REPORT NUMBER: SPNCAP-MGA-2018-002

NEW CAR ASSESSMENT PROGRAM (NCAP)
Side Impact Pole Test

HONDA MFG. OF ALABAMA, LLC
2018 Honda Odyssey EX Minivan
NHTSA No.: O20185301

MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105

Test Date: August 9, 2017

Final Report Date: September 15, 2017

FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NRM-110
1200 New Jersey Ave, SE
Room W43-410
Washington, DC 20590

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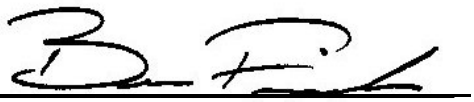
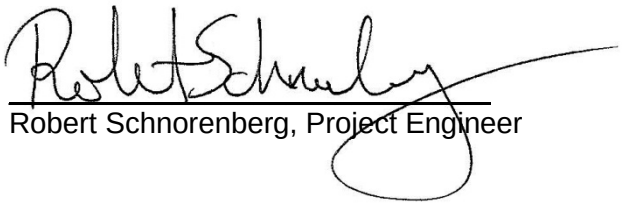
Prepared by: 
Ben Fischer, Project Engineer

Approved by: 
Robert Schnorenberg, Project Engineer

Approval Date: September 15, 2017

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

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4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of a 2018 Honda Odyssey EX Minivan, NHTSA No.: O20185301		*5. Report Date* September 15, 2017 *6. Performing Organization Code* MGA
7. Author(s) Ben Fischer, Project Engineer		*8. Performing Organization Report No.* SPNCAP-MGA-2018-002
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-14-D-00353
12. Sponsoring Agency Name and Address United States Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave, SE, Room W43-410 Washington, DC 20590		*13. Type of Report and Period Covered:* Final Test Report August 9, 2017 to September 15, 2017 *14. Sponsoring Agency Code* NRM-110
15. Supplementary Notes		

16. Abstract

A 32.20 km/h, 75° oblique impact Side NCAP Test was conducted on the subject 2018 Honda Odyssey EX 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 August 9, 2017.

The impact velocity was 32.13 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 22.1°C. The test vehicle post-test maximum crush was 297 mm at level 4. The test vehicle's performance was as follows:

	Driver ATD (SID-IIs)		
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	369
Resultant Lower Spine Acceleration	Gs	82	41
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2099
Maximum Thoracic Rib Deflection	mm	38*	22
Maximum Abdomen Rib Deflection	mm	45*	30

*Proposed IARV

The 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.

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 2018 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00353. The purpose of this test is to generate comparative side impact performance in a 2018 Honda Odyssey EX Minivan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated October 2015.

SECTION 2
SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2018 Honda Odyssey EX Minivan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.13 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin on August 9, 2017. 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 October 2015. 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	369
Resultant Lower Spine Acceleration	Gs	82	41
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2099
Maximum Thoracic Rib Deflection	mm	38*	22
Maximum Abdominal Rib Deflection	mm	45*	30

*Proposed IARV

Supplemental restraint information is given below:

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	Yes	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

Vehicle CG X recorded questionable data from 53-70ms.
Left Floor Sill Y recorded questionable data.
Left A-Post @ Sill Y recorded questionable data from 48-51ms.
Left Lower A-Post Y recorded no valid data after 34ms.
Left B-Post at Sill Y recorded no valid data after 15ms.
Left Lower B-Post Y recorded questionable data from 17-29ms.
Right Roof Y recorded no valid data after 26ms.
Load Cell Pole #2 FY recorded no valid data.
Load Cell Pole #7 FY recorded questionable data.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20185301
Model Year	2018
Make	Honda
Model	Odyssey
Body Style	Minivan
VIN	5FNRL6H54JB012589
Body Color	Obsidian Blue Pearl
Odometer Reading (km/mi)	169km / 105mi
Engine Displacement (L)	3.5 L
Type/No. Cylinders	V6
Engine Placement	Lateral
Transmission Type	Automatic
Transmission Speeds	9
Overdrive	Yes
Final Drive	FWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	N/A
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Restraint Feature	N/A

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

DATA FROM CERTIFICATION LABEL

Manufactured By	HONDA MFG. OF ALABAMA, LLC
Date of Manufacture	06/17
Vehicle Type	MPV

GVWR (kg)	2730
GAWR Front (kg)	1310
GAWR Rear (kg)	1465

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	3	8	
Capacity Weight (VCW) (kg)				608	(A)
DSC x 68.04 kg				544	(B)
Rated Cargo and Luggage Weight (RCLW) (kg)				64	(A-B)

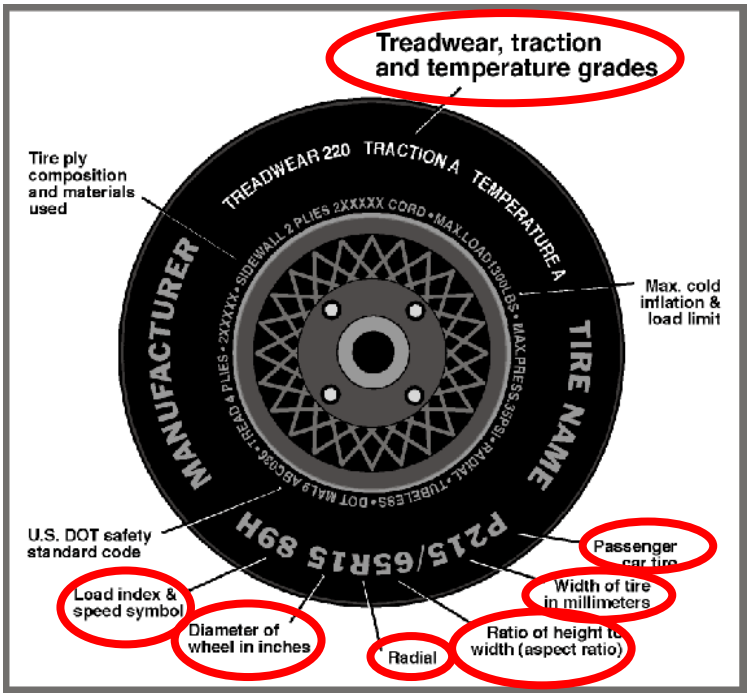
VEHICLE SEAT TYPE

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					X	
Third Row Seat			X			X	

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

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	235/60R18	235/60R18
Tire Size on Vehicle	235/60R18	235/60R18
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Turanza	Turanza
Treadwear	480	480
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 1 Polyester, 1 Nylon	2 Steel, 1 Polyester, 1 Nylon
Load Index/Speed Symbol	103H	103H
Tire Material	Rubber	Rubber
DOT Safety Code Left	7X45 JB2 1517	7X45 JB2 1517
DOT Safety Code Right	7X45 JB2 1517	7X45 JB2 1517

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

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

TEST PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kpa	240	234	234	234
Tire Placard	kpa	240	240	240	240
Owner's Manual	kpa	240	240	240	240
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	559.5	449.5		558.0	511.5		577.0	503.5	
Right	kg	552.0	452.0		550.5	501.5		554.0	494.5	
Ratio	%	55.2%	44.8%		52.3%	47.7%		53.1%	46.9%	
Totals	kg	1111.5	901.5	2013.0	1108.5	1013.0	2121.5	1131.0	998.0	2129.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2013.0	(A)
Actual Weight of 1 P572V ATD (SID-IIs) ATD Used	kg	52	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	64	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2129.0	(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	0.6	0.7	1.2	Yes
Front Pass. Sill Angle (front-to-rear)*	deg	-1.0	-0.7	-0.4	Yes
Front Bumper Angle (left-to-right)**	deg	0.0	0.0	-0.1	Yes
Rear Bumper Angle (left-to-right)**	deg	0.0	0.0	-0.1	Yes
Vehicle CG (Aft of Front Axle)	mm	1346	1435	1409	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	2	8	15	

*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)	7
None	

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: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

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	24.3	11.5	17.9
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 SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rear-most	Mid-Fore/Aft	Forward-Most
Driver Seat	17.9	26	Max	52	52	52
			Mid	26	26	26
			Min	0	0	0
Front Passenger Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

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

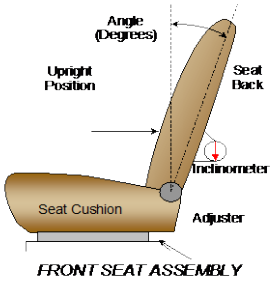
Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-most Position	
	mm	Detents	mm	Detent
Driver Seat	218		0	
Front Passenger Seat	198		0	
Front Center Seat				
Struck Side Rear Seat	152	16 (1st as 1)	152	15th (1st as 0)
Non-Struck Side Rear Seat	152	16 (1st as 1)	152	15th (1st as 0)
Rear Center Seat	152	16 (1st as 1)	152	15th (1st 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	81.7		-8.1	
Front Passenger Seat	78.2		-8.1	
Front Center Seat				
Struck Side Rear Seat	21.0	12 (1st as 1)	5.6	0th (1st as 0)
Non-Struck Side Rear Seat	21.0	12 (1st as 1)	5.6	0th (1st as 0)
Rear Center Seat	21.0	12 (1st as 1)	5.6	0th (1st as 0)

Seat back angles measured on outboard headrest post.

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 (1st as 1)	0 (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	6 detents (1st as 1)	0 (Lowermost as 0)

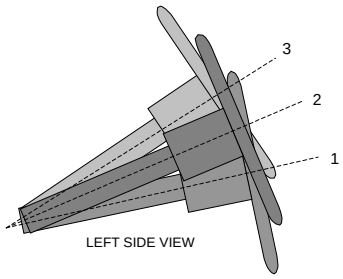
DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

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	67.6	239
Geometric Center, Position 2	65.3	219
Uppermost, Position 3	62.9	199
Telescoping Steering Wheel Travel		40
Test Position	65.3	219

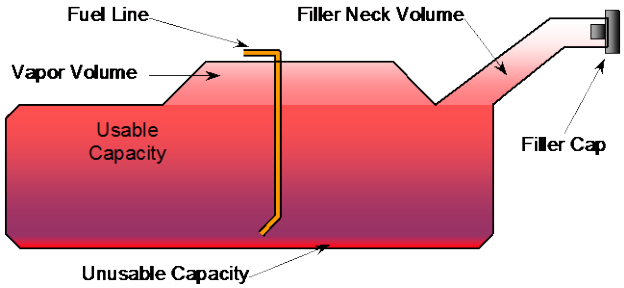


STEERING COLUMN ASSEMBLY

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 electronic fuel pump. Ignition Stage 2 will activate the fuel pump to prime the system. The filler neck is located on the driver's side.



VEHICLE FUEL TANK ASSEMBLY

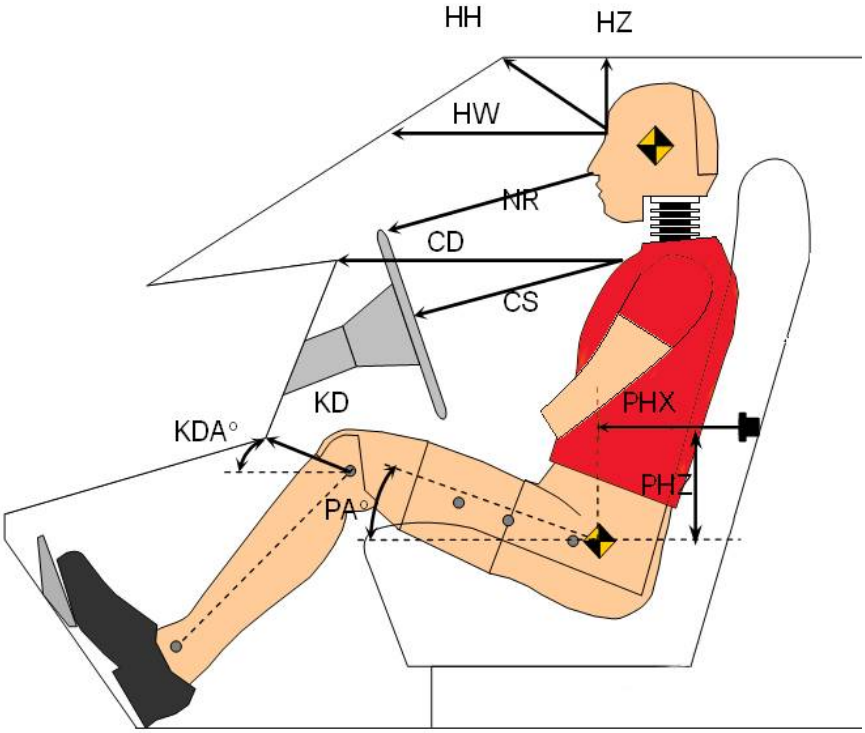
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	73.8
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	73.8
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	68.6
Actual Amount of Solvent Used	68.5
1/3 of Usable Capacity	24.6

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

.DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

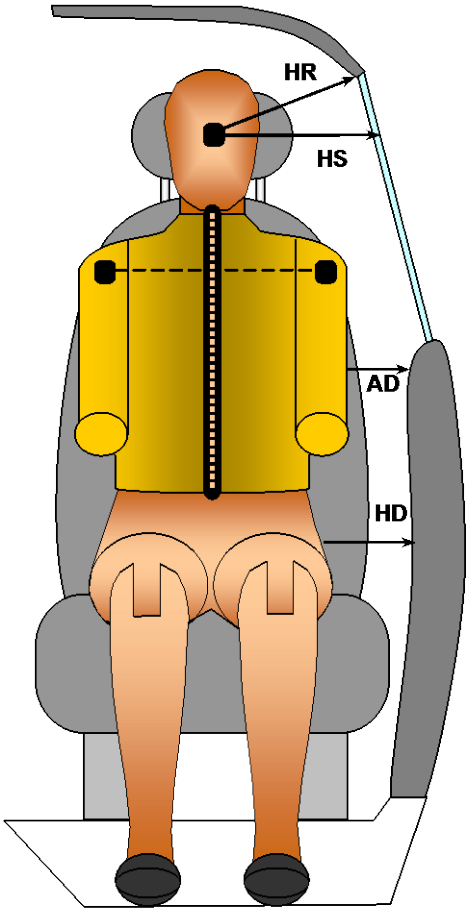


LEFT SIDE VIEW

Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	305	
HW	Head to Windshield	696	
HZ	Head to Roof Liner	206	
NR	Nose to Rim	235	
CD	Chest to Dashboard	440	
CS	Chest to Steering Wheel	182	
KDL/KDAL°	Left Knee to Dash	154	27.2
KDR/KDAR°	Right Knee to Dash	149	21.4
PAX°	Pelvic Tilt Angle (X-Axis)		19.0
PAY°	Pelvic Tilt Angle (Y-Axis)		-0.2
PHX	Hip Point to Striker (X-Axis)	369	
PHZ	Hip Point to Striker (Z-Axis)	131	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

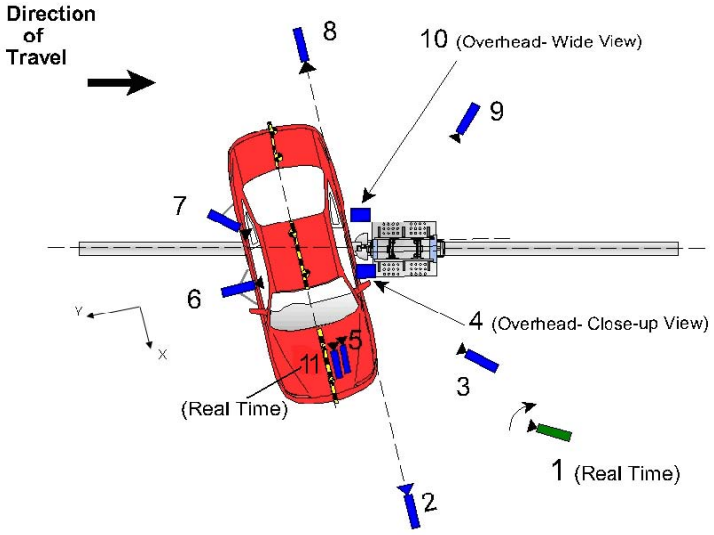


FRONT VIEW OF DUMMY

Code	Measurement Description	Driver Length (mm)
HR	Head to Side Header	292
HS	Head to Side Window	419
AD	Arm to Door	180
HD	Hip Point to Door	164

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017



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	6390	-210	-2110	25	1000
3	Impact Side 45° Forward	3940	-2100	-2080	20	1000
4	Overhead Closeup	0	70	-6670	70	1000
5	Onboard – Driver Front				16	1000
6	Onboard – Driver Side				8	1000
7	Onboard – Driver Rear				8	1000
8	Rear Ground Level	-7620	230	-2110	25	1000
9	Impact Side 45° Rearward	-5740	-4930	-2030	20	1000
10	Overhead Wide View	0	-610	-6650	14	1000
11	Real-Time Dummy Front View					30

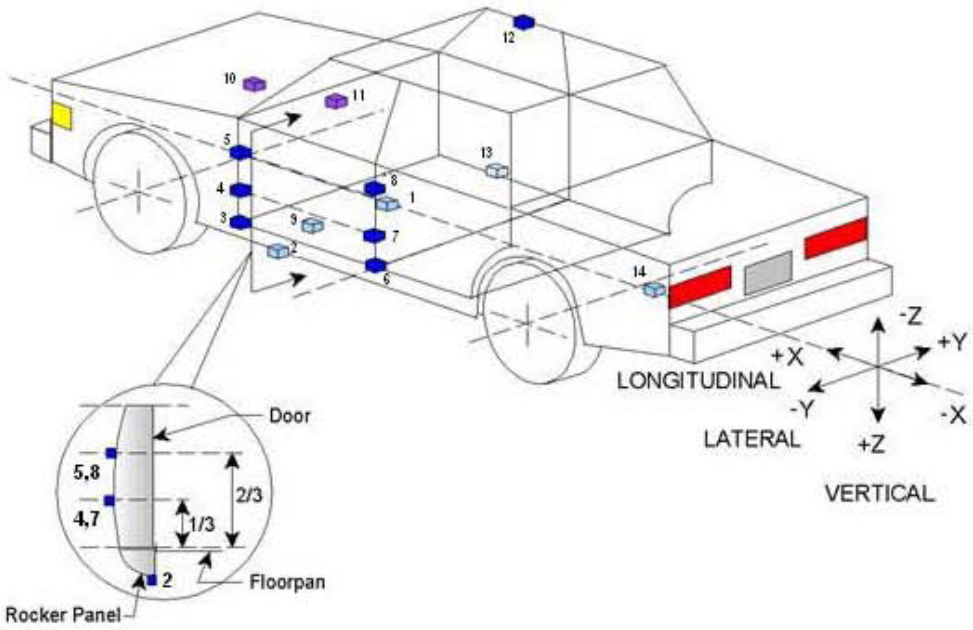
*All measurements accurate to ± 6 mm
Note: Vehicle was at a 75° angle to the rigid pole.

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

INSTRUMENTATION	Number of Channels
Driver Dummy	19
Vehicle Structure	16
Pole Load Cells	8
TOTAL	43

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017



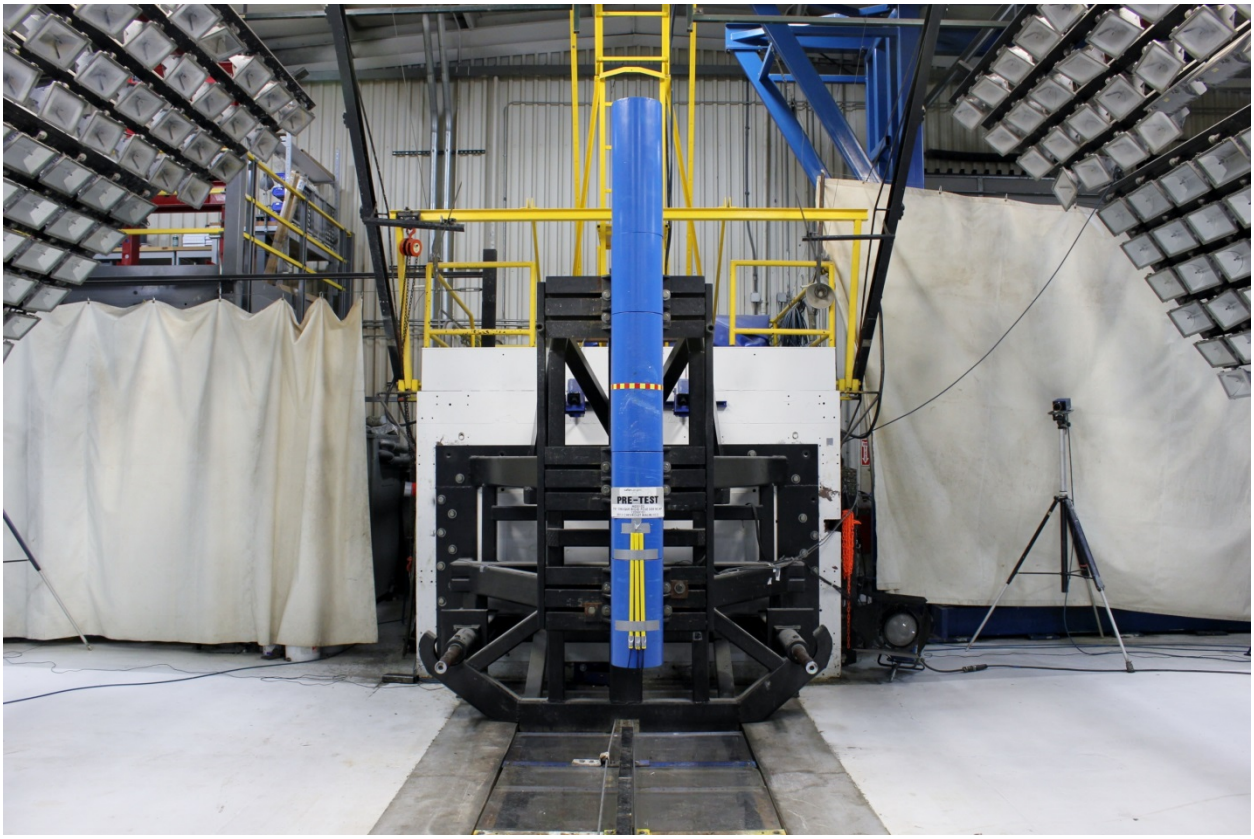
	Accelerometer Location			
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2838	-3	-190
2	Left Floor Sill	3425	-786	-262
3	A Pillar Sill	3742	-786	-241
4	A Pillar Low	3728	-890	-720
5	A Pillar Mid	3728	-887	-856
6	B Pillar Sill	2667	-786	-253
7	B Pillar Low	2670	-814	-655
8	B Pillar Mid	2577	-812	-870
9	Driver Seat Track	2885	-414	-406
10	Engine Top	4401	0	-968
11	Firewall	4196	0	-998
12	Right Roof	2660	600	-1675
13	Right Floor Sill	3425	786	-256
14	Rear Floorpan	932	0	-426

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: 2018 Honda Odyssey EX Minivan
Test Program: NCAP Side Pole Impact Test

NHTSA No. O20185301
Test Date: 8/9/2017



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: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Driver SID-IIs Dummy
Face	Curtain Airbag, Inboard Armrest
Top of Head	Curtain Airbag, Inboard Armrest
Left Side of Head	Curtain Airbag
Back of Head	Curtain Airbag, Headrest
Left Shoulder	Side Torso/Pelvis Airbag, Seat Back
Upper Torso	Side Torso/Pelvis Airbag, Seat Back
Lower Torso	Side Torso/Pelvis Airbag, Seat Back
Left Hip	Side Torso/Pelvis Airbag, Seat Cushion
Left Knee	Door Panel

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

	Struck Side		Non-Struck Side	
Description	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: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

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	Yes	No	
Seat Belt Load Limiter	Yes		No	
Other				

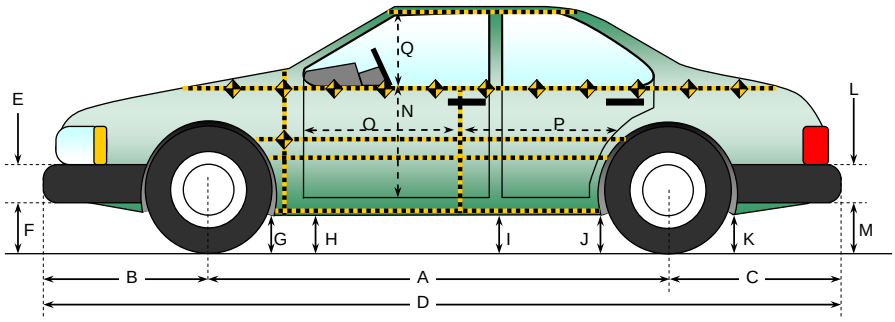
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1041
Actual Impact Point (Aft of Front Axle)	mm		1046
Horizontal Offset (+forward / -rearward)	mm	+/- 38 of Intended Impact Point	-5
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75.7
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.13
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.27

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2018 Honda Odyssey EX Minivan
Test Program: NCAP Side Pole Impact Test

NHTSA No. O20185301
Test Date: 8/9/2017



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

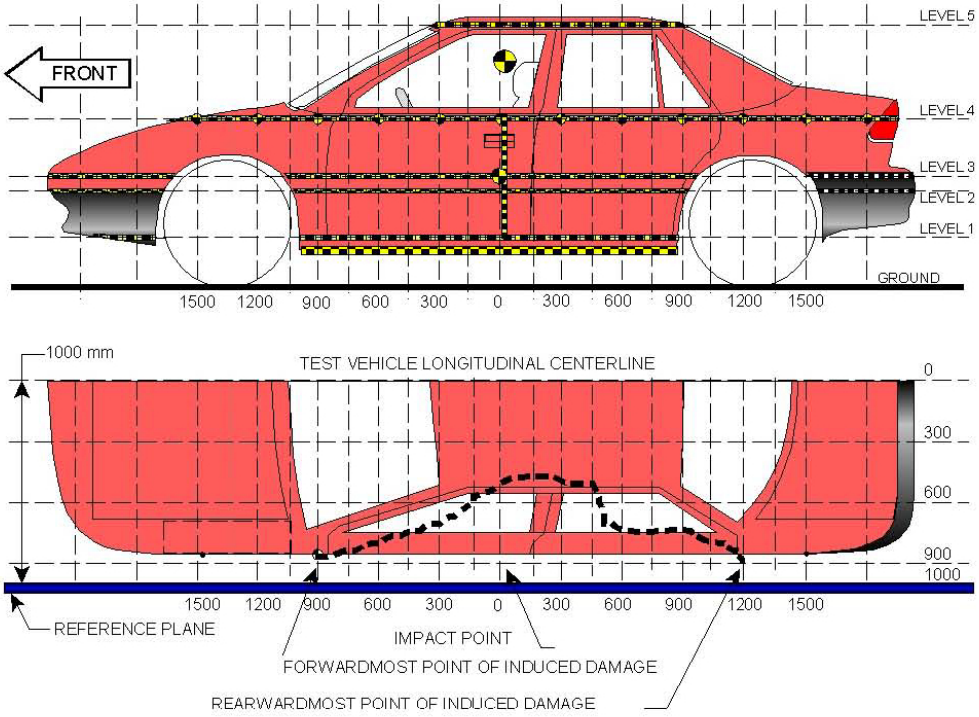
LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3000	2935	65
B	Front Axle to FSOV	968	980	-12
C	Rear Axle to RSOV	1196	1218	-22
D	Total Vehicle Length at Centerline	5164	5133	31
E	Front Bumper Thickness	120	120	0
F	Front Bumper Bottom to Ground	191	198	-7
G	Sill Height at Front Wheel Well	235	230	5
H	Sill Height at Front Door Leading Edge	208	186	22
I	Sill Height at B-Pillar	209	223	-14
J1	Sill Height at Rear Wheel Well	211	261	-50
J2	Pinch Weld Height at Rear Wheel Well	238	235	3
K	Sill Height Aft of Rear Wheel Well	258	272	-14
L	Rear Bumper Thickness	80	80	0
M	Rear Bumper Bottom to Ground	335	324	11
N	Sill Height to Bottom of Front Window Sill	830	937	-107
O	Front Door Leading Edge to Impact CL	552	443	109
P	Rear Door Trailing Edge to Impact CL	1673	1616	57
Q	Front Window Opening	441	410	31
R	Right Side Length	4450	4470	-20
S	Left Side Length	4450	4378	-28
T	Vehicle Width at B-Pillars	1963	1926	37

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017



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 MEAUREMENTS

Level	Measurement Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	310	257	75
2	Mid Door	682	287	75
3	Occupant Hip Point	722	293	75
4	Window Sill	1001	297	75
5	Window Top	1625	100	150

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

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

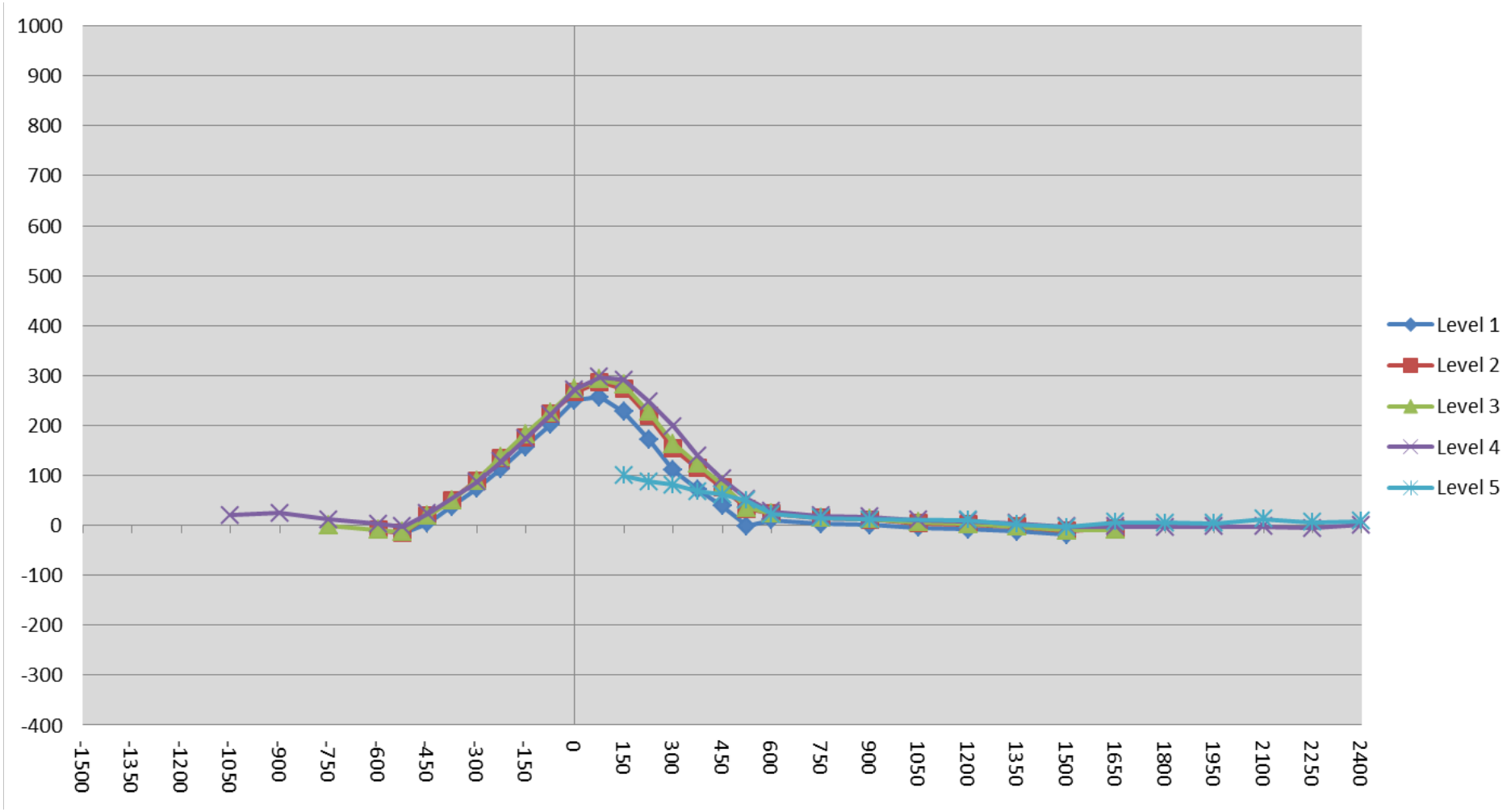
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-2700															
-2550															
-2400															
-2250															
-2100															
-1950															
-1800															
-1650															
-1500															
-1350															
-1200															
-1050				210					230					20	
-900				192					217					25	
-825															
-750			118	182				118	194				0	12	
-675															
-600		119	120	172			110	111	175			-9	-9	3	
-525	142	120	120	168		127	105	107	165		-15	-15	-13	-3	
-450	143	120	123	163		147	139	142	187		4	19	19	24	
-375	143	123	127			181	174	177			38	51	50		
-300	145	128	130	153		218	218	220	239		73	90	90	86	
-225	146	133	132	150		260	268	269	278		114	135	137	128	
-150	146	135	132	147		303	312	315	320		157	177	183	173	
-75	146	137	132	144		347	361	358	365		201	224	226	221	
0	146	138	133	141		396	405	406	413		250	267	273	272	
75	148	138	133	140		405	425	426	437		257	287	293	297	
150	148	138	133	139	402	376	411	415	431	502	228	273	282	292	100
225	147	138	133	138	391	319	357	361	386	479	172	219	228	248	88
300	147	138	133	137	383	257	292	296	335	464	110	154	163	198	81
375	149	138	133	137	380	221	253	256	277	448	72	115	123	140	68
450	149	137	132	135	376	188	213	213	228	438	39	76	81	93	62
525	150	136	131	135	375	149	169	167	188	425	-1	33	36	53	50
600	149	136	132	137	375	160	160	156	165	397	11	24	24	28	22
675															
750	150	136	132	147	375	153	151	148	166	390	3	15	16	19	15
825															
900	150	134	131	134	375	151	146	144	151	387	1	12	13	17	12
1050	151	132	129	134		146	136	135	145		-5	4	6	11	
1200	152	128	126	134	375	144	130	129	142	385	-8	2	3	8	10
1350	152	124	123	135	384	140	121	121	139	386	-12	-3	-2	4	2
1500	152	119	119	137	389	133	108	109	134	385	-19	-11	-10	-3	-4
1650		115	113	138	398		109	104	135	404		-6	-9	-3	6
1800				141	408				137	413				-4	5
1950				151	422				149	426				-2	4
2100				161	435				158	448				-3	13
2250				168	452				162	458				-6	6
2400				174	482				175	490				1	8
2550				180					181					1	
2700															

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

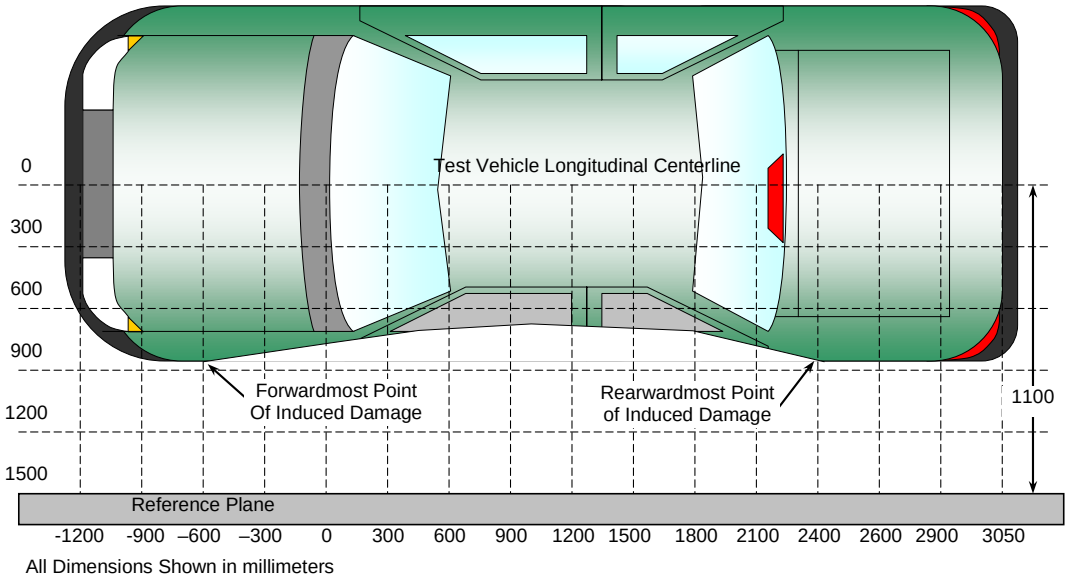
Test Vehicle: 2018 Honda Odyssey EX Minivan
Test Program: NCAP Side Pole Impact Test

NHTSA No. O20185301
Test Date: 8/9/2017



DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017



TOP VIEW

DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	546	3	131	163	32
2	321	3	133	286	153
3	96	3	133	426	293
4	-129	3	132	335	203
5	-354	3	129	201	72
6	-579	3	120	96	-24

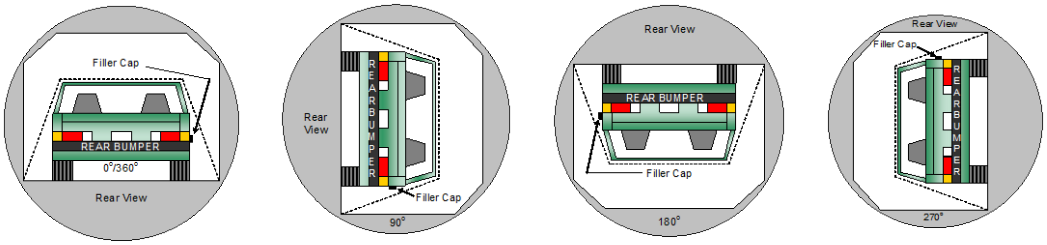
DATA SHEET NO. 12
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017

Test Time: 10:05 a.m. Temperature: 22.1°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



0°/360° 90° 180° 270°

ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	91	300	391
90° to 180°	91	300	391
180° to 270°	82	300	382
270° to 360°	87	300	387

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

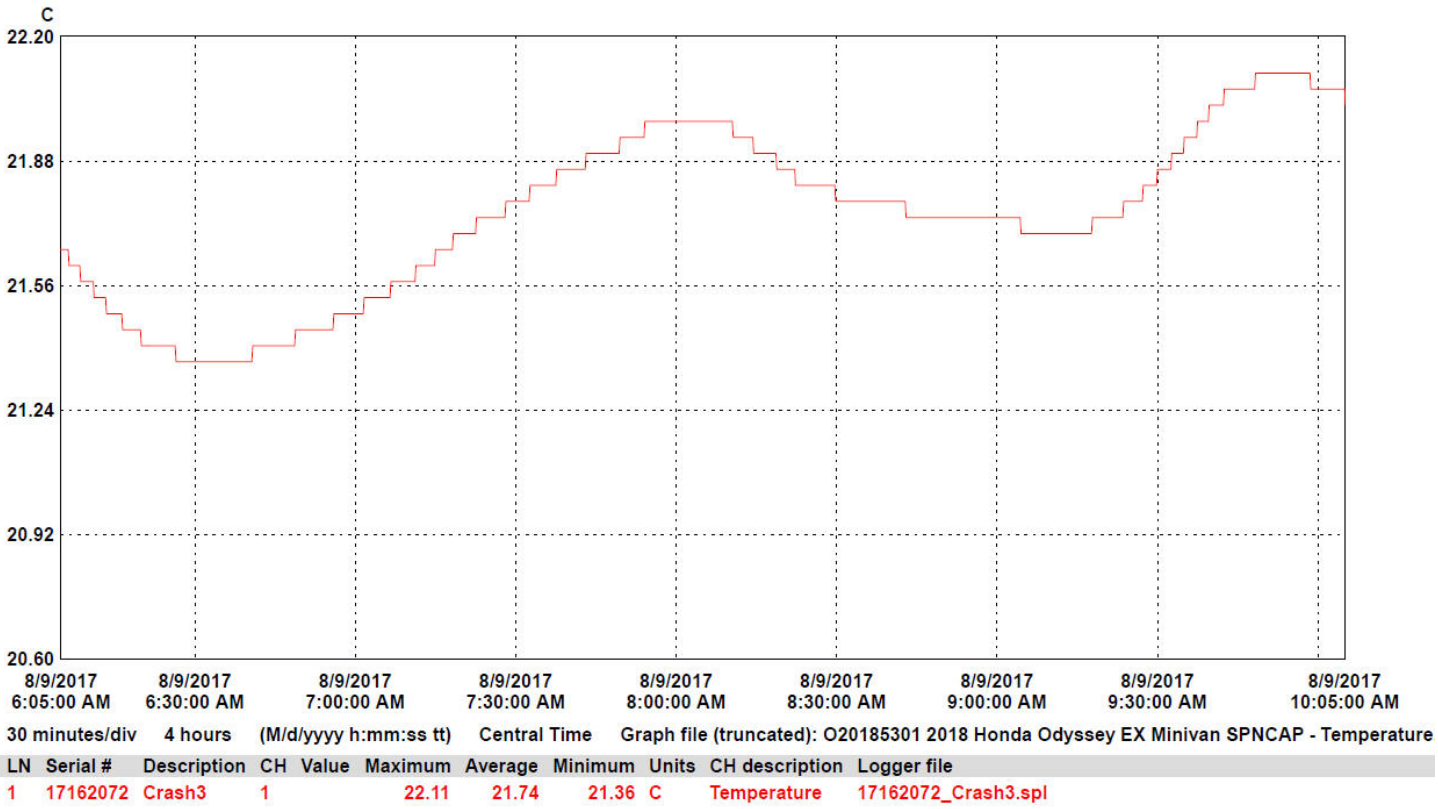
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

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: 2018 Honda Odyssey EX Minivan NHTSA No. O20185301
Test Program: NCAP Side Pole Impact Test Test Date: 8/9/2017



LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	17162072	Crash3	1		22.11	21.74	21.36	C	Temperature	17162072_Crash3.spl

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Photo No. 001 - As Delivered Right Front Three-Quarter View of Test Vehicle

Photo No. 002 - As Delivered Left Rear Three-Quarter View of Test Vehicle

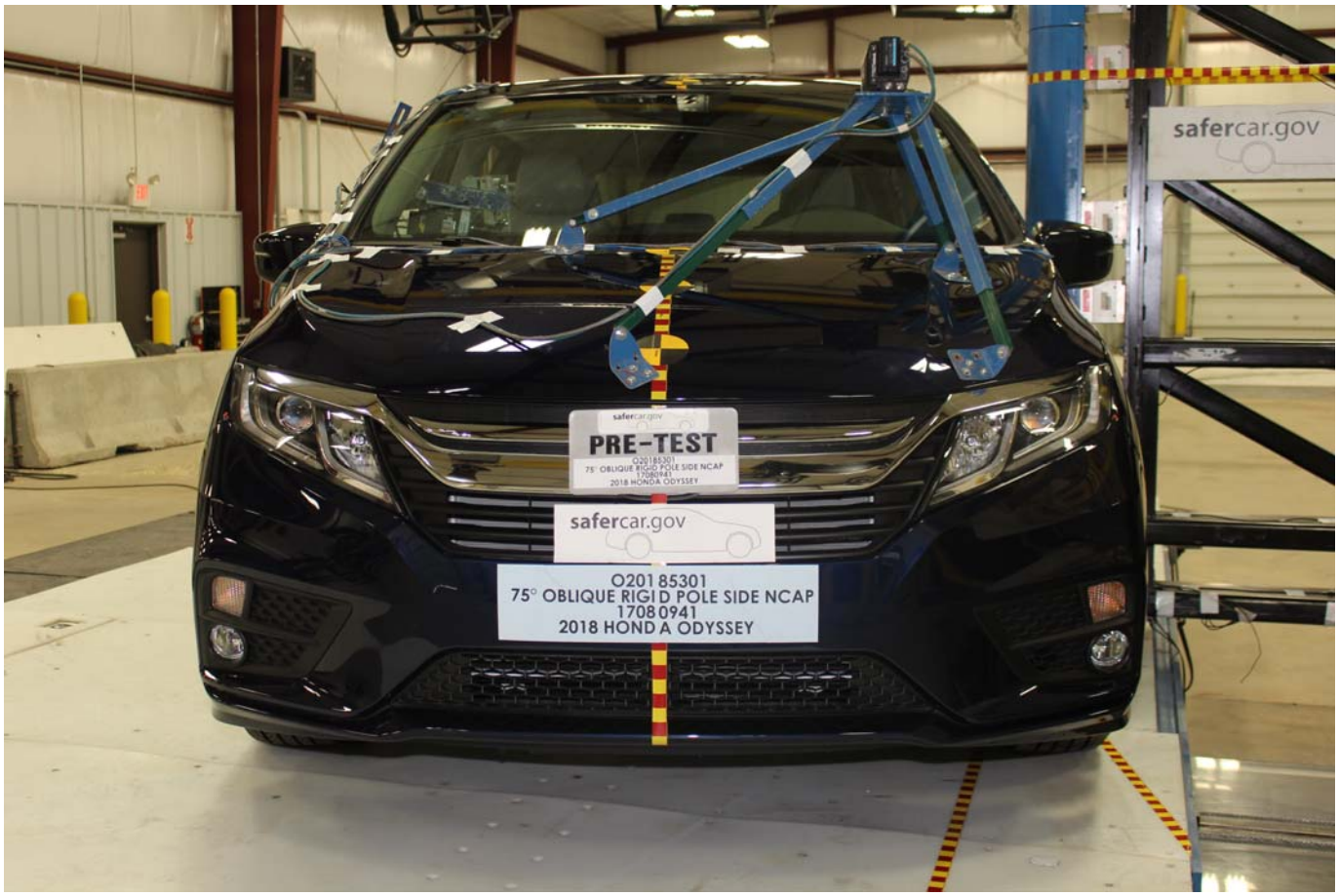


Photo No. 003 - Pre-Test Frontal View of Test Vehicle

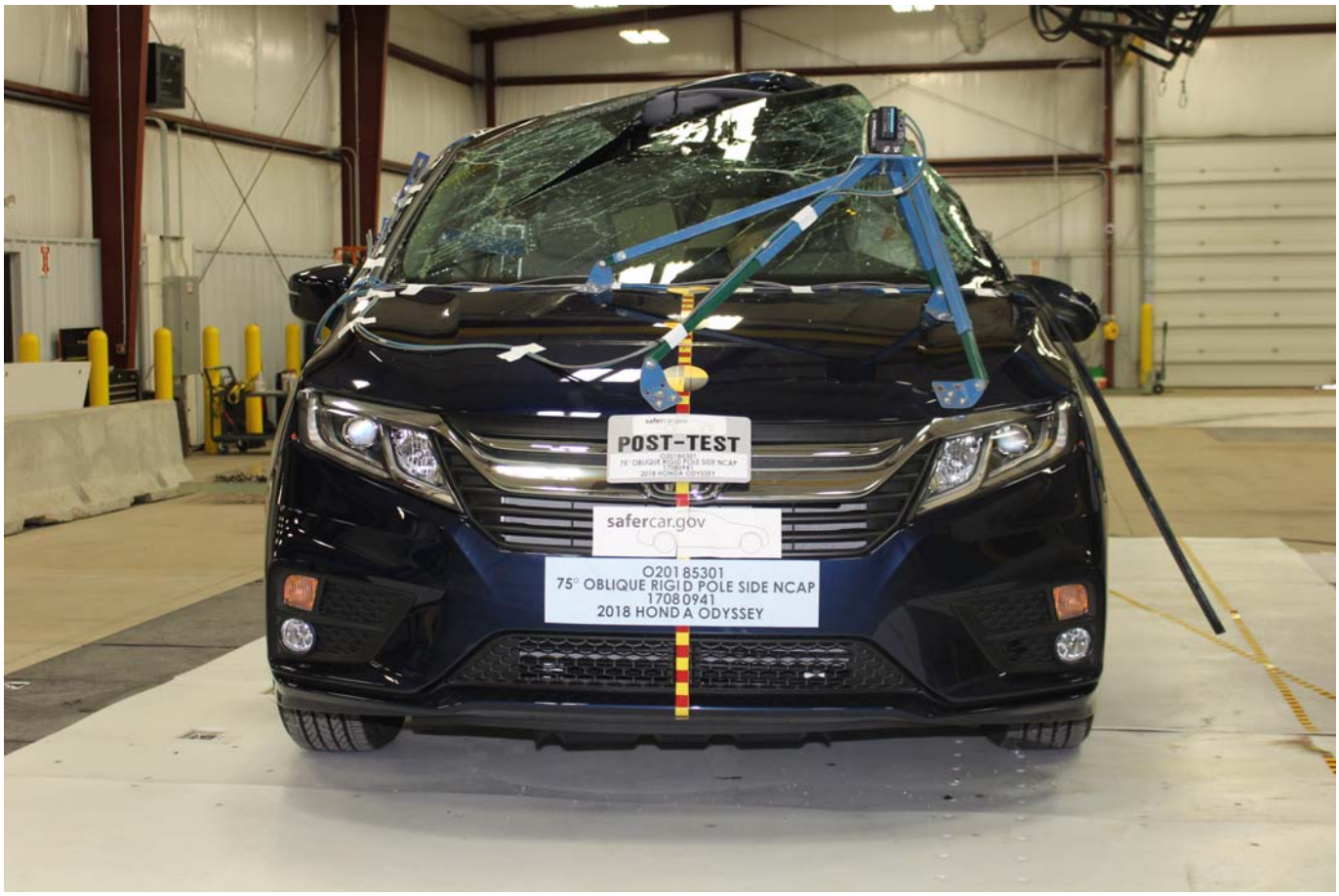


Photo No. 004 - Post-Test Frontal View of Test Vehicle

Photo No. 005 - Pre-Test Left Front Three-Quarter View of Test Vehicle

Photo No. 006 - Post-Test Left Front Three-Quarter View of Test Vehicle

Photo No. 007 - Pre-Test Left Side View of Test Vehicle

Photo No. 008 - Post-Test Left Side View of Test Vehicle

Photo No. 009 - Pre-Test Left Rear Three-Quarter View of Test Vehicle

Photo No. 010 - Post-Test Left Rear Three-Quarter View of Test Vehicle

Photo No. 011 - Pre-Test Rear View of Test Vehicle

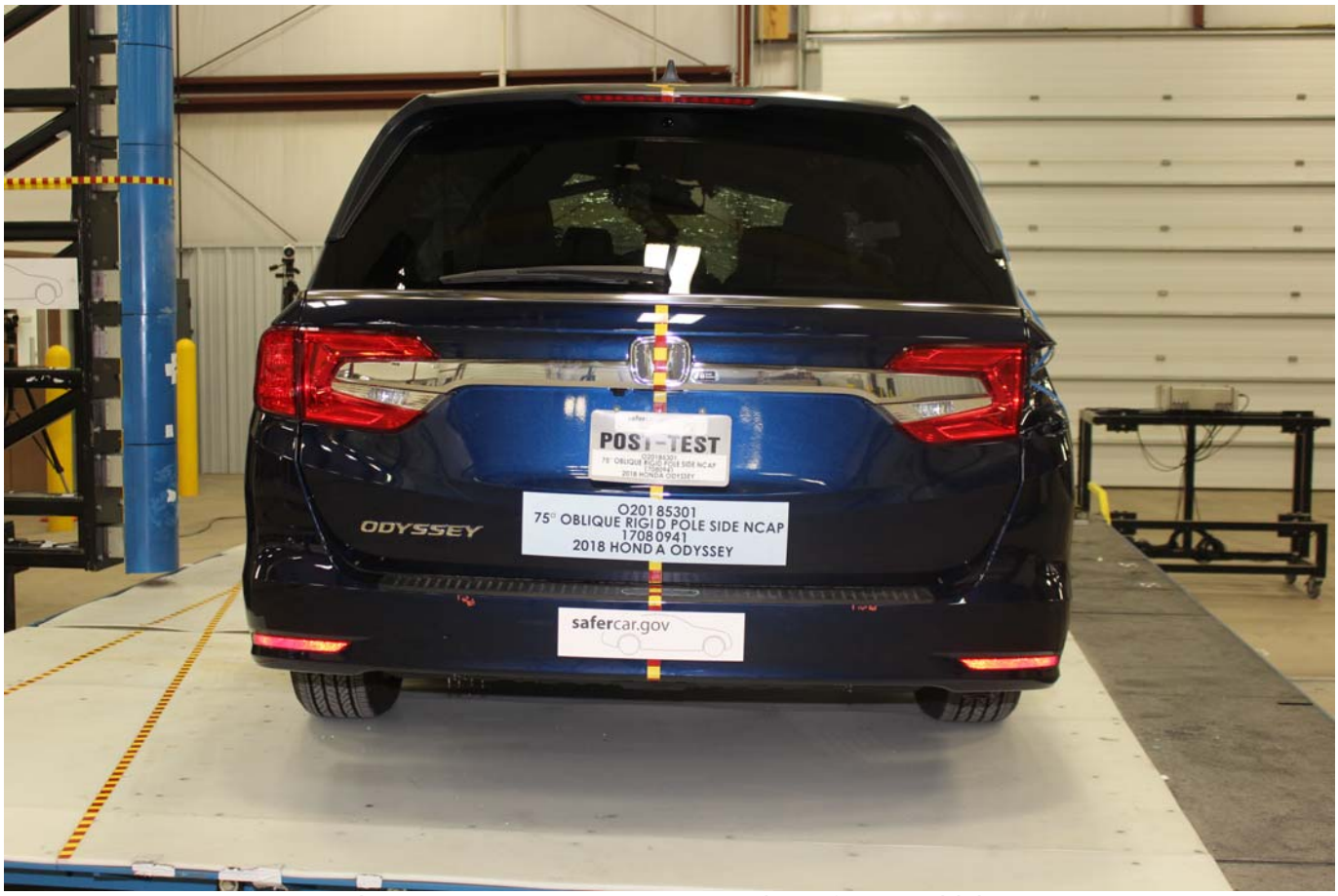


Photo No. 012 - Post-Test Rear View of Test Vehicle

Photo No. 013 - Pre-Test Right Side View of Test Vehicle

Photo No. 014 - Post-Test Right Side View of Test Vehicle

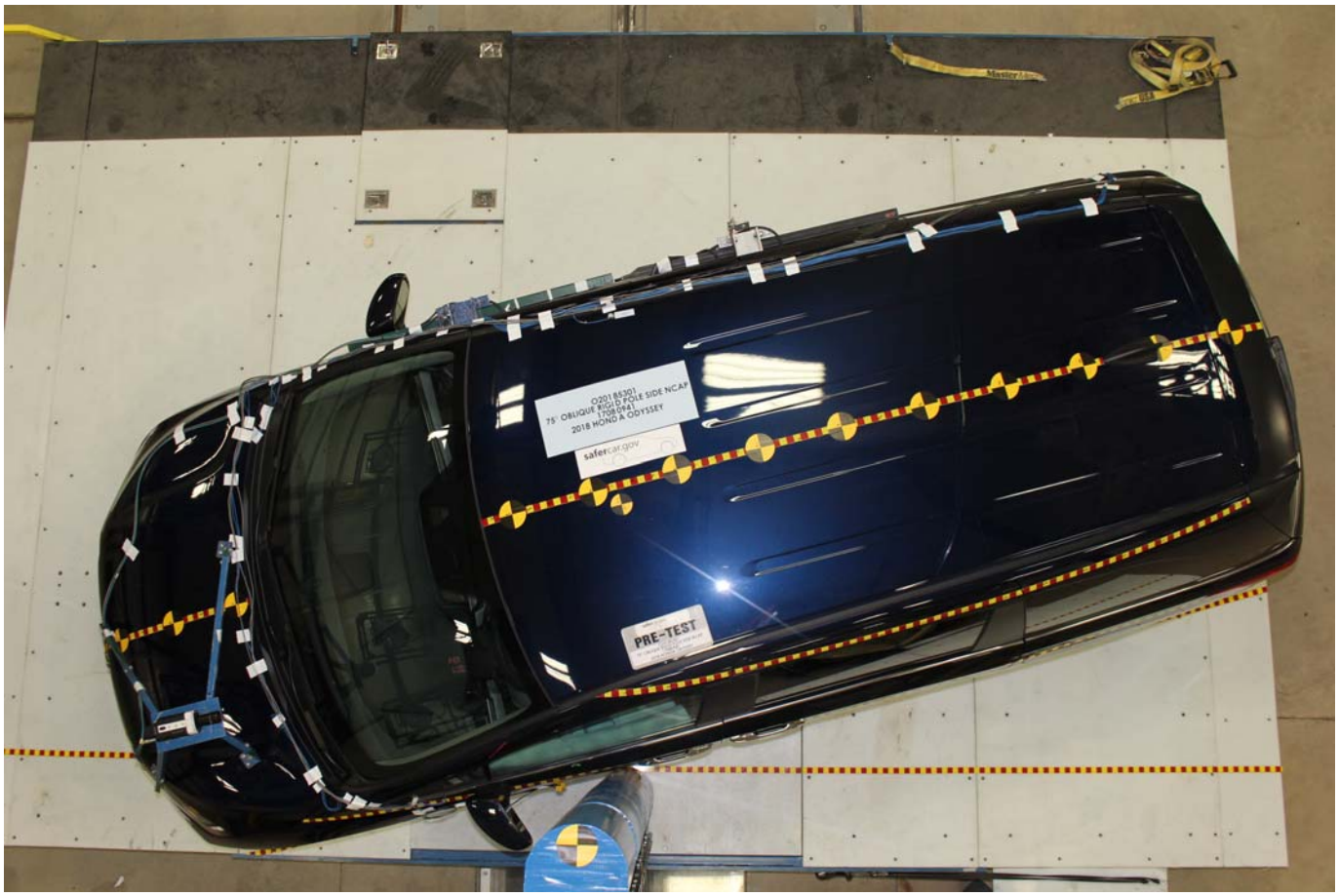


Photo No. 015 - Pre-Test Overhead View of Test Area

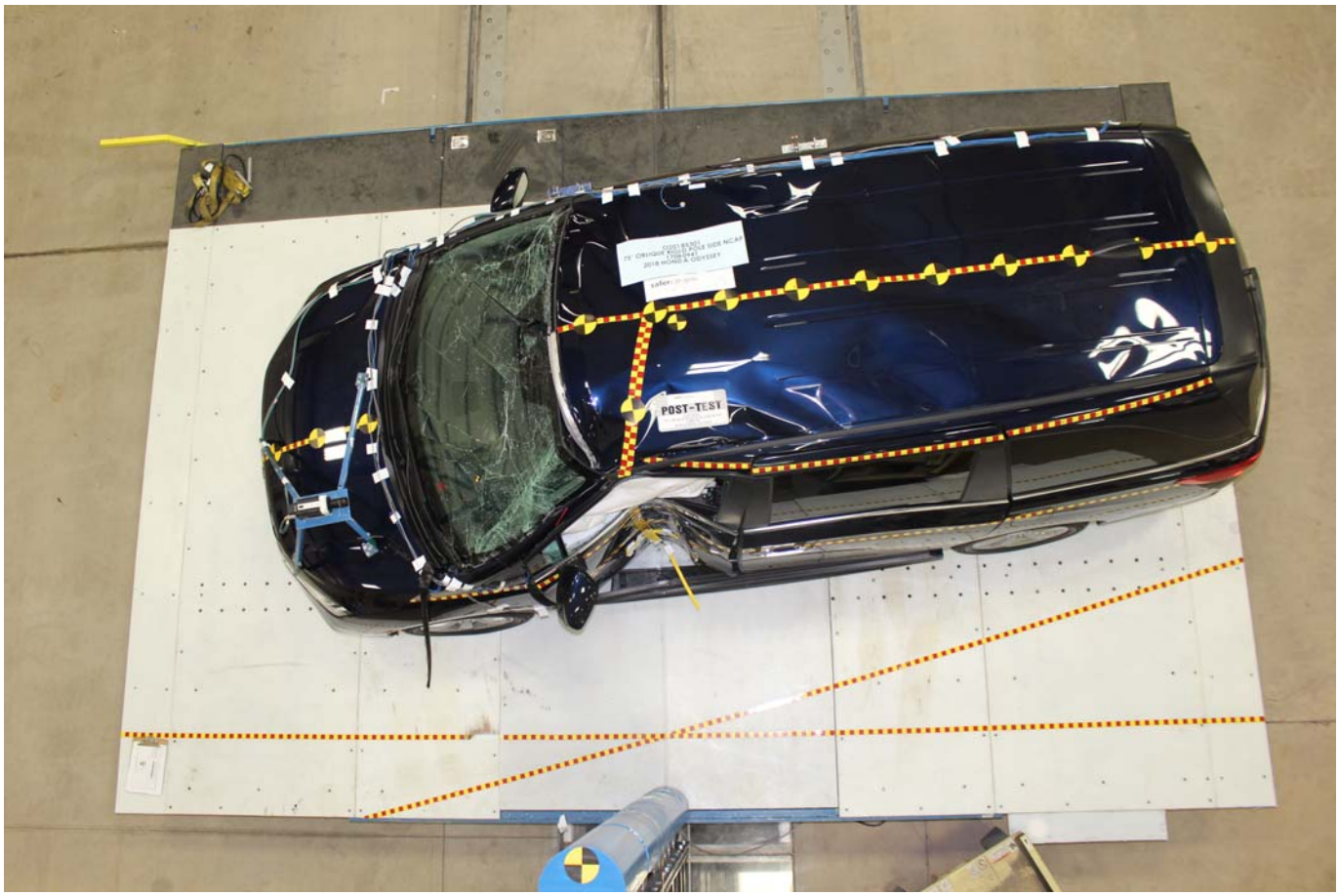


Photo No. 016 - Post-Test Overhead View of Test Area

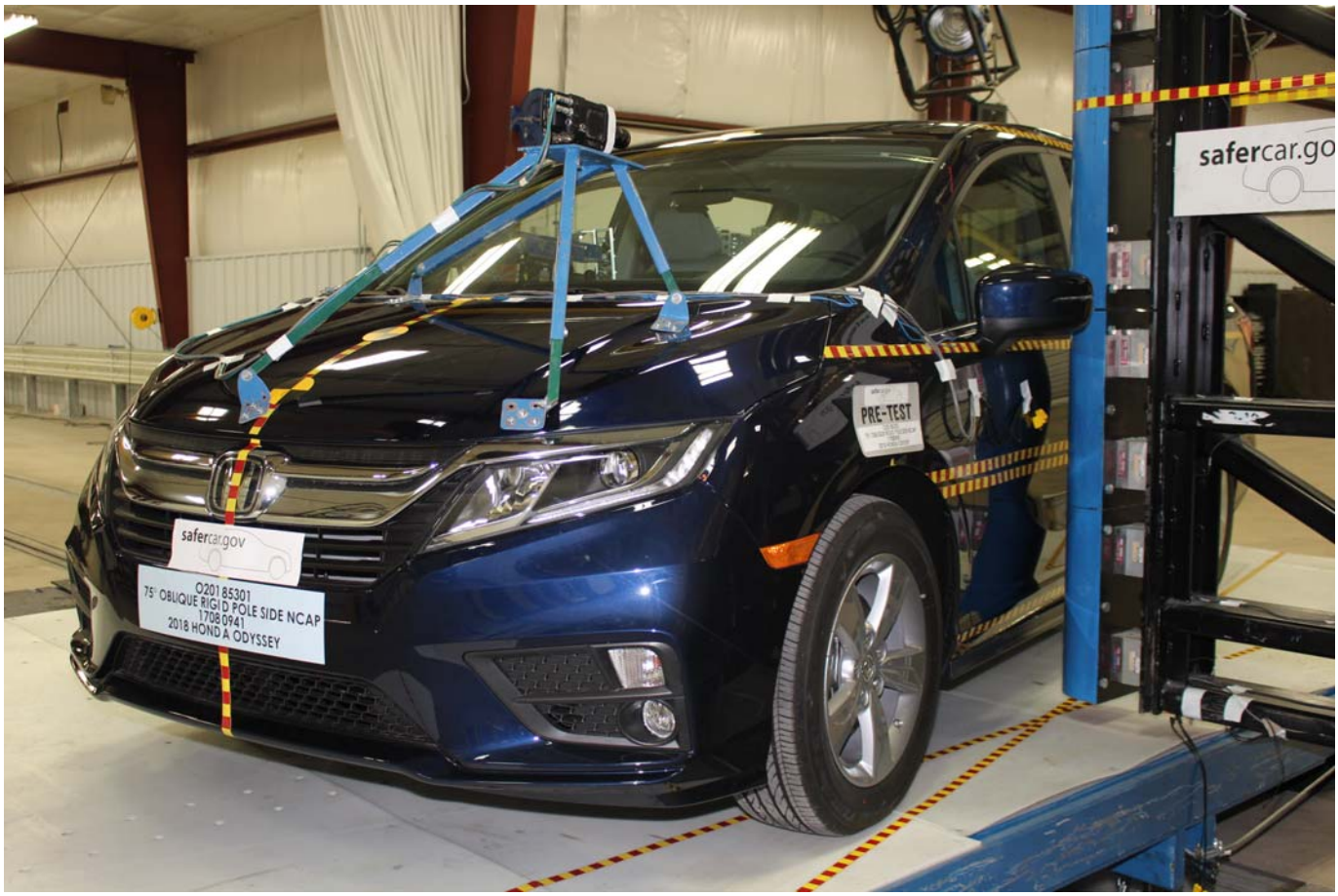


Photo No. 017 - Pre-Test Left Side View of Pole Positioned Against Side of Vehicle

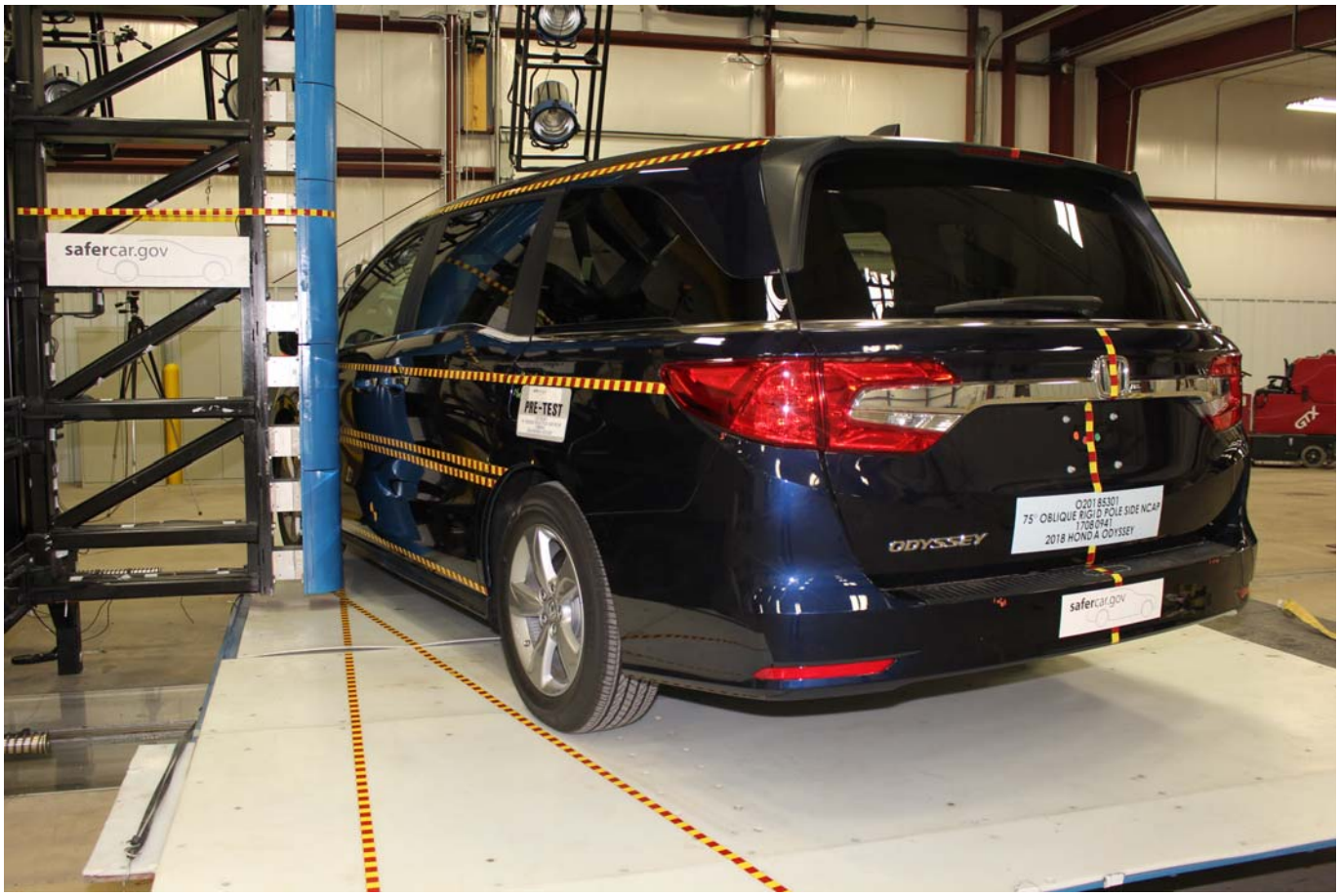


Photo No. 018 - Pre-Test Right Side View of Pole Positioned Against Side of Vehicle

Photo No. 019 - Pre-Test Close-Up View of Impact Point Target

Photo No. 020 - Post-Test Close-Up View of Impact Point Target Showing Impact Location

Photo No. 021 - Pre-Test Front Close-Up View of Dummy Head and Chest

Photo No. 022 - Post-Test Front Close-Up View of Dummy

Photo No. 023 - Pre-Test Left Side View of Dummy Showing Belt and Chalking

Photo No. 024 - Pre-Test Left Side View of Dummy Shoulder and Door Top View

Photo No. 025 - Post-Test Left Side View of Dummy Shoulder and Door Top View

Photo No. 026 - Pre-Test Front View of Seat Back Prior to Dummy Positioning

Photo No. 027 - Pre-Test Front Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint

Photo No. 028 - Pre-Test Front View of Seat Pan Prior to Dummy Positioning

Photo No. 029 - Pre-Test Overhead View of Dummy Thighs on Seat Pan

Photo No. 030 - Pre-Test Left Side View of Dummy Neck Showing Position of Adjustable Neck Bracket

Photo No. 031 - Pre-Test Left Side View of Dummy Head Showing Dummy Head is Level

Photo No. 032 - Pre-Test Placement of Dummy Feet

Photo No. 033 - Pre-Test View of Belt Anchorage for Dummy

Photo No. 034 - Pre-Test Left Side View of Steering Wheel

Photo No. 035 - Pre-Test View of Disengaged Parking Brake

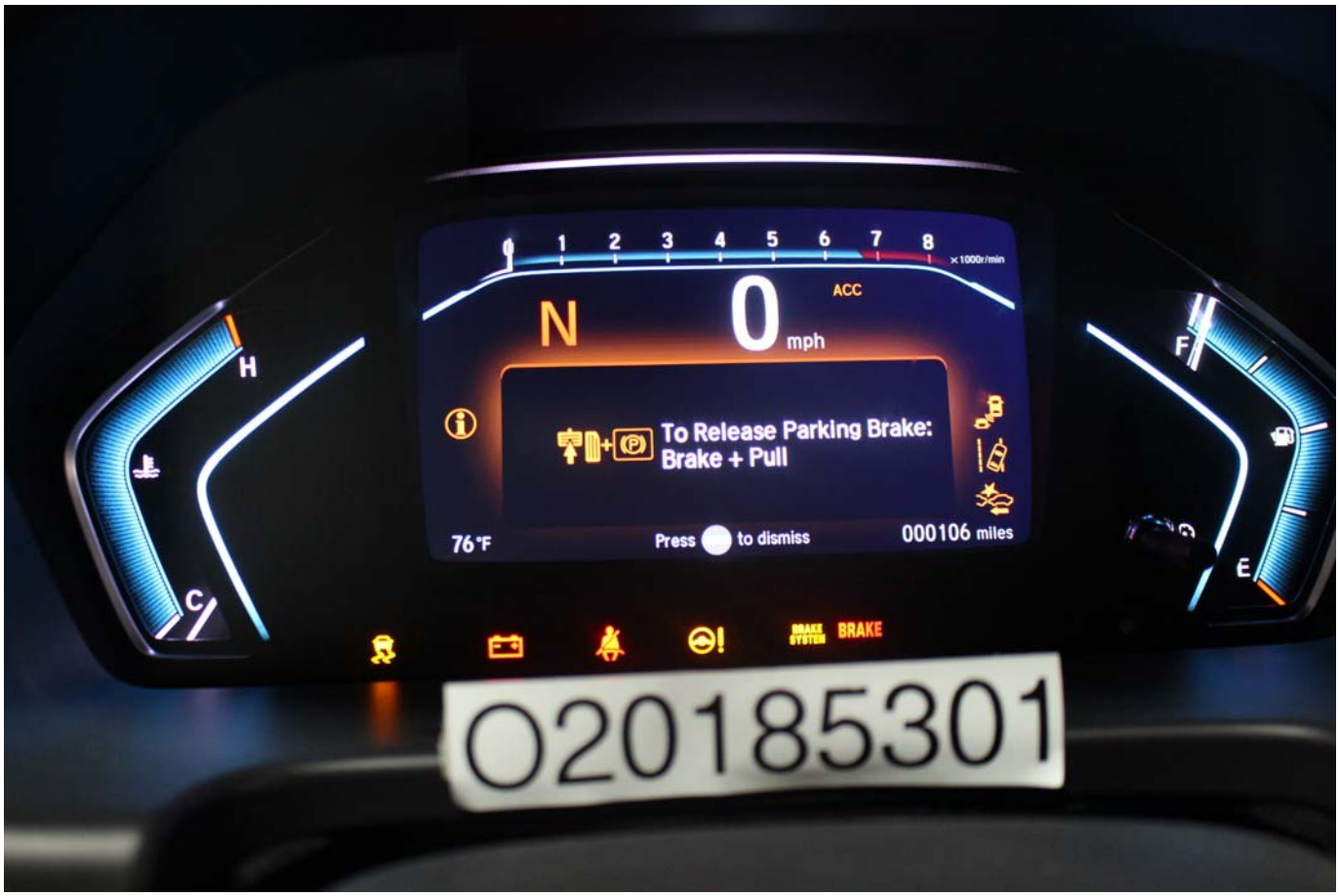


Photo No. 036 - Pre-Test View of Parking Brake

Photo No. 037 - Pre-Test Close-Up Left Side View of Driver Seat Track

Photo No. 038 - Pre-Test Close-Up Left Side View of Driver Seat Back

Photo No. 039 - Pre-Test Close-Up View of Driver Seat Back or Head Restraint

Photo No. 040 - Pre-Test Dummy and Door Clearance View

Photo No. 041 - Post-Test Dummy and Door Clearance View

Photo No. 042 - Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment

Photo No. 043 - Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment

Photo No. 044 - Pre-Test Inner Door Panel View

Photo No. 045 - Post-Test Inner Door Panel View Showing Dummy Contact Location

Photo No. 046 - Post-Test Dummy Close-Up Head Contact with Vehicle Interior View

Photo No. 047 - Post-Test Dummy Close-Up Head Contact with Side Air Bag View

Photo No. 048 - Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View

Photo No. 049 - Post-Test Dummy Close-Up Torso Contact with Side Air Bag View

Photo No. 050 - Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View

Photo No. 051 - Post-Test Dummy Close-Up Pelvis Contact with Side Air Bag View

Photo No. 052 - Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View

Photo No. 053 - Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

Photo No. 054 - Post-Test View of Fuel Filler Cap or Fuel Filler Neck

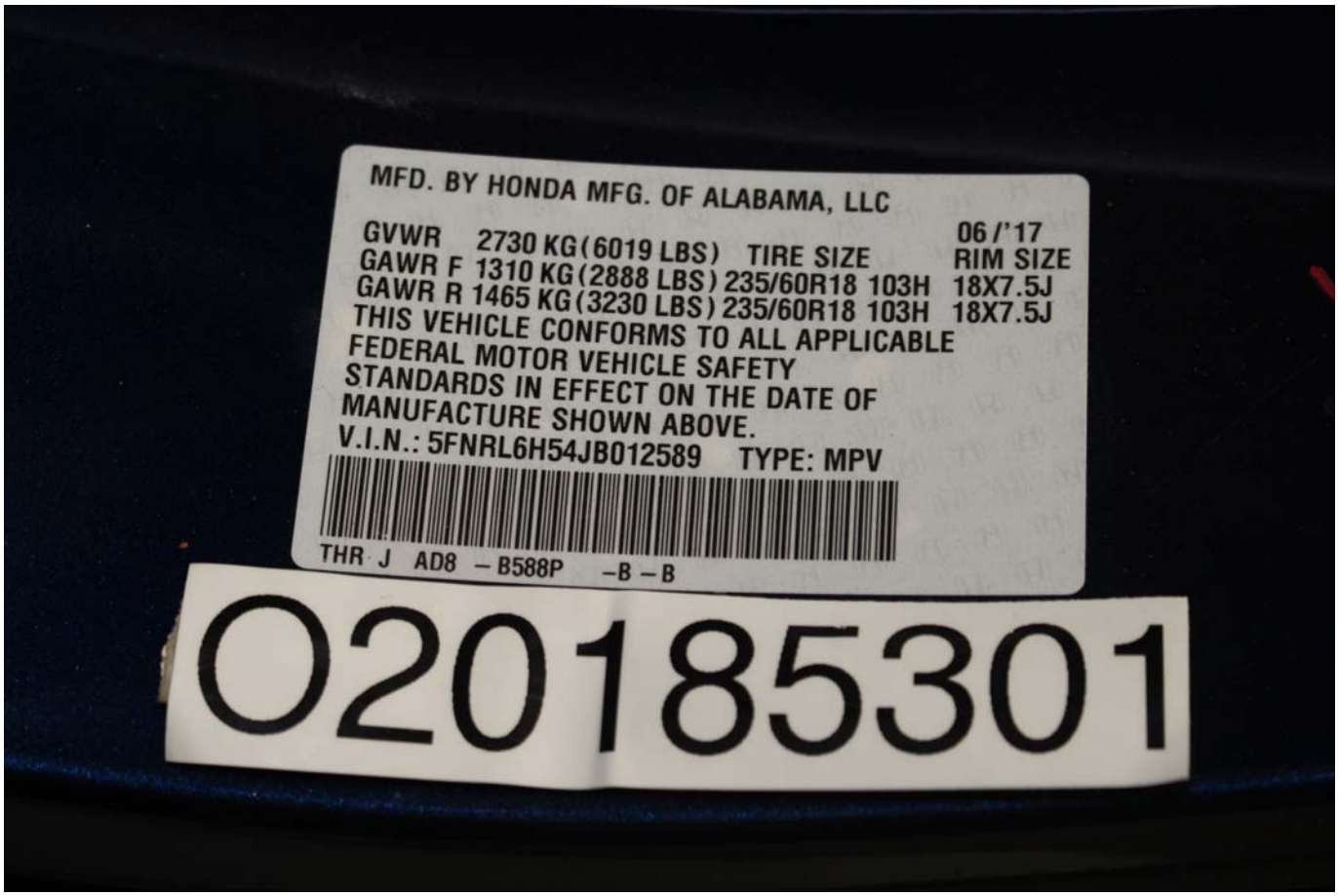


Photo No. 055 - Close-Up View of Vehicle Certification Label

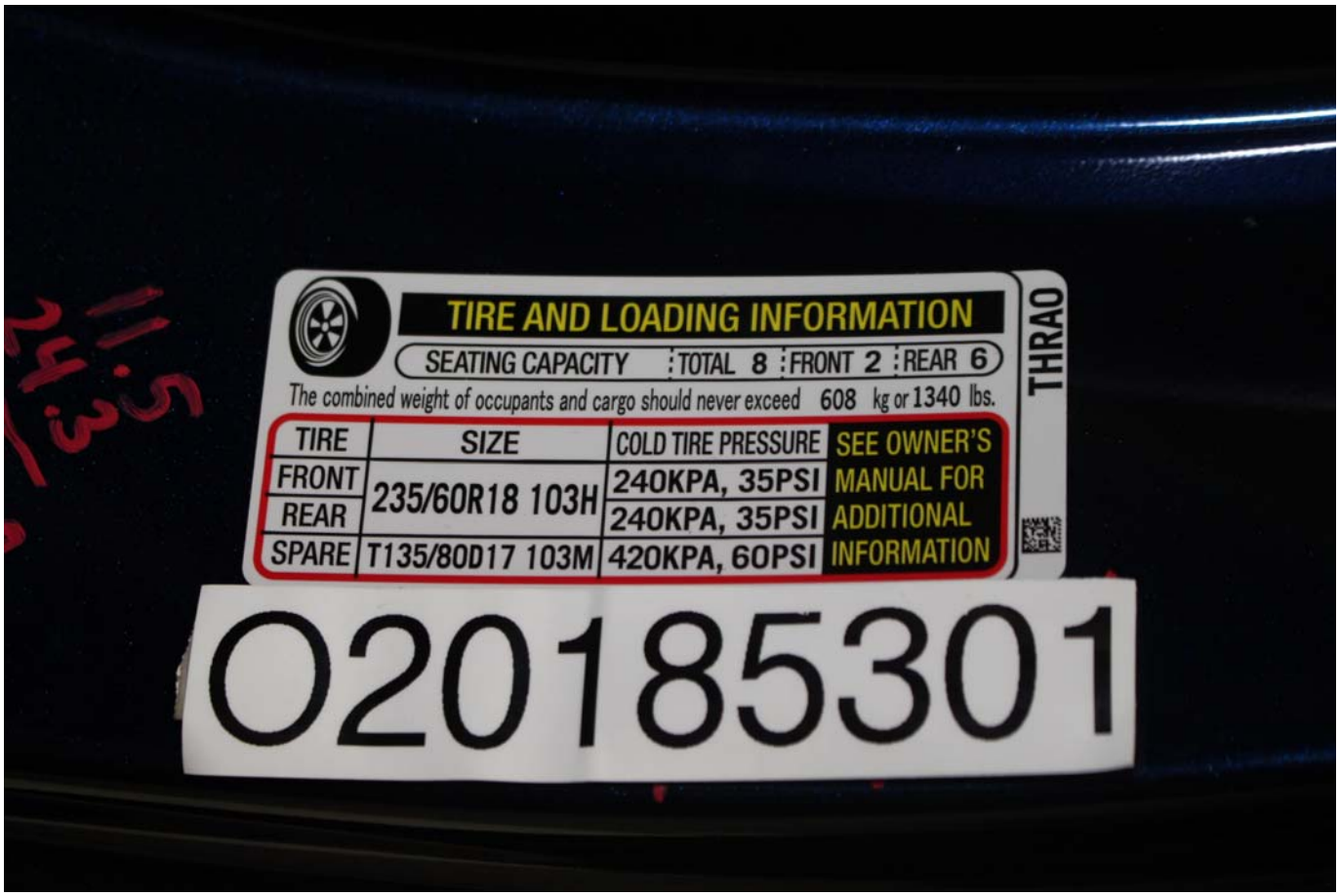


Photo No. 056 - Close-Up View of Vehicle Tire Information Placard or Label

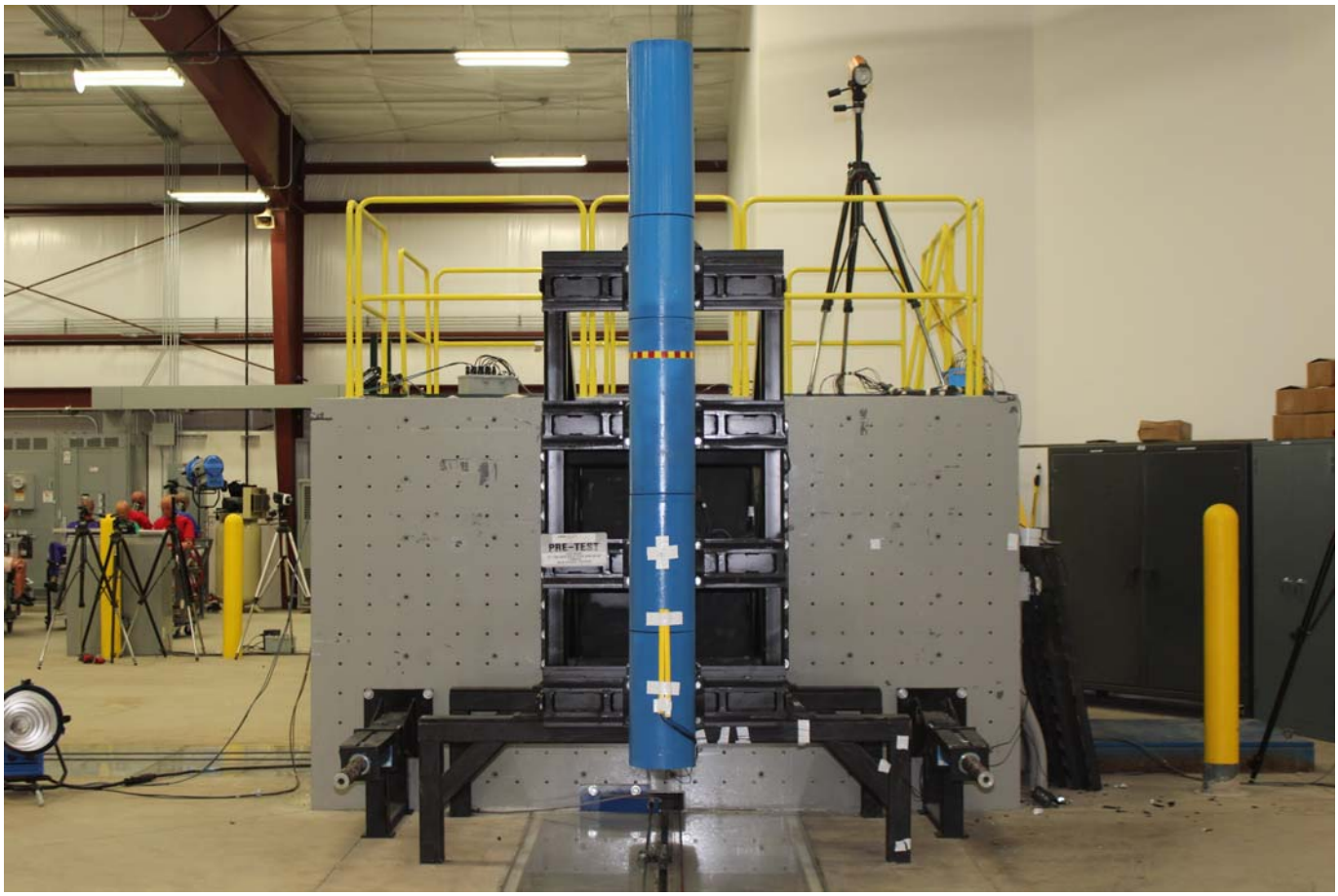


Photo No. 057 - Pre-Test Pole Barrier Front View

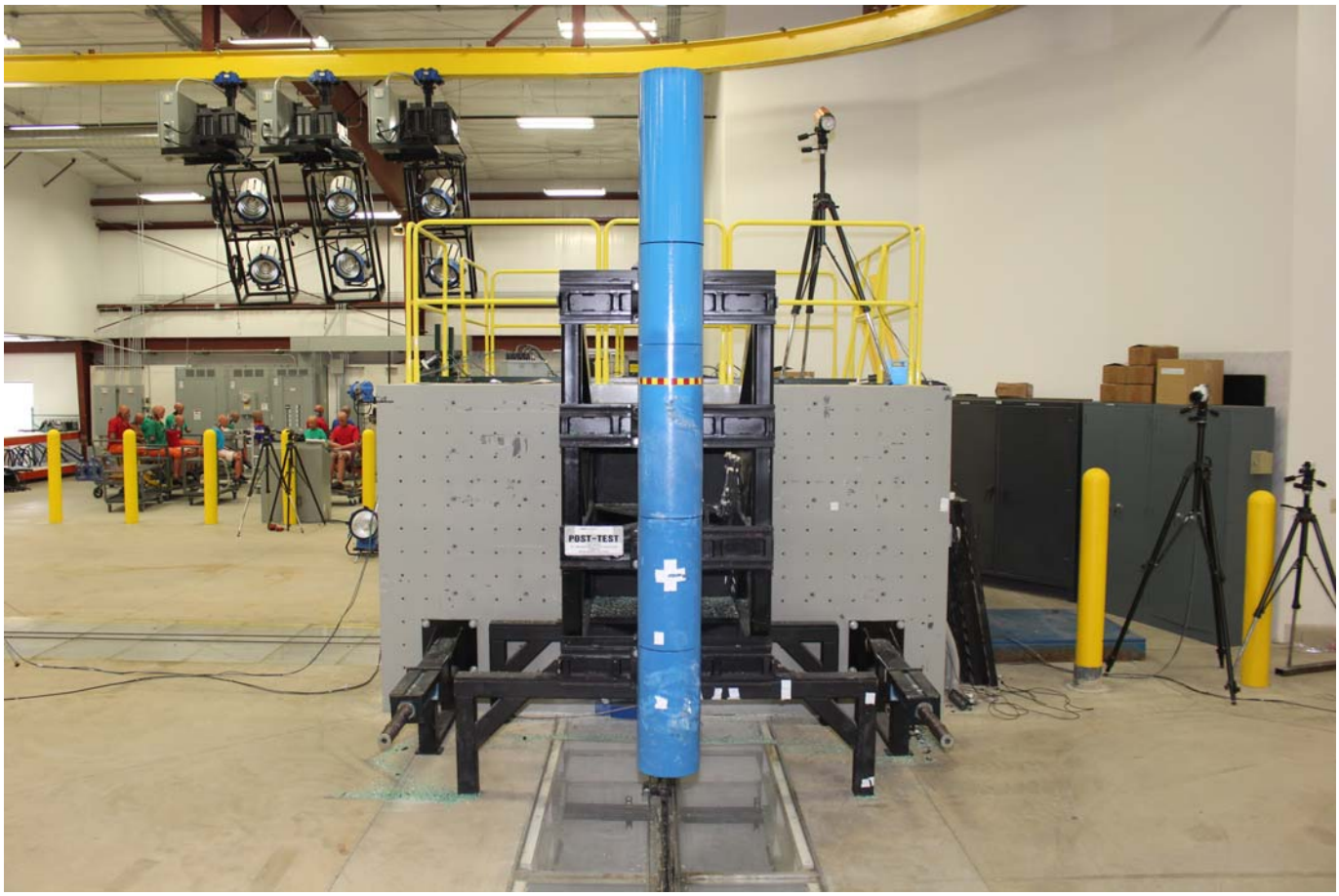


Photo No. 058 - Post-Test Pole Barrier Front View

Photo No. 059 - Pre-Test Pole Barrier Side View

Photo No. 060 - Post-Test Pole Barrier Side View

Photo No. 061 - Pre-Test Ballast View

Photo No. 062 - Post-Test Primary and Redundant Speed Trap Read-Out

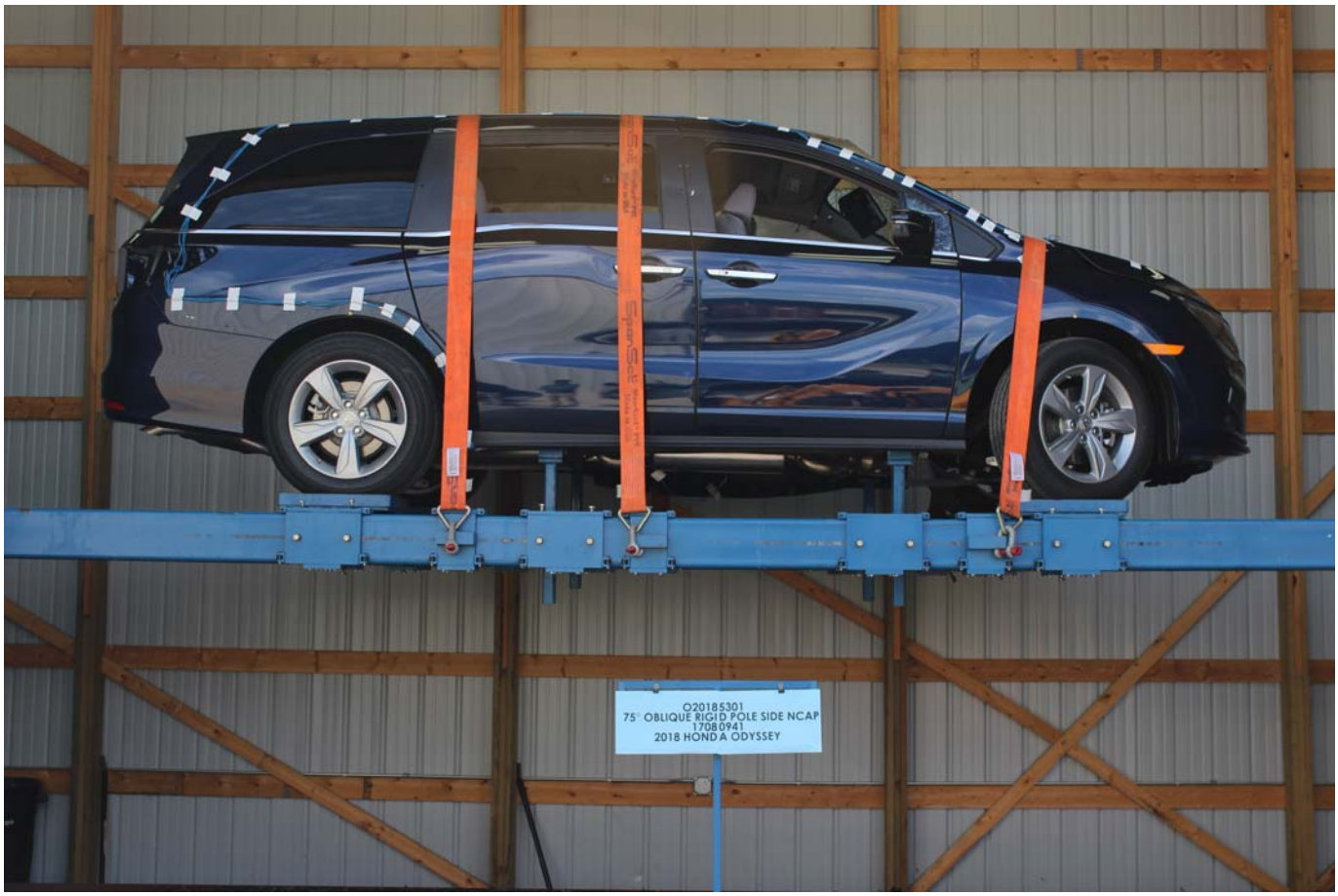


Photo No. 063 - FMVSS Photo No. 301 Static Rollover 0 Degrees

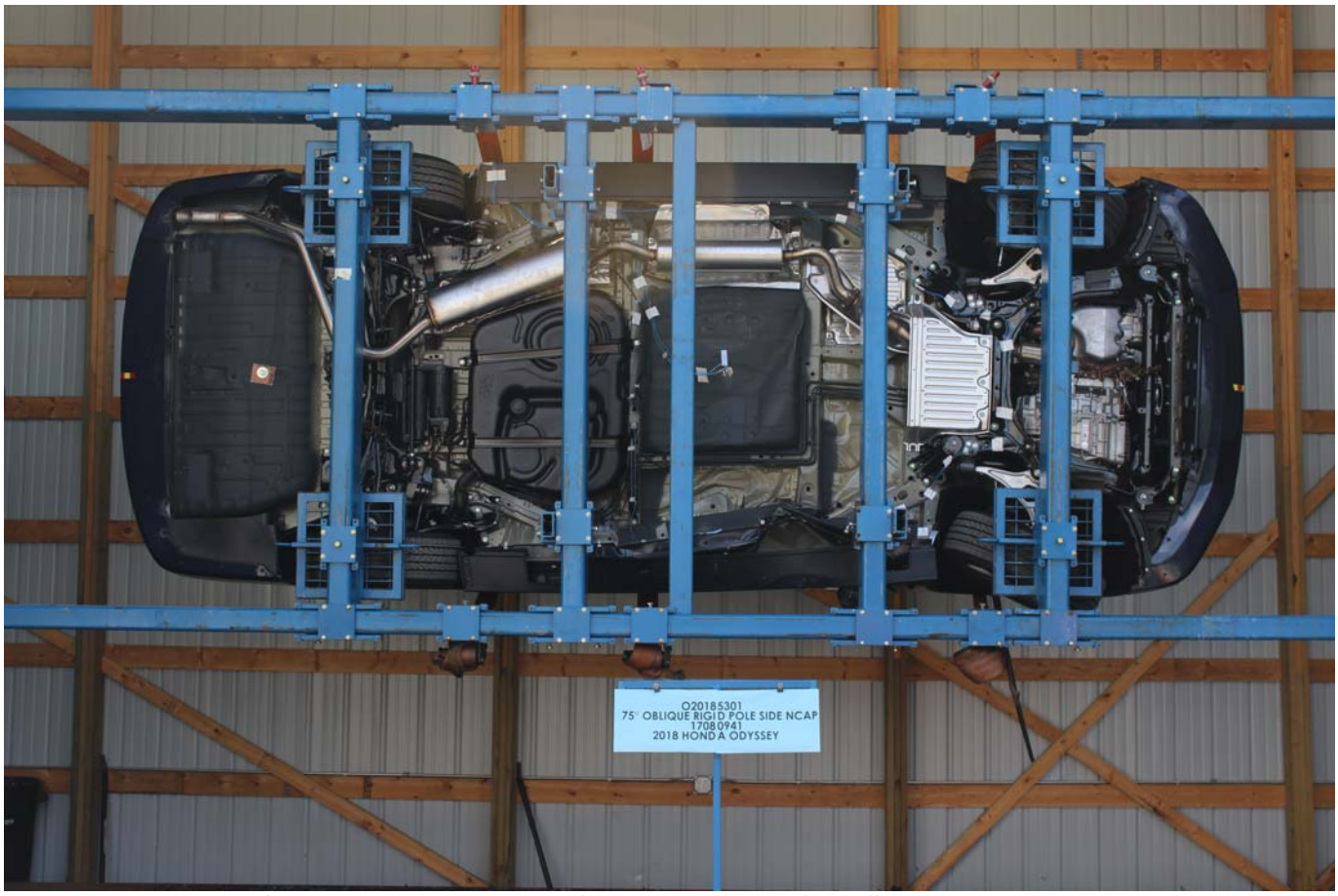


Photo No. 064 - FMVSS Photo No. 301 Static Rollover 90 Degrees

Photo No. 065 - FMVSS Photo No. 301 Static Rollover 180 Degrees

Photo No. 066 - FMVSS Photo No. 301 Static Rollover 270 Degrees

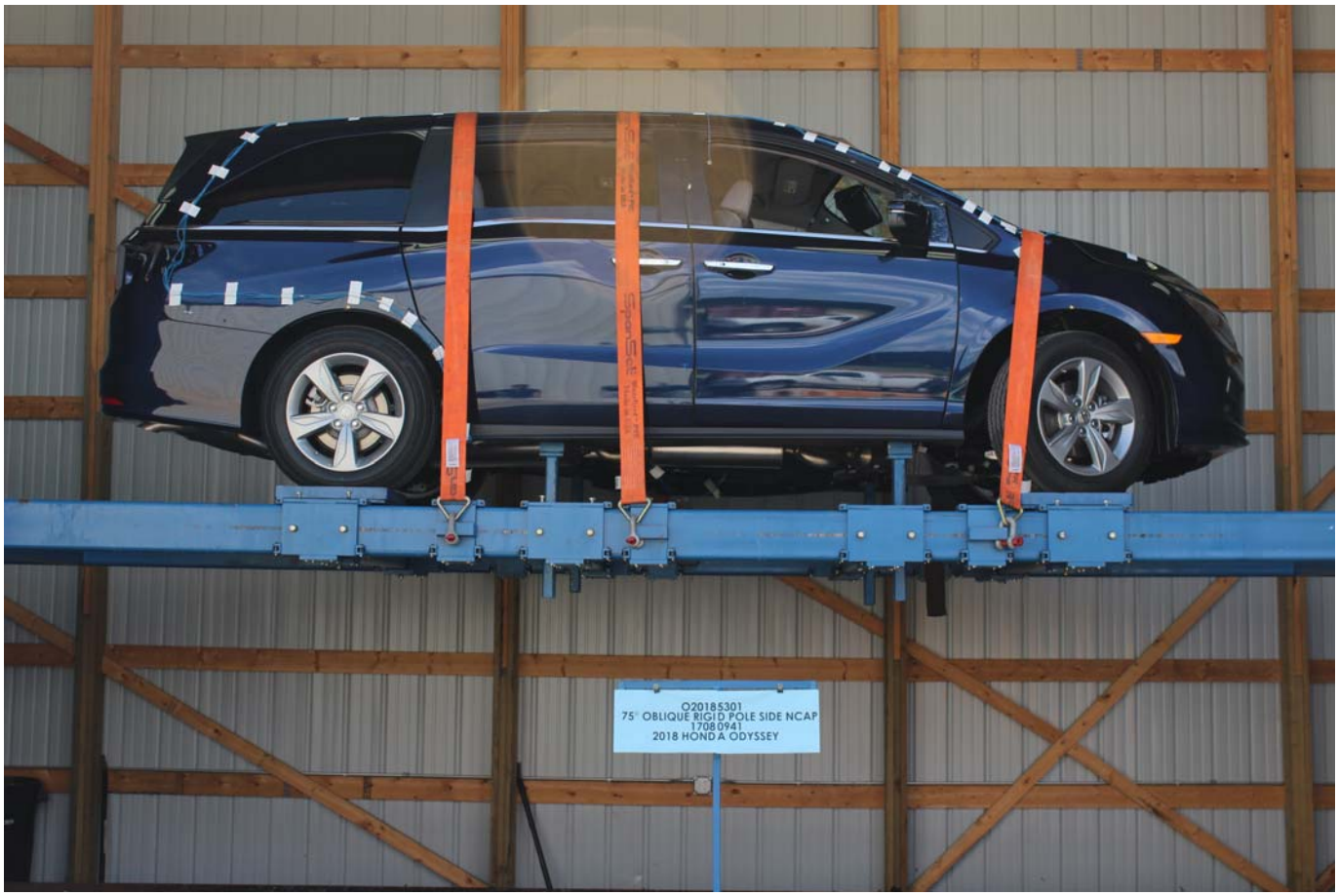


Photo No. 067 - FMVSS Photo No. 301 Static Rollover 360 Degrees

Photo No. 068 - Impact Event

HONDA

2018 ODYSSEY EX

EXT: OBSIDIAN BLUE P. ENGINE NUMBER: J35Y7-1018621
INT: GRAY

STANDARD EQUIPMENT AT NO EXTRA COST

*** TECHNICAL FEATURES ***
- 280hp 3.5-Liter VTEC V6 Engine with Variable Cylinder Management (VCM)
- 9-Speed Automatic Transmission
- Paddle Shifters
- Intelligent Traction Management
- Electric Power Steering

*** SAFETY FEATURES ***
- Driver's and Front Passenger's Airbags
- Driver's and Front Passenger's Side Airbags
- Three Row Side Curtain Airbags
- Driver's and Front Passenger's Knee Airbags
- Vehicle Stability Assist (VSA)
- Anti-Lock Braking System (ABS)
- Electronic Brake Distribution (EBD)
- Tire Pressure Monitoring System
- LED Daytime Running Lights
- LATCH System for Child Seats

*** INTERIOR FEATURES ***
- Audio System with 7 Speakers
- Display Audio with Multi-View Rear Camera
- TFT Meter Display
- CarPlay/Android Auto Integration
- SiriusXM Satellite Radio
- HD Radio
- HondaLink with Smart Phone Integration
- Bluetooth HandsFreeLink
- CabinControl Capability
- USB Audio Interface

- Push-Button Start
- Tri-Zone Automatic Climate Control
- Driver's 12-Way Power Seat
- Heated Front Seats
- Front Passenger's 4-Way Power Seat
- Tilt & Telescopic Steering Column
- Illuminated Visor Vanity Mirrors
- Magic Slide 2nd Row Seats
- 60/40 Fold-Down 3rd Row
- Floor Mats
- Second-Row Sunshades

*** EXTERIOR FEATURES ***
- Dual Power Sliding Doors
- Blind Spot Information System (BSI) w/ Cross Traffic Monitor
- 18" Alloy Wheels
- 235/60 R18 All-Season Tires
- Auto High-Beam
- Auto-On/Off Headlights
- Fog Lights
- Heated Power Door Mirrors with Turn Indicators
- Capless Fuel Filler
- LED Taillights
- Rear Privacy Glass
- Smart Entry System with Security System
- Remote Engine Start
- Walk Away Auto Lock

*** HONDA SENSING PACKAGE ***
- Adaptive Cruise Control (ACC)
- Collision Mitigation Braking System (CMBS)
- Forward Collision Warning (FCW)
- Lane Departure Warning (LDW)
- Lane Keeping Assist System (LKAS)
- Road Departure Mitigation (RDM)

Manufacturer's Suggested Retail Price **$33,860.00**

Full Tank of Fuel **No Charge**

-SiriusXM Includes: Free Activation and 3 Months Free Service (excl. AK & HI)

-Honda Roadside Assistance 3YR/36K Mile Warranty Term

Destination and Handling 940.00

TOTAL VEHICLE PRICE
(includes Pre-Delivery Service)

$34,800.00

License and title fees, state and local taxes and dealer options and accessories are not included in the manufacturer's suggested retail price.

DAVID HOBBS HONDA
6100 NO. GREEN BAY AVE
GLENDALE, WI 53209

VIN: 5FNRL6H54JB012589

PORT OF ENTRY: ALABAMA
DELIVERY POINT: SCHAUMBURG
SHIP#:
ROW/SPACE: 746-010
TRANS.METHOD: E62 TALLADEGA
N50 ELWOOD

ORIG. DLR: 207671
REF.NO: 40840
HN CODE: HN-7117
EMISSION: 50 STATE
CONTROL NO: 255996
DEALER: 207671

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy: **22** MPG combined city/hwy (19 city, 28 highway)
4.5 gallons per 100 miles

These estimates reflect new EPA methods beginning with 2017 models.
Minivans range from 19 to 52 MPG.
The best vehicle rates 136 MPGe.

You spend **$1,500** in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost **$1,650**

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 4 (1 / 10 Best)
Smog Rating (tailpipe only): 3 (1 / 10 Best)

This vehicle emits 406 grams CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs $6,750 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $2.40 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code™

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE
U.S./Canadian Parts Content: **75 %**

NOTE: Parts content does not include final assembly, distribution or other non-parts costs.

FOR THIS VEHICLE
Final Assembly Point:
LINCOLN, ALABAMA USA
Country of Origin: Engine:
U.S.A.
Transmission:
U.S.A.

GOVERNMENT 5-STAR SAFETY RATING

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	Driver	**Not Rated**
	Passenger	**Not Rated**

Based on the risk of injury in a frontal impact.
Should ONLY be compared to other vehicles of similar size and weight.

Side Crash	Front seat	**Not Rated**
	Rear seat	**Not Rated**

Based on the risk of injury in a side impact.

Rollover **Not Rated**
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

5 Mile

Photo No. 069 - Monroney Label

⚠WARNING
Reclining the seat-back too far can result in serious injury or death in a crash.
Adjust the seat-back to an upright position and sit well back in the seat.

⚠WARNING
Sitting too close to a front airbag can result in serious injury or death if the front airbags inflate.
Always sit as far back from the front airbags as possible while maintaining control of the vehicle.

⚠WARNING
Sitting improperly or out of position can result in serious injury or death in a crash.
Always sit upright, well back in the seat, with your feet on the floor.

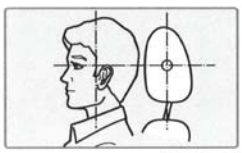
■ **Lumbar Support Adjustment Switch***

Press the top: To move the lumbar support up.
Press the bottom: To move the lumbar support down.
Press the front: To increase the entire lumbar support.
Press the rear:To decrease the entire lumbar support.

■ **Adjusting the Head Restraints**

Your vehicle is equipped with head restraints in all seating positions. Head restraints are most effective for protection against whiplash and other rear-impact crash injuries.

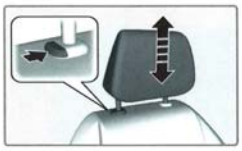
The center of the back of the occupant's head should rest against the center of the restraint. The tops of the occupant's ears should be level with the center height of the restraint.



*if equipped

To raise the head restraint: Pull it upward.

To lower the head restraint: Push it down while pressing the release button.



To remove the head restraint: Pull the restraint up as far as it will go. Then push the release button and pull the restraint up and out.

To reinstall a head restraint: Insert the legs back in place. Adjust the head restraint to an appropriate height while pressing the release button. Pull up on the restraint to make sure it is locked in position.

⚠WARNING
Improperly positioning head restraints reduces their effectiveness and increases the likelihood of serious injury in a crash.
Make sure head restraints are in place and positioned properly before driving.

⚠WARNING
Failure to reinstall or correctly reinstall the head restraints can result in severe injury during a crash.
Always replace the head restraints before driving.

For a head restraint system to work properly:
- Do not hang any items on the head restraint or from the restraint legs.
- Do not place any objects between an occupant and the seat-back.
- Install each restraint in its proper location.

Photo No. 070 - Head Restraint Use and Adjustment Information from Vehicle Owners Manual

Photo No. 071 - Post-Test View of Shattered Vehicle Inner Door Panel

APPENDIX B
DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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 Head Angular Velocity X (Deg/Sec) vs. Time

Driver Head Angular Velocity Y (Deg/Sec) vs. Time

Driver Head Angular Velocity Z (Deg/Sec) 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)

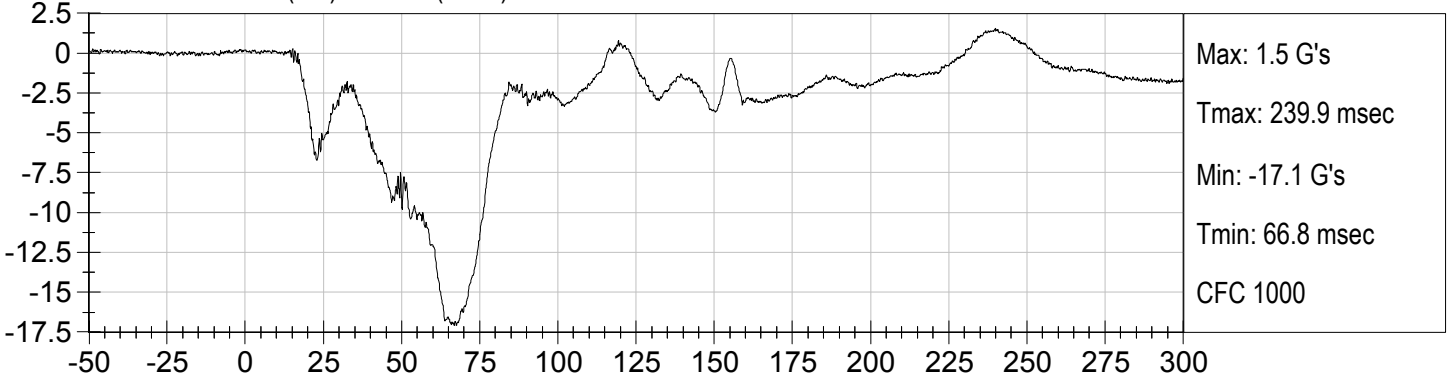
Load Cell Pole Barrier #5 Force (Y)

Load Cell Pole Barrier #6 Force (Y)

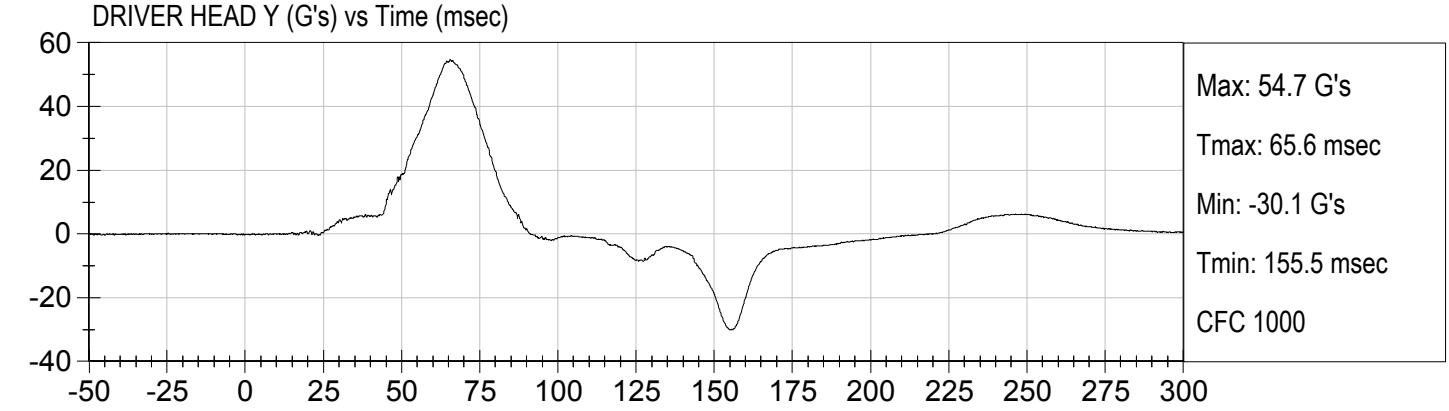
Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)

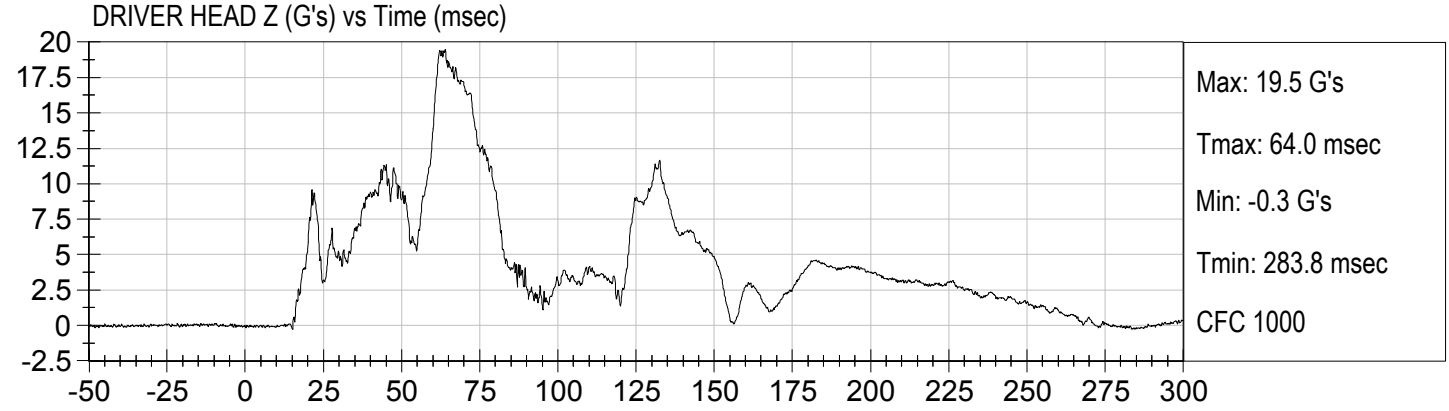
DRIVER HEAD X (G's) vs Time (msec)



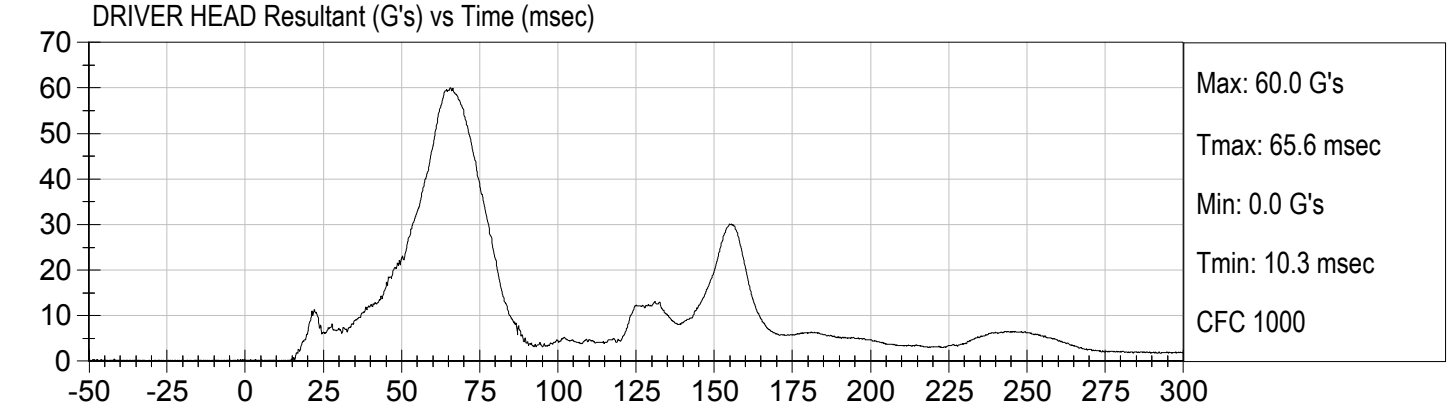
DRIVER HEAD Y (G's) vs Time (msec)



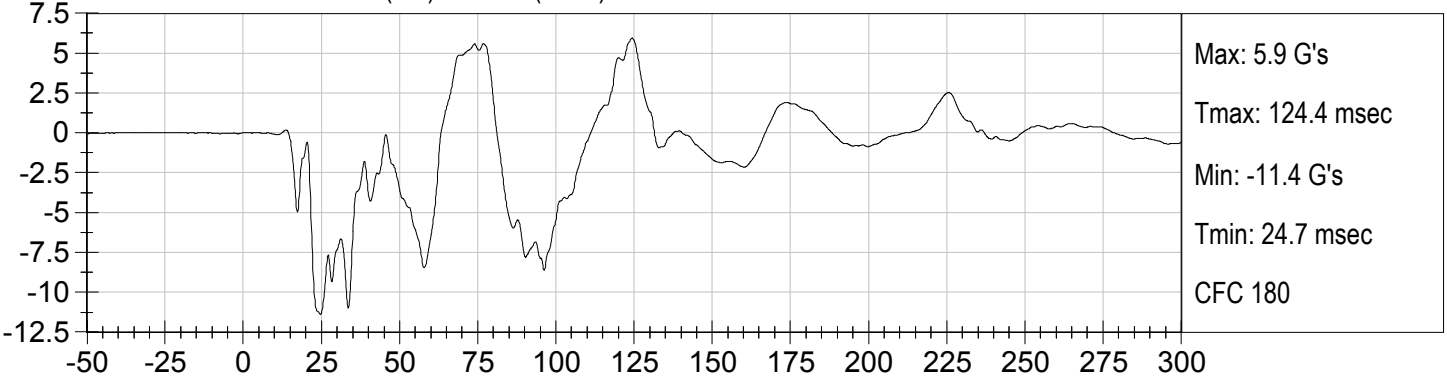
DRIVER HEAD Z (G's) vs Time (msec)



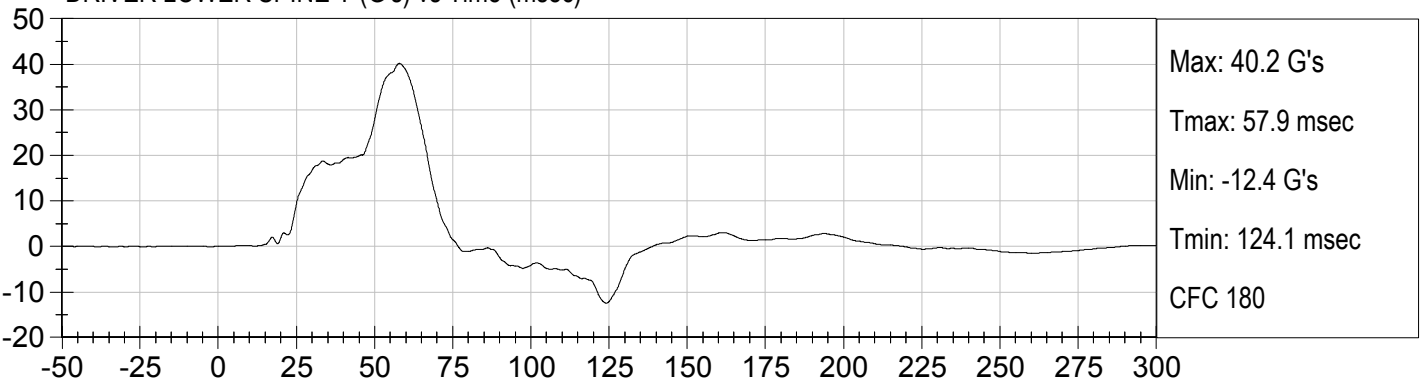
DRIVER HEAD Resultant (G's) vs Time (msec)



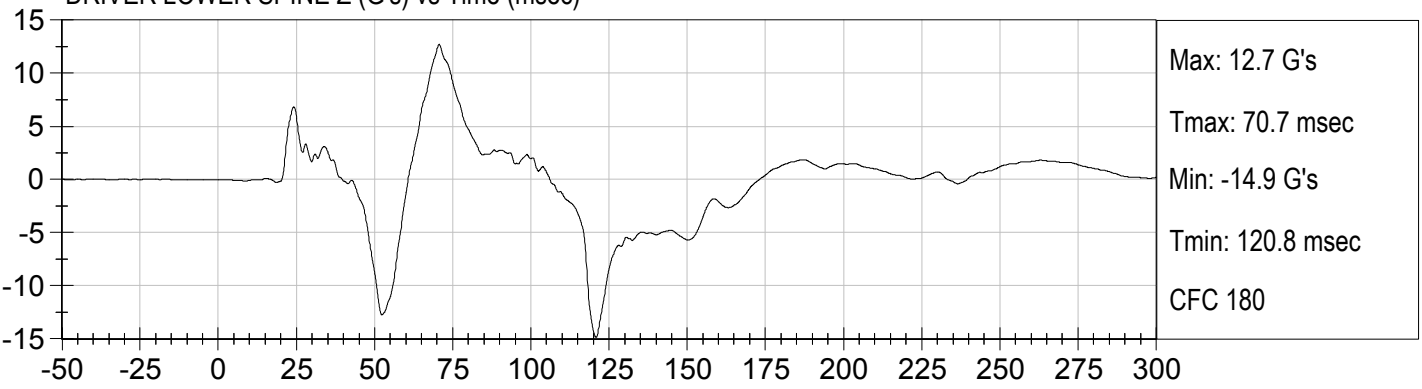
DRIVER LOWER SPINE X (G's) vs Time (msec)



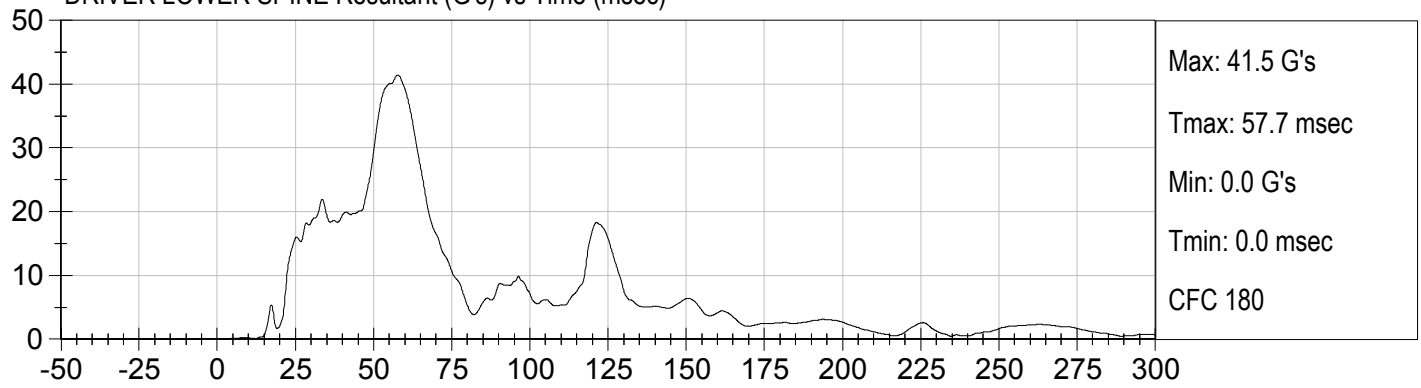
DRIVER LOWER SPINE Y (G's) vs Time (msec)



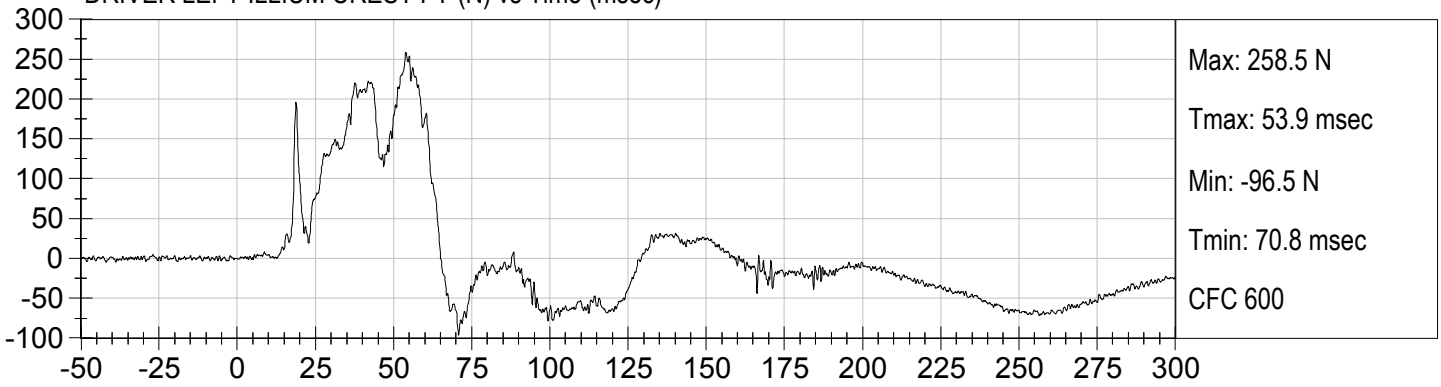
DRIVER LOWER SPINE Z (G's) vs Time (msec)



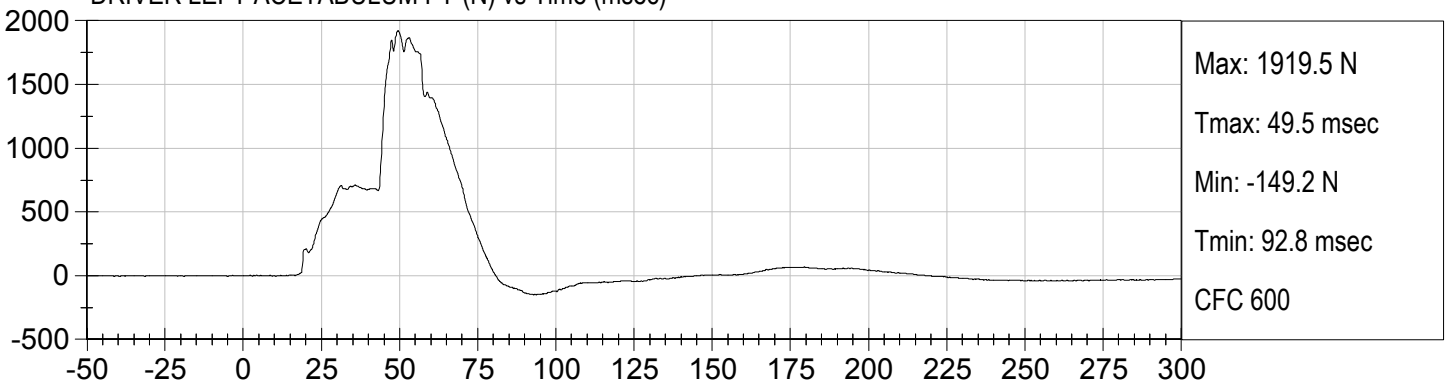
DRIVER LOWER SPINE Resultant (G's) vs Time (msec)



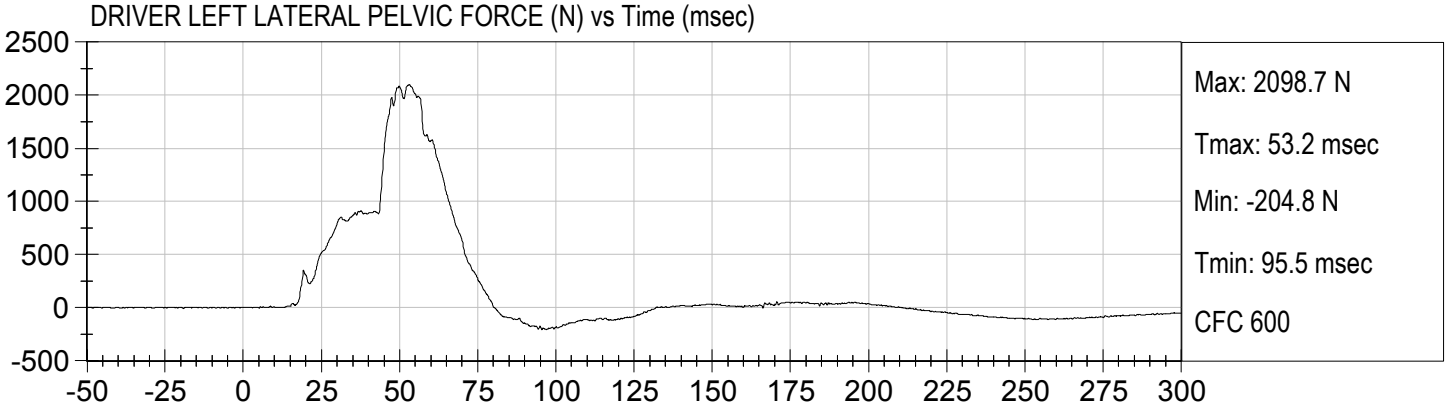
DRIVER LEFT ILLIUM CREST FY (N) vs Time (msec)



DRIVER LEFT ACETABULUM FY (N) vs Time (msec)



DRIVER LEFT LATERAL PELVIC FORCE (N) vs Time (msec)



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 **Test ID:** D171701

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Peak Resultant Acceleration	G's	115 to 137	125	Pass
Peak Longitudinal Acceleration	G's	+/- 15	3.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician

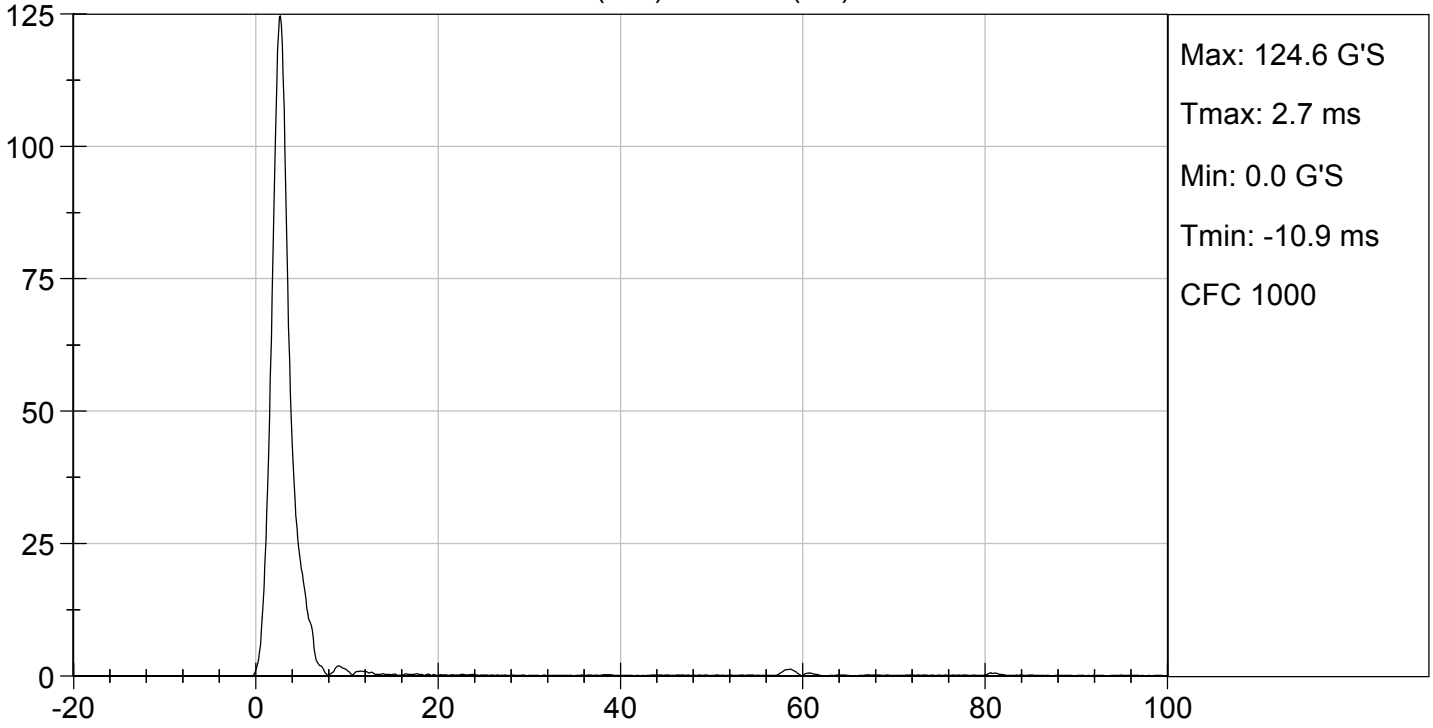
06/15/2017
Test Date

Approved By

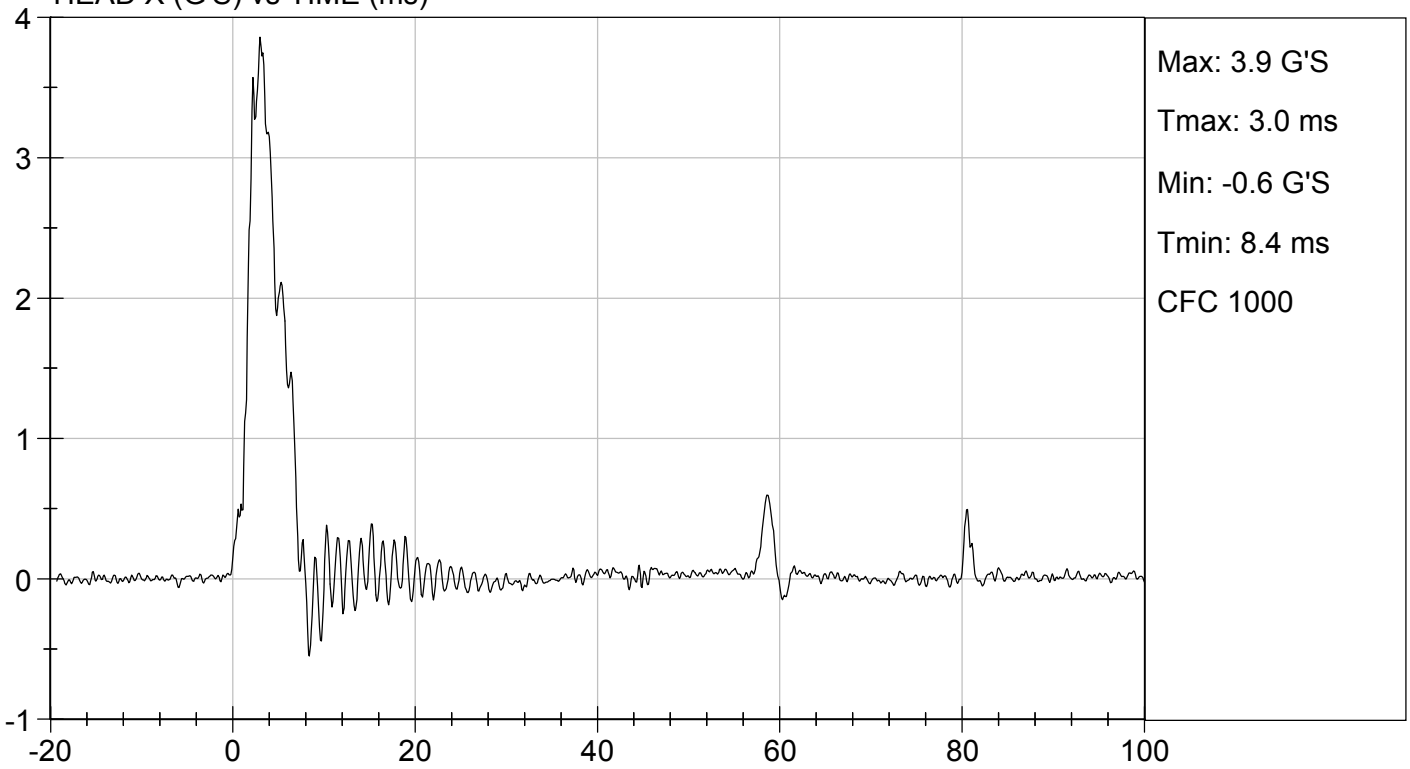
TEST DESC: HEAD DROP

TEST DATE: 06/15/2017
TEST #: D171701

HEAD RESULTANT ACCELERATION (G'S) vs TIME (ms)



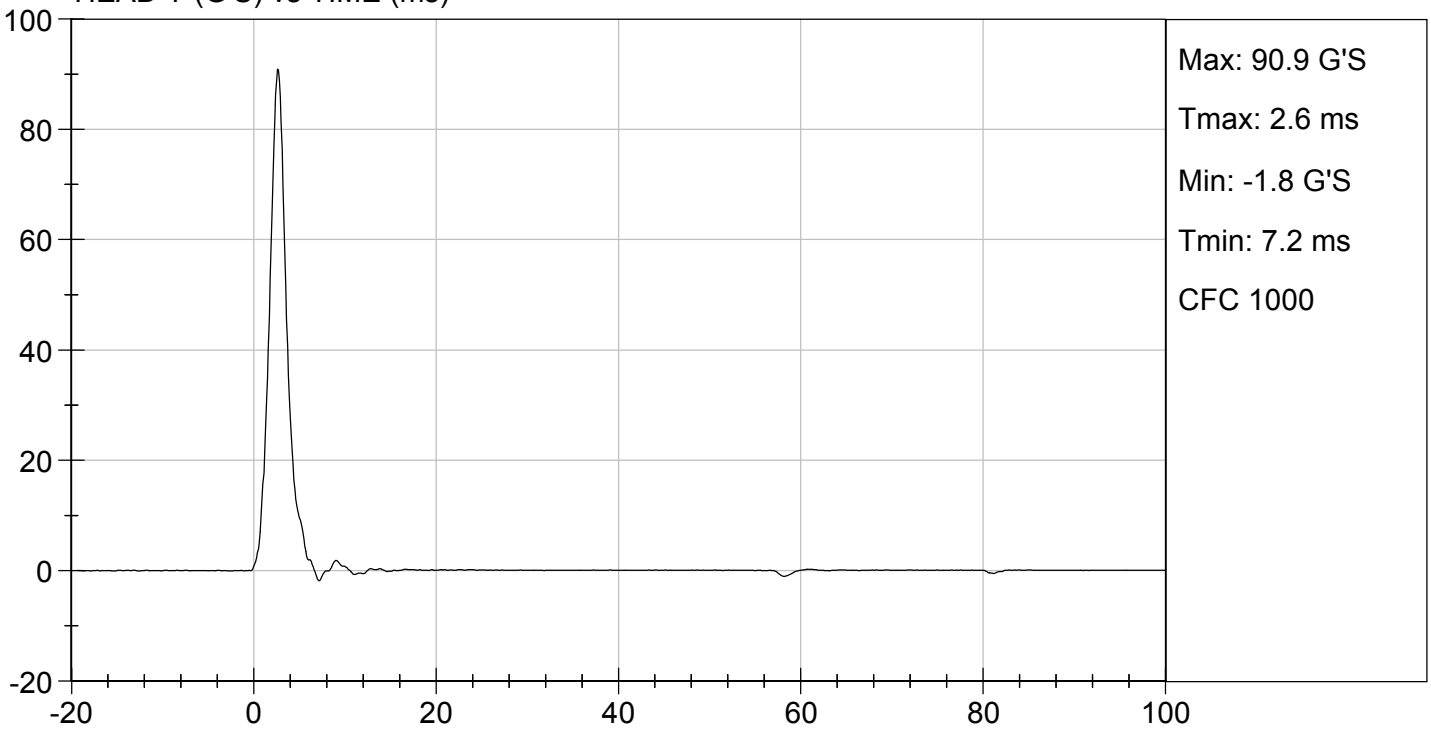
HEAD X (G'S) vs TIME (ms)



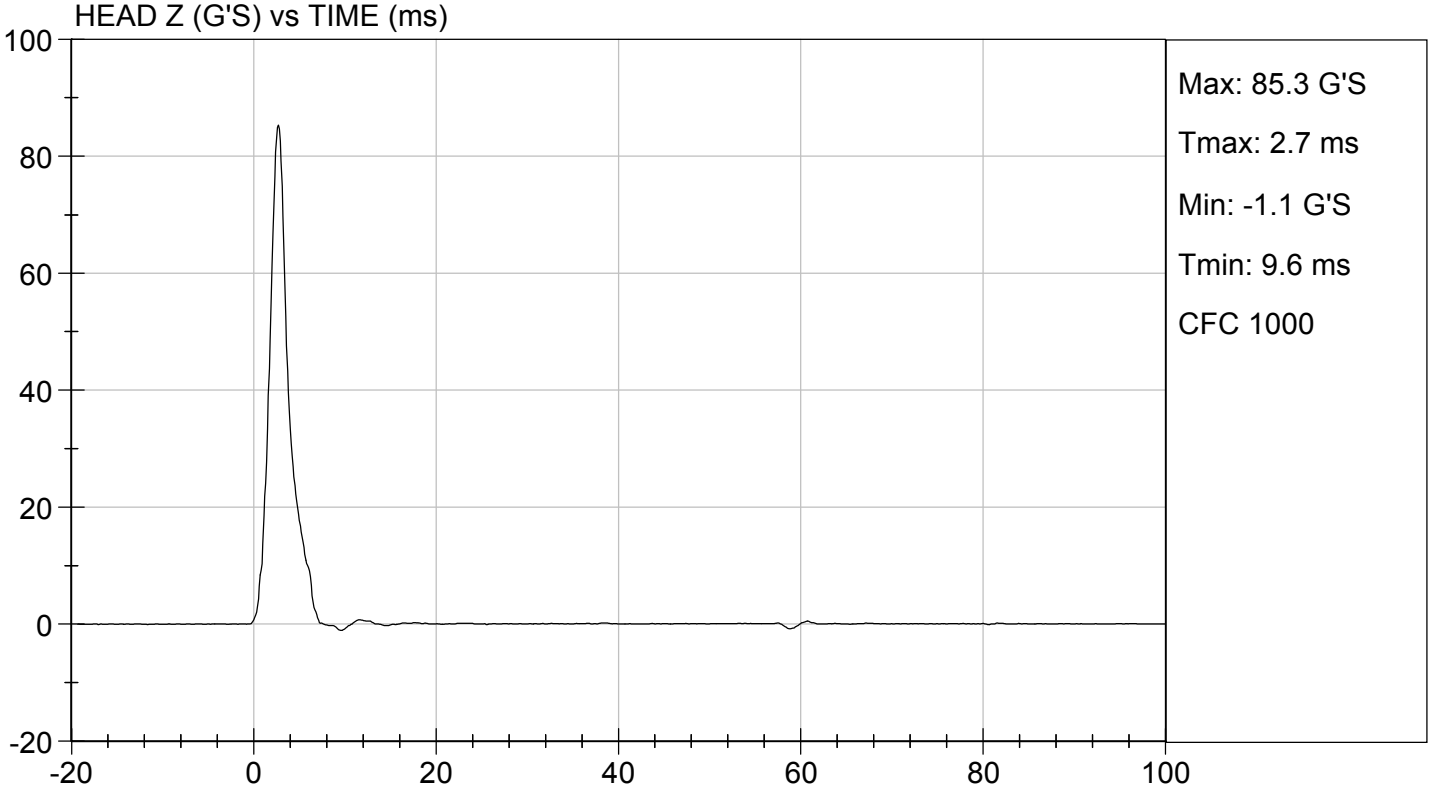
TEST DESC: HEAD DROP

TEST DATE: 06/15/2017
TEST #: D171701

HEAD Y (G'S) vs TIME (ms)



HEAD Z (G'S) vs TIME (ms)



MGA RESEARCH CORPORATION

LATERAL NECK PENDULUM TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D171702

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.2	Pass
Humidity		%	10 to 70	46	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.50	Pass
	15 ms	m/s	3.30 to 4.10	3.73	Pass
	20 ms	m/s	4.40 to 5.40	5.08	Pass
	25 ms	m/s	5.40 to 6.10	5.58	Pass
	25-100 ms	m/s	5.50 to 6.20	5.60	Pass
Maximum D-Plane Rotation		deg	71 to 81	72	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	64	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-39	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	113	Pass
			Overall Test Results		Pass

Laboratory Technician

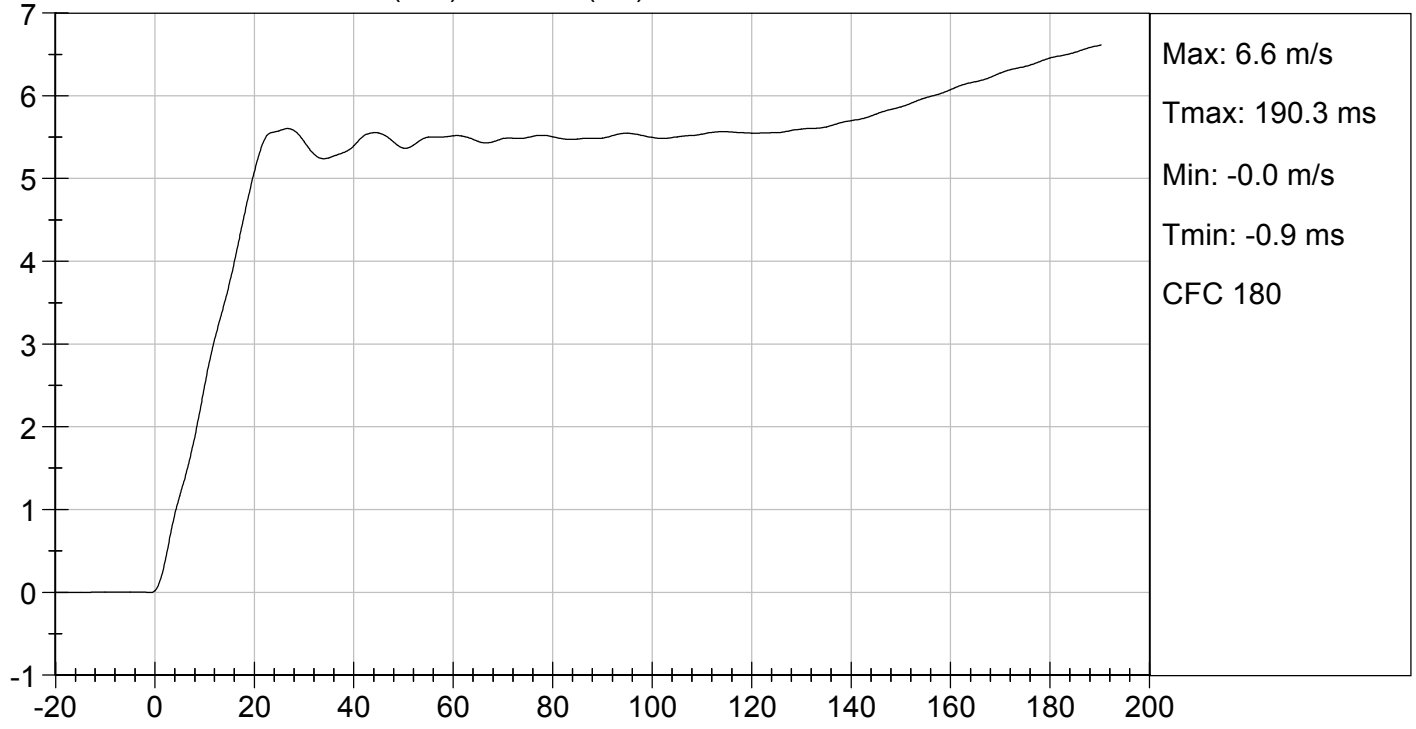
06/15/2017
Test Date

Approved By

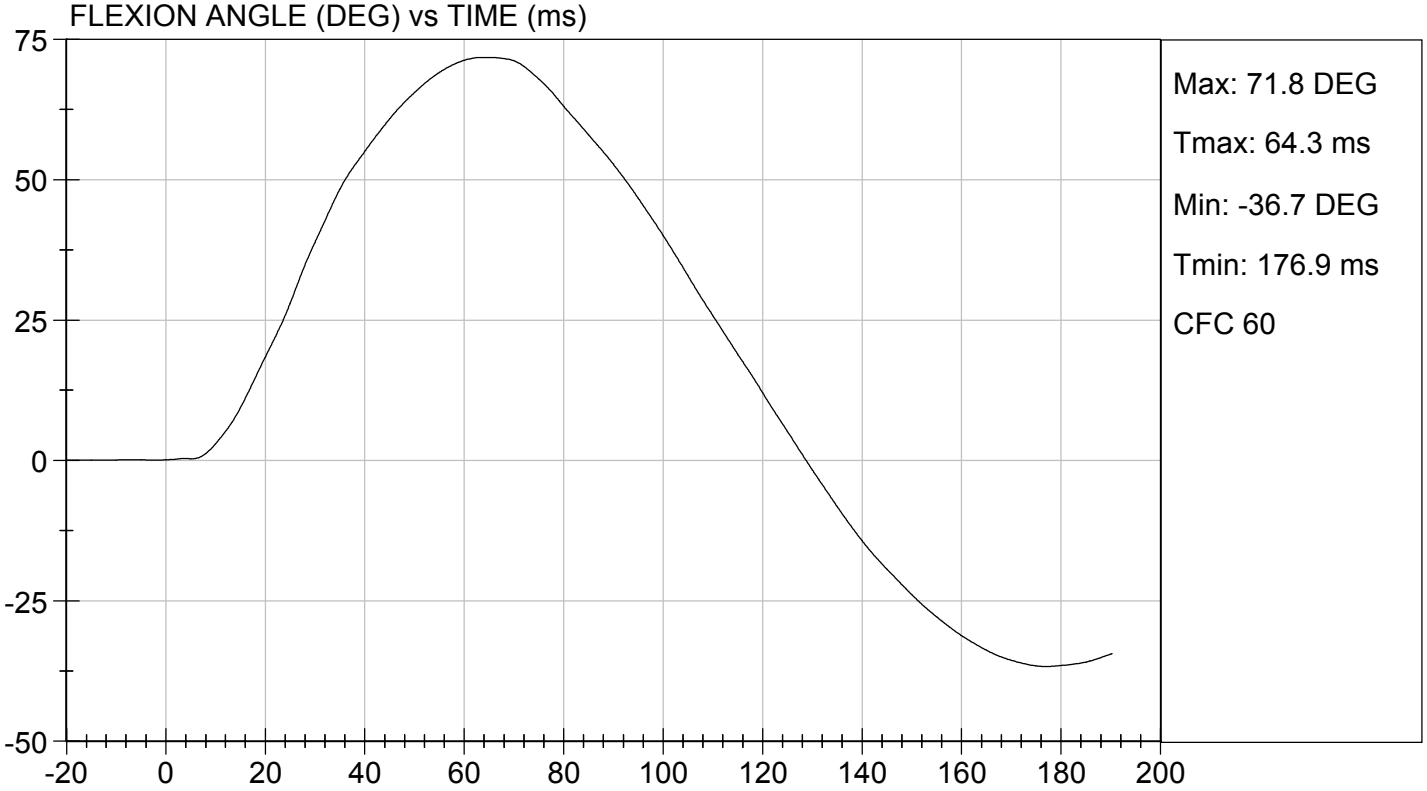
TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 06/15/2017
TEST #: D171702

PENDULUM VELOCITY (m/s) vs TIME (ms)

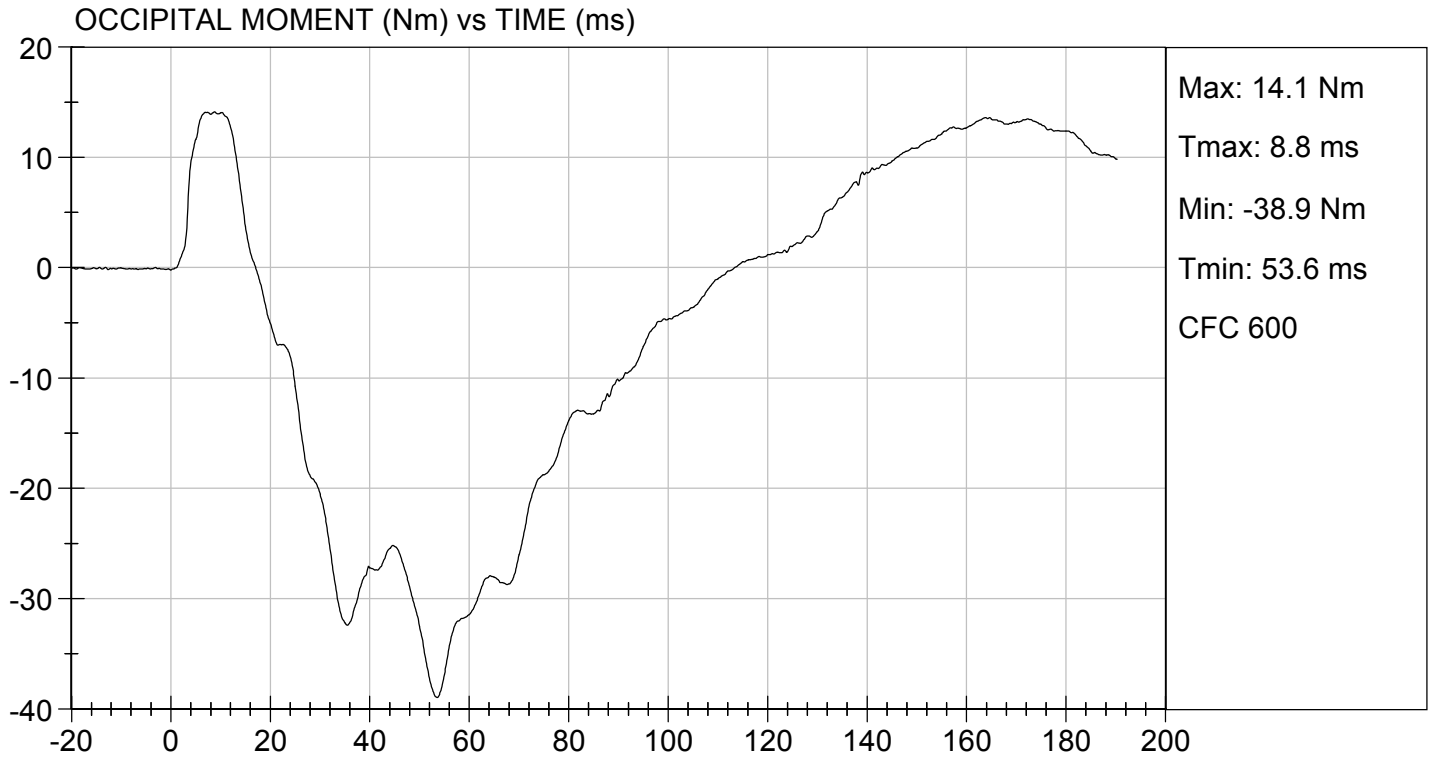


FLEXION ANGLE (DEG) vs TIME (ms)



TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 06/15/2017
TEST #: D171702



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test ID:** D171703

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	28	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
		Overall Test Results		Pass

Laboratory Technician

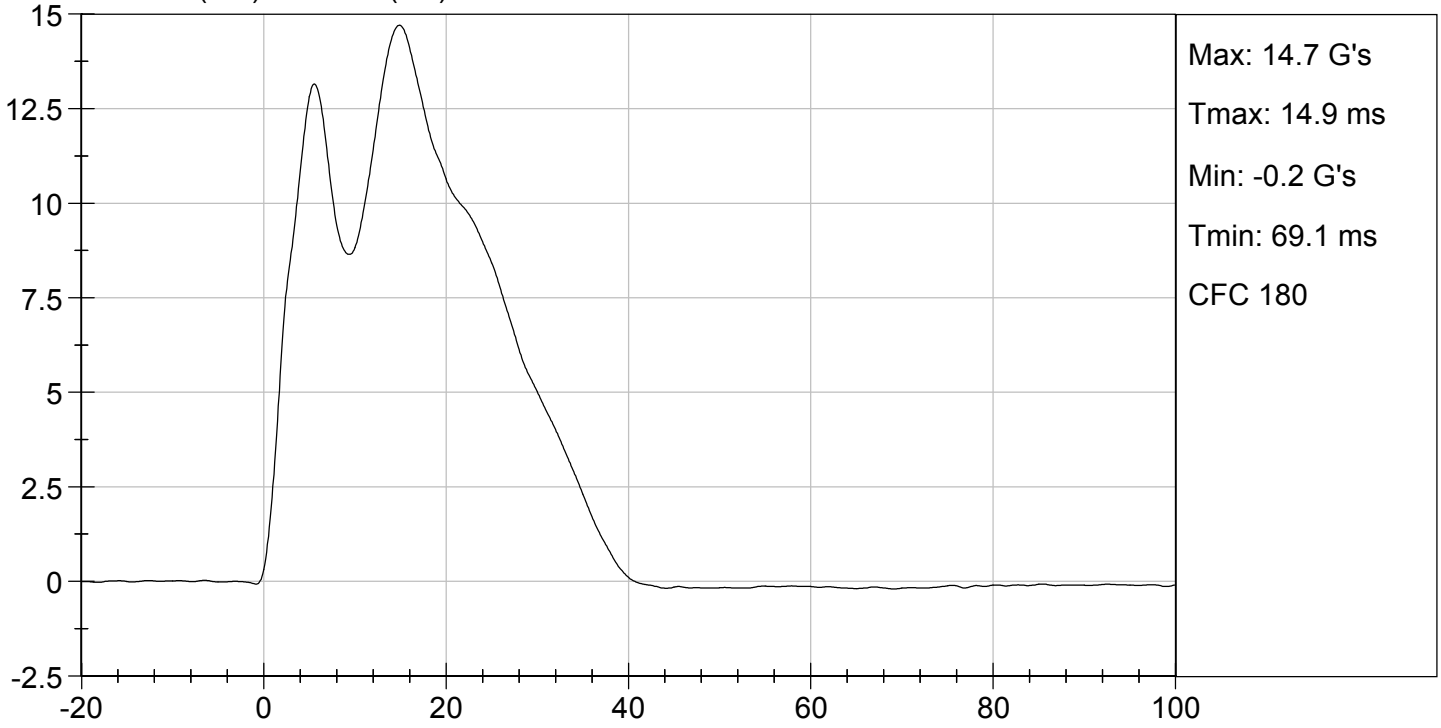
06/15/2017
Test Date

Approved By

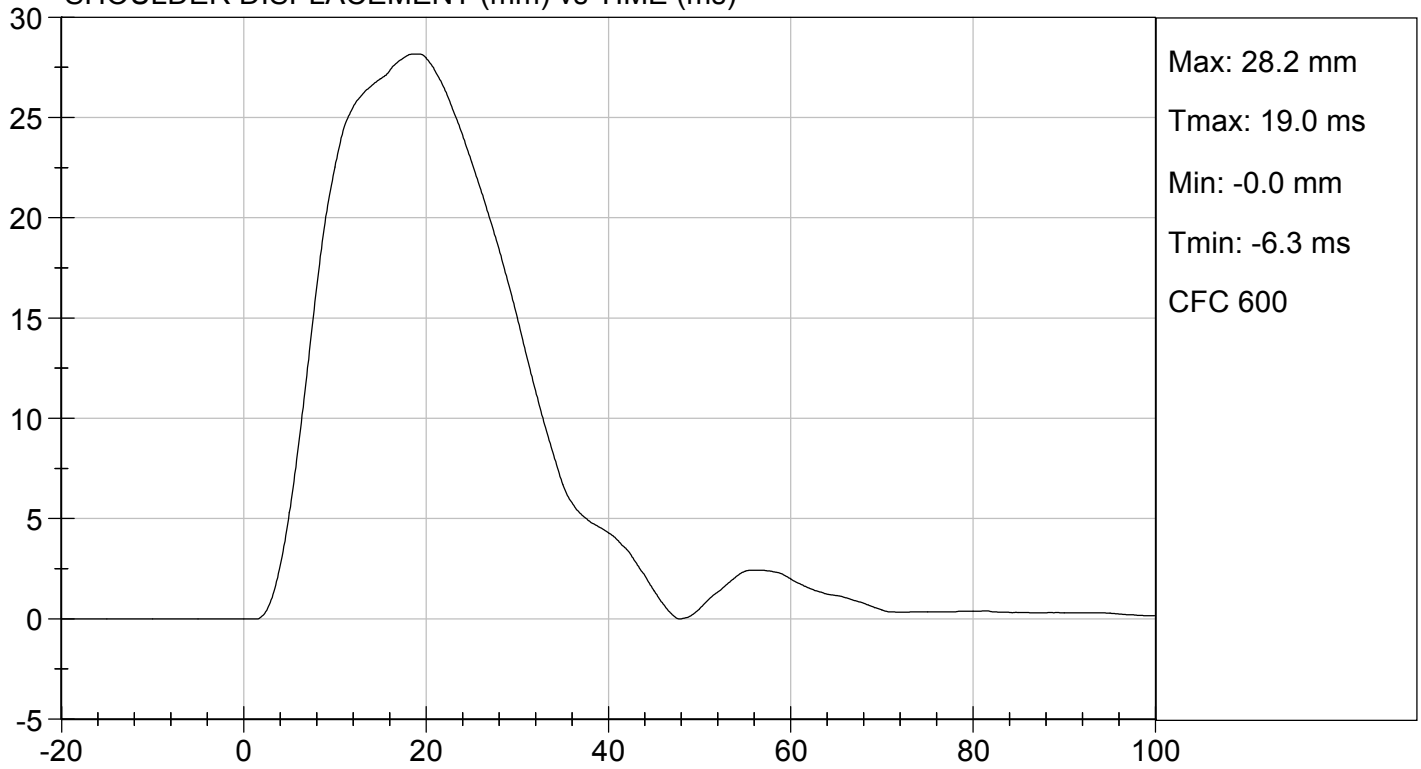
TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 06/15/2017
TEST #: D171703

PROBE (G's) vs TIME (ms)

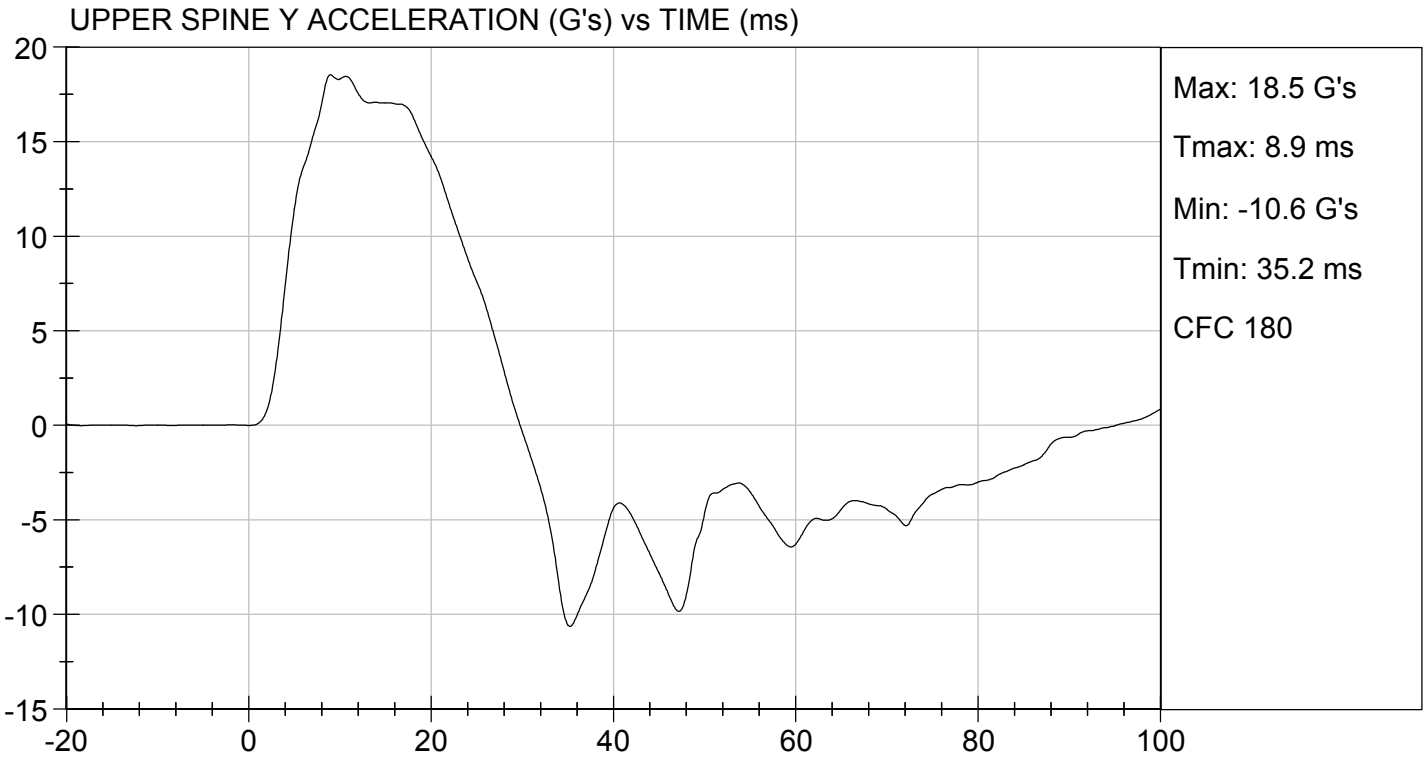


SHOULDER DISPLACEMENT (mm) vs TIME (ms)



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 06/15/2017
TEST #: D171703



MGA RESEARCH CORPORATION

THORAX (WITH ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D171704

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	47	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	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	28	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	35	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
		Overall Test Results		Pass

Laboratory Technician

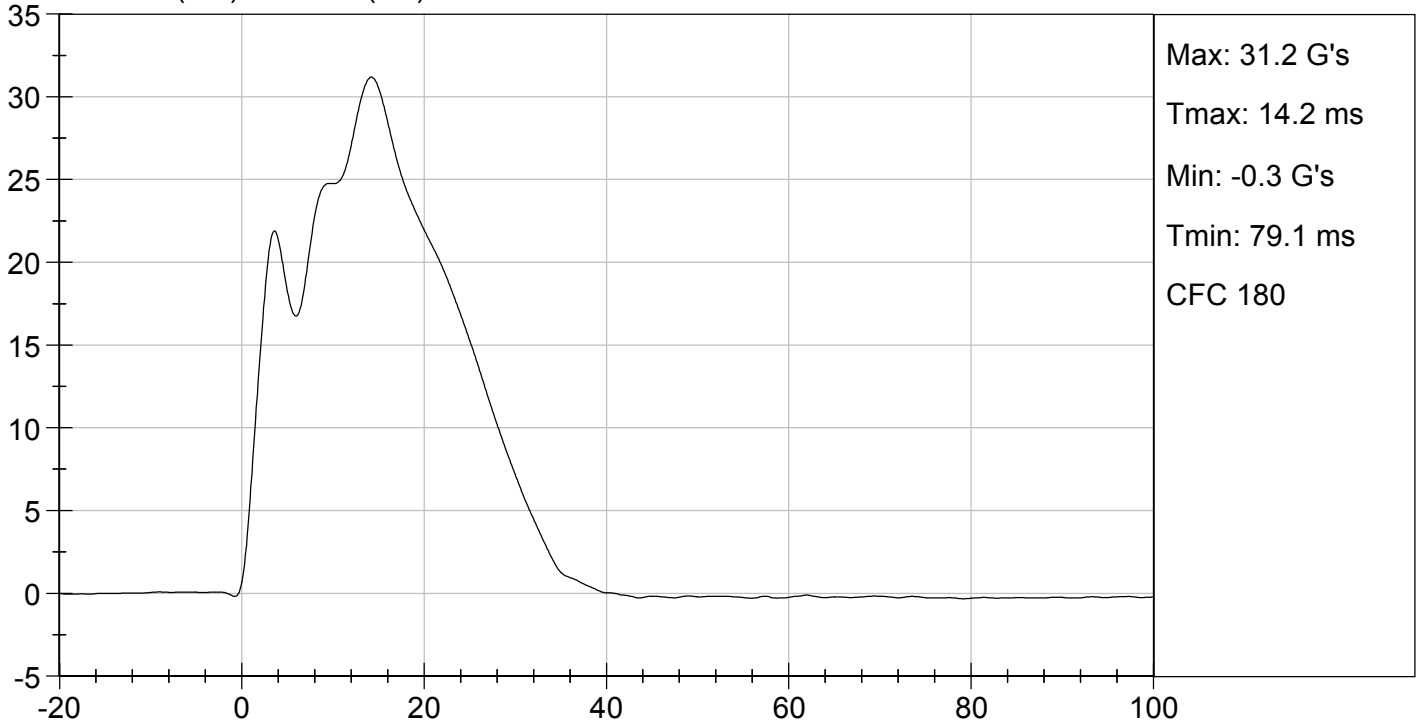
06/15/2017
Test Date

Approved By

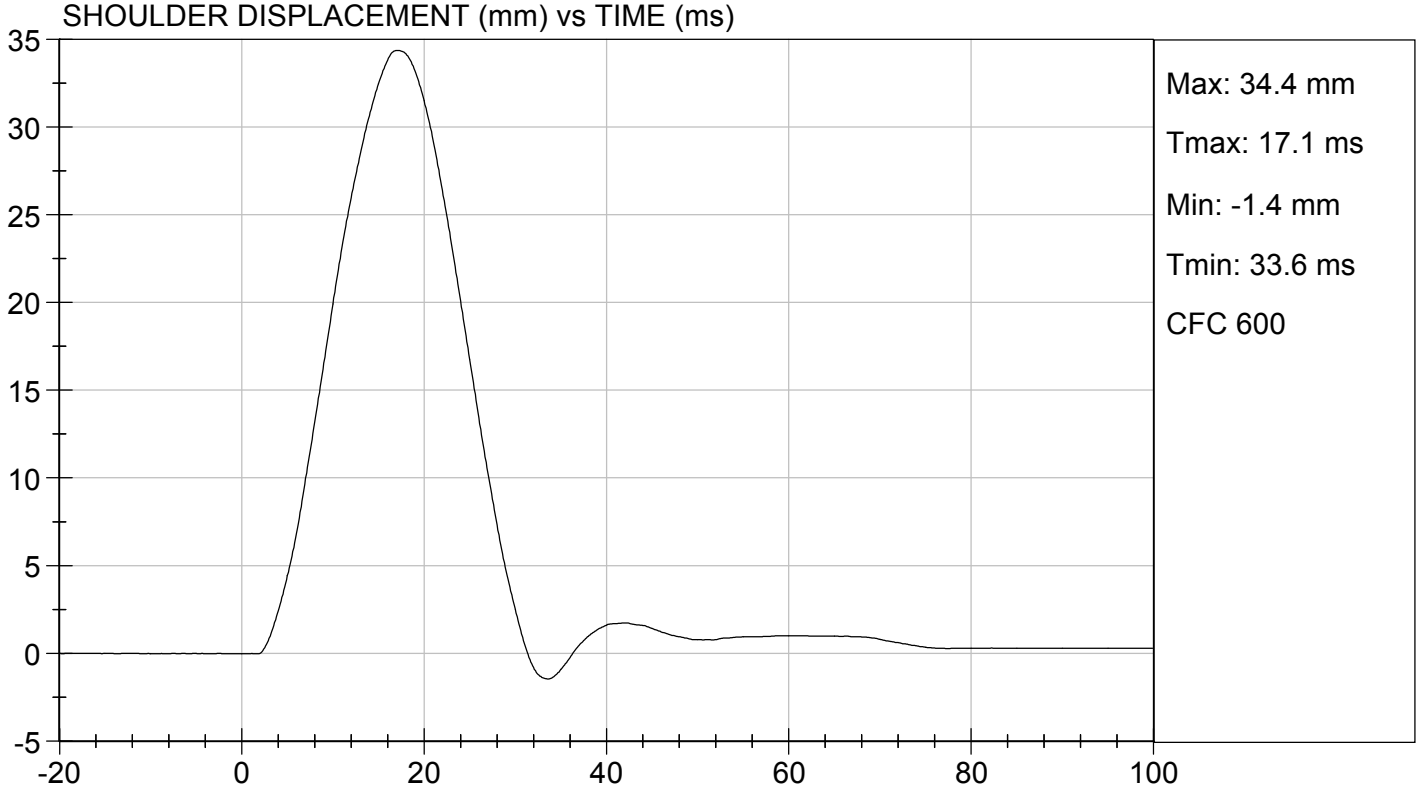
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 06/15/2017
TEST #: D171704

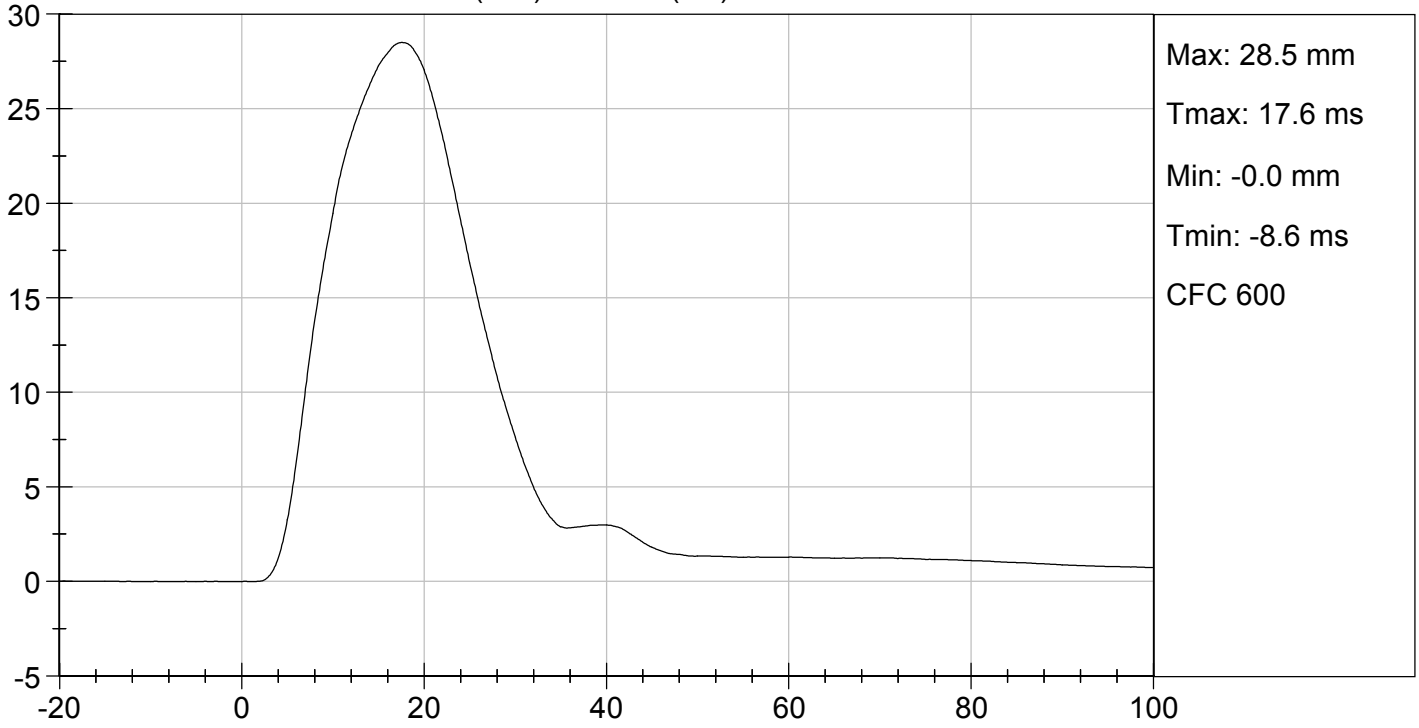
PROBE (G's) vs TIME (ms)



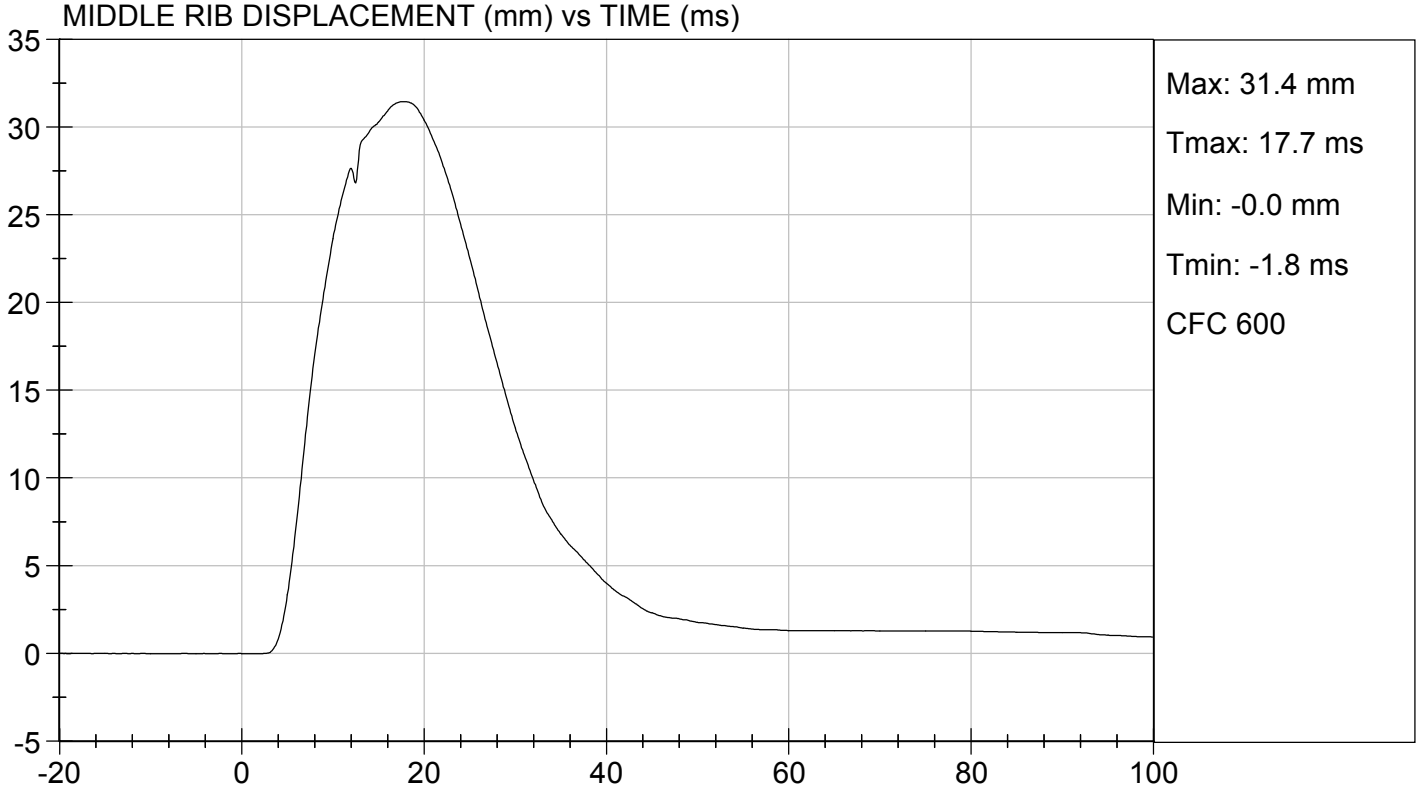
SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



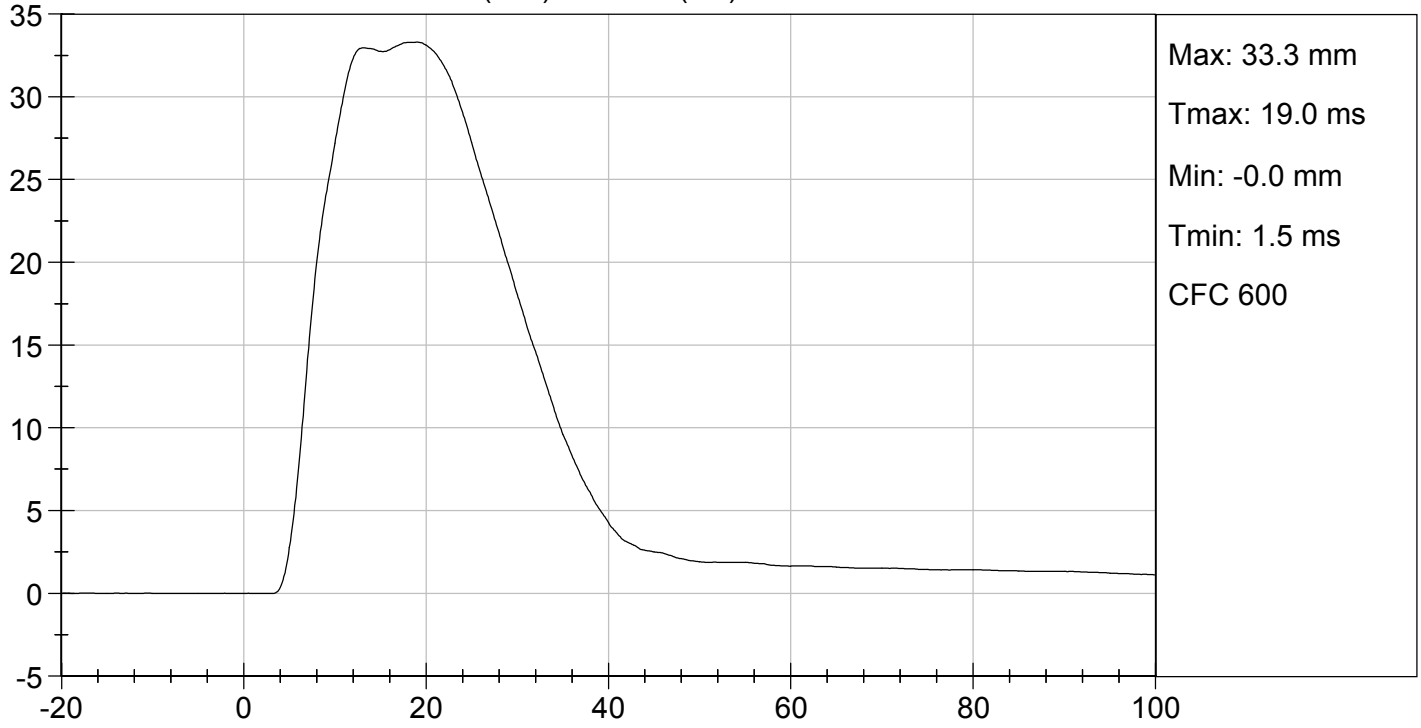
MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



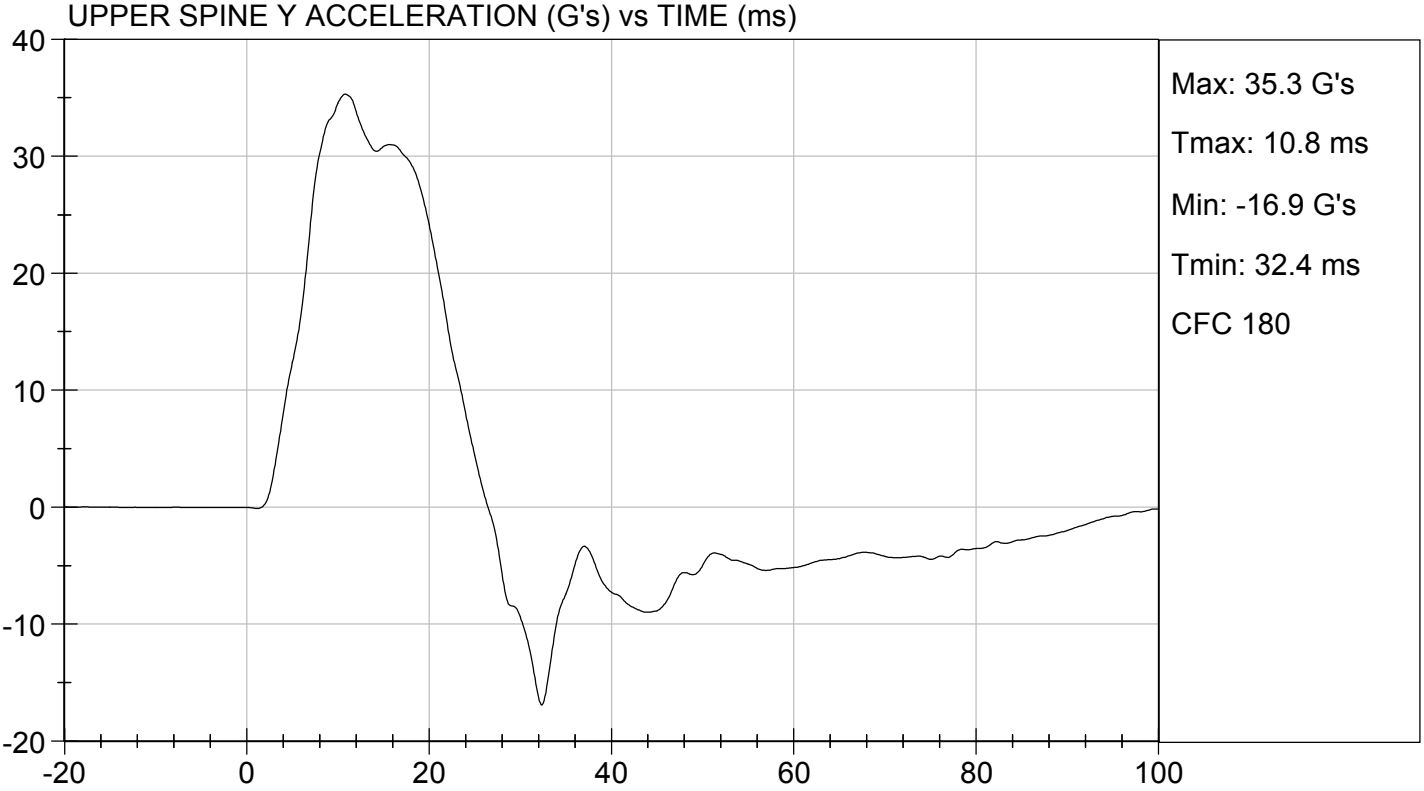
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 06/15/2017
TEST #: D171704

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



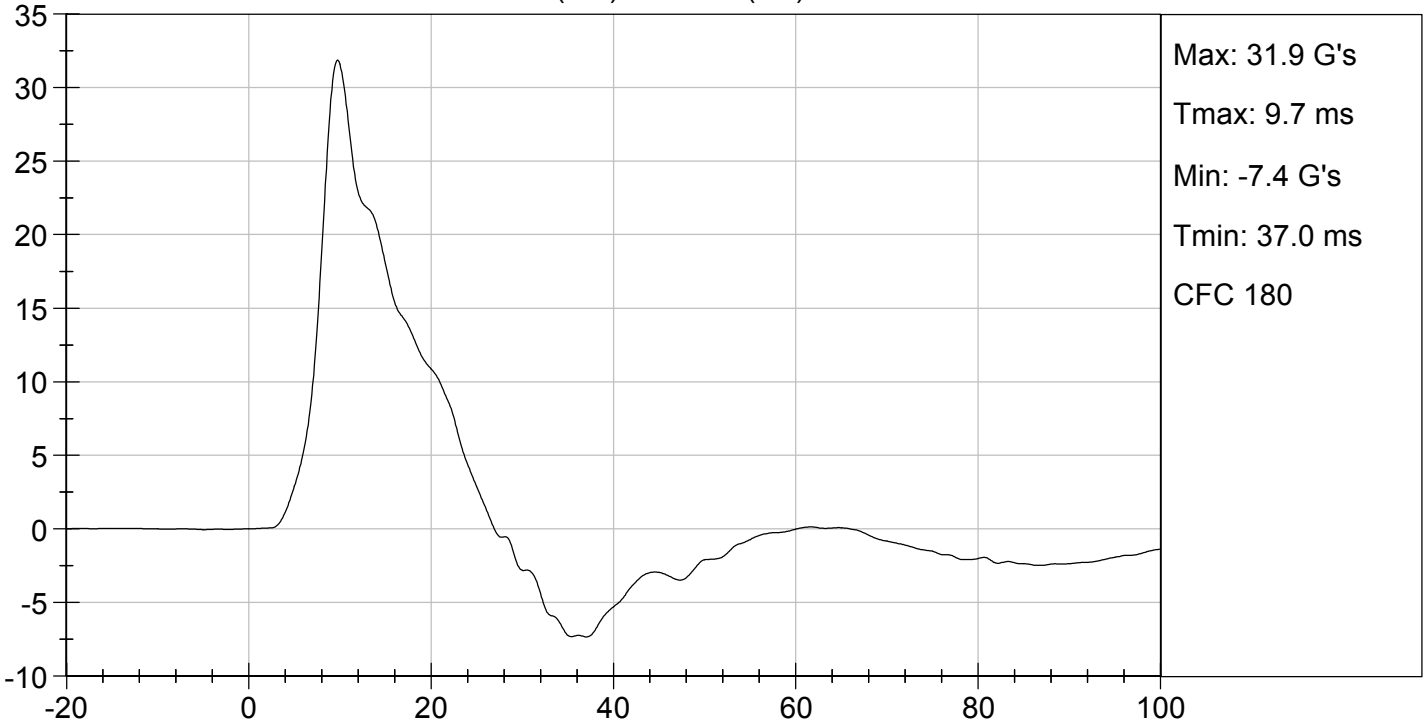
UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 06/15/2017
TEST #: D171704

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



MGA RESEARCH CORPORATION

THORAX (WITHOUT ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D171705

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	47	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	38	Pass
Middle Rib Displacement	mm	39 to 45	43	Pass
Lower Rib Displacement	mm	35 to 43	41	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	8	Pass
		Overall Test Results		Pass

Laboratory Technician

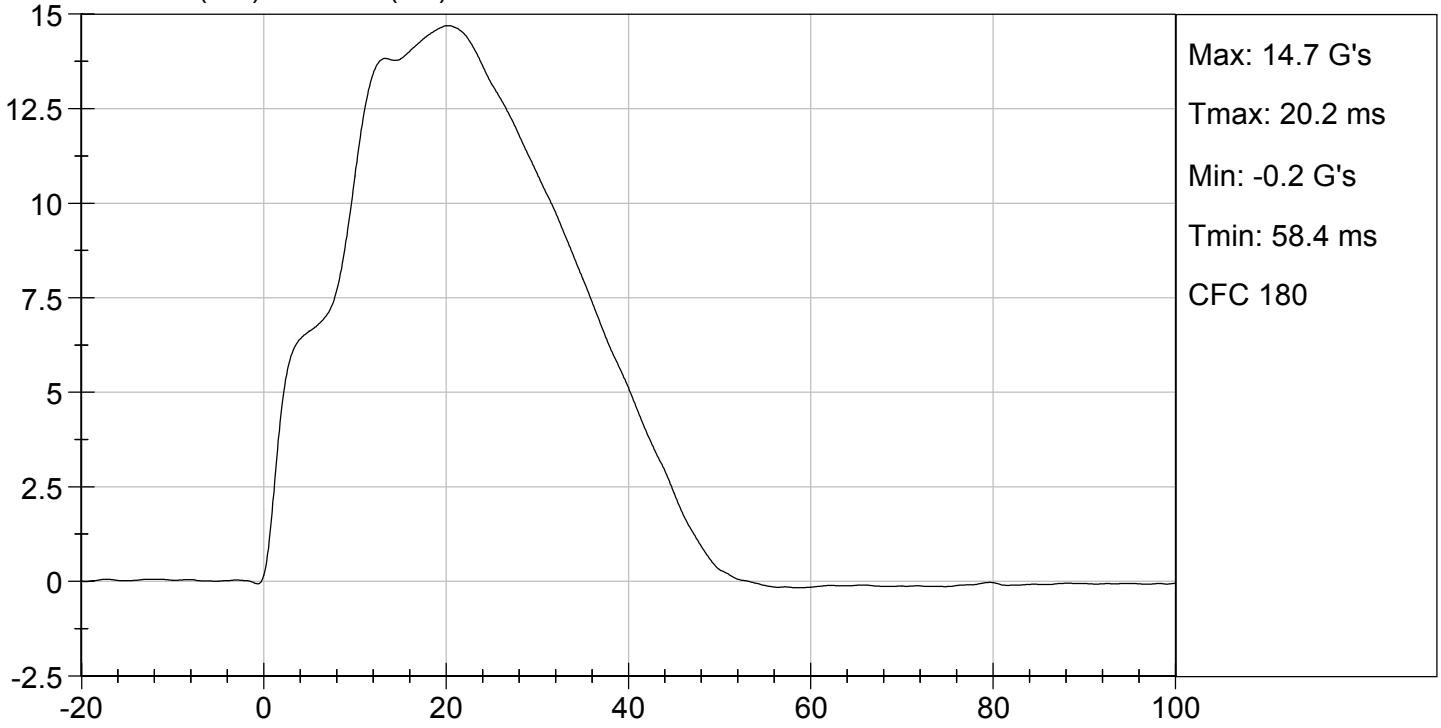
06/15/2017
Test Date

Approved By

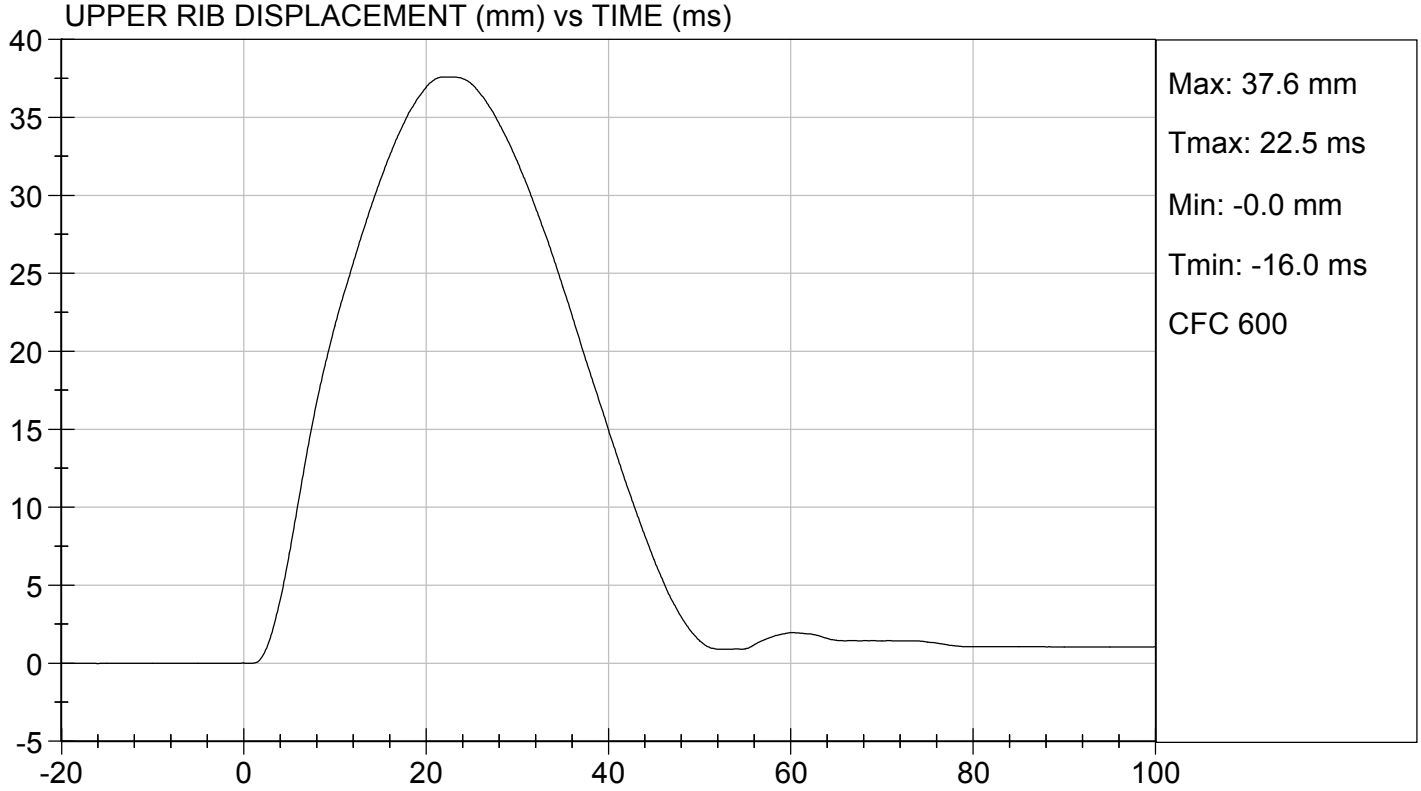
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 06/15/2017
TEST #: D171705

PROBE (G's) vs TIME (ms)



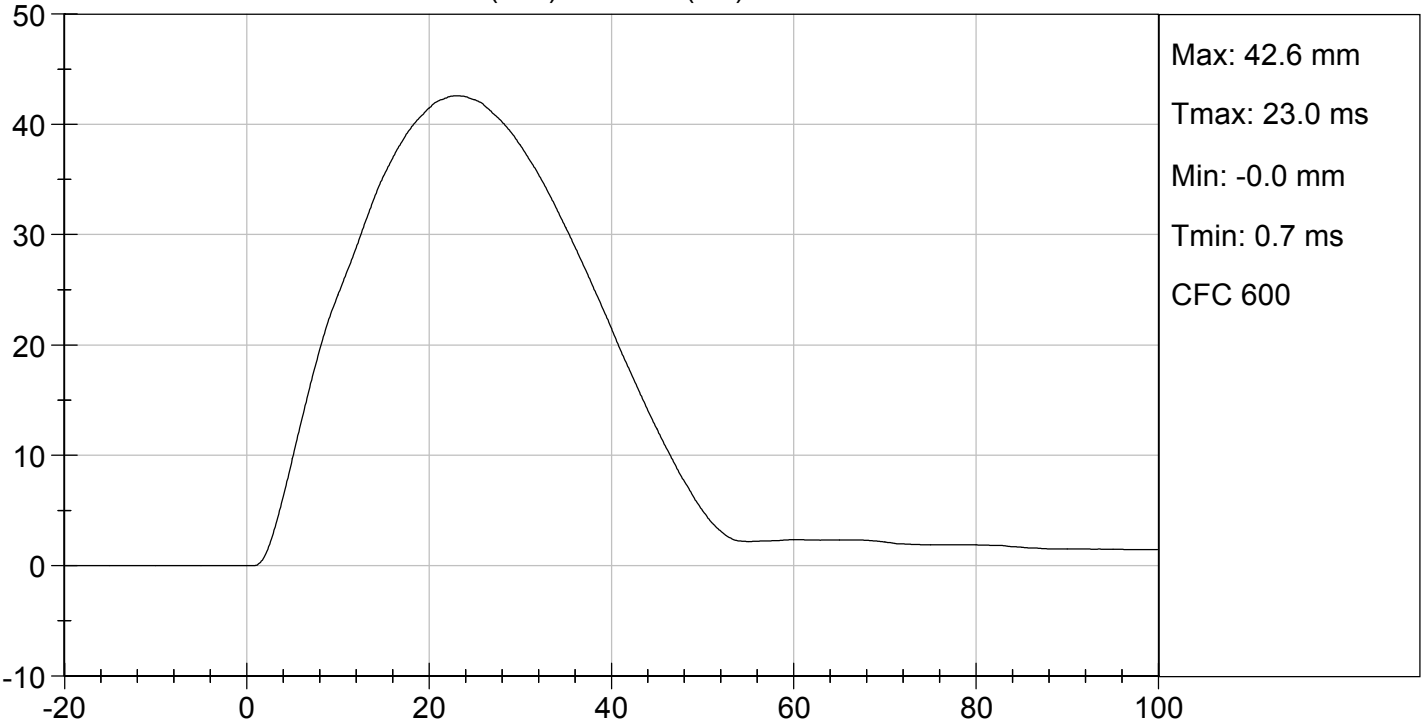
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



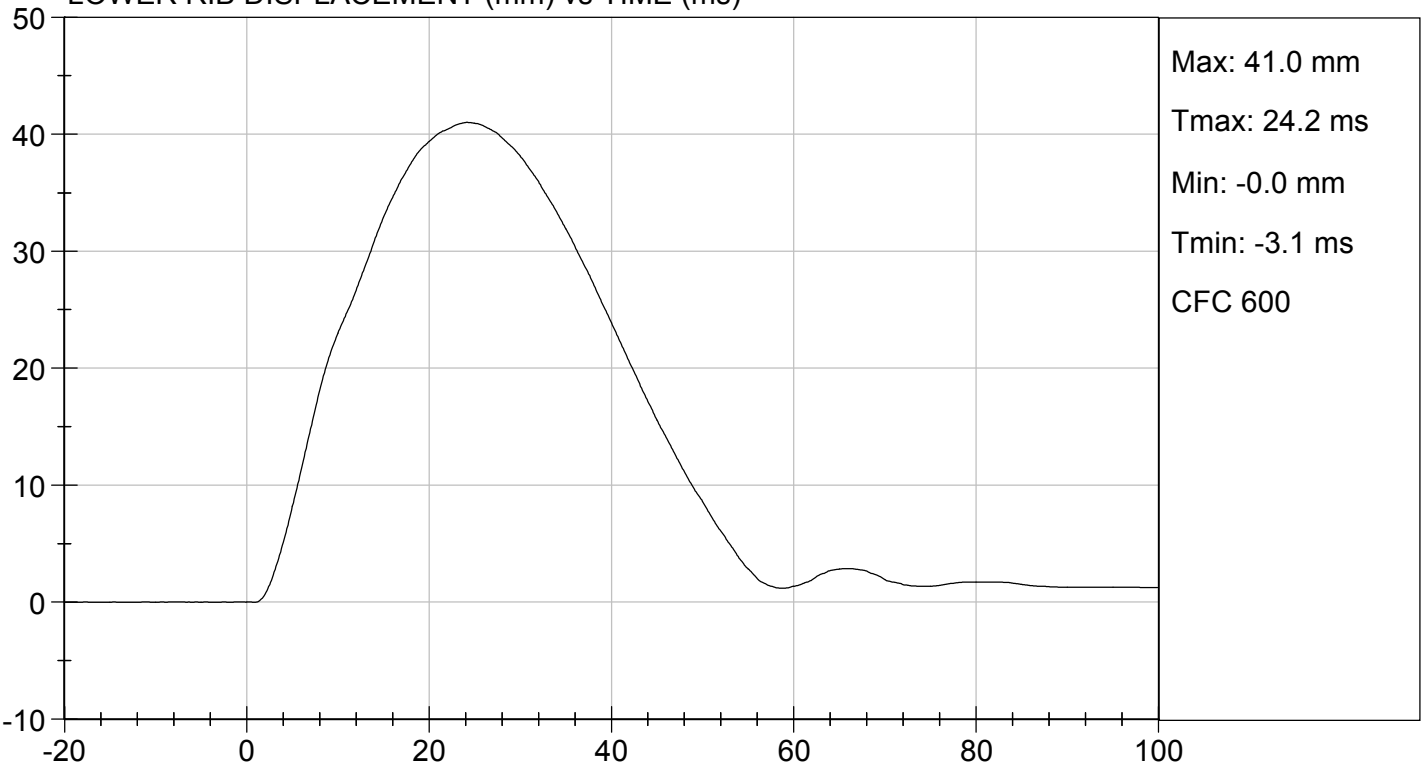
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 06/15/2017
TEST #: D171705

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



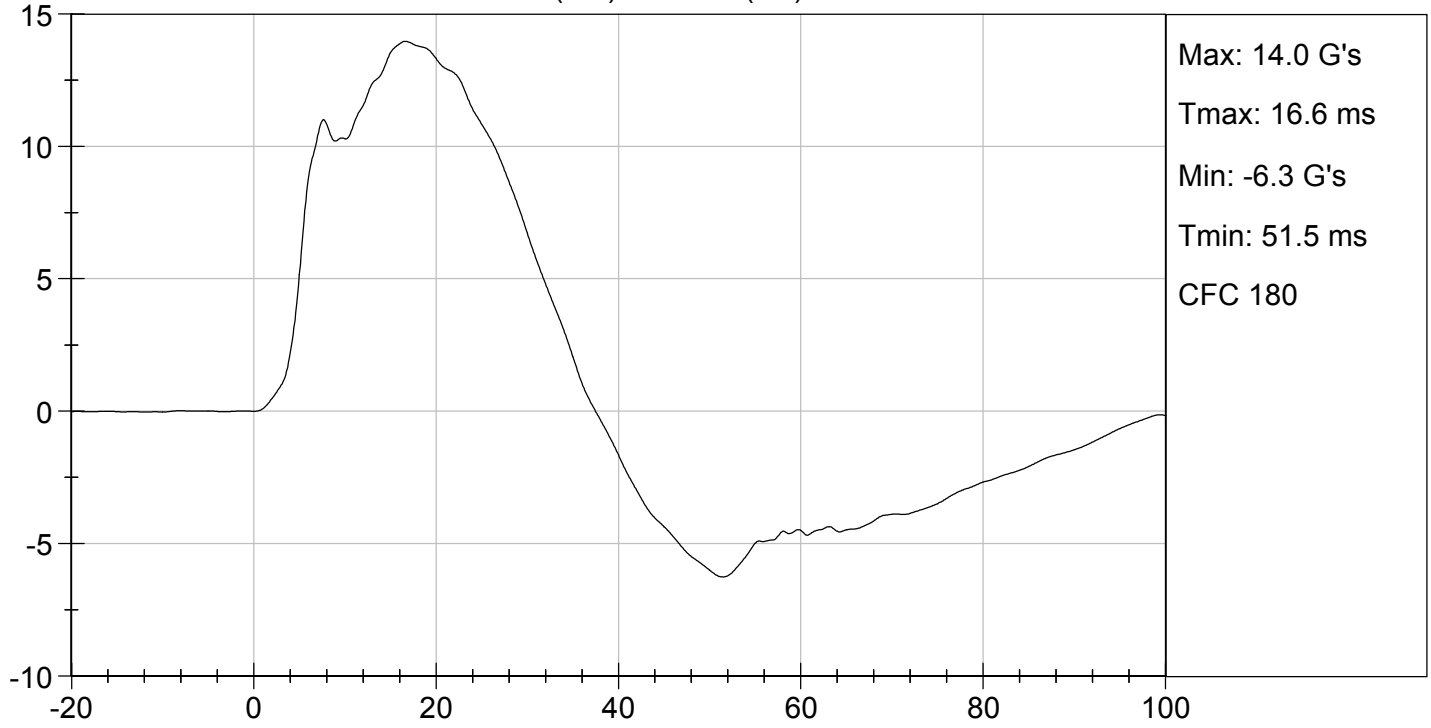
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



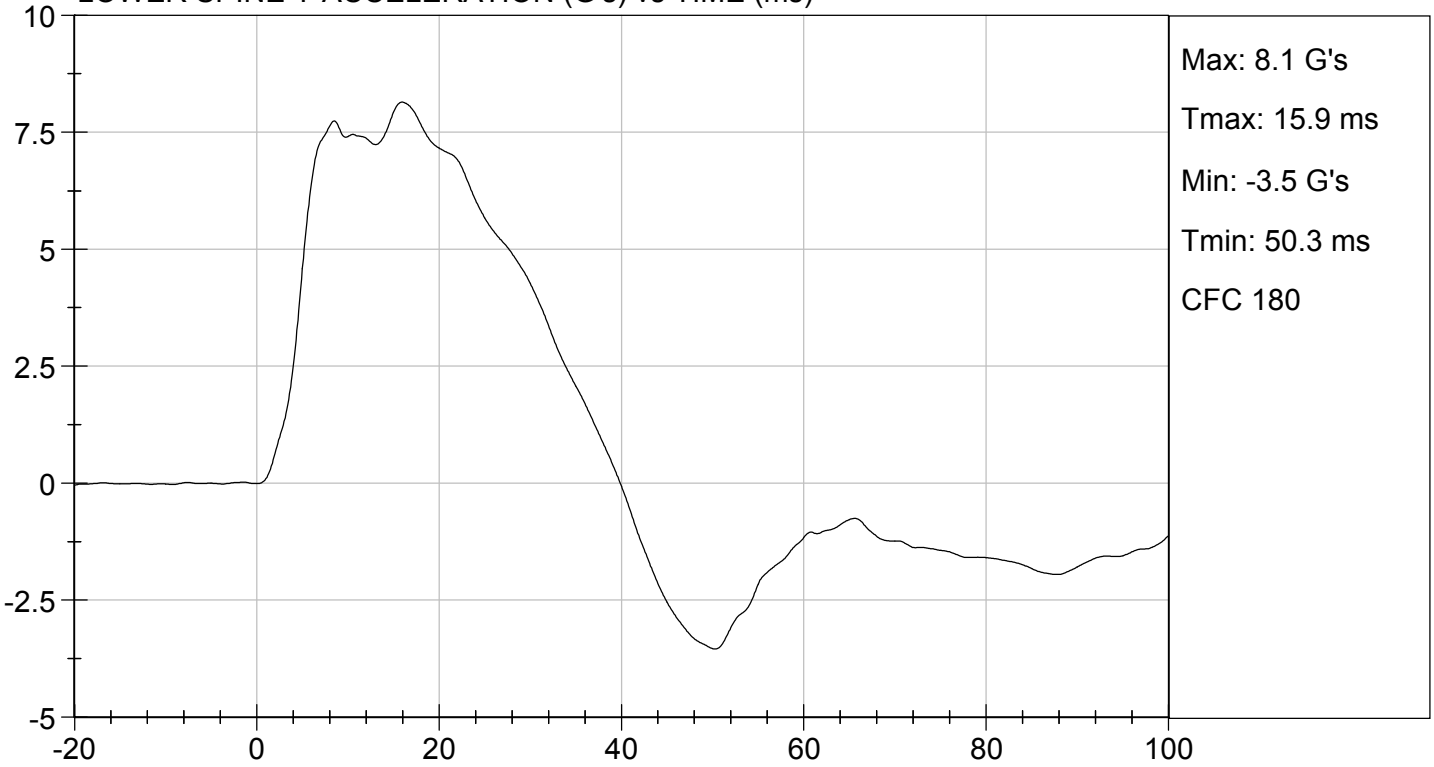
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 06/15/2017
TEST #: D171705

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:** D171706

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	47	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	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	39	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
		Overall Test Results		Pass

Laboratory Technician

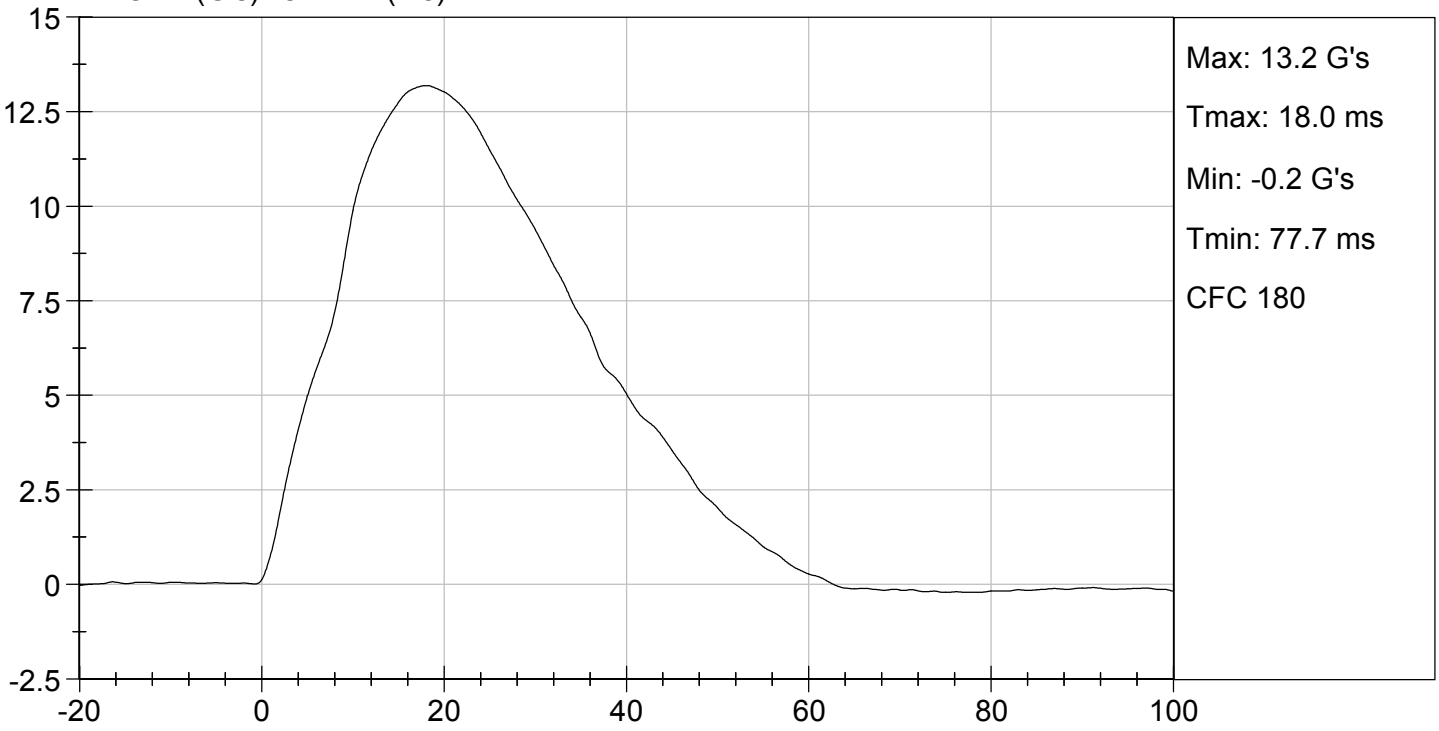
06/15/2017
Test Date

Approved By

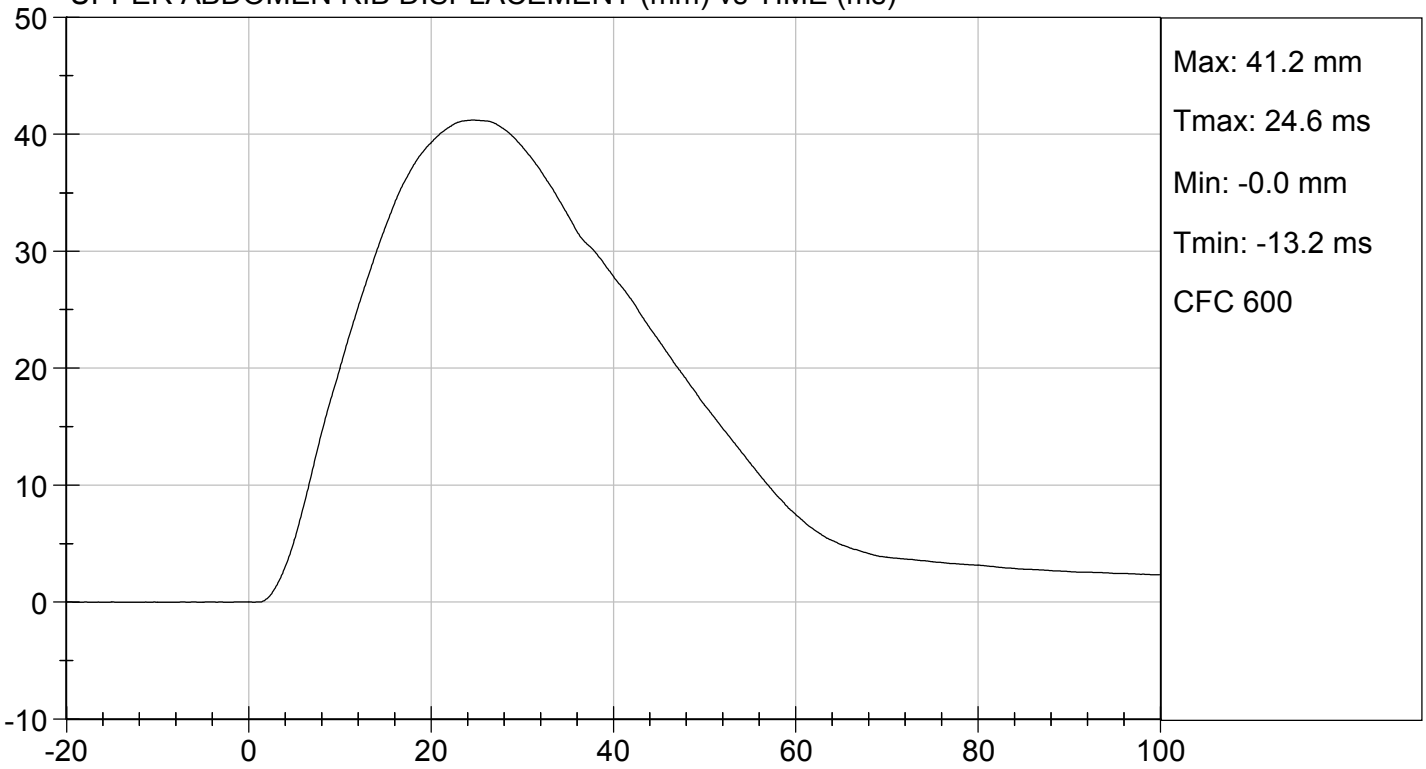
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 06/15/2017
TEST #: D171706

PROBE (G's) vs TIME (ms)



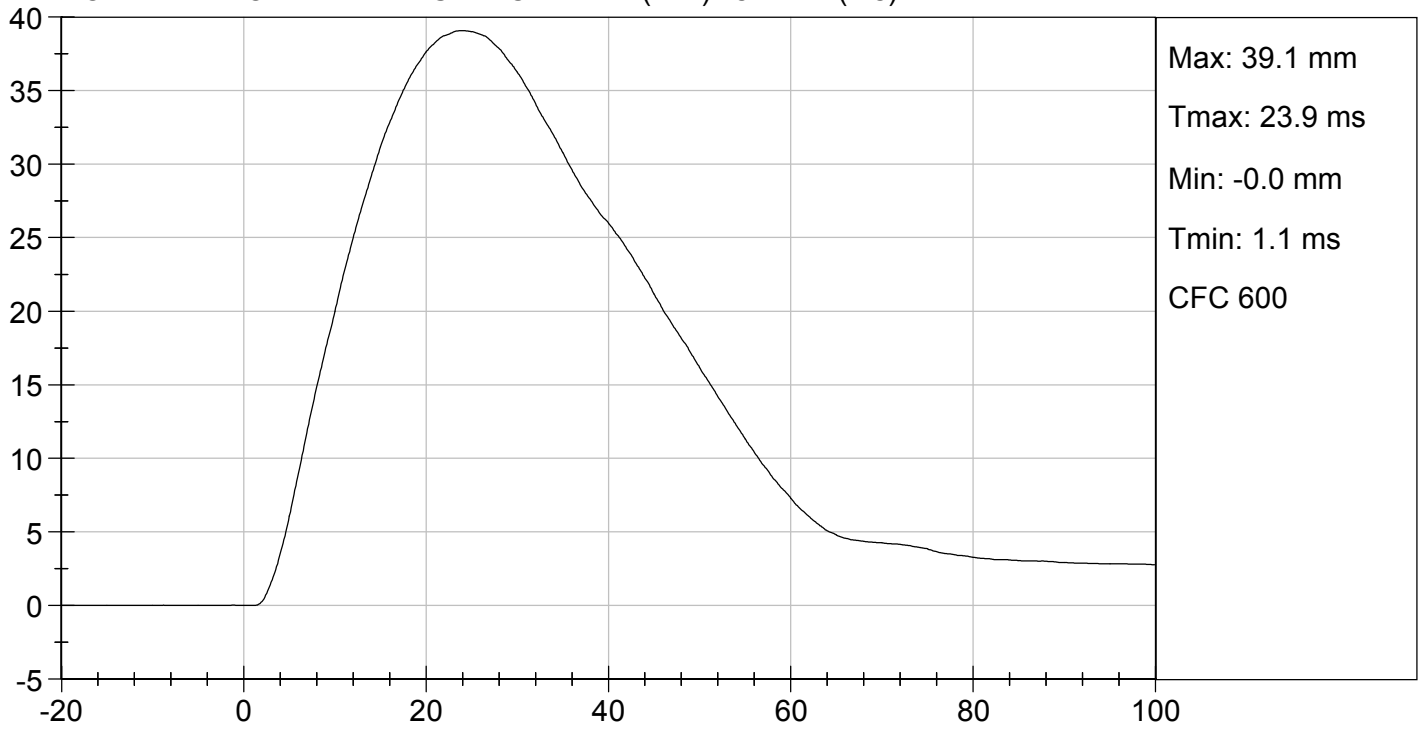
UPPER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



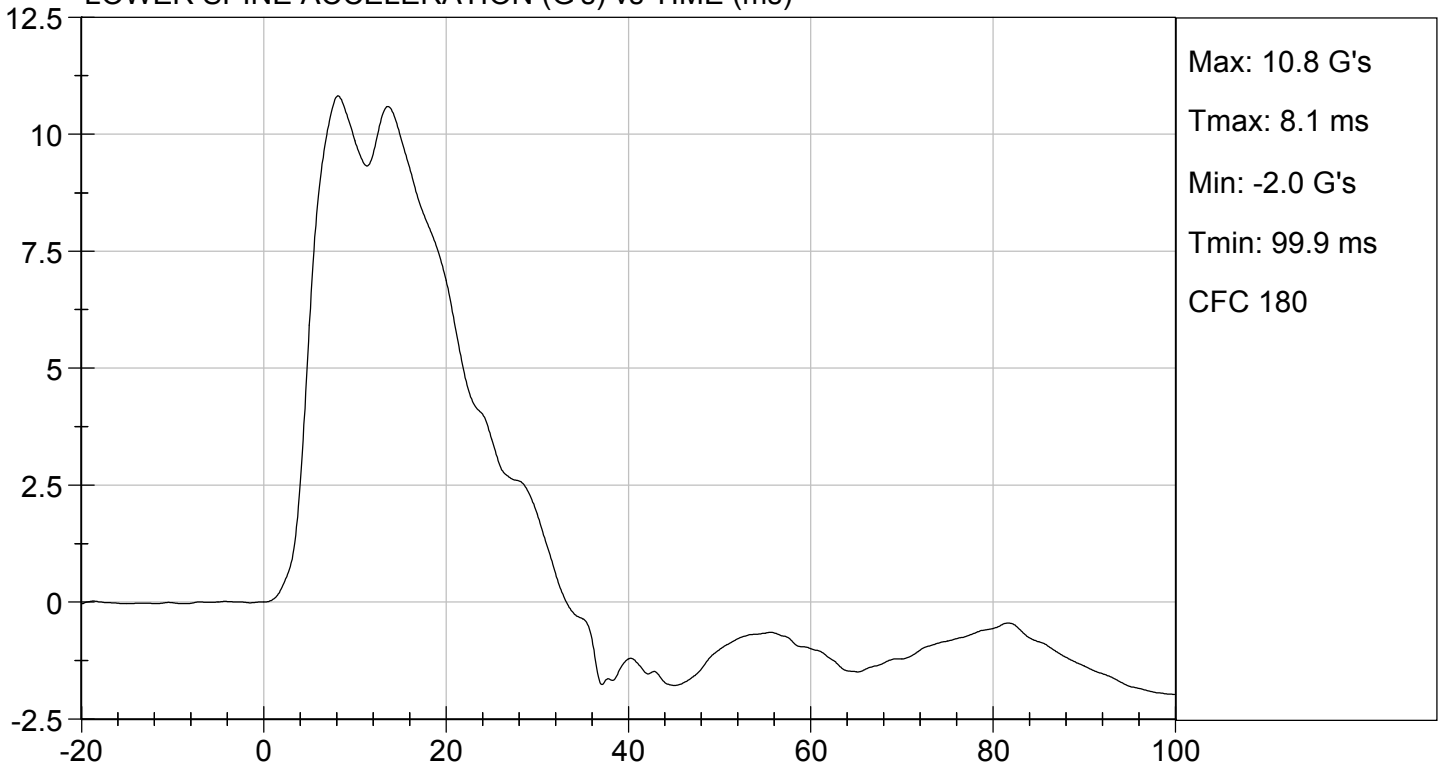
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 06/15/2017
TEST #: D171706

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:** D171707

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	47	Pass
Impact Velocity	m/s	6.60 to 6.80	6.60	Pass
Maximum Probe Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	41	Pass
Peak Acetabulum Force	N	3600 to 4300	3,772	Pass
		Overall Test Results		Pass

Laboratory Technician

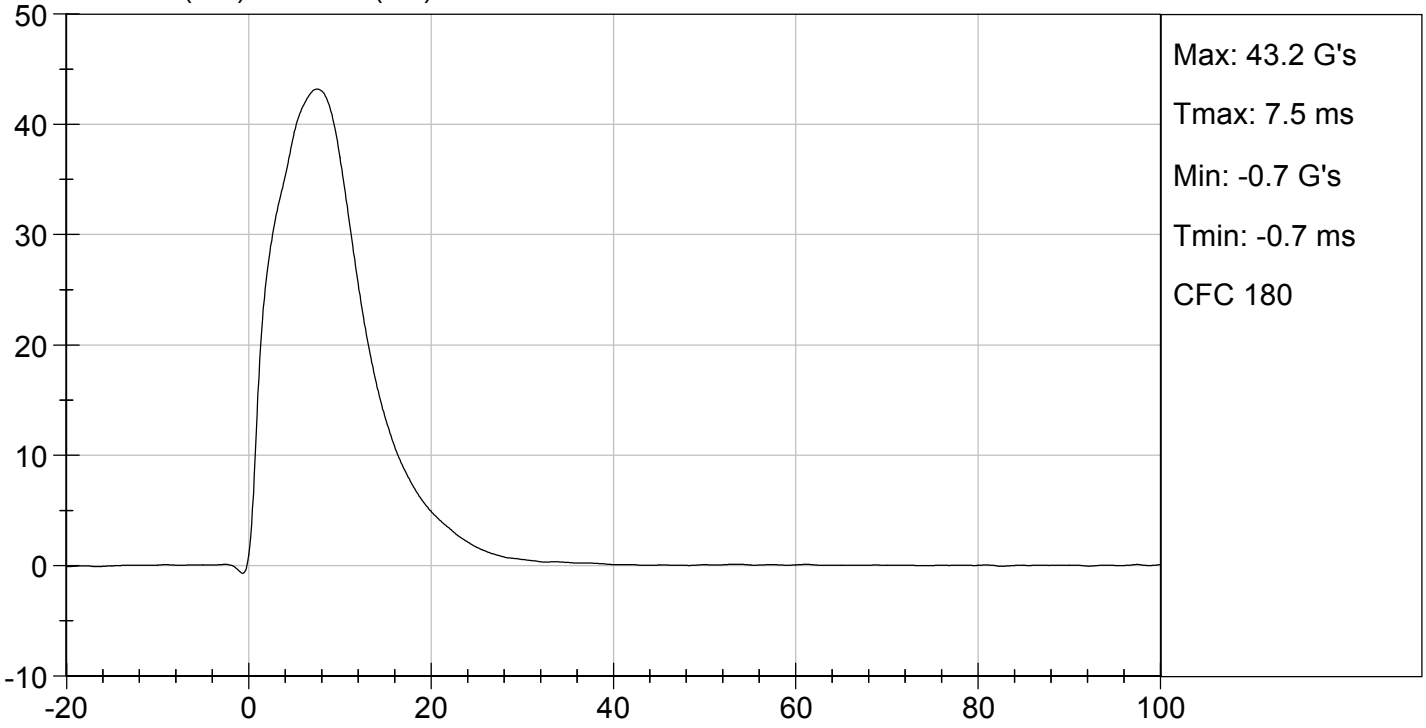
06/15/2017
Test Date

Approved By

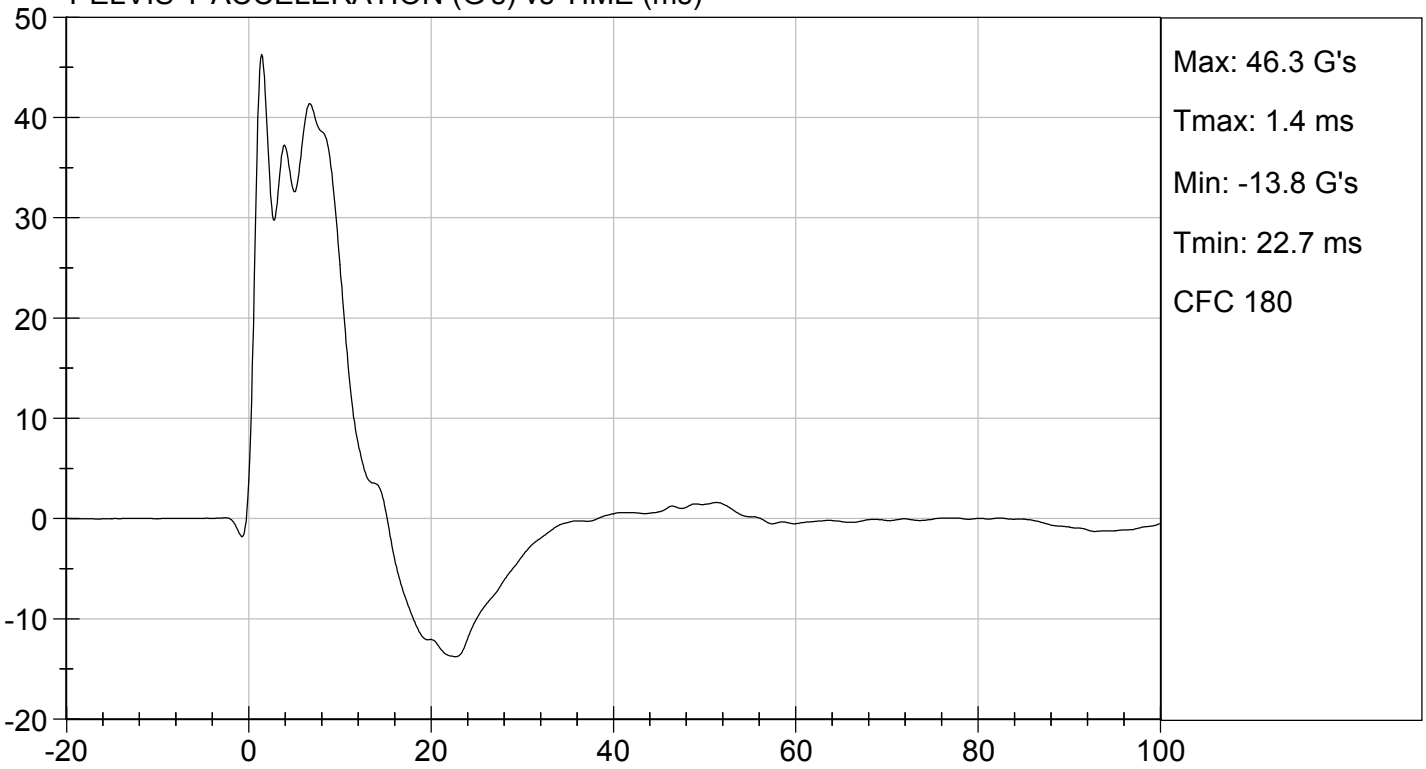
TEST DESC: PELVIS IMPACT
VELOCITY: 21.65 ft/s, 6.60 m/s

TEST DATE: 06/15/2017
TEST #: D171707

PROBE (G's) vs TIME (ms)

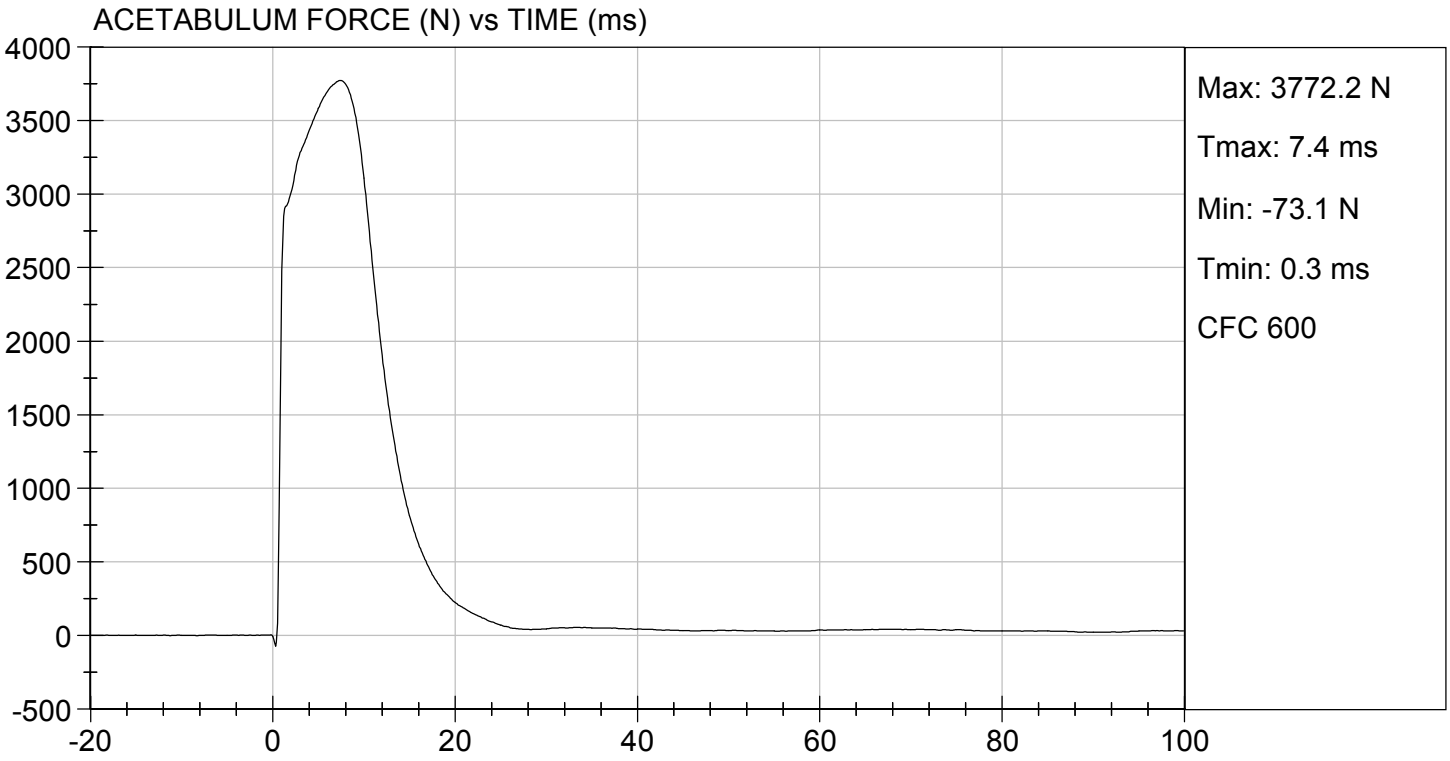


PELVIS Y ACCELERATION (G's) vs TIME (ms)



TEST DESC: PELVIS IMPACT
VELOCITY: 21.65 ft/s, 6.60 m/s

TEST DATE: 06/15/2017
TEST #: D171707



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D171708

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	47	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	36 to 45	38	Pass
Pelvis Y Acceleration	G's	28 to 39	30	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,183	Pass
		Overall Test Results		Pass

Laboratory Technician

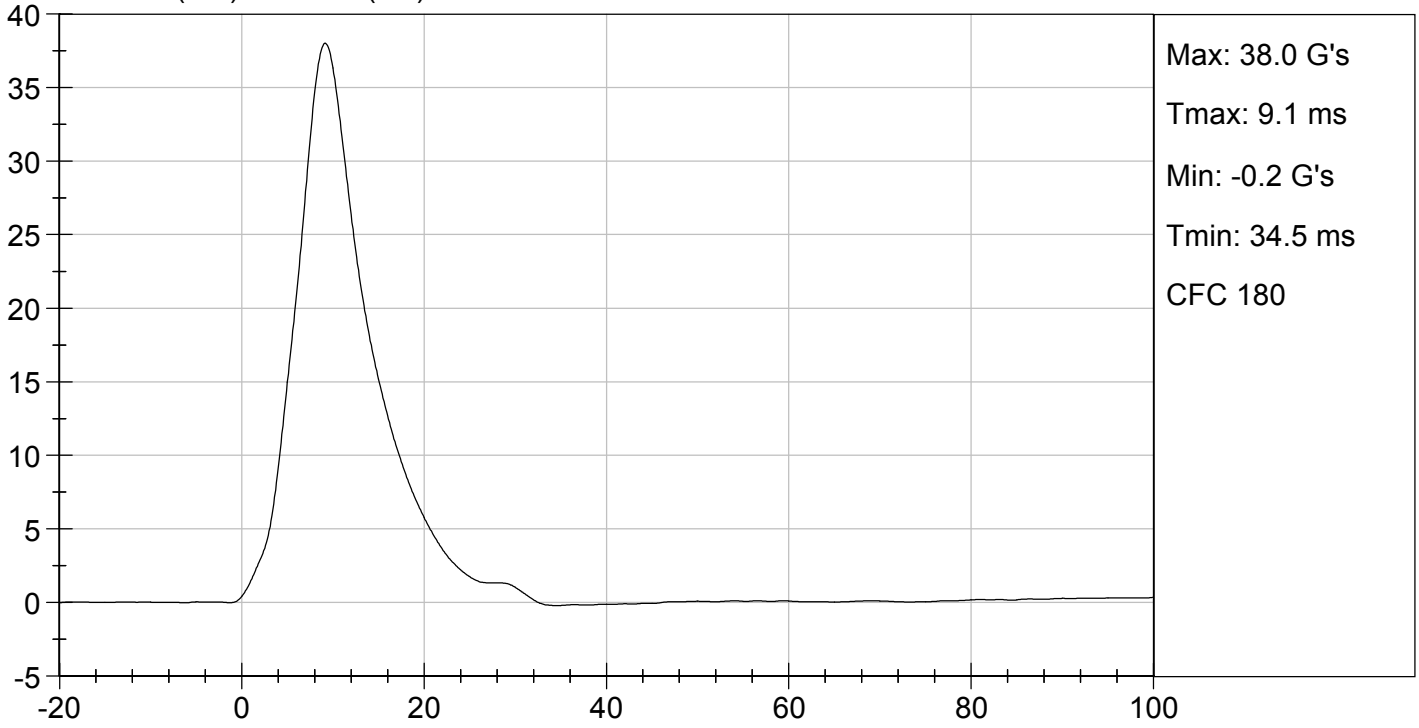
06/15/2017
Test Date

Approved By

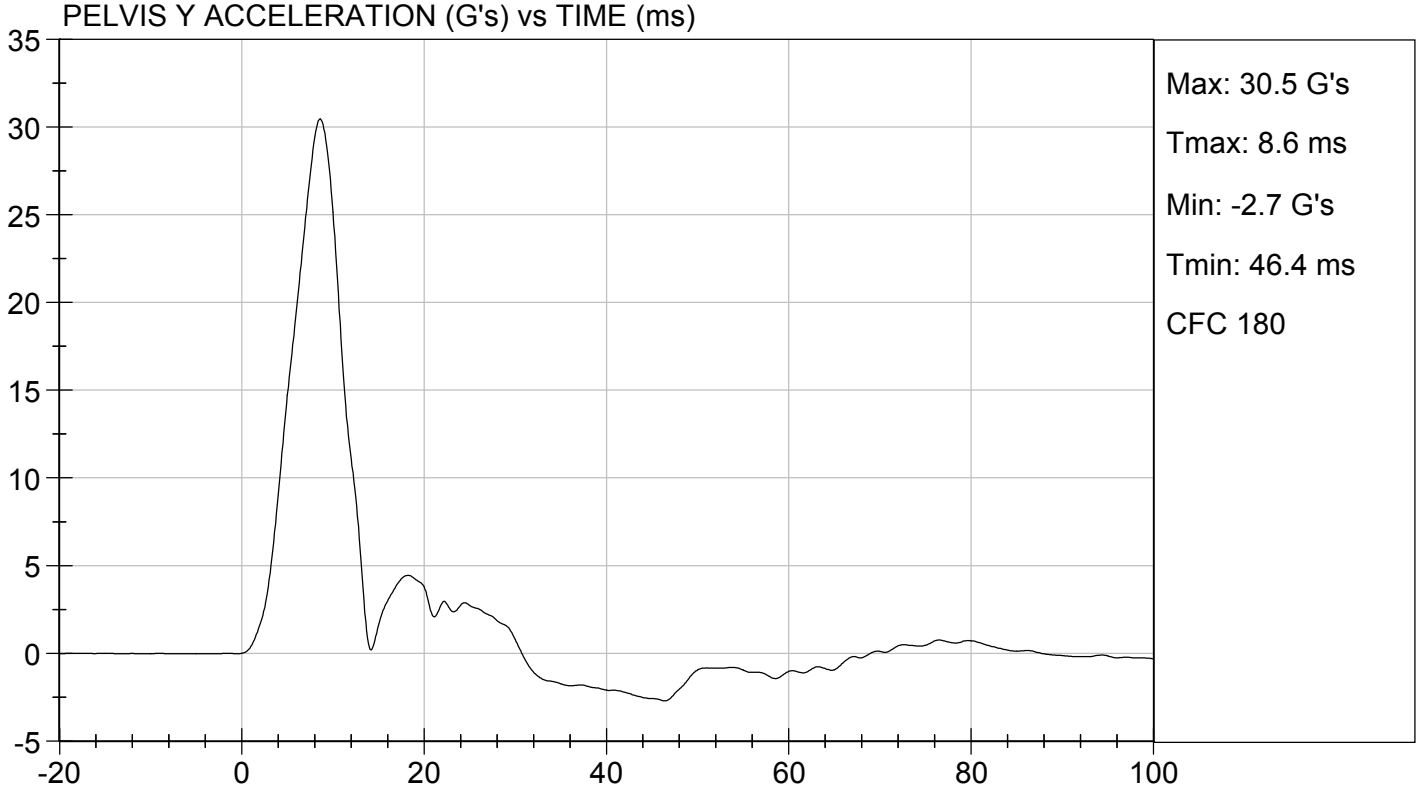
TEST DESC: ILLIAC
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 06/15/2017
TEST #: D171708

PROBE (G's) vs TIME (ms)

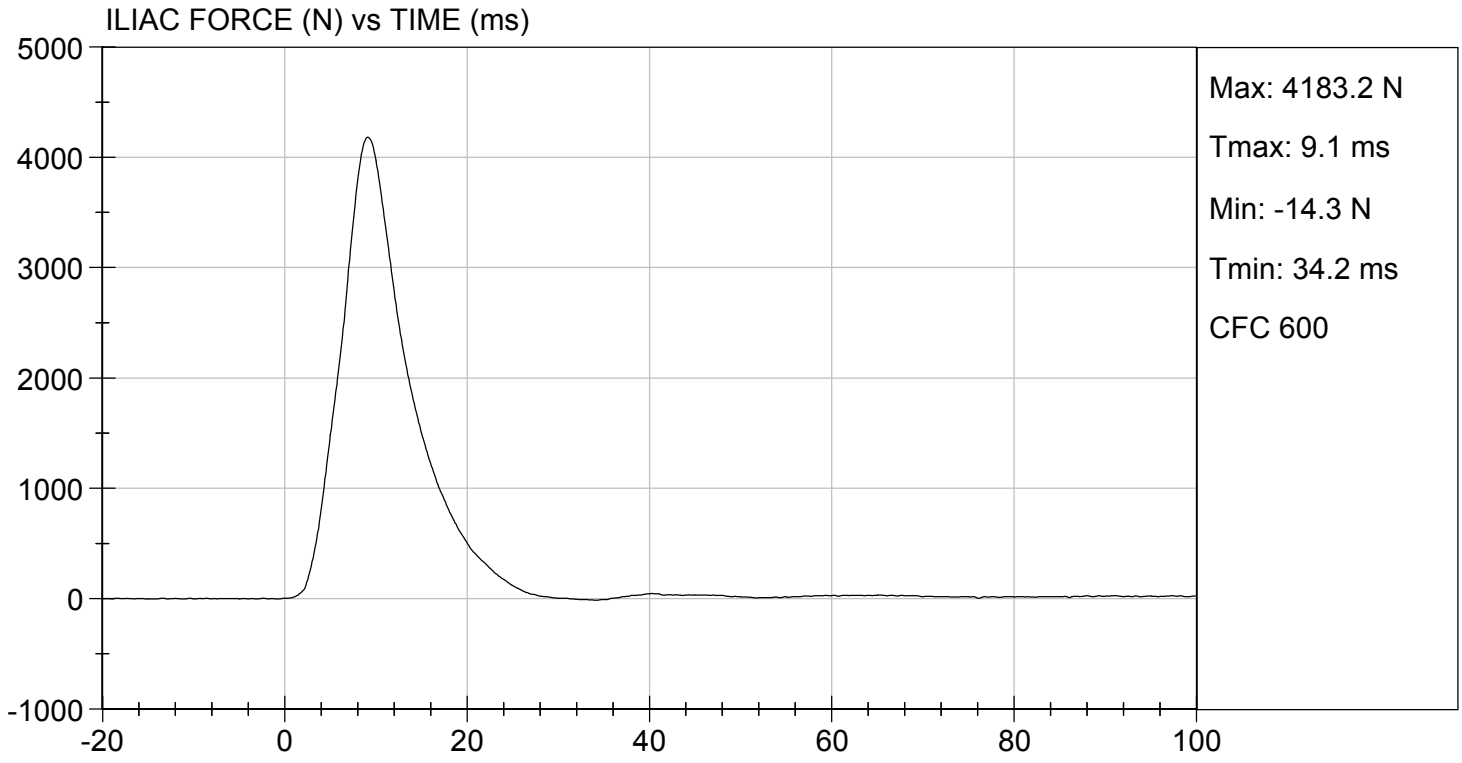


PELVIS Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 06/15/2017
TEST #: D171708



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 **Test ID:** D172141

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Peak Resultant Acceleration	G's	115 to 137	127	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-2.2	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician

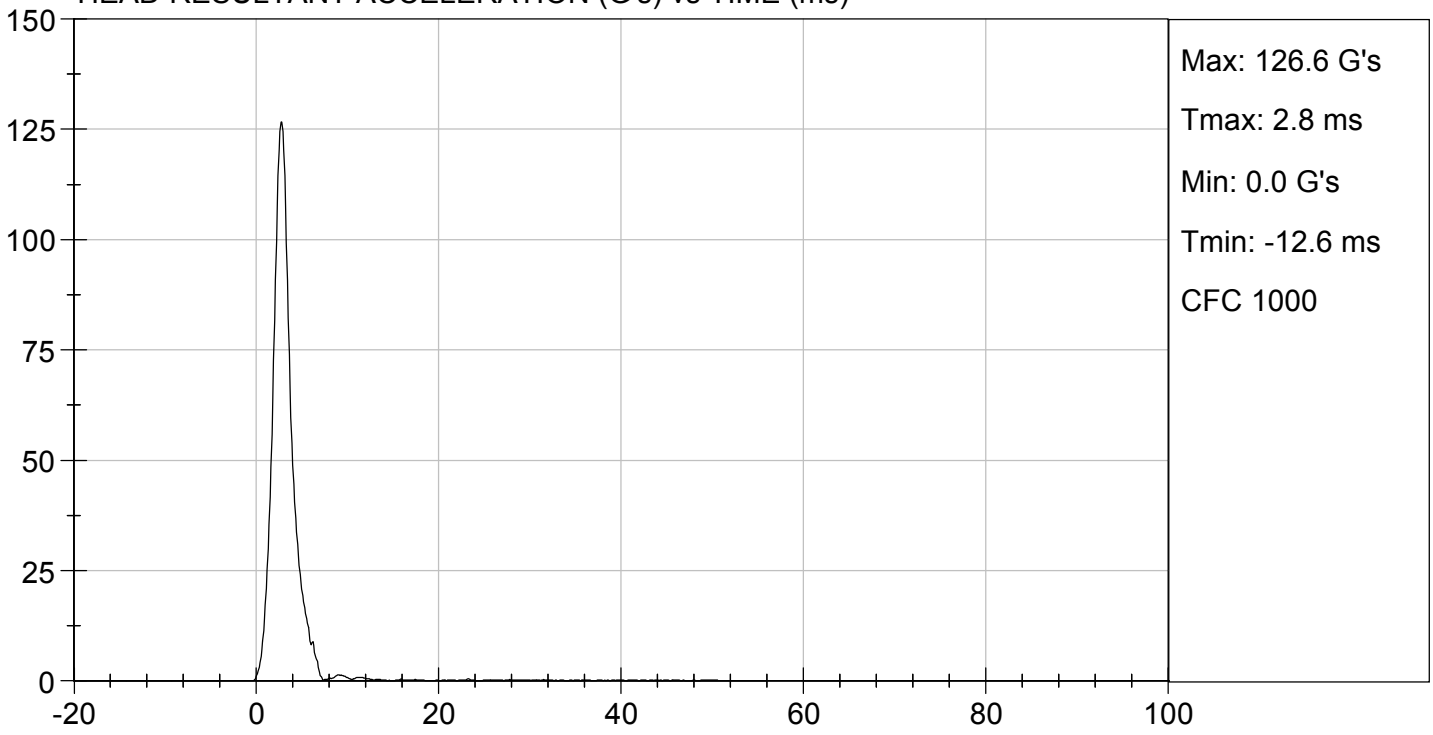
08/09/2017
Test Date

Approved By

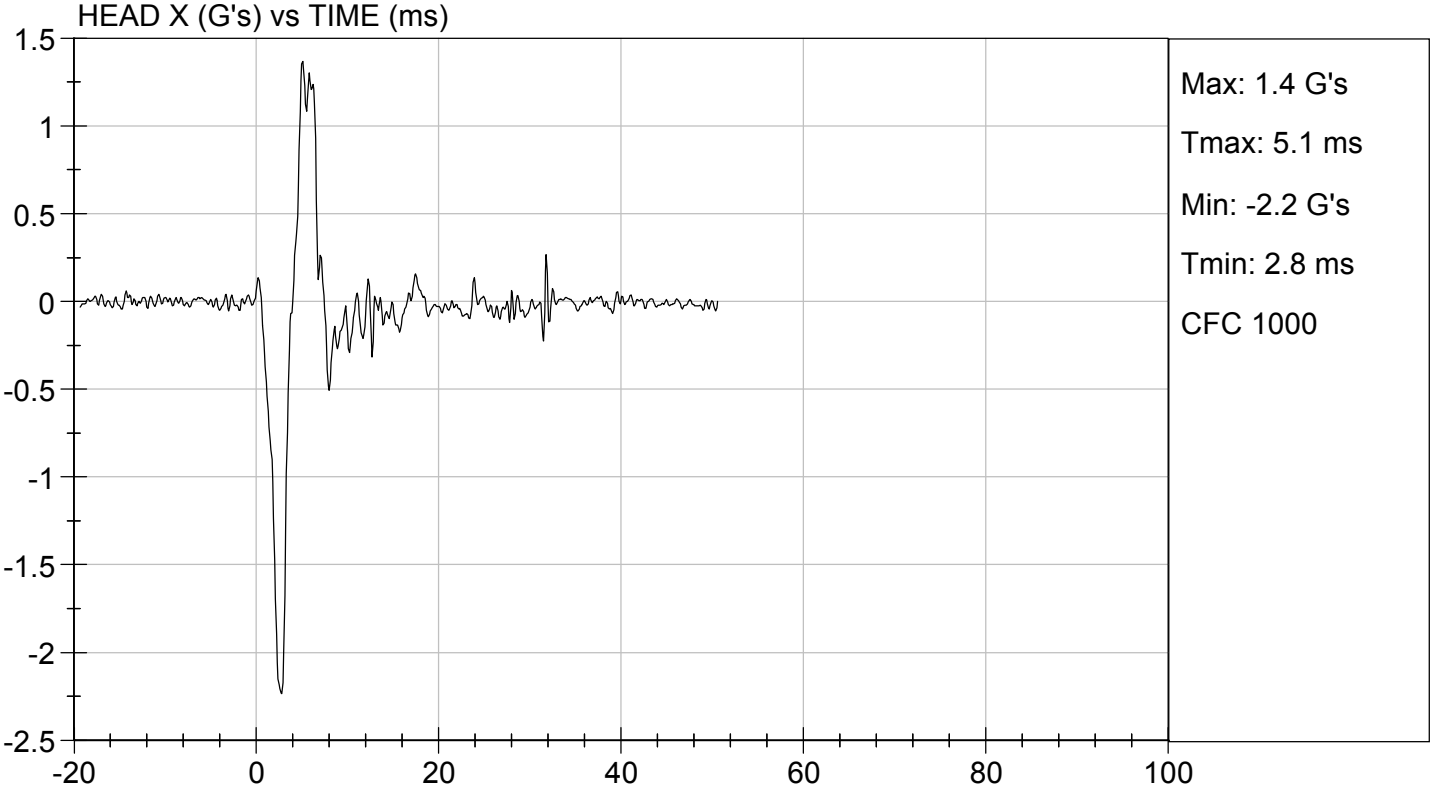
TEST DESC: HEAD DROP

TEST DATE: 08/09/2017
TEST #: D172141

HEAD RESULTANT ACCELERATION (G's) vs TIME (ms)

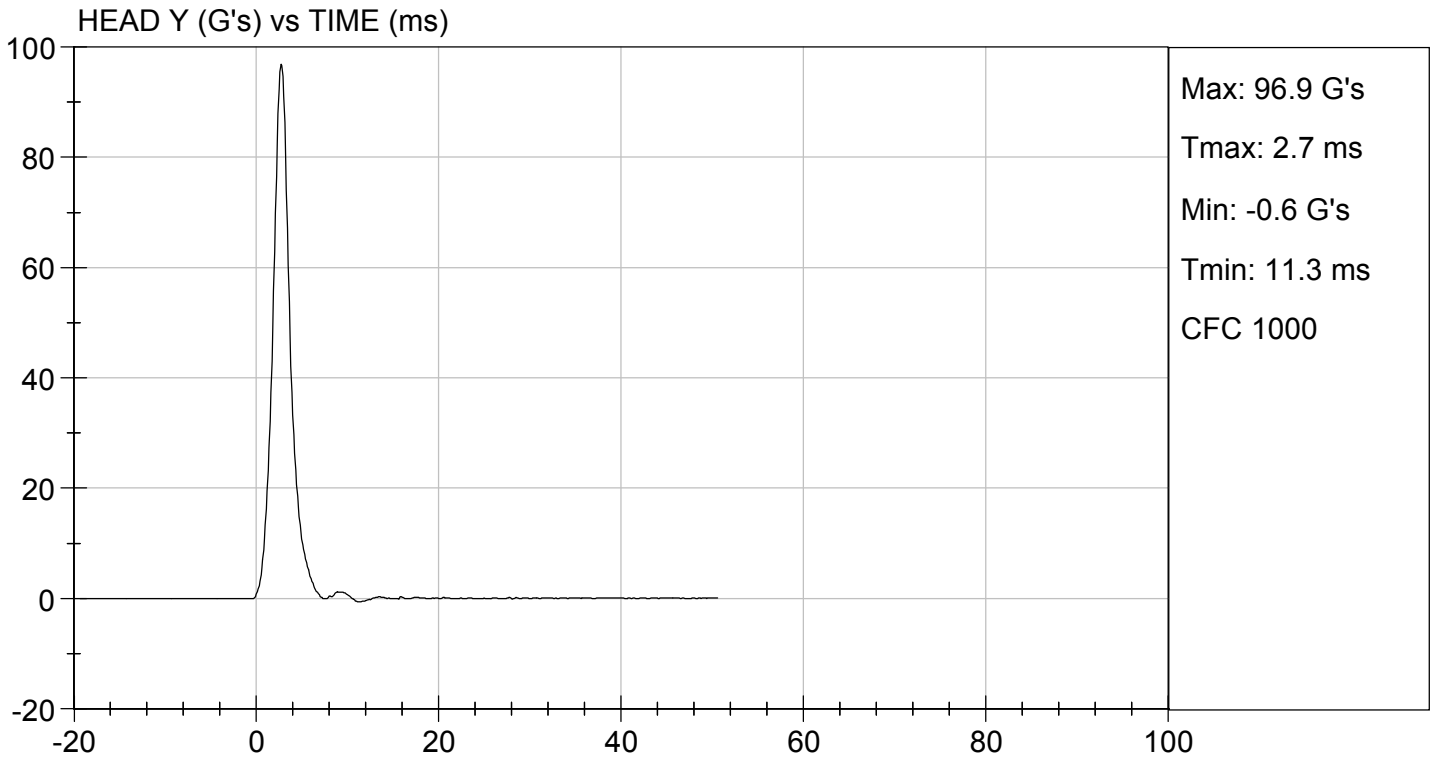


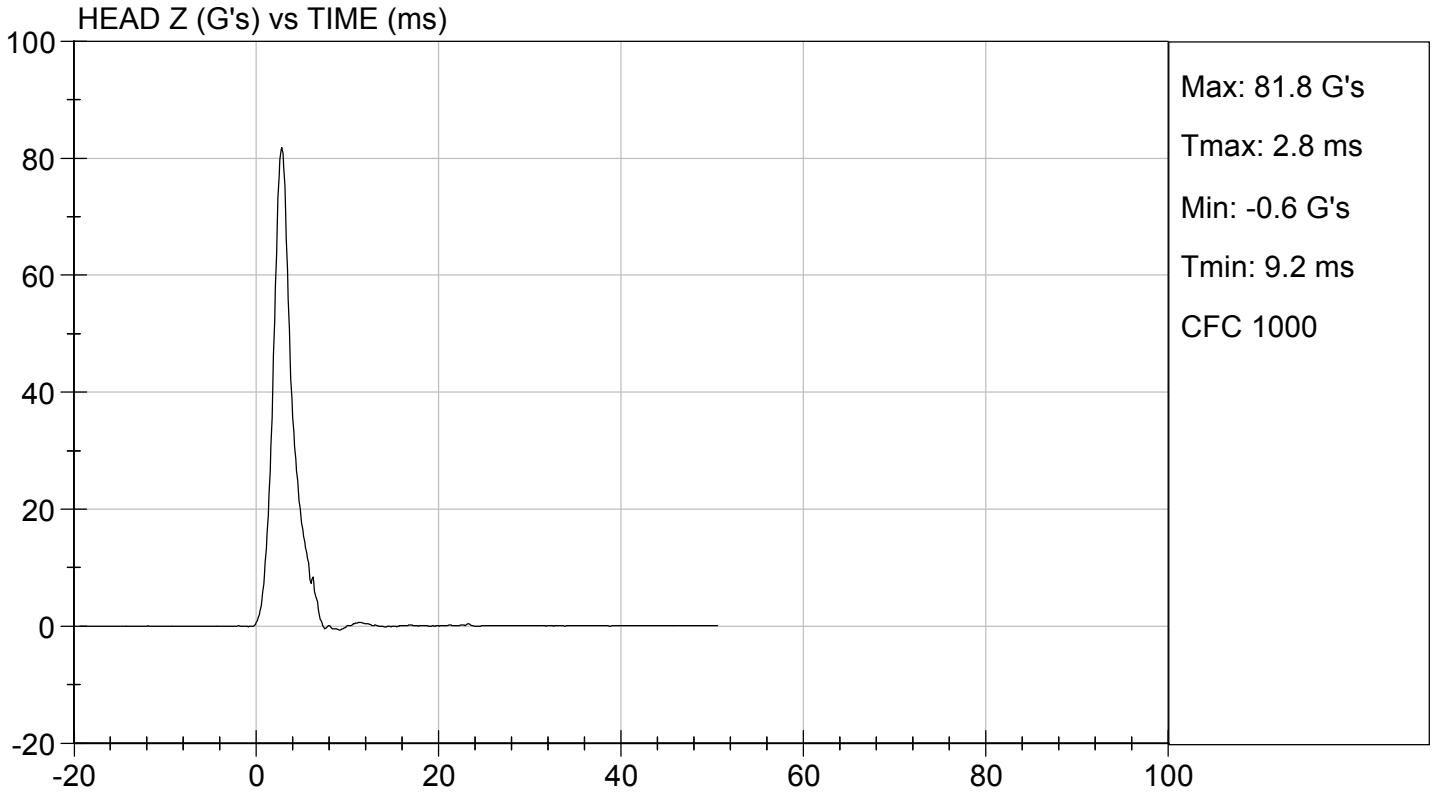
HEAD X (G's) vs TIME (ms)



TEST DESC: HEAD DROP

TEST DATE: 08/09/2017
TEST #: D172141





MGA RESEARCH CORPORATION

LATERAL NECK PENDULUM TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D172142

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.6	Pass
Humidity		%	10 to 70	45	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.66	Pass
	15 ms	m/s	3.30 to 4.10	3.87	Pass
	20 ms	m/s	4.40 to 5.40	5.19	Pass
	25 ms	m/s	5.40 to 6.10	5.71	Pass
	25-100 ms	m/s	5.50 to 6.20	5.73	Pass
Maximum D-Plane Rotation		deg	71 to 81	75	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	62	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

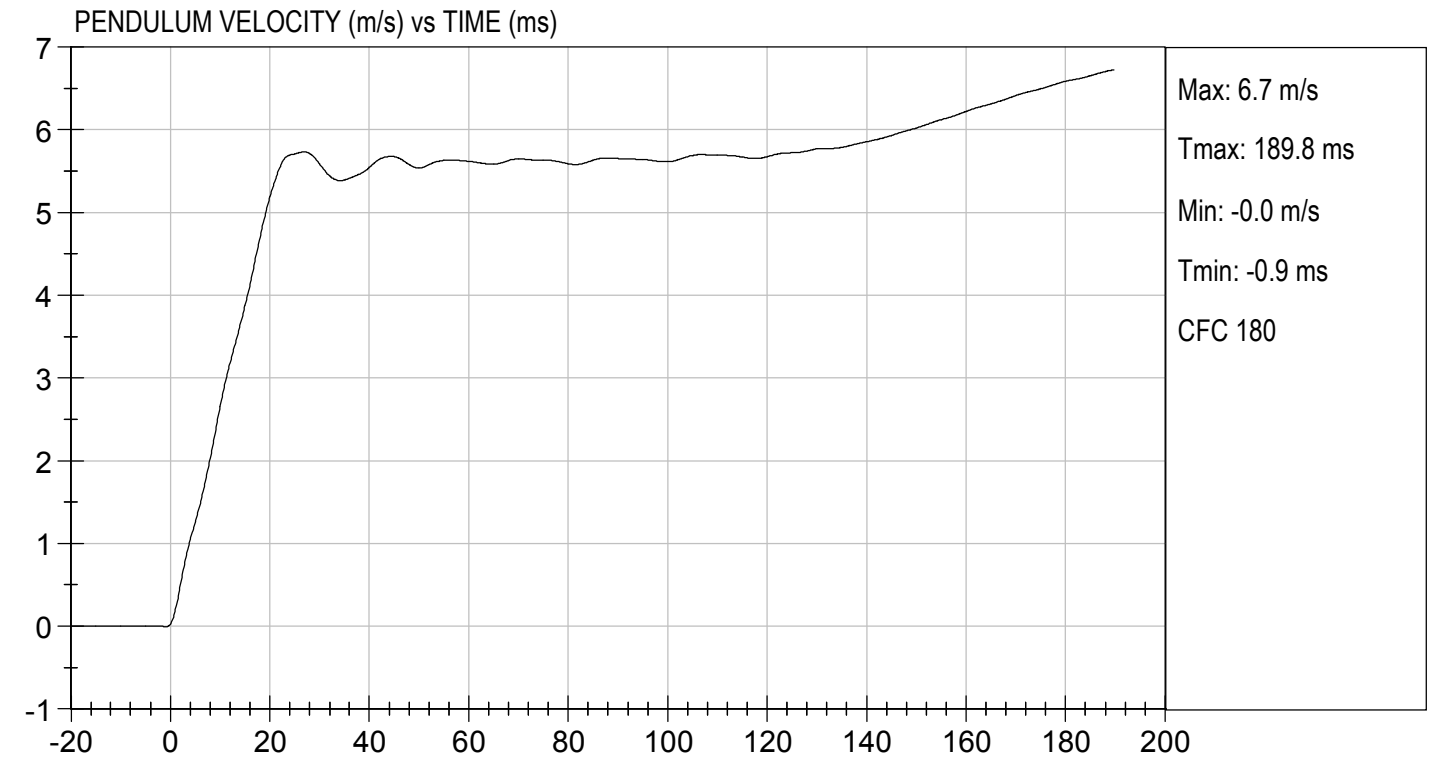
Laboratory Technician

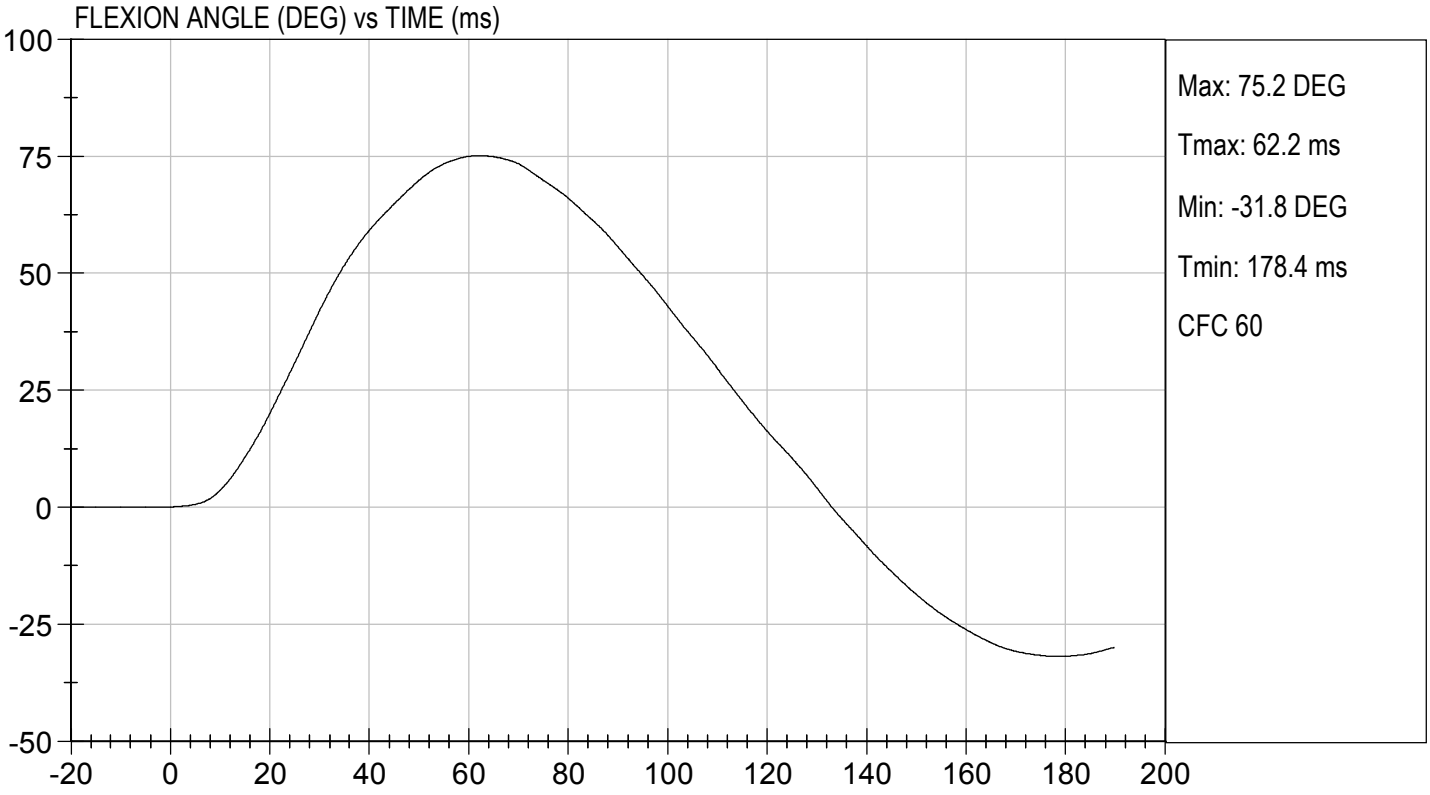
08/09/2017
Test Date

Approved By

TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

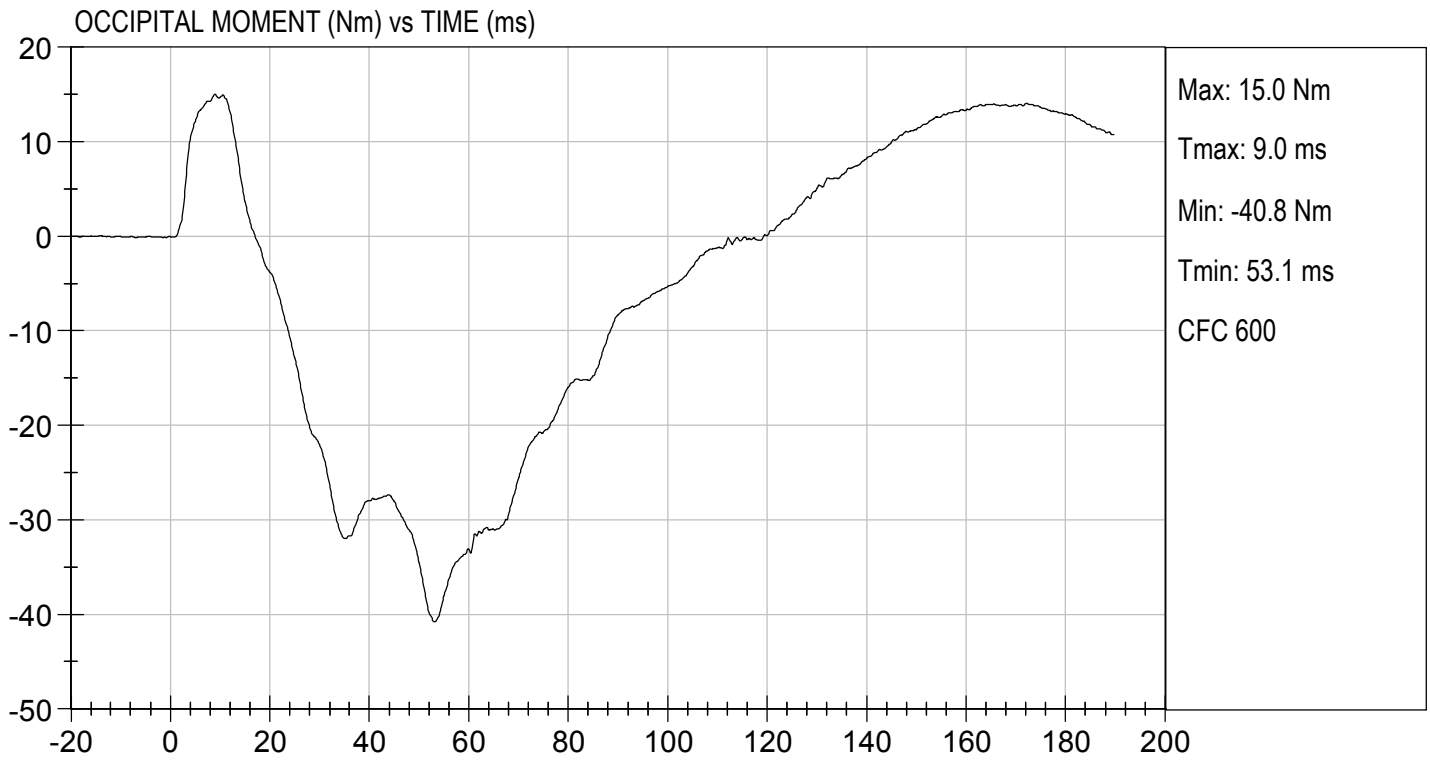
TEST DATE: 08/09/2017
TEST #: D172142





TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 08/09/2017
TEST #: D172142



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test ID:** D172143

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	30	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
		Overall Test Results		Pass

Laboratory Technician

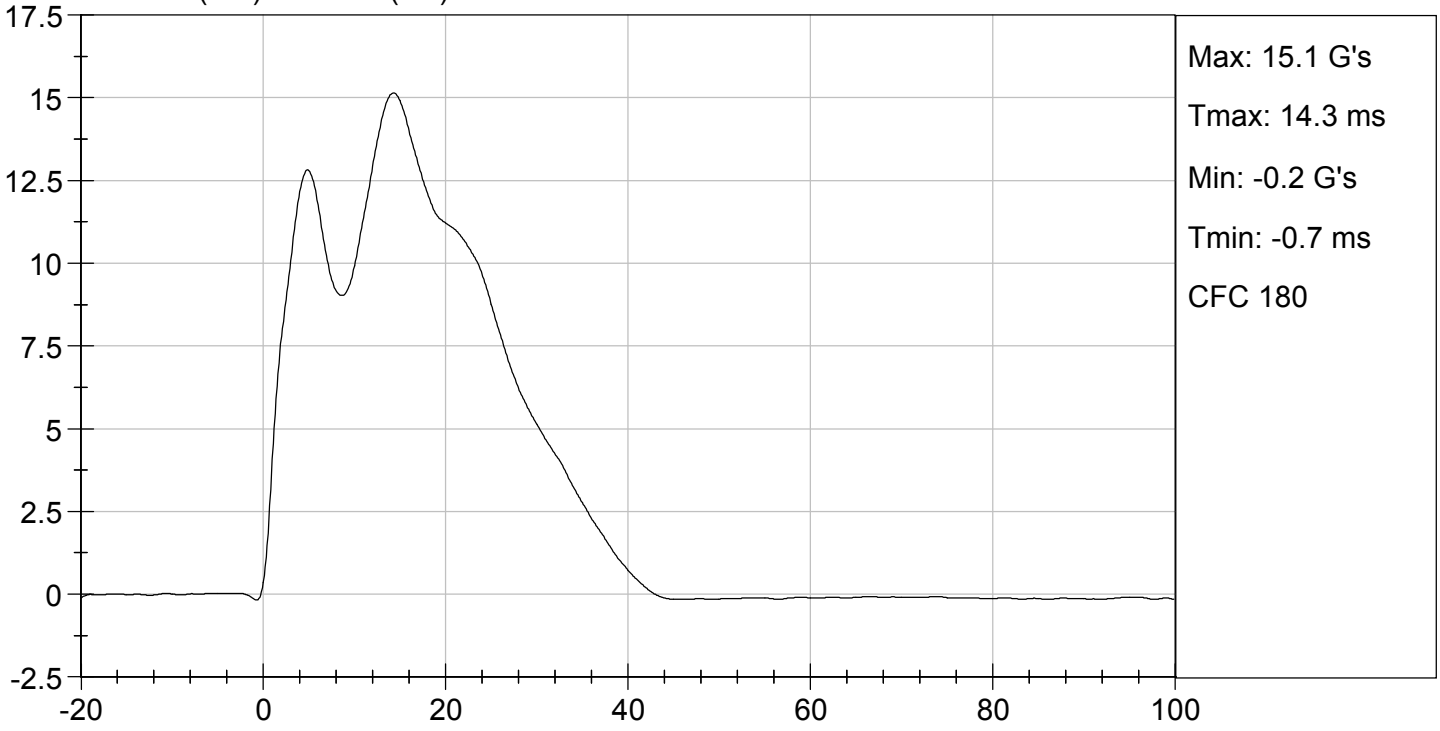
08/14/2017
Test Date

Approved By

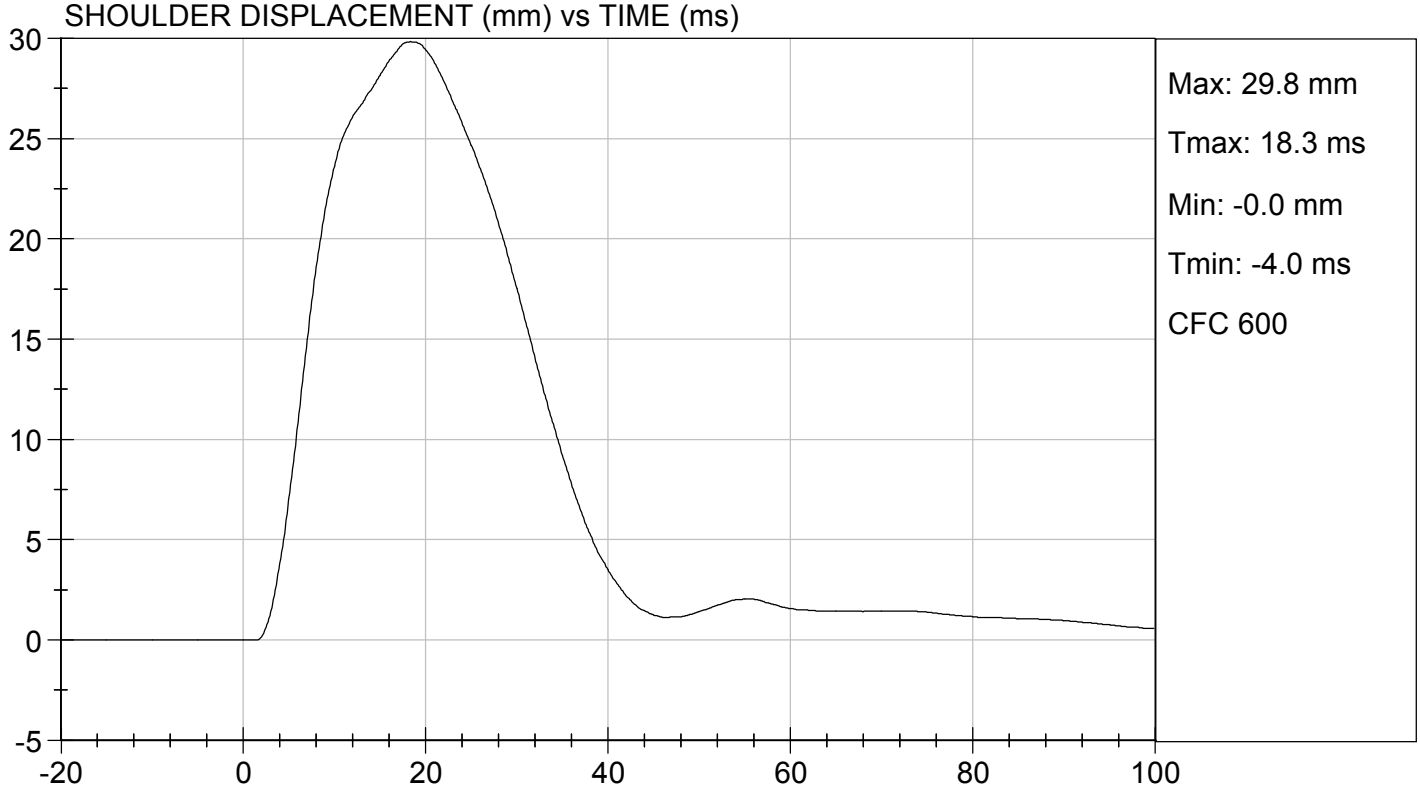
TEST DESC: SHOULDER IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 08/14/2017
TEST #: D172143

PROBE (G's) vs TIME (ms)

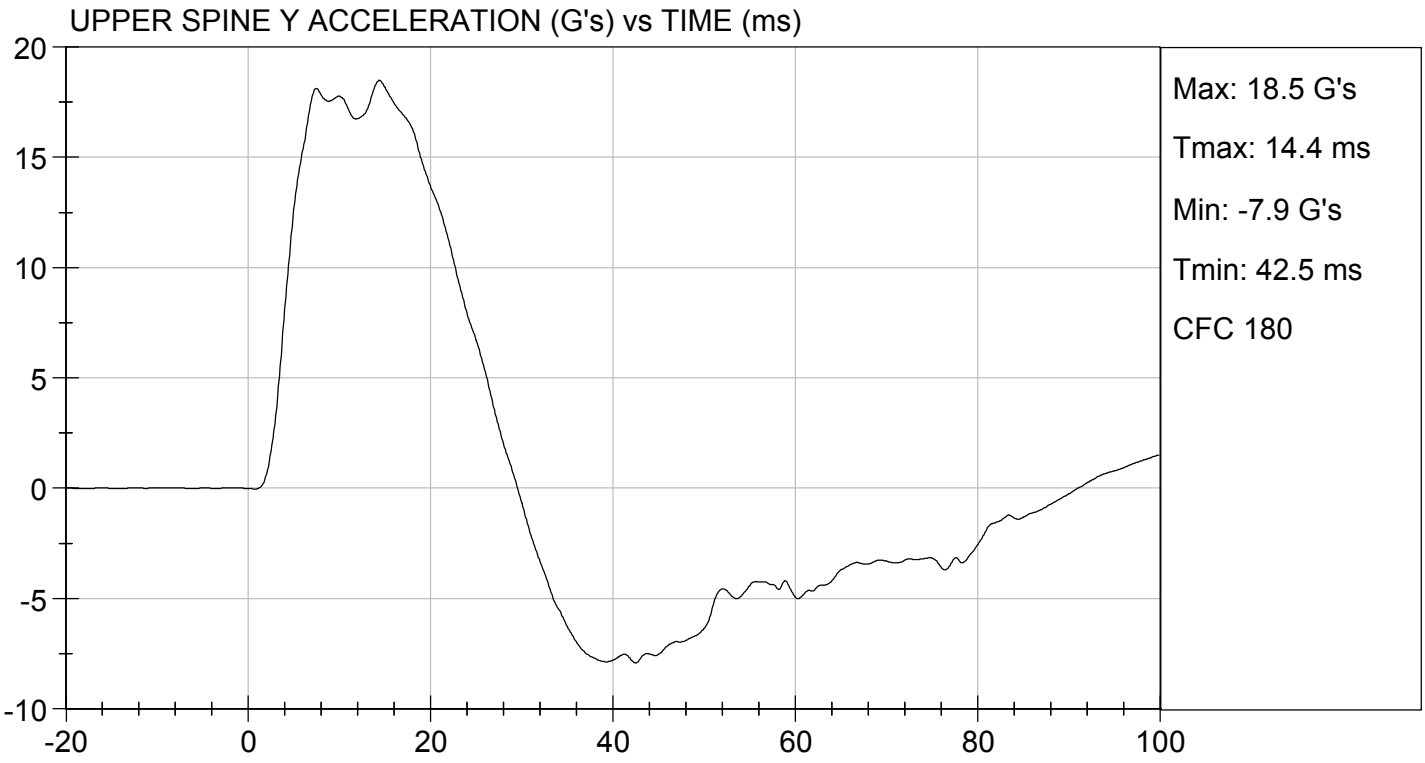


SHOULDER DISPLACEMENT (mm) vs TIME (ms)



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 08/14/2017
TEST #: D172143



MGA RESEARCH CORPORATION

THORAX (WITH ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D172144

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.7	Pass
Humidity	%	10 to 70	45	Pass
Impact Velocity	m/s	6.60 to 6.80	6.60	Pass
Maximum Probe Acceleration	G's	30 to 36	33	Pass
Shoulder Displacement	mm	31 to 40	35	Pass
Upper Rib Displacement	mm	25 to 32	29	Pass
Middle Rib Displacement	mm	30 to 36	32	Pass
Lower Rib Displacement	mm	32 to 38	35	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	36	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	33	Pass
		Overall Test Results		Pass

Laboratory Technician

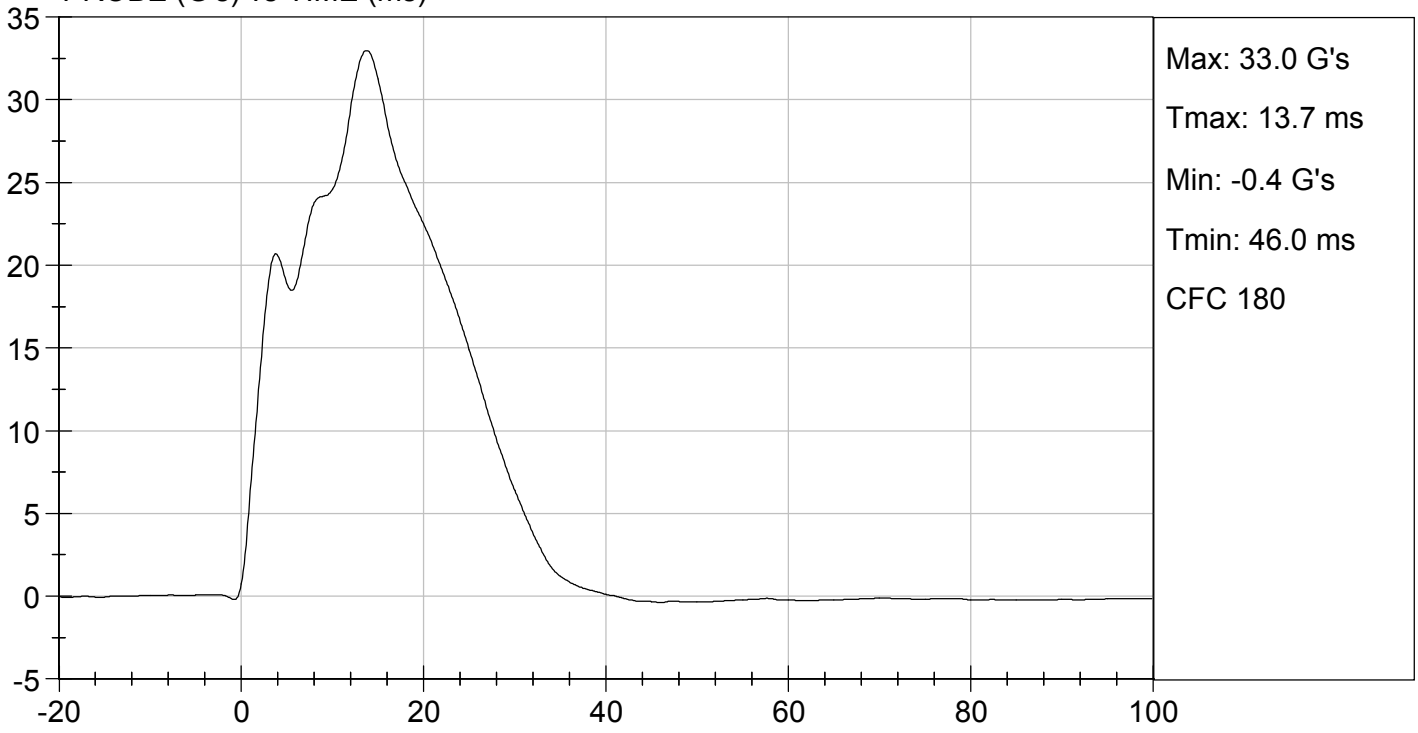
08/14/2017
Test Date

Approved By

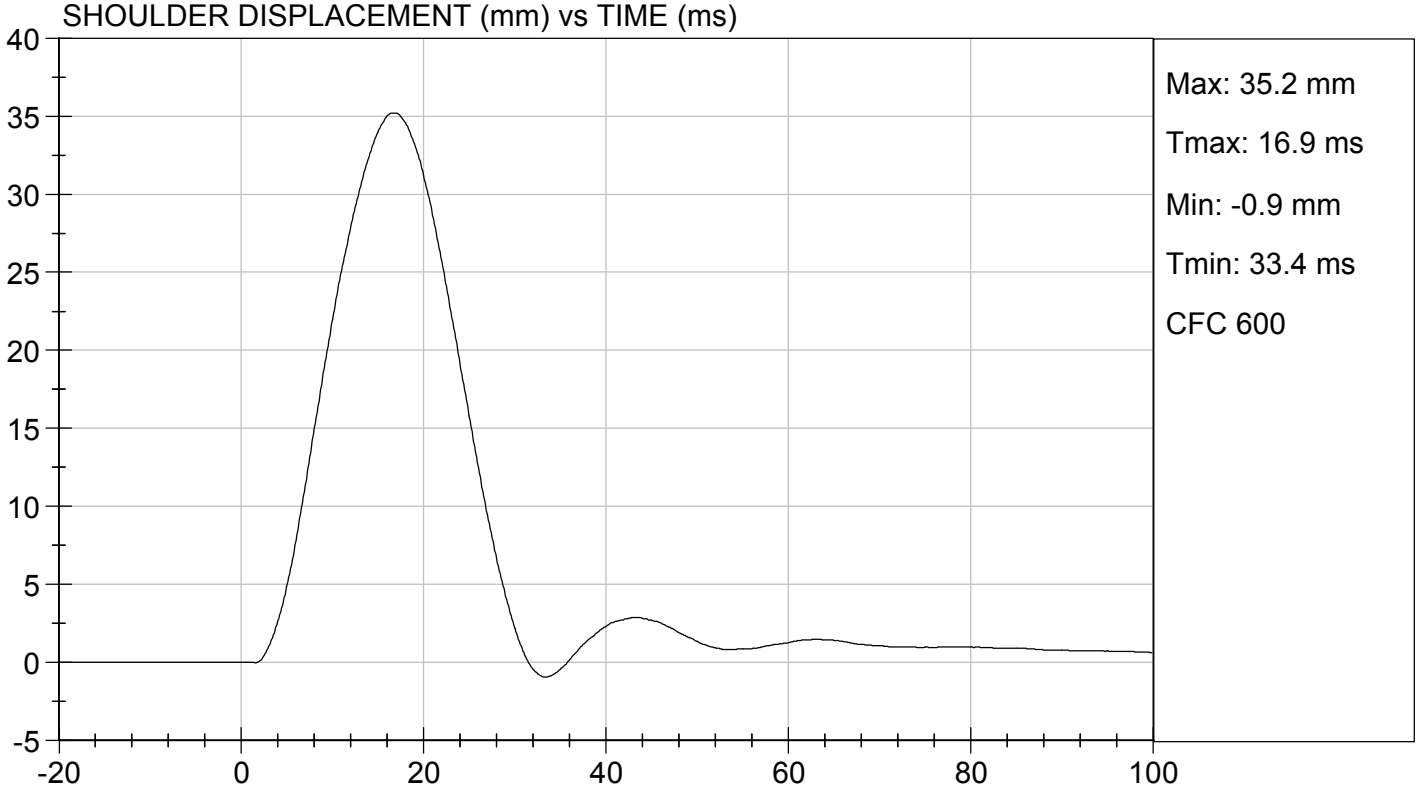
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.65 ft/s, 6.60 m/s

TEST DATE: 08/14/2017
TEST #: D172144

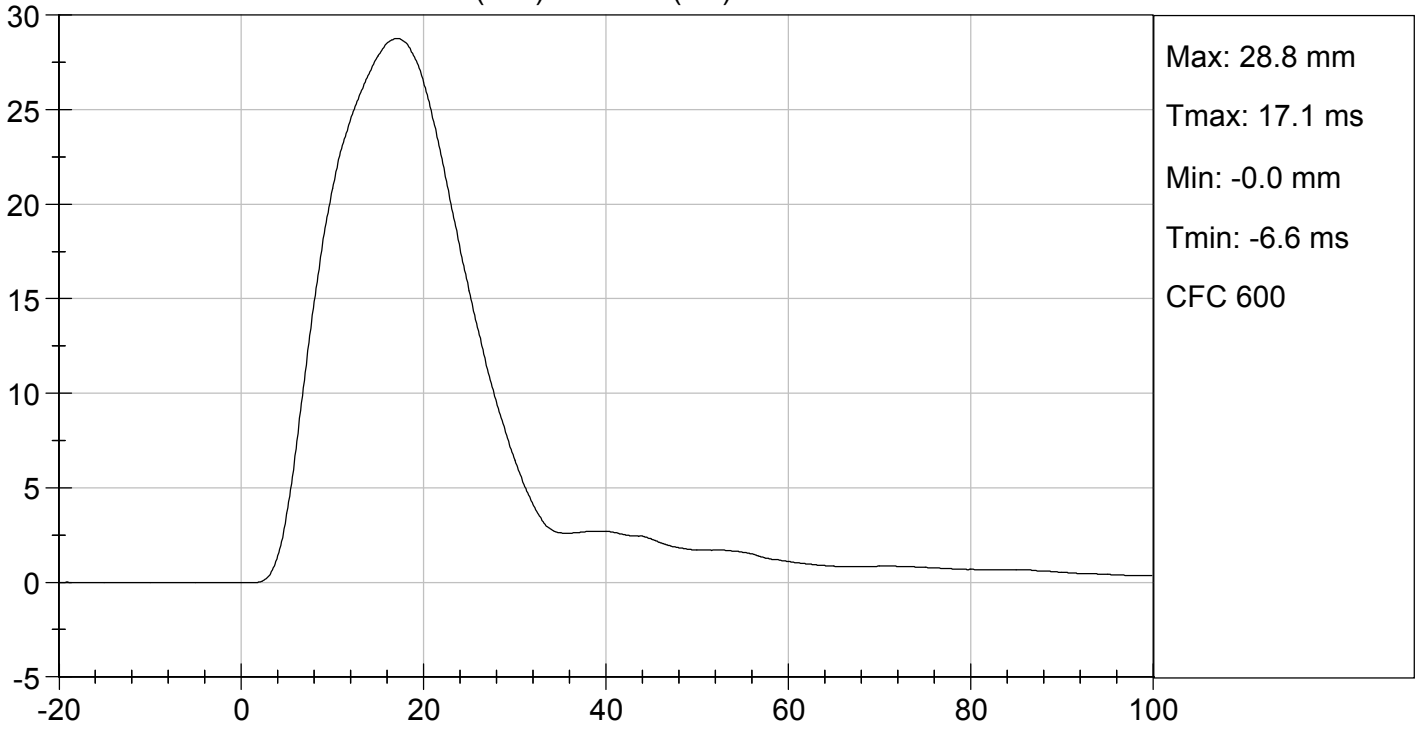
PROBE (G's) vs TIME (ms)



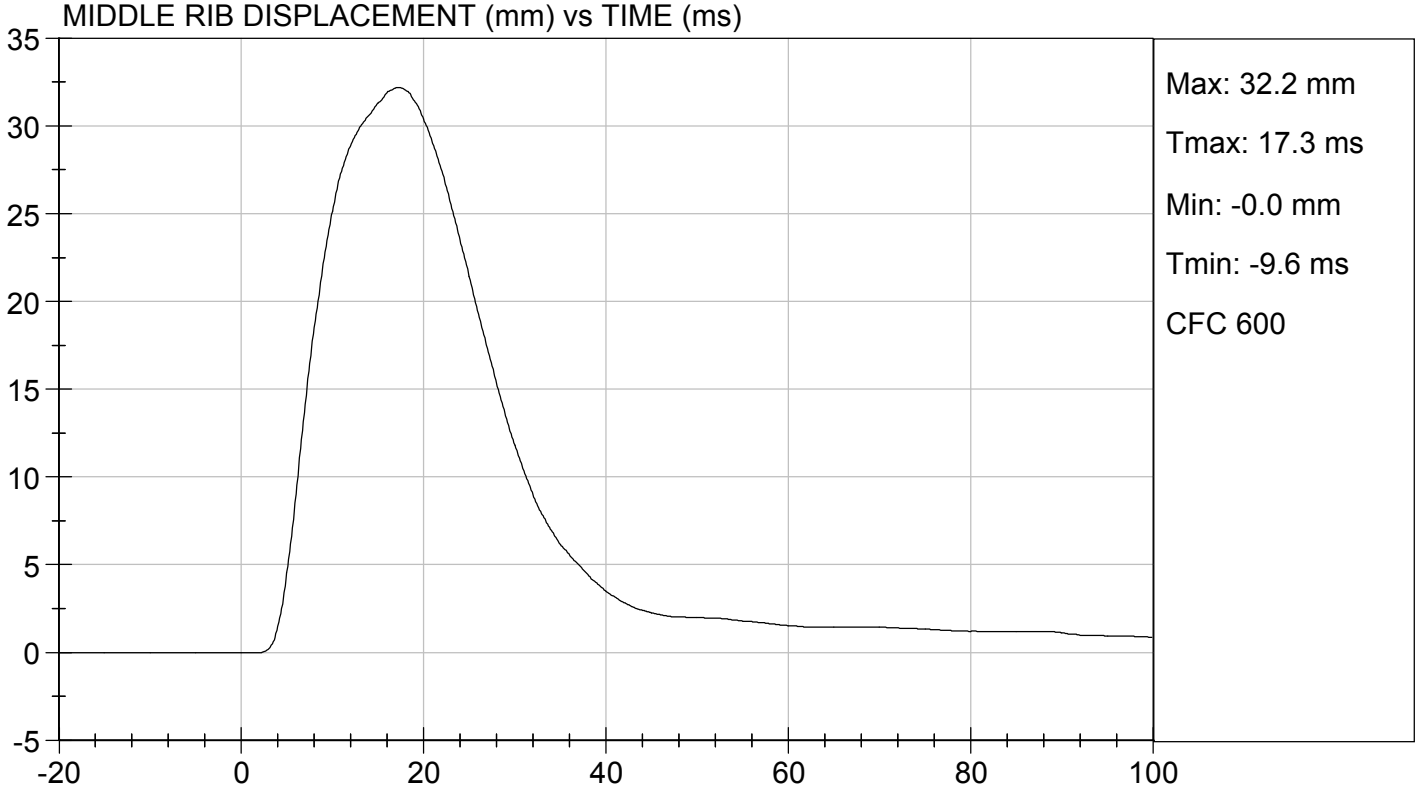
SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



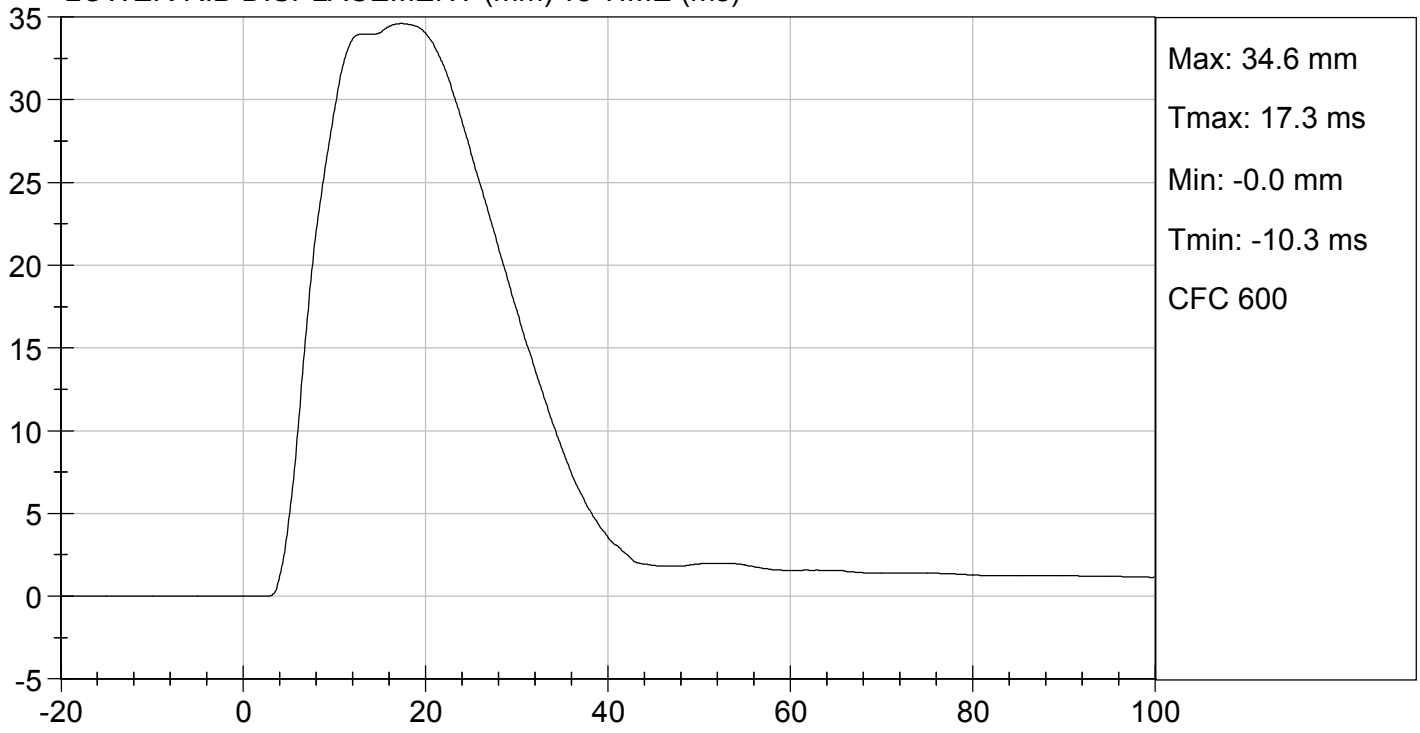
MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



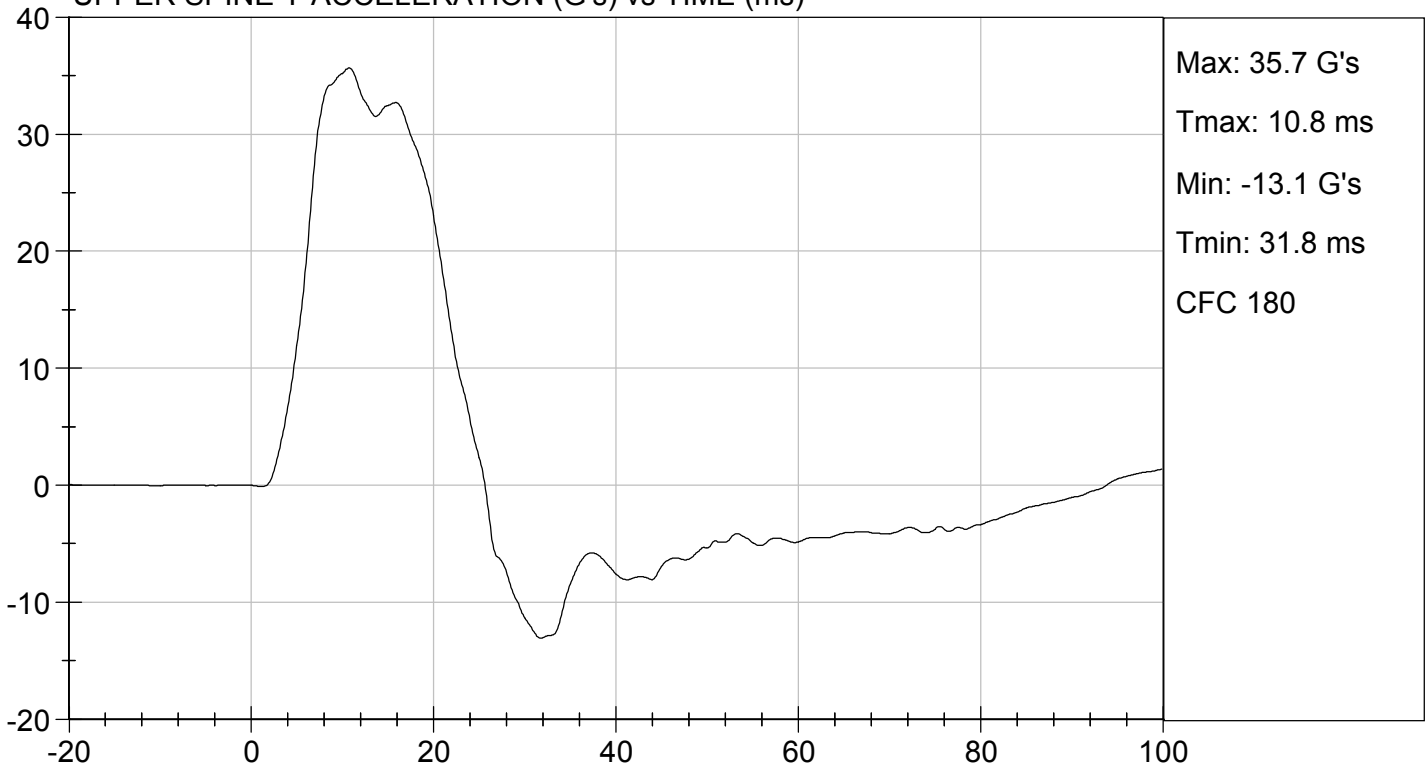
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.65 ft/s, 6.60 m/s

TEST DATE: 08/14/2017
TEST #: D172144

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

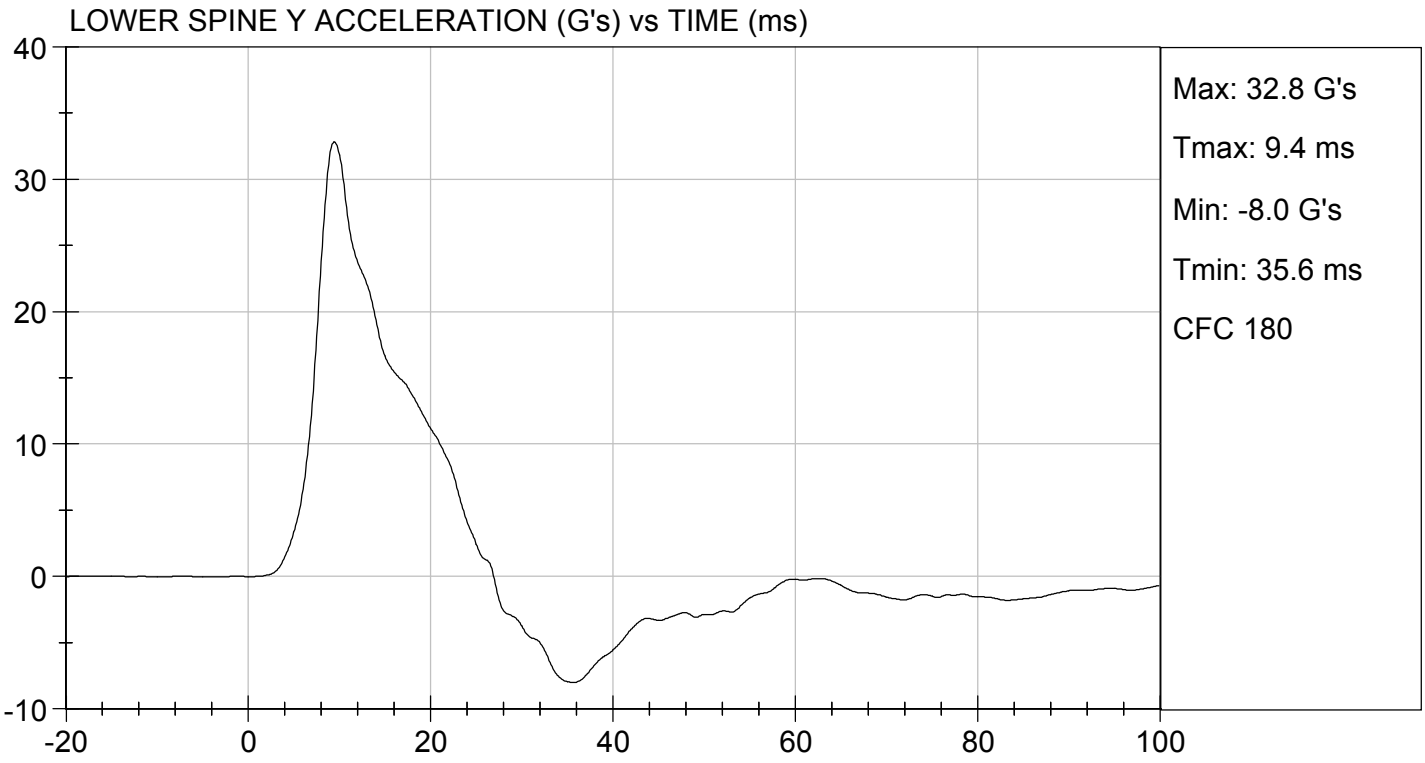


UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.65 ft/s, 6.60 m/s

TEST DATE: 08/14/2017
TEST #: D172144



MGA RESEARCH CORPORATION

THORAX (WITHOUT ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D172145

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	49	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	38	Pass
Middle Rib Displacement	mm	39 to 45	42	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	8	Pass
		Overall Test Results		Pass

Laboratory Technician

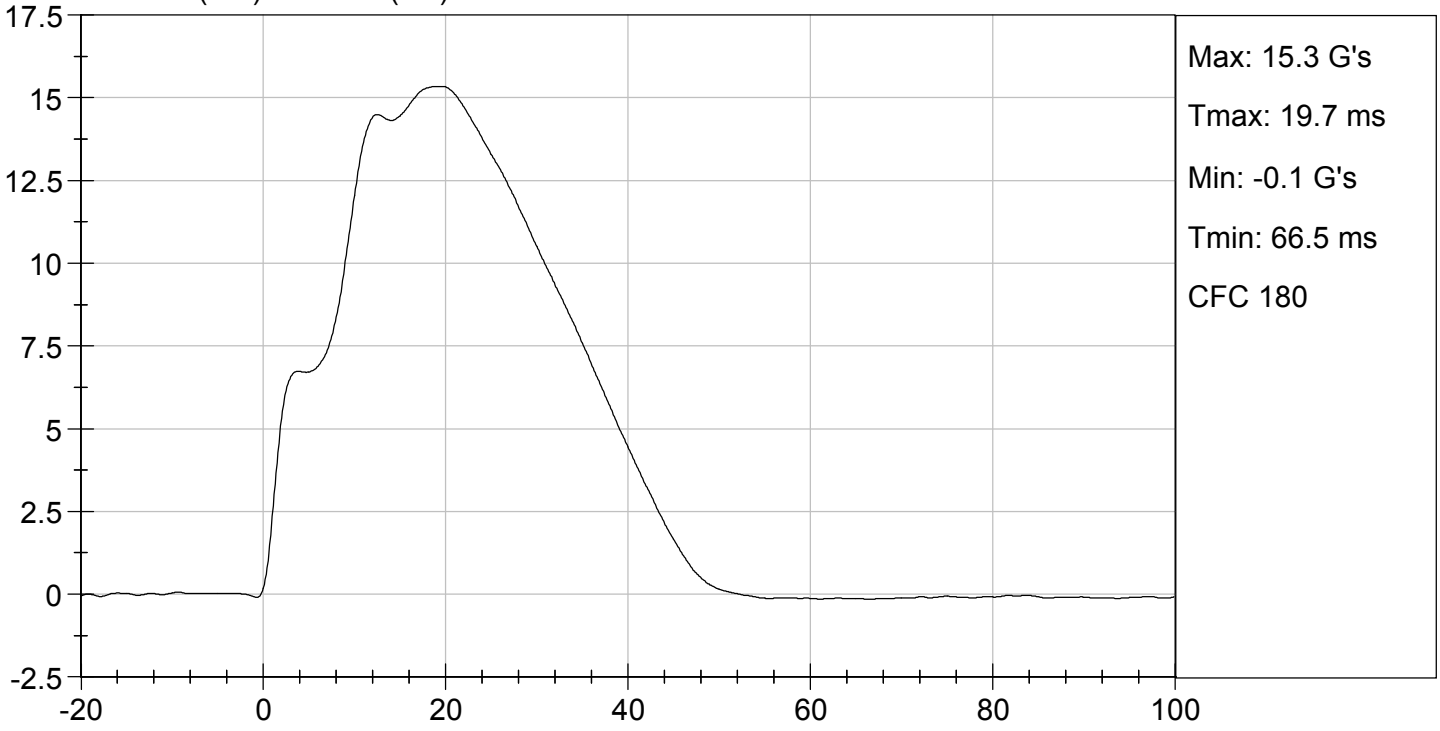
08/10/2017
Test Date

Approved By

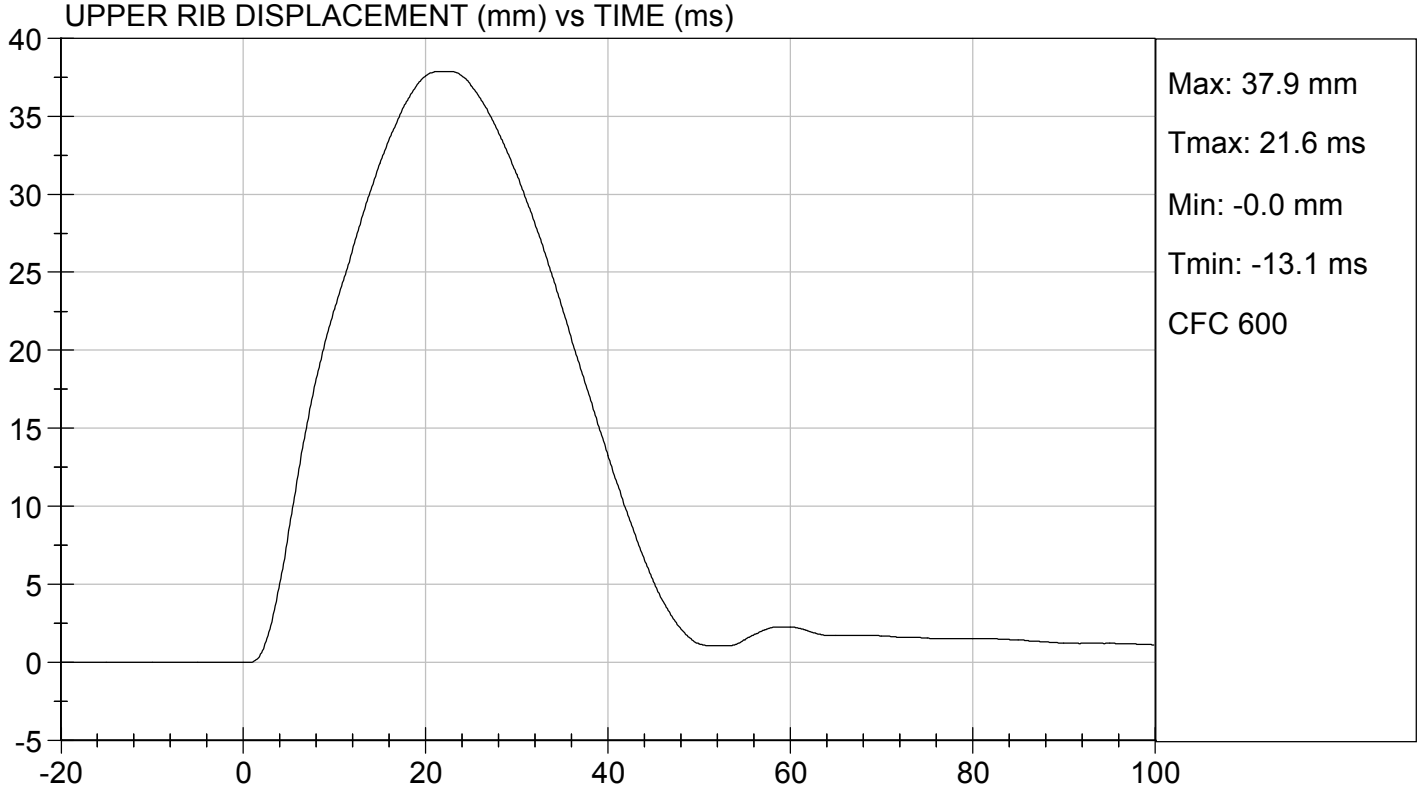
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 08/10/2017
TEST #: D172145

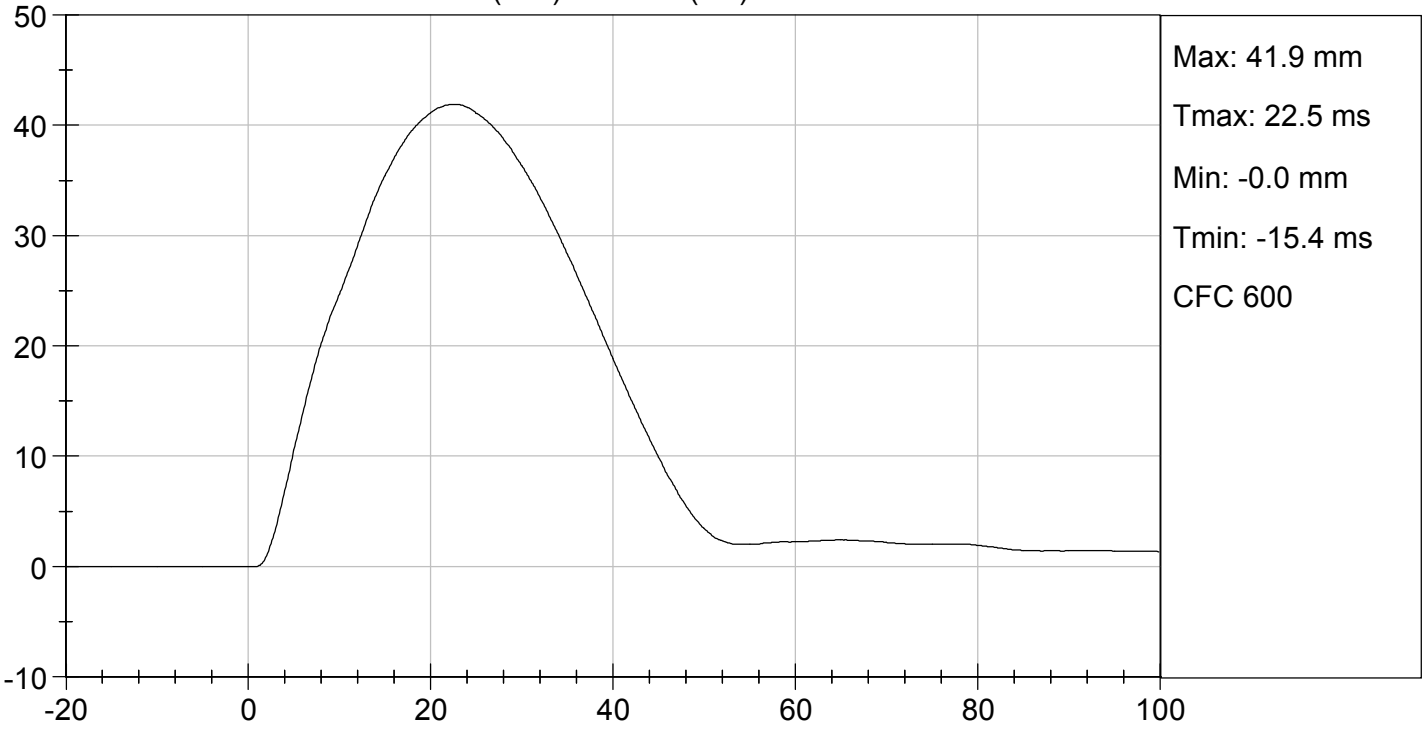
PROBE (G's) vs TIME (ms)



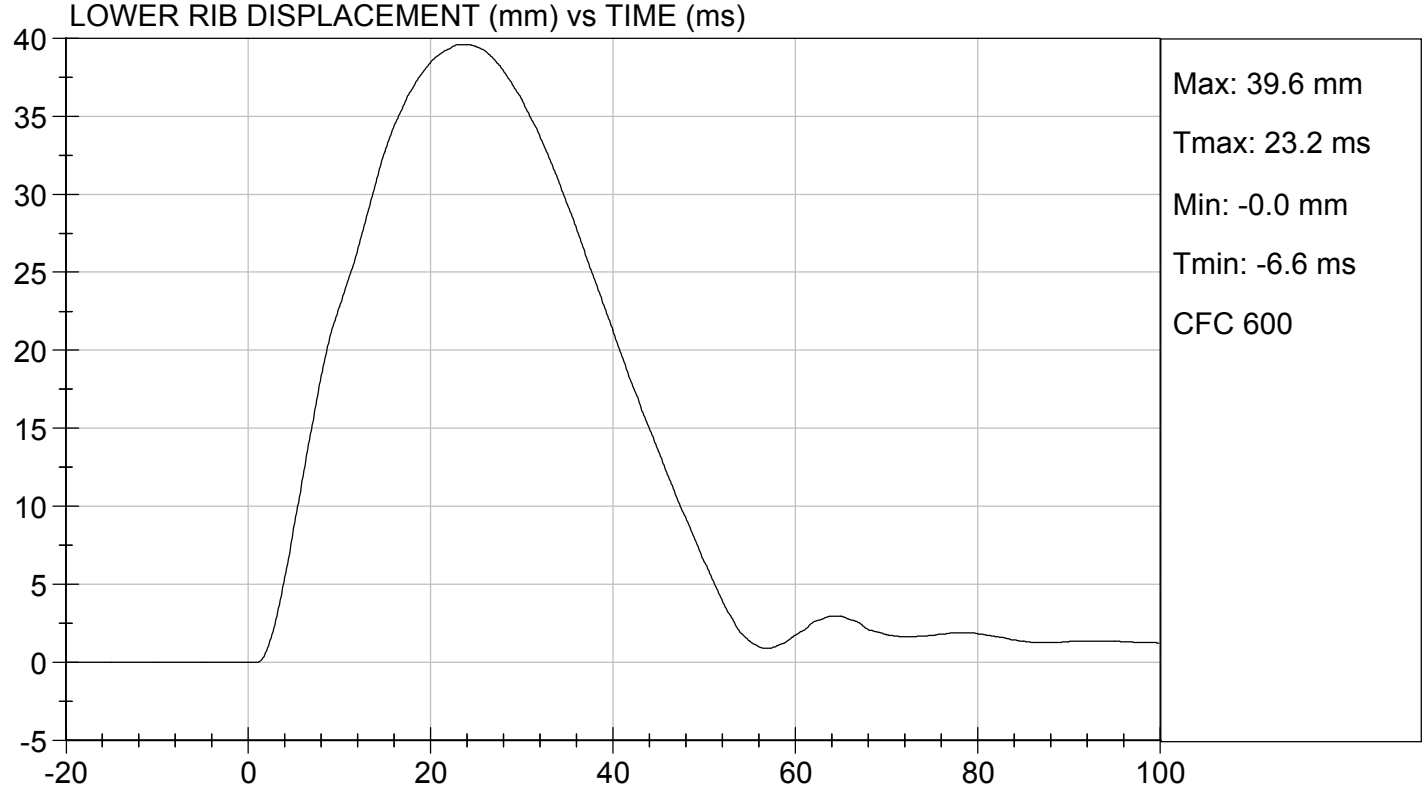
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



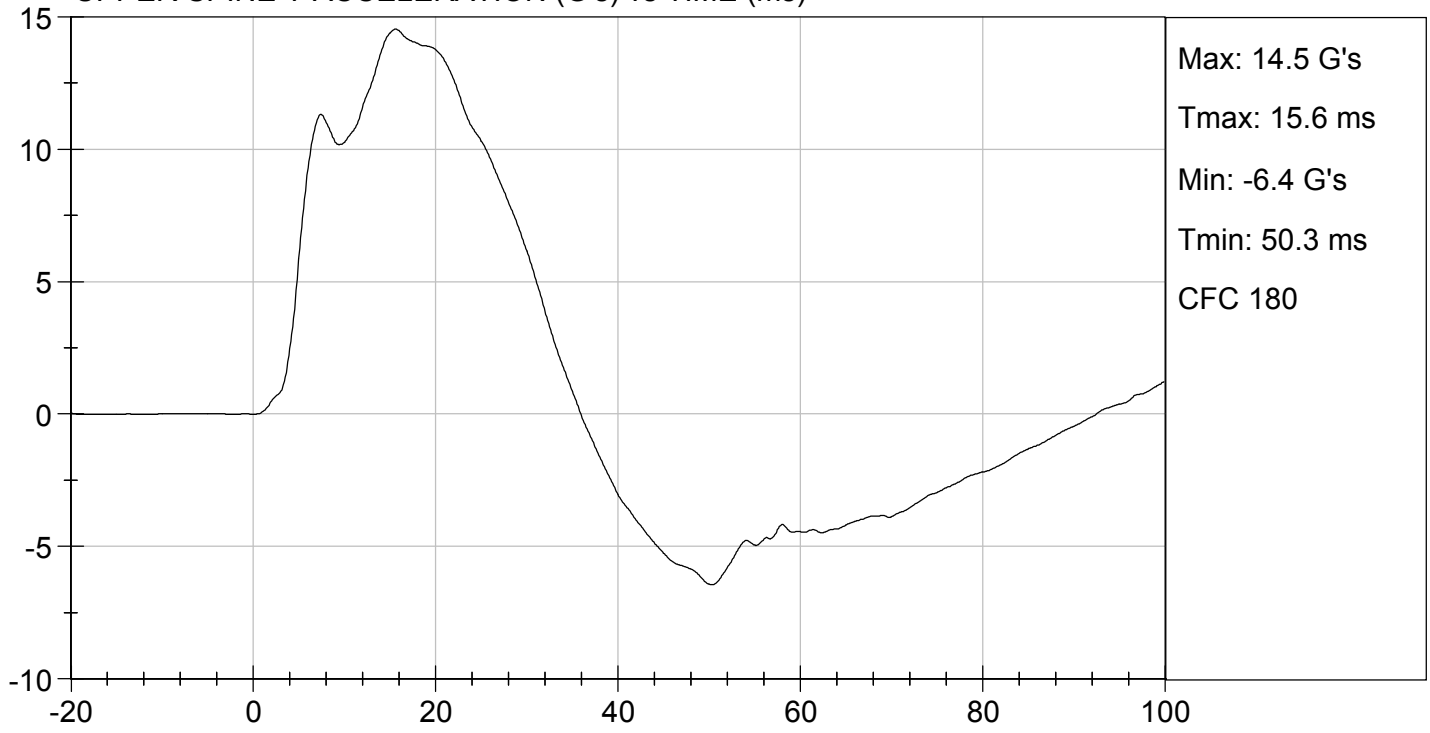
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



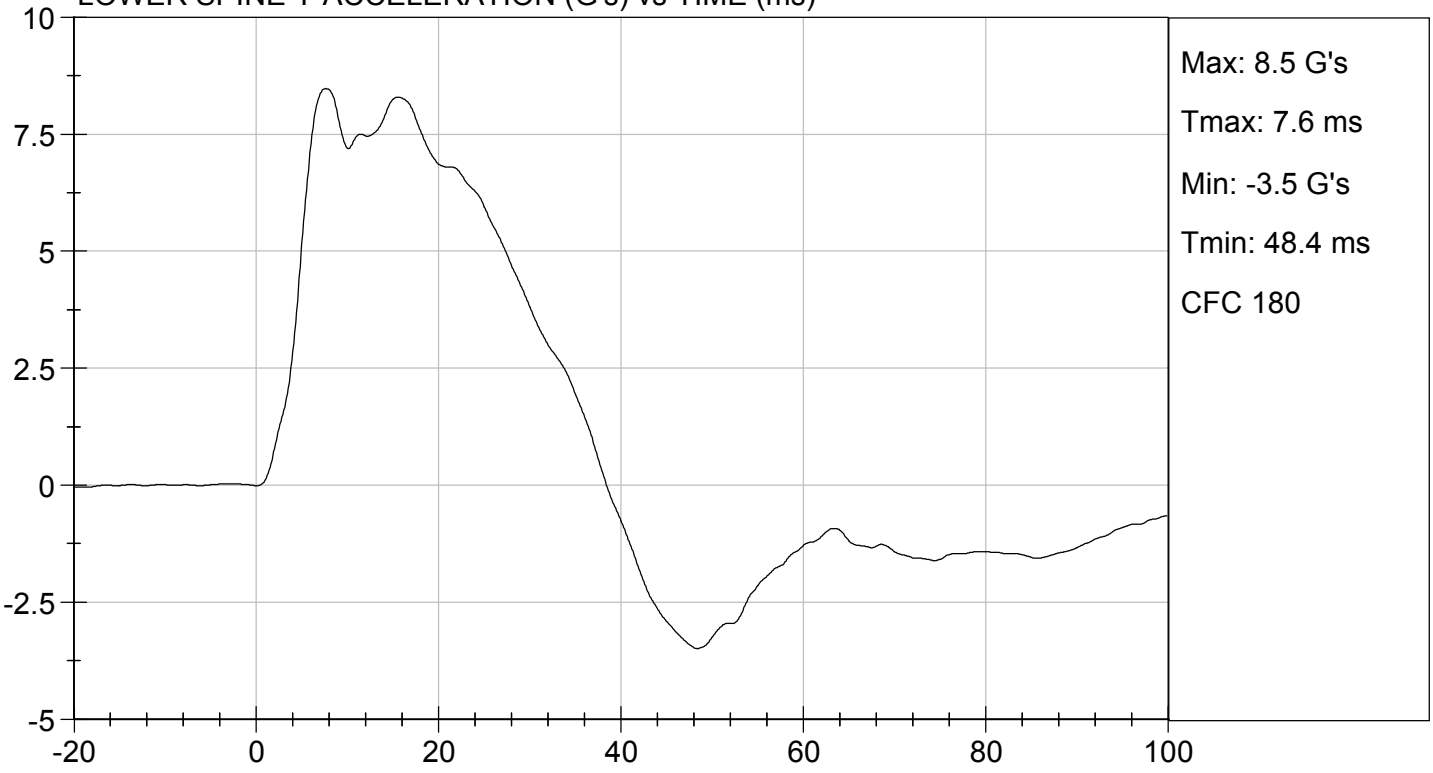
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 08/10/2017
TEST #: D172145

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:** D172146

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	49	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	12 to 16	14	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	41	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	37	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
		Overall Test Results		Pass

Laboratory Technician

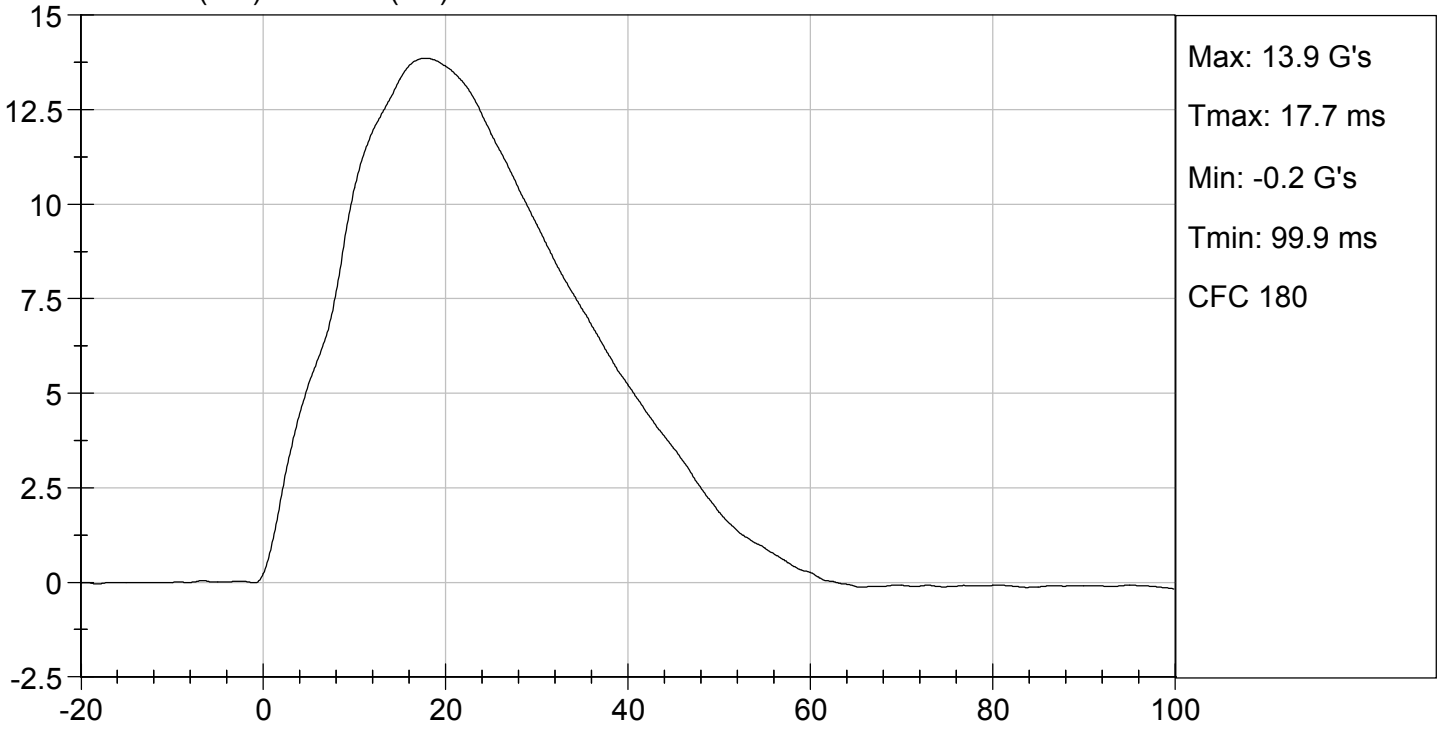
08/10/2017
Test Date

Approved By

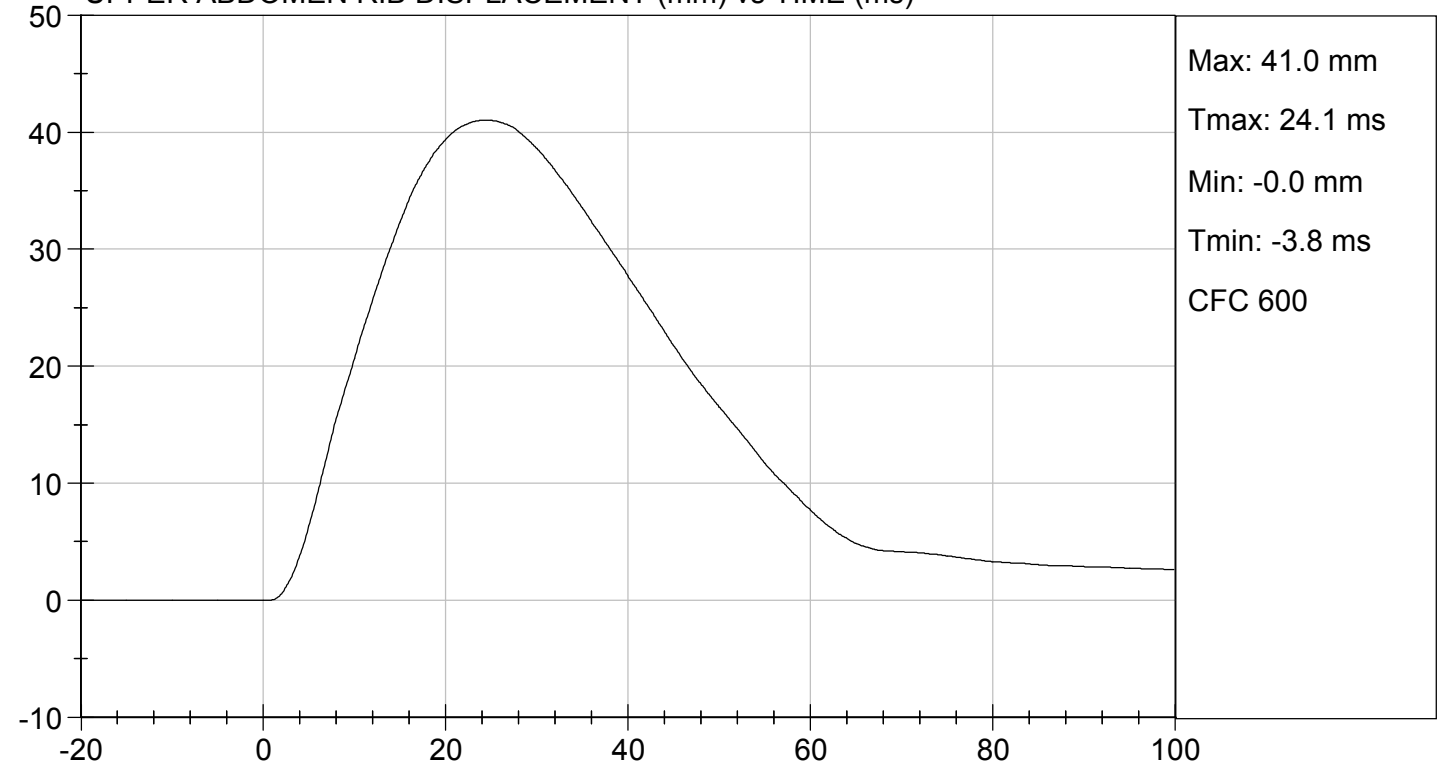
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 08/10/2017
TEST #: D172146

PROBE (G's) vs TIME (ms)



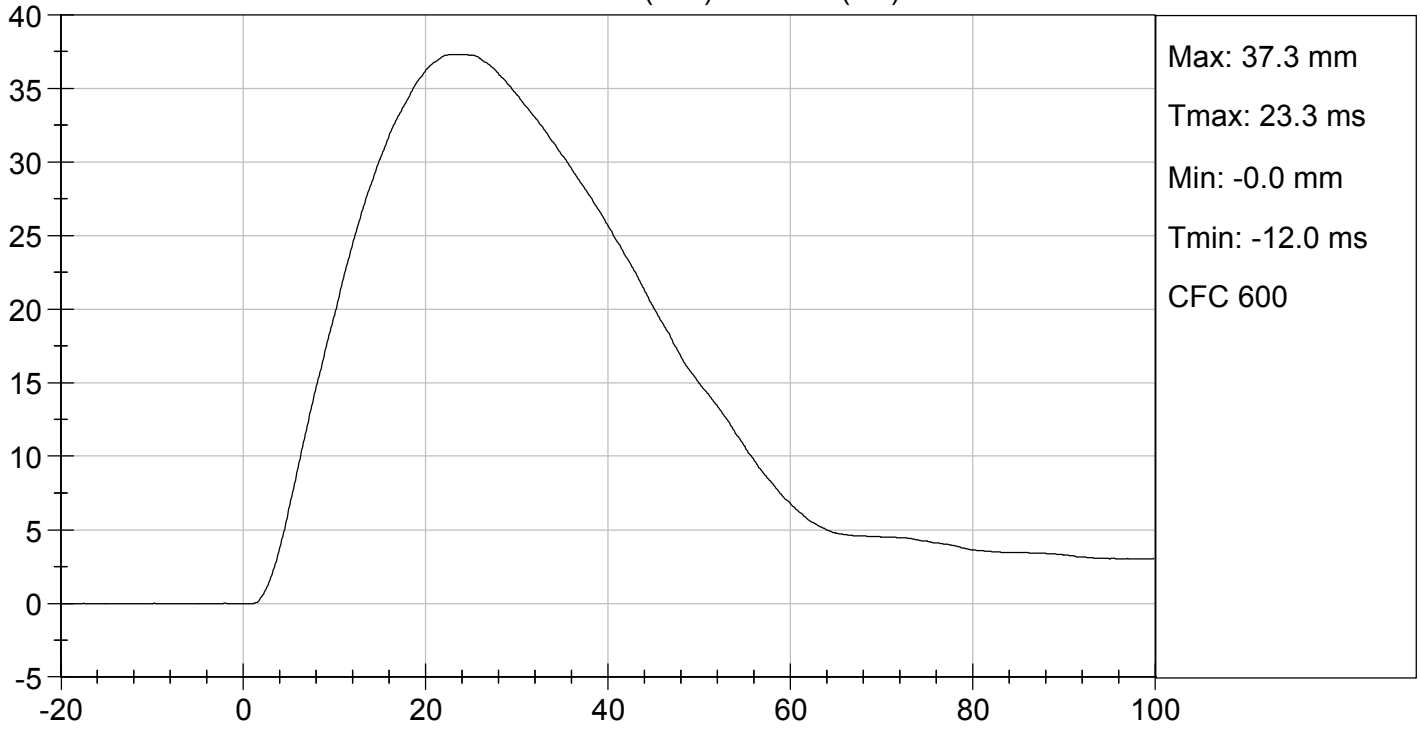
UPPER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



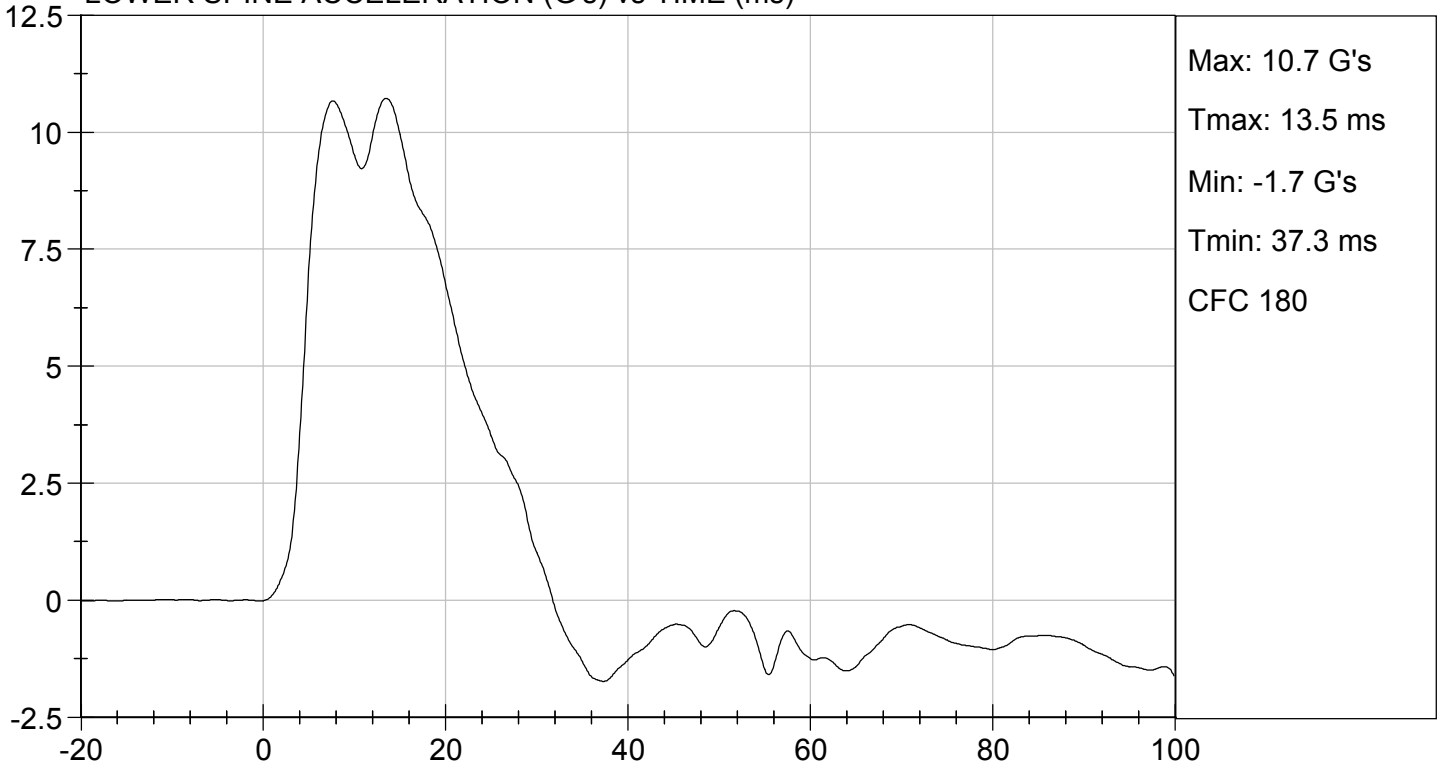
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 08/10/2017
TEST #: D172146

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:** D172147

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	49	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	42	Pass
Peak Acetabulum Force	N	3600 to 4300	3,731	Pass
		Overall Test Results		Pass

Laboratory Technician

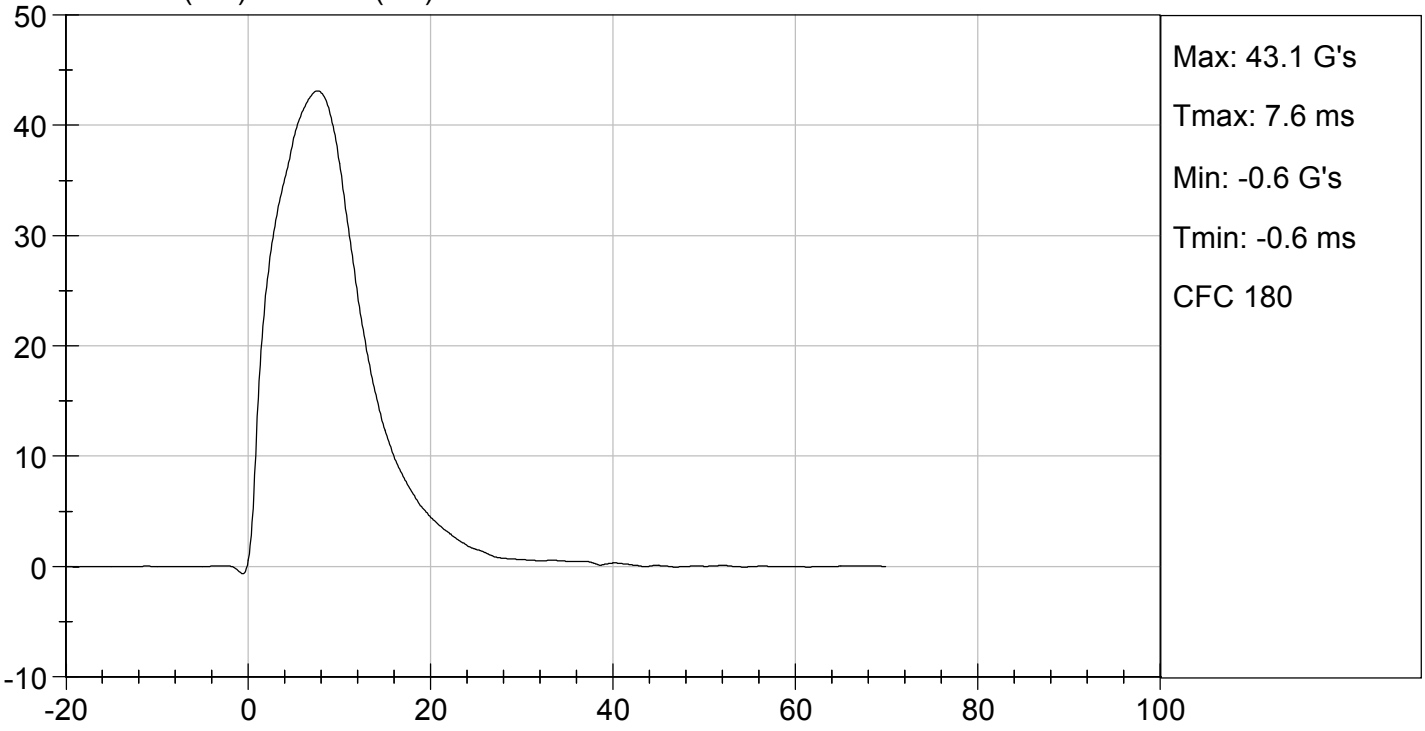
08/11/2017
Test Date

Approved By

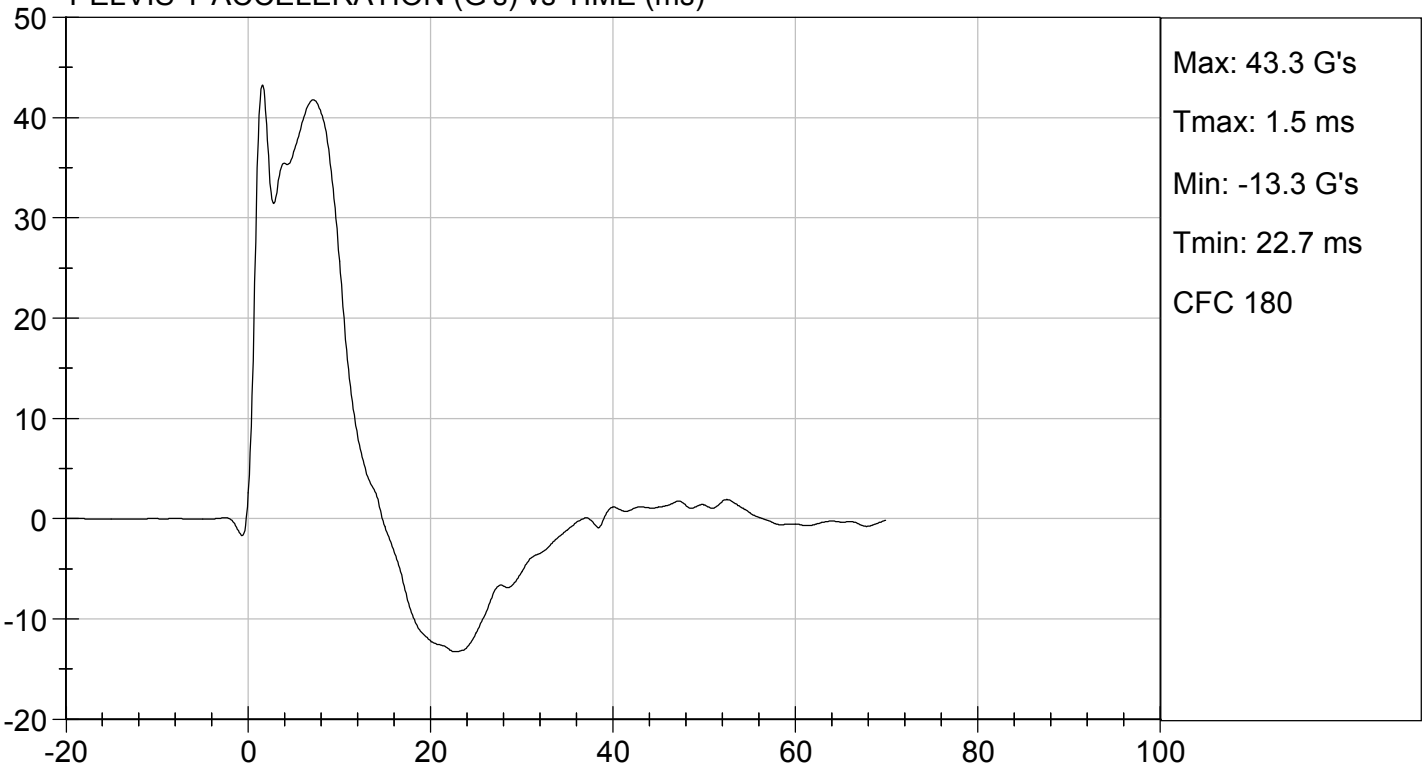
TEST DESC: PELVIS IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 08/11/2017
TEST #: D172147

PROBE (G's) vs TIME (ms)

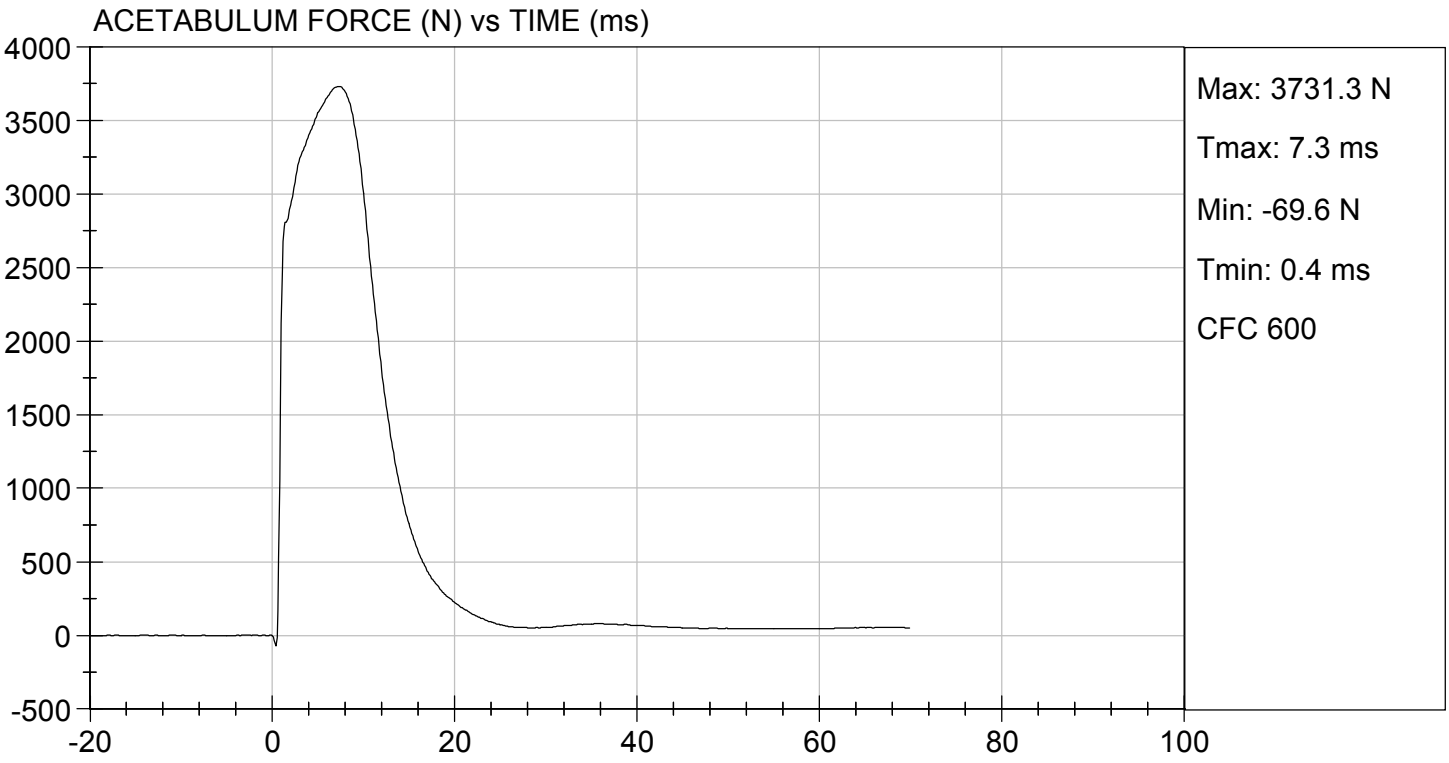


PELVIS Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 08/11/2017
TEST #: D172147



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D172148

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	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	40	Pass
Pelvis Y Acceleration	G's	28 to 39	31	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,436	Pass
		Overall Test Results		Pass

Emily Fliess

Laboratory Technician

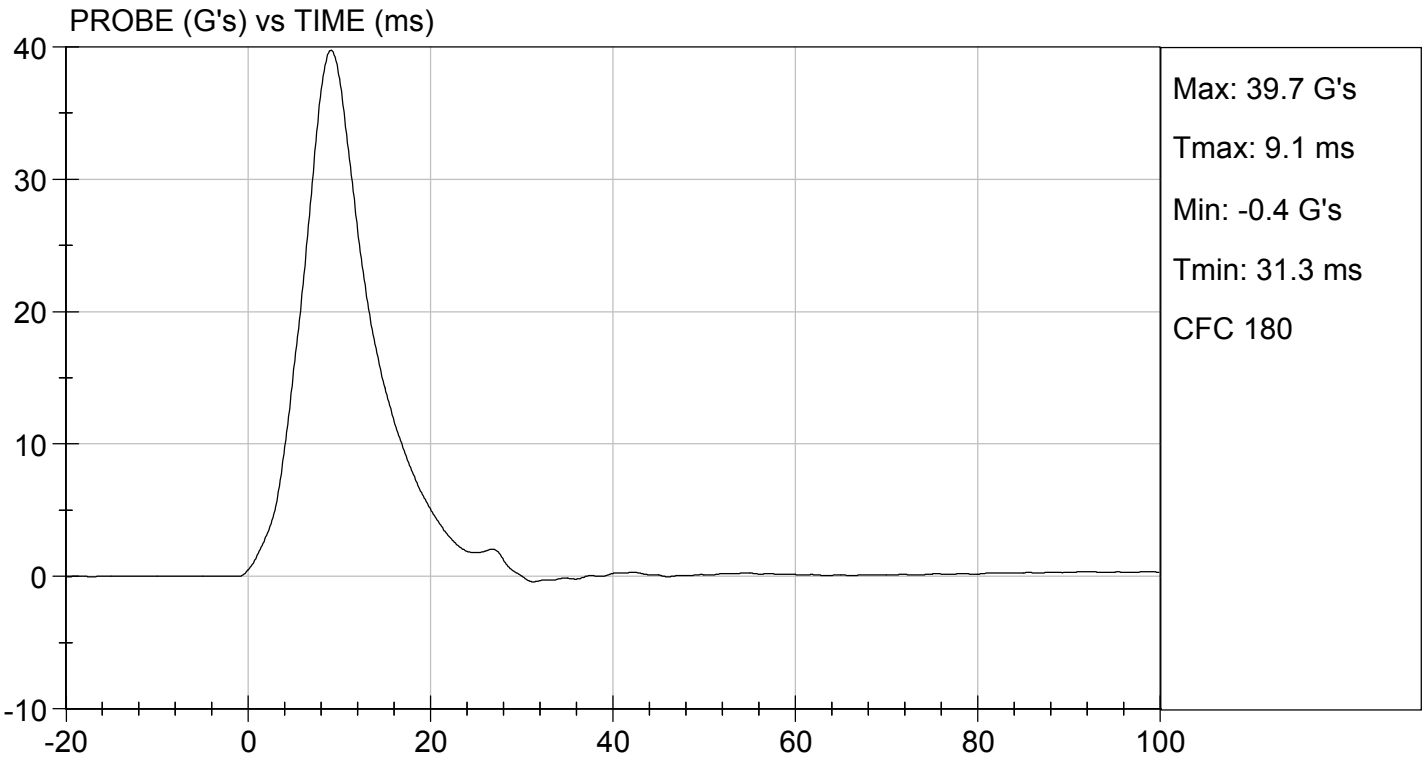
08/11/2017

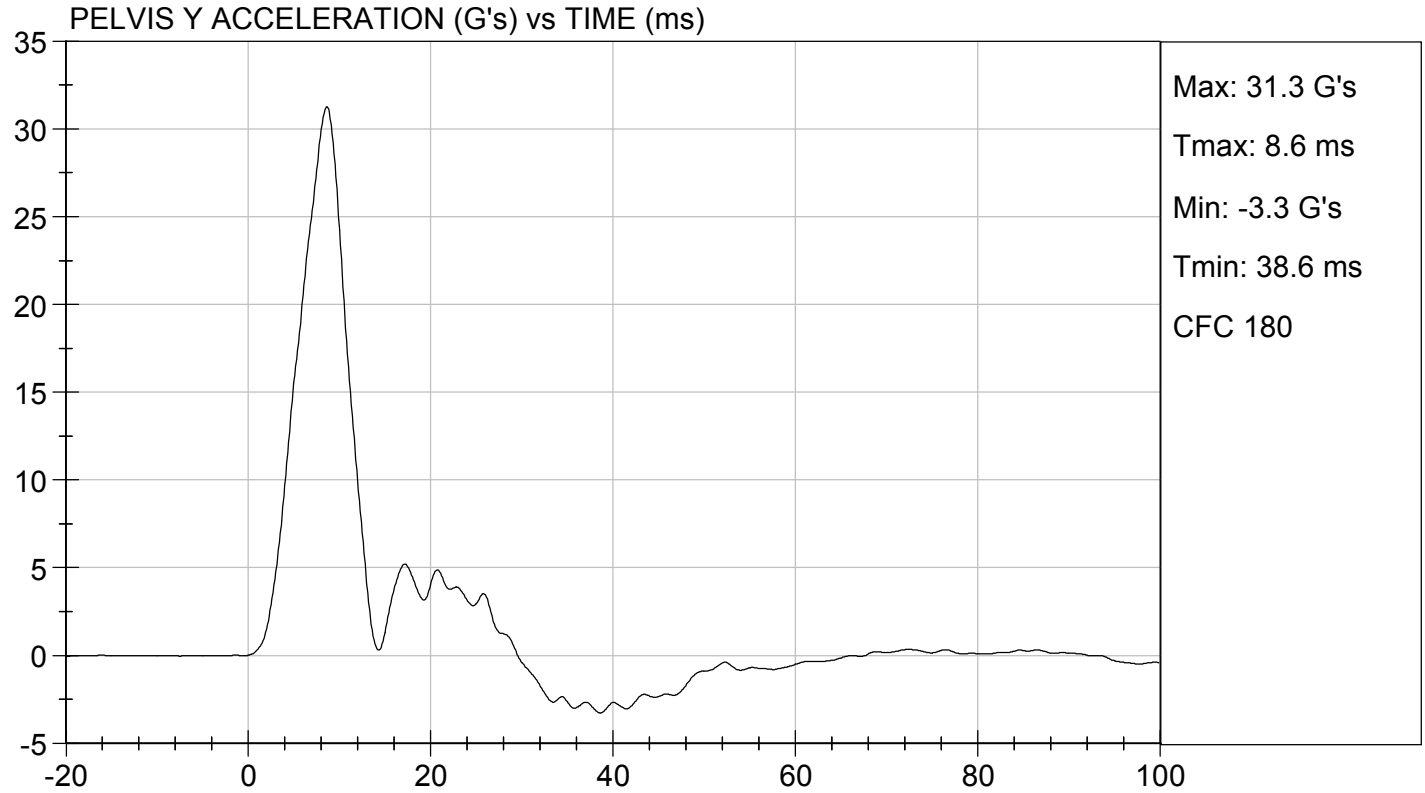
Test Date

Approved By

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

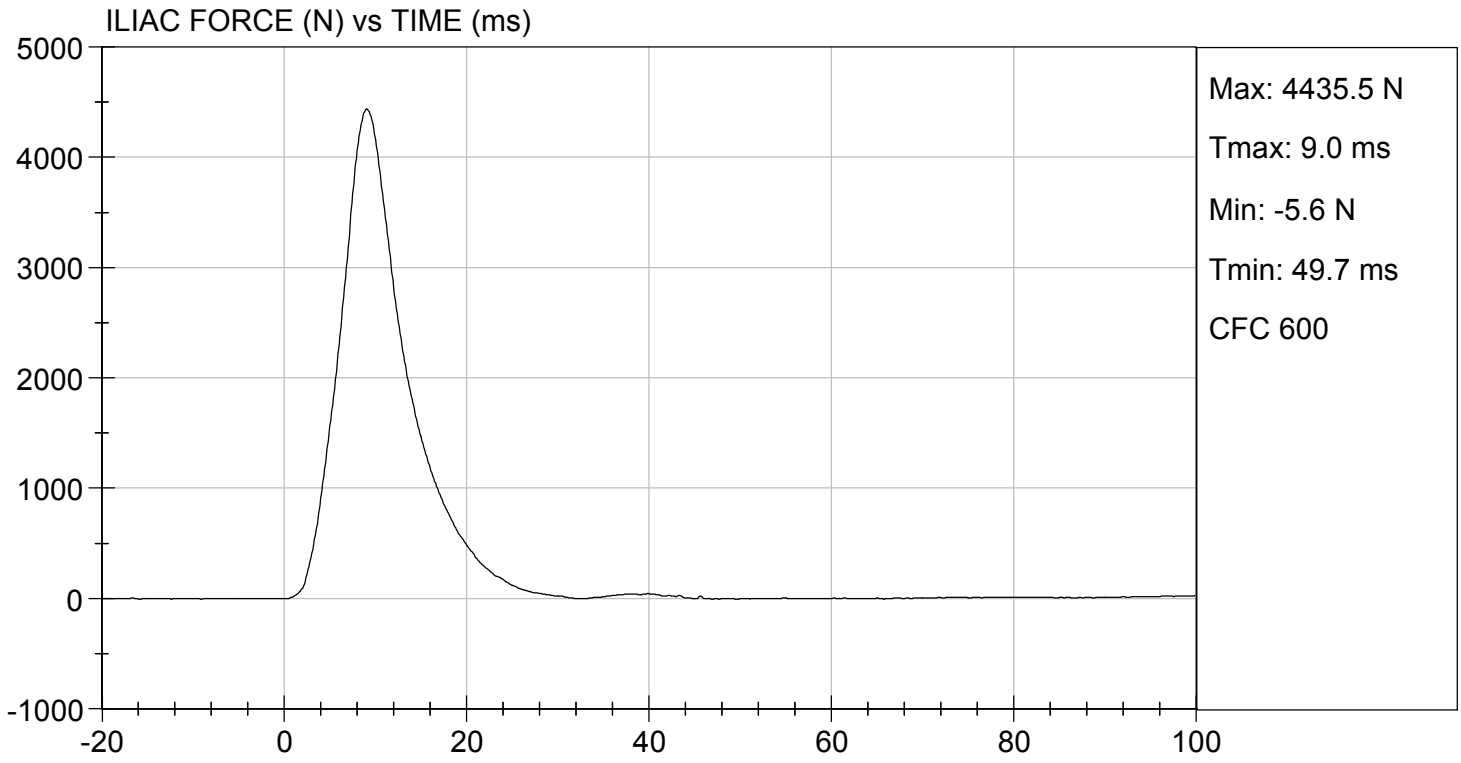
TEST DATE: 08/11/2017
TEST #: D172148





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

TEST DATE: 08/11/2017
TEST #: D172148



SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 11354
Test Number 2747
Report Number 2744
Test Date 5/3/2016 8:01:00 AM

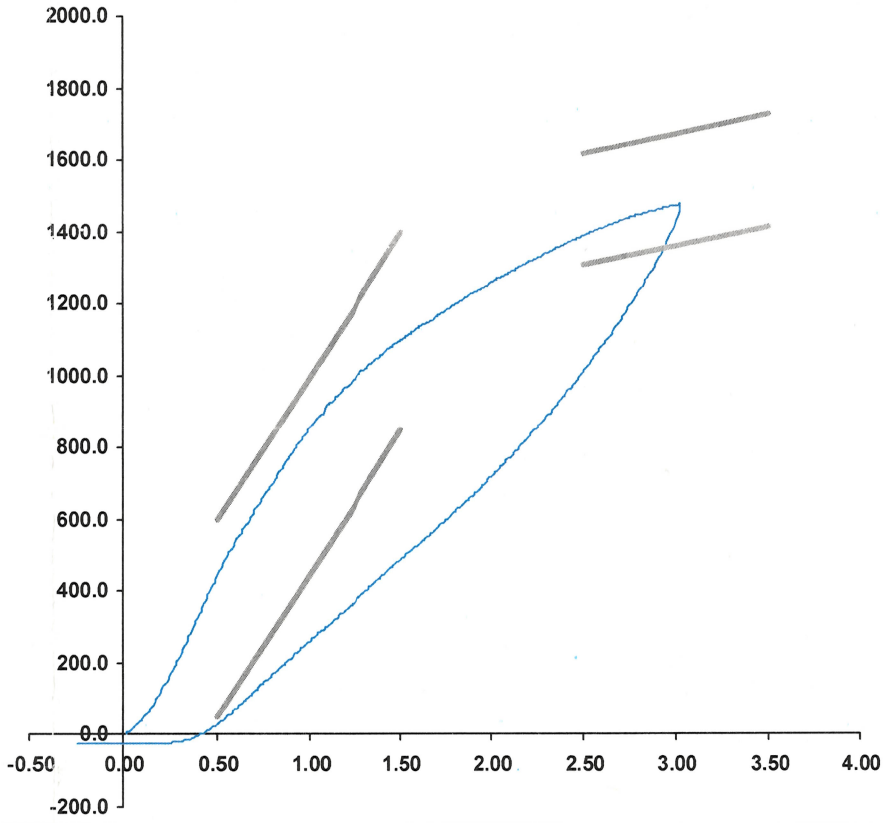
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	444.01	50.00	600.00
Force @ 1.5 mm (N)	1,098.83	850.00	1,400.00
Force @ 2.5 mm (N)	1,389.53	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,474.34	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (TI240813), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator DC

Part Number 180-4450

Template No 107 03-May-16
SACO Research

By : DC Date : 5/3/16

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 11167
Test Number 2451
Report Number 2446
Test Date 4/18/2016 11:55:03 AM

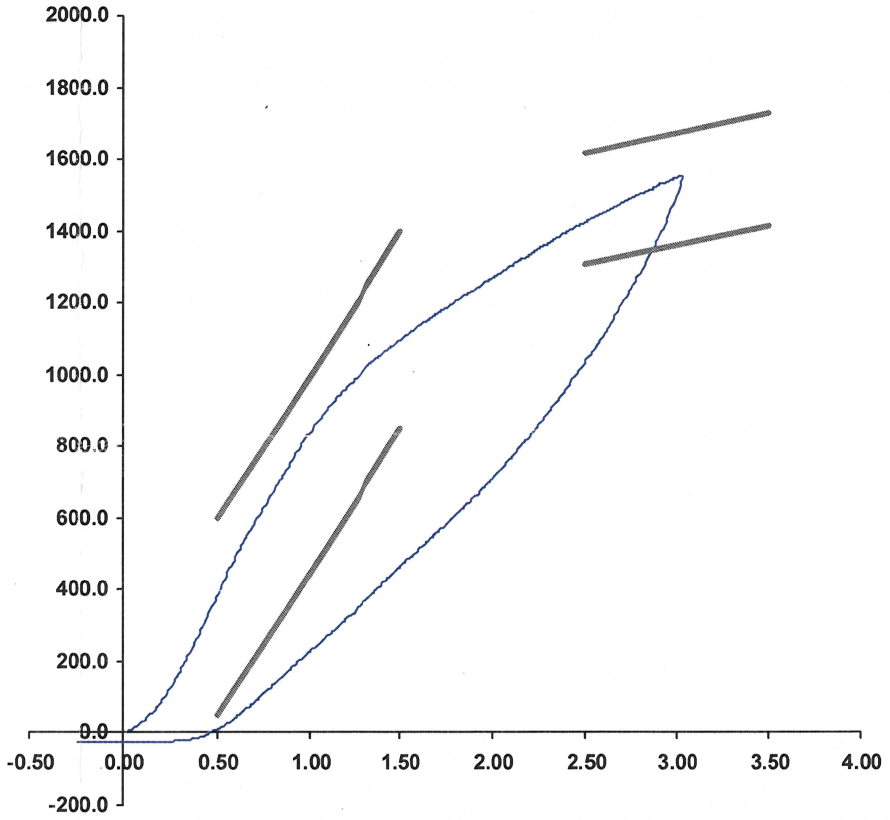
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	388.01	50.00	600.00
Force @ 1.5 mm (N)	1,100.05	850.00	1,400.00
Force @ 2.5 mm (N)	1,423.81	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,551.00	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (TI240813), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator DC

Part Number 180-4450

Template No 107 **18-Apr-16**
SACO Research

By : DC Date : 4/18/16

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation

				SID-IIs S/N 296		
				Serial Number	Manufacturer	Calibration Date
Head CG Accelerometers			X	P82075	Endevco	03/06/17
			Y	P82076	Endevco	03/06/17
			Z	P82077	Endevco	03/06/17
			Xr	P84464	Endevco	03/06/17
			Yr	P84466	Endevco	03/06/17
			Zr	P84467	Endevco	03/02/17
Head Angular Rate Sensors			X	ARS7416	DTS	07/15/14
			Y	ARS7442	DTS	07/15/14
			Z	ARS7475	DTS	07/08/14
Displacement Potentiometers	Thoracic Rib	Upper	Y	G033	FTSS	03/07/17
		Middle	Y	G1261	FTSS	03/07/17
		Lower	Y	G1270	FTSS	03/07/17
	Abdominal Rib	Upper	Y	G032	FTSS	03/07/17
		Lower	Y	G1304	FTSS	03/07/17
Lower Spine Accelerometers (T12)			X	P82090	Endevco	03/08/17
			Y	P82091	Endevco	03/08/17
			Z	P82092	Endevco	03/08/17
Acetabulum Load Cell			Y	ACG268	FTSS	12/20/16
Iliac Wing Load Cell			Y	IWG273	FTSS	12/20/16
Pelvis Plug (struck side)				11354	SACO	05/03/16
Pelvis Plug (non-struck side)				11167	SACO	04/18/16

Table 2 – Vehicle Instrumentation

		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	PCB792	PCB	06/12/17
Vehicle Center of Gravity	Y	PCB396	PCB	06/12/17
Vehicle Center of Gravity	Z	PCB976	PCB	06/12/17
Left Floor Sill	Y	PCB290	PCB	04/12/17
A-Pillar Sill	Y	PCB738	PCB	03/16/17
A-Pillar Low	Y	PCB840	PCB	05/03/17
A-Pillar Mid	Y	PCB651	PCB	03/24/17
B-Pillar Sill	Y	PCB977	PCB	05/18/17
B-Pillar Low	Y	PCB885	PCB	06/05/17
B-Pillar Mid	Y	PCB886	PCB	06/15/17
Driver Seat	Y	PCB583	PCB	05/18/17
Engine Top	X	PCB741	PCB	03/09/17
Engine Top	Y	PCB662	PCB	03/09/17
Firewall	Y	PCB359	PCB	07/10/17
Right Roof	Y	PCB622	PCB	03/27/17
Right Floor Sill	Y	PCB533	PCB	06/07/17
Rear Floorpan	X	PCB893	PCB	05/02/17
Rear Floorpan	Y	PCB777	PCB	03/09/17

Table 3 – Pole Instrumentation

	Serial Number	Manufacturer	Calibration Date
Load Cell 1	DG6277	FTSS	07/19/17
Load Cell 2	DG6278	FTSS	07/19/17
Load Cell 3	DG6279	FTSS	07/19/17
Load Cell 4	DG6280	FTSS	07/19/17
Load Cell 5	DG6281	FTSS	07/19/17
Load Cell 6	DG6283	FTSS	07/19/17
Load Cell 7	DG6284	FTSS	07/19/17
Load Cell 8	DG6582	FTSS	07/19/17