

**REPORT NUMBER: NCAPSIDE-MGA-2004-003**

**NEW CAR ASSESSMENT PROGRAM  
SIDE IMPACT TEST**

**Honda Motor Company  
2004 Acura TSX 4-Door  
NHTSA NUMBER: M45301**

**PREPARED BY:  
MGA RESEARCH CORPORATION  
5000 WARREN ROAD  
BURLINGTON, WI 53105**



**Test Date: January 14, 2004**

**Report Date: March 2, 2004**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
RULEMAKING  
OFFICE OF CRASHWORTHINESS STANDARDS  
400 SEVENTH STREET, SW, ROOM 5311  
WASHINGTON, D.C. 20590**

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\_\_\_\_\_  
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### Technical Report Documentation Page

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		<b>14. Sponsoring Agency Code</b> NVS-111																						
<b>15. Supplementary Notes</b>																								
<b>16. Abstract</b> A 55/28 km/h 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 2004 Acura TSX 4 Door to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on January 14, 2004. The impact velocity of the Moving Deformable Barrier (MDB) was 62.1km/h, and the ambient temperature at the struck side (driver's) of the vehicle was 21°C. The target vehicle's maximum post test static crush was 344 mm at level 2. The test vehicle's occupant performance is as follows: <table style="margin-left: auto; margin-right: auto; border: none;"> <thead> <tr> <th style="text-align: left;"></th> <th style="text-align: center;"><u>DRIVER</u></th> <th style="text-align: center;"><u>PASS.</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td style="text-align: center;">37</td> <td style="text-align: center;">69</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">49</td> <td style="text-align: center;">70</td> </tr> <tr> <td>Lower Spine (T<sub>12</sub>) Accel., g</td> <td style="text-align: center;">55</td> <td style="text-align: center;">64</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">52</td> <td style="text-align: center;">67</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">64</td> <td style="text-align: center;">57</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">288</td> <td style="text-align: center;">532</td> </tr> </tbody> </table>					<u>DRIVER</u>	<u>PASS.</u>	Left Upper Rib (LUR) Accel., g	37	69	Left Lower Rib (LLR) Accel., g	49	70	Lower Spine (T <sub>12</sub> ) Accel., g	55	64	Thoracic Trauma Index (TTI)	52	67	Pelvis (PEV) Accel., g	64	57	HIC	288	532
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Pelvis (PEV) Accel., g	64	57																						
HIC	288	532																						
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.																								
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**SECTION 1**  
**PURPOSE AND TEST PROCEDURE**

**1.1 PURPOSE**

This side impact test was conducted as part of the FY' 2004 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-03-D-12005. The purpose of this test was to evaluate side impact protection in a 2004 Acura TSX 4 Door manufactured by Honda Motor Company.

**1.2 TEST PROCEDURE**

The side impact test was conducted in accordance with the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002 and the corresponding MGA Research Corporation Test Procedure MGA-NHTSA5. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

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

## SECTION 2

### SUMMARY OF NCAP SIDE IMPACT TEST

#### 2.1 SUMMARY OF SIDE IMPACT TEST

A model year 2004 Acura TSX 4 Door was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.1 km/h. The specified impact velocity range is from 61.1 to 62.7 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1664.7 kg and the test weight of the MDB was 1361.2 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on January 14, 2004.

One (1) real-time motion picture camera and nine (9) high-speed motion picture cameras were used to document the impact event. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information are documented in the data sheets. Pre- and post-test photographs of the vehicle and Side Impact Dummies (SID/HIII's) can be found in Appendix A. Two 50th percentile adult male SID/HIII's were placed in the driver and left rear passenger designated seating positions according to instructions specified in the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002. Each SID/HIII was instrumented in the following locations:

- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)
- Head Center of Gravity (CG) tri-axial accelerometers (X, Y and Z axes primary and redundant)
- Upper Neck load cell (Fx, Fy, Fz, Mx, My, Mz)

The test vehicle was instrumented with twenty-five (25) structural accelerometers and the MDB was instrumented with six (6) accelerometers and two (2) contact switches on the bumper to compare left side to right side bumper impact timing. All data channels were recorded with a fully self contained on-board EME Data Acquisition System. The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

#### 2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 344 mm at level 2, 1200 mm rearward of the left vertical impact point. The driver and passenger SID/HIII's, Serial Nos. 904 and 271 respectively, were calibrated just prior to this test. The SID/HIII's injury criteria are summarized as follows:

Measurements	Units	Driver	Passenger
Thoracic Trauma Index (TTI)	G's	52	67
Peak Pelvic G's (PEV)	G's	64	57
Head Injury Criteria (HIC)	none	288	532

Test summaries and post-test observations are presented in Section 3. The vehicle, camera, and occupant measurements are presented in Section 4. Appendix A contains the still photograph prints. Appendix B contains the driver and passenger SID/HIII's, vehicle, and MDB response data traces. Appendix C contains the SID/HIII's configuration and performance verification data. Appendix D contains the test equipment information.

## TEST NOTES

There was questionable data collected for the following channels:

Mid Rear of LR Door Y after approximately 36 msec.

### SECTION 3

#### SIDE IMPACT HYBRID III DUMMY (SID/HIII) AND VEHICLE TEST DATA

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04

#### CONVERSION FACTORS USED IN THIS REPORT\*

Quantity	Typical Application	English Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressure	lbf/in <sup>2</sup>	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	$=(tf - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

\*Based on the Recommended Practice in SAE J916, May 85

**DATA SHEET NO. 1**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04

**TEST VEHICLE INFORMATION**

Make	Acura
Model	TSX 4 Door
Body Style	Sedan
NHTSA No.	M45301
VIN	JH4CL95834C020320
Color	Red
Delivery Date	01/12/04
Odometer Reading (mile)	61
Dealer	Arlington Acura
Transmission	Manual
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	2.4
Engine Placement	Lateral
Automatic Door Locks (ADL)	No
Owner's Manual Details Instructions on Disabling ADLs	Not Applicable

**TEST VEHICLE OPTIONS**

Front Airbag	Yes
Side Airbags	Yes
Power Windows	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Power Brakes	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	Yes
Anti-lock Brakes	Yes
AM/FM/Clock	Yes
Anti-theft System	Yes
Cruise Control	Yes

**DATA FROM CERTIFICATION LABEL**

Manufactured By	Honda Motor Company	GVWR (kg)	1951
Date of Manufacture	11/03	GAWR Front (kg)	1059
		GAWR Rear (kg)	921

**DATA FROM TIRE PLACARD**

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	240	240
Cold / Test Pressure (kPa)	220	210
Recommended Tire Size	P215/50R17	P215/50R17
Tire Size on Vehicle	P215/50R17	P215/50R17
Tire Manufacturer	Michelin	Michelin

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	NA	
Number Of Occupants	2	3	0	5
Capacity Wt. (VCW) (kg)				386
Cargo Wt. (RCLW) (kg)				45

**DATA SHEET NO. 1... (continued)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2004 Acura TSX 4 Door NHTSA No. M45301  
 Test Program: NCAP Side Impact Test Date: 01/14/04

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	438.6	294.4		490.3	373.3	
Right	kg	438.2	294.4		451.8	349.3	
Ratio	%	59.8	40.2		56.6	43.4	
Totals	kg	876.8	588.8	1465.6	942.1	722.6	1664.7

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1465.6
Weight of 2 P572E ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	45.4
Calculated Vehicle Target Weight (TVTW)	kg	1672.5

\* Actual As Tested Weight (ATW) will be TVTW -5/-10 kg

**TEST VEHICLE ATTITUDES AND CG**

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	699	692	688	694	1073
As Tested	mm	686	683	664	668	1159
Fully Loaded	mm	684	683	656	668	

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2670
Total Vehicle Length at Left Side	mm	3712
Total Vehicle Length at Centerline	mm	4660
Total Vehicle Length at Right Side	mm	3712
Total Vehicle Width	mm	1764
Weight of Ballast in Cargo Area	kg	27.2
Amount of Stoddard Solvent in Fuel Tank	liters	60.8

**TEST VEHICLE VERTICAL IMPACT LINE DATA**

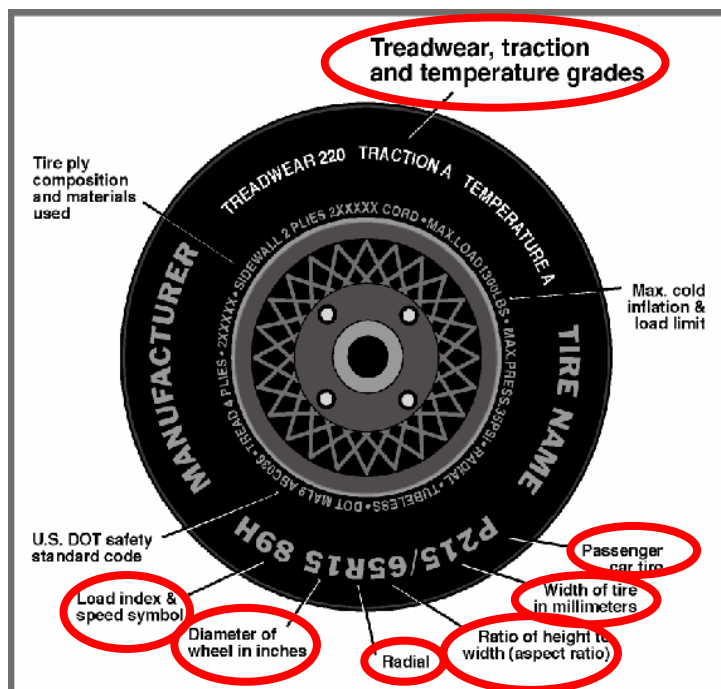
Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2670
Target Impact Point Aft of Front Axle	mm	395
Actual Impact Point Aft of Front Axle	mm	406

**DATA SHEET NO. 2**  
**TEST VEHICLE TIRE INFORMATION**

Test Vehicle: 2004 Acura TSX 4 Door  
Test Program: NCAP Side Impact

NHTSA No.: M45301  
Test Date: 01/14/04

Vehicle Year	2004	Vehicle Make	Acura
VIN	JH4CL95834C020320	Vehicle Model	TSX 4 Door



	Front	Rear
Tire Manufacturer	Michelin	Michelin
Tire Name	Pilot	Pilot
Tire Type	Touring	Touring
Tire Width (mm)	215	215
Ratio of Height to Width (aspect ratio)	50	50
Radial	R	R
Wheel Diameter	17	17
Load Index & Speed Symbol	93V	93V
Treadwear	300	300
Traction Grade	A	A
Temperature Grade	A	A

## DATA SHEET NO. 3

### TEST VEHICLE INFORMATION

Test Vehicle: 2004 Acura TSX 4 Door  
Test Program: NCAP Side Impact

NHTSA No. M45301  
Test Date: 01/14/04

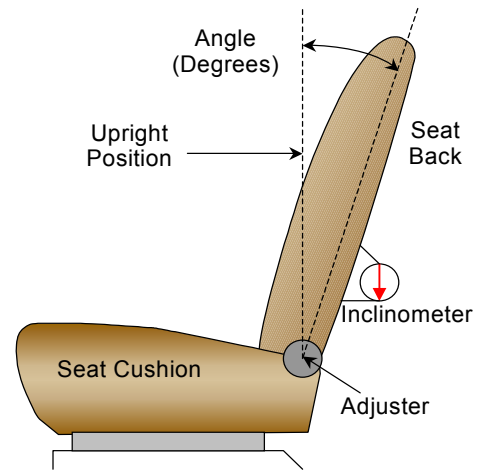
#### NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows:

Four detents rearward from the first locking detent.

Driver seat back angle: 12.4° on headrest post

Left Rear Passenger seat back angle: Non-adjustable



FRONT SEAT ASSEMBLY

#### SEAT FORE/AFT POSITIONS

The driver seat was power adjustable.

Driver seat fore/aft total travel: 240 mm

Left Rear Passenger seat fore/aft total travel: non adjustable

Driver seat fore/aft position: 120 of 240 mm

Left Rear Passenger seat fore/aft position: non adjustable

## DATA SHEET NO. 3... (continued)

### TEST VEHICLE INFORMATION

Test Vehicle: 2004 Acura TSX 4 Door  
Test Program: NCAP Side Impact

NHTSA No. M45301  
Test Date: 01/14/04

### FUEL TANK CAPACITY DATA

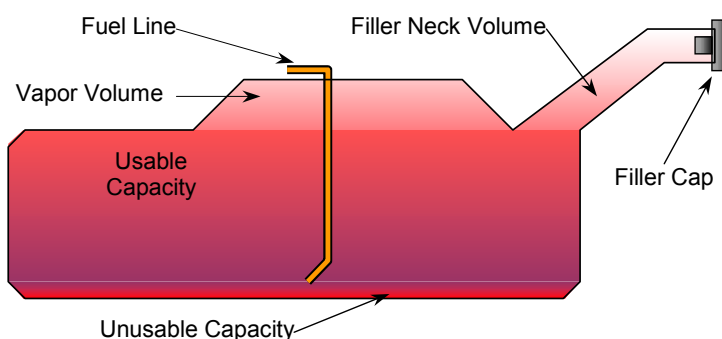
The "Usable Capacity" of the standard equipment fuel tank is: 64.7 liters

The "Usable Capacity" of any optional equipment fuel tank is: N/A liters

The "Usable Capacity" used for certification to FMVSS 301 requirements: 65.1 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 60.8 liters

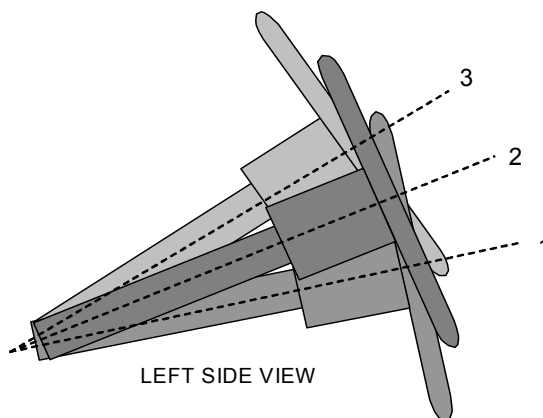
After the ignition key is turned from lock to on position, the pump will be filled up for two seconds, and then the pressure is maintained.



VEHICLE FUEL TANK ASSEMBLY

### STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes, when it is moved through its full range of driving positions.



STEERING COLUMN ASSEMBLY

The steering wheel was placed in the center of the full range of motion.

**DATA SHEET NO. 4  
TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2004 Acura TSX 4 Door  
Test Program: NCAP Side Impact

NHTSA No. M45301  
Test Date: 01/14/04

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	438.6	294.4		490.3	373.3	
Right	kg	438.2	294.4		451.8	349.3	
Weight Ratio	%	59.8	40.2		56.6	43.4	
Totals	kg	876.8	588.8	1465.6	942.1	722.6	1664.7

**MAXIMUM EXTERIOR STATIC CRUSH**

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	180	265
Level 2	Occupant H-Point	mm	344	550
Level 3	Mid Door	mm	317	611
Level 4	Window Sill	mm	237	916
Level 5	Window Top	mm	38	1335
N/A	Maximum Penetration	mm	344	550

**INSTRUMENTATION**

Driver SID/HIII Instrumentation	22
Passenger SID/HIII Instrumentation	22
Vehicle Structure Accelerometers	25
MDB Accelerometers	6
Total	75

**DATA SHEET NO. 5**

**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04

**MDB SPECIFICATIONS**

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2587
C.G. Location aft of Front Axle	1103

**MDB WEIGHTS**

	Units	Front Axle	Rear Axle	Total
Left	kg	449.4	239.9	
Right	kg	331.3	340.6	
Ratio	%	57.4	42.6	
Totals	kg	780.7	580.5	1361.2

**SPEED AND IMPACT ANGLE DATA**

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.1
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.1
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.8

**MAXIMUM STATIC CRUSH OF HONEYCOMB FACE**

Vertical Location			From Centerline		Max. Crush
Level	Description	Height	Distance	Direction	
1	Center of Bumper (mm)	432	800	Right	178
2	Top of Bumper (mm)	533	800	Right	84
3	Mid Level (mm)	686	800	Left	104
4	Top of Stack (mm)	813	800	Left	144

**MDB INSTRUMENTATION AND CAMERAS**

Accelerometers	6
Contact Switches	2
High Speed Cameras	2

**DATA SHEET NO. 6**

**POST TEST OBSERVATIONS**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04

**TEST DUMMY INFORMATION AND CONTACT POINTS**

Description	Front Seat SID/HIII	Rear Seat SID/HIII
Dummy Type / Serial No.	SID/HIII / 904	SID/HIII / 271
Head Contact	Airbag, Headrest, Left shoulder	C-Post, Airbag
Upper Torso Contact	Airbag	Door Panel
Lower Torso Contact	Mid Door	Door Panel
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	Left Knee	Left Knee

**POST TEST DOOR OPENING AND SEAT TRACK INFORMATION**

Description	Front	Rear
Locked/Unlocked Doors	Doors were unlocked	Doors were unlocked
Left Side Door Opening	Door remained closed and latched	Door remained closed and latched
Right Side Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Seat Movement	0	0
Seat Back Failure	None	None

**POST TEST STRUCTURAL OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	Cracked
Window Damage	Left Front and Left Rear
Other Notable Effects	Side airbag failed to properly deploy due to catching on the B-Pillar / Driver's seat back came apart

**AIRBAG DEPLOYMENT**

	Driver	Front Passenger	Rear Passenger
Front	No	No	N/A
Side (Torso Bag)	Yes	No	N/A
Curtain	Yes	No	Yes

**MDB LEFT EDGE IMPACT POINT DATA**

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	11 mm rear
Vertical Offset	mm	+/-20	16 mm up

**SECTION 4**  
**OCCUPANT AND VEHICLE INFORMATION**

**DATA SHEET NO. 7**

**SID/HIII INJURY CRITERIA AND SENSOR DATA**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04

**THORAX AND PELVIS PEAK ACCELERATIONS (FIR 100 Filtered)**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	36.7	34	-11.0	98	68.8	40	-9.2	65
Upper Rib (LUR) (R)	Y	G's	37.2	34	-11.4	97	71.8	39	-8.1	64
Lower Rib (LLR)	Y	G's	49.1	26	-10.7	71	69.9	40	-16.5	95
Lower Rib (LLR) (R)	Y	G's	50.0	26	-10.6	71	72.6	39	-15.5	95
Lower Spine (T <sub>12</sub> )	Y	G's	54.5	33	-12.8	67	64.1	43	-15.9	68
Lower Spine (T <sub>12</sub> ) (R)	Y	G's	53.7	33	-14.1	67	63.2	43	-15.2	68
Pelvis (PEV)	Y	G's	64.4	25	-21.1	50	56.5	34	-6.8	77
Pelvis (PEV) (R)	Y	G's	64.2	25	-20.0	51	55.6	34	-6.5	73

**THORACIC TRAUMA INDEX (TTI) AND PELVIC ACCELERATION (FIR 100 Filtered)**

Location	Driver				Passenger			
	LLR	T <sub>12</sub>	TTI(g)	PEV(g)	LLR	T <sub>12</sub>	TTI(g)	PEV(g)
Rib, Spine, and Pelvis	49.1	54.5	51.8	64.4	69.9	64.1	67.0	56.5
Rib, Spine, and Pelvis (R)	50.0	53.7	51.9	64.2	72.6	63.2	67.9	55.6

**HEAD CG PEAK ACCELERATIONS (SAE CLASS 1000 Filtered)**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	6.8	181	-23.8	50	9.6	160	-10.5	49
Head CG	Y	G's	57.0	47	-5.9	23	103.6	48	-4.3	165
Head CG	Z	G's	19.8	133	-9.4	85	14.1	40	-36.7	56
Head CG Resultant		G's	61.7	47			103.9	48		

**HEAD INJURY CRITERIA (SAE CLASS 1000 Filtered)**

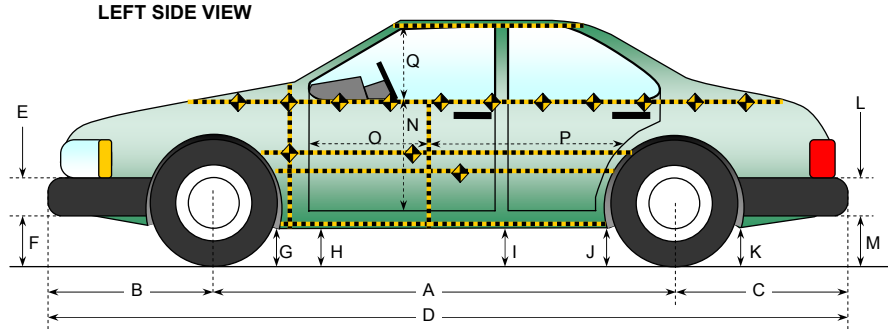
Location	Driver				Passenger			
	HIC	T <sup>1</sup>	T <sup>2</sup>	Avg G's	HIC	T <sup>1</sup>	T <sup>2</sup>	Avg G's
Head CG	288.0	35.7	56.2	45.6	532.4	44.9	56.5	73.2

Positive Acceleration Polarities: Longitudinal (X) = Forward  
 (Conforms to SAE J211) Lateral (Y) = Right  
 Vertical (Z) = Down

**DATA SHEET NO. 8**  
**VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04



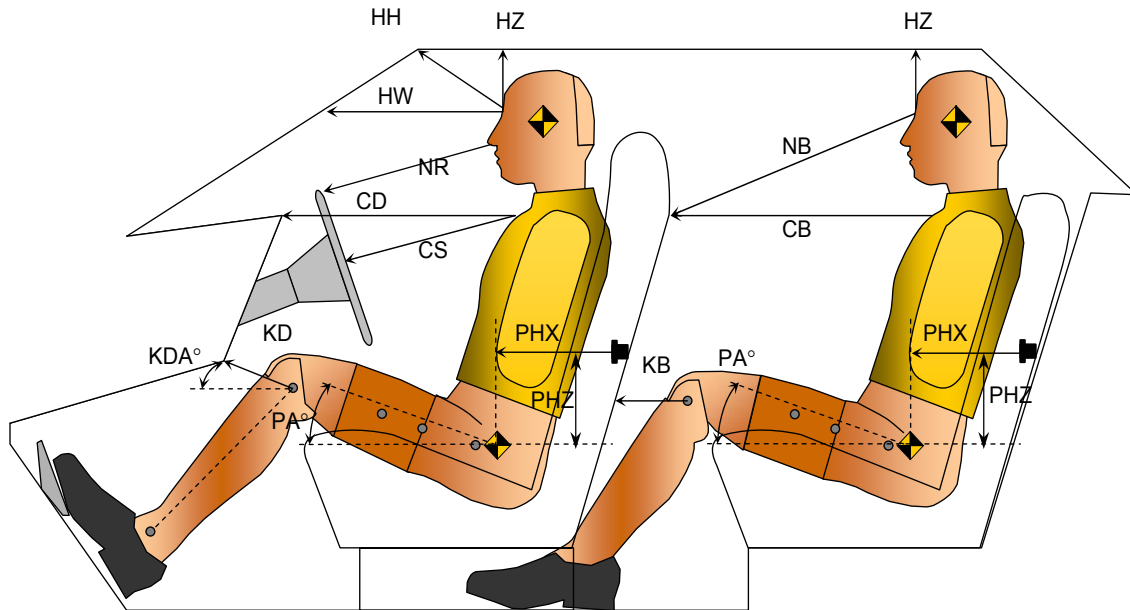
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2670	2659	11
B	Front Axle to FSOV	932	914	18
C	Rear Axle to RSOV	1020	1047	-27
D	Total Length at Centerline	4622	4620	2
E	Front Bumper Thickness	250	250	0
F	Front Bumper Bottom to Ground	424	432	-8
G	Sill Height at Front Wheel Well	172	232	-60
H	Sill Height at Front Door Leading Edge	172	230	-58
I	Sill Height at "B" Pillar	175	227	-52
J1	Sill Height at Rear Wheel Well	170	182	-12
J2	Pinch Weld Height at Rear Wheel Well	171	184	-13
K	Sill Height Aft of Rear Wheel Well	251	243	8
L	Rear Bumper Thickness	270	270	0
M	Rear Bumper Bottom to Ground	425	437	-12
N	Sill Height to Window Bottom Sill	665	492	173
O	Front Door Leading Edge to Impact CL	785	727	58
P	Rear Door Trailing Edge to Impact CL	1171	1083	88
Q	Front Window Opening	392	372	20
R	Right Side Length	3712	3724	-12
S	Left Side Length	3712	3696	16
T	Vehicle Width at "B" Post	1745	1506	239

**DATA SHEET NO. 9**  
**SID/HII LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04

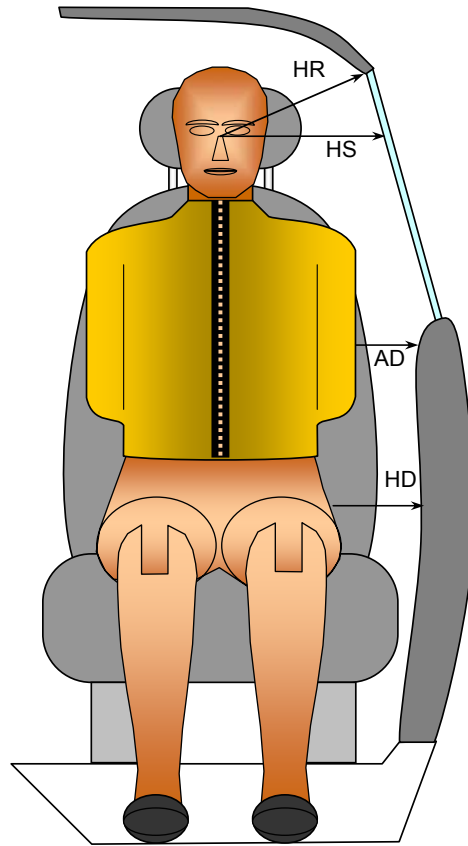


Driver Code	Pass. Code	Measurement Description	Driver 904		Passenger 271	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	372			
HW		Head to Windshield	573			
HZ	HZ	Head to Roof	130		133	
NR	NB	Nose to Rim/Nose to Seatback	432		617	
CD	CB	Chest to Dash or Seatback	534		534	
CS		Chest to Steering Wheel	347			
KDL	KBL	Left Knee to Dash or Seatback	168	28.9	201	16.9
KDR	KBR	Right Knee to Dash or Seatback	161	25.6	182	11.5
PA	PA	Pelvic Angle		23.2		24.3
PHX	PHX	H-Point to Striker (X-Axis)	207		241	
PHZ	PHZ	H-Point to Striker (Z-Axis)	164		309	

**DATA SHEET NO. 10**  
**SID/HIII LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04



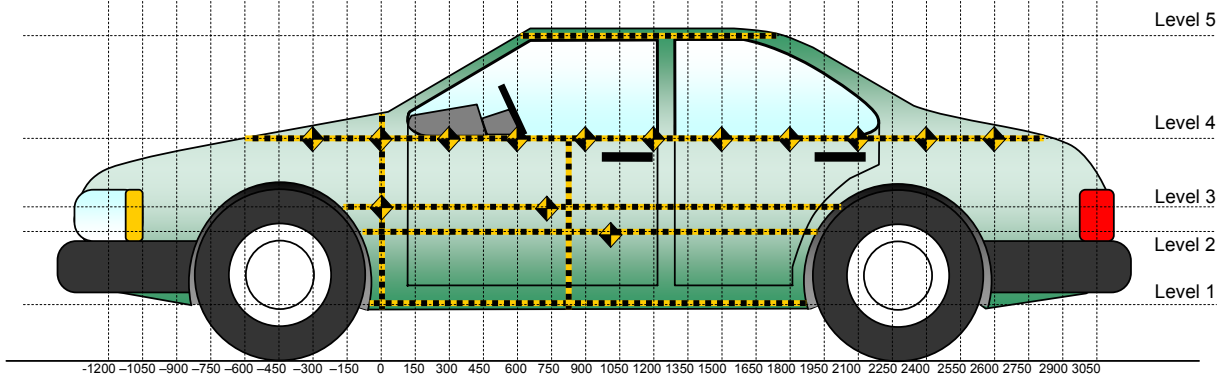
*FRONT VIEW OF DUMMY*

Code	Measurement Description	Units	Driver S/N 904	Passenger S/N 271
HR	Head to Side Header	mm	191	174
HS	Head to Side Window	mm	297	311
AD	Arm to Door	mm	86	89
HD	H-Point to Door	mm	141	170

**DATA SHEET NO. 11**  
**VEHICLE SIDE MEASUREMENTS**

Test Vehicle: 2004 Acura TSX 4 Door  
Test Program: NCAP Side Impact

NHTSA No. M45301  
Test Date: 01/14/04



All Measurements Shown in mm

**LEFT SIDE VIEW**

Measurements are taken with vehicle in the as tested condition.  
Measurements along the vertical 800 mm.  
All measurements below in mm.

Level	Measurement Description	Height Above Ground
5	Window	1335
4	Window Sill	916
3	Mid Door	611
2	Occupant H-Point	550
1	Sill Top	265

**DATA SHEET NO. 12**  
**VEHICLE EXTERIOR CRUSH PROFILES**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900				380					368					-12	
-750				355					342					-13	
-600				335					324					-11	
-450				326					314					-12	
-300				313					308					-5	
-150				310					305					-5	
0		235	239	305			250	244	304			15	5	-1	
150	252	241	244	303		389	469	437	382		137	228	193	79	
300	252	240	241	300		404	515	482	436		152	275	241	136	
450	251	238	240	300		412	537	517	490		161	299	277	190	
600	250	236	237	300		417	546	524	510		167	310	287	210	
750	249	235	235	302	556	429	554	518	513	545	180	319	283	211	-11
900	249	234	234	301	547	425	563	524	518	546	176	329	290	217	-1
1050	248	232	233	305	544	422	568	523	520	557	174	336	290	215	13
1200	249	232	233	305	545	416	576	522	521	572	167	344	289	216	27
1350	250	234	234	309	548	408	577	535	531	586	158	343	301	222	38
1500	251	235	236	312	550	402	563	553	541	573	151	328	317	229	23
1650	251	238	240	318	557	398	534	550	555	565	147	296	310	237	8
1800	252	240	241	322	566	408	489	501	507	557	156	249	260	185	-9
1950		235	239	329	582		320	365	422	565		85	126	93	-17
2100				337	604				360	584				23	-20
2250				346					307					-39	
2400				356					346					-10	
2550				372					357					-15	
2700				388					367					-21	
2850				410					384					-26	
3000				434					405					-29	

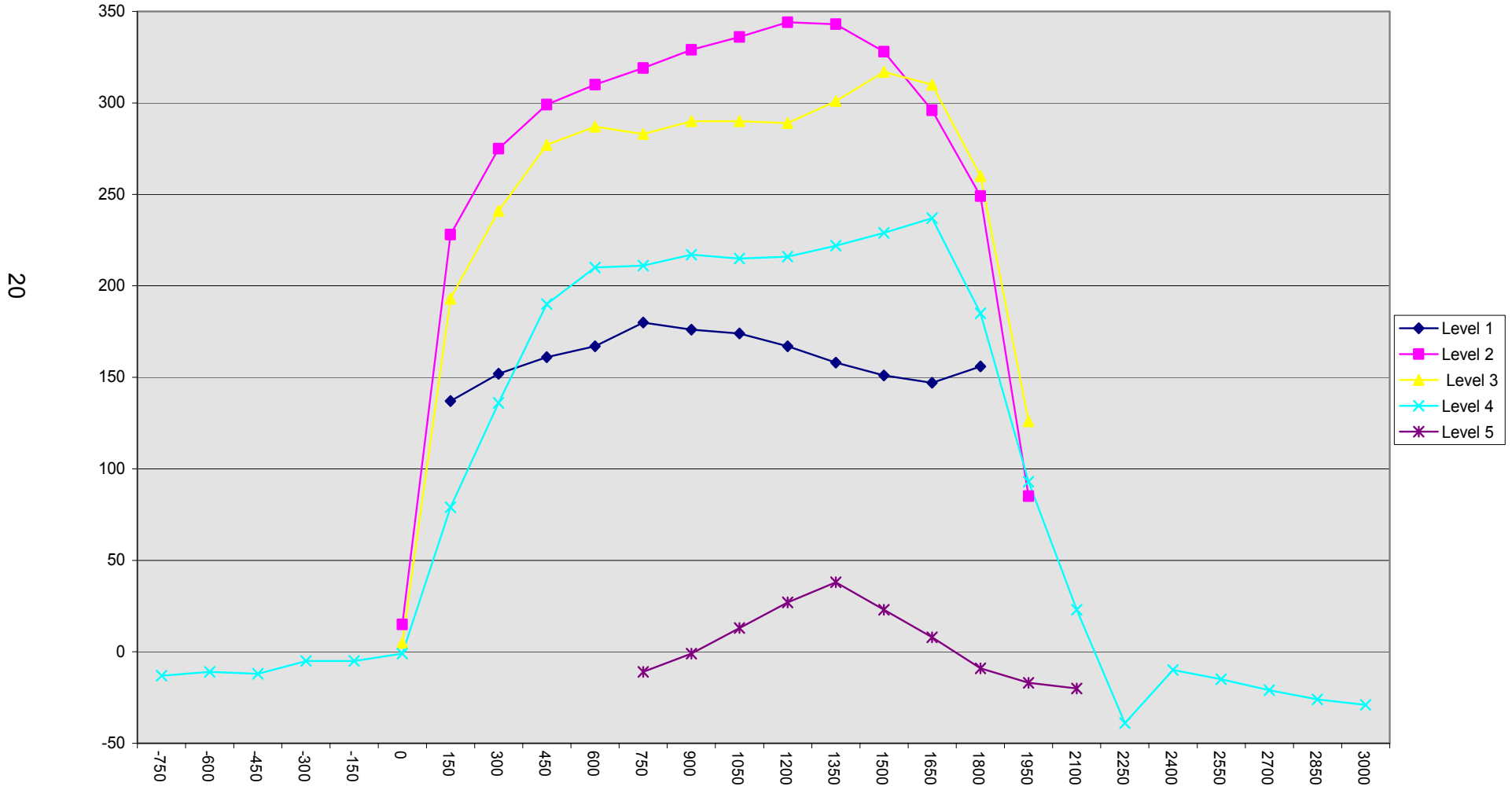
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

DATA SHEET NO. 12...(continued)  
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2004 Acura TSX 4 Door  
Test Program: NCAP Side Impact

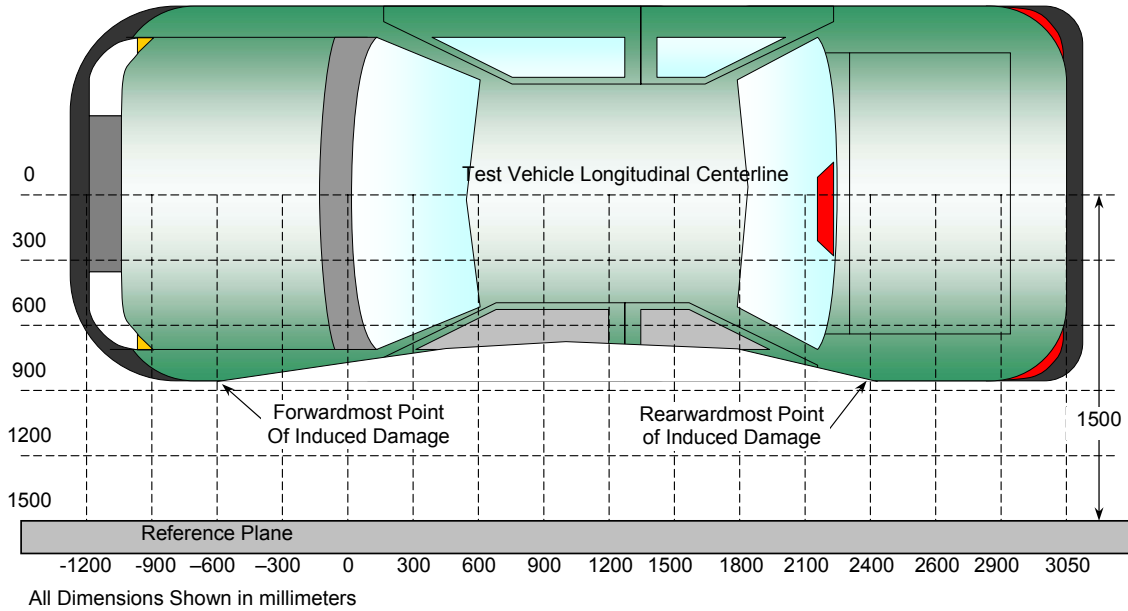
NHTSA No. M45301  
Test Date: 01/14/04



**DATA SHEET NO. 13**  
**VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04



**TOP VIEW**

**DAMAGE PROFILE DISTANCES**

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2400 mm	4	356	346	-10
2	1925 mm	4	329	433	104
3	1384 mm	2	234	570	336
4	920 mm	2	234	561	327
5	450 mm	2	238	537	299
6	0 mm	4	305	304	-1

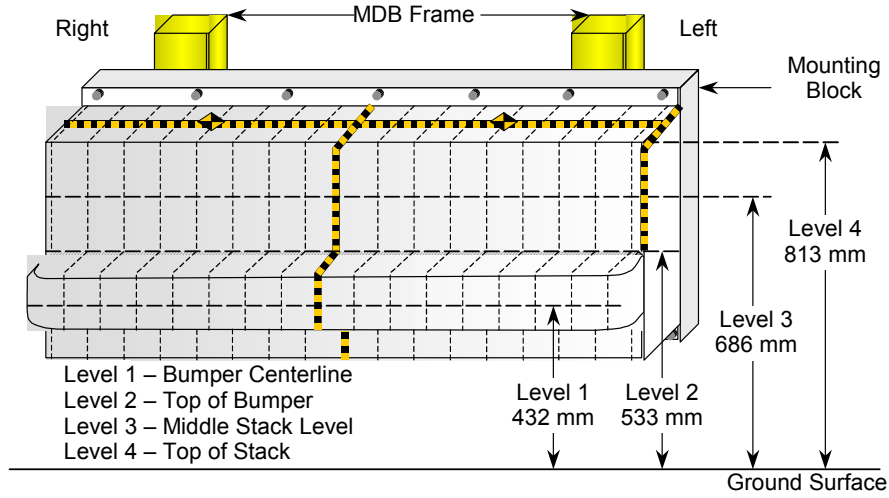
Reference plane is parallel to test vehicle longitudinal centerline.  
 Given dimensions = Reference plane to car body.

**DATA SHEET NO. 14**

**DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04



**DEFORMABLE BARRIER STATIC CRUSH**

Stack Level	Distance Right of Center								C <sub>L</sub>	Distance Left of Center							
	800	700	600	500	400	300	200	100		0	100	200	300	400	500	600	700
1	178	161	133	114	104	101	97	99	96	95	97	99	100	104	107	121	131
2	84	58	44	29	23	21	22	22	24	24	25	26	27	29	33	43	63
3	48	9	9	10	9	21	30	22	15	15	14	15	18	19	29	97	104
4	63	15	5	4	7	14	29	20	18	14	13	15	18	28	60	102	144

All Dimensions in mm

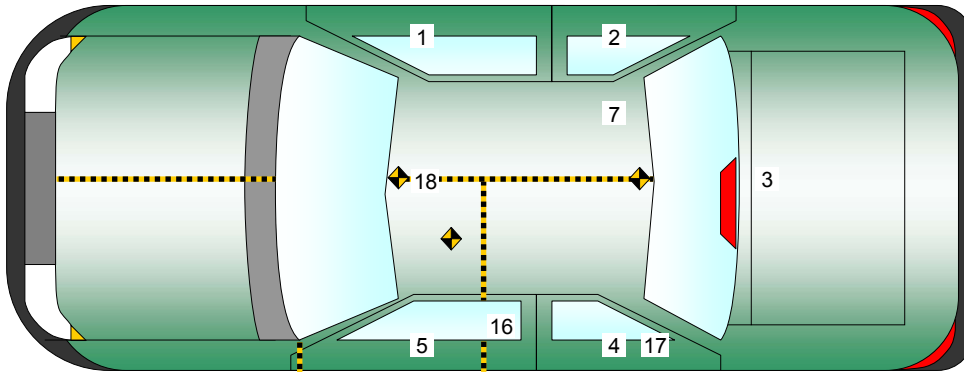
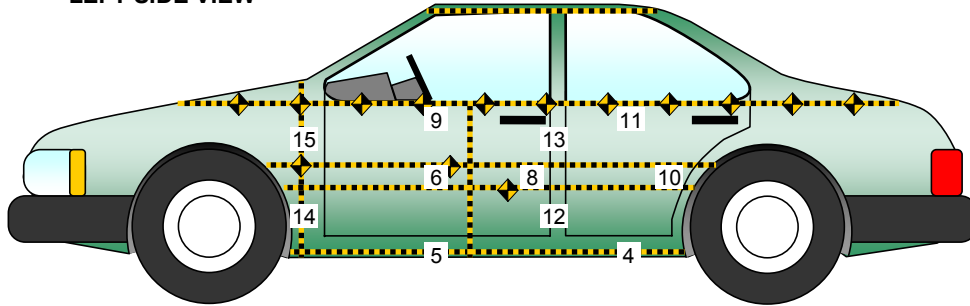
**DATA SHEET NO. 15**

**VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04

**LEFT SIDE VIEW**



No.	Location
1	Right Sill at Front Seat
2	Right Sill at Rear Seat
3	Rear Floorpan Above Axle
4	Left Sill at Rear Door
5	Left Sill at Front Door
6	Left Front Door Centerline
7	Right Rear Occupant Compartment
8	Left Front Door Mid-Rear
9	Left Front Door Upper Centerline

No.	Location
10	Left Rear Door Mid-Rear
11	Left Rear Door Upper Centerline
12	Left Lower B-Post
13	Left Middle B-Post
14	Left Lower A-Post
15	Left Middle A-Post
16	Front Seat Track
17	Rear Seat Track or Structure
18	Vehicle CG

**DATA SHEET NO. 15...(continued)**

**VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04

**VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS**

Loc. No.	Accelerometer Location	Measurements (mm)			Peak Values (G's)				
		X	Y	Z	Axis	Max	Time	Min	Time
1	Right Sill at Front Seat	2577	-730	205	X	4.3	62	-3.7	16
					Y	20.1	13	-1.9	138
					Z	4.0	76	-9.9	15
					RES	21.8	13		
2	Right Sill at Rear Seat	1448	730	220	X	5.2	31	-3.6	16
					Y	23.8	12	-3.1	106
					Z	7.4	41	-11.1	19
					RES	24.8	12		
3	Rear Floorpan Above Axle	1198	60	580	X	4.2	61	-11.0	22
					Y	20.7	41	-3.4	106
					Z	9.0	22	-11.7	48
					RES	24.9	22		
4	Left Sill at Rear Door	1449	-730	230	Y	41.5	13	-10.5	22
5	Left Sill at Front Door	2538	-730	210	Y	33.4	11	-5.7	83
6	Left Front Door C/L	2651	-760	657	Y	216.3	6	-228.6	25
7	Rear Occupant Compartment	1800	290	340	Y	20.3	11	-2.2	103
8	Left Front Door Mid-Rear	2267	-735	792	Y	169.4	6	-75.5	15
9	Left Front Door Upper C/L	2611	-737	920	Y	203.3	16	-72.4	22
10	Left Rear Door Mid-Rear	1528	-740	740	Y	*	*	*	*
11	Left Rear Door Upper C/L	1618	-740	955	Y	105.8	12	-54.4	35
12	Left Lower B-Post	2066	-670	320	Y	42.6	4	-11.0	22
13	Left Middle B-Post	2064	-720	980	Y	128.9	7	-26.1	14
14	Left Lower A-Post	3142	-675	335	Y	67.7	8	-43.6	25
15	Left Middle A-Post	3200	-830	840	Y	30.9	2	-13.2	17
16	Front Seat Track	2383	-528	320	Y	37.2	12	-10.7	22
17	Rear Seat Track or Structure				Y				
18	Vehicle CG	2472	0	380	X	1.9	64	-10.2	12
					Y	16.2	13	-1.7	102
					Z	8.1	7	-11.0	32
					RES	18.6	13		

\* No Valid Data collected after 36 msec.  
 See reference points on the following page.

**DATA SHEET NO. 15...(continued)**

**VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY**

Test Vehicle: 2004 Acura TSX 4 Door  
Test Program: NCAP Side Impact

NHTSA No. M45301  
Test Date: 01/14/04

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

DATA SHEET NO. 16

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

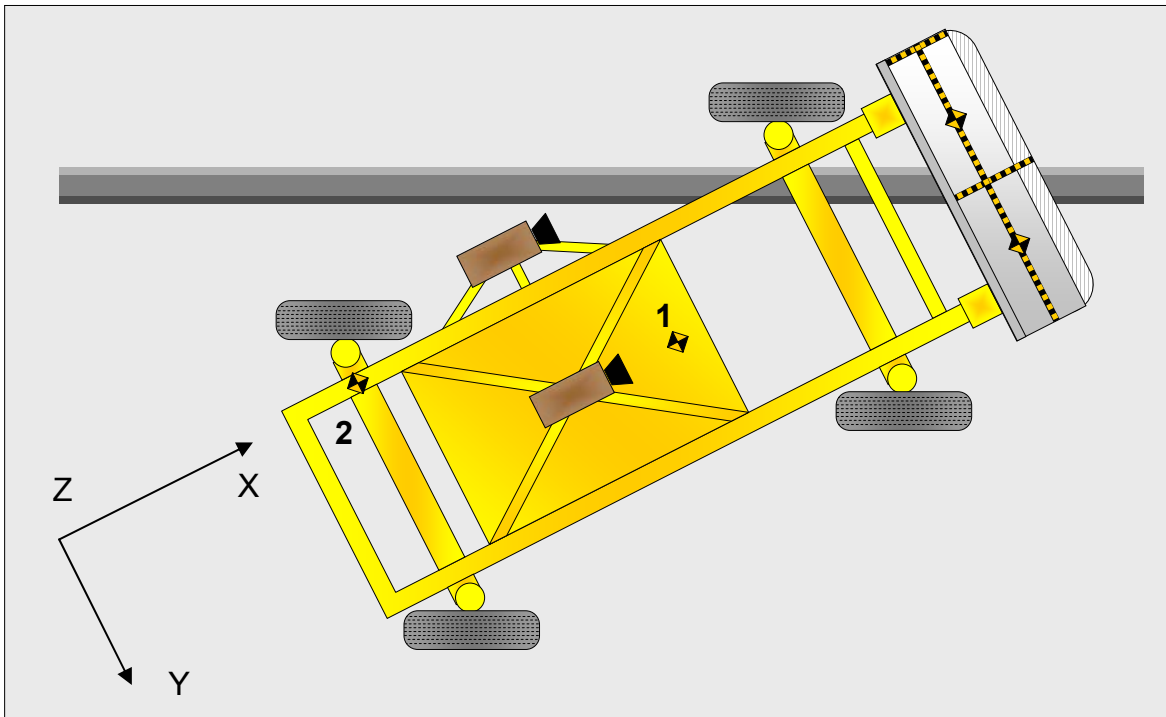
Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04

MDB ACCELEROMETER PEAK DATA AND LOCATIONS

Loc. No.	Accelerometer Location	Measurement (mm)			Peak Values (G's)				
		X	Y	Z	Axis	Max	Time	Min	Time
1	MDB CG	-1092	0	-483	X	2.7	103	-20.8	48
					Y	1.9	62	-7.3	40
					Z	17.6	59	-17.1	65
					RES	26.3	48		
2	MDB Rear	-2591	-625	-622	X	2.4	116	-24.8	32
					Y	4.8	26	-1.8	132
					Z	5.9	39	-3.5	72
					RES	24.9	32		

Reference Points X - MDB Front Axle (+ forward)  
 Y - MDB Centerline (+ to right)  
 Z - Ground Plane (+ down)



**DATA SHEET NO. 17**  
**VEHICLE STRUCTURAL MEASUREMENTS**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04

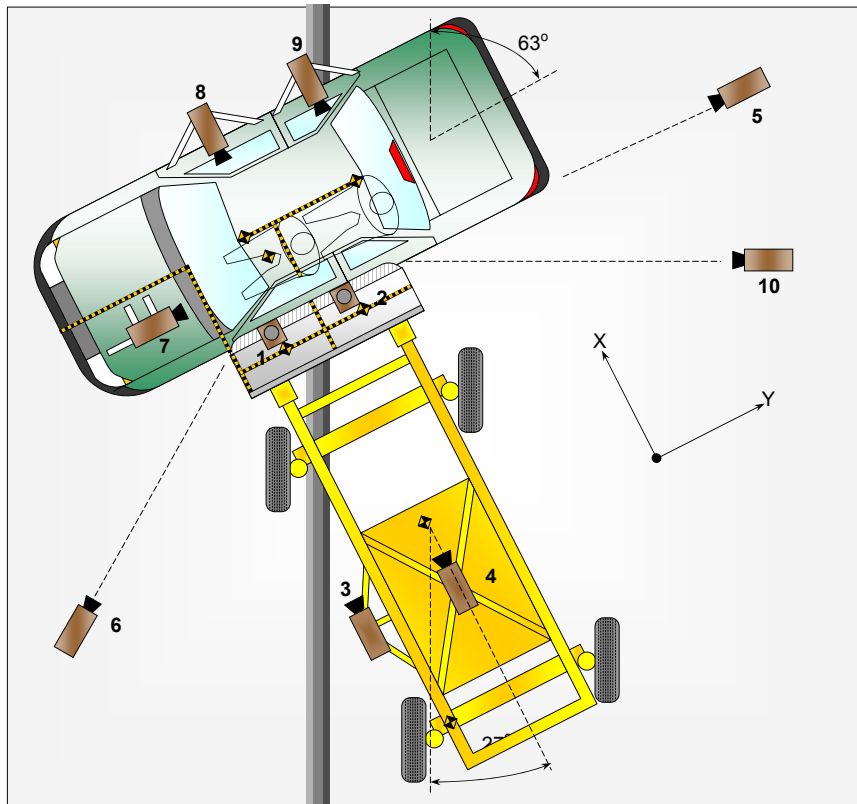
	Elements	Pre-Test (mm)
1	Total Length	4622
2	Total Width	1764
3	Bumper Top Height	518
4	Bumper Bottom Height	428
5	Longitudinal Member Top Height	200
6	Distance between Longitudinal Members	775
7	Longitudinal Member Width	97
8	Engine Top Height	850
9	Engine Bottom Height	188
10	Engine and gearbox width	850
11	Front bumper-engine distance	410
12	Front shock absorber fixing height	845
13	Bonnet leading edge height	693
14	Front shock absorber fixing width	945
15	Front bumper – front axle distance	1005
16	Front axle – a pillar distance	480
17	A-pillar – B-pillar distance	1125
18	B-Pillar – rear axle distance	1054
19	B-pillar – C-pillar distance	630
20	Roof sill bottom height	1370
21	Roof sill top height	1435
22	Floor sill bottom height	210
23	Floor sill top height	315

**DATA SHEET NO. 18**

**HIGH SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	0	0	5000	8	*
2	Overhead Close-up	640	290	5000	13	*
3	MDB Onboard, Impact Point Close-up				35	1015
4	MDB Onboard, Centerline of Impact				13	1015
5	Right Side, Ground Level, Overall	405	9074	1875	13	1020
6	Left Side, Ground Level, Overall	2675	-4613	1706	13	913
7	Vehicle Onboard Front SID/HIII, Front				13	513
8	Vehicle Onboard Front SID/HIII, Side				8	513
9	Vehicle Onboard Rear SID/HIII, Side				8	505
10	Real Time Coverage				13	24

Reference Points X - Impact Line  
 Y - MDB Left Edge Impact Point  
 Z - Ground Plane

\* no timing marks

**DATA SHEET NO. 19**

**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Test Vehicle: 2004 Acura TSX 4 Door  
Test Program: NCAP Side Impact

NHTSA No. M45301  
Test Date: 01/14/04

Test Time: 1:59 pm

Temperature at Time of Impact: 21°C

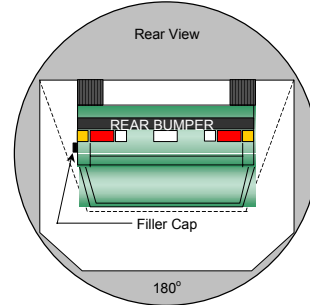
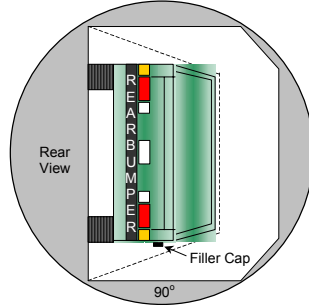
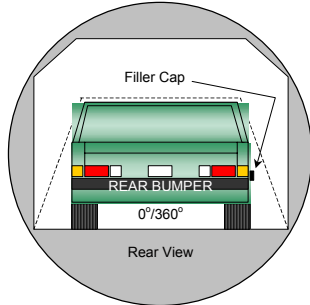
**STODDARD SOLVENT SPILLAGE MEASUREMENTS**

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

**DATA SHEET NO. 20**  
**FMVSS 301 STATIC ROLLOVER DATA SHEET**

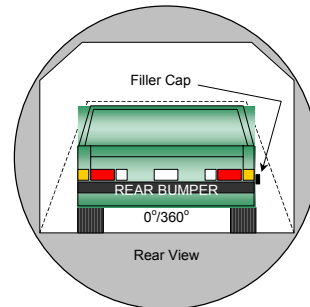
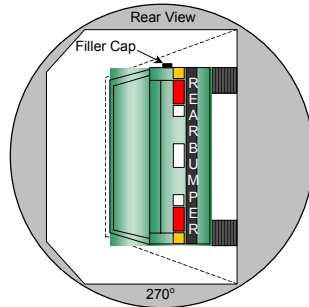
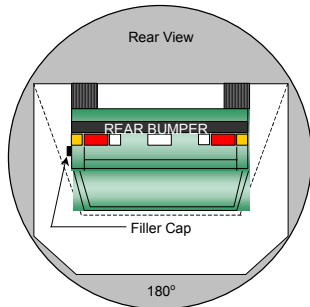
Test Vehicle: 2004 Acura TSX 4 Door  
 Test Program: NCAP Side Impact

NHTSA No. M45301  
 Test Date: 01/14/04



0° to 90°

90° to 180°



180° to 270°

270° to 360°

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent Spillage locations: None

Rollover Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	167	300	0
90° to 180°	151	300	0
180° to 270°	137	300	0
270° to 360°	159	300	0

**APPENDIX A**  
**PHOTOGRAPHS**

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A-1.



Left Front of Vehicle As Received

A-2.



Right Rear of Vehicle As Received

MFD. IN JAPAN BY HONDA MOTOR CO., LTD; 11/'03  
GVWR 4300LBS GAWR F 2335LBS R 2030LBS  
THIS VEHICLE CONFORMS TO ALL APPLICABLE  
FEDERAL MOTOR VEHICLE SAFETY, BUMPER,  
AND THEFT PREVENTION STANDARDS IN EFFECT  
ON THE DATE OF MANUFACTURE SHOWN ABOVE:

V.I.N. **JH4CL95834C020320**



**PASSENGER CAR**

Vehicle Certification Label



## TIRE AND LOADING INFORMATION

SEATING CAPACITY | TOTAL 5 | FRONT 2 | REAR 3

The combined weight of occupants and cargo should never exceed 385kg or 850lbs

ORIGINAL TIRE SIZE	COLD TIRE INFLATION PRESSURE
--------------------	------------------------------

P215/50R17 93V	FRONT
	REAR

220 kPa, 32 PSI
-----------------

210 kPa, 30 PSI
-----------------

COMPACT SPARE TIRE	COLD TIRE INFLATION PRESSURE
--------------------	------------------------------

T135/80D16 101M
-----------------

420 kPa, 60 PSI
-----------------

SEE OWNER'S  
MANUAL FOR  
ADDITIONAL  
INFORMATION

SEC-A01

A-5.



Pre-Test Front View of Test Vehicle



Post-Test Front View of Test Vehicle

A-7.



Pre-Test Left Front ¾ View of Test Vehicle



Post-Test Left Front ¾ View of Test Vehicle

A-9.



Pre-Test Left Side View of Test Vehicle

A-10.



Post-Test Left Side View of Test Vehicle



Pre-Test Left Rear ¼ View of Test Vehicle



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



Pre-Test Rear View of Test Vehicle

A-14.



Post-Test Rear View of Test Vehicle



A-15.

Pre-Test MDB (left side) Positioned Against Vehicle



Pre-Test MDB (right side) Positioned Against Vehicle



Pre-Test MDB Positioned Against Vehicle Overhead View



Post-Test MDB (left side) and Vehicle



Post-Test MDB (right side) and Vehicle



Post-Test MDB and Vehicle Overhead View



Pre-Test Impact Point on Vehicle



Post-Test Impact Point on Vehicle



Pre-Test Fuel Filler Cap View

A-24.



Post-Test Fuel Filler Cap View



Pre-Test Rear ¾ View of Right Doors of Test Vehicle



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



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



Post-Test Rear 3/4 View of Left Doors of Test Vehicle



Pre-Test Driver Dummy Left Side View (Door Open)

A-30.



Pre-Test Driver Dummy Left Side View



Post-Test Driver Dummy Left Side View

A-32.



Pre-Test Driver Dummy Shoulder and Door Top View



Post-Test Driver Dummy Shoulder and Door Top View

A-34.



Pre-Test Driver Dummy Right Side View

A-35.



Post-Test Driver Dummy Right Side View

A-36.



Post-Test Driver Dummy Contact

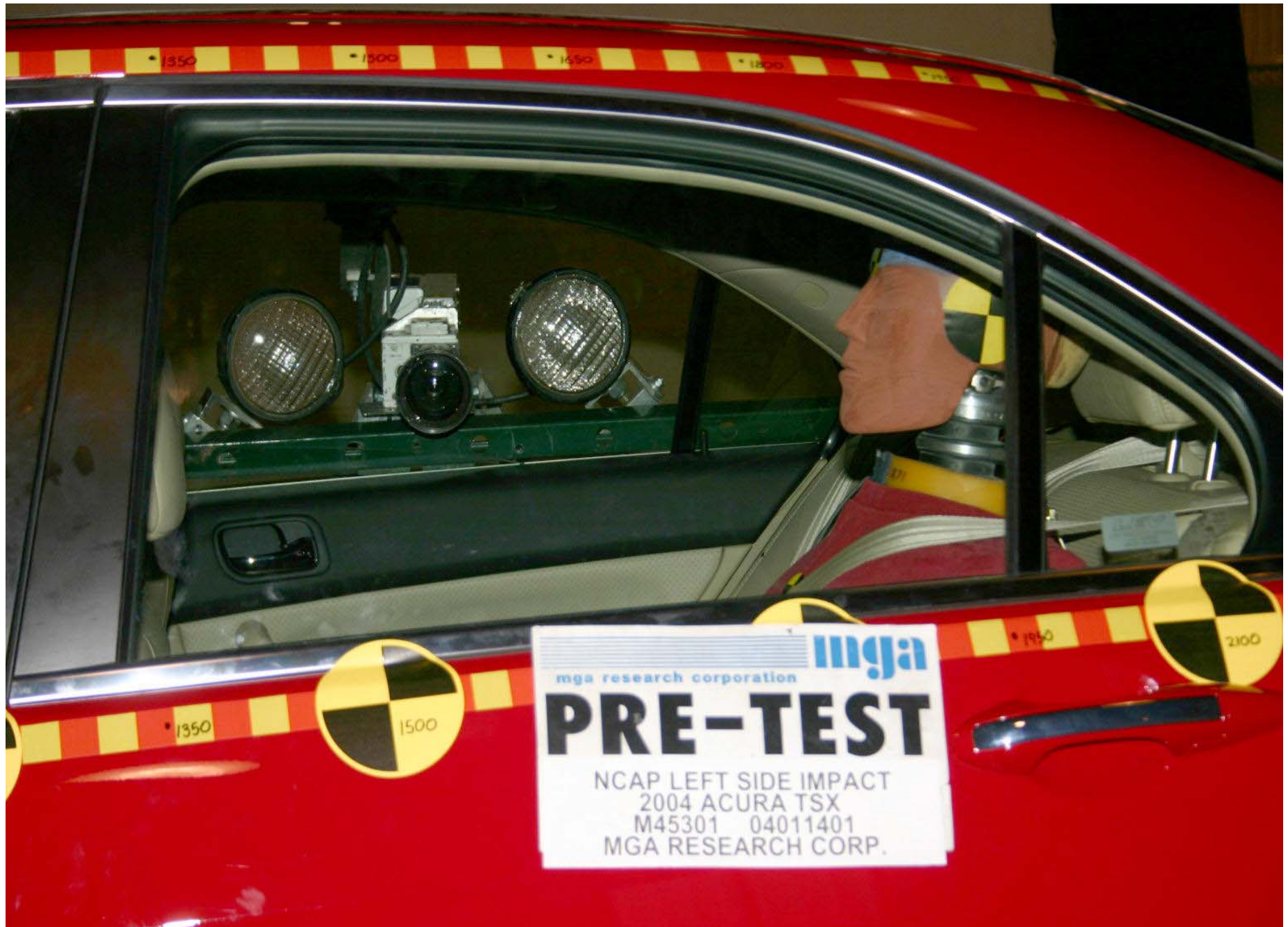
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Post-Test Driver Dummy Head Contact



Pre-Test Passenger Dummy Left Side View (Door Open)



Pre-Test Passenger Dummy Left Side View



Post-Test Passenger Dummy Left Side View

A-41.



Pre-Test Passenger Dummy Shoulder and Door Top View



Post-Test Passenger Dummy Shoulder and Door Top View

A-43.



Pre-Test Passenger Dummy Right Side View

A-44.



Post-Test Passenger Dummy Right Side View

A-45.



Post-Test Passenger Dummy Contact

A-46.



Post-Test Passenger Dummy Head Contact

A-47.

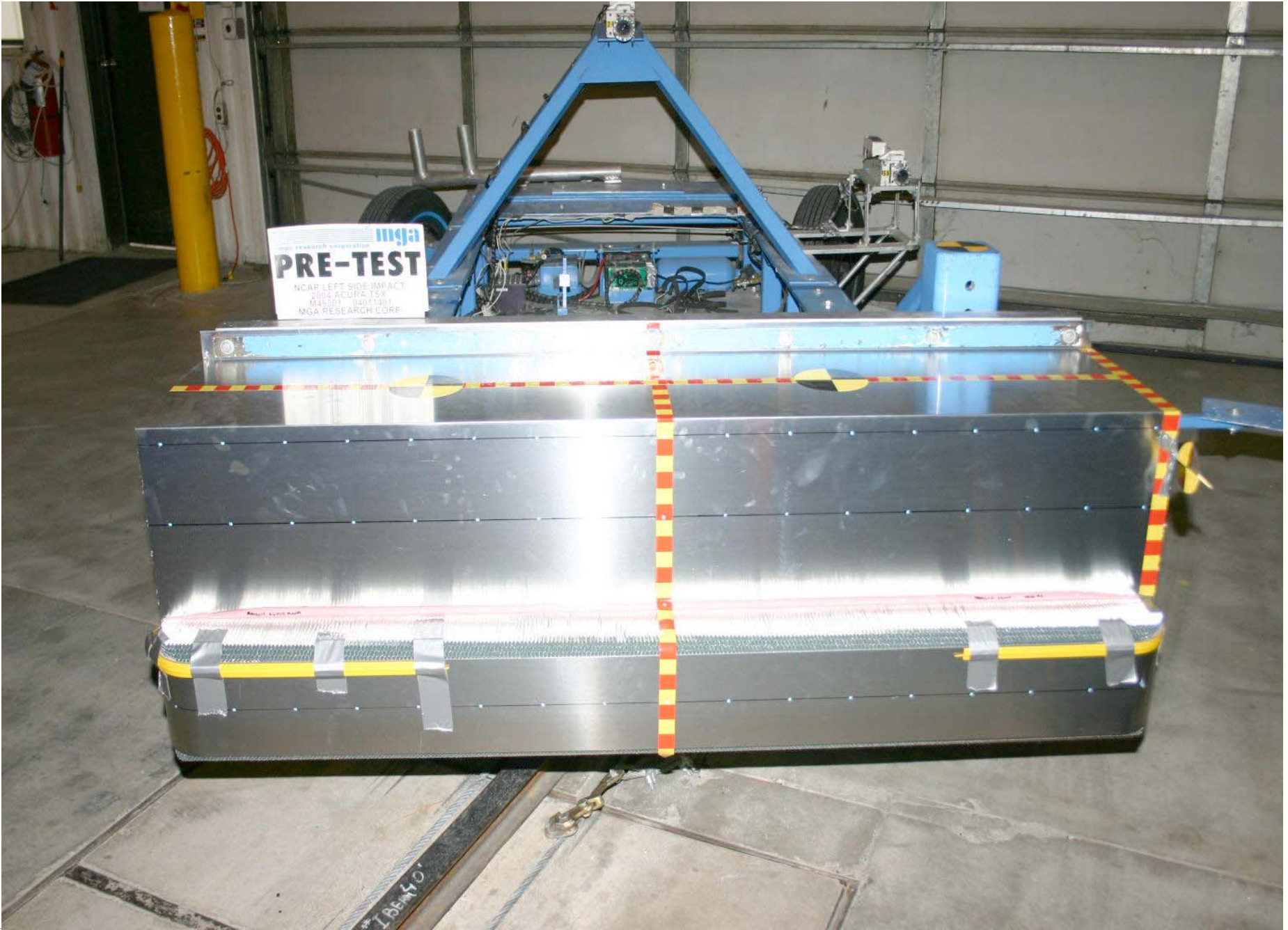


Post-Test Passenger Dummy B-Pillar View



Post-Test Passenger Dummy Seat Back View

A-49.



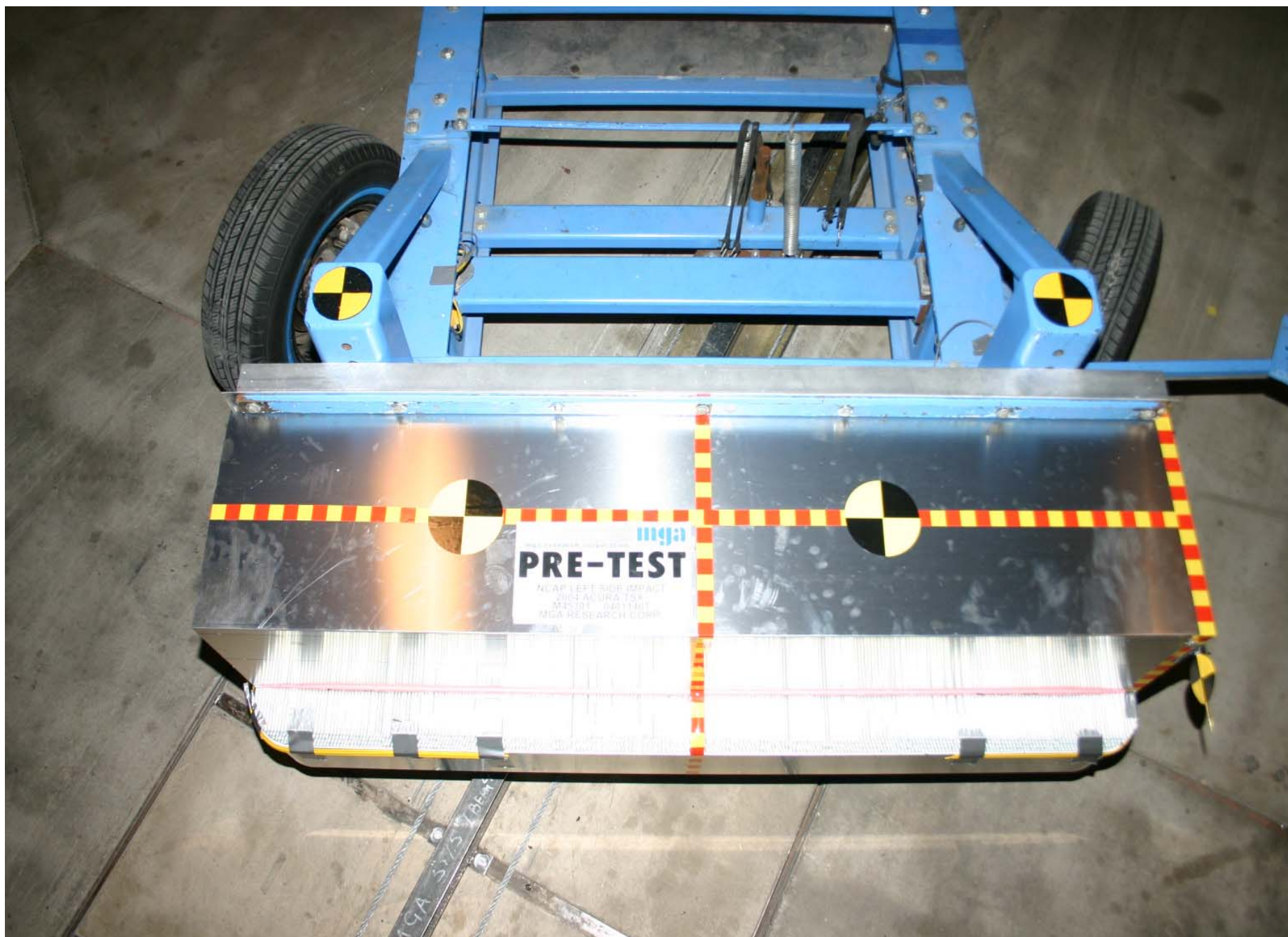
Pre-Test MDB Front View

A-50.



Post-Test MDB Front View

A-51.



Pre-Test MDB Top View

A-52.



Post-Test MDB Top View

A-53.



Pre-Test MDB Right Side View

A-54.



Post-Test MDB Right Side View

A-55.



Pre-Test MDB Left Side View

A-56.



Post-Test MDB Left Side View



A-57.

Rollover 90 Degrees

A-58.



Rollover 180 Degrees

A-59.



Rollover 270 Degrees

A-60.



Rollover 360 Degrees

A-61.



Vehicle Impact

**APPENDIX B**

**SID/HIII, VEHICLE, AND MDB RESPONSE DATA**

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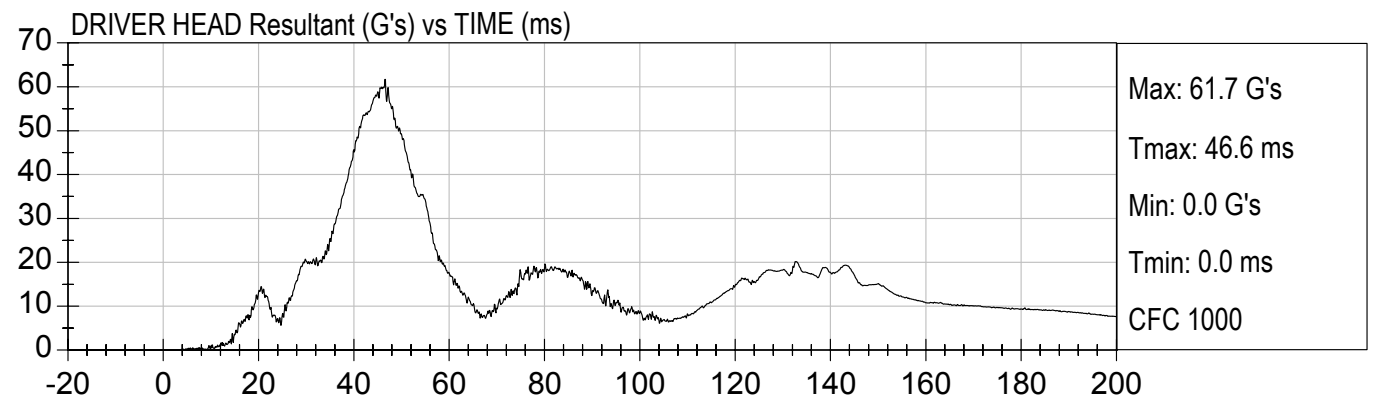
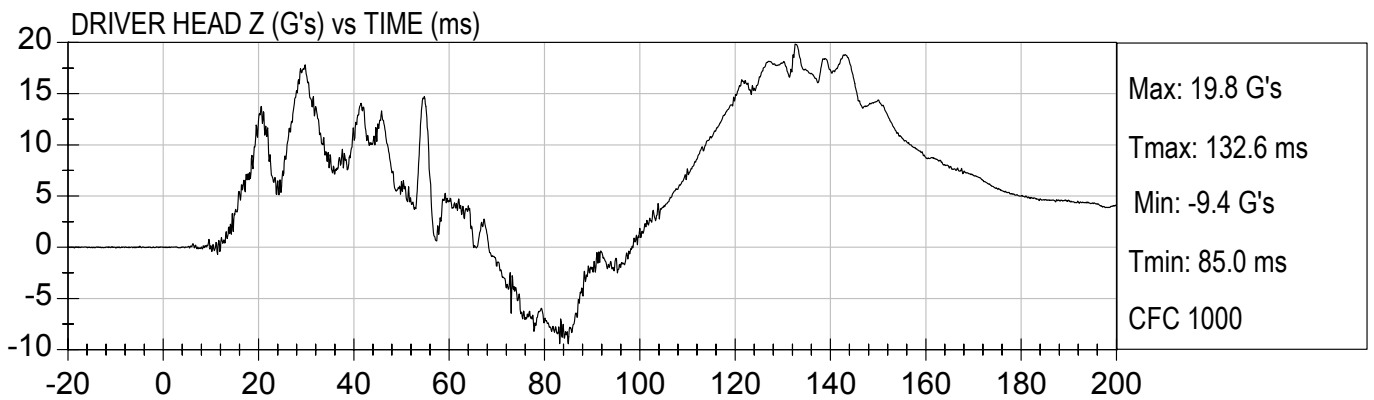
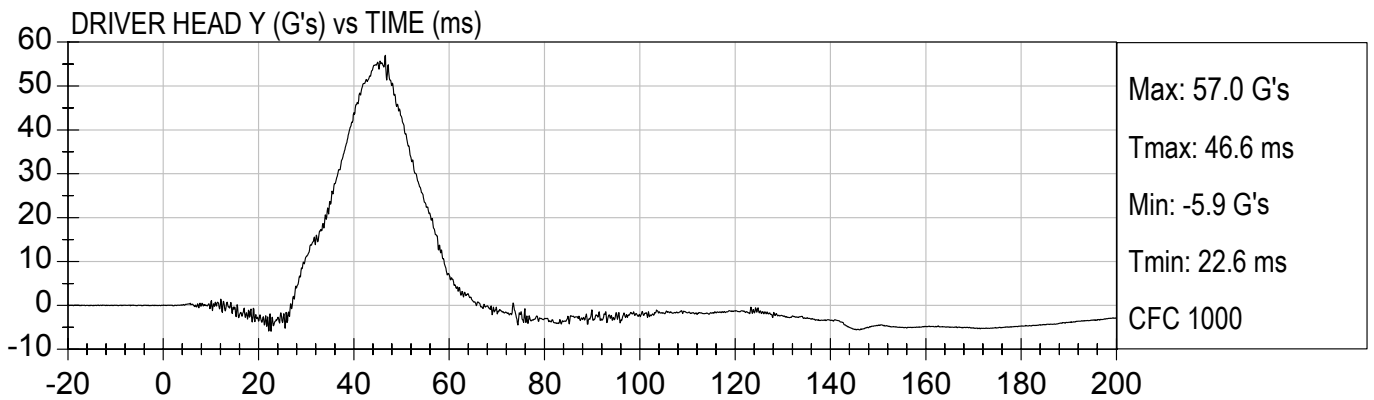
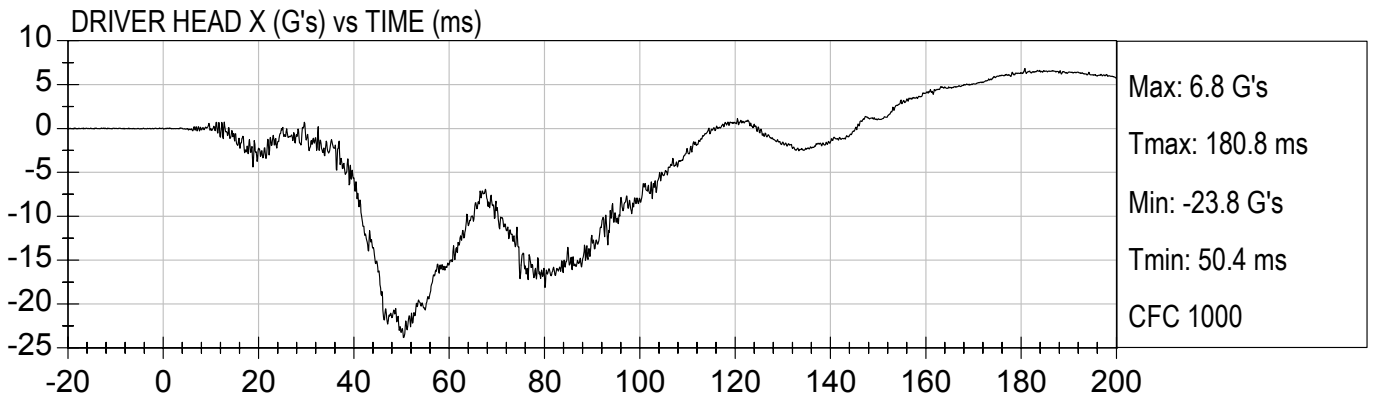
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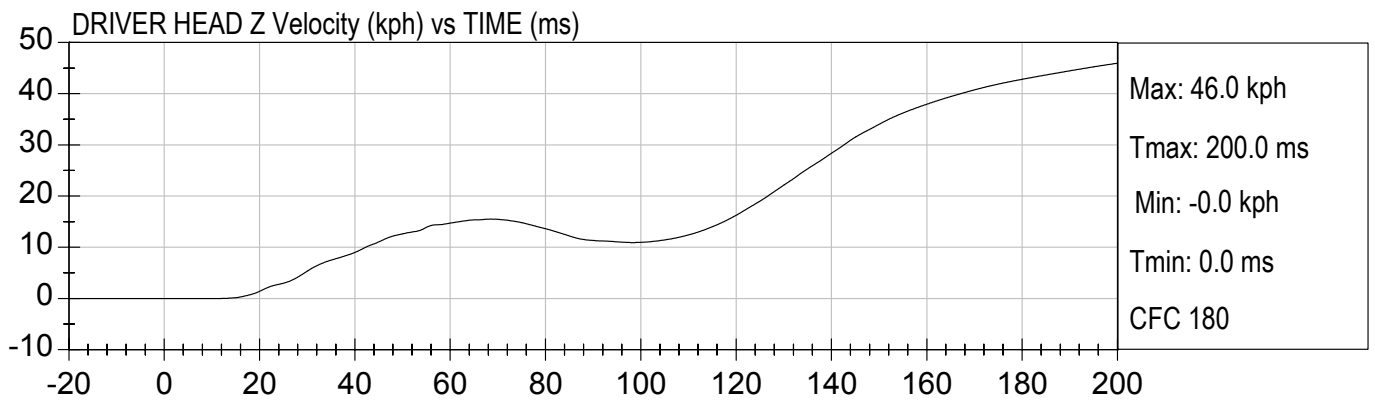
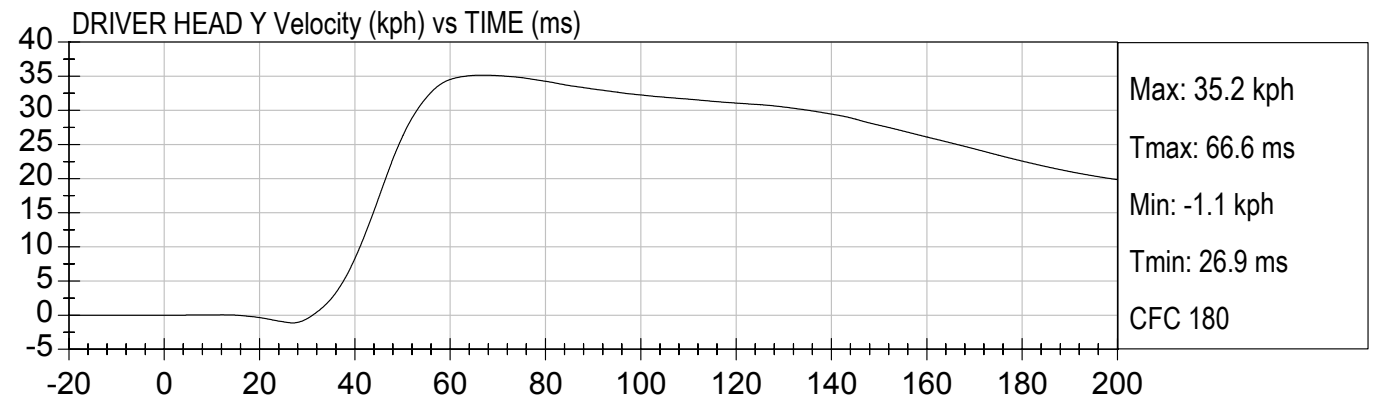
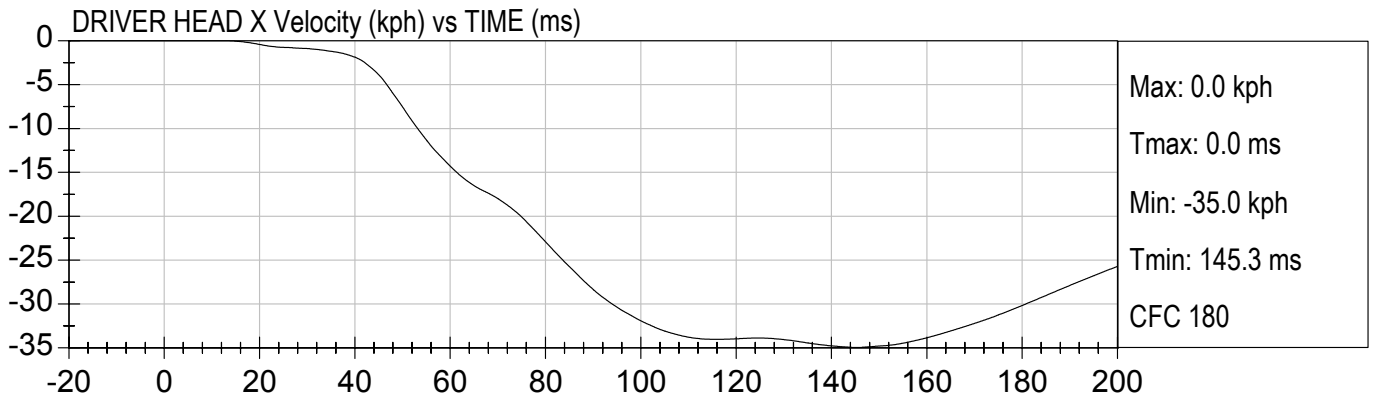
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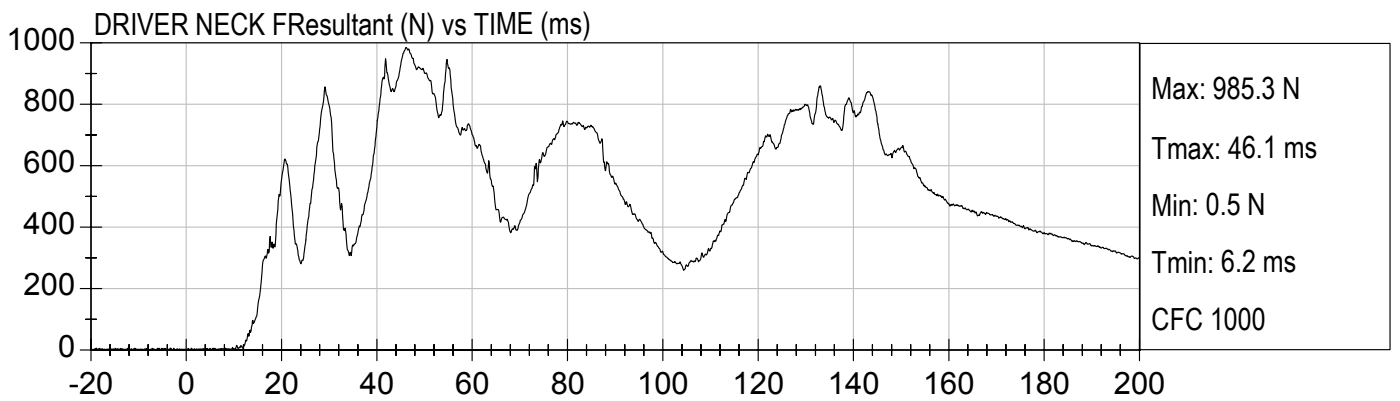
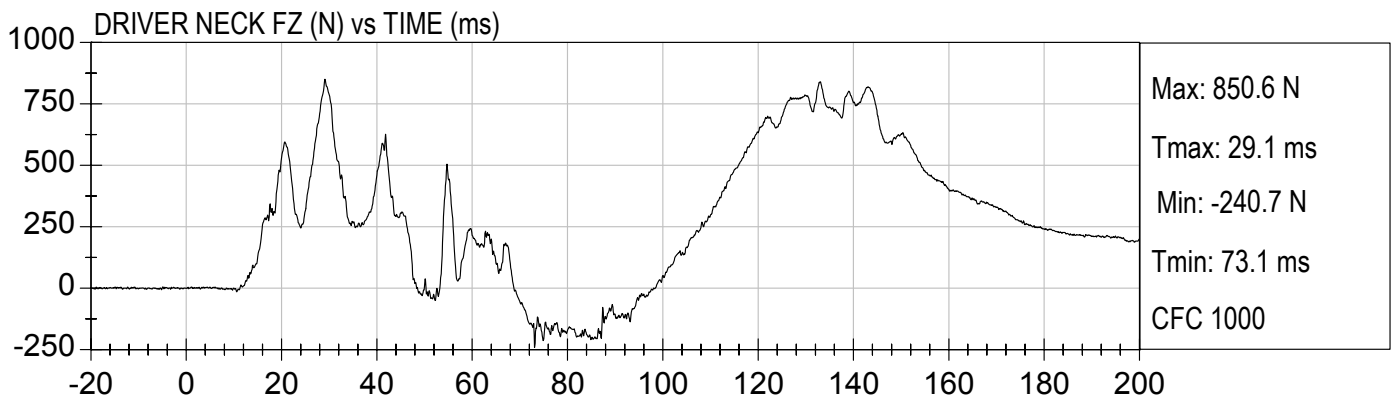
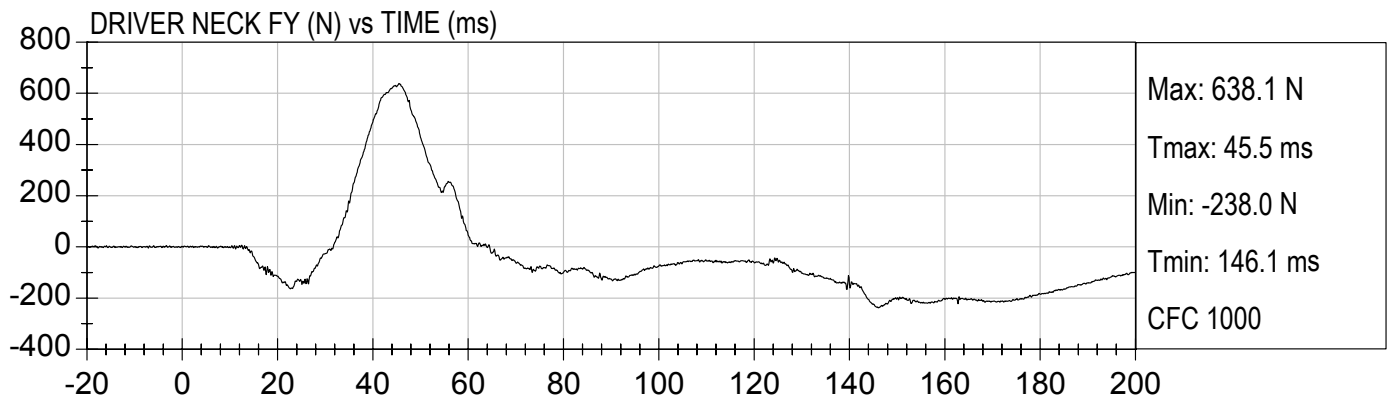
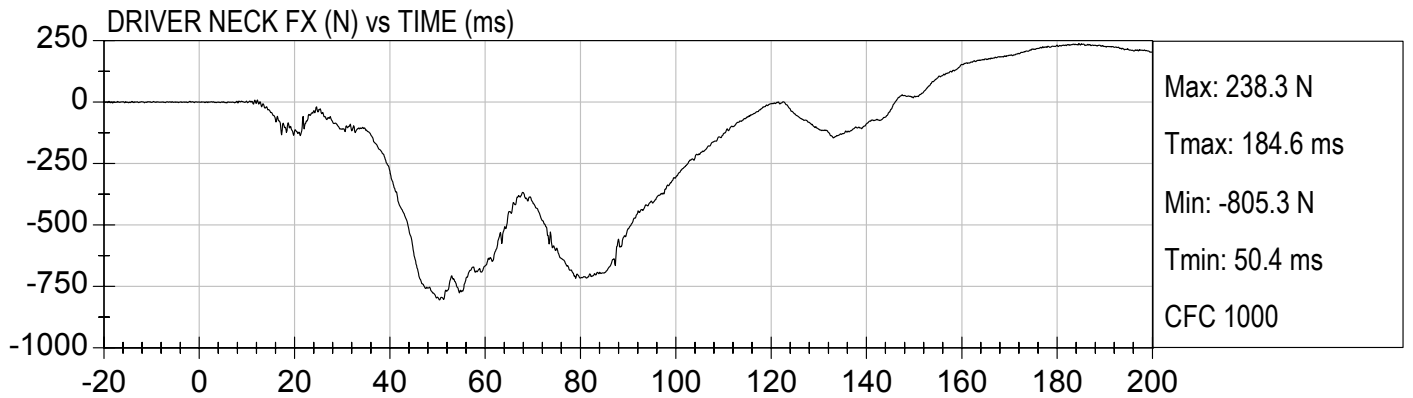


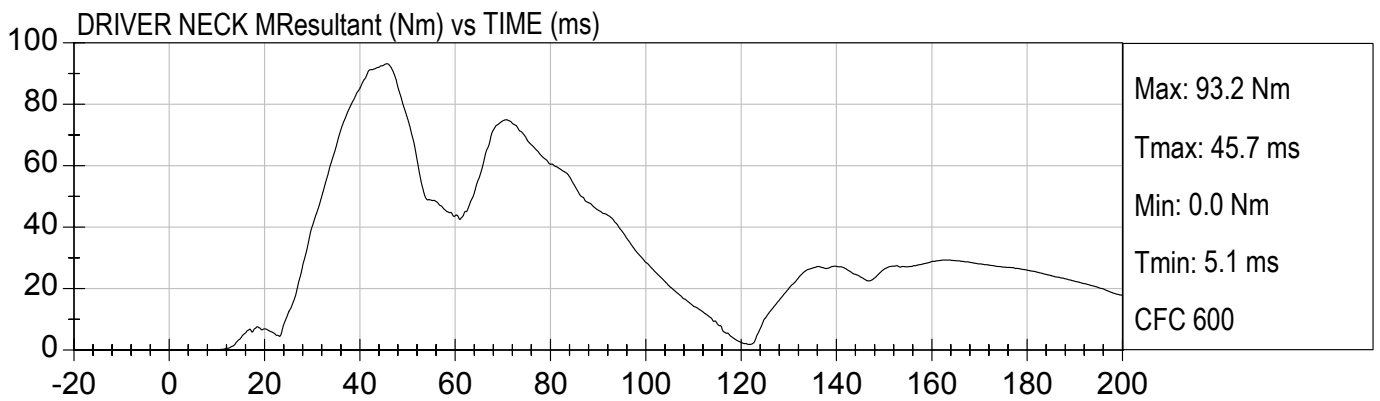
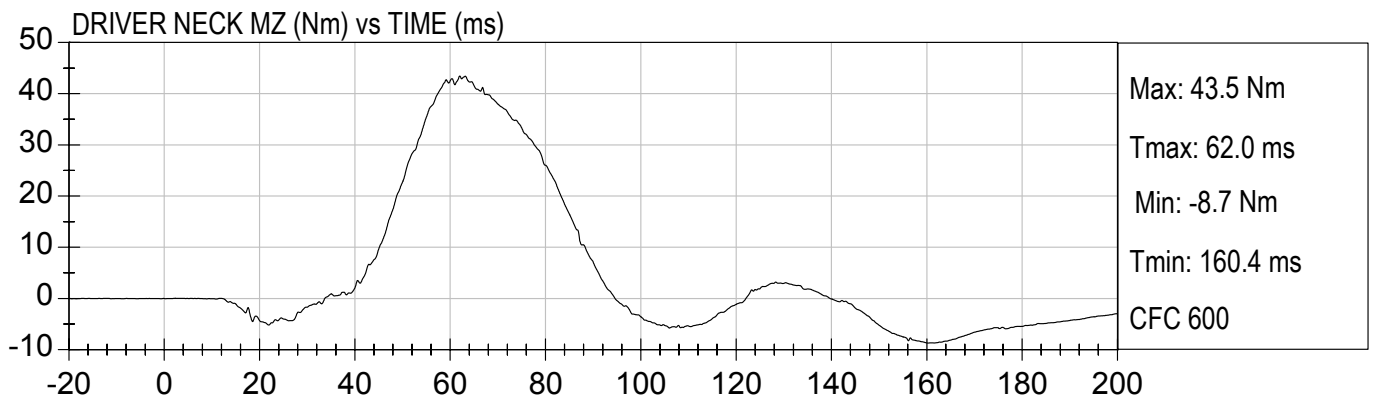
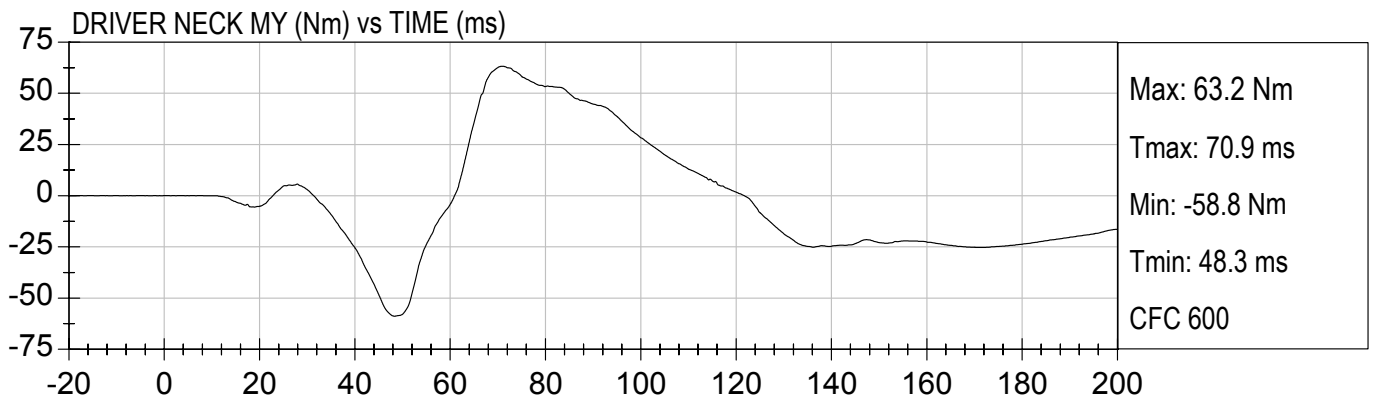
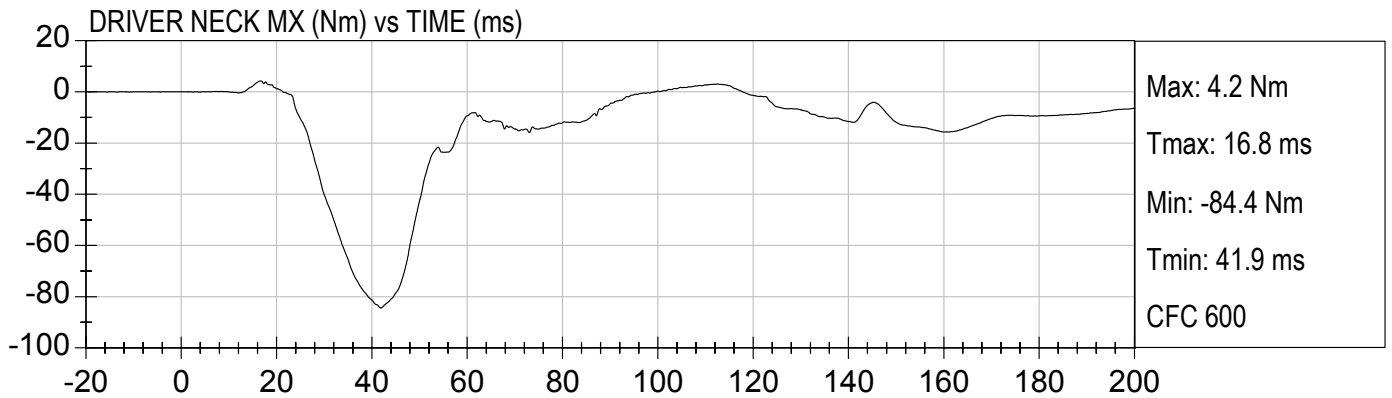




38.5MPH LEFT SIDE IMPACT (M45301)  
2004 ACURA TSX

Test Date: 1/14/2004  
Speed: 38.6 mph (62.1 km/h)

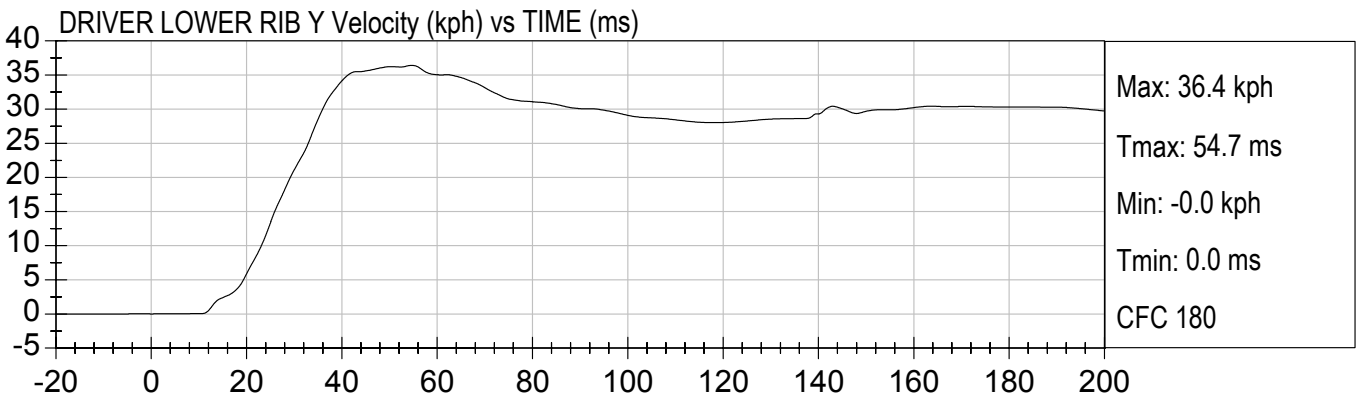
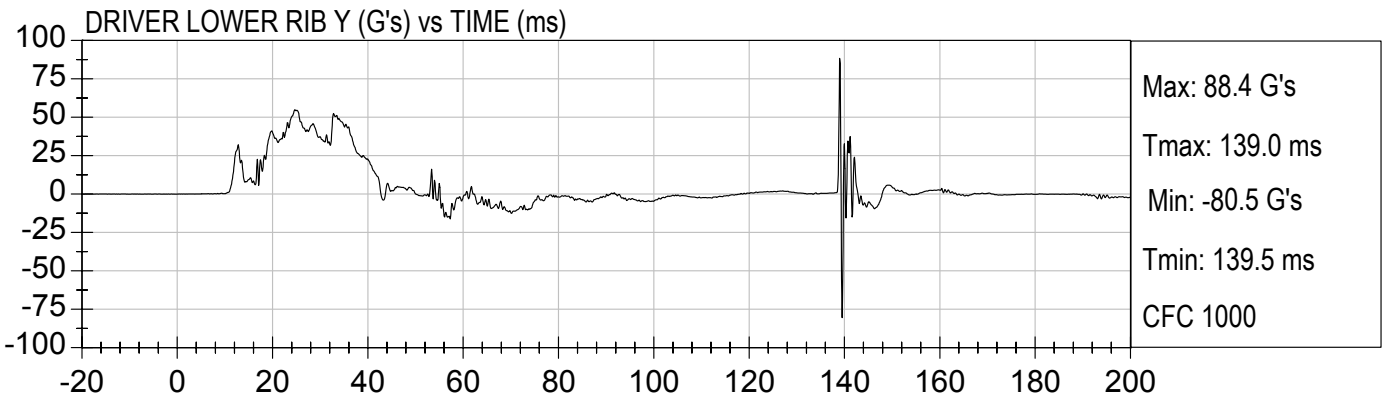
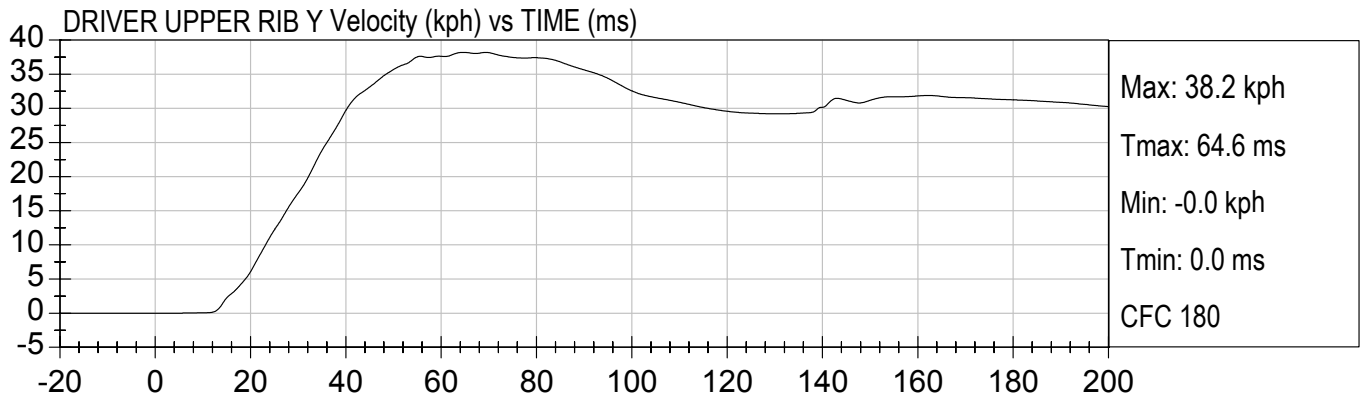
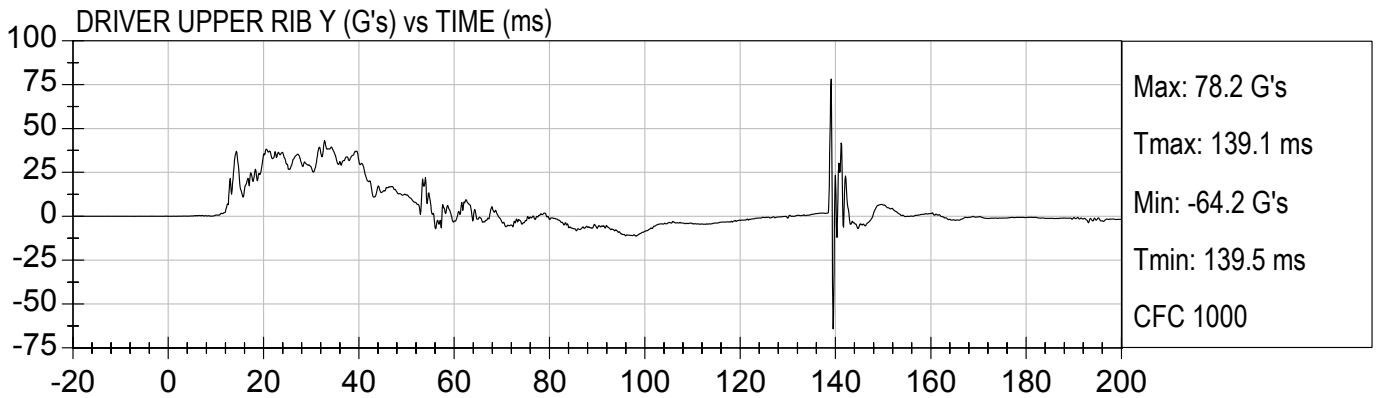


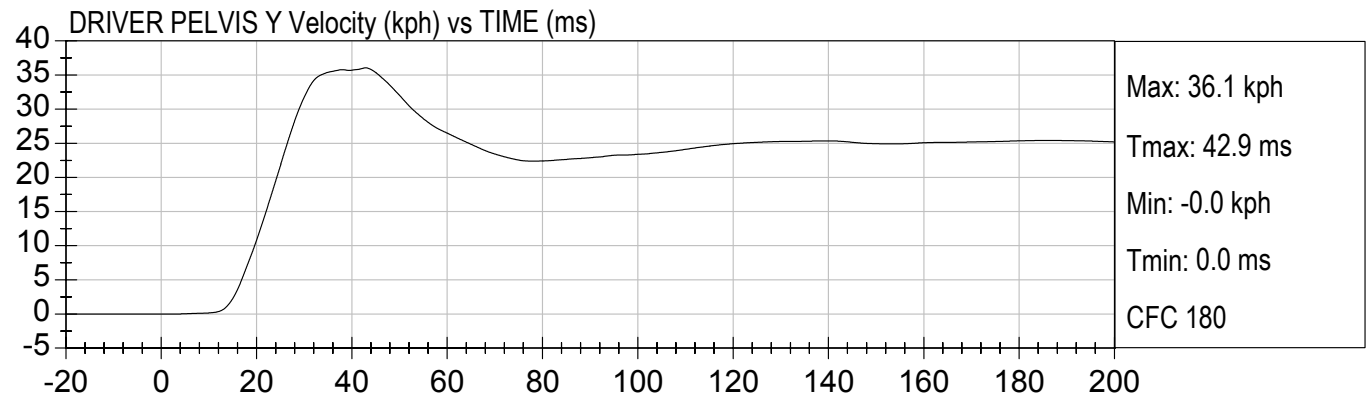
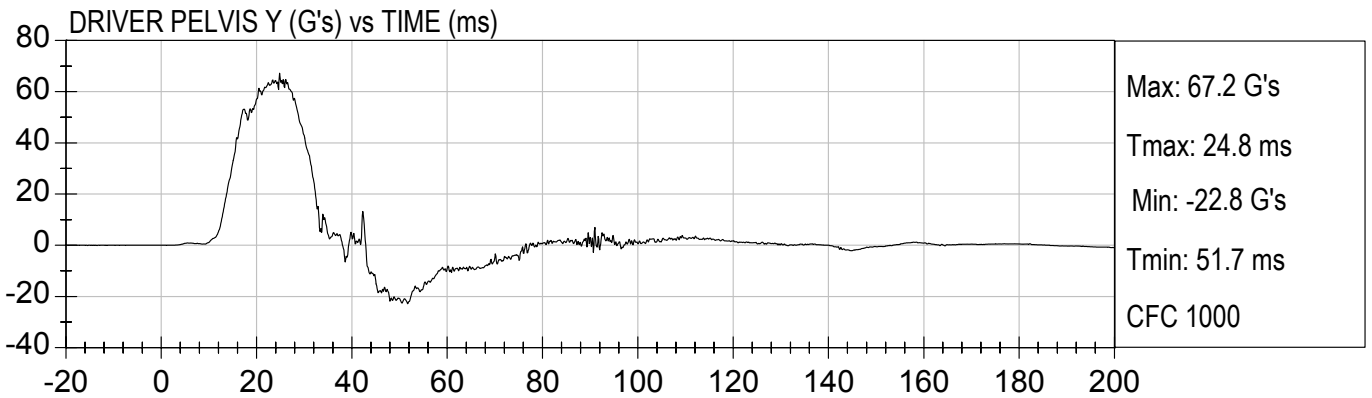
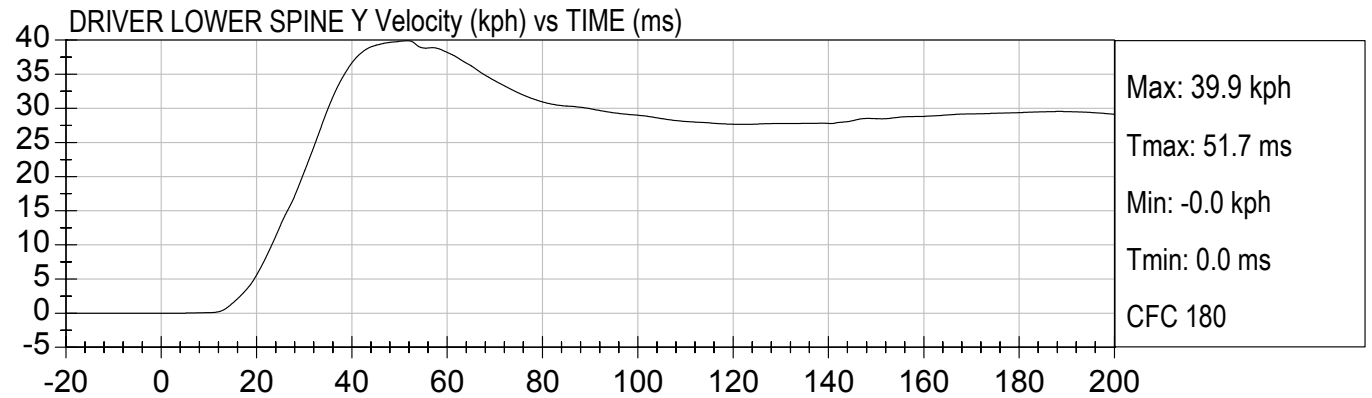
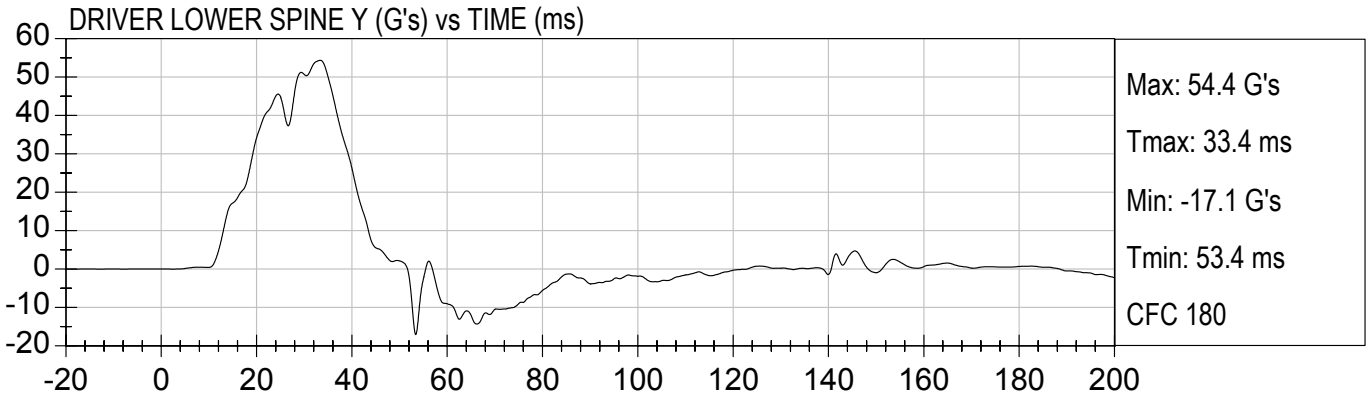


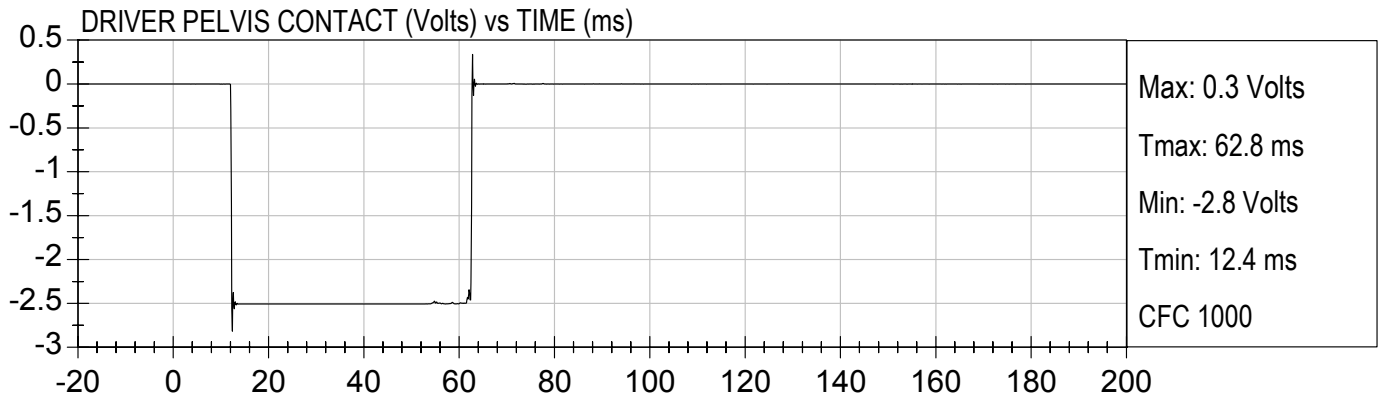
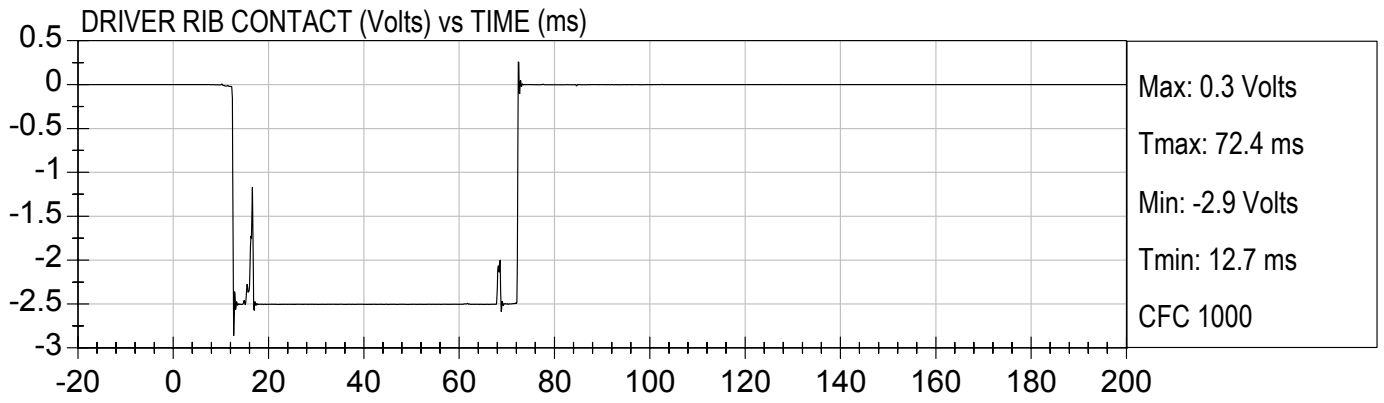


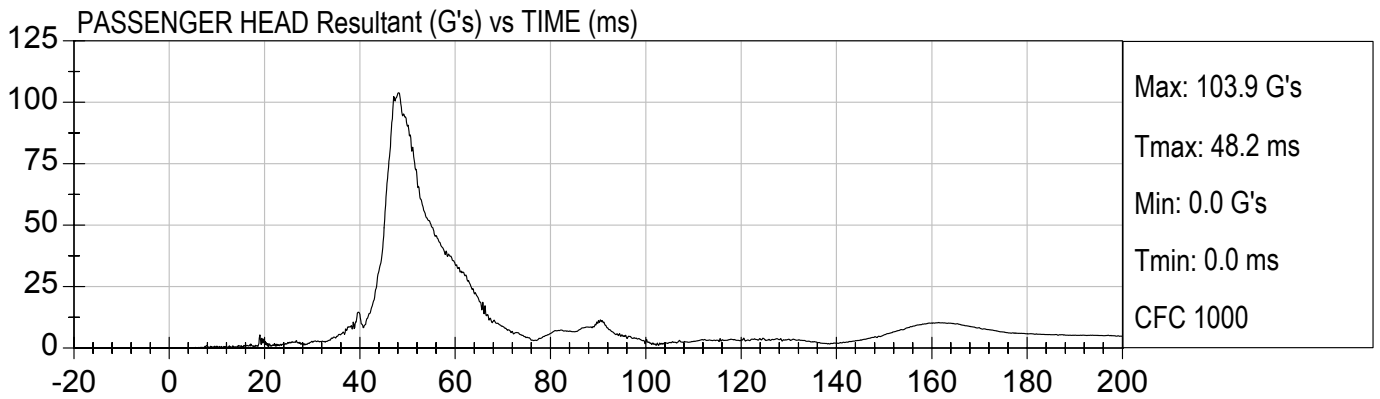
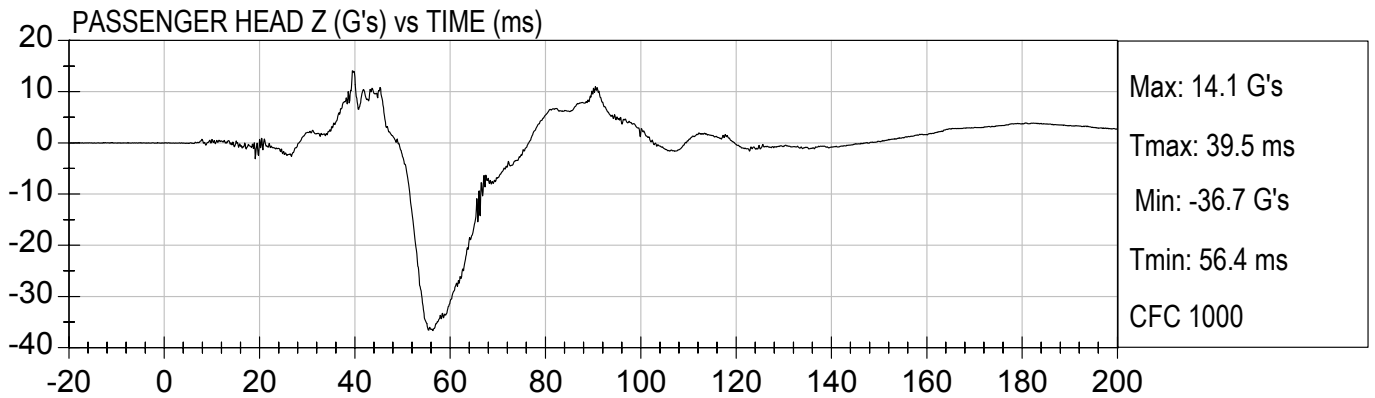
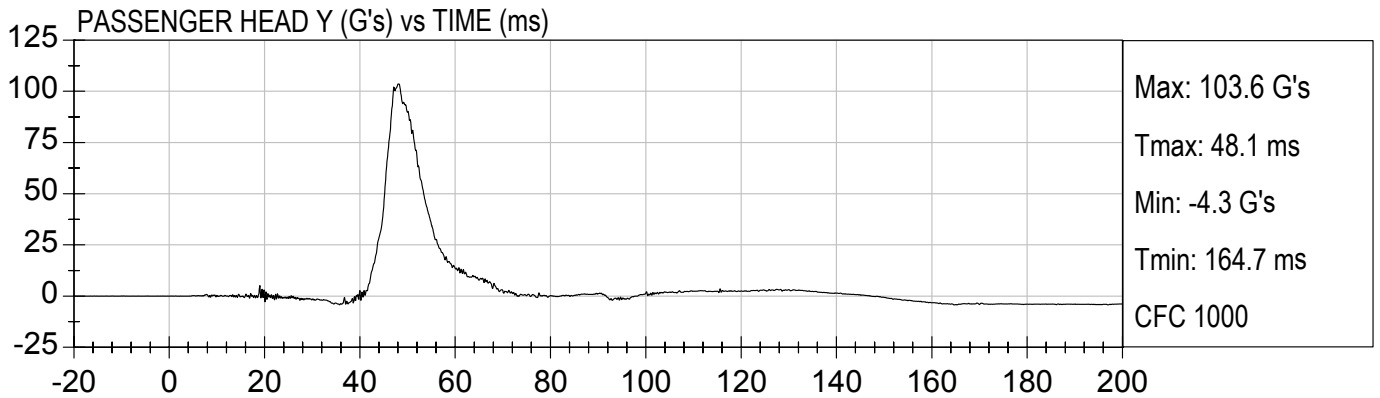
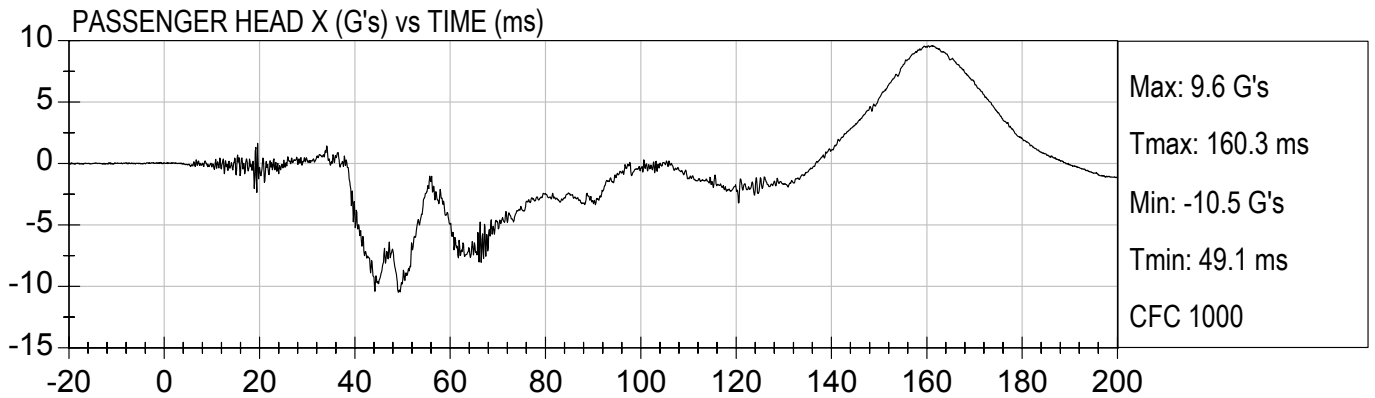
38.5MPH LEFT SIDE IMPACT (M45301)  
2004 ACURA TSX

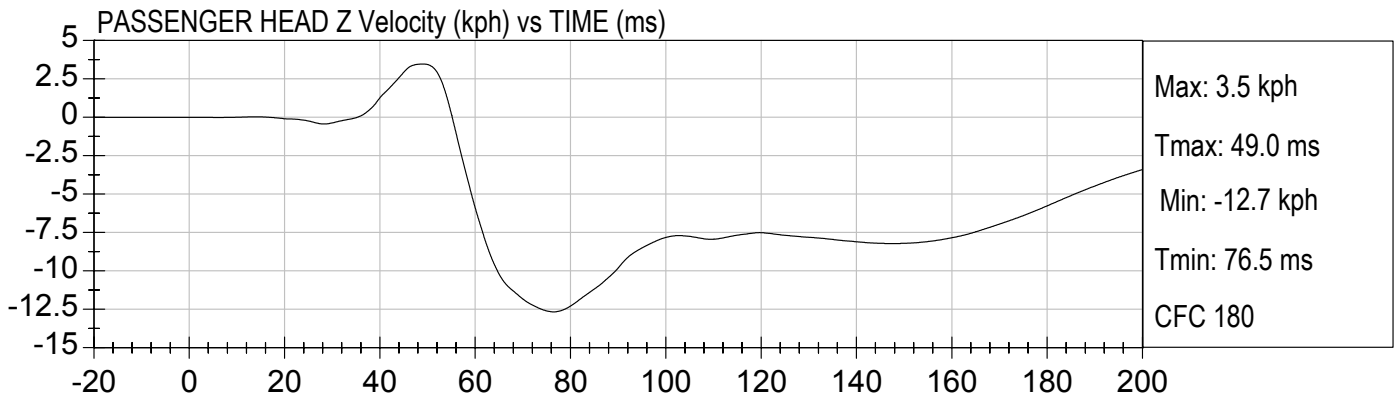
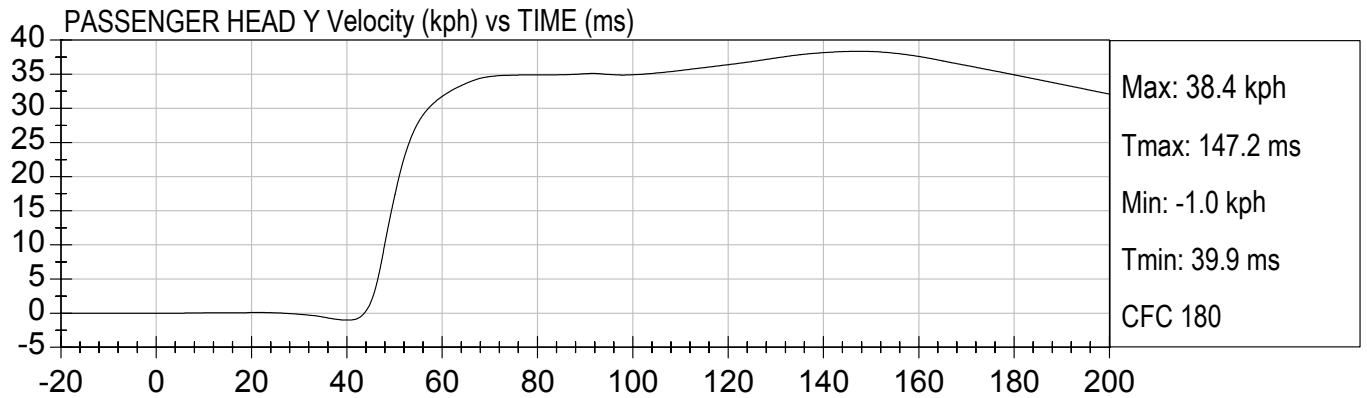
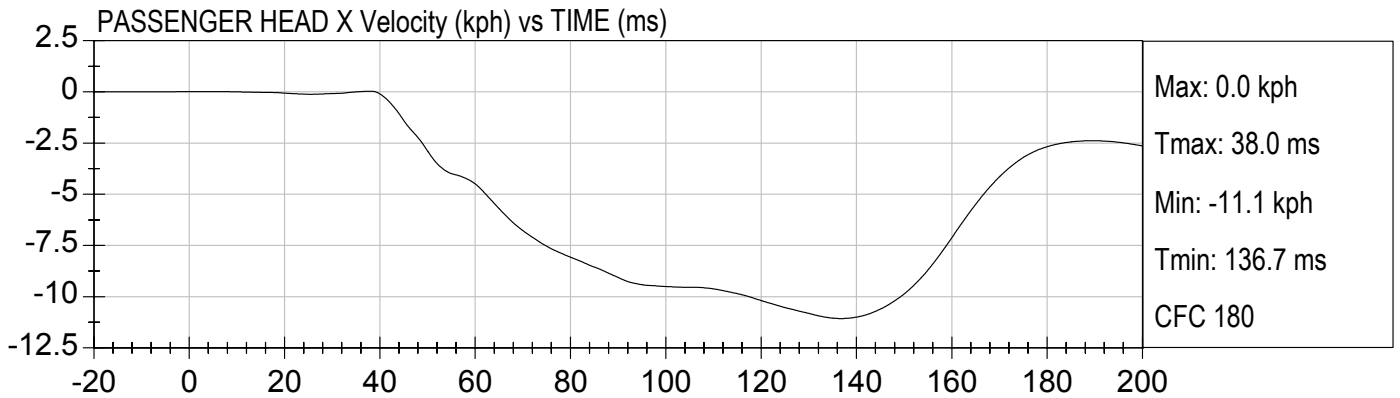
Test Date: 1/14/2004  
Speed: 38.6 mph (62.1 km/h)







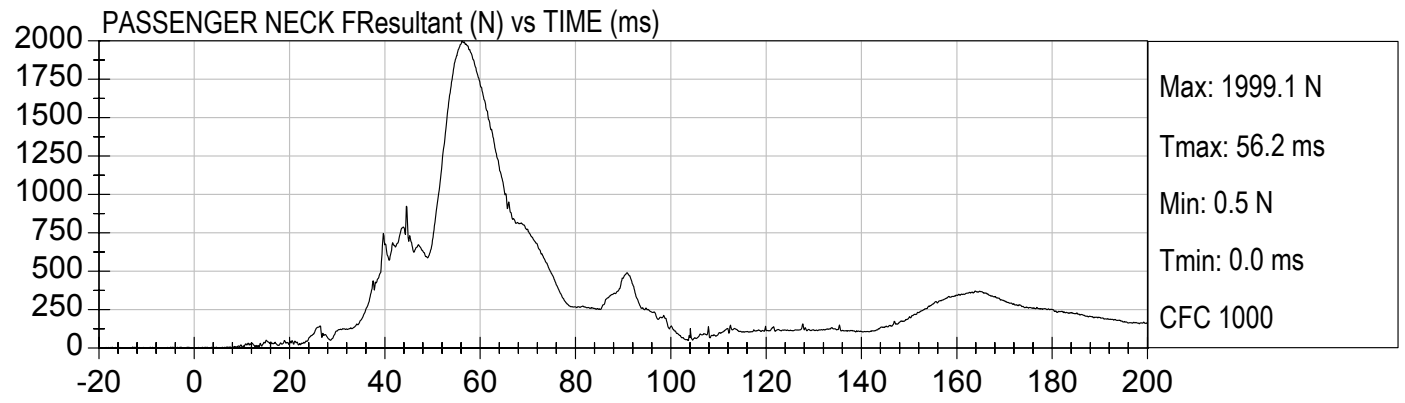
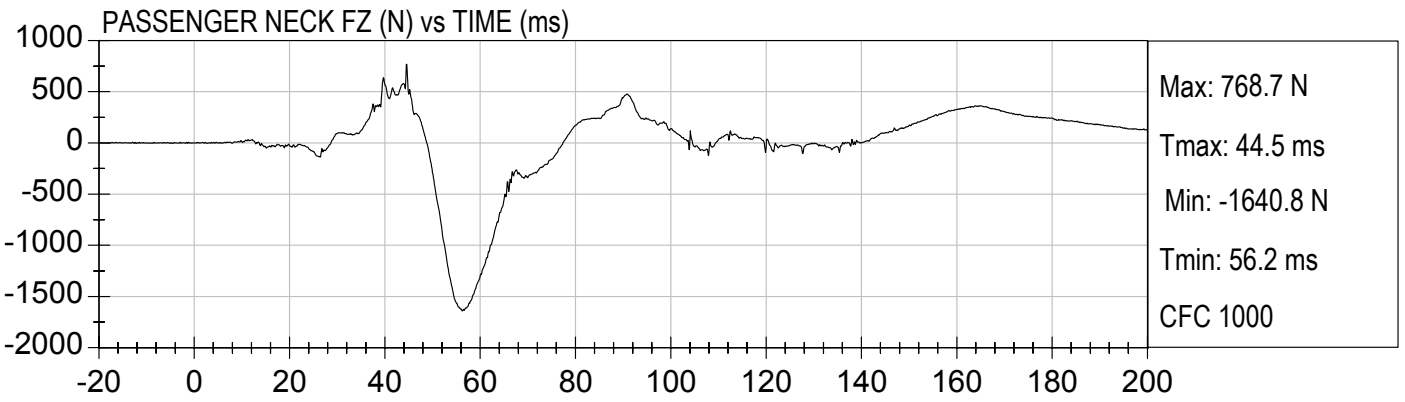
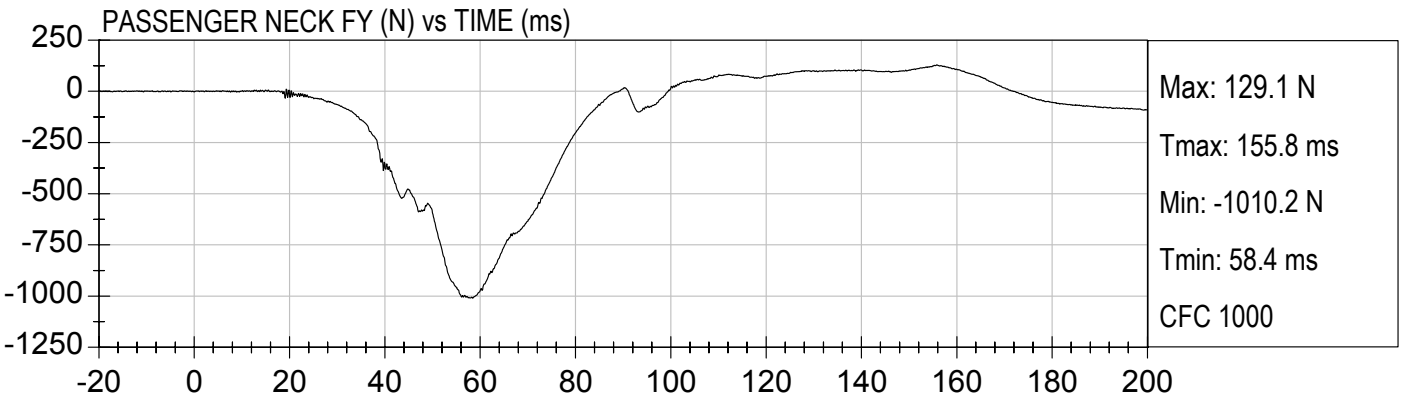
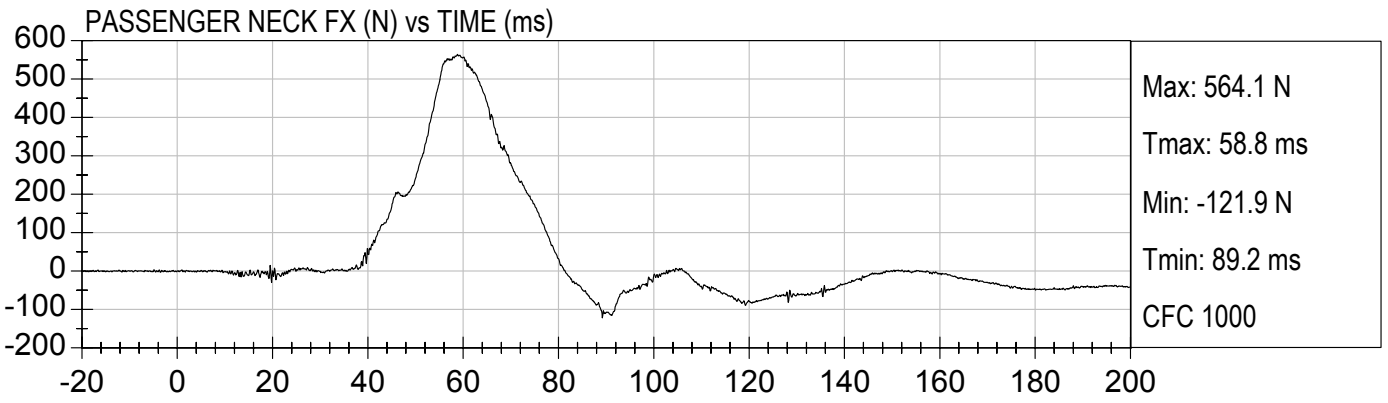






38.5MPH LEFT SIDE IMPACT (M45301)  
2004 ACURA TSX

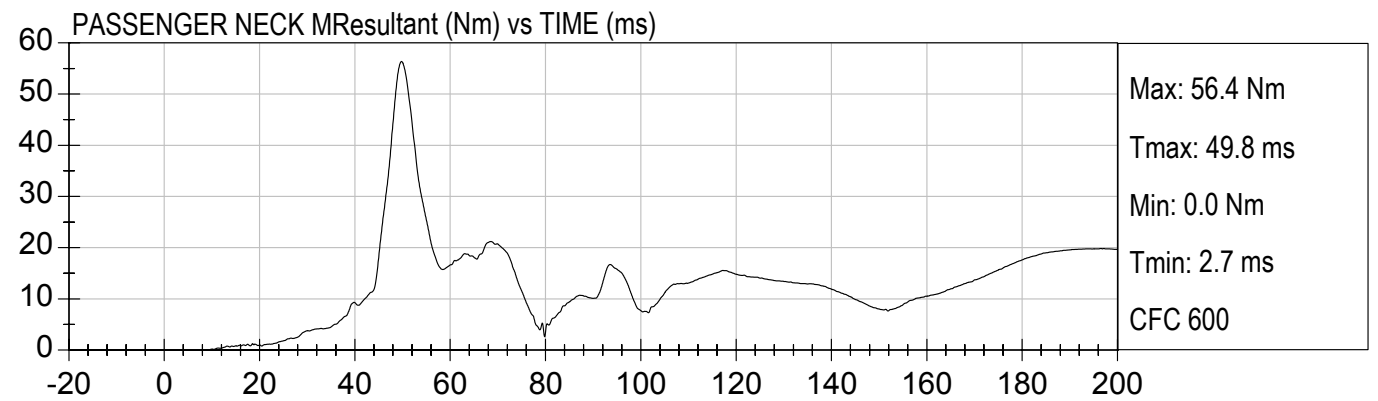
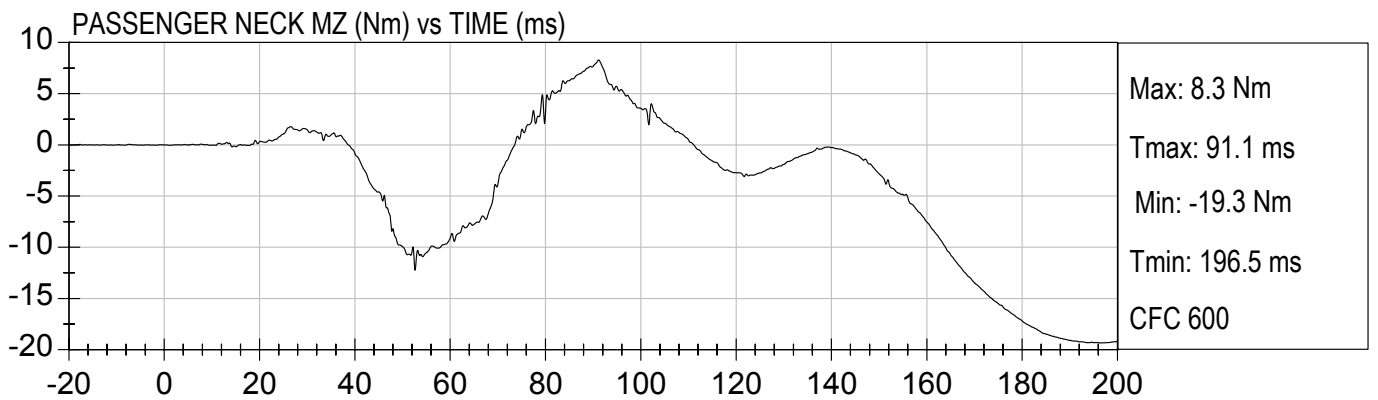
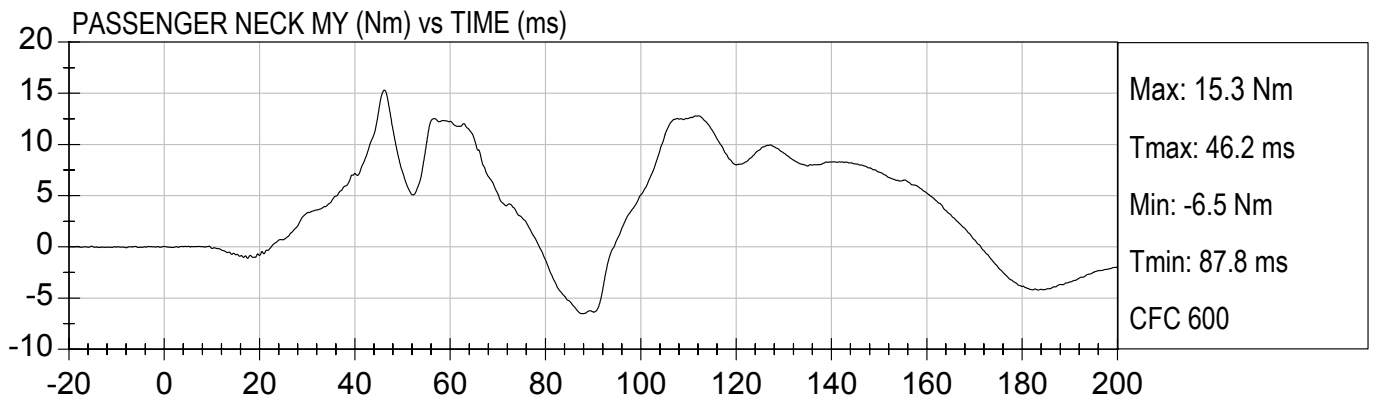
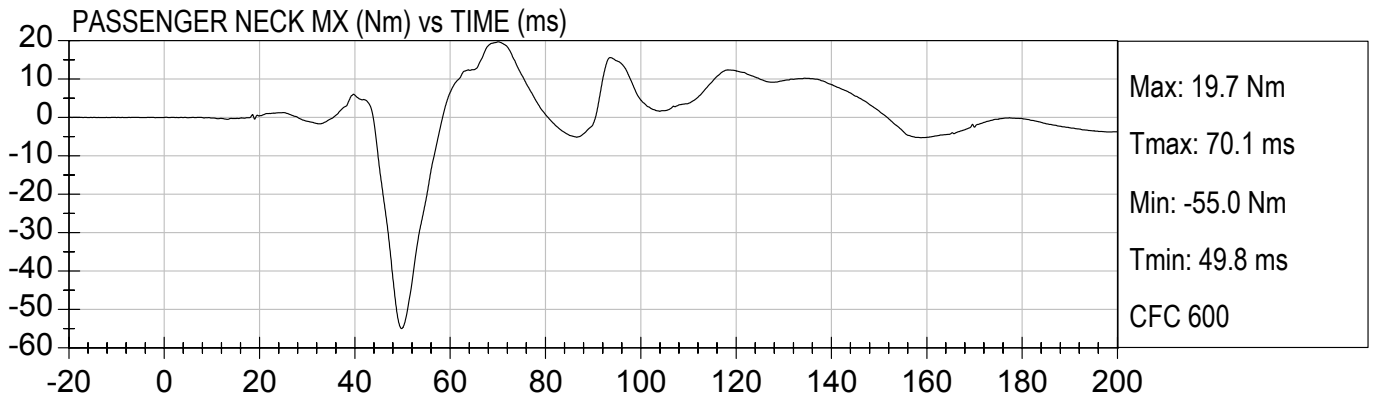
Test Date: 1/14/2004  
Speed: 38.6 mph (62.1 km/h)





38.5MPH LEFT SIDE IMPACT (M45301)  
2004 ACURA TSX

Test Date: 1/14/2004  
Speed: 38.6 mph (62.1 km/h)

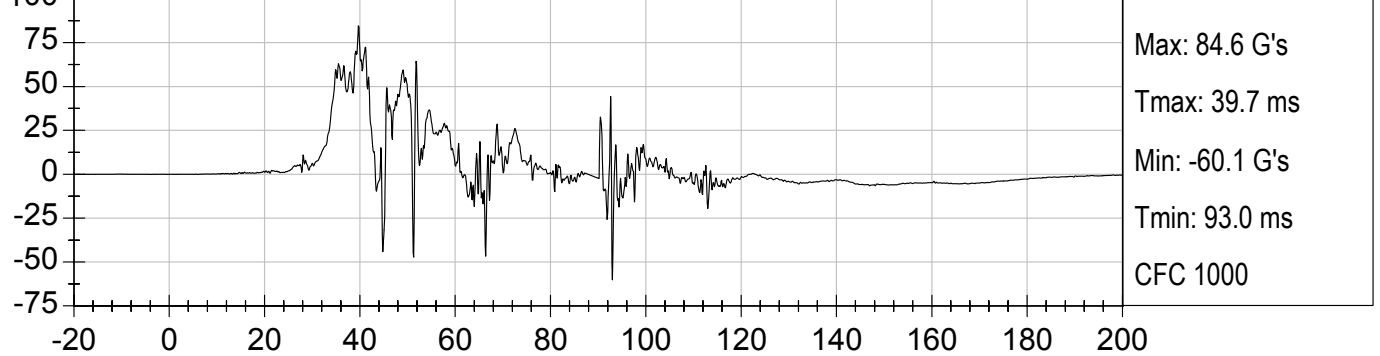




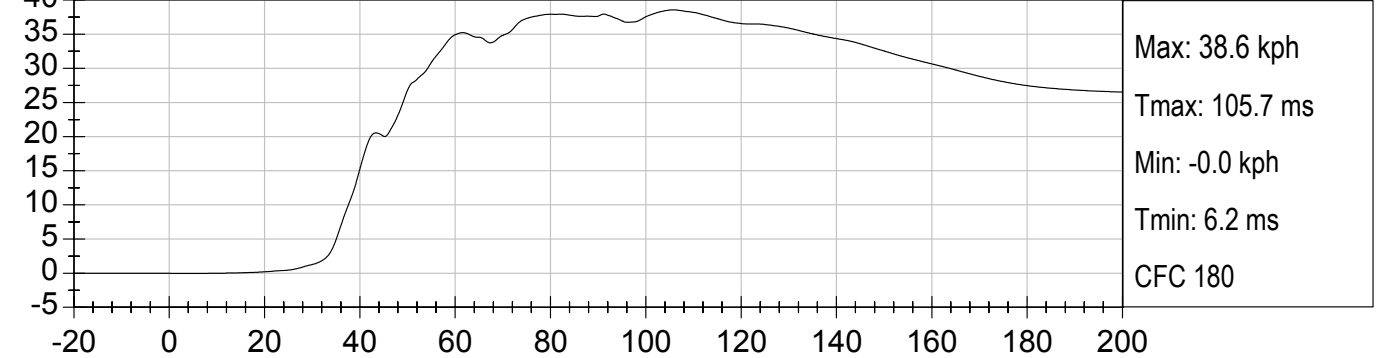
38.5MPH LEFT SIDE IMPACT (M45301)  
2004 ACURA TSX

Test Date: 1/14/2004  
Speed: 38.6 mph (62.1 km/h)

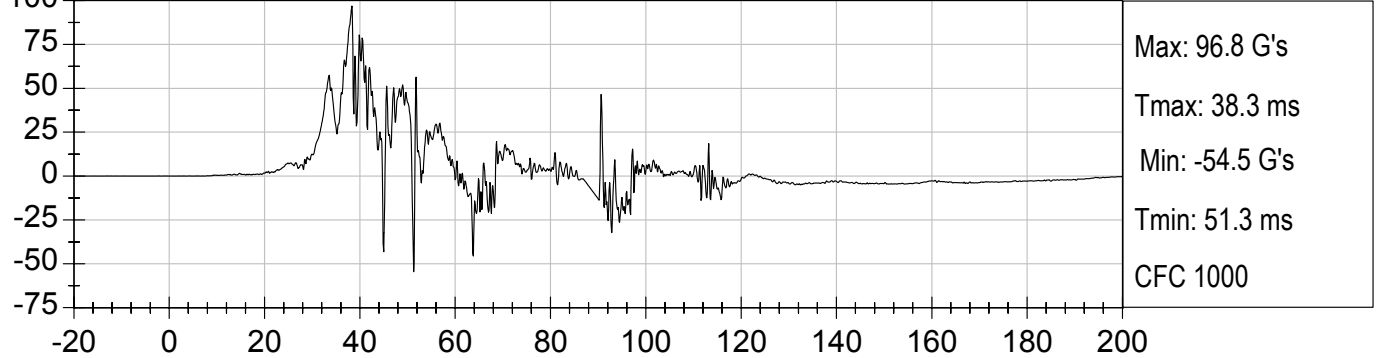
PASSENGER UPPER RIB Y (G's) vs TIME (ms)



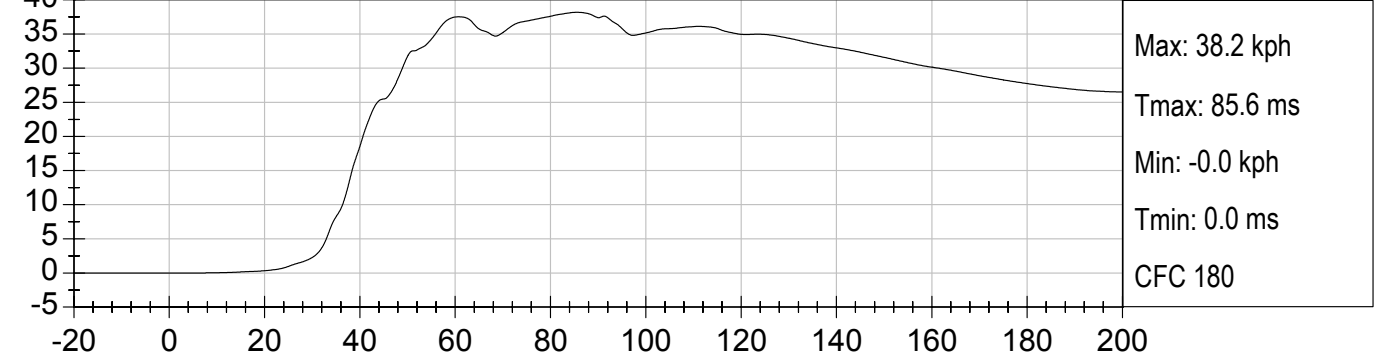
PASSENGER UPPER RIB Y Velocity (kph) vs TIME (ms)

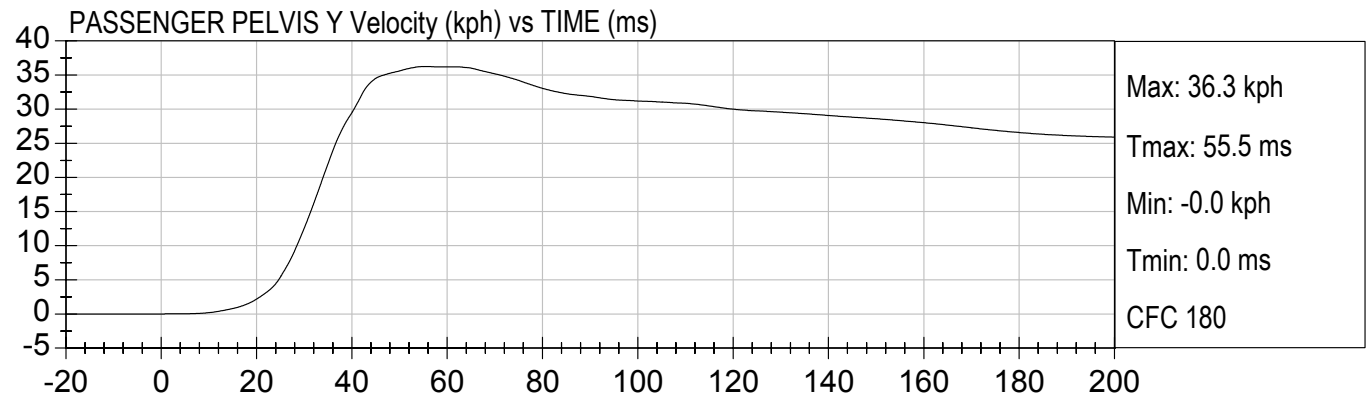
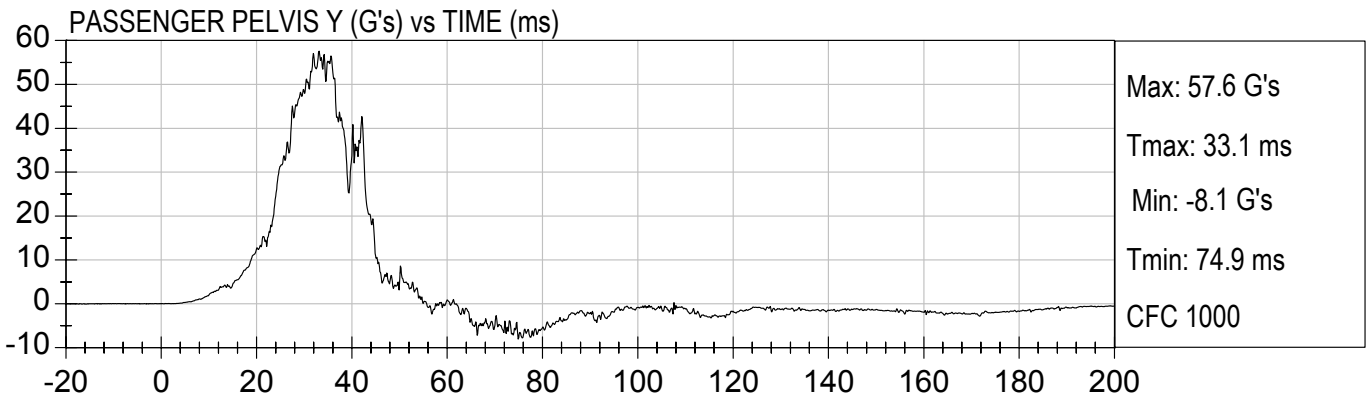
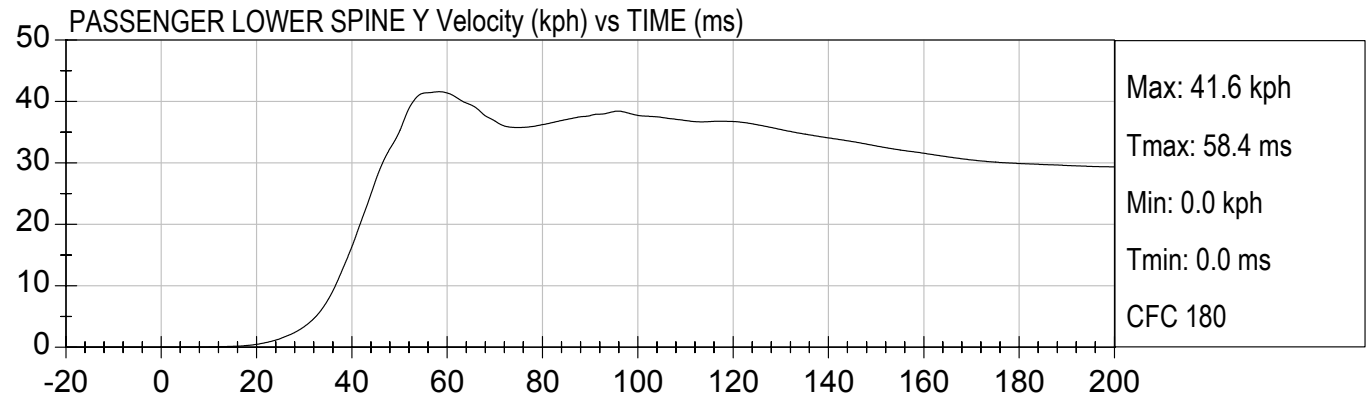
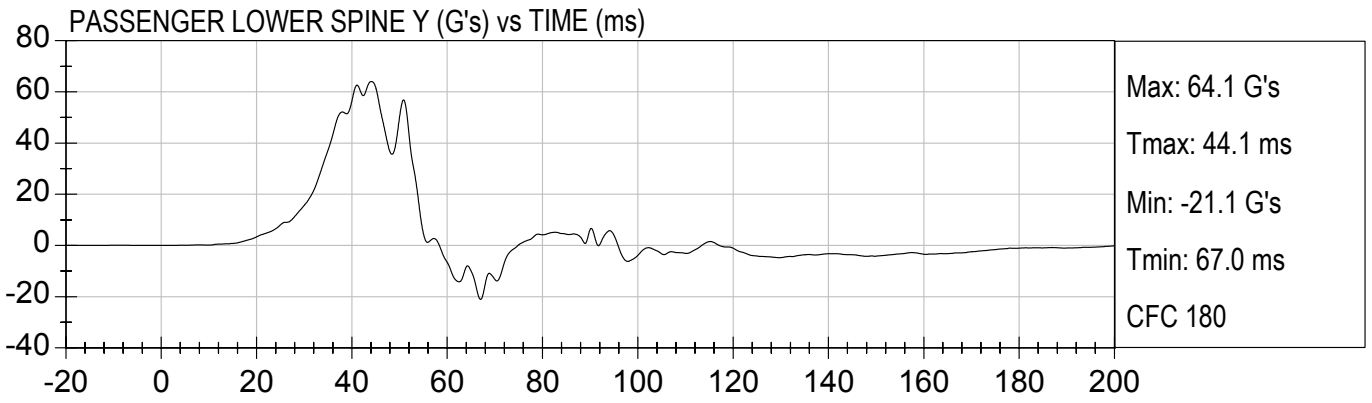


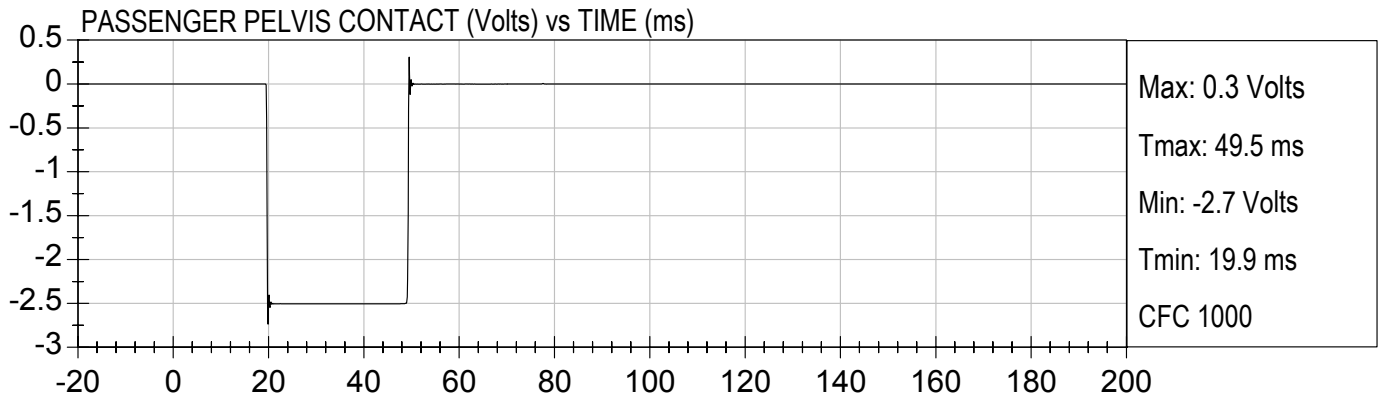
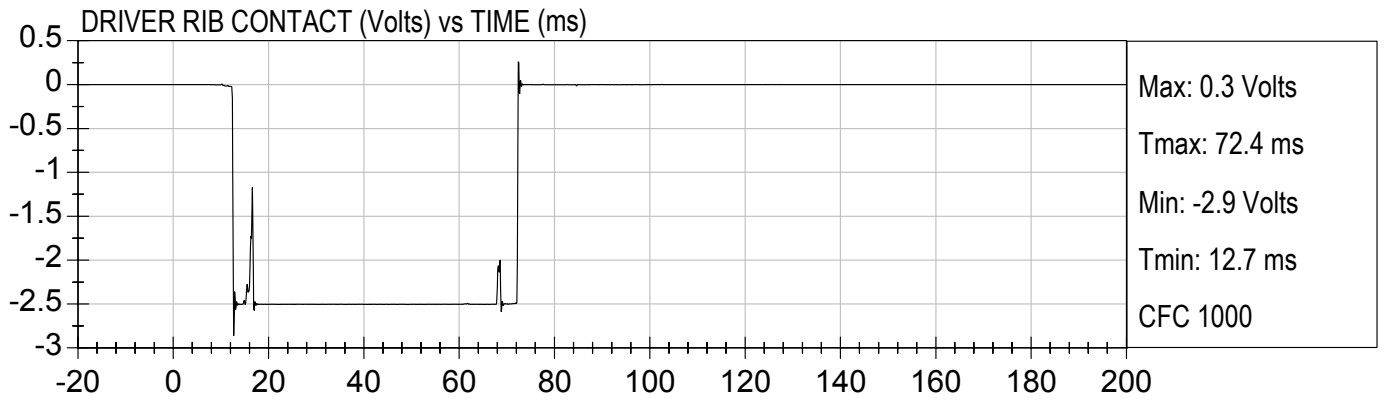
PASSENGER LOWER RIB Y (G's) vs TIME (ms)



PASSENGER LOWER RIB Y Velocity (kph) vs TIME (ms)

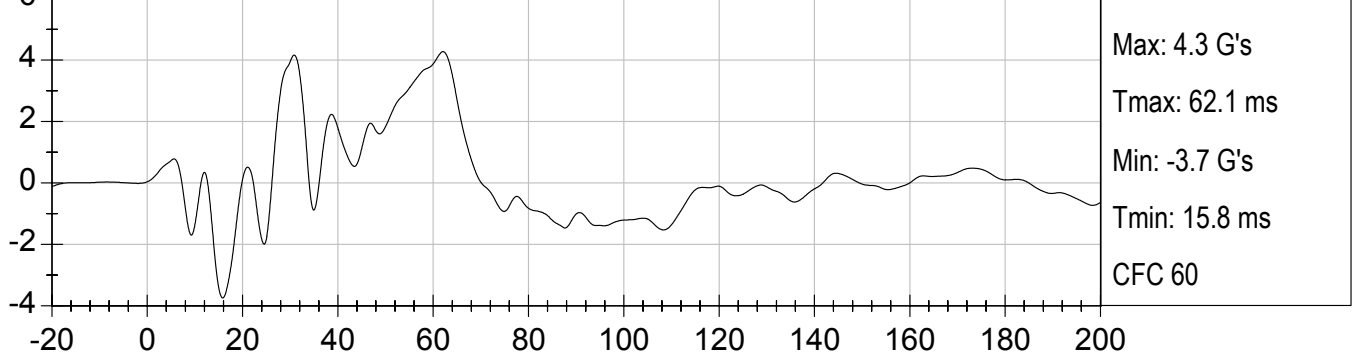




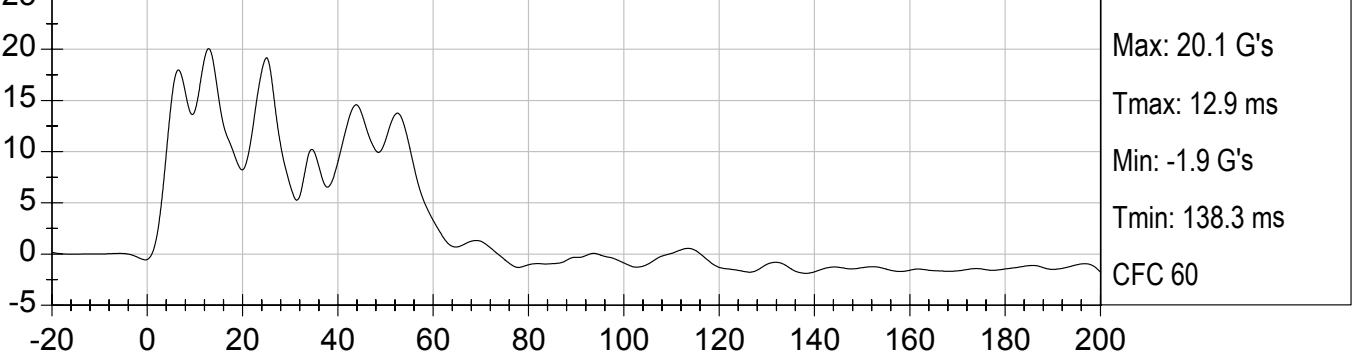




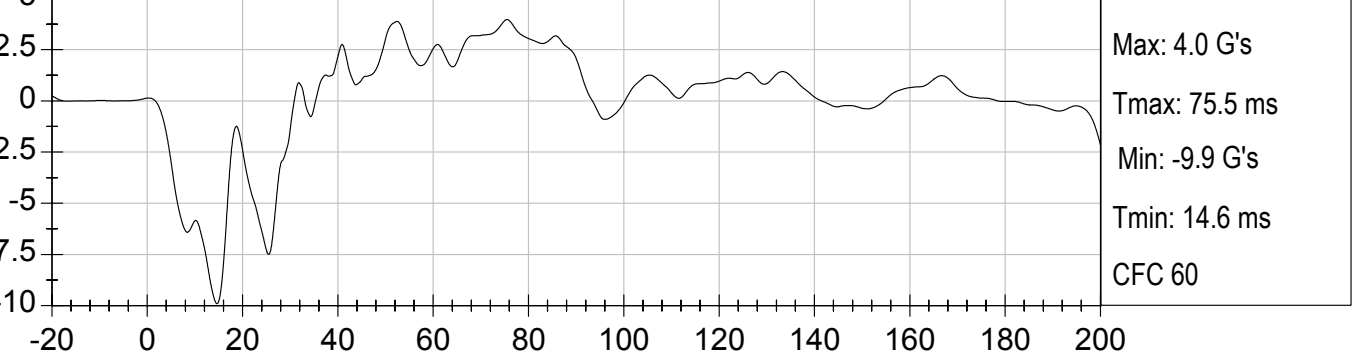
RIGHT FRONT SILL X (G's) vs TIME (ms)



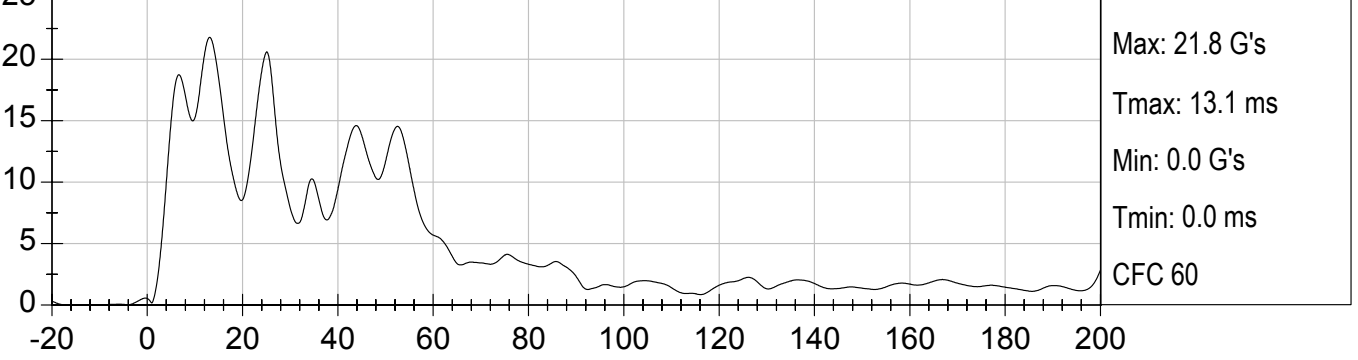
RIGHT FRONT SILL Y (G's) vs TIME (ms)

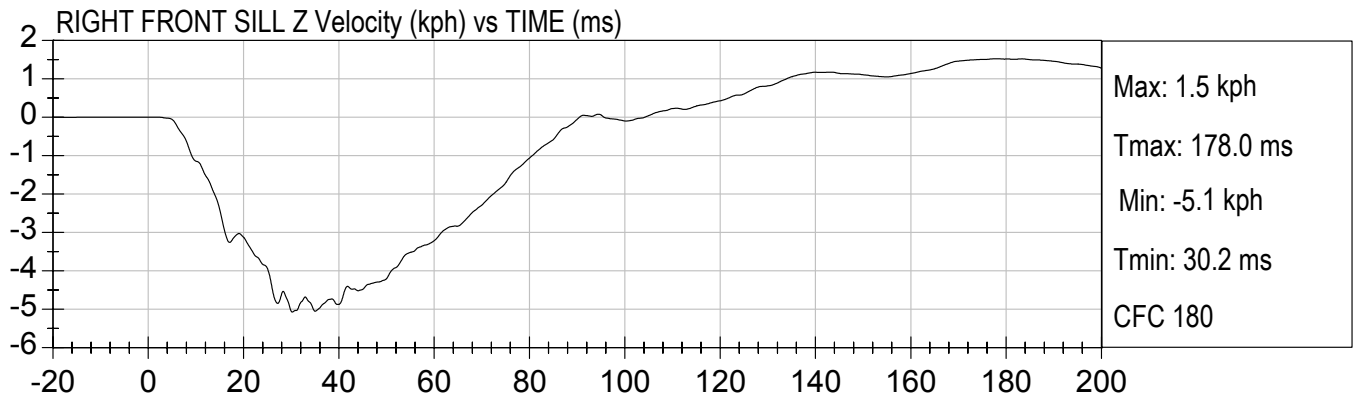
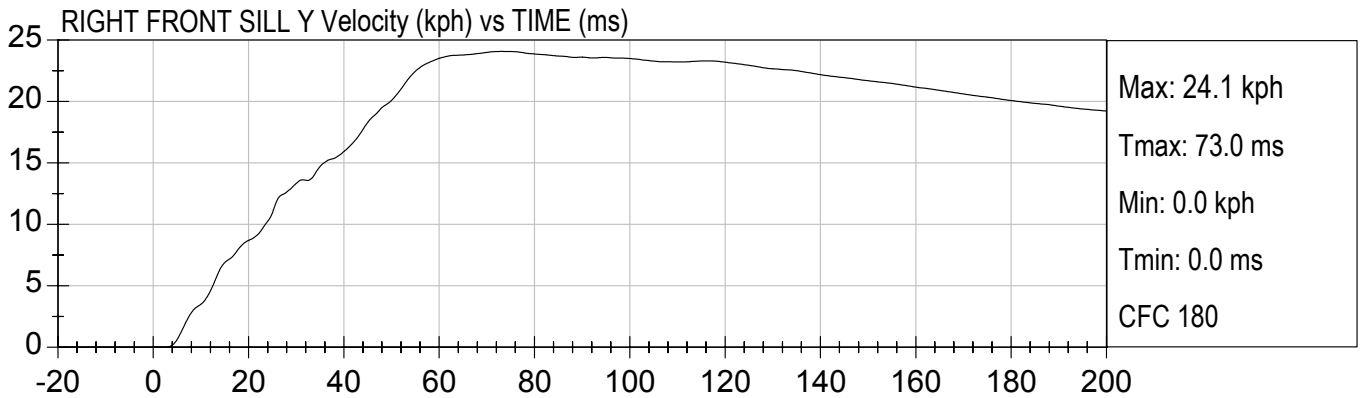
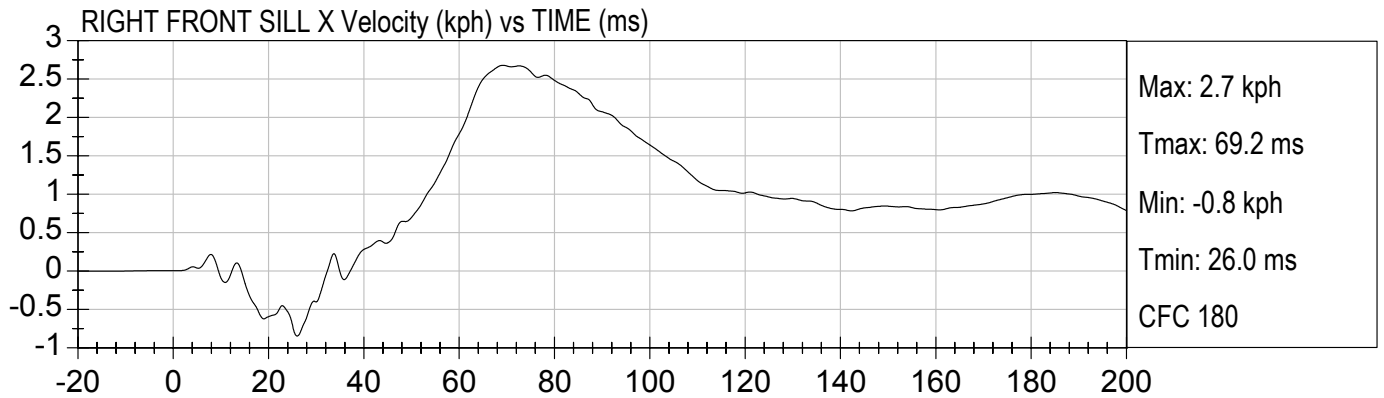


RIGHT FRONT SILL Z (G's) vs TIME (ms)



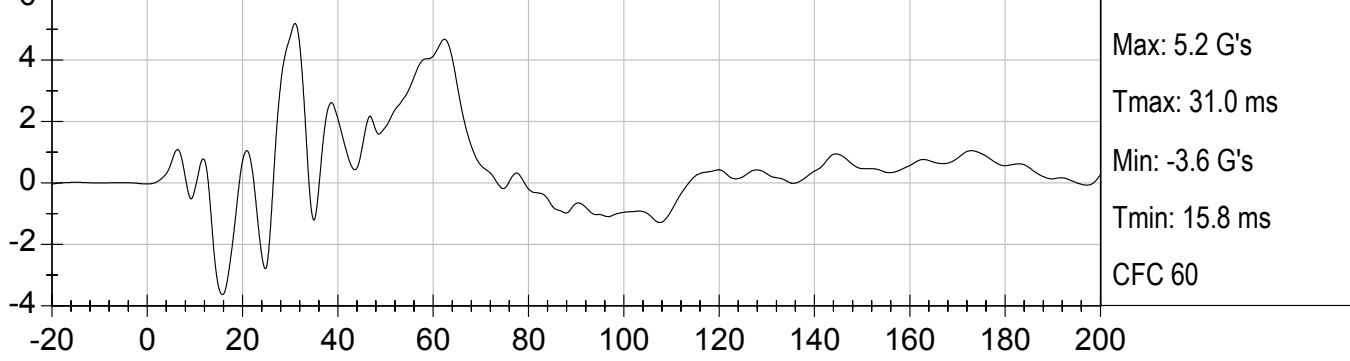
RIGHT FRONT SILL Resultant (G's) vs TIME (ms)



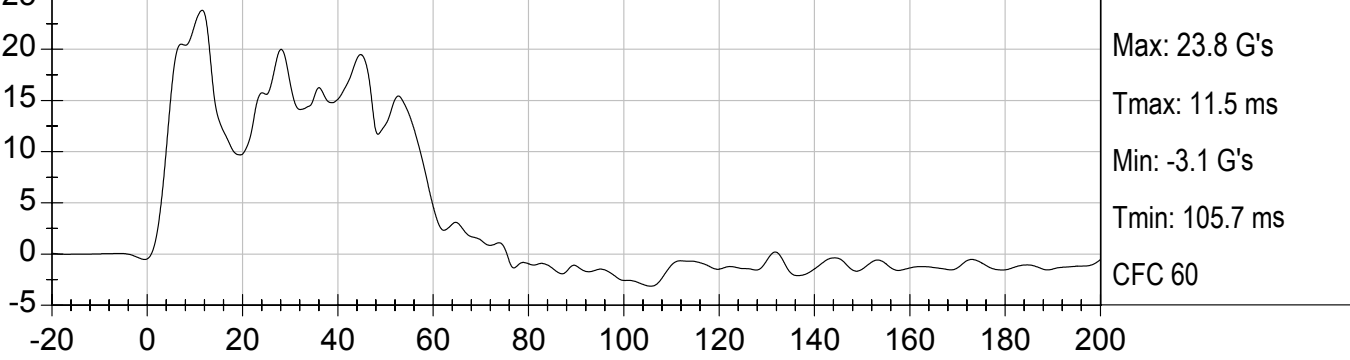




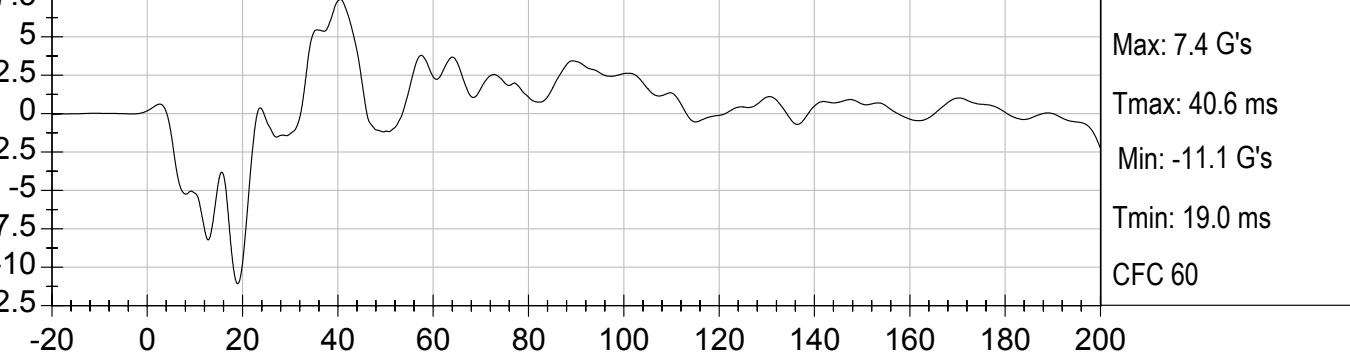
RIGHT REAR SILL X (G's) vs TIME (ms)



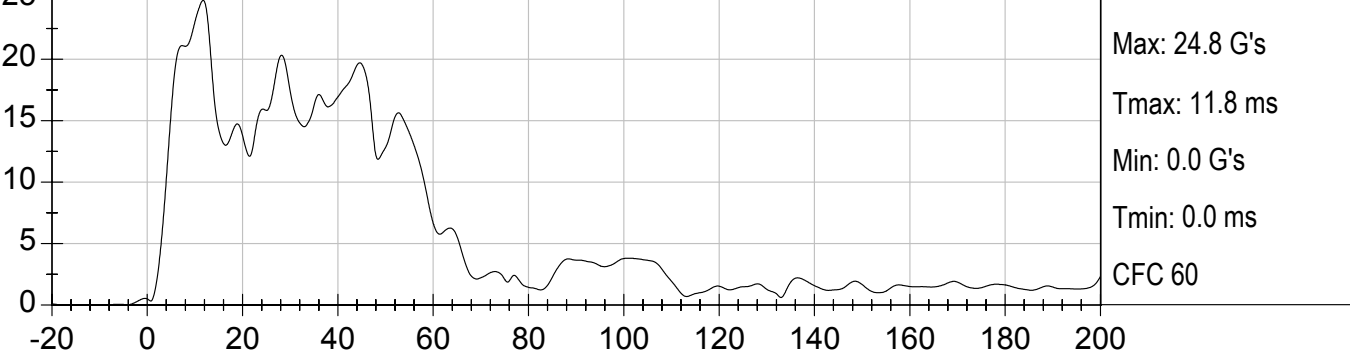
RIGHT REAR SILL Y (G's) vs TIME (ms)



RIGHT REAR SILL Z (G's) vs TIME (ms)

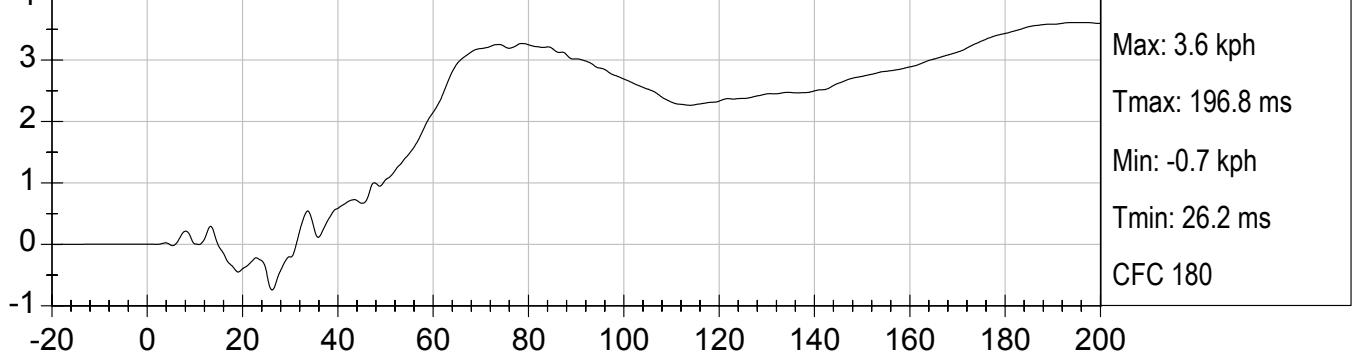


RIGHT REAR SILL Resultant (G's) vs TIME (ms)

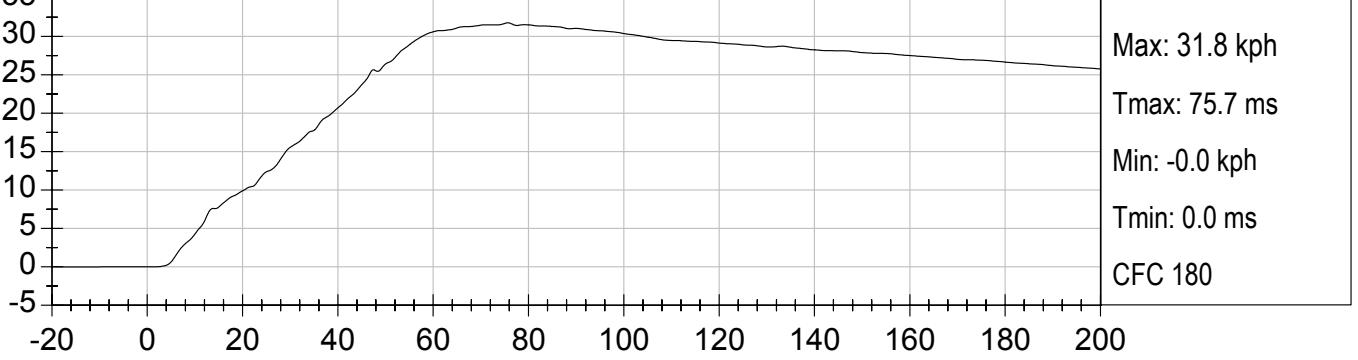




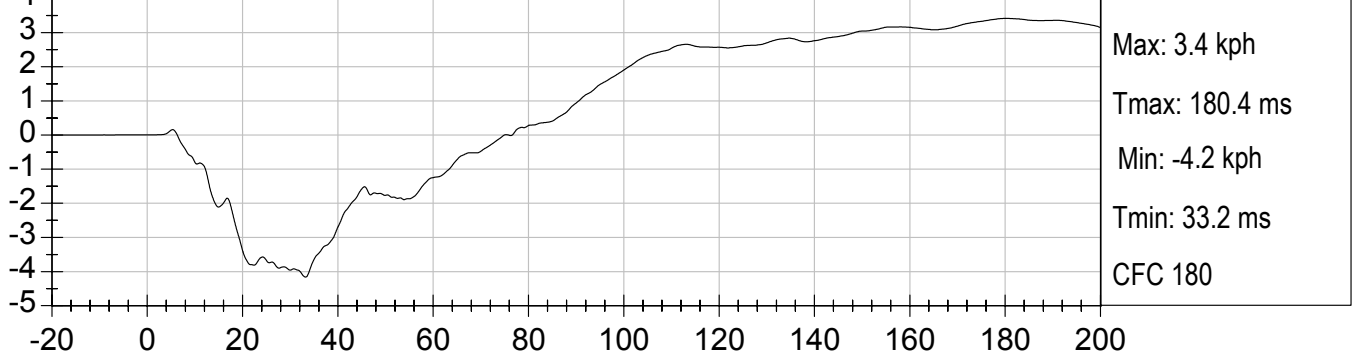
RIGHT REAR SILL X Velocity (kph) vs TIME (ms)

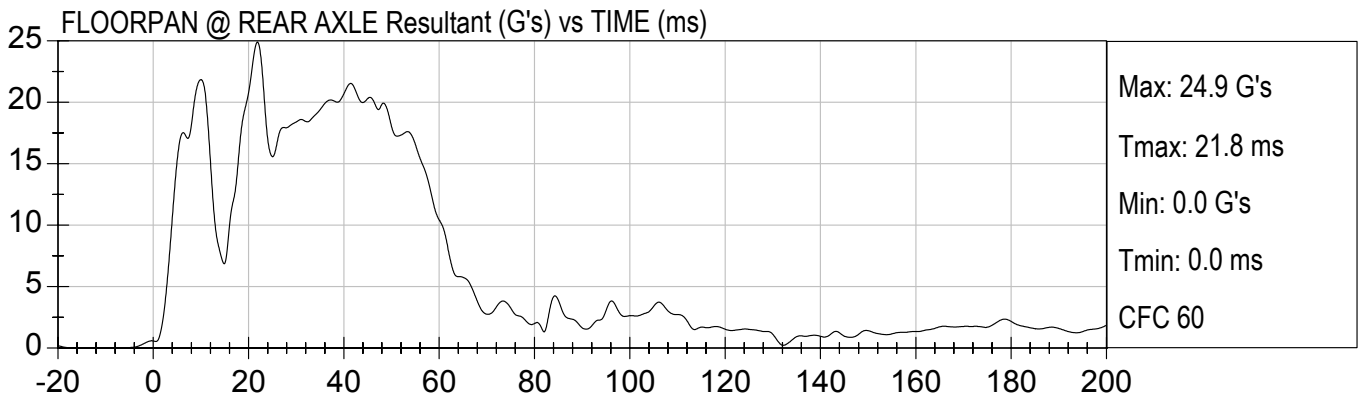
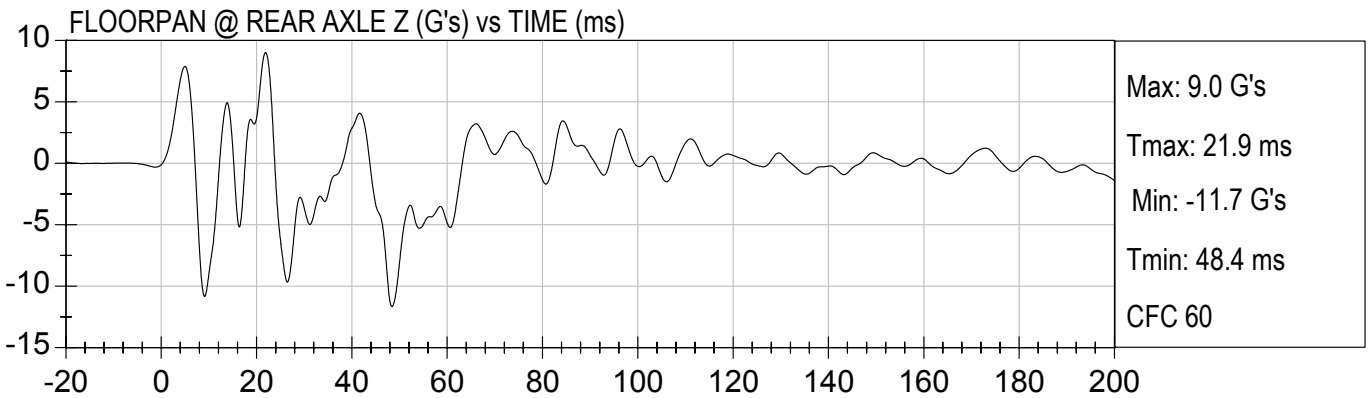
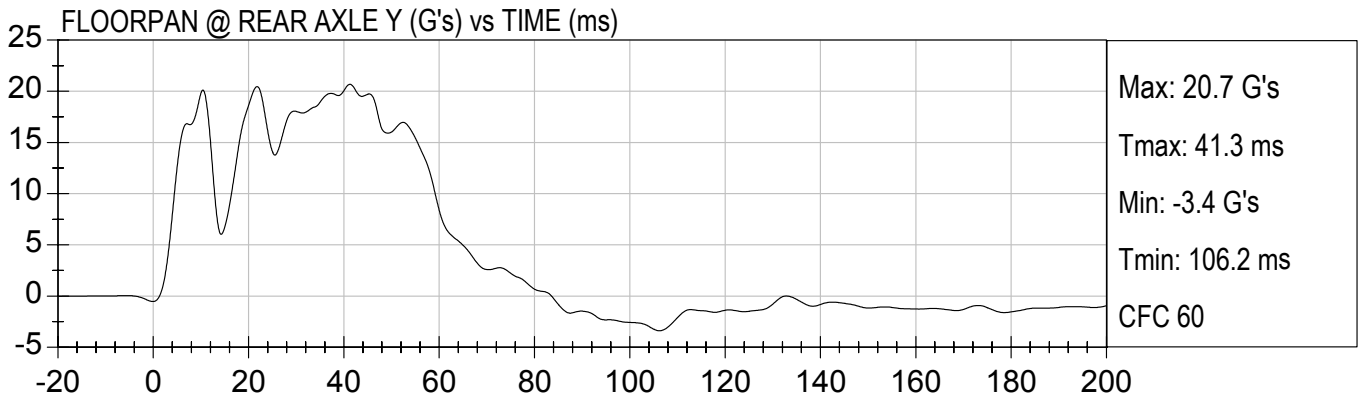
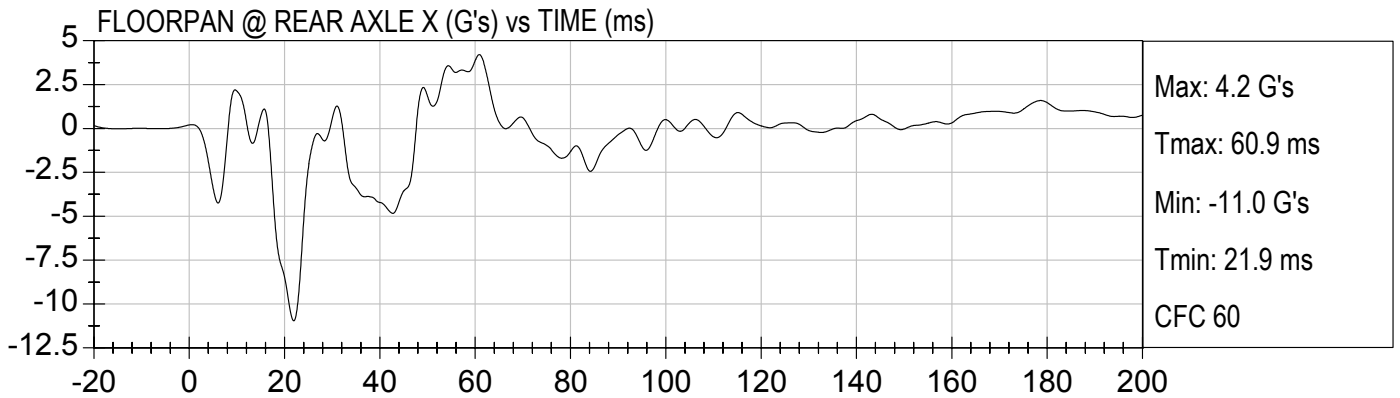


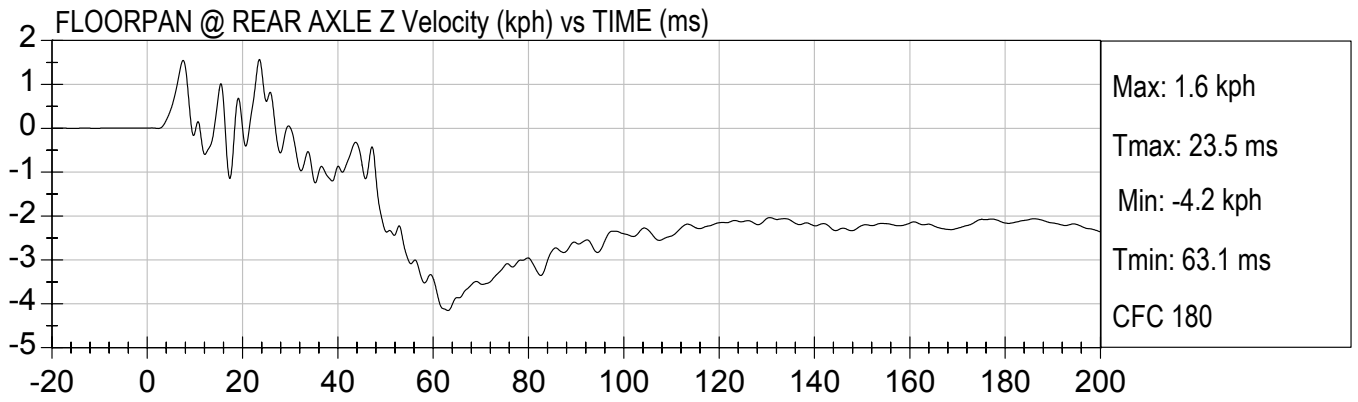
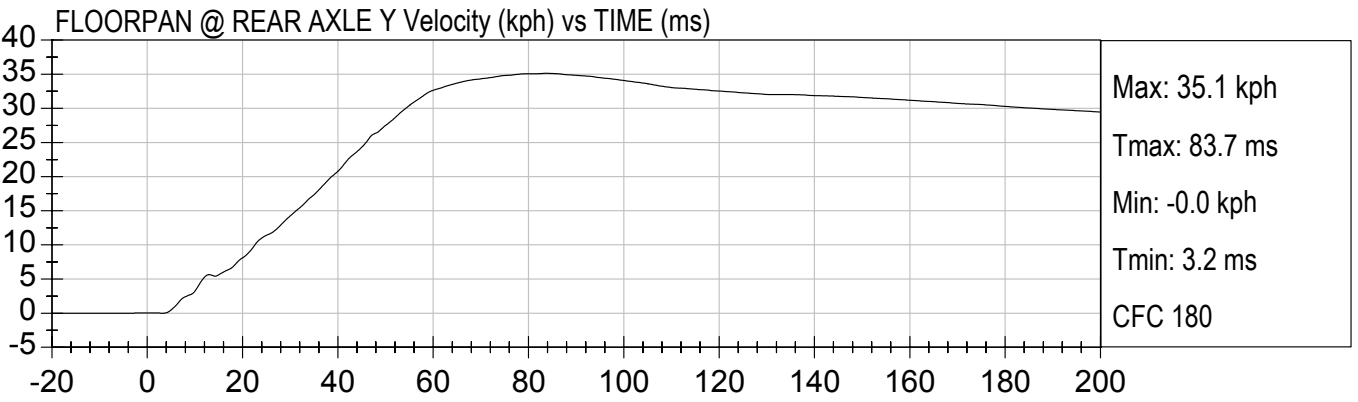
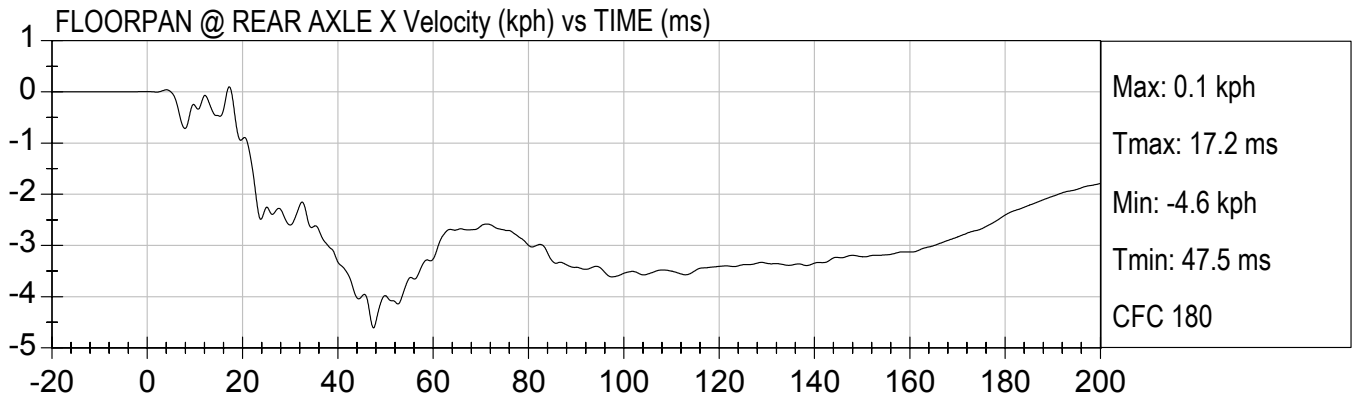
RIGHT REAR SILL Y Velocity (kph) vs TIME (ms)

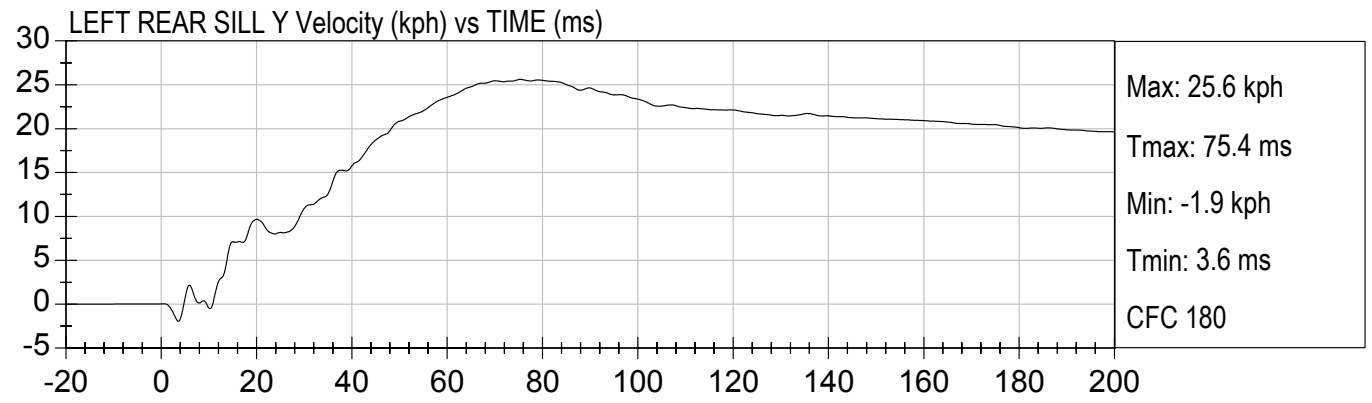
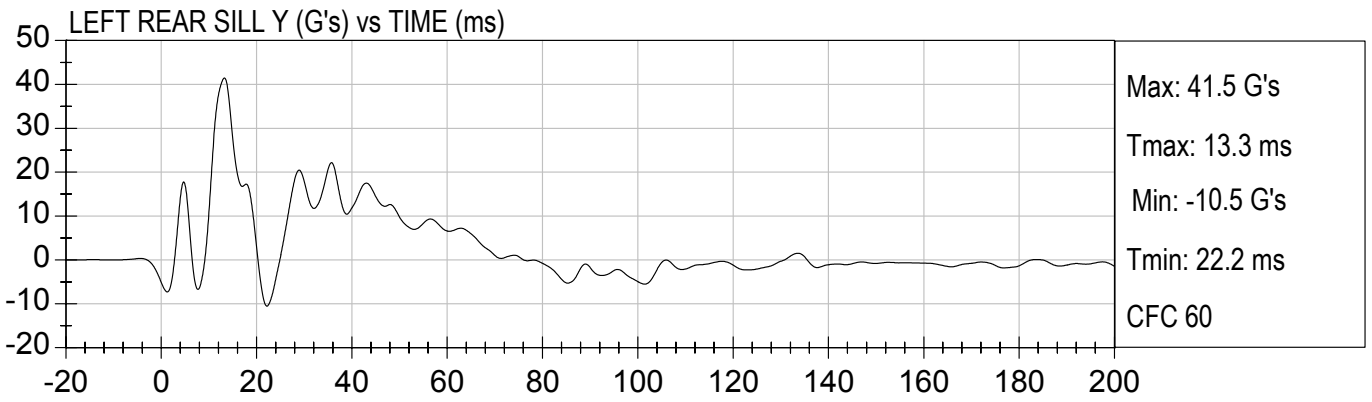
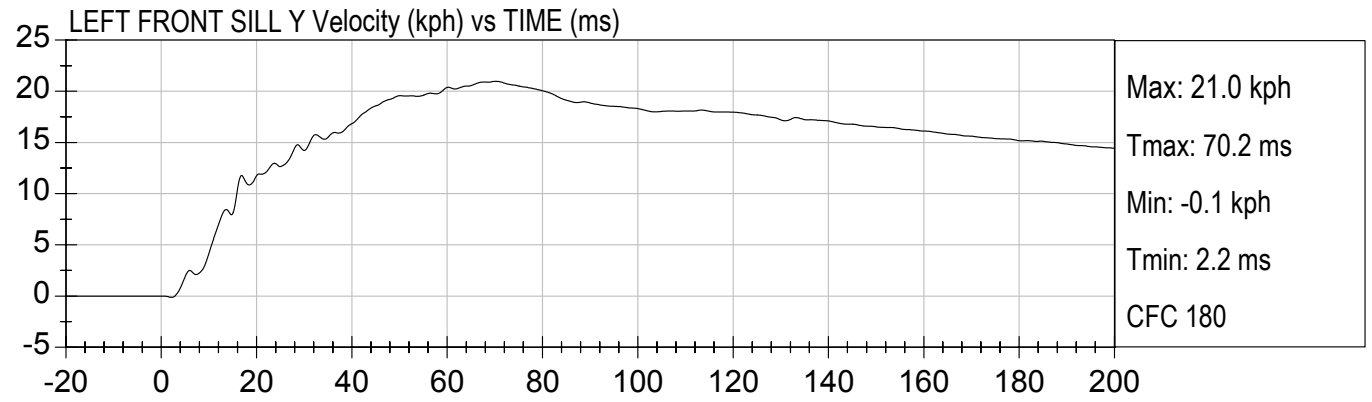
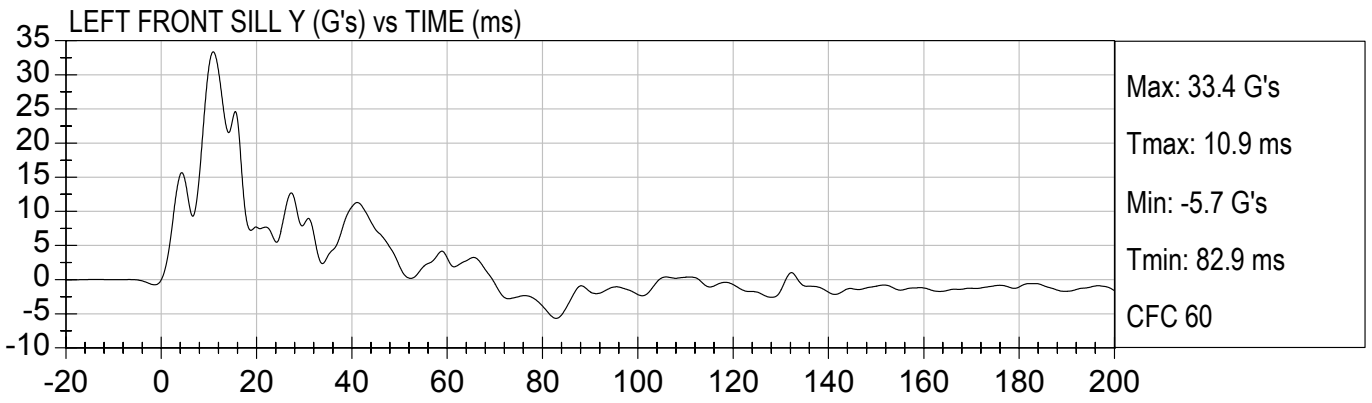


RIGHT REAR SILL Z Velocity (kph) vs TIME (ms)



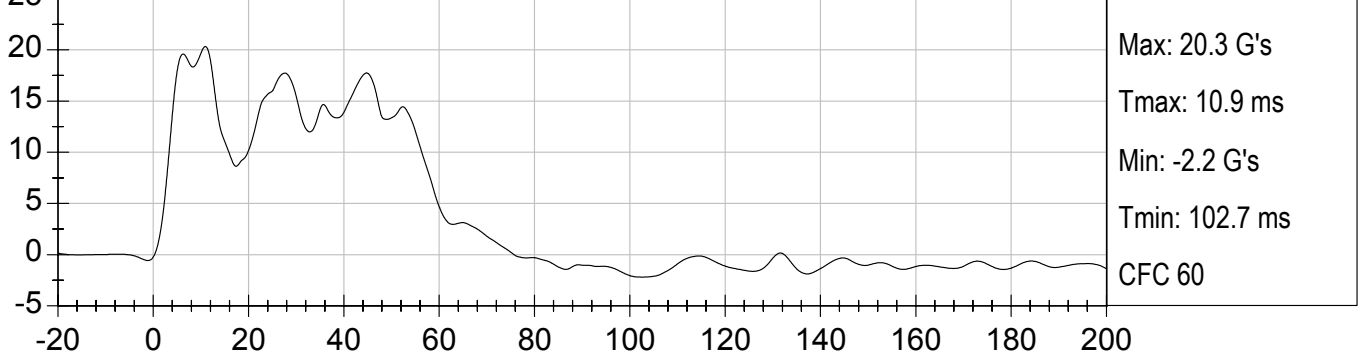




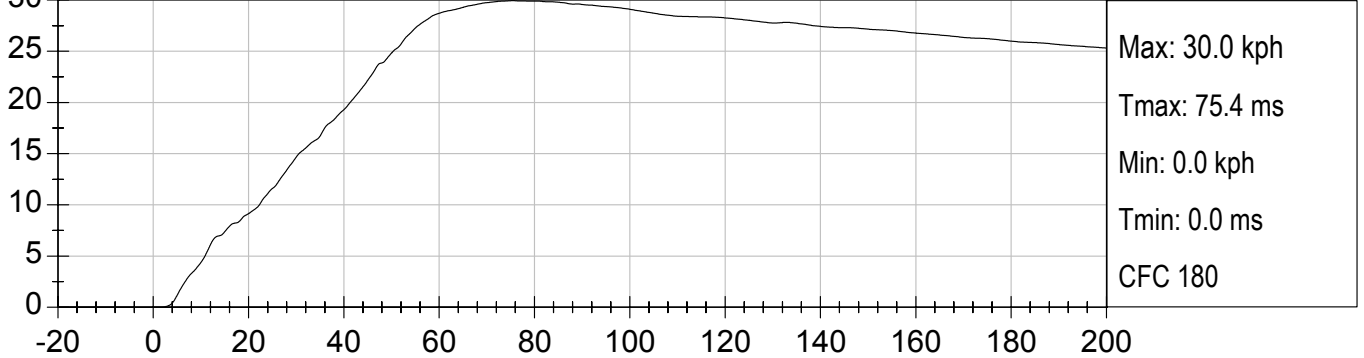




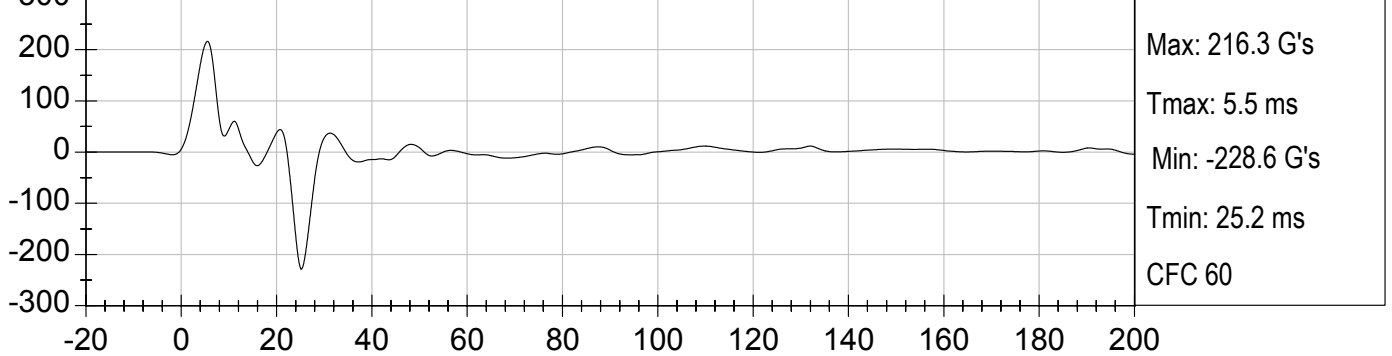
RR OCCUPANT COMPARTMENT Y (G's) vs TIME (ms)



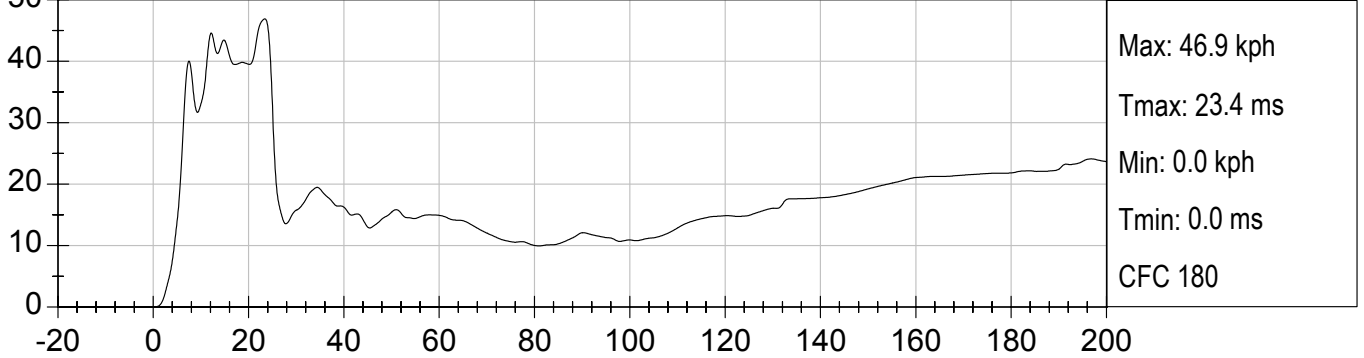
RR OCCUPANT COMPARTMENT Y Velocity (kph) vs TIME (ms)

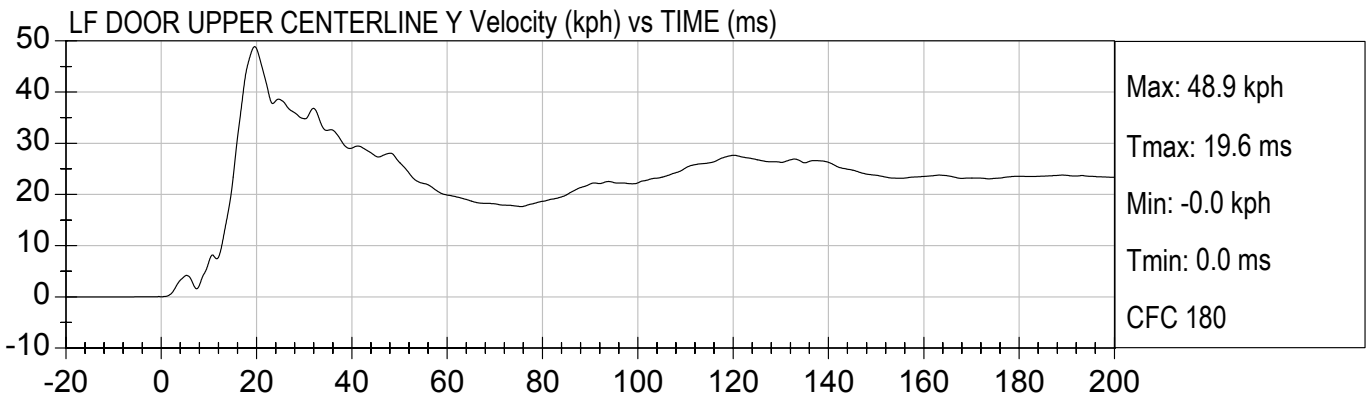
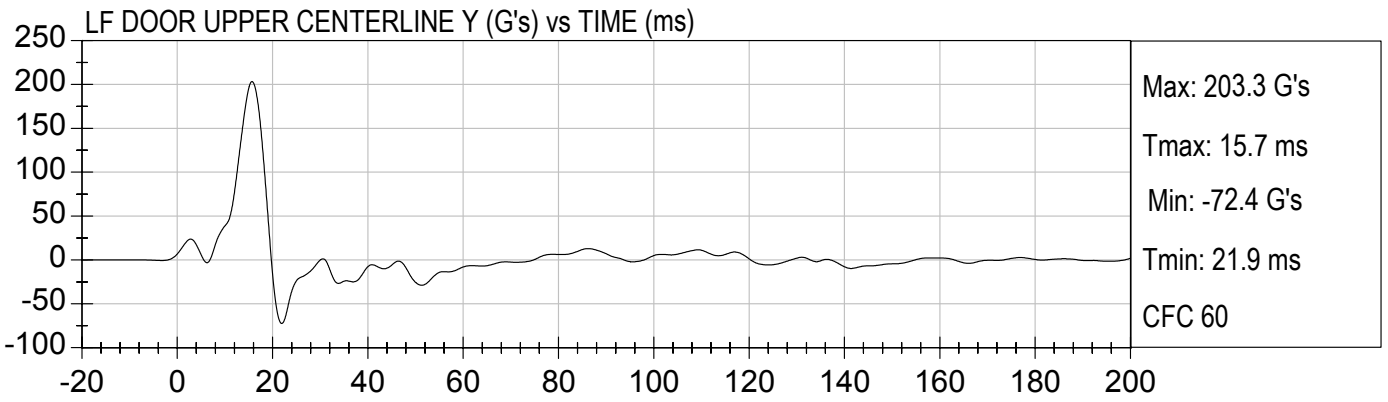
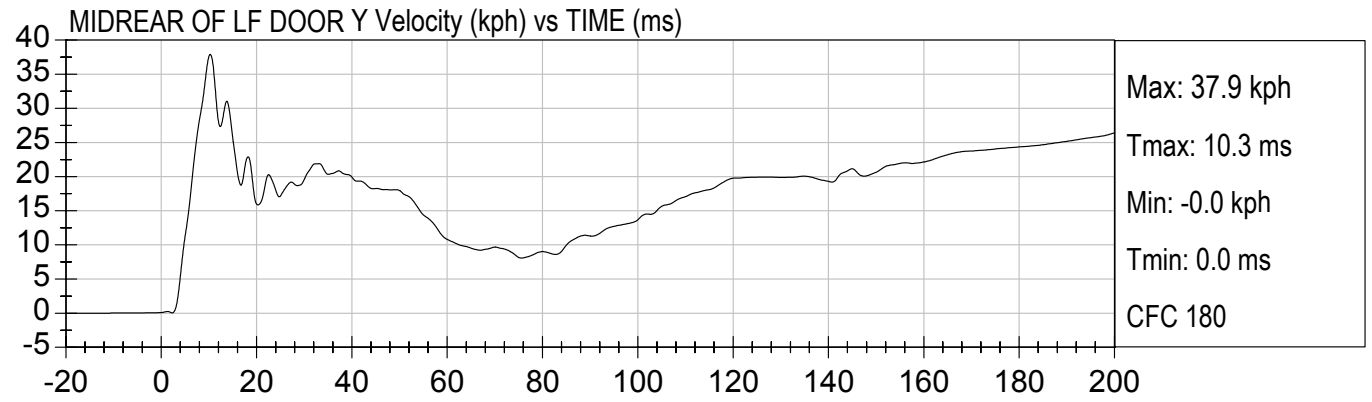
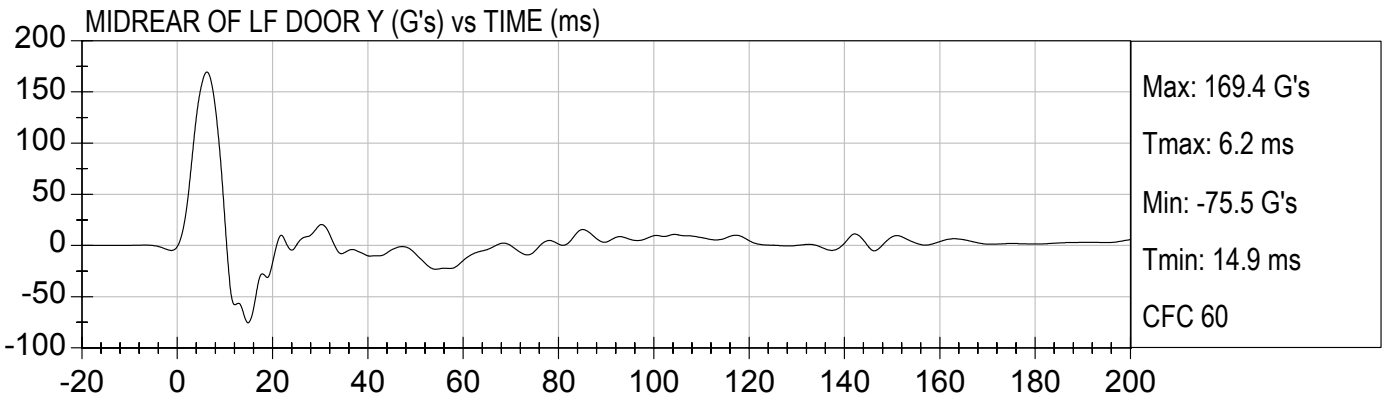


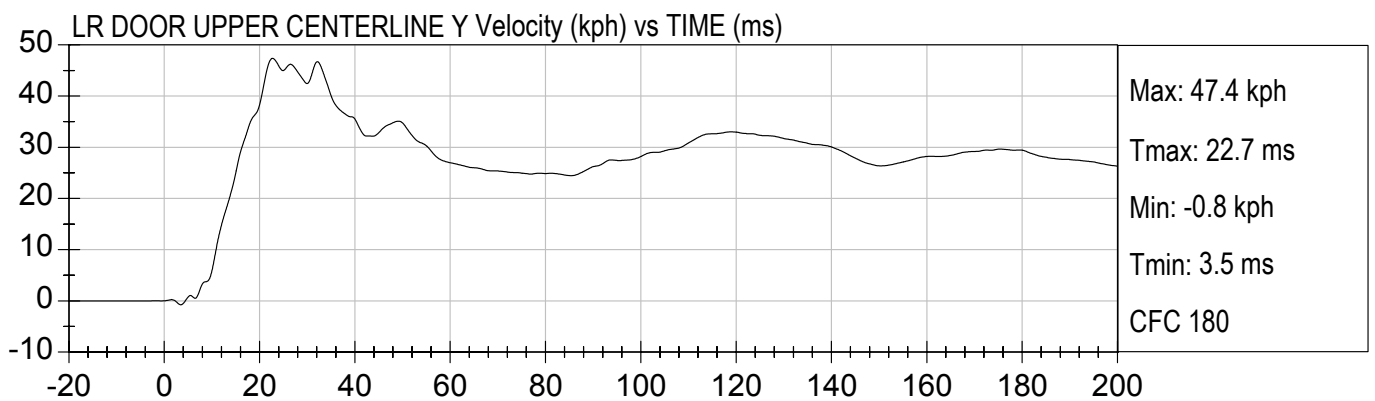
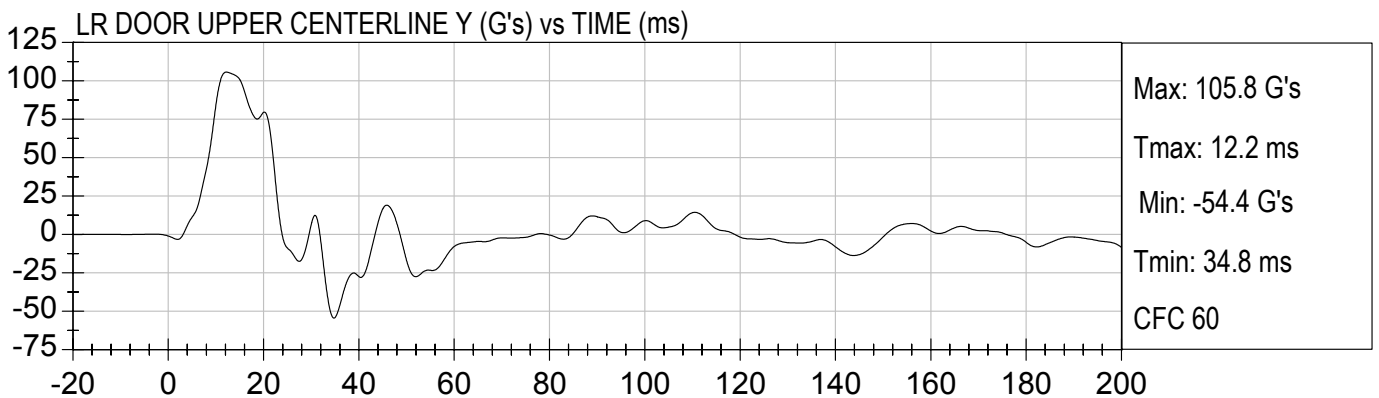
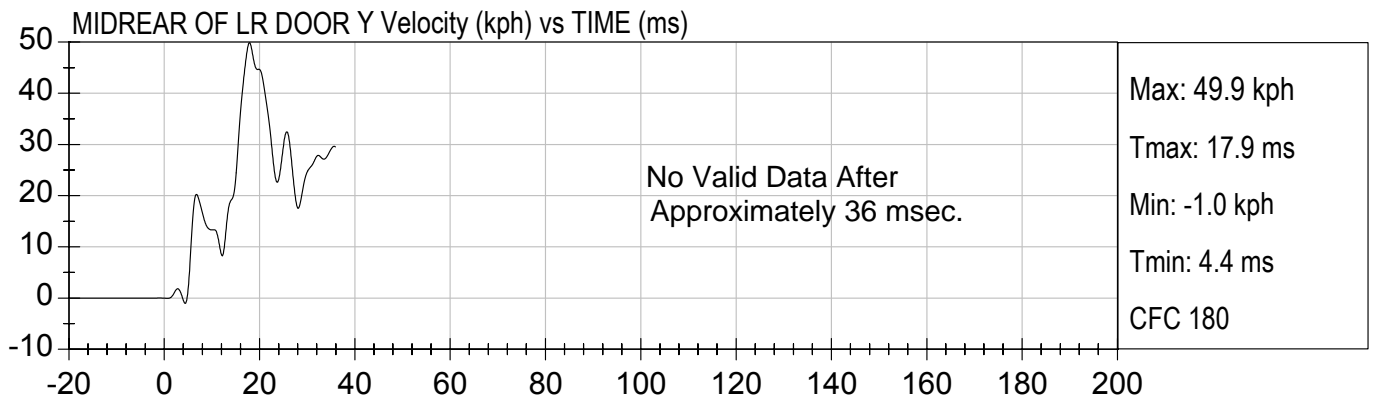
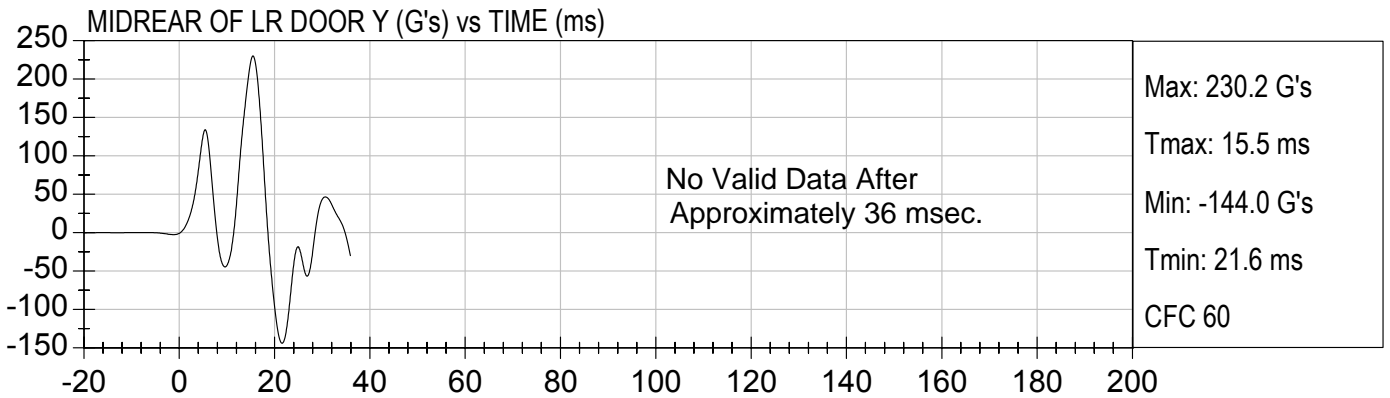
LF DOOR CENTERLINE Y (G's) vs TIME (ms)

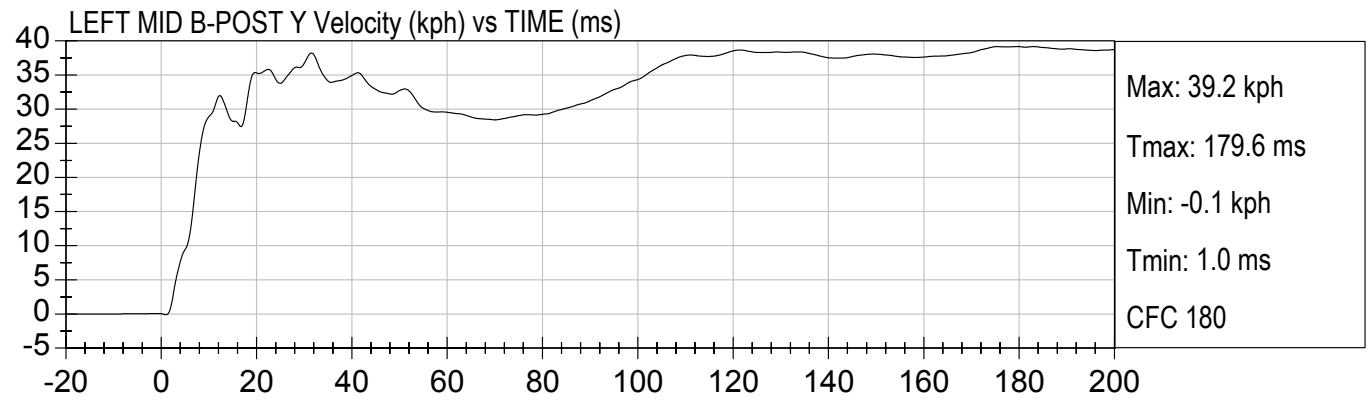
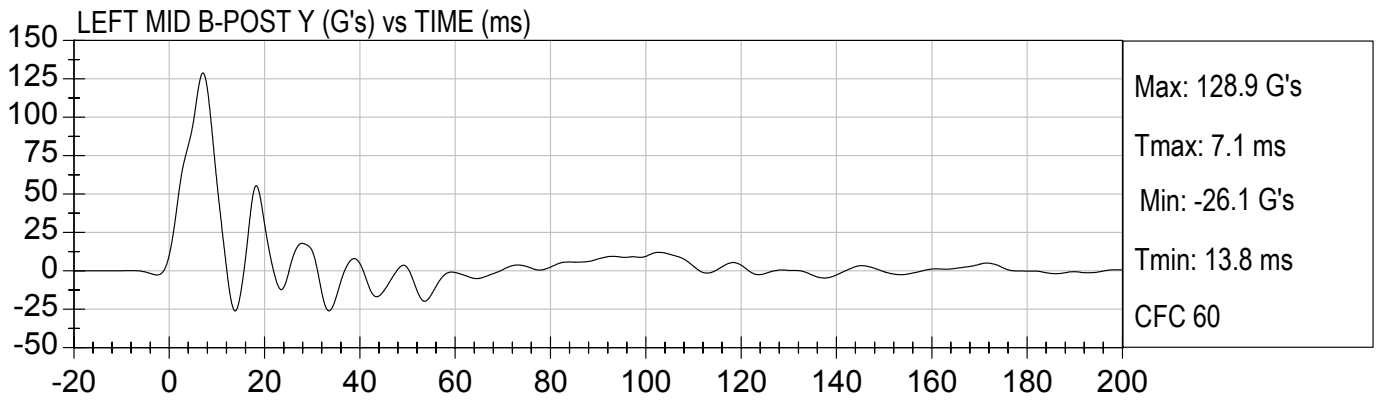
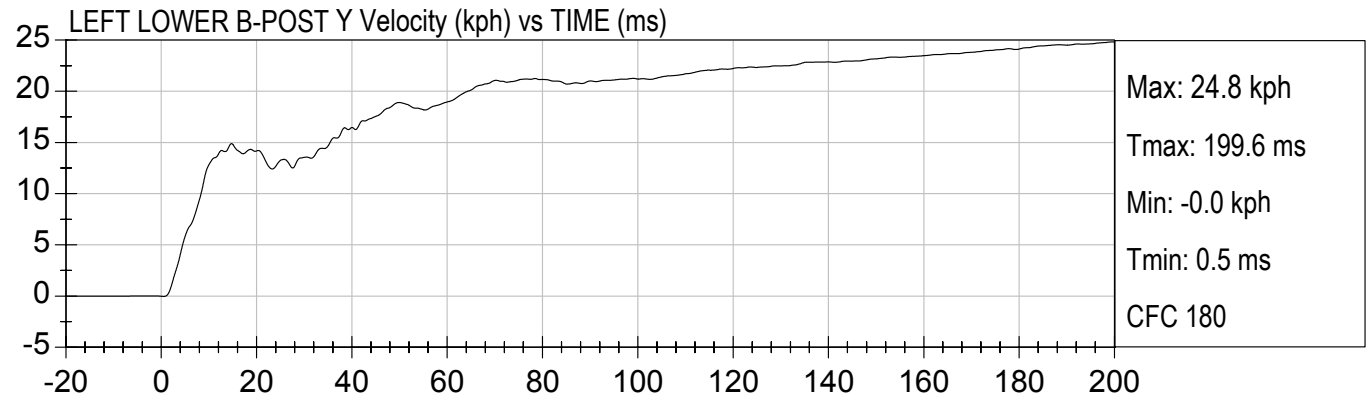
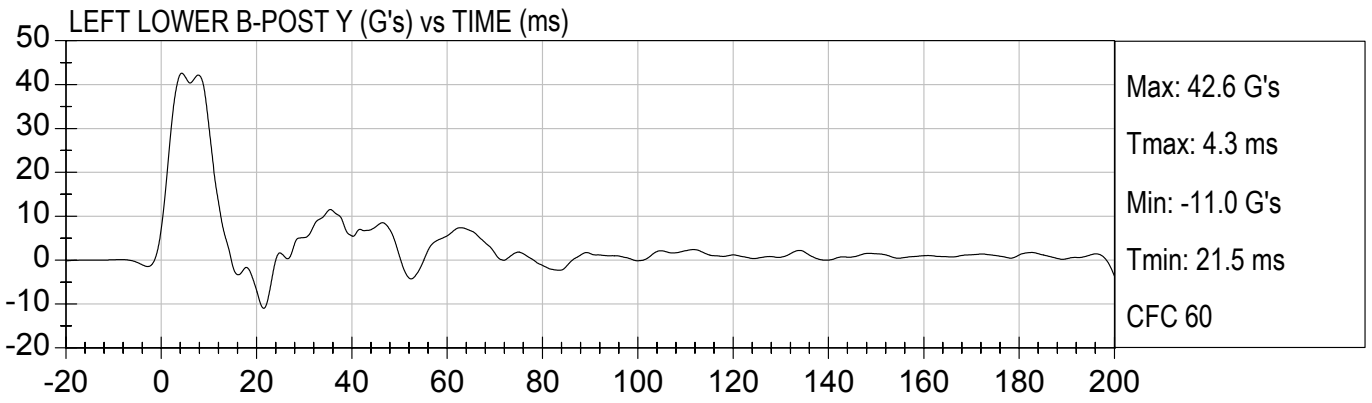


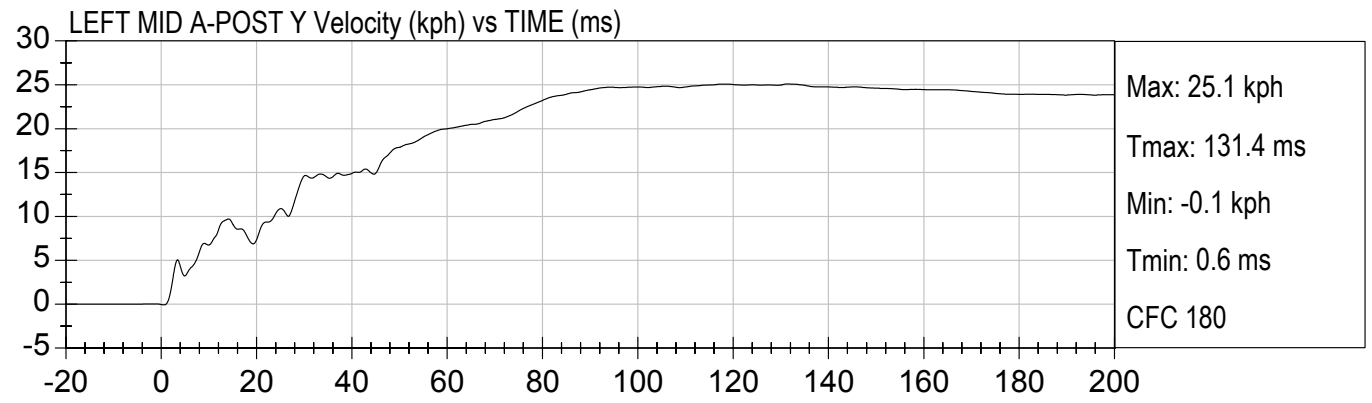
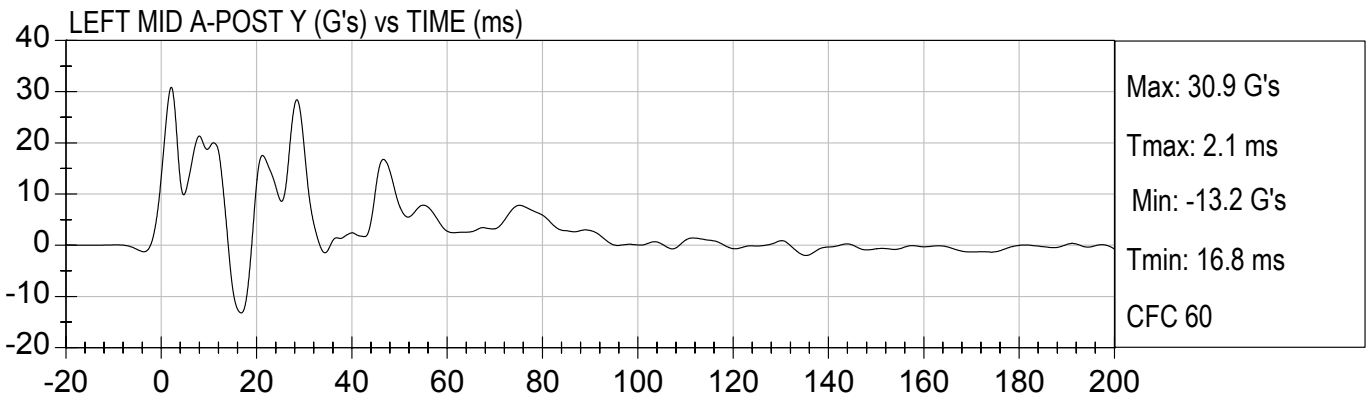
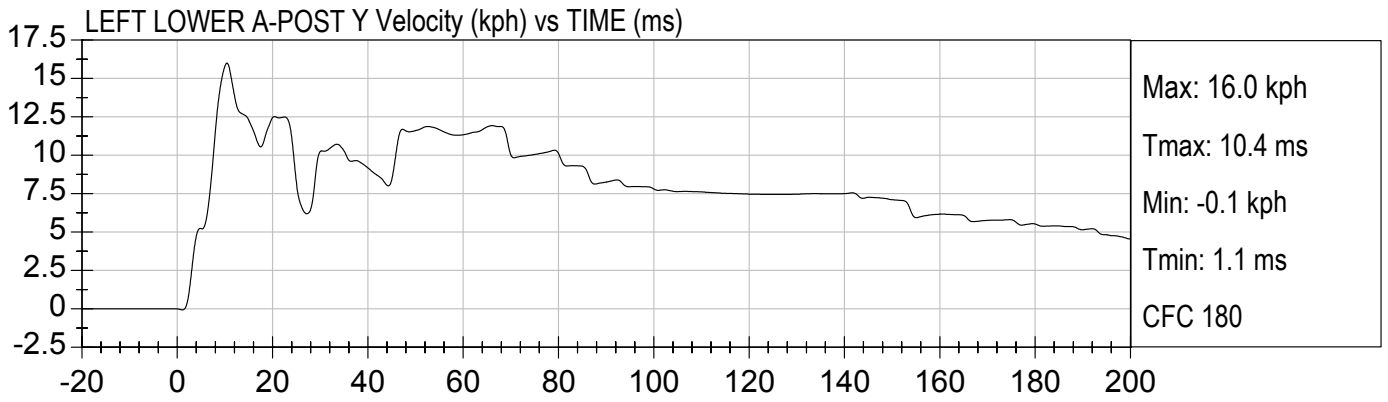
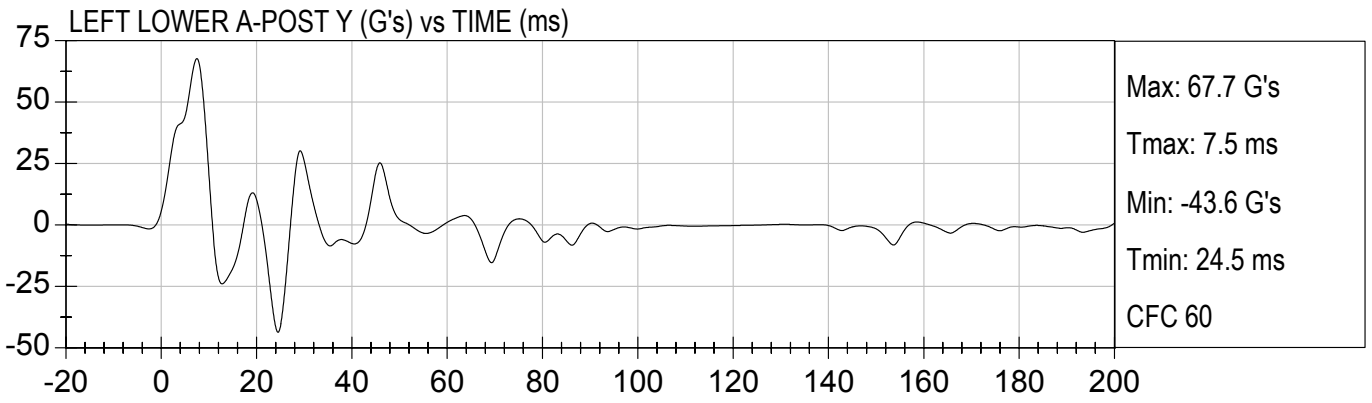
LF DOOR CENTERLINE Y Velocity (kph) vs TIME (ms)

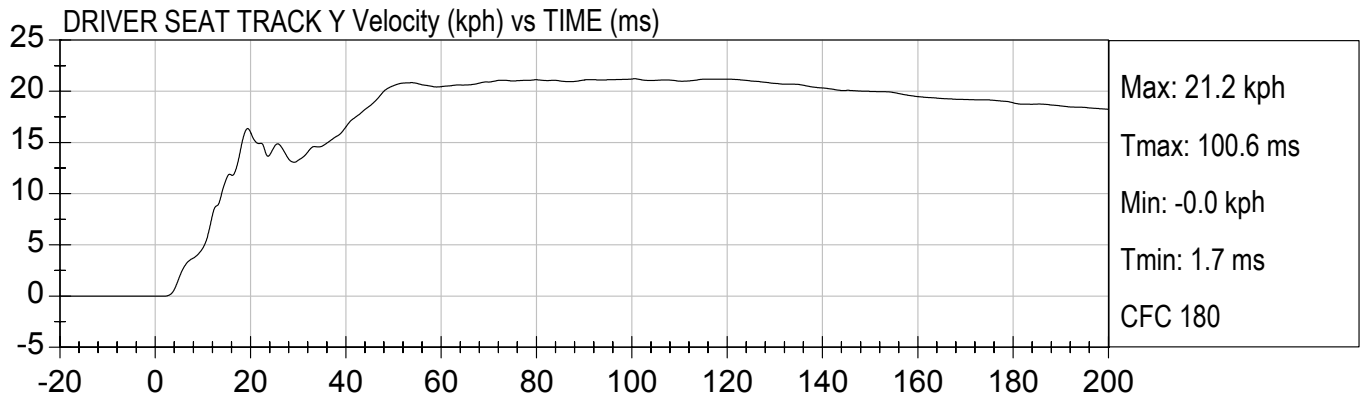
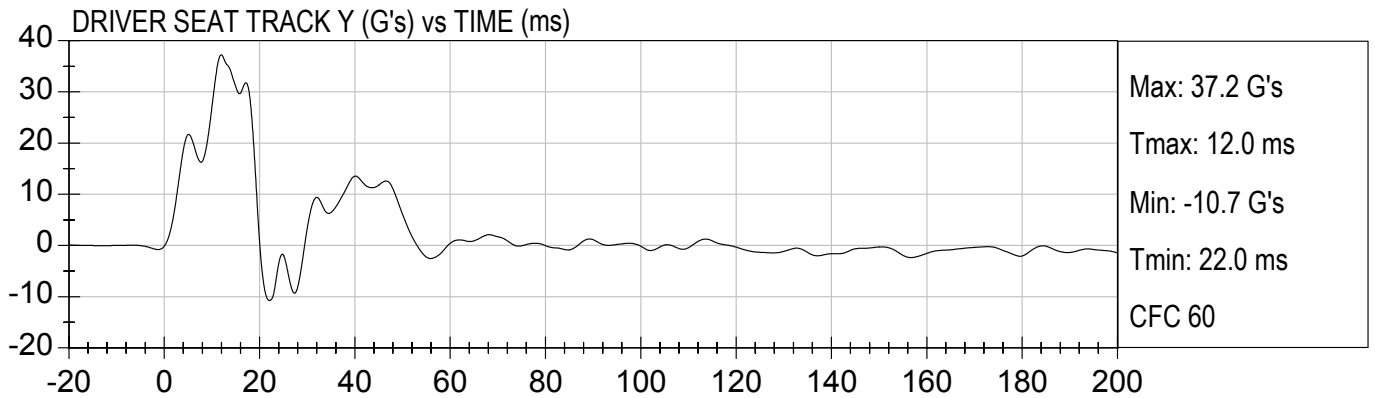


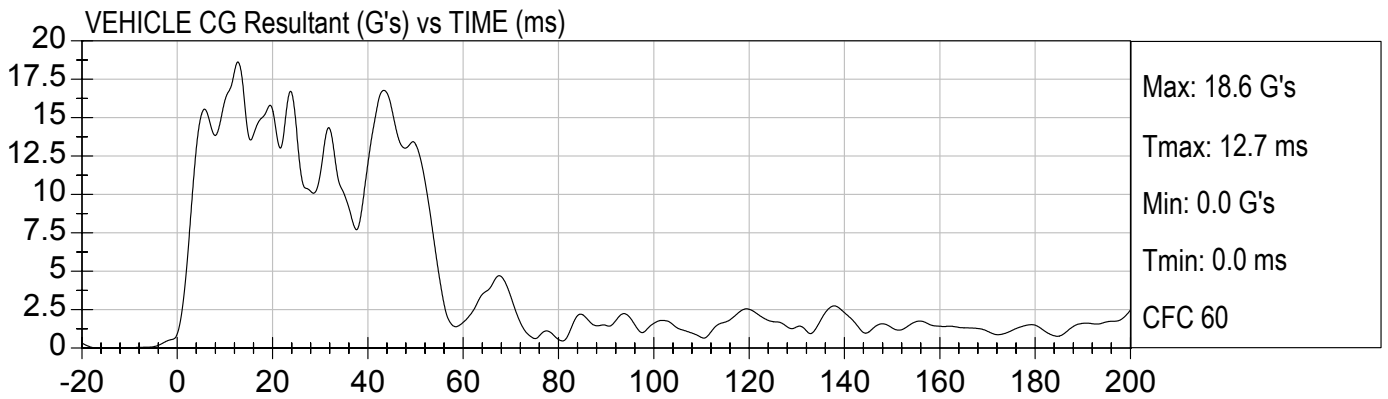
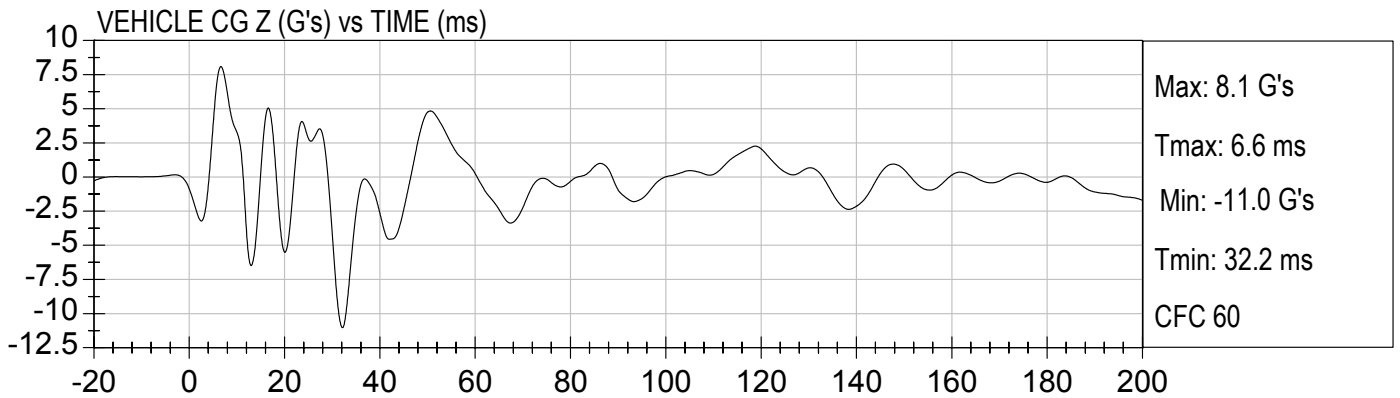
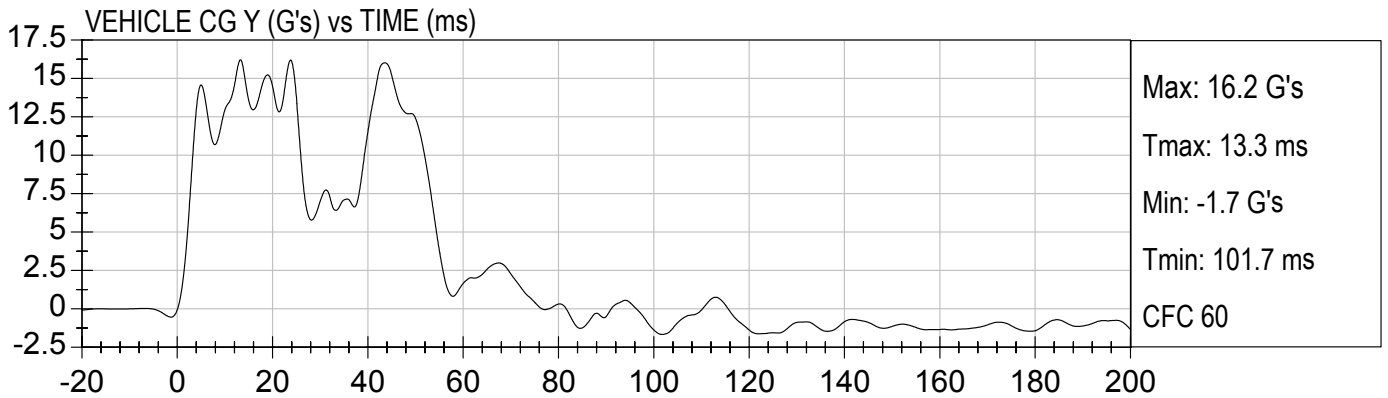
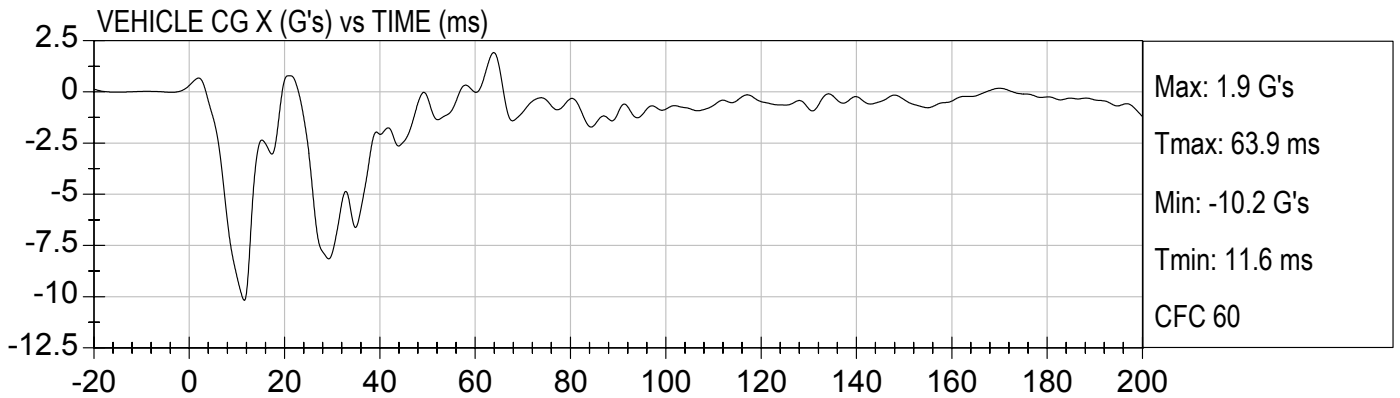


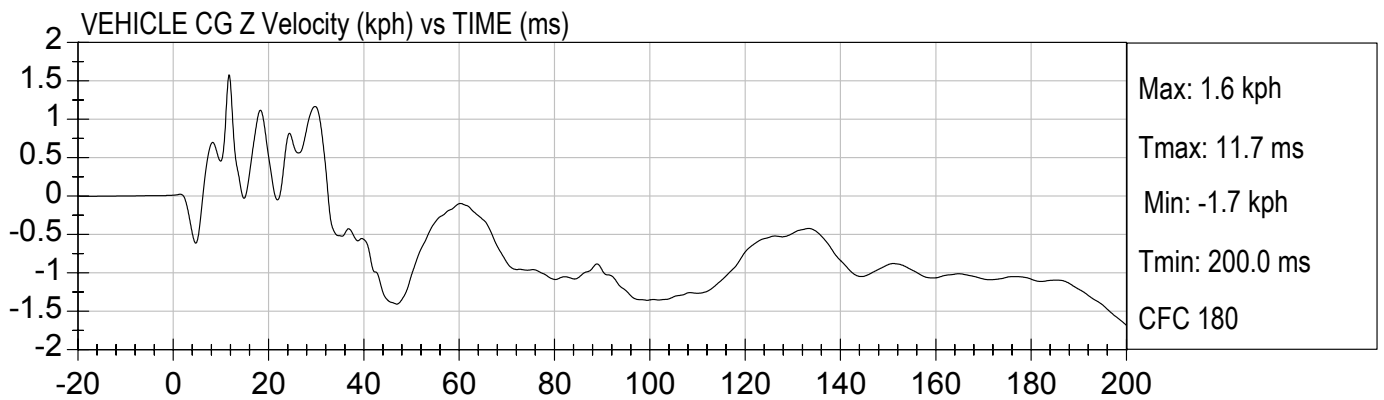
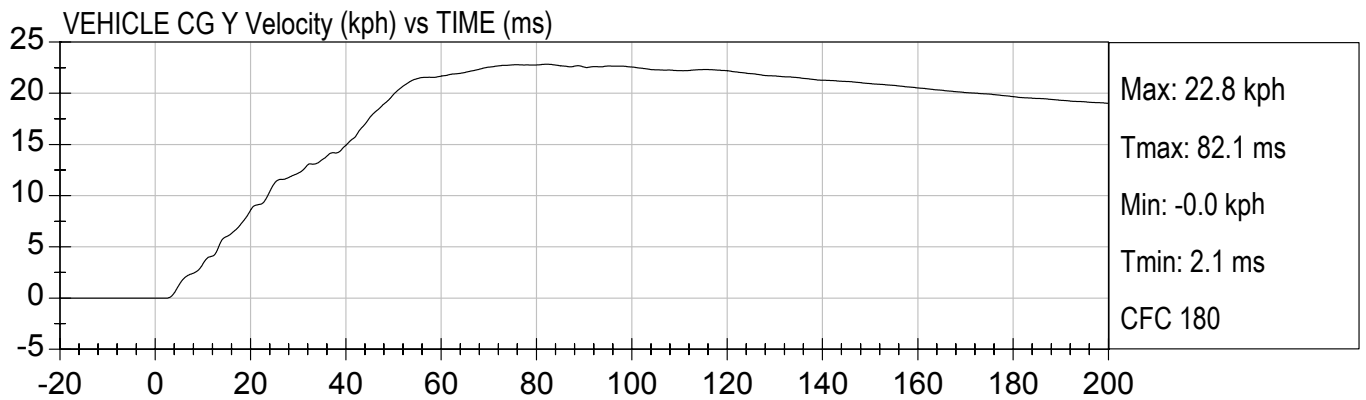
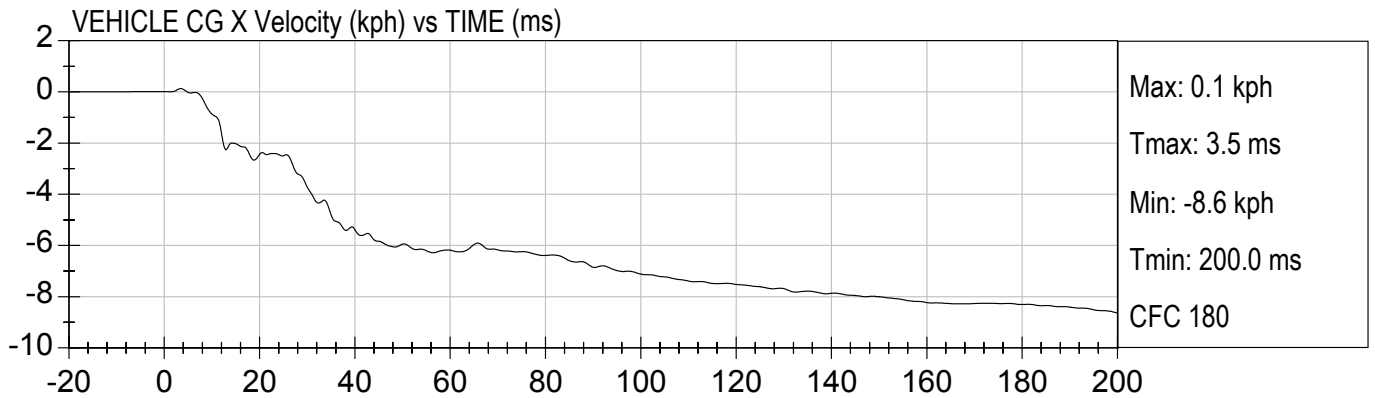


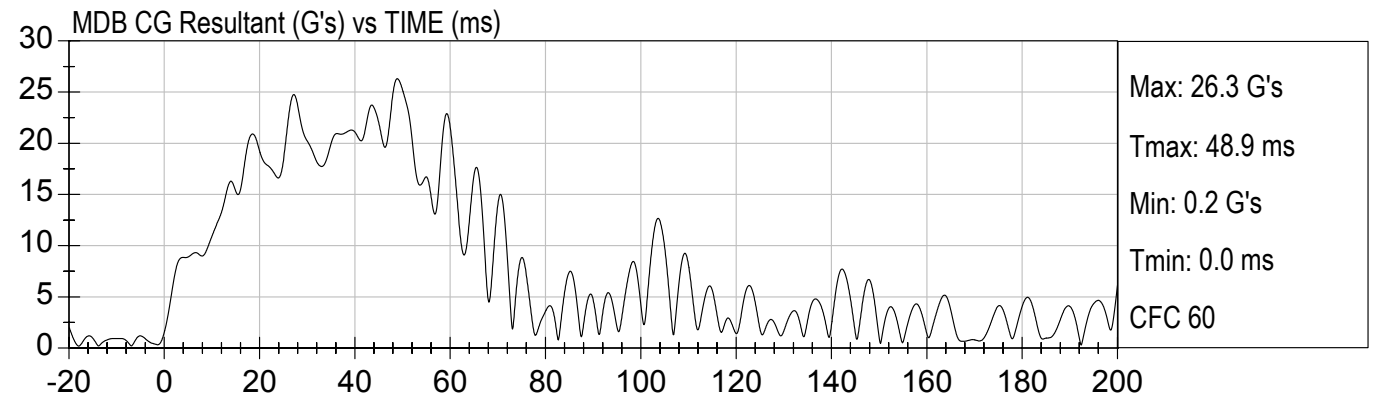
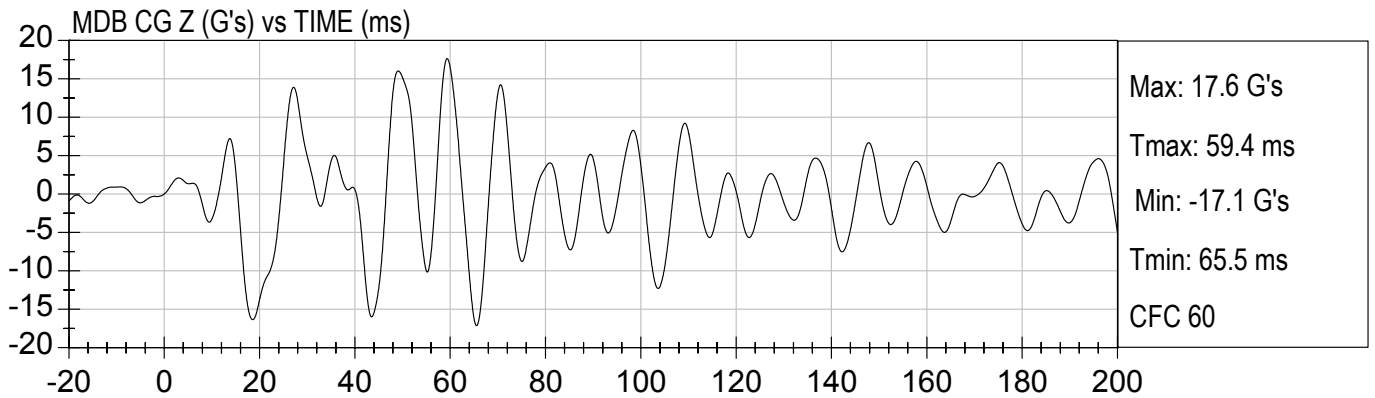
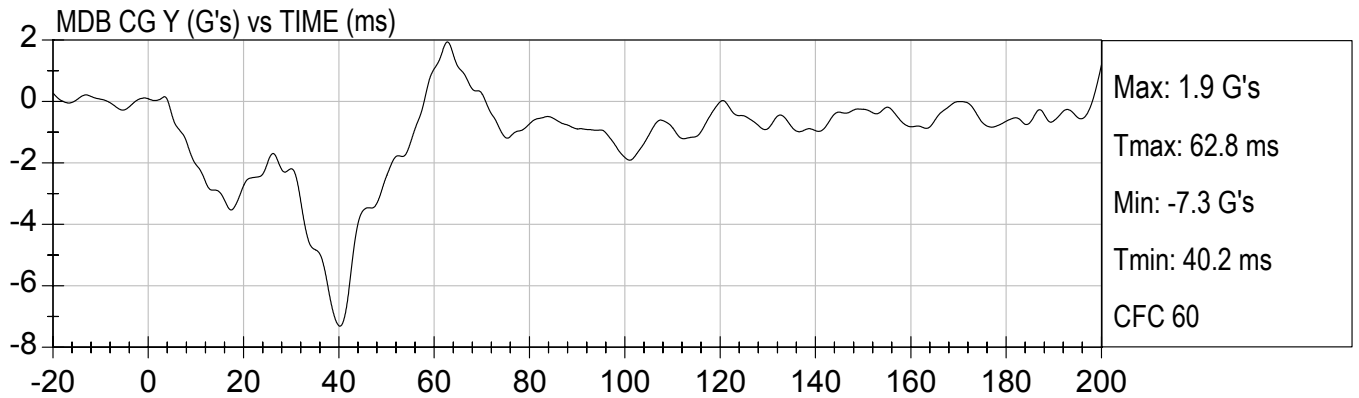
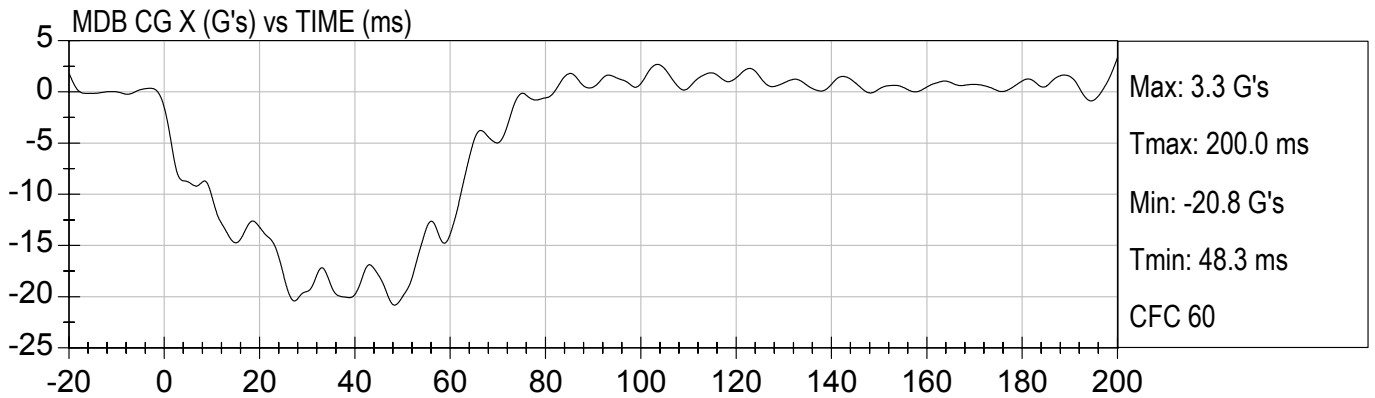


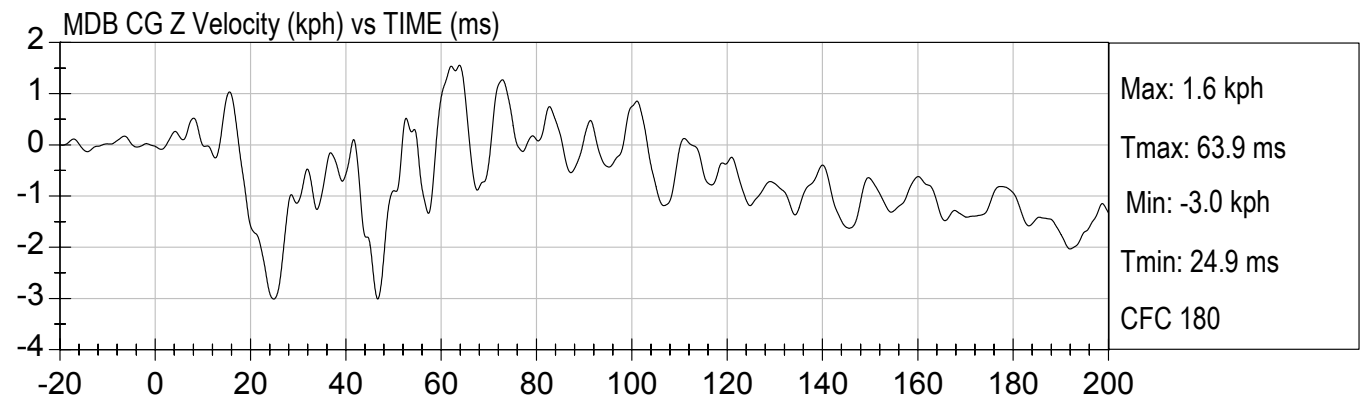
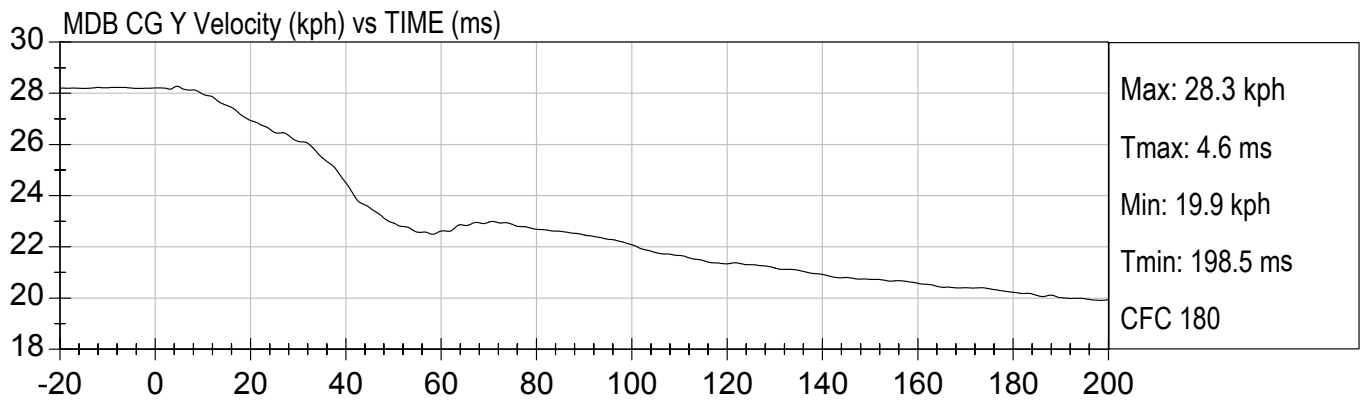
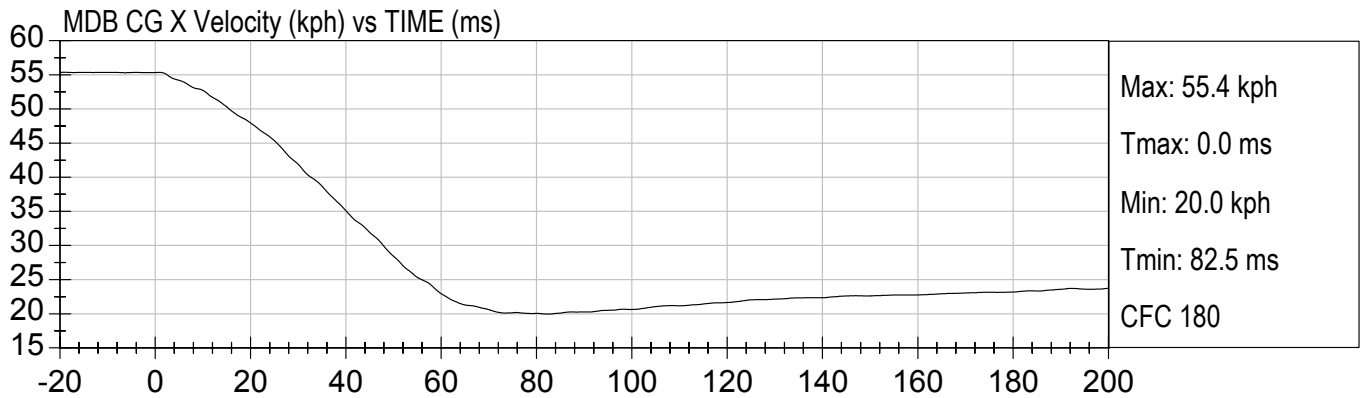


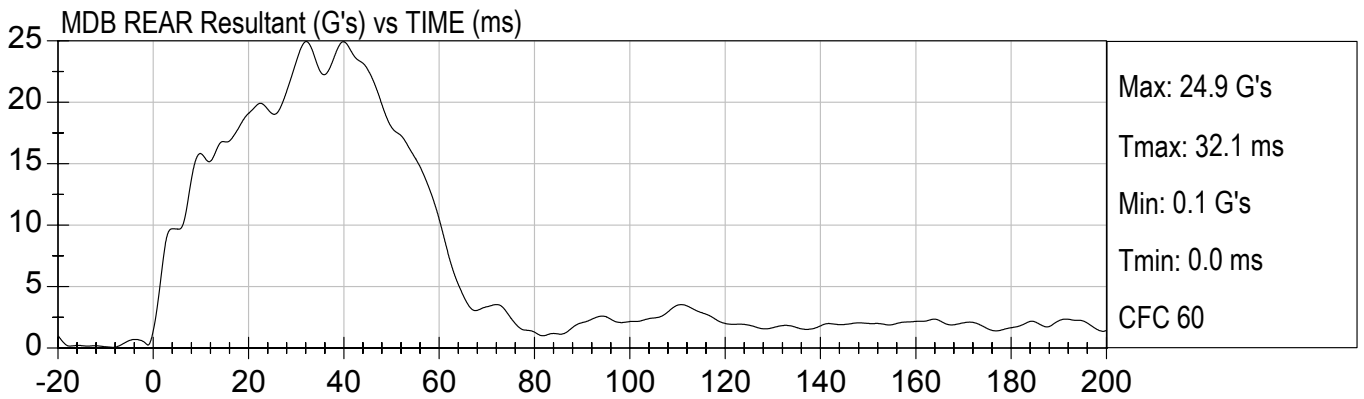
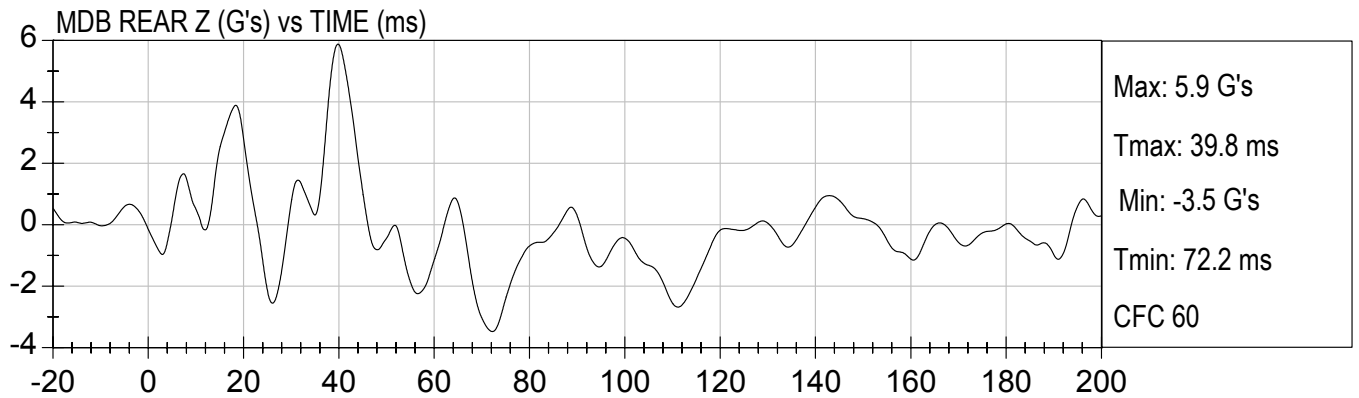
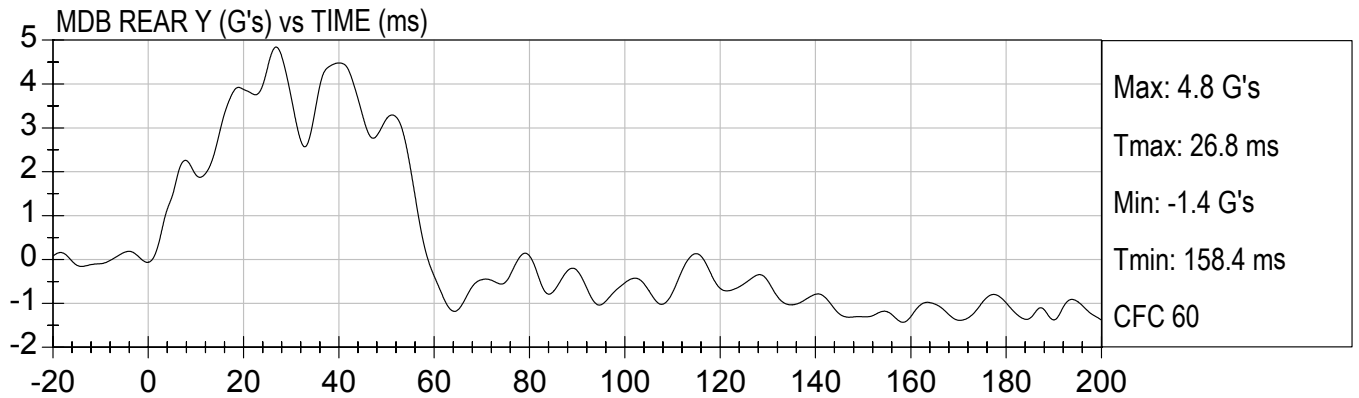
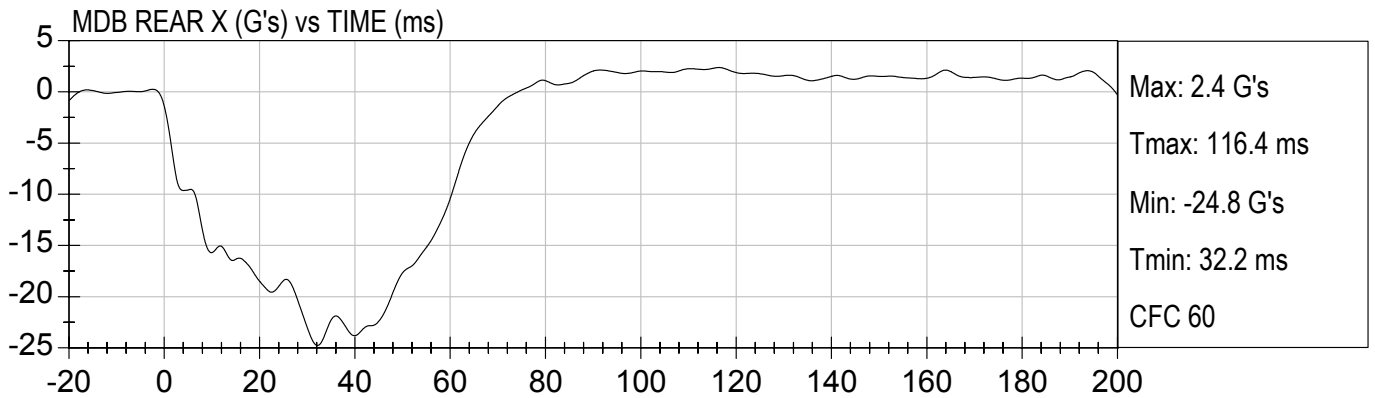






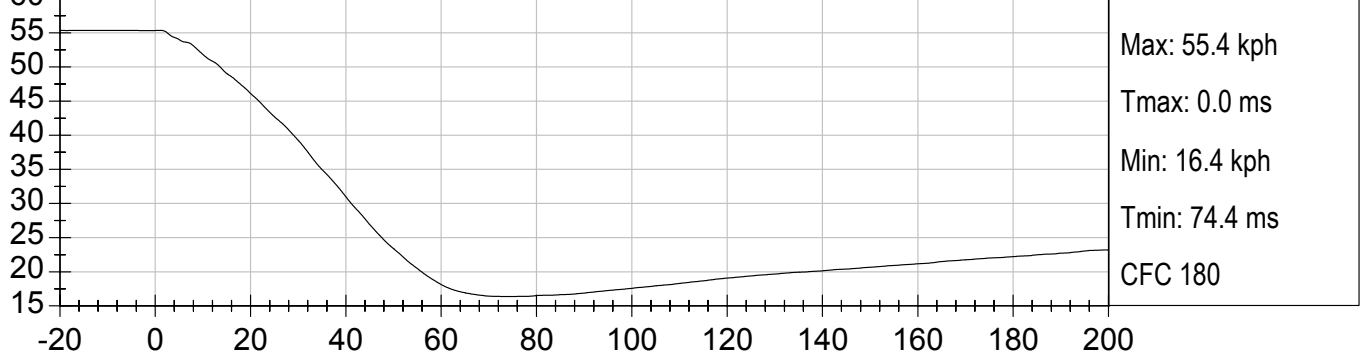




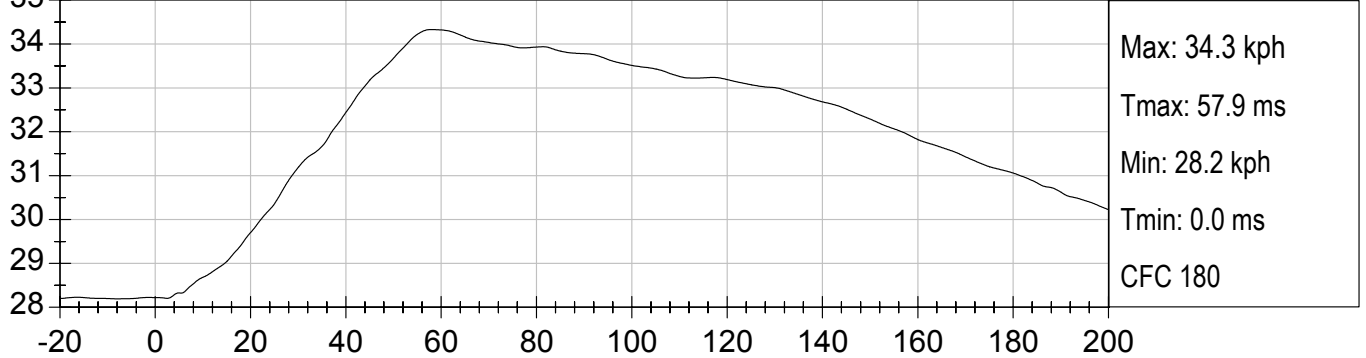




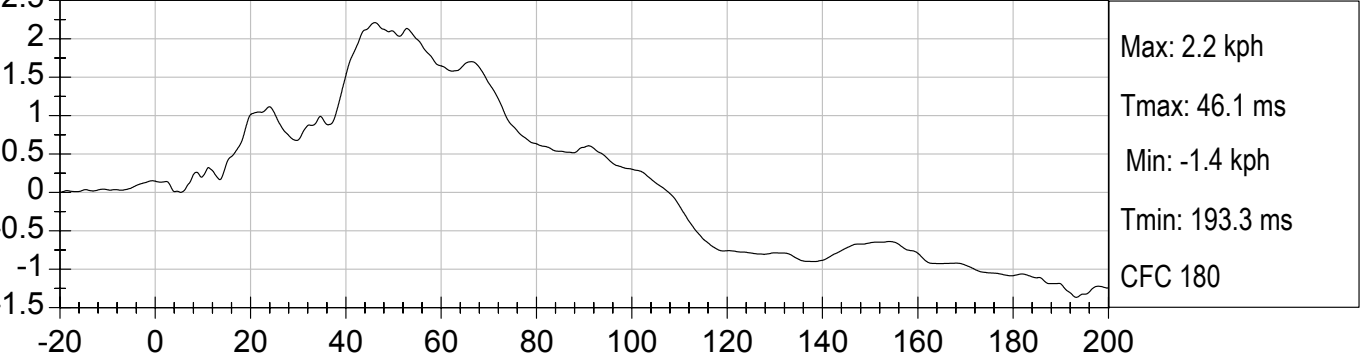
MDB REAR X Velocity (kph) vs TIME (ms)

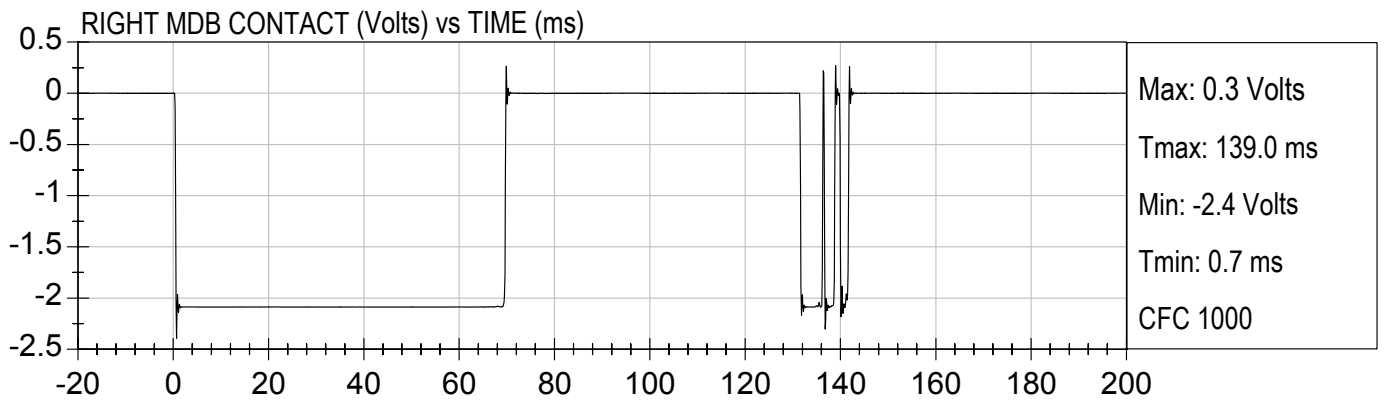
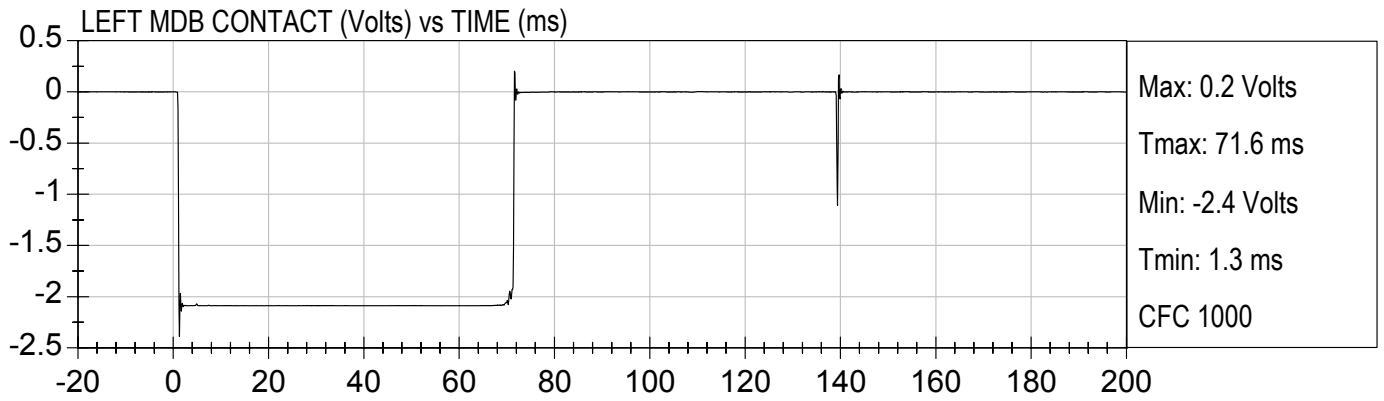


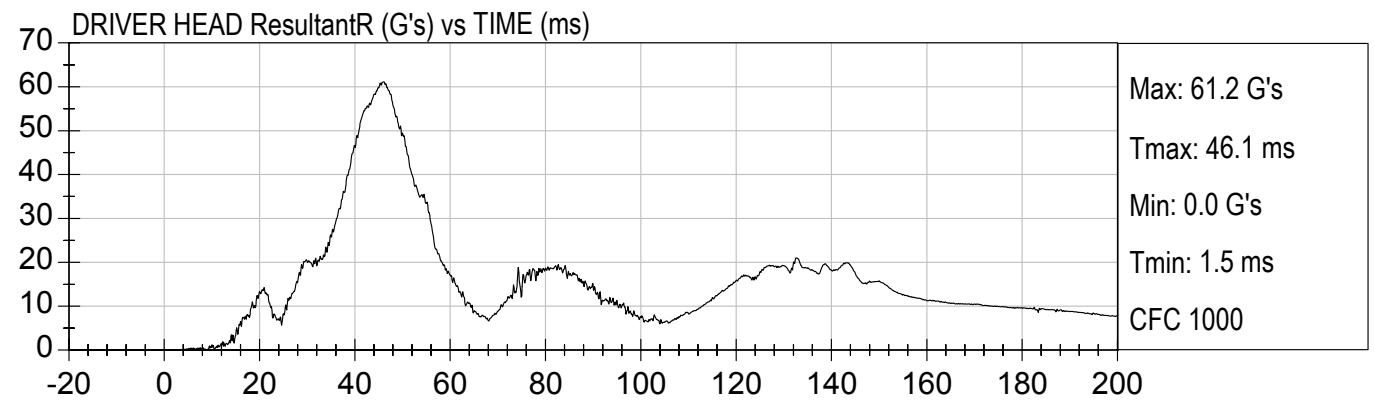
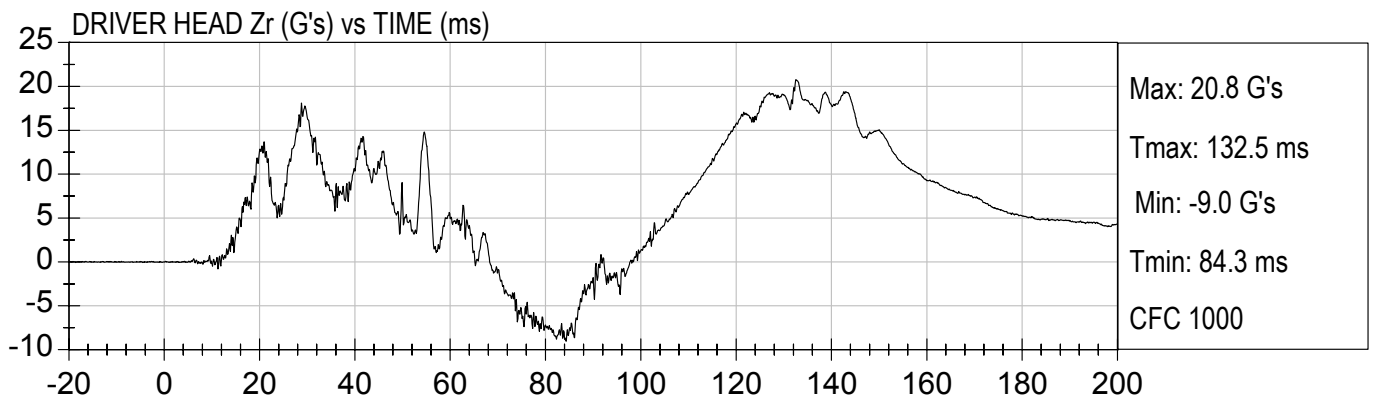
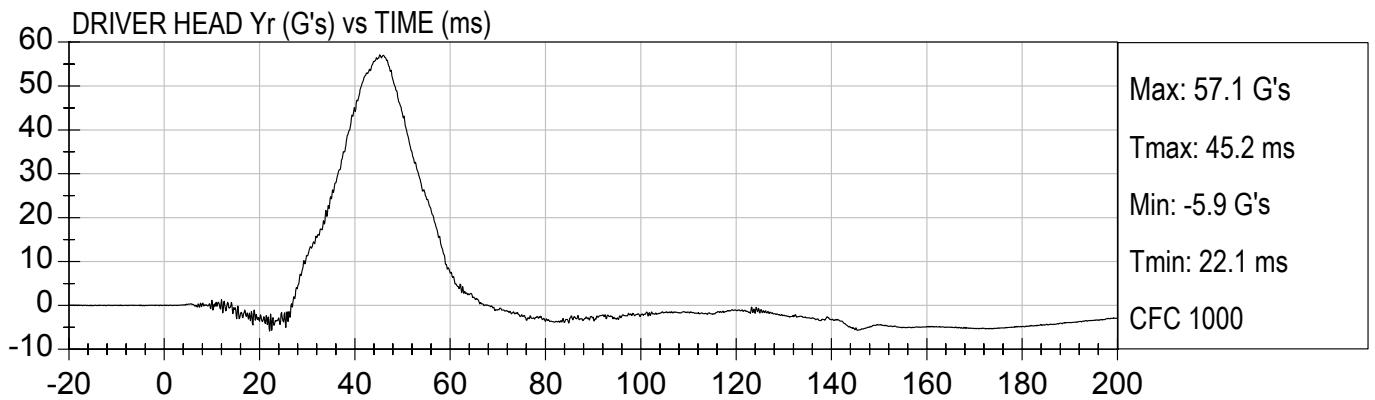
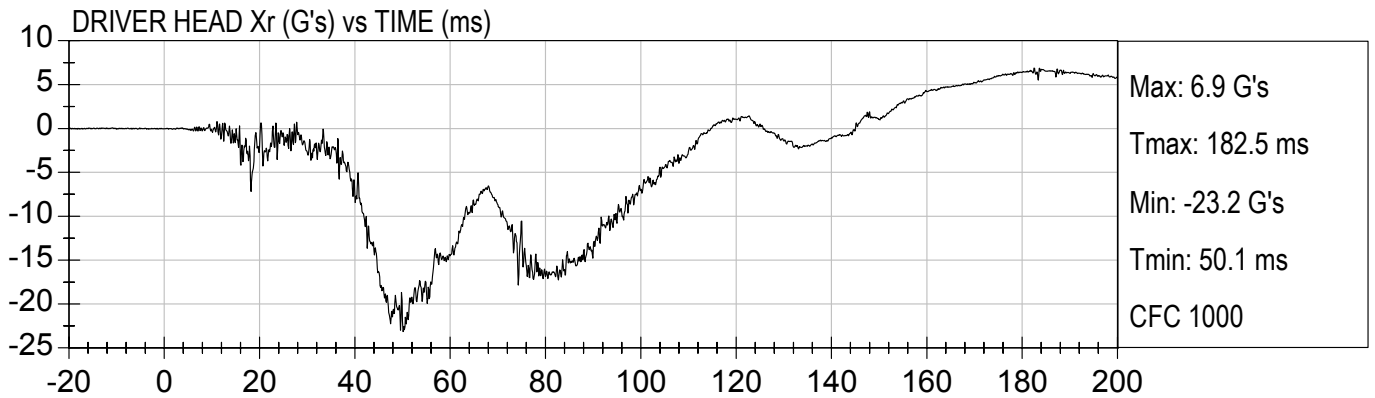
MDB REAR Y Velocity (kph) vs TIME (ms)

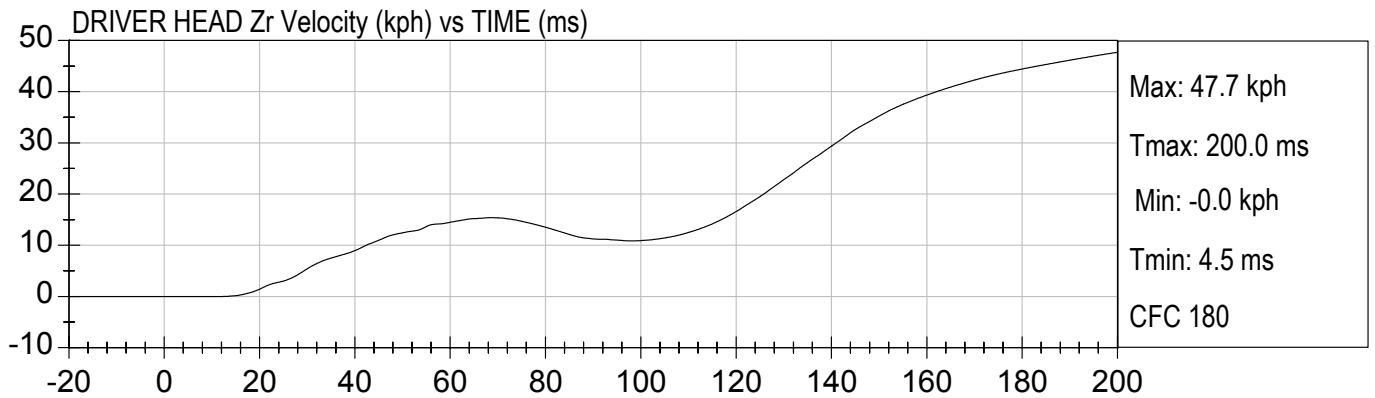
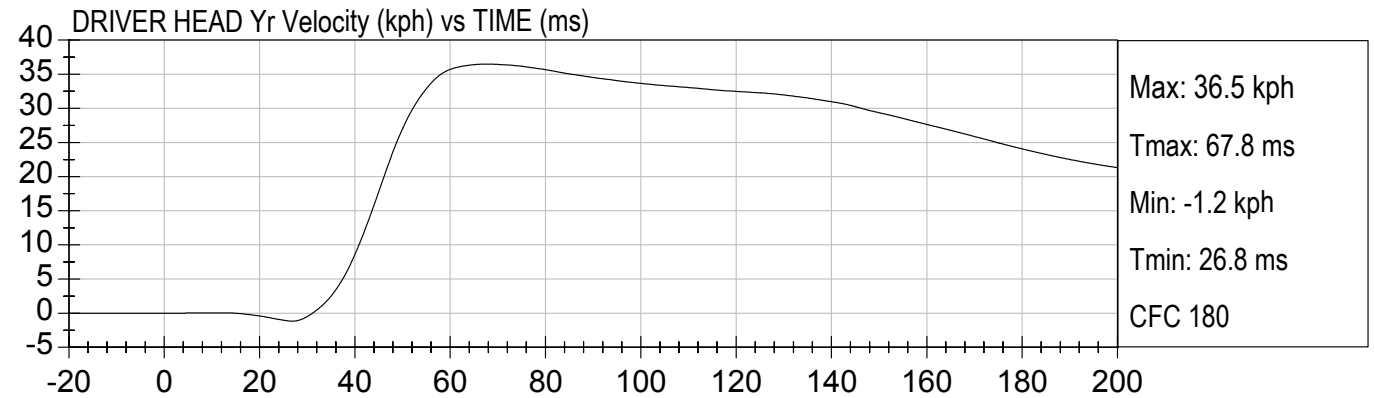
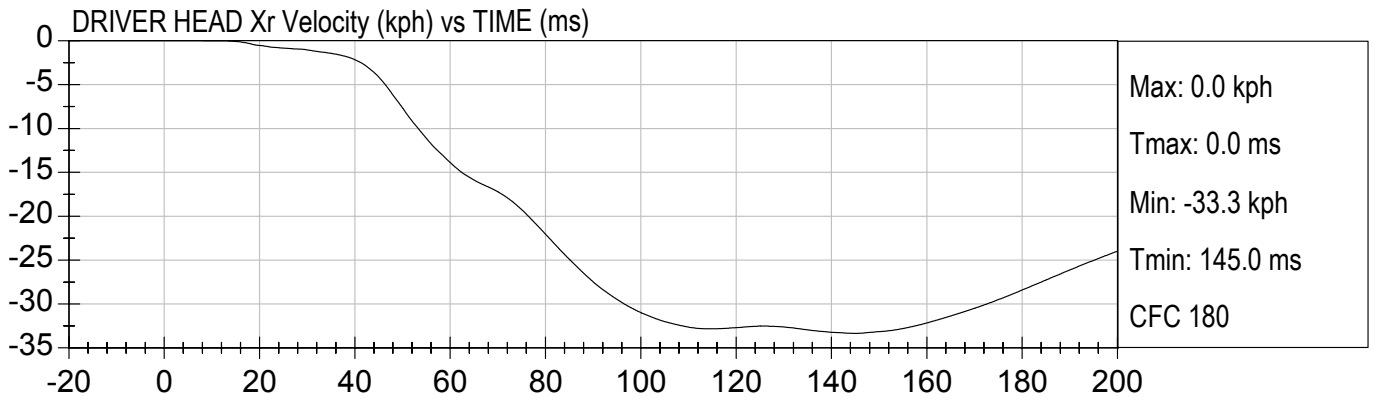


MDB REAR Z Velocity (kph) vs TIME (ms)



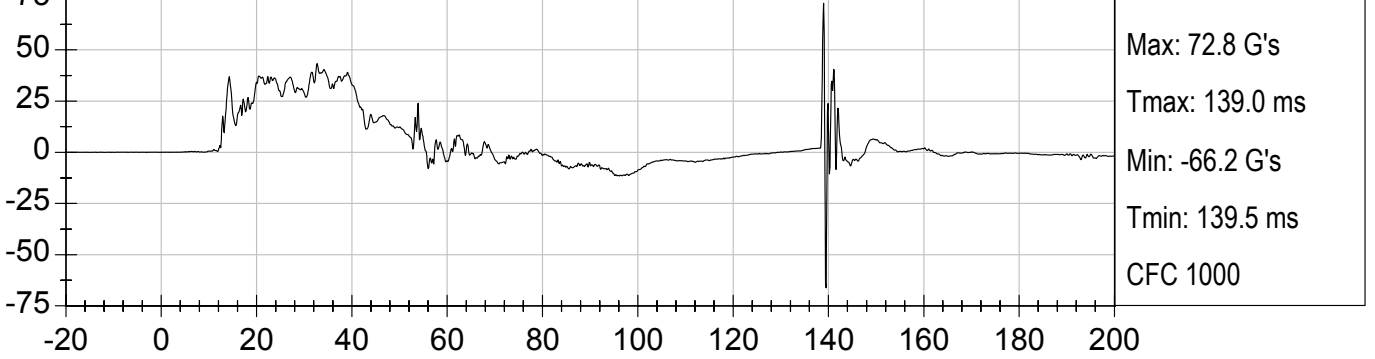




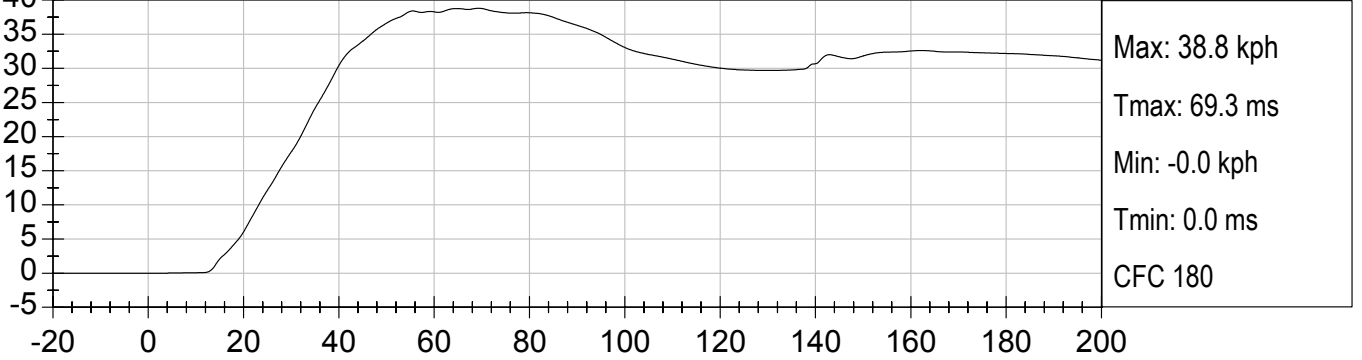




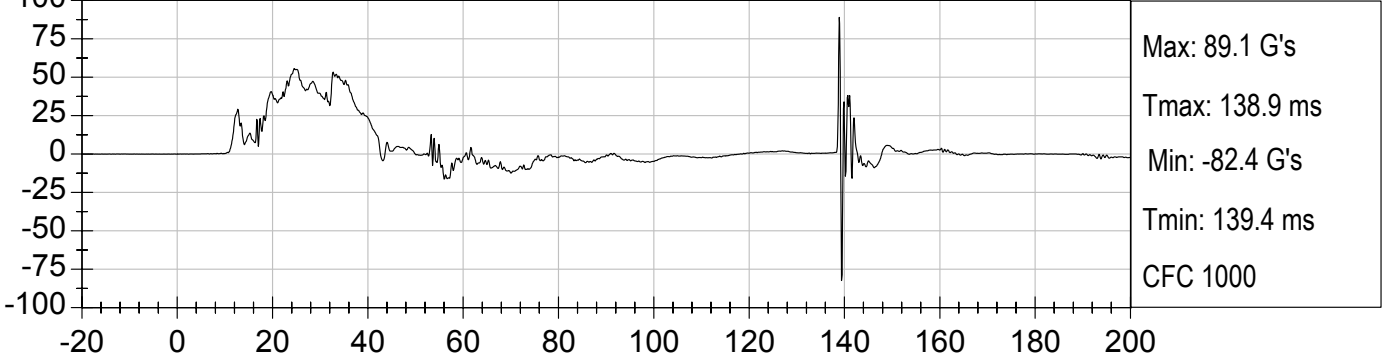
DRIVER UPPER RIB Yr (G's) vs TIME (ms)



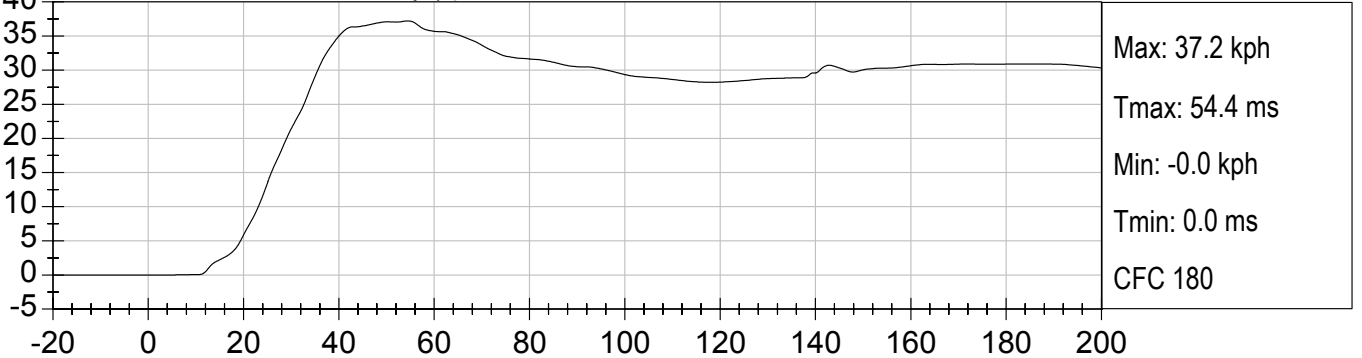
DRIVER UPPER RIB Yr Velocity (kph) vs TIME (ms)

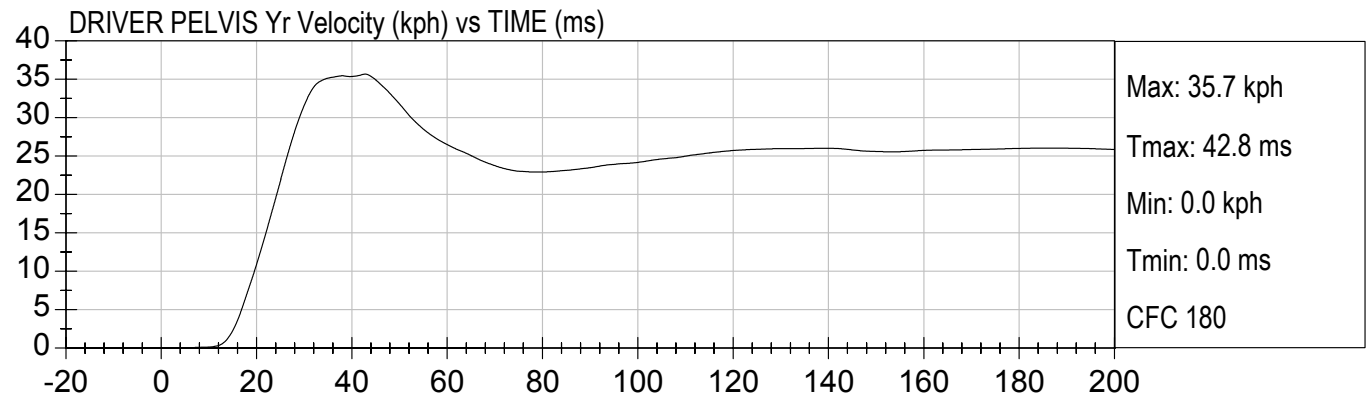
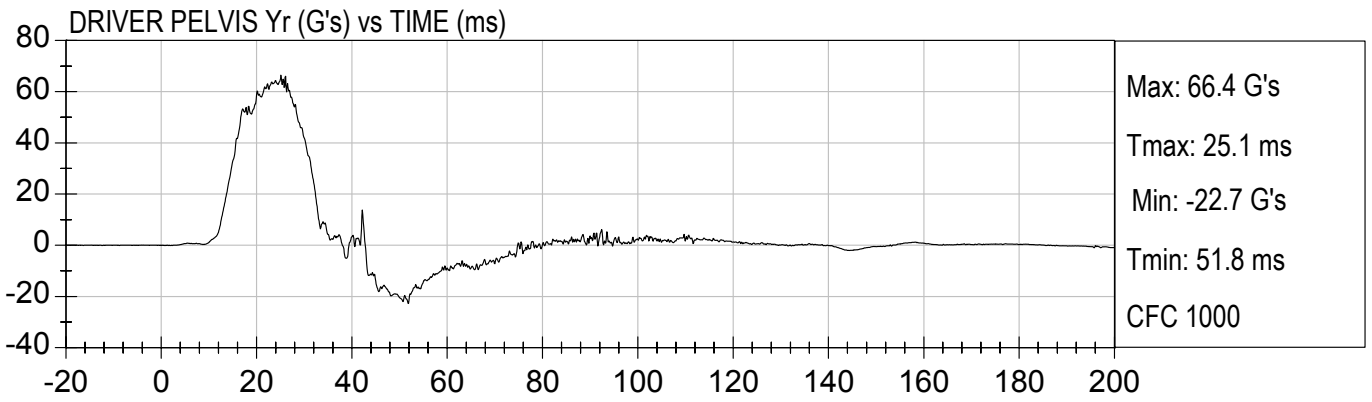
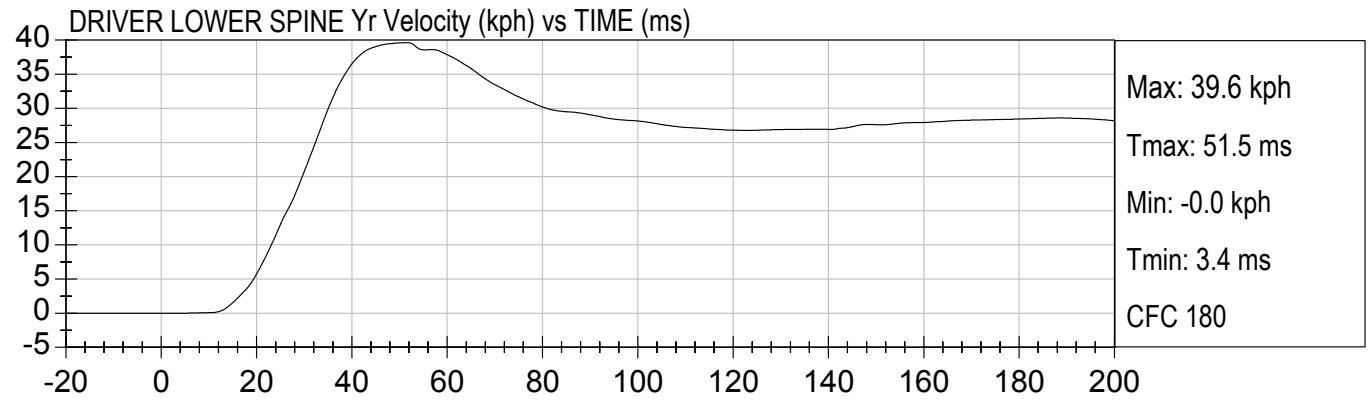
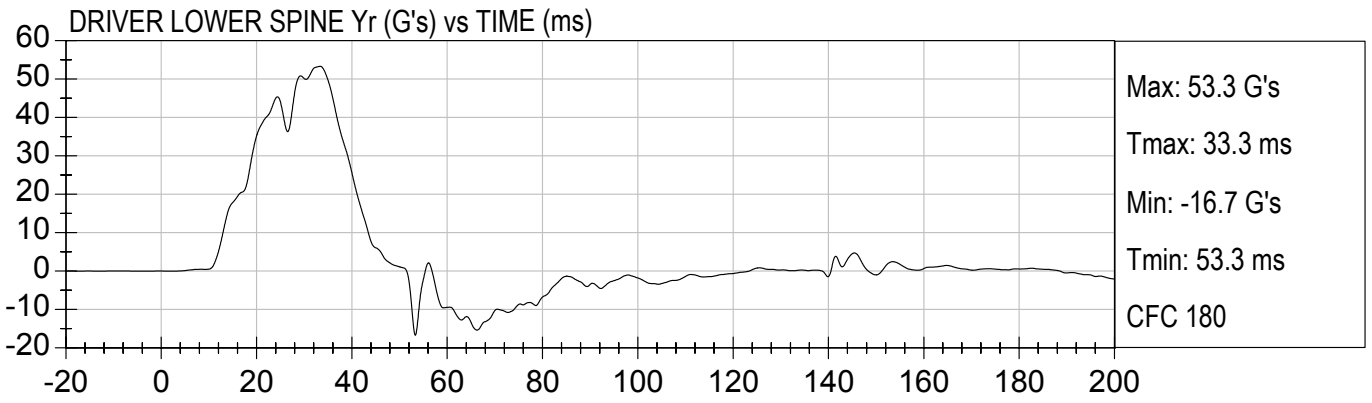


DRIVER LOWER RIB Yr (G's) vs TIME (ms)



DRIVER LOWER RIB Yr Velocity (kph) vs TIME (ms)

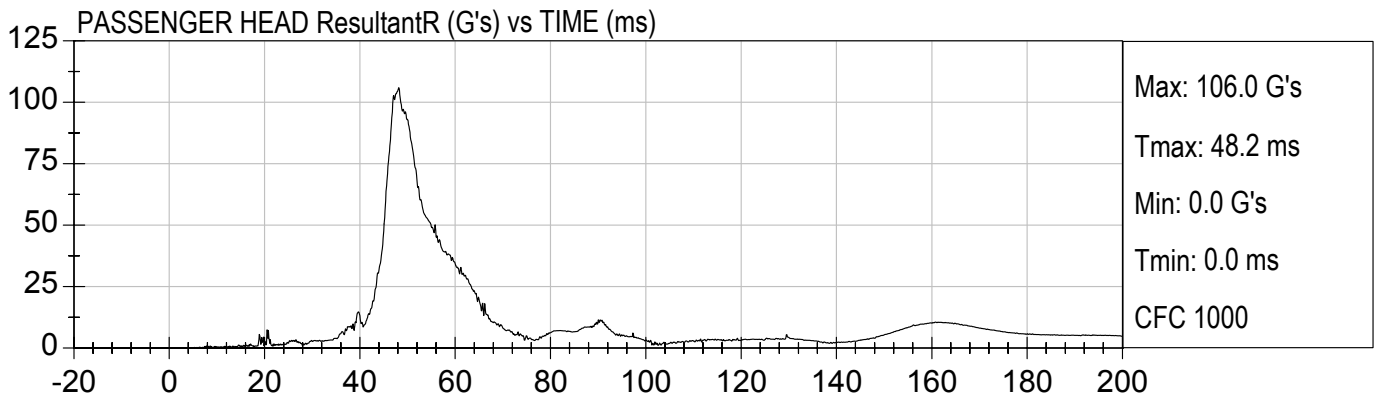
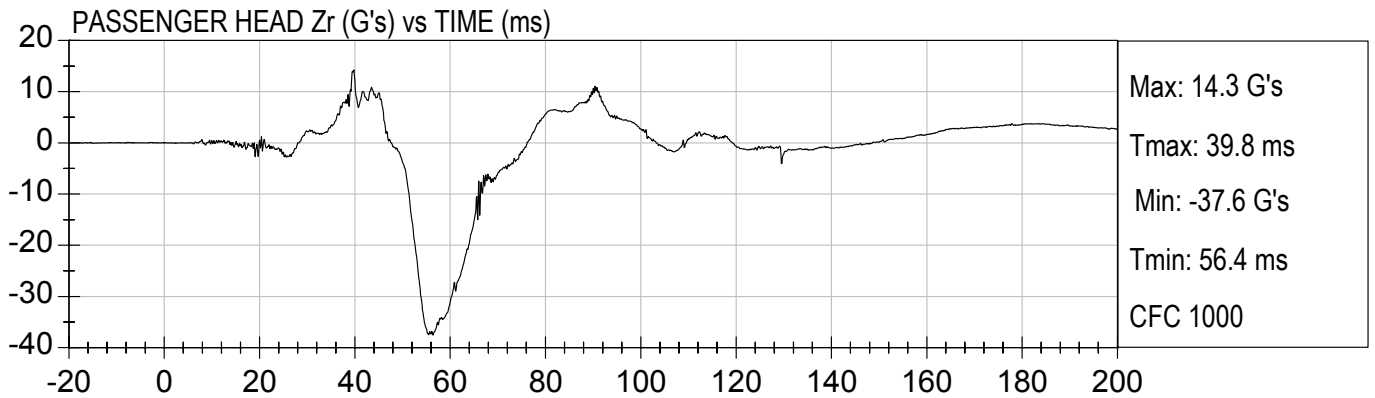
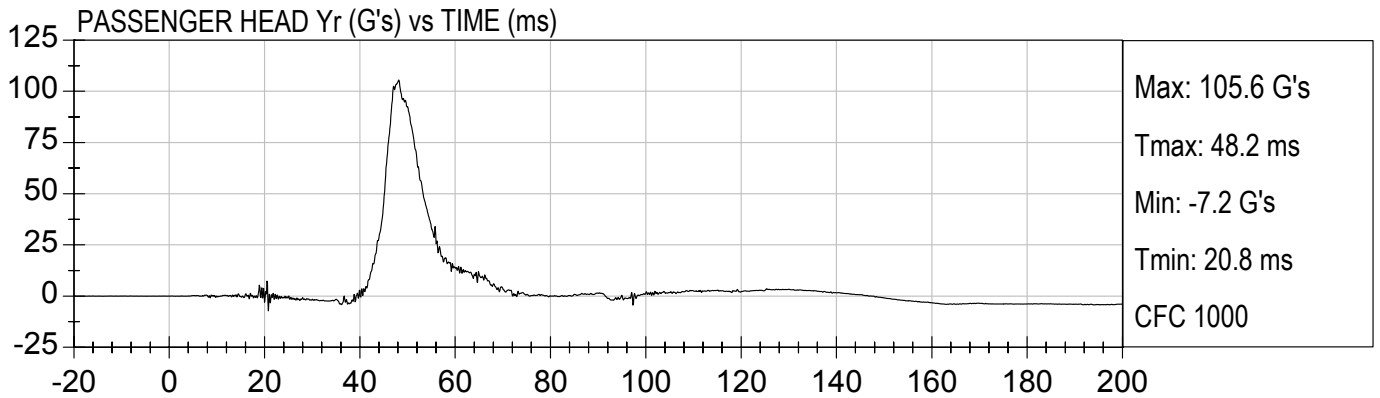
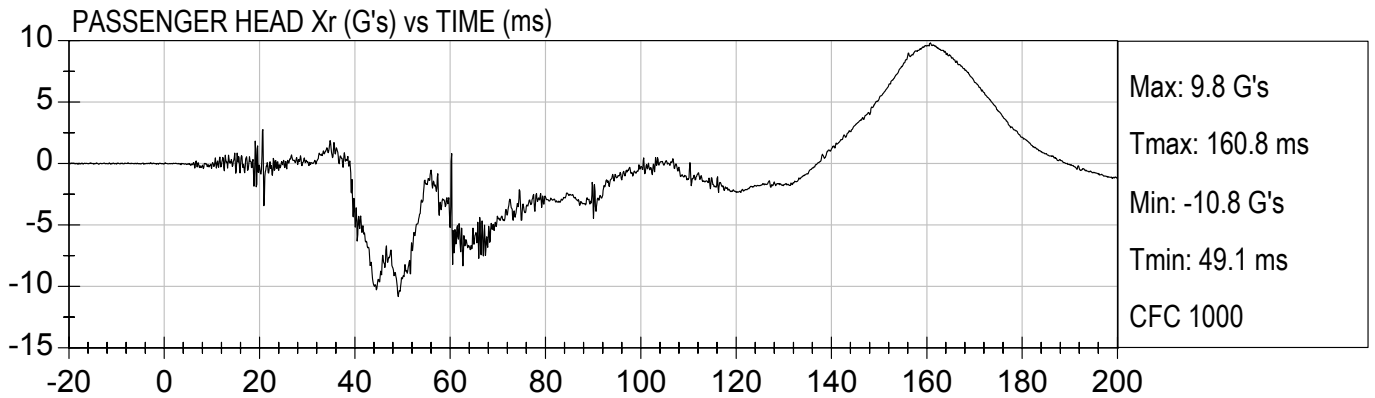


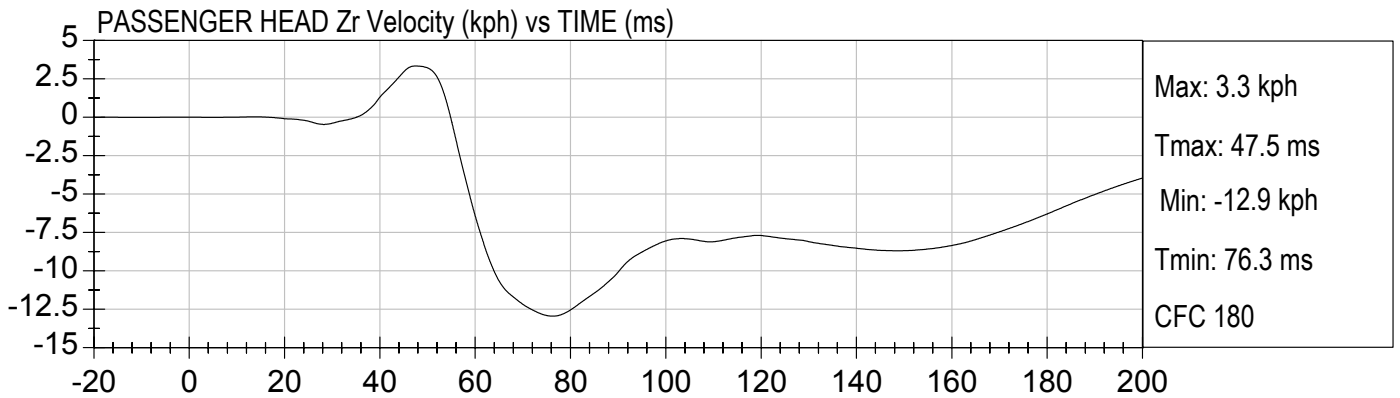
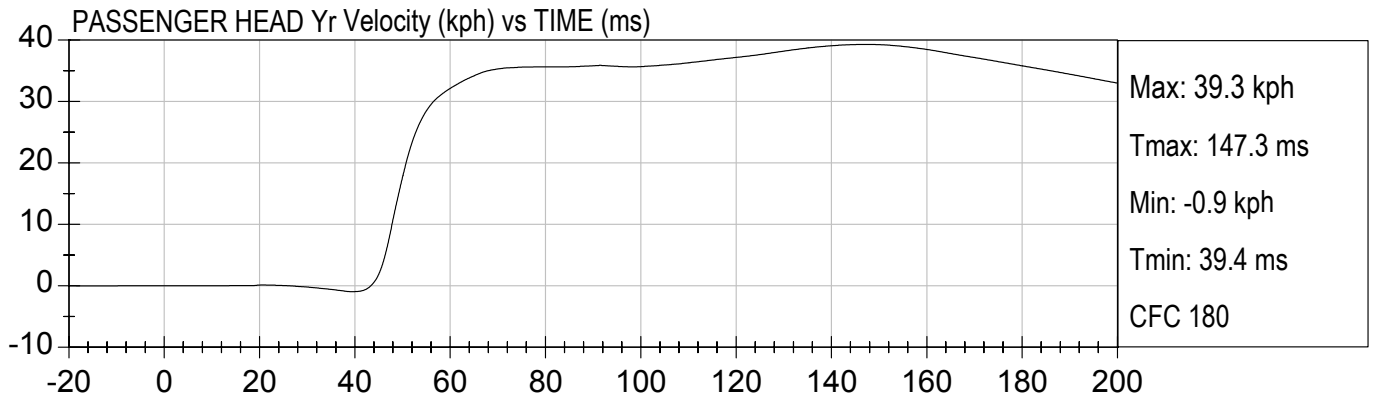
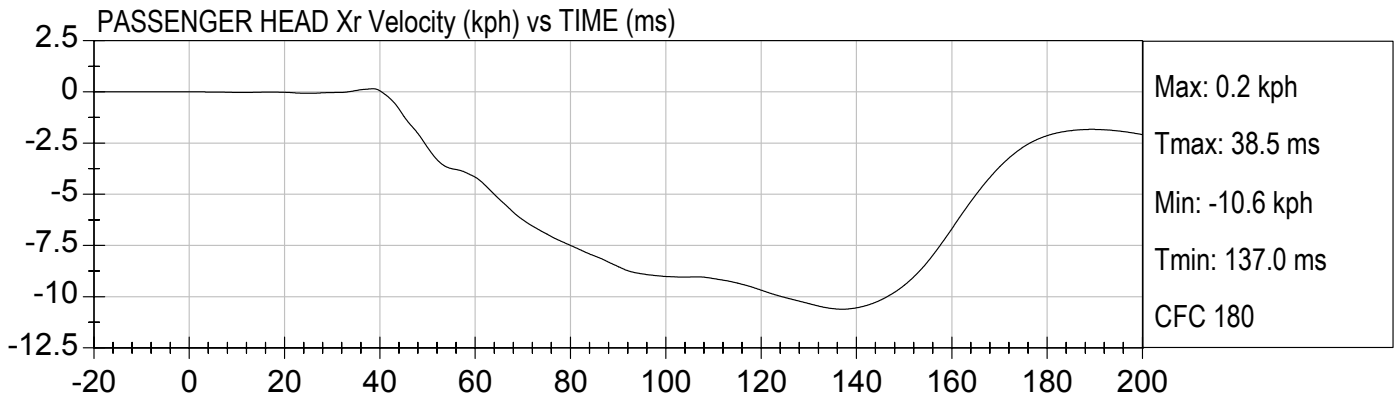




38.5MPH LEFT SIDE IMPACT (M45301)  
2004 ACURA TSX

Test Date: 1/14/2004  
Speed: 38.6 mph (62.1 km/h)



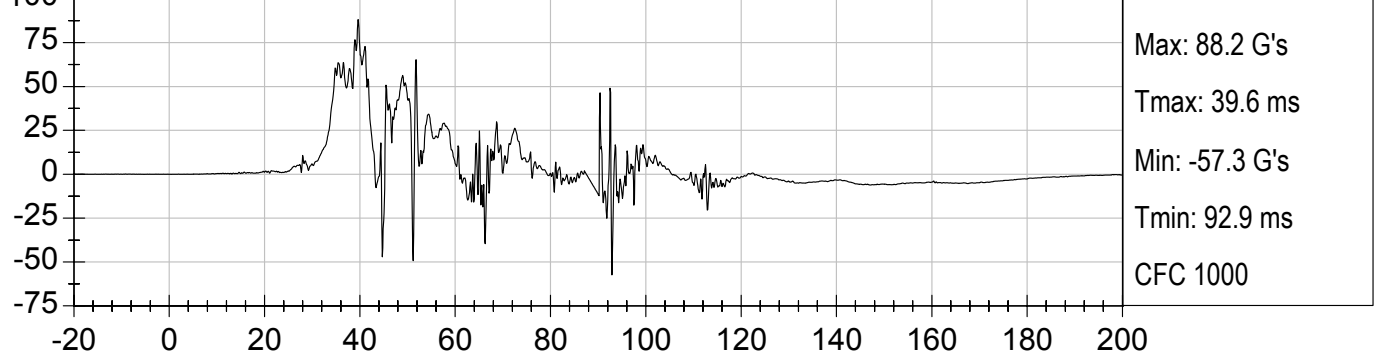




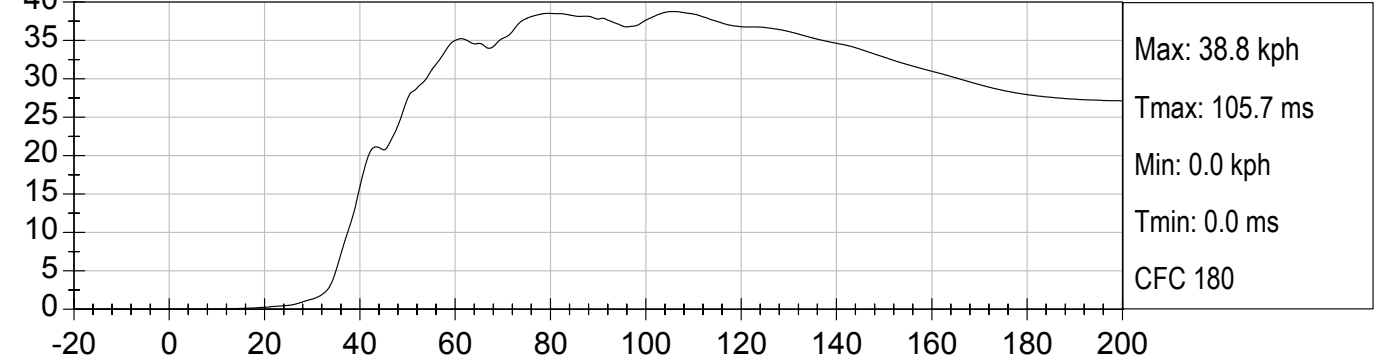
38.5MPH LEFT SIDE IMPACT (M45301)  
2004 ACURA TSX

Test Date: 1/14/2004  
Speed: 38.6 mph (62.1 km/h)

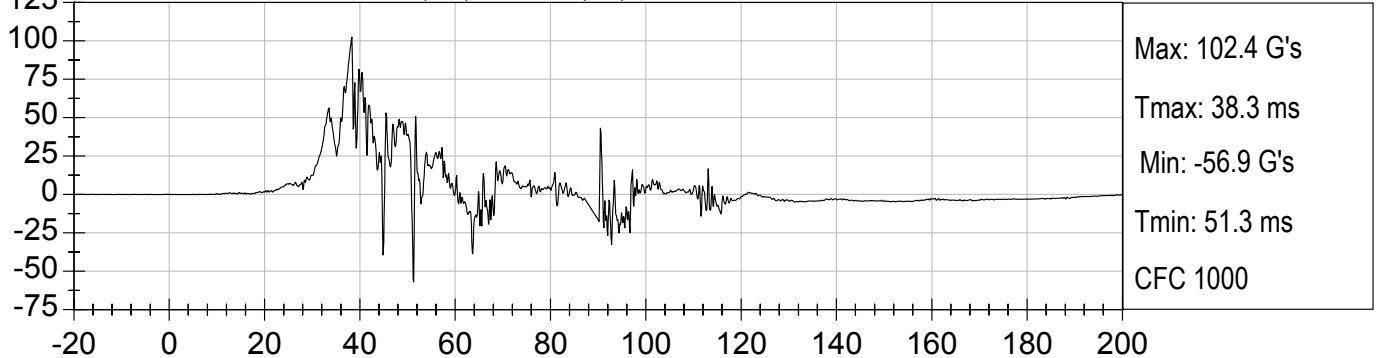
PASSENGER UPPER RIB Yr (G's) vs TIME (ms)



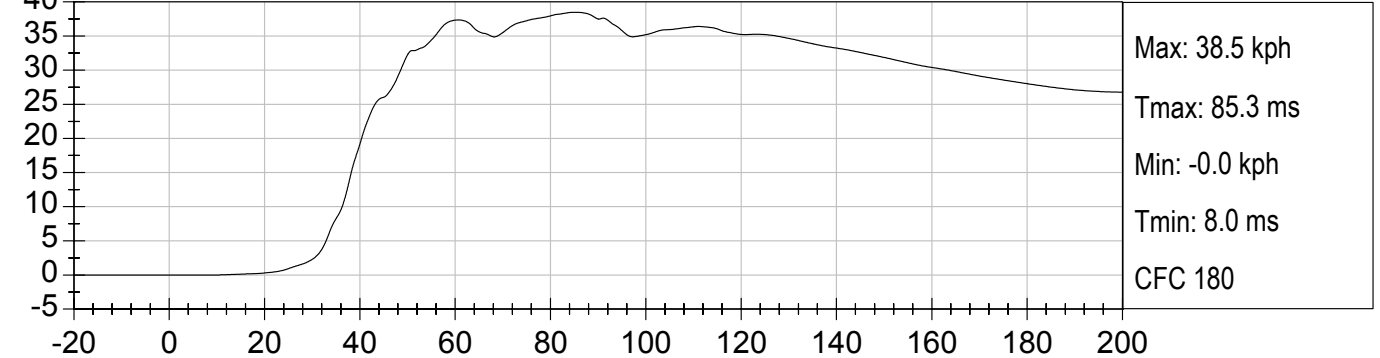
PASSENGER UPPER RIB Yr Velocity (kph) vs TIME (ms)



PASSENGER LOWER RIB Yr (G's) vs TIME (ms)



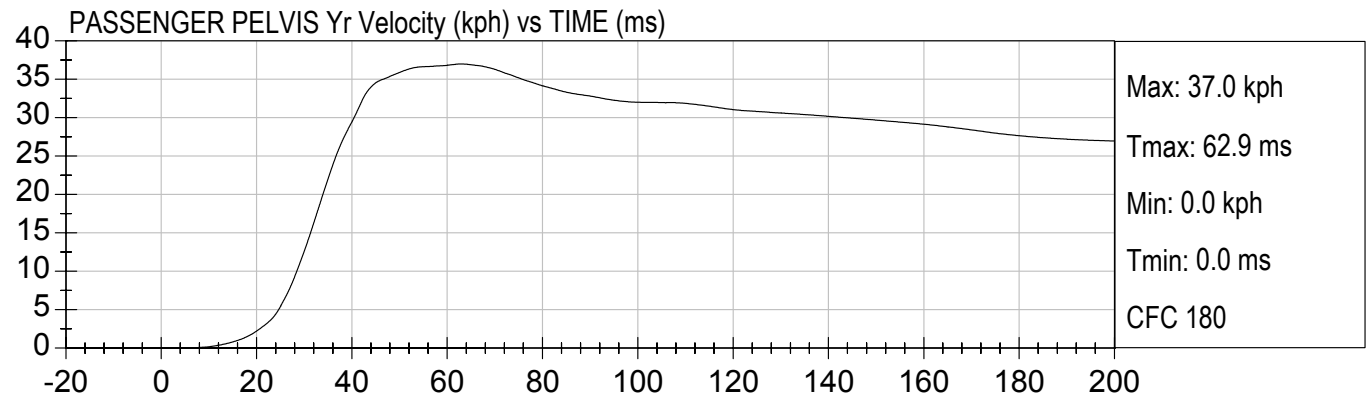
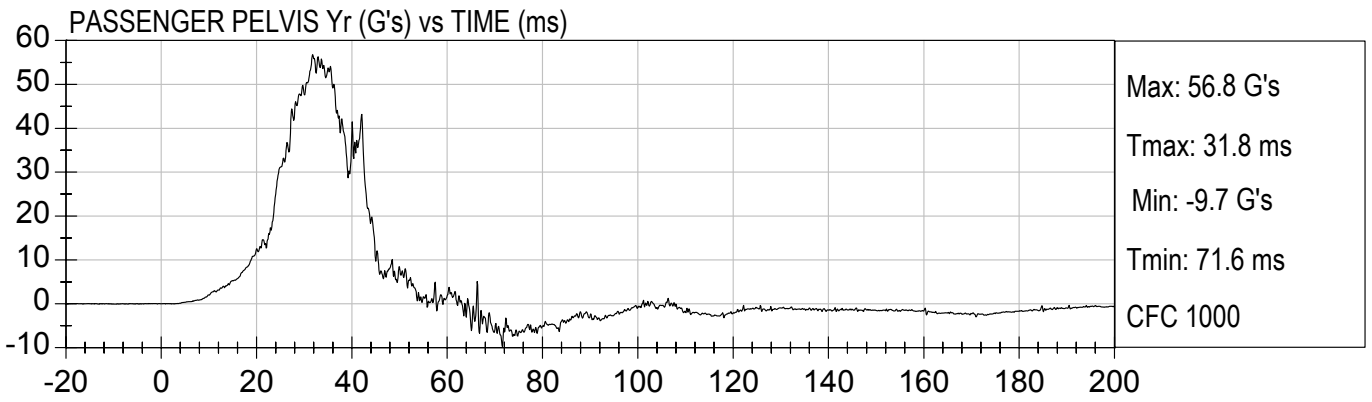
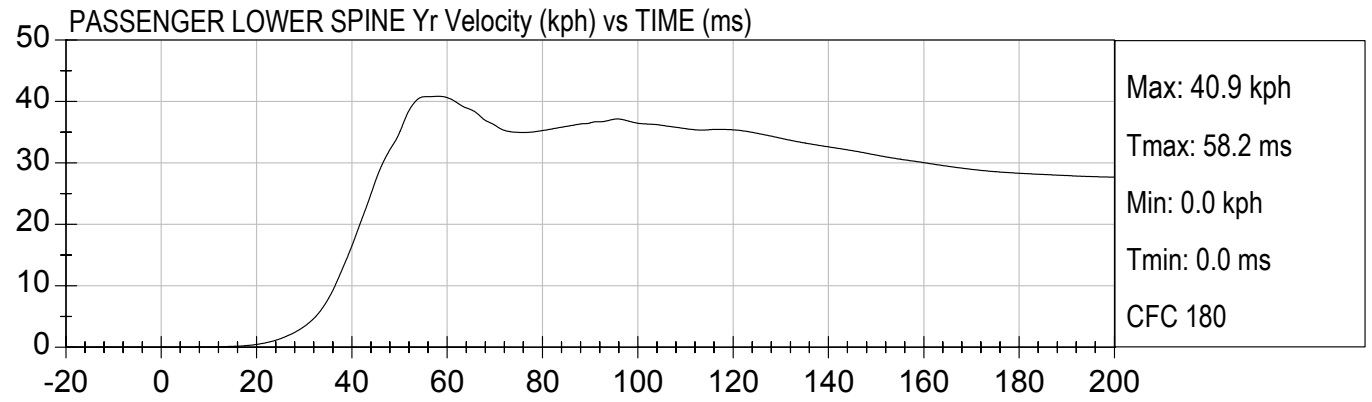
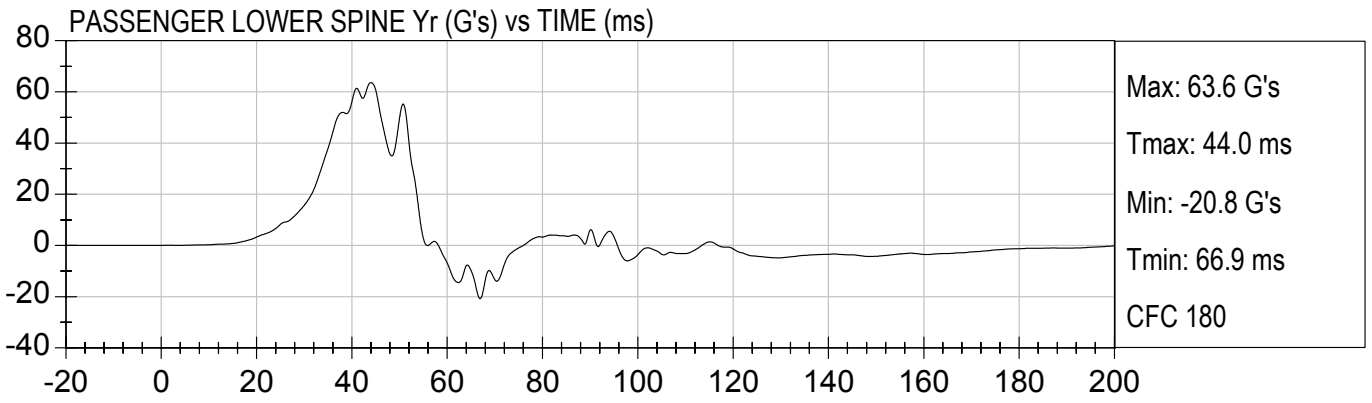
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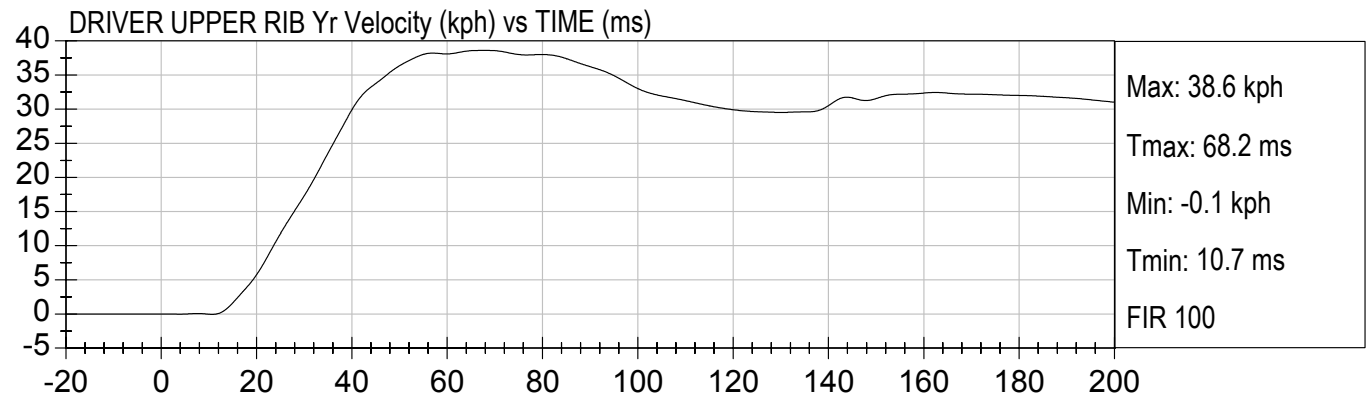
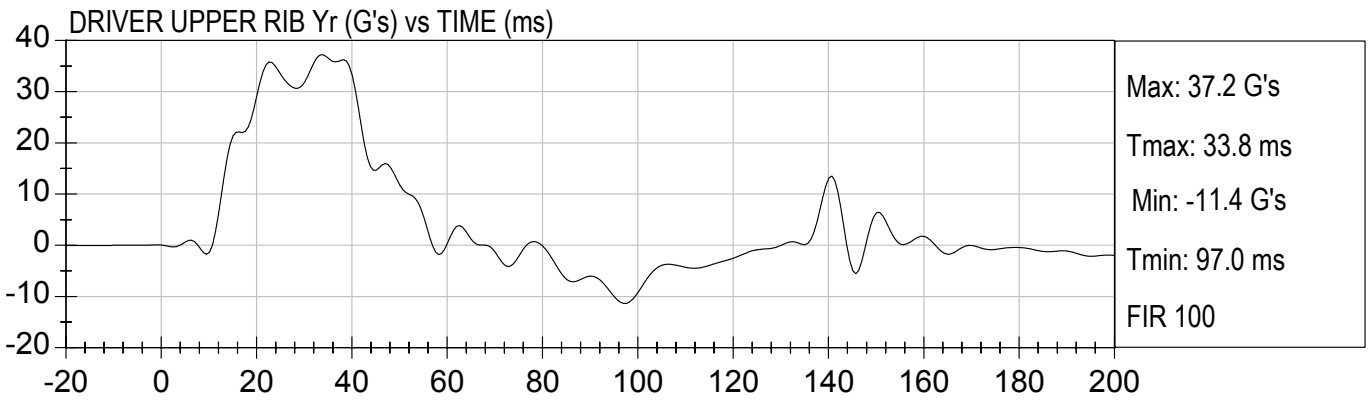
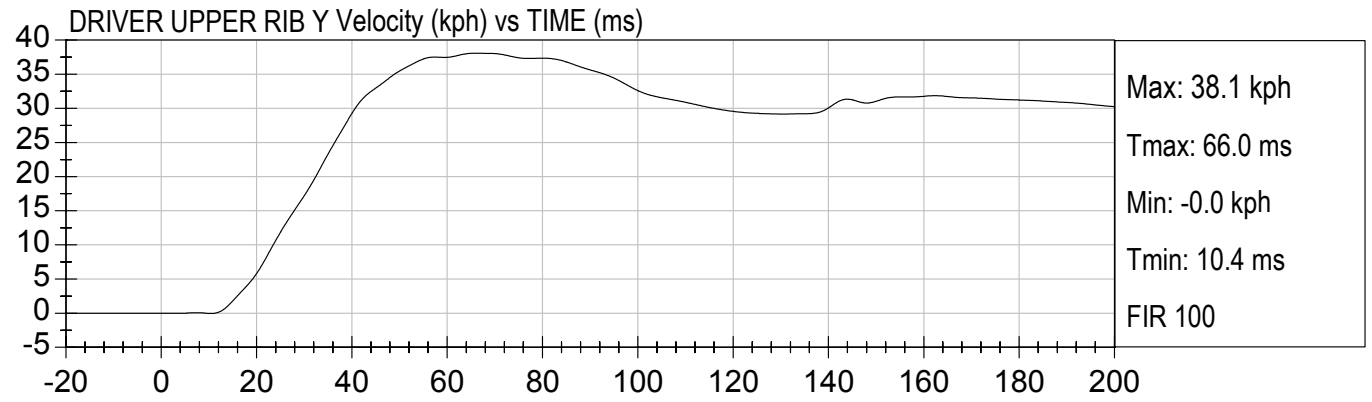
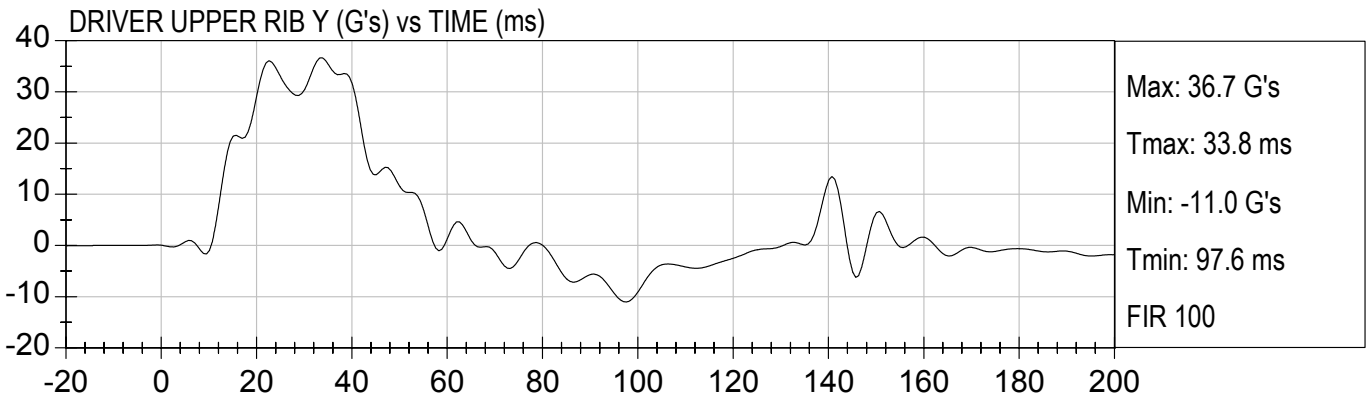


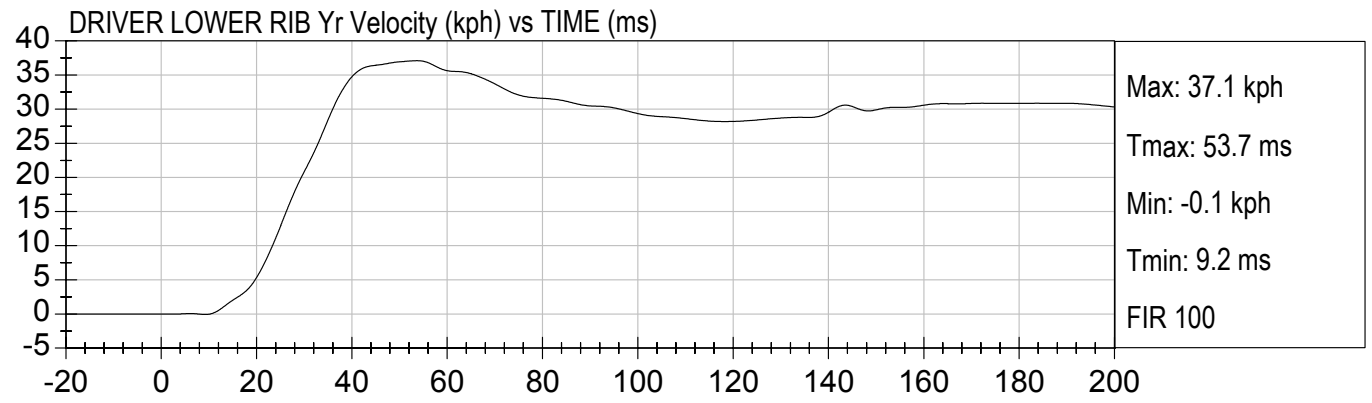
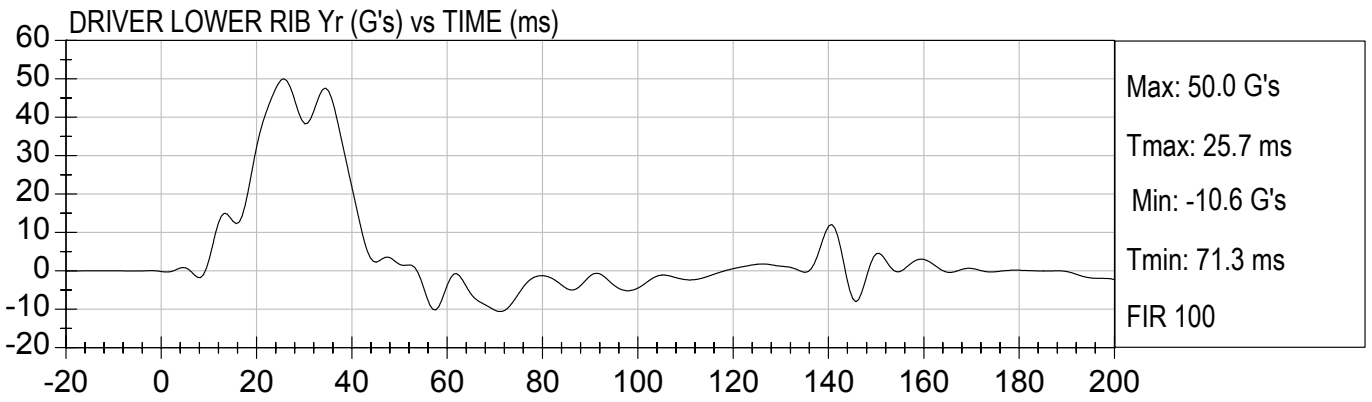
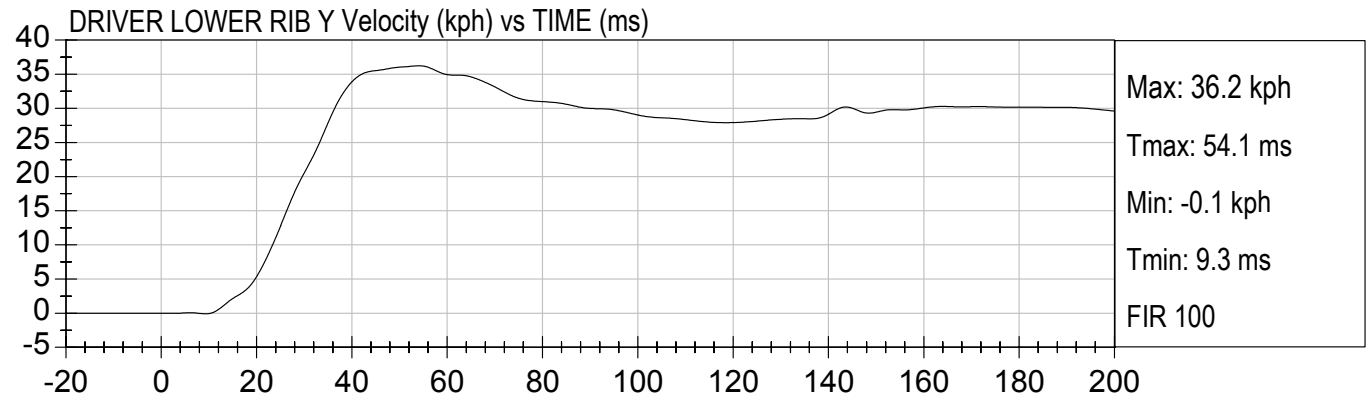
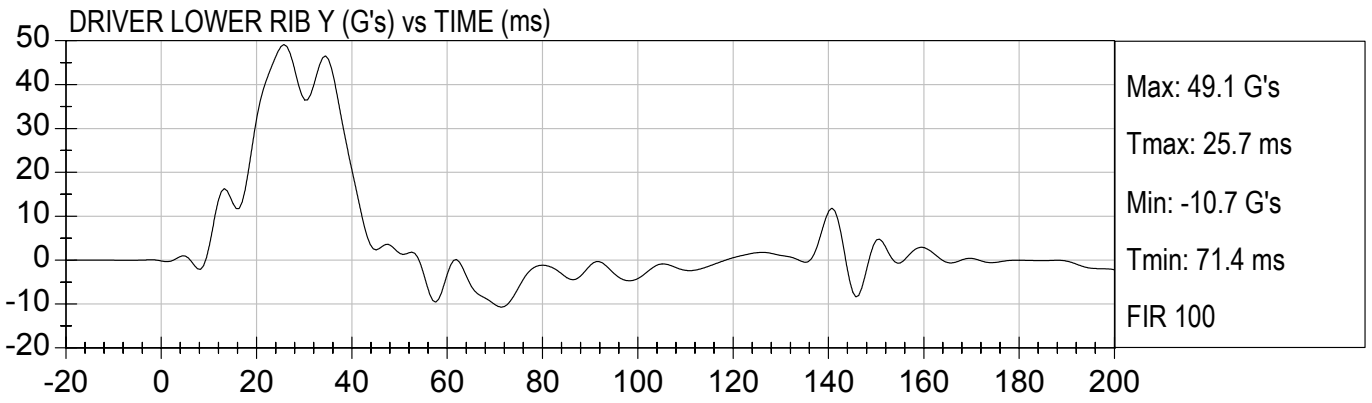


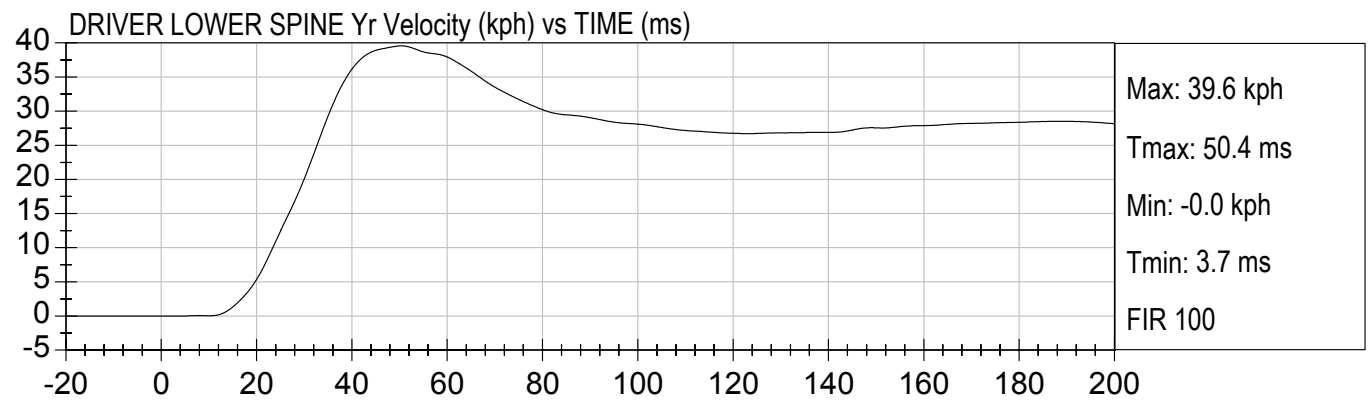
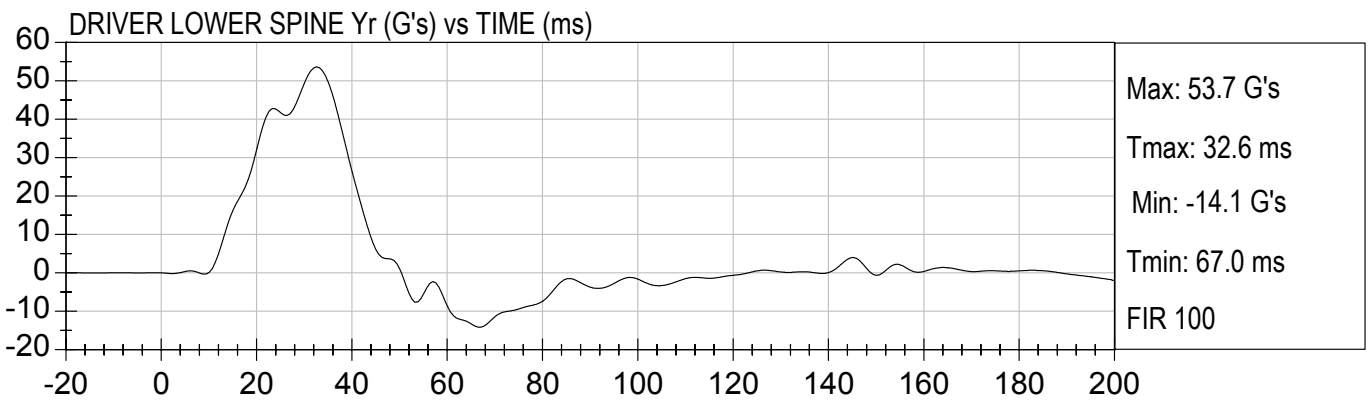
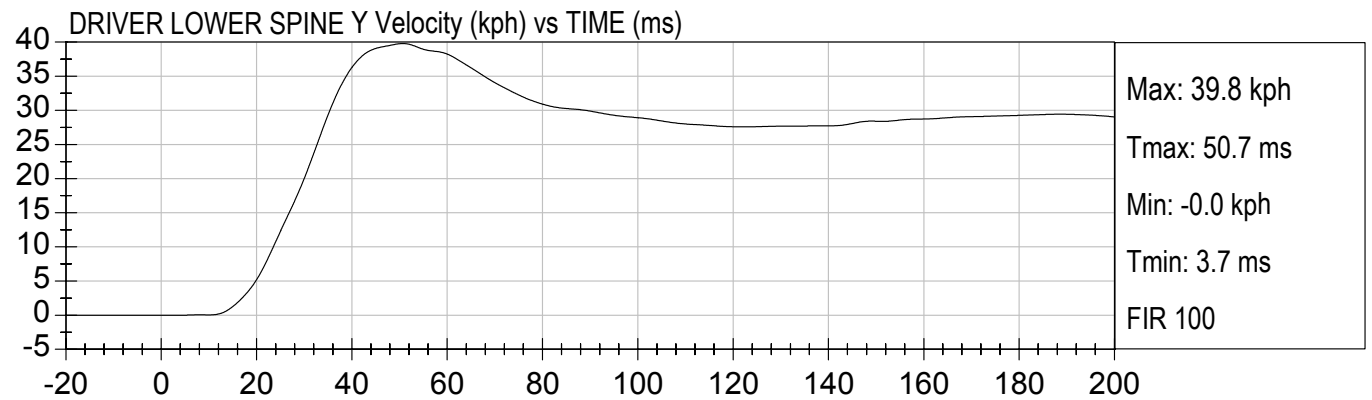
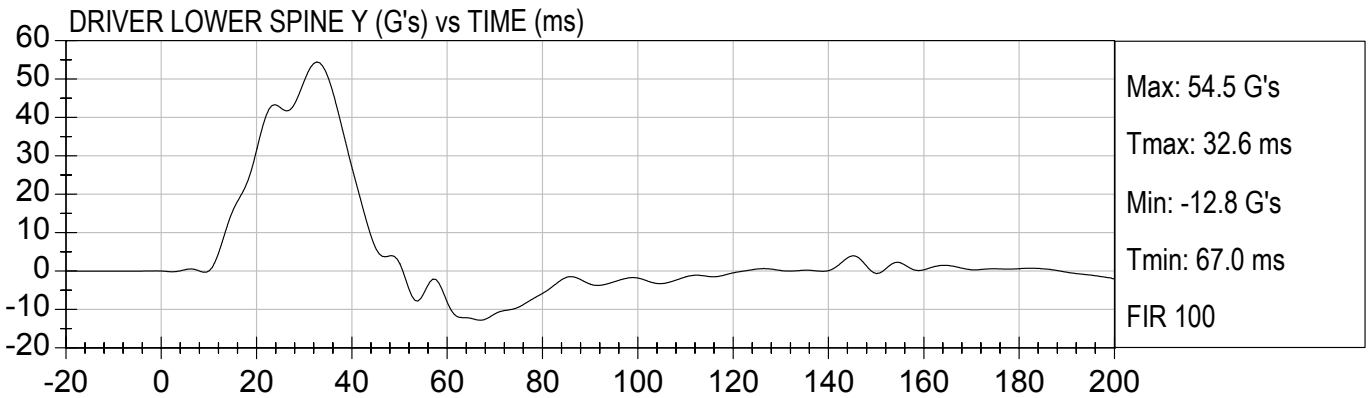
38.5MPH LEFT SIDE IMPACT (M45301)  
2004 ACURA TSX

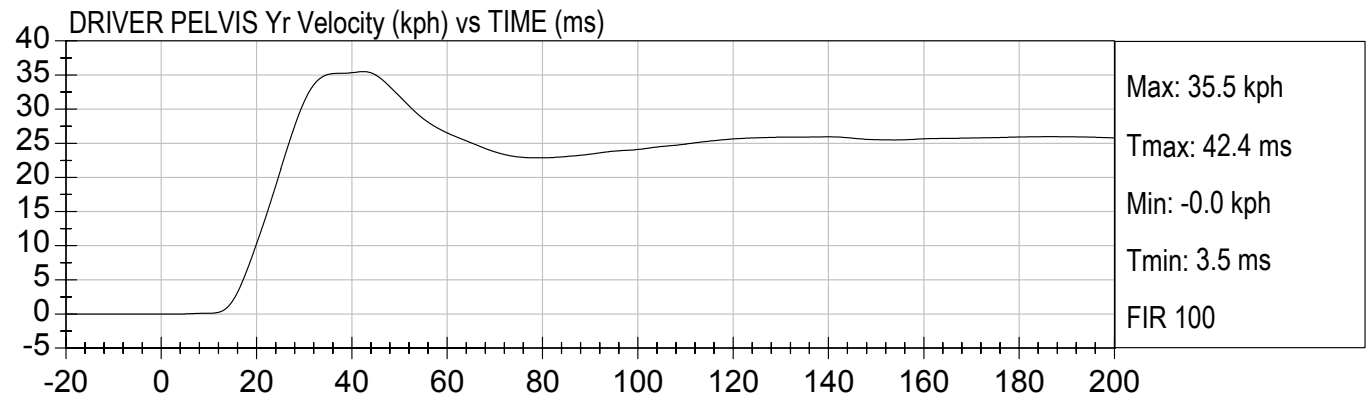
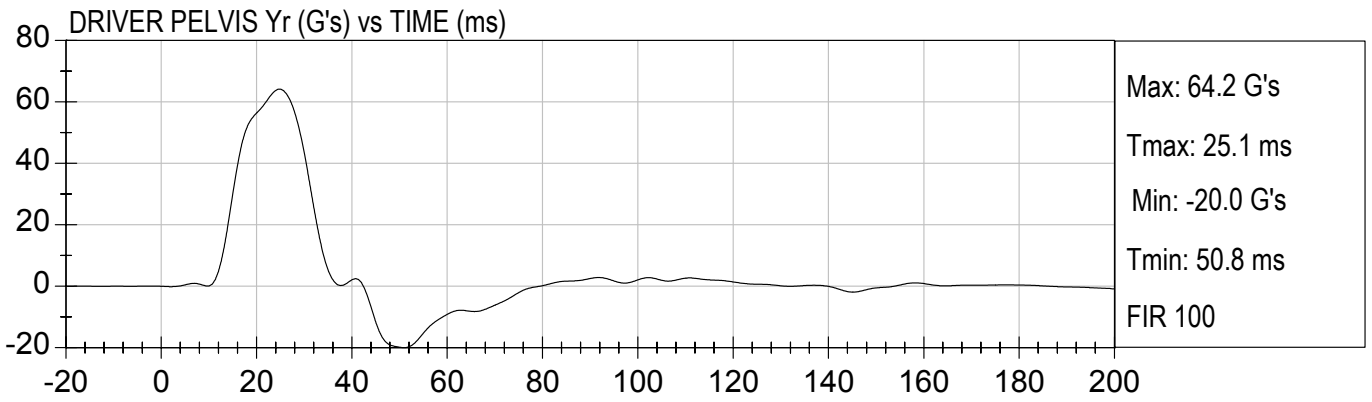
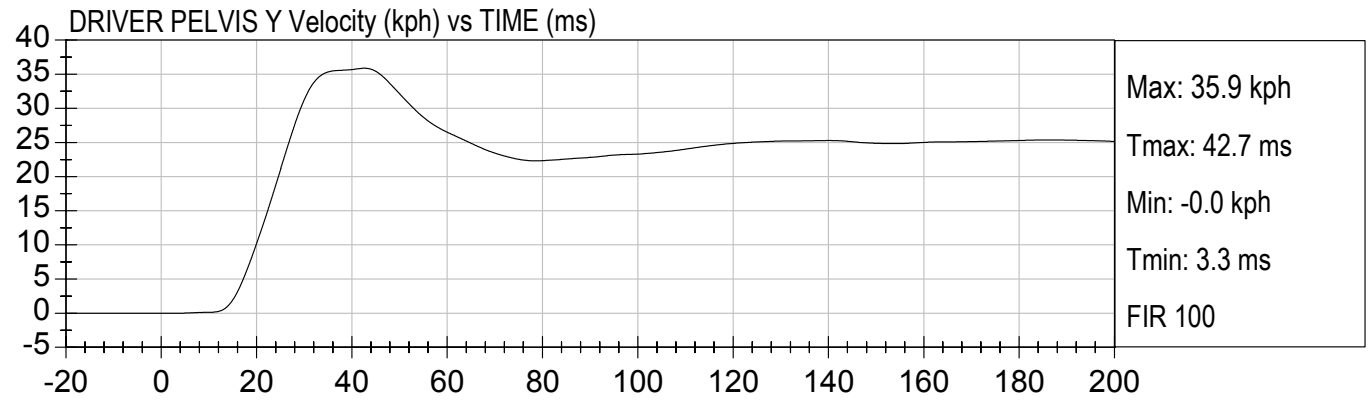
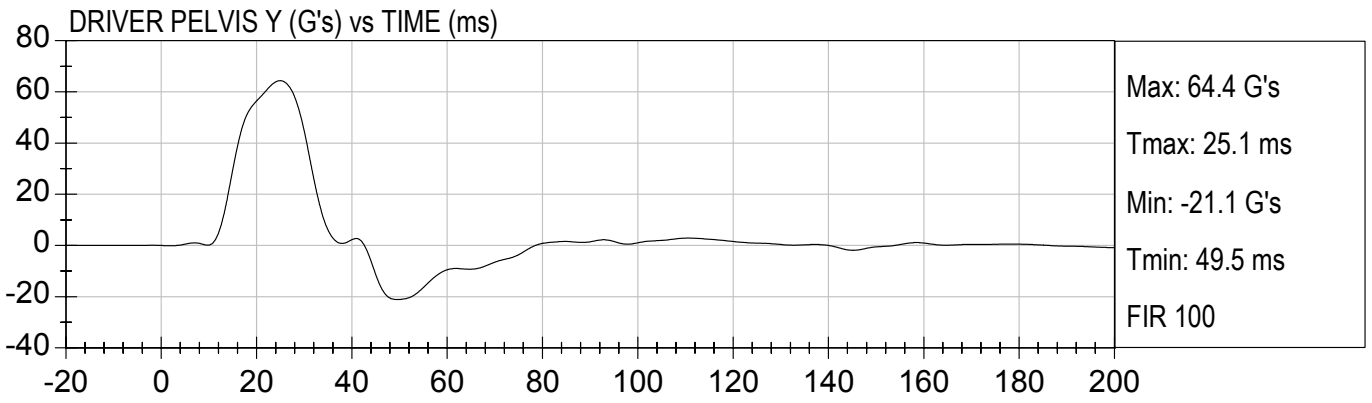
Test Date: 1/14/2004  
Speed: 38.6 mph (62.1 km/h)

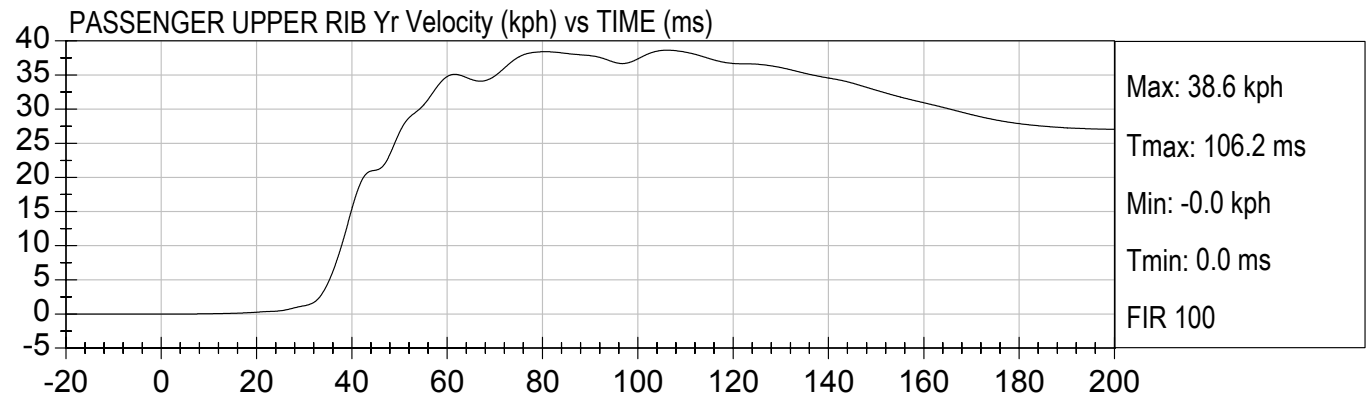
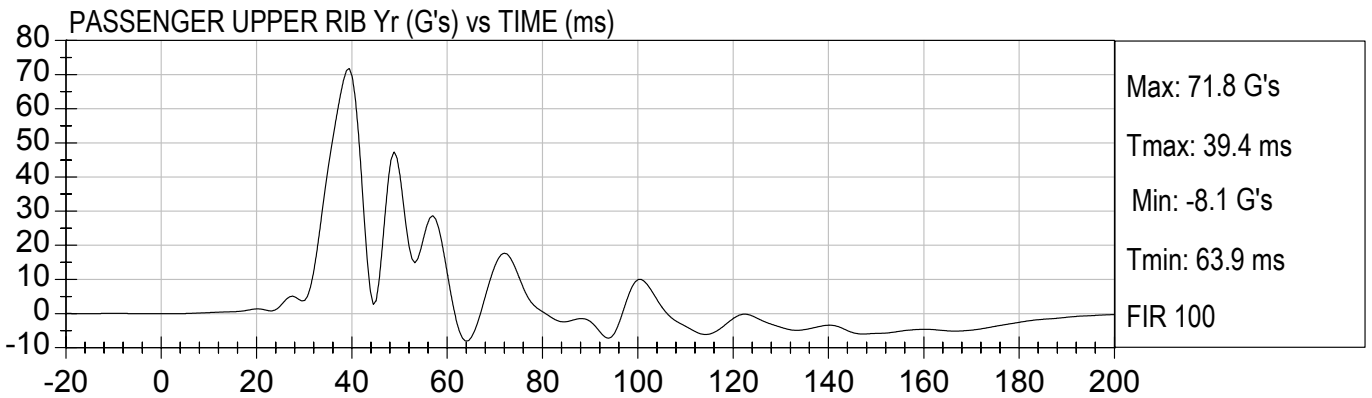
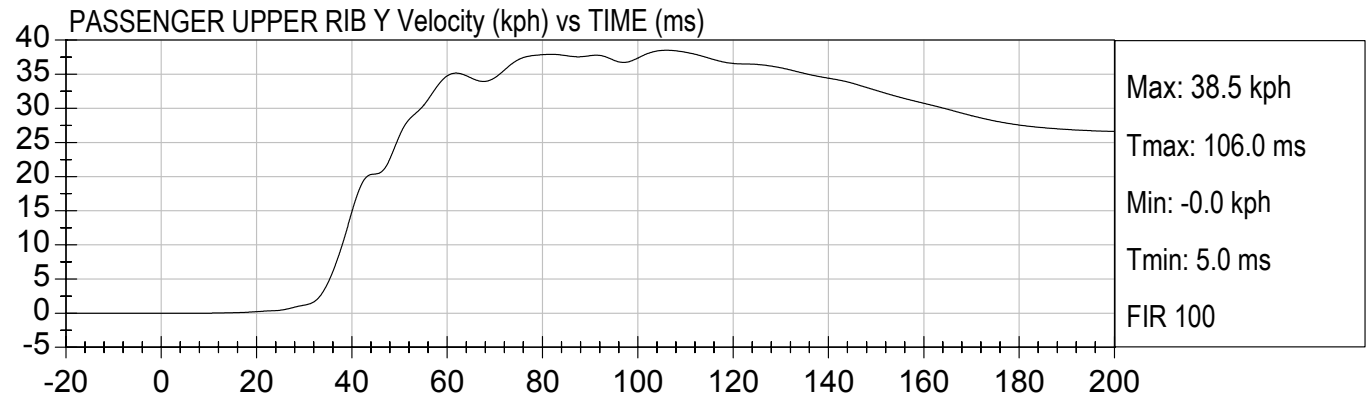
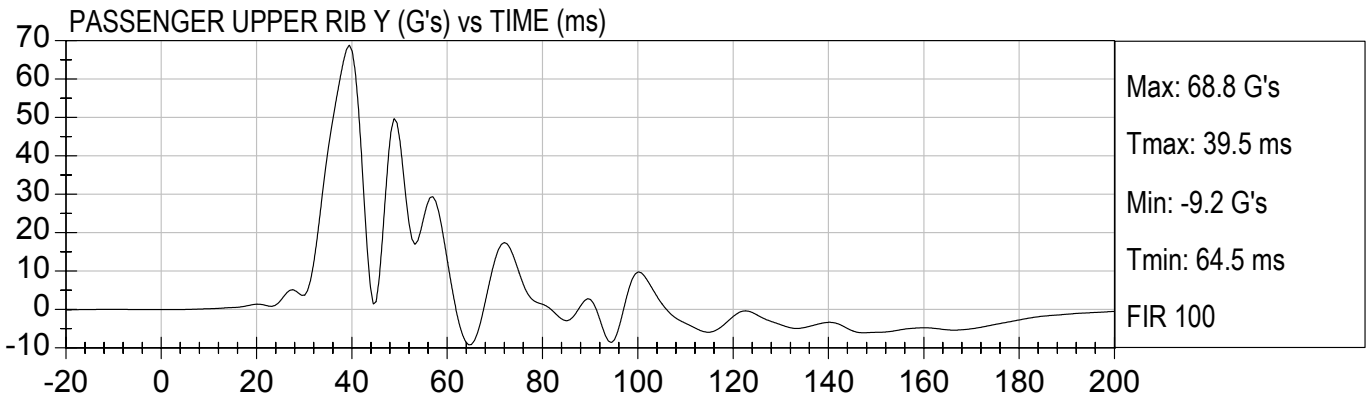


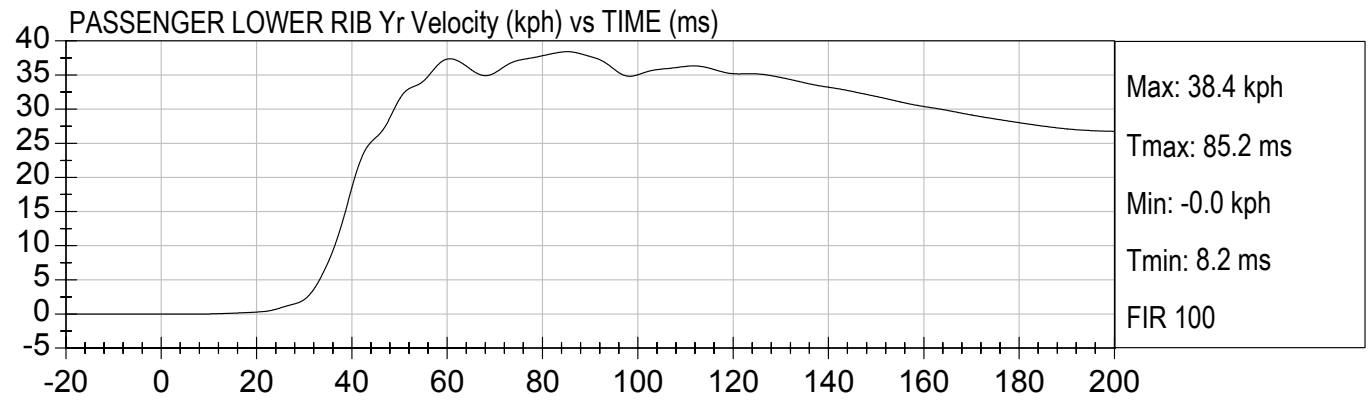
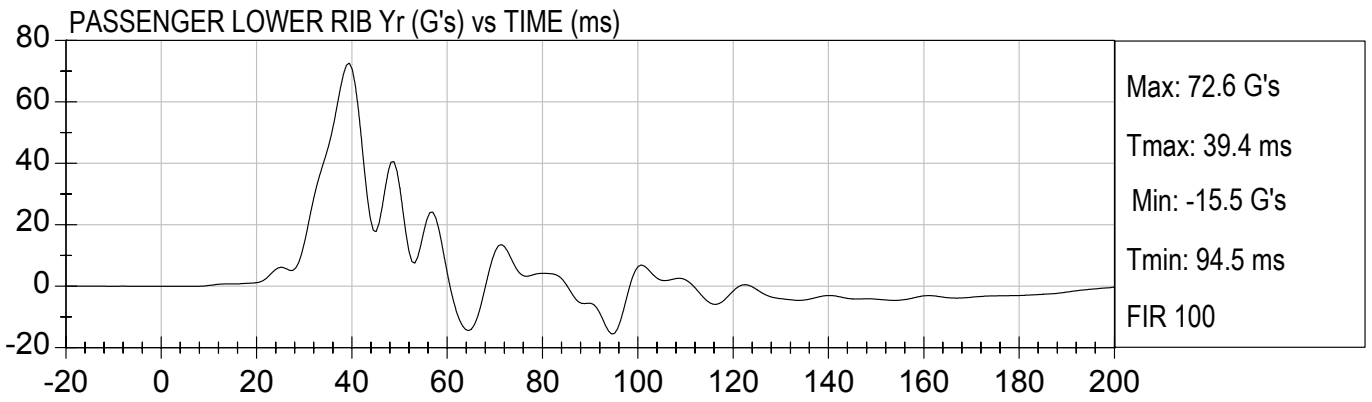
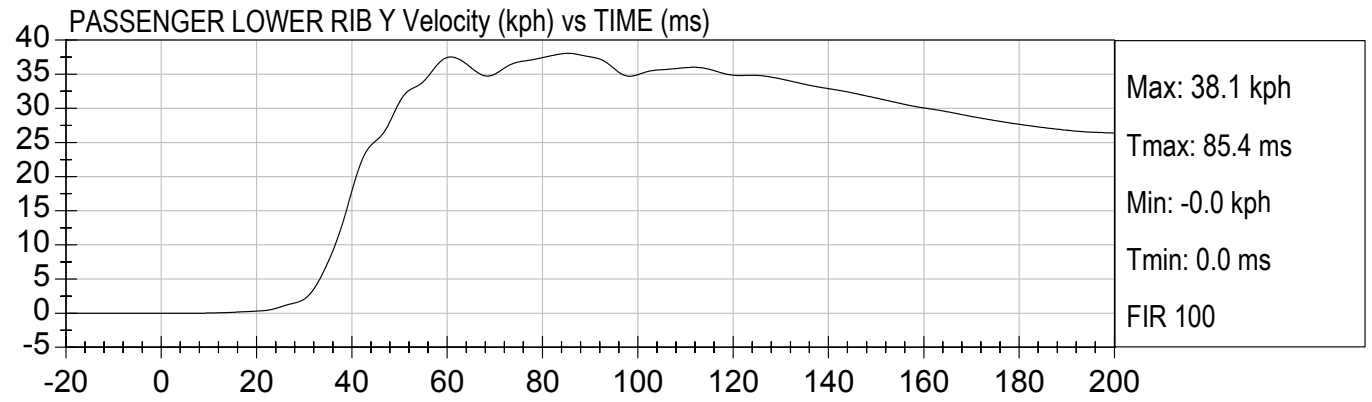
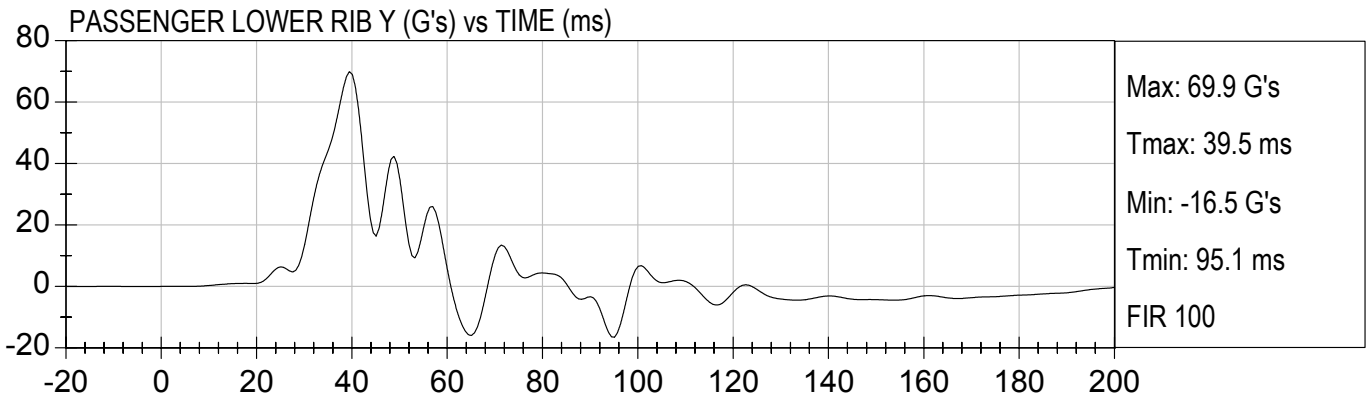


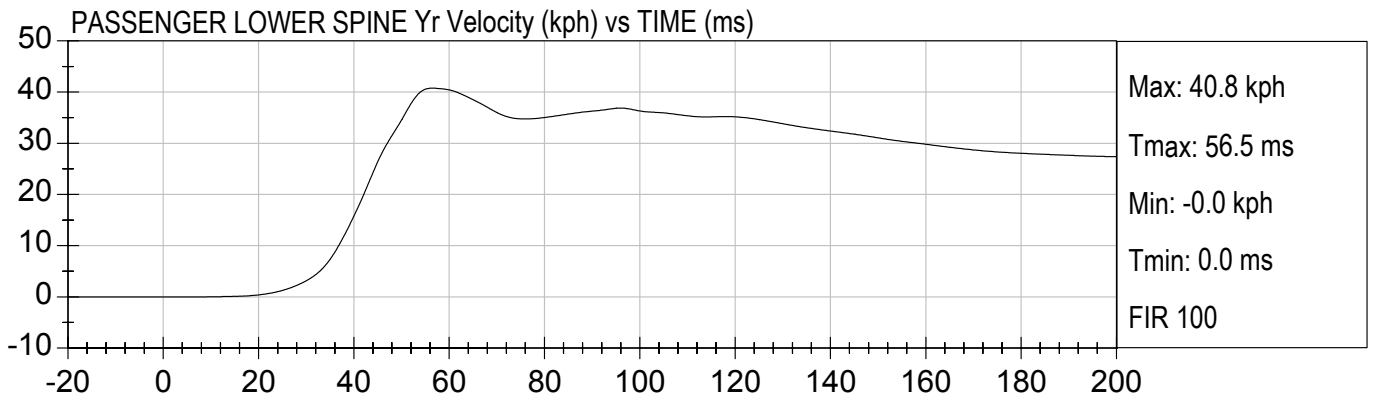
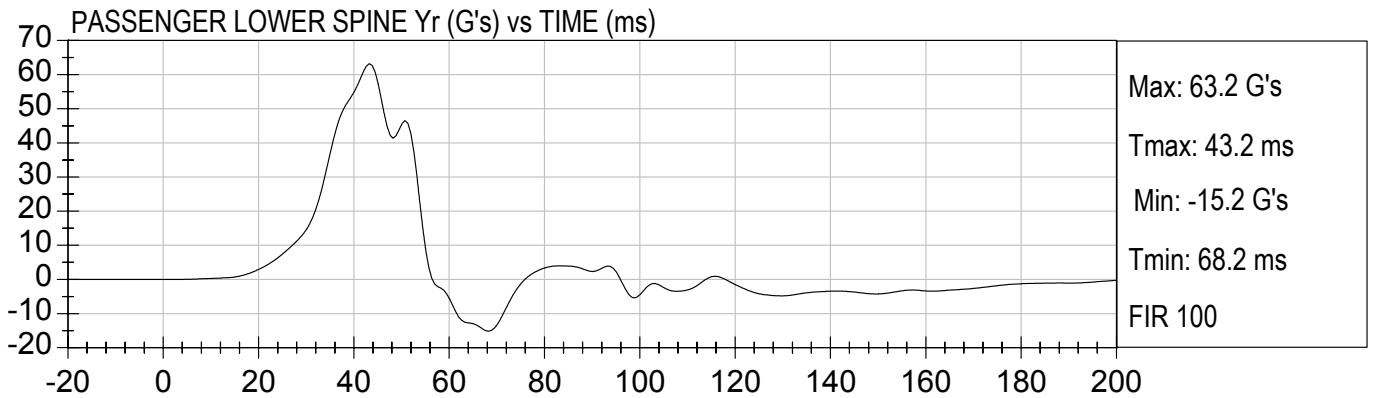
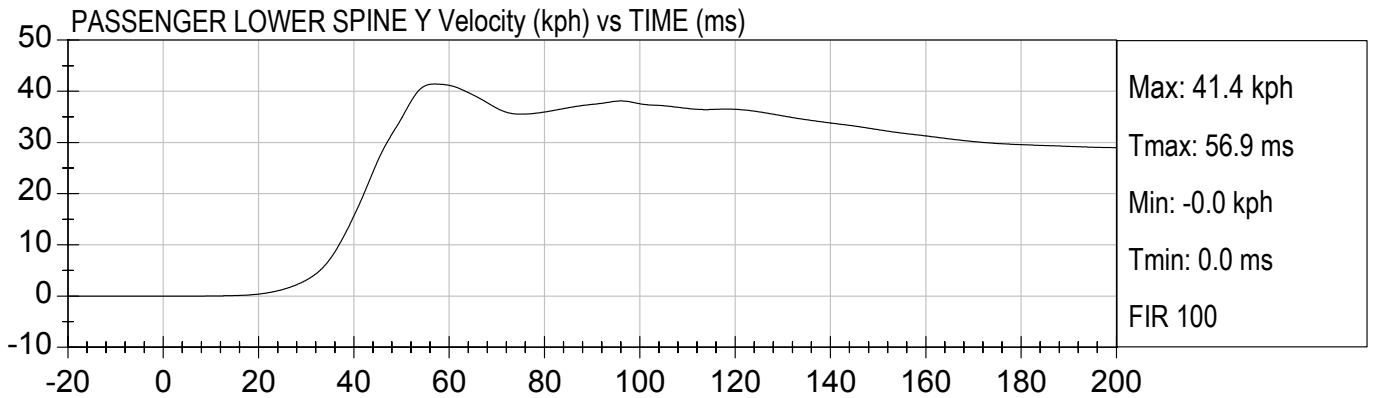
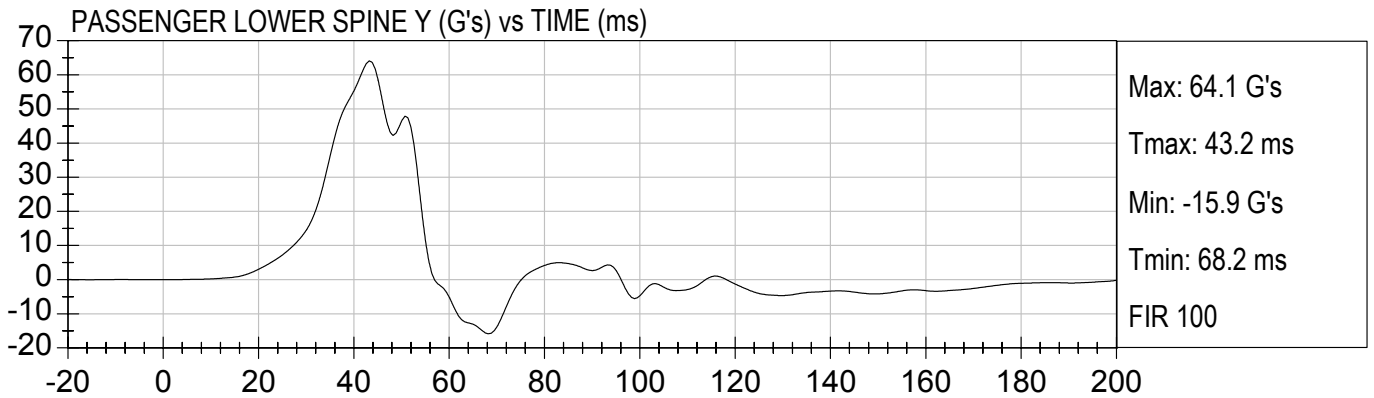


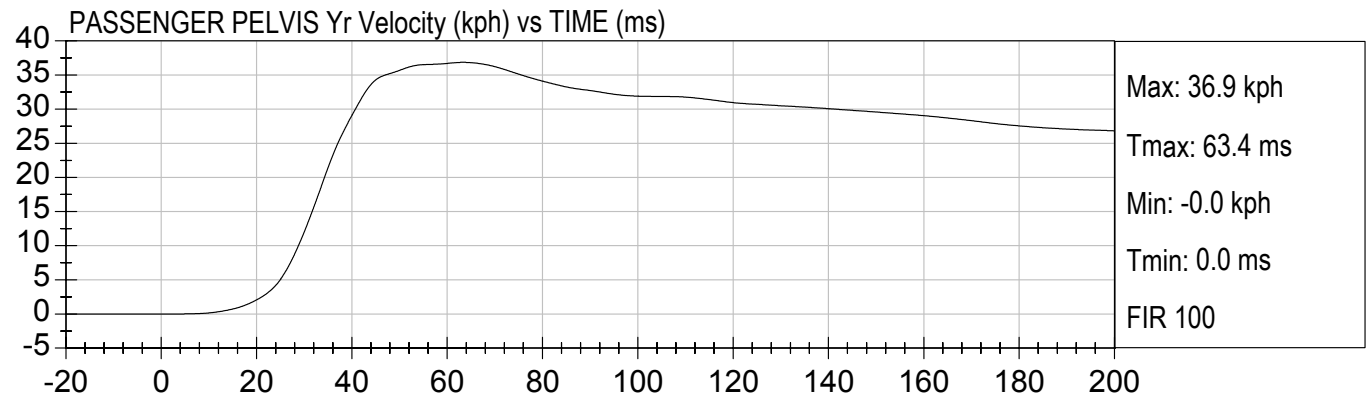
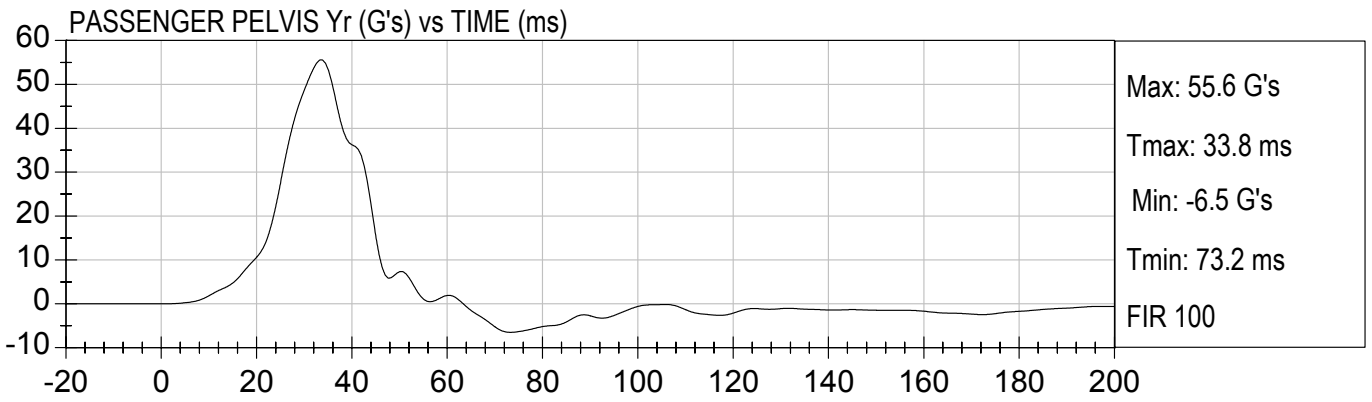
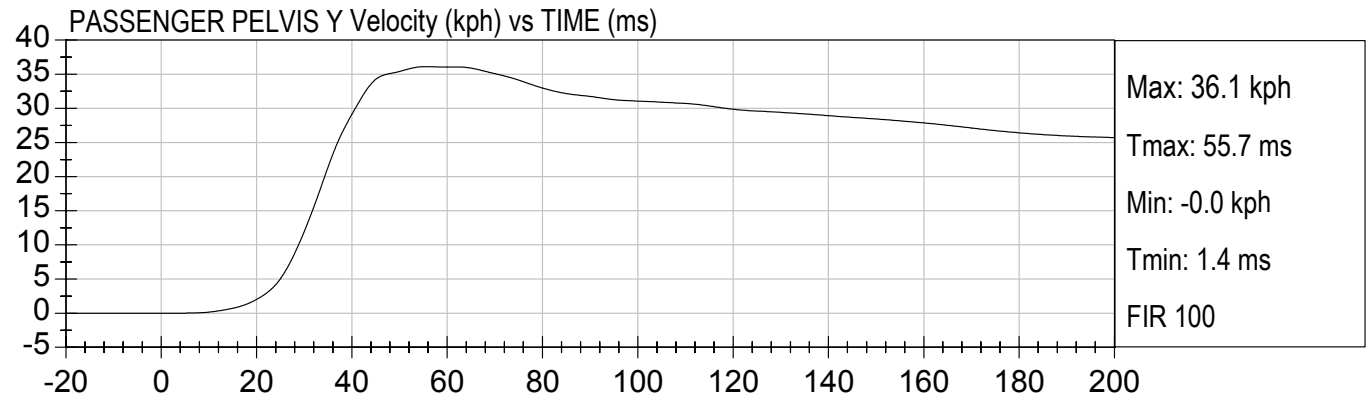
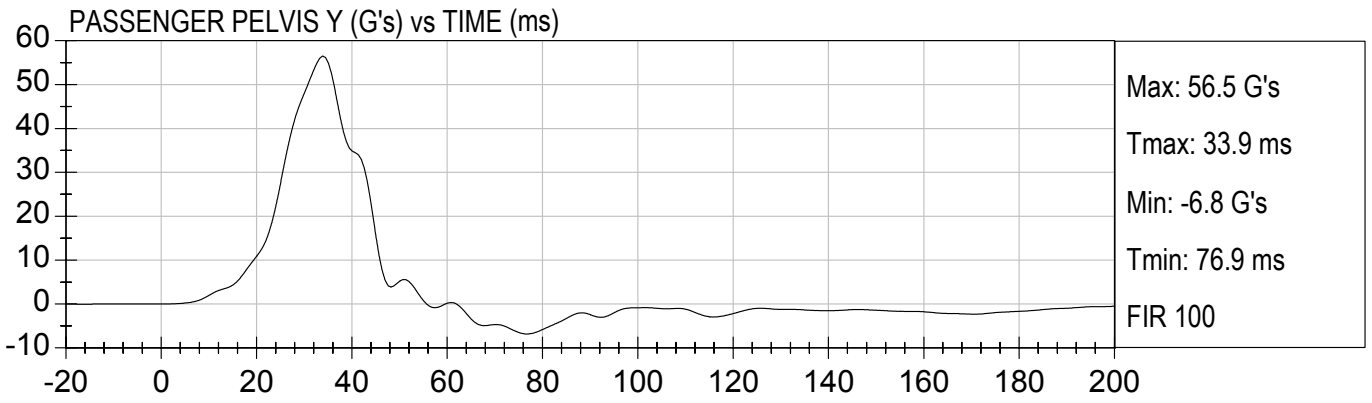












## **APPENDIX C**

### **SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

CERTIFICATION DATA

Dummy Serial Number: 904

## Calibration Test Results Summary

Dummy Serial Number: 904

### Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**External Measurements**

**ATD Serial No:** 904

**Test I.D.:** D03205

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	903	Pass
RH - Rib Height	mm	501 - 521	509	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	240	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	525	Pass
SW - Knee Pivot to Floor	mm	490 - 505	500	Pass
HW - Hip Width	mm	356 - 391	368	Pass
<b>Overall Test Results</b>				<b>Pass</b>

*Jessica Gall*  
 Laboratory Technician

11/12/2003  
 Test Date

*Shetalika Jauwal*  
 Approved By

**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Head Drop Calibration (Lateral)**

**ATD Serial No:** 904

**Test I.D.:** D032051

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Peak Resultant Acceleration	G's	120 to 150	150	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-7	Pass
<b>Overall Test Results</b>				<b>Pass</b>

*Jessica Gall*  
 Laboratory Technician

12/11/2003  
 Test Date

*Shetalika Jauwal*  
 Approved By



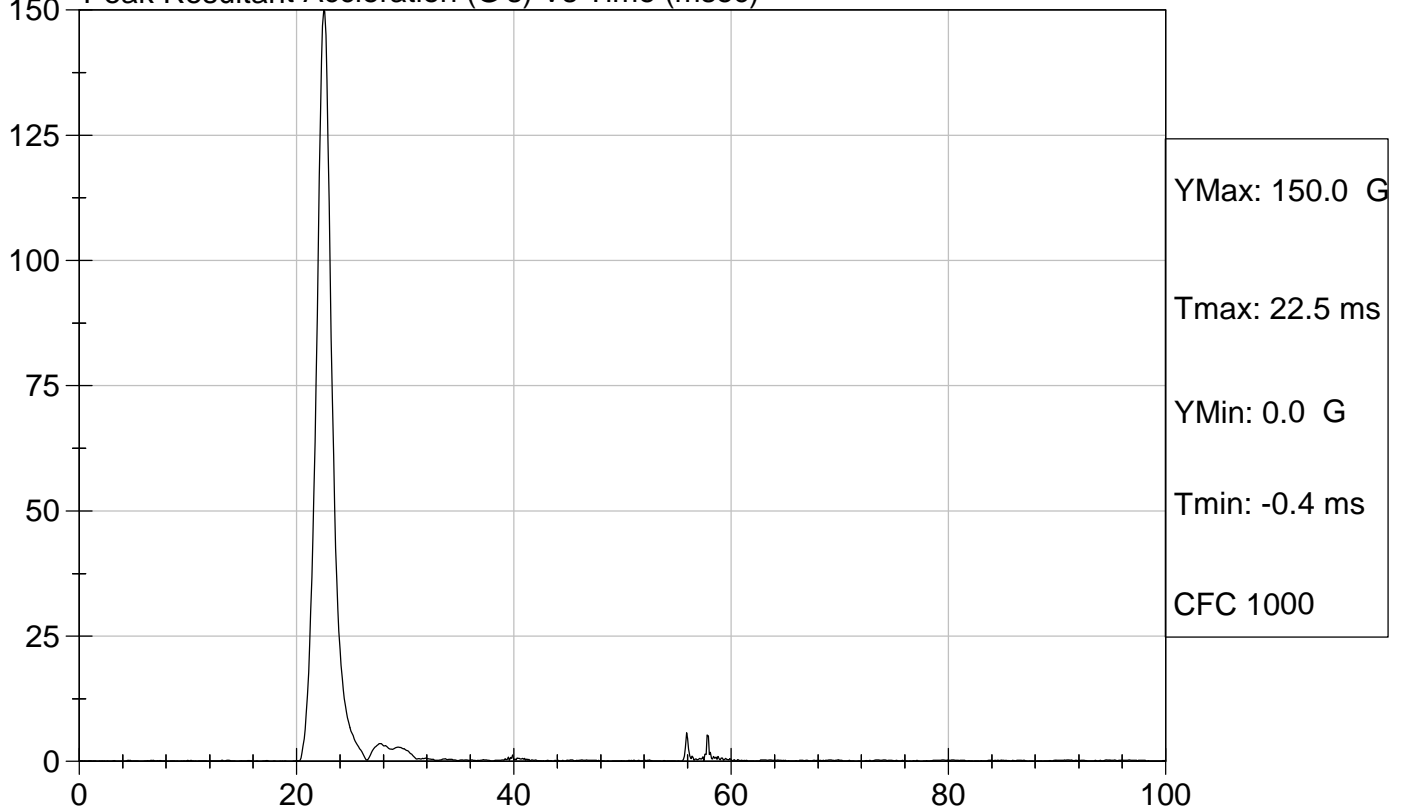
Test Description: Head Drop

Test Date: 12/11/2003

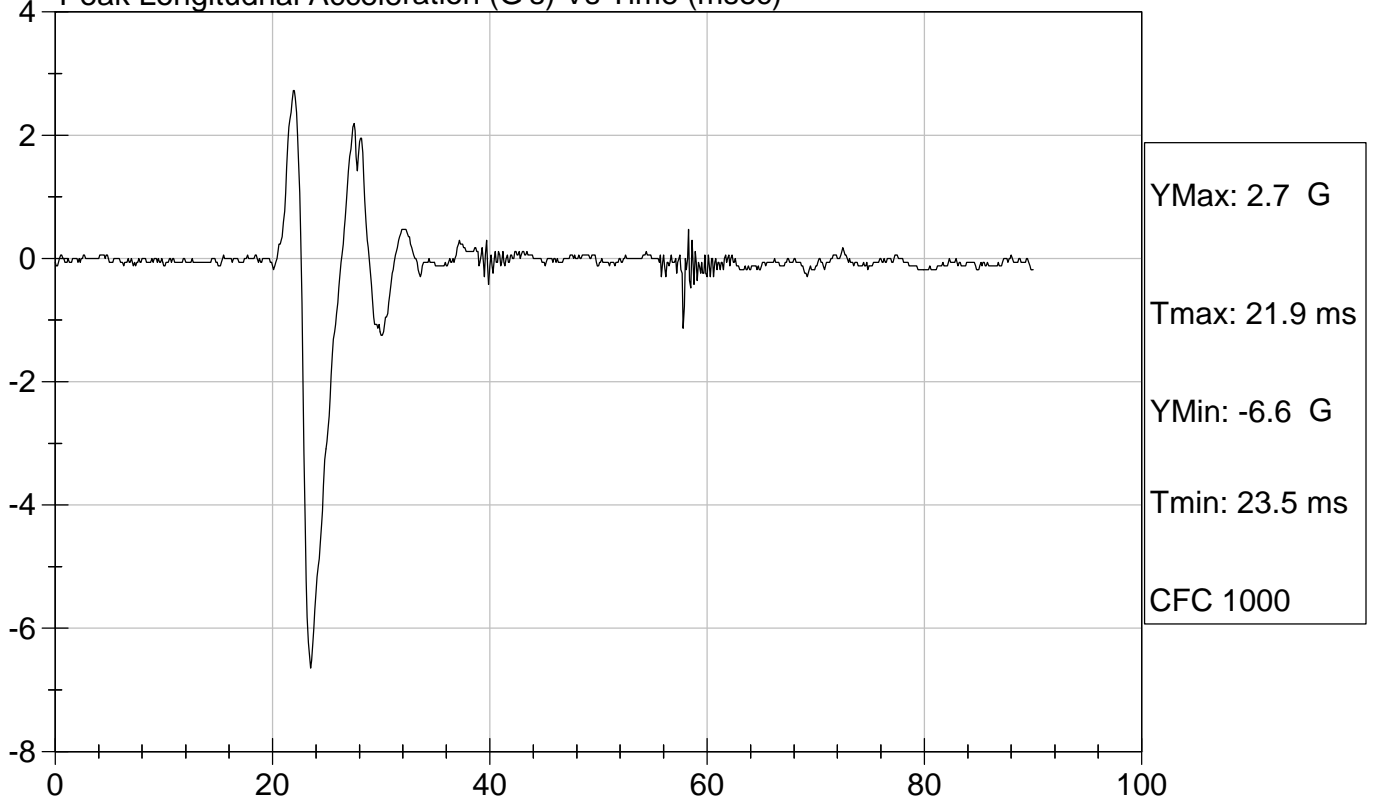
Component: D032051

Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudnal Acceleration (G's) Vs Time (msec)



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Thorax Impact Test**

ATD Serial No: 904

Test I.D.: D032052

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Upper Rib	G's	37 - 46	41	Pass
Lower Rib	G's	37 - 46	40	Pass
Lower Spine	G's	15 - 22	19	Pass
<b>Overall Test Results</b>				<b>Pass</b>

Jessica Gall  
 Laboratory Technician

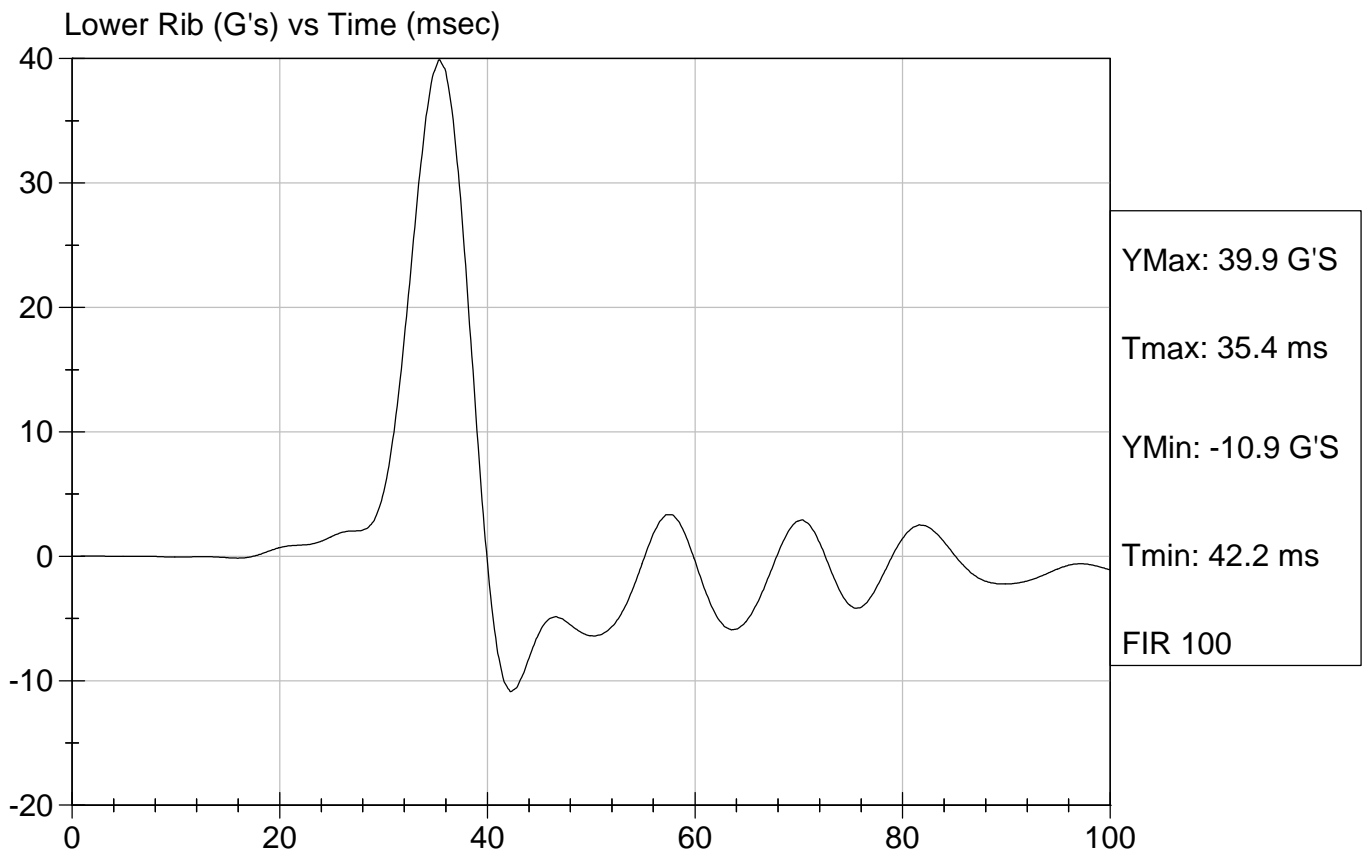
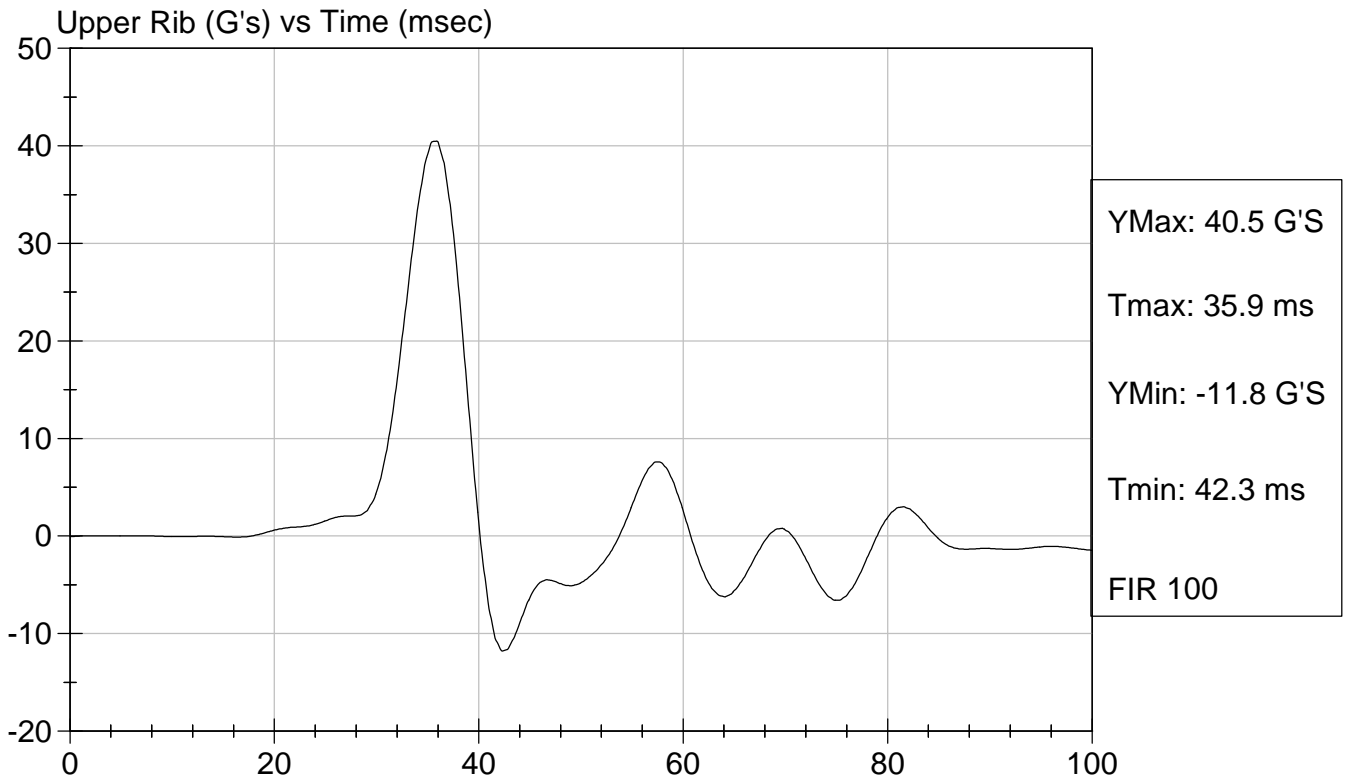
12/11/2003  
 Test Date

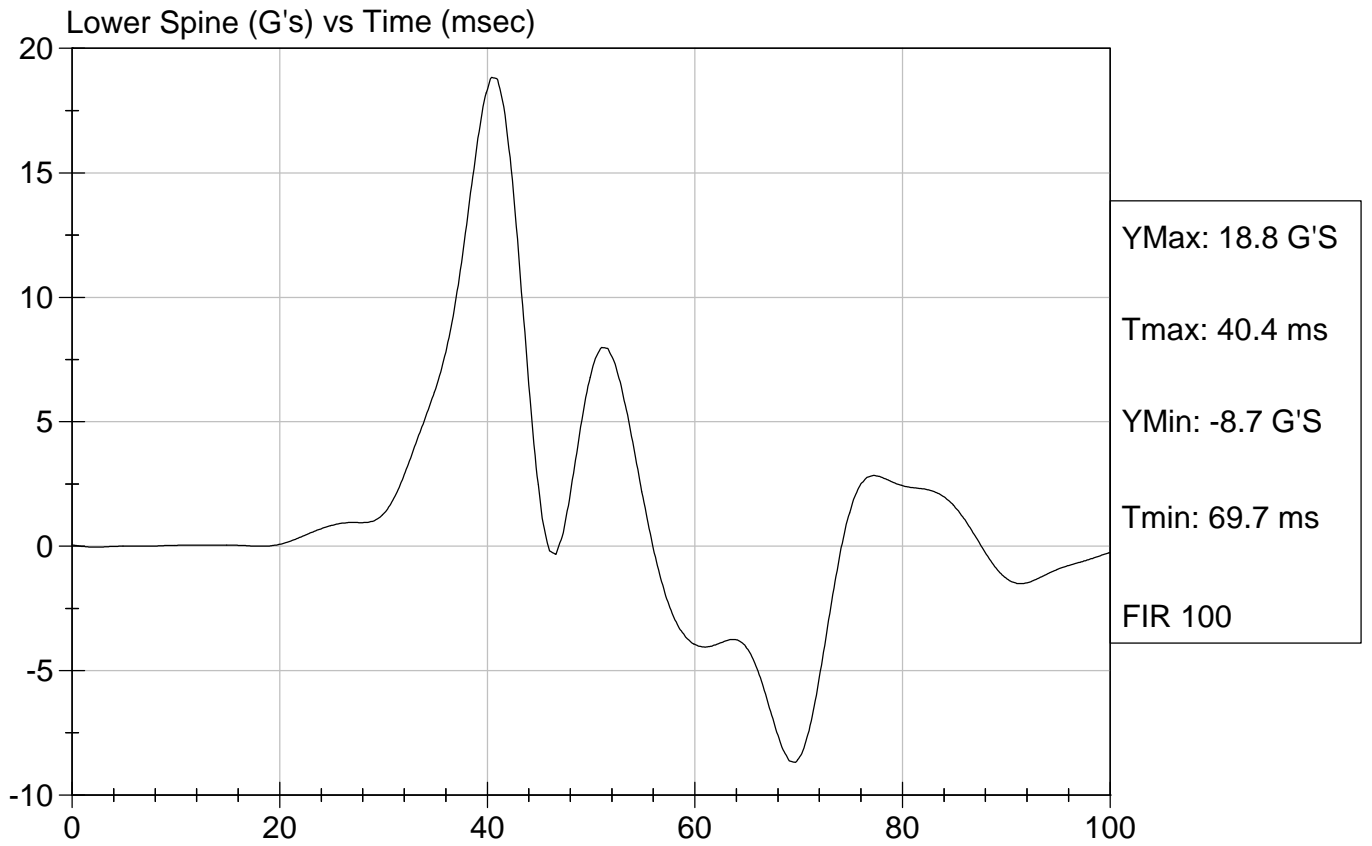
Shetalika Jauwal  
 Approved By



Test Desc: Thorax Impact  
Component ID: D032052

Test Date: 12/11/2003  
Speed: 14.1 ft/sec, 4.30 m/sec





**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Pelvis Impact Test**

**ATD Serial No:** 904

**Test I.D.:** D032053

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	4.27 - 4.33	4.29	Pass
Pelvis Acceleration	G's	40 - 60	44	Pass
<b>Overall Test Results</b>				<b>Pass</b>

*Jessica Gall*  
 Laboratory Technician

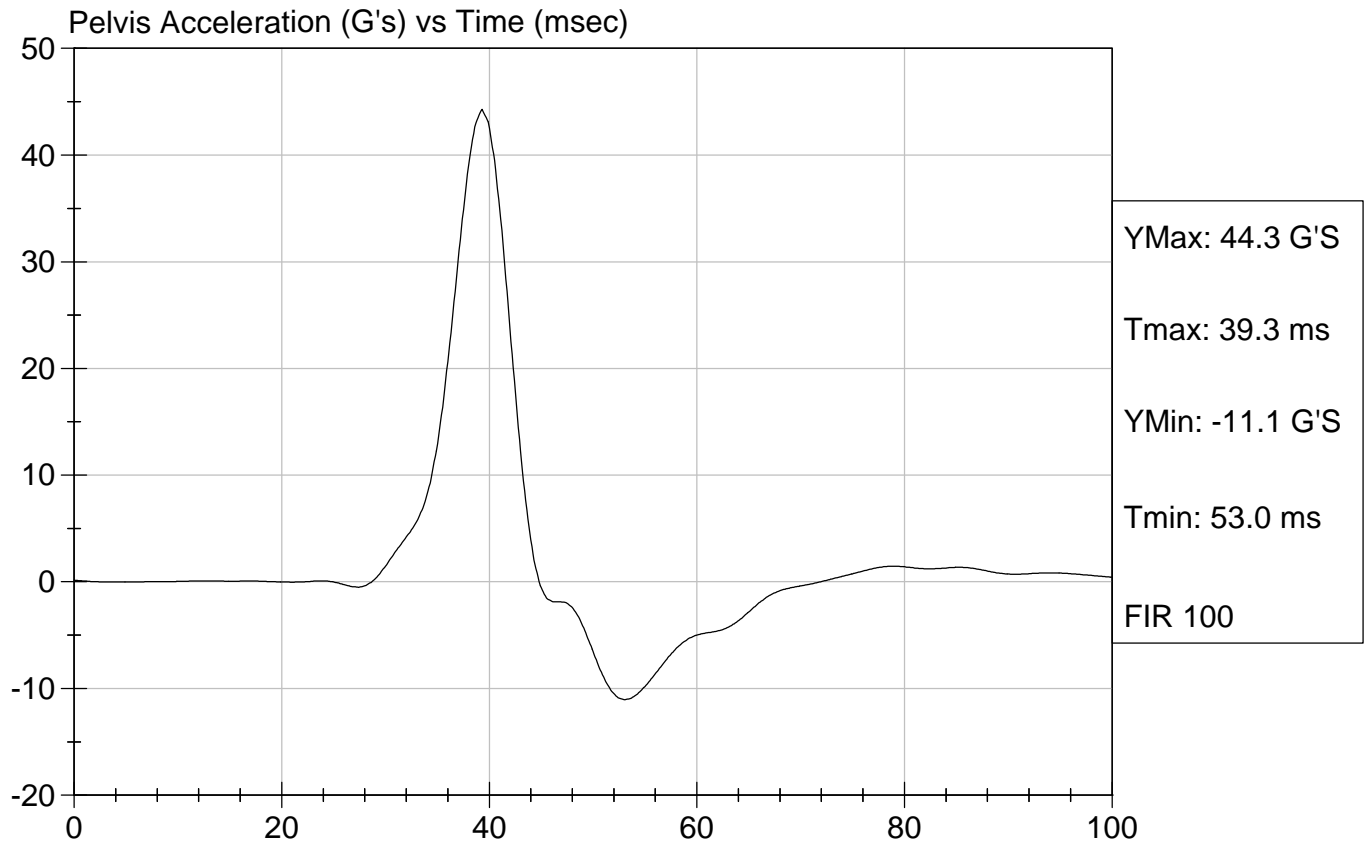
12/11/2003  
 Test Date

*Shetalika Jauwal*  
 Approved By



Test Desc: Pelvis Impact  
Component ID: D032053

Test Date: 12/11/2003  
Speed: 14.06 ft/sec, 4.29 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Abdominal Compression Calibration (Pre-Load = 10 lbs)**

ATD Serial No: 904

Test I.D: D032054

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	19.6	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Force At 12.7 mm	N	104 -162	139	Pass
Force At 19 mm	N	163 - 222	192	Pass
Force At 25.4 mm	N	222 - 280	254	Pass
Force At 33 mm	N	325 - 391	338	Pass
Overall Test Results				Pass

Jessica Gall  
 Laboratory Technician

12/11/2003  
 Test Date

Shetalika Jauwal  
 Approved By



Test Description: Abdomen Compression Test Date: 12/11/2003

Component: D032054

Speed: 0 ft/sec, 0 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Lumbar Flexion Calibration**

ATD Serial No: 904

Test I.D.: D032055

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	35	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	137.7	Pass
Force At 30 deg	N	151.2 - 204.6	175.0	Pass
Force At 40 deg	N	204.6 - 258.0	257.2	Pass
Return Angle	Deg	12 Maximum	4	Pass
Overall Test Results				Pass

Jessica Gall  
 Laboratory Technician

12/10/2003  
 Test Date

Shetalika Jauwal  
 Approved By

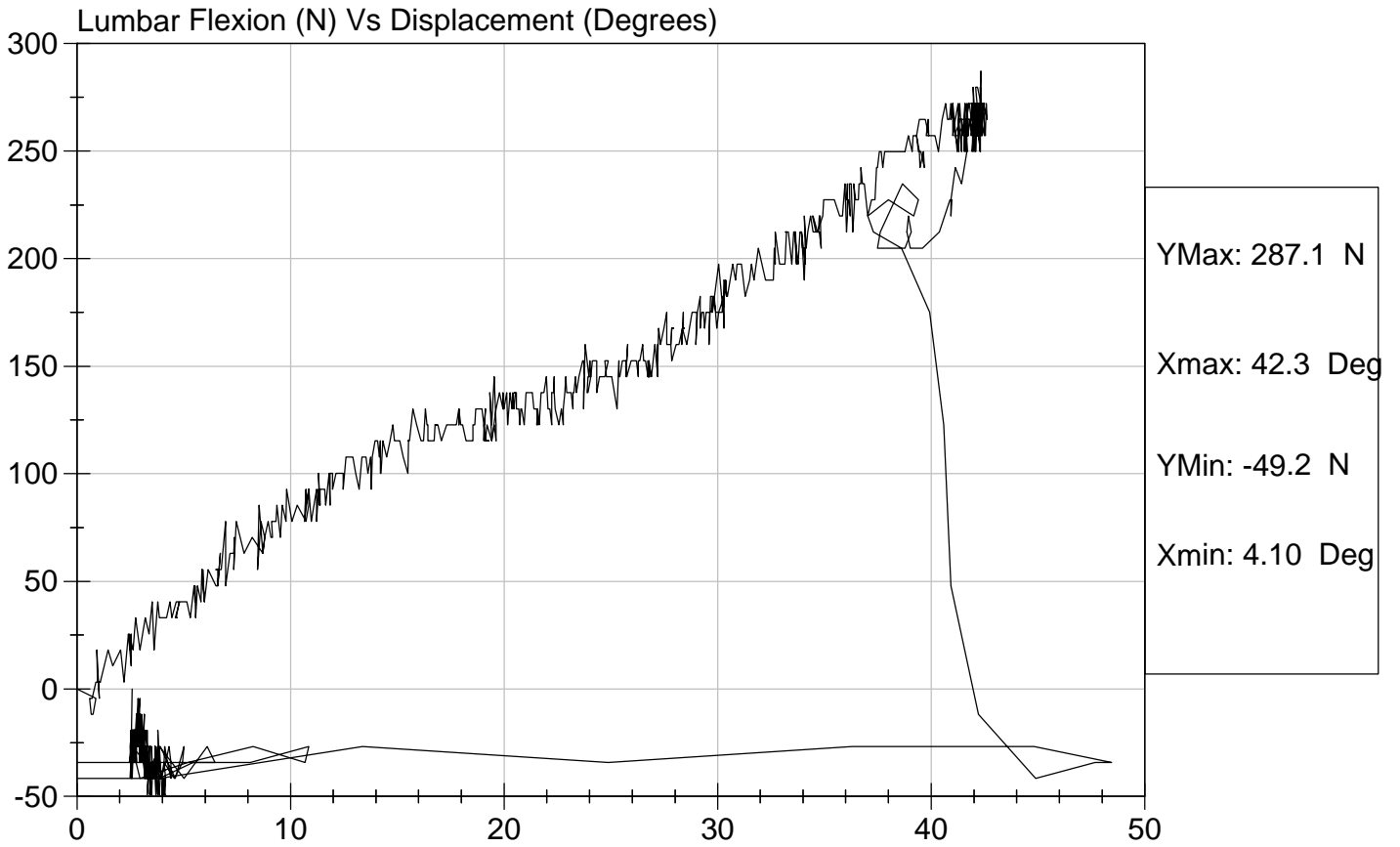


Test Description: Lumbar Flexion

Test Date: 12/10/2003

Component: D032055

Speed: 0 ft/sec, 0 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy (SID)**  
**Neck Pendulum Test**

ATD Serial No: 904

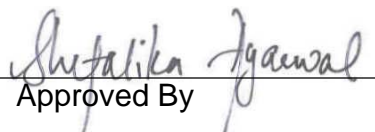
Test I.D: D032059

Tested Parameter	Units	Specification	Result	Pass/Fail	
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass	
Laboratory Relative Humidity	%	10 to 70	35	Pass	
Impact Velocity	m/s	6.89 to 7.13	6.90	Pass	
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.27	Pass
	20 msec	m/s	4.12 to 5.10	4.49	Pass
	30 msec	m/s	5.73 to 7.01	6.30	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.09	Pass
Midsaggital Plane Max Rotation	deg	66 to 82	69	Pass	
Head Rotation Peak to Zero - Decay Time	msec	58 to 67	60	Pass	
Max. Mx at Occipital Condyles	Nm	73 to 88	80	Pass	
Mx Peak To Zero - Decay Time	msec	49 to 64	53	Pass	
Mx Peak to Max. Head Rotation	msec	2 to 16	9	Pass	

  
 Laboratory Technician

12/10/2003

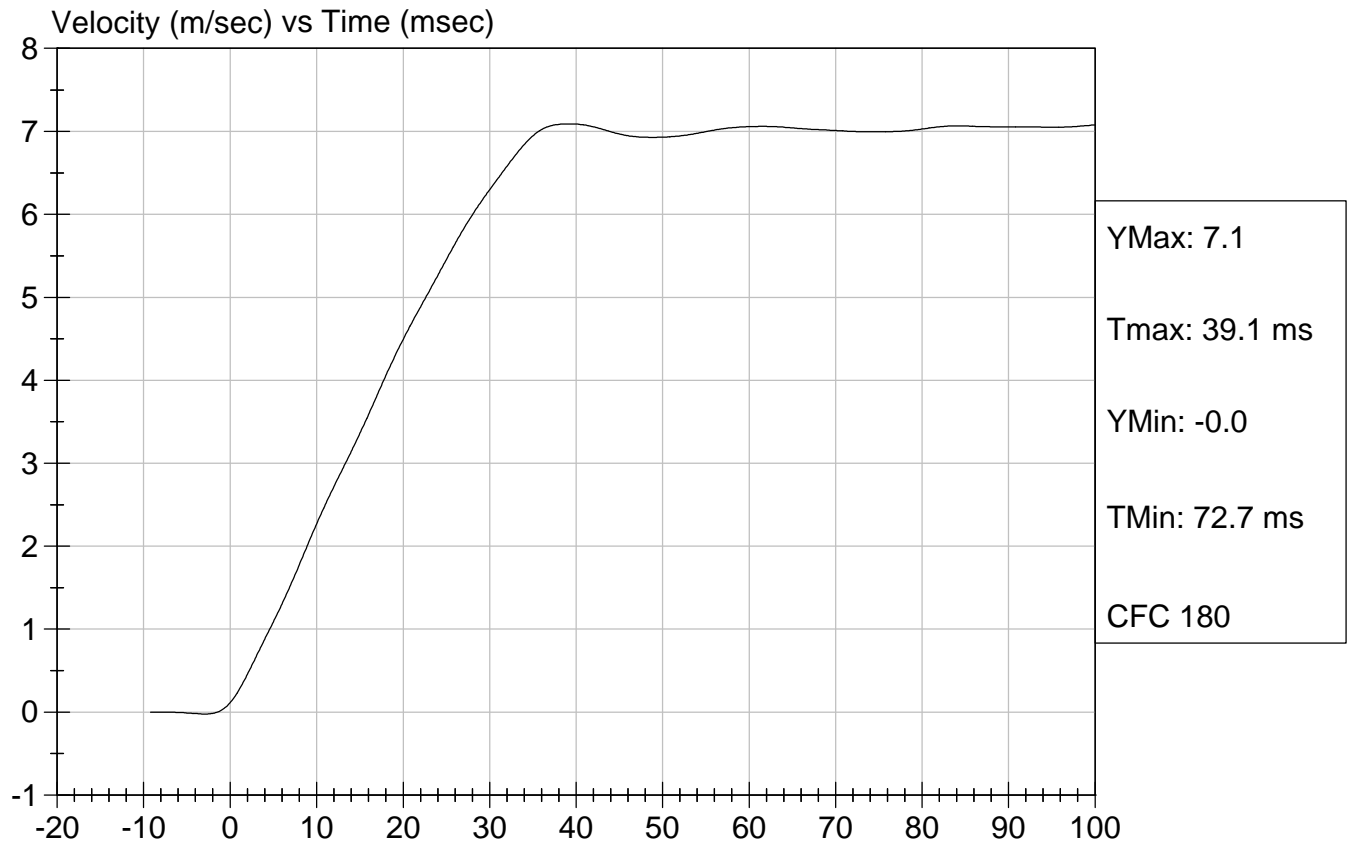
Test Date

  
 Approved By



Test Desc: Neck Bending  
Component ID: D032059

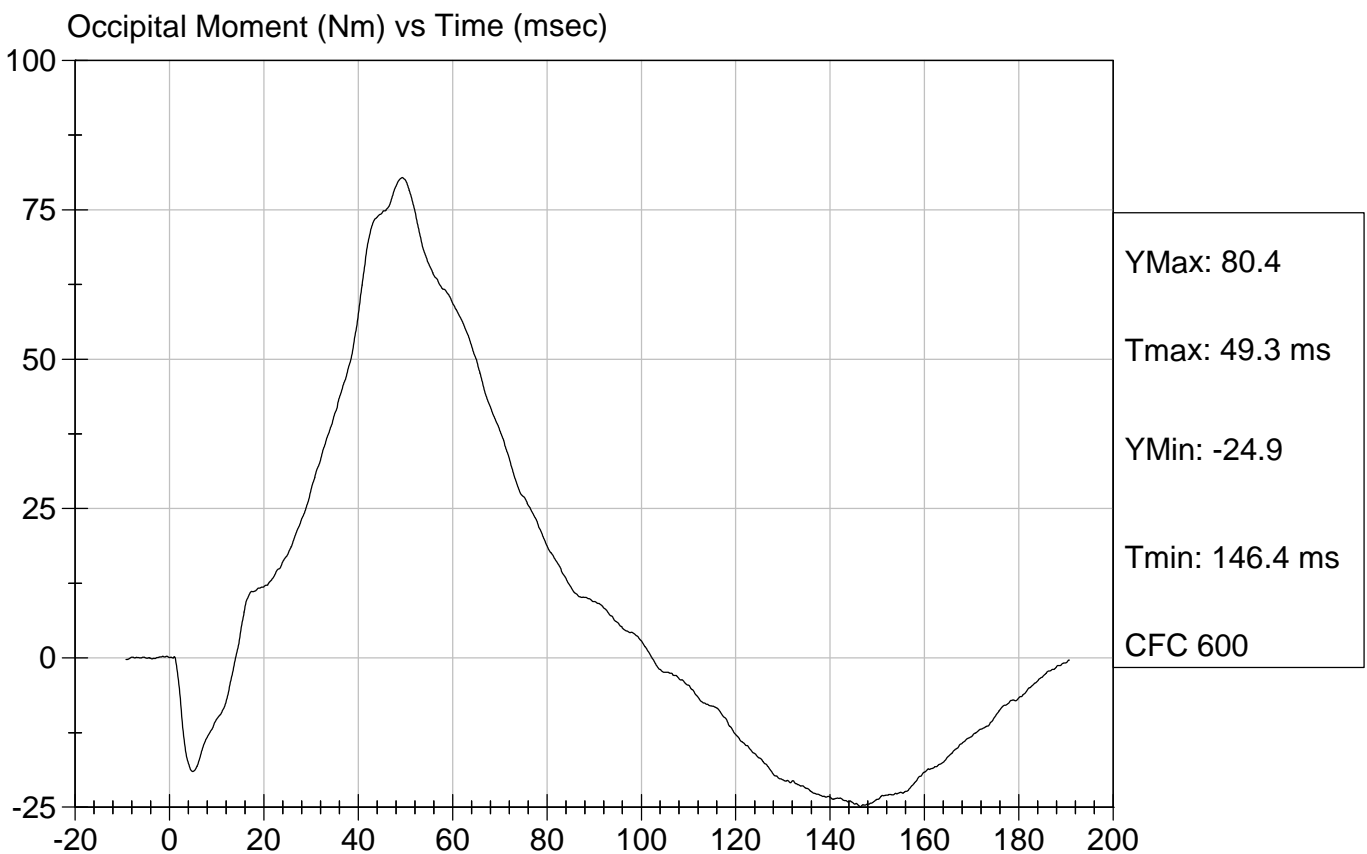
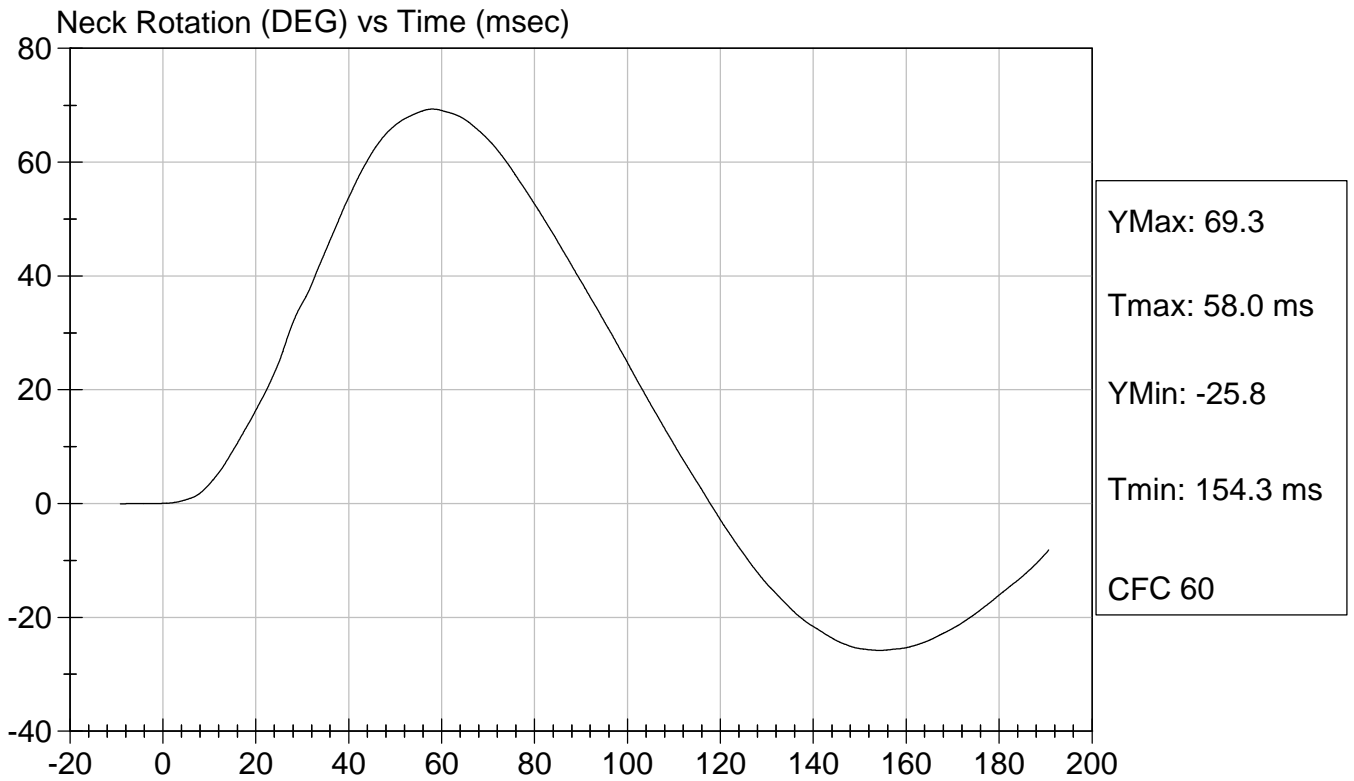
Test Date: 12/10/2003  
Speed: 22.64 ft/sec, 6.90 m/sec





Test Desc: Neck Bending  
Component ID: D032059

Test Date: 12/10/2003  
Speed: 22.64 ft/sec, 6.90 m/sec



## Calibration Test Results Summary

Dummy Serial Number: 904

### Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Head Drop Calibration (Lateral)**

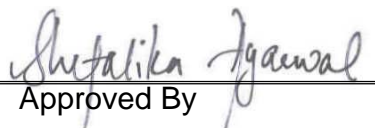
**ATD Serial No:** 904

**Test I.D.:** D04101

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Peak Resultant Acceleration	G's	120 to 150	150	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-8	Pass
<b>Overall Test Results</b>				<b>Pass</b>

  
 \_\_\_\_\_  
 Laboratory Technician

01/20/2004  
 Test Date

  
 \_\_\_\_\_  
 Approved By



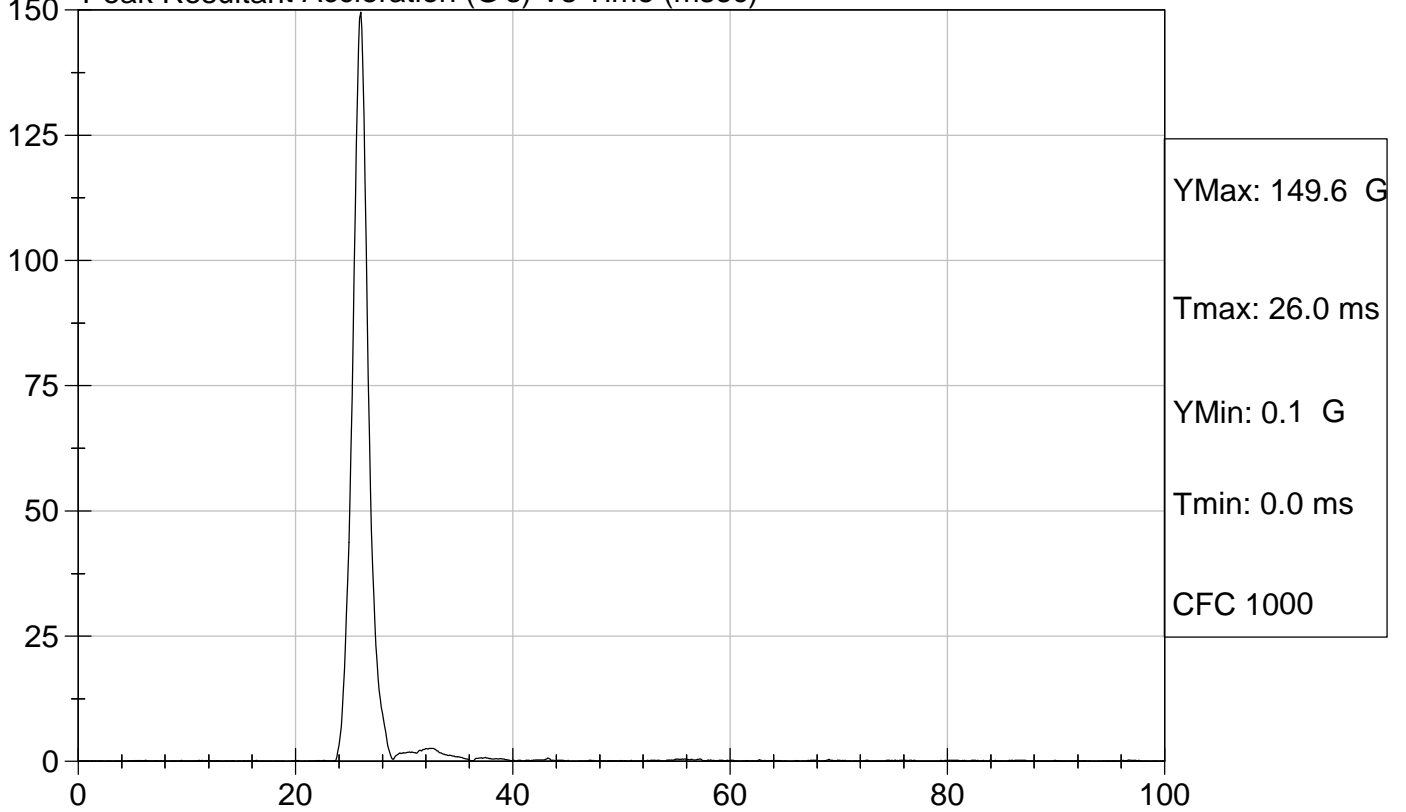
Test Description: Head Drop

Test Date: 01/20/2004

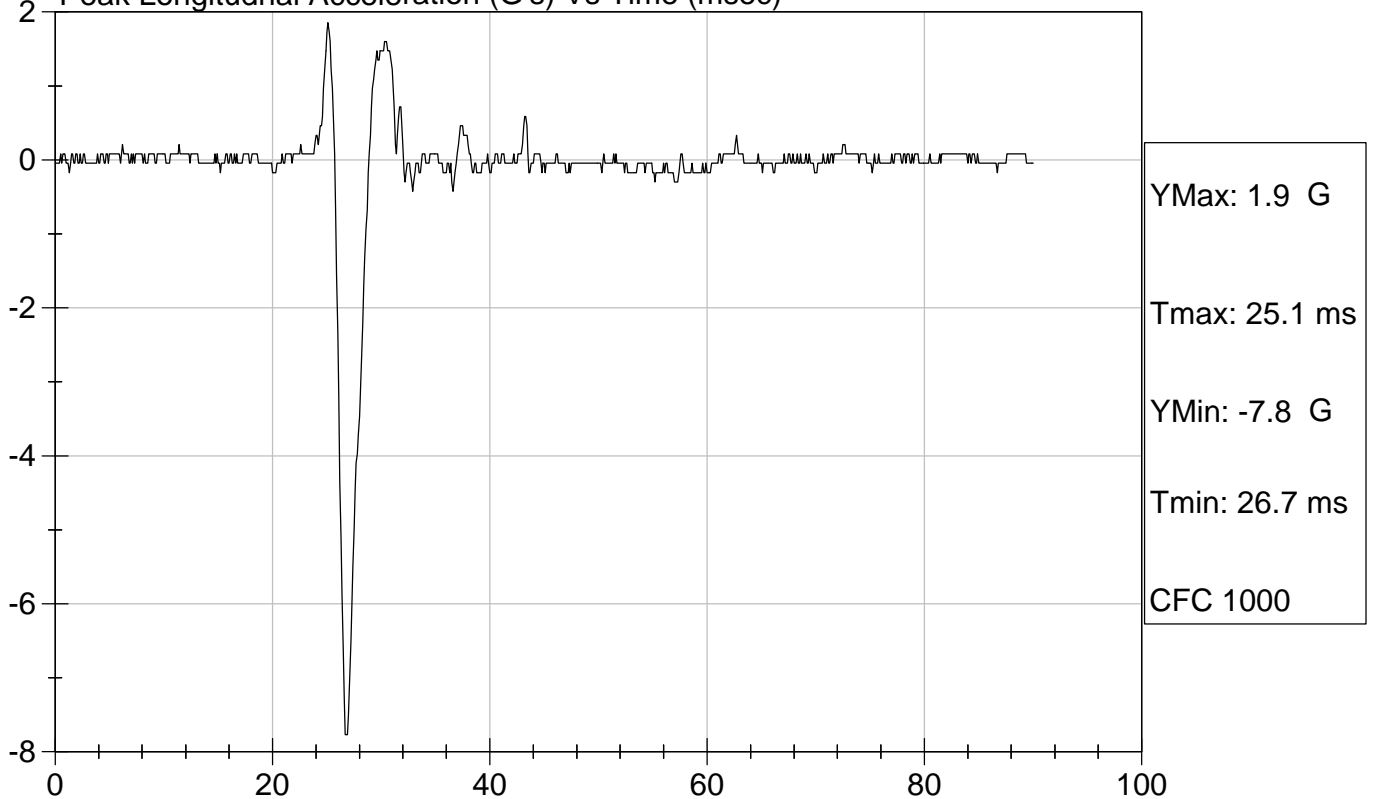
Component: D04101

Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudnal Acceleration (G's) Vs Time (msec)



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Thorax Impact Test**

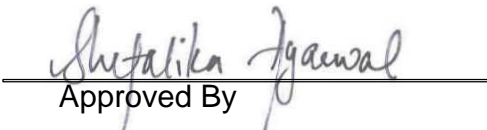
ATD Serial No: 904

Test I.D.: D04102

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Probe Velocity	m/s	4.27 - 4.33	4.29	Pass
Upper Rib	G's	37 - 46	41	Pass
Lower Rib	G's	37 - 46	41	Pass
Lower Spine	G's	15 - 22	19	Pass
Overall Test Results				Pass

  
Laboratory Technician

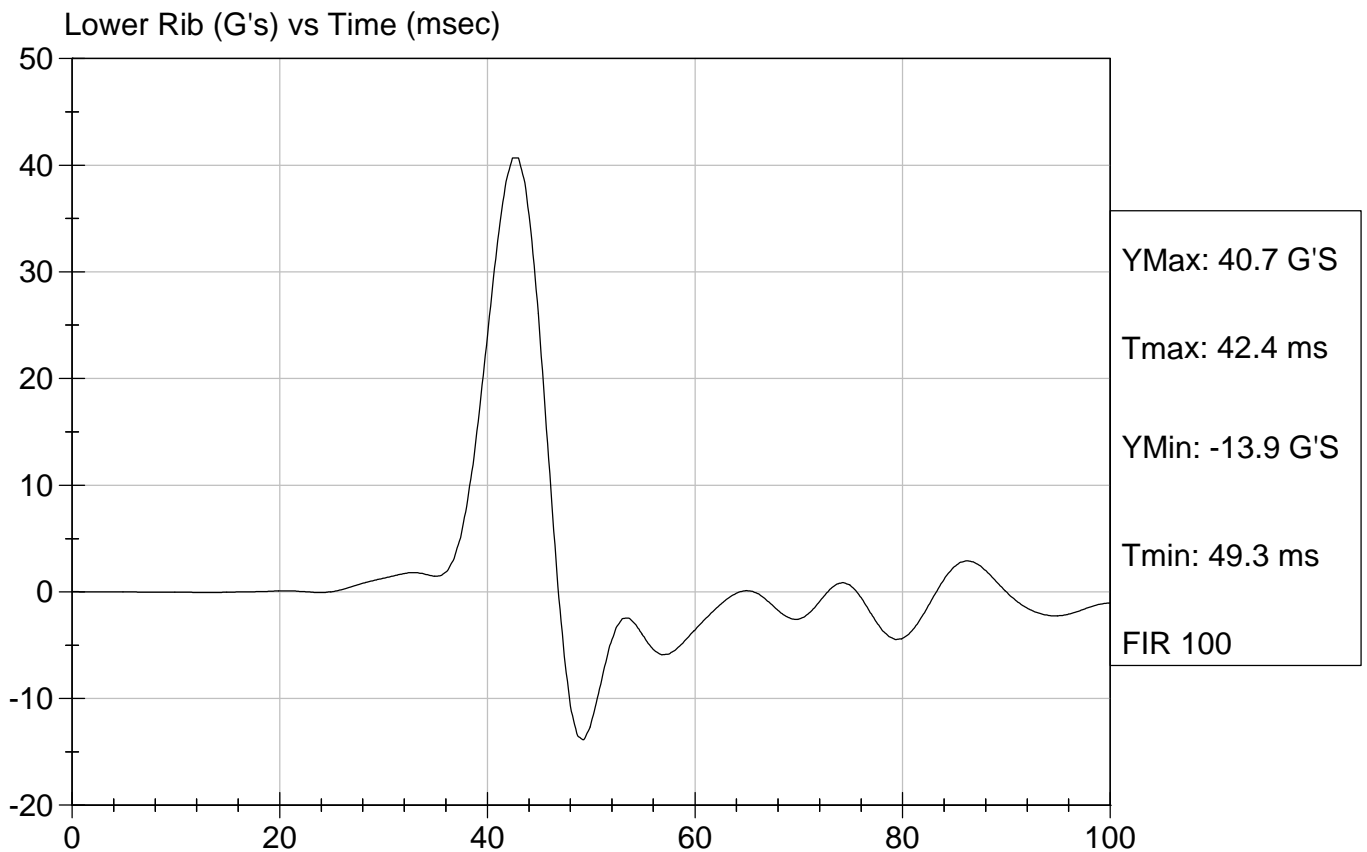
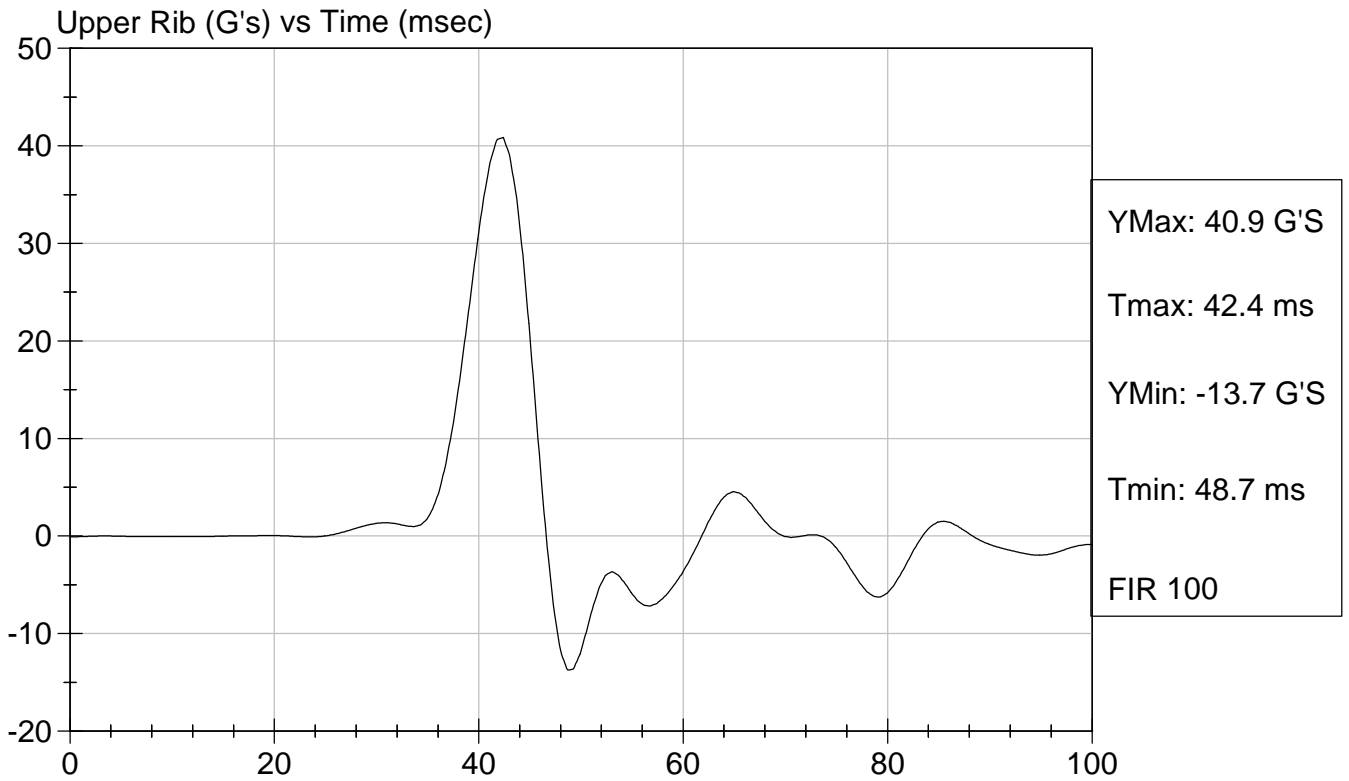
01/20/2004  
Test Date

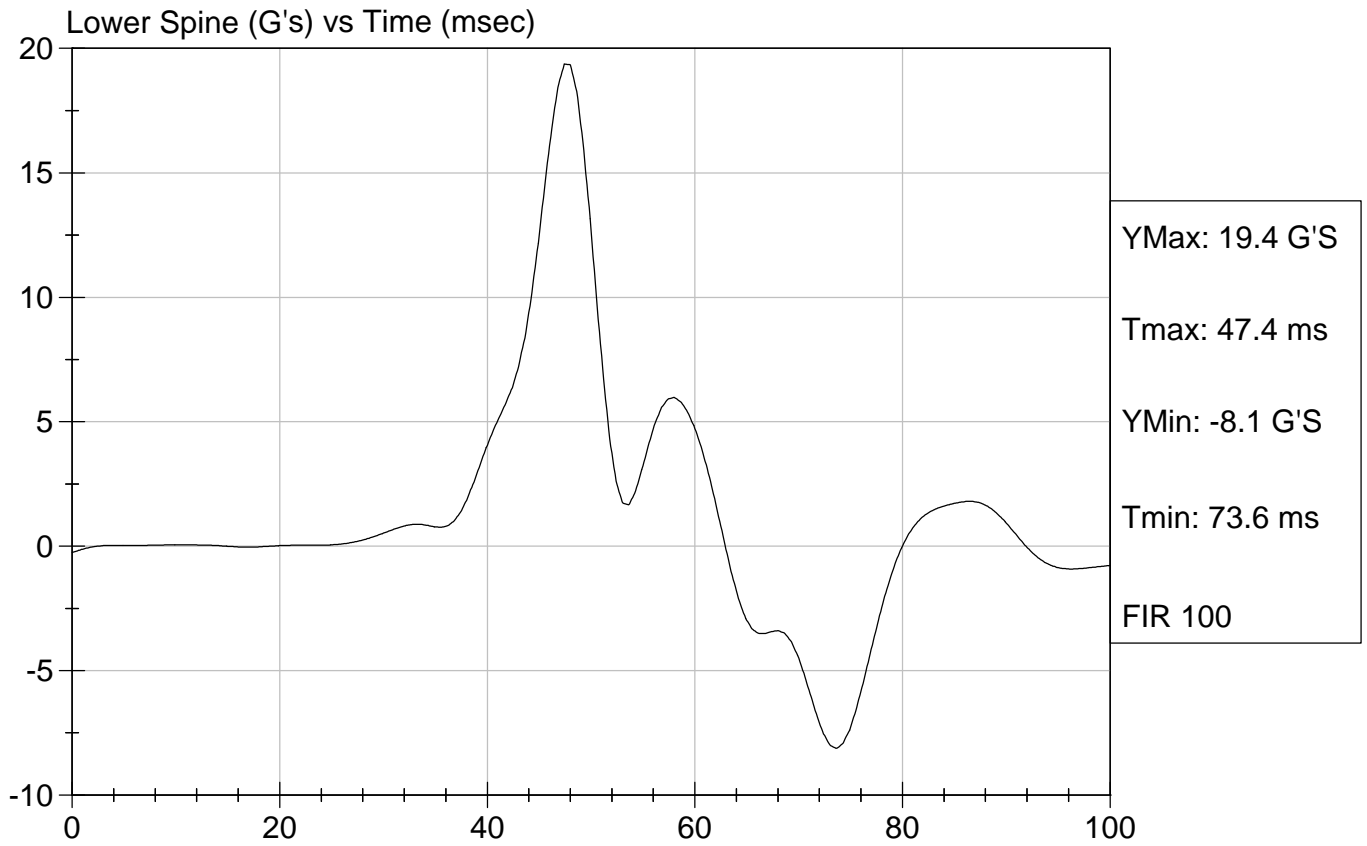
  
Approved By



Test Desc: Thorax Impact  
Component ID: D04102

Test Date: 01/20/2004  
Speed: 14.08 ft/sec, 4.29 m/sec





**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Pelvis Impact Test**

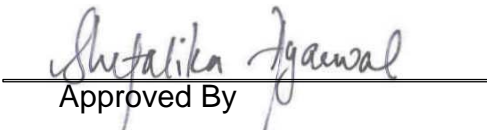
**ATD Serial No:** 904

**Test I.D.:** D04103

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Probe Velocity	m/s	4.27 - 4.33	4.29	Pass
Pelvis Acceleration	G's	40 - 60	45	Pass
Overall Test Results				Pass

  
Laboratory Technician

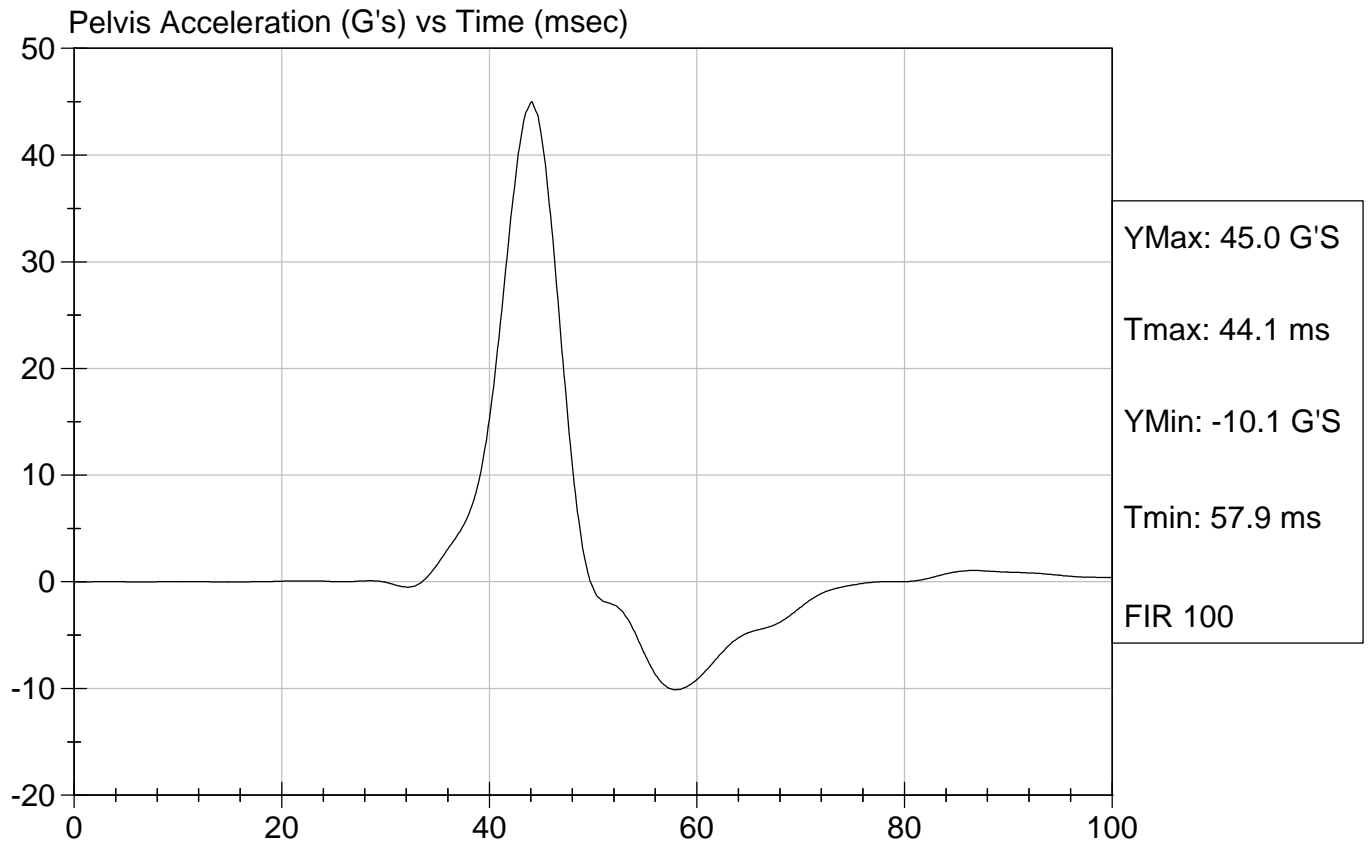
01/20/2004  
Test Date

  
Approved By



Test Desc: Pelvis Impact  
Component ID: D04103

Test Date: 01/20/2004  
Speed: 14.06 ft/sec, 4.29 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Abdominal Compression Calibration (Pre-Load = 10 lbs)**

ATD Serial No: 904

Test I.D.: D04104

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Force At 12.7 mm	N	104 -162	151	Pass
Force At 19 mm	N	163 - 222	207	Pass
Force At 25.4 mm	N	222 - 280	278	Pass
Force At 33 mm	N	325 - 391	379	Pass
Overall Test Results				Pass

Jessica Gall  
 Laboratory Technician

01/20/2004  
 Test Date

Shetalika Jauwal  
 Approved By



Test Description: Abdomen Compression Test Date: 01/20/2004

Component: D04104

Speed: 0 ft/sec, 0 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Lumbar Flexion Calibration**

ATD Serial No: 904

Test I.D.: D04105

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	109.2	Pass
Force At 30 deg	N	151.2 - 204.6	156.2	Pass
Force At 40 deg	N	204.6 - 258.0	250.4	Pass
Return Angle	Deg	12 Maximum	4	Pass
Overall Test Results				Pass

Jessica Gall  
 Laboratory Technician

01/20/2004  
 Test Date

Shetalika Jauwal  
 Approved By

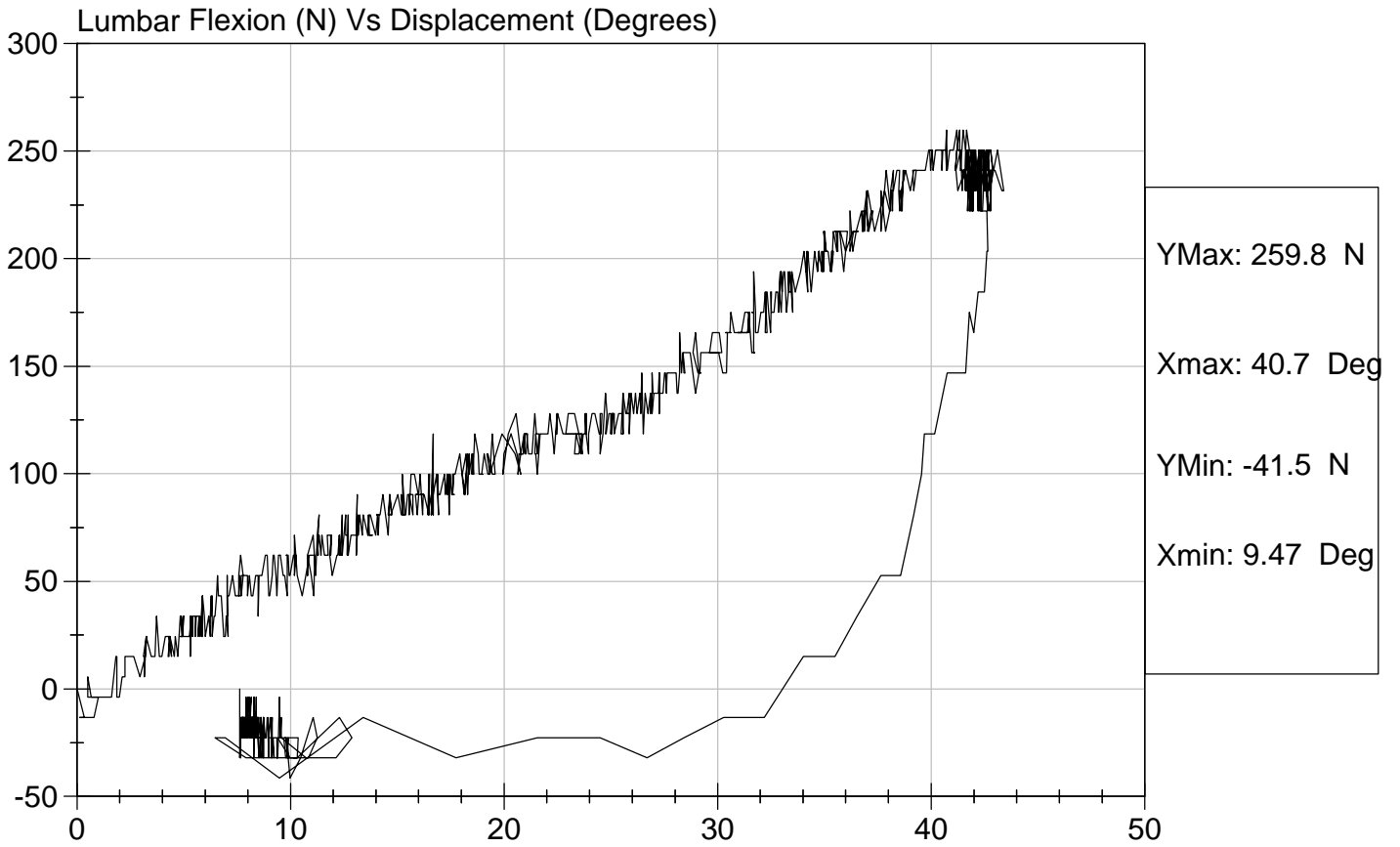


Test Description: Lumbar Flexion

Test Date: 01/20/2004

Component: D04105

Speed: 0 ft/sec, 0 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy (SID)**  
**Neck Pendulum Test**

ATD Serial No: 904

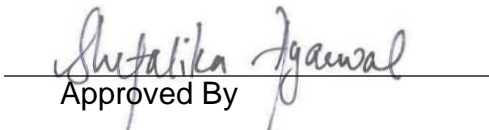
Test I.D: D04109

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	21	Pass	
Impact Velocity	m/s	6.89 to 7.13	6.99	Pass	
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.14	Pass
	20 msec	m/s	4.12 to 5.10	4.26	Pass
	30 msec	m/s	5.73 to 7.01	6.06	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.78	Pass
Midsaggital Plane Max Rotation	deg	66 to 82	67	Pass	
Head Rotation Peak to Zero - Decay Time	msec	58 to 67	59	Pass	
Max. Mx at Occipital Condyles	Nm	73 to 88	81	Pass	
Mx Peak To Zero - Decay Time	msec	49 to 64	53	Pass	
Mx Peak to Max. Head Rotation	msec	2 to 16	8	Pass	

  
 Laboratory Technician

01/20/2004

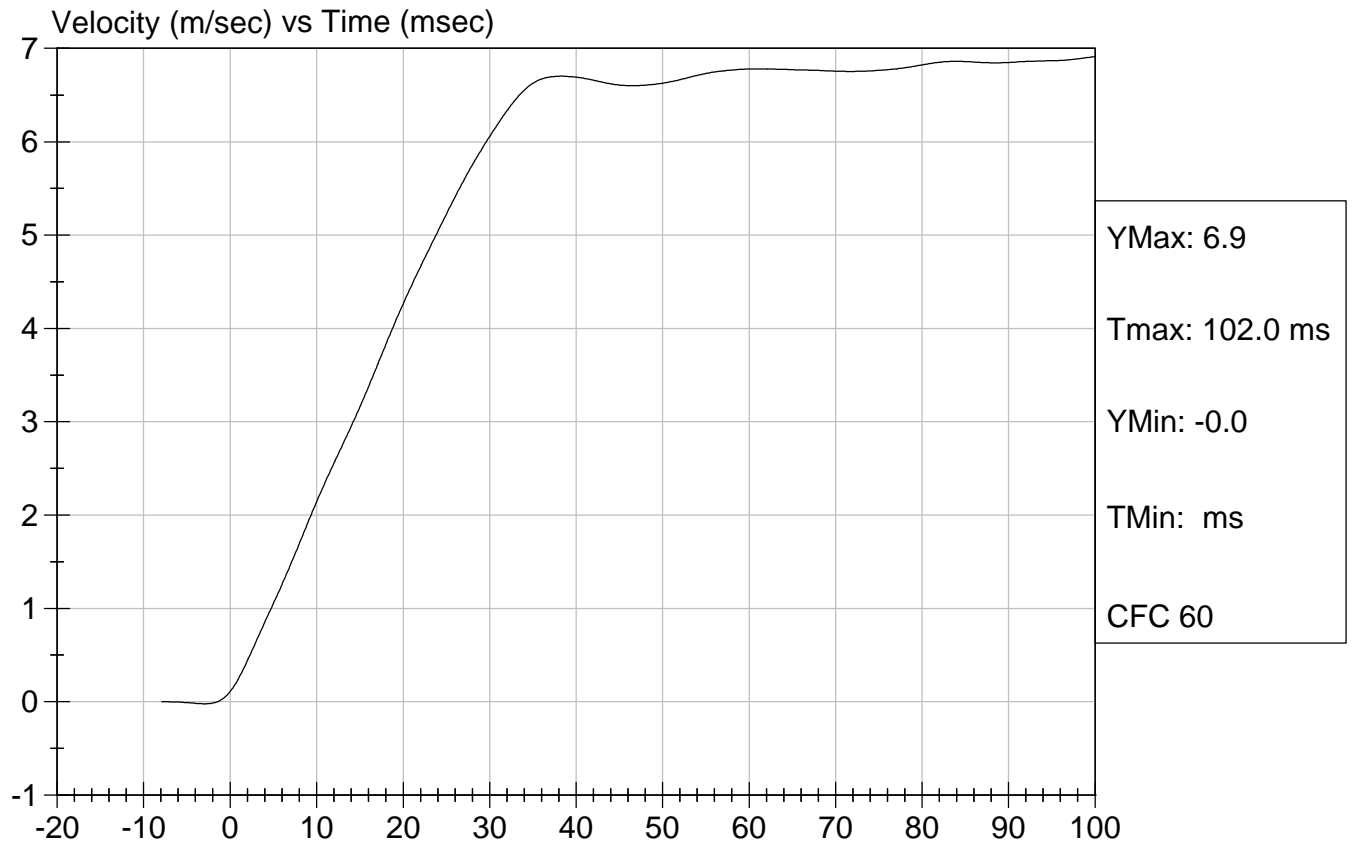
Test Date

  
 Approved By



Test Desc: Neck Bending  
Component ID: D04109

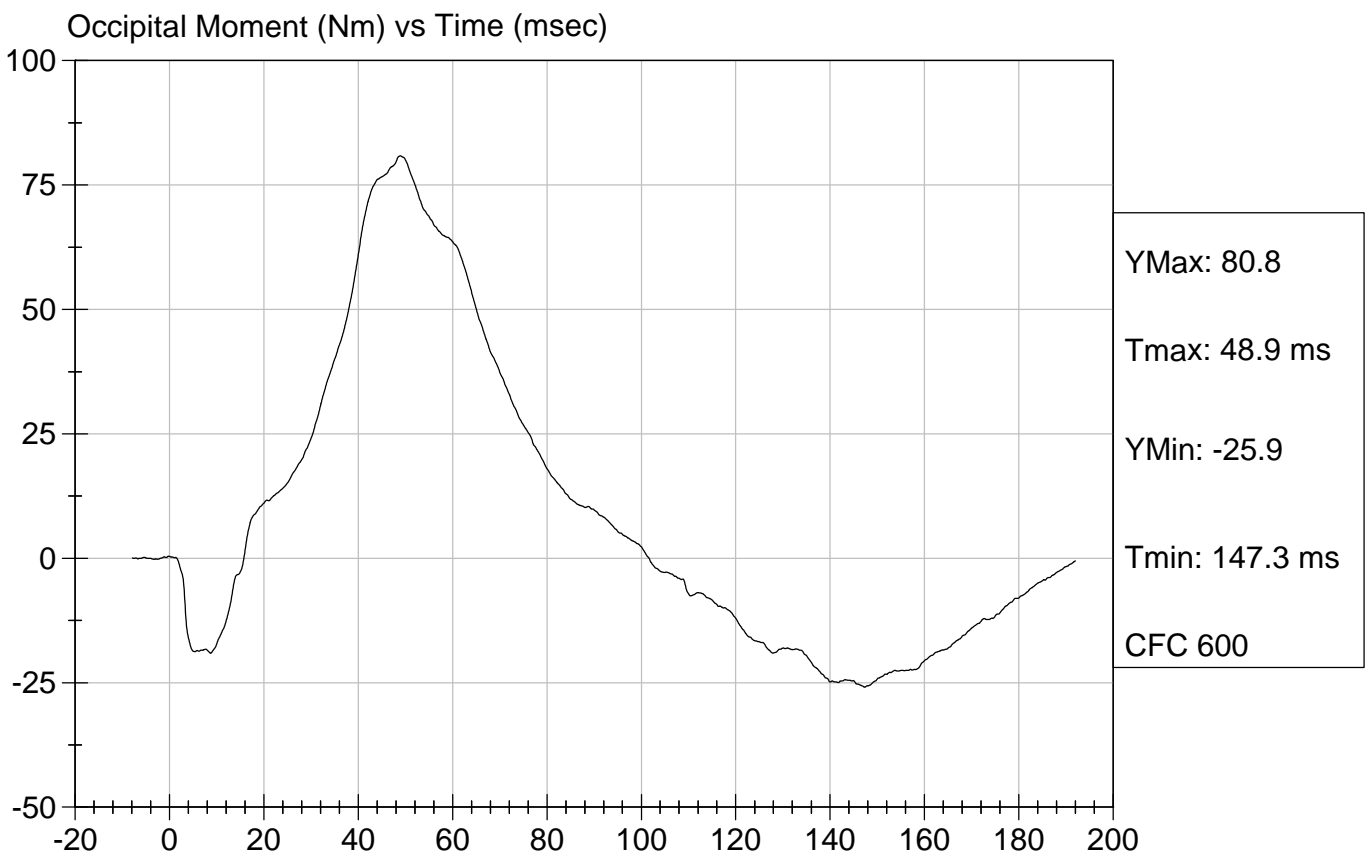
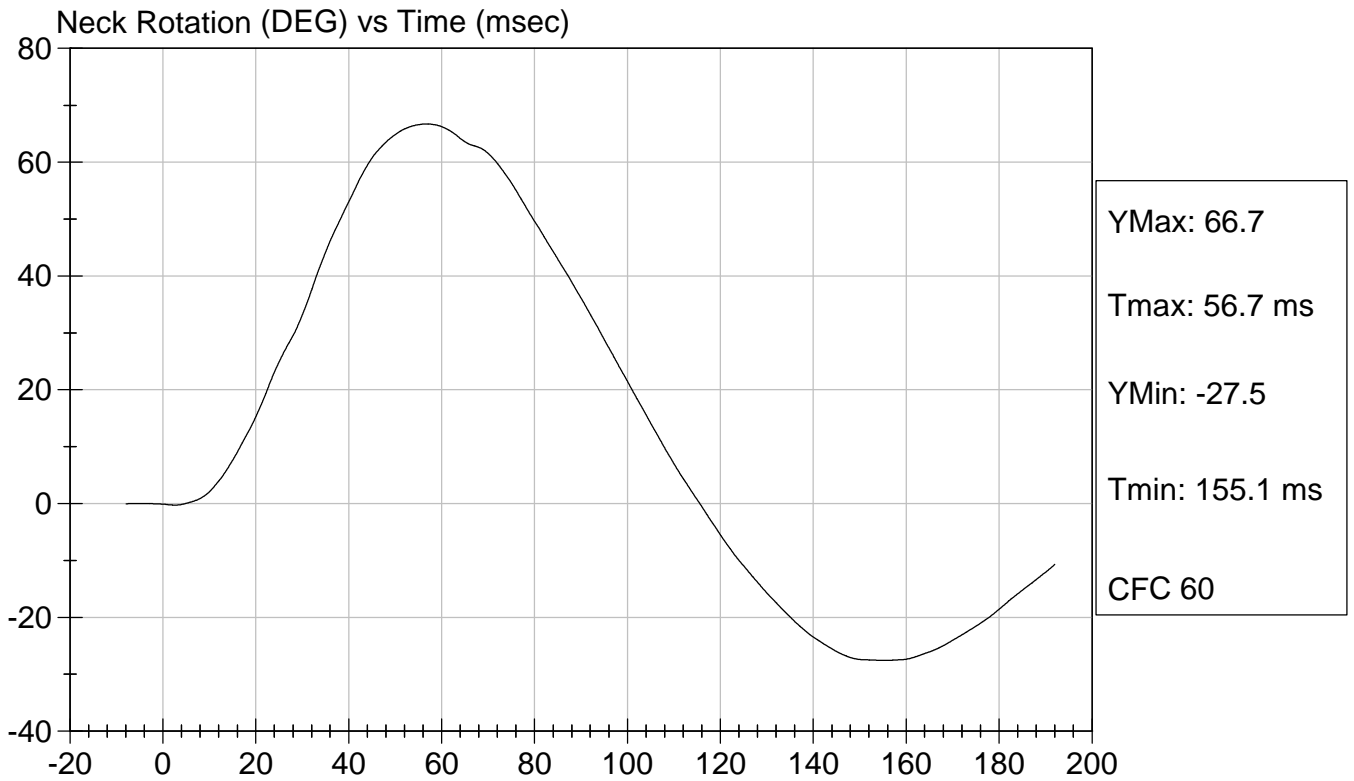
Test Date: 01/20/2004  
Speed: 22.92 ft/sec, 6.99 m/sec





Test Desc: Neck Bending  
Component ID: D04109

Test Date: 01/20/2004  
Speed: 22.92 ft/sec, 6.99 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Inspection Checklist**

**ATD Serial No:** 904

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Sternum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass

*Jessica Hall*  
 \_\_\_\_\_  
 Laboratory Technician

*Shefalika Jaiswal*  
 \_\_\_\_\_  
 Approved By

01/21/2004  
 \_\_\_\_\_  
 Test Date

CERTIFICATION DATA

Dummy Serial Number: 271

## Calibration Test Results Summary

Dummy Serial Number: 271

### Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**External Measurements**

**ATD Serial No:** 271

**Test I.D.:** D03204

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	905	Pass
RH - Rib Height	mm	501 - 521	502	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	239	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	526	Pass
SW - Knee Pivot to Floor	mm	490 - 505	497	Pass
HW - Hip Width	mm	356 - 391	371	Pass
<b>Overall Test Results</b>				Pass

*Jessica Gall*  
 Laboratory Technician

11/12/2003  
 Test Date

*Shetalika Jauwal*  
 Approved By

**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Head Drop Calibration (Lateral)**

ATD Serial No: 271

Test I.D.: D032041

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Peak Resultant Acceleration	G's	120 to 150	138	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-7	Pass
<b>Overall Test Results</b>				<b>Pass</b>

*Jessica Gall*  
 Laboratory Technician

12/11/2003  
 Test Date

*Shetalika Jauwal*  
 Approved By



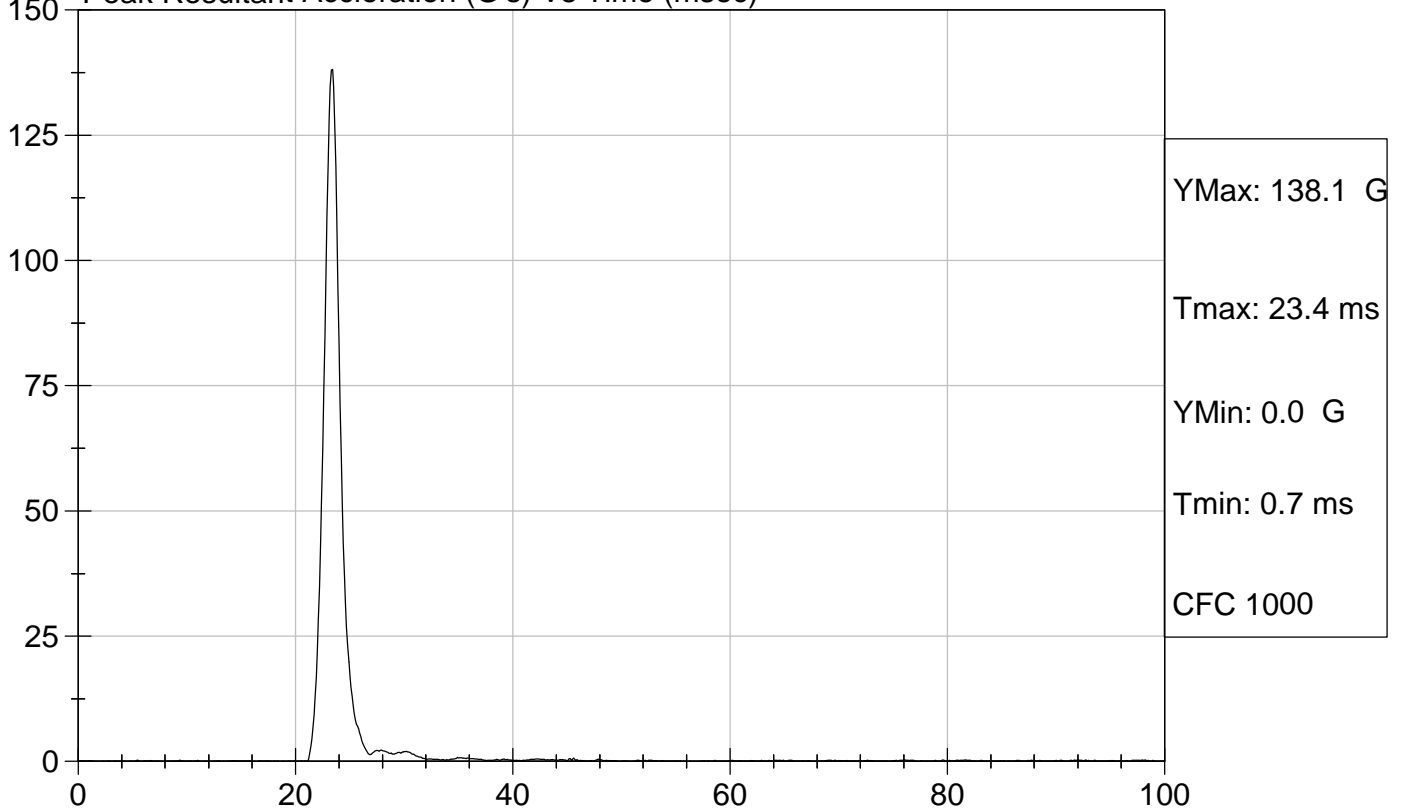
Test Description: Head Drop

Test Date: 12/11/2003

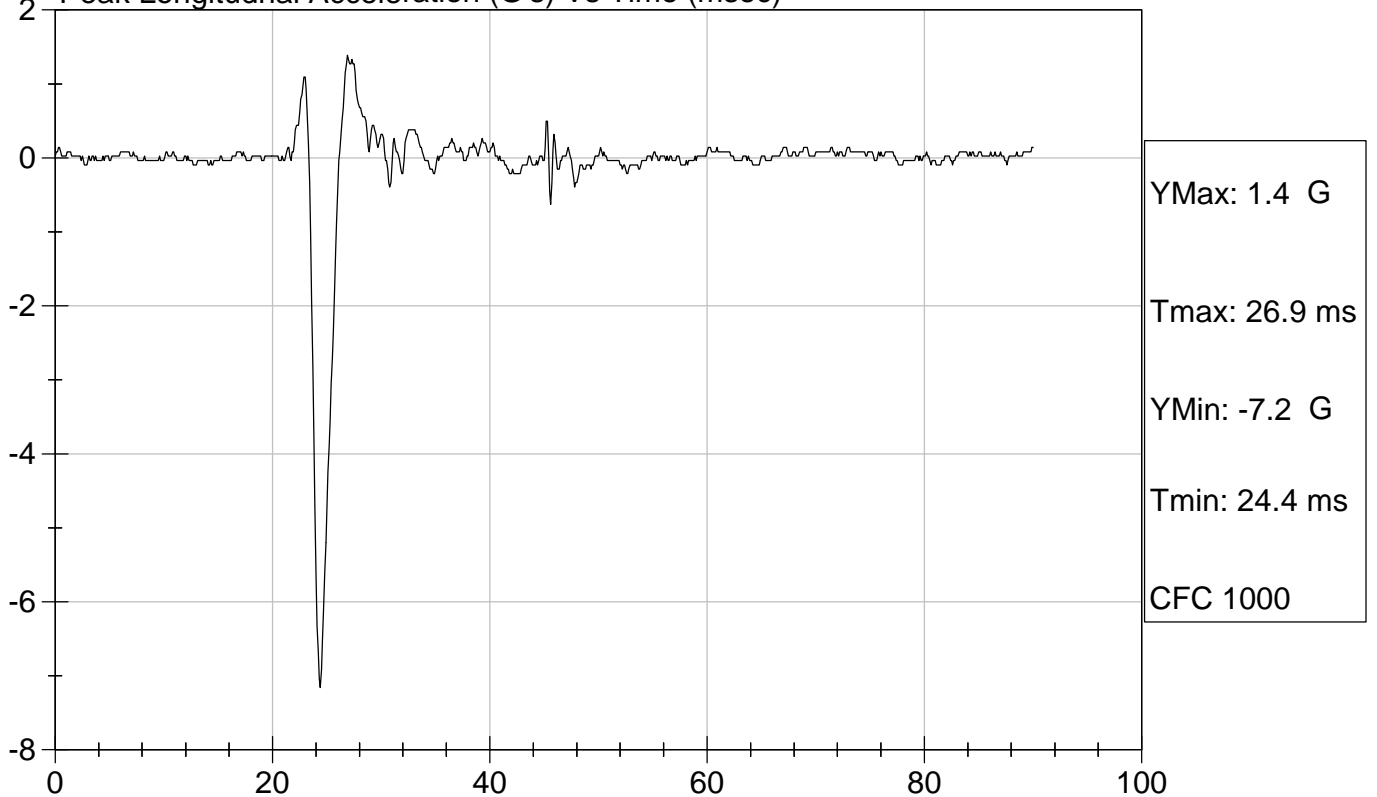
Component: D032041

Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudnal Acceleration (G's) Vs Time (msec)



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Thorax Impact Test**

ATD Serial No: 271

Test I.D.: D032042

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Upper Rib	G's	37 - 46	45	Pass
Lower Rib	G's	37 - 46	44	Pass
Lower Spine	G's	15 - 22	20	Pass
<b>Overall Test Results</b>				<b>Pass</b>

Jessica Gall  
 Laboratory Technician

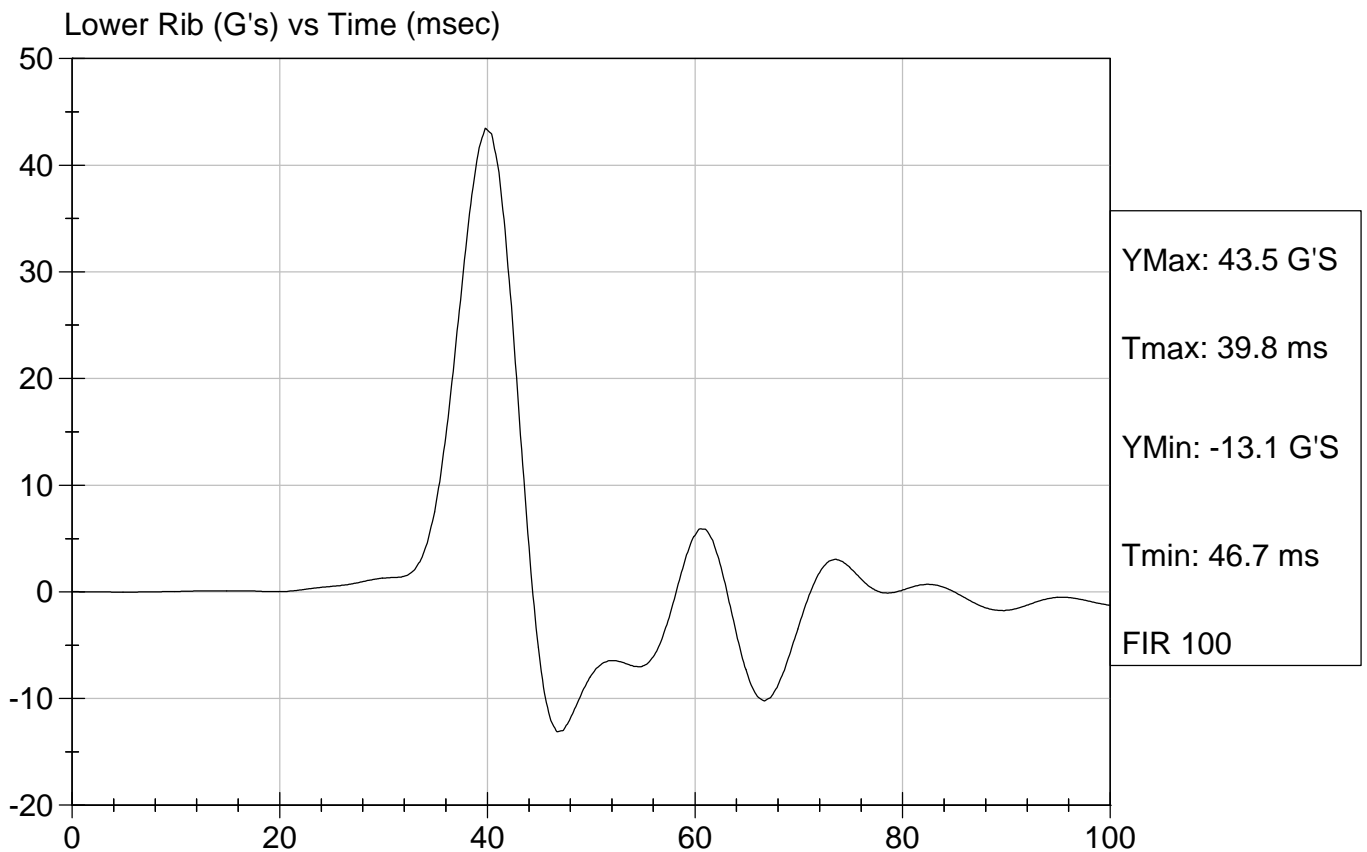
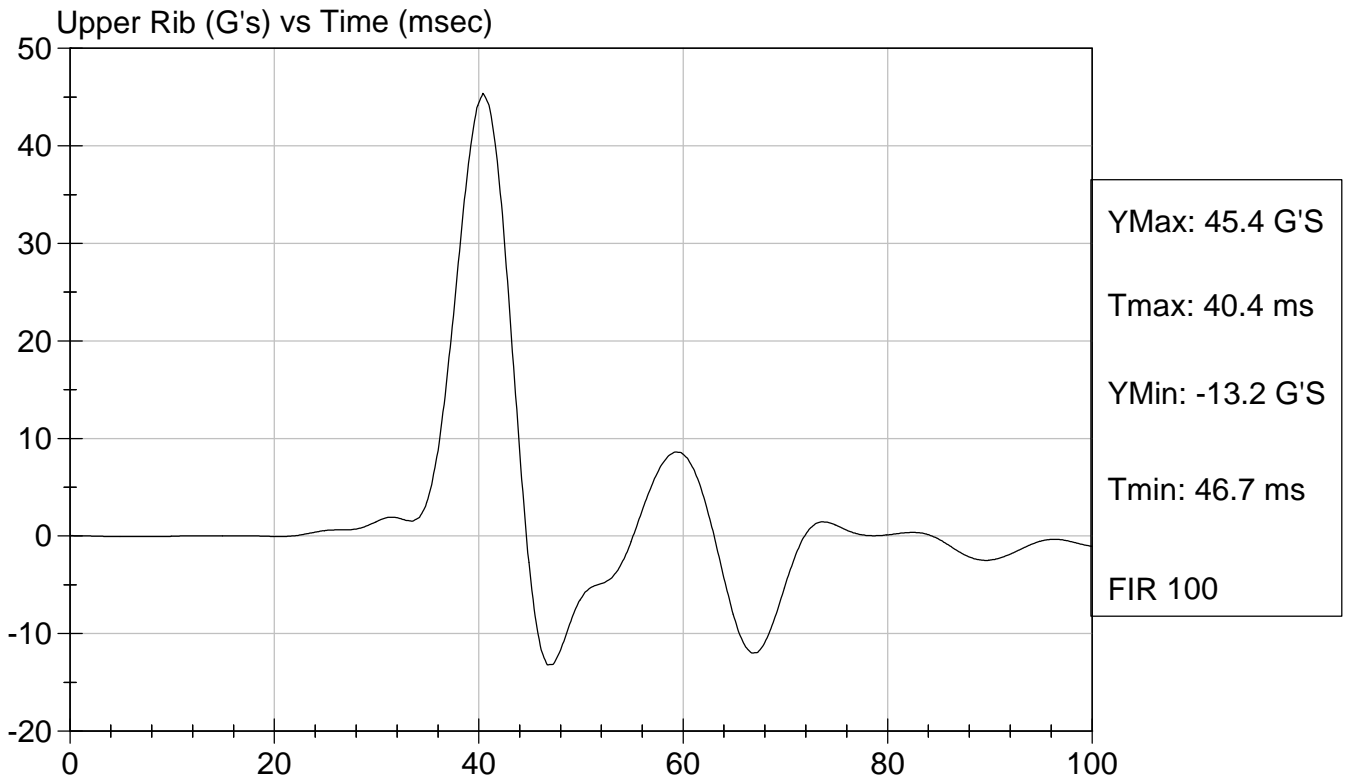
12/11/2003  
 Test Date

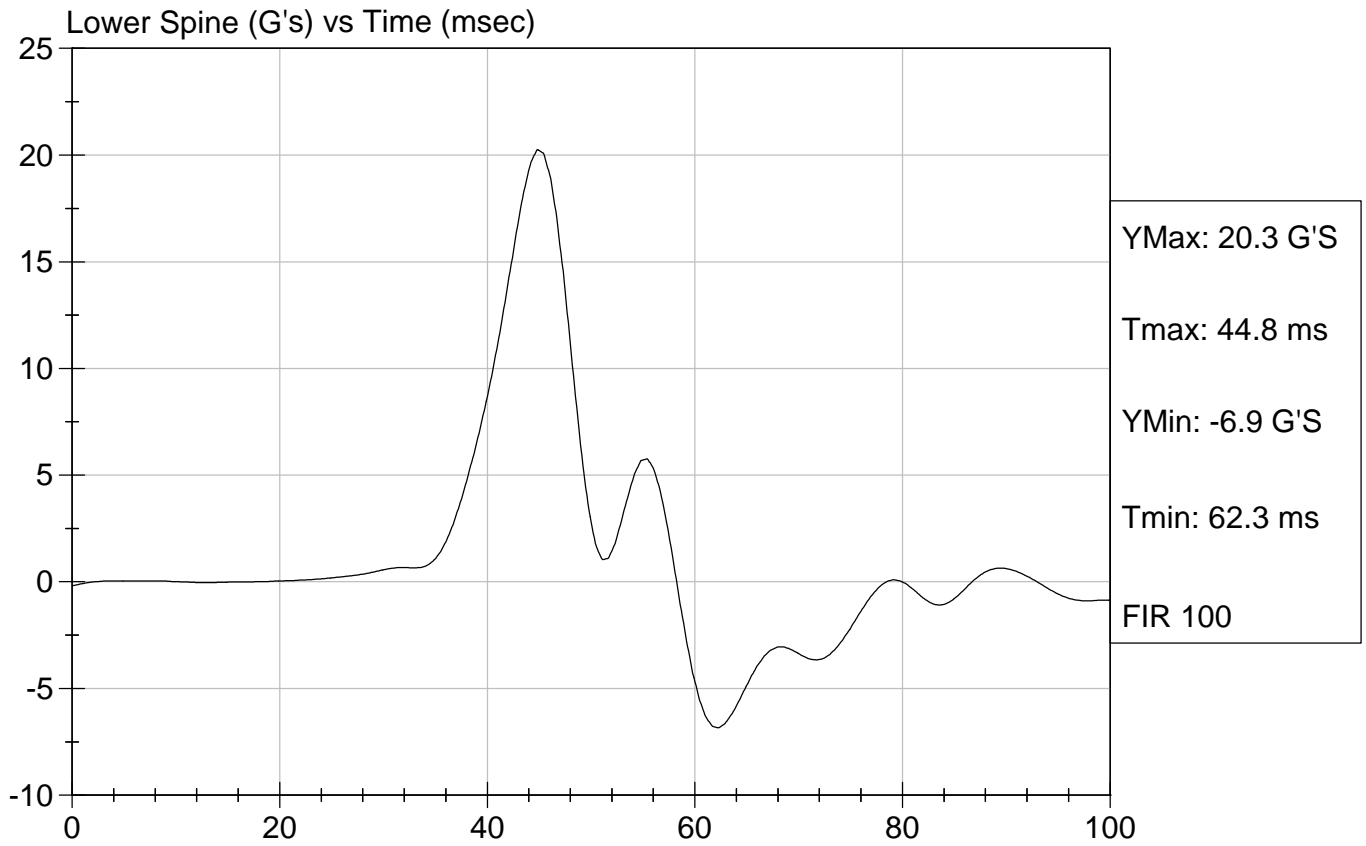
Shetalika Jauwal  
 Approved By



Test Desc: Thorax Impact  
Component ID: D032042

Test Date: 12/11/2003  
Speed: 14.11 ft/sec, 4.30 m/sec





**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Pelvis Impact Test**

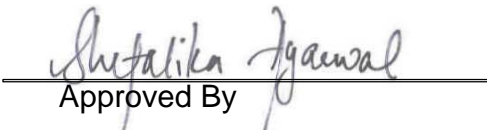
ATD Serial No: 271

Test I.D.: D032043

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	4.27 - 4.33	4.32	Pass
Pelvis Acceleration	G's	40 - 60	42	Pass
Overall Test Results				Pass

  
Laboratory Technician

12/11/2003  
Test Date

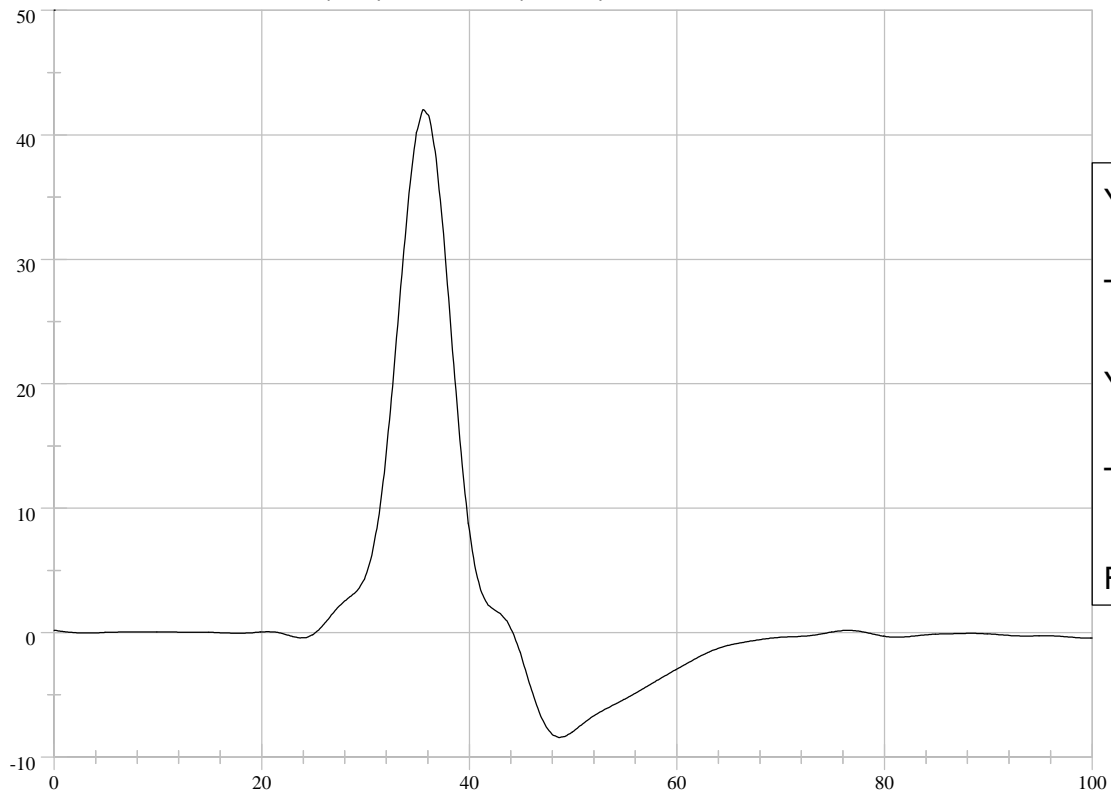
  
Approved By



Test Desc: Pelvis Impact  
Component ID: D032043

Test Date: 12/11/2003  
Speed: 14.18 ft/sec, 4.32 m/sec

Pelvis Acceleration (G's) vs Time (msec)



YMax: 42.0 G'S

Tmax: 35.5 ms

YMin: -8.4 G'S

Tmin: 48.7 ms

FIR 100

**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Abdominal Compression Calibration (Pre-Load = 10 lbs)**

ATD Serial No: 271

Test I.D.: D032044

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	19.6	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Force At 12.7 mm	N	104 -162	142	Pass
Force At 19 mm	N	163 - 222	195	Pass
Force At 25.4 mm	N	222 - 280	258	Pass
Force At 33 mm	N	325 - 391	347	Pass
Overall Test Results				Pass

Jessica Gall  
 Laboratory Technician

12/11/2003  
 Test Date

Shetalika Jauwal  
 Approved By



Test Description: Abdomen Compression Test Date: 12/11/2003

Component: D032044

Speed: 0 ft/sec, 0 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Lumbar Flexion Calibration**

ATD Serial No: 271

Test I.D.: D032045

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	35	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	114.9	Pass
Force At 30 deg	N	151.2 - 204.6	174.7	Pass
Force At 40 deg	N	204.6 - 258.0	234.4	Pass
Return Angle	Deg	12 Maximum	3	Pass
Overall Test Results				Pass

Jessica Gall  
 Laboratory Technician

12/10/2003  
 Test Date

Shetalika Jauwal  
 Approved By

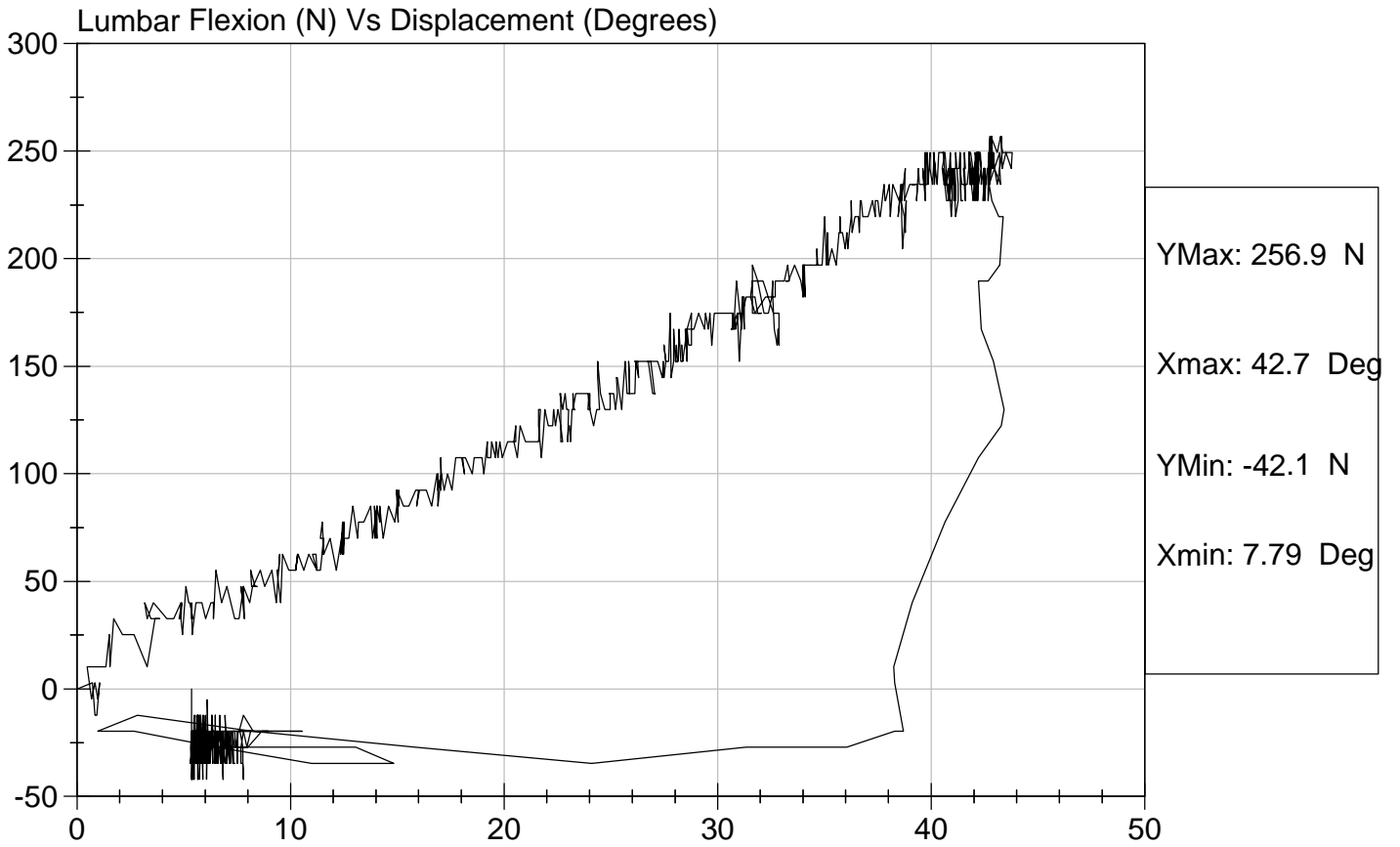


Test Description: Lumbar Flexion

Test Date: 12/10/2003

Component: D032045

Speed: 0 ft/sec, 0 m/sec




**SID Calibration Data Sheet**  
**Side Impact Dummy (SID)**  
**Neck Pendulum Test**

ATD Serial No: 271

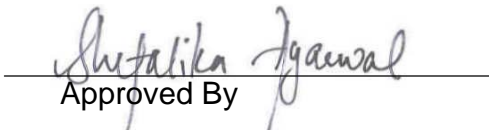
Test I.D: D032049

Tested Parameter	Units	Specification	Result	Pass/Fail	
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass	
Laboratory Relative Humidity	%	10 to 70	35	Pass	
Impact Velocity	m/s	6.89 to 7.13	7.10	Pass	
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.19	Pass
	20 msec	m/s	4.12 to 5.10	4.45	Pass
	30 msec	m/s	5.73 to 7.01	6.30	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.18	Pass
Midsaggital Plane Max Rotation	deg	66 to 82	72	Pass	
Head Rotation Peak to Zero - Decay Time	msec	58 to 67	61	Pass	
Max. Mx at Occipital Condyles	Nm	73 to 88	79	Pass	
Mx Peak To Zero - Decay Time	msec	49 to 64	55	Pass	
Mx Peak to Max. Head Rotation	msec	2 to 16	11	Pass	

  
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12/10/2003

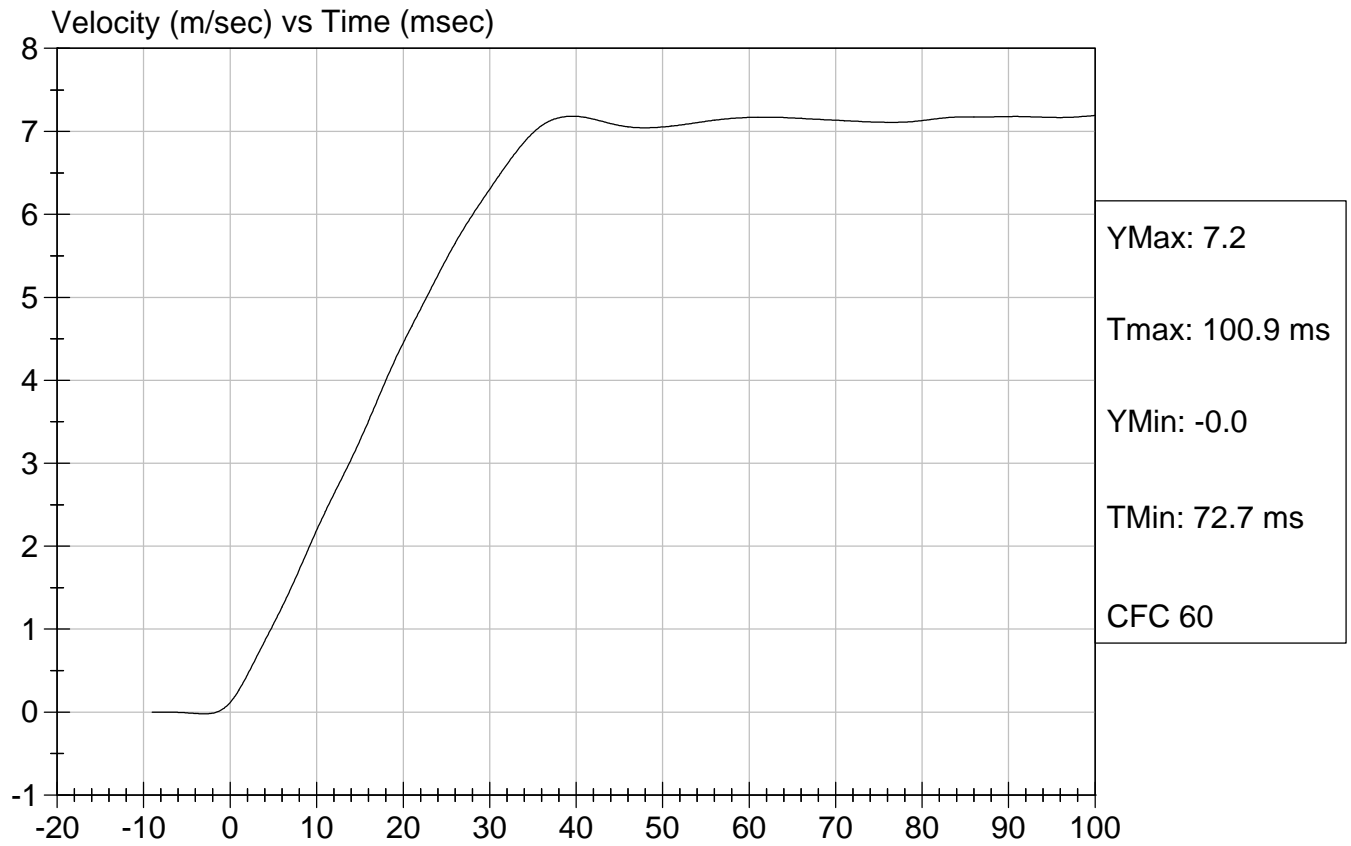
Test Date

  
 Approved By



Test Desc: Neck Bending  
Component ID: D032049

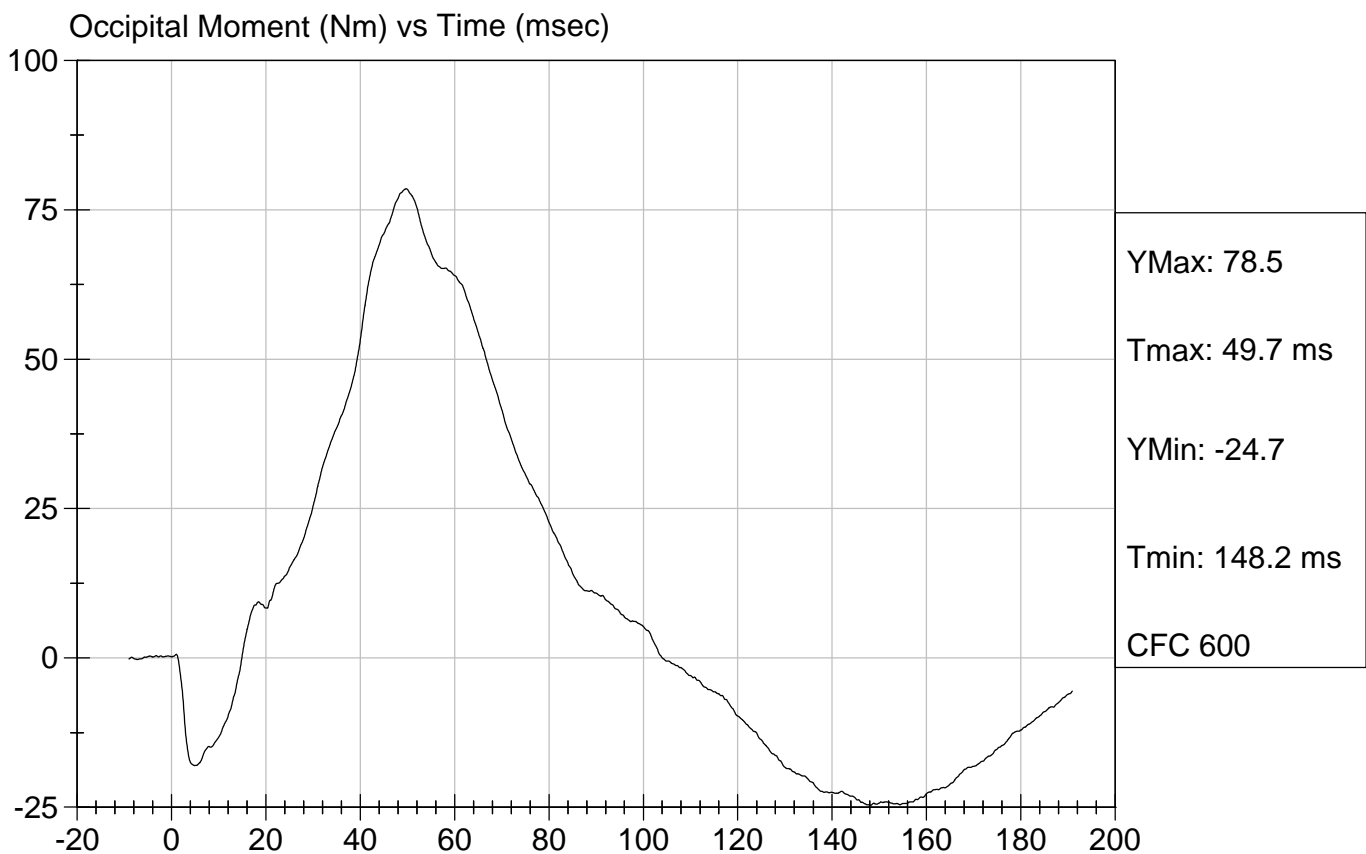
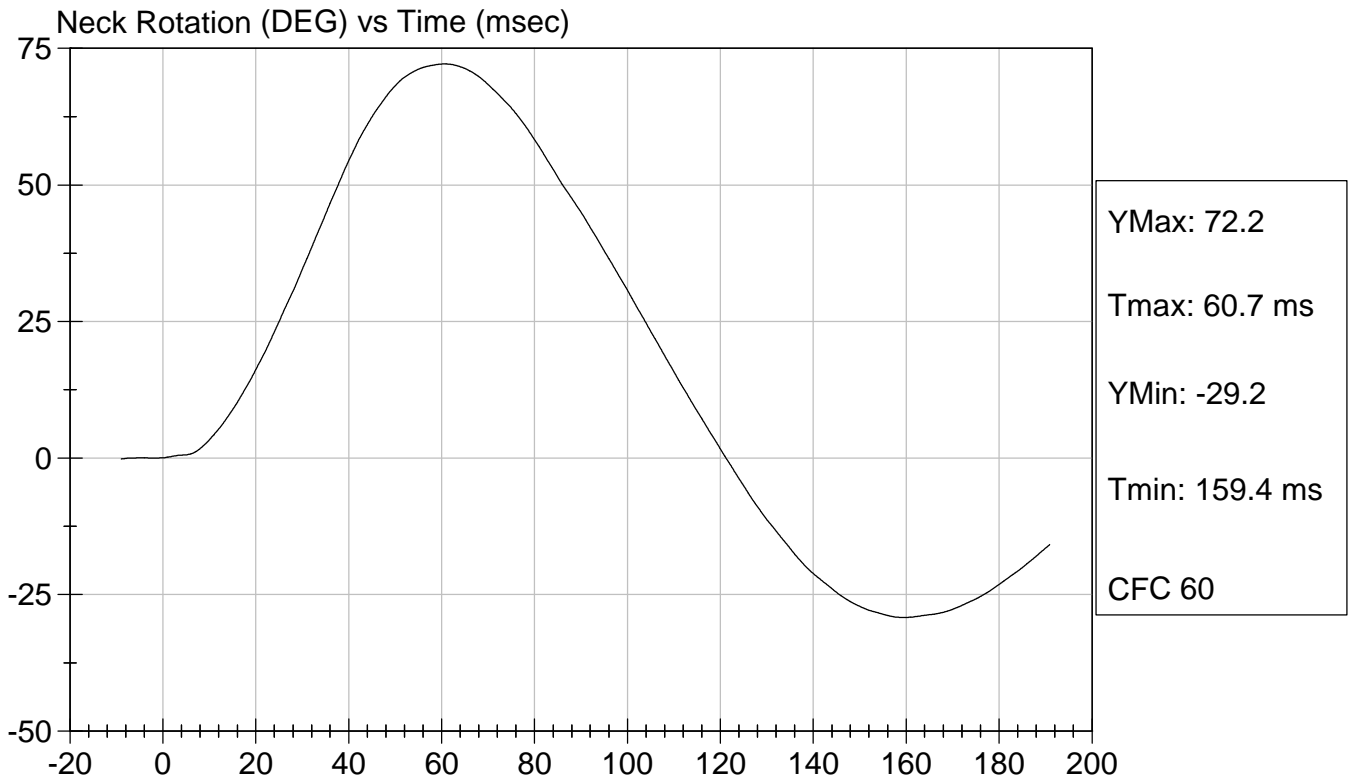
Test Date: 12/10/2003  
Speed: 23.31 ft/sec, 7.10 m/sec





Test Desc: Neck Bending  
Component ID: D032049

Test Date: 12/10/2003  
Speed: 23.31 ft/sec, 7.10 m/sec



## Calibration Test Results Summary

Dummy Serial Number: 271

### Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Head Drop Calibration (Lateral)**

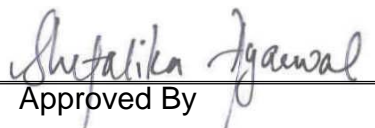
**ATD Serial No:** 271

**Test I.D.:** D04091

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Peak Resultant Acceleration	G's	120 to 150	138	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-11	Pass
<b>Overall Test Results</b>				<b>Pass</b>

  
 \_\_\_\_\_  
 Laboratory Technician

01/20/2004  
 Test Date

  
 \_\_\_\_\_  
 Approved By



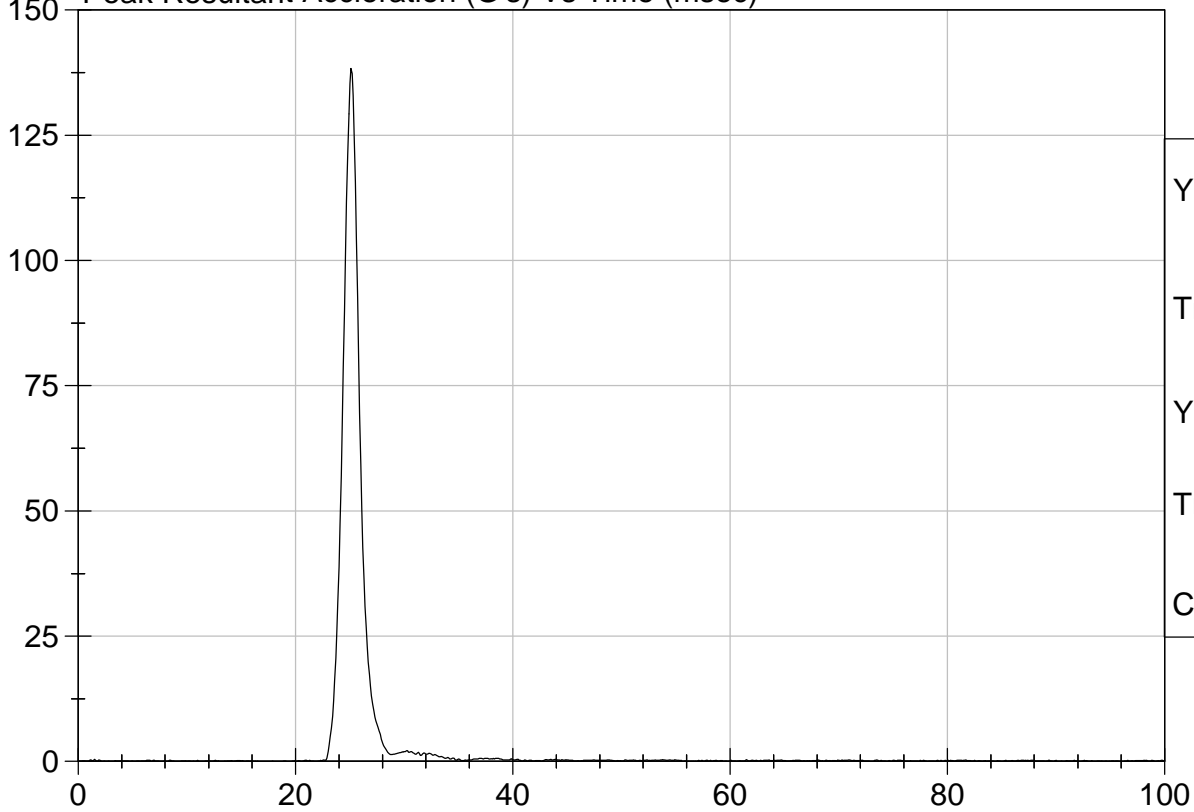
Test Description: Head Drop

Test Date: 01/20/2004

Component: D04091

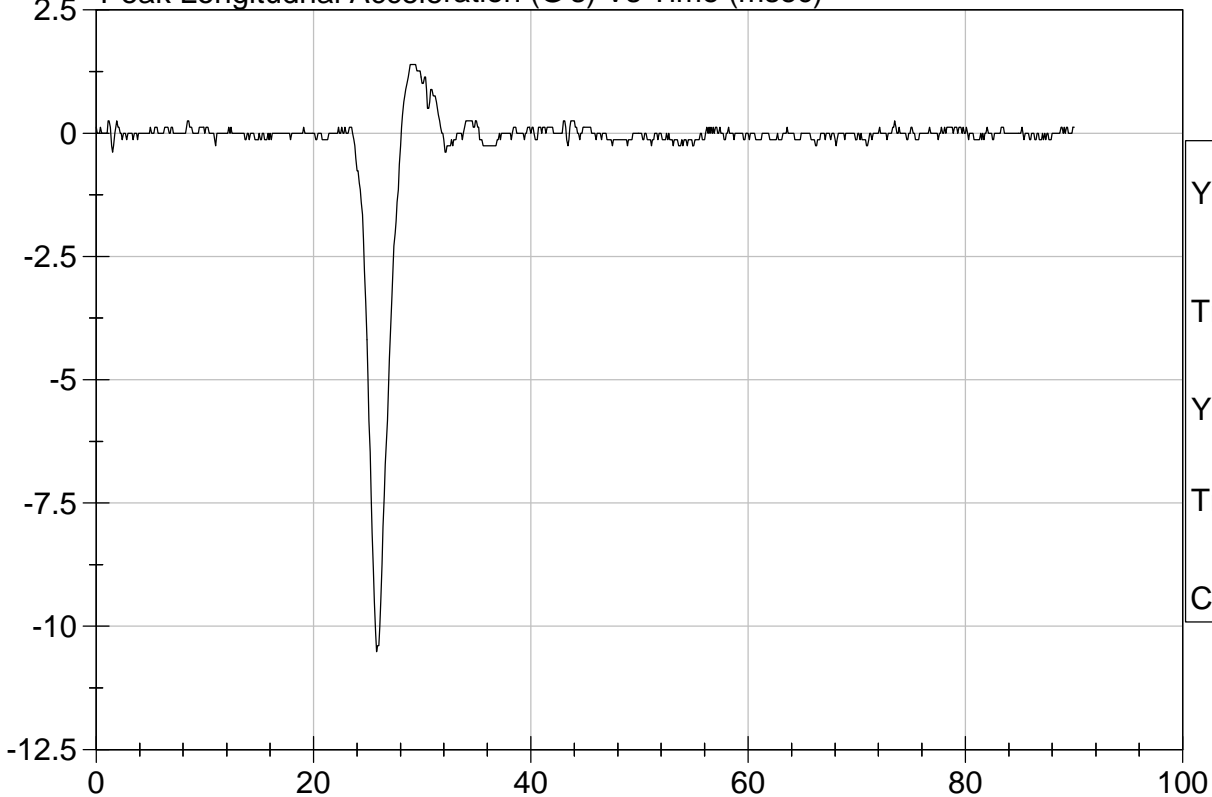
Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



YMax: 138.3 G  
Tmax: 25.1 ms  
YMin: 0.1 G  
Tmin: 0.9 ms  
CFC 1000

Peak Longitudnal Acceleration (G's) Vs Time (msec)



YMax: 1.4 G  
Tmax: 28.9 ms  
YMin: -10.5 G  
Tmin: 25.8 ms  
CFC 1000

**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Thorax Impact Test**

ATD Serial No: 271

Test I.D.: D04092

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	4.27 - 4.33	4.27	Pass
Upper Rib	G's	37 - 46	45	Pass
Lower Rib	G's	37 - 46	46	Pass
Lower Spine	G's	15 - 22	21	Pass
<b>Overall Test Results</b>				<b>Pass</b>

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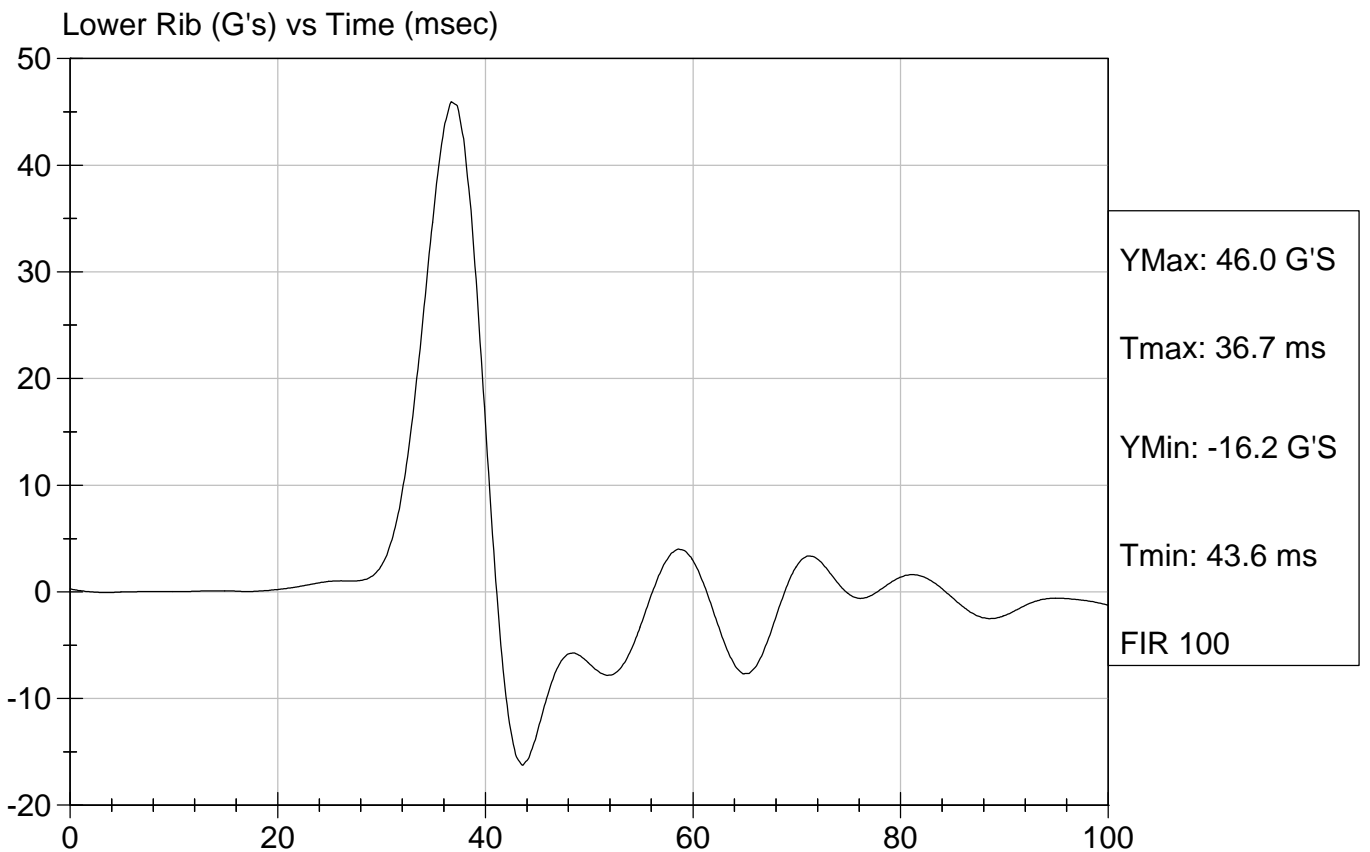
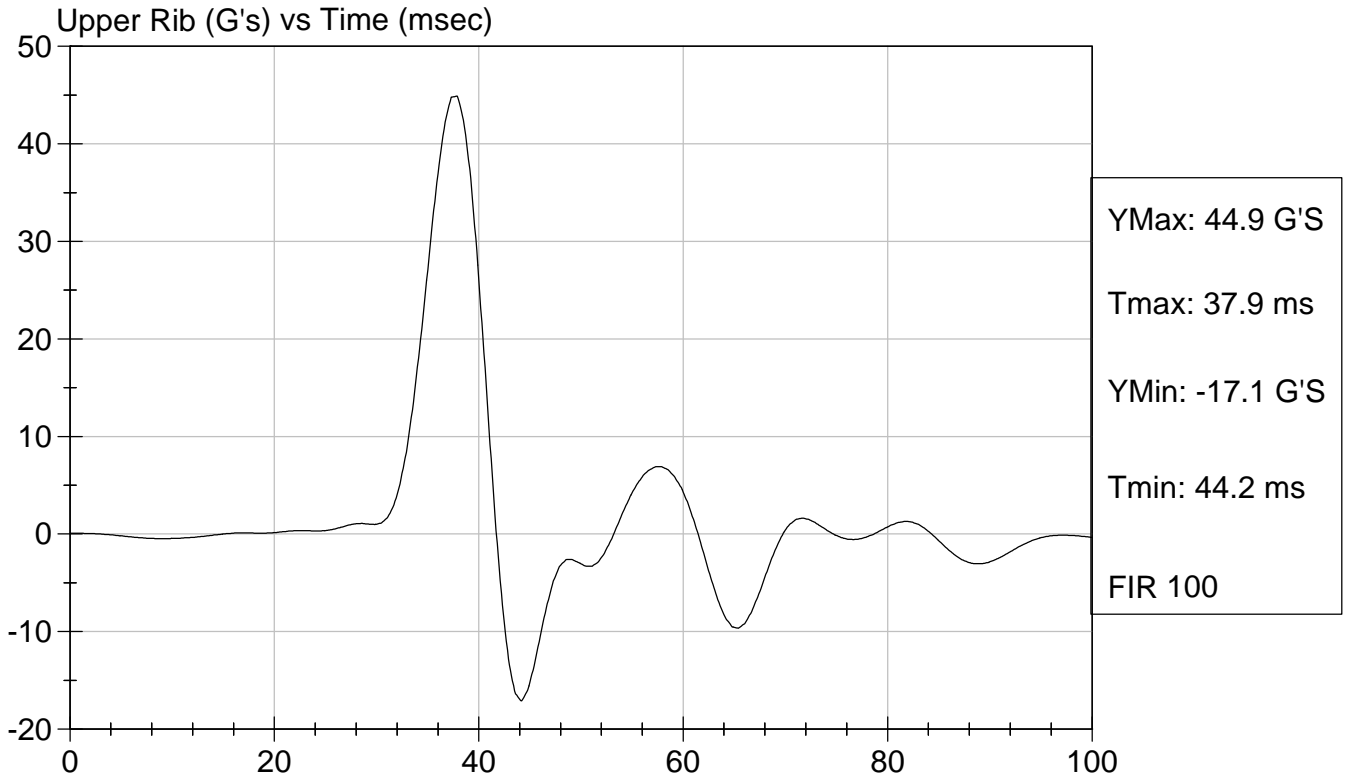
01/20/2004  
 Test Date

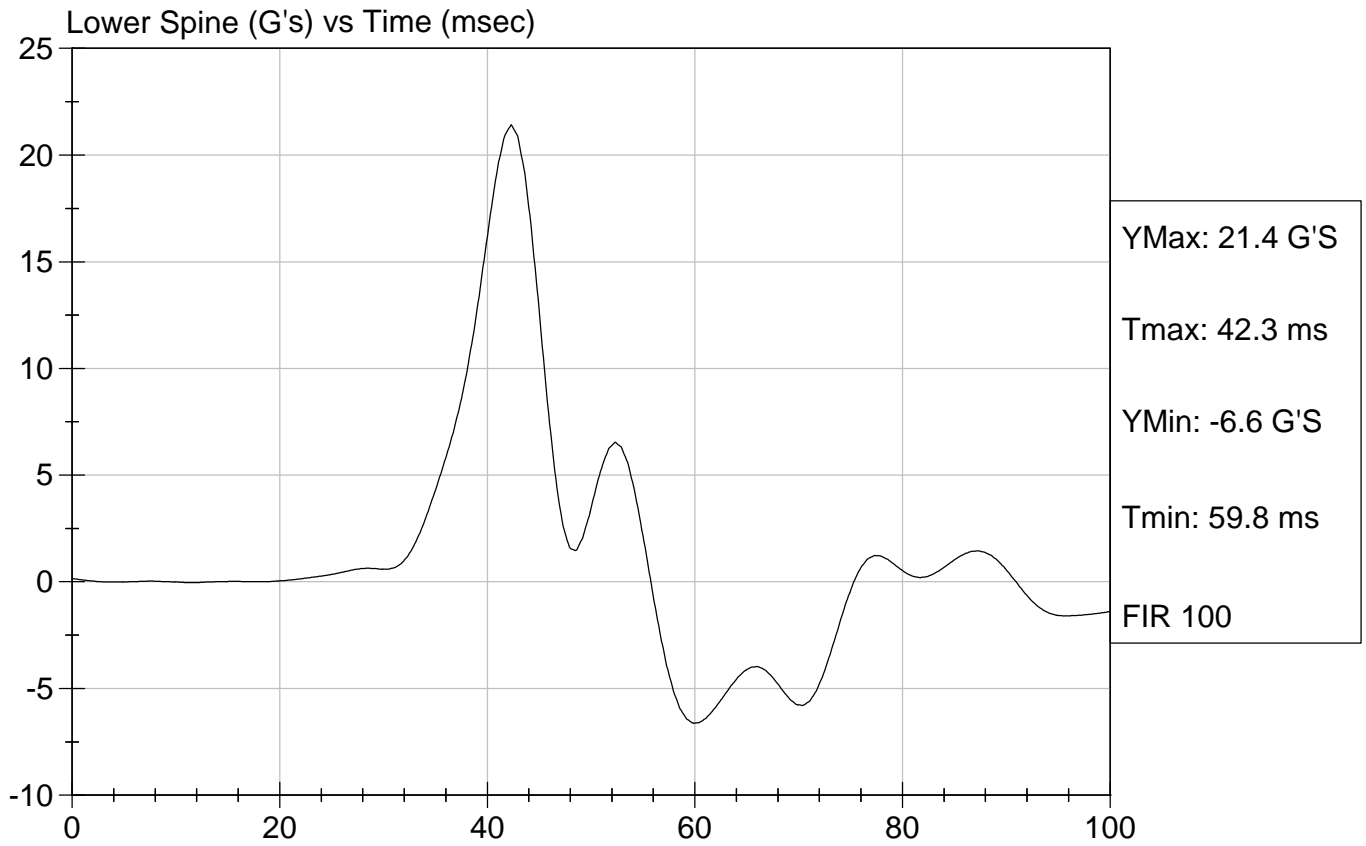
Shetalika Jauwal  
 Approved By



Test Desc: Thorax Impact  
Component ID: D04092

Test Date: 01/20/2004  
Speed: 14.02 ft/sec, 4.27 m/sec





**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Pelvis Impact Test**

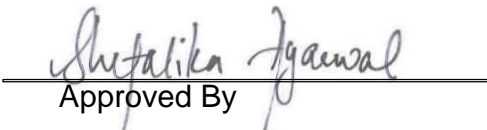
ATD Serial No: 271

Test I.D.: D04093

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	4.27 - 4.33	4.33	Pass
Pelvis Acceleration	G's	40 - 60	49	Pass
Overall Test Results				Pass

  
Laboratory Technician

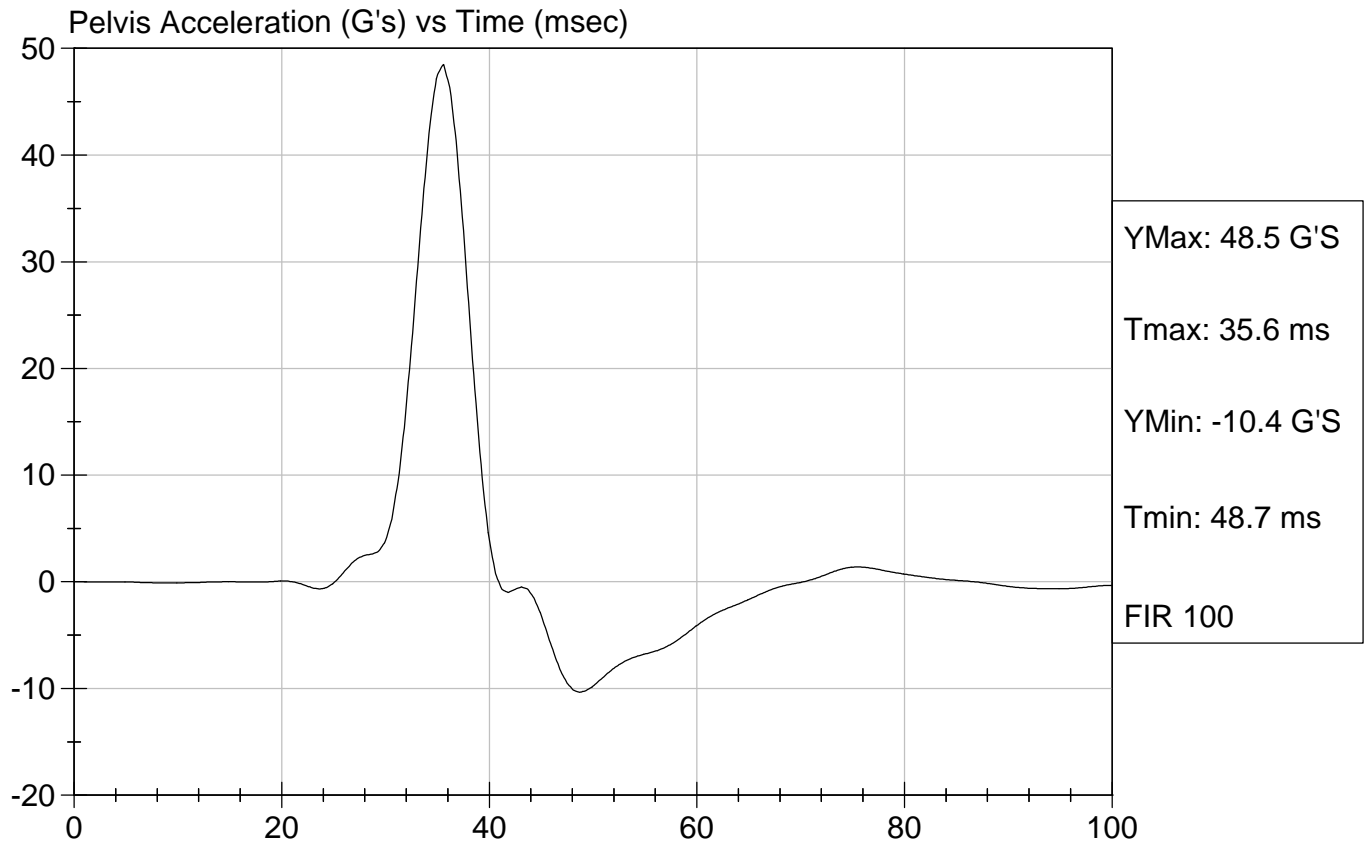
01/20/2004  
Test Date

  
Approved By



Test Desc: Pelvis Impact  
Component ID: D04093

Test Date: 01/20/2004  
Speed: 14.21 ft/sec, 4.33 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Abdominal Compression Calibration (Pre-Load = 10 lbs)**

ATD Serial No: 271

Test I.D.: D04094

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Force At 12.7 mm	N	104 -162	142	Pass
Force At 19 mm	N	163 - 222	197	Pass
Force At 25.4 mm	N	222 - 280	261	Pass
Force At 33 mm	N	325 - 391	363	Pass
Overall Test Results				Pass

Jessica Gall  
 Laboratory Technician

01/20/2004  
 Test Date

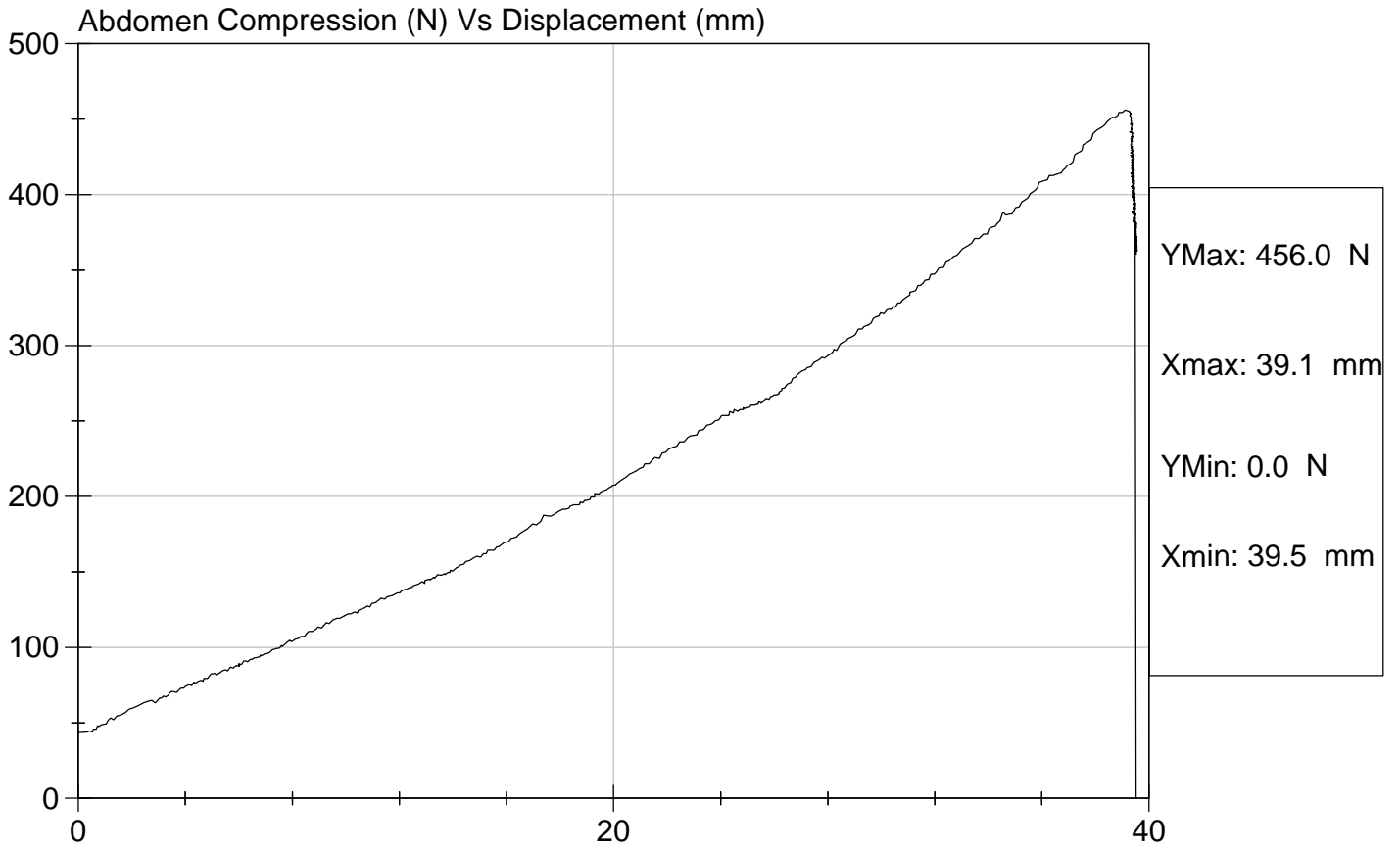
Shetalika Jauwal  
 Approved By



Test Description: Abdomen Compression Test Date: 01/20/2004

Component: D04094

Speed: 0 ft/sec, 0 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Lumbar Flexion Calibration**

ATD Serial No: 271

Test I.D.: D04095

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	138.6	Pass
Force At 30 deg	N	151.2 - 204.6	195.1	Pass
Force At 40 deg	N	204.6 - 258.0	251.6	Pass
Return Angle	Deg	12 Maximum	2	Pass
Overall Test Results				Pass

Jessica Gall  
 Laboratory Technician

01/20/2004  
 Test Date

Shetalika Jauwal  
 Approved By

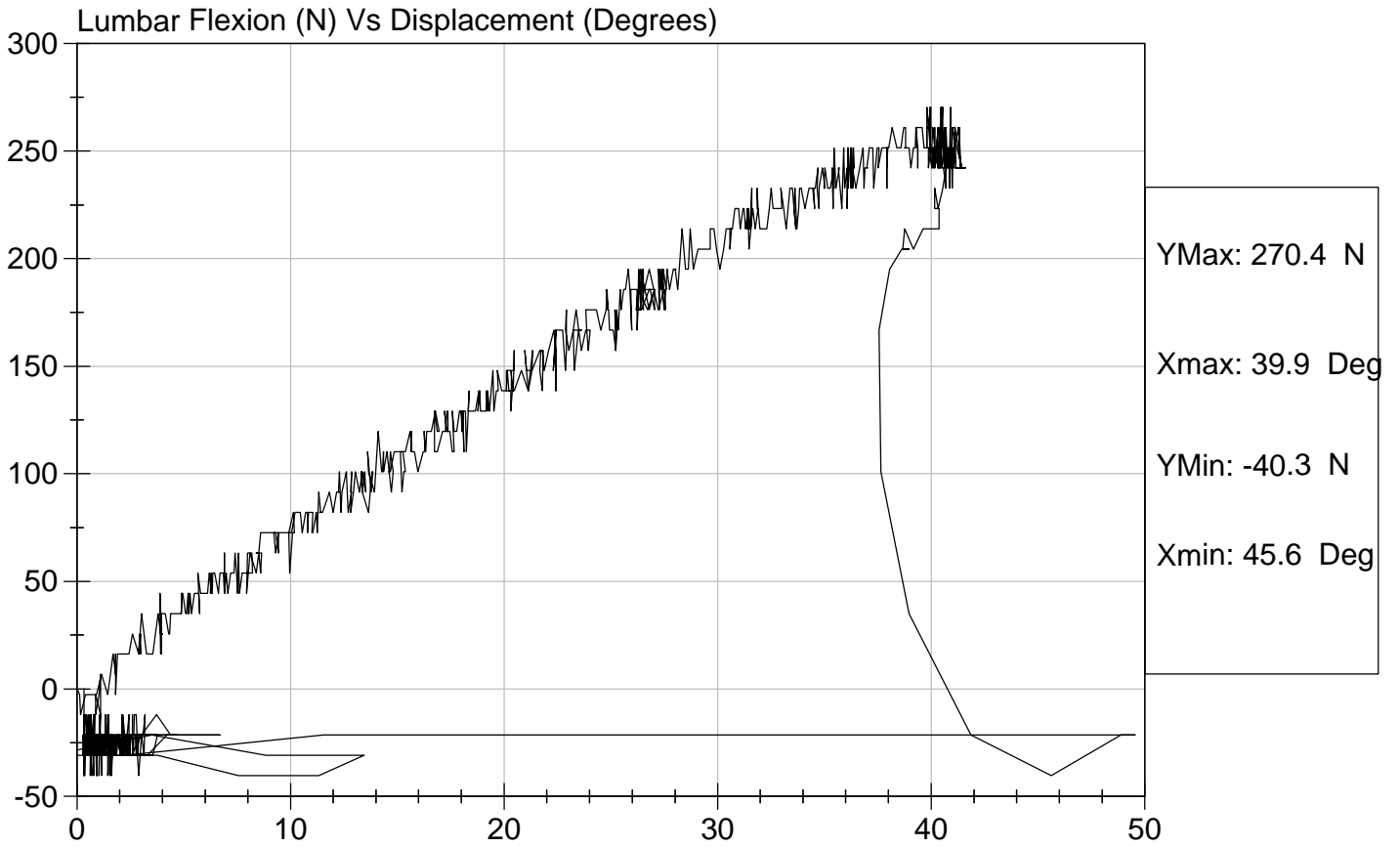


Test Description: Lumbar Flexion

Test Date: 01/20/2004

Component: D04095

Speed: 0 ft/sec, 0 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy (SID)**  
**Neck Pendulum Test**

ATD Serial No: 271

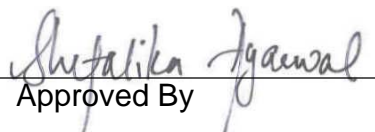
Test I.D: D04099

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	22	Pass	
Impact Velocity	m/s	6.89 to 7.13	6.93	Pass	
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.14	Pass
	20 msec	m/s	4.12 to 5.10	4.26	Pass
	30 msec	m/s	5.73 to 7.01	5.97	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.94	Pass
Midsaggital Plane Max Rotation	deg	66 to 82	74	Pass	
Head Rotation Peak to Zero - Decay Time	msec	58 to 67	61	Pass	
Max. Mx at Occipital Condyles	Nm	73 to 88	75	Pass	
Mx Peak To Zero - Decay Time	msec	49 to 64	59	Pass	
Mx Peak to Max. Head Rotation	msec	2 to 16	13	Pass	

  
 Laboratory Technician

01/20/2004

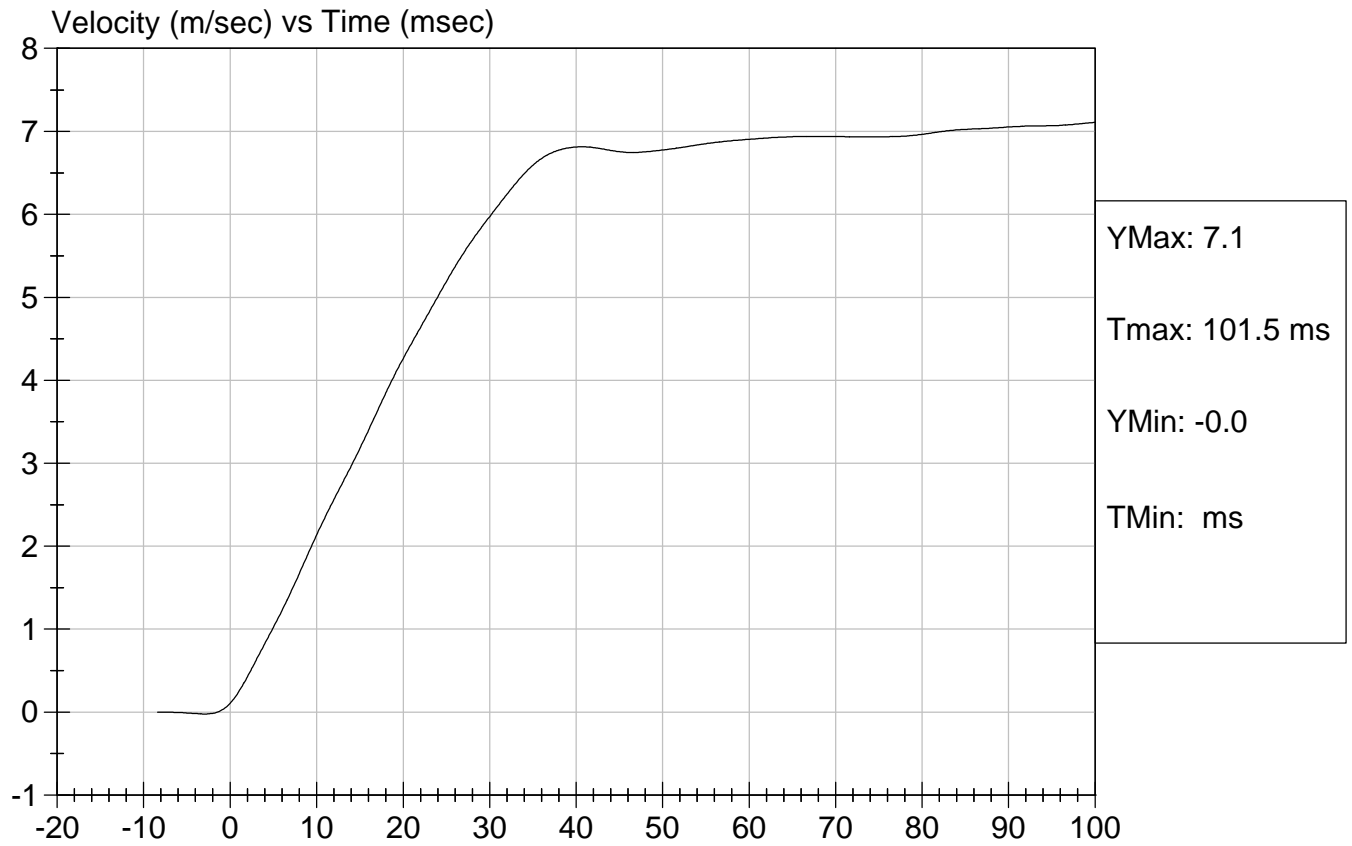
Test Date

  
 Approved By



Test Desc: Neck Bending  
Component ID: D04099

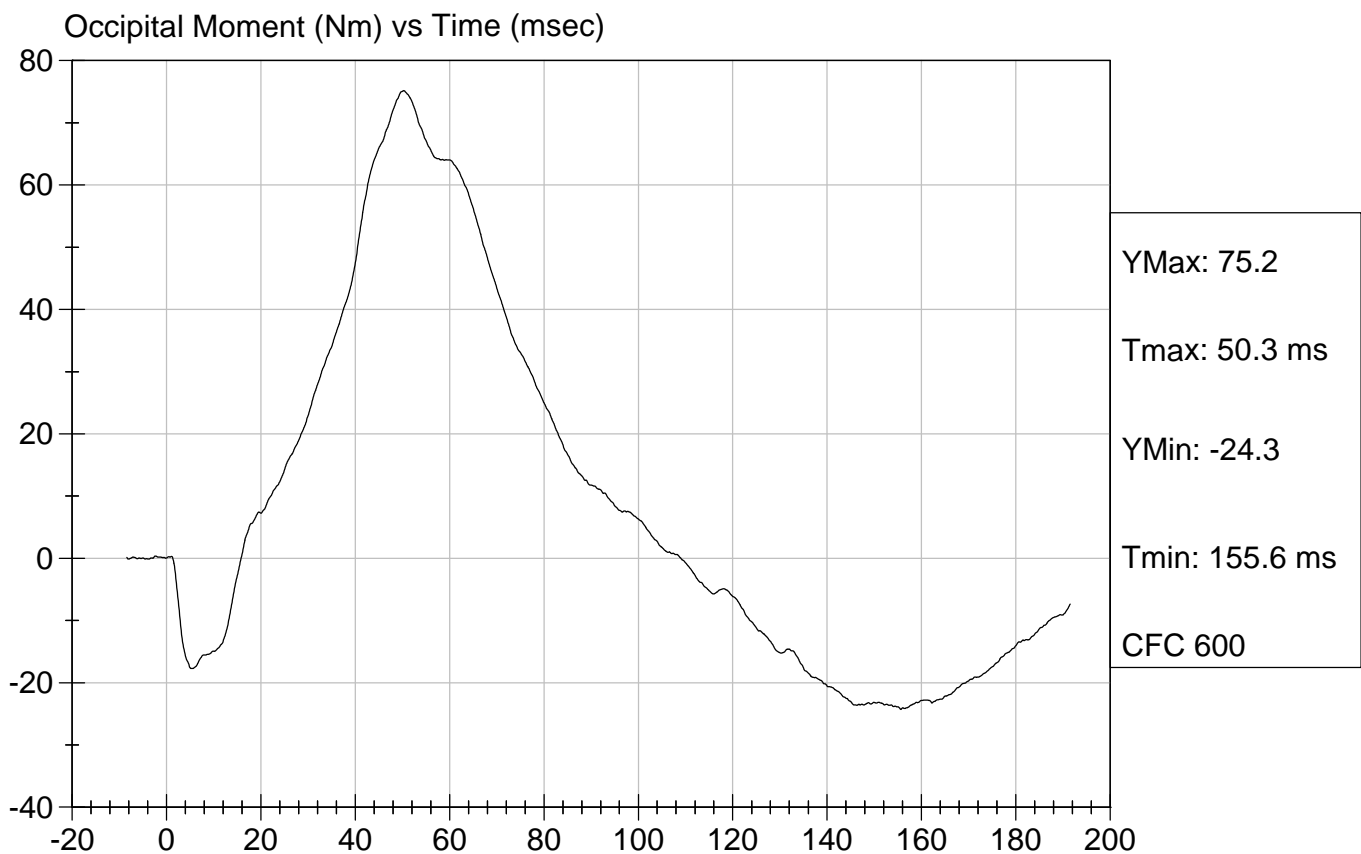
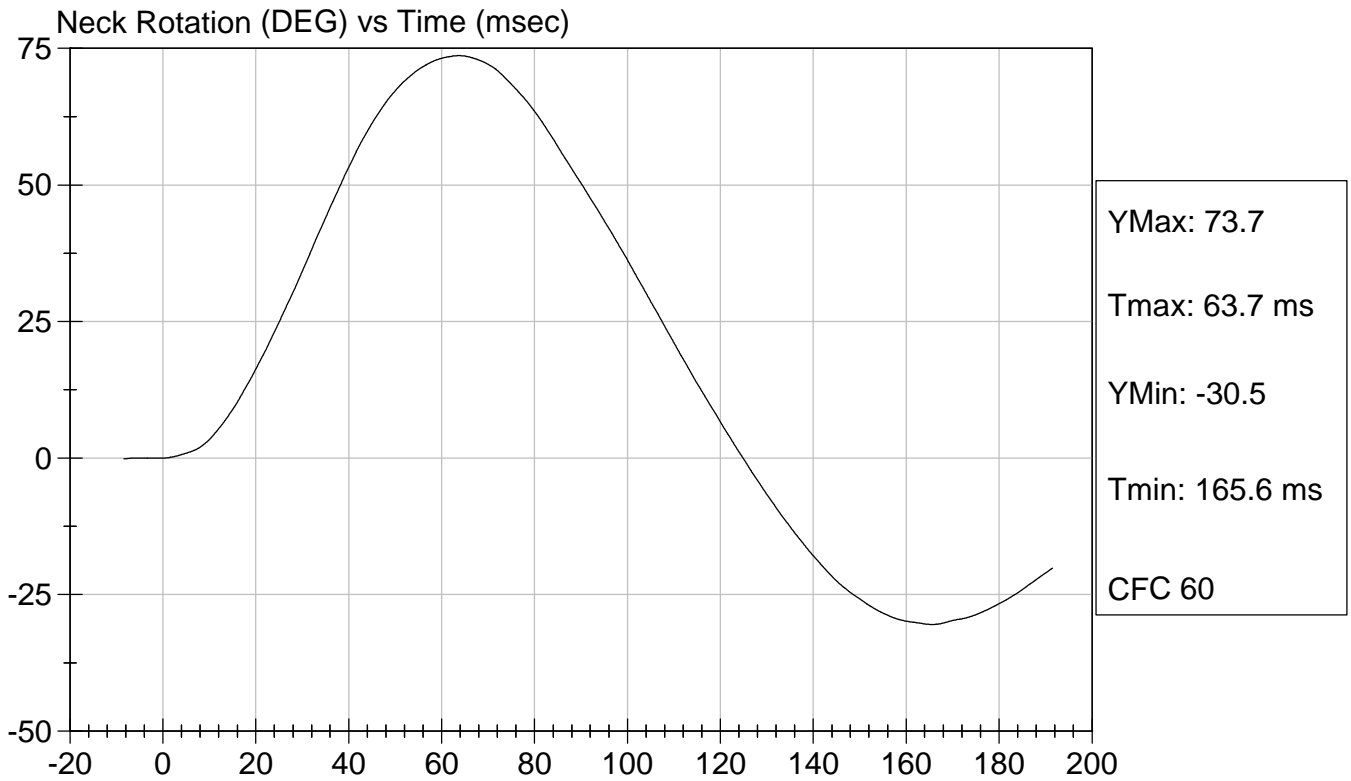
Test Date: 01/20/2004  
Speed: 22.73 ft/sec, 6.93 m/sec





Test Desc: Neck Bending  
Component ID: D04099

Test Date: 01/20/2004  
Speed: 22.73 ft/sec, 6.93 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Inspection Checklist**

**ATD Serial No:** 271

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Sternum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass

*Jessica Hall*  
 \_\_\_\_\_  
 Laboratory Technician

*Shetalika Gawal*  
 \_\_\_\_\_  
 Approved By

01/21/2004  
 Test Date

## **APPENDIX D**

### **TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION**

DUMMY AND VEHICLE CALIBRATION DATA

	INSTRUMENTS FOR DRIVER DUMMY NO. 904		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	J12450	Endevco	11/09/03
Lower Rib Y	J10420	Endevco	11/09/03
Lower Spine Y	AJ9F3	Endevco	11/09/03
Pelvis Y	AJ4K2	Endevco	11/09/03
Upper Rib Redundant Y	J12461	Endevco	11/09/03
Lower Rib Redundant Y	AJ820	Endevco	11/09/03
Lower Spine Redundant Y	AJ621	Endevco	11/09/03
Pelvis Redundant Y	ALCH7	Endevco	8/18/03
Head X	P22084	Endevco	12/05/03
Head Y	P22694	Endevco	12/05/03
Head Z	P22203	Endevco	12/05/03
Head Redundant X	P22695	Endevco	12/05/03
Head Redundant Y	P24216	Endevco	12/05/03
Head Redundant Z	P24226	Endevco	12/05/03
Neck Load Cell	253	Denton	10/17/03

	INSTRUMENTS FOR PASSENGER DUMMY NO. 271		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	J11625	Endevco	11/10/03
Lower Rib Y	AN8M6	Endevco	11/10/03
Lower Spine Y	AGP28	Endevco	11/10/03
Pelvis Y	AJ420	Endevco	11/10/03
Upper Rib Redundant Y	J10730	Endevco	11/10/03
Lower Rib Redundant Y	AN8P9	Endevco	11/10/03
Lower Spine Redundant Y	AJ9A7	Endevco	11/10/03
Pelvis Redundant Y	AMTA3	Endevco	11/10/03
Head X	J22107	Endevco	11/13/03
Head Y	J22055	Endevco	11/13/03
Head Z	AMTB8	Endevco	11/13/03
Head Redundant X	AGTY4	Endevco	11/13/03
Head Redundant Y	AK956	Endevco	11/13/03
Head Redundant Z	AHRP5	Endevco	11/13/03
Neck Load Cell	252	Denton	9/20/03

## VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Front Door Centerline Y	K18-J05	Entran	12/10/03
Midrear of Left Rear Door Y	I25-F09	Entran	9/11/03
Left Front Door Upper Centerline Y	K18-J01	Entran	12/10/03
Midrear of Left Rear Door Y	K21-N12	Entran	10/08/03
Left Rear Door Upper Centerline Y	A27-R14	Entran	10/09/03
Left Mid A-Post Y	C12-M08	Entran	10/08/03
Left Lower A-Post Y	E01-F15	Entran	11/11/03
Left Mid B-Post Y	K07-R15	Entran	12/10/03
Left Lower B-Post Y	G10-F13	Entran	10/17/03
Floorpan @ Rear Axle X	I15-Z05	Entran	11/11/03
Floorpan @ Rear Axle Y	E01-F13	Entran	11/11/03
Floorpan @ Rear Axle Z	H21-N16	Entran	11/11/03
Driver Seat Track Y	99F15A	Entran	8/15/03
Right Front Sill X	K11-Z09	Entran	12/10/03
Right Front Sill Y	G10-F04	Entran	10/17/03
Right Front Sill Z	H21-J03	Entran	10/09/03
Right Rear Sill X	K18-D13	Entran	12/15/03
Right Rear Sill Y	K07-R24	Entran	12/15/03
Right Rear Sill Z	K20-J06	Entran	12/15/03
Left Front Sill Y	K20-J01	Entran	12/15/03
Left Rear Sill Y	K20-J09	Entran	12/15/03
Right Rear Occupant Compartment Y	L23-A02	Entran	10/09/03
Vehicle CG X	H21-J06	Entran	10/09/03
Vehicle CG Y	F04-N08	Entran	12/10/03
Vehicle CG Z	H01-N28	Entran	9/11/03

Note: All Endevco accelerometers are Model No. 7264-2000  
 All Entran accelerometers are Model No. EGE-72