REPORT NUMBER: SPNCAP-MCW-13-003

NEW CAR ASSESSMENT PROGRAM (SPNCAP)
SIDE IMPACT POLE TEST

CHRYSLER GROUP, LLC
2013 RAM 1500 4-DOOR CREW CAB PICKUP
NHTSA NUMBER: MD 0313

PREPARED BY:
MEDICAL COLLEGE OF WISCONSIN
5000 WEST NATIONAL AVENUE
RESEARCH 151
MILWAUKEE, WISCONSIN 53295

TEST DATE: 29 NOVEMBER 2012

REPORT DATE: 11 DECEMBER 2012

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NVS-111
1200 NEW JERSEY AVE, SE, ROOM W43-410
WASHINGTON, D.C. 20590

Prepared by: Mark McGee

Date: 3/5/13

Reviewed by: Jim O'Kane

Date: 5 MAR 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-MCW-13-003	*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 2013 Ram 1500 4-Door Crew Cab Pickup NHTSA No. MD 0313		*5. Report Date* December 11, 2012 *6. Performing Organization Code* MCW
7. Author(s) Frank Pintar, Project Manager Mark Meyer, Project Engineer		*8. Performing Organization Report No.* MCW-13-003
9. Performing Organization Name and Address Medical College of Wisconsin 5000 W. National Ave. Milwaukee, WI 53295		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-09-D-00123
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards, NVS-111 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590		*13. Type of Report and Period Covered:* November 29 to December 11 *14. Sponsoring Agency Code* NVS-111

15. Supplementary Notes

16. Abstract

A 32.20 km/h (20 mph), 75° oblique Side NCAP Test was conducted on the subject 2013 Ram 1500 4-Door Crew Cab Pickup 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 the Medical College of Wisconsin (MCW) in Milwaukee, Wisconsin on 29 November 2012.

The impact velocity was 31.99 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 19 °C. The test vehicle's post-test maximum static crush was 599 mm at level 2. The test vehicle's occupant performance is as follows:

		Driver ATD (SID-IIs)	
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})	N/a	1000	442
Resultant Lower Spine Acceleration	G's	82	46
Total Pelvic Force (Acetabular & Pelvic)	NWT	5525	4071
Maximum Thoracic Rib Deflection	mm	38	33
Maximum Abdomen Rib Deflection	mm	45	34

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, NPO-411 1200 New Jersey Ave, SE Washington, D.C. 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833	
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Form DOT F1700.7 (8-72)

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SECTION 1
TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2013 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00123. The purpose of this test is to generate comparative side impact performance in a 2013 Ram 1500 4-Door Crew Cab Pickup. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated September 2012.

SECTION 2
SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2013 Ram 1500 4-Door Crew Cab Pickup. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 31.99 km/h. The test was conducted at the Medical College of Wisconsin, in Milwaukee, Wisconsin, on 29 November 2012. 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 (1) 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 2012. 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 and Lower Rib Displacement Potentiometers
- Lower Spine (T_{12}) Triaxial Accelerometers
- Illiac 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:

OCCUPANT SUMMARY			
Head Injury Criteria (HIC_{36})	**Driver ATD (SID-IIs)**		
	Units	**IARV**	**Result**
Head Injury Criteria (HIC_{36})	N/a	1000	442
Resultant Lower Spine Acceleration	G's	82	46
Total Pelvic Force (Sum of Acetabular and Iliac Forces)	NWT	5525	4071
Maximum Thoracic Rib Deflection	mm	38*	33
Maximum Abdominal Rib Deflection	mm	45*	34

Head Injury Criterion (HIC) is the standardized calculation using resultant head acceleration to assess head injury. Generally, a higher HIC represents an increase in the likelihood of a serious head injury. HIC_{36} specifies a time 'window' of 36 milliseconds over which the integral is calculated. T1 and T2 represent the time of the lower and upper bounds of the window in which the HIC is calculated.

The resultant lower spine acceleration is the single equivalent of the X, Y, and Z accelerations.

The sum of the pelvic forces is used to assess the likelihood of injury to the pelvis during a side impact crash. Higher pelvic forces correspond to an increase in the likelihood of sustaining a severe pelvis injury.

*Proposed IARV

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION		
Restraint Type	**Left Front (Driver) Occupant Location 01**	
	Mounted	Deployed
Frontal Airbag	Yes	Did Not Deploy
Knee Airbag	No	N/a
Side Curtain Airbag	Yes	Deployed
Side Torso/Pelvis Airbag	Yes	Deployed
Seat Belt Pretensioner	Yes	Deployed
Seat Belt Load Limiter	Yes	N/a
Other	No	N/a

These test data and report can be found in detail on the NHTSA website at www.nhtsa.dot.gov.

A brief summary of the crash test can be located at www.safercar.gov

TEST NOTES

All placards say "Dodge" Ram 1500, and should say Ram 1500

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

VEHICLE INFORMATION	
NHTSA No.	MD 0313
Model Year	2013
Make	Ram
Model	1500 Crew
Body Style	Crew Cab Pickup
VIN	1C6RR6KTXDS513572
Body Color	Mineral Grey
Odometer Reading (km/mi)	13 mi.
Engine Displacement (L)	4.7
Type/No. of Cylinders	8
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	RWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

VEHICLE OPTIONS	
Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	No
Other Optional Features	Yes
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	No
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	Yes
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	Yes

Does owner's manual provide instructions to turn off automatic door locks? No

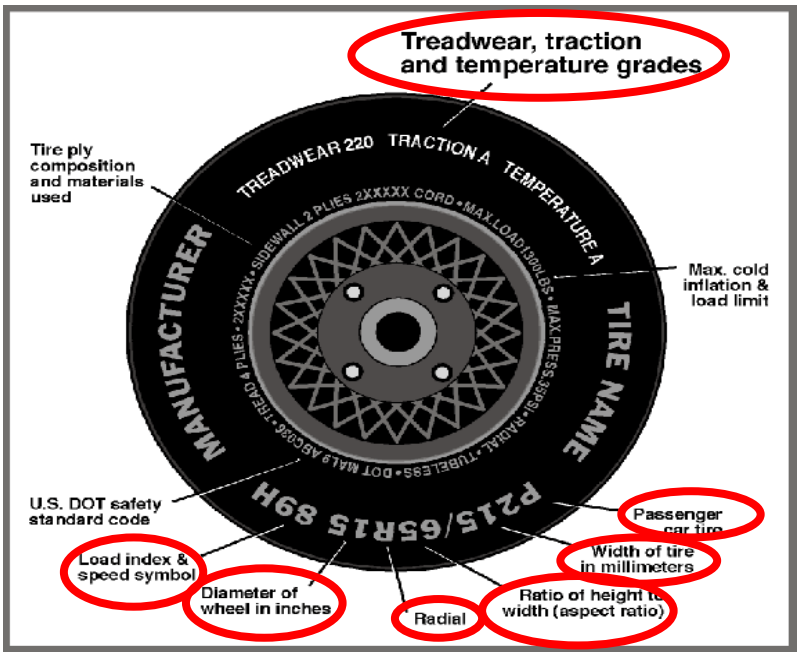
DATA FROM CERTIFICATION LABEL			
Manufactured By	Chrysler Group, LLC	GVWR (kg)	3085
Date of Manufacture	September 2012	GAWR Front(kg)	1679
Vehicle Type	Pickup	GAWR Rear (kg)	1770

VEHICLE SEATING AND WEIGHT CAPACITY DATA					
	Front	**Rear**	**Third**	**Total**	
Designated Seating Capacity (DSC)	3	3	0	6	
Capacity Weight (VCW) kg				679.2	(A)
DSC X 68.04 kg				408.2	(B)
Rated Cargo Weight (RCLW)				271.0	(A-B)

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

VEHICLE SEAT TYPE							
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X					X	
Rear or Second Row Seat			X	X	X	N/a	
Third Row Seat							

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



VEHICLE TIRE INFORMATION		
Measured Parameter	**Front**	**Rear**
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	269	269
Recommended Tire Size	P275/60R20	P275/60R20
Tire Size on Vehicle	P275/60R20	P275/60R20
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Wrangler SR-A	Wrangler SR-A
Treadwear	500	500
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2	2
Tire Plies Body	4	4
Load Index/Speed Symbol	114S	114S
Tire Material	Polyester & Steel	Polyester & Steel
DOT Safety Code Left	4BT6 EXWR 3412	4BT6 EXWR 3412
DOT Safety Code Right	4BT6 EXWR 3412	4BT6 EXWR 3412

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

TIRE PRESSURES					
	Units	**LF**	**RF**	**LR**	**RR**
As Delivered	kpa	288.2	286.7	285.0	286.4
Tire Placard	kpa	268.9	268.9	268.9	268.9
Owner's Manual	kpa	268.9	268.9	268.9	268.9
As Tested	kpa	268.9	268.9	268.9	268.9

TEST VEHICLE AXLE WEIGHTS										
	Units	**As Delivered (UVW)**			**As Tested (ATW)**			**Fully Loaded**		
		Front	**Rear**	**Total**	**Front**	**Rear**	**Total**	**Front**	**Rear**	**Total**
Left	kg	674.9	544.8		685.8	624.1		699.5	624.2	
Right	kg	675.9	500.3		673.1	586.0		679.5	572.9	
Ratio	%	56.4	43.6		52.9	47.1		53.5	46.5	
Totals	kg	1350.8	1045.1	2395.9	1358.9	1210.1	2569.0	1379.0	1197.1	2576.1

TARGET TEST WEIGHT CALCULATION			
	Units		
Total Delivered Weight (UVW)	kg	2395.9	(A)
Sum of Actual Weight of 1 P572 ATDs (SID-IIs) Used	kg	44.1	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	1361.1	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	2576.1	(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

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW	
Ballast	**Weight (kg)**
Front & rear passenger door panel, front & rear passenger window, front & rear passenger window trim, front & rear passenger door-mounted speakers	18.1

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

TEST VEHICLE ATTITUDES AND CG					
	Units	**As Delivered**	**As Tested**	**Fully Loaded**	**Meets Requirement**
Driver Door Sill Angle (Front to Rear)*	Deg.	-0.9	-0.5	-0.2	Yes
Front Pass. Door Sill Angle (Front to Rear)*	Deg.	-1.0	-0.8	-0.7	Yes
Front Bumper Angle (Left to Right)	Deg.	0.3	0.2	0.2	Yes
Rear Bumper Angle (Left to Right)	Deg.	0.3	0.2	0.2	Yes
Vehicle CG (Aft of Front Axle)	mm	1557.2	1681.6	1659.0	
Vehicle CG Left (+) / Right (-) from Long. Centerline)	mm	18.3	19.9	27.9	

DATA SHEET NO. 2
SEAT, SEAT BELT, STEERIING WHEEL ADJUSTMENT, AND FUEL SYSTEMS DATA

SCRL ANGLE RANGE			
	SCRL (°)		
	Max	**Min**	**Mid**
Driver Seat**	0.0°	0.0°	0.0°
Front Passenger Seat**	0.0°	0.0°	0.0°
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat			

**Seat pan non-adjustable

SCRL ANGLE RANGE						
Seat	**As Tested SCRL Angle (Mid) (°)**	**As Tested SCRP Height (mm)**	**SCRP Height Position**	**SCRP Height (mm)**		
				Rearmost	**Mid-Fore/Aft**	**Forward-Most**
Driver's Seat	N/a	N/a	Max	N/a	N/a	N/a
	0.0	-343.3	Mid	-324.6	-334.2	-343.3
	N/a	N/a	Min	N/a	N/a	N/a
Front Passenger Seat	N/a	Fixed	Max	N/a	N/a	N/a
	0.0	-370.8	Mid	-351.9	-362.5	-370.8
	N/a	Fixed	Min	N/a	N/a	N/a
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*			Max			
			Mid			
			Min			

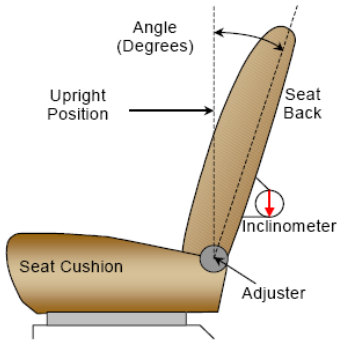
*If applicable

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

SEAT FORE/AFT TRAVEL				
Seat	**Total Fore/Aft Travel**		**Test Position from Forward-most Position**	
	mm	**Detents***	**mm**	**Detents***
Driver Seat	230	24	0	0 (w/ Full Forward = 0)
Front Passenger Seat	230	24	0	0 (w/ Full Forward = 0)
Front Center Seat*				
Struck Side Rear Seat	Fixed	N/a	N/a	N/a
Non-Struck Side Rear Seat	Fixed	N/a	N/a	N/a
Rear Center Seat*				

*If applicable

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



FRONT SEAT ASSEMBLY

SEAT BACK ANGLE ADJUSTMENT				
Seat	**Total Seat Back Angle Range**		**Test Position from Most Upright**	
	Degrees	**Detents***	**Degrees**	**Detents***
Driver Seat w/ Seated Dummy	56.2°	29	6.6°	3
Front Passenger Seat	56.3°	29	6.6°	3
Front Center Seat*				
Struck Side Rear Seat	Fixed	N/a	Fixed	N/a
Non-Struck Side Rear Seat	Fixed	N/a	Fixed	N/a
Rear Center Seat*				

*If applicable

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

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

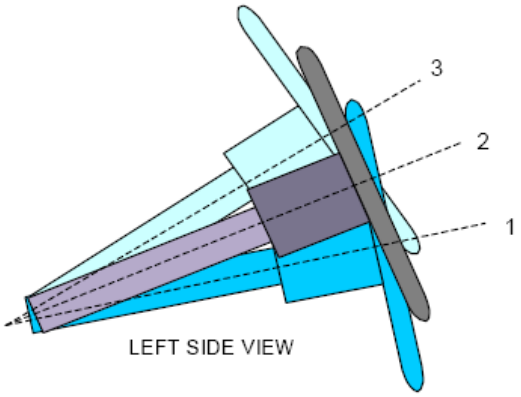
SEAT BELT ANCHORAGE ADJUSTMENT (D-RING)		
	Total No. of Positions	**Placement**
Driver Seat	5	H

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

HEAD RESTRAINT ADJUSTMENT		
	Total No. of Positions	**Placement**
Driver Seat	3	Lowest Position

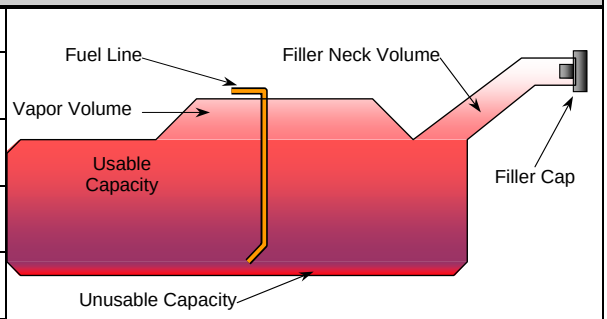
Steering Column Adjustment
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

STEERING COLUMN ADJUSTMENT			
	Degrees	**Fore/Aft Position (mm)**	
Lowermost, Pos. No. 1	14.6°	Non-Adjustable	
Geometric Center, Pos. No. 2	23.1°	Non-Adjustable	
Uppermost, Pos. No. 3	31.6°	Non-Adjustable	
Telescoping Steering Wheel Travel	N/a	N/a	
Test Position	24.0°	As Positioned	



STEERING COLUMN ASSEMBLY

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

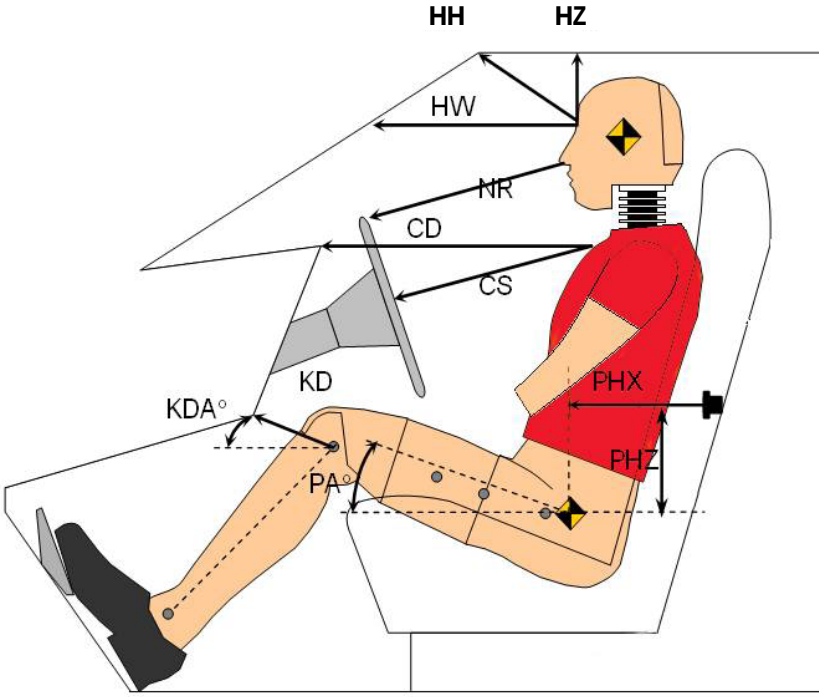
FUEL TANK CAPACITY DATA			
Description	**Units**	**Value**	
Usable Capacity of Standard Equipment Fuel Tank	L	98.4	
Usable Capacity of Optional Equipment Fuel Tank	L	121.1	
Usable Capacity of Standard Tank as Specified in Owner's Manual	L	98.4	
Usable Capacity of Optional Tank as Specified in Owner's Manual	L	121.1	
Amount of Stoddard Added for Test	L	112.7	
% Usable Capacity (92%-94%)	%	93.0	
1/3 of Usable Capacity	40.4		

VEHICLE FUEL TANK ASSEMBLY

Fuel Pump
The vehicle is equipped with an electronic fuel pump. Key is "ON" position. The fuel pump is on the left side.

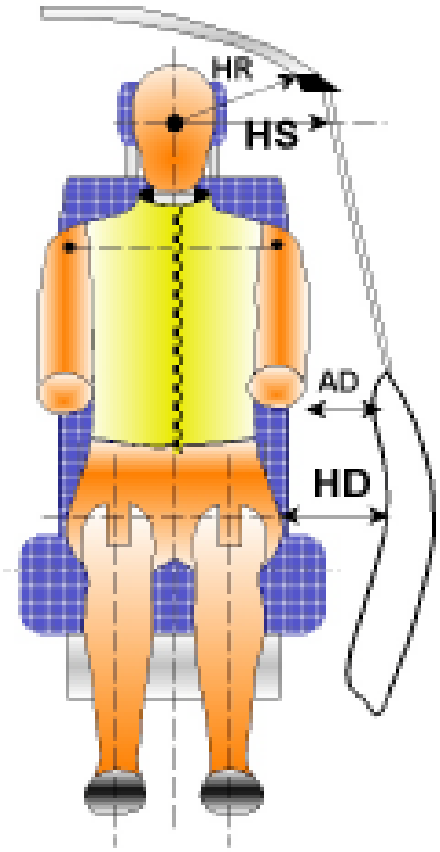
Is the Actual Amount of Solvent Used in the test equal to 93% +/- 1% of the Usable Capacity stated in on Form No. 1? Yes

DATA SHEET NUMBER NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS



Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	332	
HW	Head to Windshield	646	
HZ	Head to Roof	242	
NR	Nose to Rim	277	
CD	Chest to Dashboard	446	
CS	Chest to Steering Wheel	212	
KDL	Left Knee to Dash	100	
KDAL	Left Knee to Dash		26.5°
KDR	Right Knee to Dash	99	
KDAR	Right Knee to Dash		25.4°
PAX	Pelvic Tilt Angle (X-Axis)		0.0°
PAY	Pelvic Tilt Angle (Y-Axis)		18.1°
PHX	H-Point to Striker (X-Axis)	326.7	
PHZ	H-Point to Striker (Z-Axis)	-29.3	

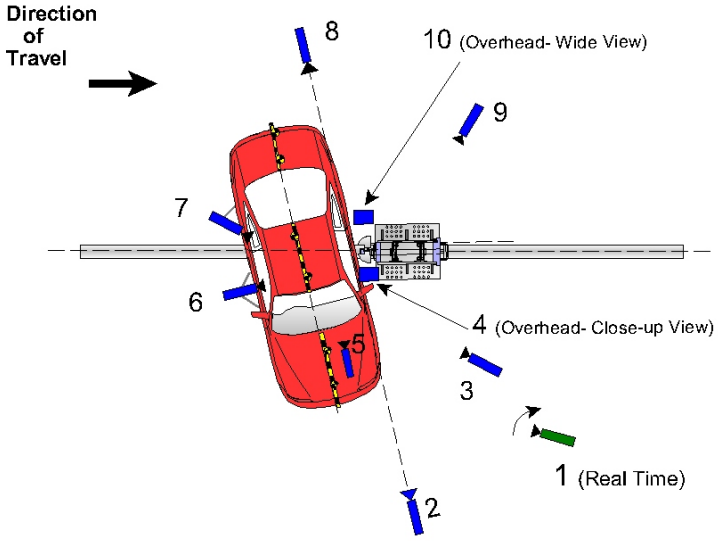
DATA SHEET NUMBER NO. 4
DUMMY LATERALL CLEARANCE DIMENSIONS



DUMMY LATERAL CLEARANCE DIMENSIONS		
Code	**Measurement Description**	**Length (mm)**
HR	Head to Side Header	255
HS	Head to Side Window	338
AD	Arm to Door	226
HD	Hip Point to Door	165

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Camera Locations



	View	Coordinates †			Lens Length	Operating Frame Rate
		X	Y	Z		
		mm	mm	mm	mm	fps
1	Rear Time (24 – 30 fps) Pan View of Impact				N/a	30
2	Front ground Level – Impact View	8463	-2761	-1294	35	1000
3	Impact Side 45° - Forward View of Pole	5877	-3648	-1421	25	1000
4	Overhead Close – Up View of Impact	157	344	-5866	25	1000
5	Onboard – Dummy Front View				12.5	1000
6	Onboard – Dummy Side View				12.5	1000
7	Onboard – Dummy Rear Oblique View				12.5	1000
8	Rear Ground Level – Impact View	-7794	-2304	-1260	25	1000
9	Impact Side 45° - Rearward Pole View	-8843	-3581	-1487	35	1000
10	Overhead Wide – View Impact	165	37	-5472	10	1000
11	Real – Time (24 – 30 fps)Dummy Front View				N/a	30

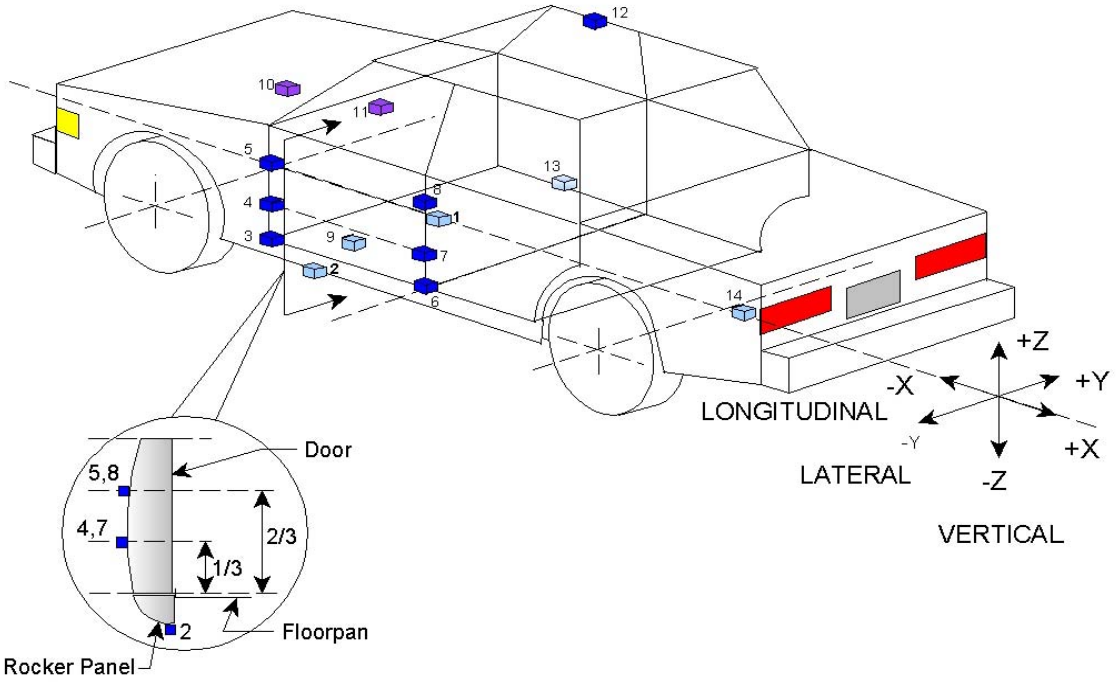
Origin		Orientation	
X	Impact Point	X	+(X) Forward
Y	Impact Point	Y	+(Y) Right
Z	Ground	Z	+(Z) Down

**All measurements accurate to +/- 6 mm*
Note: Vehicle was at a 15° angle to the rigid pole

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA (CONTINUED)

INSTRUMENTATION	
	Number of channels
Driver Dummy	16
Vehicle Structure	18
Pole Load Cells	8
Total No. of Data Channels	42

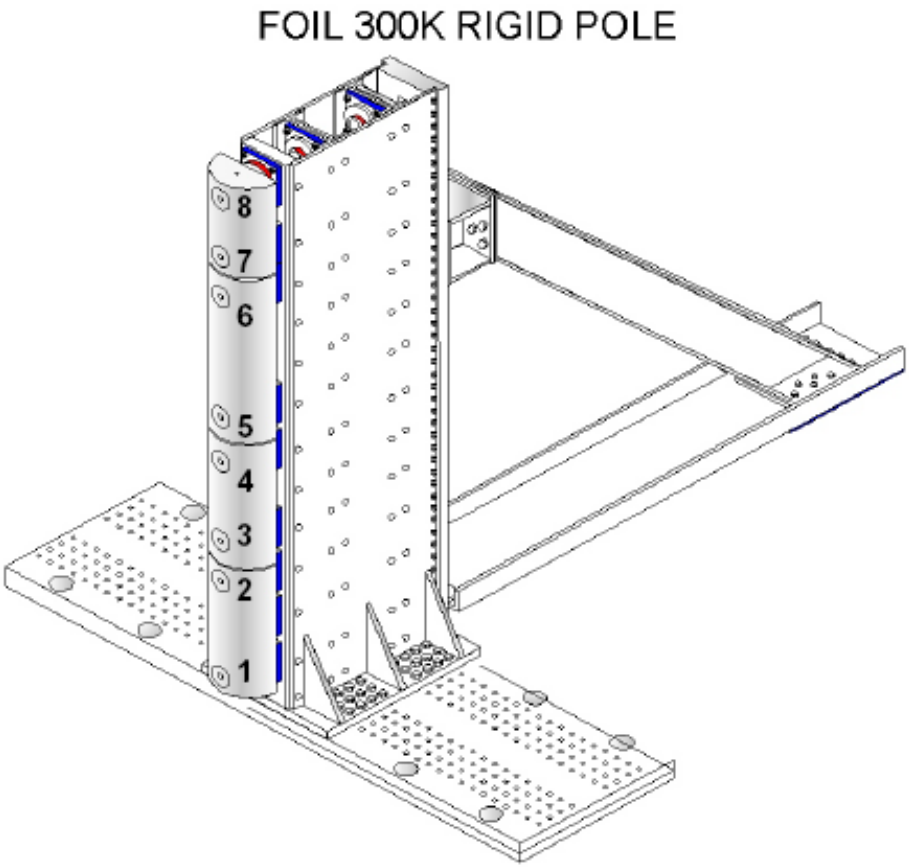
DATA SHEET NO. 6
VEHICLE ACCELEROMETER LOCATIONS



ACCELEROMETER/SENSOR LOCATION				
Loc. no.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3838.0	180.1	-165.6
2	Left Floor Sill	3954.7	-766.4	190.9
3	A-Pillar Sill	4229.9	-762.0	150.8
4	A-Pillar Low	4221.9	-886.1	-213.6
5	A-Pillar Mid	4205.2	-878.2	-372.6
6	B-Pillar Sill	3093.5	-896.1	49.4
7	B-Pillar Low	3082.1	-891.9	-203.9
8	B-Pillar Mid	3095.7	-888.1	-495.8
9	Driver Seat Track	3408.2	-631.3	-120.2
10	Engine Top	4985.4	138.6	-559.1
11	Firewall	4433.3	492.3	-568.6
12	Right Roof	2984.4	673.3	-1320.2
13	Right Floor Sill	3082.2	803.3	141.9
14	Rear Floorpan	1162.4	5.76	-258.9

Origin		Orientation	
X	Test Vehicle Rear Bumper	X	+ Forward
Y	Test Vehicle Centerline	Y	+ Right
Z	Ground Plane	Z	+ Down

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA



LOAD CELL LOCATIONS	
ID	**Height From Ground (mm)**
1	77
2	477
3	632
4	969
5	1167
6	1638
7	1808
8	2030

*Measured From Top of Platform

DATA SHEET NUMBER NO. 8
POST TEST OBSERVATIONS

TEST DUMMY INFORMATION AND CONTACT POINTS	
Dummy Body Part	**Driver SID-IIs Dummy**
Face	To Side Curtain Airbag
Top of Head	To Side Curtain Airbag
Left Side of Head	To Side Curtain Airbag
Back of Head	To Side Curtain Airbag and Rebounded into Head Rest
Left Shoulder	To Torso/Pelvis Bag
Upper Torso	To Torso/Pelvis Bag and Seat Back Wing
Lower Torso	To Torso/Pelvis Bag and Seat Back Wing
Left Hip	To Torso/Pelvis Bag and Seat Back Wing
Left Knee	To Interior Door Panel and Rebounded into Knee Bolster

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

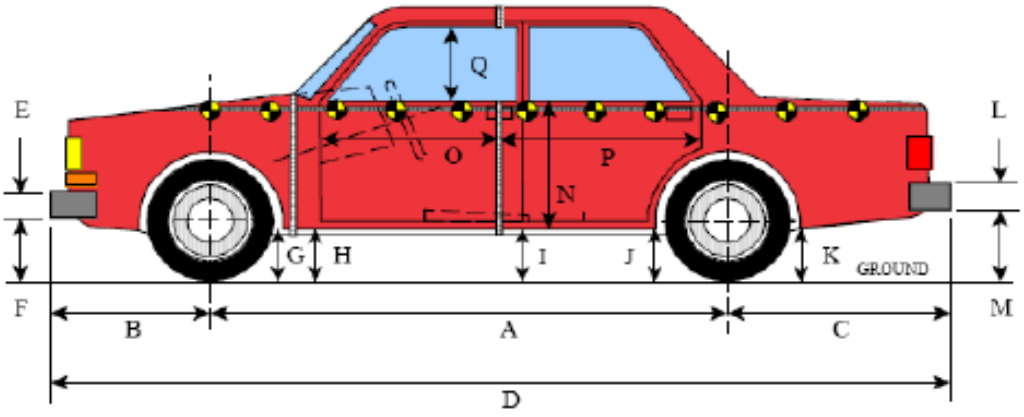
DATA SHEET NUMBER NO. 8
POST TEST OBSERVATIONS (CONTINUED)

POST TEST STRUCTURAL OBSERVATIONS	
Critical Areas of Performance	**Observations/Conclusions**
Pillar Performance	No Separation
Sill Separation	Max Sill Separation of ~136 mm at B-Pillar at Roof Line
Windshield Damage	Cracking Along Entire Windshield; Heaviest Concentration along Impacted Side and Top
Window Damage	Front Window Shattered at Impact
Other Notable Effects	None Noted

SUPPLEMENTAL RESTRAINT INFORMATION				
Restraint Type	**Struck Side Driver**		**Struck Side Rear Passenger**	
	Mounted	**Deployed**	**Mounted**	**Deployed**
Frontal Airbag	Yes – Steering Wheel	Did Not Deploy		
Knee Airbag	No	N/a		
Side Curtain Airbag	Yes – Side Header	Deployed Properly	Yes – Side Header	Deployed Properly
Side Torso/Pelvis Airbag	Yes – Seat Back	Deployed Properly	No	N/a
Seat Belt Pretensioner	Yes	Deployed Properly	Yes	Did Not Deploy
Seat Belt Load Limiter	Yes	N/a	No	N/a
Other	No	N/a	No	N/a

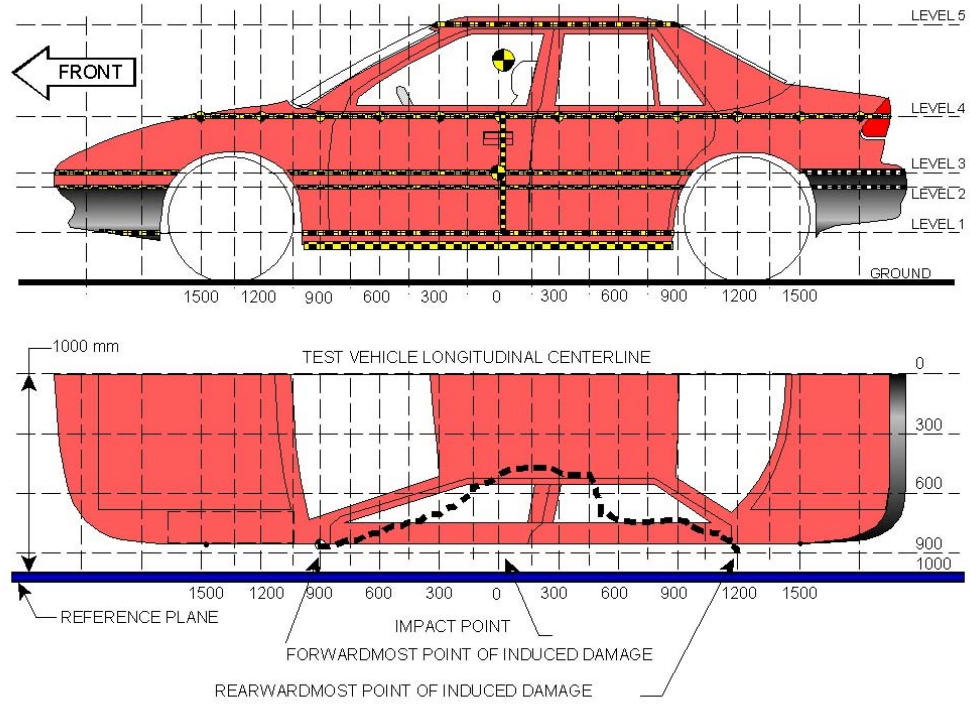
IMPACT SPEED			
Measured Parameter	**Units**	**Tolerance**	**Value**
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1188
Actual Impact Point (Aft of Front Axle)	mm		1191
Horizontal Offset (+ forward / - rear)	mm	+/- 38 of Intended Impact Point	-3
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	degrees	75 +/- 3	75
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	31.99
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	31.96

DATA SHEET NUMBER NO. 9
VEHICLE PROFILE MEASURMENTS



VEHICLE PRE- AND POST- TEST MEASUREMENT INFORMATION				
Code	**Description**	**Pre Test**	**Post Test**	**Difference**
		mm	**mm**	**mm**
A	Wheelbase	3570	3383	-187
B	Front Axle to FSOV	793	886	93
C	Rear Axle to RSOV	1132	1147	15
D	Total Length at Centerline	5824	5778	-46
E	Front Bumper Thickness	296	296	0
F	Front Bumper Bottom to Ground	403	456	53
G	Sill Height at Front Wheel Well	430	438	8
H	Sill Height at Front Door Leading Edge	415	423	8
I	Sill Height at B-Pillar	428	418	-10
J1	Sill Height at Rear Wheel Well	392	396	4
J2	Pinch Weld Height at Rear Wheel Well	433	438	5
K	Sill Height Aft of Rear Wheel Well	527	580	53
L	Rear Bumper Thickness	50	50	0
M	Rear Bumper Bottom to Ground	563	599	36
N	Sill Height to Window Bottom Sill	865	865	0
O	Front Door Leading Edge to Impact C/L	1114	770	-344
P	Rear Door Trailing Edge to Impact C/L	1034	1034	0
Q	Front Window Opening	480	445	-35
R	Right Side Length	5495	5505	10
S	Left Side Length	5495	5416	-79
T	Vehicle Width at B-Pillar	2017	1852	-165

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS



NOTE: All measurements are in millimeters (mm)

MAXIMUM EXTERIOR CRUSH MEASUREMENTS				
Level	**Measurement Description**	**Height Above Ground (mm)**	**Maximum Exterior Static Crush (mm)**	**Distance from Impact (mm)**
1	Sill Top	460	535	0
2	Occupant Hip Point	970	599	0
3	Mid-Door	875	596	150
4	Window Sill	1293	526	150
5	Window Top	1841	376	150

Note: All vehicle measurements taken at the vertical impact reference line.

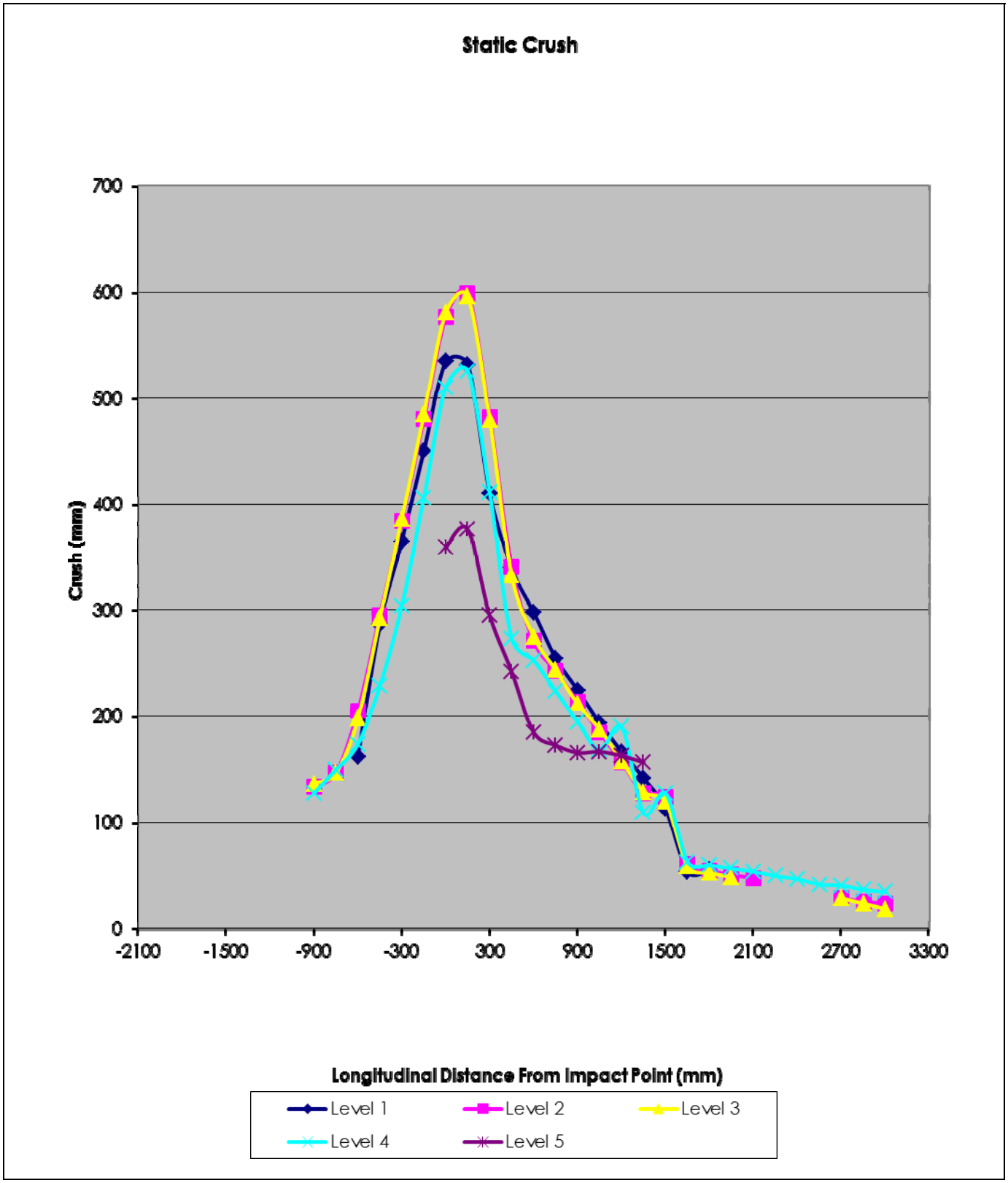
DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS
(CONTINUED)

Note: All dimensions are in millimeters with a tolerance of ±3 mm

TEST VEHICLE STATIC CRUSH

	Level	1			2			3			4			5		
		460			970			875			1293			1841		
		Pre	Post	Crush	Pre	Post	Crush	Pre	Post	Crush	Pre	Post	Crush	Pre	Post	Crush
DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT	-1800										533	580	47			
	-1650							282	318	36	489	548	59			
	-1500				277	353	76	274	352	78	457	527	70			
	-1350				268	360	92				429	514	85			
	-1200				264	370	106				409	504	95			
	-1050				259	379	120				392	498	106			
	-900				255	389	134	260	397	137	375	503	128			
	-750				249	396	147	258	405	147	365	515	150			
	-600	326	488	162	251	456	205	259	457	198	354	528	174			
	-450	327	613	286	255	550	295	260	552	292	349	578	229			
	-300	325	690	365	260	644	384	261	647	386	345	649	304			
	-150	321	771	450	260	740	480	260	744	484	339	745	406			
	0	320	855	535	260	837	577	260	841	581	335	845	510	570	929	359
	150	322	854	532	260	859	599	258	854	596	328	854	526	558	934	376
	300	322	732	410	257	739	482	256	735	479	322	733	411	555	850	295
	450	322	662	340	254	595	341	254	587	333	319	592	273	550	792	242
	600	320	618	298	253	524	271	254	529	275	314	567	253	550	735	185
	750	321	576	255	252	495	243	254	498	244	311	535	224	547	720	173
	900	321	546	225	252	466	214	254	466	212	309	504	195	544	710	166
	1050	325	519	194	252	437	185	254	442	188	306	474	168	540	707	167
	1200	327	494	167	253	410	157	255	413	158	305	495	190	540	703	163
	1350	328	470	142	254	382	128	256	385	129	305	414	109	536	693	157
	1500	349	462	113	256	380	124	260	380	120	305	433	128			
	1650	341	395	54	265	326	61	267	326	59	312	375	63			
	1800	345	401	56	258	313	55	259	312	53	308	368	60			
	1950				251	302	51	256	305	49	303	360	57			
	2100				252	300	48				301	355	54			
	2250										298	348	50			
	2400										298	345	47			
	2550										298	340	42			
	2700				258	287	29	265	294	29	300	341	41			
	2850				262	288	26	266	290	24	305	342	37			
	3000				268	292	24	273	292	19	307	342	35			

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

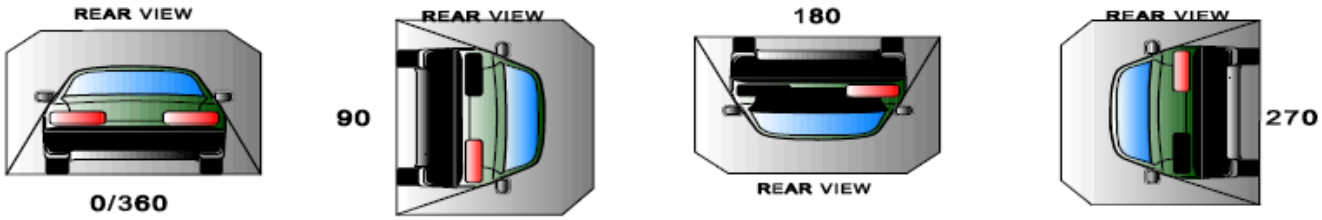


DATA SHEET NO. 11
FMVSS 301 STATIC ROLLOVER RESULTS

Temperature at Time of Impact: 19° C Test Time: 2:30 pm

STODDARD SOLVENT SPILLAGE MEASUREMENTS				
Period	**Description**	**Maximum Allowable Spillage**	**Spillage**	
			Amount	**Location**
A	From Impact Until Vehicle Motion Ceases	1 oz	0	N/a
B	5 Minutes After Vehicle Motion Ceases	5 oz	0	N/a
C	Next 25 Minutes	1 oz/minute	0	N/a
D				

FMVSS 301 STATIC ROLLOVER DATA



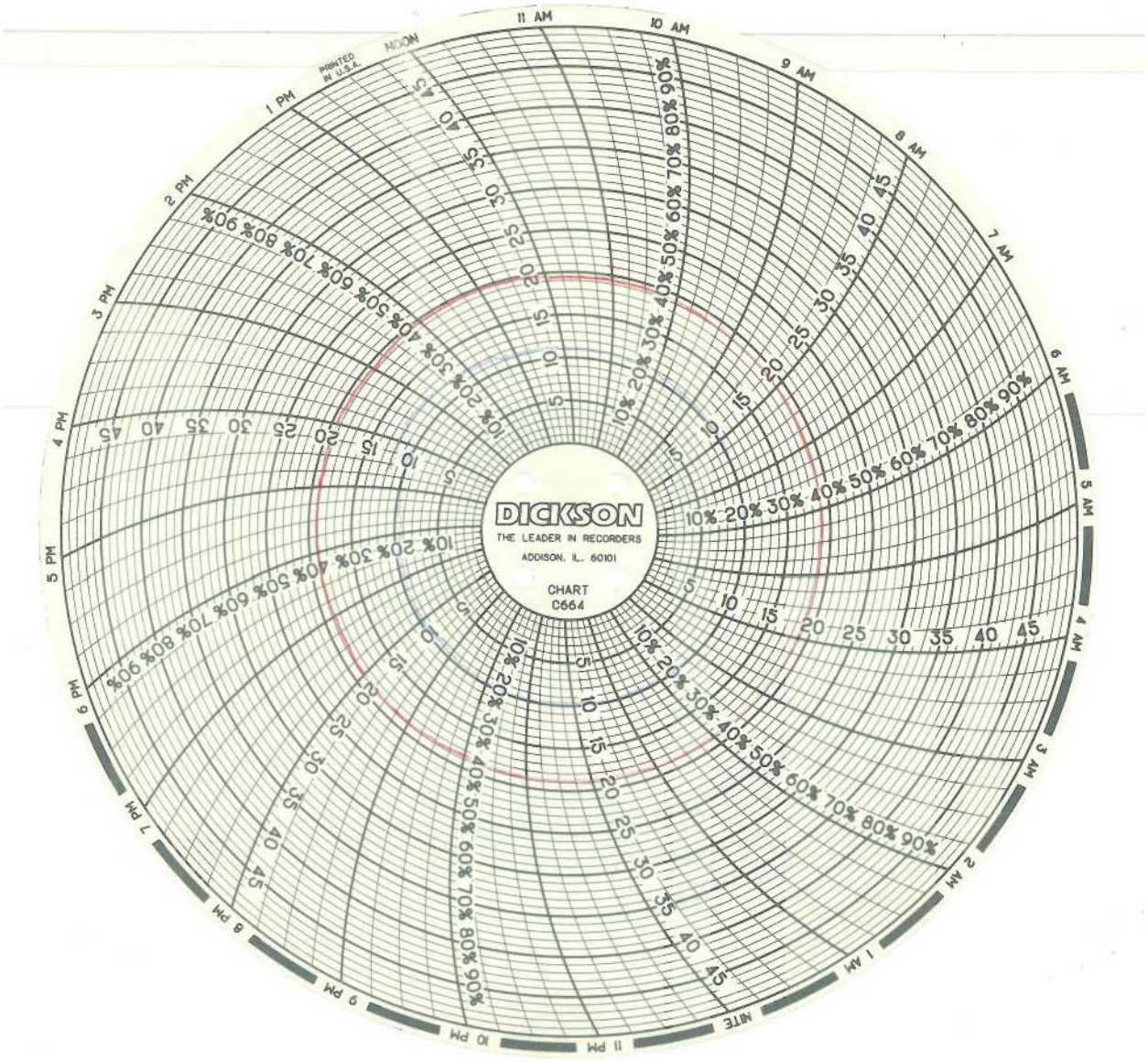
ROLLOVER SOLVENT COLLECTION TIME TABLE			
Test phase	**Rotation Time (sec.)**	**Hold Time (sec.)**	**Total Time (sec.)**
0° to 90°	64	300	364
90° to 180°	67	300	367
180° to 270°	66	300	366
270° to 360°	65	300	365

DATA SHEET NO. 11
FMVSS 301 STATIC ROLLOVER RESULTS (CONTINUED)

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE				
	First Five Minutes (oz)	Sixth Minute (oz)	Seventh Minute (oz)	Eighth Minute (oz)
0° to 90°	0	0	0	N/a
90° to 180°	0	0	0	N/a
180° to 270°	0	0	0	N/a
270° to 360°	0	0	0	N/a

SPILLAGE LOCATION	
0° to 90°	N/a
90° to 180°	N/a
180° to 270°	N/a
270° to 360°	N/a

DATA SHEET NO. 12
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA



APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

LIST OF PHOTOGRAPHS (CONTINUED)

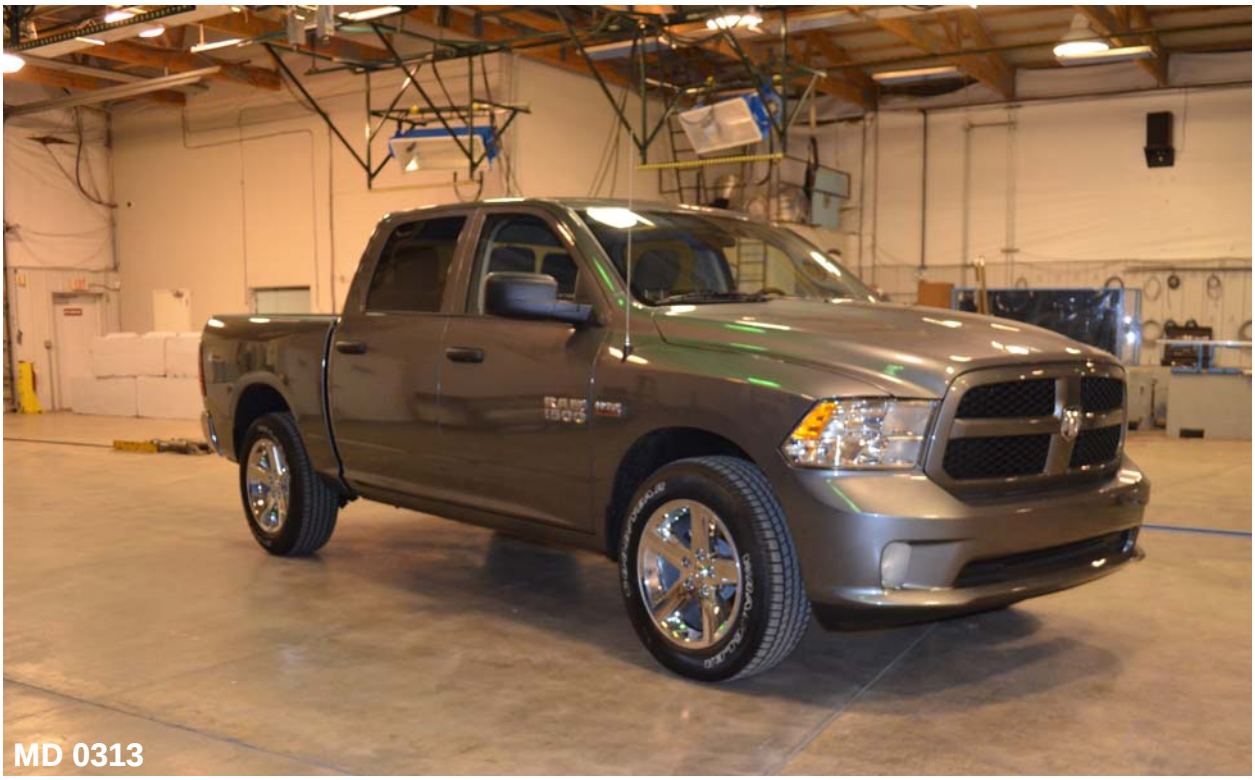


Figure 001: As Delivered Right Front 3-4 View of Test Vehicle

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

Figure 003: Pre-Test Frontal View of Test Vehicle

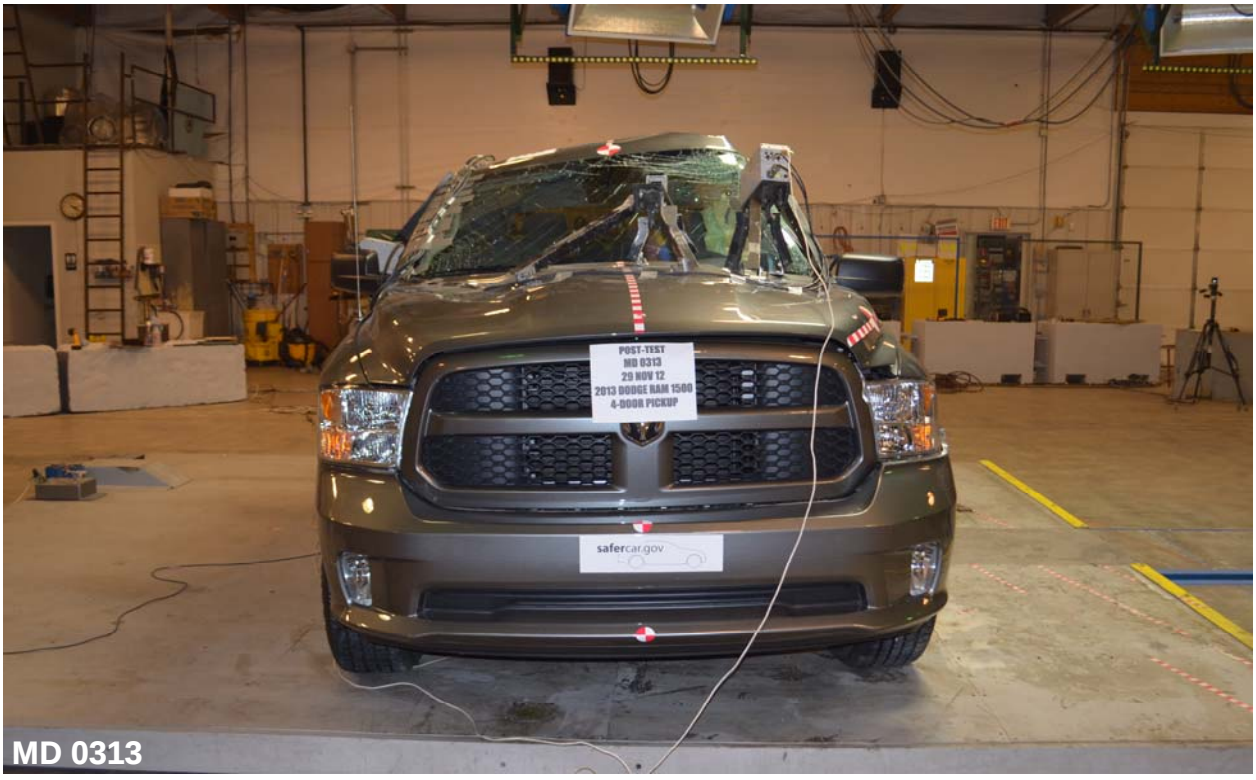


Figure 004: Post-Test Frontal View of Test Vehicle

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

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

Figure 007: Pre-Test Left Side View of Test Vehicle

Figure 008: Post-Test Left Side View of Test Vehicle

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

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

Figure 011: Pre-test rear view of test vehicle

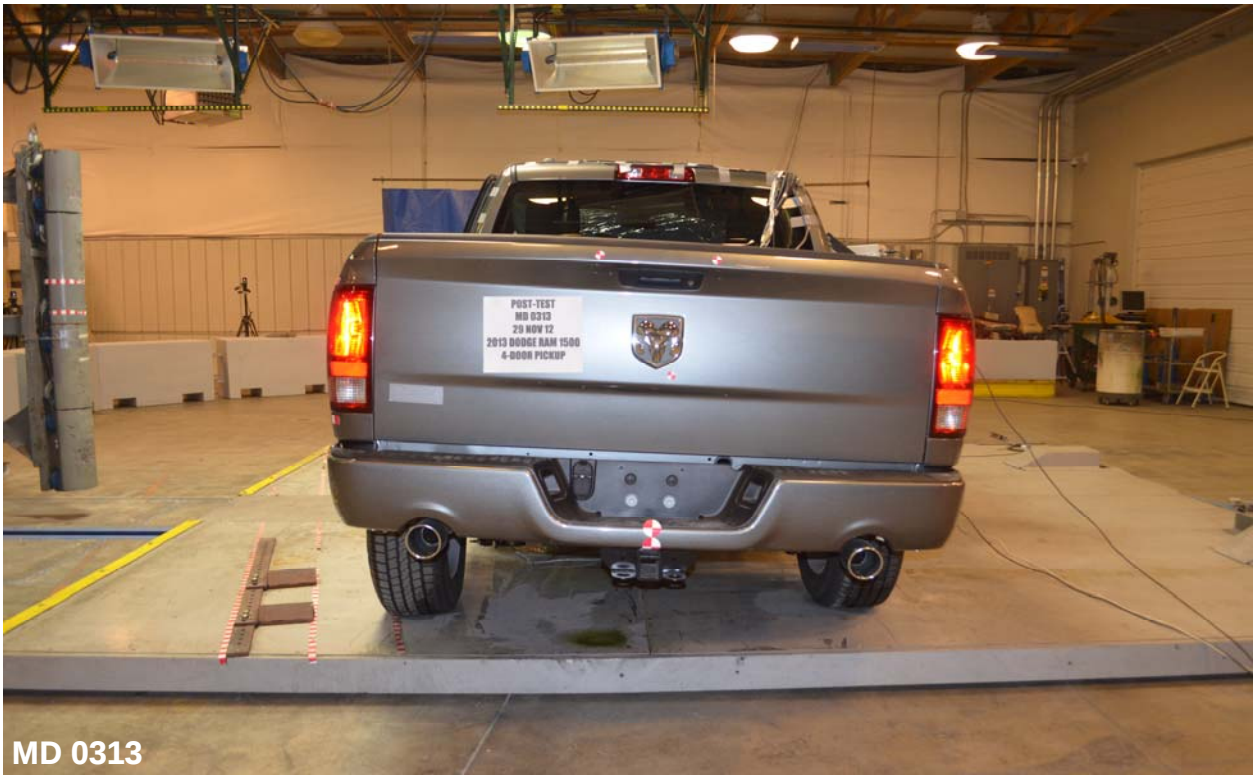


Figure 012: Post-Test Rear View of Test Vehicle

Figure 013: Pre-Test Right Side View of Test Vehicle

Figure 014: Post-Test Right Side View of Test Vehicle

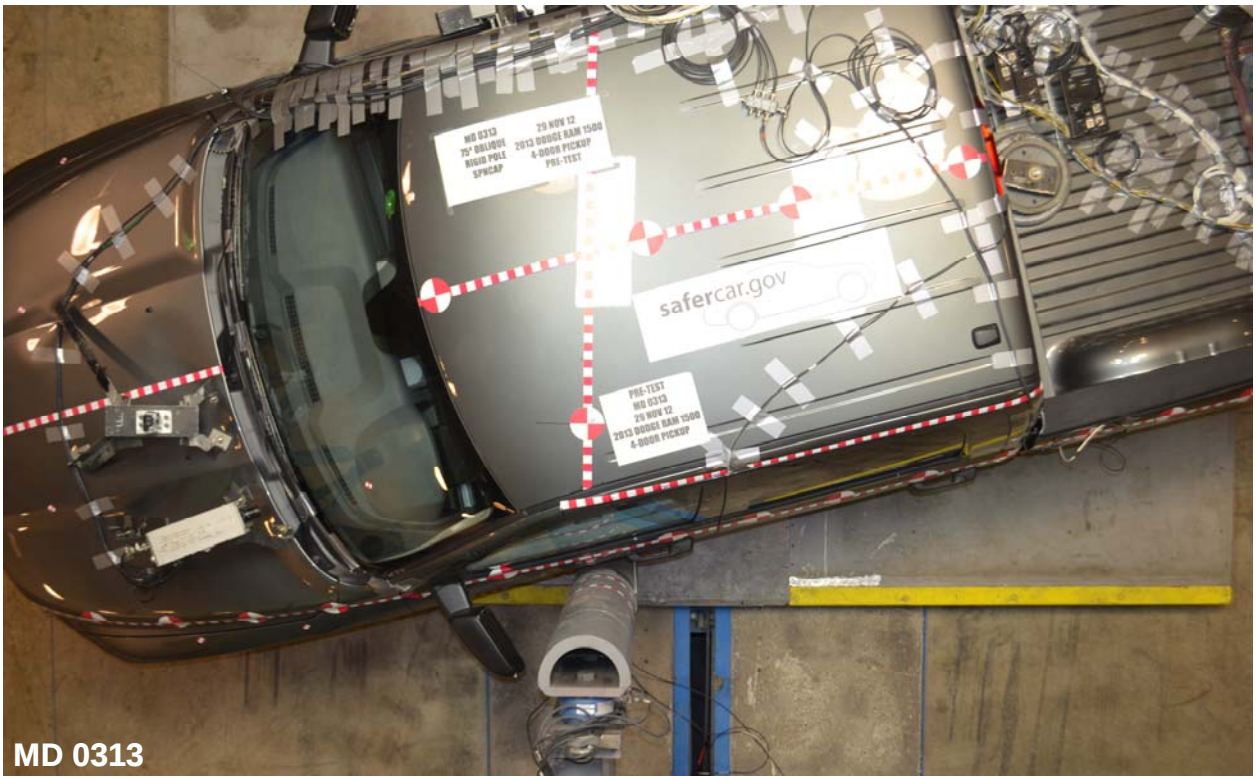


Figure 015: Pre-Test Overhead View of Test Area

Figure 016: Post-Test Overhead View of Test Area

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

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

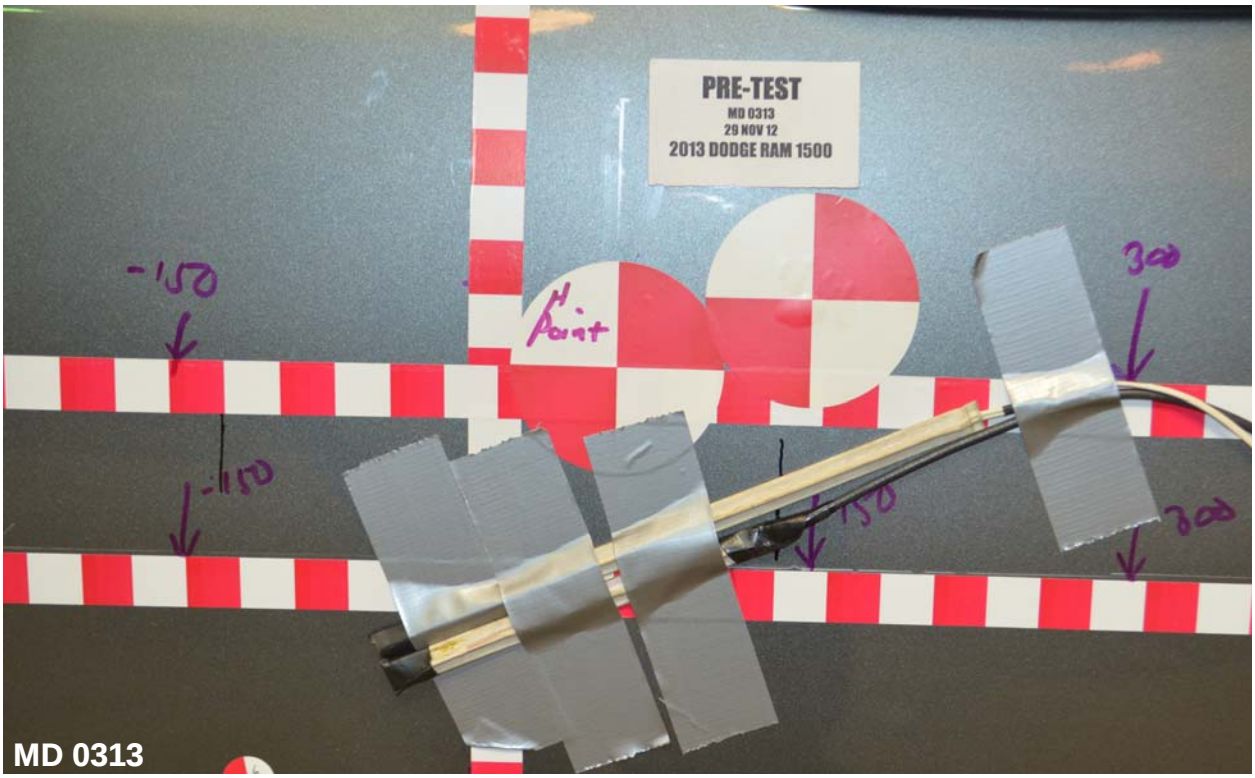


Figure 019: Pre-Test Close-Up View of Impact Point Target

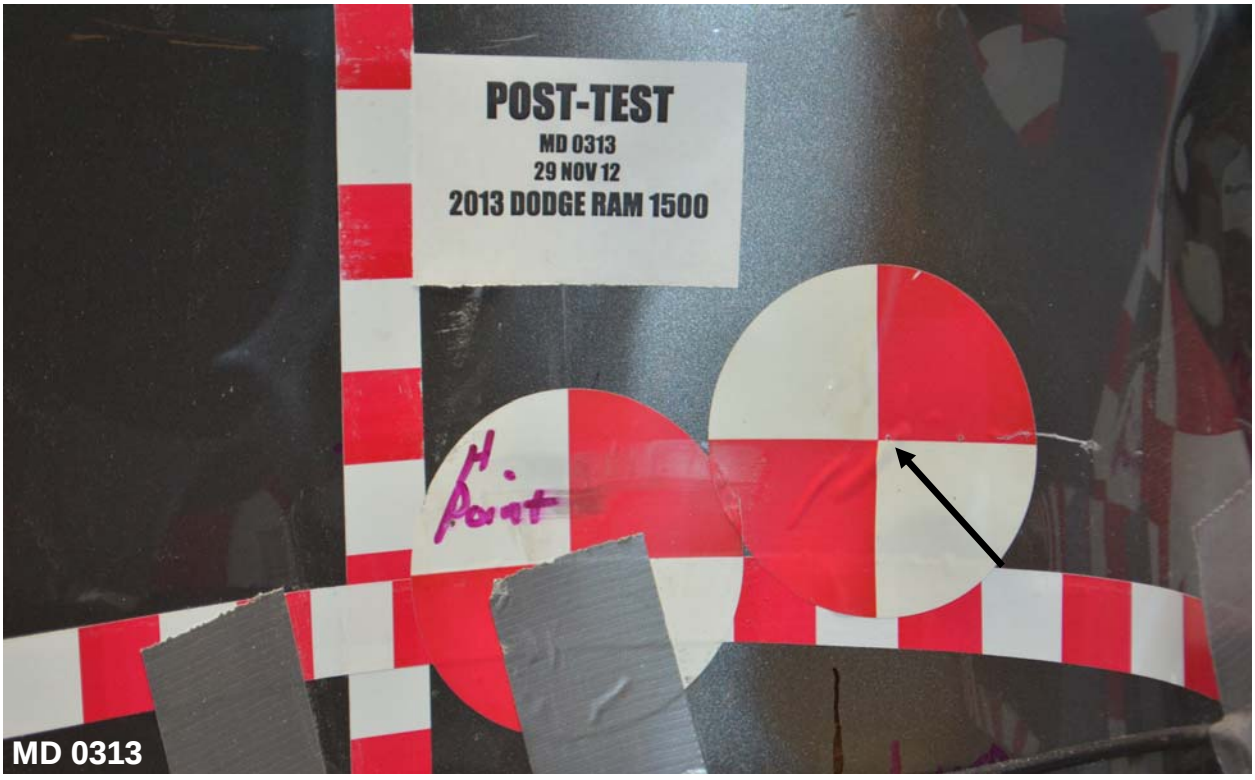


Figure 020: Post-Test Close-Up View of Impact Point Target Showing Impact Location

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

Figure 022: Post-Test Front Close-Up View of Dummy

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

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

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

Figure 026: Pre-Test Frontal View of Seat Back Prior to Dummy Positioning

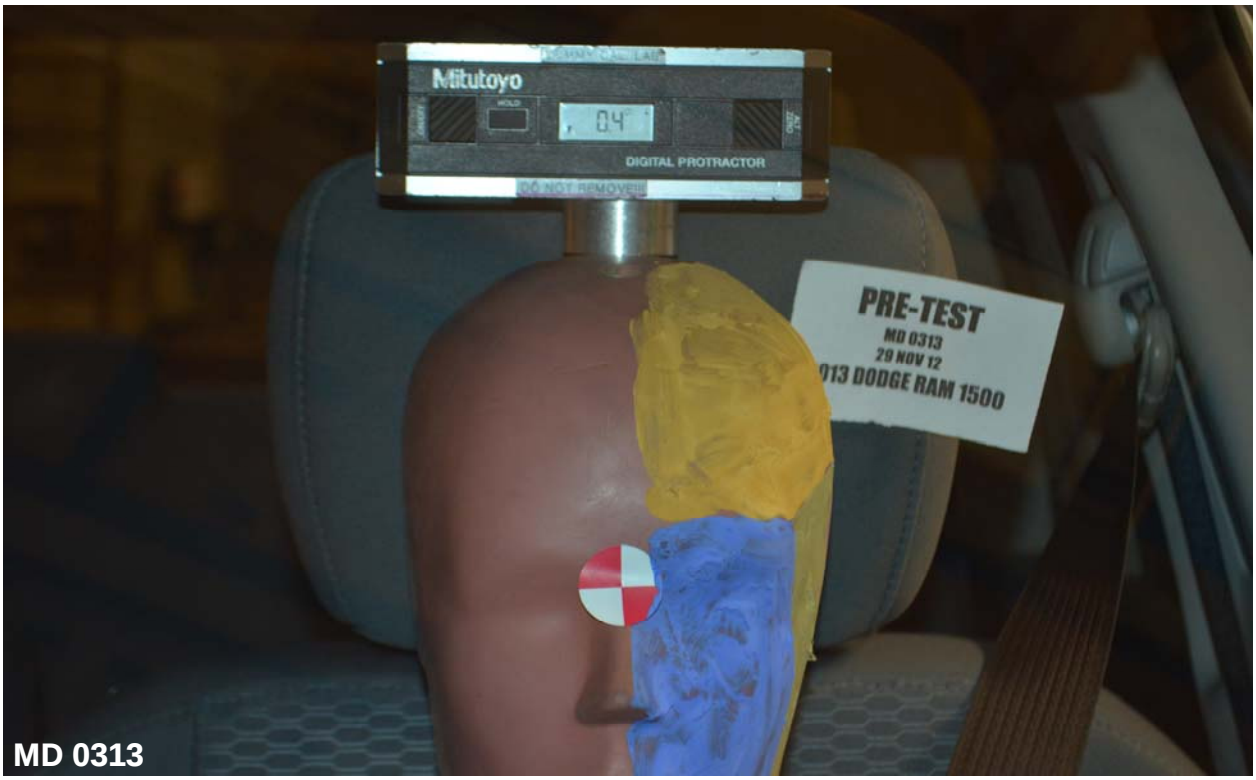


Figure 027: Pre-Test Frontal Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint

Figure 028: Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning

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

Figure 030: Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket

Figure 031: Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level

Figure 032: Pre-Test Placement of Dummy's Feet

Figure 033: Pre-Test View of Belt Anchorage for Dummy

Figure 034: Pre-Test Left Side View of Steering Wheel

Figure 035: Pre-Test View of Disengaged Parking Brake

Figure 036: Pre-Test View of Parking Brake

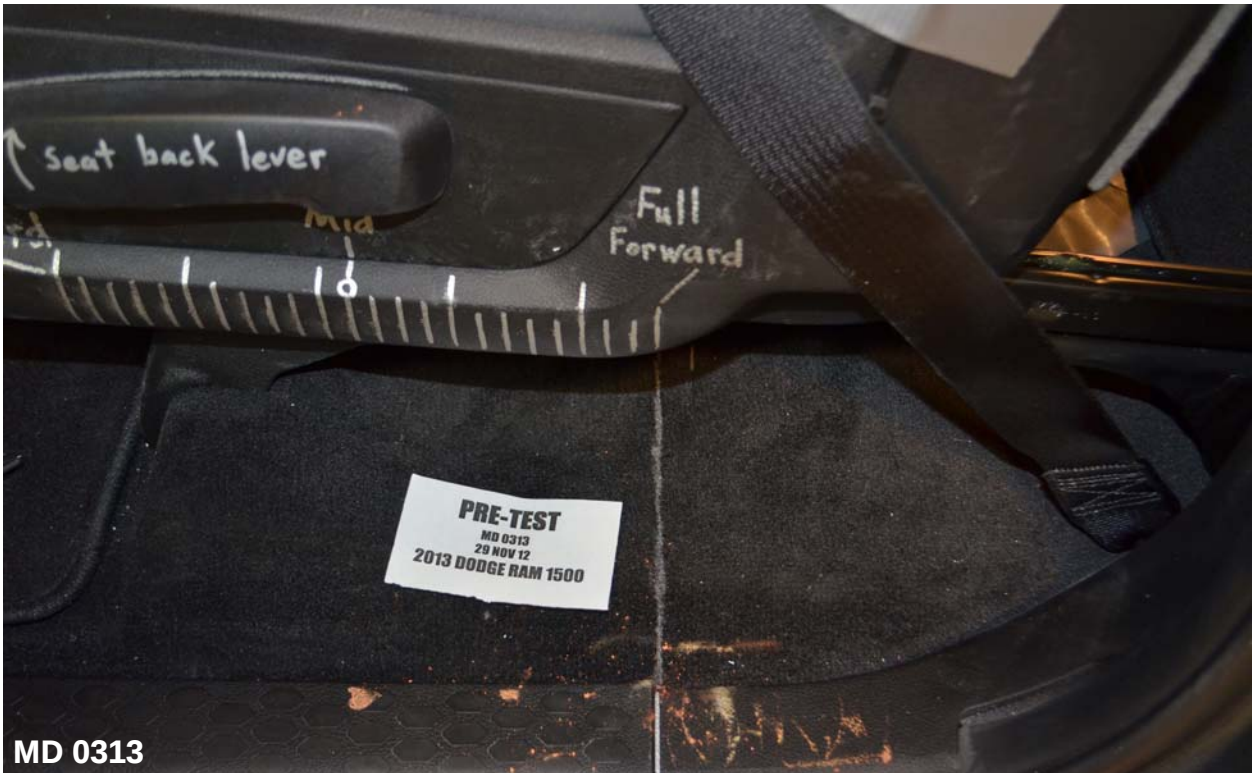


Figure 037: Pre-Test Close-Up Left Side View of Drive Seat Track

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

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

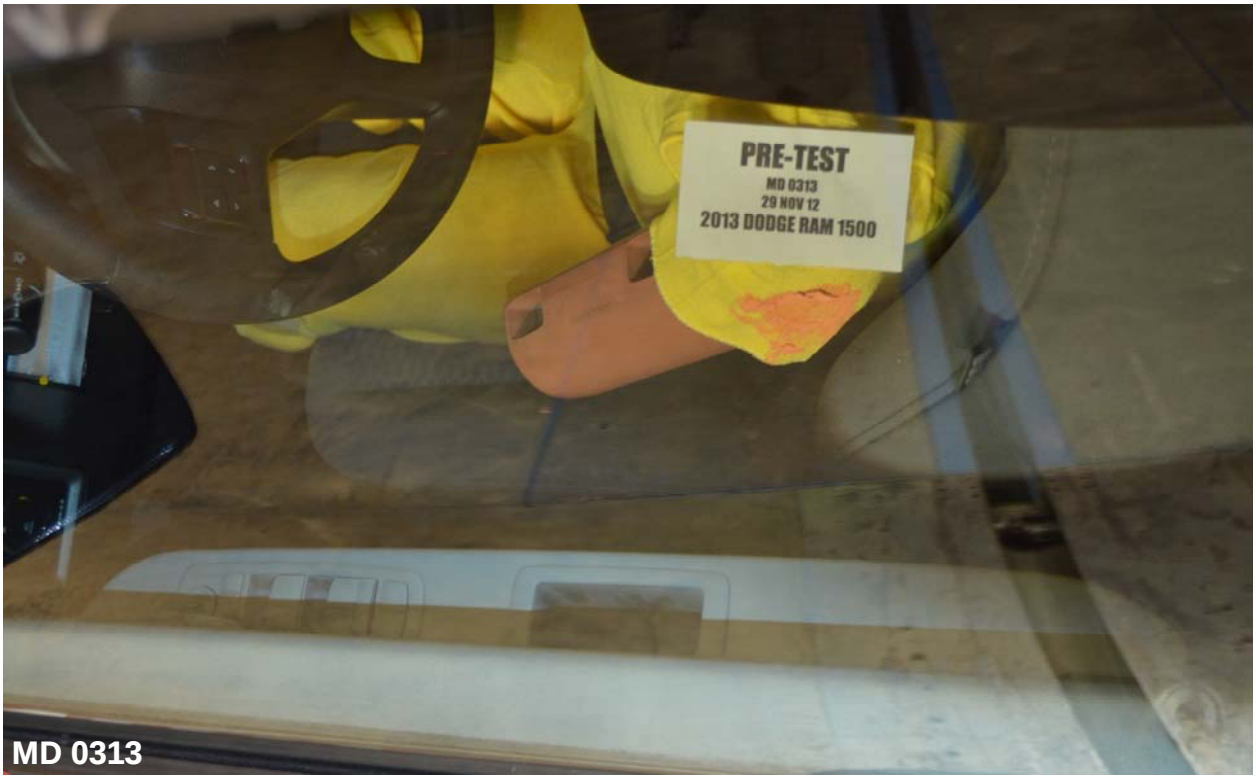


Figure 040: Pre-Test Dummy and Door Clearance View

Figure 041: Post-Test Dummy and Door Clearance View

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

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

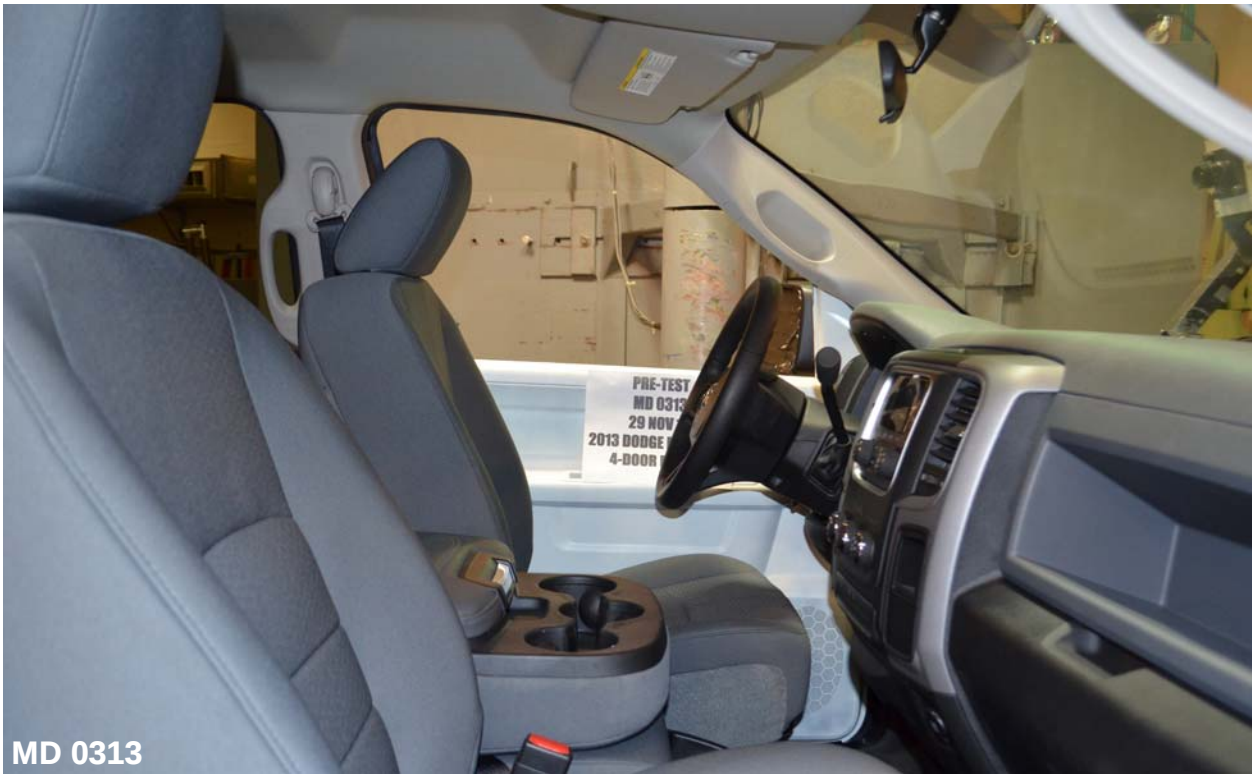


Figure 044: Pre-Test Inner Door Panel View

Figure 045: Post-Test Inner Door Panel View Showing Dummy Contact Locations

Not Applicable

MD 0313

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

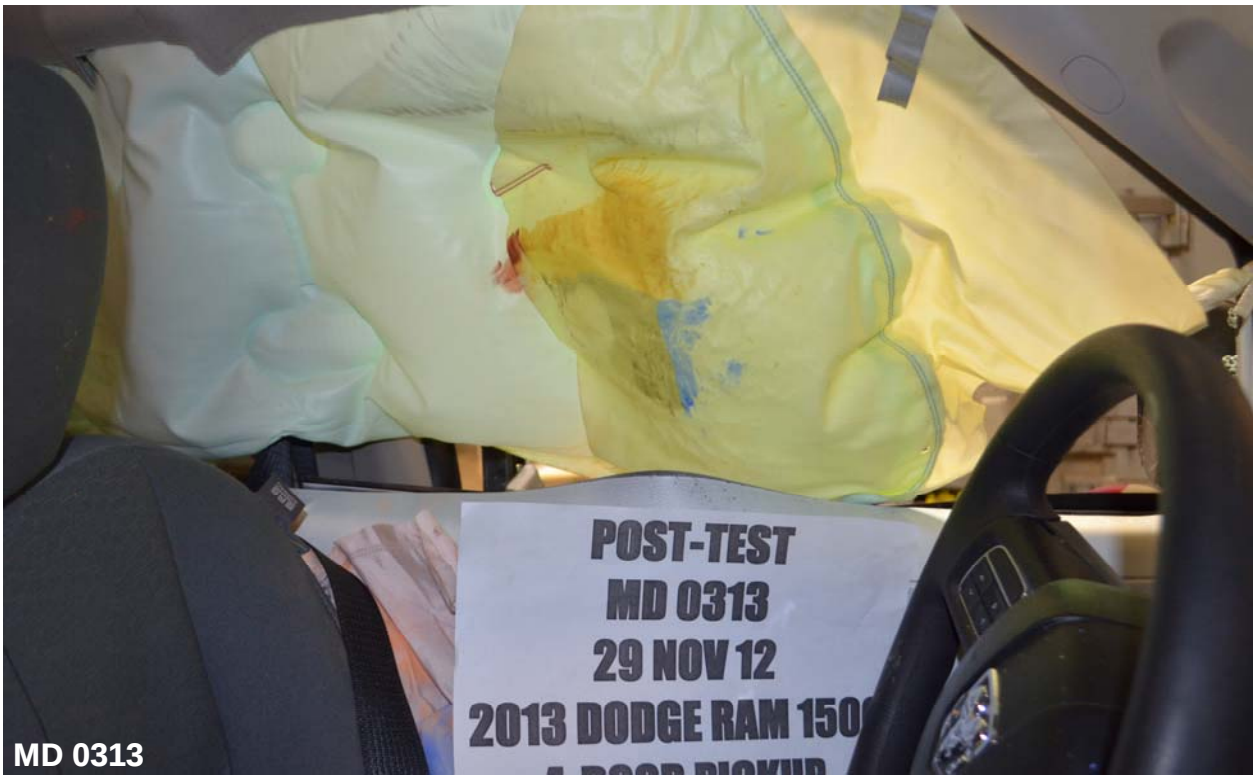


Figure 047: Post-Test Dummy Close-Up Head Contact with Side Air bag View

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

Figure 049: Post-Test Dummy Close-Up Torso Contact with Side Air bag View

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

Figure 051: Post-Test Dummy Close-Up Pelvis Contact with Side Air bag View

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

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

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

Figure 055: Close-Up View of Vehicle's Certification Label

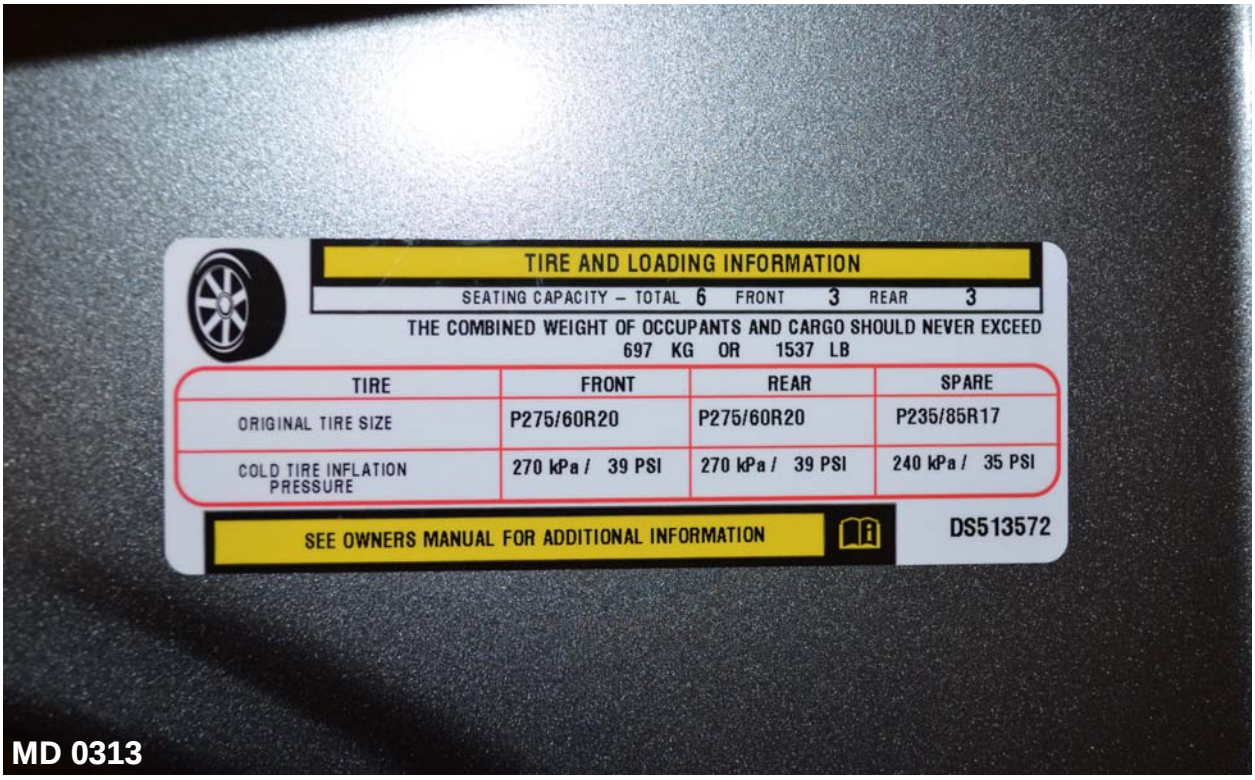


Figure 056: Close-Up View of Vehicle's Tire Information Placard or Label

Figure 057: No. 057 - Pre-Test Pole Barrier Front View

Figure 058: Post-Test Pole Barrier Front View

Figure 059: Pre-Test Pole Barrier Side View

Figure 060: Post-Test Pole Barrier Side View

Figure 061: Pre-Test Ballast View

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

Figure 063: FMVSS No. 301 Static Rollover 0 Degrees

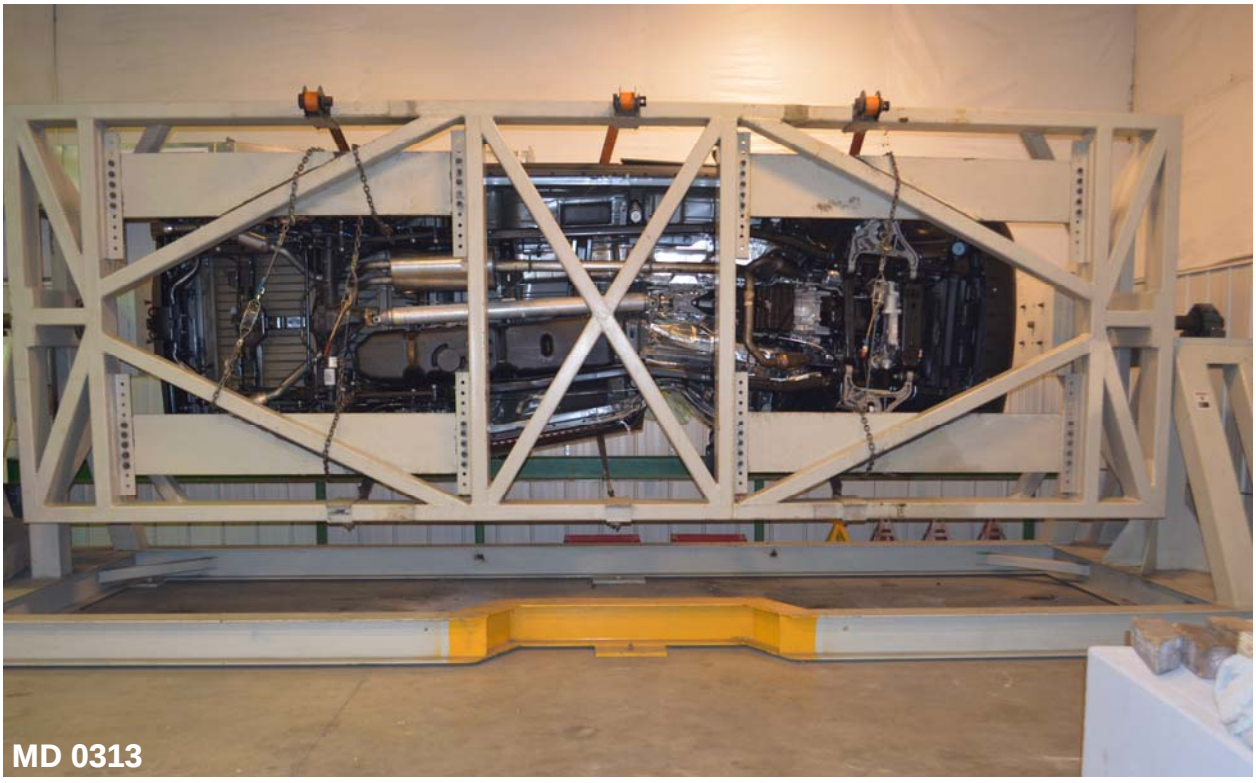


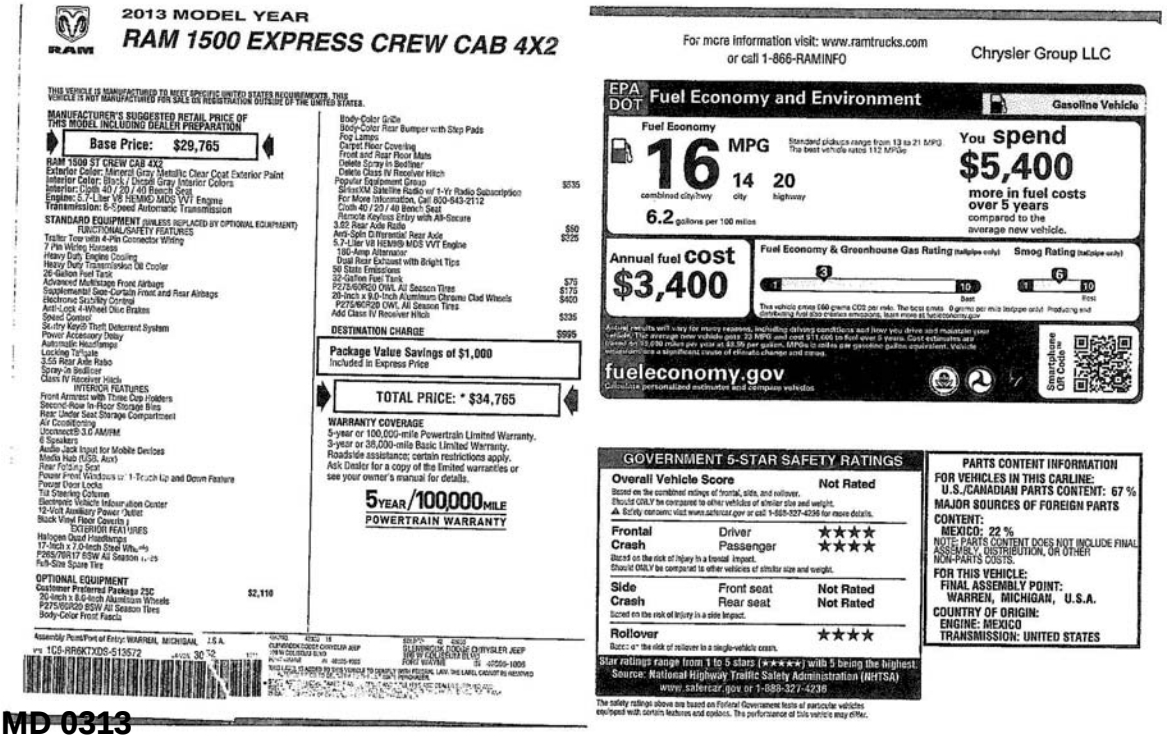
Figure 064: FMVSS No. 301 Static Rollover 90 Degrees

Figure 065: FMVSS No. 301 Static Rollover 180 Degrees

Figure 066: FMVSS No. 301 Static Rollover 270 Degrees

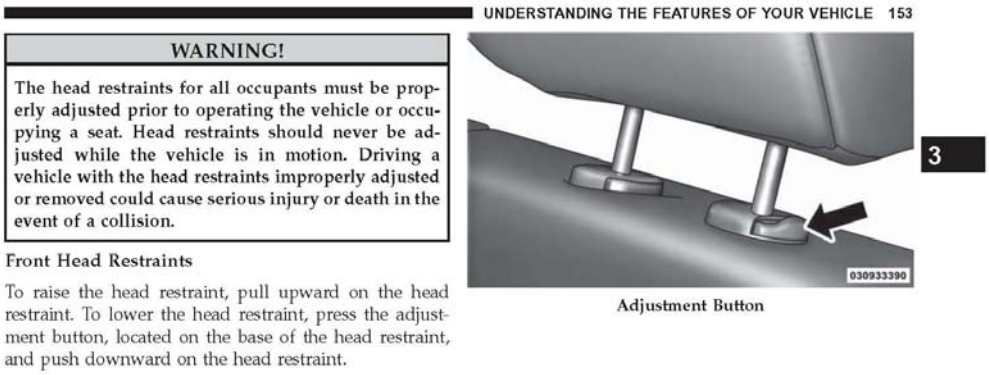
Figure 067: FMVSS No. 301 Static Rollover 360 Degrees

Figure 068: Impact Event



MD 0313

Figure 069: Monroney Label



UNDERSTANDING THE FEATURES OF YOUR VEHICLE 153

WARNING!

The head restraints for all occupants must be properly adjusted prior to operating the vehicle or occupying a seat. Head restraints should never be adjusted while the vehicle is in motion. Driving a vehicle with the head restraints improperly adjusted or removed could cause serious injury or death in the event of a collision.

Front Head Restraints

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, press the adjustment button, located on the base of the head restraint, and push downward on the head restraint.

Adjustment Button

MD 0313

Figure 070: Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

APPENDIX B
ATD AND VEHICLE RESPONSE DATA

The following plots are provided in the test report

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

Additional Driver Dummy Instrumentation Data

Driver Head Acceleration (X) Primary
Driver Head Acceleration (Y) Redundant
Driver Head Acceleration (Z) Redundant
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper abdomen rib deflection (Y)
Driver Lower abdomen rib deflection (Y)
Driver Shoulder Contact Switch
Driver Pelvis Contact Switch

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Vehicle Center of Gravity Angular Rate About X (Roll)
Vehicle Center of Gravity Angular Rate About Y (Pitch)
Vehicle Center of Gravity Angular Rate About Z (Yaw)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Middle A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Middle B-Pillar Acceleration (Y)
Driver Seat Track at Dummy H-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

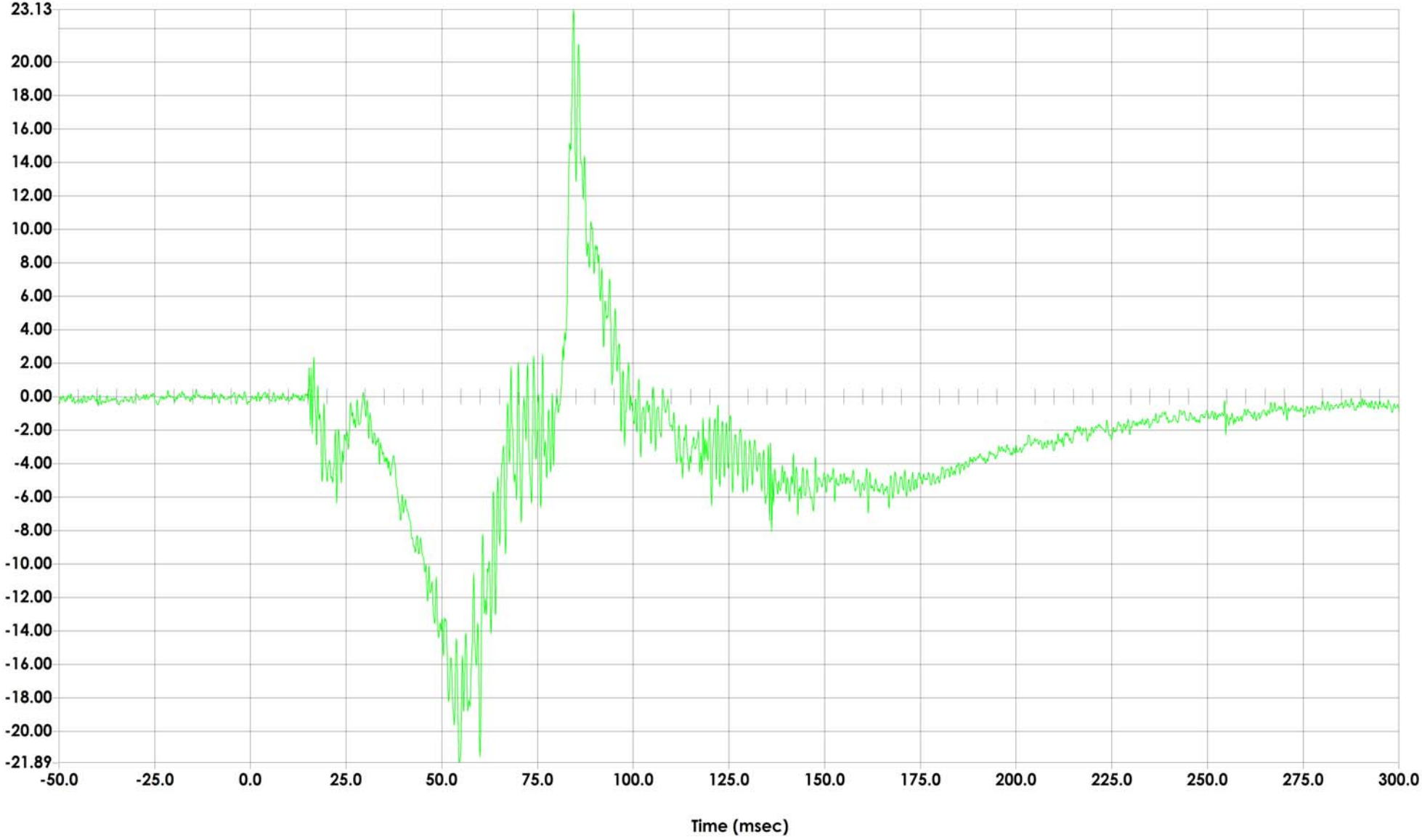
Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

Test ID	MD 0313
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	004
Units	G'S

Max	23.13	G'S
	84.40	msec
Min	-21.89	G'S
	54.56	msec

MEDICAL COLLEGE OF WISCONSIN

Head Acceleration (X) Redundant vs. Time

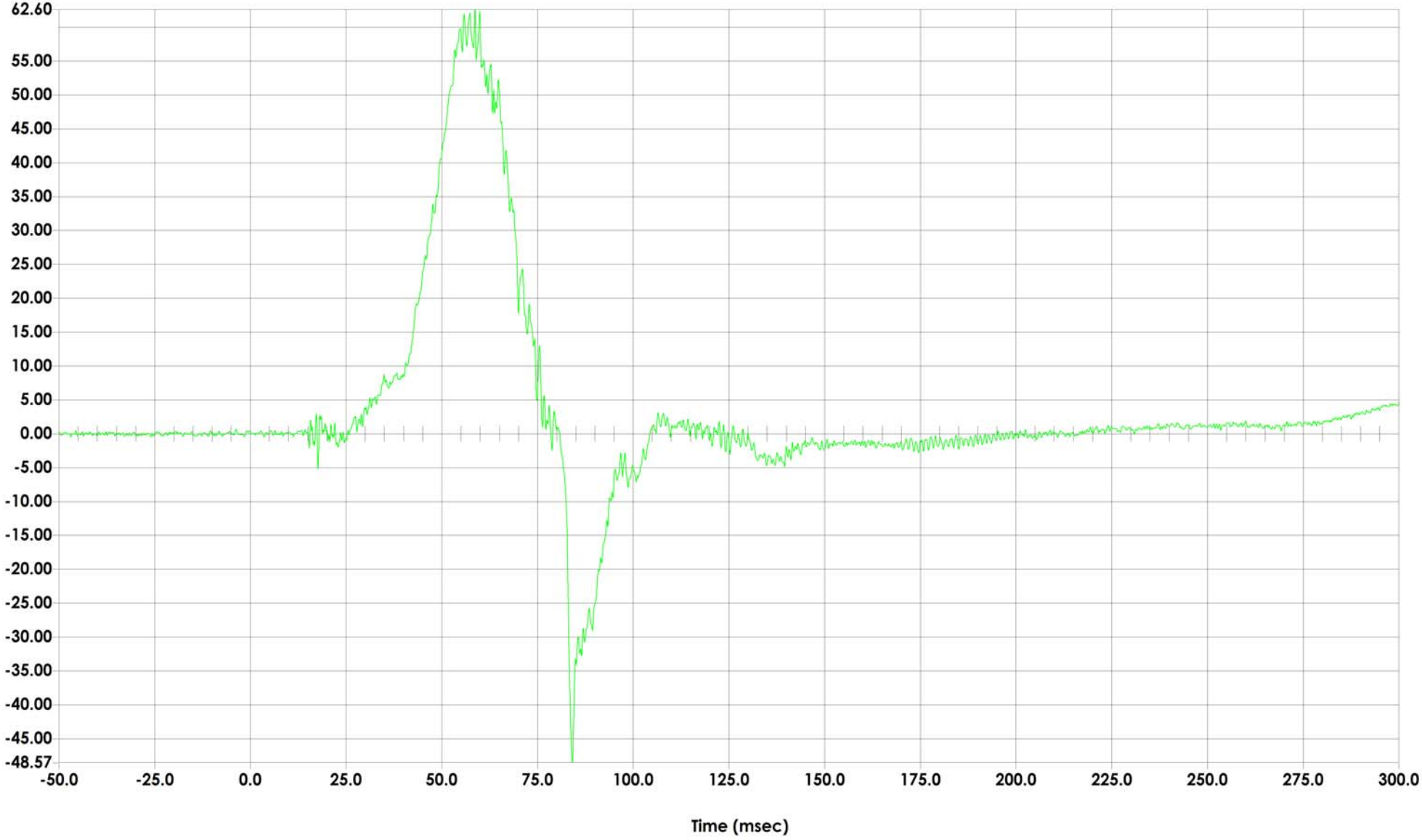


Test ID	MD 0313
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	002
Units	G'S

Max	62.60	G'S
	58.72	msec
Min	-48.57	G'S
	84.08	msec

MEDICAL COLLEGE OF WISCONSIN

Head Acceleration (Y) Primary vs. Time

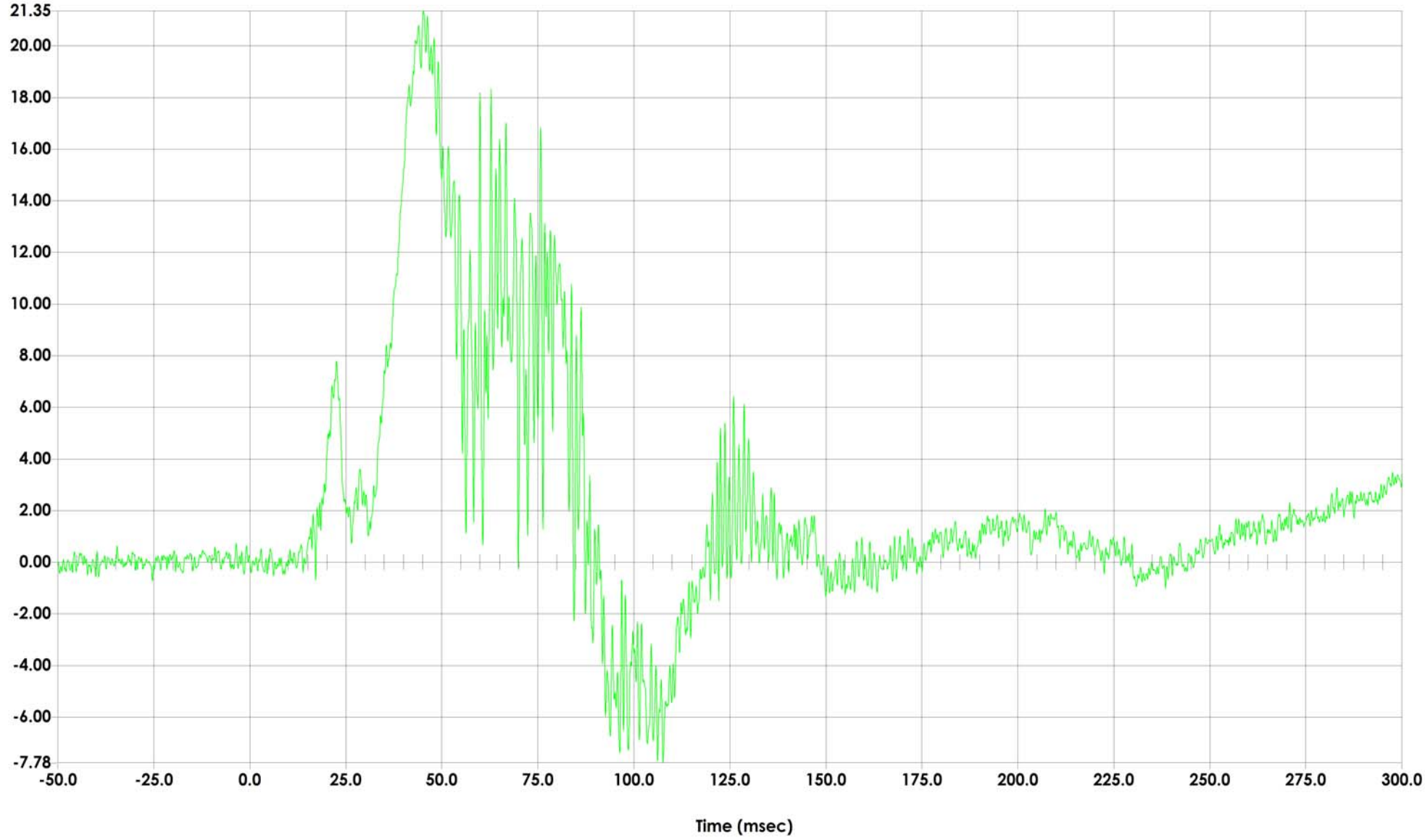


Test ID	MD 0313
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	003
Units	G'S

Max	21.35	G'S
	45.20	msec
Min	-7.78	G'S
	107.60	msec

MEDICAL COLLEGE OF WISCONSIN

Head Acceleration (Z) Primary vs. Time

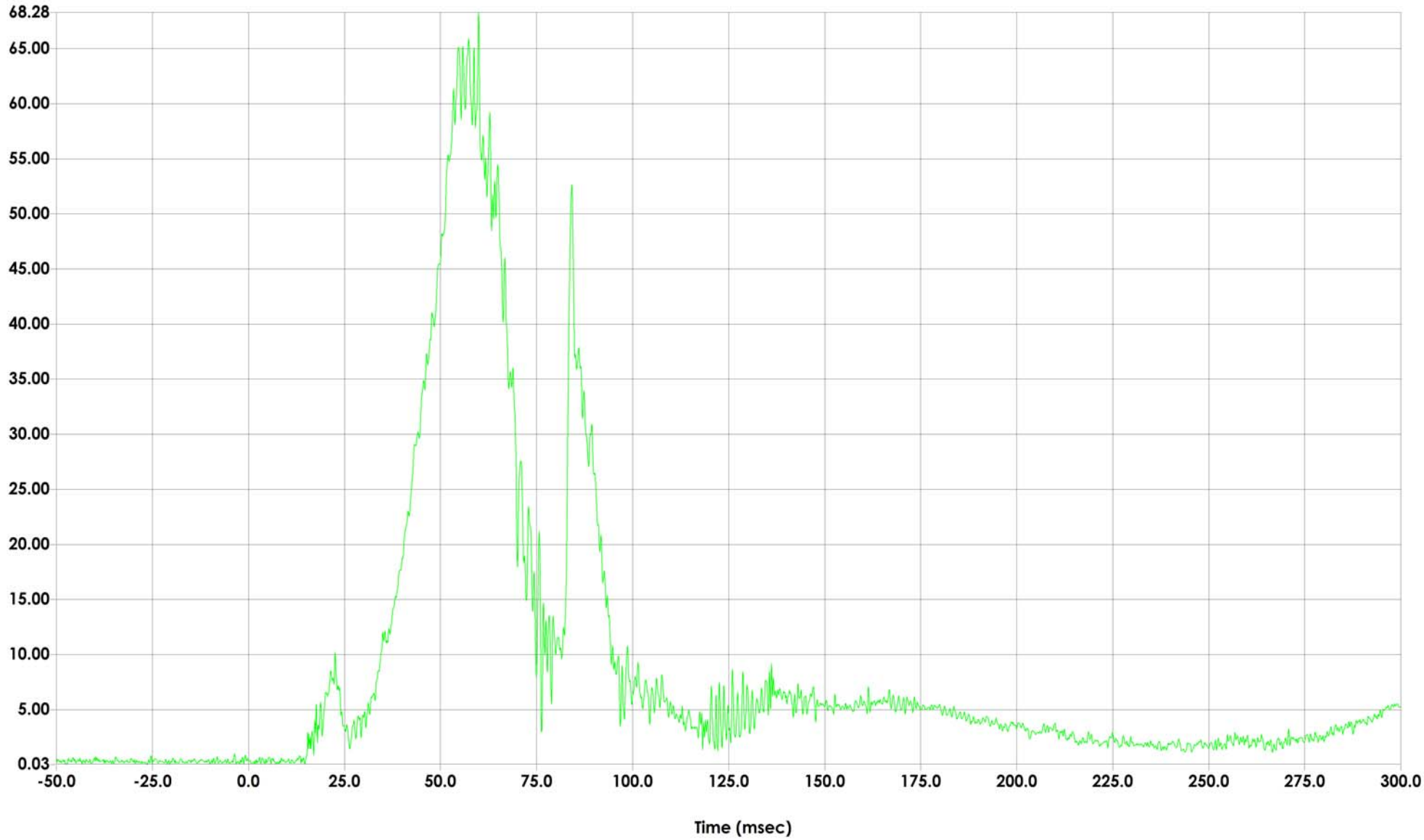


Test ID	MD 0313
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	043
Units	G'S

Max	68.28	G'S
	59.92	msec
Min	0.03	G'S
	-26.32	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Head Resultant Primary vs. Time

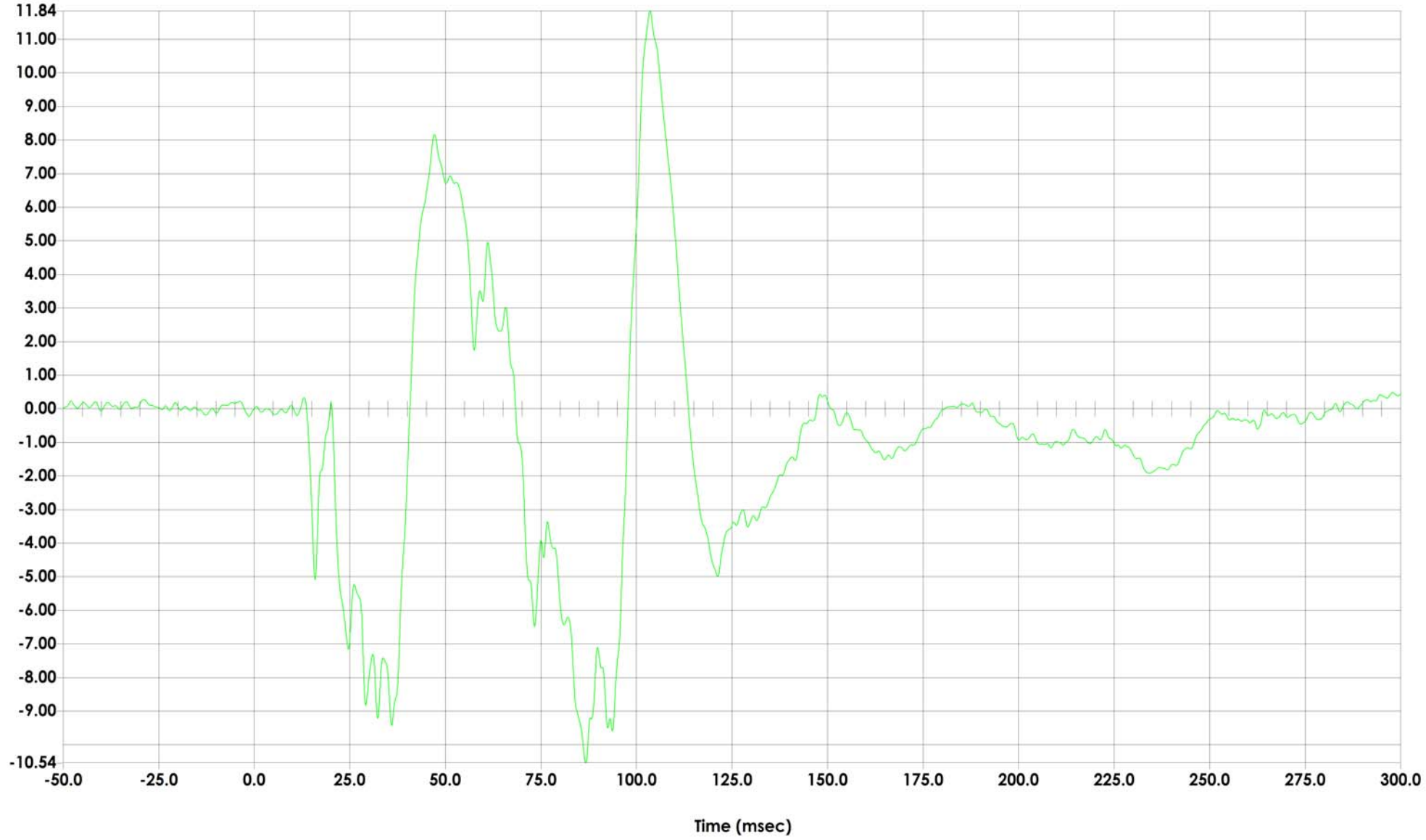


Test ID	MD 0313
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	012
Units	G'S

Max	11.84	G'S
	103.60	msec
Min	-10.54	G'S
	86.80	msec

MEDICAL COLLEGE OF WISCONSIN

Lower Spine T12 Acceleration (X) vs. Time

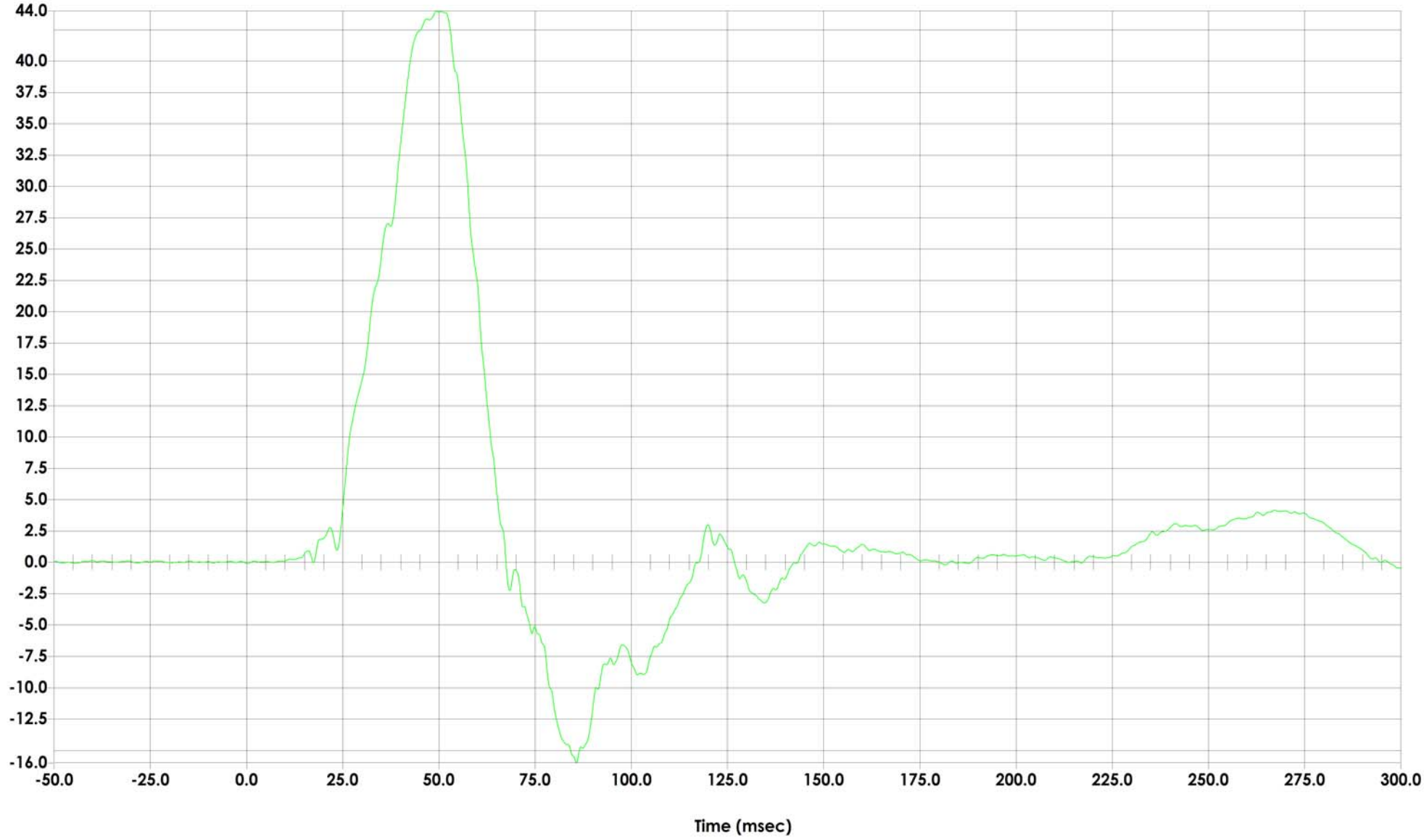


Test ID	MD 0313
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	013
Units	G'S

Max	43.99	G'S
	49.36	msec
Min	-16.01	G'S
	85.76	msec

MEDICAL COLLEGE OF WISCONSIN

Lower Spine T12 Acceleration (Y) vs. Time

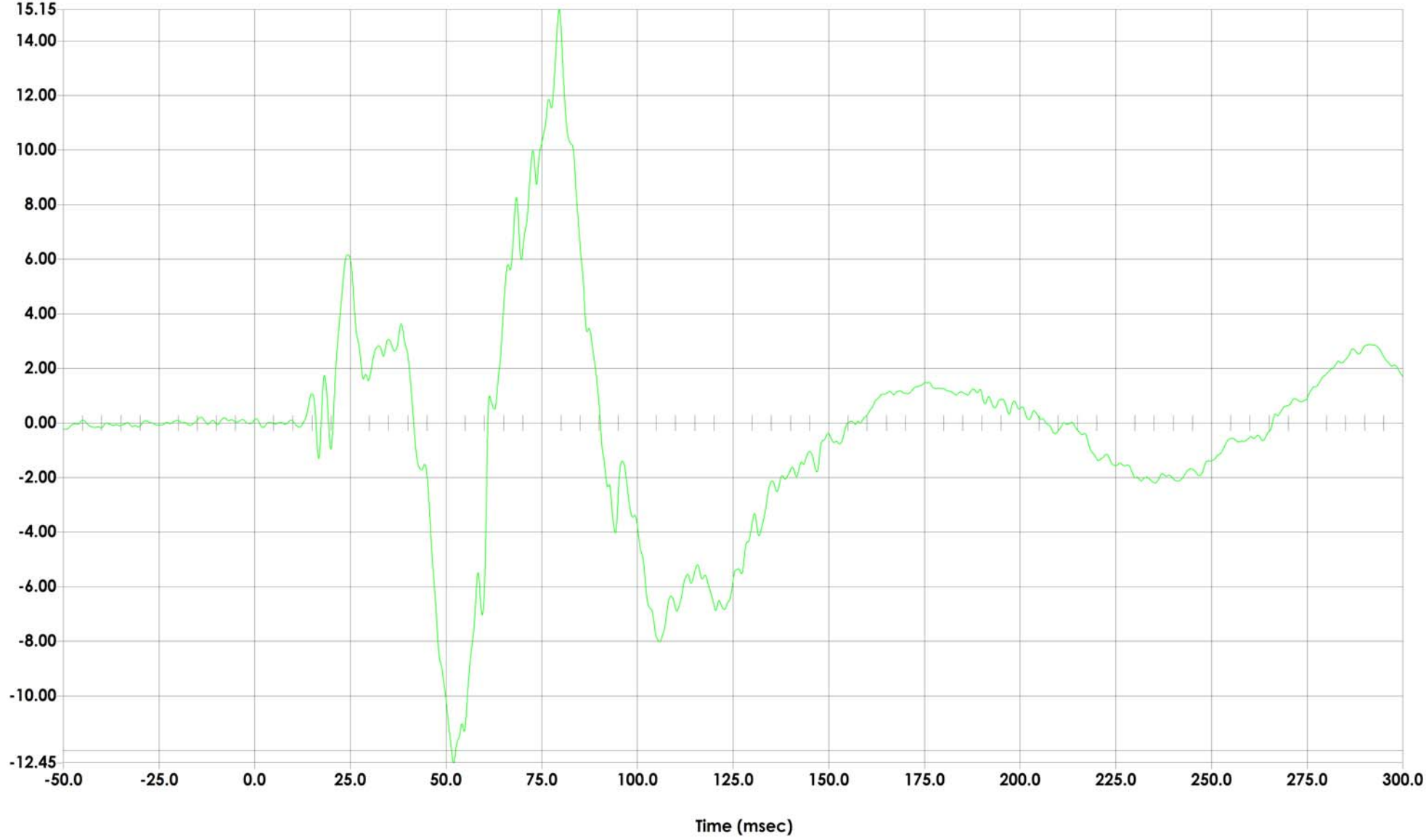


Test ID	MD 0313
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	014
Units	G'S

Max	15.15	G'S
	79.60	msec
Min	-12.45	G'S
	52.00	msec

MEDICAL COLLEGE OF WISCONSIN

Lower Spine T12 Acceleration (Z) vs. Time

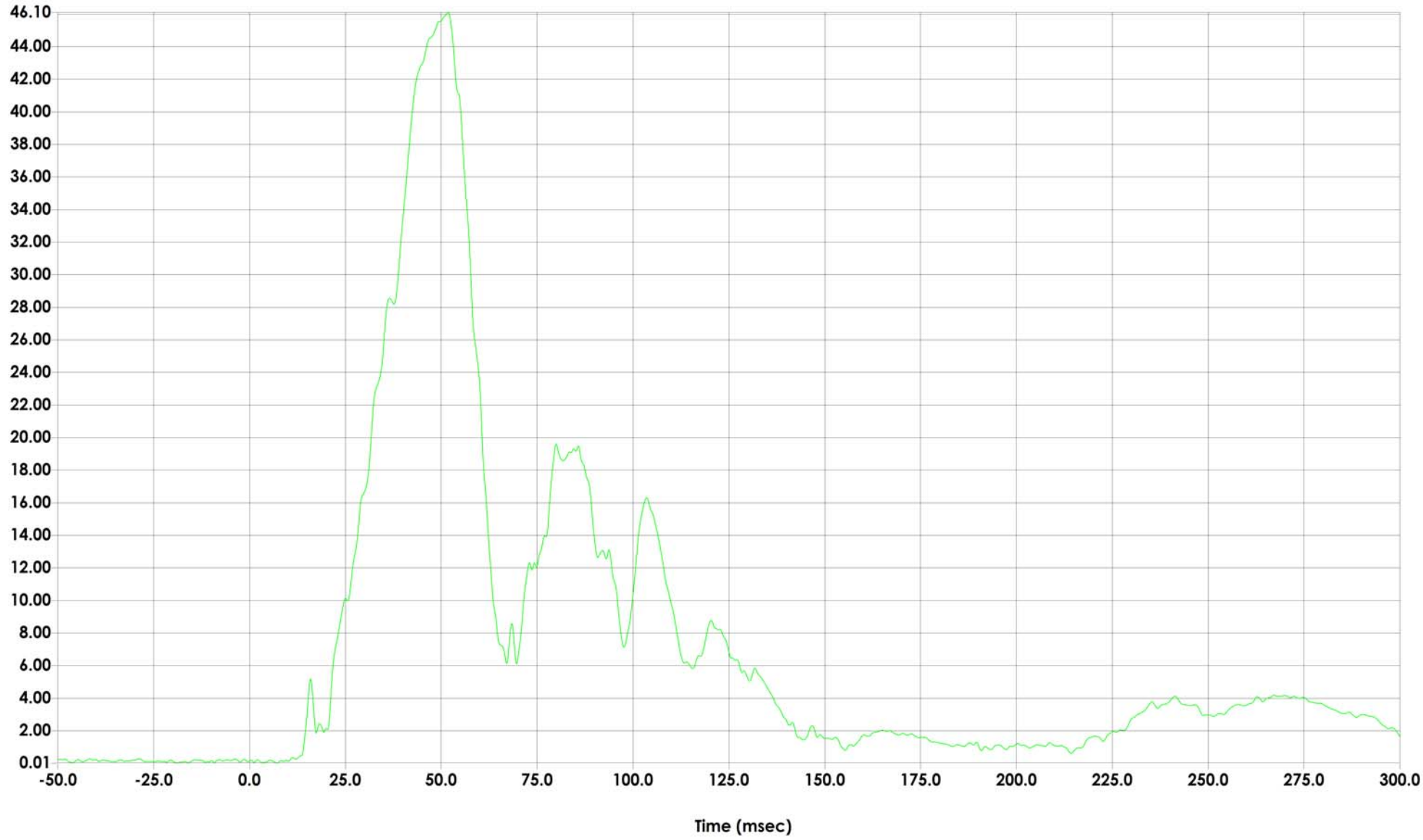


Test ID	MD 0313
Sampling Rate (Hz)	12500
Filter	CFC180
Plot number	044
Units	G'S

Max	46.10	G'S
	51.84	msec
Min	0.01	G'S
	-18.80	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Lower Spine T12 Resultant Acceleration vs. Time

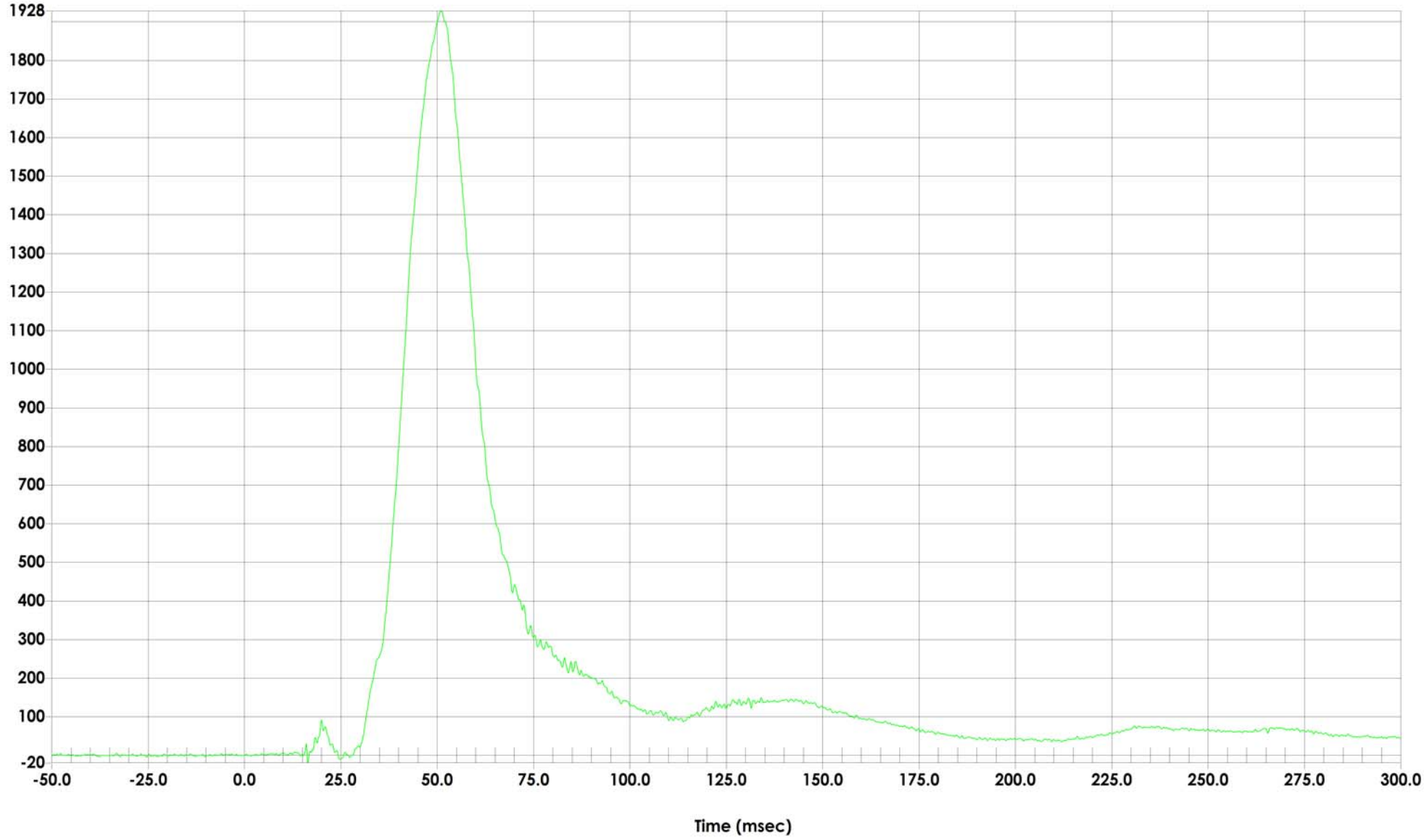


Test ID	MD 0313
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	015
Units	NWT

Max	1927.84	NWT
	51.12	msec
Min	-19.60	NWT
	16.40	msec

MEDICAL COLLEGE OF WISCONSIN

Iliac Wing Force on Impact Side (Y) vs. Time

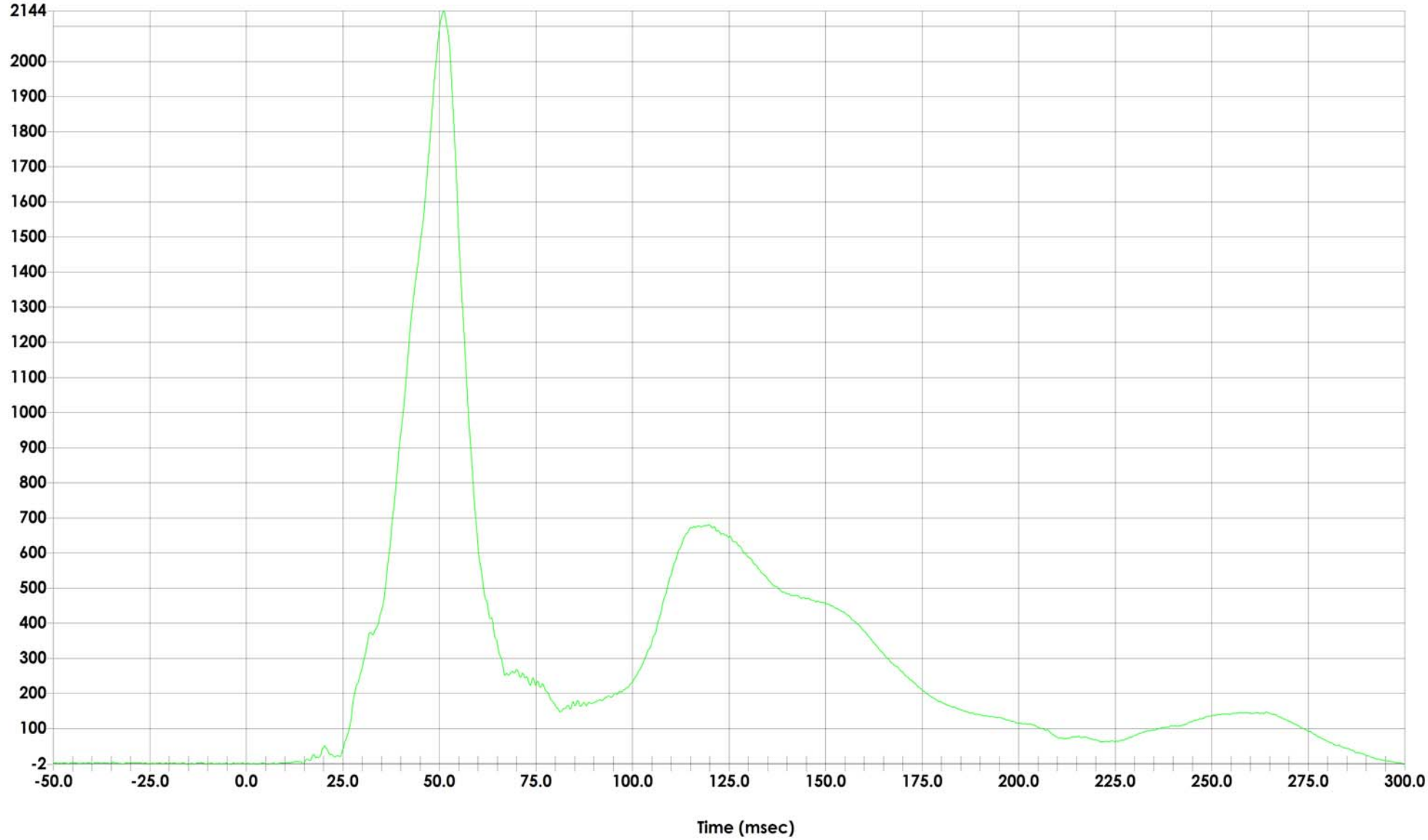


Test ID	MD 0313
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	016
Units	NWT

Max	2143.60	NWT
	51.12	msec
Min	-1.81	NWT
	5.52	msec

MEDICAL COLLEGE OF WISCONSIN

Acetabulum Force on Impact Side (Y) vs. Time

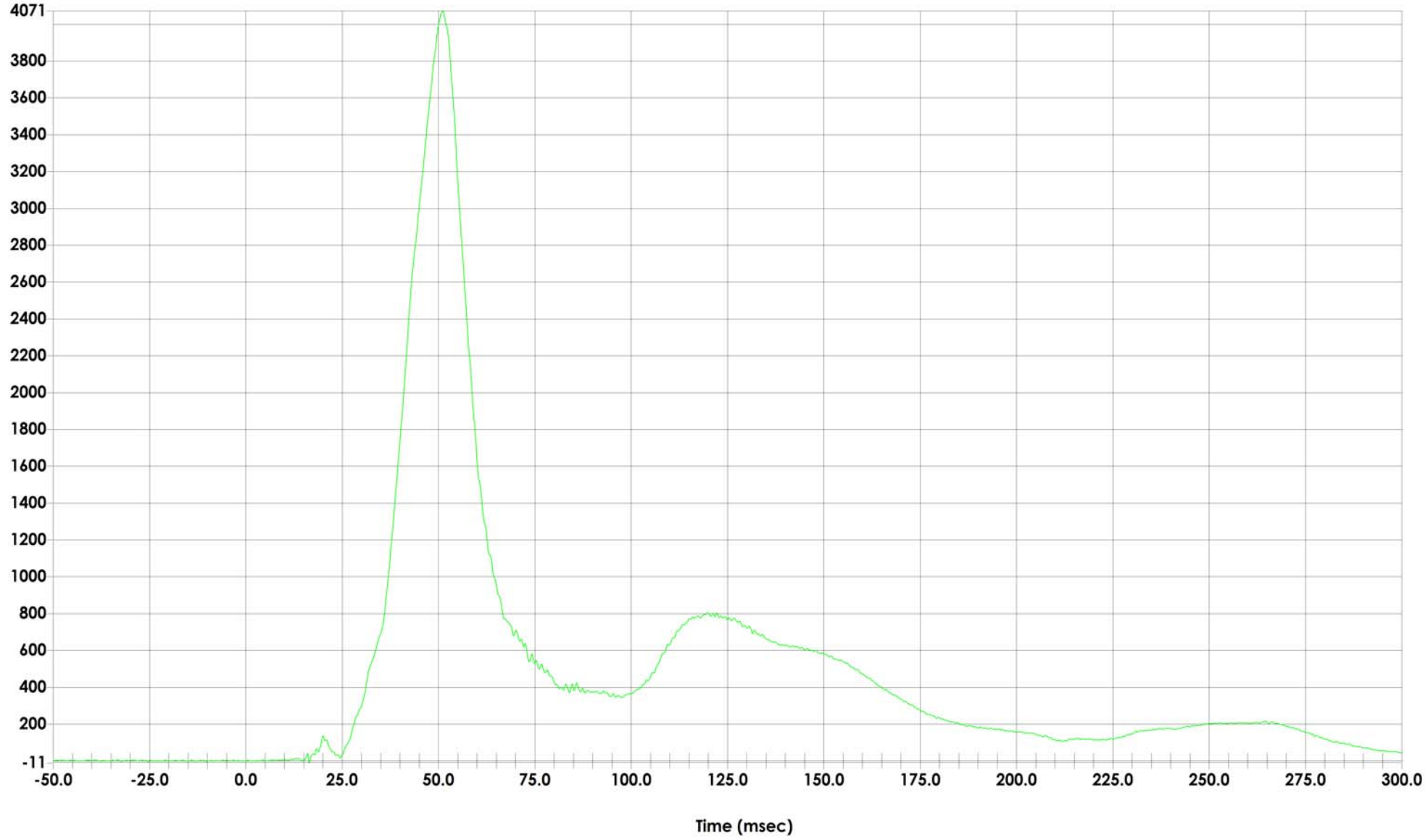


Test ID	MD 0313
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	045
Units	NWT

Max	4071.44	NWT
	51.12	msec
Min	-10.82	NWT
	16.40	msec

MEDICAL COLLEGE OF WISCONSIN

Driver Total Pelvis Force on Impact Side (Y) vs. Time



APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE DATA

TABLE 1
EXTERNAL MEASUREMENTS

SIDIIs Serial Number 301 Test Sequences 1 & 2

TEST PARAMETER	SPEC.	PRE		POST	
Date	-	7-11-12		12-5-12	
Sequential Test Number	-	1		2	
		Result	**Pass/Fail**	**Result**	**Pass/Fail**
Temperature (°C)	**20.6-22.2**	21.2	Pass	21.1	Pass
Relative Humidity (%)	**10-70**	47.7	Pass	22.6	Pass
Sitting Height	**772 – 788**	778	Pass	778	Pass
Shoulder Pivot Height	**437 – 453**	445	Pass	439	Pass
H-Point Height	**79 – 89**	85	Pass	85	Pass
H-Point from Seat Back	**141 – 151**	145	Pass	146	Pass
Shoulder Pivot from Backline	**97 – 107**	102	Pass	103	Pass
Thigh Clearance	**119 – 135**	122	Pass	123	Pass
Head Breadth	**140 – 148**	141	Pass	142	Pass
Head Back from Backline	**40 – 46**	42	Pass	42	Pass
Head Depth	**178 – 188**	181	Pass	182	Pass
Head Circumference	**541 – 551**	544	Pass	544	Pass
Buttock to Knee Length	**514 – 540**	515	Pass	523	Pass
Popliteal Height	**343 – 369**	344	Pass	351	Pass
Knee Pivot to Floor Height	**392 – 409**	395	Pass	402	Pass
Buttock Popliteal Length	**416 – 442**	421	Pass	430	Pass
Chest Depth w/o Jacket	**195 – 211**	208	Pass	210	Pass
Foot Length	**216 – 232**	221	Pass	223	Pass
Hip Breadth	**313 – 323**	322	Pass	319	Pass
Arm Length	**249 – 259**	255	Pass	253	Pass
Knee Joint to Seat Back	**477 – 493**	482	Pass	483	Pass
Shoulder Width	**341 – 357**	346	Pass	350	Pass
Foot Width	**78 – 94**	85	Pass	82	Pass
Chest Circumference w/Jacket	**851 – 881**	861	Pass	855	Pass
Waist Circumference	**761 – 791**	779	Pass	775	Pass

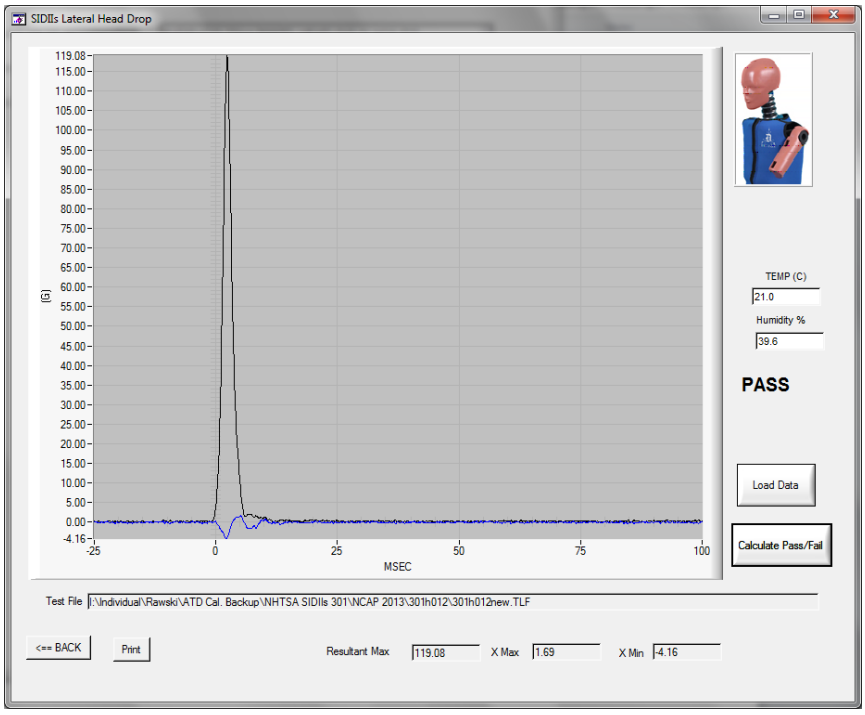
TABLE 2
HEAD DROP TEST

SIDIIs Serial Number 301 Test Sequences 1 & 2

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	6-27-12		12-1-12	
Sequential Test Number		-	1		2	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Head Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	21.0	Pass	20.9	Pass
	Min		20.9	Pass	20.8	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	45.2	Pass	34.3	Pass
	Min		39.6	Pass	34.2	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.0	Pass	20.9	Pass
Humidity – During Test (%)		**10-70**	39.6	Pass	34.3	Pass
Peak Head Resultant Acceleration (G)		**115-137**	119.1	Pass	119.7	Pass
Peak Head X Acceleration (G)		**<15**	1.7	Pass	3.2	Pass
Unimodal (Oscillation) (Yes/No)		**<15%**	-	Yes	-	Yes

TABLE 2
HEAD DROP TEST (CONTINUED)

PRE-TEST



POST-TEST

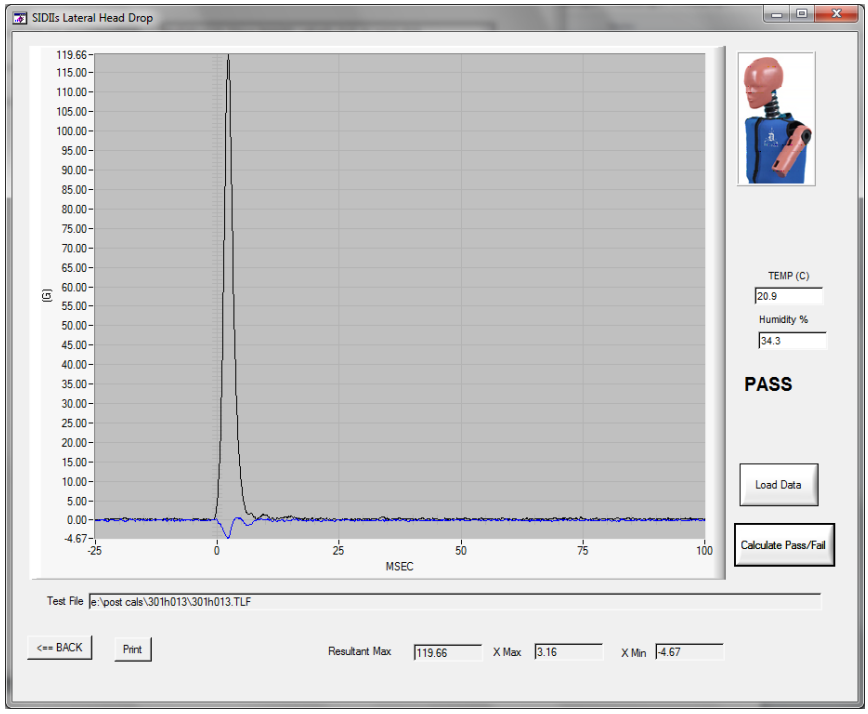


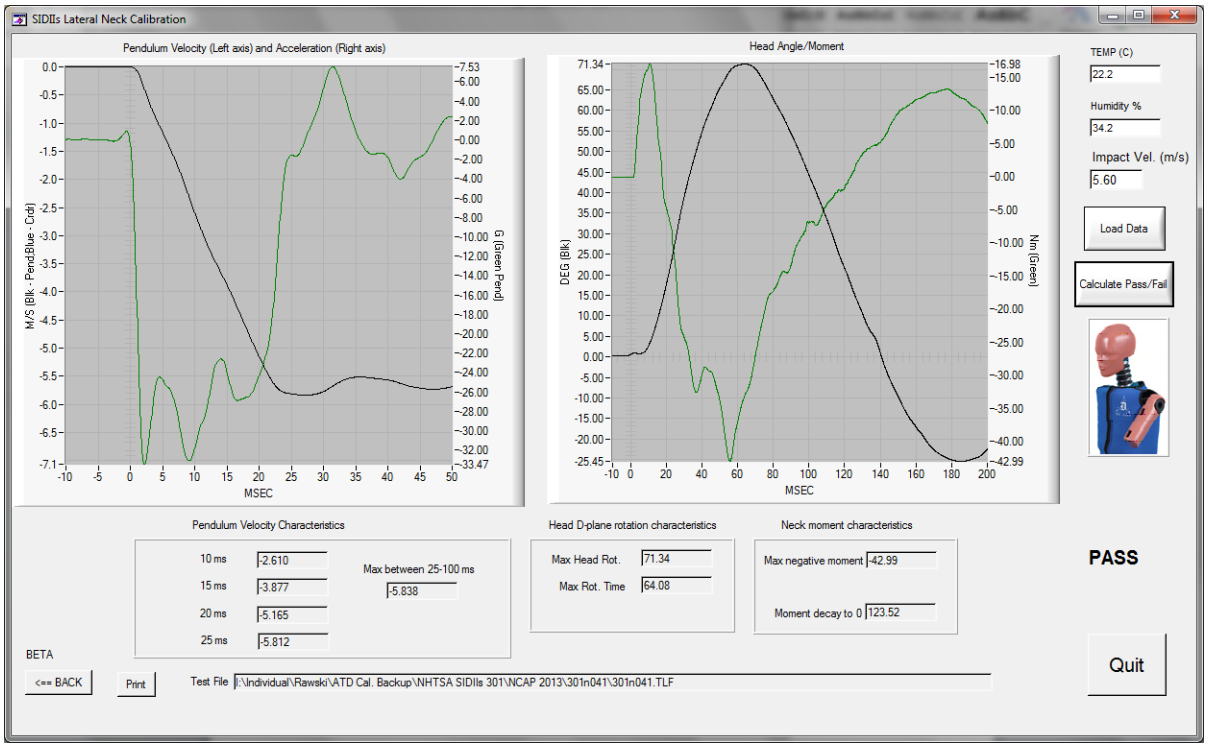
TABLE 3
LATERAL NECK PENDULUM TEST

SIDIIs Serial Number 301 Test Sequences 1 & 2

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	7-5-12		12-1-12	
Sequential Test Number		-	1		2	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Neck Assembly Soak Time (min)		**≥ 240**	240	Pass	240	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	22.2	Pass	20.9	Pass
	Min		21.3	Pass	20.8	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	41.0	Pass	34.3	Pass
	Min		34.2	Pass	34.2	Pass
Temperature – During Test (°C)		**20.6-22.2**	22.2	Pass	20.9	Pass
Humidity – During Test (%)		**10-70**	34.2	Pass	34.3	Pass
Pendulum Velocity (m/s)		**5.51-5.63**	5.60	Pass	5.56	Pass
Pendulum Deceleration (G)	10 ms	**2.20-2.80**	2.61	Pass	2.5	Pass
	15 ms	**3.30-4.10**	3.88	Pass	3.71	Pass
	20 ms	**4.40-5.40**	5.17	Pass	4.98	Pass
	25 ms	**5.40-6.10**	5.81	Pass	5.82	Pass
	25-100 ms	**5.50-6.20**	5.84	Pass	5.89	Pass
Maximum D-Plane rotation (deg)		**71-81**	71.3	Pass	71.5	Pass
Time of Maximum D-Plane Rotation (ms)		**50-70**	64.1	Pass	63.4	Pass
Peak Occ. Condyle Moment (Nm)		**36-44**	43.0	Pass	40.0	Pass
Time of Moment Decay (ms)		**102-126**	123.5	Pass	122.8	Pass

TABLE 3
LATERAL NECK PENDULUM TEST (CONTINUED)

PRE-TEST



POST-TEST

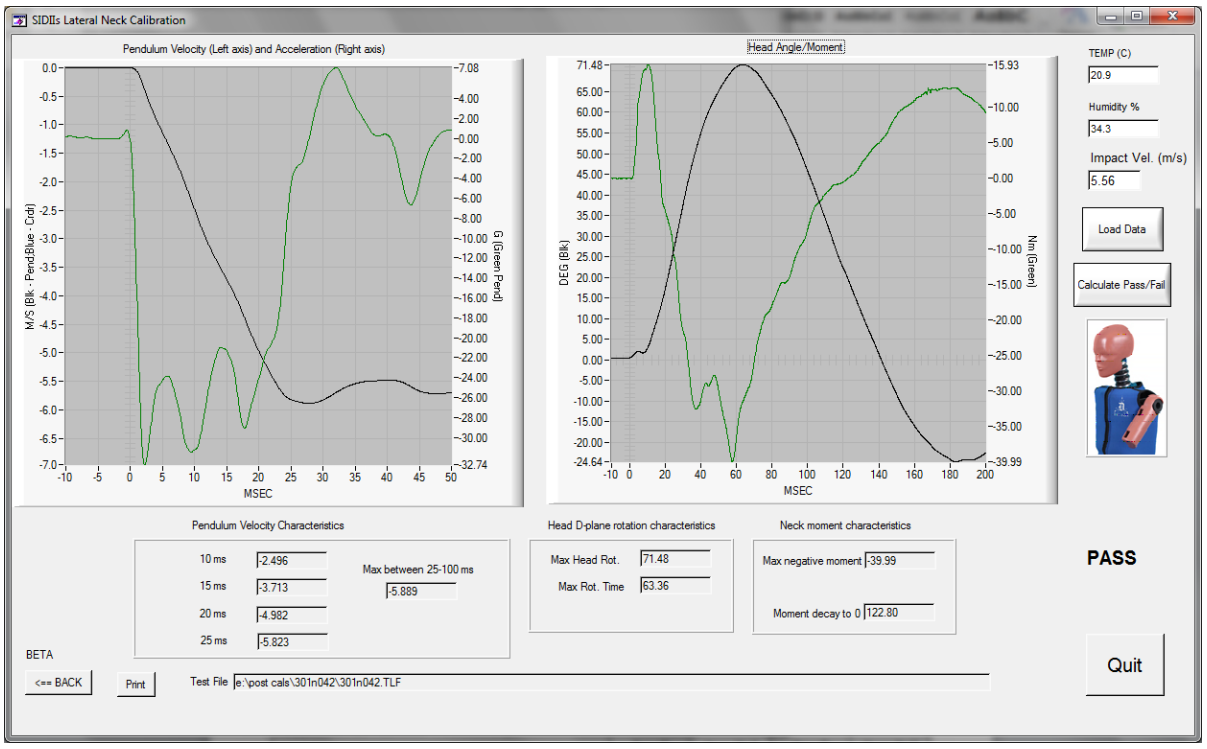


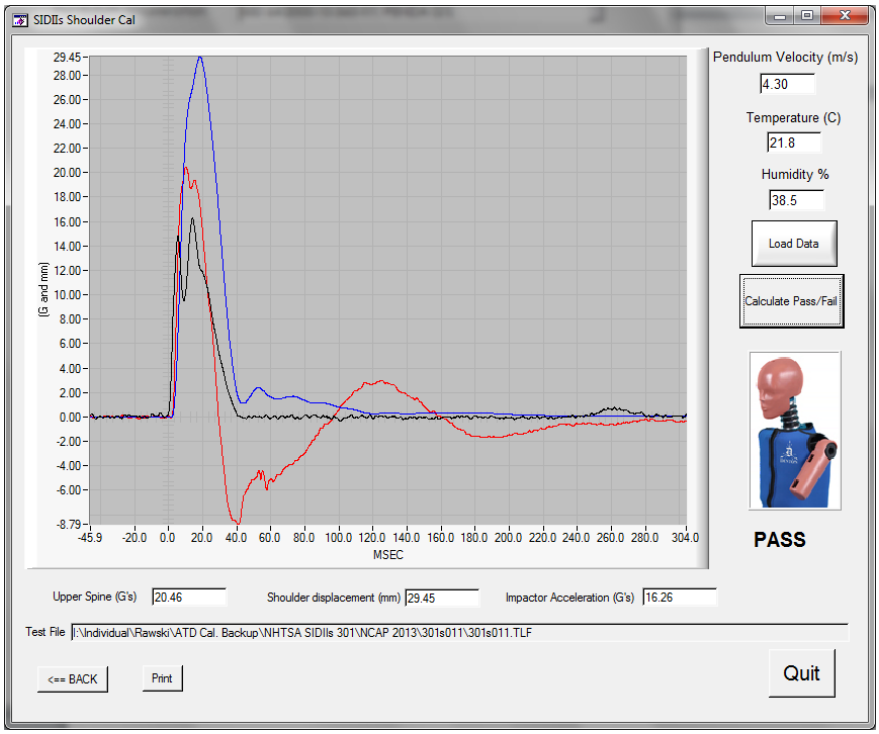
TABLE 4
SHOULDER IMPACT TEST

SIDIIs Serial Number 301 Test Sequences 1 & 2

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	7-10-12		12-3-12	
Sequential Test Number		-	1		2	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	21.8	Pass	21.9	Pass
	Min		21.0	Pass	20.8	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	41.3	Pass	42.3	Pass
	Min		38.5	Pass	34.1	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.8	Pass	21.9	Pass
Relative Humidity – During Test (%)		**10-70**	38.5	Pass	42.3	Pass
Impactor Velocity (m/s)		**4.2-4.4**	4.30	Pass	4.30	Pass
Peak Shoulder Deflection (mm)		**28-37**	29.5	Pass	31.1	Pass
Peak Lateral Spine (T1) Acceleration Y (G)		**17-22**	20.5	Pass	20.8	Pass
Peak Impactor Acceleration (G)		**13-18**	16.3	Pass	16.1	Pass

TABLE 4
SHOULDER IMPACT TEST (CONTINUED)

PRE-TEST



POST-TEST

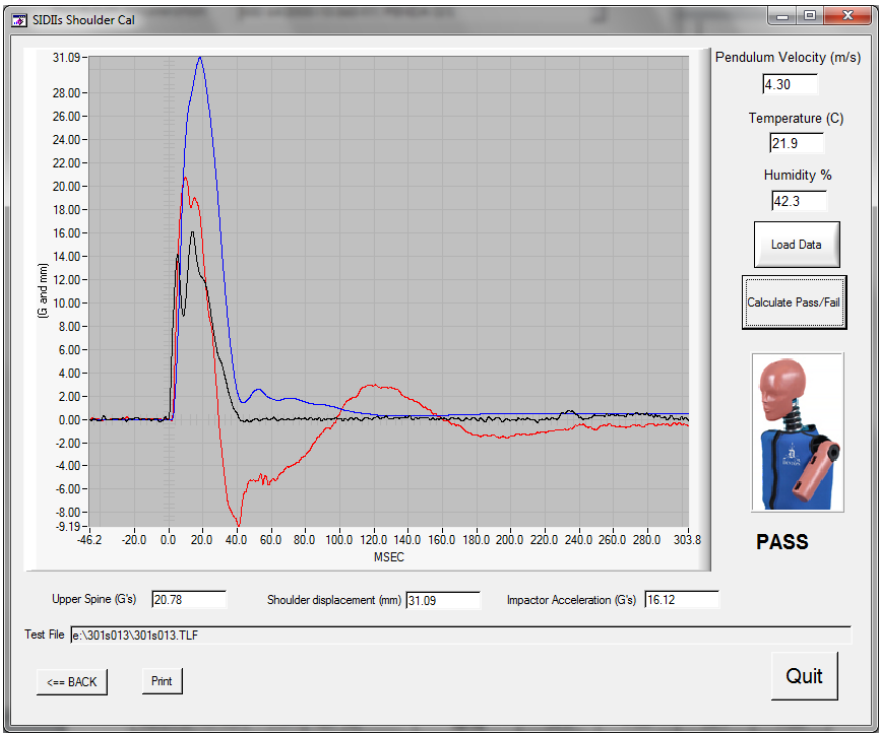


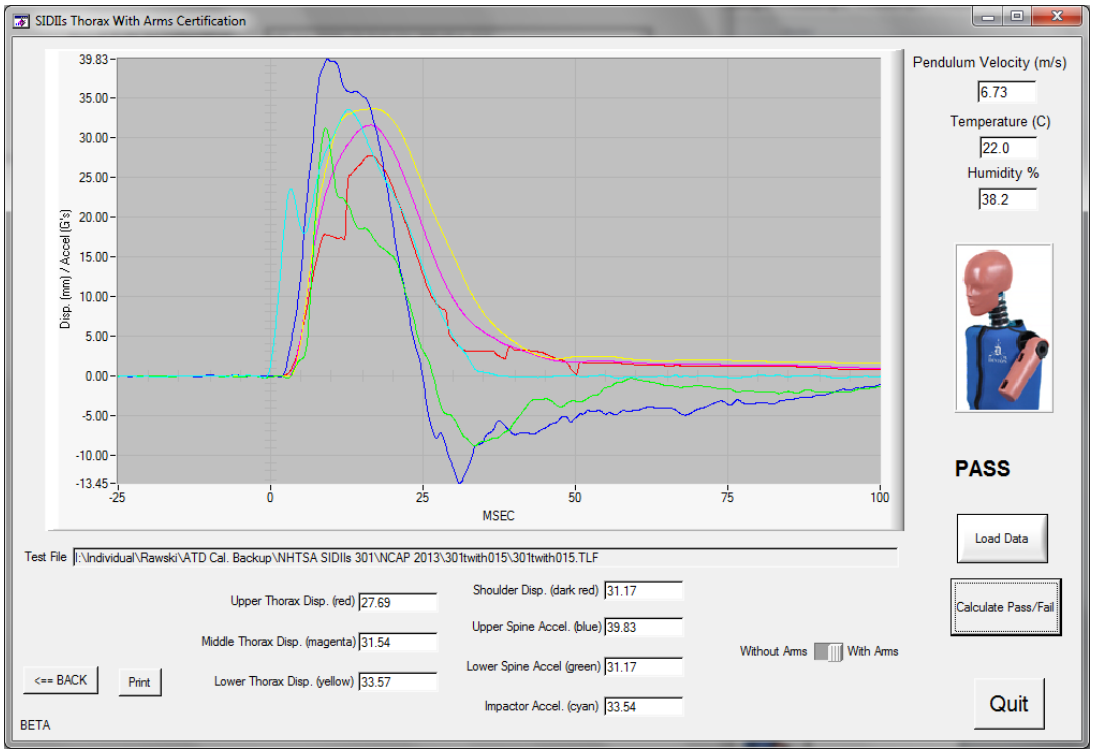
TABLE 5
THORAX (WITH ARM) IMPACT TEST

SIDIIs Serial Number 301 Test Sequences 1 & 2

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	7-10-12		12-4-12	
Sequential Test Number		-	1		2	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	22.0	Pass	21.9	Pass
	Min		21.3	Pass	20.8	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	41.2	Pass	42.3	Pass
	Min		38.2	Pass	34.1	Pass
Temperature – During Test (°C)		**20.6-22.2**	22.0	Pass	21.9	Pass
Relative Humidity – During Test (%)		**10-70**	38.2	Pass	42.3	Pass
Impactor Velocity (m/s)		**6.6-6.8**	6.73	Pass	6.73	Pass
Peak Shoulder Deflection (mm)		**31-40**	31.2	Pass	31.1	Pass
Peak Upper Rib Deflection (mm)		**25-32**	27.7	Pass	26.4	Pass
Peak Middle Rib Deflection (mm)		**30-36**	31.5	Pass	31.7	Pass
Peak Lower Rib Deflection (mm)		**32-38**	33.6	Pass	34.9	Pass
Peak Upper Spine (T1) Acceleration Y (G)		**34-43**	39.8	Pass	42.0	Pass
Peak Lower Spine (T12) Acceleration Y (G)		**29-37**	31.2	Pass	31.1	Pass
Peak Impactor Acceleration (G)		**30-36**	33.5	Pass	34.4	Pass

TABLE 5
THORAX (WITH ARM) IMPACT TEST (CONTINUED)

PRE-TEST



POST-TEST

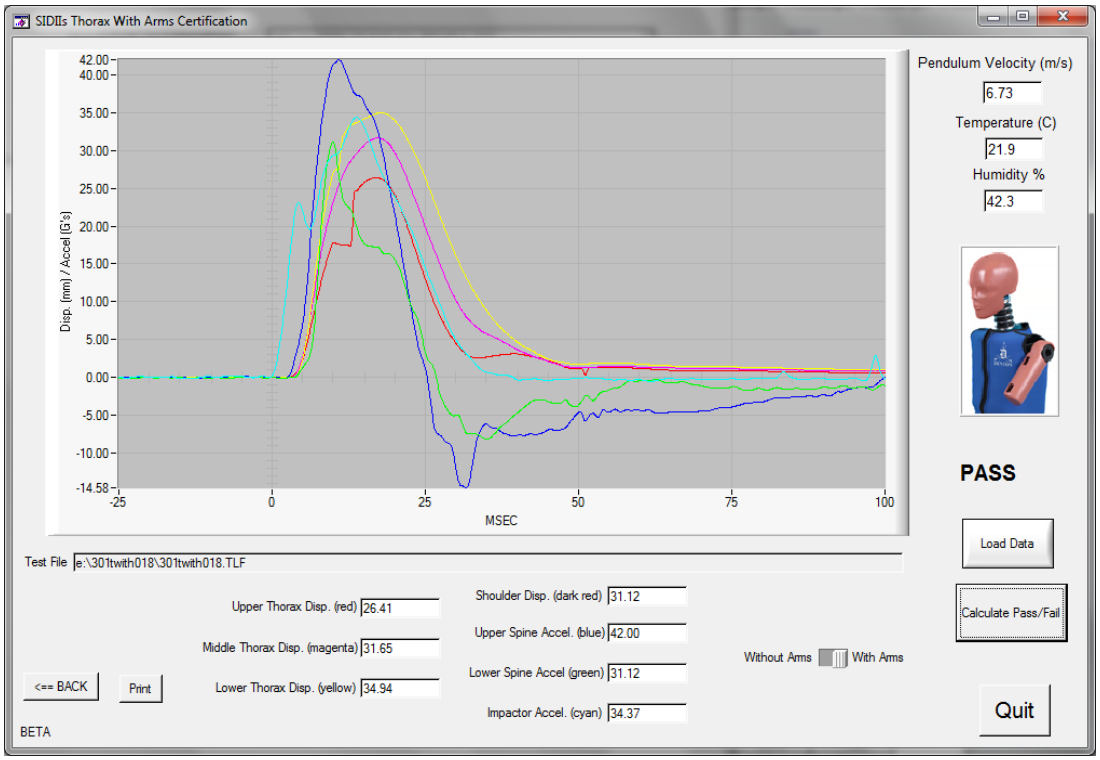


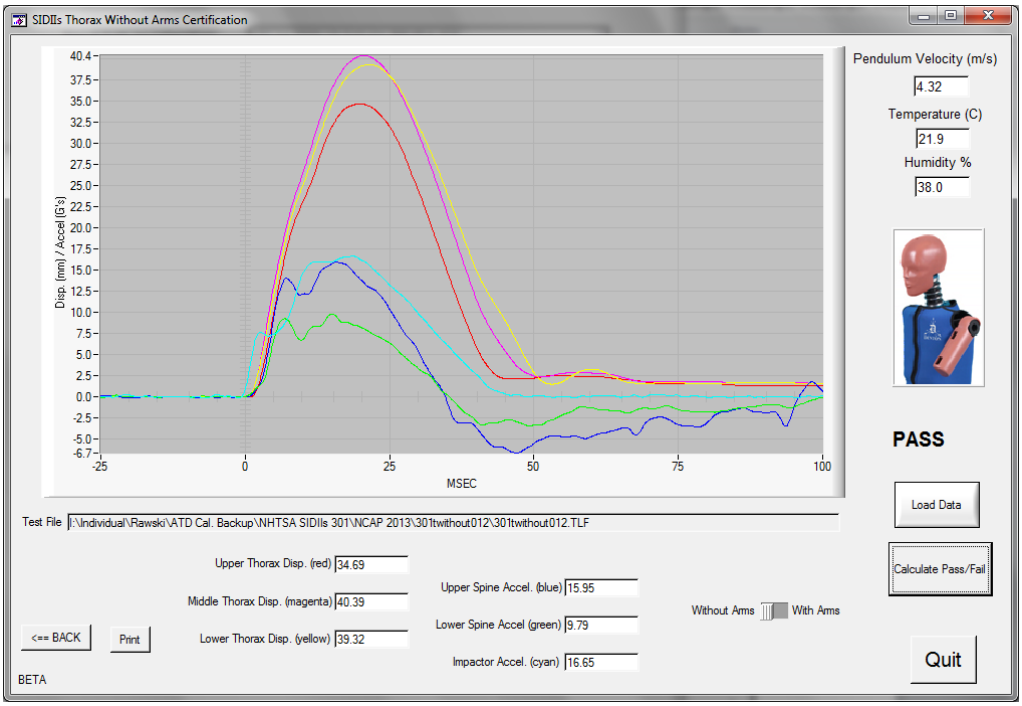
TABLE 6
THORAX (WITHOUT ARM) IMPACT TEST

SIDIIs Serial Number 301 Test Sequences 1 & 2

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	7-10-12		12-4-12	
Sequential Test Number		-	1		2	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	21.9	Pass	21.9	Pass
	Min		21.0	Pass	20.8	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	42.3	Pass	42.3	Pass
	Min		38.0	Pass	34.2	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.9	Pass	21.9	Pass
Relative Humidity – During Test (%)		**10-70**	38	Pass	42.3	Pass
Impactor Velocity (m/s)		**4.2-4.4**	4.32	Pass	4.32	Pass
Peak Upper Rib Deflection (mm)		**32-40**	34.7	Pass	35.3	Pass
Peak Middle Rib Deflection (mm)		**39-45**	40.4	Pass	39.6	Pass
Peak Lower Rib Deflection (mm)		**35-43**	39.3	Pass	37.3	Pass
Peak Upper Spine (T1) Acceleration Y (G)		**13-17**	16.0	Pass	16.3	Pass
Peak Lower Spine (T12) Acceleration Y (G)		**7-11**	9.8	Pass	9.3	Pass
Peak Impactor Acceleration (G)		**14-18**	16.7	Pass	16.6	Pass

TABLE 6
THORAX (WITHOUT ARM) IMPACT TEST (CONTINUED)

PRE-TEST



POST-TEST

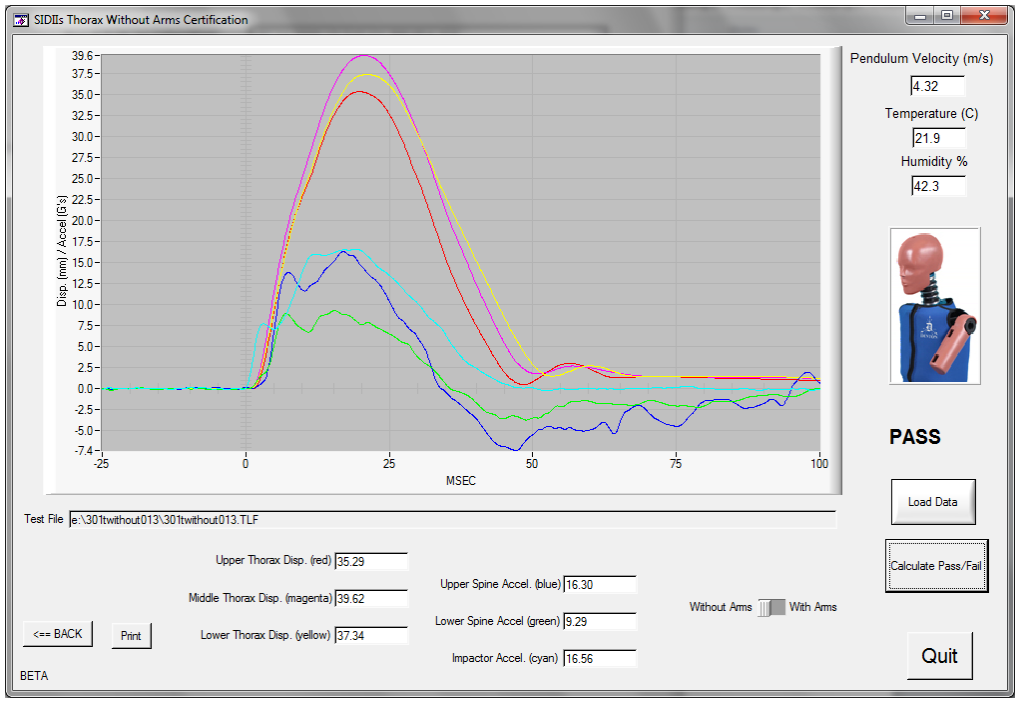


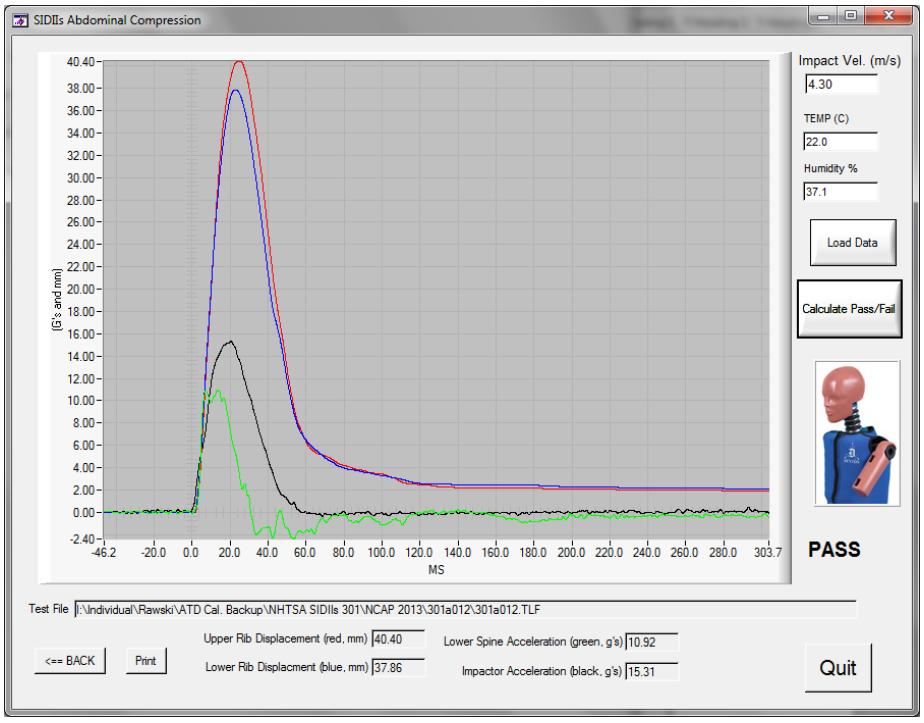
TABLE 7
ABDOMEN IMPACT TEST

SIDIIs Serial Number 301 Test Sequences 1 & 2

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	7-10-12		12-4-12	
Sequential Test Number		-	1		2	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	22.0	Pass	21.9	Pass
	Min		21.2	Pass	20.8	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	41.2	Pass	42.3	Pass
	Min		37.1	Pass	34.1	Pass
Temperature – During Test (°C)		**20.6-22.2**	22.0	Pass	21.9	Pass
Relative Humidity – During Test (%)		**10-70**	37.1	Pass	42.3	Pass
Impactor Velocity (m/s)		**4.2-4.4**	4.30	Pass	4.30	Pass
Peak Upper Abdominal Rib Deflection (mm)		**36-47**	40.4	Pass	38.4	Pass
Peak Lower Abdominal Rib Deflection (mm)		**33-44**	37.9	Pass	39.6	Pass
Peak Lower Spine (T12) Acceleration Y (G)		**9-14**	10.9	Pass	12.3	Pass
Peak Impactor Acceleration (G)		**12-16**	15.3	Pass	15.3	Pass

TABLE 7
ABDOMEN IMPACT TEST (CONTINUED)

PRE-TEST



POST-TEST

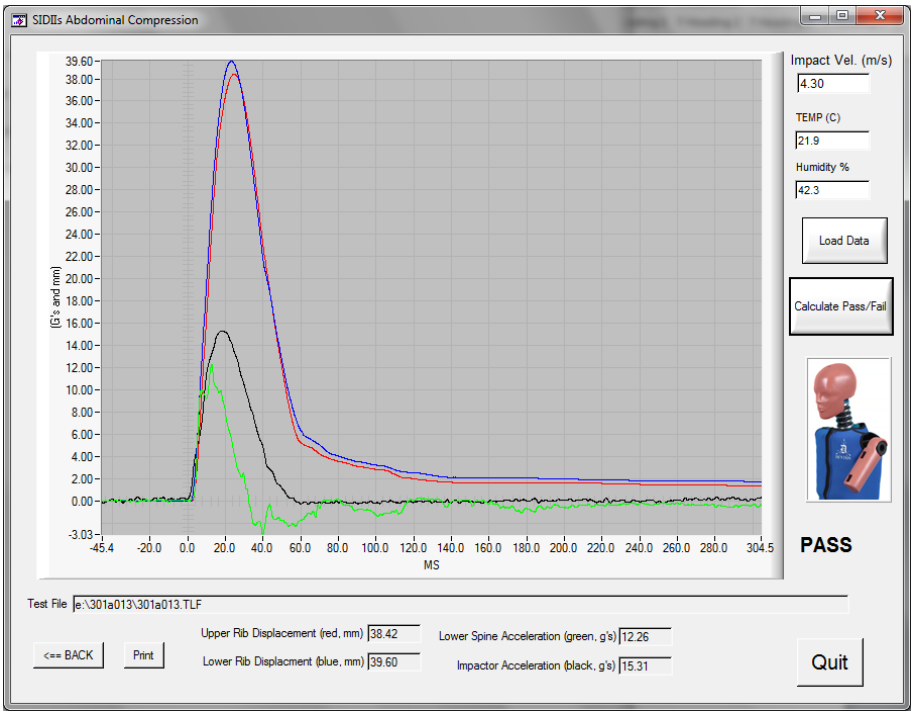
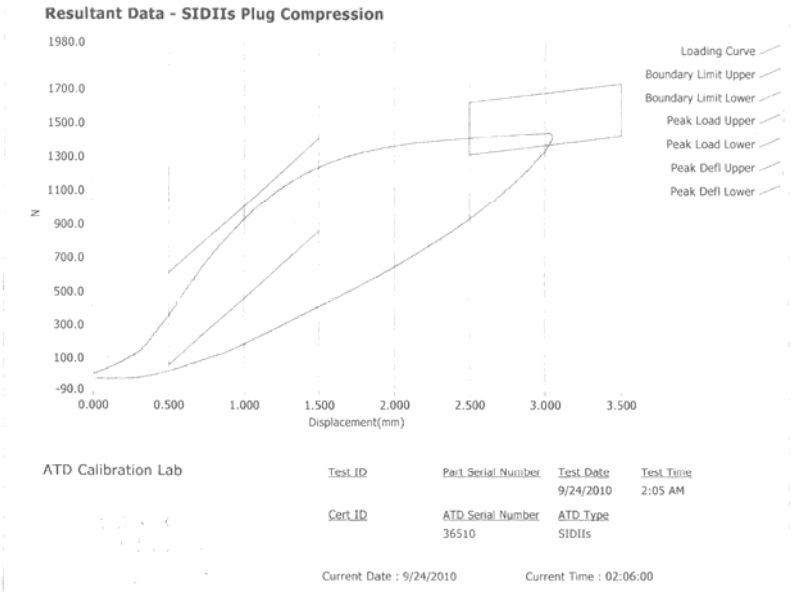


TABLE 8
PELVIS PLUG QUASI-STATIC TEST

PRE-TEST



POST-TEST

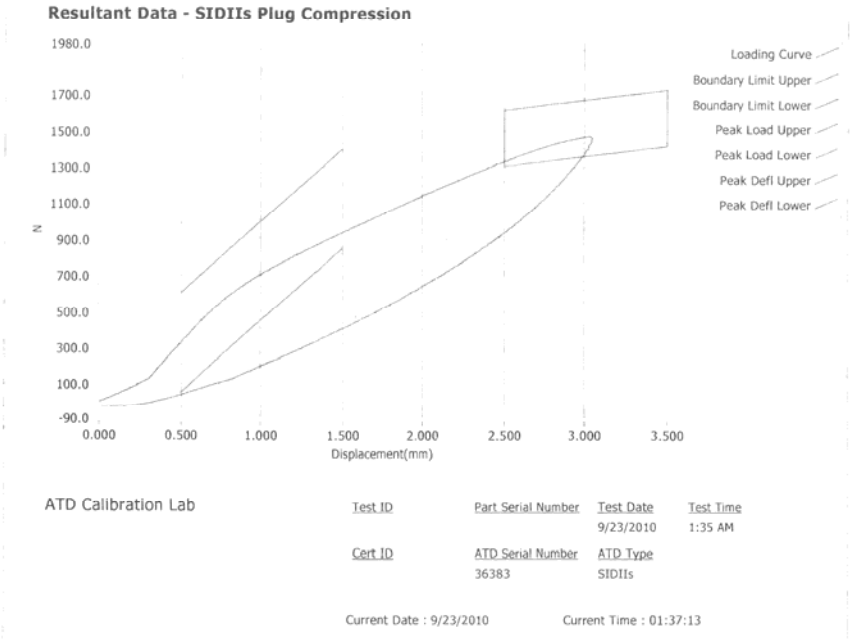


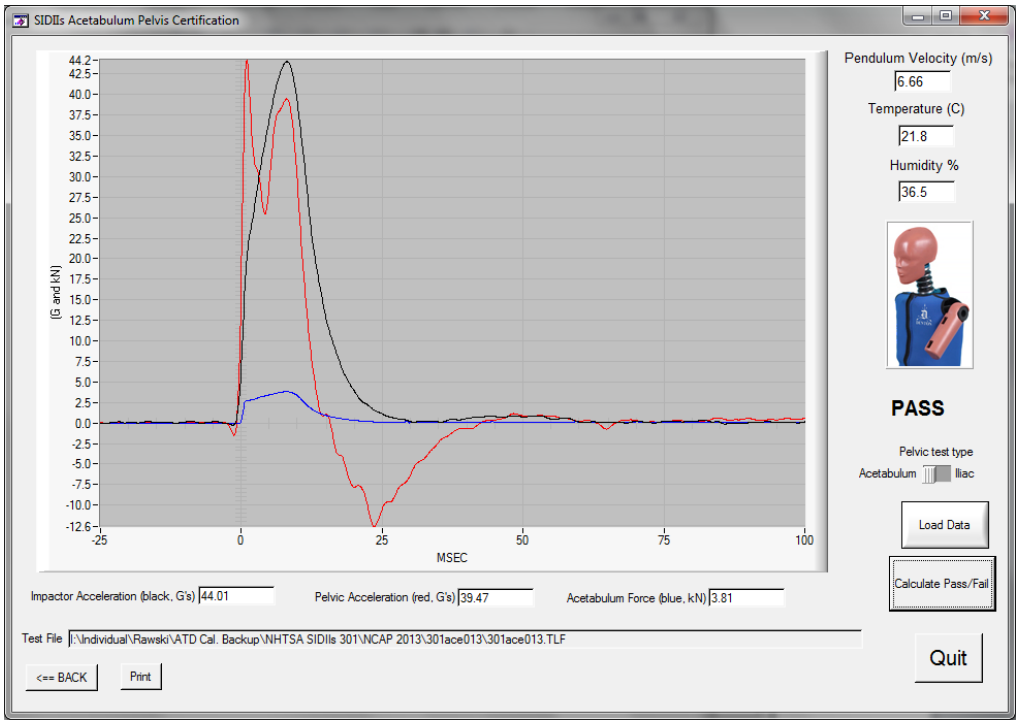
TABLE 9
PELVIS ACETABULUM IMPACT TEST

SIDIIs Serial Number 301 Test Sequences 1 & 2

TEST PARAMETER		SPEC.	PRE		POST	
Date		-	7-10-12		12-4-12	
Sequential Test Number		-	1		2	
			Result	**Pass/Fail**	**Results**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	21.8	Pass	21.9	Pass
	Min		21.0	Pass	20.8	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	41.2	Pass	42.3	Pass
	Min		36.5	Pass	34.1	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.8	Pass	21.9	Pass
Humidity – During Test (%)		**10-70**	36.5	Pass	42.3	Pass
Impactor Velocity (m/s)		**6.6-6.8**	6.66	Pass	6.66	Pass
Peak Impactor Acceleration (G)		**38-47**	44.0	Pass	44.9	Pass
Pelvis Acceleration Y after 6ms (G)		**34-42**	39.5	Pass	39.4	Pass
Peak Acetabulum Force (kN)		**3.60-4.30**	3.8	Pass	4.1	Pass
Pelvis Plug Serial No. 36510 (Pre) 36383 (Post)						

TABLE 9
PELVIS ACETABULUM IMPACT TEST (CONTINUED)

PRE-TEST



POST-TEST

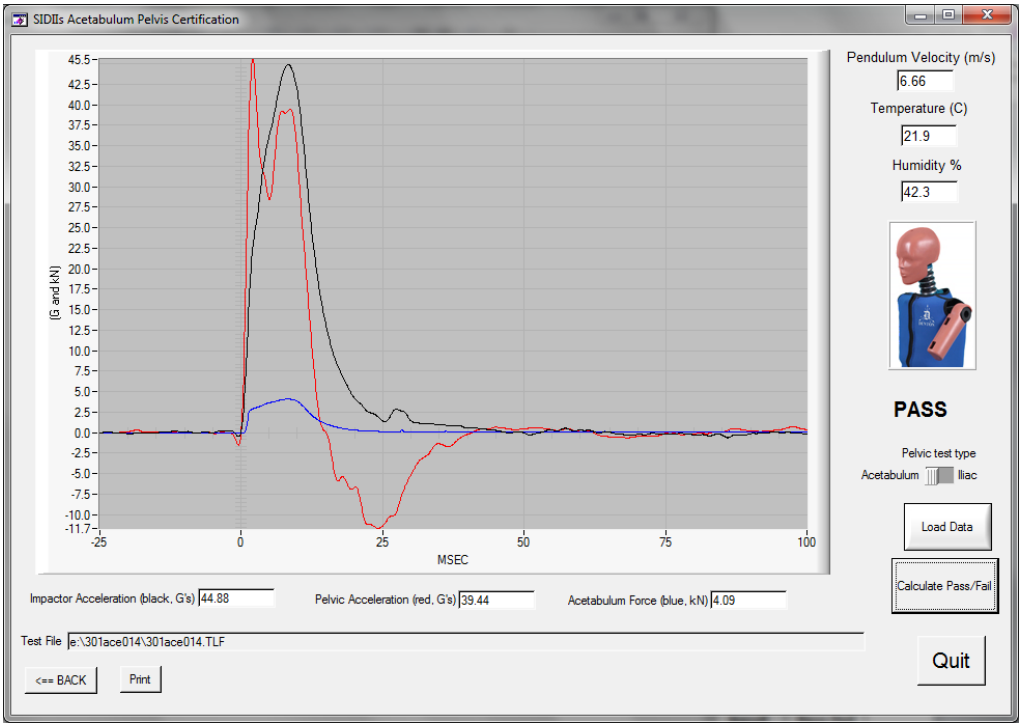


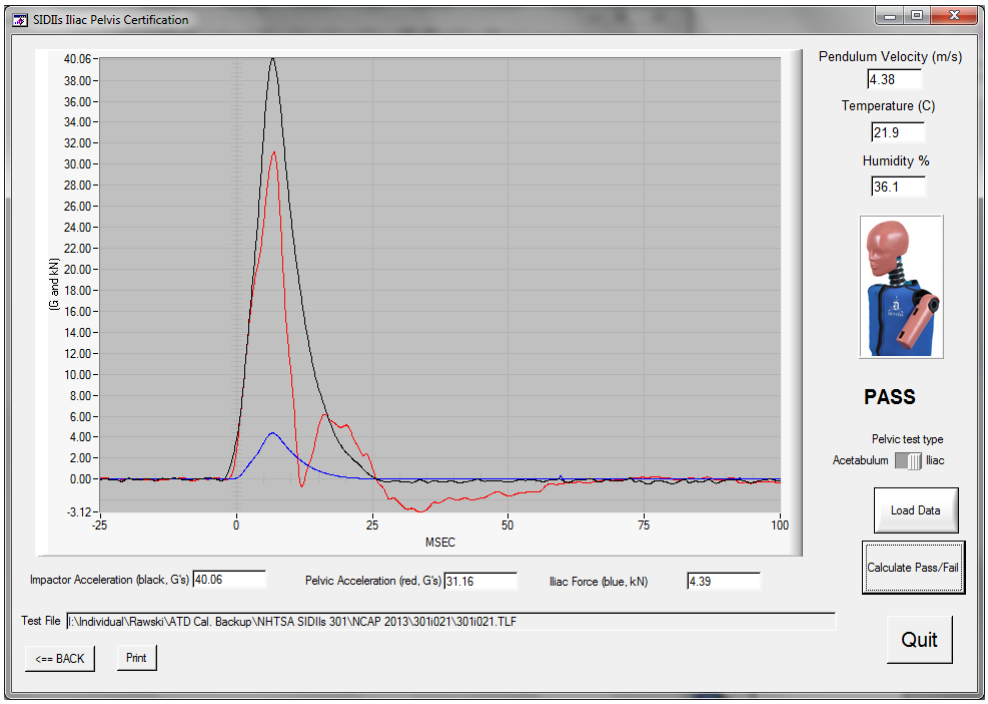
TABLE 10
PELVIS ILIAC IMPACT TEST

SIDIIs Serial Number 301 Test Sequences 1 & 2

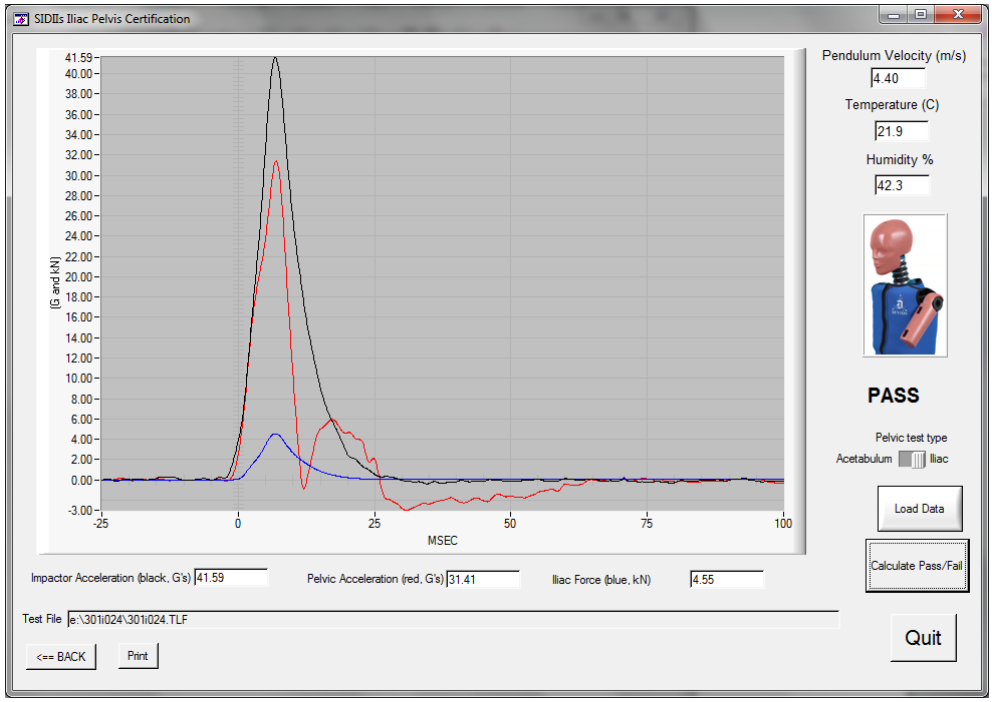
TEST PARAMETER		SPEC.	PRE		POST	
Date		-	7-10-12		12-4-12	
Sequential Test Number		-	1		2	
			Result	**Pass/Fail**	**Result**	**Pass/Fail**
Dummy Soak Time (min)		**≥ 180**	180	Pass	180	Pass
Temperature(°C) – During Soak	Max	**20.6-22.2**	21.9	Pass	21.9	Pass
	Min		20.8	Pass	20.8	Pass
Humidity(%) – During Soak	Max	**10.0-70.0**	41.2	Pass	42.3	Pass
	Min		36.1	Pass	34.1	Pass
Temperature – During Test (°C)		**20.6-22.2**	21.9	Pass	21.9	Pass
Humidity – During Test (%)		**10-70**	36.1	Pass	42.3	Pass
Pendulum Velocity (m/s)		**4.2-4.4**	4.38	Pass	4.4	Pass
Peak Impactor Acceleration (G)		**36-46**	40.1	Pass	41.6	Pass
Pelvis Acceleration Y (G)		**29-39**	31.2	Pass	31.4	Pass
Peak Iliac Force Y (N)		**4.00-5.20**	4.4	Pass	4.6	Pass
Pelvis Plug Serial No. 36510 (Pre) 36383 (Post)						

TABLE 10
PELVIS ILIAC IMPACT TEST (CONTINUED)

PRE-TEST



POST-TEST



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 - DUMMY INSTRUMENTATION

				SID-IIs S/N: 301		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	J43444	Endevco	15/JUNE/2011
			Y	J43739	Endevco	15/JUNE/2011
			Z	P21673	Endevco	15/JUNE/2011
			X_R	J43808	Endevco	15/JUNE/2011
			Y_R	12136	Endevco	15/JUNE/2011
			Z_R	P59119	Endevco	15/JUNE/2011
Displacement Potentiometers	Thoracic Rib	Upper	Y	1142	FTSS	16/APR/2012
		Middle	Y	014	Servo	27/OCT/2012
		Lower	Y	1155	FTSS	16/APR/2012
	Abdominal Rib	Upper	Y	1205	FTSS	16/APR/2012
		Lower	Y	1237	FTSS	16/APR/2012
Lower Spine Accelerometers (T_{12})			X	B13098	Endevco	15/JUNE/2011
			Y	J22318	Endevco	15/JUNE/2011
			Z	J22189	Endevco	15/JUNE/2011
Acetabulum Load Cell			Y	IF-520_115	FTSS	20/APR/2012
Iliac Wing Load Cell			Y	IF-520_DI4284	FTSS	19/APR/2012
Pelvis Plug (Struck-Side)				36309	FTSS	22/SEP/11
Pelvis Plug (Non-Struck-Side)				36403	FTSS	23/SEP/11

TABLE 2 - VEHICLE INSTRUMENTATION

		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P25041	Endevco	15/OCT/2012
Vehicle Center of Gravity	Y	P24138	Endevco	15/OCT/2012
Vehicle Center of Gravity	Z	P21689	Endevco	15/OCT/2012
Left Floor Sill	Y	A011644	MSI	15/OCT/2012
A-Pillar Sill	Y	A086969	MSI	15/OCT/2012
A-Pillar Low	Y	A086977	MSI	15/OCT/2012
A-Pillar Mid	Y	A086988	MSI	15/OCT/2012
B-Pillar Sill	Y	A011655	MSI	15/OCT/2012
B-Pillar Low	Y	A086966	MSI	15/OCT/2012
B-Pillar Mid	Y	A011668	MSI	15/OCT/2012
Driver Seat	Y	P59120	Endevco	15/OCT/2012
Engine Top	X	A011321	MSI	15/OCT/2012
Engine Top	Y	A011312	MSI	15/OCT/2012
Firewall	Y	A007227	MSI	15/OCT/2012
Right Roof	Y	DT54J	Endevco	15/OCT/2012
Right Floor Sill	Y	J43797	Endevco	15/OCT/2012
Rear Floorpan	X	P22230	Endevco	15/OCT/2012
Rear Floorpan	Y	P14233	Endevco	15/OCT/2012

TABLE 3 - POLE INSTRUMENTATION

		Serial Number	Manufacturer	Calibration Date
Load Cell 1	Y	332420	Interface	30/MAY/12
Load Cell 2	Y	332407	Interface	30/MAY/12
Load Cell 3	Y	332400	Interface	30/MAY/12
Load Cell 4	Y	352865	Interface	30/MAY/12
Load Cell 5	Y	332403	Interface	30/MAY/12
Load Cell 6	Y	334238	Interface	30/MAY/12
Load Cell 7	Y	330824	Interface	30/MAY/12
Load Cell 8	Y	330834	Interface	30/MAY/12