

REPORT NUMBER: 214D-MGA-2002-008

**SAFETY COMPLIANCE TESTING FOR FMVSS 214
SIDE IMPACT PROTECTION
INDICANT**

Toyota Motor Corporation
2002 Toyota Highlander SUV
NHTSA NUMBER: C25107

**PREPARED BY:
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April 2, 2002

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW, ROOM 6111 (NSA-30)
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-97-C-11033.

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COTR, Side Impact

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16. Abstract A 55/28 km/h 90° Moving Deformable Barrier INDICANT Compliance Test was conducted on the 2002 Toyota Highlander SUV in accordance with the specifications of the Office of Vehicle Safety Compliance Laboratory Test Procedure No. TP-214D-06 Side Impact Protection (except the test was conducted 8 km/h (5 mph) faster than the standard specifies) for determination of FMVSS No. 214 Side Impact Protection. The test was conducted at MGA Research Corporation, in Burlington Wisconsin on April 2, 2002. The impact velocity of the Moving Deformable Barrier (MDB) was 62.3 km/h, and the ambient temperature at the struck side (driver's) of the vehicle was 20°C. The target vehicle's maximum post test static crush was 298 mm at level 3. The test vehicle's occupant performance is as follows: <table style="margin-left: auto; margin-right: auto; border: none;"> <thead> <tr> <th></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;">48</td> <td style="text-align: center;">43</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">54</td> <td style="text-align: center;">48</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td style="text-align: center;">63</td> <td style="text-align: center;">51</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">58</td> <td style="text-align: center;">49</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">65</td> <td style="text-align: center;">90</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">120</td> <td style="text-align: center;">544</td> </tr> </tbody> </table> 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.					<u>DRIVER</u>	<u>PASS.</u>	Left Upper Rib (LUR) Accel., g	48	43	Left Lower Rib (LLR) Accel., g	54	48	Lower Spine (T ₁₂) Accel., g	63	51	Thoracic Trauma Index (TTI)	58	49	Pelvis (PEV) Accel., g	65	90	HIC	120	544
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SECTION 1

PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This side impact test is conducted as part of the FY' 2002 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-97-C-11033. The purpose of this test was to evaluate side impact protection in a 2002 Toyota Highlander SUV manufactured by Toyota Motor Corporation.

1.2 TEST PROCEDURE

The side impact test was conducted in accordance with the current National Highway Traffic Safety Administration (NHTSA), Office of Vehicle Safety Compliance (OVSC), Laboratory Test Procedure TP-214D-06, dated July 26, 2001 and the corresponding MGA Research Corporation Test Procedure MGA-NHTSA2 with the exception of the test speed, which was at the NCAP High Speed Lateral Impact level (61.2 km/h, approximately 8 km/h faster than compliance speed). 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 SIDE IMPACT TEST

2.1 SUMMARY OF SIDE IMPACT TEST

A model year 2002 Toyota Highlander SUV 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 62.3 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 1829.9 kg and the test weight of the MDB was 1362.0 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on April 2, 2002.

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 (SIDs) can be found in Appendix A. Two 50th percentile adult male SID's were placed in the driver and left rear passenger designated seating positions according to instructions specified in the OVSC Laboratory Test Procedure dated July 26, 2001. Each SID was instrumented with fourteen (14) accelerometers 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).

The test vehicle was instrumented with twenty-one (21) structural accelerometers and the MDB was instrumented with five (5) 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 298 mm at level 3, 1350 mm rearward of the left vertical impact point. The driver and passenger SID's, Serial Nos. 48 and 49 respectively, were calibrated just prior to this test. The SID's injury criteria is summarized as follows:

Measurements	Units	Driver	Passenger
Thoracic Trauma Index (TTI)	G's	58	49
Peak Pelvic G's (PEV)	G's	65	90
Head Injury Criteria (HIC)	none	120	544

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's, vehicle, and MDB response data traces. Appendix C contains the SID's configuration and performance verification data. Appendix D contains the test equipment information.

TEST NOTES

The following accelerometers were not used for this test:

Left Front Door on Centerline
Midrear of Left Front Door
Left Front Door Upper Centerline
Midrear of Left Rear door
Left Rear Door Upper Centerline

SECTION 3

SIDE IMPACT DUMMY (SID) AND VEHICLE TEST DATA

Test Vehicle: 2002/Toyota/Highlander/SUV
Test Program: 214 Indicant

NHTSA No. C25107
Test Date: 4/2/02

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 ²	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: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02

TEST VEHICLE INFORMATION

Make	Toyota
Model	Highlander
Body Style	SUV
NHTSA No.	C25107
VIN	JTEGD21A520029997
Color	Indigo Ink Pearl
Delivery Date	February 27, 2002
Odometer Reading (mile)	60
Dealer	Hesser Toyota
Transmission	Automatic
Final Drive	Rear
Number of Cylinders	4
Engine Displacement (L)	2.4
Engine Placement	lateral

TEST VEHICLE OPTIONS

Front Airbag	Yes
Side Airbags	No
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/Cassette/CD	Yes
Anti-theft System	No
Cruise Control	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Corporation
Date of Manufacture	12/01

GVWR (kg)	2260
GAWR Front (kg)	1300
GAWR Rear (kg)	1240

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	210	210
Cold / Test Pressure (kPa)	210	210
Recommended Tire Size	P225/70R16	P225/70R16
Tire Size on Vehicle	P225/70R16	P225/70R16
Tire Manufacturer	Goodyear	Goodyear

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Contour		
Number Of Occupants x 68.04 kg.	2	3		340.2
Capacity Wt. (VCW) (kg)				420.0
Cargo Wt. (RCLW) (kg)				79.8

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	454.5	349.7		515.3	444.1	
Right	kg	453.1	337.9		472.2	398.3	
Ratio	%	56.9	43.1		54.0	46.0	
Totals	kg	907.6	687.6	1595.2	987.5	842.4	1829.9

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1595.2
Weight of 2 P572E ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	79.8
Calculated Vehicle Target Weight (TVTW)	kg	1836.5

- 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	803	802	798	803	1172
As Tested	mm	790	798	772	779	1252
Fully Loaded	mm	788	795	766	775	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2720
Total Vehicle Length at Left Side	mm	3930
Total Vehicle Length at Centerline	mm	4660
Total Vehicle Length at Right Side	mm	3926
Total Vehicle Width	mm	1830
Weight of Ballast in Cargo Area	kg	56.7
Amount of Stoddard Solvent in Fuel Tank	liters	69.7

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2720
Target Impact Point Aft of Front Axle	mm	420
Actual Impact Point Aft of Front Axle	mm	449

DATA SHEET NO. 1...(continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002/Toyota/Highlander/SUV
Test Program: 214 Indicant

NHTSA No. C25107
Test Date: 4/2/02

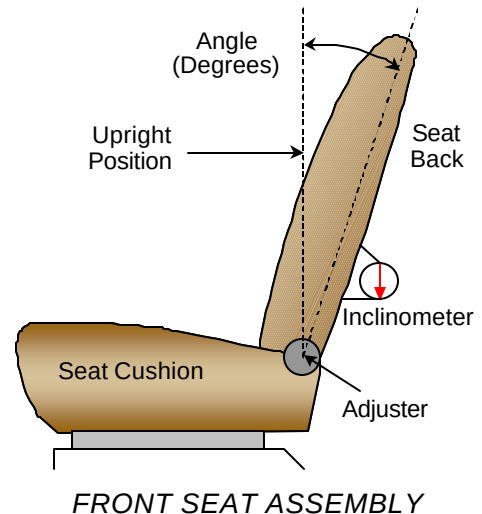
NORMAL DESIGN RIDING POSITION

The driver seat is positioned to the manufacturer's designated angle. The procedure for setting the seat position is as follows:

Recline to the fifth notch. From the most upright position (position 1) move rearward 4 notches. Headrest angle of 86.8 degrees.

Driver seat back angle: 5th notch, 1st as 1

Passenger seat back angle: Non adjustable



SEAT FORE/AFT POSITIONS

The driver's seat is manually operated and the rear passenger seat has no adjustments. The fore/aft is set to the middle position for the driver's seat. The first detent is numbered "1".

Driver seat fore/aft total travel: 17 positions

Passenger seat fore/aft total travel: Non adjustable

Driver seat fore/aft position: 9th position, 1st as one

Passenger seat fore/aft position: Non adjustable

SEAT BELT UPPER ANCHORAGE

The test vehicle is equipped with adjustable "D" ring anchorage for the driver's seat position. There are 5 positions, with the uppermost position numbered "1". The driver's "D" ring anchorage is placed in position 3, the middle position.

DATA SHEET NO. 1...(continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2002/Toyota/Highlander/SUV
Test Program: 214 Indicant

NHTSA No. C25107
Test Date: 4/2/02

FUEL TANK CAPACITY DATA

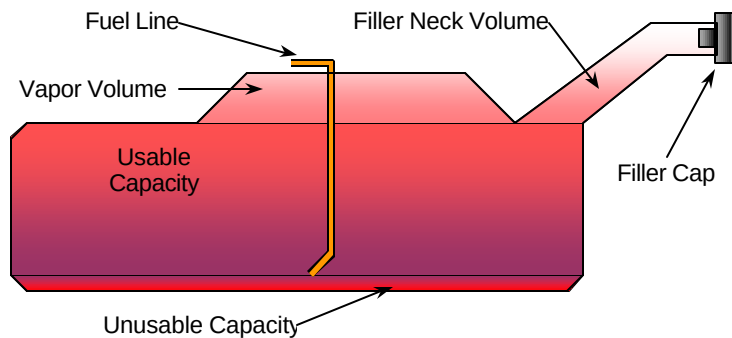
The "Usable Capacity" of the standard equipment fuel tank is: 75.0 liters

The "Usable Capacity" of any optional equipment fuel tank is: n/a liters

92-94% of "Usable Capacity" for certification to FMVSS 301 requirements: 69.0-71.3 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 69.7 liters

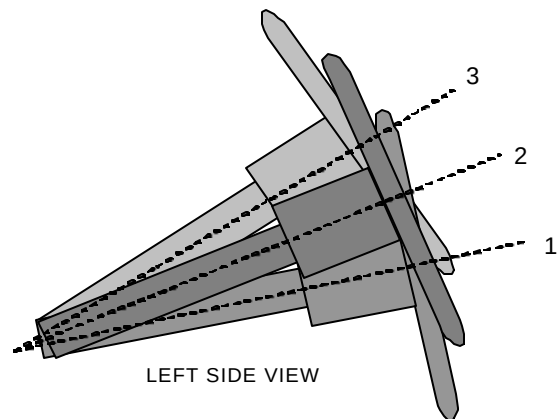
The test vehicle is equipped with an electric fuel pump. The fuel filler door is located on the left rear fender.



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 motion. An aluminum plate is placed across the rim of the steering wheel, and inclinometer is placed onto the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

Lowermost, position 1: 25.1°

Geometric center, position 2: 27.0°

Uppermost, position 3: 28.8°

DATA SHEET NO. 2
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	454.5	349.7		515.3	444.1	
Right	kg	453.1	337.9		472.2	398.3	
Weight Ratio	%	56.9	43.1		54.0	46.0	
Totals	kg	907.6	687.6	1595.2	987.5	842.4	1829.9

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	139	345
Level 2	Mid Door	mm	295	672
Level 3	Occupant H Point	mm	298	740
Level 4	Window Sill	mm	192	1058
Level 5	Window Top	mm	-14	1578
N/A	Maximum Penetration	mm	298	740

INSTRUMENTATION

Driver SID Accelerometers	14
Passenger SID Accelerometers	14
Vehicle Structure Accelerometers	21
MDB Accelerometers	5
Total	54

DATA SHEET NO. 3**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**

Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2590
C.G. Location aft of Front Axle	1127

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	395.1	293.8	
Right	kg	385.7	287.4	
Ratio	%	57.3	42.7	
Totals	kg	780.8	581.2	1362.0

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.3
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.3
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.3

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	170
2	Top of Bumper (mm)	533	800	Left	129
3	Mid Level (mm)	686	800	Left	133
4	Top of Stack (mm)	813	800	Left	174

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	2
High Speed Cameras	2

DATA SHEET NO. 4**POST TEST OBSERVATIONS**

Test Vehicle: 2002/Toyota/Highlander/SUV
Test Program: 214 Indicant

NHTSA No. C25107
Test Date: 4/2/02

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID	Rear Seat SID
Dummy Type / Serial No.	SID/048	SID/049
Head Contact	D-ring, headrest	Window frame
Upper Torso Contact	Door trim panel above armrest	Door trim panel above armrest
Lower Torso Contact	Door trim panel below armrest	Door trim panel below armrest
Left Knee Contact	Door trim panel below armrest	Door trim panel below armrest
Right Knee Contact	Left knee	Left knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Remained closed & latched	Remained closed & latched
Right Side Door Opening	Remained closed & latched	Remained closed & latched
Seat Movement	0	0
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No failures
Sill Separation	No separation
Windshield Damage	None
Window Damage	Left rear broke
Other Notable Effects	Fuel door opened; fuel cap remained closed

AIRBAG DEPLOYMENT

	Driver	Front Passenger	Rear Passenger
Front	yes	yes	
Side			

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	29 Rearward
Vertical Offset	mm	+/-20	8 Up

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5

SID INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02

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	48.2	41	10.2	90	42.5	51	6.7	110
Upper Rib (LUR) (R)	Y	G's	50.1	41	10.0	90	42.5	51	6.5	110
Lower Rib (LLR)	Y	G's	53.7	38	16.0	33	47.8	50	3.9	114
Lower Rib (LLR) (R)	Y	G's	52.4	38	14.1	33	48.6	50	4.2	114
Lower Spine (T ₁₂)	Y	G's	62.9	43	8.4	61	51.0	46	9.4	71
Lower Spine (T ₁₂) (R)	Y	G's	62.3	42	7.7	61	51.3	46	8.3	71
Pelvis (PEV)	Y	G's	64.7	39	12.5	62	89.9	39	11.0	63
Pelvis (PEV) (R)	Y	G's	63.7	38	9.9	61	90.2	39	11.7	64

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

Location	Driver				Passenger			
	LLR	T ₁₂	TTI(g)	PEV(g)	LLR	T ₁₂	TTI(g)	PEV(g)
Rib, Spine, and Pelvis	53.7	62.9	58	64.7	47.8	51.0	49	89.9
Rib, Spine, and Pelvis (R)	52.4	62.3	57	63.7	48.6	51.3	50	90.2

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	4.8	23	23.6	79	4.9	87	21.1	99
Head CG	Y	G's	22.6	55	4.3	35	48.2	97	13.8	83
Head CG	Z	G's	33.2	65	8.5	25	79.0	85	14.6	64
Head CG Resultant		G's	34.6	62			81.4	85		

HEAD INJURY CRITERIA (SAE CLASS 1000 Filtered)

Location	Driver				Passenger			
	HIC	T ¹	T ²	Avg G's	HIC	T ¹	T ²	Avg G's
Head CG	120	50.2	86.2	25.6	544	72.4	101.8	50.9

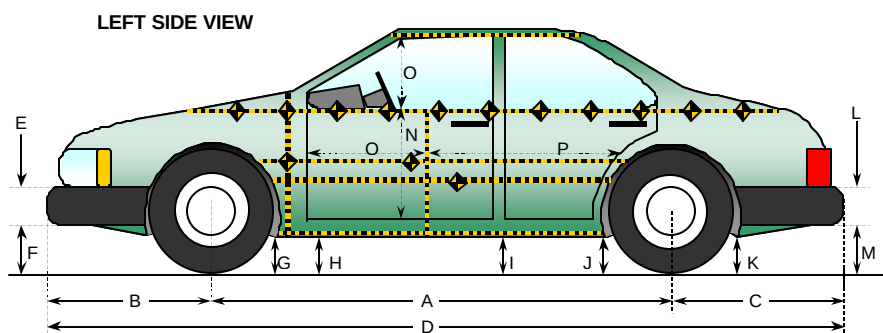
Positive Acceleration Polarities: Longitudinal (X) = Forward
 (Conforms to SAE J211) Lateral (Y) = Right
 Vertical (Z) = Down

DATA SHEET NO. 6

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02



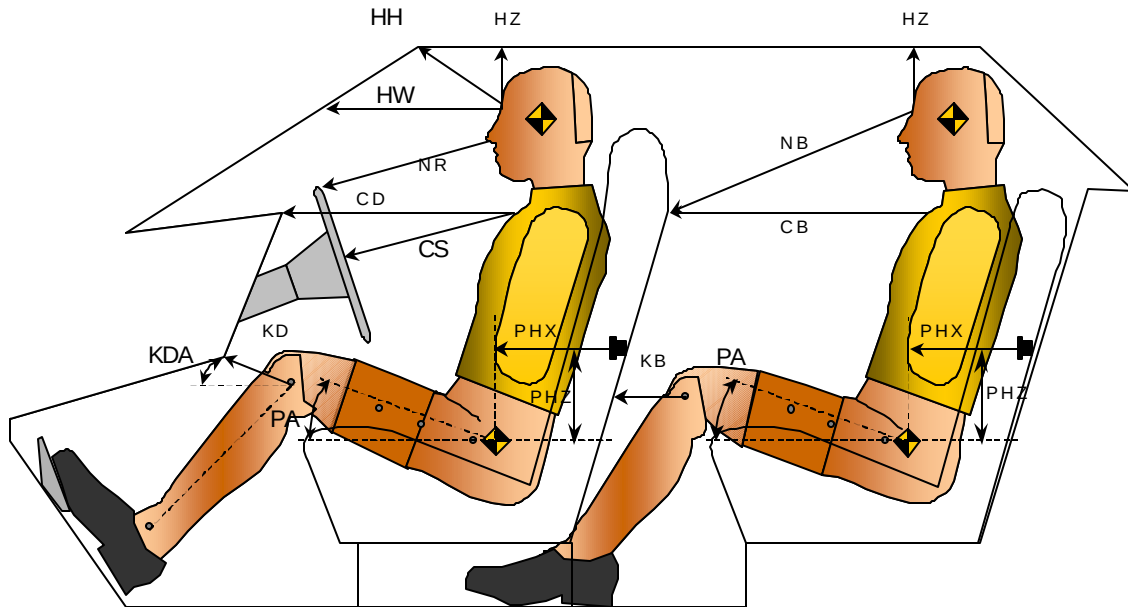
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2720	2695	-25
B	Front Axle to FSOV	930	916	-14
C	Rear Axle to RSOV	1010	1027	17
D	Total Length at Centerline	4660	4638	-22
E	Front Bumper Thickness	235	235	0
F	Front Bumper Bottom to Ground	455	480	25
G	Sill Height at Front Wheel Well	250	235	-15
H	Sill Height at Front Door Leading Edge	260	256	-4
I	Sill Height at "B" Pillar	257	267	10
J1	Sill Height at Rear Wheel Well	226	267	41
J2	Pinch Weld Height at Rear Wheel Well	235	273	38
K	Sill Height Aft of Rear Wheel Well	305	308	3
L	Rear Bumper Thickness	183	183	0
M	Rear Bumper Bottom to Ground	440	452	12
N	Sill Height to Window Bottom Sill	793	696	-97
O	Front Door Leading Edge to Impact CL	760	734	-26
P	Rear Door Trailing Edge to Impact CL	1156	1057	-99
Q	Front Window Opening	490	490	0
R	Right Side Length	3926	3926	0
S	Left Side Length	3930	3875	-55
T	Vehicle Width at "B" Post	1830	1580	-250

DATA SHEET NO. 7
SID LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02

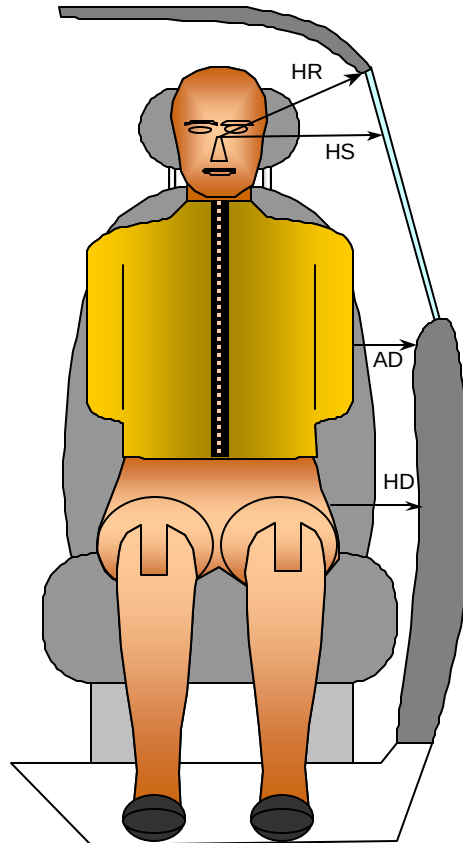


Driver Code	Pass. Code	Measurement Description	Driver 48		Passenger 49	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	399			
HW		Head to Windshield	658			
HZ	HZ	Head to Roof	222		215	
NR	NB	Nose to Rim/Nose to Seatback	442		654	
CD	CB	Chest to Dash or Seatback	531		584	
CS		Chest to Steering Wheel	335			
KDL	KBL	Left Knee to Dash or Seatback	192	0	307	0
KDR	KBR	Right Knee to Dash or Seatback	177	0	281	0
PA	PA	Pelvic Angle		23.4		24.6
PHX	PHX	H-Point to Striker (X-Axis)	211		240	
PHZ	PHZ	H-Point to Striker (Z-Axis)	136		305	

DATA SHEET NO. 8
SID LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2002/Toyota/Highlander/SUV
Test Program: 214 Indicant

NHTSA No. C25107
Test Date: 4/2/02



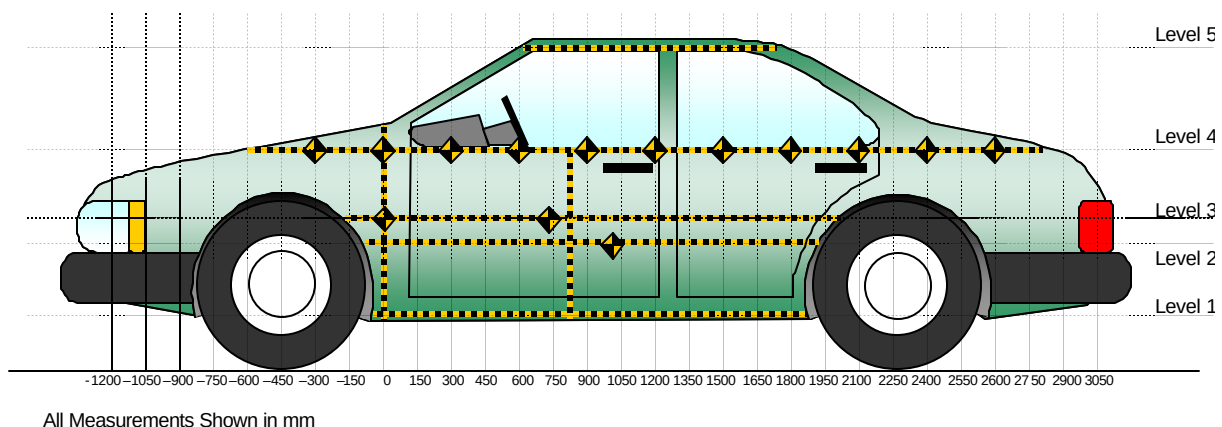
FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver 48	Passenger 49
HR	Head to Side Header	mm	231	239
HS	Head to Side Window	mm	313	341
AD	Arm to Door	mm	122	124
HD	H-Point to Door	mm	177	182

DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2002/Toyota/Highlander/SUV
Test Program: 214 Indicant

NHTSA No. C25107
Test Date: 4/2/02



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	1578
4	Window Sill	1058
3	Occupant H Point	740
2	Mid Door	672
1	Sill Top	345

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2002/Toyota/Highlander/SUV
Test Program: 214 Indicant

NHTSA No. C25107
Test Date: 4/2/02

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1050															
-900				336					319					-17	
-750				314					296					-18	
-600				295					279					-16	
-450				281					267					-14	
-300				271					262					-9	
-150			199	264				222	259				23	-5	
0		200	204	260			245	247	260			45	43	0	
150	284	203	207	254		423	373	369	267		139	170	162	13	
300	292	203	209	253		429	435	433	294		137	232	224	41	
450	293	203	210	250		432	444	457	307		139	241	247	57	
600	294	203	210	249		433	457	470	323		139	254	260	74	
750	294	203	210	248	514	432	466	480	347	479	138	263	270	99	-35
900	294	203	209	249	507	432	475	485	353	477	138	272	276	104	-30
1050	296	203	209	249	505	429	477	481	374	480	133	274	272	125	-25
1200	296	203	211	252	504	429	474	499	422	483	133	271	288	170	-21
1350	297	205	213	254	507	428	500	511	446	487	131	295	298	192	-20
1500	300	205	214	257	506	423	495	509	397	482	123	290	295	140	-14
1650	300	205	213	260	508	418	490	500	345	479	118	285	287	85	-29
1800	288	206	209	264	509	399	439	453	368	477	111	233	244	104	-32
1950		203	205	269	511		329	337	315	475		126	132	46	-36
2100			203	274	514			284	283	472			81	9	-42
2250				280	517				294	472				14	-45
2400				287	521				283	472				-4	-49
2550				297	524				276	475				-21	-49
2700				310	529				274	477				-36	-52
2850				325					286					-39	
3000				346					310					-36	
3150															
3300															

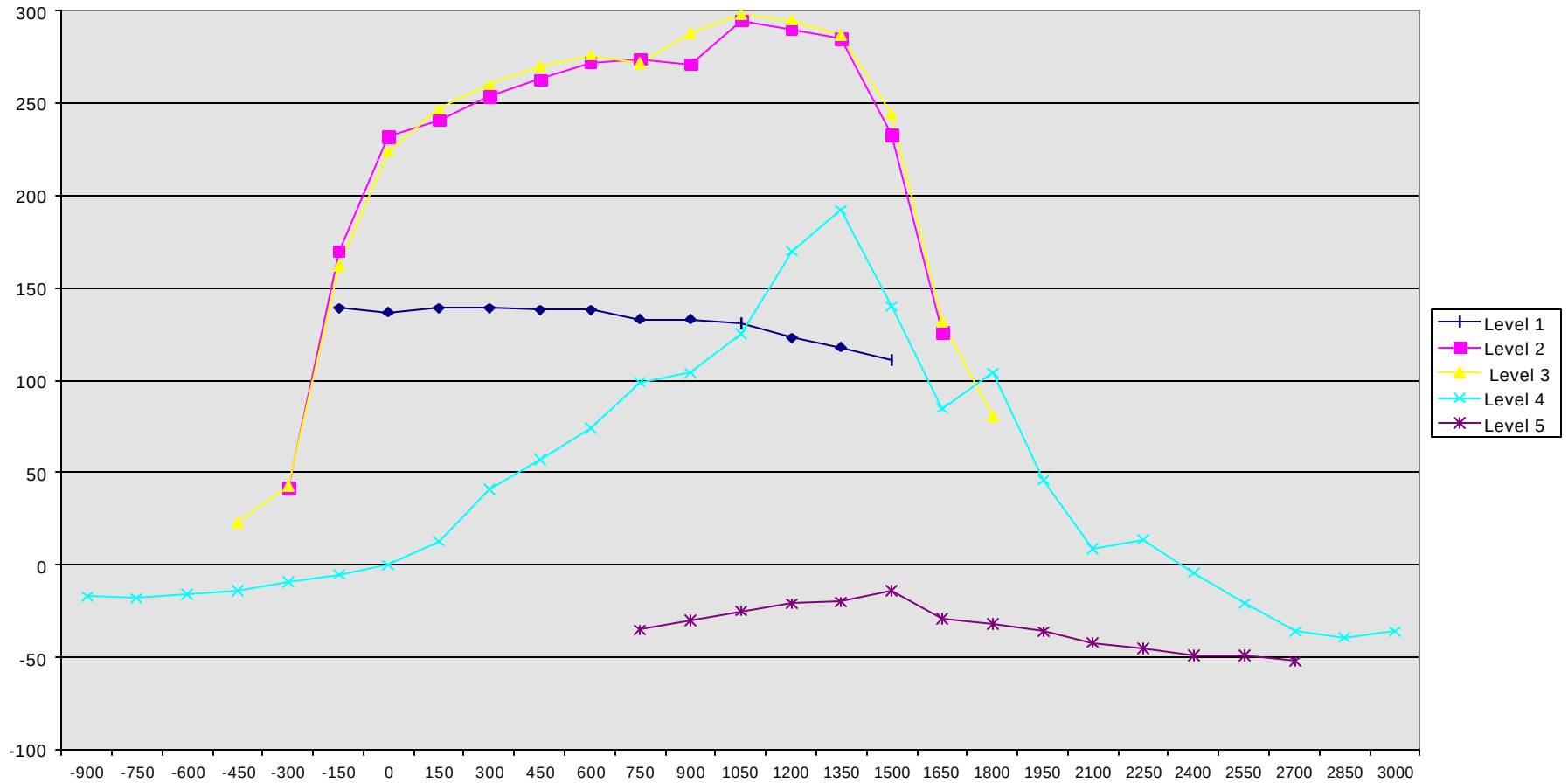
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

DATA SHEET NO. 10...(continued)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2002/Toyota/Highlander/SUV
Test Program: 214 Indicant

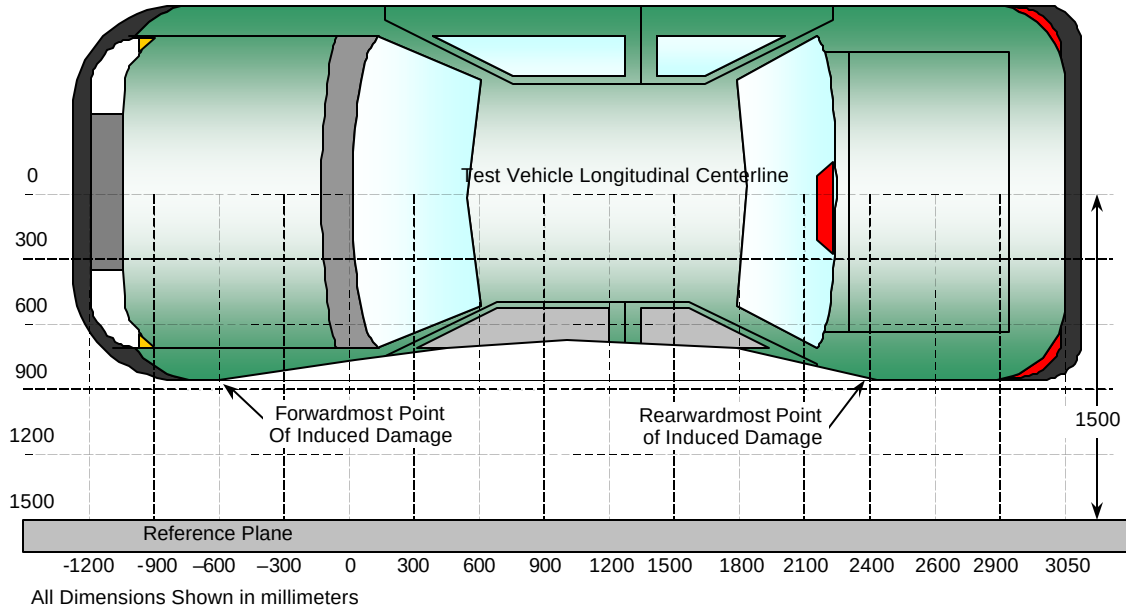
NHTSA No. C25107
Test Date: 4/2/02



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

Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02



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	287	283	-4
2	1950 mm	3	205	337	132
3	1395 mm	3	213	512	299
4	922 mm	3	209	487	278
5	450 mm	3	210	457	247
6	0 mm	4	260	260	0

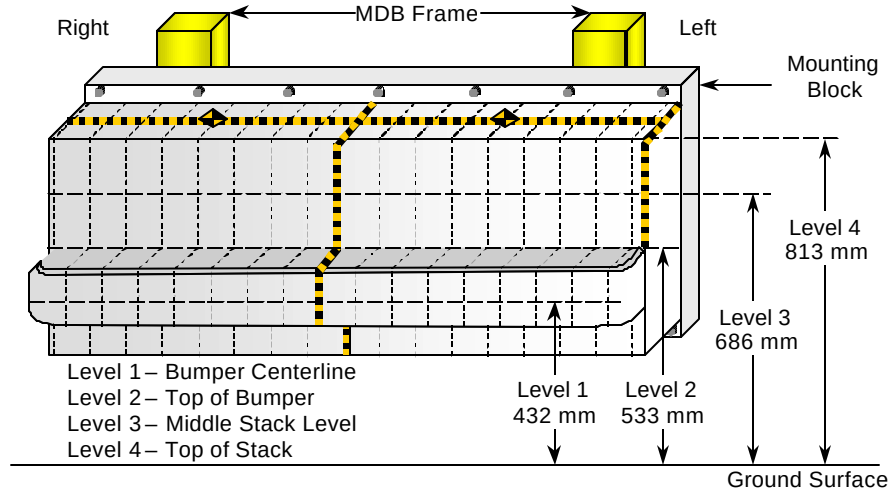
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body.

DATA SHEET NO. 12

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02



DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C _L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	170	164	161	158	151	150	150	150	149	149	148	149	149	148	148	150	161
2	101	100	89	86	81	77	82	82	81	82	84	84	84	84	85	86	129
3	43	23	15	15	17	25	46	32	26	27	30	33	38	48	60	77	133
4	66	36	12	5	12	27	61	60	49	50	54	64	73	86	96	119	174

All Dimensions in mm

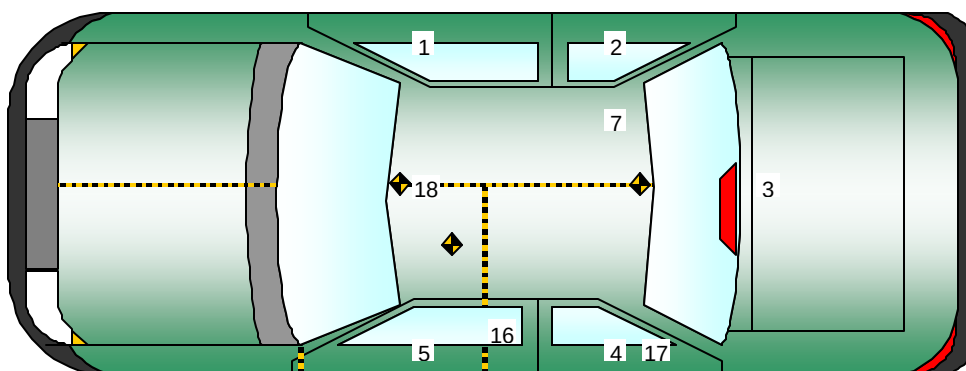
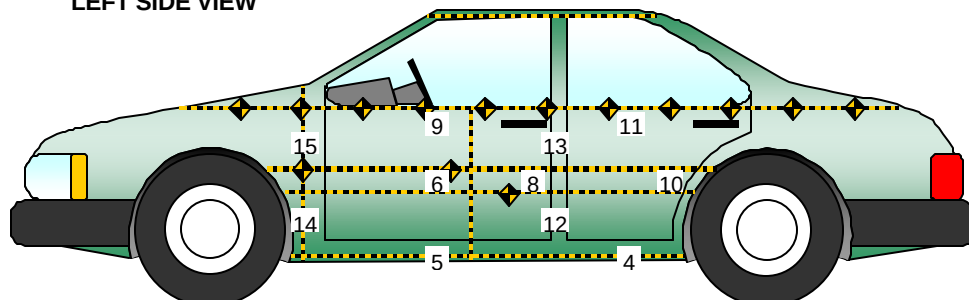
DATA SHEET NO. 13

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02

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. 13...(continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02

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	2686	715	-290	X	2.8	61	5.5	11
					Y	30.9	17	5.4	23
					Z	5.8	74	9.2	20
					RES	31.0	17		
2	Right Sill at Rear Seat	1518	715	-271	X	2.3	36	5.6	16
					Y	31.2	17	4.6	84
					Z	5.2	100	8.8	15
					RES	32.4	17		
3	Rear Floorpan Above Axle	918	0	-620	X	9.6	68	8.1	10
					Y	23.4	38	3.1	82
					Z	5.1	34	4.0	64
					RES	24.4	38		
4	Left Sill at Rear Door	1499	-715	-270	Y	53.1	19	6.6	83
5	Left Sill at Front Door	2664	-715	-292	Y	100.3	8	49.5	13
7	Rear Occupant Compartment	1856	325	-441	Y	29.0	17	2.8	56
12	B-Post Lower	2129	-670	-415	Y	**	**	**	**
13	B-Post Middle	2151	-742	-1040	Y	132.0	13	69.5	21
14	A-Post Lower	3185	-741	-479	Y	104.9	7	134.9	21
15	A-Post Middle	3201	-822	-1030	Y	35.4	9	10.2	29
16	Front Seat Track	2384	-578	-400	Y	72.8	16	28.7	21
17	Rear Seat Track or Structure	1799	-508	-470	Y	48.3	17	13.8	22
18	Vehicle CG	2372	0	-392	X	1.6	53	9.0	12
					Y	27.4	17	3.0	23
					Z	36.6	24	36.4	29
					RES	39.0	29		

Reference Points X - Test Vehicle Rear Bumper (+ forward)

Y - Test Vehicle Centerline (+ to right)

Z - Ground Plane (+ down)

** No valid data after 8 msec

DATA SHEET NO. 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

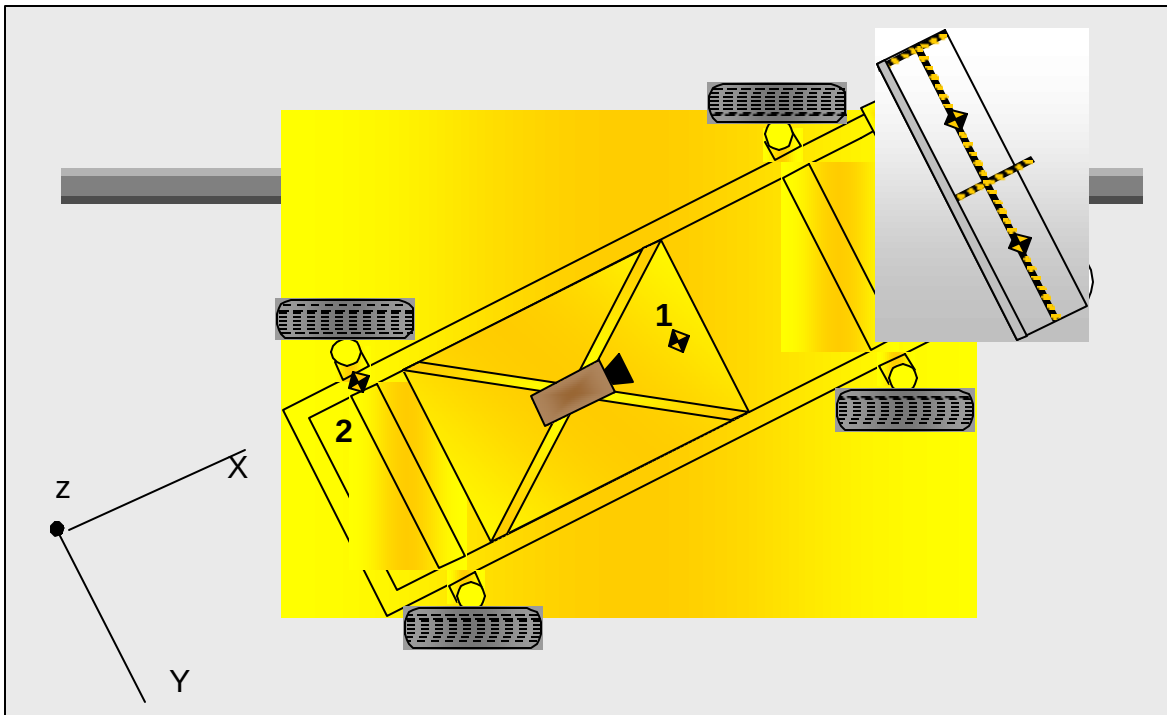
Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02

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	1.7	119	20.6	45
					Y	1.8	61	6.3	25
					Z	25.4	59	20.8	65
					RES	27.7	42		
2	MDB Rear	-2591	-625	-622	X	1.5	87	22.9	40
					Y	6.7	26	1.0	62

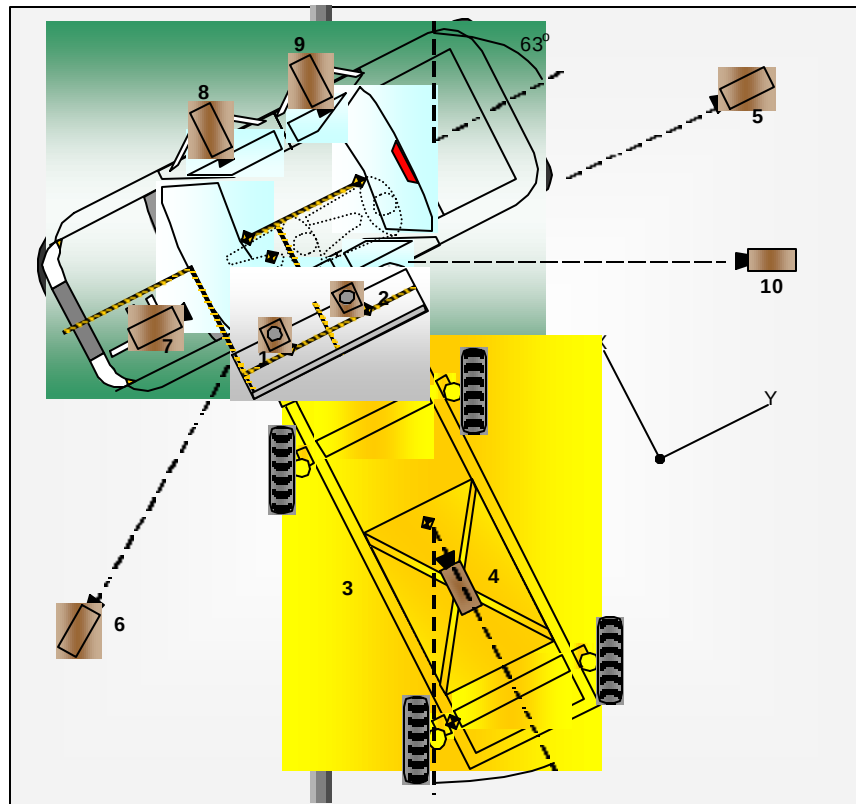
Reference Points X - MDB Front Axle (+ forward)
 Y - MDB Centerline (+ to right)
 Z - Ground Plane (+ down)



DATA SHEET NO. 15
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Inducant

NHTSA No. C25107
 Test Date: 4/2/02



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	1000	-60	-4950	8	1099
2	Overhead Close-up	-1202	50	-4950	13	1015
3	MDB Onboard, Impact Point Close-up				13	1031
4	MDB Onboard, Centerline of Impact				13	1015
5	Right Side, Ground Level, Overall	4079	-8534	-1843	25	881
6	Left Side, Ground Level, Overall	-2489	1975	-1712	13	952
7	Vehicle Onboard Front SID, Front				13	518
8	Vehicle Onboard Front SID, Side				13	508
9	Vehicle Onboard Rear SID, Side				13	503
10	Real Time Coverage					

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

DATA SHEET NO. 16

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2002/Toyota/Highlander/SUV
Test Program: 214 Indicant

NHTSA No. C25107
Test Date: 4/2/02

Test Time: 11:50 AM

Temperature at Time of Impact: 20°C

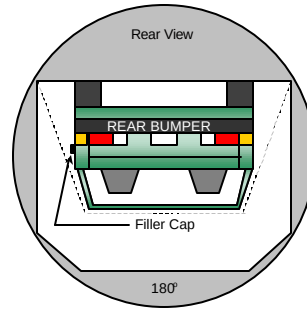
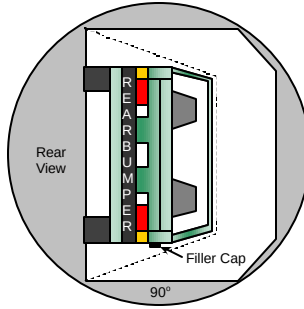
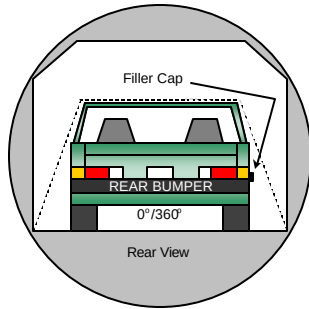
Stoddard Solvent Spillage Measurements

- 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. 17
FMVSS 301 STATIC ROLLOVER DATA SHEET

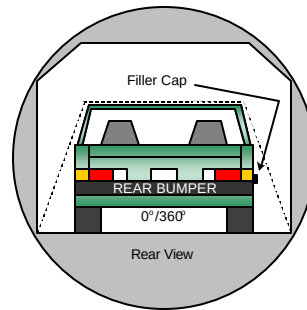
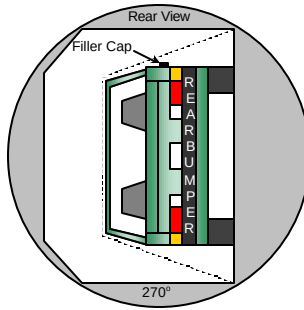
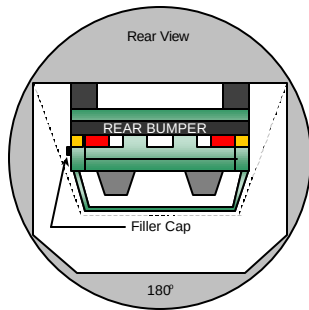
Test Vehicle: 2002/Toyota/Highlander/SUV
 Test Program: 214 Indicant

NHTSA No. C25107
 Test Date: 4/2/02



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:

Rollover Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	164	300	0
90° to 180°	151	300	0
180° to 270°	134	300	0
270° to 360°	156	300	0

APPENDIX A
PHOTOGRAPHS

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Pre-Test Front View of Test Vehicle



Post-Test Front View of Test Vehicle



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle

A-5.



Pre-Test Left Side View of Test Vehicle

A-6.



Post-Test Left Side View of Test Vehicle



Pre-Test Left Rear Three-Quarter View



Post-Test Left Rear Three-Quarter View



Pre-Test Left Front Three-Quarter View

Post-Test Left Front Three-Quarter View



Pre-Test Right Rear Three-Quarter View



Post-Test Right Rear Three-Quarter View



Pre-Test Right Front Three-Quarter View



Post-Test Right Front Three-Quarter View



Pre-Test MDB Positioned Against Vehicle (left side)



Pre-Test MDB Positioned Against Vehicle (right side)



Pre-Test MDB Positioned Against Vehicle Overhead View



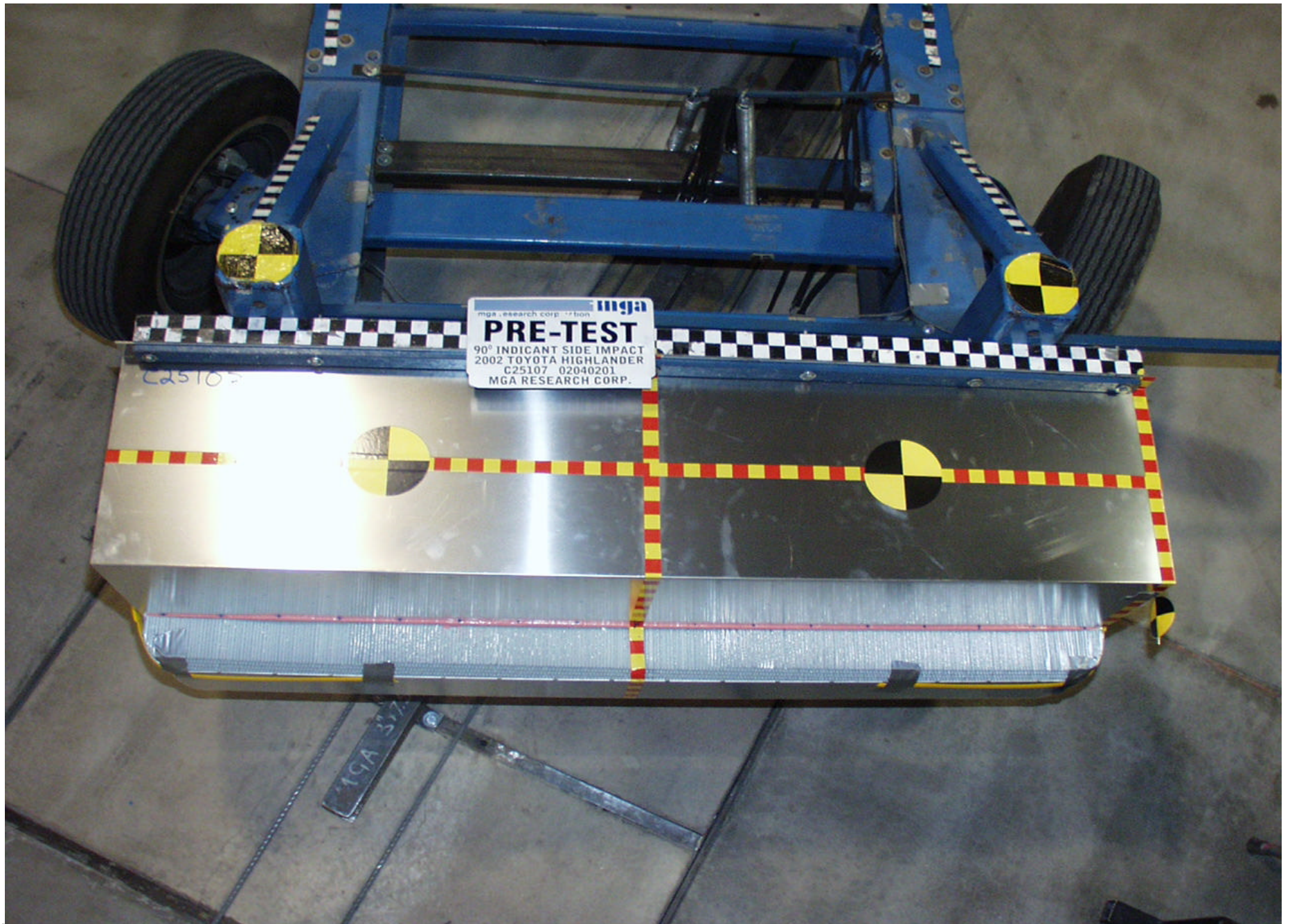
Post-Test MDB and Vehicle (left side)



Post-Test MDB and Vehicle (right side)



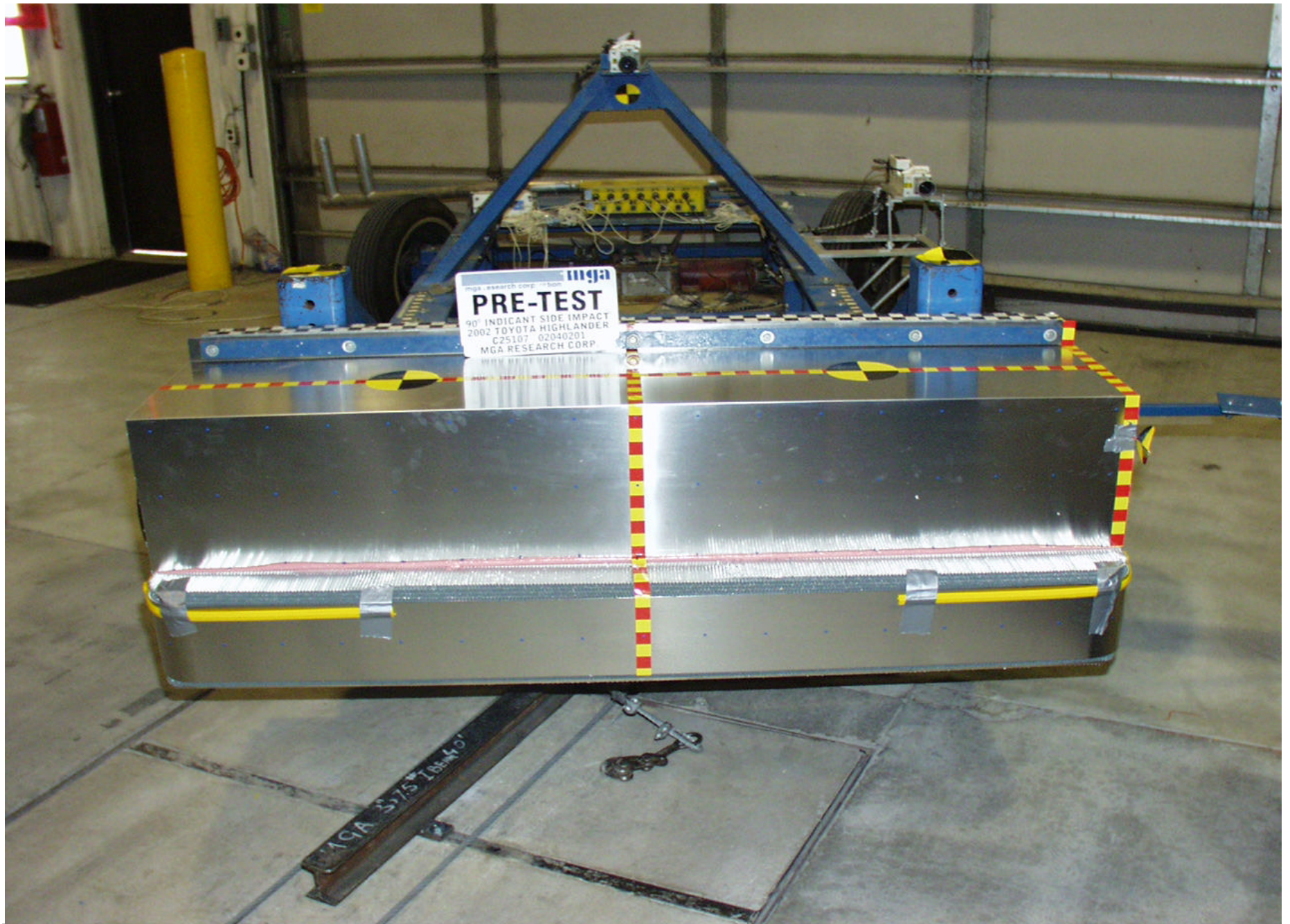
Post-Test MDB and Vehicle Overhead View



Pre-Test MDB Top View



Post-Test MDB Top View



Pre-Test MDB Front View



Post-Test MDB Front View



Pre-Test MDB Right Side View



Post-Test MDB Right Side View



Pre-Test MDB Left Side View



Post-Test MDB Left Side View



Pre-Test Driver Dummy Right Side View



Post-Test Driver Dummy Right Side View



Pre-Test Driver Dummy Left Side View



Post-Test Driver Dummy Left Side View



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



Pre-Test Driver Dummy Shoulder and Door Top View



Post-Test Driver Dummy Shoulder and Door Top View



Post-Test Driver Dummy Contact



Pre-Test Passenger Dummy Right Side View



Post-Test Passenger Dummy Right Side View



Pre-Test Passenger Dummy Left Side View



Post-Test Passenger Dummy Left Side View



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



Pre-Test Passenger Dummy Shoulder and Door Top View



Post-Test Passenger Dummy Shoulder and Door Top View



Post-Test Passenger Dummy Contact



Pre-Test Left Front Impact Point on Vehicle



Post-Test Left Front Impact Point on Vehicle



Impact

TION

WEIGHT
420kg (925lbs)
RR.3 TOTAL 5
OR16 101S
IE (kPa(psi))
CAPACITY WEIGHT
RR. 210(30)
IAL FOR
INFORMATION
0 Z

MFD. BY: TOYOTA MOTOR CORPORATION
GVWR: 2260KG (4985LB)
GAWR: FRT. 1300KG (2865LB) WITH P225/70R16 TIRES.
16X6 1/2JJ RIMS. AT 210KPA (30PSI) COLD.
RR. 1240KG (2735LB) WITH P225/70R16 TIRES.
16X6 1/2JJ RIMS. AT 210KPA (30PSI) COLD.
THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR
VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT
ON THE DATE OF MANUFACTURE SHOWN ABOVE.
JTEGD21A520029997 MPV
ACU20L-BWPNKA
C/TR 8P4/FG14
A/TM -02A/
U241E
MADE IN JAPAN
NO. 998

DATE 12/01

Vehicle Certification Label

TIRE-LOADING		INFORMATION	
•CHARGE MAXIMALE DU VEHICULE 420kg (925 LIVRES)		•VEHICLE CAPACITY WEIGHT 420kg (925lbs)	
•PERSONNES AVANT 2	ARRIERE 3	TOTAL 5	
•DIMENSION DES PNEUS	P225/70R16 101S		
•PRESSION DE PNEUS	(kPa (LB/PO ²))		
AU POIDS MAXIMAL DU VEHICULE CHARGE		•COLD TIRE PRESSURE (kPa(psi))	
AVANT 210(30)	ARRIERE 210(30)	UP TO VEHICLE CAPACITY WEIGHT	
POUR DE PLUS AMPLES DETAILS,		FRT. 210(30)	RR. 210(30)
VOIR LE MANUEL DU PROPRIETAIRE		SEE OWNER'S MANUAL FOR	
		ADDITIONAL INFORMATION	
48080		02	

Tire Placard

A-50.



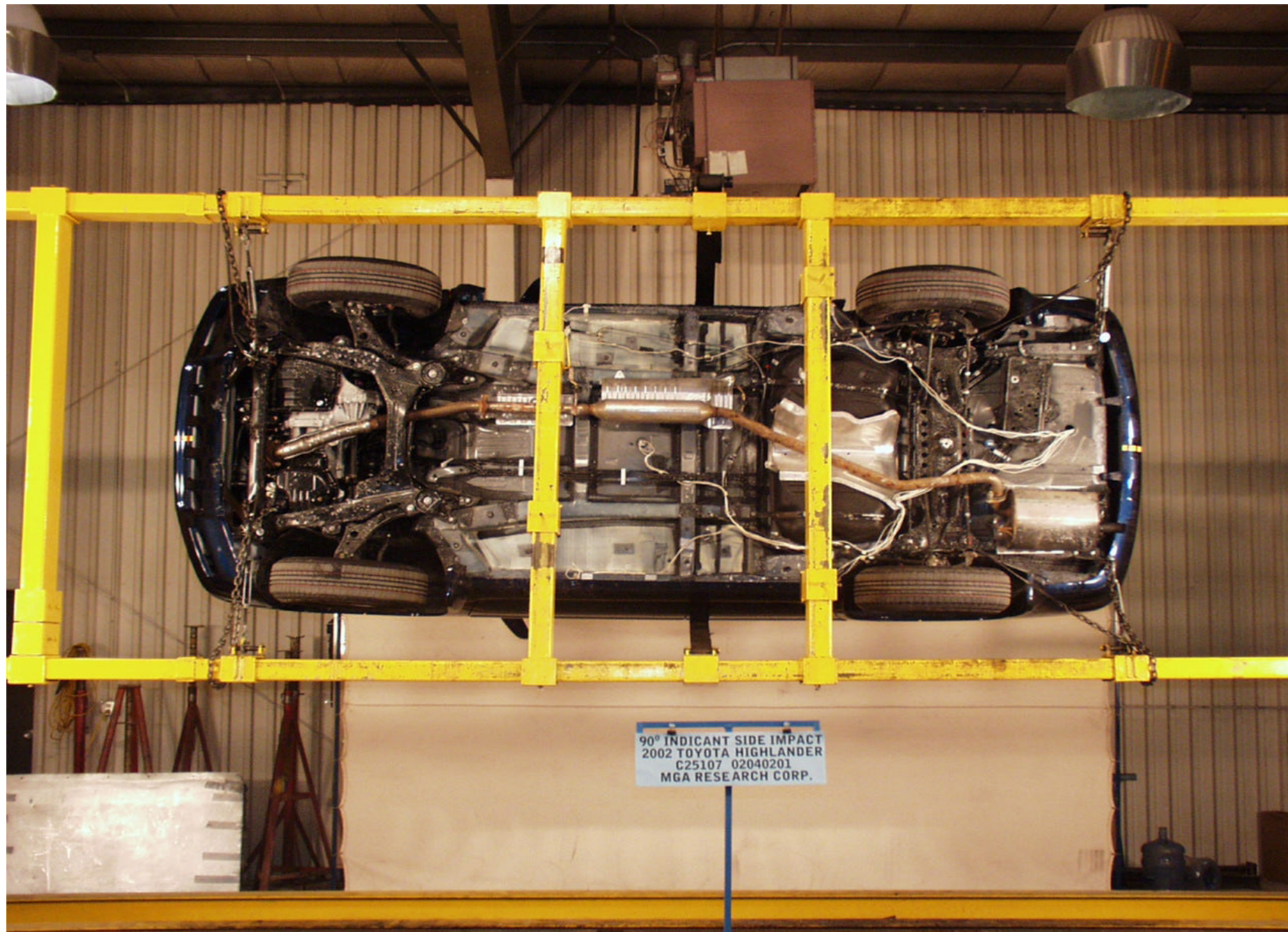
Rollover 90

A-51.



Rollover 180

A-52.



Rollover 270

A-53.



Rollover 360



Left Front Attitude Point



Right Front Attitude Point



Left Rear Attitude Point



Right Rear Attitude Point

APPENDIX B

SID, VEHICLE, AND MDB RESPONSE DATA

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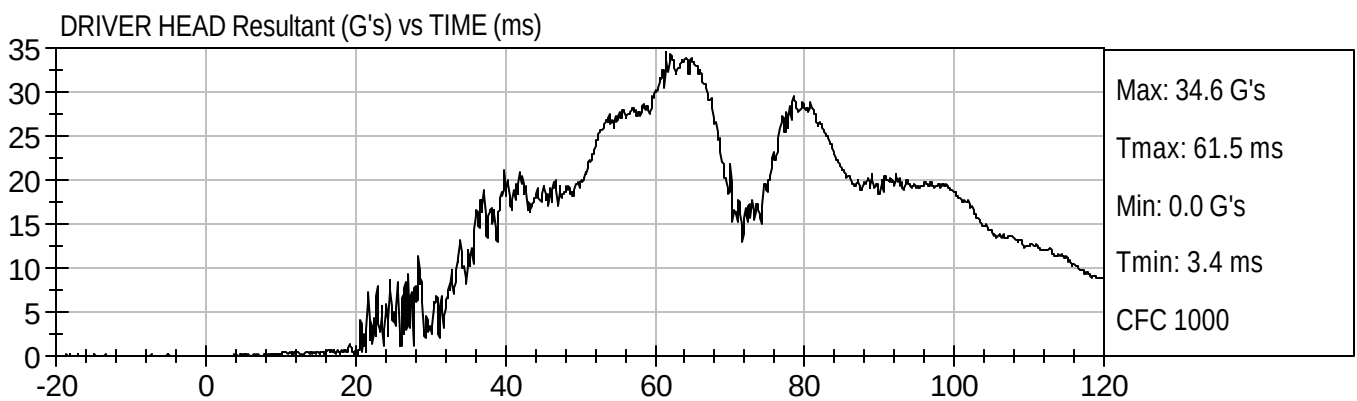
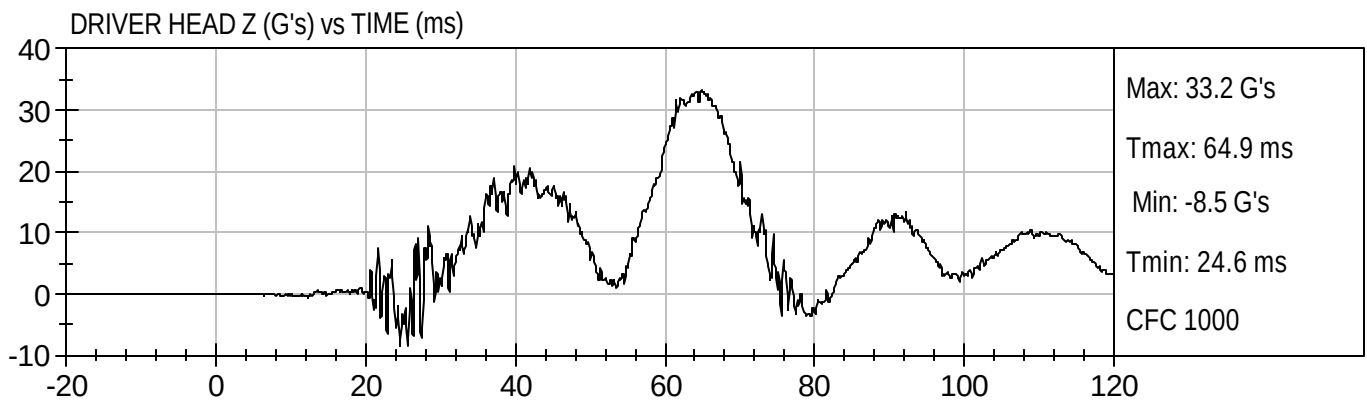
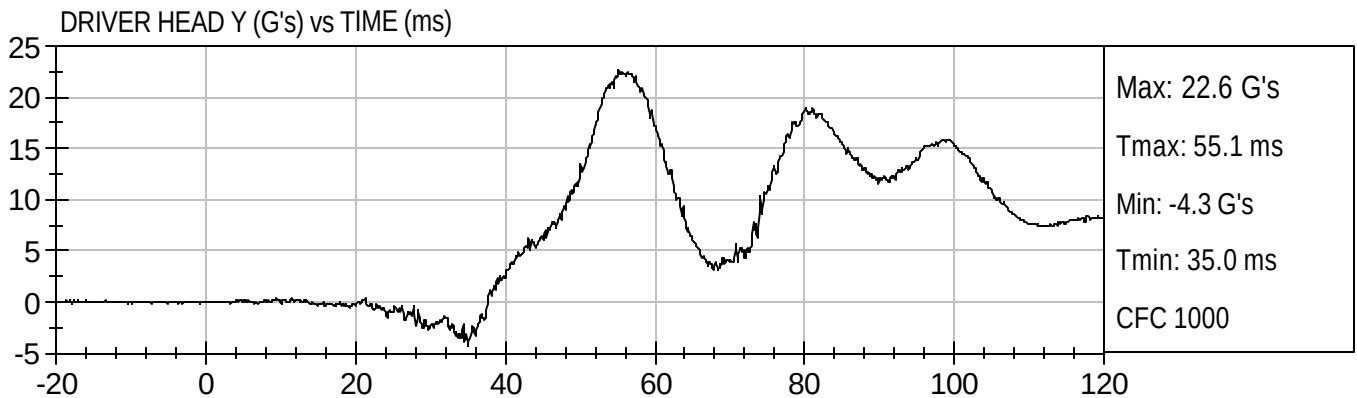
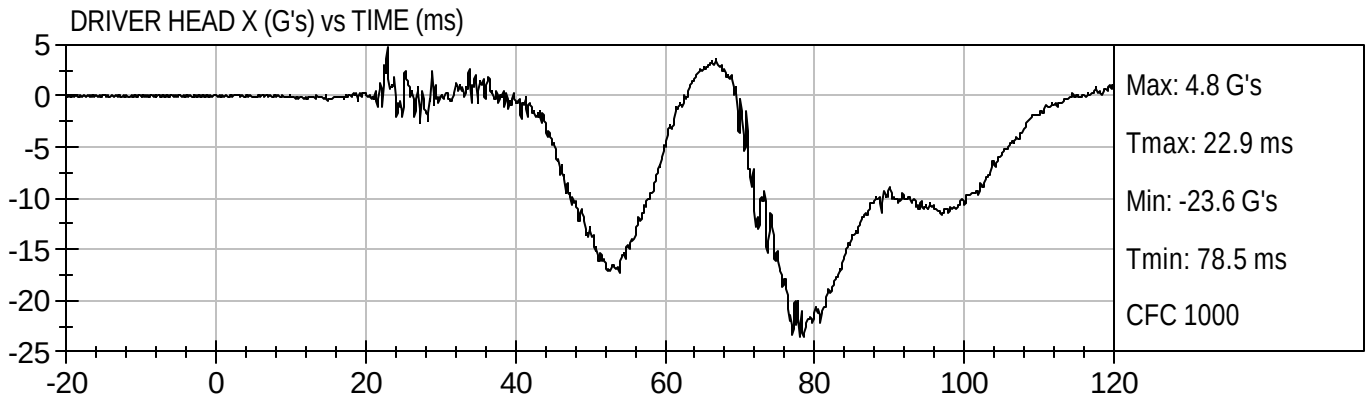
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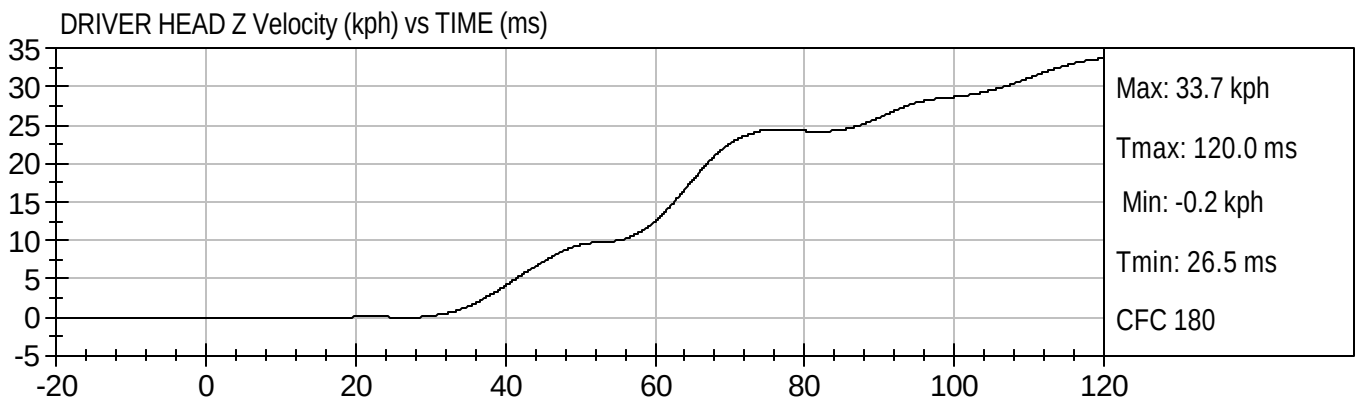
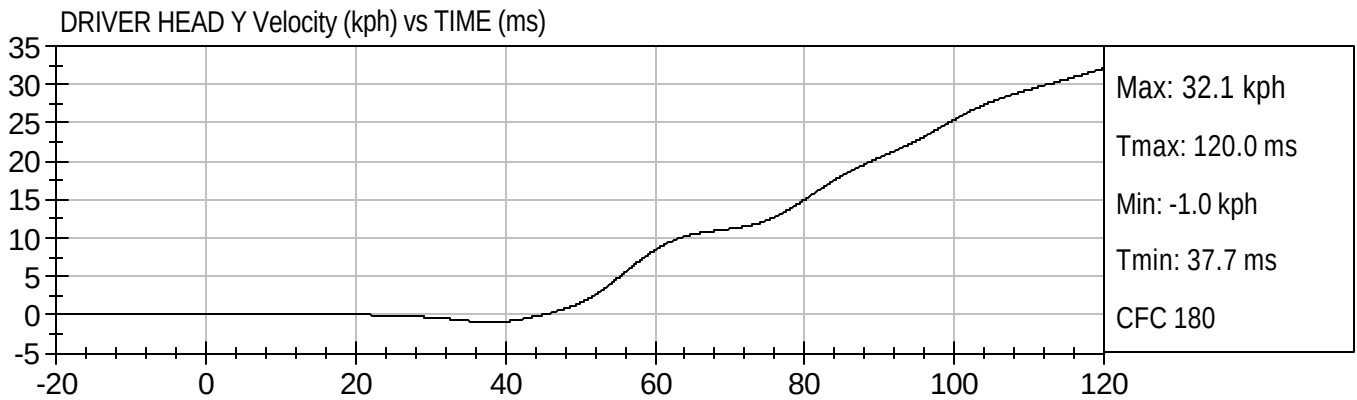
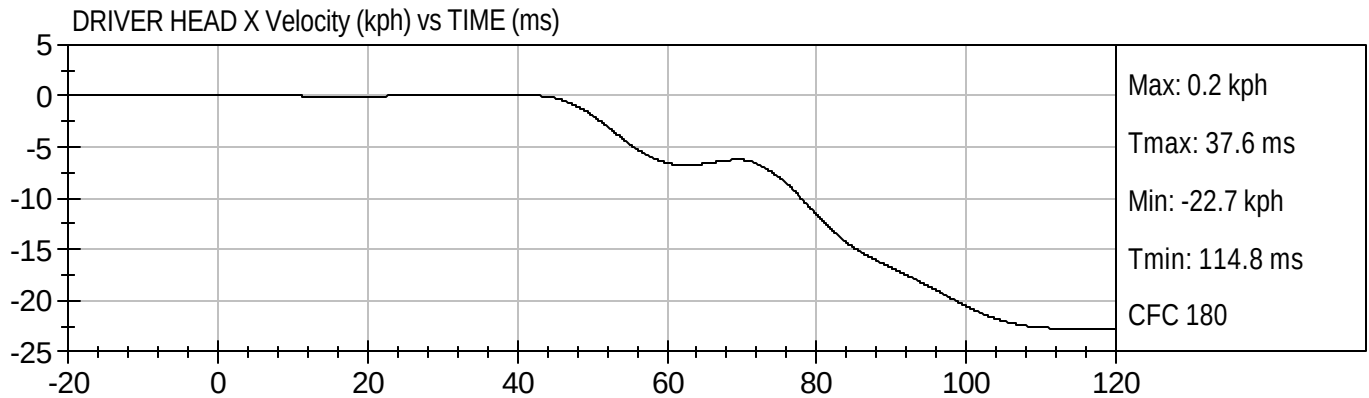
* No Valid Data After Approximately 8 msec.

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* Electrical Spike removed from 13 to 17 msec.

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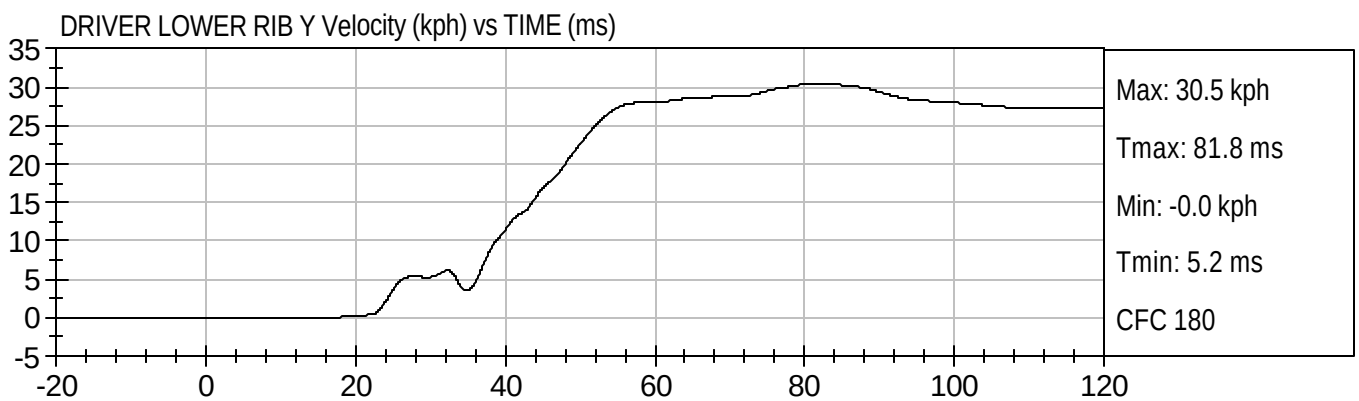
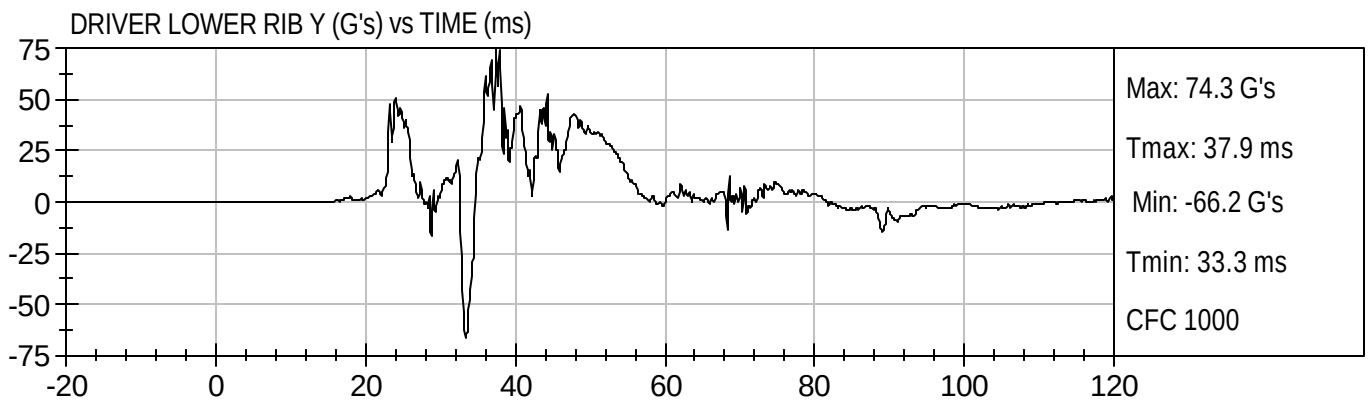
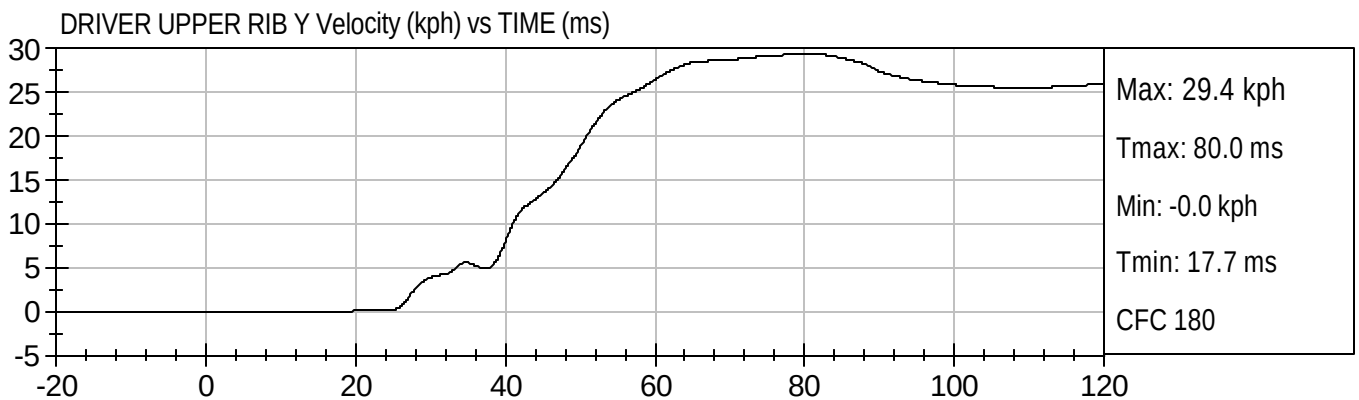
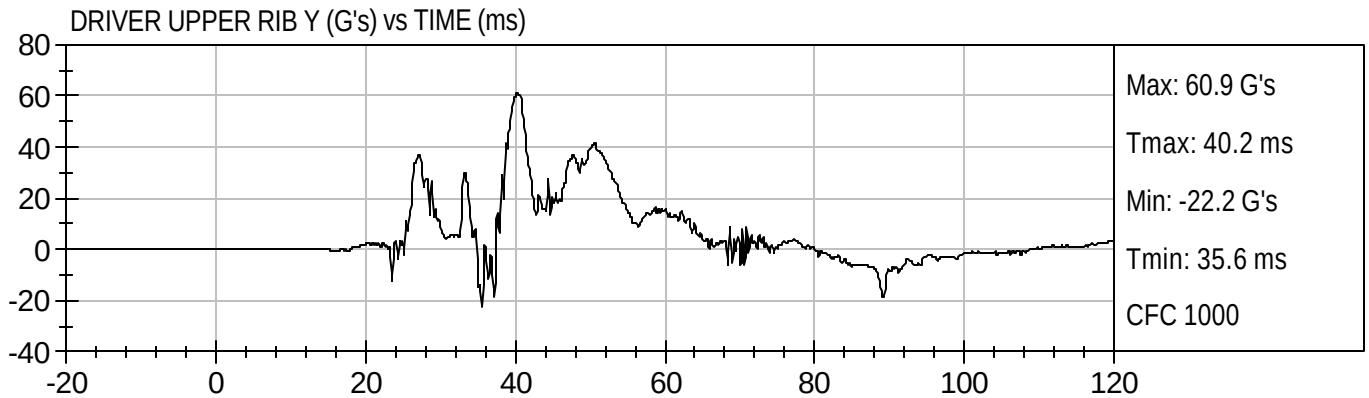


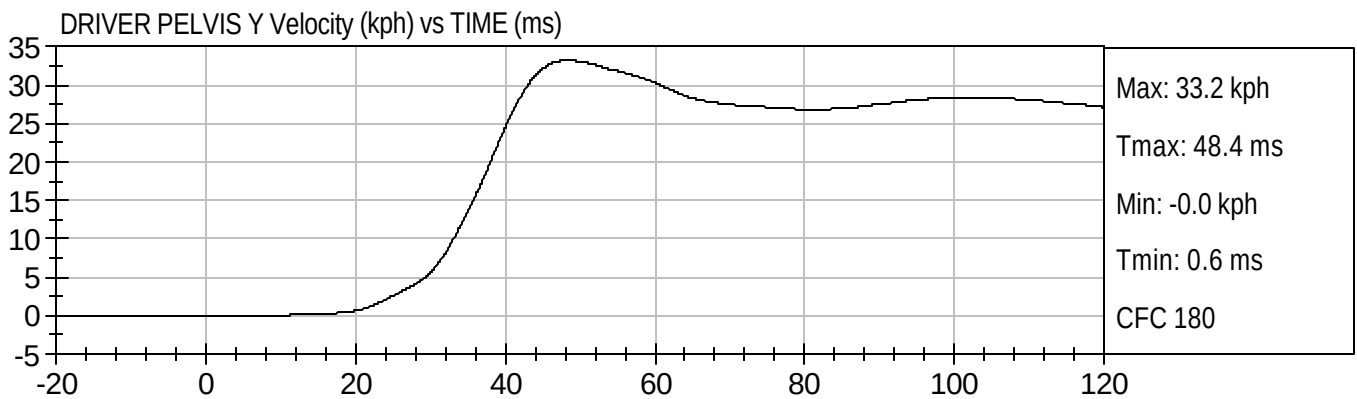
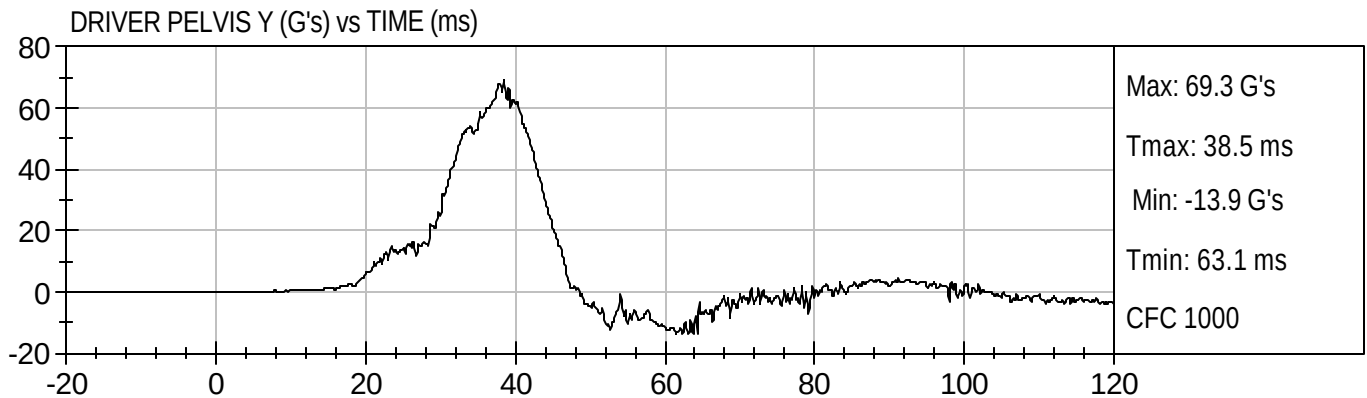
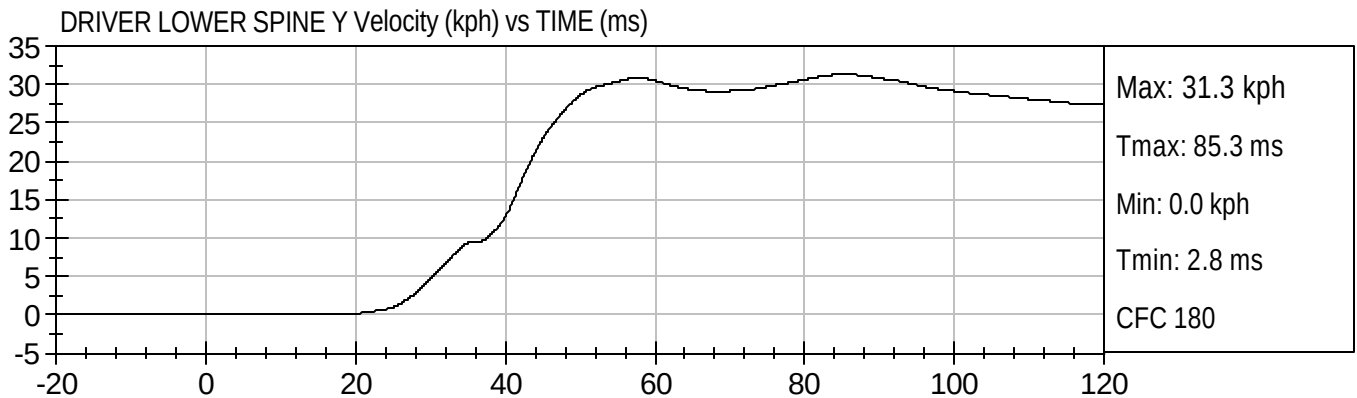
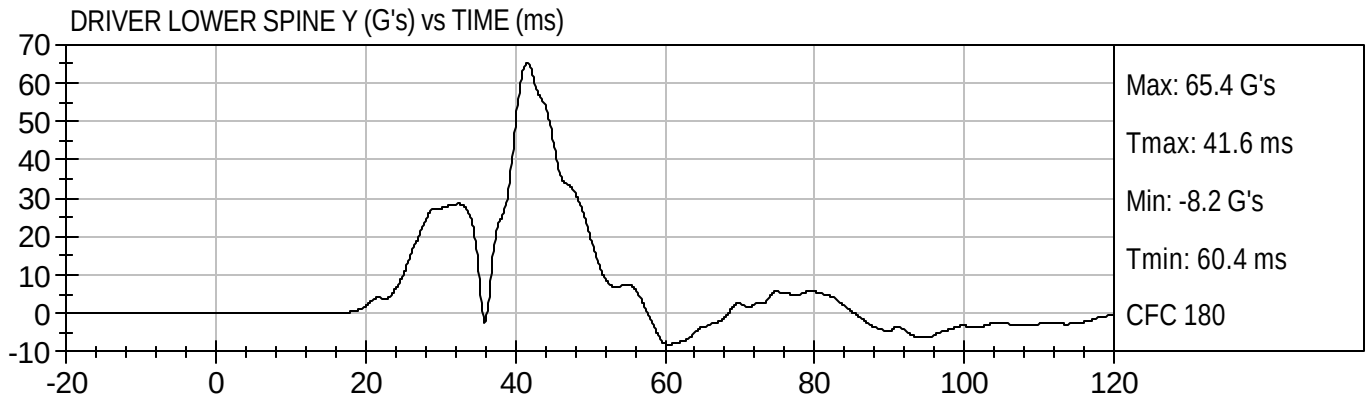




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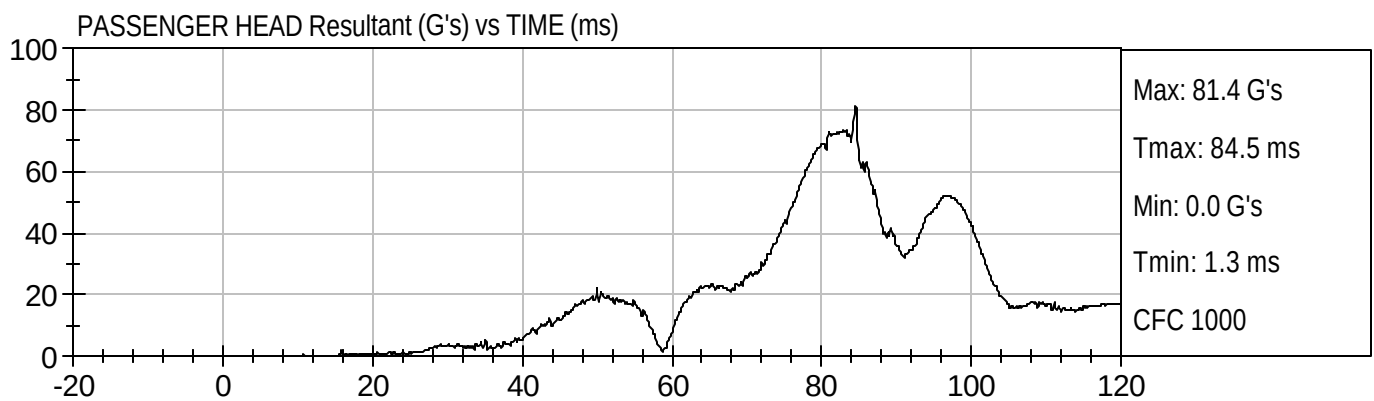
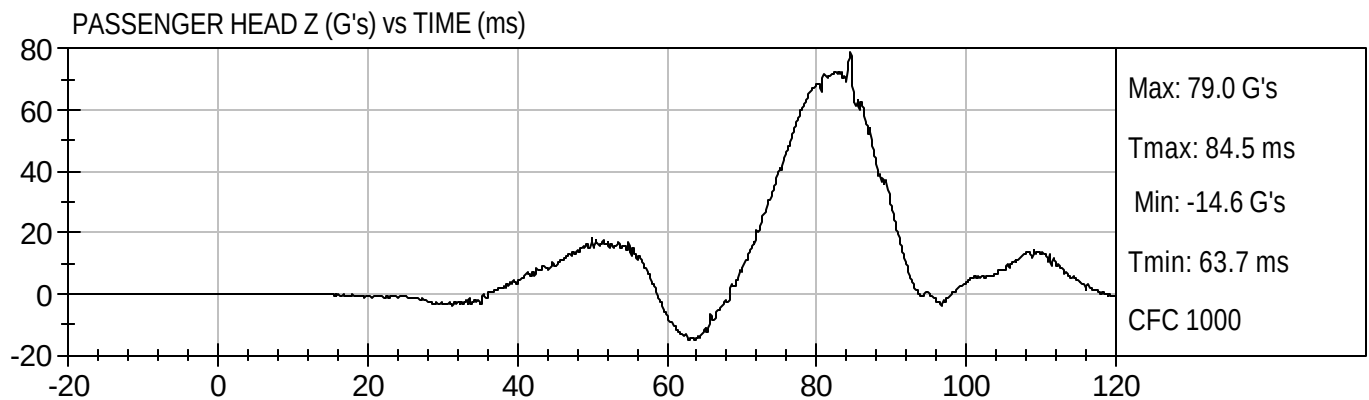
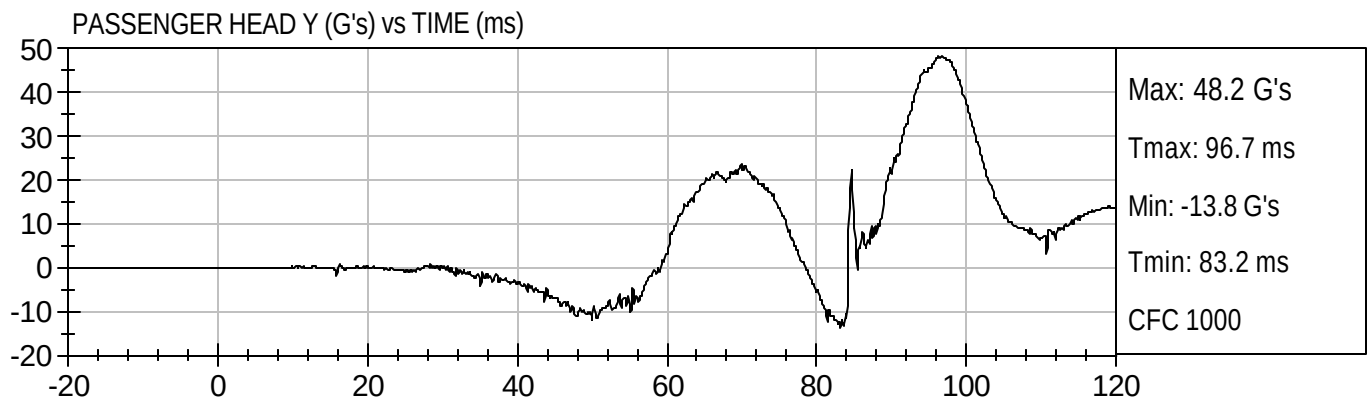
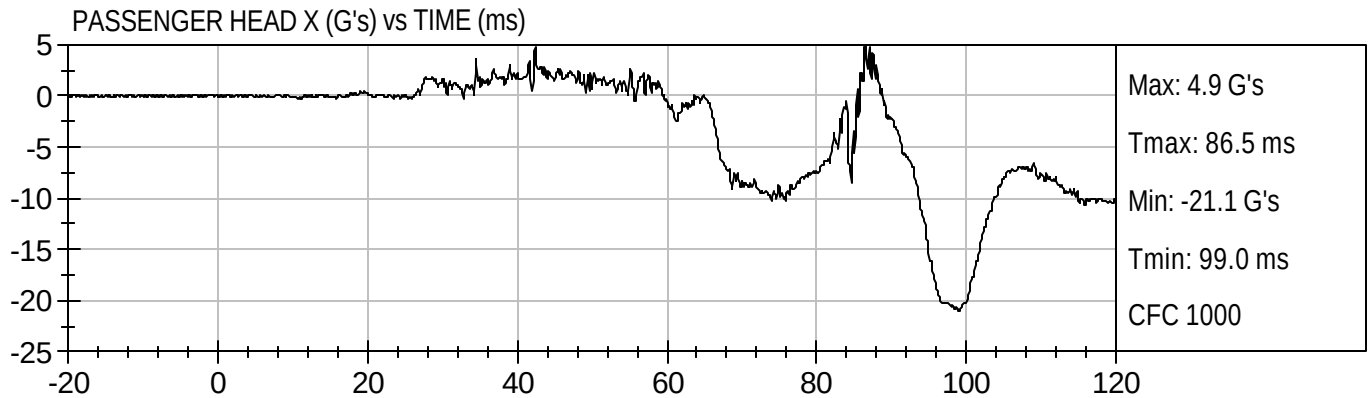


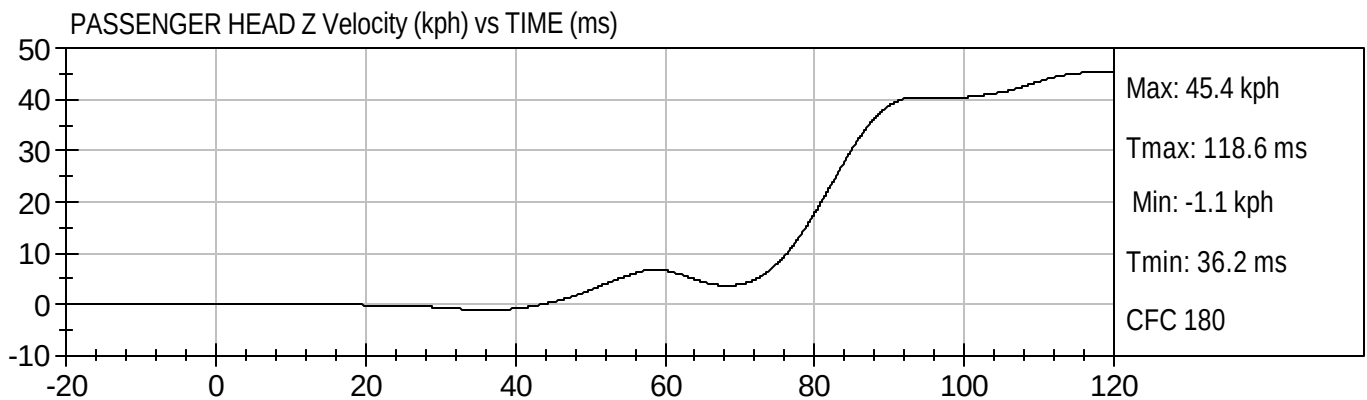
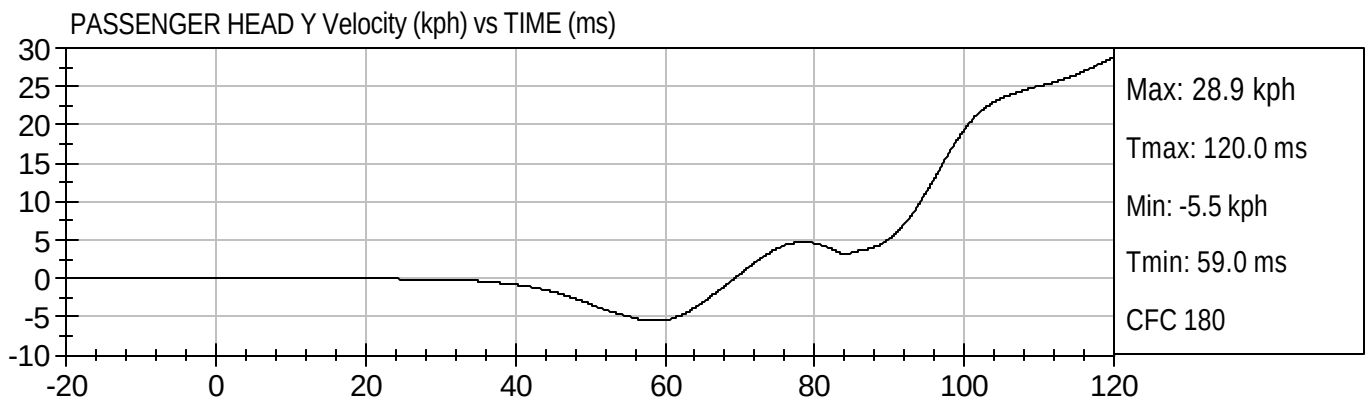
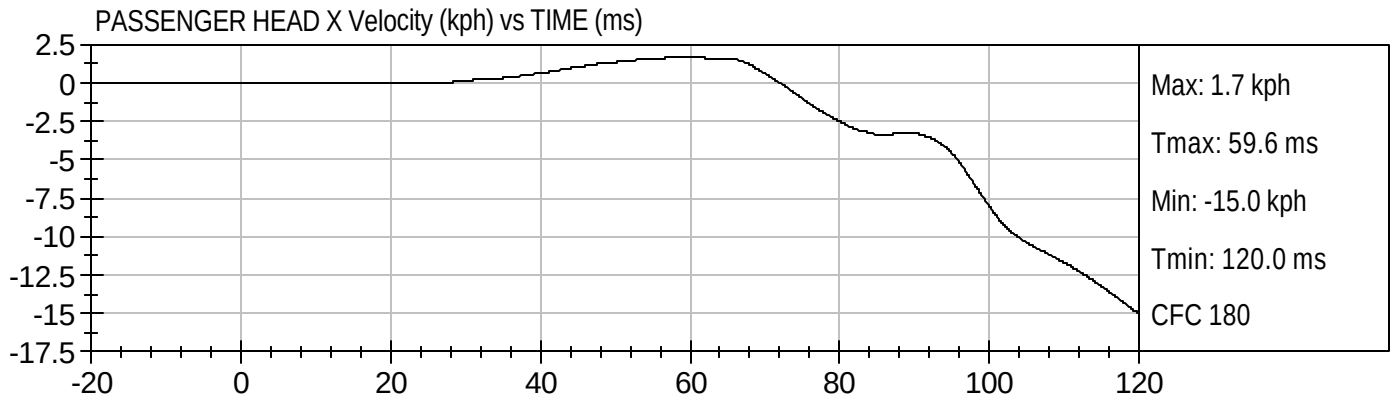




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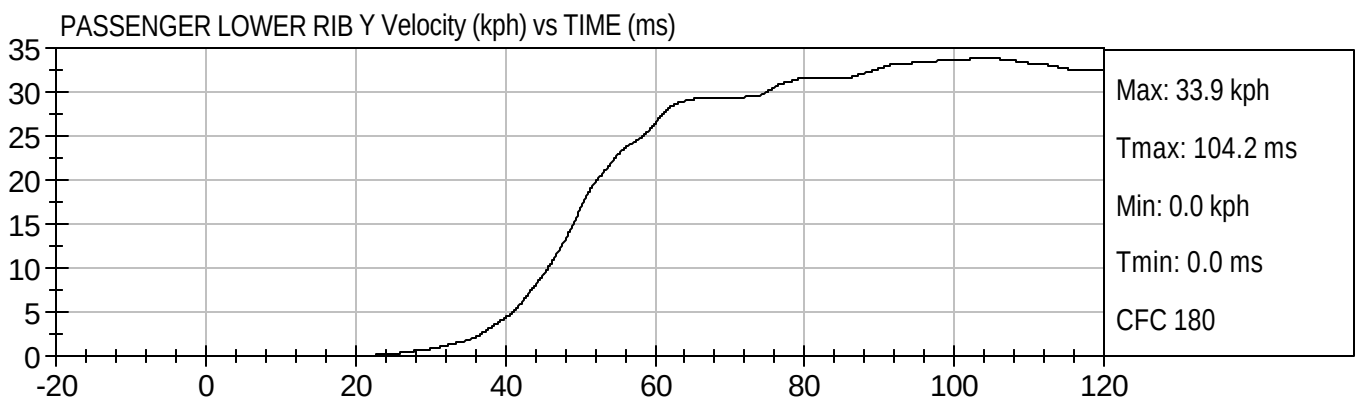
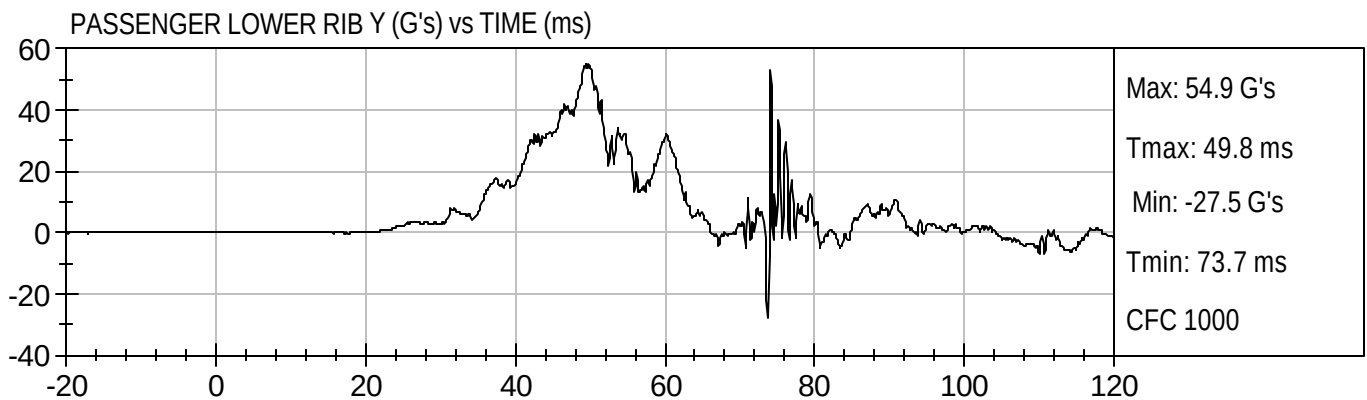
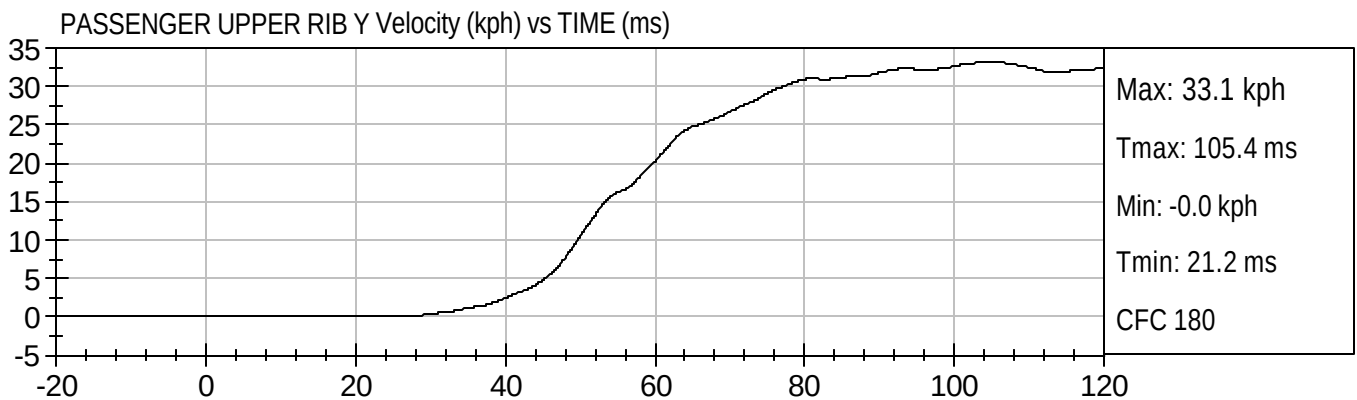
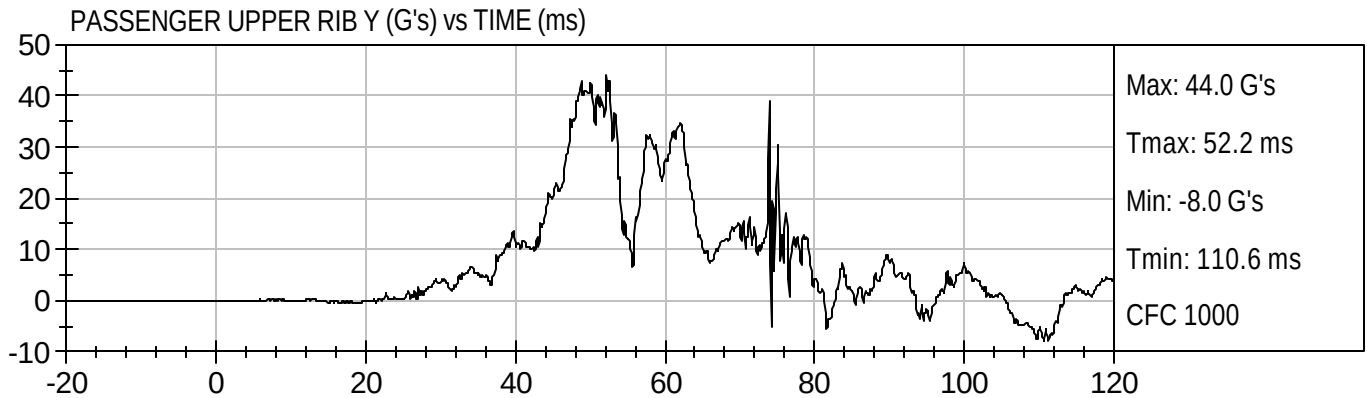






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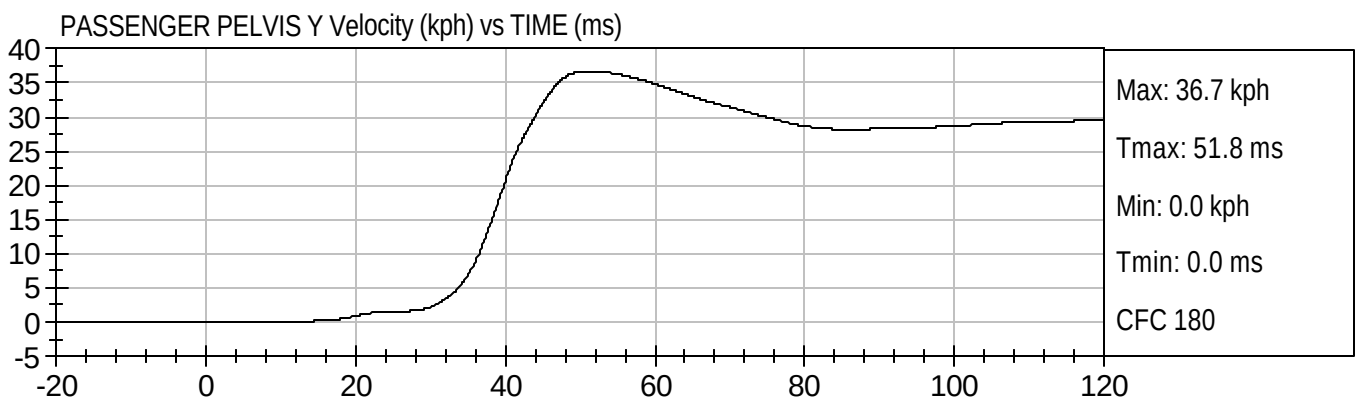
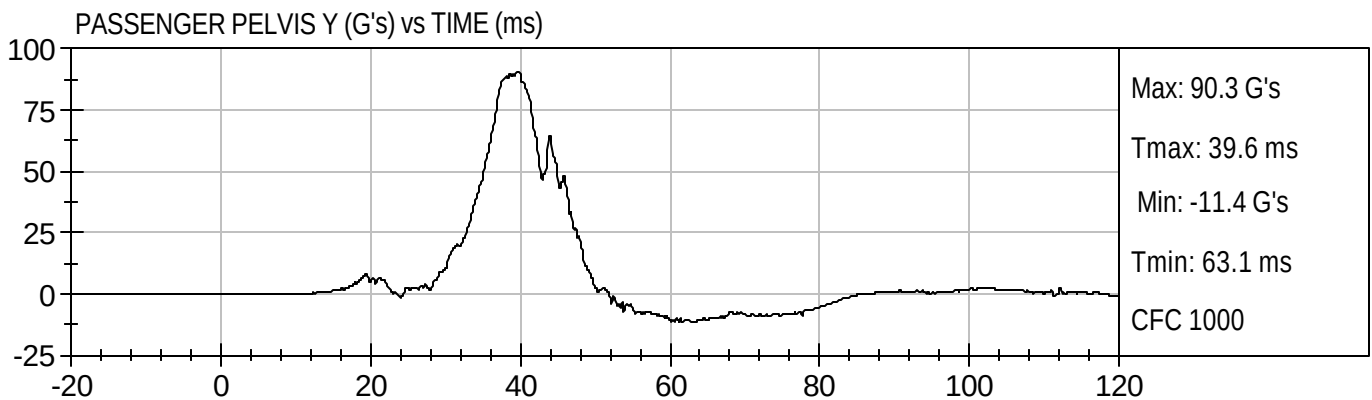
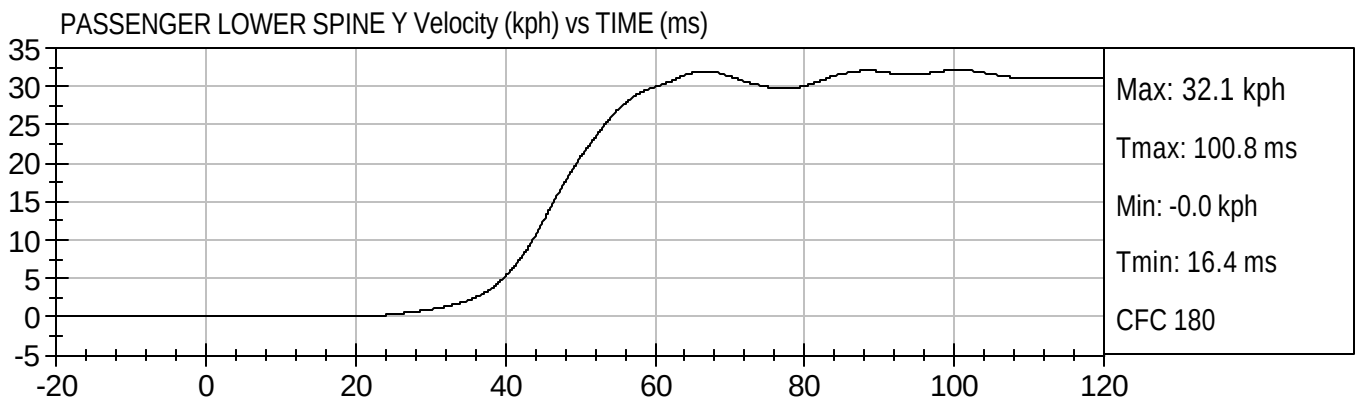
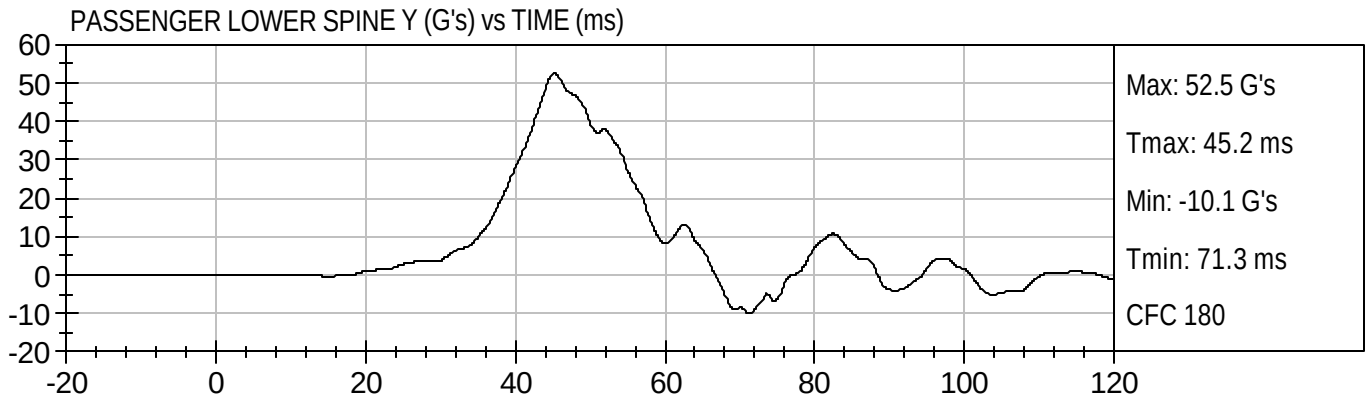
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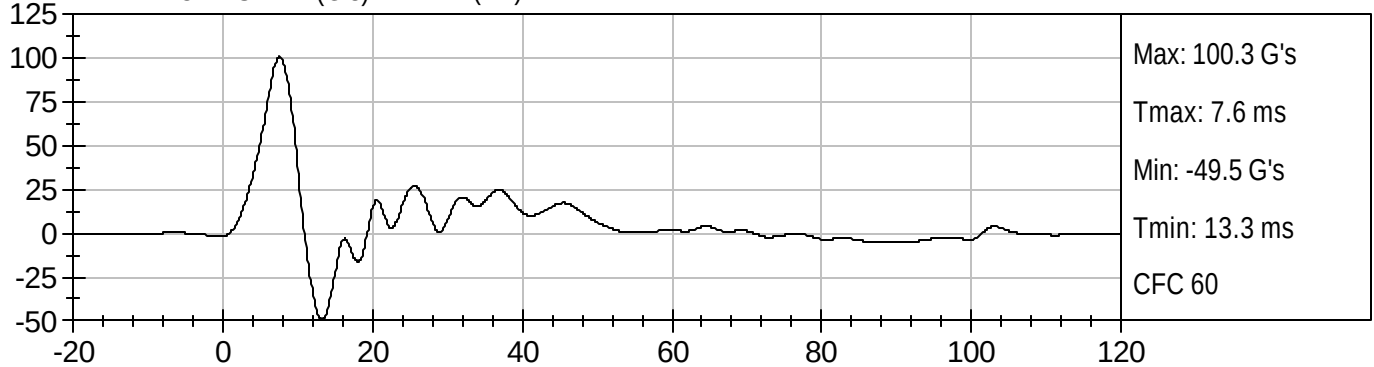




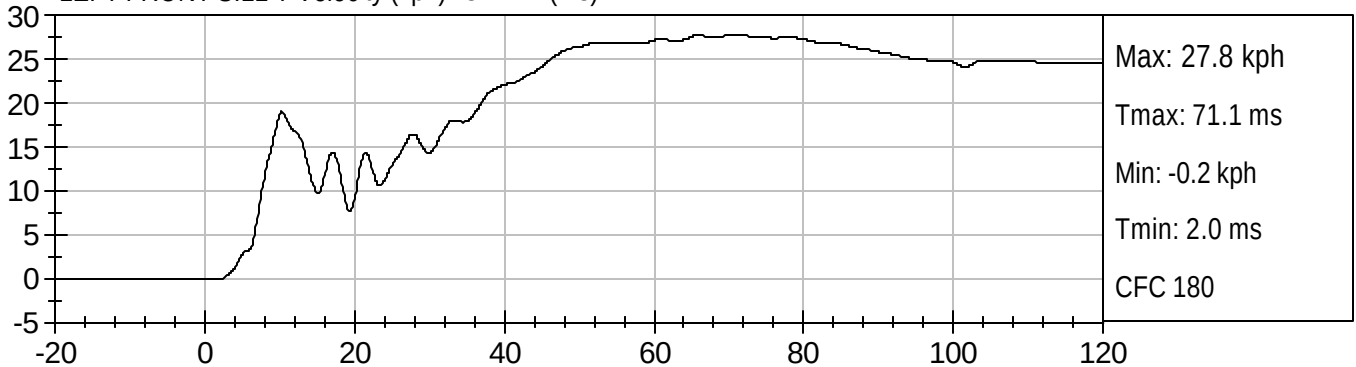
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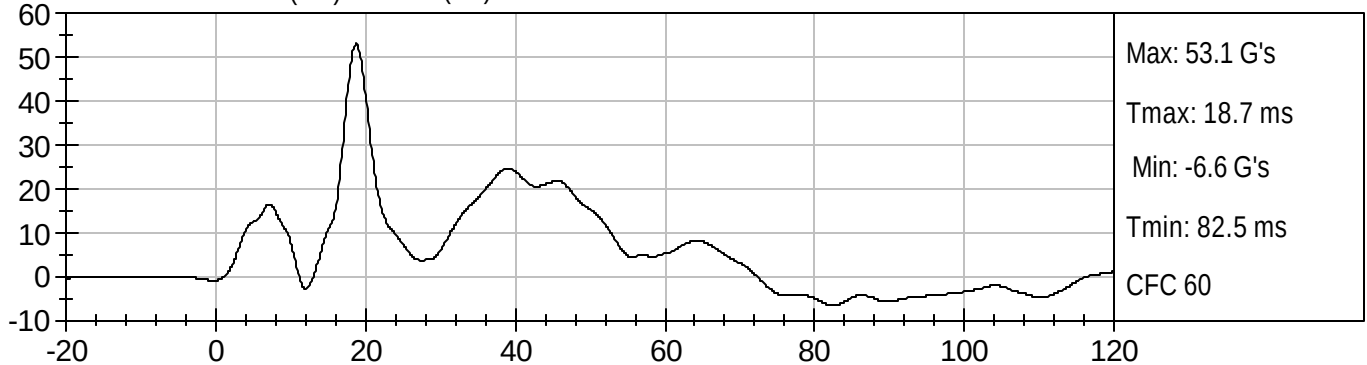
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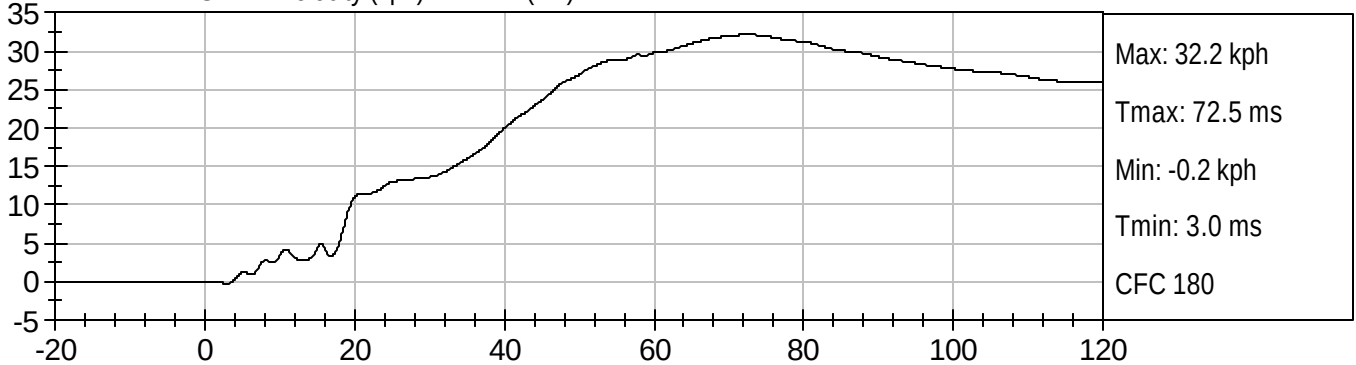
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LEFT REAR SILL Y (G's) vs TIME (ms)



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

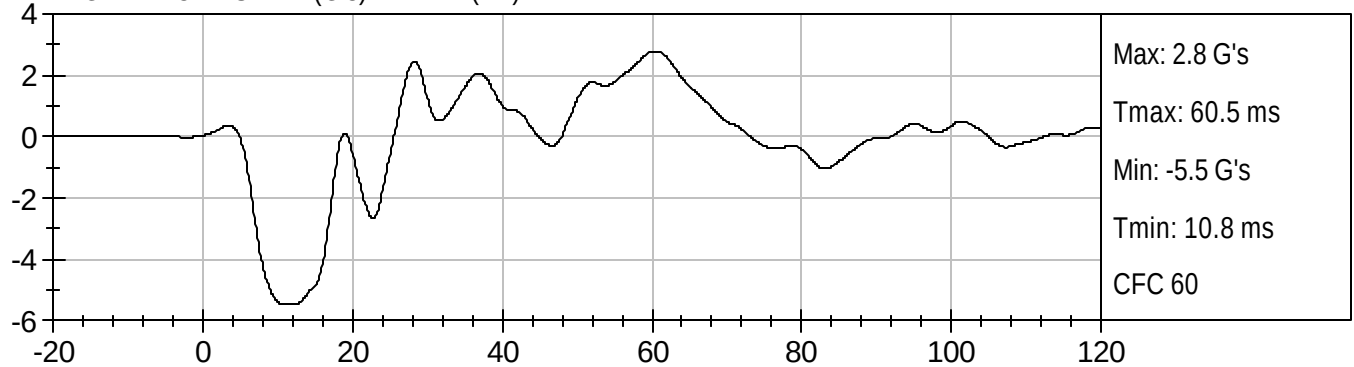




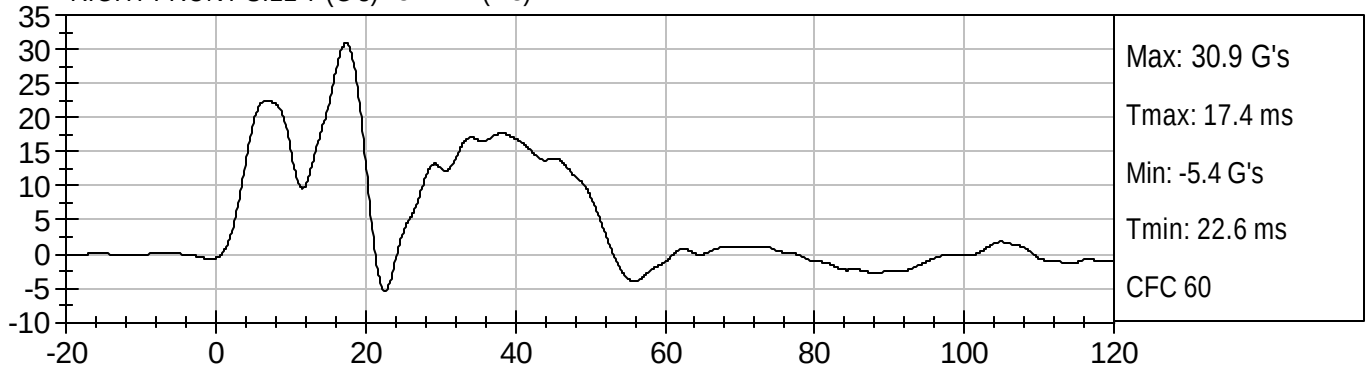
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2002 TOYOTA HIGHLANDER (C25107)

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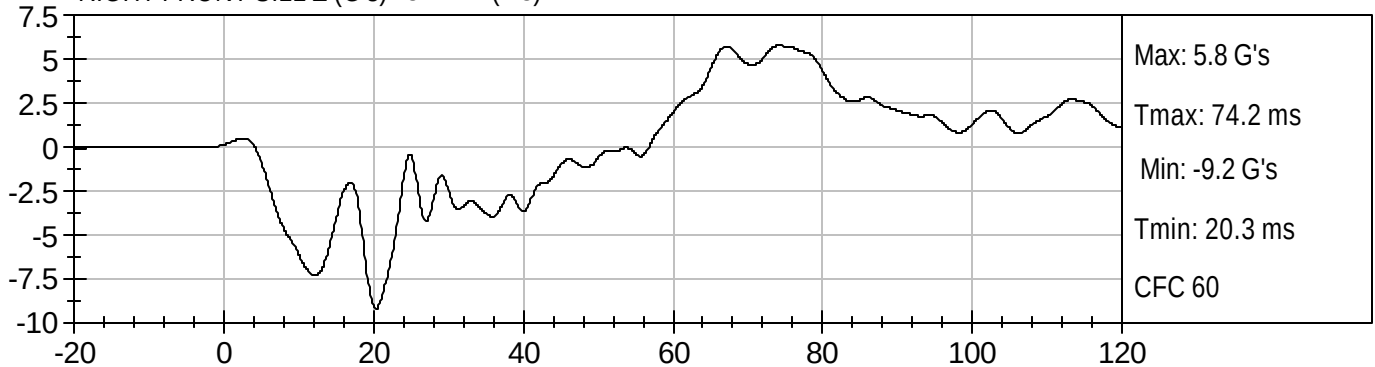
RIGHT FRONT SILL X (G's) vs TIME (ms)



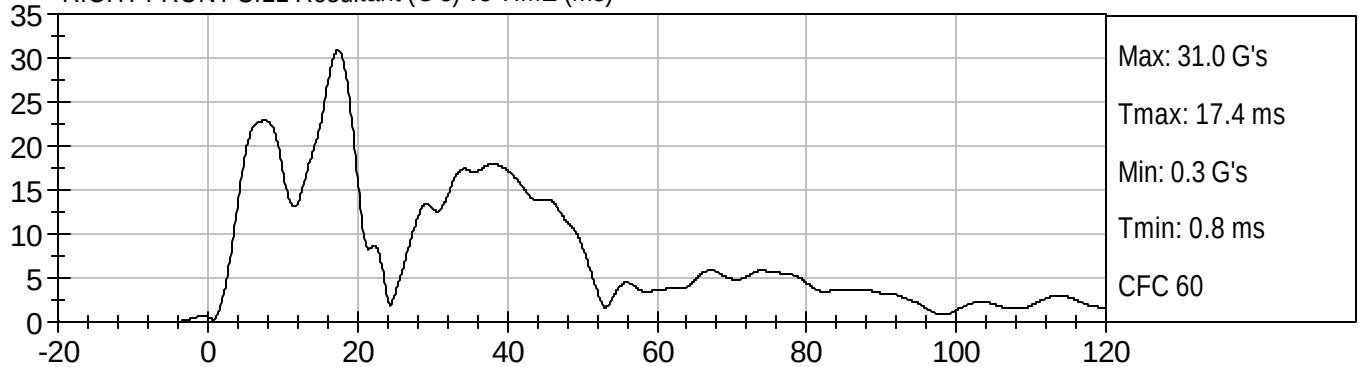
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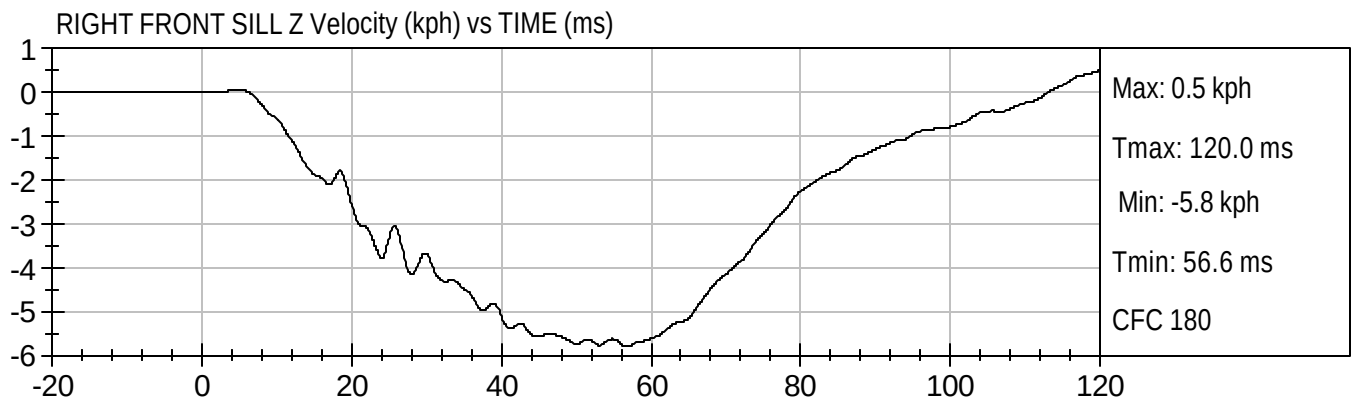
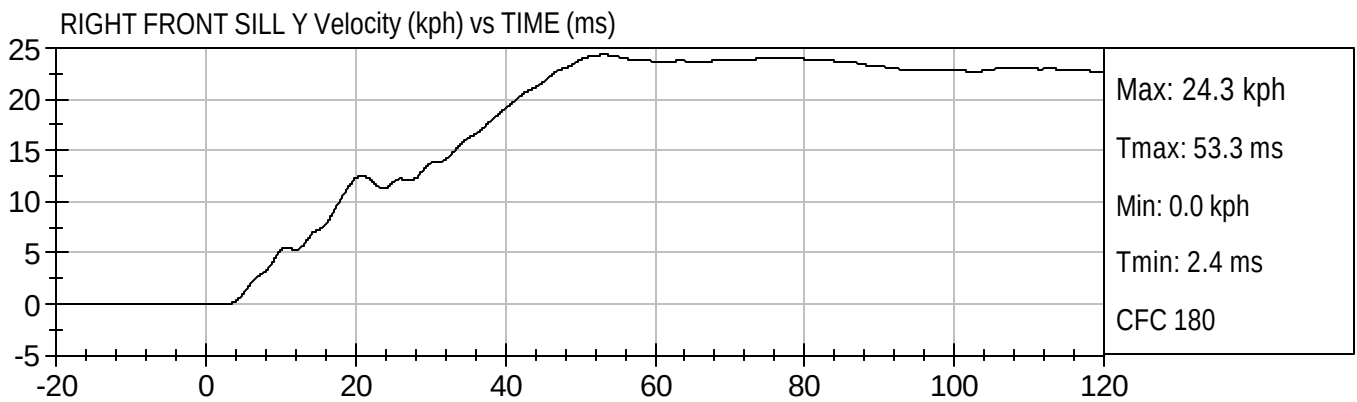
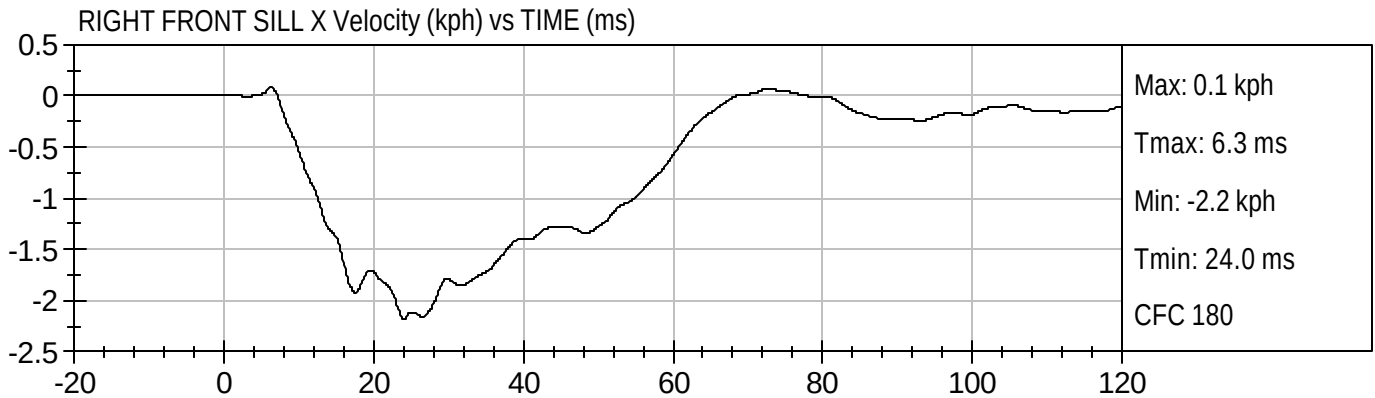


RIGHT FRONT SILL Z (G's) vs TIME (ms)



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



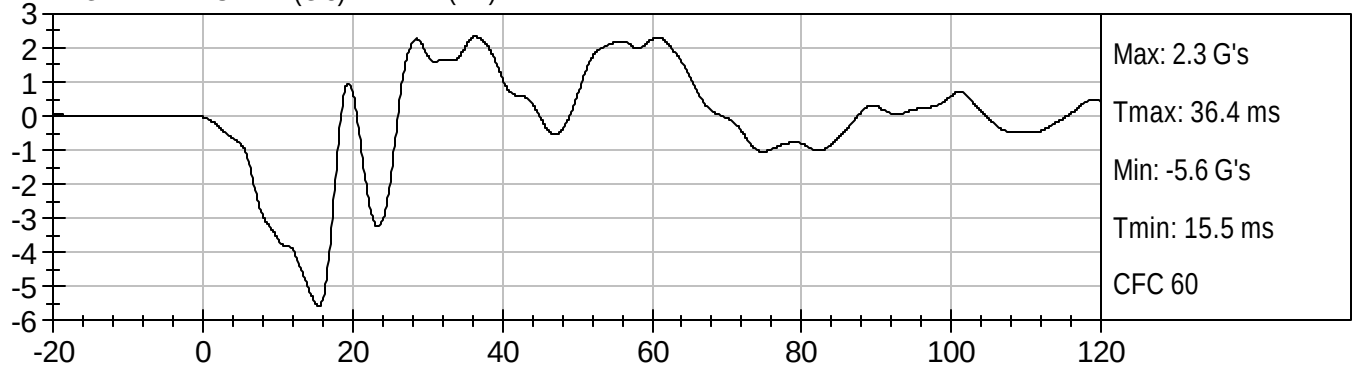




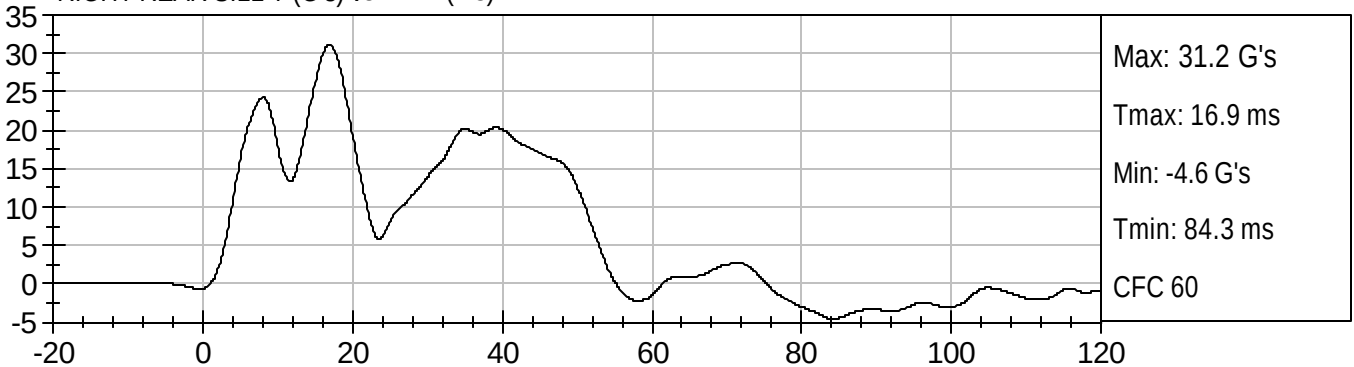
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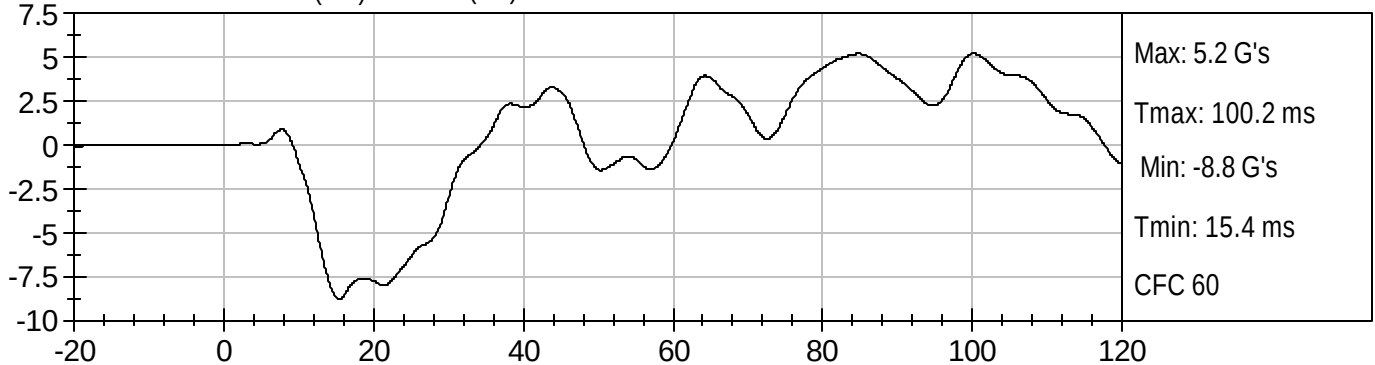
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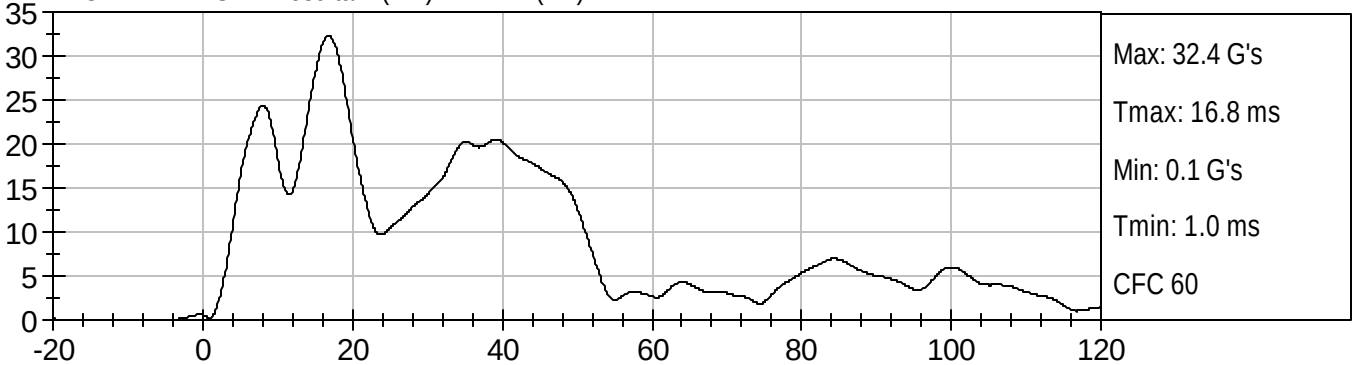
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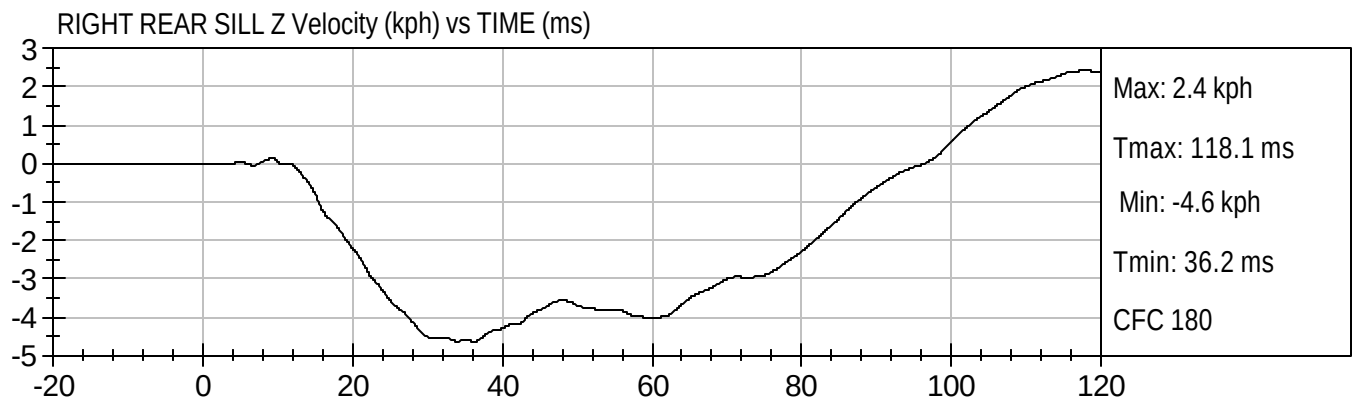
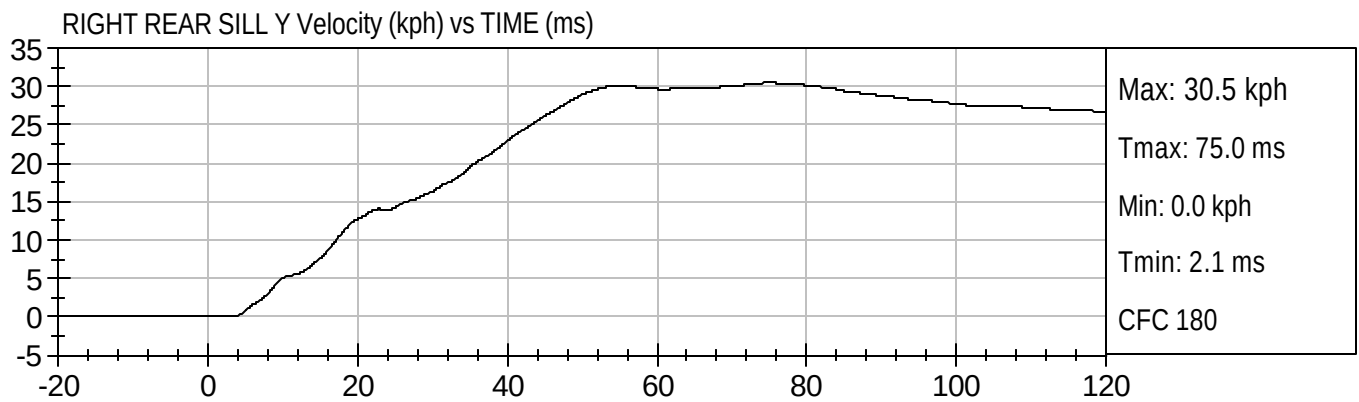
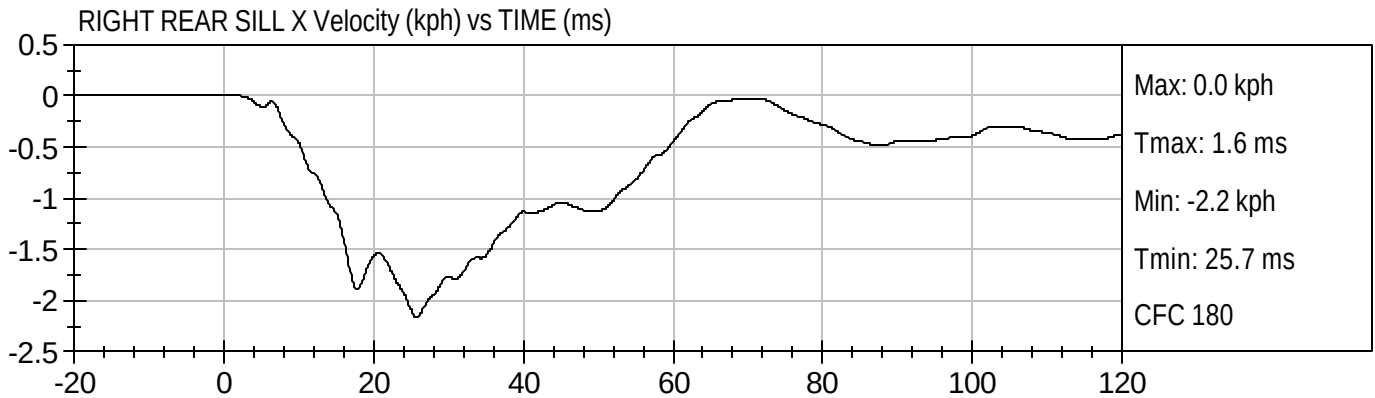


RIGHT REAR SILL Z (G's) vs TIME (ms)



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

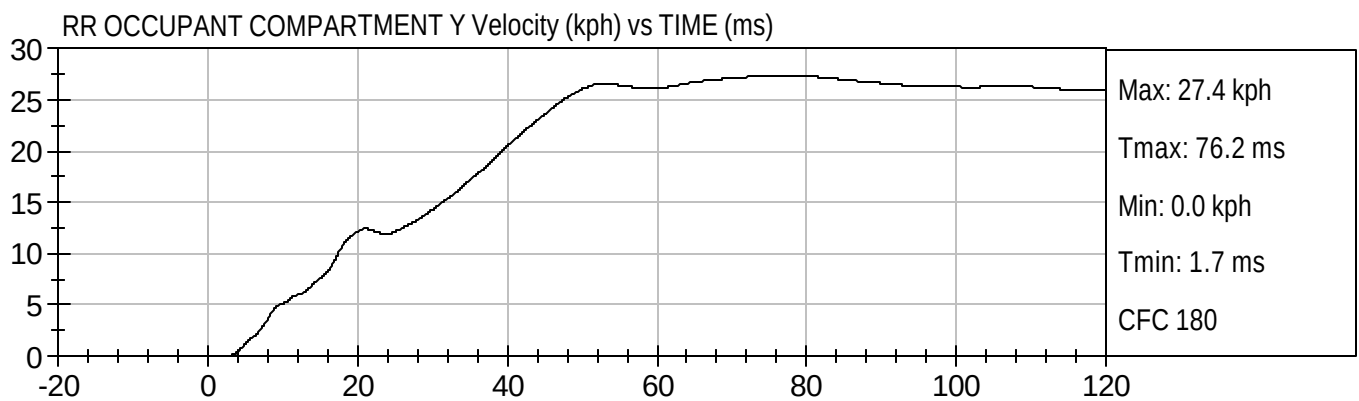
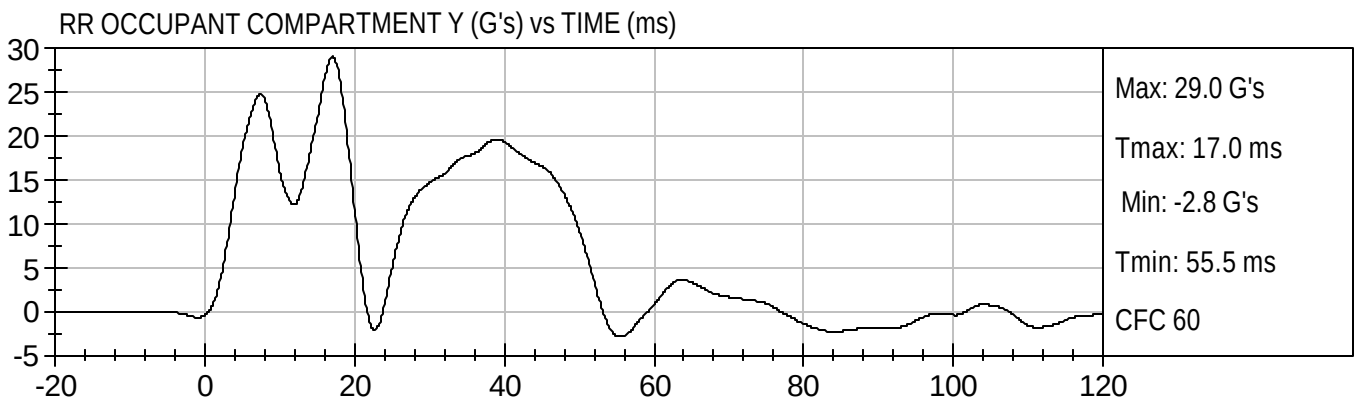
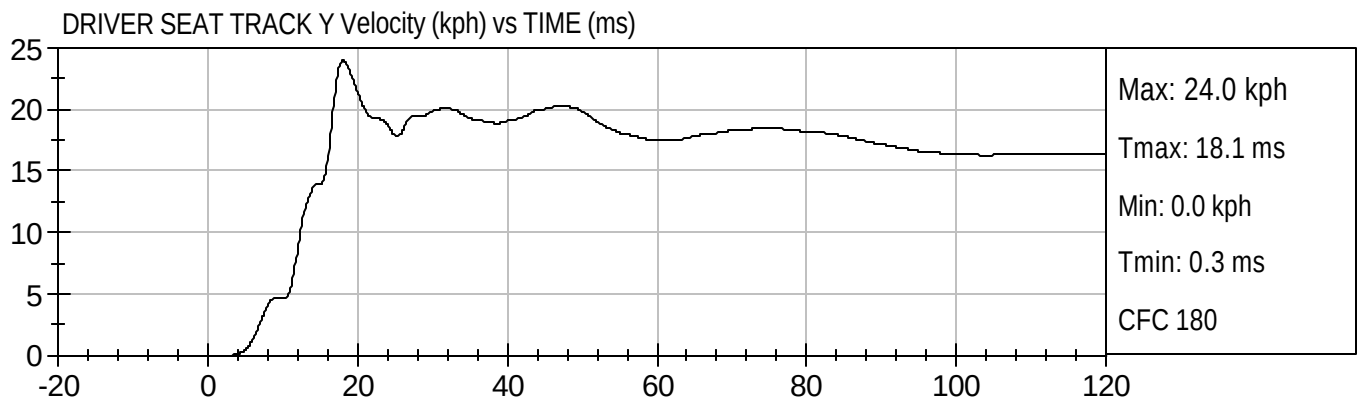
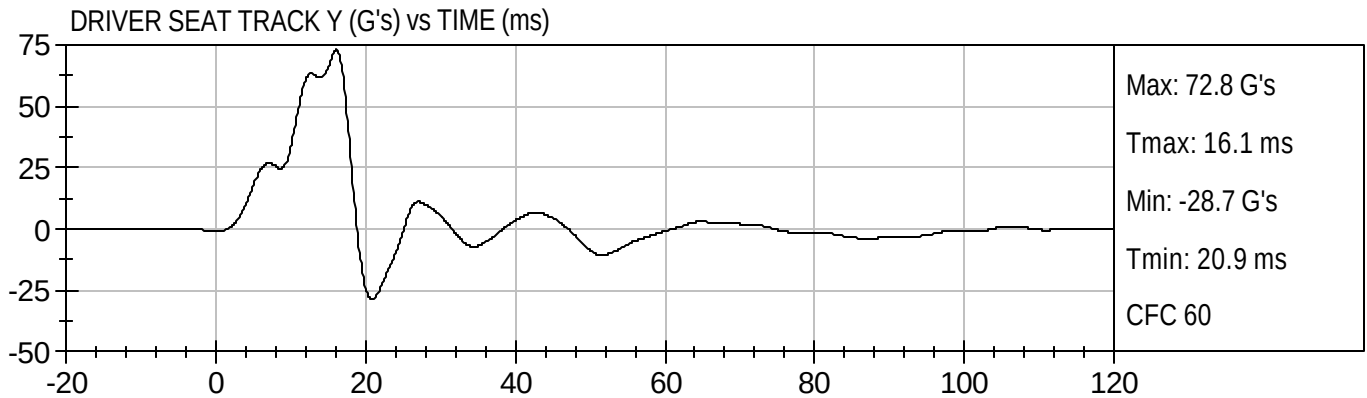


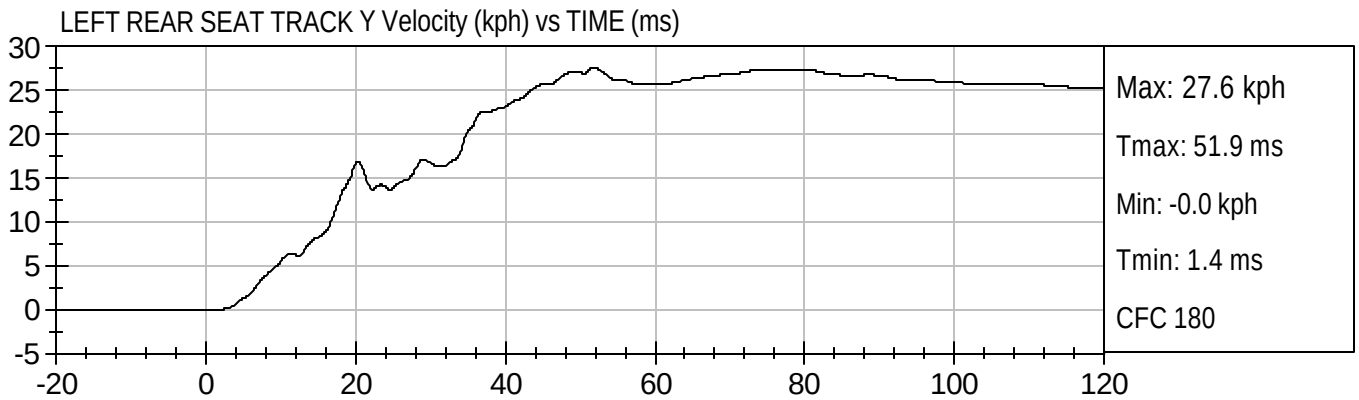
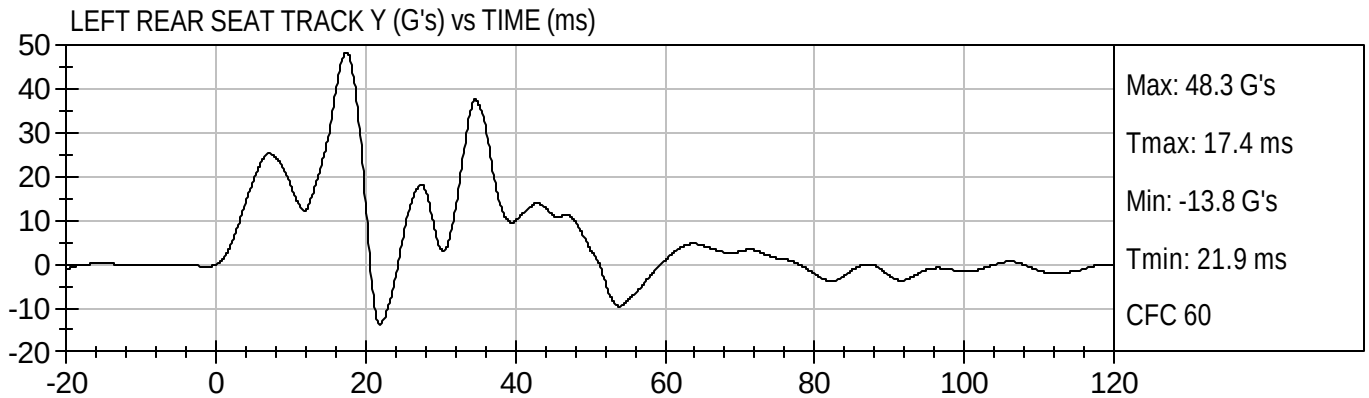




90 DEGREE INDICANT SIDE IMPACT
2002 TOYOTA HIGHLANDER (C25107)

Test Date: 4/2/02
Speed: 38.7 mph (62.3 km/h)



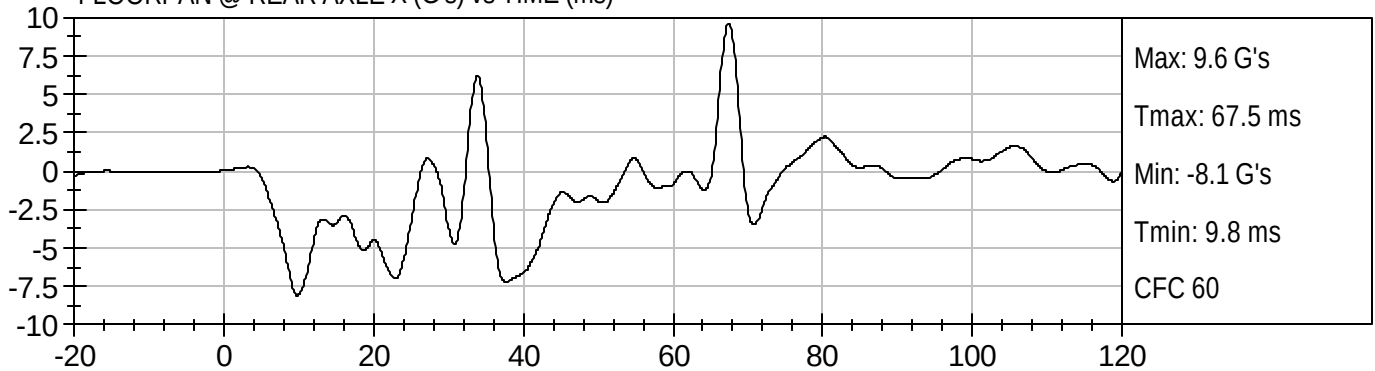




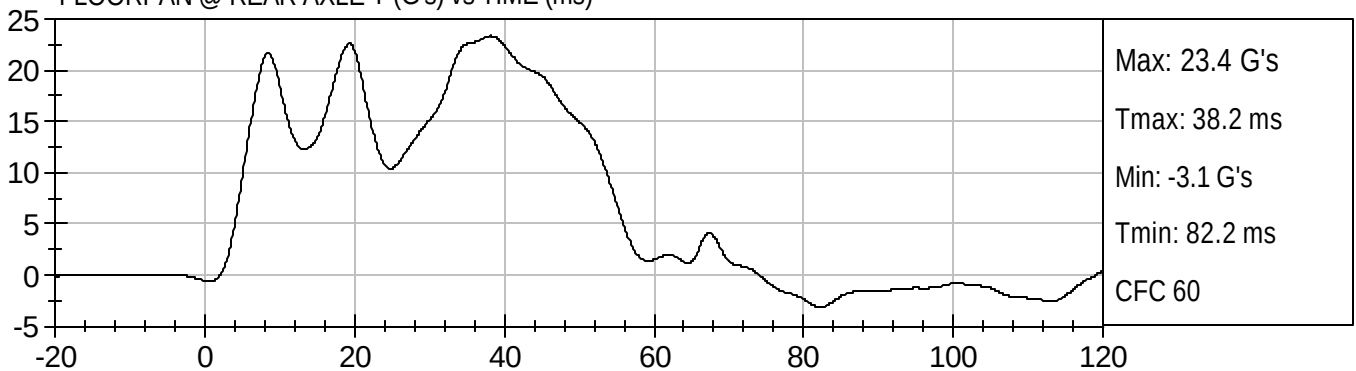
90 DEGREE INDICANT SIDE IMPACT
2002 TOYOTA HIGHLANDER (C25107)

Test Date: 4/2/02
Speed: 38.7 mph (62.3 km/h)

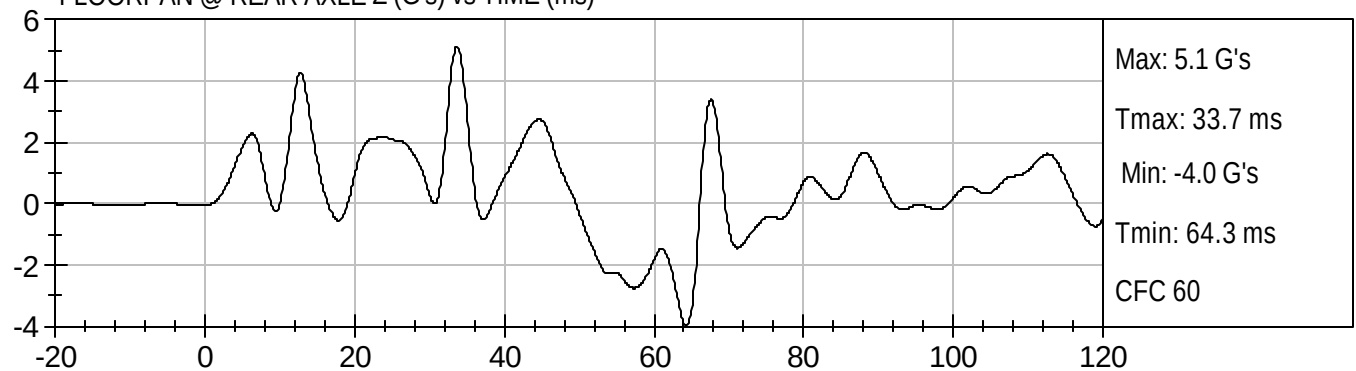
FLOORPAN @ REAR AXLE X (G's) vs TIME (ms)



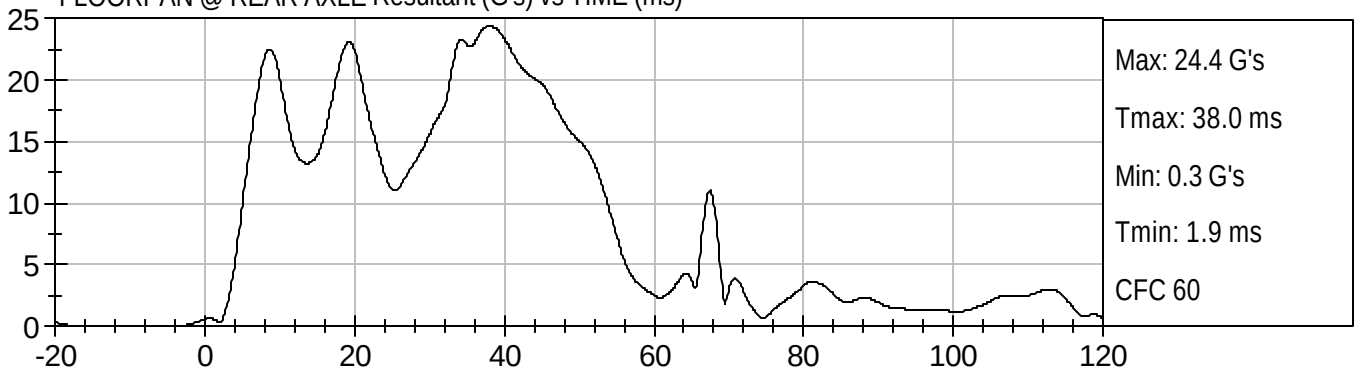
FLOORPAN @ REAR AXLE Y (G's) vs TIME (ms)



FLOORPAN @ REAR AXLE Z (G's) vs TIME (ms)

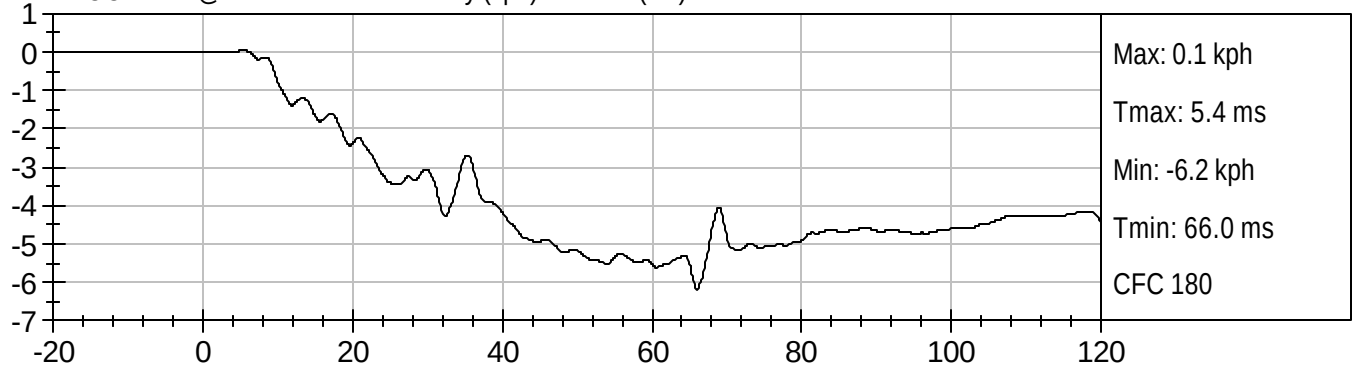


FLOORPAN @ REAR AXLE Resultant (G's) vs TIME (ms)

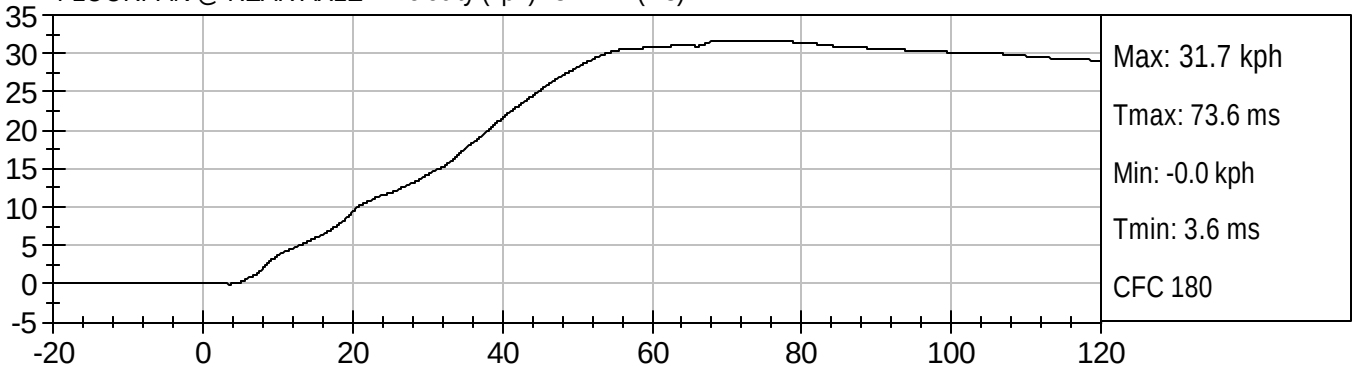




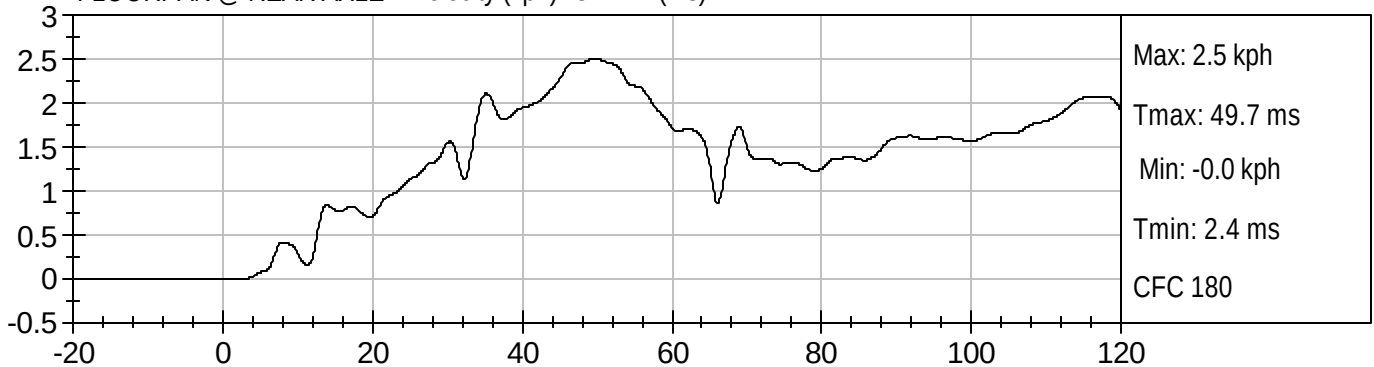
FLOORPAN @ REAR AXLE X Velocity (kph) vs TIME (ms)



FLOORPAN @ REAR AXLE Y Velocity (kph) vs TIME (ms)



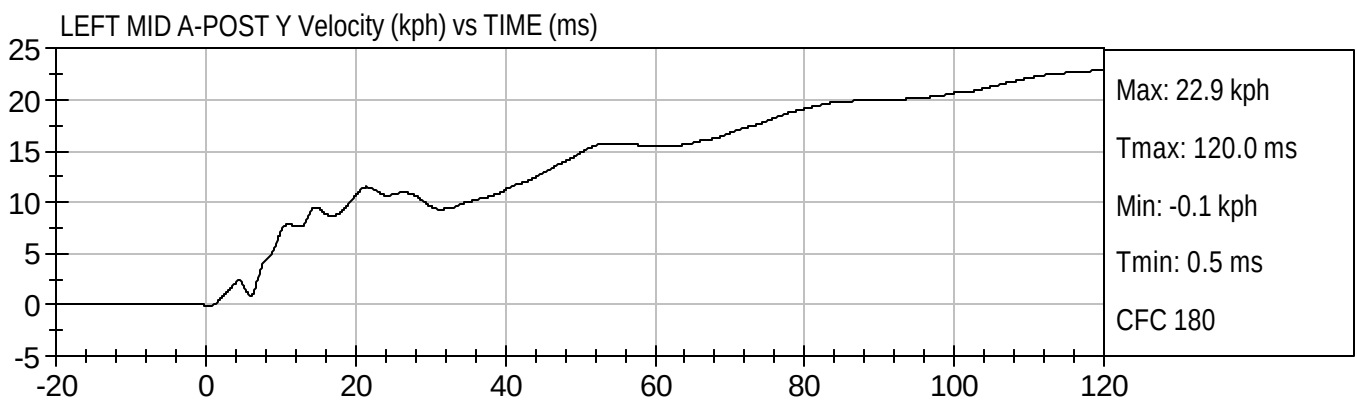
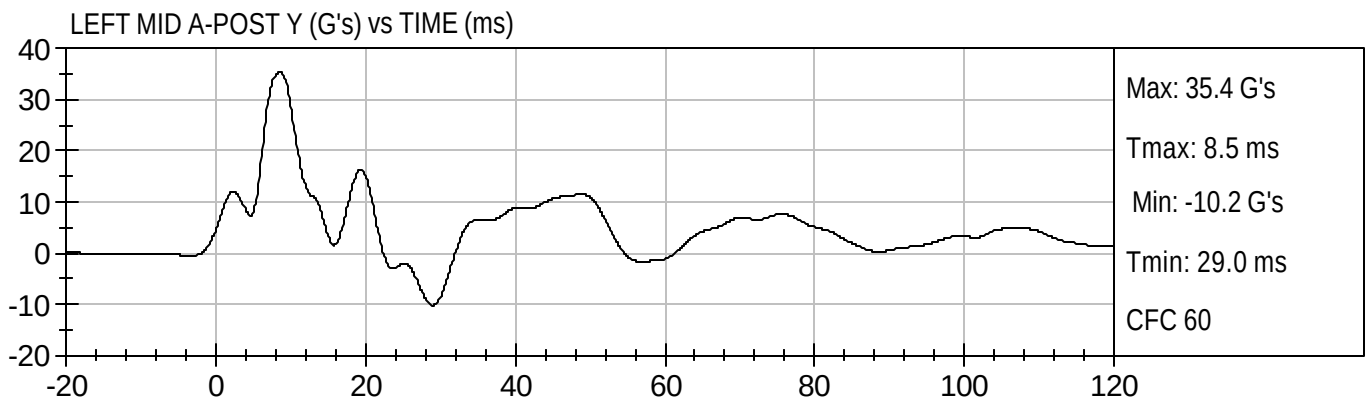
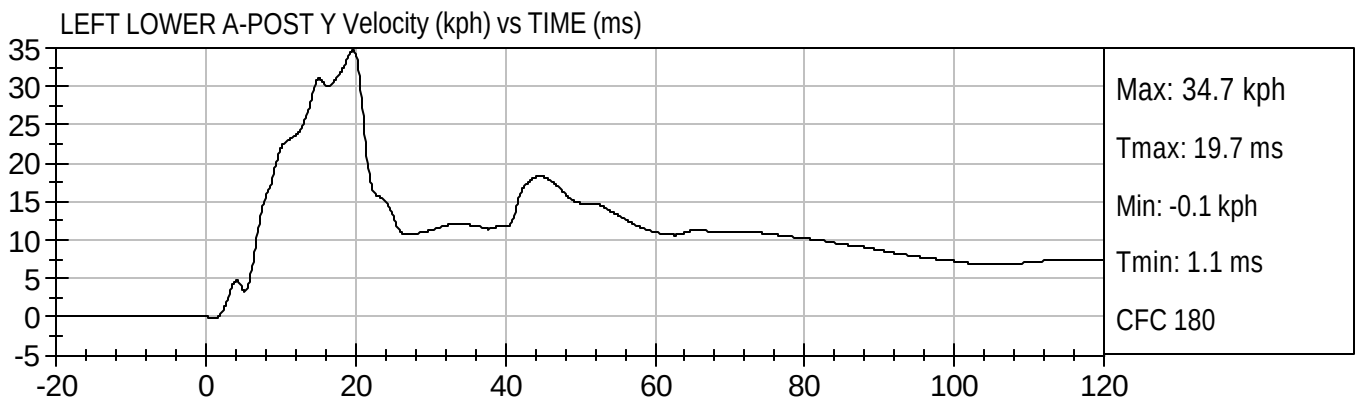
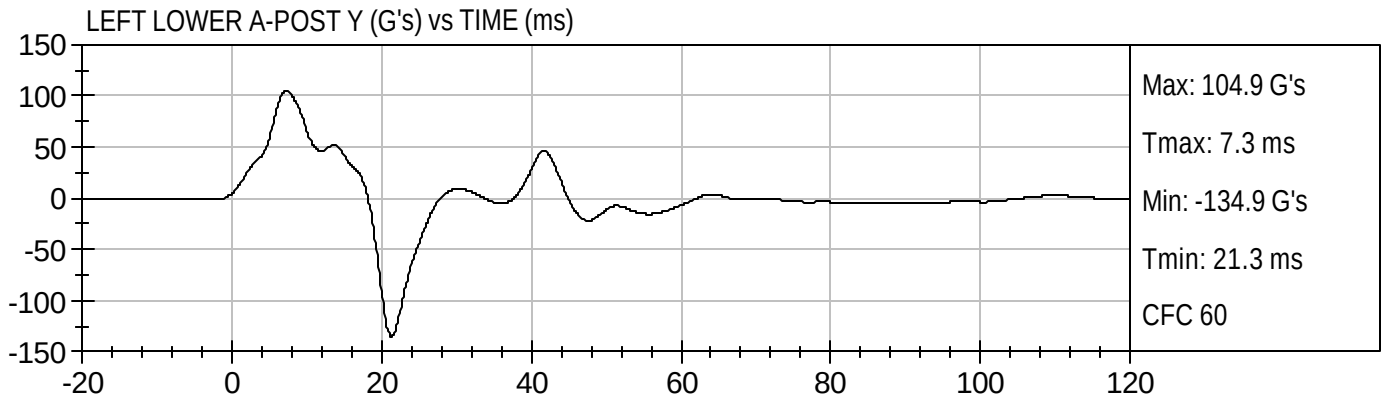
FLOORPAN @ REAR AXLE Z Velocity (kph) vs TIME (ms)





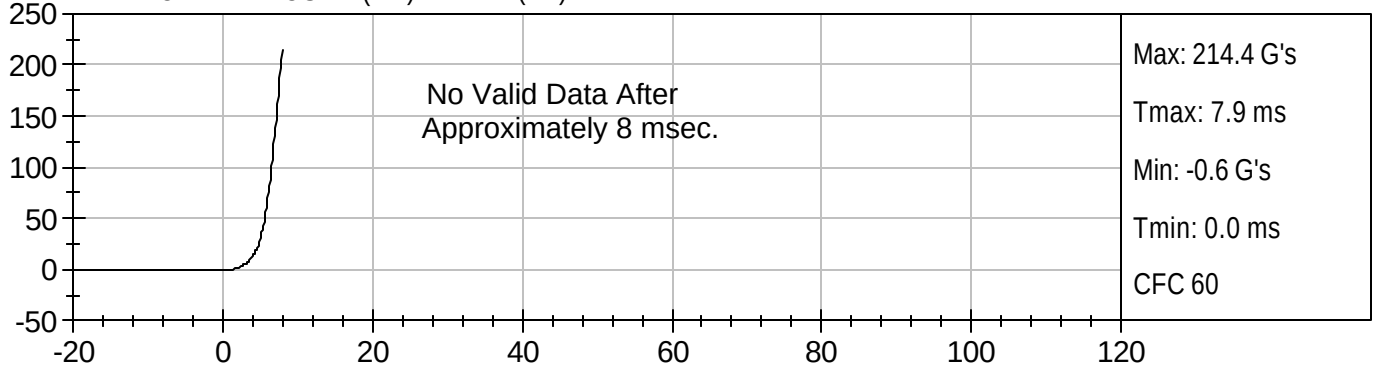
90 DEGREE INDICANT SIDE IMPACT
2002 TOYOTA HIGHLANDER (C25107)

Test Date: 4/2/02
Speed: 38.7 mph (62.3 km/h)

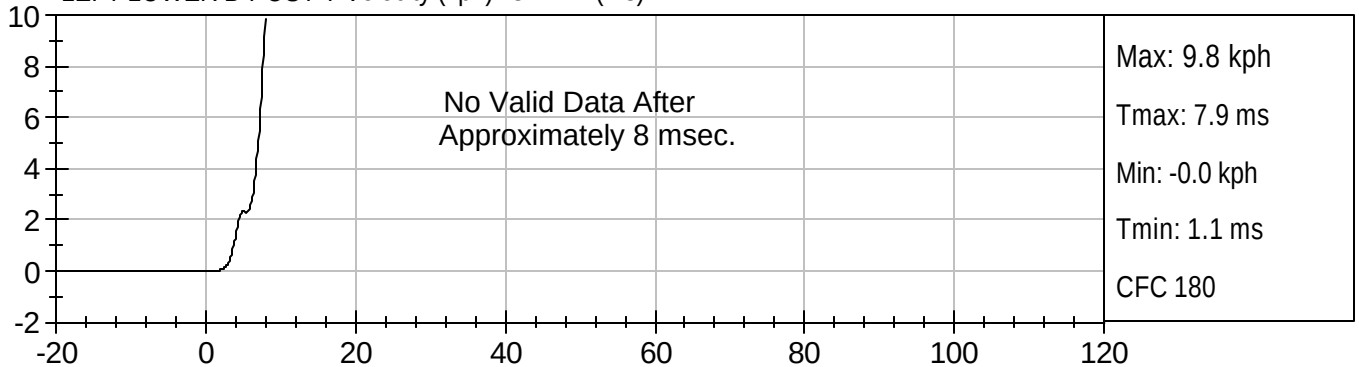




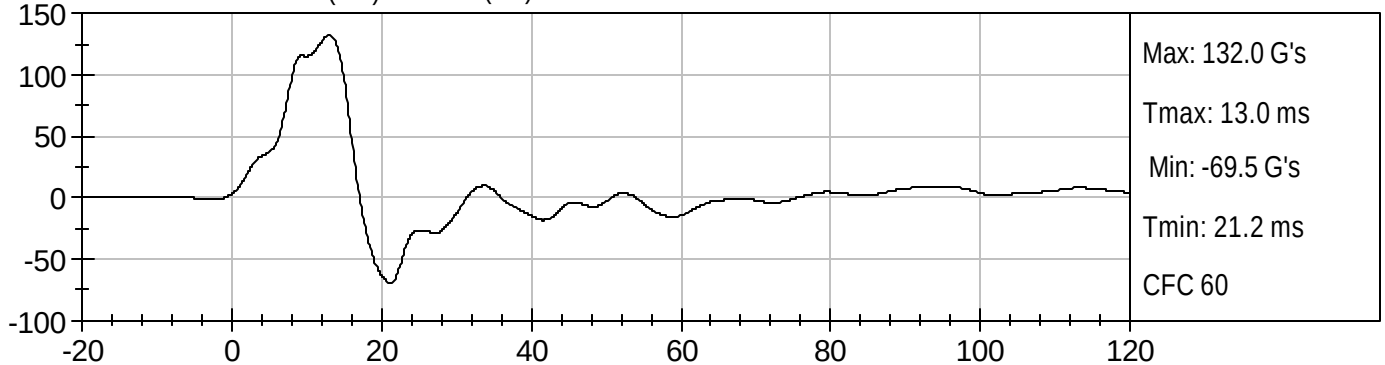
LEFT LOWER B-POST Y (G's) vs TIME (ms)



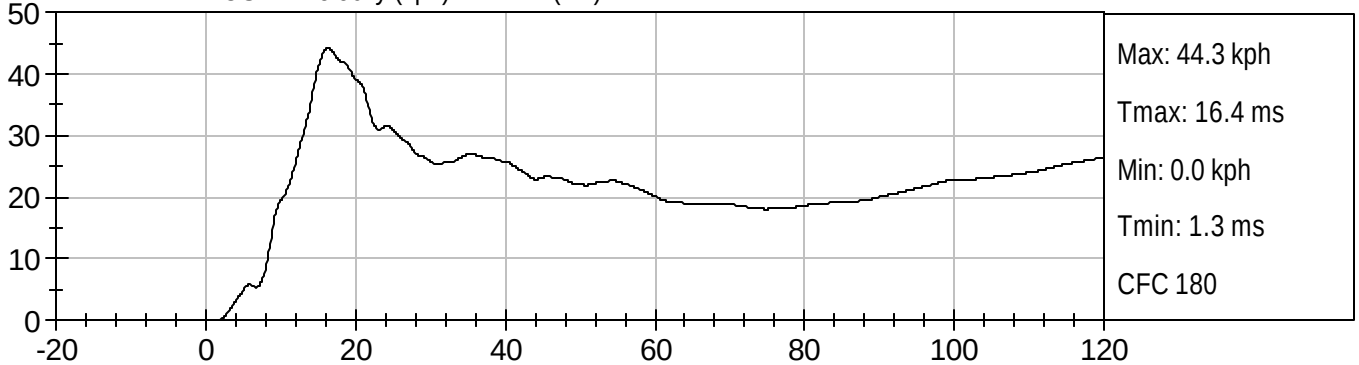
LEFT LOWER B-POST Y Velocity (kph) vs TIME (ms)



LEFT MID B-POST Y (G's) vs TIME (ms)



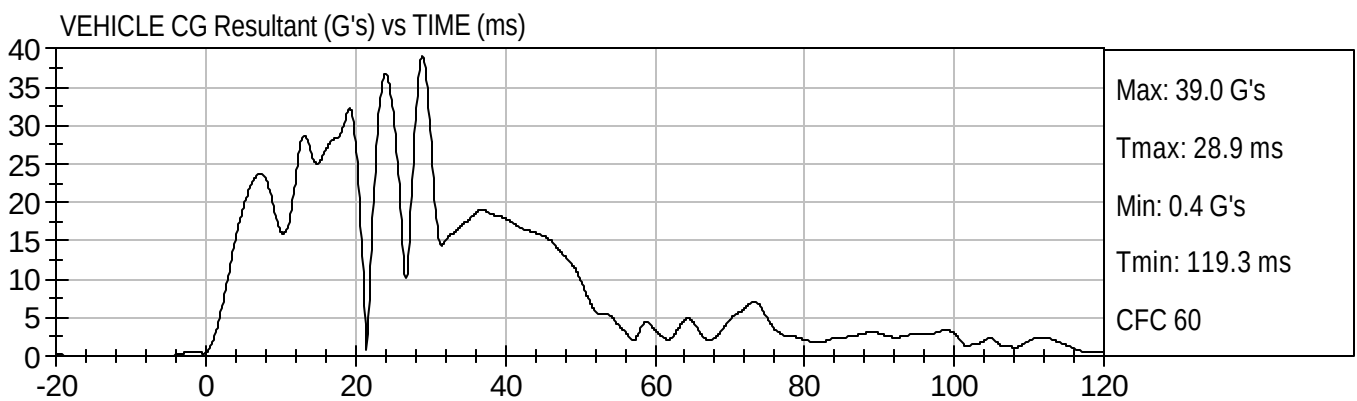
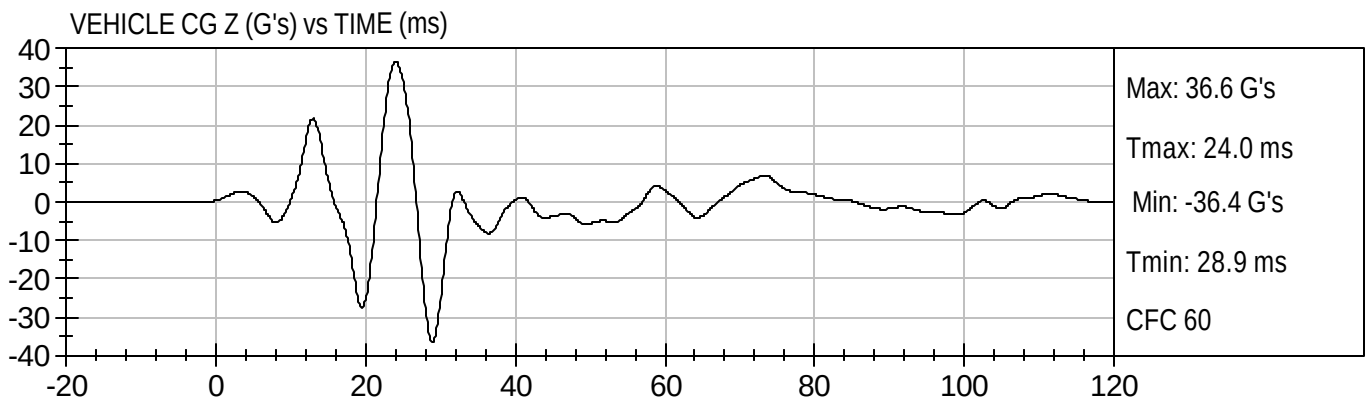
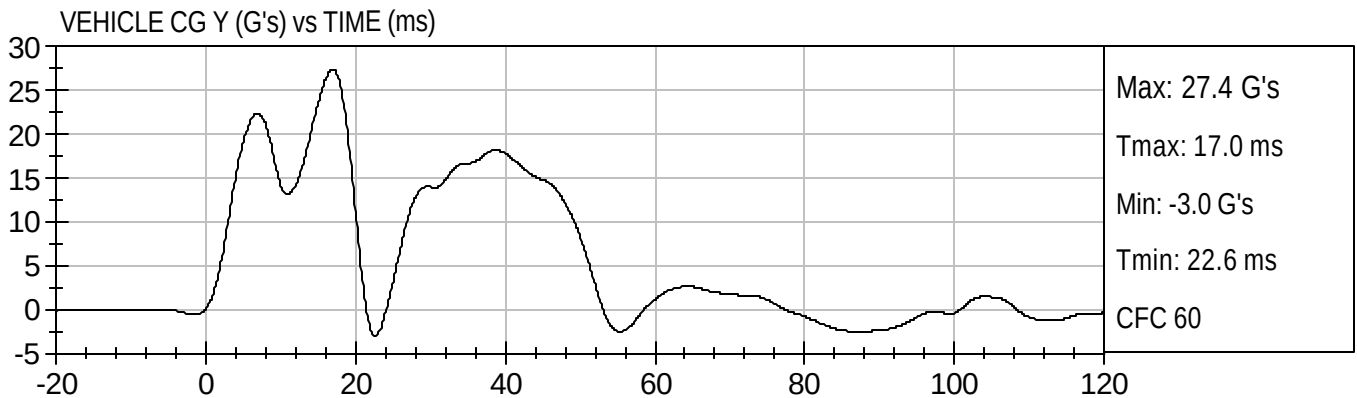
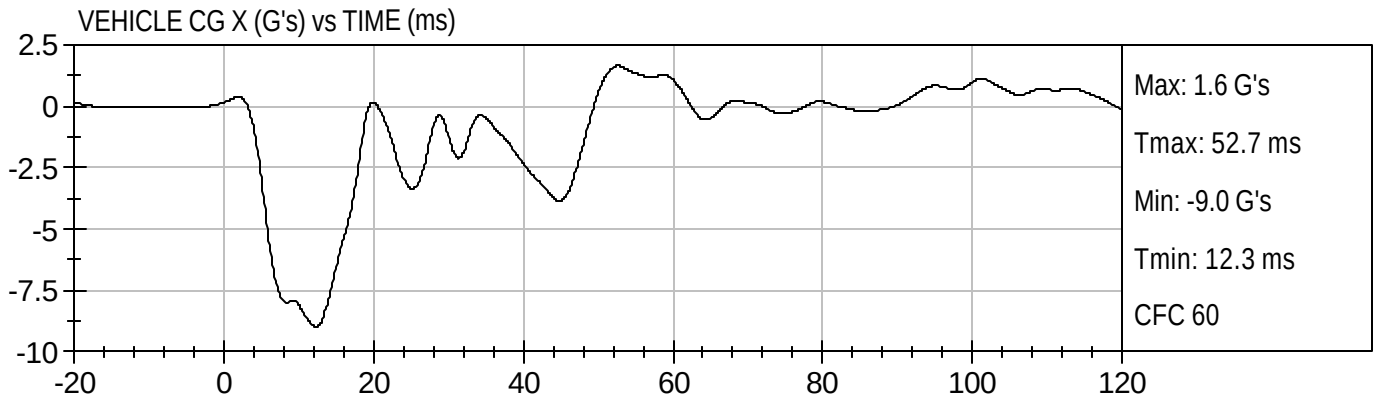
LEFT MID B-POST Y Velocity (kph) vs TIME (ms)

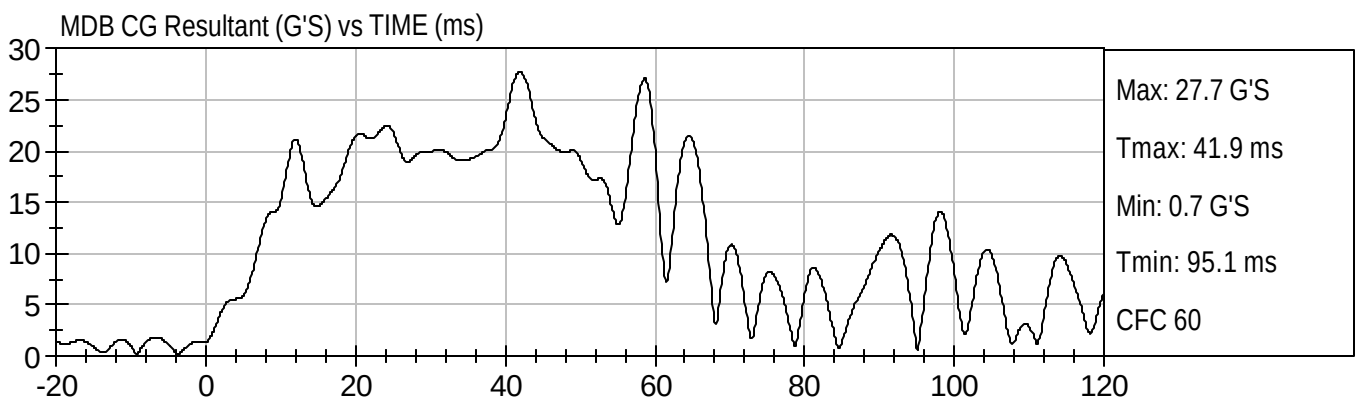
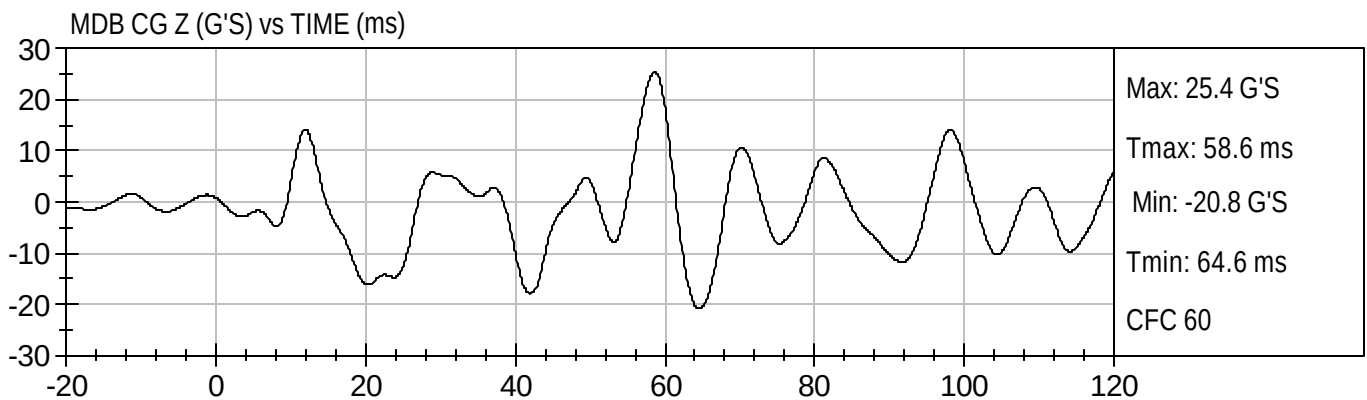
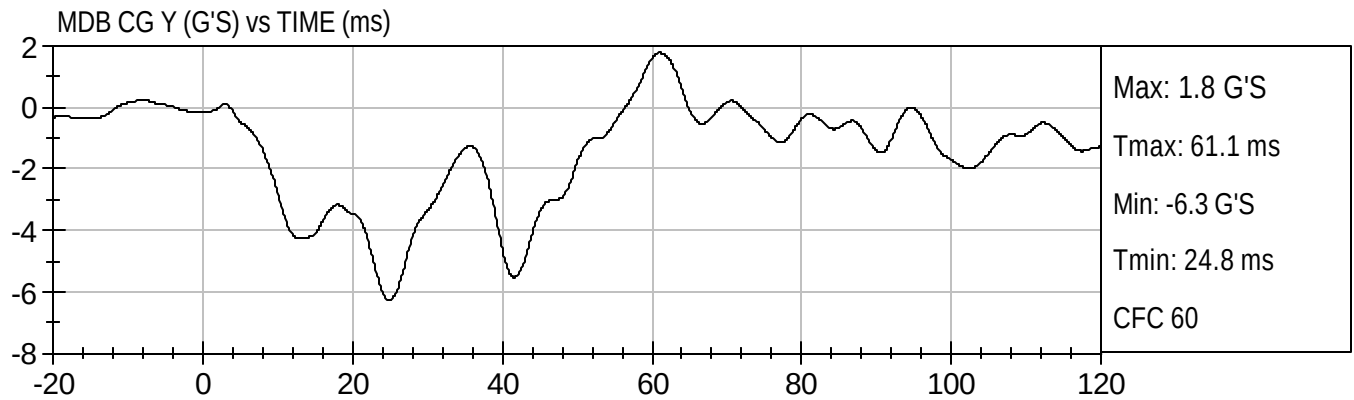
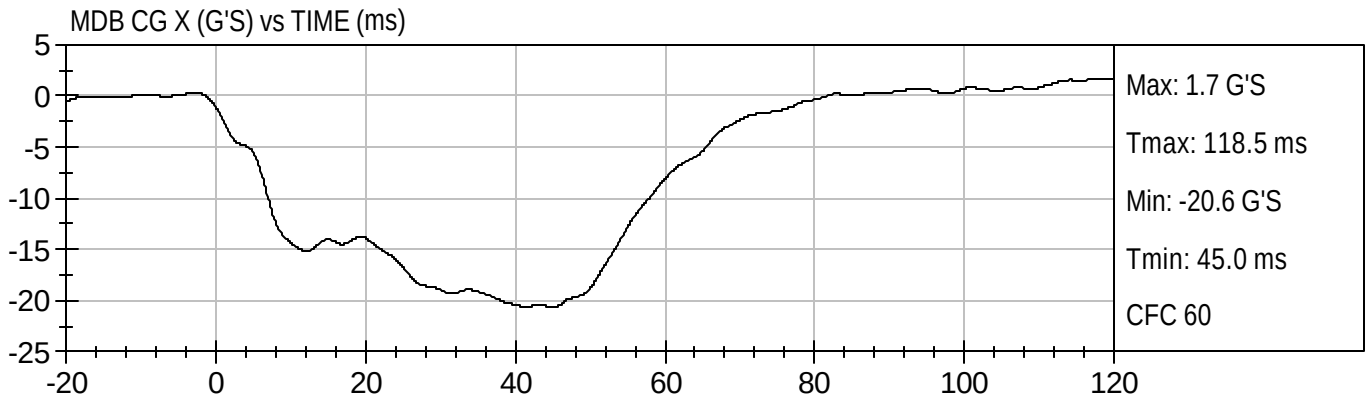


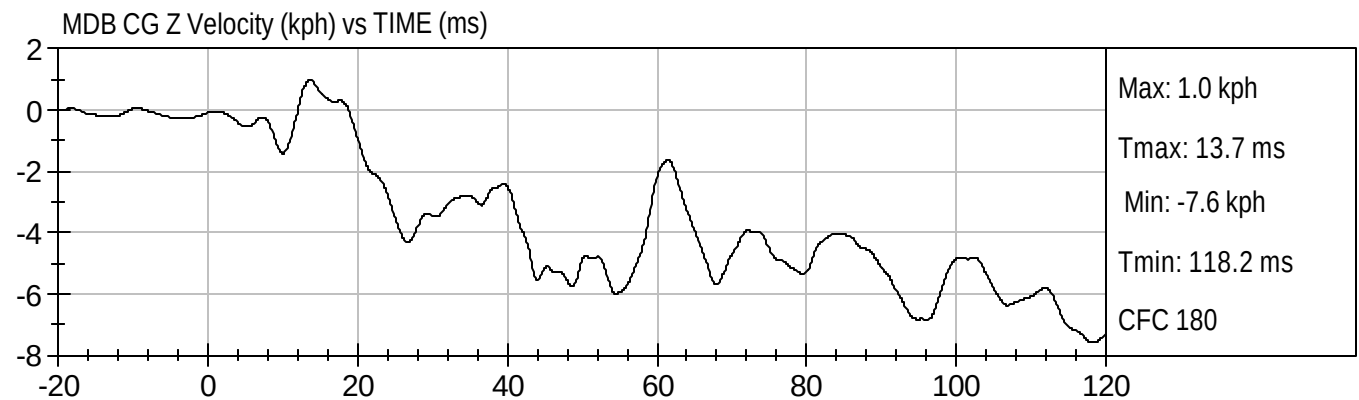
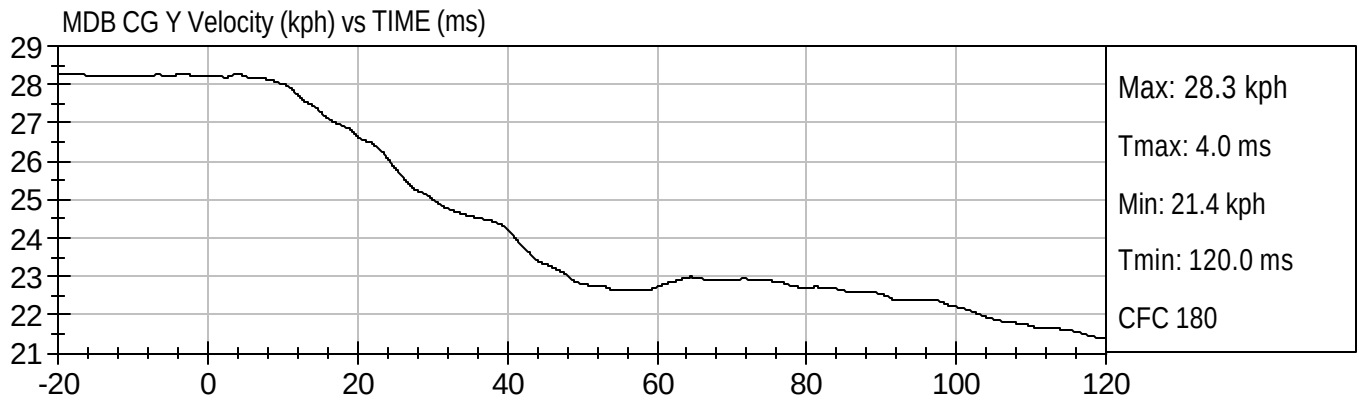
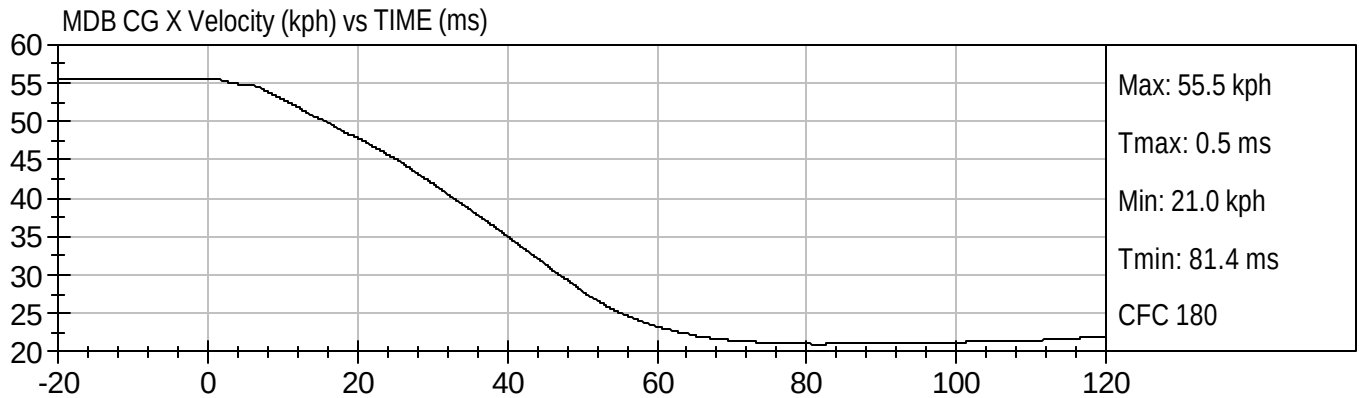


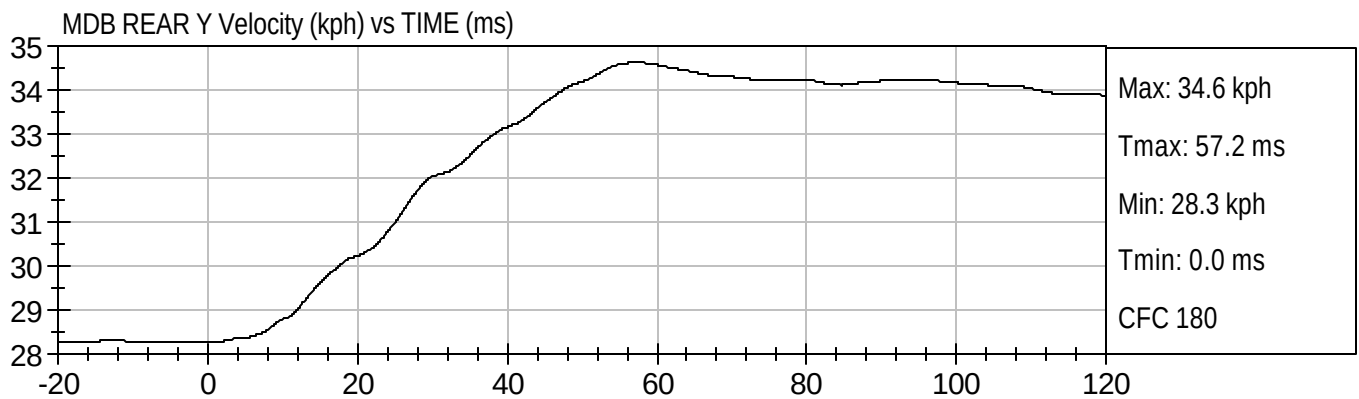
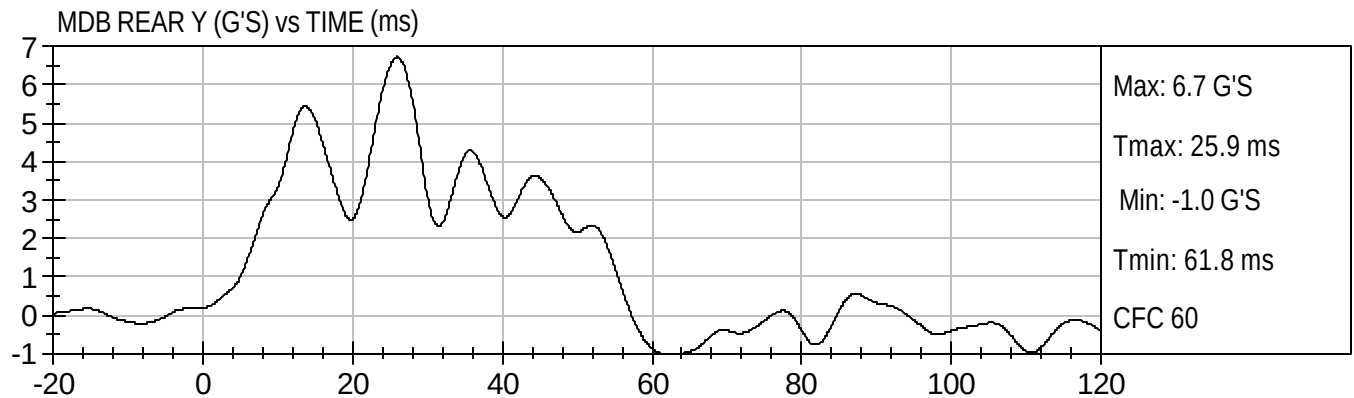
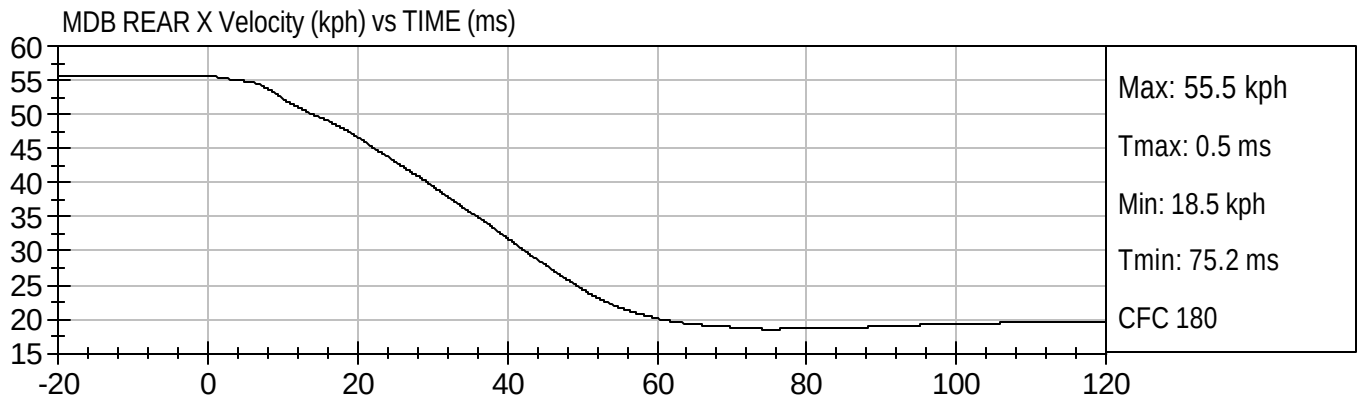
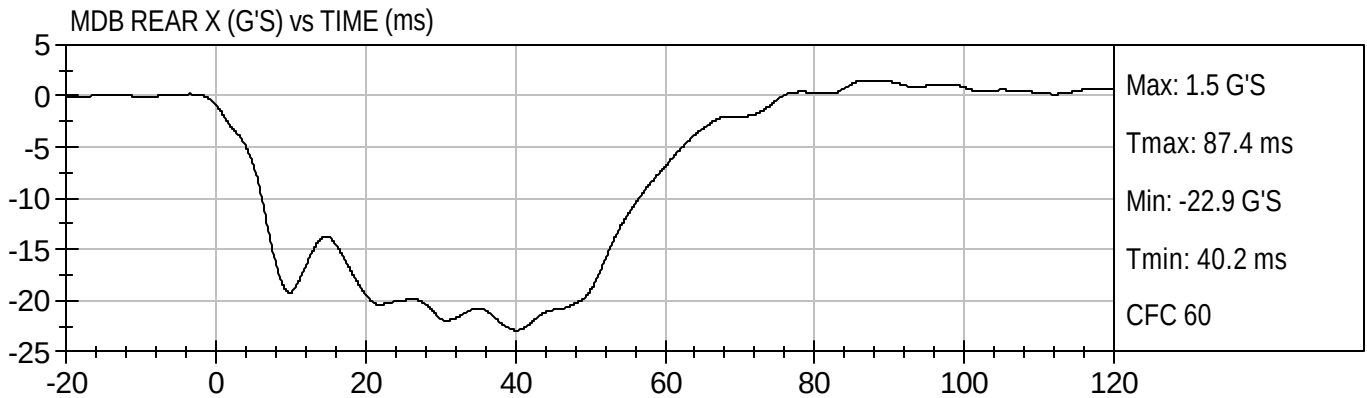
90 DEGREE INDICANT SIDE IMPACT
2002 TOYOTA HIGHLANDER (C25107)

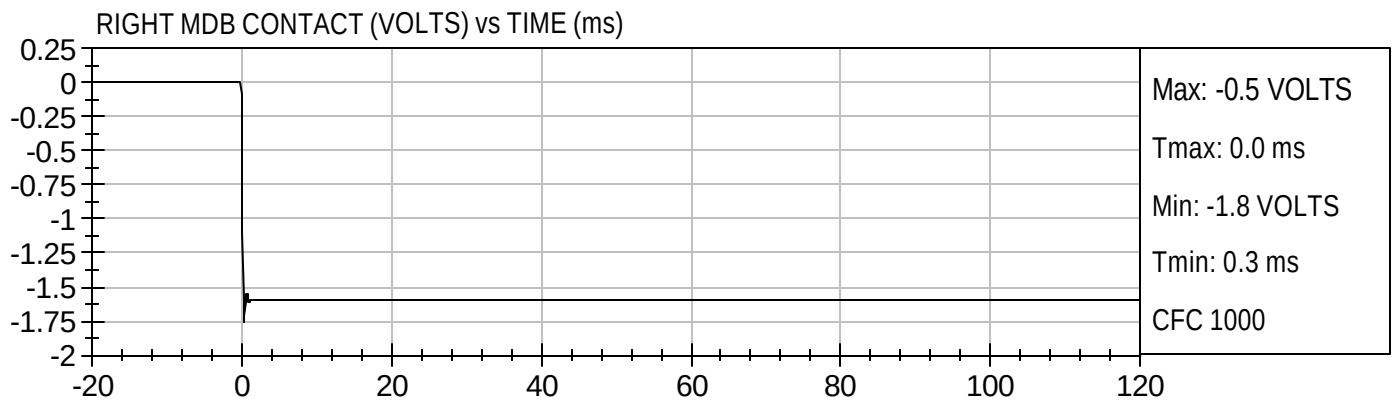
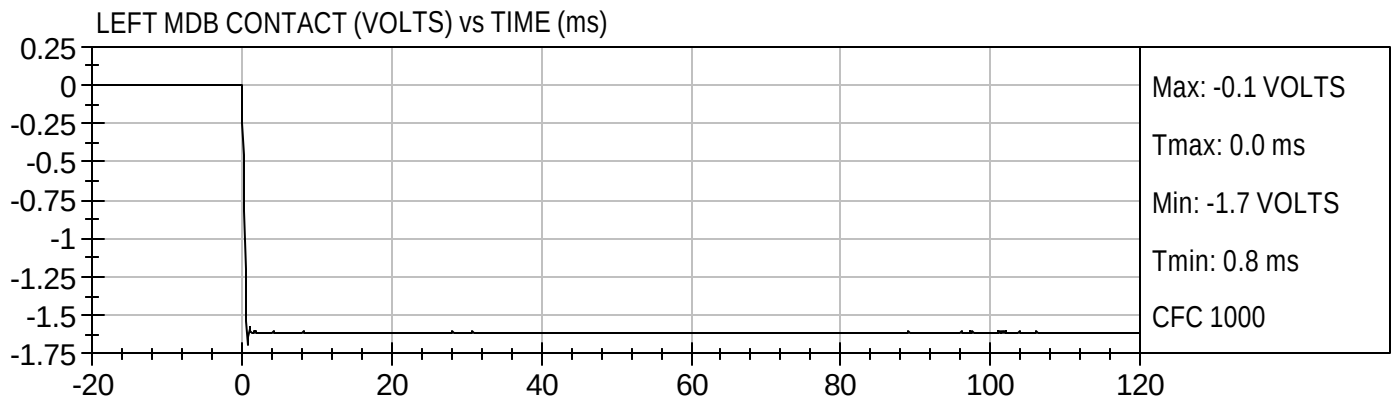
Test Date: 4/2/02
Speed: 38.7 mph (62.3 km/h)

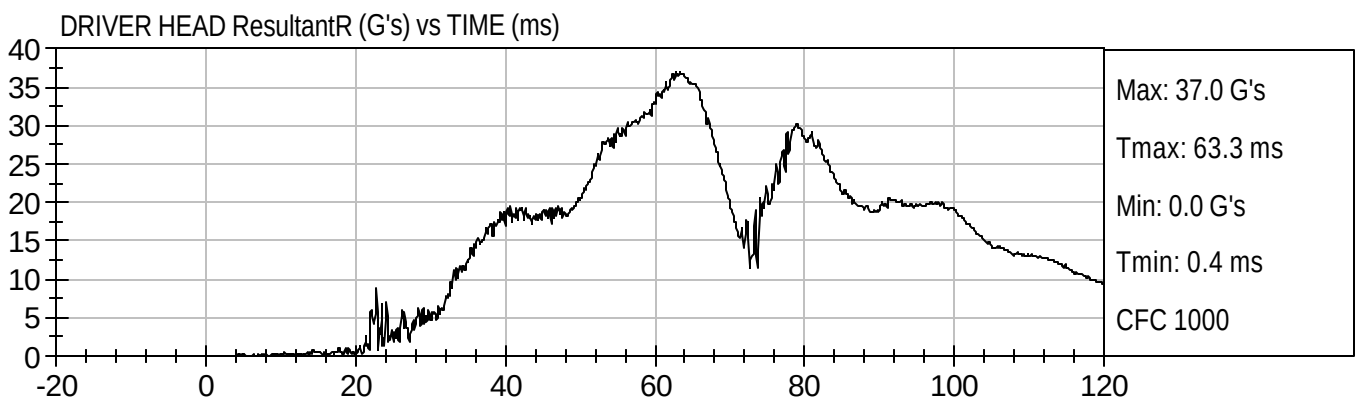
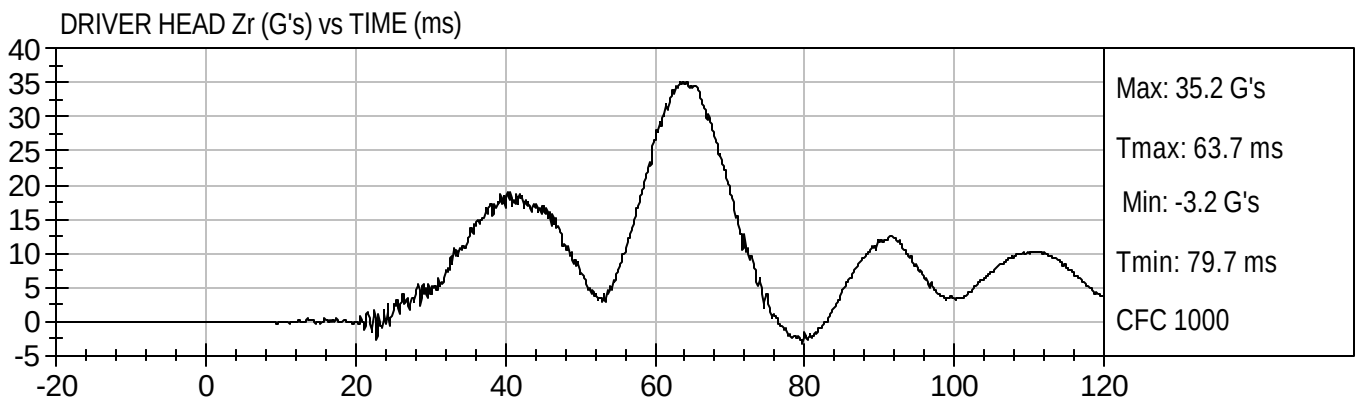
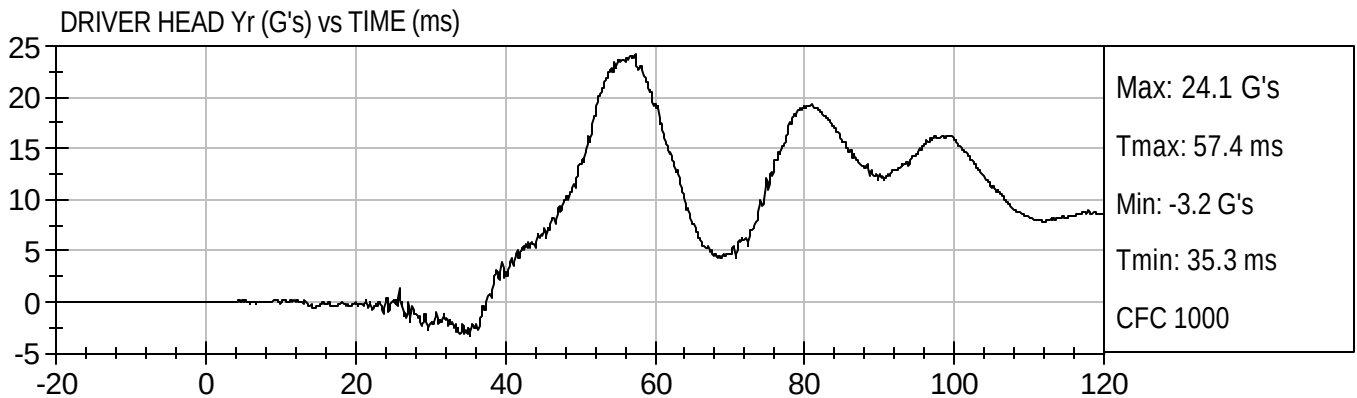
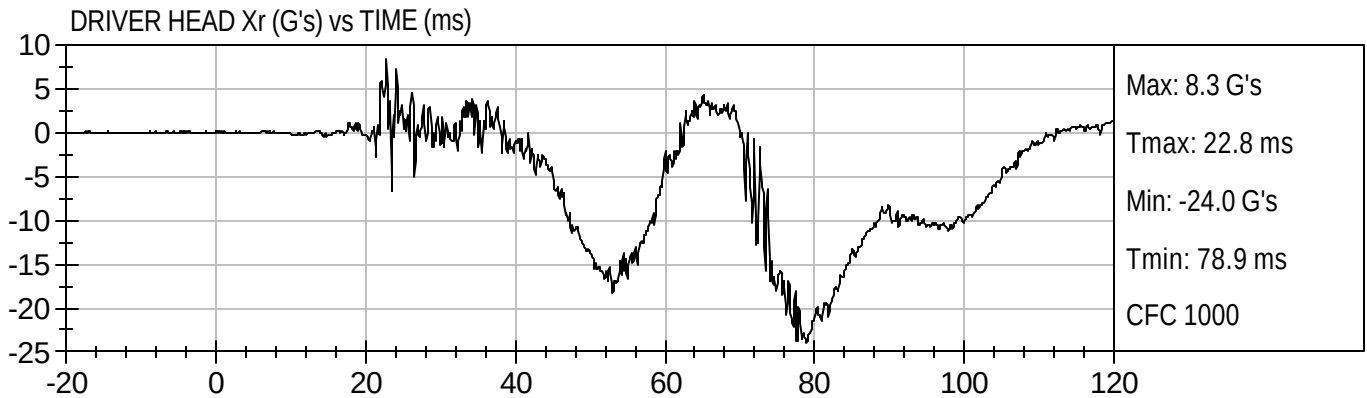


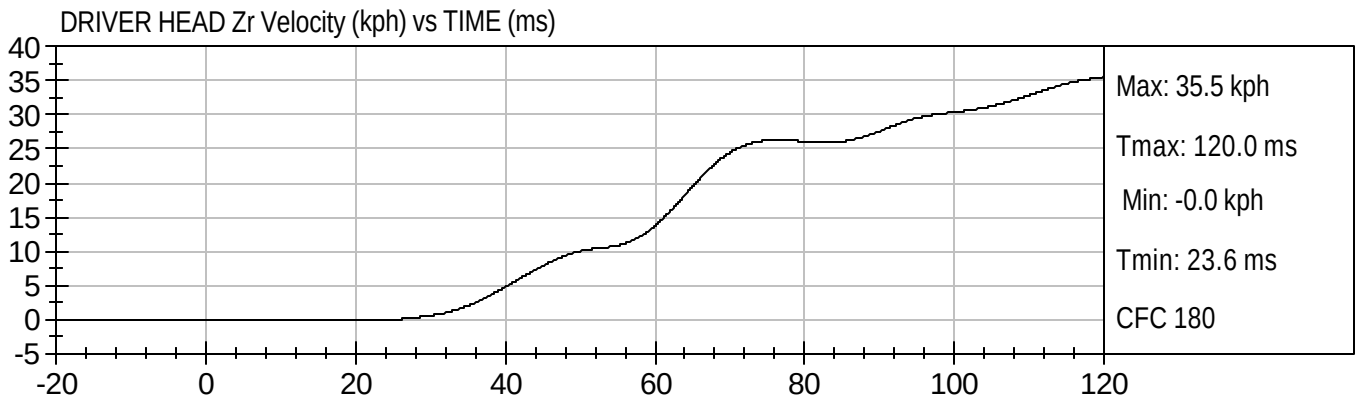
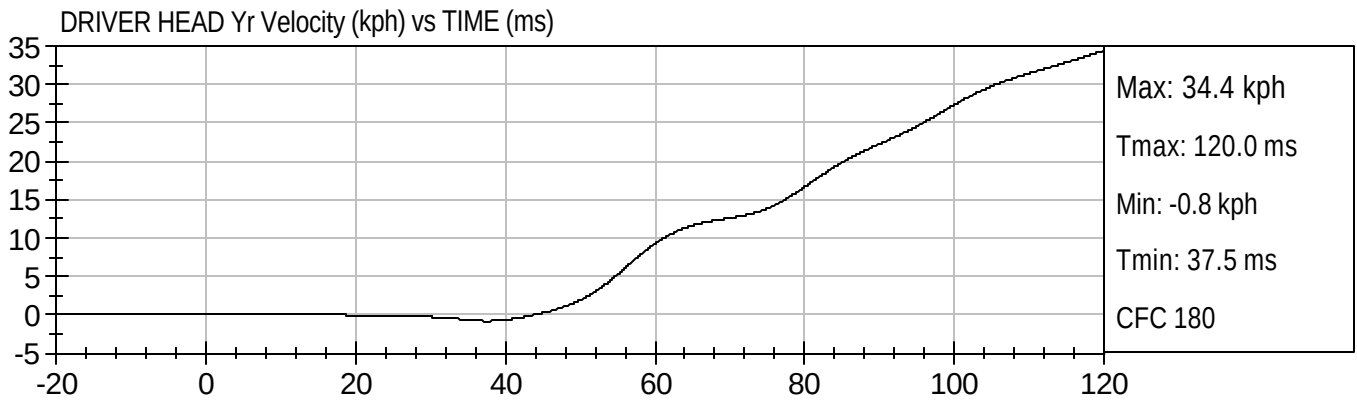
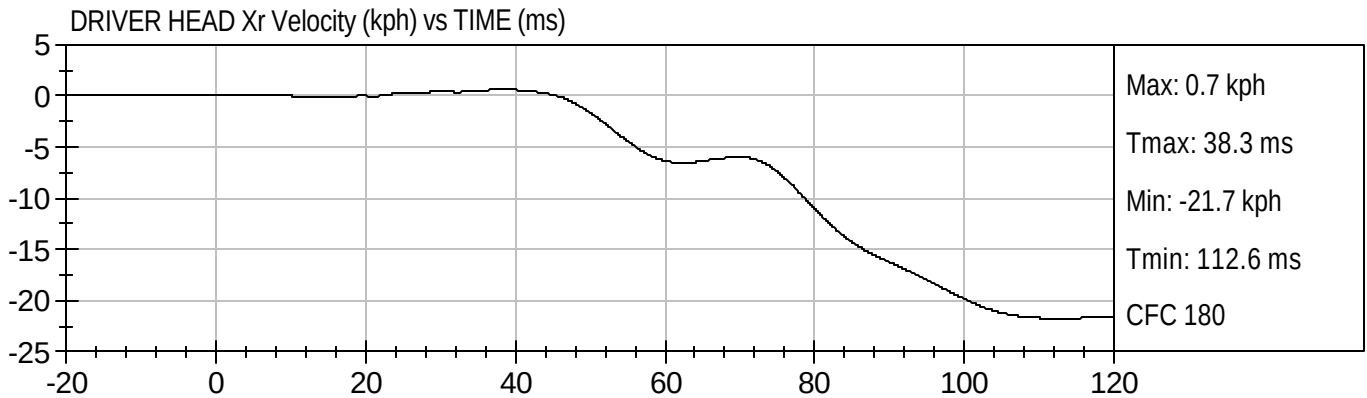








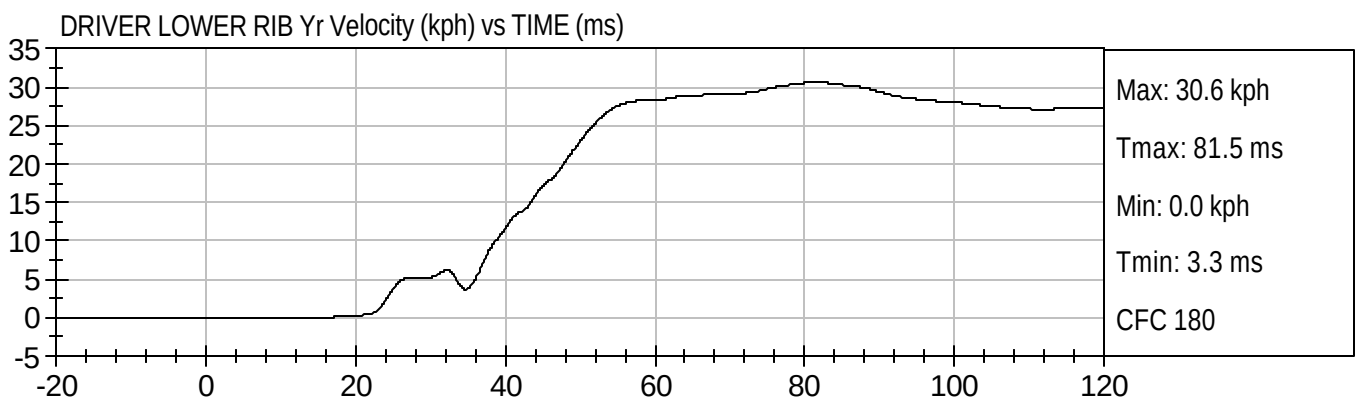
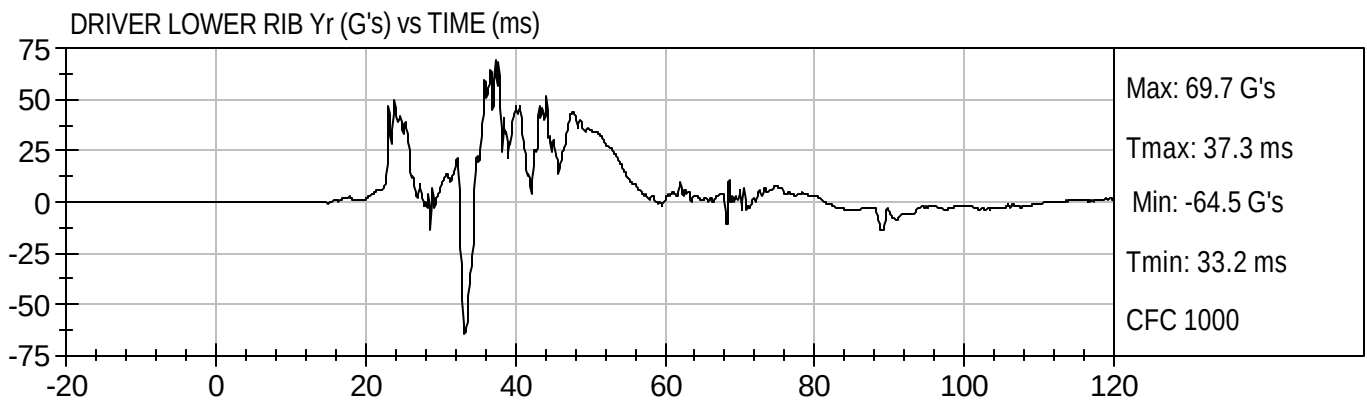
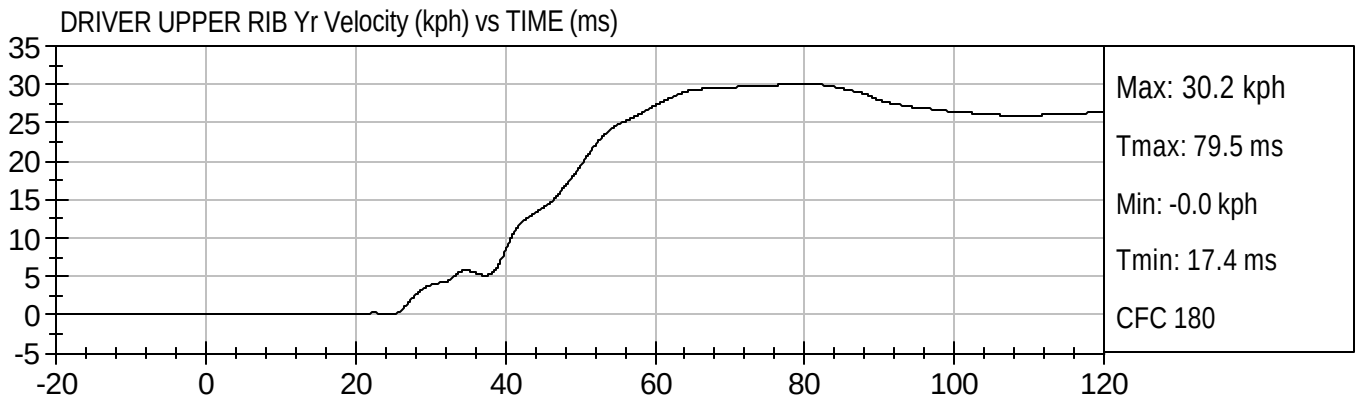
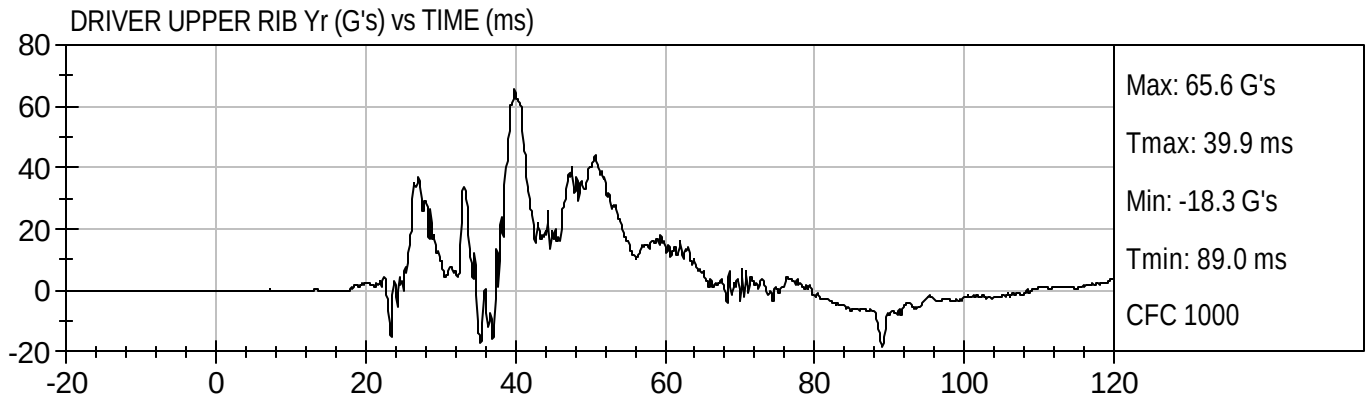


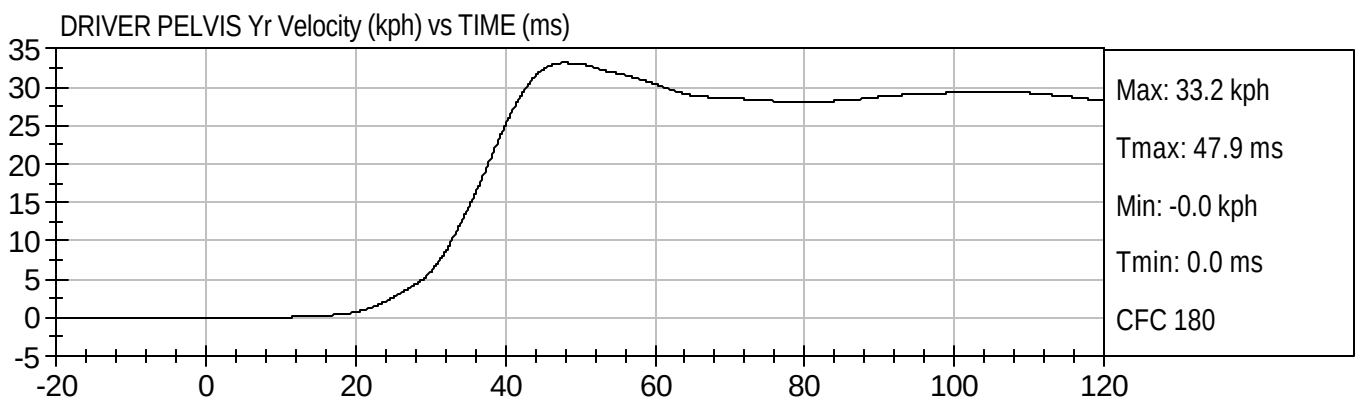
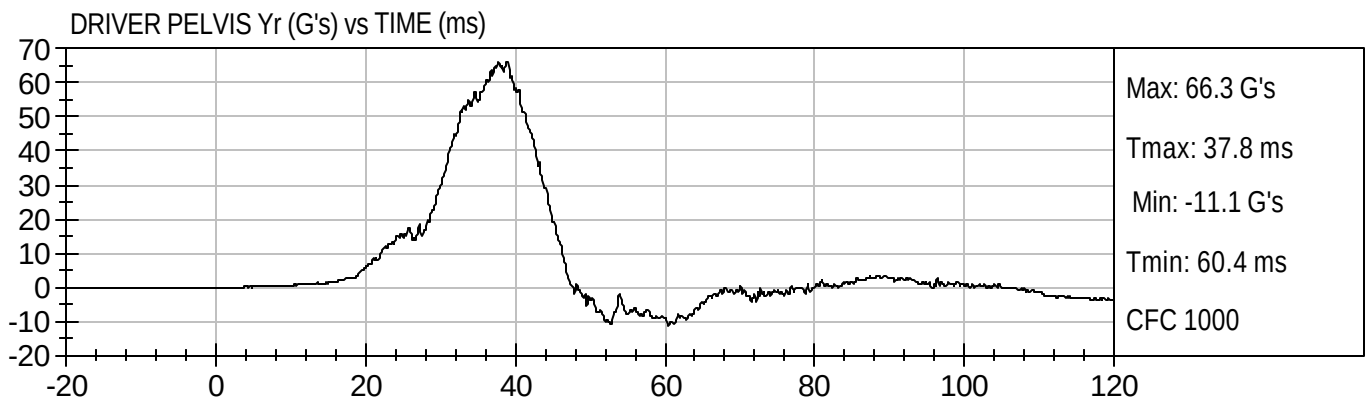
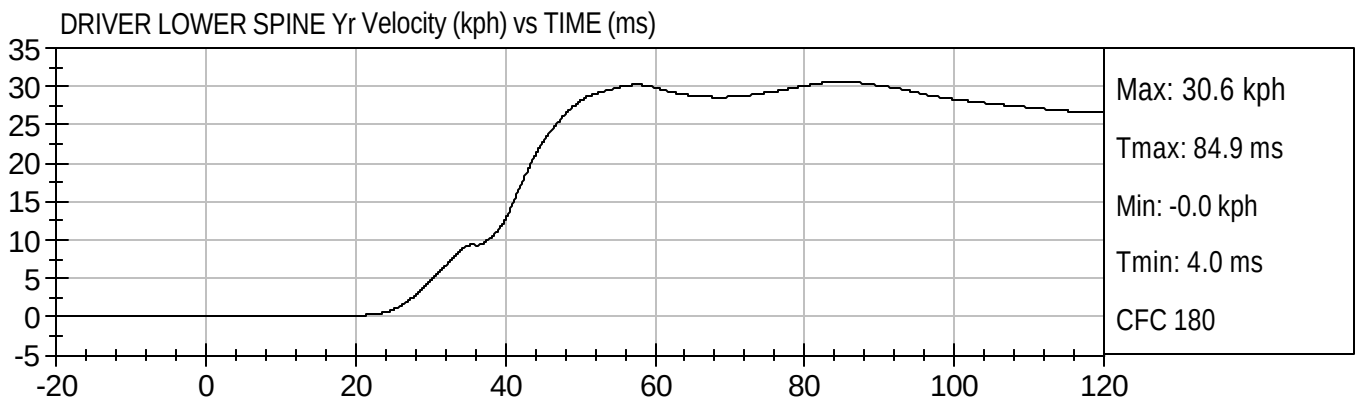
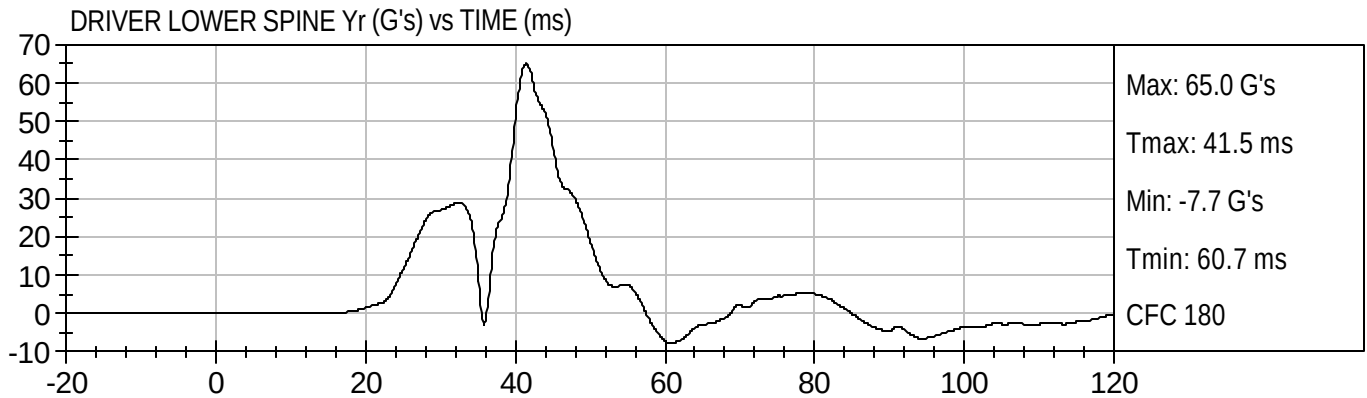




90 DEGREE INDICANT SIDE IMPACT
2002 TOYOTA HIGHLANDER (C25107)

Test Date: 4/2/02
Speed: 38.7 mph (62.3 km/h)

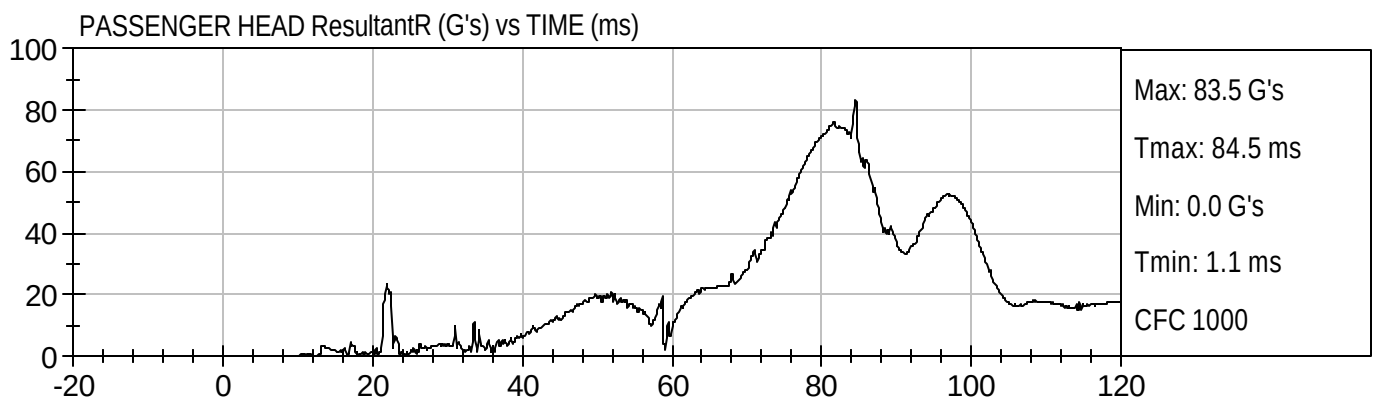
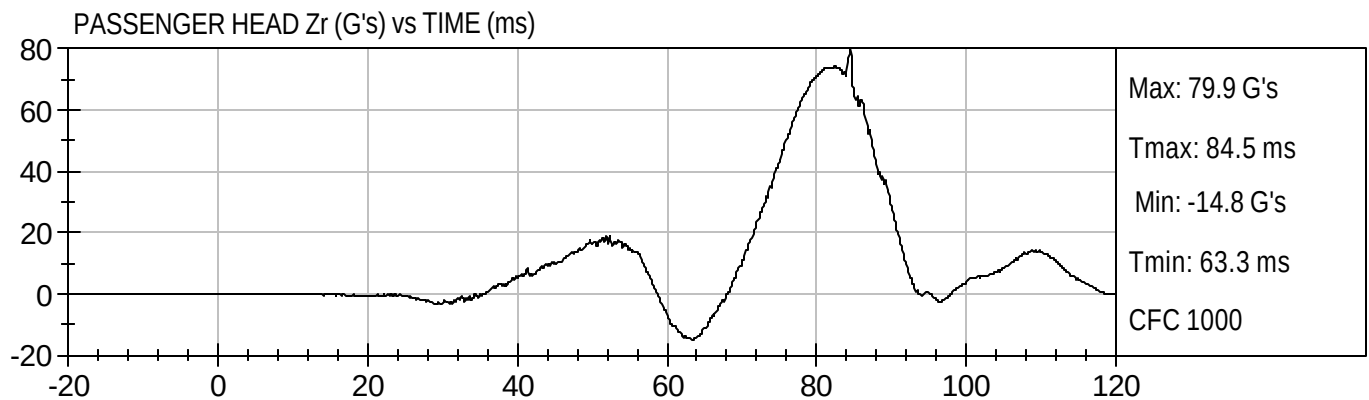
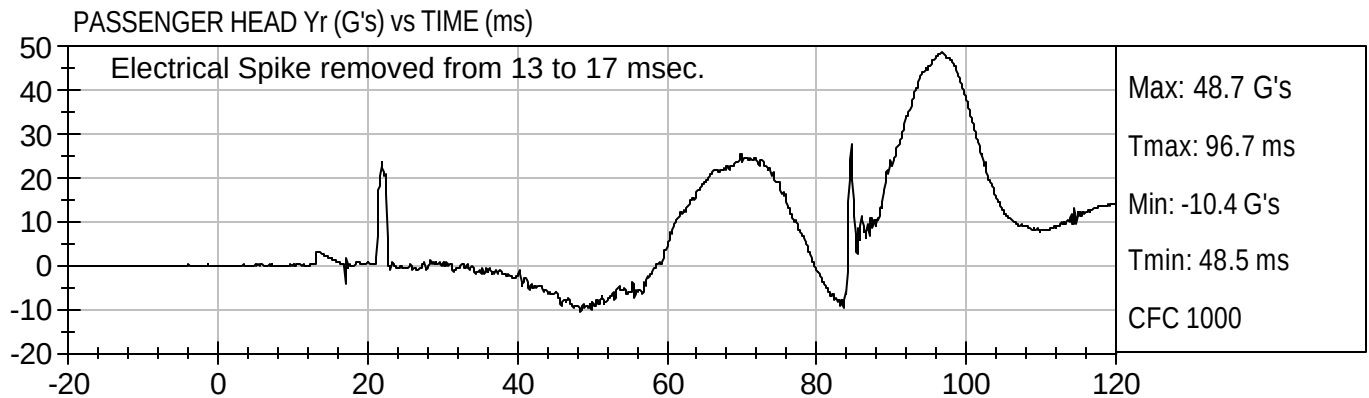
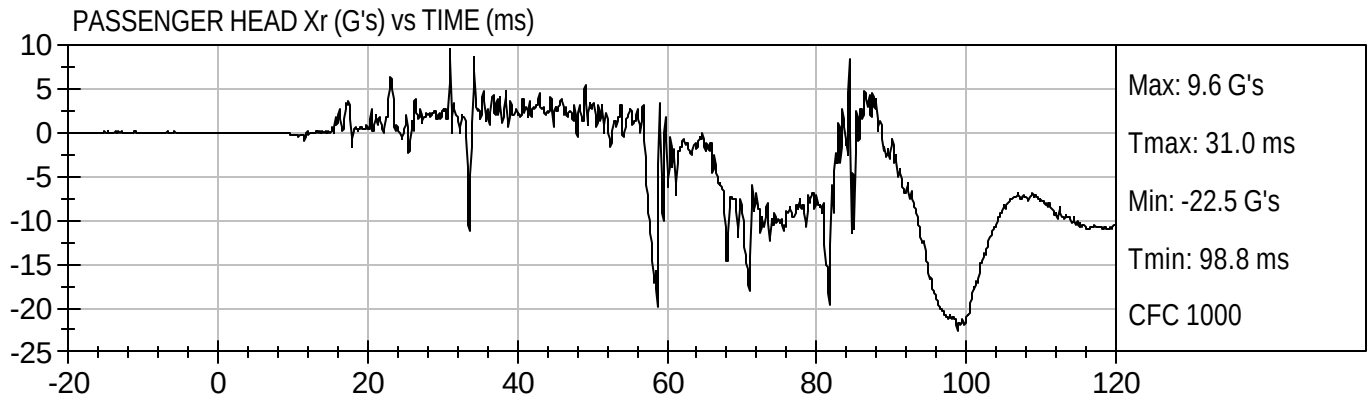


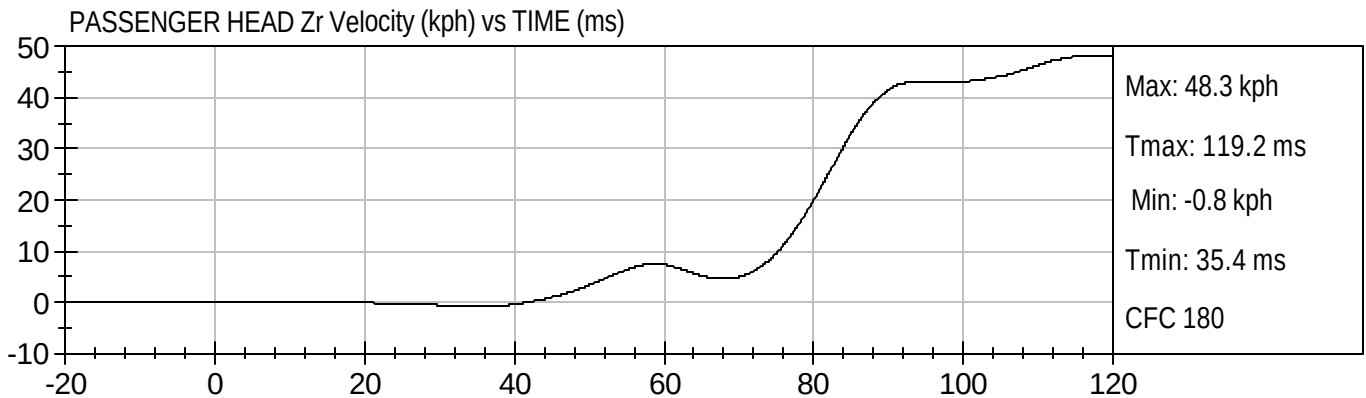
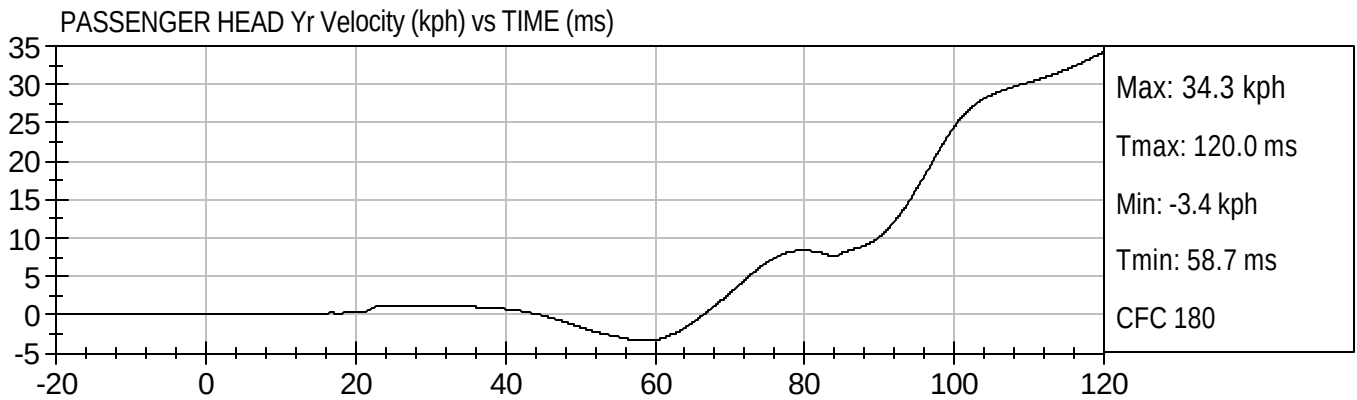
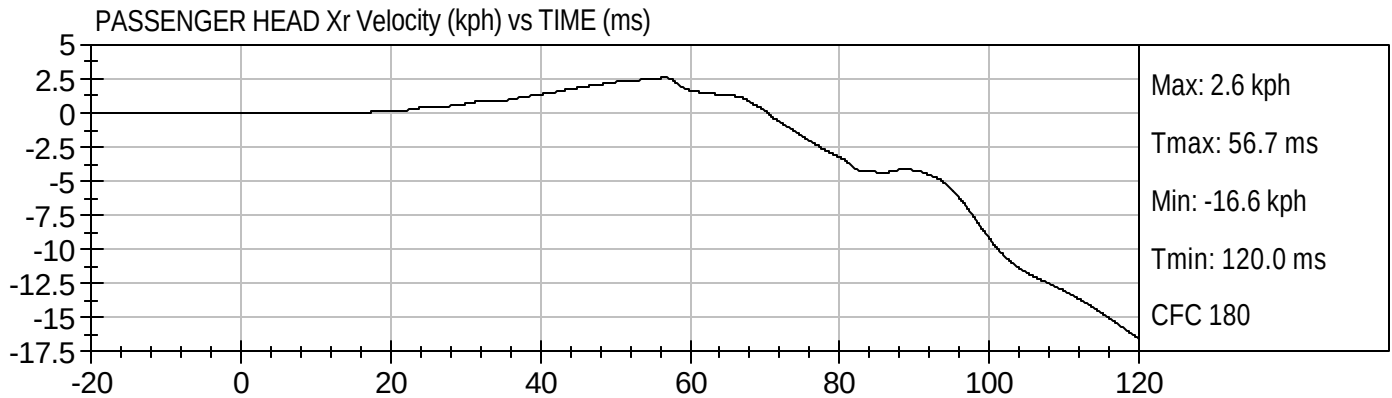


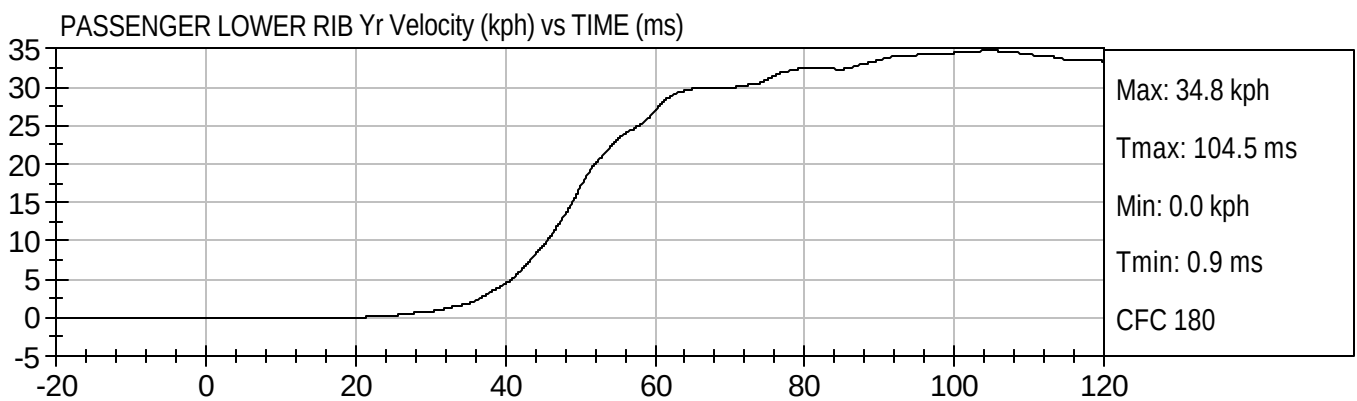
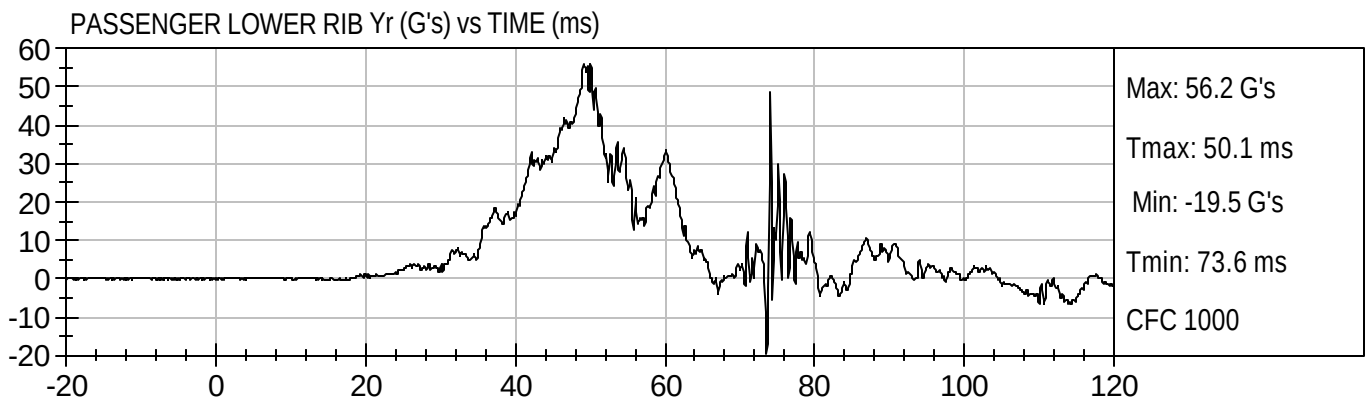
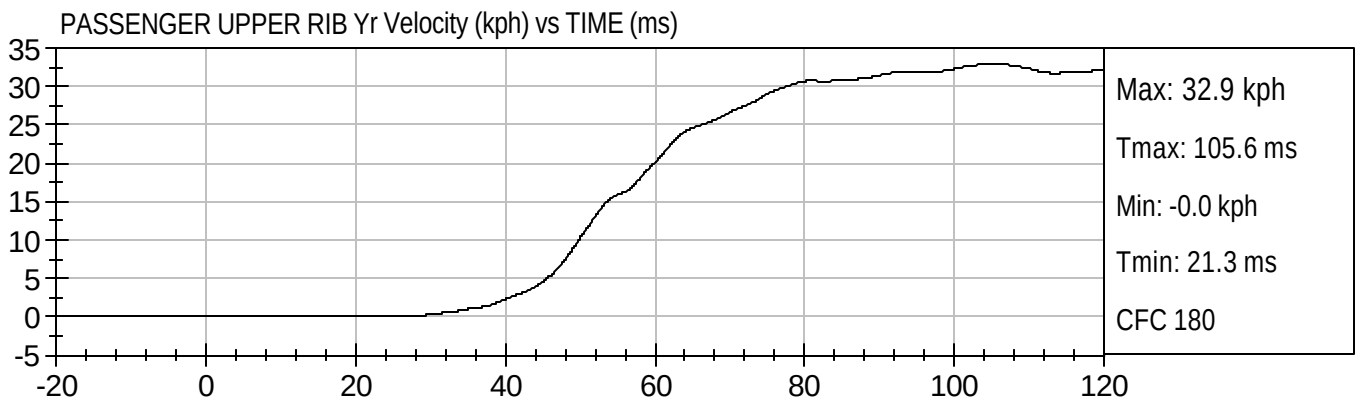
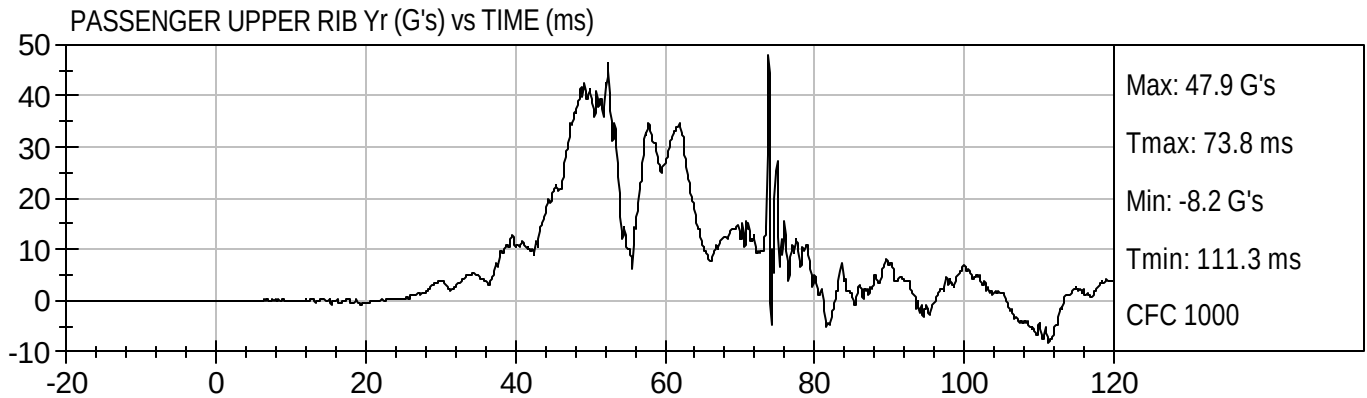


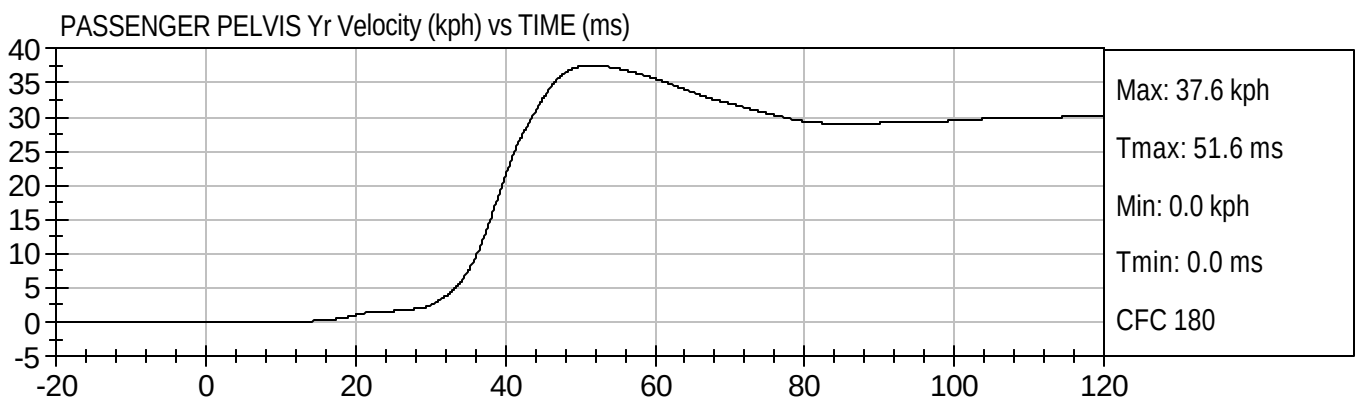
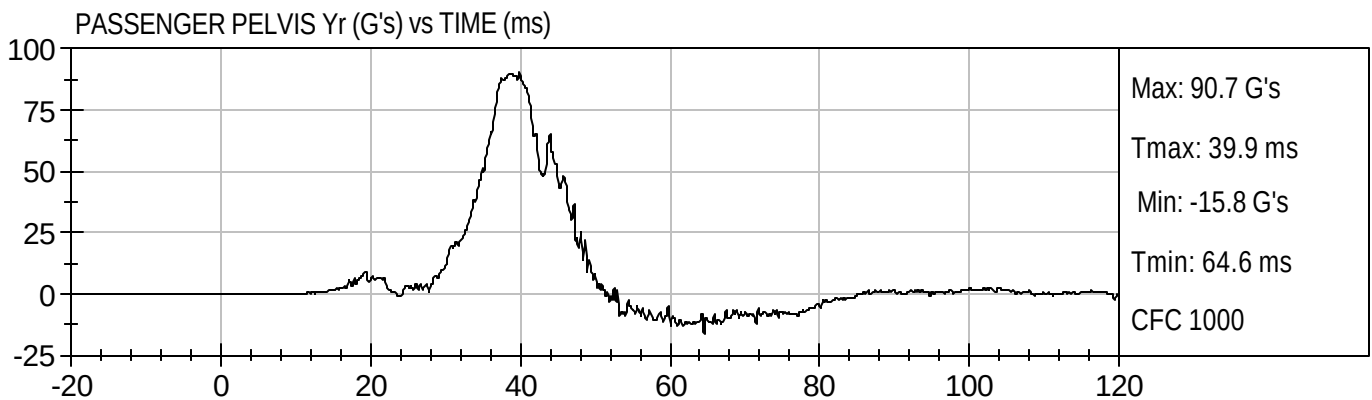
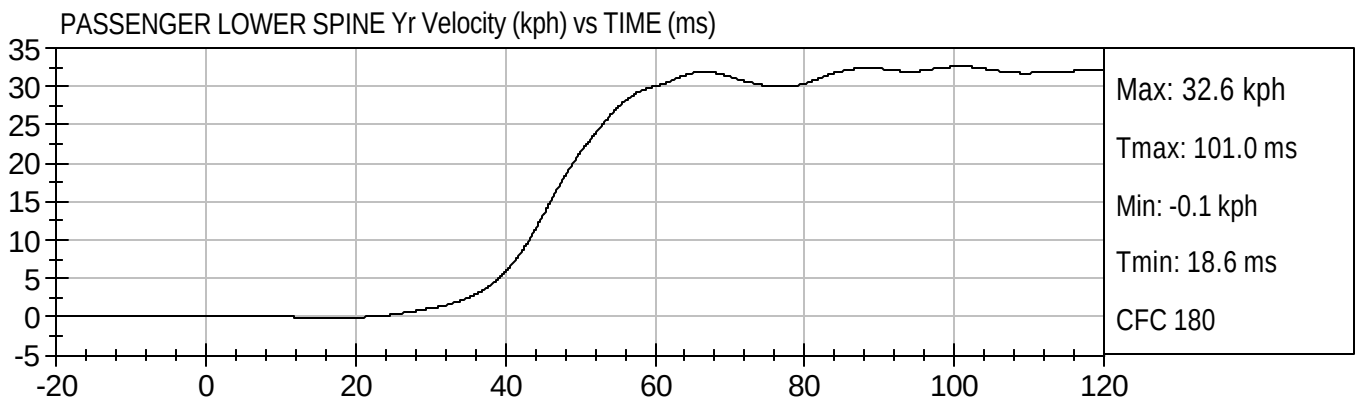
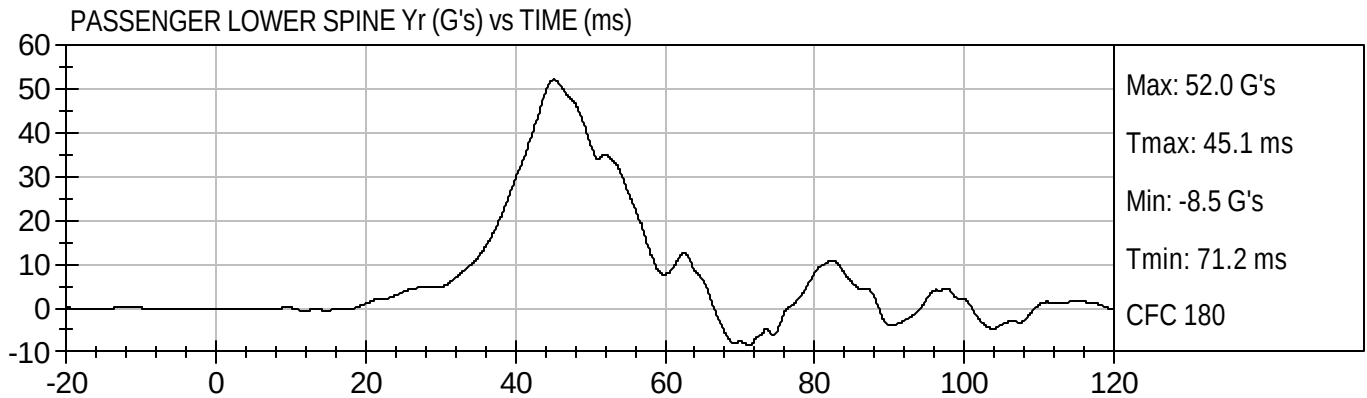
90 DEGREE INDICANT SIDE IMPACT
2002 TOYOTA HIGHLANDER (C25107)

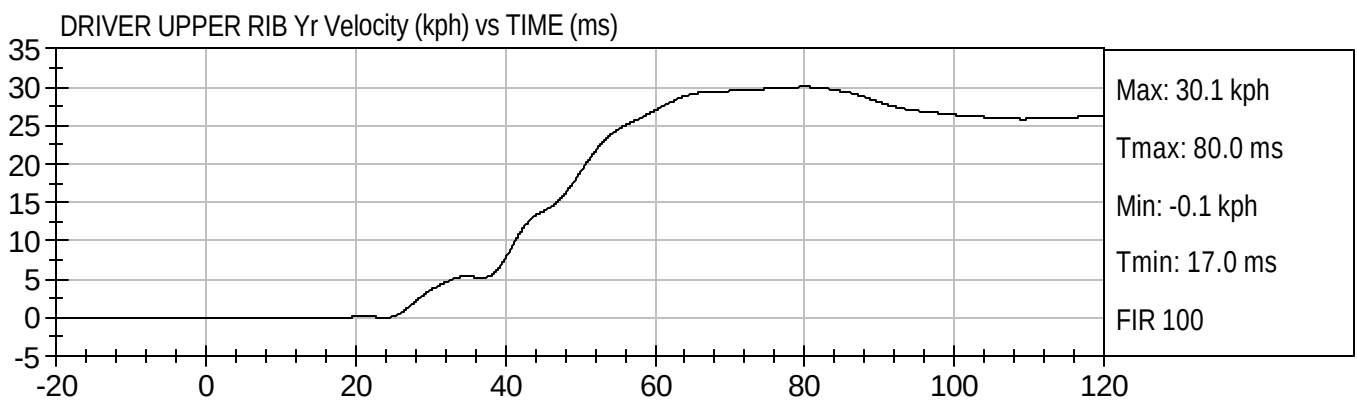
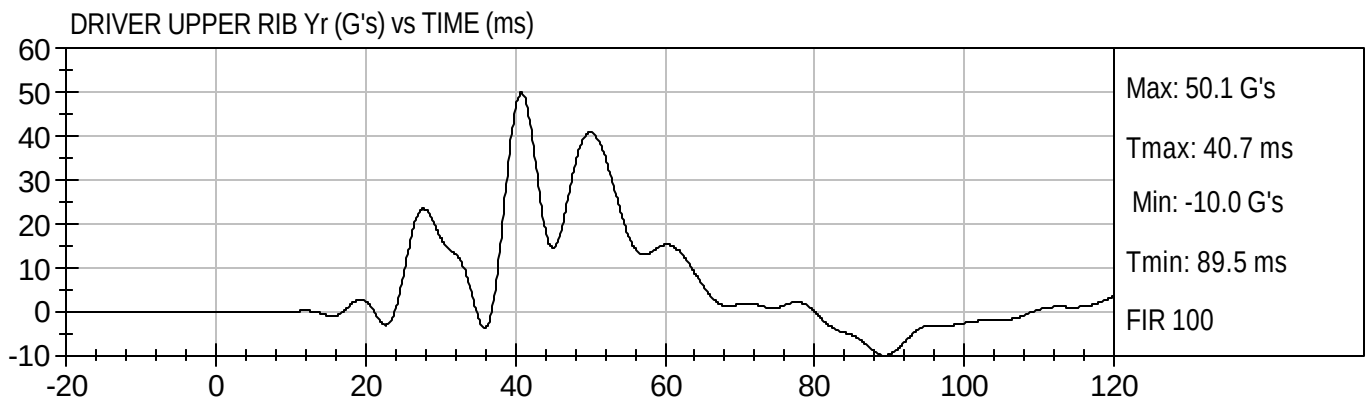
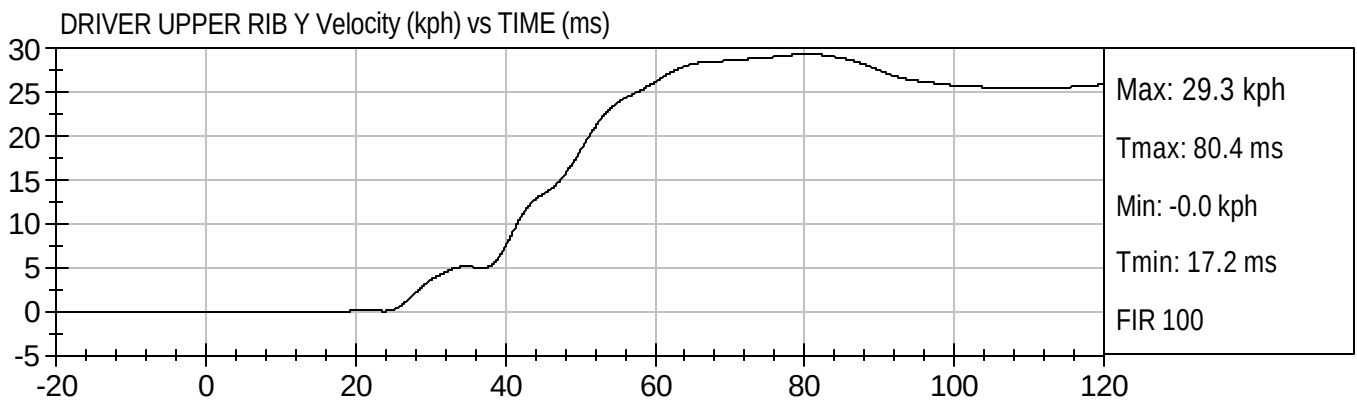
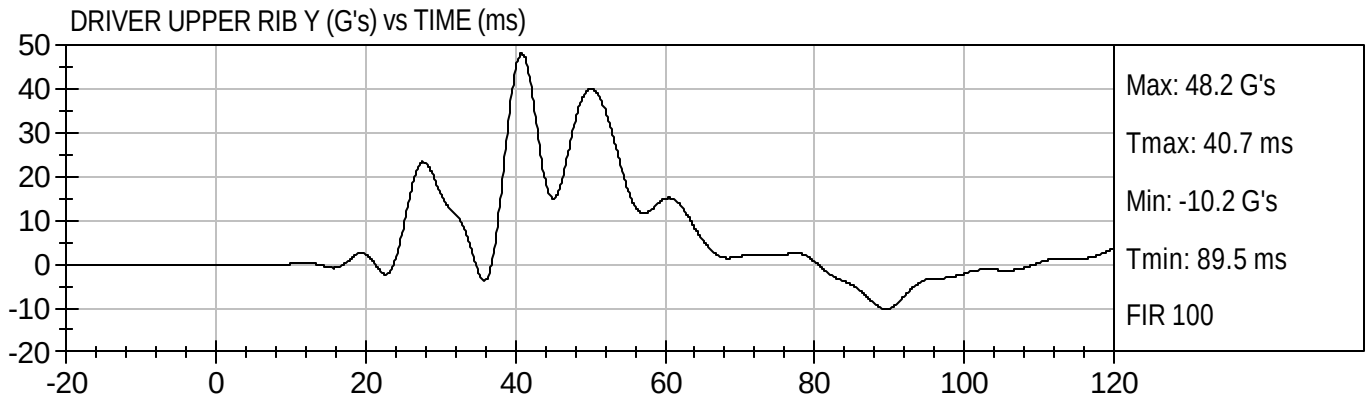
Test Date: 4/2/02
Speed: 38.7 mph (62.3 km/h)

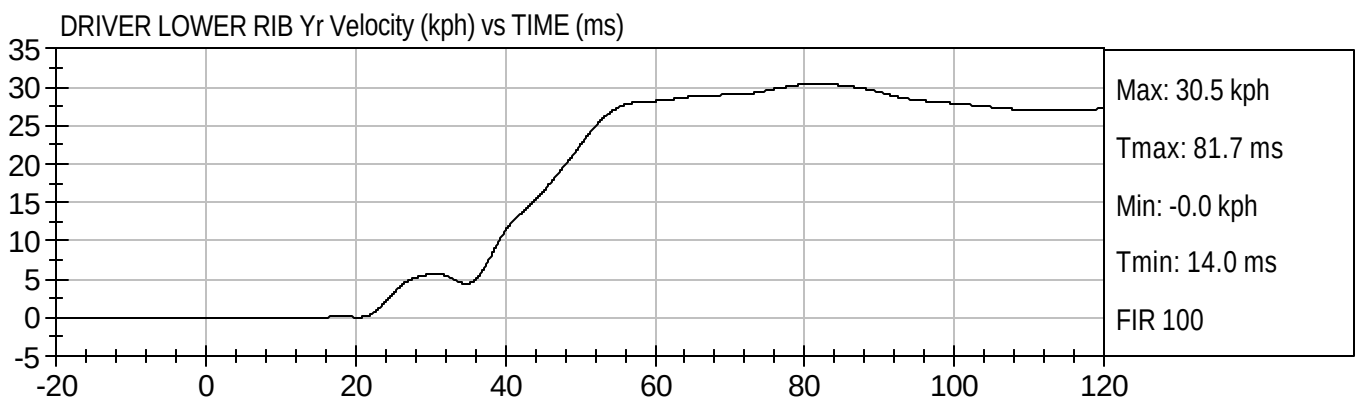
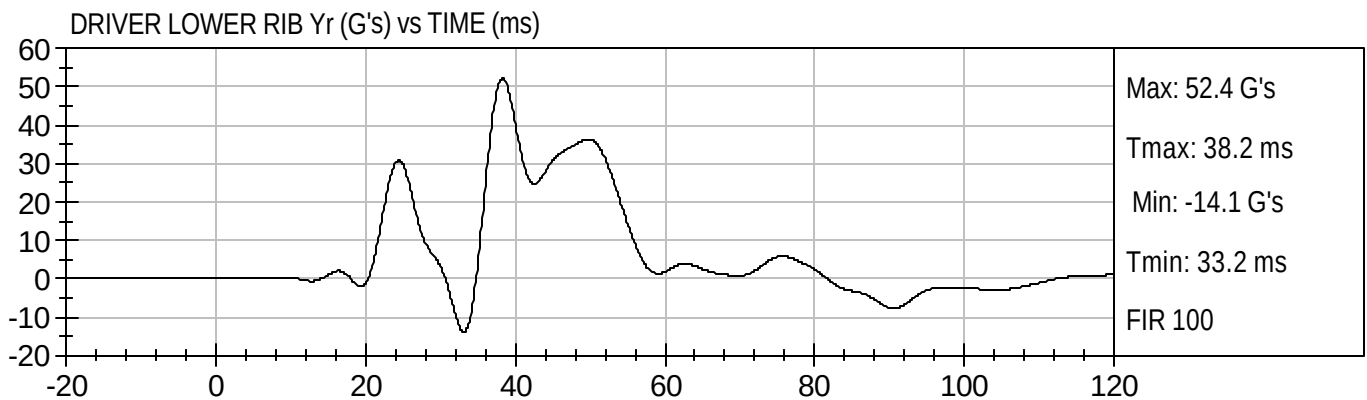
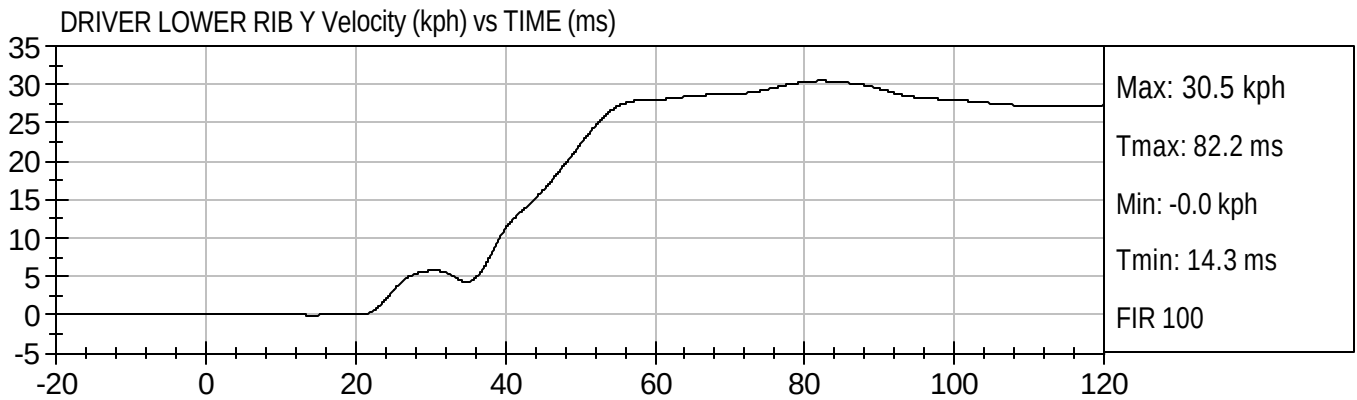
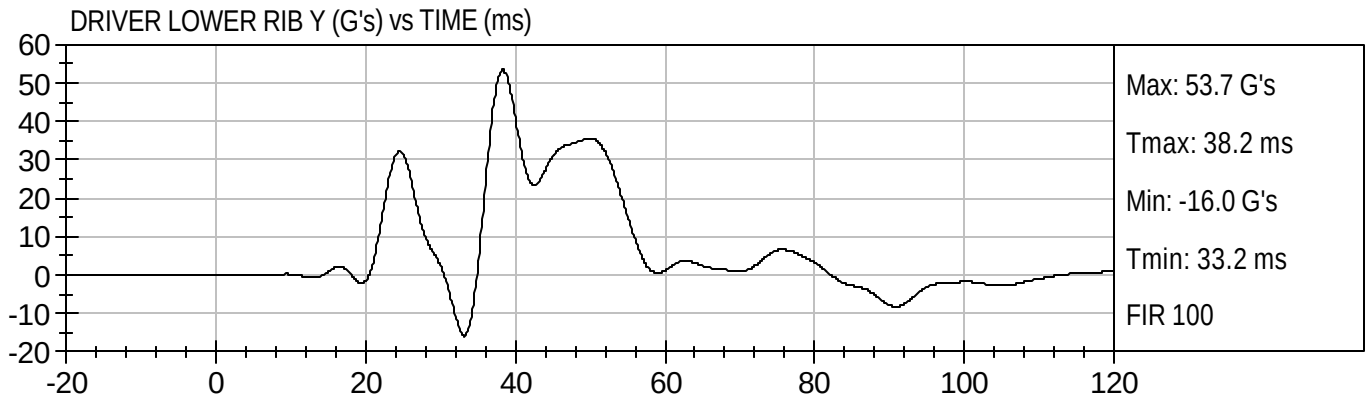


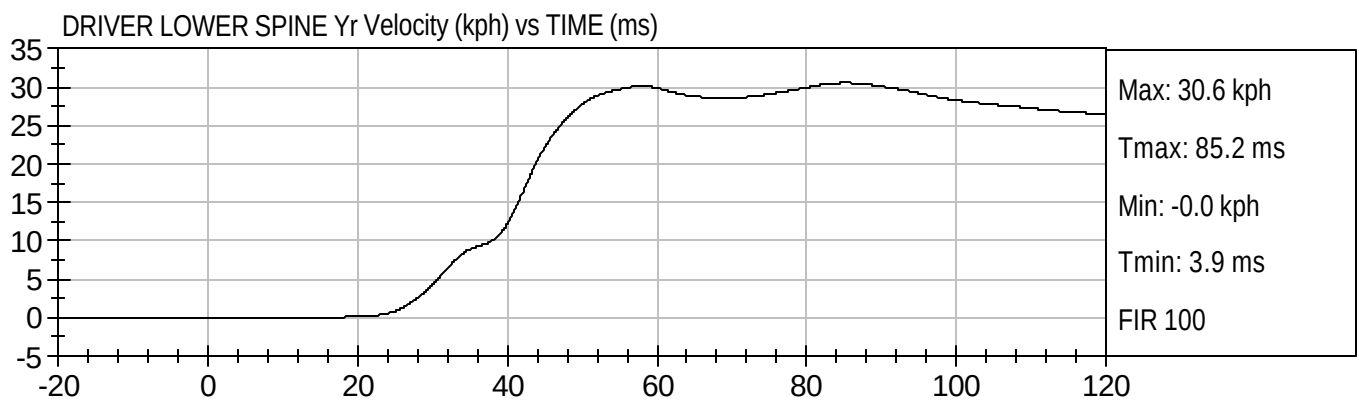
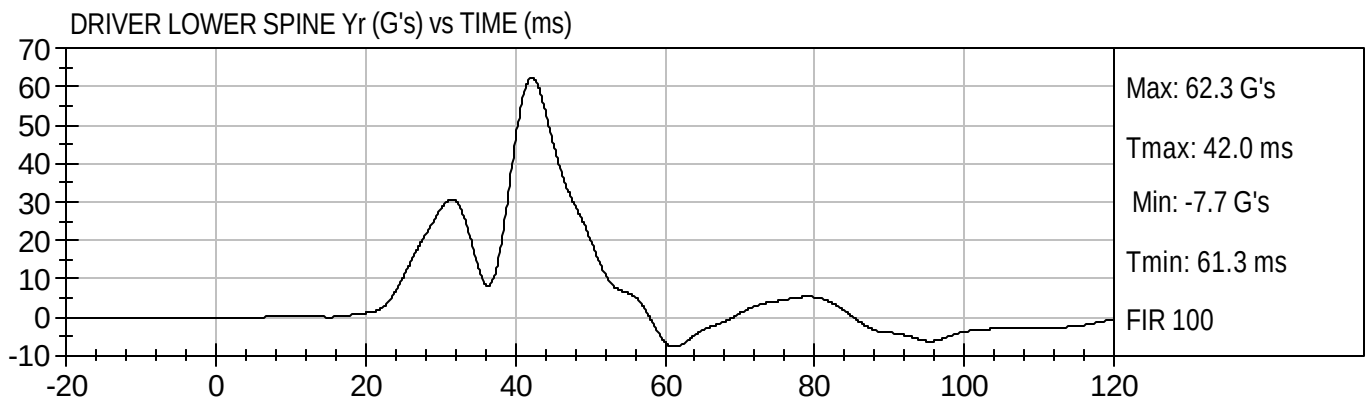
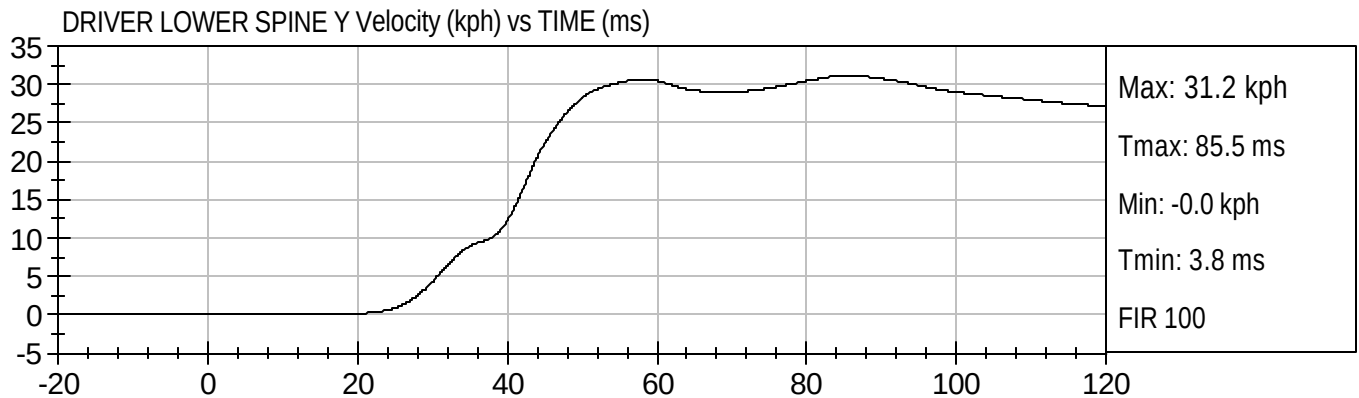
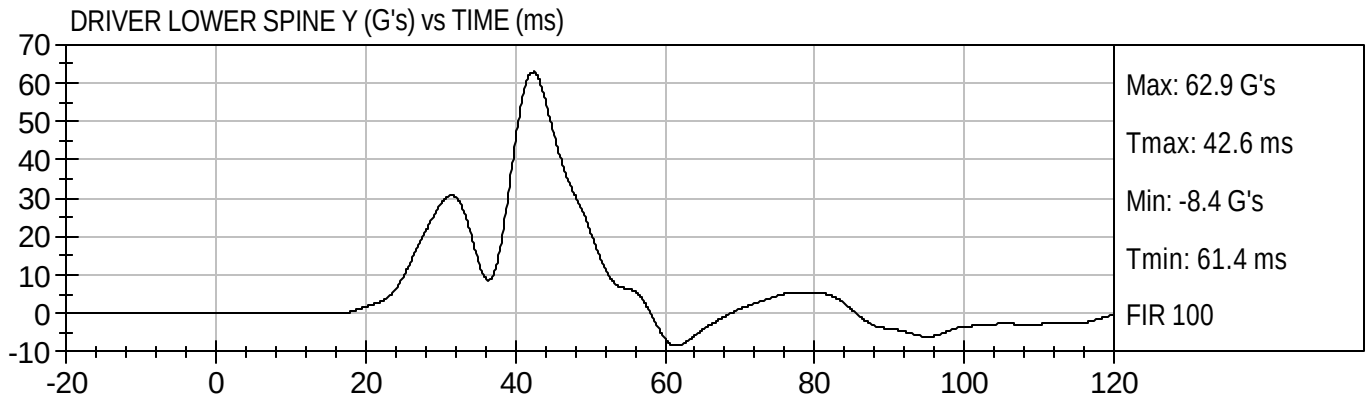


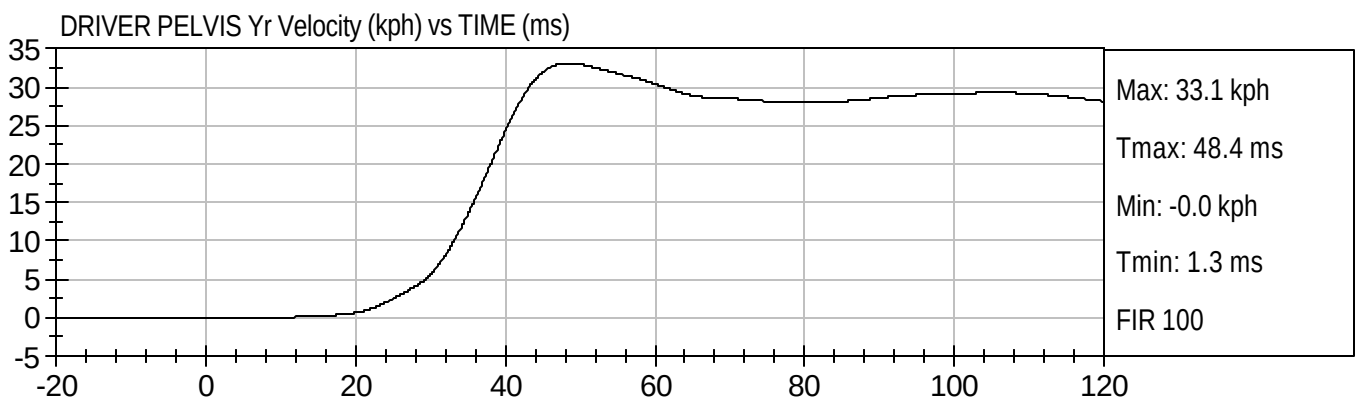
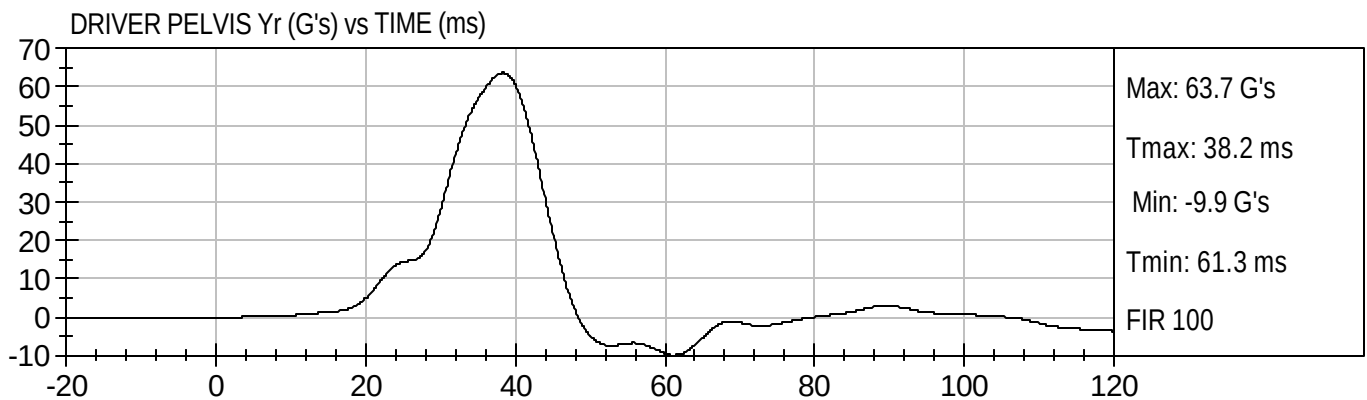
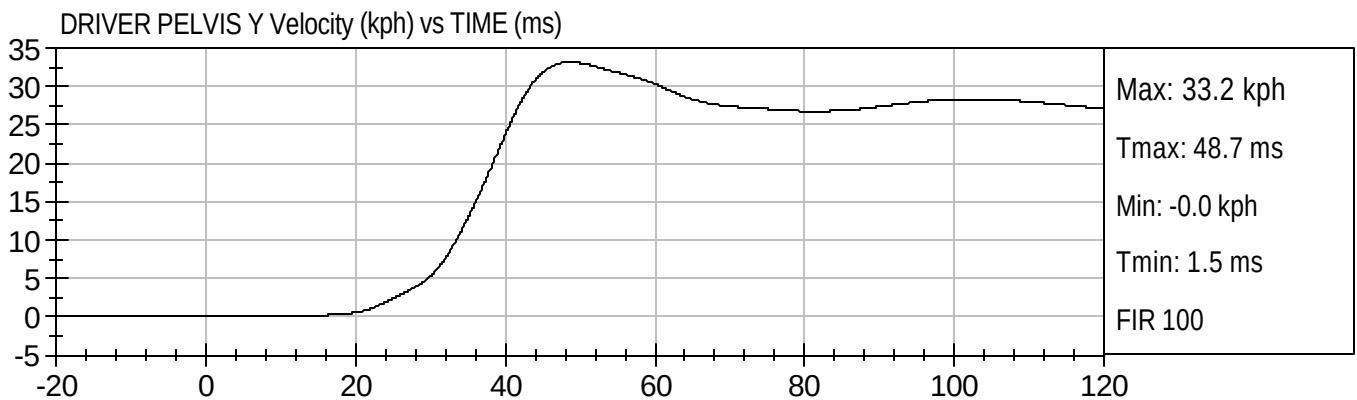
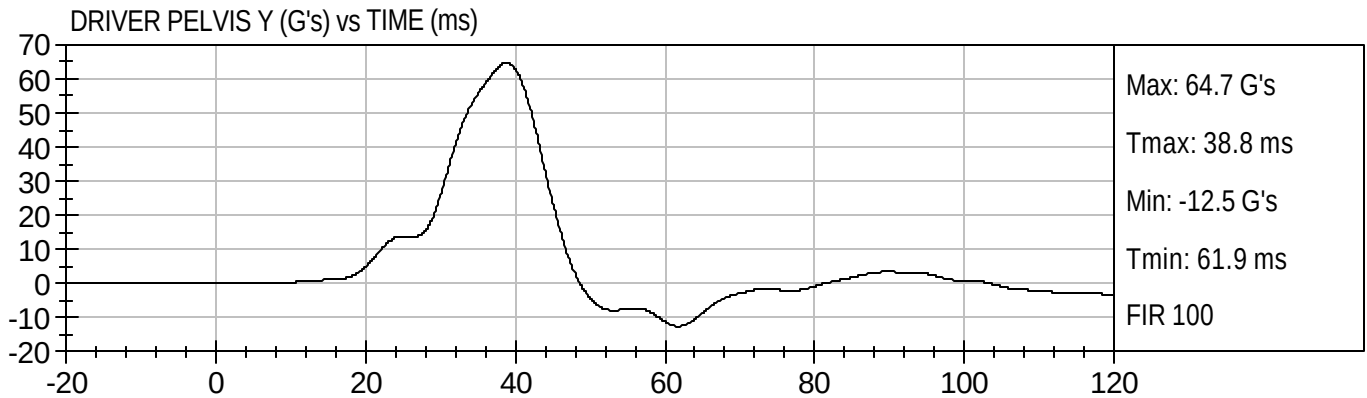


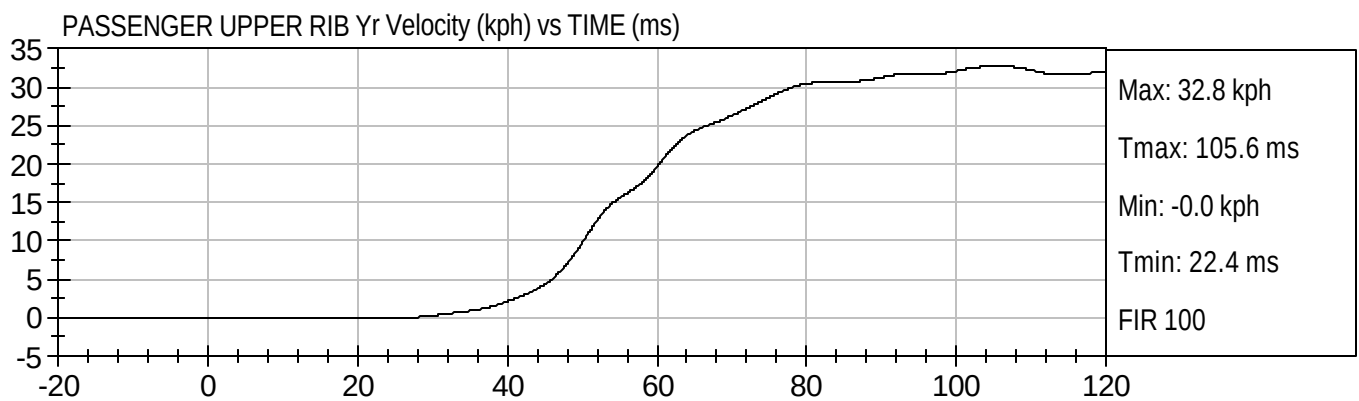
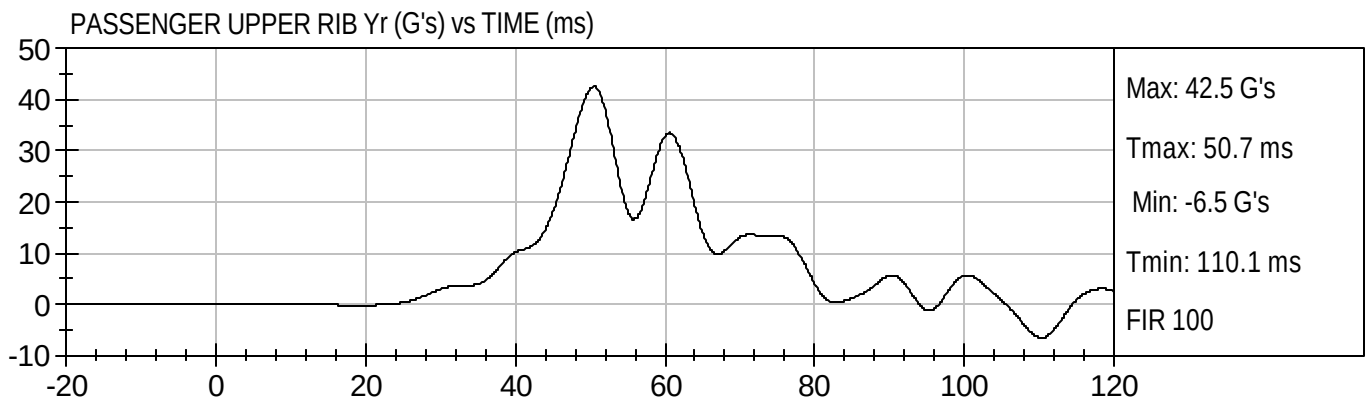
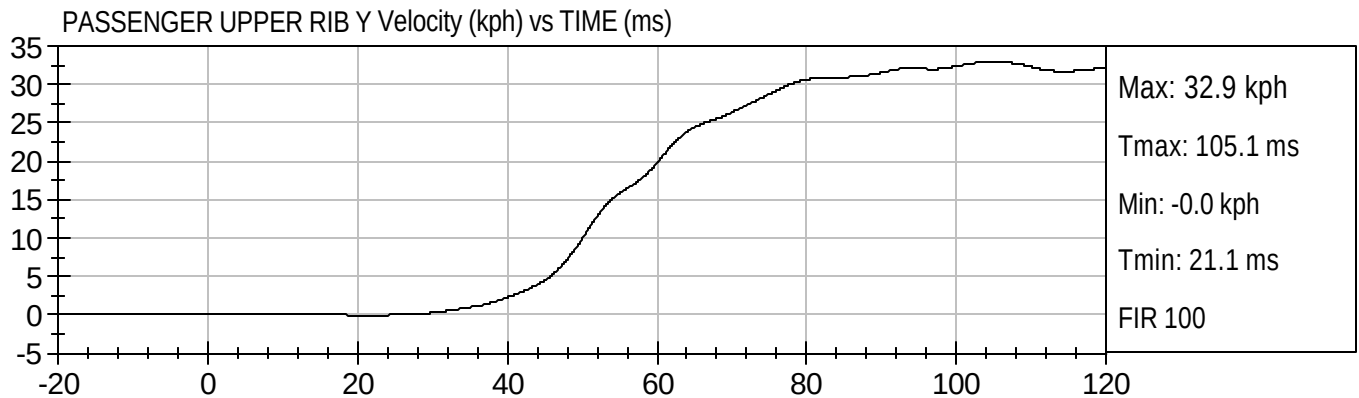
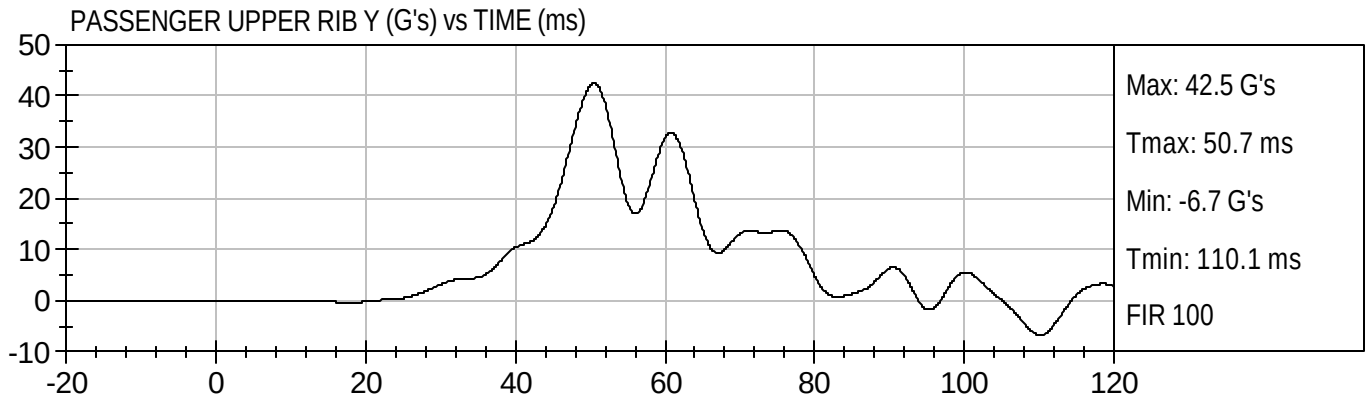


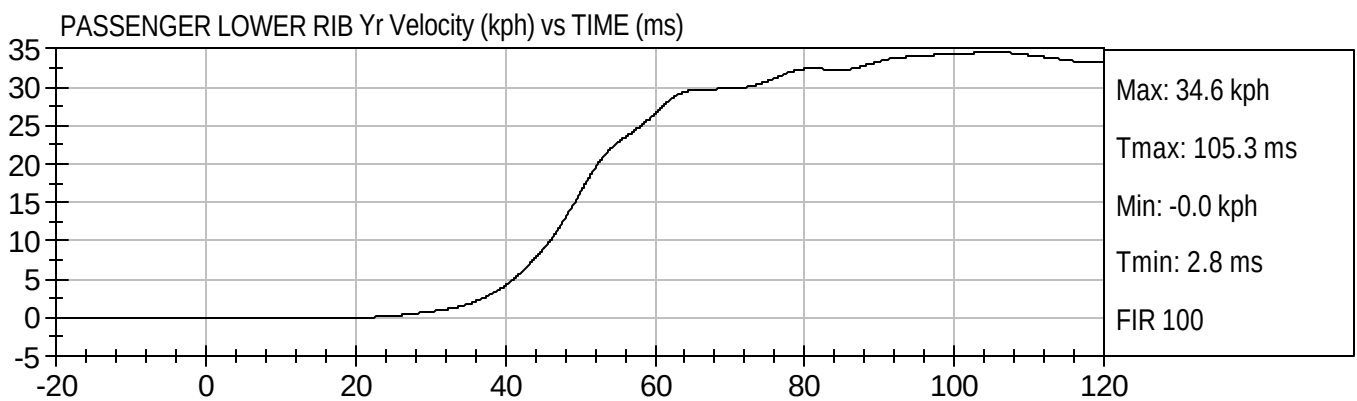
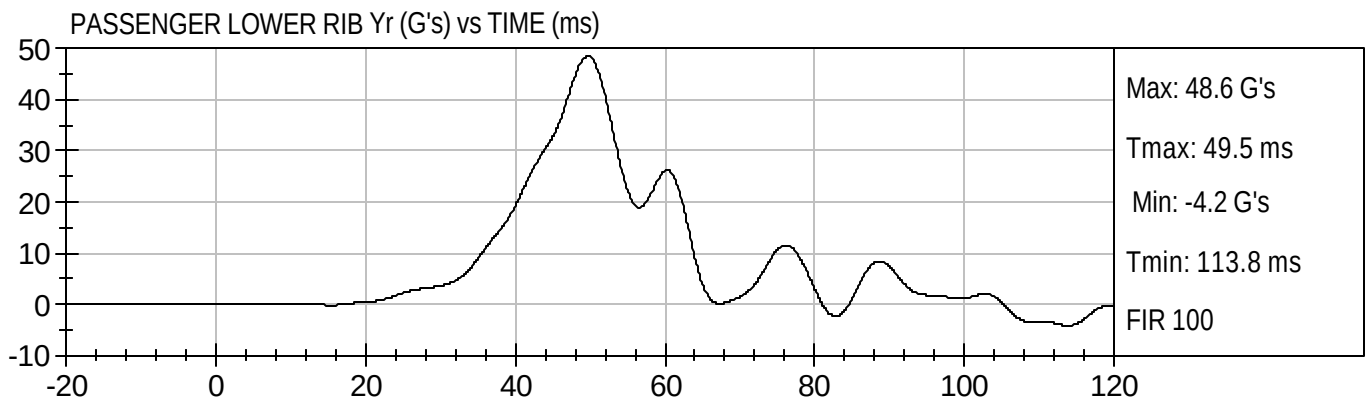
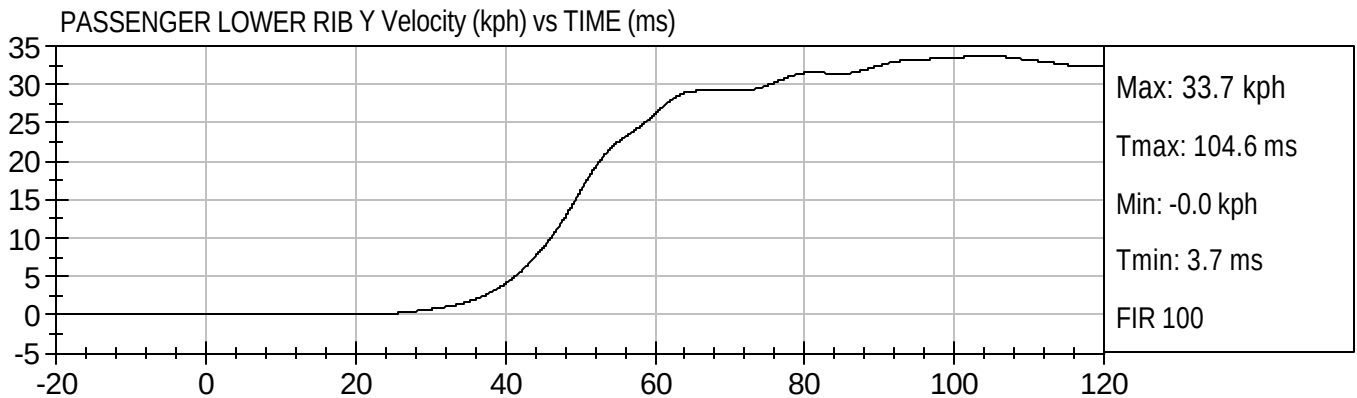
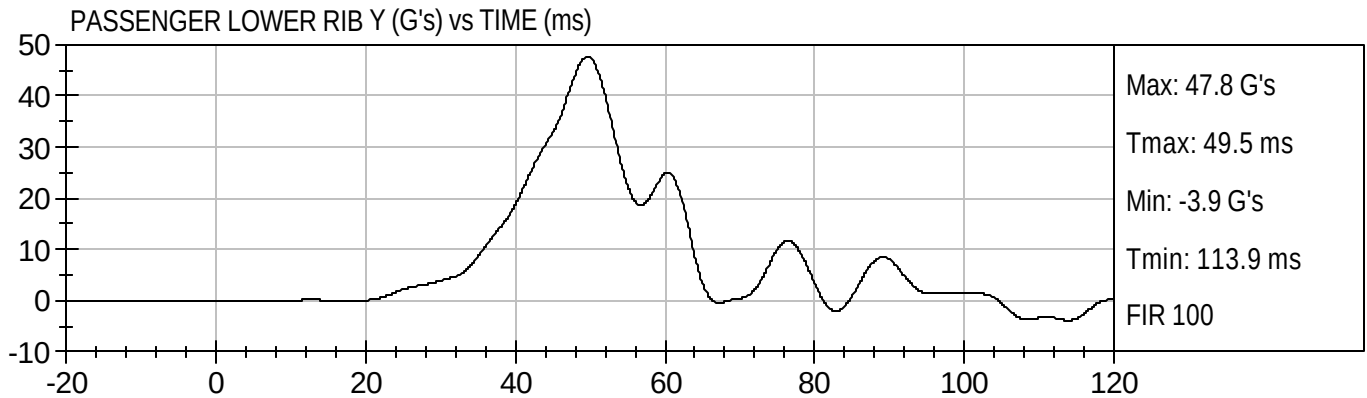


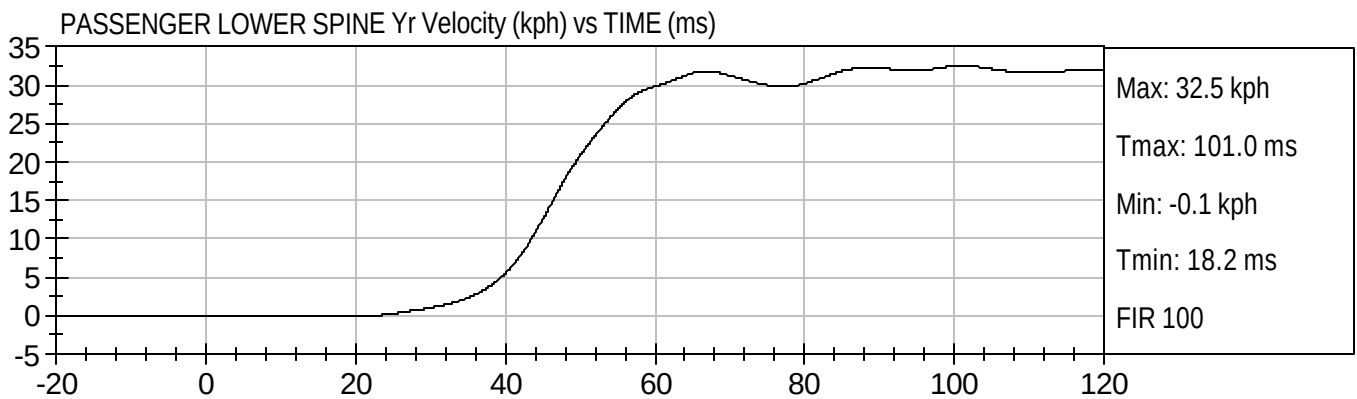
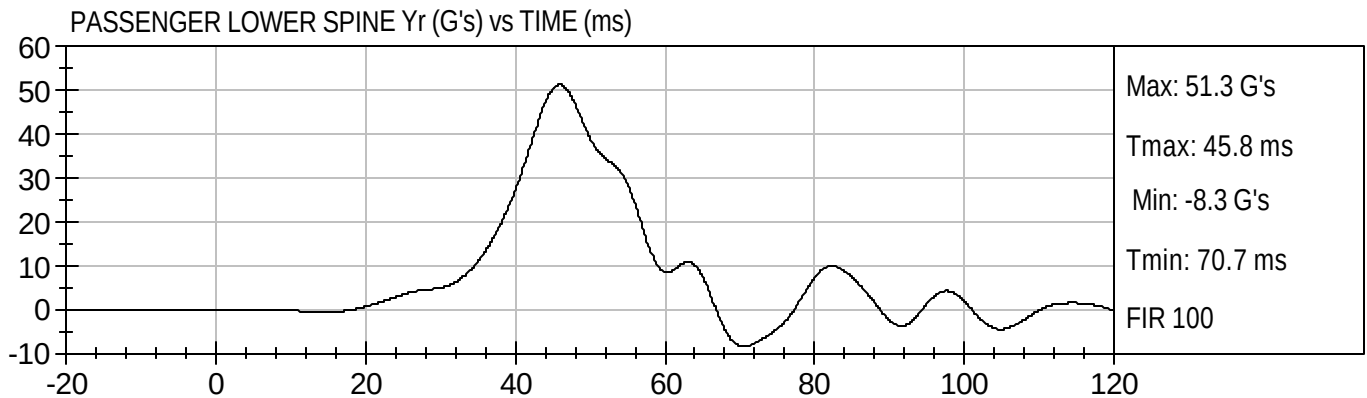
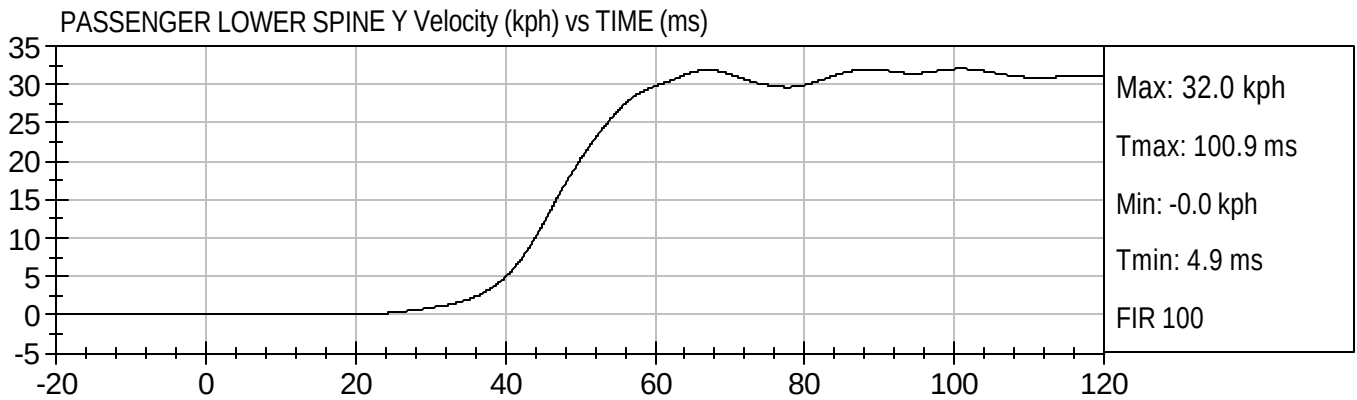
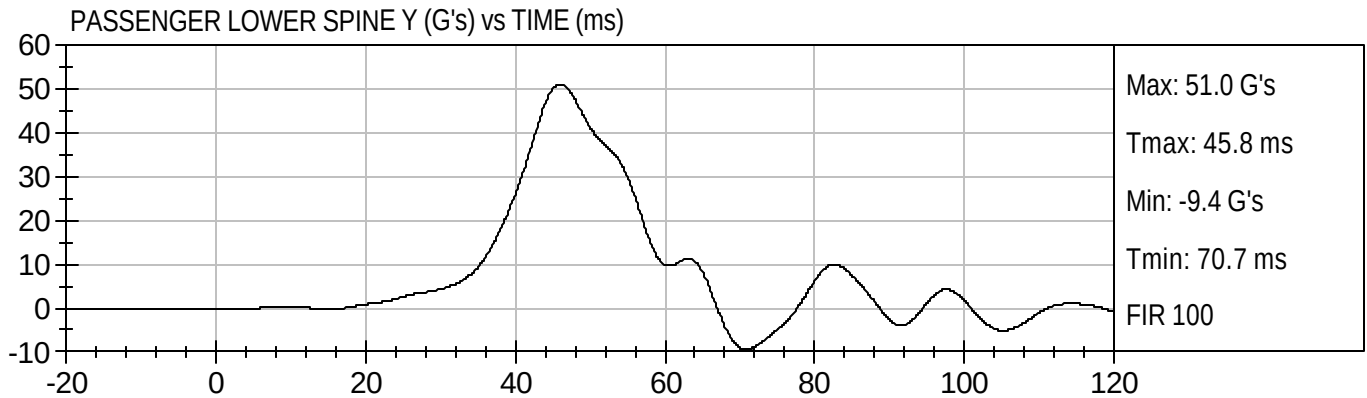








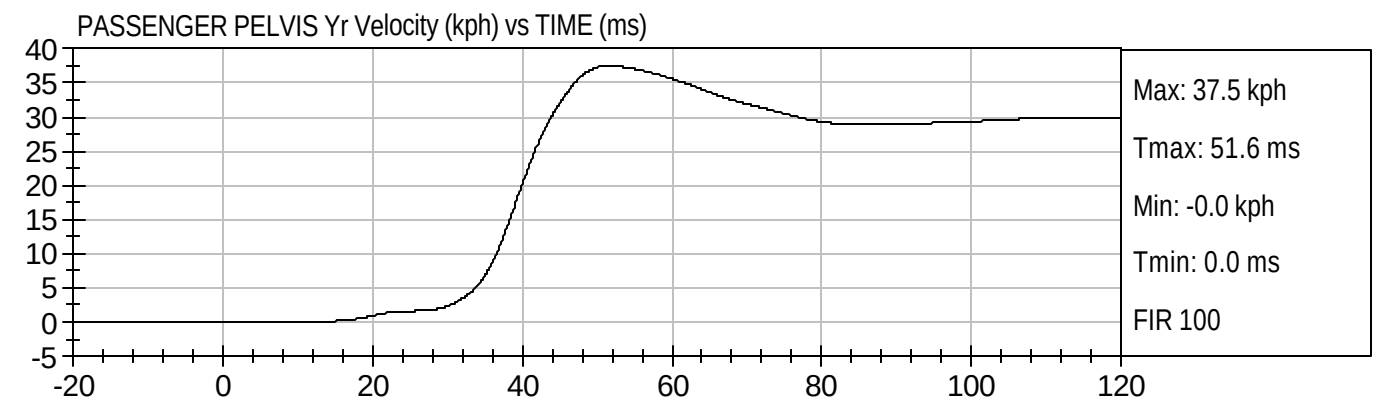
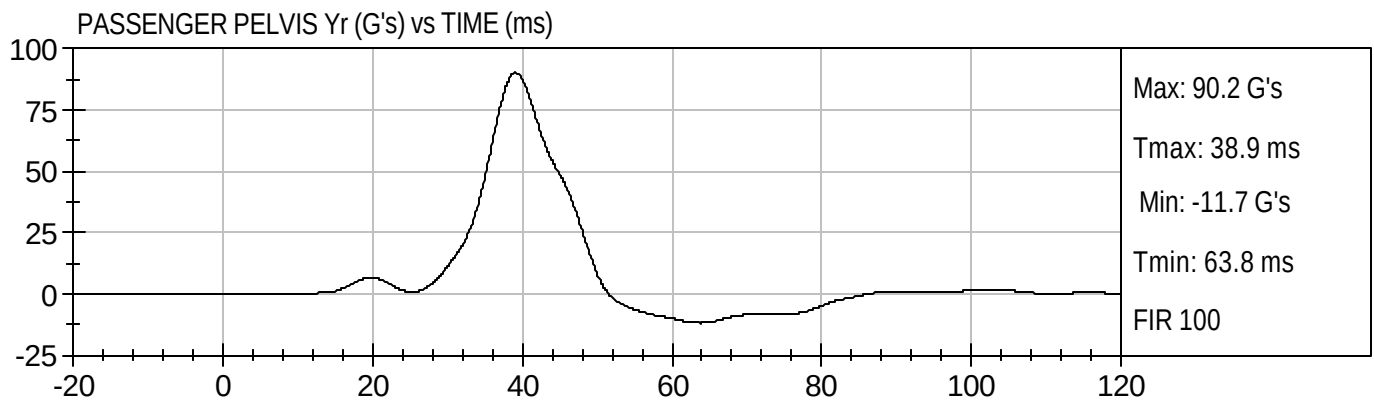
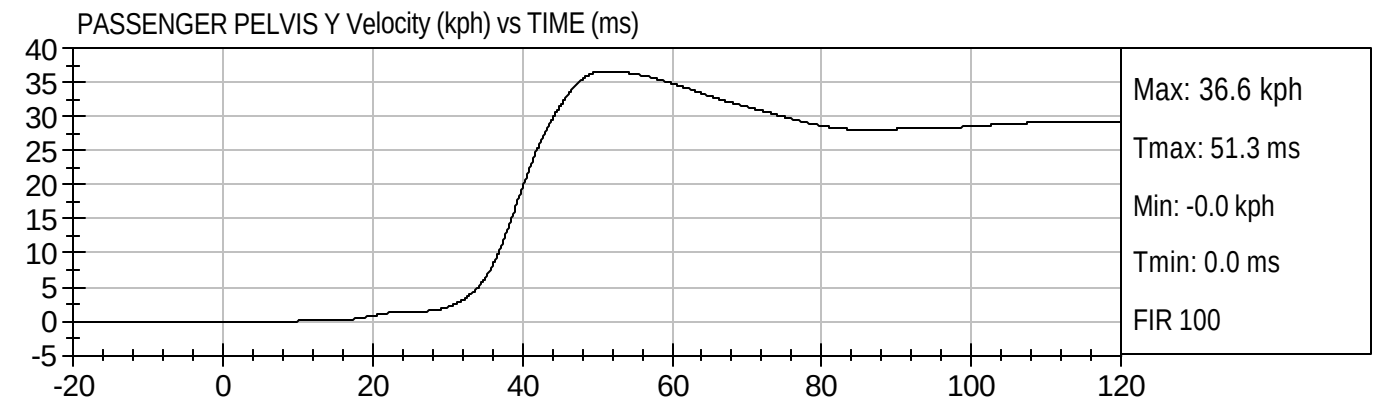
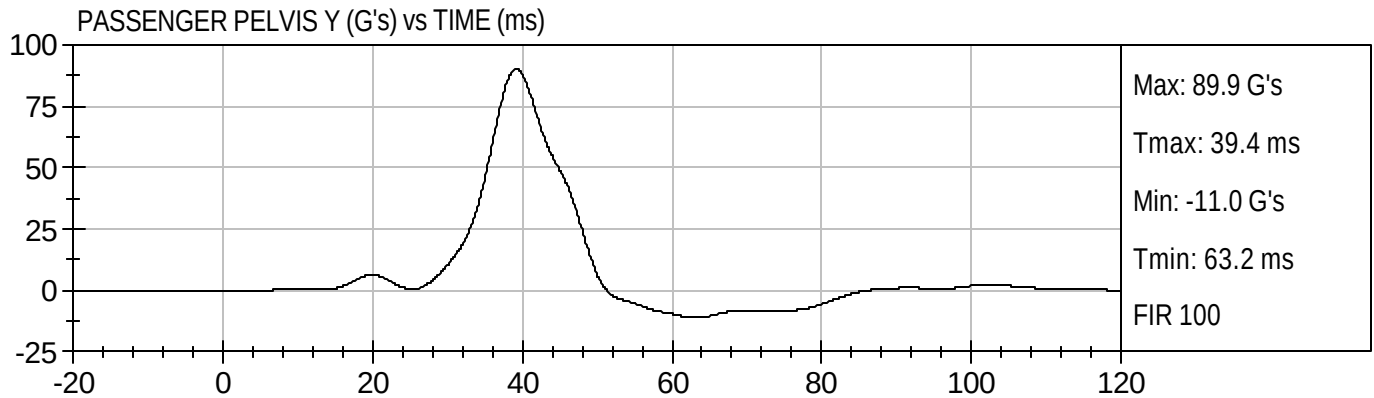






90 DEGREE INDICANT SIDE IMPACT
2002 TOYOTA HIGHLANDER (C25107)

Test Date: 4/2/02
Speed: 38.7 mph (62.3 km/h)



APPENDIX C

SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA

SID Calibration Data Sheet
Side Impact Dummy
Configured to Left Side Impact

Technician: Tim Michnay

Tested Parameter	Units	Specification	Dummy Serial Number: 048	
			Pre-Test	Post-Test
SH - Seated Height	mm	889 - 909	902	902
RH - Rib Height	mm	501 - 521	507	507
HP - Hip Pivot Height	mm	99 ref.	99	99
RD - Rib from Back Line	mm	229 - 241	236	236
KV - Knee Pivot to Back Line	mm	511 - 526	519	519
SW - Knee Pivot to Floor	mm	490 - 505	492	492
HW - Hip Width	mm	356 - 391	364	364
Thorax Impact				
Laboratory Temperature	deg C	18.9 - 25.5	21.3	21.3
Laboratory Relative Humidity	%	10 to 70	22	29
Probe Velocity	m/s	4.27 - 4.33	4.27	4.30
Upper Rib	G's	37 - 46	39	40
Lower Rib	G's	37 - 46	37	38
Lower Spine	G's	15 - 22	19	19
Pelvis Impact				
Laboratory Temperature	deg C	18.9 to 25.5	21.3	21.3
Laboratory Relative Humidity	%	10 to 70	22	29
Probe Velocity	m/s	4.27 to 4.33	4.27	4.30
Pelvis	G's	40 - 60	199	46

SID Calibration Data Sheet
Side Impact Dummy
Configured to Left Side Impact

Technician: Tim Michnay

Tested Parameter	Units	Specification	Dummy Serial Number: 049	
			Pre-Test	Post-Test
SH - Seated Height	mm	889 - 909	898	898
RH - Rib Height	mm	501 - 521	517	517
HP - Hip Pivot Height	mm	99 ref.	99	99
RD - Rib from Back Line	mm	229 - 241	232	232
KV - Knee Pivot to Back Line	mm	511 - 526	522	522
SW - Knee Pivot to Floor	mm	490 - 505	492	492
HW - Hip Width	mm	356 - 391	367	367
Thorax Impact				
Laboratory Temperature	deg C	18.9 - 25.5	23.2	23.2
Laboratory Relative Humidity	%	10 to 70	22	29
Probe Velocity	m/s	4.27 - 4.33	4.27	4.30
Upper Rib	G's	37 - 46	41	42
Lower Rib	G's	37 - 46	40	43
Lower Spine	G's	15 - 22	19	21
Pelvis Impact				
Laboratory Temperature	deg C	18.9 to 25.5	23.2	21.3
Laboratory Relative Humidity	%	10 to 70	22	29
Probe Velocity	m/s	4.27 to 4.33	4.28	4.30
Pelvis	G's	40 - 60	49	54

CERTIFICATION DATA

Dummy Serial Number: 048

CERTIFICATION DATA

Dummy Serial Number: 048

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.
Pelvis 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: 048

Test I.D: D0224

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	902	Pass
RH - Rib Height	mm	501 - 521	507	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	236	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	519	Pass
SW - Knee Pivot to Floor	mm	490 - 505	492	Pass
HW - Hip Width	mm	356 - 391	364	Pass
Overall Test Results			Pass	

Laboratory Technician

2/18/02
Test Date

Approved By

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration

ATD Serial No: 048

Test I.D: D02241

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Peak Resultant Acceleration	G's	210 to 260	250	Pass
Peak Lateral Acceleration	G's	< 10	7	Pass
Time Above 100 G	msec	0.9 - 1.5	1.2	Pass
Overall Test Results				Pass

Laboratory Technician

2/15/02
Test Date

Approved By



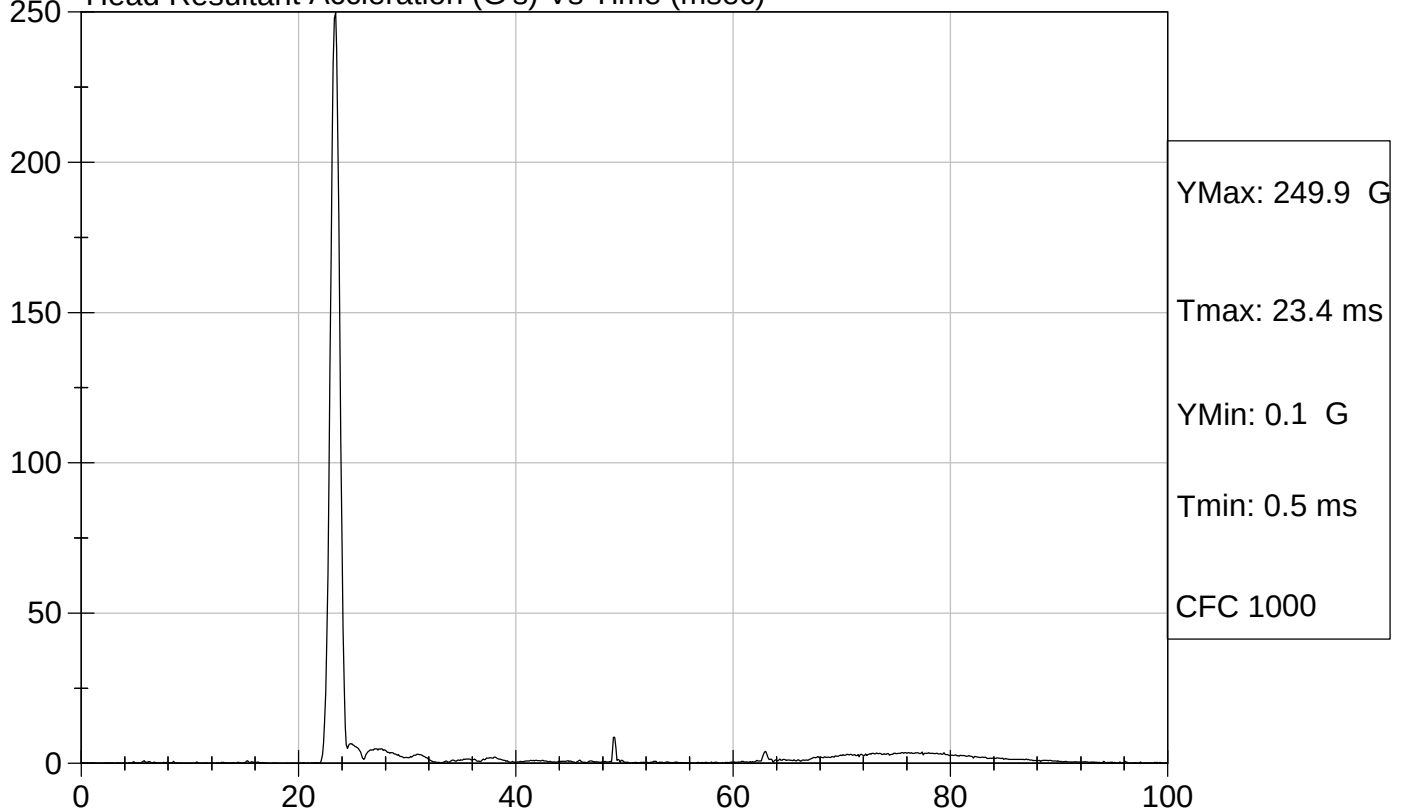
Test Description: Head Drop

Test Date: 2/15/02

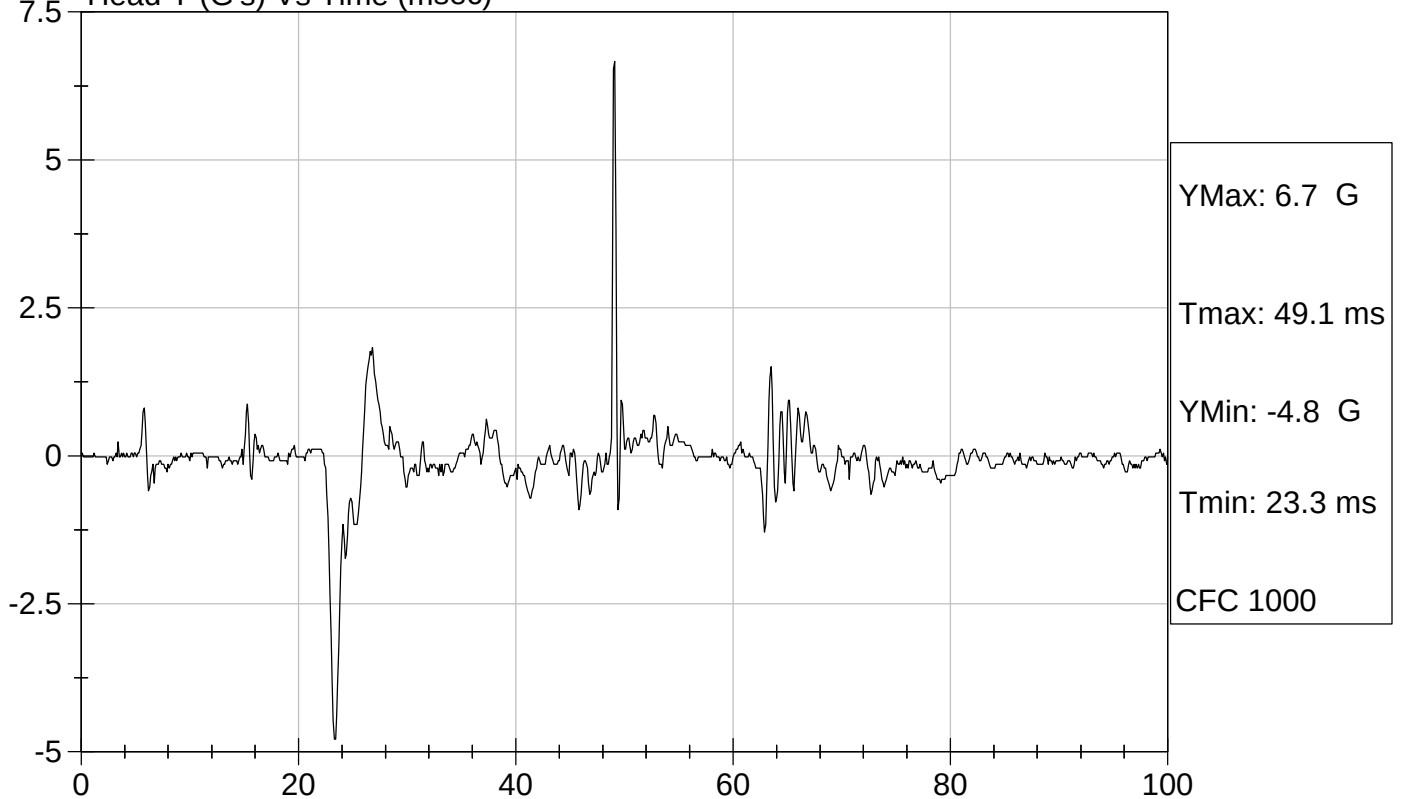
Component: D02241

Speed: 0 ft/s, 0.00 m/s

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



Head Y (G's) Vs Time (msec)



SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 048

Test I.D: D02242

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.3	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	39	Pass
Lower Rib	G's	37 - 46	37	Pass
Lower Spine	G's	15 - 22	19	Pass
Overall Test Results				Pass

Laboratory Technician

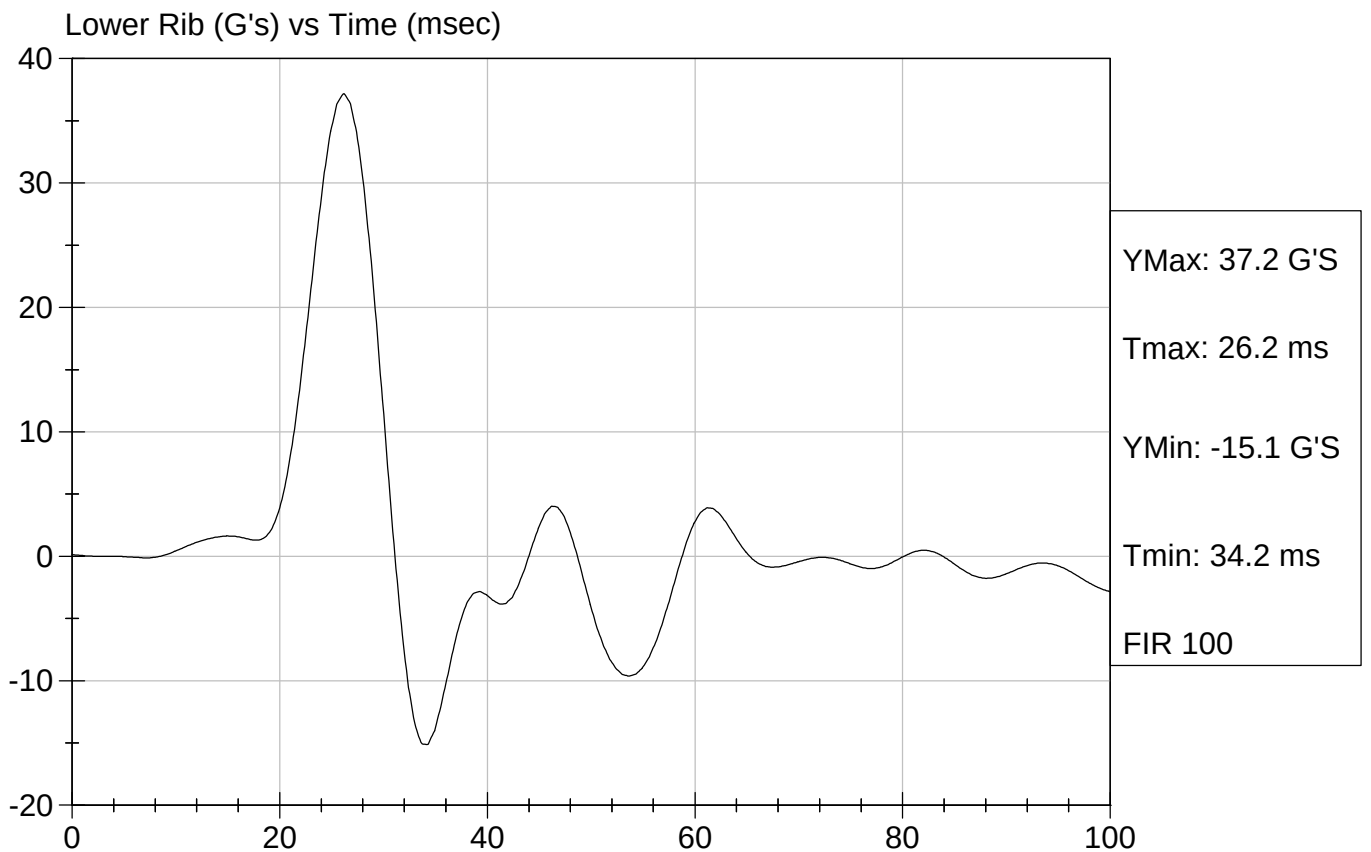
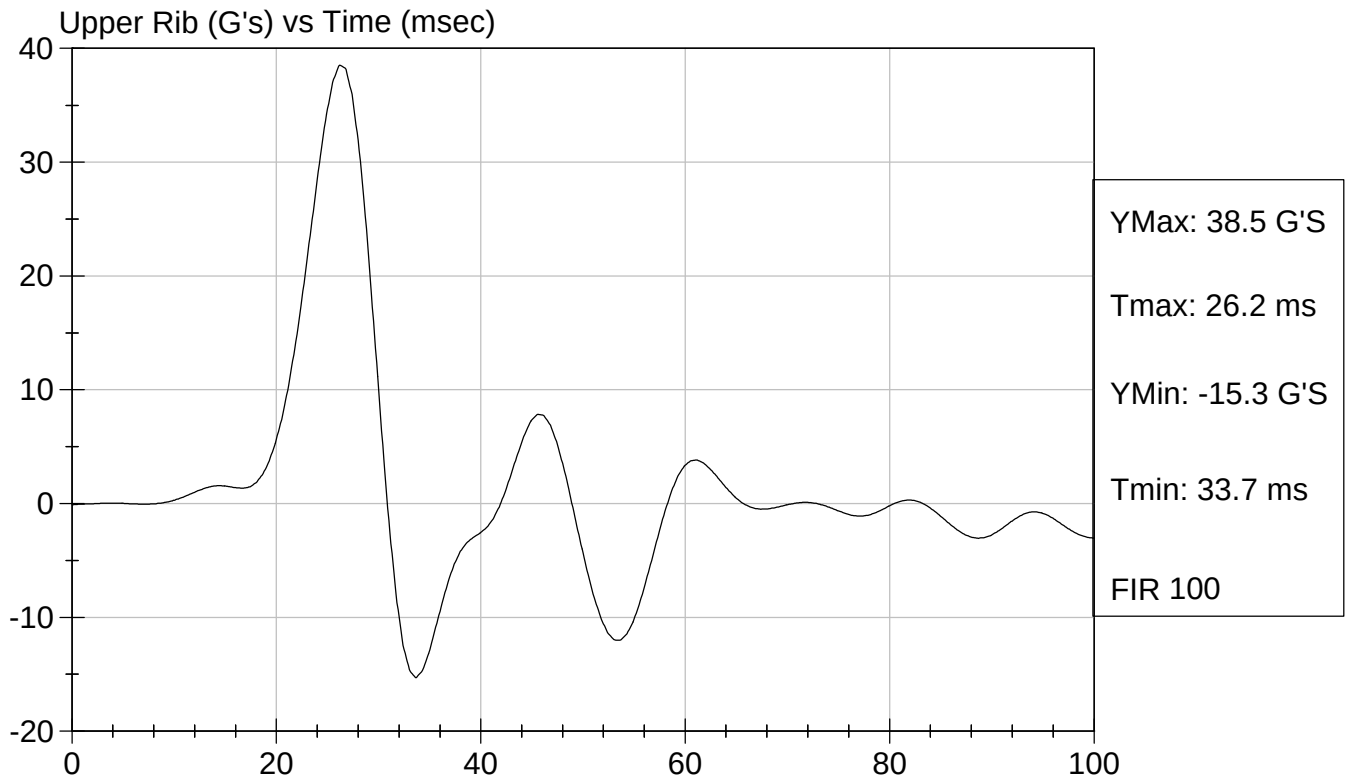
04/08/2002
Test Date

Approved By



Test Desc: Thorax Impact
Component ID: D02242

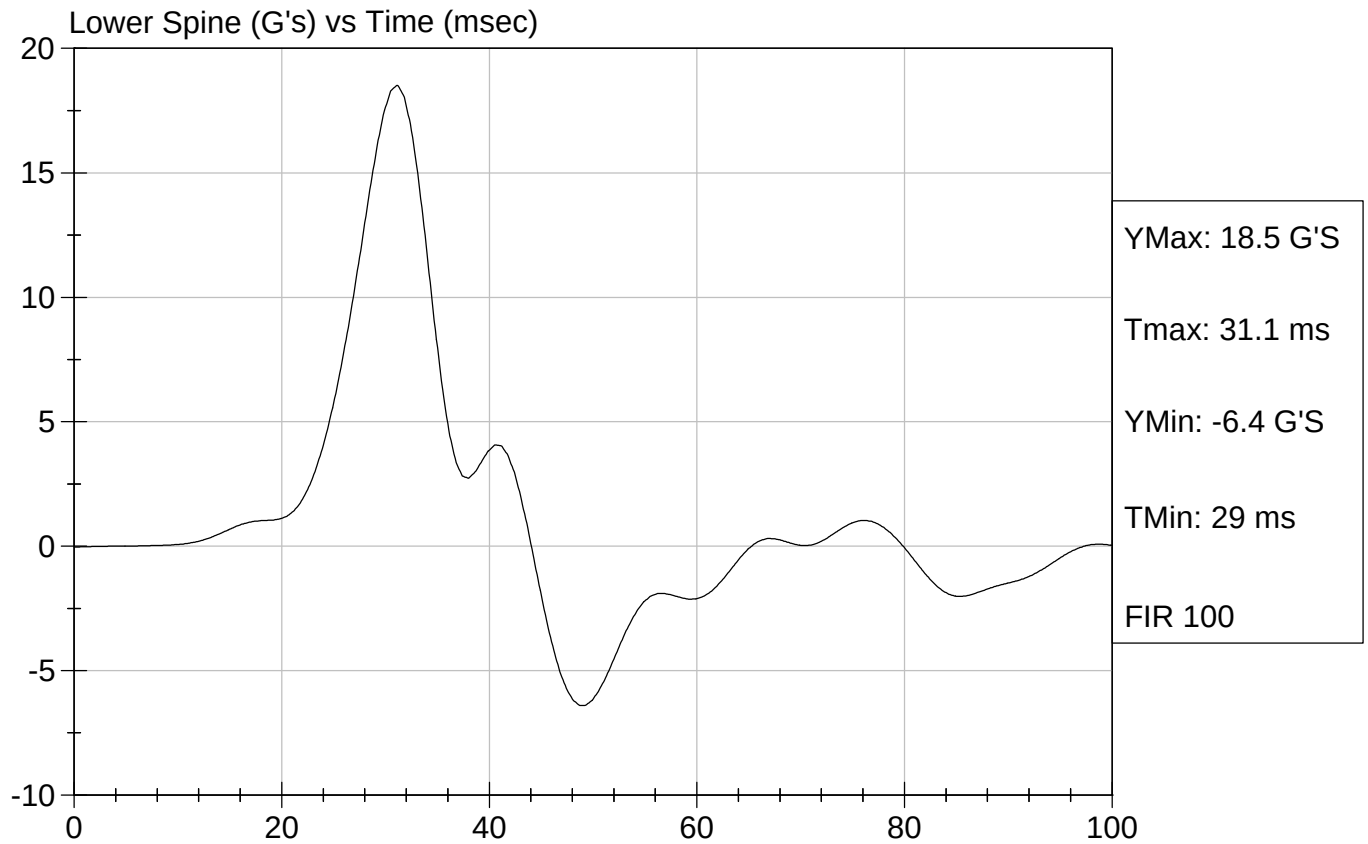
Test Date: 04/08/2002
Speed: 14.01 ft/sec, 0 m/sec





Test Desc: Thorax Impact
Component ID: D02242

Test Date: 04/08/2002
Speed: 14.01 ft/sec, 4.27 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 048

Test I.D: D02243

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	4.27	Pass
Pelvis Acceleration	G's	40 - 60	199	Pass
Overall Test Results				Pass

Laboratory Technician

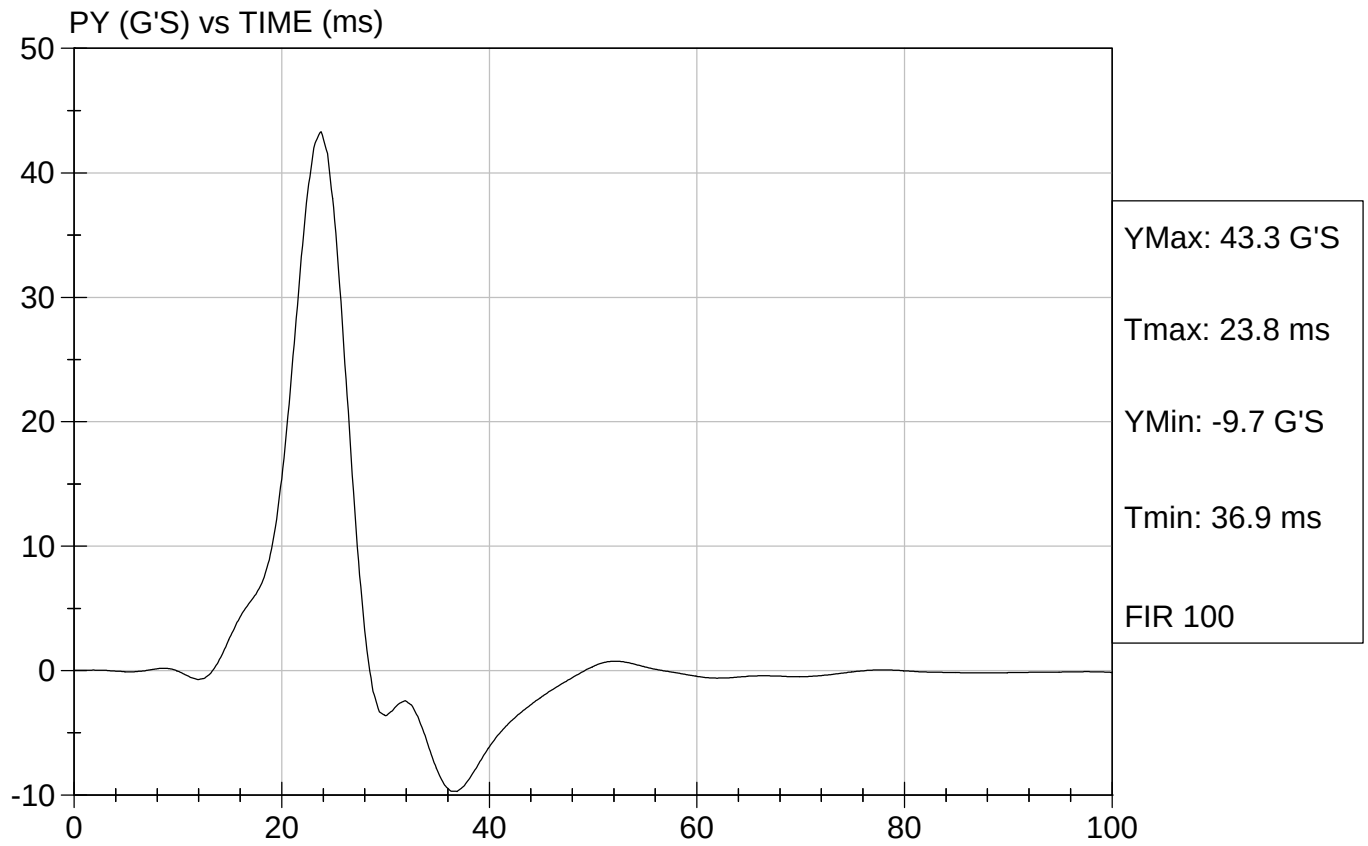
2/18/02
Test Date

Approved By



Test Desc: Pelvis Impact
Component ID: D02243

Test Date: 2/18/02
Speed: 14.01 ft/sec, 4.27 m/sec



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

ATD Serial No: 048

Test I.D: D02244

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 12.7 mm	N	104 -162	141	Pass
Force At 19 mm	N	163 - 222	197	Pass
Force At 25.4 mm	N	222 - 280	263	Pass
Force At 33 mm	N	325 - 391	366	Pass
Overall Test Results				Pass

Laboratory Technician

2/15/02
Test Date

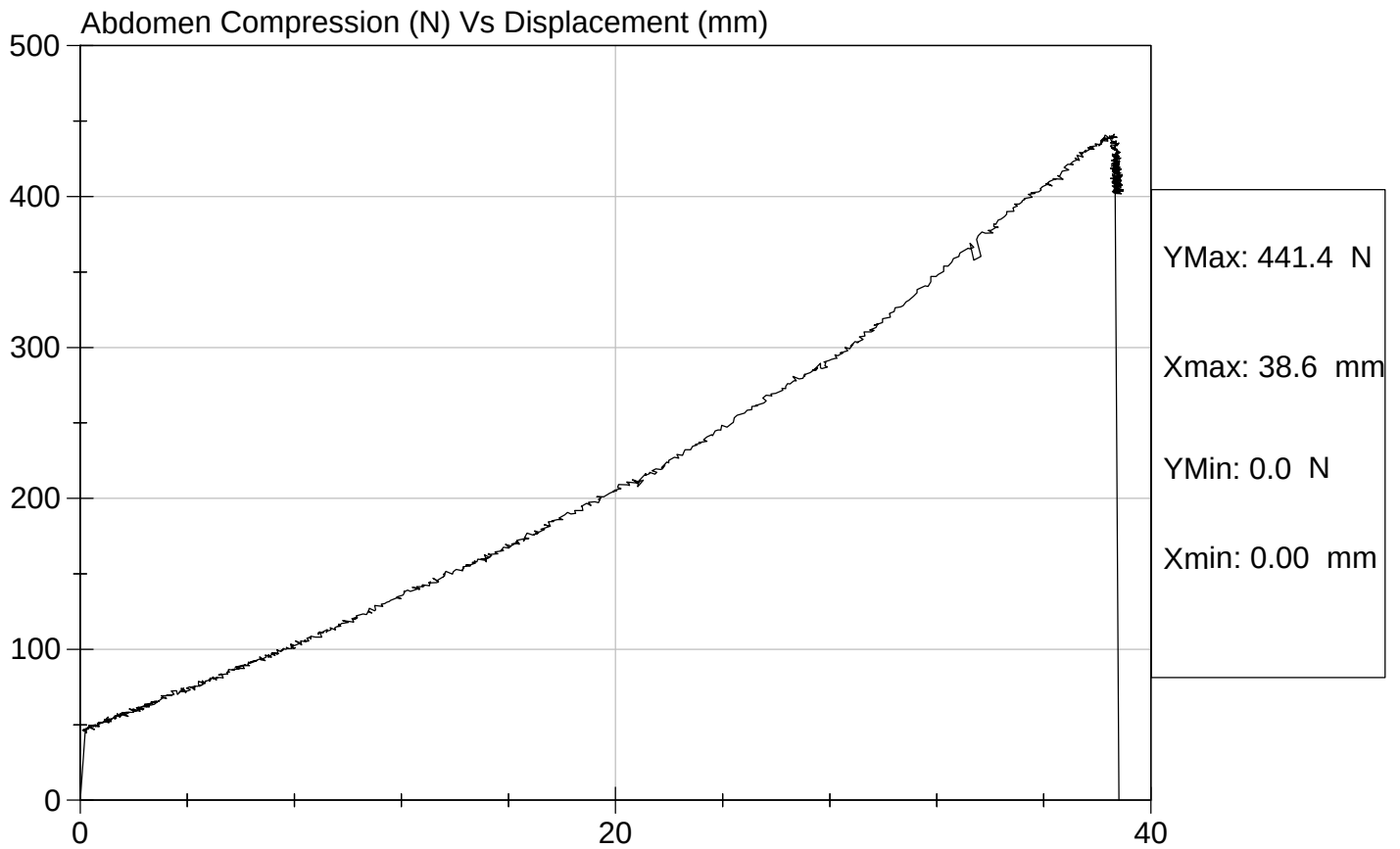
Approved By



Test Description: Abdomen Compression Test Date: 2/15/02

Component: D02244

Speed: 0 ft/sec, 0.00 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 048

Test I.D: D02245

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	118.9	Pass
Force At 30 deg	N	151.2 - 204.6	172.0	Pass
Force At 40 deg	N	204.6 - 258.0	225.1	Pass
Return Angle	Deg	12 Maximum	9	Pass
			Overall Test Results	Pass

Laboratory Technician

2/15/2002
Test Date

Approved By

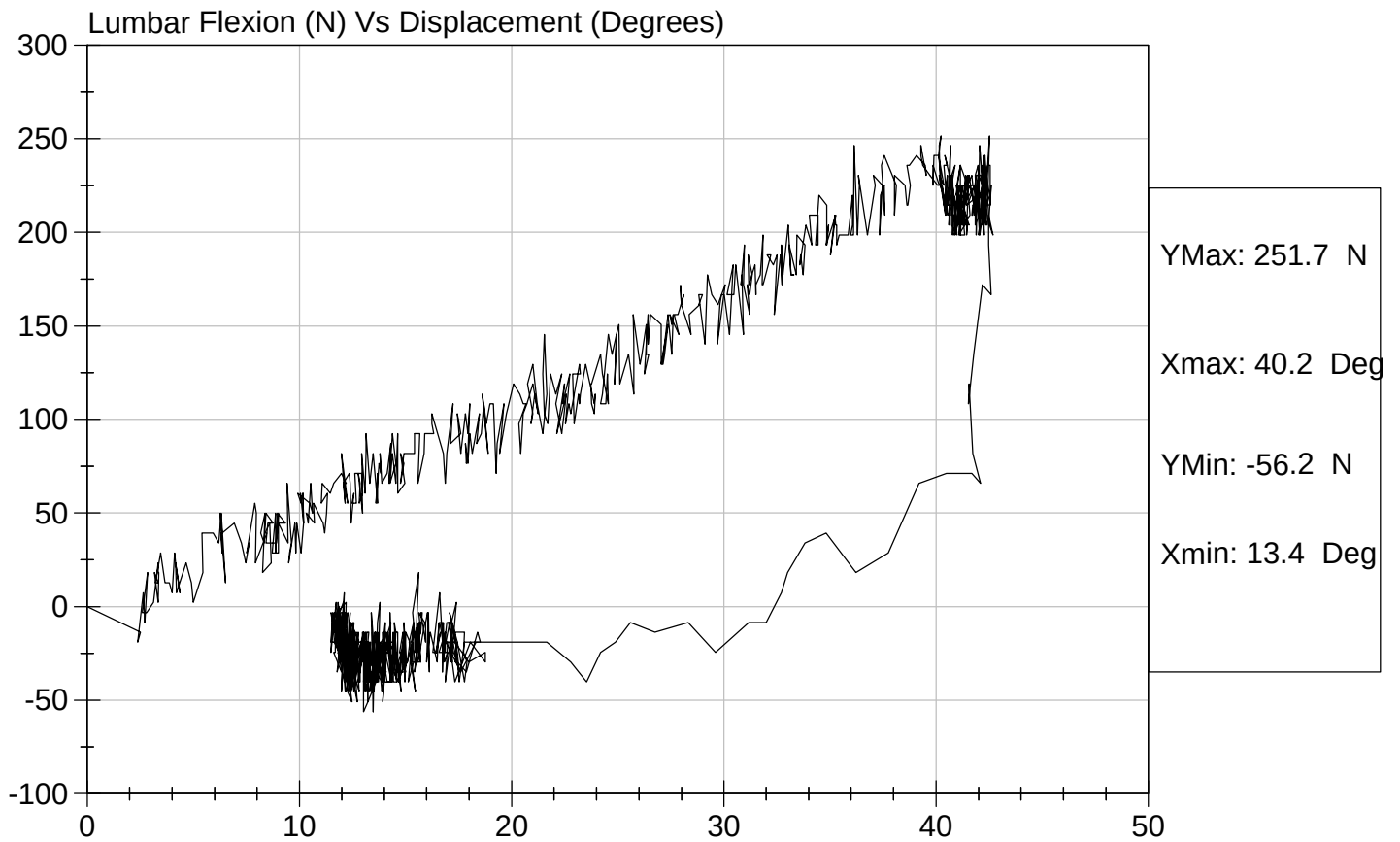


Test Description: Lumbar Flexion

Test Date: 2/15/2002

Component: D02245

Speed: 0 ft/sec, 0.00 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 048

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

Laboratory Technician

4/5/02

Test Date

Approved By

CERTIFICATION DATA

Dummy Serial Number: 049

CERTIFICATION DATA

Dummy Serial Number: 049

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.
Pelvis 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: 049

Test I.D: D0225

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	898	Pass
RH - Rib Height	mm	501 - 521	517	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	232	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	522	Pass
SW - Knee Pivot to Floor	mm	490 - 505	492	Pass
HW - Hip Width	mm	356 - 391	367	Pass
Overall Test Results			Pass	

Laboratory Technician

2/18/02
Test Date

Approved By

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration

ATD Serial No: 049

Test I.D: D02251

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Peak Resultant Acceleration	G's	210 to 260	229	Pass
Peak Lateral Acceleration	G's	< 10	-2	Pass
Time Above 100 G	msec	0.9 - 1.5	1.3	Pass
Overall Test Results				Pass

Laboratory Technician

2/15/02
Test Date

Approved By



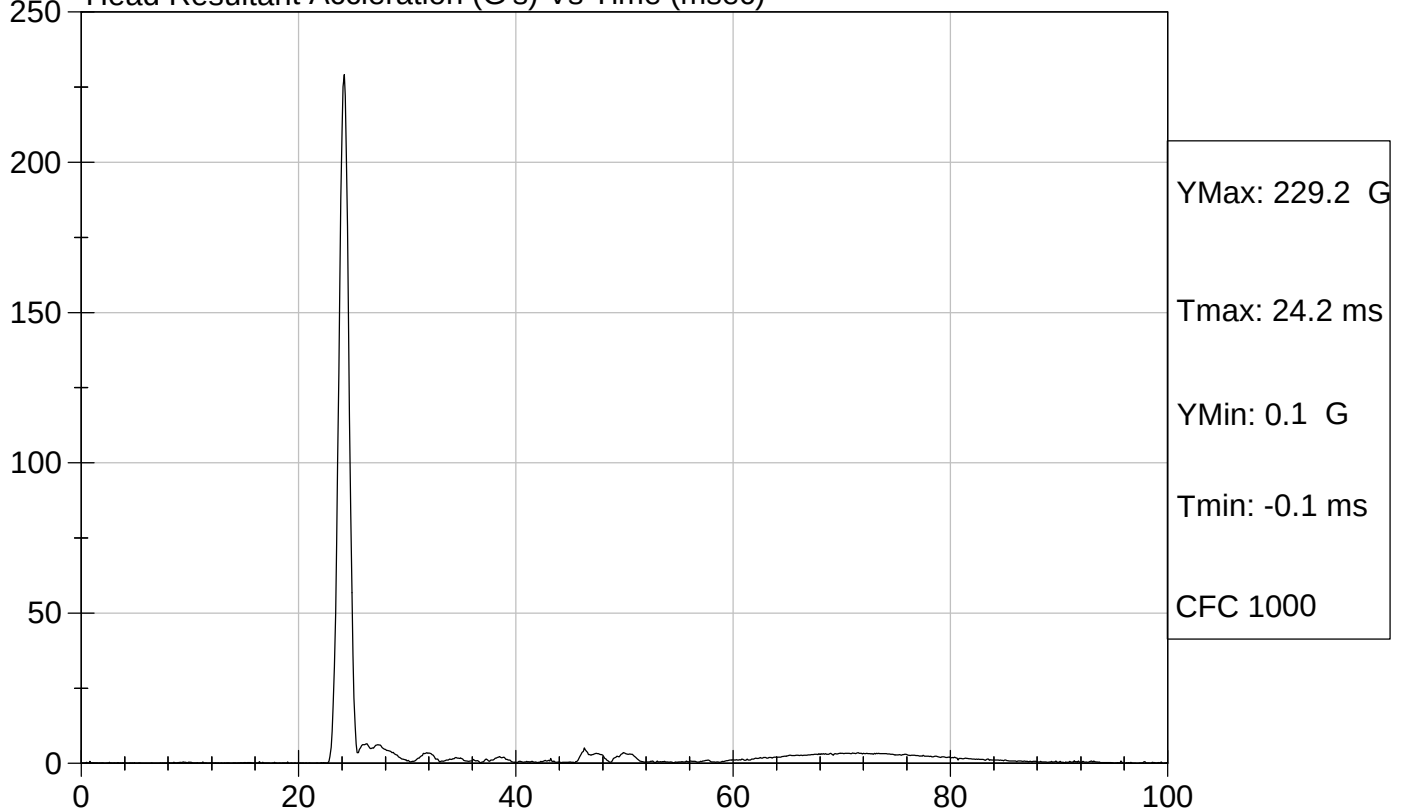
Test Description: Head Drop

Test Date: 2/15/02

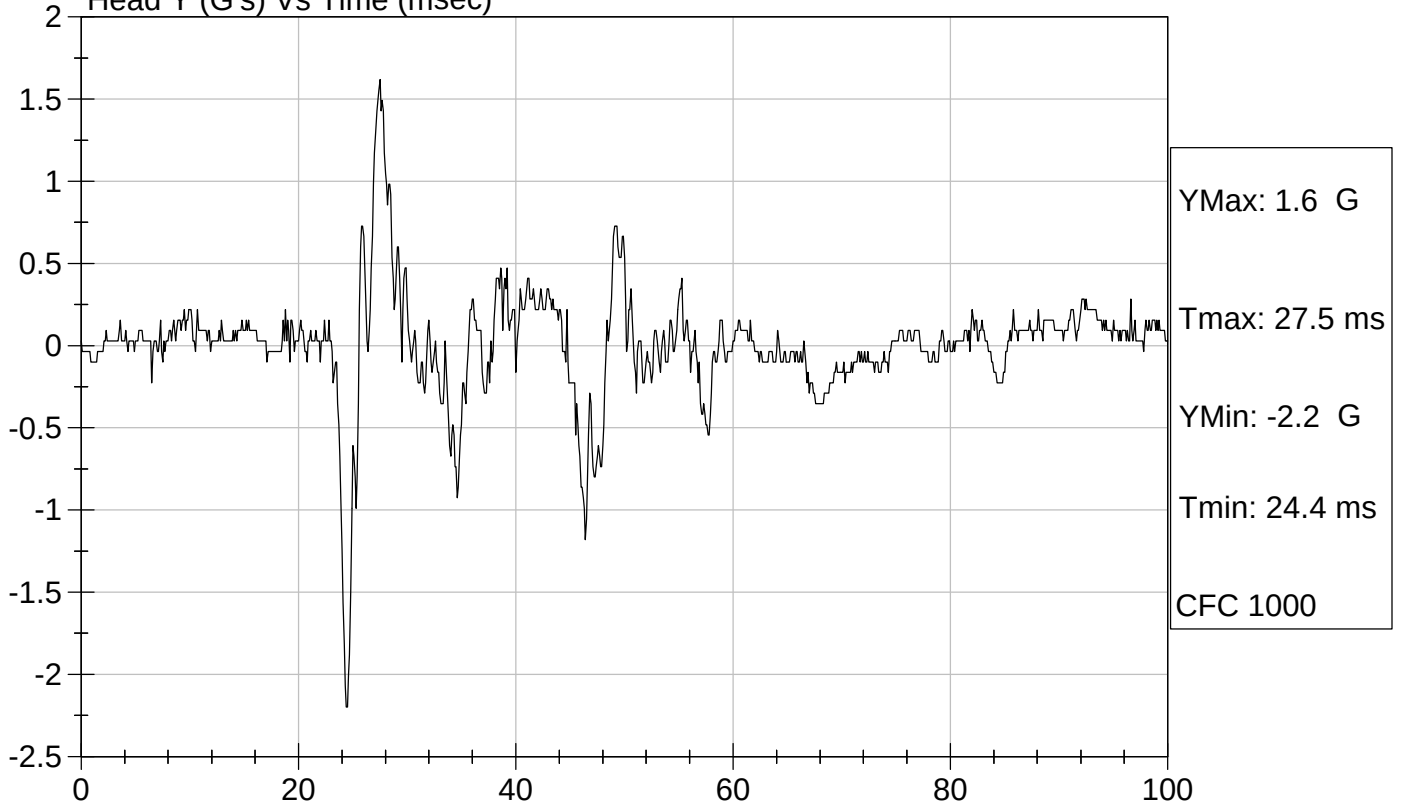
Component: D02251

Speed: 0 ft/s, 0.00 m/s

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



Head Y (G's) Vs Time (msec)



SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 049

Test I.D: D02252

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	23.2	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	41	Pass
Lower Rib	G's	37 - 46	40	Pass
Lower Spine	G's	15 - 22	19	Pass
Overall Test Results				Pass

Laboratory Technician

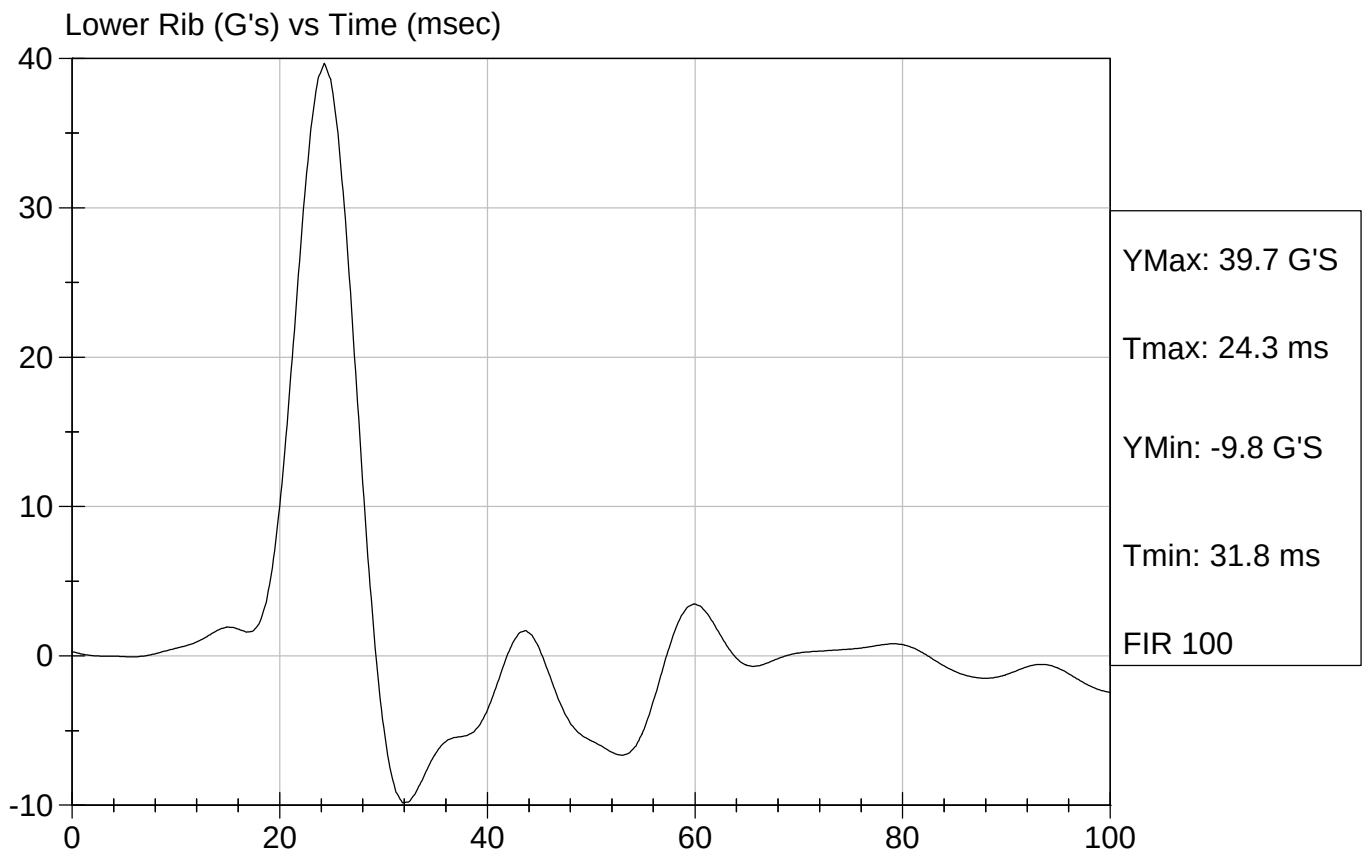
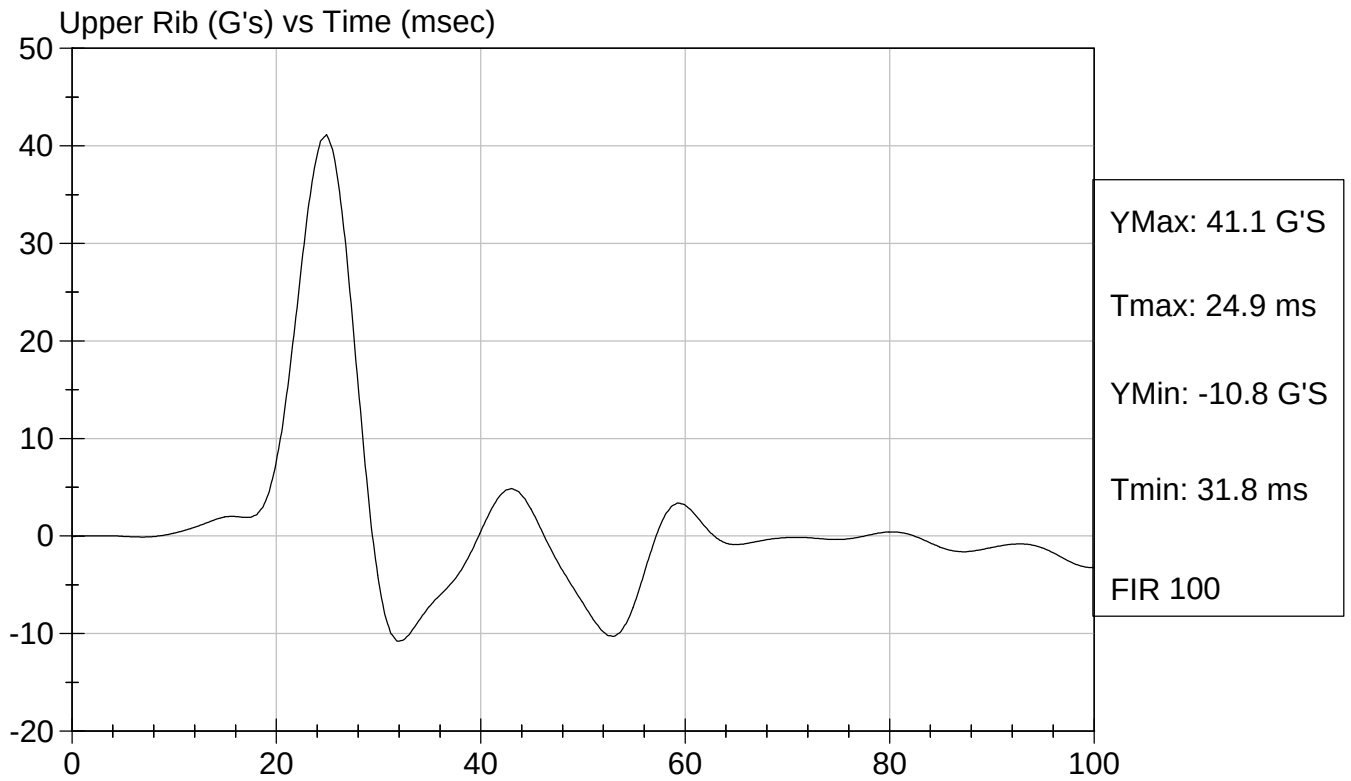
2/18/02
Test Date

Approved By



Test Desc: Thorax Impact
Component ID: D02252

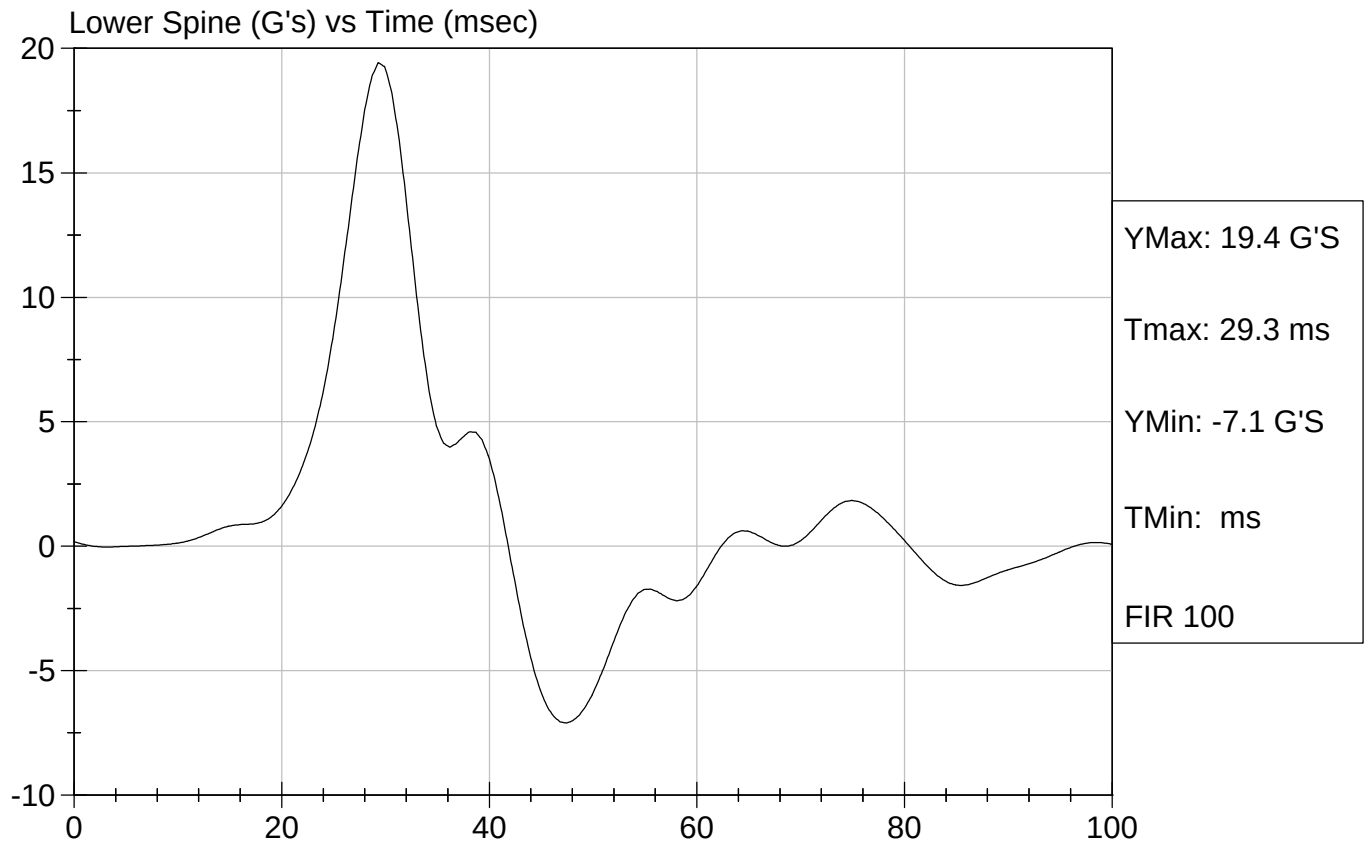
Test Date: 2/18/02
Speed: 14.01 ft/sec, 0 m/sec





Test Desc: Thorax Impact
Component ID: D02252

Test Date: 2/18/02
Speed: 14.01 ft/sec, 4.27 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 049

Test I.D: D02253

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	23.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	4.27 - 4.33	4.28	Pass
Pelvis Acceleration	G's	40 - 60	49	Pass
Overall Test Results				Pass

Laboratory Technician

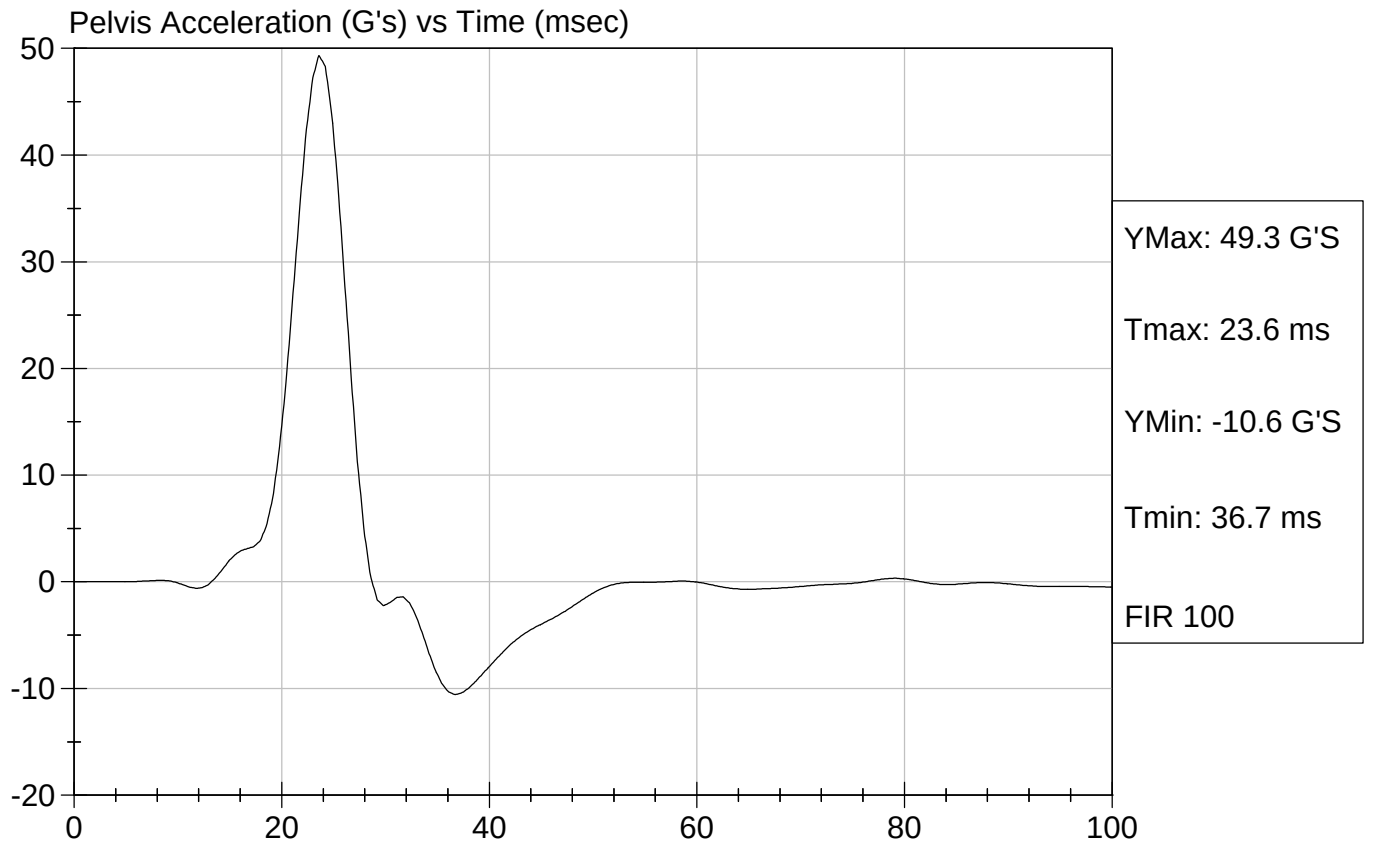
2/18/02
Test Date

Approved By



Test Desc: Pelvis Impact
Component ID: D02253

Test Date: 2/18/02
Speed: 14.04 ft/sec, 4.28 m/sec



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

ATD Serial No: 049

Test I.D: D02254

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 12.7 mm	N	104 -162	135	Pass
Force At 19 mm	N	163 - 222	186	Pass
Force At 25.4 mm	N	222 - 280	248	Pass
Force At 33 mm	N	325 - 391	334	Pass
Overall Test Results				Pass

Laboratory Technician

2/15/02
Test Date

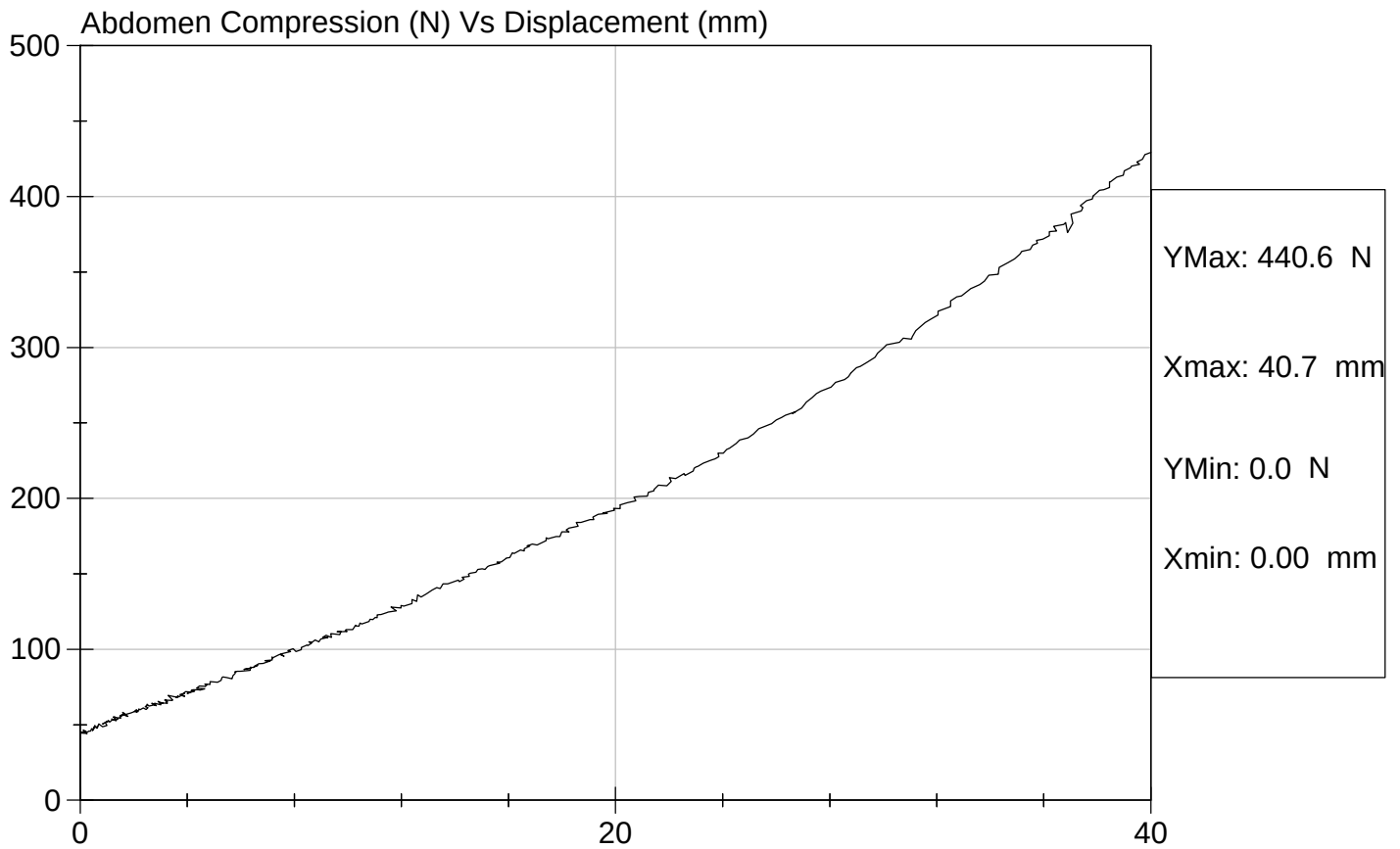
Approved By



Test Description: Abdomen Compression Test Date: 2/15/02

Component: D02254

Speed: 0 ft/sec, 0.00 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 049

Test I.D: D02255

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	99.2	Pass
Force At 30 deg	N	151.2 - 204.6	155.5	Pass
Force At 40 deg	N	204.6 - 258.0	215.8	Pass
Return Angle	Deg	12 Maximum	8	Pass
Overall Test Results			Pass	

Laboratory Technician

2/15/2002
Test Date

Approved By

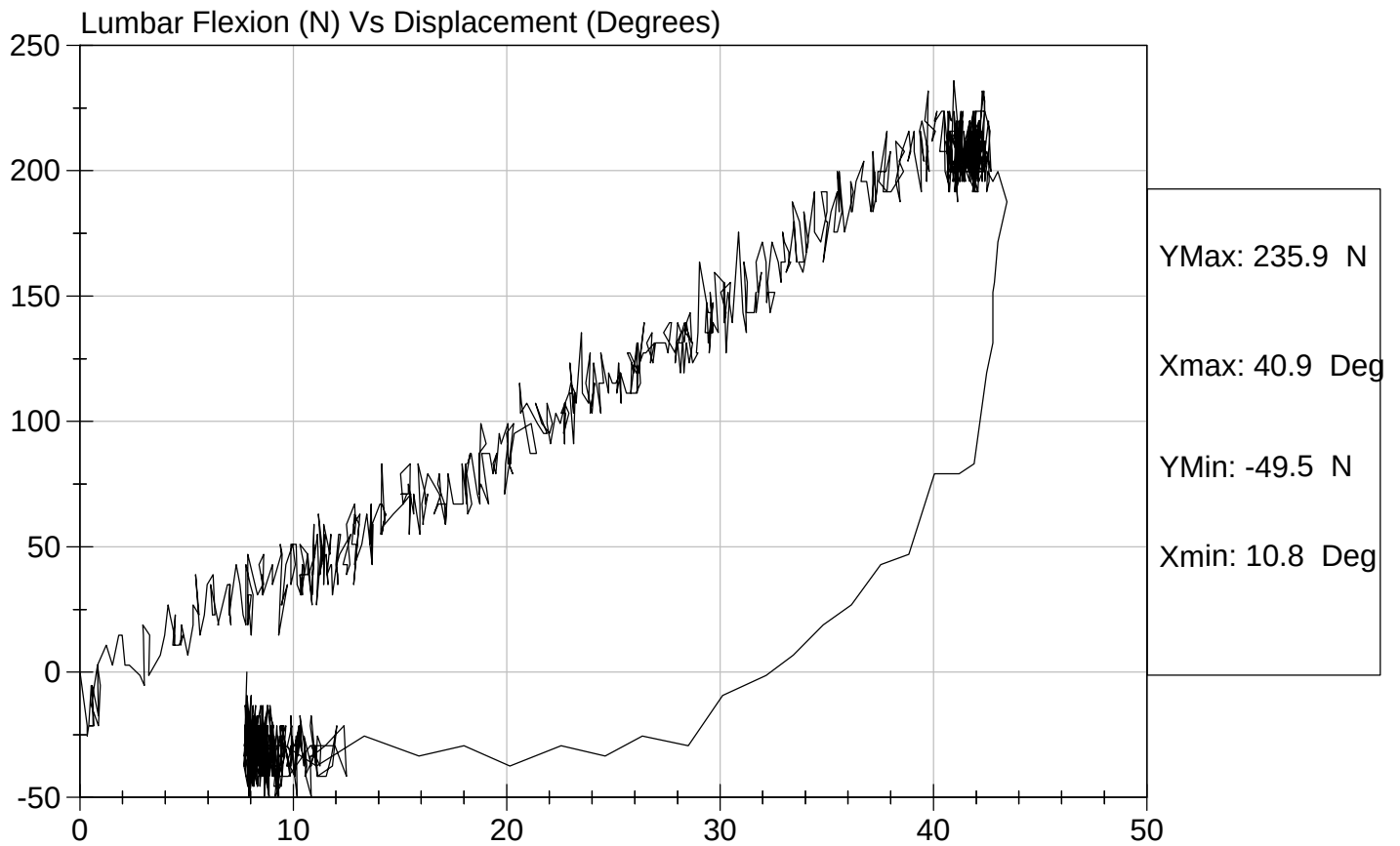


Test Description: Lumbar Flexion

Test Date: 2/15/2002

Component: D02255

Speed: 0 ft/sec, 0.00 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 049

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

Laboratory Technician

4/5/02

Test Date

Approved By

CERTIFICATION DATA

Dummy Serial Number: 048

CERTIFICATION DATA

Dummy Serial Number: 048

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.
Pelvis 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: 048

Test I.D: D0250

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	902	Pass
RH - Rib Height	mm	501 - 521	507	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	236	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	519	Pass
SW - Knee Pivot to Floor	mm	490 - 505	492	Pass
HW - Hip Width	mm	356 - 391	364	Pass
Overall Test Results			Pass	

Laboratory Technician

4/5/02
Test Date

Approved By

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration

ATD Serial No: 048

Test I.D: D02501

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
Peak Resultant Acceleration	G's	210 to 260	249	Pass
Peak Lateral Acceleration	G's	< 10	4	Pass
Time Above 100 G	msec	0.9 - 1.5	1.2	Pass
Overall Test Results				Pass

Laboratory Technician

04/05/2002
Test Date

Approved By



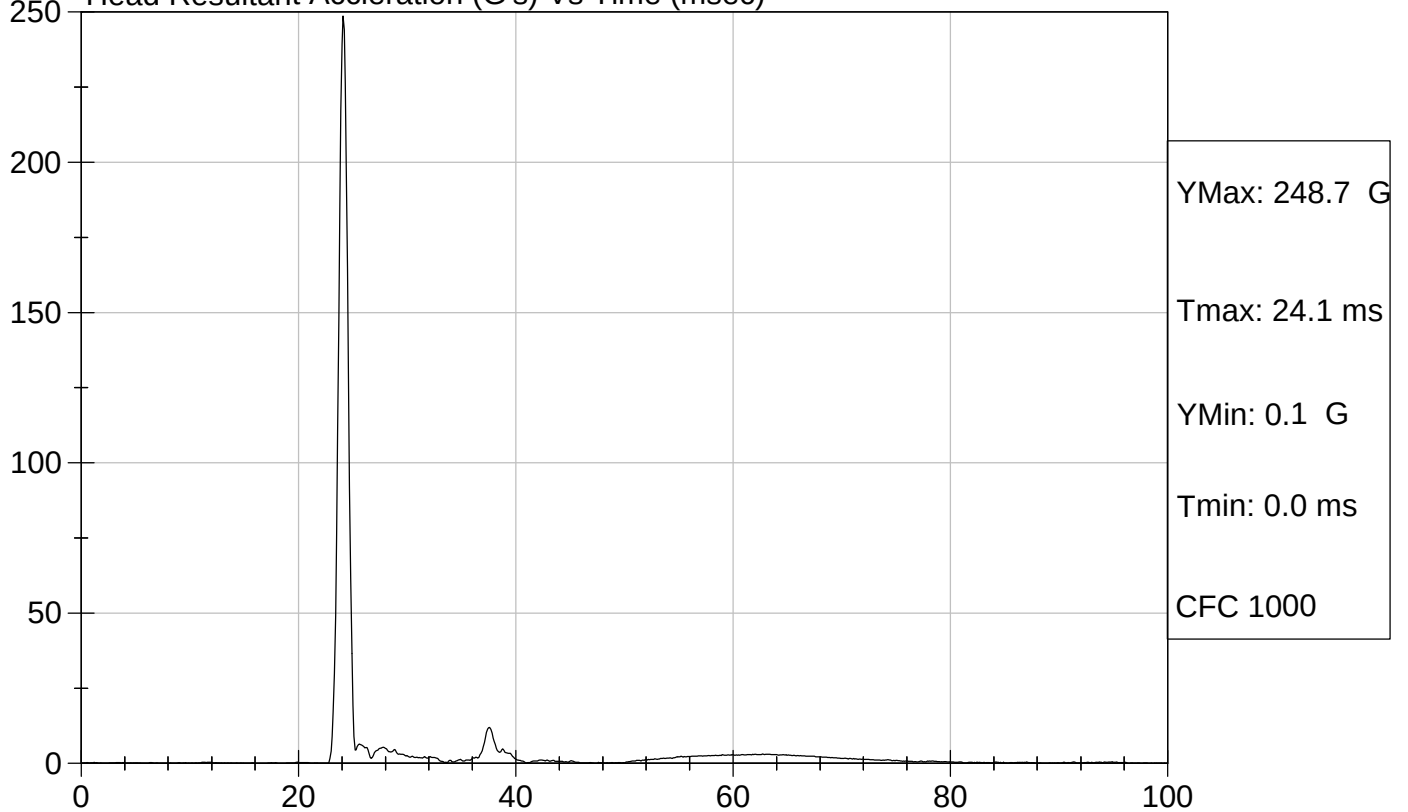
Test Description: Head Drop

Test Date: 04/05/2002

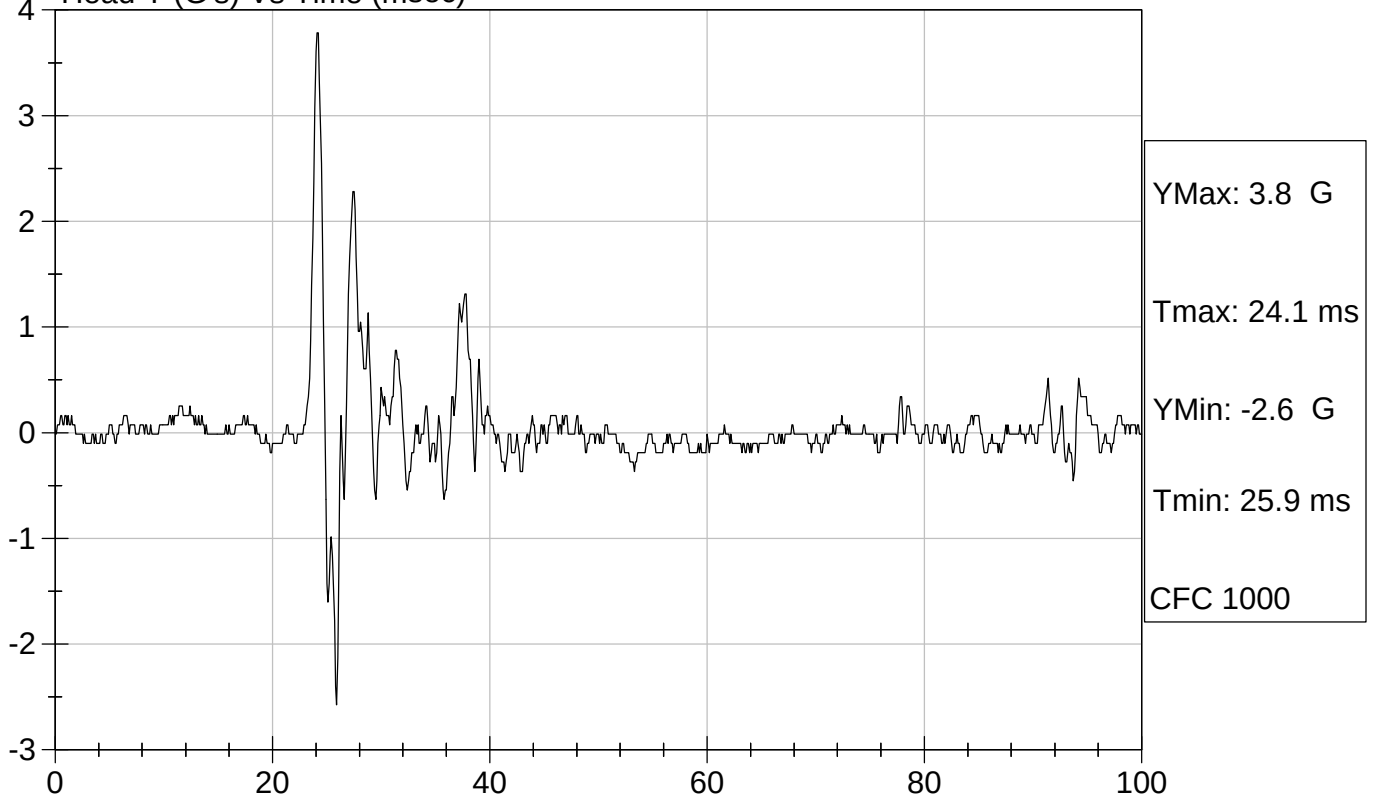
Component: D02501

Speed: 0 ft/s, 0.00 m/s

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



Head Y (G's) Vs Time (msec)



SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 048

Test I.D: D02502

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Upper Rib	G's	37 - 46	40	Pass
Lower Rib	G's	37 - 46	38	Pass
Lower Spine	G's	15 - 22	19	Pass
Overall Test Results				Pass

Laboratory Technician

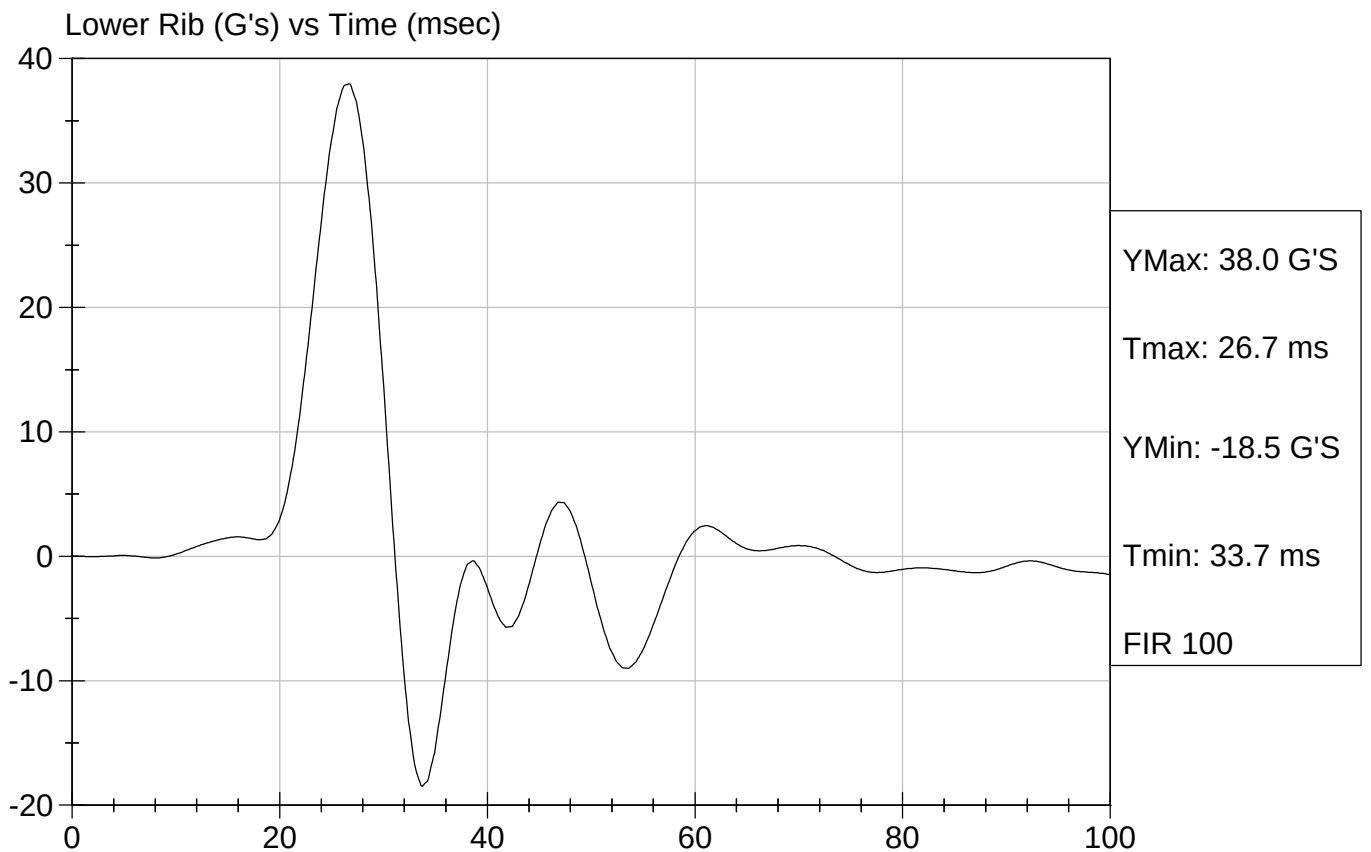
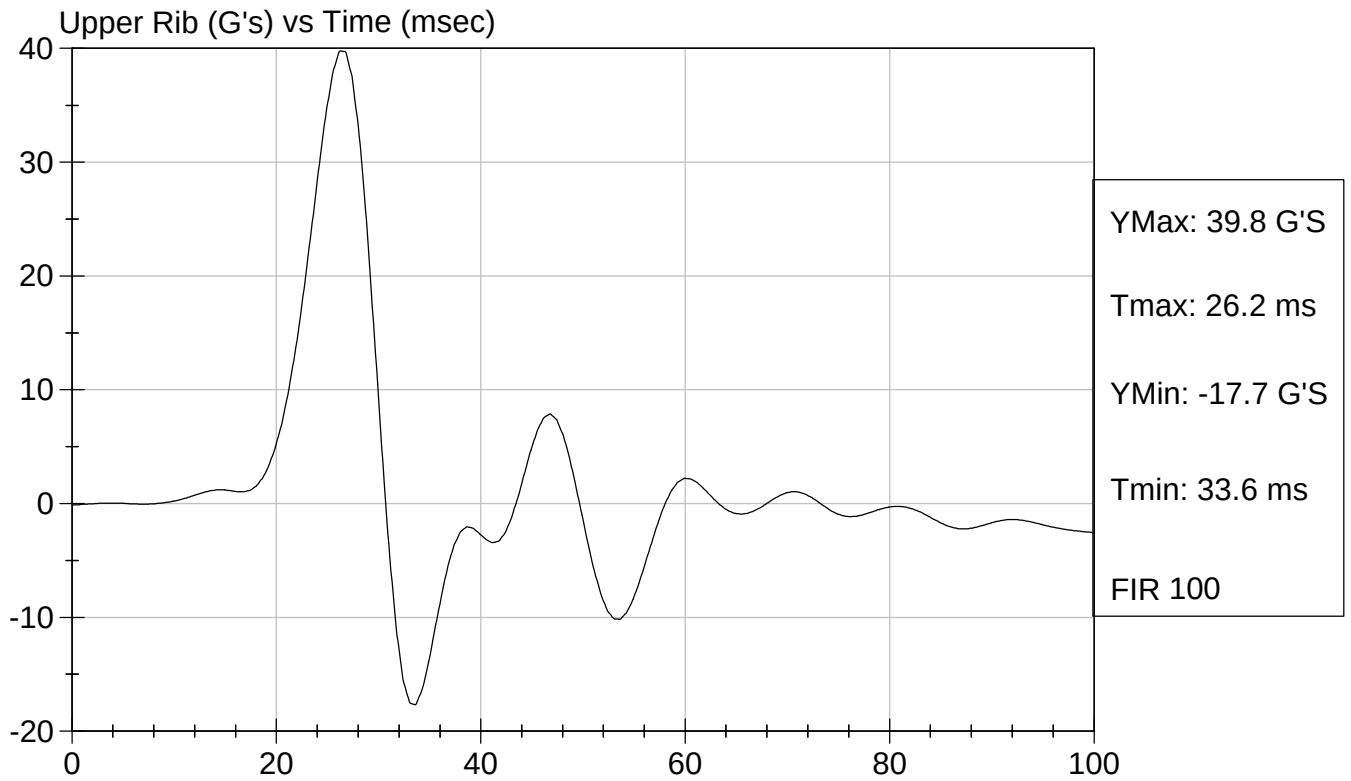
04/04/2002
Test Date

Approved By



Test Desc: Thorax Impact
Component ID: D02502

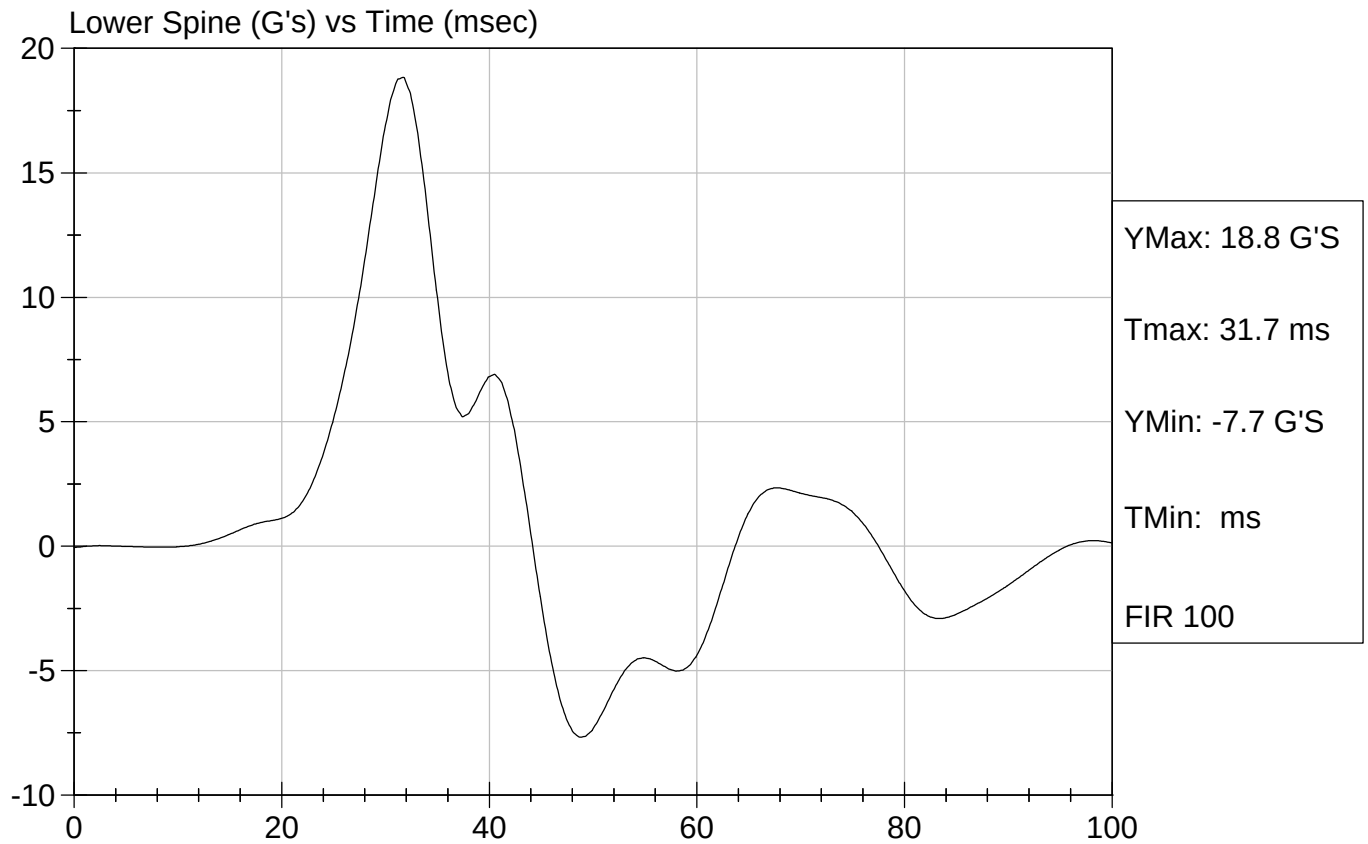
Test Date: 04/04/2002
Speed: 14.11 ft/sec, 0 m/sec





Test Desc: Thorax Impact
Component ID: D02502

Test Date: 04/04/2002
Speed: 14.11 ft/sec, 4.30 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 048

Test I.D: D02503

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	29	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	46	Pass
Overall Test Results				Pass

Laboratory Technician

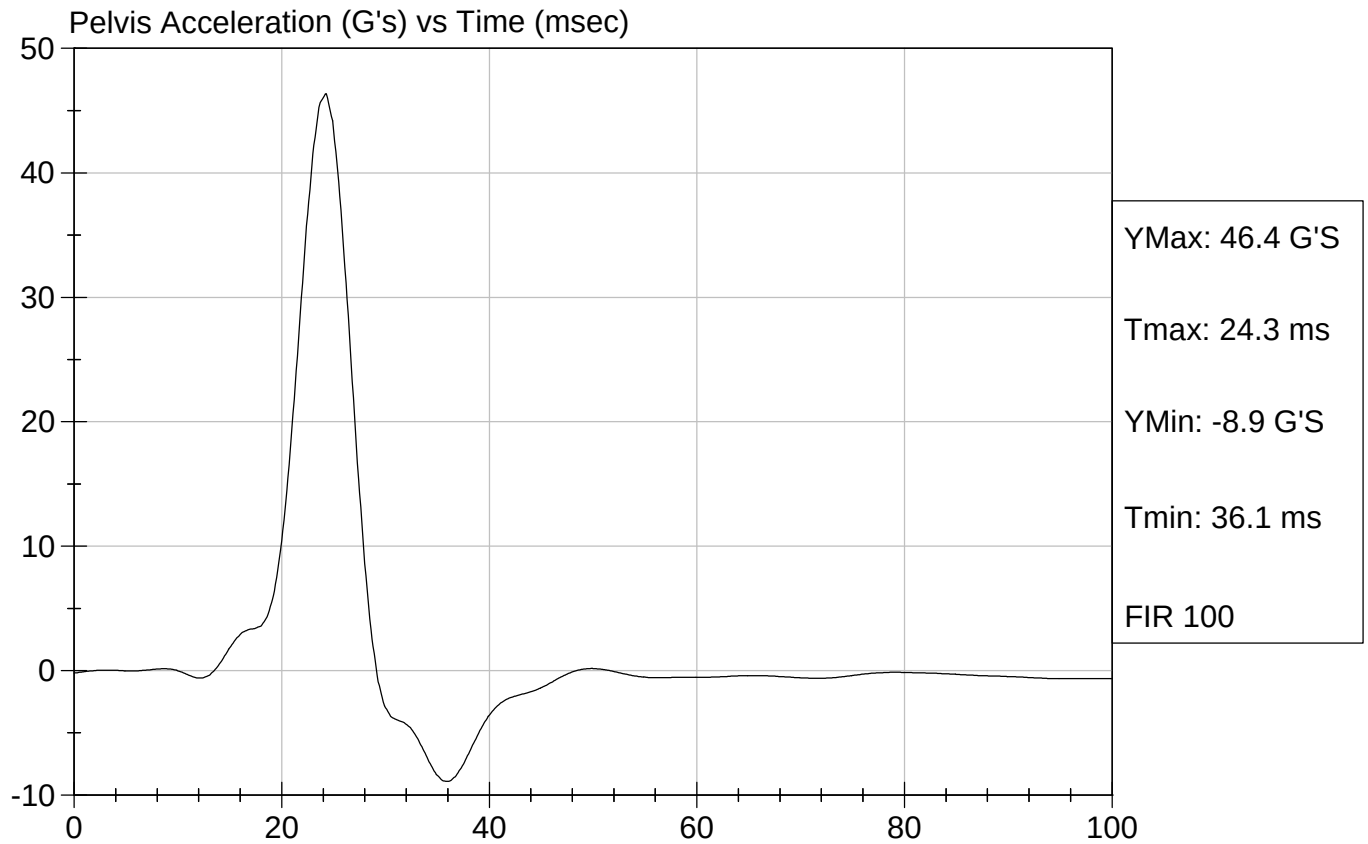
04/09/2002
Test Date

Approved By



Test Desc: Pelvis Impact
Component ID: D02503

Test Date: 04/09/2002
Speed: 14.11 ft/sec, 4.30 m/sec



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

ATD Serial No: 048

Test I.D: D02504

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	24	Pass
Force At 12.7 mm	N	104 -162	144	Pass
Force At 19 mm	N	163 - 222	193	Pass
Force At 25.4 mm	N	222 - 280	255	Pass
Force At 33 mm	N	325 - 391	347	Pass
Overall Test Results				Pass

Laboratory Technician

04/05/2002
Test Date

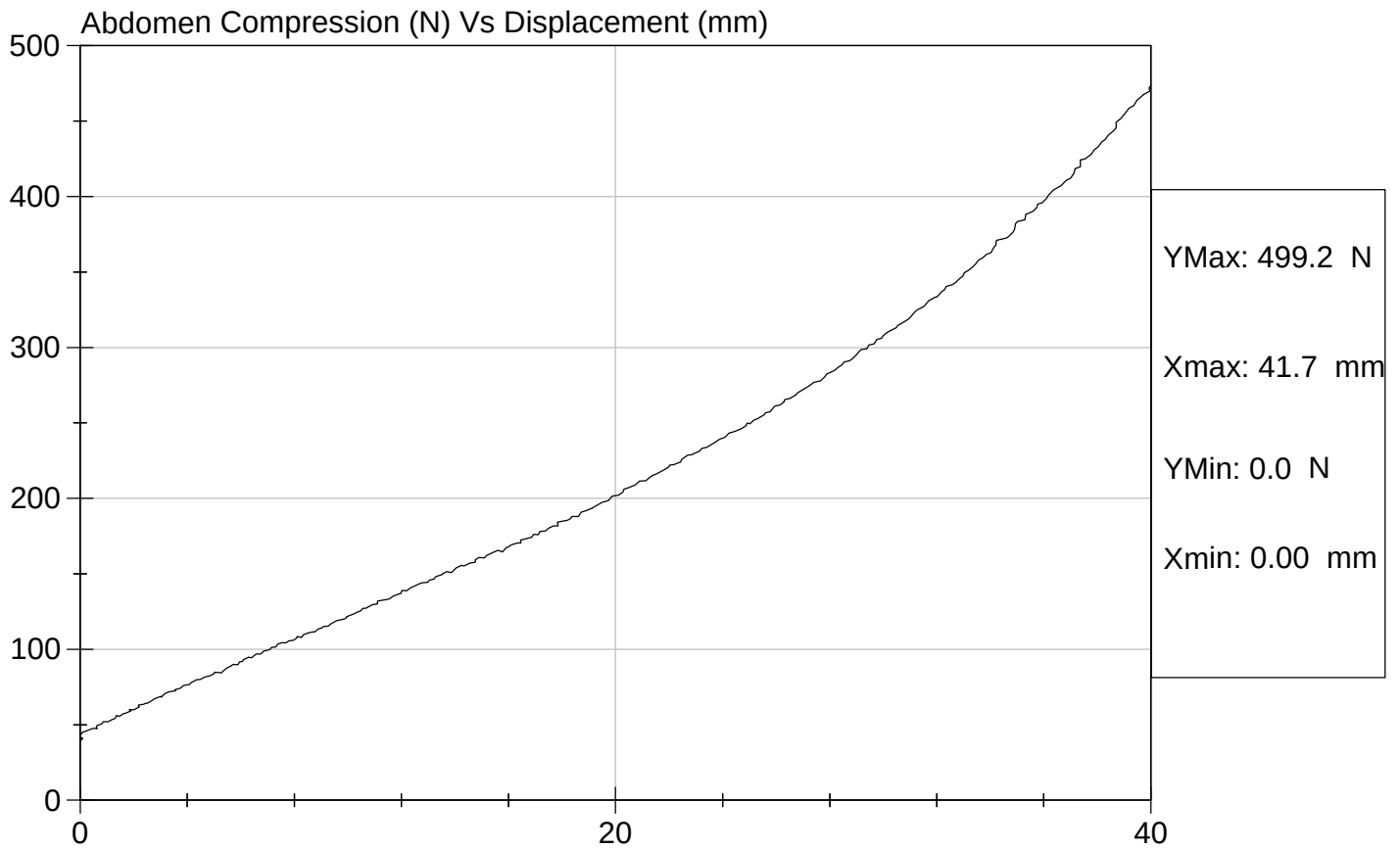
Approved By



Test Description: Abdomen Compression Test Date: 04/05/2002

Component: D02504

Speed: 0 ft/sec, 0.00 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 048

Test I.D: D02505

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	24	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	101.8	Pass
Force At 30 deg	N	151.2 - 204.6	166.2	Pass
Force At 40 deg	N	204.6 - 258.0	206.5	Pass
Return Angle	Deg	12 Maximum	4	Pass
			Overall Test Results	Pass

Laboratory Technician

04/05/2002
Test Date

Approved By

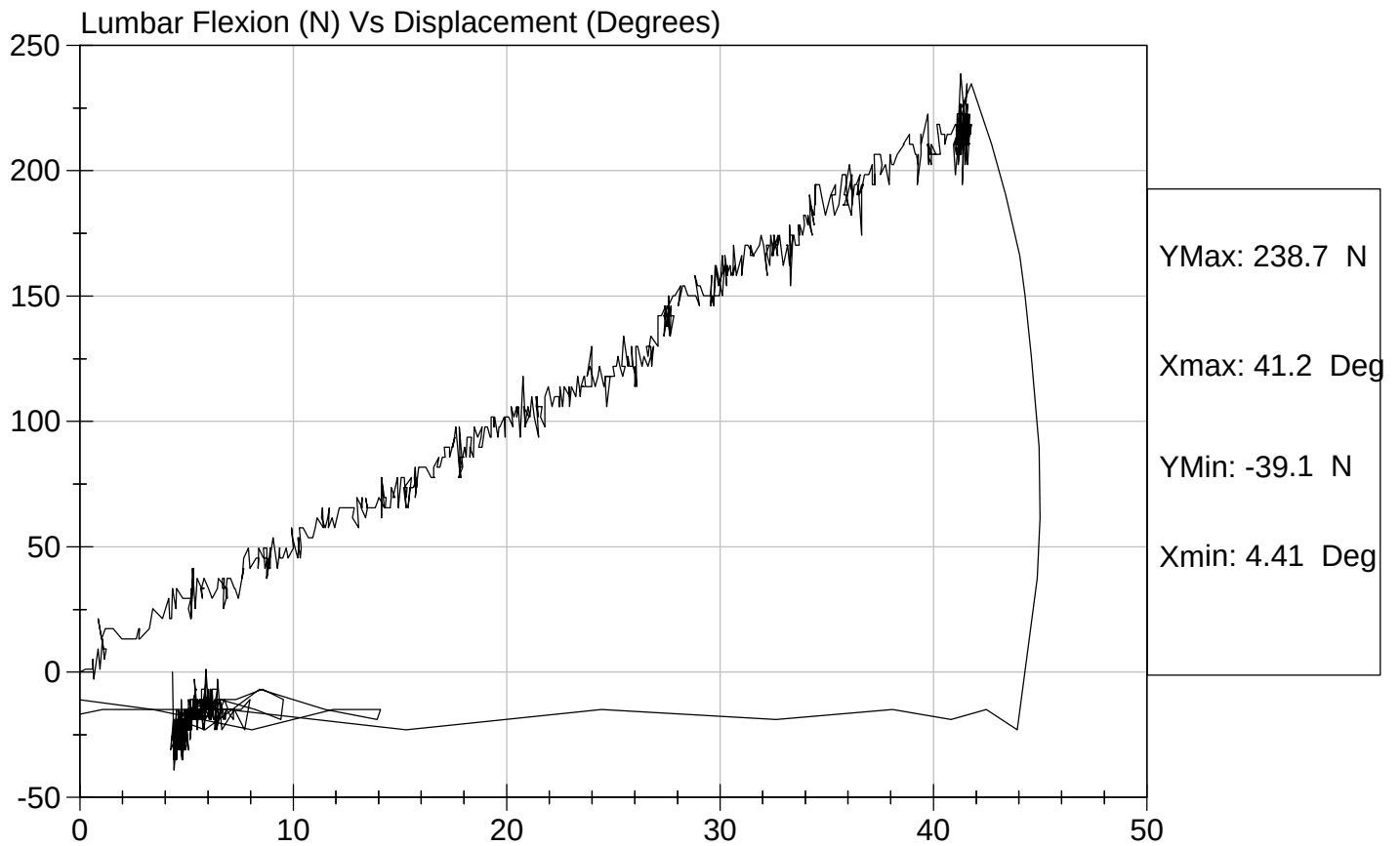


Test Description: Lumbar Flexion

Test Date: 04/05/2002

Component: D02505

Speed: 0 ft/sec, 0.00 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 048

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

Laboratory Technician

4/5/02

Test Date

Approved By

CERTIFICATION DATA

Dummy Serial Number: 049

CERTIFICATION DATA

Dummy Serial Number: 049

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.
Pelvis 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: 049

Test I.D: D0251

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	898	Pass
RH - Rib Height	mm	501 - 521	517	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	232	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	522	Pass
SW - Knee Pivot to Floor	mm	490 - 505	492	Pass
HW - Hip Width	mm	356 - 391	367	Pass
Overall Test Results			Pass	

Laboratory Technician

4/5/02
Test Date

Approved By

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration

ATD Serial No: 049

Test I.D: D02511

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
Peak Resultant Acceleration	G's	210 to 260	235	Pass
Peak Lateral Acceleration	G's	< 10	4	Pass
Time Above 100 G	msec	0.9 - 1.5	1.2	Pass
Overall Test Results				Pass

Laboratory Technician

04/05/2002
Test Date

Approved By



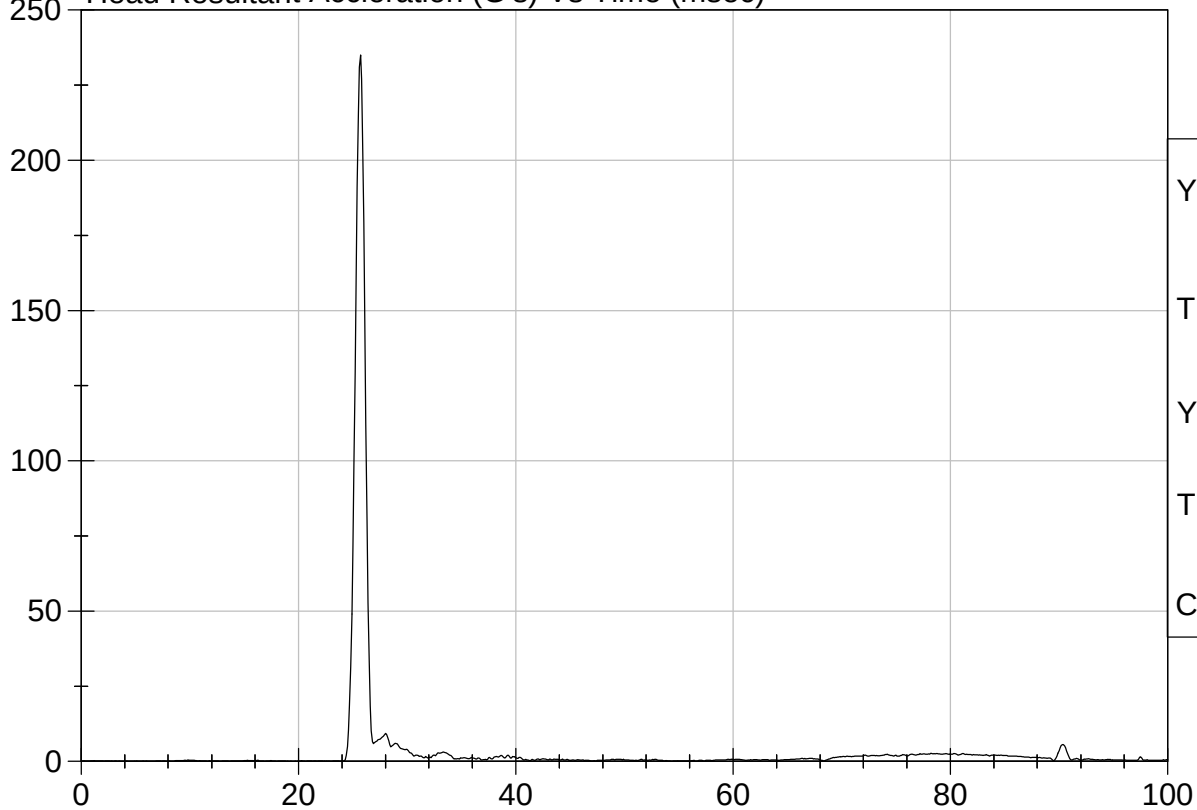
Test Description: Head Drop

Test Date: 04/05/2002

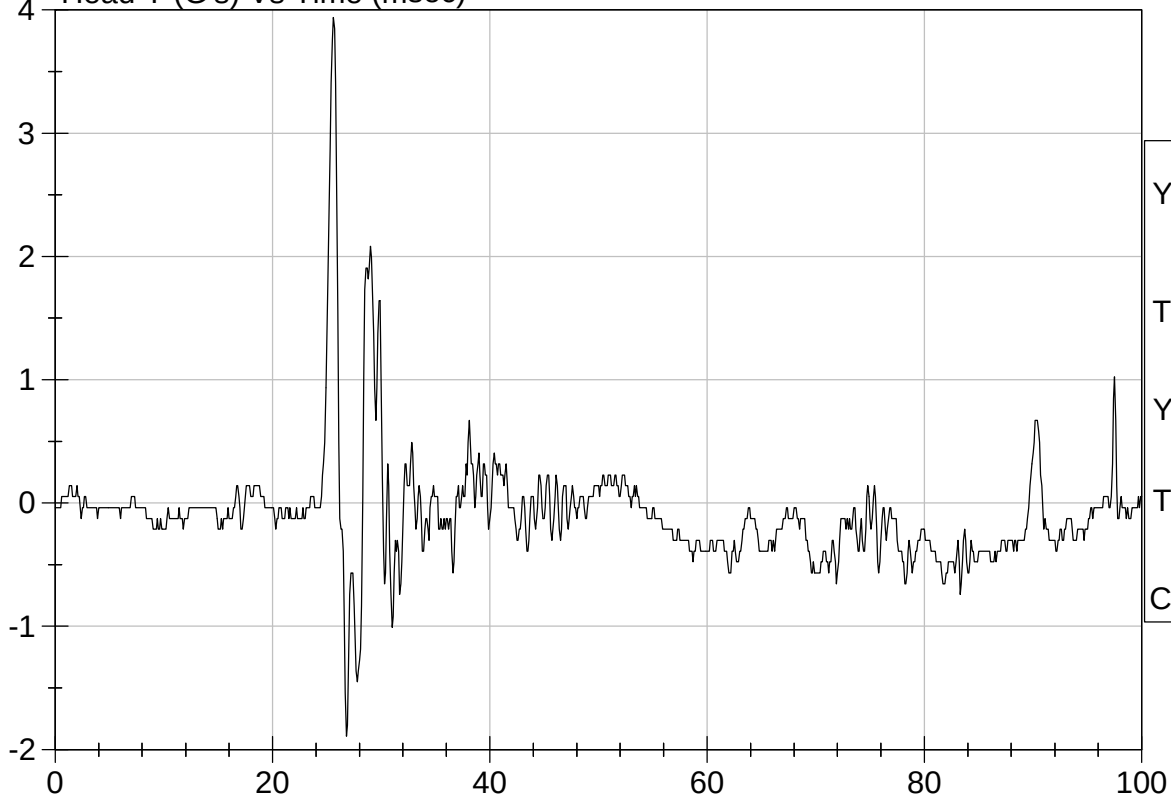
Component: D02511

Speed: 0 ft/s, 0.00 m/s

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



Head Y (G's) Vs Time (msec)



SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 049

Test I.D: D02512

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	23.2	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Upper Rib	G's	37 - 46	42	Pass
Lower Rib	G's	37 - 46	44	Pass
Lower Spine	G's	15 - 22	21	Pass
Overall Test Results				Pass

Laboratory Technician

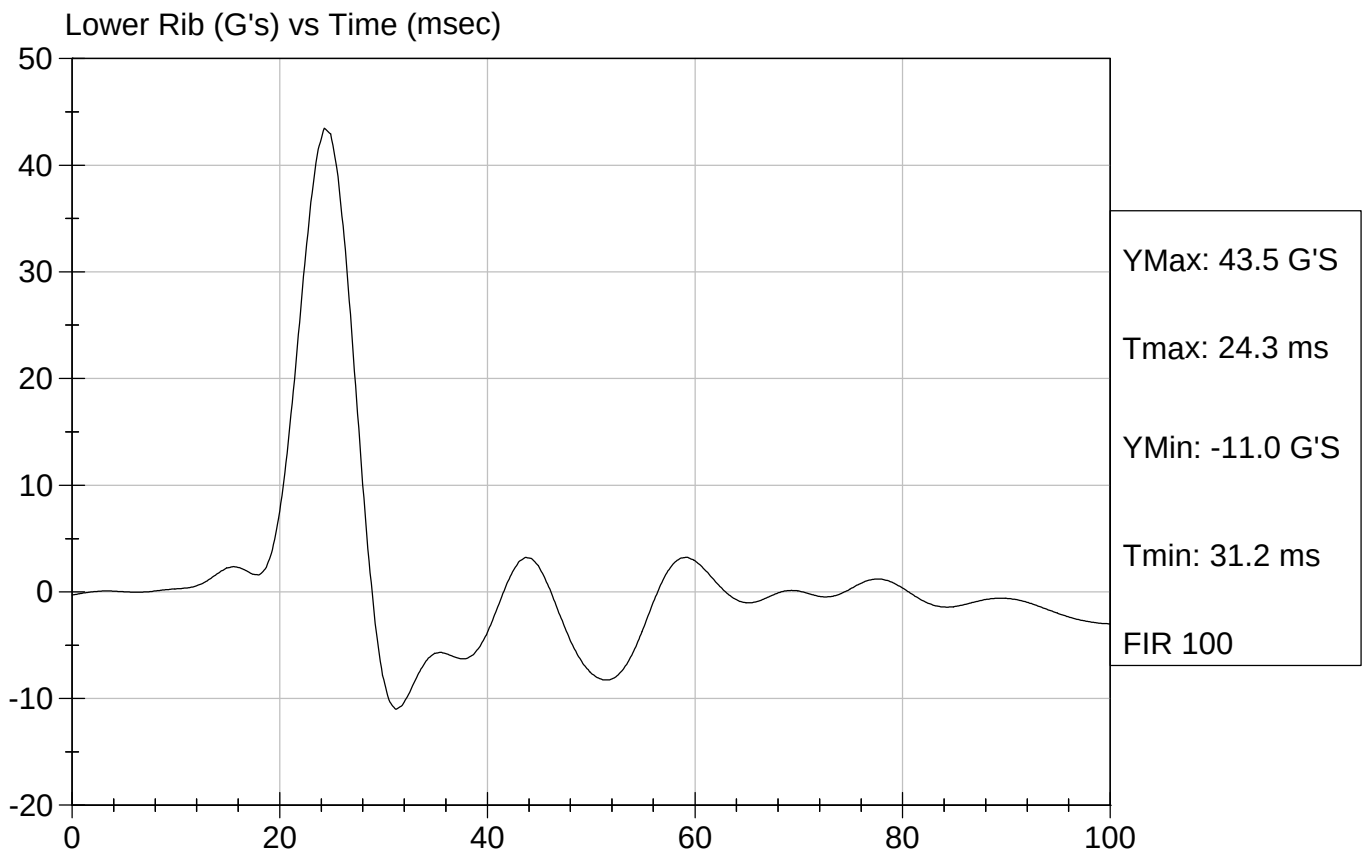
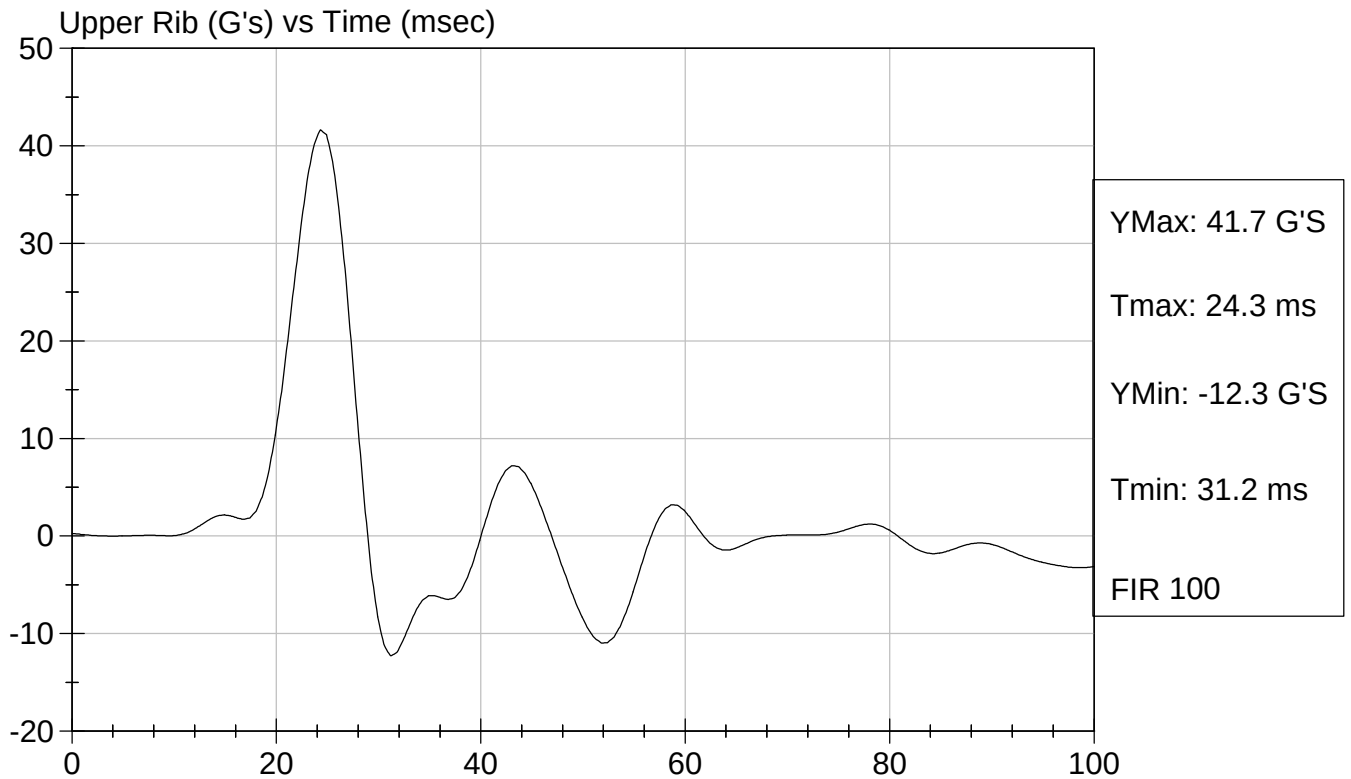
4/4/02
Test Date

Approved By



Test Desc: Thorax Impact
Component ID: D02512

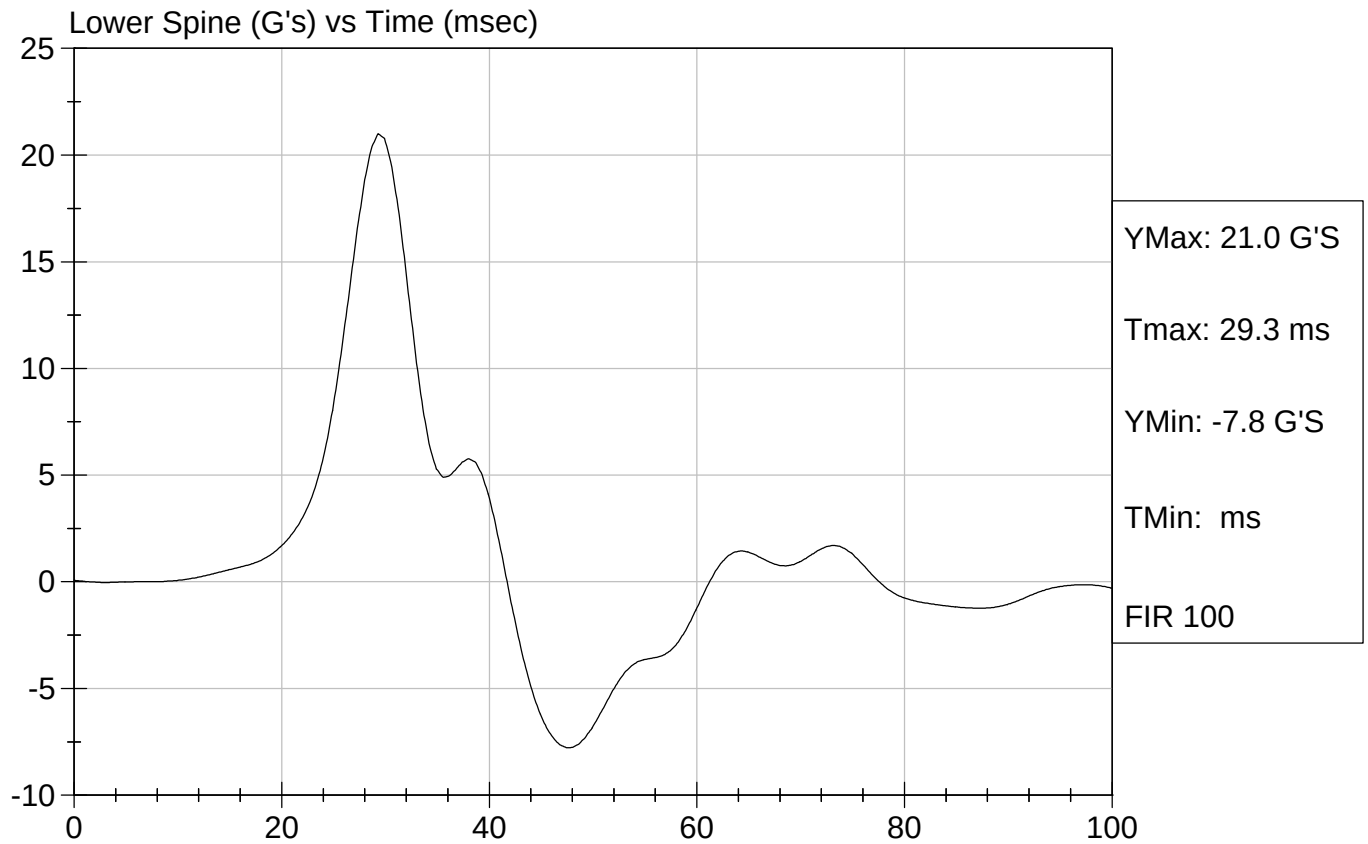
Test Date: 4/4/02
Speed: 14.11 ft/sec, 0 m/sec





Test Desc: Thorax Impact
Component ID: D02512

Test Date: 4/4/02
Speed: 14.11 ft/sec, 4.30 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 049

Test I.D: D02513

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	29	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	54	Pass
Overall Test Results				Pass

Laboratory Technician

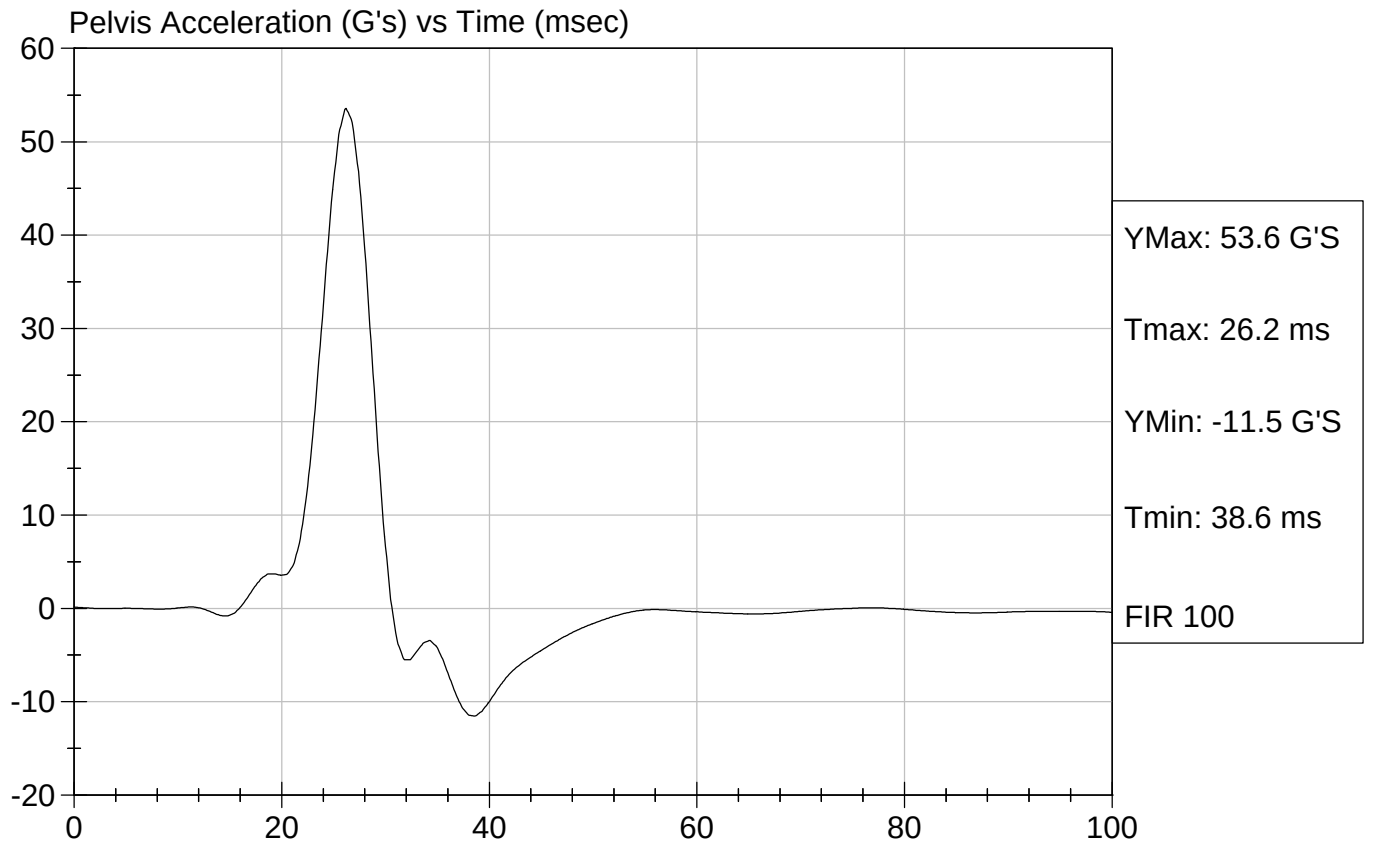
4/4/02
Test Date

Approved By



Test Desc: Pelvis Impact
Component ID: D02513

Test Date: 4/4/02
Speed: 14.11 ft/sec, 4.30 m/sec



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

ATD Serial No: 049

Test I.D: D02514

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	24	Pass
Force At 12.7 mm	N	104 -162	147	Pass
Force At 19 mm	N	163 - 222	205	Pass
Force At 25.4 mm	N	222 - 280	272	Pass
Force At 33 mm	N	325 - 391	379	Pass
Overall Test Results				Pass

Laboratory Technician

04/05/2002
Test Date

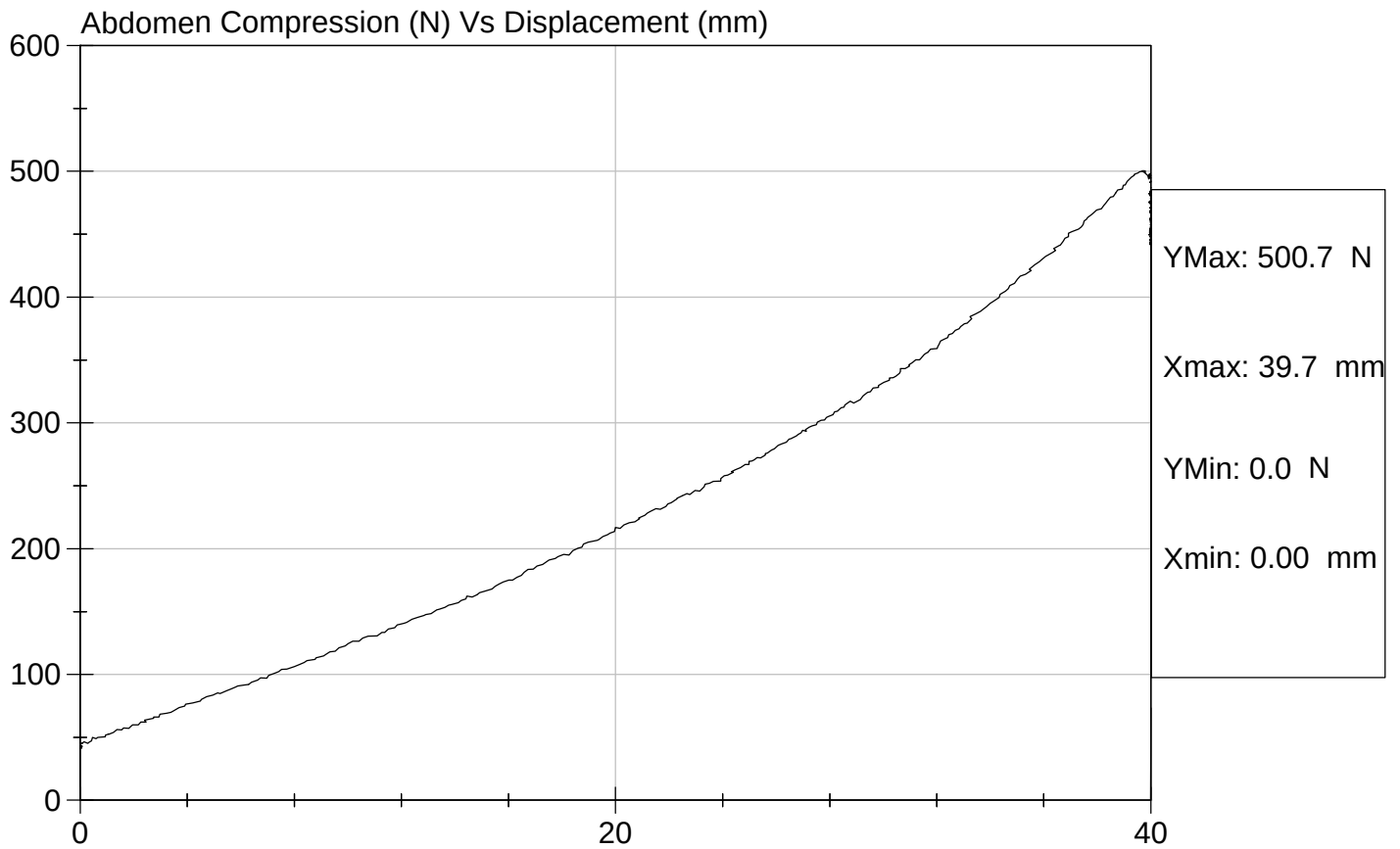
Approved By



Test Description: Abdomen Compression Test Date: 04/05/2002

Component: D02514

Speed: 0 ft/sec, 0.00 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 049

Test I.D: D02515

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	24	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	117.6	Pass
Force At 30 deg	N	151.2 - 204.6	194.1	Pass
Force At 40 deg	N	204.6 - 258.0	226.3	Pass
Return Angle	Deg	12 Maximum	1	Pass
Overall Test Results			Pass	

Laboratory Technician

04/05/2002
Test Date

Approved By

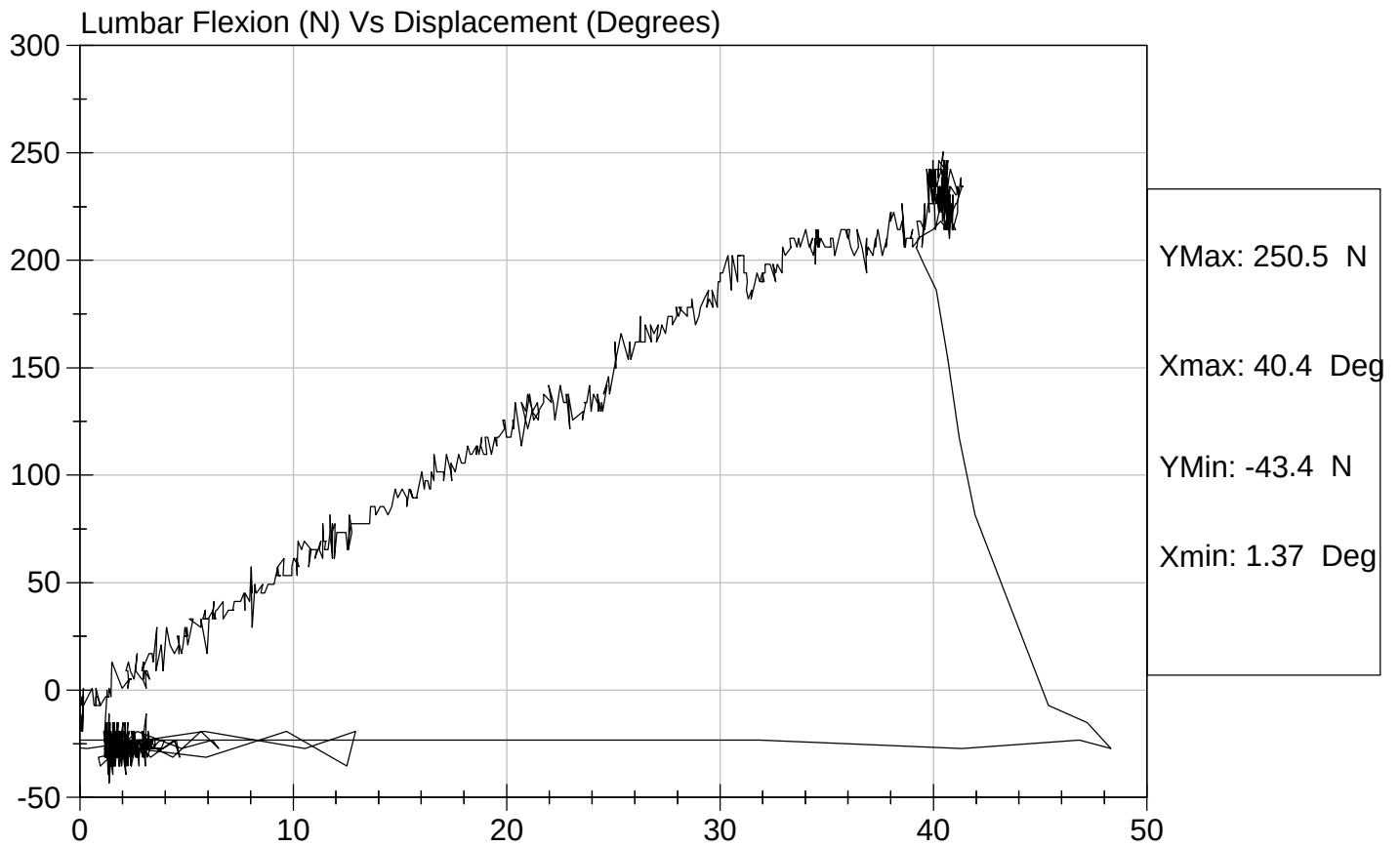


Test Description: Lumbar Flexion

Test Date: 04/05/2002

Component: D02515

Speed: 0 ft/sec, 0.00 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 049

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

Laboratory Technician

4/5/02

Test Date

Approved By

APPENDIX D

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA

	INSTRUMENTS FOR DRIVER DUMMY NO.		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y		Endevco	
Lower Rib Y		Endevco	
Lower Spine Y		Endevco	
Pelvis Y		Endevco	
Upper Rib Redundant Y		Endevco	
Lower Rib Redundant Y		Endevco	
Lower Spine Redundant Y		Endevco	
Pelvis Redundant Y		Endevco	
Head Center of Gravity X		Endevco	
Head Center of Gravity Y		Endevco	
Head Center of Gravity Z		Endevco	

	INSTRUMENTS FOR PASSENGER DUMMY NO.		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y		Endevco	
Lower Rib Y		Endevco	
Lower Spine Y		Endevco	
Pelvis Y		Endevco	
Upper Rib Redundant Y		Endevco	
Lower Rib Redundant Y		Endevco	
Lower Spine Redundant Y		Endevco	
Pelvis Redundant Y		Endevco	
Head Center of Gravity X		Endevco	
Head Center of Gravity Y		Endevco	
Head Center of Gravity Z		Endevco	

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X		Entran	
Moving Barrier CG Y		Entran	
Moving Barrier CG Z		Entran	
Moving Barrier Rear Axle X		Entran	
Moving Barrier Rear Axle Y		Entran	
Left Mid A-Post Y		Entran	
Left Lower A-Post Y		Entran	
Left Mid B-Post Y		Entran	
Left Lower B-Post Y		Entran	
Rear Floorpan Above Axle X		Entran	
Rear Floorpan Above Axle Y		Entran	
Rear Floorpan Above Axle Z		Entran	
Driver Seat Track Y		Entran	
Right Side Sill at Front Seat X		Entran	
Right Side Sill at Front Seat Y		Entran	
Right Side Sill at Front Seat Z		Entran	
Right Side Sill at Rear Seat X		Entran	
Right Side Sill at Rear Seat Y		Entran	
Right Side Sill at Rear Seat Z		Entran	
Left Side Sill at Front Seat Y		Entran	
Left Side Sill at Rear Seat Y		Entran	
Right Rear Occupant Compartment Y		Entran	
Vehicle CG X		Entran	
Vehicle CG Y		Entran	
Vehicle CG Z		Entran	

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