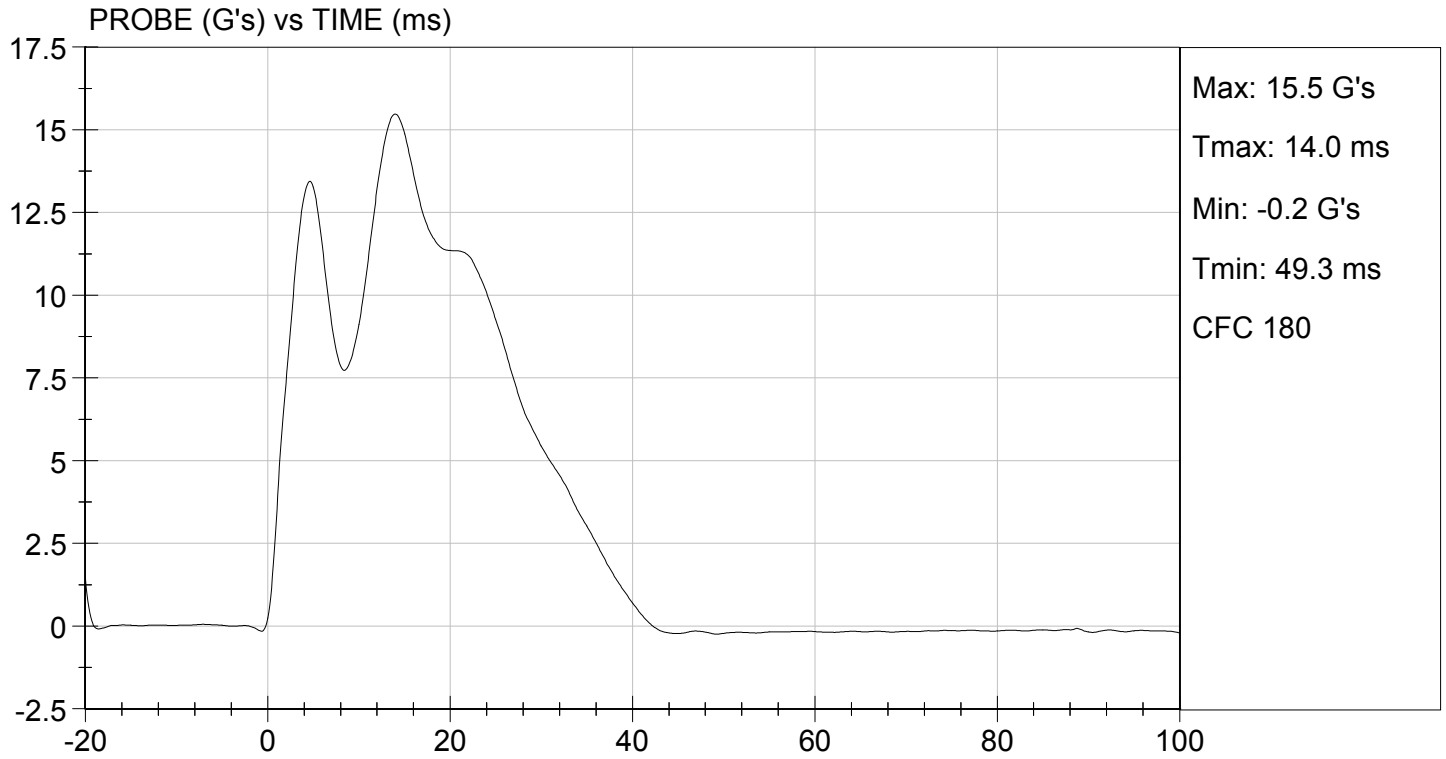
10/22/2013
Test Date

David Winkelbauer
Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

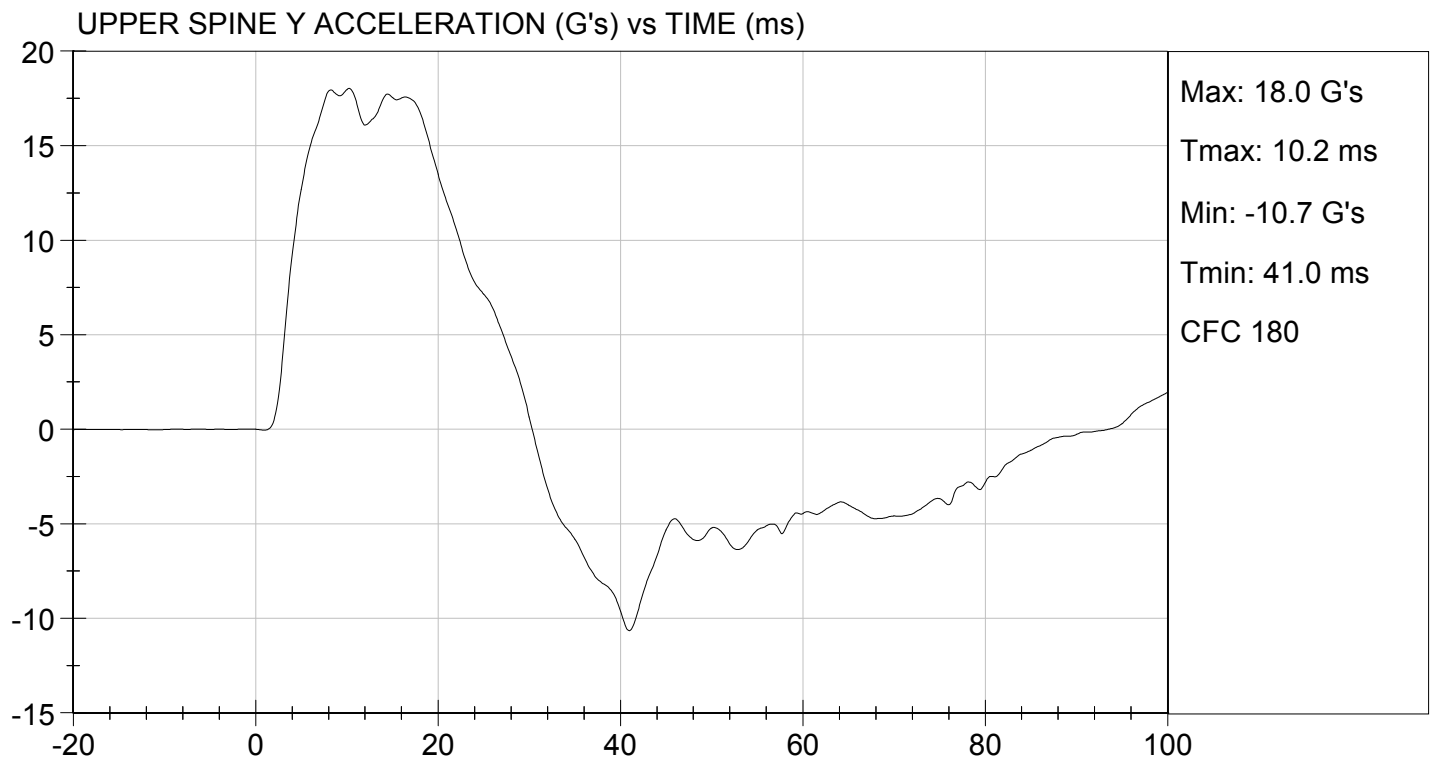
TEST DATE: 10/22/2013
TEST #: D133543





TEST DESC: SHOULDER IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 10/22/2013
TEST #: D133543

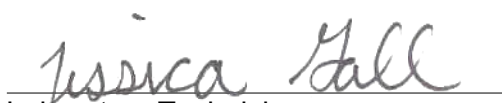


MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D133544

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	32	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	32	Pass
Lower Rib Displacement	mm	32 to 38	37	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	40	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	30	Pass
Overall Test Results				Pass


Laboratory Technician

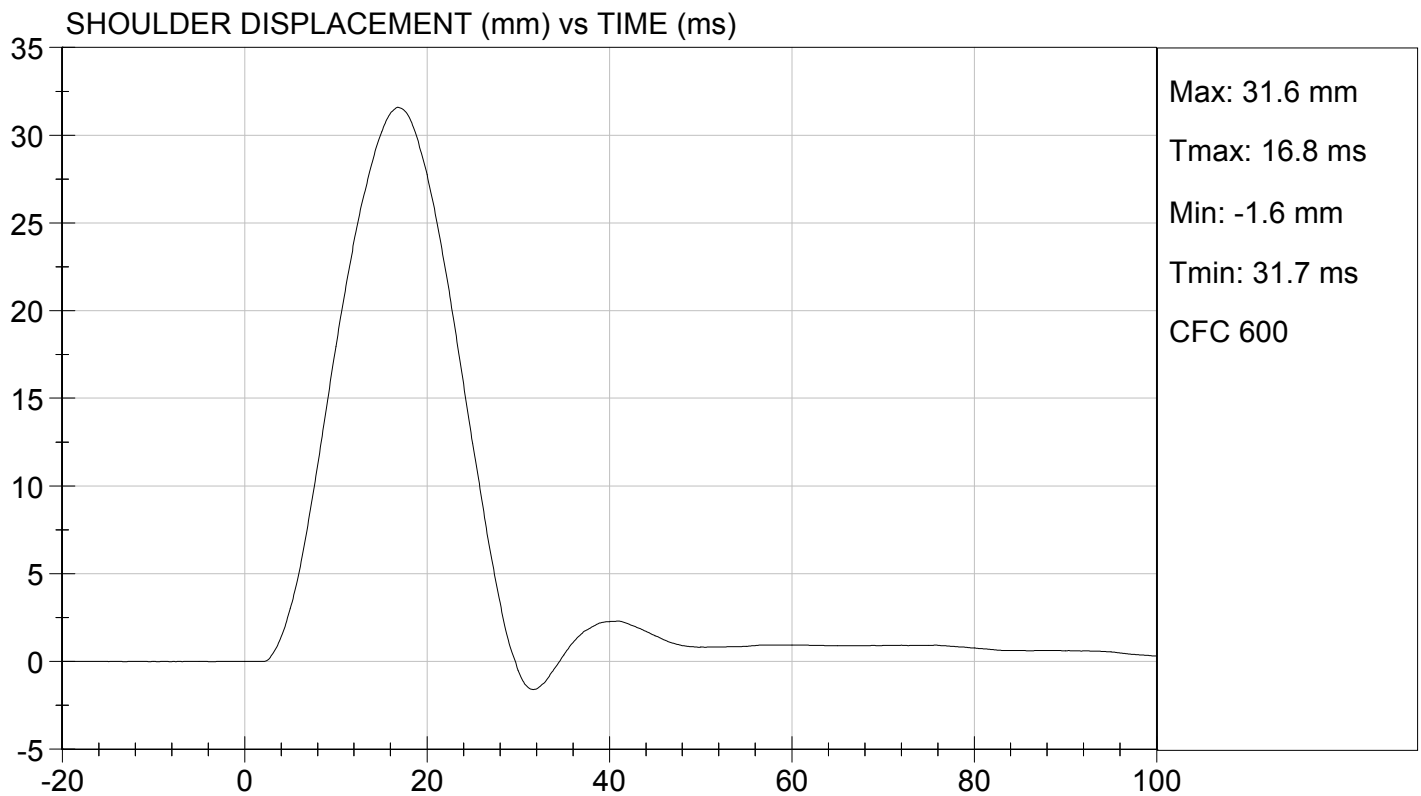
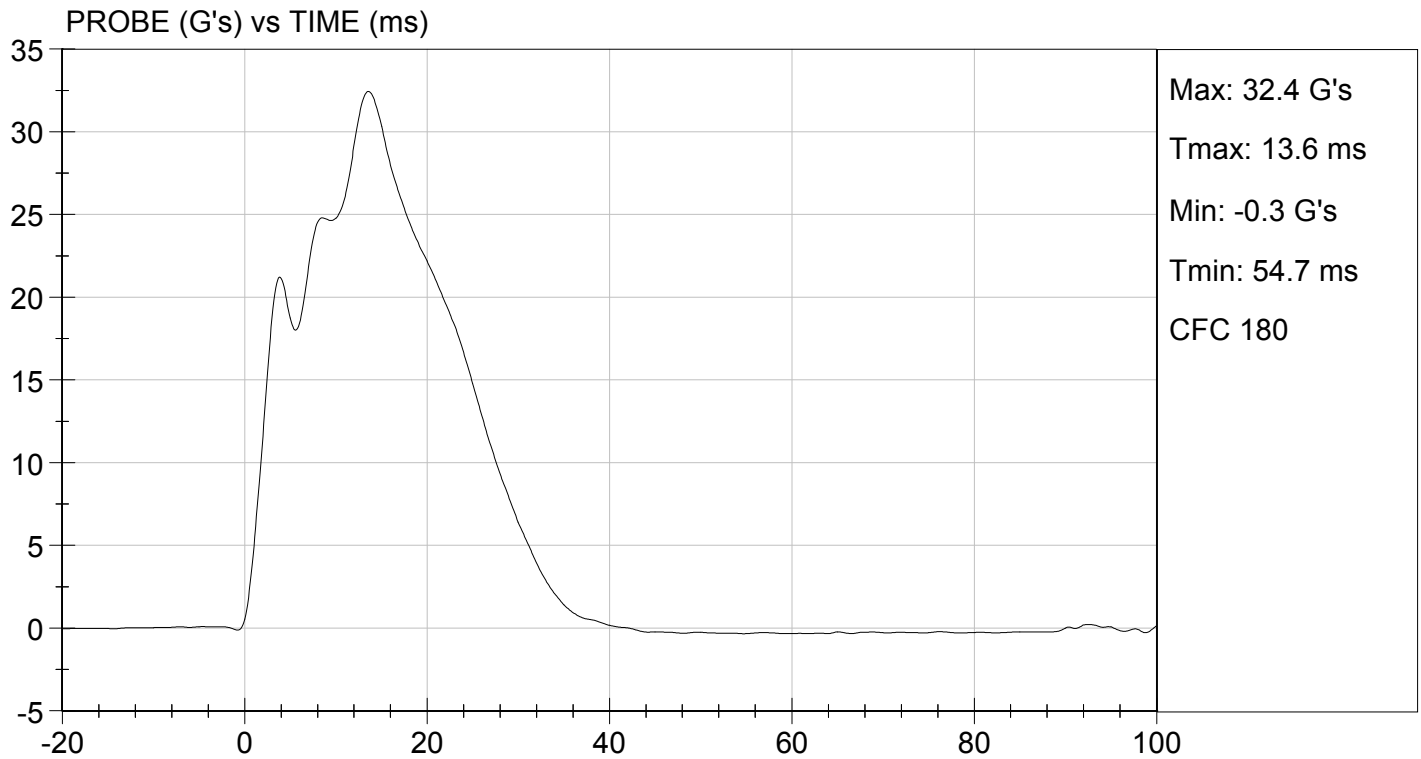
10/22/2013
Test Date


Approved By



TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

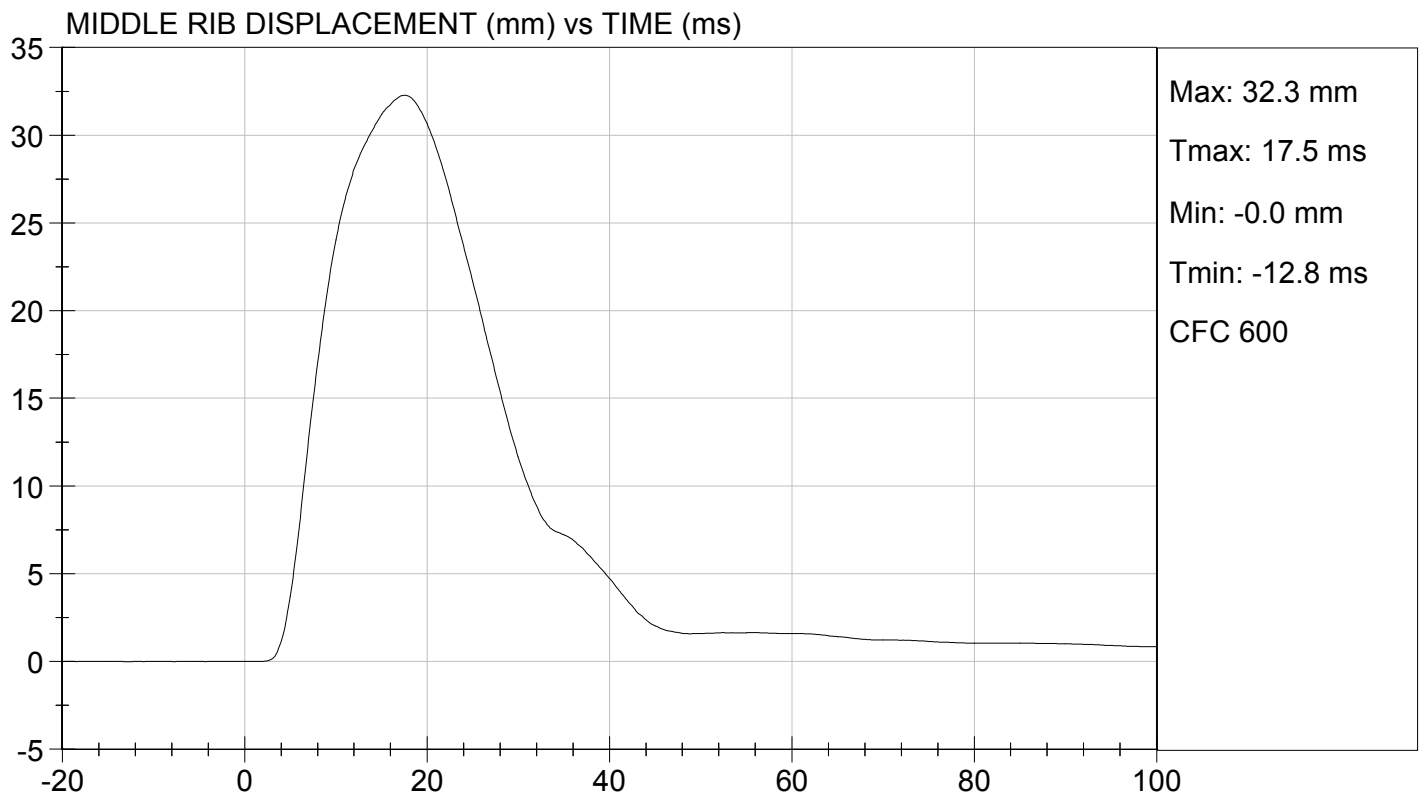
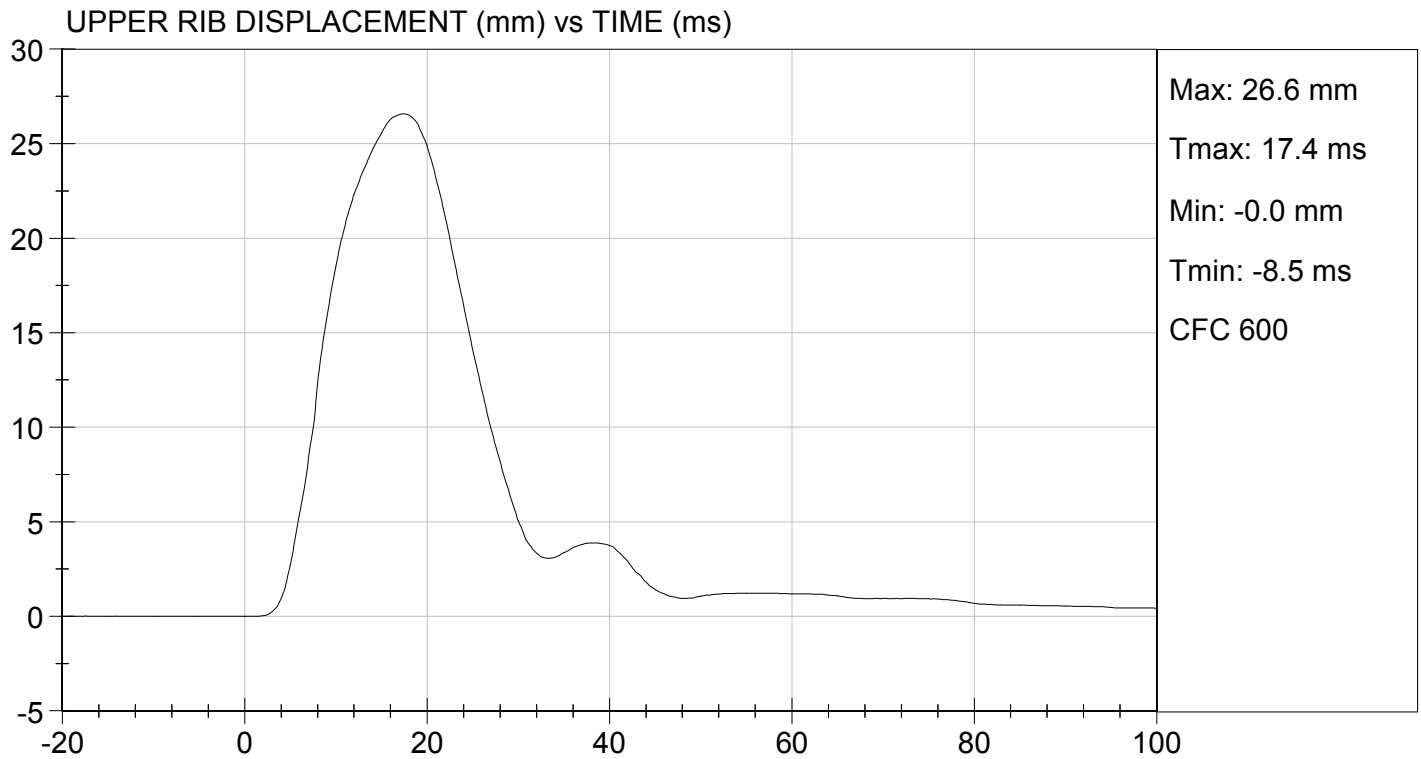
TEST DATE: 10/22/2013
TEST #: D133544





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

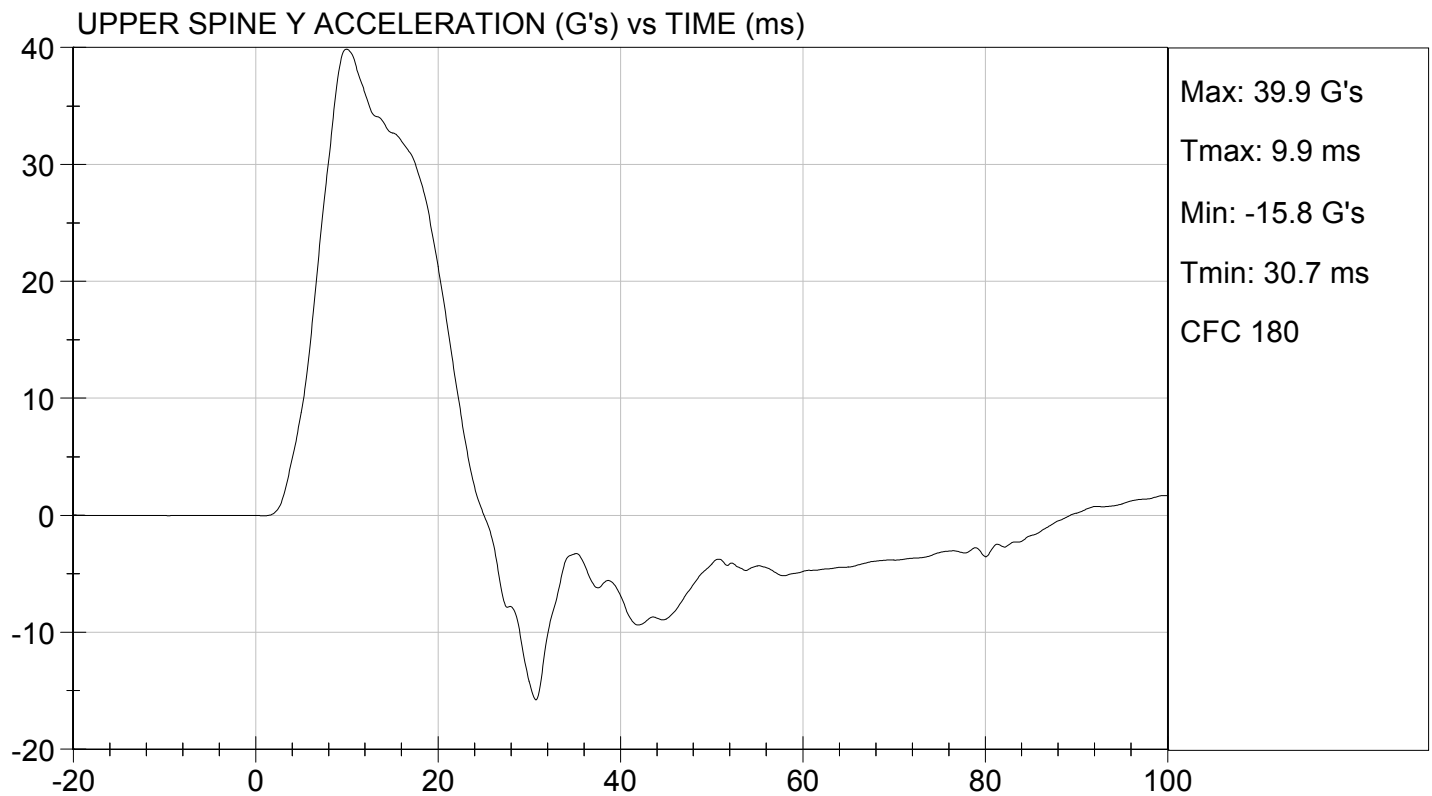
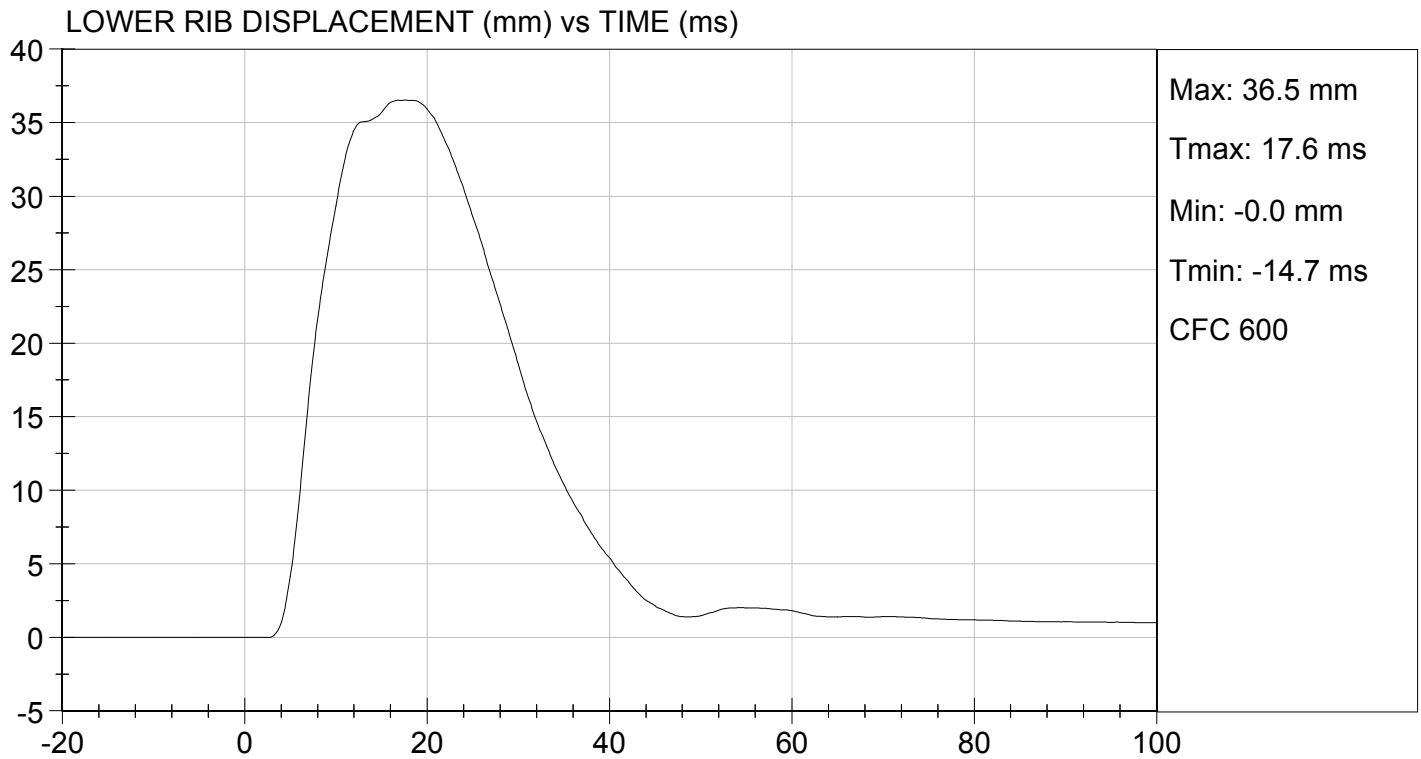
TEST DATE: 10/22/2013
TEST #: D133544





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

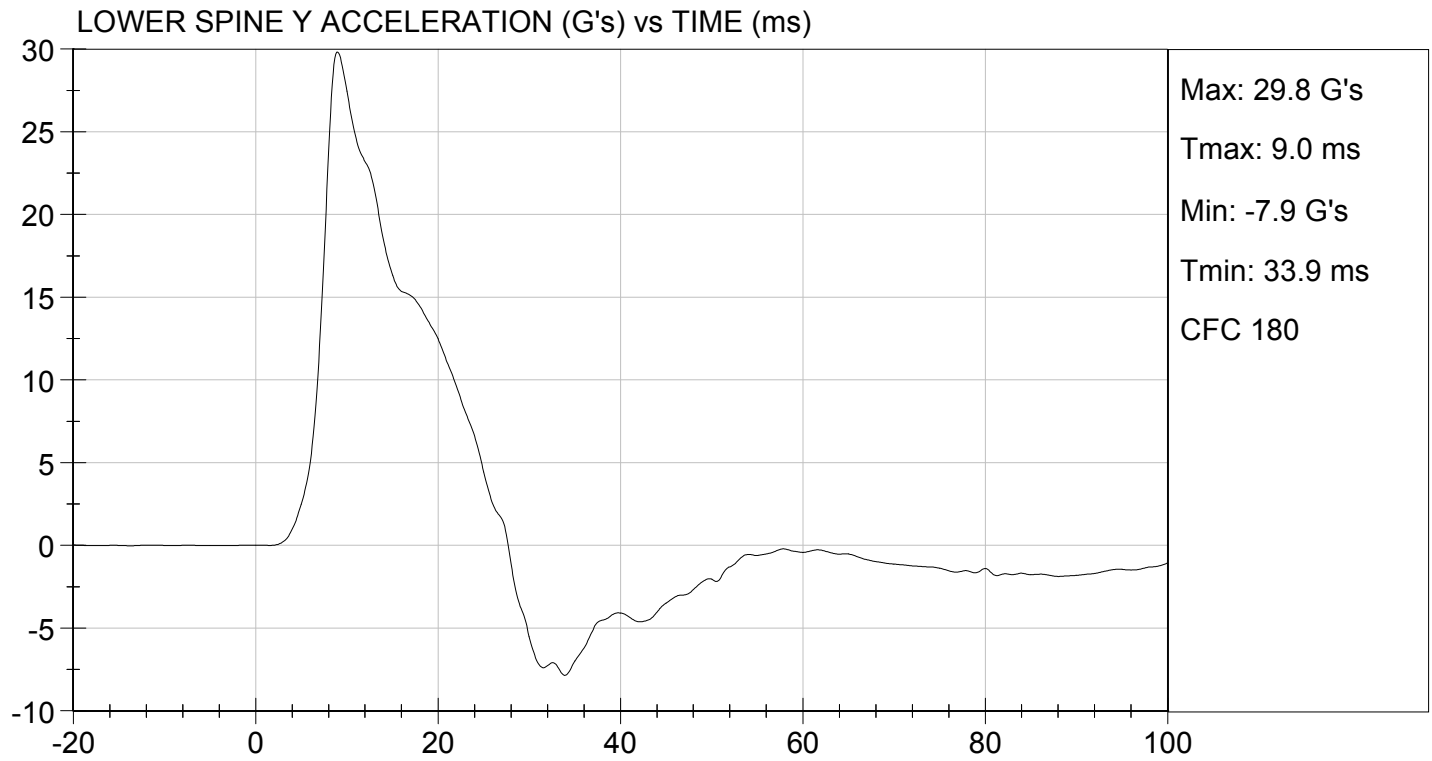
TEST DATE: 10/22/2013
TEST #: D133544





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 10/22/2013
TEST #: D133544



MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D133545

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	35	Pass
Middle Rib Displacement	mm	39 to 45	41	Pass
Lower Rib Displacement	mm	35 to 43	40	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

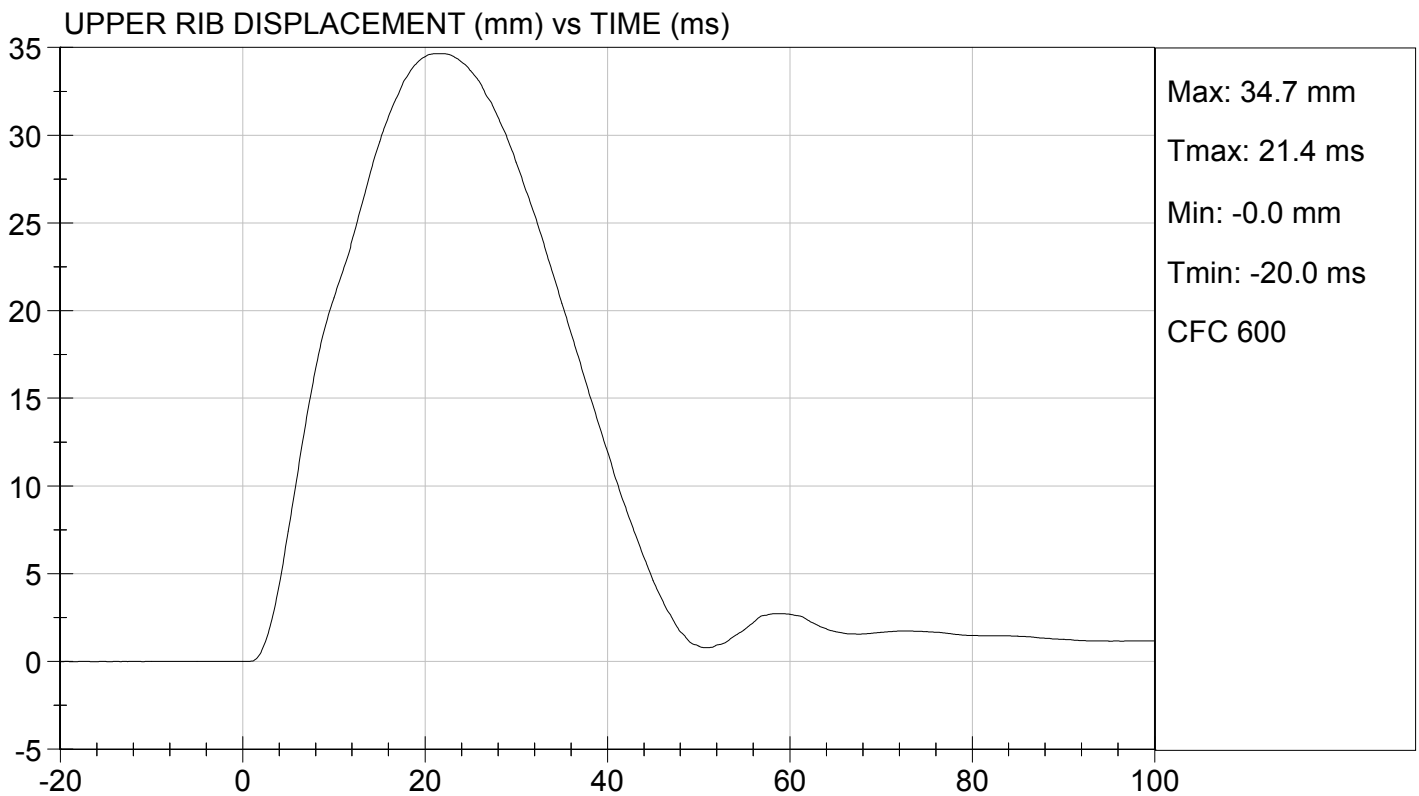
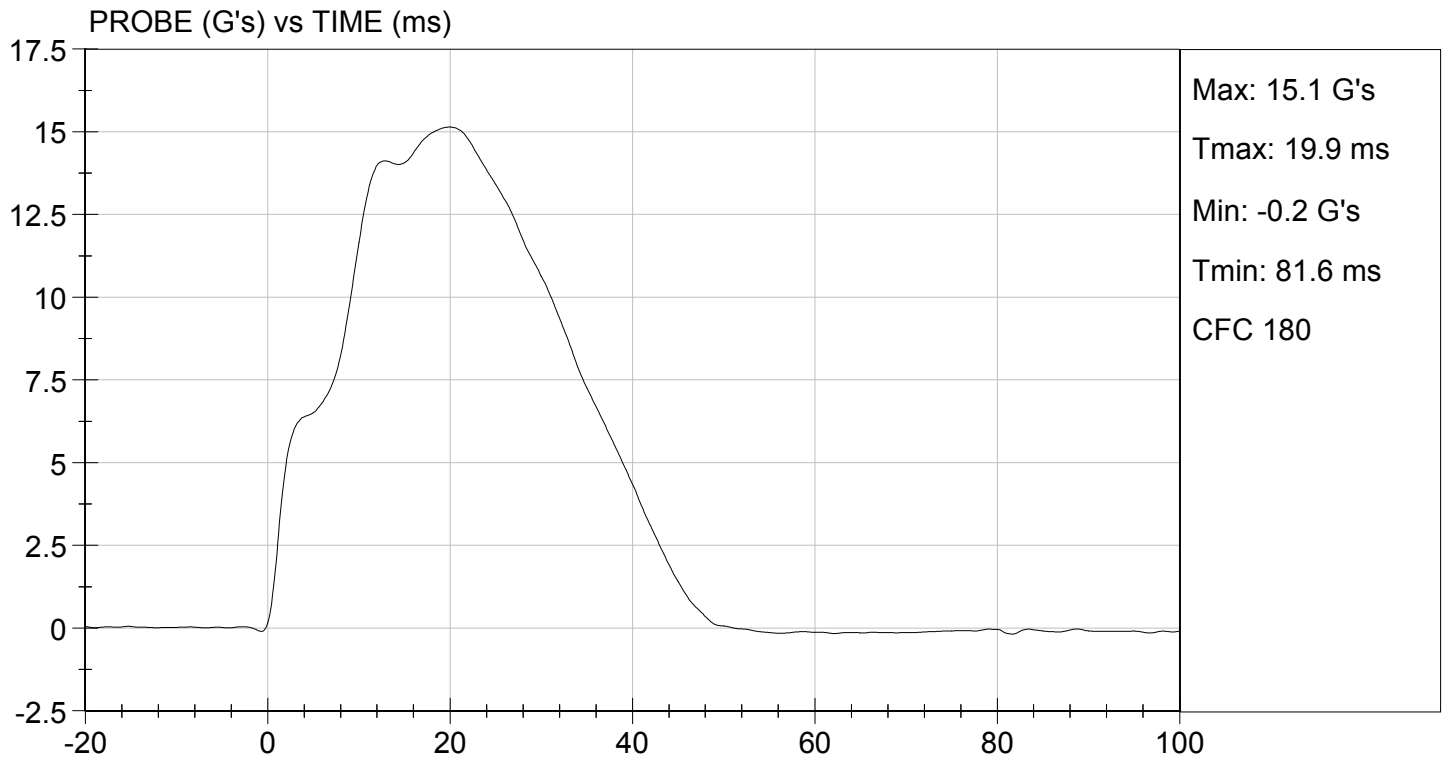
10/22/2013
Test Date

David Winkelbauer
Approved By



TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

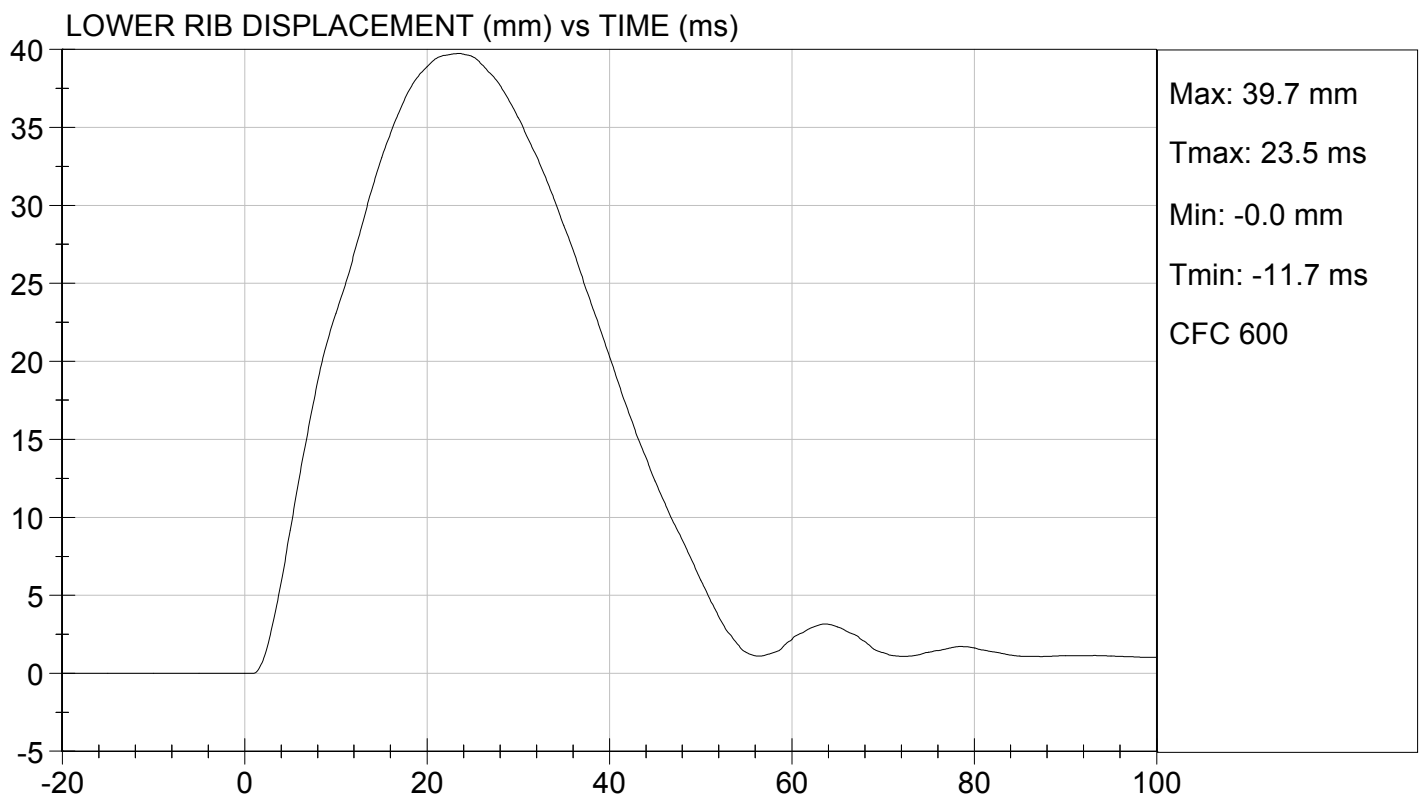
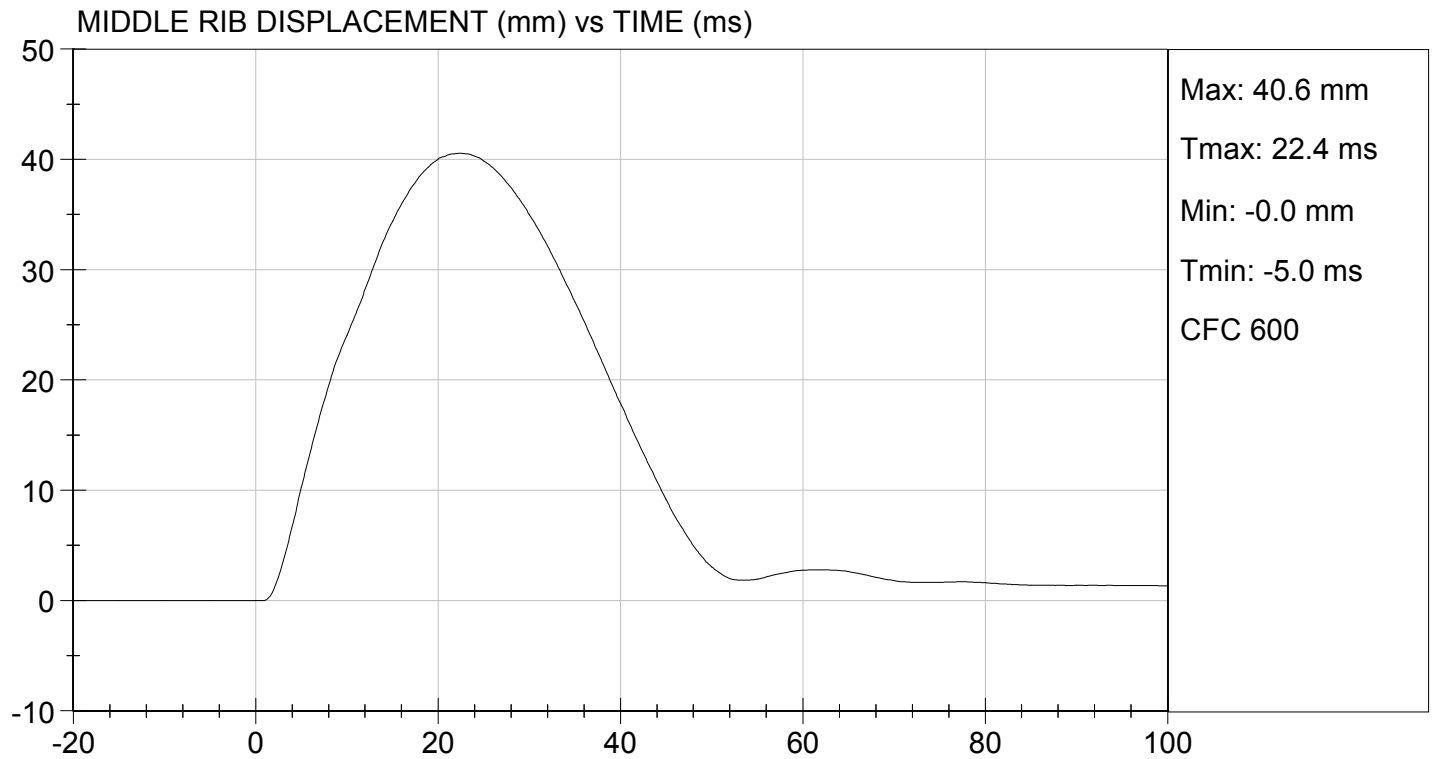
TEST DATE: 10/22/2013
TEST #: D133545





TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 10/22/2013
TEST #: D133545

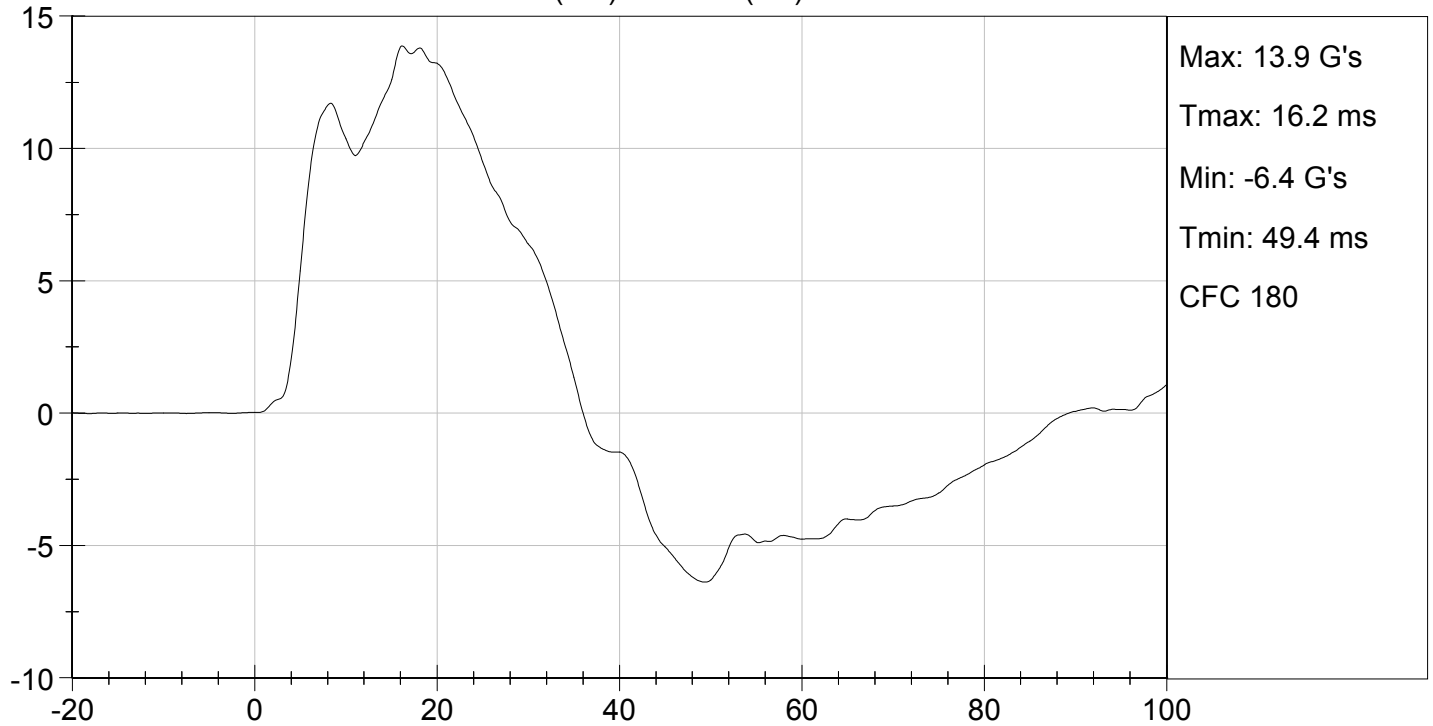




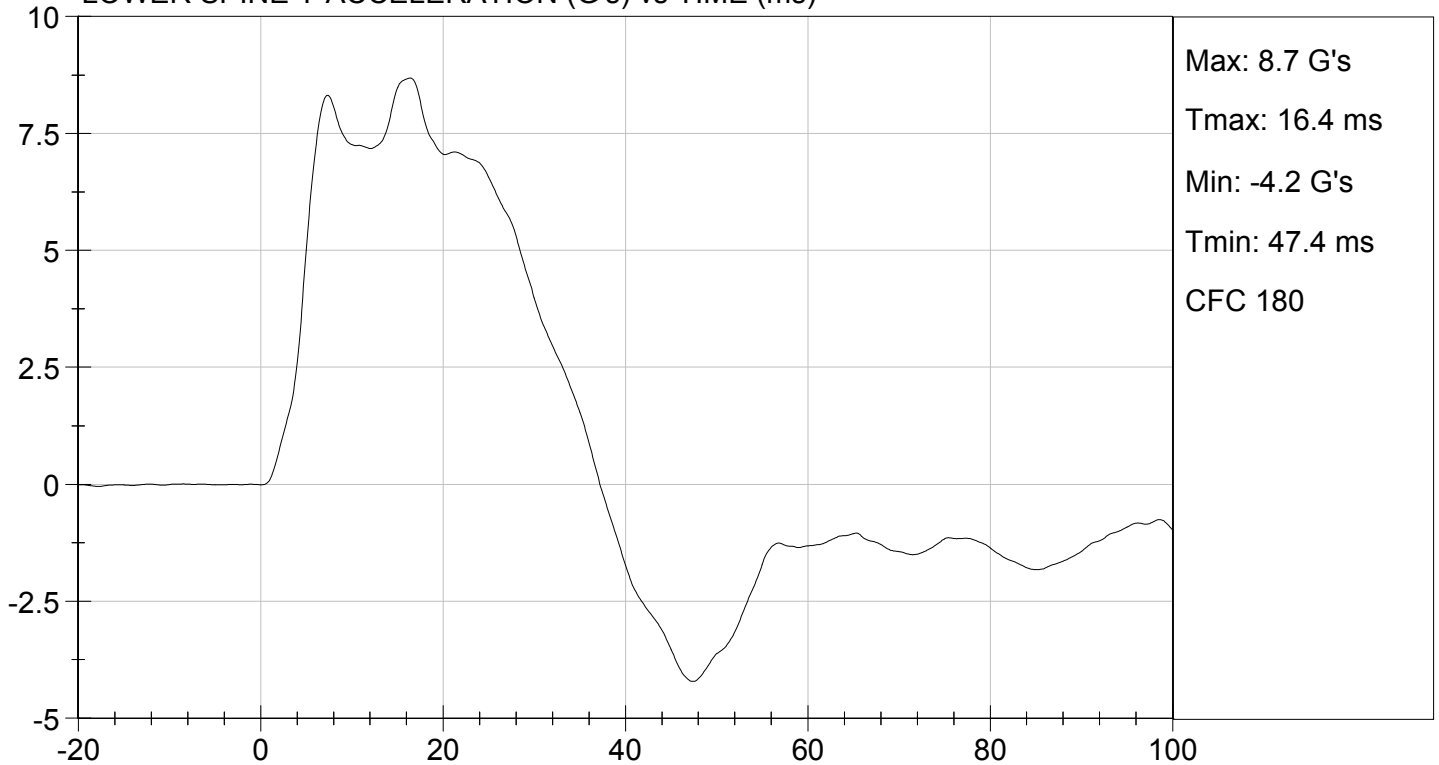
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 10/22/2013
TEST #: D133545

UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



LOWER SPINE Y ACCELERATION (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D133546

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	26	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	12 to 16	13	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	41	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	41	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
Overall Test Results				Pass


Laboratory Technician

10/23/2013

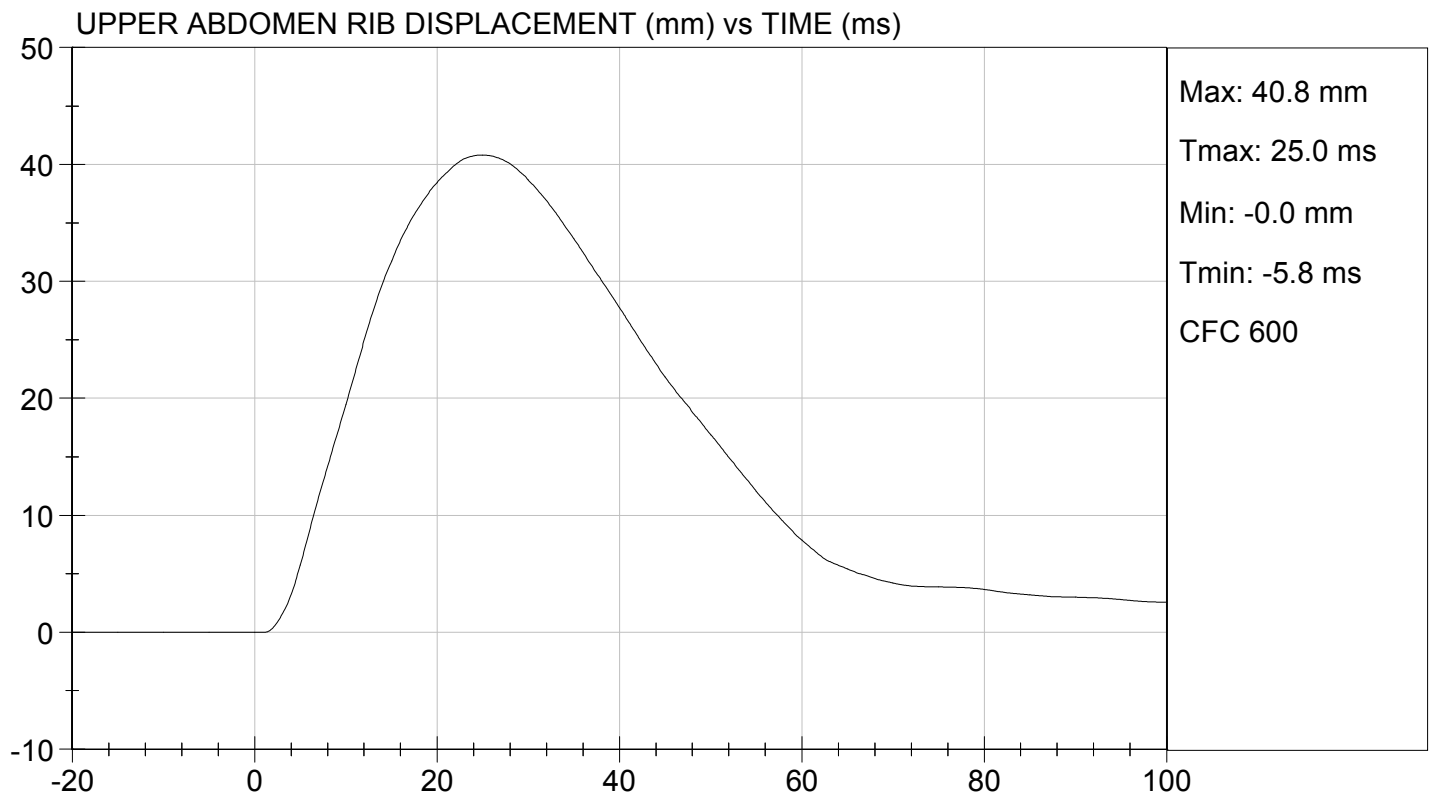
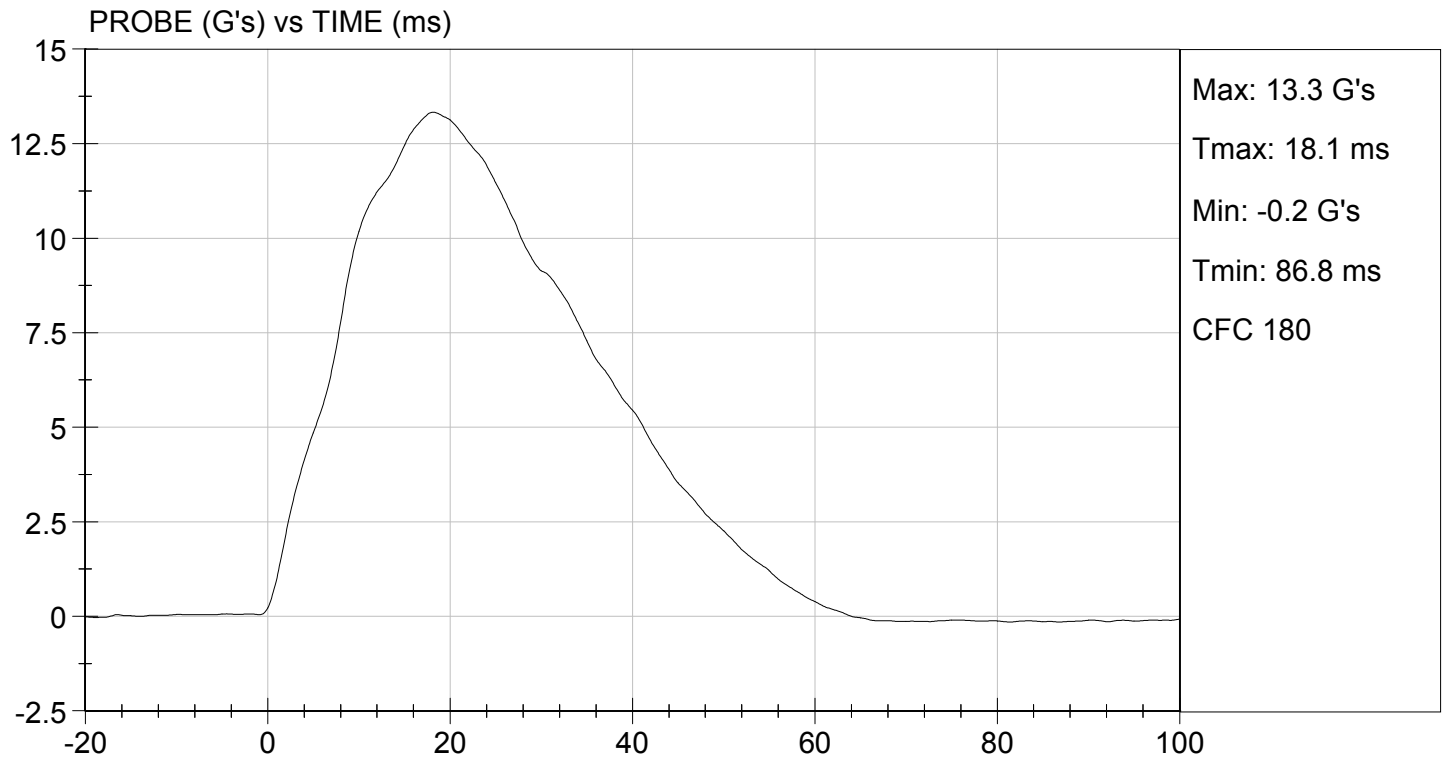
Test Date


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 10/23/2013
TEST #: D133546

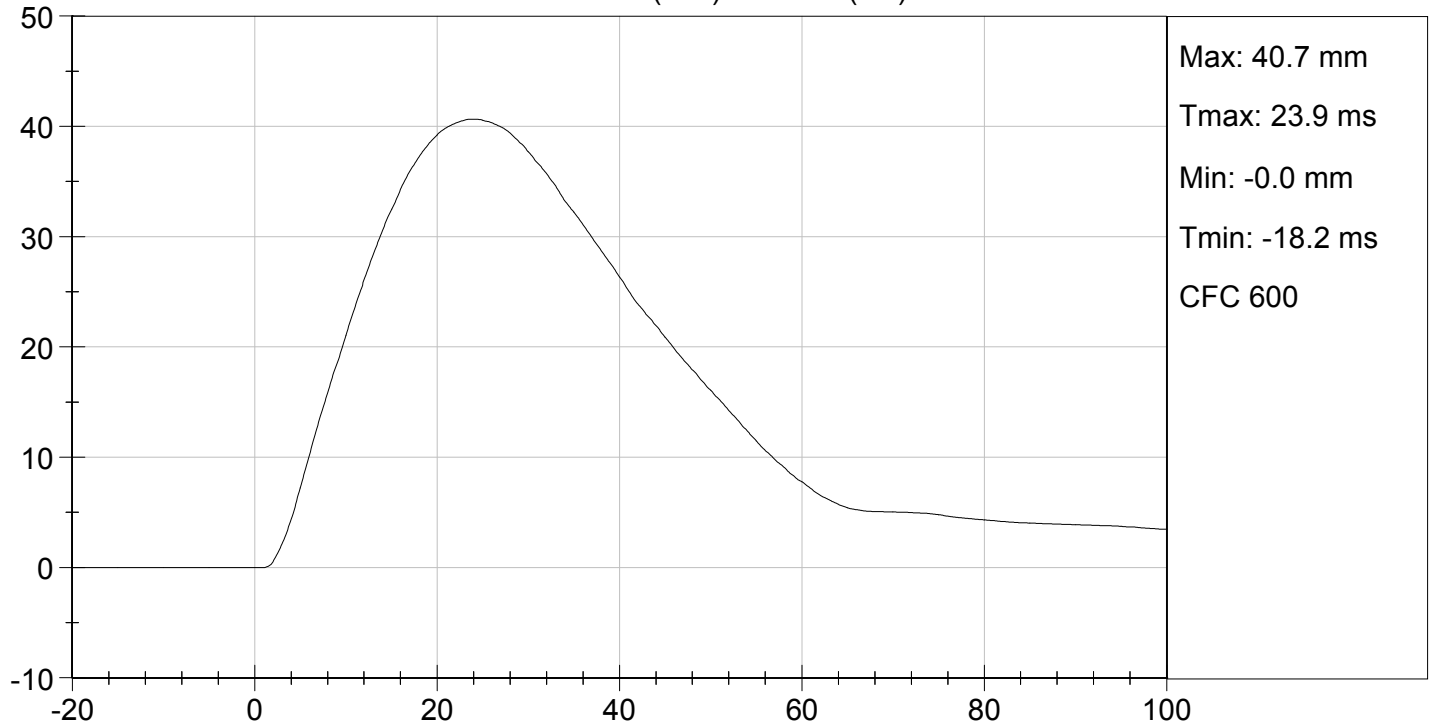




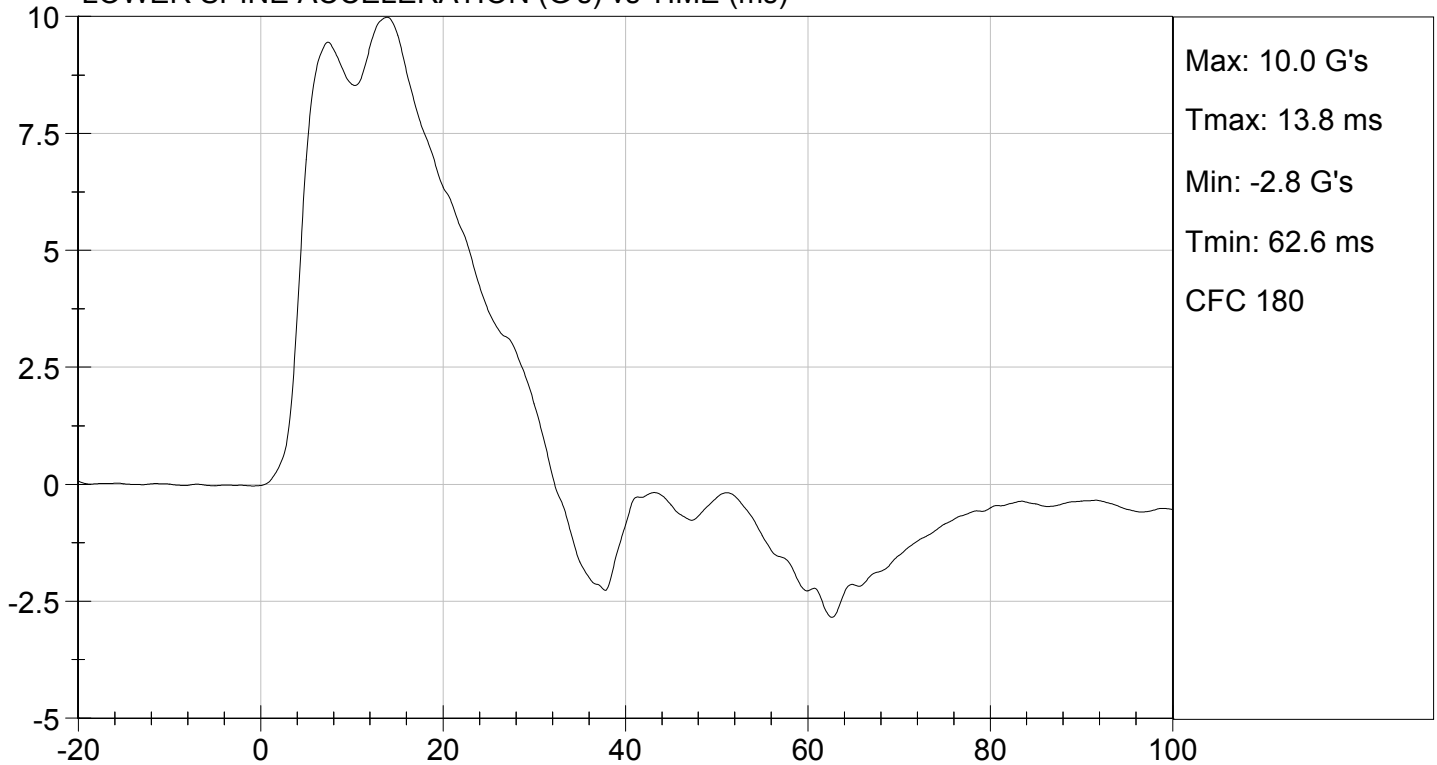
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 10/23/2013
TEST #: D133546

LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER SPINE ACCELERATION (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D133547

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	26	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	46	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	42	Pass
Peak Acetabulum Force	N	3600 to 4300	4,089	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

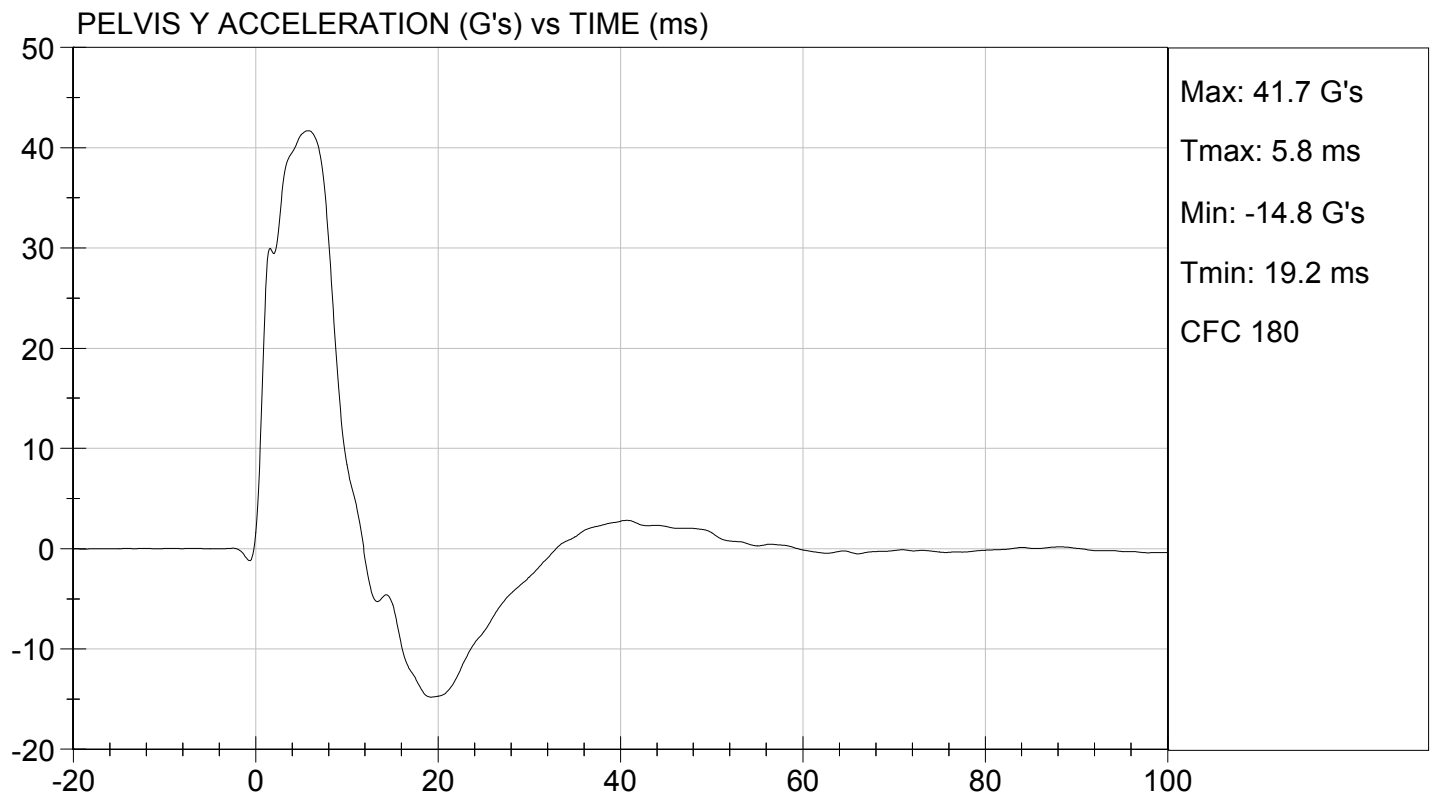
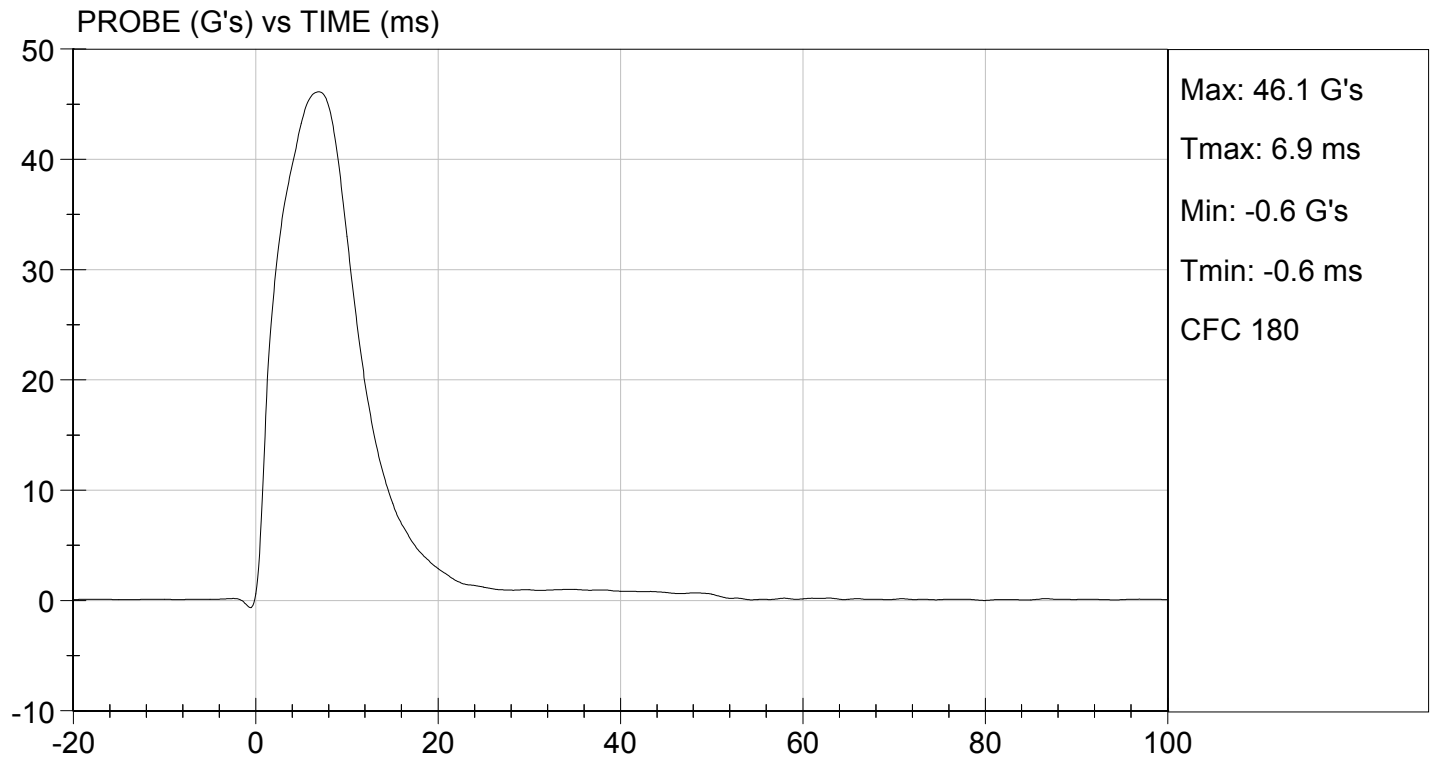
10/23/2013
Test Date

David Winkelbauer
Approved By



TEST DESC: PELVIS IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

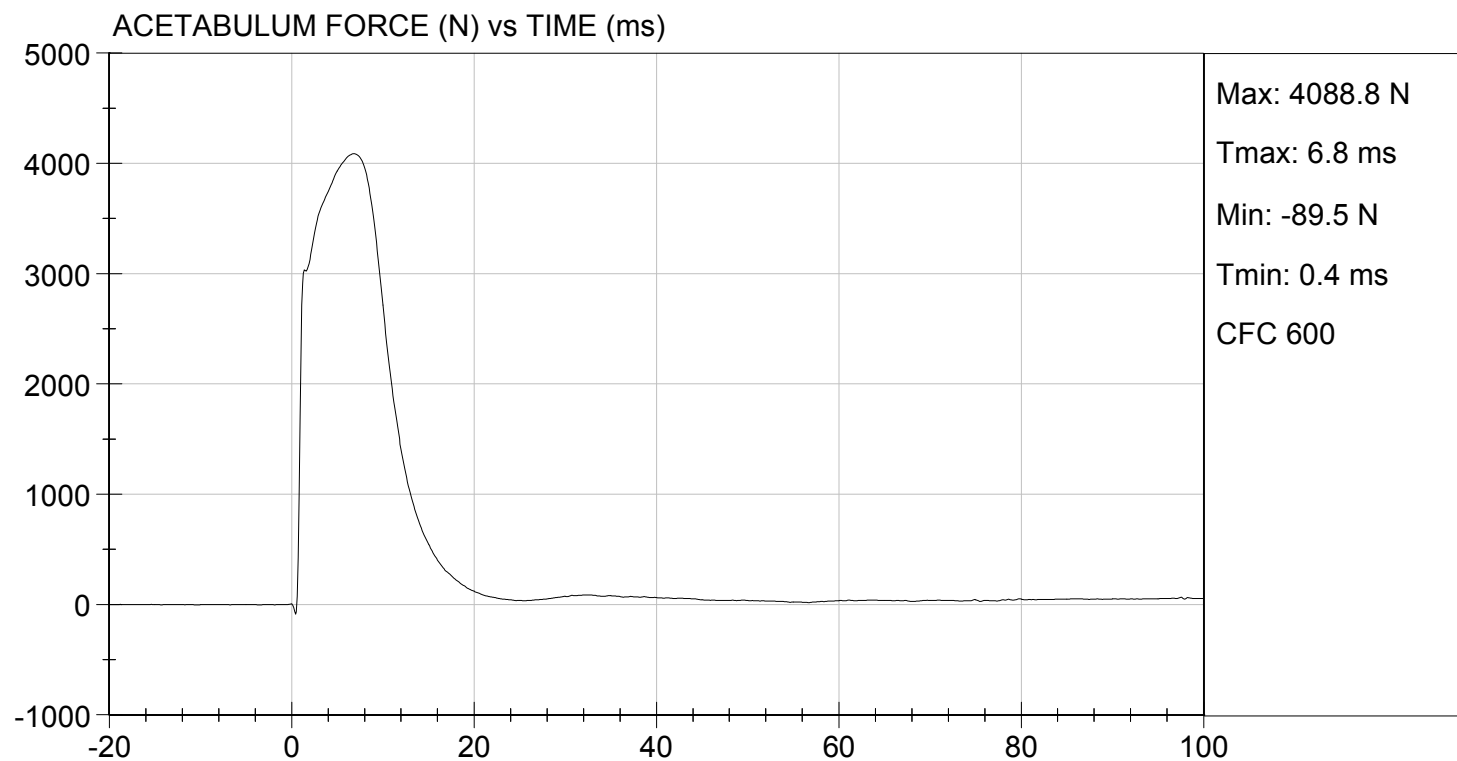
TEST DATE: 10/23/2013
TEST #: D133547





TEST DESC: PELVIS IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 10/23/2013
TEST #: D133547



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D133548

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	26	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	36 to 45	37	Pass
Pelvis Y Acceleration	G's	28 to 39	30	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,445	Pass
Overall Test Results				Pass


Laboratory Technician

10/23/2013

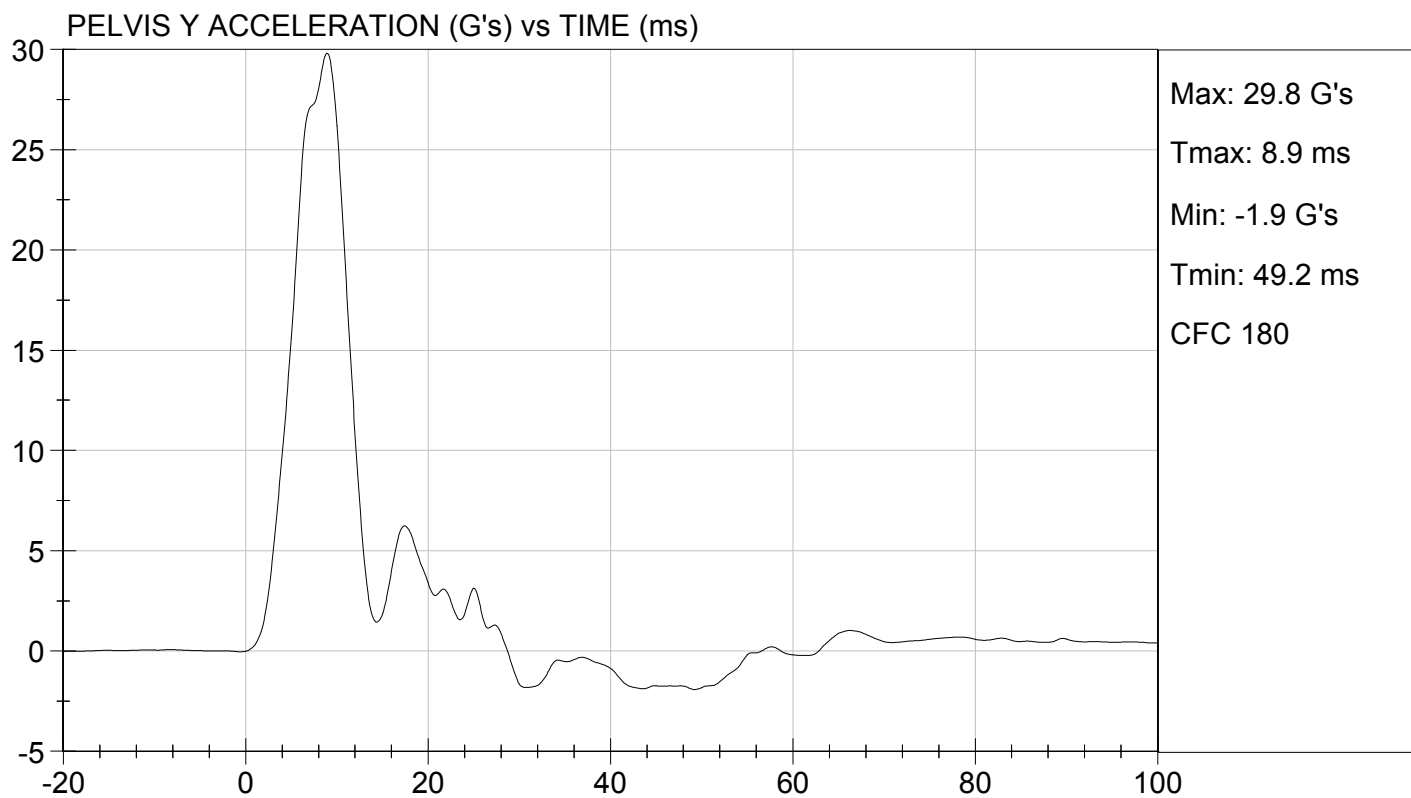
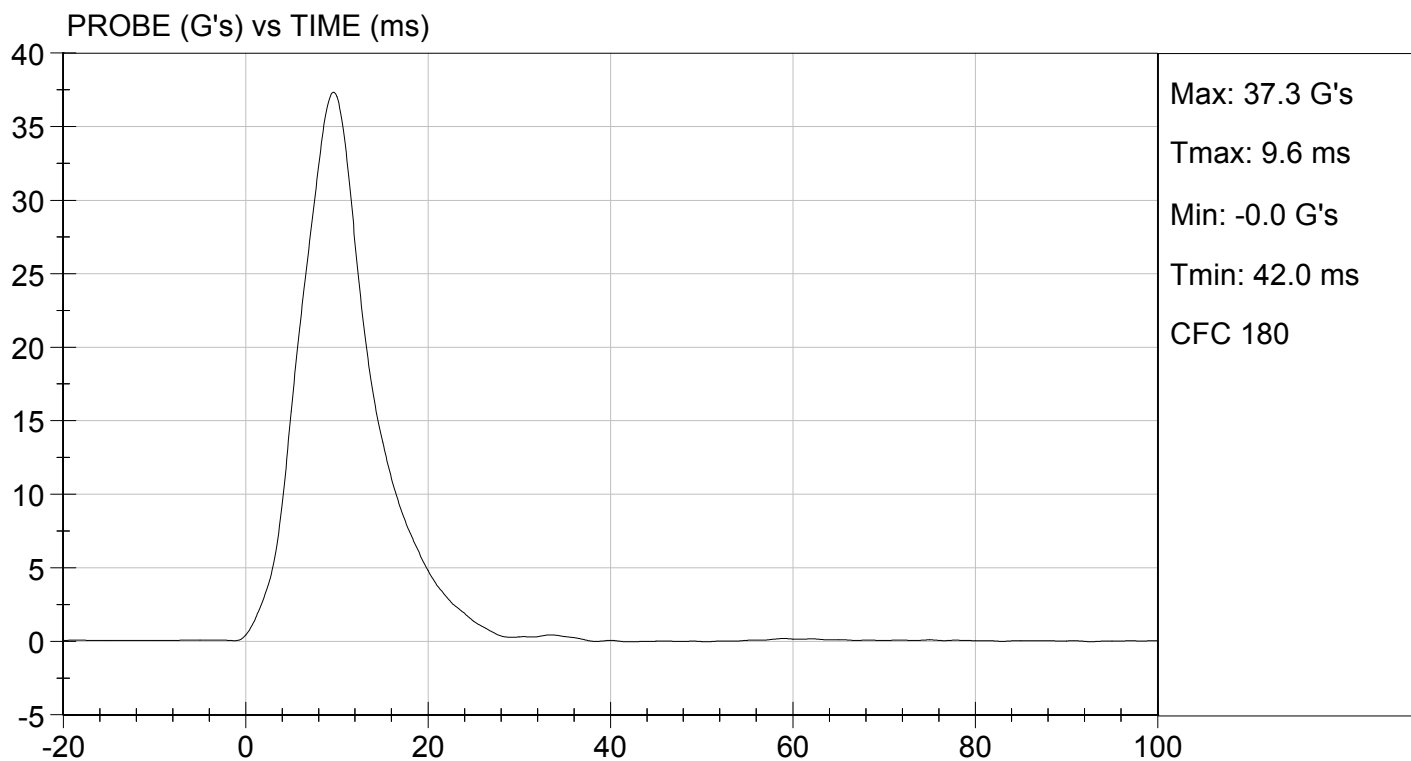
Test Date


Approved By



TEST DESC: ILLIAC
VELOCITY: 14.12 ft/s, 4.30 m/s

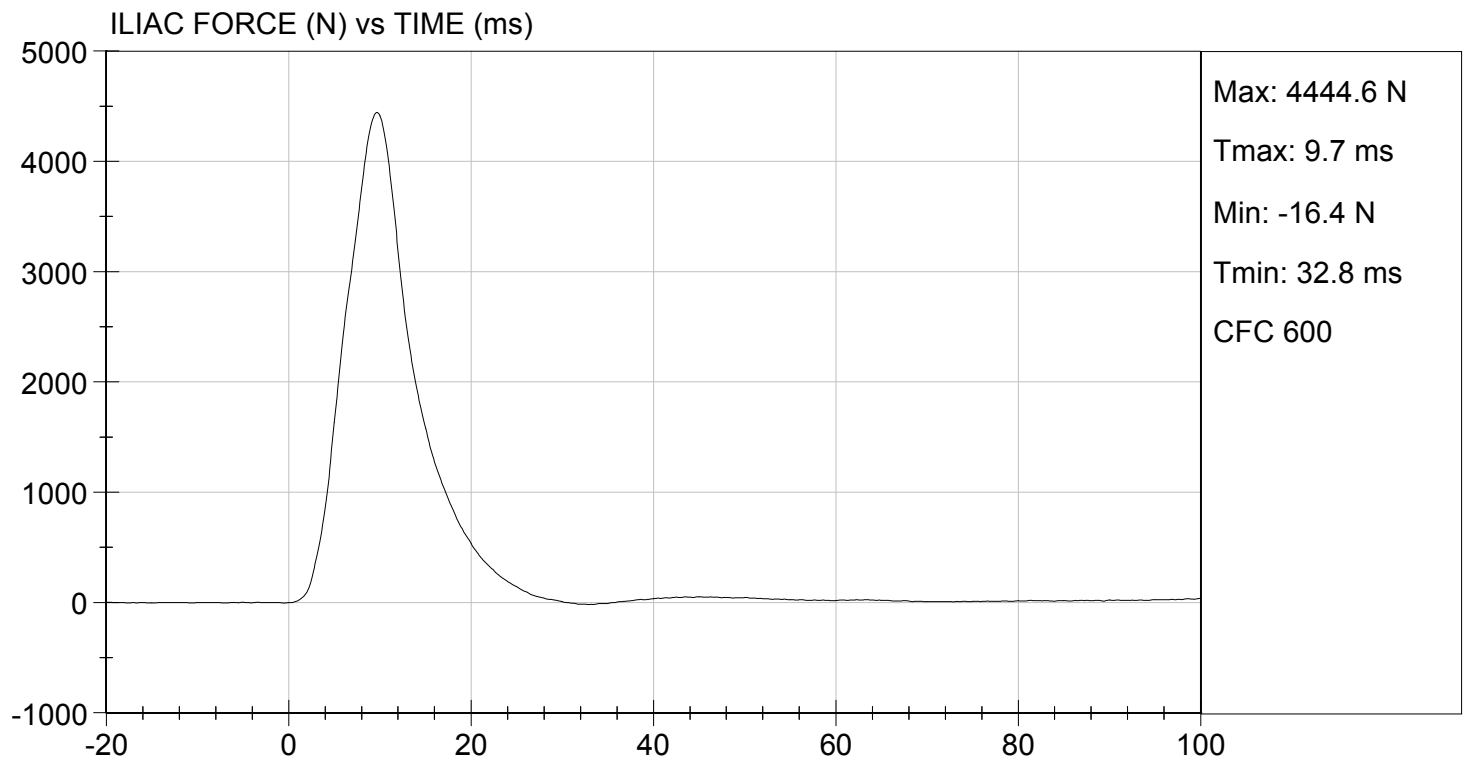
TEST DATE: 10/23/2013
TEST #: D133548



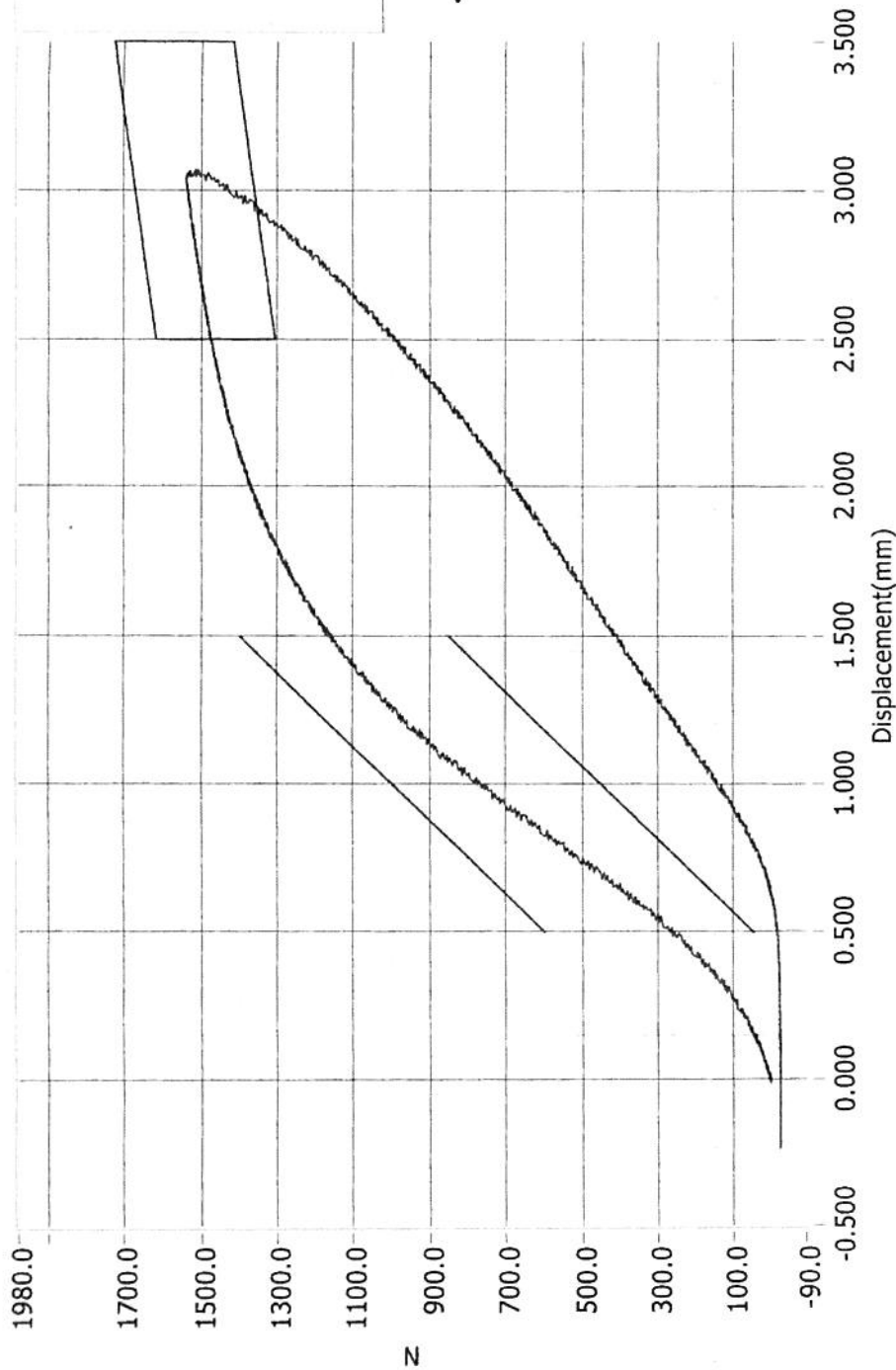


TEST DESC: ILLIAC
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 10/23/2013
TEST #: D133548



Resultant Data - SIDIIs Plug Compression



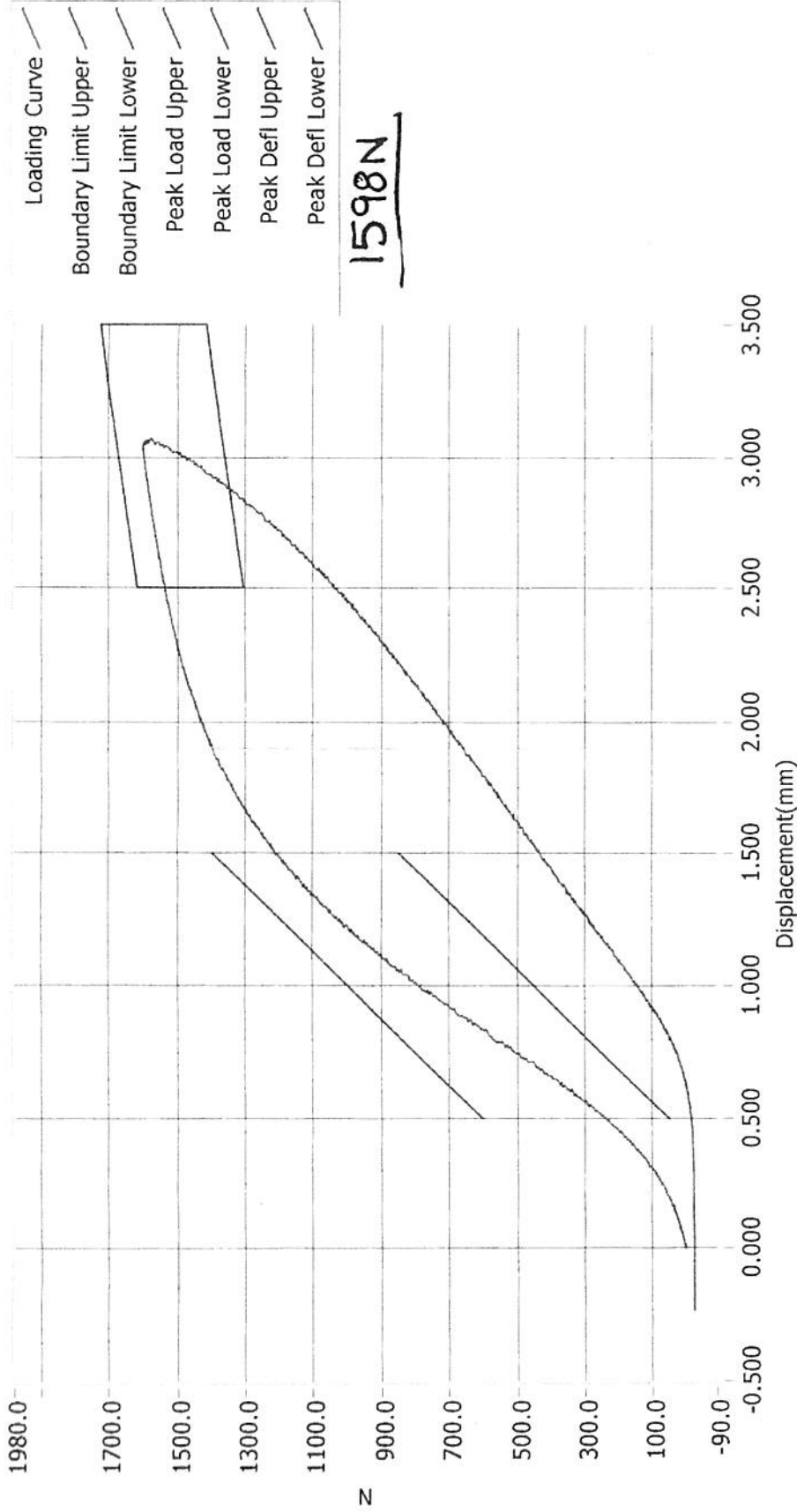
ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	63383	1/28/2013	5:44 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 1/28/2013

Current Time : 17:45:15

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	63319	1/24/2013	11:06 PM
Cert ID	ATD Serial Number	ATD Type	SIDIIs
	N/A		

Current Date : 1/24/2013

Current Time : 23:06:44

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation

				SID-IIs S/N 306			
				Serial Number	Manufacturer	Calibration Date	
Head CG Accelerometers				X	P79727	Endevco	07/08/13
				Y	P79728	Endevco	07/08/13
				Z	P79730	Endevco	07/08/13
				Xr	P79733	Endevco	07/08/13
				Yr	P79734	Endevco	07/08/13
				Zr	P79735	Endevco	07/08/13
Displacement Potentiometers	Thoracic Rib	Upper	Y	G1187	FTSS	10/17/13	
		Middle	Y	G1261	FTSS	10/17/13	
		Lower	Y	G1270	FTSS	10/17/13	
	Abdominal Rib	Upper	Y	G032	FTSS	10/17/13	
		Lower	Y	G1304	FTSS	10/17/13	
Lower Spine Accelerometers (T12)				X	P78279	Endevco	10/10/13
				Y	P78280	Endevco	10/10/13
				Z	P78281	Endevco	10/10/13
Acetabulum Load Cell				Y	ACG111	FTSS	04/26/13
Iliac Wing Load Cell				Y	IWG226	FTSS	04/26/13
Pelvis Plug (struck side)					63383	FTSS	01/28/13
Pelvis Plug (non-struck side)					633319	FTSS	01/24/13

Table 2 – Vehicle Instrumentation

		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P78977	Endevco	10/16/13
Vehicle Center of Gravity	Y	P78978	Endevco	10/16/13
Vehicle Center of Gravity	Z	P78979	Endevco	10/16/13
Left Floor Sill	Y	P67948	Endevco	07/23/13
A-Pillar Sill	Y	P67286	Endevco	05/29/13
A-Pillar Low	Y	P78933	Endevco	08/15/13
A-Pillar Mid	Y	P78943	Endevco	07/24/13
B-Pillar Sill	Y	P78964	Endevco	07/17/13
B-Pillar Low	Y	P78881	Endevco	07/24/13
B-Pillar Mid	V	P67504	Endevco	08/15/13
Driver Seat	Y	P77700	Endevco	08/15/13
Engine Top	X	P78938	Endevco	10/16/13
Engine Top	Y	P78939	Endevco	10/16/13
Firewall	Y	P63878	Endevco	07/03/13
Right Roof	Y	P77668	Endevco	07/24/13
Right Floor Sill	Y	P59396	Endevco	09/16/13
Rear Floorpan	X	P66870	Endevco	10/16/13
Rear Floorpan	Y	P66869	Endevco	10/16/13

Table 3 – Pole Instrumentation

	Serial Number	Manufacturer	Calibration Date
Load Cell 1	DG6277	FTSS	08/16/13
Load Cell 2	DG6278	FTSS	08/16/13
Load Cell 3	DG6279	FTSS	08/19/13
Load Cell 4	DG6280	FTSS	08/19/13
Load Cell 5	DG6281	FTSS	08/19/13
Load Cell 6	DG6283	FTSS	08/19/13
Load Cell 7	DG6284	FTSS	08/19/13
Load Cell 8	DG6582	FTSS	08/19/13