

REPORT NUMBER: TO1-MGA-2004-022

**OBLIQUE RIGID SIDE POLE IMPACT
SIDIIsD DRIVER POSITION, Q6 LEFT REAR POSITION
TEST DATE: July 15, 2005
Task Order #T0001 / RFP #0004**

**2005 VOLKSWAGEN JETTA
NHTSA NUMBER: R55802**

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



**FINAL REPORT SUBMITTED:
April 12, 2006**

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
VOLPE NATIONAL TRANSPORTATION SYSTEM CENTER
55 BROADWAY, KENDALL SQUARE
CAMBRIDGE, MA 02142**

This final test report was prepared for the U.S. Department of Transportation, Volpe National Transportation System Center, in response to Contract Number DTRS57-04-D-30001.

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Prepared by: Shefalika Naik
Shefalika Naik, Project Engineer

Reviewed by: David Winkelbauer
David Winkelbauer, Project Engineer

Approval Date: July 21, 2005

Technicians: Wayne Dahlke
Jordan Haynes
Erik Nelson
Chris Novak
Charles Carlson
Nick Kosinski
Daniel Sienko Jr.
Adam Savino
Eric Peschman

Engineers: Jay Nutting
Kristin Ebert

Photographic: Matt Jacobson
Alan Raguse

Instrumentation/
Calibration: Jamie Aide
Jessica Gall
David Wilcox
Tom Miller
Tim Bratz

Secretary: Cyndy Kline

FINAL REPORT ACCEPTED BY:

Accepted By: _____
Contract Technical Manager

Acceptance Date: _____

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SECTION 1
PURPOSE AND TEST PROCEDURE

This Side Impact test is conducted as part of Contract No. DTRS57-04-D-30001, RFP 4, Task Order 1, sponsored by the U.S. Department of Transportation, Volpe National Transportation System Center. The purpose of this test is to evaluate the responses of the SIDIIIsD and the Q6 in a 2005 Volkswagen Jetta, when subjected to a rigid pole side impact at 285 degrees.

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

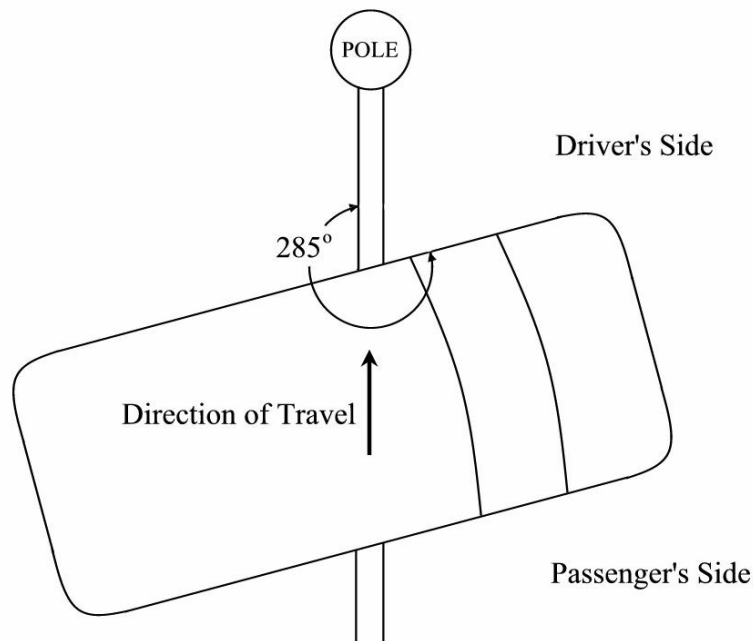
SECTION 2

SUMMARY OF SIDE IMPACT TEST

A rigid pole side impact test at 285 degrees was performed on a 2005 Volkswagen Jetta. The subject vehicle was towed into a rigid pole at a velocity of 32.3 km/h. The weight of the vehicle as tested was 1576.8 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on July 15, 2005. Pre- and post-test photographs of the test vehicle and the dummies are included in Appendix A.

One SIDIIIsD side impact dummy was placed in the left front designated seating position according to instructions specified in TP-214P-00 dated May 21, 2004. A Q6 dummy was placed in the left rear seating position in a Graco Turbo Booster with the back of the booster seat removed. The side impact event was documented by twelve high speed cameras and one real time camera. Camera locations and other pertinent camera information can be found in this report.

Appendix B contains the vehicle and dummy response data traces. A summary of the dummy configuration and performance verification test data is shown in Appendix C. Dummy and vehicle calibration data can be found in Appendix D of this report.



SECTION 2...continued

SUMMARY OF SIDE IMPACT TEST

The following tables summarize the results of the Left Side Impact Test:

Rib Deflection (mm) CFC 180	
Upper Thorax Rib	-28.0
Mid Thorax Rib	-27.9
Lower Thorax Rib	-33.3
Upper Abdominal Rib	-33.8
Lower Abdominal Rib	-32.5

Abdominal Forces (N) CFC 600	
Left Acetabulum Force	6078
Left Ilium Crest Force	1900
Sum of Left Acetabulum and Left Ilium	7876

Lower Spine (CFC180)	
Lower Spine Resultant	54.2

		Left Front
HIC 15	T1 (msec)	51.6
	T2 (msec)	66.6
	T2 – T1 (msec)	15
	HIC	470.5
HIC 36	T1 (msec)	49.8
	T2 (msec)	67.7
	T2 – T1 (msec)	17.9
	HIC	478.0

<i>Injury Criteria</i>		Left Rear Passenger
HIC 36		191
	T1	93.7
	T2	108.0
N _{te}		0.7
N _{tf}		0.0
N _{ce}		0.1
N _{cf}		0.1
Clip (g)		52

TEST NOTES

LRP Child Pelvis X – no valid data collected
 Floorpan @ Rear Axle Y – no valid data after 75 msec
 Left Rear Sill Y – no valid data after 80 msec
 Left Front Sill Y – no valid data after 40 msec
 Driver Seat Track Y – no valid data after 28 msec
 Left A-Post @ Sill Y – no valid data after 190 msec
 Left B-Post @ Sill Y – no valid data after 60 msec

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

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005

TEST VEHICLE INFORMATION

Make	Volkswagen
Model	Jetta
Body Style	Passenger Car
VIN	3VWPF71KX5M622144
Color	Black
Odometer Reading (mile)	60
Transmission	Manual
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	2.5
Engine Placement	Lateral

TEST VEHICLE OPTIONS

Front Airbag	Yes
Side Airbags	Curtain & Thorax
Power Windows	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Power Brakes	Yes
Anti-lock Brakes	Yes
AM/FM/CD	Yes
Cruise Control	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Volkswagen de Mexico	GVWR (kg)	1940
Date of Manufacture	04/05	GAWR Front (kg)	1030
		GAWR Rear (kg)	960

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Cold Pressure (kPa)	230	230
Recommended Tire Size	P195/65R15	P195/65/R15
Tire Size on Vehicle	P195/65/R15	P195/65/R15
Tire Manufacturer	Michelin	Michelin

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				441
Cargo Wt. (RCLW) (kg)				100.7

DATA SHEET NO. 1... (continued)**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2005 Volkswagen JettaTest Date: July 15, 2005**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	422.3	286.7		445.0	359.7	
Right	kg	419.1	300.7		428.7	343.4	
Ratio	%	58.9	41.1		55.4	44.6	
Totals	kg	841.4	587.4	1428.8	873.7	703.1	1576.8

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1428.8
Weight of SIDIIsD Side Impact Dummy	kg	54.4
Rated Cargo/Luggage Weight (RCLW)	kg	100.7
Calculated Vehicle Target Weight (TVTW)	kg	1583.9

TEST VEHICLE ATTITUDES

	Unit	As Delivered	Fully Loaded	Ready for Test
Right Door Sill Angle	Deg	0.8 ND	0.0	0.6 ND
Left Door Sill Angle	Deg	0.9 ND	0.0	0.6 ND
Front Bumper Angle	Deg	0.3 LD	0.6 LD	0.2 LD
Rear Bumper Angle	Deg	0.0	0.2 LD	0.2 LD

ND=Nose down, BD = Back Down, LD = Left Down, RD = Right Down

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2018
Total Vehicle Length at Centerline	mm	4561
Total Vehicle Width	mm	1753
Weight of Ballast in Cargo Area	kg	0.0
Amount of Water in Fuel Tank	liters	53.0

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Impact Reference Line From Front Axle	mm	1103
Impact Point	mm	7mm forward
Impact Angle Difference	deg	0.5°

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005

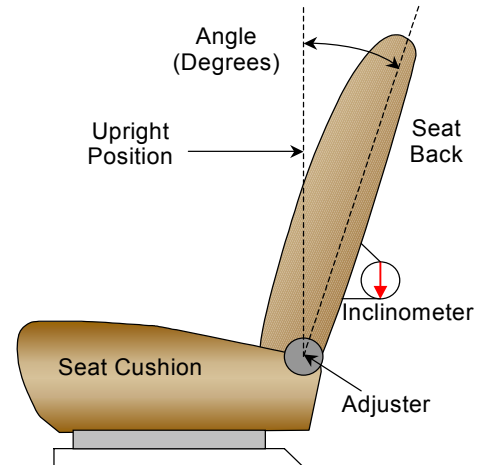
SEAT RIDING POSITION

Driver seat back angle: 1.3° forward on head rest post

SEAT FORE/AFT POSITIONS

Driver seat fore/aft total travel: 38 detents

Driver seat fore/aft position: Full forward



FRONT SEAT ASSEMBLY

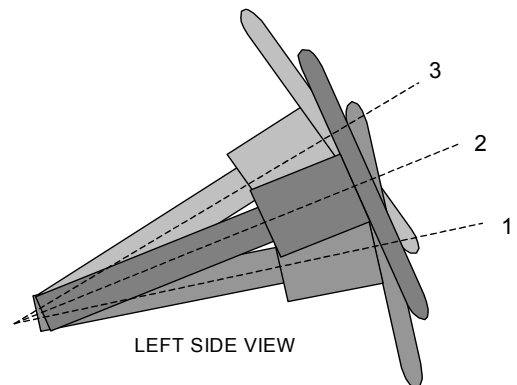
SEAT BELT UPPER ANCHORAGE

The test vehicle "D" ring anchorage for the driver's seat position was placed in the lowest position.

STEERING COLUMN ADJUSTMENT

The steering column was placed in the mid position of travel.

Steering column position: 23.8°



STEERING COLUMN ASSEMBLY

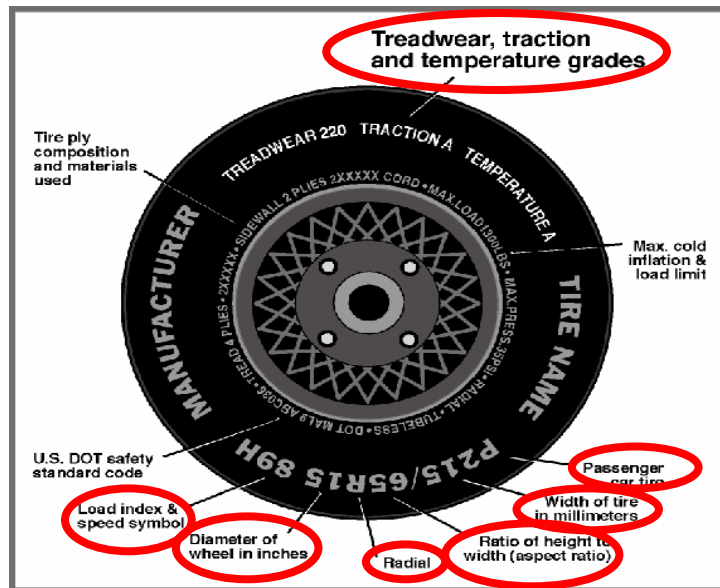
DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005

Vehicle Year	2005	Vehicle Make	Volkswagen
VIN	3VWPF71KXSM622144	Vehicle Model	Jetta



	Front	Rear
Tire Manufacturer	Michelin	Michelin
Tire Name	Energy MXV4	Energy MXV4
Tire Type	All Season	All Season
Tire Width (mm)	195	195
Ratio of Height to Width (aspect ratio)	65	65
Radial	R	R
Wheel Diameter	15	15
Load Index & Speed Symbol	91H	91H
Treadwear	440	440
Traction Grade	A	A
Temperature Grade	A	A

DATA SHEET NO. 3
POST TEST OBSERVATIONS

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front	Left Rear
Dummy Type	SIDIIsD	Q6
Head Contact	Curtain, Headrest, Door Panel	Curtain, Headrest, Door Panel
Upper Torso Contact	Side Airbag	
Lower Torso Contact	Door Panel	
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	Left Knee	Left Knee

POST TEST DOOR OPENING

Description	Left Front	Left Rear
Left Side Door Opening	Remained latched and closed	Remained latched and closed
Right Side Door Opening	Remained latched and closed	Remained latched and closed

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No failures
Sill Separation	None
Windshield Damage	Windshield broke
Window Damage	Left side windows up for test, left front broke
Other Notable Effects	None

AIRBAG DEPLOYMENT

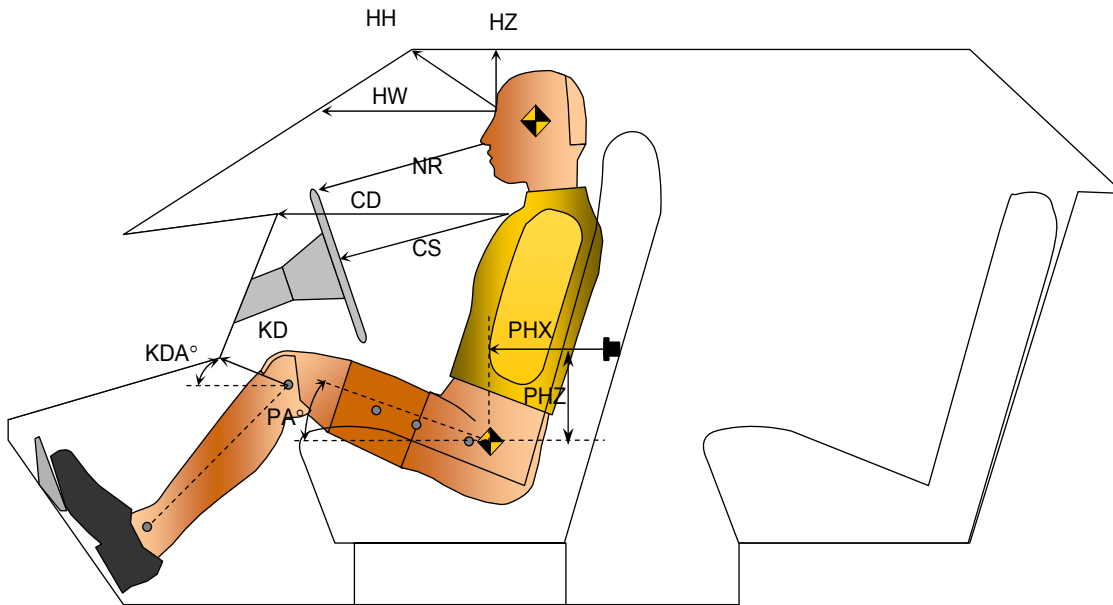
	Driver	Passenger
Front	No	No
Side	Yes	No
Curtain	Yes	No

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 4
SIDIIsD CLEARANCE DIMENSIONS

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005



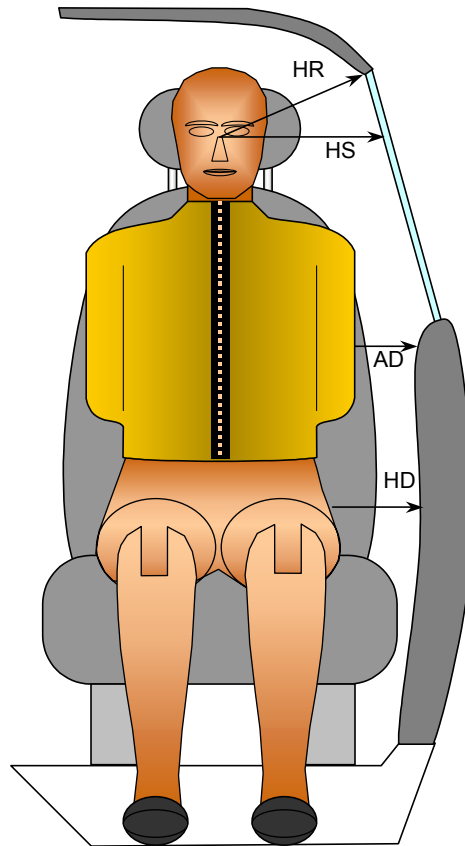
Driver Code	Measurement Description	Left Front	
		Length(mm)	Angle(°)
HH	Head to Header	354	
HW	Head to Windshield	708	
HZ	Head to Roof	251	
NR	Nose to Rim	287	
CD	Chest to Dash (Top of Rib)	454	
CS	Chest to Steering Wheel (Top of Rib)	208	
KDL	Left Knee to Dash	129	41.2
KDR	Right Knee to Dash	124	40.0
PA	Pelvic Angle (Longitudinal)		32.0
PHX	H-Point to Striker (X-Axis)	311	
PHZ	H-Point to Striker (Z-Axis)	195	

DATA SHEET NO. 4 (continued...)

SIDIIsD CLEARANCE DIMENSIONS

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005



FRONT VIEW OF DUMMY

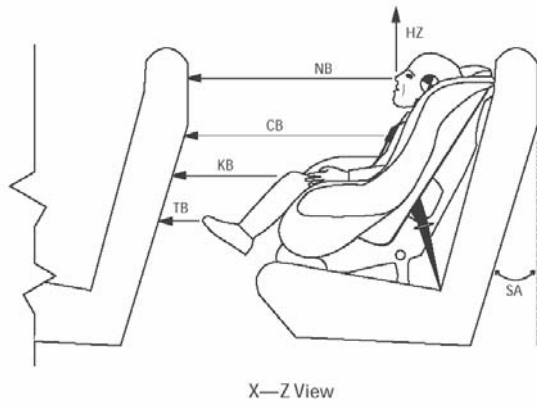
Code	Measurement Description	Units	Left Front
HR	Head to Side Header	mm	276
HS	Head to Side Window	mm	401
AD	Arm to Door	mm	184
HD	H-Point to Door	mm	173

DATA SHEET NO. 5 **CHILD DUMMY POSITIONING IN VEHICLE**

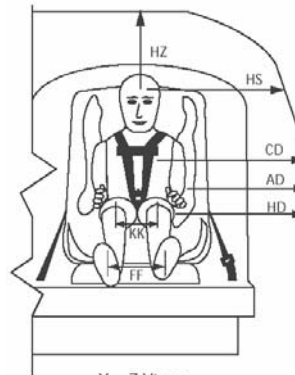
Child Restraint System

Graco Turbo Booster (Forward Facing) With Back Removed

Dummy Measurements for CRS Passengers



X—Z View



Y—Z View

X—Z View

- | | | |
|----|---|--------------------------|
| HZ | - | Head to Roof |
| HS | - | Head to Side Window |
| CD | - | Chest to Door |
| AD | - | Arm to Door |
| HD | - | H-Point to Door |
| KK | - | Knee to Knee |
| FF | - | Foot to Foot |
| NB | - | Nose to Front Seat Back |
| CB | - | Chest to Front Seat Back |
| KB | - | Knee to Front Seat Back |
| TB | - | Toe to Front Seat Back |
| SA | - | Seat Back Angle |

Measurement	Pre-Test (mm)
	CRS (001)
SA (deg)	24.0
HS	366
CD	311
AD	128
HD	204
HZ	349
NB	782
CB	814
KK	151
FF	139
KB - LEFT	506
KB - RIGHT	506
TB - LEFT	199
TB - RIGHT	191
Top of Head to Window Sill (Z)	99
Shoulder to Window Sill (Z)	109
Top of vehicle armrest to top of booster armrest (Z)	20

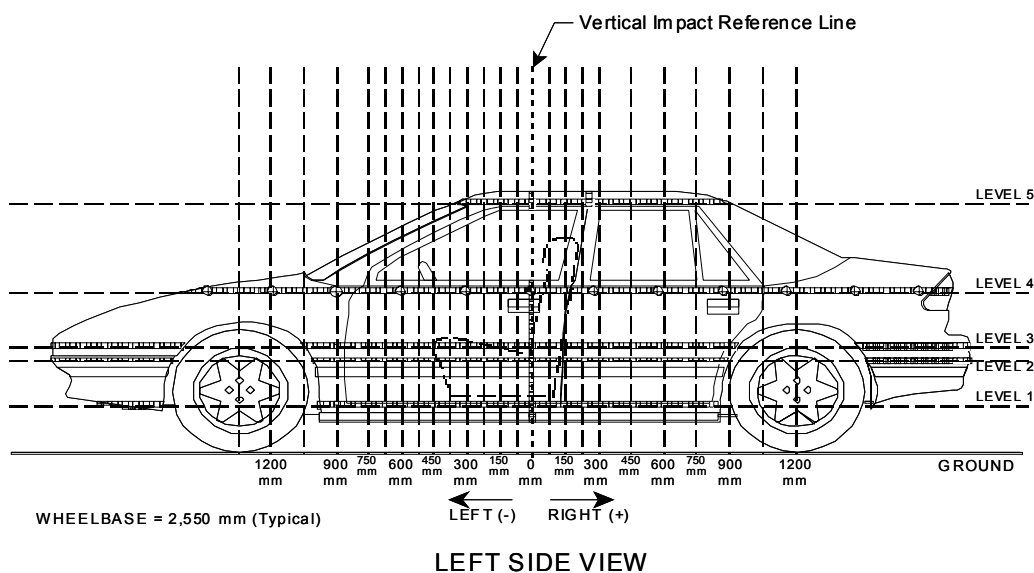
All dimensions in mm (unless noted)
Left Rear Passenger (Forward facing)

DATA SHEET NO. 6 **VEHICLE SIDE MEASUREMENTS**

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005

PRETEST AND POST TEST EXTERIOR PROFILE MEASUREMENTS



Measurements are taken with vehicle in the as tested condition.
Measurements along the vertical 0 mm.
All measurements below in mm.

Level	Measurement Description	Height Above Ground
5	Window	1154
4	Window Sill	827
3	Mid Door	568
2	Occupant H-Point	508
1	Sill Top	285

DATA SHEET NO. 7
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1425				370					370					0	
-1275				340					345					5	
-1125				339					331					-8	
-975				302					322					20	
-825			219	293				265	323				46	30	
-675	249	227	228	288		293	268	267	319		44	41	39	31	
-600	248	228	228	290		321	292	290	319		73	64	62	29	
-525	249	227	225	287		349	322	324	347		100	95	99	60	
-450	248	226	224	287		379	354	358	376		131	128	134	89	
-375	247	225	224	286		411	389	391	409		164	164	167	123	
-300	247	224	223	286		446	427	429	448		199	203	206	162	
-225	245	224	222	285		485	470	472	485		240	246	250	200	
-150	246	223	222	285	494	522	518	519	525	600	276	295	297	240	106
-75	245	222	220	285	493	577	563	567	569	616	332	341	347	284	123
0	244	222	220	284	490	615	606	605	609	647	371	384	385	325	157
75	244	222	221	286	495	607	607	613	623	650	363	385	392	337	155
150	245	222	220	286	496	564	567	570	581	628	319	345	350	295	132
225	245	222	220	288	498	511	508	512	528	615	266	286	292	240	117
300	246	223	220	288	502	467	436	440	477	595	221	213	220	189	93
375	246	223	221	291	503	438	389	386	435	586	192	166	165	144	83
450	248	226	223	293	508	412	371	366	424	580	164	145	143	131	72
525	248	227	224	296	510	386	362	350	411	569	138	135	126	115	59
600	250	228	225	300	510	365	348	342	404	564	115	120	117	104	54
750	252	232	230	306	518	322	328	324	382	553	70	96	94	76	35
900	255	235	234	312	525	289	301	309	367	548	34	66	75	55	23
1050	258	236	239	323	527	243	265	273	349	542	-15	29	34	26	15
1200		230	235	330	538		240	243	328	543		10	8	-2	5
1350			232	339				244	333				12	-6	
1500				352					353					1	
1650				366					362					-4	
1800				380					379					-1	
1950				398					396					-2	
2100				416					414					-2	
2250				441					440					-1	

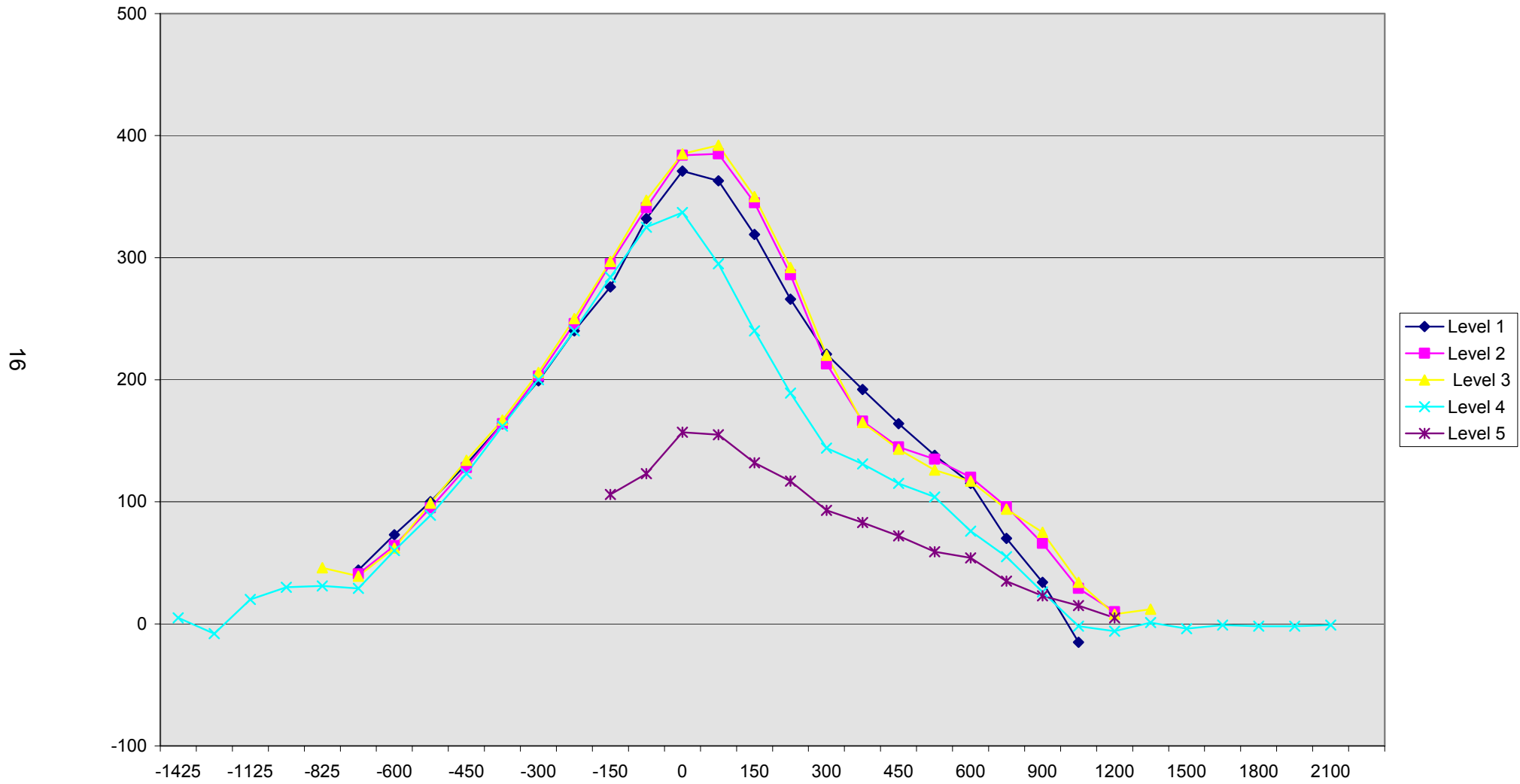
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body. Measurements are in mm.

DATA SHEET NO. 7... (continued)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005

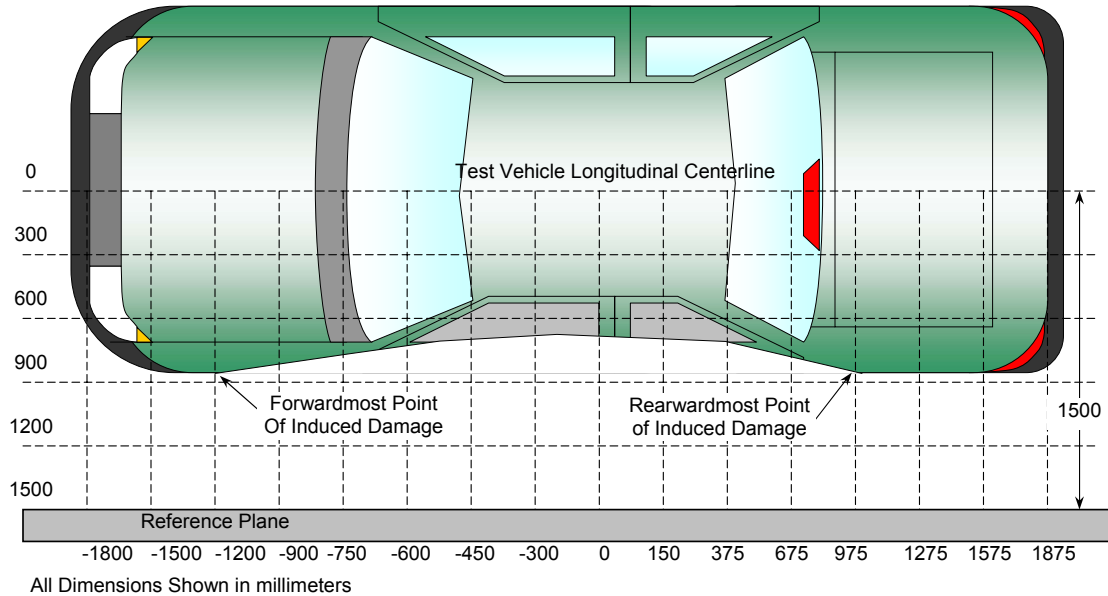


Measurement in mm.

DATA SHEET NO. 8 **VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005



TOP VIEW

Damage Profile Distances

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2250 mm	4	441	440	-1
2	1530 mm	4	352	349	-3
3	850 mm	3	234	316	82
4	45 mm	3	220	609	389
5	-723 mm	4	288	317	29
6	-1425 mm	4	370	370	0

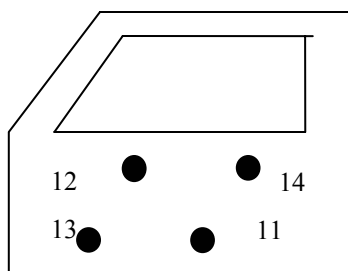
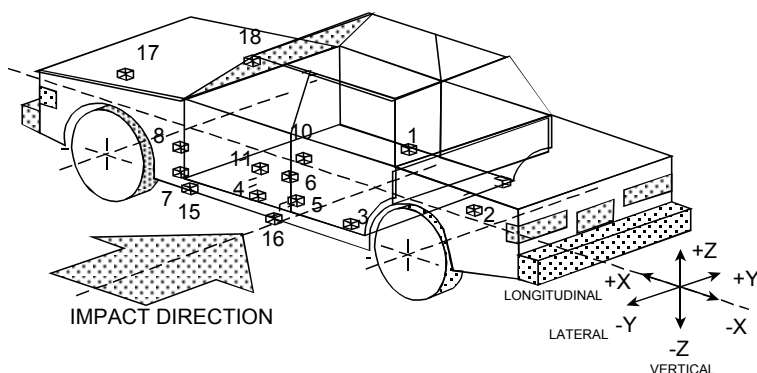
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body.

DATA SHEET NO. 9
VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005



No.	Location
1	Right Side Sill at Front Seat
2	Rear Floorpan Above Axle
3	Left Side Sill at Rear Door
4	Left Side Sill at Front Door
5	Left Lower B-Post
6	Left Mid B-Post
7	Left Lower A-Post
8	Left Mid A-Post
9	Driver Seat Track
10	Vehicle CG
11	Left Front Door @ Pelvis

No.	Location
12	Left Front Door @ Arm
13	Left Front Door @ Knee
14	Left Front Door @ Mid Rib
15	Left A-Post @ Sill
16	Left B-Post @ Sill
17	Upper Engine
18	Firewall

DATA SHEET NO. 9... (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Long (X) Maximums (g's) (CFC 60)		Lat. (Y) Maximums (g's) (CFC 60)		Vert. (Z) Maximums (g's) (CFC 60)		Resultant (g's) (CFC 60)
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	
1	Right Side Sill at Front Seat	1.3	-5.5	14.3	-0.6	5.6	-3.8	14.8
2	Rear Floorpan Above Axle	1.8	-6.2	*	*	4.6	-4.6	15.6
3	Left Side Sill at Rear Door			**	**			
4	Left Side Sill at Front Door			***	***			
5	Left Lower B-Post			45.8	-10.8			
6	Left Mid B-Post			60.1	-19.8			
7	Left Lower A-Post			18.4	-1.7			
8	Left Mid A-Post			21.0	-2.0			
9	Driver Left Seat Track			****	****			
10	Vehicle CG	2.4	-9.5	39.0	-8.9	20.8	-10.9	39.9
11	Left Front Door at Pelvis			167.1	-82.7			
12	Left Front Door at Arm			96.0	-27.4			
13	Left Front Door at Knee			68.0	-85.8			
14	Left Front Door at Rib			85.9	-8.6			
15	Left A-post @ Sill			*****	*****			
16	Left B-post @ Sill			*****	*****			
17	Upper Engine	2.4	-13.7	14.7	-2.9			
18	Firewall			14.2	-1.0			

* No valid data collected after 75 msec

** No valid data collected after 80 msec

*** No valid data collected after 40 msec

**** No valid data collected after 28 msec

***** No valid data collected after 190 msec

***** No valid data collected after 60 msec

Sign Convention X - + forward
 Y - + to right
 Z - + down

DATA SHEET NO. 9... (continued)**VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY**Test Vehicle: 2005 Volkswagen JettaTest Date: July 15, 2005**VEHICLE ACCELEROMETER COORDINATES**

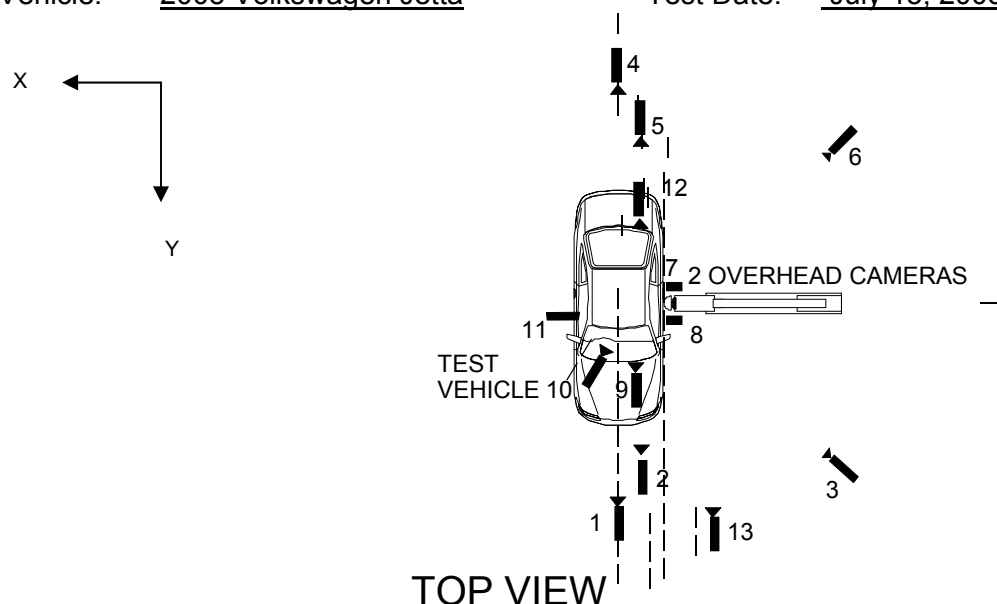
Loc. No.	Description	Coordinates (mm)		
		X	Y	Z
1	Right Side Sill at Front Seat	2418	732	225
2	Rear Floorpan Above Axle	998	0	450
3	Left Side Sill at Rear Door	1816	-731	228
4	Left Side Sill at Front Door	2840	-731	224
5	Left Lower B-Post	2104	-738	438
6	Left Mid B-Post	2089	-732	906
7	Left Lower A-Post	3182	-784	535
8	Left Mid A-Post	3175	-788	827
9	Driver Left Seat Track	2286	-598	477
10	Vehicle CG	2546	0	420
11	Left Door @ Pelvis	2467	-756	641
12	Left Door @ Arm	2428	-747	750
13	Left Door @ Knee	2886	-758	633
14	Left Door @ Rib	2433	-750	924
15	Left A Pillar Sill	3205	-730	225
16	Left B Pillar Sill	2068	-731	225
17	Engine	3804	215	805
18	Firewall	3576	0	823

Sign Convention X – Rear Bumper (+ forward)
 Y – Vehicle Centerline (+ to right)
 Z – Ground Plane (+ up)

DATA SHEET NO. 10
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2005 Volkswagen Jetta

Test Date: July 15, 2005



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Front Overall	-1125	7795	1450	35	1000
2	Front Close Up	-1275	6295	1515	24	1000
3	Front Angle	-2255	3150	1450	24	1000
4	Rear Overall	3465	-9765	1485	24	1000
5	Rear Close Up	2955	-8800	1465	35	1000
6	Rear Angle	-2265	-2615	1465	24	1000
7	Overhead View	565	-840	5725	14	1000
8	Overhead Close Up	0	0	5050	19	1000
9	Onboard Driver Front				13	500
10	Onboard Driver Hip				10	500
11	Onboard Driver Side				8	500
12	Onboard Child				13	500
13	Real Time				13	24

Reference Points X - + Forward of Impact
 Y - + Right of Impact
 Z - + Up from Ground

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.



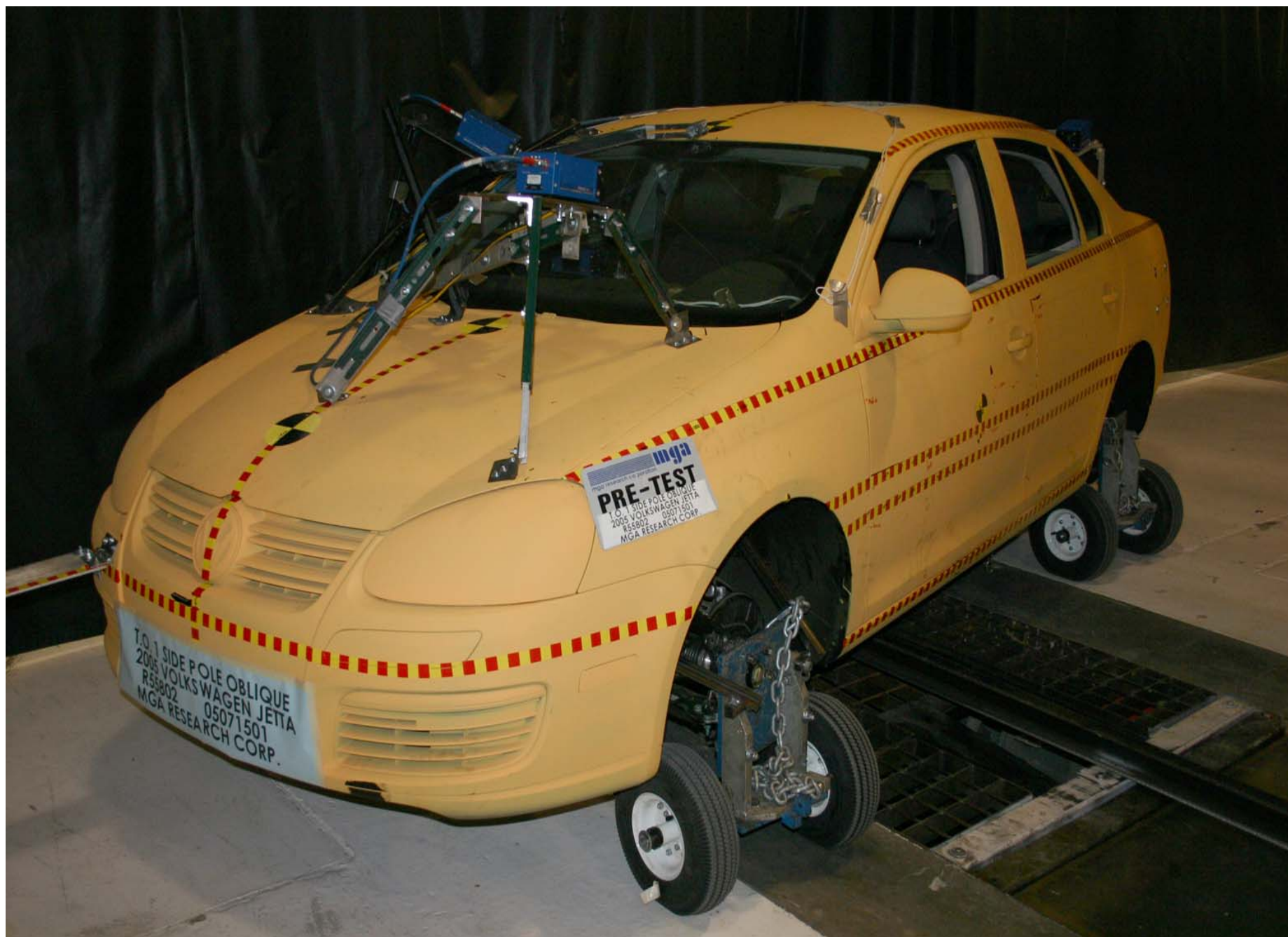
Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle (Close Up)



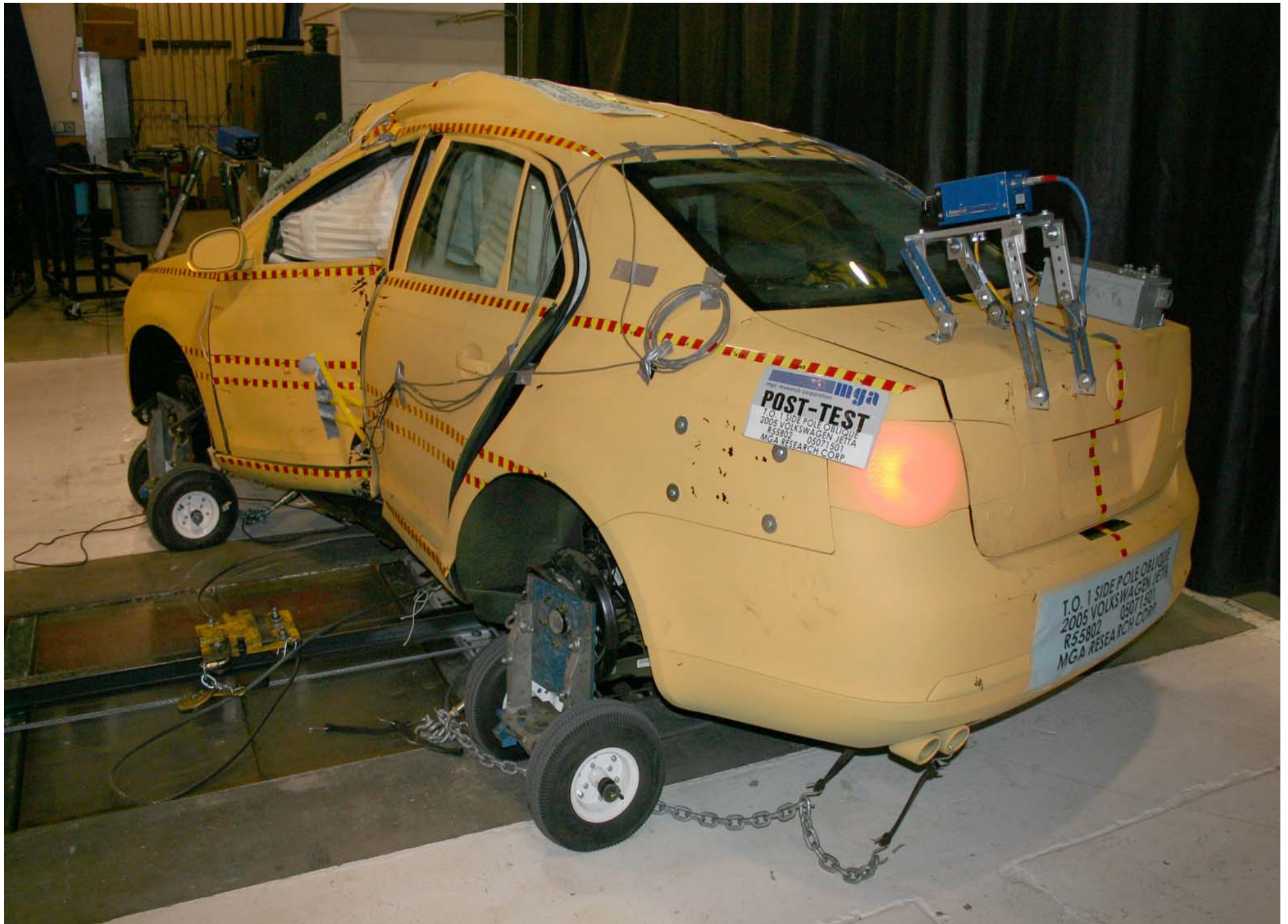
Pre-Test Left $\frac{3}{4}$ Front View of Test Vehicle



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



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



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



Pre-Test Vehicle Overhead View Positioned Against Pole



Post-Test Vehicle Overhead View



Pre-Test Vehicle Overhead View Positioned Against Pole (Close Up)



Post-Test Vehicle Overhead View (Close Up)



Pre-Test Driver Seat Position



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



Pre-Test Driver Dummy Left Side View



Post-Test Driver Dummy Left Side View



Pre-Test Driver Dummy Right Side View



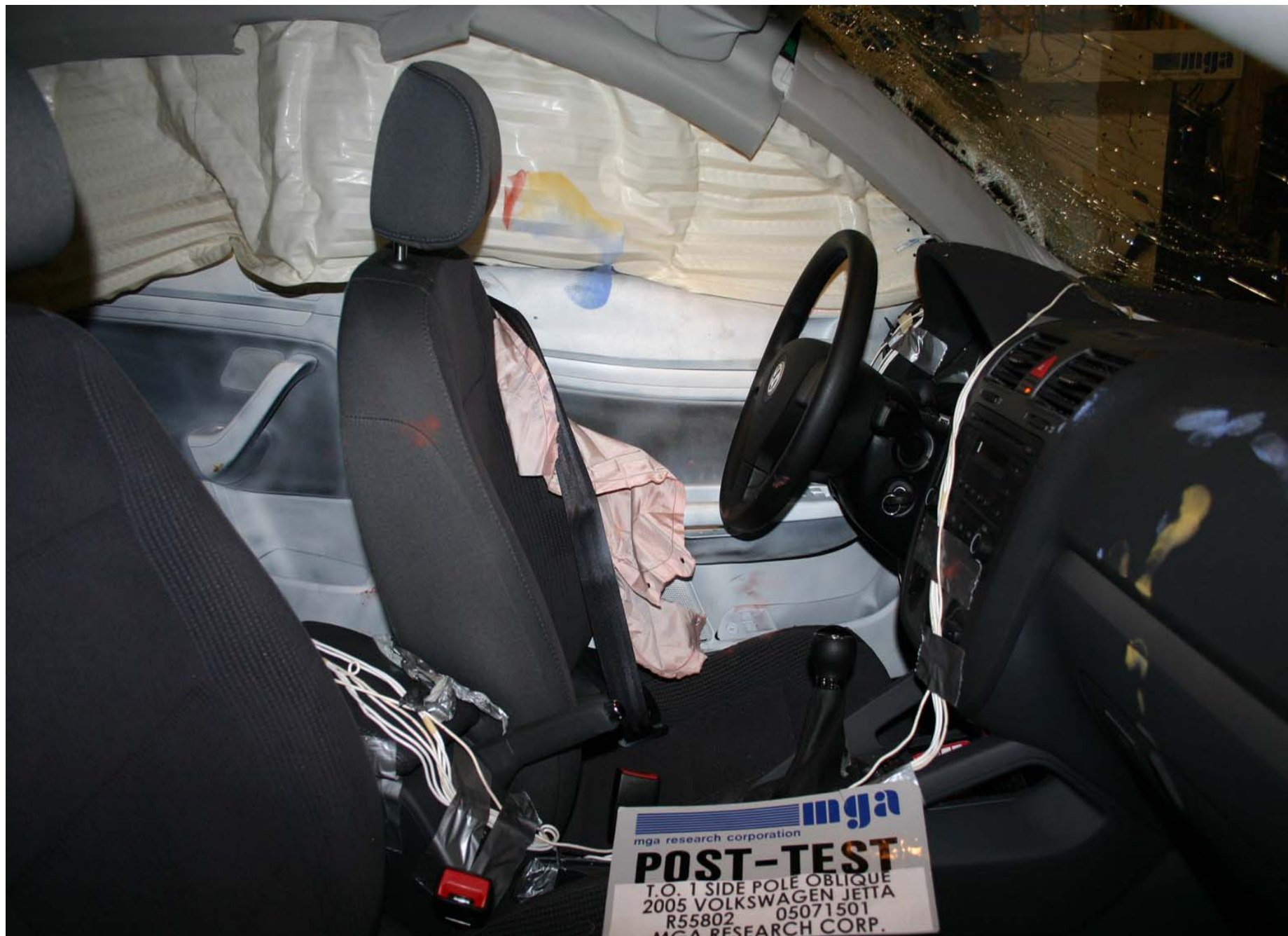
Post-Test Driver Dummy Right Side View



Pre-Test Driver Shoulder and Door Top View



Post-Test Driver Dummy Head Contact



Post-Test Driver Dummy Contact



Post-Test Driver Dummy Lower Body Contact



Pre-Test LRP Child Dummy Left Side View (Door open)



Pre-Test LRP Child Dummy Left Side View



Post-Test LRP Child Dummy Left Side View



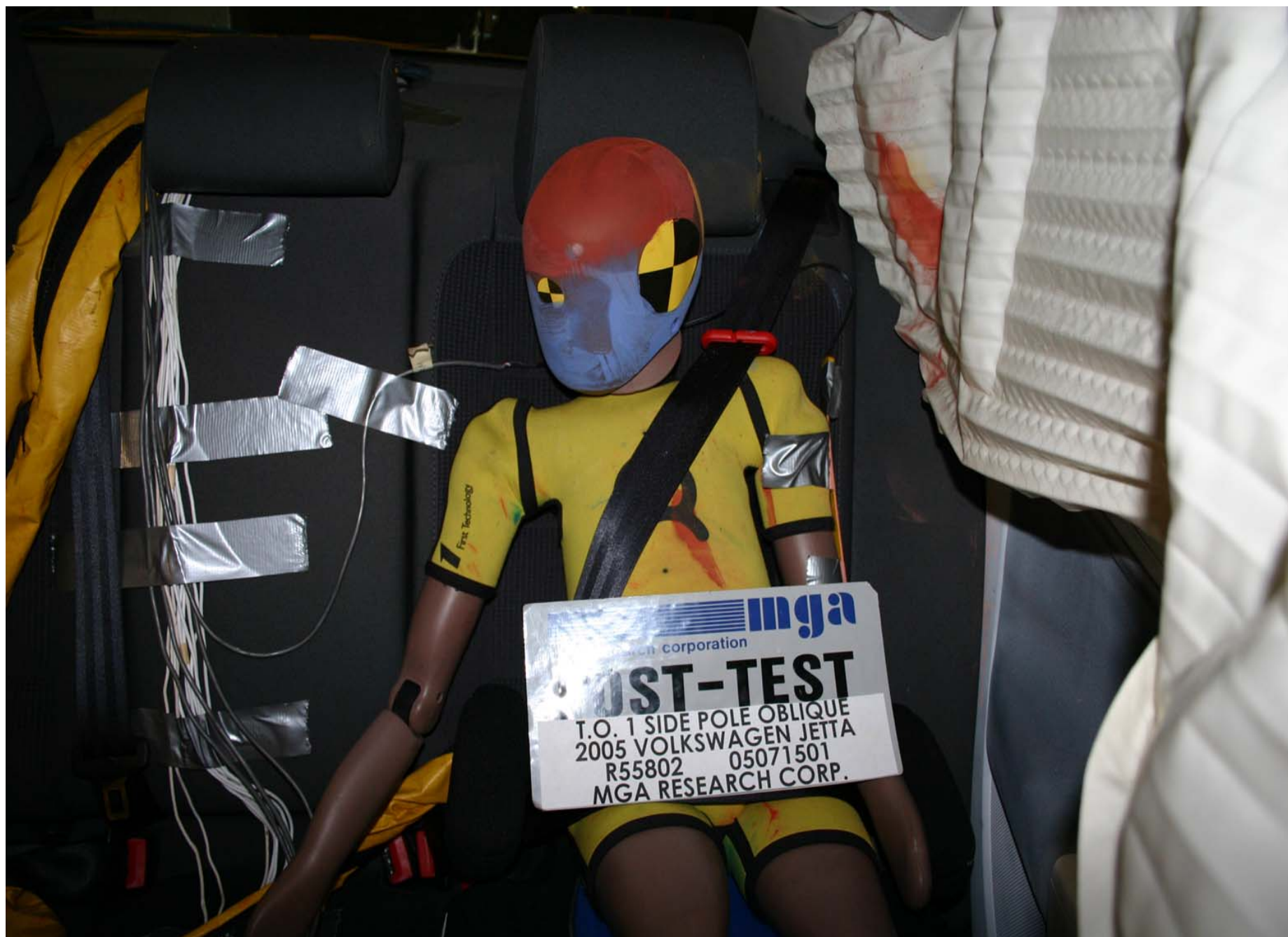
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Post-Test LRP Child Dummy Right Side View



Pre-Test LRP Child Dummy Front Facing View



Post-Test LRP Child Dummy Front Facing View



Pre-Test LRP Child Dummy Shoulder and Door Top View



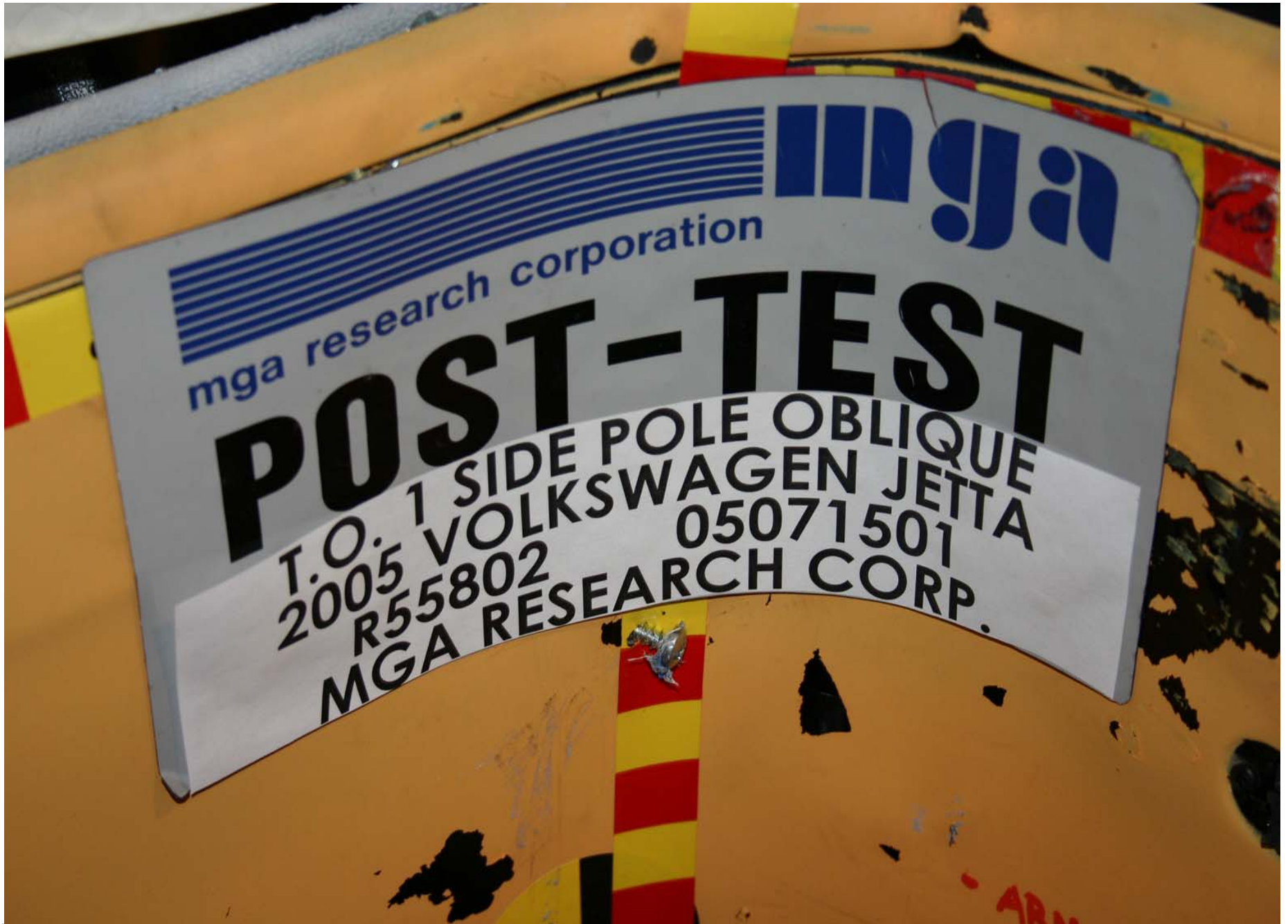
Post-Test LRP Child Dummy Contact



Post-Test LRP Dummy Lower Body Contact



Post-Test LRP Child Dummy Head Contact



Post-Test Impact Point on Vehicle



Vehicle Certification Label



TIRE AND LOADING INFORMATION

SEATING CAPACITY | TOTAL 5 | FRONT 2 | REAR 3

THE COMBINED WEIGHT OF OCCUPANTS AND CARGO SHOULD NEVER EXCEED 441 KG OR 972 LBS

ORIGINAL SIZE	COLD TIRE INFLATION PRESSURE		SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION
195/65 R15 91H	FRONT	230 KPA, 33 PSI	
	REAR	230 KPA, 33 PSI	
SPARE TIRE	COLD TIRE INFLATION PRESSURE		
195/65 R15 91H	230 KPA, 33 PSI		

C: 1

/ 05



1K0 010 452 P

Tire Placard



Pre-Test Point of Impact View



Post-Test Point of Impact View



86,00 ms • 15 Jul 2005 09:57 • T0: 0 • 1,000 fps • Frame: 86

Impact

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA TRACES

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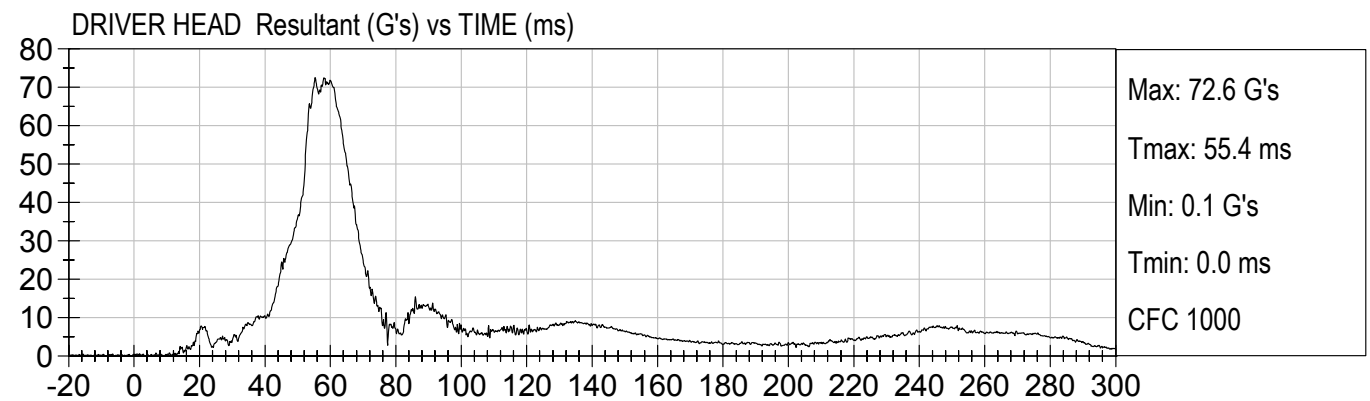
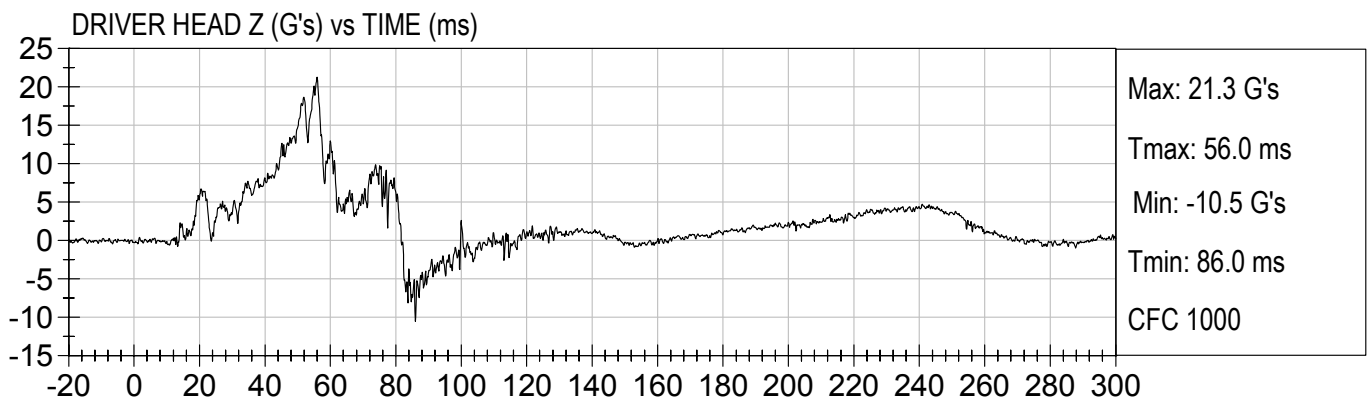
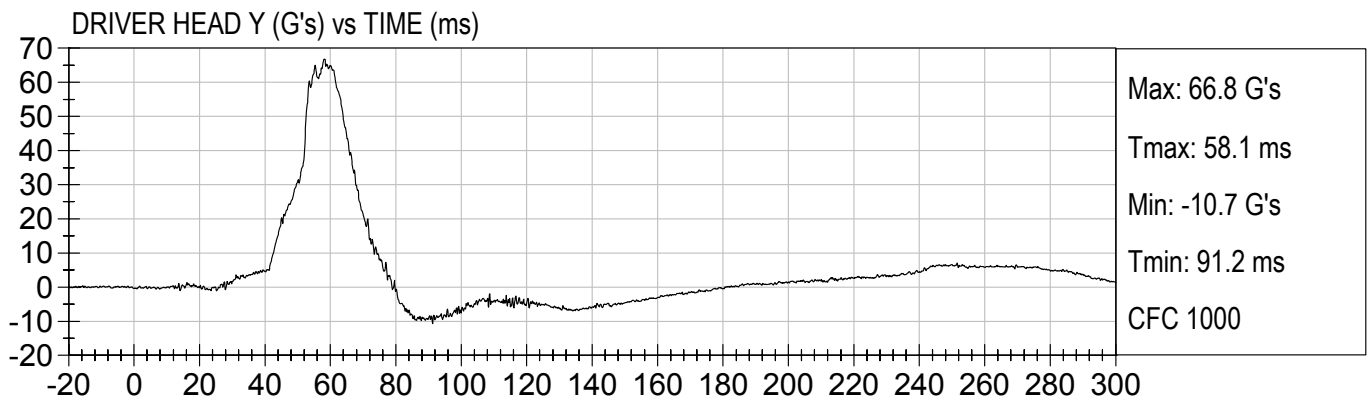
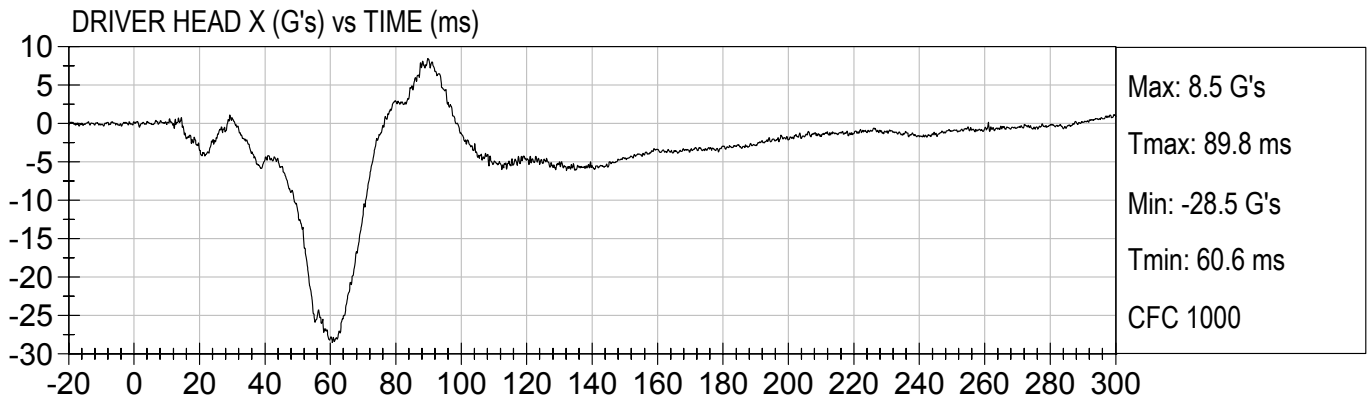
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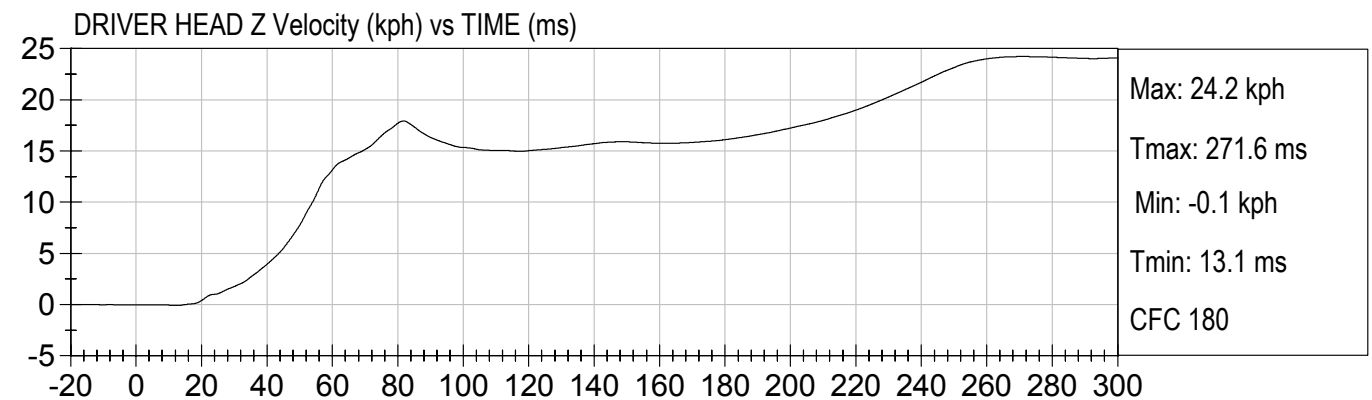
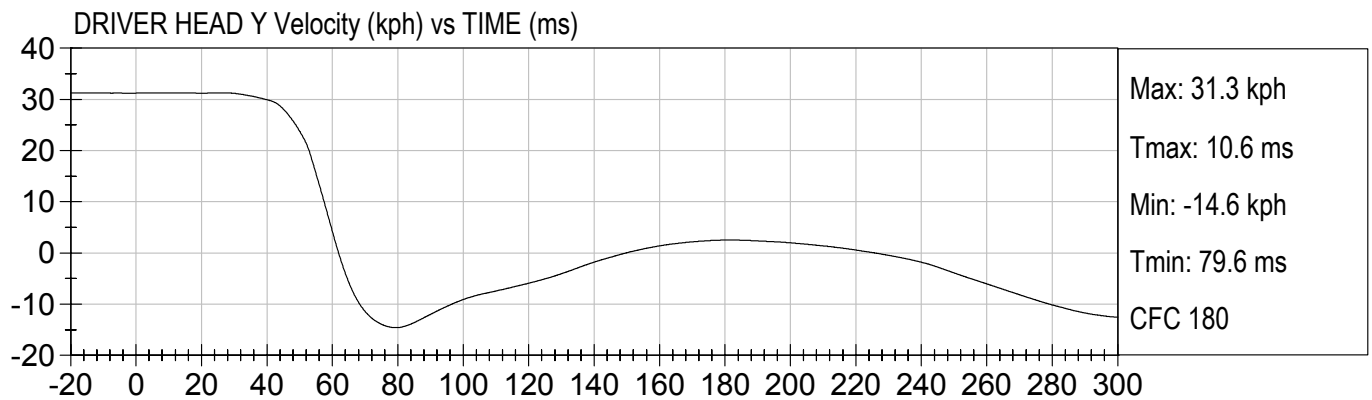
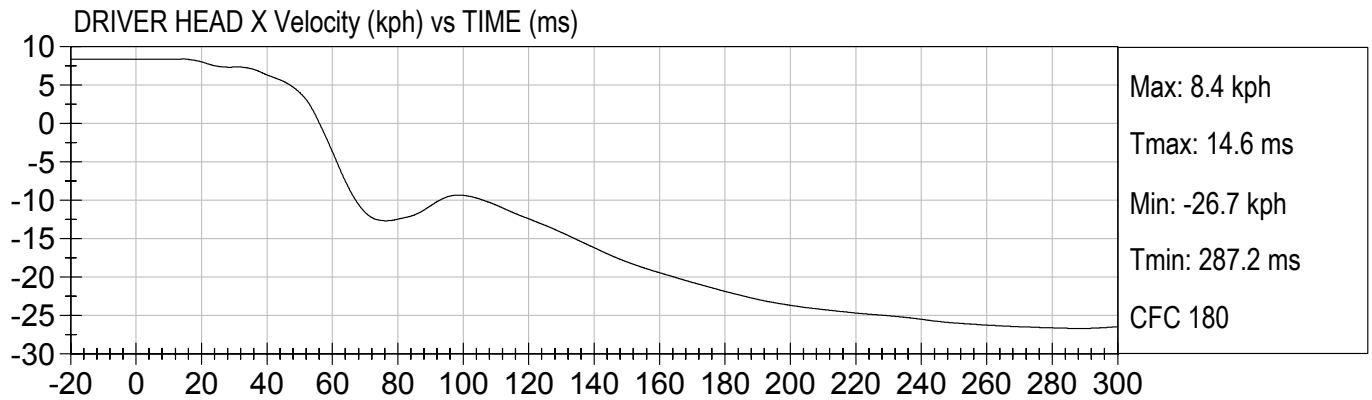
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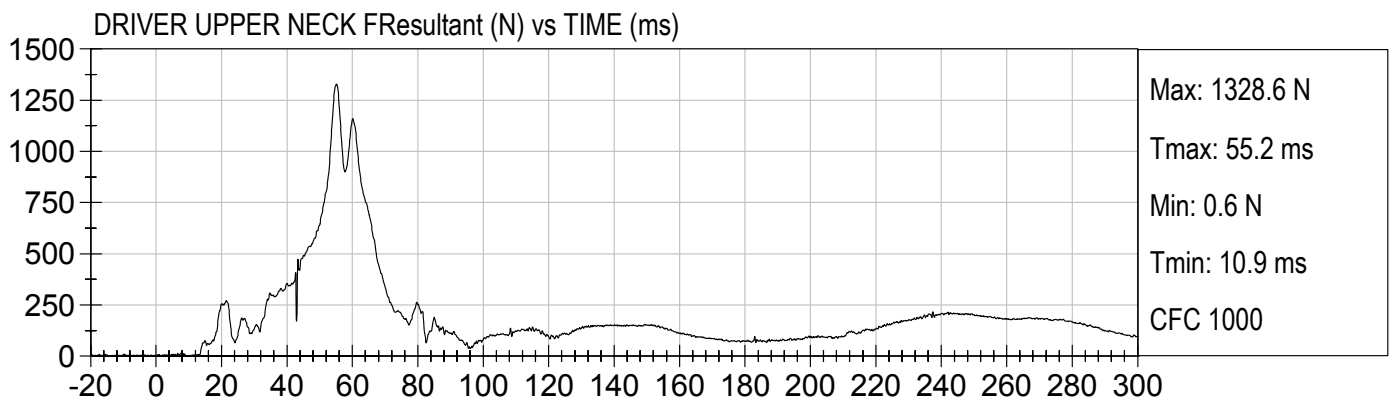
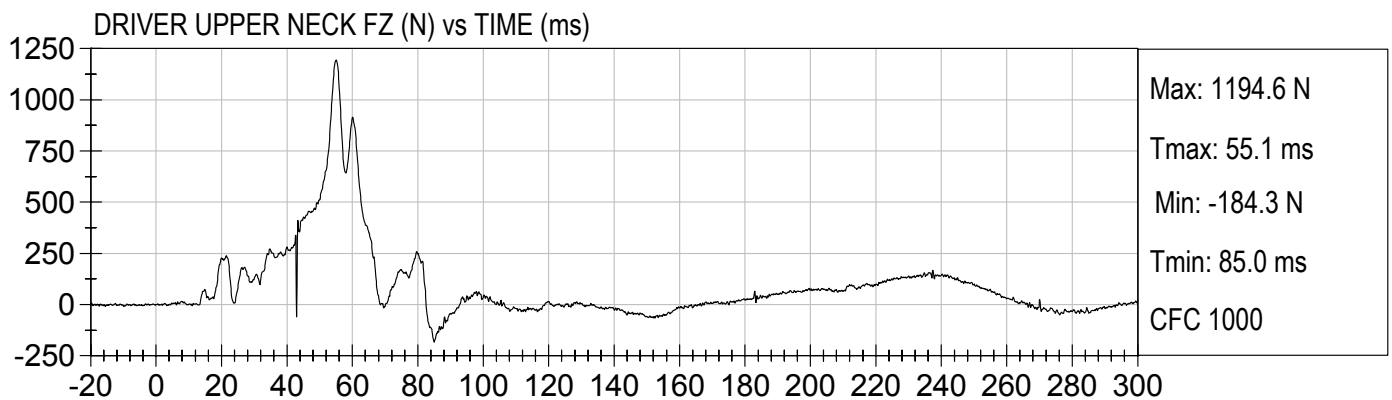
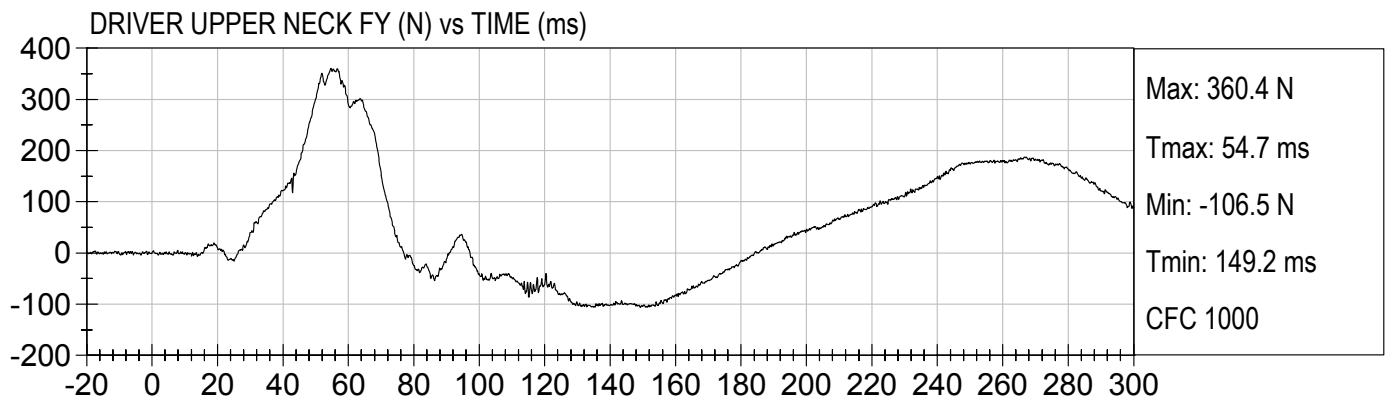
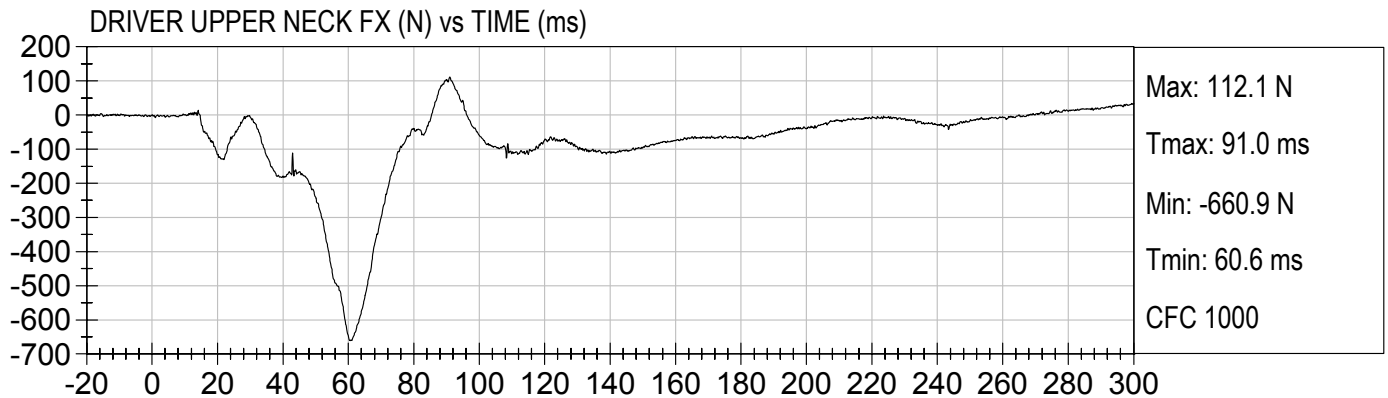
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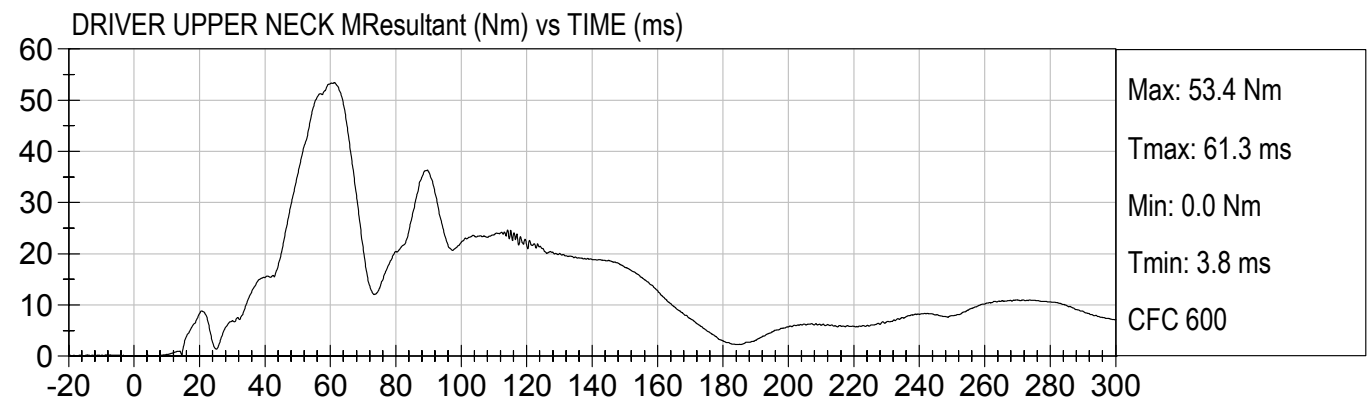
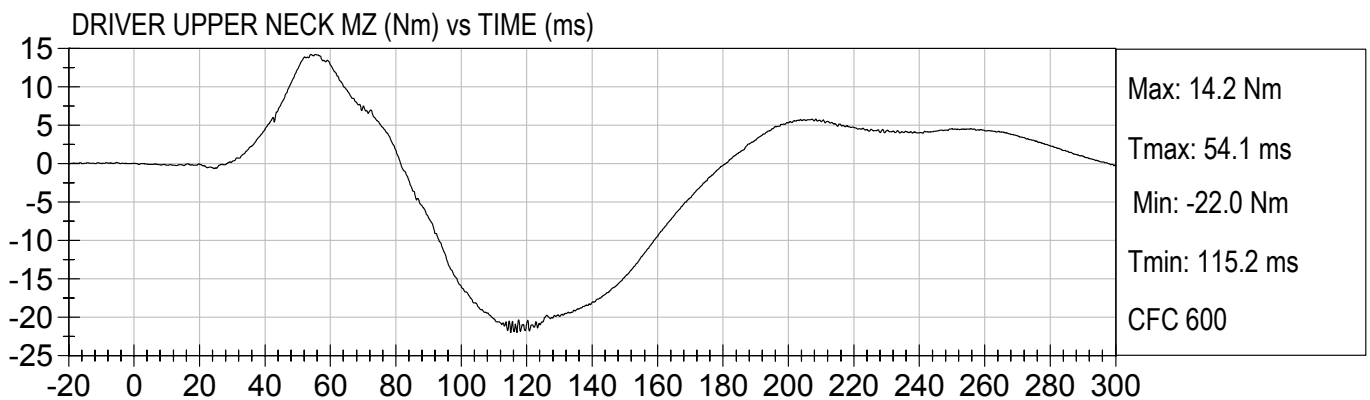
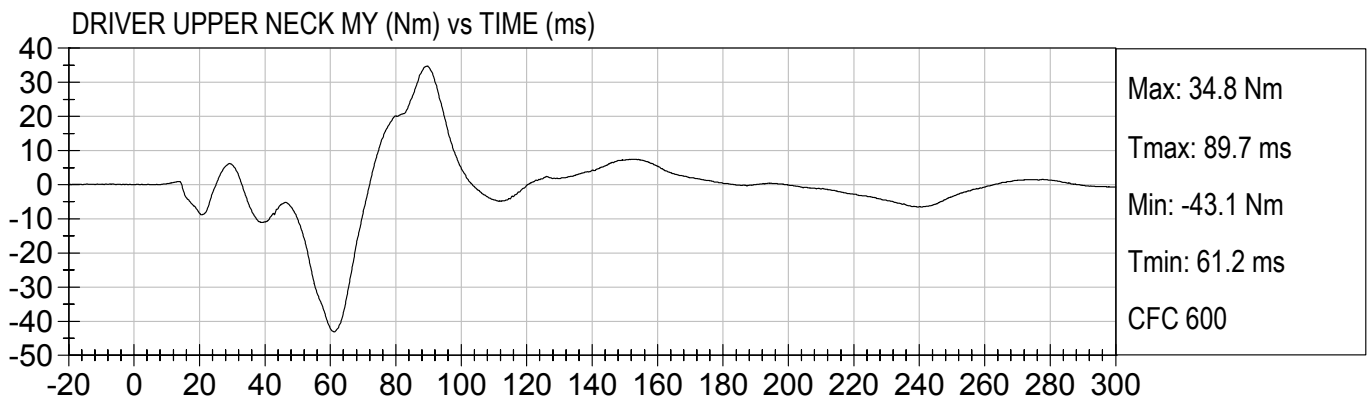
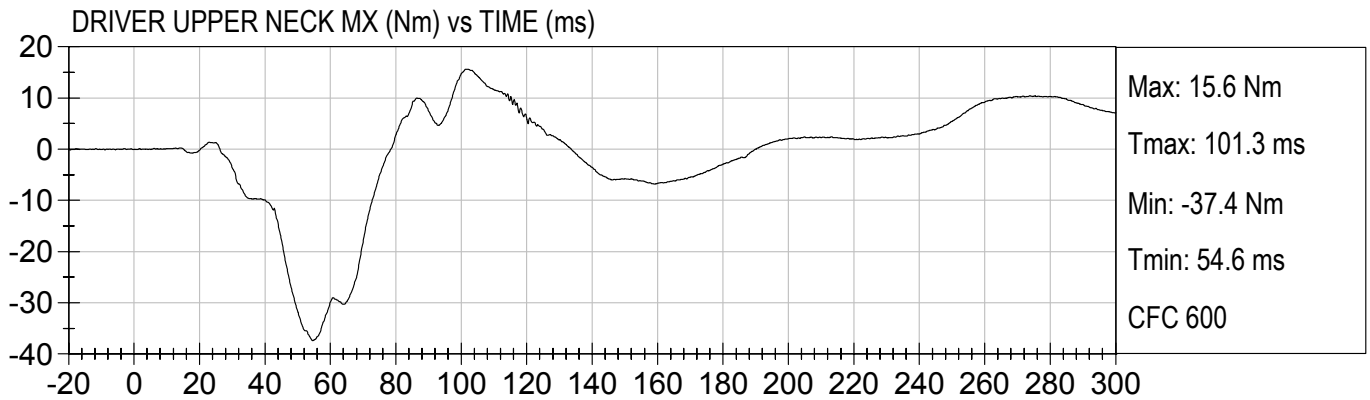
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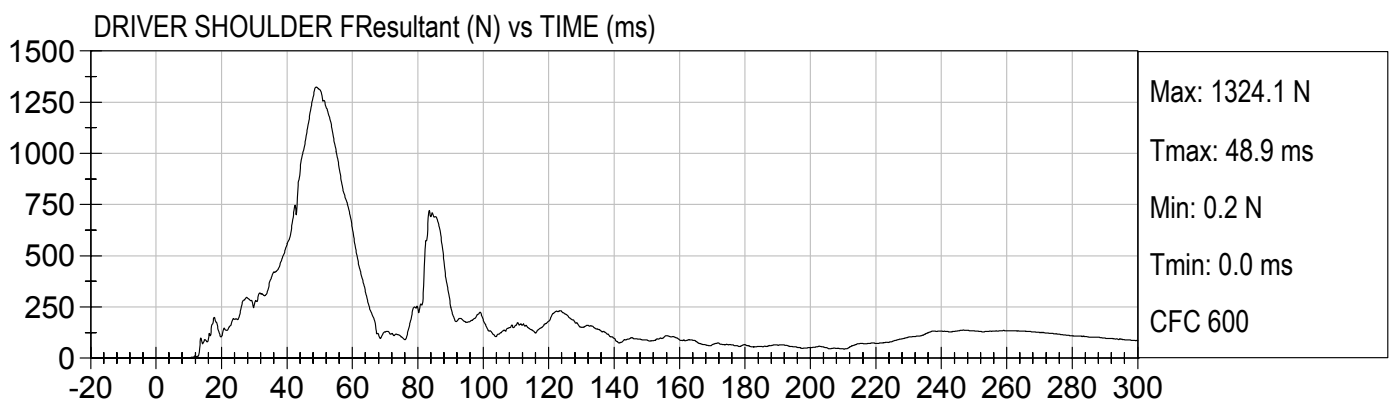
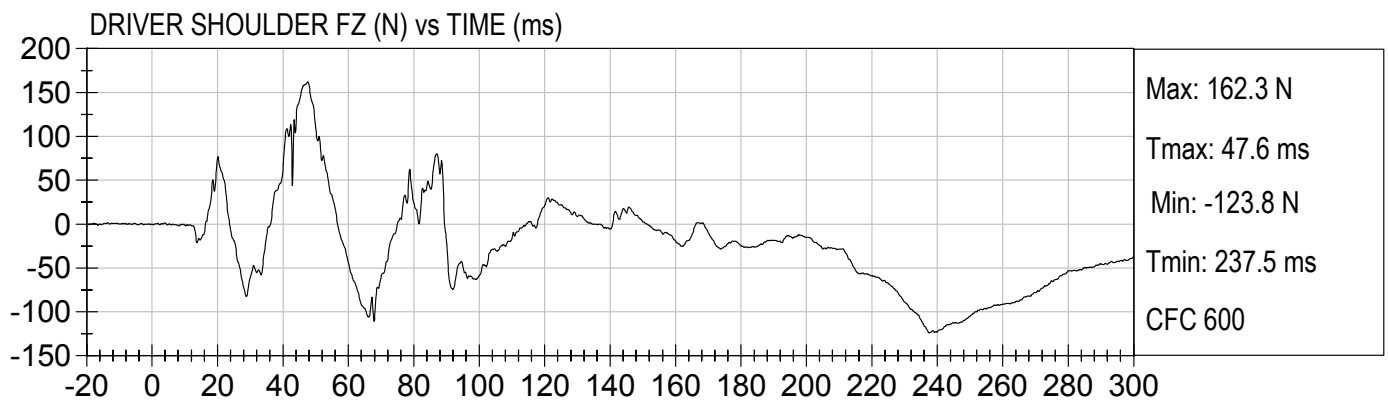
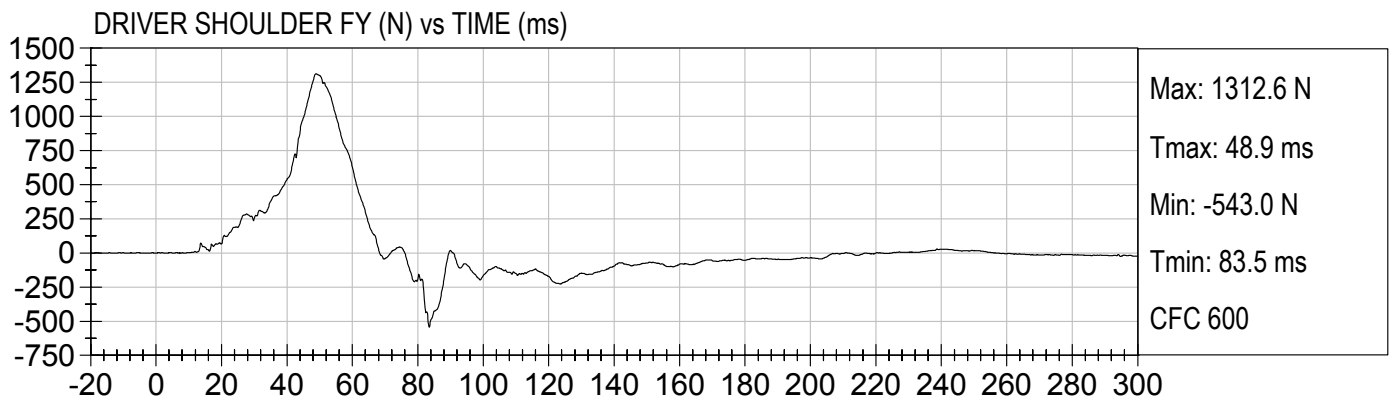
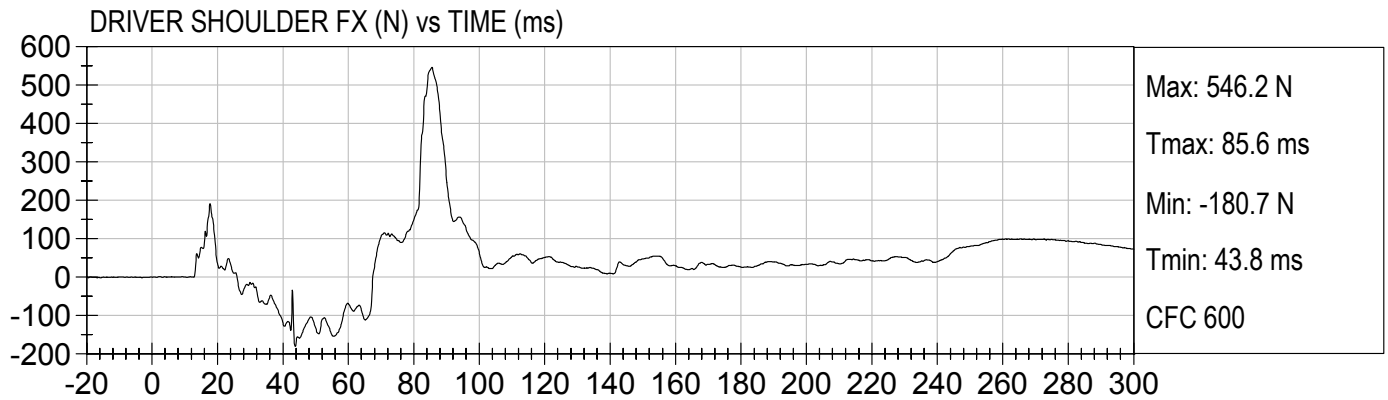
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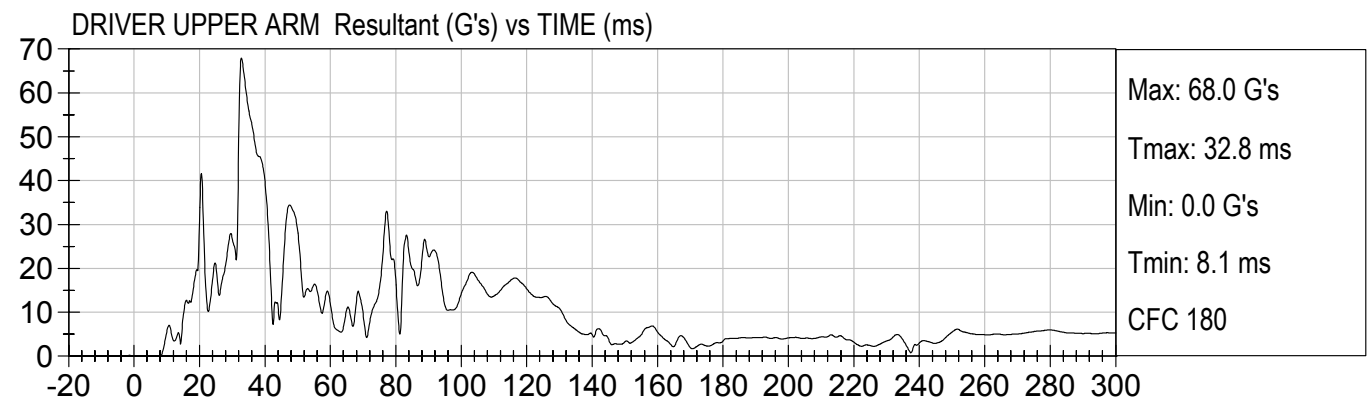
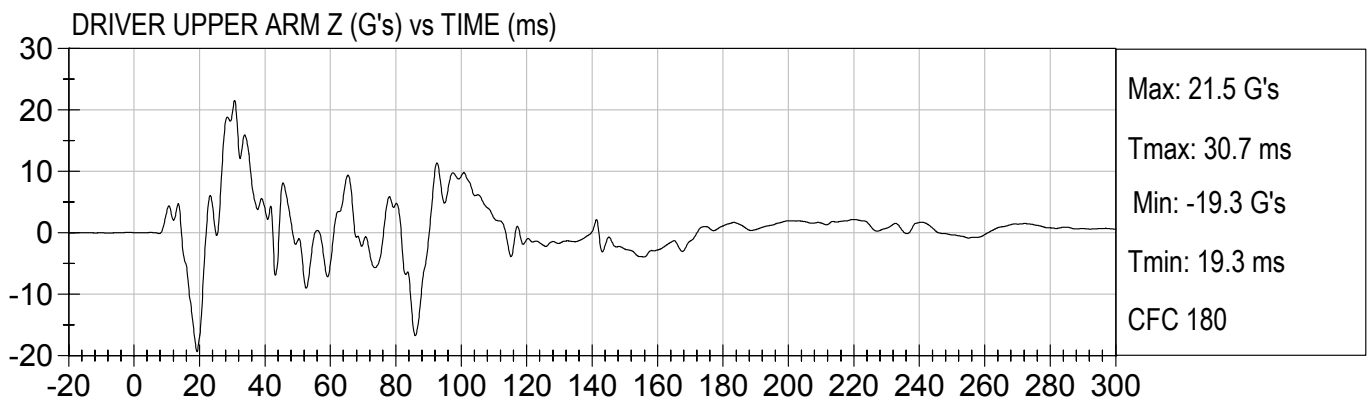
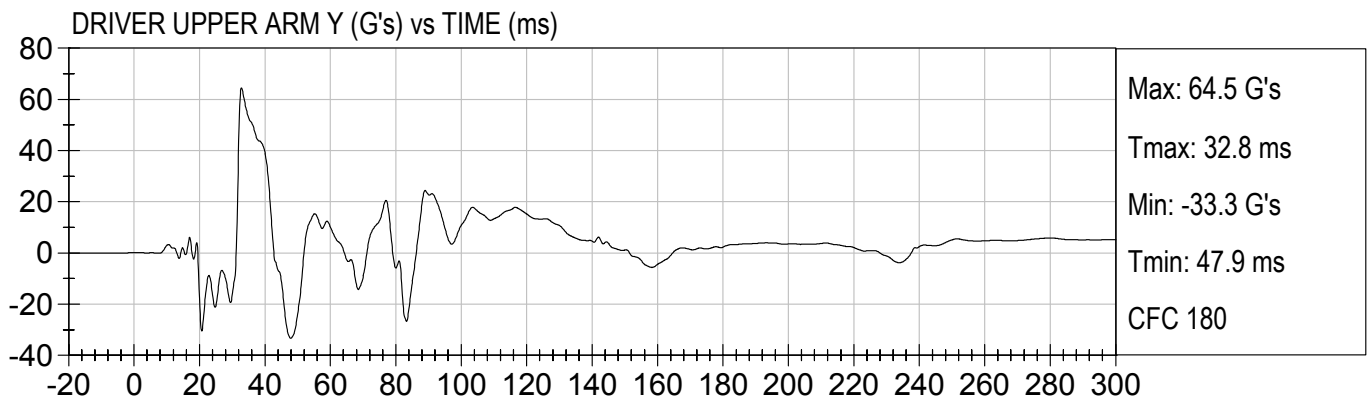
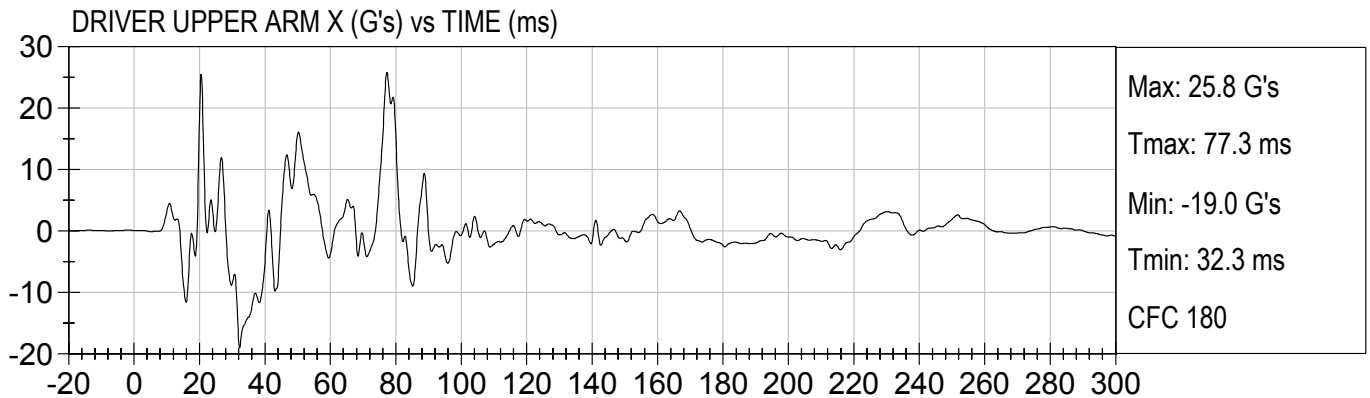






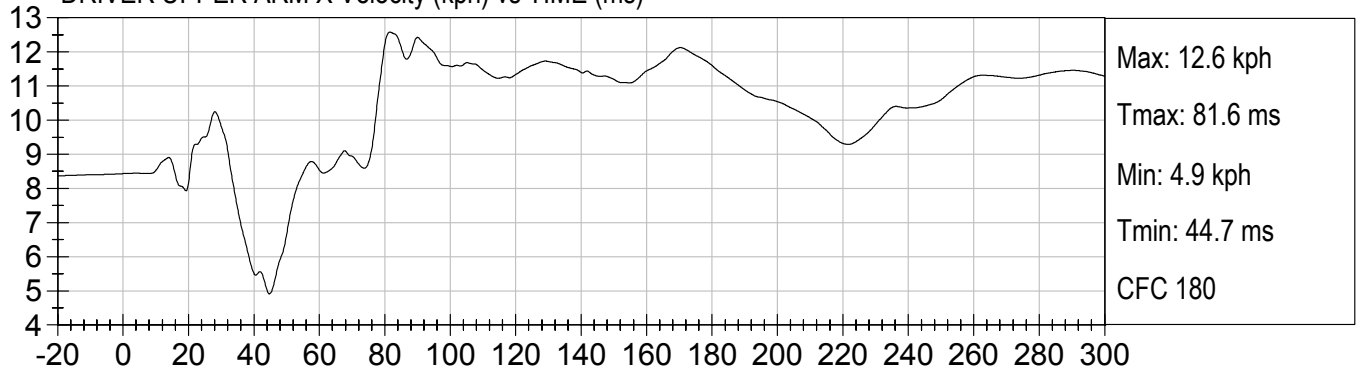




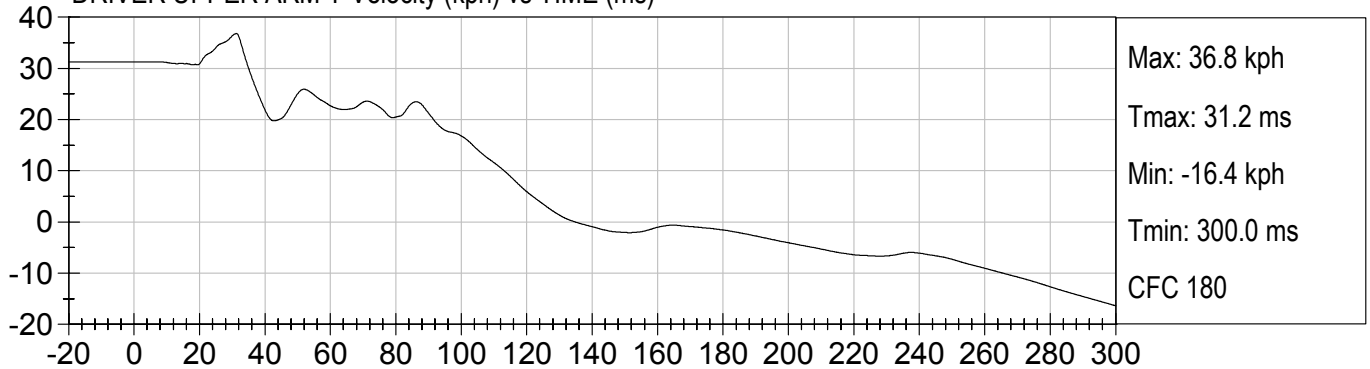




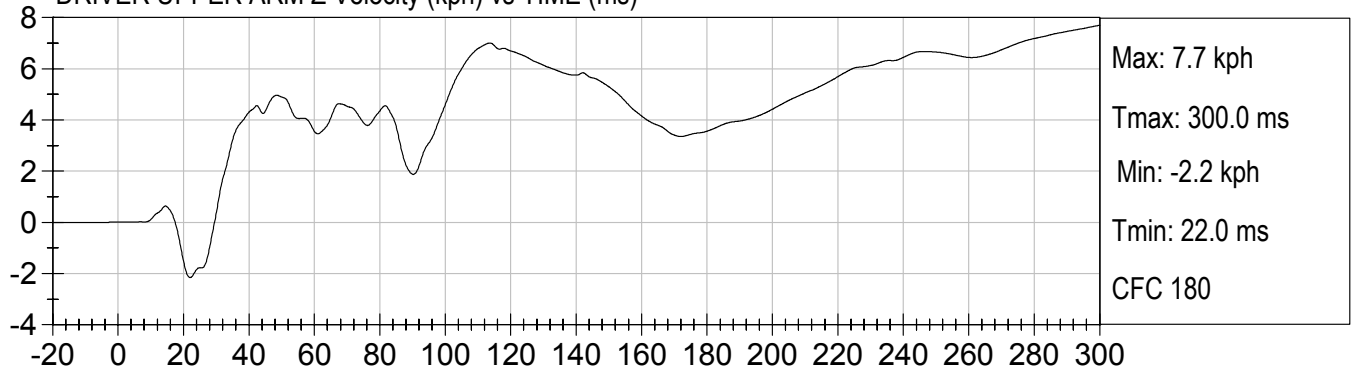
DRIVER UPPER ARM X Velocity (kph) vs TIME (ms)

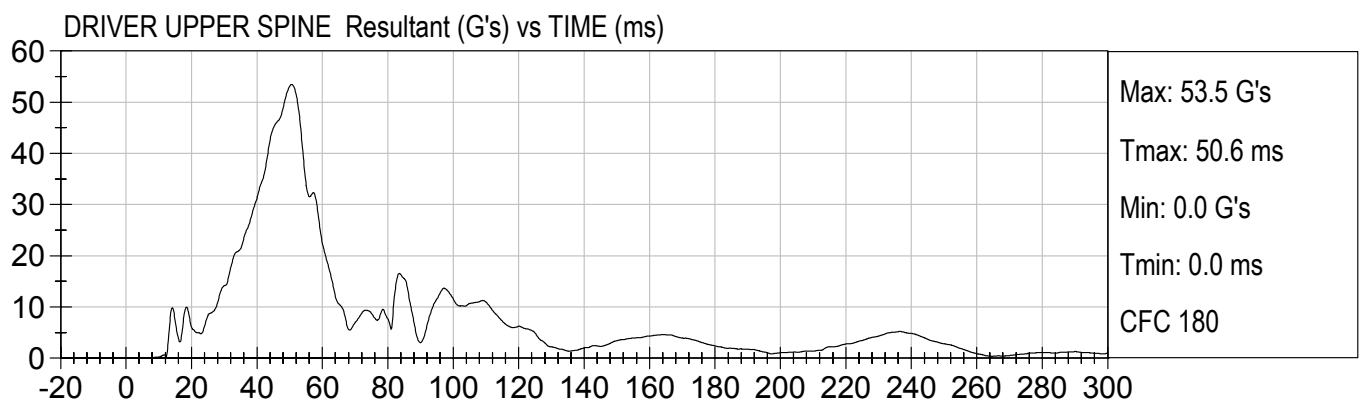
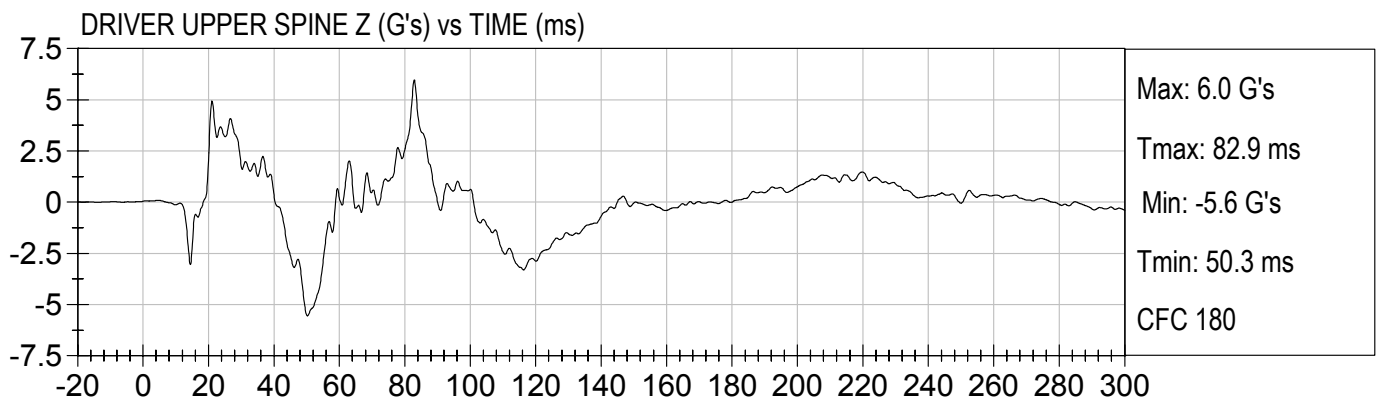
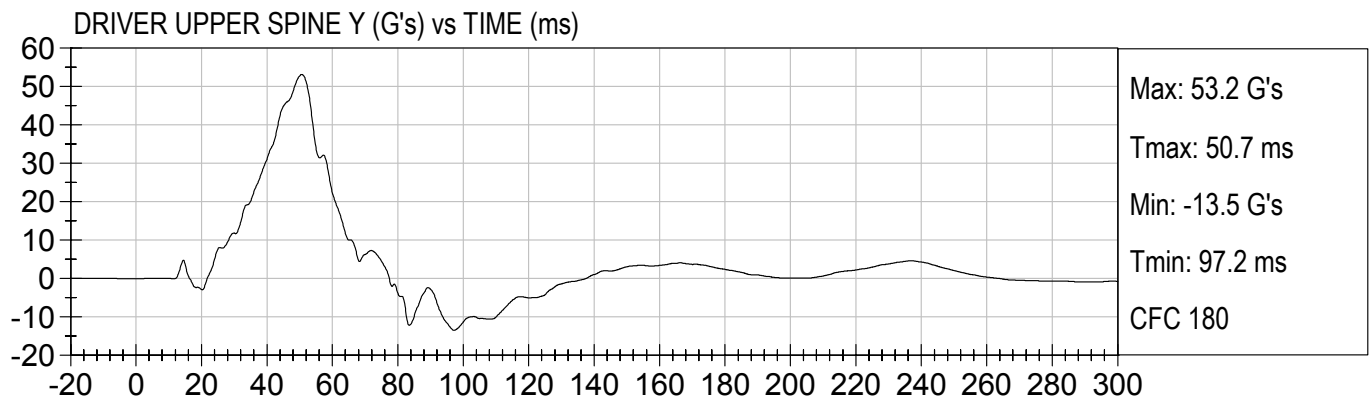
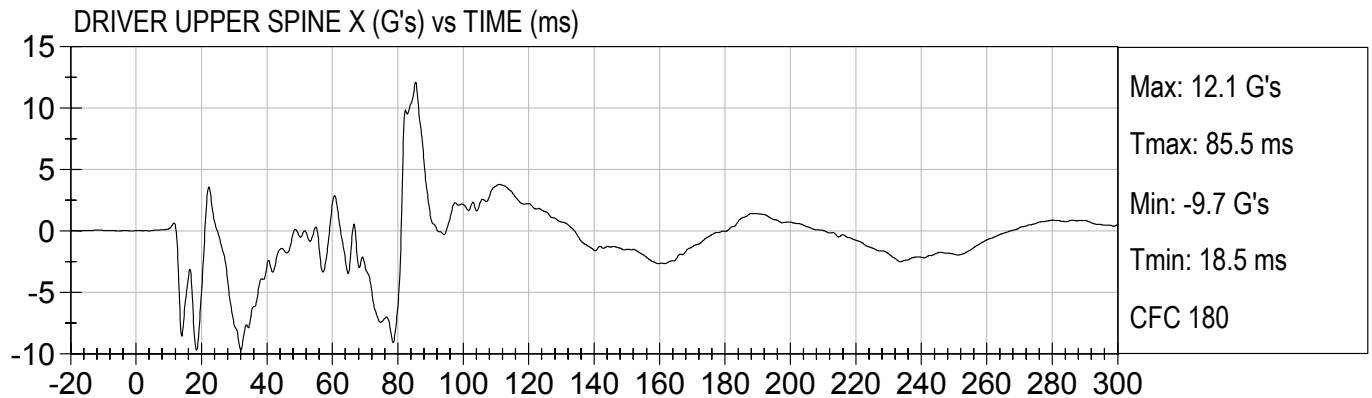


DRIVER UPPER ARM Y Velocity (kph) vs TIME (ms)



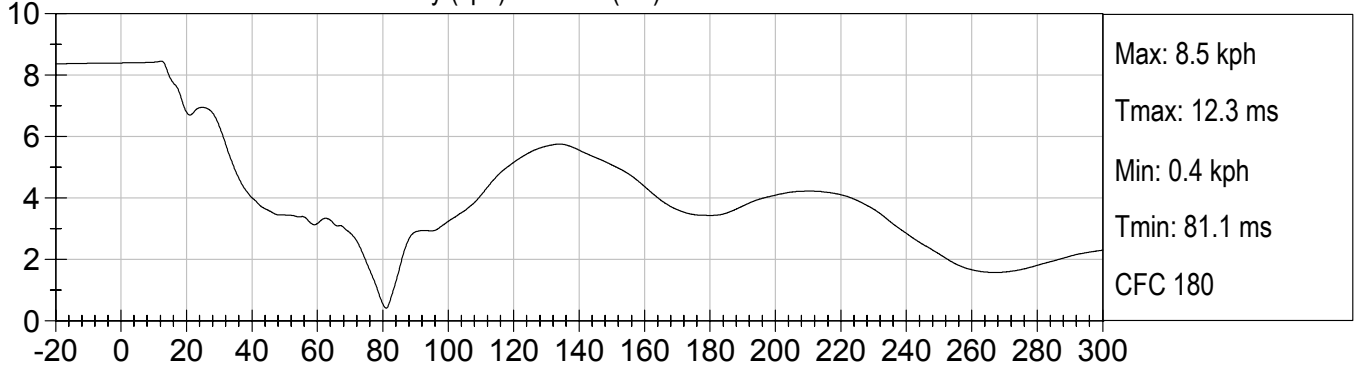
DRIVER UPPER ARM Z Velocity (kph) vs TIME (ms)



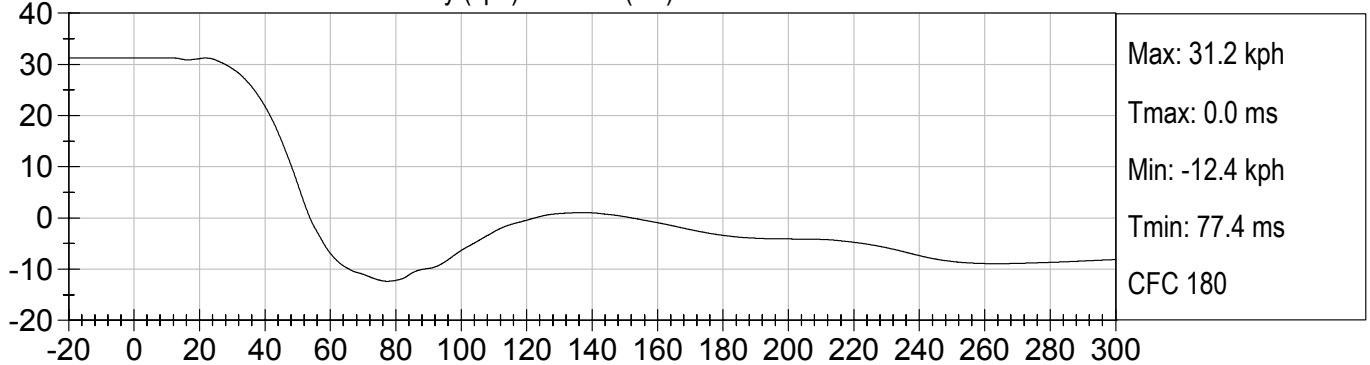




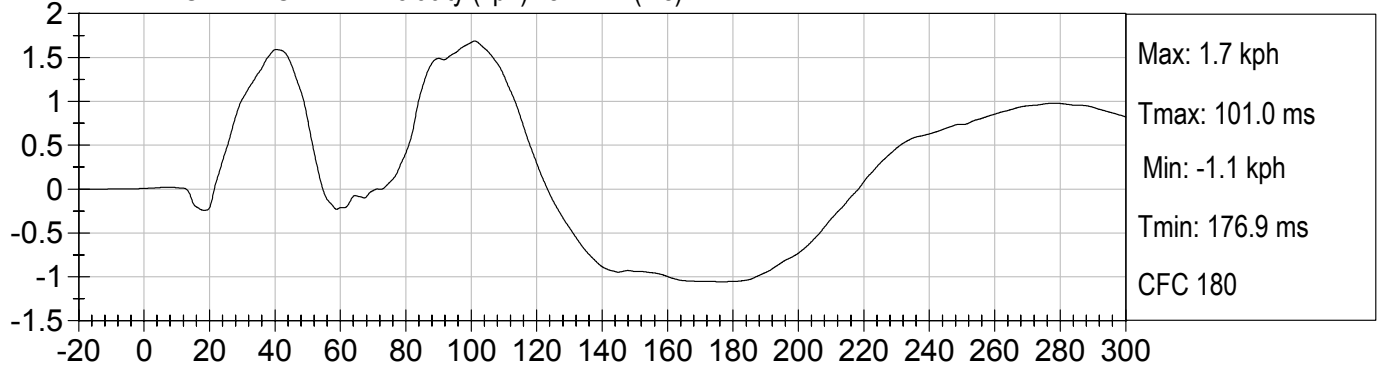
DRIVER UPPER SPINE X Velocity (kph) vs TIME (ms)

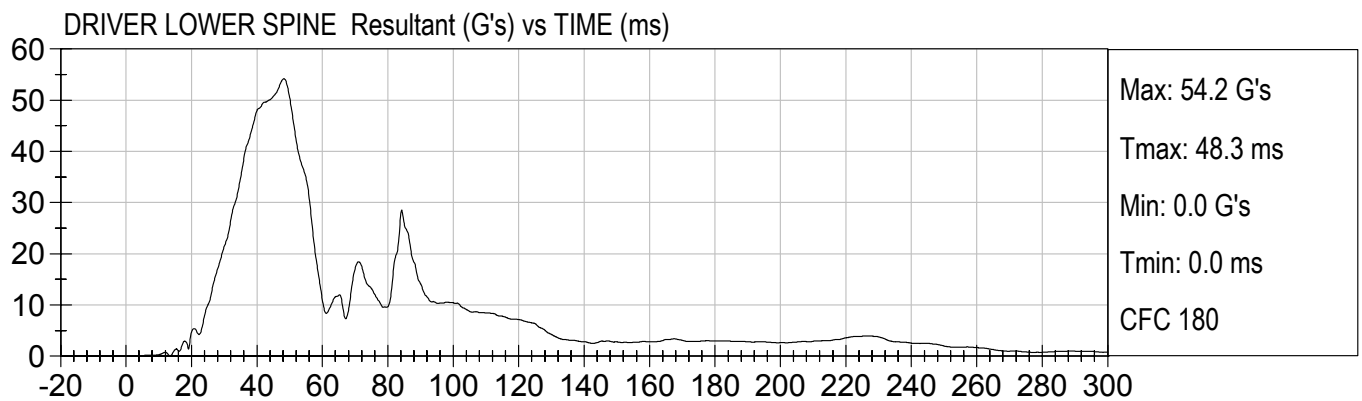
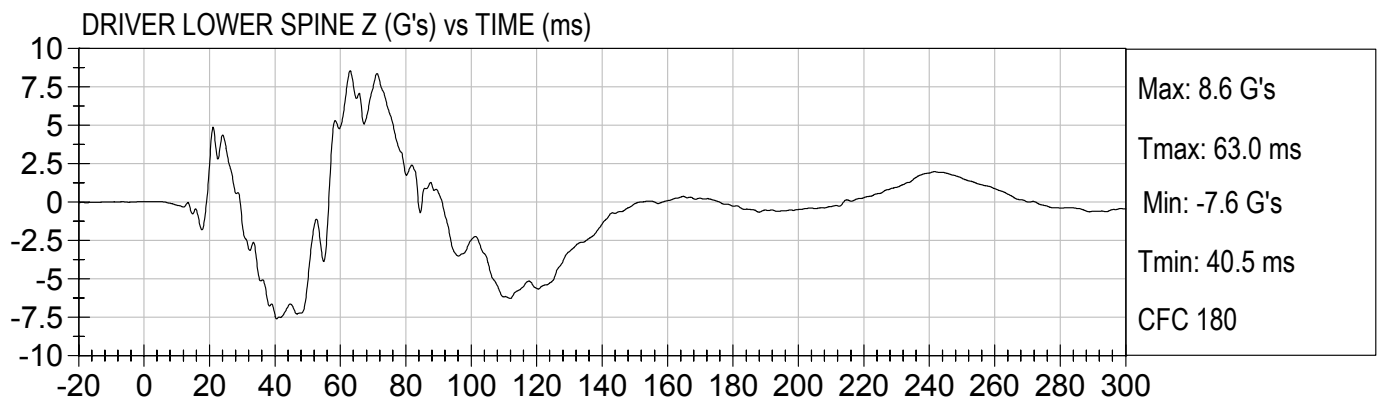
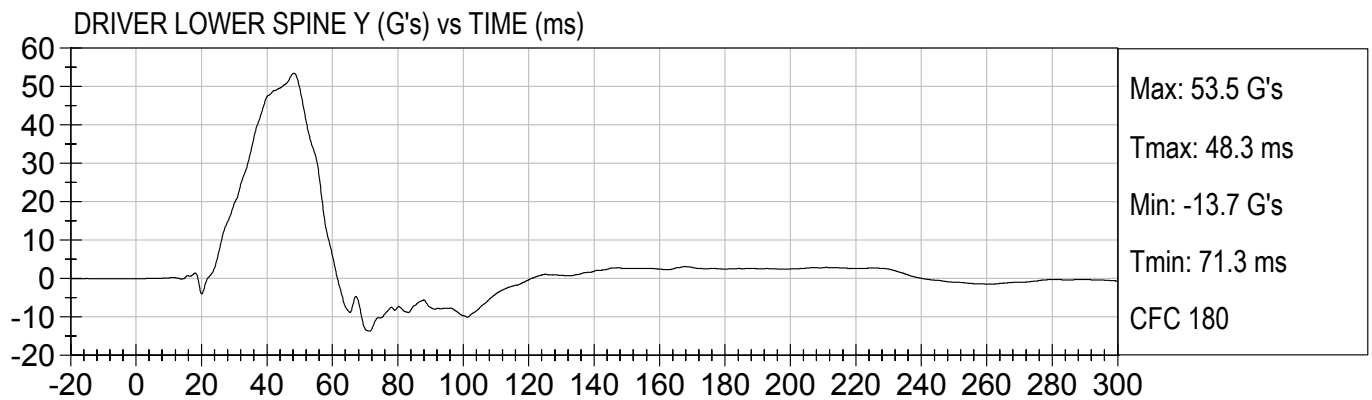
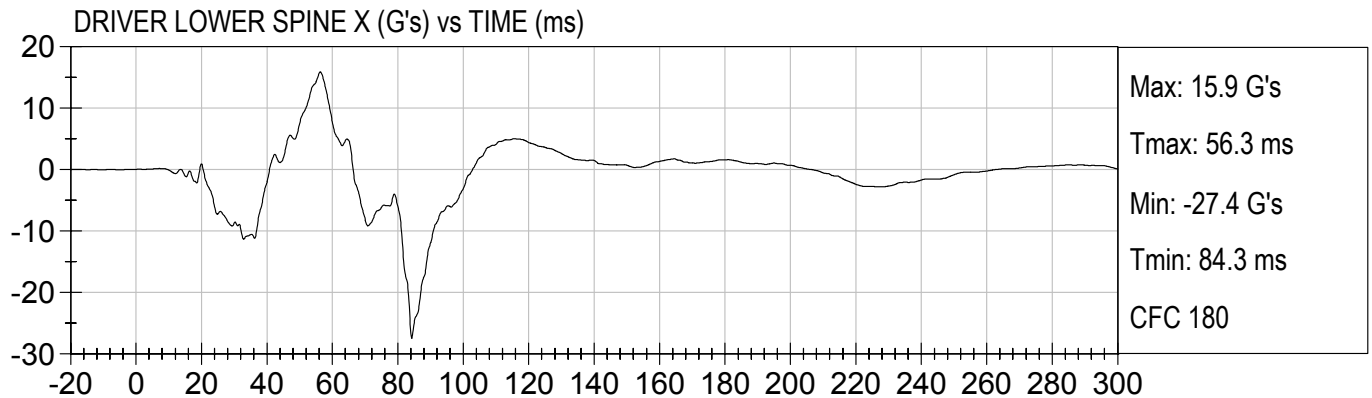


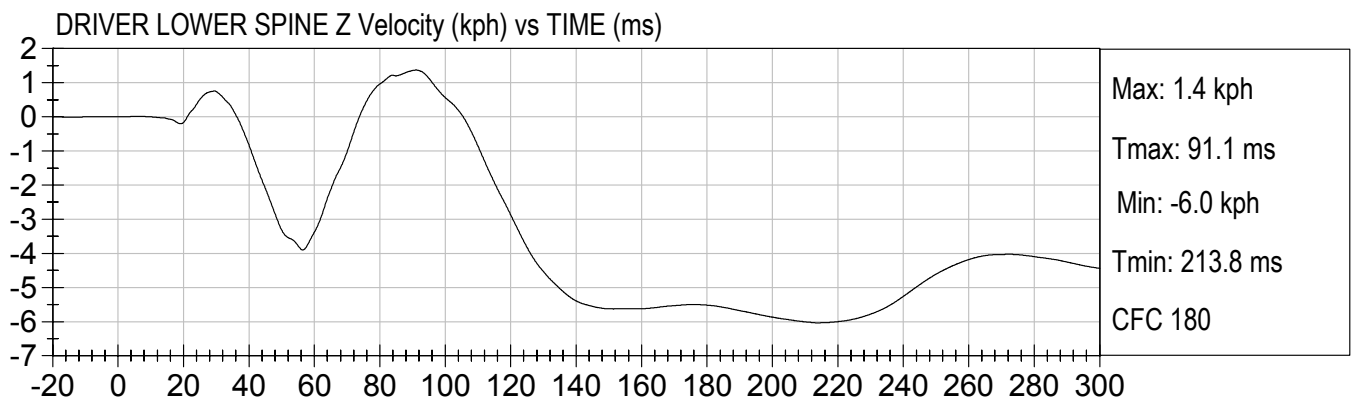
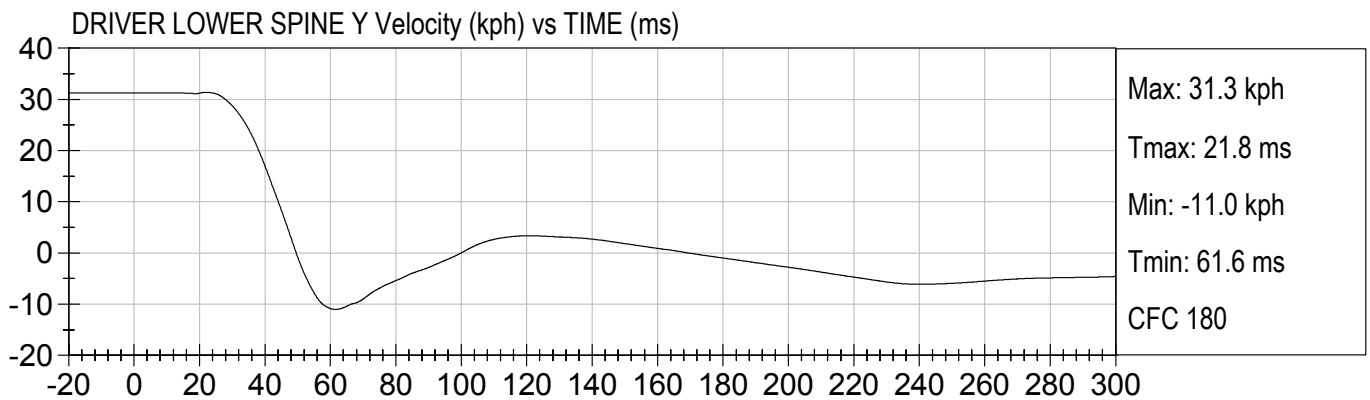
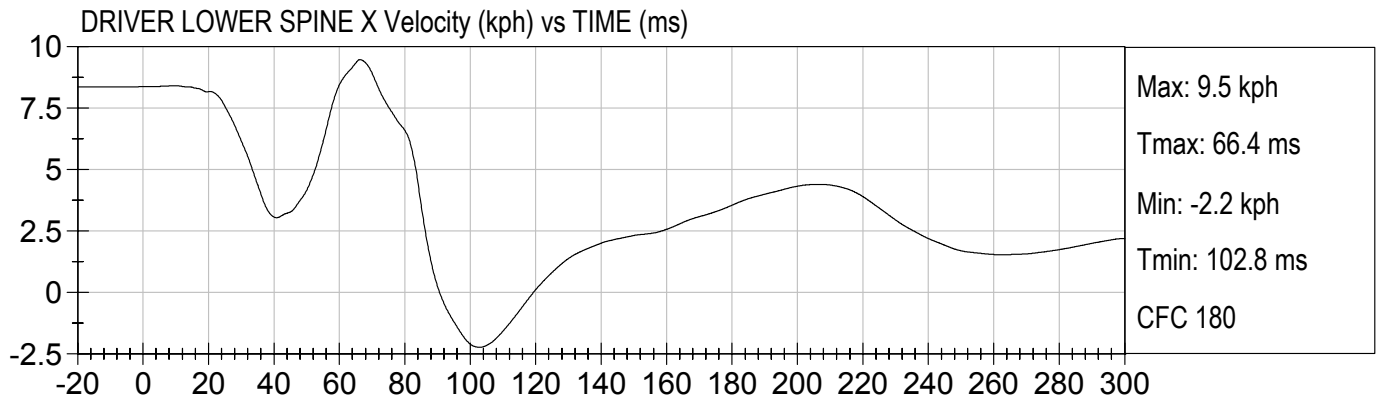
DRIVER UPPER SPINE Y Velocity (kph) vs TIME (ms)

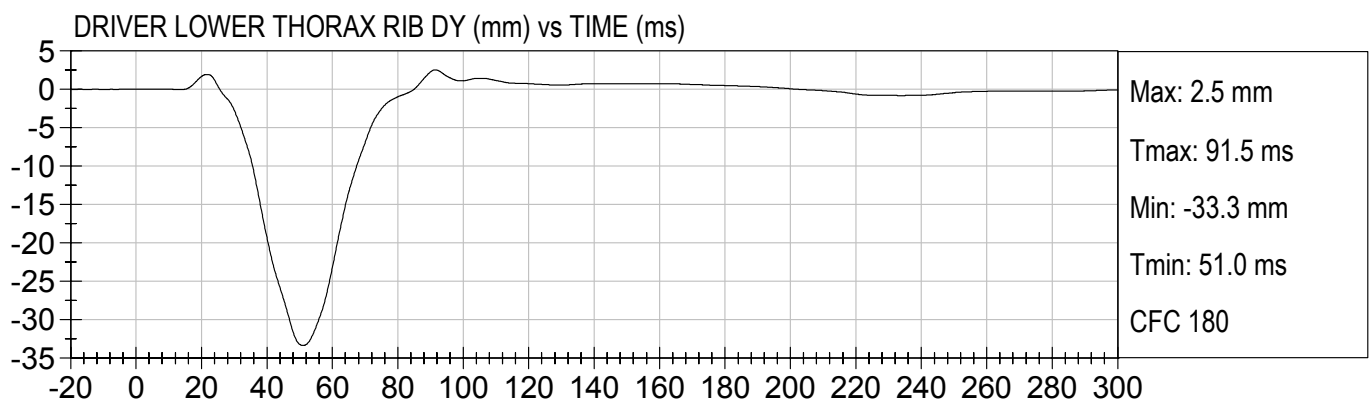
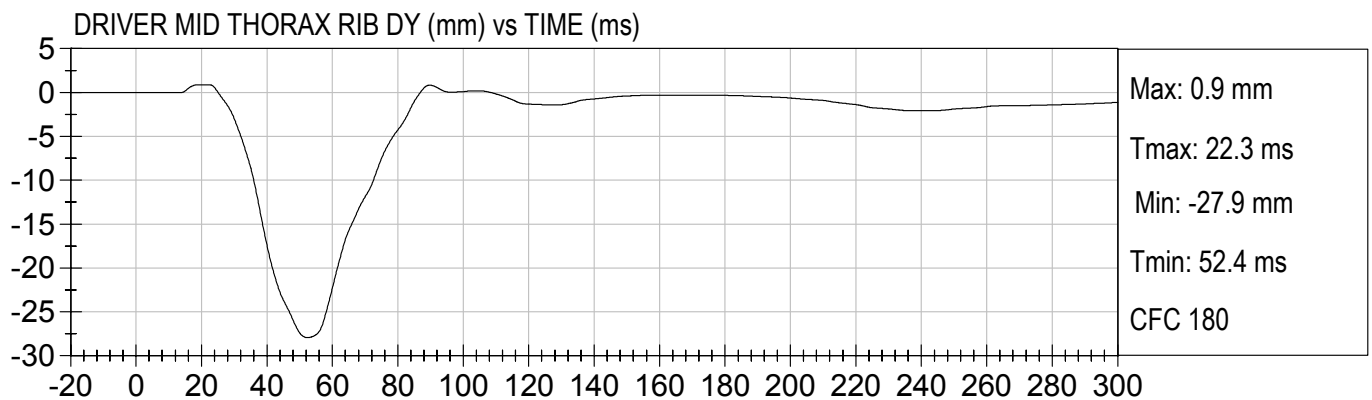
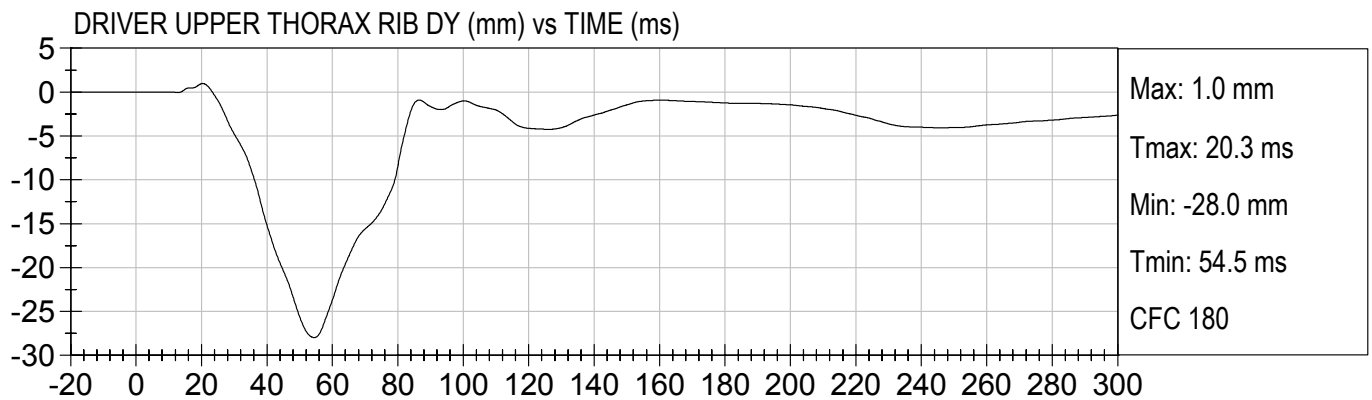
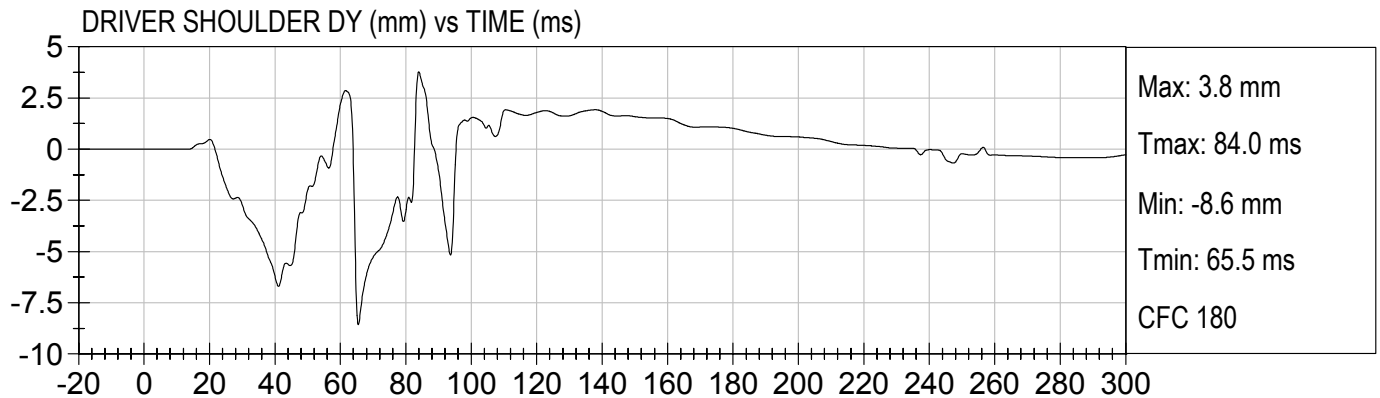


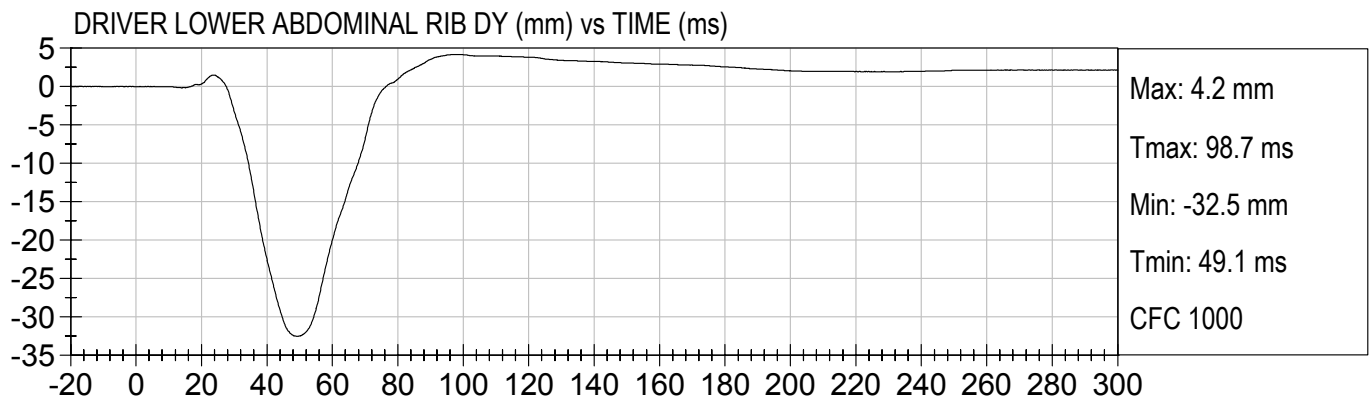
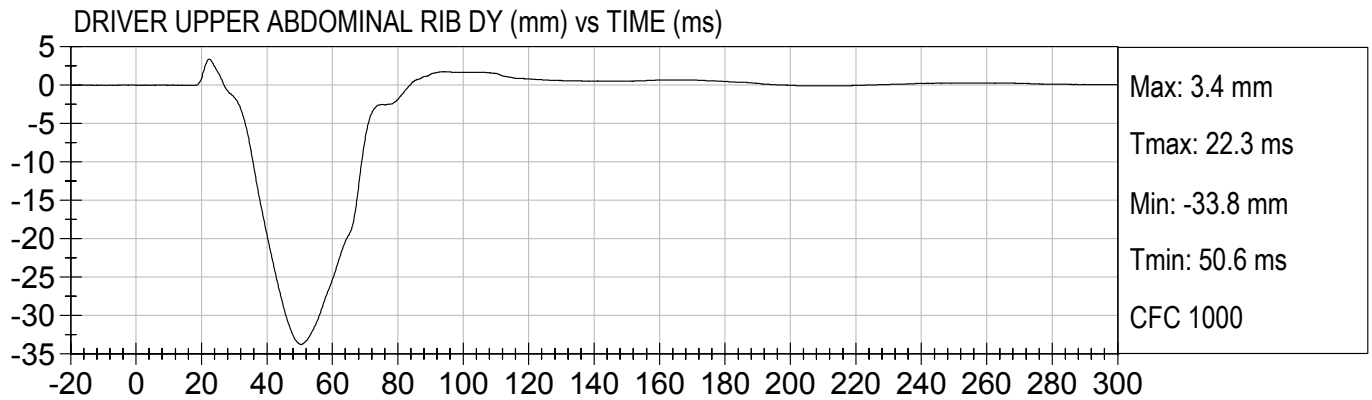
DRIVER UPPER SPINE Z Velocity (kph) vs TIME (ms)

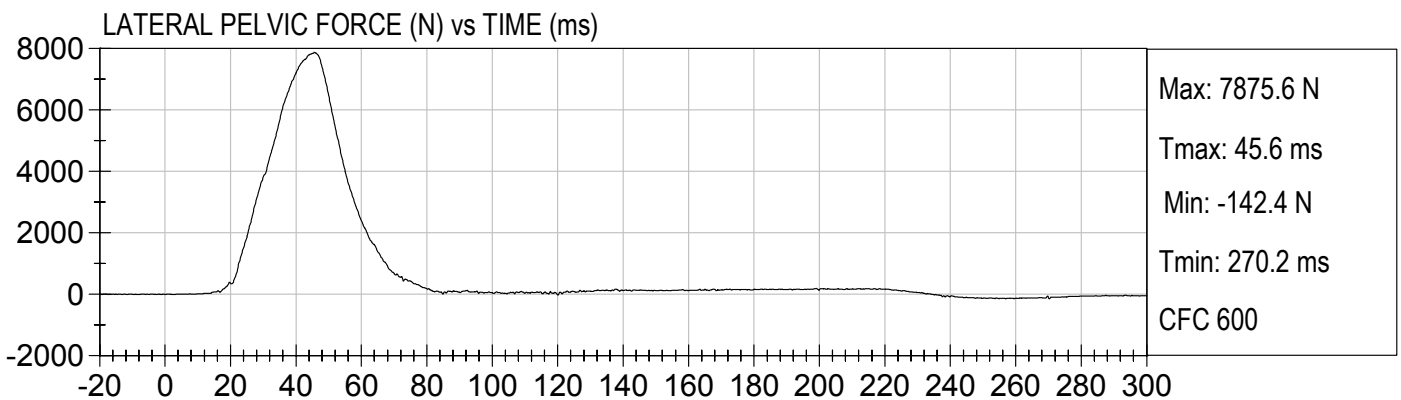
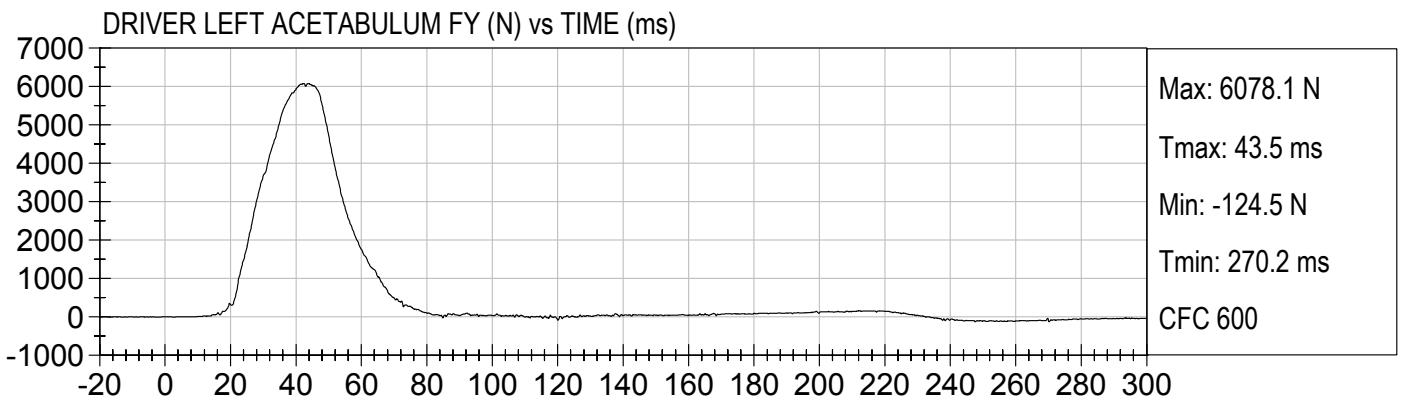
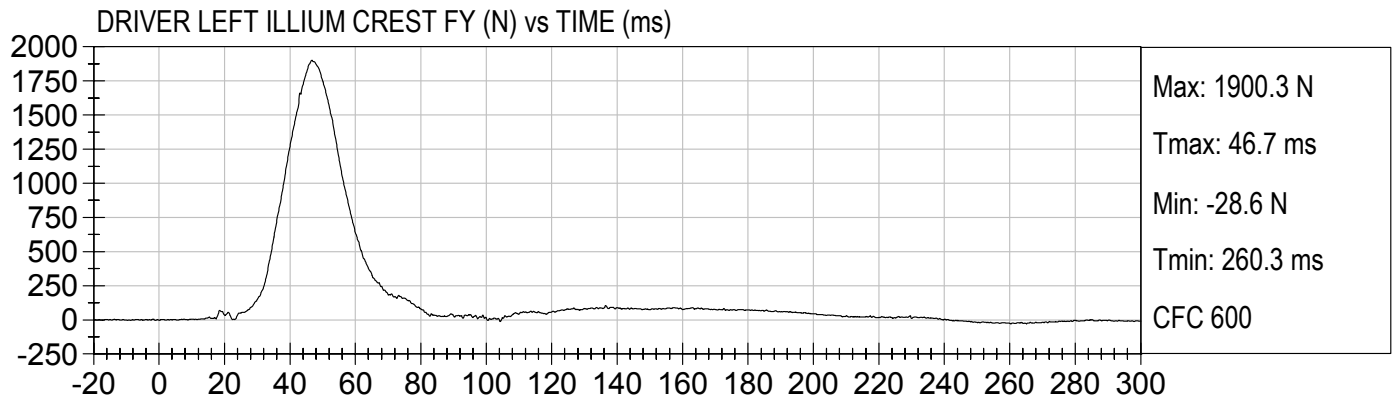


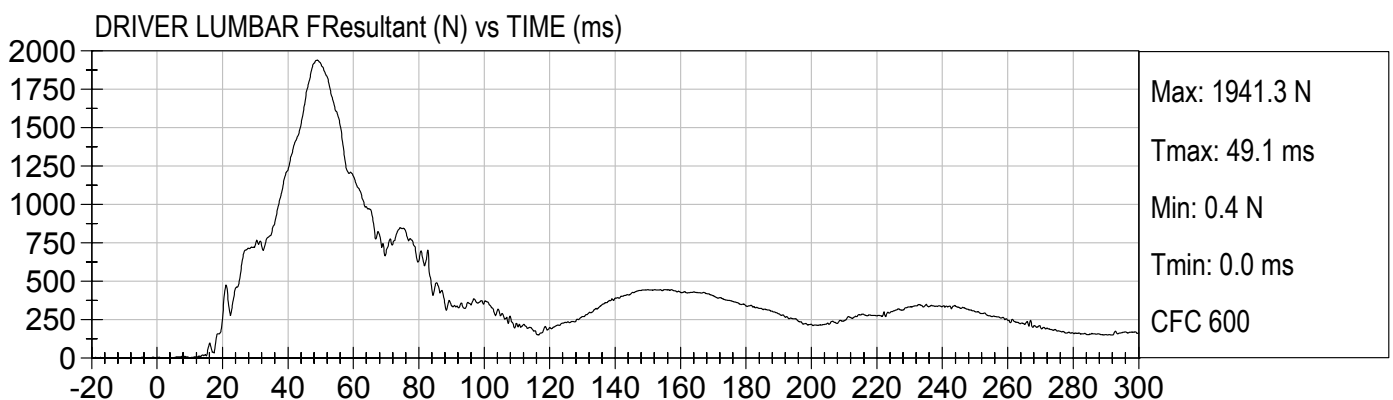
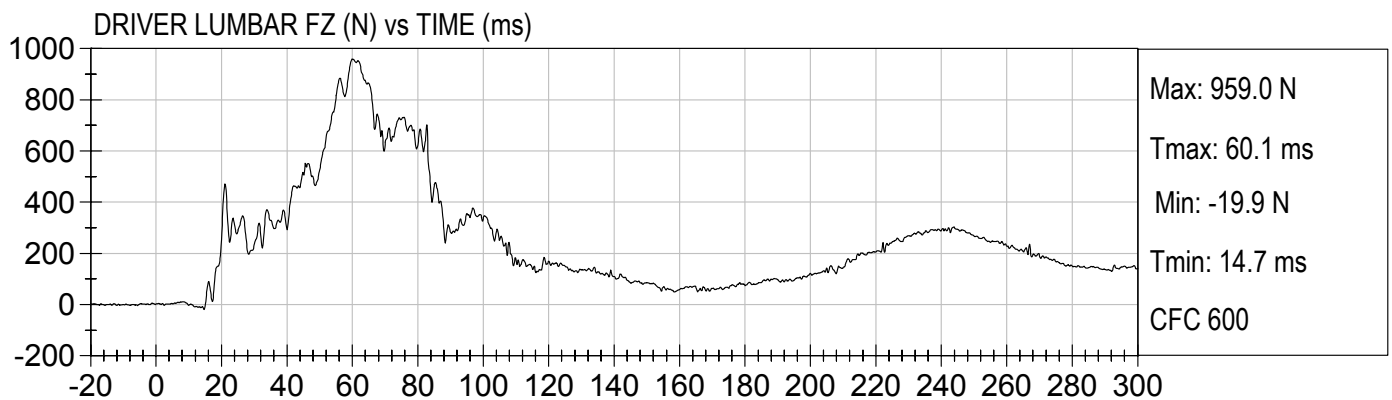
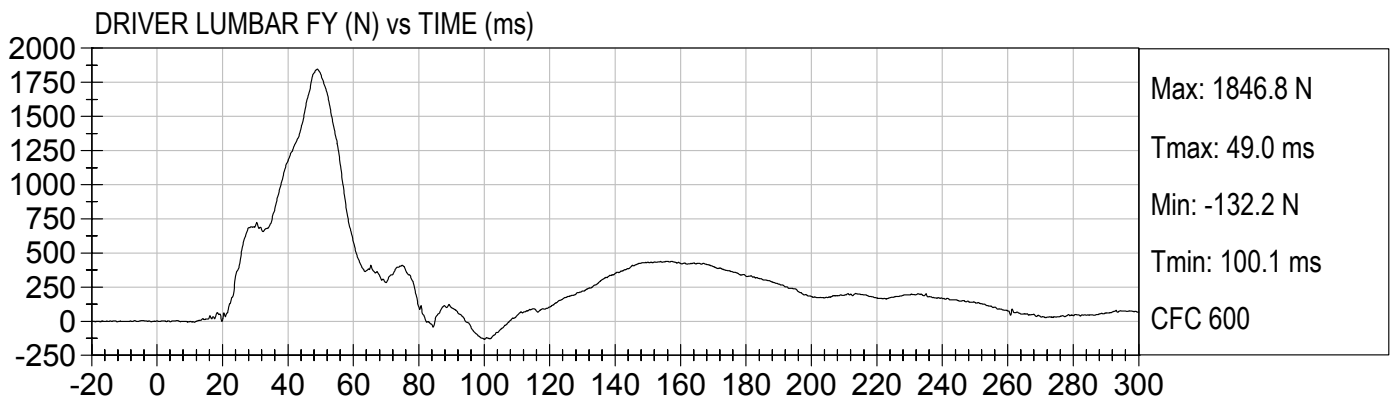
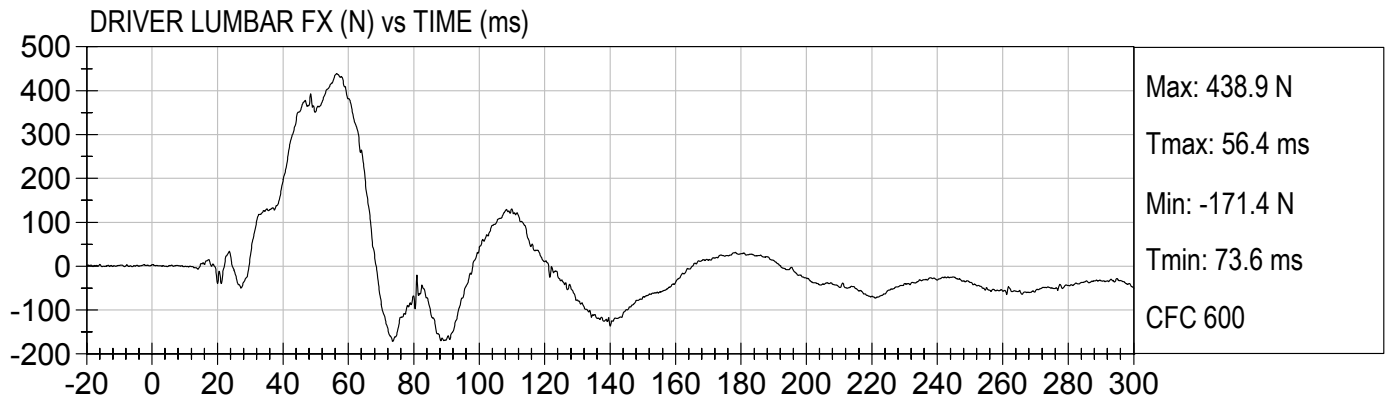


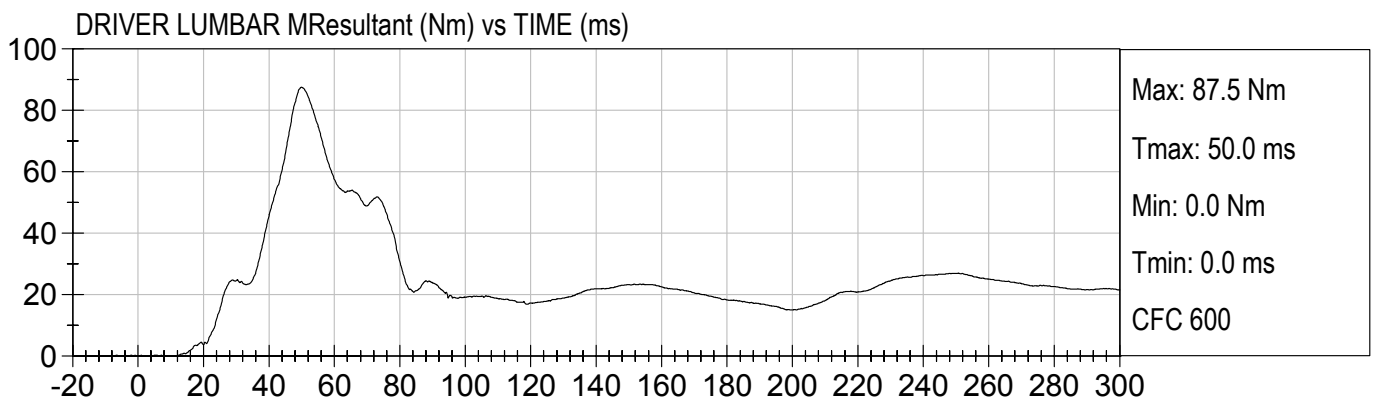
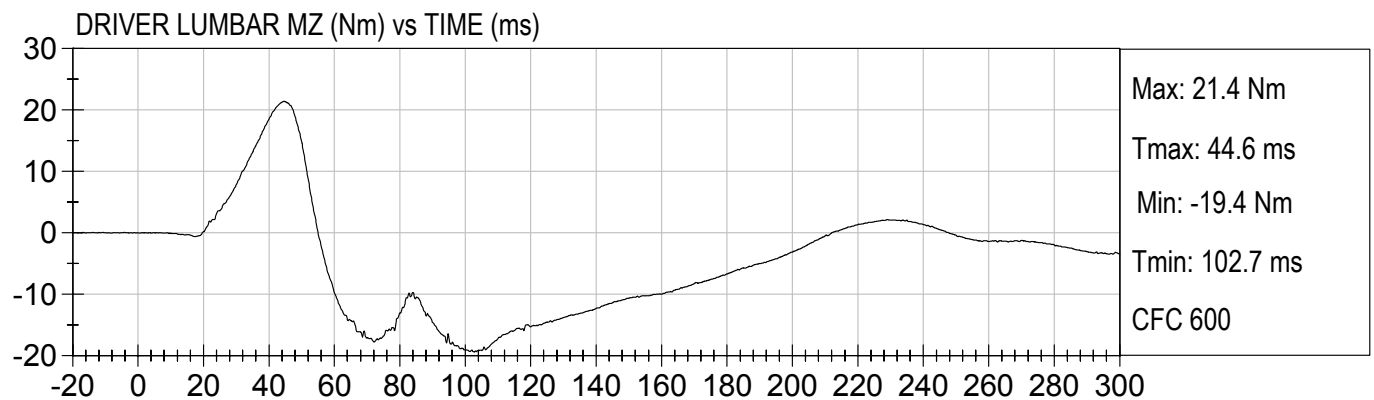
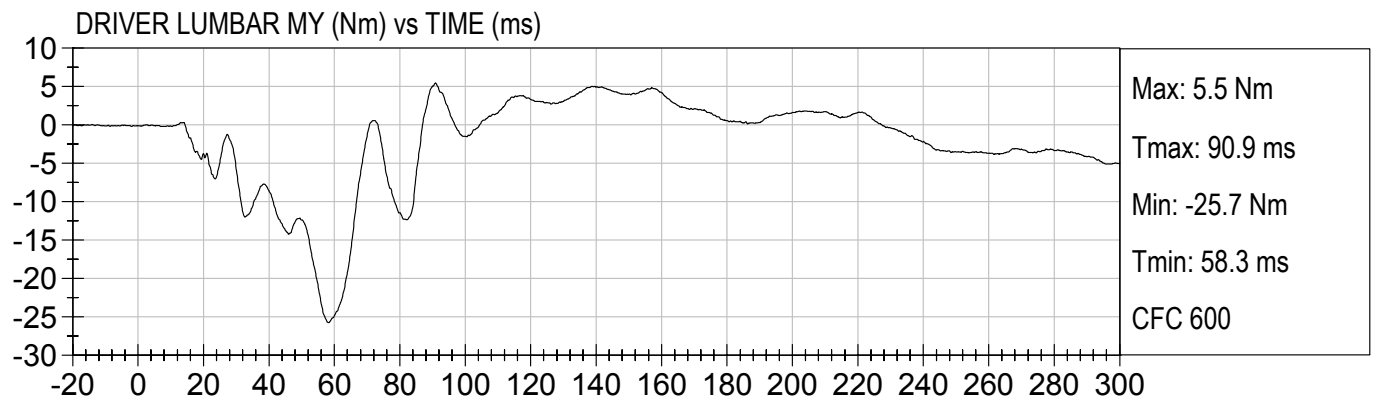
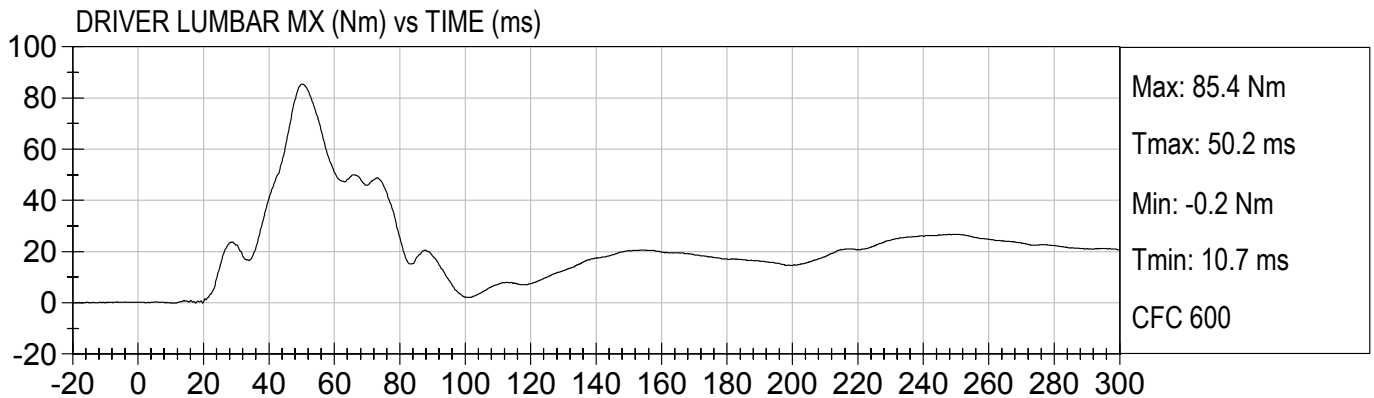


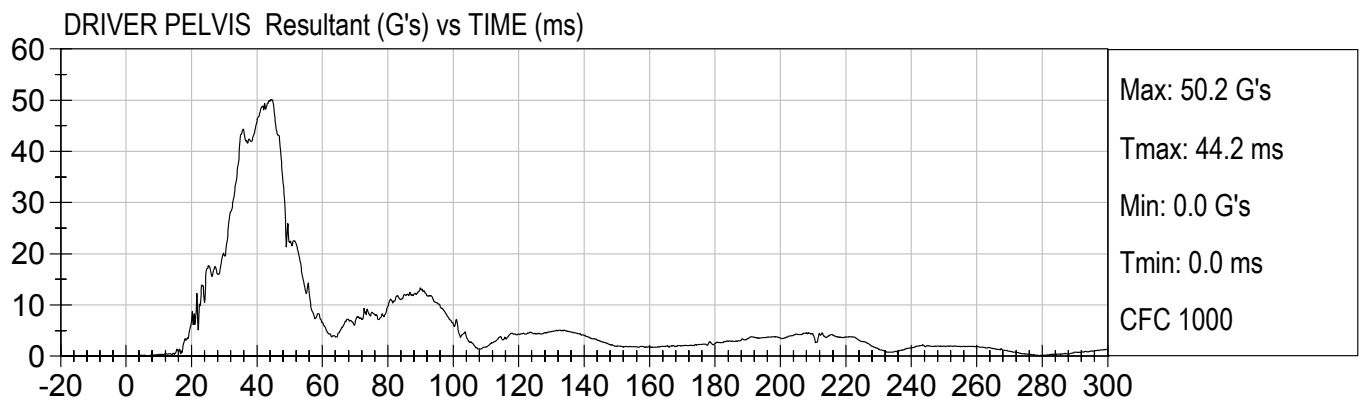
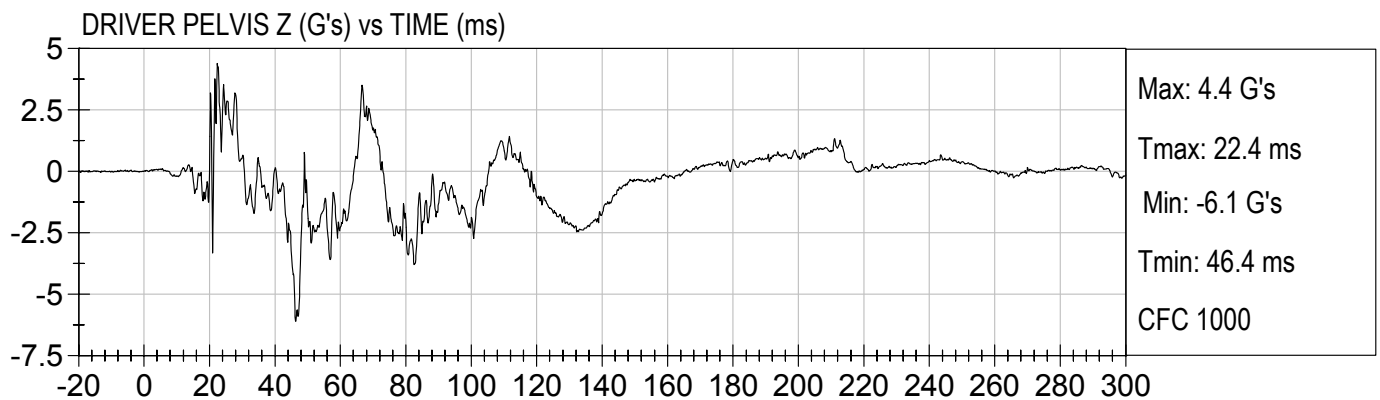
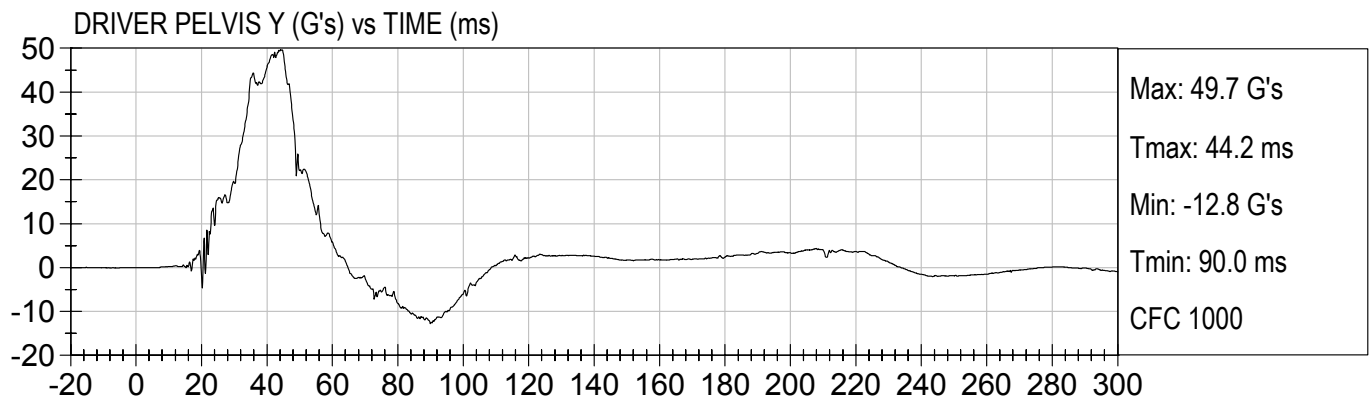
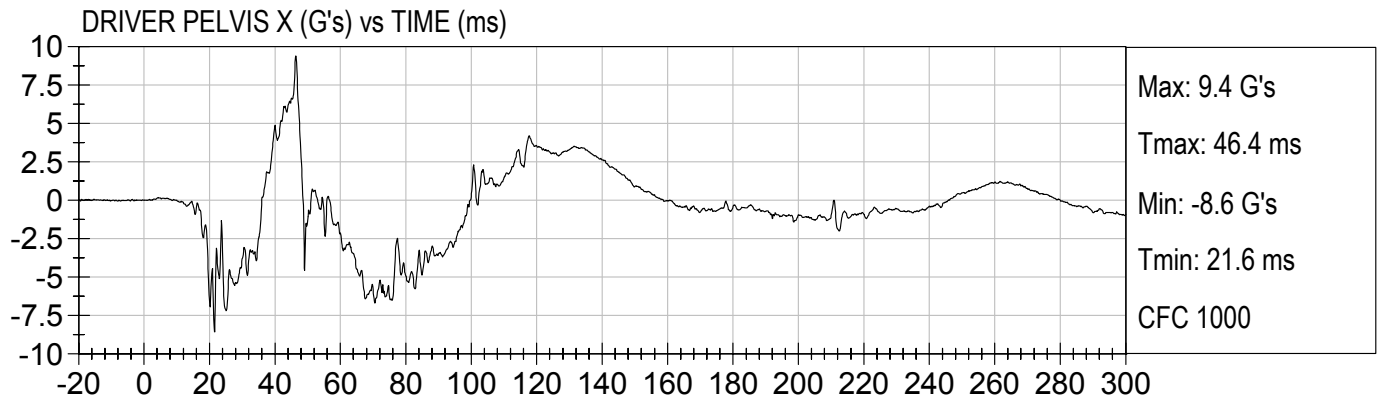






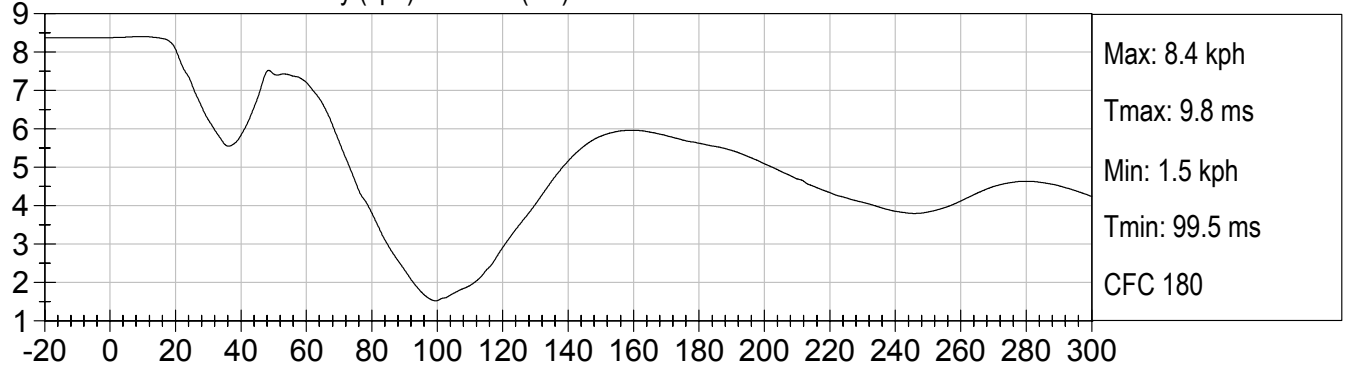




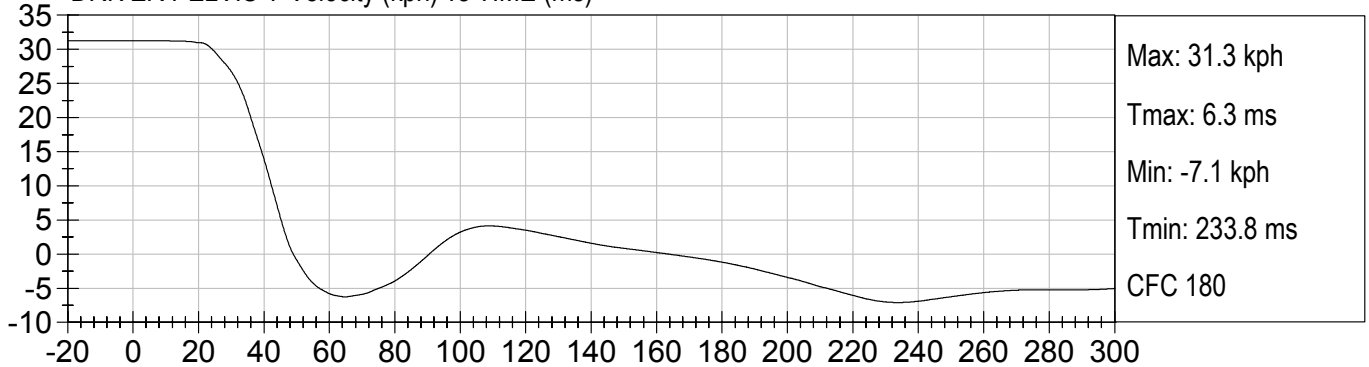




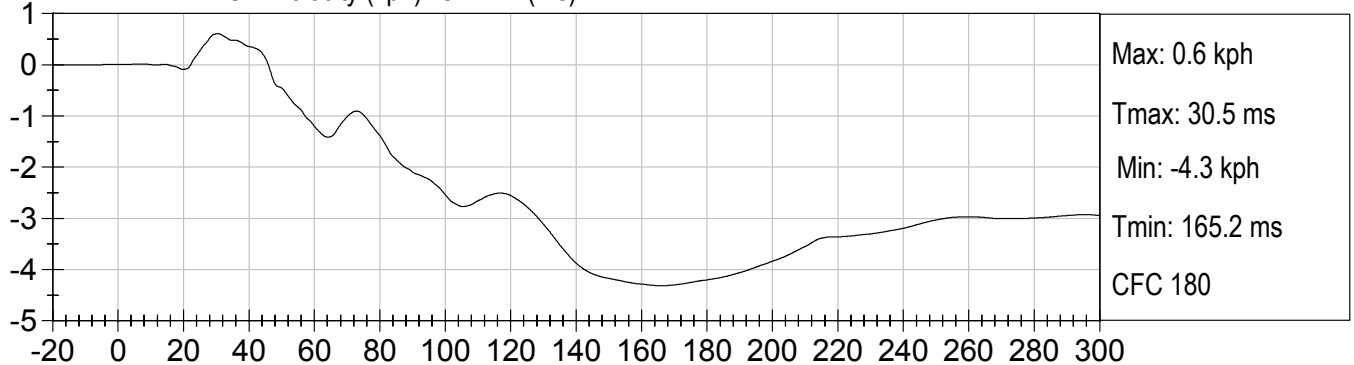
DRIVER PELVIS X Velocity (kph) vs TIME (ms)

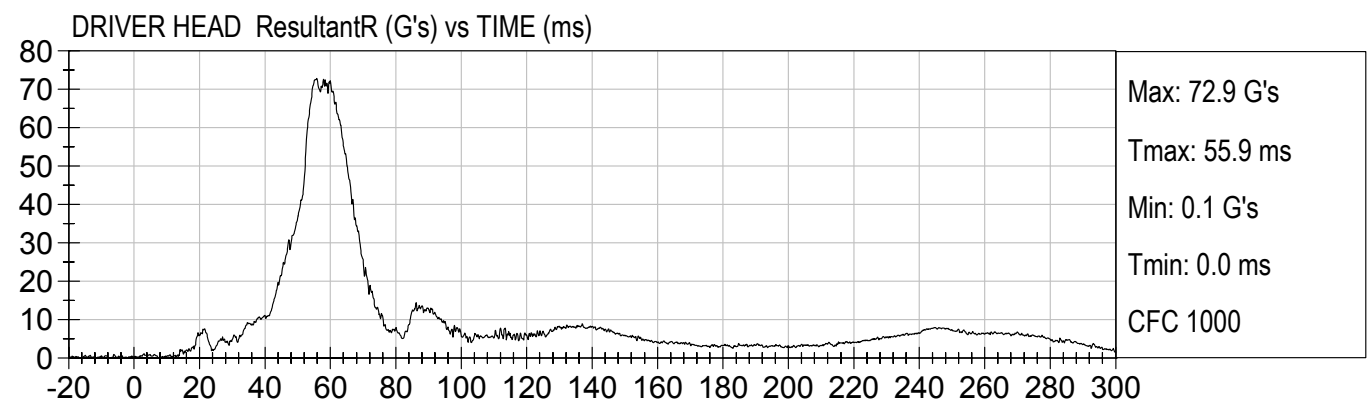
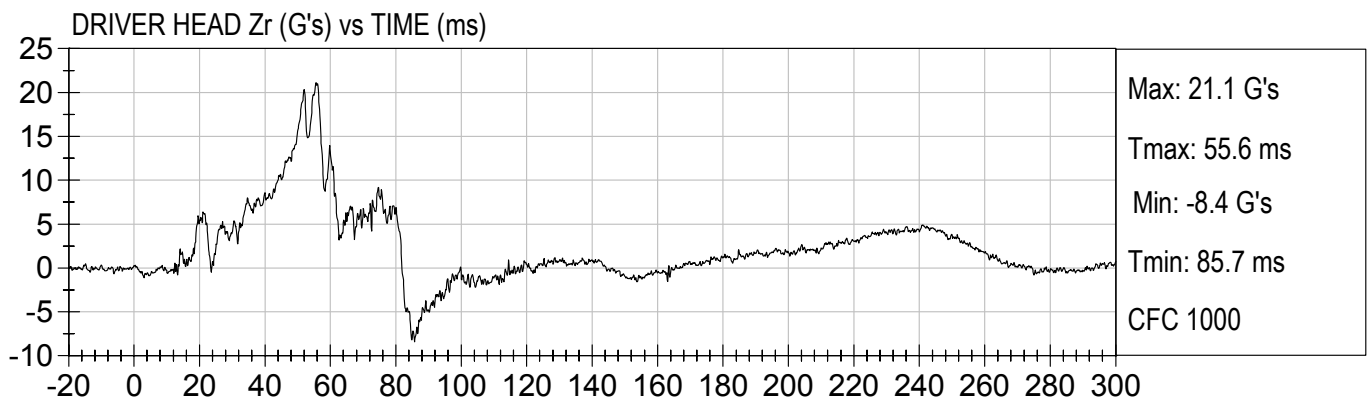
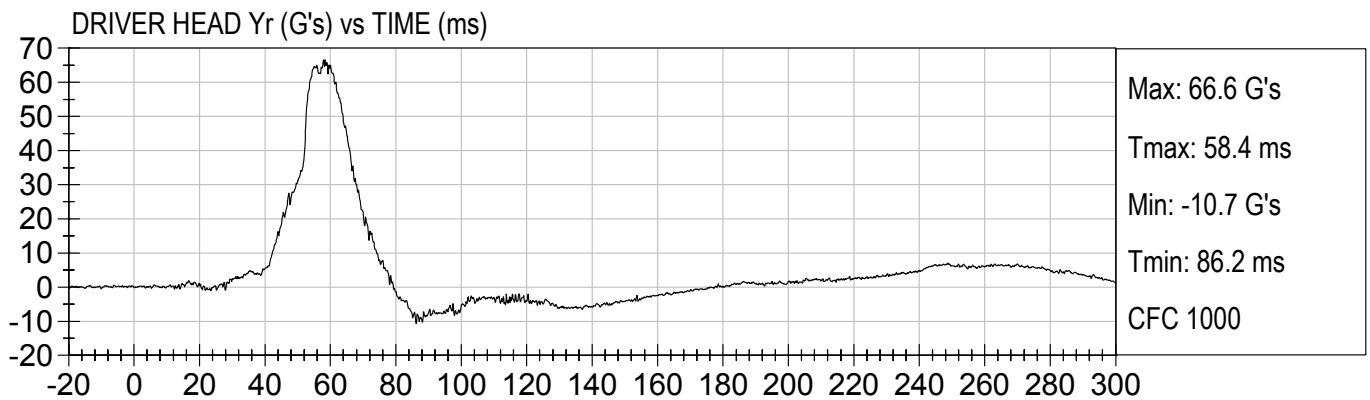
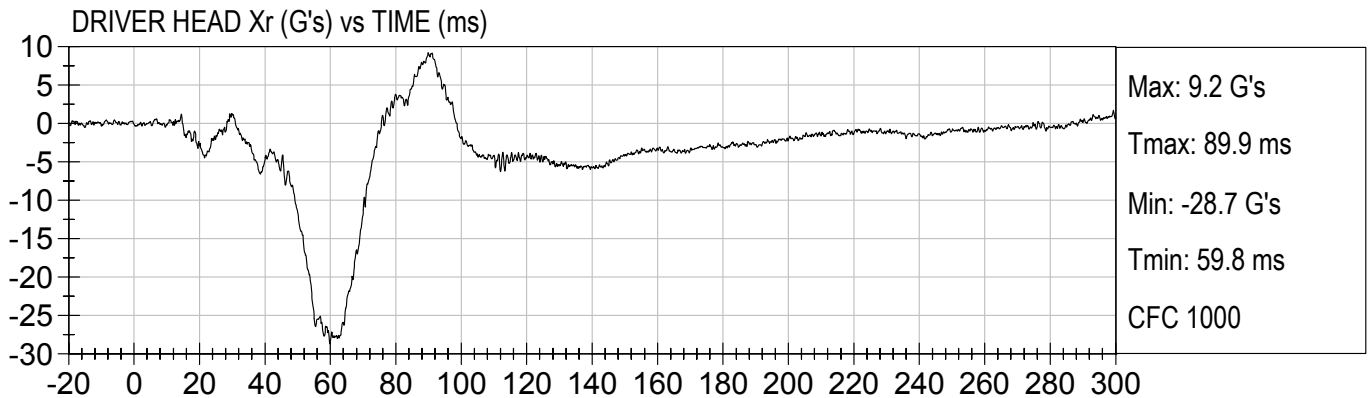


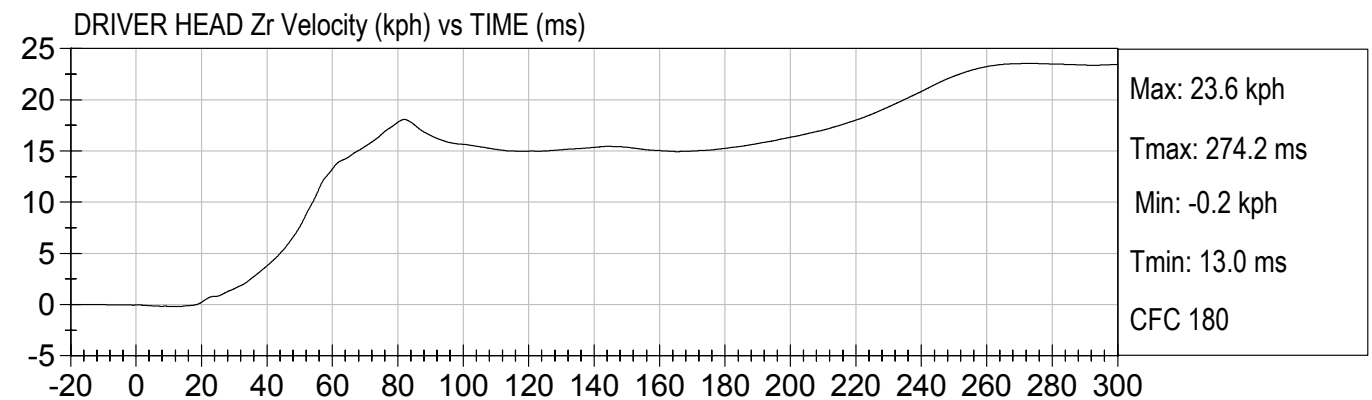
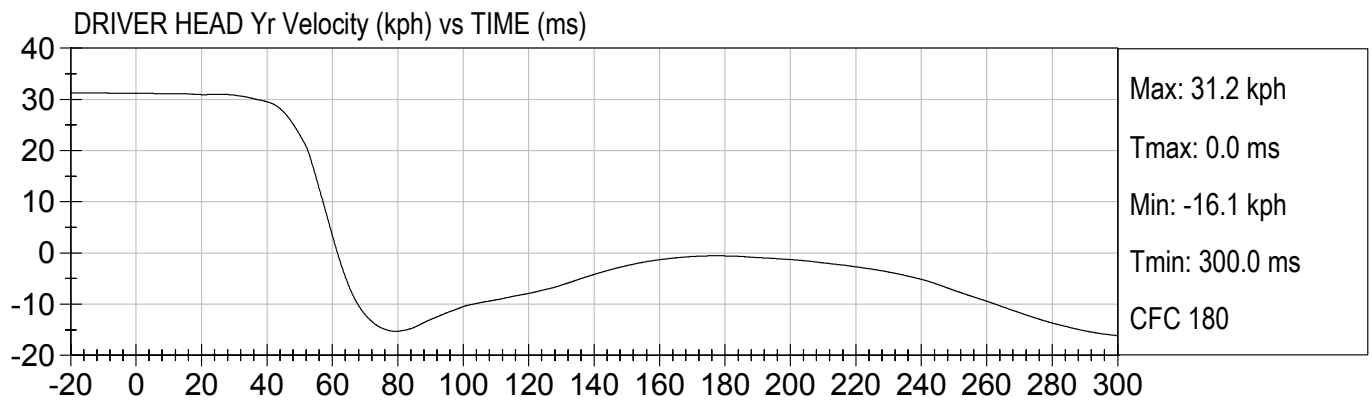
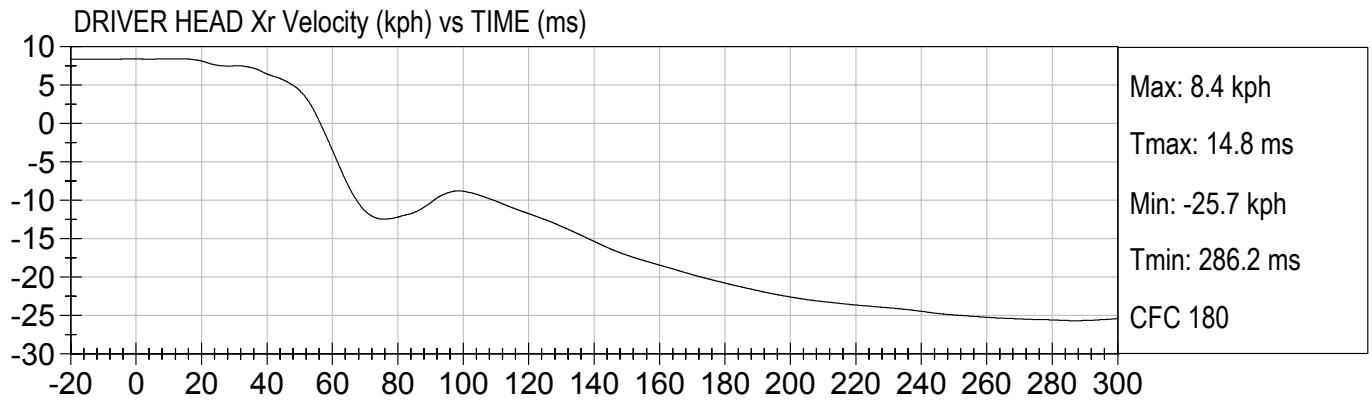
DRIVER PELVIS Y Velocity (kph) vs TIME (ms)

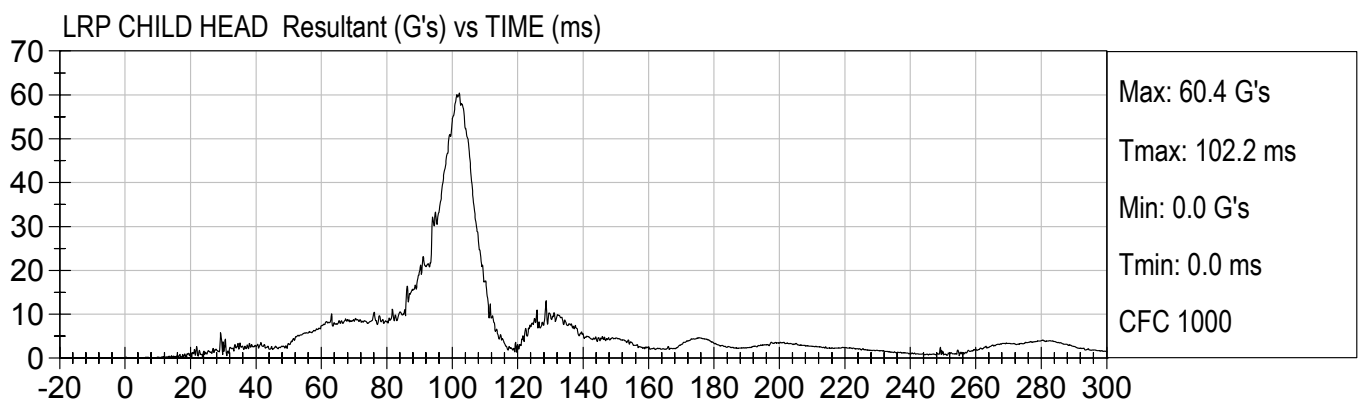
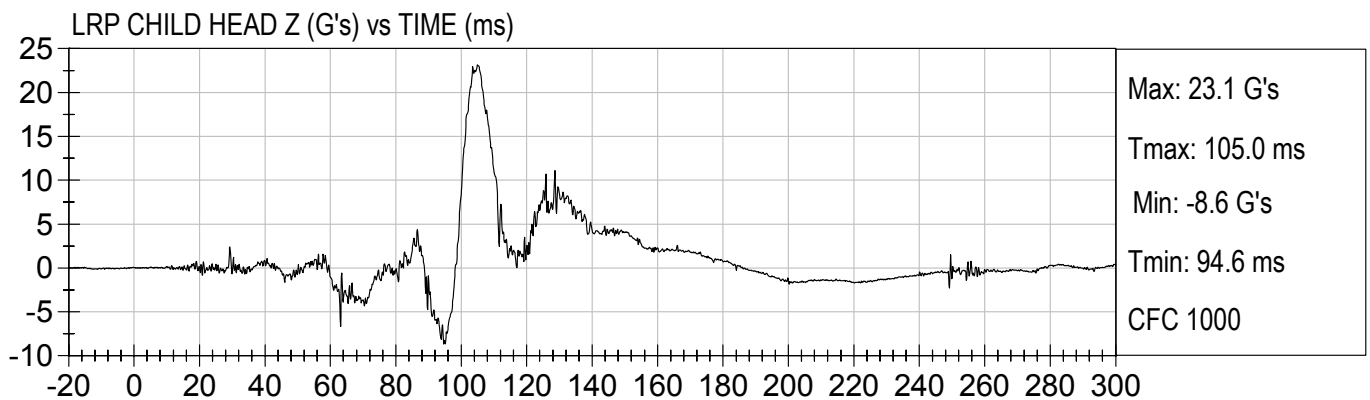
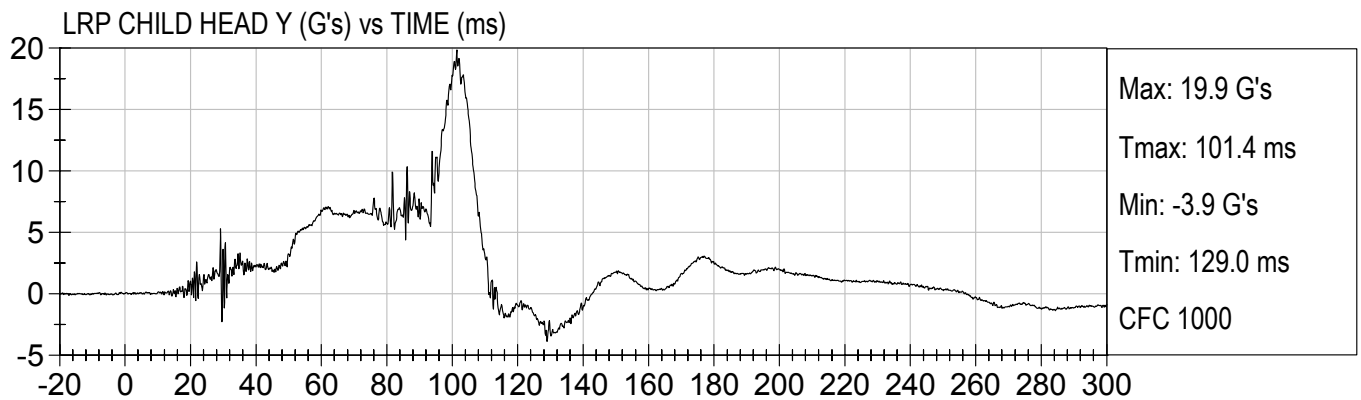
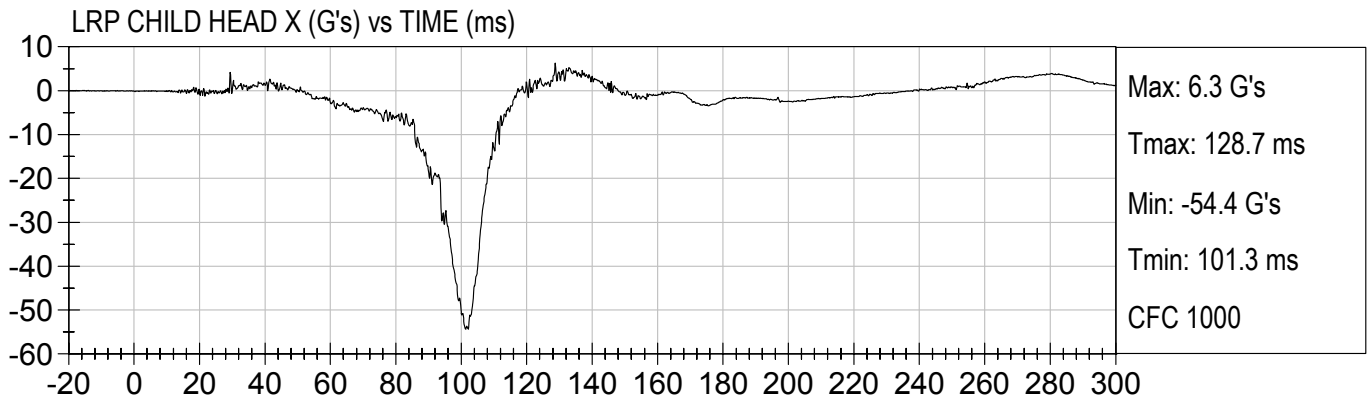


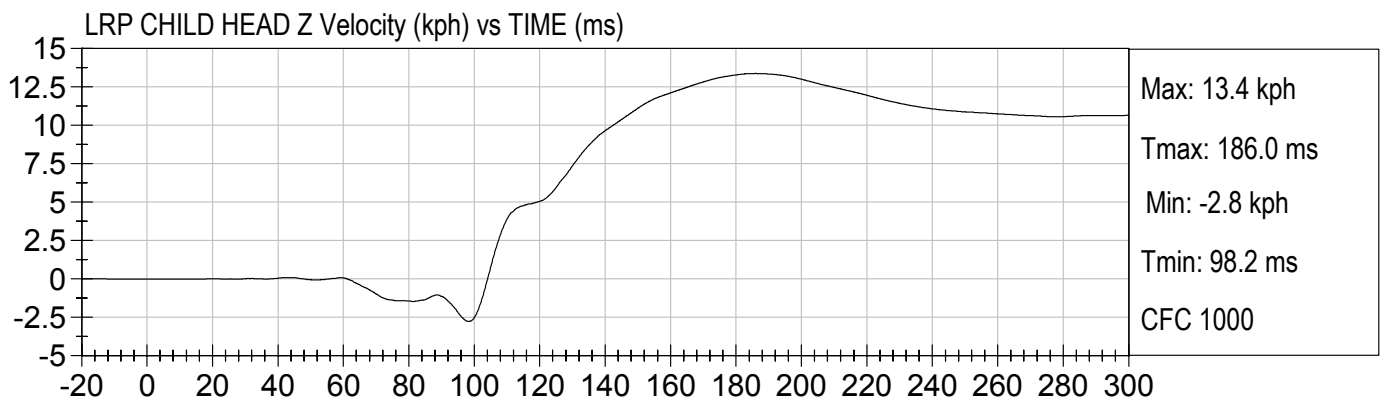
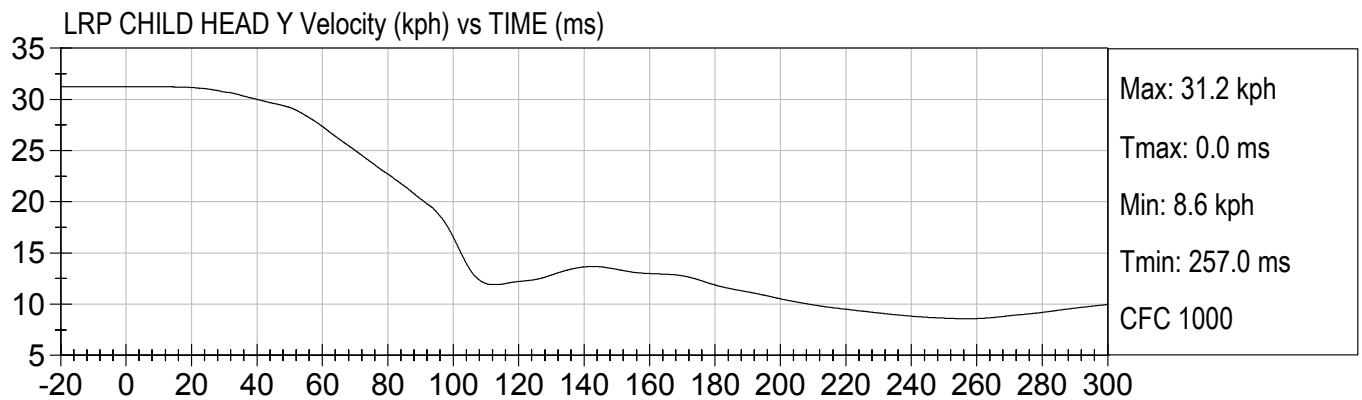
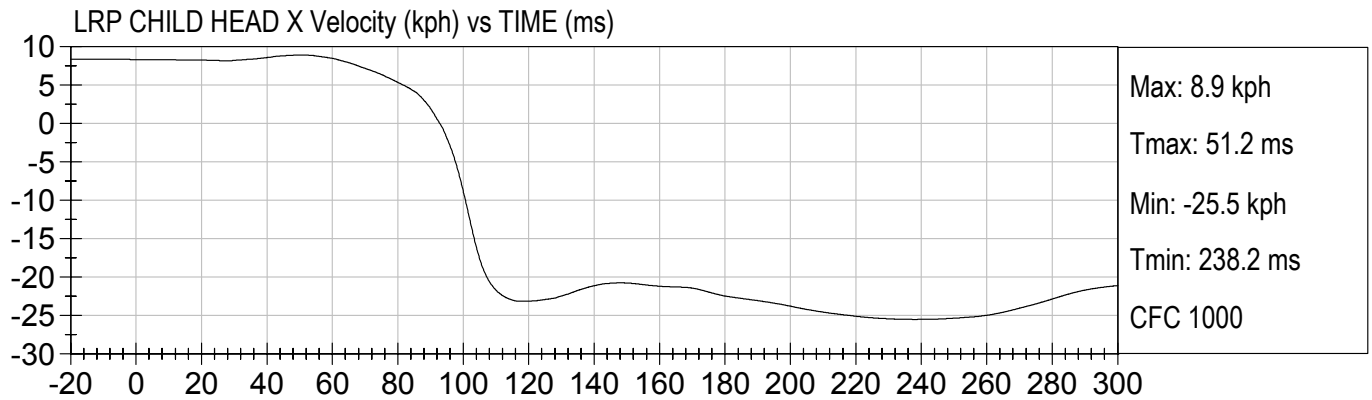
DRIVER PELVIS Z Velocity (kph) vs TIME (ms)

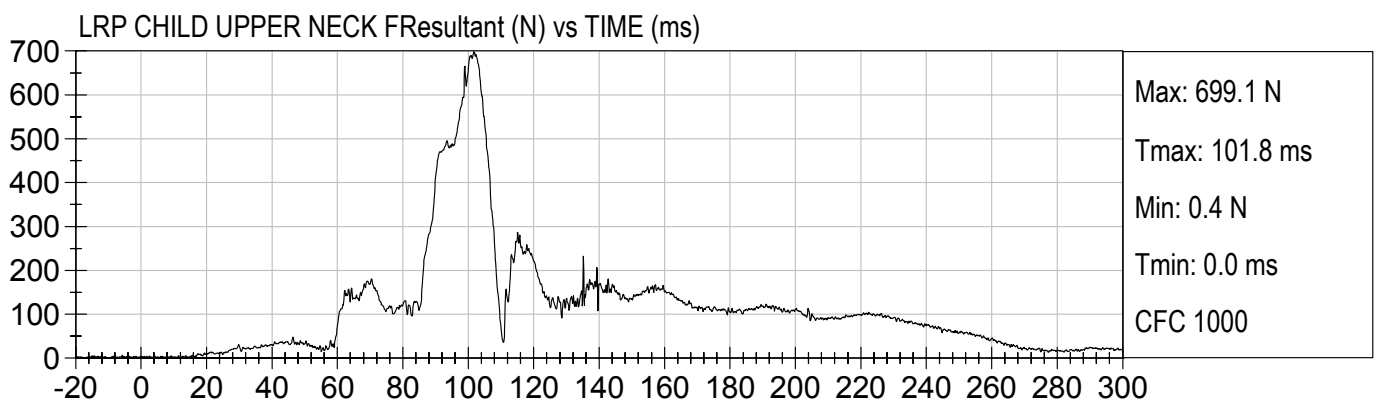
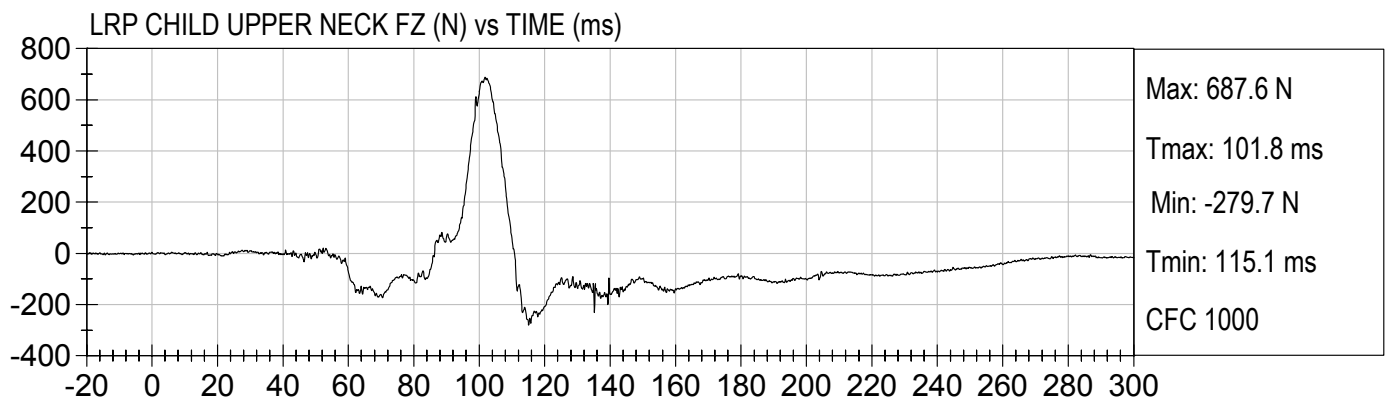
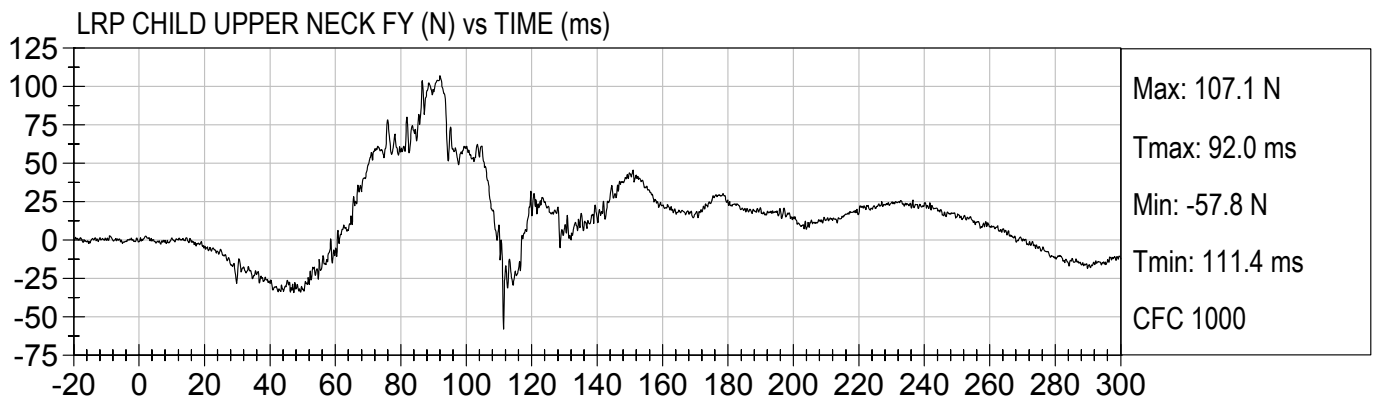
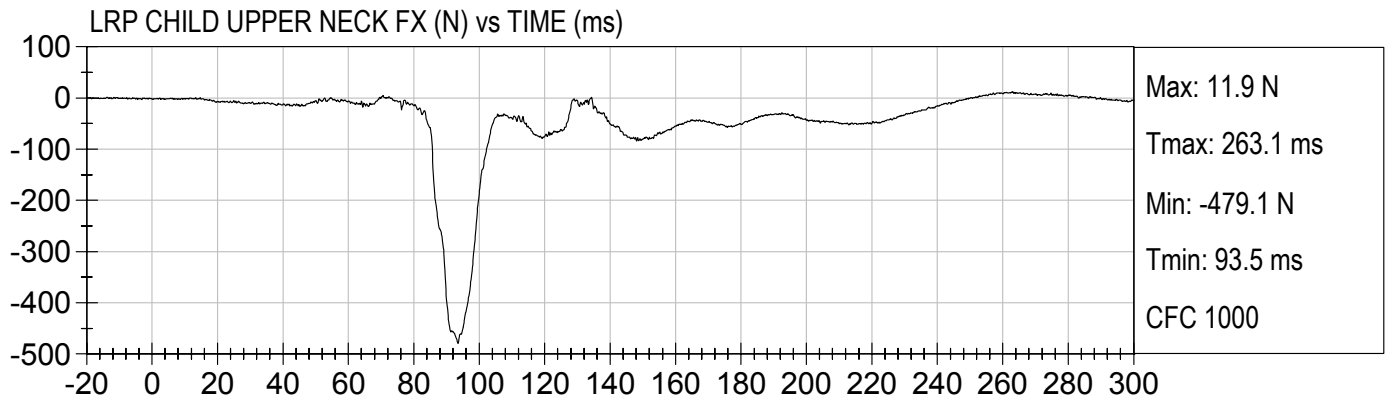


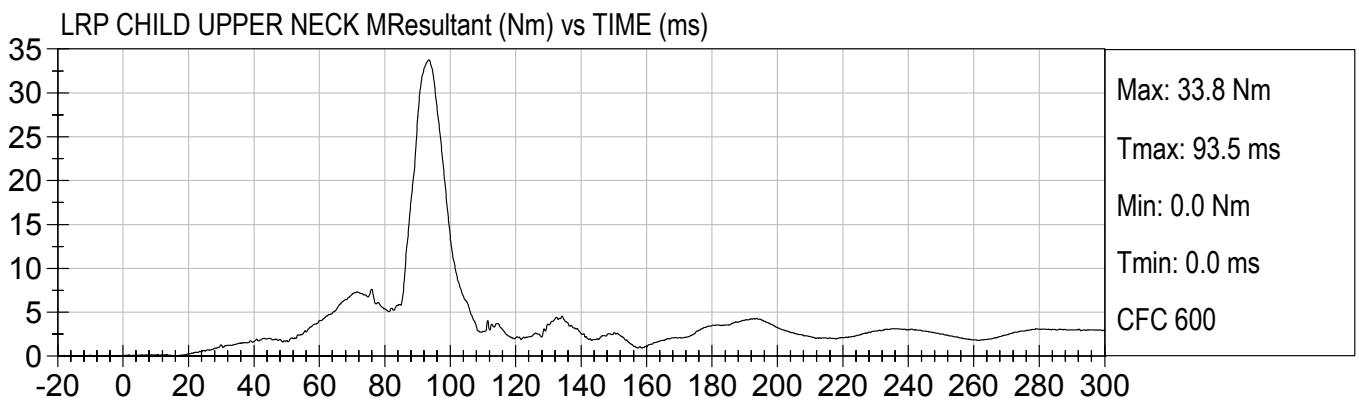
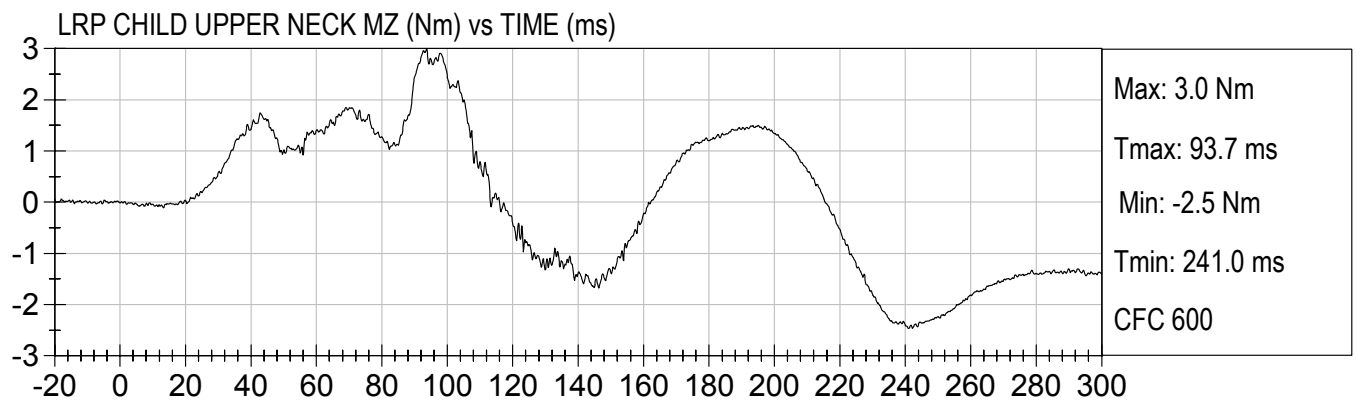
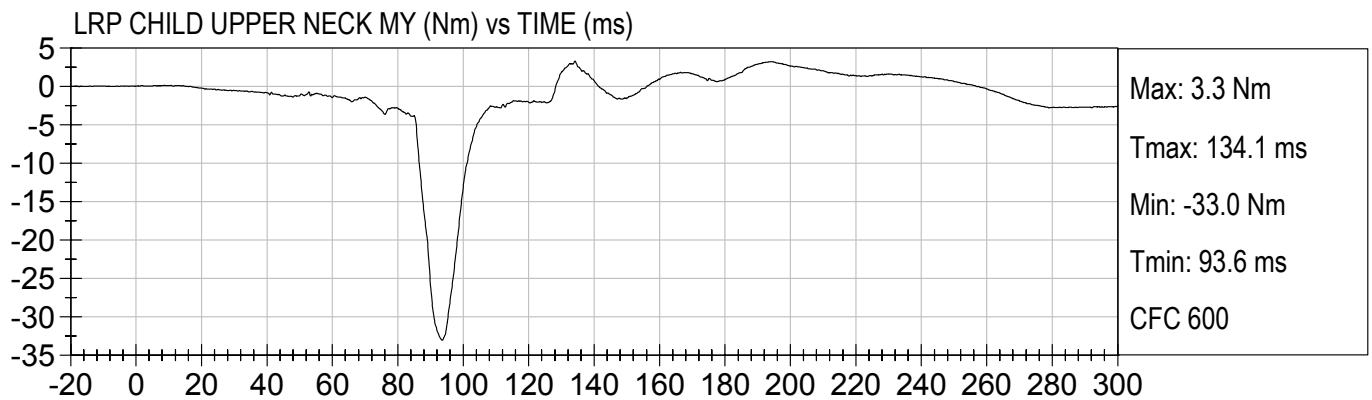
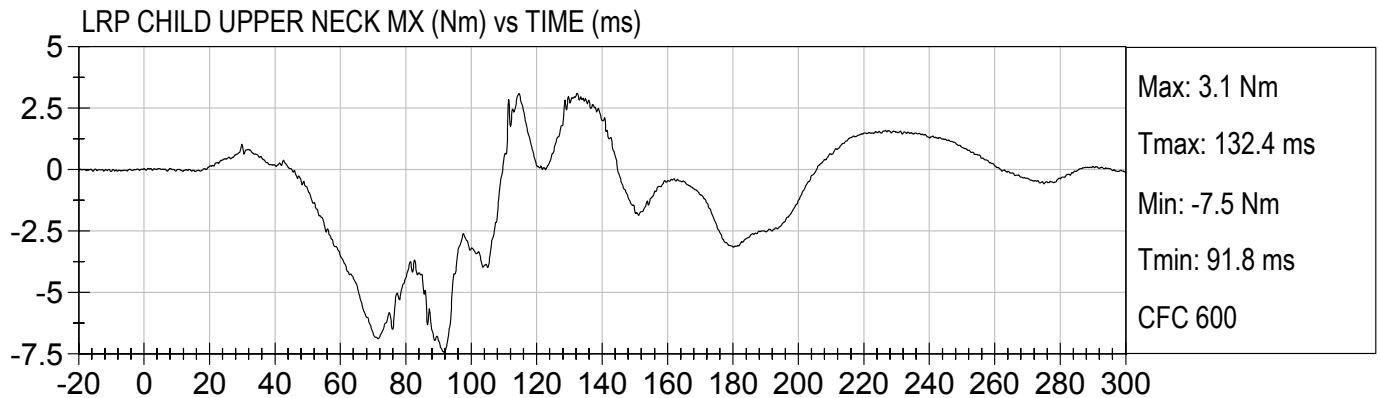


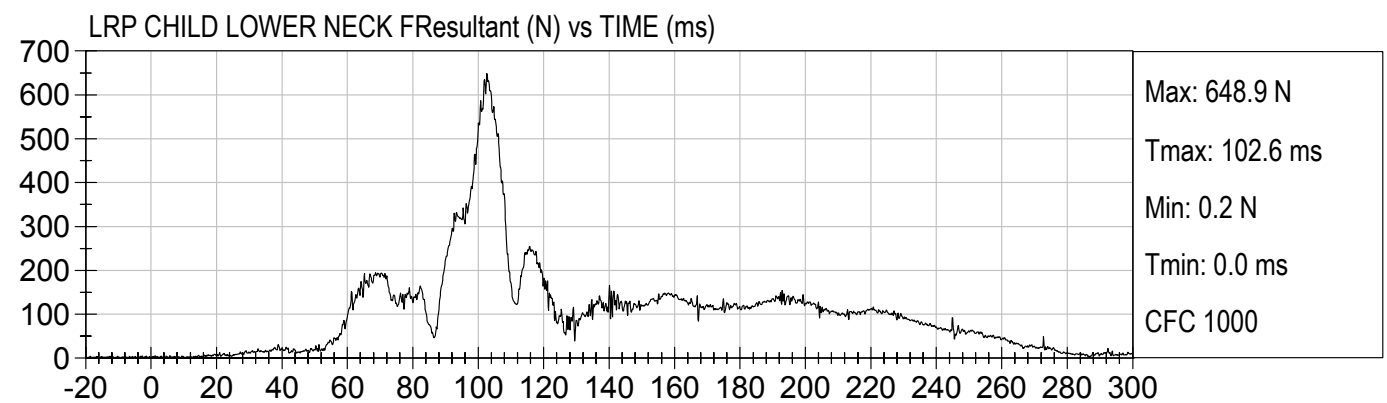
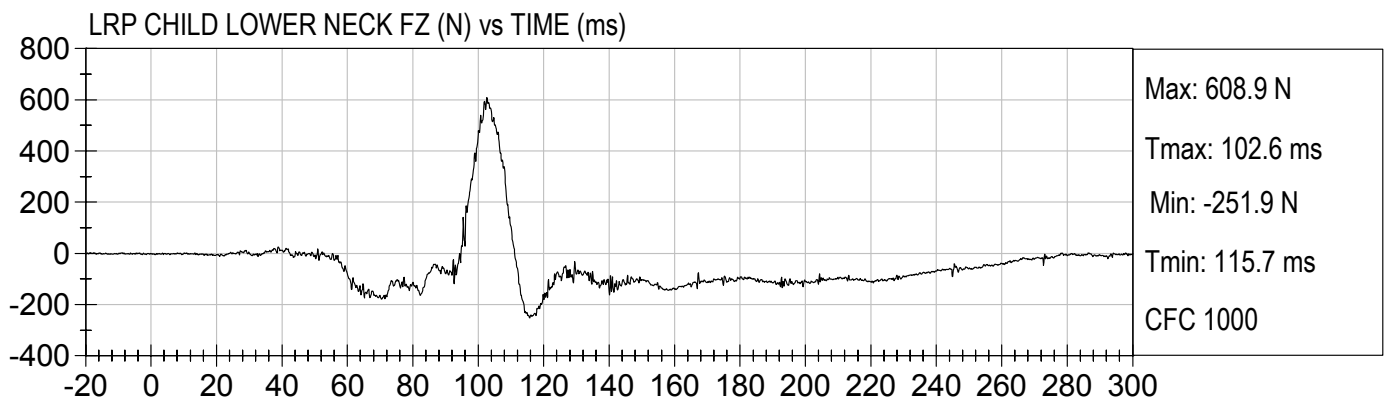
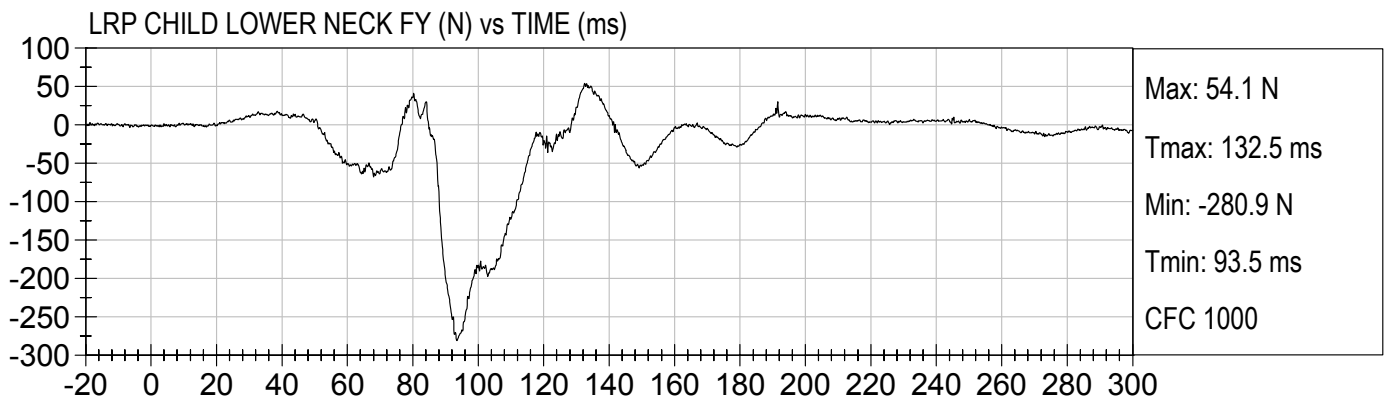
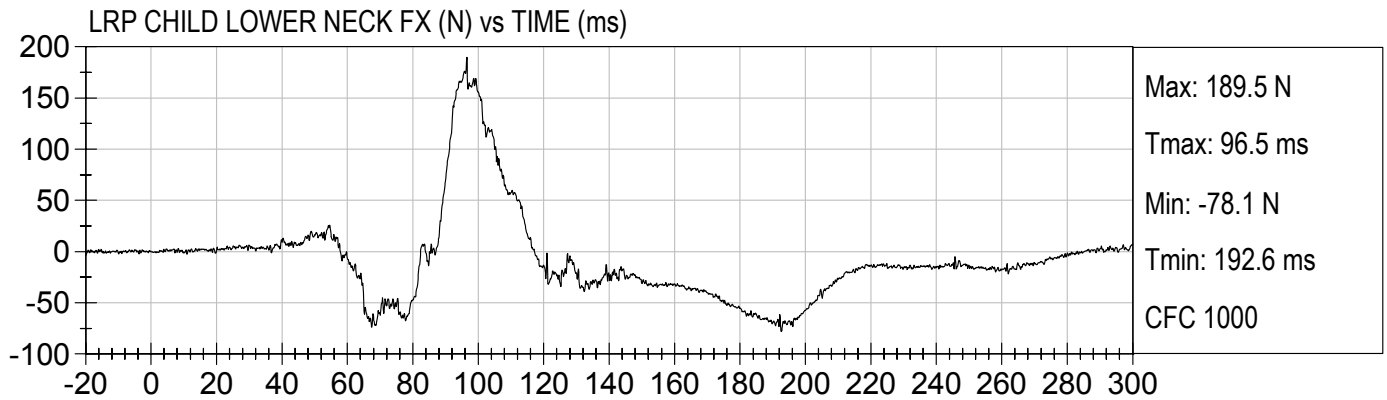






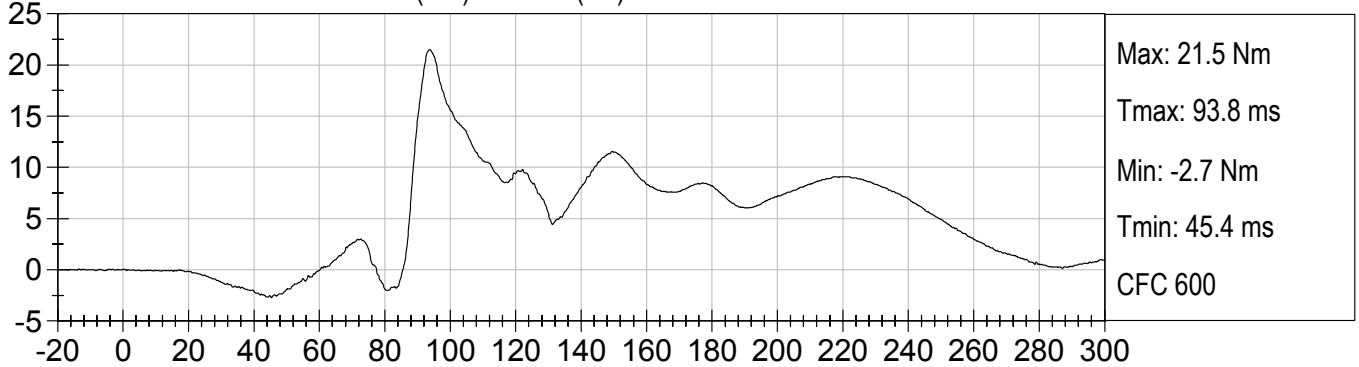




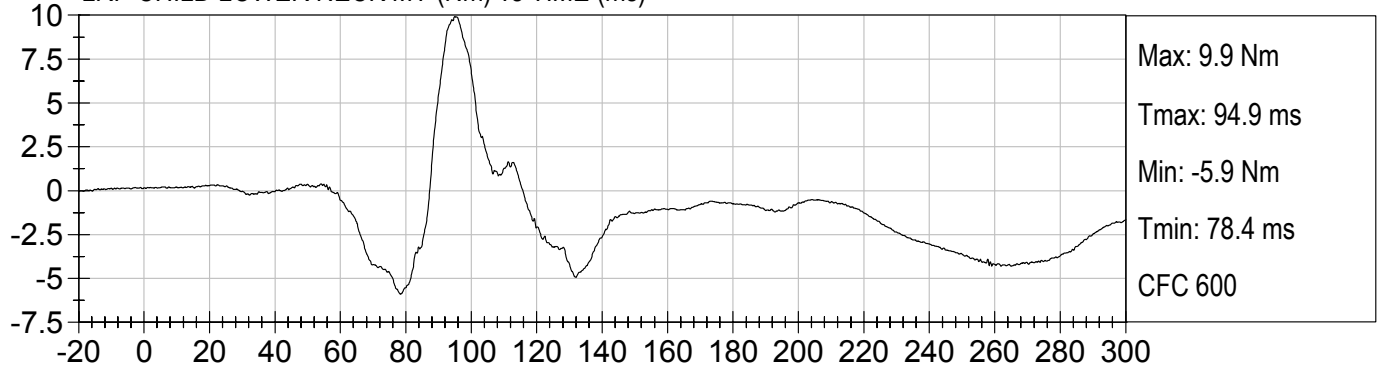




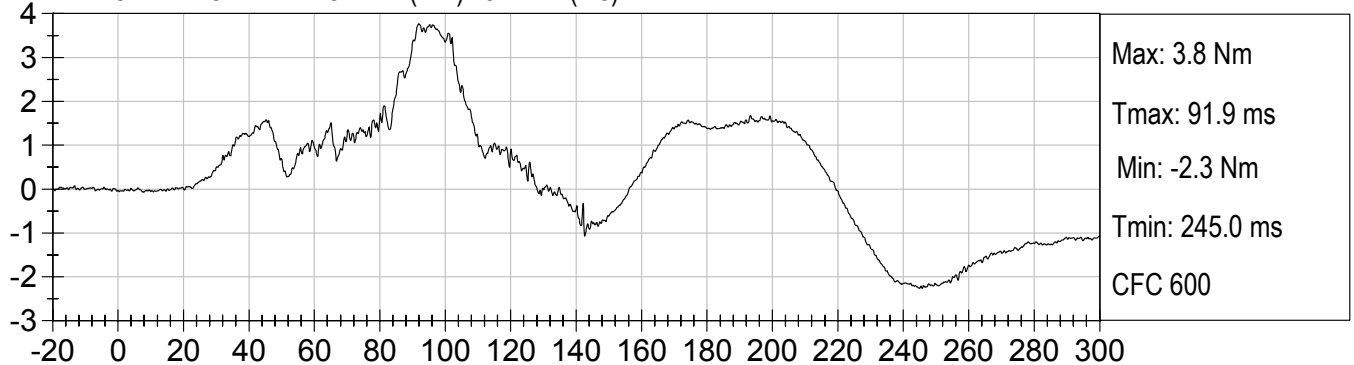
LRP CHILD LOWER NECK MX (Nm) vs TIME (ms)



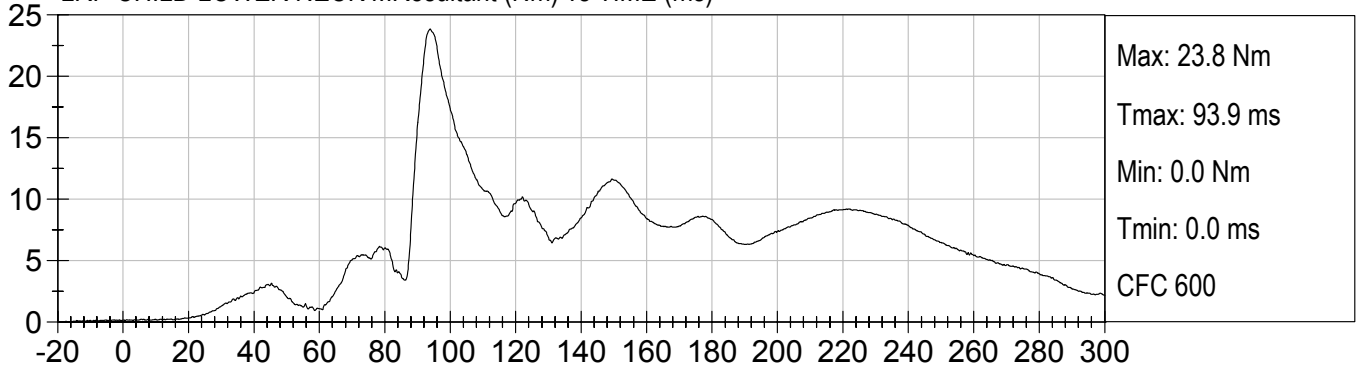
LRP CHILD LOWER NECK MY (Nm) vs TIME (ms)

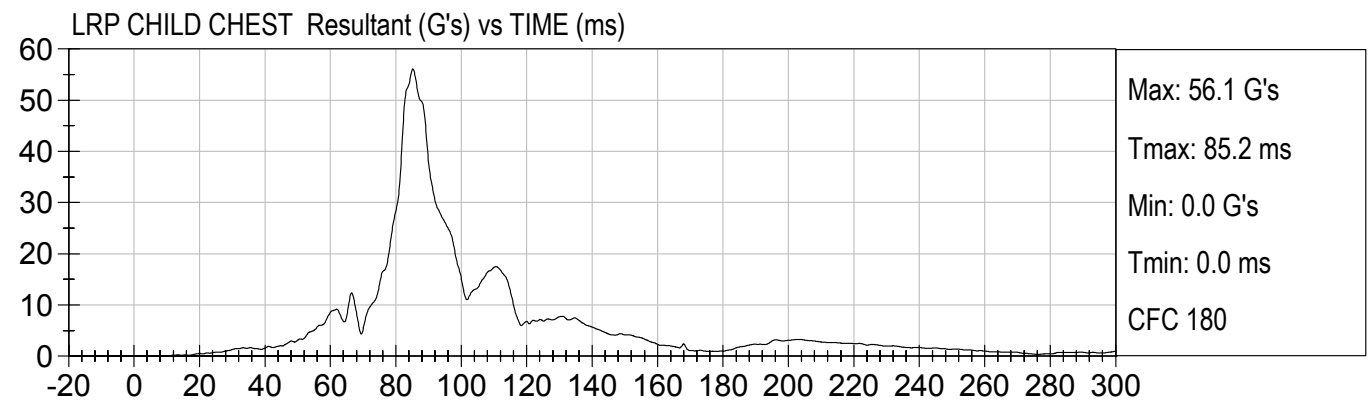
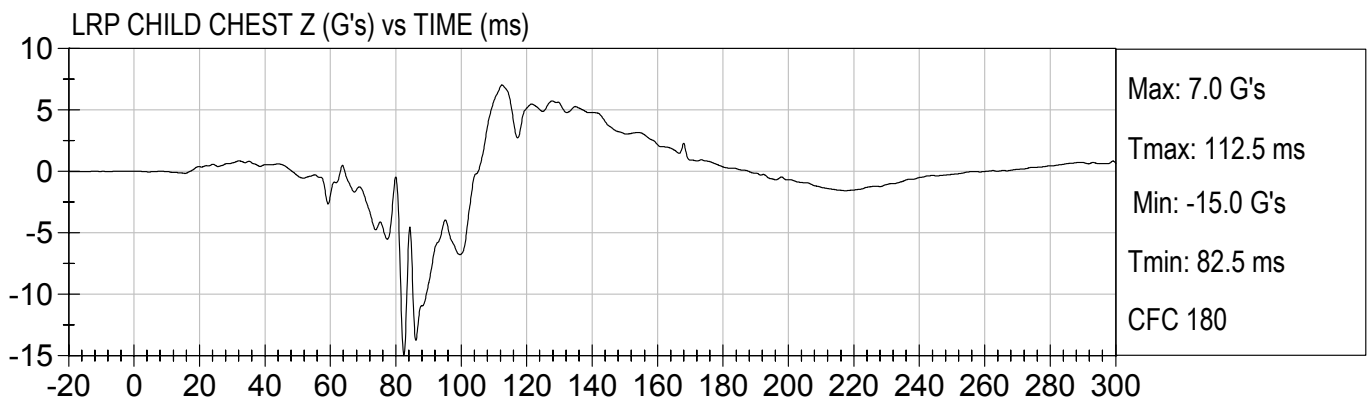
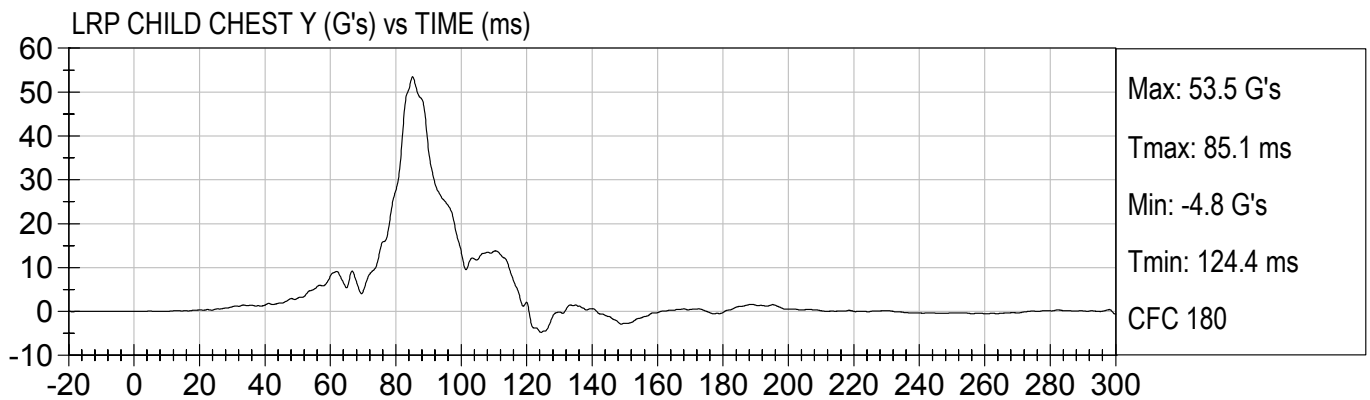
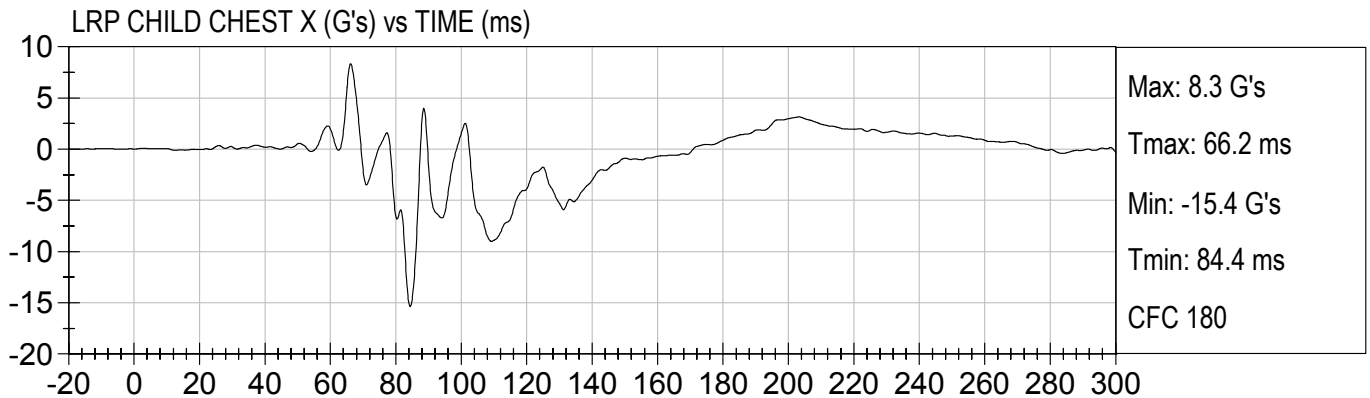


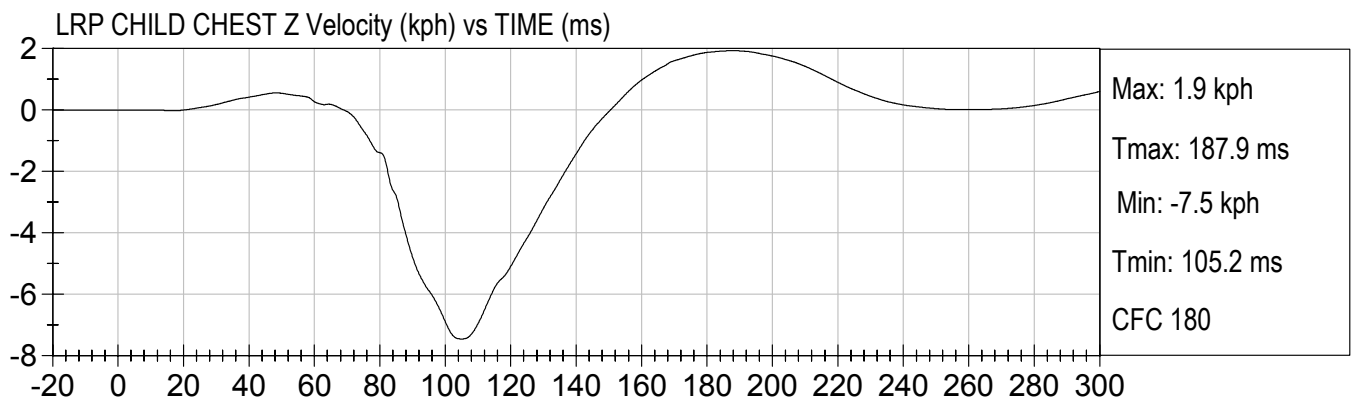
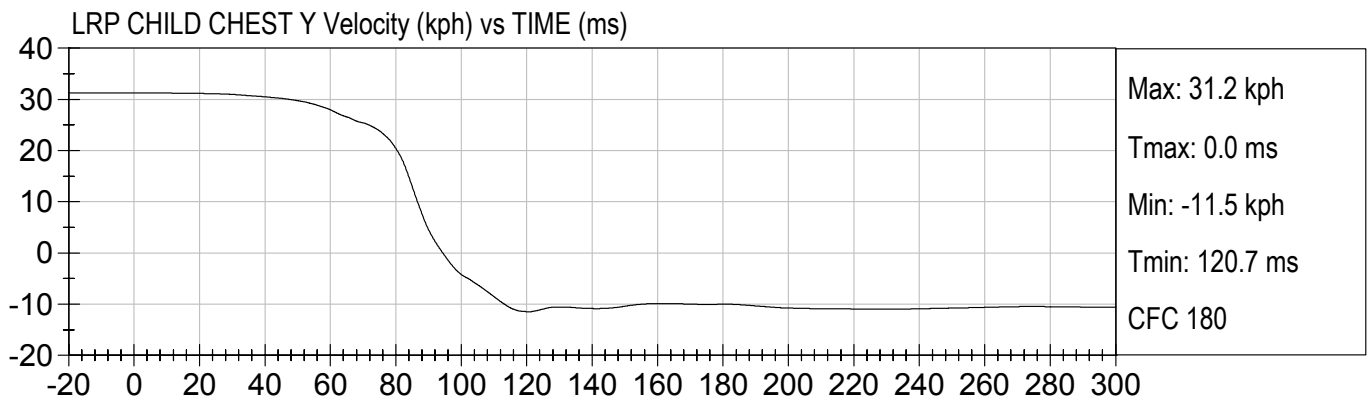
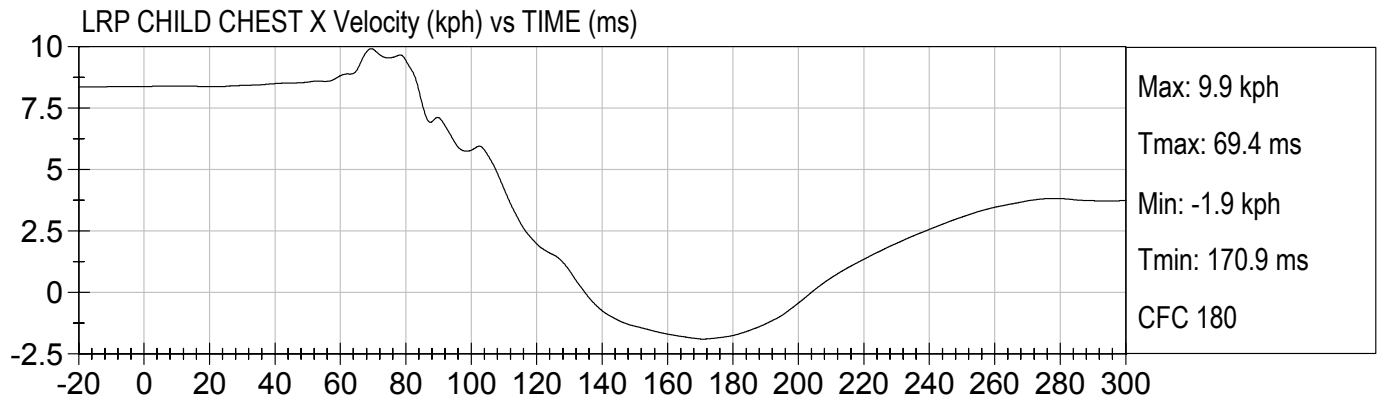
LRP CHILD LOWER NECK MZ (Nm) vs TIME (ms)

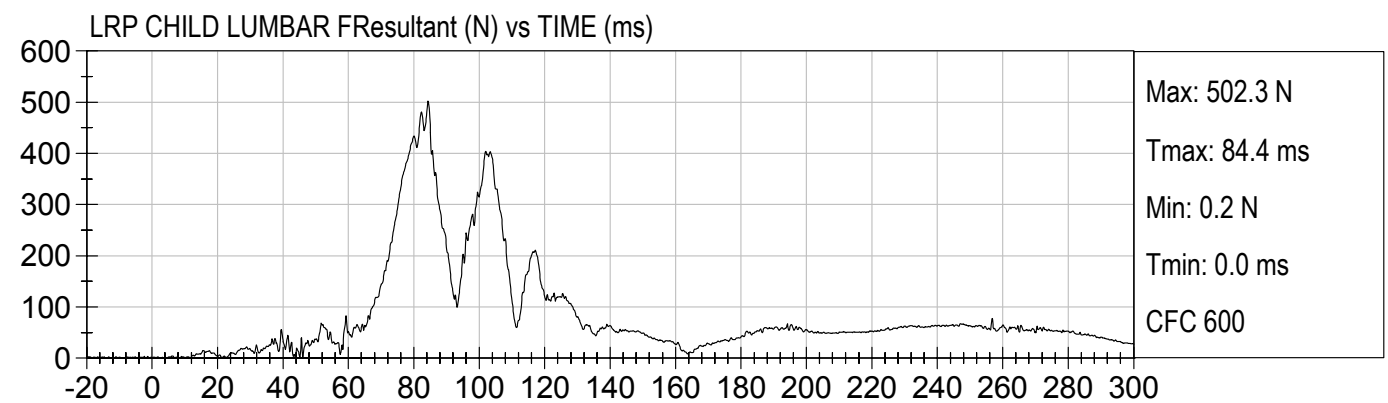
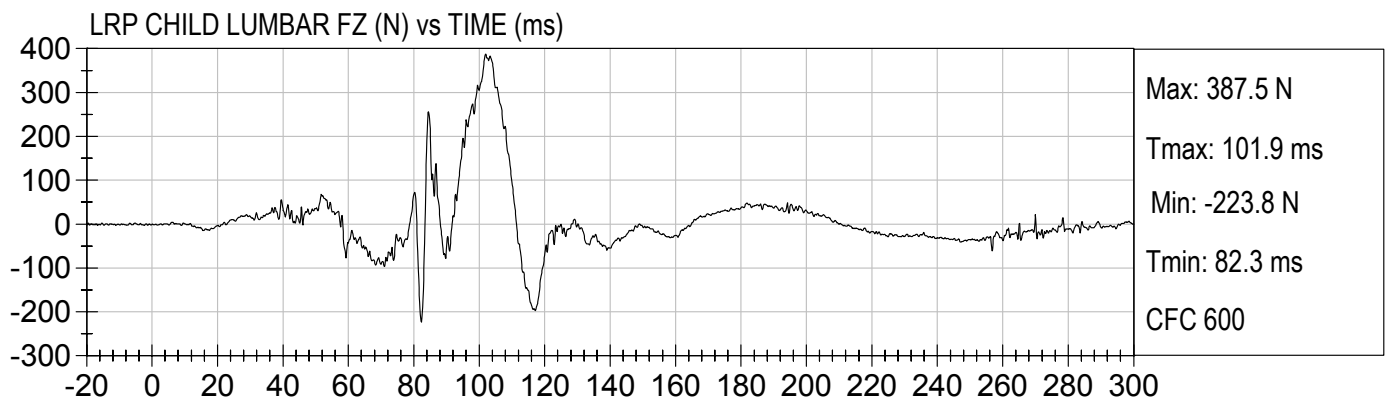
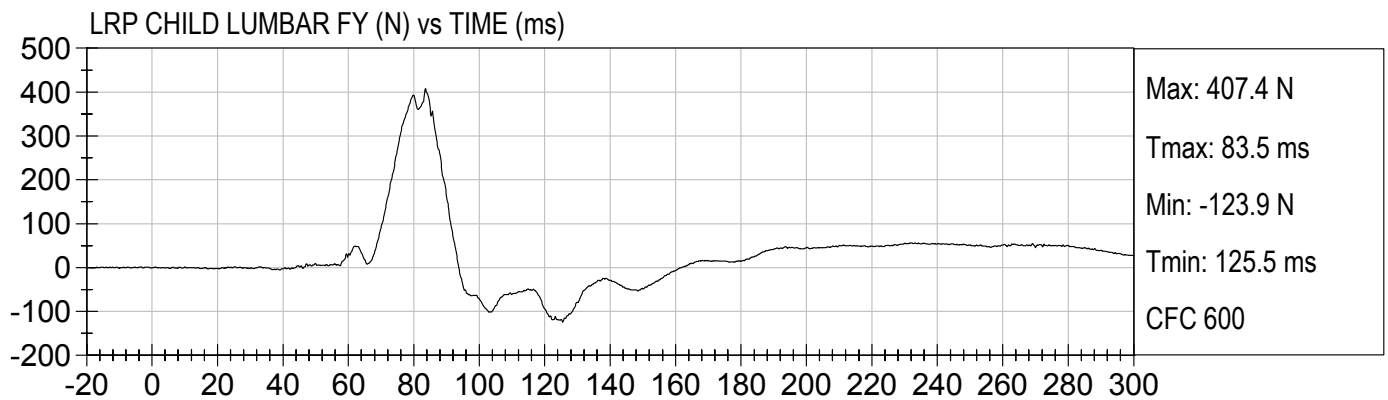
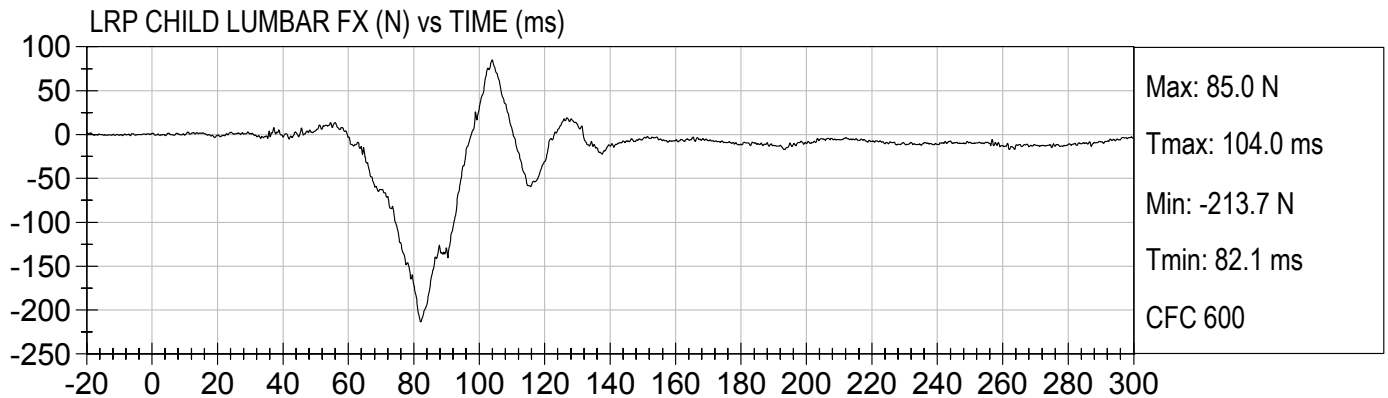


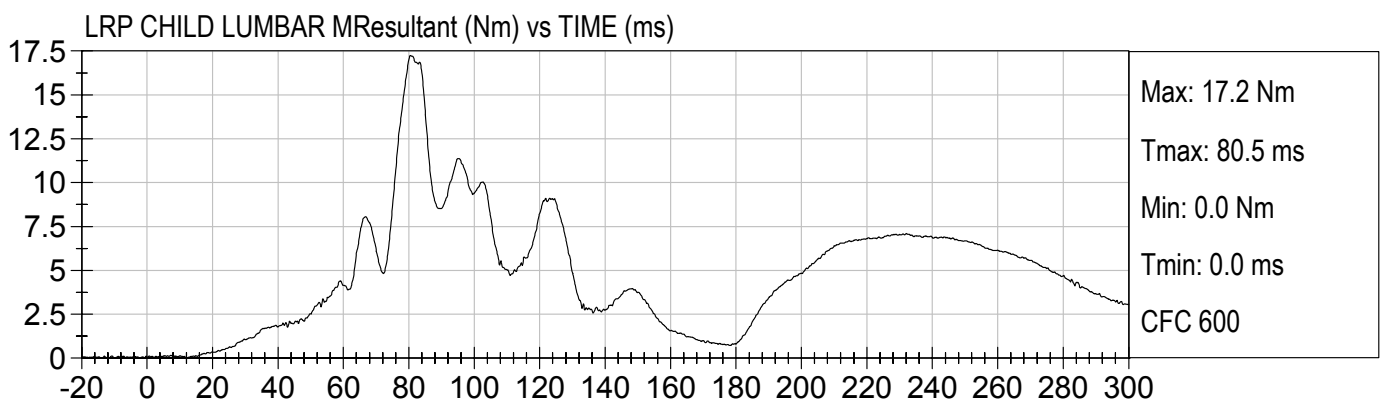
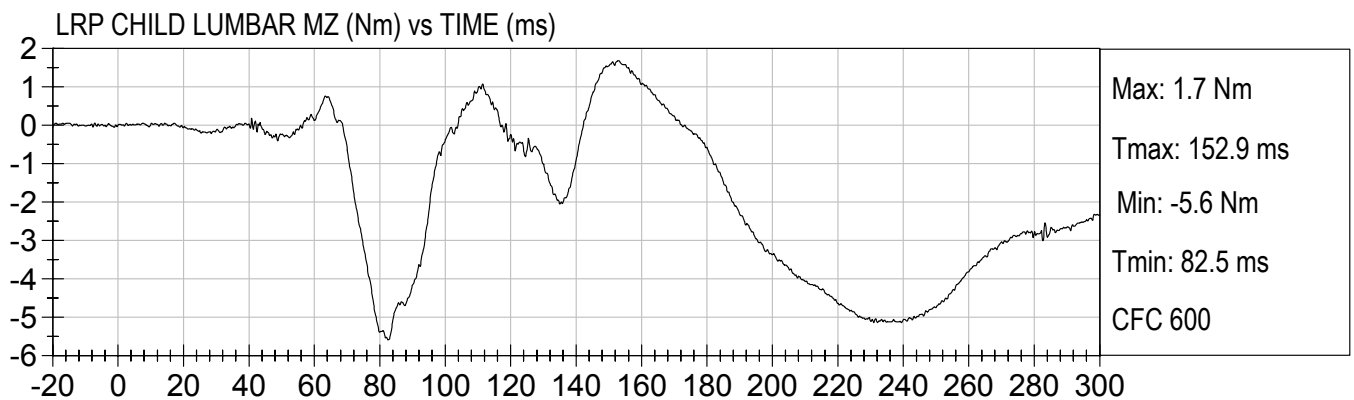
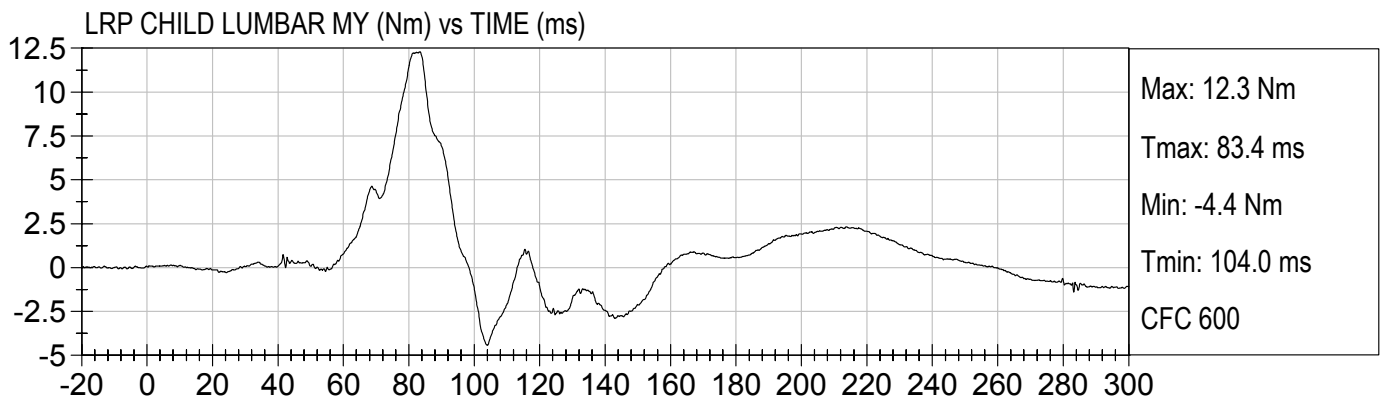
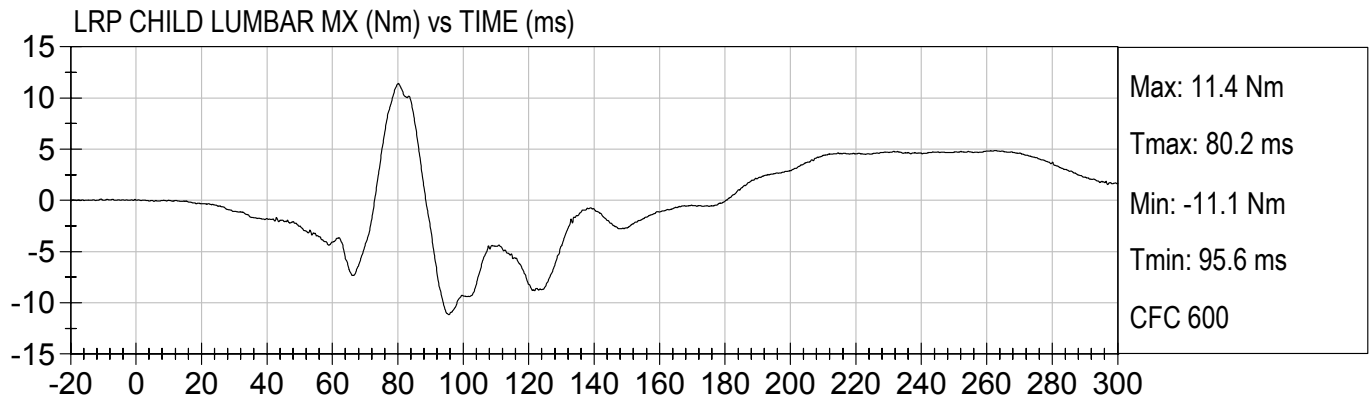
LRP CHILD LOWER NECK MResultant (Nm) vs TIME (ms)

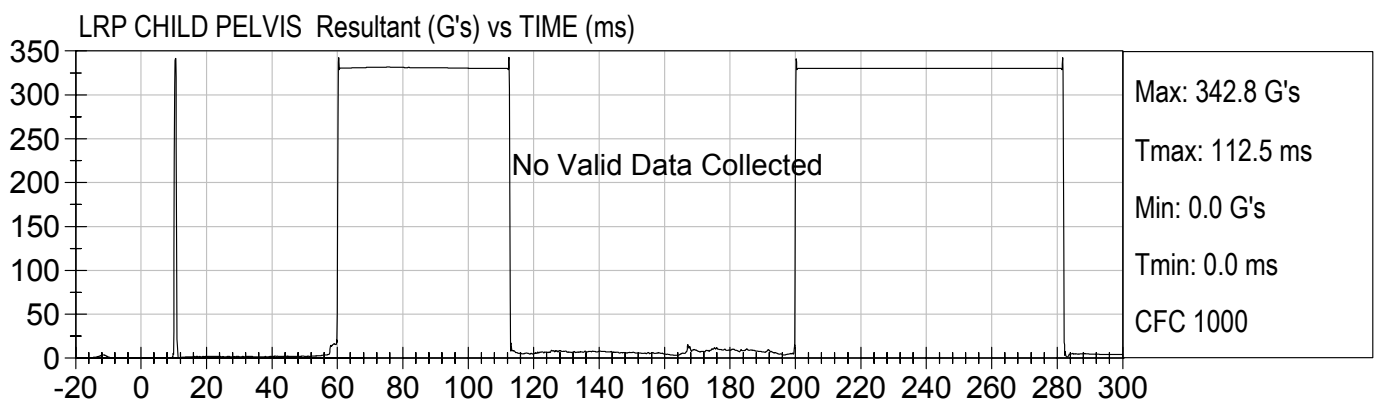
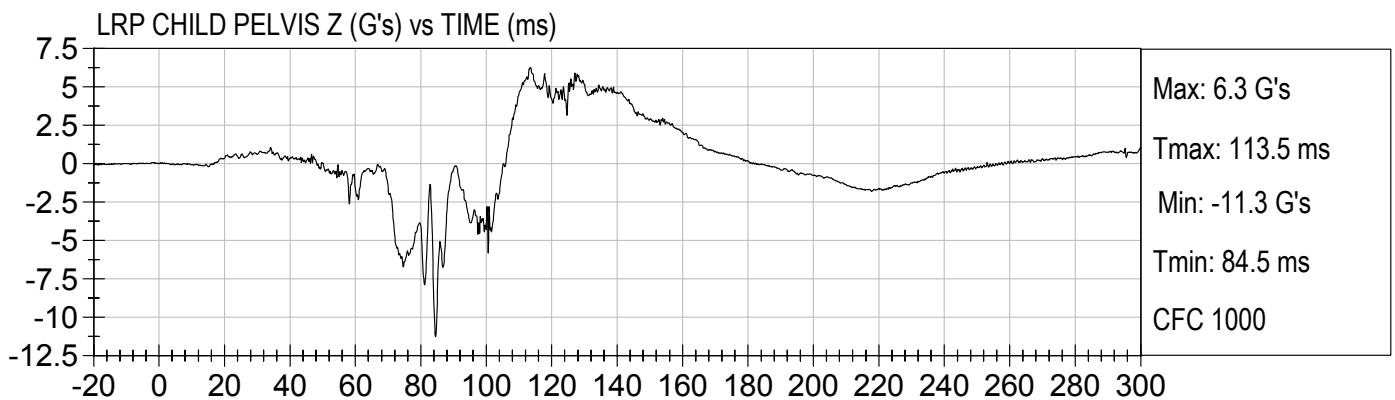
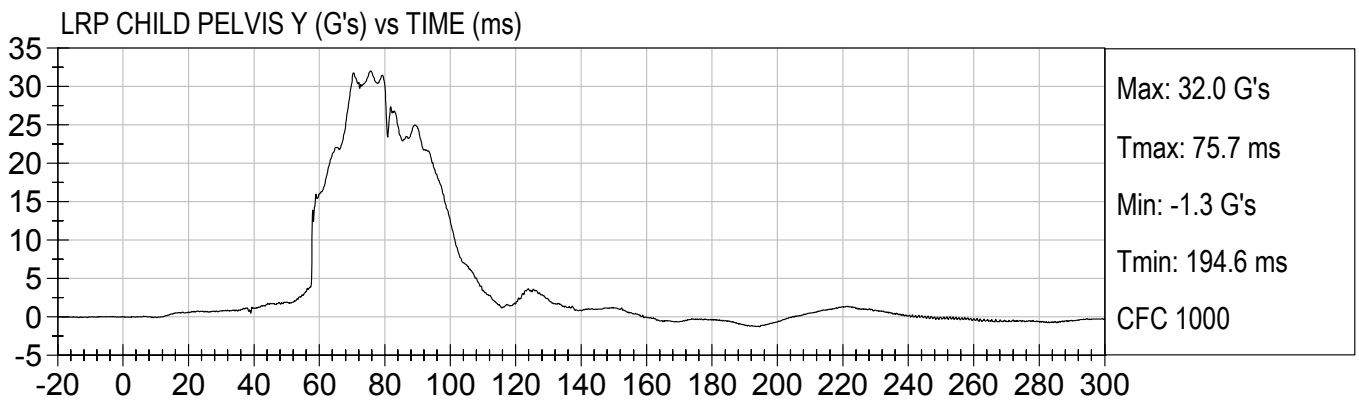
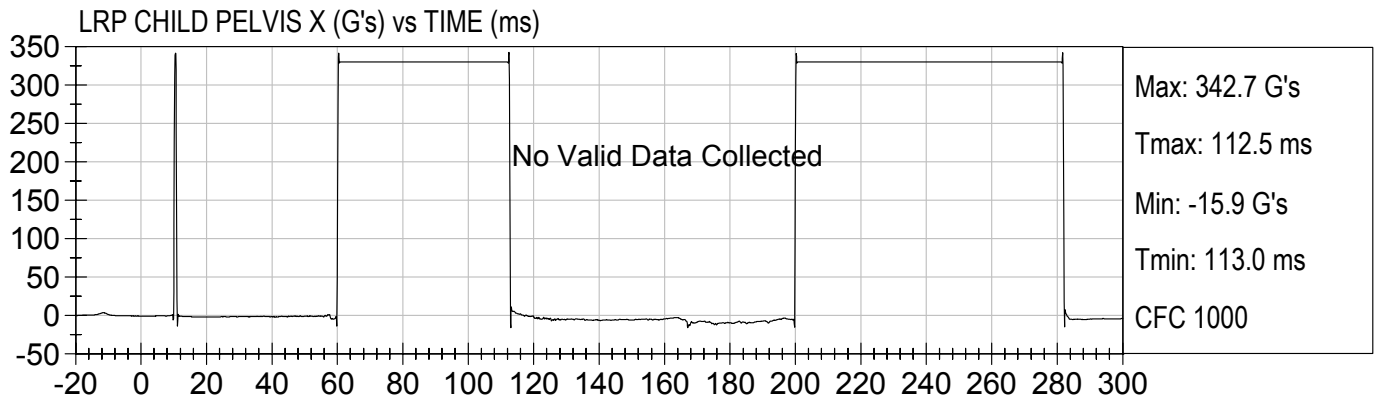


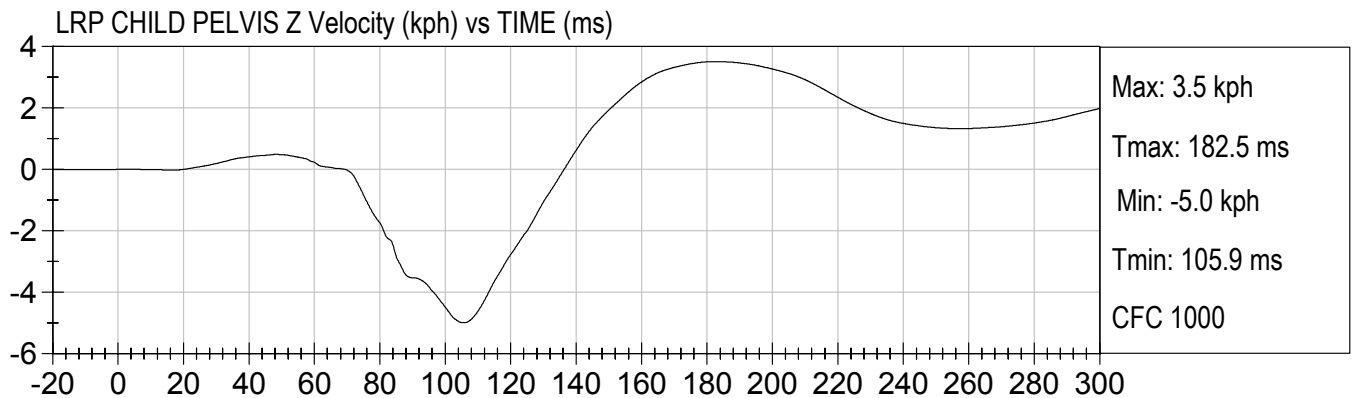
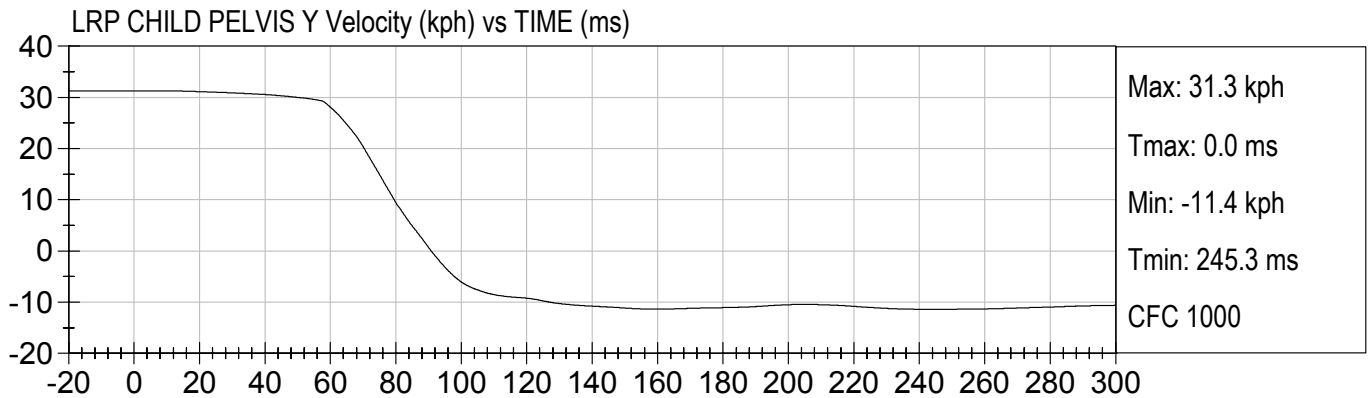
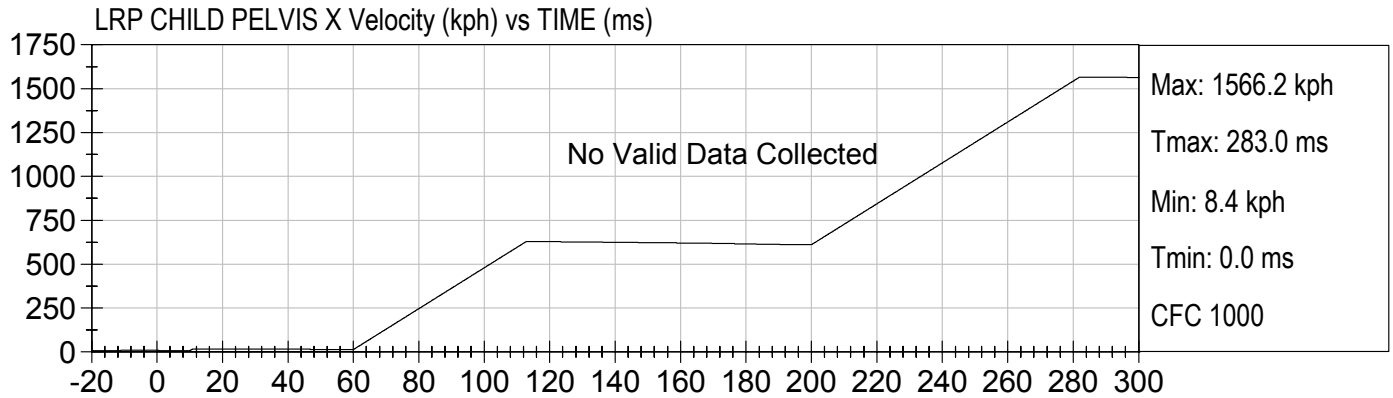






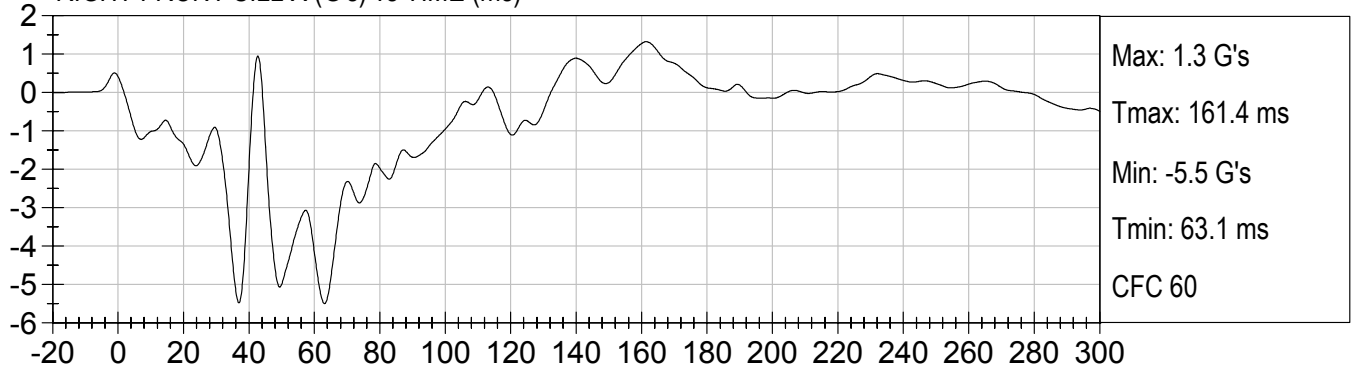




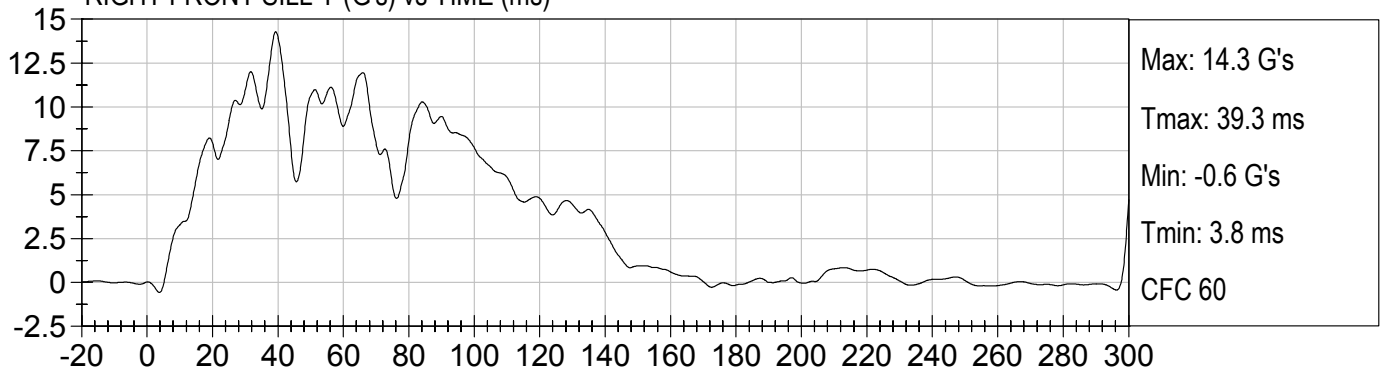




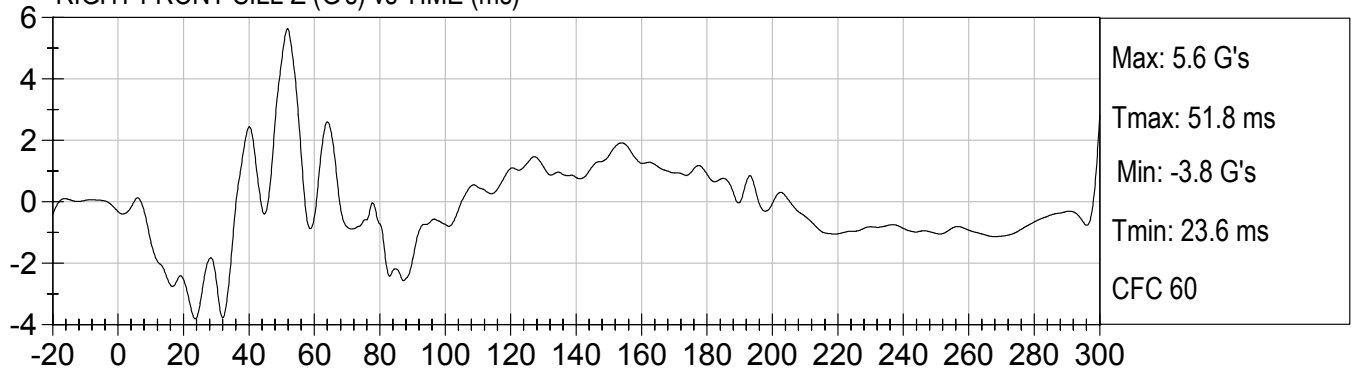
RIGHT FRONT SILL X (G's) vs TIME (ms)



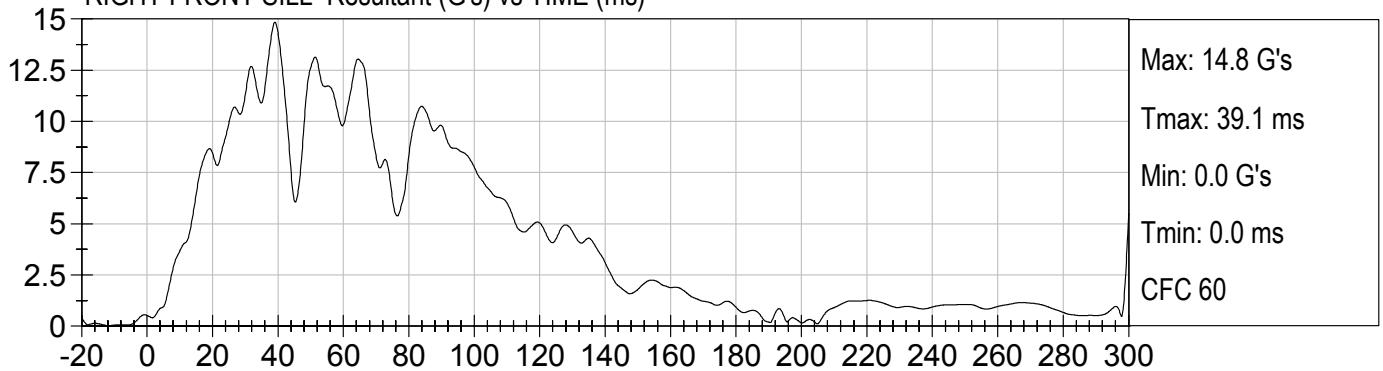
RIGHT FRONT SILL Y (G's) vs TIME (ms)



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

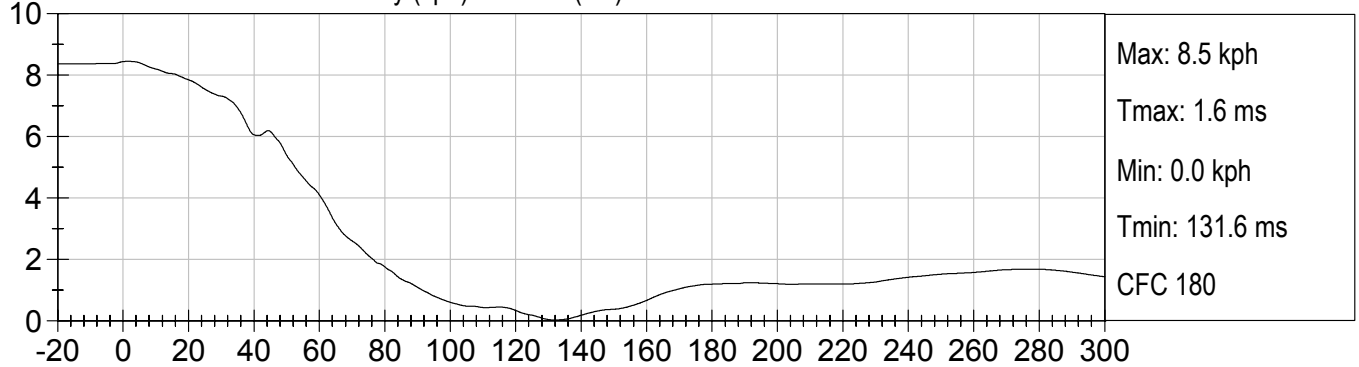


RIGHT FRONT SILL Resultant (G's) vs TIME (ms)

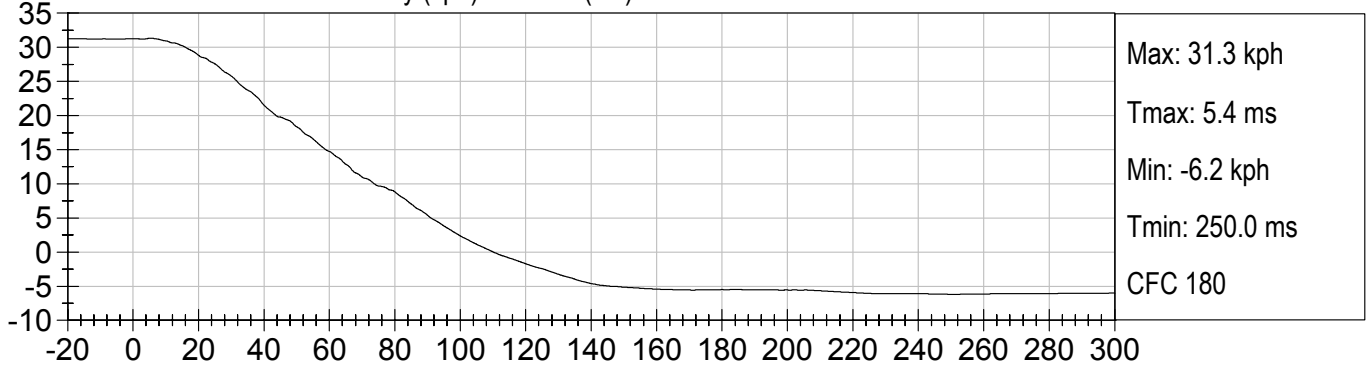




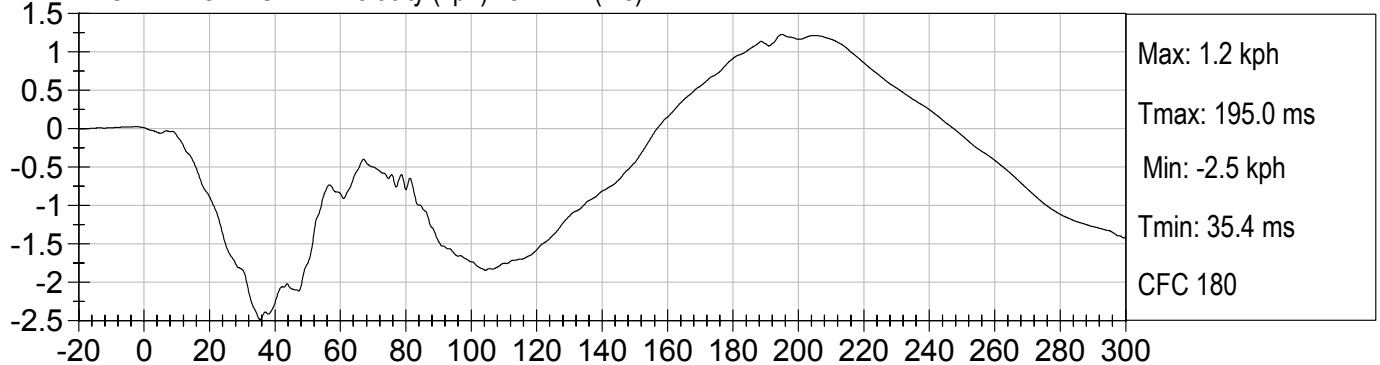
RIGHT FRONT SILL X Velocity (kph) vs TIME (ms)



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

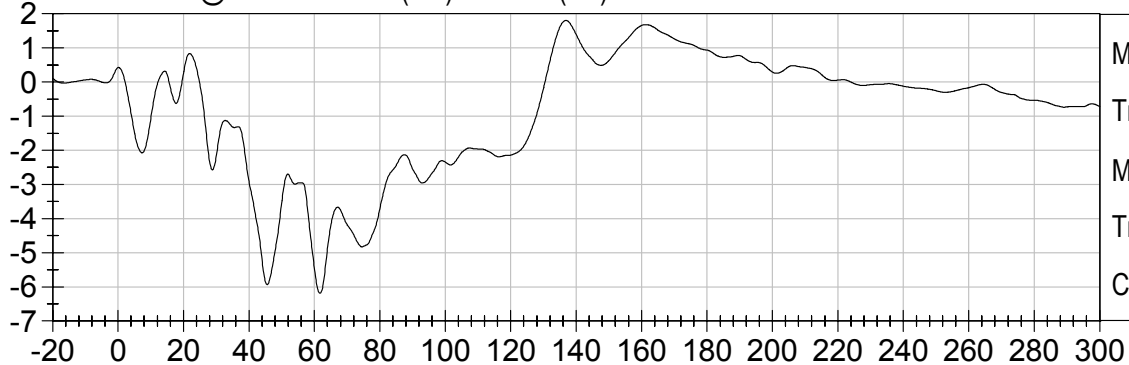


RIGHT FRONT SILL Z Velocity (kph) vs TIME (ms)



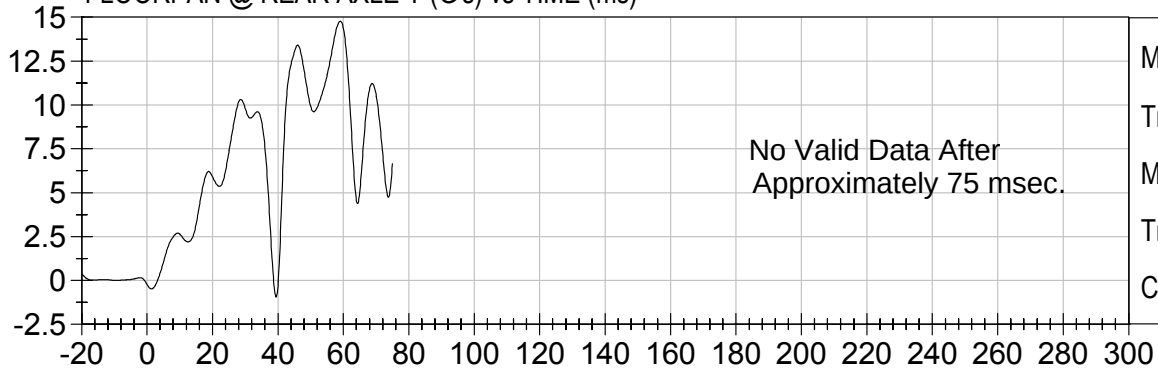


FLOORPAN @ REAR AXLE X (G's) vs TIME (ms)



Max: 1.8 G's
Tmax: 136.9 ms
Min: -6.2 G's
Tmin: 61.7 ms
CFC 60

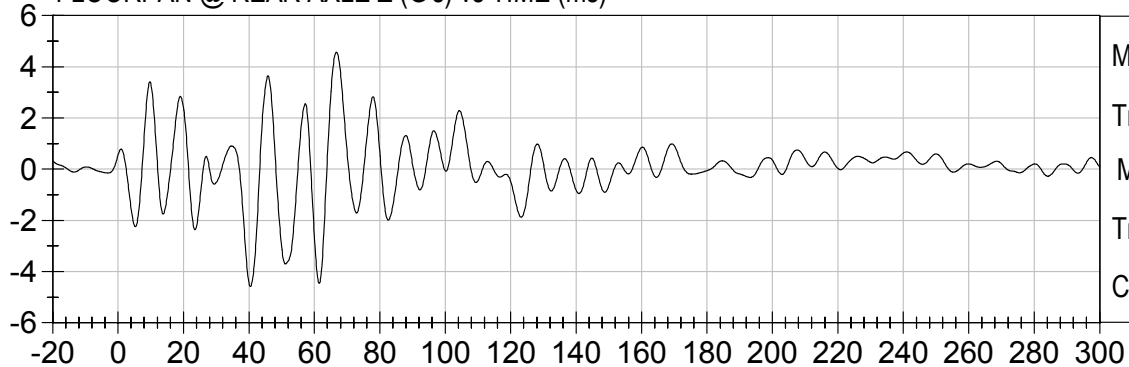
FLOORPAN @ REAR AXLE Y (G's) vs TIME (ms)



No Valid Data After
Approximately 75 msec.

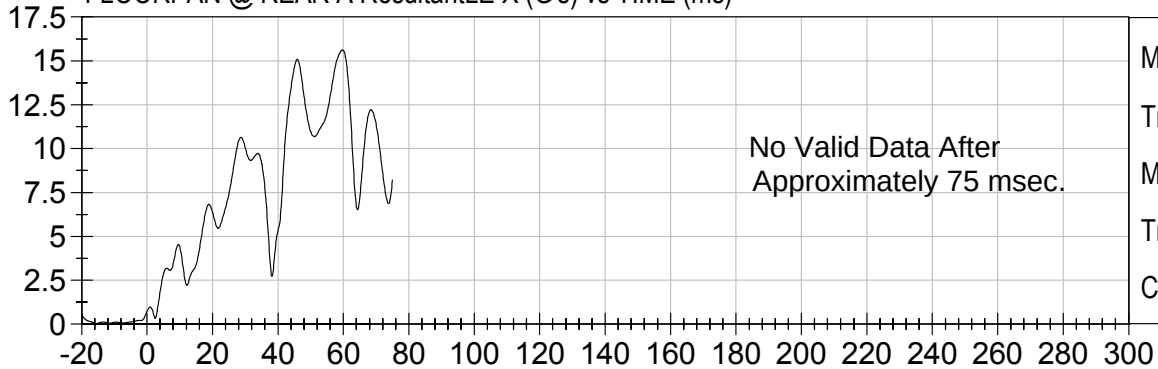
Max: 14.8 G's
Tmax: 59.1 ms
Min: -0.9 G's
Tmin: 39.4 ms
CFC 60

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



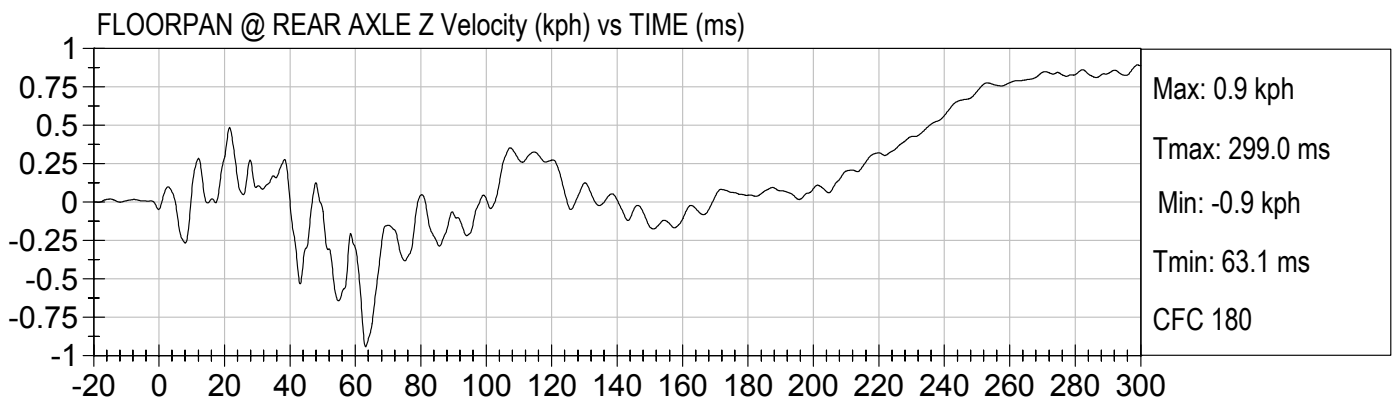
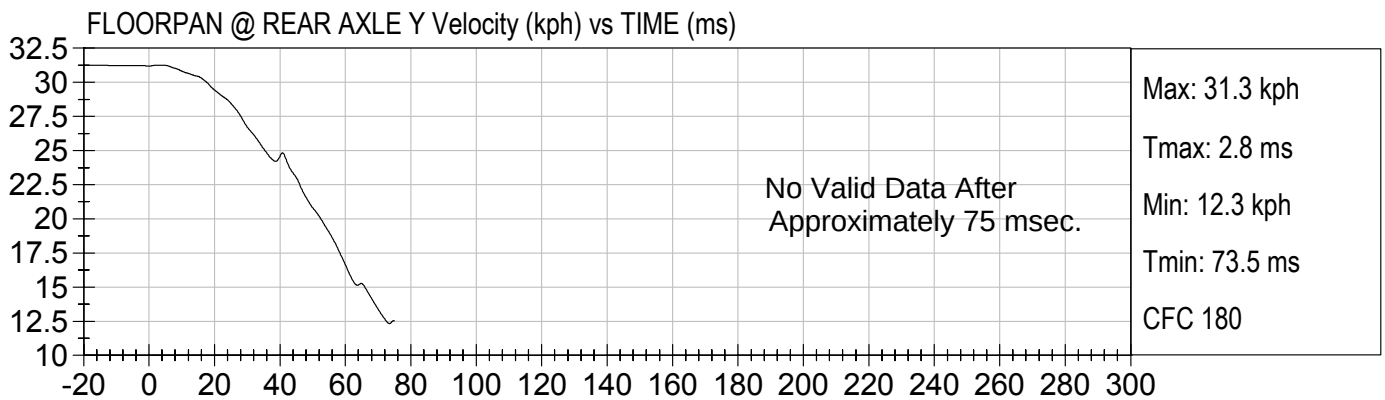
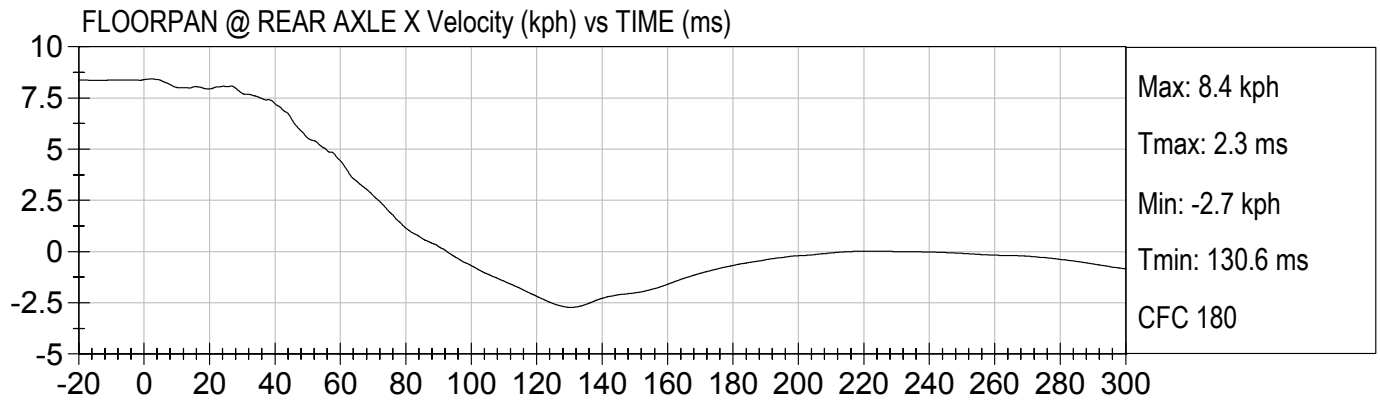
Max: 4.6 G's
Tmax: 66.7 ms
Min: -4.6 G's
Tmin: 40.4 ms
CFC 60

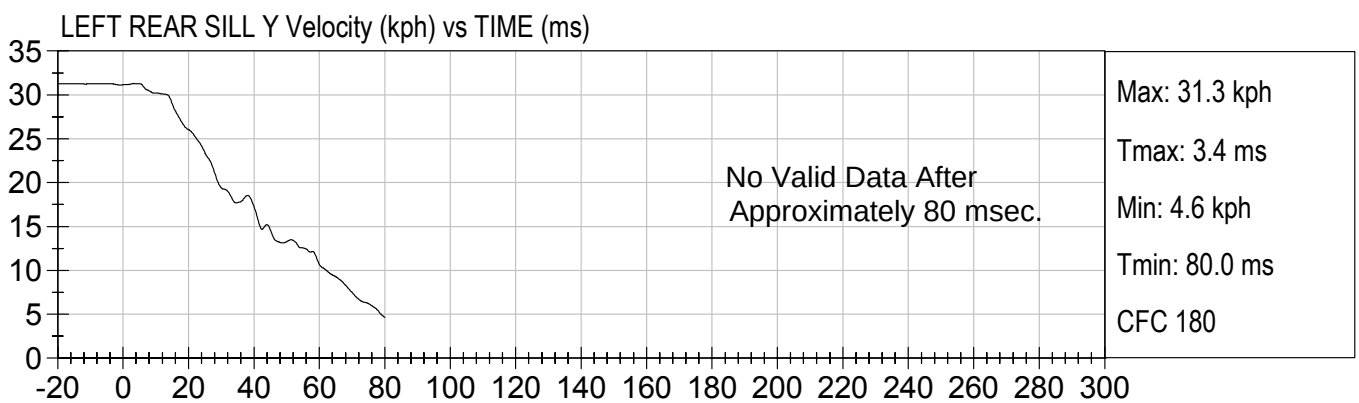
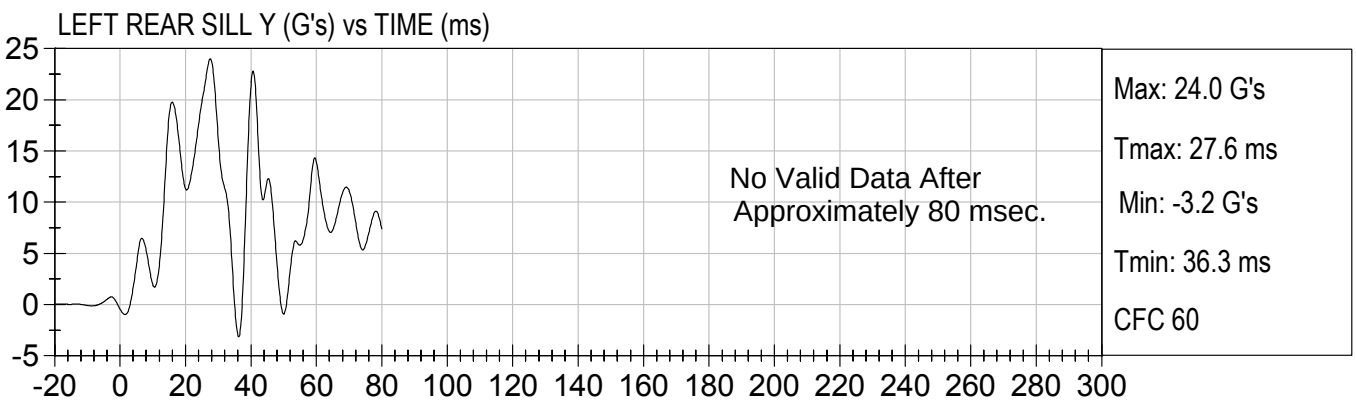
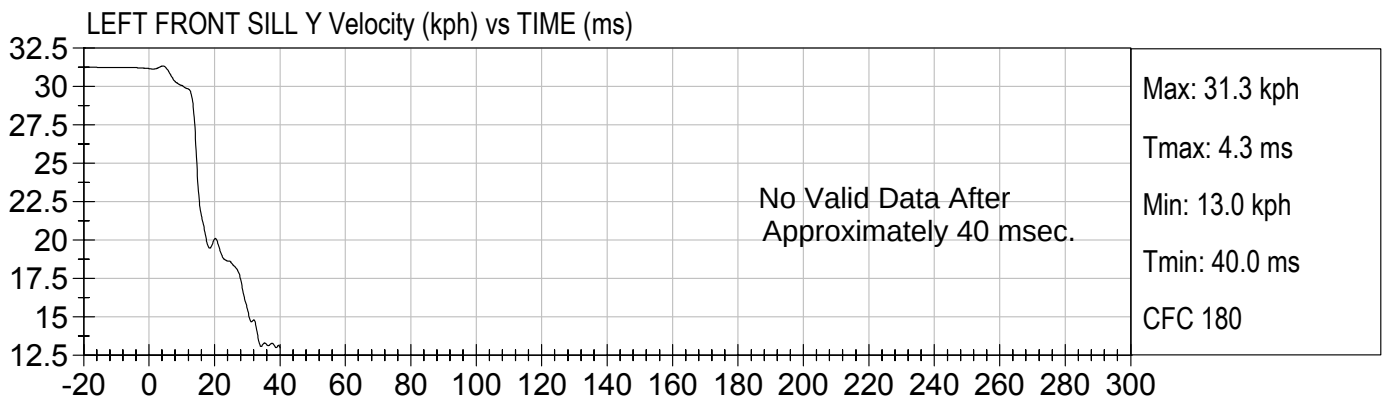
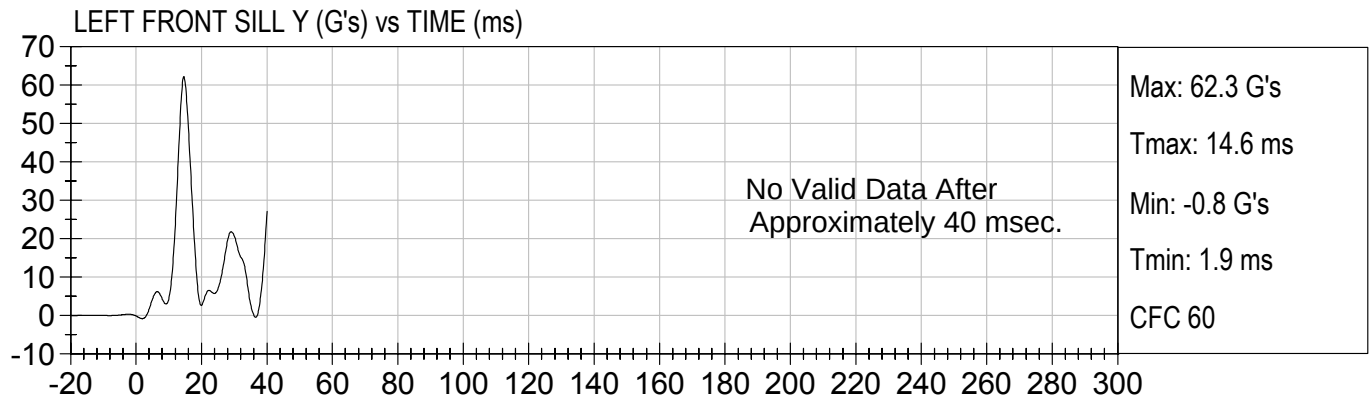
FLOORPAN @ REAR A ResultantLE X (G's) vs TIME (ms)

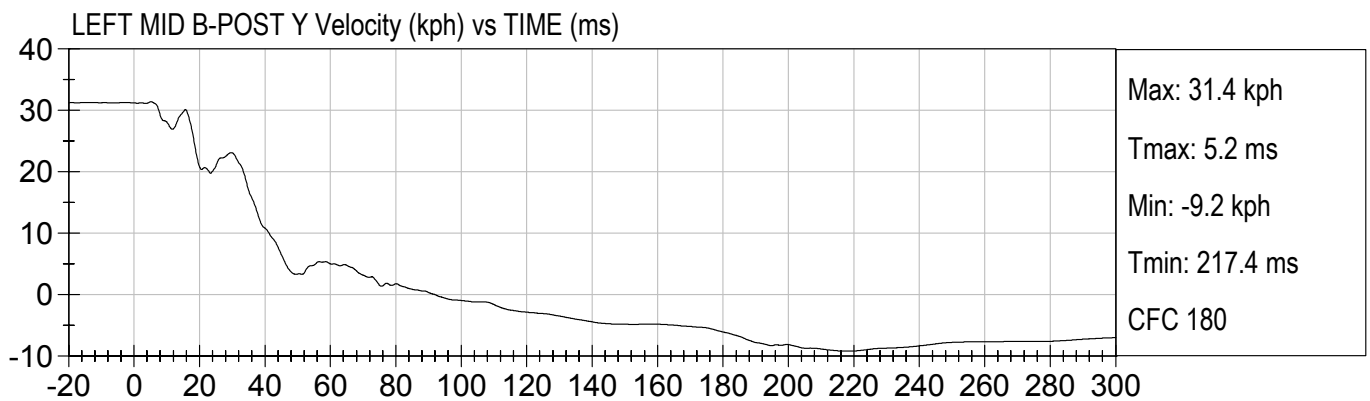
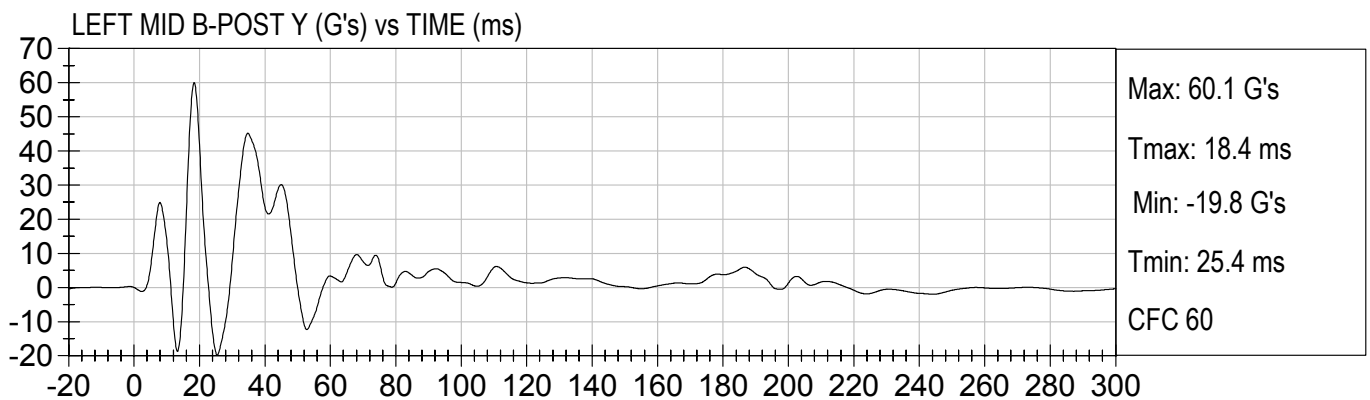
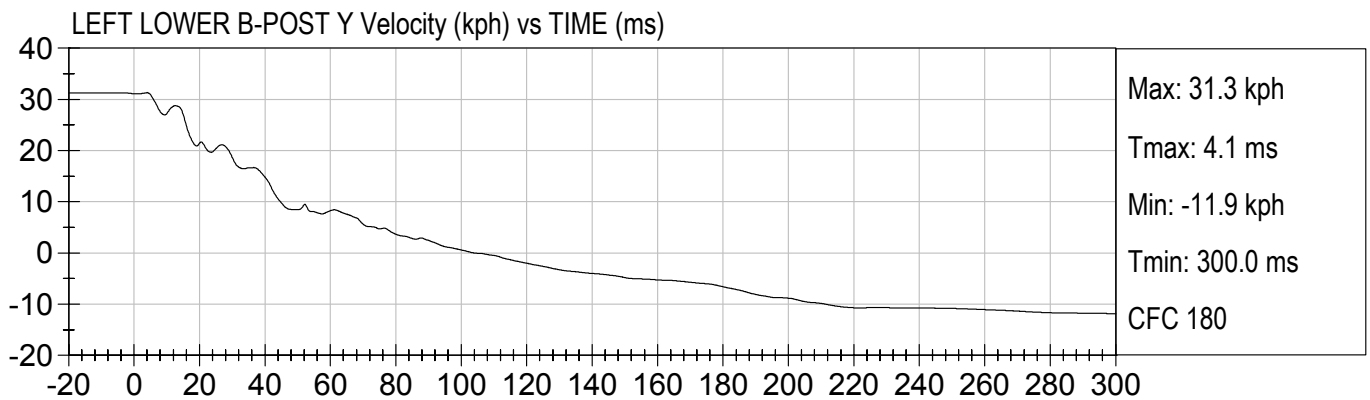
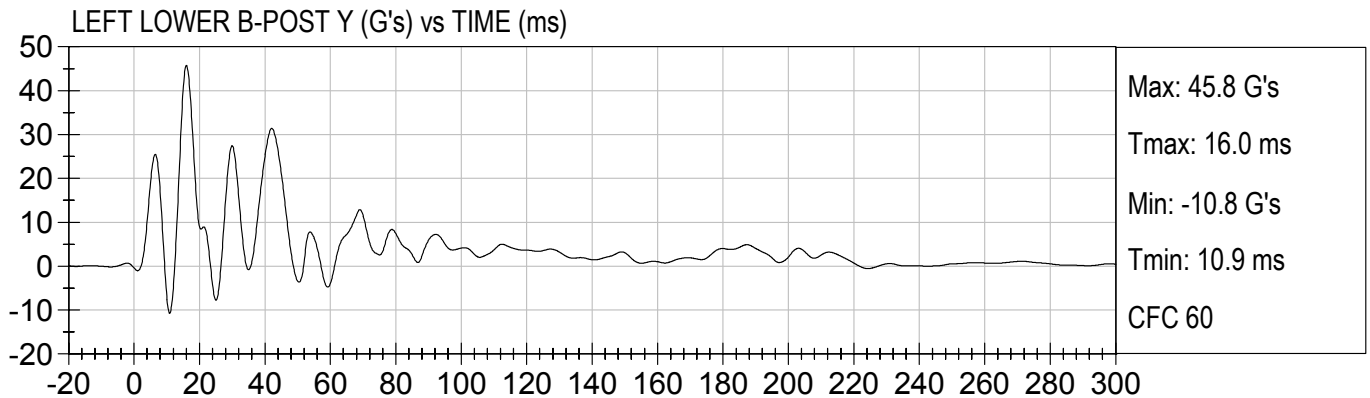


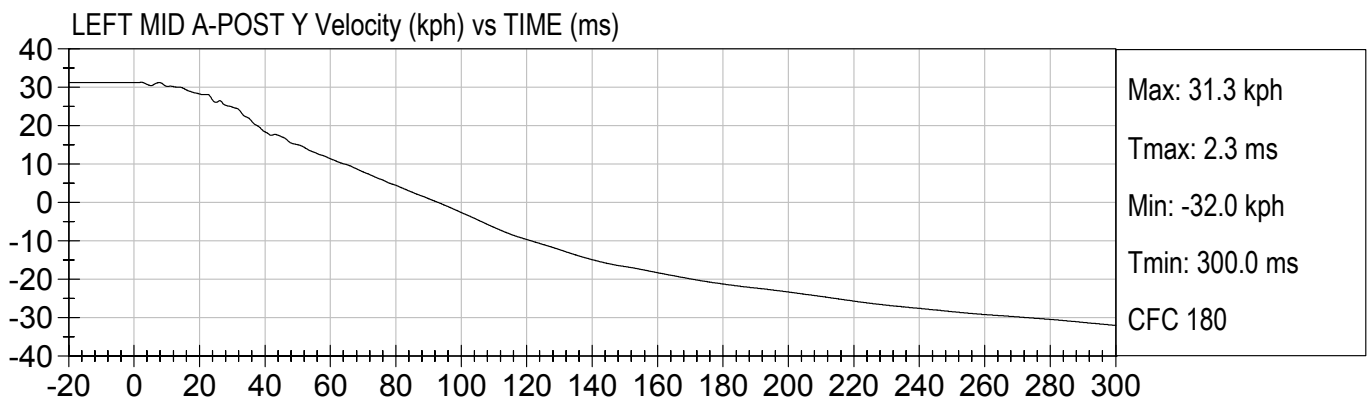
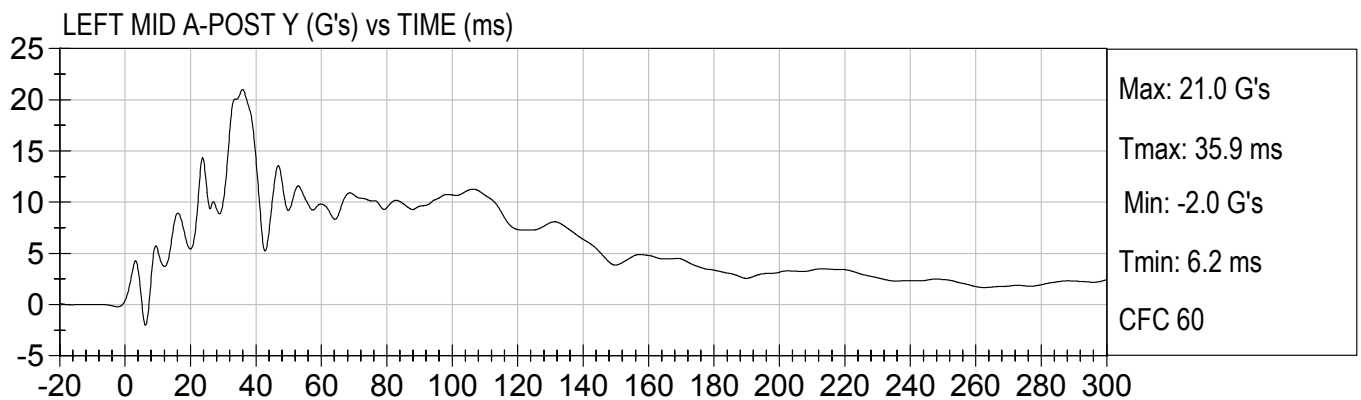
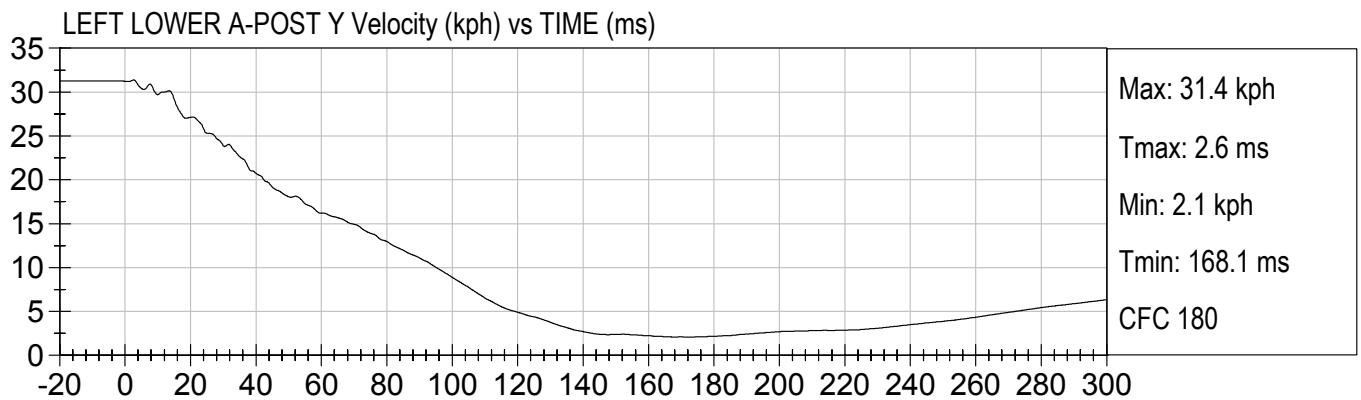
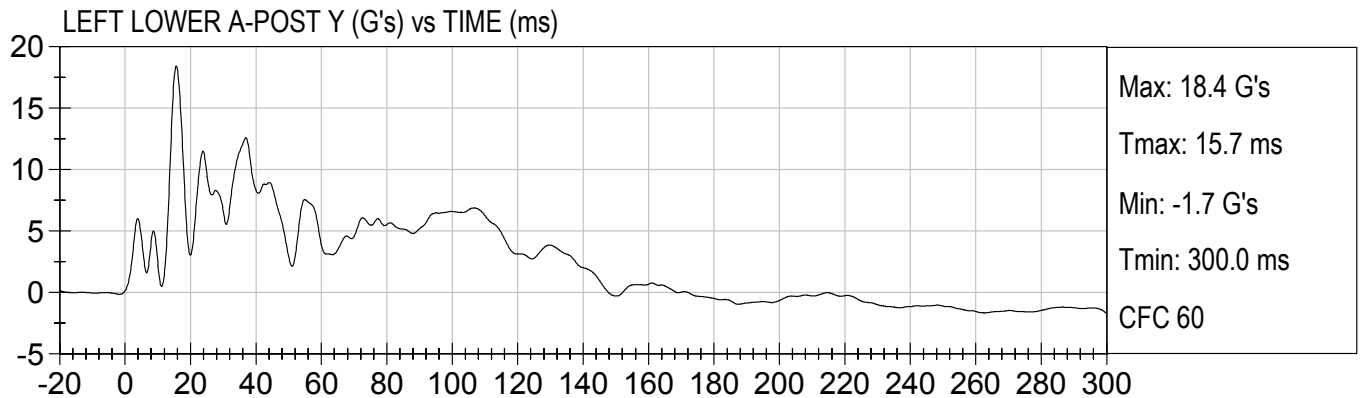
No Valid Data After
Approximately 75 msec.

Max: 15.6 G's
Tmax: 59.7 ms
Min: 0.0 G's
Tmin: 0.0 ms
CFC 60



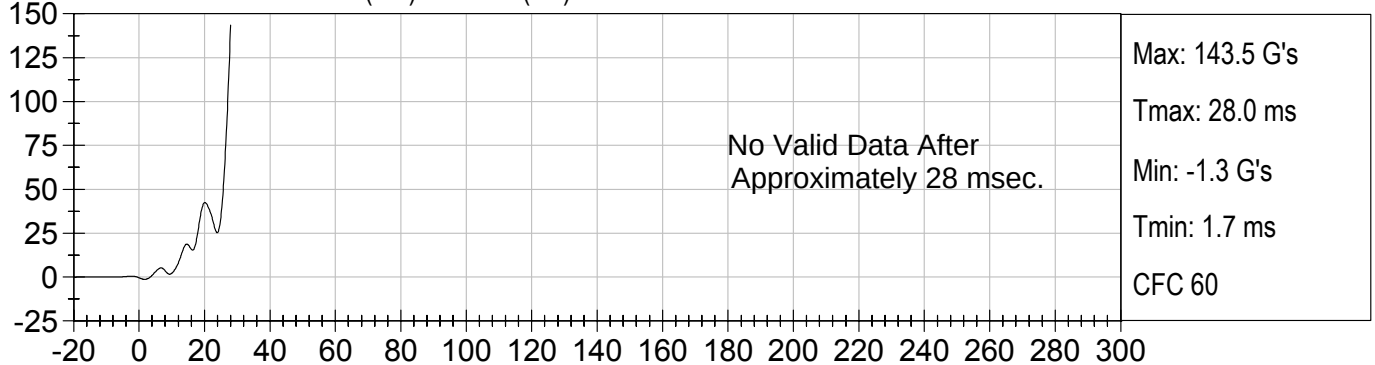




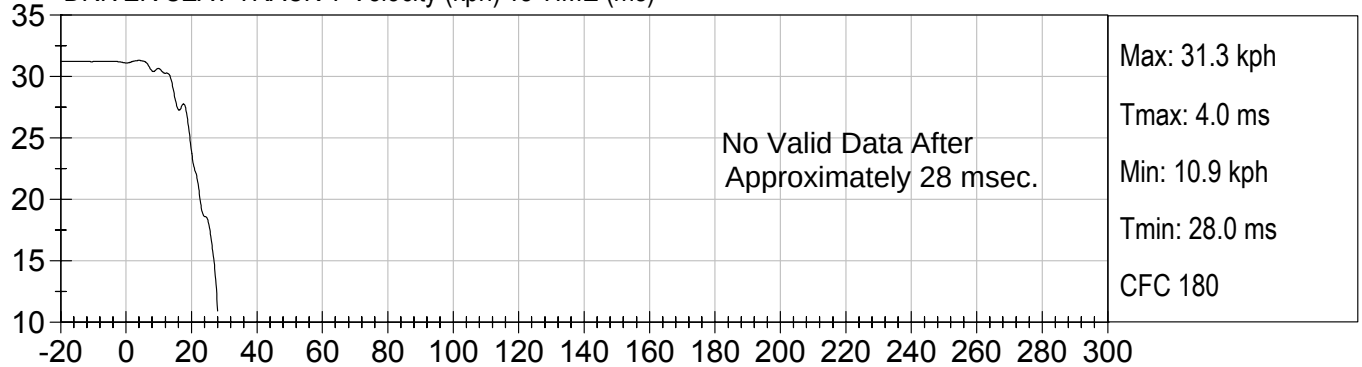




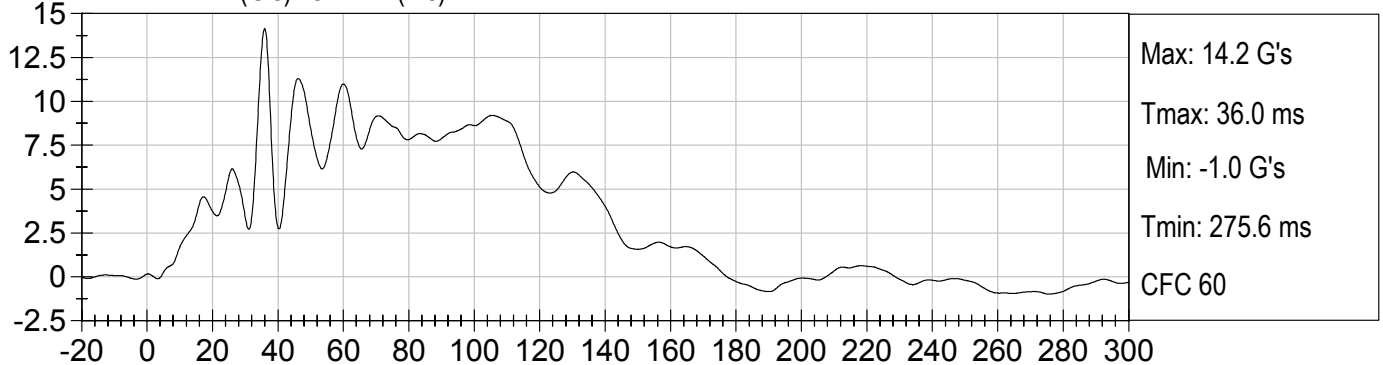
DRIVER SEAT TRACK Y (G's) vs TIME (ms)



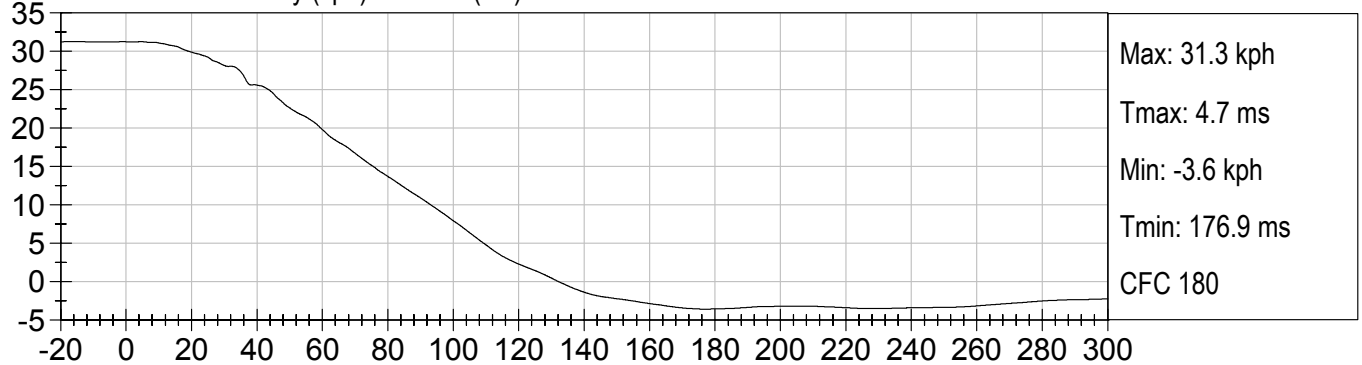
DRIVER SEAT TRACK Y Velocity (kph) vs TIME (ms)

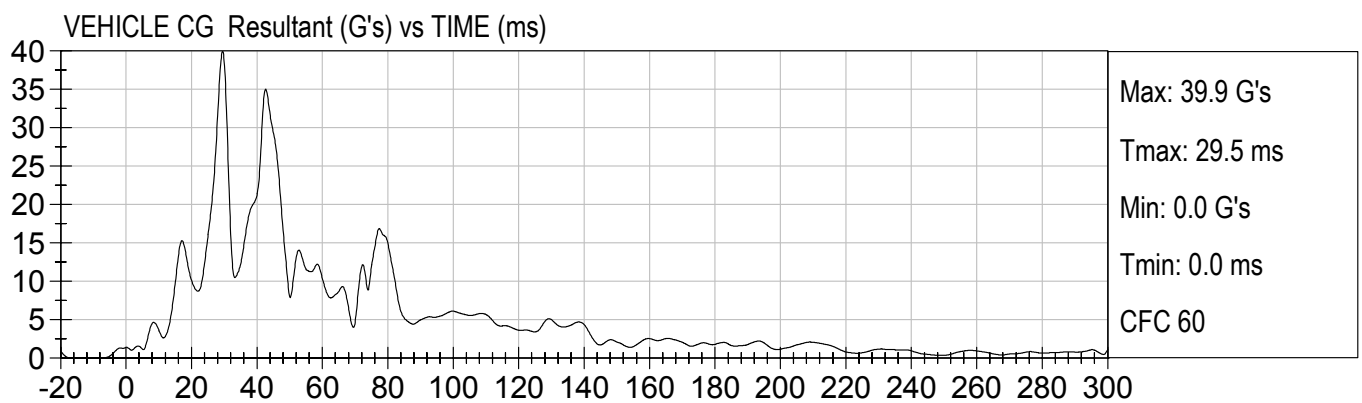
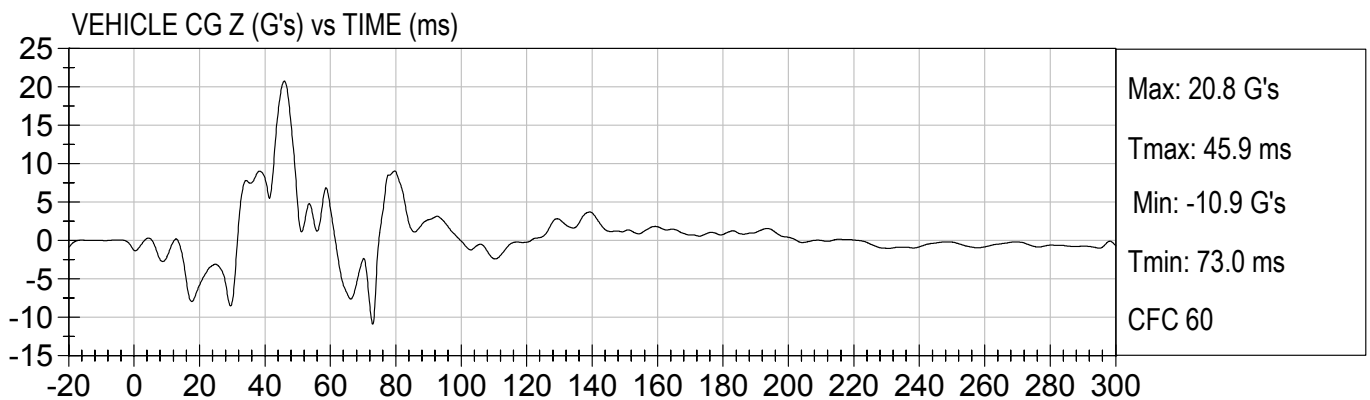
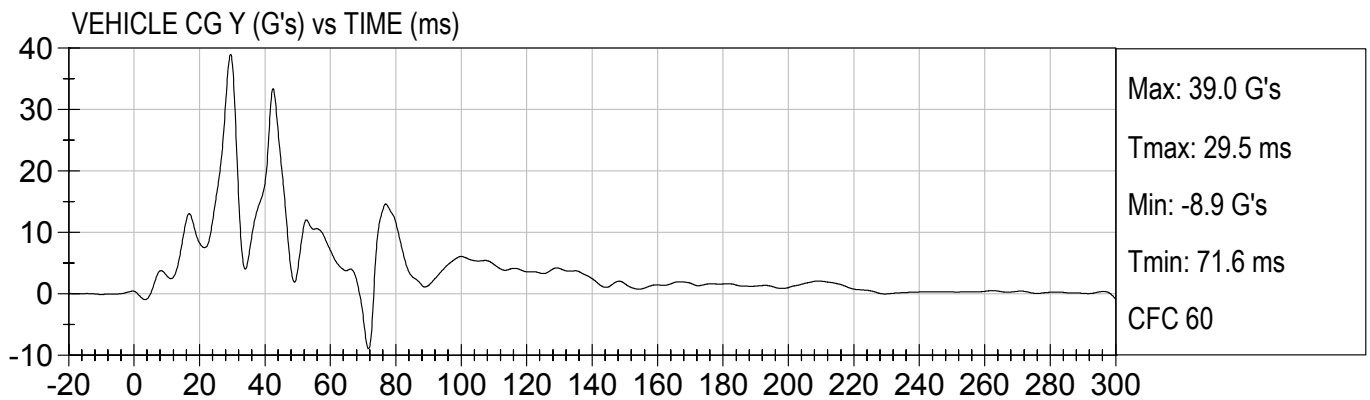
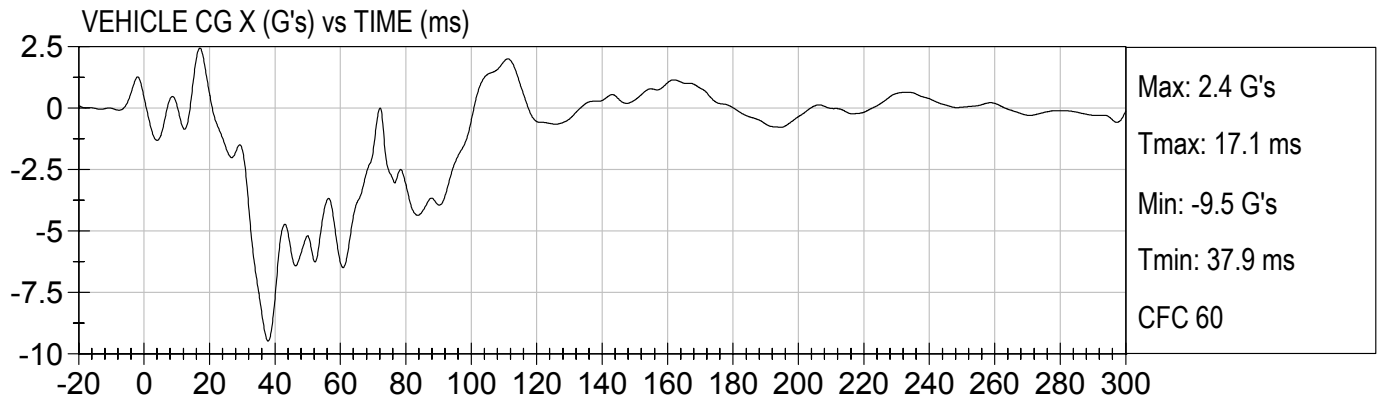


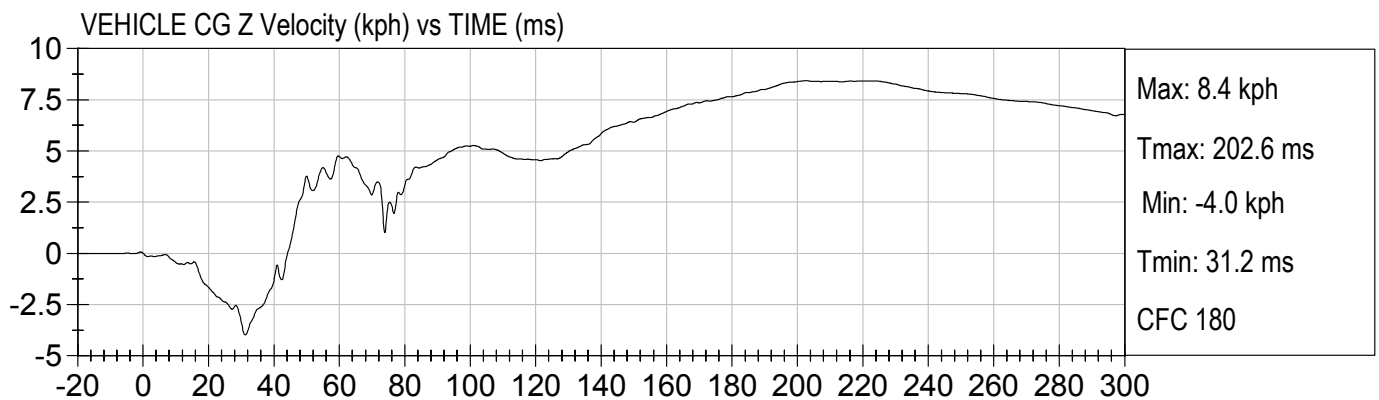
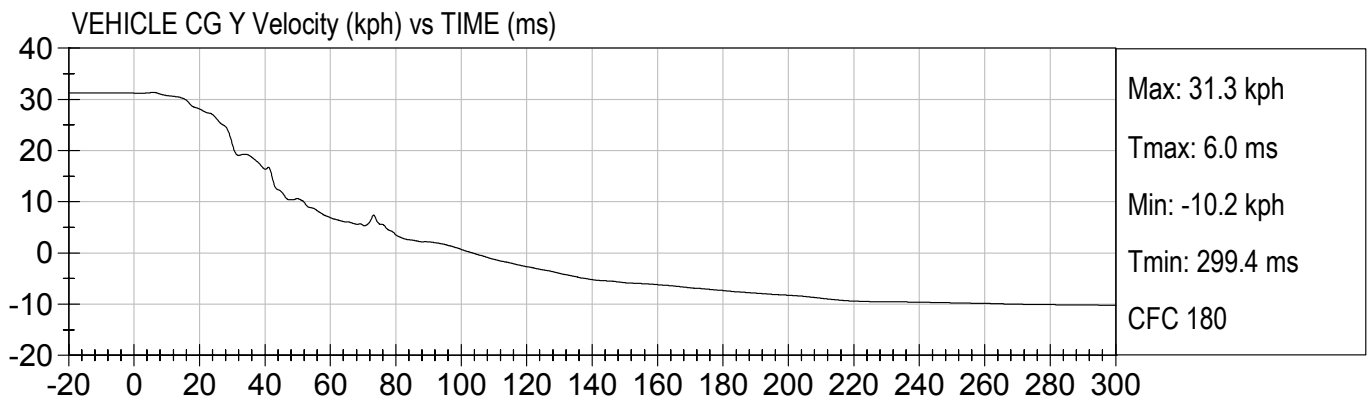
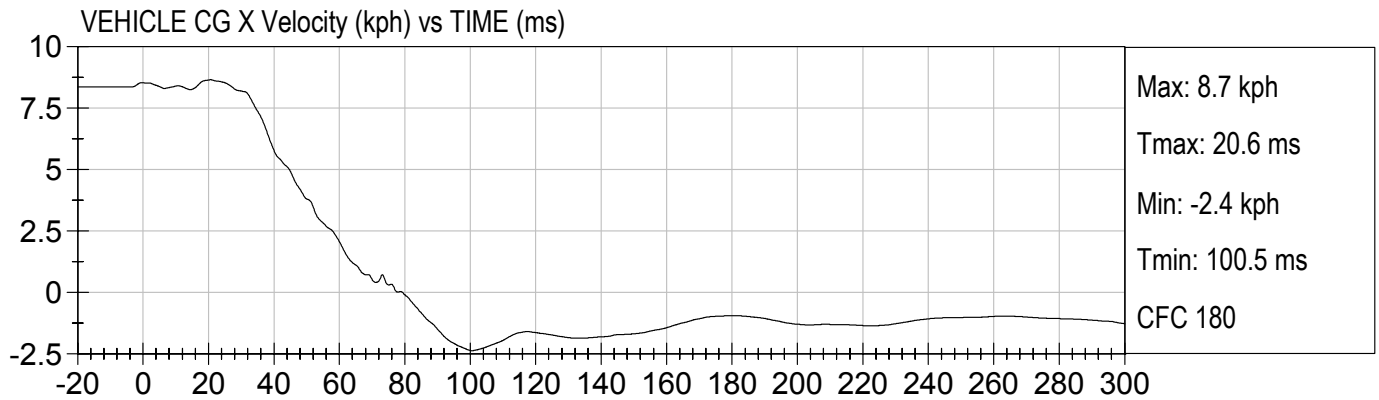
FIREWALL Y (G's) vs TIME (ms)



FIREWALL Y Velocity (kph) vs TIME (ms)

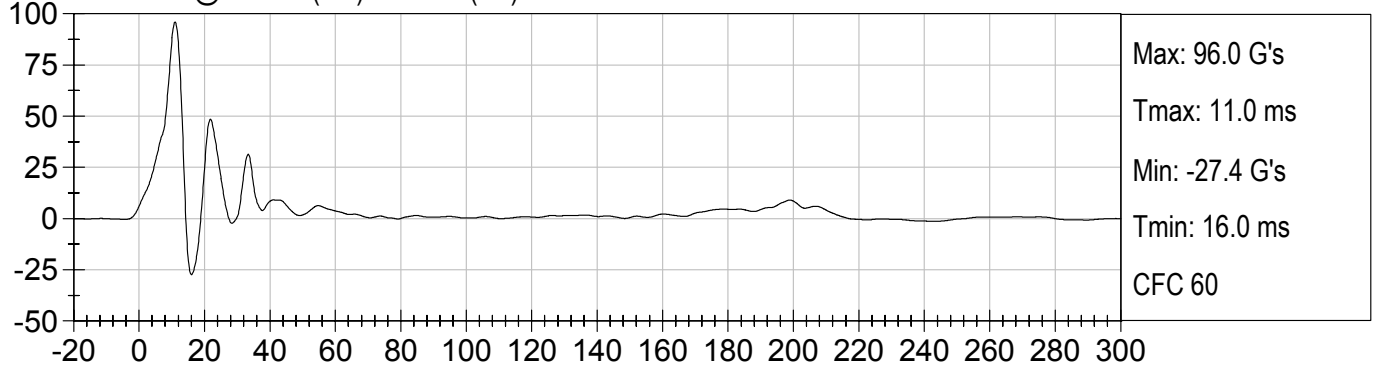




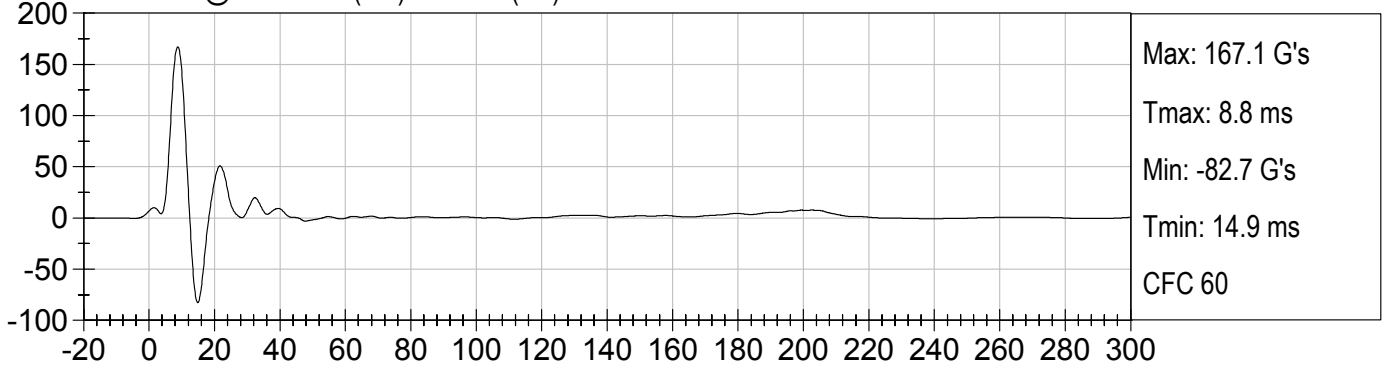




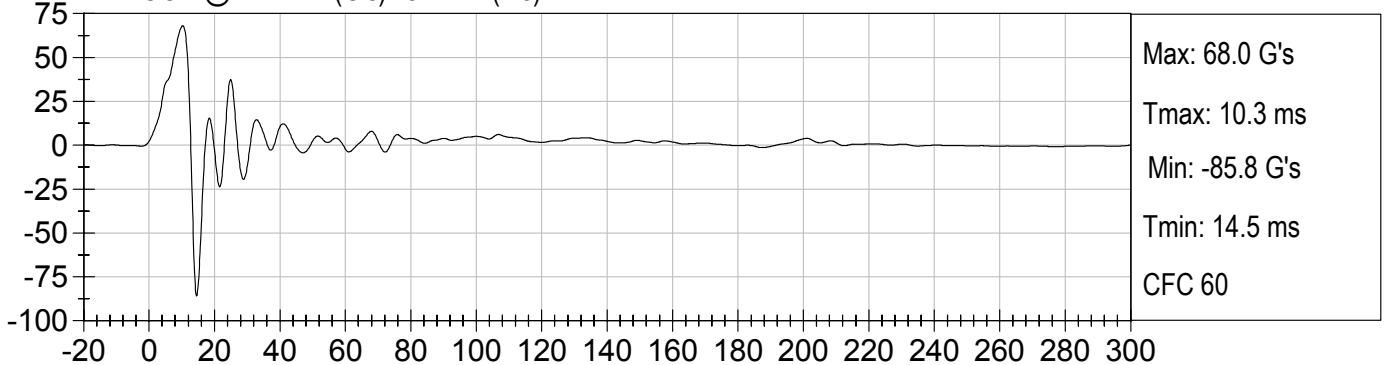
LF DOOR @ ARM Y (G's) vs TIME (ms)



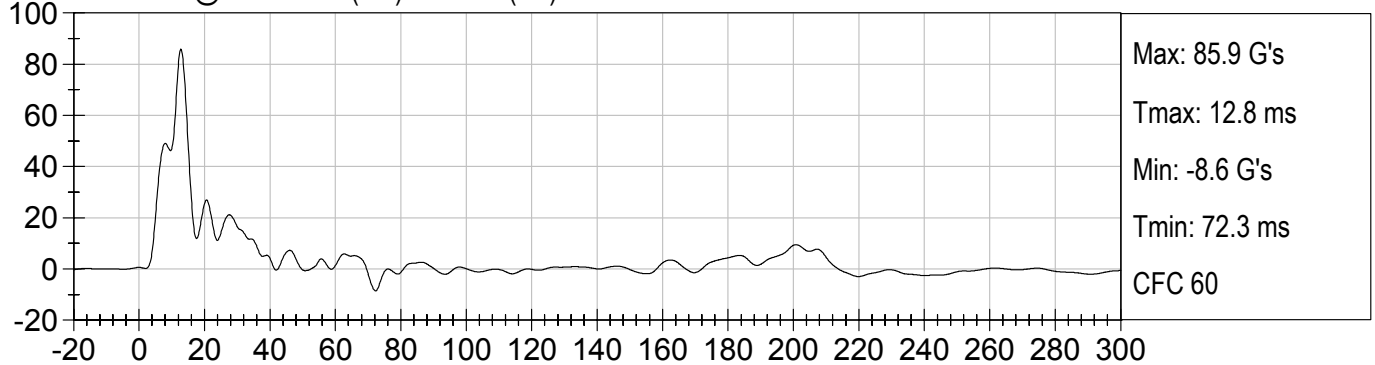
LF DOOR @ PELVIS Y (G's) vs TIME (ms)

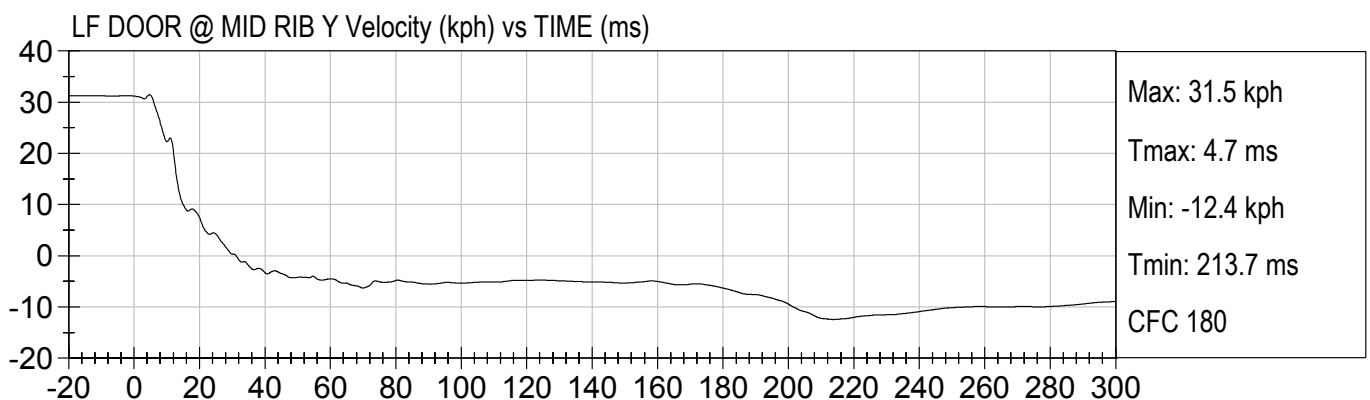
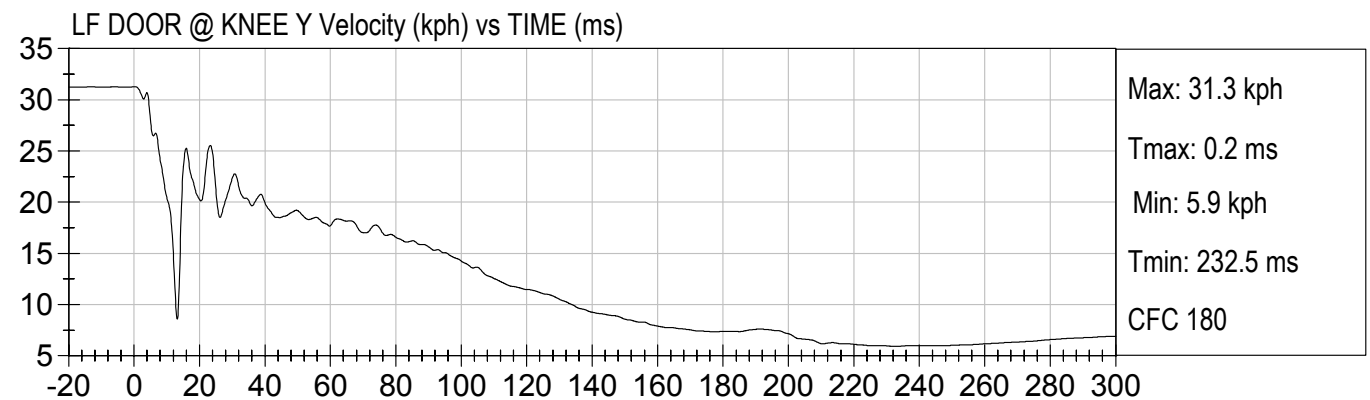
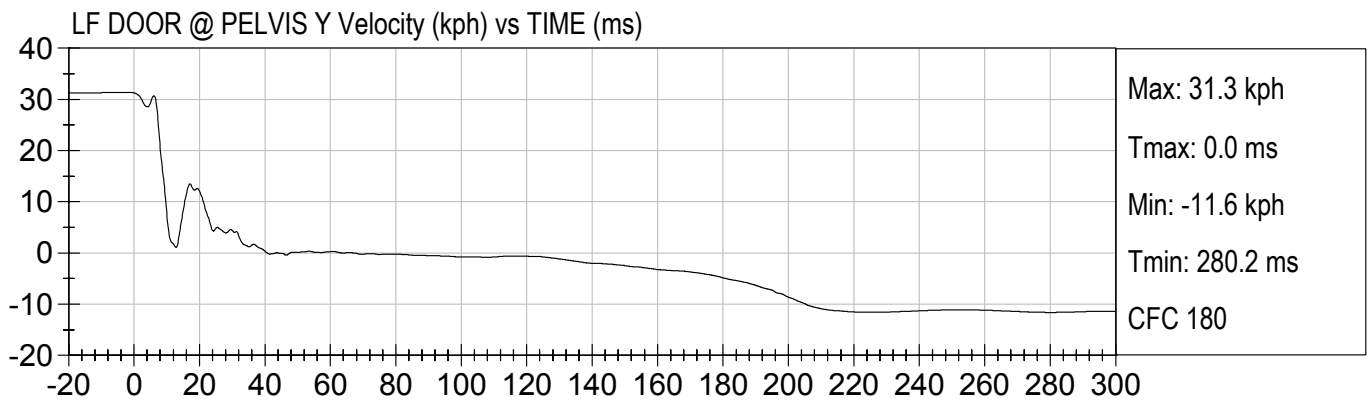
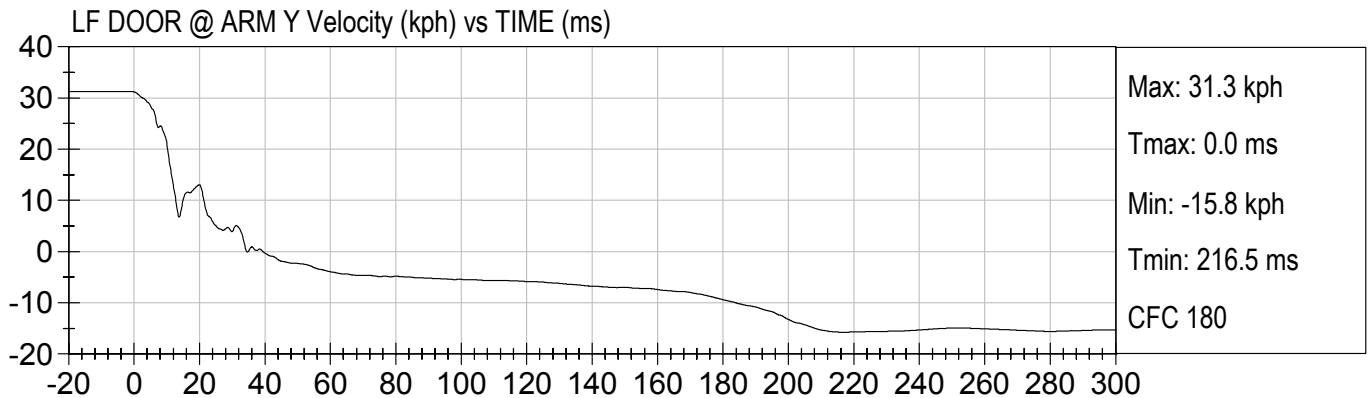


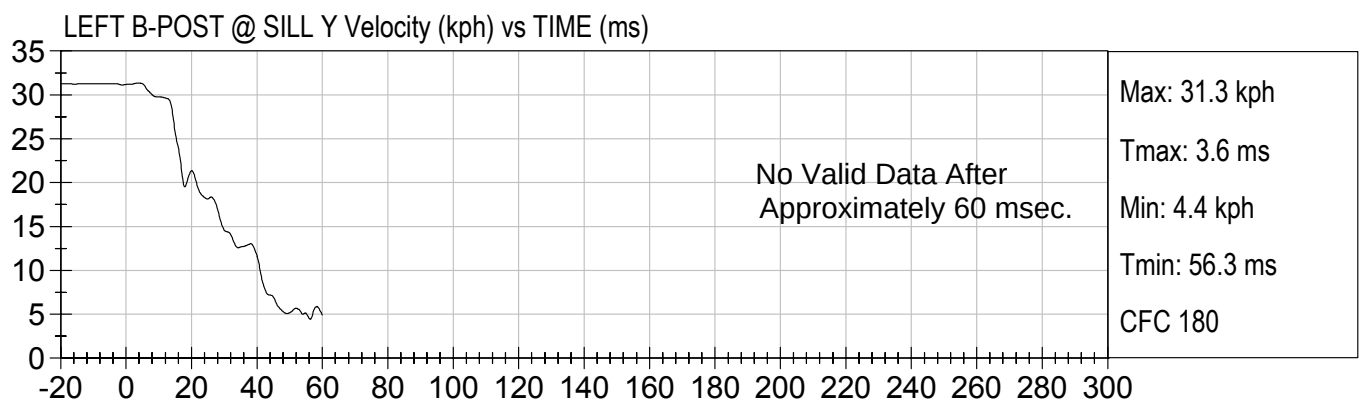
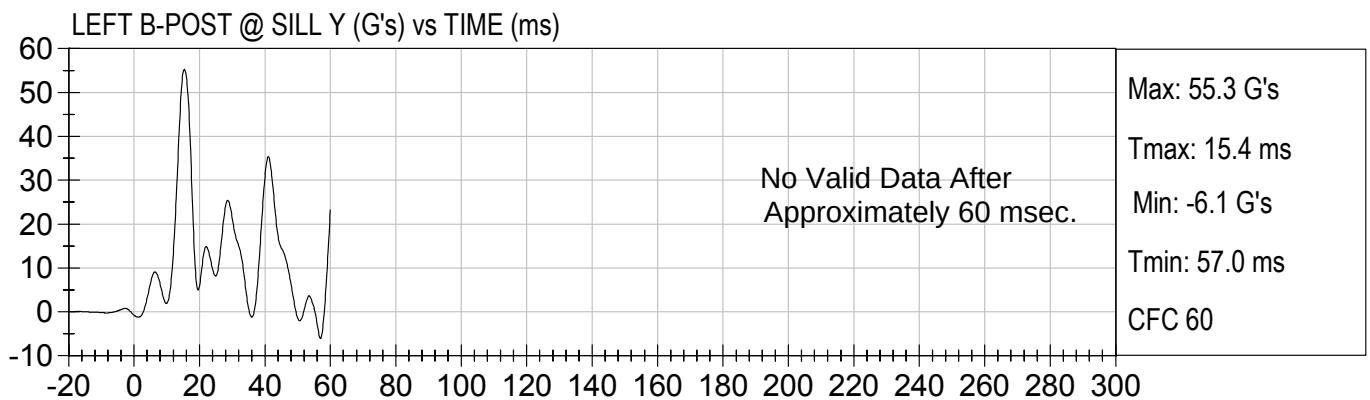
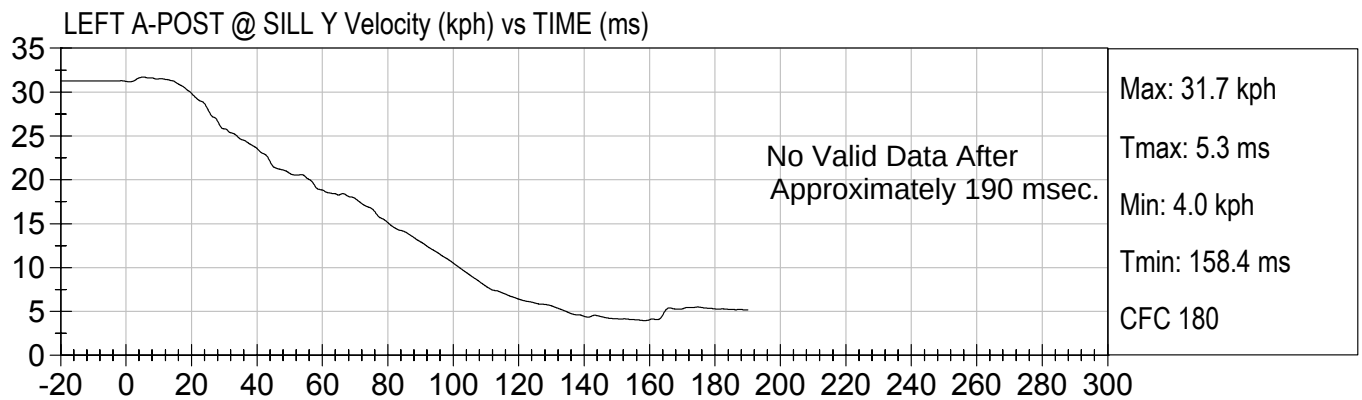
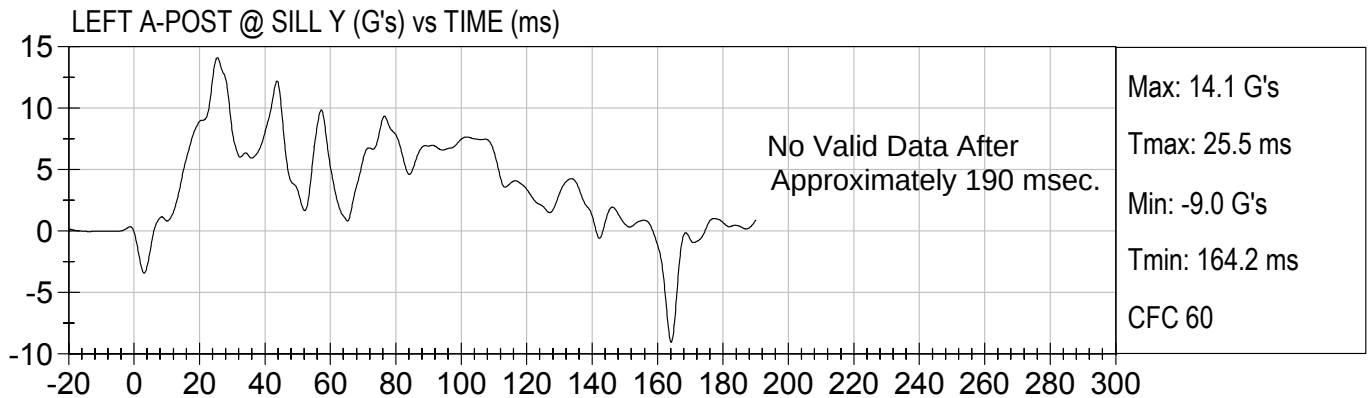
LF DOOR @ KNEE Y (G's) vs TIME (ms)

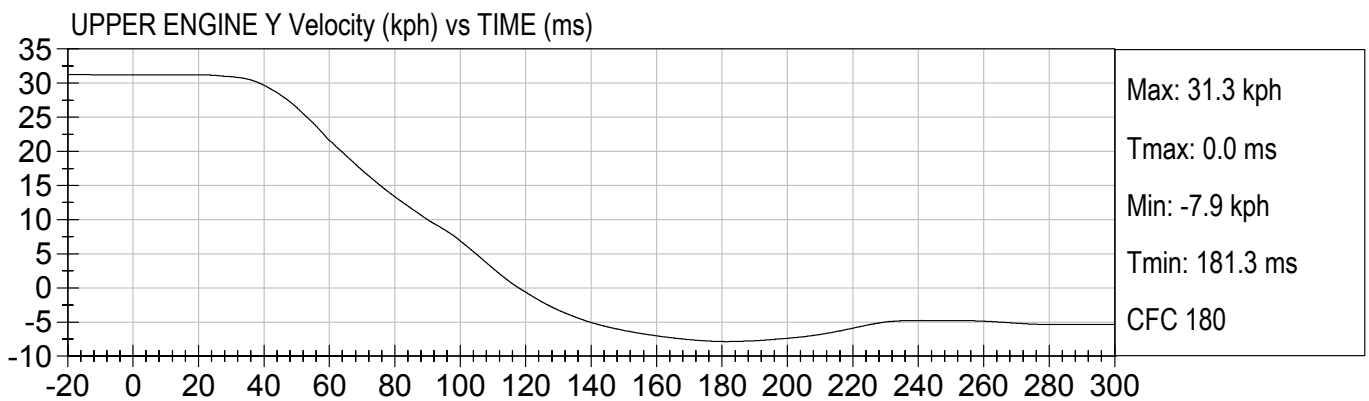
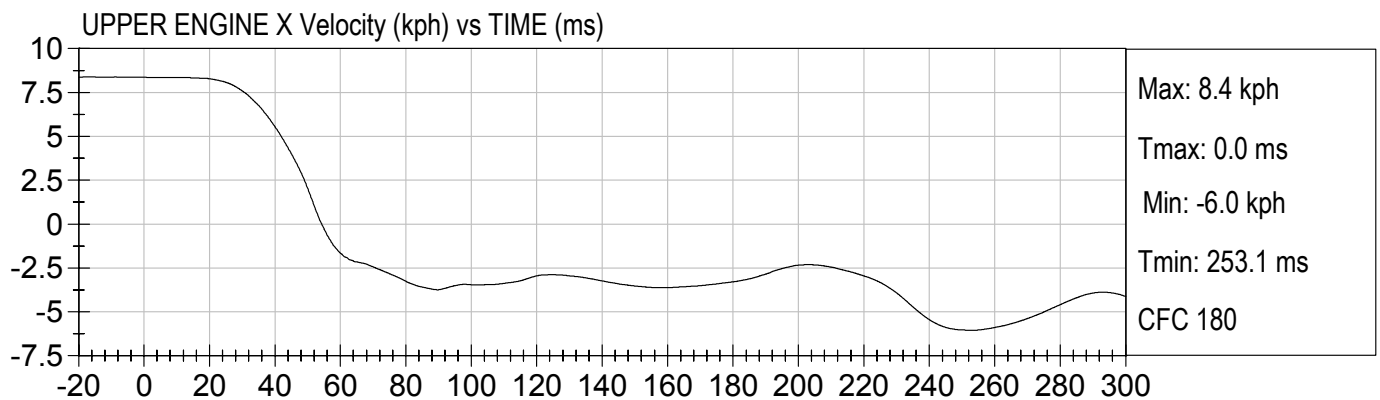
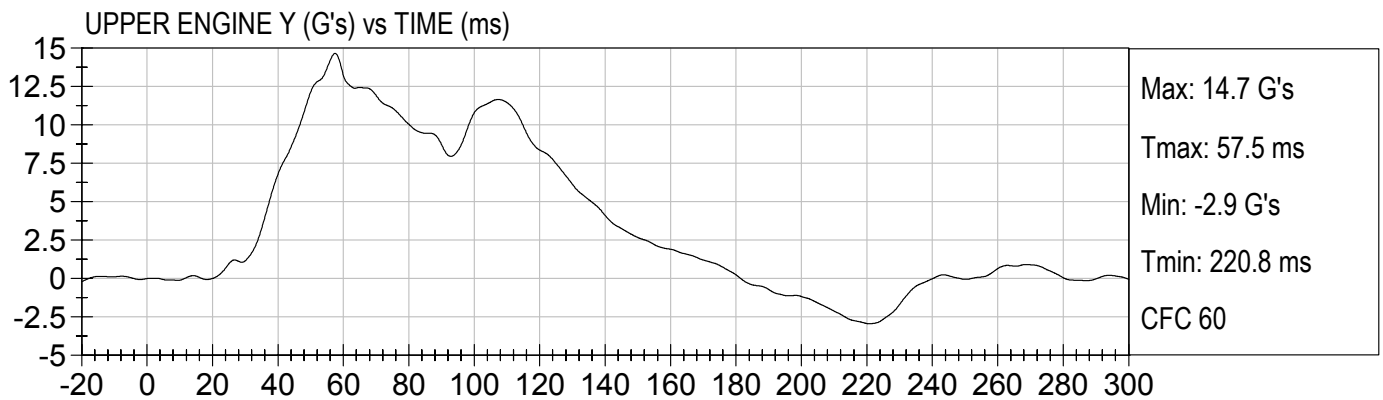
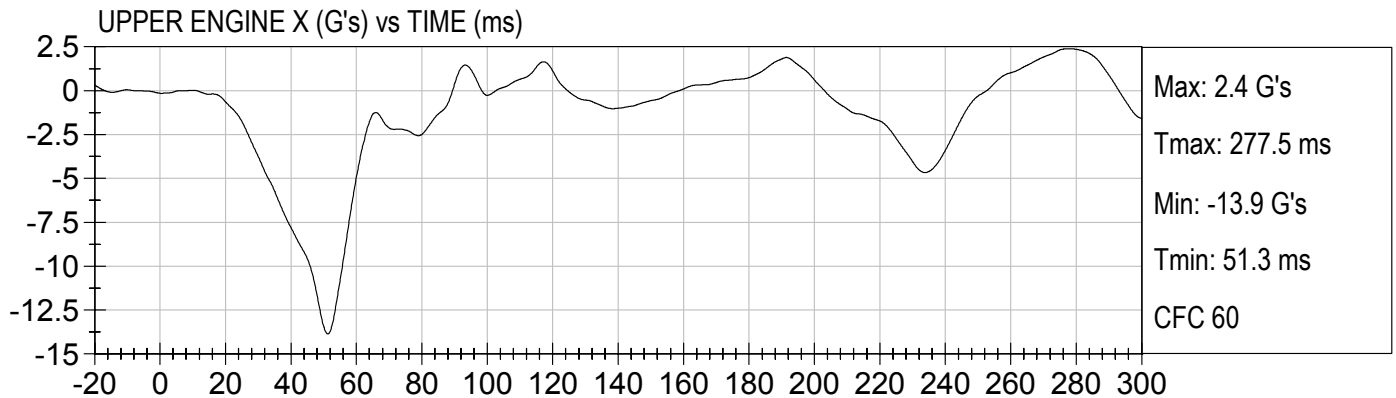


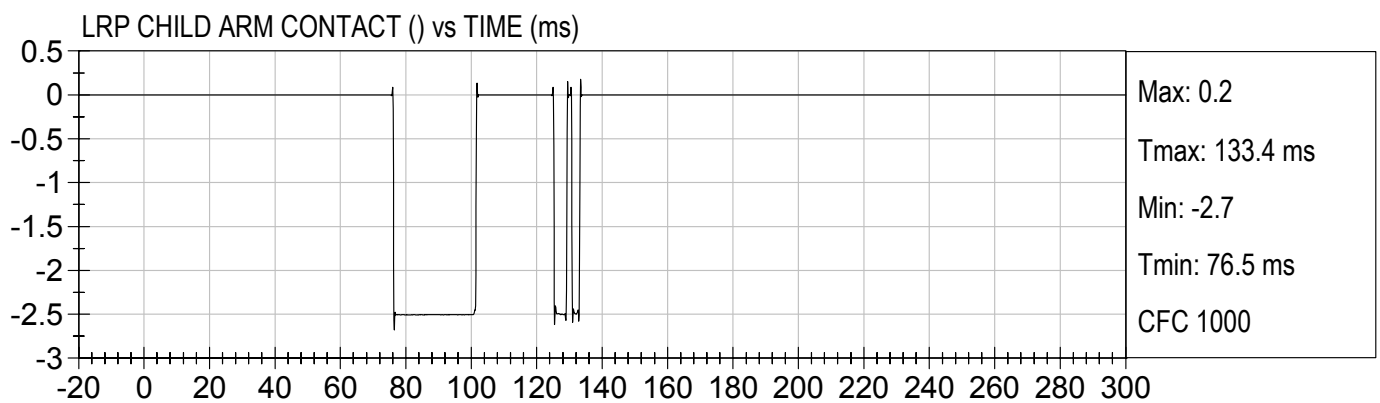
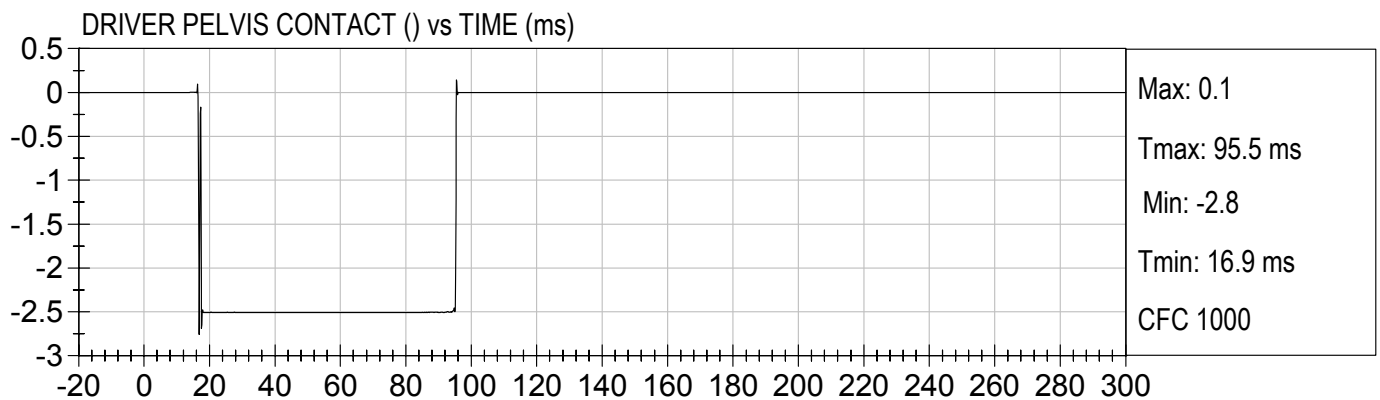
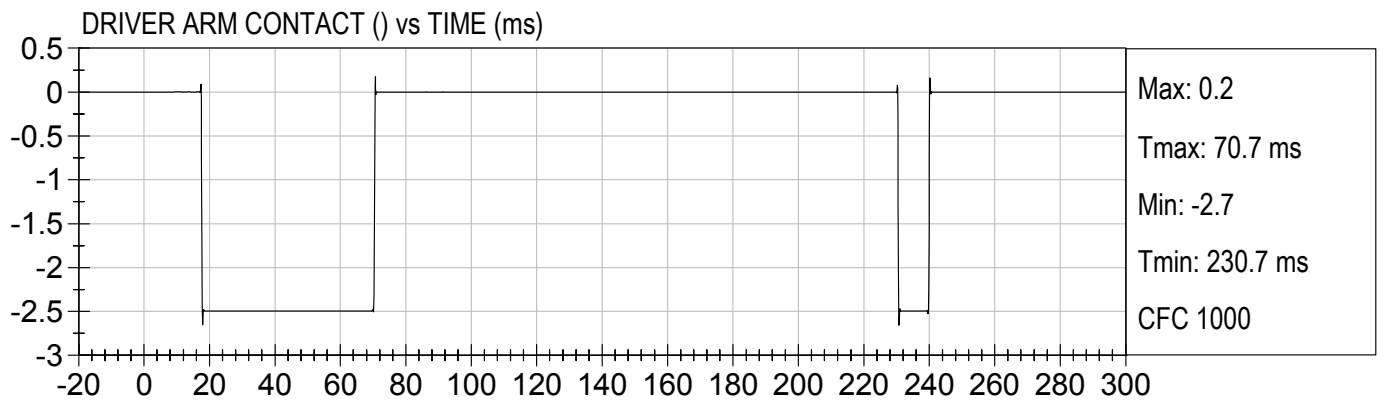
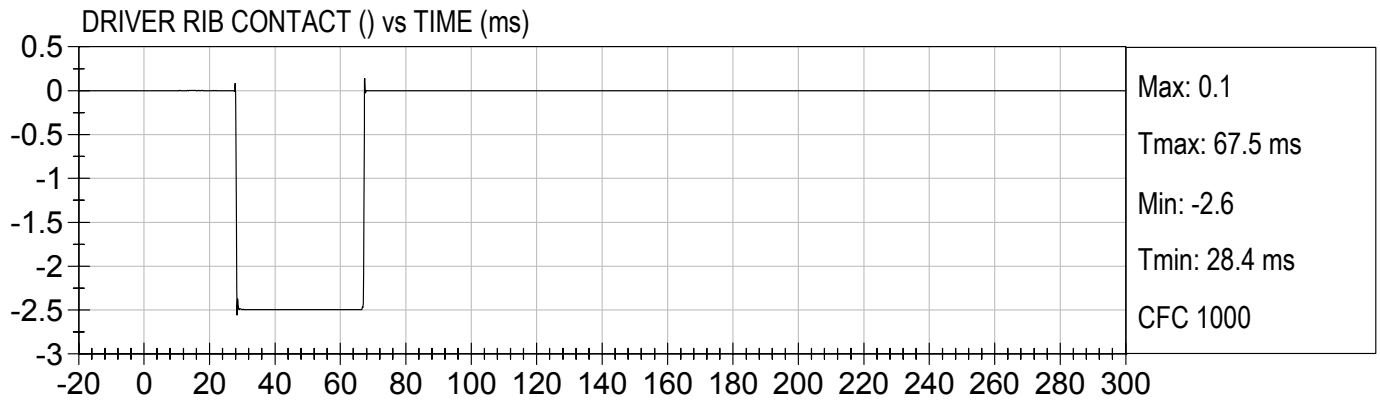
LF DOOR @ MID RIB Y (G's) vs TIME (ms)











APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CERTIFICATION DATA

Dummy Serial Number: 033

PRE-TEST CALIBRATION

MGA RESEARCH CORPORATION
HEAD DROP TEST
SIDIIISD DUMMY

Date: 7/14/05
Dummy Serial Number: 033
Test Number: D051941

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.3
Humidity	10% - 70%	46
Resultant Acceleration	125 - 145 g's	133
Peak Longitudinal Acceleration	(-15) – (+ 15) g's	10
Unimodal	<10%	YES

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

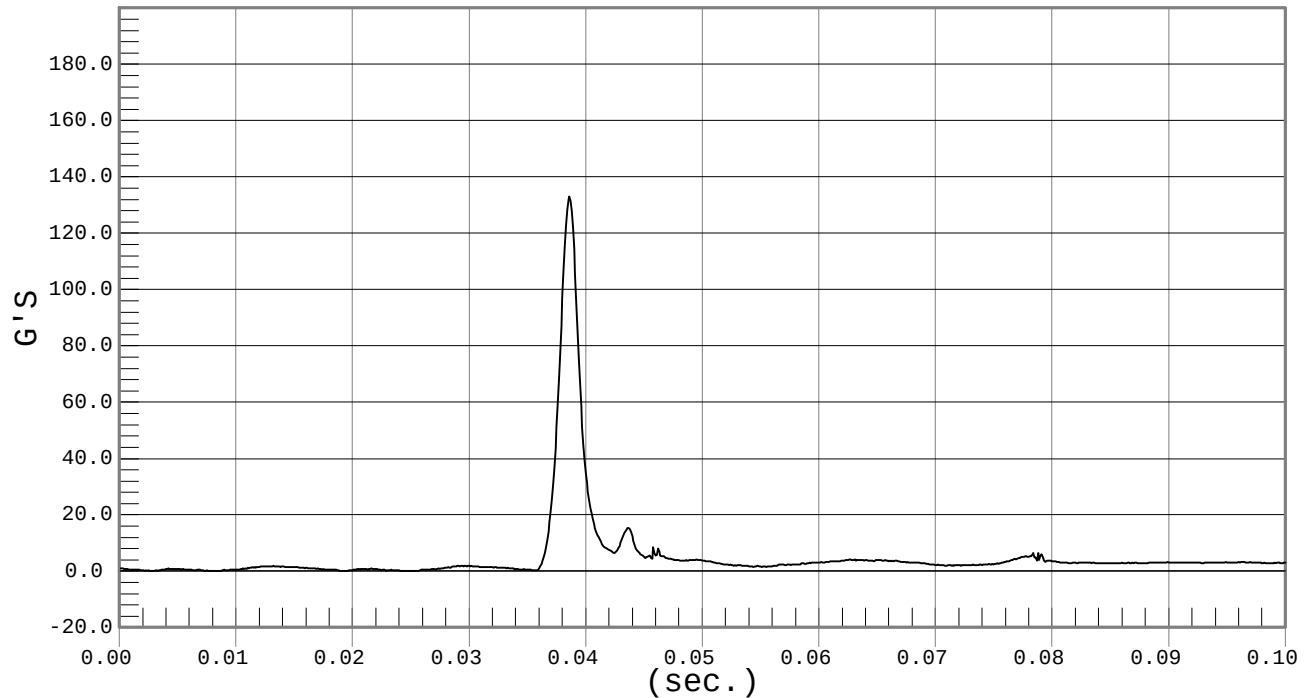


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #033

Test Date: 07-14-05
Speed: 0.0 fps, 0.00 M/s

Ymin = .06 G'S @ 0.0025 sec., Ymax = 133.13 G'S @ 0.0385 sec.

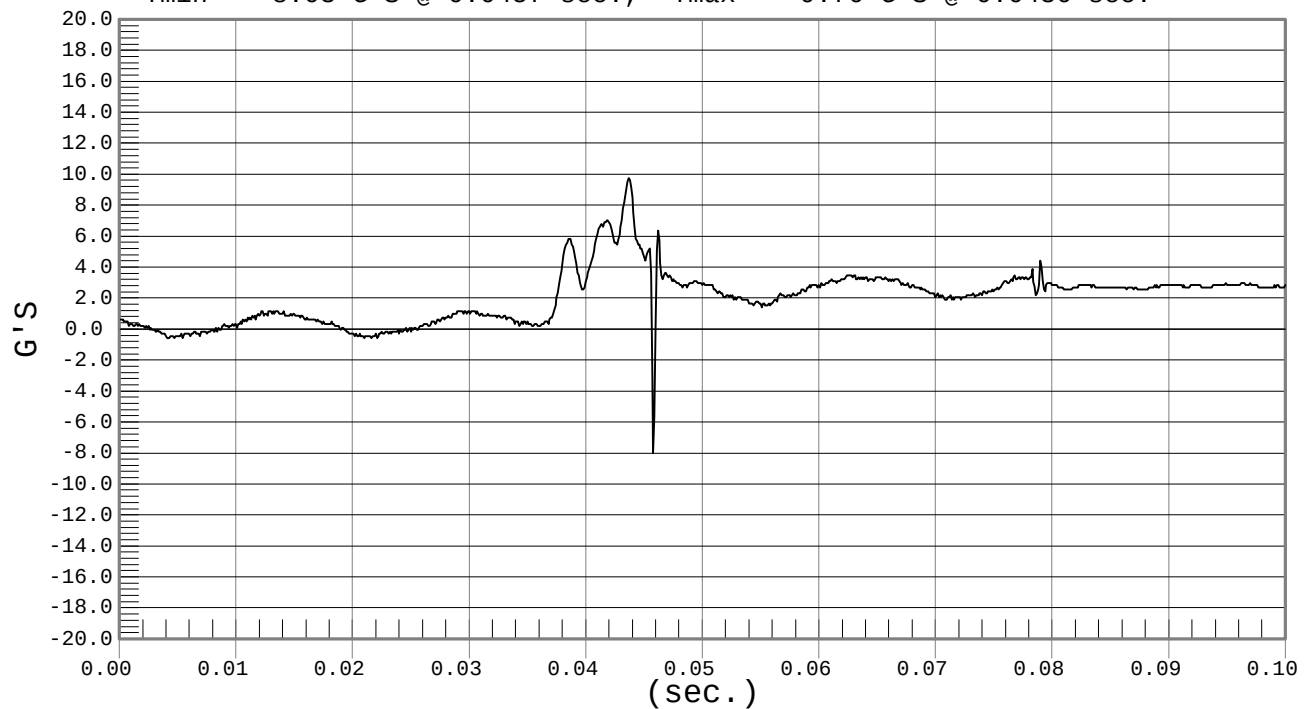


PEAK LONGITUDINAL ACCELARATION

Test Desc.: Head Drop
Component: Dummy #033

Test Date: 07-14-05
Speed: 0.0 fps, 0.00 M/s

Ymin = -8.03 G'S @ 0.0457 sec., Ymax = 9.76 G'S @ 0.0436 sec.



MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SIDIIISD DUMMY

Date: 7/13/05
Dummy Serial Number: 033
Test Number: D051942

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		20.6° – 22.2°	21.6
Humidity		10% - 70%	44
Impact Velocity (m/s)		5.51-5.63	5.62
Delta Velocity (m/s)	10 ms	2.20-2.80	2.48
	15 ms	3.40-4.10	3.66
	20 ms	4.50-5.40	4.89
	25 ms	5.50-6.10	5.77
	25-100 ms	5.20-6.20	5.88
Maximum D-Plane Rotation (deg)		74 - 79	74
Time of Maximum D-Plane Rotation		50-70	60
Maximum Occipital Condyle Moment during Rotation Interval (Nm)		(-45) – (-40)	-42
Time of Moment Decay to 0 Nm		113-123	113

TEST MEETS SPECIFICATIONS

Technician: Jessica Gall

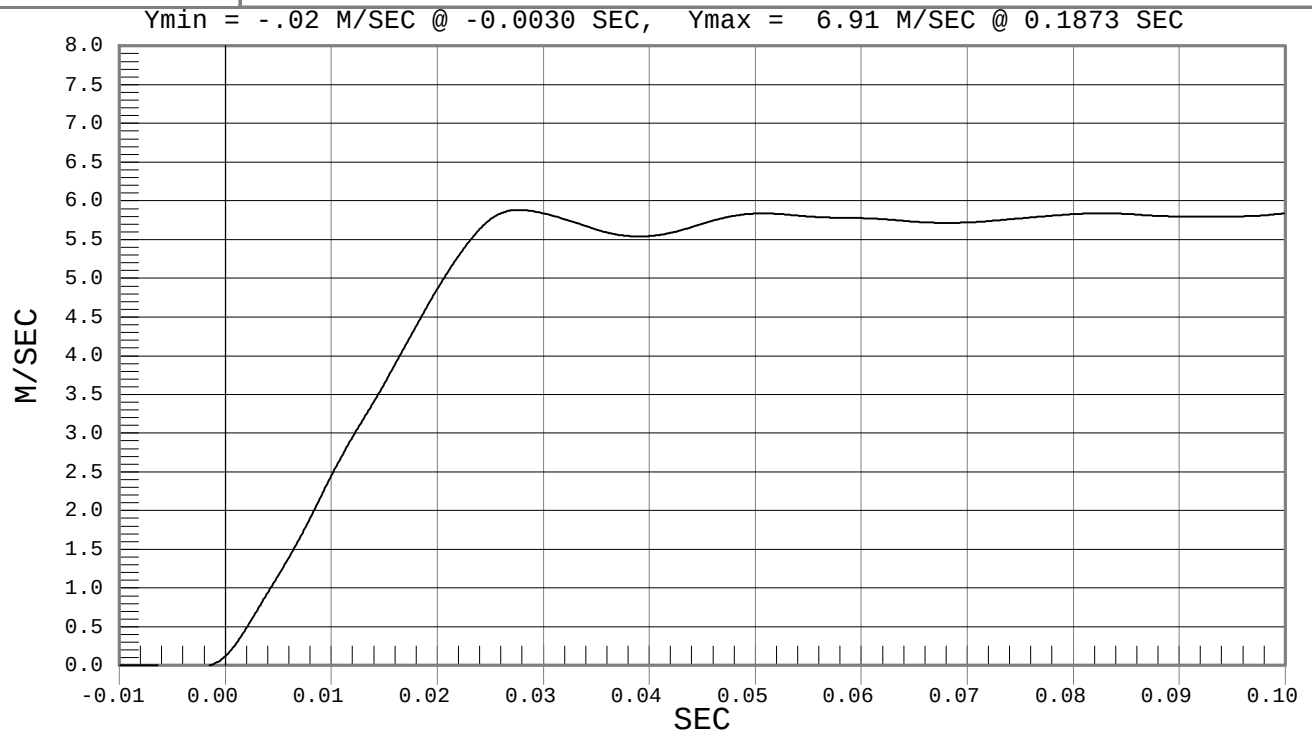
Approved By: David Winkelbauer



PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #033

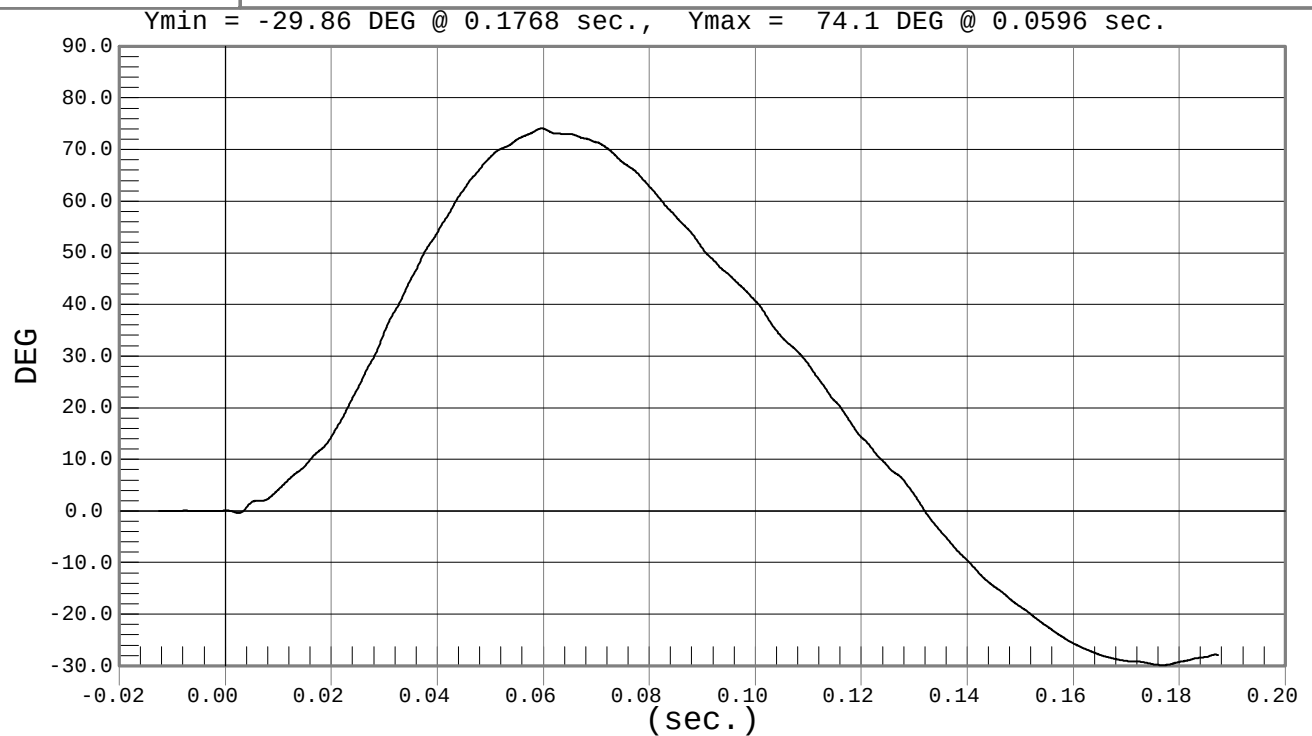
Test Date: 07-13-05
Speed: 18.5 fps, 5.62 M/s



FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #033

Test Date: 07-13-05
Speed: 18.5 fps, 5.62 M/s



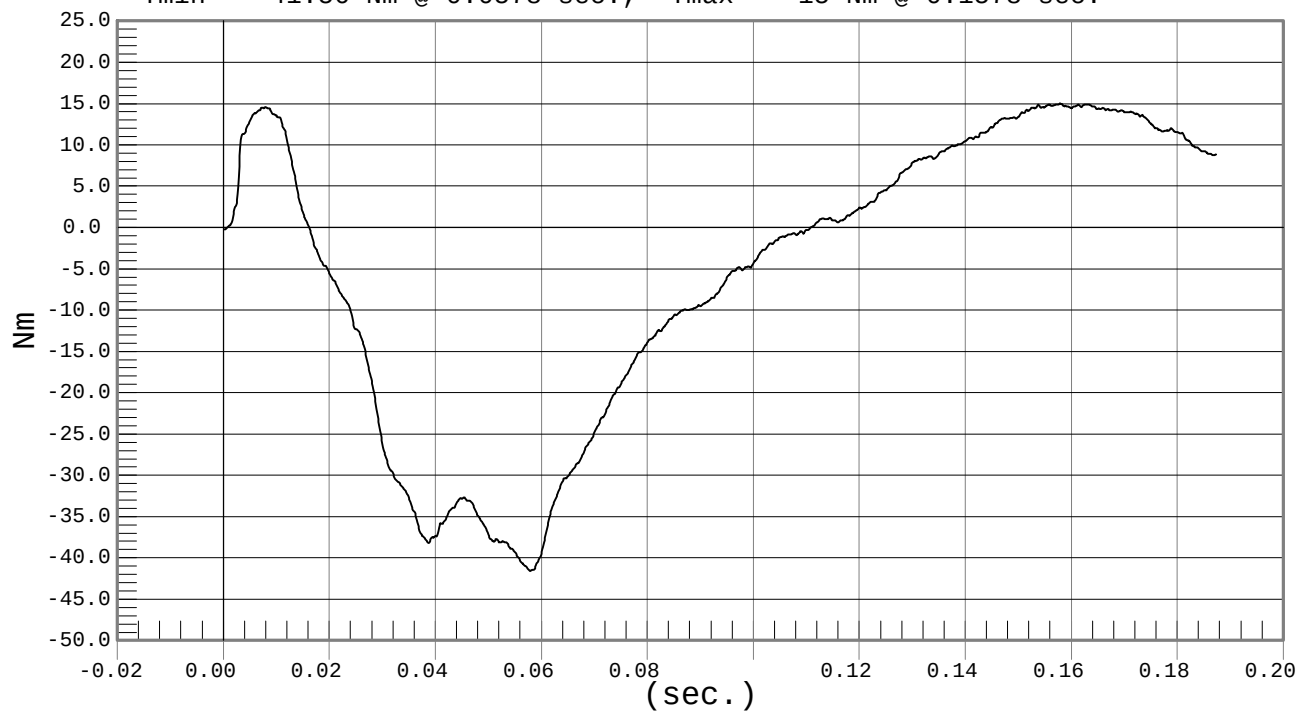


Test Desc.: Neck Bending
Component: Dummy #033

OCCIPITAL MOMENT

Test Date: 07-13-05
Speed: 18.5 fps, 5.62 M/s

Ymin = -41.56 Nm @ 0.0578 sec., Ymax = 15 Nm @ 0.1578 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SIDIIISD DUMMY

Date: 7/13/05
Dummy Serial Number: 033
Test Number: D051943

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.0
Humidity	10% - 70%	43
Impact Velocity	4.41 - 4.59 m/s	4.51
Maximum Probe Force	1.6 - 2.4 kN	2.1
Shoulder Displacement	27 - 39 mm	32

TEST MEETS SPECIFICATIONS

Technician: _____

Jessica Gall

Approved By: _____

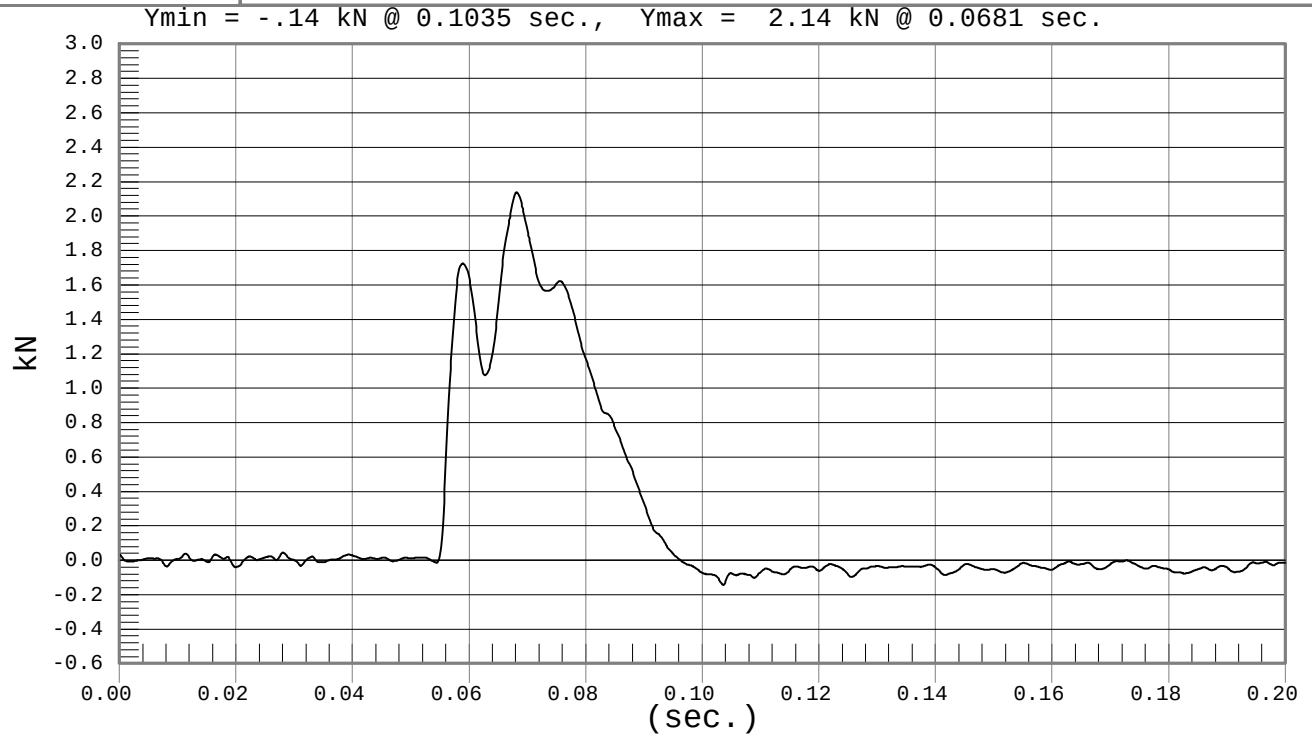
David Winkelbauer



PROBE FORCE

Test Desc.: Shoulder Impact
Component: Dummy #033

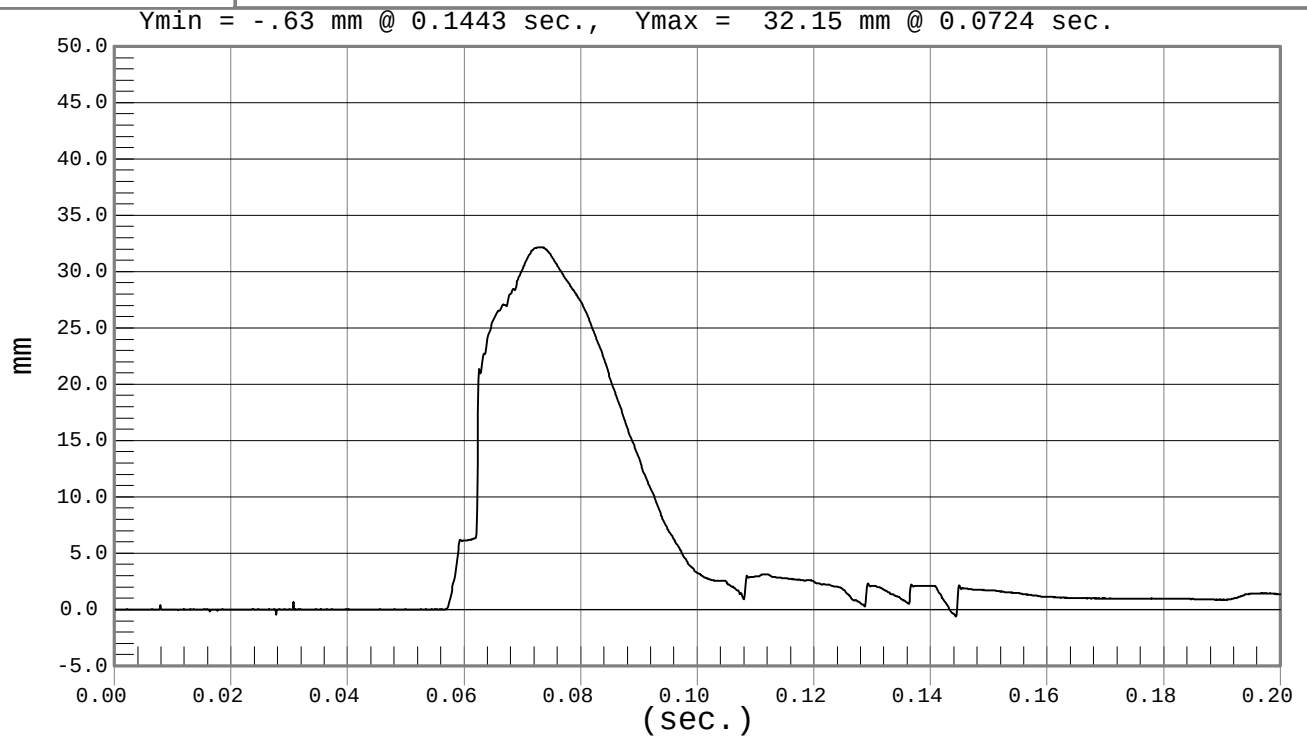
Test Date: 07-13-05
Speed: 14.8 fps, 4.51 M/s



SHOULDER DISPLACEMENT

Test Desc.: Shoulder Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 14.8 fps, 4.51 M/s



MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SIDIIISD DUMMY

Date: 7/13/05
Dummy Serial Number: 033
Test Number: D051944

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.2
Humidity	10% - 70%	44
Impact Velocity	6.57 - 6.84 m/s	6.76
Peak Probe Force	4.1 – 4.7 kN	4.5
Shoulder Displacement	30 - 42 mm	33
Upper Rib Displacement	23 - 35 mm	28
Middle Rib Displacement	29 - 44 mm	32
Lower Rib Displacement	33 - 40 mm	34
Upper Spine (T1) Y Acceleration	34 – 48 g's	39
Lower Spine (T12) Y Acceleration	30 - 38 g's	30

TEST MEETS SPECIFICATIONS

Technician: _____

Jessica Hall

Approved By: _____

David Winkelbauer

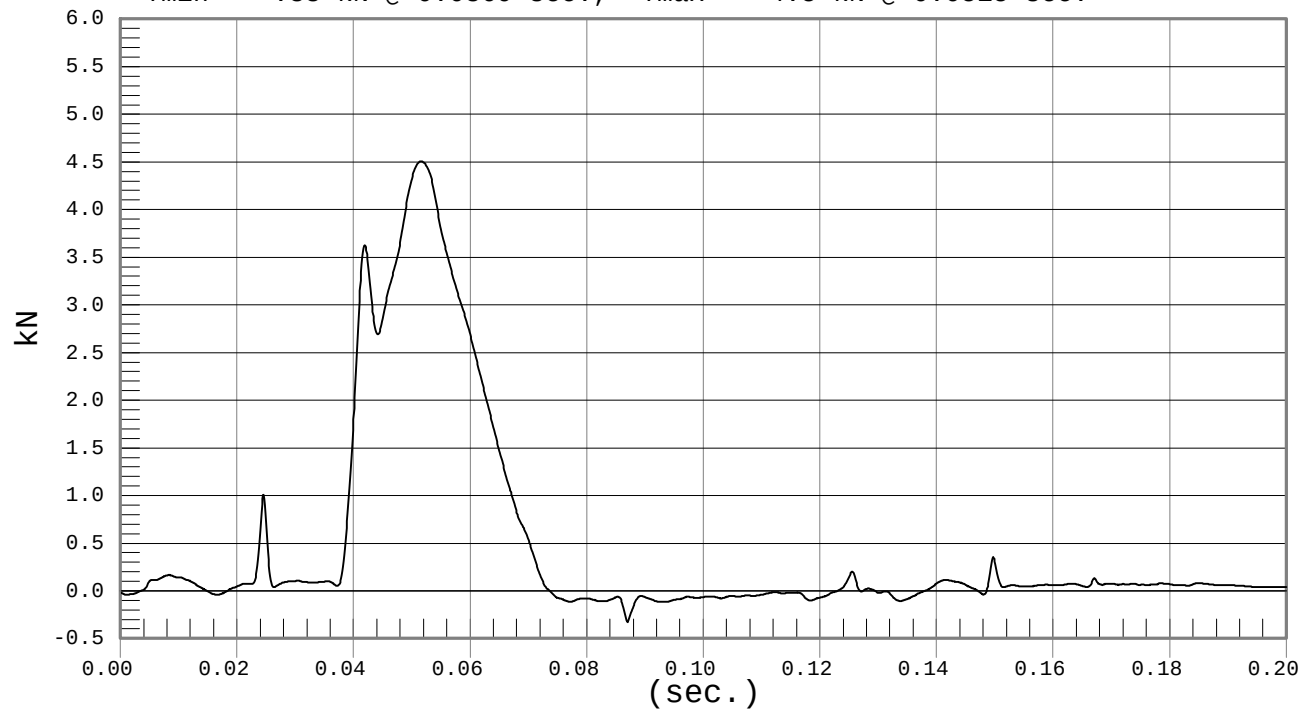


PROBE FORCE

Test Desc.: Thorax with Arm
Component: Dummy #033

Test Date: 07-13-05
Speed: 22.2 fps, 6.76 M/s

Ymin = -.33 kN @ 0.0869 sec., Ymax = 4.5 kN @ 0.0515 sec.



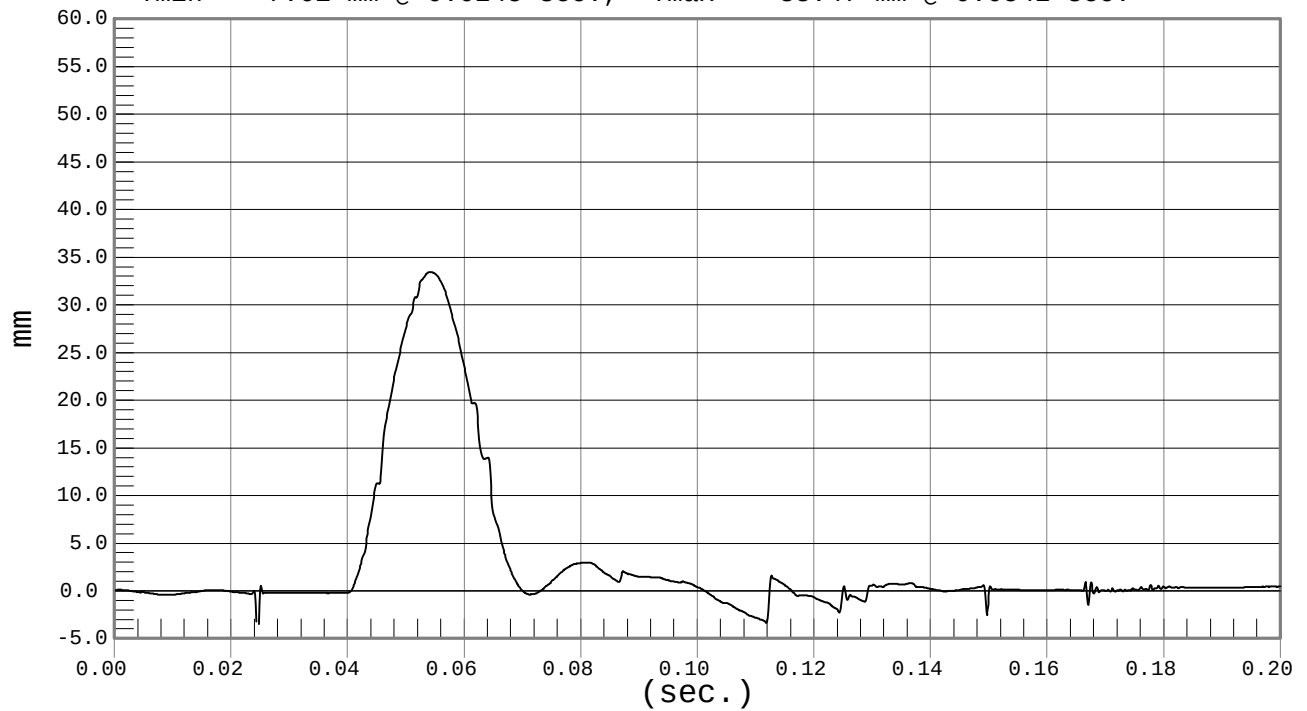


SHOULDER DISPLACEMENT

Test Desc.: Thorax with Arm
Component: Dummy #033

Test Date: 07-13-05
Speed: 22.2 fps, 6.76 M/s

Ymin = -7.61 mm @ 0.0245 sec., Ymax = 33.47 mm @ 0.0542 sec.

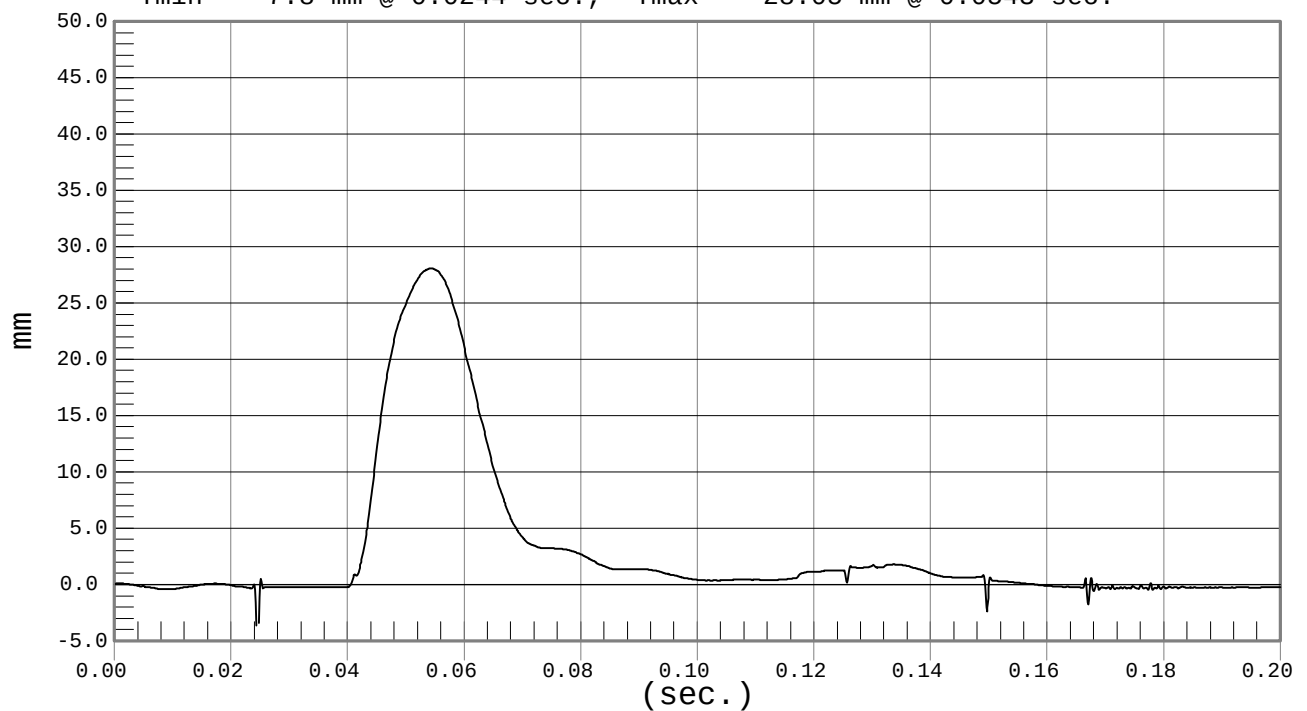


UPPER RIB DISPLACEMENT

Test Desc.: Thorax with Arm
Component: Dummy #033

Test Date: 07-13-05
Speed: 22.2 fps, 6.76 M/s

Ymin = -7.8 mm @ 0.0244 sec., Ymax = 28.05 mm @ 0.0543 sec.



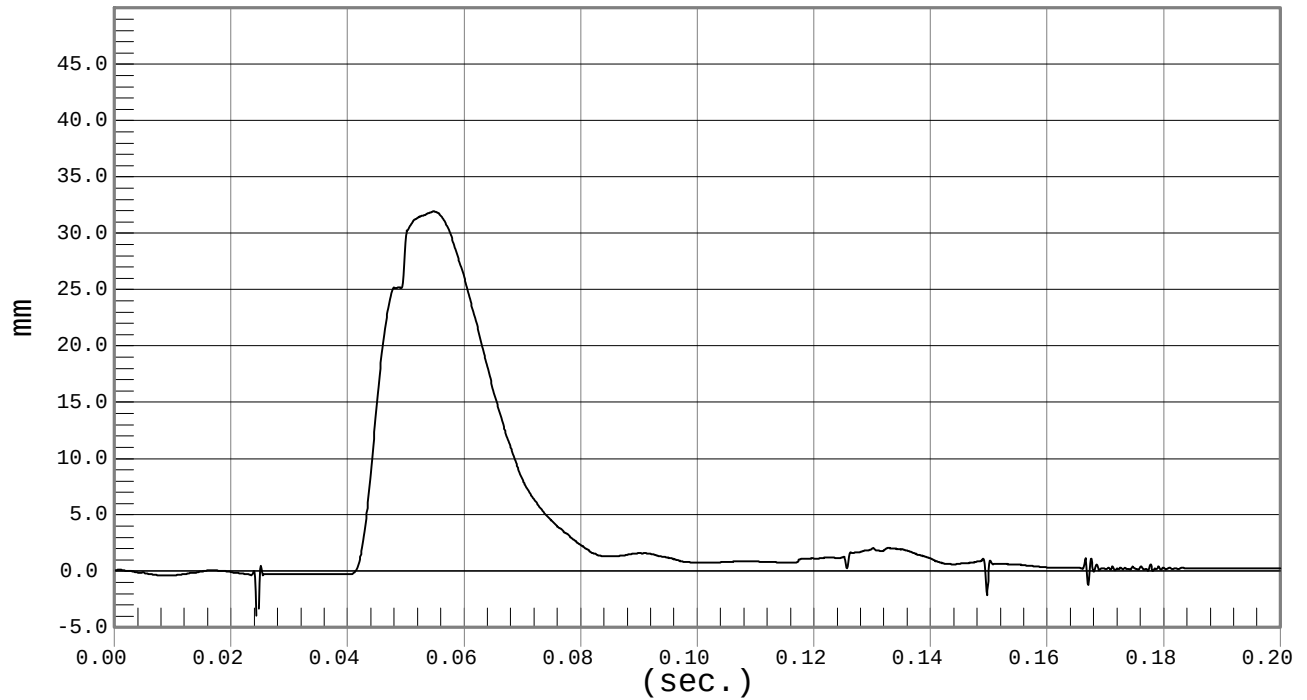


MIDDLE RIB DISPLACEMENT

Test Desc.: Thorax with Arm
Component: Dummy #033

Test Date: 07-13-05
Speed: 22.2 fps, 6.76 M/s

Ymin = -8.06 mm @ 0.0244 sec., Ymax = 31.93 mm @ 0.0547 sec.

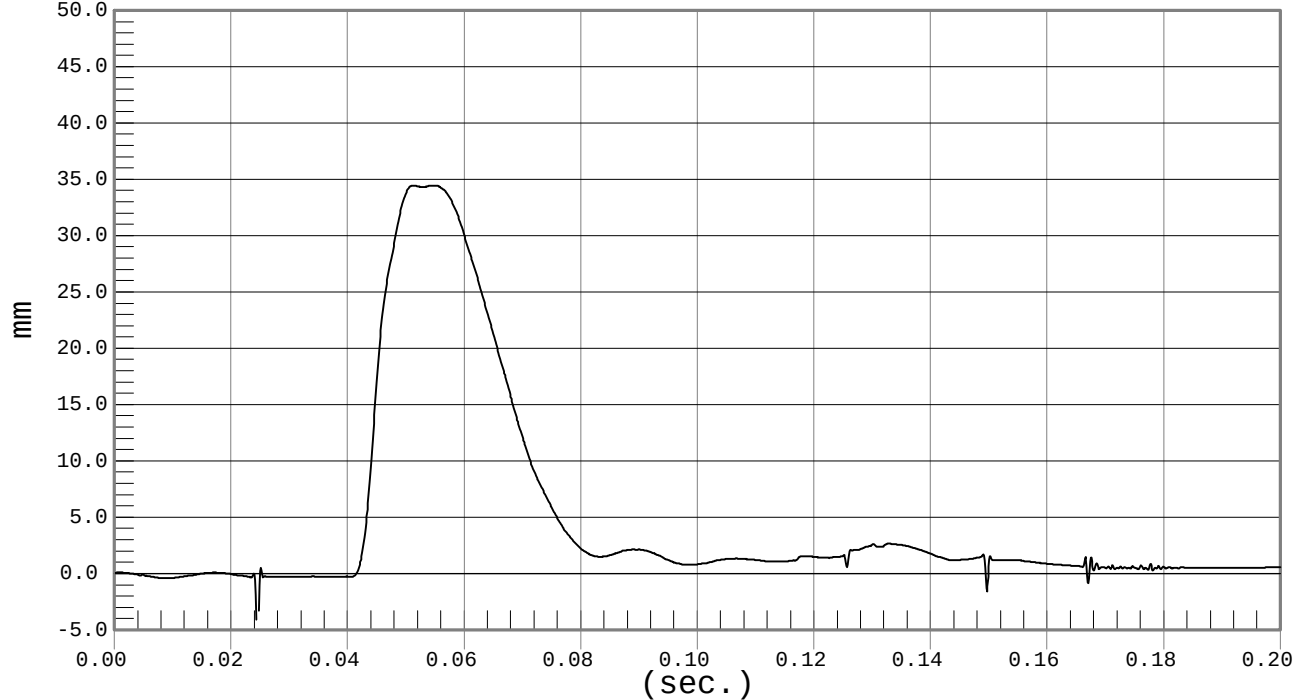


LOWER RIB DISPLACEMENT

Test Desc.: Thorax with Arm
Component: Dummy #033

Test Date: 07-13-05
Speed: 22.2 fps, 6.76 M/s

Ymin = -8.16 mm @ 0.0244 sec., Ymax = 34.43 mm @ 0.0514 sec.



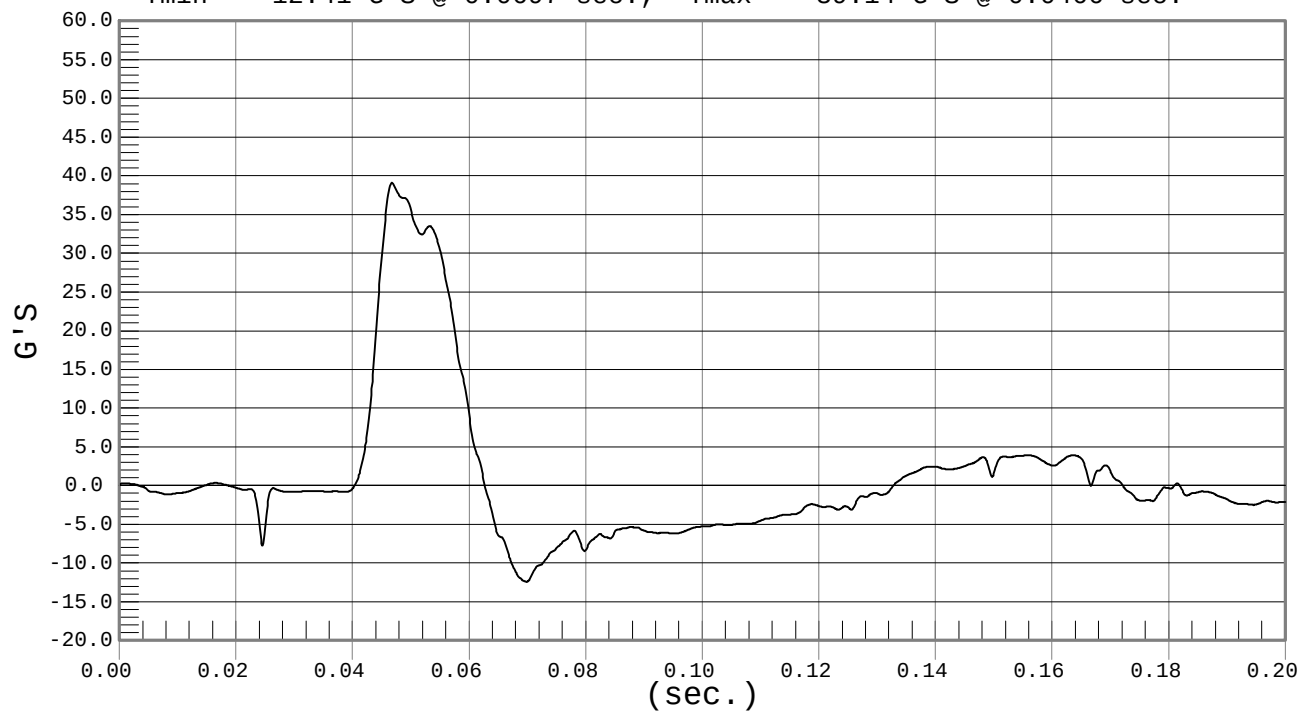


UPPER SPINE ACCELERATION

Test Desc.: Thorax with Arm
Component: Dummy #033

Test Date: 07-13-05
Speed: 22.2 fps, 6.76 M/s

Ymin = -12.41 G'S @ 0.0697 sec., Ymax = 39.14 G'S @ 0.0466 sec.

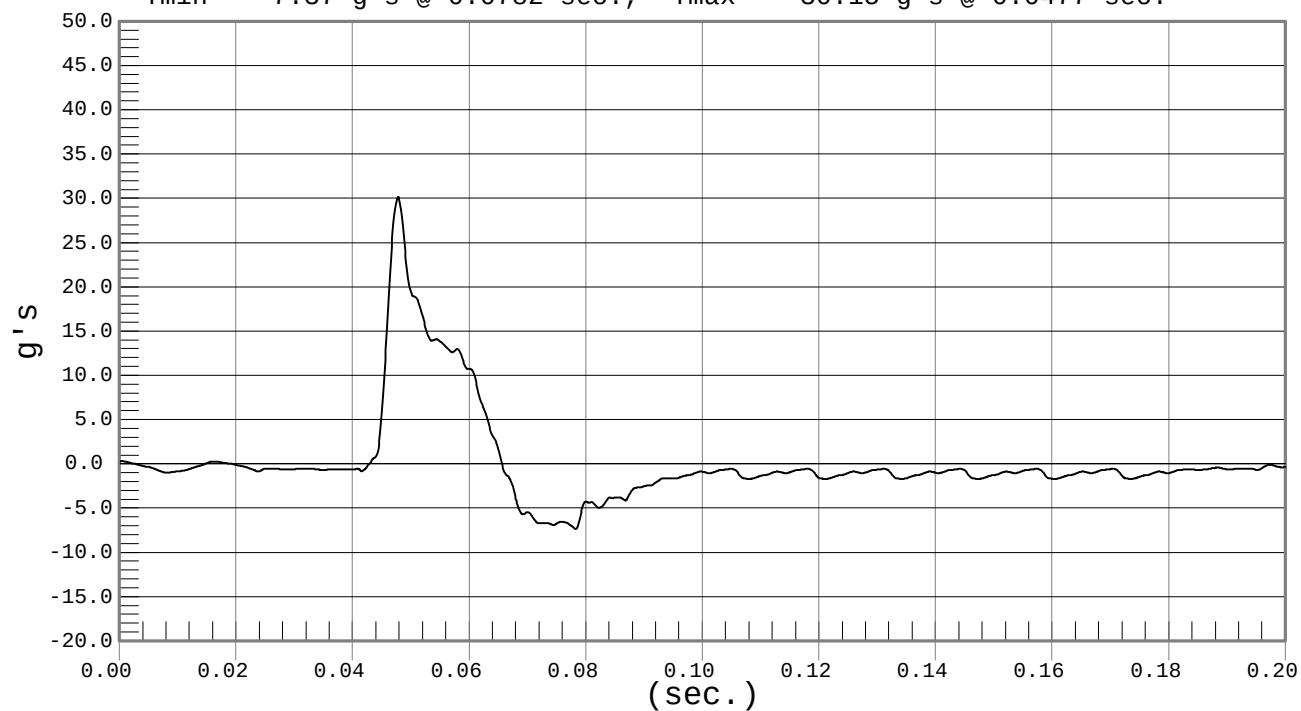


LOWER SPINE ACCELERATION

Test Desc.: Thorax with Arm
Component: Dummy #033

Test Date: 07-13-05
Speed: 22.2 fps, 6.76 M/s

Ymin = -7.37 g's @ 0.0782 sec., Ymax = 30.15 g's @ 0.0477 sec.



MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SIDIIISD DUMMY

Date: 7/13/05
Dummy Serial Number: 033
Test Number: D051945

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.3
Humidity	10% - 70%	45
Impact Velocity	4.20 - 4.40 m/s	4.34
Peak Probe Force	1.8 - 2.3 kN	2.1
Upper Rib Displacement	32 - 41 mm	37
Middle Rib Displacement	40 - 51 mm	41
Lower Rib Displacement	34 - 47 mm	39
Upper Spine (T1) Acceleration	13 - 18 g's	14
Lower Spine (T12) Acceleration	8 – 13 g's	8

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

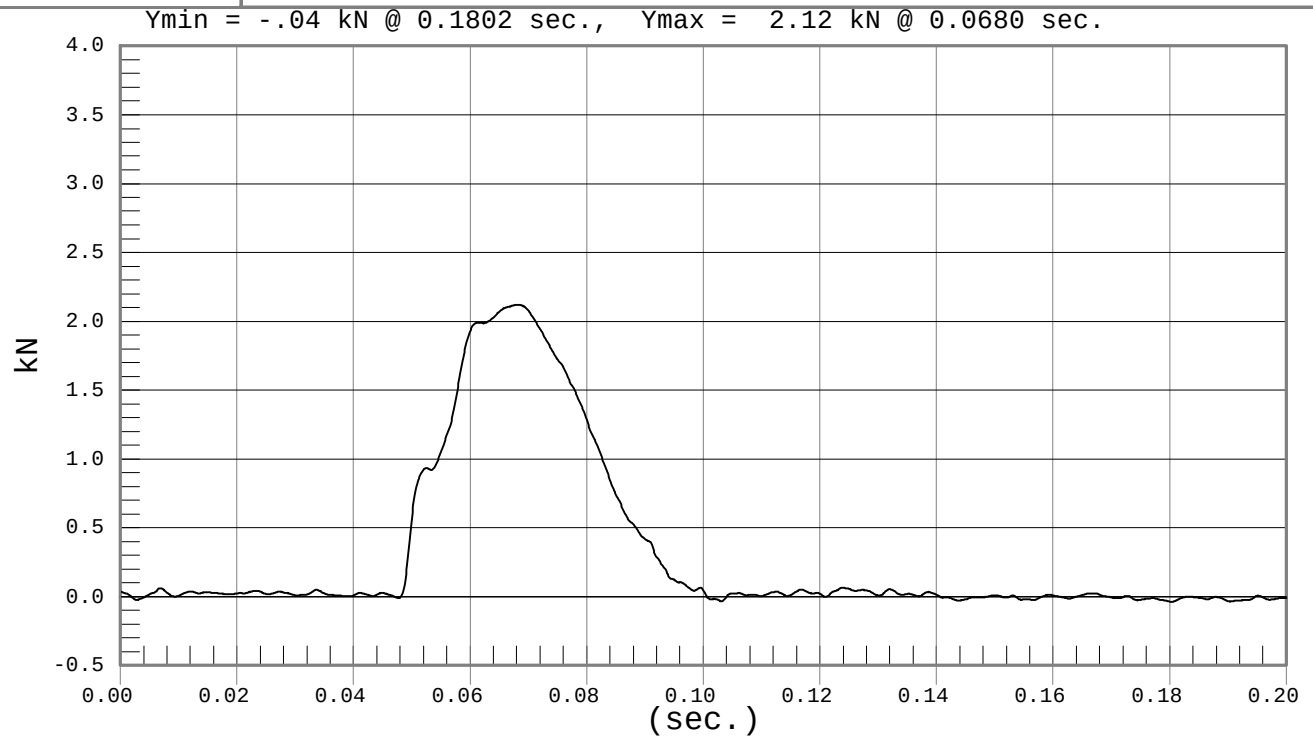
Approved By: David Winkelbauer



PROBE FORCE

Test Desc.: Thorax without Arm
Component: Dummy #033

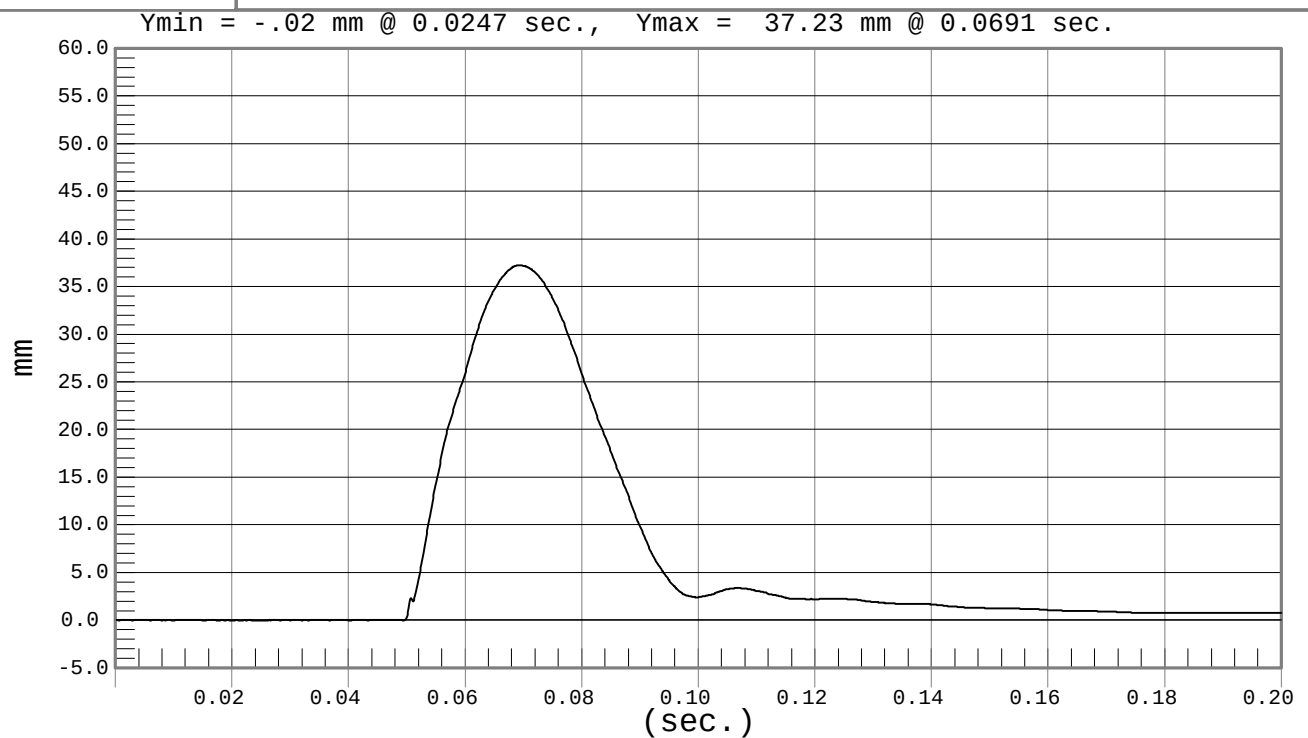
Test Date: 07-13-05
Speed: 14.2 fps, 4.34 M/s



UPPER RIB DISPLACEMENT

Test Desc.: Thorax without Arm
Component: Dummy #033

Test Date: 07-13-05
Speed: 14.2 fps, 4.34 M/s



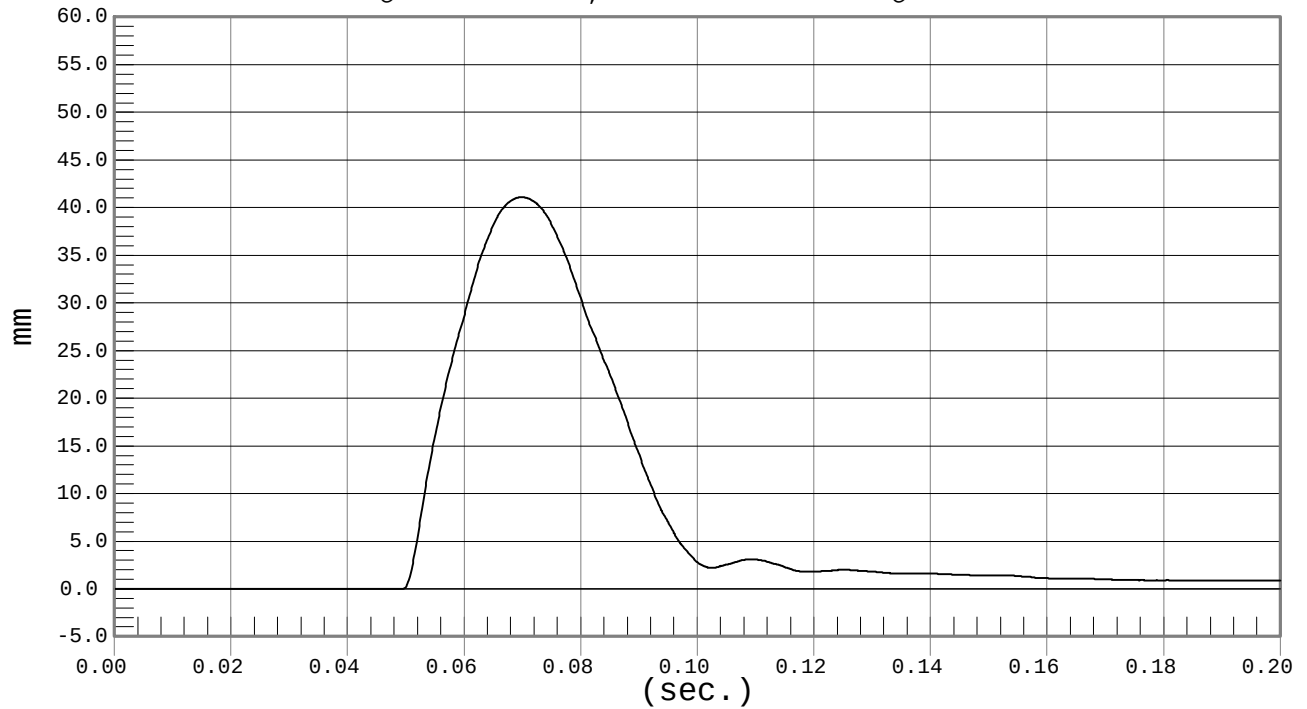


MIDDLE RIB DISPLACEMENT

Test Desc.: Thorax without Arm
Component: Dummy #033

Test Date: 07-13-05
Speed: 14.2 fps, 4.34 M/s

Ymin = -.01 mm @ 0.0088 sec., Ymax = 41.1 mm @ 0.0697 sec.

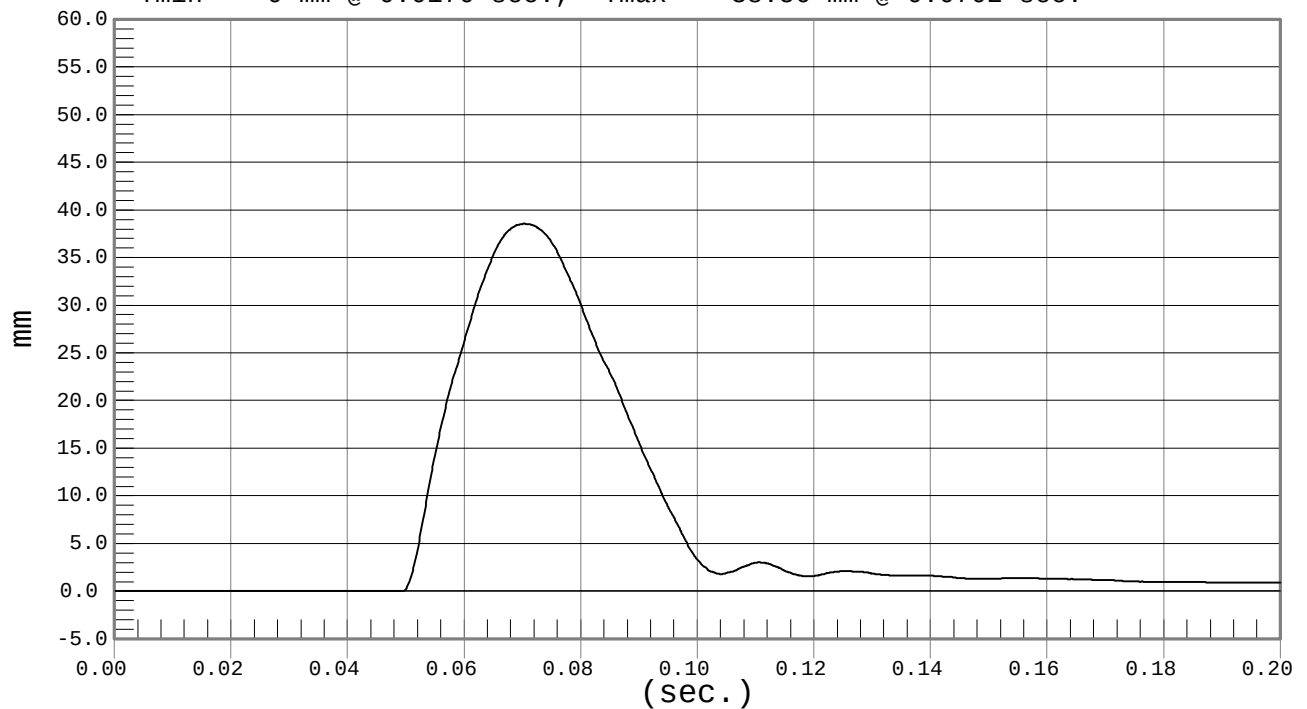


LOWER RIB DISPLACEMENT

Test Desc.: Thorax without Arm
Component: Dummy #033

Test Date: 07-13-05
Speed: 14.2 fps, 4.34 M/s

Ymin = 0 mm @ 0.0170 sec., Ymax = 38.56 mm @ 0.0702 sec.

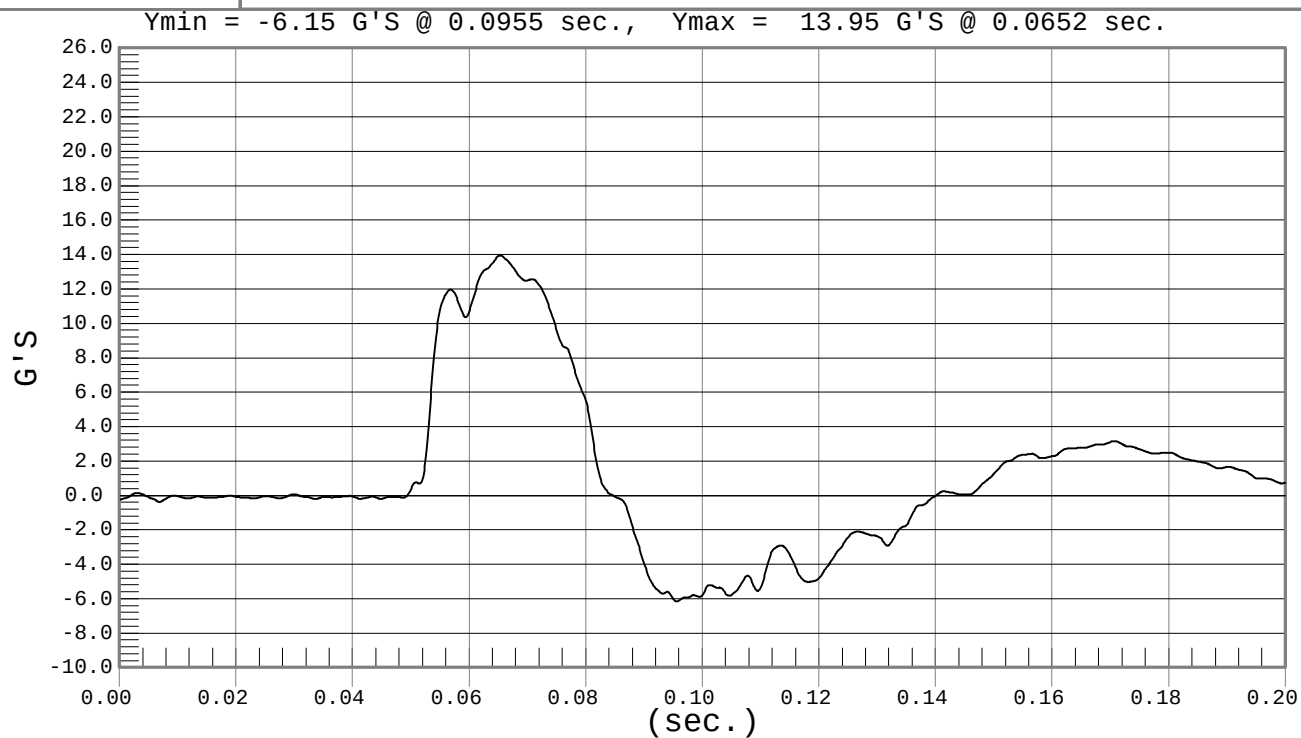




UPPER SPINE ACCELERATION

Test Desc.: Thorax without Arm
Component: Dummy #033

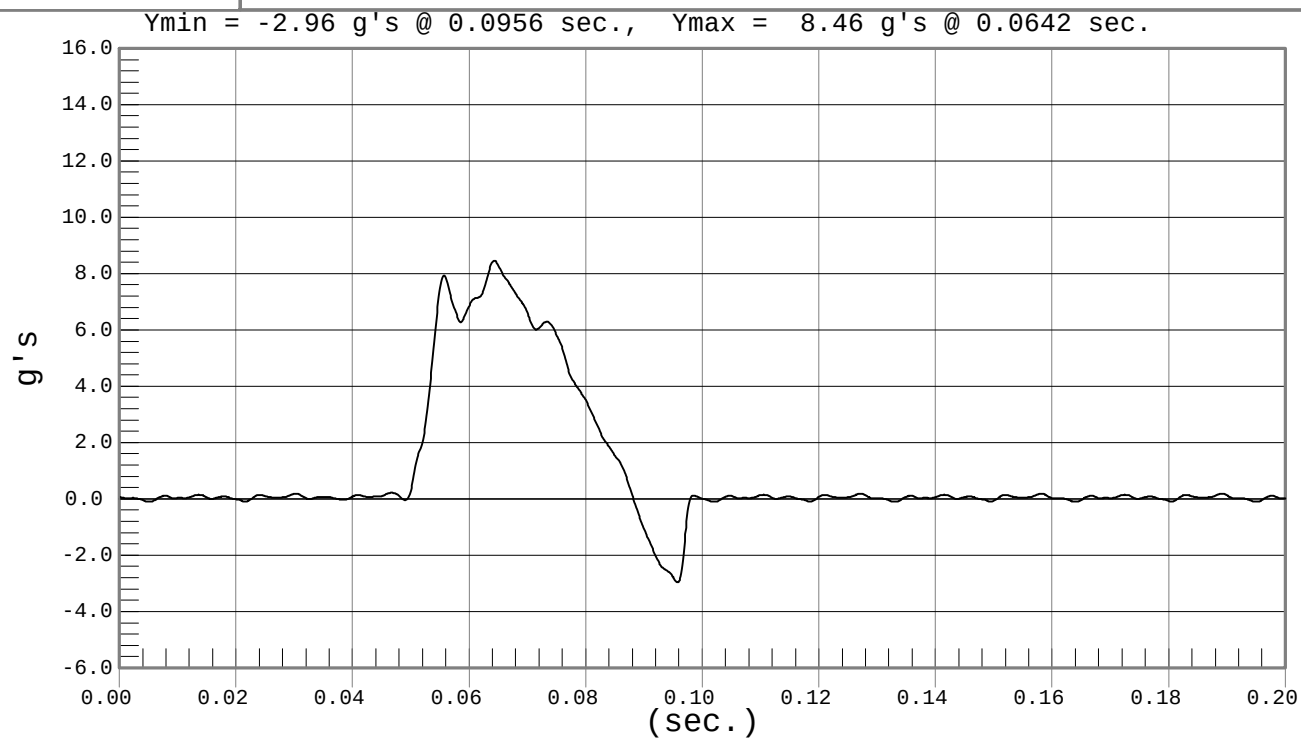
Test Date: 07-13-05
Speed: 14.2 fps, 4.34 M/s



LOWER SPINE ACCELERATION

Test Desc.: Thorax without Arm
Component: Dummy #033

Test Date: 07-13-05
Speed: 14.2 fps, 4.34 M/s



MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SIDIIISD DUMMY

Date: 7/13/05
Dummy Serial Number: 033
Test Number: D051946

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.5
Humidity	10% - 70%	46
Impact Velocity	4.41 - 4.59 m/s	4.49
Probe Force	1.3 - 1.9 kN	1.9
Upper Rib Displacement	44 - 55 mm	43*
Lower Rib Displacement	44 - 56 mm	44
Upper Spine (T1) Y Acceleration	5 - 9 g's	7
Lower Spine (T12) Y Acceleration	9 - 13 g's	12

*TEST DOES NOT MEET SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

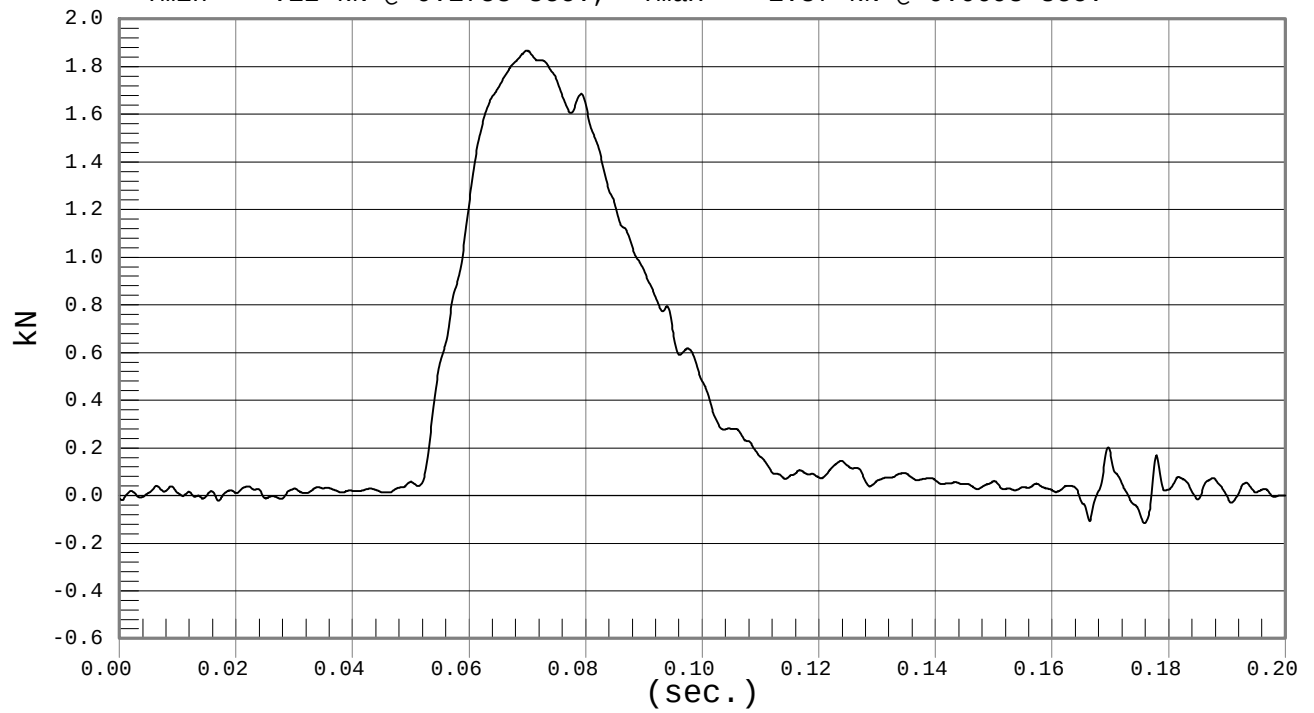


PROBE FORCE

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 14.7 fps, 4.49 M/s

Ymin = -.12 kN @ 0.1758 sec., Ymax = 1.87 kN @ 0.0698 sec.



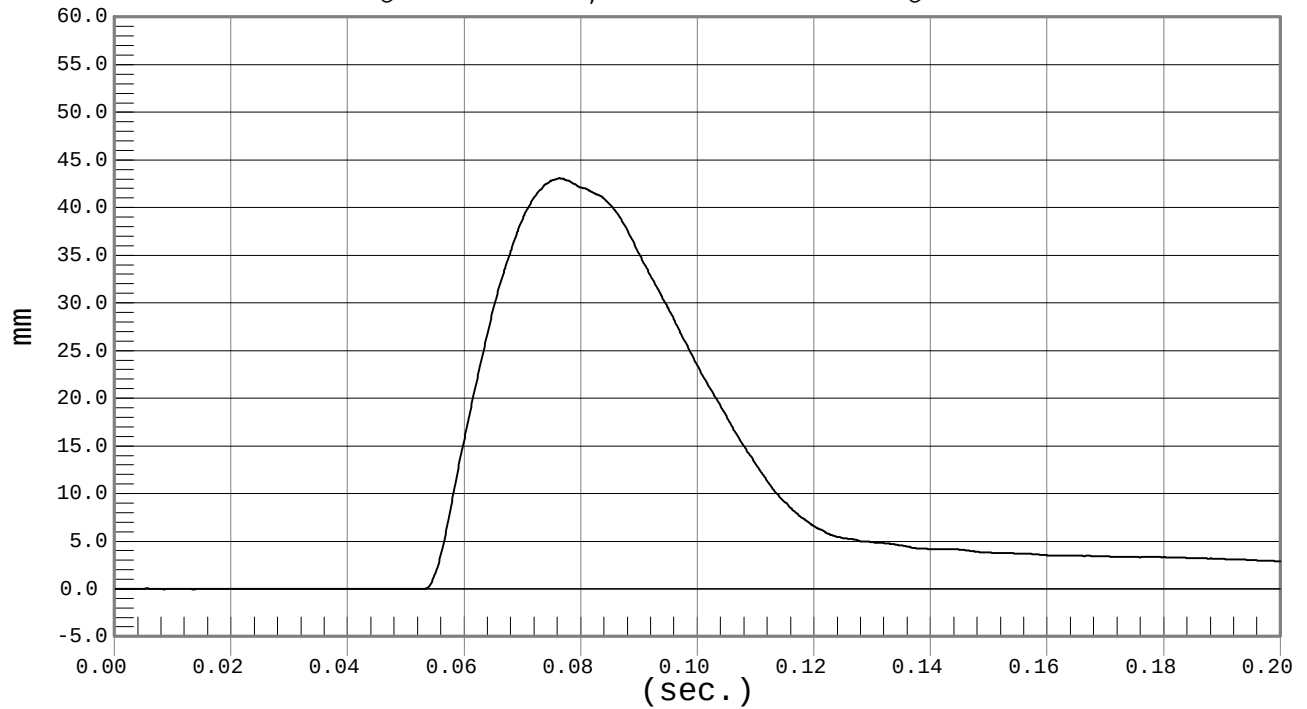


UPPER RIB DISPLACEMENT

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 14.7 fps, 4.49 M/s

Ymin = -.07 mm @ 0.0135 sec., Ymax = 43.07 mm @ 0.0762 sec.

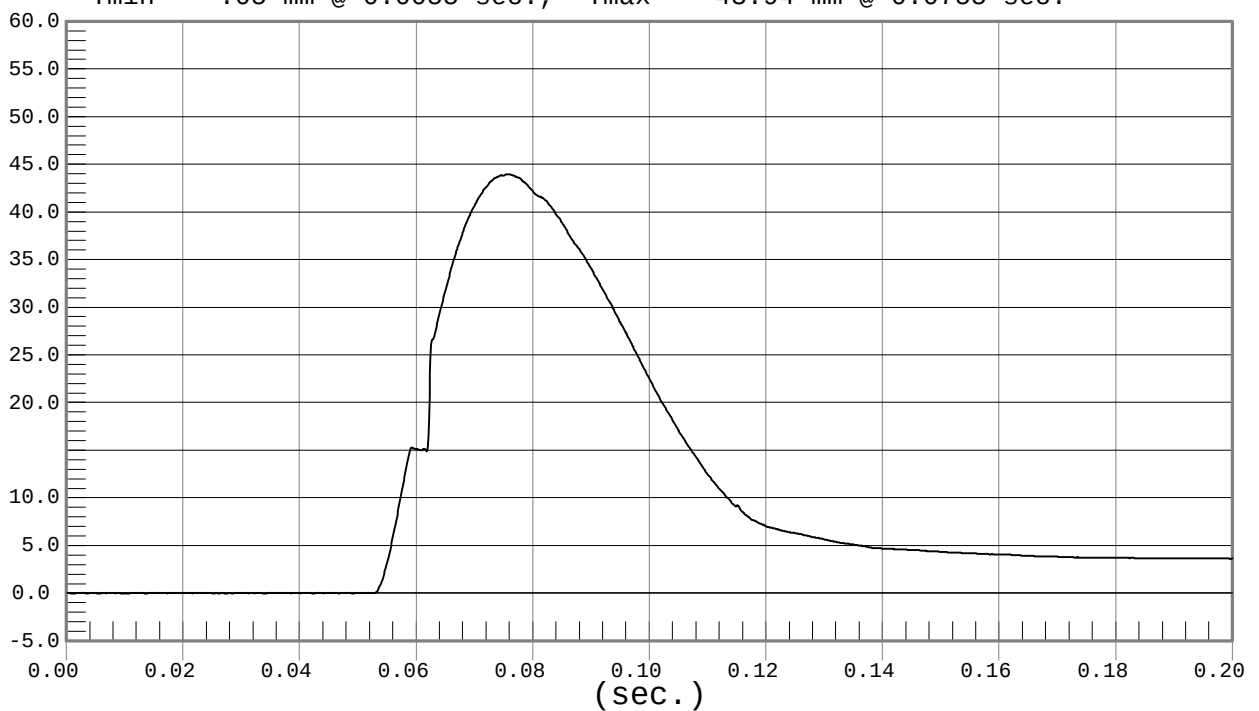


LOWER RIB DISPLACEMENT

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 14.7 fps, 4.49 M/s

Ymin = -.05 mm @ 0.0055 sec., Ymax = 43.94 mm @ 0.0755 sec.



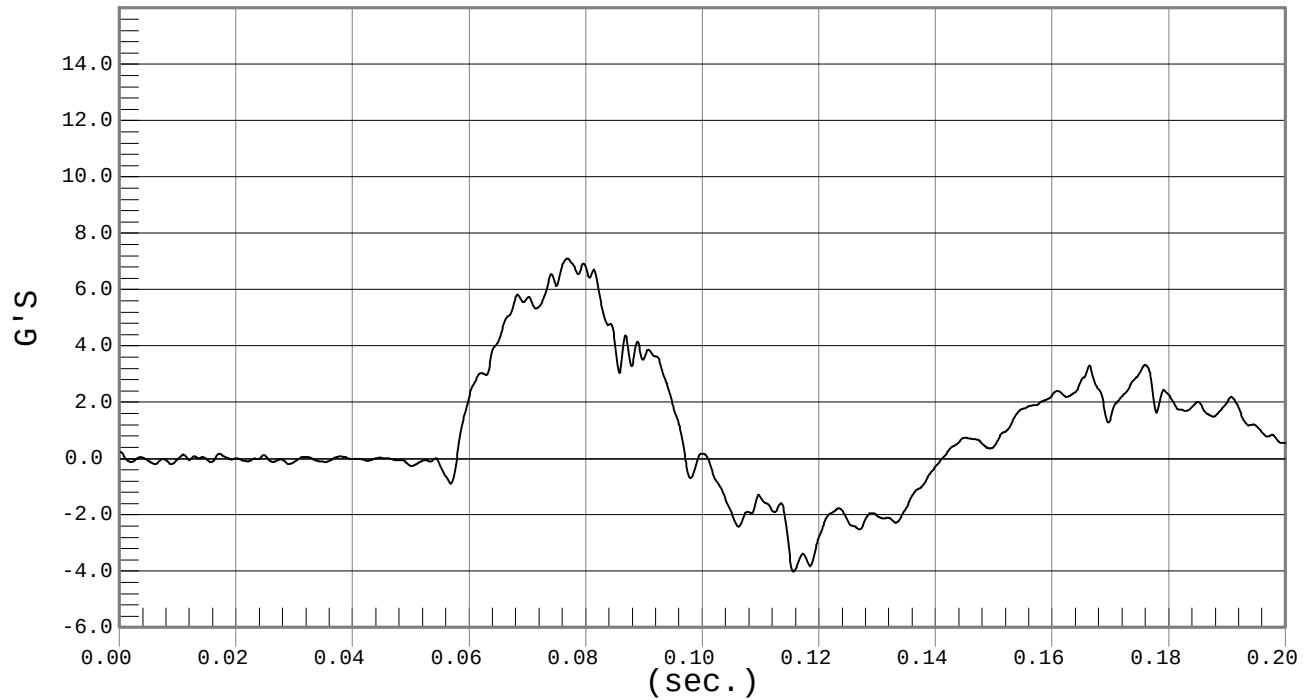


UPPER SPINE ACCELERATION

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 14.7 fps, 4.49 M/s

Ymin = -4.01 G'S @ 0.1155 sec., Ymax = 7.11 G'S @ 0.0767 sec.

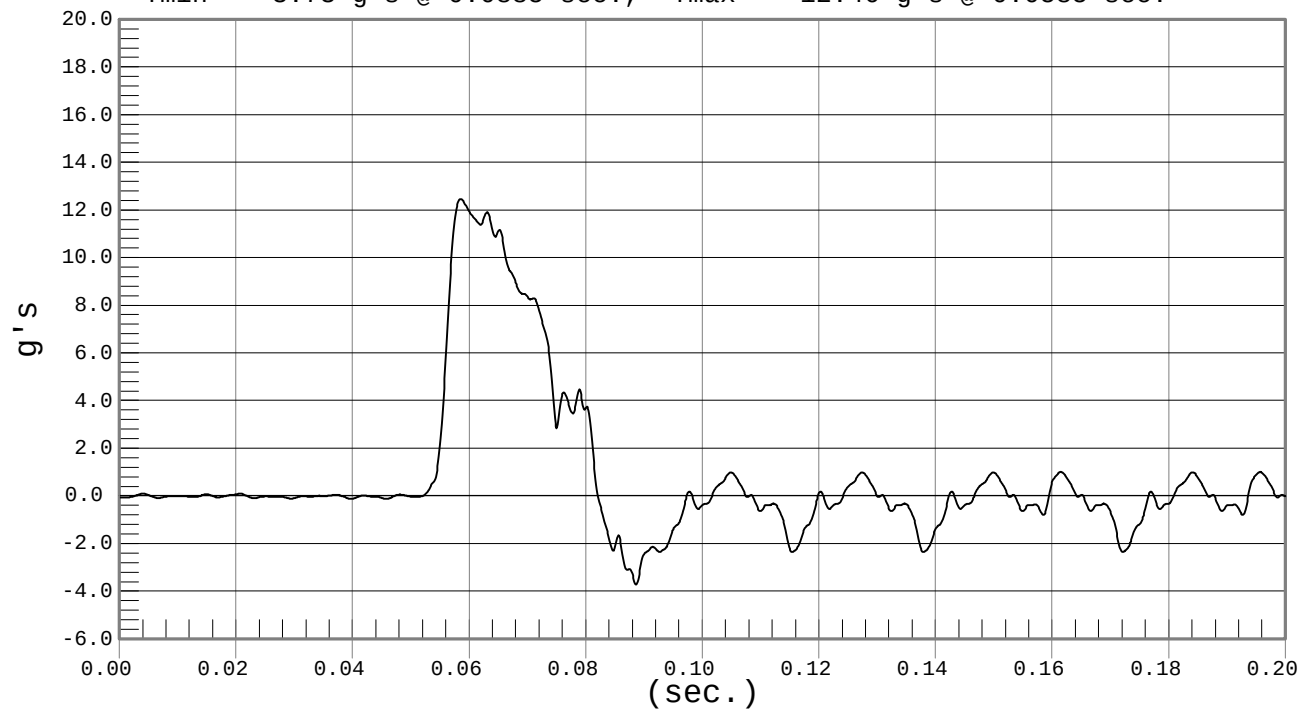


LOWER SPINE ACCELERATION

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 14.7 fps, 4.49 M/s

Ymin = -3.73 g's @ 0.0885 sec., Ymax = 12.46 g's @ 0.0585 sec.



MGA RESEARCH CORPORATION
PELVIS IMPACT TEST
SIDIIsD DUMMY

Date: 7/13/05
Dummy Serial Number: 033
Test Number: D051947

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.1
Humidity	10% - 70%	45
Impact Velocity	6.60 - 6.80 m/s	6.64
Peak Impactor Acceleration	40 – 48 g's	41
Pelvis Y Acceleration	40 – 48 g's	47
Peak Pelvis Acetabulum Force	3803 – 4505 N	4007

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

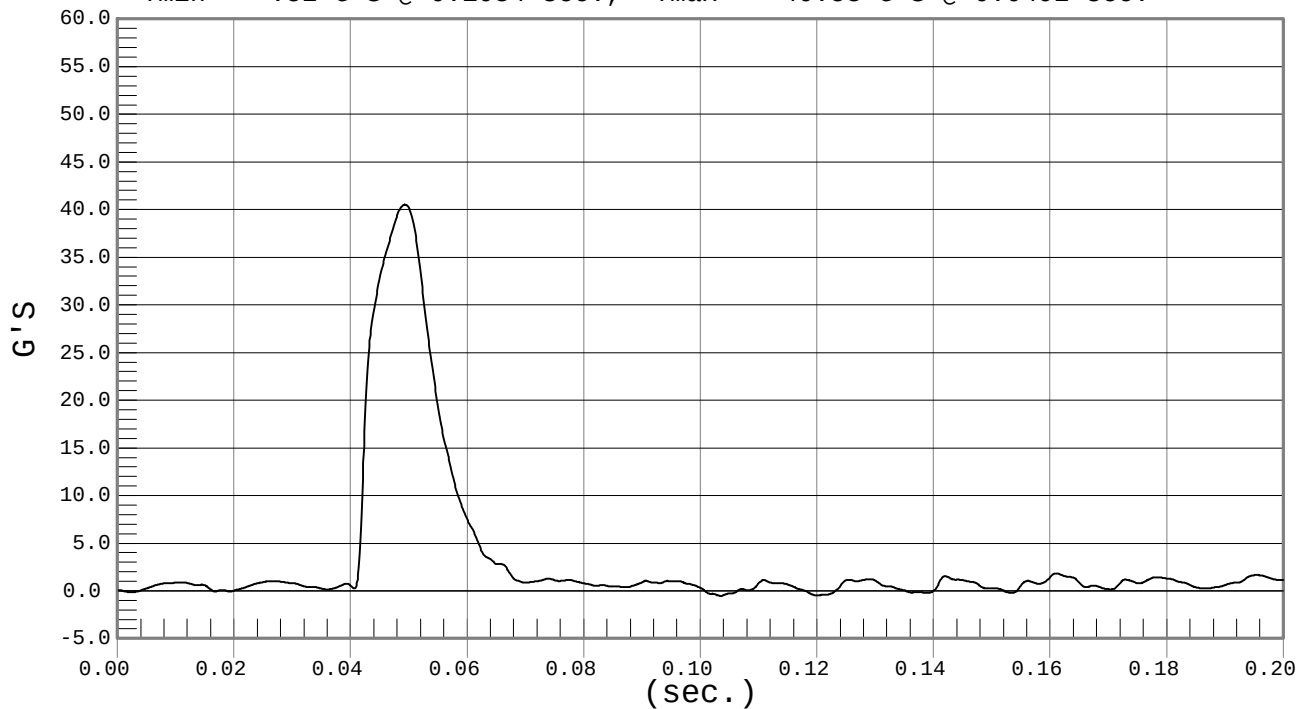


IMPACTOR ACCELERATION

Test Desc.: Pelvis Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 21.8 fps, 6.64 M/s

Ymin = -.52 G'S @ 0.1034 sec., Ymax = 40.53 G'S @ 0.0492 sec.

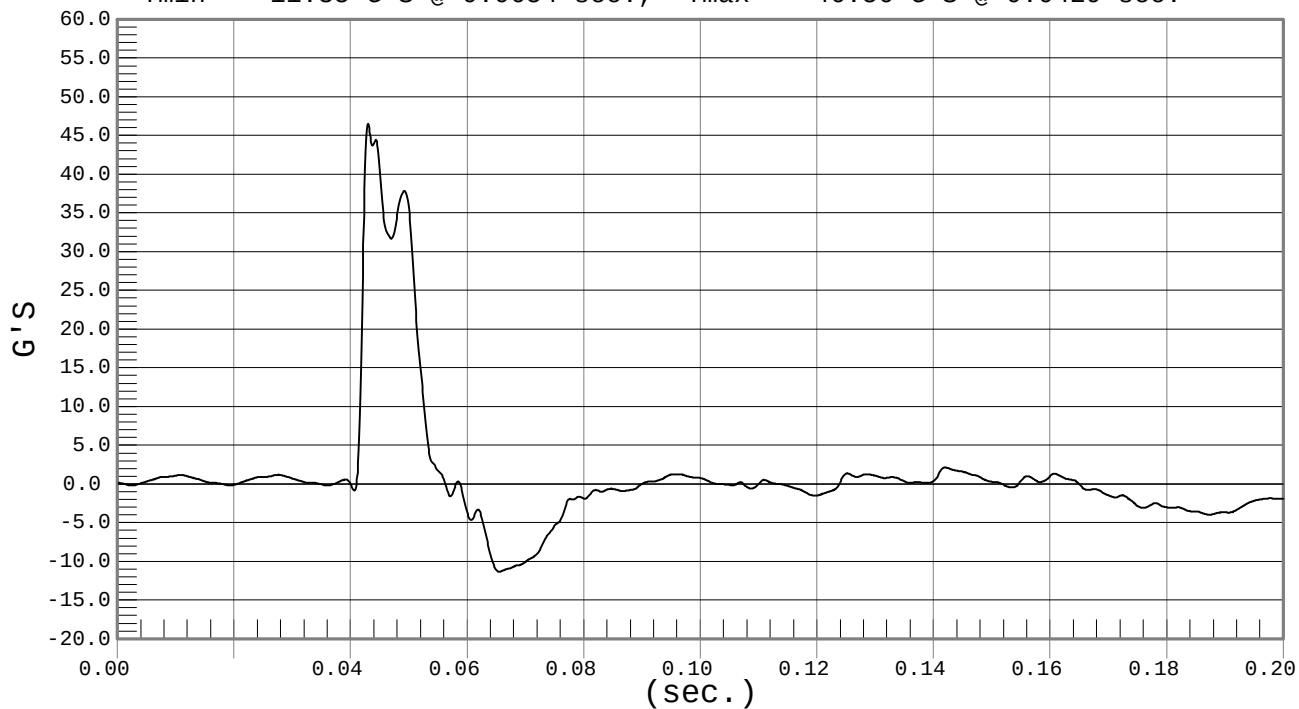


PELVIS ACCELERATION

Test Desc.: Pelvis Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 21.8 fps, 6.64 M/s

Ymin = -11.35 G'S @ 0.0654 sec., Ymax = 46.56 G'S @ 0.0429 sec.



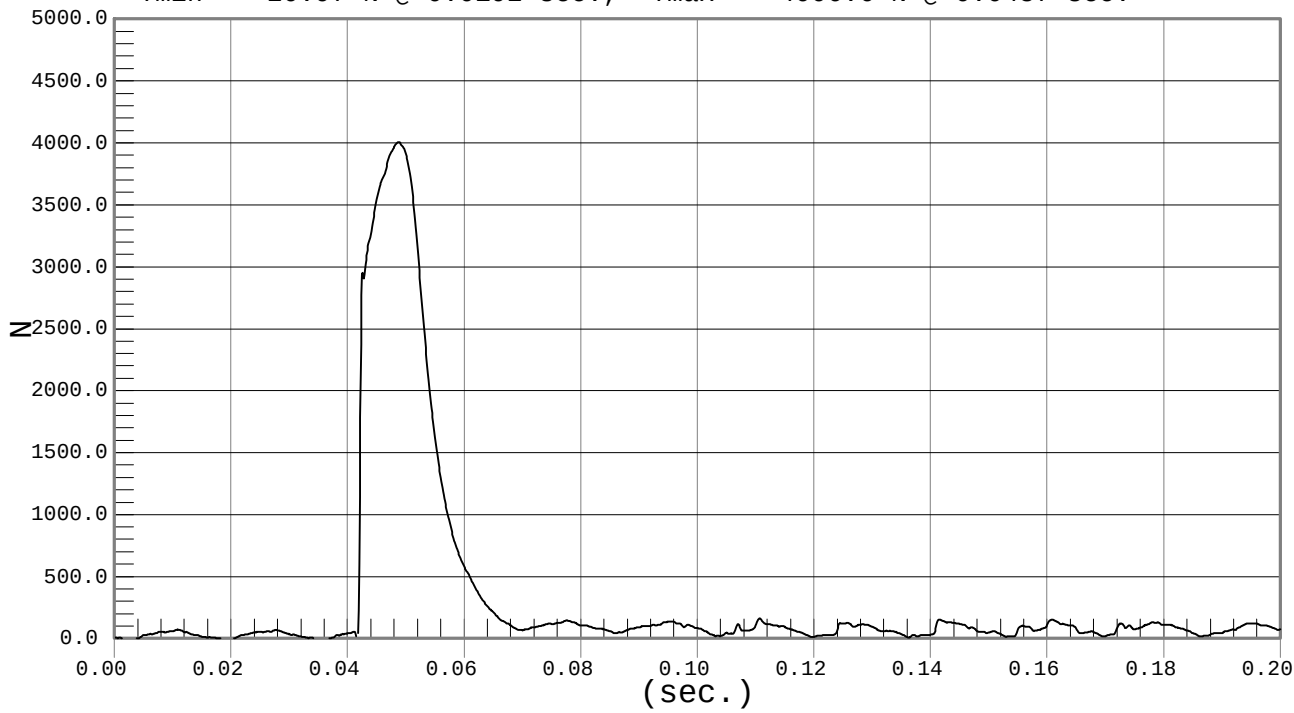


ACETABULUM FORCE

Test Desc.: Pelvis Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 21.8 fps, 6.64 M/s

Ymin = -20.97 N @ 0.0192 sec., Ymax = 4006.6 N @ 0.0487 sec.



MGA RESEARCH CORPORATION
ILIAC IMPACT TEST
SIDIIISD DUMMY

Date: 7/13/05
Dummy Serial Number: 033
Test Number: D051948

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.1
Humidity	10% - 70%	44
Impact Velocity	4.20 – 4.40 m/s	4.21
Peak Impactor Acceleration	41 – 47 g's	43
Pelvis Y Acceleration	32 – 40 g's	39
Peak Pelvis Iliac Force	4841 – 5491 N	5179

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

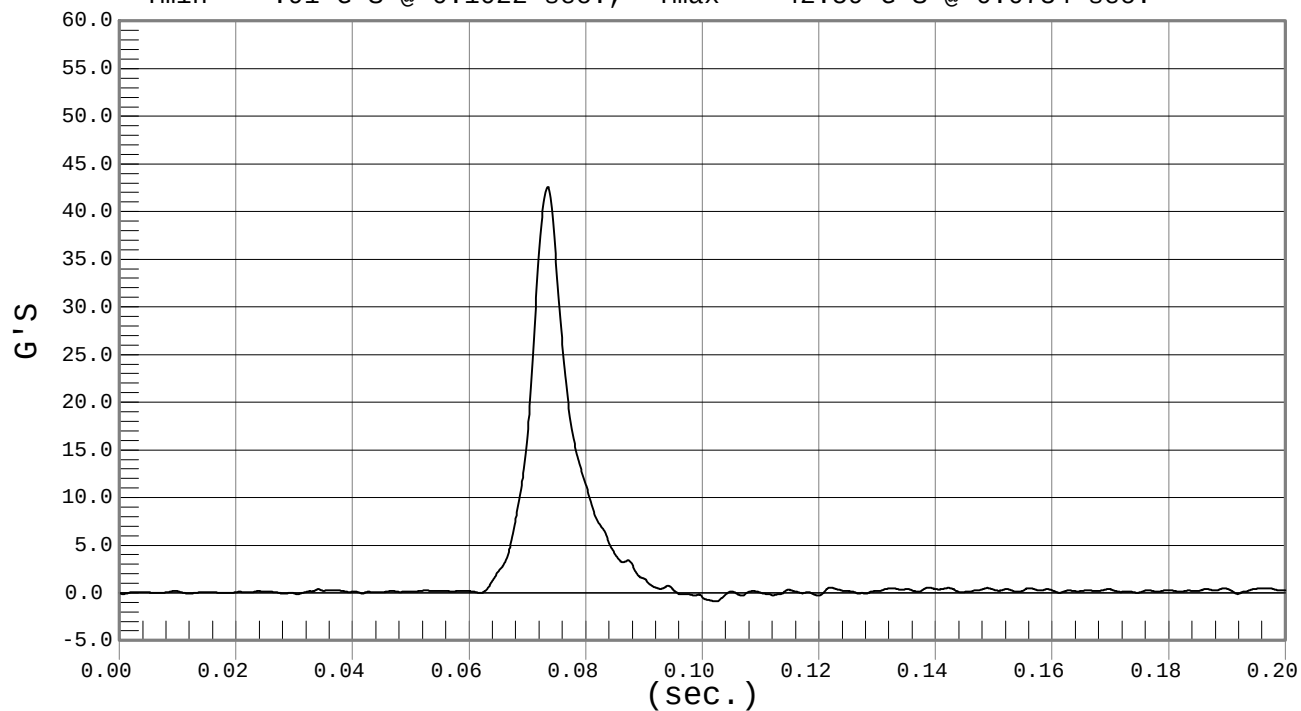


IMPACTOR ACCELERATION

Test Desc.: Iliac Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 13.8 fps, 4.21 M/s

Ymin = -.91 G'S @ 0.1022 sec., Ymax = 42.59 G'S @ 0.0734 sec.

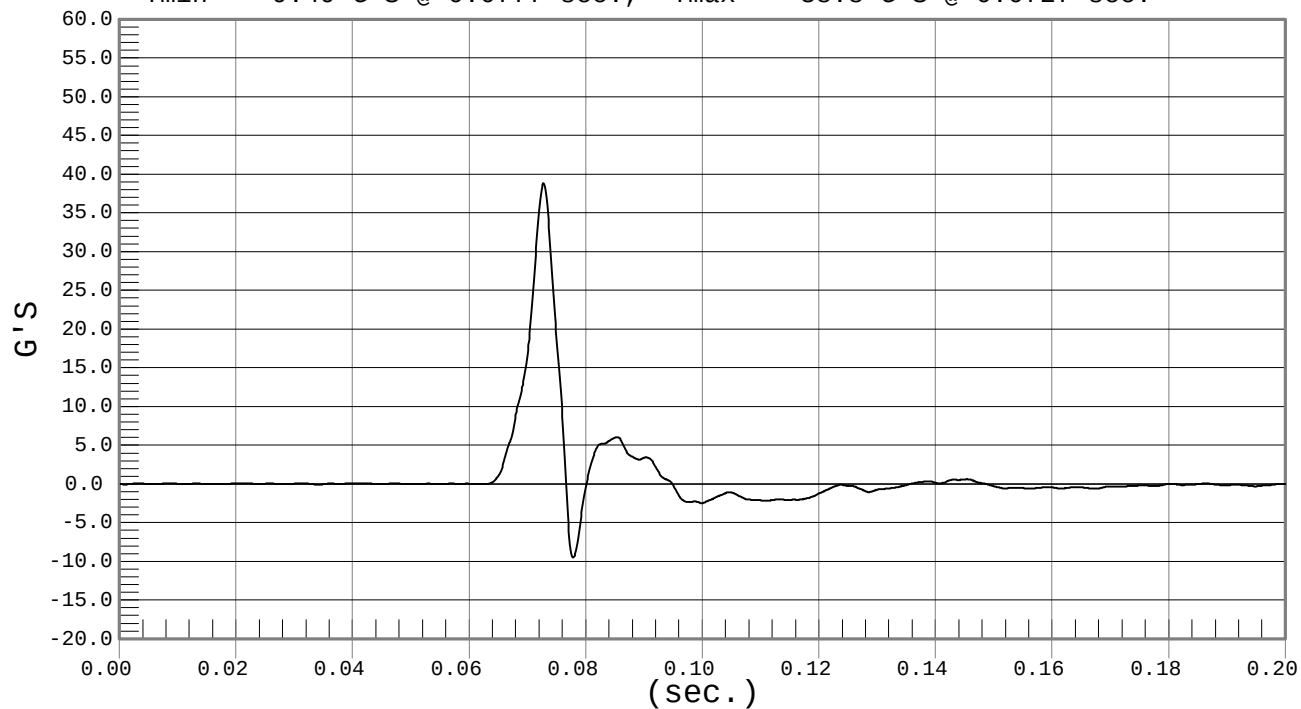


PELVIS ACCELERATION

Test Desc.: Iliac Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 13.8 fps, 4.21 M/s

Ymin = -9.49 G'S @ 0.0777 sec., Ymax = 38.8 G'S @ 0.0727 sec.



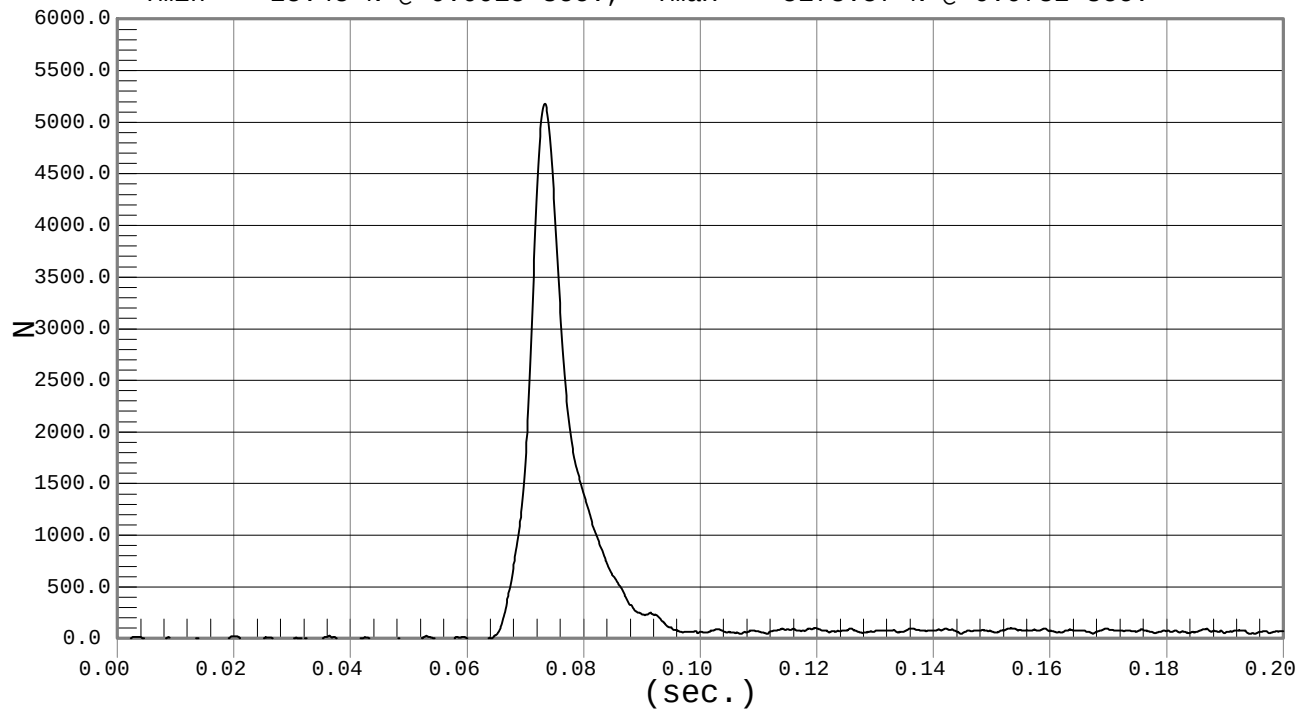


ILIAC FORCE

Test Desc.: Iliac Impact
Component: Dummy #033

Test Date: 07-13-05
Speed: 13.8 fps, 4.21 M/s

Ymin = -25.45 N @ 0.0015 sec., Ymax = 5178.57 N @ 0.0732 sec.



CERTIFICATION DATA

Dummy Serial Number: 033

POST-TEST CALIBRATION

MGA RESEARCH CORPORATION
HEAD DROP TEST
SIDIISD DUMMY

Date: 7/18/05
Dummy Serial Number: 033
Test Number: D051961

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.9
Humidity	10% - 70%	47
Resultant Acceleration	125 - 145 g's	127
Peak Longitudinal Acceleration	(-15) – (+ 15) g's	-9
Unimodal	<10%	YES

TEST MEETS SPECIFICATIONS

Technician: _____

Jessica Hall

Approved By: _____

David Winkelbauer

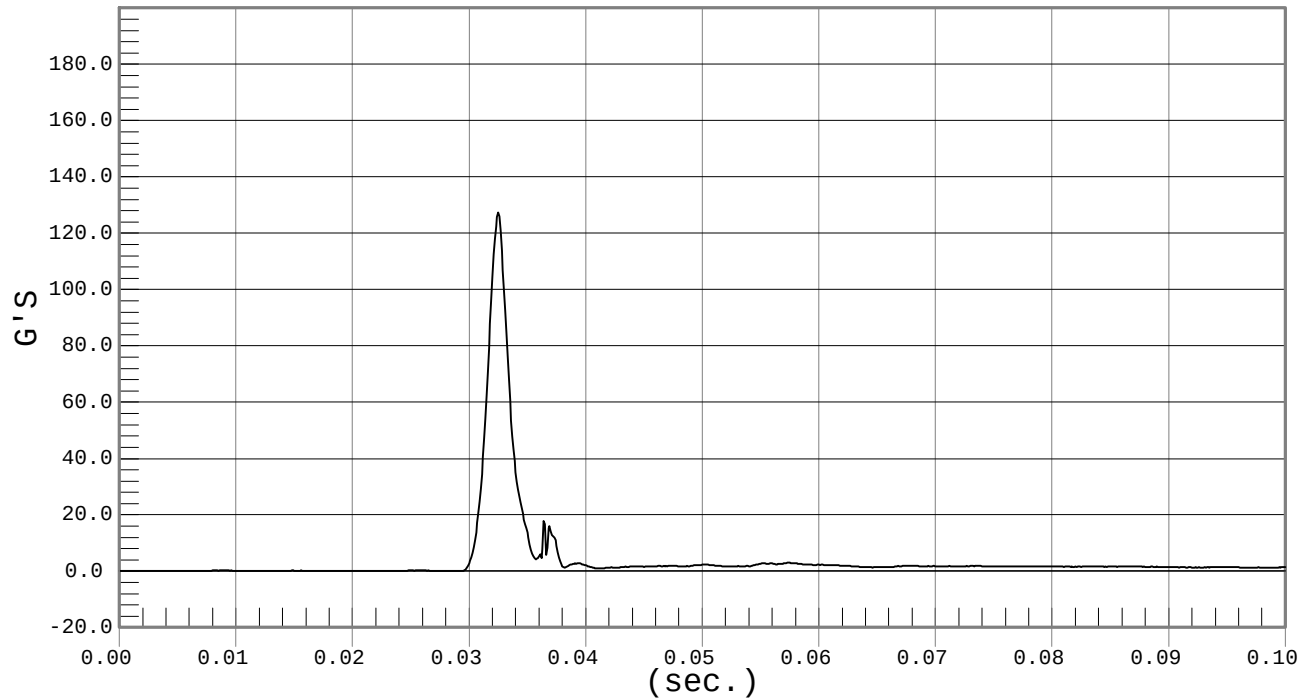


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #033

Test Date: 07-18-05
Speed: 0.0 fps, 0.00 M/s

Ymin = .06 G'S @ 0.0013 sec., Ymax = 127.29 G'S @ 0.0324 sec.

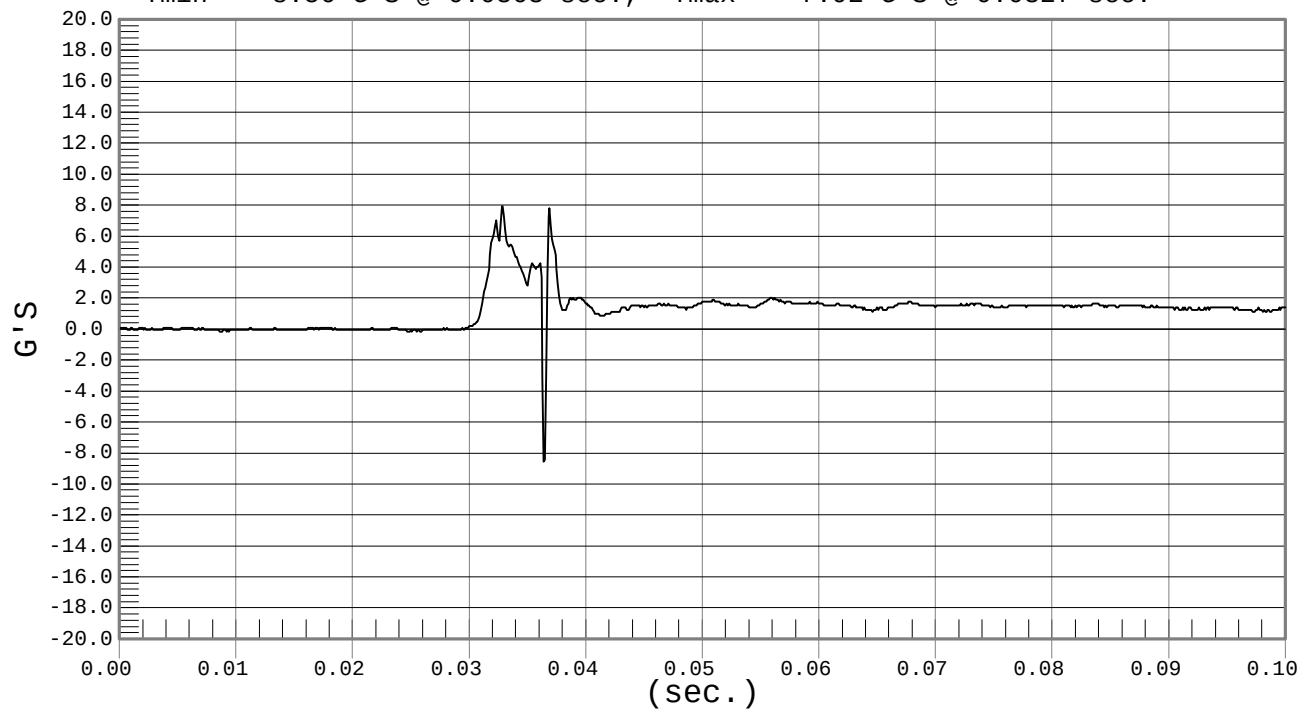


PEAK LONGITUDINAL ACCELARATION

Test Desc.: Head Drop
Component: Dummy #033

Test Date: 07-18-05
Speed: 0.0 fps, 0.00 M/s

Ymin = -8.56 G'S @ 0.0363 sec., Ymax = 7.92 G'S @ 0.0327 sec.



MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SIDIIISD DUMMY

Date: 7/18/05
Dummy Serial Number: 033
Test Number: D051962

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		20.6° – 22.2°	21.8
Humidity		10% - 70%	46
Impact Velocity (m/s)		5.51-5.63	5.52
Delta Velocity (m/s)	10 ms	2.20-2.80	2.39
	15 ms	3.40-4.10	3.48
	20 ms	4.50-5.40	4.61
	25 ms	5.50-6.10	5.58
	25-100 ms	5.20-6.20	5.86
Maximum D-Plane Rotation (deg)		74 - 79	75
Time of Maximum D-Plane Rotation		50-70	62
Maximum Occipital Condyle Moment during Rotation Interval (Nm)		(-45) – (-40)	-41
Time of Moment Decay to 0 Nm		113-123	113

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

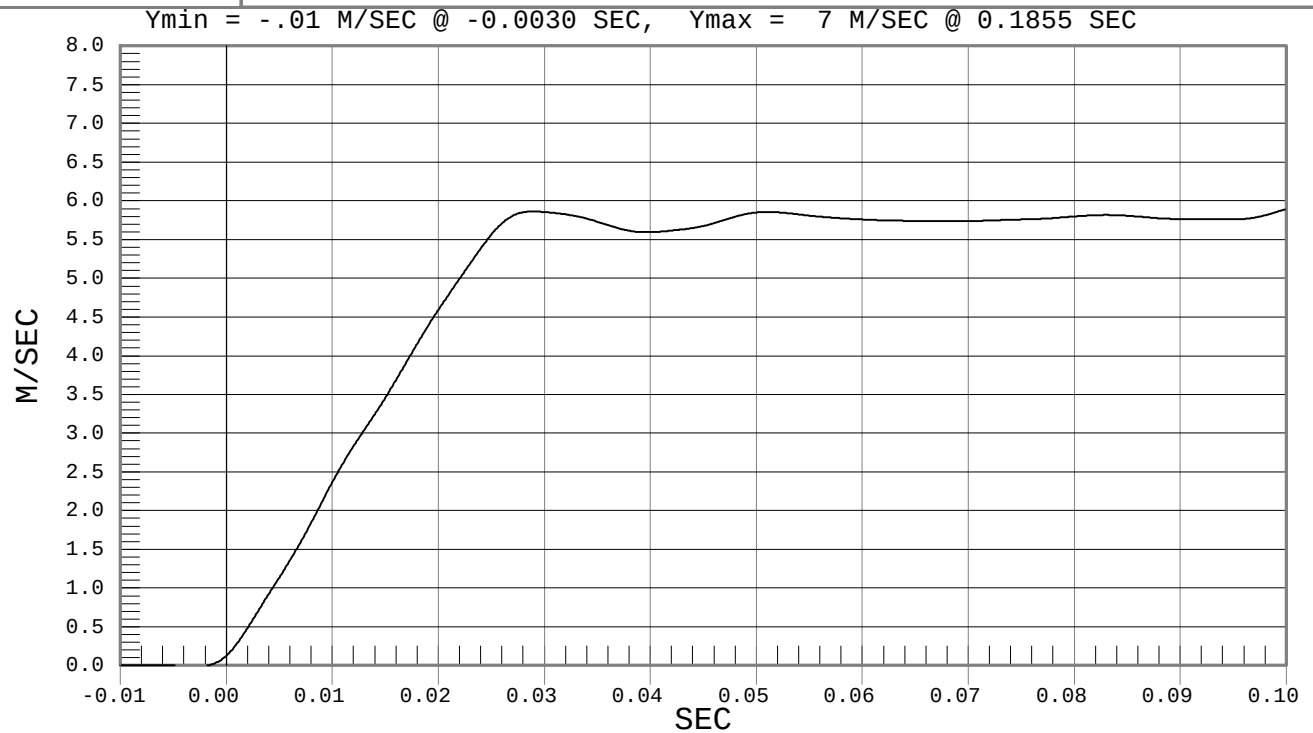
Approved By: David Winkelbauer



PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #033

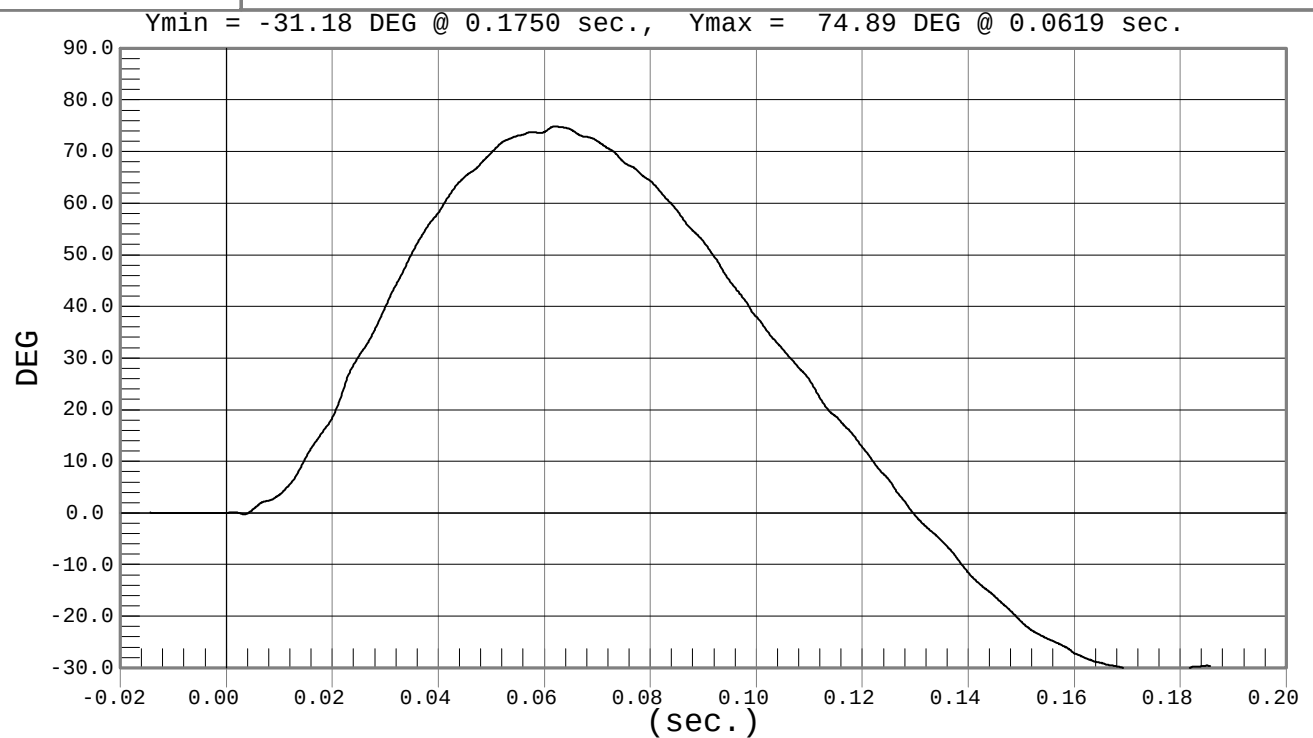
Test Date: 07-18-05
Speed: 18.1 fps, 5.52 M/s



FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #033

Test Date: 07-18-05
Speed: 18.1 fps, 5.52 M/s



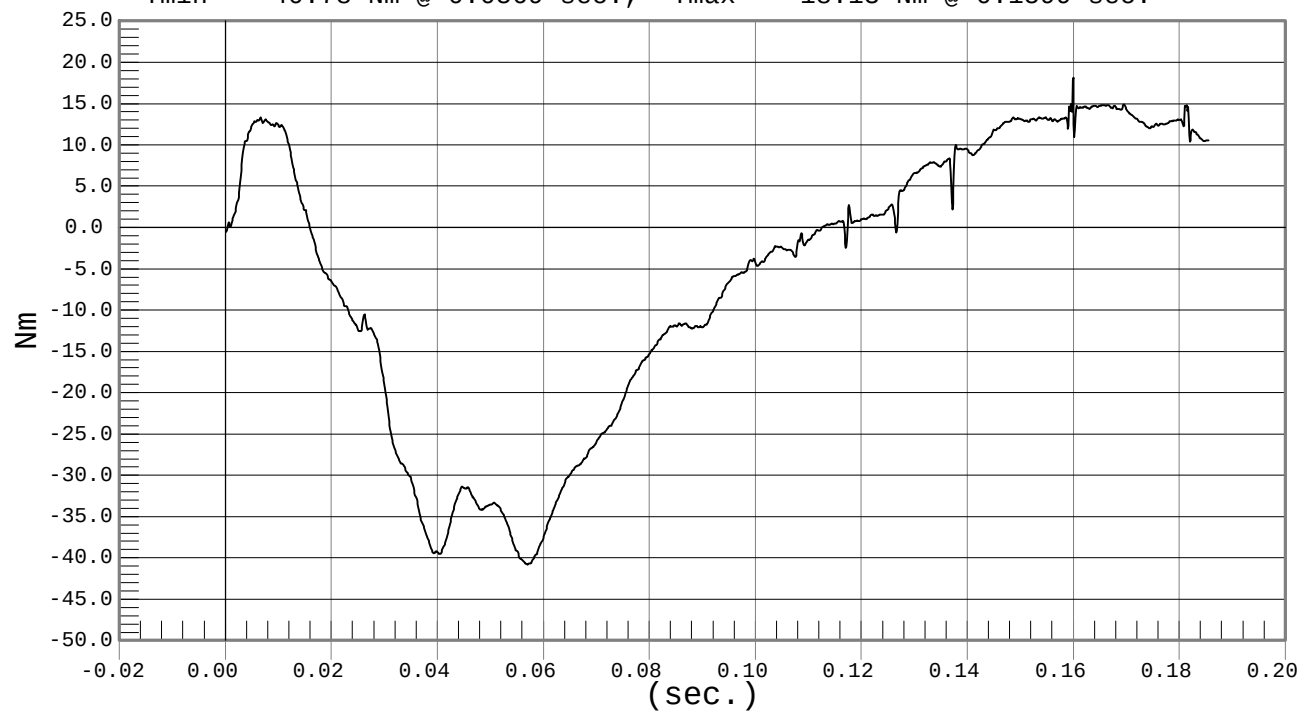


Test Desc.: Neck Bending
Component: Dummy #033

OCCIPITAL MOMENT

Test Date: 07-18-05
Speed: 18.1 fps, 5.52 M/s

Ymin = -40.78 Nm @ 0.0569 sec., Ymax = 18.13 Nm @ 0.1599 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SIDIIISD DUMMY

Date: 7/18/05
Dummy Serial Number: 033
Test Number: D051963

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.7
Humidity	10% - 70%	48
Impact Velocity	4.41 - 4.59 m/s	4.47
Maximum Probe Force	1.6 - 2.4 kN	2.2
Shoulder Displacement	27 - 39 mm	33

TEST MEETS SPECIFICATIONS

Technician: _____

Jessica Hall

Approved By: _____

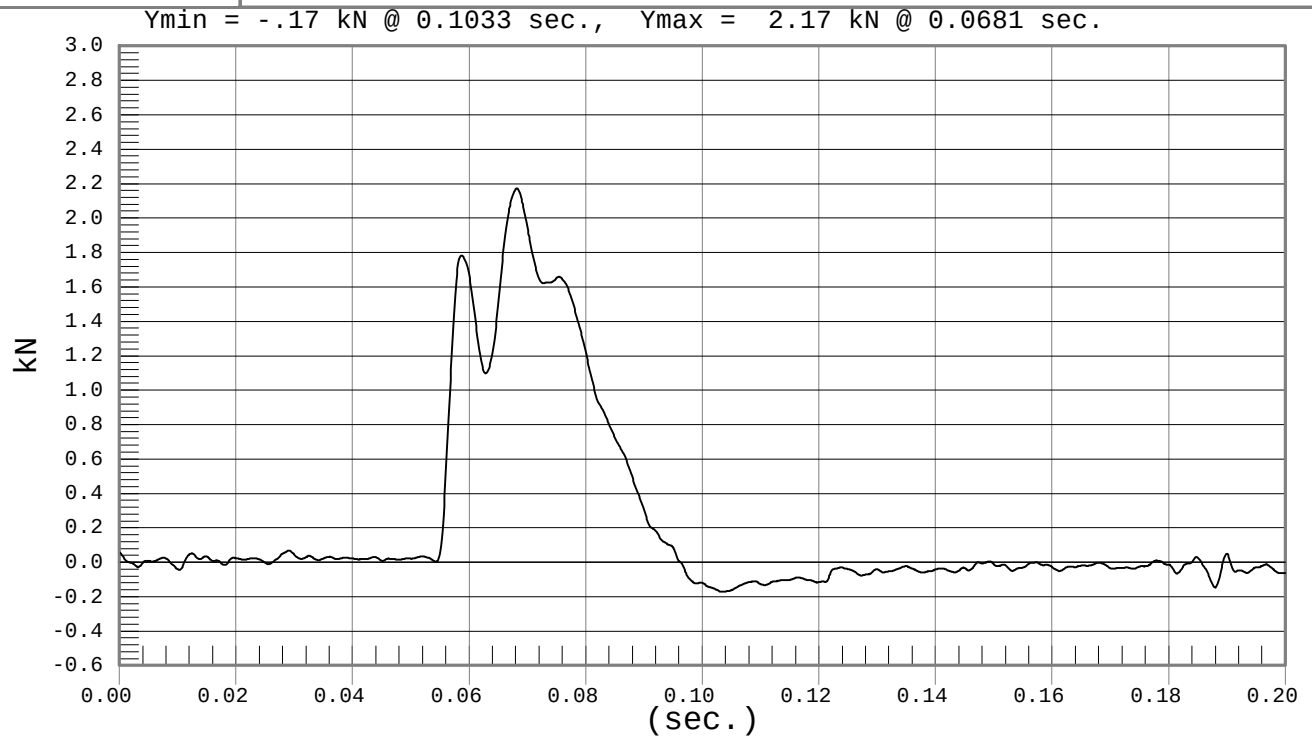
David Winkelbauer



PROBE FORCE

Test Desc.: Shoulder Impact
Component: Dummy #033

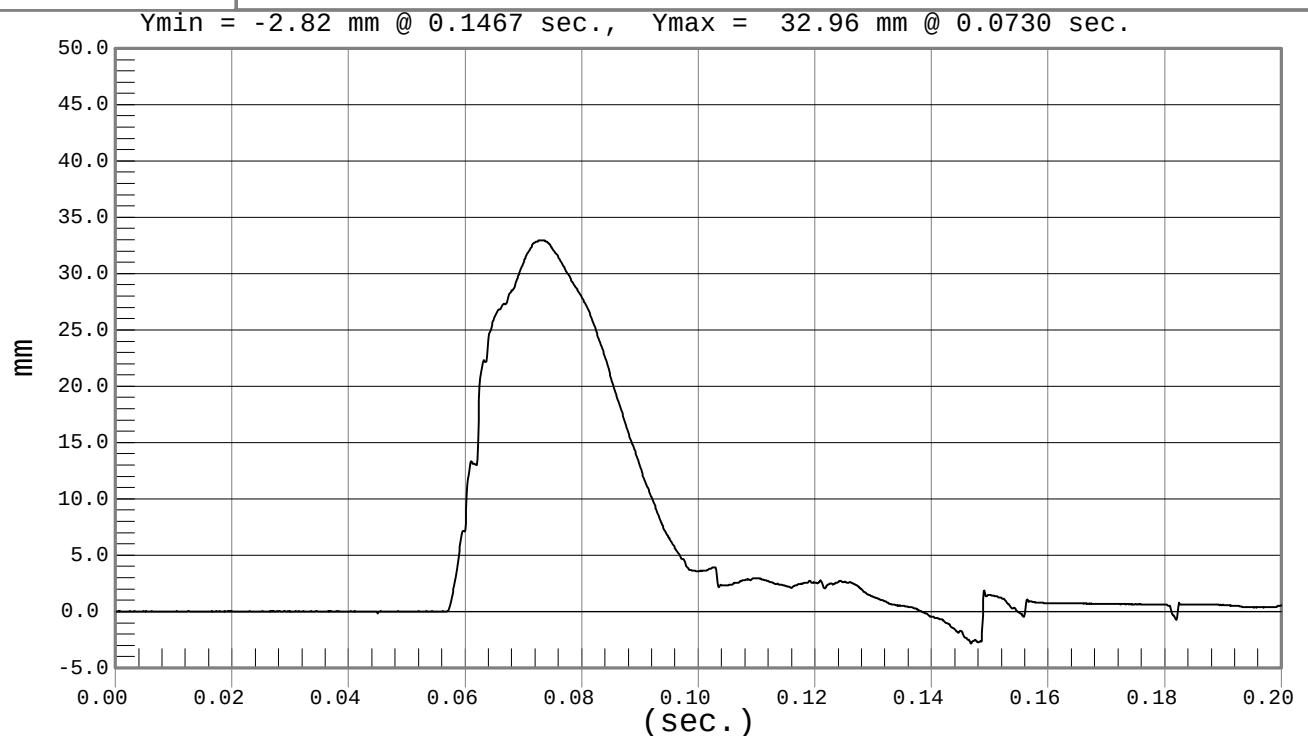
Test Date: 07-18-05
Speed: 14.7 fps, 4.47 M/s



SHOULDER DISPLACEMENT

Test Desc.: Shoulder Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.7 fps, 4.47 M/s



MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SIDIIISD DUMMY

Date: 7/19/05
Dummy Serial Number: 033
Test Number: D051964

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.4
Humidity	10% - 70%	45
Impact Velocity	6.57 - 6.84 m/s	6.78
Peak Probe Force	4.1 – 4.7 kN	4.6
Shoulder Displacement	30 - 42 mm	41
Upper Rib Displacement	23 - 35 mm	30
Middle Rib Displacement	29 - 44 mm	31
Lower Rib Displacement	33 - 40 mm	32*
Upper Spine (T1) Y Acceleration	34 – 48 g's	35
Lower Spine (T12) Y Acceleration	30 - 38 g's	31

*TEST DOES NOT MEET SPECIFICATIONS

Technician: _____

Jessica Hall

Approved By: _____

David Winkelbauer

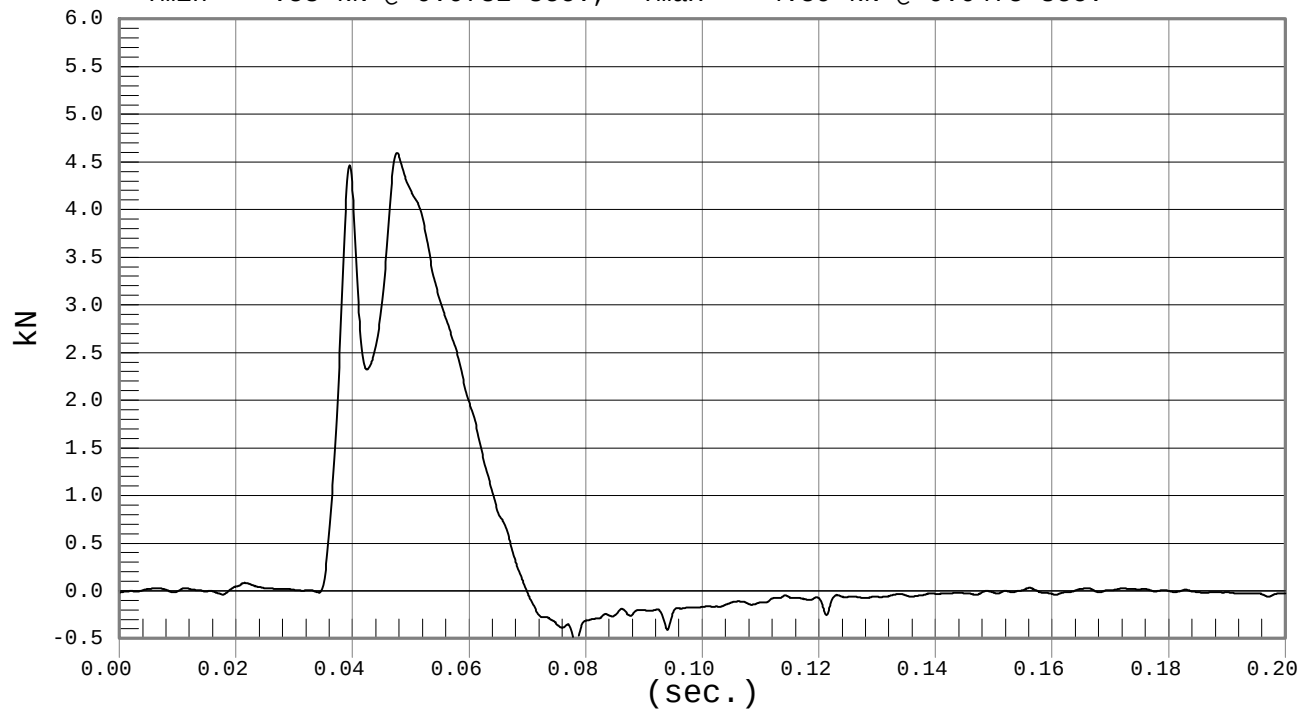


PROBE FORCE

Test Desc.: Thorax With Arm Impact
Component: Dummy #033

Test Date: 07-19-05
Speed: 22.2 fps, 6.78 M/s

Ymin = -.58 kN @ 0.0782 sec., Ymax = 4.59 kN @ 0.0475 sec.



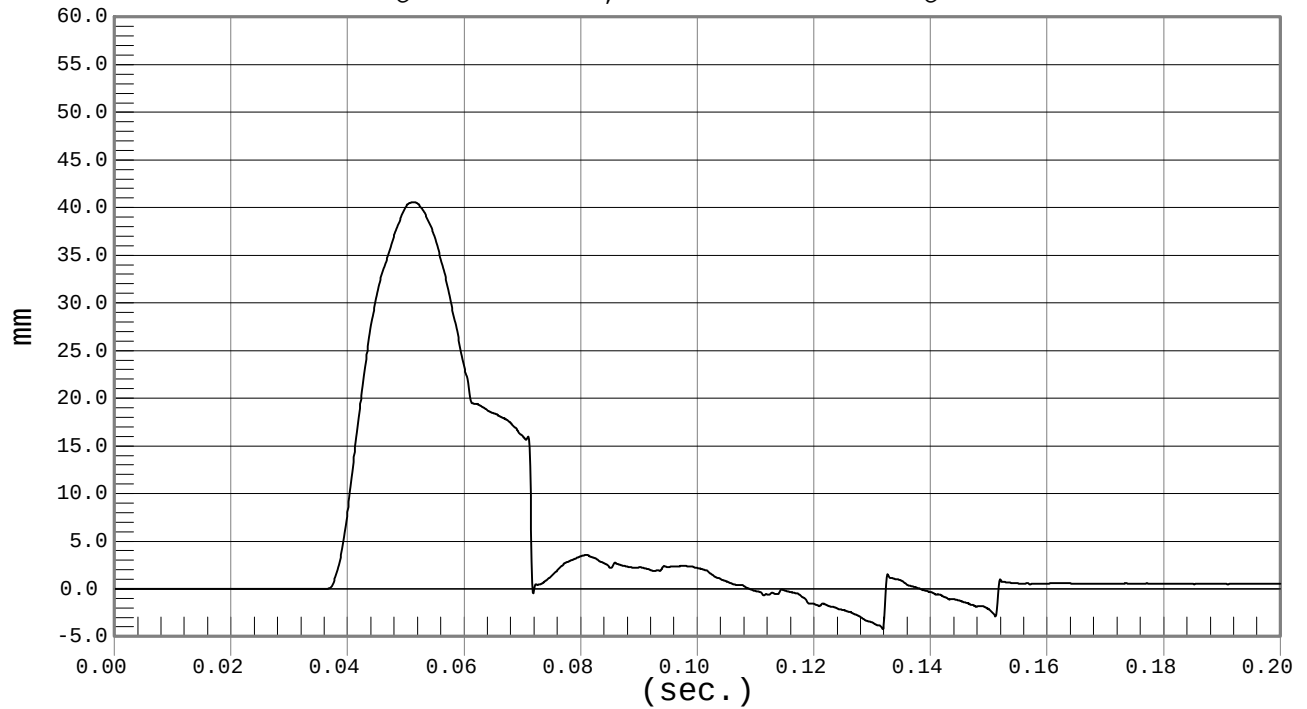


SHOULDER DISPLACEMENT

Test Desc.: Thorax With Arm Impact
Component: Dummy #033

Test Date: 07-19-05
Speed: 22.2 fps, 6.78 M/s

Ymin = -4.22 mm @ 0.1317 sec., Ymax = 40.59 mm @ 0.0513 sec.

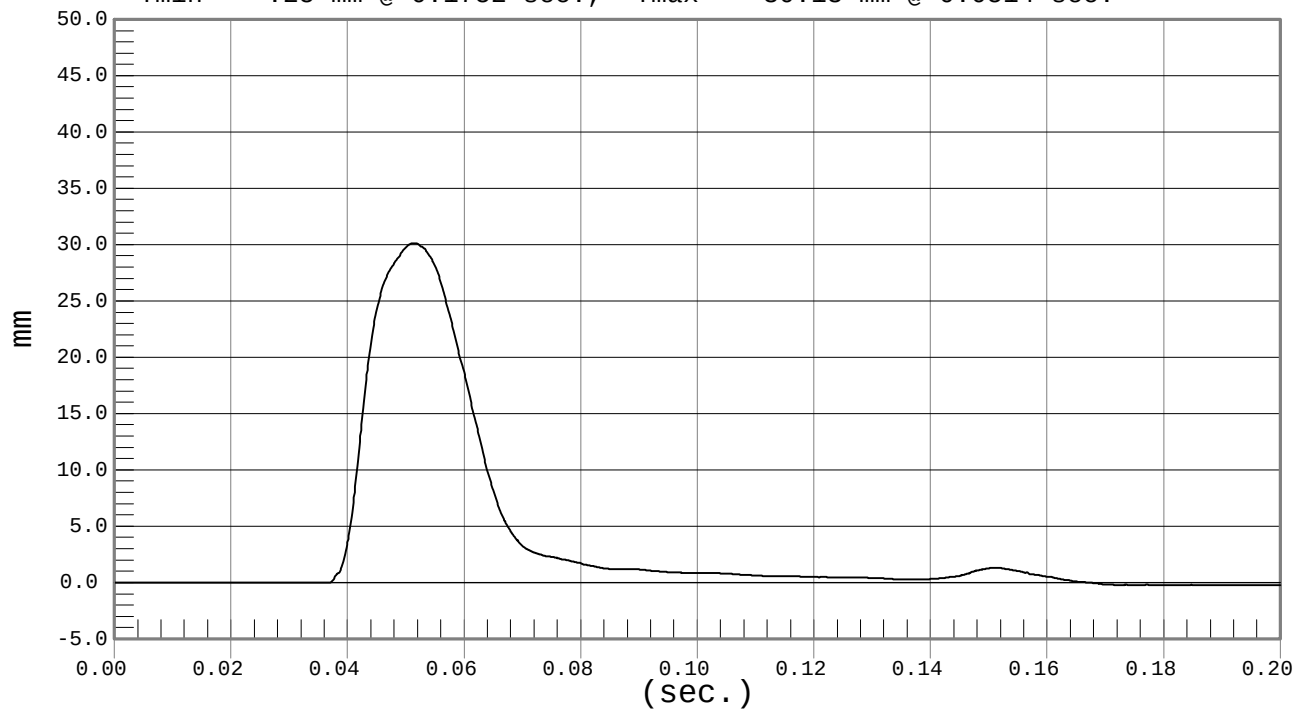


UPPER RIB DISPLACEMENT

Test Desc.: Thorax With Arm Impact
Component: Dummy #033

Test Date: 07-19-05
Speed: 22.2 fps, 6.78 M/s

Ymin = -.25 mm @ 0.1752 sec., Ymax = 30.13 mm @ 0.0514 sec.



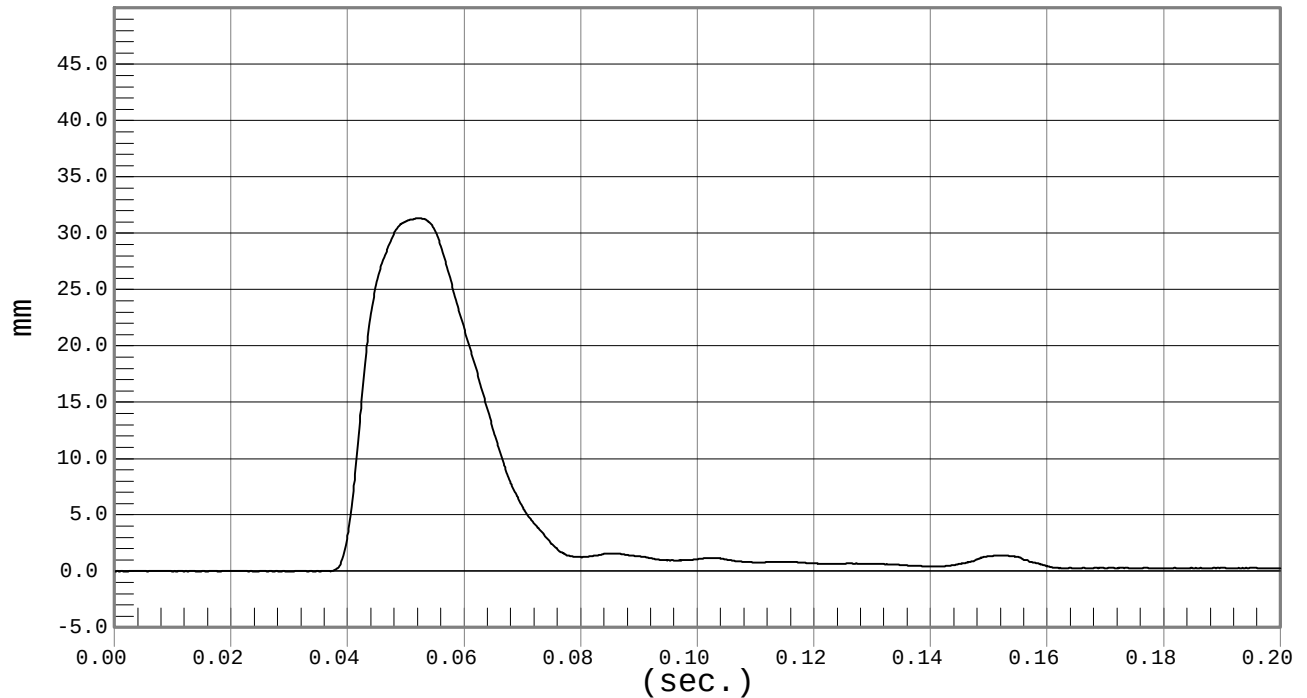


MIDDLE RIB DISPLACEMENT

Test Desc.: Thorax With Arm Impact
Component: Dummy #033

Test Date: 07-19-05
Speed: 22.2 fps, 6.78 M/s

Ymin = -.03 mm @ 0.0299 sec., Ymax = 31.33 mm @ 0.0519 sec.

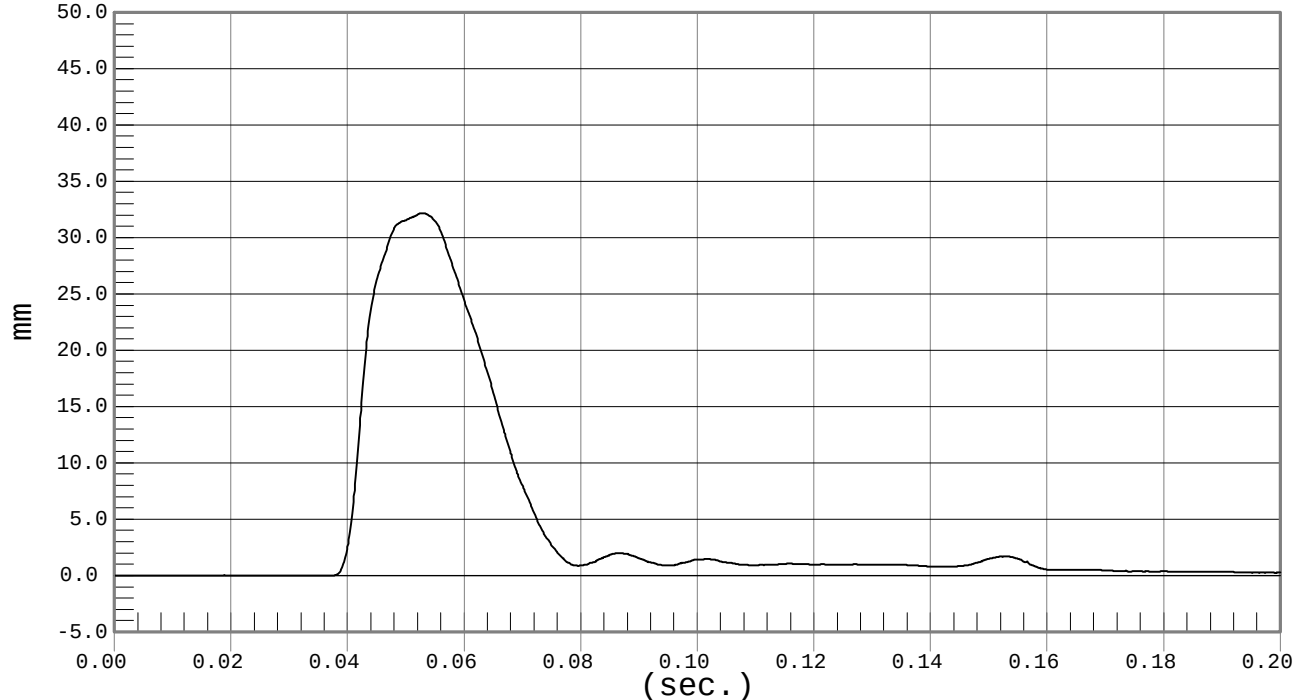


LOWER RIB DISPLACEMENT

Test Desc.: Thorax With Arm Impact
Component: Dummy #033

Test Date: 07-19-05
Speed: 22.2 fps, 6.78 M/s

Ymin = -.01 mm @ 0.0201 sec., Ymax = 32.16 mm @ 0.0525 sec.



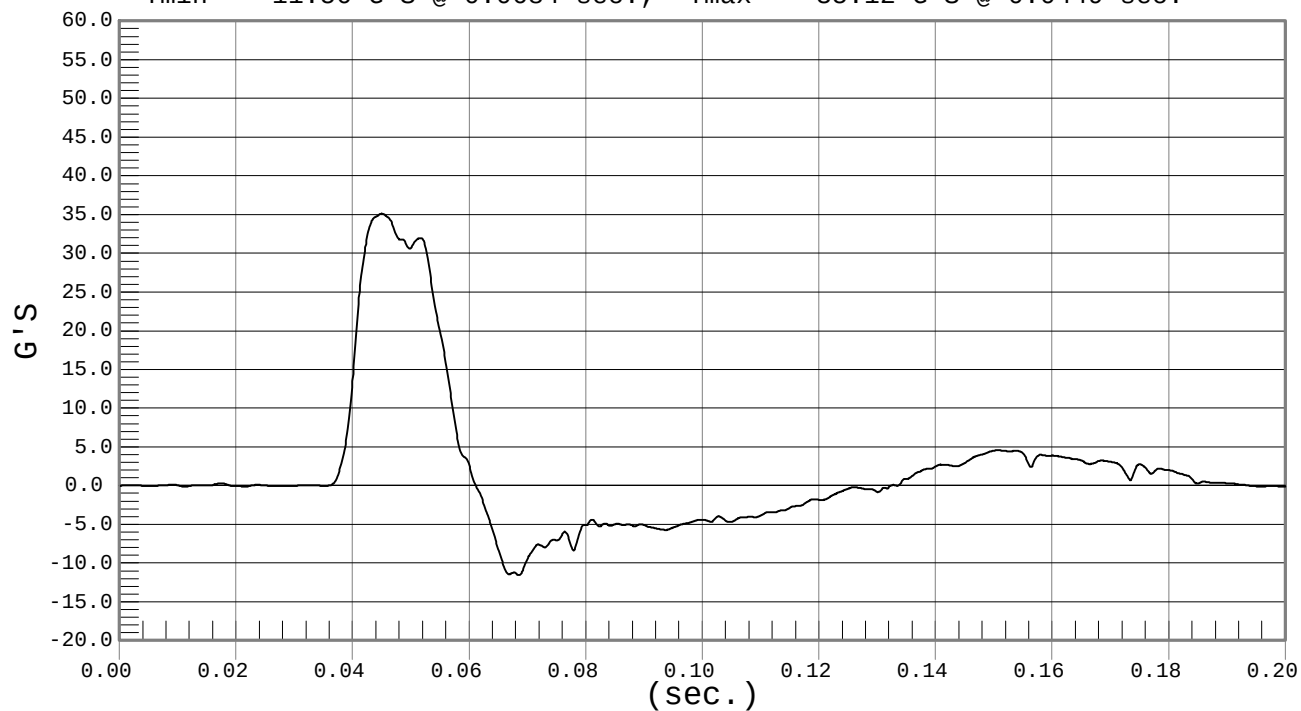


UPPER SPINE ACCELERATION

Test Desc.: Thorax With Arm Impact
Component: Dummy #033

Test Date: 07-19-05
Speed: 22.2 fps, 6.78 M/s

Ymin = -11.56 G'S @ 0.0684 sec., Ymax = 35.12 G'S @ 0.0449 sec.

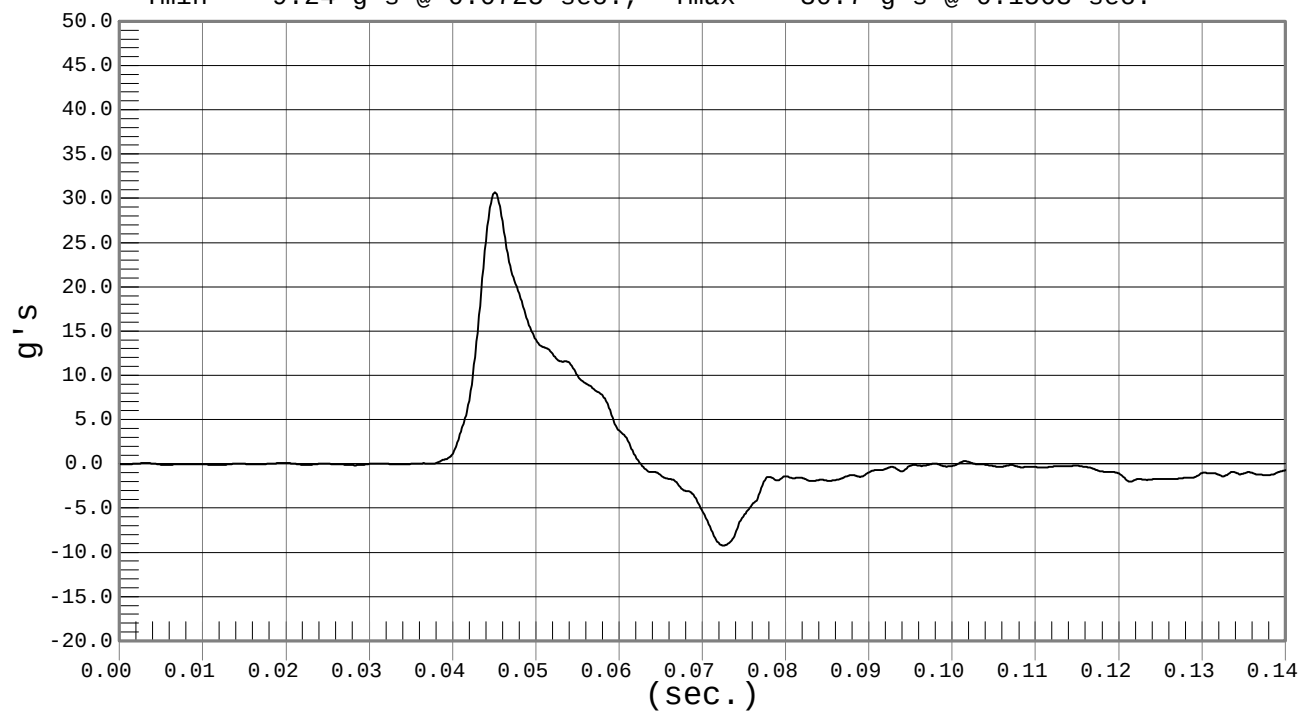


LOWER SPINE ACCELERATION

Test Desc.: Thorax With Arm Impact
Component: Dummy #033

Test Date: 07-19-05
Speed: 22.2 fps, 6.78 M/s

Ymin = -9.24 g's @ 0.0725 sec., Ymax = 30.7 g's @ 0.1563 sec.



MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SIDIIISD DUMMY

Date: 7/18/05
Dummy Serial Number: 033
Test Number: D051965

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.3
Humidity	10% - 70%	44
Impact Velocity	4.20 - 4.40 m/s	4.29
Peak Probe Force	1.8 - 2.3 kN	2.1
Upper Rib Displacement	32 - 41 mm	35
Middle Rib Displacement	40 - 51 mm	40
Lower Rib Displacement	34 - 47 mm	39
Upper Spine (T1) Acceleration	13 - 18 g's	13
Lower Spine (T12) Acceleration	8 – 13 g's	9

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

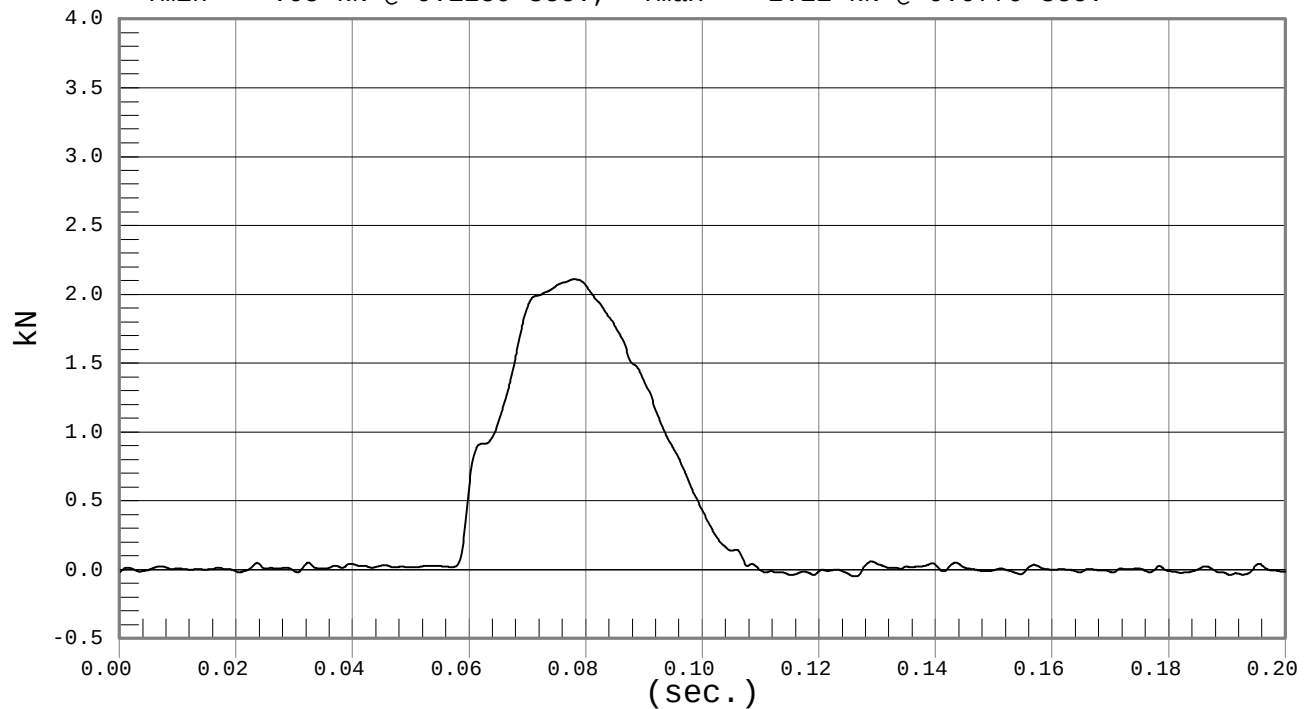


PROBE FORCE

Test Desc.: Thorax Without Arm Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.1 fps, 4.29 M/s

Ymin = -.05 kN @ 0.1259 sec., Ymax = 2.11 kN @ 0.0779 sec.

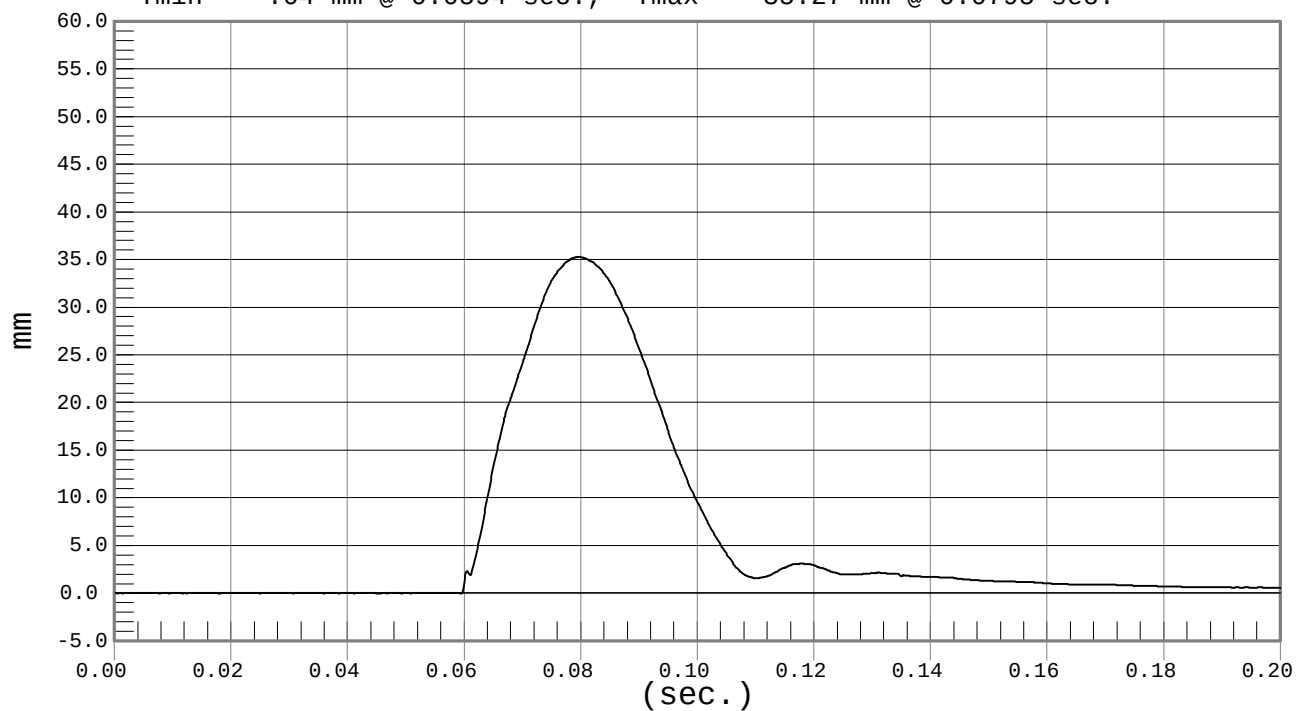


UPPER RIB DISPLACEMENT

Test Desc.: Thorax Without Arm Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.1 fps, 4.29 M/s

Ymin = -.04 mm @ 0.0594 sec., Ymax = 35.27 mm @ 0.0795 sec.



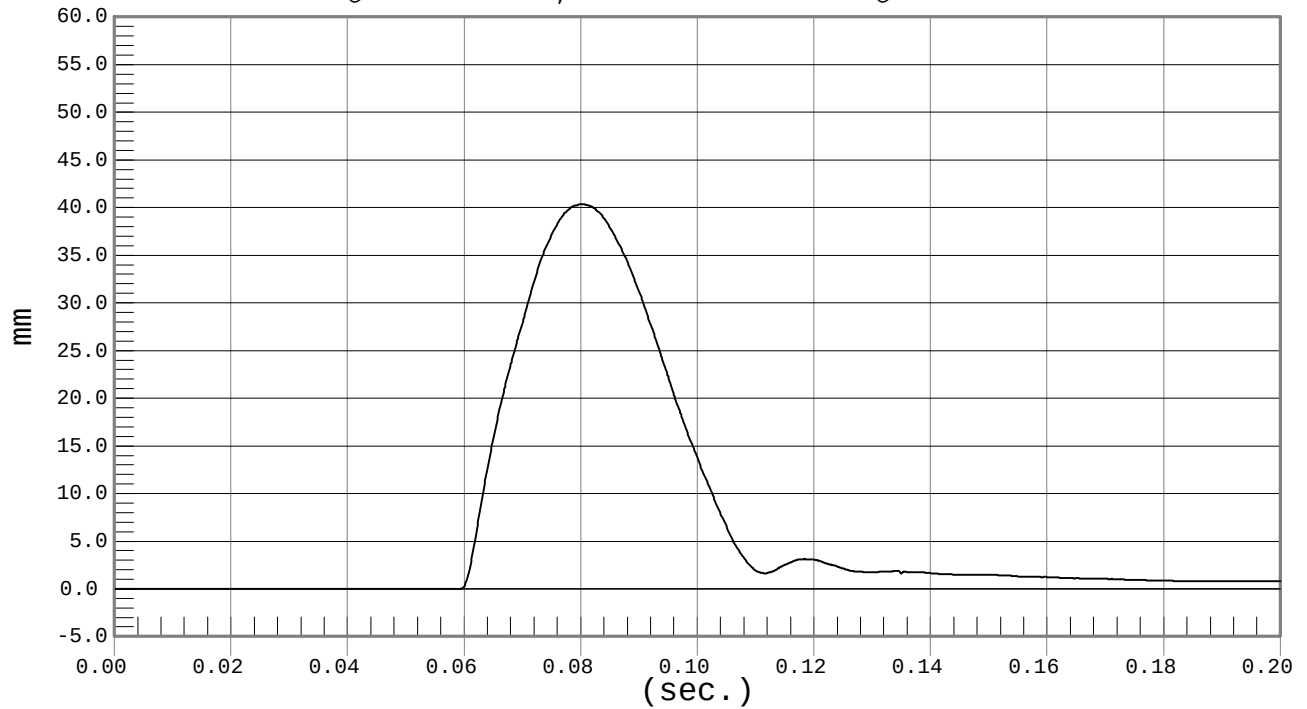


MIDDLE RIB DISPLACEMENT

Test Desc.: Thorax Without Arm Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.1 fps, 4.29 M/s

Ymin = 0 mm @ 0.0590 sec., Ymax = 40.36 mm @ 0.0801 sec.

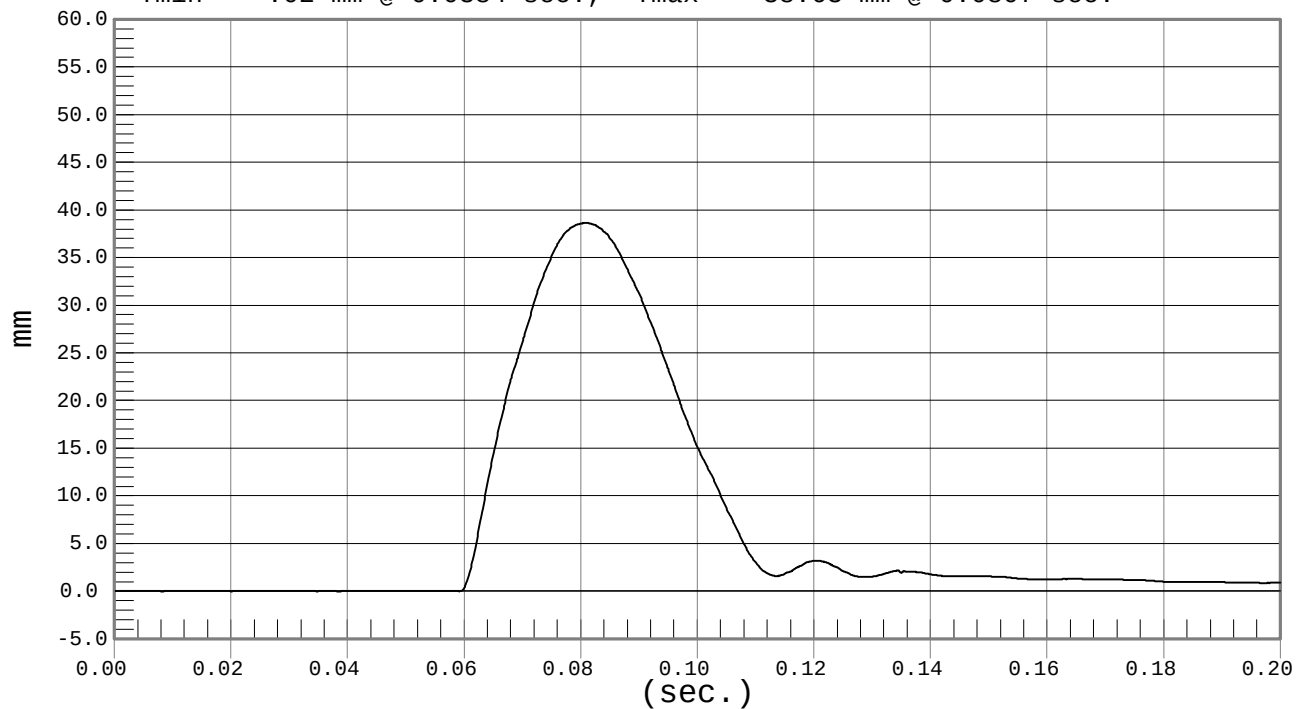


LOWER RIB DISPLACEMENT

Test Desc.: Thorax Without Arm Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.1 fps, 4.29 M/s

Ymin = -.02 mm @ 0.0384 sec., Ymax = 38.63 mm @ 0.0807 sec.



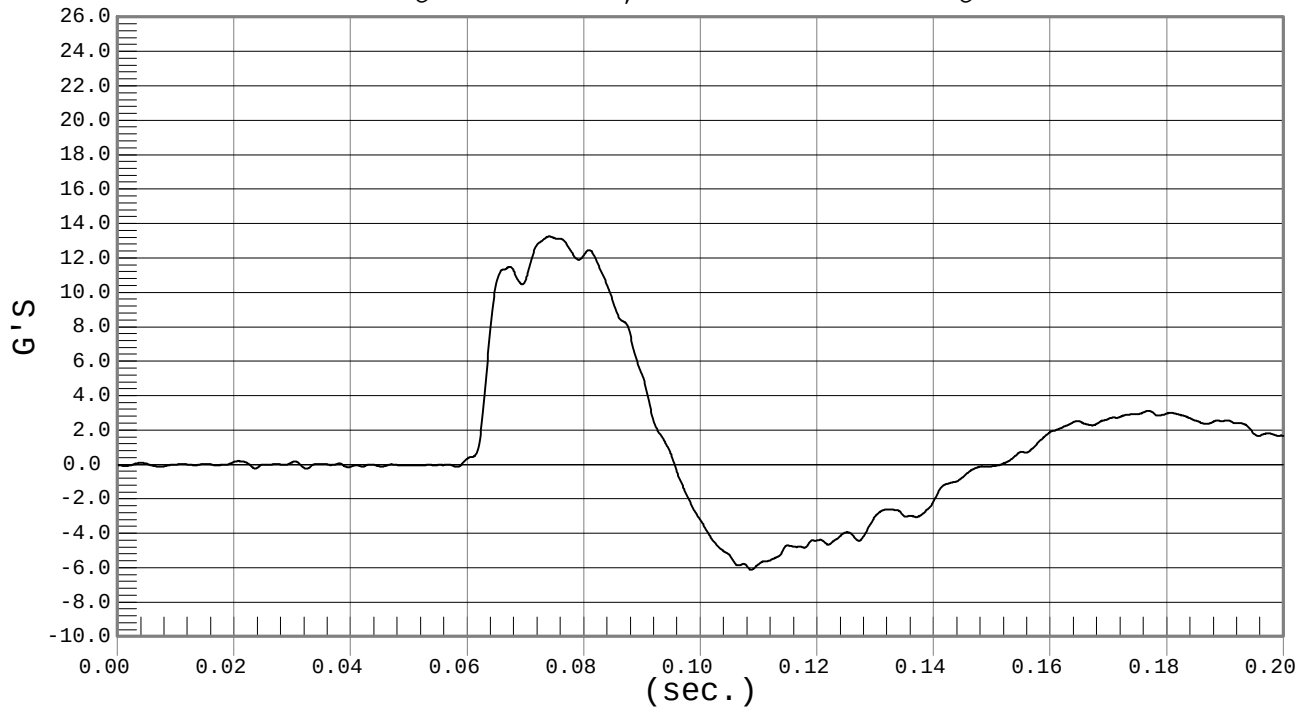


UPPER SPINE ACCELERATION

Test Desc.: Thorax Without Arm Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.1 fps, 4.29 M/s

Ymin = -6.12 G'S @ 0.1086 sec., Ymax = 13.24 G'S @ 0.0740 sec.

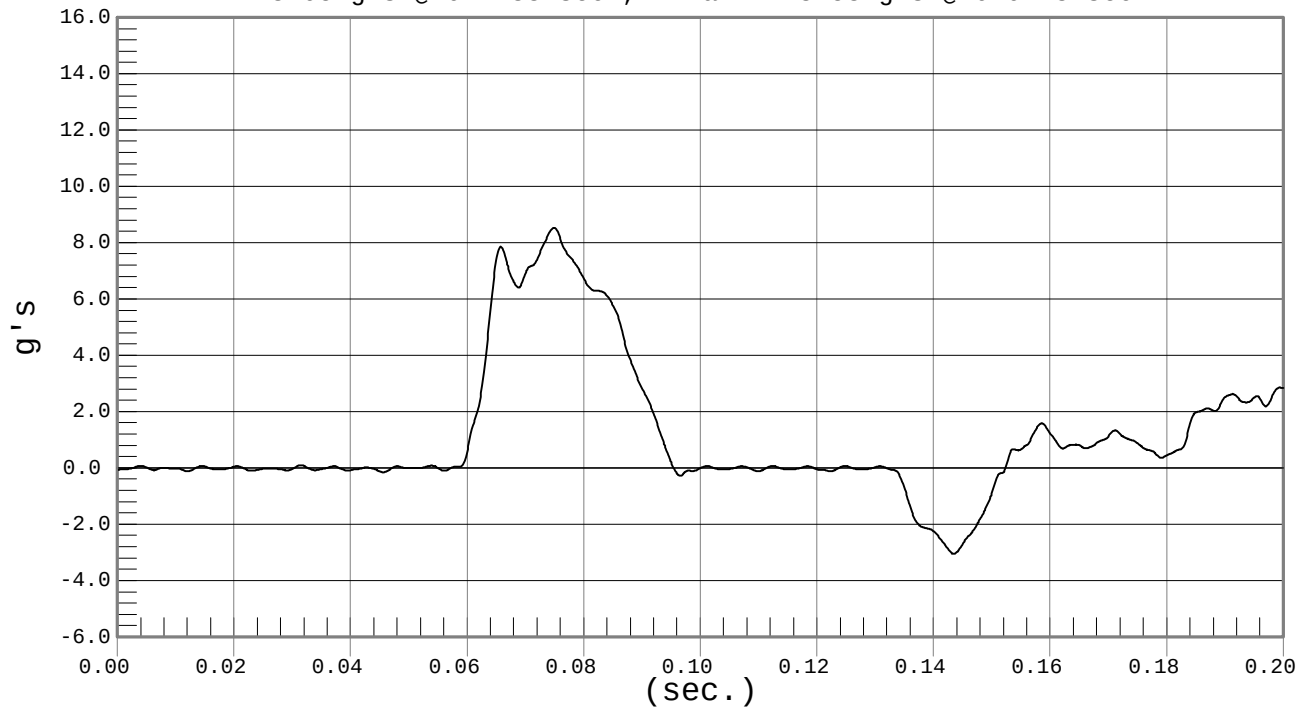


LOWER SPINE ACCELERATION

Test Desc.: Thorax Without Arm Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.1 fps, 4.29 M/s

Ymin = -3.05 g's @ 0.1433 sec., Ymax = 8.53 g's @ 0.0748 sec.



MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SIDIIISD DUMMY

Date: 7/18/05
Dummy Serial Number: 033
Test Number: D051966

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.1
Humidity	10% - 70%	43
Impact Velocity	4.41 - 4.59 m/s	4.55
Probe Force	1.3 - 1.9 kN	1.9
Upper Rib Displacement	44 - 55 mm	46
Lower Rib Displacement	44 - 56 mm	46
Upper Spine (T1) Y Acceleration	5 - 9 g's	7
Lower Spine (T12) Y Acceleration	9 - 13 g's	13

TEST MEETS SPECIFICATIONS

Technician: _____

Jessica Hall

Approved By: _____

David Winkelbauer

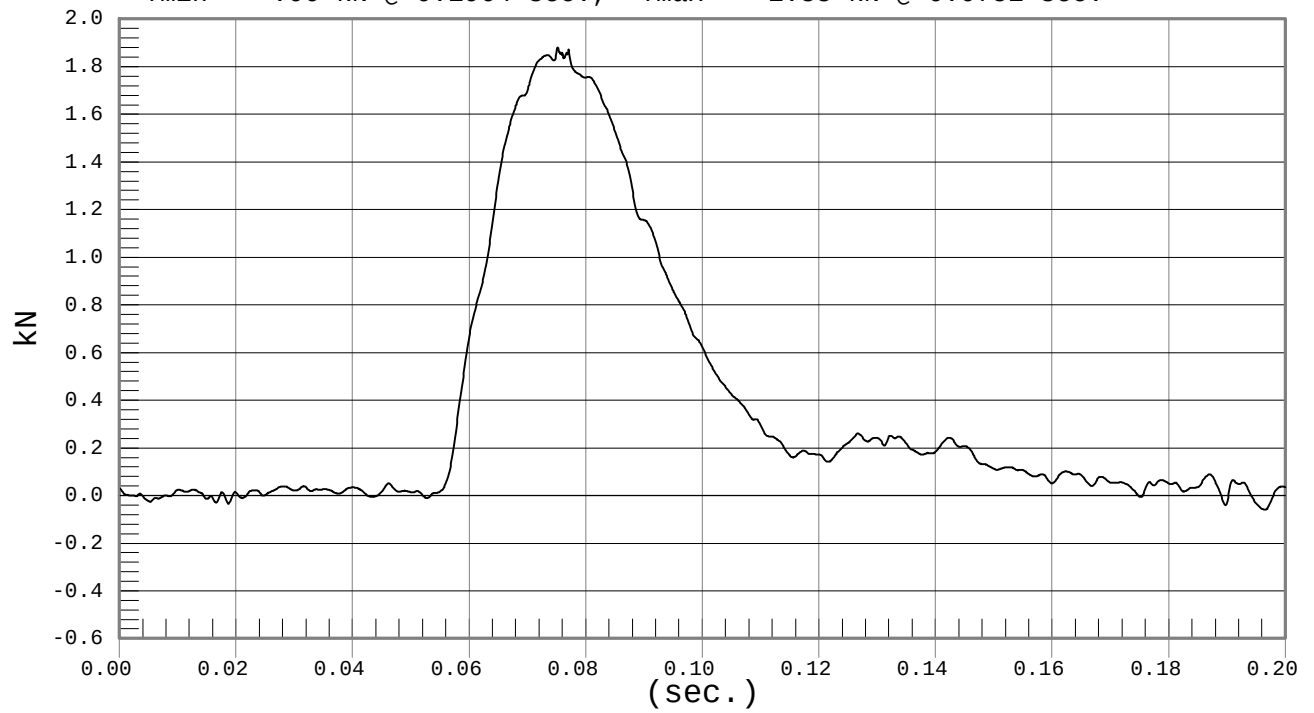


PROBE FORCE

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.9 fps, 4.55 M/s

Ymin = -.06 kN @ 0.1964 sec., Ymax = 1.88 kN @ 0.0751 sec.



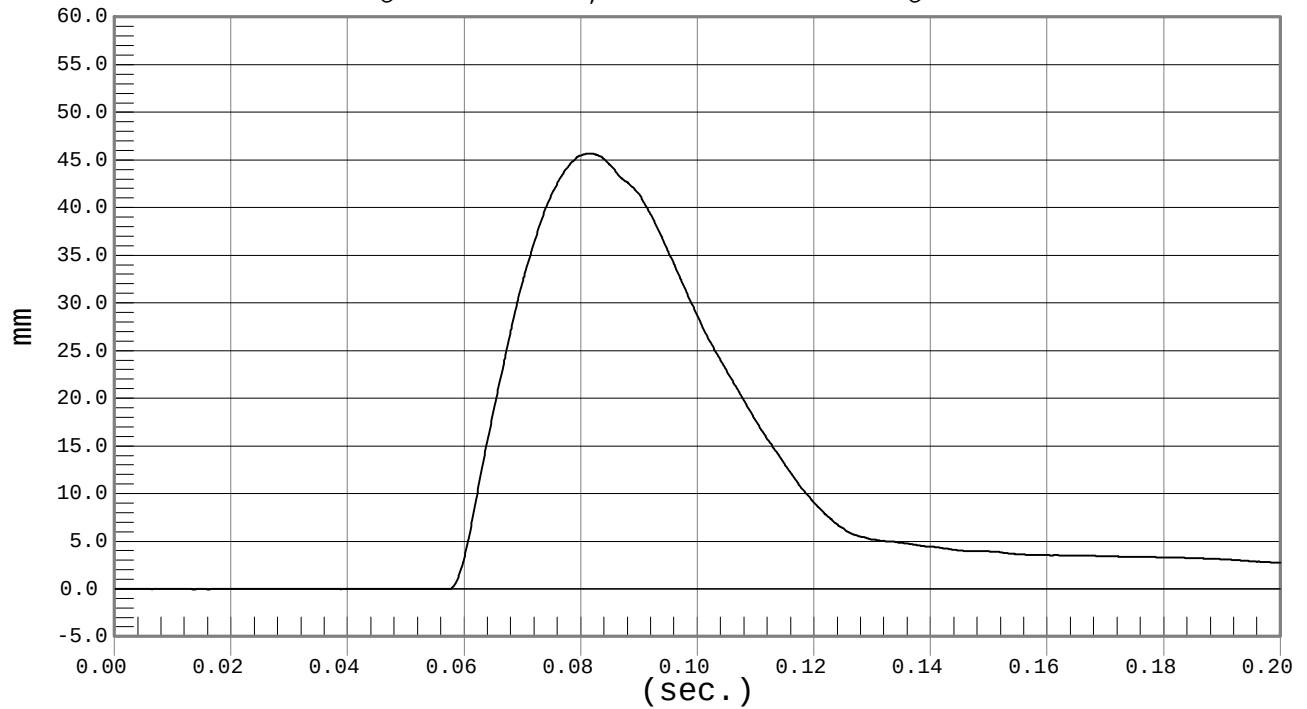


UPPER RIB DISPLACEMENT

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.9 fps, 4.55 M/s

Ymin = -.07 mm @ 0.0135 sec., Ymax = 45.67 mm @ 0.0817 sec.

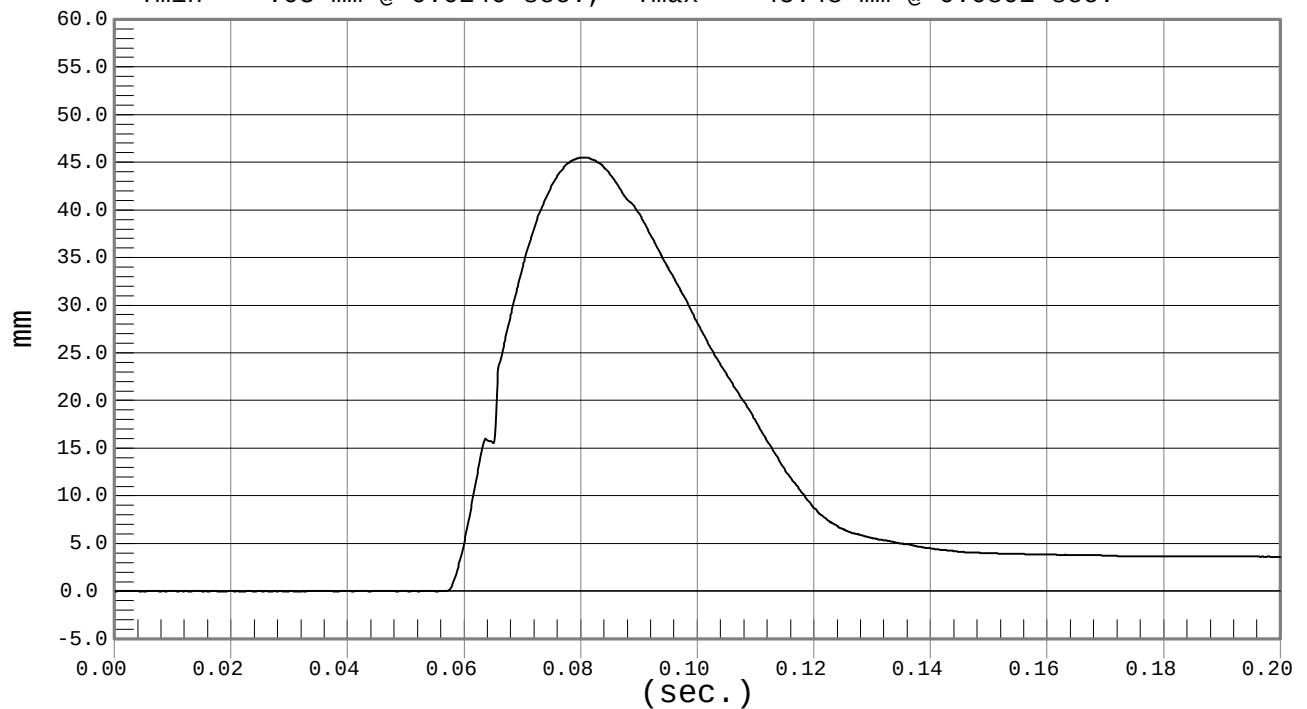


LOWER RIB DISPLACEMENT

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.9 fps, 4.55 M/s

Ymin = -.03 mm @ 0.0240 sec., Ymax = 45.48 mm @ 0.0801 sec.



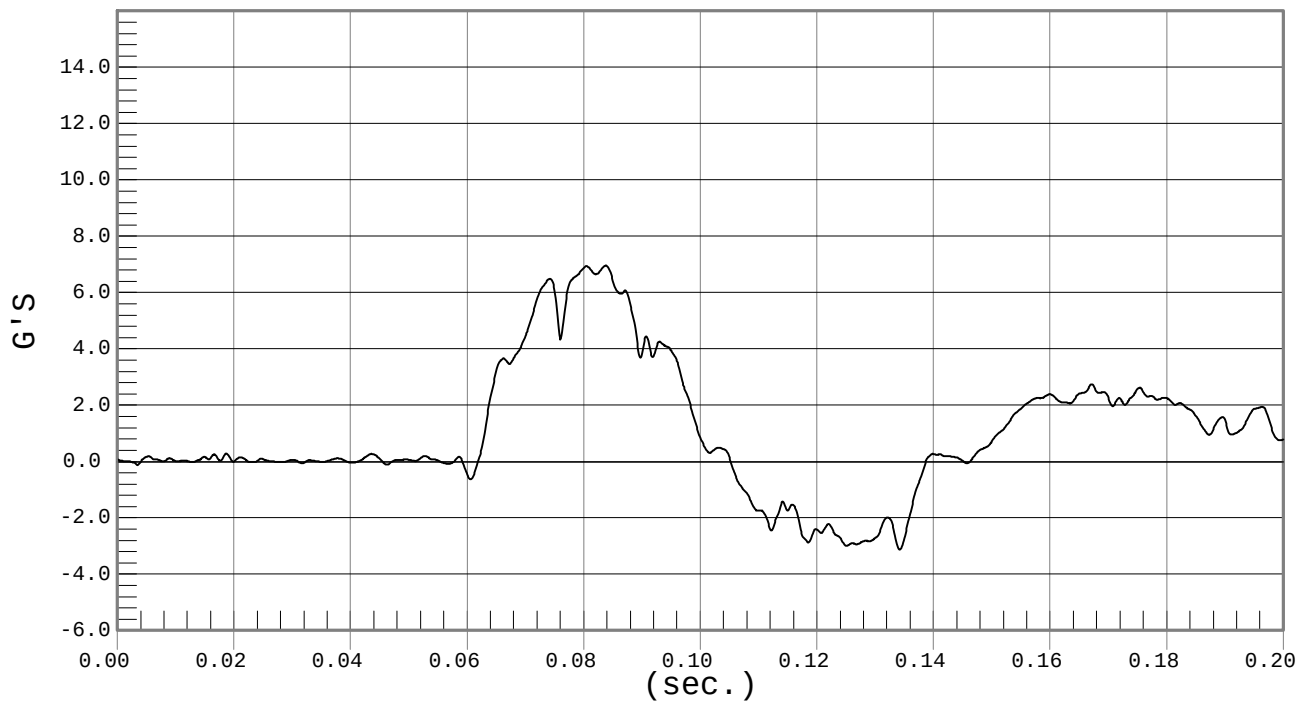


UPPER SPINE ACCELERATION

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.9 fps, 4.55 M/s

Ymin = -3.14 G'S @ 0.1341 sec., Ymax = 6.96 G'S @ 0.0837 sec.

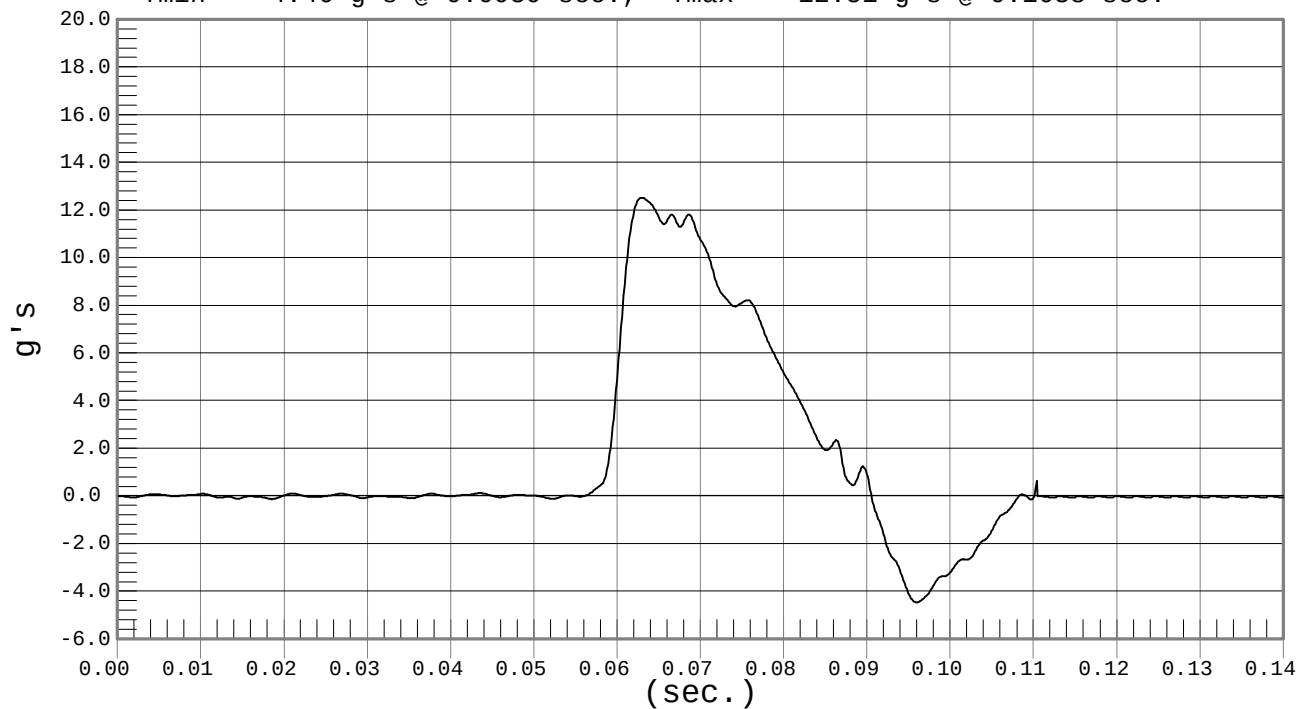


LOWER SPINE ACCELERATION

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 14.9 fps, 4.55 M/s

Ymin = -4.46 g's @ 0.0959 sec., Ymax = 12.51 g's @ 0.1638 sec.



MGA RESEARCH CORPORATION
PELVIS IMPACT TEST
SIDIIISD DUMMY

Date: 7/18/05
Dummy Serial Number: 033
Test Number: D051967

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.5
Humidity	10% - 70%	44
Impact Velocity	6.60 - 6.80 m/s	6.68
Peak Impactor Acceleration	40 – 48 g's	40
Pelvis Y Acceleration	40 – 48 g's	46
Peak Pelvis Acetabulum Force	3803 – 4505 N	3970

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

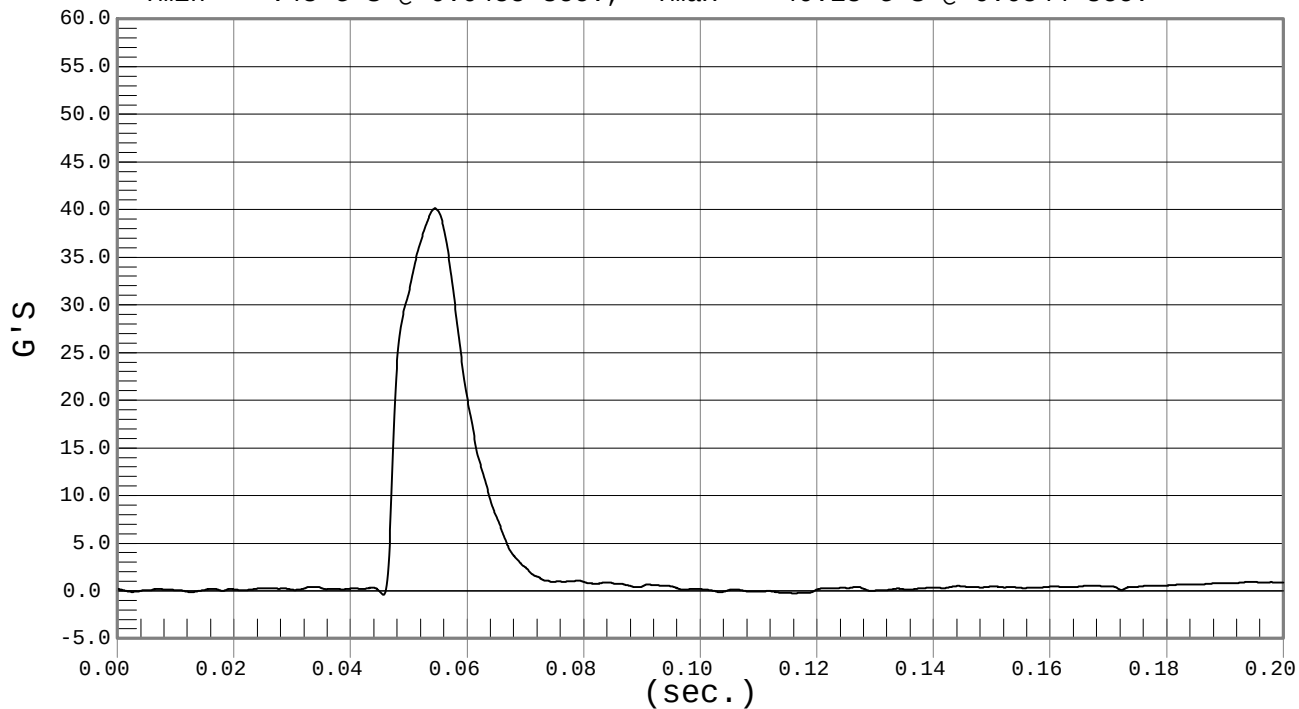


IMPACTOR ACCELERATION

Test Desc.: Pelvis Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 21.9 fps, 6.68 M/s

Ymin = -.43 G'S @ 0.0455 sec., Ymax = 40.13 G'S @ 0.0544 sec.

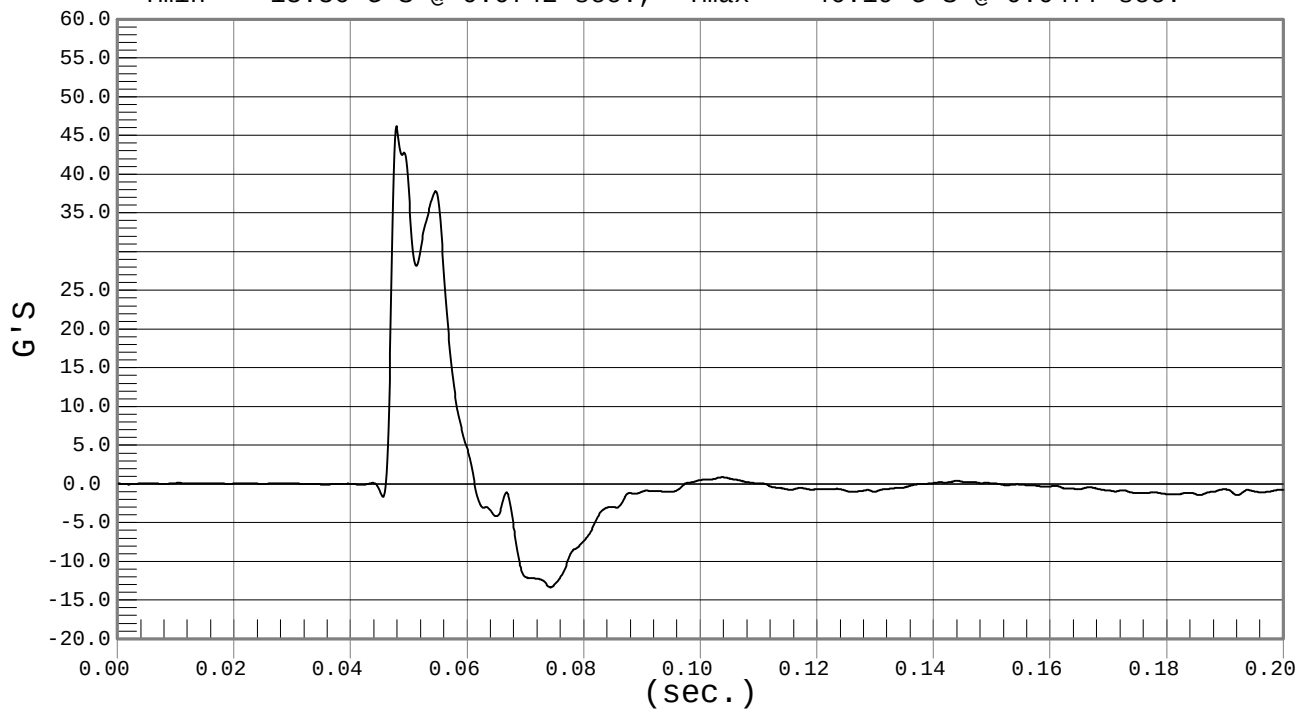


PELVIS ACCELERATION

Test Desc.: Pelvis Impact
Component: Dummy #033

Test Date: 07-18-05
Speed: 21.9 fps, 6.68 M/s

Ymin = -13.36 G'S @ 0.0742 sec., Ymax = 46.19 G'S @ 0.0477 sec.



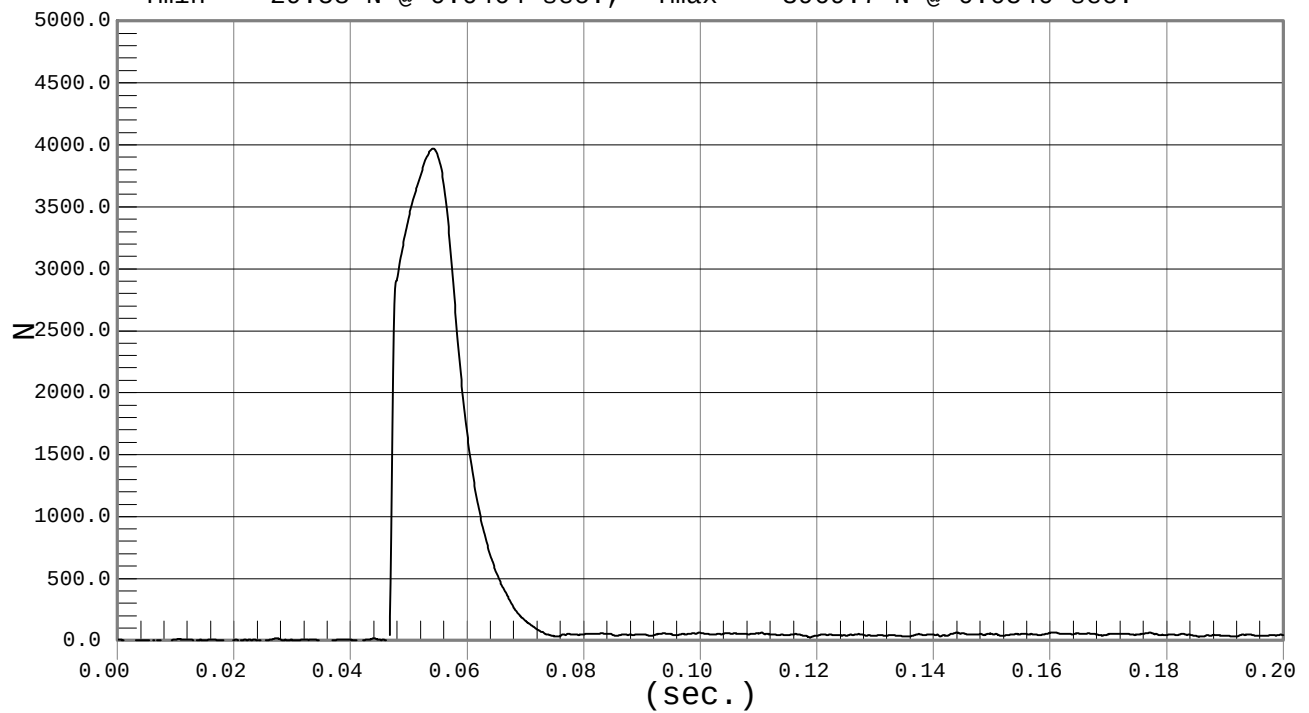


Test Desc.: Pelvis Impact
Component: Dummy #033

ACETABULUM FORCE

Test Date: 07-18-05
Speed: 21.9 fps, 6.68 M/s

Ymin = -29.58 N @ 0.0464 sec., Ymax = 3969.7 N @ 0.0540 sec.



MGA RESEARCH CORPORATION
ILIAC IMPACT TEST
SIDIIISD DUMMY

Date: 7/19/05
Dummy Serial Number: 033
Test Number: D051968

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	20.6° – 22.2°	21.9
Humidity	10% - 70%	39
Impact Velocity	4.20 – 4.40 m/s	4.34
Peak Impactor Acceleration	41 – 47 g's	42
Pelvis Y Acceleration	32 – 40 g's	37
Peak Pelvis Iliac Force	4841 – 5491 N	5193

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

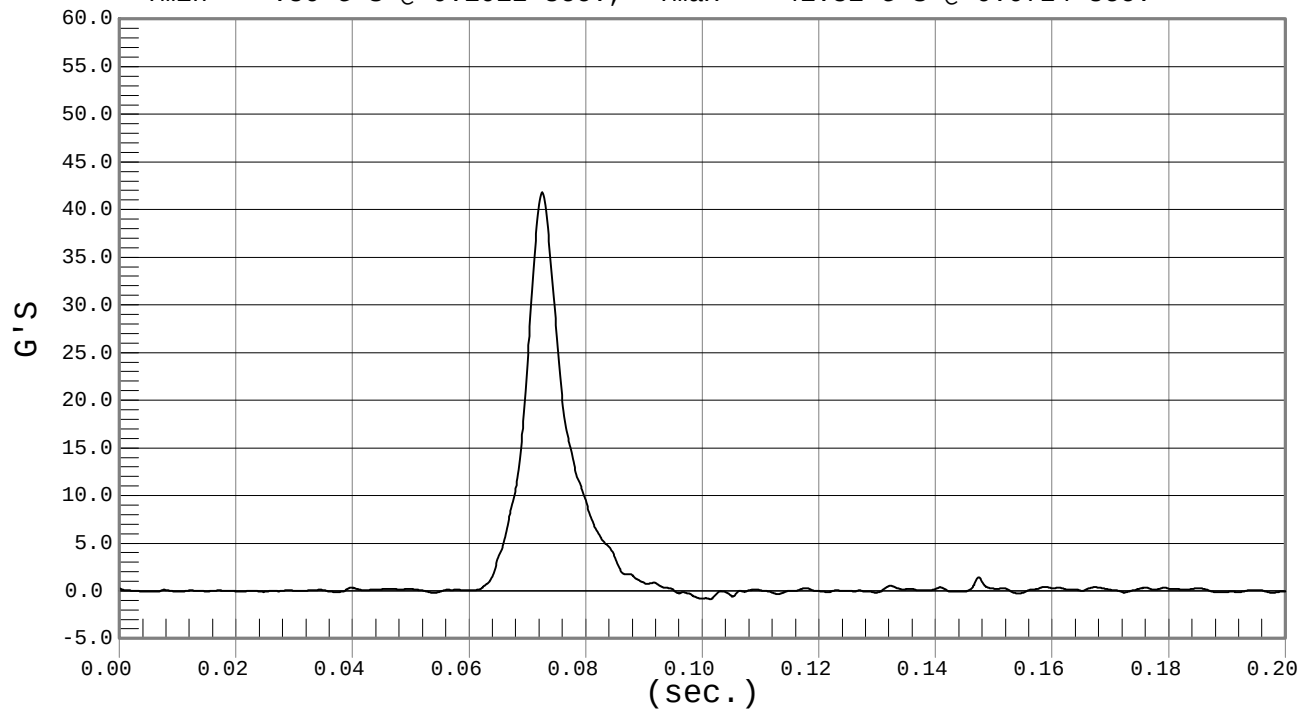


IMPACTOR ACCELERATION

Test Desc.: Iliac Impact
Component: Dummy #033

Test Date: 07-19-05
Speed: 14.3 fps, 4.34 M/s

Ymin = -.86 G'S @ 0.1012 sec., Ymax = 41.81 G'S @ 0.0724 sec.

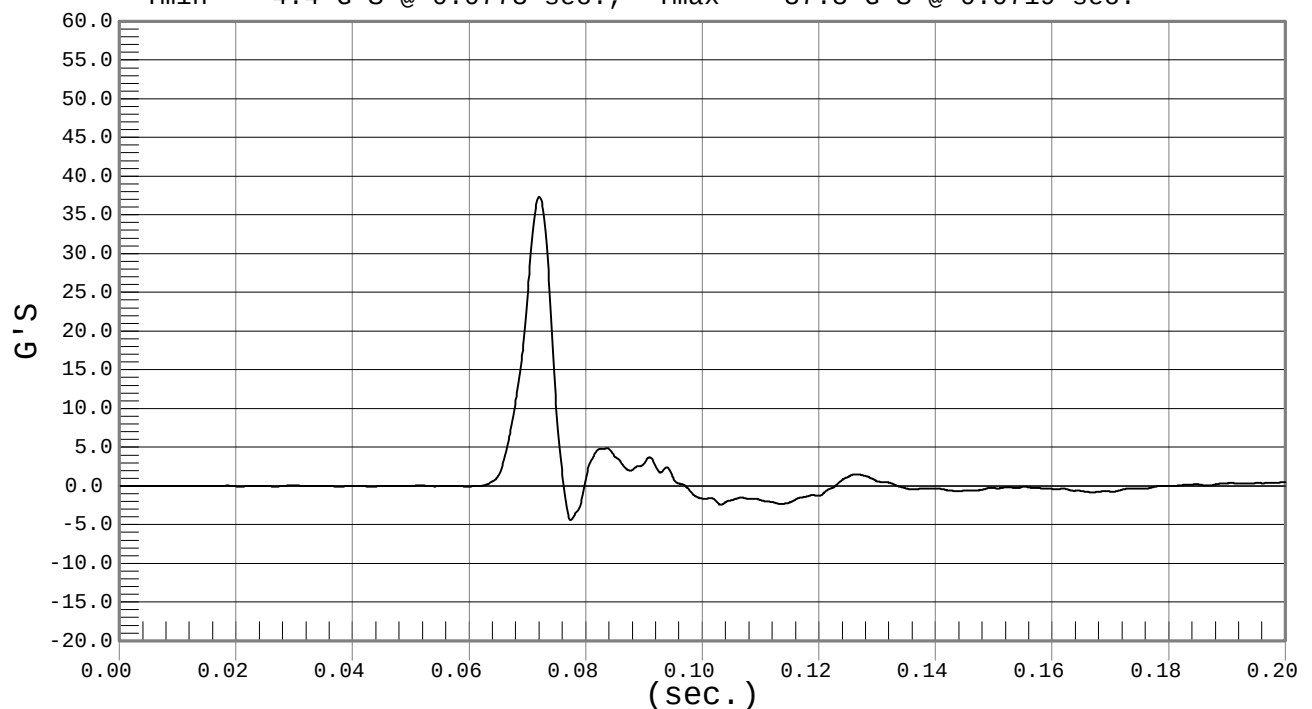


PELVIS ACCELERATION

Test Desc.: Iliac Impact
Component: Dummy #033

Test Date: 07-19-05
Speed: 14.3 fps, 4.34 M/s

Ymin = -4.4 G'S @ 0.0773 sec., Ymax = 37.3 G'S @ 0.0719 sec.



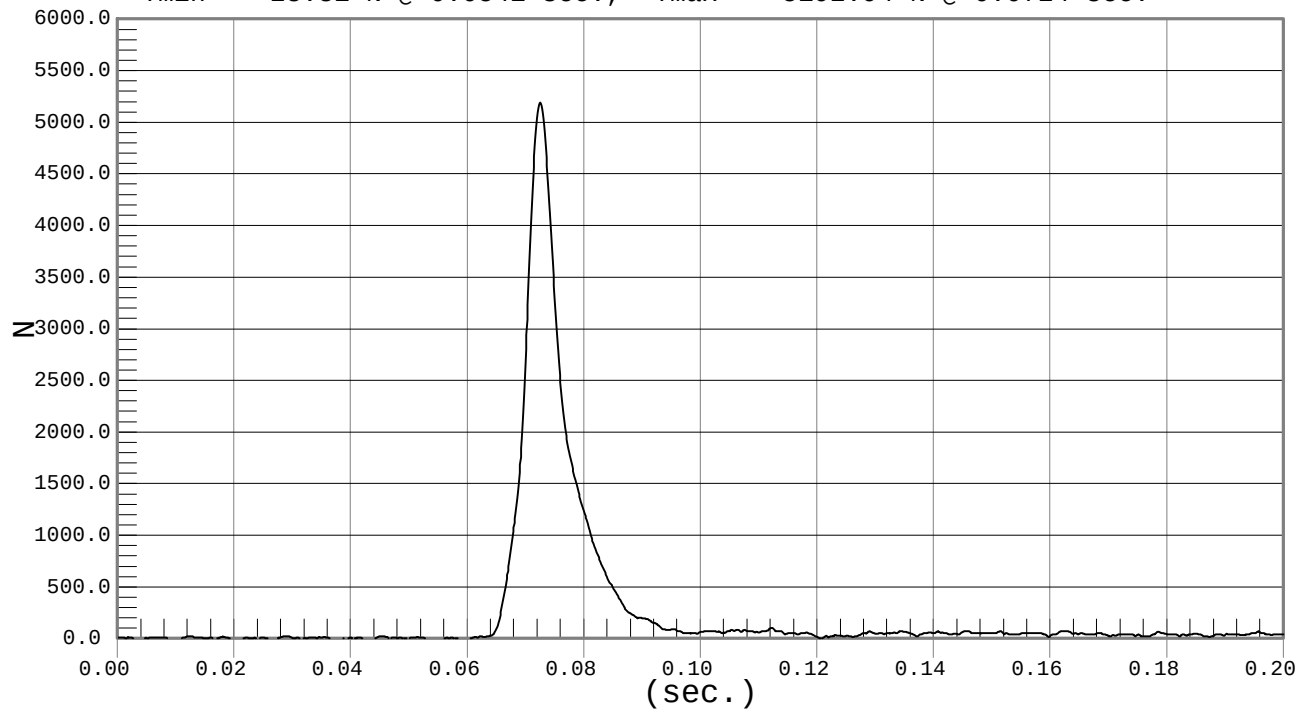


ILIAC FORCE

Test Desc.: Iliac Impact
Component: Dummy #033

Test Date: 07-19-05
Speed: 14.3 fps, 4.34 M/s

Ymin = -28.31 N @ 0.0541 sec., Ymax = 5192.94 N @ 0.0724 sec.



APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY CALIBRATION DATA

	INSTRUMENTS FOR LEFT FRONT DUMMY SIDIIsD: 033		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X Accelerometer	J11361	Endevco	2/02/05
Head Y Accelerometer	AMT78	Endevco	2/02/05
Head Z Accelerometer	AP1Y8	Endevco	2/02/05
Head X Redundant	AJ9Y3	Endevco	2/02/05
Head Y Redundant	ALFP5	Endevco	2/02/05
Head Z Redundant	AP138	Endevco	2/02/05
Upper Neck Load Cell	284	FTSS	5/03/05
Upper Arm X	AHWK8	Endevco	7/07/05
Upper Arm Y	C24-A03	Entran	7/07/05
Upper Arm Z	AMTA3	Endevco	7/07/05
Shoulder DY	033SHLD	Servo	6/29/04
Shoulder Force Load Cell	107	FTSS	5/03/05
Upper Thorax Rib DY	033RIB1	Servo	6/29/04
Mid Thorax Rib DY	033RIB2	Servo	7/21/04
Lower Thorax Rib DY	033RIB3	Servo	7/12/04
Upper Abdominal Rib DY	033RIB4	Servo	6/29/04
Lower Abdominal Rib DY	033RIB5	Servo	6/29/04
Upper Spine X	L20-A38	Entran	4/12/05
Upper Spine Y	AJ9A7	Endevco	4/12/05
Upper Spine Z	AHTB2	Endevco	4/12/05
Lower Spine X	J26-H12	Entran	2/01/05
Lower Spine Y	J26-H11	Entran	2/01/05
Lower Spine Z	J26-H15	Entran	2/01/05
Left Acetabulum FY	ACG110FY	FTSS	5/02/05
Left Ilium Crest FY	IWG115FY	FTSS	5/02/05
Pelvis X Accelerometer	A29-N20	Entran	4/29/05
Pelvis Y Accelerometer	A28-H09	Entran	4/29/05
Pelvis Z Accelerometer	A28-H06	Entran	4/29/05
Lumbar Load Cell	104	FTSS	5/03/05

	INSTRUMENTS FOR LEFT REAR DUMMY: Q6		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X Accelerometer	AH0F0	Endevco	2/02/05
Head Y Accelerometer	AJ808	Endevco	2/02/05
Head Z Accelerometer	J13851	Endevco	2/02/05
Upper Neck Load Cell	93	Denton	3/03/03
Lower Neck Load Cell	92	Denton	3/03/03
Chest X	J13656	Endevco	2/02/05
Chest Y	J19173	Endevco	2/02/05
Chest Z	P27020	Endevco	2/02/05
Pelvis X Accelerometer	AJ9D9	Endevco	6/03/05
Pelvis Y Accelerometer	AJ820	Endevco	6/03/05
Pelvis Z Accelerometer	AGM47	Endevco	6/03/05
Lumbar Load Cell	91	Denton	3/04/03

VEHICLE INSTRUMENTS CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Lower A-Post Y	C04-L06	Entran	3/24/05
Left Mid A-Post Y	C04-L14	Entran	3/24/05
Left Lower B-Post Y	B19-Z09	Entran	3/09/05
Left Mid B-Post Y	C06-L02	Entran	3/24/05
Floorpan @ Rear Axle X	C29-L16	Entran	4/28/05
Floorpan @ Rear Axle Y	C29-L27	Entran	4/28/05
Floorpan @ Rear Axle Z	C29-L20	Entran	4/28/05
Driver Seat Track Y	L18-J07	Entran	3/17/05
Right Front Sill X	C06-L07	Entran	3/24/05
Right Front Sill Y	C06-L05	Entran	3/24/05
Right Front Sill Z	C06-L06	Entran	3/24/05
Left Rear Sill Y	C10-Z04	Entran	4/22/05
Left Front Sill Y	C21-G10	Entran	4/28/05
Vehicle CG X	C15-L10	Entran	4/22/05
Vehicle CG Y	C15-L07	Entran	4/22/05
Vehicle CG Z	C21-G09	Entran	4/22/05
Left Front Door @ Pelvis	E05-Z48	Entran	6/28/05
Left Front Door @ Arm	E05-Z51	Entran	6/28/05
Left Front Door @ Knee	L17-D08	Entran	3/17/05
Left Front Door @ Mid Rib	B19-Z13	Entran	3/03/05
Left A-Post @ Sill Y	C12-R25	Entran	4/28/05
Left B-Post @ Sill Y	C21-G12	Entran	4/28/05
Upper Engine X	B26-Z12	Entran	3/17/05
Upper Engine Y	B26-Z02	Entran	3/17/05
Firewall Y	C06-L18	Entran	3/24/05