

REPORT NUMBER: TO11-MGA-2003-006

FULL SCALE SIDE IMPACT POLE TESTS OF BASELINE VEHICLES

**SID IIs with Floating Rib Guides
Task Order T0007 / RFP 0011**

**FORD MOTOR COMPANY
2002 FORD EXPLORER
NHTSA NUMBER: R21315**

**PREPARED BY:
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TEST DATE: March 10, 2003

FINAL REPORT SUBMITTED: September 2, 2003

**PREPARED FOR:
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VOLPE NATIONAL TRANSPORTATION SYSTEM CENTER
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This final test report was prepared for the U.S. Department of Transportation, Volpe National Transportation System Center, in response to Contract Number DTRS57-98-D-00041.

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SECTION 1
PURPOSE AND TEST PROCEDURE

This Side Impact test is conducted as part of Contract No. DTRS57-98-D-00041, task order 11, 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 SID IIs with floating rib guides in a 2002 Ford Explorer, 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.

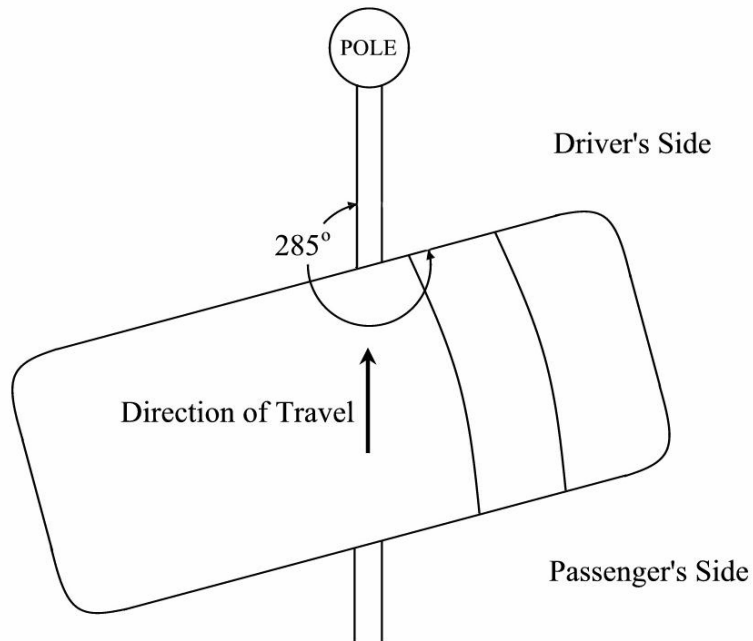
SECTION 2

SUMMARY OF SIDE IMPACT TEST

A rigid pole side impact test at 285 degrees was performed on a 2002 Ford Explorer. The subject vehicle was towed into a rigid pole at a velocity of 31.9 km/h. The weight of the vehicle as tested was 2218.6 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on March 10, 2003. Pre- and post-test photographs of the test vehicle and the dummies are included in Appendix A.

One SID IIS side impact dummy with floating rib guides was placed in the left front designated seating position according to instructions specified in the FMVSS 208 Laboratory Test Procedure (TP208-12), appendix G which is dated January 14, 2003. The side impact event was documented by ten high speed cameras. 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. Appendix E contains the dummy peak responses.



SECTION 2...(continued)
SUMMARY OF SIDE IMPACT TEST

The following table summarizes the results of the Left Side Impact Test:

Rib Deflection (mm) CFC 180	
Upper Thorax Rib	-37
Mid Thorax Rib	-34
Lower Thorax Rib	-29
Upper Abdominal Rib	-28
Lower Abdominal Rib	-47
Rib Deflection Rate (m/sec) CFC 180	
Upper Thorax Rib	-3.9
Mid Thorax Rib	-3.6
Lower Thorax Rib	-3.4
Upper Abdominal Rib	-2.8
Lower Abdominal Rib	-5.5
Viscous Criteria CFC 180	
Upper Thorax Rib	0.8
Mid Thorax Rib	0.6
Lower Thorax Rib	0.5
Upper Abdominal Rib	0.3
Lower Abdominal Rib	0.8

Abdominal Forces (N) CFC 600	
Left Acetabulum Force	1768
Left Ilium Crest Force	5475
Right Ilium Crest Force	937
Pubic Symphysis Force	-642
Sum of Left Acetabulum and Left Ilium	7141

		Left Front
HIC 15	T1 (msec)	55.7
	T2 (msec)	56.7
	T2 – T1 (msec)	1.0
	HIC	4595

Fir Filtered	Left Front
Upper Thorax Rib Y (g's)	117.2
Mid Thorax Rib Y (g's)	104.2
Lower Thorax Rib Y (g's)	154.6
Upper Abdominal Rib Y (g's)	85.6
Lower Abdominal Rib Y (g's)	149.4
Lower Spine Y (g's)	98.0
Pelvis Y (g's)	83.3

TEST NOTES

The dummy and vehicle X and Y velocities presented in this report do not contain the correct initial velocity. The correct initial velocities should be:

X – Test Speed * Sine 15 Degrees

Y – Test Speed * Cosine 15 Degrees

The SID IIS was fitted with floating rib guides.

The curtain side airbag was deployed with a remote firing system 13 msec after vehicle contact with the pole.

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

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003

TEST VEHICLE INFORMATION

Make	Ford
Model	Explorer
Body Style	SUV
VIN	1FMDU75W72ZA66213
Color	Painted Orange
Odometer Reading (mile)	10,365
Transmission	4 Sp Automatic
Final Drive	4 WD
Number of Cylinders	8
Engine Displacement (L)	4.6
Engine Placement	Longitudinal

TEST VEHICLE OPTIONS

Front Airbag	Yes
Side Airbags	Curtain
Power Windows	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Power Brakes	Yes
Anti-lock Brakes	No
AM/FM/CD	Yes
Cruise Control	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.	GVWR (kg)	2648
Date of Manufacture	7/01	GAWR Front (kg)	1240
		GAWR Rear (kg)	1508

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	207	241
Recommended Tire Size	P245/70R16	P245/70R16
Tire Size on Vehicle	P245/70R16	P245/70R16
Tire Manufacturer	Goodyear	Goodyear

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket	Bench	
Number Of Occupants x 68.04 kg.	136.1	204.1	136.1	476.3

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	549.8	500.3		580.2	529.8	
Right	kg	553.4	500.3		587.4	521.2	
Ratio	%	52.4	47.6		52.6	47.4	
Totals	kg	1103.2	1000.6	2103.8	1167.6	1051.0	2218.6

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Vehicle Target Weight	kg	2219*

*Set To Match Previous Tests

TEST VEHICLE ATTITUDES

	Unit	As Delivered	Fully Loaded	Ready for Test
Right Door Sill Angle	Deg	0.8 ND	0.5 ND	0.8 ND
Left Door Sill Angle	Deg	1.1 ND	0.9 ND	0.9 ND
Front Bumper Angle	Deg	0.2 RD	0.0	0.1 RD
Rear Bumper Angle	Deg	0.1 RD	0.0	0.0

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	2885
Total Vehicle Length at Left Side	mm	4030
Total Vehicle Length at Centerline	mm	4905
Total Vehicle Length at Right Side	mm	4030
Total Vehicle Width	mm	1808
Weight of Ballast in Cargo Area	kg	0
Amount of water in Fuel Tank	liters	37.8

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Actual Impact Point	mm	18 Rear

DATA SHEET NO. 1... (continued)

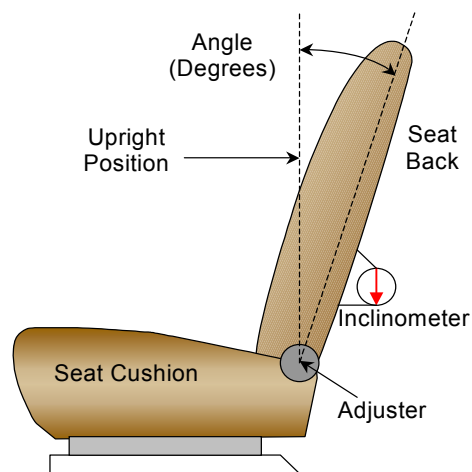
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003

NORMAL DESIGN RIDING POSITION

Driver seat back angle: 6.5 degrees on seat frame



FRONT SEAT ASSEMBLY

SEAT FORE/AFT POSITIONS

The driver's seat is electronically operated.

Driver seat fore/aft total travel: 250 mm

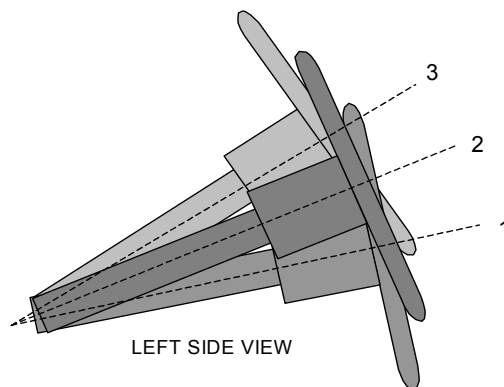
Driver seat fore/aft position: 5 mm back from full forward

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.



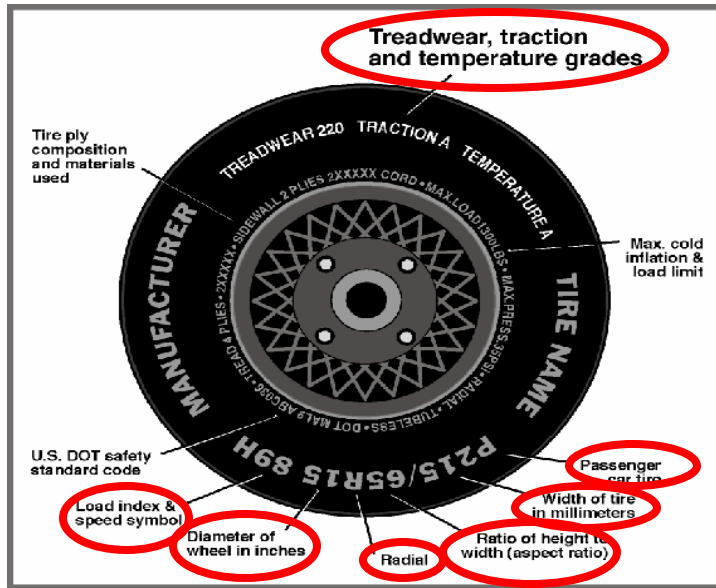
STEERING COLUMN ASSEMBLY

DATA SHEET NO. 2
TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003

Vehicle Year	2002	Vehicle Make	Ford
Vin	1FMDU75W72ZA66213	Vehicle Model	Explorer



	Front	Rear
Tire Manufacturer	Goodyear	Goodyear
Tire Name	Eagle LS	Eagle LS
Tire Type	Passenger	Passenger
Tire Width (mm)	245	245
Ratio of Height to Width (aspect ratio)	70	70
Radial	Radial	Radial
Wheel Diameter	16	16
Load Index & Speed Symbol	106S	106S
Treadwear	360	360
Traction Grade	A	A
Temperature Grade	B	B

DATA SHEET NO. 3
POST TEST OBSERVATIONS

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front
Dummy Type	SID IIS
Head Contact	Side headliner, curtain airbag
Upper Torso Contact	Door trim panel
Lower Torso Contact	Armrest
Left Knee Contact	Lower door trim panel
Right Knee Contact	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	Left side shattered
Window Damage	Left side windows down for test
Other Notable Effects	None

AIRBAG DEPLOYMENT

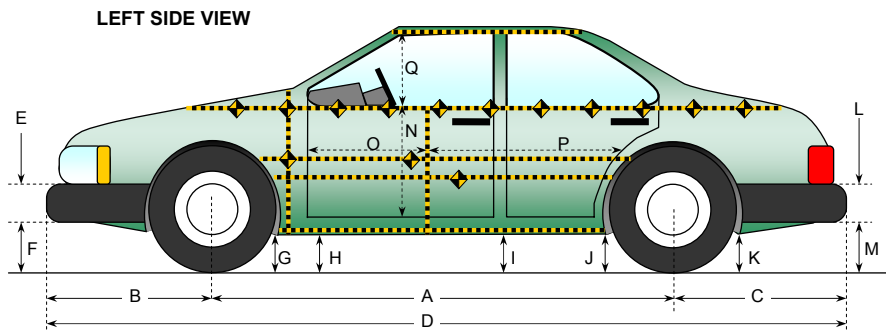
	Driver
Front	No
Side	None
Curtain	Yes

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 4
VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003



All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2885	2828	57
B	Front Axle to FSOV	880	823	57
C	Rear Axle to RSOV	1140	1132	8
D	Total Length at Centerline	4905	4783	122
E	Front Bumper Thickness	77	77	0
F	Front Bumper Bottom to Ground	732	756	-24
G	Sill Height at Front Wheel Well	353	364	-11
H	Sill Height at Front Door Leading Edge	328	298	30
I	Sill Height at "B" Pillar	335	318	17
J1	Sill Height at Rear Wheel Well	383	384	-1
J2	Pinch Weld Height at Rear Wheel Well	338	329	9
K	Sill Height Aft of Rear Wheel Well	500	495	5
L	Rear Bumper Thickness	85	85	0
M	Rear Bumper Bottom to Ground	562	568	-6
N	Sill Height to Window Bottom Sill	750	768	-18
O	Front Door Leading Edge to Impact CL	608	485	123
P	Rear Door Trailing Edge to Impact CL	1542	1390	152
Q	Front Window Opening	460	425	35
R	Right Side Length	4030	3879	151
S	Left Side Length	4030	4030	0
T	Vehicle Width at "B" Post	1808	1702	106

DATA SHEET NO. 5

SID IIS CLEARANCE DIMENSIONS

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003

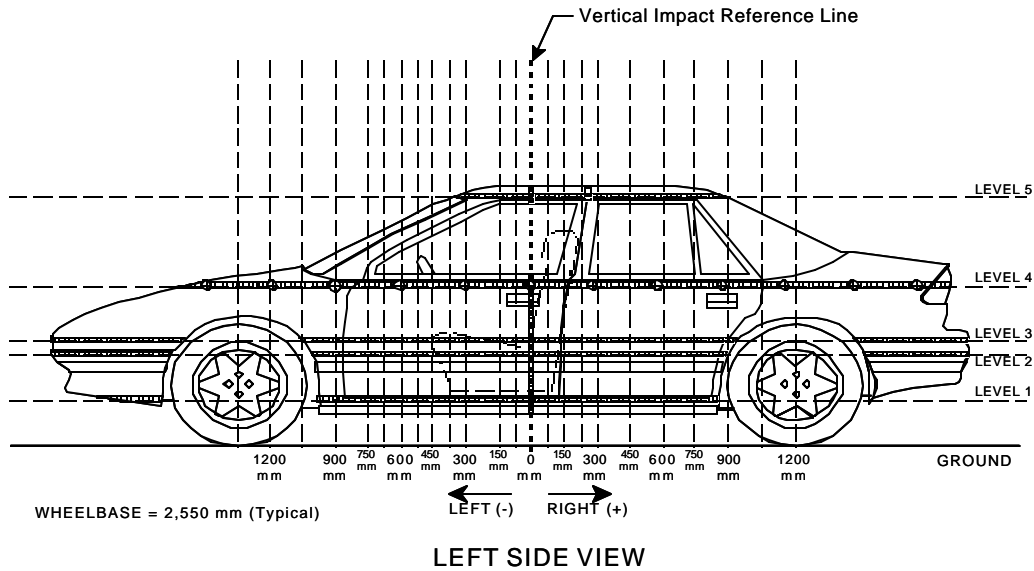
AA	Ankle to Ankle	Taken between the center points of both ankles, after the feet are placed	239
AD	Arm to Door	Horizontal measurement taken from the center point of the elbow to the first contact point of the door panel	152
HA	Head to A pillar	Horizontal measurement taken from the center of the head's outboard CG target to the A pillar	310
HCM	Hub to Chest	Minimum horizontal distance measured from the hub to the dummy's chest	118
HD	H point to Door	Horizontal measurement taken from the H point hole to the first contact point of the door panel	167
HH	Head to Header	Taken from center point between eyes to header directly in front of dummy	236
HR	Head to Roof	Taken from the center of the outboard target to the roof edge (not the upper edge of the car door), perpendicular to the long axis of the car. If a tape measure is held from the target and extends below the roof, the point to measure is at the low edge of the roof line, which will make contact with the tape measure	221
HS	Head to Side Window	Taken from the center of the outboard target to the side window, measured horizontally and perpendicular to the long axis of the car. In cases where the window is not fully up, a flat bar should be placed across the window opening to simulate the position of the window.	283
HW	Head to Windshield	Taken from the center point between the dummy's eyes to the point on the windshield directly level with the dummy's forehead.	412
KDL	Knee to Dash Left	Taken from the knee pivot point to the point on the dash that is directly level with the center of the knee.	100
KK	Knee to Knee	With the legs in a vertical plane after the feet are placed, the measurement is taken from outside flange to outside flange.	211
NAS	Neck Angle Seated	Taken from the neck when the dummy is seated across two of the "vertebral discs" of the neck.	6.6
NR	Nose to Rim	Taken from the tip of the nose to the steering wheel rim at the 12 o'clock position.	173
PA	Pelvic Angle	Taken by placing an inclinometer on the H point bar.	19.7
RA	Rim to Abd	Taken from the point where the bottom of the chest jacket and the pelvic structure meet to the steering wheel rim at the 6 o'clock position	37
SA	Seat Back Angle	Taken from the lower left corner of the driver seat frame, above the pivot, below the joint.	6.5
SCH	Steering Wheel to Chest	Horizontal measurement taken from the center of the steering wheel to the dummy's chest.	118
SCR	Steering Wheel to Chest	Taken from the center of the steering wheel to the top of the rib guide.	121
SHH	Striker to H point Horizontal	Taken from the H point to the driver door striker.	343
SHV	Striker to H point Vertical	Taken from the H point to the driver door striker. Value is negative if the striker is above the H point and positive if the striker is below the H point.	-7
SK	Striker to Knee	Taken from the center point of the knee to the striker.	752
SKA	Striker to Knee Angle	Taken on top of the tape measure while it is extended from the center point of the knee to the striker.	3.0

DATA SHEET NO. 6
VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003

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	1717
4	Window Sill	1211
3	Mid Door	941
2	Occupant H-Point	886
1	Sill Top	504

DATA SHEET NO. 7
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1650				294					285					-9	
-1500				275					268					-7	
-1350				261					258					-3	
-1200				251					257					6	
-1050			165	245				176	253				11	8	
-900		167	184	238			173	192	243			6	8	5	
-825		189	193	237			194	198	240			5	5	3	
-750	234	197	196	235		224	200	201	237		-10	3	5	2	
-675	232	197	196	232		223	199	199	233		-9	2	3	1	
-600	229	197	195	231		221	177	177	230		-8	-20	-18	-1	
-525	235	196	194	232		250	218	216	230		15	22	22	-2	
-450	227	196	194	232		273	256	253	258		46	60	59	26	
-375	227	195	193	234		301	295	291	288		74	100	98	54	
-300	226	195	193	232		336	297	333	333		110	102	140	101	
-225	226	195	192	232		375	383	379	376		149	188	187	144	
-150	225	194	192	232		423	429	429	430		198	235	237	198	
-75	225	194	192	230		468	485	486	490		243	291	294	260	
0	226	194	192	230	433	512	536	534	546	583	286	342	342	316	150
75	227	194	192	230	429	549	563	565	572	594	322	369	373	342	165
150	227	194	192	230	429	518	550	552	559	580	291	356	360	329	151
225	227	194	192	229	428	451	507	505	518	539	224	313	313	289	111
300	227	194	192	228	429	390	437	441	449	497	163	243	249	221	68
375	228	195	192	228	429	325	365	370	380	455	97	170	178	152	26
450	227	195	192	229	429	275	300	302	321	416	48	105	110	92	-13
525	235	194	191	229	429	290	267	268	318	378	55	73	77	89	-51
600	228	194	192	229	430	275	259	257	309	452	47	65	65	80	22
750	230	196	194	230	433	258	243	241	292	447	28	47	47	62	14
900	233	199	195	232	434	242	227	222	274	442	9	28	27	42	8
1050	235	200	197	236	435	226	208	204	258	437	-9	8	7	22	2
1200	239	202	200	240	437	207	192	188	243	431	-32	-10	-12	3	-6
1350		172	189	239	437		148	167	226	425		-24	-22	-13	-12
1500			165	242	441			111	205	440			-54	-37	-1
1650				245	445				239	445				-6	0
1800				249	449				241	448				-8	-1
1950				251	453				245	453				-6	0
2100				256	461				244	461				-12	0
2250				262	463				242	463				-20	0

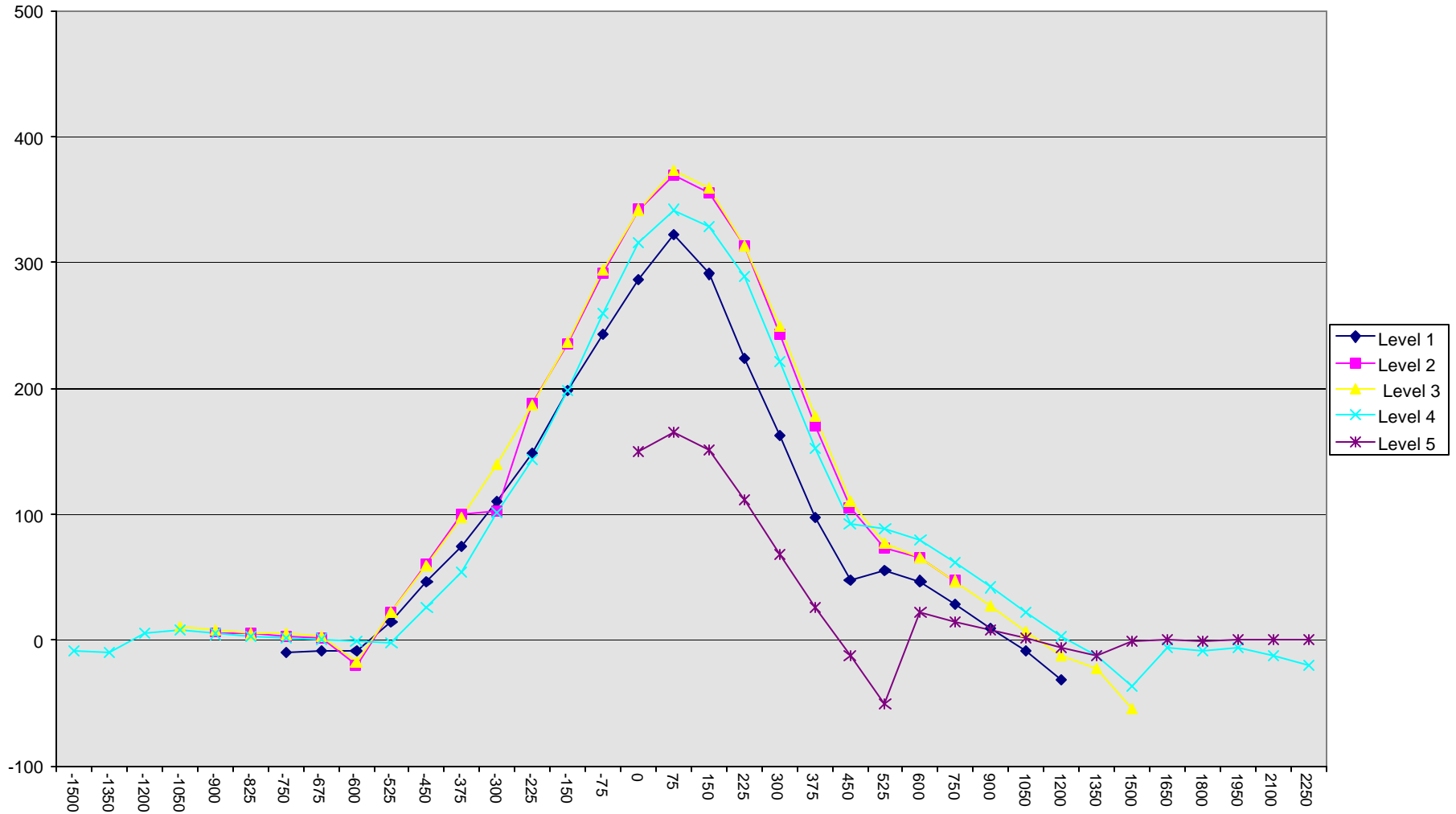
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body. Measurements in mm.

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

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003

16

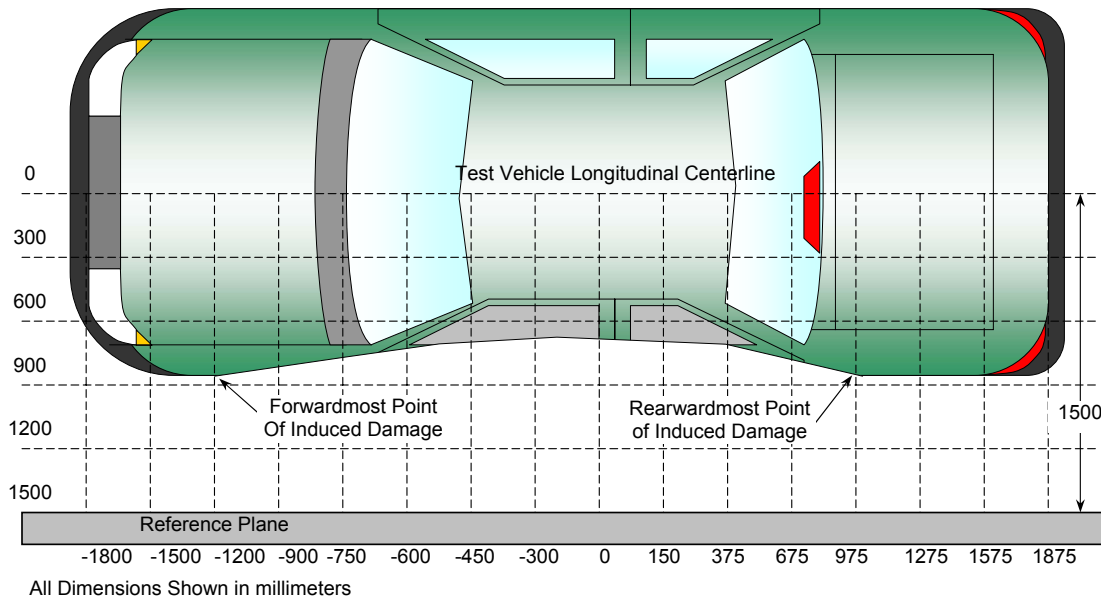


Measurement in mm.

DATA SHEET NO. 8
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003



TOP VIEW

Damage Profile Distances

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2400 mm	4	299	299	0
2	1736 mm	4	247	240	-7
3	957 mm	2	199	217	18
4	21 mm	2	194	557	363
5	-833 mm	3	192	198	6
6	-1650 mm	4	294	290	-4

Reference plane is parallel to test vehicle longitudinal centerline.

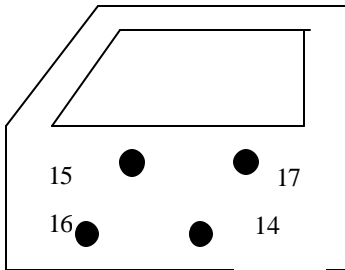
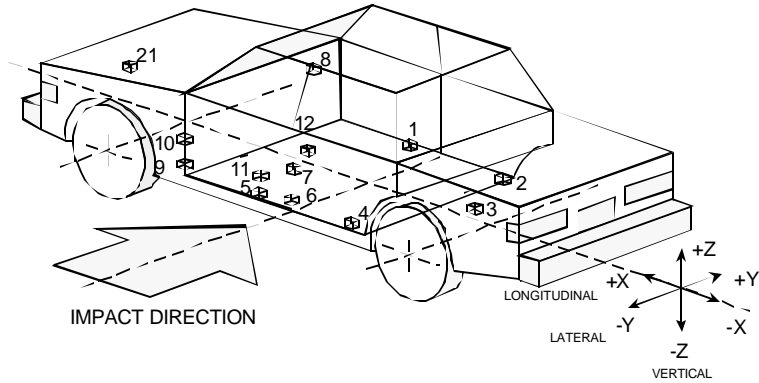
Given dimensions = Reference plane to car body.

DATA SHEET NO. 9

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003



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

No.	Location
12	Vehicle CG
13	Left A-Pillar @ Roof
14	Left Front Door @ Pelvis
15	Left Front Door @ Arm
16	Left Front Door @ Knee
17	Left Front Door @ Rib
19	Left Driver Seat Frame
20	Right Driver Seat Frame
21	Lower Center Radiator Support

DATA SHEET NO. 9... (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003

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.	Max.
1	Right Side Sill at Front Seat	1.4	5.1	18.5	0.8	3.2	6.2	19.0
2	Right Side Sill at Rear Seat	3.1	9.5	15.5	1.9	3.2	6.3	18.2
3	Rear Floorpan Above Axle	1.6	4.7	14.6	0.7	2.9	9.1	15.3
4	Left Side Sill at Rear Door			19.1	3.9			
5	Left Side Sill at Front Door **			54.6	43.4			
6	Left Lower B-Post			20.8	8.8			
7	Left Mid B-Post			40.0	2.3			
8	Left Upper B-Post*							
9	Left Lower A-Post			25.8	13.0			
10	Left Mid A-Post			17.8	18.0			
11	Driver Left Seat Track			49.2	42.5			
12	Vehicle CG	3.3	10.0	28.9	0.6	23.0	20.2	31.5
13	Left A-Post at Roof*							
14	Left Front Door at Pelvis ***			146.7	1.0			
15	Left Front Door at Arm			100.2	60.6			
16	Left Front Door at Knee			71.4	52.4			
17	Left Front Door at Rib			111.4	51.2			
19	Left Driver Seat Frame			61.2	14.2			
20	Right Driver Seat Frame			93.3	16.4			
21	Lower Center Radiator Support	3.7	9.4	14.3	1.7	2.6	9.4	16.8

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

*= Not used to avoid interference with restraint system.

**=No valid data collected after 30 msec

***= No valid data collected after 20 msec

DATA SHEET NO. 9... (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003

VEHICLE ACCELEROMETER COORDINATES

Loc. No.	Description	Coordinates (mm)		
		X	Y	Z
1	Right Side Sill at Front Seat	2568	616	420
2	Right Side Sill at Rear Seat	1594	616	473
3	Rear Floorpan Above Axle	1134	0	734
4	Left Side Sill at Rear Door	1612	-652	383
5	Left Side Sill at Front Door	2538	-652	365
6	Left Lower B-Post	2240	-720	608
7	Left Mid B-Post	2262	-738	1158
8	Left Upper B-Post	*	*	*
9	Left Lower A-Post	3208	-732	574
10	Left Mid A-Post	3324	-828	1213
11	Driver Left Seat Track	2495	-559	603
12	Vehicle CG	2512	0	833
13	Left A-Pillar @ Roof	*	*	*
14	Left Door @ Pelvis	2455	-779	854
15	Left Door @ Arm	2792	-769	1094
16	Left Door @ Knee	2222	-574	1104
17	Left Door @ Rib	2222	-193	1109
19	Left Driver Seat Frame	4268	0	246
20	Right Driver Seat Frame	2568	616	420
21	Lower Center Radiator Support	1594	616	473

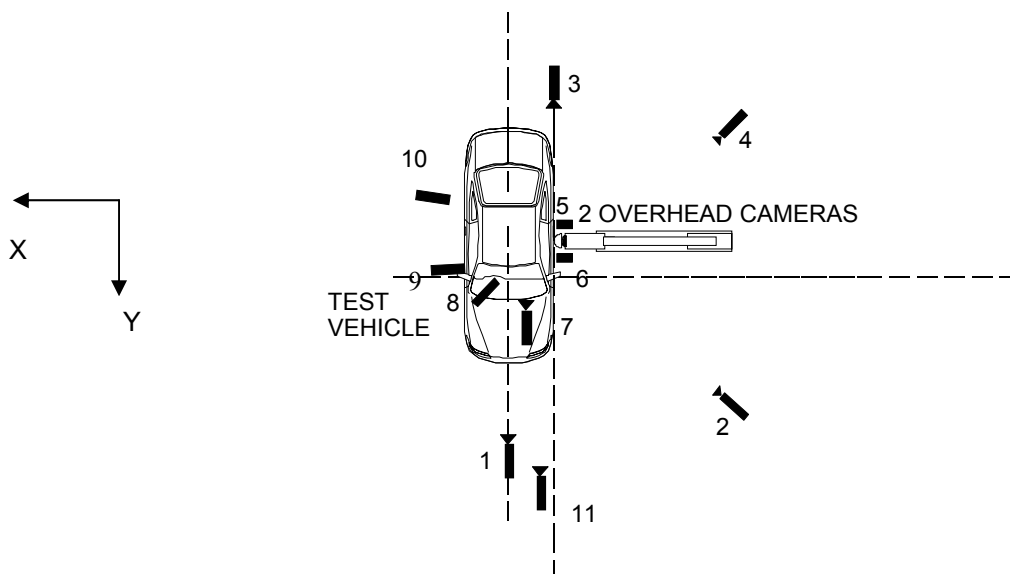
Sign Convention X – Rear Bumper (+ forward)
 Y – Vehicle Centerline (+ to right)
 Z – Ground Plane (+ up)

* = Not used to avoid interference with restraint system.

DATA SHEET NO. 10
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2002 Ford Explorer SUV

Test Date: March 10, 2003



TOP VIEW

No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Front Ground Level	500	9300	1560	25	823
2	Front Angle	-2600	3460	1450	50	1020
3	Rear Ground Level	580	-9170	1550	25	1047
4	Rear Angle	-2480	-5070	1460	50	1036
5	Overhead View	860	0	5000	8	1036
6	Overhead View, Close-up	0	0	5000	13	1015
7	Onboard Hood				13	526
8	Onboard Hip				13	524
9	Onboard Perp.				13	521
10	Onboard B-Post				13	513
11	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

A-2.



Post-Test Front View of Test Vehicle



Pre-Test Rear View of Test Vehicle

A-4.



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

A-7.



Pre-Test Left Front ¼ Side View of Test Vehicle

A-8.



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

A-9.



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

A-10.



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

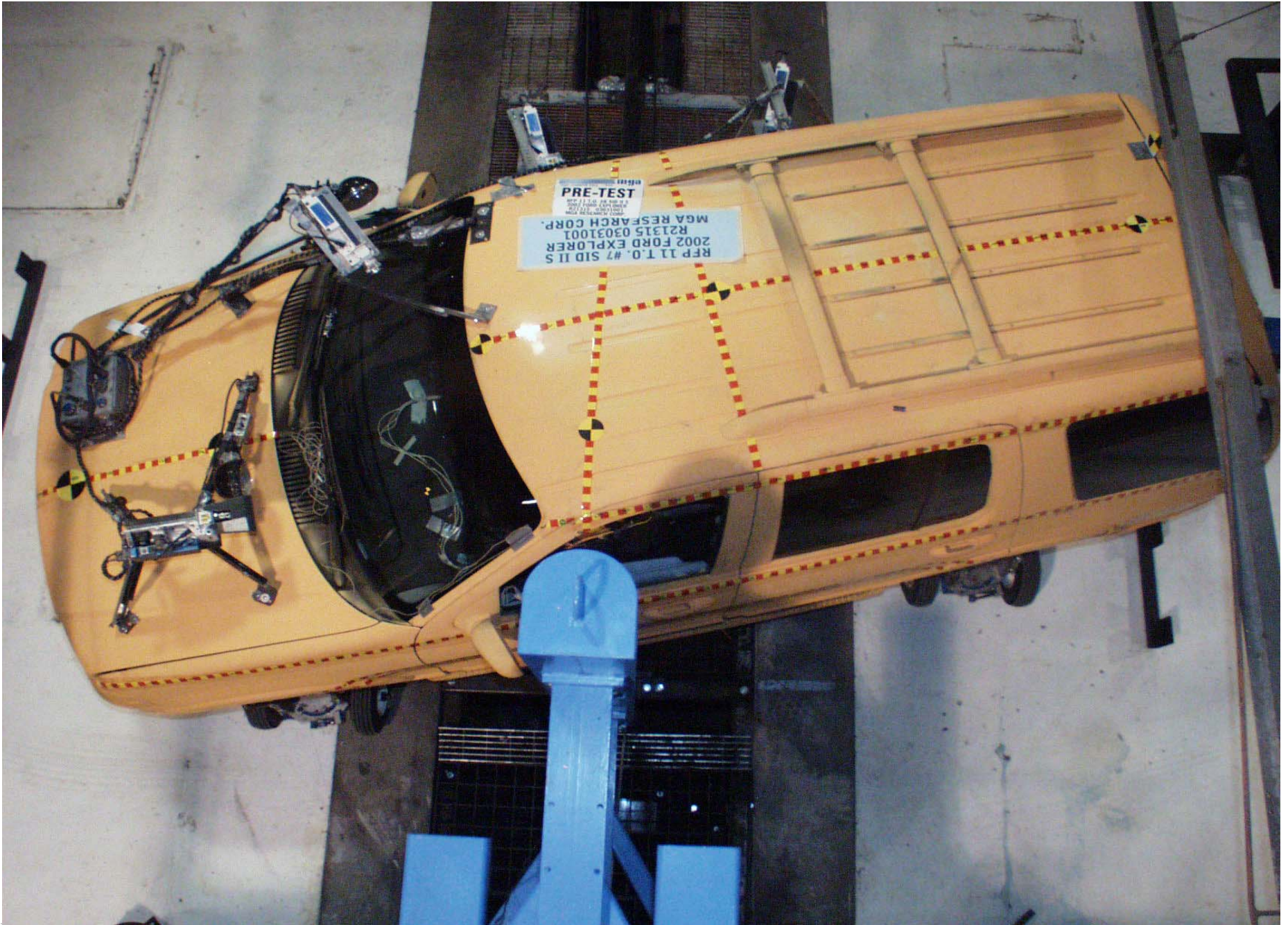
A-11.



Pre-Test Vehicle Positioned Against Pole (left side)

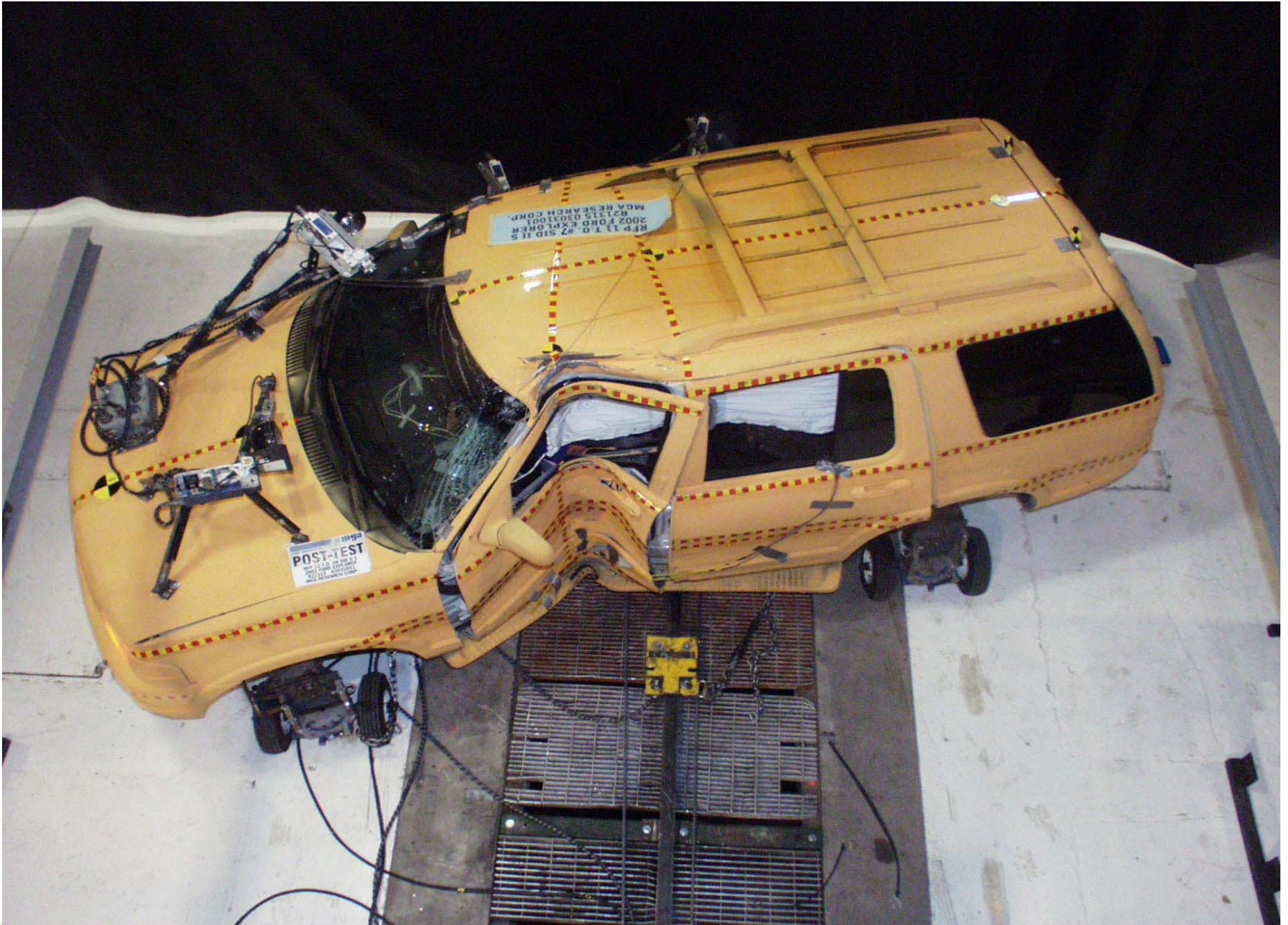


Pre-Test Vehicle Positioned Against Pole (right side)



Pre-Test Vehicle Positioned Against Pole Overhead View

A-14.



Post-Test Pole and Vehicle Overhead View



Pre-Test Driver Seat Position



mga . e s e a r c h c o r p o r a t i o n **mga**
PRE-TEST
RFP 11 T.O. #7 SID II S
2002 FORD EXPLORER
R21315 03031001
MGA RESEARCH CORP.

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 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 Impact Point on Vehicle



Post-Test Impact Point on Vehicle



Impact

MFD. BY FORD MOTOR CO. IN U.S.A.

DATE: 07/01	GVWR: 5840LB / 2648KG	
FRONT GAWR: 2735LB	REAR GAWR: 3325LB	
1240KG	1508KG	
P245/70R16SL	P245/70R16SL	WITH TIRES RIMS
16X7.0J	16X7.0J	PSI COLD
AT 207 kPa/30	AT 241 kPa/35	

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

VIN: 1FMDU75W72ZA66213
TYPE: MPV


F0044
T0062



EXT PNT:	WF	TS	IRC: 89	DSD:
WB BRK	INT TR	TP/PS	R AXLE	TR SPR
114 4	4M		1 45	R DB
				1U51A
				50B
			1200107262800 UTC	▽ 2U5A-1520472-AA

A-28.

Vehicle Certification Label

		A66213	
P245/70R16SL			
		207 KPA 30 PSI	241 KPA 35 PSI

Tire Placard

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA TRACES

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The dummy and vehicle X and Y velocities presented in this report do not contain the correct initial velocity. The correct initial velocities should be:

X – Test Speed * Sine 15 Degrees

Y – Test Speed * Cosine 15 Degrees

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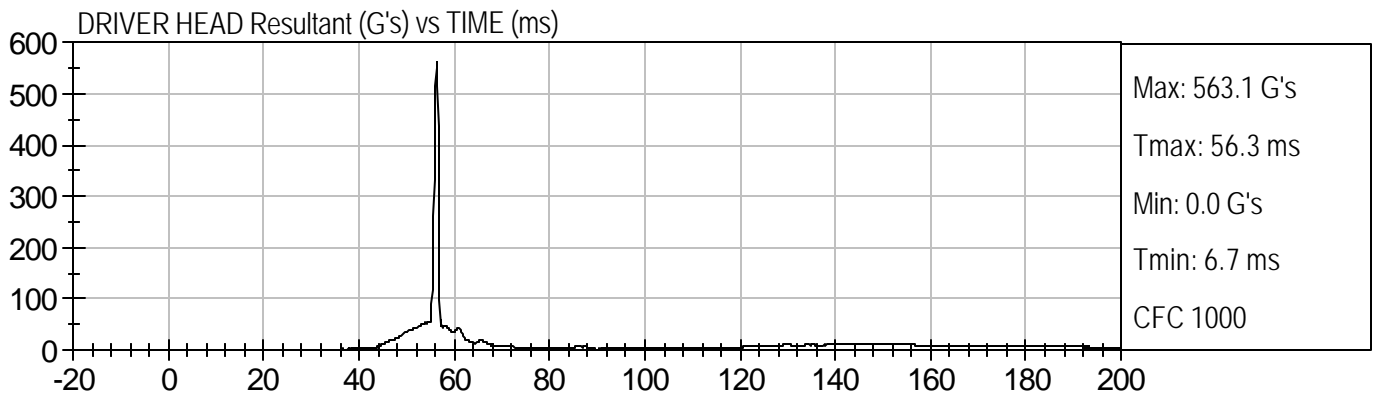
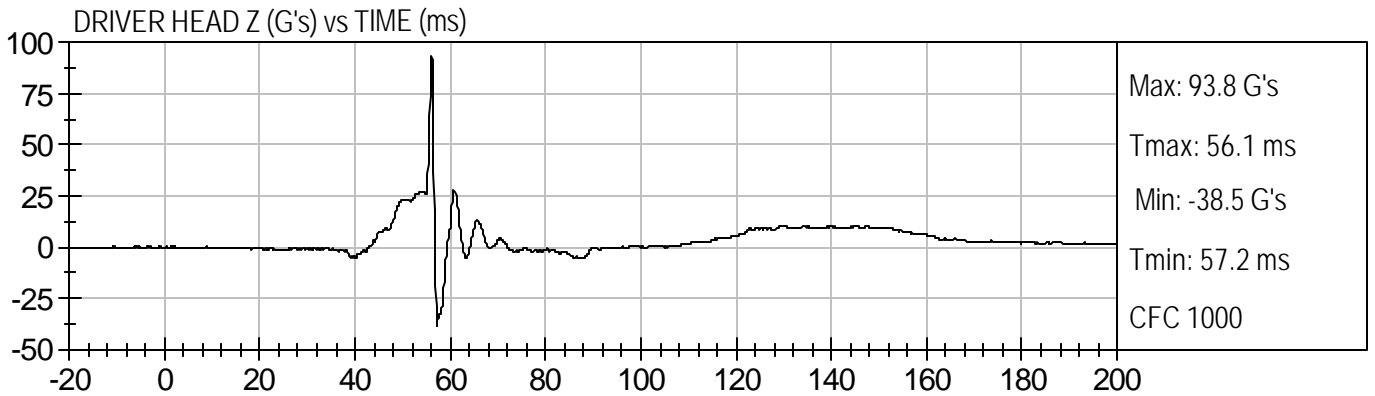
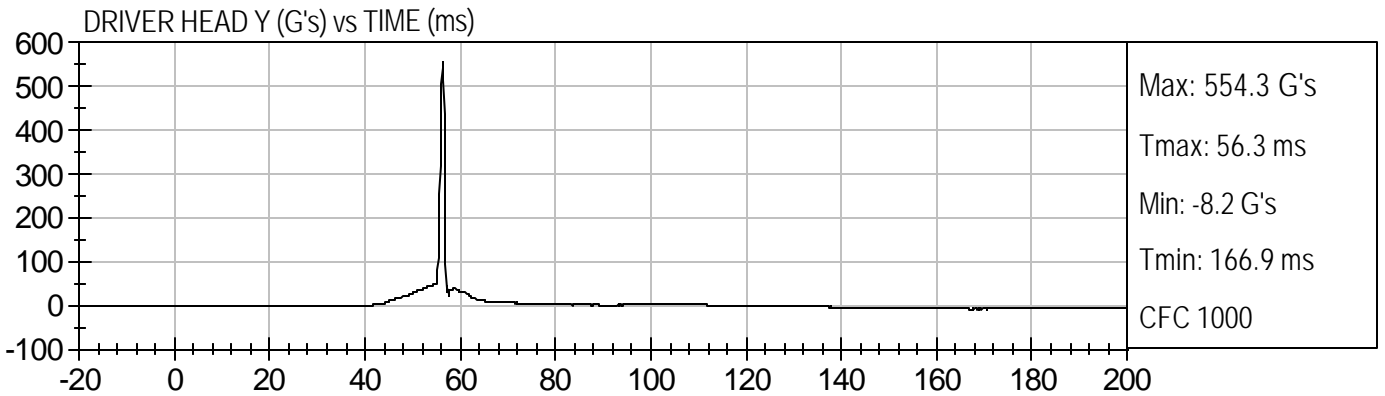
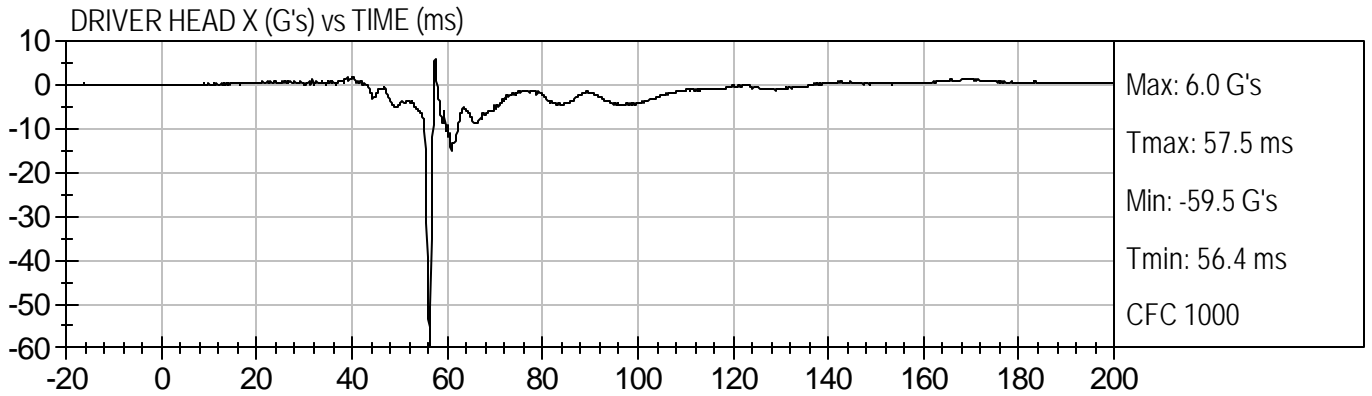
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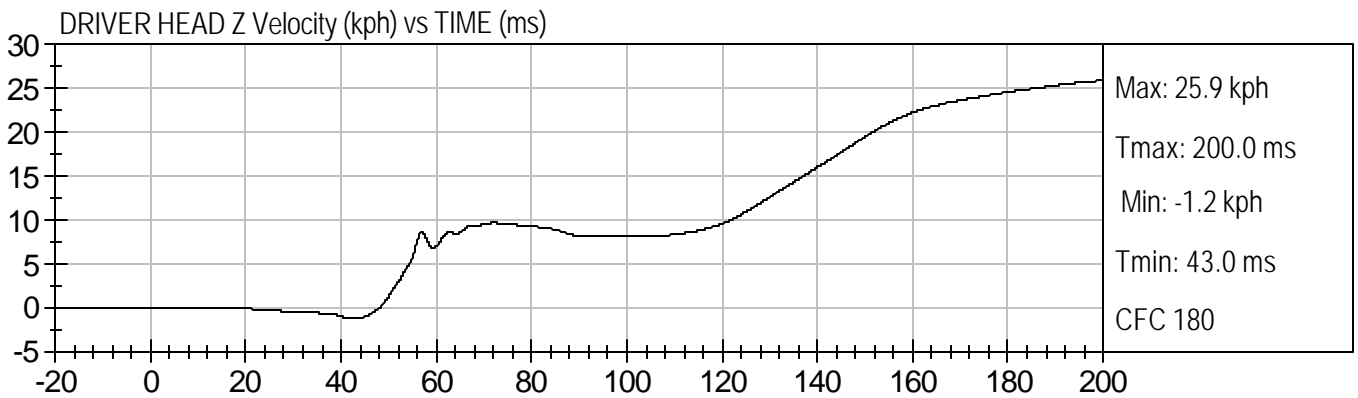
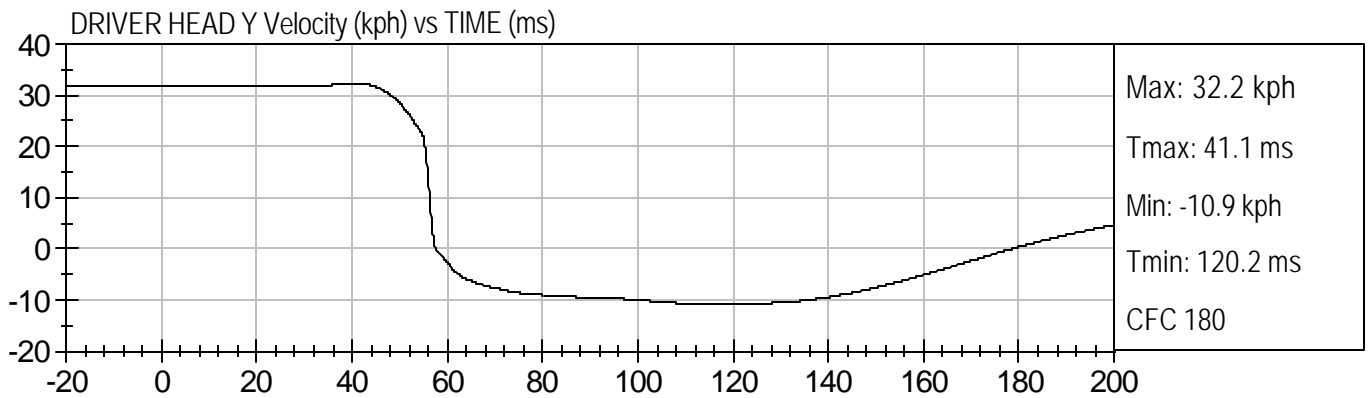
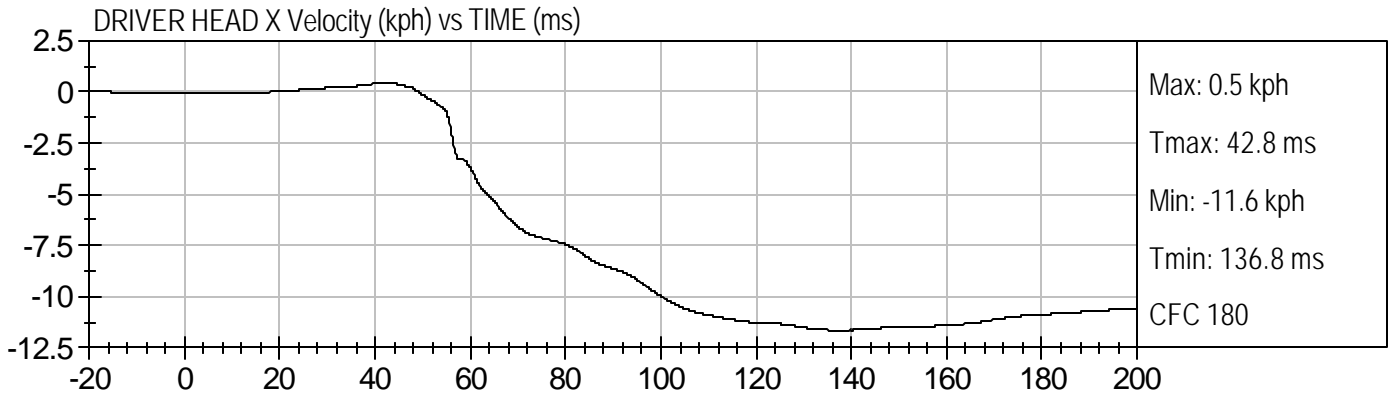
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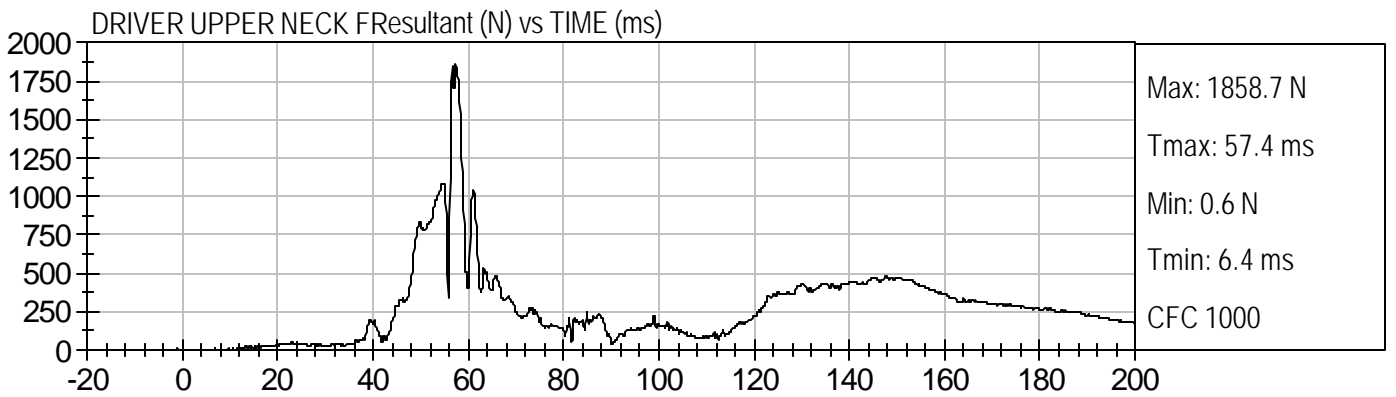
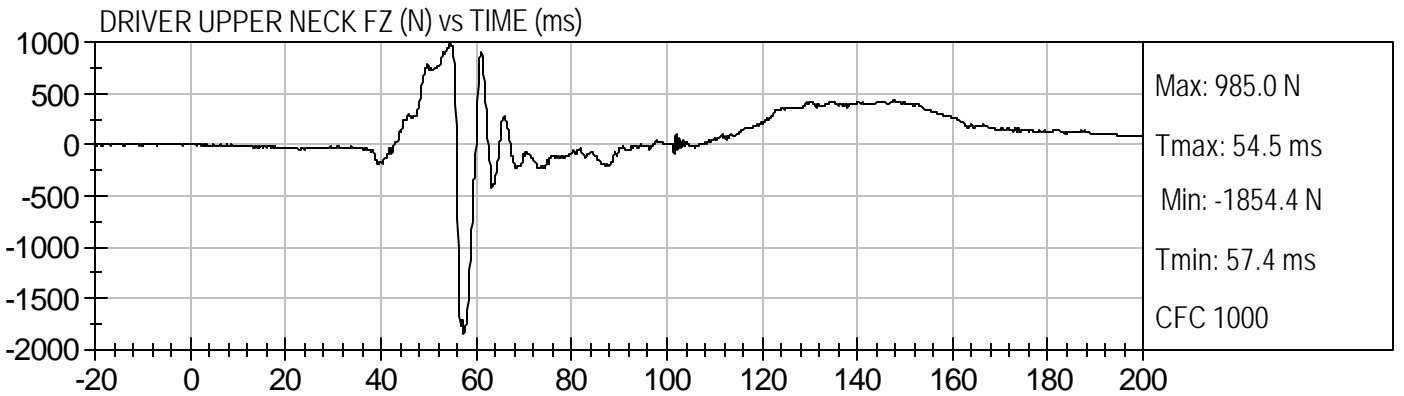
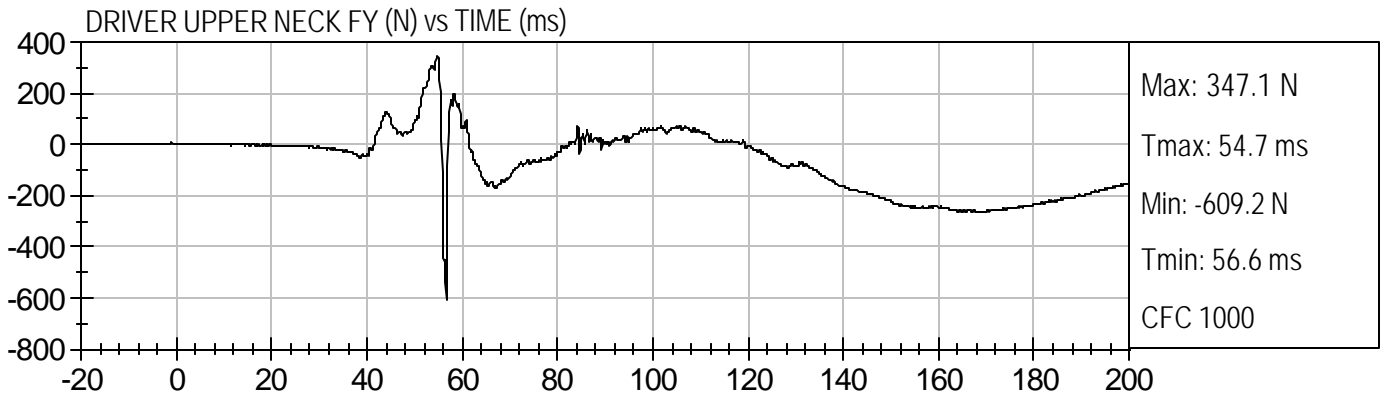
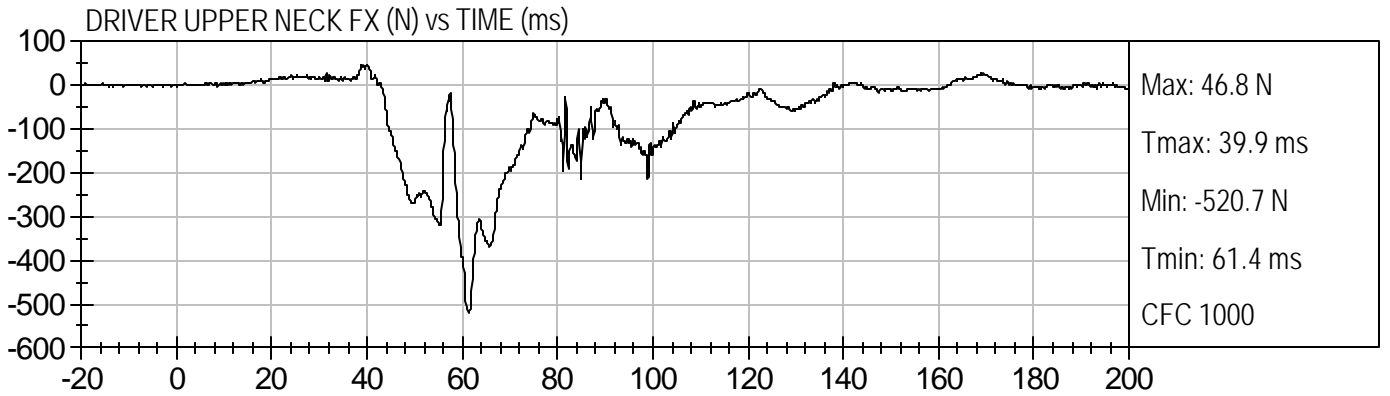
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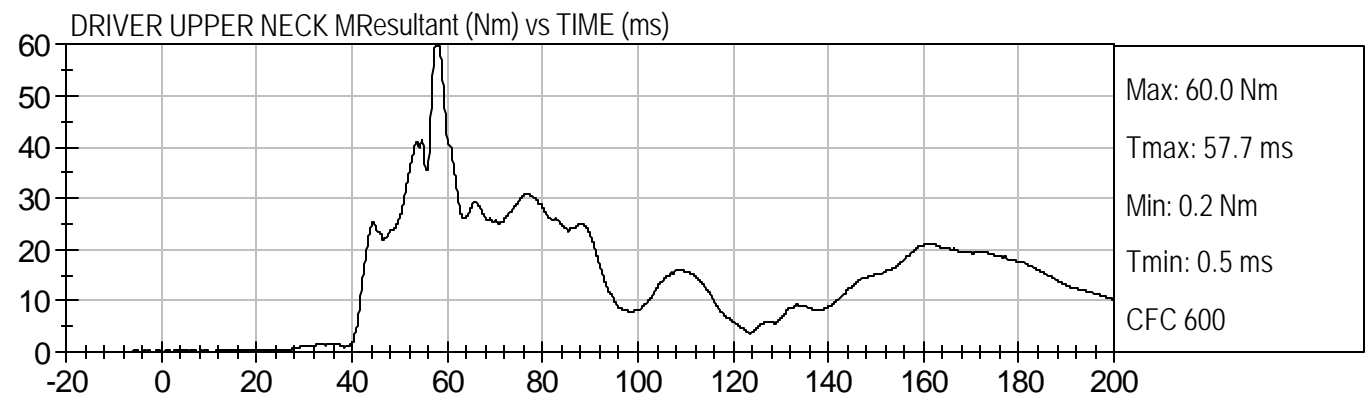
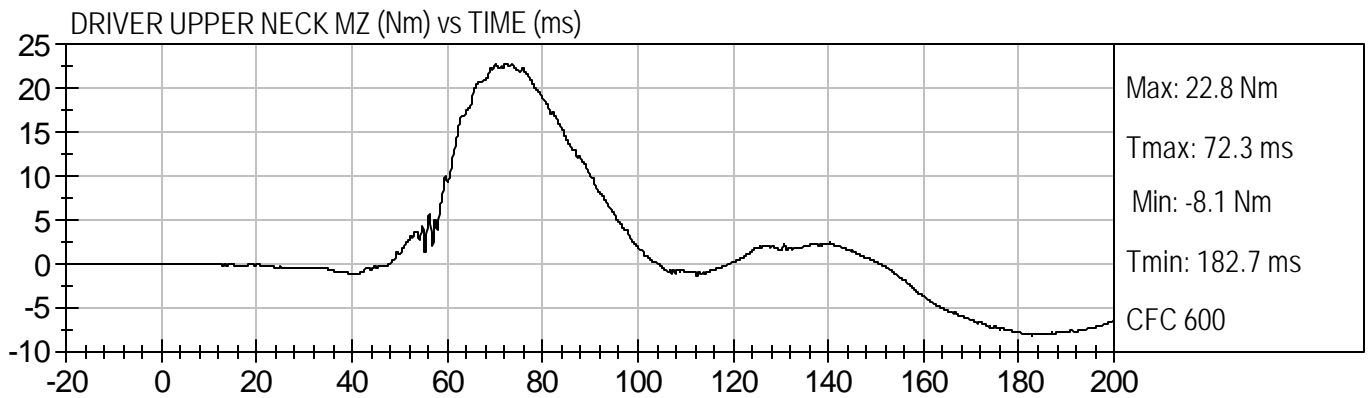
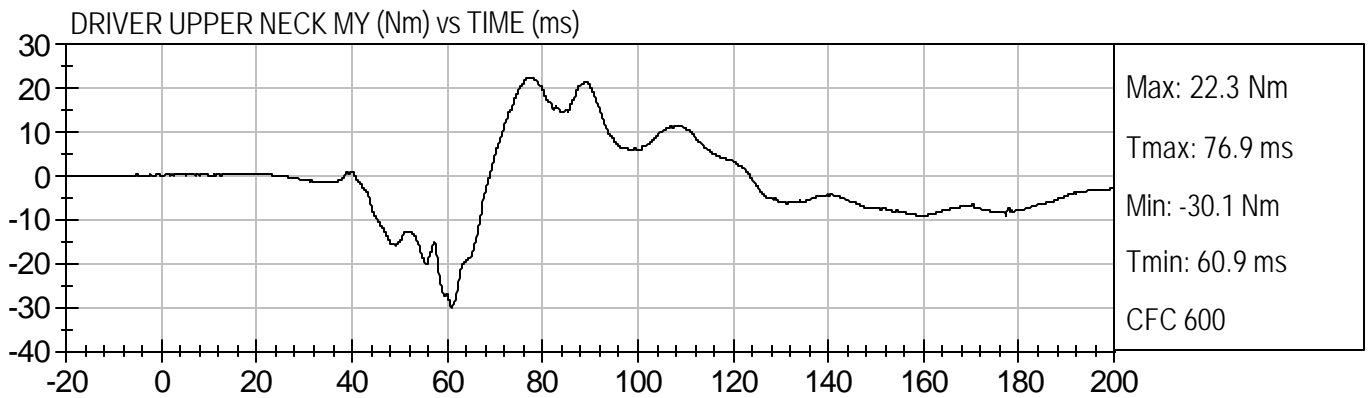
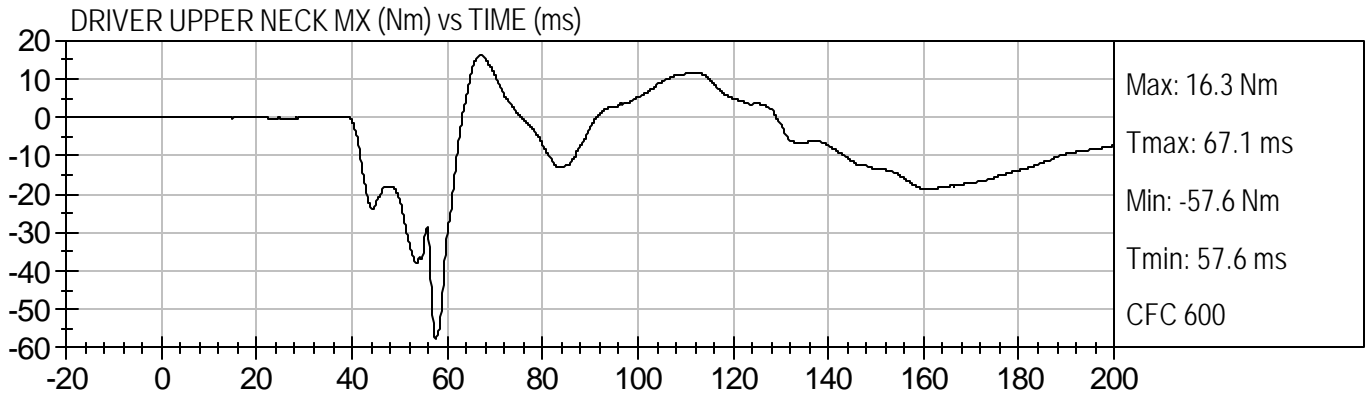
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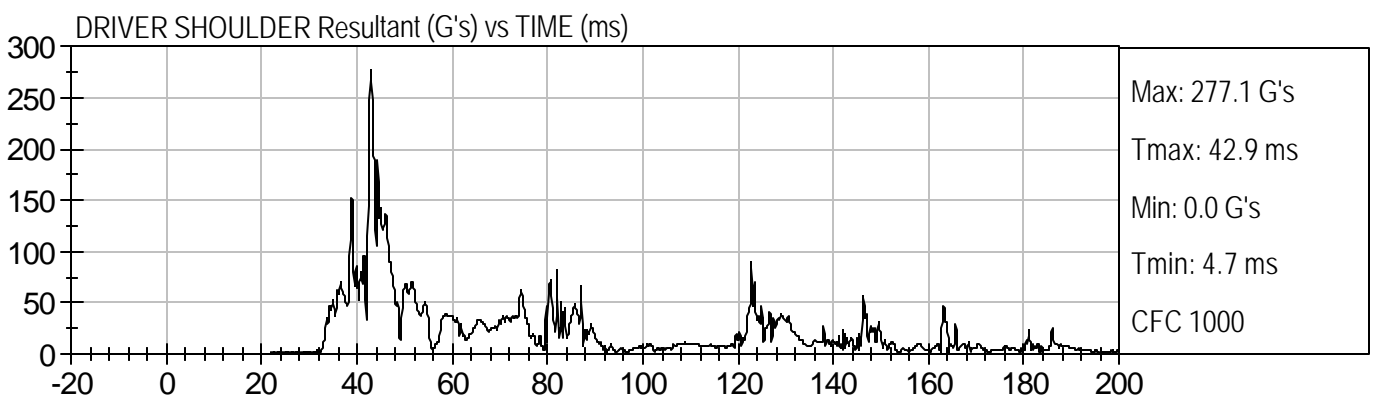
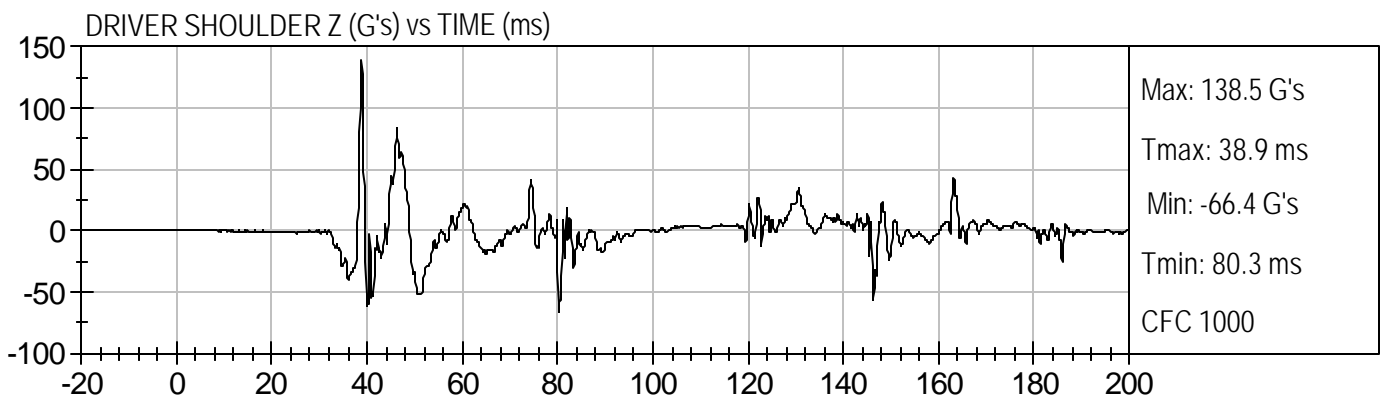
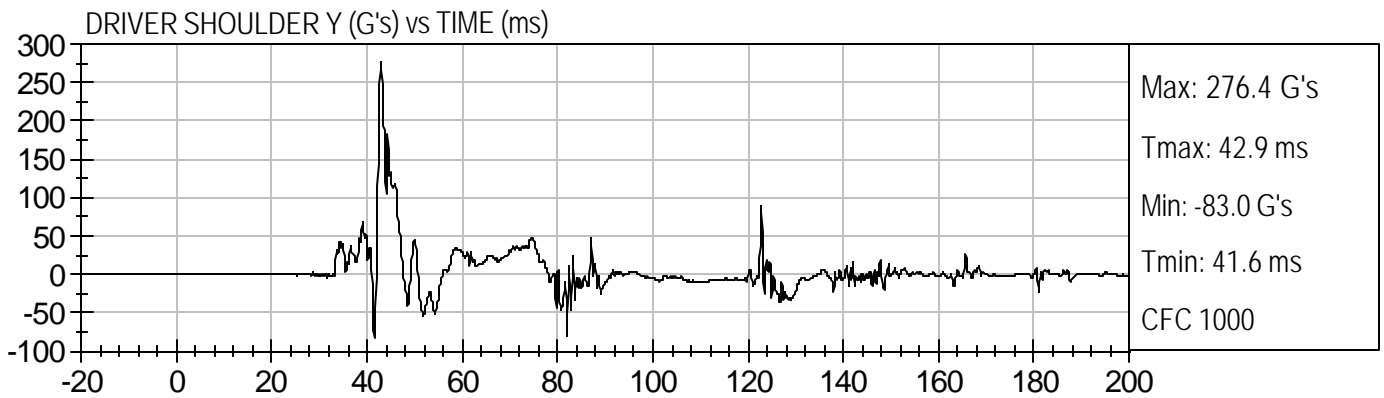
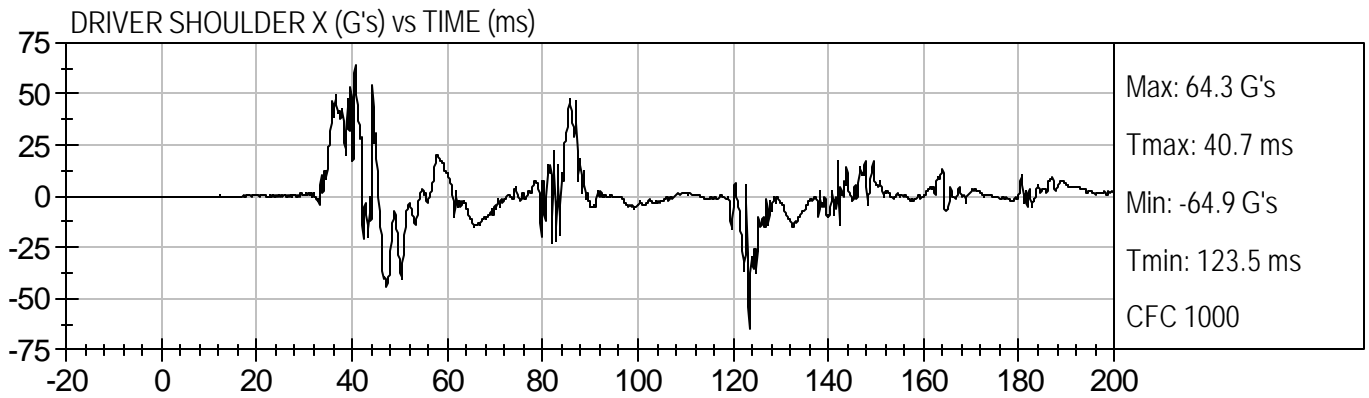
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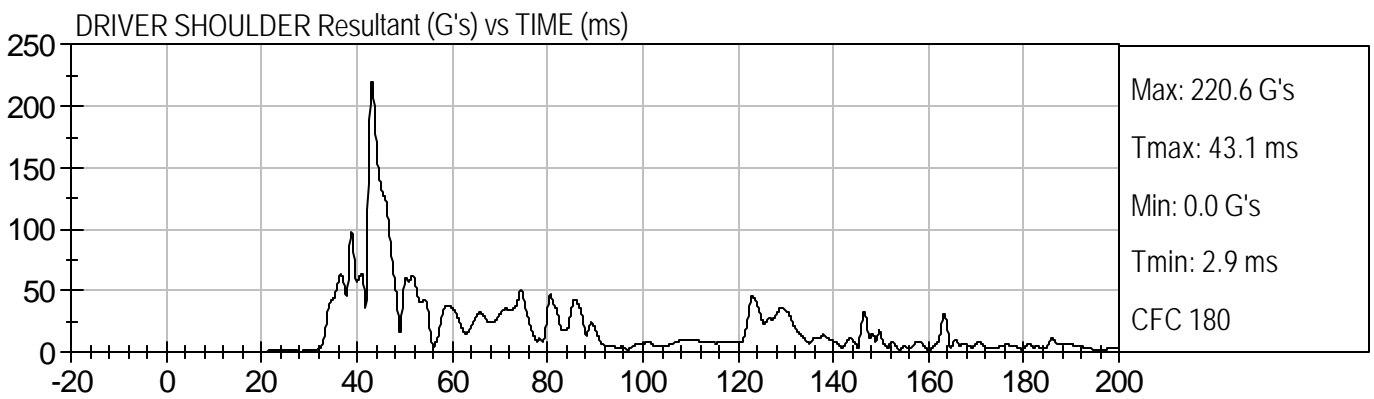
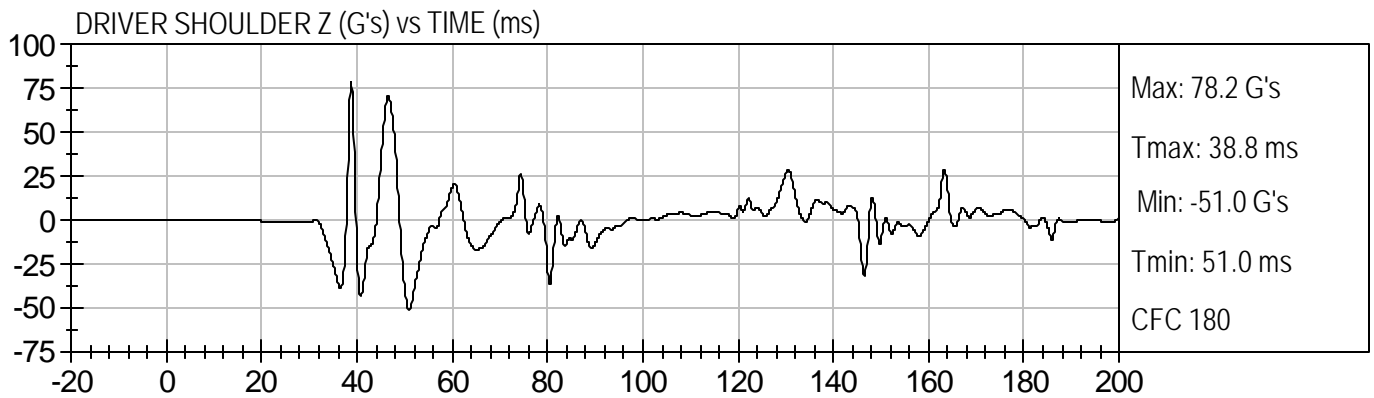
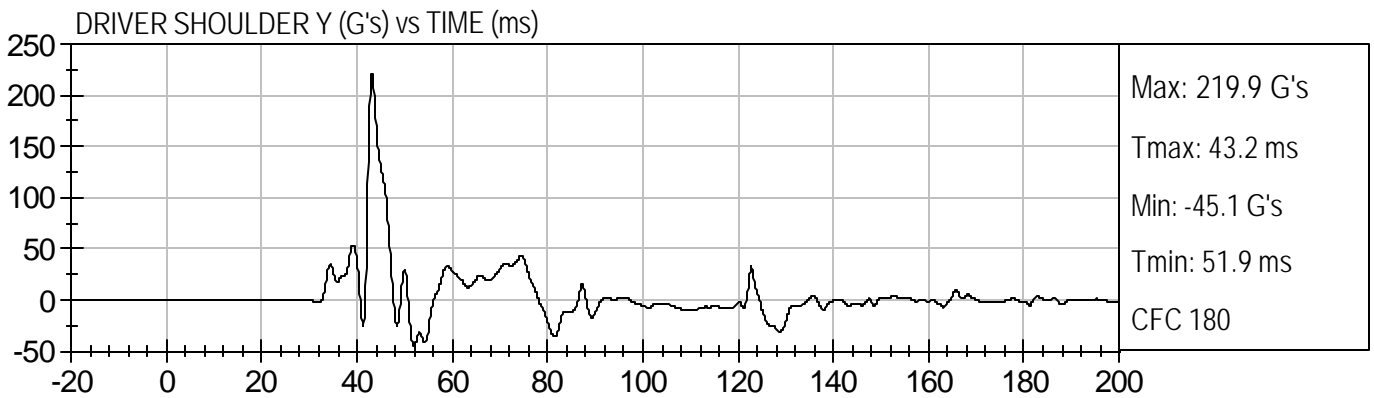
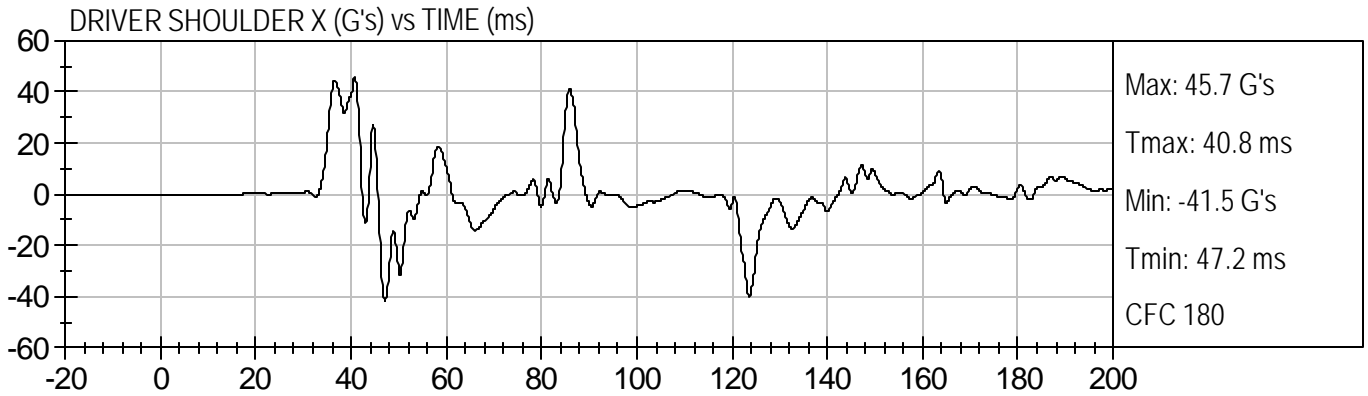


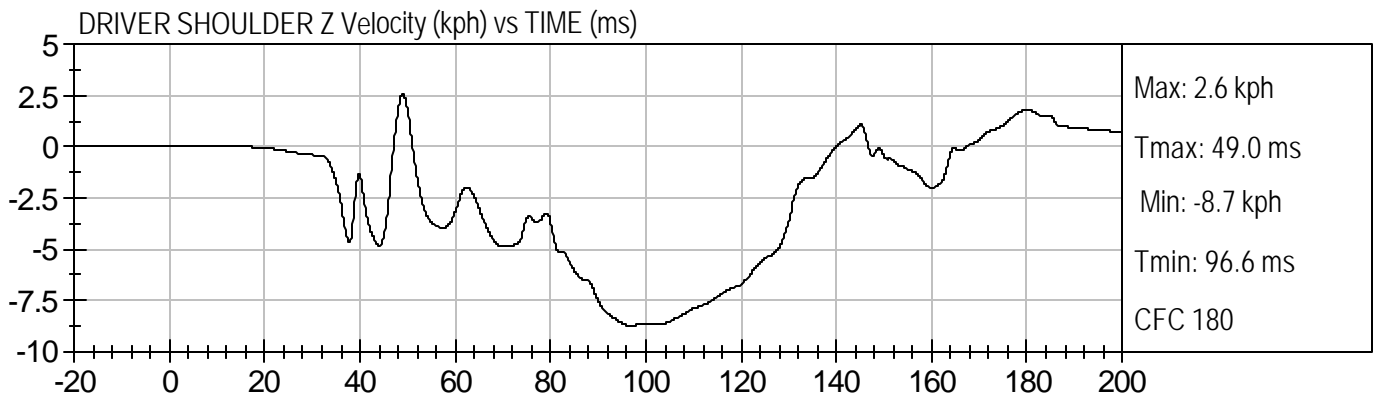
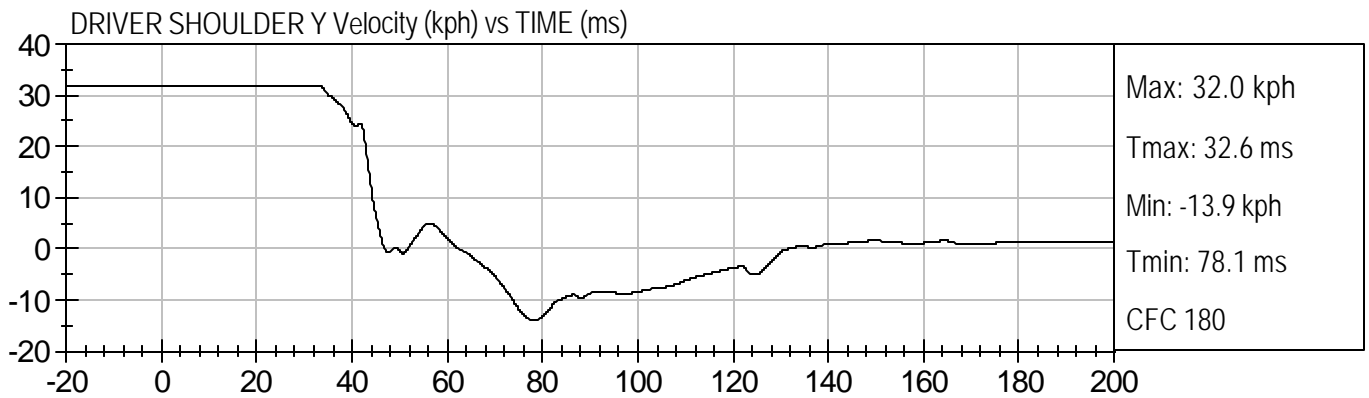
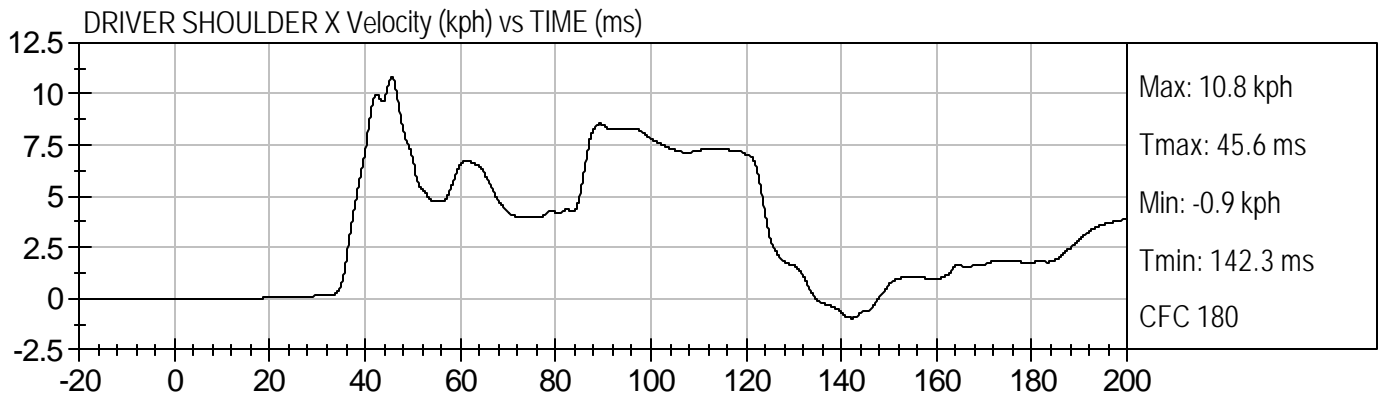


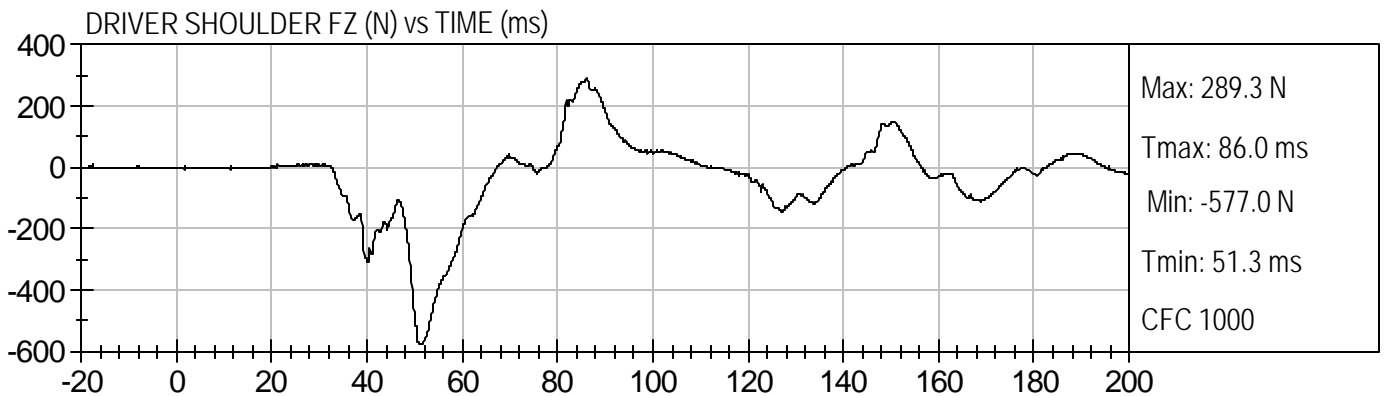
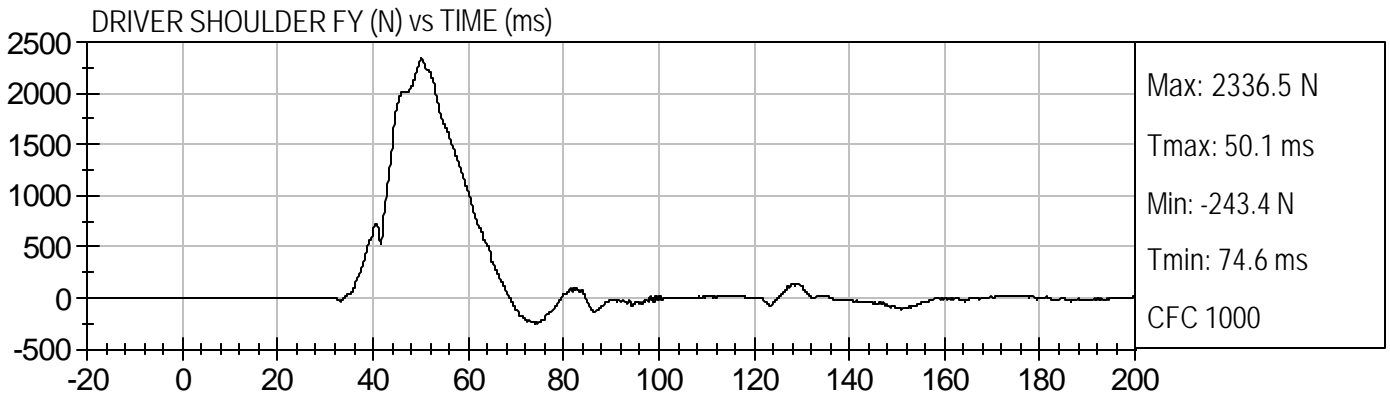
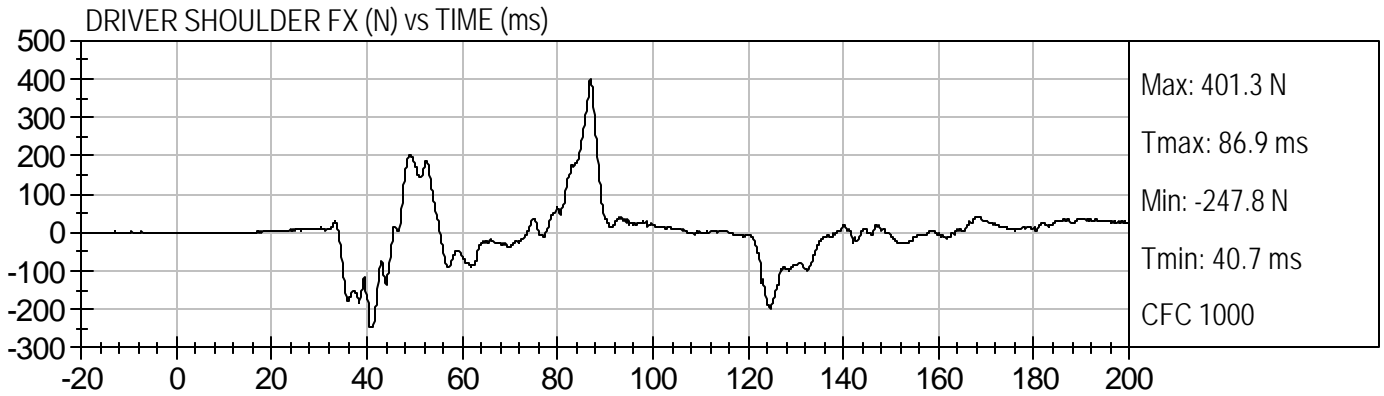


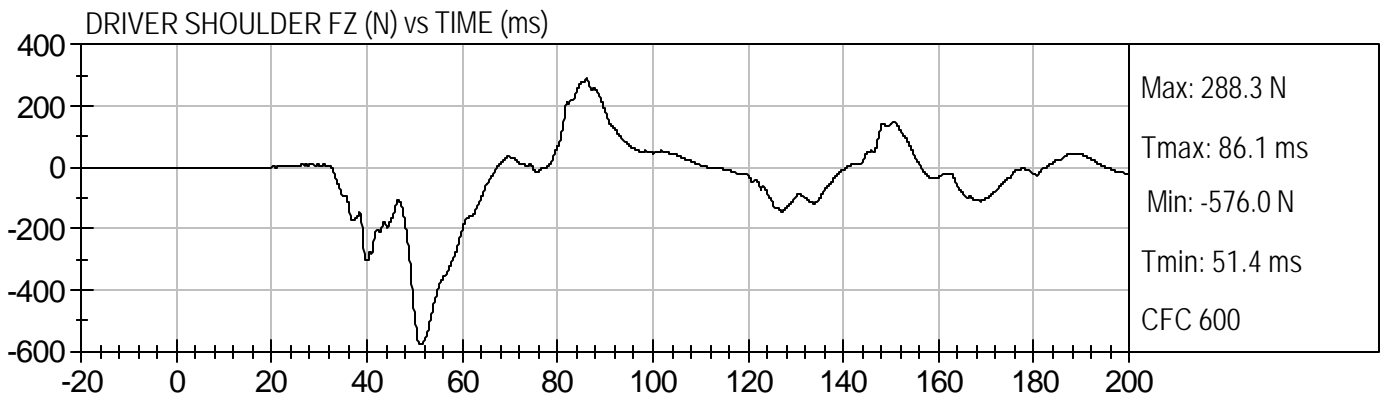
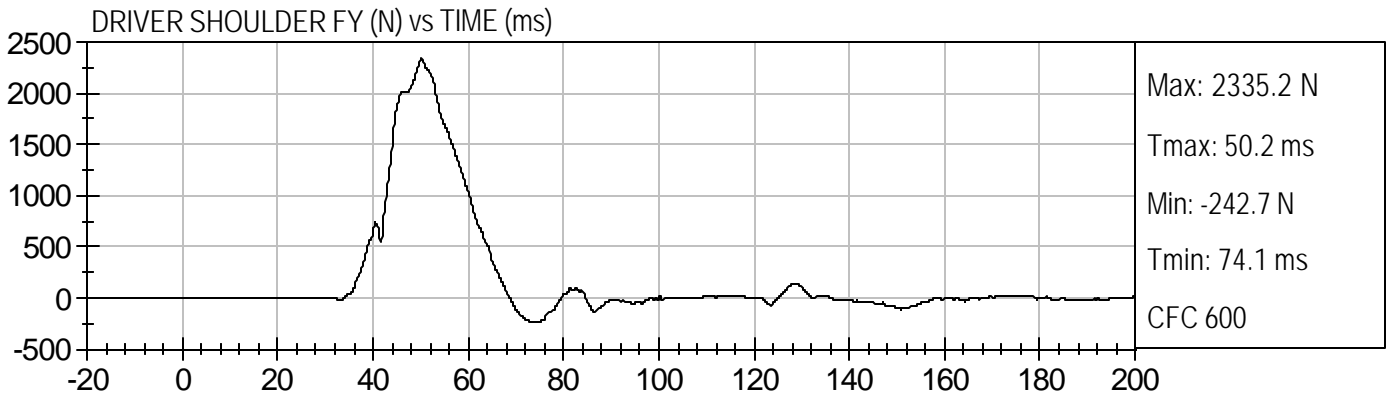
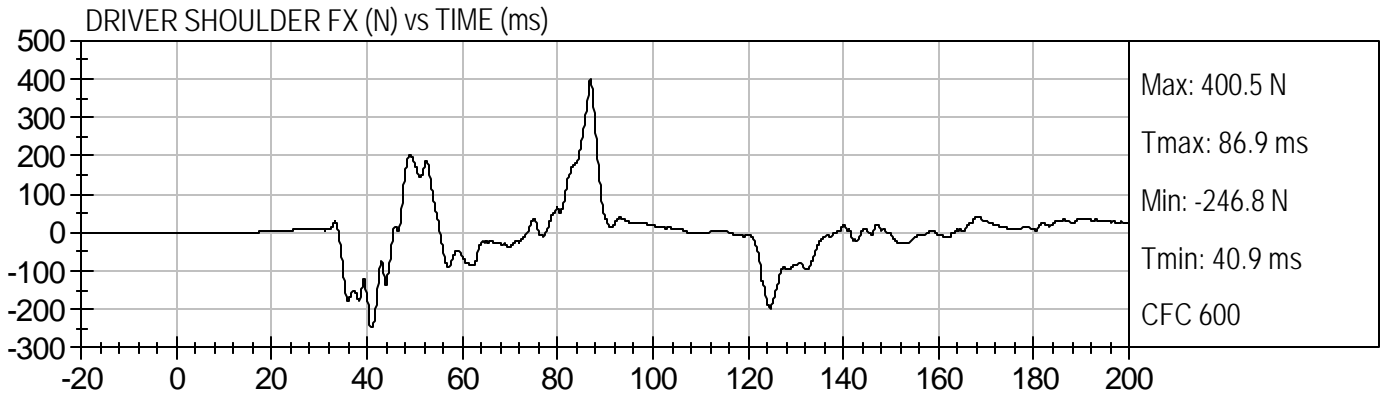


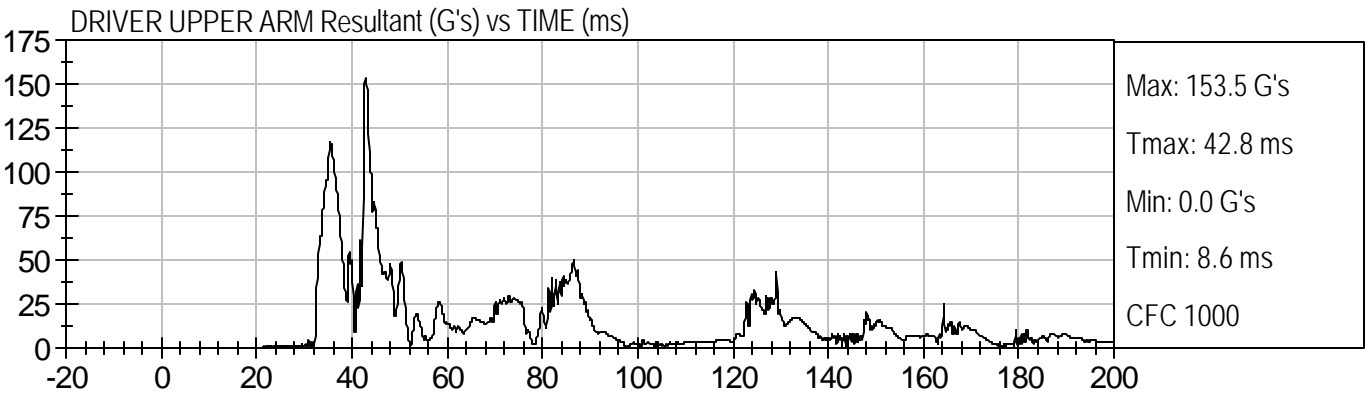
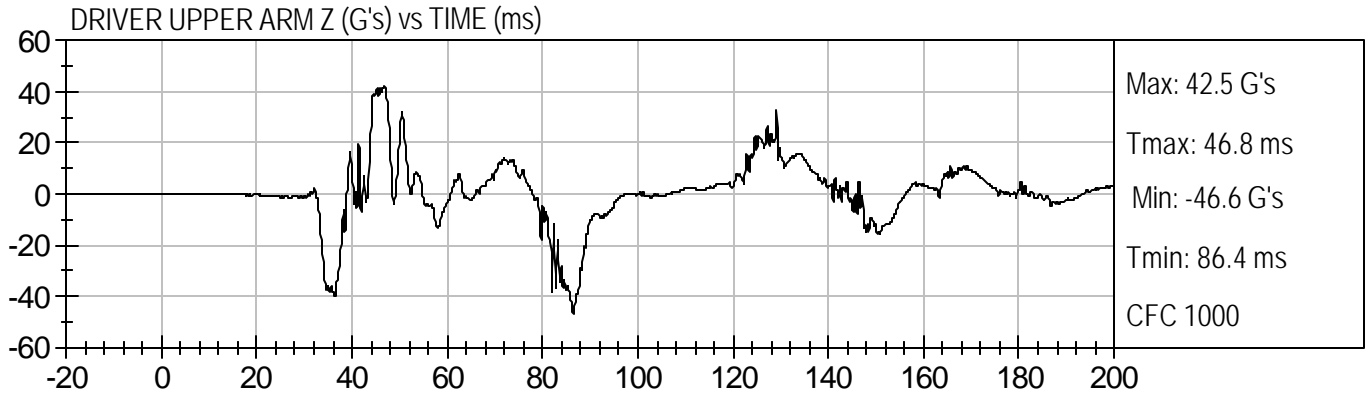
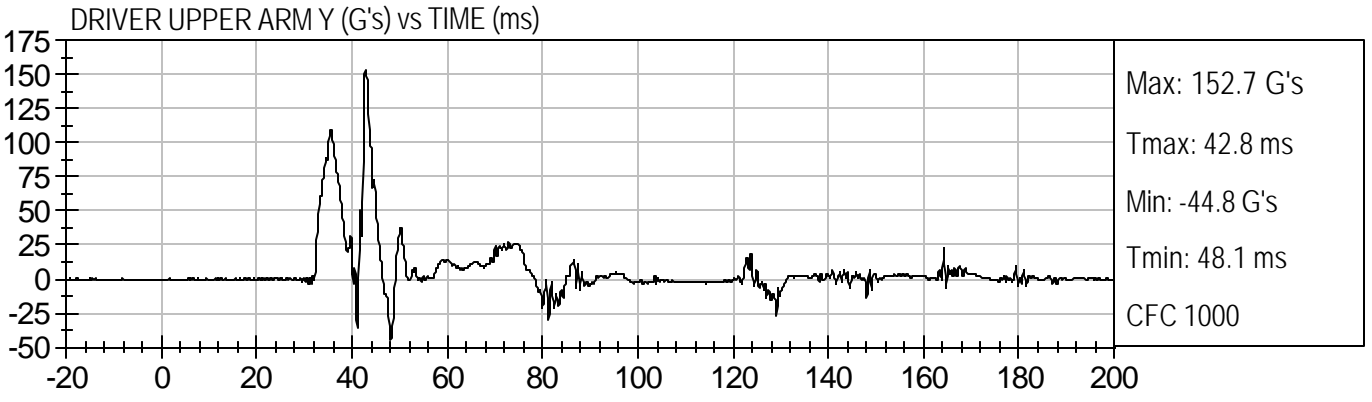
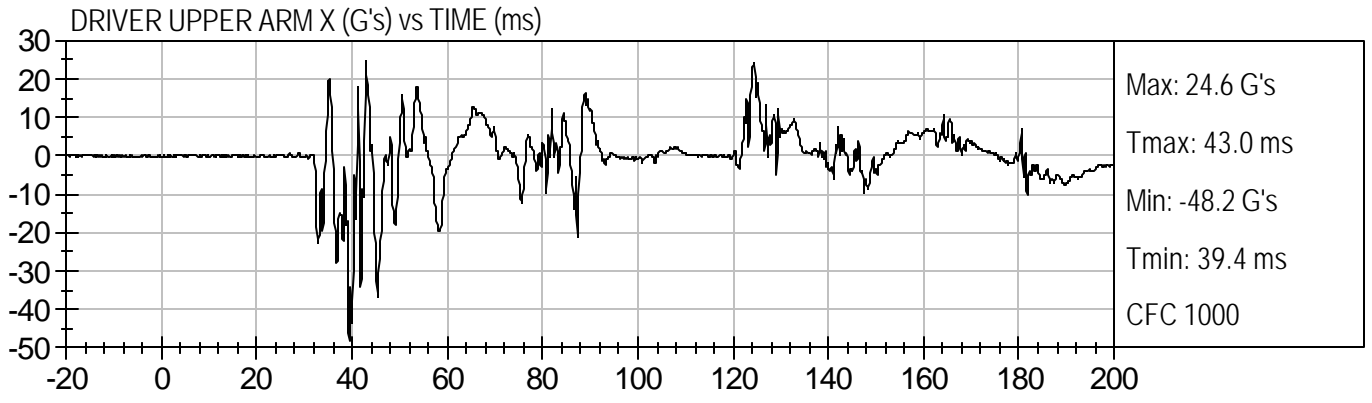


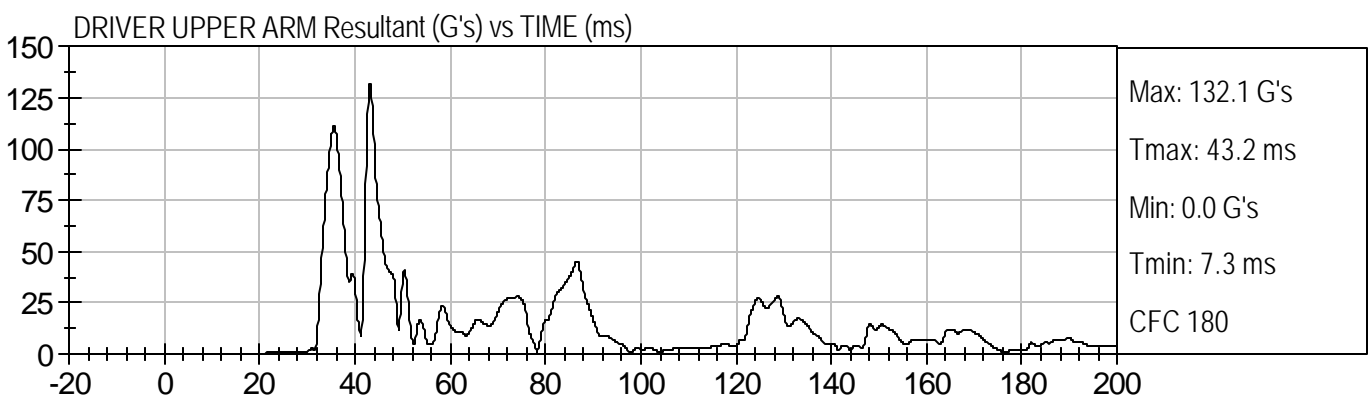
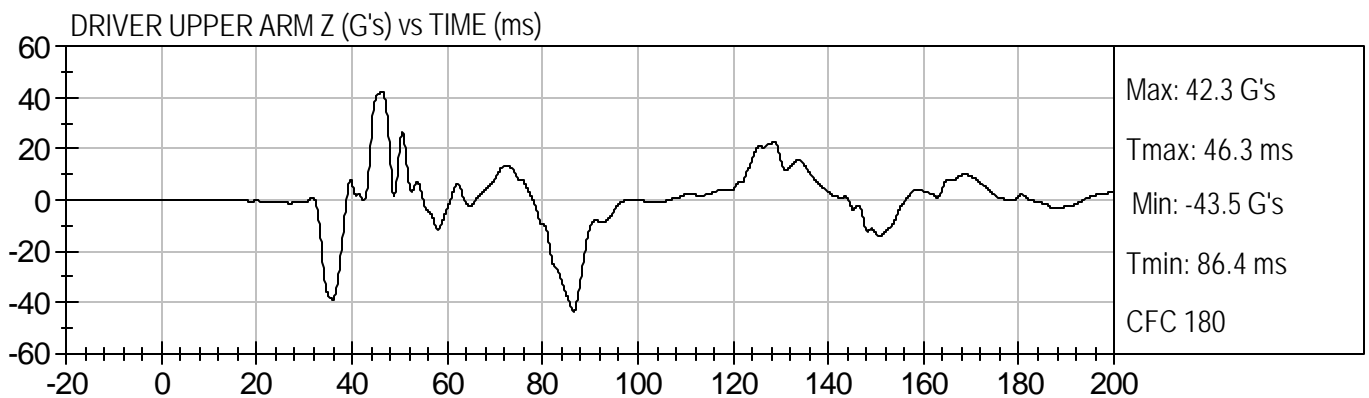
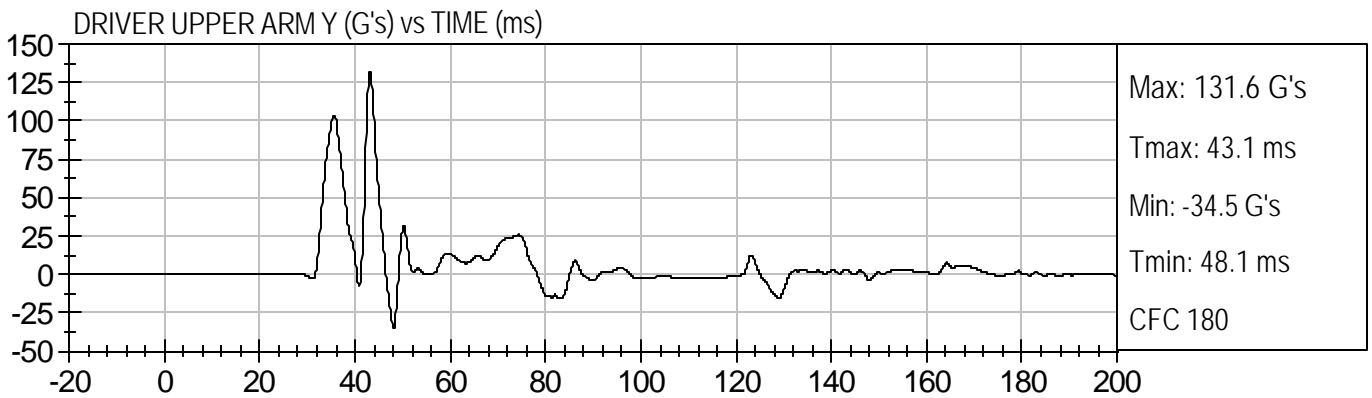
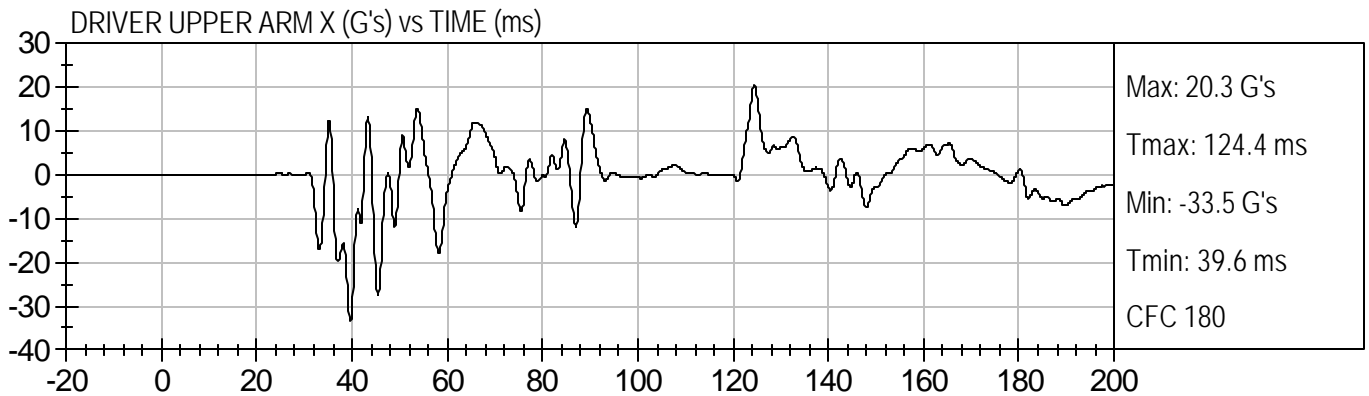






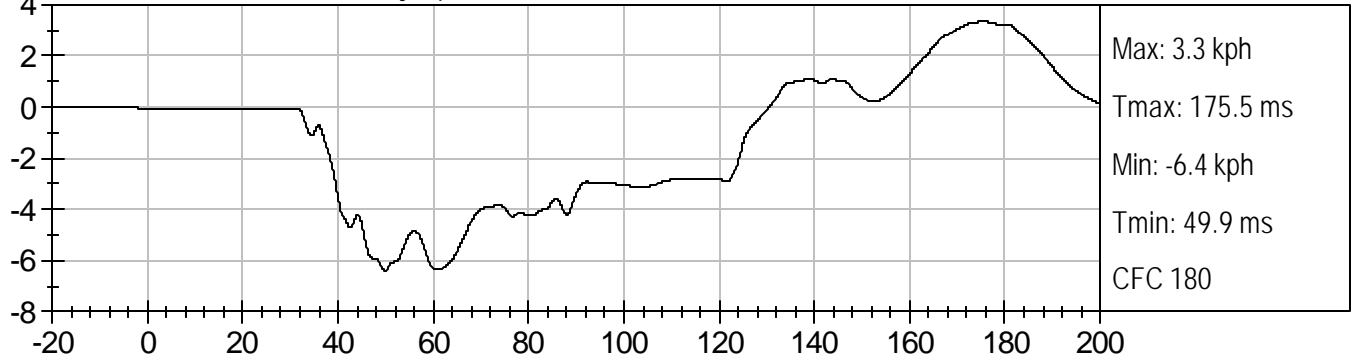




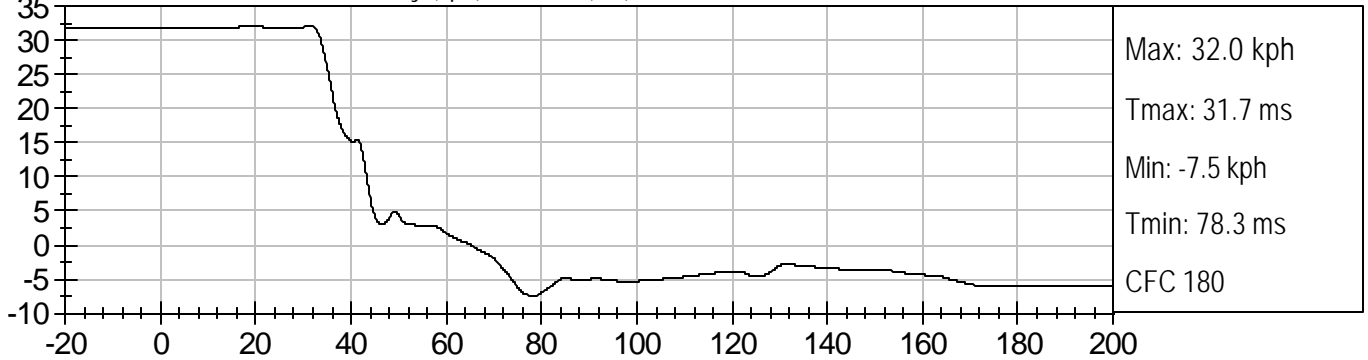




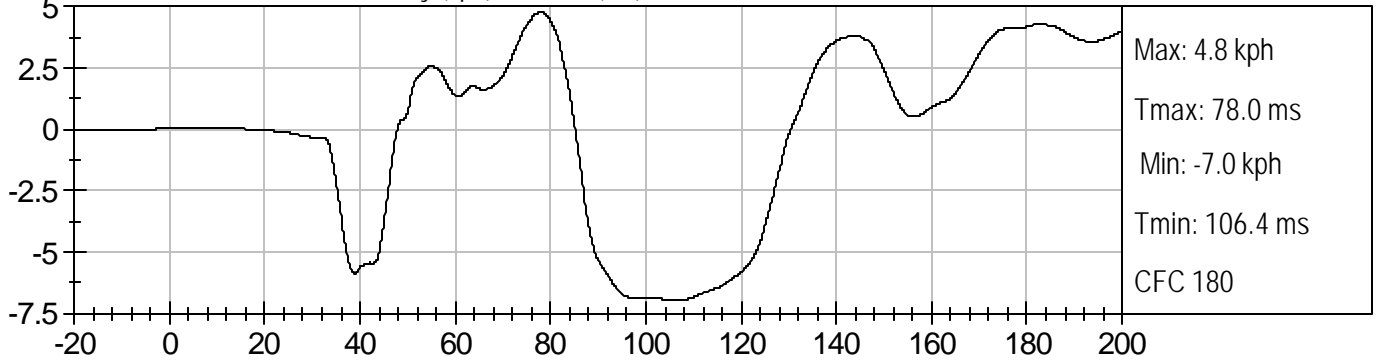
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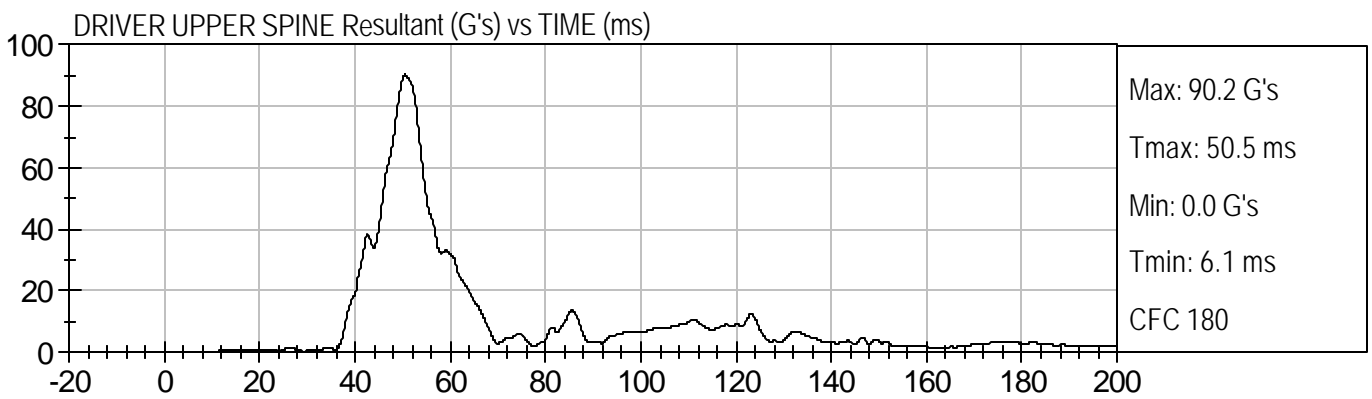
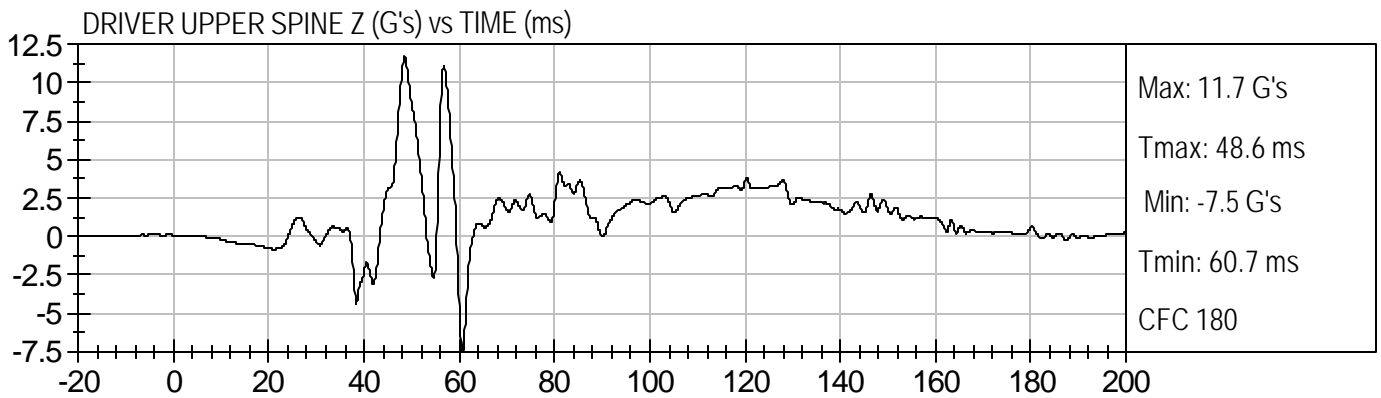
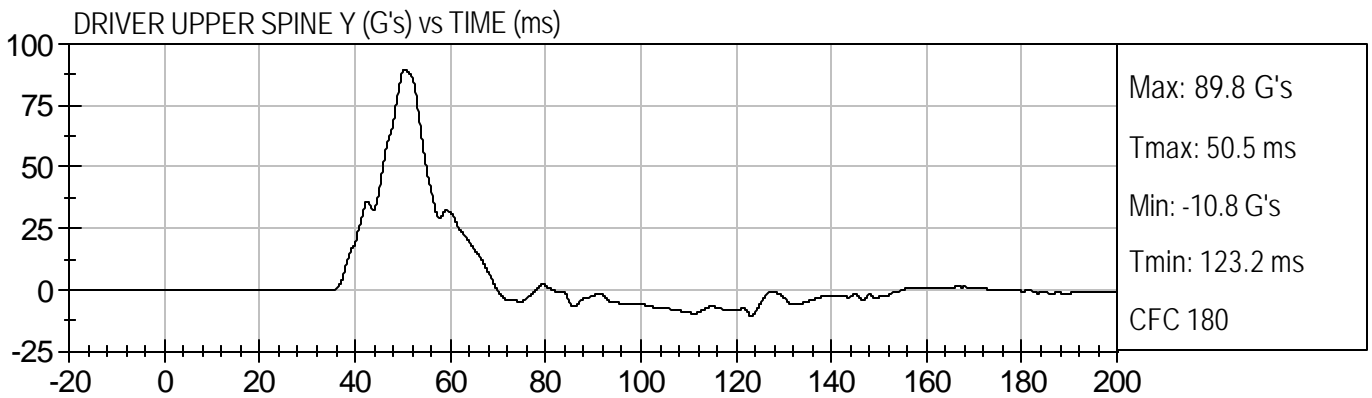
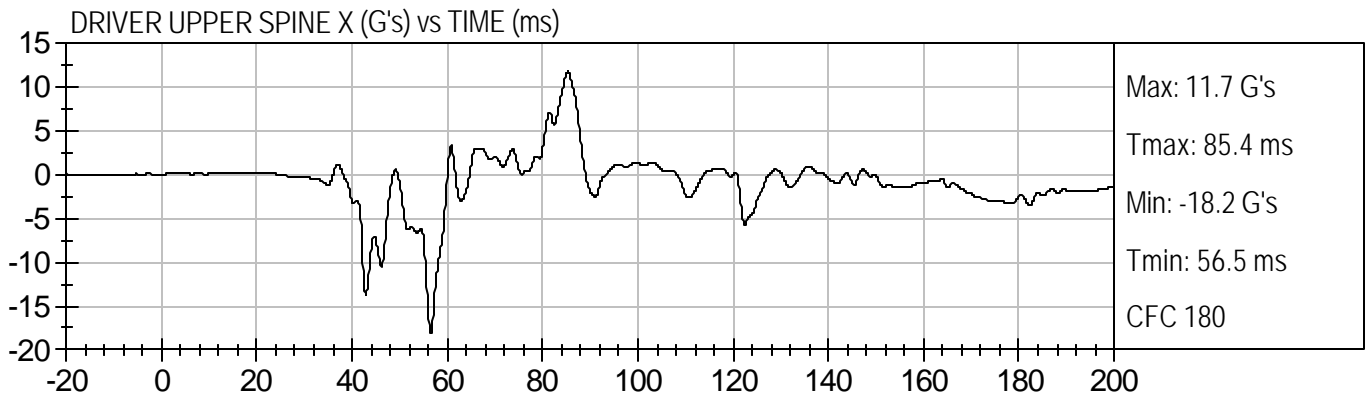


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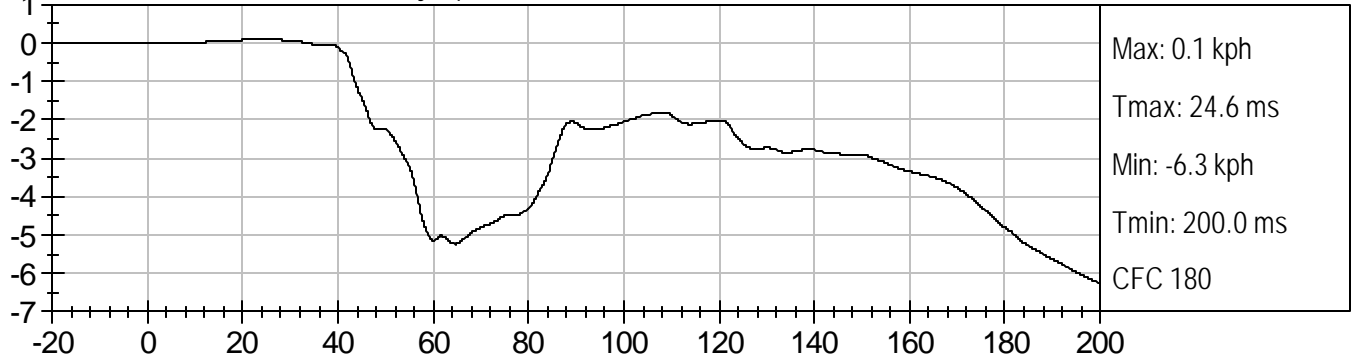
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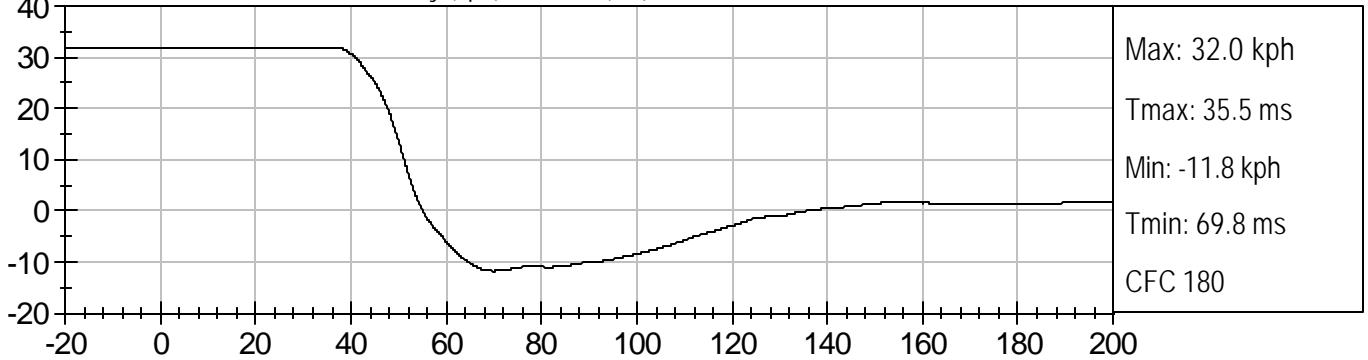




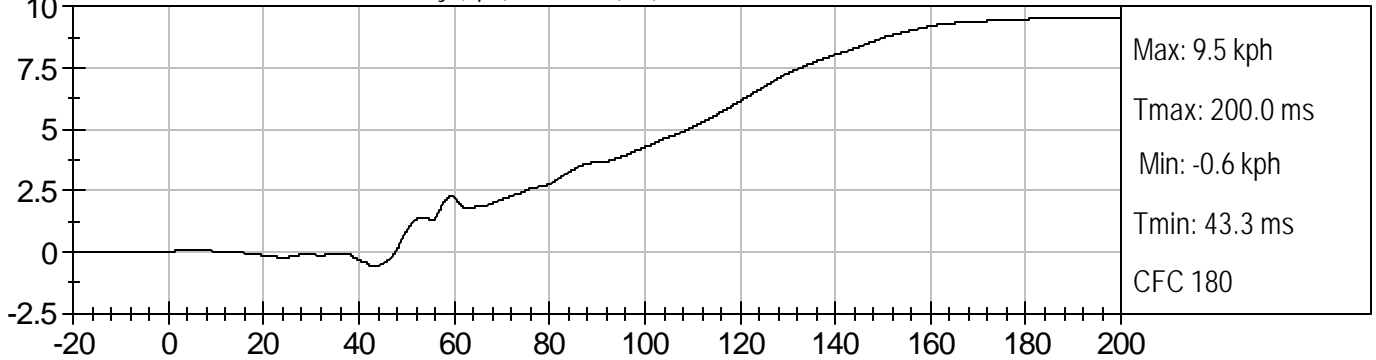
DRIVER UPPER SPINE X Velocity (kph) vs TIME (ms)

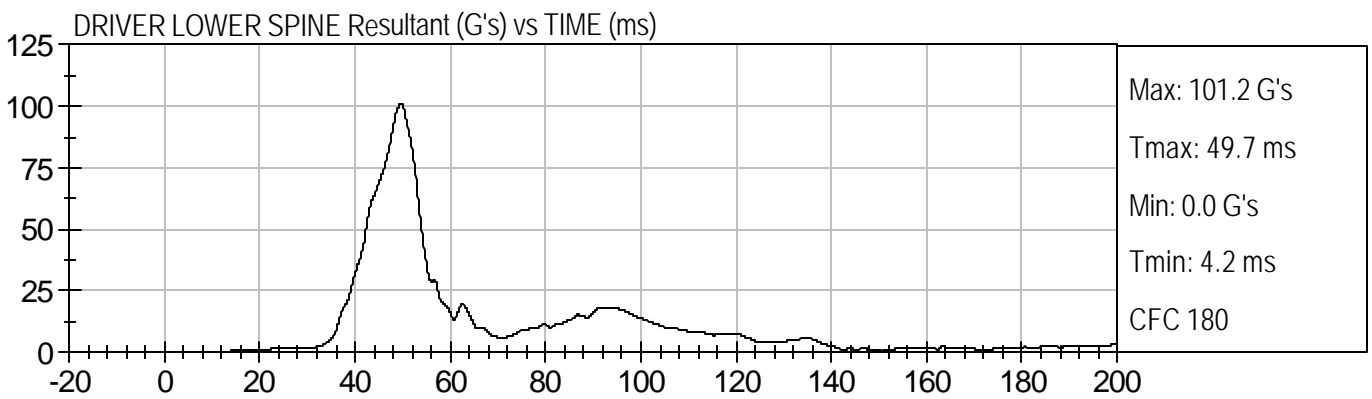
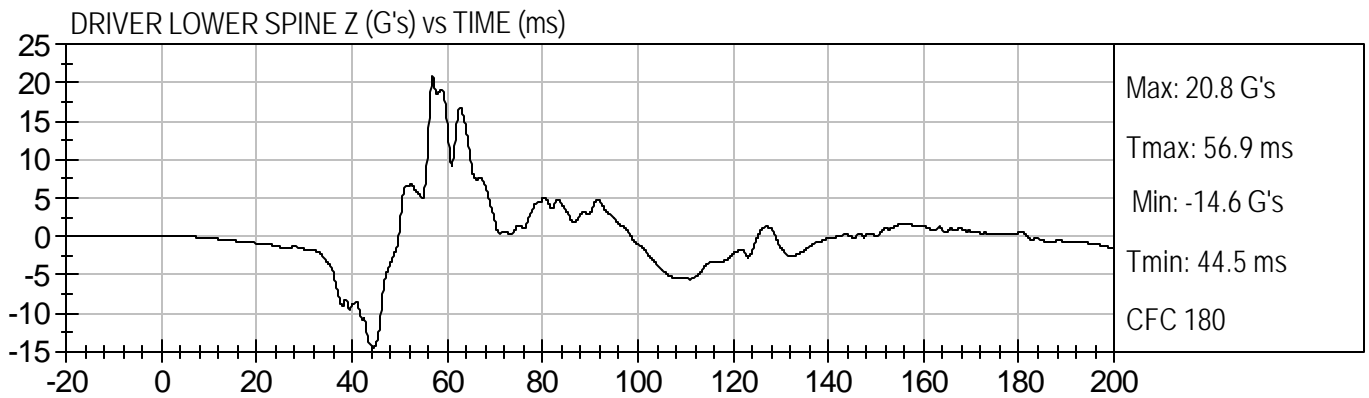
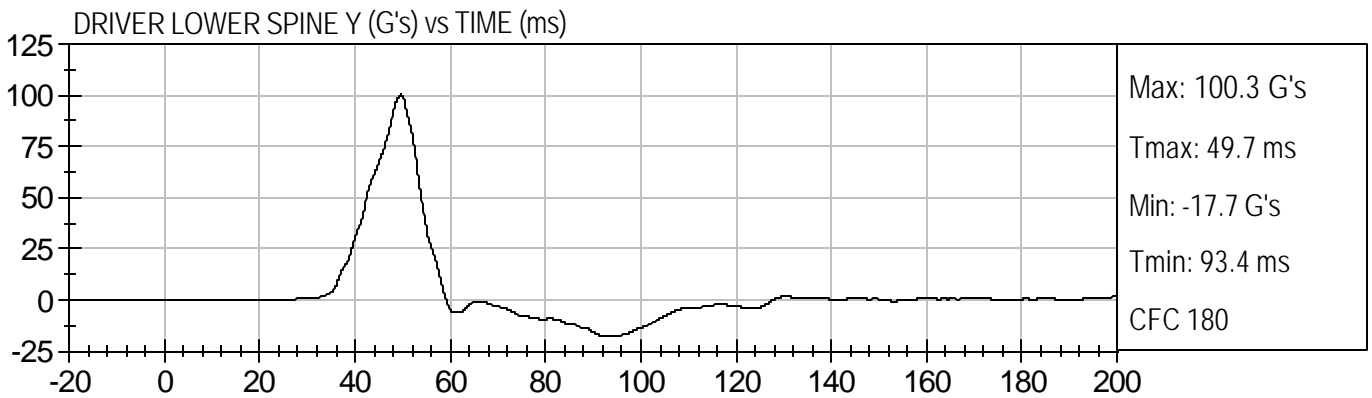
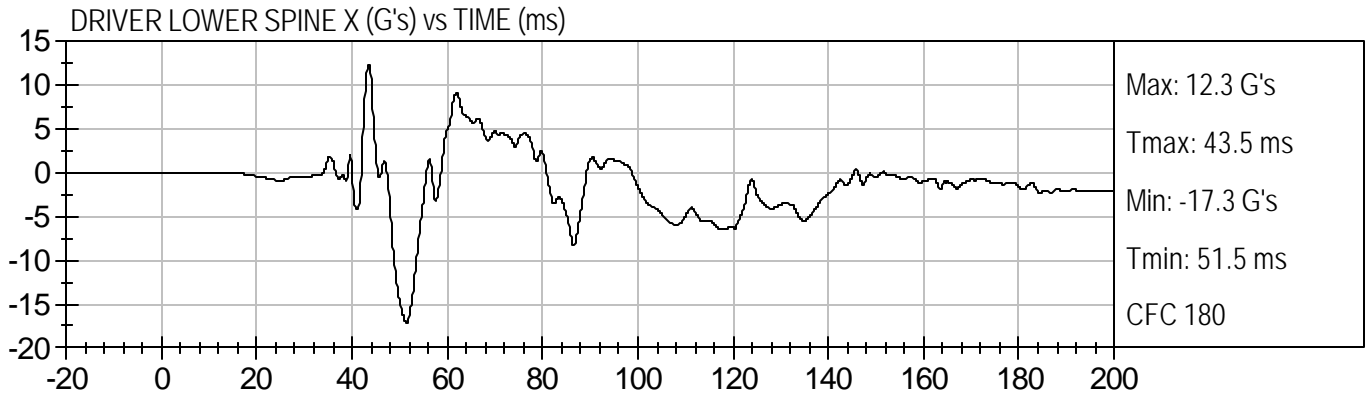


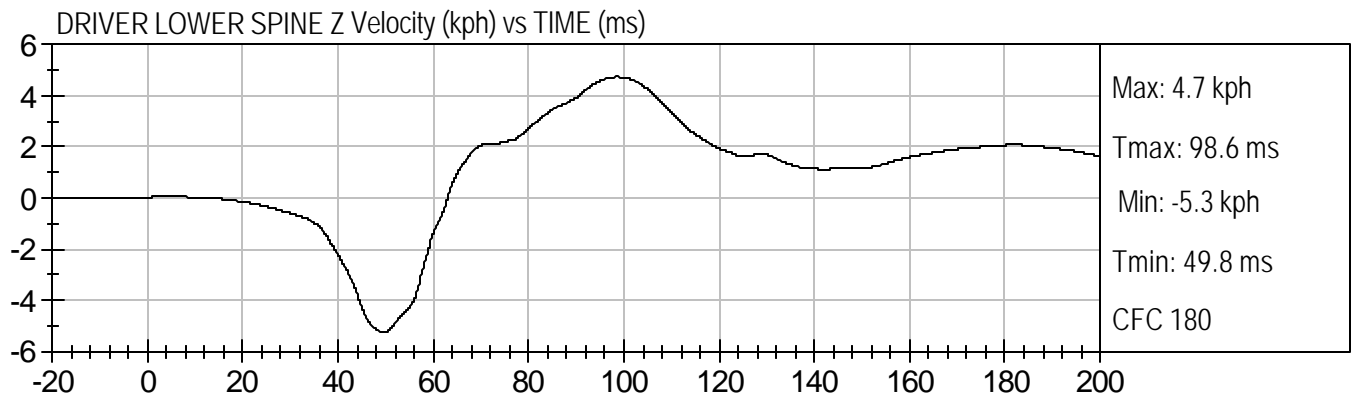
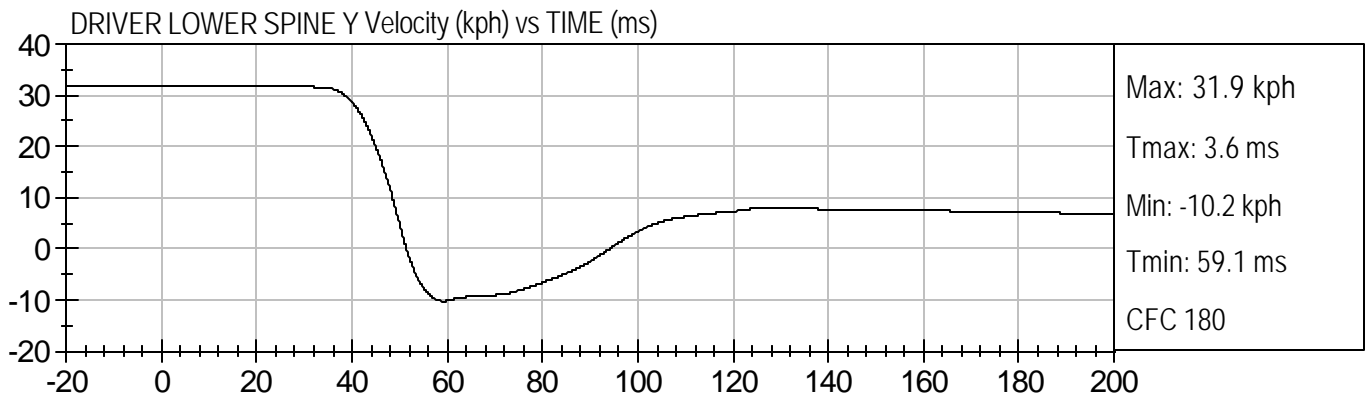
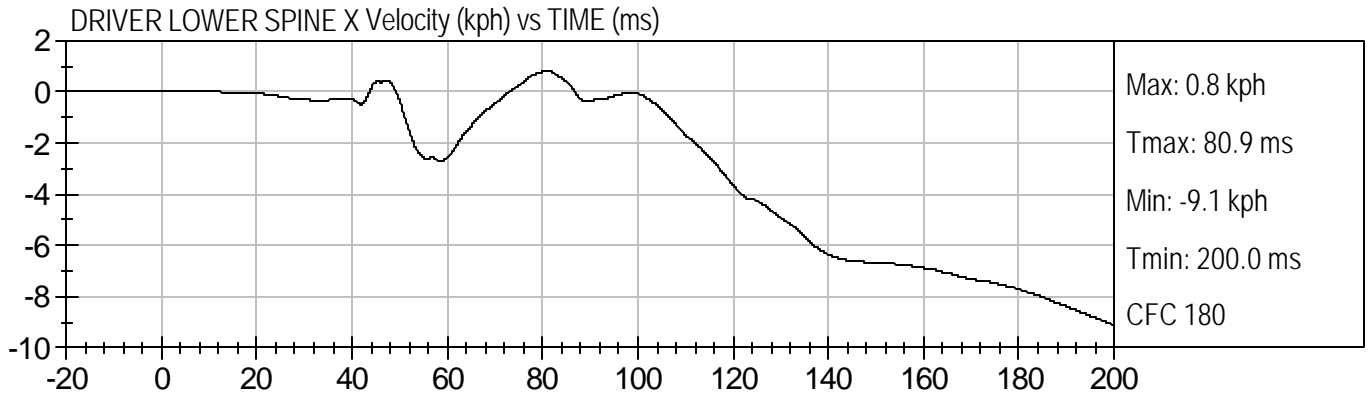
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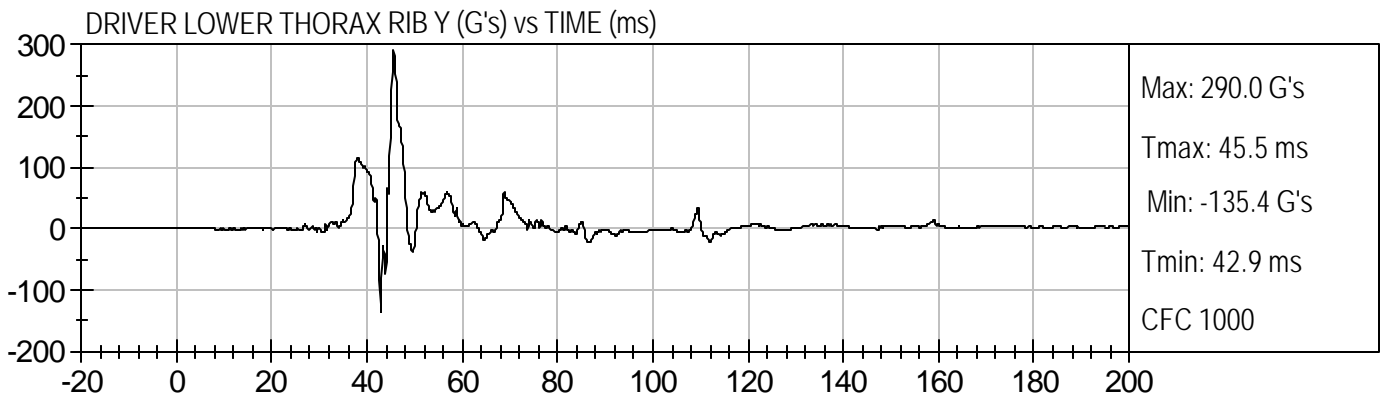
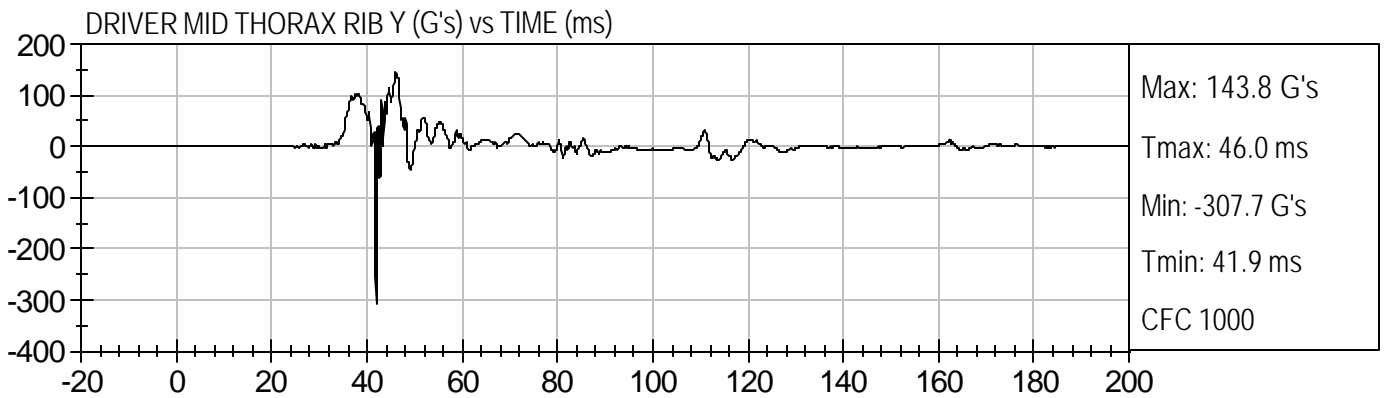
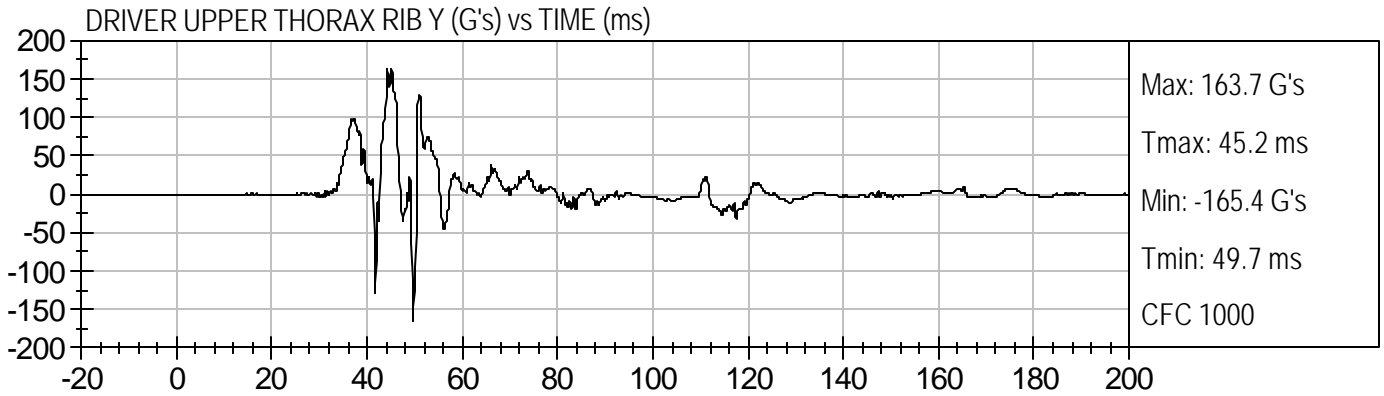


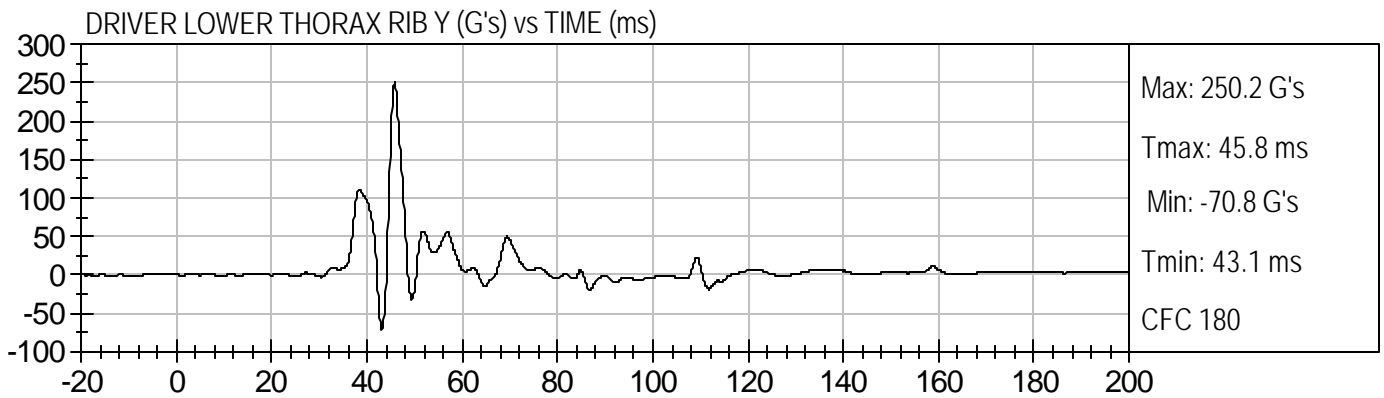
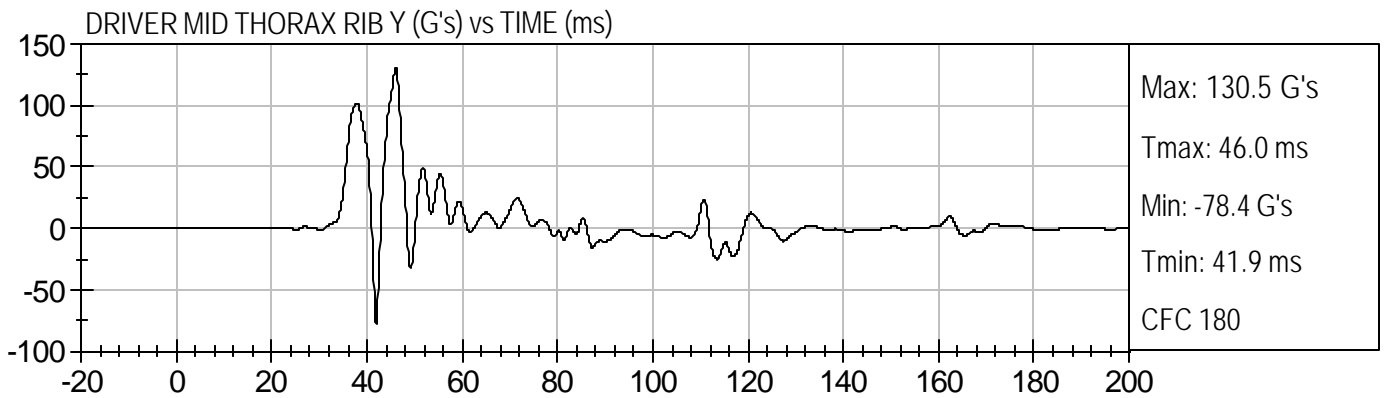
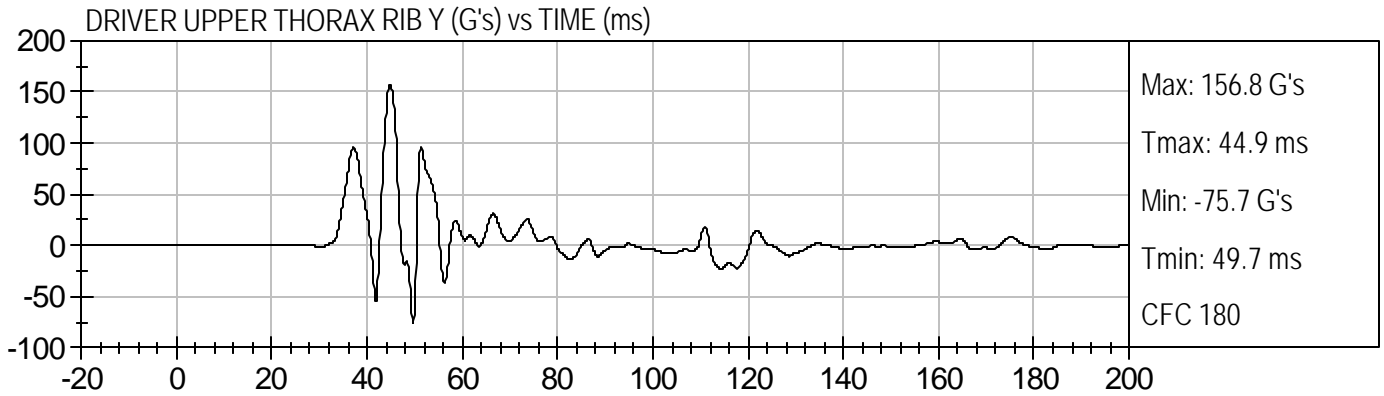
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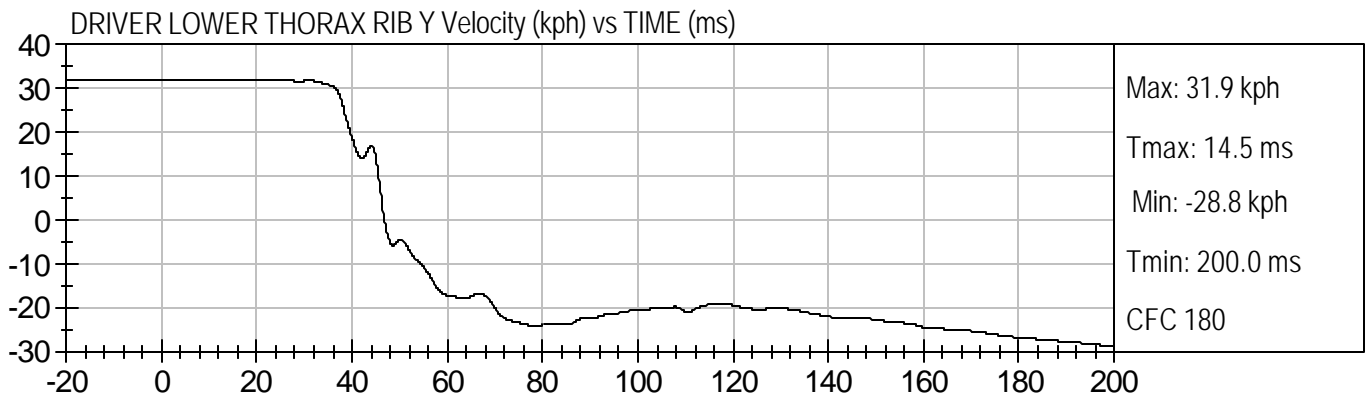
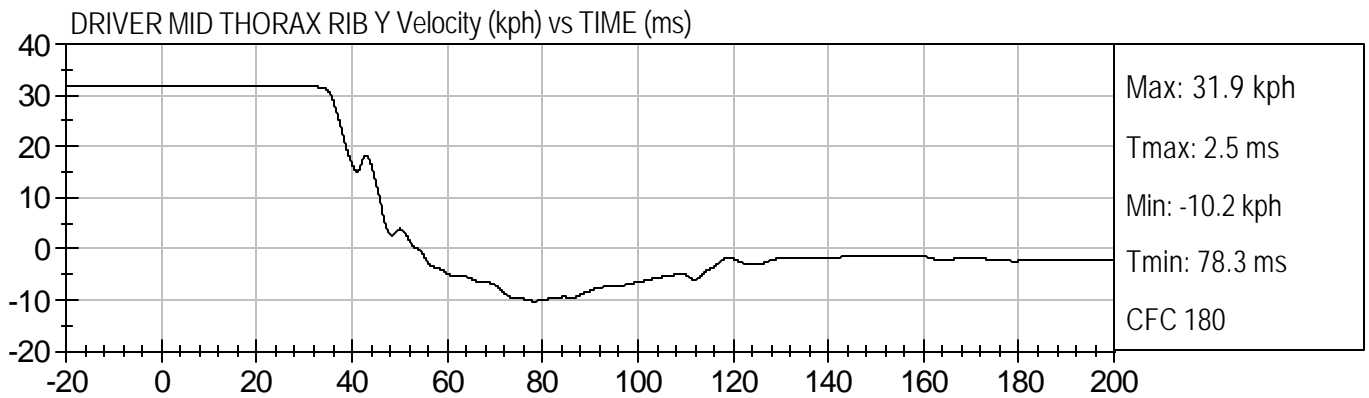
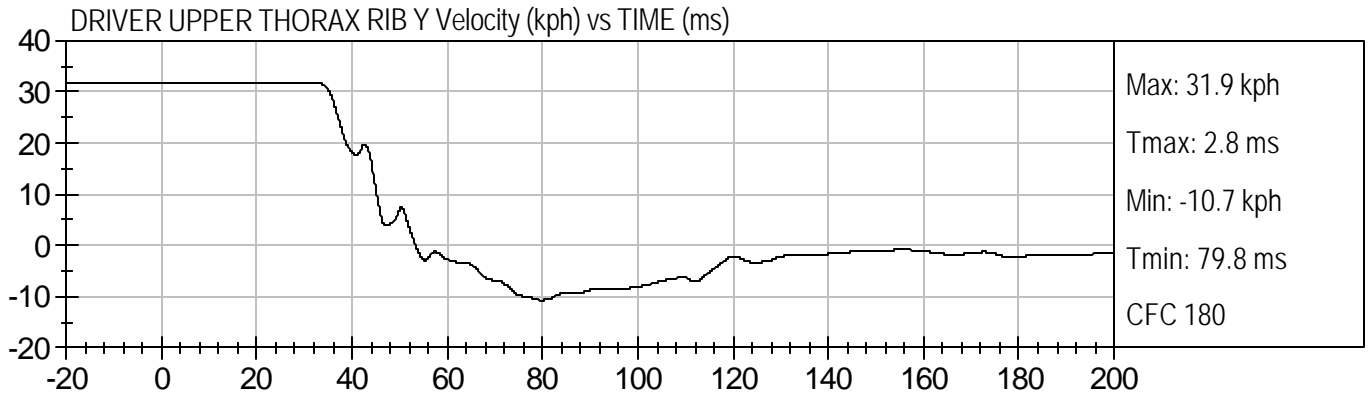






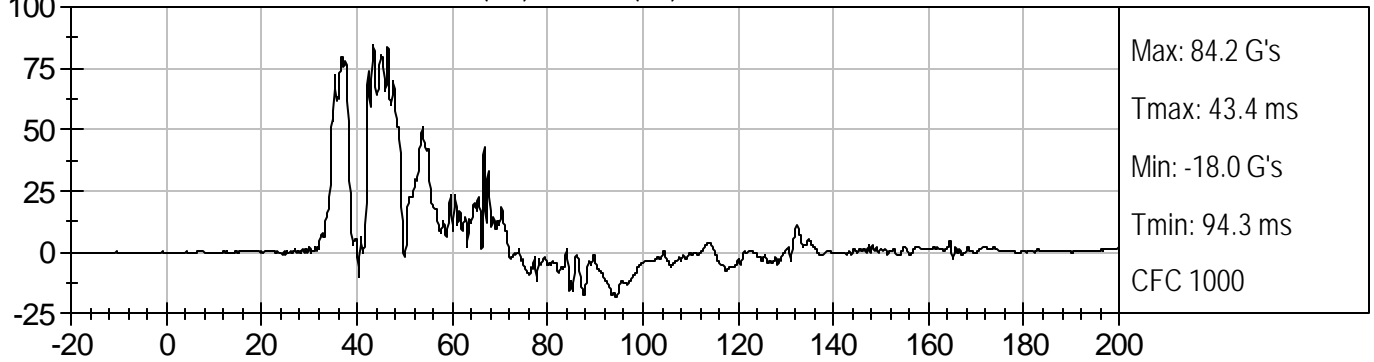




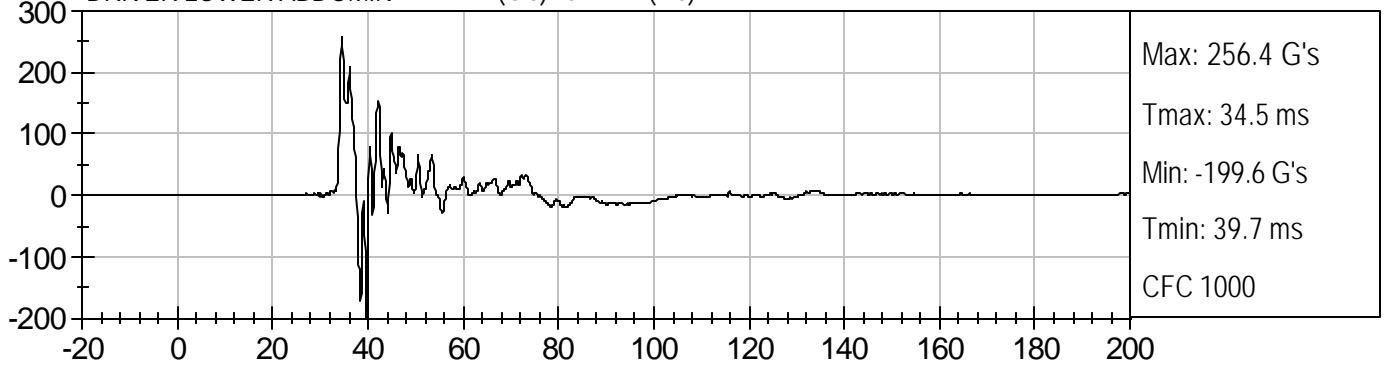




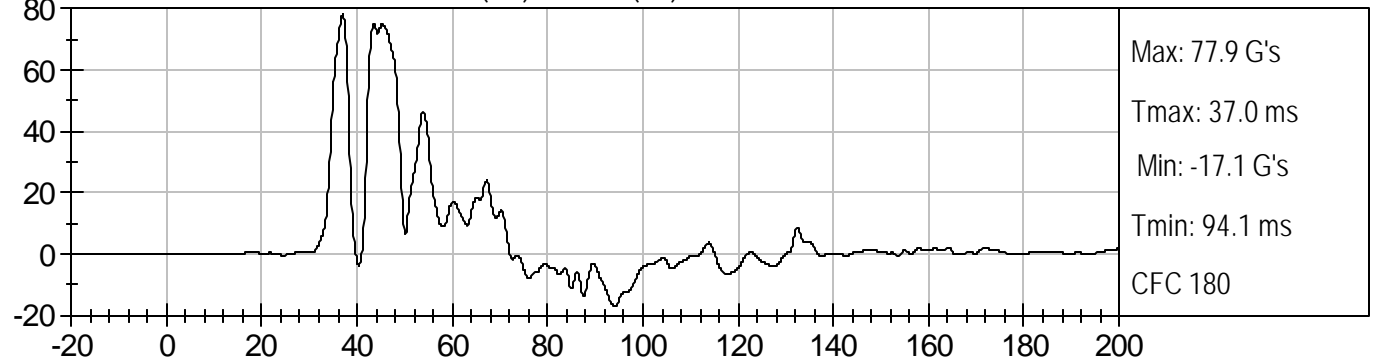
DRIVER UPPER ABDOMINAL RIB Y (G's) vs TIME (ms)



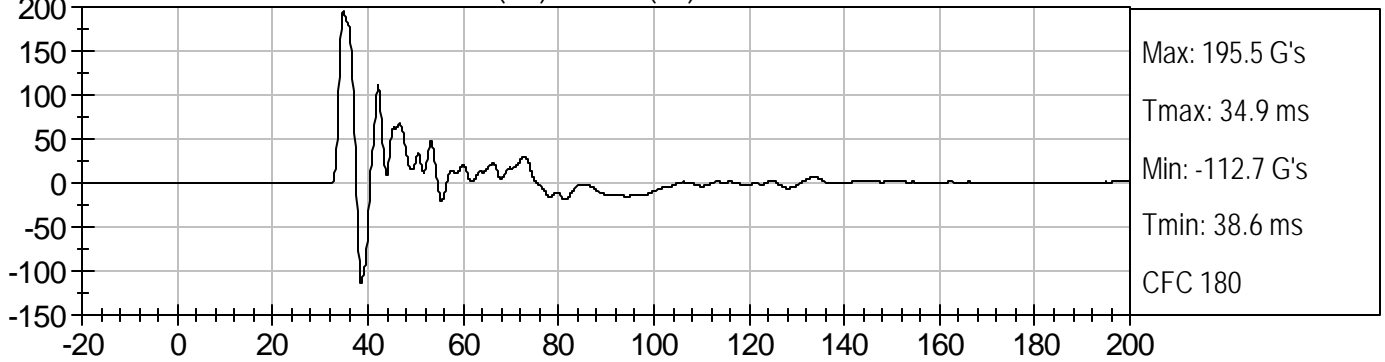
DRIVER LOWER ABDOMINAL RIB Y (G's) vs TIME (ms)

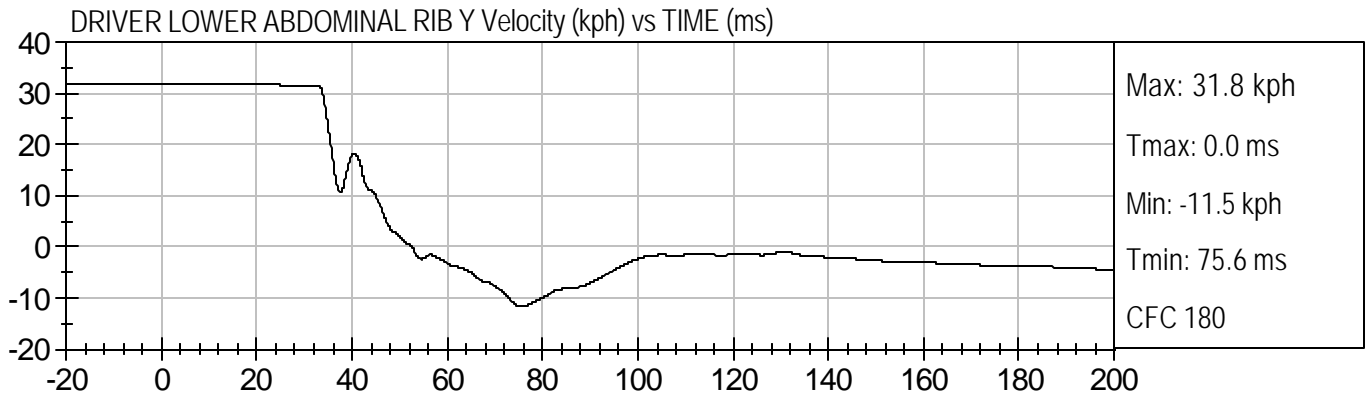
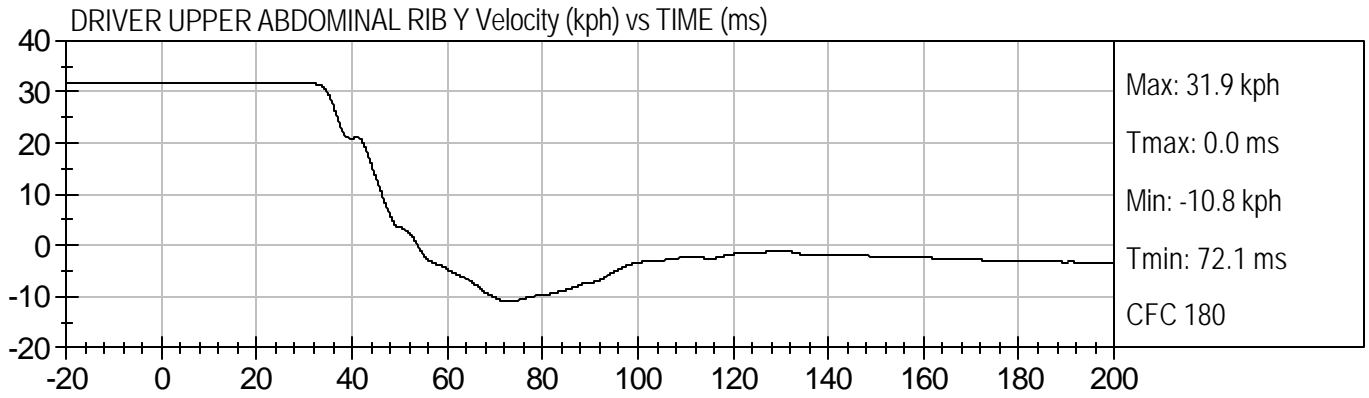


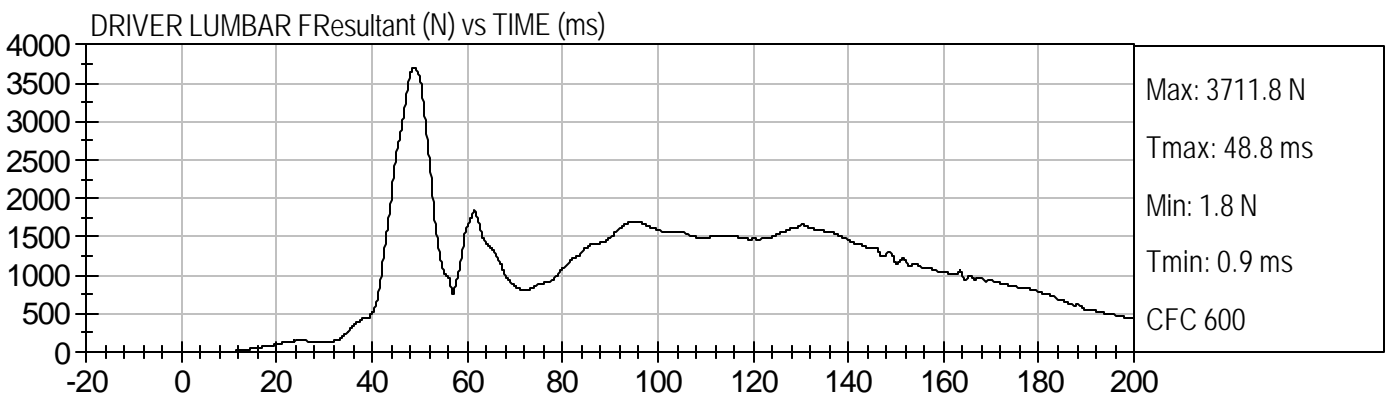
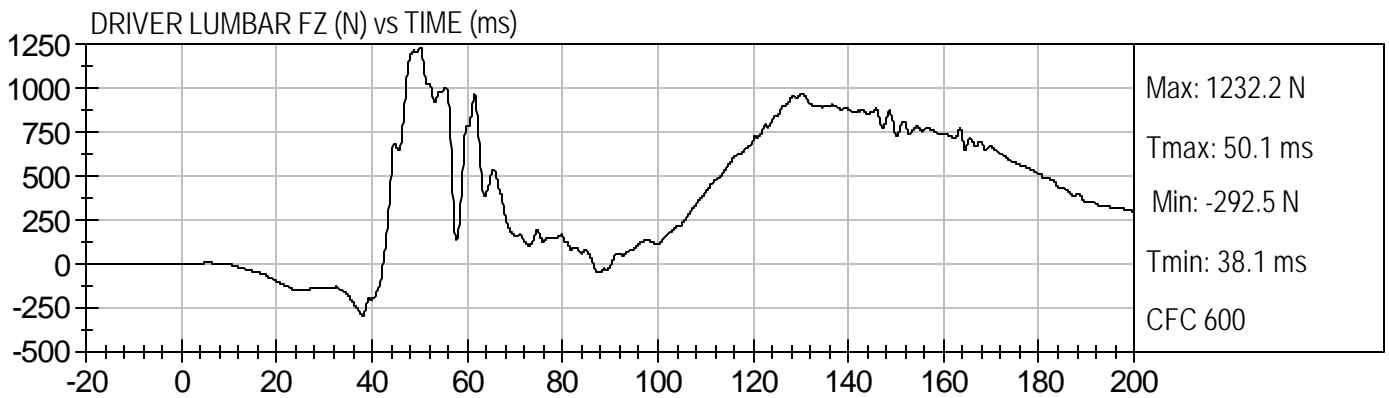
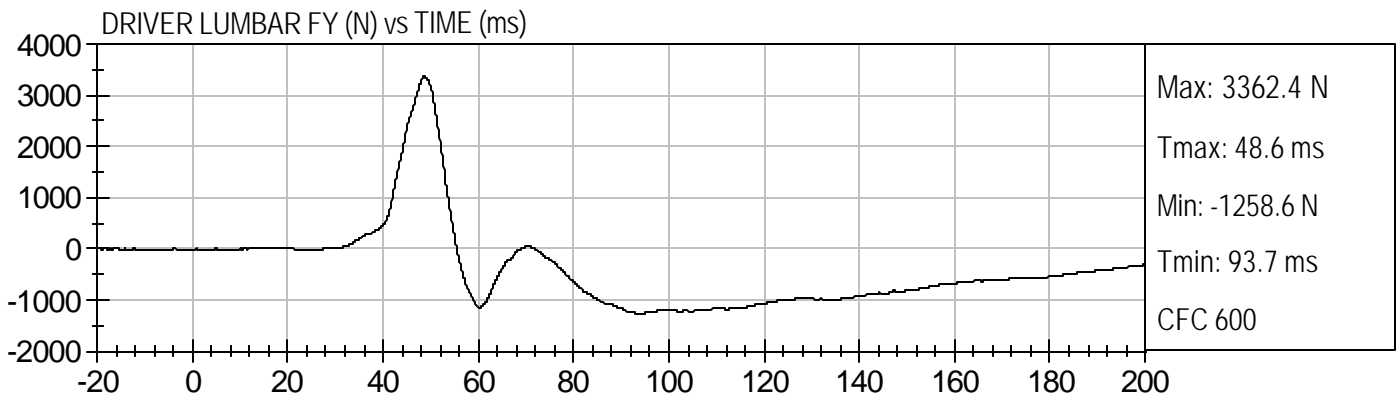
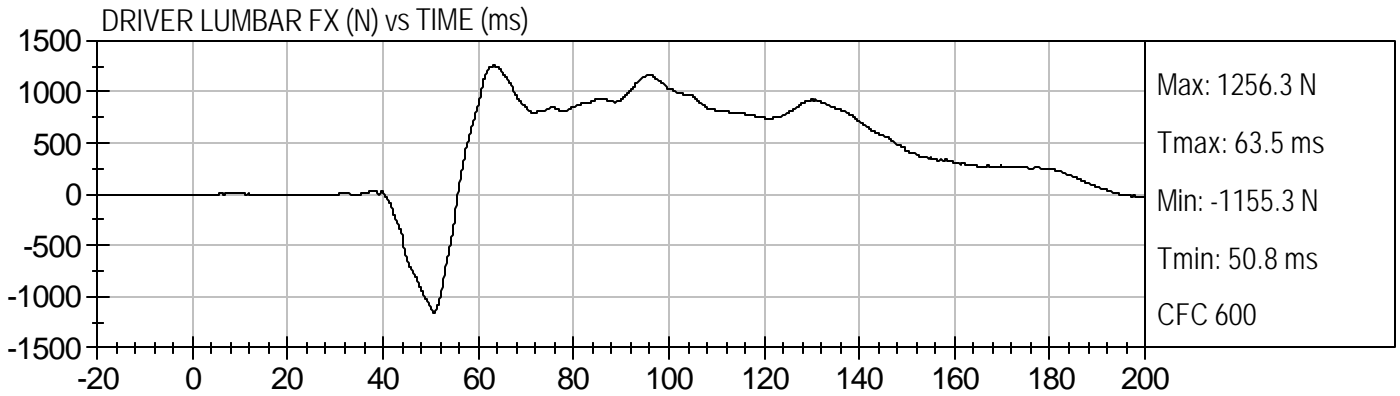
DRIVER UPPER ABDOMINAL RIB Y (G's) vs TIME (ms)

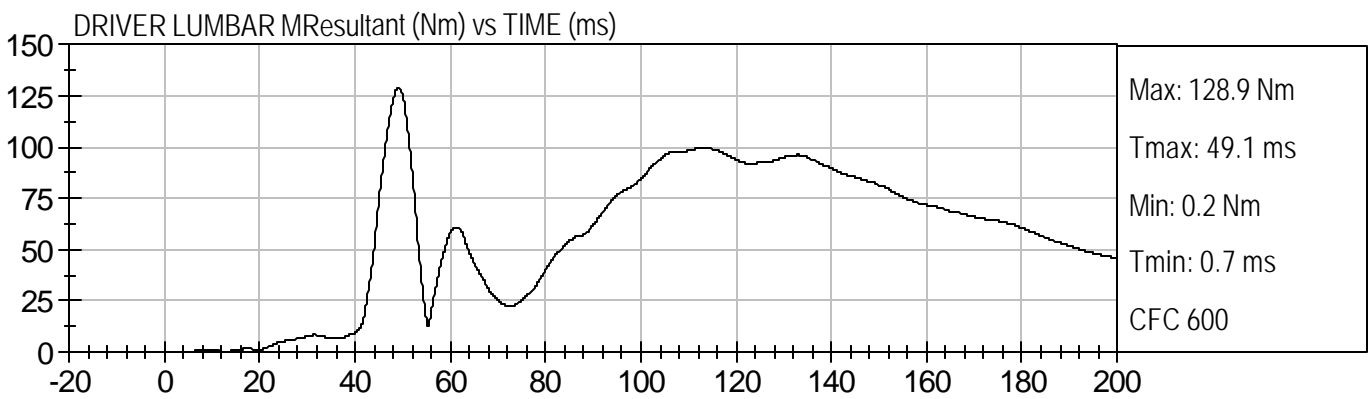
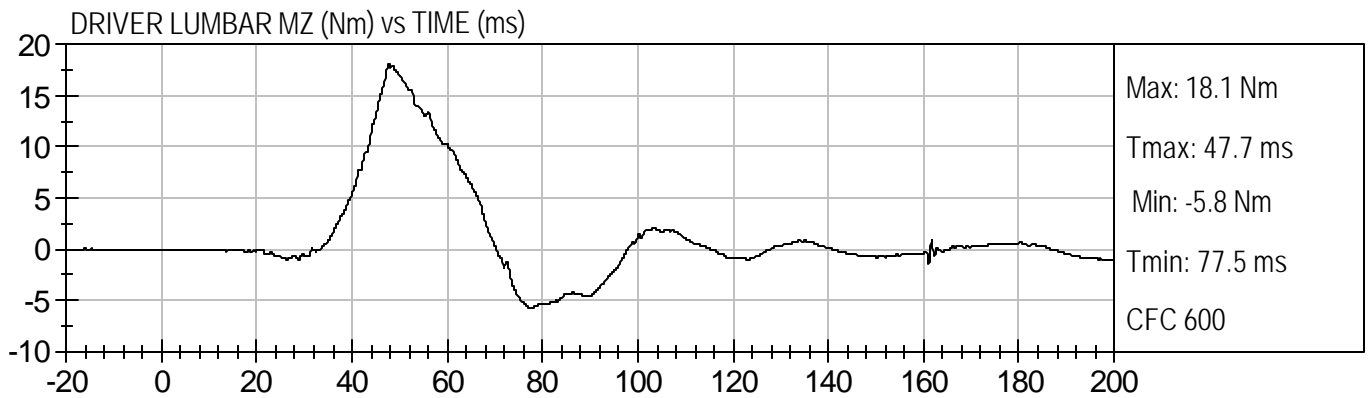
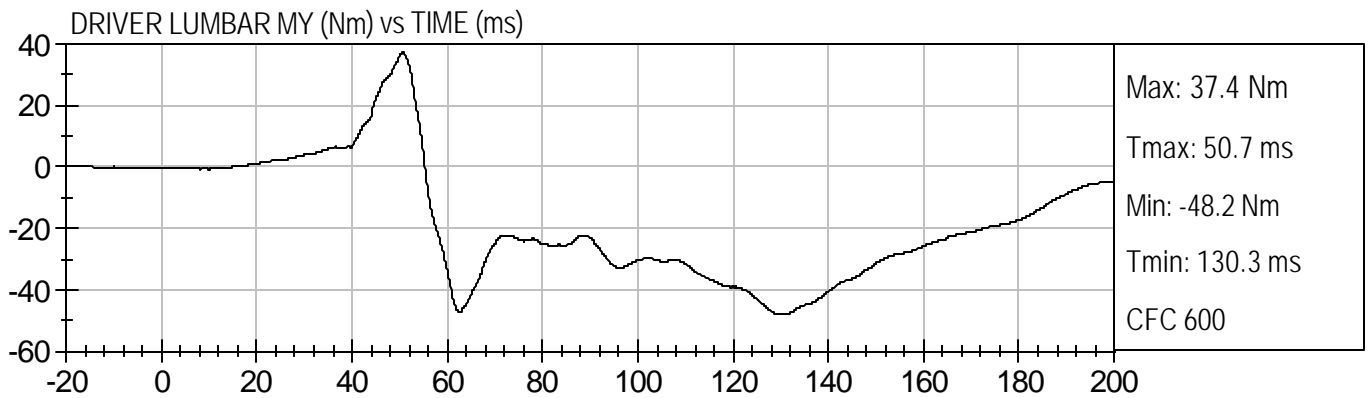
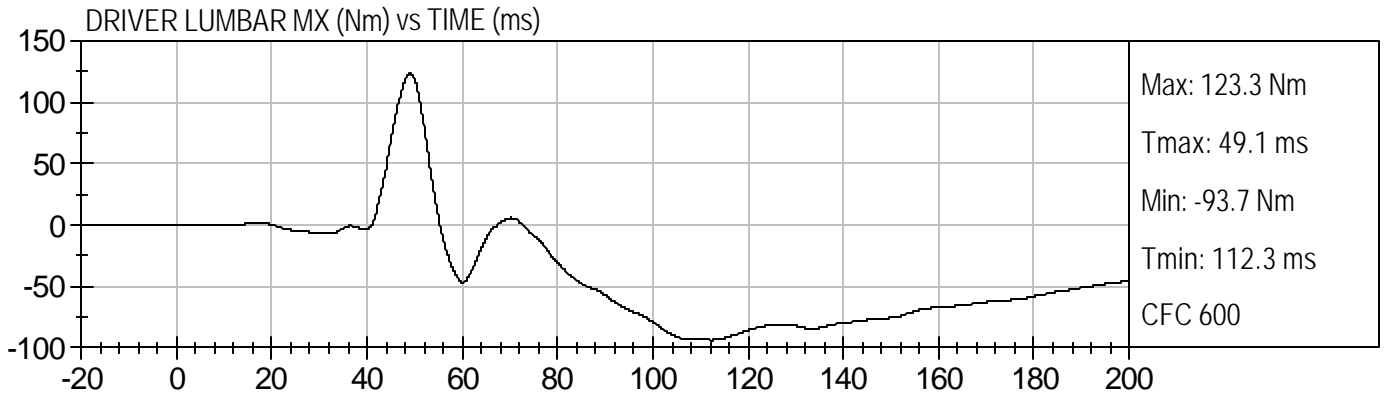


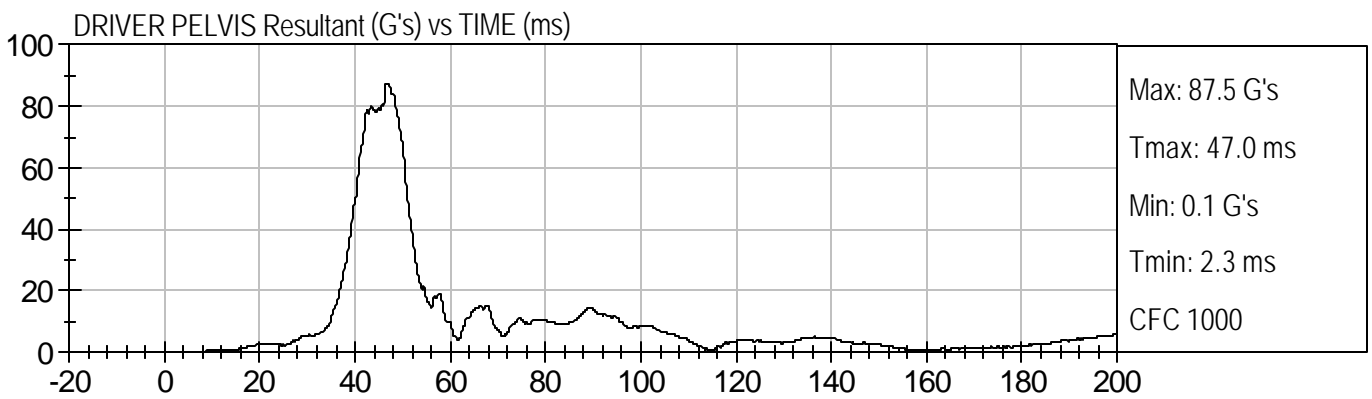
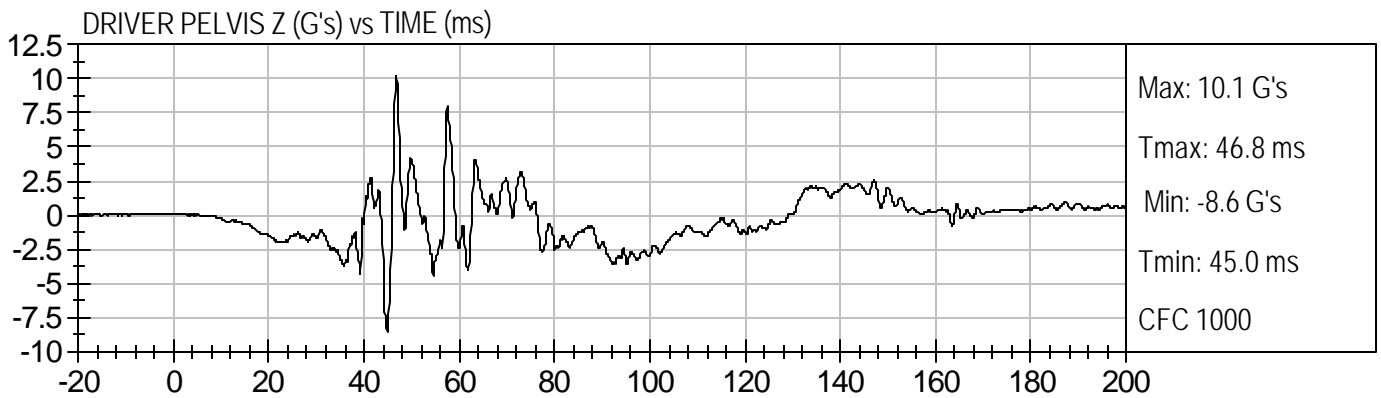
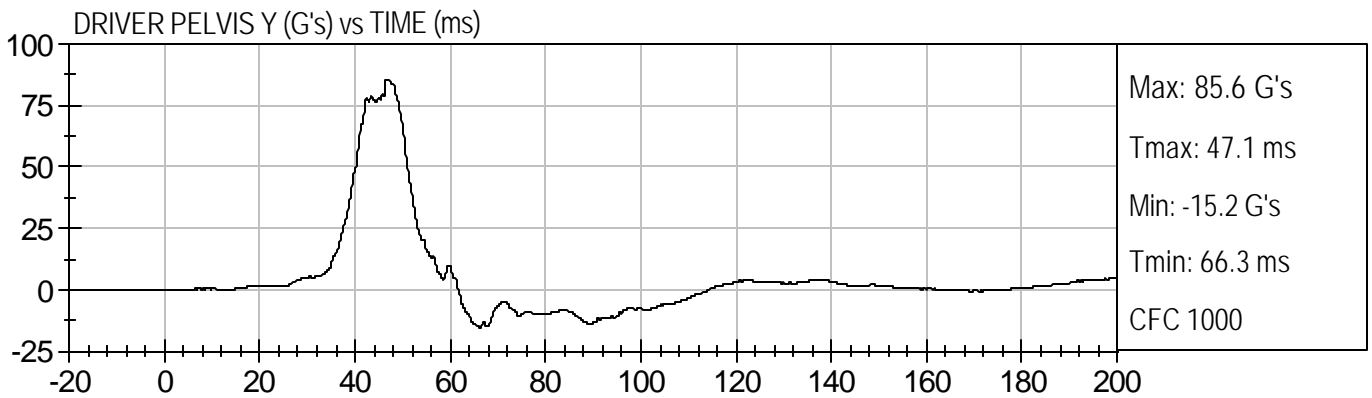
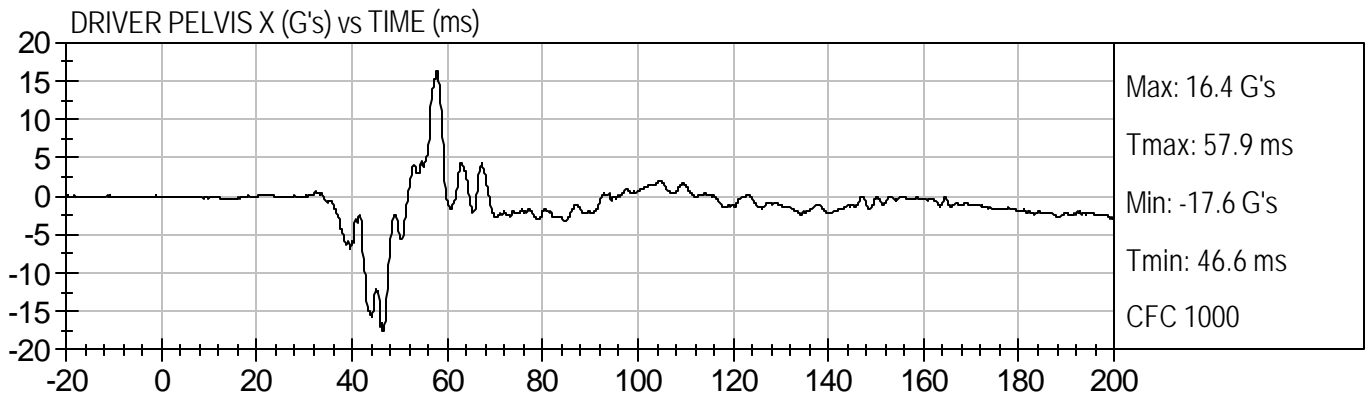
DRIVER LOWER ABDOMINAL RIB Y (G's) vs TIME (ms)





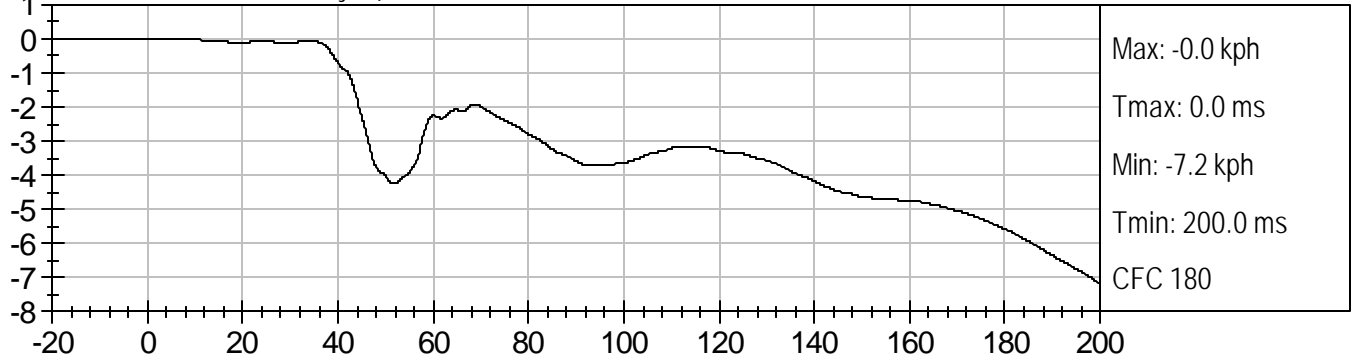




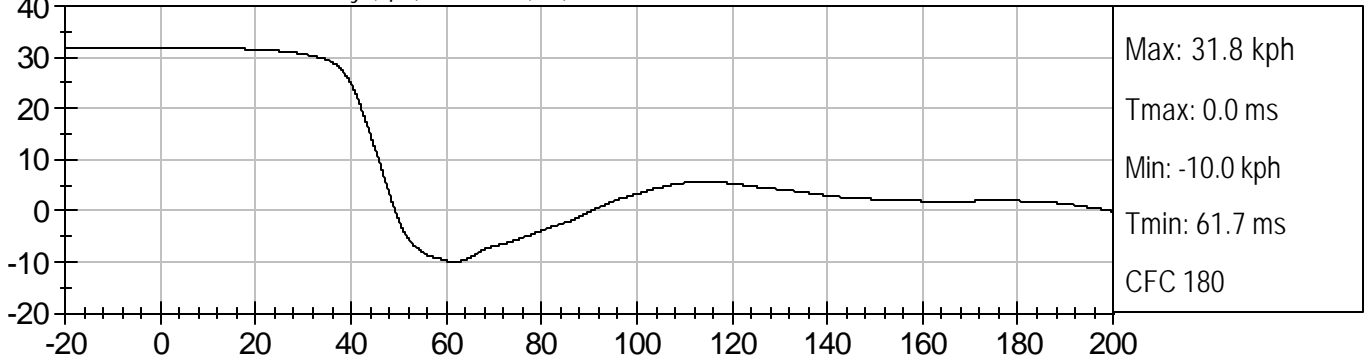




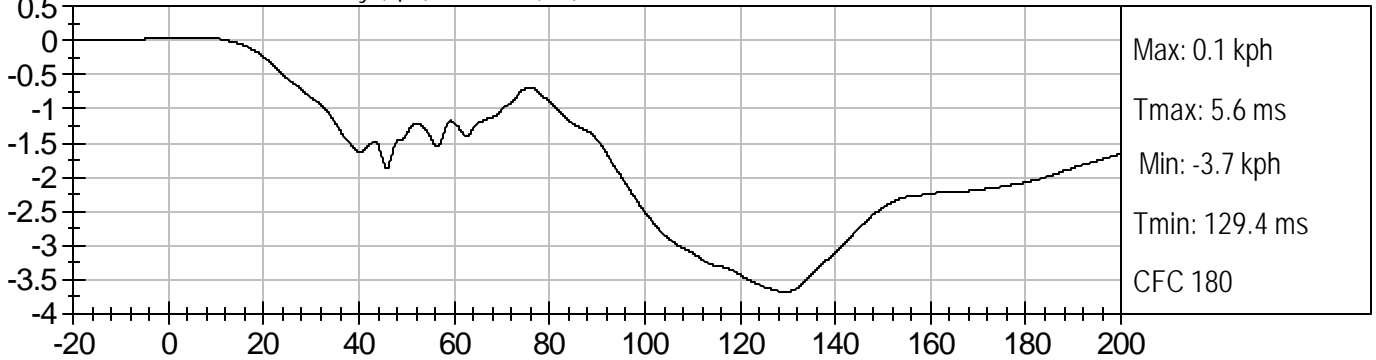
DRIVER PELVIS X Velocity (kph) vs TIME (ms)

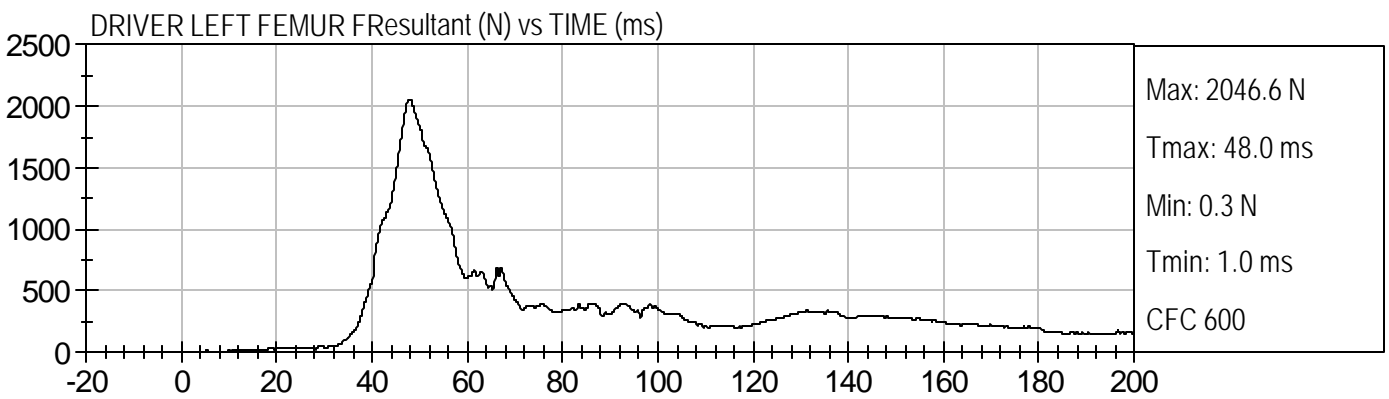
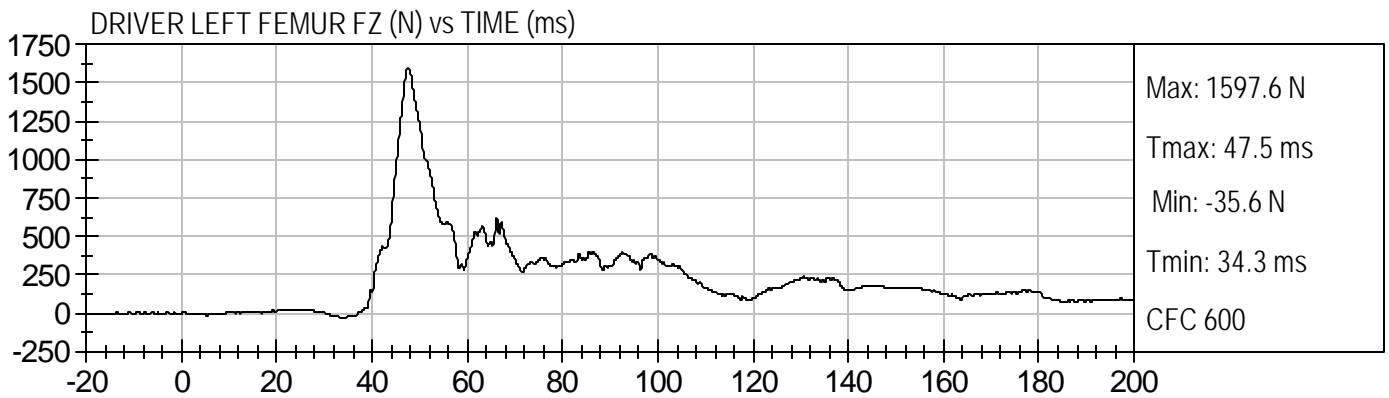
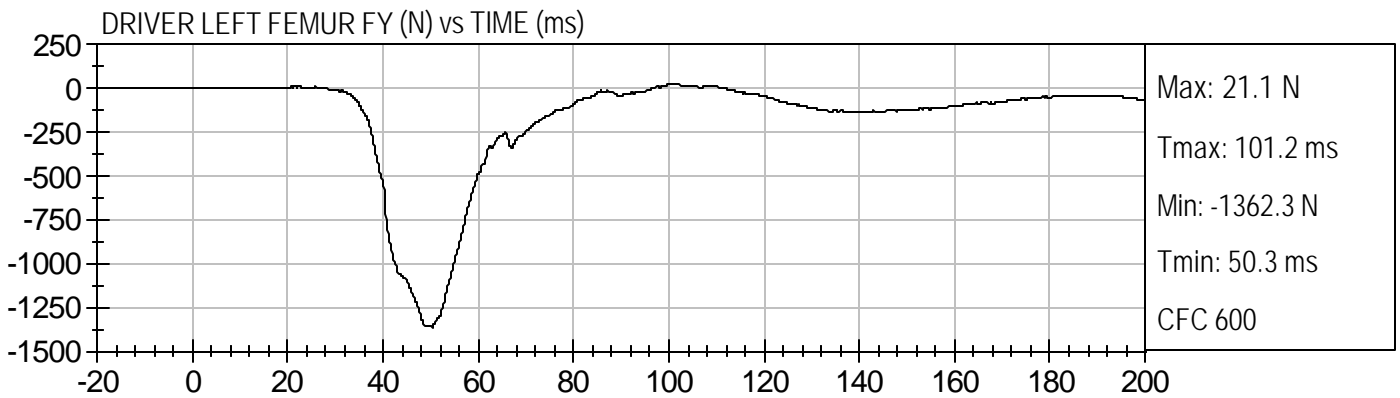
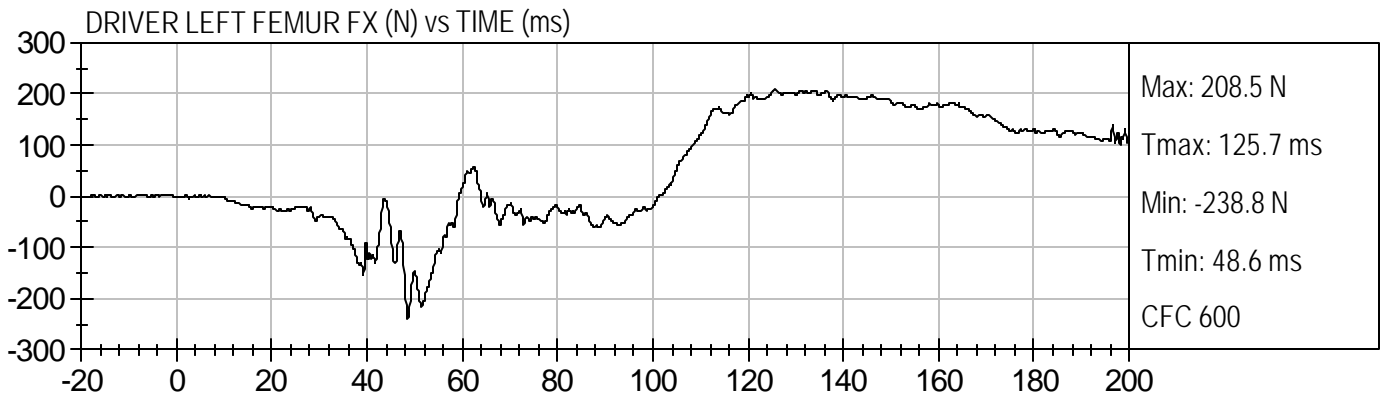


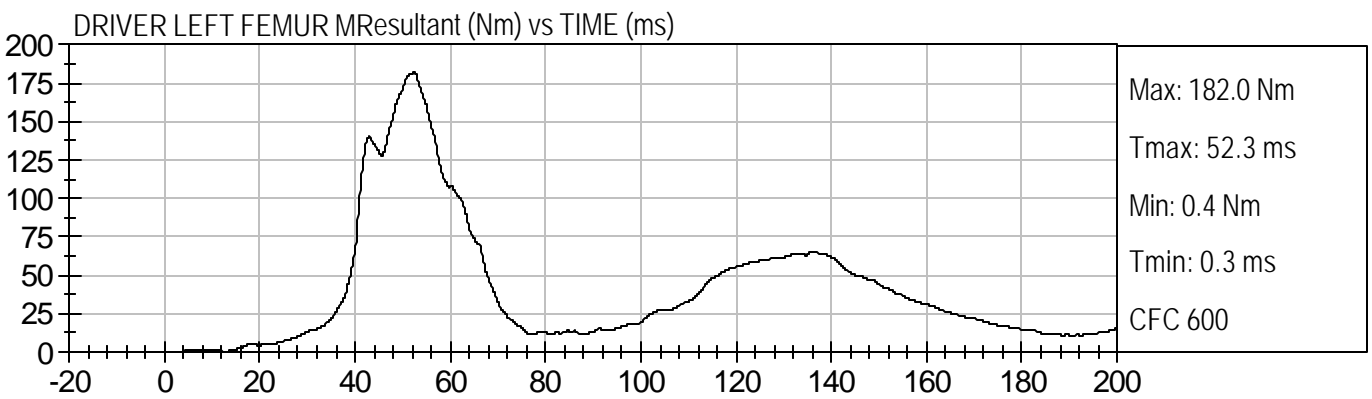
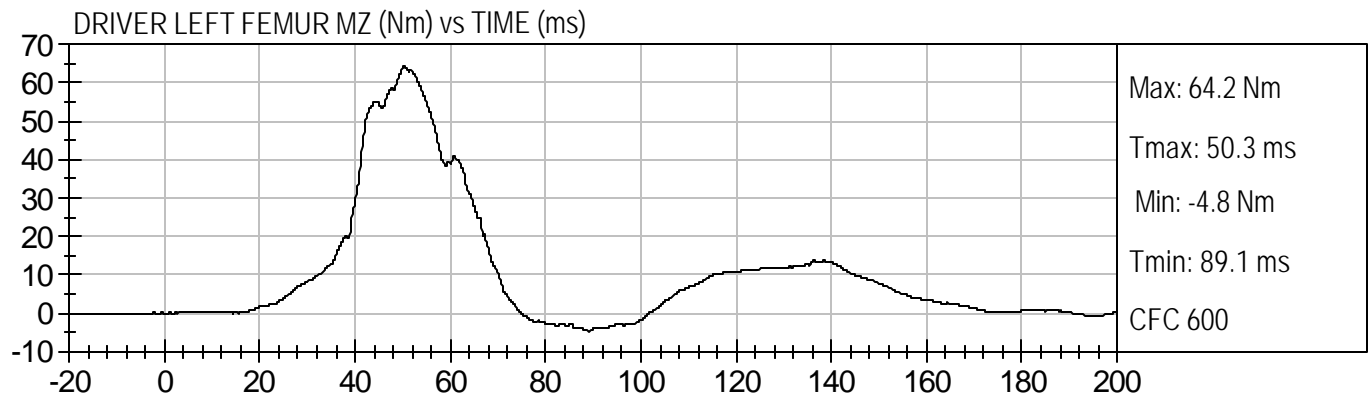
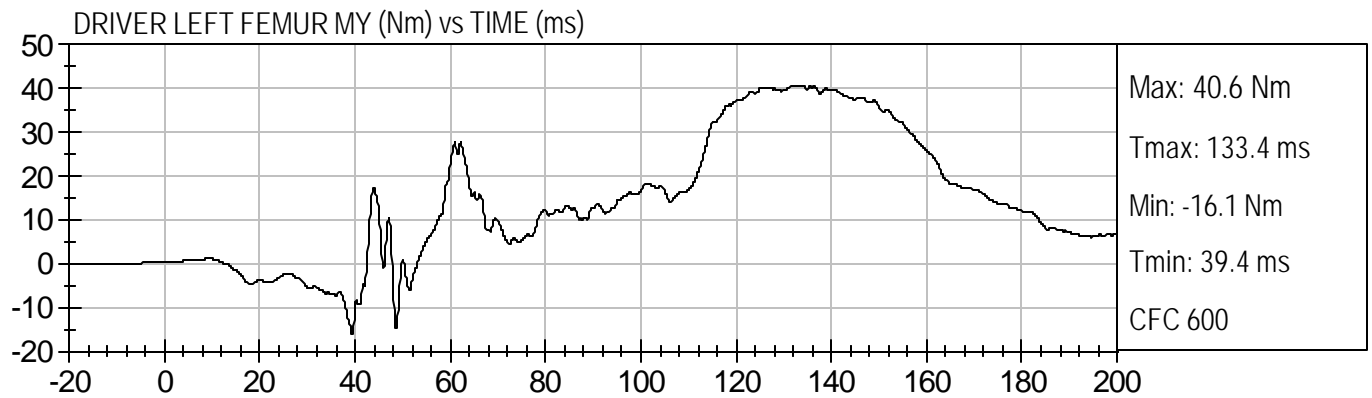
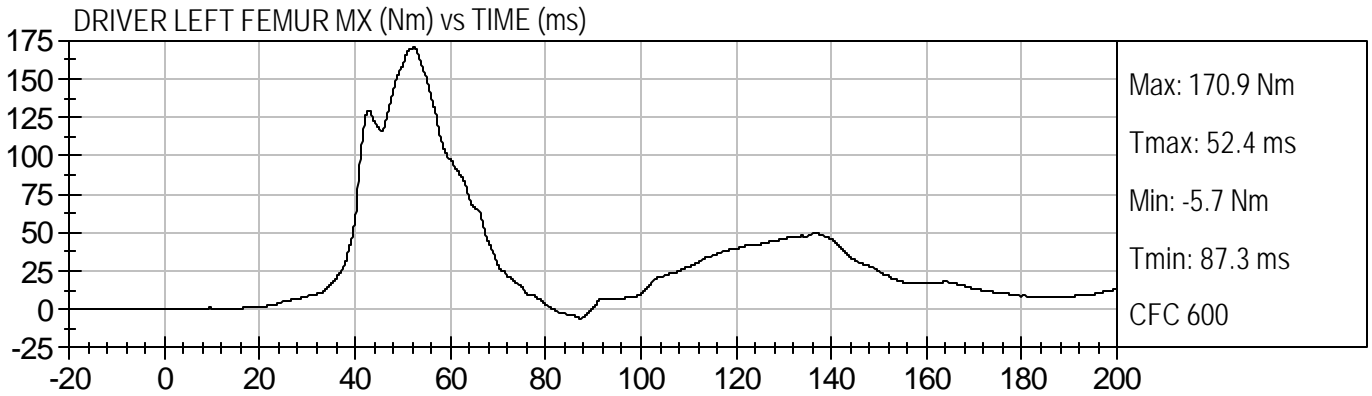
DRIVER PELVIS Y Velocity (kph) vs TIME (ms)

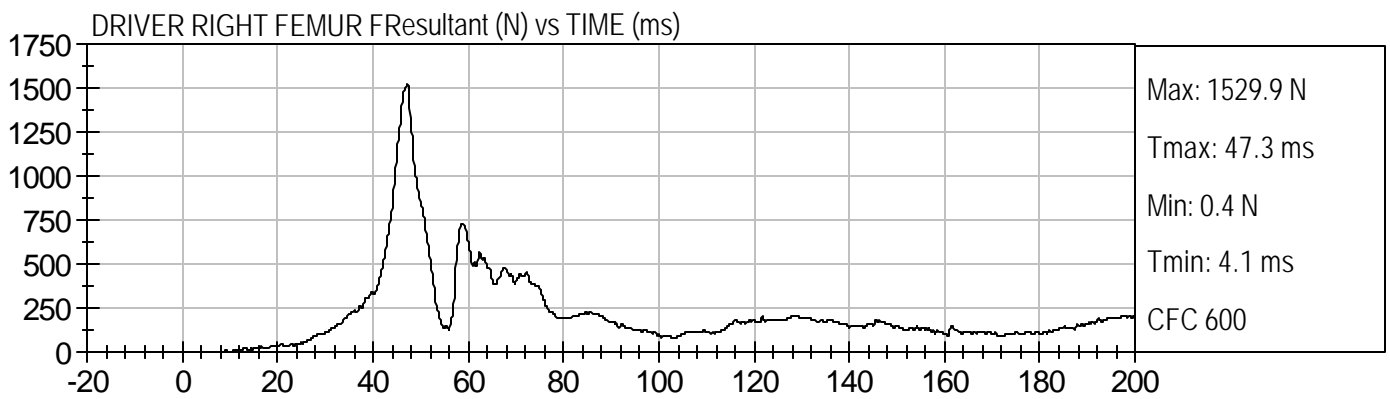
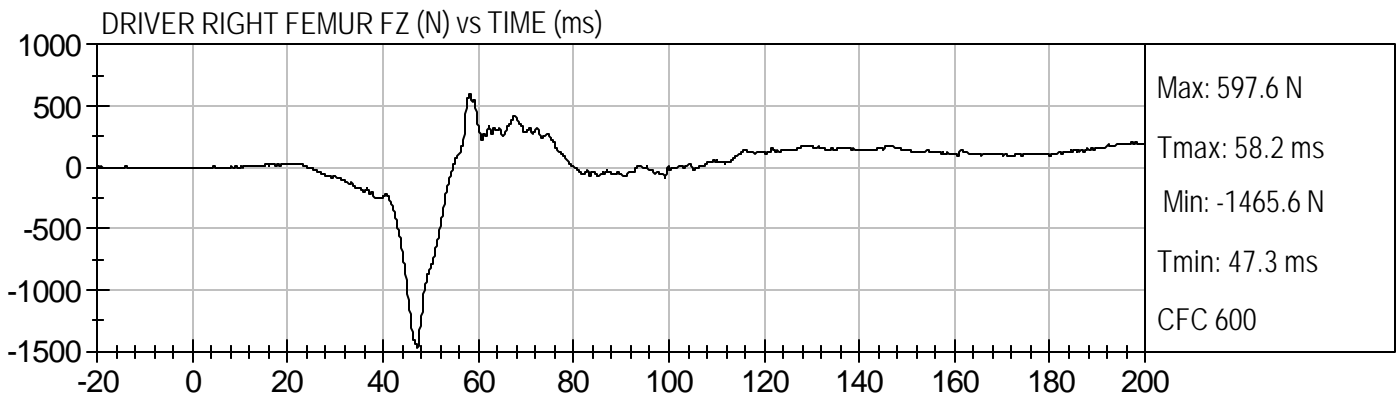
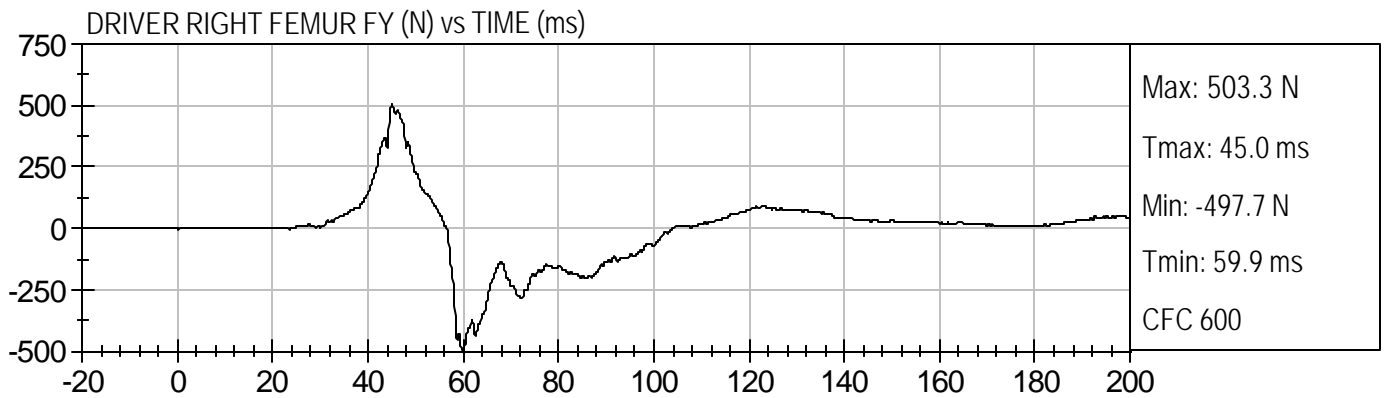
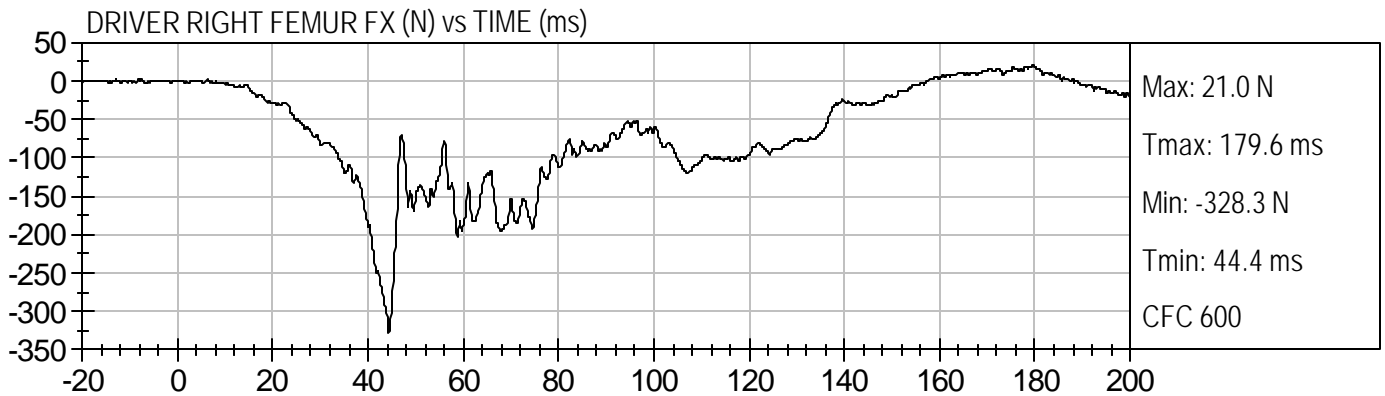


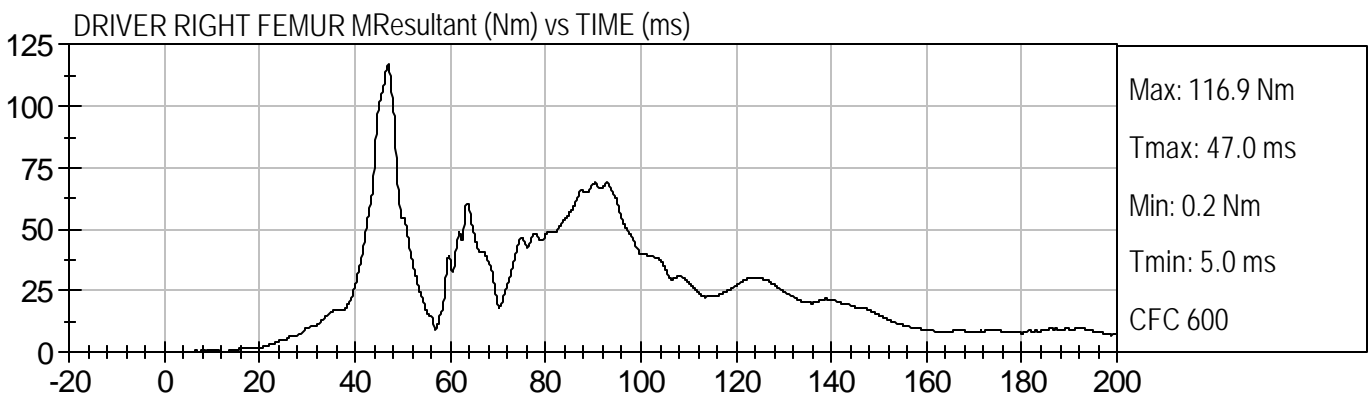
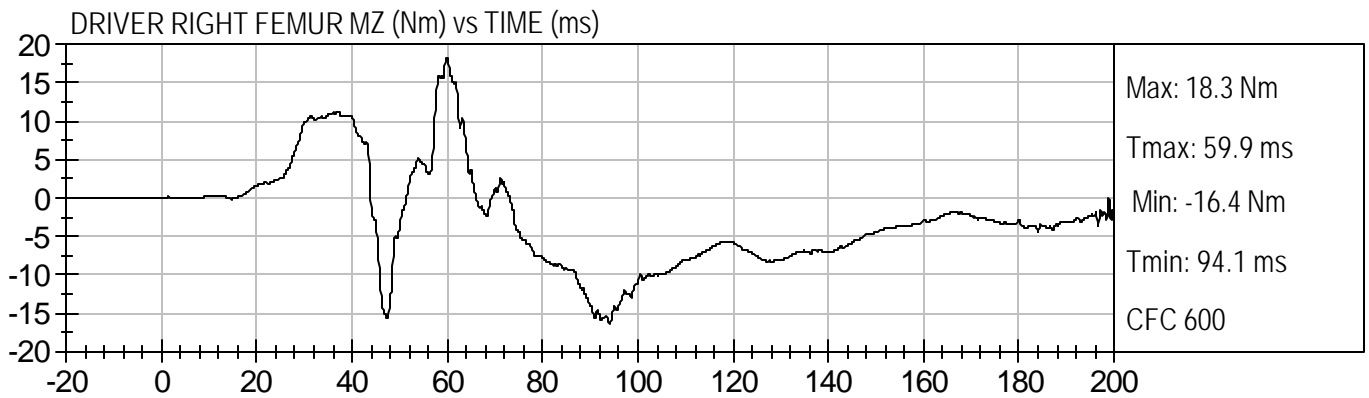
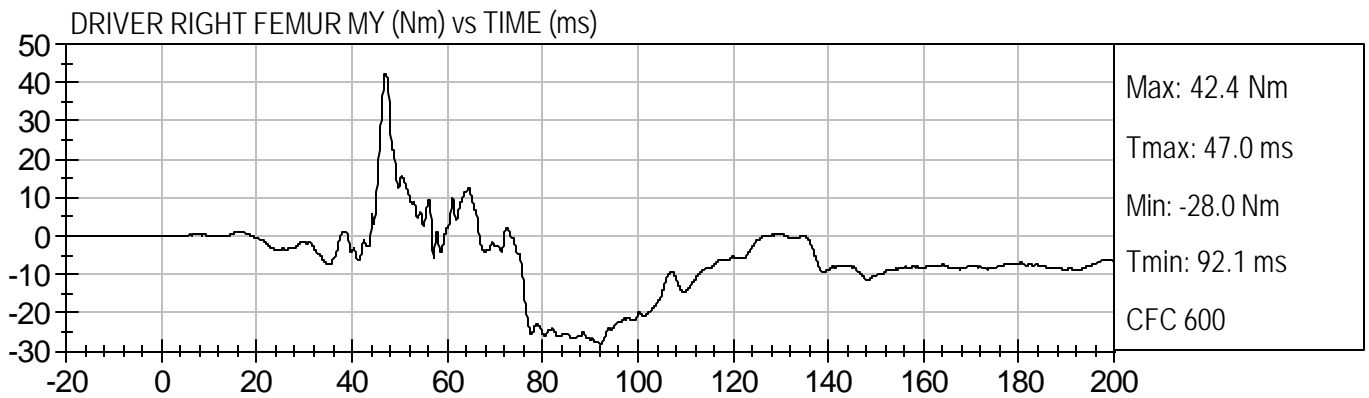
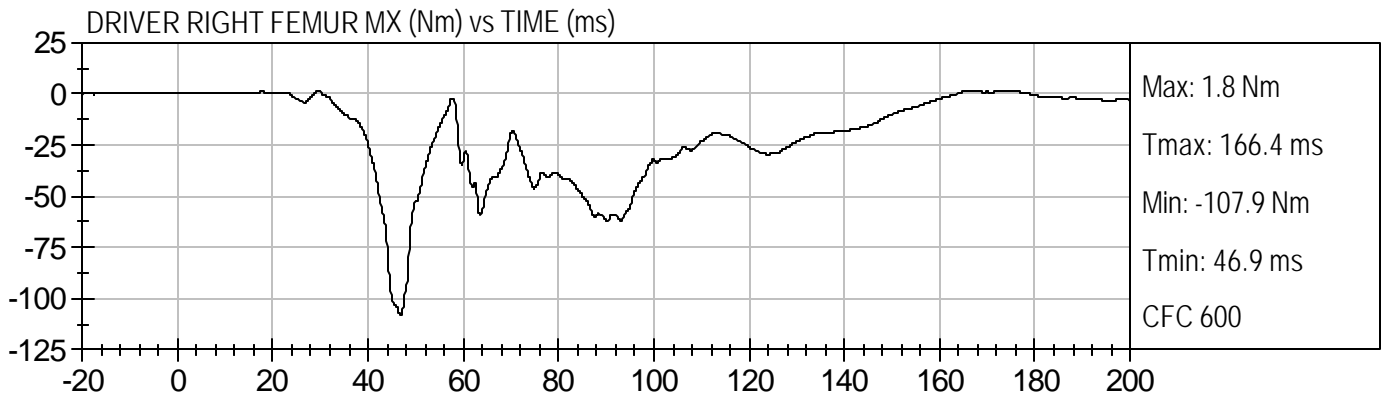
DRIVER PELVIS Z Velocity (kph) vs TIME (ms)

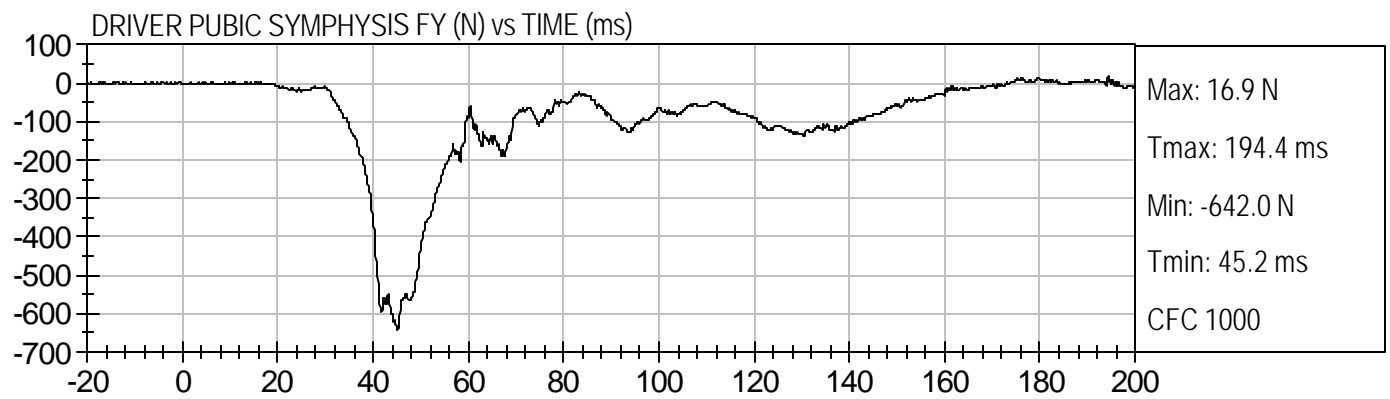
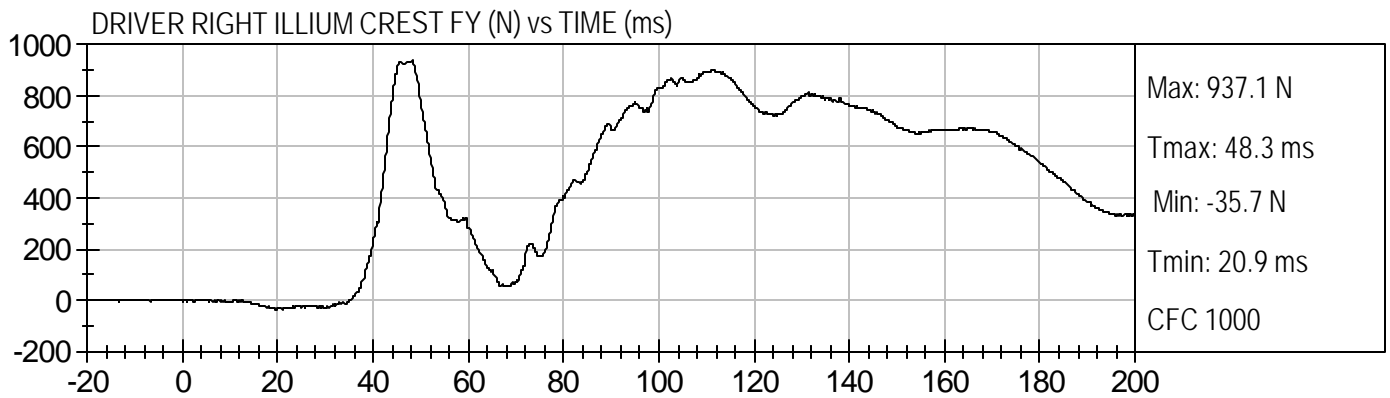
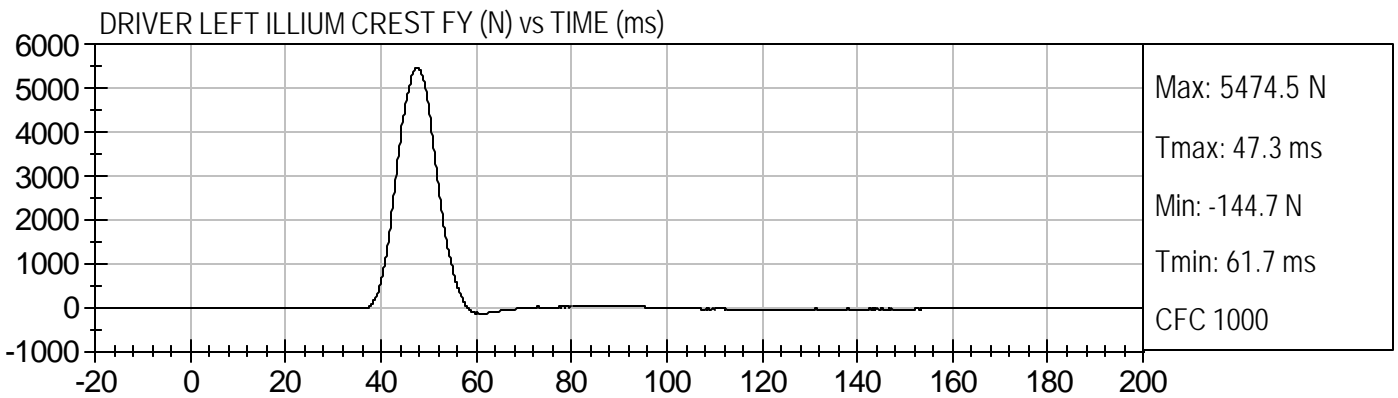
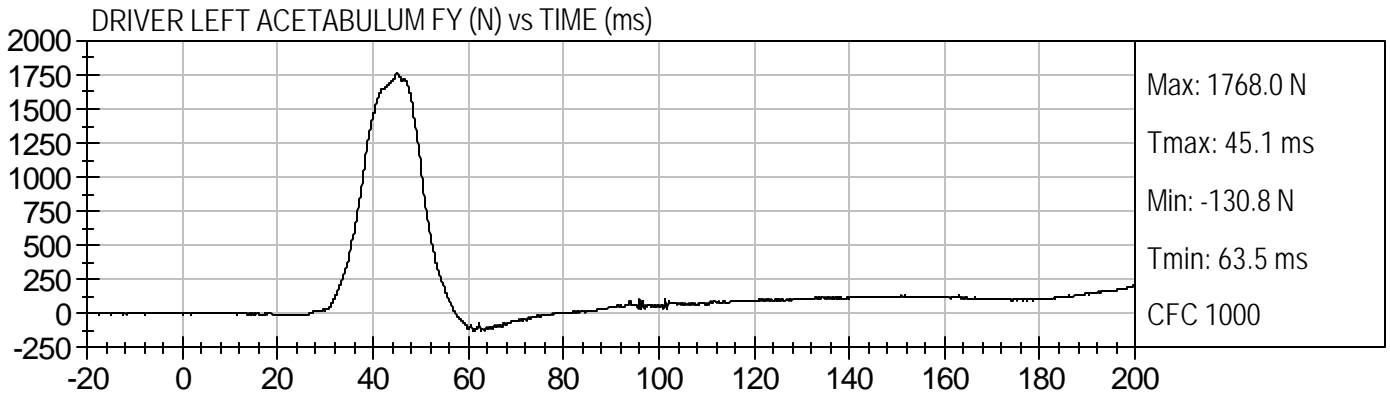


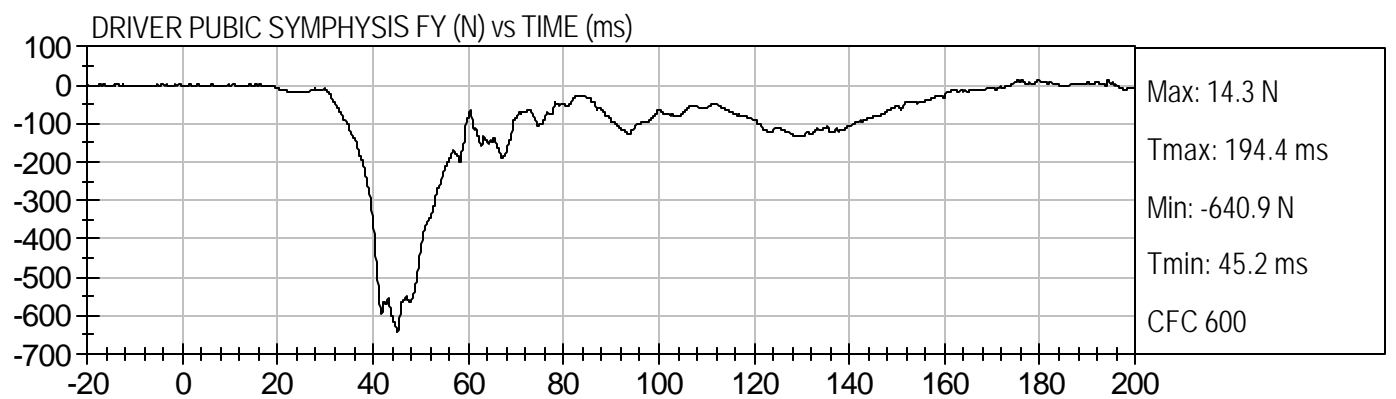
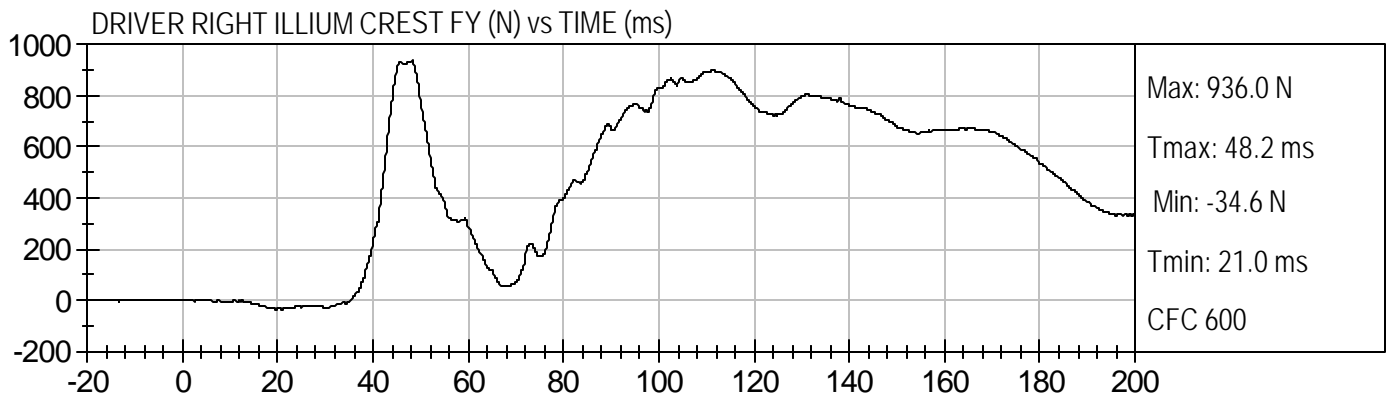
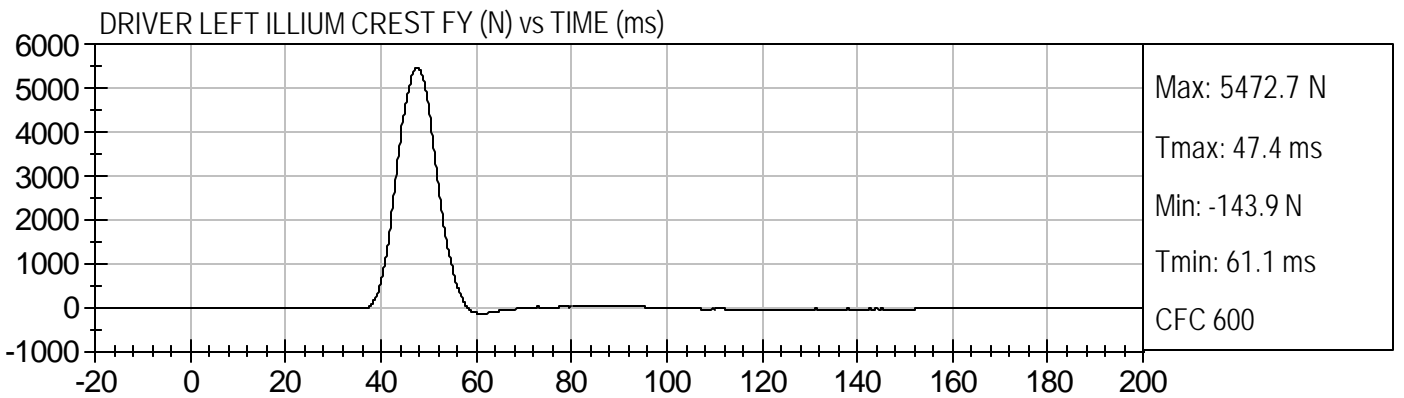
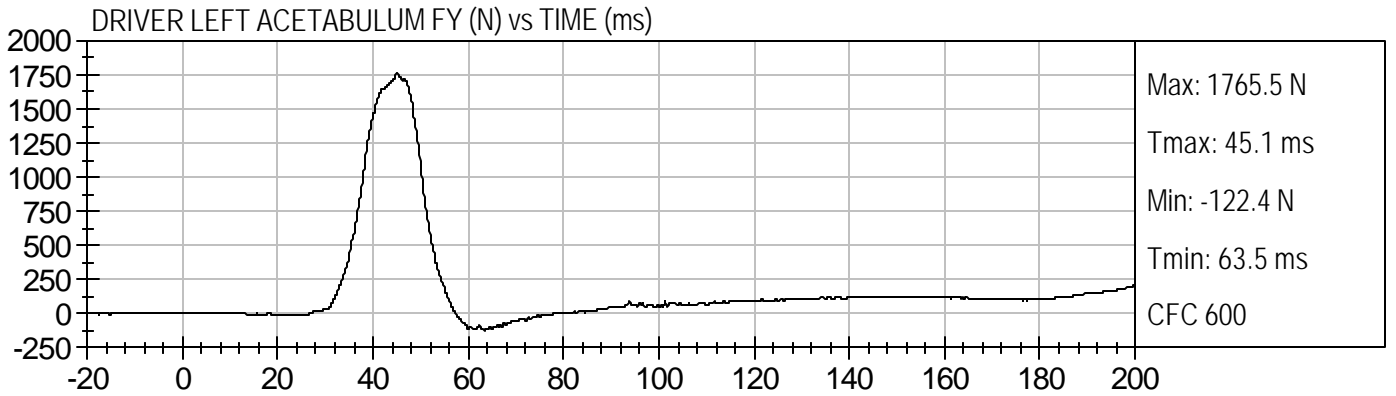


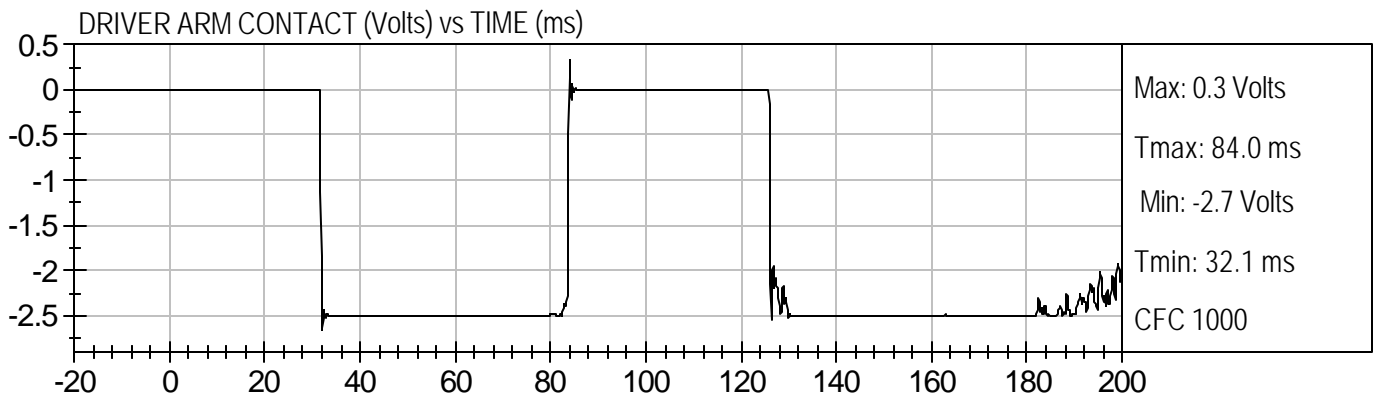
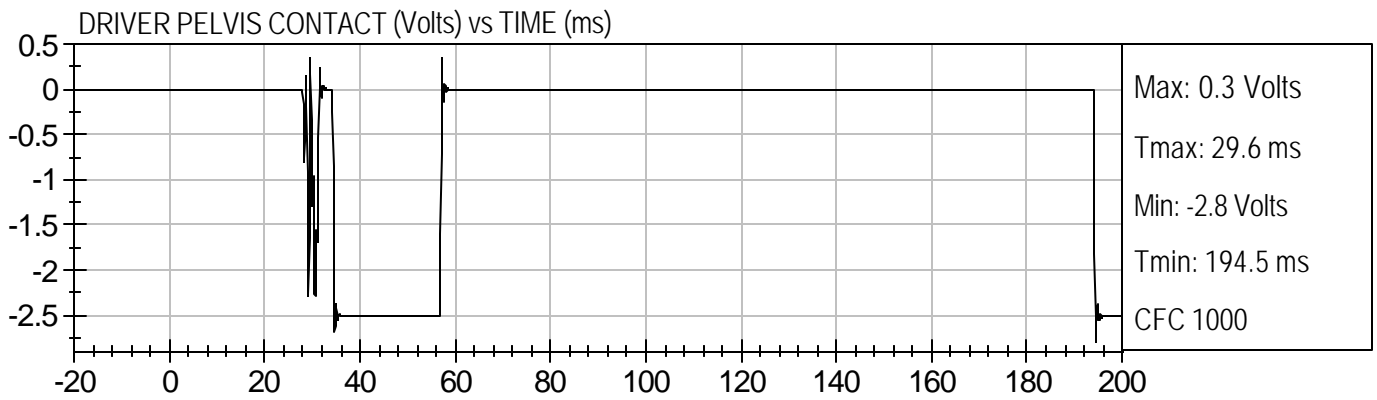
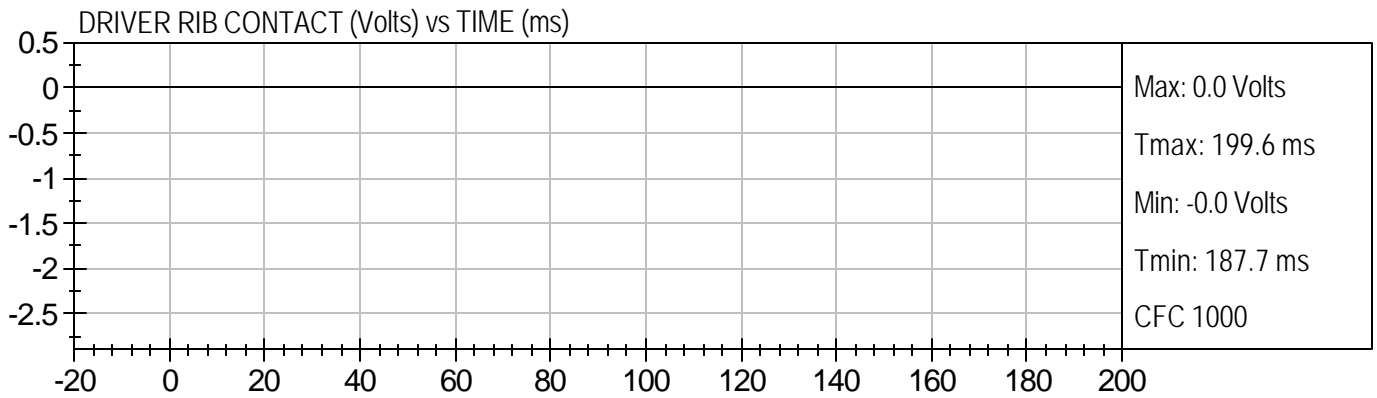


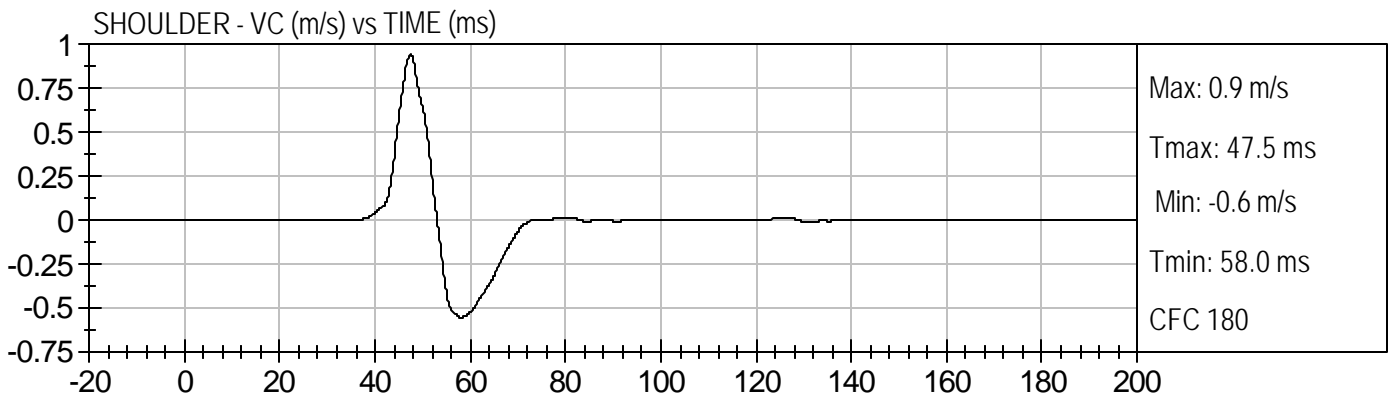
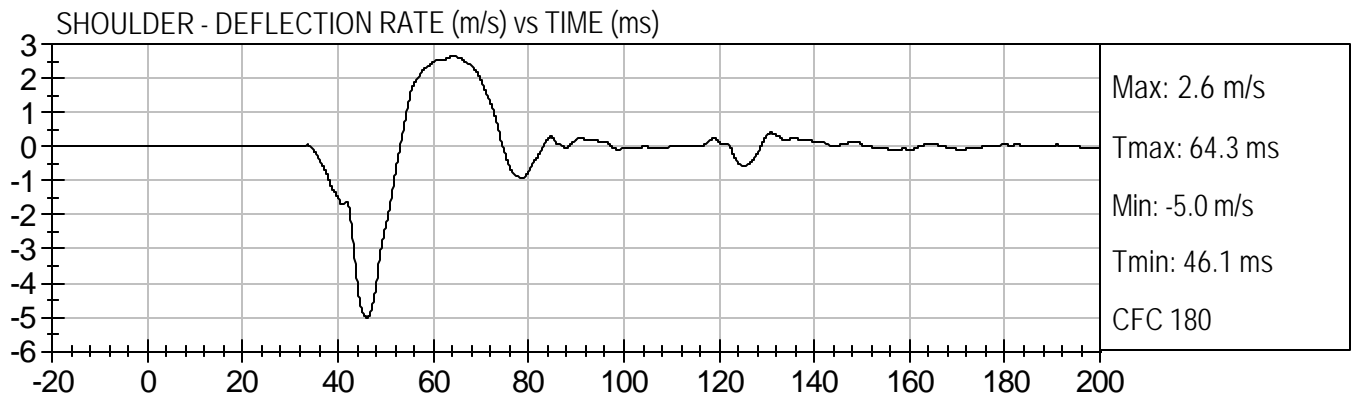
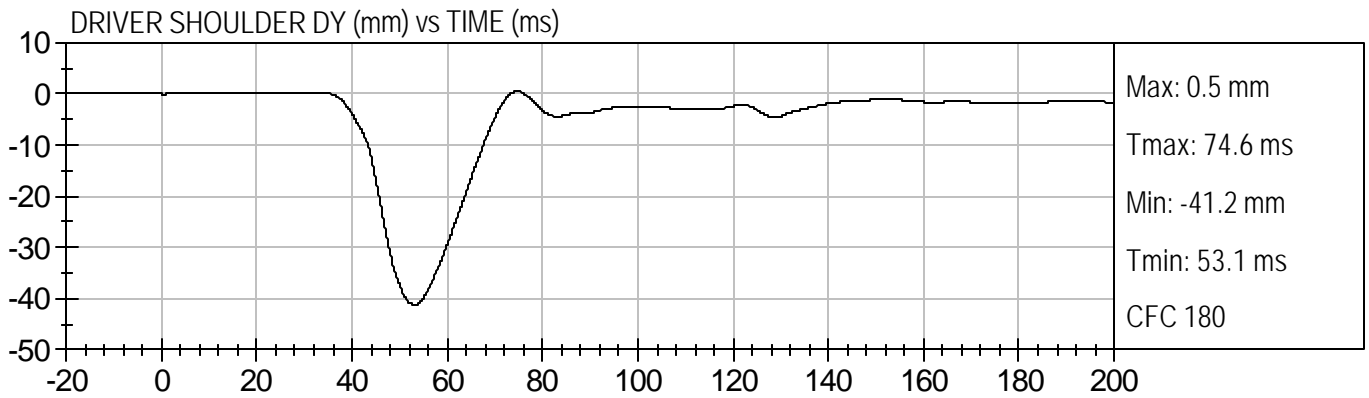


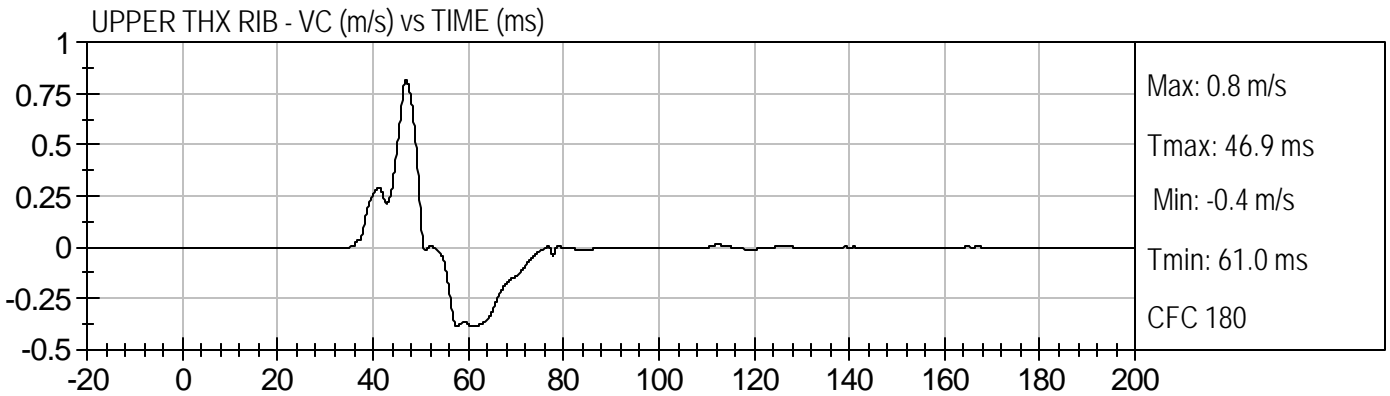
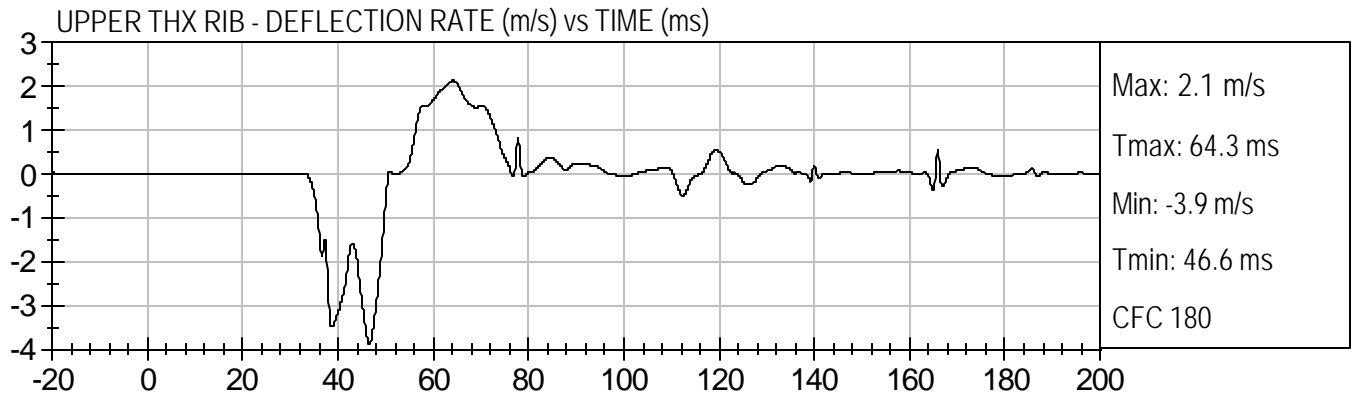
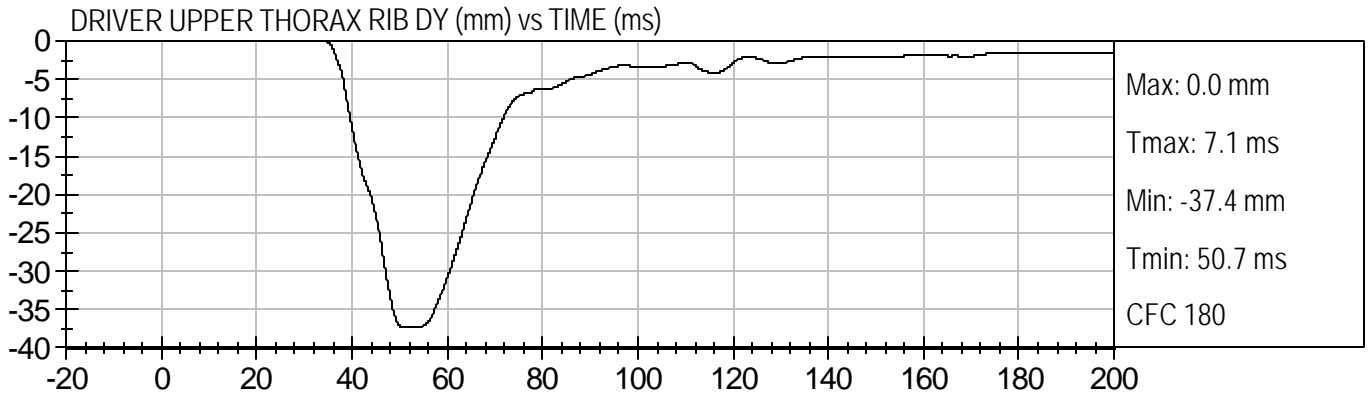


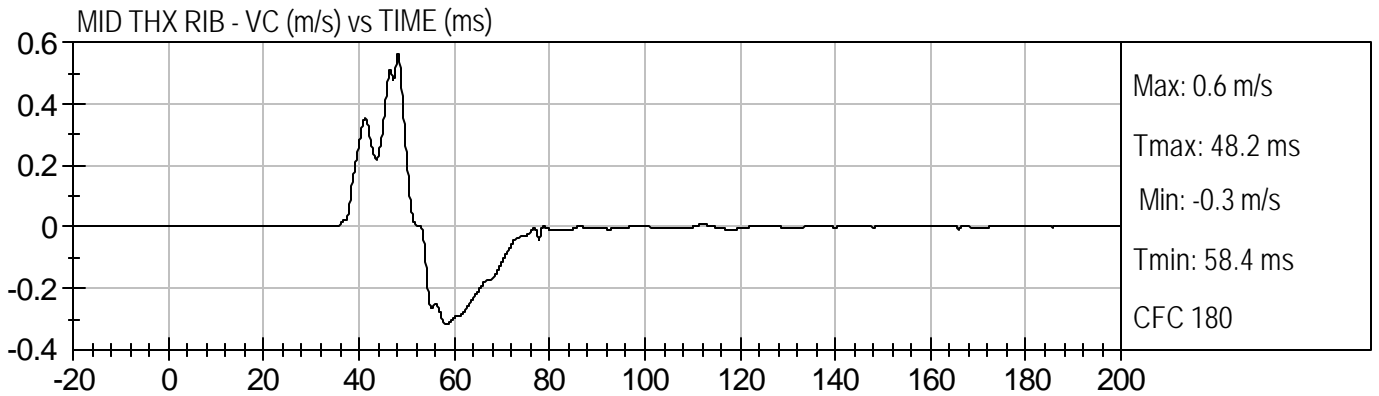
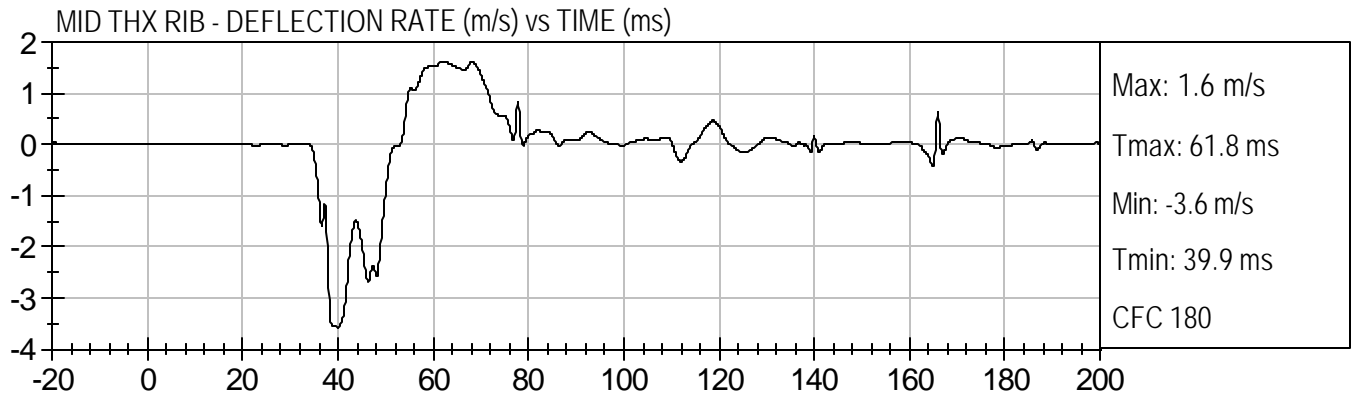
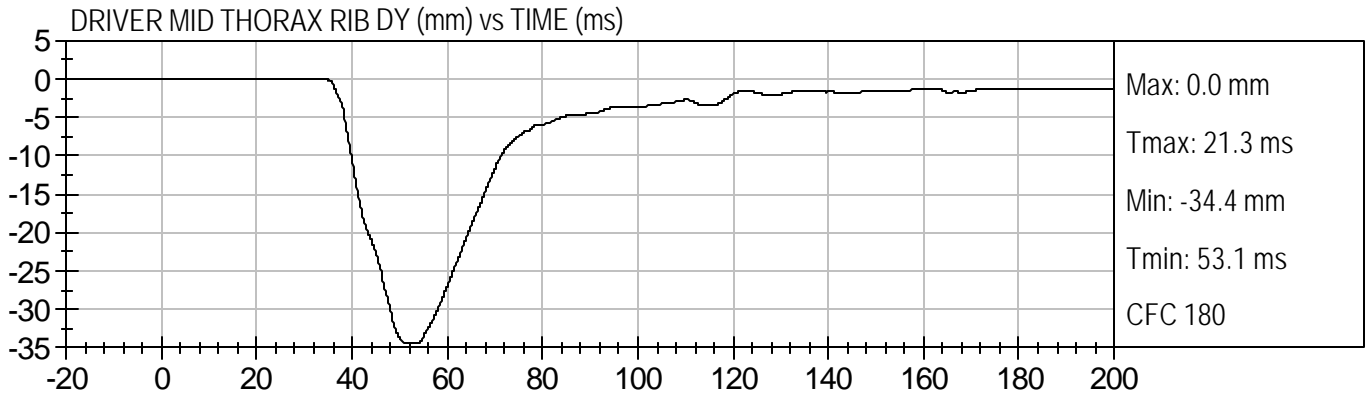


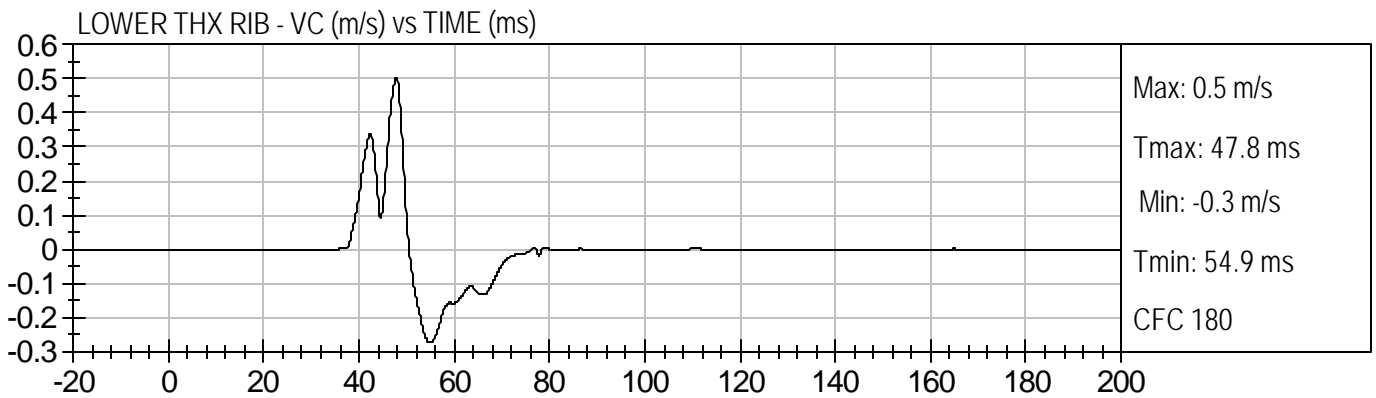
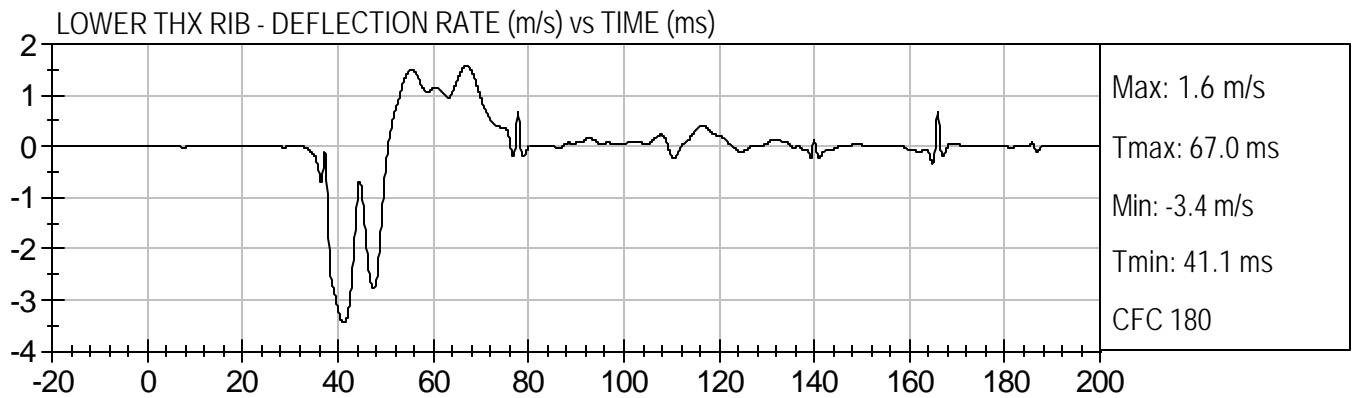
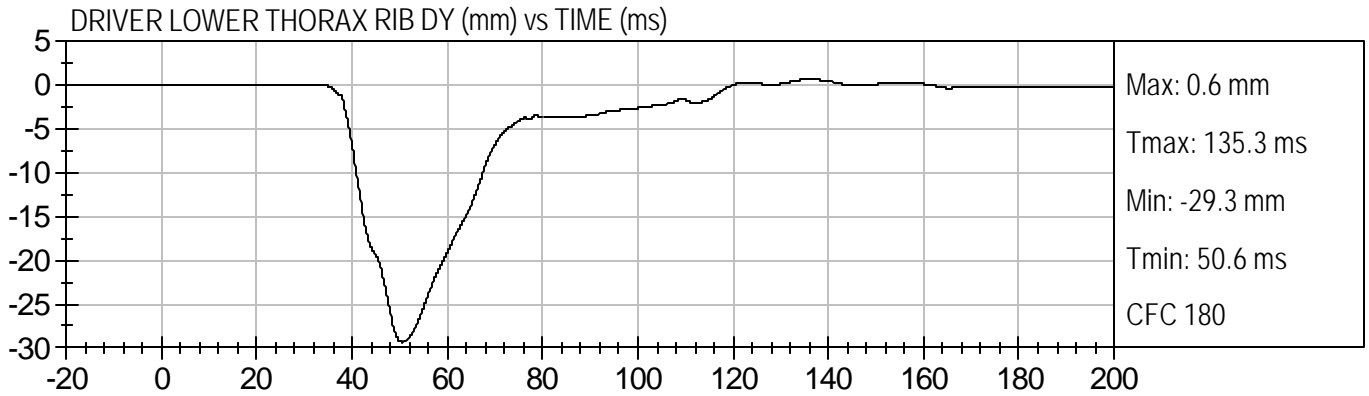


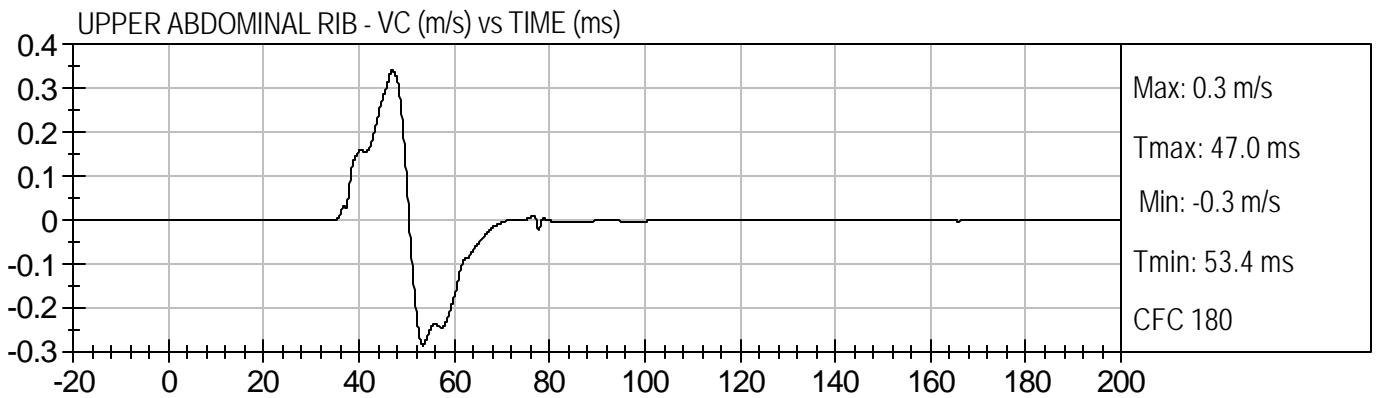
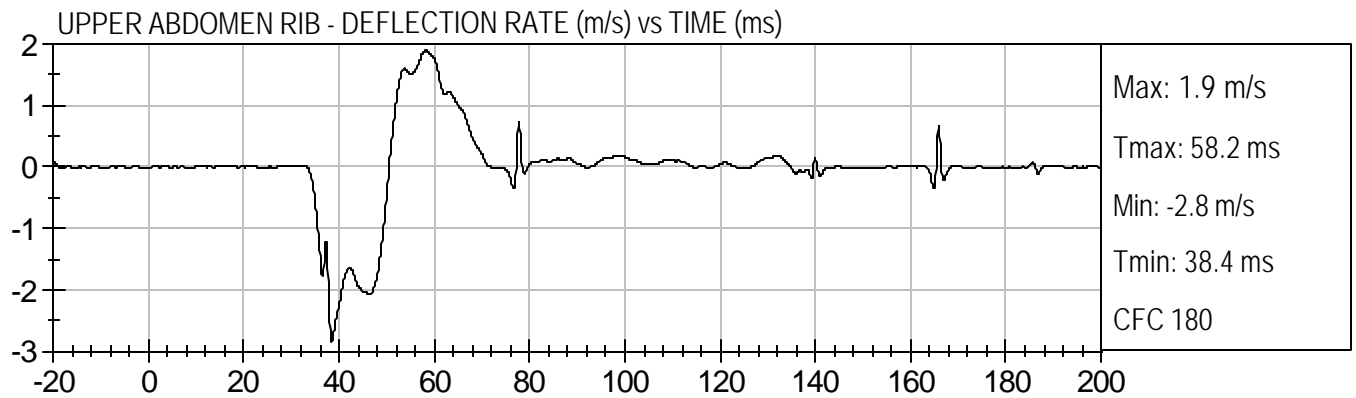
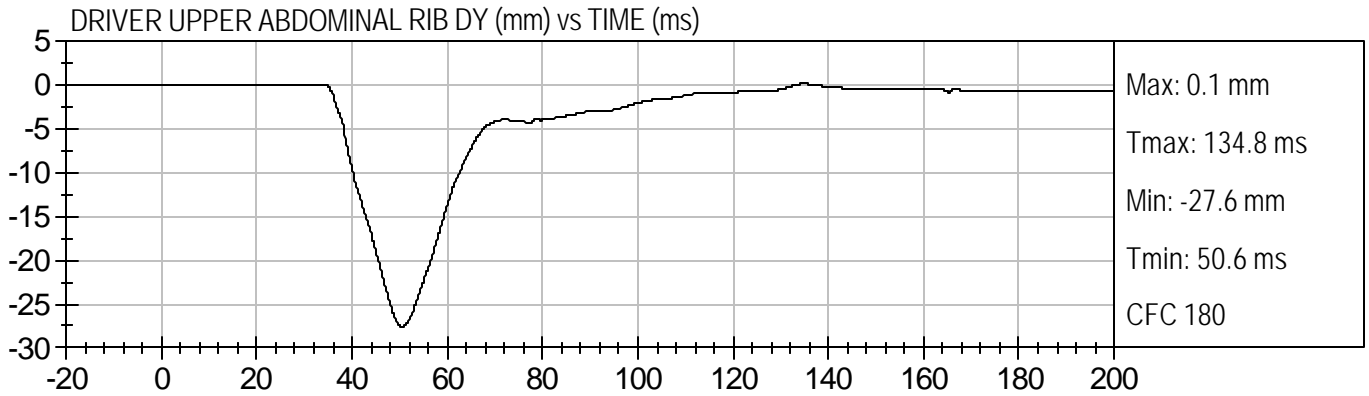


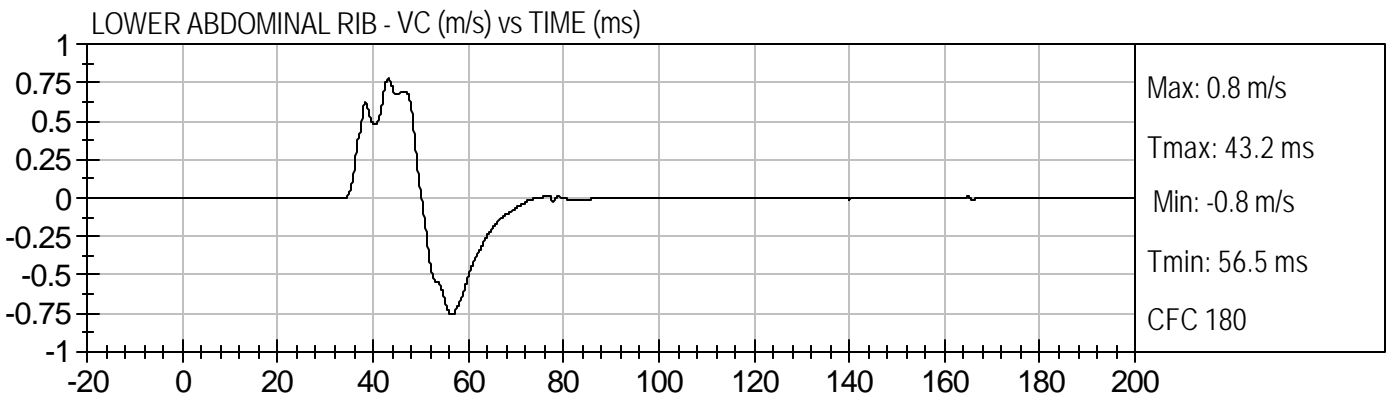
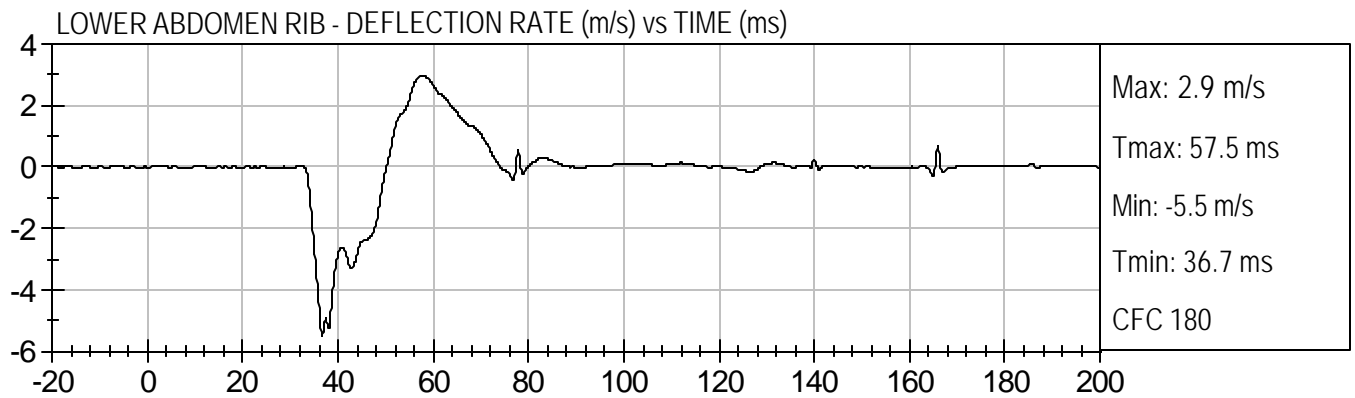
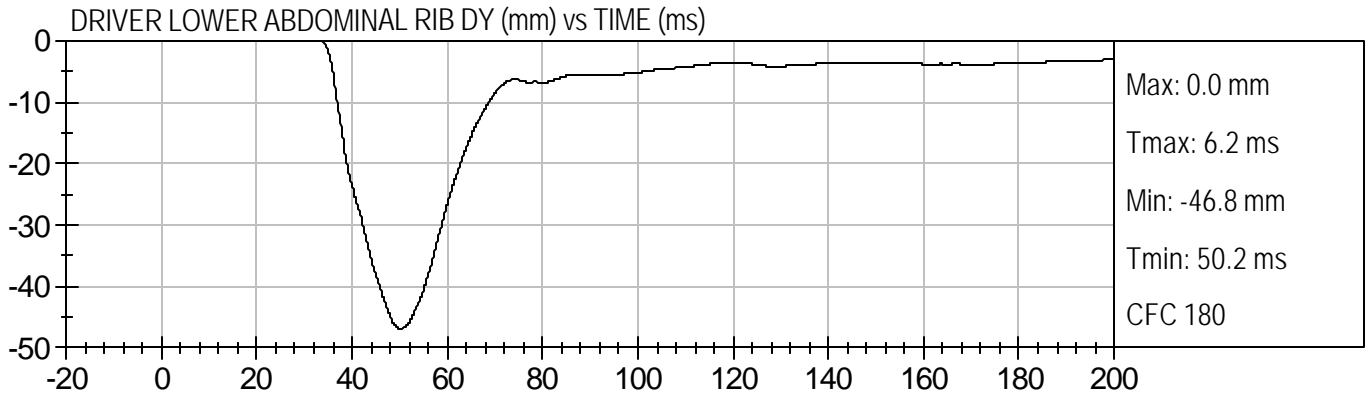


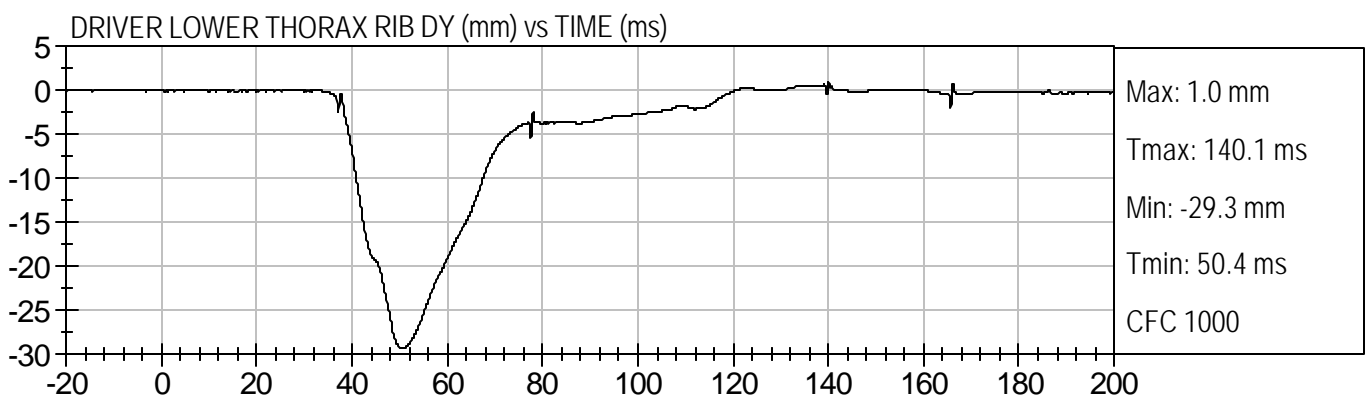
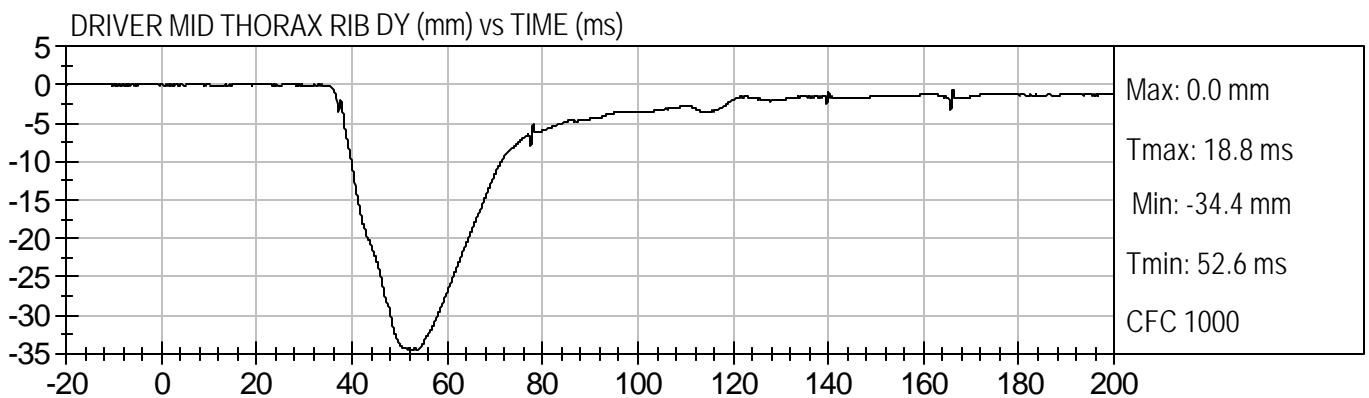
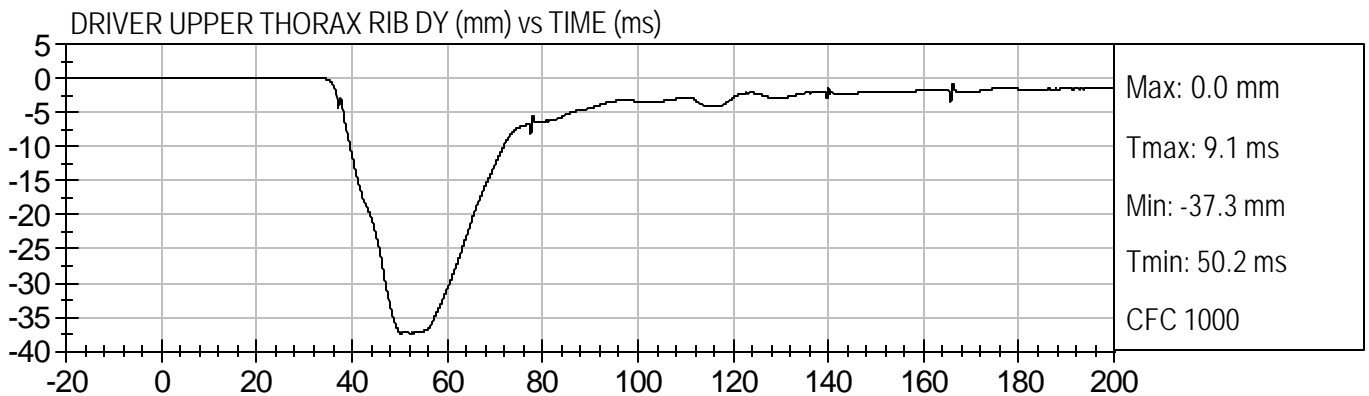
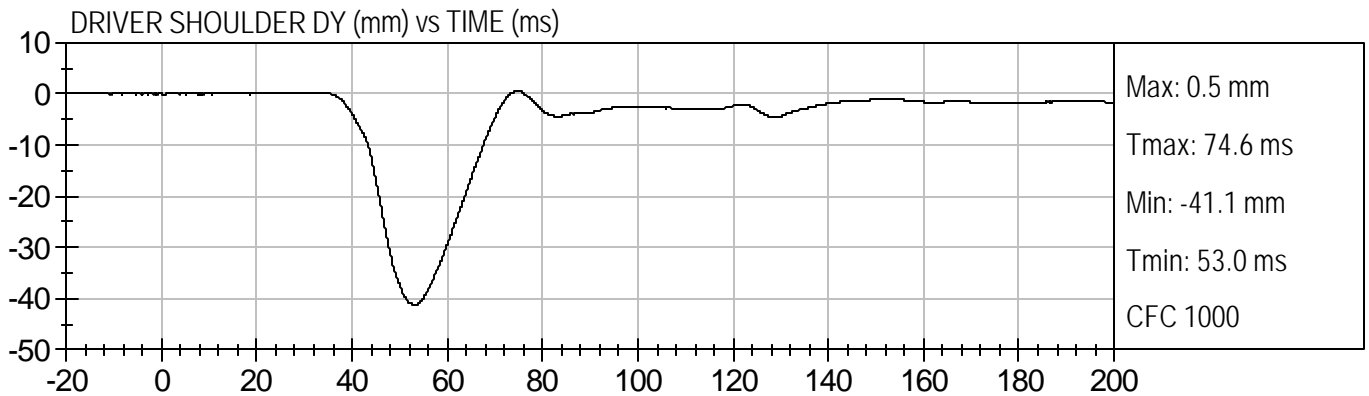


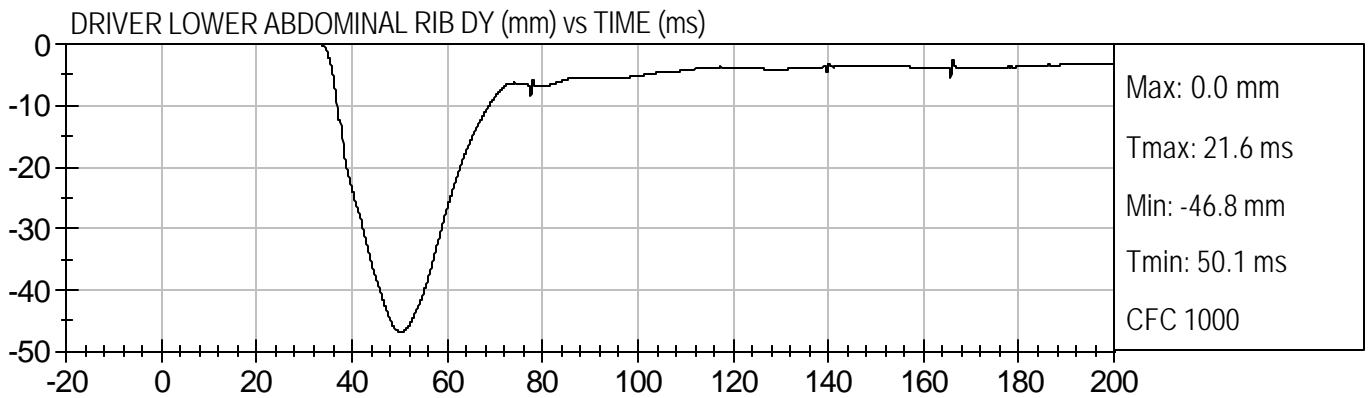
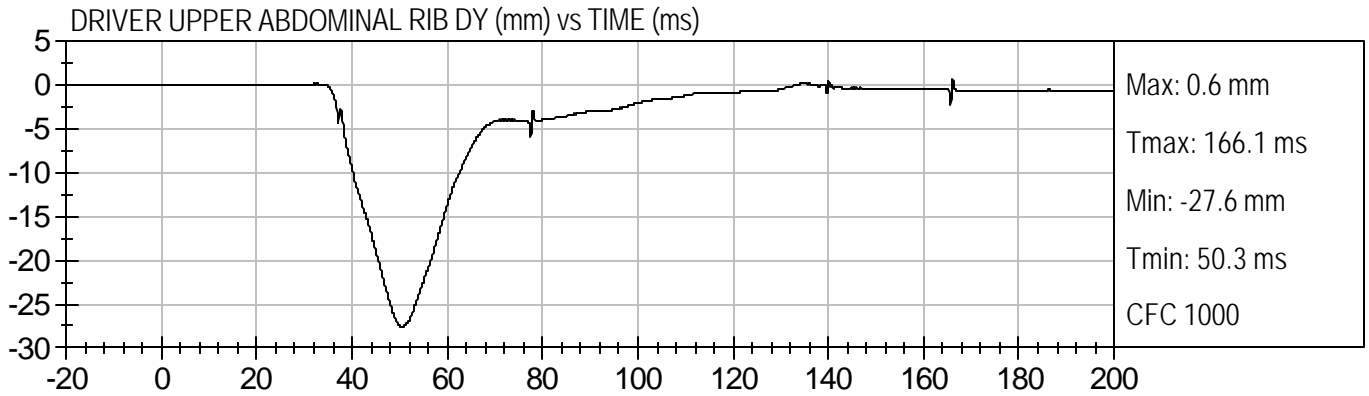


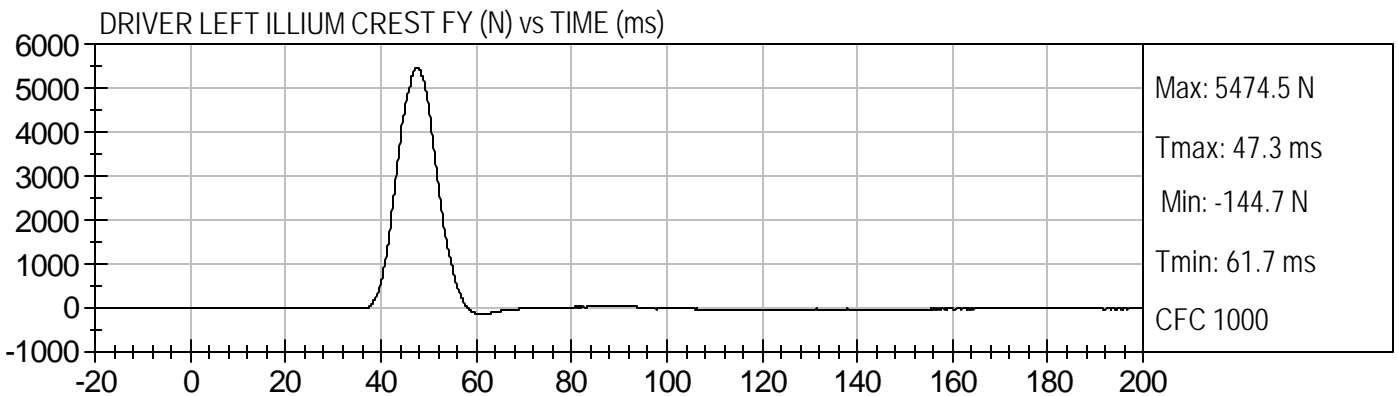
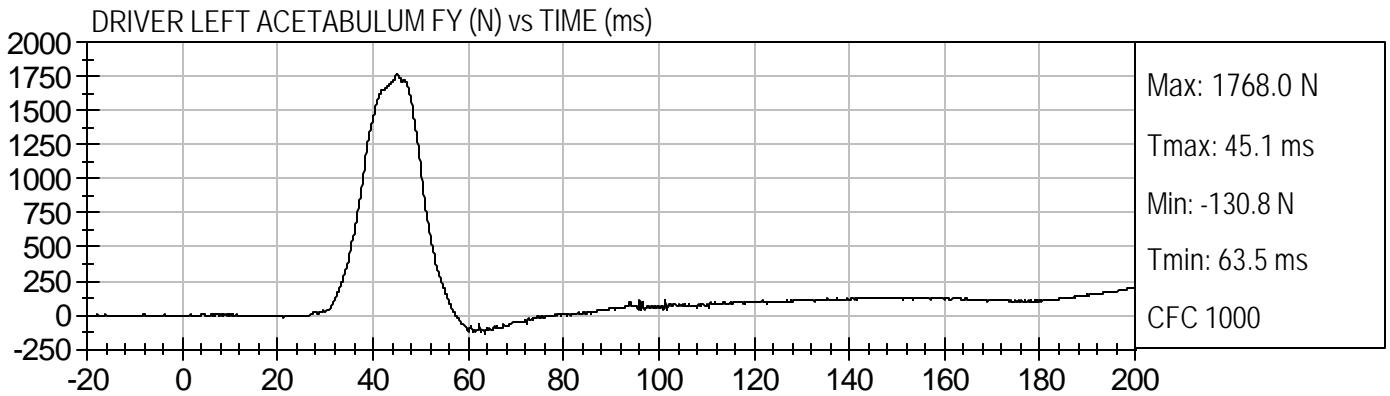
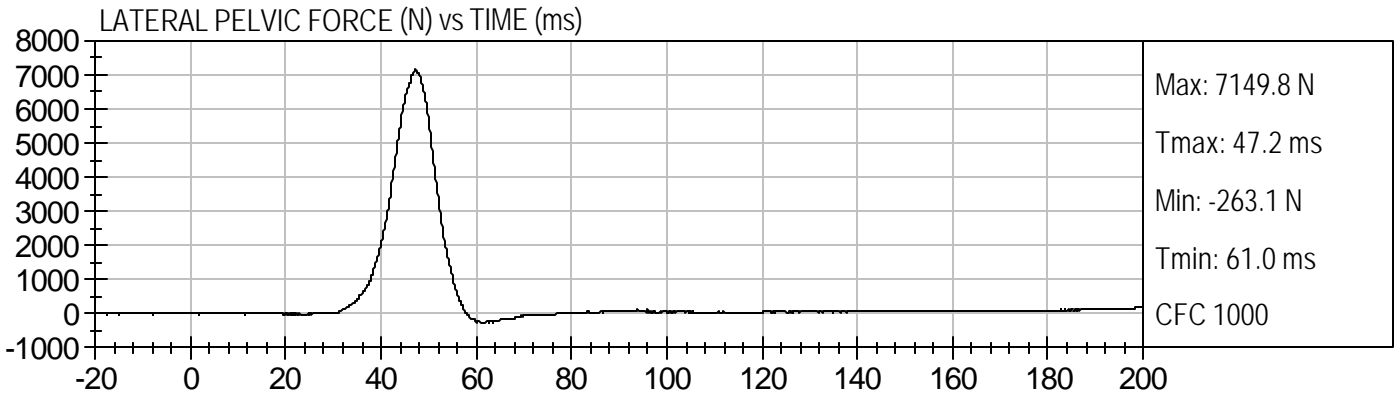


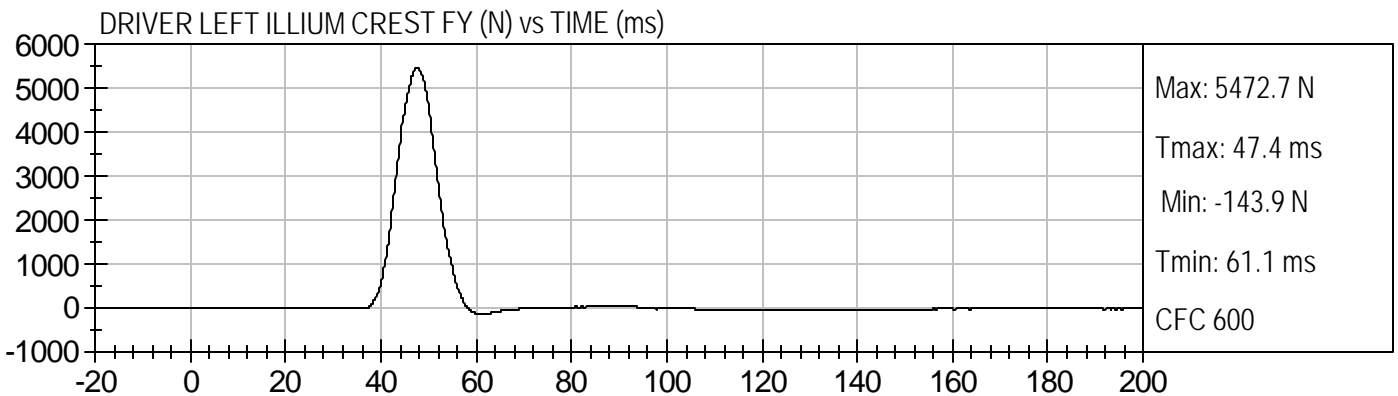
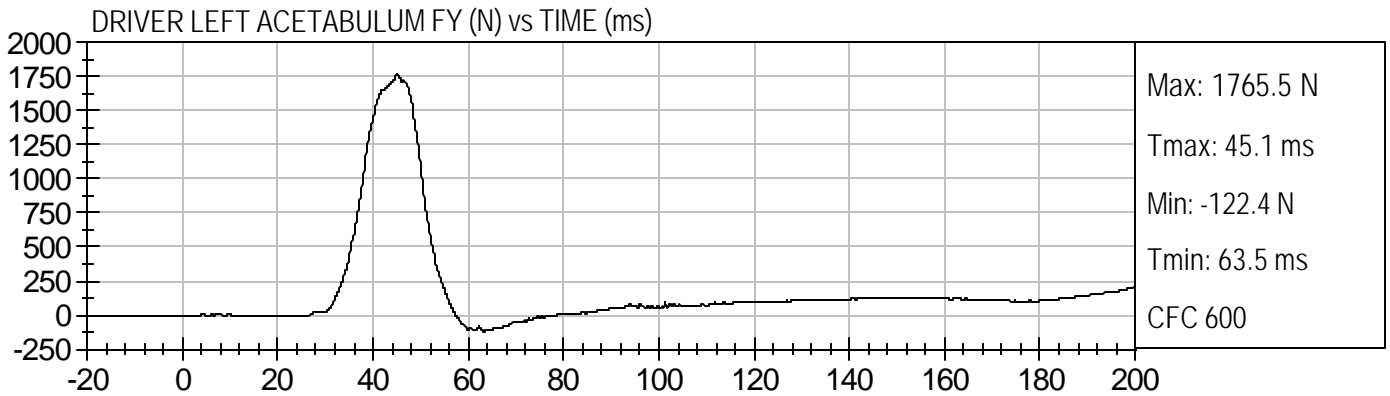
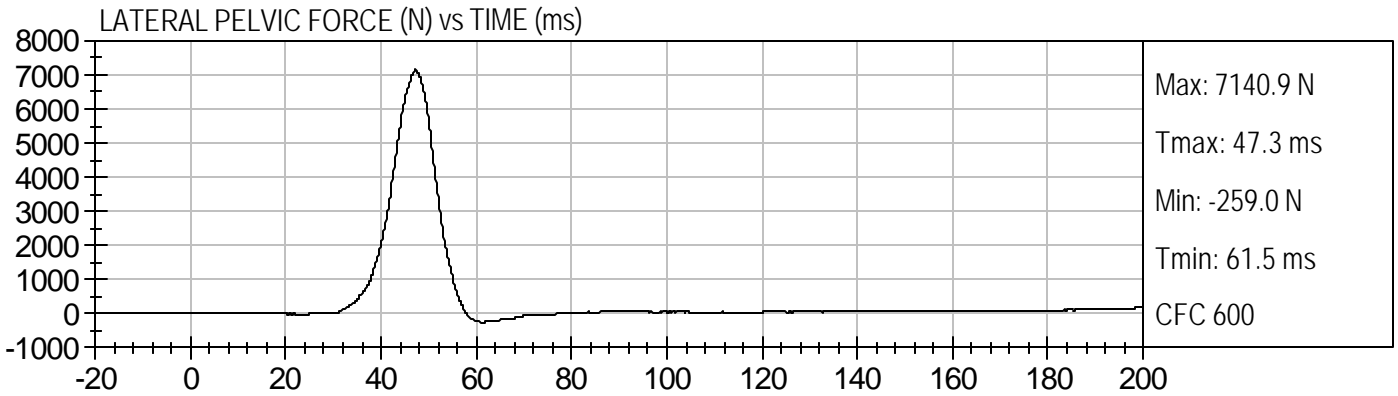






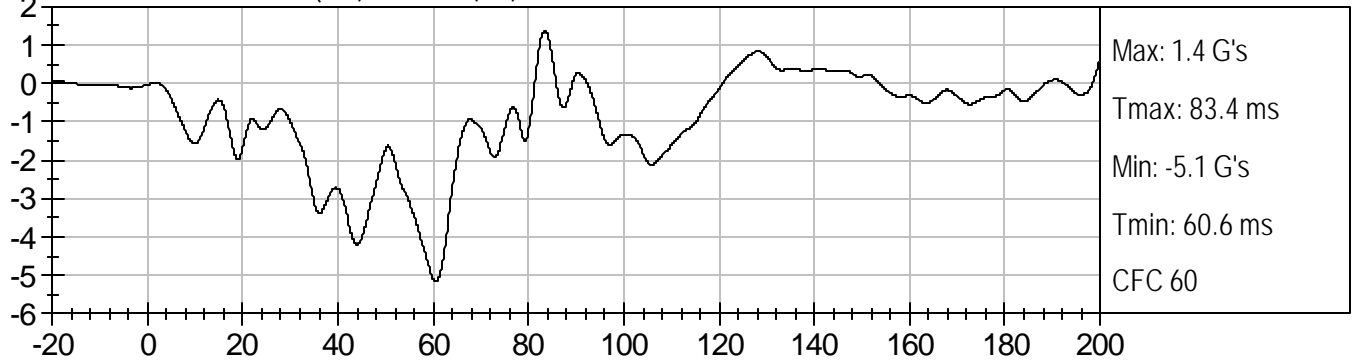




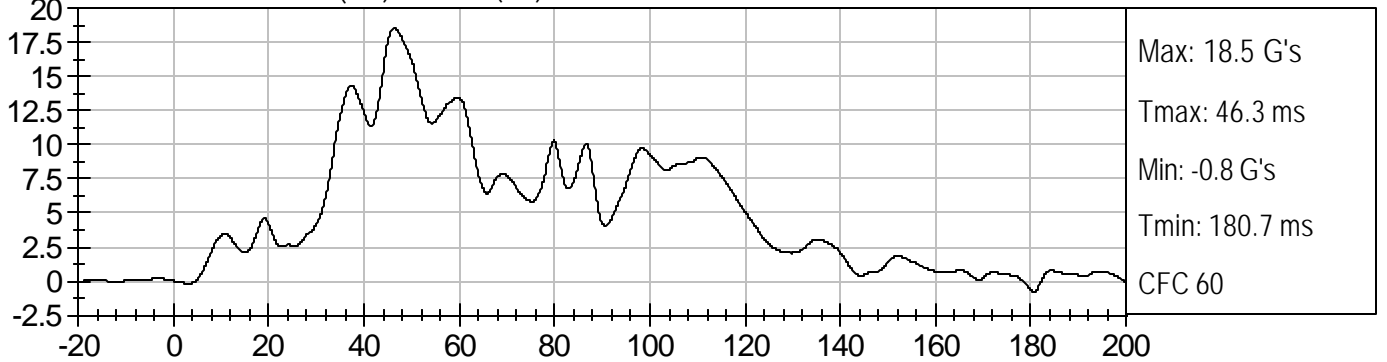




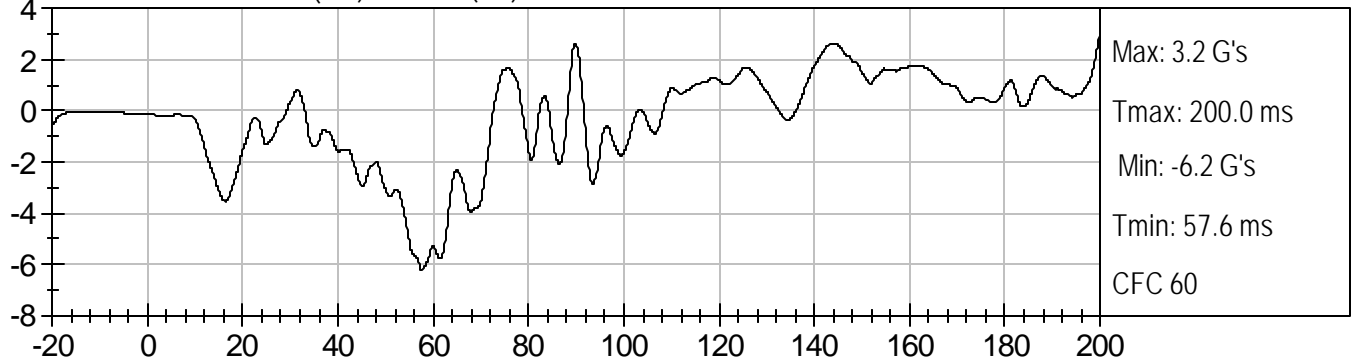
RIGHT FRONT SILL X (G's) vs TIME (ms)



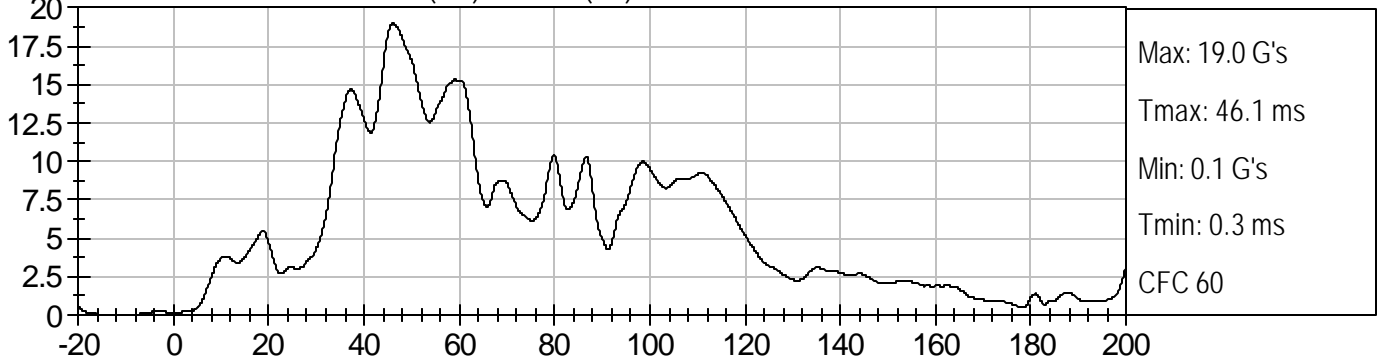
RIGHT FRONT SILL Y (G's) vs TIME (ms)

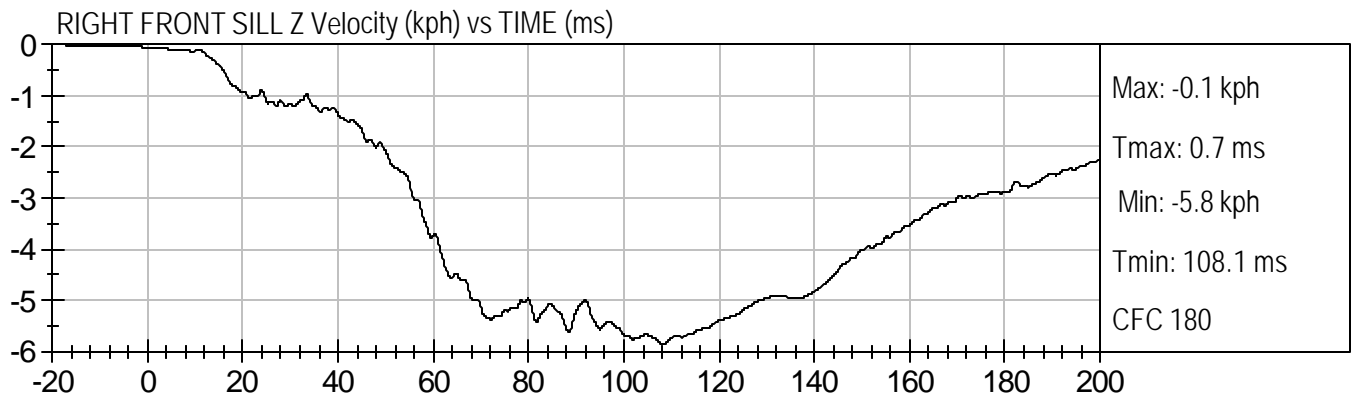
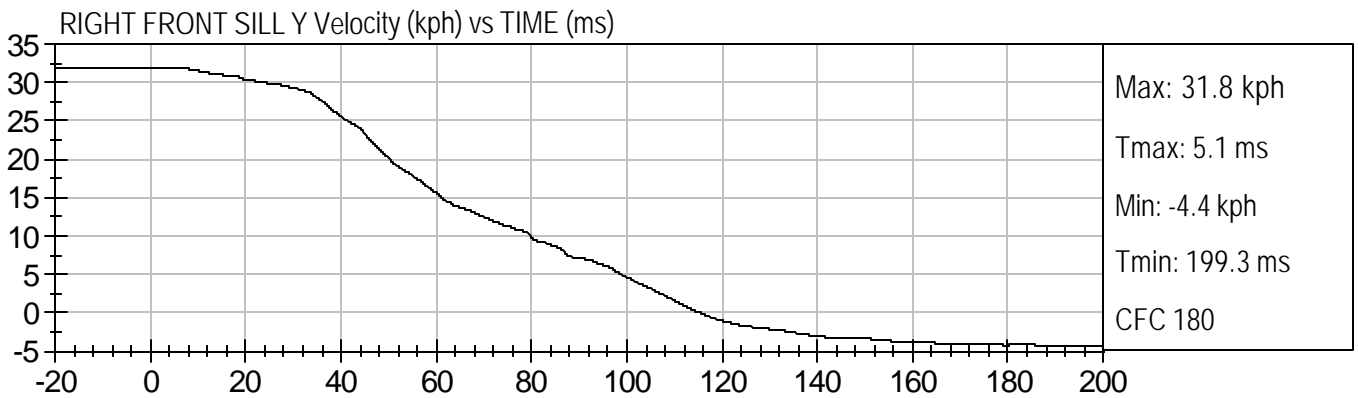
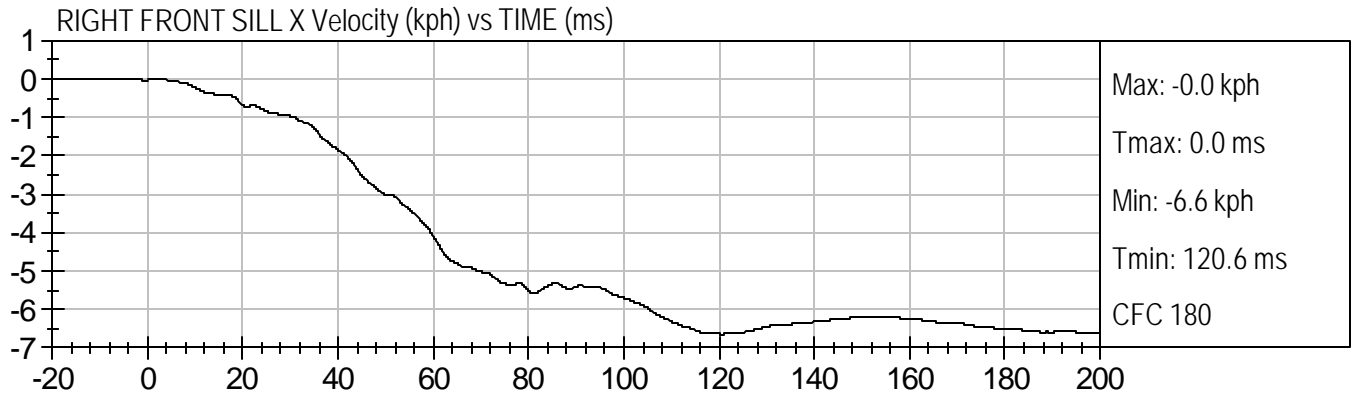


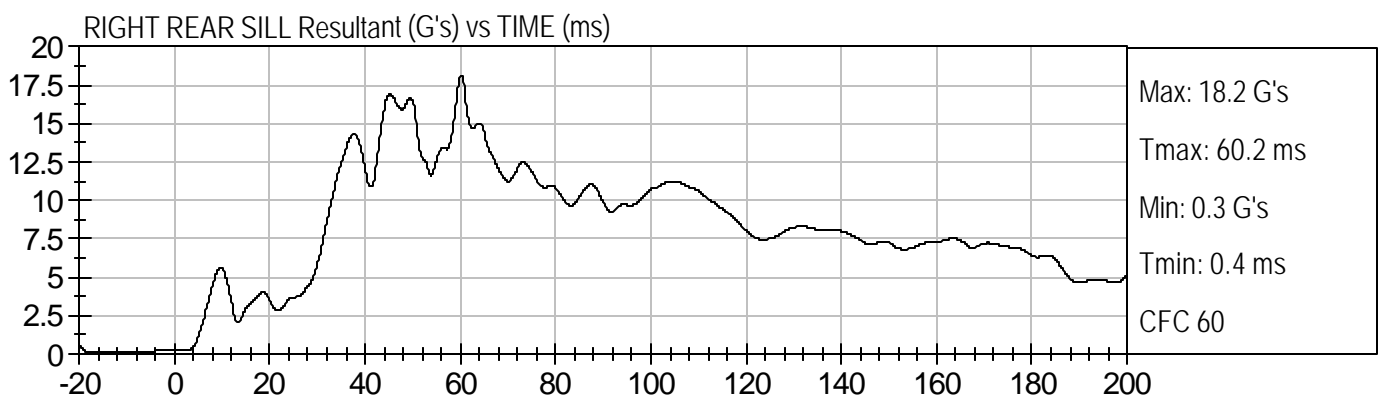
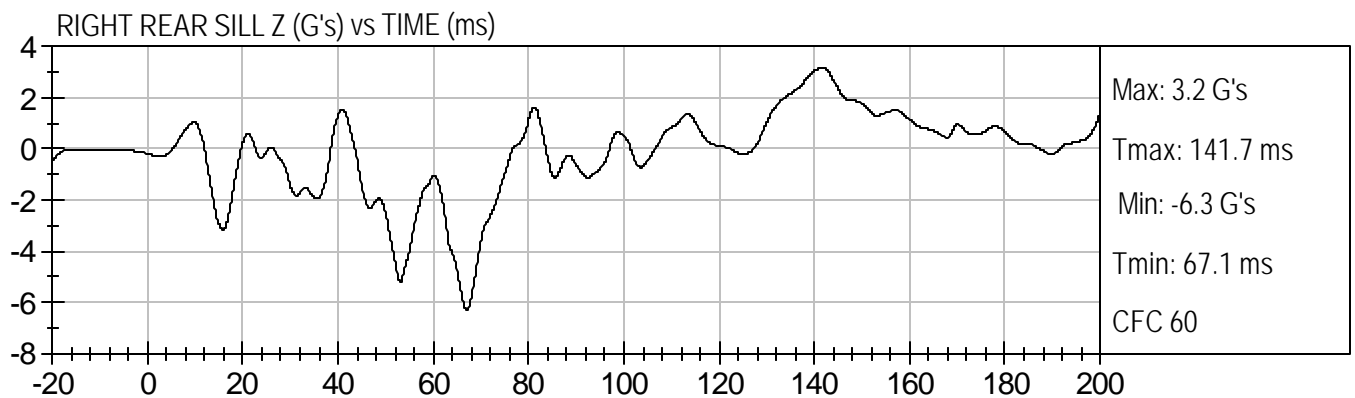
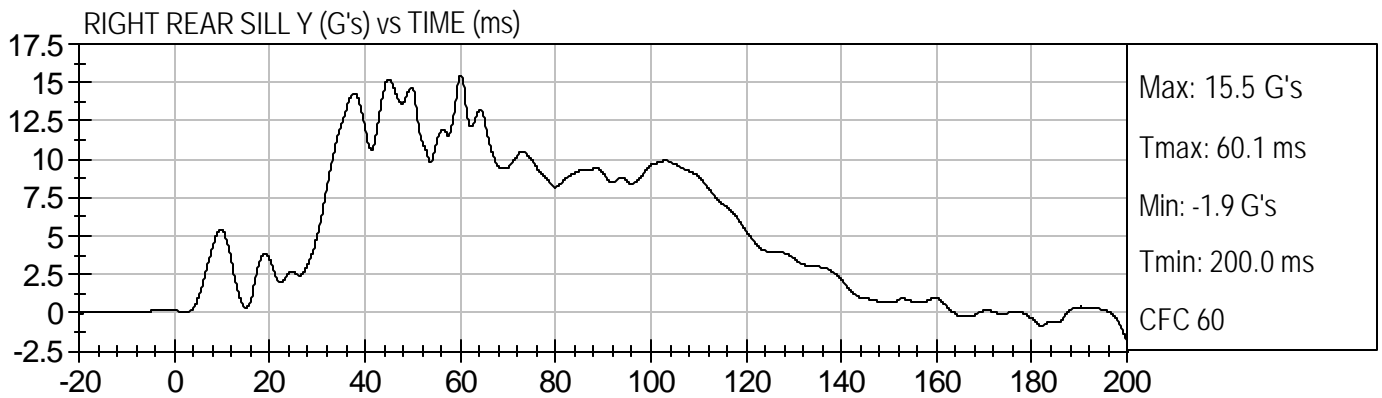
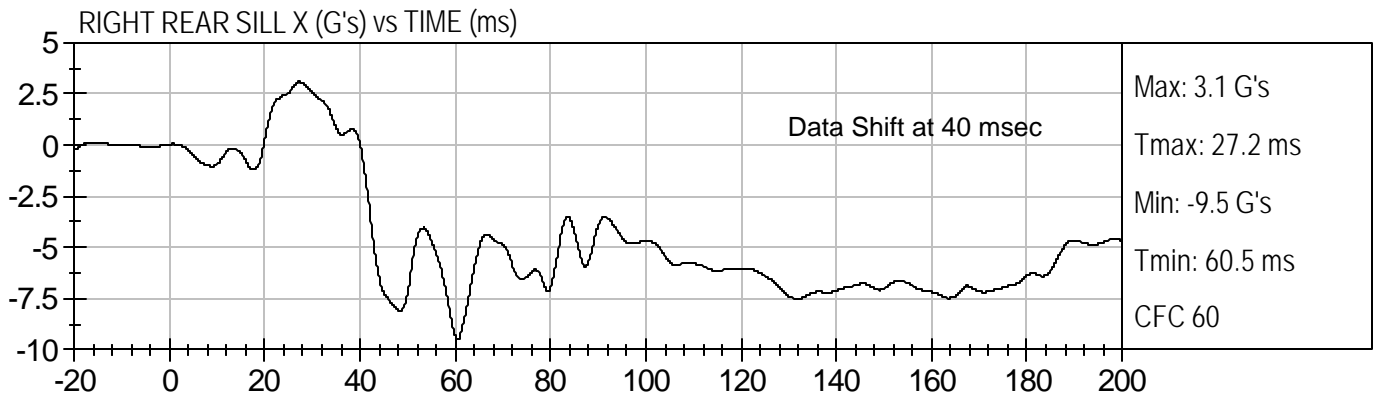
RIGHT FRONT SILL Z (G's) vs TIME (ms)

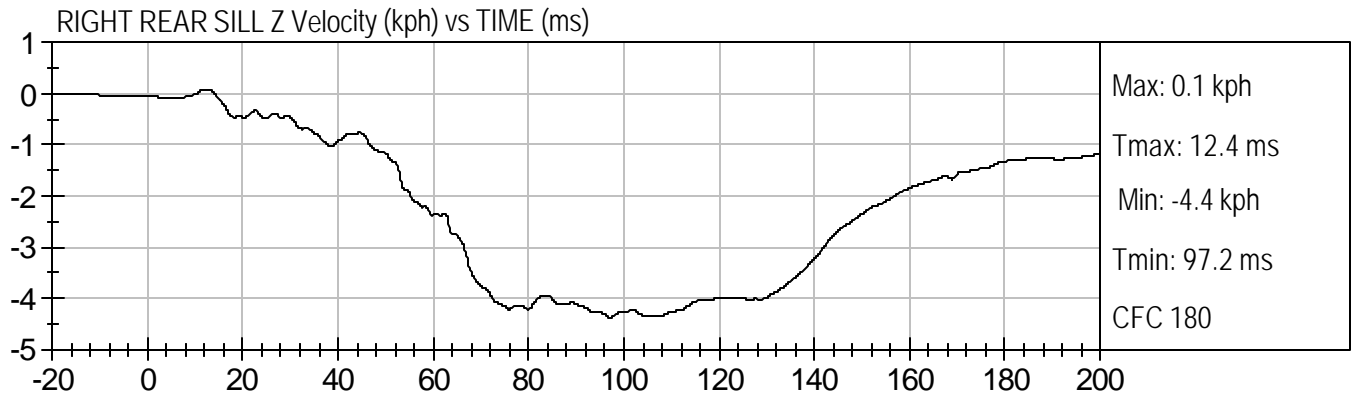
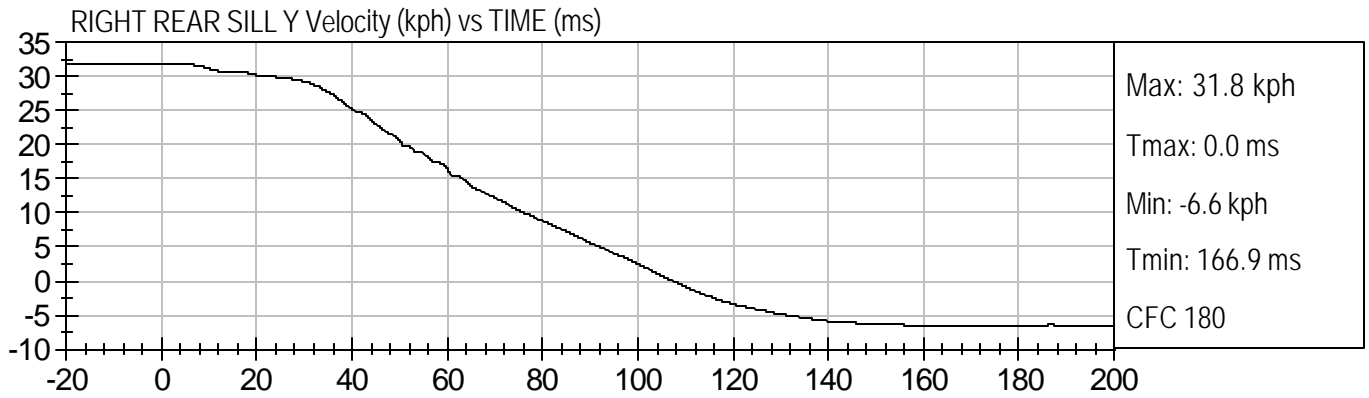
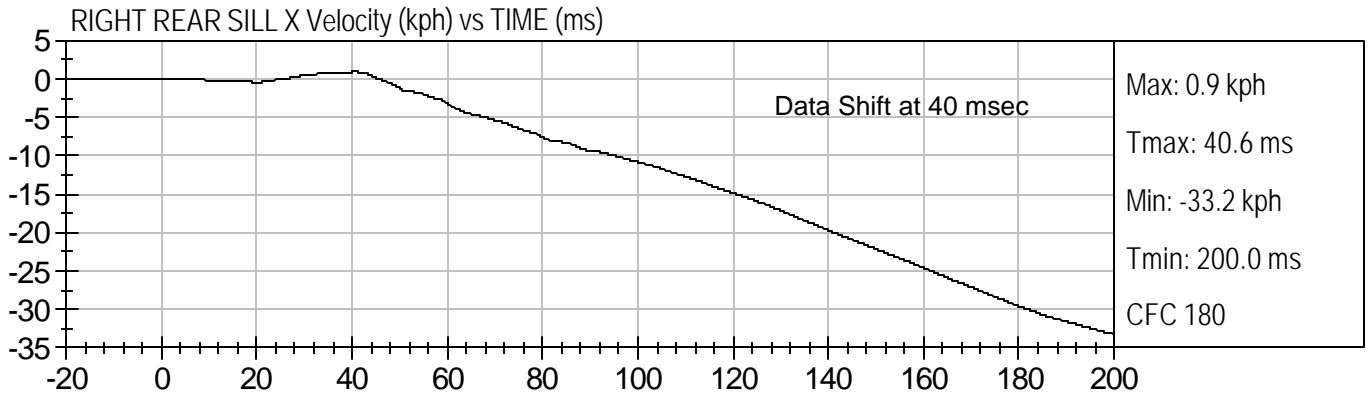


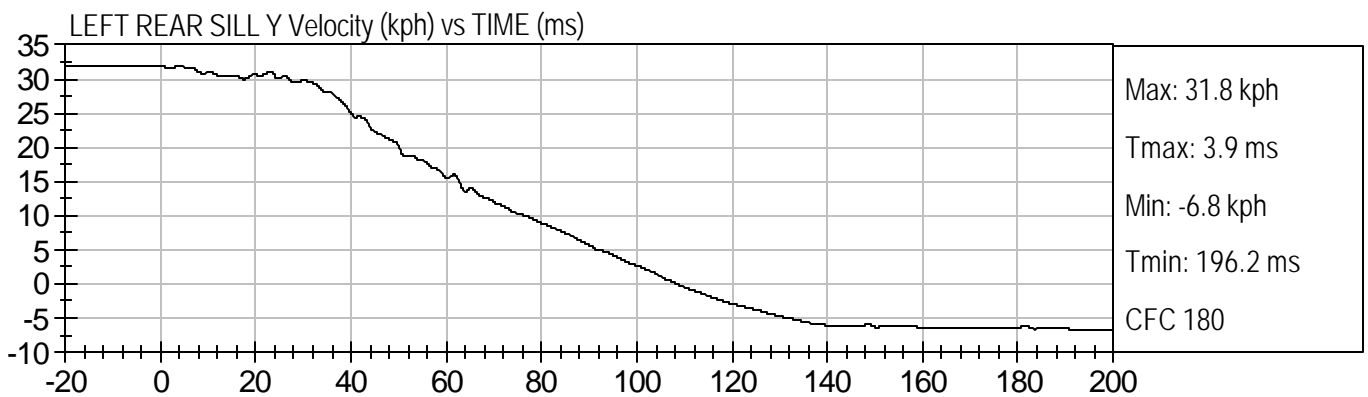
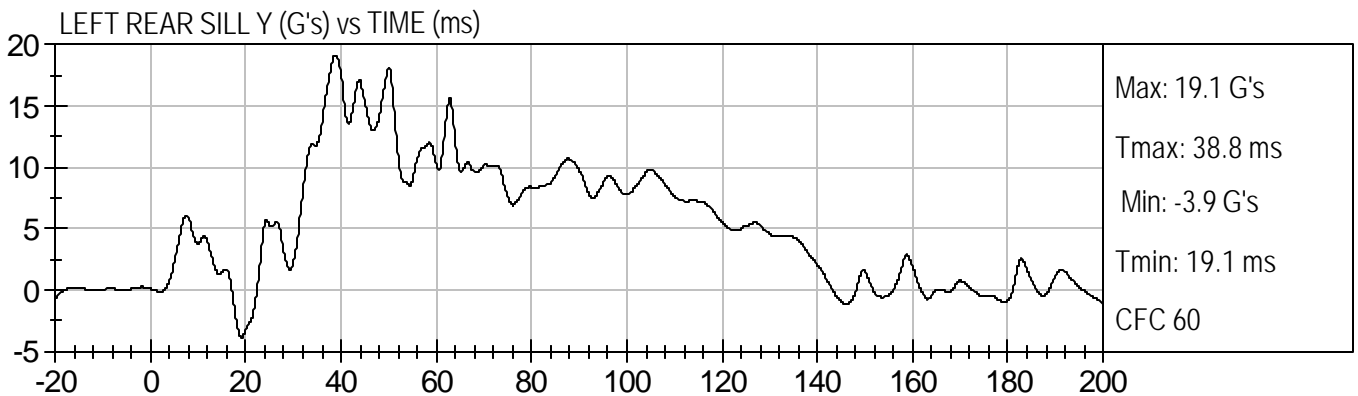
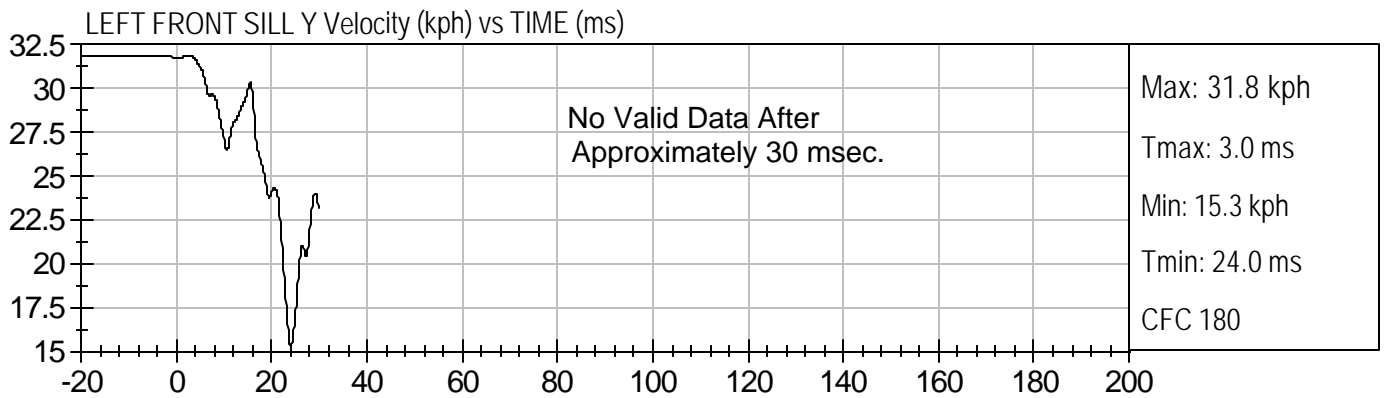
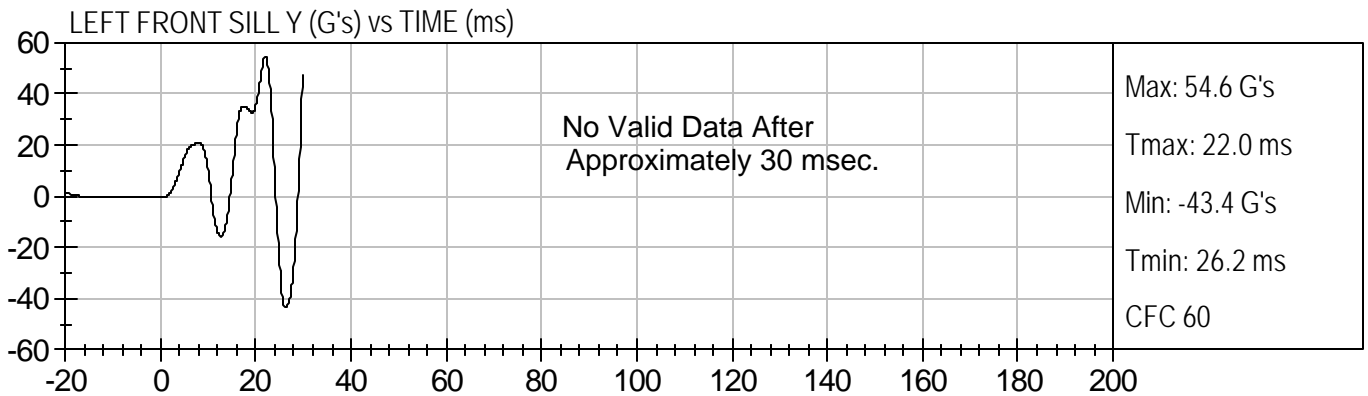
RIGHT FRONT SILL Resultant (G's) vs TIME (ms)

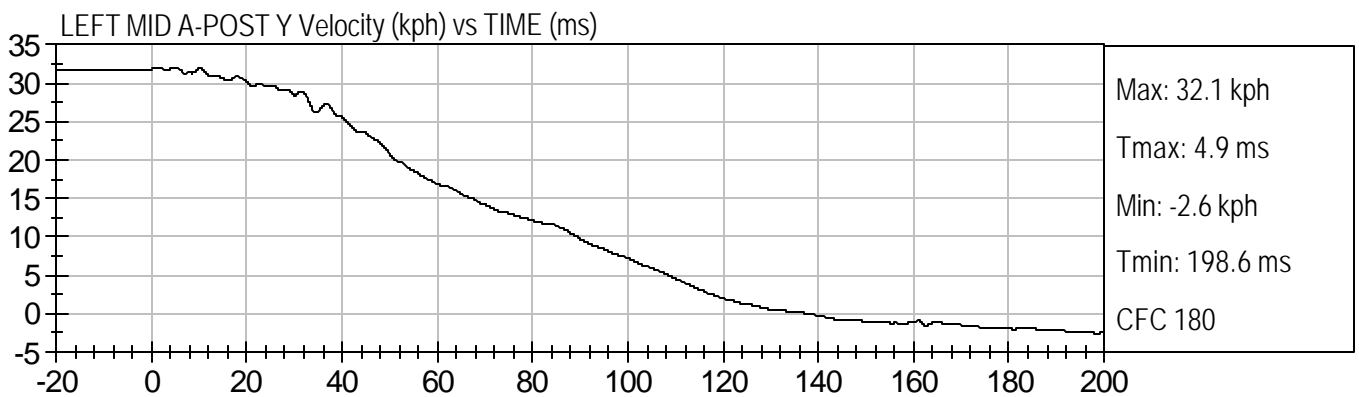
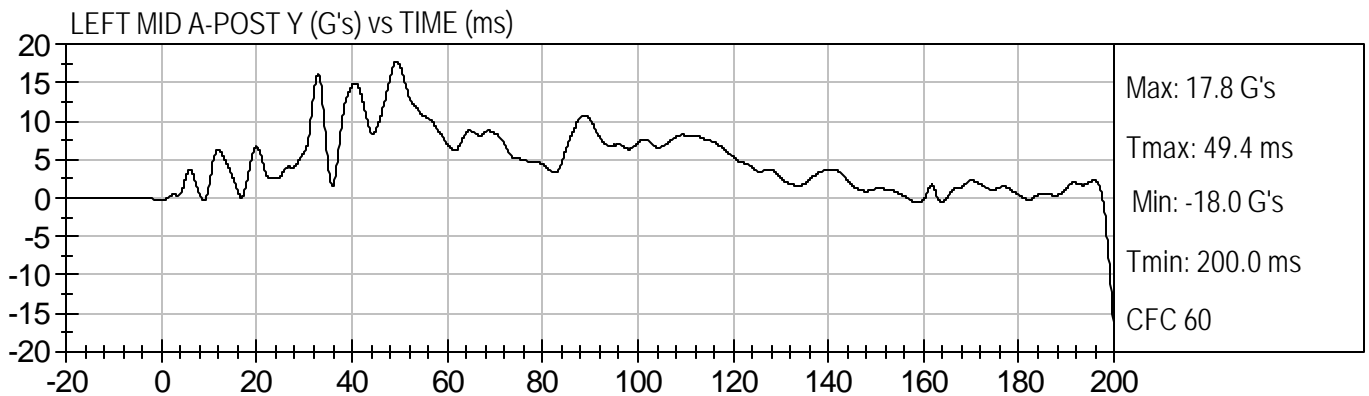
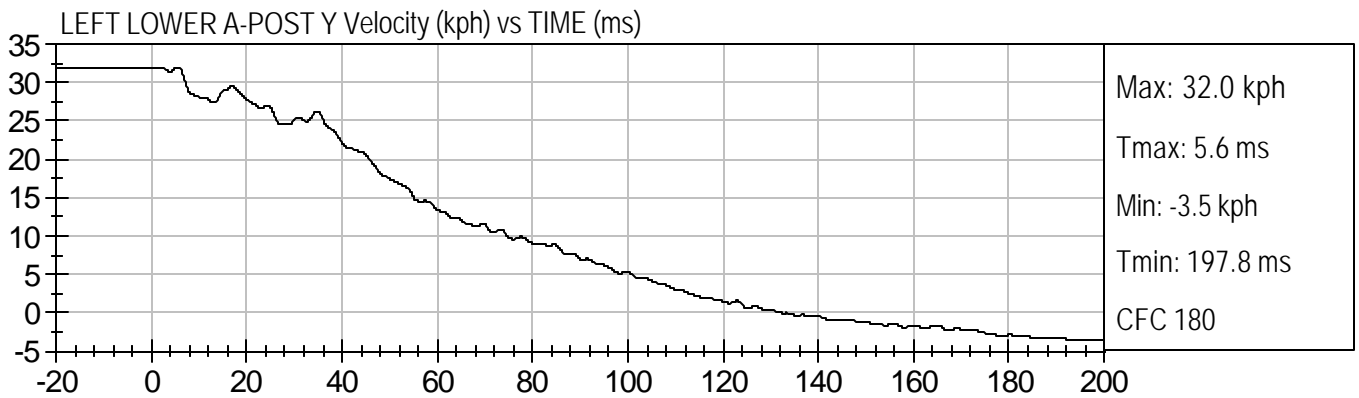
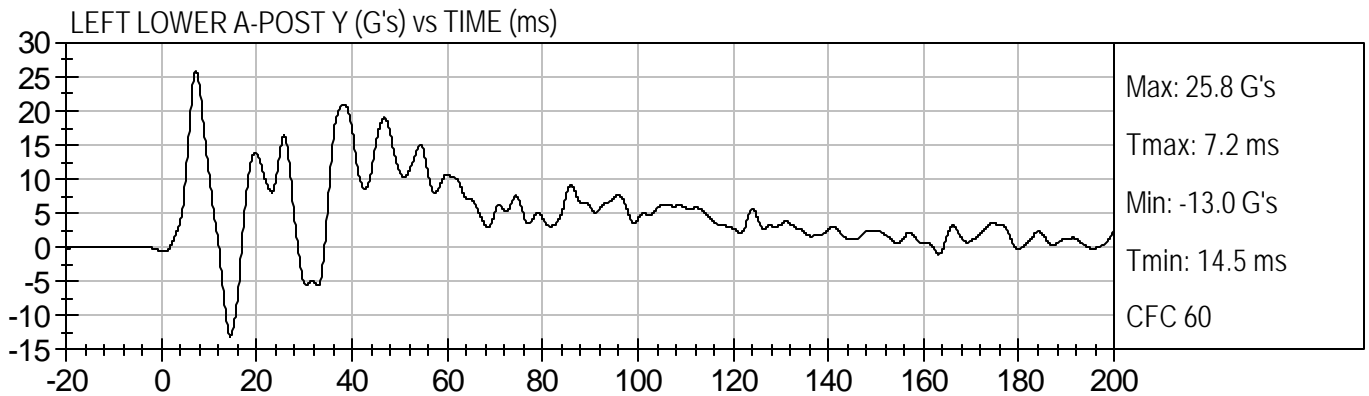


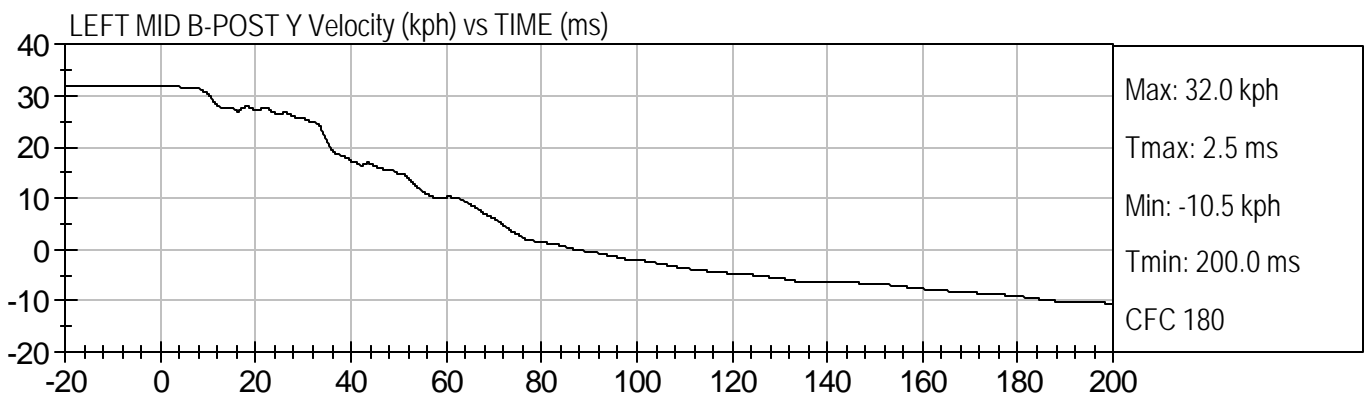
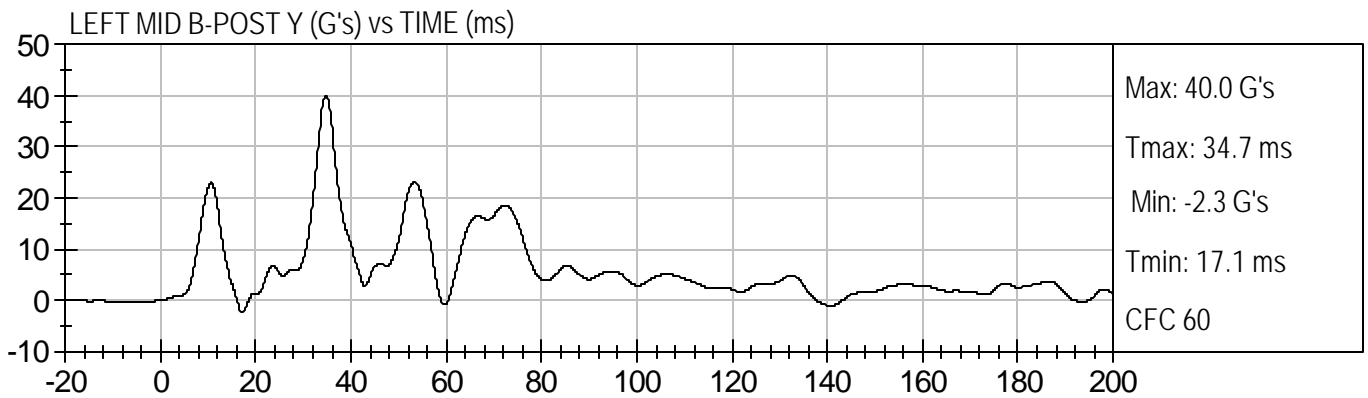
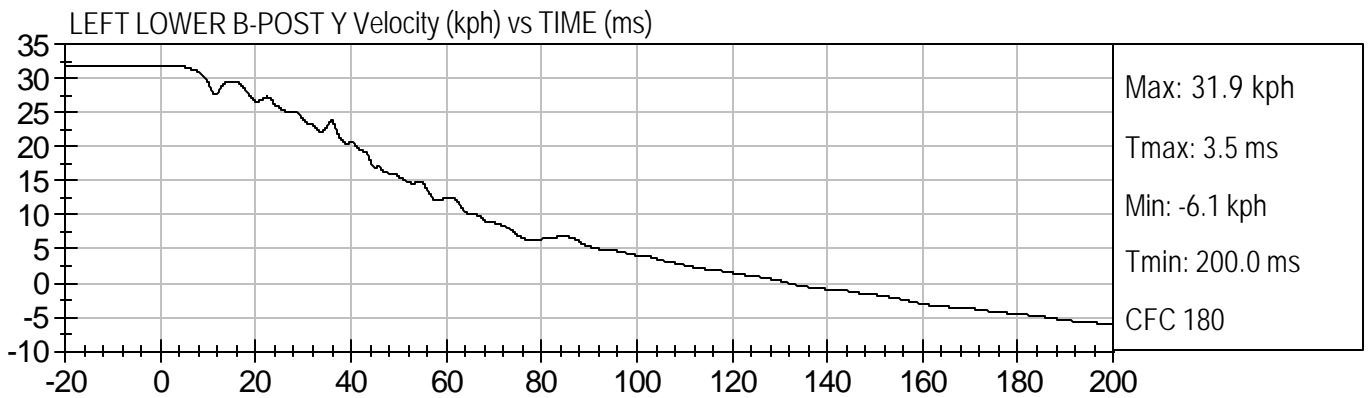
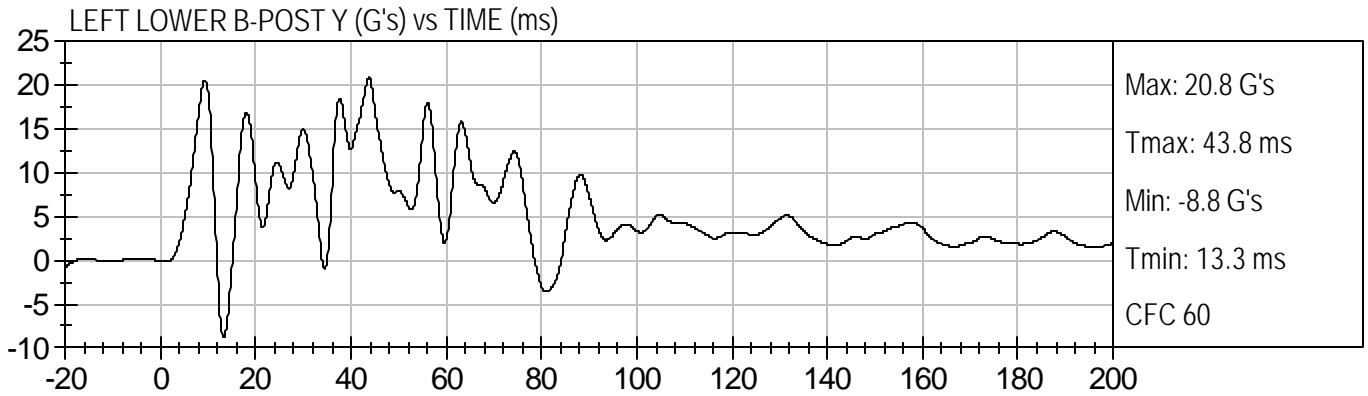


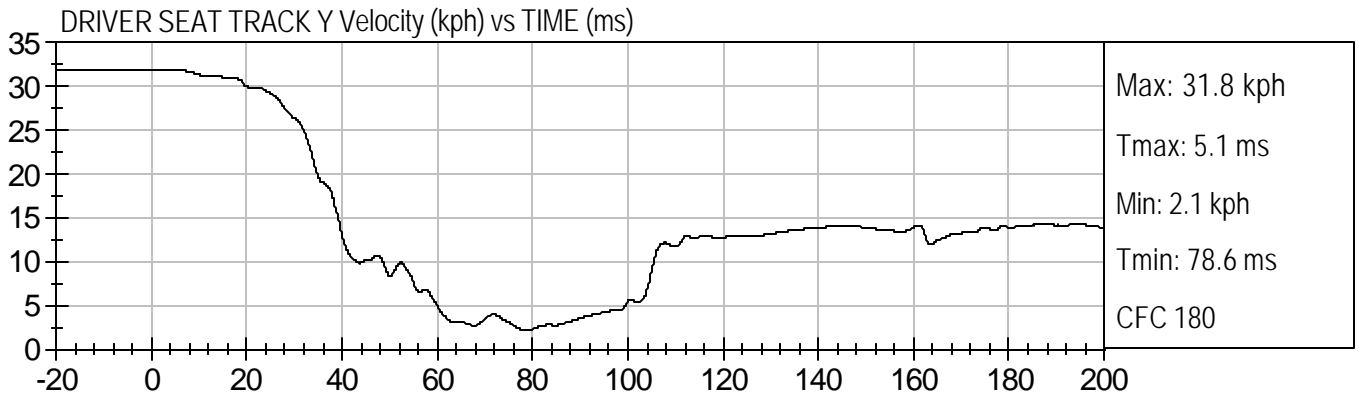
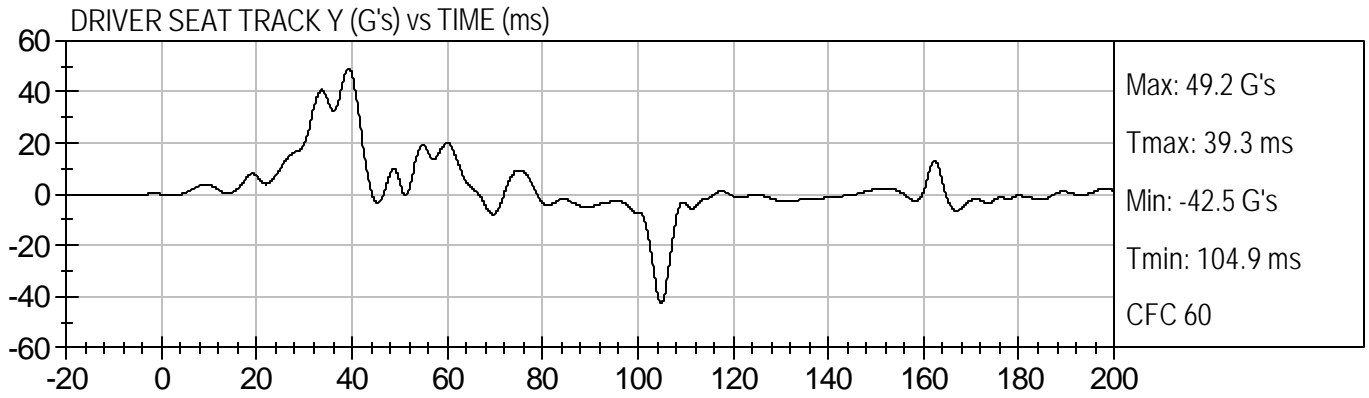


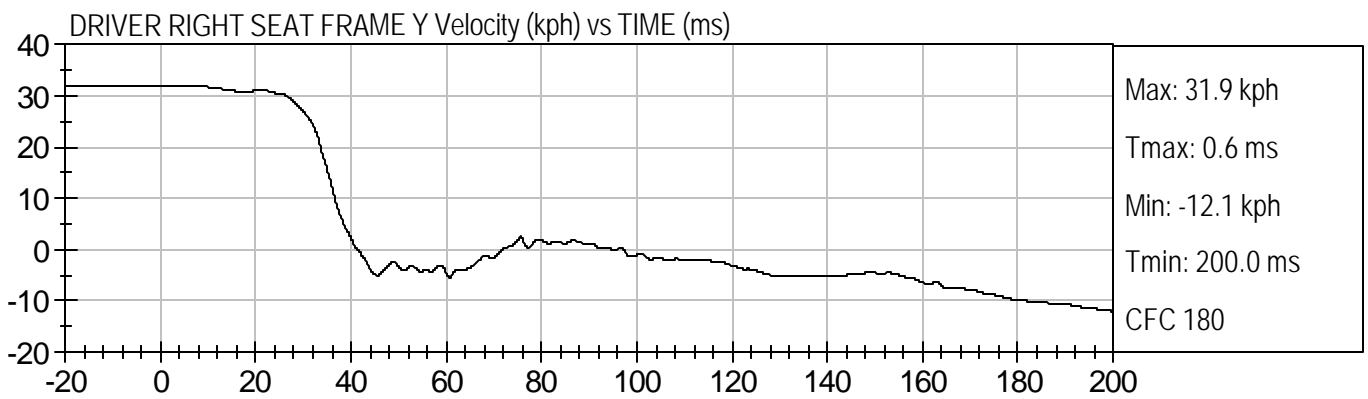
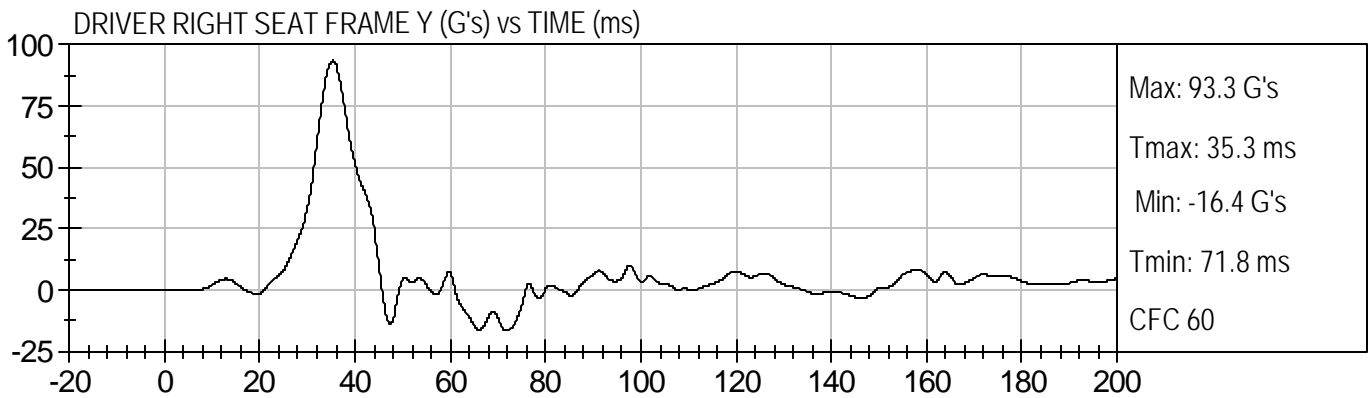
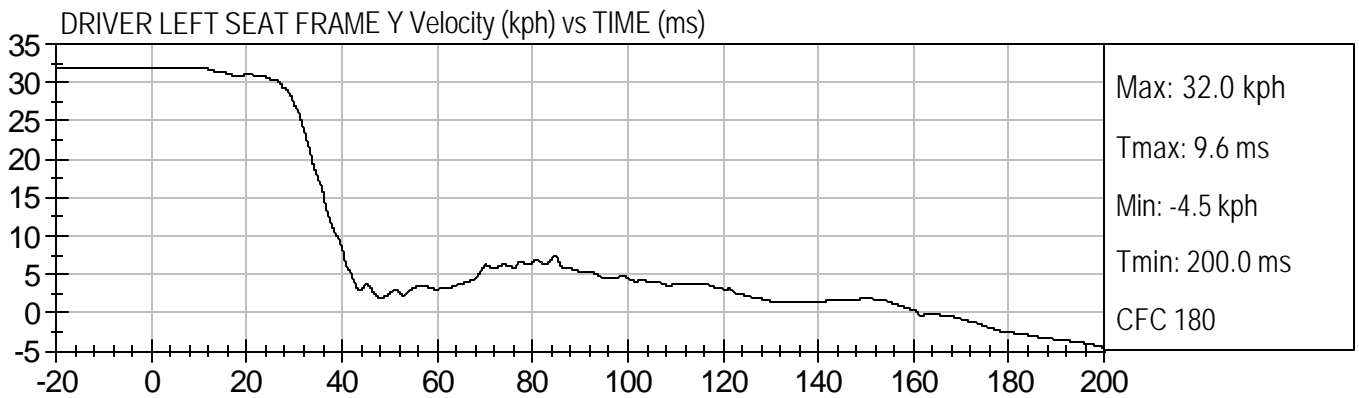
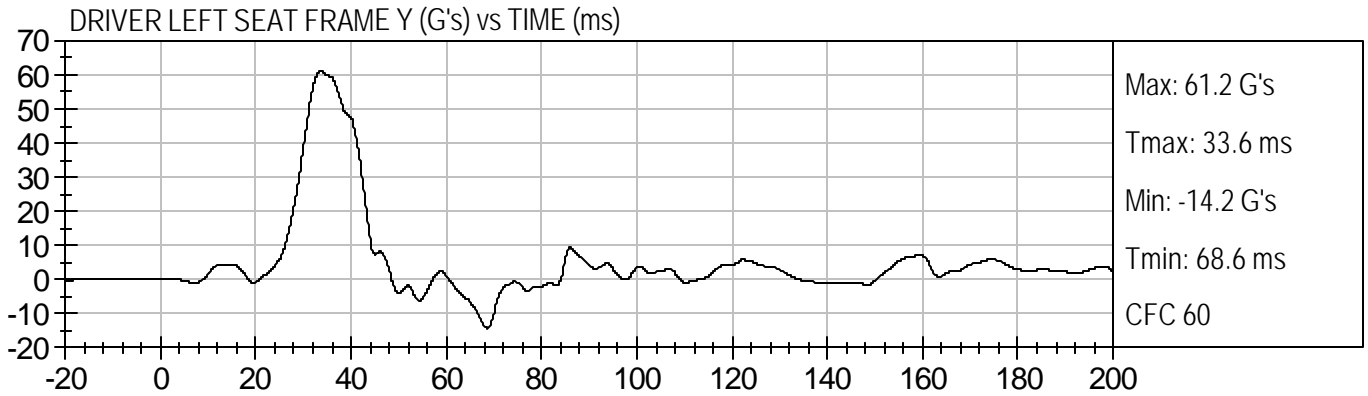


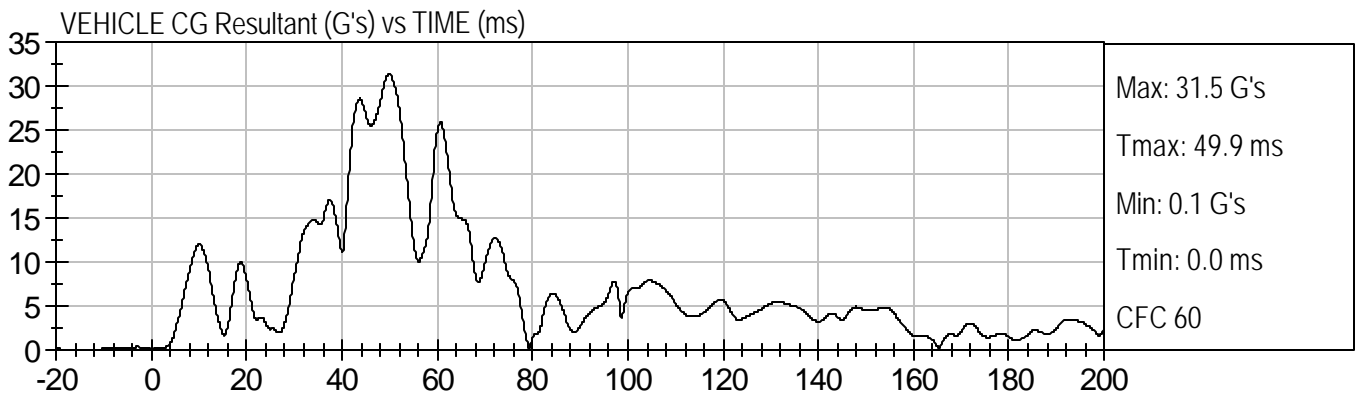
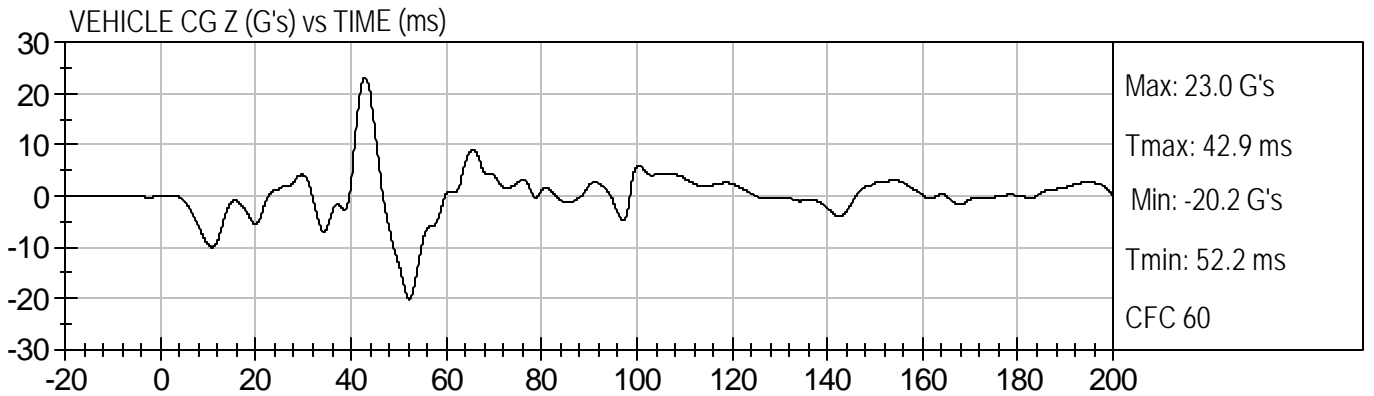
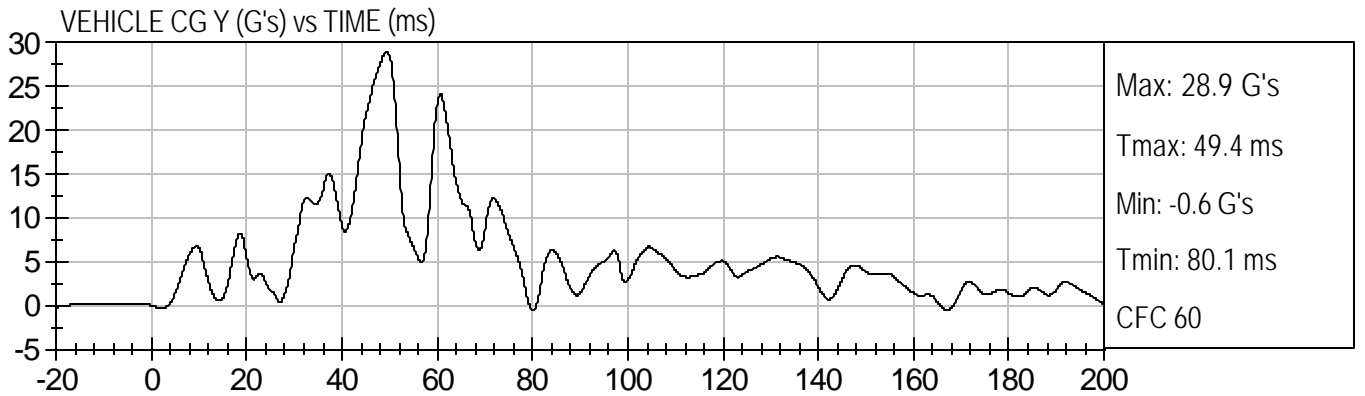
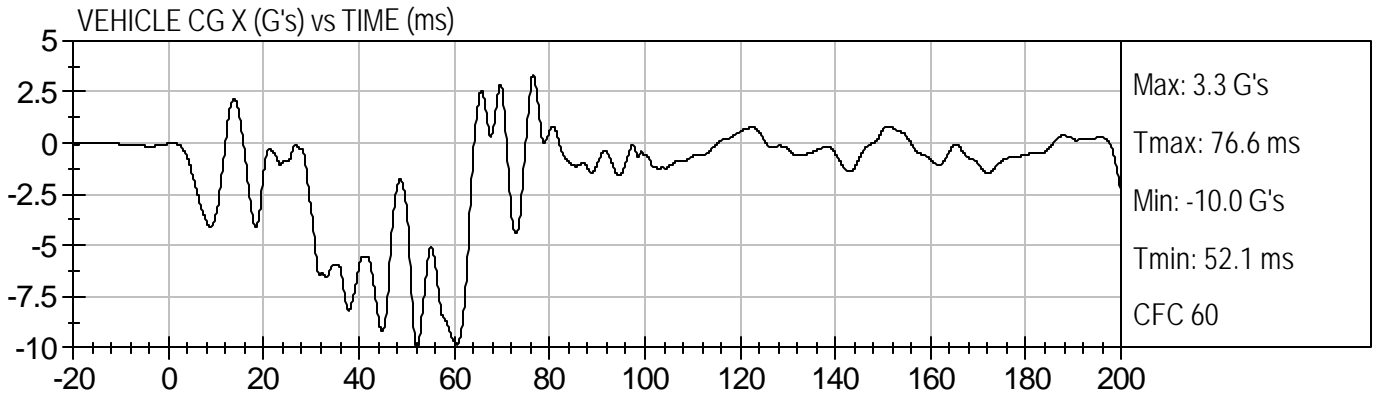


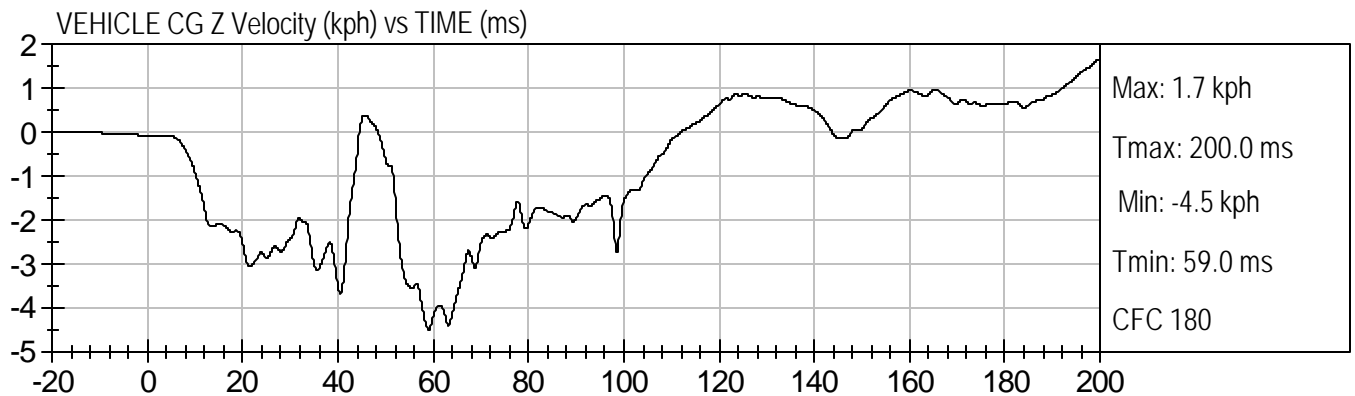
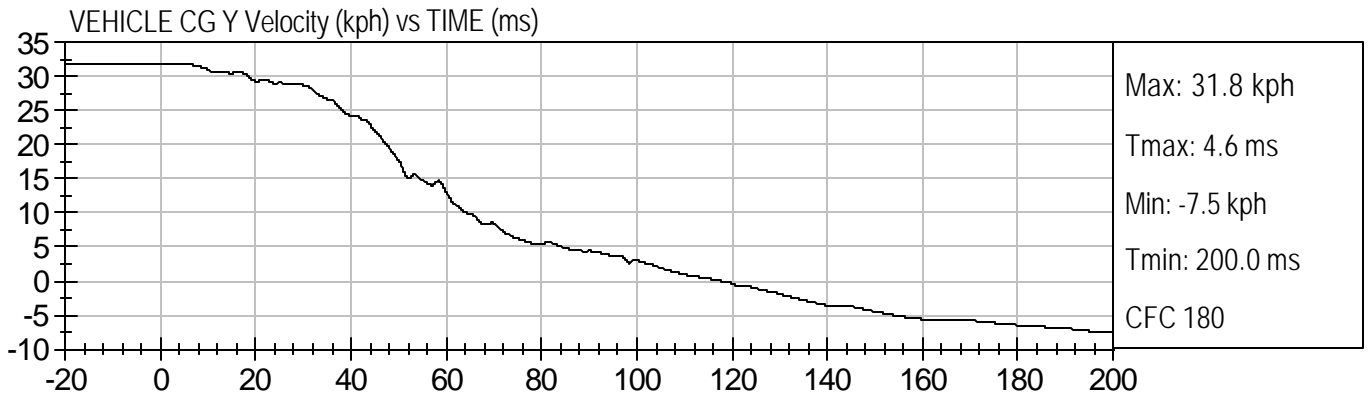
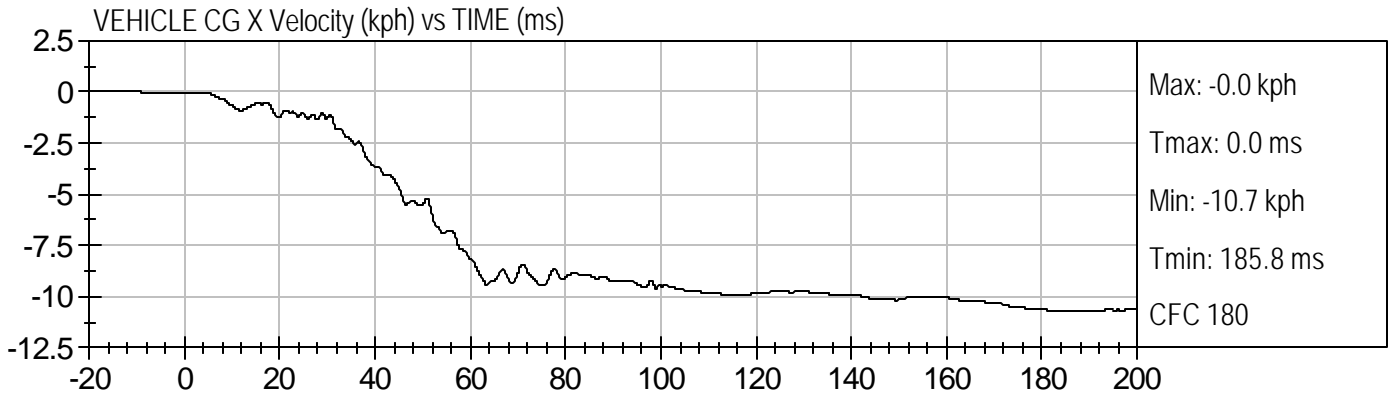


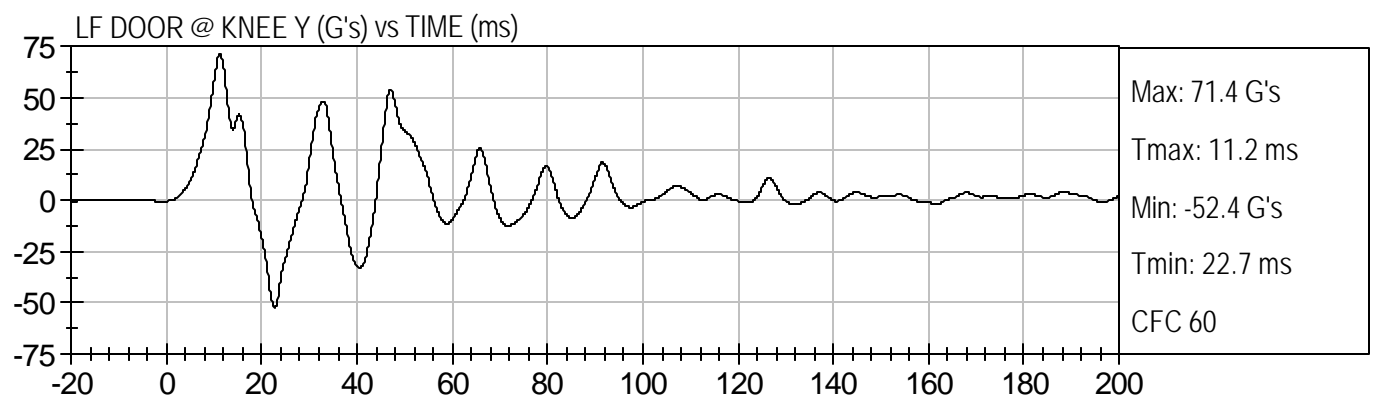
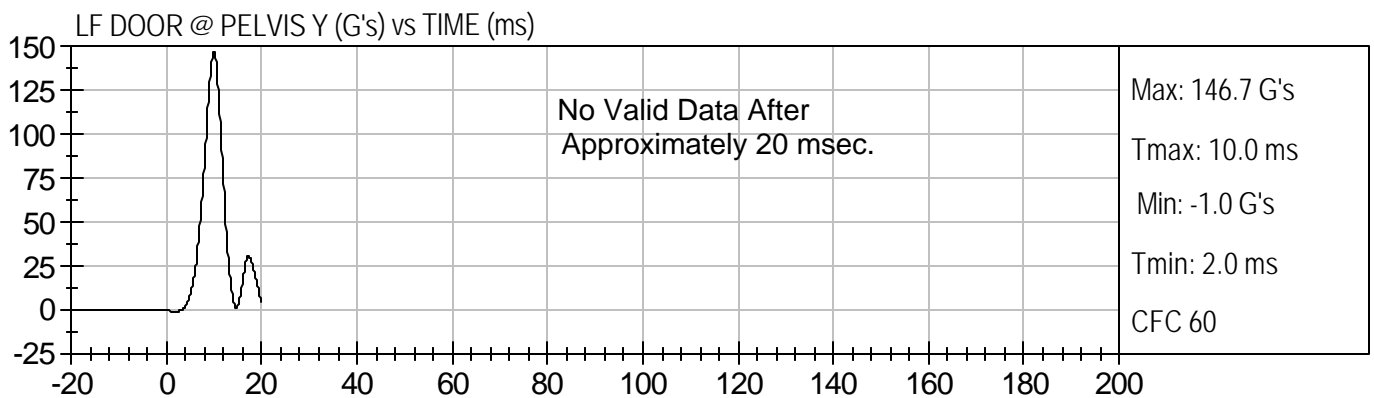
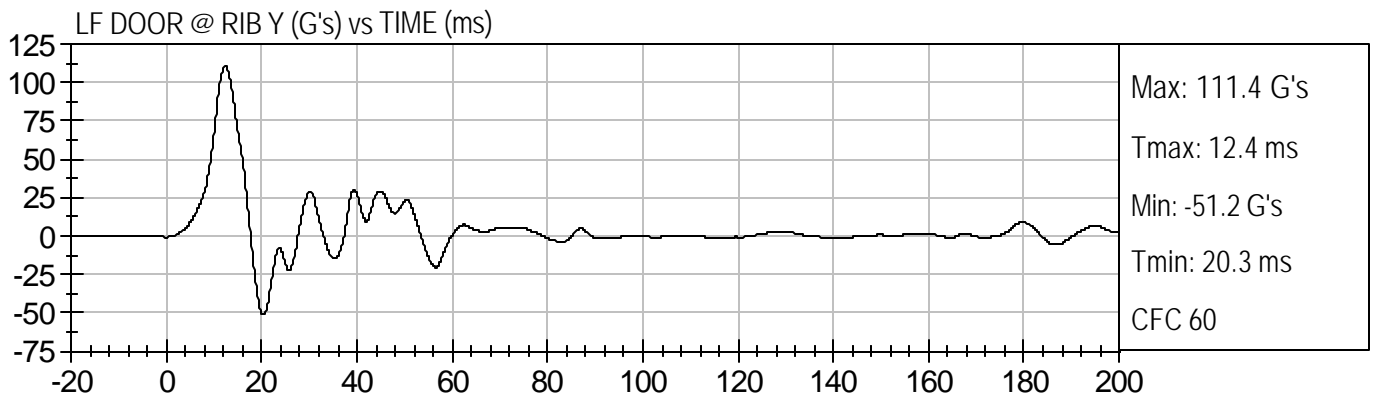
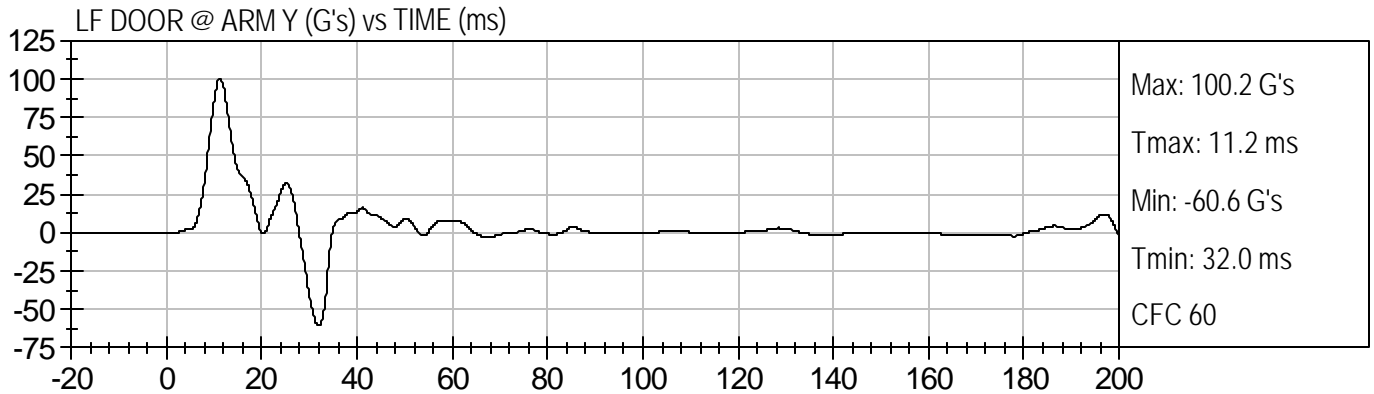






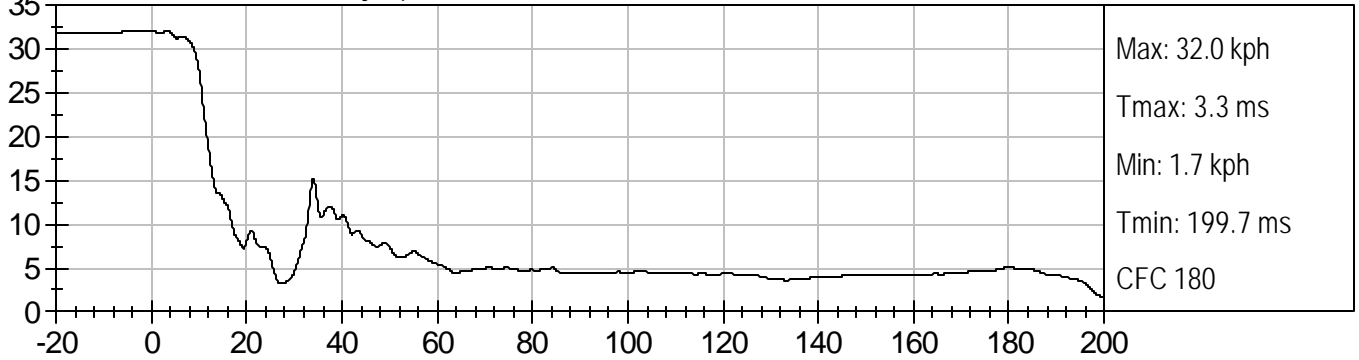




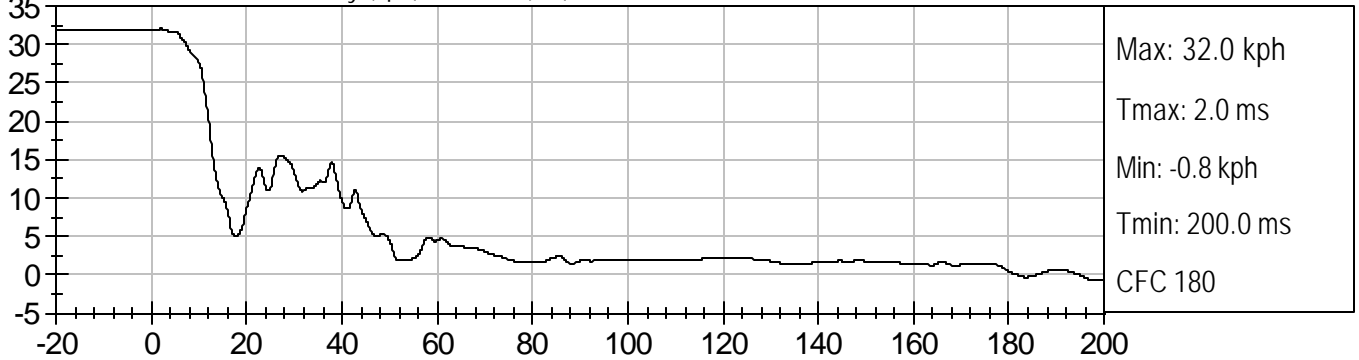




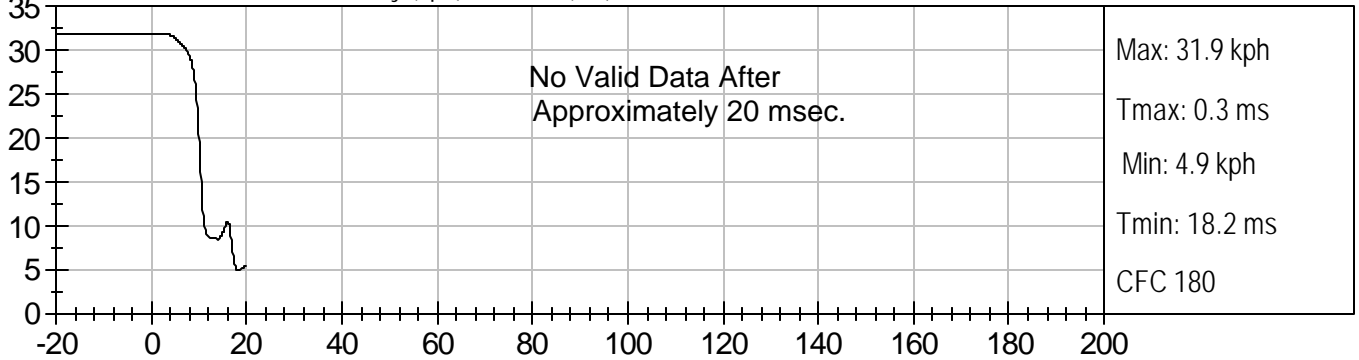
LF DOOR @ ARM Y Velocity (kph) vs TIME (ms)



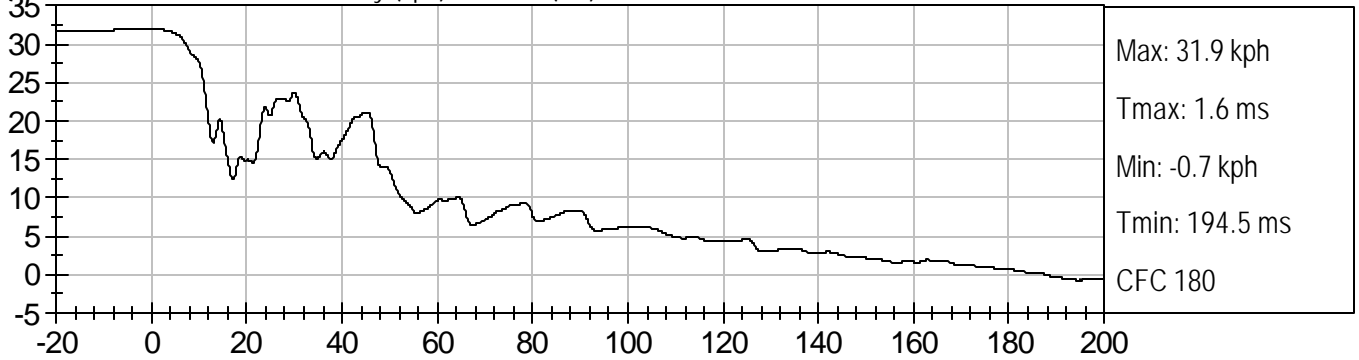
LF DOOR @ RIB Y Velocity (kph) vs TIME (ms)

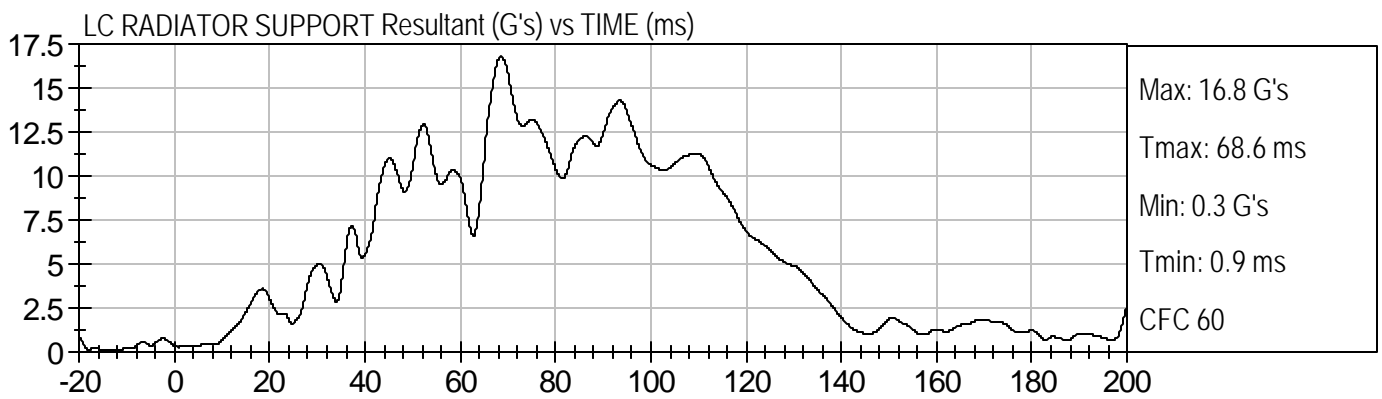
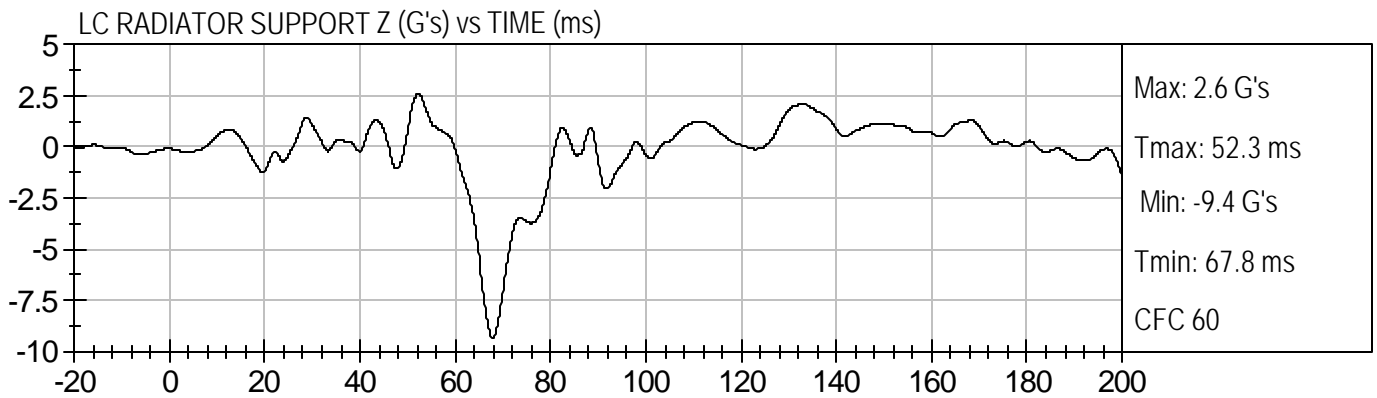
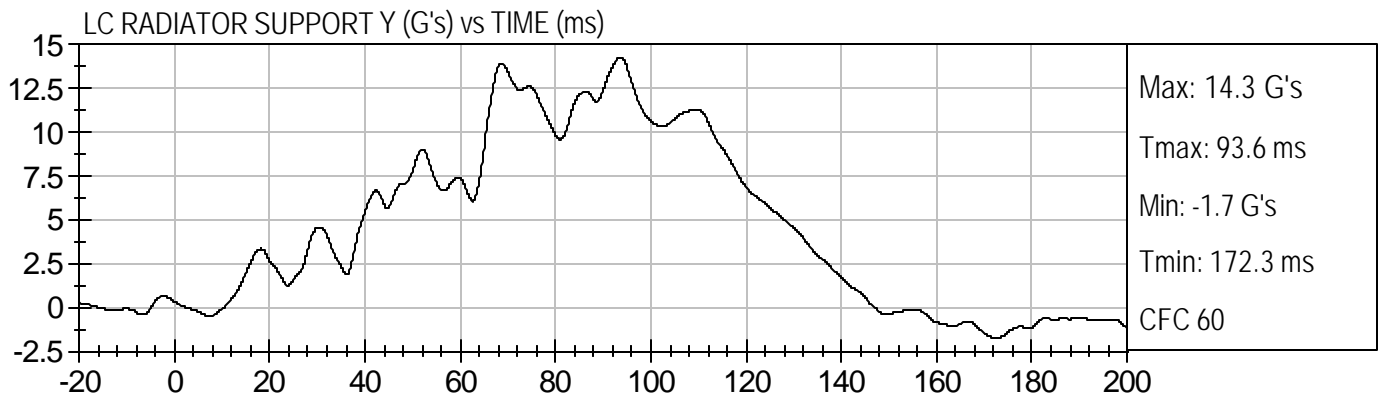
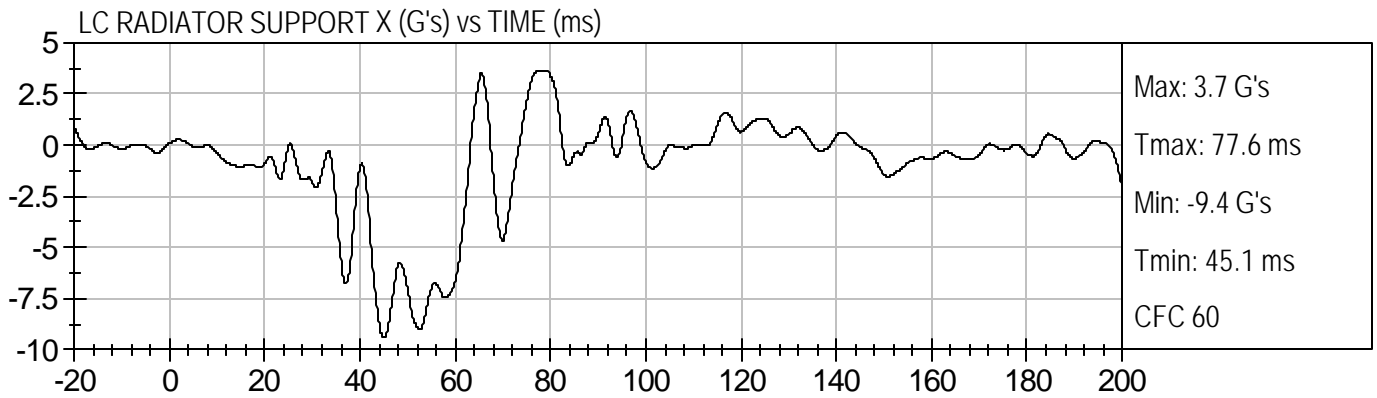


LF DOOR @ PELVIS Y Velocity (kph) vs TIME (ms)



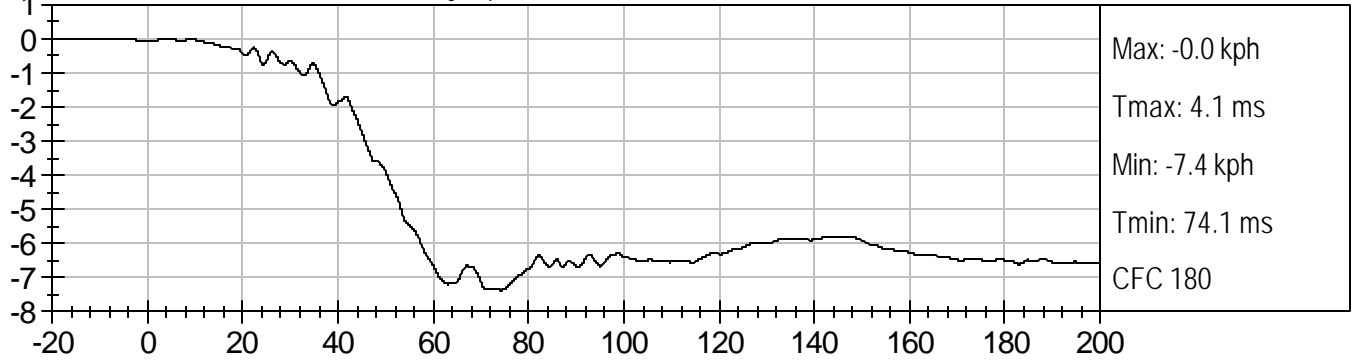
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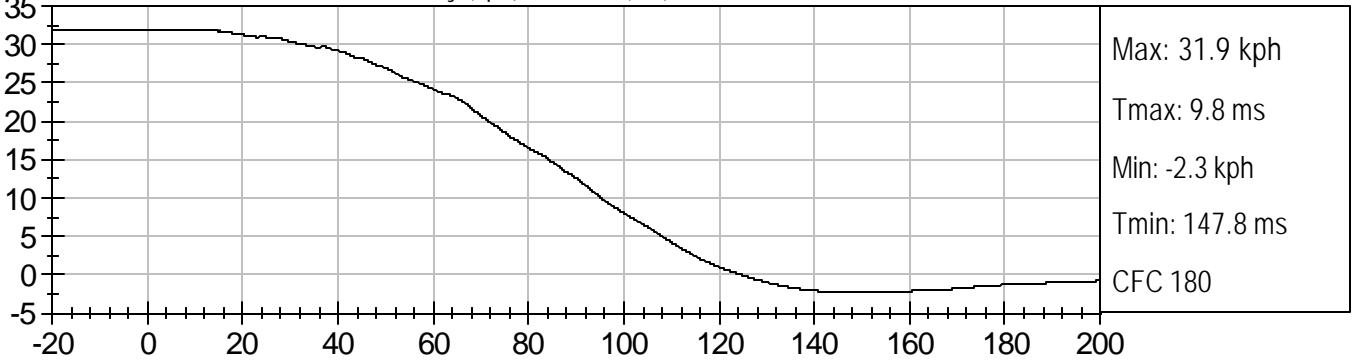




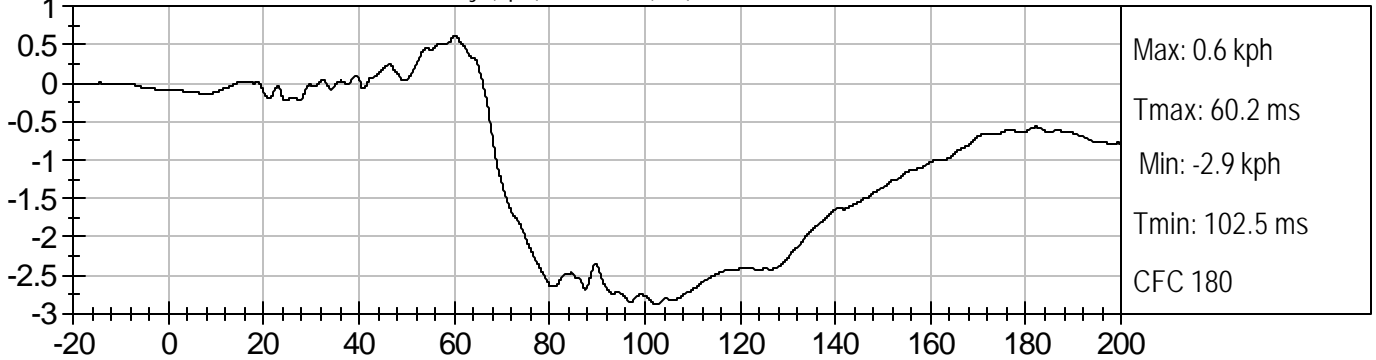
LC RADIATOR SUPPORT X Velocity (kph) vs TIME (ms)



LC RADIATOR SUPPORT Y Velocity (kph) vs TIME (ms)

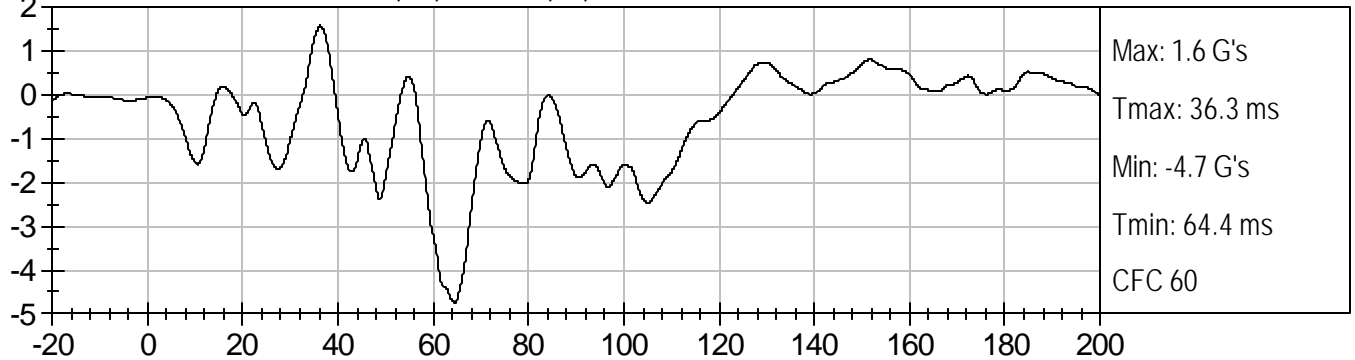


LC RADIATOR SUPPORT Z Velocity (kph) vs TIME (ms)

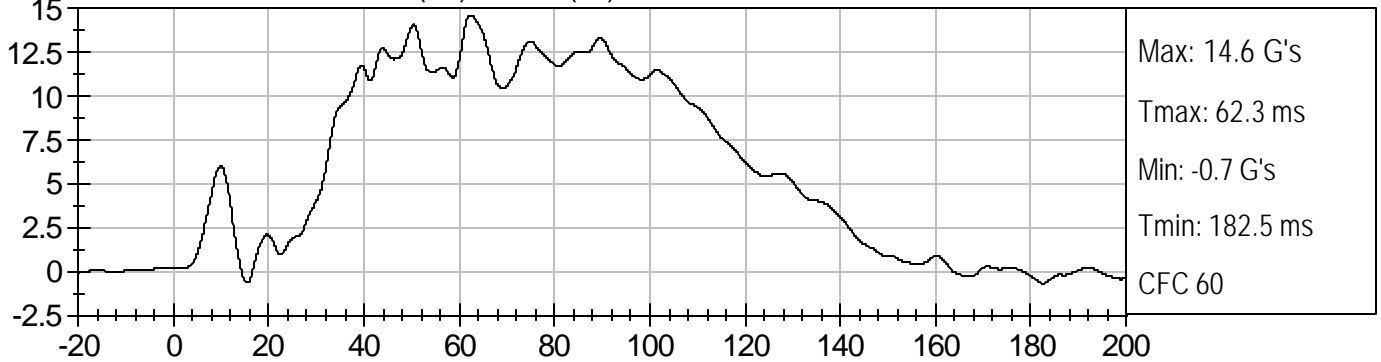




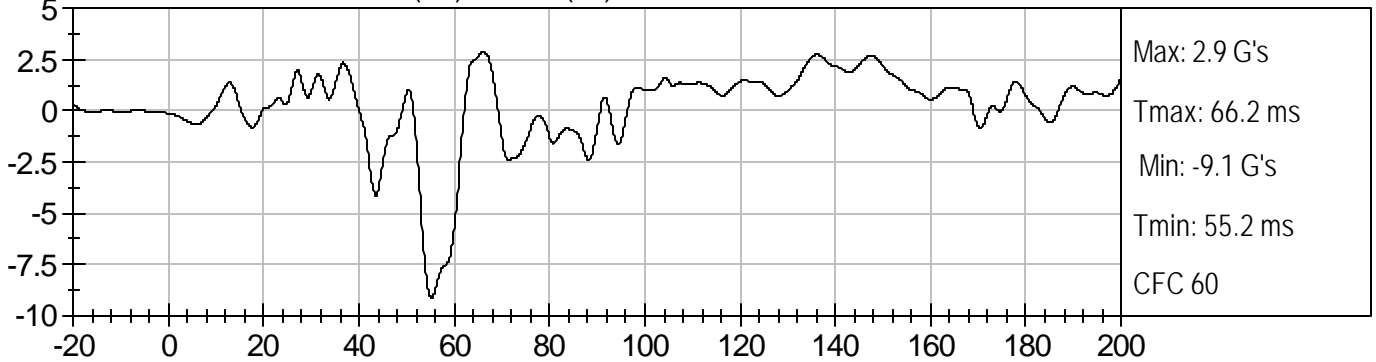
FLOORPAN @ REAR AXLE X (G's) vs TIME (ms)



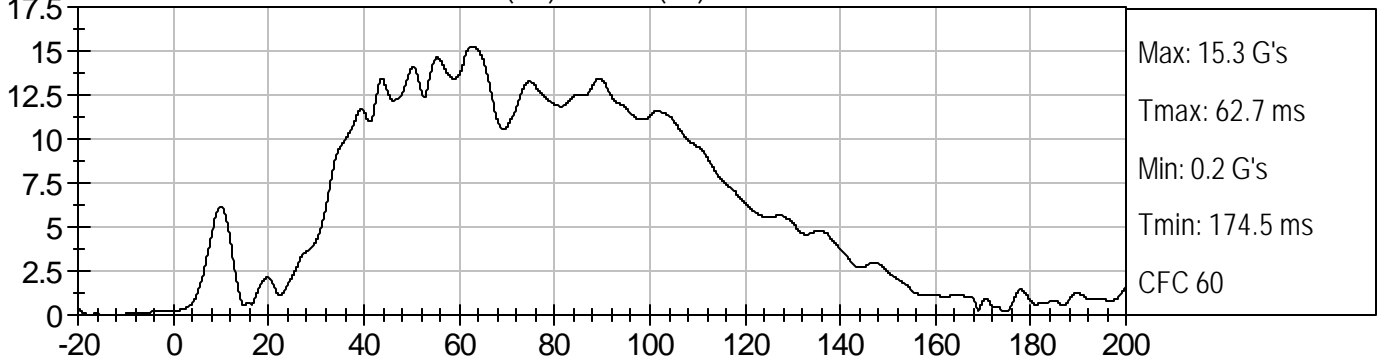
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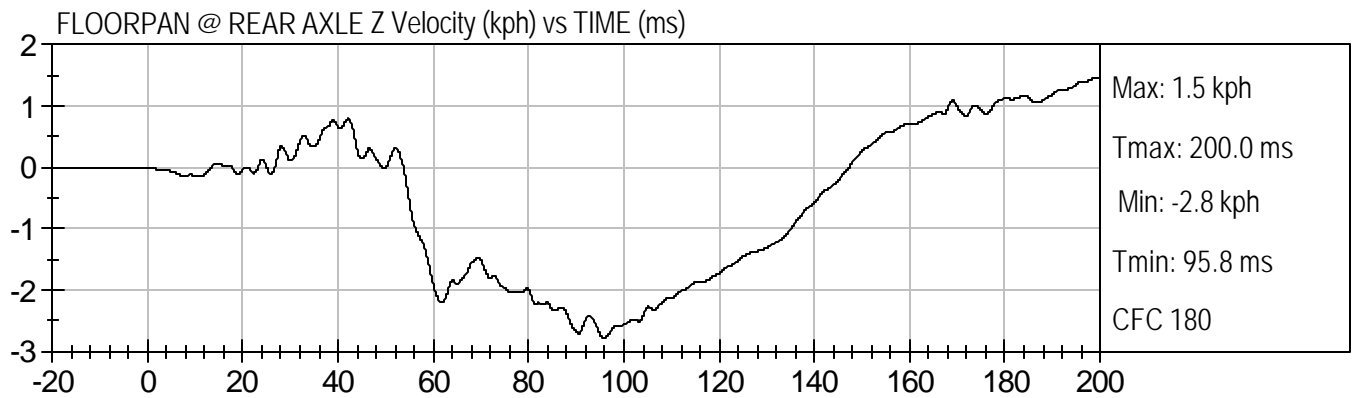
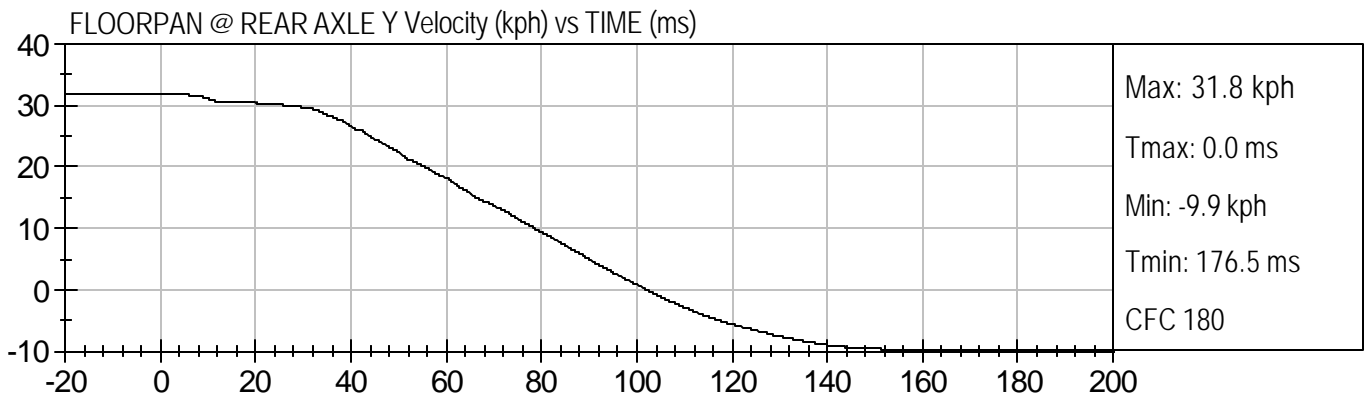
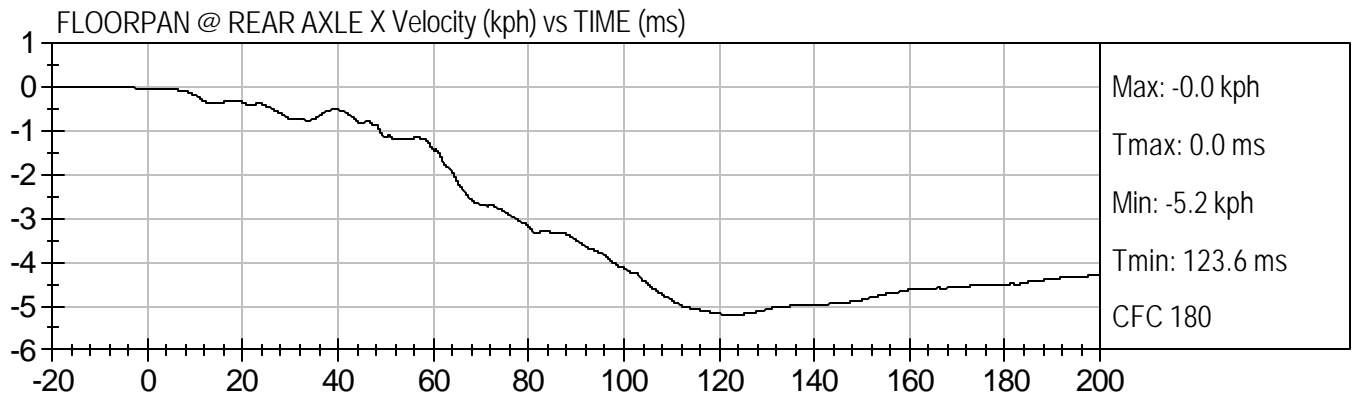


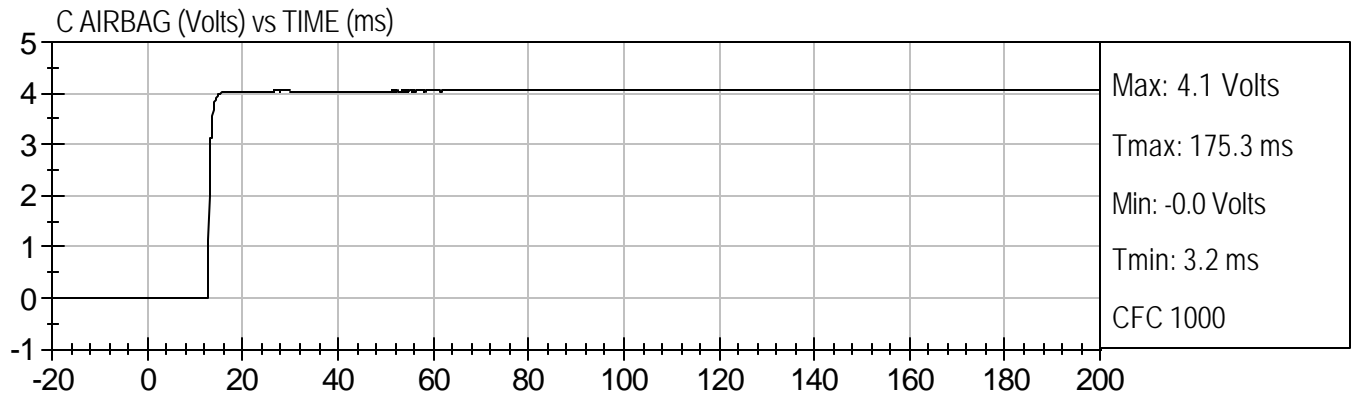
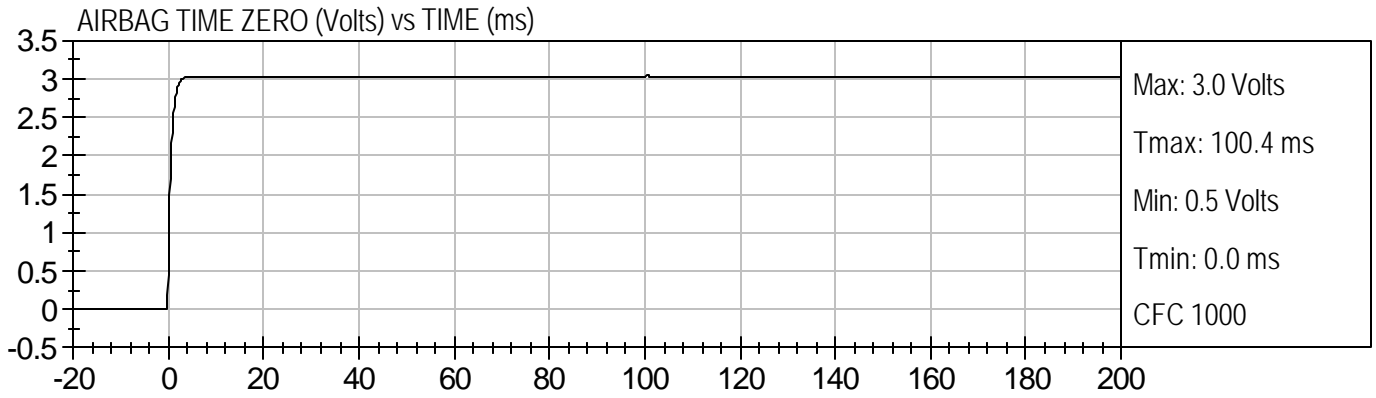
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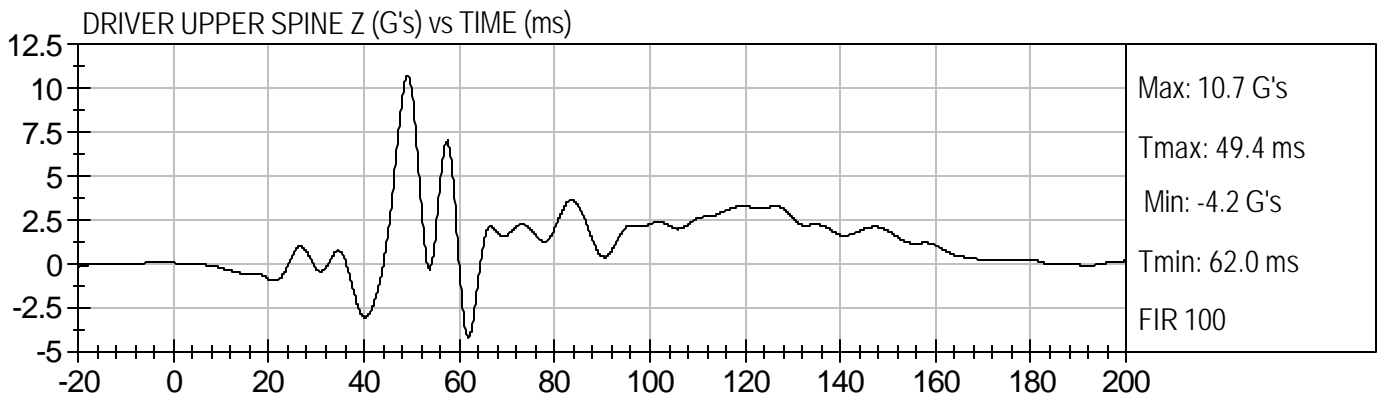
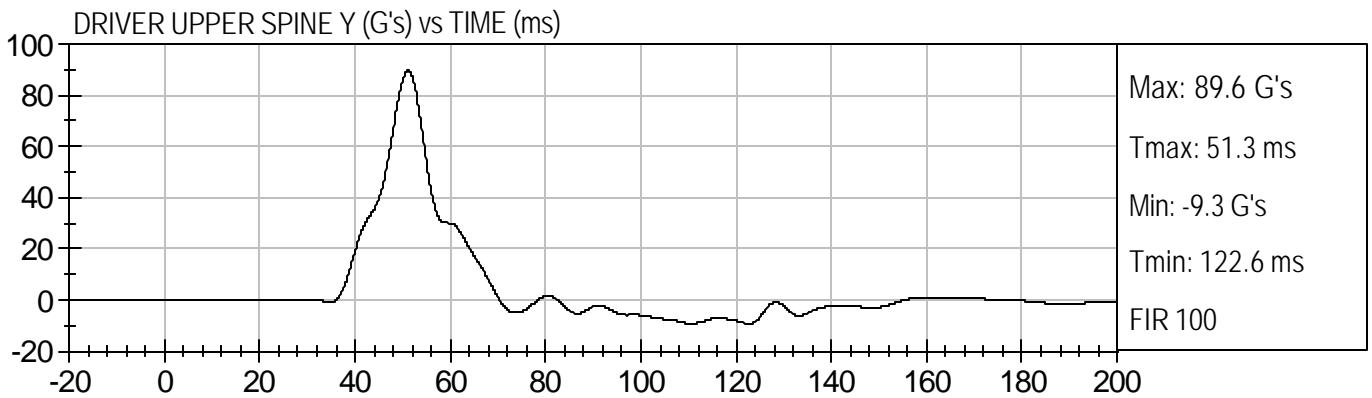
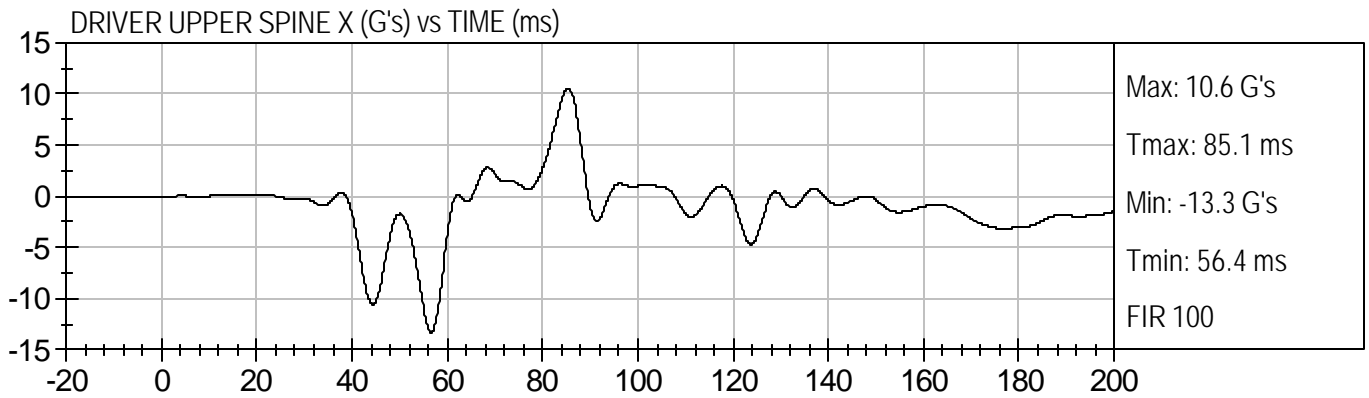


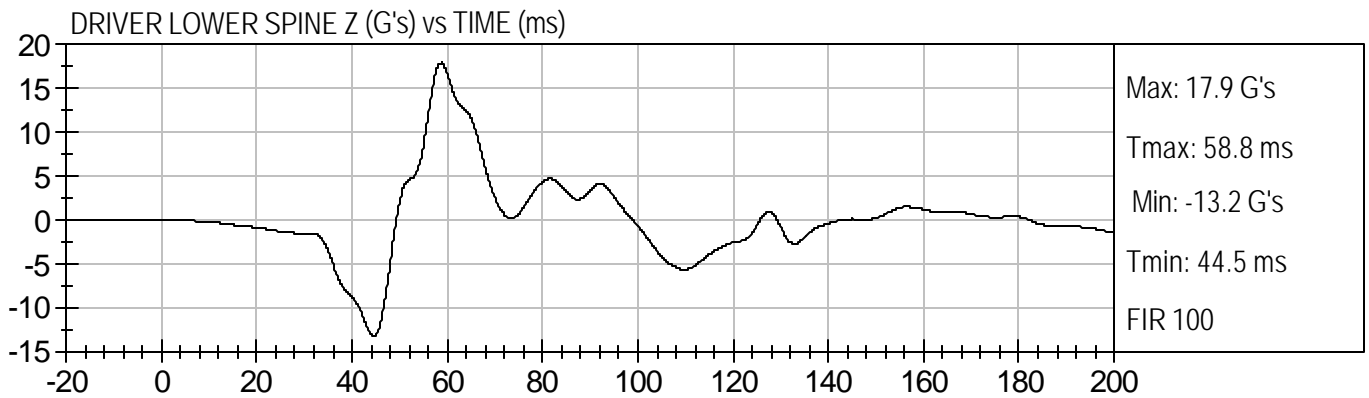
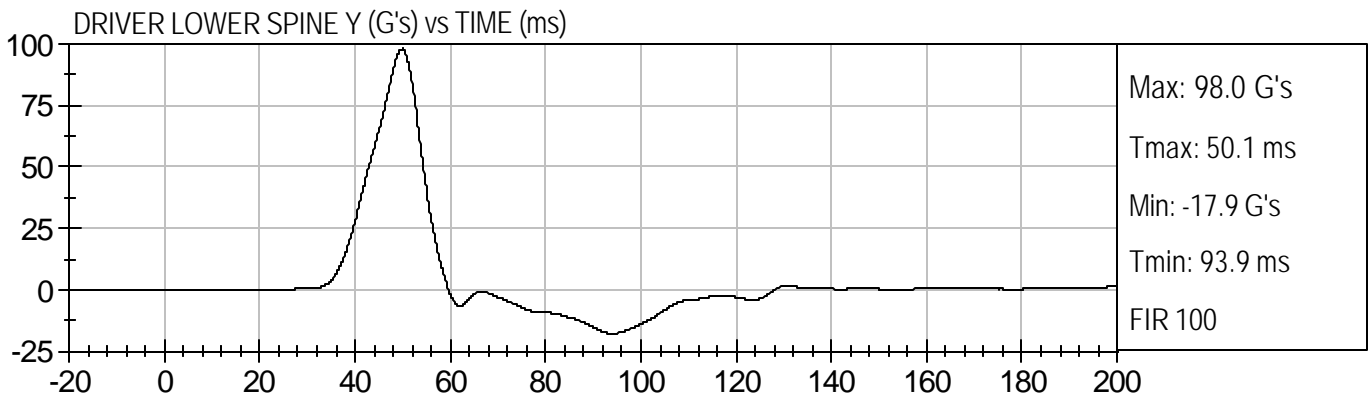
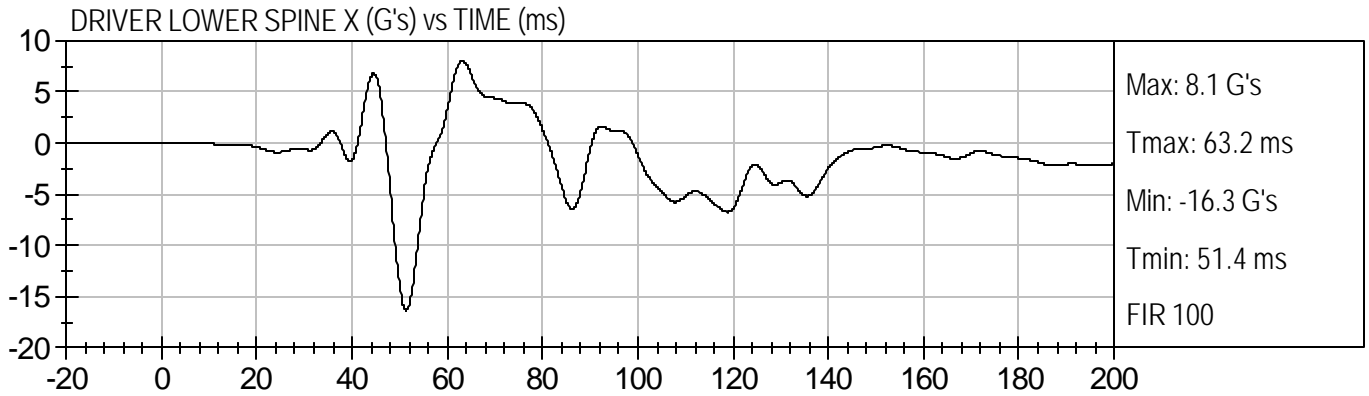
FLOORPAN @ REAR AXLE Resultant (G's) vs TIME (ms)

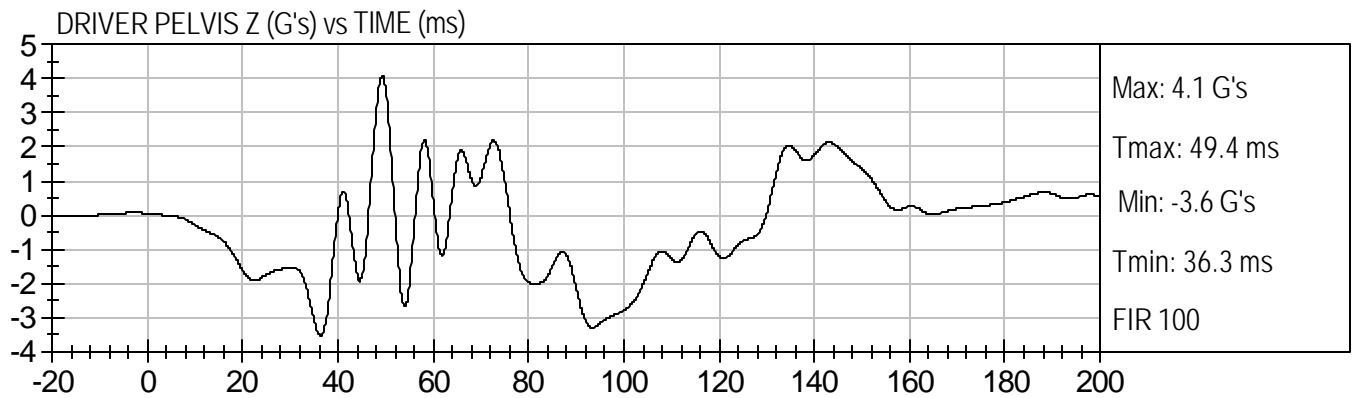
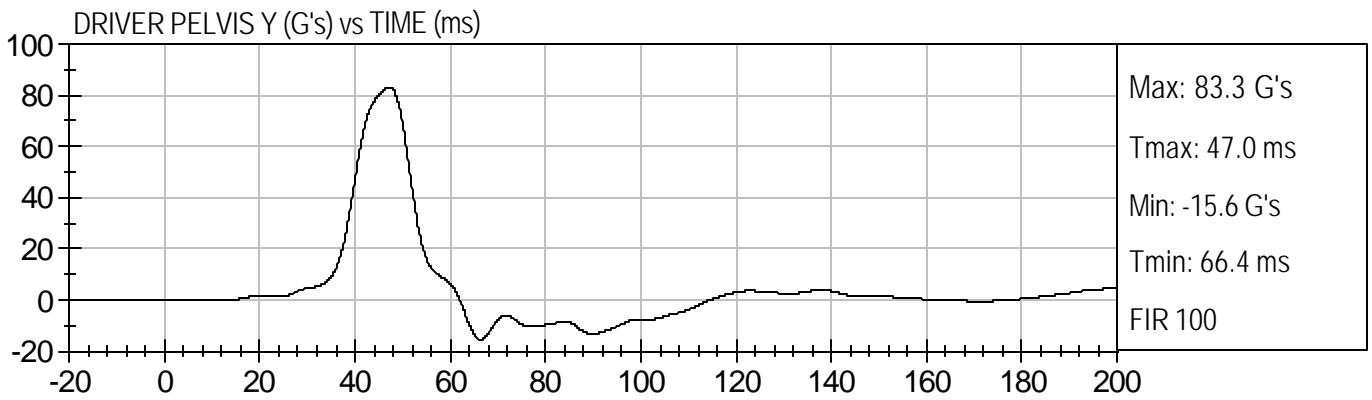
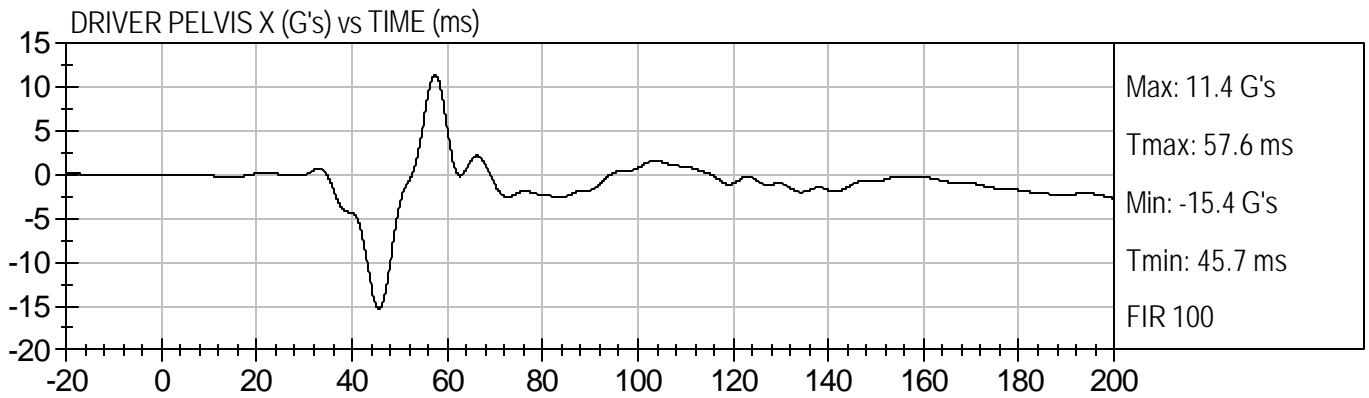


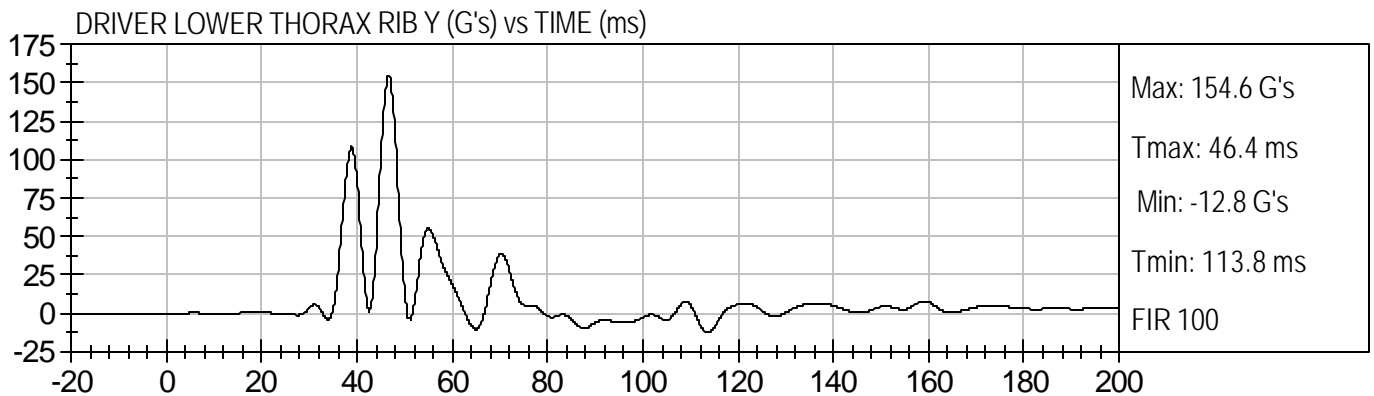
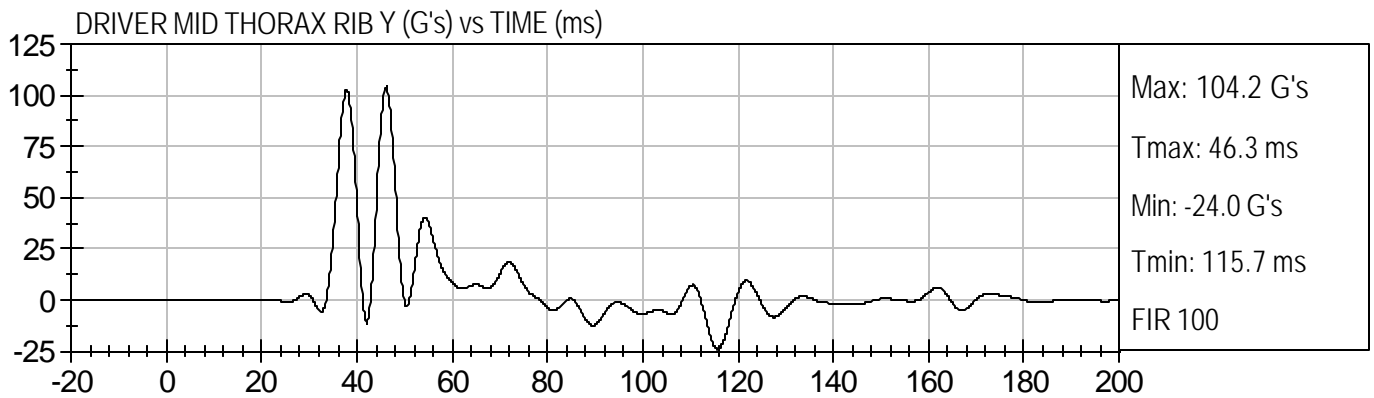
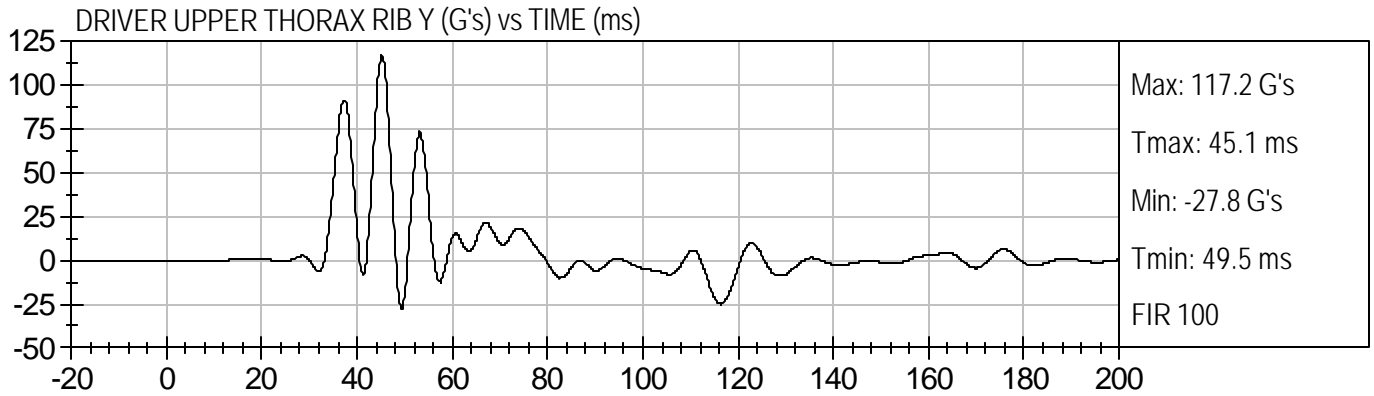


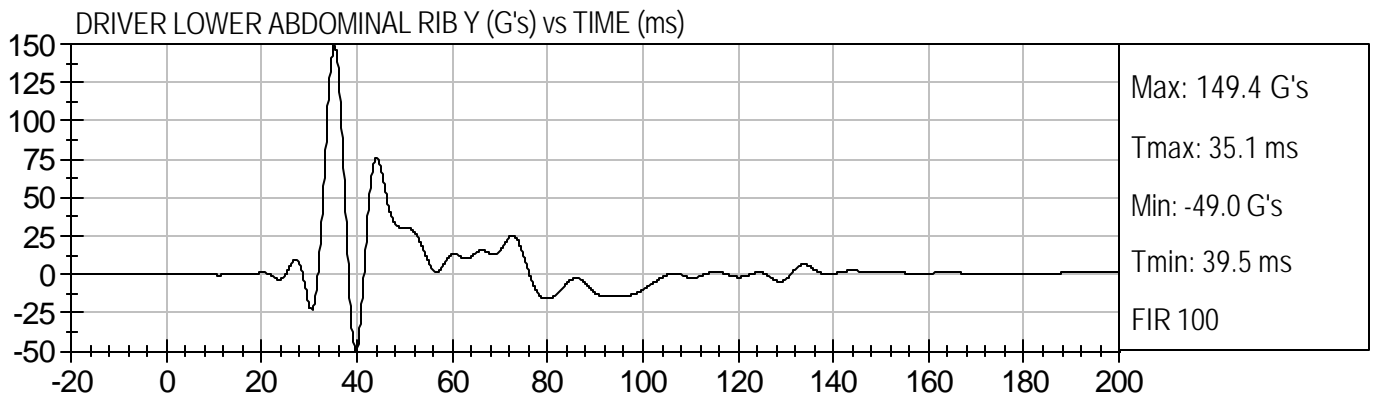
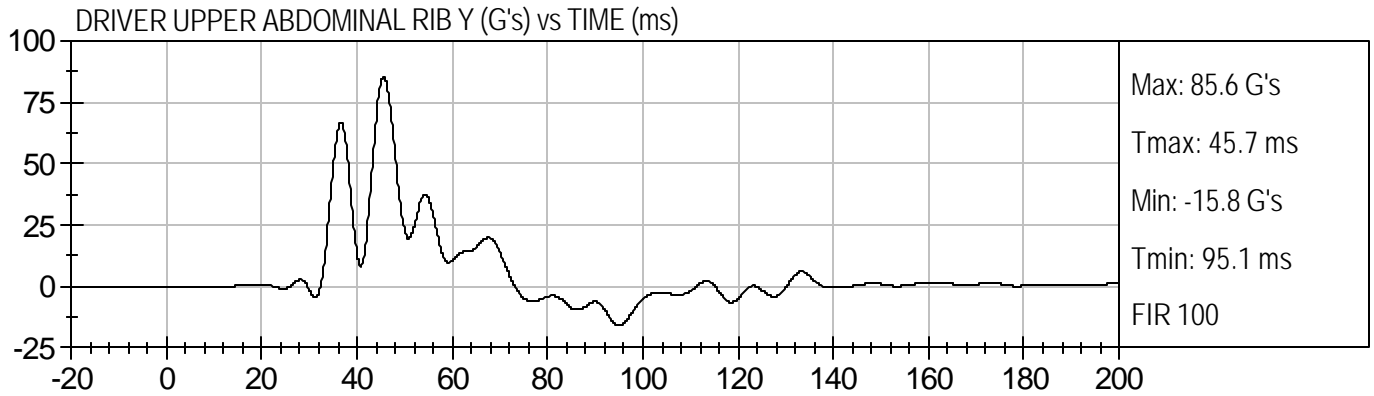


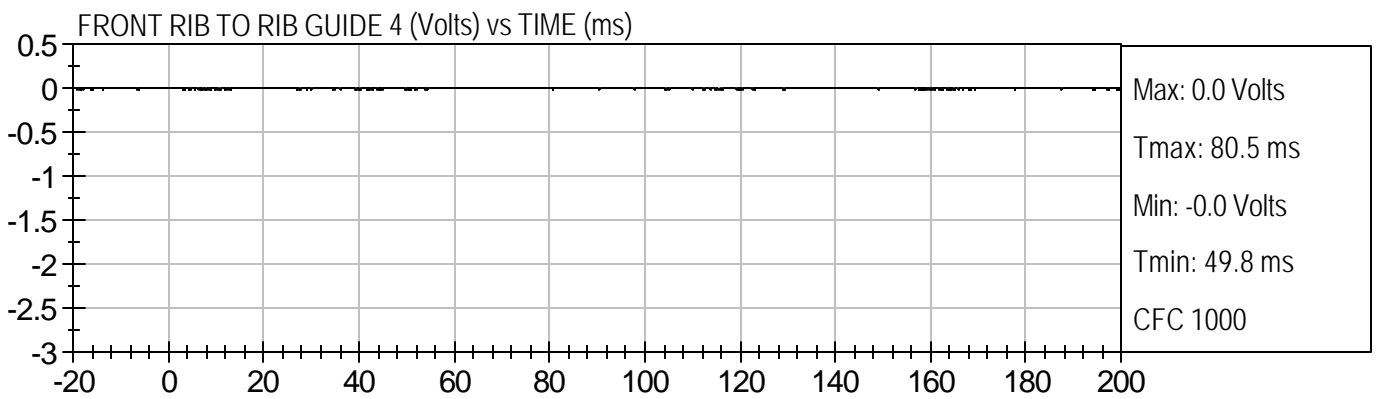
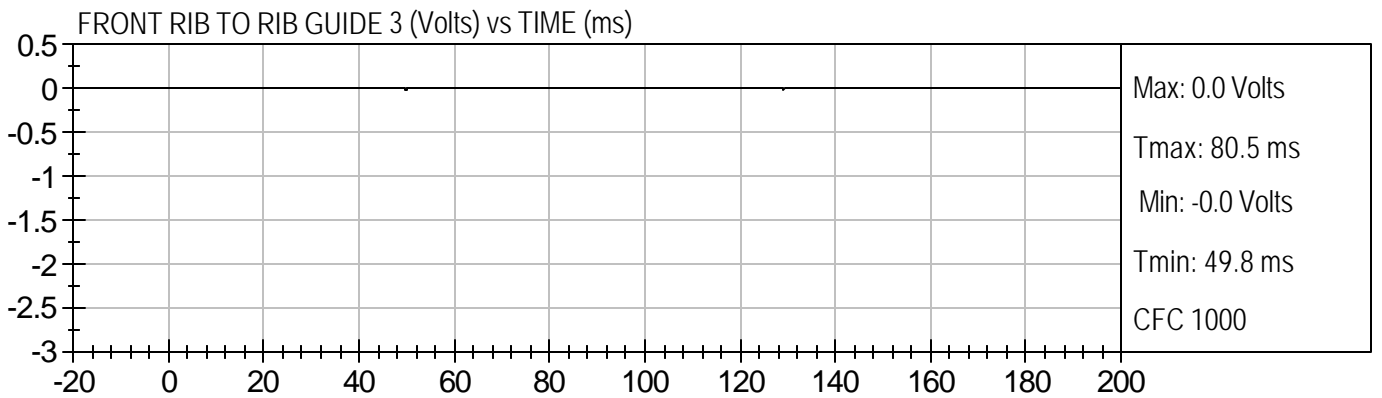
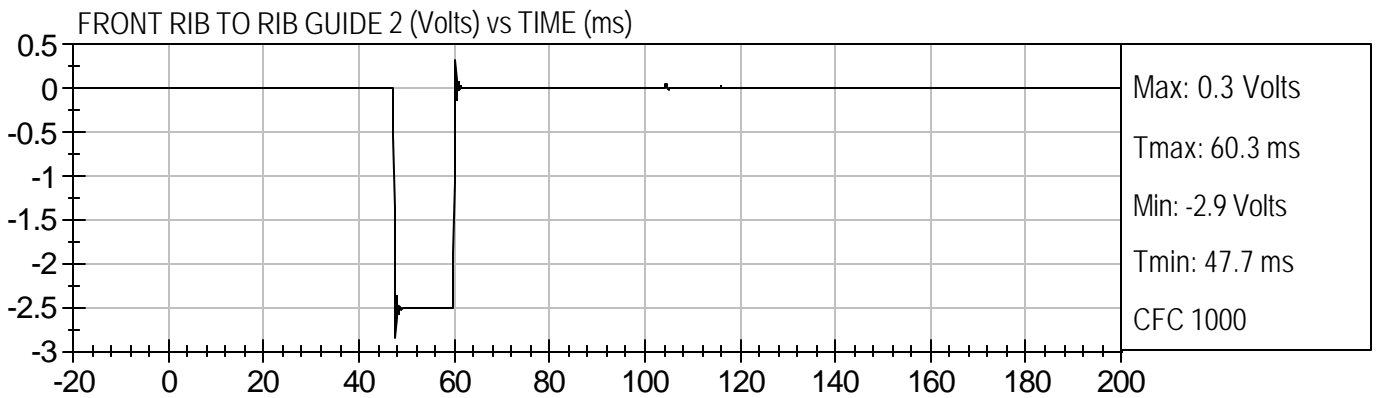
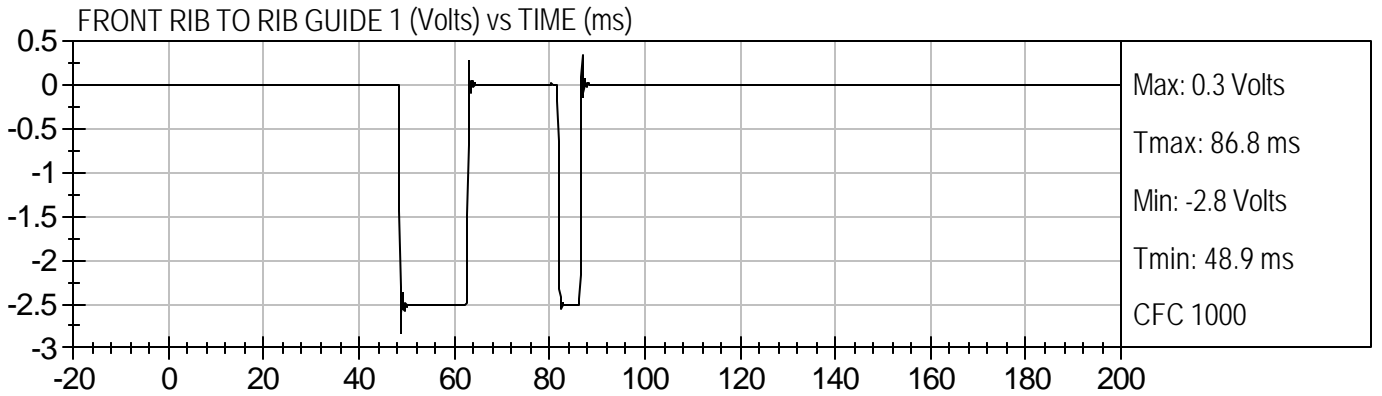


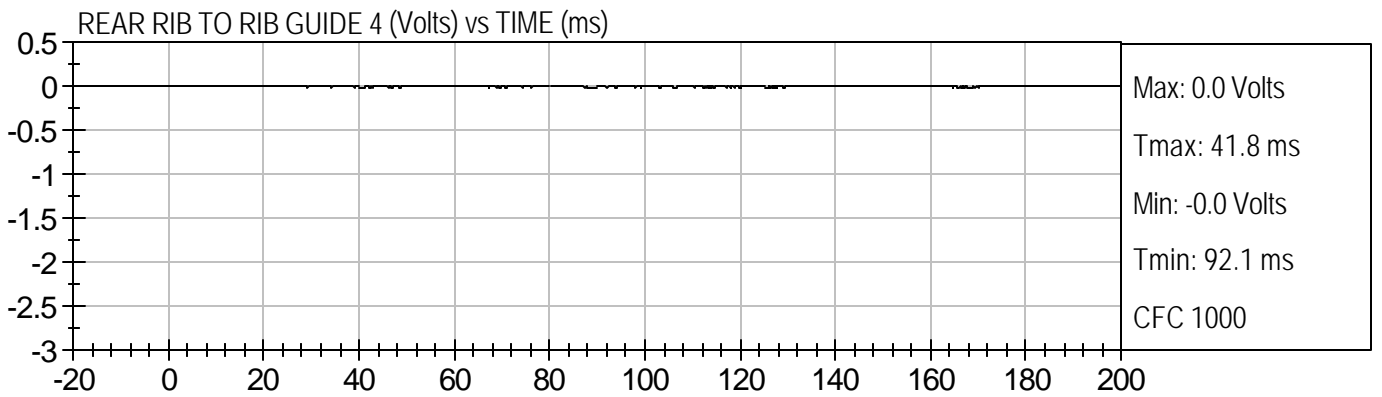
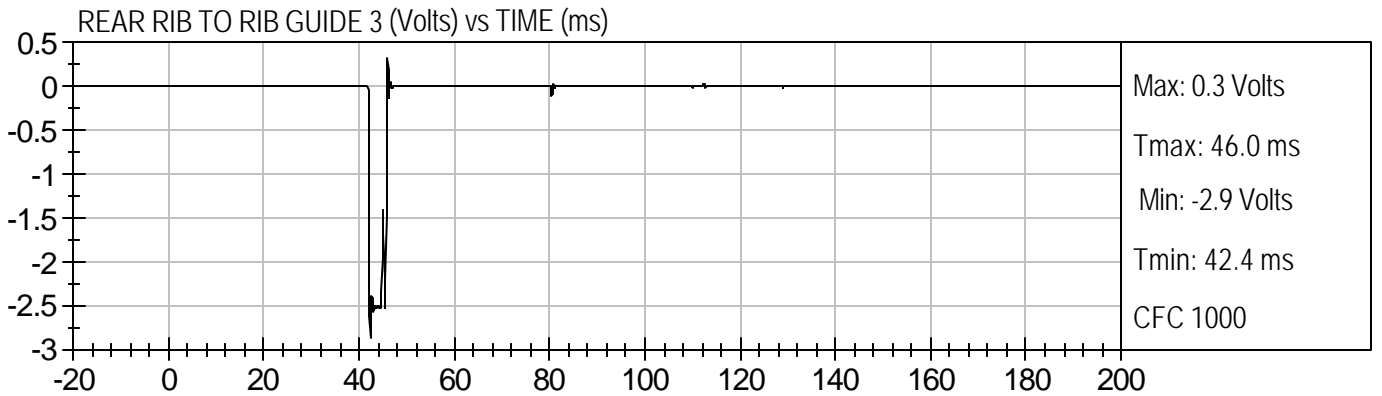
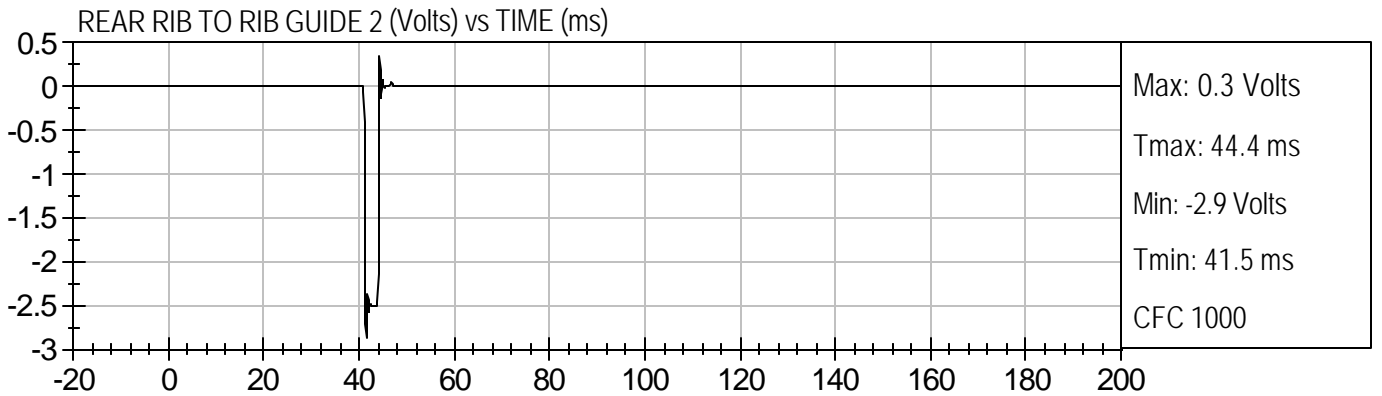
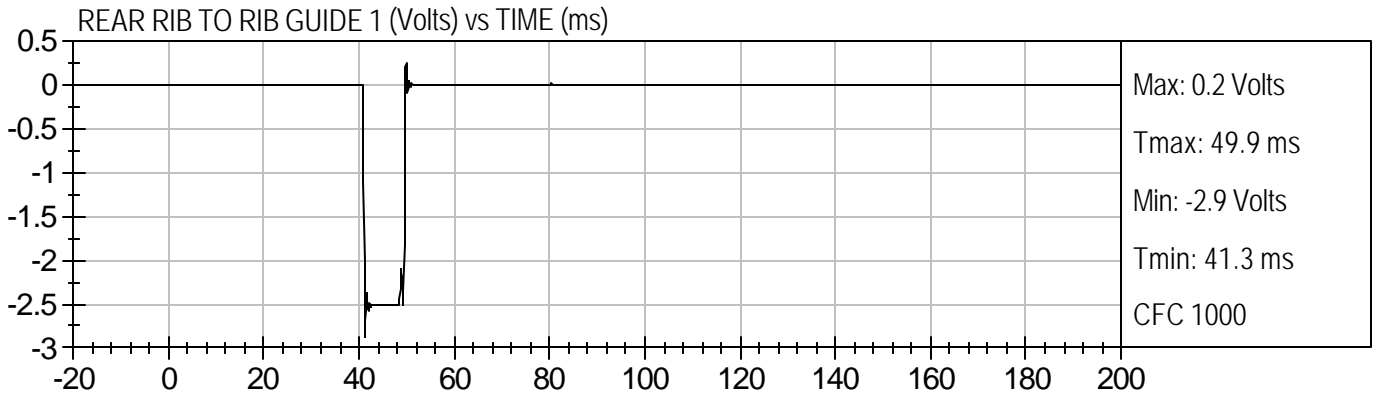


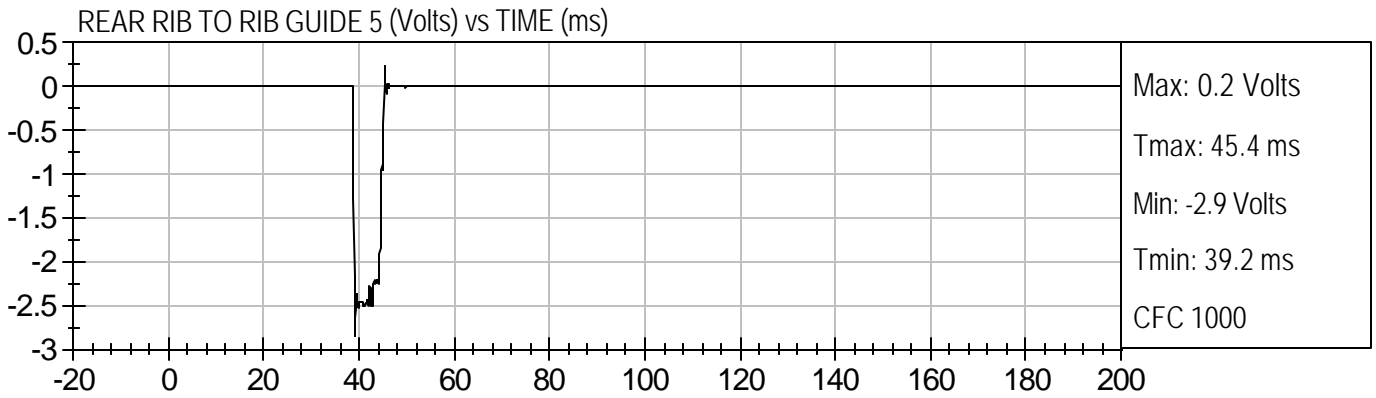
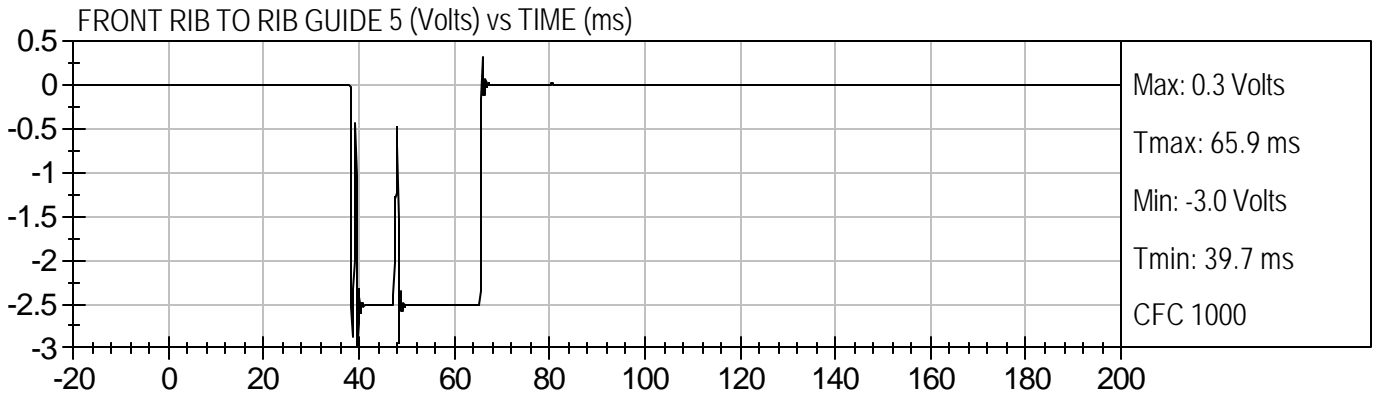


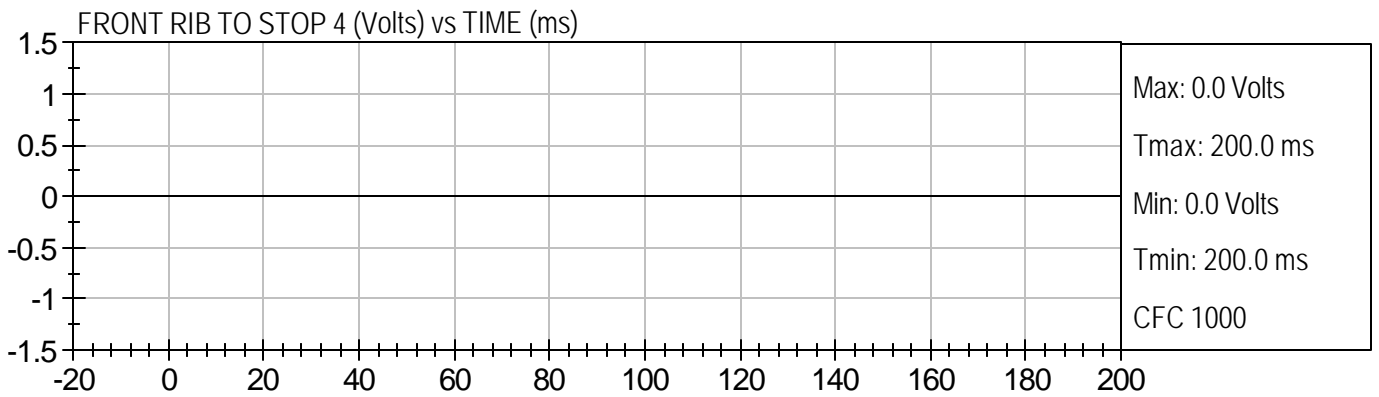
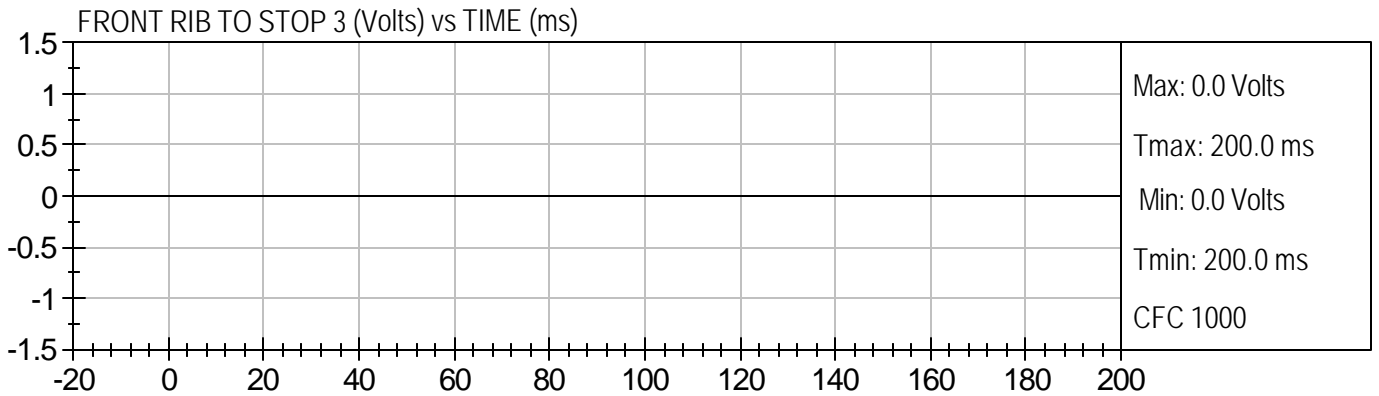
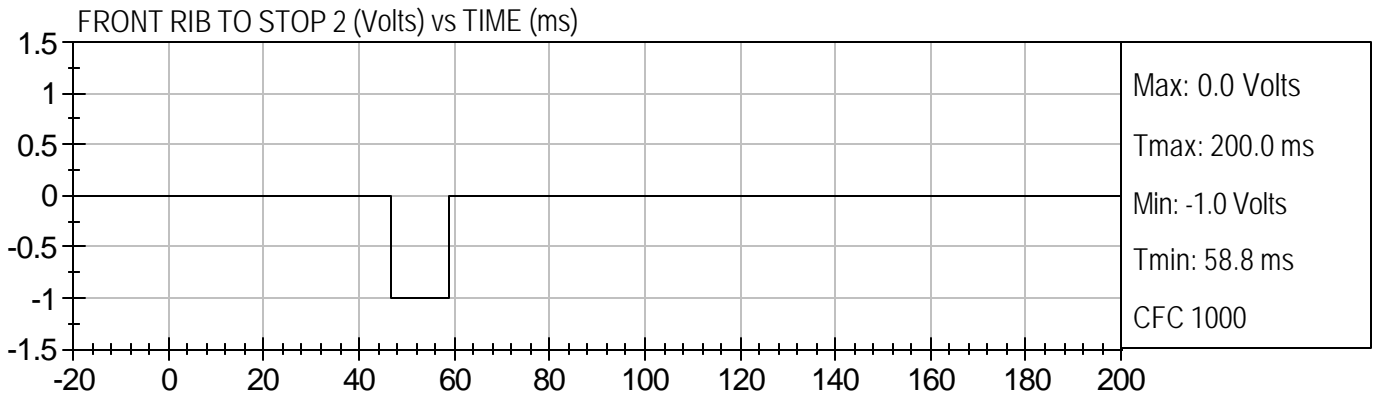
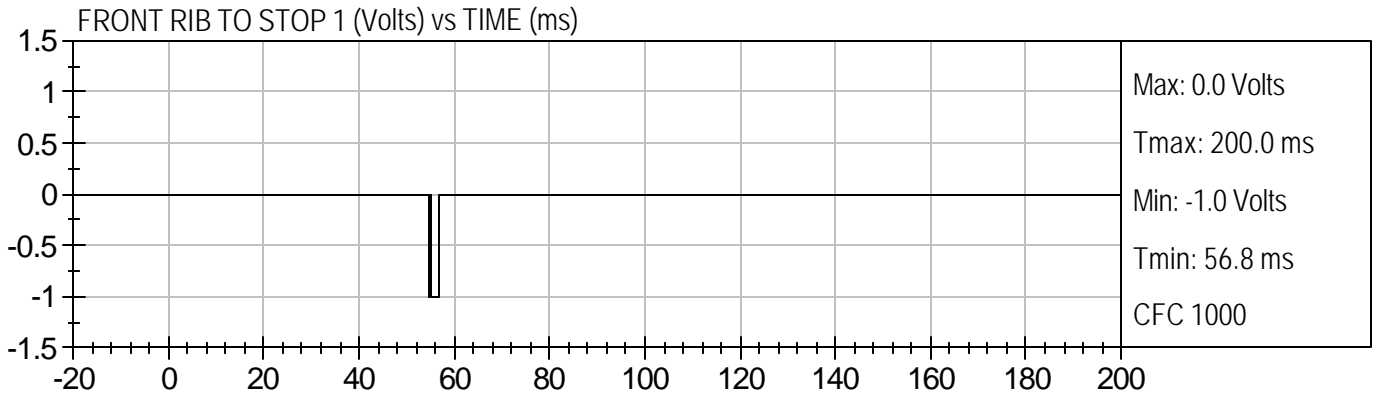


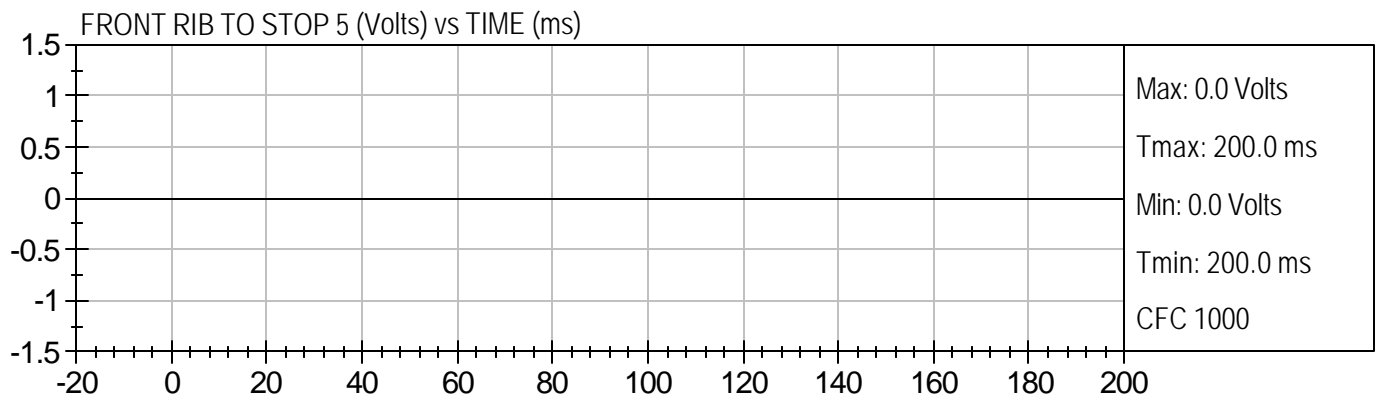


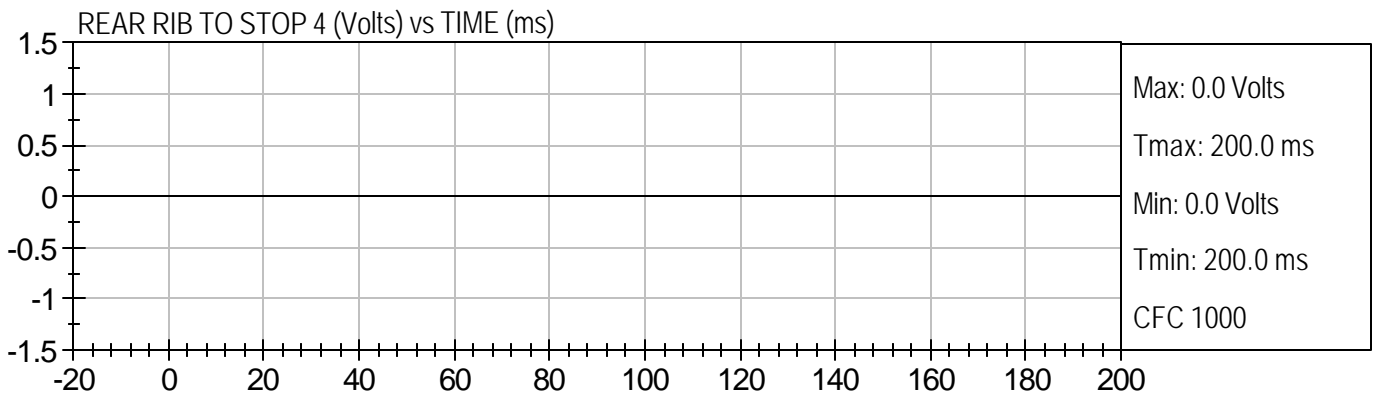
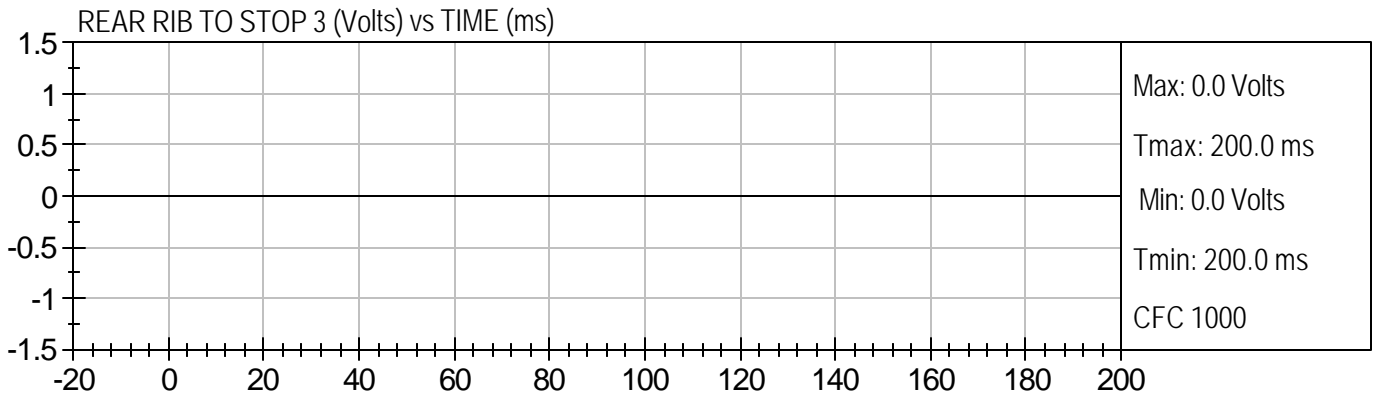
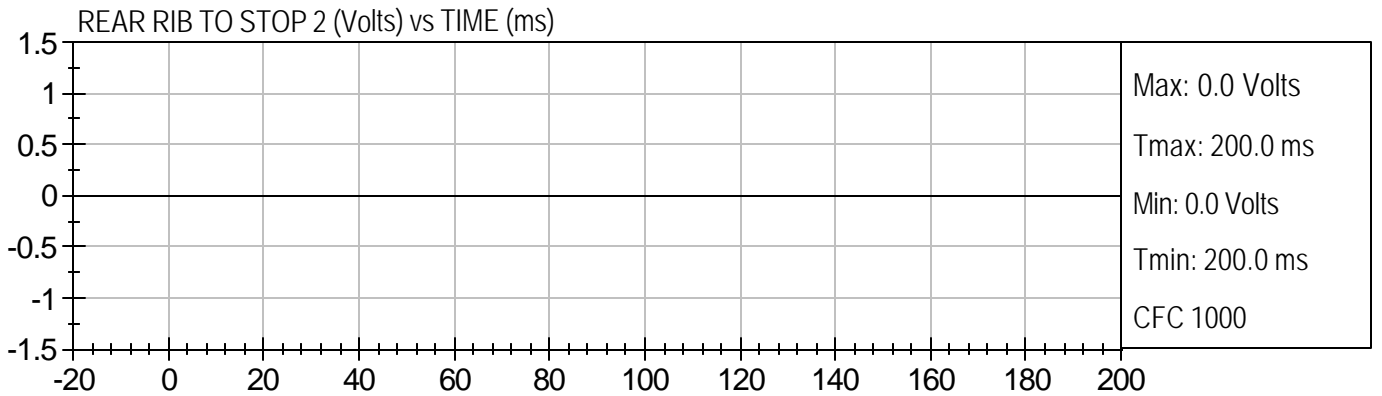
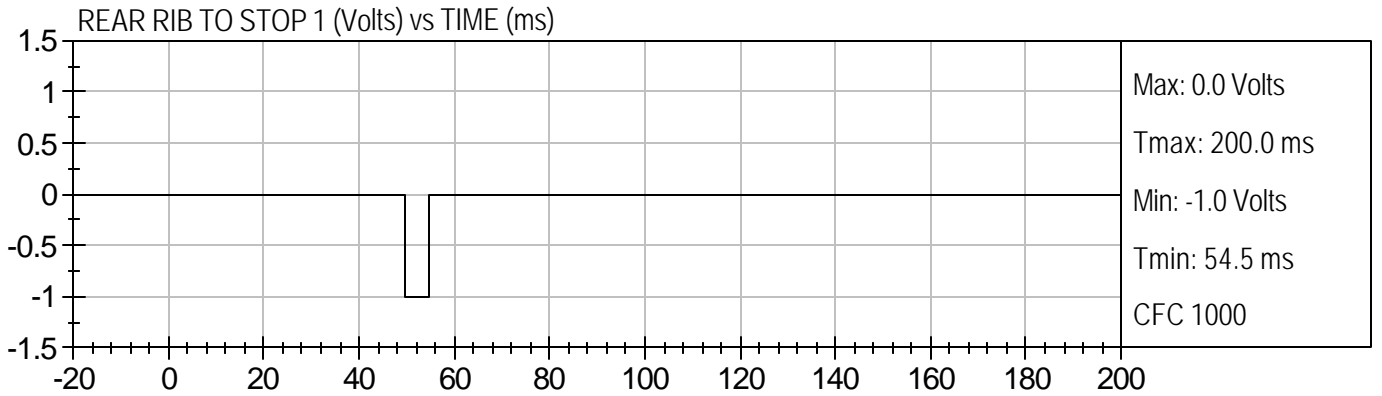


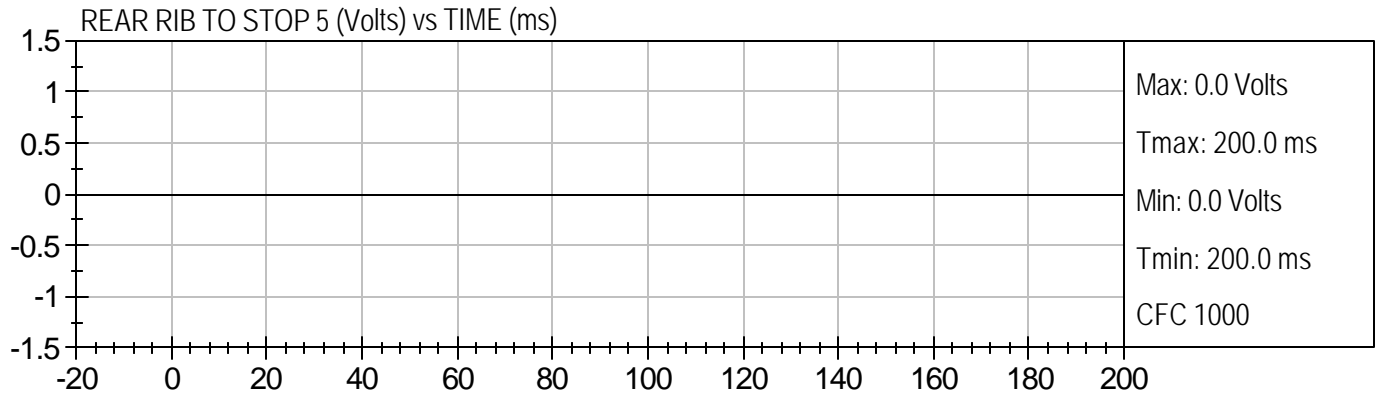












APPENDIX C

SID IIs CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CERTIFICATION DATA

Dummy Serial Number: 033

Calibration Test Results Summary

Dummy Serial Number: 033

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.
Thorax (with arm) Test:	The thorax did not pass all impact test requirements.
Thorax (without arm) Test:	The thorax passed all impact test requirements.
Abdomen Impact Test:	The abdomen did not pass all impact test requirements.
Pelvis Test:	The pelvis passed all impact test requirements.

Note: Calibrations performed at VRTC.

Temperature and Humidity were not recorded.

MGA RESEARCH CORPORATION
 HEAD DROP TEST
 SID IIs DUMMY

Date: 2/25/03
 Dummy Serial Number: 033
 Test Number: Not Available

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		Hdl 01	Hdl 02
Temperature	18.9° – 25.6°		
Humidity	10% - 70%		
Resultant Accel	115 - 145 g's	118.099	117.173
Peak Longitude Accel	{-15) – (+ 15) g's	-2.969	2.293

TEST MEETS SPECIFICATIONS

MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID IIs DUMMY

Date: 2/25/03
 Dummy Serial Number: 033
 Test Number: Not Available

TEST PARAMETER		SPECIFICATION	TEST RESULTS	
			Neck 01	Neck 02
Temperature		18.9° – 25.6°		
Humidity		10% - 70%		
Impact Velocity (m/s)		5.51-5.63	5.594	5.594
Delta Velocity (m/s)	10 ms	2.10-2.70	2.252	2.166
	15 ms	3.00-3.80	3.334	3.197
	20 ms	4.20-5.20	4.46	4.363
	25-60 ms	5.00-6.40	5.98	5.963
Peak D-Plane Rotation (deg)		72-82	73.284	73.795
Decay Time of D-Plane Rotation Peak to Zero Degree (ms)		60-83	69.24	61.88
Peak Occipital Condyle Moment (Nm)		{-43} – (-36)	-42.138	-41.62
Time at 10 or -10 Nm after Peak Moment (ms)		90 - 98	92.64	93.04
Time of last Moment Peak to Max Rotation (ms)		<14	8.24	8.02
Front Pot Peak Rotation Deg)		59 - 72	61.139	61.688
Time of Front Pot Peak Rotation (ms)		61 - 73	64.24	64.46
Rear Pot Peak Rotation (deg)		47 - 56	48.697	48.996
Time of Rear Pot Peak Rotation (ms)		62 - 73	63	63.62

TEST MEETS SPECIFICATIONS

MGA RESEARCH CORPORATION
 SHOULDER IMPACT TEST
 SID IIs DUMMY

Date: 2/28/03
 Dummy Serial Number: 033
 Test Number: Not Available

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		Shl 01	Shl 02
Temperature	18.9° – 25.6°		
Humidity	10% - 70%		
Impact Velocity	4.41 - 4.59 m/s	4.456	4.456
SHLYD	27-39 mm	30.612	30.522
Resistive Force	1.6 - 2.4 kN	2.382	2.351

TEST MEETS SPECIFICATIONS

MGA RESEARCH CORPORATION
 THORAX (WITH ARM) IMPACT TESTS
 SID IIs DUMMY

Date: 2/28/03
 Dummy Serial Number: 033
 Test Number: Not Available

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		Thwa 01	Thwa 02
Temperature	18.9° – 25.6°		
Humidity	10% - 70%		
Impact Velocity	6.57 - 6.84 m/s	6.58	6.58
Probe Force	4.3 - 5.3 kN	4.86	4.81
T01YG	34 – 48 g's	44.7	43.5
SRB4YG (T12)	31 - 36 g's	38.4*	38.6*
RB1YD	23 - 35 mm	26.8	27.2
RB2YD	29 - 44 mm	30.8	30.6
RB3YD	33 - 40 mm	32.5*	31.6*
SHLYD	30 - 42 mm	34.2	35.2

* TEST DOES NOT MEET SPECIFICATIONS

MGA RESEARCH CORPORATION
 THORAX (WITHOUT ARM) IMPACT TESTS
 SID IIs DUMMY

Date: 2/27/03
 Dummy Serial Number: 033
 Test Number: Not Available

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		Thwoa 01	Thwoa -02
Temperature	18.9° – 25.6°		
Humidity	10% - 70%		
Impact Velocity	4.2 - 4.4m/s	4.364	4.364
Probe Force	1.6 - 2.4 kN	2.278	2.257
T01YG	13 - 18 g's	15.852	16.308
SRB4YG (T12)	8 - 13 g's	10.461	10.557
RB1YD	32 - 41 mm	37.166	37.702
RB2YD	40 - 51 mm	43.671	43.749
RB3YD	34 - 47 mm	40.825	40.713

TEST MEETS SPECIFICATIONS

MGA RESEARCH CORPORATION
 ABDOMINAL IMPACT TEST
 SID IIs DUMMY

Date: 2/27/03
 Dummy Serial Number: 033
 Test Number: Not Available

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		ABD 01	ABD 02
Temperature	18.9° – 25.6°		
Humidity	10% - 70%		
Impact Velocity	4.41 - 4.59 m/s	4.536	4.536
Resistive Force	1.4 - 1.6 kN	1.961*	1.937*
T01YG	5 - 9 g's	7.619	7.509
SRB4YG (T12)	10 - 12 g's	16.006*	16.266*
RB4YD	44 - 55 mm	45.309	46.89
RB5YD	44 - 56 mm	46.096	46.409

* TEST DOES NOT MEET SPECIFICATIONS

MGA RESEARCH CORPORATION
 PELVIS IMPACT TEST
 SID IIs DUMMY

Date: 2/27/03
 Dummy Serial Number: 033
 Test Number: Not Available

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		Pev 01	Pev 02
Temperature	18.9° – 25.6°		
Humidity	10% - 70%		
Impact Velocity	6.57 - 6.84 m/s	6.72	6.791
Resistive Force	5.0 - 7.2 kN	6.193	7.412*
PEVYG	46 - 60 g's	50.977	53.347

* TEST DOES NOT MEET SPECIFICATIONS

CERTIFICATION DATA

Dummy Serial Number: 033

Calibration Test Results Summary

Dummy Serial Number: 033

Post-Test Calibration

Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck did not pass all test requirements.
Shoulder Impact Test:	The shoulder passed all impact test requirements.
Thorax (with arm) Test:	The thorax passed all impact test requirements.
Thorax (without arm) Test:	The thorax passed all impact test requirements.
Abdomen Impact Test:	The abdomen did not pass all impact test requirements.
Pelvis Test:	The pelvis passed all impact test requirements.

MGA RESEARCH CORPORATION
HEAD DROP TEST
SID IIs DUMMY

Date: 3/14/03
Dummy Serial Number: 033
Test Number: D03291/311

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		D03291	D03311
Temperature	18.9° – 25.6°	20.5	20.5
Humidity	10% - 70%	20	20
Resultant Accel	115 - 145 g's	117	121
Peak Longitude Accel	(-15) – (+ 15) g's	5	4

TEST MEETS SPECIFICATIONS

Technician: 

Approved By: 

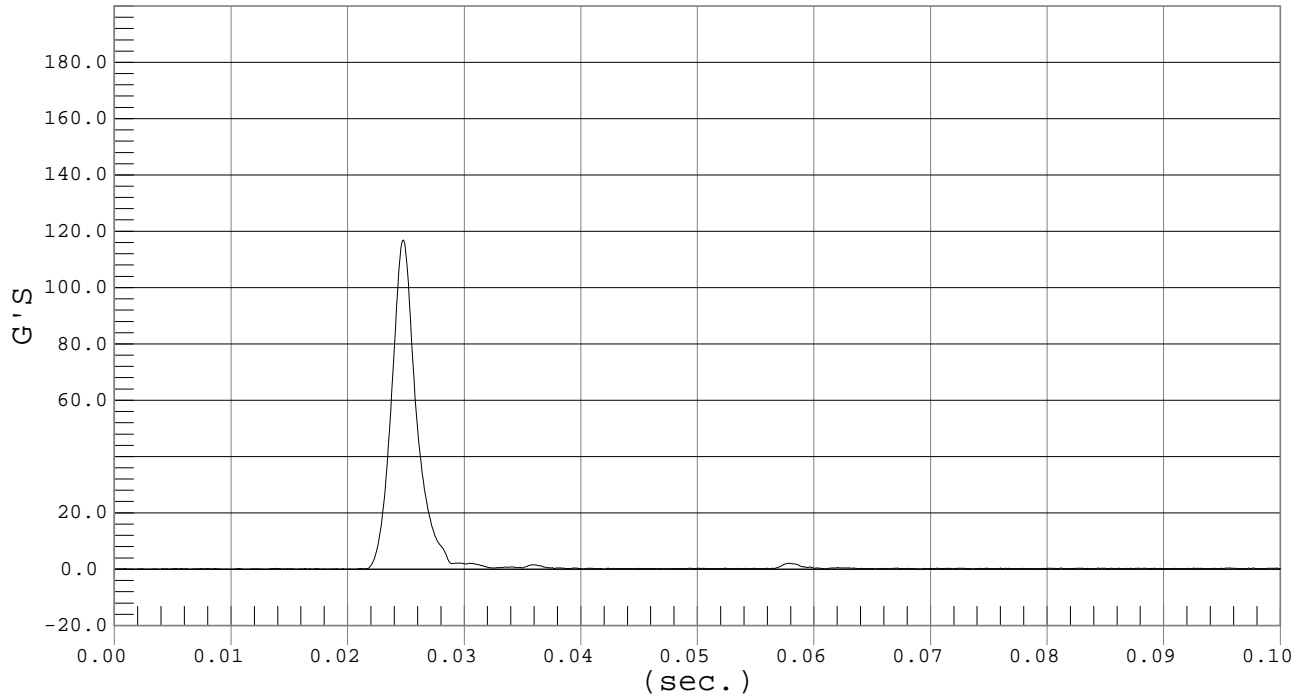


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #033

Test Date: 03-14-03
Speed: 0.0 fps, 0.00 M/s

Ymin = .04 G'S @ 0.0001 sec., Ymax = 116.87 G'S @ 0.0247 sec.

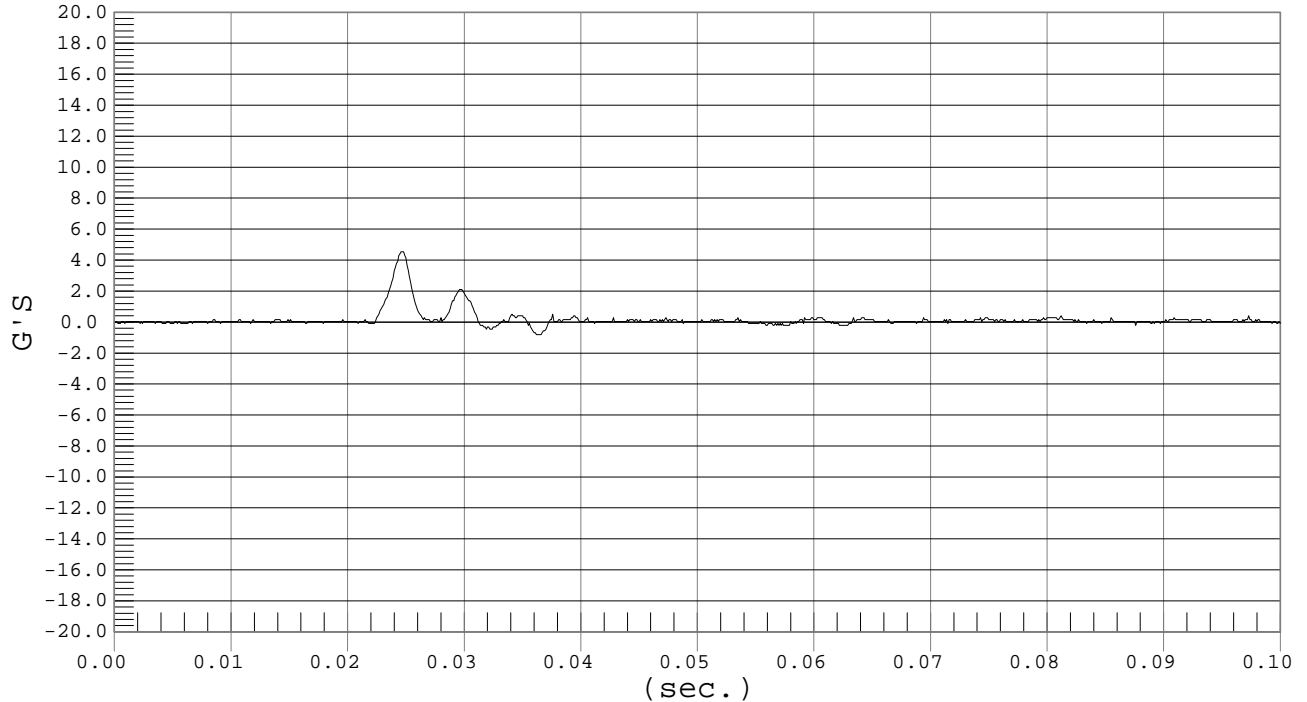


PEAK LONGITUDINAL ACCELARATION

Test Desc.: Head Drop
Component: Dummy #033

Test Date: 03-14-03
Speed: 0.0 fps, 0.00 M/s

Ymin = -2.76 G'S @ 0.1211 sec., Ymax = 4.53 G'S @ 0.0245 sec.



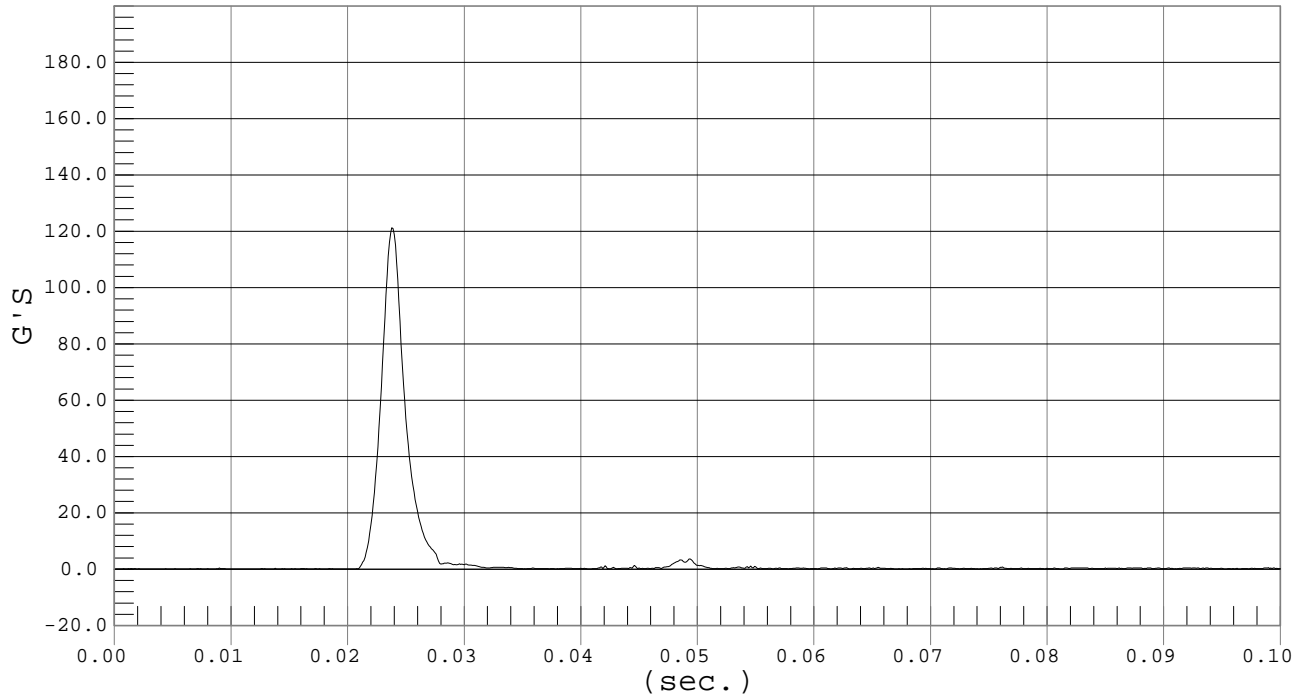


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #033

Test Date: 03-14-03
Speed: 0.0 fps, 0.00 M/s

Ymin = .07 G'S @ 0.0015 sec., Ymax = 121.24 G'S @ 0.0237 sec.

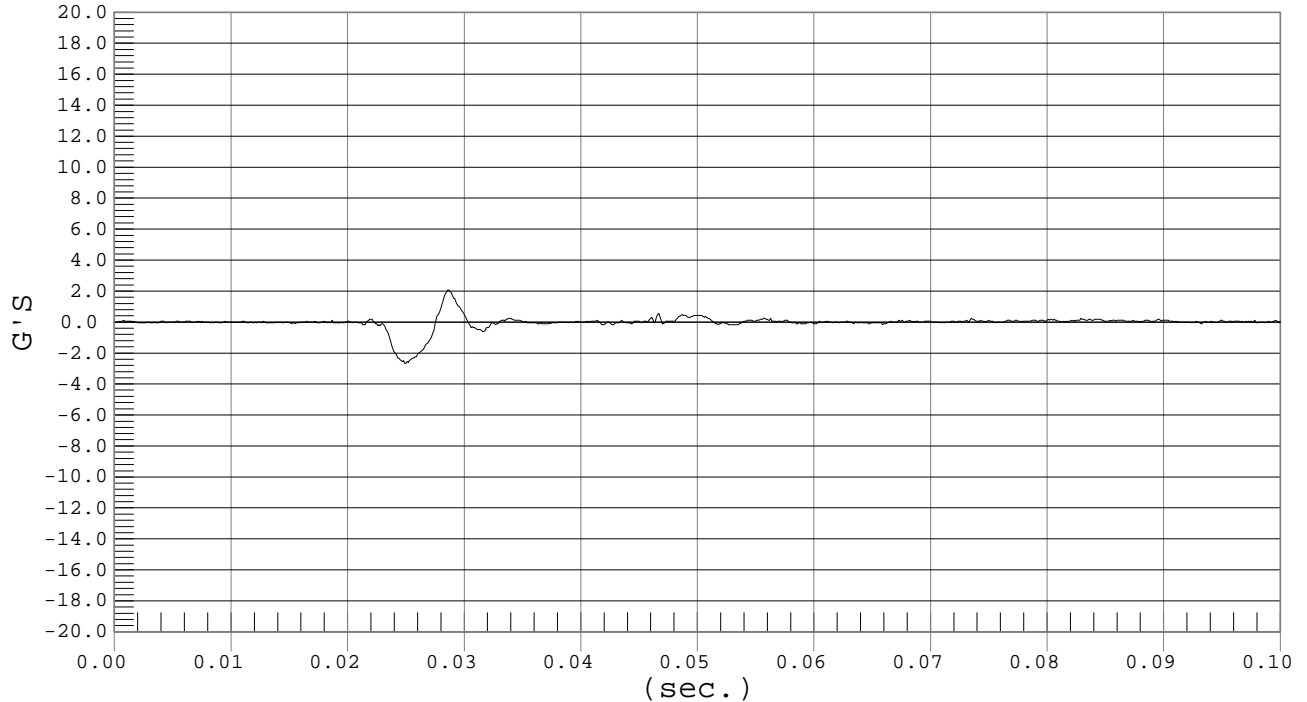


PEAK LONGITUDINAL ACCELARATION

Test Desc.: Head Drop
Component: Dummy #033

Test Date: 03-14-03
Speed: 0.0 fps, 0.00 M/s

Ymin = -2.67 G'S @ 0.0248 sec., Ymax = 3.65 G'S @ 0.1323 sec.

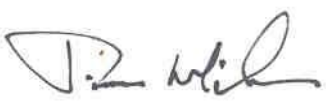


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID IIs DUMMY

Date: 3/14/03
 Dummy Serial Number: 033
 Test Number: D03292/312

TEST PARAMETER		SPECIFICATION	TEST RESULTS	
			D03292	D03312
Temperature		20.6° – 22.2°	21.1	21.1
Humidity		10% - 70%	23	23
Impact Velocity (m/s)		5.51-5.63	5.61	5.61
Delta Velocity (m/s)	10 ms	2.10-2.70	2.14	2.33
	15 ms	3.00-3.80	3.21	3.49
	20 ms	4.20-5.20	4.37	4.69
	25-60 ms	5.00-6.40	5.84	5.55
Peak D-Plane Rotation (deg)		72-82	73	77
Decay Time of D-Plane Rotation Peak to Zero Degree (ms)		60-83	66	67
Peak Occipital Condyle Moment (Nm)		(-43) – (-36)	-42	-43
Time at 10 or -10 Nm after Peak Moment (ms)		90 - 98	93	91
Time of last Moment Peak to Max Rotation (ms)		<14	9	12
Front Pot Peak Rotation Deg)		59 - 72	64	66
Time of Front Pot Peak Rotation (ms)		61 - 73	66	65
Rear Pot Peak Rotation (deg)		47 - 56	50	51
Time of Rear Pot Peak Rotation (ms)		62 - 73	62	*61

* TEST DOES NOT MEET SPECIFICATIONS

Technician: 

Approved By: 

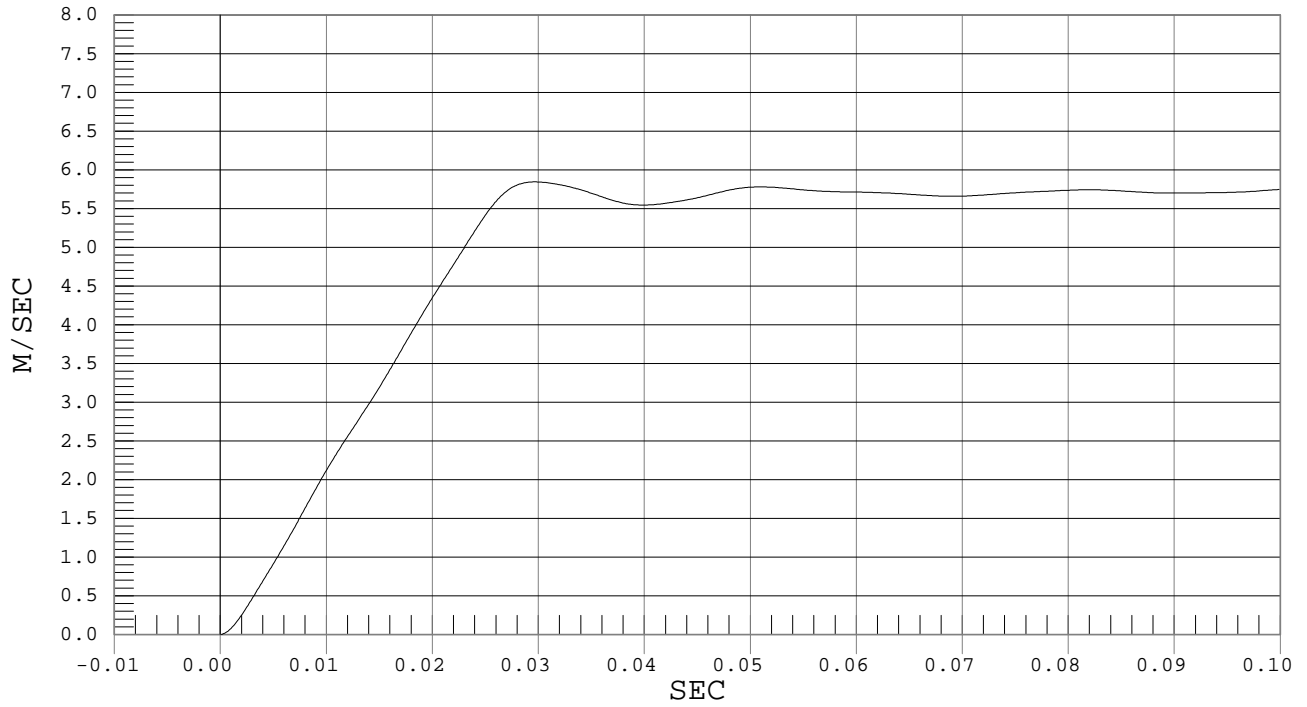


PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #033

Test Date: 03-14-03
Speed: 18.4 fps, 5.61 M/s

Ymin = 0 M/SEC @ 0.0000 SEC, Ymax = 6.9 M/SEC @ 0.1930 SEC

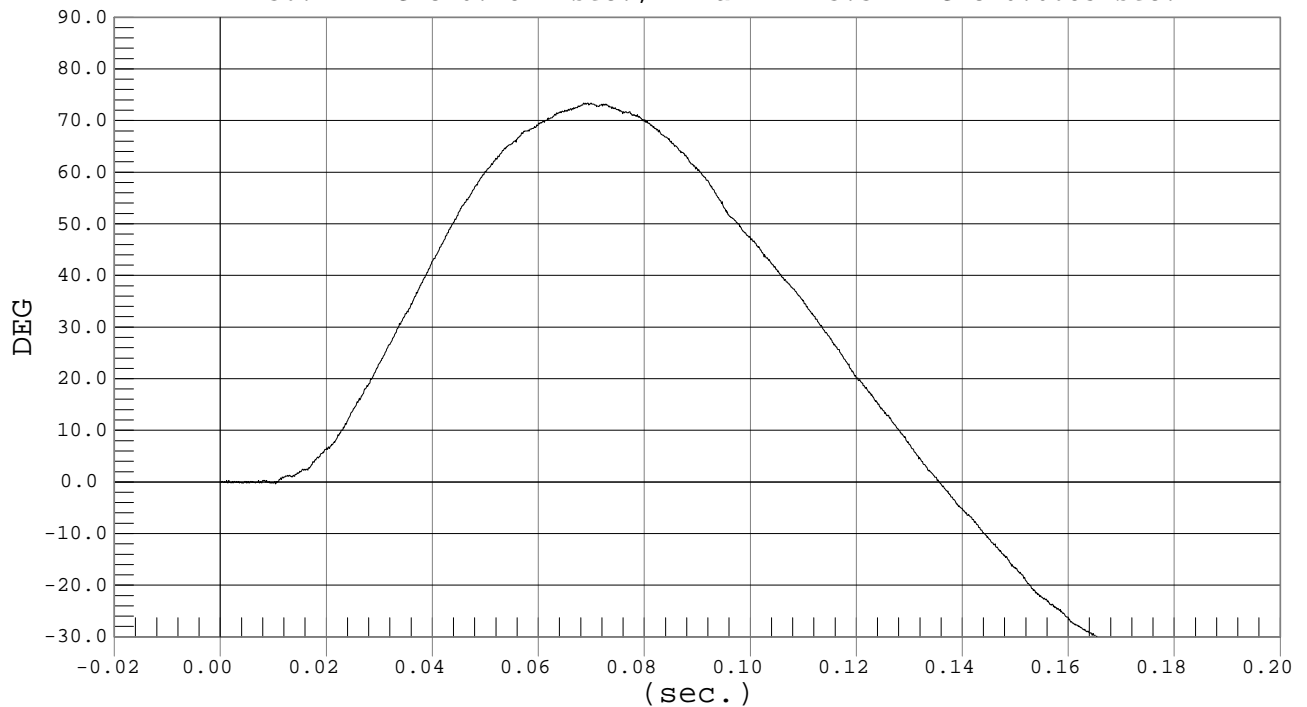


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #033

Test Date: 03-14-03
Speed: 18.4 fps, 5.61 M/s

Ymin = -36.22 DEG @ 0.1841 sec., Ymax = 73.34 DEG @ 0.0685 sec.



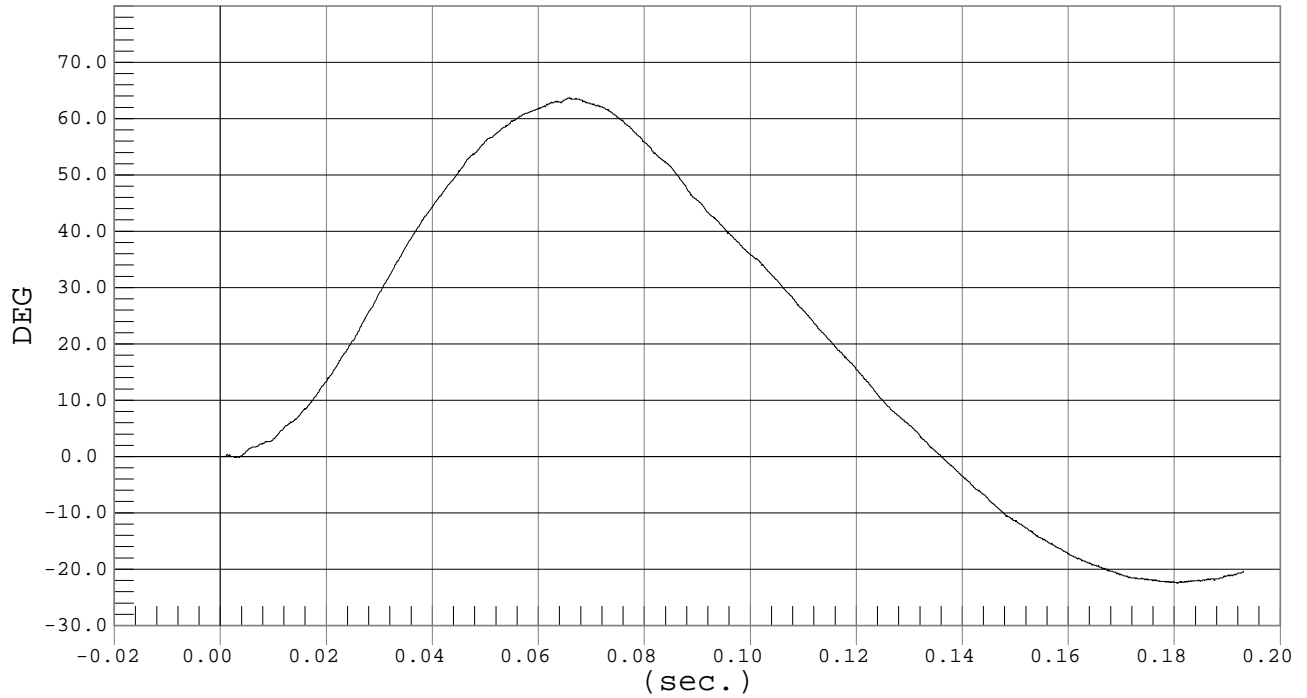


Test Desc.: Neck Bending
Component: Dummy #033

FRONT

Test Date: 03-14-03
Speed: 18.4 fps, 5.61 M/s

Ymin = -22.53 DEG @ 0.1804 sec., Ymax = 63.79 DEG @ 0.0658 sec.

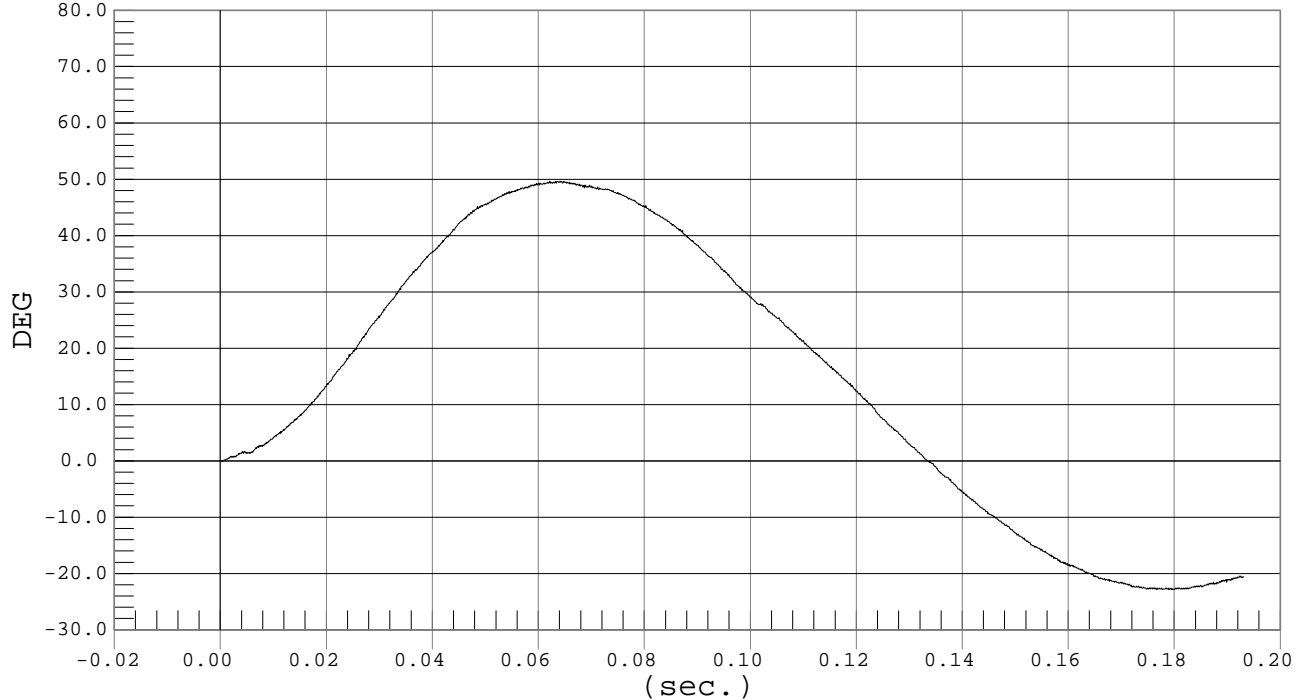


Test Desc.: Neck Bending
Component: Dummy #033

REAR

Test Date: 03-14-03
Speed: 18.4 fps, 5.61 M/s

Ymin = -22.89 DEG @ 0.1766 sec., Ymax = 49.64 DEG @ 0.0621 sec.



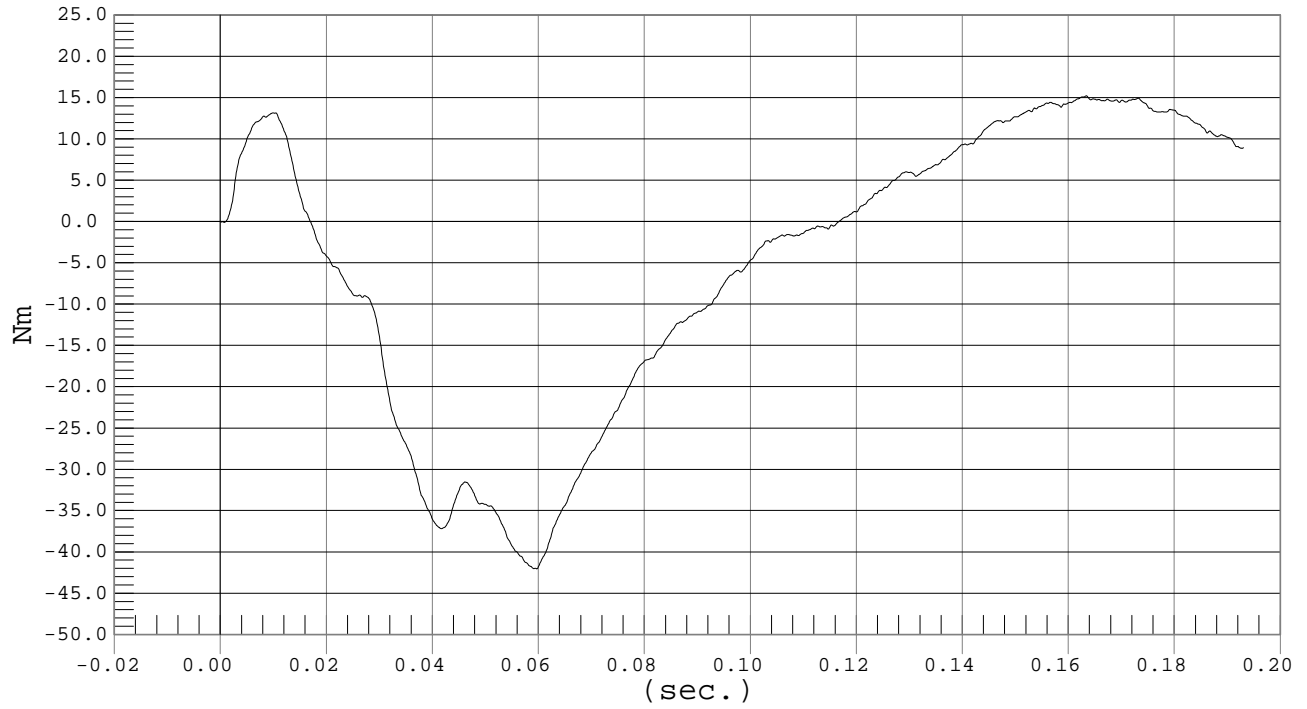


Test Desc.: Neck Bending
Component: Dummy #033

OCCIPITAL MOMENT

Test Date: 03-14-03
Speed: 18.4 fps, 5.61 M/s

Ymin = -42.04 Nm @ 0.0596 sec., Ymax = 15.21 Nm @ 0.1633 sec.



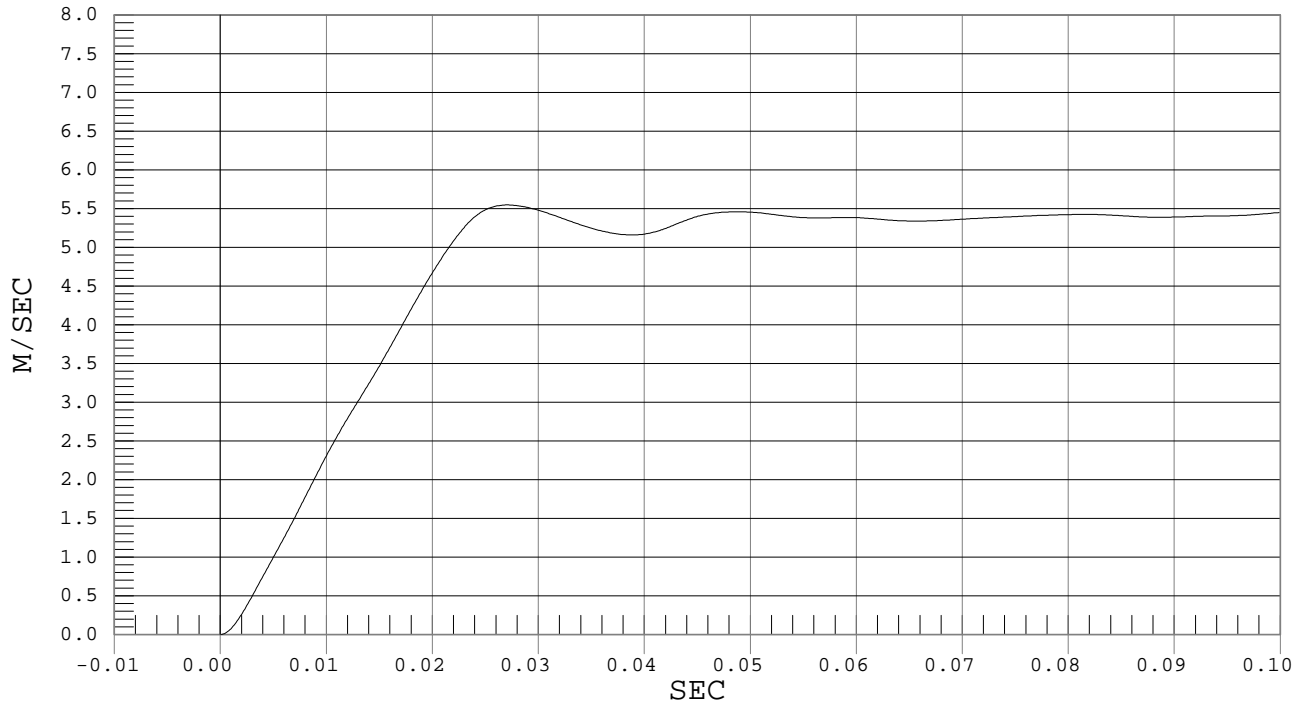


PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #033

Test Date: 03-14-03
Speed: 18.4 fps, 5.61 M/s

Ymin = 0 M/SEC @ 0.0000 SEC, Ymax = 6.57 M/SEC @ 0.1930 SEC

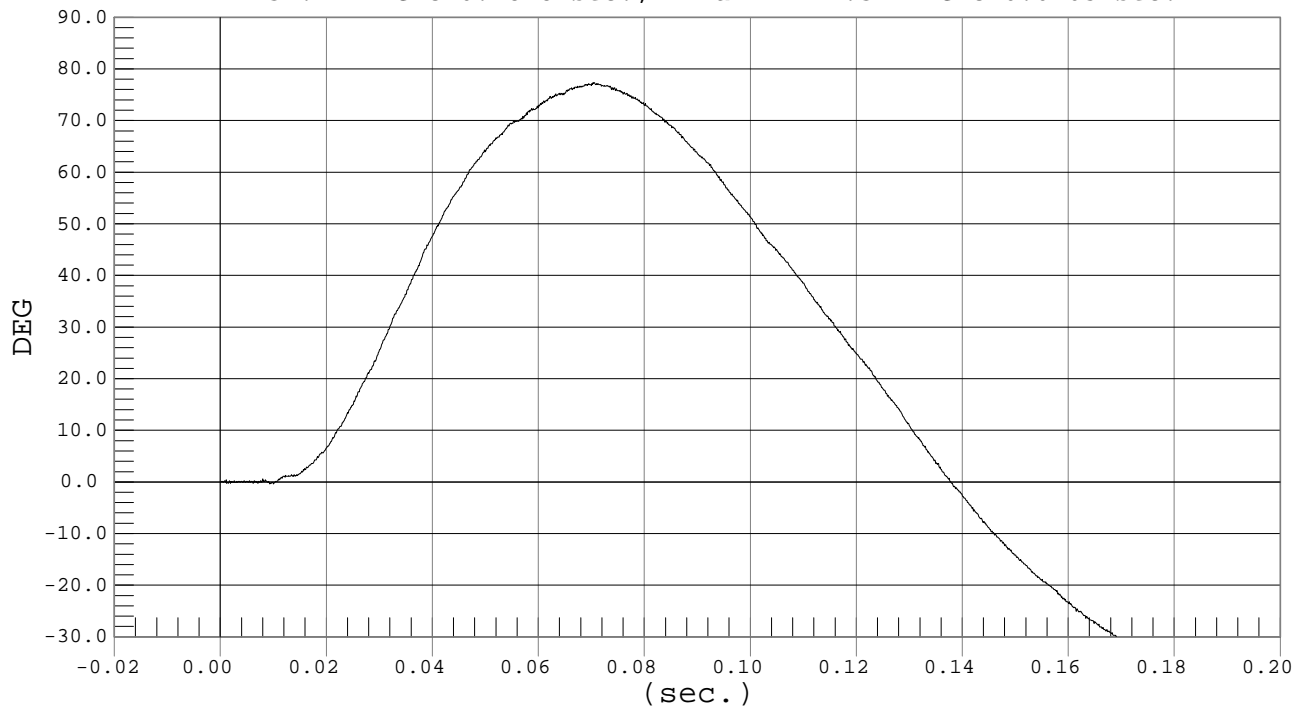


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #033

Test Date: 03-14-03
Speed: 18.4 fps, 5.61 M/s

Ymin = -34.74 DEG @ 0.1848 sec., Ymax = 77.32 DEG @ 0.0705 sec.



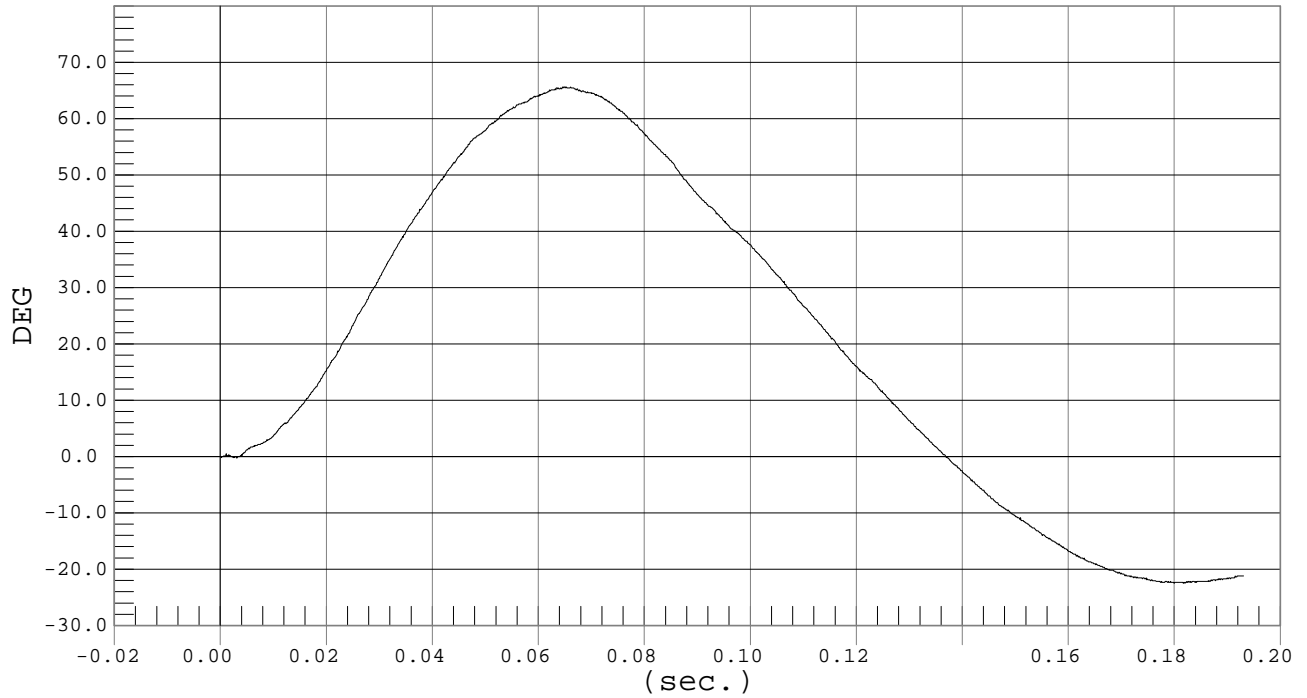


Test Desc.: Neck Bending
Component: Dummy #033

FRONT

Test Date: 03-14-03
Speed: 18.4 fps, 5.61 M/s

Ymin = -22.53 DEG @ 0.1799 sec., Ymax = 65.62 DEG @ 0.0645 sec.

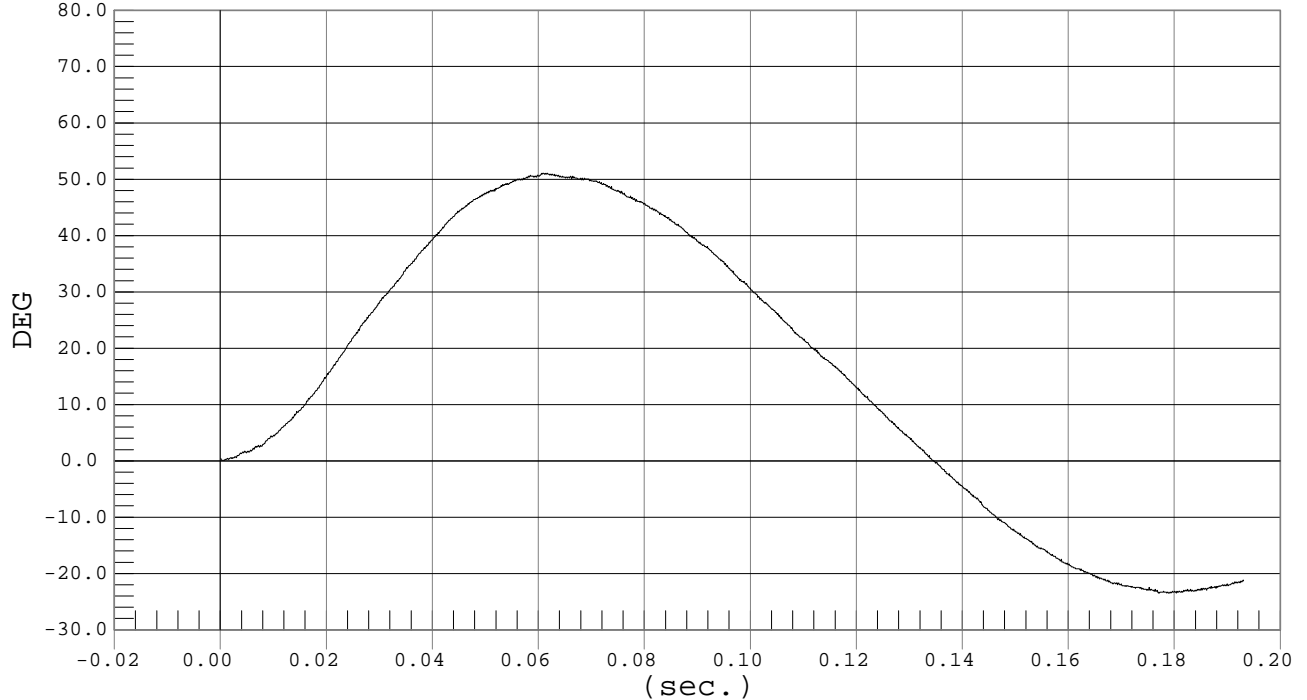


Test Desc.: Neck Bending
Component: Dummy #033

REAR

Test Date: 03-14-03
Speed: 18.4 fps, 5.61 M/s

Ymin = -23.48 DEG @ 0.1769 sec., Ymax = 51.06 DEG @ 0.0605 sec.



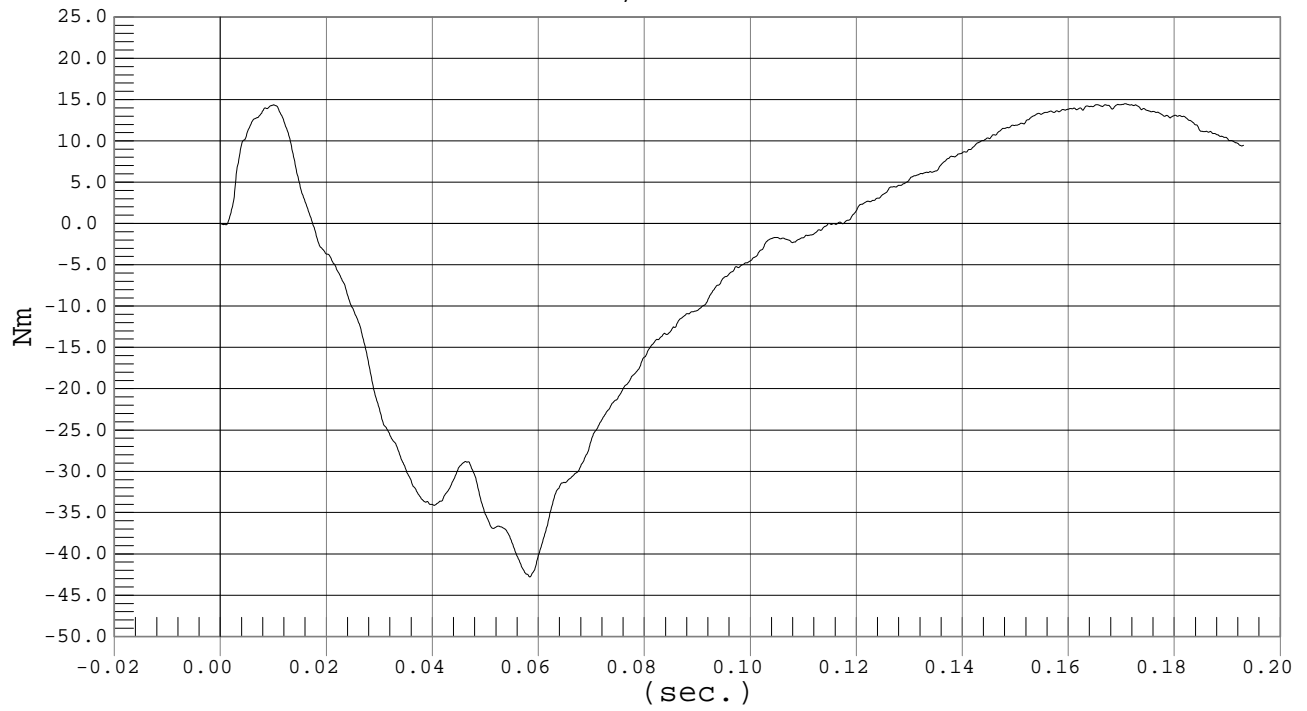


Test Desc.: Neck Bending
Component: Dummy #033

OCCIPITAL MOMENT

Test Date: 03-14-03
Speed: 18.4 fps, 5.61 M/s

Ymin = -42.79 Nm @ 0.0583 sec., Ymax = 14.5 Nm @ 0.1706 sec.

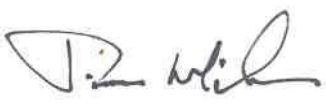


MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID IIs DUMMY

Date: 3/12-13/03
 Dummy Serial Number: 033
 Test Number: D03293/313

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		D03293	D03313
Temperature	20.6° – 22.2°	21.1	21.1
Humidity	10% - 70%	25	23
Impact Velocity	4.41 - 4.59 m/s	4.45	4.50
Probe Force	1.6 - 2.4 Kn	2.1	2.2
Shoulder Displacement	27-39 mm	33	33

TEST MEETS SPECIFICATIONS

Technician: 

Approved By: 

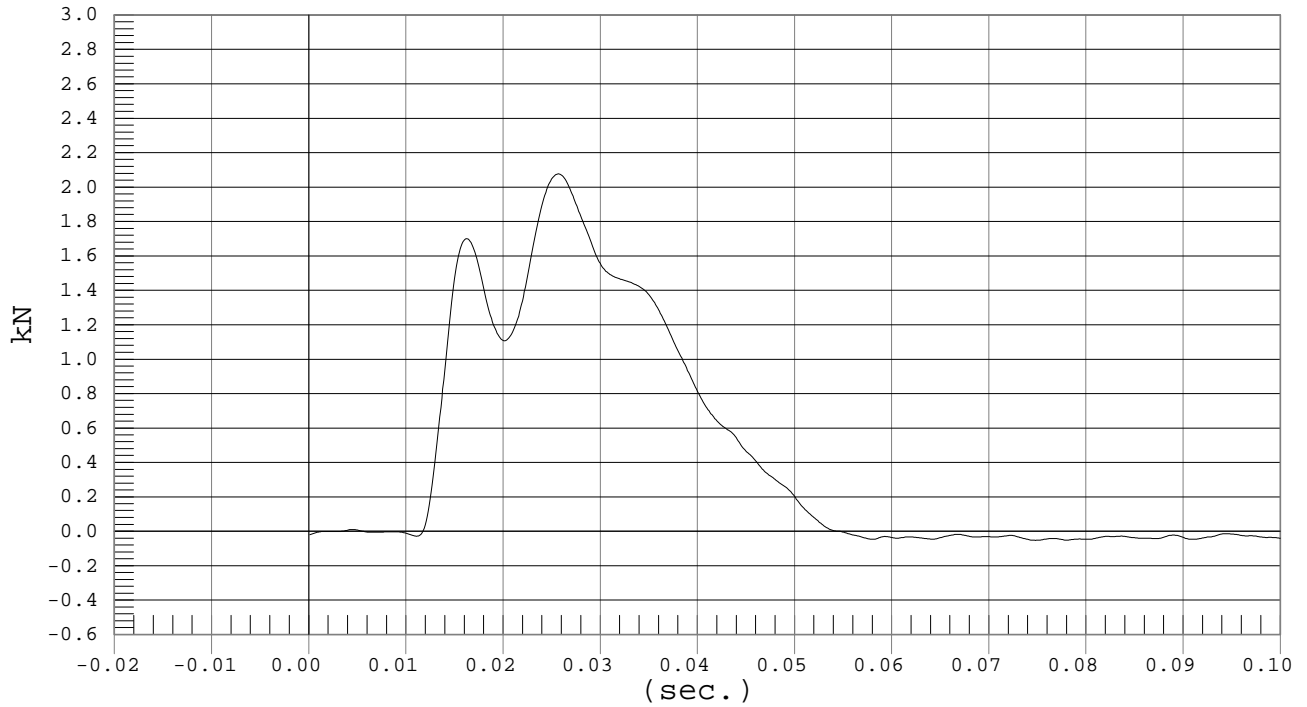


PROBE FORCE

Test Desc.: Shoulder Impact
Component: Dummy #033

Test Date: 03-12-03
Speed: 14.6 fps, 4.45 M/s

Ymin = -.05 kN @ 0.0747 sec., Ymax = 2.08 kN @ 0.0256 sec.

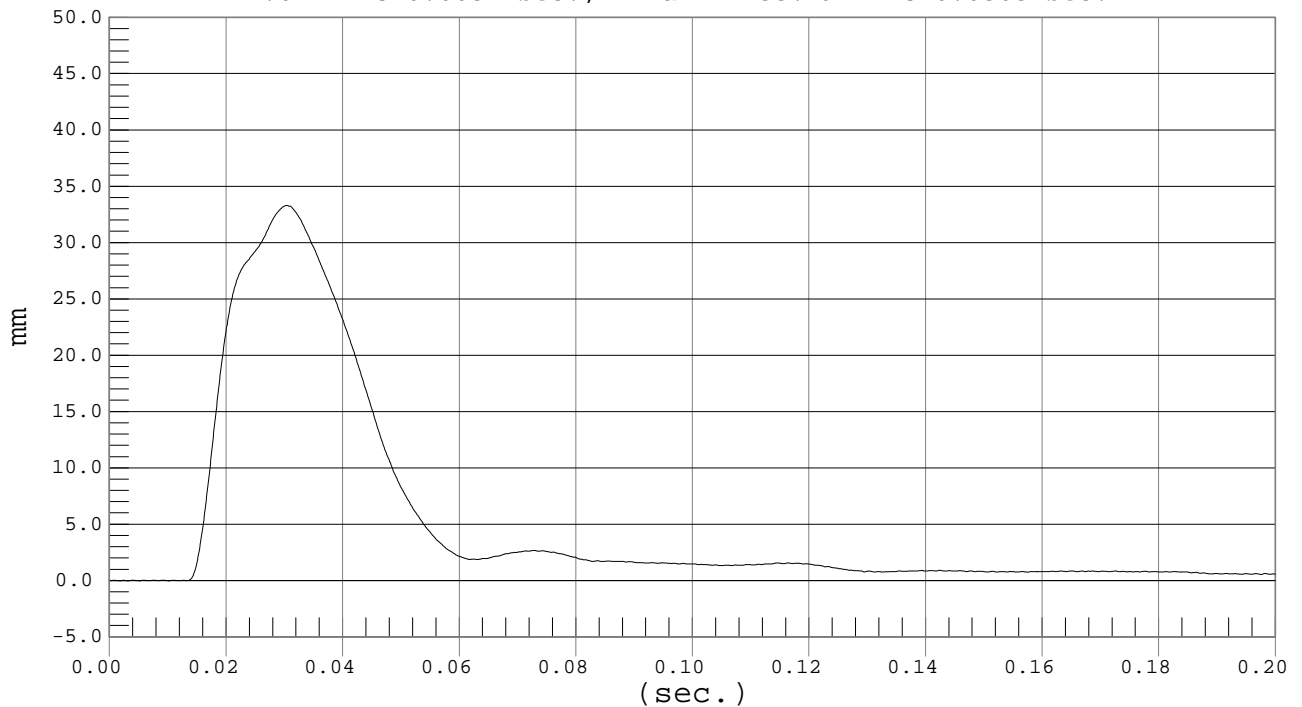


SHOULDER DISPLACEMENT

Test Desc.: Shoulder Impact
Component: Dummy #033

Test Date: 03-12-03
Speed: 14.6 fps, 4.45 M/s

Ymin = -.04 mm @ 0.0051 sec., Ymax = 33.29 mm @ 0.0303 sec.



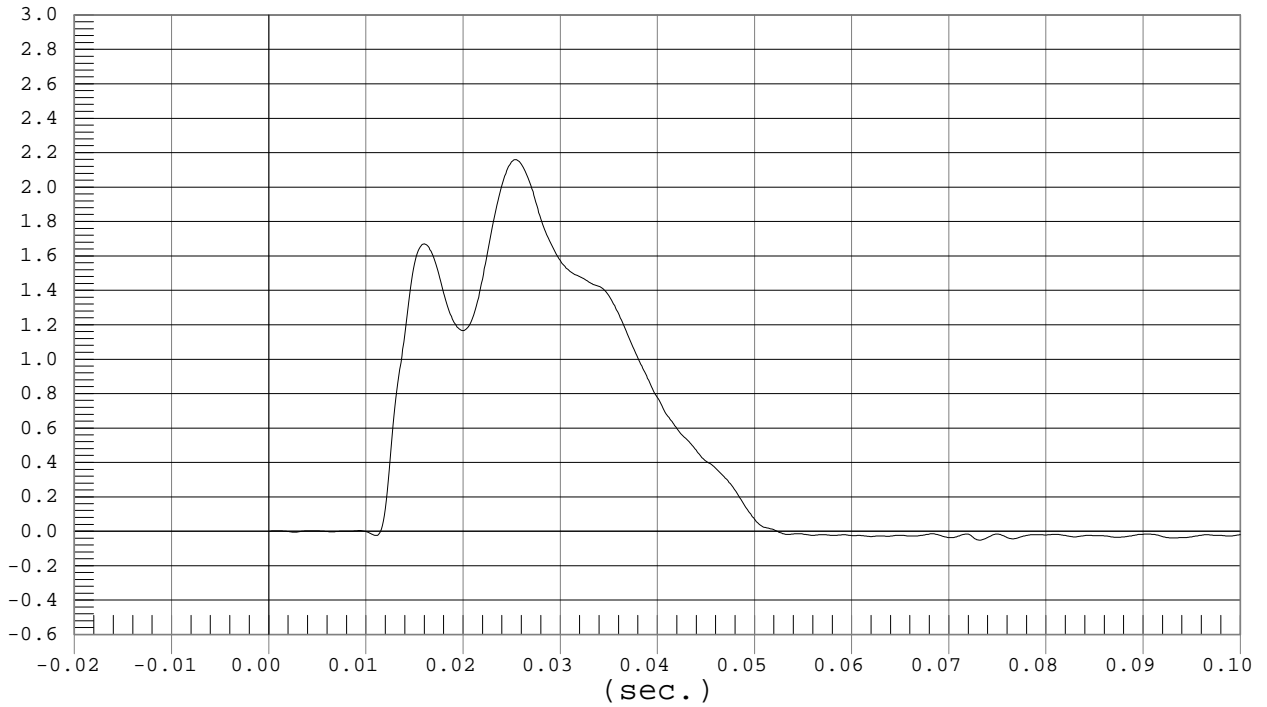


PROBE FORCE

Test Desc.: Shoulder Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 14.8 fps, 4.50 M/s

Ymin = -.07 kN @ 0.1563 sec., Ymax = 2.16 kN @ 0.0253 sec.

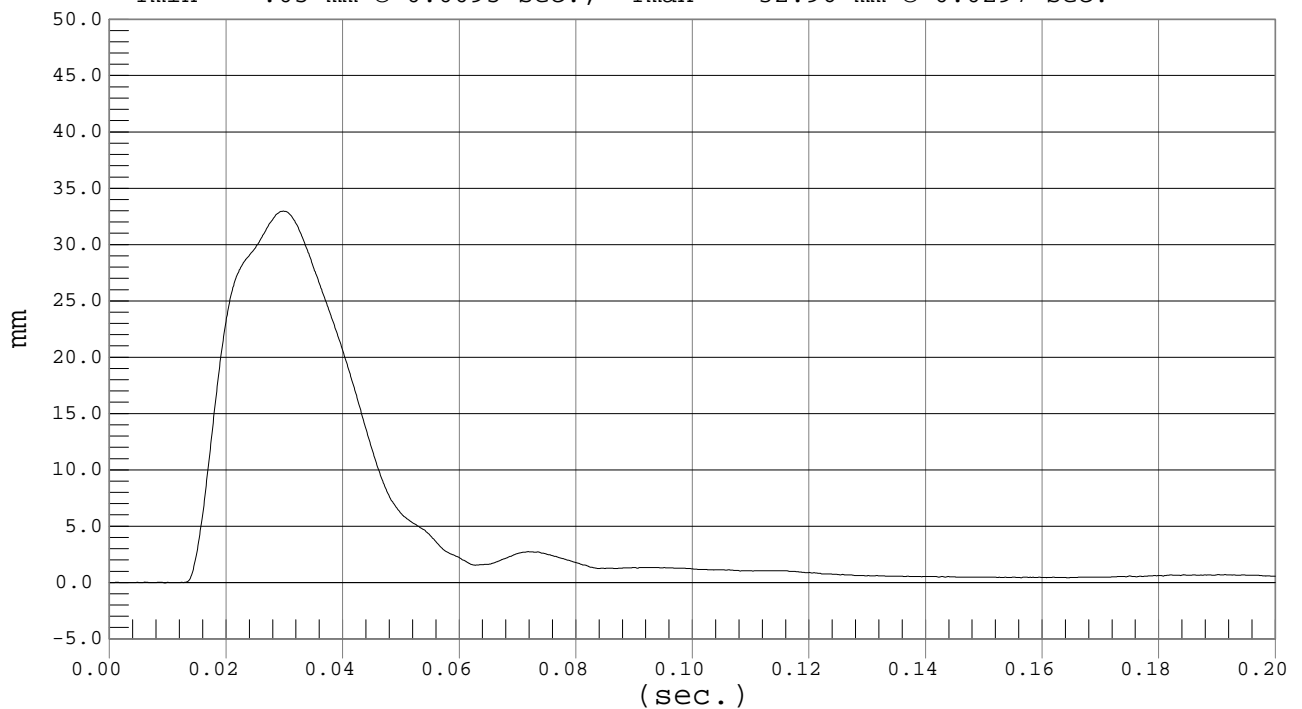


SHOULDER DISPLACEMENT

Test Desc.: Shoulder Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 14.8 fps, 4.50 M/s

Ymin = -.05 mm @ 0.0095 sec., Ymax = 32.96 mm @ 0.0297 sec.



MGA RESEARCH CORPORATION
 THORAX (WITH ARM) IMPACT TESTS
 SID IIs DUMMY

Date: 3/12-13/03
 Dummy Serial Number: 033
 Test Number: D03294/314

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		D03294	D03314
Temperature	20.6° – 22.2°	21.1	21.0
Humidity	10% - 70%	24	24
Impact Velocity	6.57 - 6.84 m/s	6.74	6.68
Probe Force	4.1 – 4.7 kN	4.6	4.4
Upper Spine Acceleration	34 - 48 g's	41	43
Lower Spine Acceleration	31 - 36 g's	35	35
Upper Rib Displacement	23 - 35 mm	29	29
Middle Rib Displacement	29 - 44 mm	33	33
Lower Rib Displacement	33 - 40 mm	36	36
Shoulder Displacement	30 - 42 mm	36	36

TEST MEETS SPECIFICATIONS

Technician: 

Approved By: 

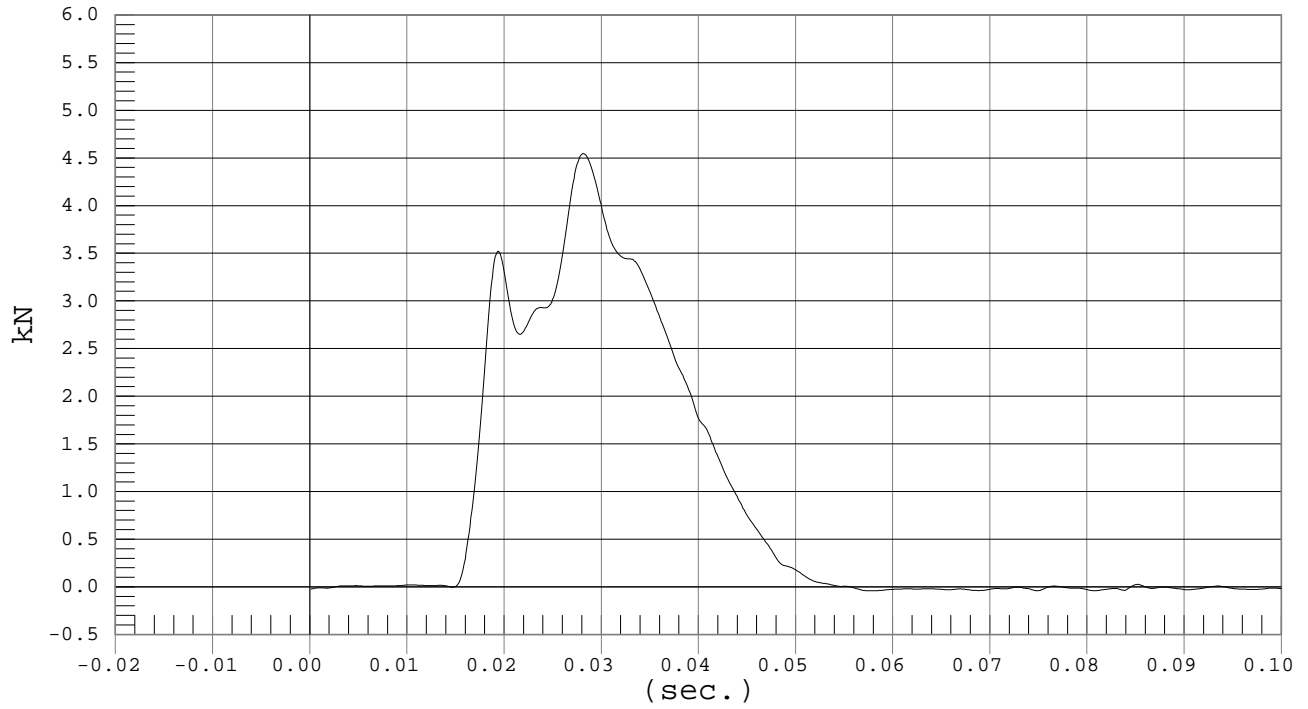


Test Desc.: Thorax with Arm
Component: Dummy #033

PROBE FORCE

Test Date: 03-12-03
Speed: 22.1 fps, 6.74 M/s

Ymin = -.11 kN @ 0.1912 sec., Ymax = 4.55 kN @ 0.0281 sec.



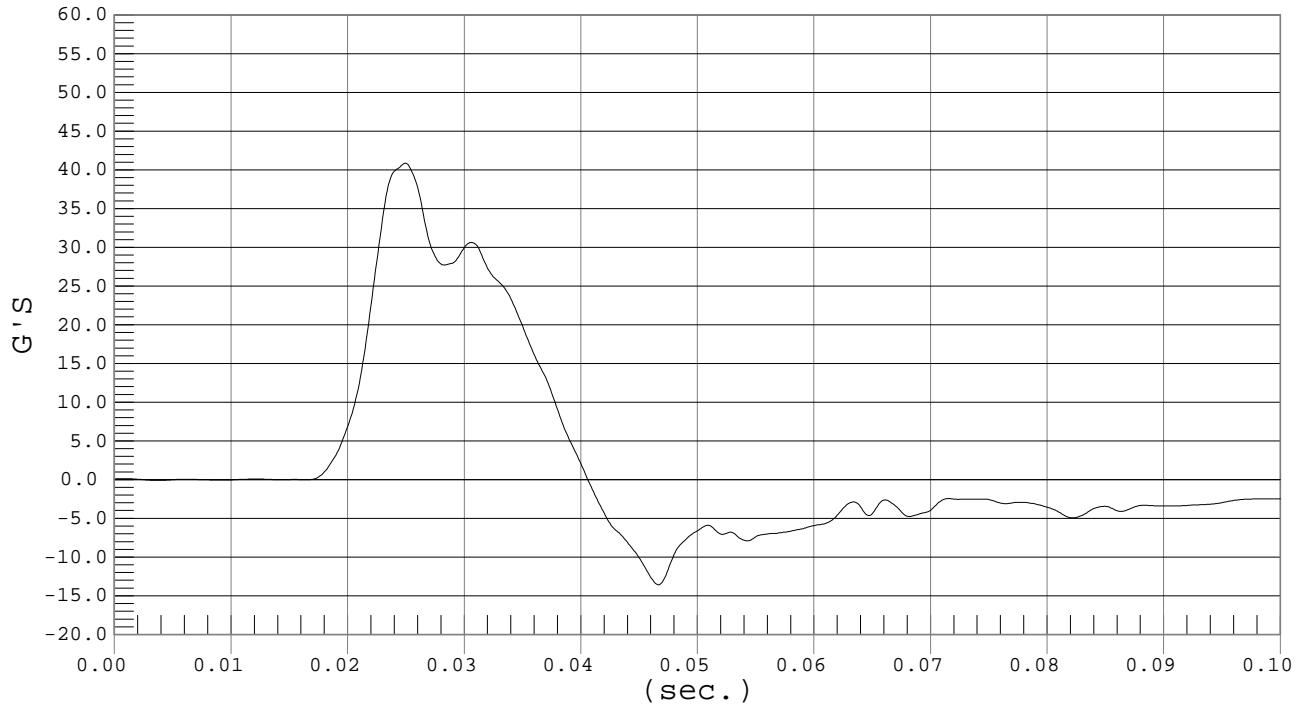


UPPER SPINE ACCELERATION

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

Test Date: 03-12-03
Speed: 22.1 fps, 6.74 M/s

Ymin = -13.58 G'S @ 0.0466 sec., Ymax = 40.86 G'S @ 0.0249 sec.

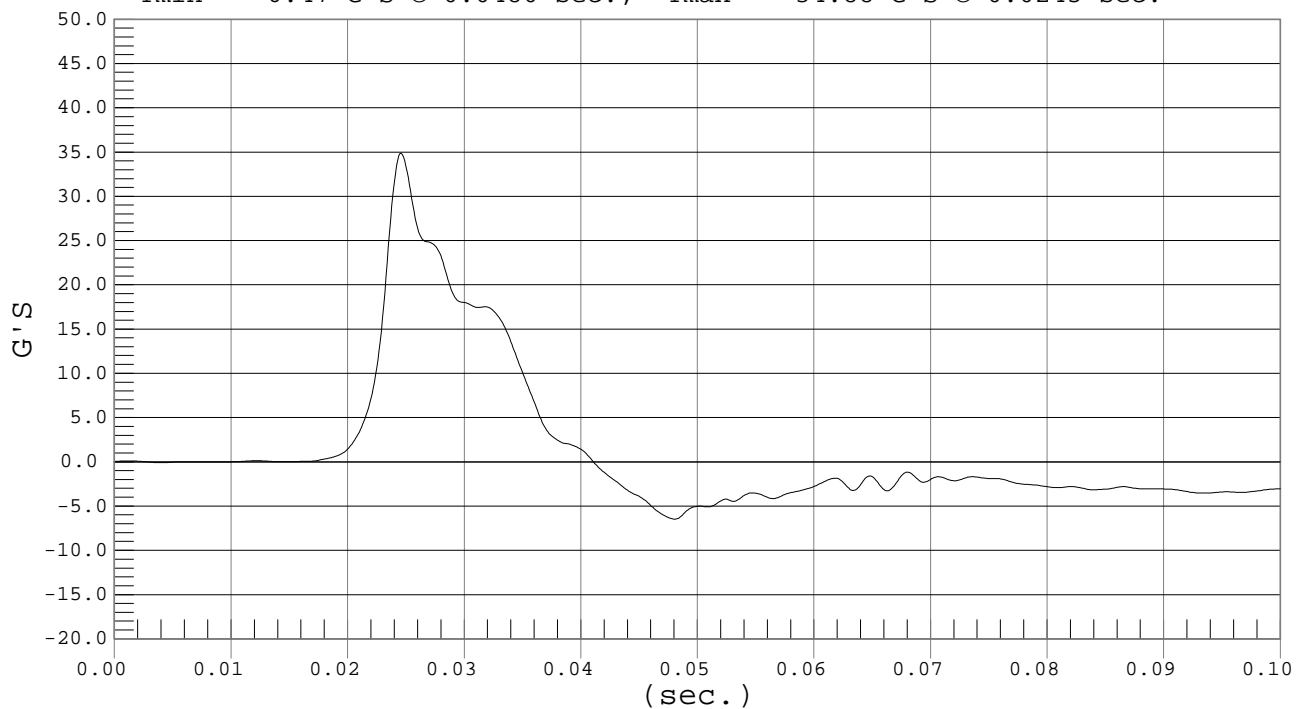


LOWER SPINE ACCELERATION

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

Test Date: 03-12-03
Speed: 22.1 fps, 6.74 M/s

Ymin = -6.47 G'S @ 0.0480 sec., Ymax = 34.88 G'S @ 0.0245 sec.



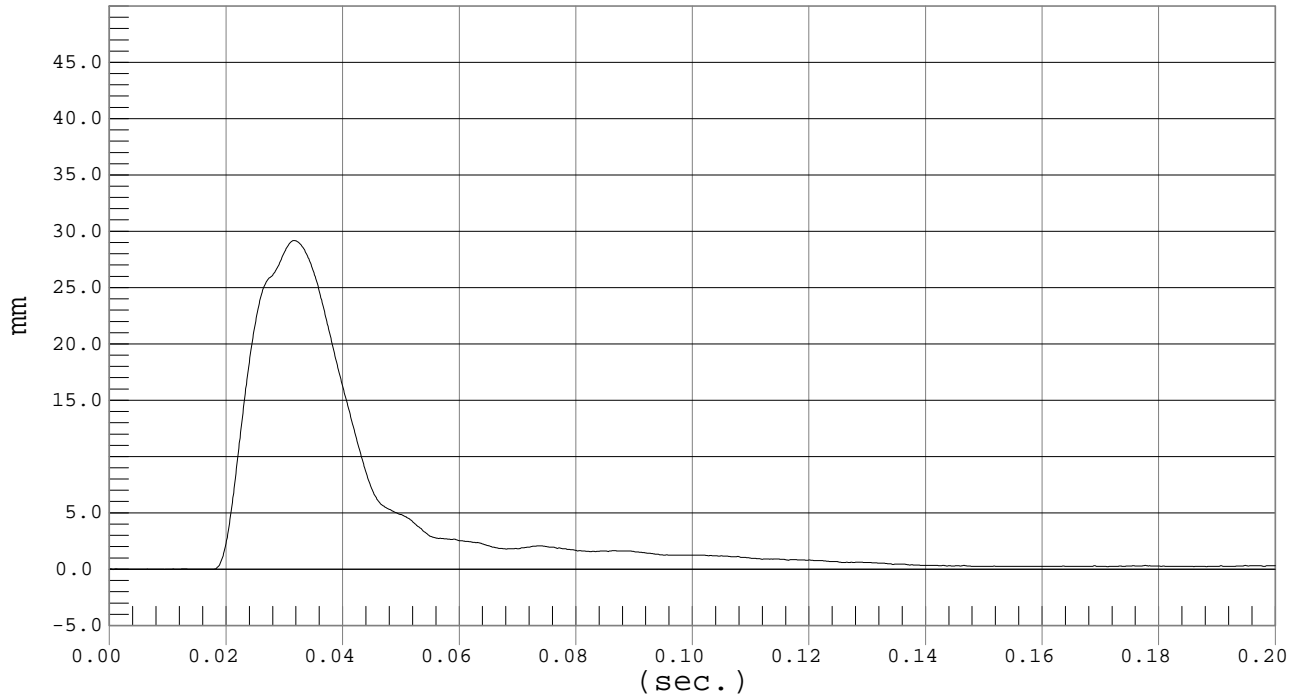


UPPER RIB DISPLACEMENT

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

Test Date: 03-12-03
Speed: 22.1 fps, 6.74 M/s

Ymin = -.02 mm @ 0.0005 sec., Ymax = 29.18 mm @ 0.0316 sec.

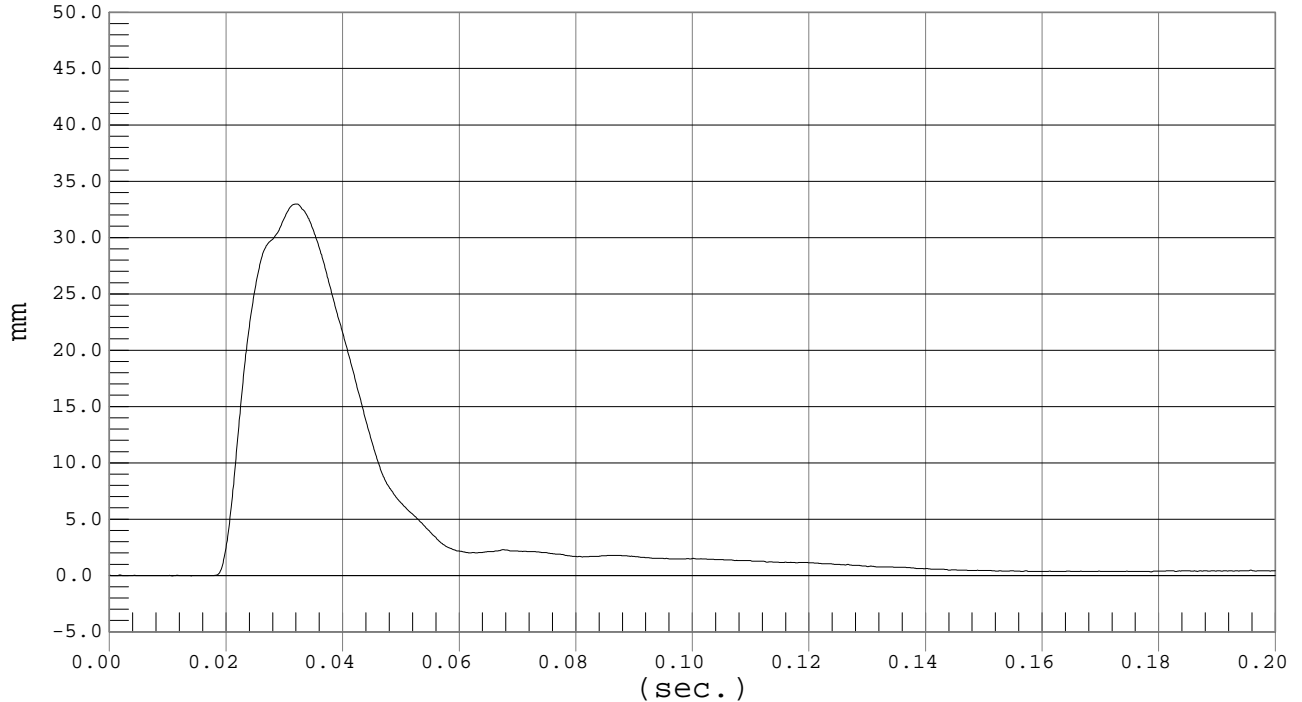


MIDDLE RIB DISPLACEMENT

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

Test Date: 03-12-03
Speed: 22.1 fps, 6.74 M/s

Ymin = -.04 mm @ 0.0107 sec., Ymax = 32.98 mm @ 0.0320 sec.



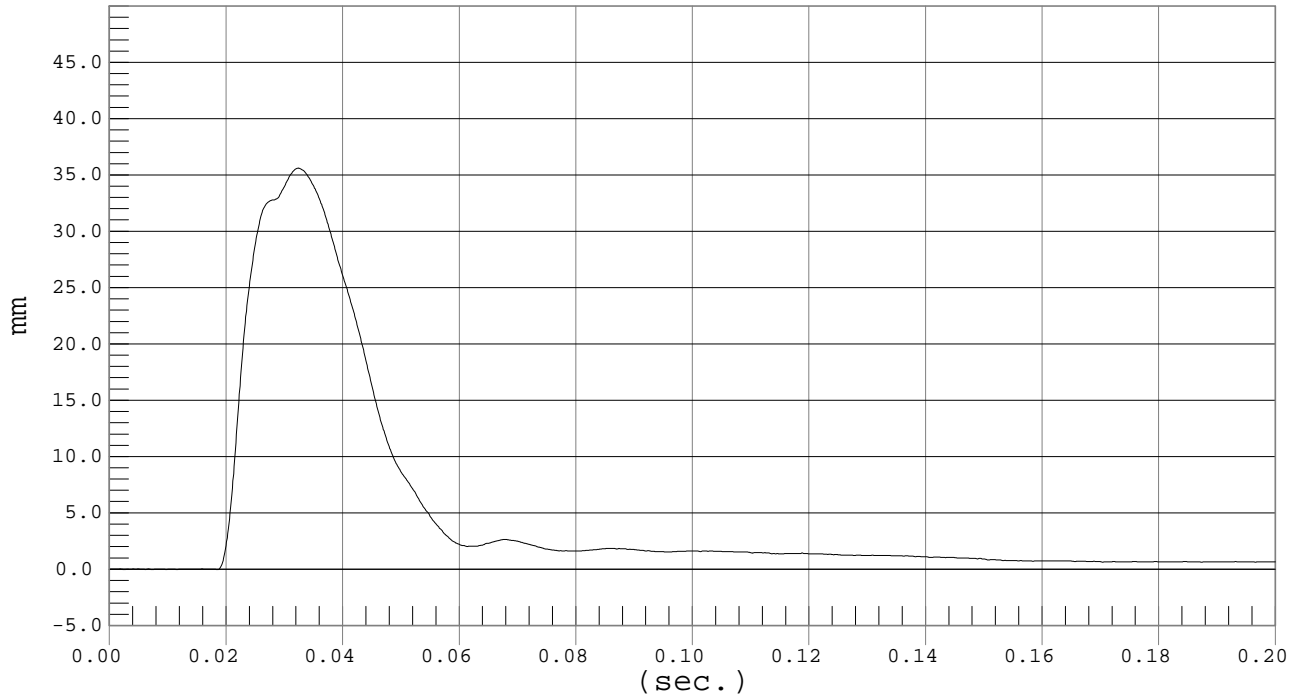


LOWER RIB DISPLACEMENT

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

Test Date: 03-12-03
Speed: 22.1 fps, 6.74 M/s

Ymin = $-.04$ mm @ 0.0073 sec., Ymax = 35.6 mm @ 0.0323 sec.

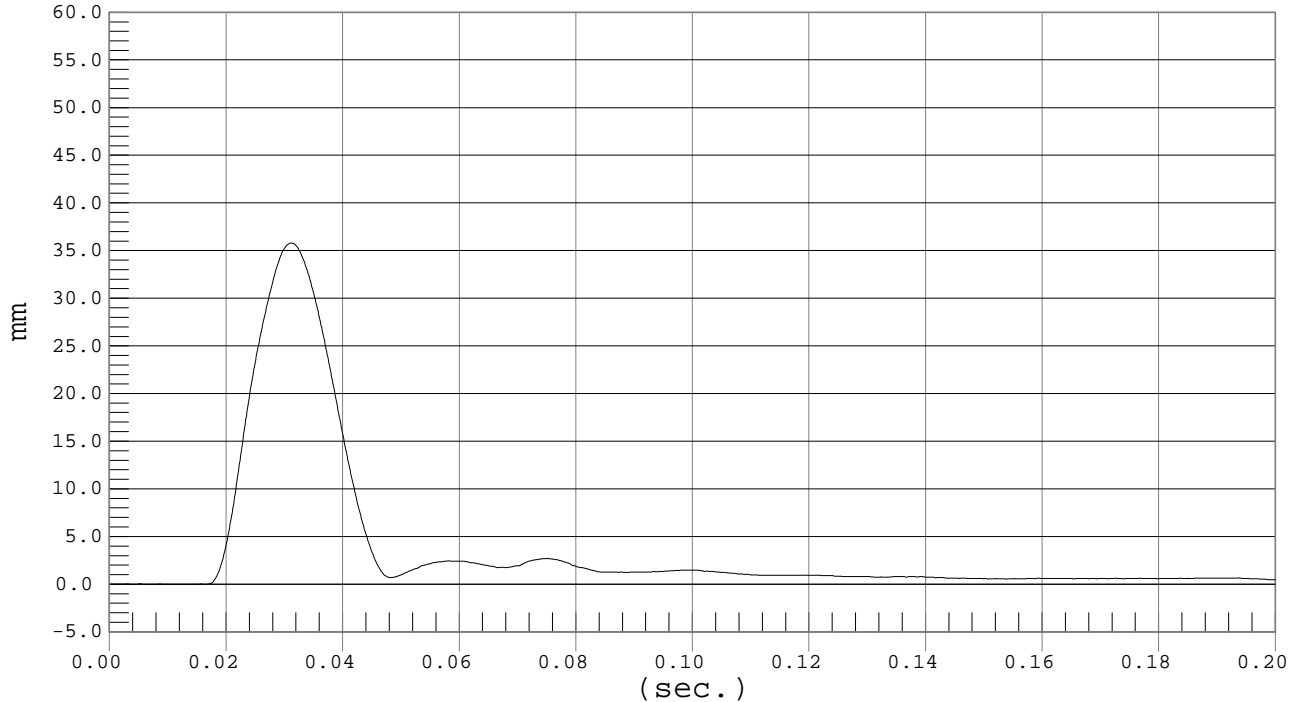


SHOULDER DISPLACEMENT

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

Test Date: 03-12-03
Speed: 22.1 fps, 6.74 M/s

Ymin = $-.01$ mm @ 0.0024 sec., Ymax = 35.77 mm @ 0.0312 sec.



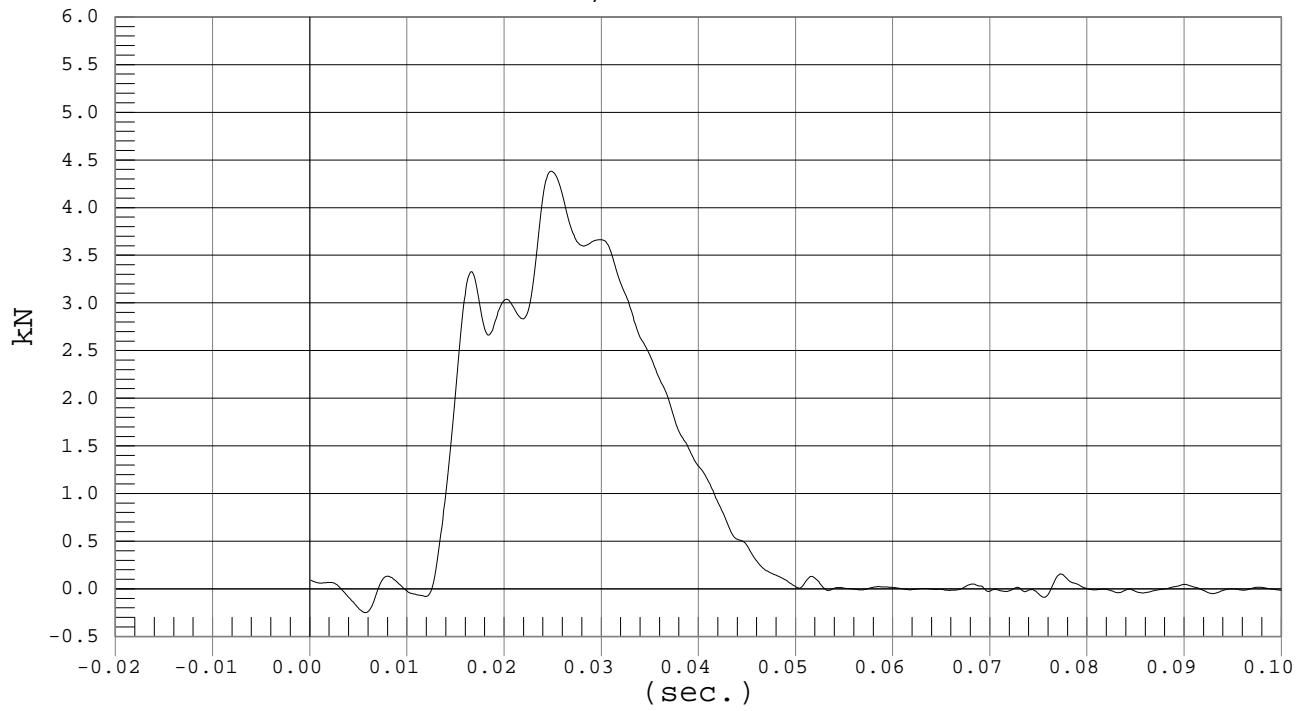


PROBE FORCE

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

Test Date: 03-13-03
Speed: 21.9 fps, 6.68 M/s

Ymin = -.25 kN @ 0.0056 sec., Ymax = 4.38 kN @ 0.0248 sec.



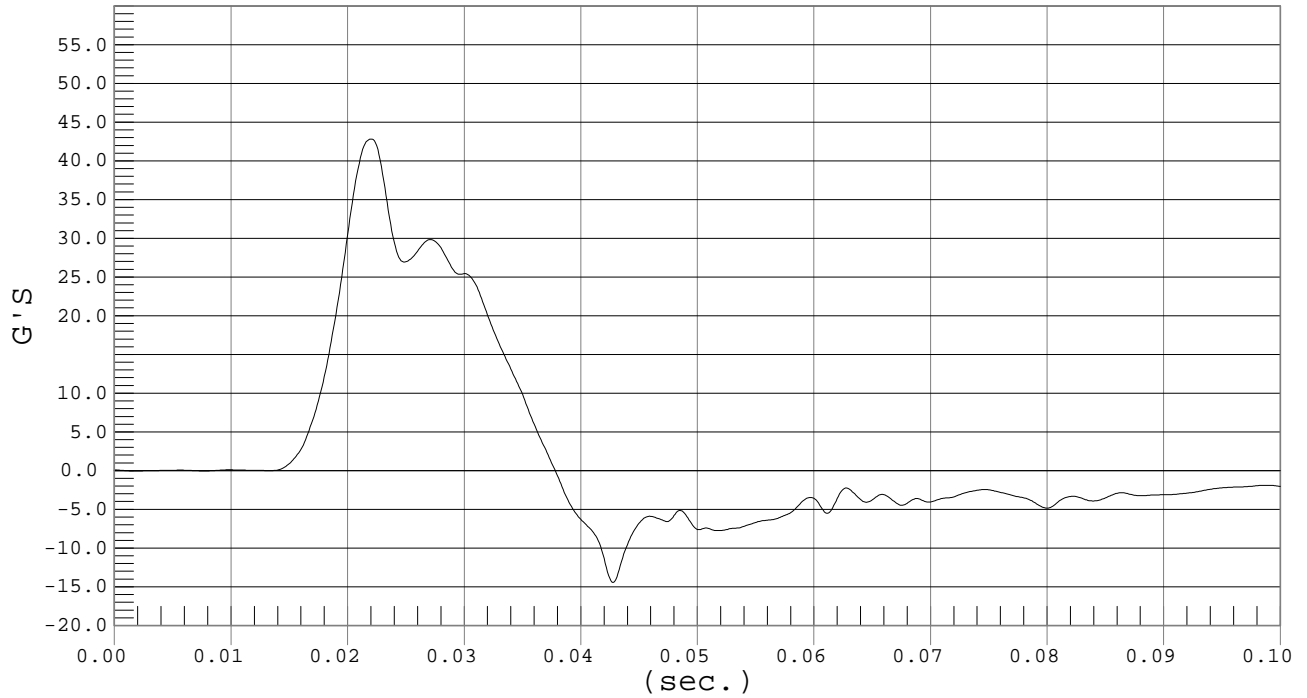


UPPER SPINE ACCELERATION

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

Test Date: 03-13-03
Speed: 21.9 fps, 6.68 M/s

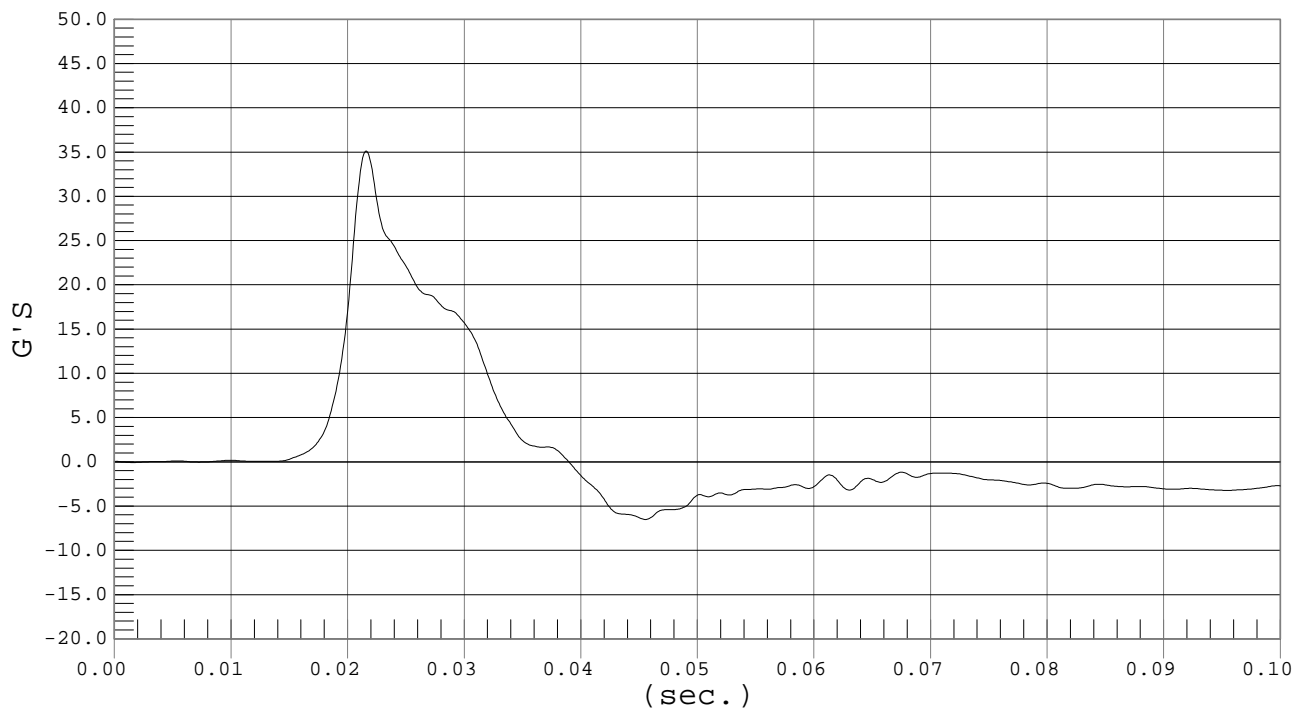
Ymin = -14.44 G'S @ 0.0427 sec., Ymax = 42.83 G'S @ 0.0219 sec.



LOWER SPINE ACCELERATION

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

Test Date: 03-13-03
Speed: 21.9 fps, 6.68 M/s



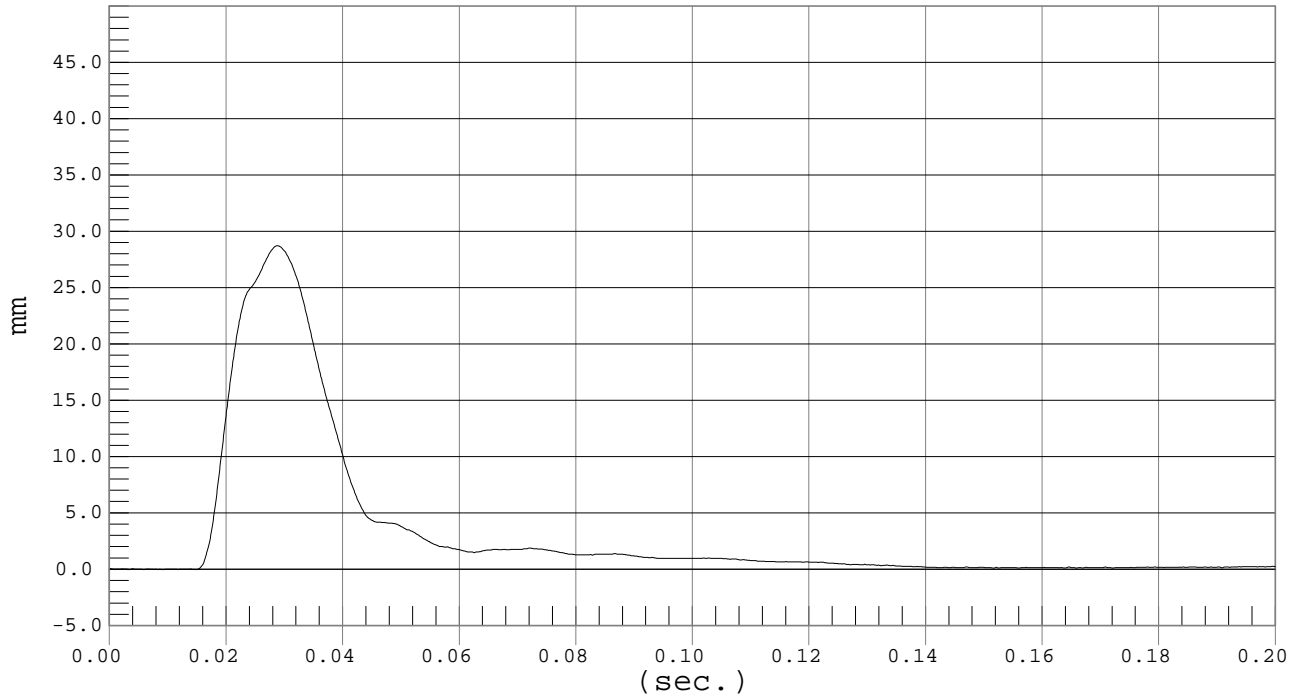


UPPER RIB DISPLACEMENT

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

Test Date: 03-13-03
Speed: 21.9 fps, 6.68 M/s

Ymin = -.03 mm @ 0.0033 sec., Ymax = 28.71 mm @ 0.0287 sec.

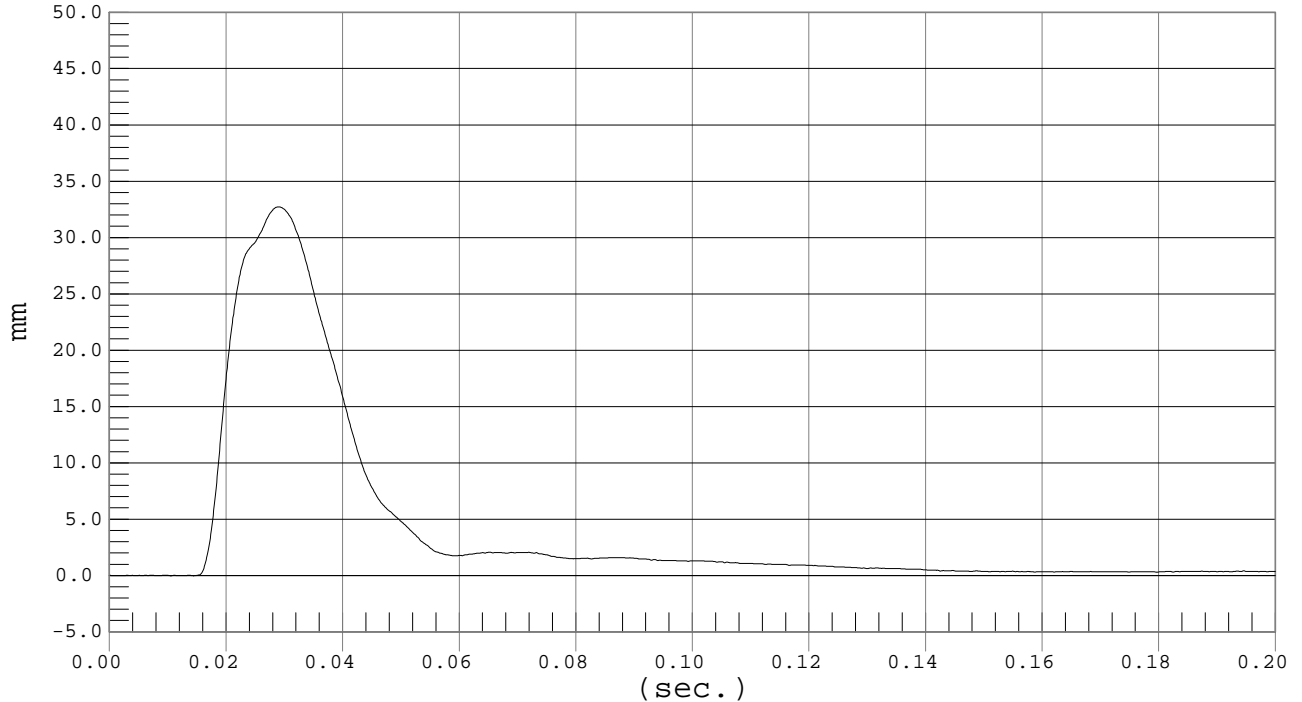


MIDDLE RIB DISPLACEMENT

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

Test Date: 03-13-03
Speed: 21.9 fps, 6.68 M/s

Ymin = -.04 mm @ 0.0104 sec., Ymax = 32.72 mm @ 0.0289 sec.



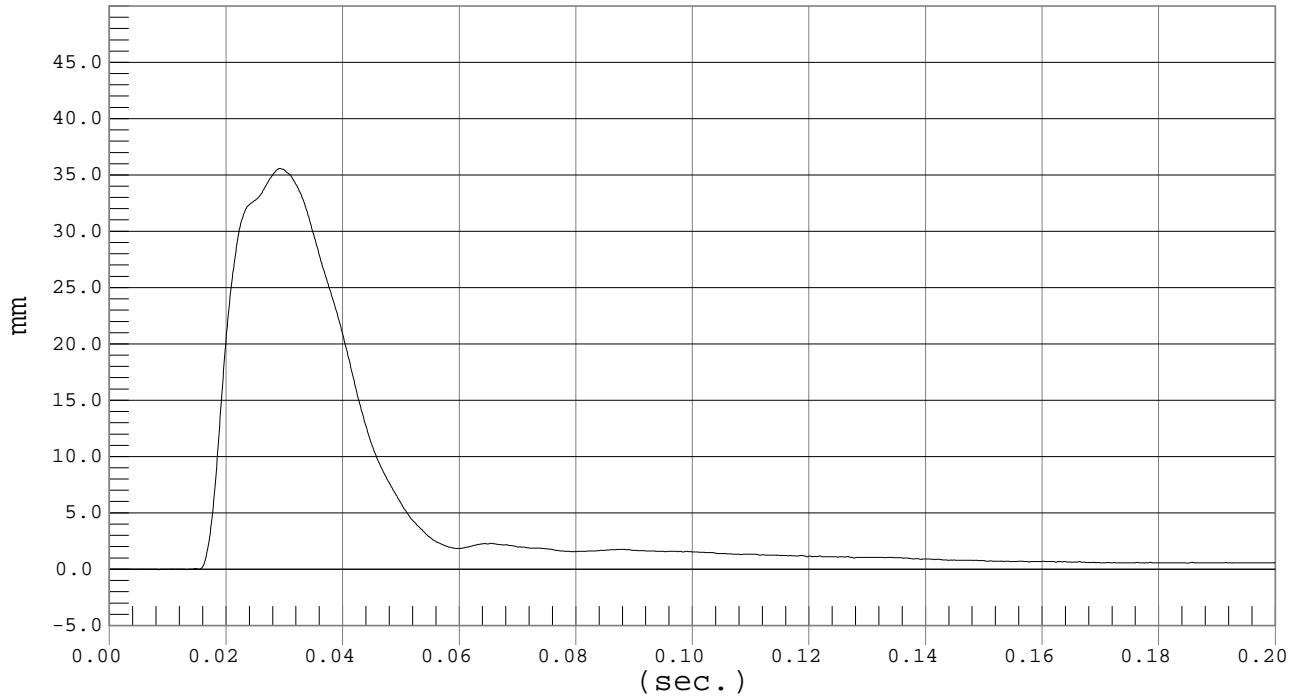


LOWER RIB DISPLACEMENT

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

Test Date: 03-13-03
Speed: 21.9 fps, 6.68 M/s

Ymin = -.06 mm @ 0.0084 sec., Ymax = 35.57 mm @ 0.0291 sec.

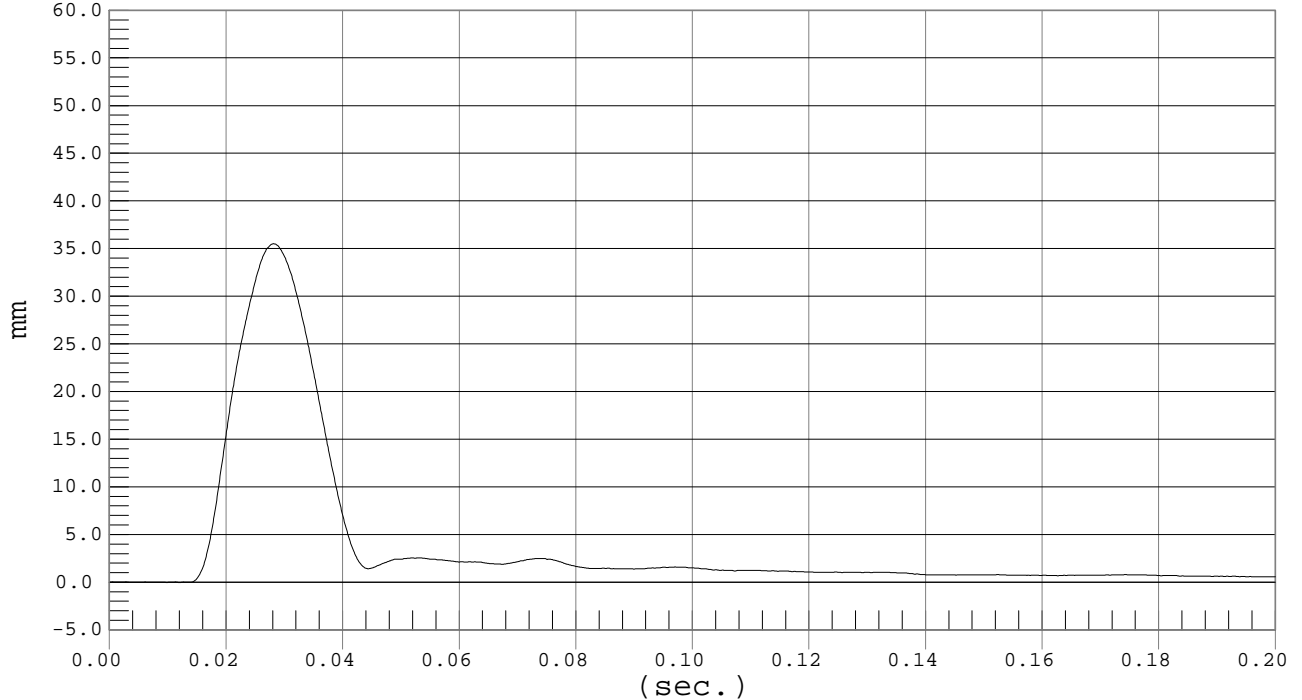


SHOULDER DISPLACEMENT

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

Test Date: 03-13-03
Speed: 21.9 fps, 6.68 M/s

Ymin = -.05 mm @ 0.0120 sec., Ymax = 35.5 mm @ 0.0281 sec.




MGA RESEARCH CORPORATION
 THORAX (WITHOUT ARM) IMPACT TESTS
 SID IIs DUMMY

Date: 3/13/03
 Dummy Serial Number: 033
 Test Number: D03295/315

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		D03295	D03315
Temperature	20.8° – 22.2°	21.0	21.3
Humidity	10% - 70%	24	23
Impact Velocity	4.2 - 4.4m/s	4.2	4.3
Probe Force	1.8 - 2.3 kN	2.0	2.0
Upper Spine Acceleration	13 - 18 g's	14	15
Lower Spine Acceleration	8 - 13 g's	9	10
Upper Rib Displacement	32 – 41 mm	35	38
Middle Rib Displacement	40 – 51 mm	41	43
Lower Rib Displacement	34 – 47 mm	41	40

TEST MEETS SPECIFICATIONS

Technician: 

Approved By: 

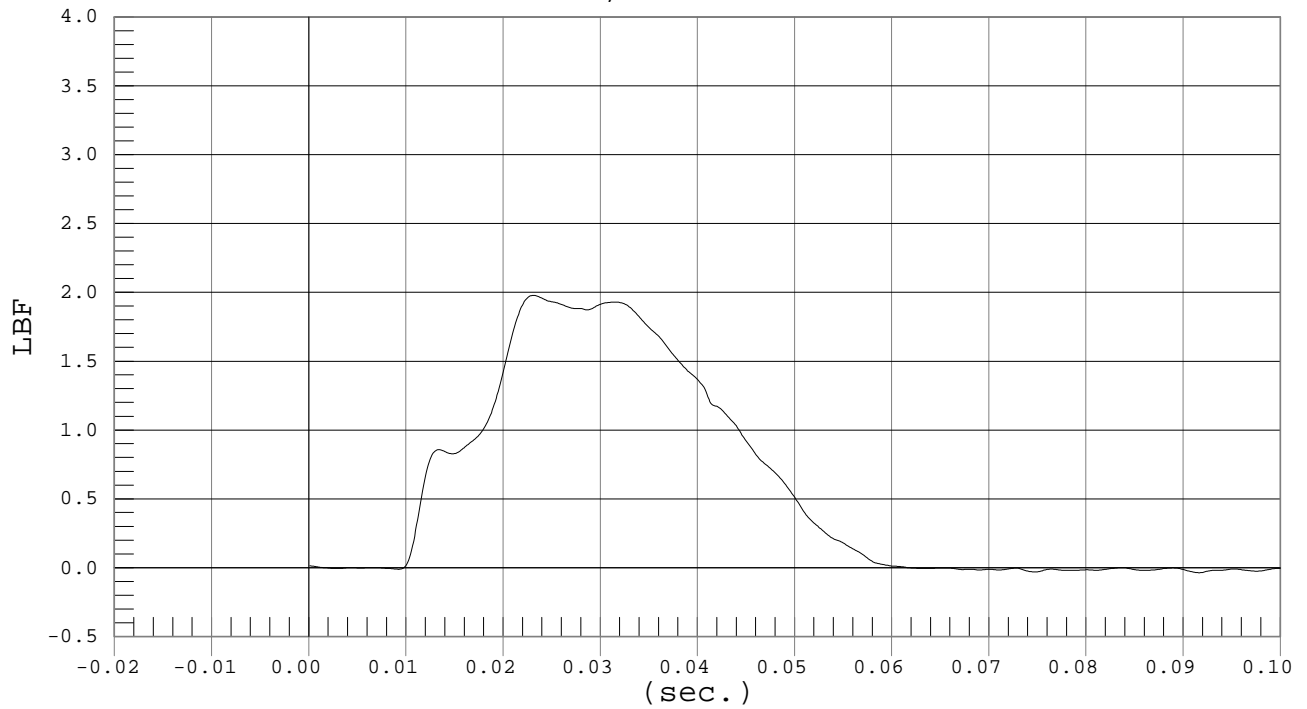


PROBE FORCE

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

Test Date: 03-13-03
Speed: 13.8 fps, 4.21 M/s

Ymin = -.04 LBF @ 0.0915 sec., Ymax = 1.98 LBF @ 0.0230 sec.

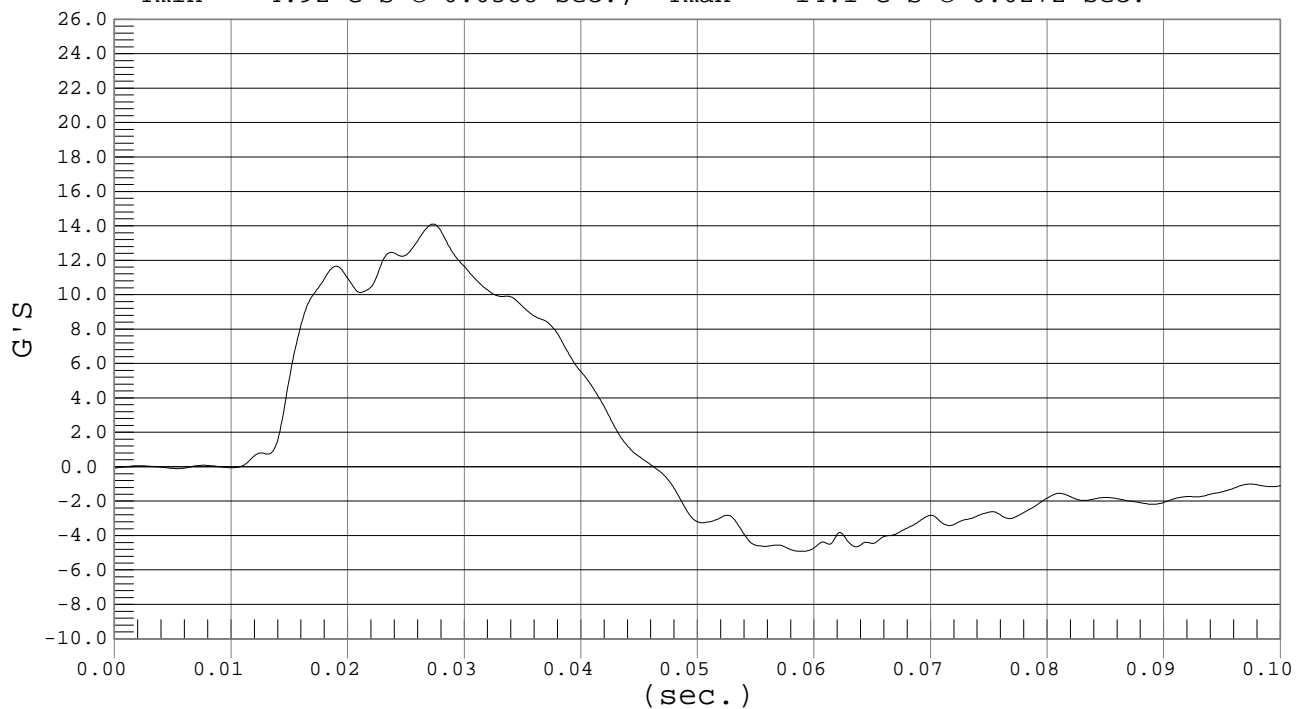


UPPER SPINE ACCELERATION

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

Test Date: 03-13-03
Speed: 13.8 fps, 4.21 M/s

Ymin = -4.92 G'S @ 0.0588 sec., Ymax = 14.1 G'S @ 0.0272 sec.



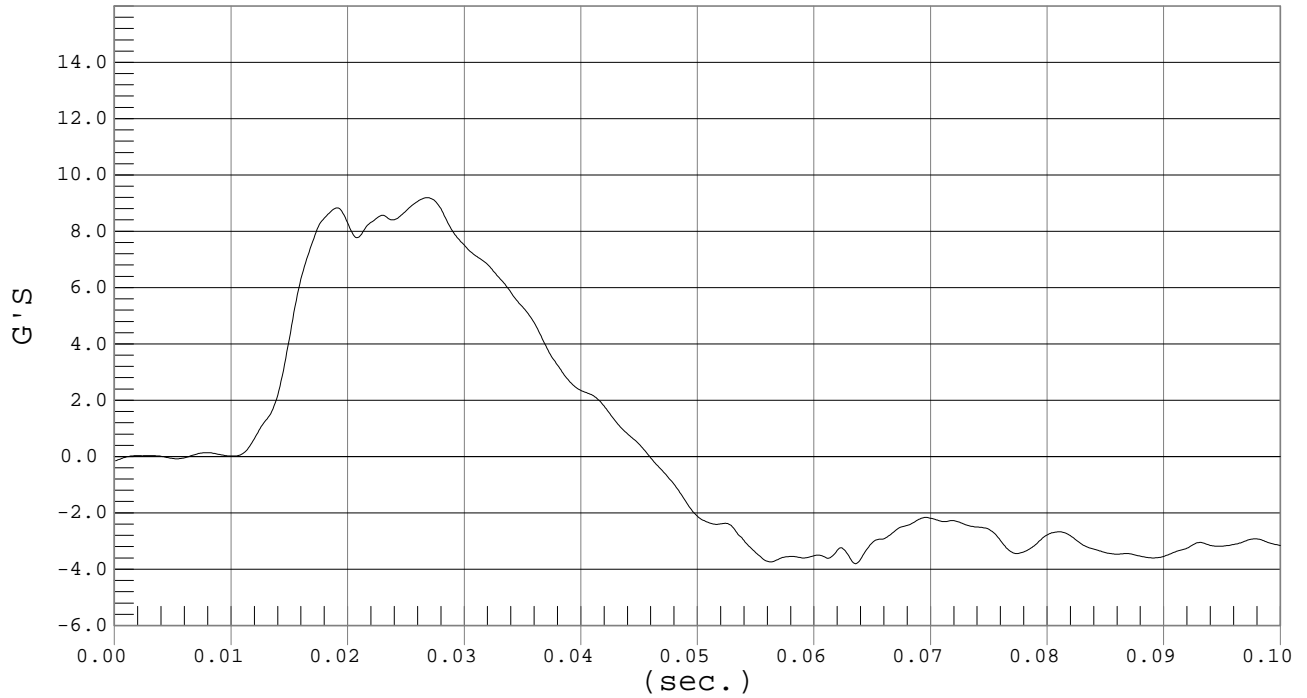


LOWER SPINE ACCELERATION

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

Test Date: 03-13-03
Speed: 13.8 fps, 4.21 M/s

Ymin = -3.8 G'S @ 0.0635 sec., Ymax = 9.19 G'S @ 0.0267 sec.

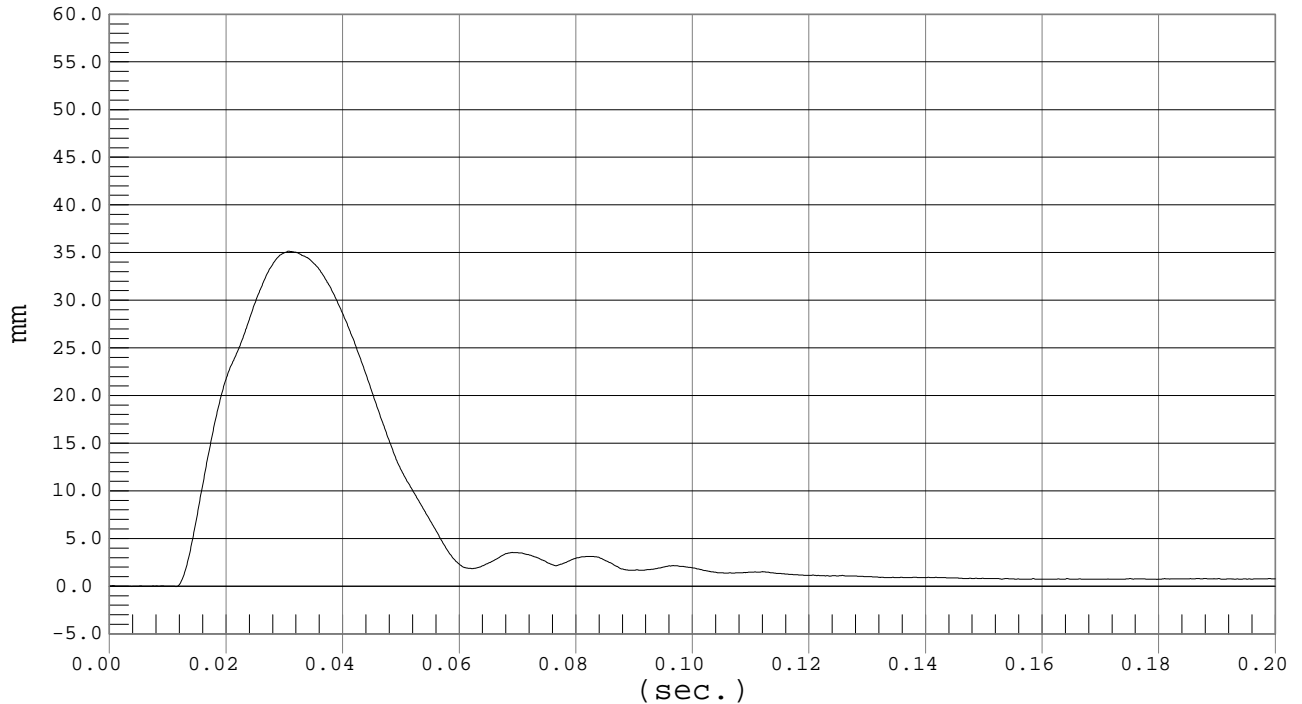


UPPER RIB DISPLACEMENT

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

Test Date: 03-13-03
Speed: 13.8 fps, 4.21 M/s

Ymin = -.04 mm @ 0.0114 sec., Ymax = 35.14 mm @ 0.0306 sec.



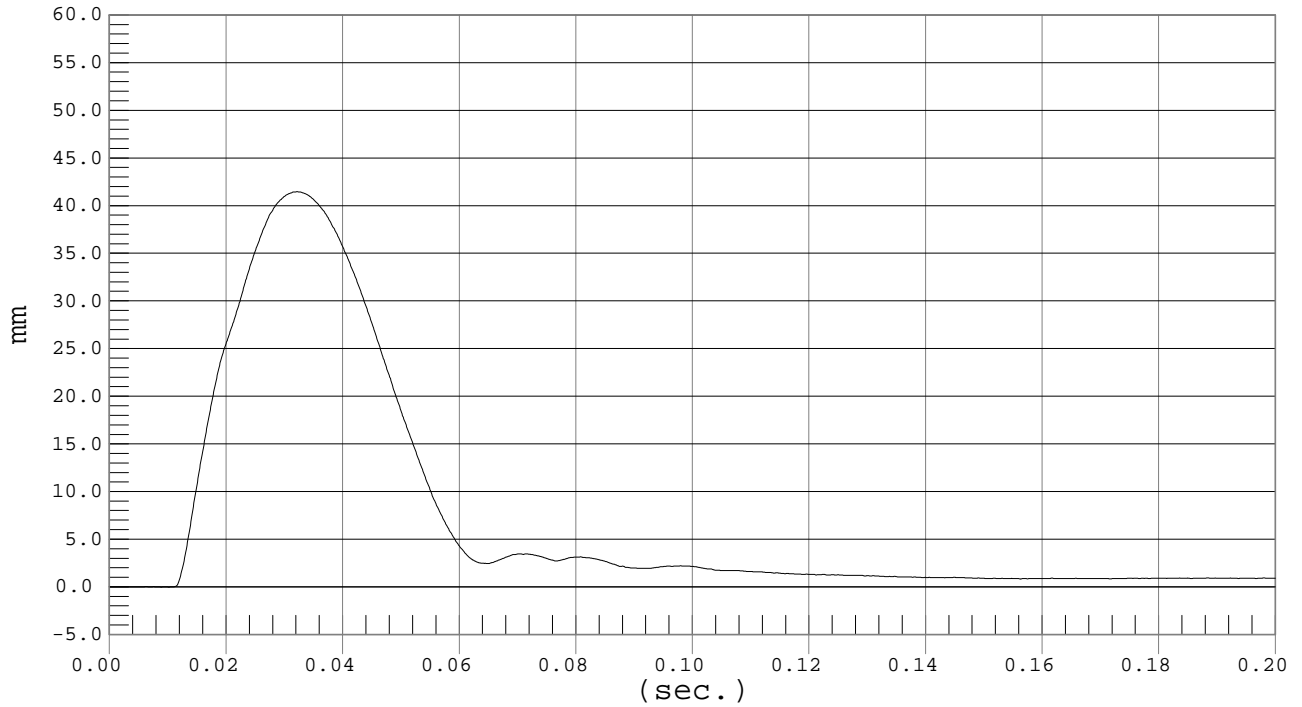


MIDDLE RIB DISPLACEMENT

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

Test Date: 03-13-03
Speed: 13.8 fps, 4.21 M/s

Ymin = -.03 mm @ 0.0101 sec., Ymax = 41.45 mm @ 0.0321 sec.

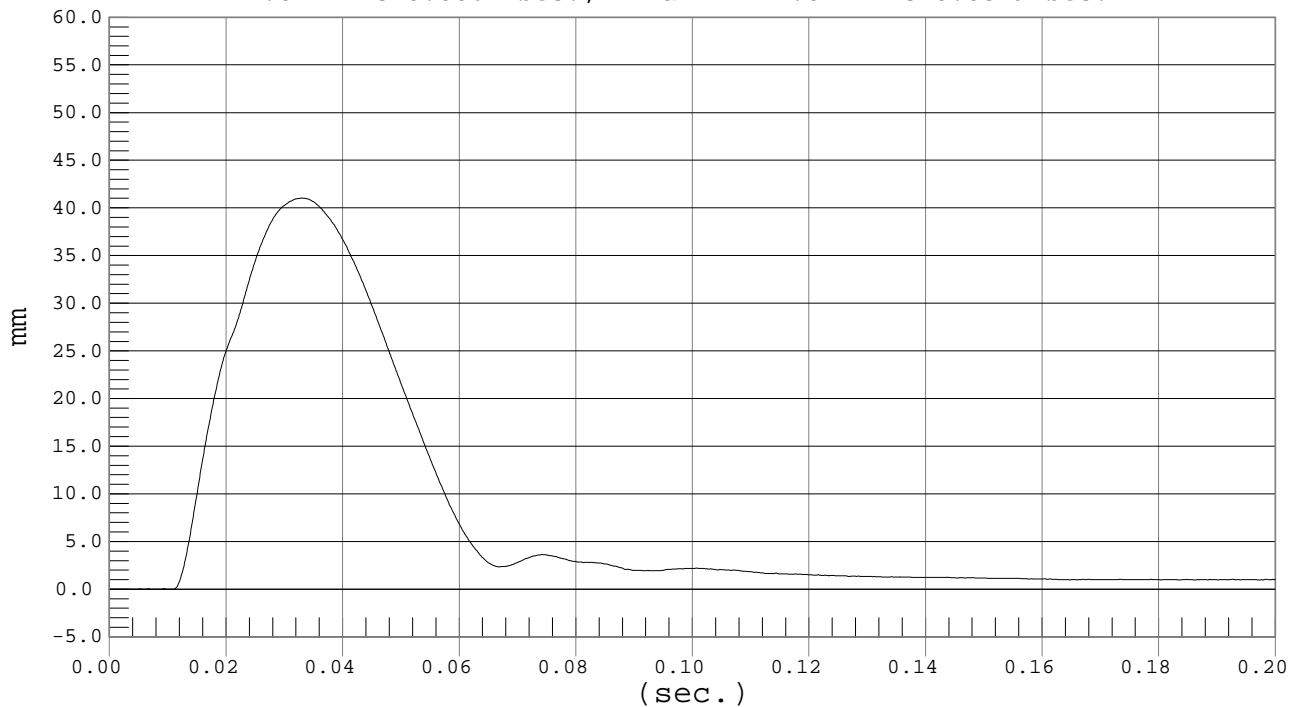


LOWER RIB DISPLACEMENT

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

Test Date: 03-13-03
Speed: 13.8 fps, 4.21 M/s

Ymin = -.01 mm @ 0.0061 sec., Ymax = 41.04 mm @ 0.0329 sec.



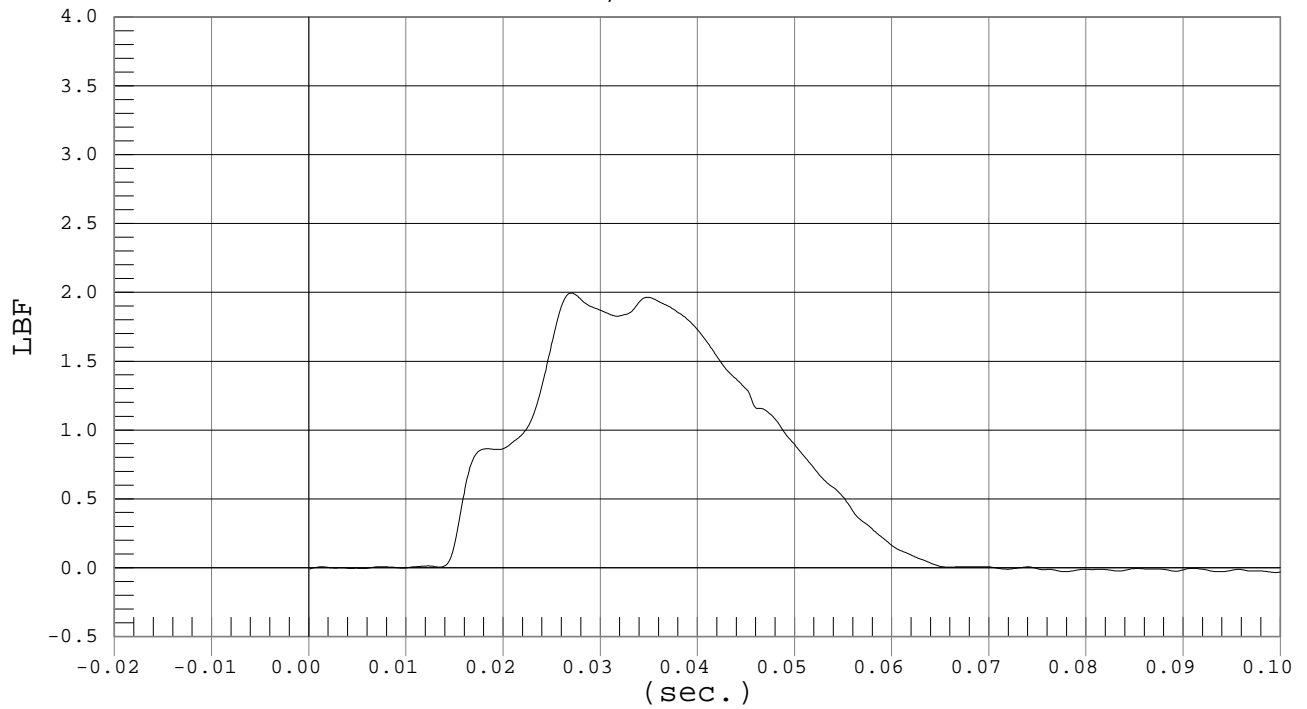


PROBE FORCE

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

Test Date: 03-13-03
Speed: 14.0 fps, 4.27 M/s

Ymin = -.04 LBF @ 0.1156 sec., Ymax = 1.99 LBF @ 0.0269 sec.

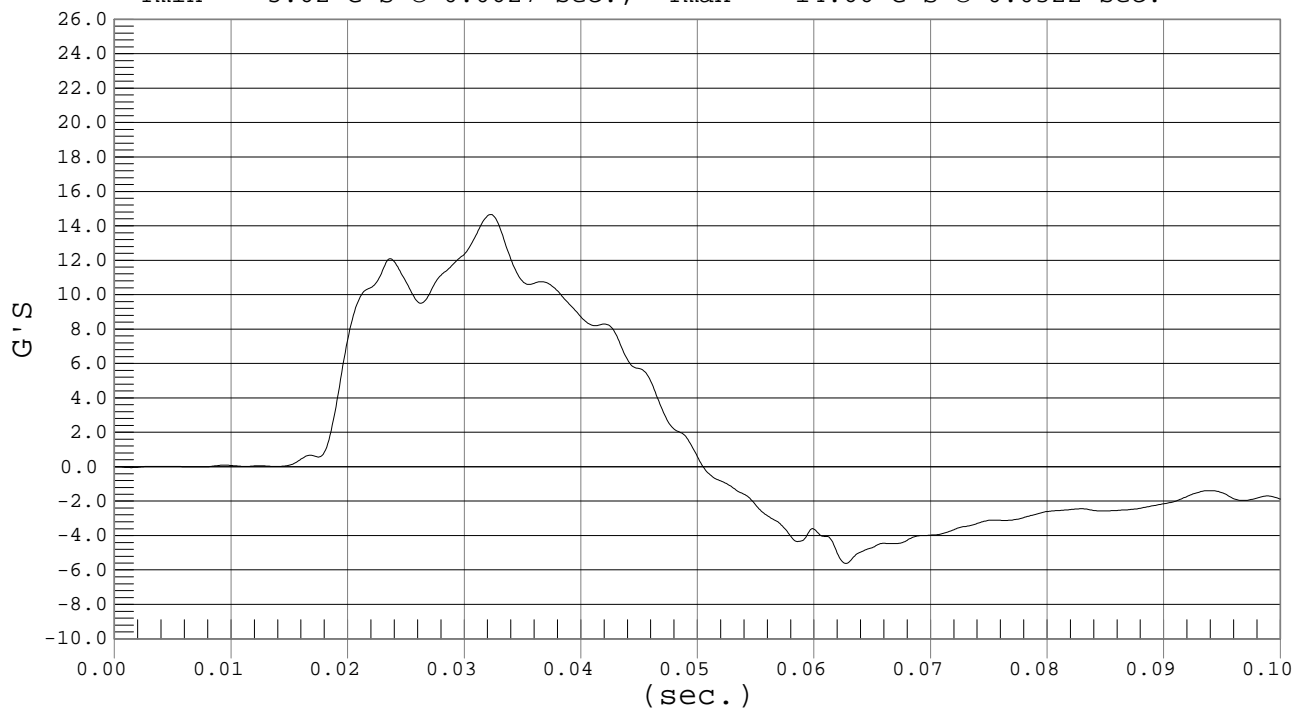


UPPER SPINE ACCELERATION

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

Test Date: 03-13-03
Speed: 14.0 fps, 4.27 M/s

Ymin = -5.62 G'S @ 0.0627 sec., Ymax = 14.66 G'S @ 0.0322 sec.



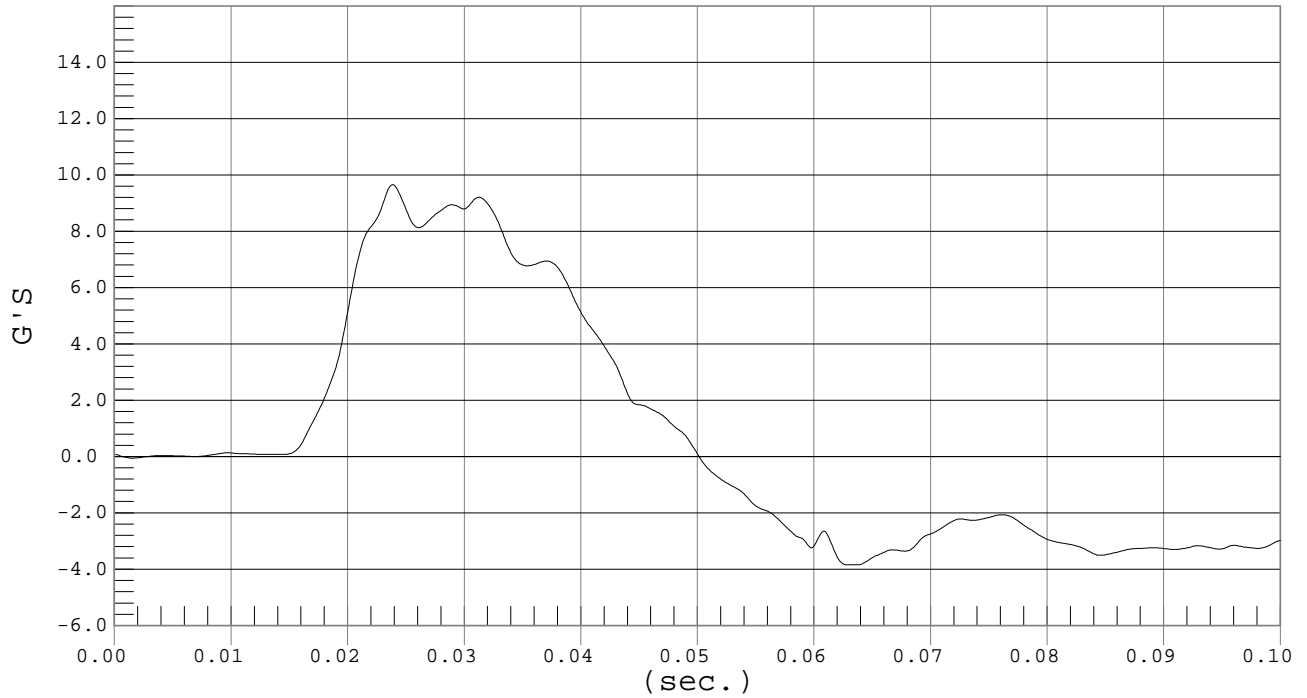


LOWER SPINE ACCELERATION

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

Test Date: 03-13-03
Speed: 14.0 fps, 4.27 M/s

Ymin = -3.85 G'S @ 0.0633 sec., Ymax = 9.65 G'S @ 0.0238 sec.

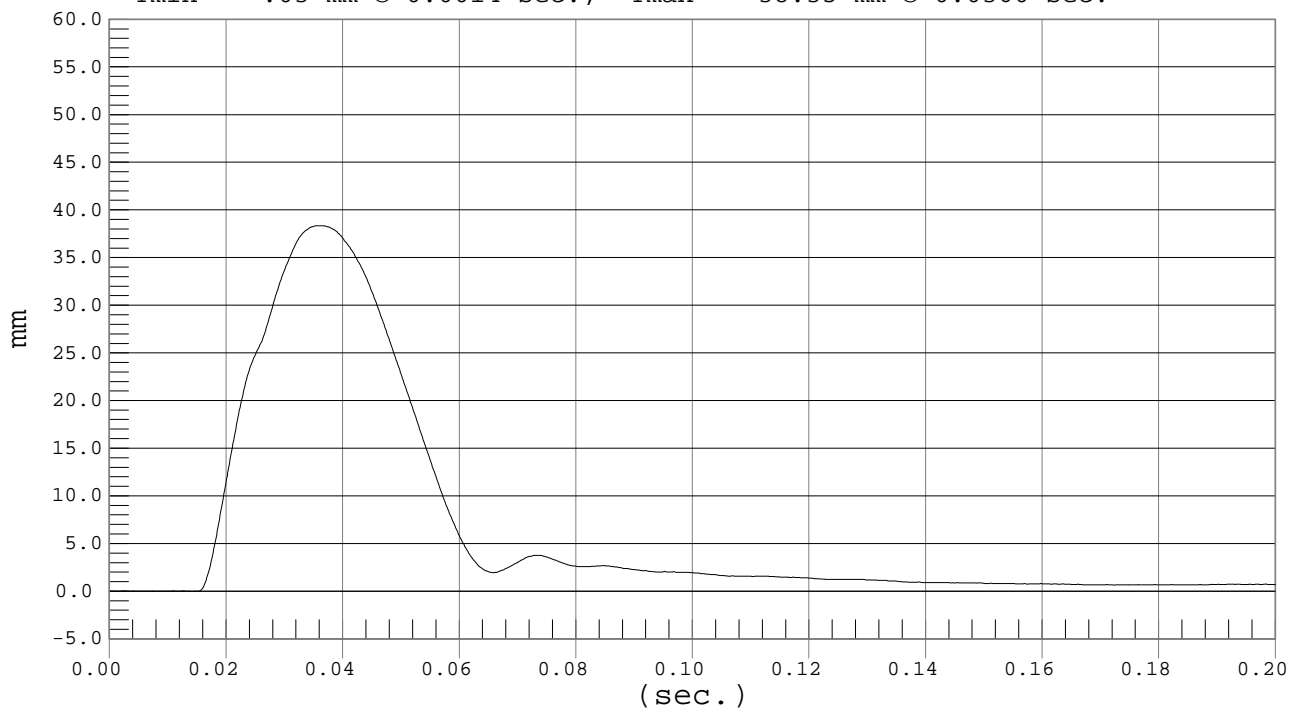


UPPER RIB DISPLACEMENT

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

Test Date: 03-13-03
Speed: 14.0 fps, 4.27 M/s

Ymin = -.03 mm @ 0.0014 sec., Ymax = 38.35 mm @ 0.0360 sec.



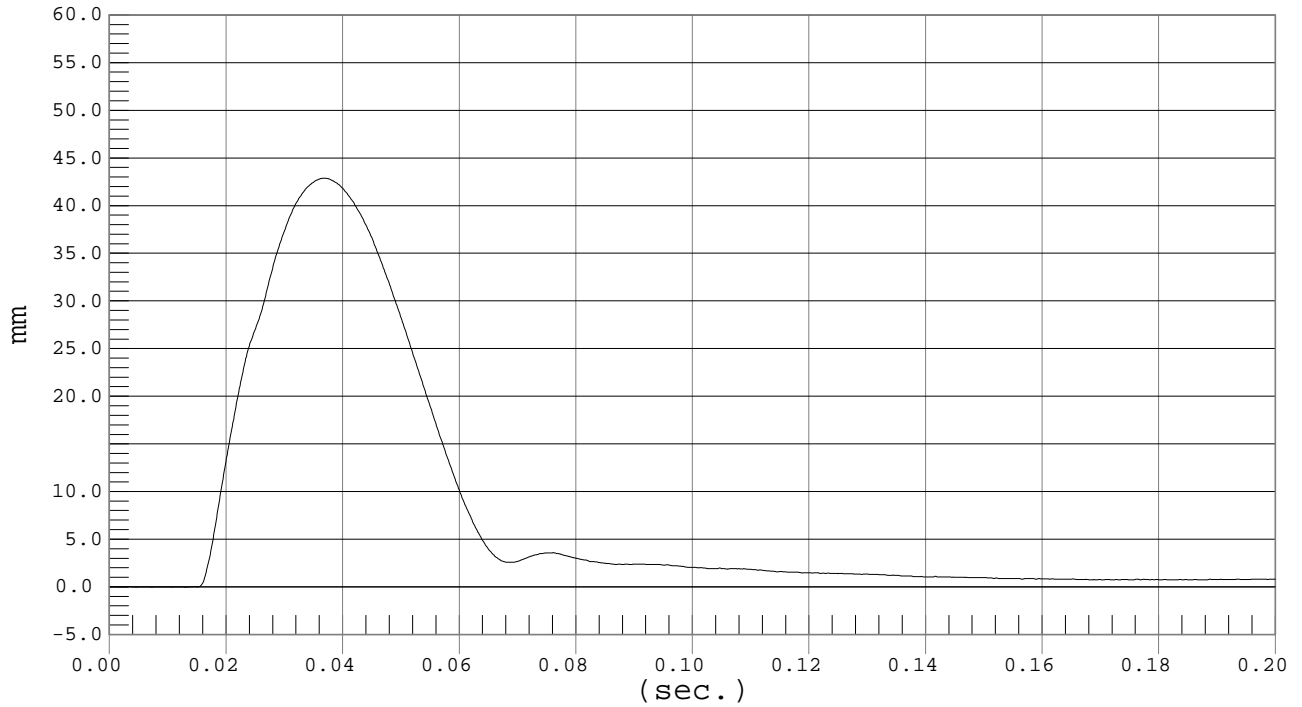


MIDDLE RIB DISPLACEMENT

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

Test Date: 03-13-03
Speed: 14.0 fps, 4.27 M/s

Ymin = -0.05 mm @ 0.0130 sec., Ymax = 42.88 mm @ 0.0368 sec.

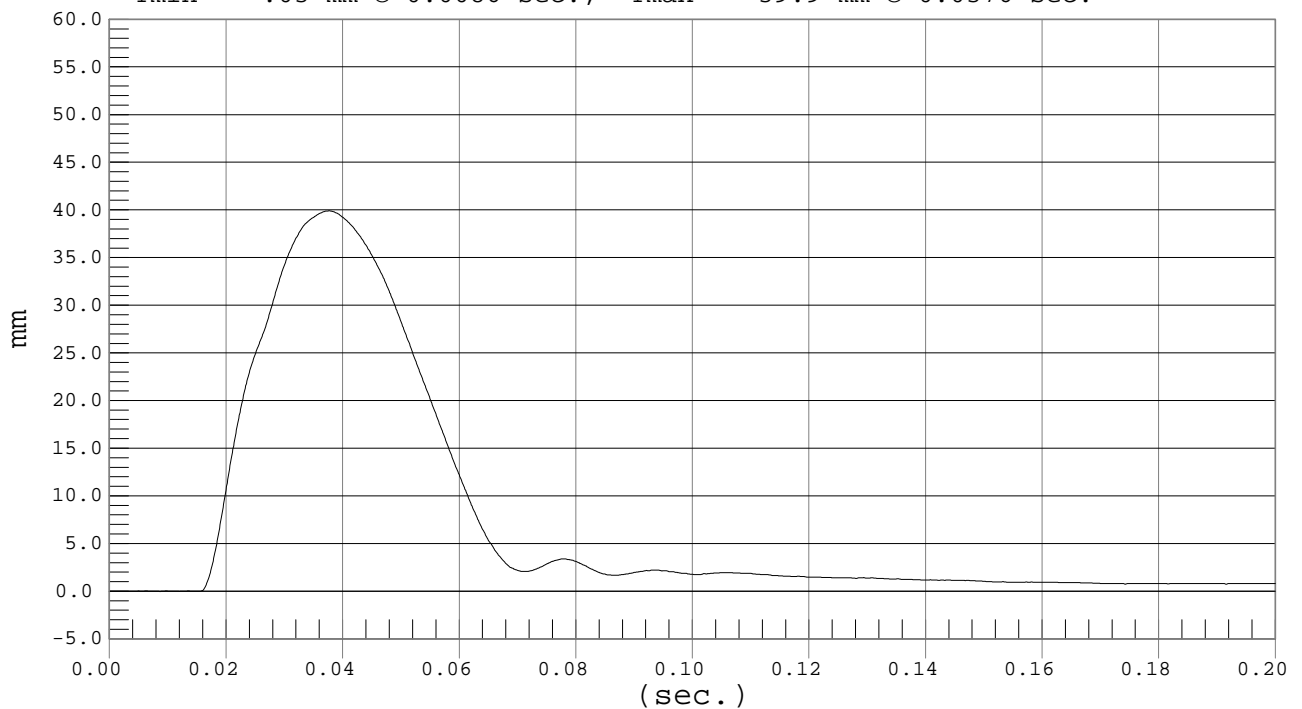


LOWER RIB DISPLACEMENT

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

Test Date: 03-13-03
Speed: 14.0 fps, 4.27 M/s

Ymin = -0.03 mm @ 0.0086 sec., Ymax = 39.9 mm @ 0.0376 sec.

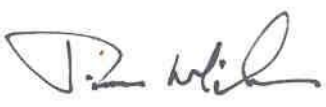


MGA RESEARCH CORPORATION
 ABDOMINAL IMPACT TEST
 SID IIs DUMMY

Date: 3/13/03
 Dummy Serial Number: 033
 Test Number: D03296/316

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		D03296	D03316
Temperature	20.8° – 22.2°	20.8	21.1
Humidity	10% - 70%	22	24
Impact Velocity	4.41 – 4.59 m/s	4.49	4.50
Probe Force	1.3 - 1.9 kN	1.8	1.7
Upper Spine Acceleration	5 – 9 g's	6	6
Lower Spine Acceleration	10 - 12 g's	*14	*13
Upper Rib Displacement	44 - 55 mm	47	47
Middle Rib Displacement	44 - 56 mm	46	48

*TEST DOES NOT MEET SPECIFICATIONS

Technician: 

Approved By: 

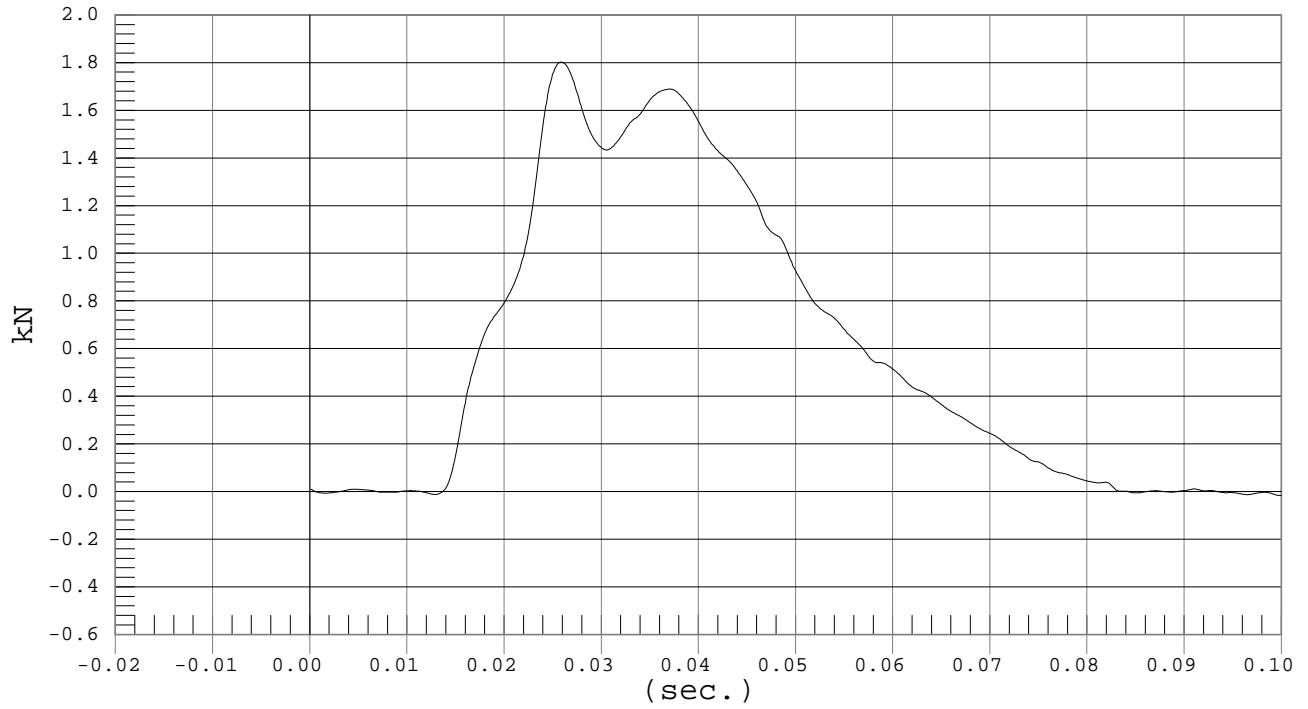


Test Desc.: Abdomen Impact
Component: Dummy #033

PROBE FORCE

Test Date: 03-13-03
Speed: 14.7 fps, 4.49 M/s

Ymin = -.04 kN @ 0.1116 sec., Ymax = 1.8 kN @ 0.0258 sec.



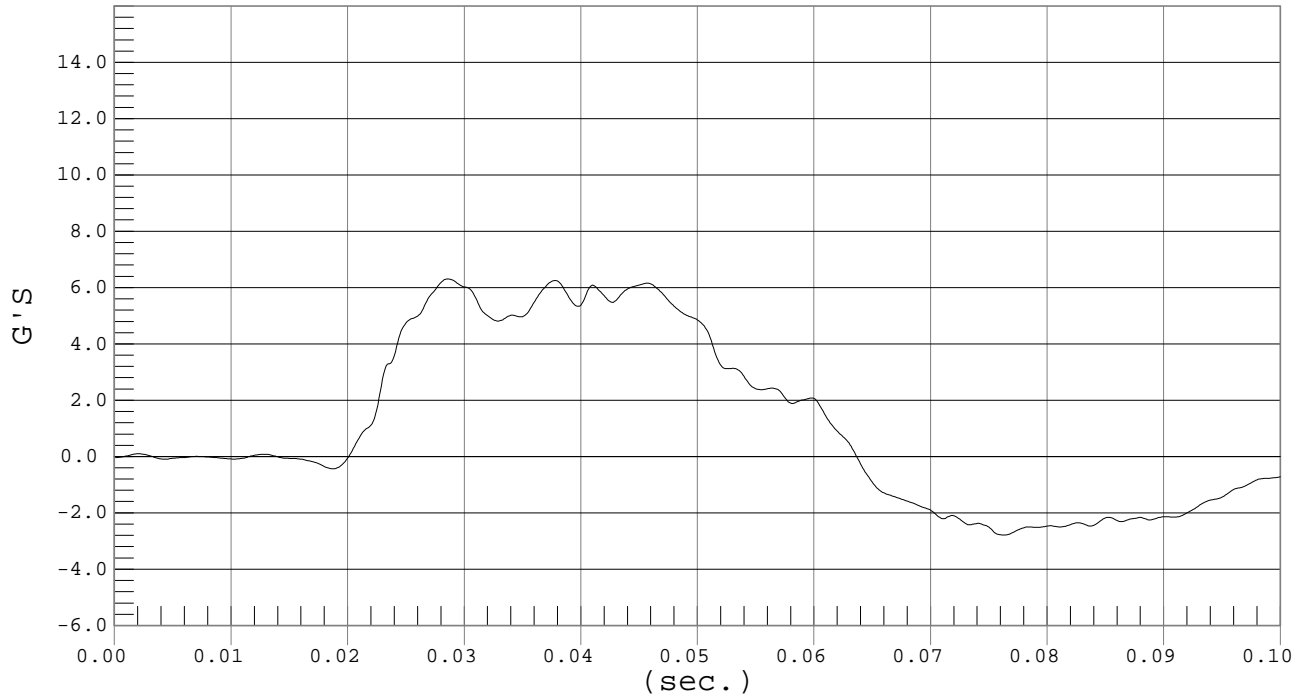


UPPER SPINE ACCELERATION

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 14.7 fps, 4.49 M/s

Ymin = -2.79 G'S @ 0.0762 sec., Ymax = 6.31 G'S @ 0.0285 sec.

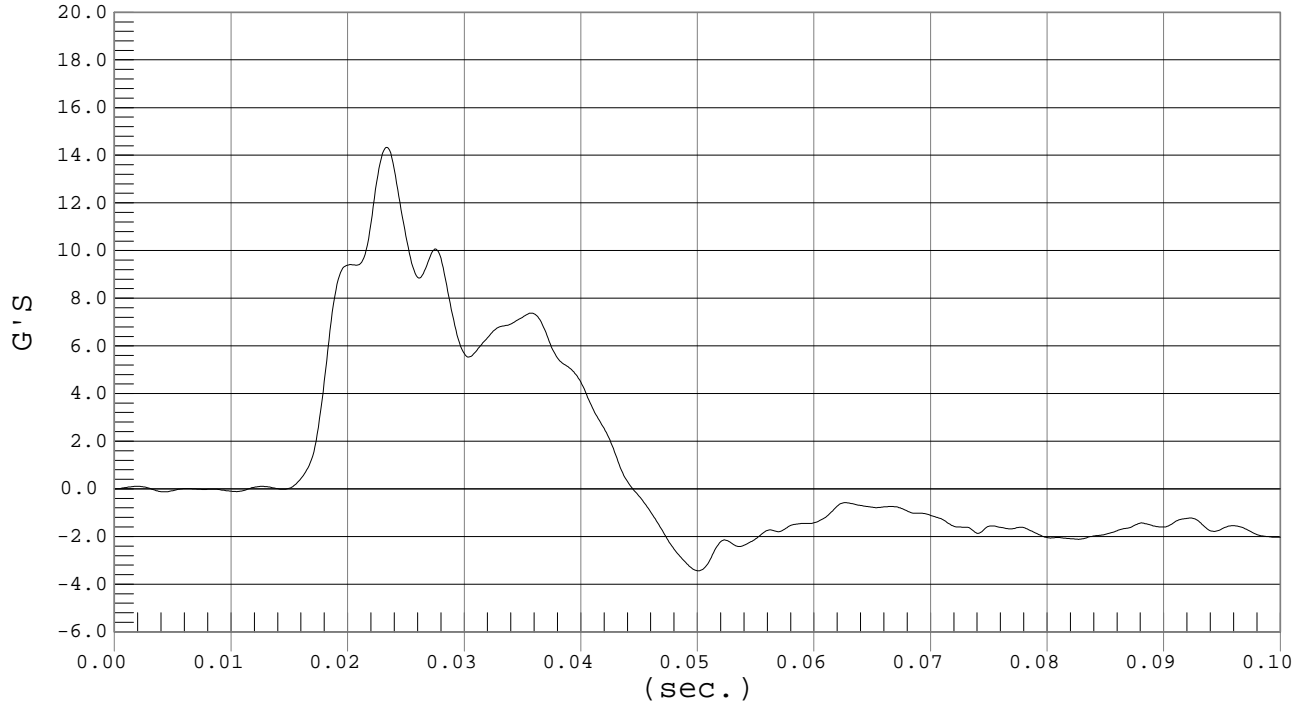


LOWER SPINE ACCELERATION

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 14.7 fps, 4.49 M/s

Ymin = -3.44 G'S @ 0.0500 sec., Ymax = 14.33 G'S @ 0.0233 sec.



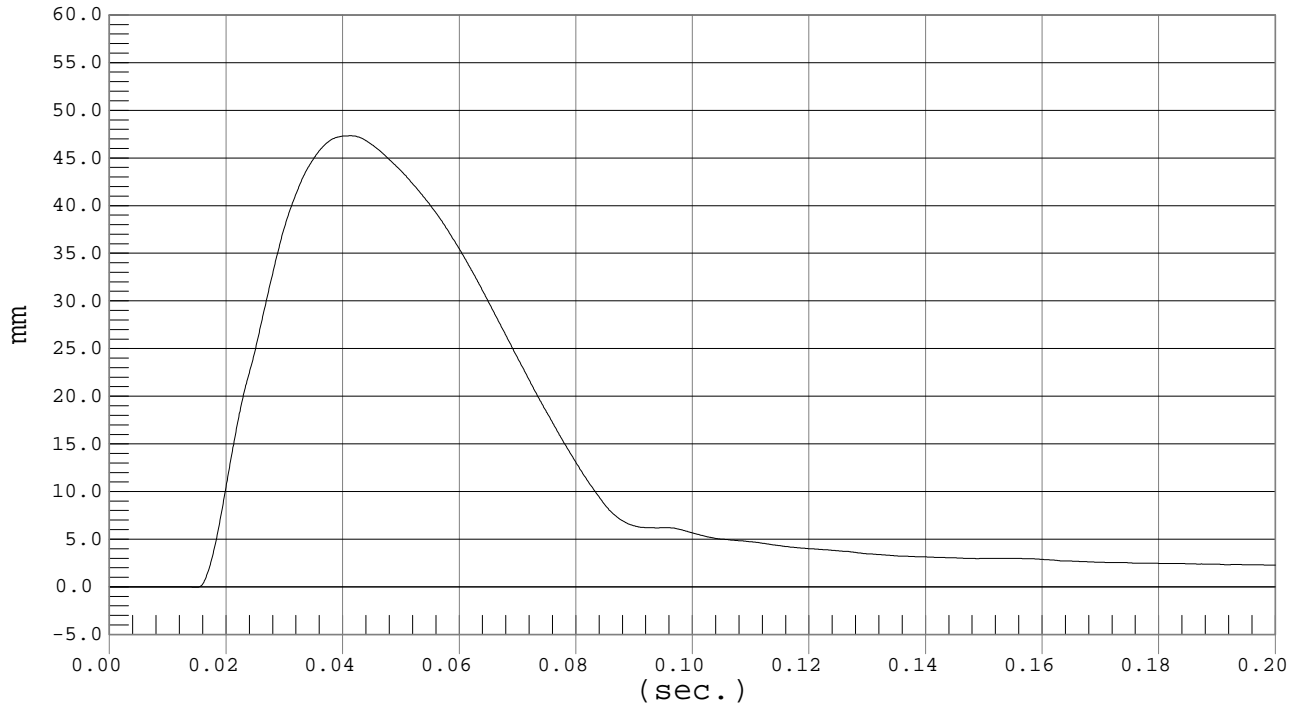


UPPER RIB DISPLACEMENT

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 14.7 fps, 4.49 M/s

Ymin = $-.05$ mm @ 0.0149 sec., Ymax = 47.33 mm @ 0.0413 sec.

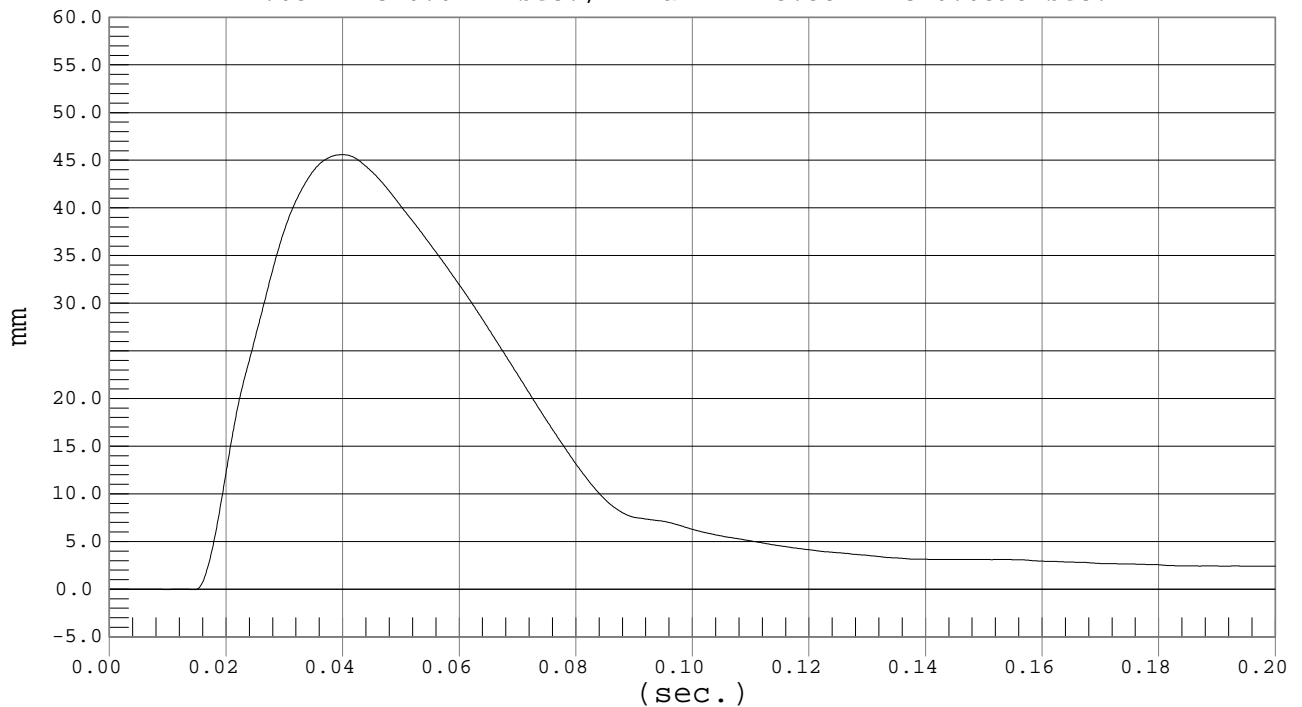


LOWER RIB DISPLACEMENT

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 14.7 fps, 4.49 M/s

Ymin = $-.05$ mm @ 0.0144 sec., Ymax = 45.58 mm @ 0.0398 sec.



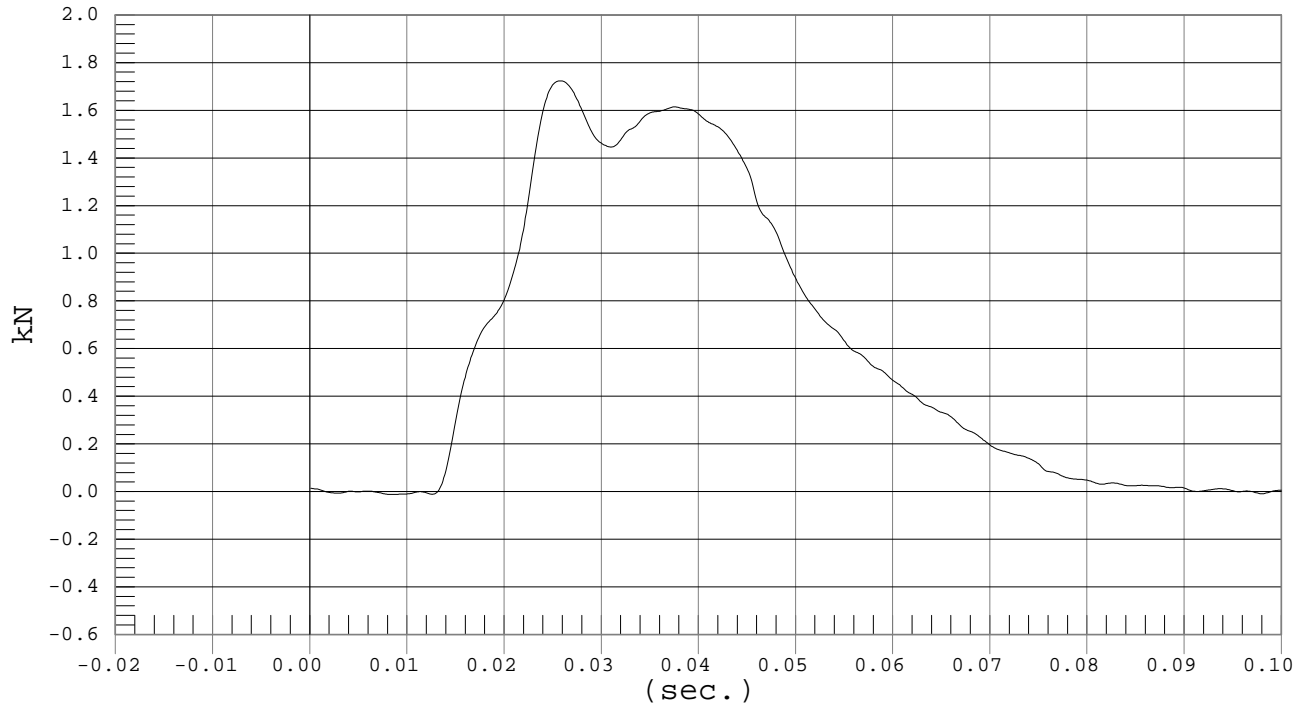


Test Desc.: Abdomen Impact
Component: Dummy #033

PROBE FORCE

Test Date: 03-13-03
Speed: 14.8 fps, 4.50 M/s

Ymin = -.01 kN @ 0.0082 sec., Ymax = 1.72 kN @ 0.0257 sec.



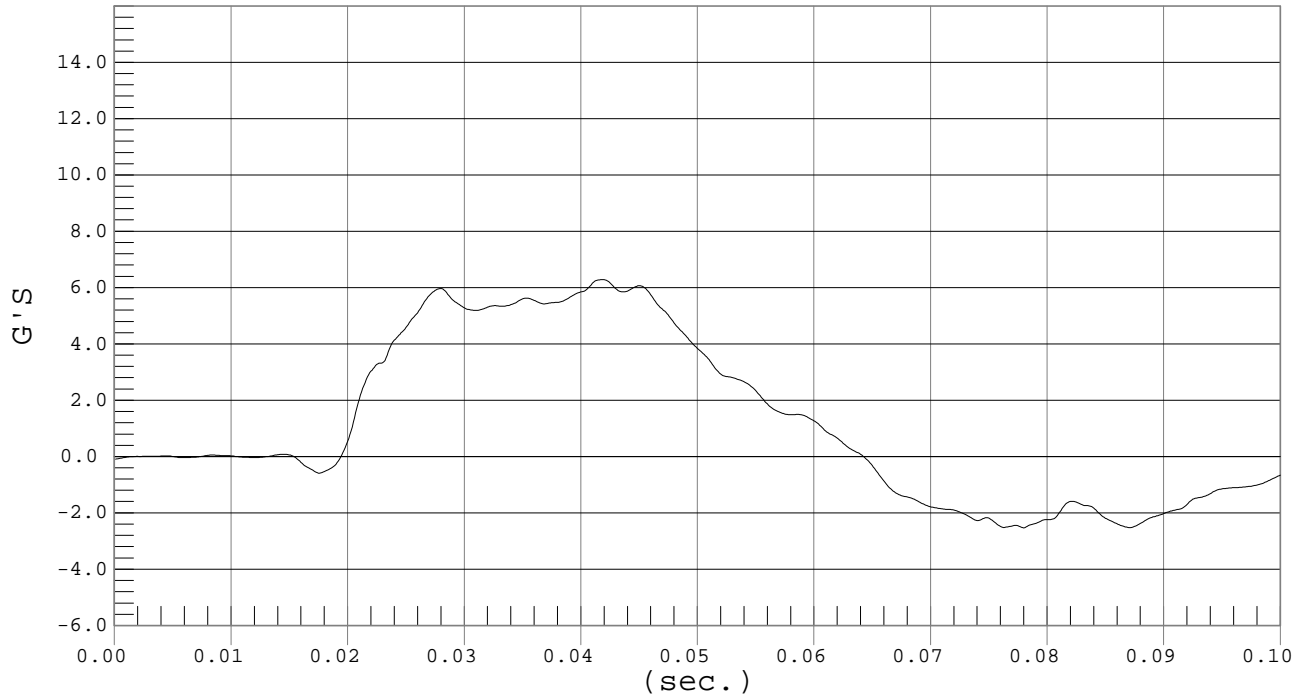


UPPER SPINE ACCELERATION

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 14.8 fps, 4.50 M/s

Ymin = -2.53 G'S @ 0.0779 sec., Ymax = 6.28 G'S @ 0.0417 sec.

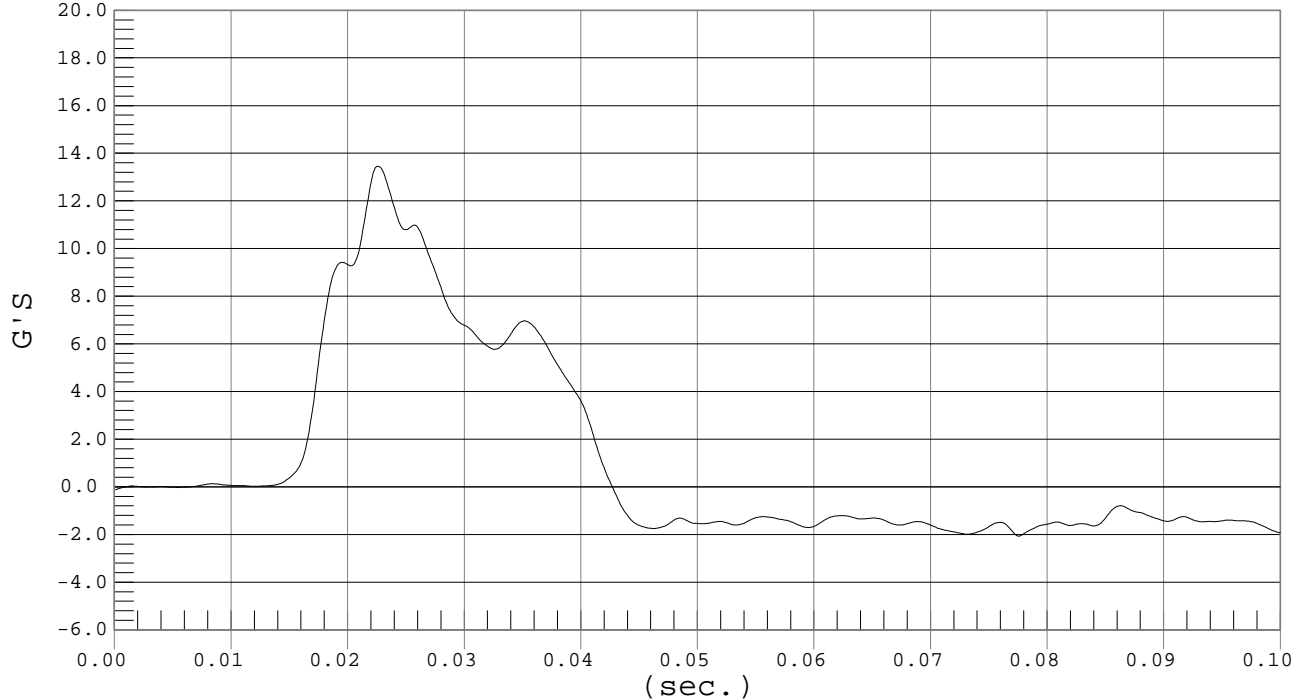


LOWER SPINE ACCELERATION

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 14.8 fps, 4.50 M/s

Ymin = -2.07 G'S @ 0.0775 sec., Ymax = 13.46 G'S @ 0.0225 sec.



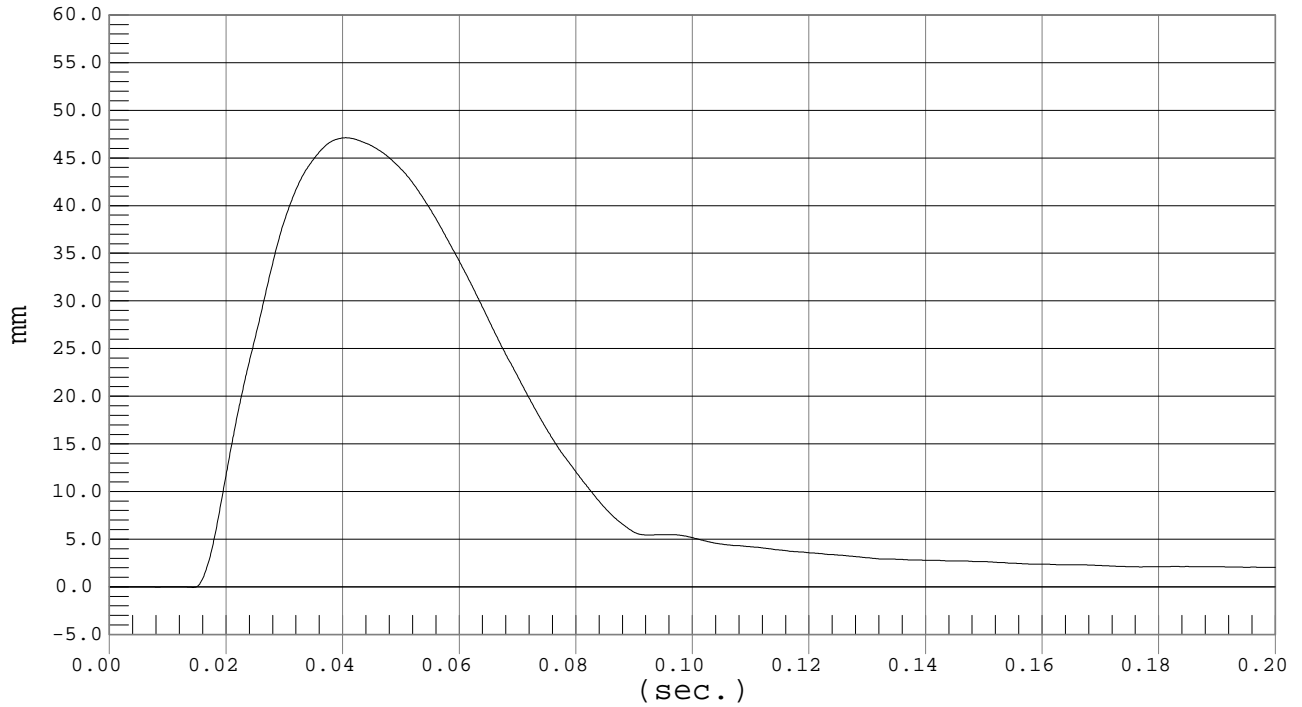


UPPER RIB DISPLACEMENT

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 14.8 fps, 4.50 M/s

Ymin = -.06 mm @ 0.0143 sec., Ymax = 47.11 mm @ 0.0404 sec.

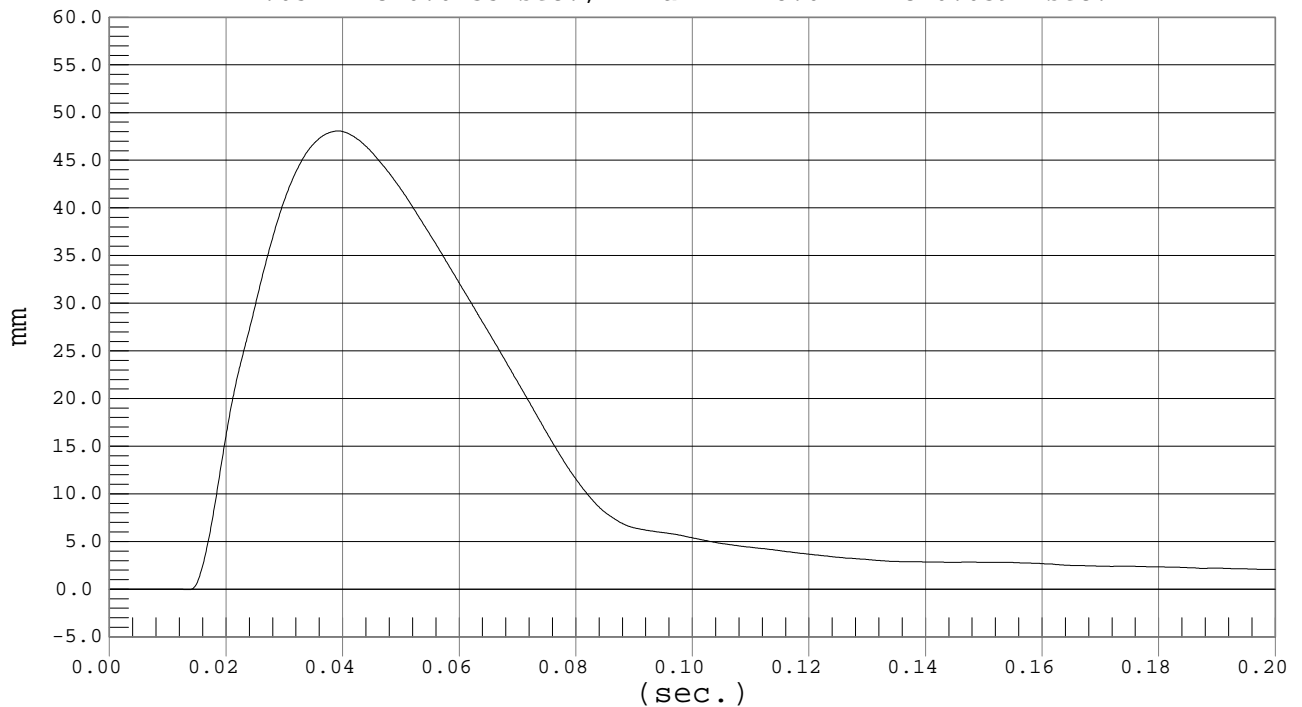


LOWER RIB DISPLACEMENT

Test Desc.: Abdomen Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 14.8 fps, 4.50 M/s

Ymin = -.05 mm @ 0.0135 sec., Ymax = 48.07 mm @ 0.0391 sec.



MGA RESEARCH CORPORATION
 PELVIS IMPACT TEST
 SID IIs DUMMY

Date: 3/13-14/03
 Dummy Serial Number: 033
 Test Number: D03299/319

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
		D03299	D03319
Temperature	20.8° – 22.2°	20.8	20.9
Humidity	10% - 70%	23	25
Impact Velocity	6.57 - 6.84 m/s	6.74	6.74
Probe Force	5.0 - 7.2 kN	5.6	5.7
Pelvis G's	46 - 60 g's	50	47

TEST MEETS SPECIFICATIONS

Technician: 

Approved By: 

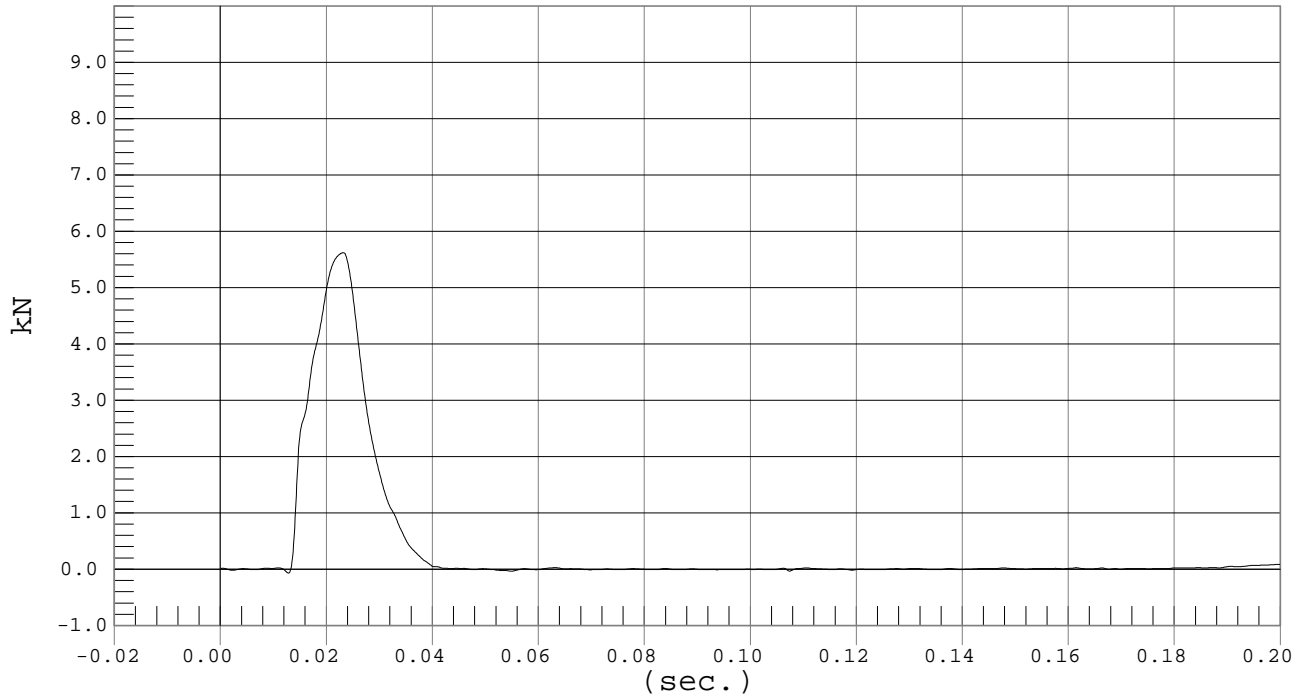


IMPACTOR FORCE

Test Desc.: Pelvis Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 22.1 fps, 6.74 M/s

Ymin = -.07 kN @ 0.0127 sec., Ymax = 5.62 kN @ 0.0231 sec.

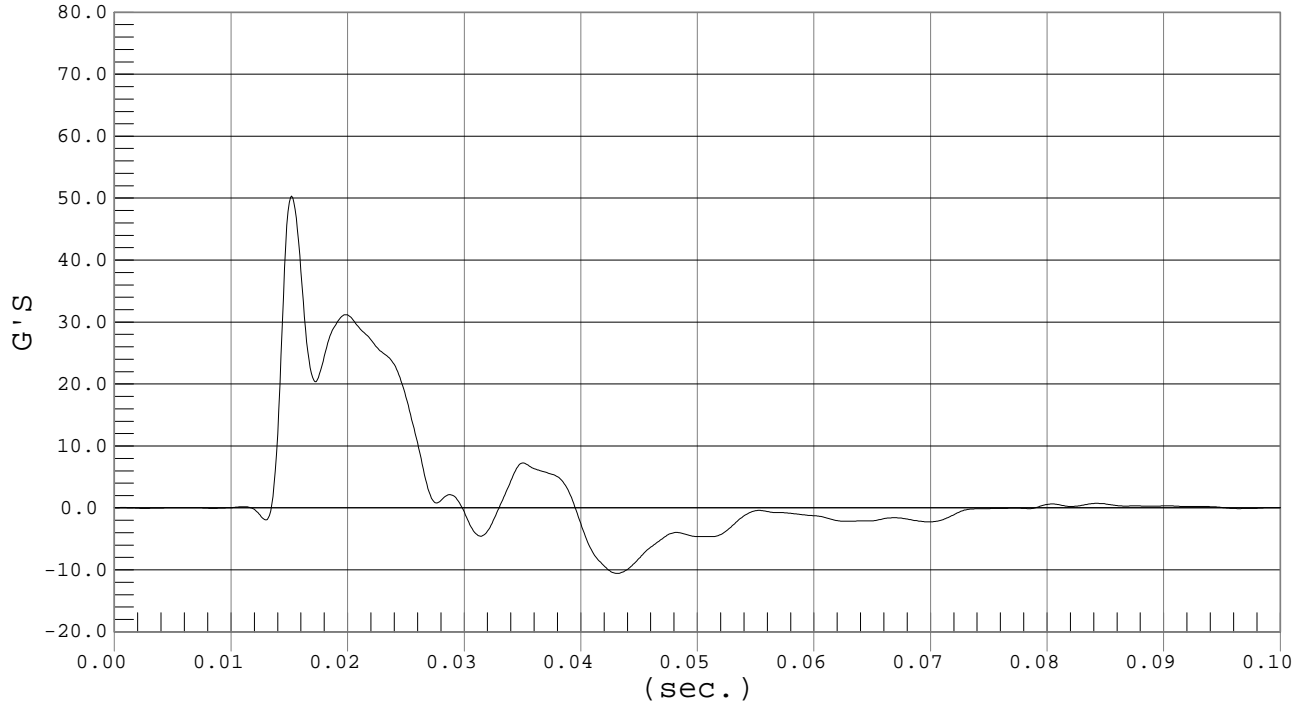


PELVIS ACCELERATION

Test Desc.: Pelvis Impact
Component: Dummy #033

Test Date: 03-13-03
Speed: 22.1 fps, 6.74 M/s

Ymin = -10.58 G'S @ 0.0430 sec., Ymax = 50.32 G'S @ 0.0151 sec.



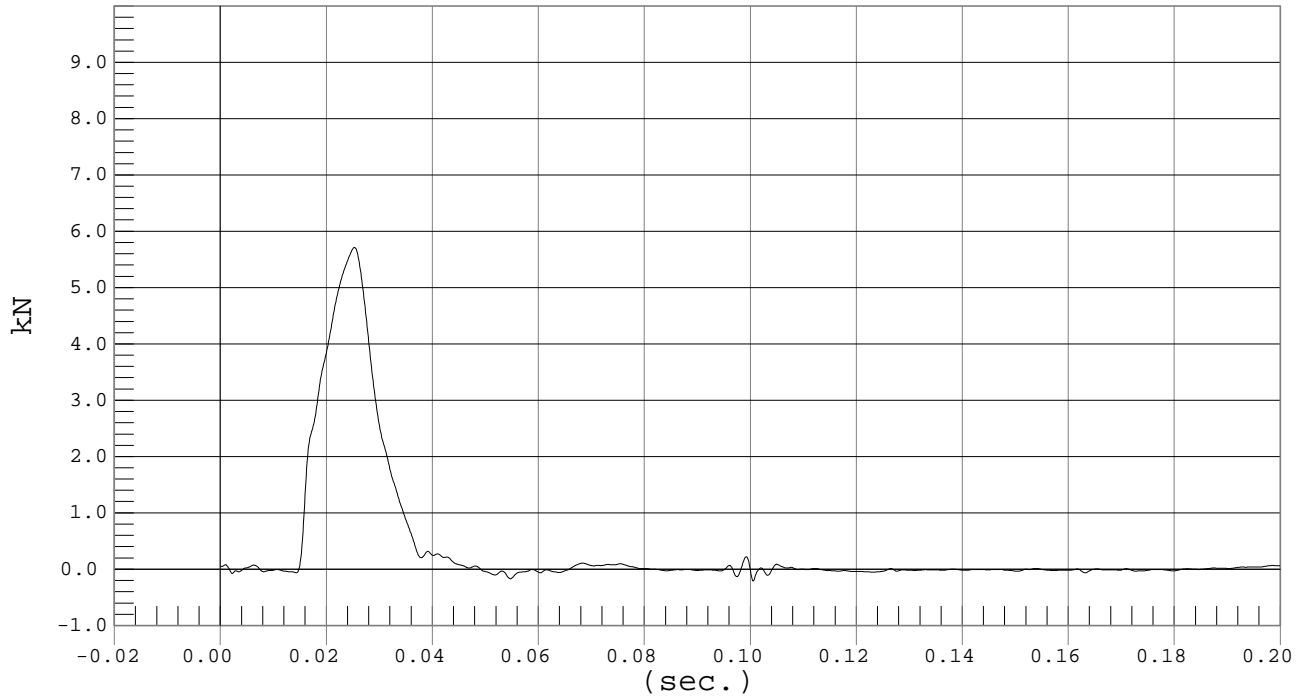


IMPACTOR FORCE

Test Desc.: Pelvis Impact
Component: Dummy #033

Test Date: 03-14-03
Speed: 22.1 fps, 6.74 M/s

Ymin = -.21 kN @ 0.1004 sec., Ymax = 5.71 kN @ 0.0252 sec.

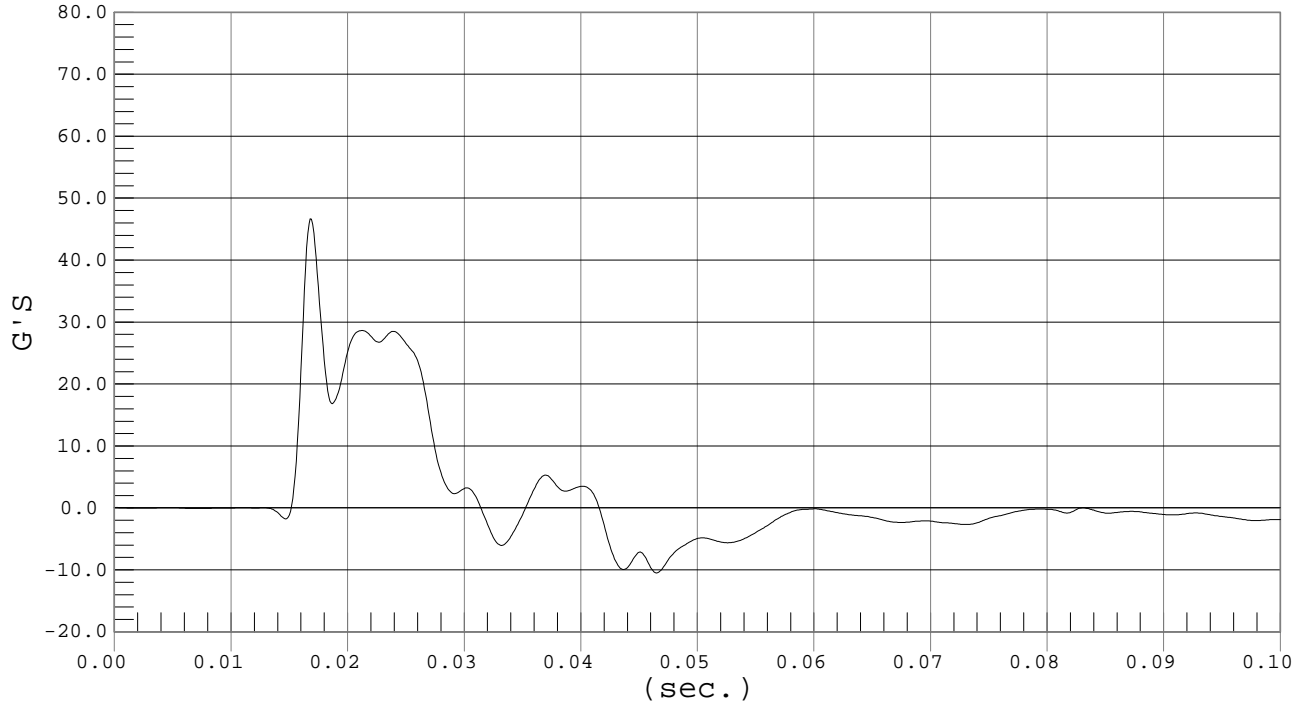


PELVIS ACCELERATION

Test Desc.: Pelvis Impact
Component: Dummy #033

Test Date: 03-14-03
Speed: 22.1 fps, 6.74 M/s

Ymin = -10.5 G'S @ 0.0464 sec., Ymax = 46.65 G'S @ 0.0167 sec.



APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY CALIBRATION DATA

	INSTRUMENTS FOR LEFT FRONT DUMMY SID 2S: 033		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X Accelerometer	P17858	Endevco	1/10/03
Head Y Accelerometer	P12566	Endevco	1/10/03
Head Z Accelerometer	P15638	Endevco	1/10/03
Driver Upper Thorax Rib Y	01J02-F07	Entran	1/8/03
Driver Mid Thorax Rib Y	B02A18-N03	Entran	1/8/03
Driver Lower Thorax Rib Y	P15951	Endevco	1/10/03
Driver Upper Abdominal Rib Y	99H30-Z07	Entran	1/9/03
Driver Lower Abdominal Rib Y	01J02-F12	Entran	1/9/03
Driver Upper Neck FX	N304FX	FTSS	6/14/02
Driver Upper Neck FY	N304FY	FTSS	6/14/02
Driver Upper Neck FZ	N304FZ	FTSS	6/14/02
Driver Upper Neck MX	N304MX	FTSS	6/14/02
Driver Upper Neck MY	N304MY	FTSS	6/14/02
Driver Upper Neck MZ	N304MZ	FTSS	6/14/02
Driver Upper Spine X	B02A09-F04	Entran	1/9/03
Driver Upper Spine Y	01G25-N18	Entran	1/9/03
Driver Upper Spine Z	02A16-A12	Entran	1/9/03
Driver Lower Spine X	02A16-A03	Entran	1/9/03
Driver Lower Spine Y	B02A18-N14	Entran	1/9/03
Driver Lower Spine Z	02A04-A24	Entran	1/9/03
Driver Shoulder X	P17848	Endevco	1/10/03
Driver Shoulder Y	P16336	Endevco	1/10/03
Driver Shoulder Z	P16225	Endevco	1/10/03
Driver Upper Thorax Rib DY	020RB1	Honeywell	1/13/03
Driver Mid Thorax Rib DY	020RB2	Honeywell	1/13/03
Driver Lower Thorax Rib DY	020RB3	Honeywell	1/13/03
Driver Upper Abdominal Rib DY	020RB4	Honeywell	1/13/03
Driver Lower Abdominal Rib DY	020RB5	Honeywell	1/13/03
Driver Shoulder FX	S101FX	FTSS	6/25/02
Driver Shoulder FY	S101FY	FTSS	6/25/02
Driver Shoulder FZ	S101FZ	FTSS	6/25/02
Driver Lumbar FX	L104FX	FTSS	5/10/02
Driver Lumbar FY	L104FY	FTSS	5/10/02
Driver Lumbar FZ	L104FZ	FTSS	8/15/02

DUMMY CALIBRATION DATA (continued)

	INSTRUMENTS FOR LEFT FRONT DUMMY SID 2S: 033		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Driver Lumbar MX	L104MX	FTSS	8/15/02
Driver Lumbar MY	L104MY	FTSS	6/24/02
Driver Lumbar MZ	L104MZ	FTSS	6/24/02
Driver Upper Arm X	B02A25-N01	Entran	1/9/03
Driver Upper Arm Y	02A16-A13	Entran	1/9/03
Driver Upper Arm Z	B02A25-N04	Entran	1/9/03
Driver Left Acetabulum FY	AC111FY	FTSS	6/25/02
Driver Left Ilium Crest FY	IW113FY	FTSS	6/25/02
Driver Right Ilium Crest FY	IW115FY	FTSS	6/25/02
Pubic Symphysis FY	P106FY	FTSS	6/24/02
Driver Right Femur FX	F109FX	FTSS	1/20/03
Driver Right Femur FY	F109FY	FTSS	1/20/03
Driver Right Femur FZ	F109FZ	FTSS	1/20/03
Driver Right Femur MX	F109MX	FTSS	1/20/03
Driver Right Femur MY	F109MY	FTSS	1/20/03
Driver Right Femur MZ	F109MZ	FTSS	1/20/03
Driver Left Femur FX	F107FX	FTSS	1/20/03
Driver Left Femur FY	F107MY	FTSS	1/20/03
Driver Left Femur FZ	F107FZ	FTSS	1/20/03
Driver Left Femur MX	F107MX	FTSS	1/20/03
Driver Left Femur MY	F107MY	FTSS	1/20/03
Driver Left Femur MZ	F107FZ	FTSS	1/20/03
Pelvis X Accelerometer	B02A25-N05	Entran	1/9/03
Pelvis Y Accelerometer	B02A18-N13	Entran	1/9/03
Pelvis Z Accelerometer	02A18-N03	Entran	1/9/03

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Mid A-Post Y	I25-F05	ENTRAN	1/16/03
Left Lower A-Post Y	D11-F01	ENTRAN	11/19/02
Left Mid B-Post Y	G03-N04	ENTRAN	1/24/03
Left Lower B-Post Y	G03-N08	ENTRAN	9/6/02
Floorpan @ Rear Axle X	99F251	ENTRAN	1/15/03
Floorpan @ Rear Axle Y	D11-F14	ENTRAN	11/19/02
Floorpan @ Rear Axle Z	I25-J09	ENTRAN	10/7/02
Driver Seat Track Y	K21-N31	ENTRAN	10/9/02
Driver Left Seat Frame Y	K21-N04	ENTRAN	1/16/03
Driver Right Seat Frame Y	H07-F07	ENTRAN	1/16/03
Right Front Sill X	K21-N01	ENTRAN	1/24/03
Right Front Sill Y	H05-F07	ENTRAN	11/19/02
Right Front Sill Z	G13-F03	ENTRAN	1/24/03
Right Rear Sill X	K21-N12	ENTRAN	9/6/02
Right Rear Sill Y	H01-N27	ENTRAN	10/30/02
Right Rear Sill Z	K21-N20	ENTRAN	10/18/02
Left Rear Sill Y	99F18A	ENTRAN	11/4/02
Left Front Sill Y	99F254	ENTRAN	10/31/02
Vehicle CG X	H01-N26	ENTRAN	11/19/02
Vehicle CG Y	H01-N09	ENTRAN	11/19/02
Vehicle CG Z	99F216	ENTRAN	10/31/02
Left Front Door @ Pelvis Y	H01-N11	ENTRAN	10/31/02
Left Front Door @ Arm Y	K21-N05	ENTRAN	1/16/03
Left Front Door @ Knee Y	99F272	ENTRAN	1/16/03
Left Rear Door @ Rib Y	I12-F12	ENTRAN	1/16/03
Lower Center Radiator Support X	K21-N1	ENTRAN	1/16/03
Lower Center Radiator Support Y	G03-N06	ENTRAN	1/16/03
Lower Center Radiator Support Z	G01-N01	ENTRAN	1/16/03

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

APPENDIX E
DUMMY PEAK RESPONSES

DRIVER PEAK RESPONSE TABLE

Location	Peak Response						
				2002 Ford Explorer 2/19/03		2002 Ford Explorer 3/10/03	
	Class	Axis	Units	Peak	Time	Peak	Time
Head	1000	X	G	-100.6	53.8	-59.5	56.4
	1000	Y	G	896.4	54.3	554.3	56.3
	1000	Z	G	-212.8	53.8	93.8	56.1
	1000	RES	G	912.2	54.3	563.1	56.3
Head Injury Criteria (HIC)				14361.7		4595	
t1				53.6		55.7	
t2				54.5		56.7	
Upper Neck Force	1000	X	N	476	60.9	-521	61.4
	1000	Y	N	-1635	54.1	-609	56.6
	1000	Z	N	2659	54.3	-1854	57.4
	1000	RES	N	3017	54.3	1859	57.4
Upper Neck Moment	600	X	Nm	71.0	55.3	-57.6	57.6
	600	Y	Nm	-26.3	61.0	-30.1	60.9
	600	Z	Nm	12.8	84.3	22.8	72.3
	600	RES	Nm	71.1	55.3	60.0	57.7
Shoulder G's	180	X	G	-39.3	48.6	45.7	40.8
	180	Y	G	-194.1	49.5	219.9	43.2
	180	Z	G	84.7	74.0	78.2	38.8
	180	RES	G	197.9	49.5	220.6	43.1

DRIVER PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Response						
				2002 Ford Explorer 2/19/03		2002 Ford Explorer 3/10/03	
	Class	Axis	Units	Peak	Time	Peak	Time
Shoulder Force	600	X	N	-319	49.3	401	86.9
	600	Y	N	2361	49.2	2335	50.2
	600	Z	N	-584.2	52.1	-576	51.4
Upper Arm	180	X	G	-34.6	42.2	-33.5	39.6
	180	Y	G	130.7	43.8	131.6	43.1
	180	Z	G	59.9	44.8	-43.5	86.4
	180	RES	G	141.9	43.9	132.1	43.2
Upper Spine	180	X	G	-25.5	54.4	-18.2	56.5
	180	Y	G	88.9	51.4	89.8	50.5
	180	Z	G	20.9	55	11.7	48.6
	180	RES	G	89.5	51.3	90.2	50.5
Upper Thorax Rib	180	Y	G	170.3	45.2	156.8	44.9
Mid Thorax Rib	180	Y	G	145.4	45.5	130.5	46.0
Lower Thorax Rib	180	Y	G	198.9	46.5	250.2	45.8
Upper Abdominal Rib	180	Y	G	126.9	37.8	77.9	37.0
Lower Abdominal Rib	180	Y	G	183.9	35.2	195.5	34.9
Shoulder Deflection	180	Y	mm	-44.1	53.7	-41.2	53.1

DRIVER PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Response						
				2002 Ford Explorer 2/19/03		2002 Ford Explorer 3/10/03	
	Class	Axis	Units	Peak	Time	Peak	Time
Upper Thorax Deflection	180	Y	mm			-37.4	50.7
Middle Thorax Deflection	180	Y	mm			-34.4	53.1
Lower Thorax Deflection	180	Y	mm			-29.3	50.6
Upper Abdominal Rib Deflection	180	Y	mm			-27.6	50.6
Lower Abdominal Rib Deflection	180	Y	mm			-46.8	50.2
Shoulder Deflection Rate	180		m/s	-4.7	45.8	-5.0	46.1
Upper Thorax Deflection Rate	180		m/s			-3.9	46.6
Middle Thorax Deflection Rate	180		m/s			-3.6	39.9
Lower Thorax Deflection Rate	180		m/s			-3.4	41.1
Upper Abdominal Rib Deflection Rate	180		m/s			-2.8	38.4
Lower Abdominal Rib Deflection Rate	180	Y	m/s			-5.5	36.7
Shoulder VC	180	Y	m/s	1.0	48.9	0.94	47.5
Upper Thorax Rib VC	180	Y	m/s			0.81	46.9
Mid Thorax Rib VC	180	Y	m/s			0.56	48.2
Lower Thorax Rib VC	180	Y	m/s			0.50	47.8
Upper Abdominal Rib VC	180	Y	m/s			0.34	47.0
Lower Abdominal Rib VC	180	Y	m/s			0.78	43.2

DRIVER PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Response						
				2002 Ford Explorer 2/19/03		2002 Ford Explorer 3/10/03	
	Class	Axis	Units	Peak	Time	Peak	Time
Lower Spine	180	X	G	13.8	60.7	-17.3	51.5
	180	Y	G	96.3	48.0	100.3	49.7
	180	Z	G	25.5	54.8	20.8	56.9
	180	RES	G	97.3	48.0	101.2	49.7
Lumbar Force	600	X	N	1140.1	62.6	1256	63.5
	600	Y	N	3271.8	48.5	3362	48.6
	600	Z	N	1150.9	51.0	1232	50.1
Lumbar Moment	600	X	Nm			123.3	49.1
	600	Y	Nm			-48.2	130.3
	600	Z	Nm			18.1	47.7
Left Acetabulum Force	600	Y	N	1950	45.8	1766	45.1
Left Ilium Crest Force	600	Y	N	5263	77.6	5473	47.4
Sum of Left Acetabulum & Left Ilium Crest	600	Y	N	7164	47.3	7141	47.3
Right Ilium Crest	600	Y	N	467	47.4	936	48.2
Pubic Symphysis Force	600	Y	N	-680.3	45.5	-641	45.2
Right Femur Force	600	X	N	-271.6	42.2	-328	44.4
	600	Y	N	-571.8	58.7	503	45.0
	600	Z	N	-623.2	46.3	-1466	47.3
	600	RES	N	748	46.3	1530	47.3

DRIVER PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Response						
				2002 Ford Explorer 2/19/03		2002 Ford Explorer 3/10/03	
	Class	Axis	Units	Peak	Time	Peak	Time
Right Femur Moment	600	X	Nm	-102.4	45.5	-107.9	46.9
	600	Y	Nm	-25.4	93.3	42.4	47.0
	600	Z	Nm	20.9	60.6	18.3	59.9
	600	RES	Nm	103.3	45.5	116.9	47.0
Left Femur Force	600	X	N	208	131.3	-239	48.6
	600	Y	N	-1415	50.6	-1362	50.3
	600	Z	N	1256	50.0	1598	47.5
	600	RES	N	1898	50.0	2047	48.0
Left Femur Moment	600	X	Nm	180.3	51.4	170.9	52.4
	600	Y	Nm	32.6	134.2	40.6	133.4
	600	Z	Nm	95.9	51.9	64.2	50.3
	600	RES	Nm	203.7	51.5	182.0	52.3
Pelvis	1000	X	G	16.9	54.9	-17.6	46.6
	1000	Y	G	84.5	47.5	85.6	47.1
	1000	Z	G	15.7	55.2	10.1	46.8