

REPORT NUMBER: 214D-MGA-2002-003

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

Daewoo Motor Company
2002 Daewoo Nubira 4 door
NHTSA NUMBER: C20503

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



January 17, 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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Prepared by: _____
Chris Havens, Project Engineer

Date: _____

Reviewed by: _____
David Winkelbauer, Facility Director

Date: _____

FINAL REPORT ACCEPTED BY:

COTR, Side Impact

Date of Acceptance

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		14. Sponsoring Agency Code NSA-30																						
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16. Abstract A 55/28 km/h 90° Moving Deformable Barrier INDICANT Compliance Test was conducted on the 2002 Daewoo Nubira 4 door 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 January 17, 2002. The impact velocity of the Moving Deformable Barrier (MDB) was 62.0 km/h, and the ambient temperature at the struck side (driver's) of the vehicle was 20.6° C. The target vehicle's maximum post test static crush was 344 mm at level 2. The test vehicle's occupant performance is as follows: <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <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;">71</td> <td style="text-align: center;">65</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">57</td> <td style="text-align: center;">80</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td style="text-align: center;">80</td> <td style="text-align: center;">75</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">75</td> <td style="text-align: center;">77</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">84</td> <td style="text-align: center;">77</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">300</td> <td style="text-align: center;">1087</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	71	65	Left Lower Rib (LLR) Accel., g	57	80	Lower Spine (T ₁₂) Accel., g	80	75	Thoracic Trauma Index (TTI)	75	77	Pelvis (PEV) Accel., g	84	77	HIC	300	1087
	<u>DRIVER</u>	<u>PASS.</u>																						
Left Upper Rib (LUR) Accel., g	71	65																						
Left Lower Rib (LLR) Accel., g	57	80																						
Lower Spine (T ₁₂) Accel., g	80	75																						
Thoracic Trauma Index (TTI)	75	77																						
Pelvis (PEV) Accel., g	84	77																						
HIC	300	1087																						
17. Key Words Compliance Testing FMVSS 214D Side Impact Protection Side Impact Dummy (SID) New Car Assessment Program (NCAP)		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, Room 5108 (NAD-52) 400 Seventh Street, S.W. Washington, D.C. 20590																						
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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 Daewoo Nubira 4 door manufactured by Daewoo Motor Company.

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 Daewoo Nubira 4 door was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.0 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 1486.5 kg and the test weight of the MDB was 1362.0 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on January 17, 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 (20) 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 344 mm at level 2, 1200 mm rearward of the left vertical impact point. The driver and passenger SID's, Serial Nos. 37 and 36 respectively, were calibrated just prior to this test. The SID's injury criteria are summarized as follows:

Measurements	Units	Driver	Passenger
Thoracic Trauma Index (TTI)	G's	75	77
Peak Pelvic G's (PEV)	G's	84	77
Head Injury Criteria (HIC)	none	300	1087

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
Mid Rear of Left Front Door
Left Front Door Upper Centerline
Mid Rear of Left Rear door
Left Rear Door Upper Centerline
Rear Seat Track

SECTION 3
SIDE IMPACT DUMMY (SID) AND VEHICLE TEST DATA

Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02

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 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02

TEST VEHICLE INFORMATION

Make	Daewoo
Model	Nubira
Body Style	4 door
NHTSA No.	C20503
VIN	KLAJC52212K728378
Color	silver
Delivery Date	January 10, 2002
Odometer Reading (mile)	36
Dealer	Nudi Auto
Transmission	5 speed manual
Final Drive	front
Number of Cylinders	4
Engine Displacement (L)	2.0
Engine Placement	lateral

TEST VEHICLE OPTIONS

Front Airbag	yes
Side Airbags	no
Power Windows	yes
Power Steering	yes
Power Door Locks	no
Tilt Wheel	no
Air Conditioning	yes
Power Brakes	yes
Disc Brakes, Front	yes
Disc Brakes, Rear	yes
Anti-lock Brakes	no
AM/FM/Cassette	yes
Anti-theft System	yes
Cruise Control	no

DATA FROM CERTIFICATION LABEL

Manufactured By	Daewoo Motor Company
Date of Manufacture	7-01

GVWR (kg)	1673.8
GAWR Front (kg)	890.0
GAWR Rear (kg)	949.8

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	238	238
Cold Pressure (kPa)	238	238
Recommended Tire Size	P185/65R14	P185/65R14
Tire Size on Vehicle	P185/65R14	P185/65R14
Tire Manufacturer	Kumho	Kumho

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Contoured		
Number Of Occupants x 68.04	2	3		340.2
Capacity Wt. (VCW) (kg)				400.0
Cargo Wt. (RCLW) (kg)				59.8

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

Test Vehicle: 2002 Daewoo Nubira 4 door

NHTSA No. C20503

Test Program: 214 Indicant Side Impact

Test Date: 1/17/02

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	395.1	247.7		446.8	334.8	
Right	kg	386.0	245.4		397.4	307.5	
Ratio	%	61.3	38.7		56.8	43.2	
Totals	kg	781.1	493.1	1274.2	844.2	642.3	1486.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1274.2
Weight of 2 P572E ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	59.4
Calculated Vehicle Target Weight (TVTW)	kg	1495.1

- 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	648	655	635	641	996
As Tested	mm	639	653	594	608	1113
Fully Loaded	mm	636	652	582	608	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2576
Total Vehicle Length at Left Side	mm	3966
Total Vehicle Length at Centerline	mm	4465
Total Vehicle Length at Right Side	mm	3966
Total Vehicle Width	mm	1690
Weight of Ballast in Cargo Area	kg	28.6
Amount of Stoddard Solvent in Fuel Tank	liters	48.0

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2576
Target Impact Point Aft of Front Axle	mm	348
Actual Impact Point Aft of Front Axle	mm	363

DATA SHEET NO. 1...(continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002 Daewoo Nubira 4 door
Test Program: 214 Indicant Side Impact

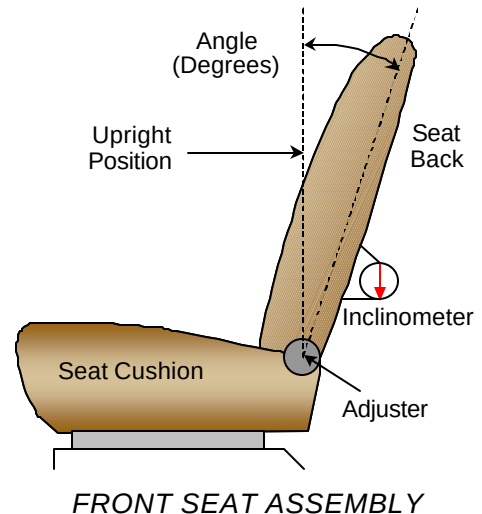
NHTSA No. C20503
Test Date: 1/17/02

NORMAL DESIGN RIDING POSITION

The driver seat is positioned to the manufacturer's designated angle. The procedure for the seat is as follows: 25° The angle between seat back main frame and horizontal line is 68°, or the angle between head restraint rod and horizontal line is 75.5°. The rear passenger is fixed; no adjustments can be made.

Driver seat back angle: 75.5°

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. Bucket – from rearmost position move forward 108 mm or 9 steps

Driver seat fore/aft total travel: 20 detents

Passenger seat fore/aft total travel: non-adjustable

Driver seat fore/aft position: 9th detent from rearmost 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 6 positions or detents, with the lowermost position numbered "0". The driver's "D" ring anchorage is placed in position 3.

DATA SHEET NO. 1...(continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2002 Daewoo Nubira 4 door
Test Program: 214 Indicant Side Impact

NHTSA No. C20503
Test Date: 1/17/02

FUEL TANK CAPACITY DATA

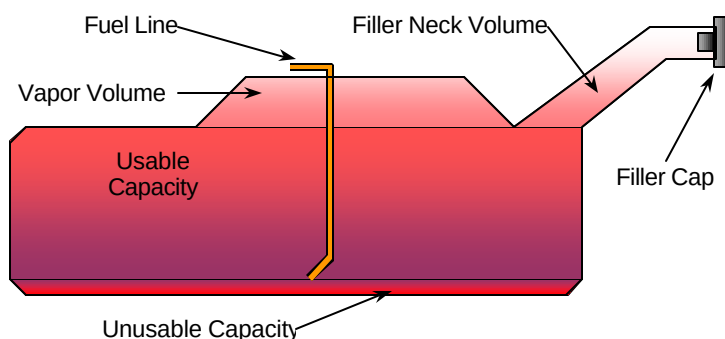
The "Usable Capacity" of the standard equipment fuel tank is: 51.1 liters

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

92-94% of "Usable Capacity" for certification to FMVSS 301 requirements: 47.0 to 48.0 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 48.0 liters

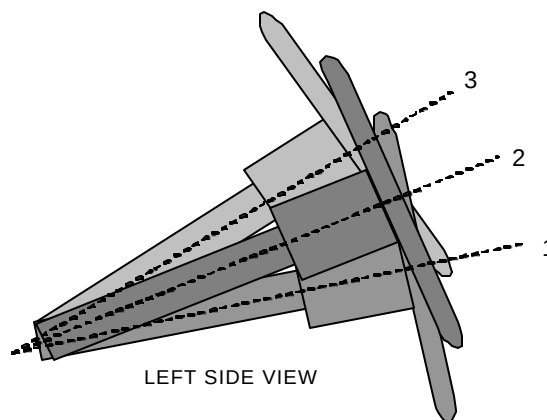
The test vehicle is equipped with an electric fuel pump. The fuel filler door is located on the right rear fender.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

The tested vehicle has a fixed steering column, no adjustment can be made.



STEERING COLUMN ASSEMBLY

DATA SHEET NO. 2**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	395.1	247.7		446.8	334.8	
Right	kg	386	245.4		397.4	307.5	
Weight Ratio	%	55.3	44.7		56.8	43.2	
Totals	kg	781.1	493.1	1274.2	844.2	642.3	1486.5

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	181	244
Level 2	Occupant H-Point	mm	344	484
Level 3	Mid Door	mm	317	584
Level 4	Window Sill	mm	281	876
Level 5	Window Top	mm	66	1331
Level 2	Maximum Penetration	mm	344	484

INSTRUMENTATION

Driver SID Accelerometers	11
Passenger SID Accelerometers	11
Vehicle Structure Accelerometers	20
MDB Accelerometers	5
Total	47

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

Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02

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	62.0
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.6
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.7

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

Vertical Location			From Centerline		Max. Crush
Level	Description	Height	Distance	Direction	
1	Center of Bumper (mm)	432	700	Right	150
2	Top of Bumper (mm)	533	800	Left	108
3	Mid Level (mm)	686	800	Left	146
4	Top of Stack (mm)	813	800	Left	181

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	2
High Speed Cameras	2

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

Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID	Rear Seat SID
Dummy Type / Serial No.	SID / 37	SID / 36
Head Contact	B-pillar	C-pillar, headrest
Upper Torso Contact	rear of front door	rear of rear door
Lower Torso Contact	armrest	armrest
Left Knee Contact	lower door	lower door
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	none	none
Seat Back Failure	none	none

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	none
Sill Separation	none
Windshield Damage	cracked, left side
Window Damage	front and rear left side shattered
Other Notable Effects	trunk and fuel door opened, fuel cap remained closed

AIRBAG DEPLOYMENT

	Driver	Front Passenger	Rear Passenger
Front	yes	yes	none
Side	none	none	none

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	15 rearward
Vertical Offset	mm	+/-20	0

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5

SID INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02

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	70.6	24	25.4	71	65.1	37	9.3	74
Upper Rib (LUR)(R)	Y	G's	67.3	25	24.2	71	67.5	37	8.7	74
Lower Rib (LLR)	Y	G's	56.6	24	19.1	69	80.0	35	16.6	71
Lower Rib (LLR) (R)	Y	G's	53.4	25	20.3	69	78.4	35	16.8	71
Lower Spine (T ₁₂)	Y	G's	79.9	29	20.5	64	74.9	41	25.7	61
Lower Spine (T ₁₂) (R)	Y	G's	79.6	29	21.9	64	74.3	41	25.5	61
Pelvis (PEV)	Y	G's	84.0	29	9.4	81	76.7	36	13.9	77
Pelvis (PEV) (R)	Y	G's	84.7	29	8.9	81	75.9	36	13.9	77

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

Location	Driver				Passenger			
	LUR	T ₁₂	TTI(g)	PEV(g)	LLR	T ₁₂	TTI(g)	PEV(g)
Rib, Spine, and Pelvis	70.6	79.9	75	84.0	80.0	74.9	77	76.7
Rib, Spine, and Pelvis (R)	67.3	79.6	73	84.7	78.4	74.3	76	75.9

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	14.7	41	43.0	76	8.5	164	29.1	51
Head CG	Y	G's	55.9	42	10.0	56	129.4	53	13.9	65
Head CG	Z	G's	40.2	55	7.5	21	26.2	48	73.0	57
Head CG Resultant		G's	57.3	42			132.6	53		

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	300	39.7	75.7	37.0	1087	48.4	59.3	99.9

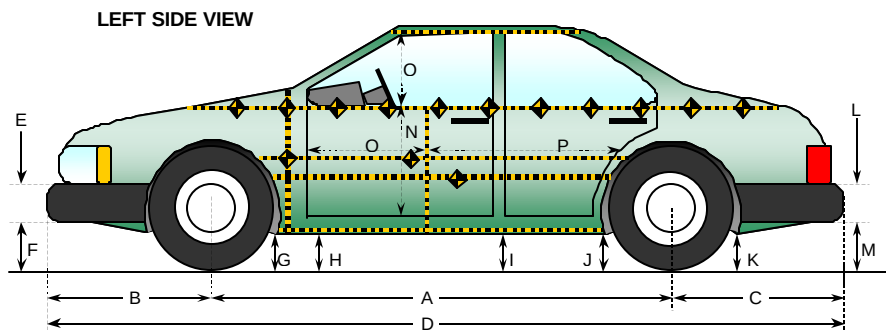
Positive Acceleration Polarities: Longitudinal (X) = Forward
 (Conforms to SAE J211) Lateral (Y) = Right
 Vertical (Z) = Down

DATA SHEET NO. 6

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02



All Measurements in mm

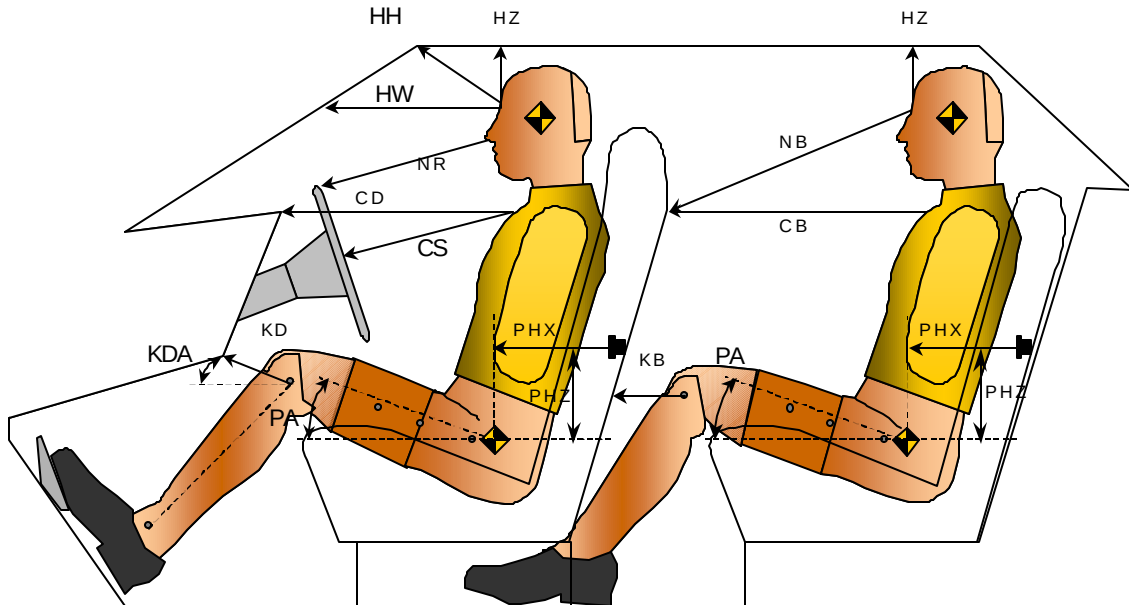
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2570	2542	-28
B	Front Axle to FSOV	915	935	20
C	Rear Axle to RSOV	980	956	-24
D	Total Length at Centerline	4465	4433	-32
E	Front Bumper Thickness	120	120	0
F	Front Bumper Bottom to Ground	410	428	18
G	Sill Height at Front Wheel Well	195	229	34
H	Sill Height at Front Door Leading Edge	179	224	45
I	Sill Height at "B" Pillar	162	164	2
J1	Sill Height at Rear Wheel Well	157	150	-7
J2	Pinch Weld Height at Rear Wheel Well	157	144	-13
K	Sill Height Aft of Rear Wheel Well	211	218	7
L	Rear Bumper Thickness	80	80	0
M	Rear Bumper Bottom to Ground	429	445	16
N	Sill Height to Window Bottom Sill	665	618	-47
O	Front Door Leading Edge to Impact CL	696	683	-13
P	Rear Door Trailing Edge to Impact CL	1132	996	-136
Q	Front Window Opening	437	419	-18
R	Right Side Length	3966	3983	17
S	Left Side Length	3966	3913	-53
T	Vehicle Width at "B" Post	1690	1388	-302

DATA SHEET NO. 7

SID LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02

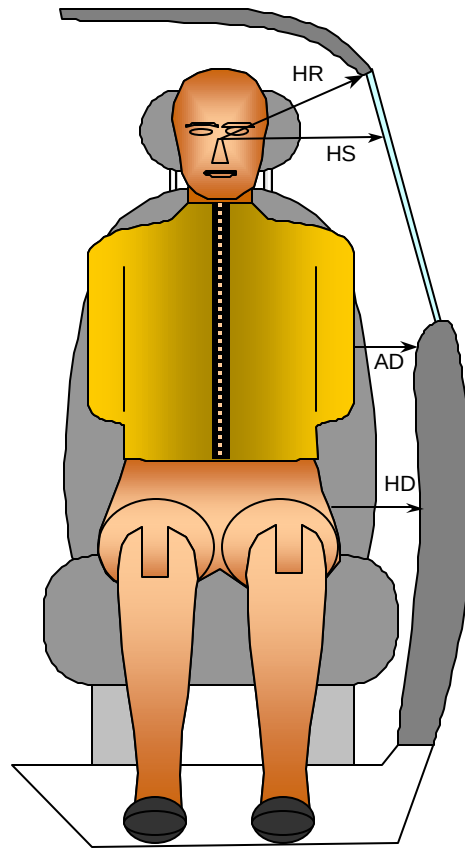


Driver Code	Pass. Code	Measurement Description	Driver 38		Passenger 36	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	359			
HW		Head to Windshield	587			
HZ	HZ	Head to Roof	171		151	
NR	NB	Nose to Rim/Nose to Seatback	516		604	
CD	CB	Chest to Dash or Seatback	589		502	
CS		Chest to Steering Wheel	405			
KDL	KBL	Left Knee to Dash or Seatback	188	0	181	0
KDR	KBR	Right Knee to Dash or Seatback	164	0	189	0
PA	PA	Pelvic Angle		24.9		24.5
PHX	PHX	H-Point to Striker (X-Axis)	196		248	
PHZ	PHZ	H-Point to Striker (Z-Axis)	119		289	

DATA SHEET NO. 8
SID LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02



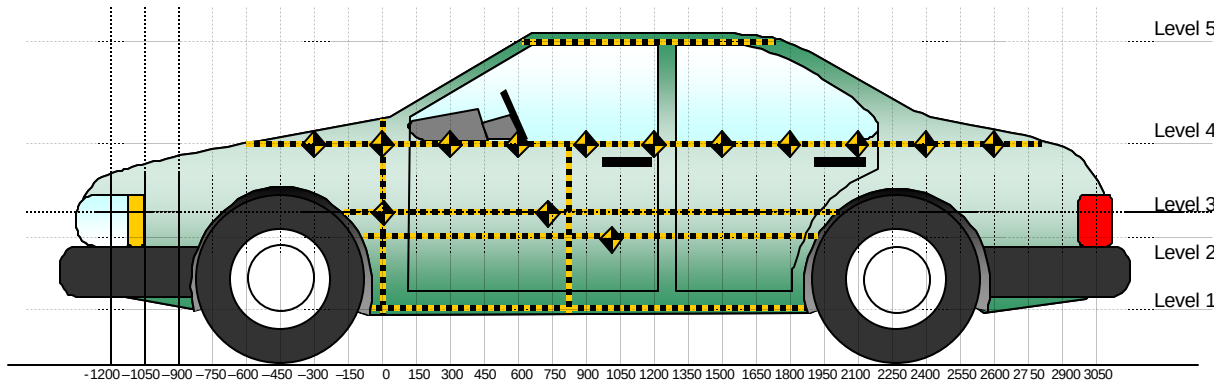
FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver 37	Passenger 36
HR	Head to Side Header	mm	192	189
HS	Head to Side Window	mm	271	303
AD	Arm to Door	mm	117	91
HD	H-Point to Door	mm	151	160

DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02



All Measurements Shown in mm

LEFT SIDE VIEW

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

Level	Measurement Description	Height Above Ground
5	Window	1331
4	Window Sill	876
3	Mid Door	584
2	Occupant H-Point	484
1	Sill Top	244

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2002 Daewoo Nubira 4 door
Test Program: 214 Indicant Side Impact

NHTSA No. C20503
Test Date: 1/17/02

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1050															
-900			336					338					2		
-750			300	380				314	373				14	-7	
-600			281	360				311	361				30	1	
-450				343					354					11	
-300				333					354					21	
-150			261	328				325	355				64	27	
0		269	260	322			385	358	361			116	98	39	
150	316	270	262	319		387	534	484	392		71	264	222	73	
300	314	272	263	318		464	566	533	480		150	294	270	162	
450	310	271	264	319		474	585	532	499		164	314	268	180	
600	308	270	263	319		482	590	551	518		174	320	288	199	
750	306	268	263	320	578	487	592	545	529	605	181	324	282	209	27
900	307	266	262	318	575	487	592	534	538	610	180	326	272	220	35
1050	307	264	262	315	570	483	580	528	548	632	176	316	266	233	62
1200	307	264	262	315	566	481	608	579	570	632	174	344	317	255	66
1350	308	264	262	317	564	461	598	568	597	625	153	334	306	280	61
1500	309	264	261	316	563	418	582	567	595	611	109	318	306	279	48
1650	311	265	260	316	563	379	560	571	597	597	68	295	311	281	34
1800	314	264	259	317	567	379	515	562	497	586	65	251	303	180	19
1950			258	314	577			433	398	588			175	84	11
2100			253	315				302	313				49	-2	
2250				320					349					29	
2400			254	324				270	340				16	16	
2550			261	332				273	342				12	10	
2700			273	340				279	344				6	4	
2850			293	360				295	357				2	-3	
3000															
3150															
3300															

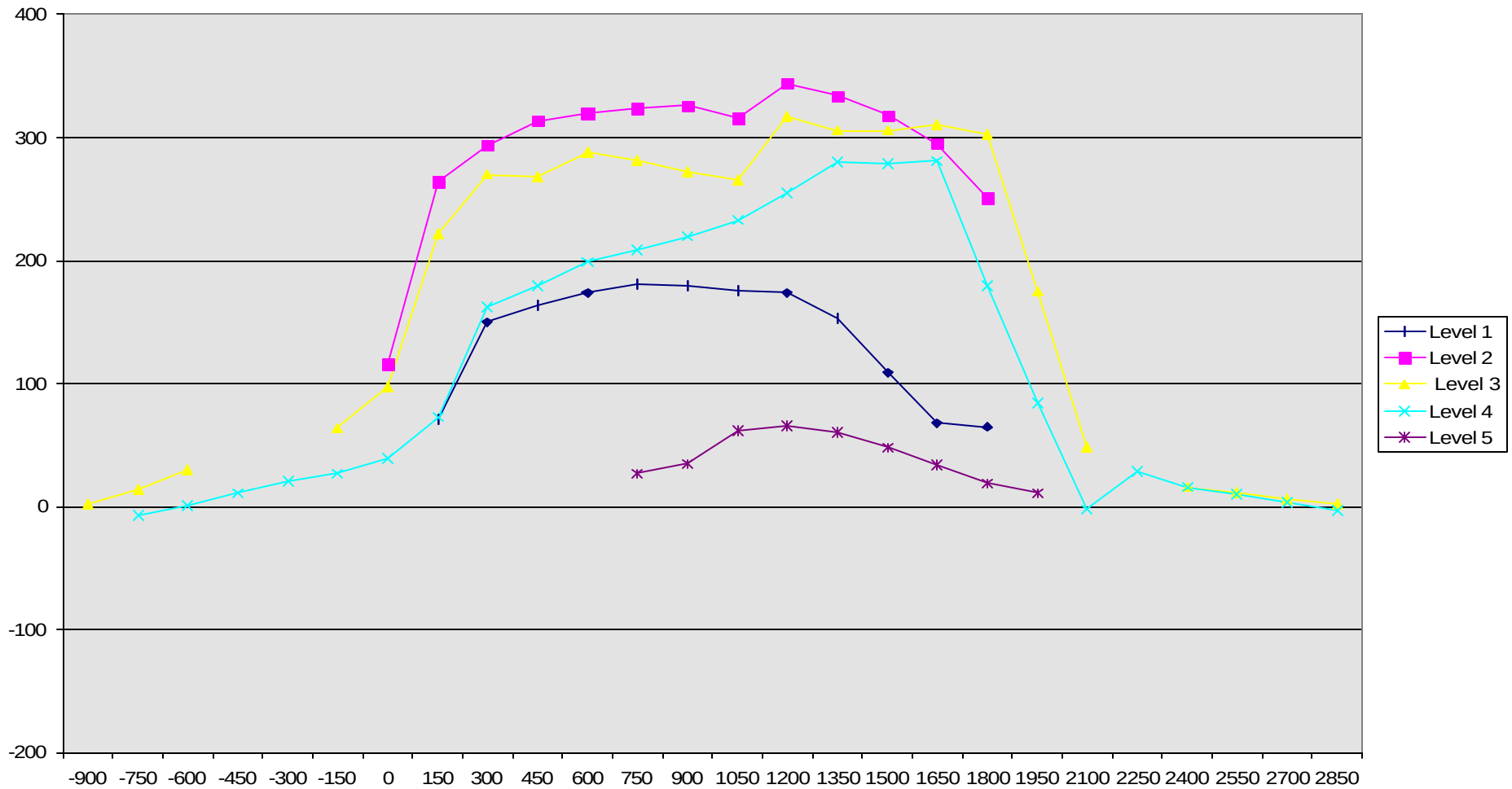
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

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

Test Vehicle: 2002 Daewoo Nubira 4 door
Test Program: 214 Inducant Side Impact

NHTSA No. C20503
Test Date: 1/17/02

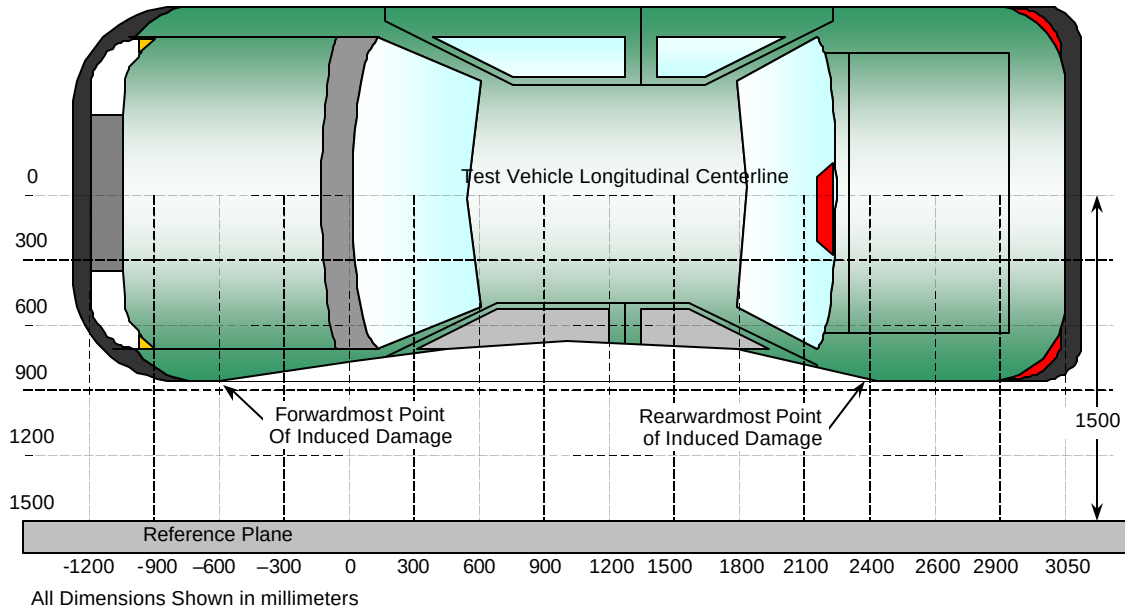


DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02



TOP VIEW

Damage Profile Distances

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2850 mm	4	360	357	-3
2	2178 mm	2	316	354	38
3	1436 mm	2	264	600	336
4	738 mm	2	268	592	324
5	74 mm	4	269	432	163
6	-600 mm	4	360	361	1

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

DATA SHEET NO. 12

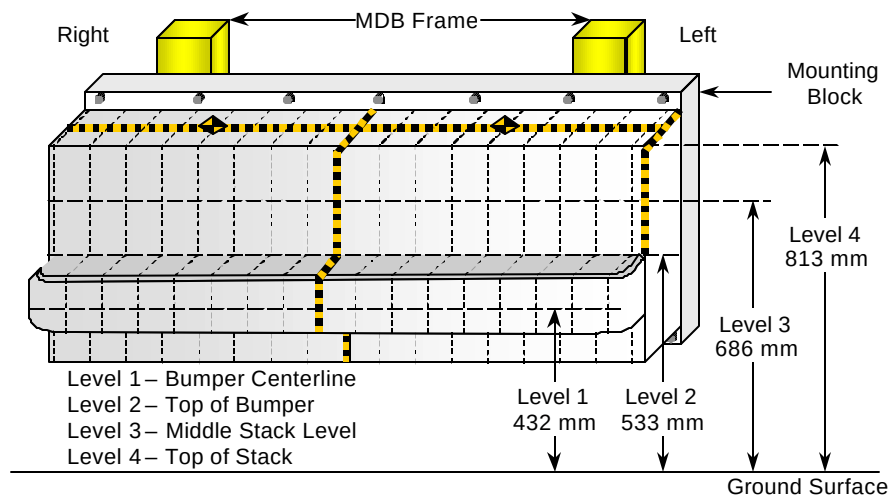
DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2002 Daewoo Nubira 4 door

NHTSA No. C20503

Test Program: 214 Indicant Side Impact

Test Date: 1/17/02



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	61	150	135	122	121	119	109	105	103	101	100	99	98	100	109	135	138
2	98	87	76	75	69	68	67	65	60	63	62	62	61	63	70	86	108
3	32	4	4	5	5	22	21	15	13	14	19	24	29	63	91	123	146
4	63	7	5	8	4	3	18	14	19	23	28	32	44	63	89	131	181

All Dimensions in mm

DATA SHEET NO. 13

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

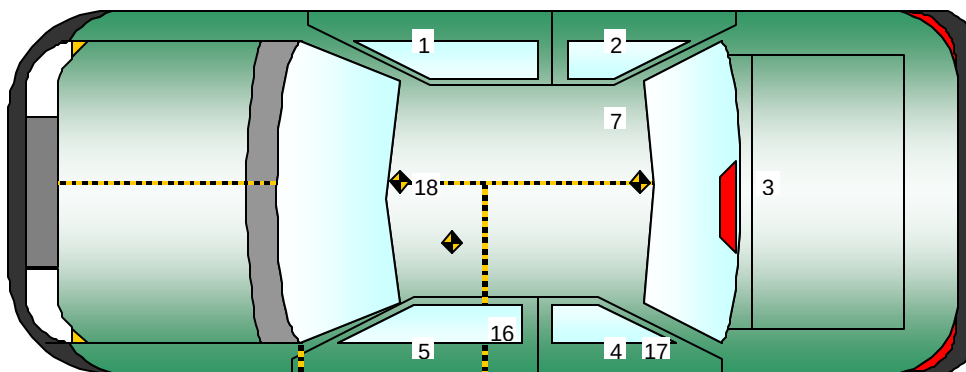
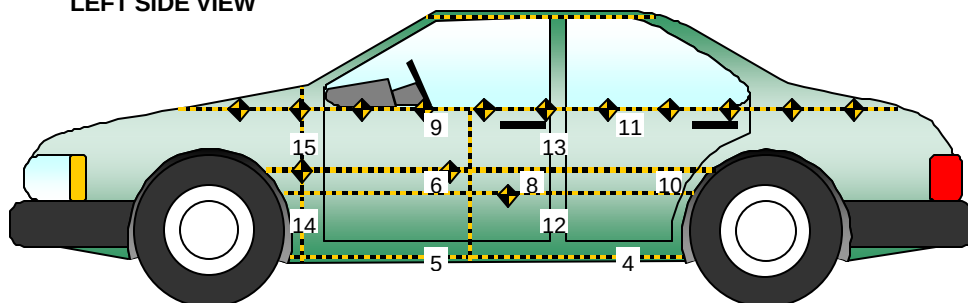
Test Vehicle: 2002 Daewoo Nubira 4 door

NHTSA No. C20503

Test Program: 214 Indicant Side Impact

Test Date: 1/17/02

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 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02

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	2414	636	-212	X	3.6	65	5.9	11
					Y	22.6	7	2.4	164
					Z	3.7	100	4.9	21
					RES	22.8	7		
2	Right Sill at Rear Seat	1467	636	-207	X	3.8	65	5.5	12
					Y	25.3	7	2.6	87
					Z	4.6	33	8.7	25
					RES	25.4	7		
3	Rear Floorpan Above Axle	1015	0	-325	X	3.3	158	7.0	16
					Y	24.0	28	4.3	85
					Z	16.0	42	10.5	21
					RES	26.4	42		
4	Left Sill at Rear Door	1480	-652	-200	Y	40.7	16	7.2	24
5	Left Sill at Front Door	2418	-656	-200	Y	55.1	18	5.0	81
7	Rear Occupant Compartment	1745	314	-328	Y	25.5	17	2.0	182
12	B-Post Lower	1895	-660	-280	Y	75.1	7	8.2	26
13	B-Post Middle*	1908	-694	-882	Y	163.5	6	*	*
14	A-Post Lower	2962	-667	-440	Y	224.6	5	41.7	20
15	A-Post Middle	2990	-735	-843	Y	86.7	12	13.0	20
16	Front Seat Track	2084	-568	-280	Y	59.1	18	29.0	23
18	Vehicle CG	2412	0	-422	X	4.1	68	9.1	20
					Y	43.6	17	2.5	83
					Z	13.9	10	8.9	24
					RES	44.0	17		

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

* Questionable data after approximately 15 msec.

DATA SHEET NO. 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

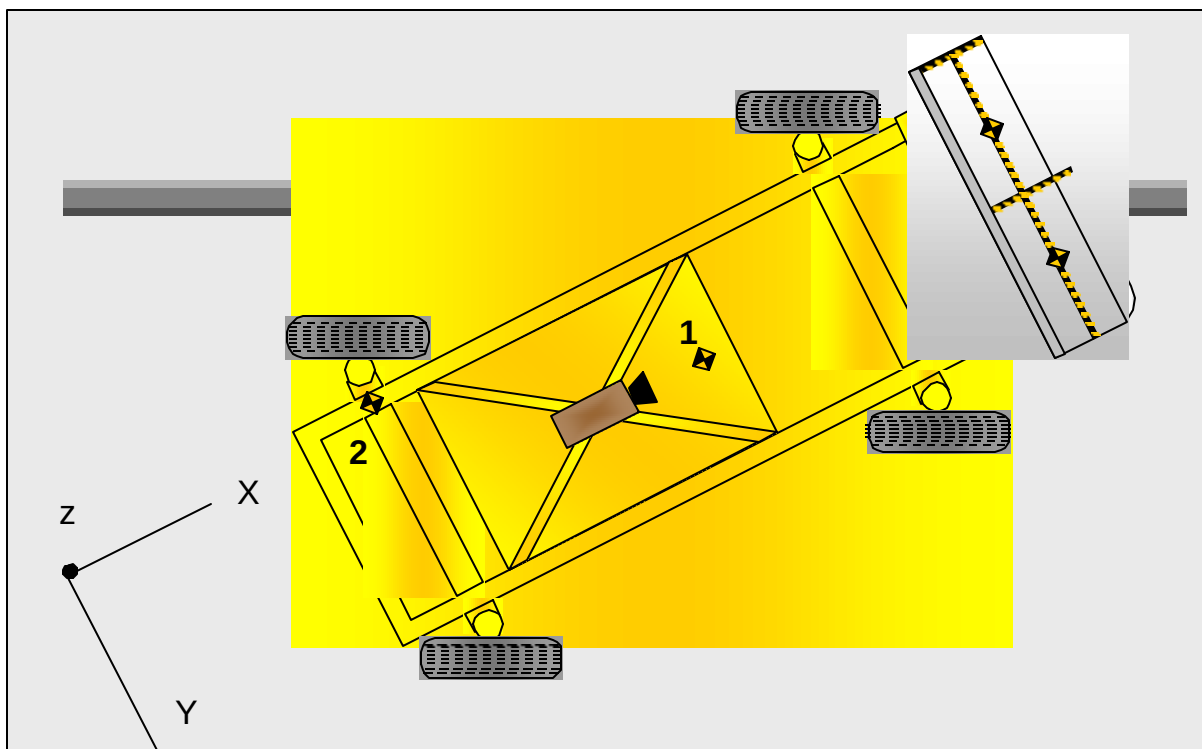
Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02

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	1.9	100	18.7	35
					Y	1.9	59	6.4	25
					Z	27.5	49	22.6	45
					RES	29.7	45		
2	MDB Rear	-2591	-625	-622	X	2.3	93	20.7	29
					Y	5.7	25	1.4	196

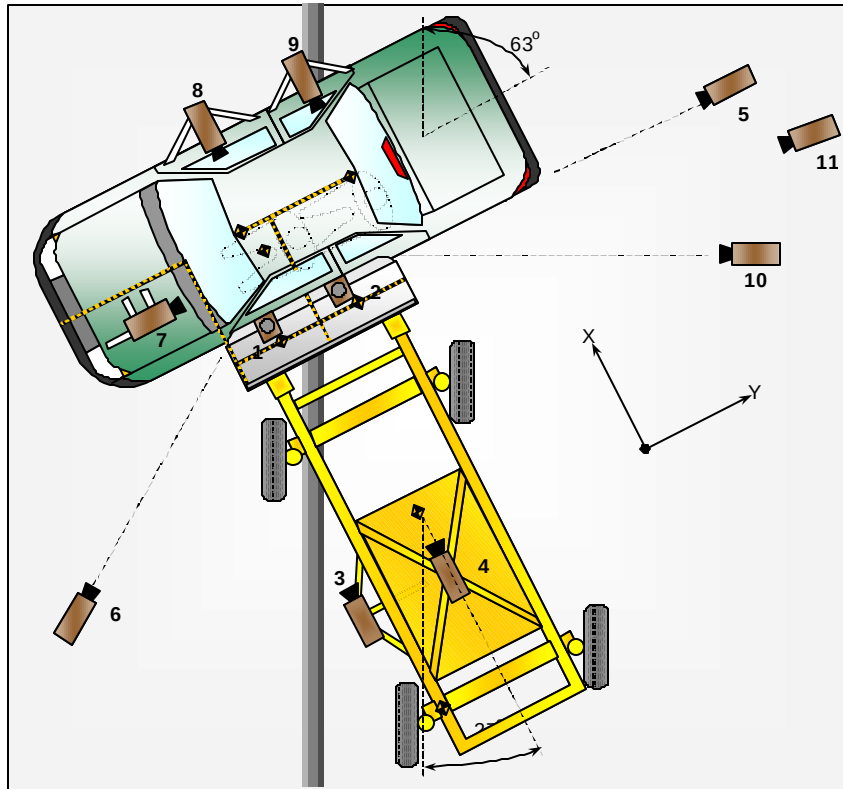
Reference Points X - MDB Front Axle (+ forward)
 Y - MDB Centerline (+ to right)
 Z - Ground Plane (+ down)



DATA SHEET NO. 15
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2002 Daewoo Nubira 4 door
 Test Program: 214 Indicant Side Impact

NHTSA No. C20503
 Test Date: 1/17/02



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	-225	1150	5000	8	1058
2	Overhead Close-up	-695	-350	5000	13	1053
3	MDB Onboard, Impact Point Close-up				13	1064
4	MDB Onboard, Centerline of Impact				13	1031
5	Right Side, Ground Level, Overall	-722	10560	1800	25	741
6	Left Side, Ground Level, Overall	-715	-1945	1660	13	1070
7	Vehicle Onboard Front SID, Front				13	518
8	Vehicle Onboard Front SID, Side				7.5	505
9	Vehicle Onboard Rear SID, Side				13	513
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 Daewoo Nubira 4 door

NHTSA No. C20503

Test Program: 214 Indicant Side Impact

Test Date: 1/17/02

Test Time: 1:03 pm

Temperature at Time of Impact: 20.6° 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

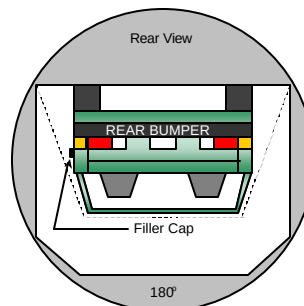
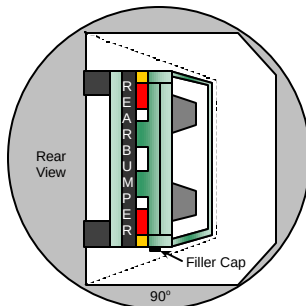
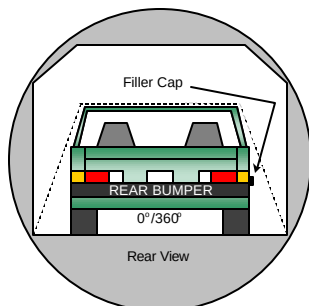
FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2002 Daewoo Nubira 4 door

Test Program: 214 Indicant Side Impact

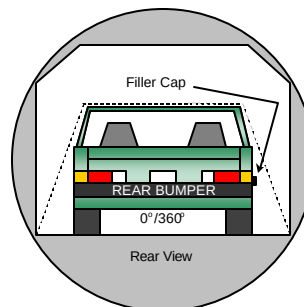
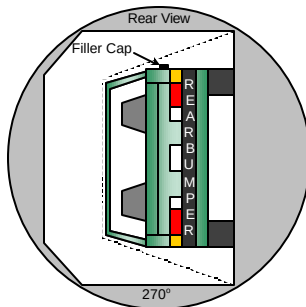
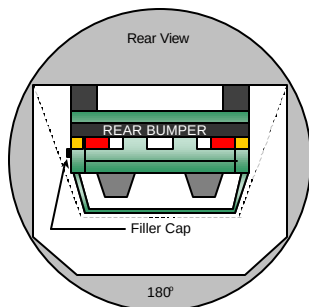
NHTSA No. C20503

Test Date: 1/17/02



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°	165	300	0
90° to 180°	140	300	0
180° to 270°	150	300	0
270° to 360°	150	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 MDB Positioned Against Vehicle (left side)



Pre-Test MDB Positioned Against Vehicle (right side)



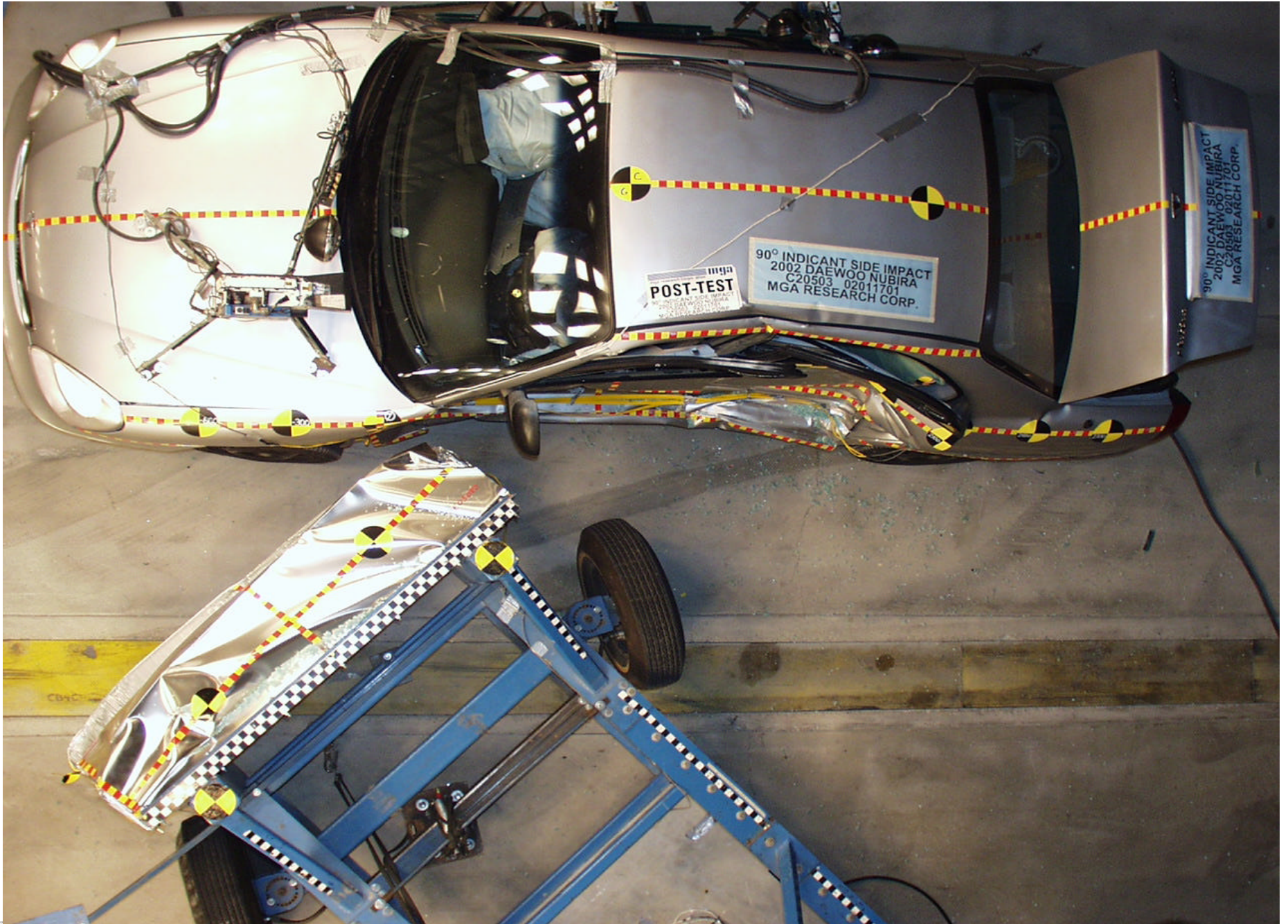
Pre-Test MDB Positioned Against Vehicle Overhead View



Post-Test MDB and Vehicle (left side)



Post-Test MDB and Vehicle (right side)



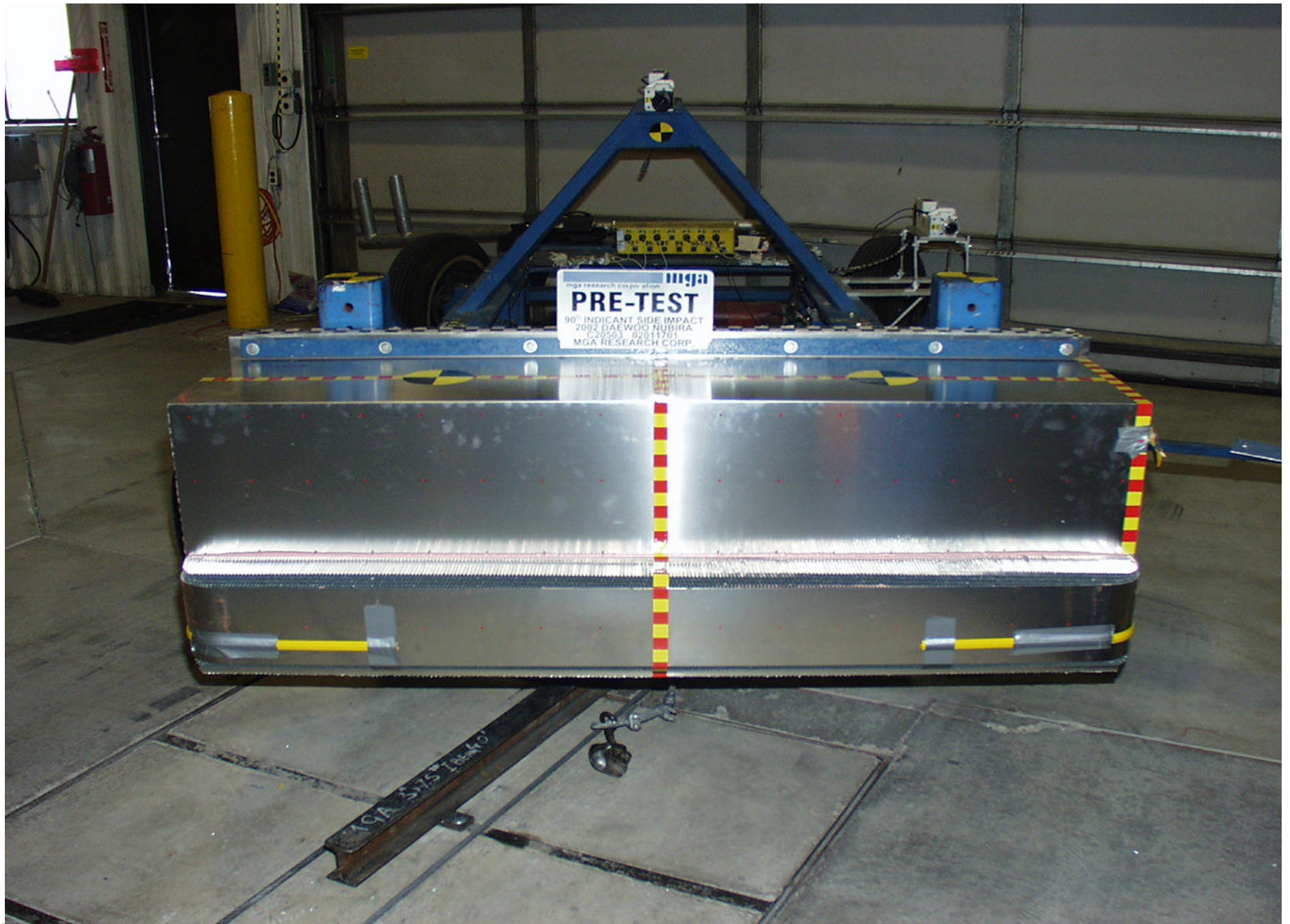
Post-Test MDB and Vehicle Overhead View



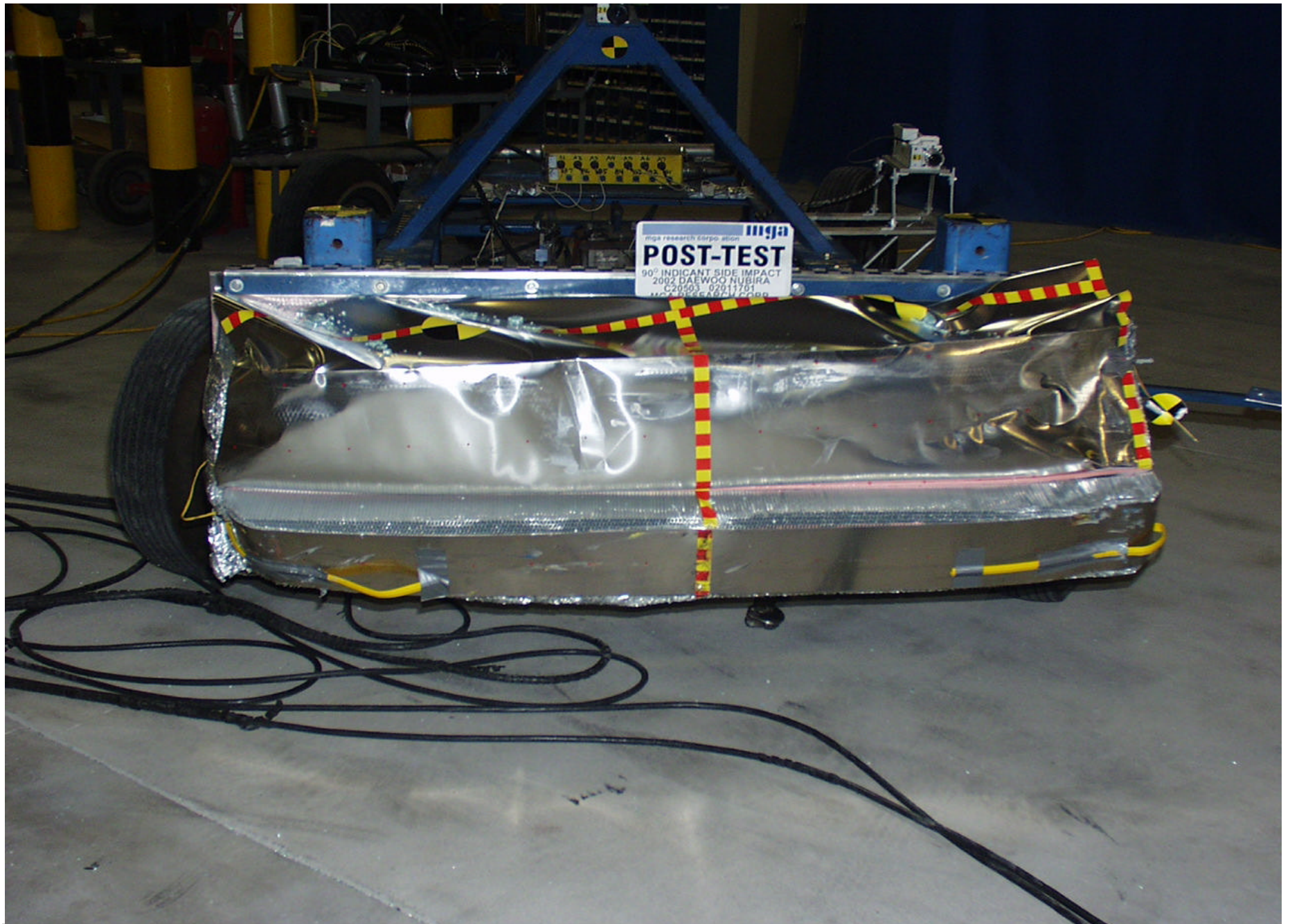
Pre-Test MDB Top View



Post-Test MDB Top View



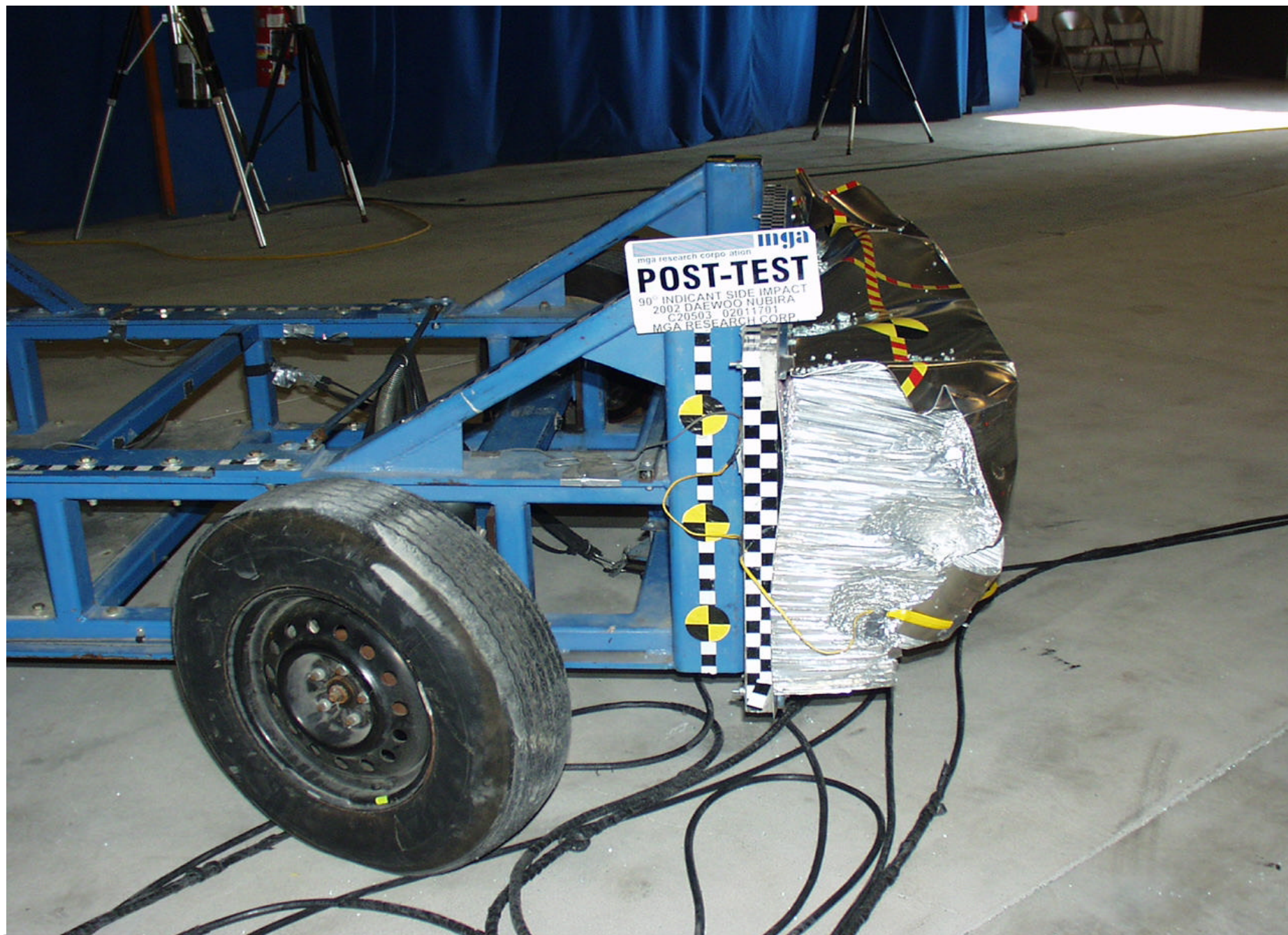
Pre-Test MDB Front View



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



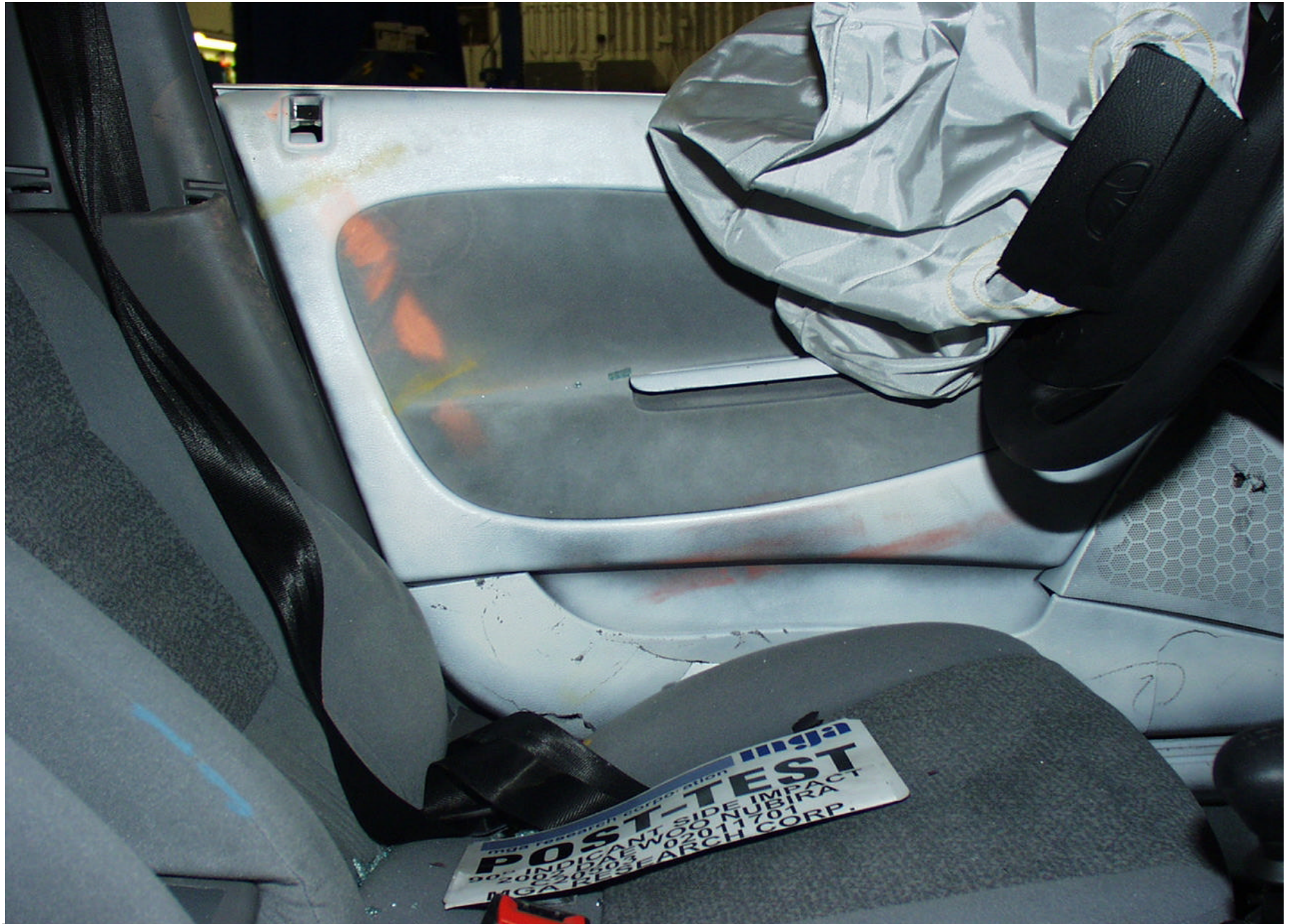
Pre-Test Driver Dummy Left Side View (Door Open)



Pre-Test Driver Dummy Shoulder and Door Top View



Post-Test Driver Dummy Shoulder and Door Top View



Post-Test Driver Dummy Contact



Post-Test Driver Dummy Head 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



Post-Test Passenger Dummy Head Contact



Pre-Test Left Front Impact Point on Vehicle



Post-Test Left Front Impact Point on Vehicle



Impact



Vehicle Certification Label



Tire Placard

A-44.



Rollover 90

A-45.



Rollover 180



A-47.



Rollover 360



Left Front Attitude Point

mga research corporation

PRE-TEST

90° INDICANT SIDE IMPACT
2002 DAEWOO NUBIRA
C20503 02011701
MGA RESEARCH CORP.

A-49.

Right Front Attitude Point

A-50.



Right Rear Attitude Point



Left Rear Attitude Point

APPENDIX B

SID, VEHICLE, AND MDB RESPONSE DATA

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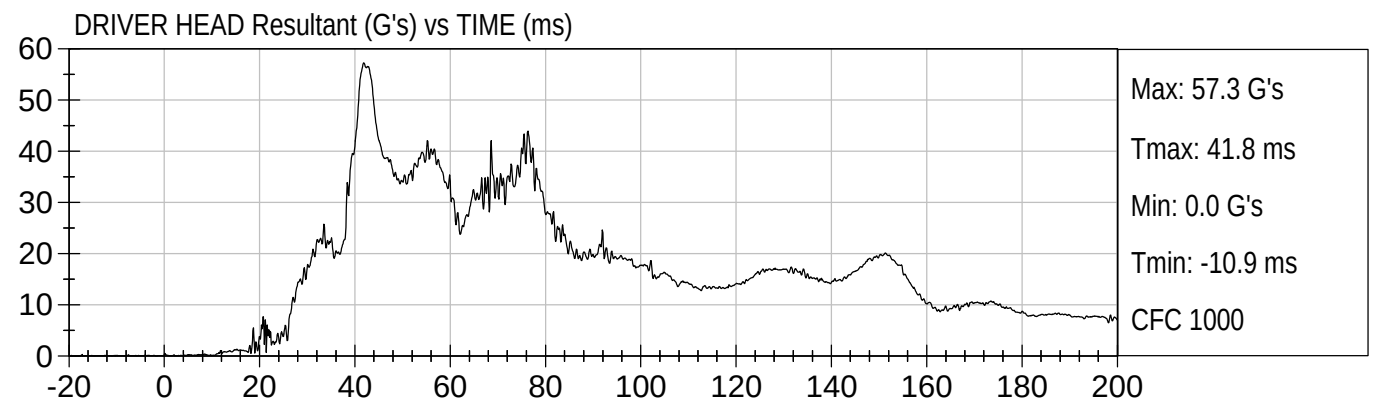
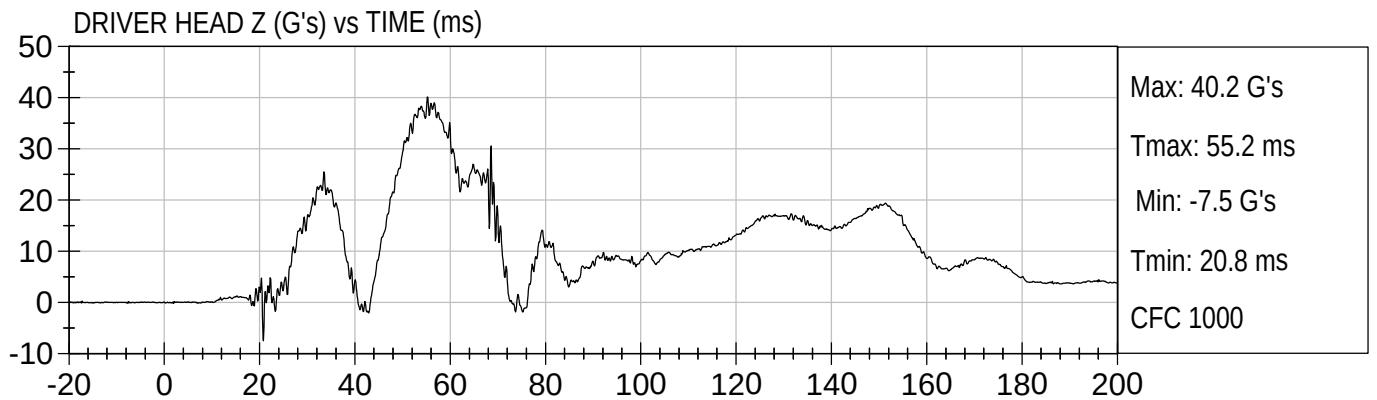
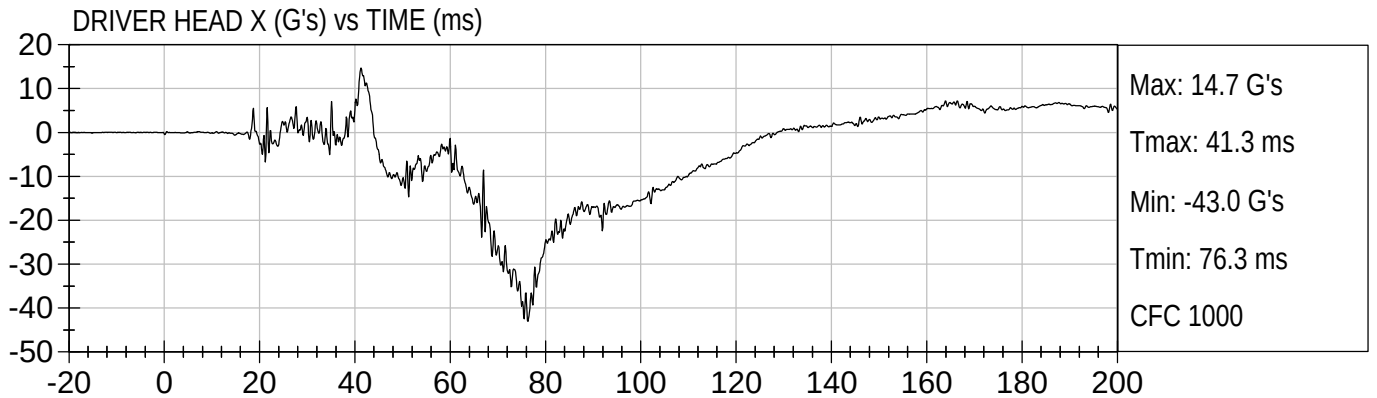
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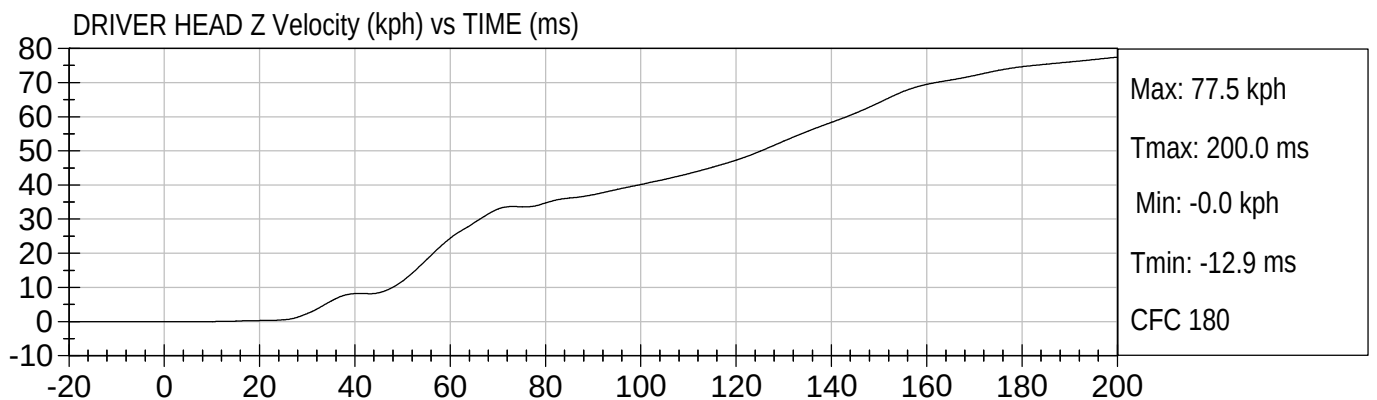
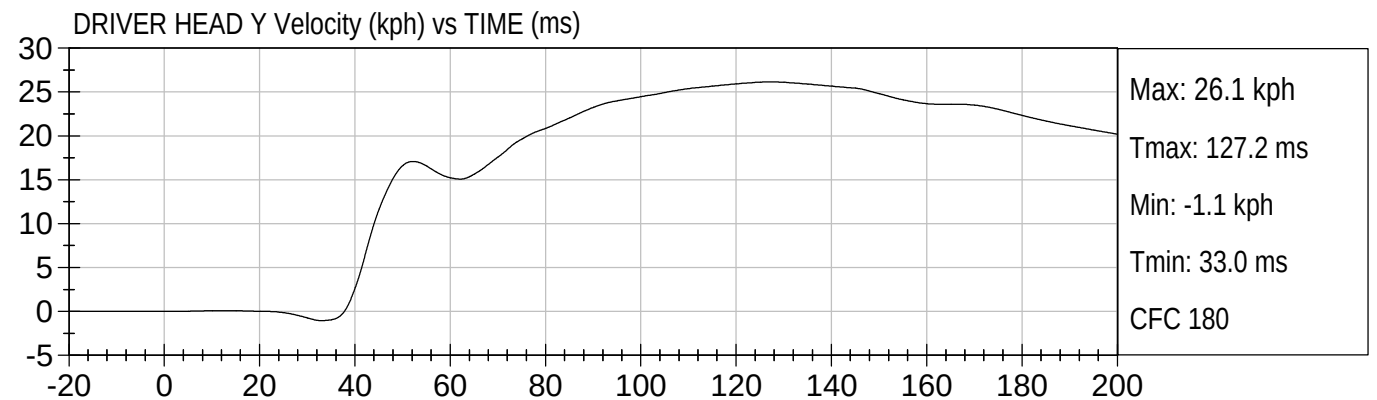
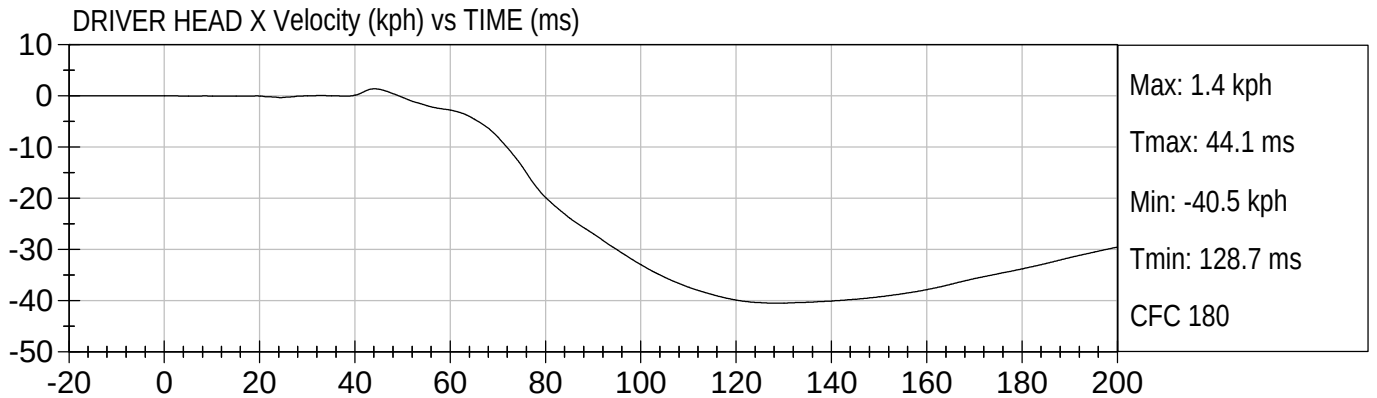
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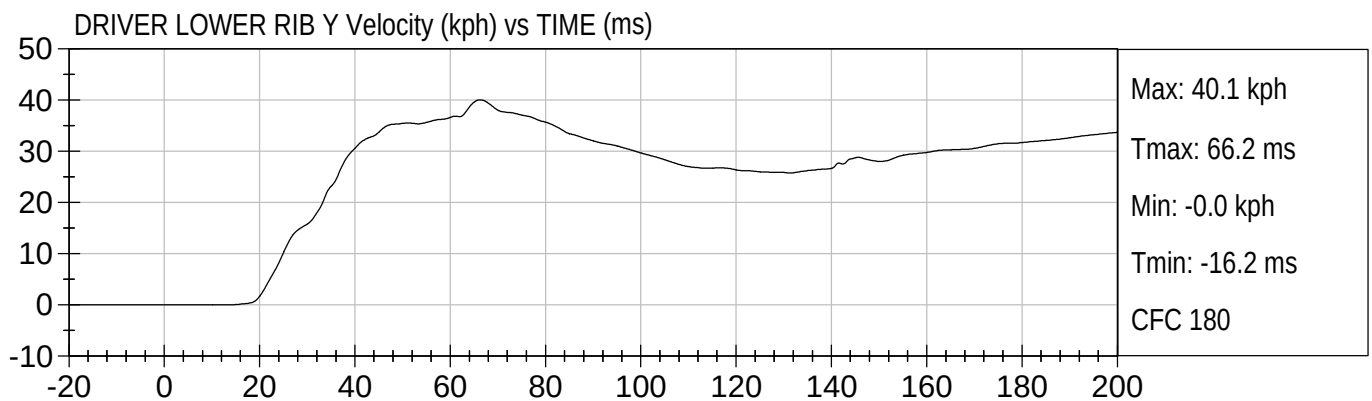
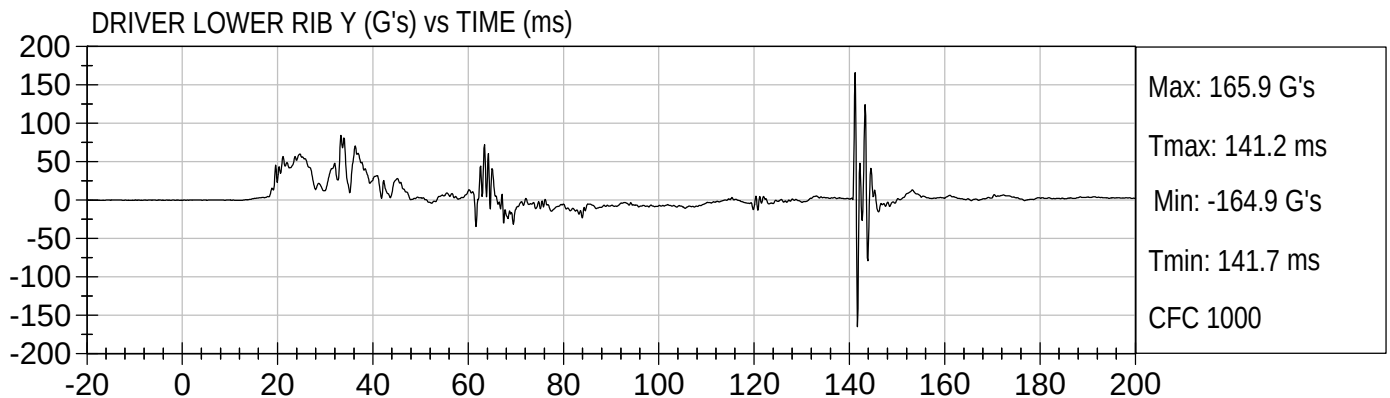
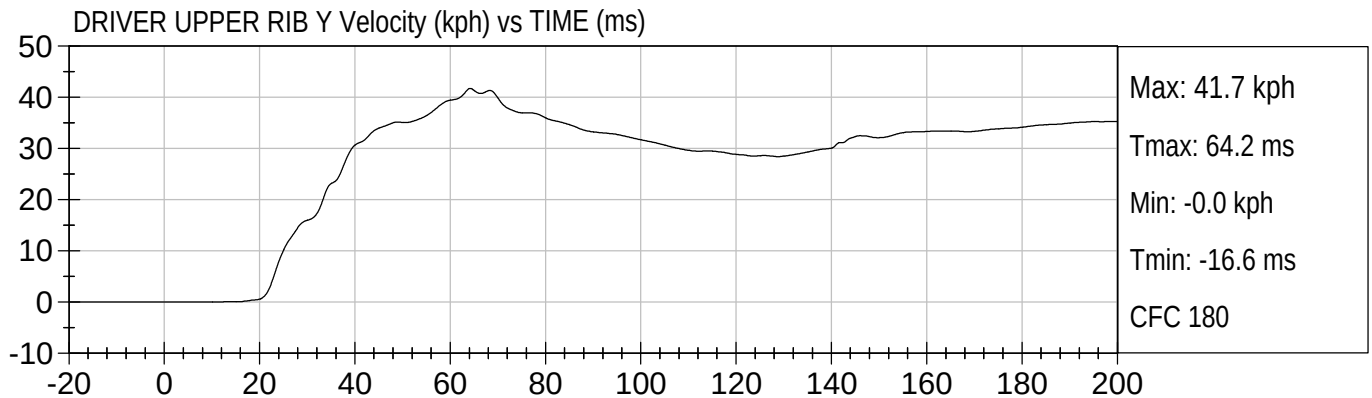
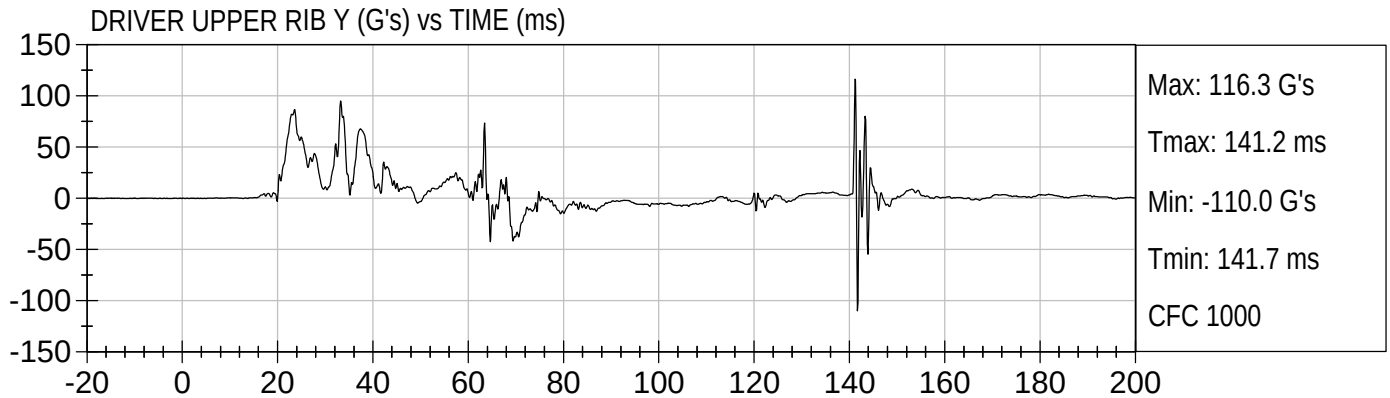
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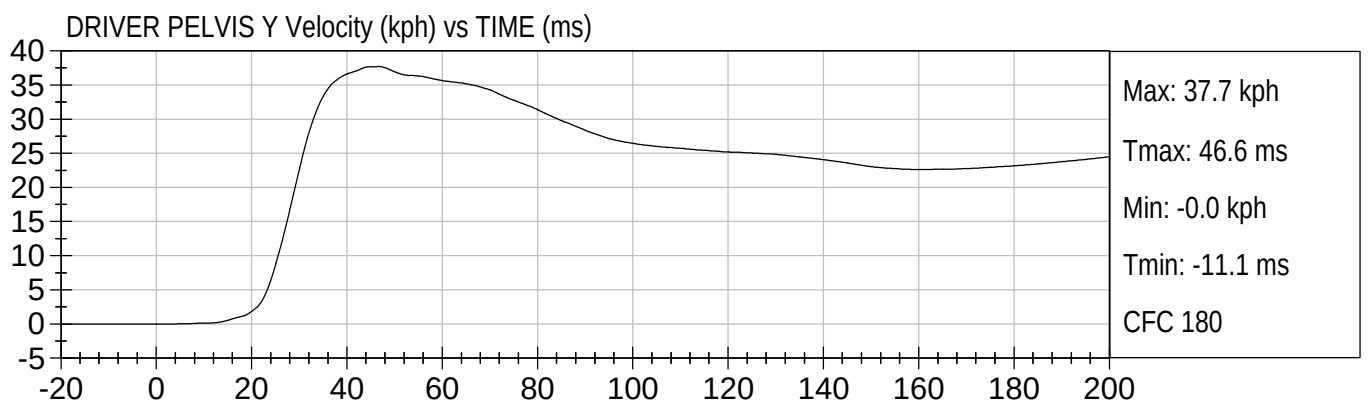
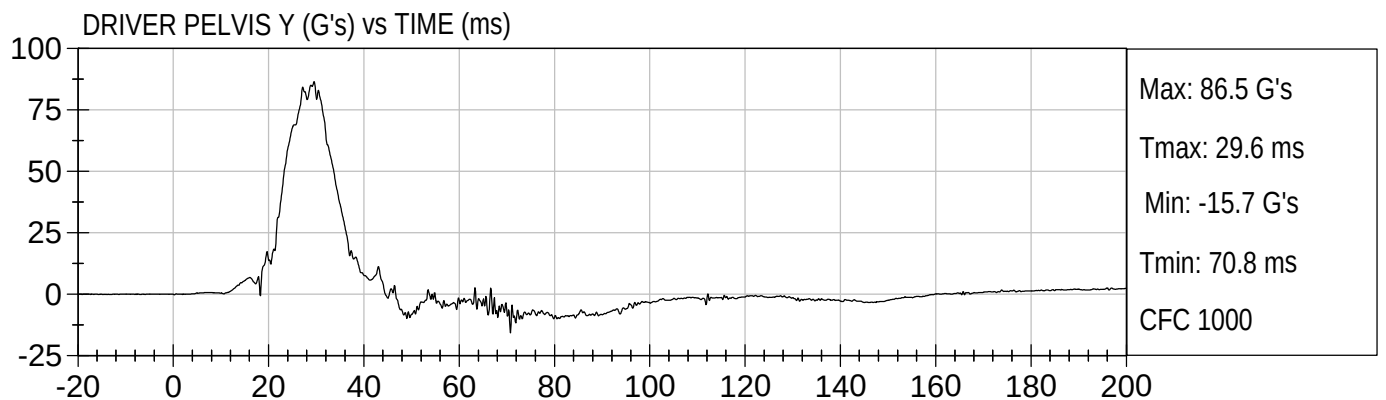
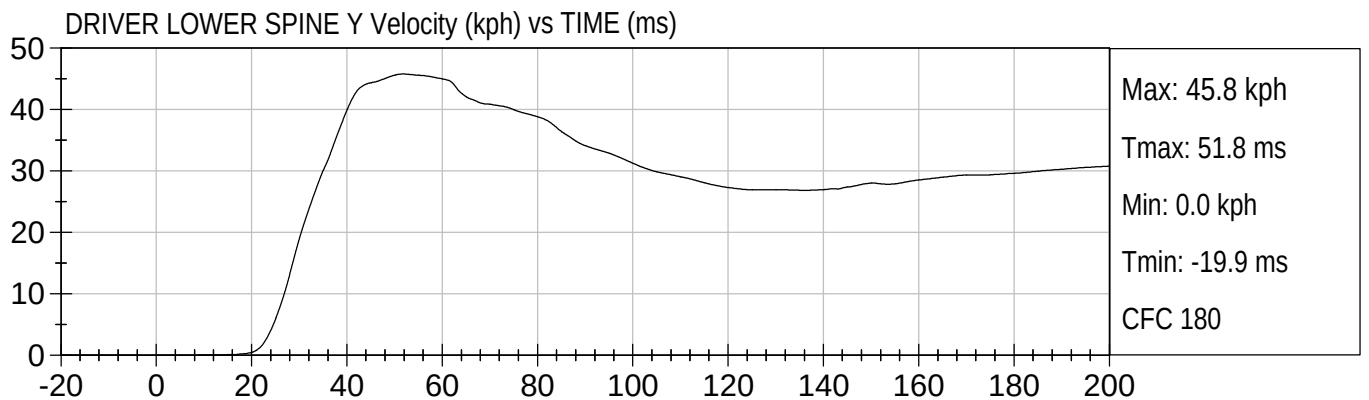
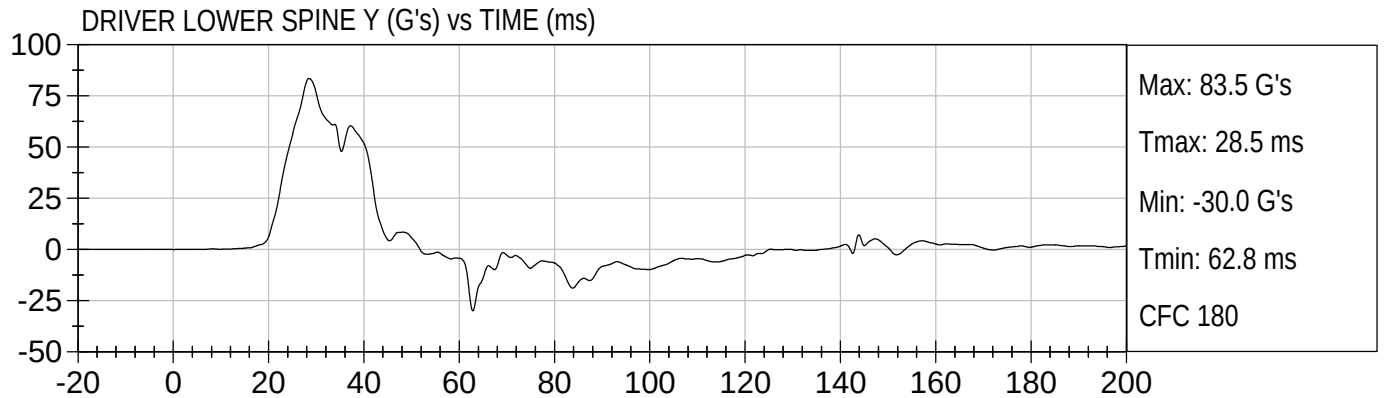
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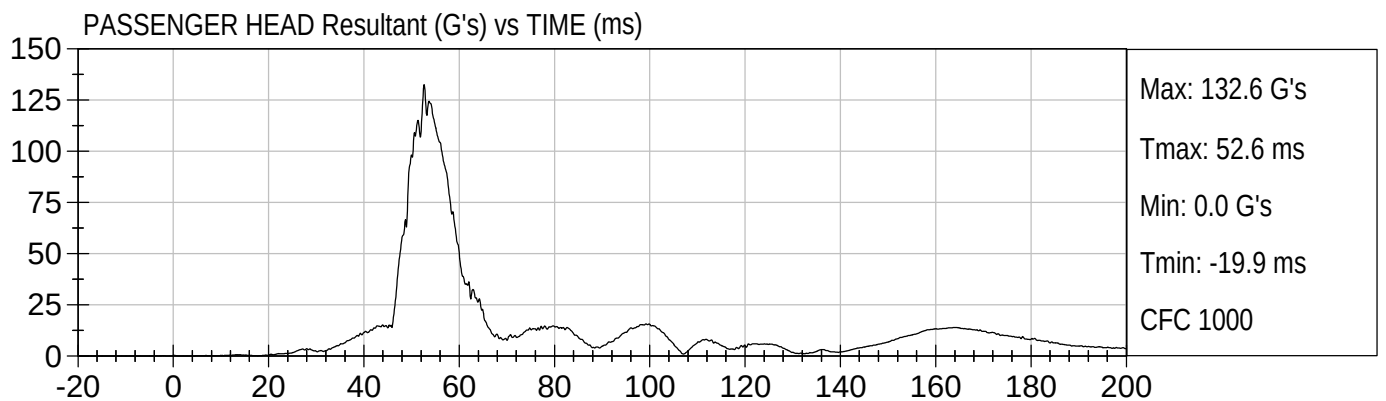
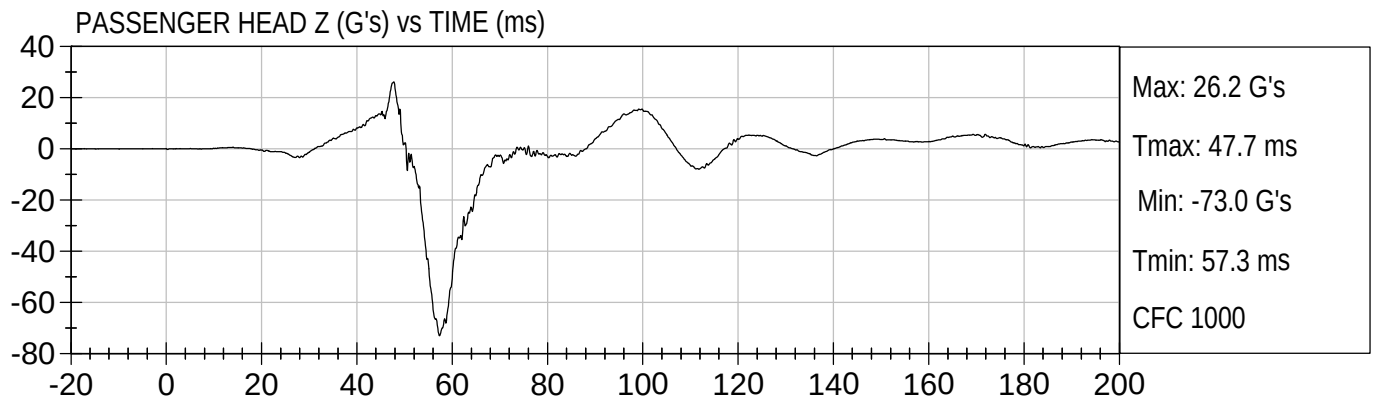
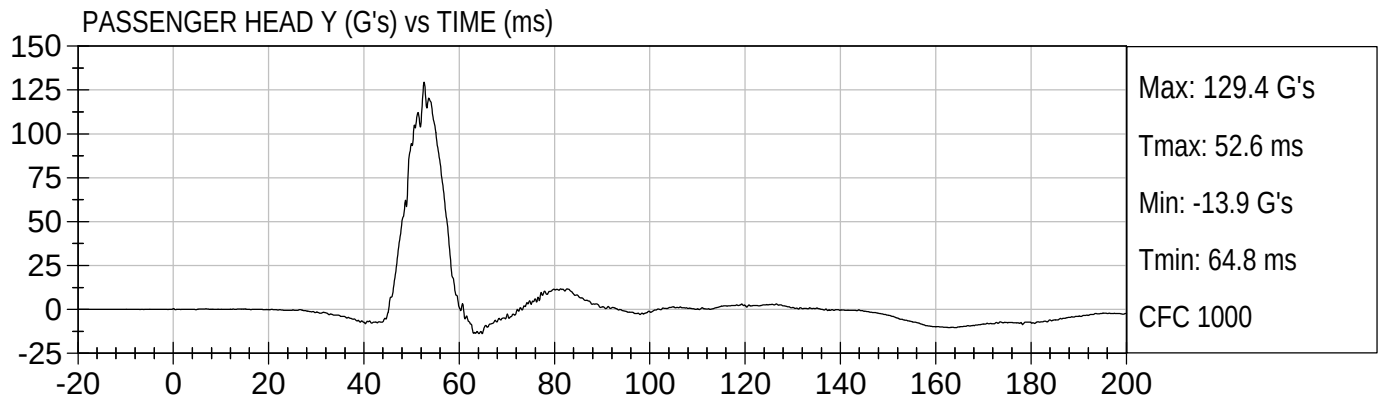
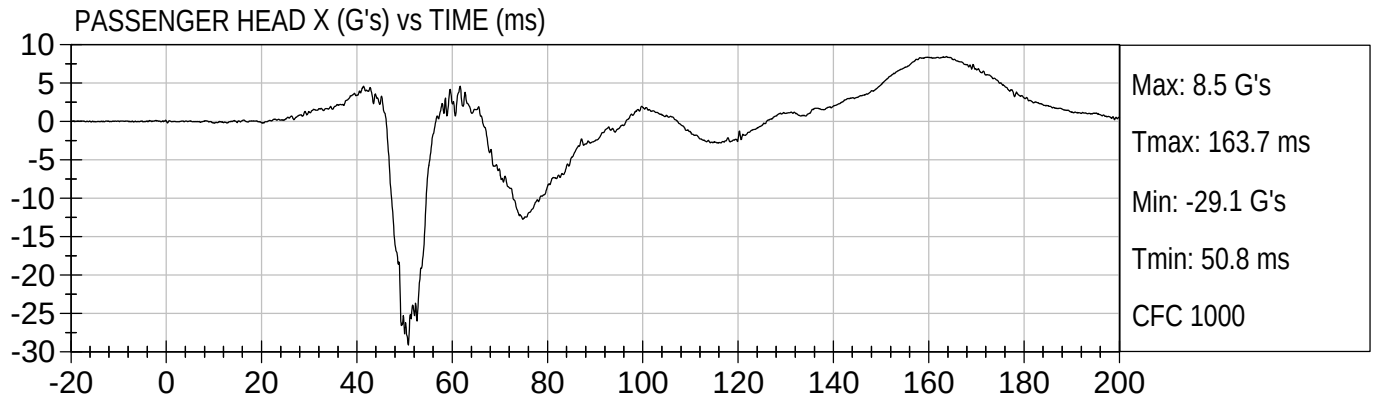
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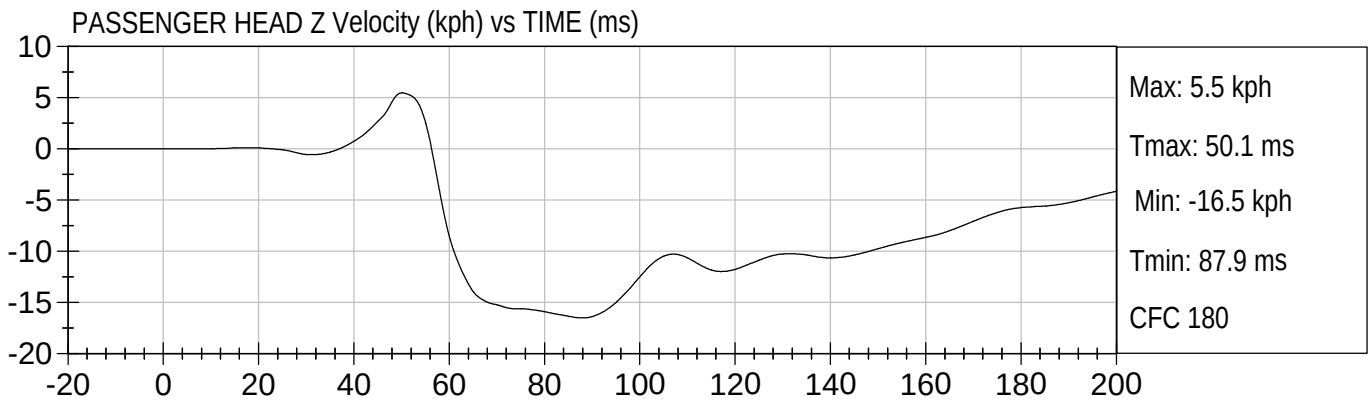
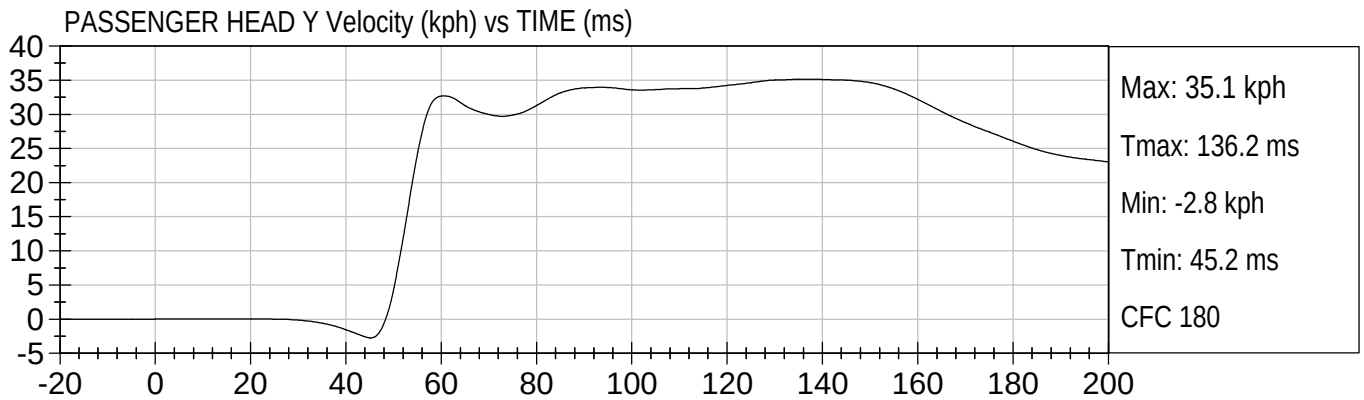
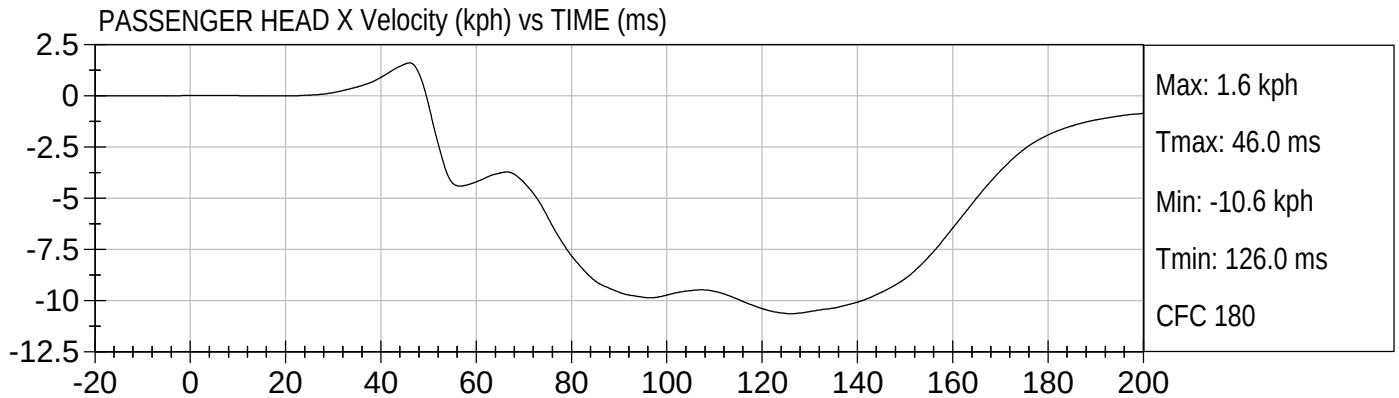


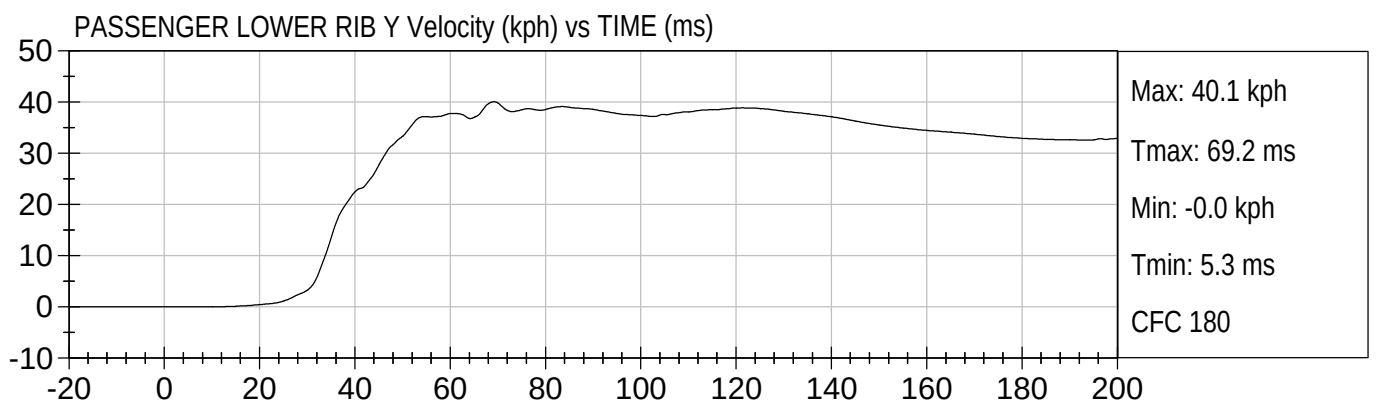
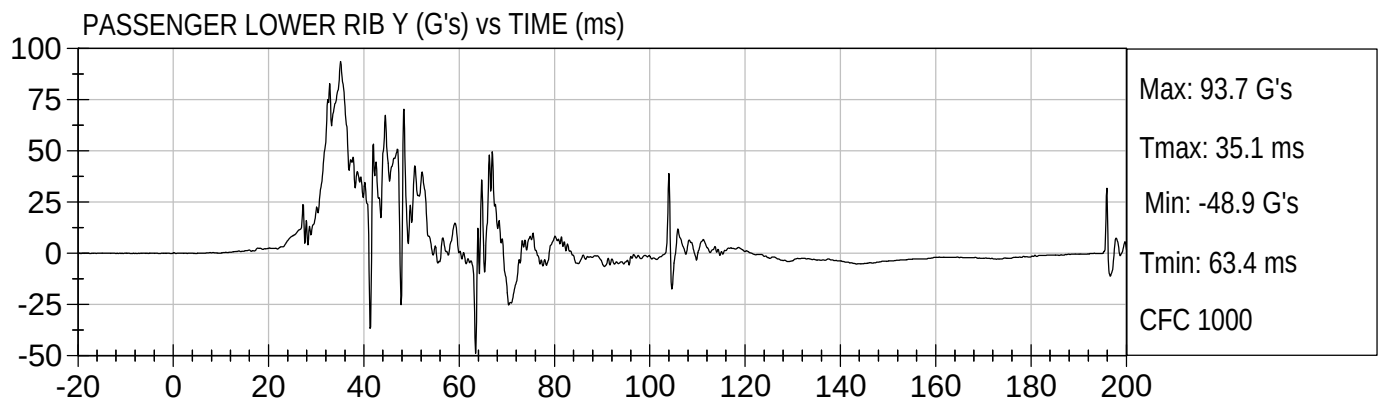
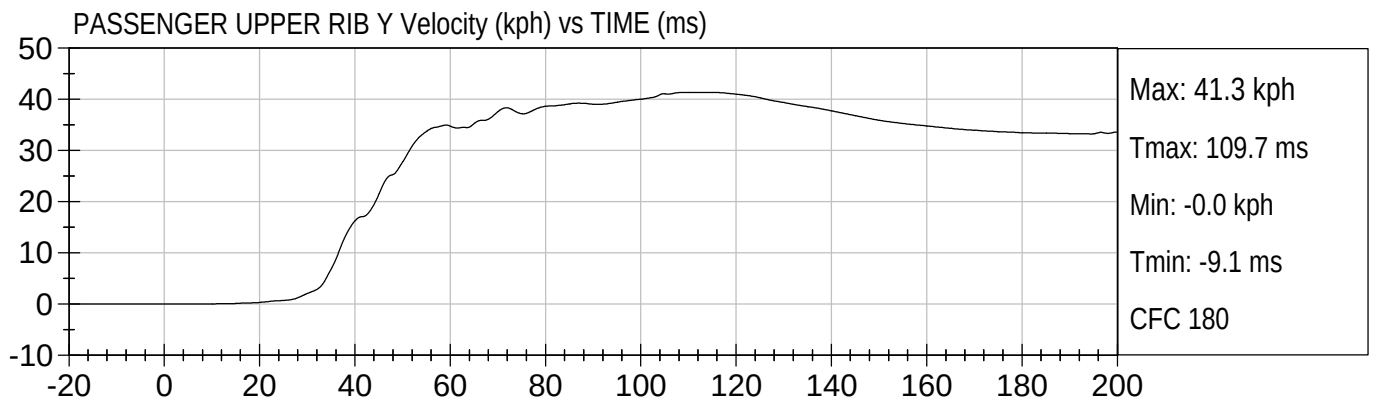
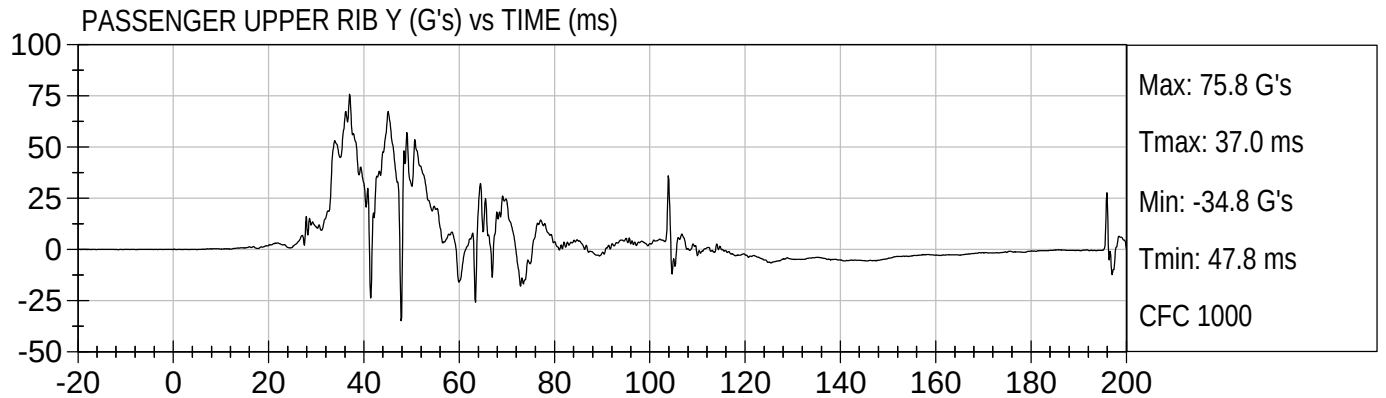


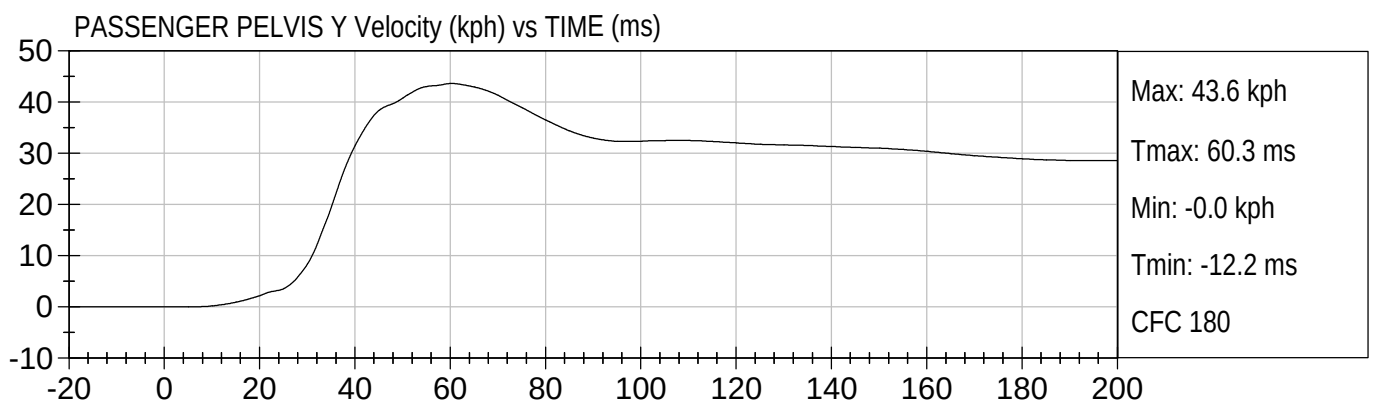
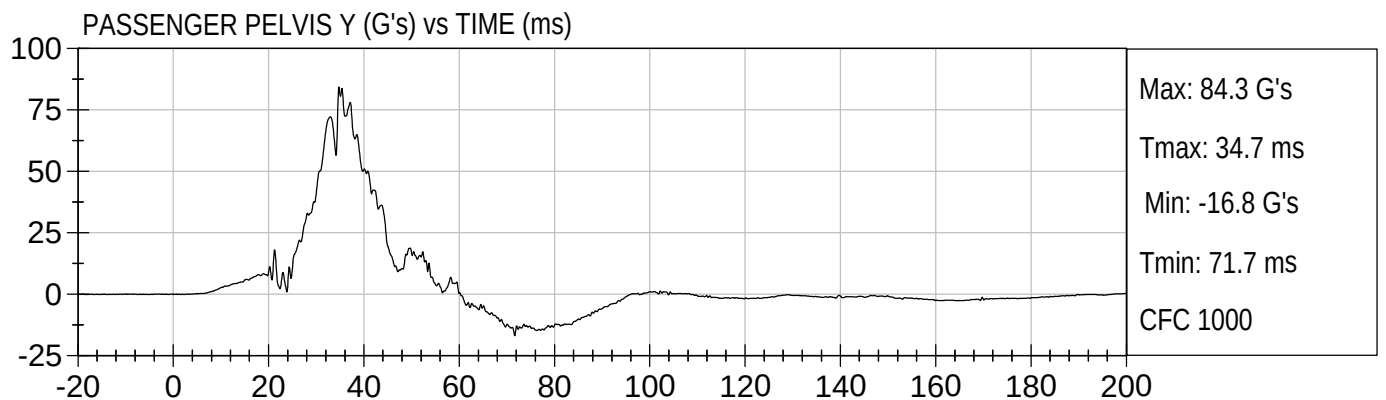
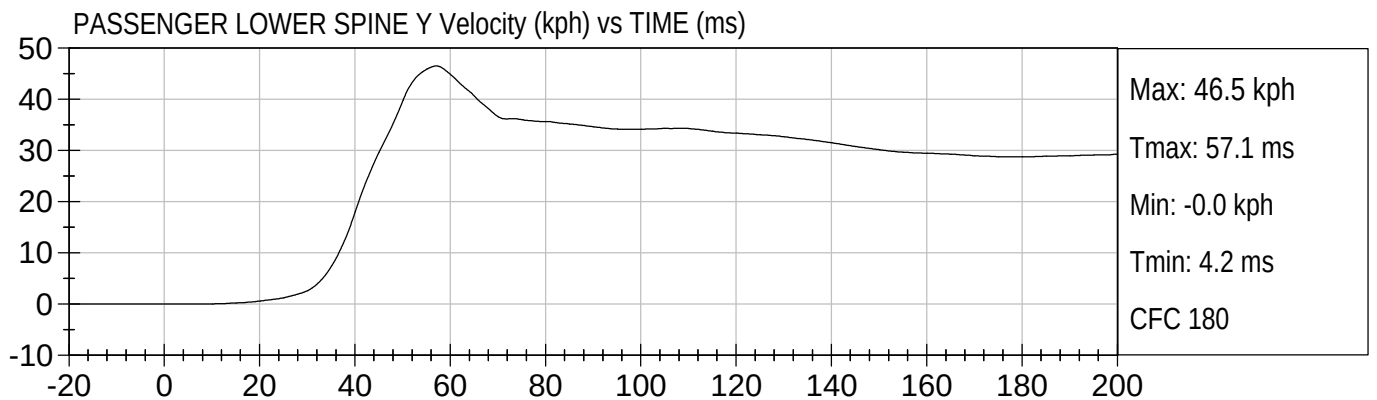
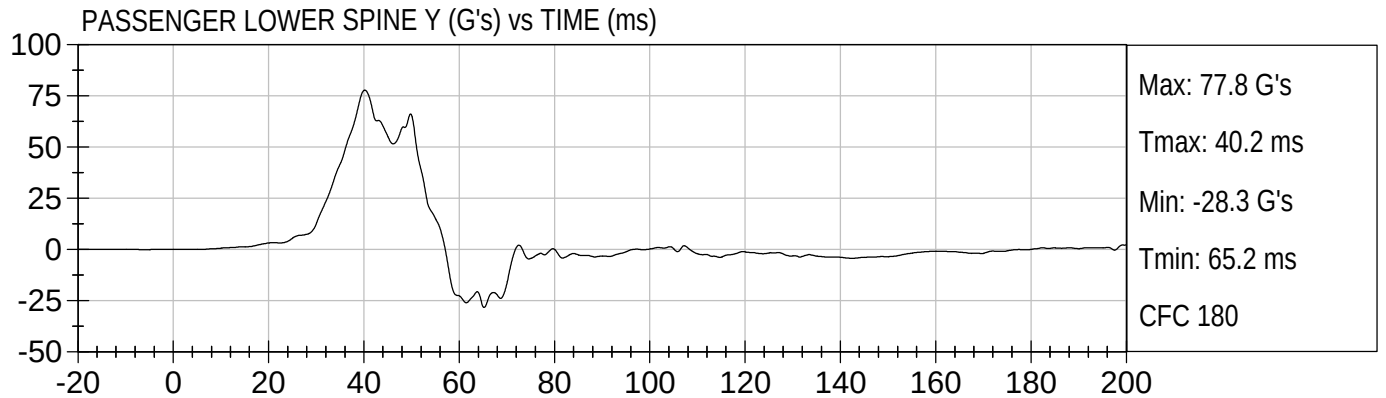


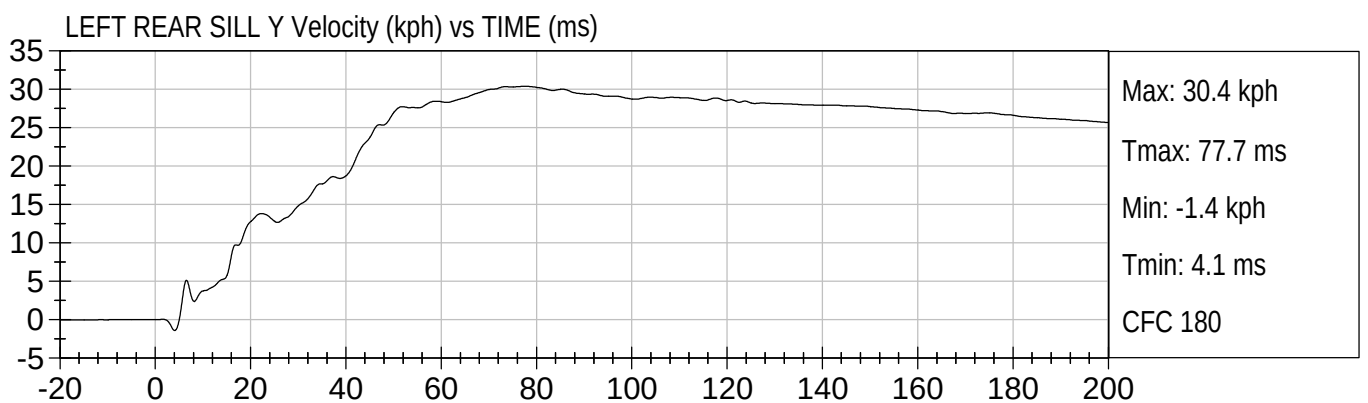
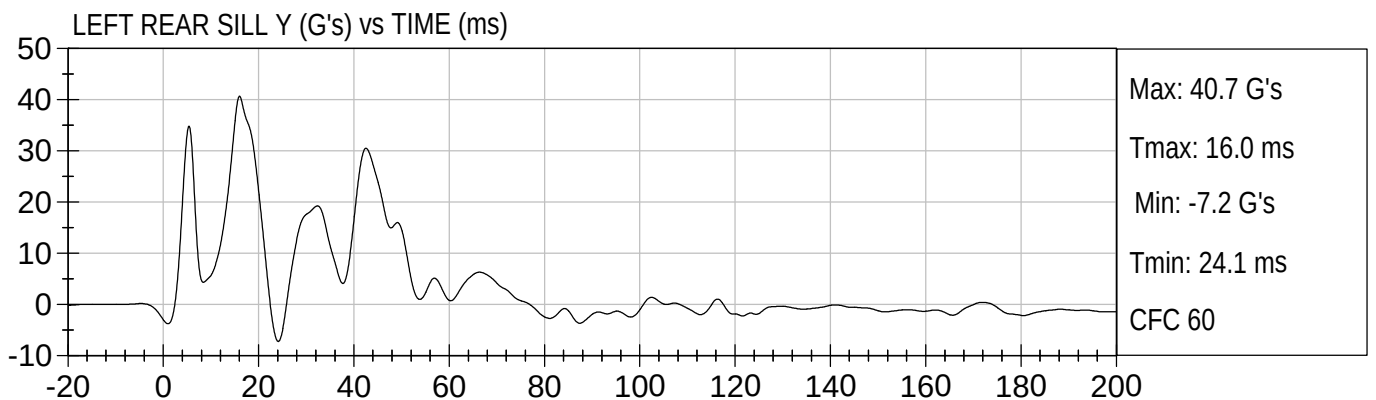
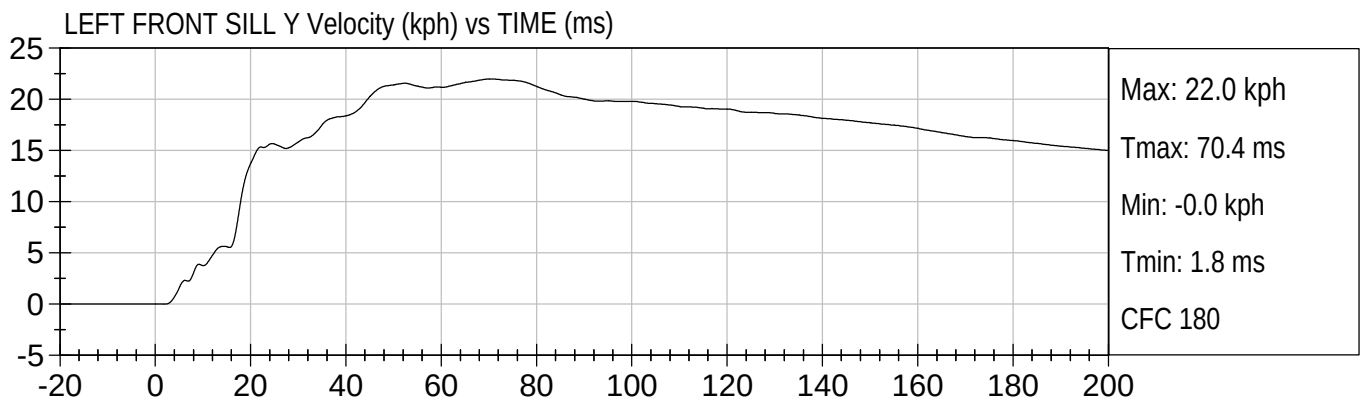
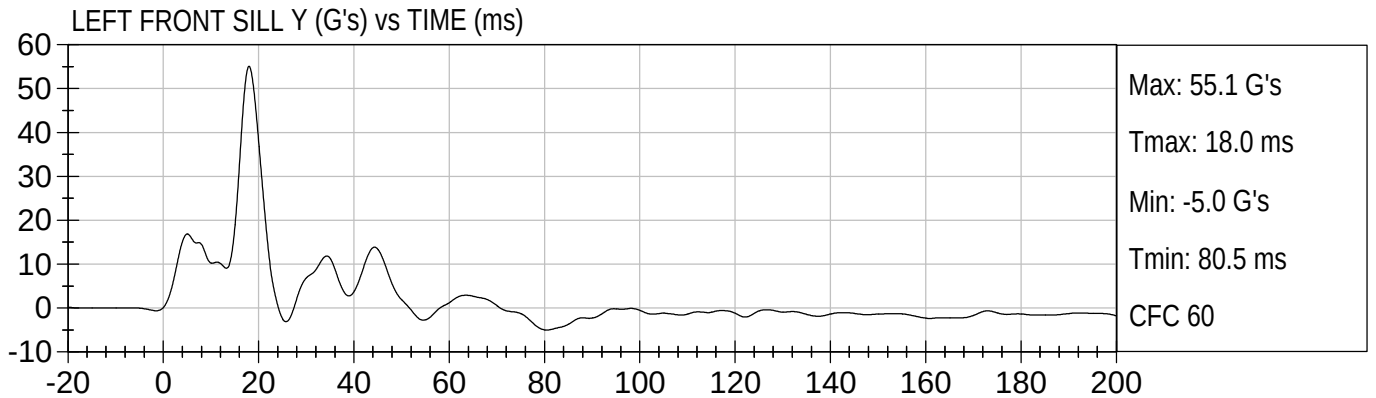


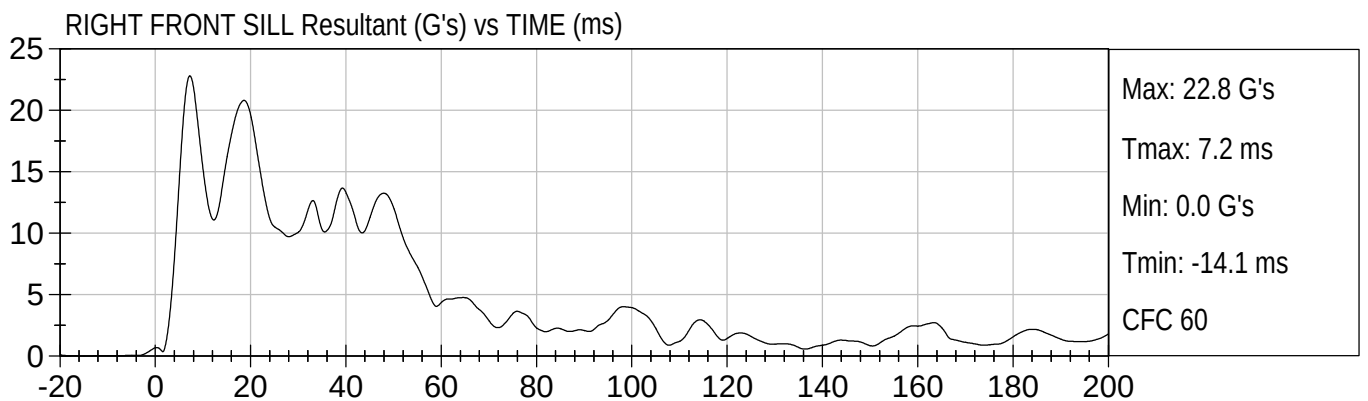
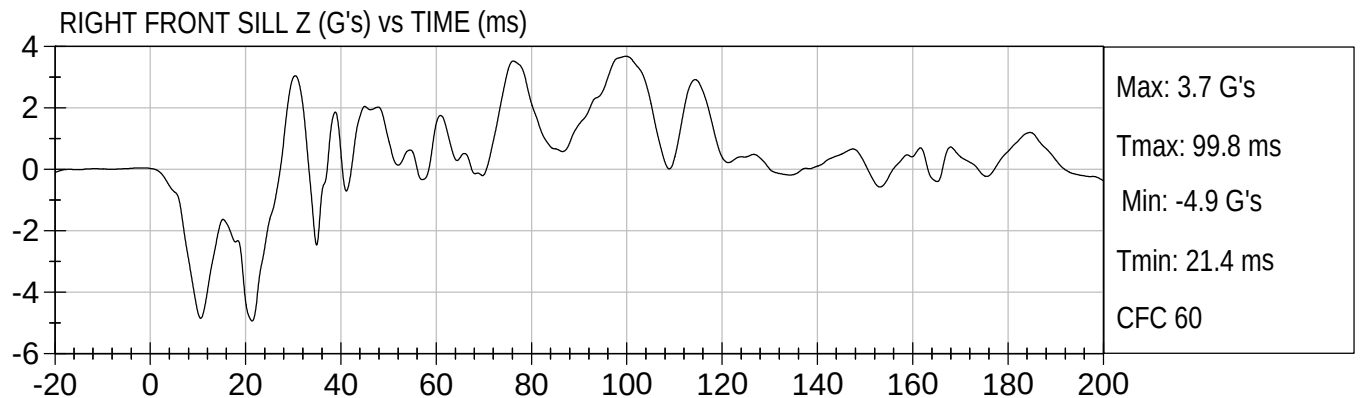
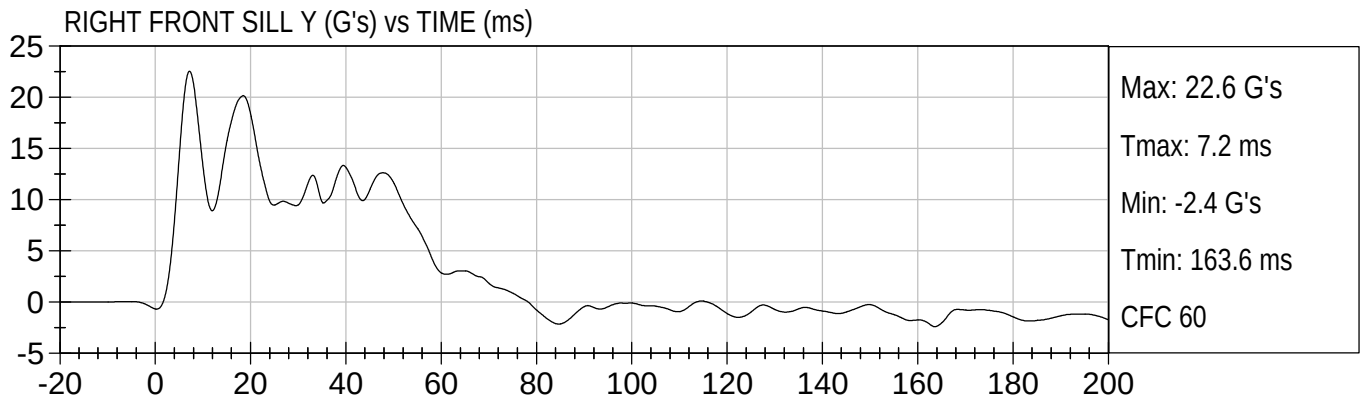
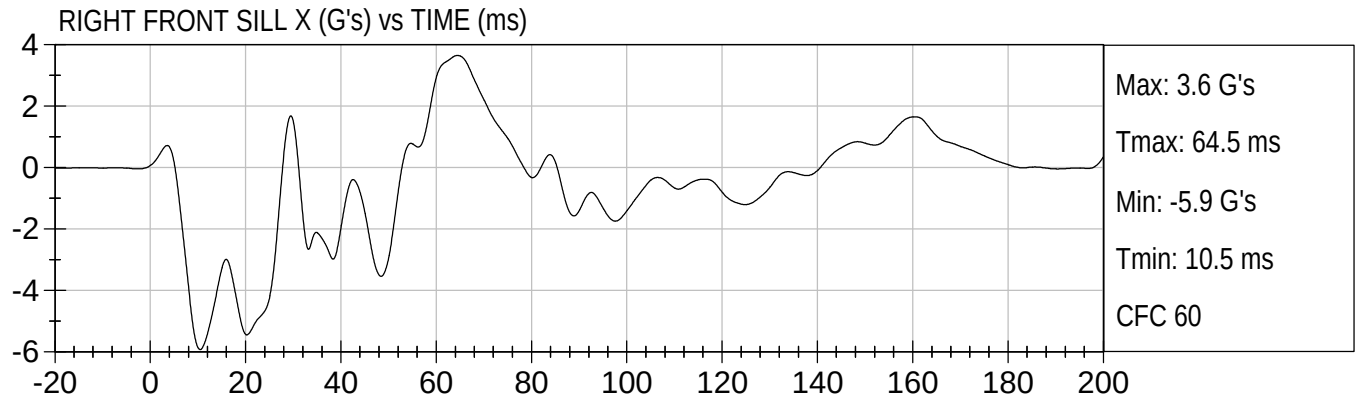


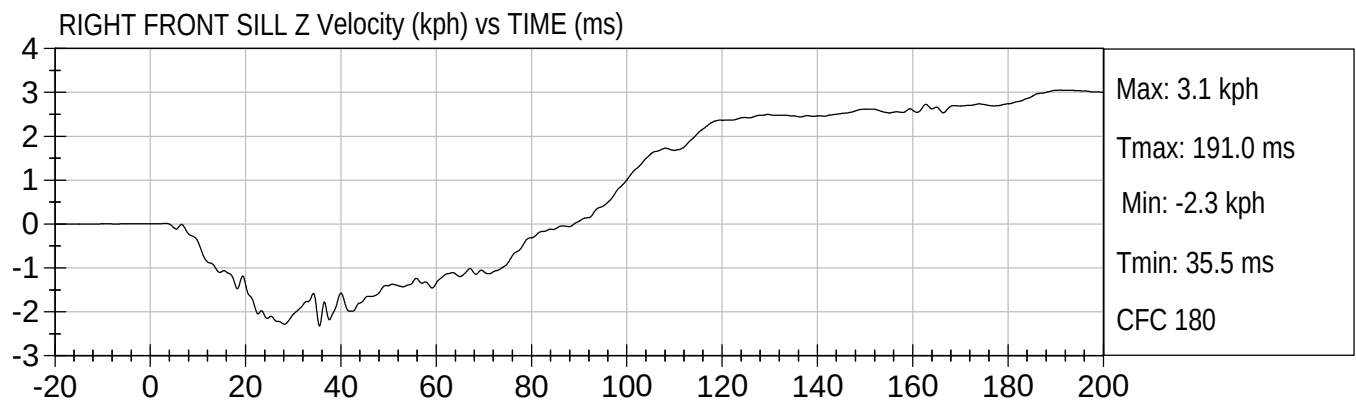
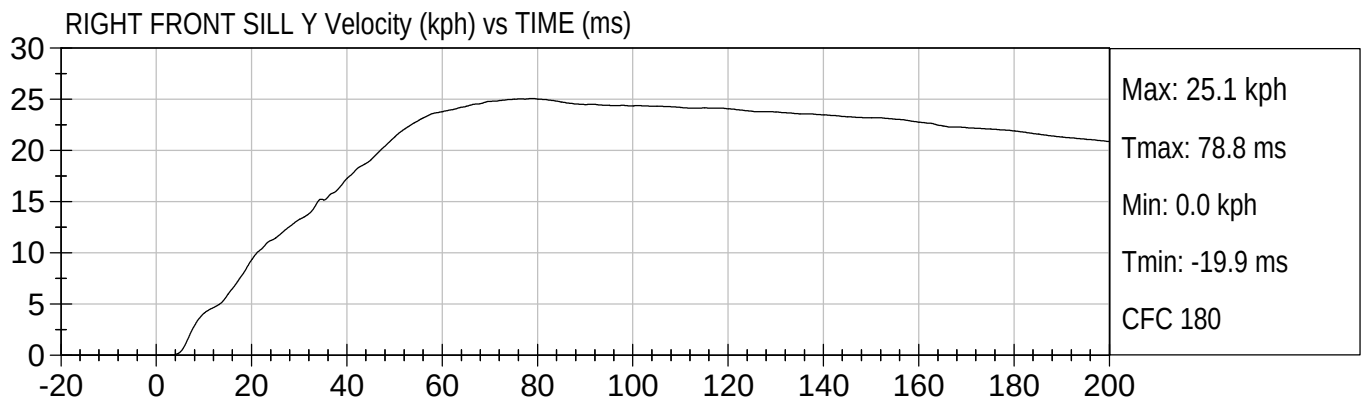
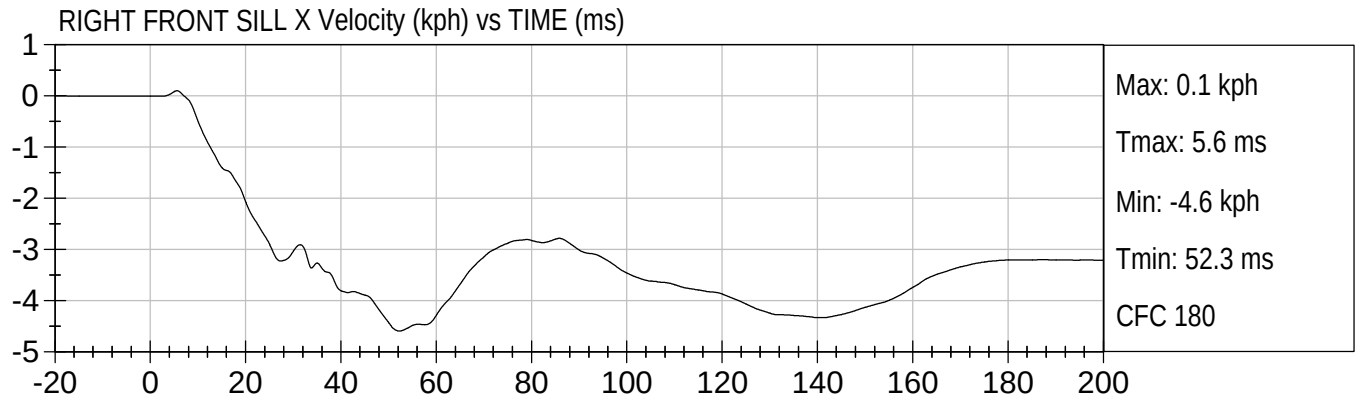


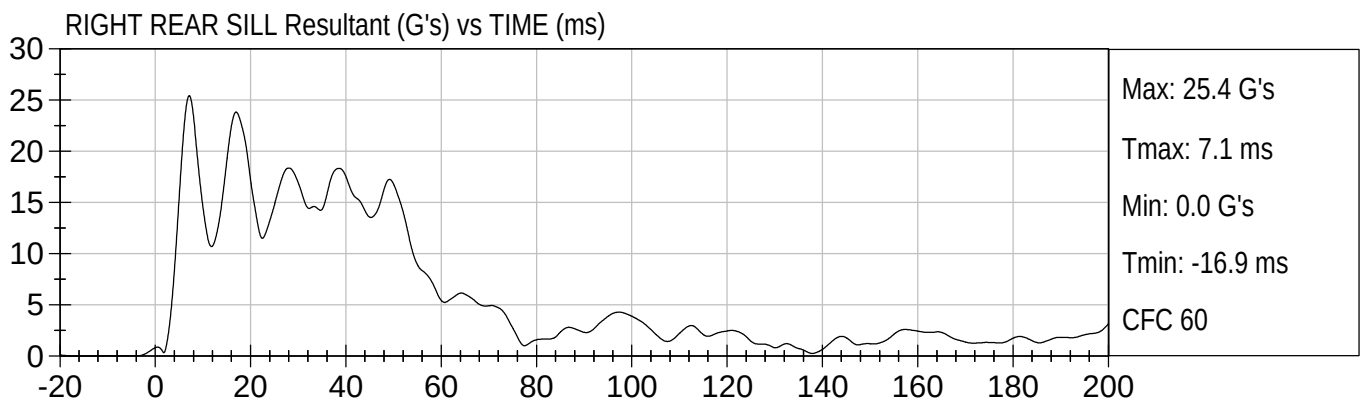
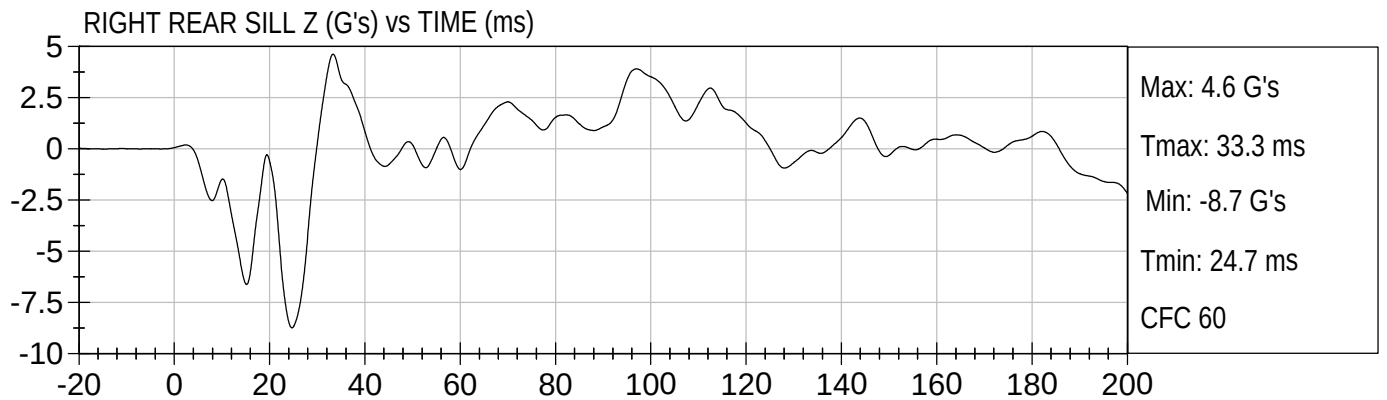
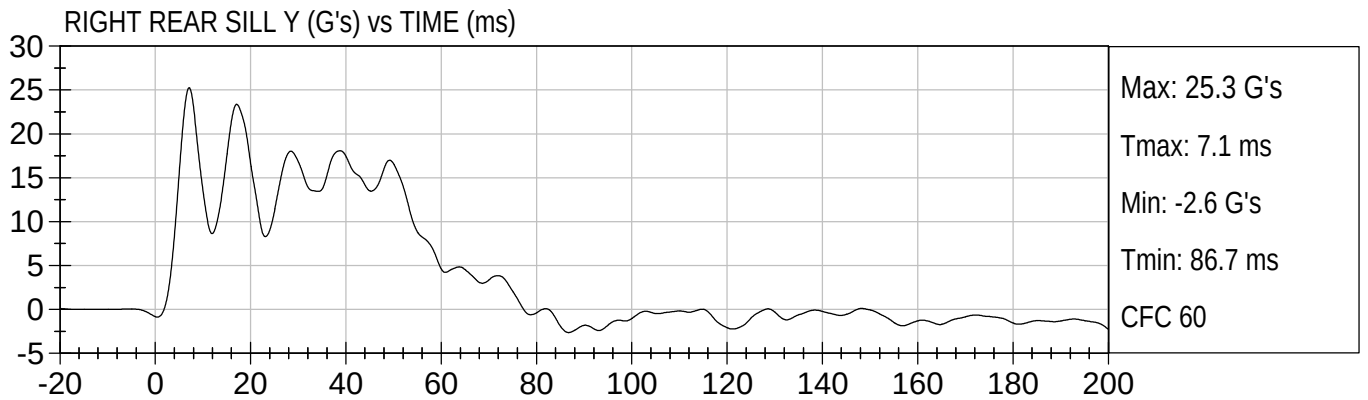
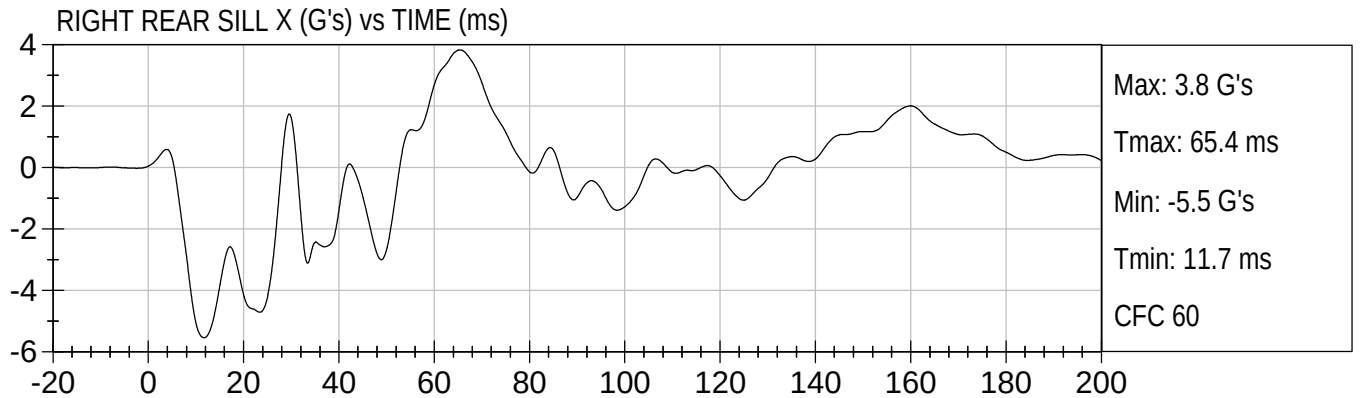


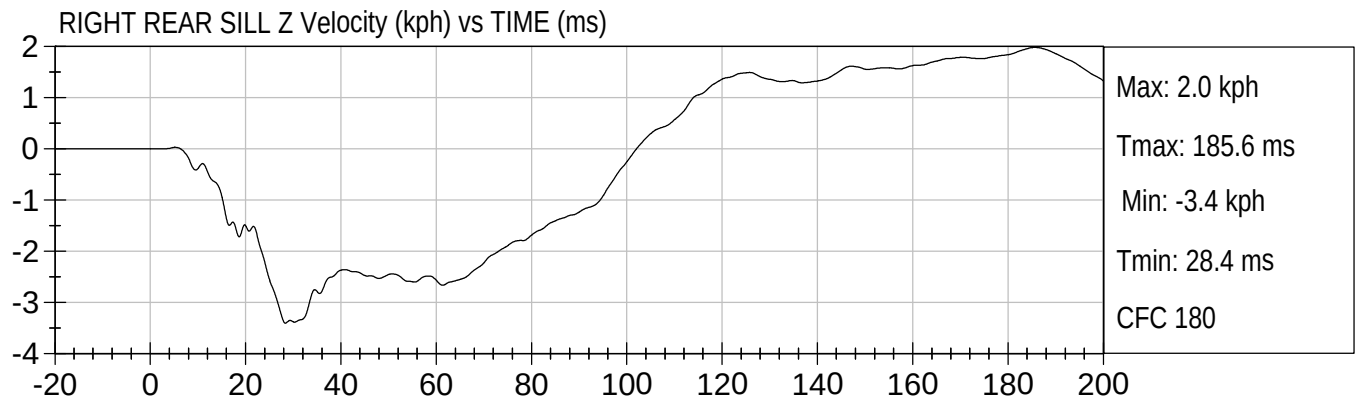
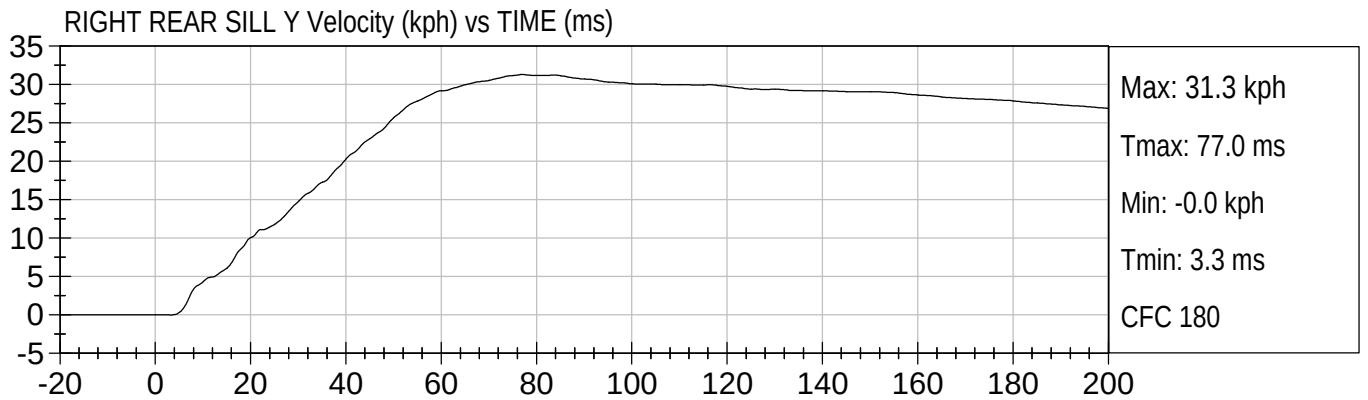
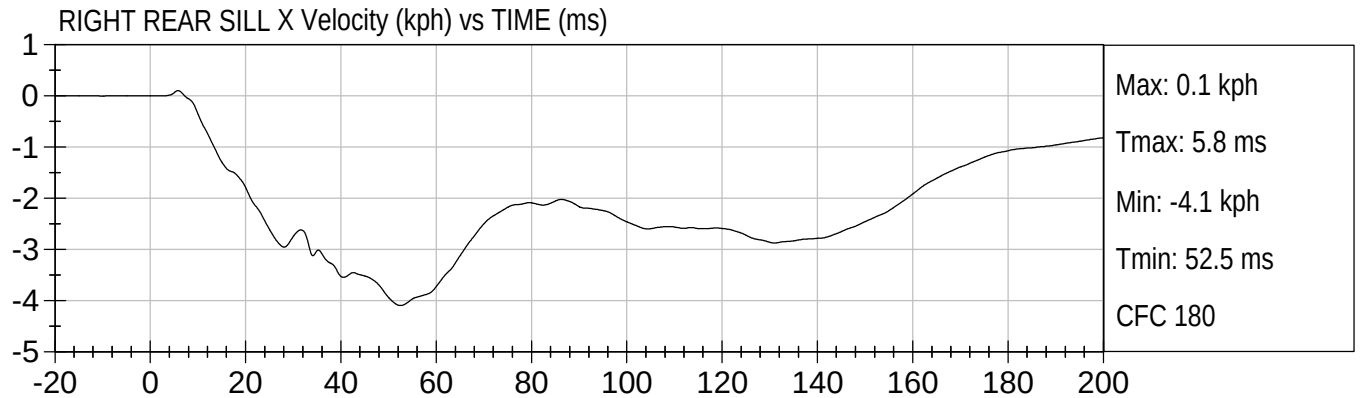


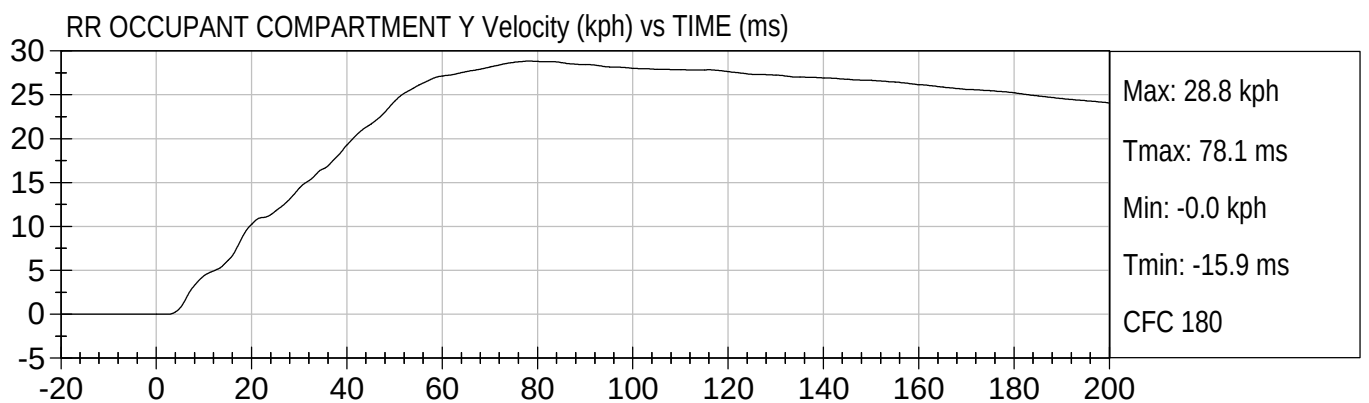
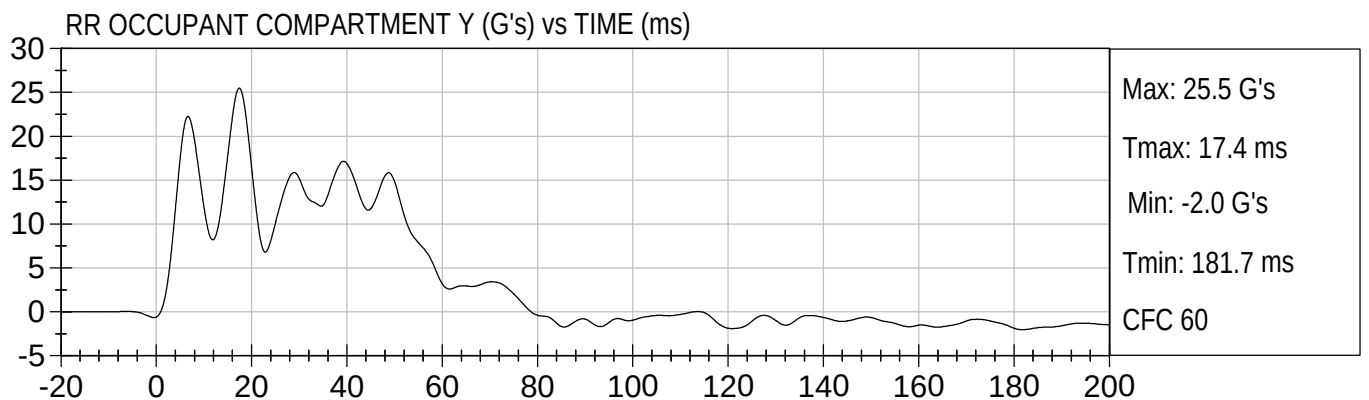
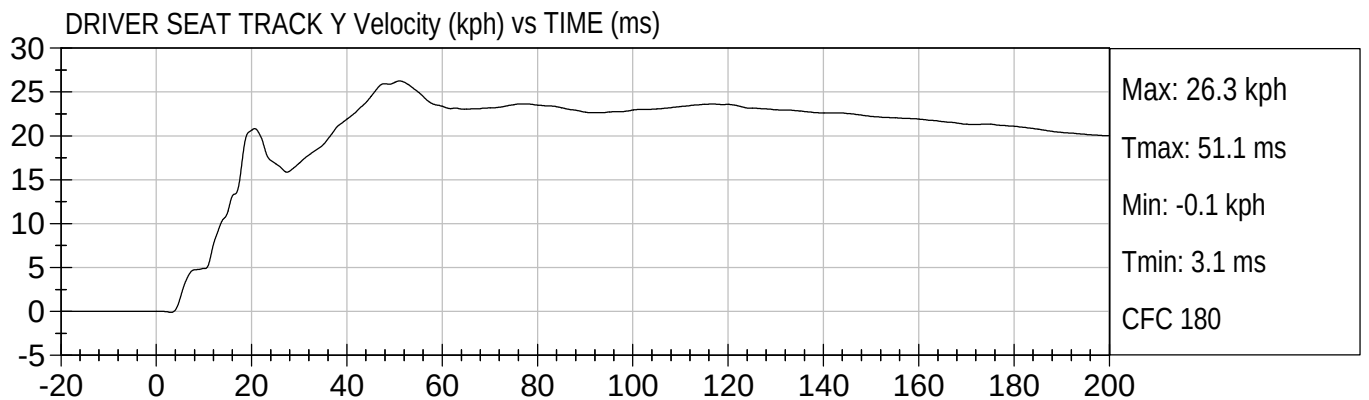
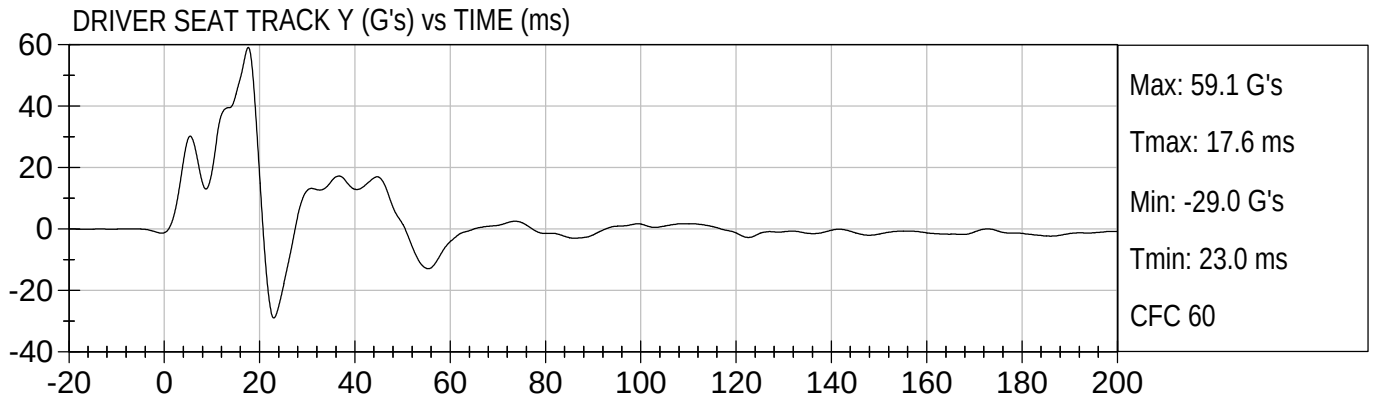


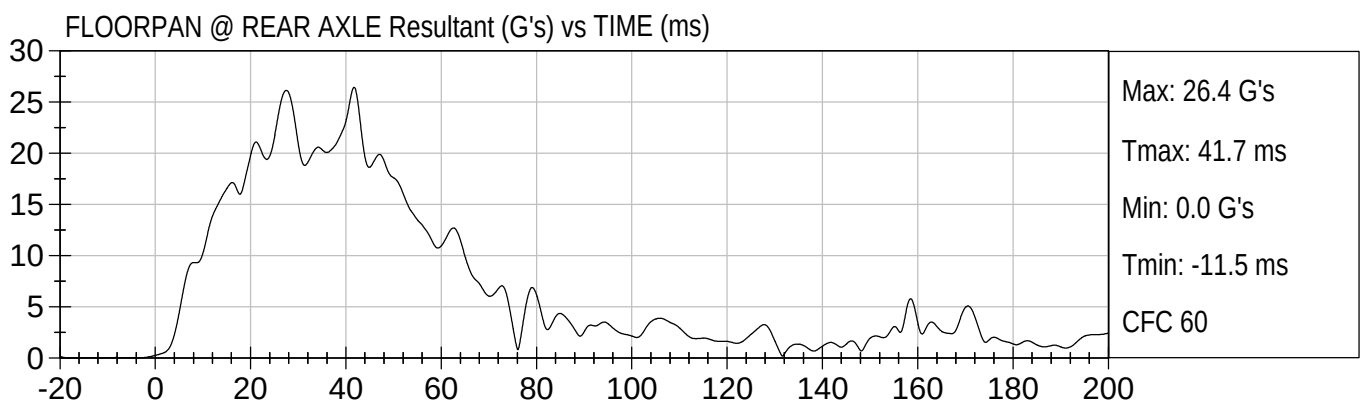
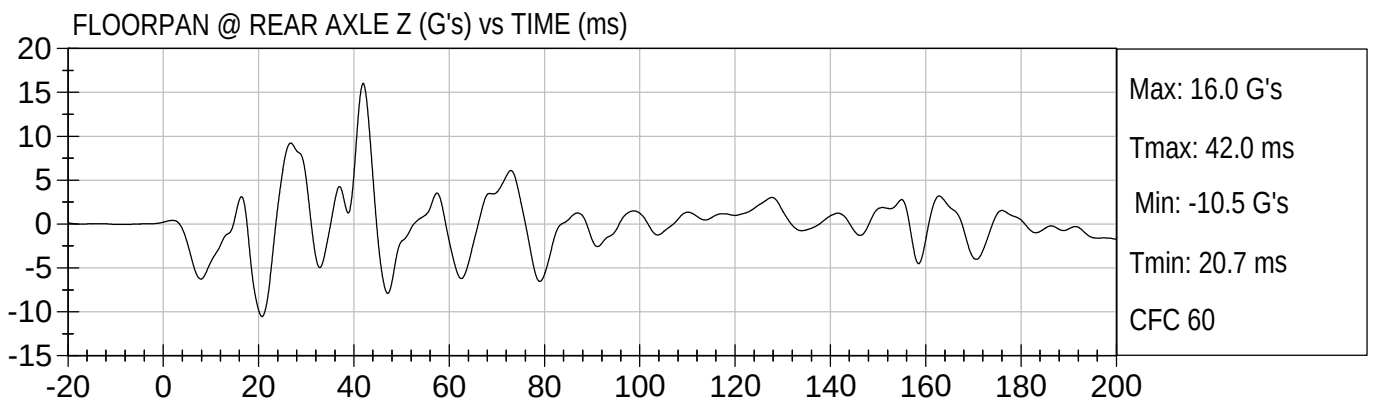
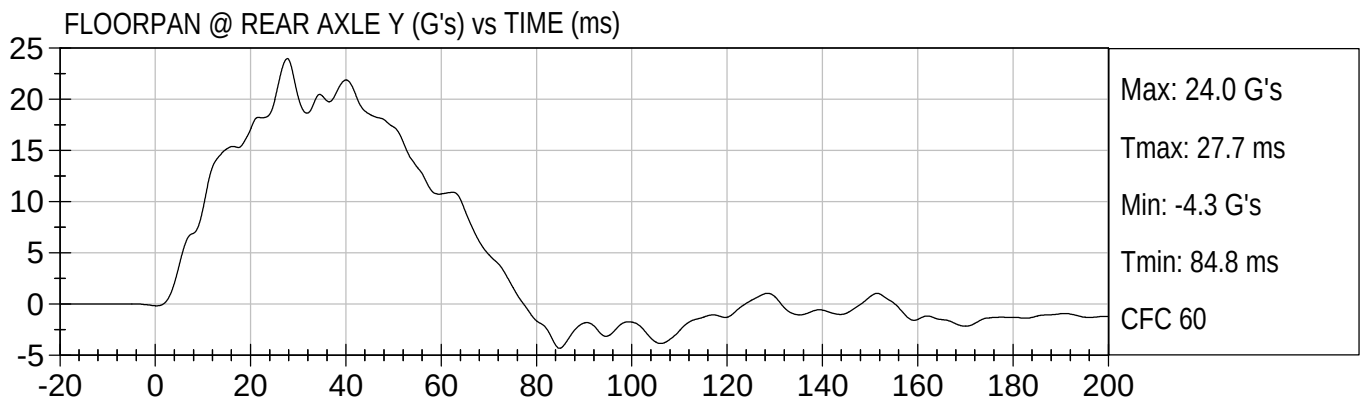
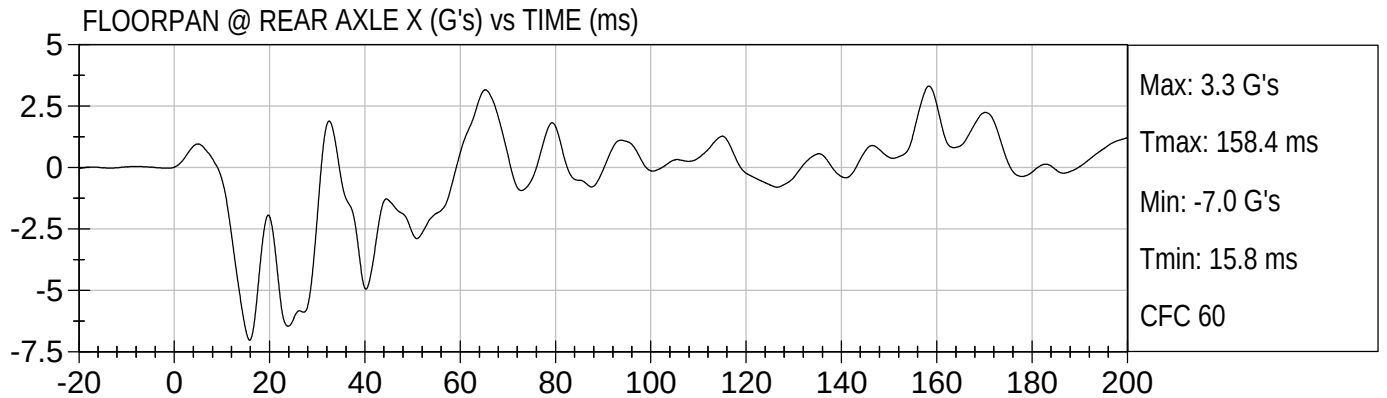


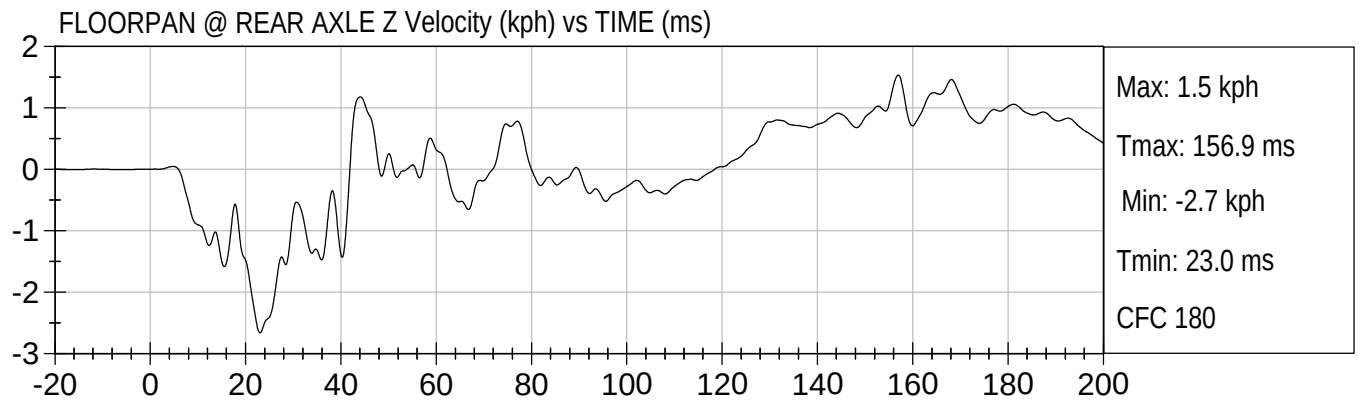
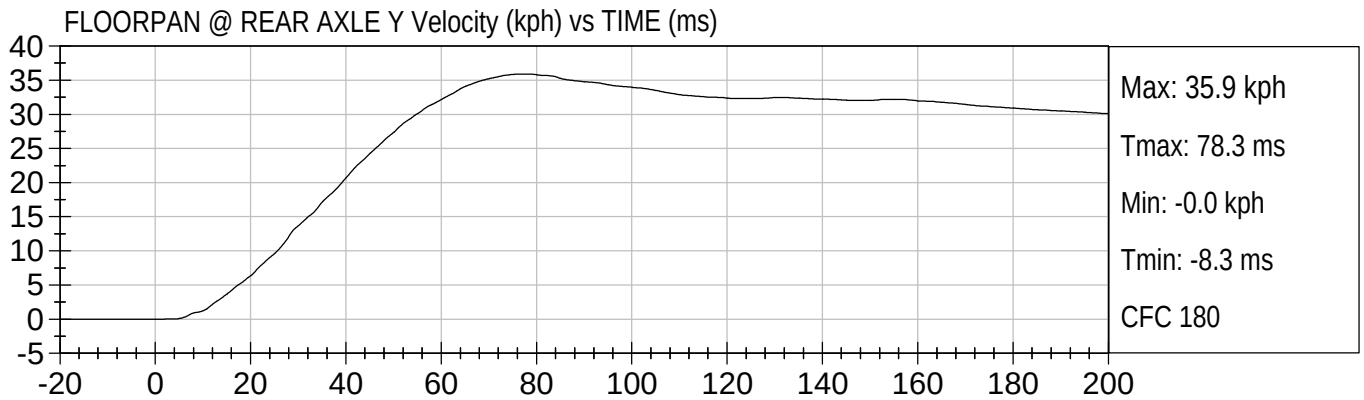
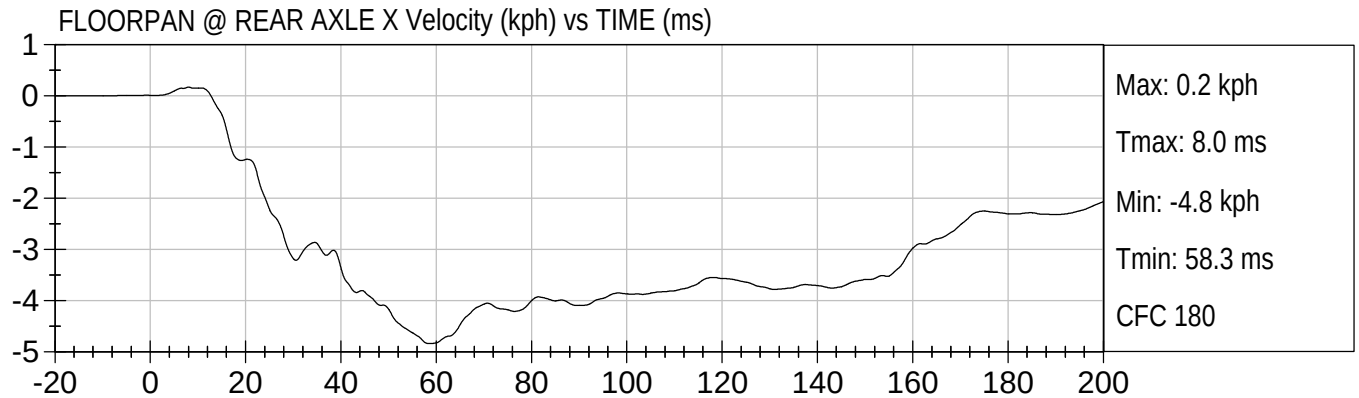


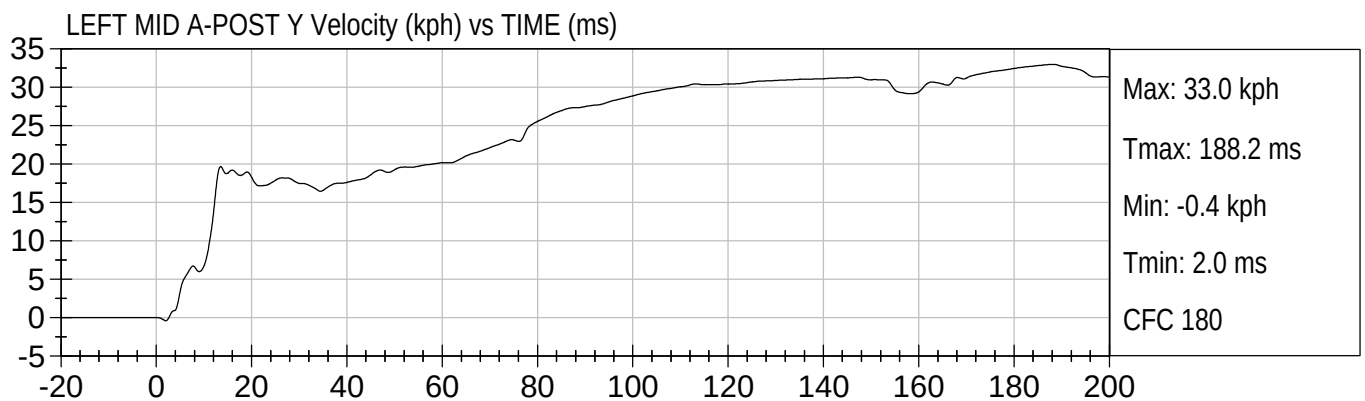
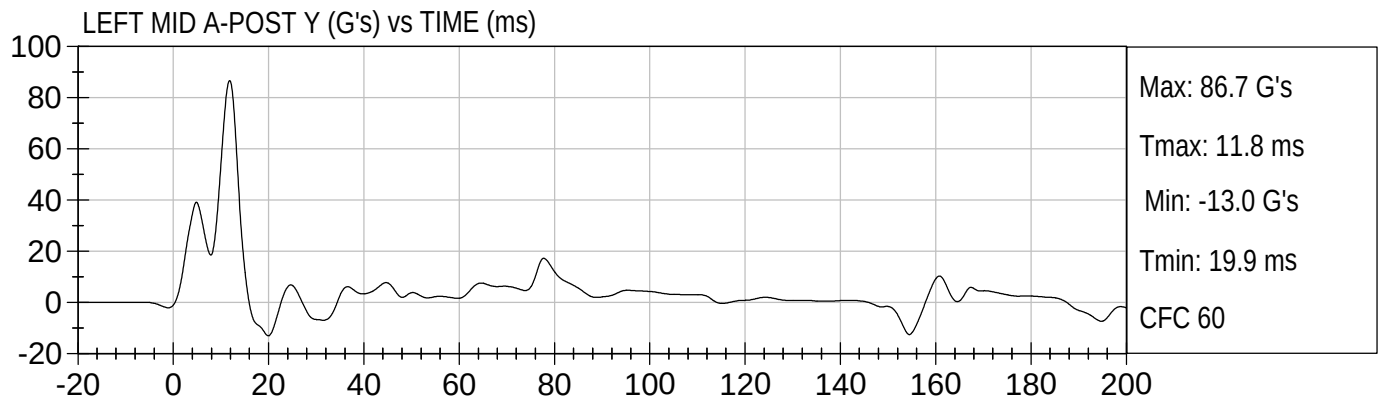
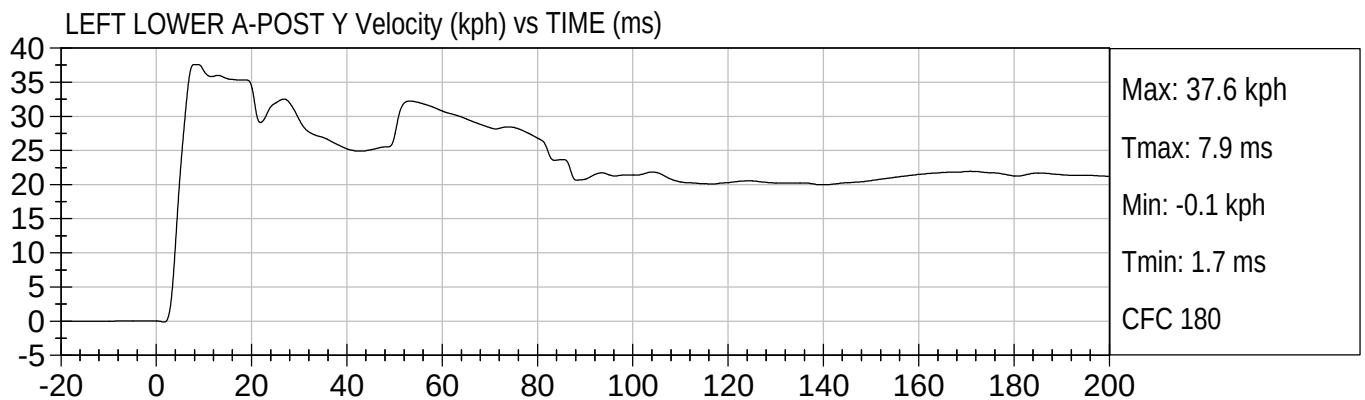
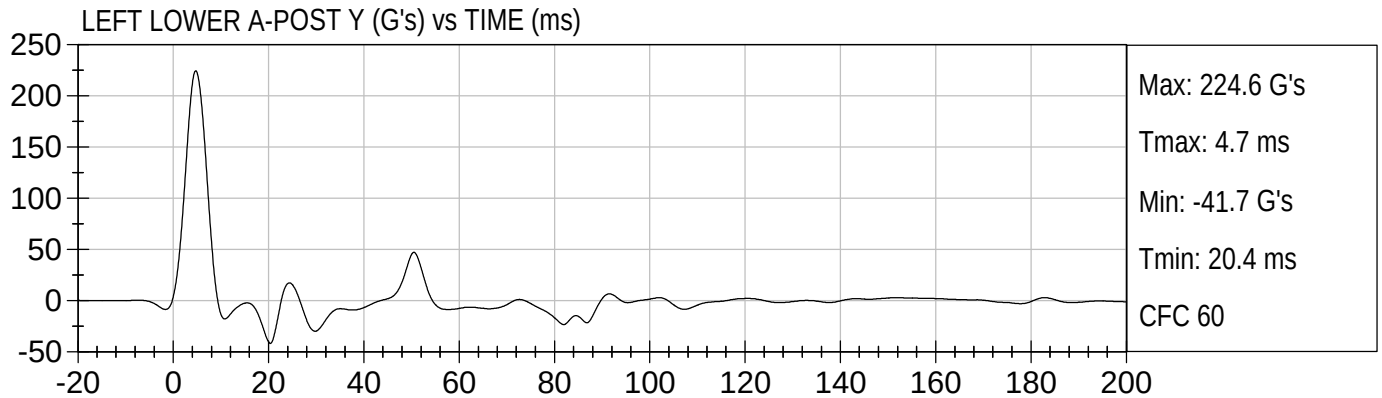


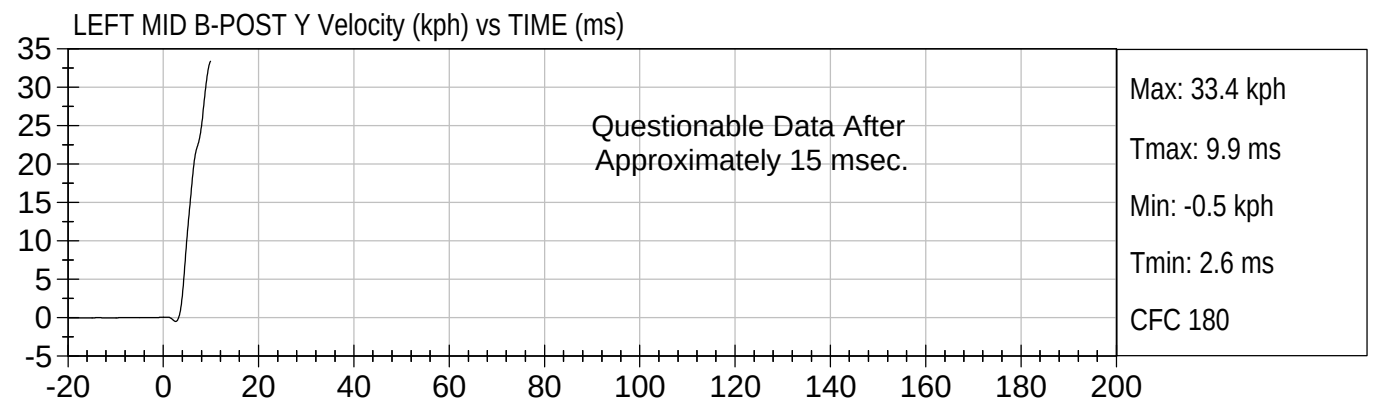
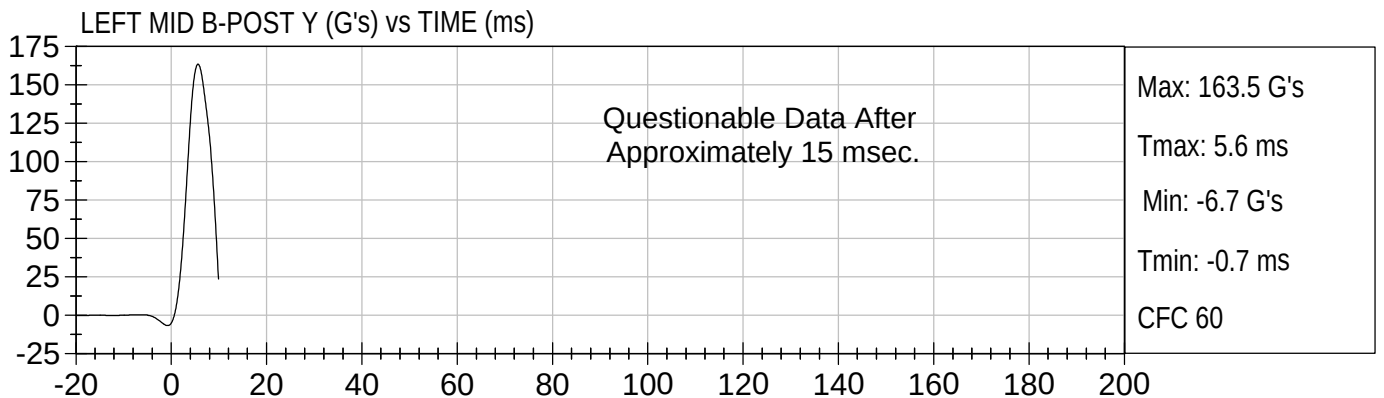
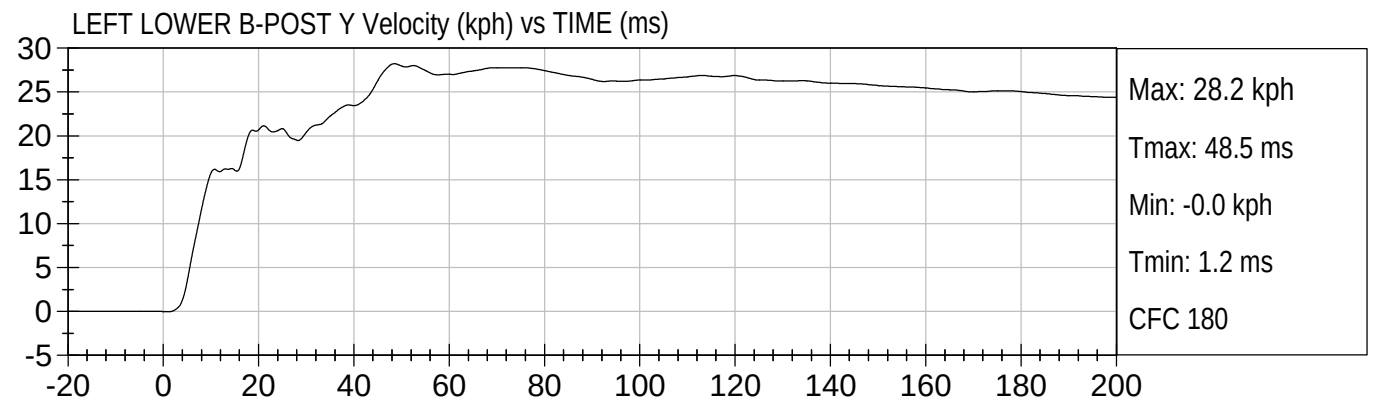
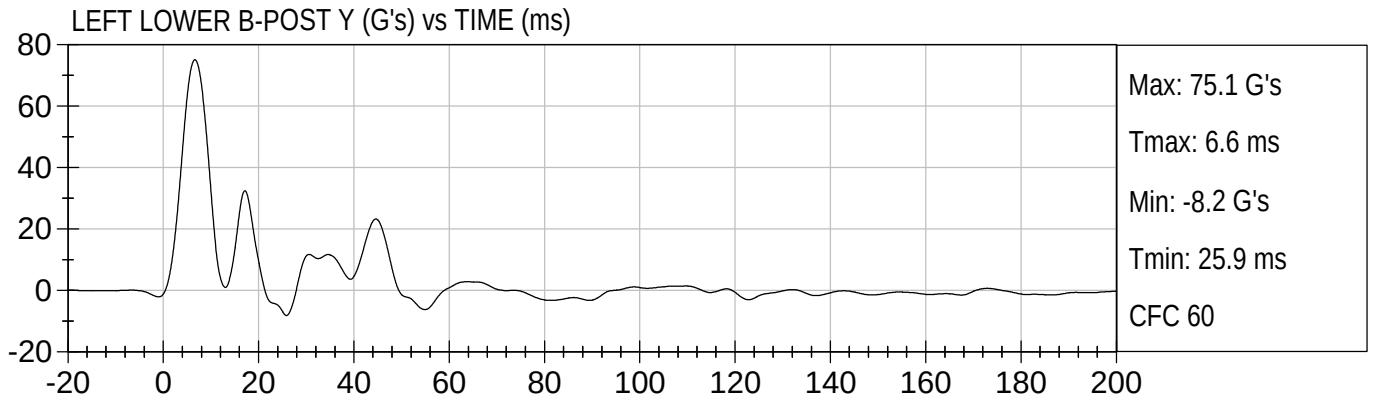


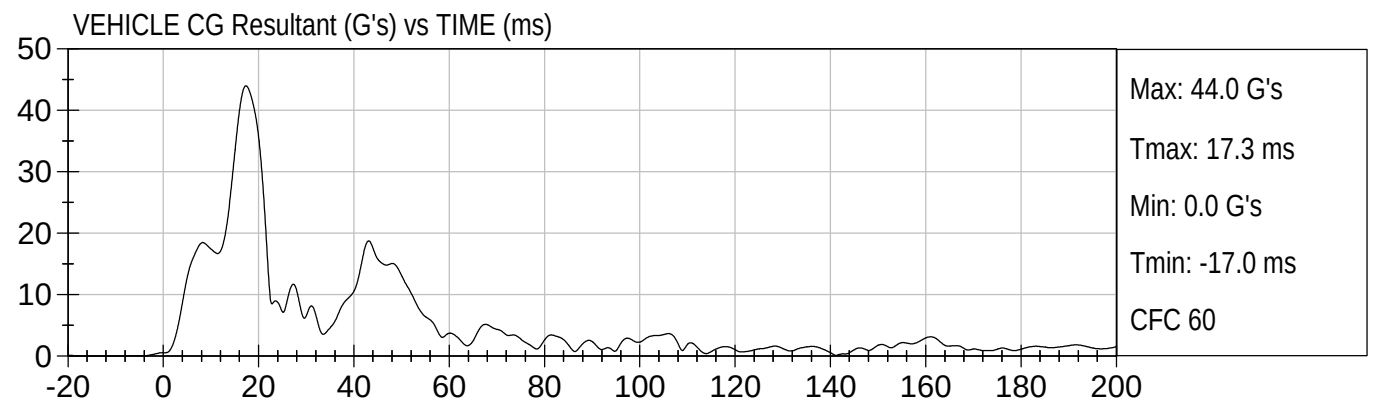
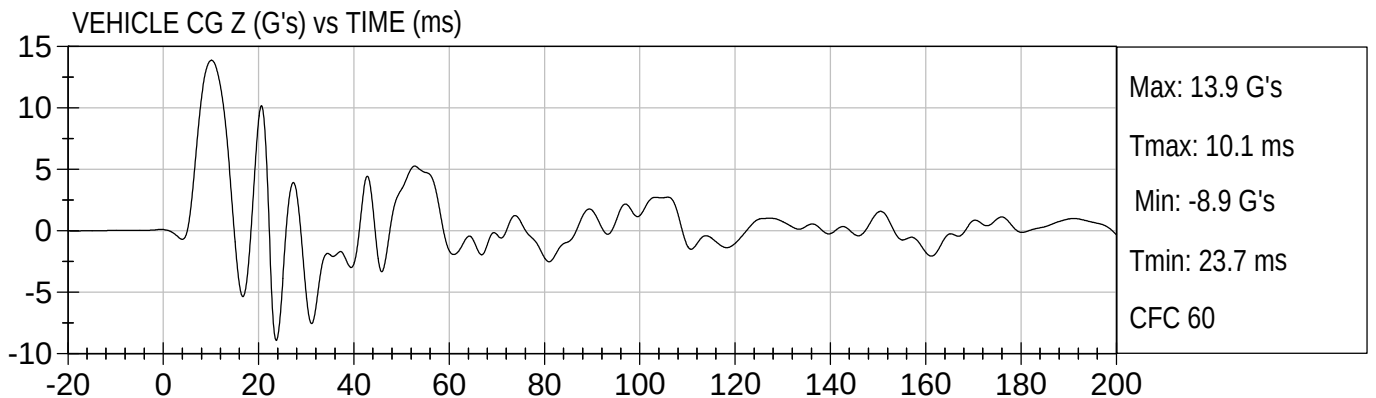
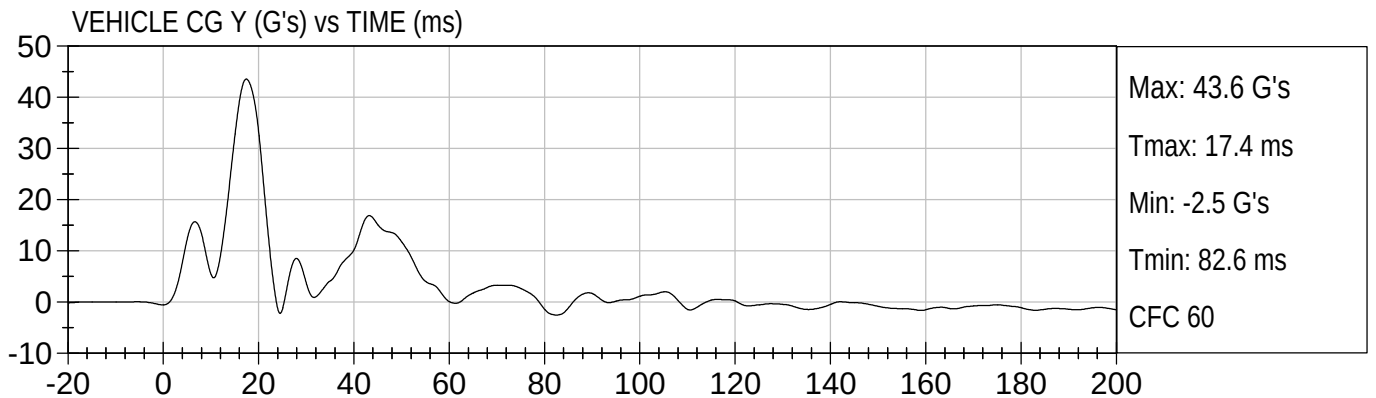
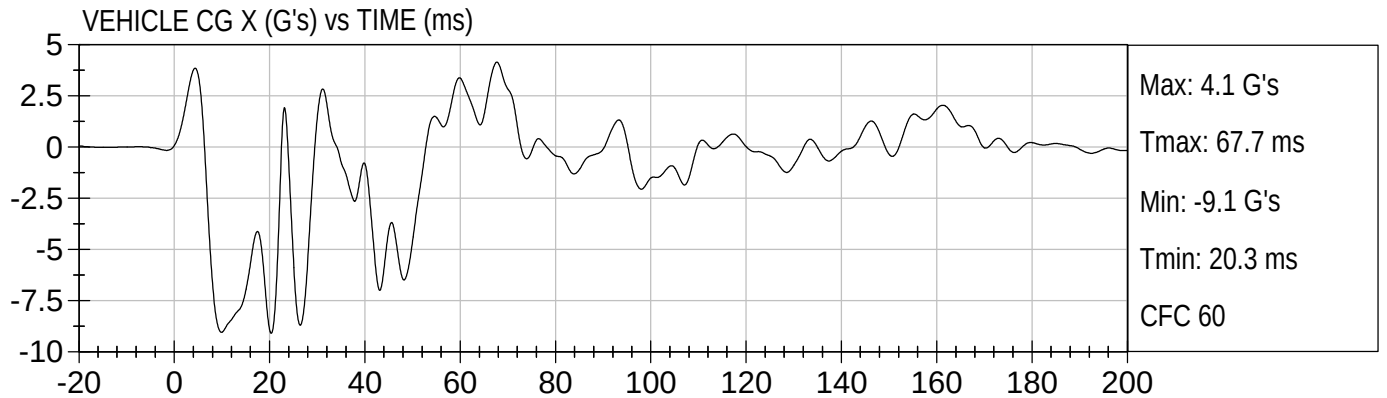


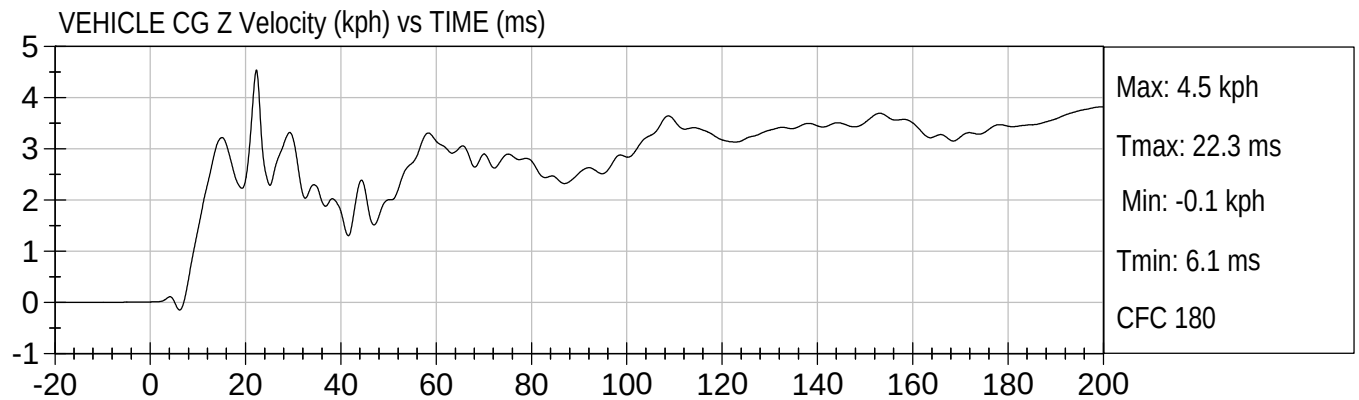
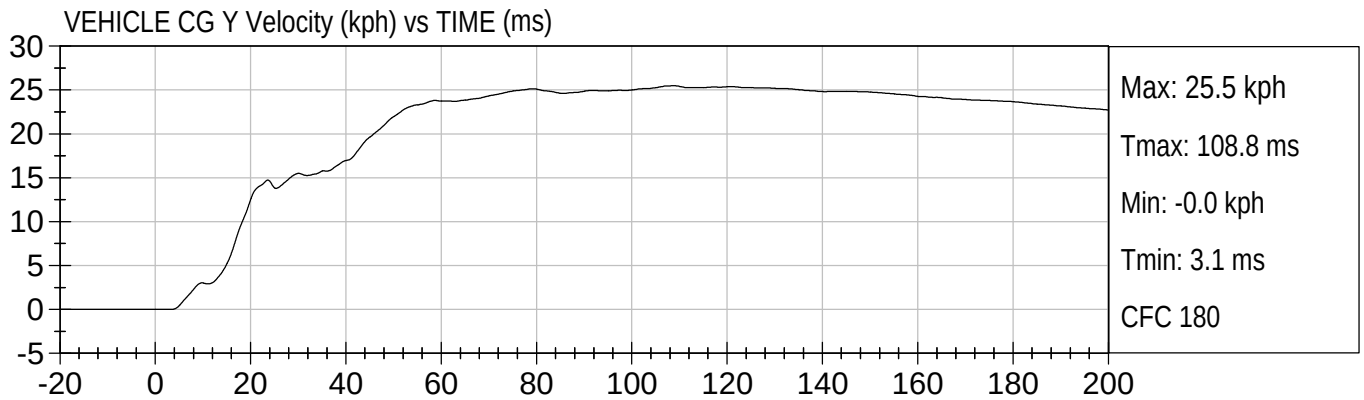
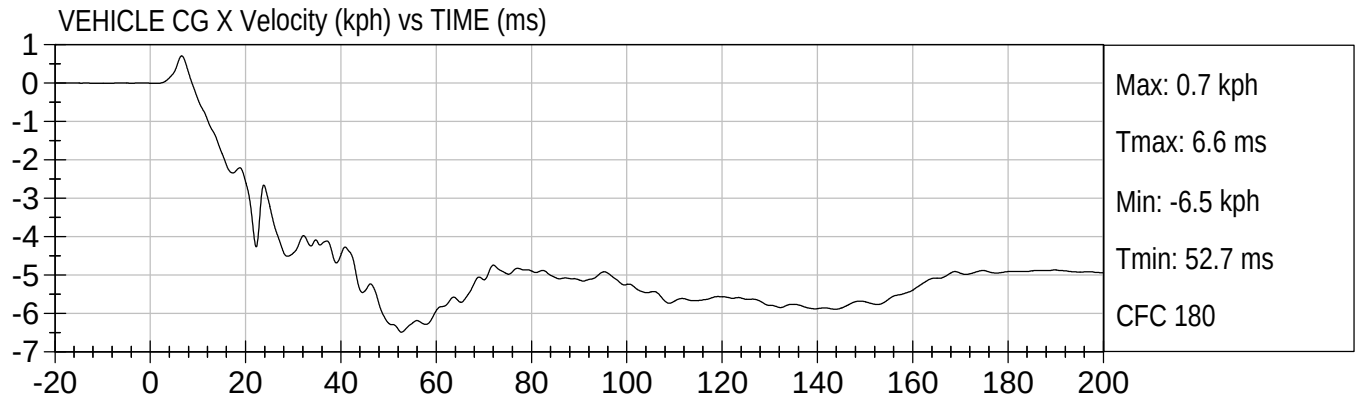


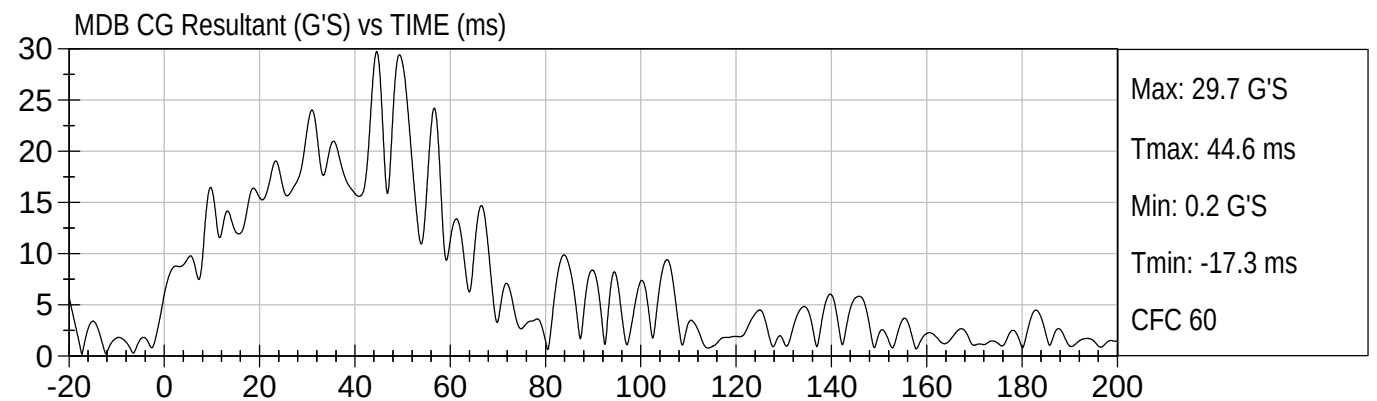
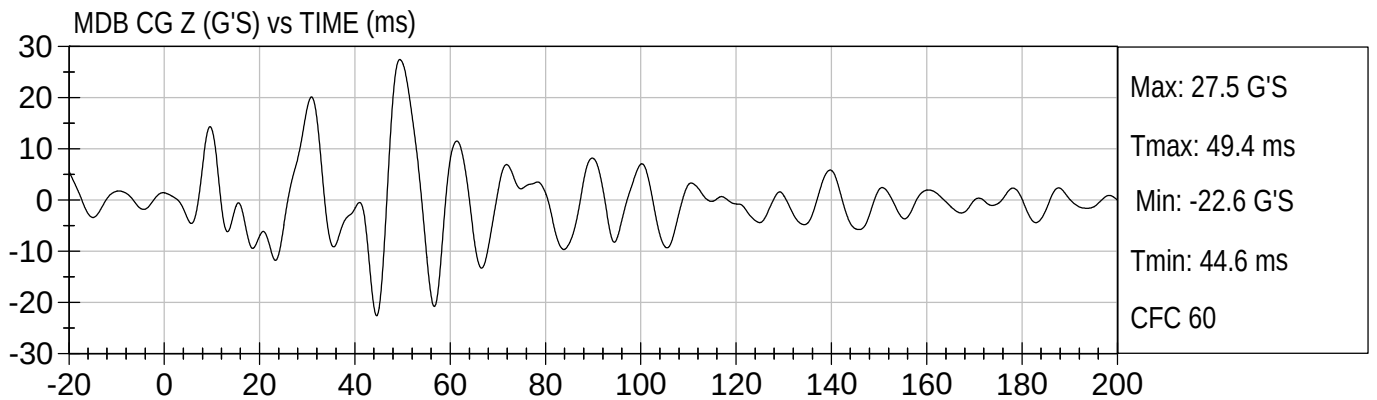
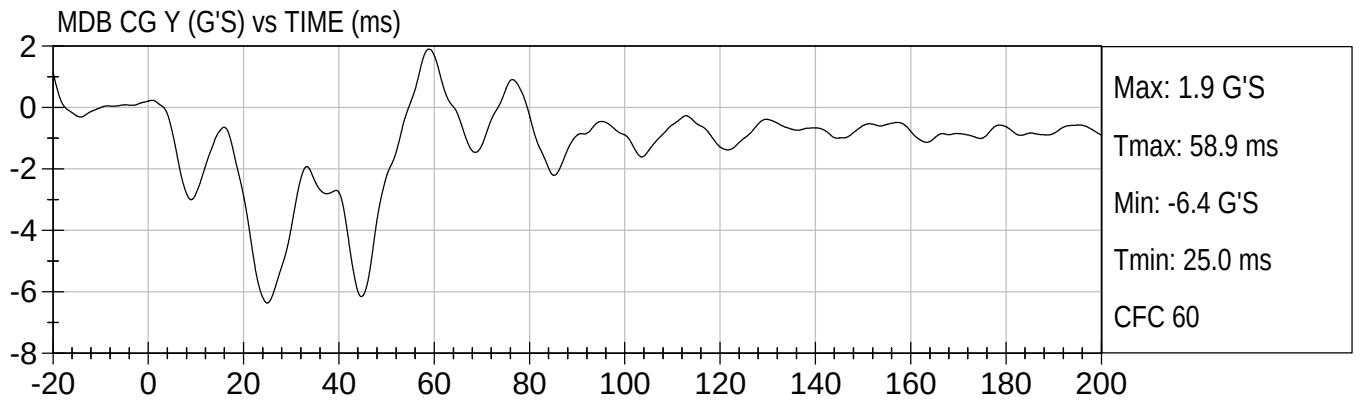
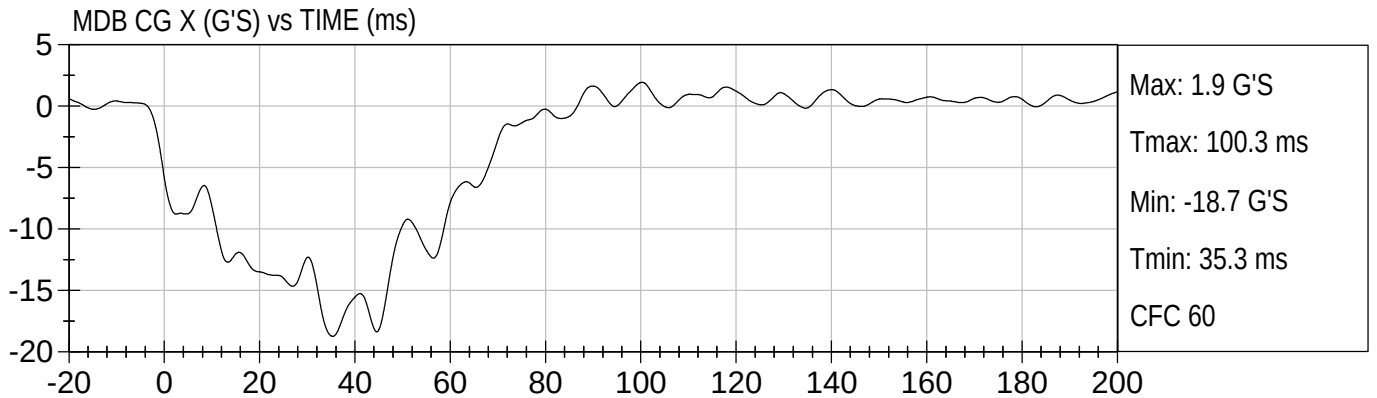






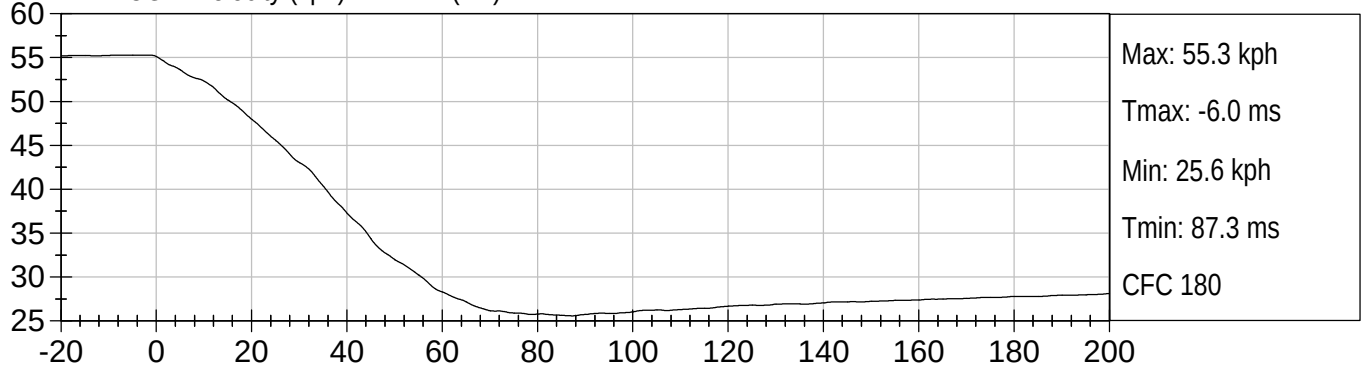




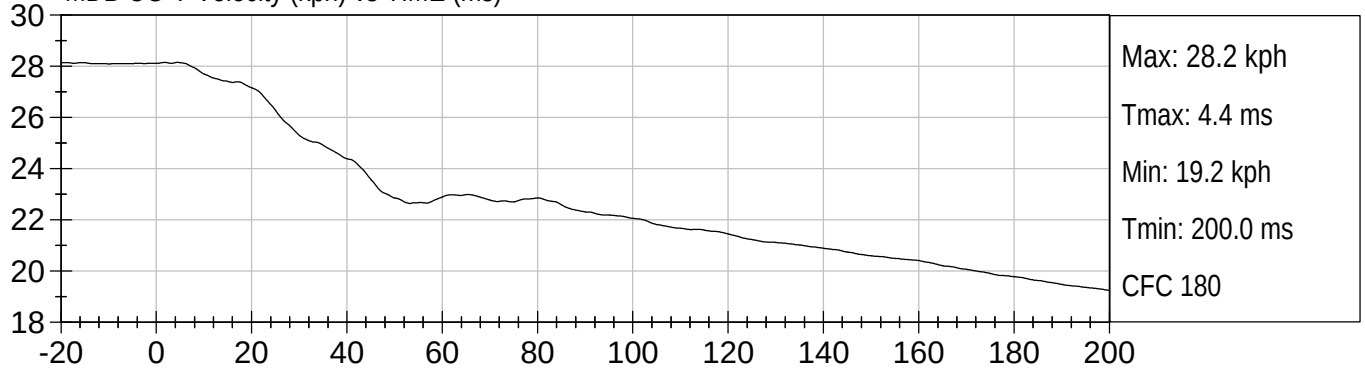




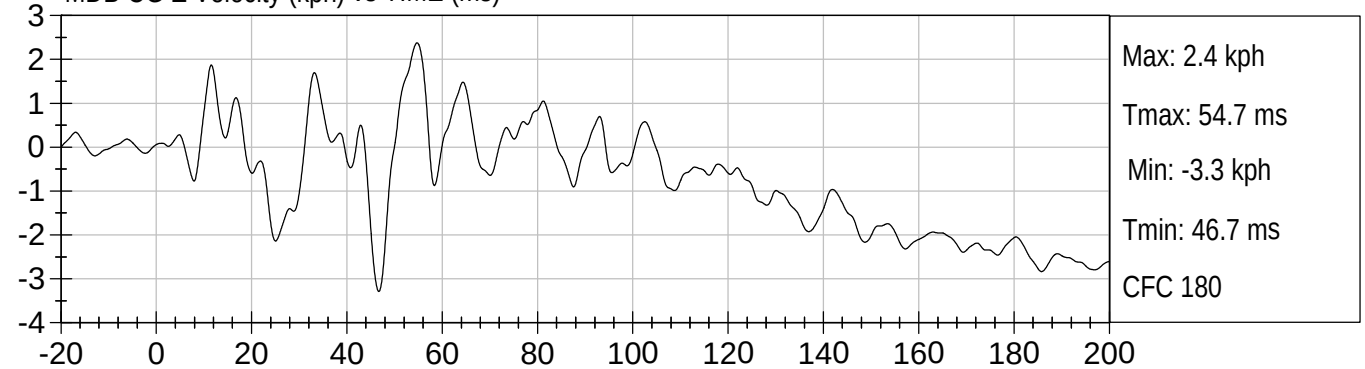
MDB CG X Velocity (kph) vs TIME (ms)

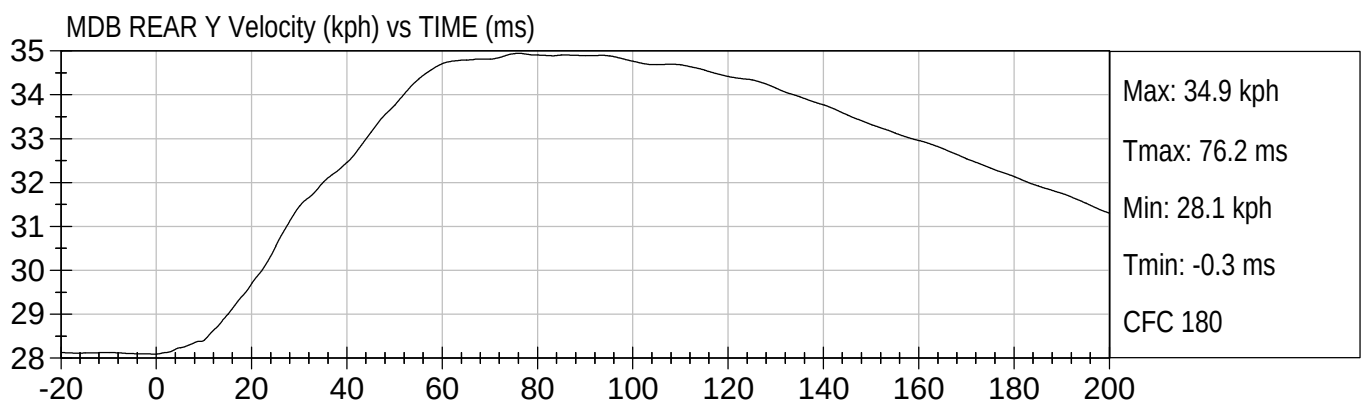
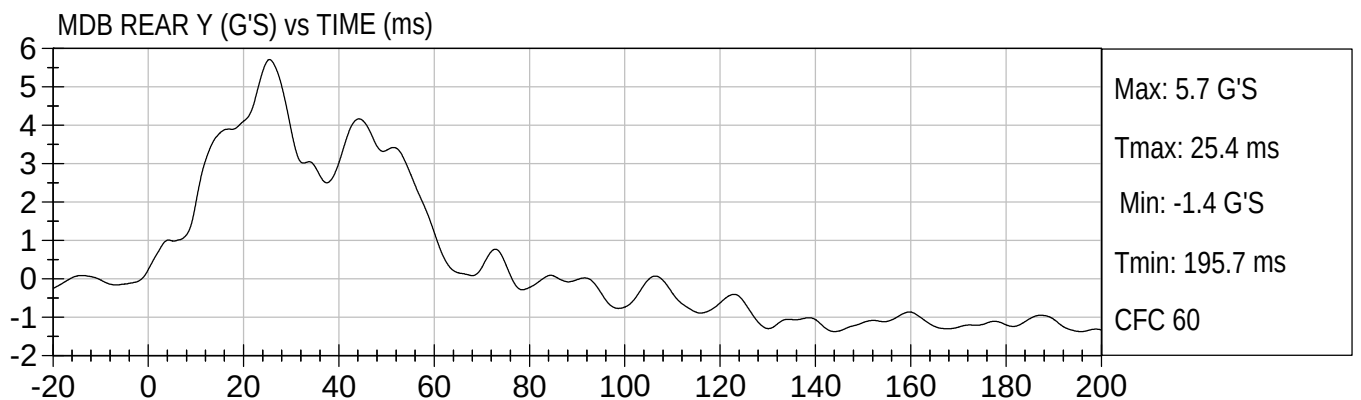
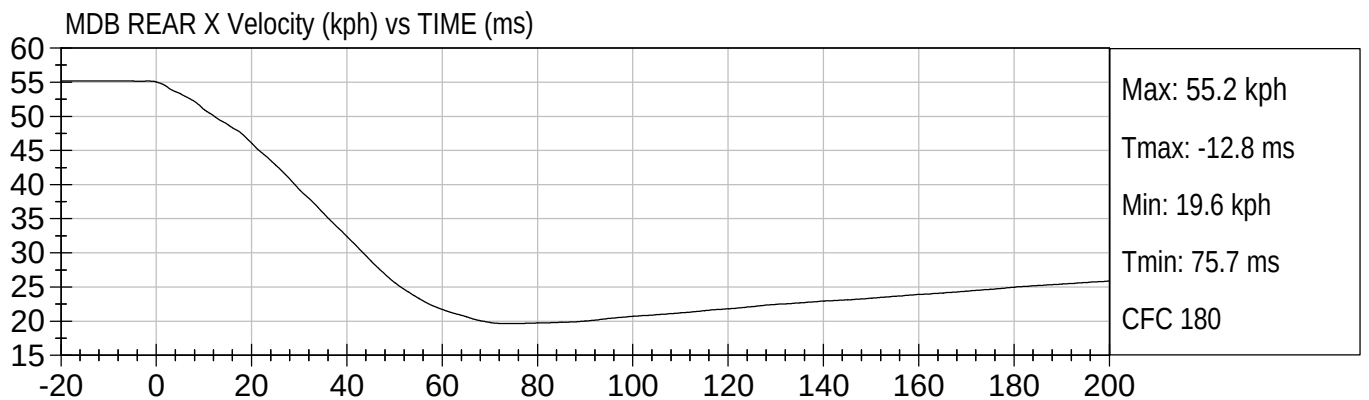
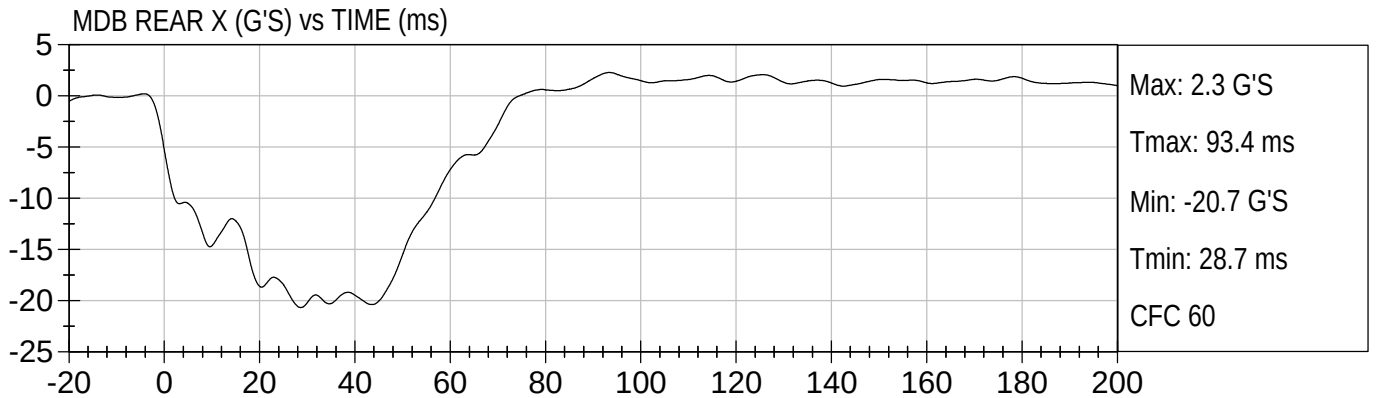


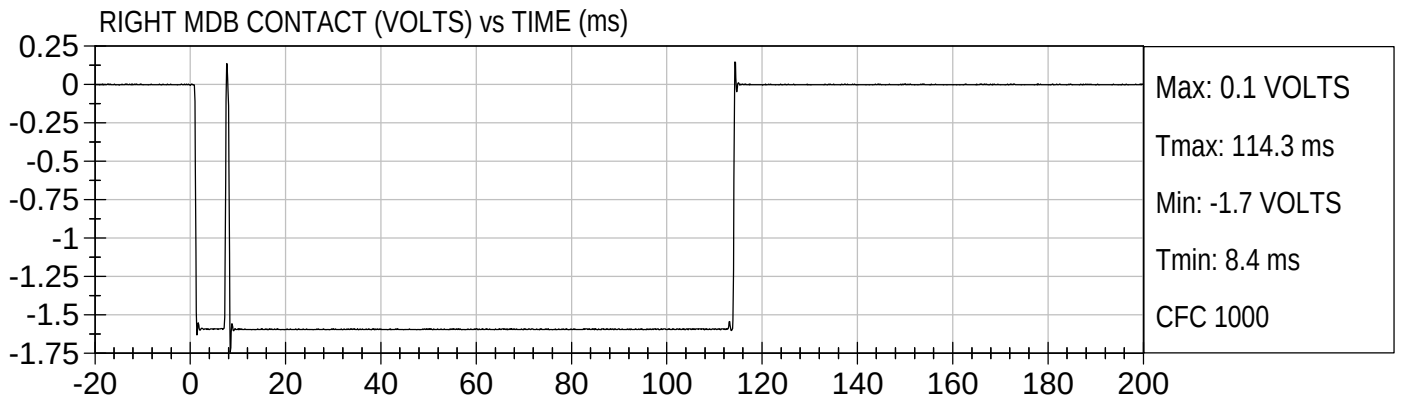
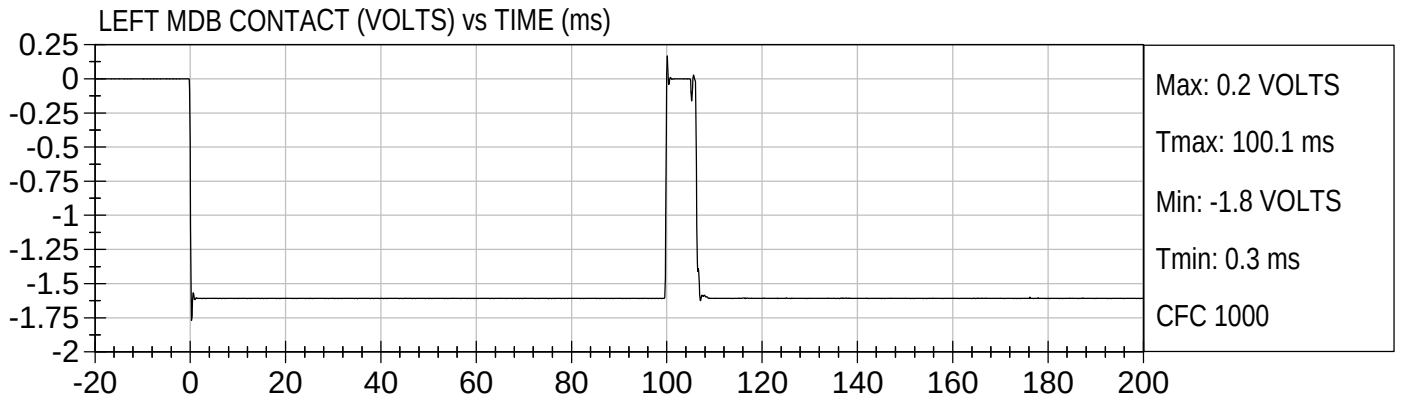
MDB CG Y Velocity (kph) vs TIME (ms)

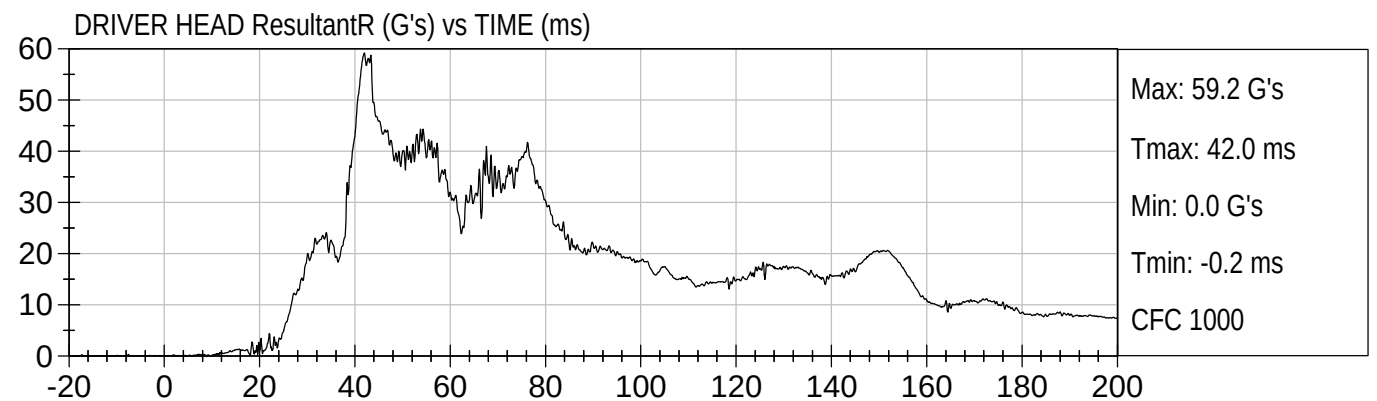
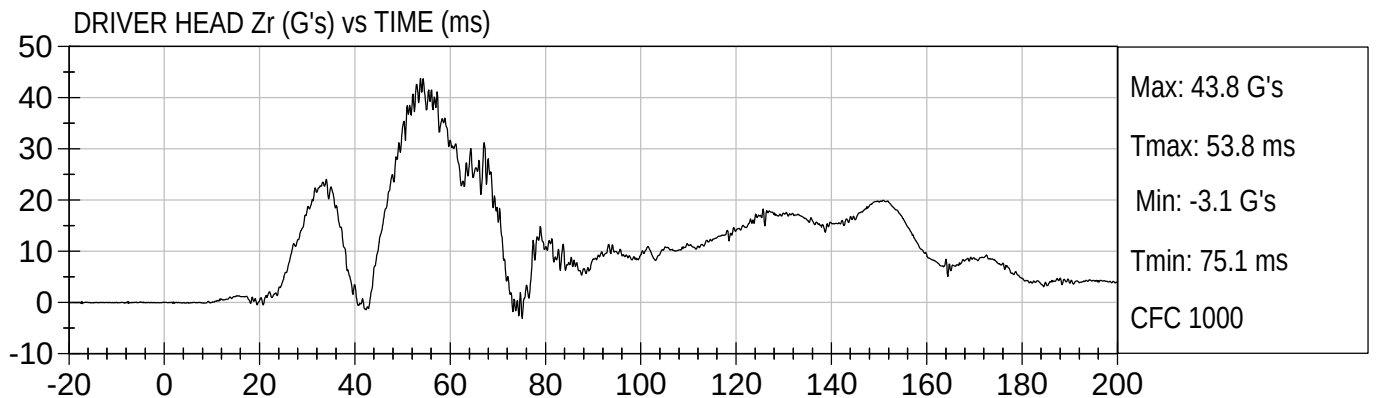
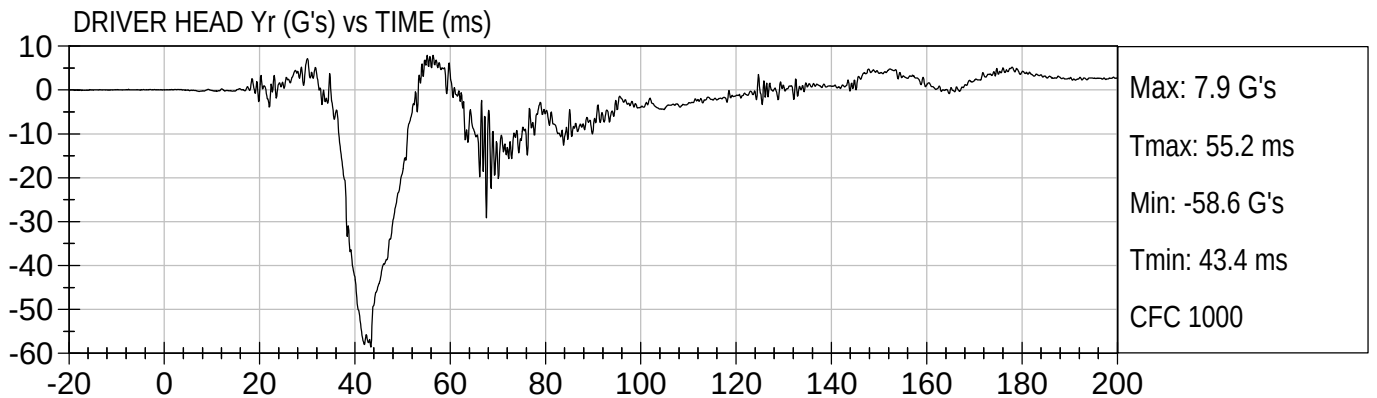
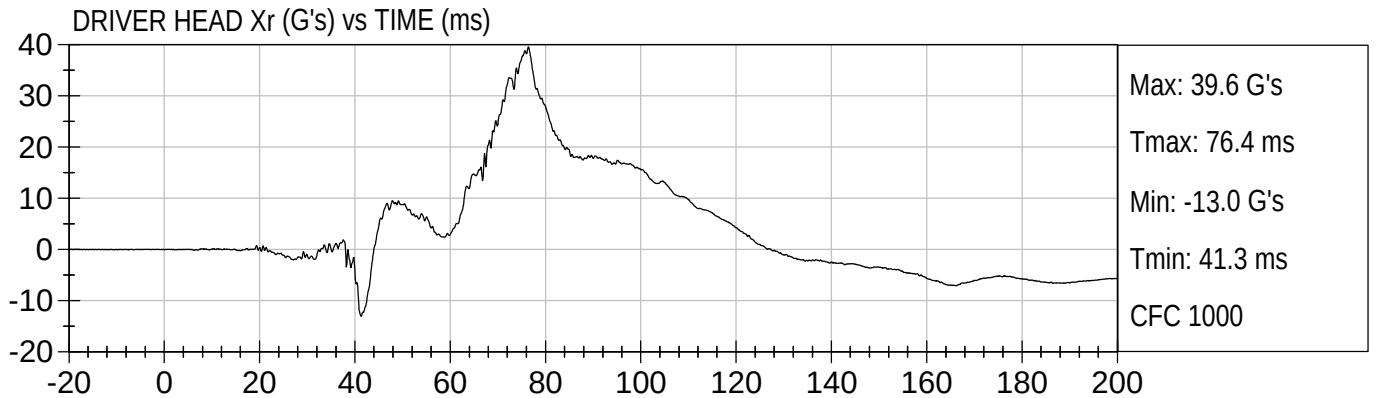


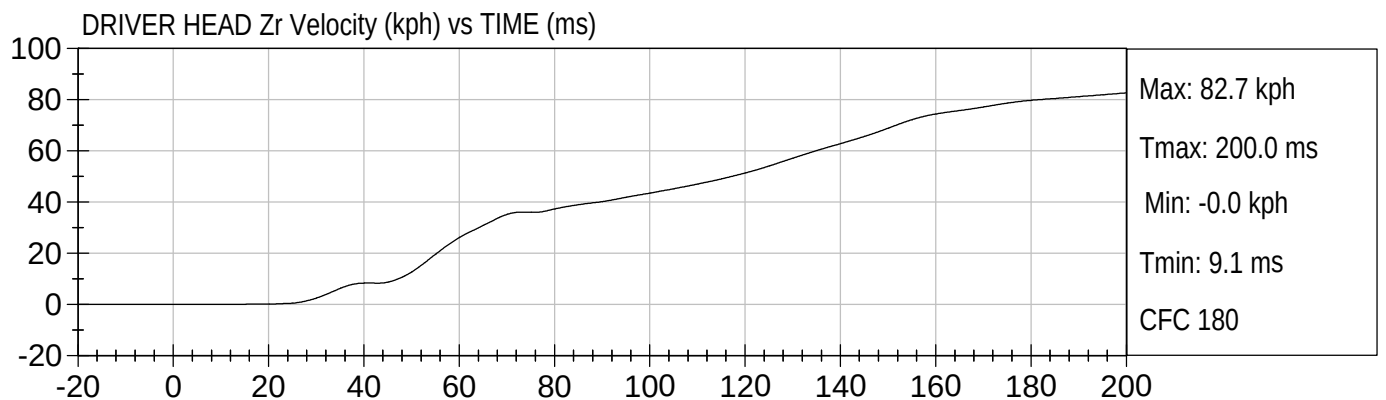
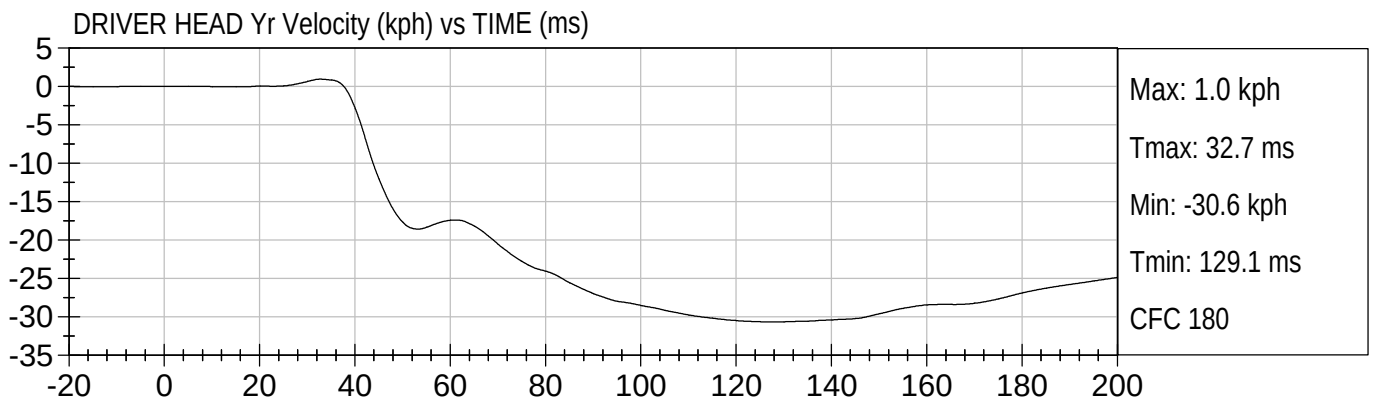
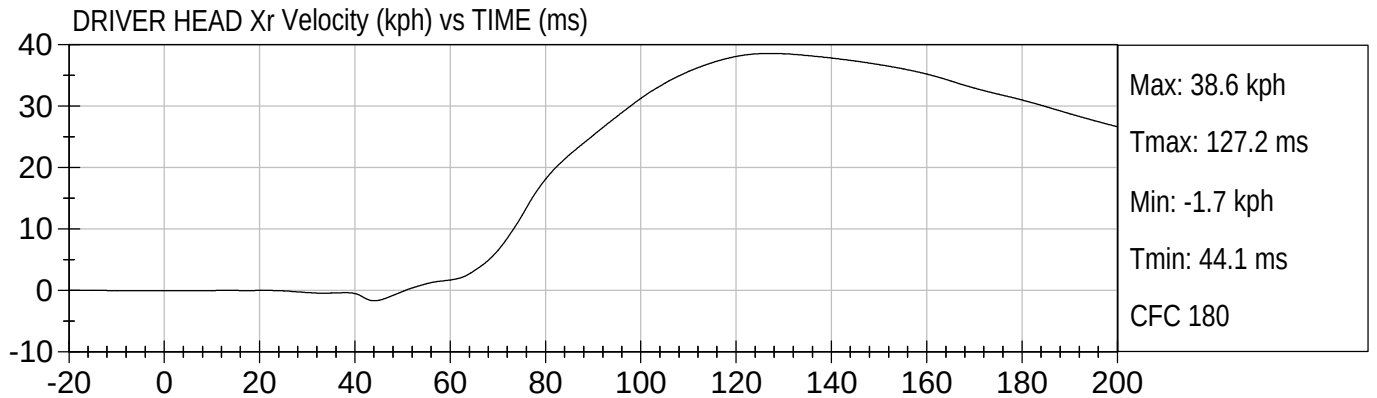
MDB CG Z Velocity (kph) vs TIME (ms)

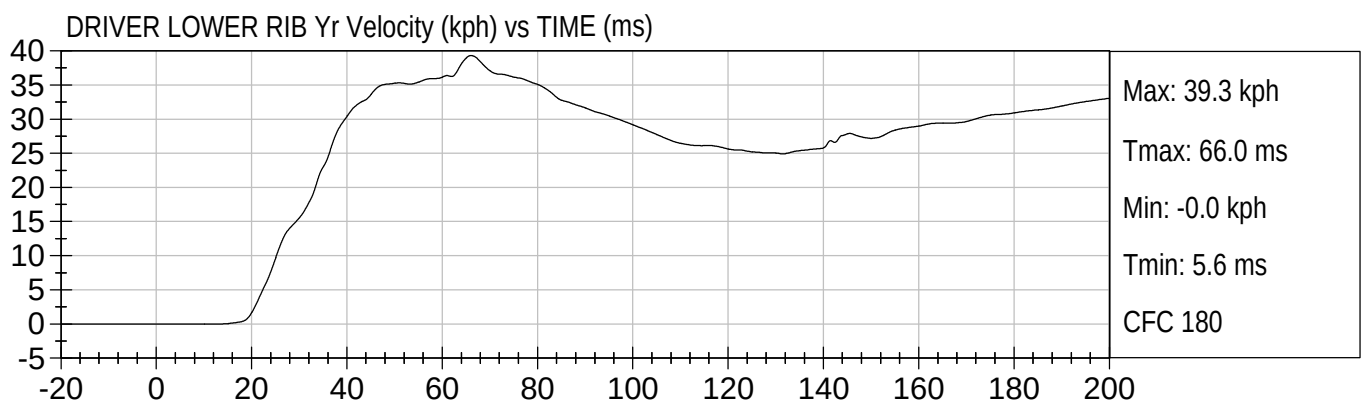
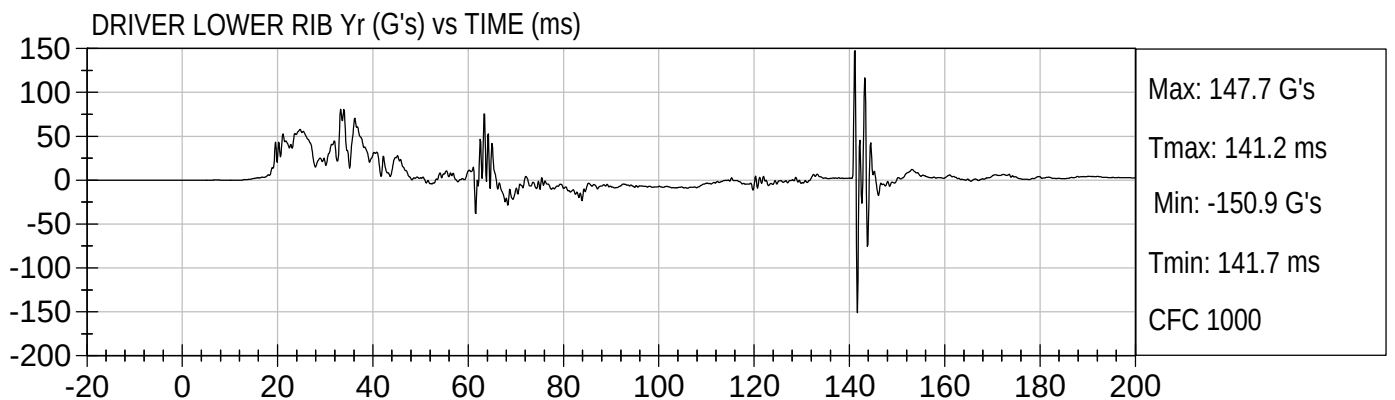
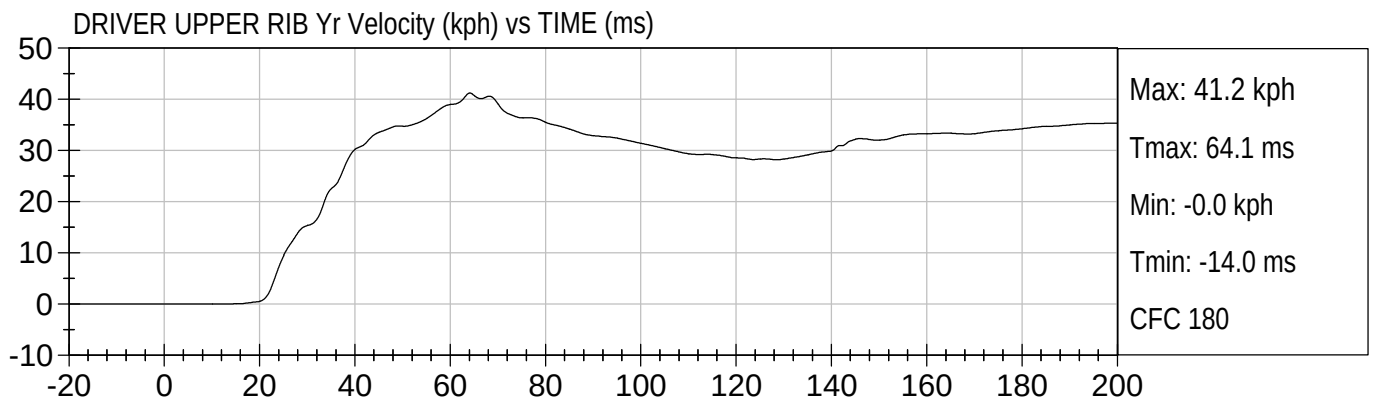
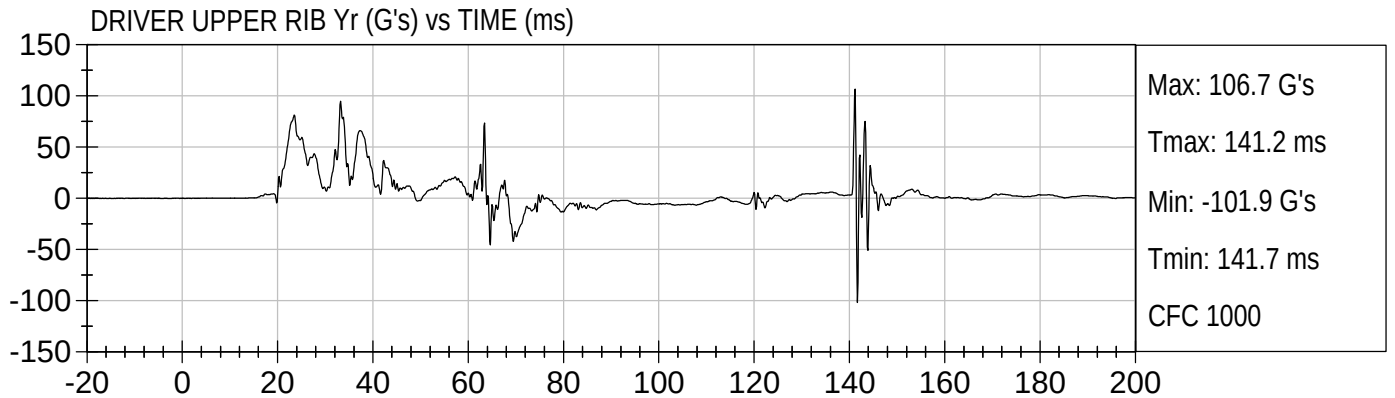


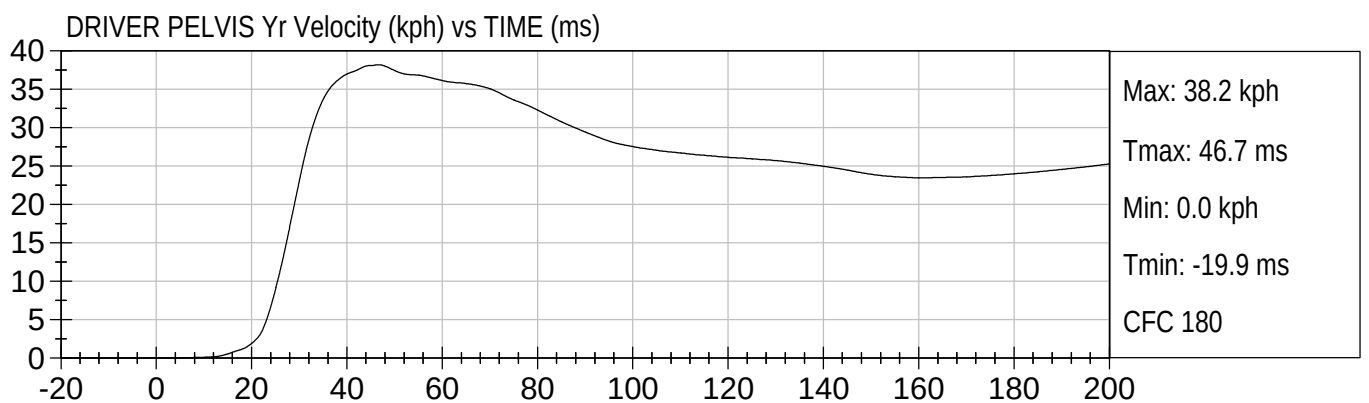
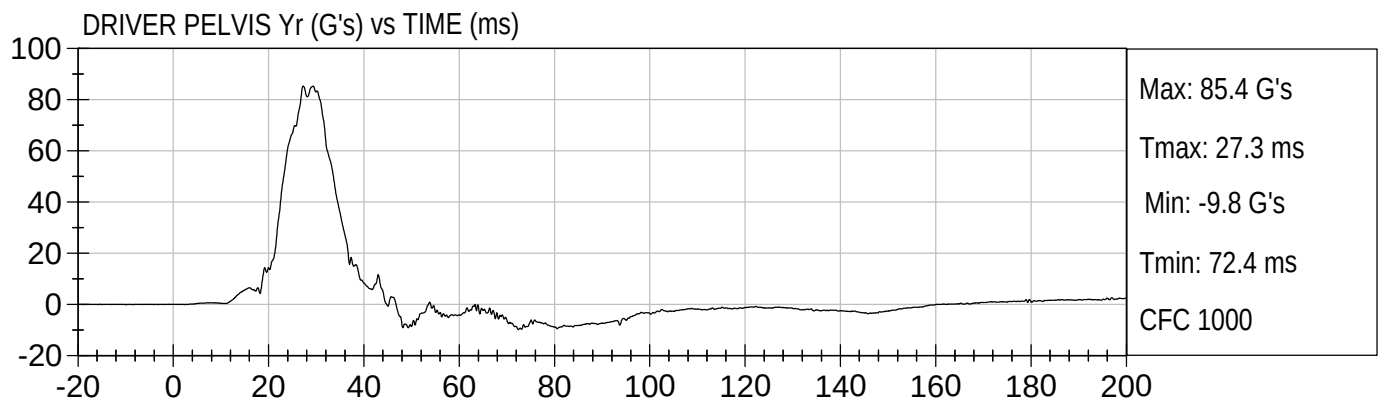
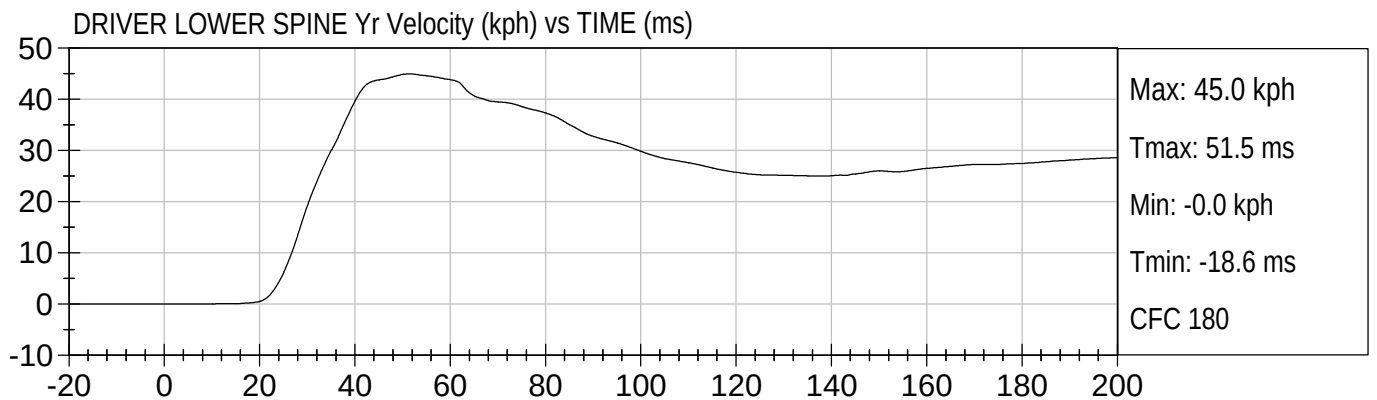
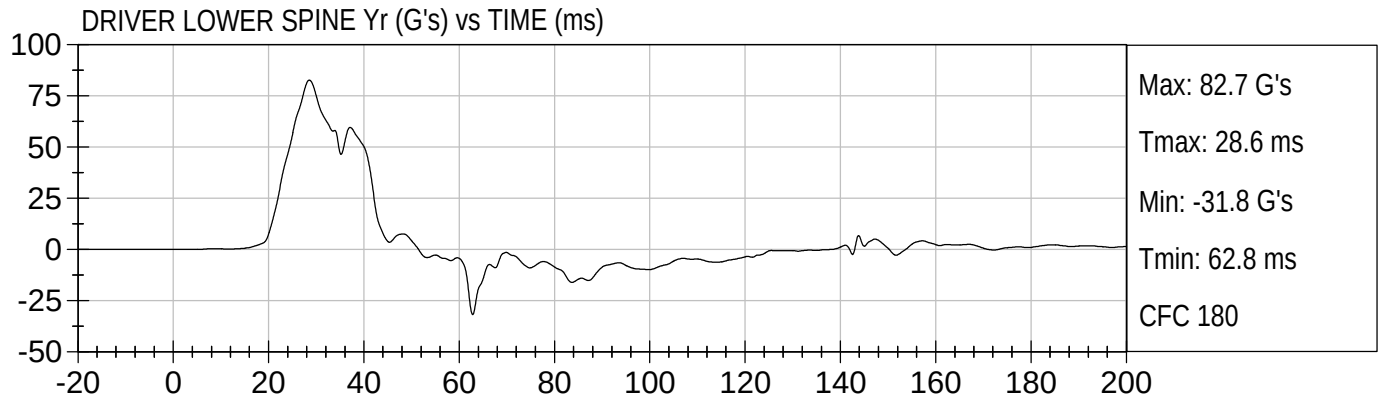


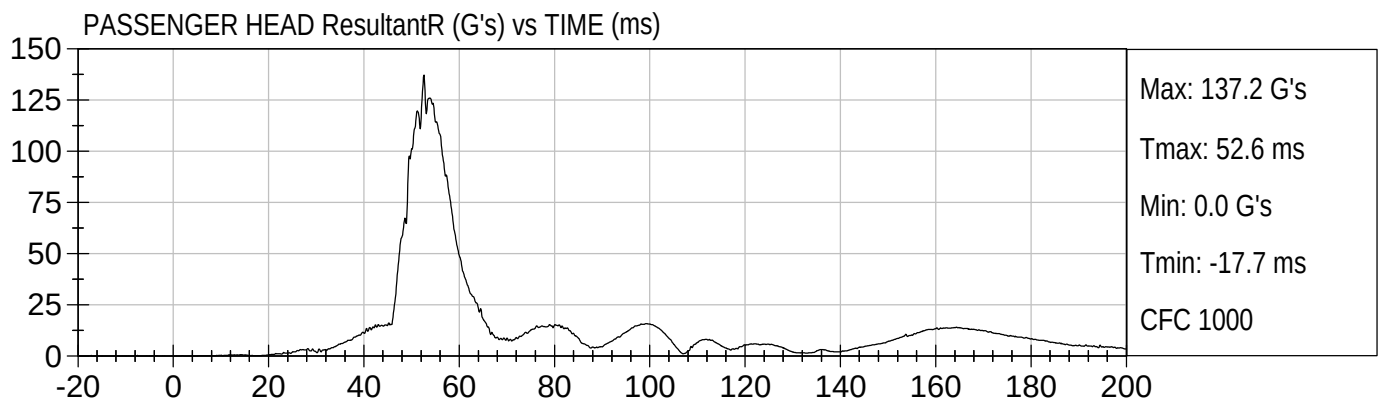
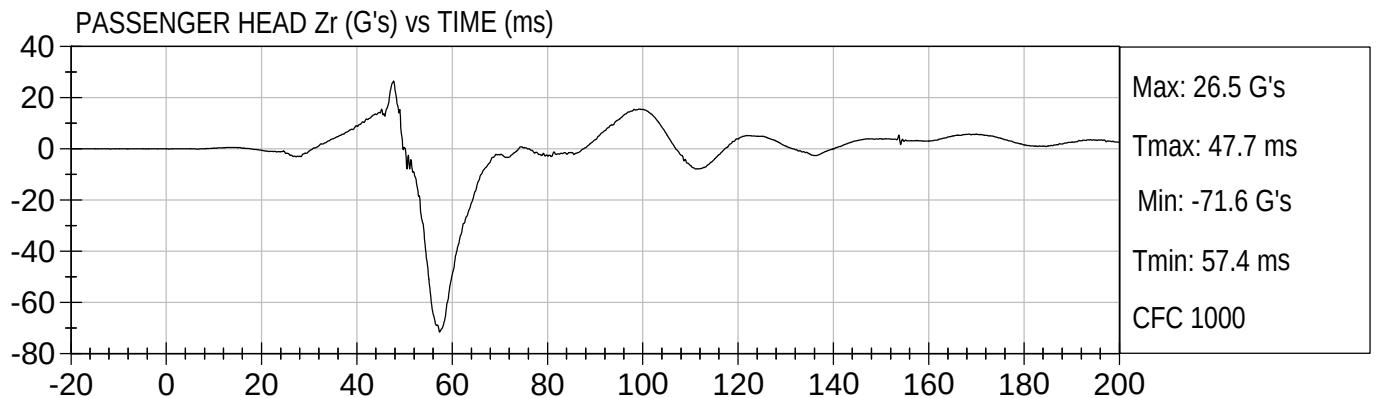
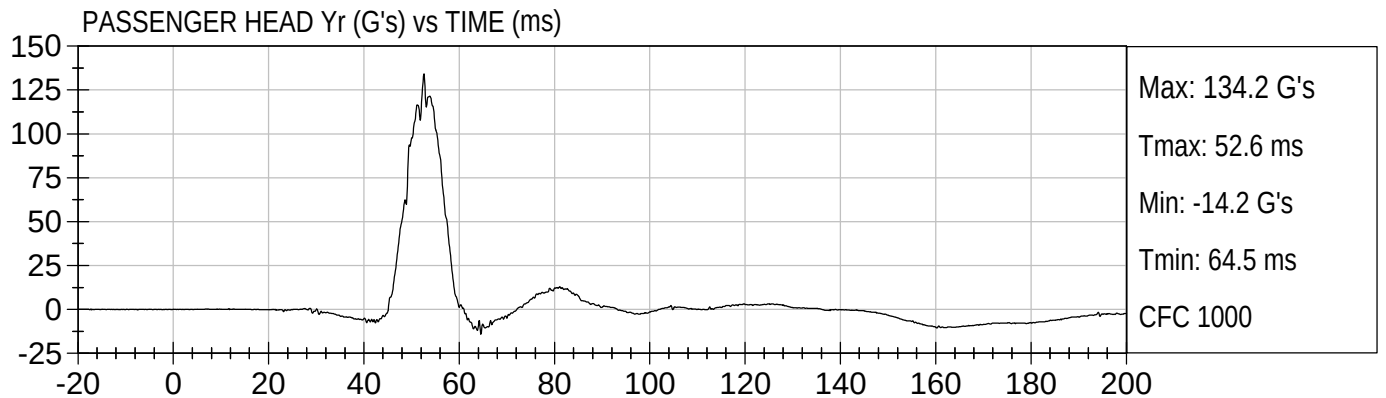
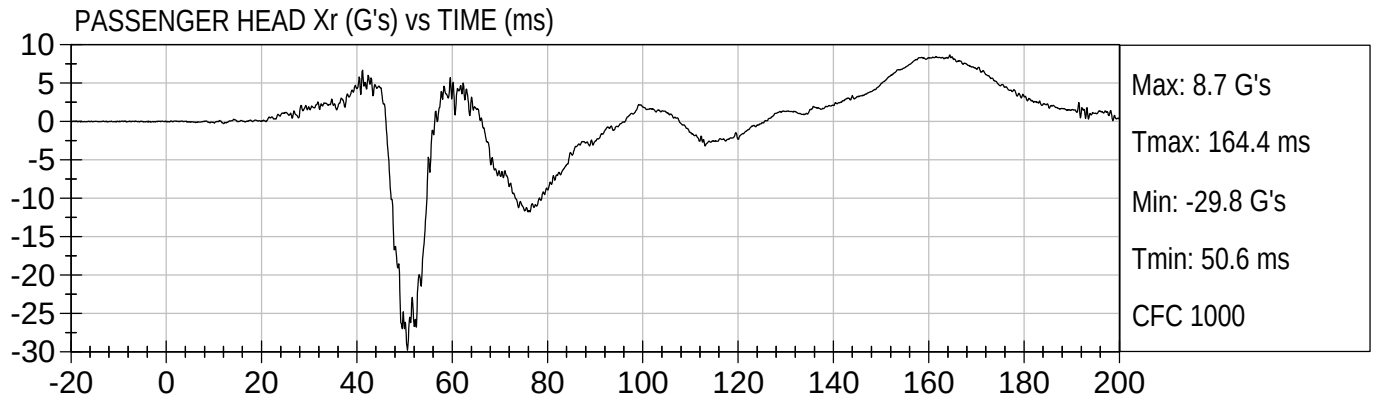


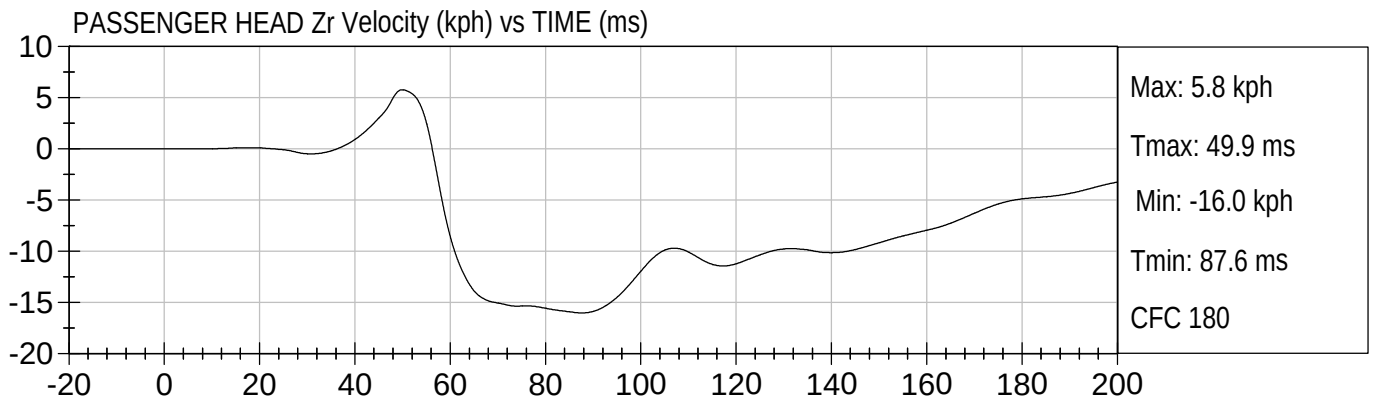
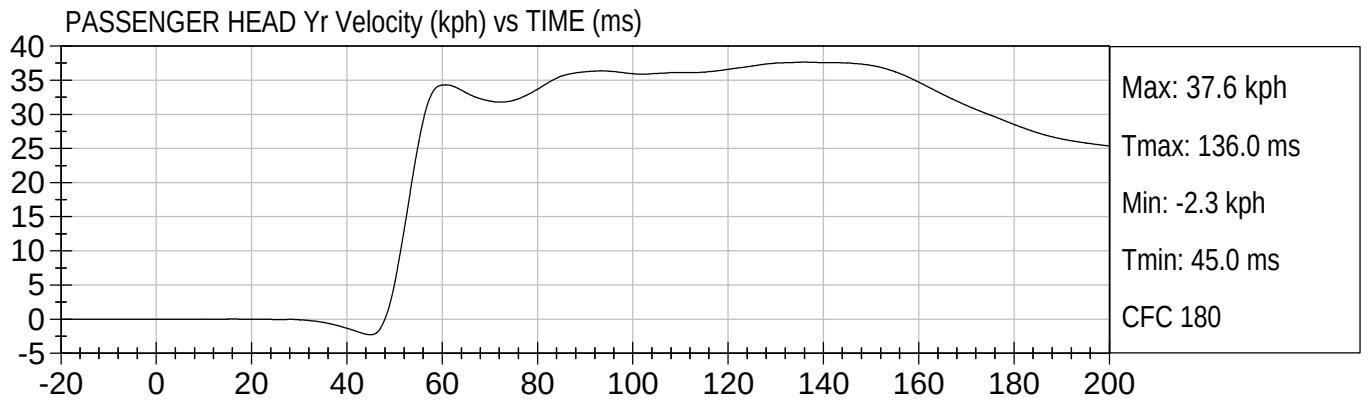
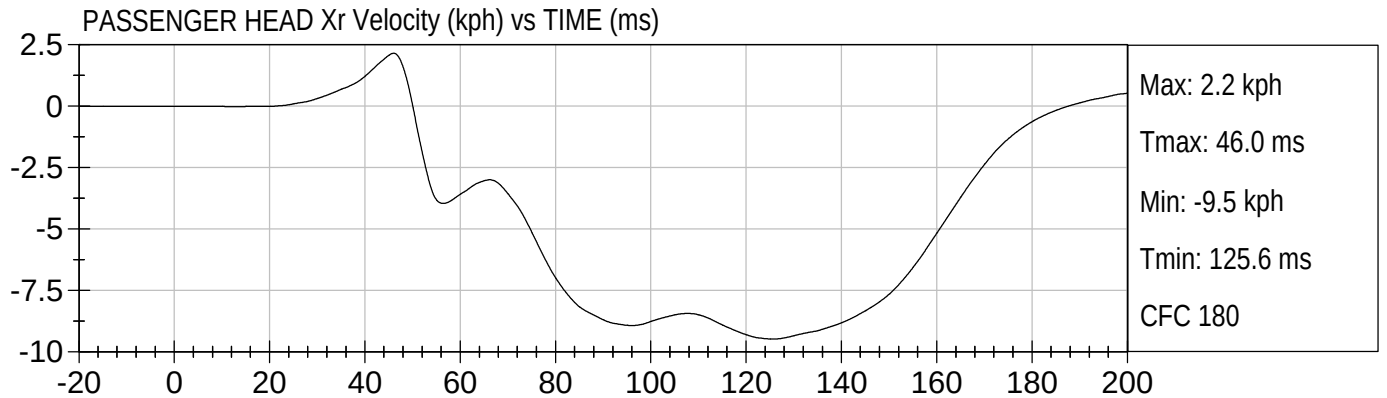


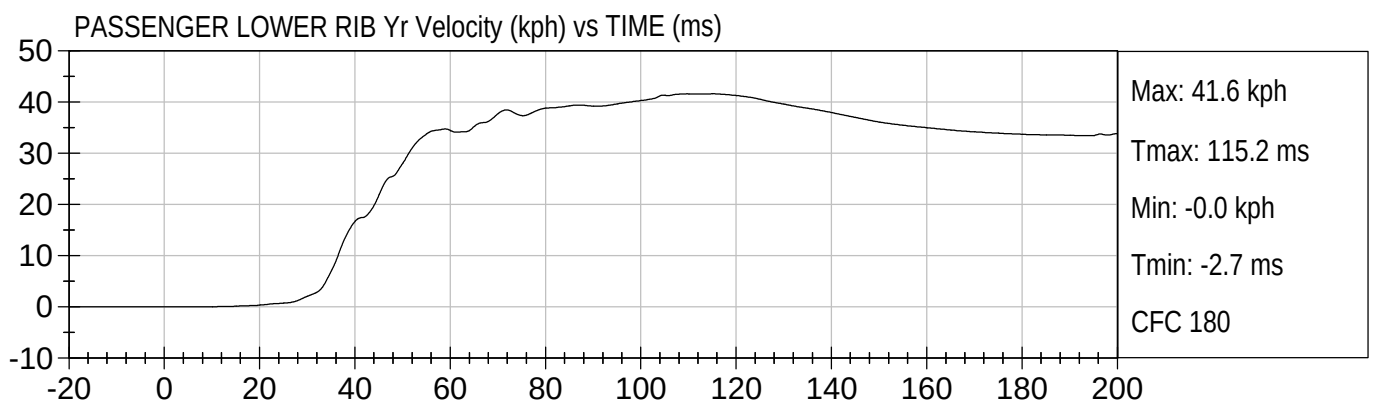
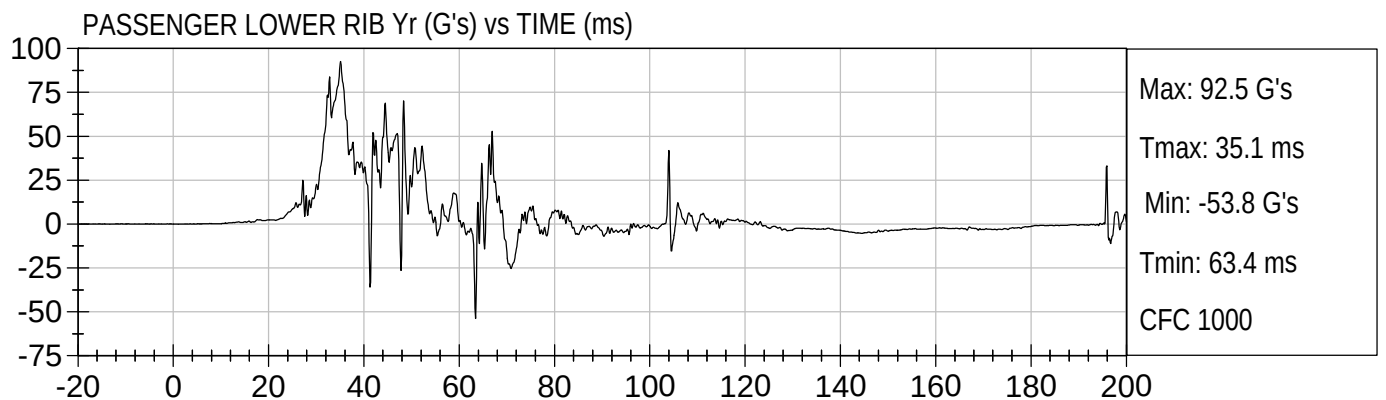
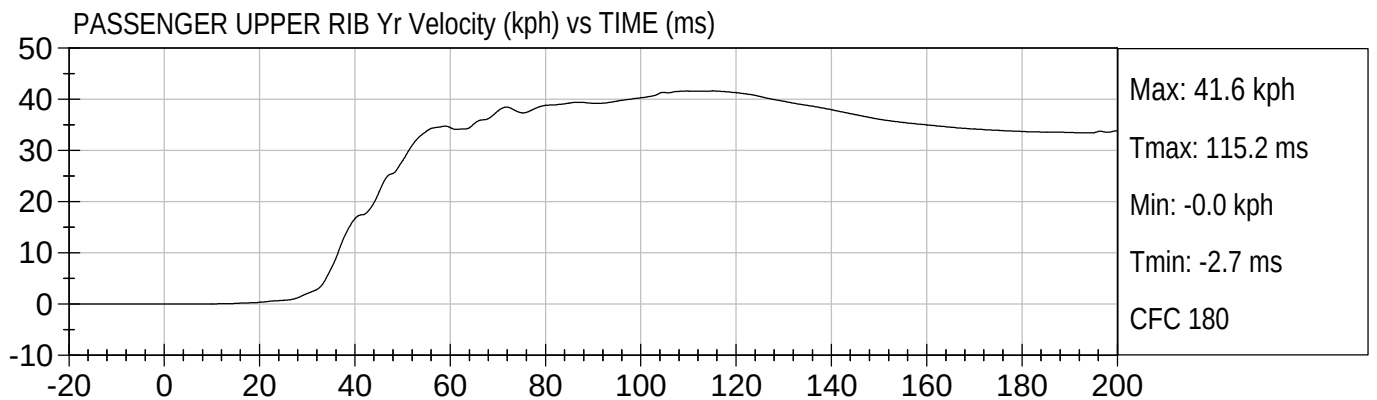
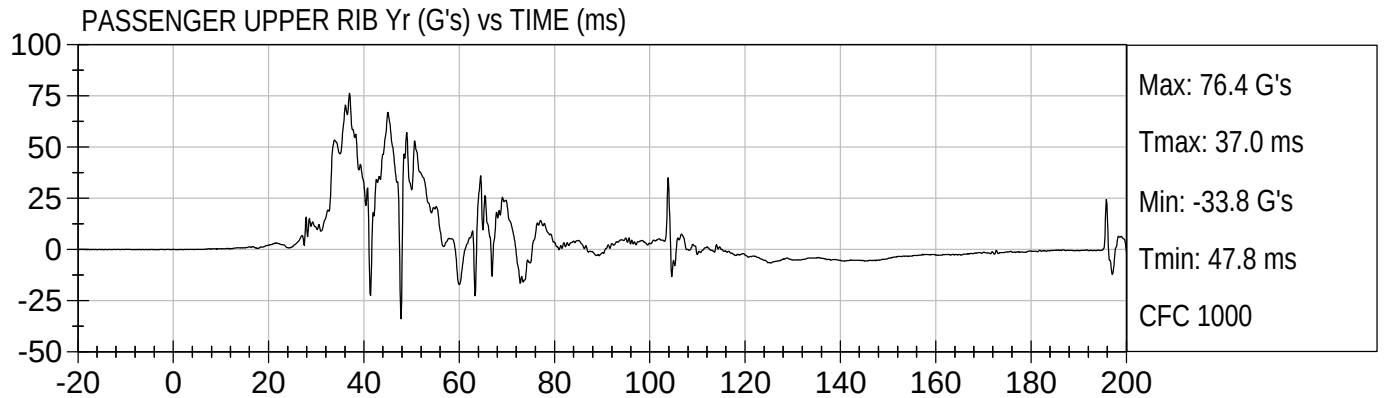


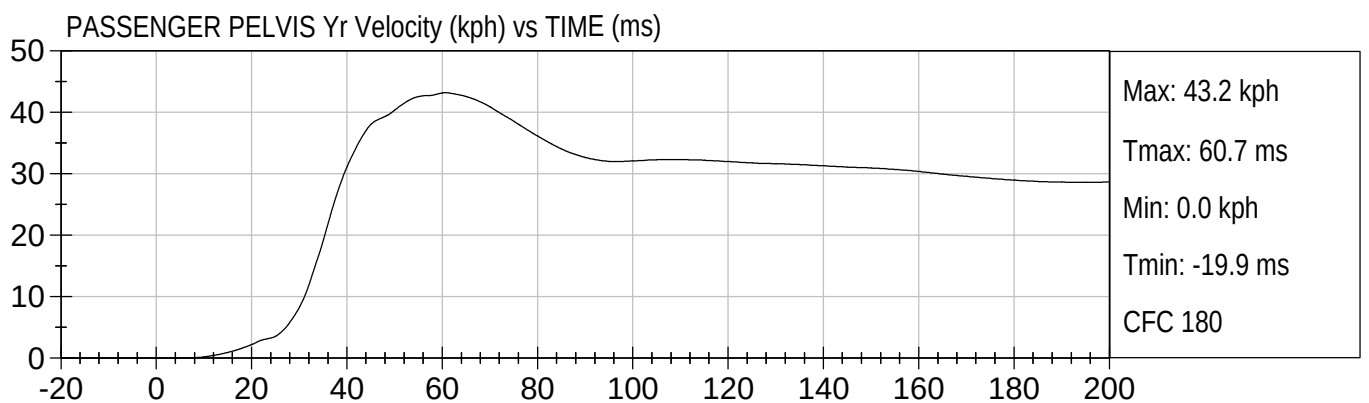
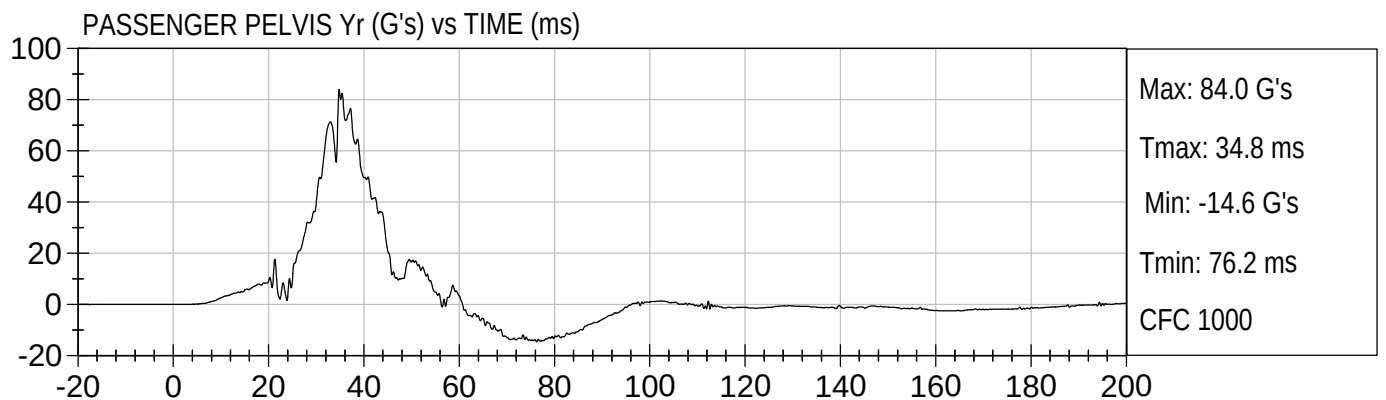
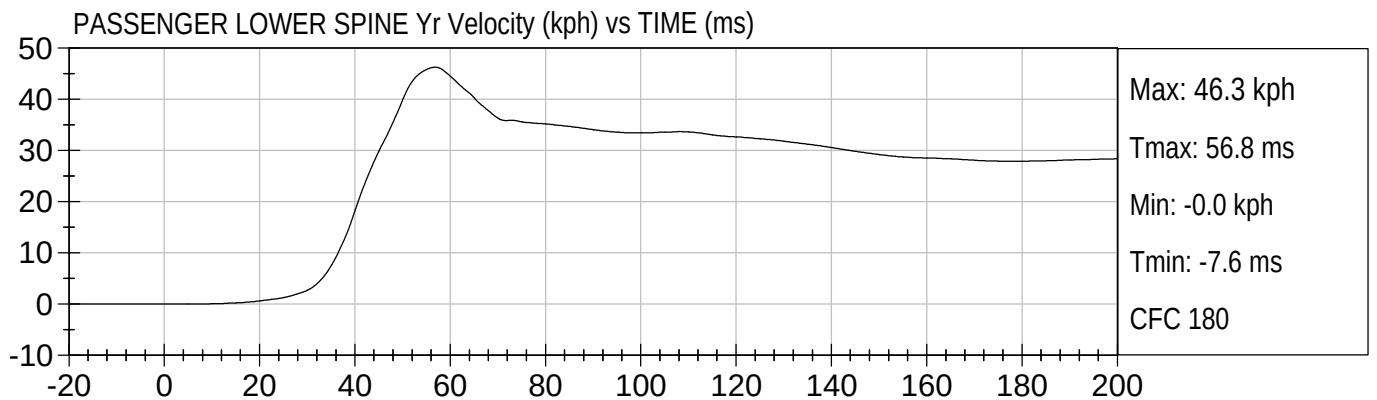
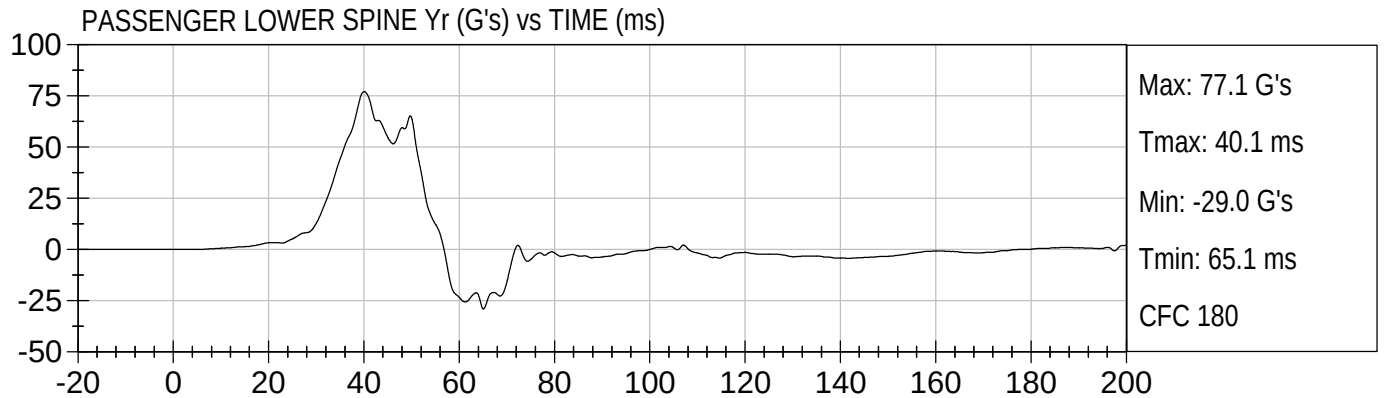


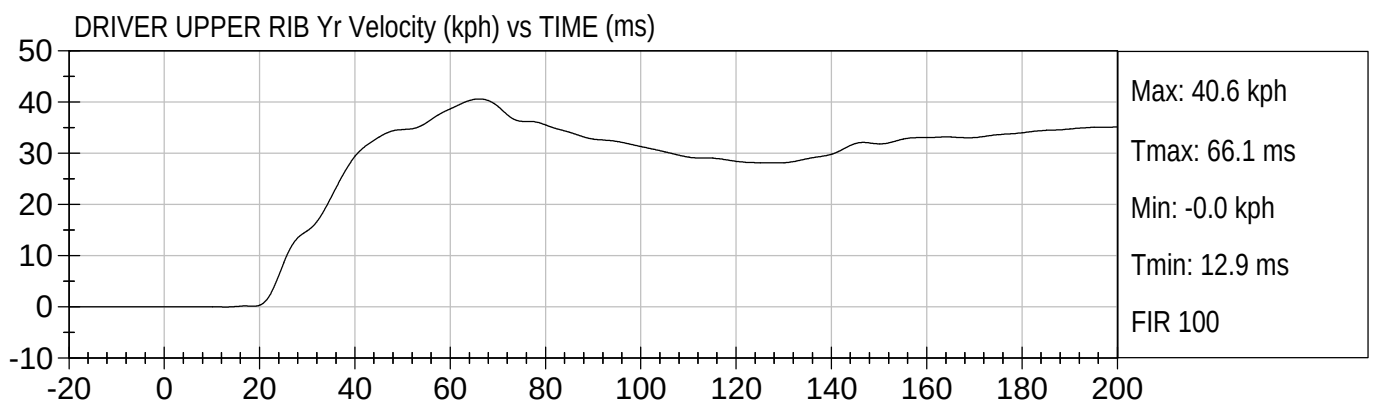
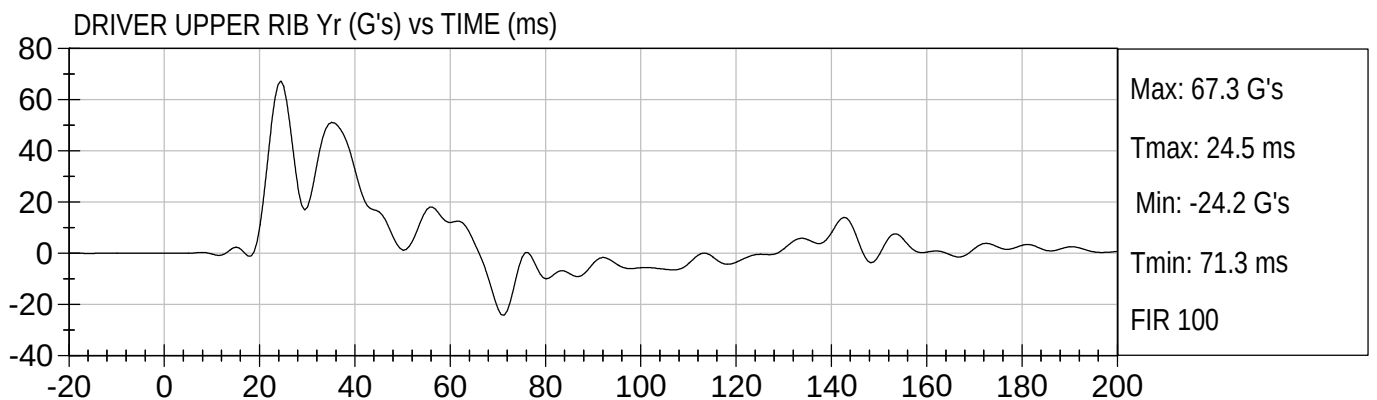
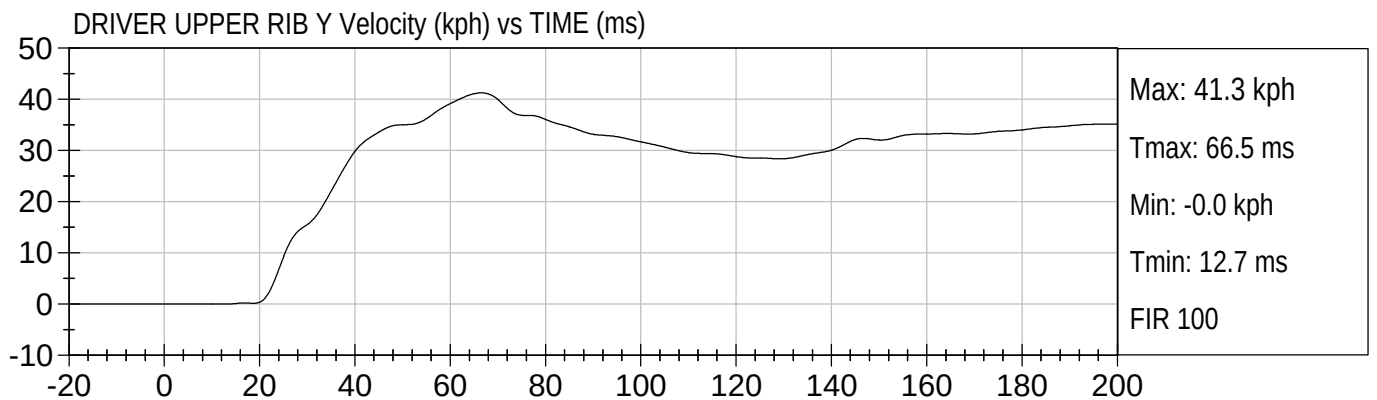
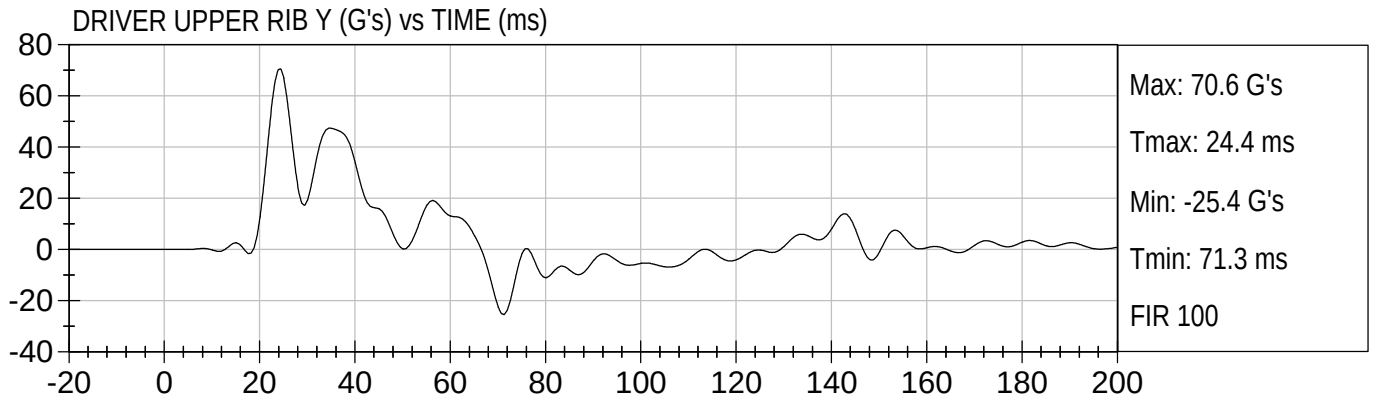


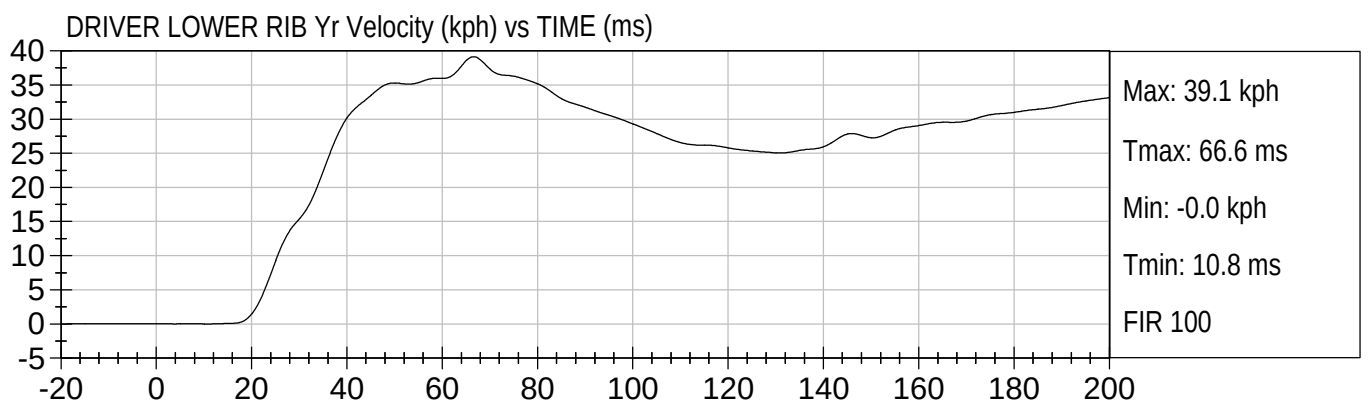
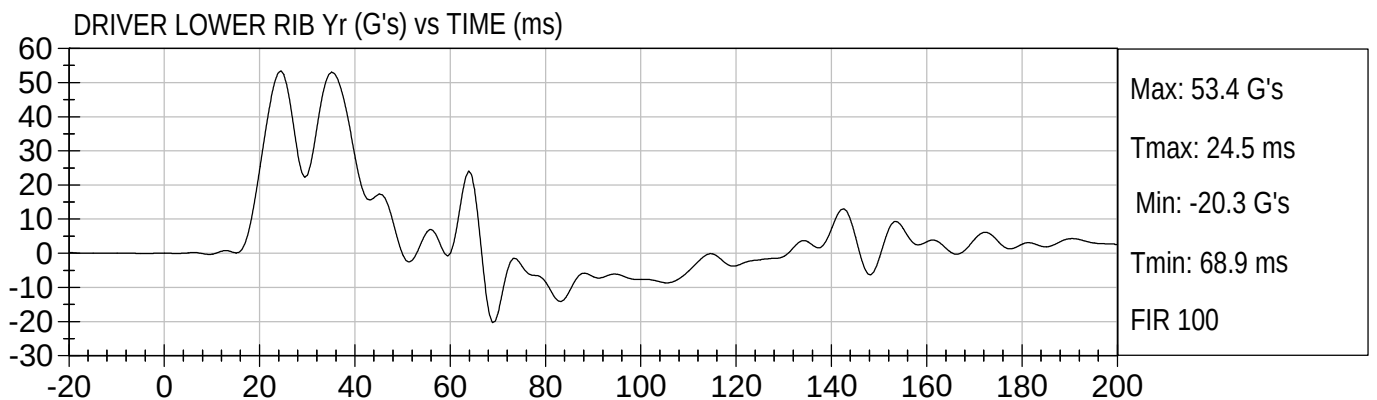
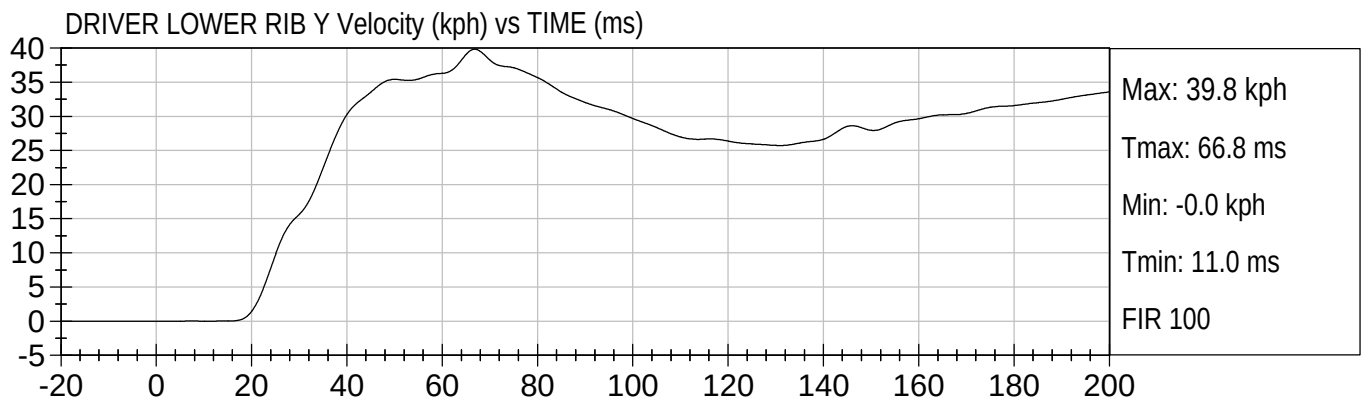
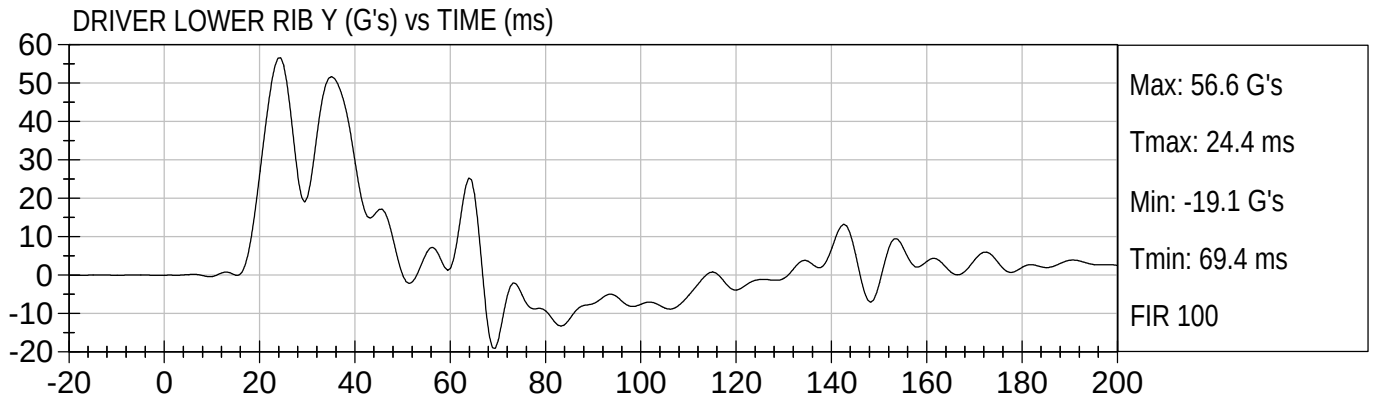


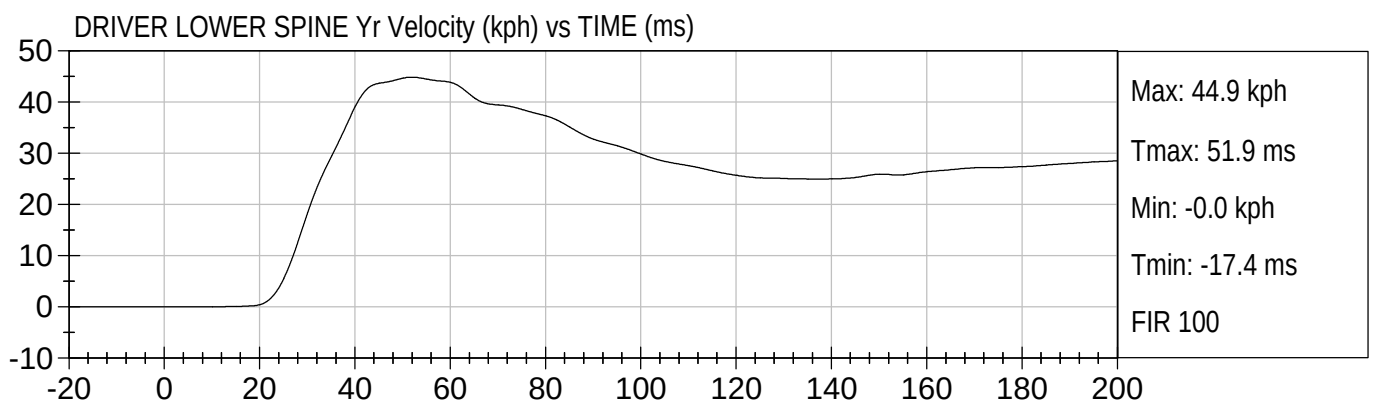
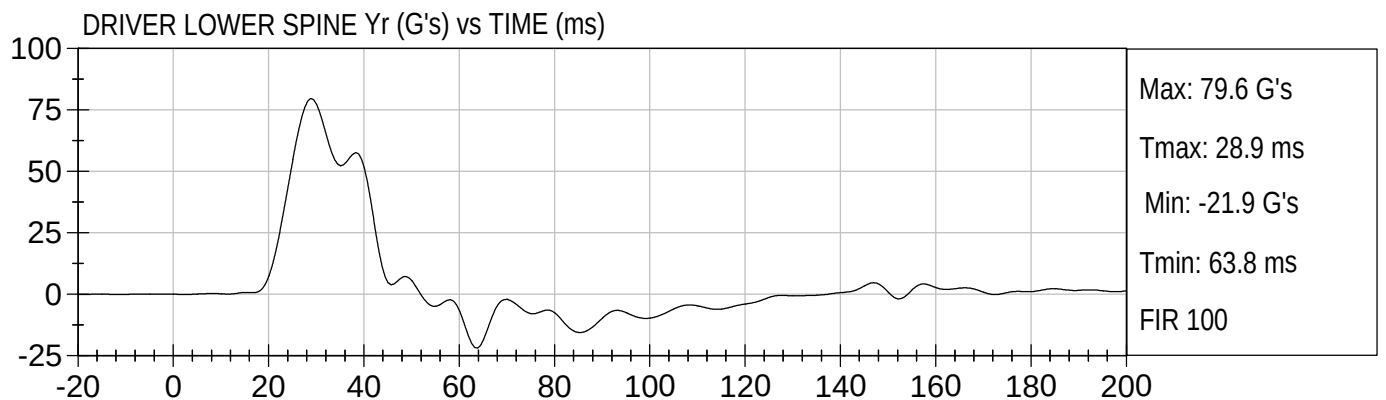
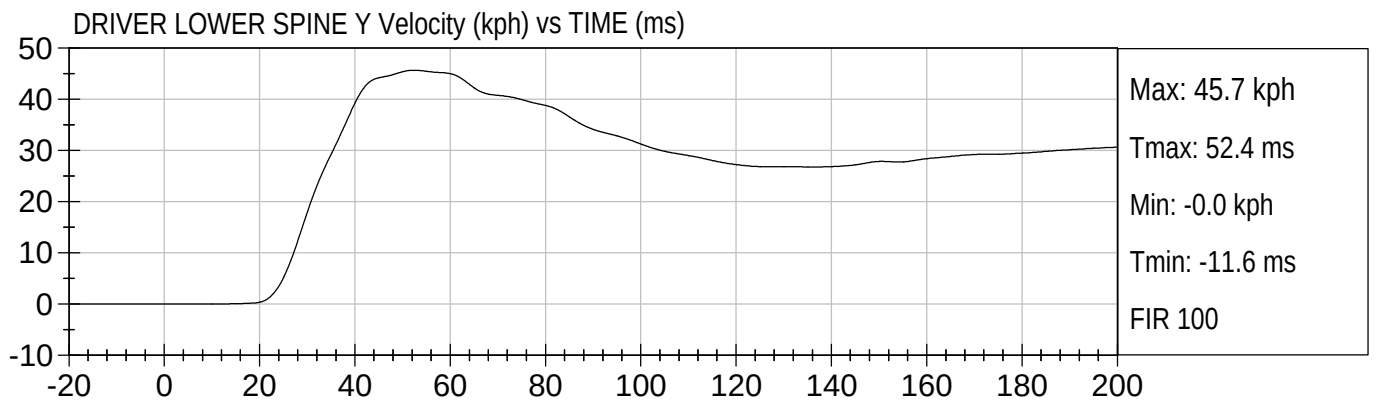
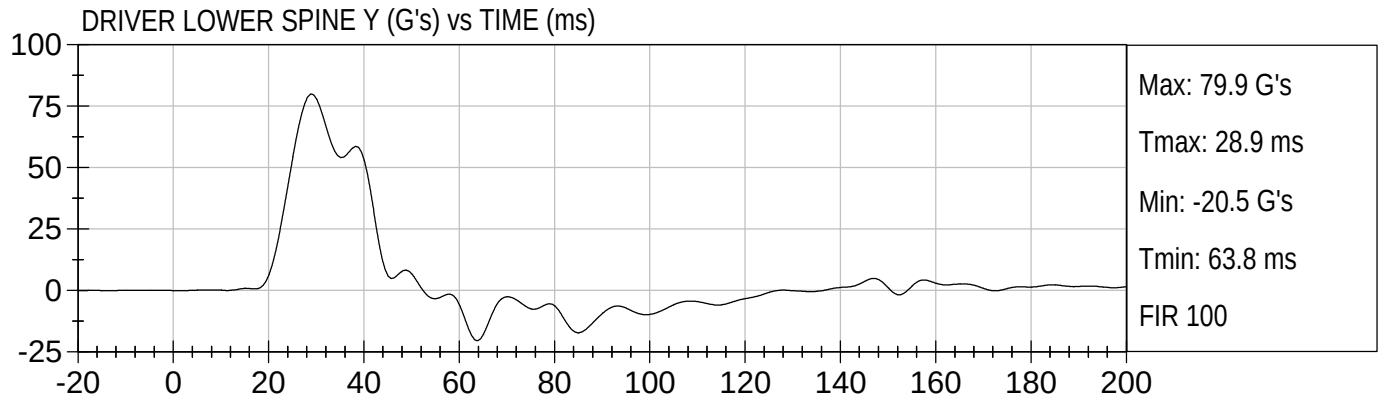


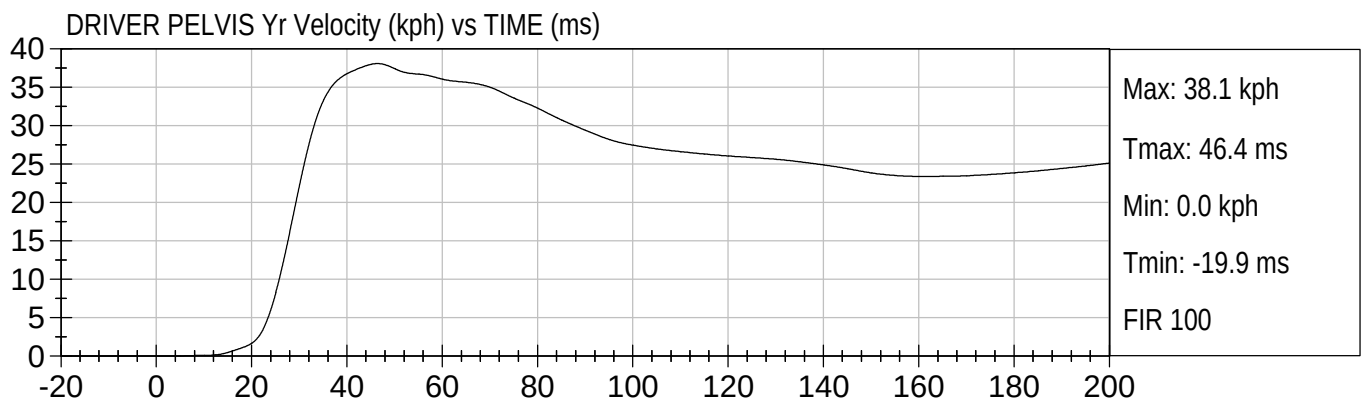
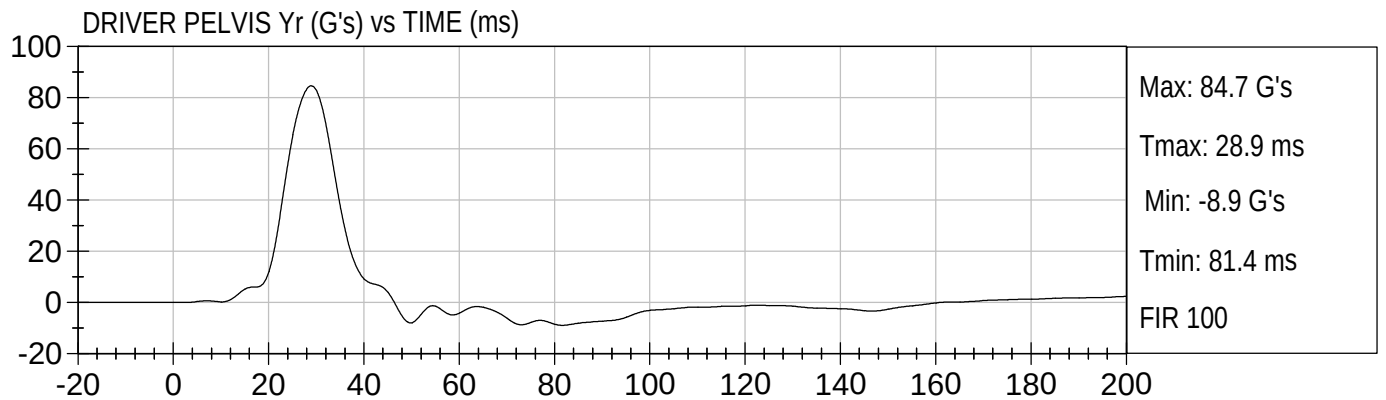
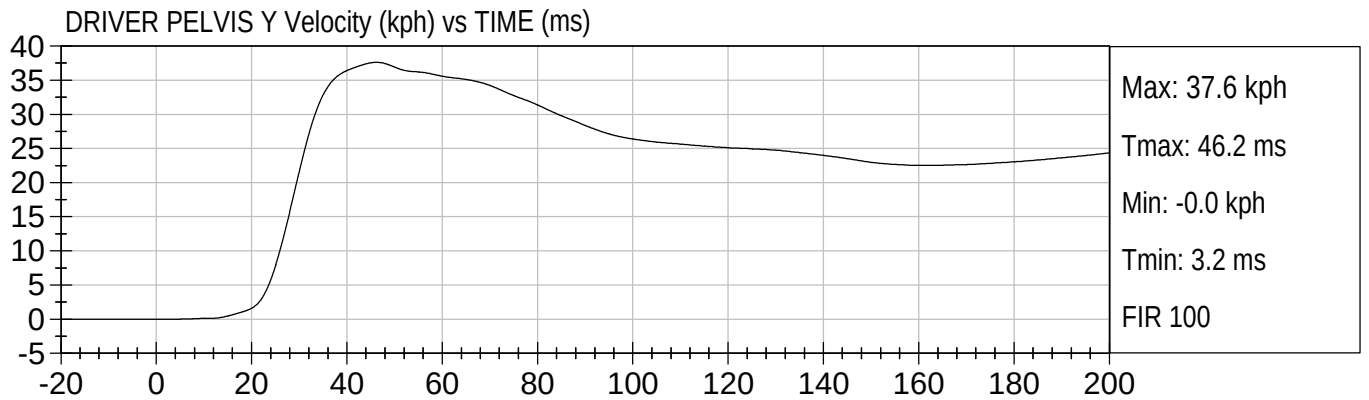
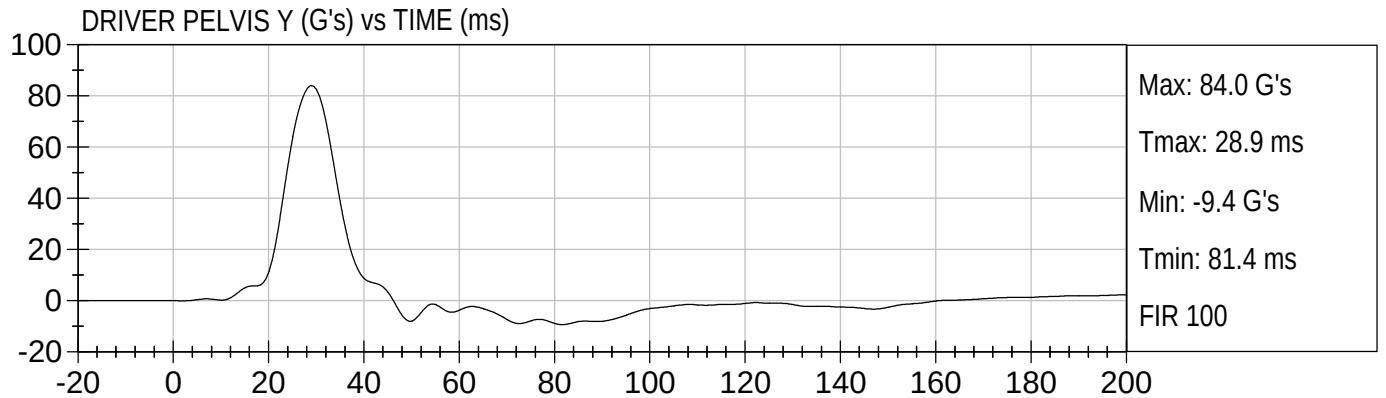


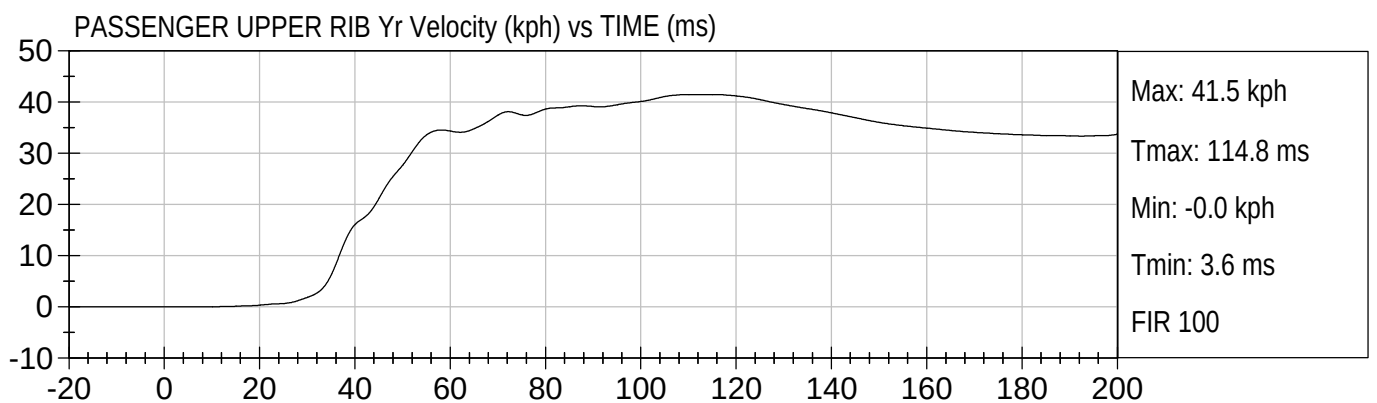
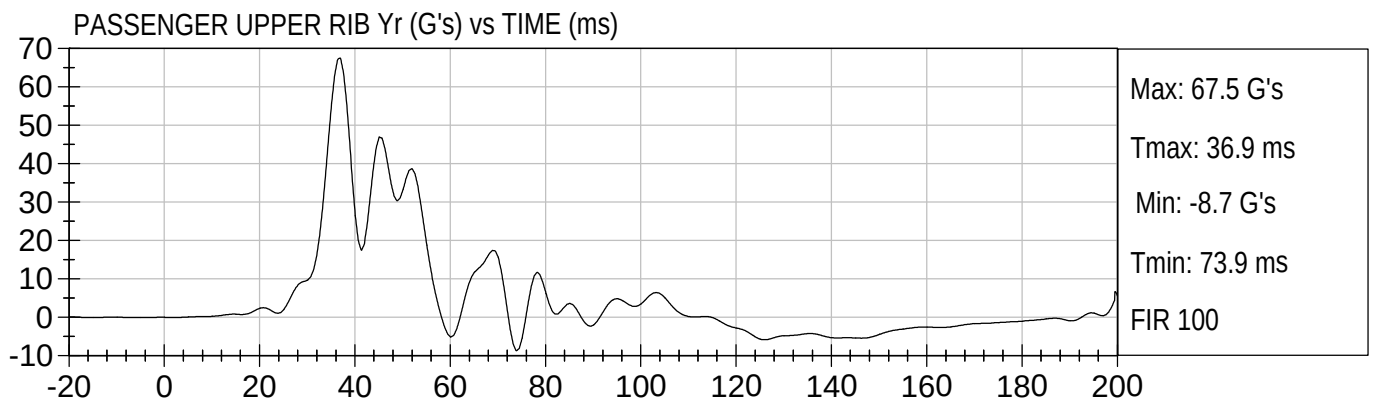
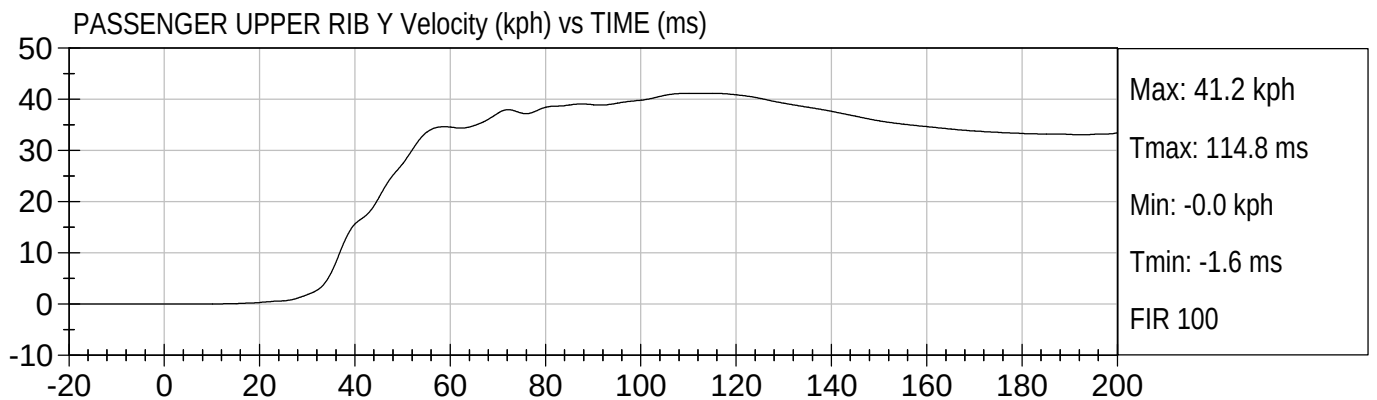
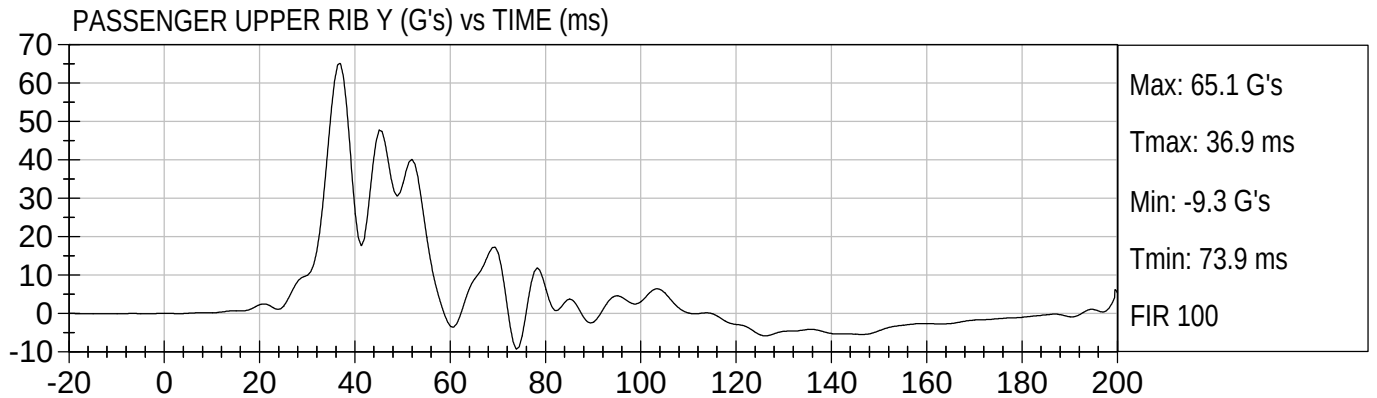


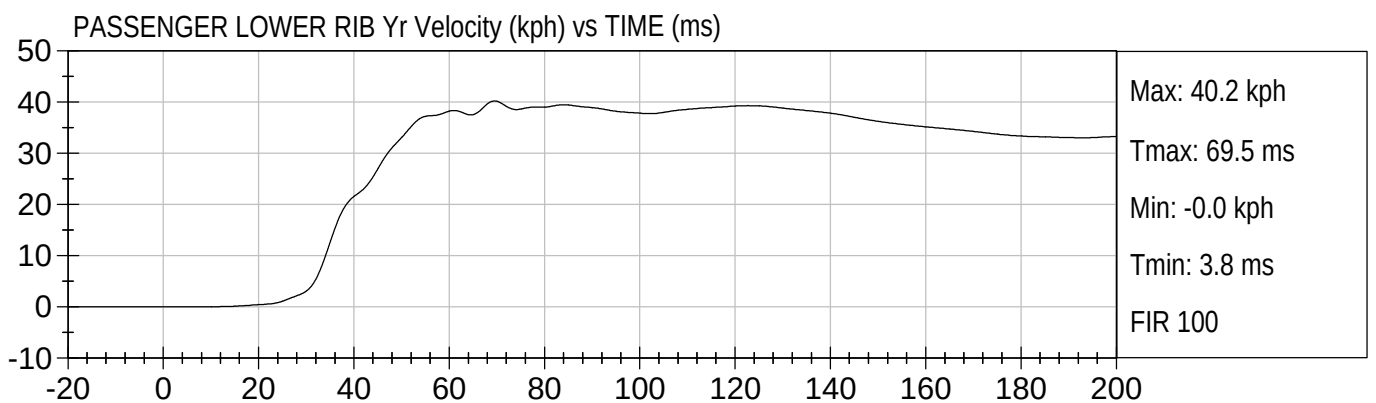
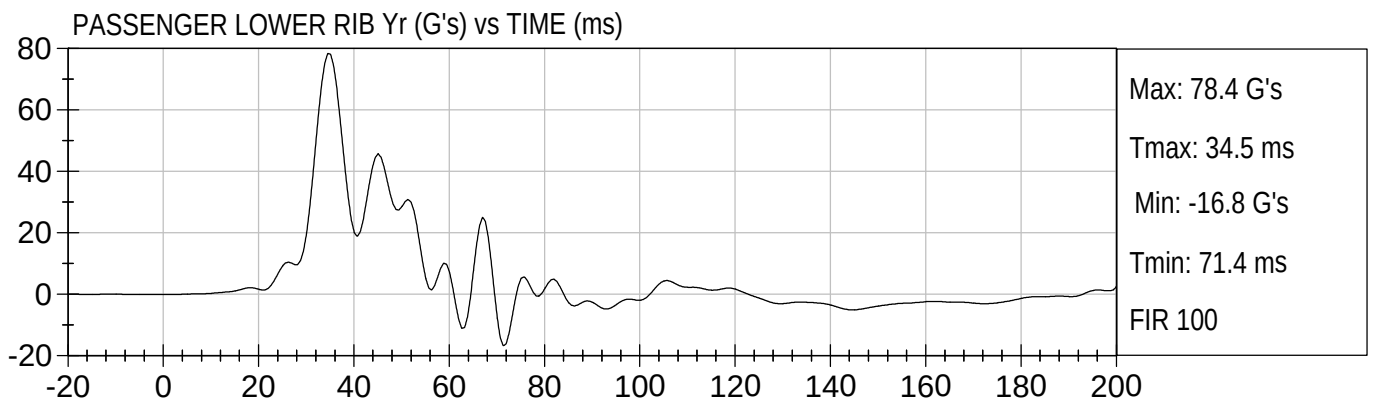
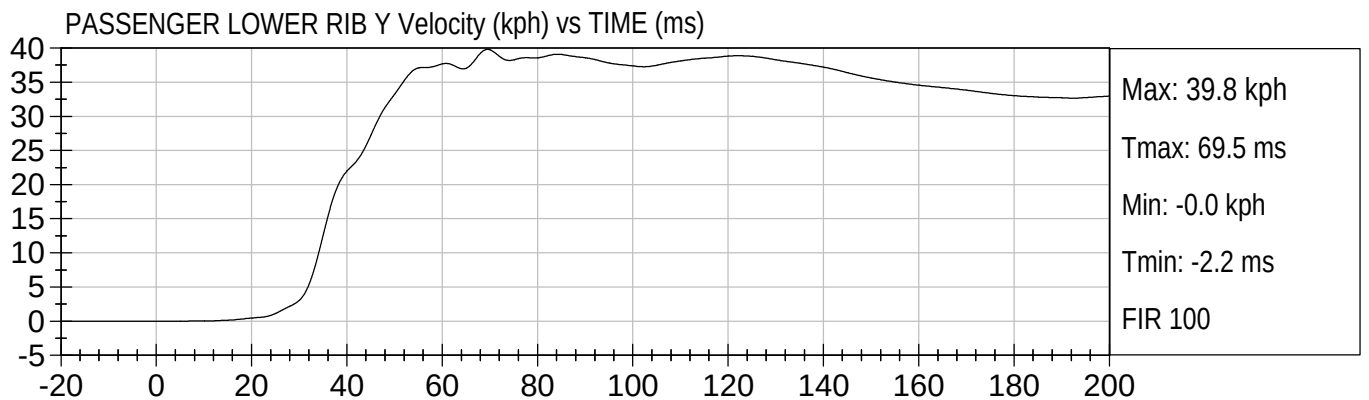
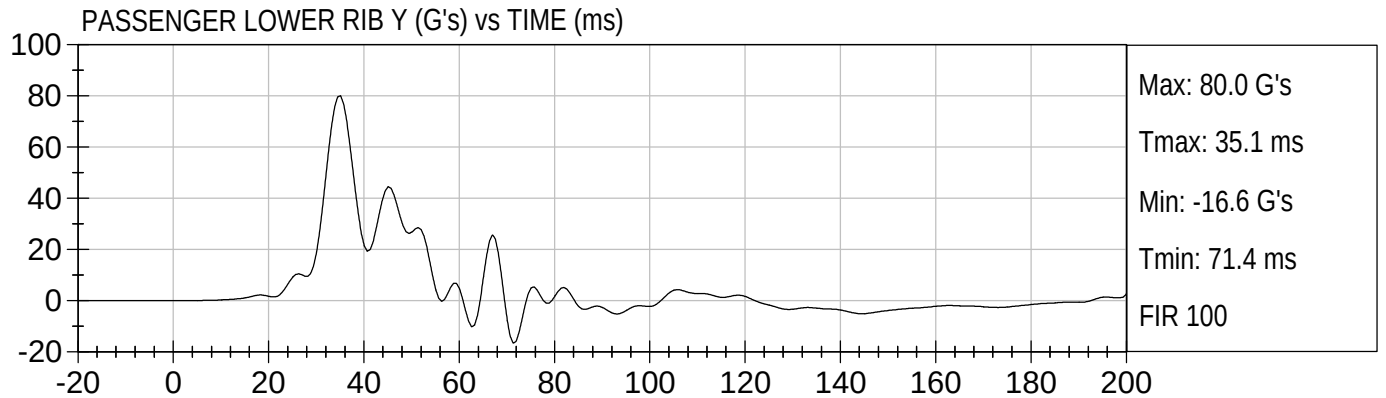


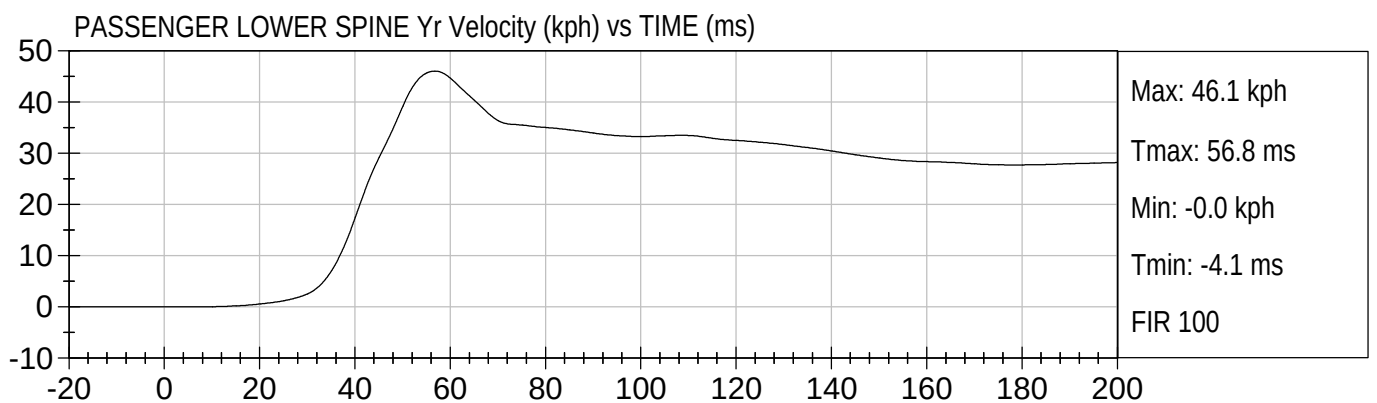
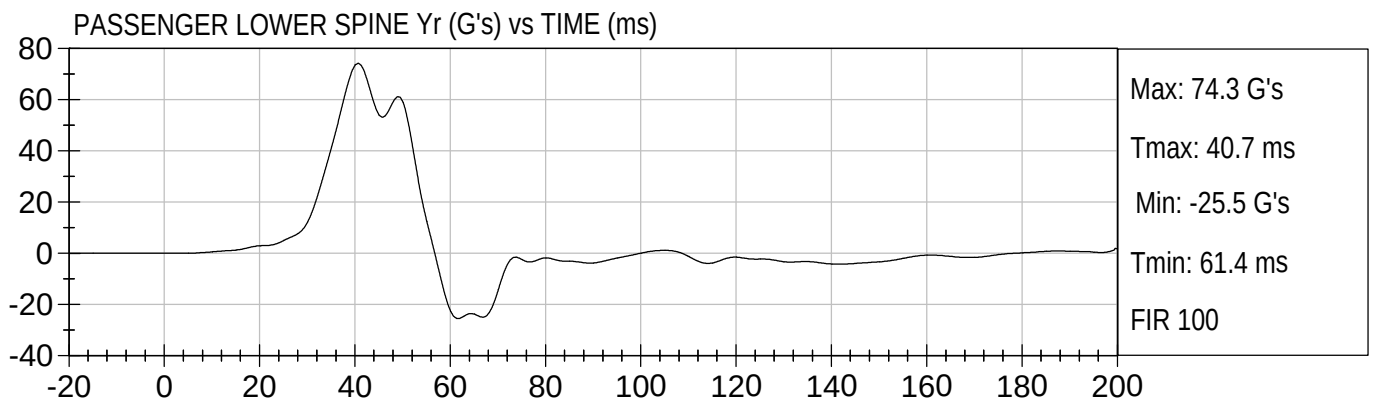
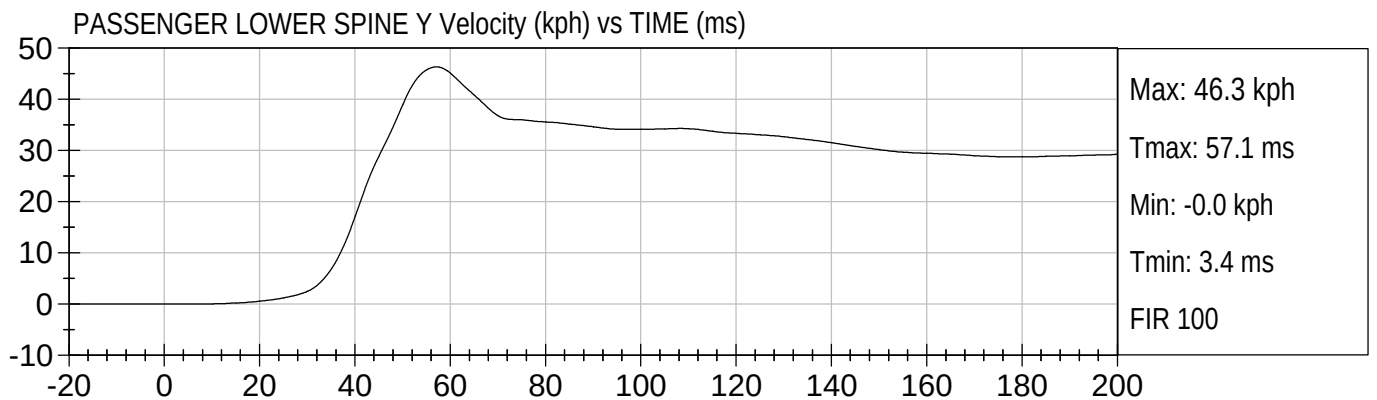
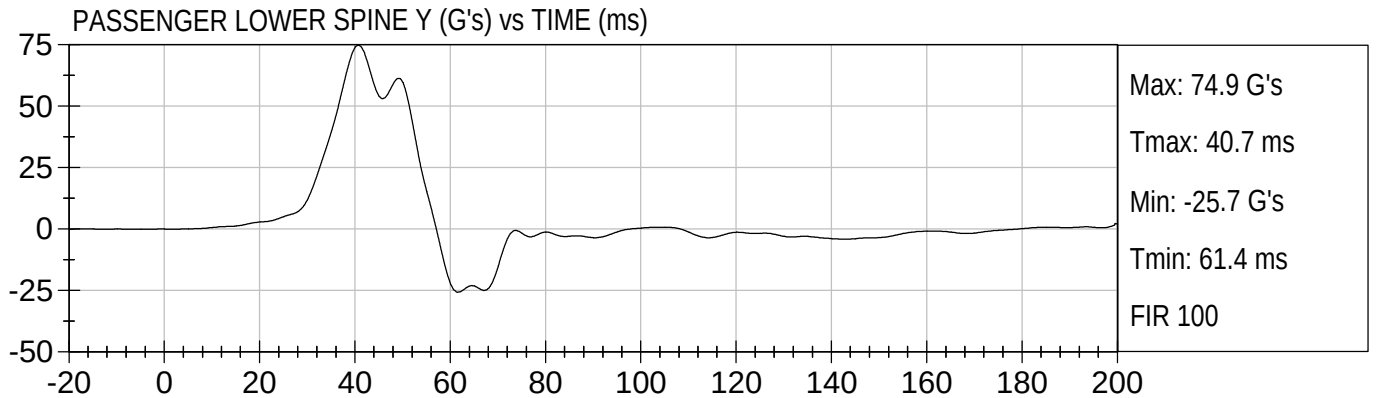


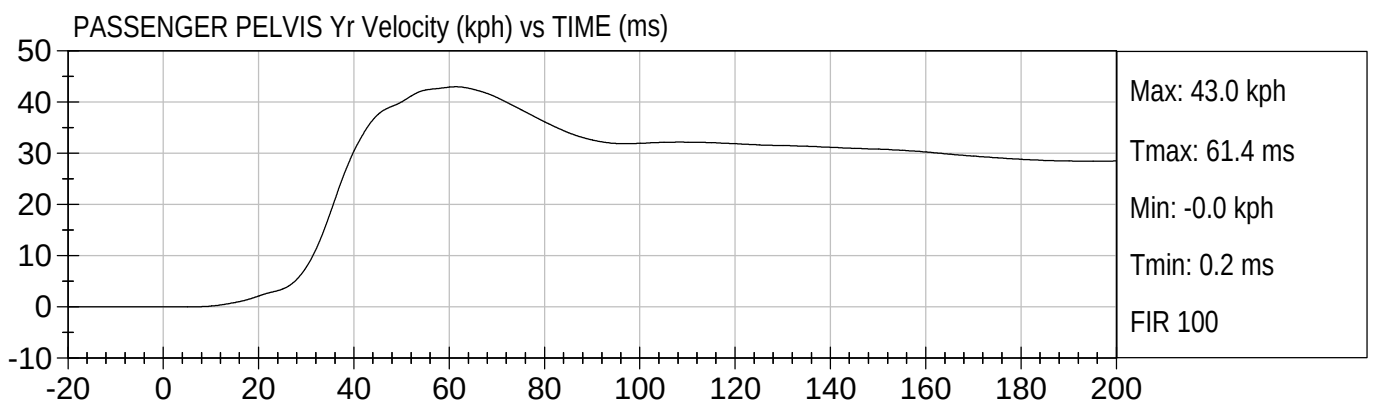
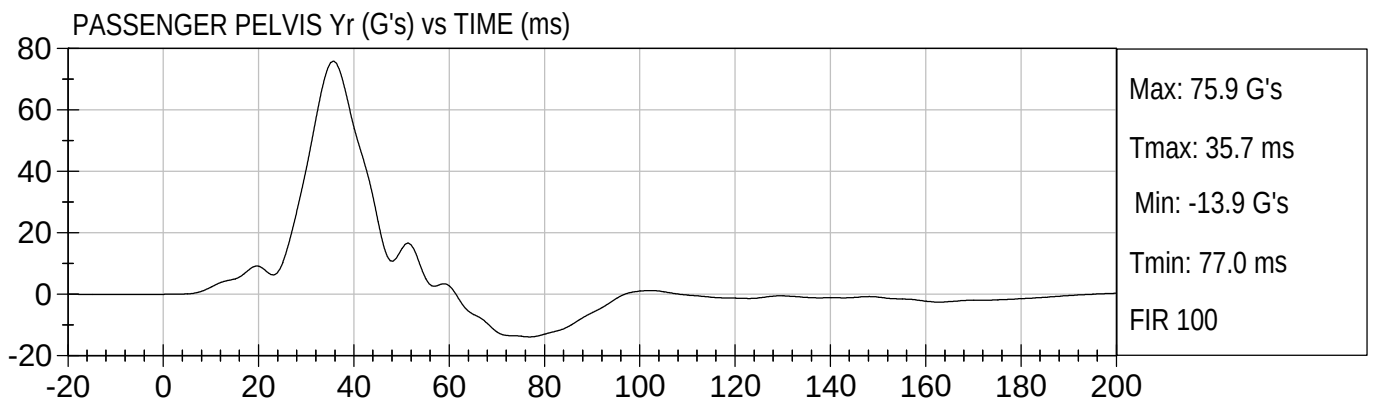
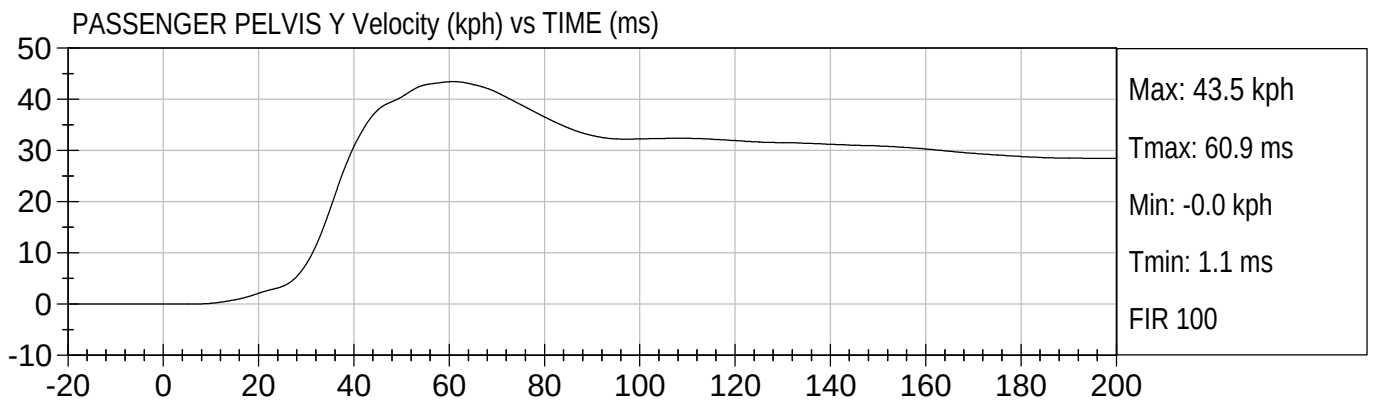
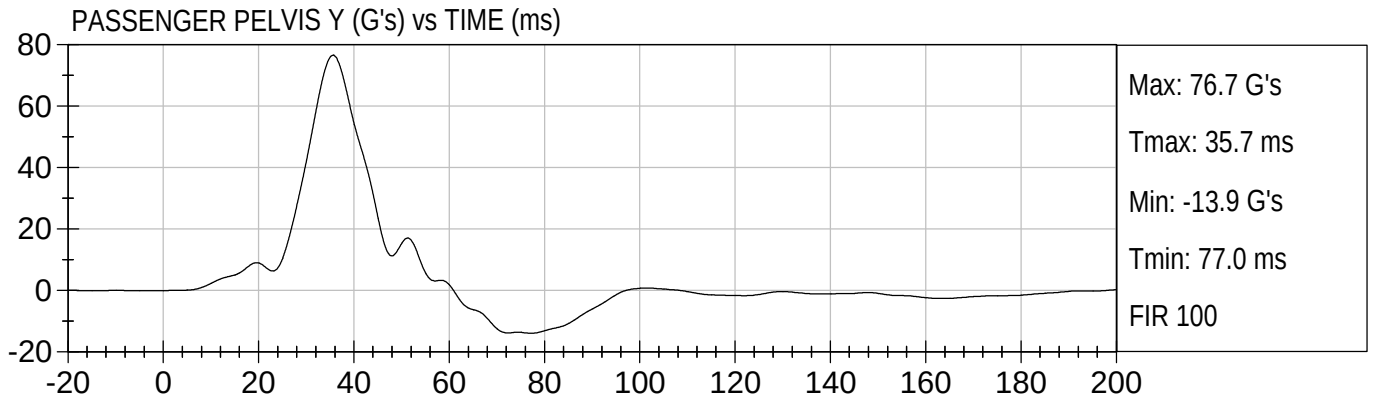












APPENDIX C

SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CERTIFICATION DATA

Dummy Serial Number: 037

Calibration Test Results Summary

Dummy Serial Number: 037

Pre-Test Calibration

Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all impact test requirements.
Shoulder Impact Test:	The shoulder passed all impact test requirements.
Rib Tests:	All ribs passed all impact test requirements.
Abdomen Test:	The abdomen passed all impact test requirements.
Lumbar Spine Test:	The lumbar spine passed all impact test requirements.
Pelvis Test:	The pelvis passed all impact test requirements.

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

Technician: Tim Michnay

Tested Parameter	Units	Specification	Dummy Serial Number:037		Dummy Serial Number:036	
			Pre-Test	Post-Test	Pre-Test	Post-Test
SH – Seated Height	mm	889 - 909	902	902	903	903
RH – Rib Height	mm	501 – 521	509	509	506	506
HP – Hip Pivot Height	mm	99 ref.	99	99	99	99
RD-Rib from Back Line	mm	229 – 241	232	232	232	232
KV – Knee Pivot from Back Line	mm	511 – 526	519	519	518	518
SW – Knee Pivot to Floor	mm	490 – 505	493	493	497	497
HW – Hip Width	mm	356 – 391	378	378	370	370
Thorax Impact						
Laboratory Temperature	°C	18.9 to 25.5	22.2	20.7	22.0	20.7
Laboratory Relative Humidity	%	10 to 70	28	21	27	23
Probe Velocity	m/s	4.27 – 4.33	4.28	4.28	4.27	4.30
Upper Rib	G's	37 – 46	39	44	42	44
Lower Rib	G's	37 – 46	45	44	44	46
Lower Spine	G's	15 – 22	21	20	19	19
Pelvis Impact						
Laboratory Temperature	°C	18.9 to 25.5	22.2	20.6	21.7	20.7
Laboratory Relative Humidity	%	10 to 70	28	21	27	23
Probe Velocity	m/s	4.27 – 4.33	4.29	4.30	4.27	4.27
Pelvis	G's	40 - 60	48	48	42	46

SID Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No.: 037

Test Number: D0205

Tested Parameter	Units	Specification	Result	Pass/Fail
SH – Seated Height	mm	889 - 909	902	Pass
RH – Rib Height	mm	501 – 521	509	Pass
HP – Hip Pivot Height	mm	99 ref.	99	Pass
RD-Rib from Back Line	mm	229 – 241	232	Pass
KV – Knee Pivot from Back Line	mm	511 – 526	519	Pass
SW – Knee Pivot to Floor	mm	490 – 505	493	Pass
HW – Hip Width	mm	356 – 391	378	Pass
Overall Test Results				Pass

Laboratory Technician

01/15/02

Test Date

Approved By

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration

ATD Serial No.: 037

Test I.D.: D02051

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Peak Resultant Acceleration	G's	210 to 260	223	Pass
Peak Lateral Acceleration	G's	< 10	2	Pass
Time Above 100 G	msec	0.9 – 1.5	1.1	Pass
Overall Test Results				Pass

Laboratory Technician

01/15/02

Test Date

Approved By

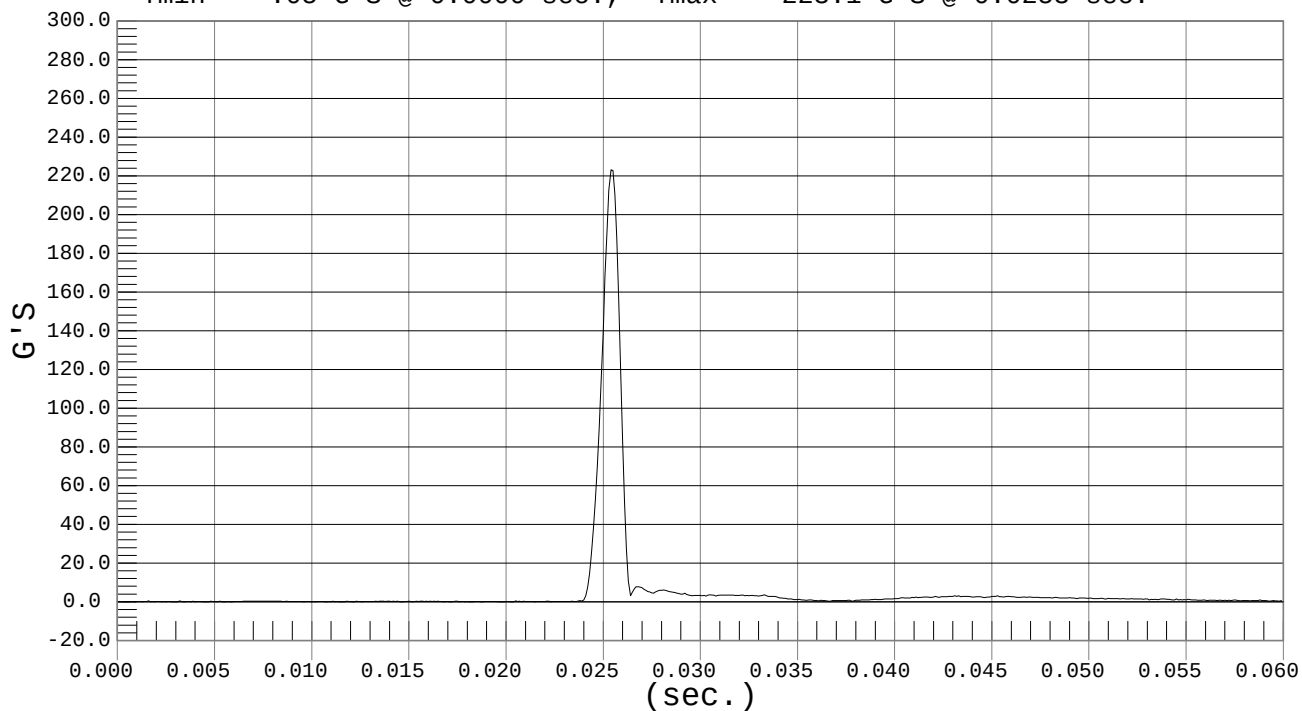


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #037

Test Date: 01-15-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .05 G'S @ 0.0000 sec., Ymax = 223.1 G'S @ 0.0253 sec.

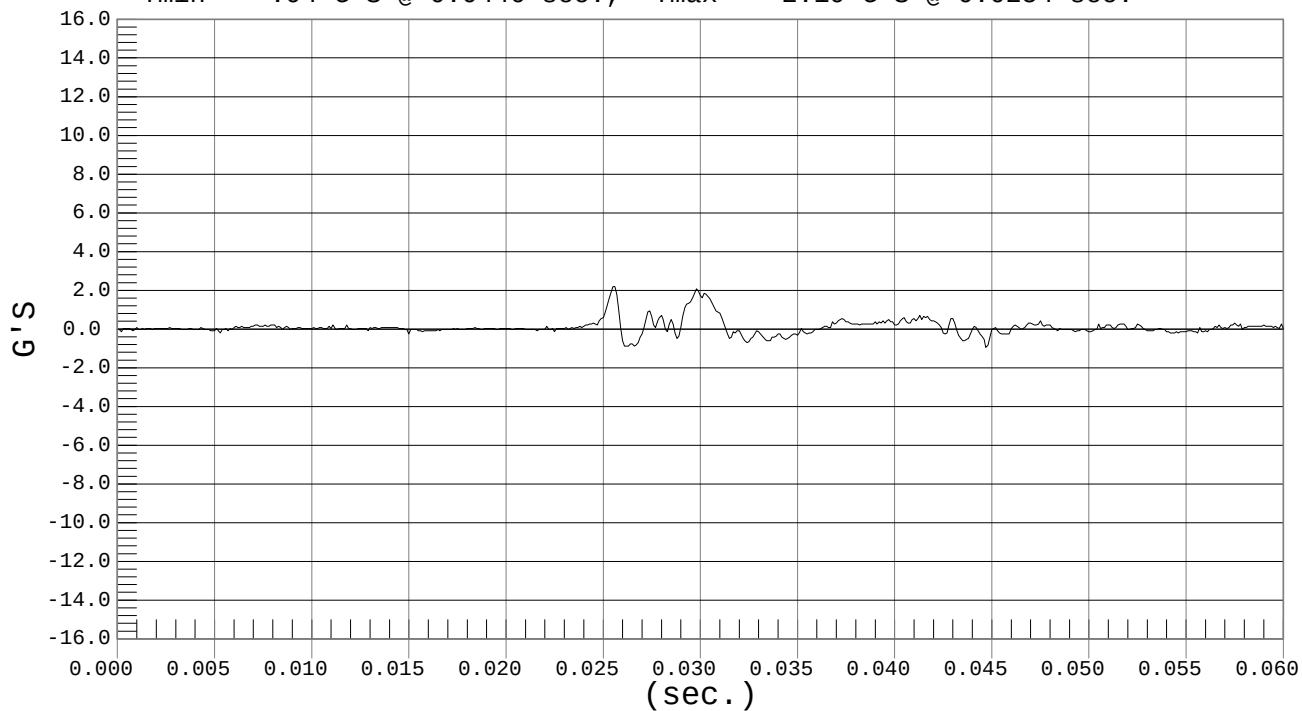


PEAK LATERAL ACCELERATION

Test Desc.: Head Drop
Component: Dummy #037

Test Date: 01-15-02
Speed: 0.0 fps, 0.00 M/s

Ymin = -.94 G'S @ 0.0446 sec., Ymax = 2.19 G'S @ 0.0254 sec.



SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Calibration

ATD Serial No.: 037

Test I.D.: D02052

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	22.2	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Probe Velocity	m/s	4.27 – 4.33	4.28	Pass
Upper Rib	G's	37 – 46	39	Pass
Lower Rib	G's	37 – 46	45	Pass
Lower Spine	G's	15 - 22	21	Pass
Overall Test Results				Pass

Laboratory Technician

01/15/02

Test Date

Approved By

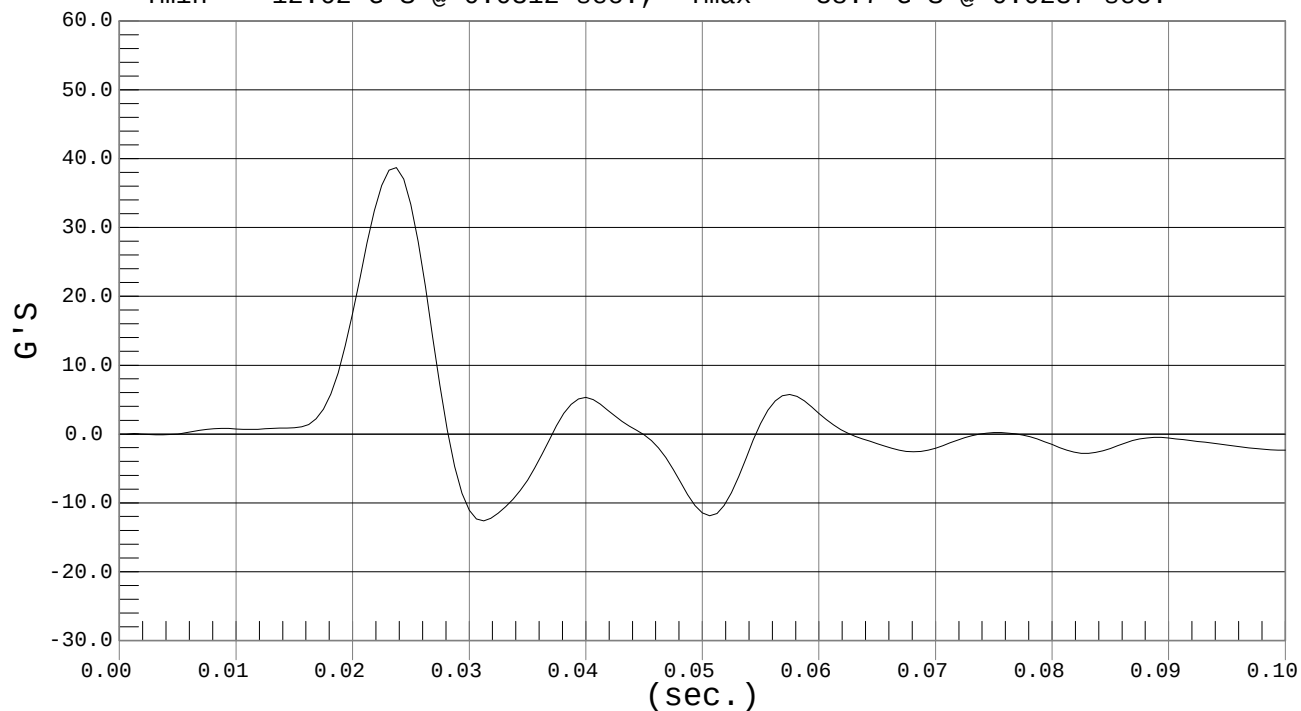


UPPER RIB ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #037

Test Date: 01-15-02
Speed: 14.1 fps, 4.28 M/s

Ymin = -12.62 G'S @ 0.0312 sec., Ymax = 38.7 G'S @ 0.0237 sec.

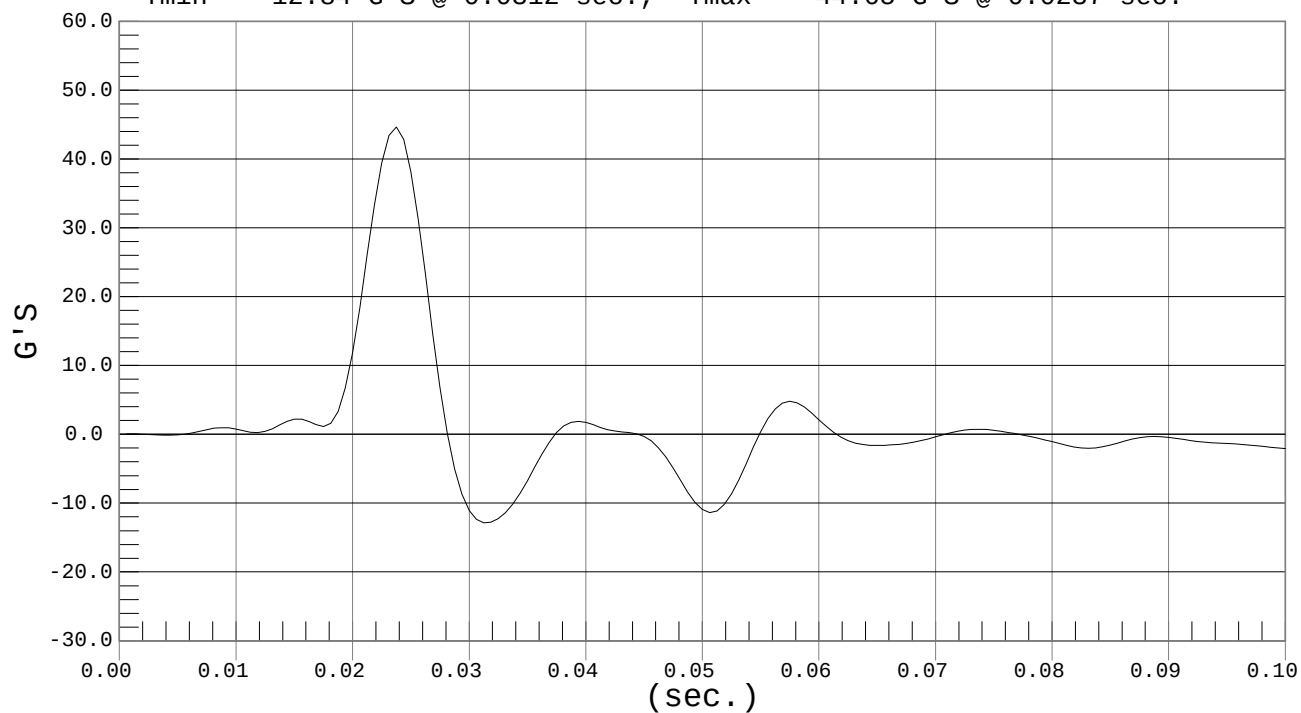


LOWER RIB ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #037

Test Date: 01-15-02
Speed: 14.1 fps, 4.28 M/s

Ymin = -12.84 G'S @ 0.0312 sec., Ymax = 44.65 G'S @ 0.0237 sec.



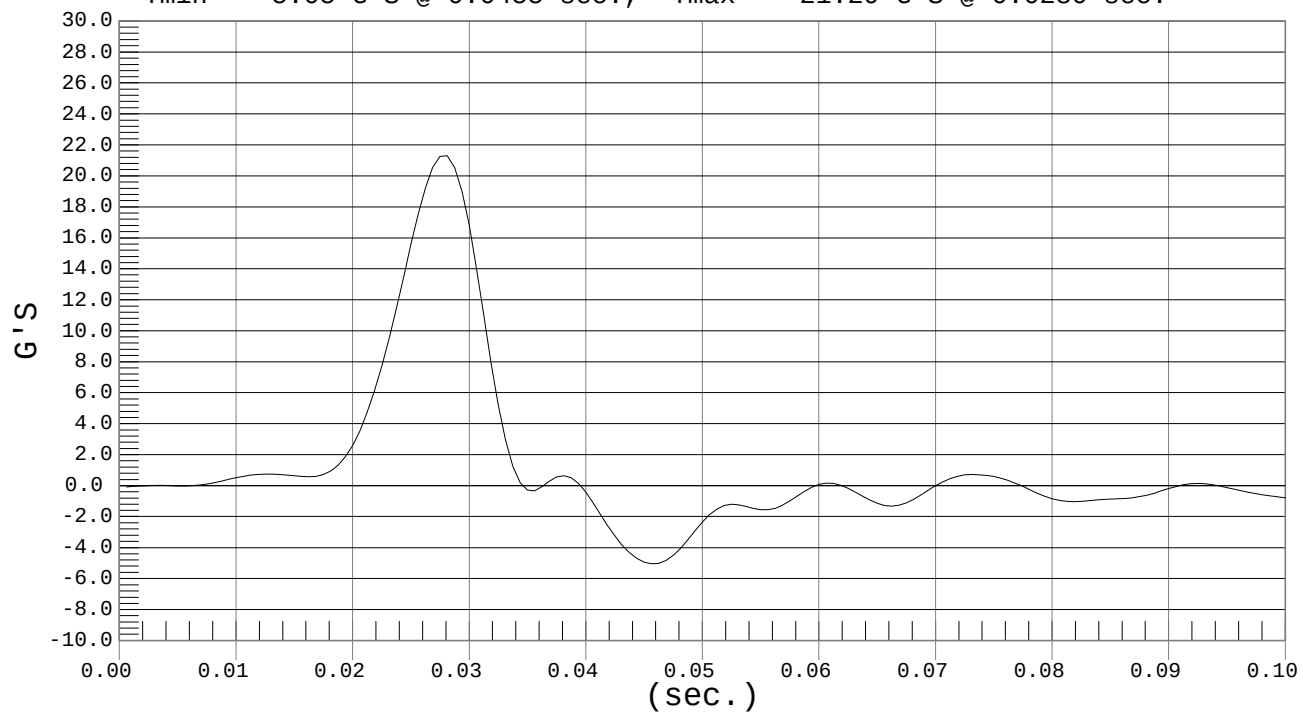


LOWER SPINE ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #037

Test Date: 01-15-02
Speed: 14.1 fps, 4.28 M/s

Ymin = -5.05 G'S @ 0.0455 sec., Ymax = 21.29 G'S @ 0.0280 sec.



SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Calibration

ATD Serial No.: 037

Test I.D.: D02053

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	22.2	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Probe Speed	m/s	4.27 – 4.33	4.29	Pass
Pelvis Acceleration	G's	40 - 60	48	Pass
Overall Test Results				Pass

Laboratory Technician

01/15/02

Test Date

Approved By

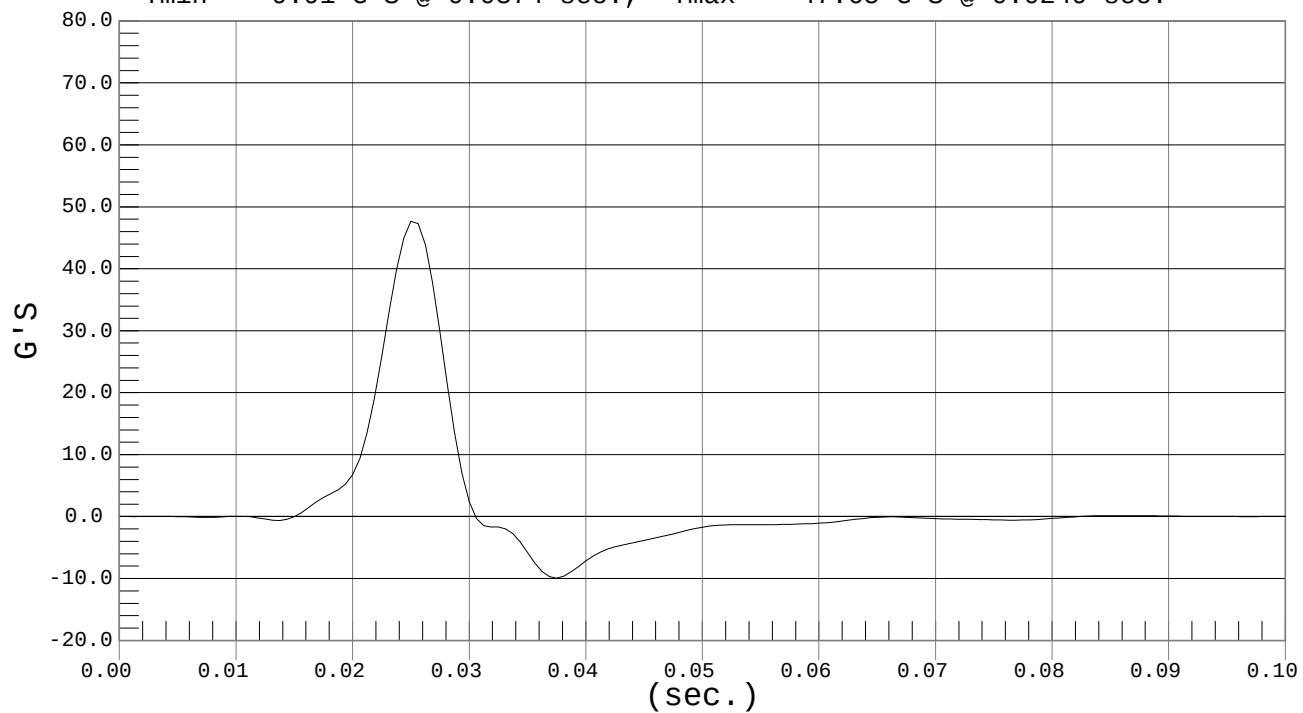


PELVIS ACCELERATION

Test Desc.: Pelvis Impact
Component: Dummy #037

Test Date: 01-15-02
Speed: 14.1 fps, 4.29 M/s

Ymin = -9.91 G'S @ 0.0374 sec., Ymax = 47.65 G'S @ 0.0249 sec.



SID Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Preload = 10 lbs)

ATD Serial No.: 037

Test I.D.: D02054

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	22.6	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Force @ 12.7	mm	104 – 162	135	Pass
Force @ 19	mm	163 – 222	185	Pass
Force @ 25.4	mm	222 – 280	244	Pass
Force @ 33	mm	325 - 391	347	Pass
Overall Test Results				Pass

Laboratory Technician

01/14/02
Test Date

Approved By

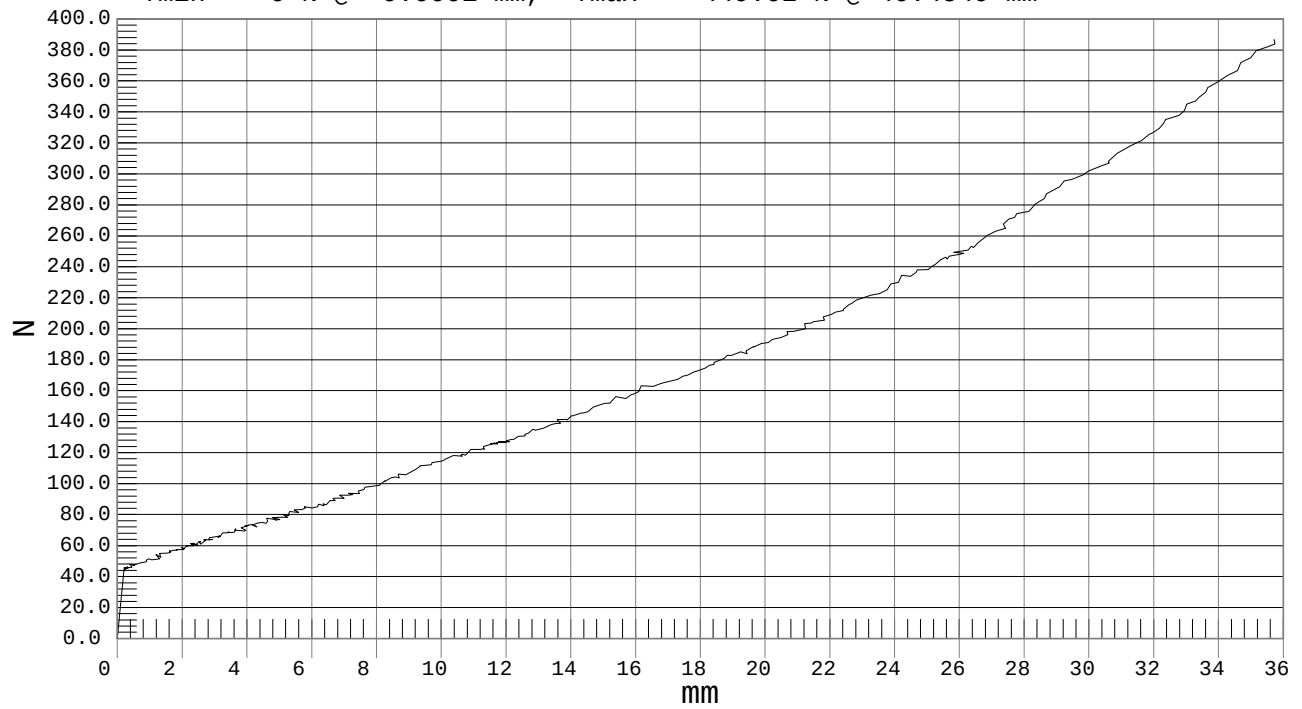


ABDOMEN COMPRESSION

Test Desc.: ABDOMEN COMPRESSION
Component: DUMMY # 037

Test Date: 01-14-02
Speed: 0.0 fps, 0.00 M/s

Ymin = 0 N @ -0.0001 mm, Ymax = 449.02 N @ 40.4549 mm



SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No.: 037

Test I.D.: D02055

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	22.5	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Force @ 0	mm	0 – 26.7	0.0	Pass
Force @ 20	mm	97.9 – 151.2	118.7	Pass
Force @ 30	mm	151.2 – 204.6	182.5	Pass
Force @ 40	mm	204.6 – 258.0	254.3	Pass
Return Angle	Degrees	12 Maximum	4	Pass
Overall Test Results				Pass

Laboratory Technician

01/14/02
Test Date

Approved By

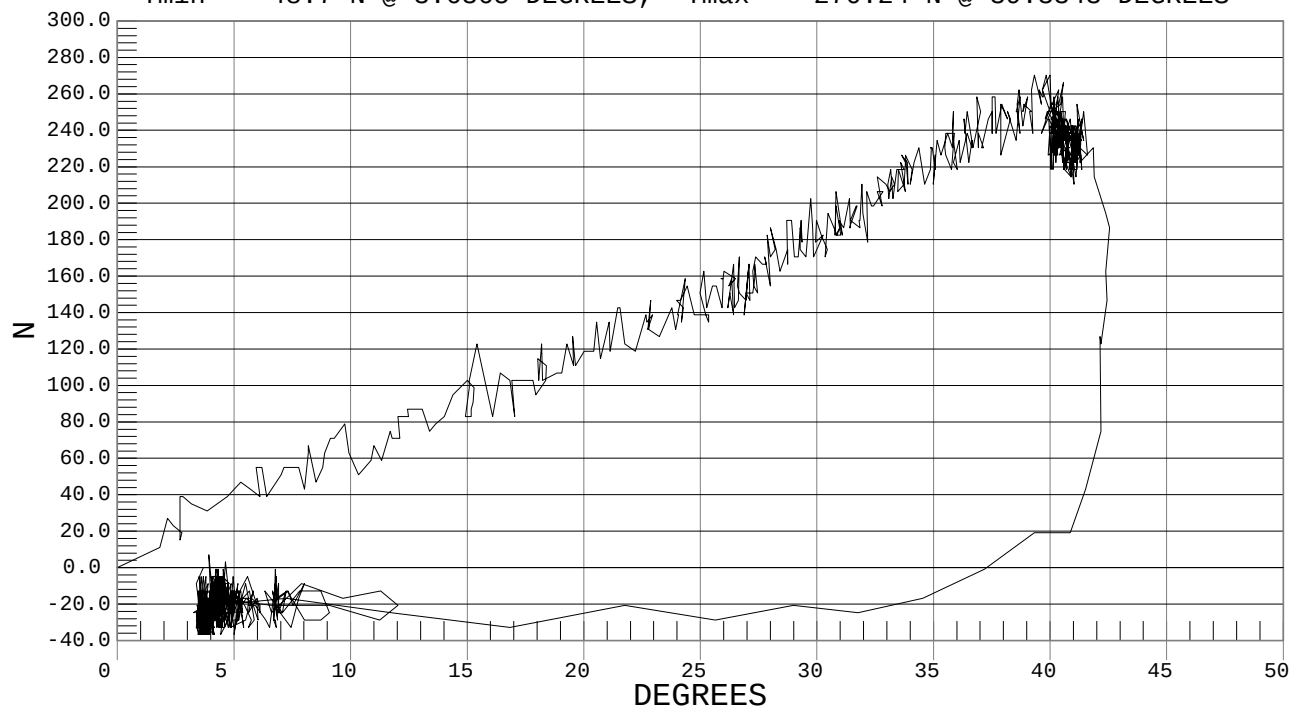


LUMBAR FLEXION

Test Desc.: LUMBAR FLEXION
Component: DUMMY # 037

Test Date: 01-14-02
Speed: 0.0 fps, 0.00 M/s

Ymin = -48.7 N @ 3.6365 DEGREES, Ymax = 270.24 N @ 39.3343 DEGREES



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No.: 037

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, weldment, 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		

Notes (include component/problem/section/reason):

Laboratory Technician

01/15/02
Test Date

Approved By

CERTIFICATION DATA

Dummy Serial Number: 036

Calibration Test Results Summary

Dummy Serial Number: 036

Pre-Test Calibration

Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all impact test requirements.
Shoulder Impact Test:	The shoulder passed all impact test requirements.
Rib Tests:	All ribs passed all impact test requirements.
Abdomen Test:	The abdomen passed all impact test requirements.
Lumbar Spine Test:	The lumbar spine passed all impact test requirements.
Pelvis Test:	The pelvis passed all impact test requirements.

Approved By SID Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No.: 036

Test Number: D0204

Tested Parameter	Units	Specification	Result	Pass/Fail
SH – Seated Height	mm	889 - 909	903	Pass
RH – Rib Height	mm	501 – 521	506	Pass
HP – Hip Pivot Height	mm	99 ref.	99	Pass
RD-Rib from Back Line	mm	229 – 241	232	Pass
KV – Knee Pivot from Back Line	mm	511 – 526	518	Pass
SW – Knee Pivot to Floor	mm	490 – 505	497	Pass
HW – Hip Width	mm	356 – 391	370	Pass
Overall Test Results				Pass

Laboratory Technician

01/15/02
Test Date

Approved By

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration

ATD Serial No.: 036

Test I.D.: D02041

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Peak Resultant Acceleration	G's	210 to 260	257	Pass
Peak Lateral Acceleration	G's	< 10	-3	Pass
Time Above 100 G	msec	0.9 – 1.5	1.1	Pass
Overall Test Results				Pass

Laboratory Technician

01/15/02
Test Date

Approved By

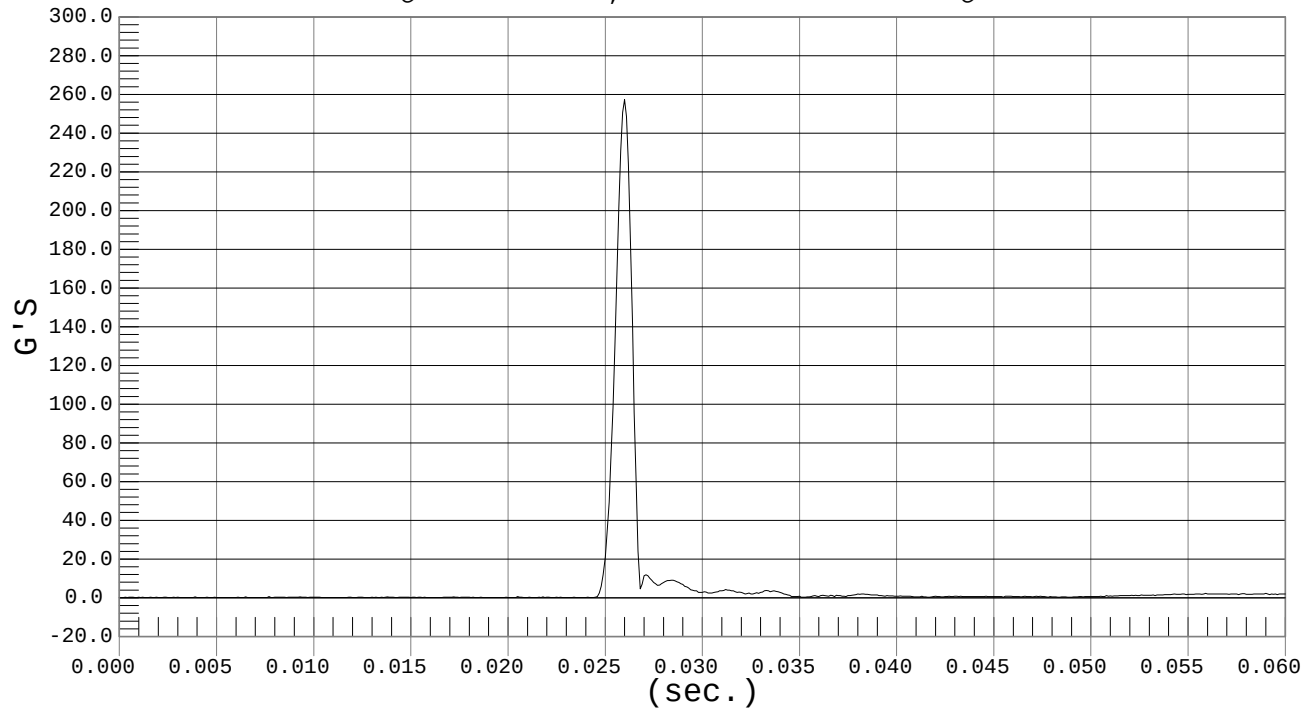


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #036

Test Date: 01-15-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .07 G'S @ 0.0019 sec., Ymax = 257.29 G'S @ 0.0259 sec.

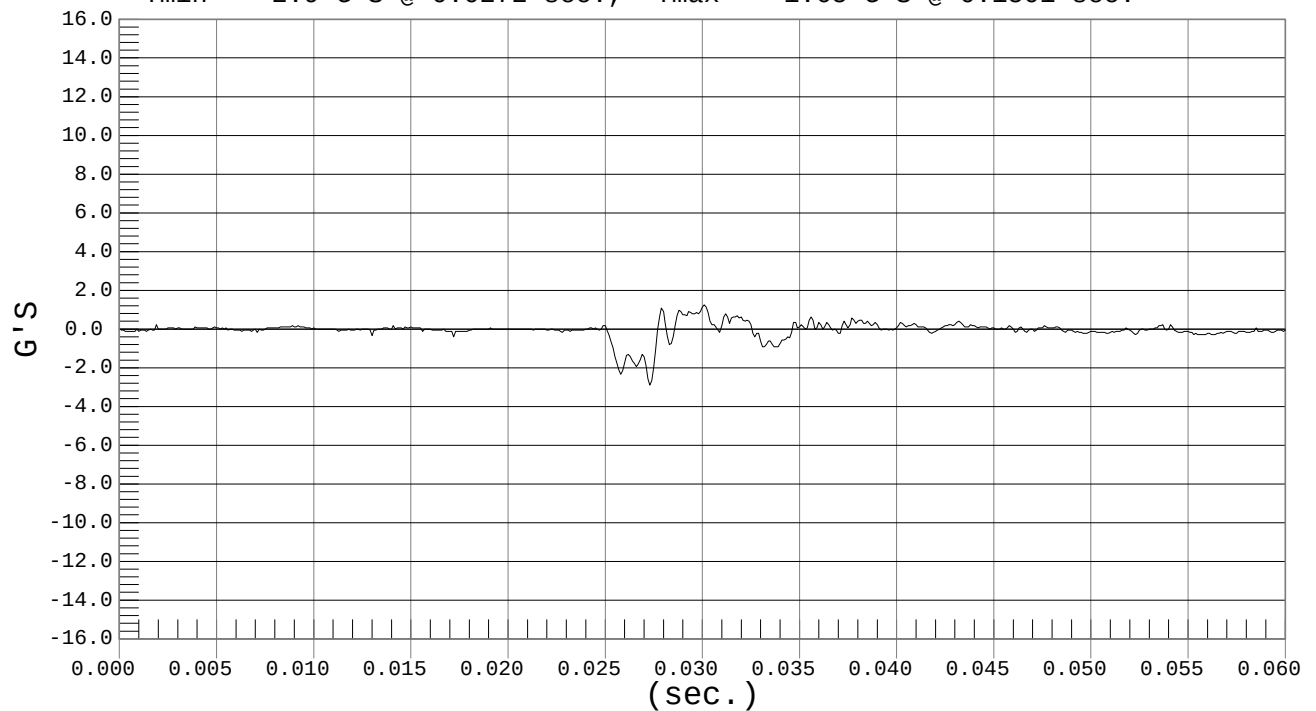


PEAK LATERAL ACCELARATION

Test Desc.: Head Drop
Component: Dummy #036

Test Date: 01-15-02
Speed: 0.0 fps, 0.00 M/s

Ymin = -2.9 G'S @ 0.0272 sec., Ymax = 1.65 G'S @ 0.1501 sec.



SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Calibration

ATD Serial No.: 036

Test I.D.: D02042

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Probe Velocity	m/s	4.27 – 4.33	4.27	Pass
Upper Rib	G's	37 – 46	42	Pass
Lower Rib	G's	37 – 46	44	Pass
Lower Spine	G's	15 - 22	19	Pass
Overall Test Results				Pass

Laboratory Technician

01/15/02

Test Date

Approved By

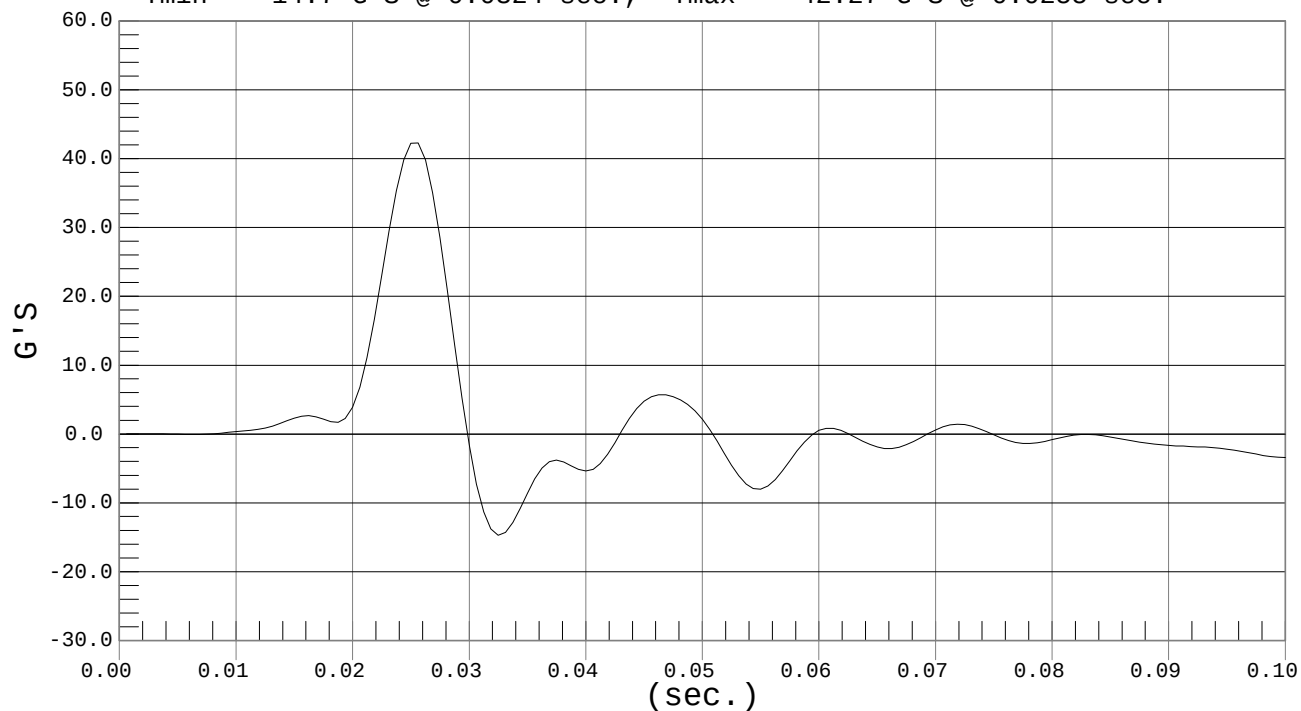


UPPER RIB ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #036

Test Date: 01-15-02
Speed: 14.0 fps, 4.27 M/s

Ymin = -14.7 G'S @ 0.0324 sec., Ymax = 42.27 G'S @ 0.0255 sec.

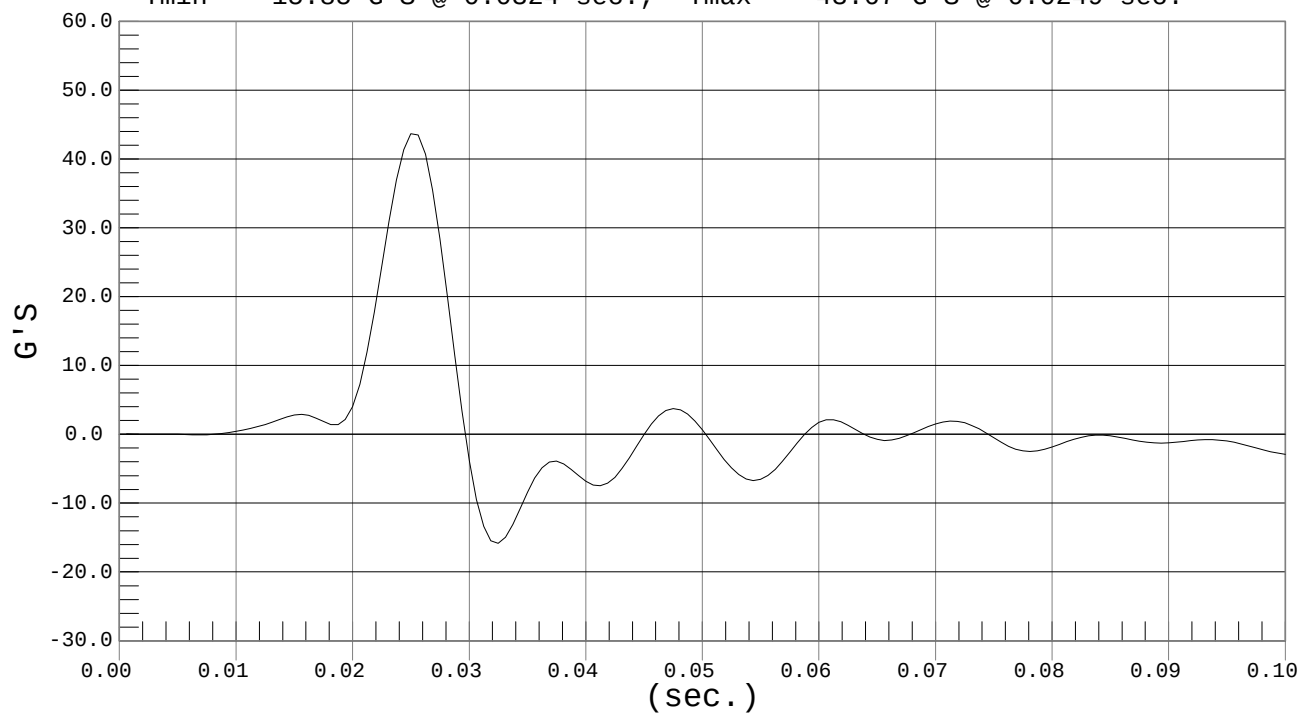


LOWER RIB ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #036

Test Date: 01-15-02
Speed: 14.0 fps, 4.27 M/s

Ymin = -15.85 G'S @ 0.0324 sec., Ymax = 43.67 G'S @ 0.0249 sec.



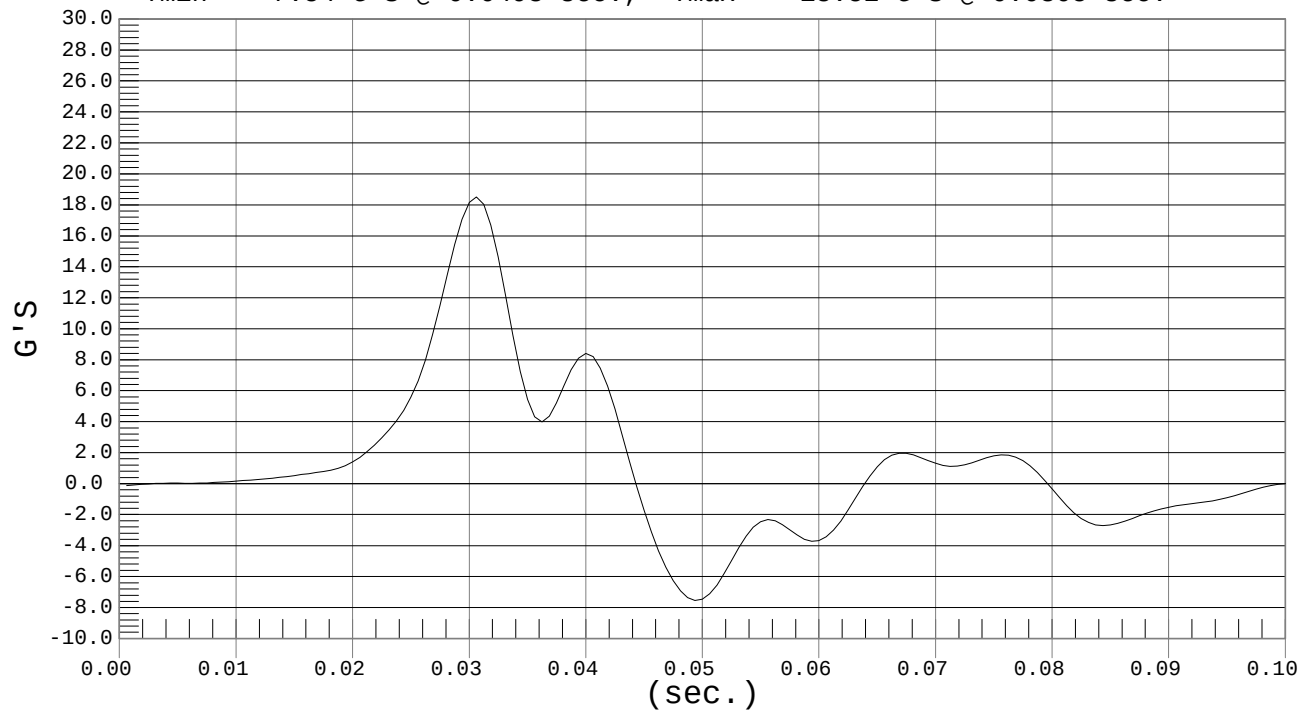


LOWER SPINE ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #036

Test Date: 01-15-02
Speed: 14.0 fps, 4.27 M/s

Ymin = -7.54 G'S @ 0.0493 sec., Ymax = 18.52 G'S @ 0.0305 sec.



SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Calibration

ATD Serial No.: 036

Test I.D.: D02043

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Probe Speed	m/s	4.27 – 4.33	4.27	Pass
Pelvis Acceleration	G's	40 - 60	42	Pass
Overall Test Results				Pass

Laboratory Technician

01/15/02

Test Date

Approved By

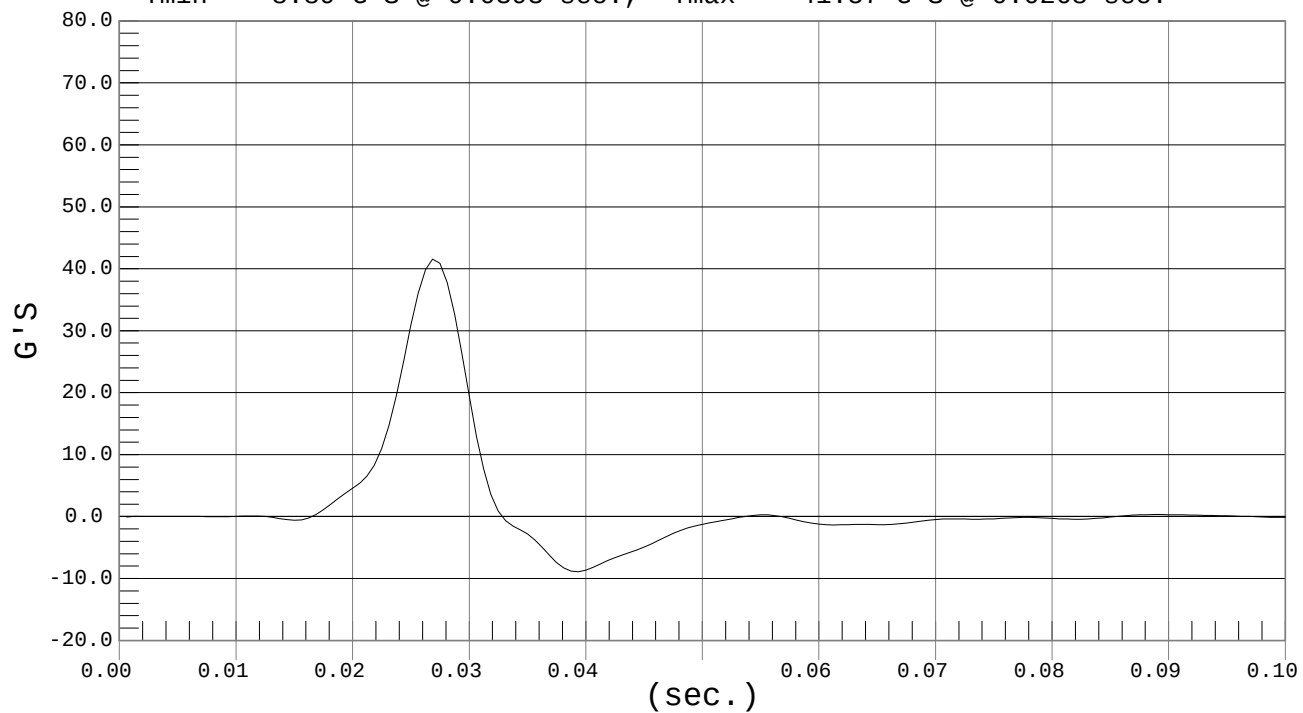


PELVIS ACCELERATION

Test Desc.: Pelvis Impact
Component: Dummy #036

Test Date: 01-15-02
Speed: 14.0 fps, 4.27 M/s

Ymin = -8.89 G'S @ 0.0393 sec., Ymax = 41.57 G'S @ 0.0268 sec.



SID Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Preload = 10 lbs)

ATD Serial No.: 036

Test I.D.: D02044

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	22.6	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Force @ 12.7	mm	104 – 162	139	Pass
Force @ 19	mm	163 – 222	189	Pass
Force @ 25.4	mm	222 – 280	243	Pass
Force @ 33	mm	325 - 391	345	Pass
Overall Test Results				Pass

Laboratory Technician

01/14/02
Test Date

Approved By

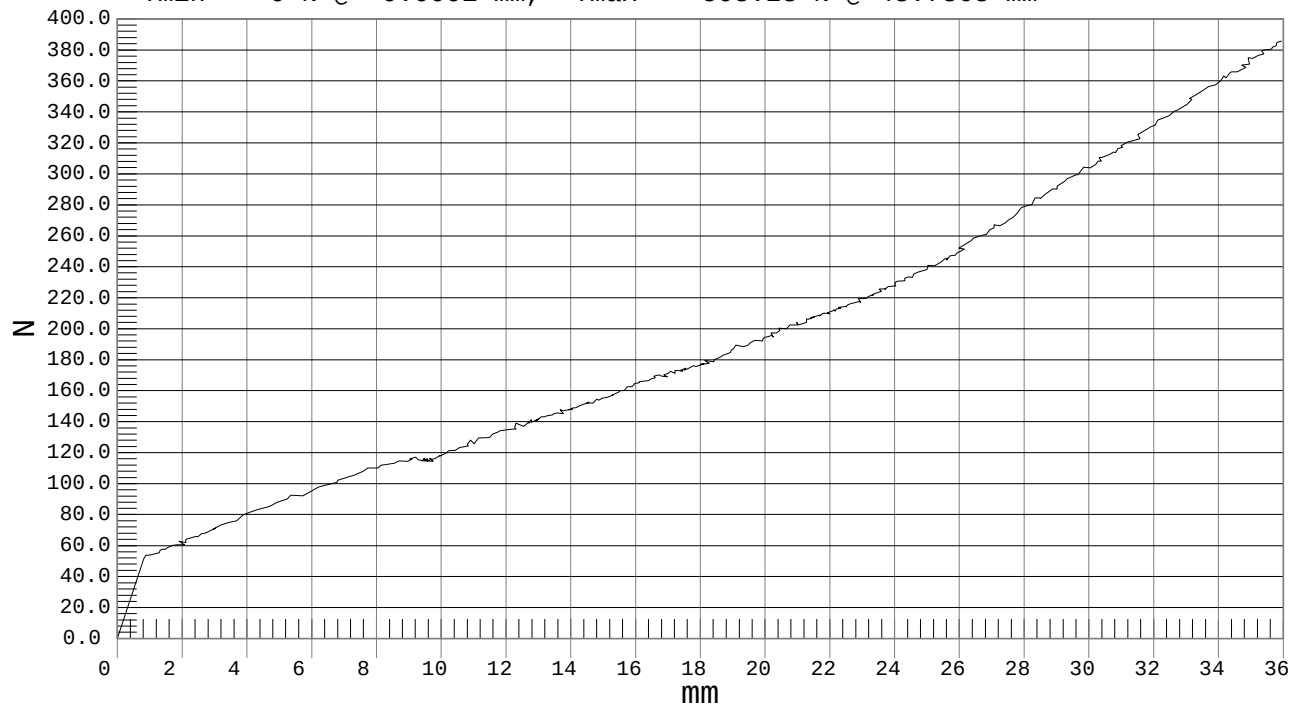


ABDOMEN COMPRESSION

Test Desc.: ABDOMEN COMPRESSION
Component: Dummy # 036

Test Date: 01-14-02
Speed: 0.0 fps, 0.00 M/s

Ymin = 0 N @ -0.0001 mm, Ymax = 508.23 N @ 43.7868 mm



SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No.: 036

Test I.D.: D02045

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	22.6	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Force @ 0	mm	0 – 26.7	0.0	Pass
Force @ 20	mm	97.9 – 151.2	121.5	Pass
Force @ 30	mm	151.2 – 204.6	173.6	Pass
Force @ 40	mm	204.6 – 258.0	217.7	Pass
Return Angle	Degrees	12 Maximum	7	Pass
Overall Test Results				Pass

Laboratory Technician

01/14/02

Test Date

Approved By

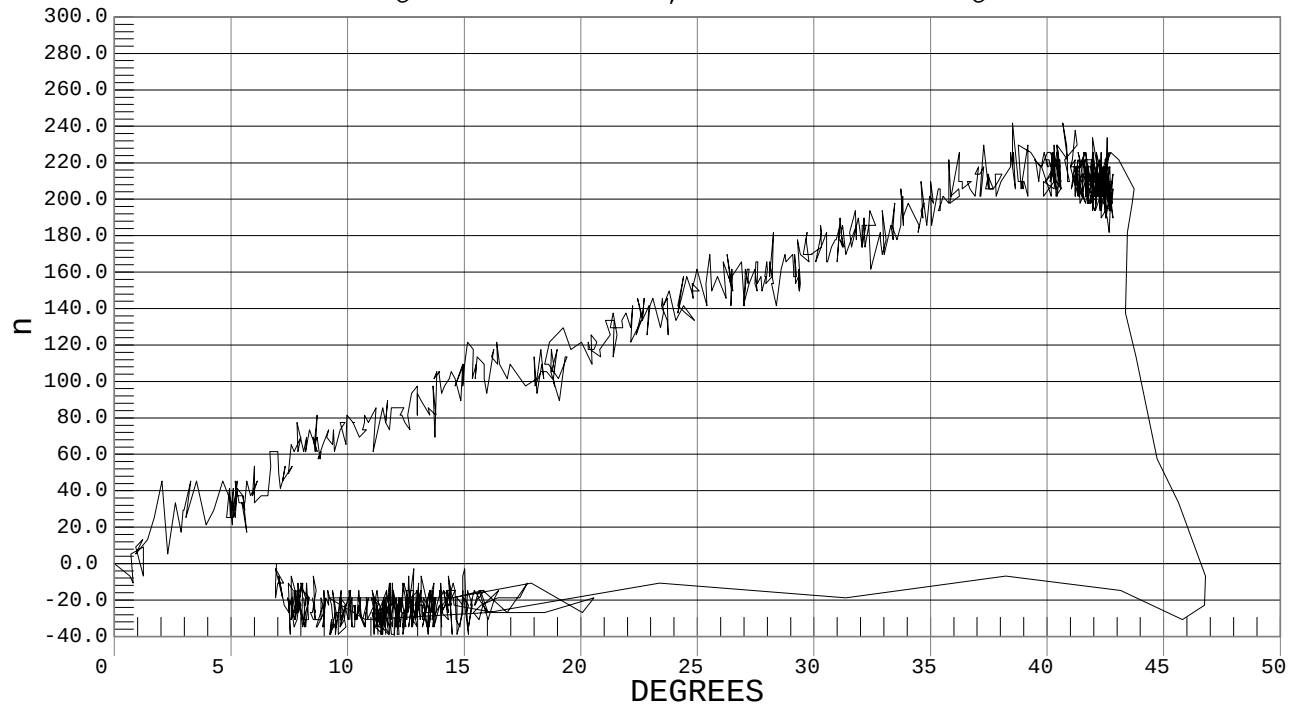


LUMBAR FLEXION

Test Desc.: LUMBAR FLEXION
Component: DUMMY # 036

Test Date: 01-14-02
Speed: 0.0 fps, 0.00 M/s

Ymin = -54.88 n @ 10.8058 DEGREES, Ymax = 241.8 n @ 38.5201 DEGREES



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No.: 036

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, weldment, 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		

Notes (include component/problem/section/reason):

Laboratory Technician

01/15/02
Test Date

Approved By

CERTIFICATION DATA

Dummy Serial Number: 037

Calibration Test Results Summary

Dummy Serial Number: 037

Post-Test Calibration

Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all impact test requirements.
Shoulder Impact Test:	The shoulder passed all impact test requirements.
Rib Tests:	All ribs passed all impact test requirements.
Abdomen Test:	The abdomen passed all impact test requirements.
Lumbar Spine Test:	The lumbar spine passed all impact test requirements.
Pelvis Test:	The pelvis passed all impact test requirements.

SID Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No.: 037

Test Number: D0209

Tested Parameter	Units	Specification	Result	Pass/Fail
SH – Seated Height	mm	889 - 909	902	Pass
RH – Rib Height	mm	501 – 521	509	Pass
HP – Hip Pivot Height	mm	99 ref.	99	Pass
RD-Rib from Back Line	mm	229 – 241	232	Pass
KV – Knee Pivot from Back Line	mm	511 – 526	519	Pass
SW – Knee Pivot to Floor	mm	490 – 505	493	Pass
HW – Hip Width	mm	356 – 391	378	Pass
Overall Test Results				Pass

Laboratory Technician

01/18/02
Test Date

Approved By

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration

ATD Serial No.: 037

Test I.D.: D02091

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Peak Resultant Acceleration	G's	210 to 260	225	Pass
Peak Lateral Acceleration	G's	< 10	-4	Pass
Time Above 100 G	msec	0.9 – 1.5	1.1	Pass
Overall Test Results				Pass

Laboratory Technician

01/18/02

Test Date

Approved By

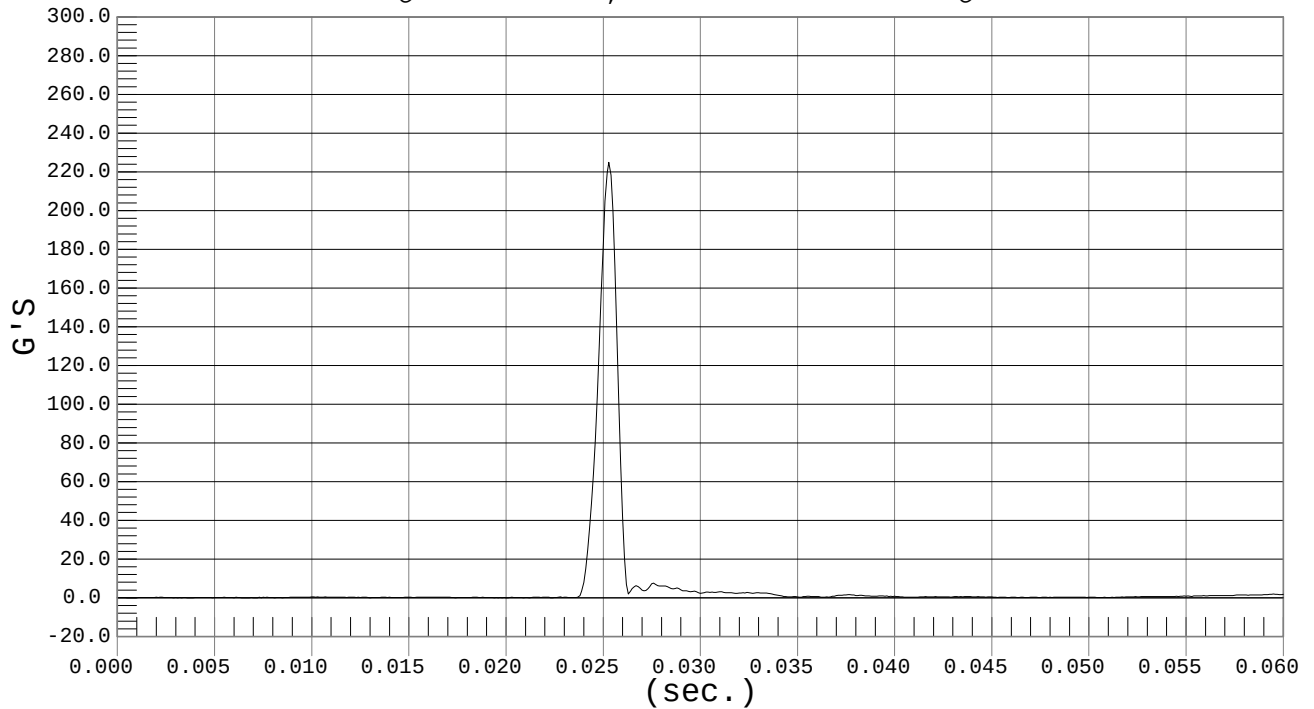


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #037

Test Date: 01-18-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .05 G'S @ 0.0006 sec., Ymax = 224.91 G'S @ 0.0252 sec.

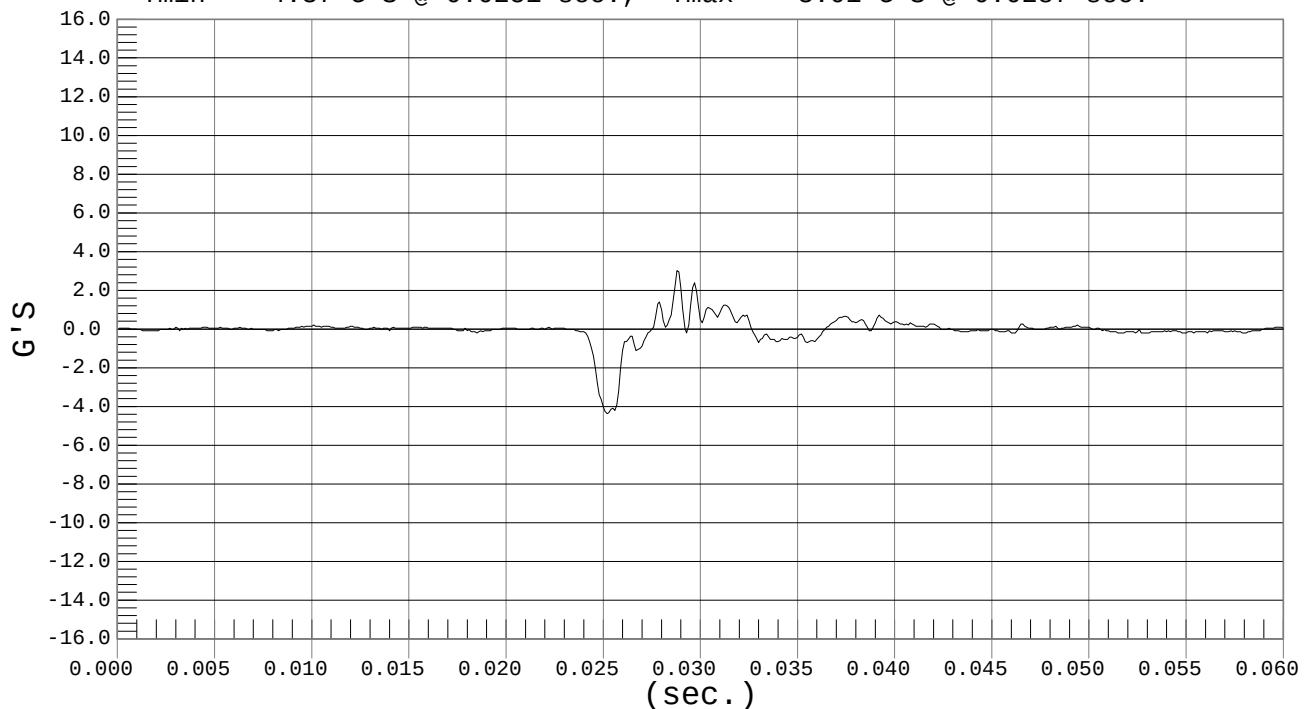


PEAK LATERAL ACCELARATION

Test Desc.: Head Drop
Component: Dummy #037

Test Date: 01-18-02
Speed: 0.0 fps, 0.00 M/s

Ymin = -4.37 G'S @ 0.0251 sec., Ymax = 3.01 G'S @ 0.0287 sec.



SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Calibration

ATD Serial No.: 037

Test I.D.: D02092

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Probe Velocity	m/s	4.27 – 4.33	4.28	Pass
Upper Rib	G's	37 – 46	44	Pass
Lower Rib	G's	37 – 46	44	Pass
Lower Spine	G's	15 - 22	20	Pass
Overall Test Results				Pass

Laboratory Technician

01/18/02

Test Date

Approved By

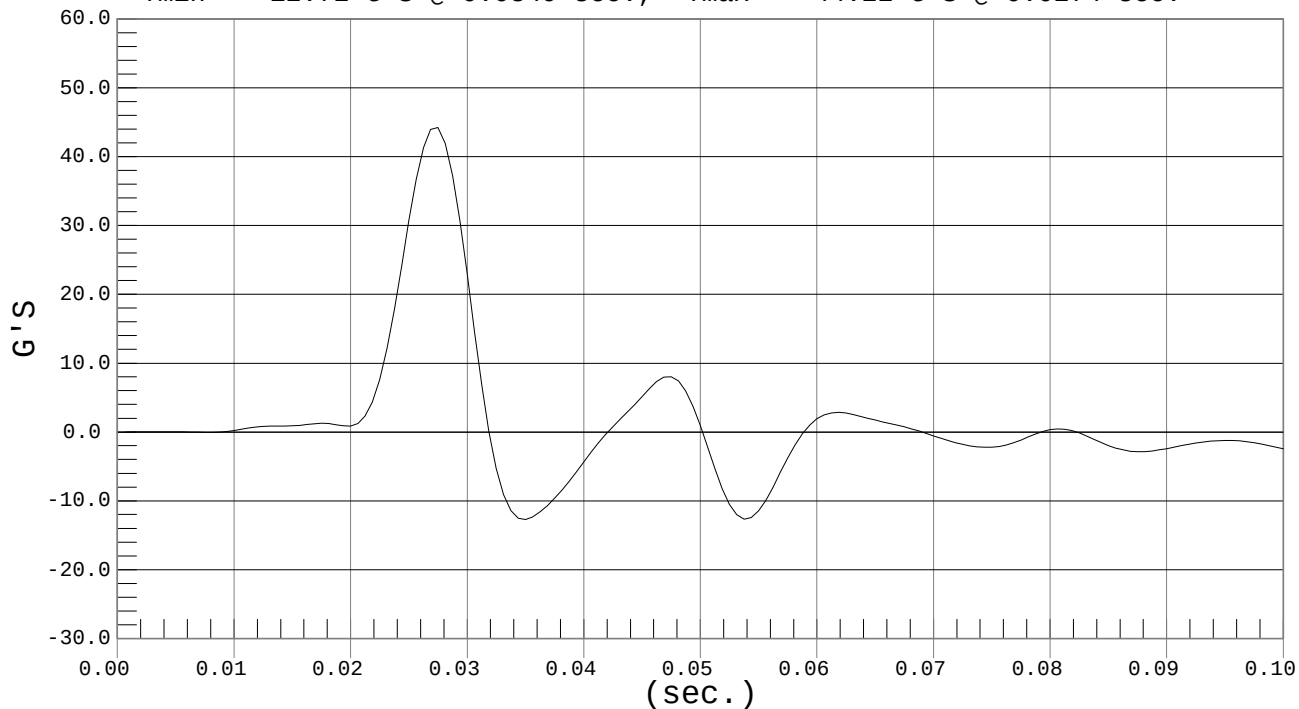


UPPER RIB ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #037

Test Date: 01-18-02
Speed: 14.0 fps, 4.28 M/s

Ymin = -12.72 G'S @ 0.0349 sec., Ymax = 44.22 G'S @ 0.0274 sec.

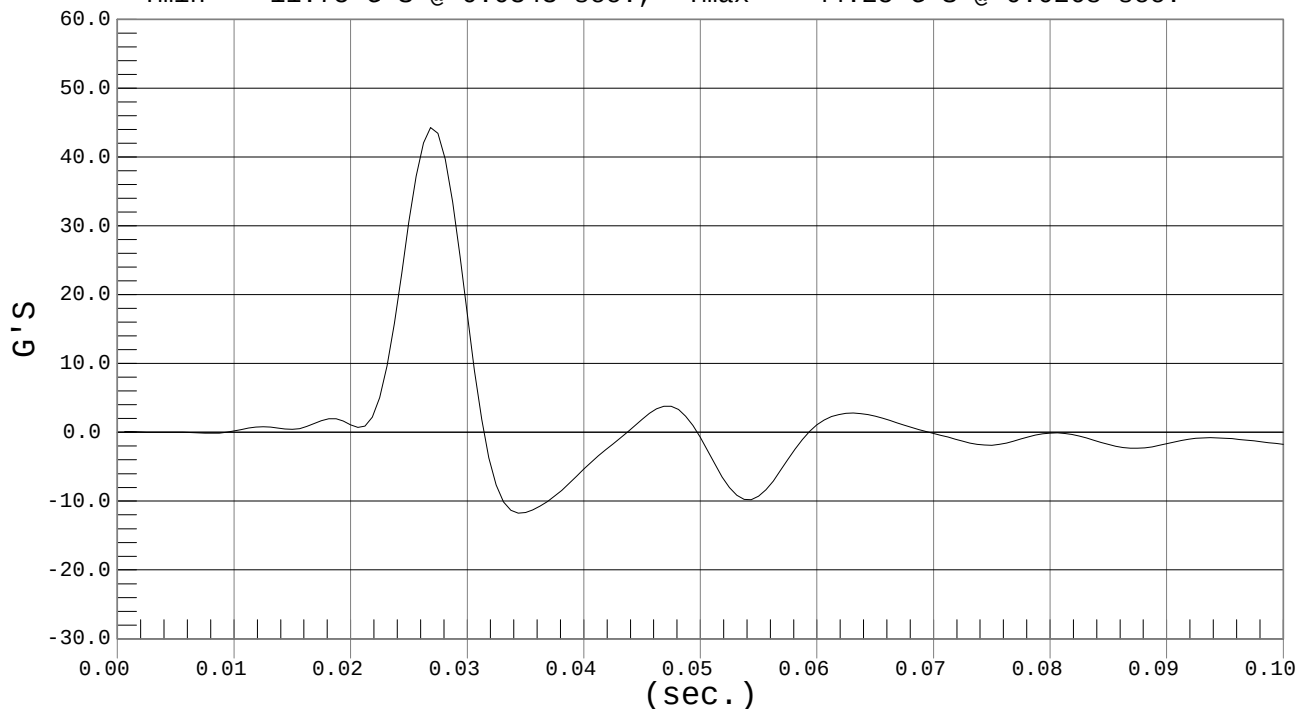


LOWER RIB ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #037

Test Date: 01-18-02
Speed: 14.0 fps, 4.28 M/s

Ymin = -11.75 G'S @ 0.0343 sec., Ymax = 44.25 G'S @ 0.0268 sec.



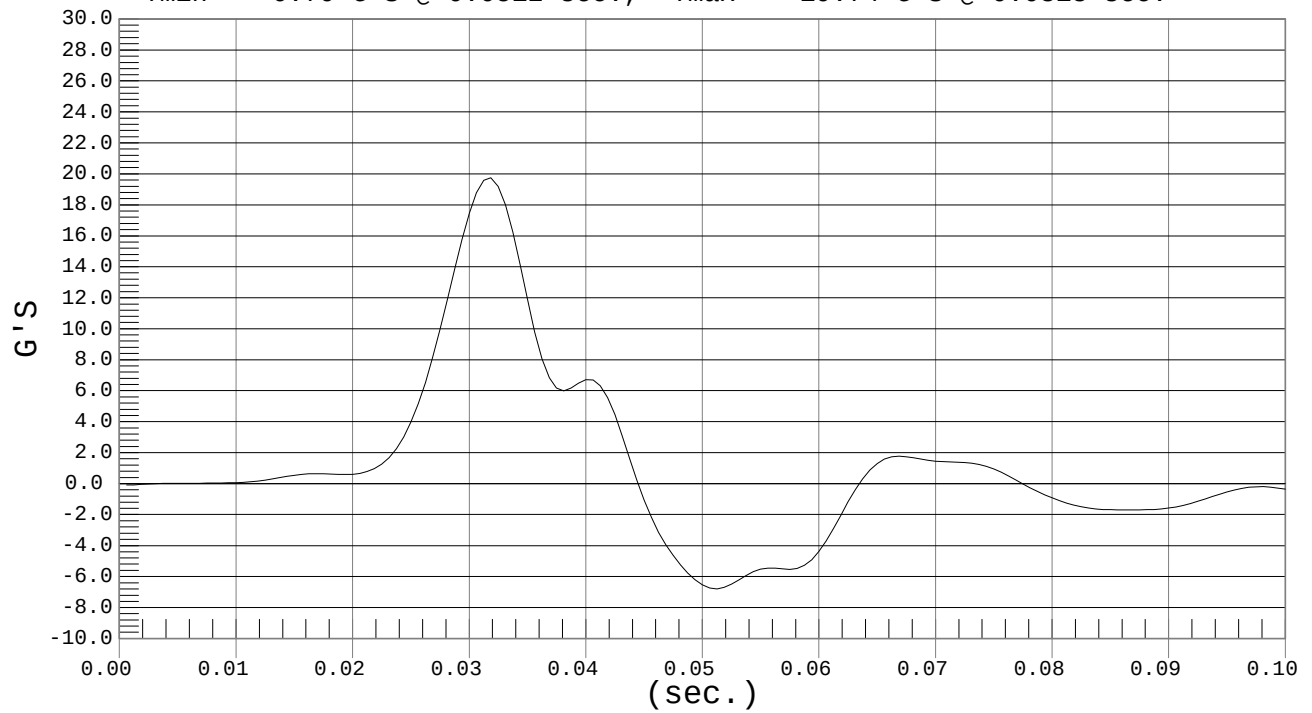


LOWER SPINE ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #037

Test Date: 01-18-02
Speed: 14.0 fps, 4.28 M/s

Ymin = -6.79 G'S @ 0.0512 sec., Ymax = 19.74 G'S @ 0.0318 sec.



SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Calibration

ATD Serial No.: 037

Test I.D.: D02093

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Probe Speed	m/s	4.27 – 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	48	Pass
			Overall Test Results	Pass

Laboratory Technician

01/18/02

Test Date

Approved By

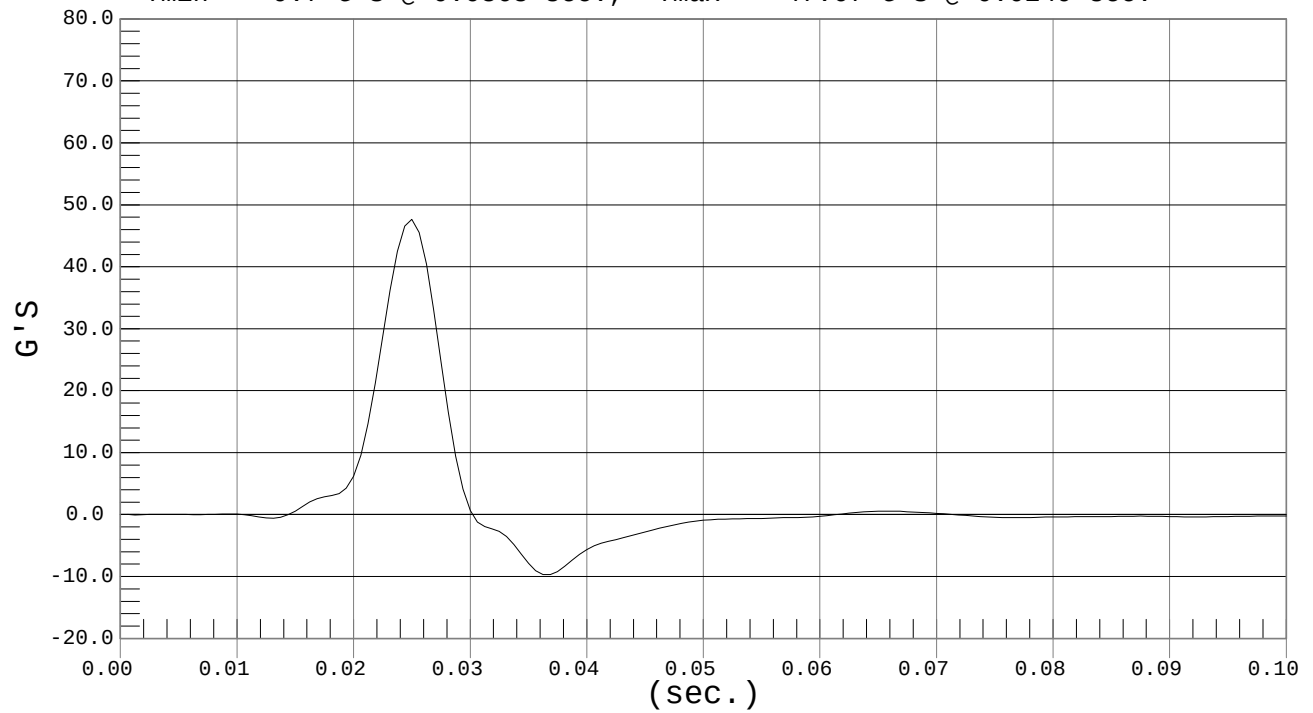


PELVIS ACCELERATION

Test Desc.: Pelvis Impact
Component: Dummy #037

Test Date: 01-18-02
Speed: 14.1 fps, 4.30 M/s

Ymin = -9.7 G'S @ 0.0368 sec., Ymax = 47.67 G'S @ 0.0249 sec.



SID Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Preload = 10 lbs)

ATD Serial No.: 037

Test I.D.: D02094

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Force @ 12.7	mm	104 – 162	137	Pass
Force @ 19	mm	163 – 222	188	Pass
Force @ 25.4	mm	222 – 280	251	Pass
Force @ 33	mm	325 - 391	353	Pass
Overall Test Results				Pass

Laboratory Technician

01/17/02

Test Date

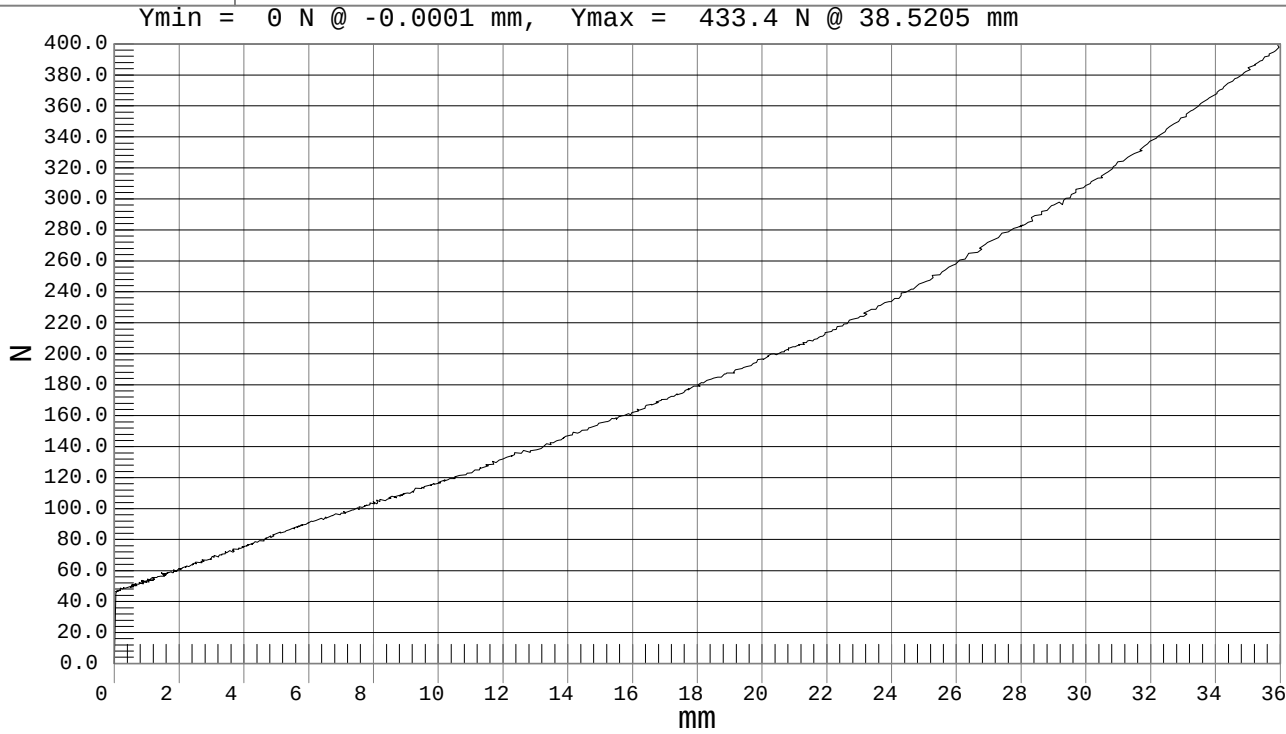
Approved By



ABDOMEN COMPRESSION

Test Desc.: ABDOMEN COMPRESSION
Component: DUMMY # 037

Test Date: 01-17-02
Speed: 0.0 fps, 0.00 M/s



SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No.: 037

Test I.D.: D02095

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Force @ 0	mm	0 – 26.7	0.0	Pass
Force @ 20	mm	97.9 – 151.2	100.1	Pass
Force @ 30	mm	151.2 – 204.6	159.9	Pass
Force @ 40	mm	204.6 – 258.0	231.7	Pass
Return Angle	Degrees	12 Maximum	4	Pass
Overall Test Results				Pass

Laboratory Technician

01/18/02

Test Date

Approved By

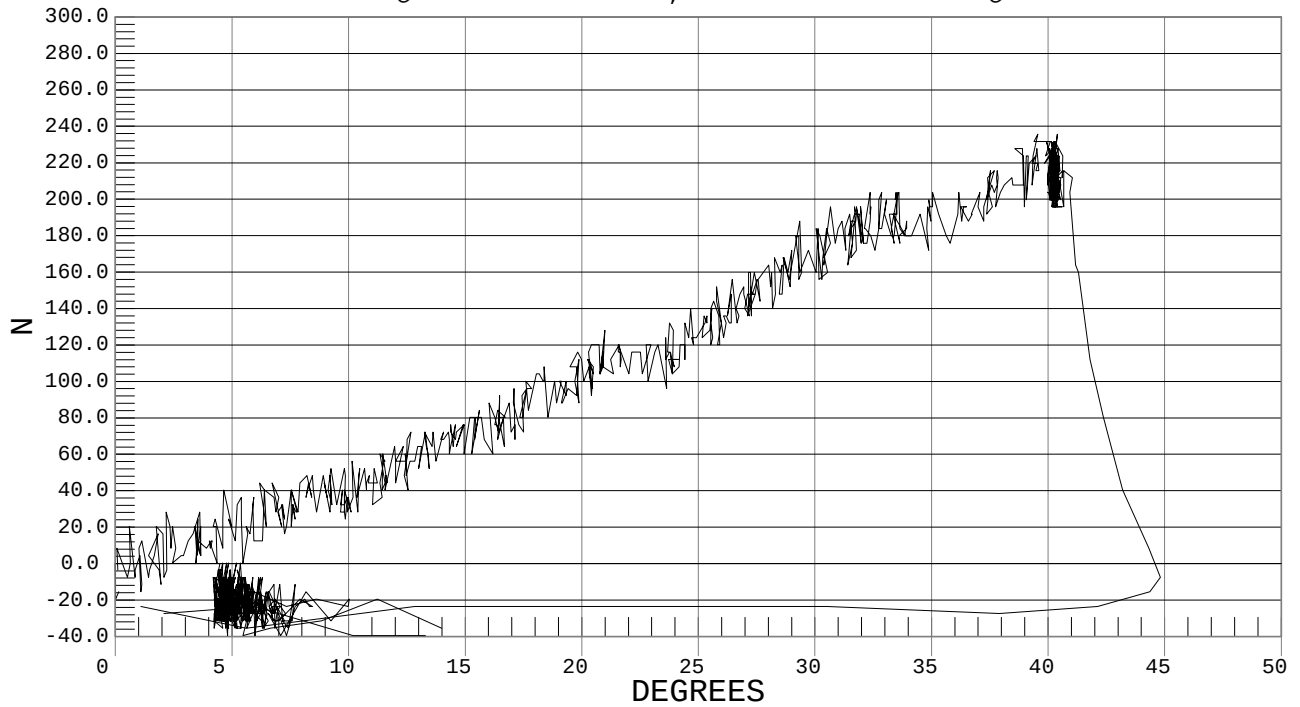


LUMBAR FLEXION

Test Desc.: LUMBAR FLEXION
Component: DUMMY # 037

Test Date: 01-18-02
Speed: 0.0 fps, 0.00 M/s

Ymin = -43.39 N @ 14.6193 DEGREES, Ymax = 235.66 N @ 39.5622 DEGREES



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No.: 037

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, weldment, 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	Fail
Joints	1 to 2 g range	Pass
Other		

Notes (include component/problem/section/reason): Left foot broken; replaced

Laboratory Technician

01/18/02
Test Date

Approved By

CERTIFICATION DATA

Dummy Serial Number: 036

Calibration Test Results Summary

Dummy Serial Number: 036

Post-Test Calibration

Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all impact test requirements.
Shoulder Impact Test:	The shoulder passed all impact test requirements.
Rib Tests:	All ribs passed all impact test requirements.
Abdomen Test:	The abdomen passed all impact test requirements.
Lumbar Spine Test:	The lumbar spine passed all impact test requirements.
Pelvis Test:	The pelvis passed all impact test requirements.

SID Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No.: 036

Test Number: D0208

Tested Parameter	Units	Specification	Result	Pass/Fail
SH – Seated Height	mm	889 - 909	903	Pass
RH – Rib Height	mm	501 – 521	506	Pass
HP – Hip Pivot Height	mm	99 ref.	99	Pass
RD-Rib from Back Line	mm	229 – 241	232	Pass
KV – Knee Pivot from Back Line	mm	511 – 526	518	Pass
SW – Knee Pivot to Floor	mm	490 – 505	497	Pass
HW – Hip Width	mm	356 – 391	370	Pass
Overall Test Results				Pass

Laboratory Technician

01/18/02
Test Date

Approved By

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration

ATD Serial No.: 036

Test I.D.: D02081

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Peak Resultant Acceleration	G's	210 to 260	236	Pass
Peak Lateral Acceleration	G's	< 10	2	Pass
Time Above 100 G	msec	0.9 – 1.5	1.1	Pass
Overall Test Results				Pass

Laboratory Technician

01/18/02

Test Date

Approved By

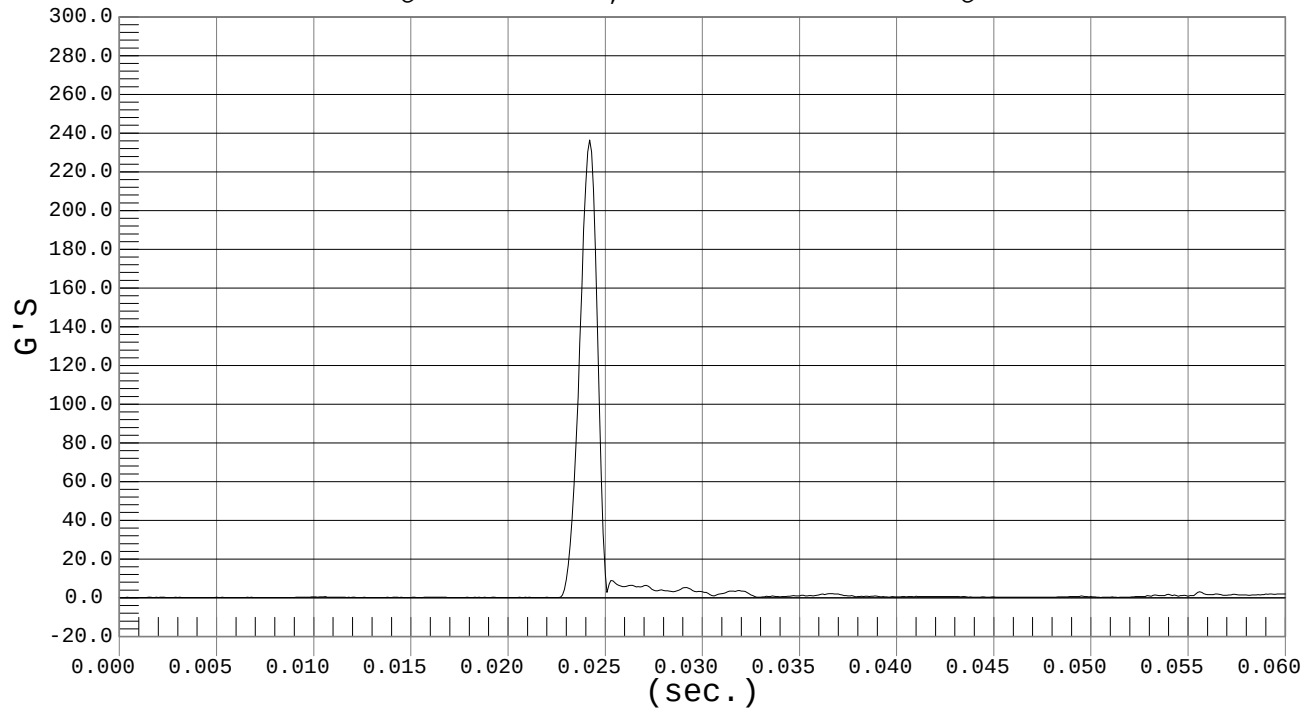


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #036

Test Date: 01-18-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .09 G'S @ 0.0002 sec., Ymax = 236.46 G'S @ 0.0241 sec.

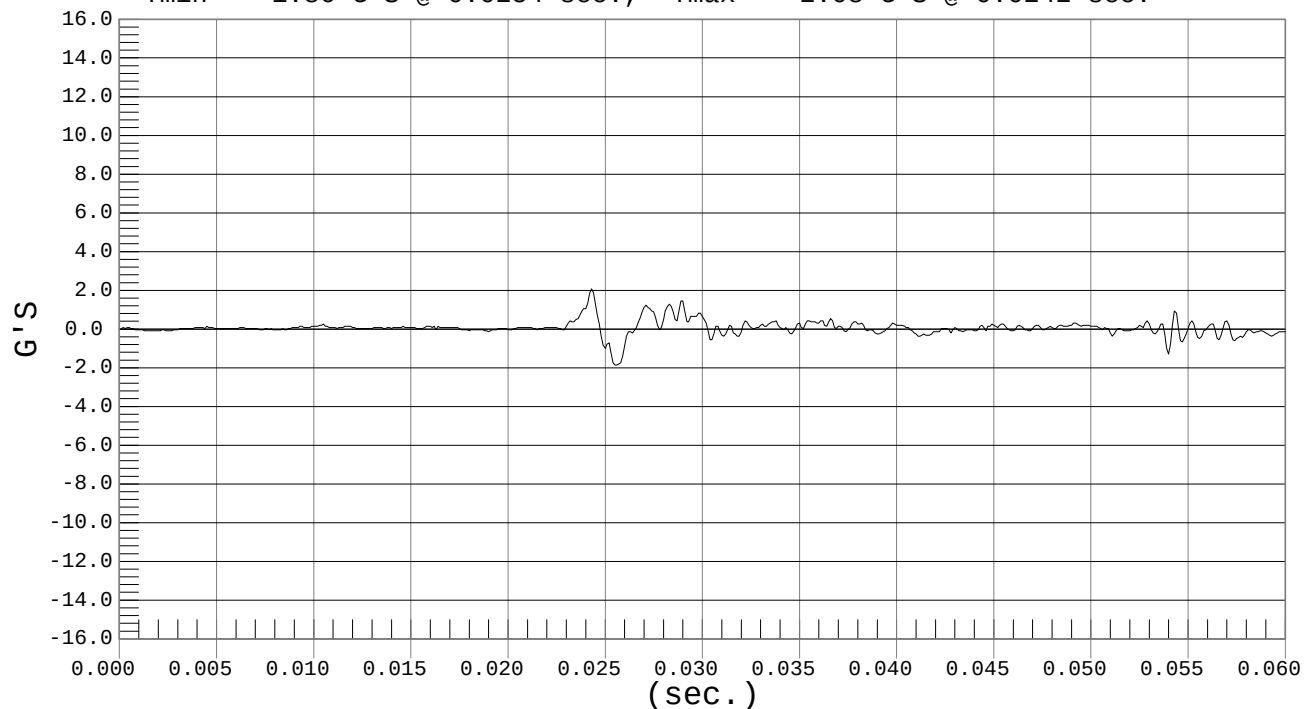


PEAK LATERAL ACCELARATION

Test Desc.: Head Drop
Component: Dummy #036

Test Date: 01-18-02
Speed: 0.0 fps, 0.00 M/s

Ymin = -1.86 G'S @ 0.0254 sec., Ymax = 2.08 G'S @ 0.0242 sec.



SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Calibration

ATD Serial No.: 036

Test I.D.: D02082

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Probe Velocity	m/s	4.27 – 4.33	4.30	Pass
Upper Rib	G's	37 – 46	44	Pass
Lower Rib	G's	37 – 46	46	Pass
Lower Spine	G's	15 - 22	19	Pass
Overall Test Results				Pass

Laboratory Technician

01/17/02

Test Date

Approved By

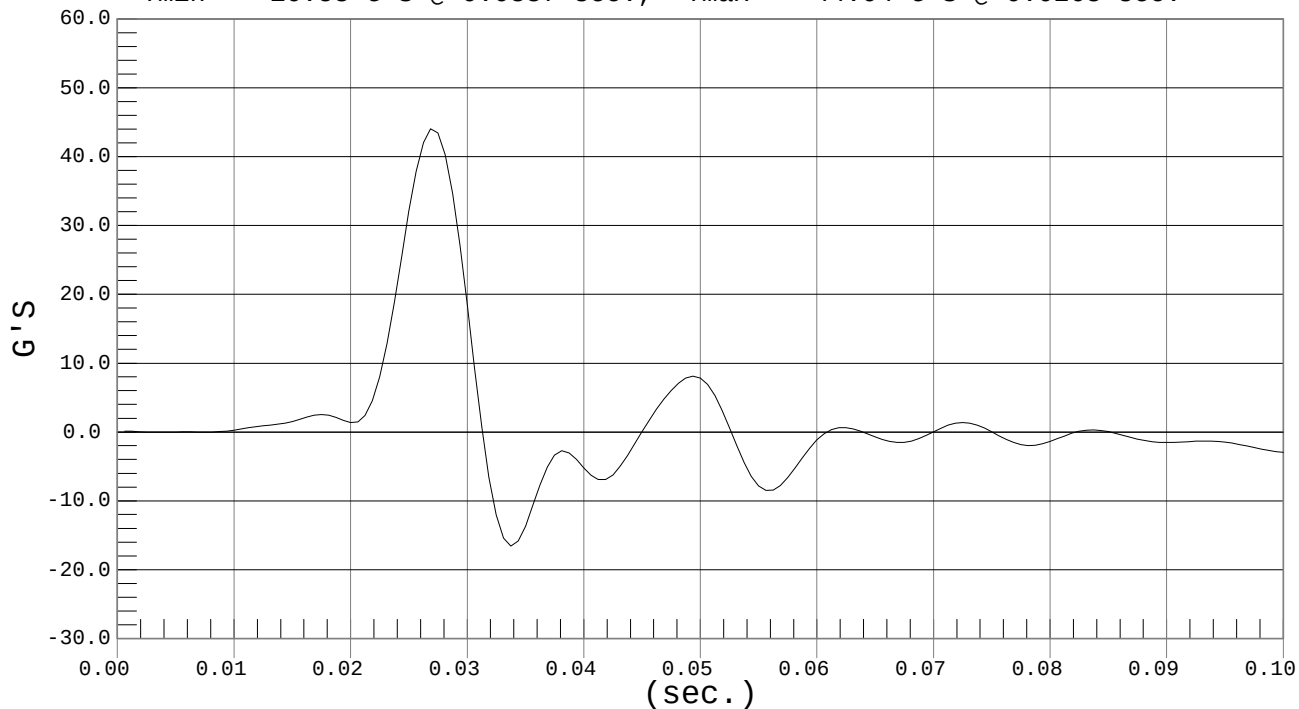


UPPER RIB ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #036

Test Date: 01-17-02
Speed: 14.1 fps, 4.30 M/s

Ymin = -16.58 G'S @ 0.0337 sec., Ymax = 44.04 G'S @ 0.0268 sec.

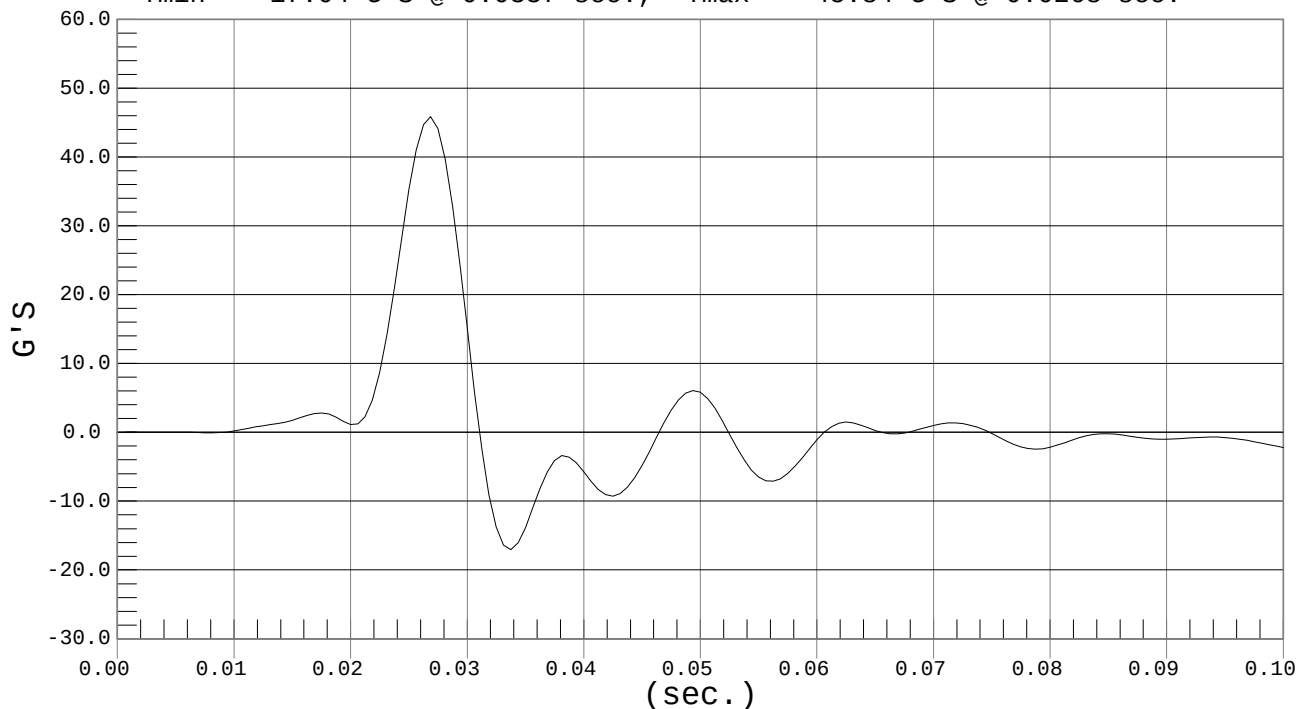


LOWER RIB ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #036

Test Date: 01-17-02
Speed: 14.1 fps, 4.30 M/s

Ymin = -17.04 G'S @ 0.0337 sec., Ymax = 45.84 G'S @ 0.0268 sec.



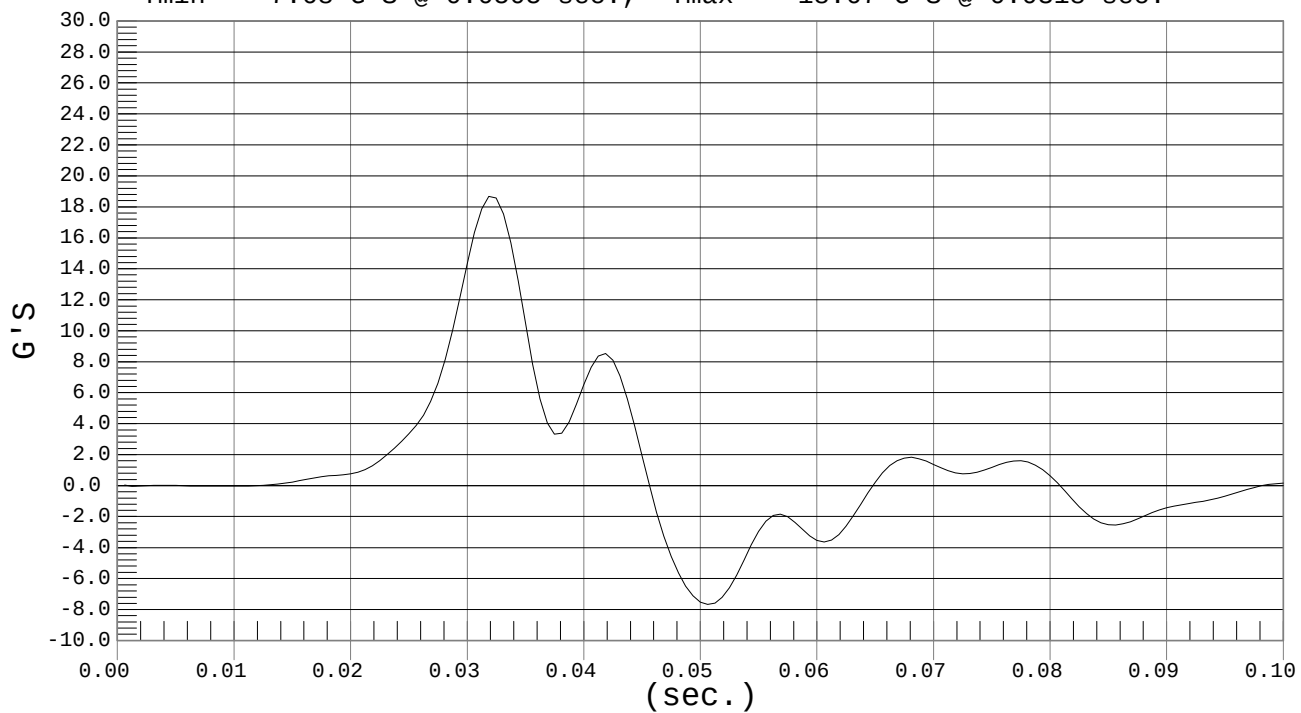


LOWER SPINE ACCELERATION

Test Desc.: Thorax Impact
Component: Dummy #036

Test Date: 01-17-02
Speed: 14.1 fps, 4.30 M/s

Ymin = -7.68 G'S @ 0.0505 sec., Ymax = 18.67 G'S @ 0.0318 sec.



SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Calibration

ATD Serial No.: 036

Test I.D.: D02083

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Probe Speed	m/s	4.27 – 4.33	4.27	Pass
Pelvis Acceleration	G's	40 - 60	46	Pass
Overall Test Results				Pass

Laboratory Technician

01/17/02

Test Date

Approved By

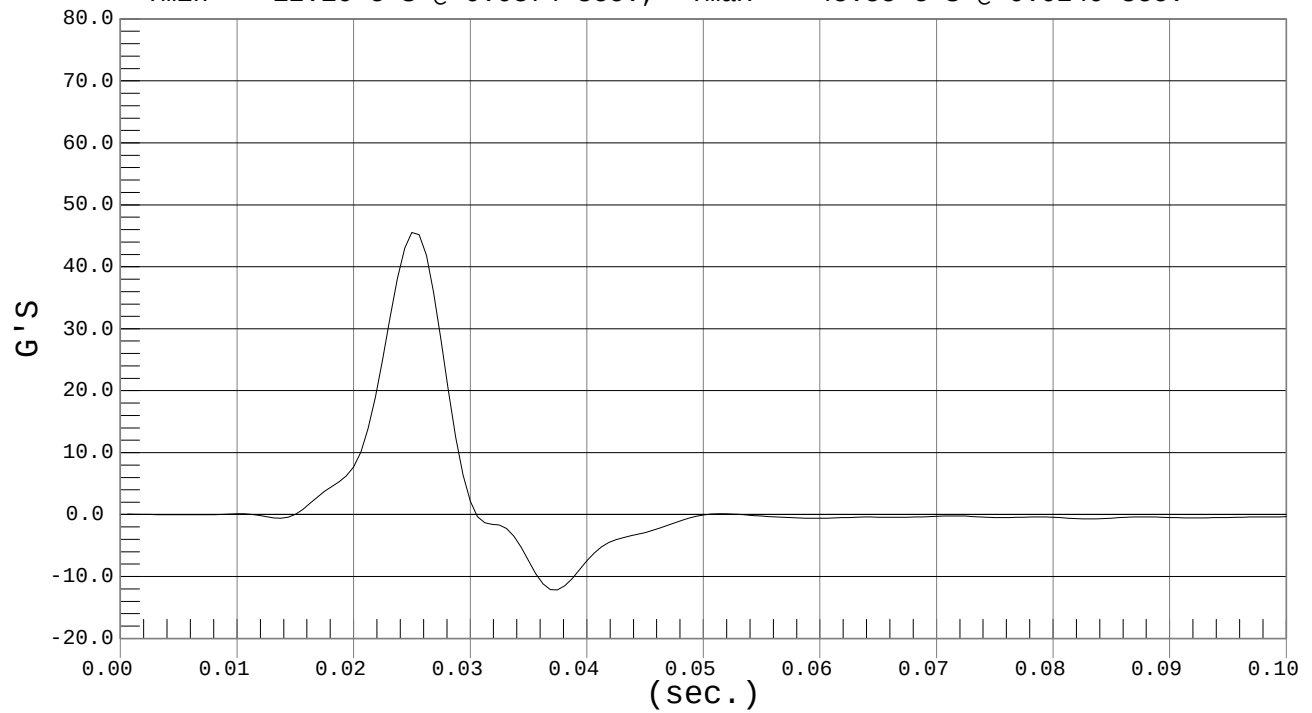


PELVIS ACCELERATION

Test Desc.: Pelvis Impact
Component: Dummy #036

Test Date: 01-17-02
Speed: 14.0 fps, 4.27 M/s

Ymin = -12.16 G'S @ 0.0374 sec., Ymax = 45.55 G'S @ 0.0249 sec.



SID Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Preload = 10 lbs)

ATD Serial No.: 036

Test I.D.: D02084

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Force @ 12.7	mm	104 – 162	137	Pass
Force @ 19	mm	163 – 222	186	Pass
Force @ 25.4	mm	222 – 280	249	Pass
Force @ 33	mm	325 - 391	341	Pass
Overall Test Results				Pass

Laboratory Technician

01/17/02

Test Date

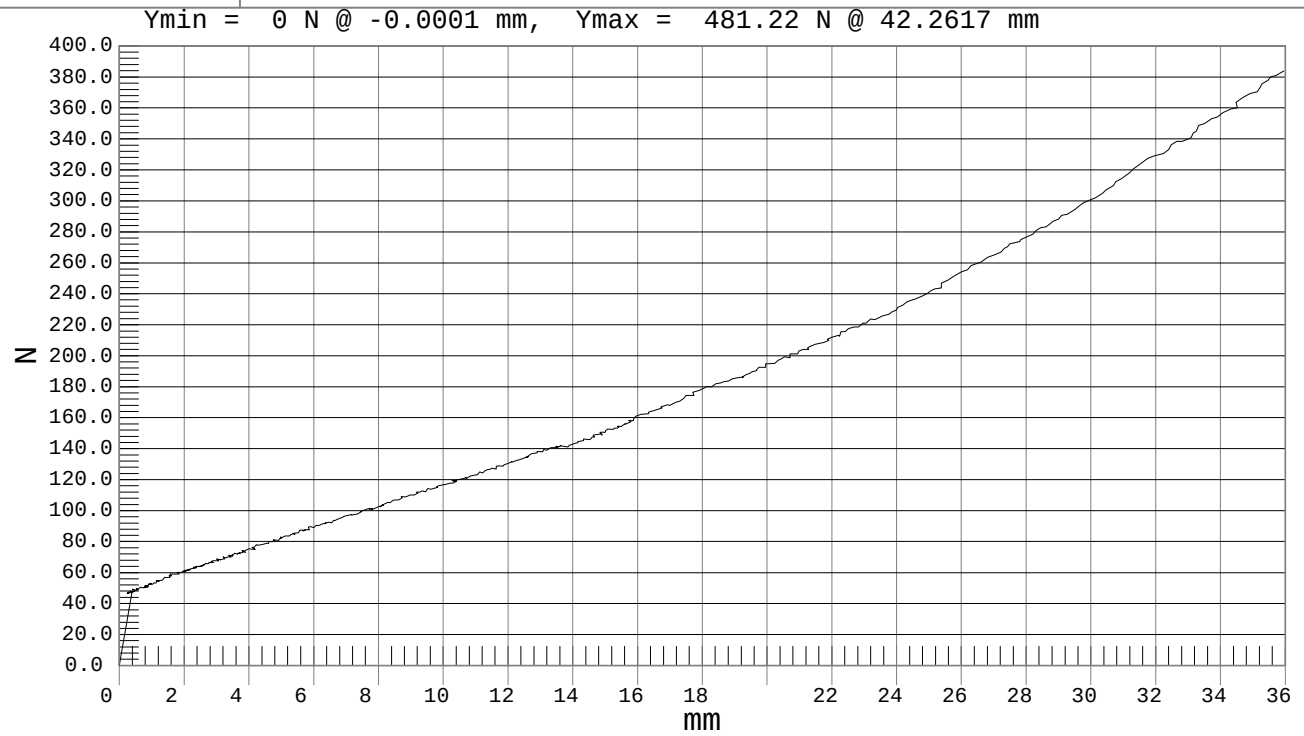
Approved By



ABDOMEN COMPRESSION

Test Desc.: ABDOMEN COMPRESSION
Component: DUMMY # 036

Test Date: 01-17-02
Speed: 0.0 fps, 0.00 M/s



SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No.: 036

Test I.D.: D02085

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 – 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Force @ 0	mm	0 – 26.7	0.0	Pass
Force @ 20	mm	97.9 – 151.2	121.8	Pass
Force @ 30	mm	151.2 – 204.6	165.6	Pass
Force @ 40	mm	204.6 – 258.0	229.4	Pass
Return Angle	Degrees	12 Maximum	4	Pass
Overall Test Results				Pass

Laboratory Technician

01/17/02
Test Date

Approved By

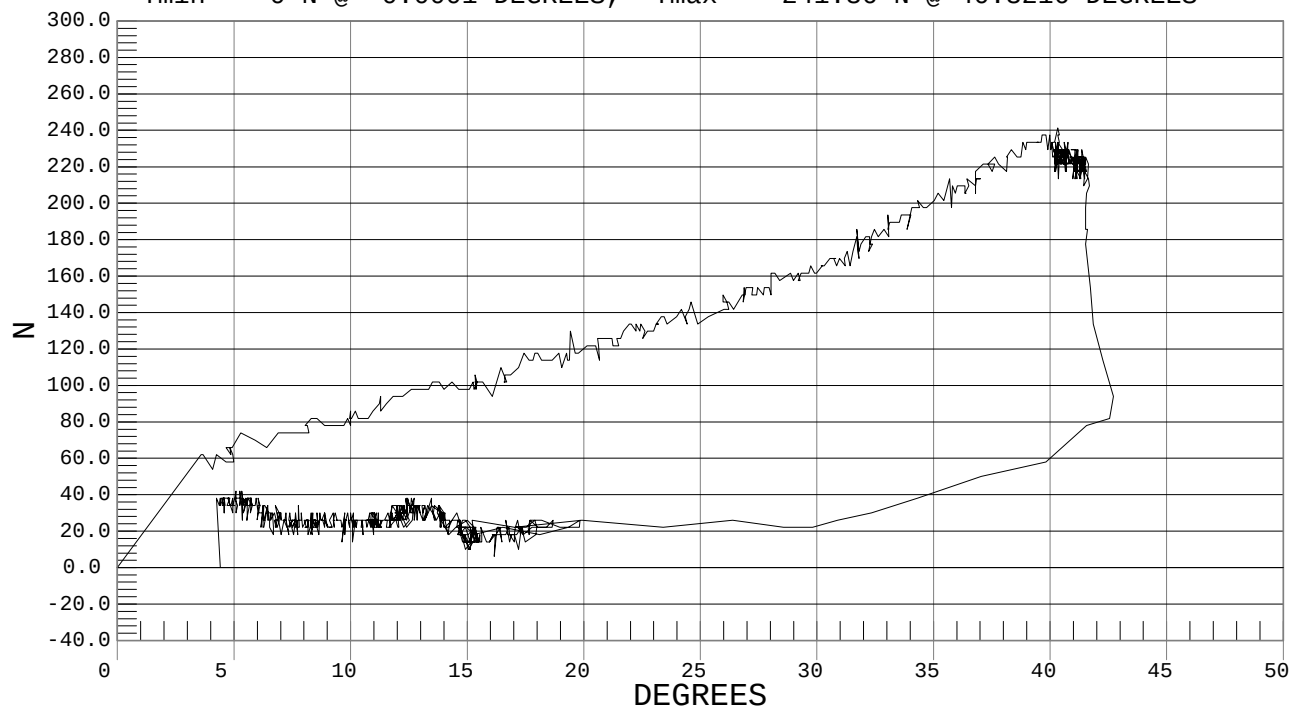


LUMBAR FLEXION

Test Desc.: LUMBAR FLEXION
Component: DUMMY # 036

Test Date: 01-17-02
Speed: 0.0 fps, 0.00 M/s

Ymin = 0 N @ -0.0001 DEGREES, Ymax = 241.36 N @ 40.3216 DEGREES



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No.: 036

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, weldment, 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		

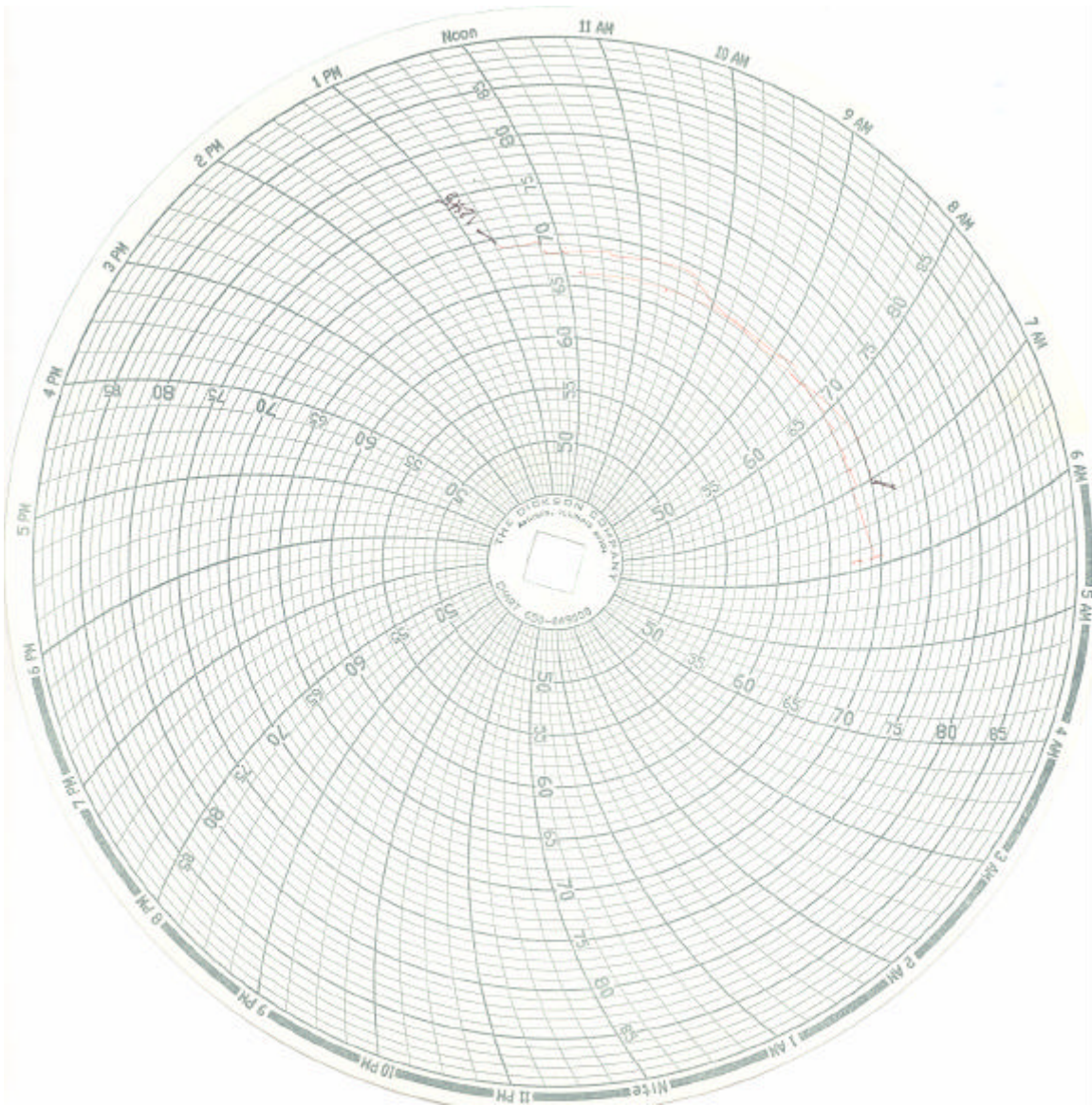
Notes (include component/problem/section/reason):

Laboratory Technician

01/18/02
Test Date

Approved By

Vehicle and Dummy Temperature



APPENDIX D

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA

	INSTRUMENTS FOR DRIVER DUMMY NO. 37		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	J12471	Endevco	1/7/02
Lower Rib Y	AJ420	Endevco	1/7/02
Lower Spine Y	ALDY8	Endevco	1/7/02
Pelvis Y	J13851	Endevco	1/7/02
Upper Rib Redundant Y	J12423	Endevco	1/7/02
Lower Rib Redundant Y	AMTA3	Endevco	1/7/02
Lower Spine Redundant Y	AP0E1	Endevco	1/7/02
Pelvis Redundant Y	J13658	Endevco	1/7/02
Head Center of Gravity X	ALB87	Endevco	1/7/02
Head Center of Gravity Y	AHRP5	Endevco	1/7/02
Head Center of Gravity Z	AJ9T6	Endevco	1/7/02

	INSTRUMENTS FOR PASSENGER DUMMY NO. 36		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AKAC4	Endevco	1/7/02
Lower Rib Y	J10420	Endevco	1/7/02
Lower Spine Y	AP1Y8	Endevco	1/7/02
Pelvis Y	AP138	Endevco	1/7/02
Upper Rib Redundant Y	J13642	Endevco	1/7/02
Lower Rib Redundant Y	AKAF2	Endevco	1/7/02
Lower Spine Redundant Y	AMT78	Endevco	1/7/02
Pelvis Redundant Y	AP0G2	Endevco	1/7/02
Head Center of Gravity X	J21970	Endevco	1/7/02
Head Center of Gravity Y	J21691	Endevco	1/7/02
Head Center of Gravity Z	J22033	Endevco	1/7/02

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X	H14-N05	Entran	9/12/01
Moving Barrier CG Y	A08-A08	Entran	11/2/01
Moving Barrier CG Z	K16-X08	Entran	10/1/01
Moving Barrier Rear Axle X	A08-A05	Entran	8/21/01
Moving Barrier Rear Axle Y	D11-F16	Entran	11/2/01
Left Mid A-Post Y	G03-N07	Entran	7/30/01
Left Lower A-Post Y	G03-N01	Entran	8/7/01
Left Mid B-Post Y	J10-E08	Entran	8/29/01
Left Lower B-Post Y	G03-N08	Entran	9/27/01
Rear Floorpan Above Axle X	H14-N10	Entran	9/12/01
Rear Floorpan Above Axle Y	H14-N07	Entran	9/12/01
Rear Floorpan Above Axle Z	H14-N11	Entran	9/12/01
Driver Seat Track Y	I12-F11	Entran	10/10/01
Right Side Sill at Front Seat X	E23-R11	Entran	9/27/01
Right Side Sill at Front Seat Y	F07-A14	Entran	8/8/01
Right Side Sill at Front Seat Z	I12-F10	Entran	10/10/01
Right Side Sill at Rear Seat X	G03-N02	Entran	9/27/01
Right Side Sill at Rear Seat Y	A08-A13	Entran	8/7/01
Right Side Sill at Rear Seat Z	G03-N15	Entran	7/30/01
Left Side Sill at Front Seat Y	I25-F05	Entran	9/27/01
Left Side Sill at Rear Seat Y	H07-F07	Entran	9/27/01
Right Rear Occupant Compartment Y	H14-N06	Entran	9/12/01
Vehicle CG X	G13-F16	Entran	7/16/01
Vehicle CG Y	G13-F03	Entran	10/29/01
Vehicle CG Z	G13-F18	Entran	10/29/01

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