

REPORT NUMBER: TO6-MGA-2002-005

**ES-2 FULL SCALE VEHICLE TESTS
NCAP LEFT SIDE IMPACT
Task Order # T0005 / RFP # 0006**

**Ford Motor Company
2001 Ford Focus 4 door
NHTSA No. # R10229**

**PREPARED BY:
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December 10, 2002

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
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, under Contract No. DTRS57-98-D-00041.

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SECTION 1
PURPOSE AND TEST PROCEDURE

This side impact test was conducted as part of Contract No. DTRS57-98-D-00041, Task Order T0005, RFP 0006, sponsored by the U.S. Department of Transportation, Volpe National Transportation System Center. The purpose of this test was to compare the response of the standard ES-2 dummy with a modified version of the ES-2 with prototype rib extensions and a modified backplate. (The previous test was conducted on October 5, 2001, Report Number TO6-MGA-2001-006)

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

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A 2001 Ford Focus 4 door was impacted on the left side by a Moving Deformable Barrier (MDB) which was moving forward in a 27 degree position to the tow road guidance system at a velocity of 61.8 kph (38.4 mph). The target vehicle was stationary and positioned at an angle of 63 degrees to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, WI on December 10, 2002. Pre- and post-test photographs of the test vehicle, the MDB and the side impact dummies are included in Appendix A.

Two ES-2 side impact dummies were placed in the left front and left rear designated seating positions according to instructions specified in the FMVSS 214 Side Impact Laboratory Test Procedure which is dated August 2, 1999 and Evaluation of Eurosid-1 Positioning Procedure Appendix A dated February 5, 1997. 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 side impact dummy (ES-2) 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 a copy of the dummy positioning procedure used, Appendix F contains the ES-2 peak responses, and Appendix G contains the ES-2 sign conventions.

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

		Left Front	Left Rear
1) Head Performance Criteria			
< 1000	T1 (msec)	42.7	37.3
	T2 (msec)	78.7	58.8
	HPC	272	236
2) Thorax Performance Criteria			
2.1) Chest Deflection < 42 mm	Upper Rib Deflection	33	25
	Mid Rib Deflection	48	17
	Lower Rib Deflection	27	14
2.2) Viscous Criteria < 1.0 m/sec	Upper Rib	0.6	0.3
	Mid Rib	0.9	0.1
	Lower Rib	0.5	0.1
3) Abdominal Protection Criterion			
Sum < 2500 N	Front Abdominal Force	406	924
	Mid Abdominal Force	656	760
	Rear Abdominal Force	913	554
	Sum of Abdominal Force	1858	2036
4) Pelvis Performance Criterion			
< 6000 N	Pubic Symphysis Force	3629	3725

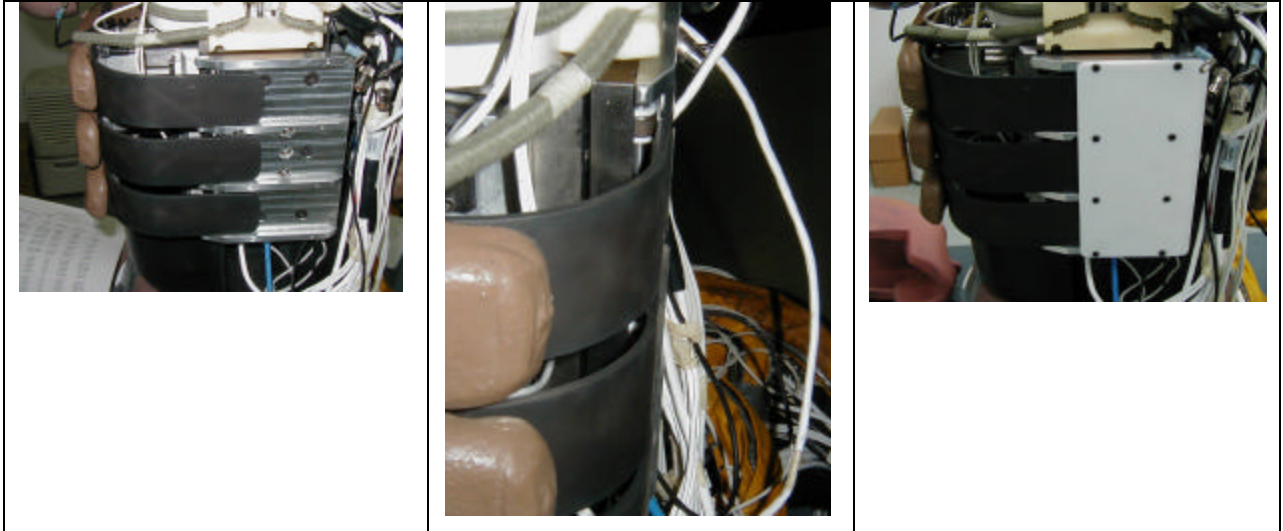
		Left Front	Left Rear
HIC	T1 (msec)	42.7	37.3
	T2 (msec)	78.7	58.8
	T2-T1 (msec)	36.0	21.5
	HIC	272	236

FIR Filtered (g's)	Left Front	Left Rear
Upper Rib Y	131.1	79.0
Mid Rib Y	178.5	60.2
Lower Rib Y	135.9	114.6
Lower Spine Y	78.6	63.6
Pelvis Y	103.6	95.6
TTI	129	89

Contacts (msec)	Left Front	Left Rear
Head	No contact	36.0
Arm	16.3	22.1
Rib	27.5	30.7
Pelvis	13.2	21.9

TEST NOTES

Both ES-2 dummies had prototype rib extension upgrades.



SECTION 3
SIDE IMPACT DUMMY (ES-2) AND VEHICLE TEST DATA

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002

TEST VEHICLE INFORMATION

Make / Model	Ford / Focus
Body Style	4 door
NHTSA No.	R10229
VIN	1FAHP34351W220839
Odometer Reading	20,697 miles
Transmission	Manual
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	2.0
Engine Placement	Lateral

TEST VEHICLE OPTIONS

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Company
Date of Manufacture	01/01

GVWR (kg)	1646
GAWR Front (kg)	895
GAWR Rear (kg)	791

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	221	221
Cold / Test Pressure (kPa)	221	221
Recommended Tire Size	P195/60R15	P195/60R15
Tire Size on Vehicle	P195/60R15	P195/60R15
Tire Manufacturer	Firestone	Firestone

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Contour		
Number Of Occupants x 68.04 kg.	2	3		340
Capacity Wt. (VCW) (kg)				375
Cargo Wt. (RCLW) (kg)				35

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	364.7	248.6		428.7	322.5	
Right	kg	372.0	246.8		386.9	288.9	
Ratio	%	59.8	40.2		57.2	42.8	
Totals	kg	736.7	495.4	1232.1	815.6	611.4	1427.0

Weight of Ballast in Vehicle = 0

TARGET TEST WEIGHT

Measured Parameter	Units	Value
Vehicle Target Weight (TVTW)*	kg	1427.0

* = matches previous vehicle tests

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	669	667	675	678	1052
As Tested	mm	641	654	633	650	1121
Fully Loaded	mm	651	660	641	655	

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2616
Target Impact Point Aft of Front Axle	mm	368
Actual Impact Point Aft of Front Axle	mm	386

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002

NORMAL DESIGN RIDING POSITION

Driver seat back angle: 16 degrees from full forward

Rear passenger seat back angle: non adjustable

SEAT FORE/AFT POSITIONS

Driver seat fore/aft total travel: 17 positions

Rear passenger seat fore/aft total travel: non adjustable

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

Rear passenger seat fore/aft position: non adjustable

SEAT BELT UPPER ANCHORAGE

The D ring was placed in the full up position.

STEERING COLUMN ADJUSTMENT

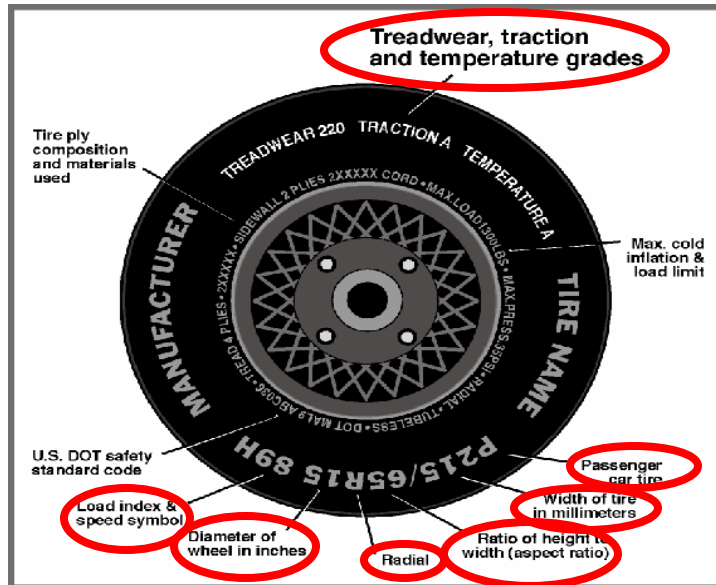
The steering column was placed in the mid position.

DATA SHEET NO. 2
TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2001 Ford Focus

Test Date: December 10, 2002

Vehicle Year	2002	Vehicle Make	Ford
Vin	1FAHP34351W220839	Vehicle Model	Focus



	Front	Rear
Tire Manufacturer	Firestone	Firestone
Tire Name	Firehawk GTA	Firehawk GTA
Tire Type	Passenger	Passenger
Tire Width (mm)	195	195
Ratio of Height to Width (aspect ratio)	60	60
Radial	R	R
Wheel Diameter	15	15
Load Index & Speed Symbol	87T	87T
Treadwear	300	300
Traction Grade	A	A
Temperature Grade	B	B

DATA SHEET NO. 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002

MDB SPECIFICATIONS

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

MDB WEIGHTS

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

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.8
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.8
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.1

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

Vertical Location			From Centerline		Max. Crush
Level	Description	Height	Distance	Direction	
1	Center of Bumper (mm)	432	800	Right	158
2	Top of Bumper (mm)	533	800	Left	80
3	Mid Level (mm)	686	800	Left	117
4	Top of Stack (mm)	813	800	Left	165

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	2
High Speed Cameras	2

DATA SHEET NO. 4
POST TEST OBSERVATIONS

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat	Rear Seat
Dummy Type / Serial No.	ES-2 / 009	ES-2 / 010
Head Contact	Side header, Headrest	C post, Side header
Upper Torso Contact	Door trim panel	Door trim panel
Lower Torso Contact	Door trim panel	Door trim panel
Left Knee Contact	Door trim panel	Door trim panel
Right Knee Contact	Left knee	Left knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

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

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No failures
Sill Separation	None
Windshield Damage	Broke
Window Damage	Left side broke
Other Notable Effects	None

AIRBAG DEPLOYMENT

	Driver	Front Passenger	Rear Passenger
Front	No	No	
Side			

MDB LEFT EDGE IMPACT POINT DATA

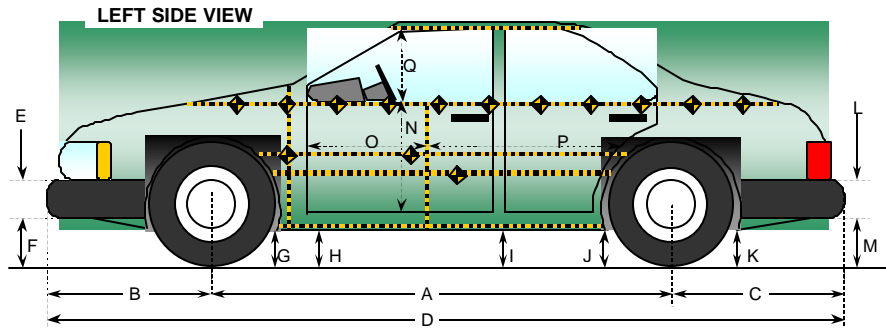
Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	18 rearward
Vertical Offset	mm	+/-20	3 up

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5
VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002



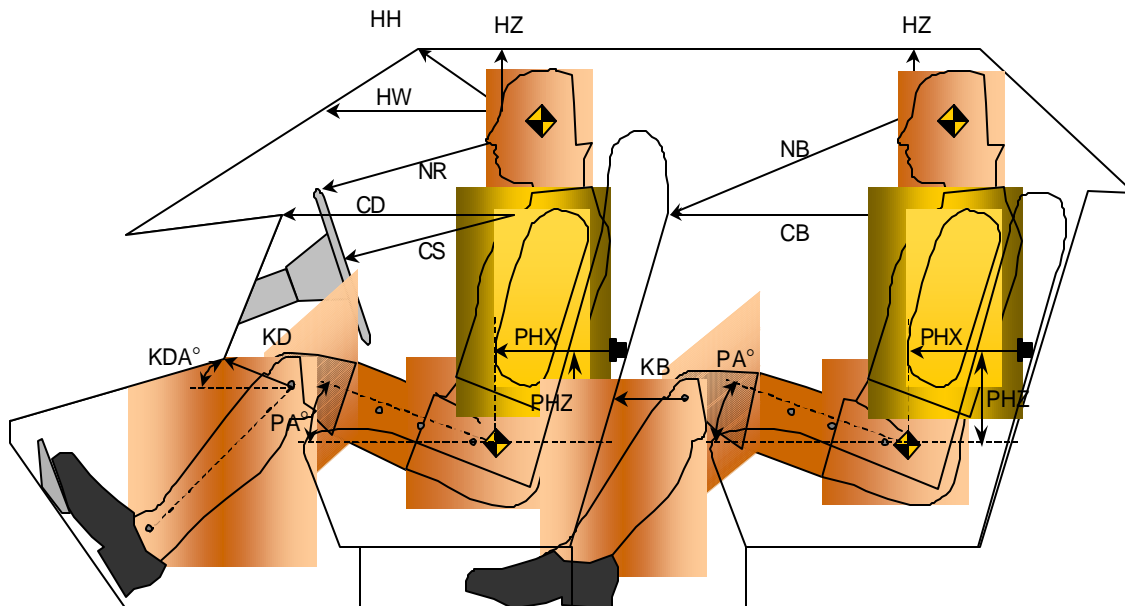
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2616	2554	62
B	Front Axle to FSOV	865	846	19
C	Rear Axle to RSOV	914	952	-38
D	Total Length at Centerline	4395	4352	43
E	Front Bumper Thickness	135	135	0
F	Front Bumper Bottom to Ground	400	420	-20
G	Sill Height at Front Wheel Well	152	189	-37
H	Sill Height at Front Door Leading Edge	151	192	-41
I	Sill Height at "B" Pillar	144	188	-44
J1	Sill Height at Rear Wheel Well	153	147	6
J2	Pinch Weld Height at Rear Wheel Well	146	161	-15
K	Sill Height Aft of Rear Wheel Well	251	255	-4
L	Rear Bumper Thickness	145	145	0
M	Rear Bumper Bottom to Ground	405	485	-80
N	Sill Height to Window Bottom Sill	685	655	30
O	Front Door Leading Edge to Impact CL	752	737	15
P	Rear Door Trailing Edge to Impact CL	1226	1114	112
Q	Front Window Opening	442	440	2
R	Right Side Length	3812	3829	-17
S	Left Side Length	3812	3740	72
T	Vehicle Width at "B" Post	1697	1418	279

DATA SHEET NO. 6
ES-2 LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002

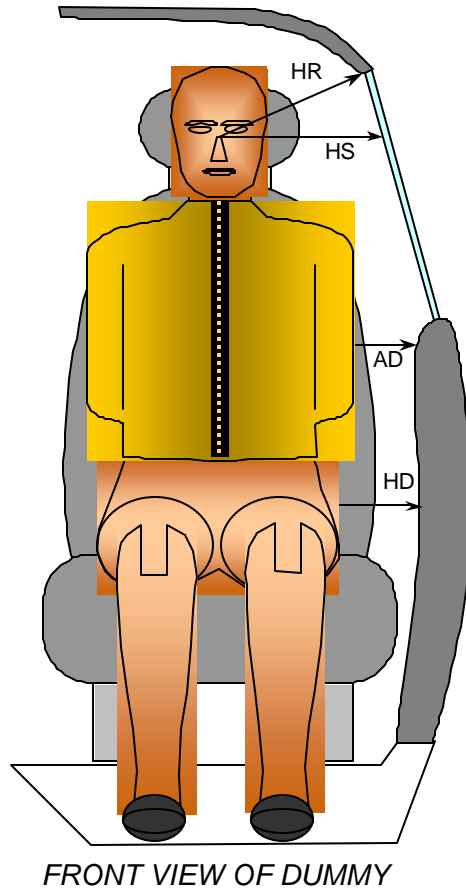


Driver Code	Pass. Code	Measurement Description	Left Front 009		Left Rear 010	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	349			
HW		Head to Windshield	578			
HZ	HZ	Head to Roof	164		140	
NR	NB	Nose to Rim/Nose to Seatback	482		553	
CD	CB	Chest to Dash or Seatback	549		472	
CS		Chest to Steering Wheel	367			
KDL	KBL	Left Knee to Dash or Seatback	178	0	192	0
KDR	KBR	Right Knee to Dash or Seatback	198	0	184	0
PA	PA	Pelvic Angle (longitudinal)		23.4		23.6
PA	PA	Pelvic Angle (lateral)		1.0		0.3
SA	SA	Spine Angle (longitudinal)		25.2		26.0
SA	SA	Spine Angle (lateral)		2.2		0.4
PHX	PHX	H-Point to Striker (X-Axis)	187		227	
PHZ	PHZ	H-Point to Striker (Z-Axis)	106		284	

DATA SHEET NO. 7
ES-2 LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002

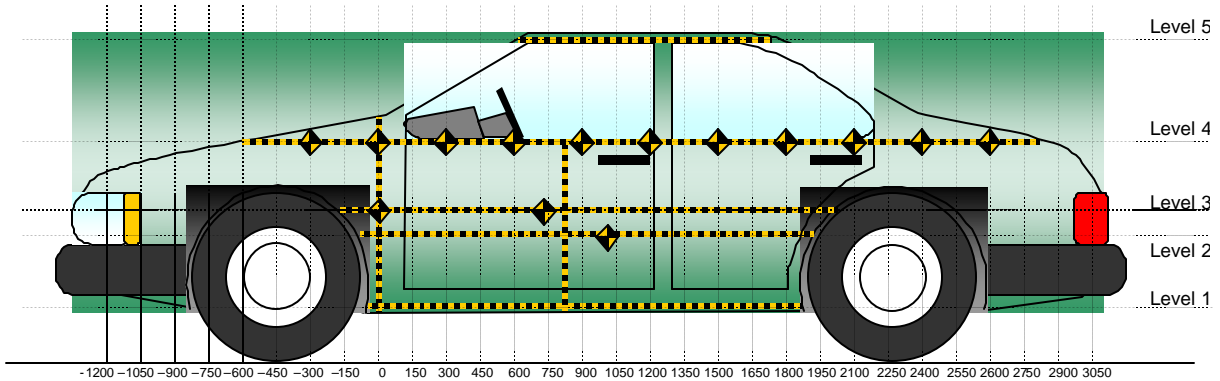


Code	Measurement Description	Units	Left Front 009	Left Rear 010
HR	Head to Side Header	mm	174	143
HS	Head to Side Window	mm	273	252
AD	Arm to Door	mm	65	70
HD	H-Point to Door	mm	96	124

DATA SHEET NO. 8
VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002



All Measurements Shown in mm

LEFT SIDE VIEW

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

Level	Measurement Description	Height Above Ground
5	Window	1370
4	Window Sill	885
3	Mid Door	574
2	Occupant H-Point	520
1	Sill Top	242

DATA SHEET NO. 9
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1050															
-900															
-750															
-600				360					367					7	
-450				343					355					12	
-300				330					349					19	
-150				321					349					28	
0		260	260	315			396	384	359			136	124	44	
150	299	265	266	312		406	550	534	415		107	285	268	103	
300	304	259	264	309		436	570	551	471		132	311	287	162	
450	307	258	263	307		459	573	543	504		152	315	280	197	
600	307	256	260	306		474	573	543	503		167	317	283	197	
750	306	255	260	307	537	485	563	538	512	576	179	308	278	205	39
900	306	254	259	308	540	498	555	542	532	588	192	301	283	224	48
1050	306	254	259	311	541	513	553	537	544	547	207	299	278	233	14
1200	308	257	259	309	543	513	587	583	554	568	205	330	324	245	25
1350	308	252	259	315	544	503	580	584	548	568	195	328	325	233	24
1500	310	255	260	316	543	460	542	562	539	529	150	287	302	223	-14
1650	305	255	261	321	542	422	491	513	510	491	117	236	252	189	-51
1800	290	262	262	323	540	383	432	435	461	452	93	170	173	138	-88
1950		260	260	329	542		298	302	357	569		38	42	28	27
2100			257	336				310	383				53	47	
2250				343					374					31	
2400			258	350				284	370				26	20	
2550			276	359				287	373				11	14	
2700			288	367				284	375				-4	8	
2850				379					378					-1	
3000				400					392					-8	
3150															
3300															

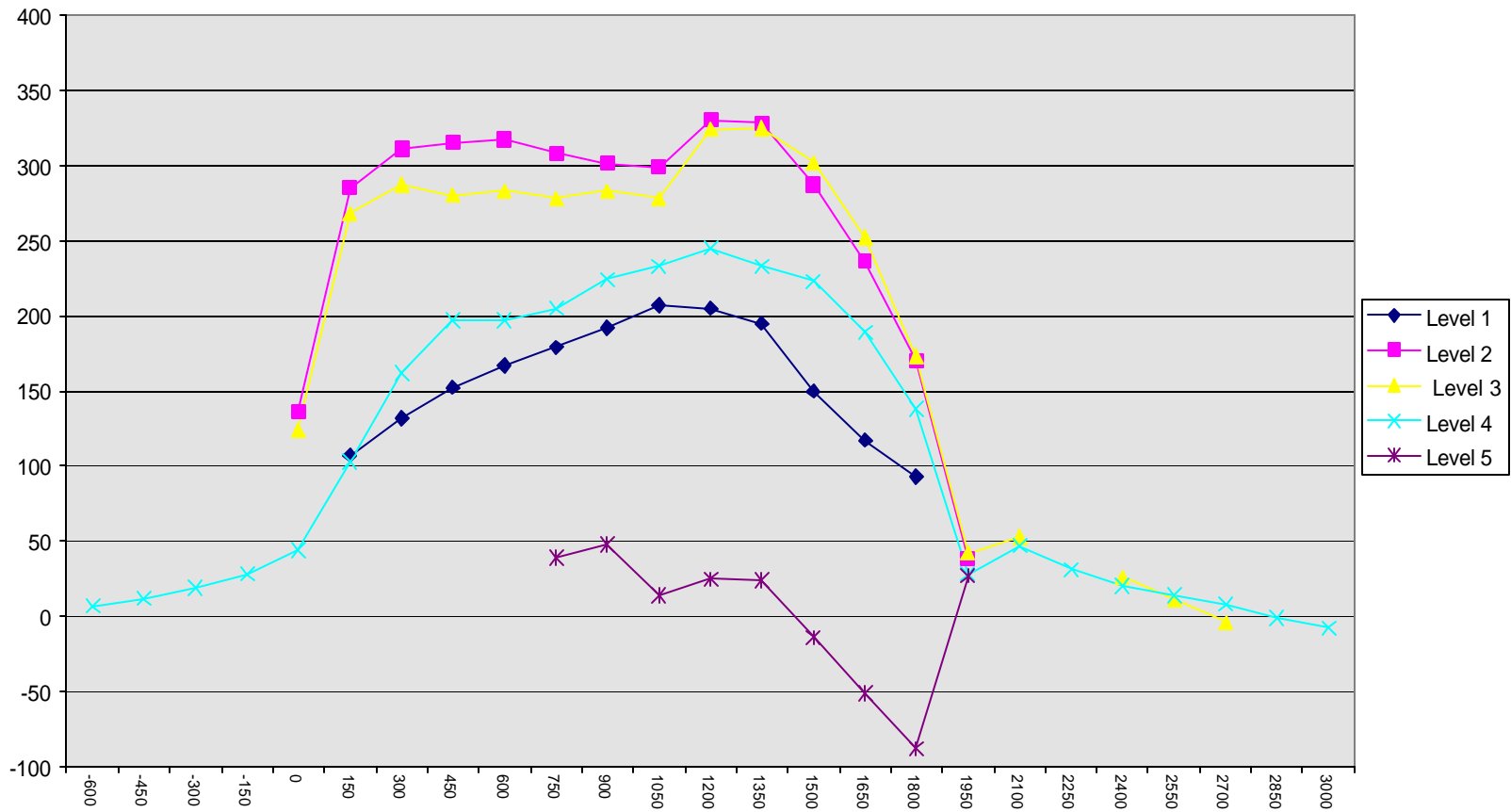
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

DATA SHEET NO. 9... (continued)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2001 Ford Focus 4 door

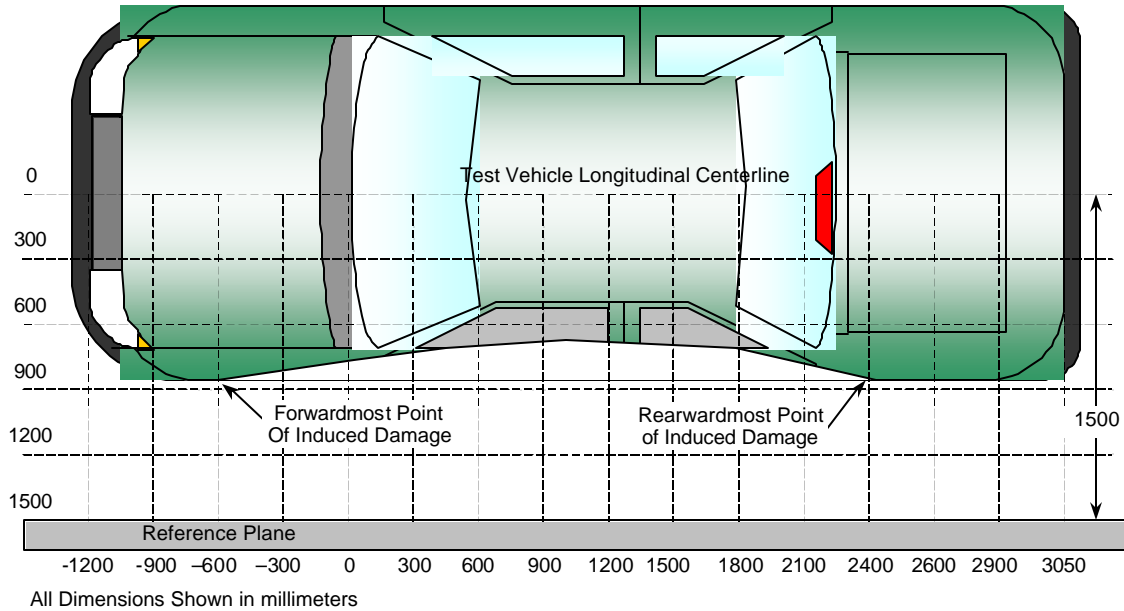
Test Date: December 10, 2002



DATA SHEET NO. 10
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002



TOP VIEW

Damage Profile Distances

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2850 mm	4	379	378	-1
2	2187 mm	4	338	374	36
3	1428 mm	3	260	575	315
4	736 mm	2	255	591	336
5	73 mm	4	313	374	61
6	-600 mm	4	360	367	7

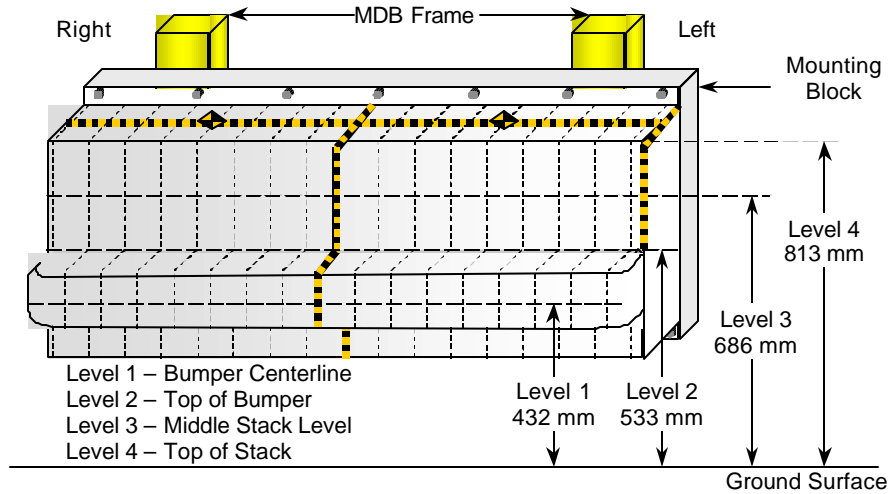
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body.

DATA SHEET NO. 11

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002



DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C _L	Distance Left of Center							
	800	700	600	500	400	300	200	100		0	100	200	300	400	500	600	700
1	158	119	76	55	46	52	54	53	56	60	65	69	73	81	86	104	128
2	72	60	33	30	33	36	36	35	40	44	49	53	59	62	67	72	80
3	56	15	0	-1	0	1	7	10	8	8	9	13	17	22	31	60	117
4	73	26	3	-2	-2	8	25	18	30	30	20	22	29	42	60	105	165

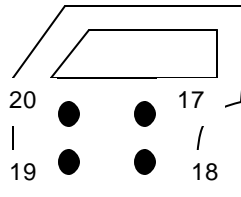
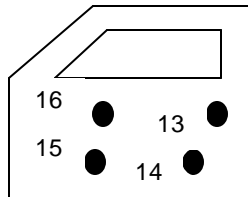
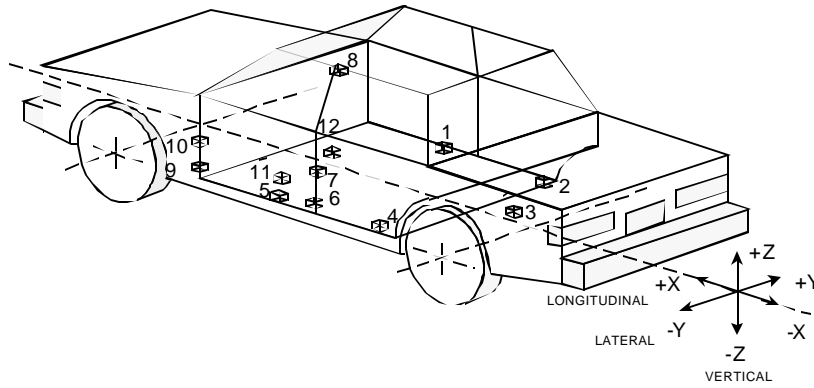
All Dimensions in mm

DATA SHEET NO. 12

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002



No.	Location
1	Right Sill at Front Seat
2	Right Sill at Rear Seat
3	Rear Floorpan Above Axle
4	Left Sill at Rear Door
5	Left Sill at Front Door
6	Left 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
12	Vehicle CG

No.	Location
13	Left Front Door @ Mid Rib
14	Left Front Door @ Pelvis
15	Left Front Door @ Knee
16	Left Front Door @ Arm
17	Left Rear Door @ Mid Rib
18	Left Rear Door @ Pelvis
19	Left Rear Door @ Knee
20	Left Rear Door @ Arm
21	Left Driver Seat Frame
22	Right Driver Seat Frame
23	Right Rear Occupant Compartment

DATA SHEET NO. 12... (continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002

VEHICLE ACCELEROMETER PEAK DATA

Loc. No.	Accelerometer Location	Longitudinal (X) Maximum (g's) (CFC 60)		Lateral (Y) Maximum (g's) (CFC 60)		Vertical (Z) Maximum (g's) (CFC 60)		Result. (g's) (CFC 60)
		Pos	Neg	Pos	Neg	Pos	Neg	Max
1	Right Sill at Front Seat	3.6	5.8	19.9	2.0	4.1	6.7	21.1
2	Right Sill at Rear Seat	2.2	6.1	24.7	3.3	4.9	6.0	24.8
3	Rear Floorpan Above Axle	4.0	10.4	22.8	4.2	12.1	10.9	25.8
4	Left Sill at Rear Door			78.0	33.8			
5	Left Sill at Front Door			56.7	9.5			
6	Left Lower B Post			105.9	19.7			
7	Left Mid B Post			195.7	30.2			
8	Left Upper B Post			35.0	20.0			
9	Left Lower A Post			68.6	26.7			
10	Left Mid A Post			57.5	11.1			
11	Driver Seat Track			52.2	13.0			
12	Vehicle CG	5.8	12.1	30.0	7.9	8.9	5.8	30.2
13	Left Front Door @ Mid Rib			190.7	95.4			
14	Left Front Door @ Pelvis			169.5	133.3			
15	Left Front Door @ Knee			215.0	92.0			
16	Left Front Door @ Arm			182.6	94.2			
17	Left Rear Door @ Mid Rib			157.5	129.1			
18	Left Rear Door @ Pelvis			175.9	86.8			
19	Left Rear Door @ Knee			**	**			
20	Left Rear Door @ Arm			195.3	98.9			
21	Left Driver Seat Frame			129.8	29.4			
22	Right Driver Seat Frame			101.2	26.9			
23	Right Rear Occupant Compartment			38.0	2.6			

** No valid data collected

DATA SHEET NO. 12... (continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002

VEHICLE ACCELEROMETER COORDINATES

Loc. No.	Description	Coordinates (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2482	658	191
2	Right Sill at Rear Seat	1634	682	200
3	Rear Floorpan Above Axle	1041	0	501
4	Left Sill at Rear Door	1360	-700	211
5	Left Sill at Front Door	2323	-700	194
6	Left Lower B Post	1956	-658	266
7	Left Mid B Post	1954	-698	976
8	Left Upper B Post	1934	-493	1435
9	Left Lower A Post	2999	-673	467
10	Left Mid A Post	2997	-753	963
11	Driver Seat Track	2174	-552	366
12	Vehicle CG	2419	0	230
13	Left Front Door @ Mid Rib	2189	-714	956
14	Left Front Door @ Pelvis	2276	-732	424
15	Left Front Door @ Knee	2643	-712	688
16	Left Front Door @ Arm	2444	-725	944
17	Left Rear Door @ Mid Rib	1306	-730	994
18	Left Rear Door @ Pelvis	1563	-726	454
19	Left Rear Door @ Knee	1778	-721	692
20	Left Rear Door @ Arm	1550	-718	951
21	Left Driver Seat Frame	1924	-510	768
22	Right Driver Seat Frame	1924	-165	783
23	Right Rear Occupant Compartment	1798	358	428

Reference Points X – Rear Bumper (+forward)
 Y – Vehicle Centerline (+ right)
 Z – Ground Level (+ up)

DATA SHEET NO. 13

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

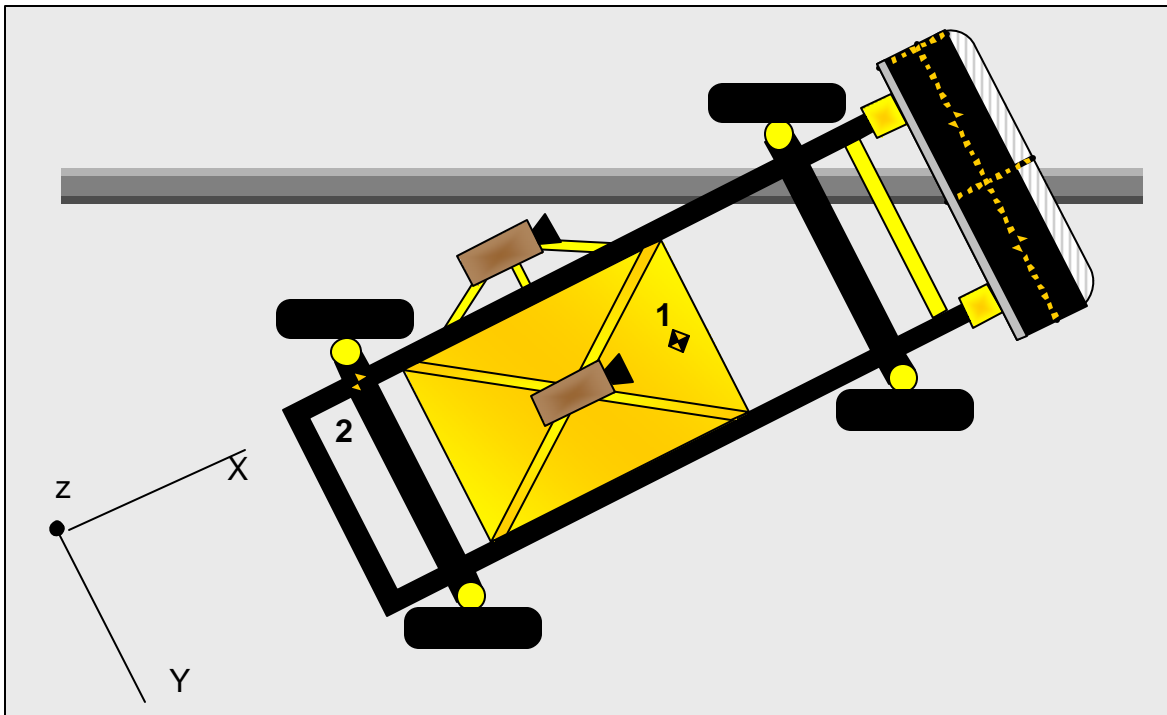
Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002

MDB ACCELEROMETER PEAK DATA AND LOCATIONS

Loc. No.	Accelerometer Location	Measurement (mm)			Peak Values (G's)				
		X	Y	Z	Axis	Max	Time	Min	Time
1	MDB CG	-1092	0	483	X	1.3	117	20.3	41
					Y	2.4	58	7.6	33
					Z	35.4	53	16.2	69
					RES	37.2	53		
2	MDB Rear	-2591	-625	622	X	2.0	123	22.8	36
					Y	4.8	31	2.0	188

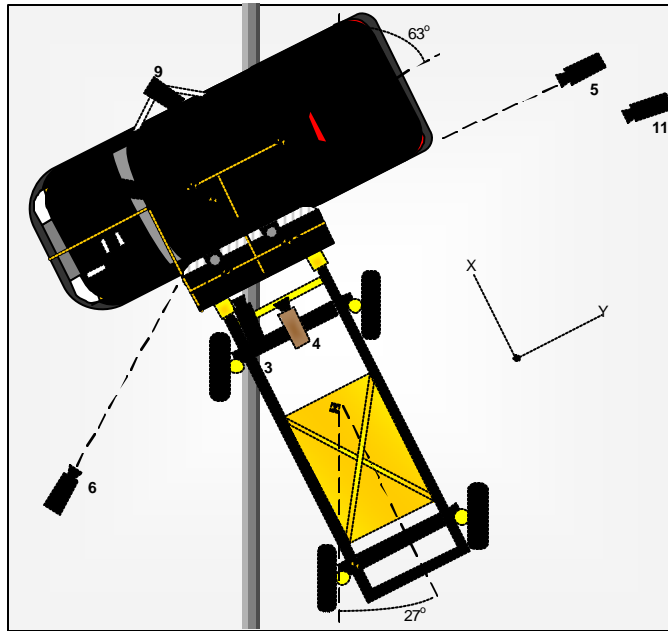
Reference Points X - MDB Front Axle (+ forward)
 Y - MDB Centerline (+ to right)
 Z - Ground Plane (+ up)



DATA SHEET NO. 14
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2001 Ford Focus 4 door

Test Date: December 10, 2002



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall				8	1099
2	Overhead Close-up				25	1047
3	MDB Onboard, Impact Point Close-up				35	985
4	MDB Onboard, Centerline of Impact				13	1031
5	Right Side, Ground Level, Overall				13	943
6	Front Impact	-3800	-5200	2710	25	Xx
7	Vehicle Onboard Front SID, Front				13	1020
8	Vehicle Onboard Front SID, Hip				13	512
9	Vehicle Onboard Rear SID, Hip				13	510
10	Vehicle Onboard Rear SID, Rear				8	498
11	Real Time Coverage				13	510

Reference Points X – Impact Line (+ forward or back)
Y - MDB Left Edge Impact Point (+ right)
Z - Ground Plane (+ up)

APPENDIX A
PHOTOGRAPHS

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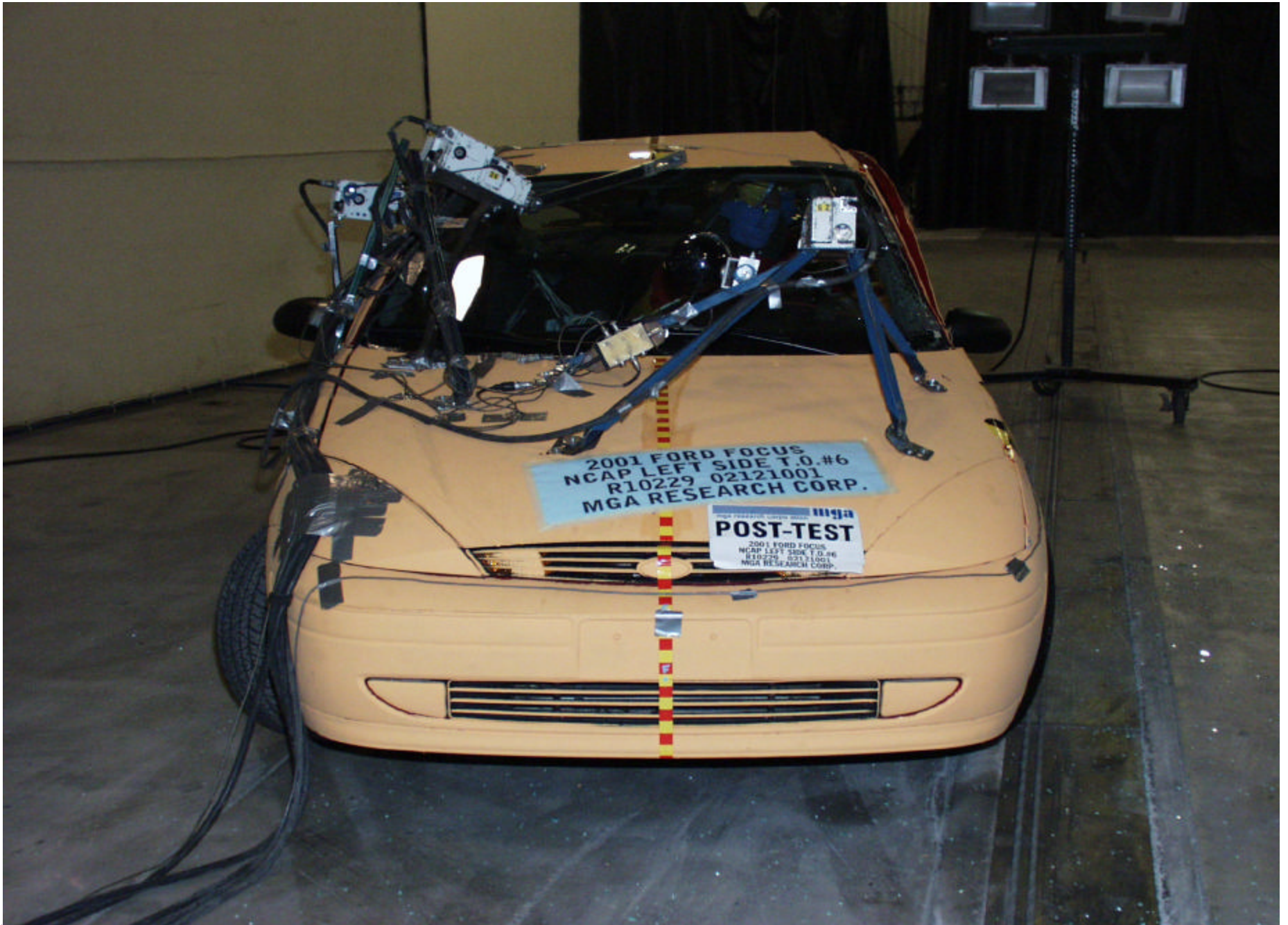
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Pre-Test Front View of Test Vehicle



Post-Test Front View of Test Vehicle



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle

A-5.



Pre-Test Left Side View of Test Vehicle

A-6.



Post-Test Left Side View of Test Vehicle

A-7.



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



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



Pre-Test Left Rear ¾ View of Test Vehicle



Post-Test Left Rear ¾ View of Test Vehicle

A-11.



Pre-Test MDB Positioned Against Vehicle (left side)



Pre-Test MDB Positioned Against Vehicle (right side)



Pre-Test MDB Positioned Against Vehicle (overhead view)

A-14.



Post-Test MDB and Vehicle (left side)

A-15.



Post-Test MDB and Vehicle (right side)



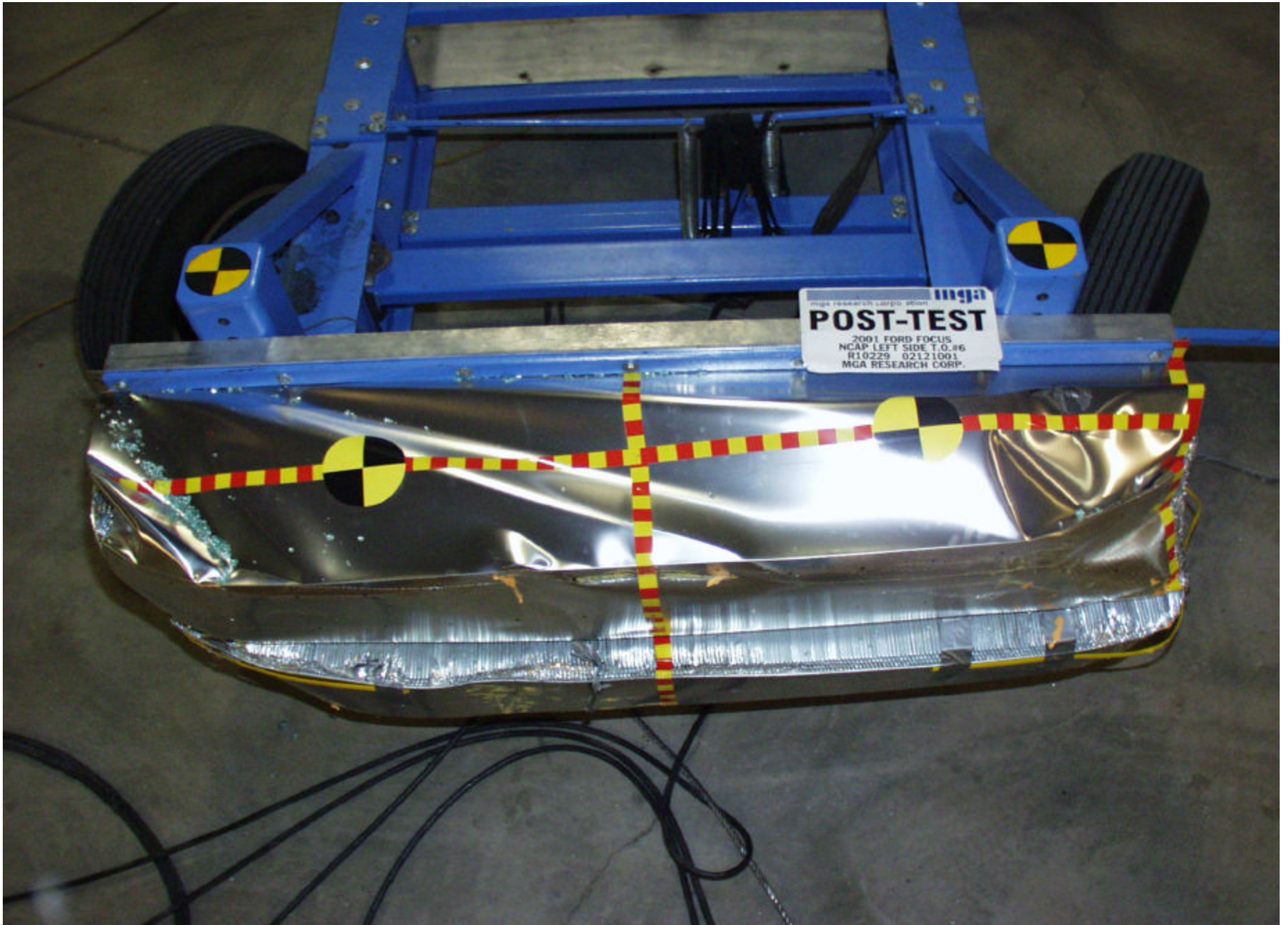
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A-17.



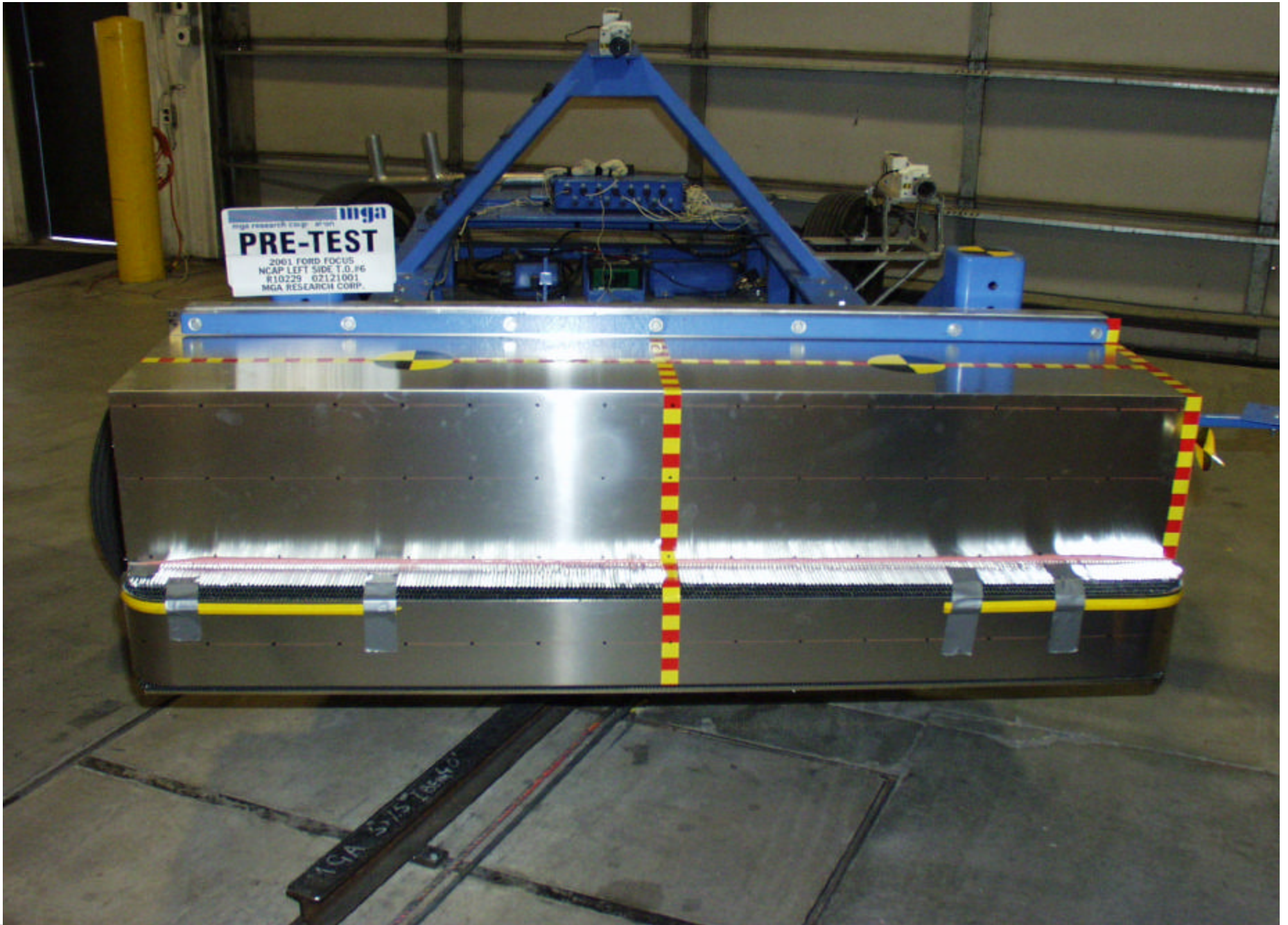
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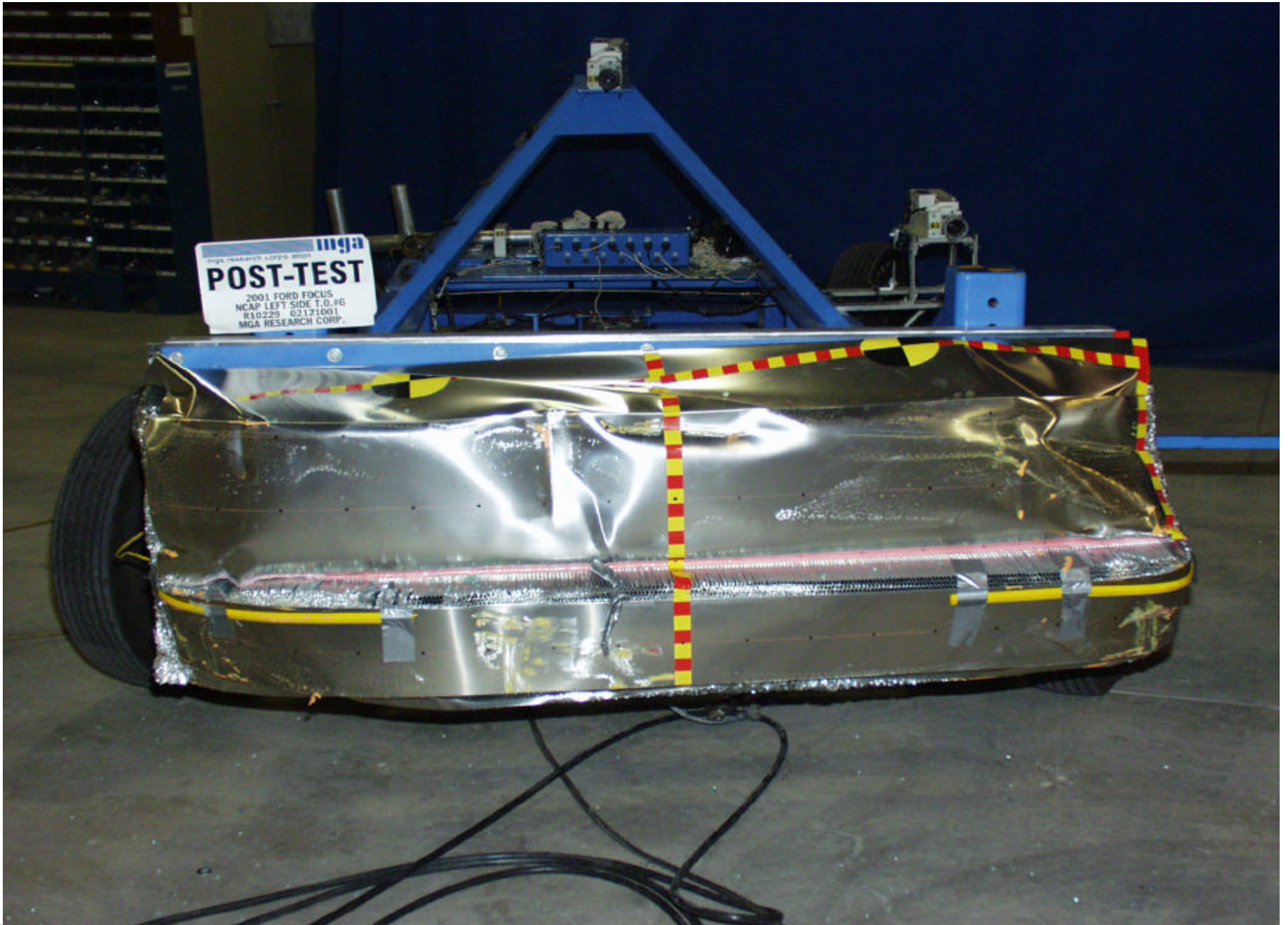
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Pre-Test MDB Front View

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Post-Test MDB Front View

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Pre-Test MDB Right Side View

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Post-Test MDB Right Side View



Pre-Test MDB Left Side View

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Post-Test MDB Left Side View



Pre-Test Driver Dummy Left Side View



Post-Test Driver Dummy Left Side View



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

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Pre-Test Driver Dummy Right Side View



Post-Test Driver Dummy Right Side View

A-30.



Pre-Test Driver Dummy Shoulder and Door Top View



Post-Test Driver Dummy Shoulder and Door Top View

A-32.



Pre-Test Passenger Dummy Left Side View

A-33.



Post-Test Passenger Dummy Left Side View

A-34.



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



Pre-Test Passenger Dummy Right Side View



Post-Test Passenger Dummy Right Side View



Pre-Test Passenger Dummy Shoulder and Door Top View



Post-Test Passenger Dummy Shoulder and Door Top View



Post-Test Driver Dummy Head Contact

A-40.



Post-Test Driver Dummy Lower Body Contact



Post-Test Passenger Dummy Head Contact



Post-Test Passenger Dummy Lower Body Contact



Pre-Test Impact Point on Vehicle



Post-Test Impact Point on Vehicle

A-45.

focus

RECOMMENDED TIRE SIZE AND INFLATION PRESSURE (COLD)
 DIMENSIONS DES PNEUS et PRESSIONS DE GONFLAGE RECOMMANDÉES (À FROID)

TIRE SIZE DIMENSIONS DES PNEUS	LOAD RANGE CHARGE NOMINALE	PRESSION PRESSURE	
		AVANT FRONT	ARRIÈRE REAR
P185/65 R14 85S* **	ALL	221 kpa / 32 PSI	221 kpa / 32 PSI
P195/60 R15 87T*	ALL	221 kpa / 32 PSI	221 kpa / 32 PSI
P205/50 R16 86H*	ALL	234 kpa / 34 PSI	234 kpa / 34 PSI
T125/80 R15 95M* TEMPORAL SPARE PNEU DE SECOURS PROVISOIRE	ALL	415 kpa / 60 PSI	415 kpa / 60 PSI

*MUST BE REPLACED WITH AN EQUIVALENT TYPE SPEED RATED TIRE.
 **SNOW CHAINS MAY ONLY BE USED WITH THIS TIRE.
 *NE REMPLACER QUE PAR UN PNEU DONT L'INDICE DE VITESSE EST LE MEME. **N'UTILISER DES CHAÎNES À NEIGE QU'AVEC CE TYPE DE PNEU.

TOTAL LOAD = OCCUPANTS PLUS LUGGAGE		CHARGE TOTALE = OCCUPANTS PLUS BAGAGES		
MAXIMUM LOAD CHARGE MAXIMALE	OCCUPANTS OCCUPANTS	DISTRIBUTION		LUGGAGE BAGAGES
		FRONT AVANT	REAR ARRIÈRE	
375 kg/826.7 lb	5	2	3	35 kg/77.2 lb

FOR SUSTAINED HIGH SPEED, TRAILER TOWING, RECREATIONAL ACCESSORIES, SNOW CHAINS OR TEMPORAL SPARE INFORMATION - SEE OWNER GUIDE.
 HAUTES VITESSES SOUTENUES, REMORQUES, ACCESSOIRES DE LOISIRS, CHAÎNES À NEIGE ET PNEU DE SECOURS PROVISOIRE : CONSULTER LE GUIDE DU PROPRIÉTAIRE.

YUSA-F06099-AD

Tire Placard

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

GVWR: 3630LB/1646KG

DATE: 01/01

FRONT GAWR: 1975LB 895KG

REAR GAWR: 1745LB 791KG

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

VIN: 1FAHP34351W220839

TYPE: PASSENGER

F0063

R0035



EXT PNT: E4

IRC: 41 | DSO:

BRK	INT TR	TP/PS	R	AXLE	TR	SPR	1AK2A
A	EW		3	UU	5		Z05

UPC ▼ F85B-1520472-AB

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Left Front Attitude

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Right Front Attitude

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Left Rear Attitude

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Right Rear Attitude

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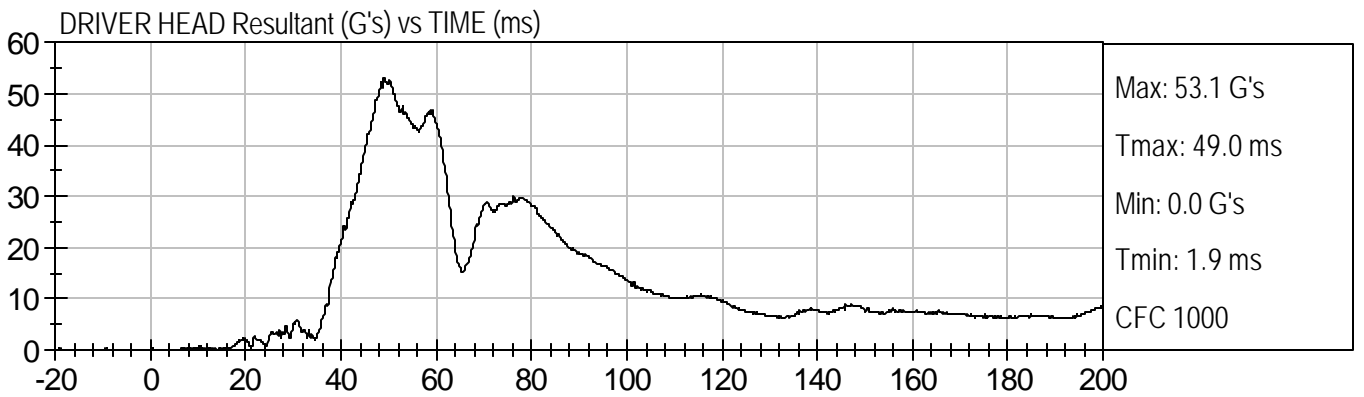
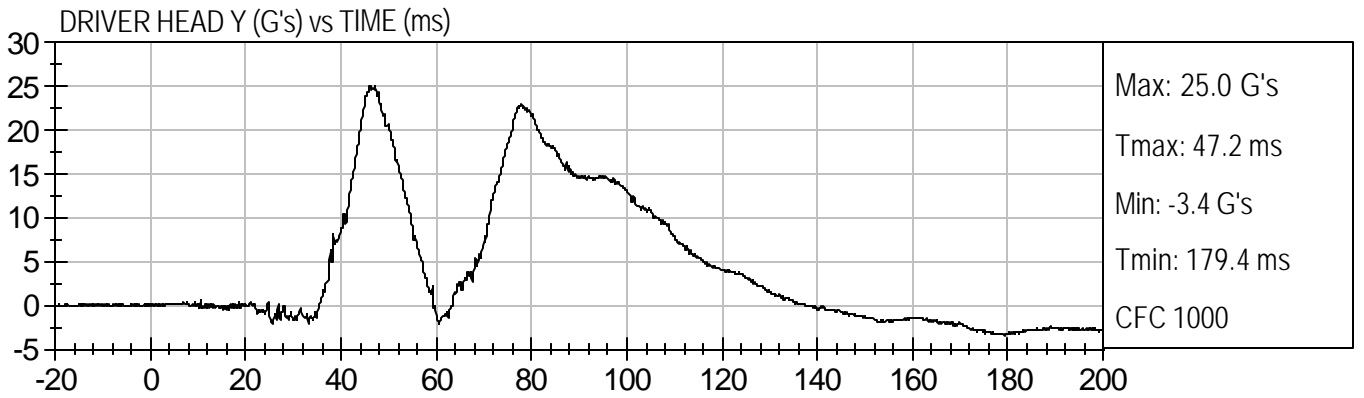
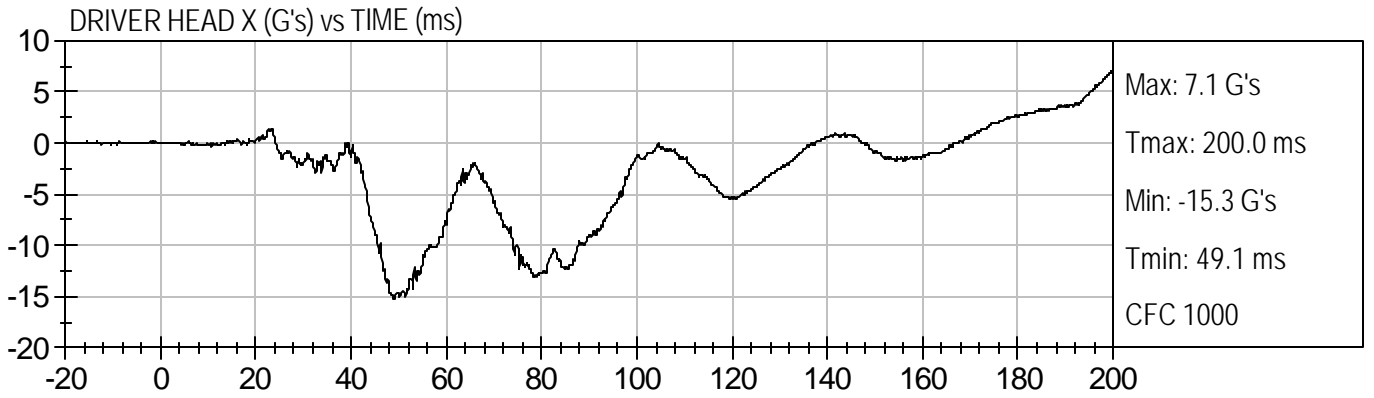
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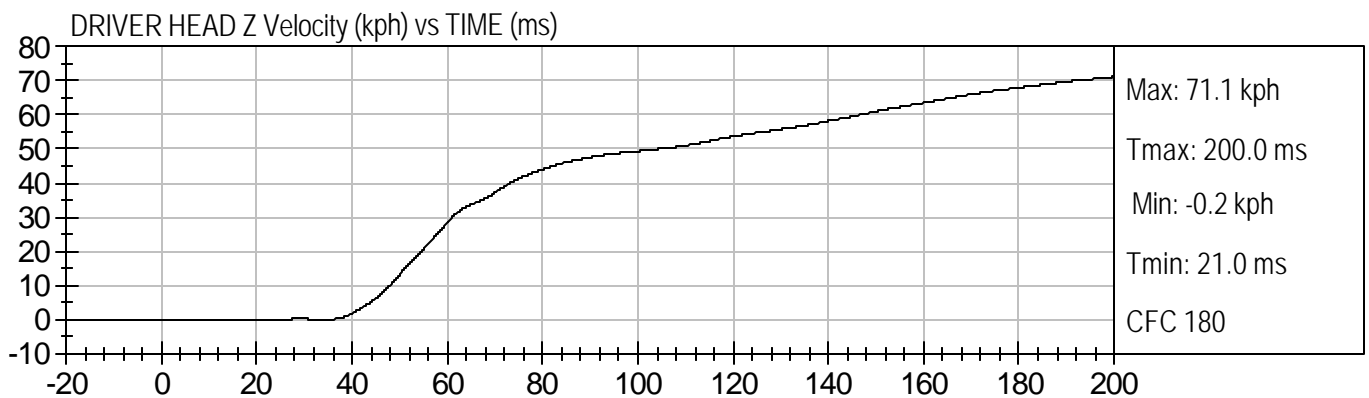
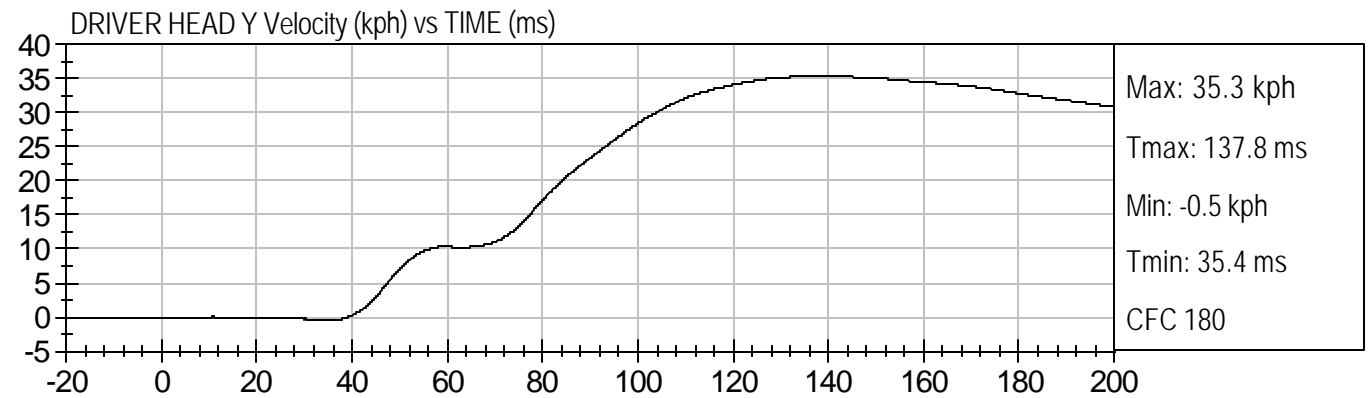
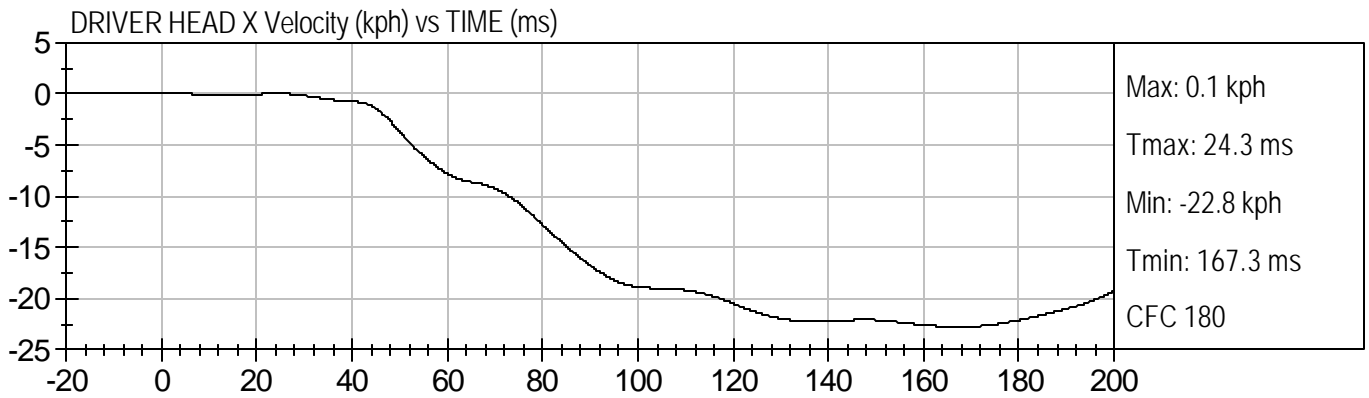
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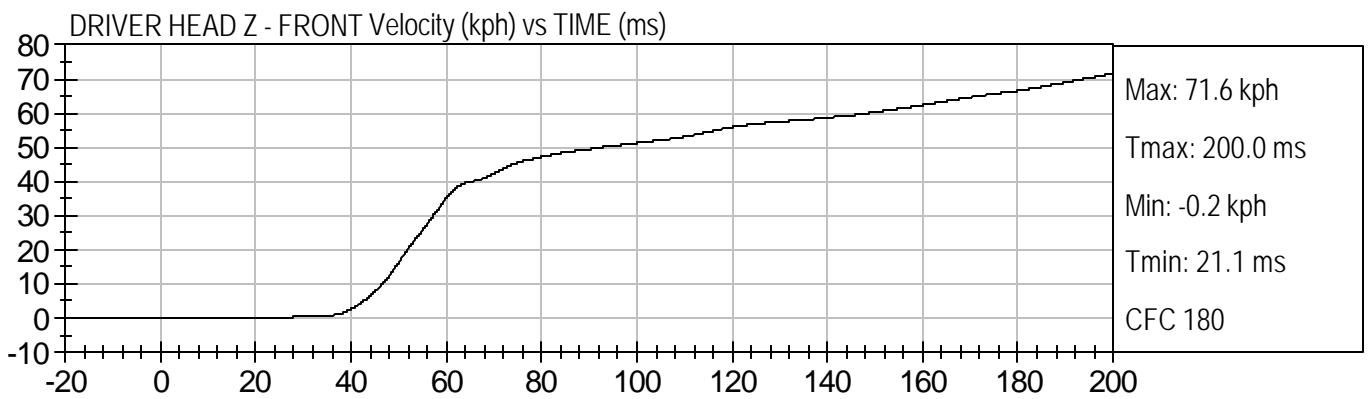
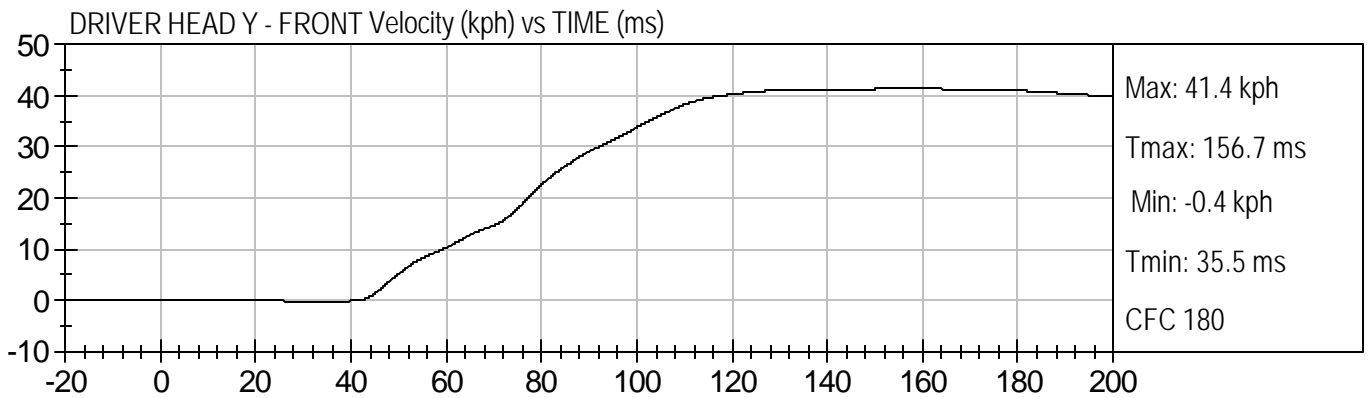
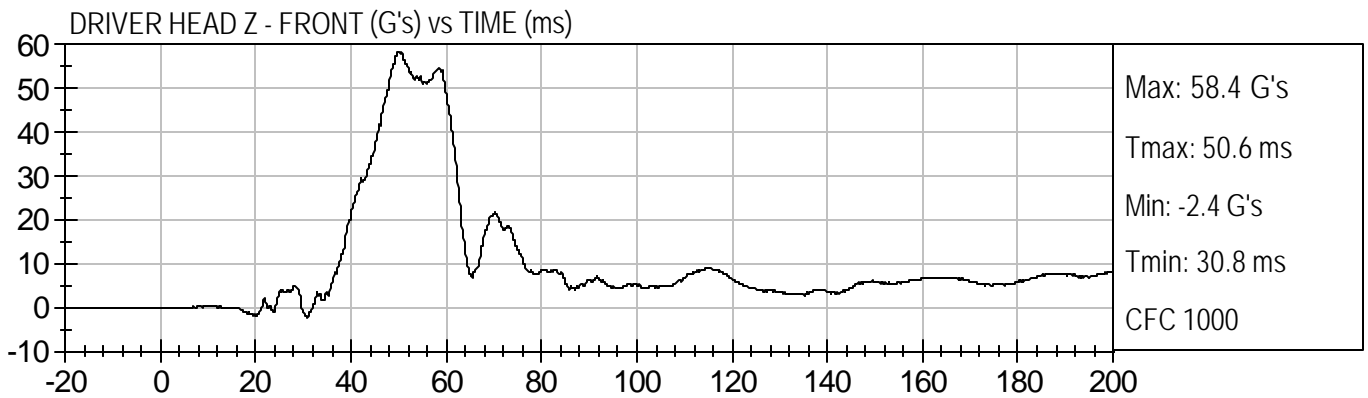
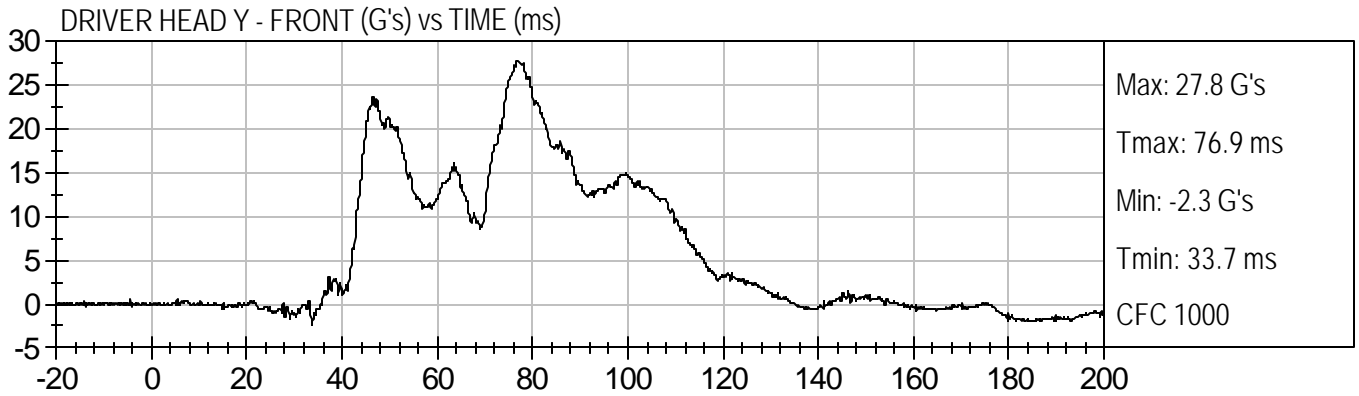
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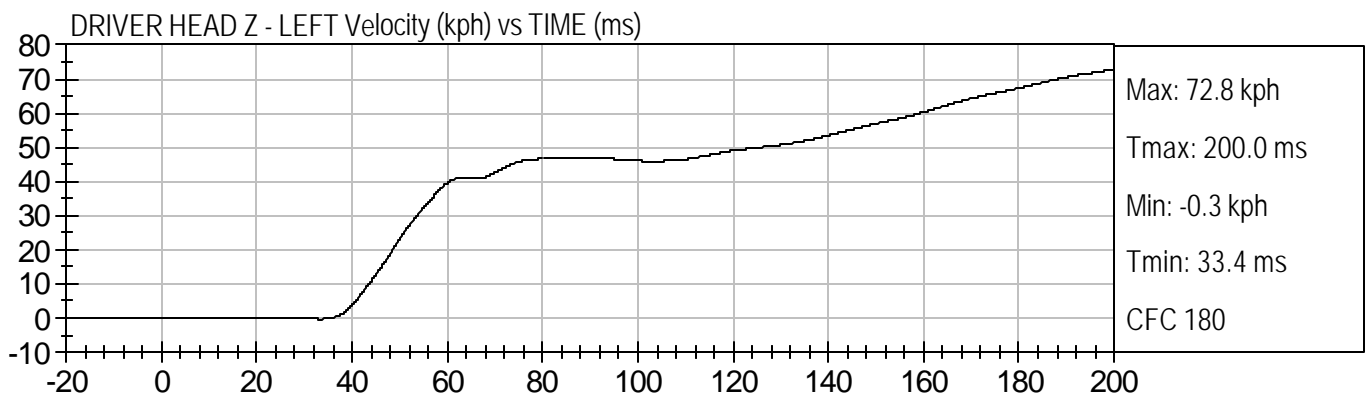
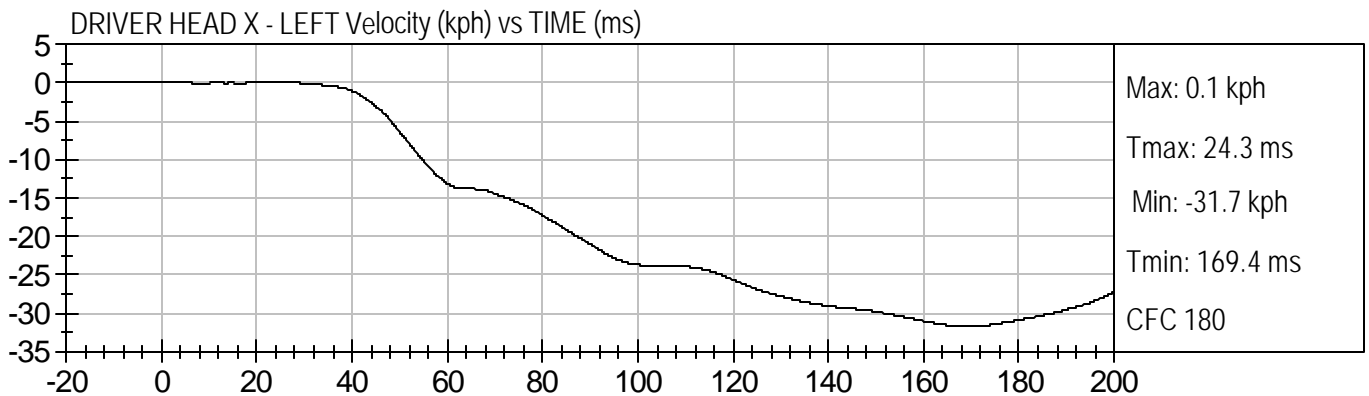
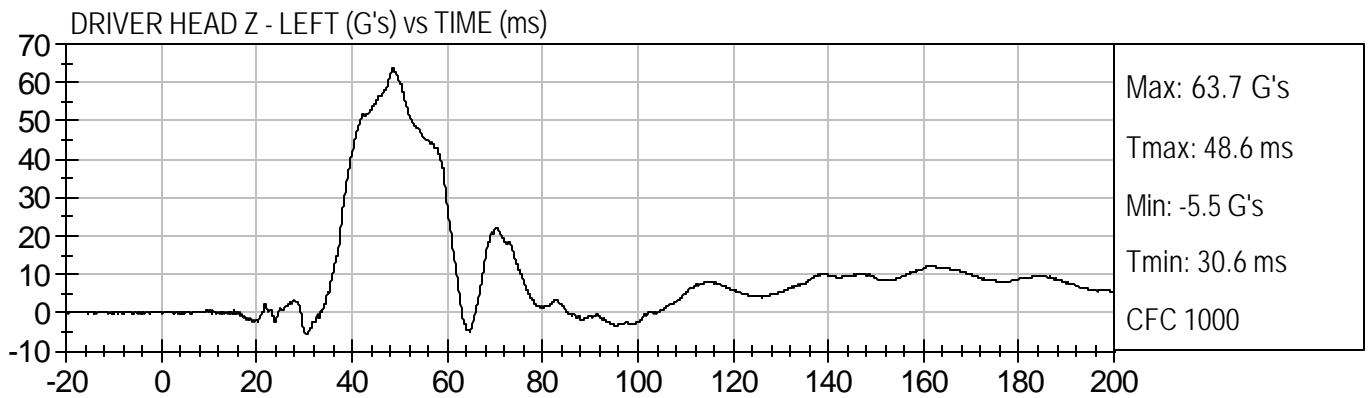
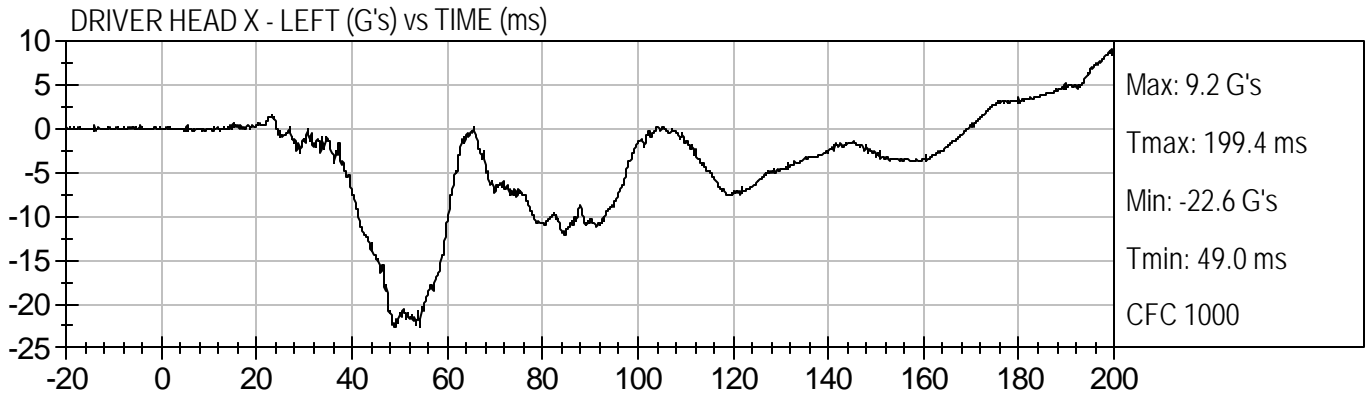
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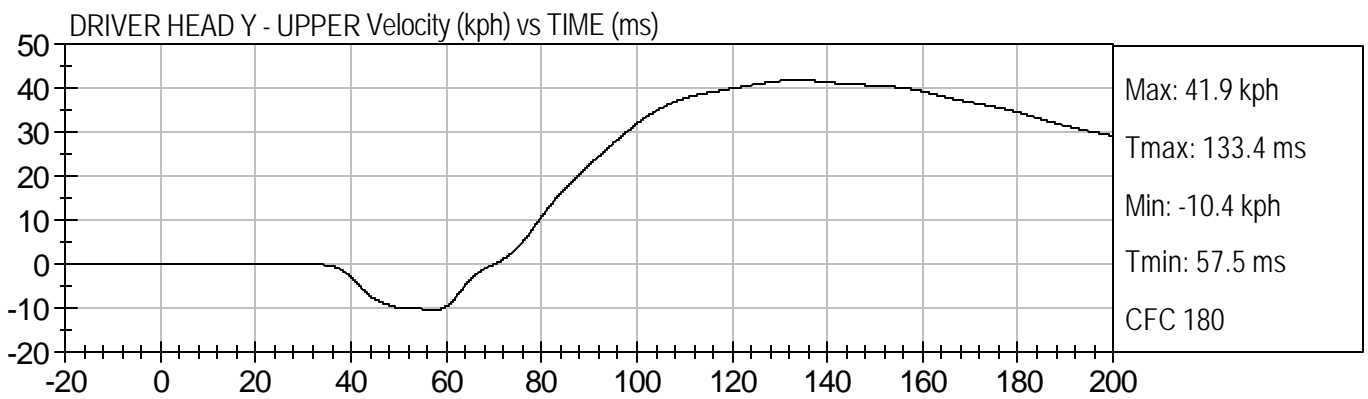
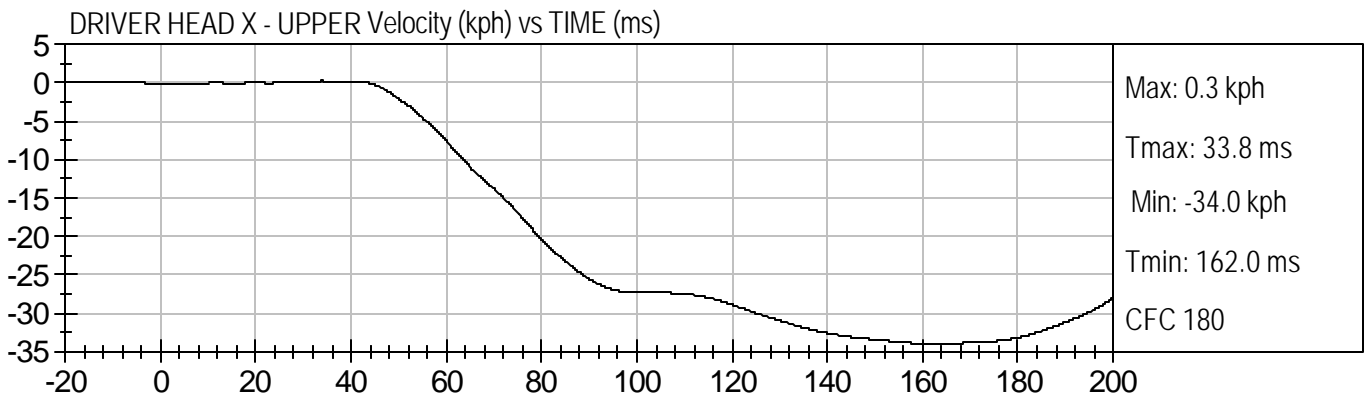
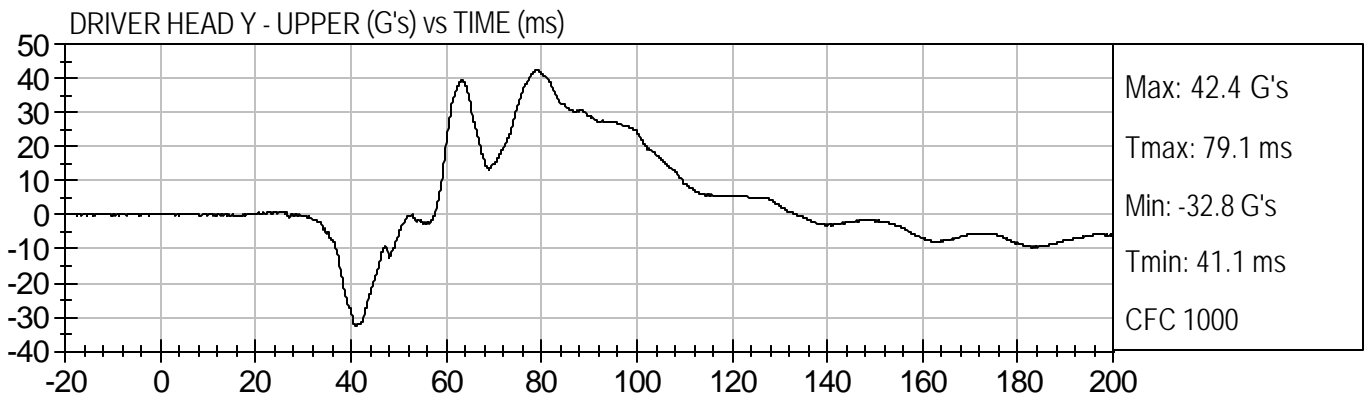
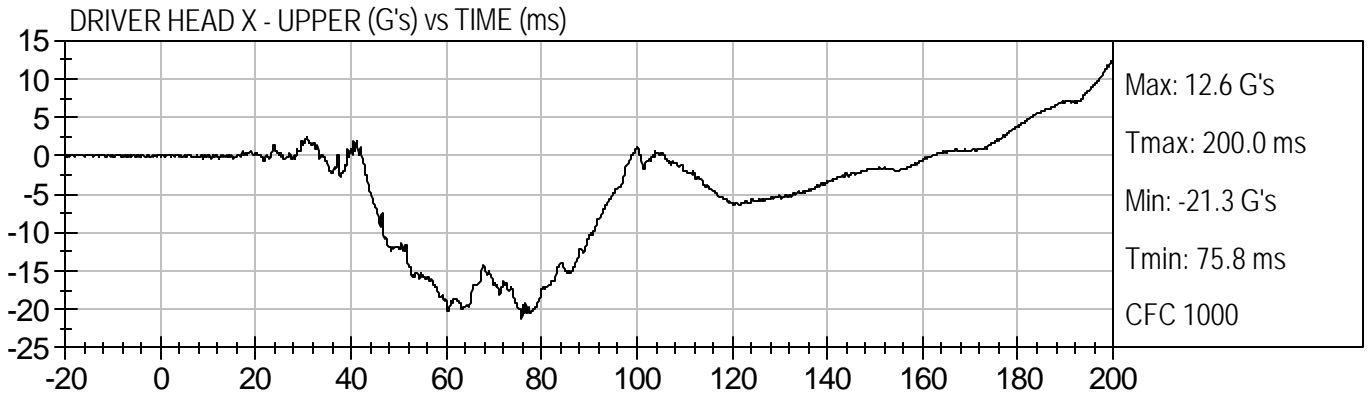
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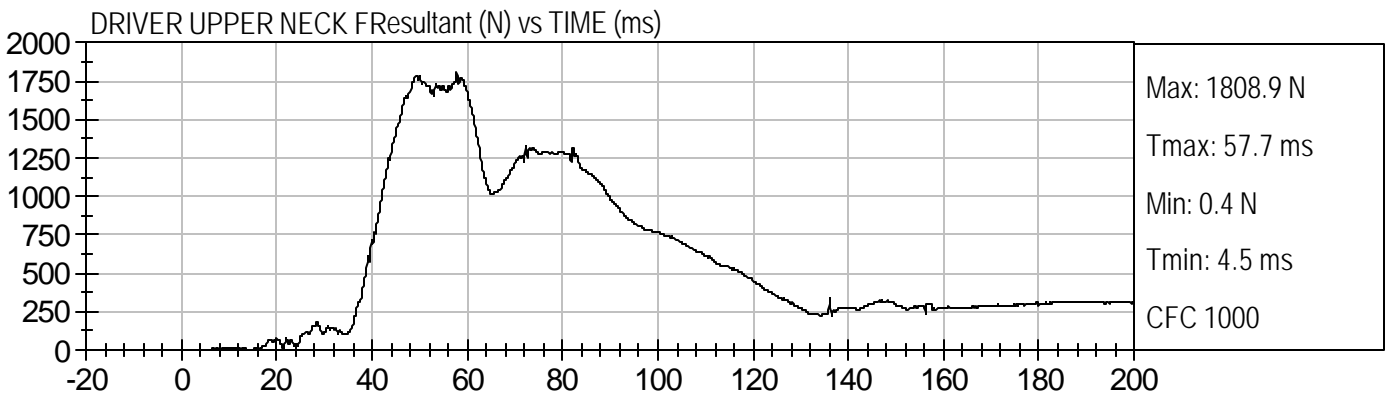
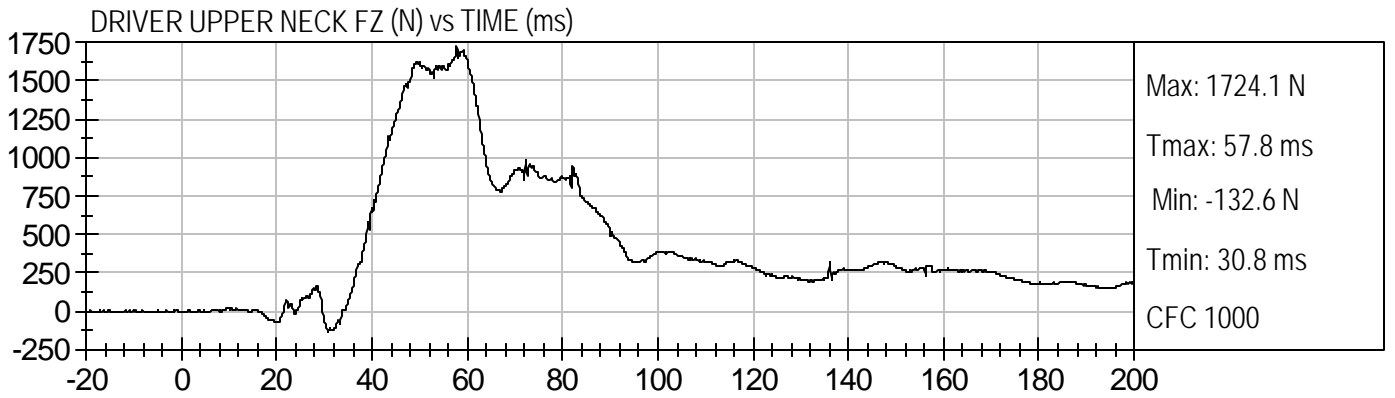
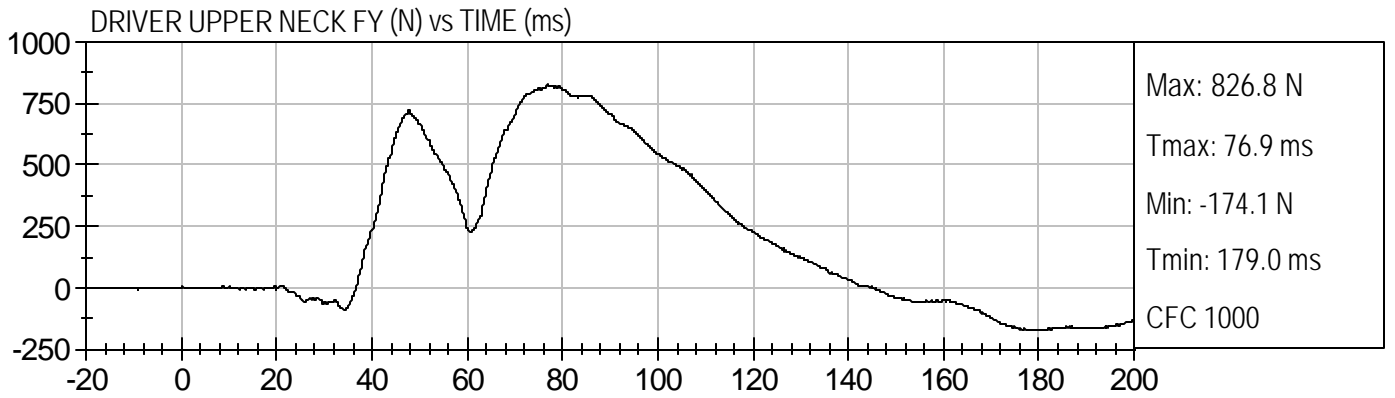
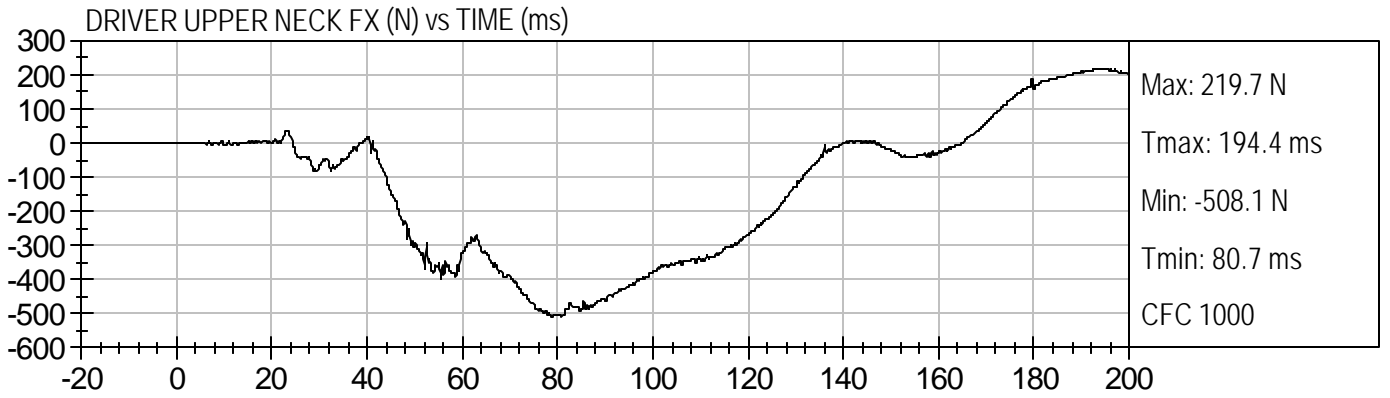


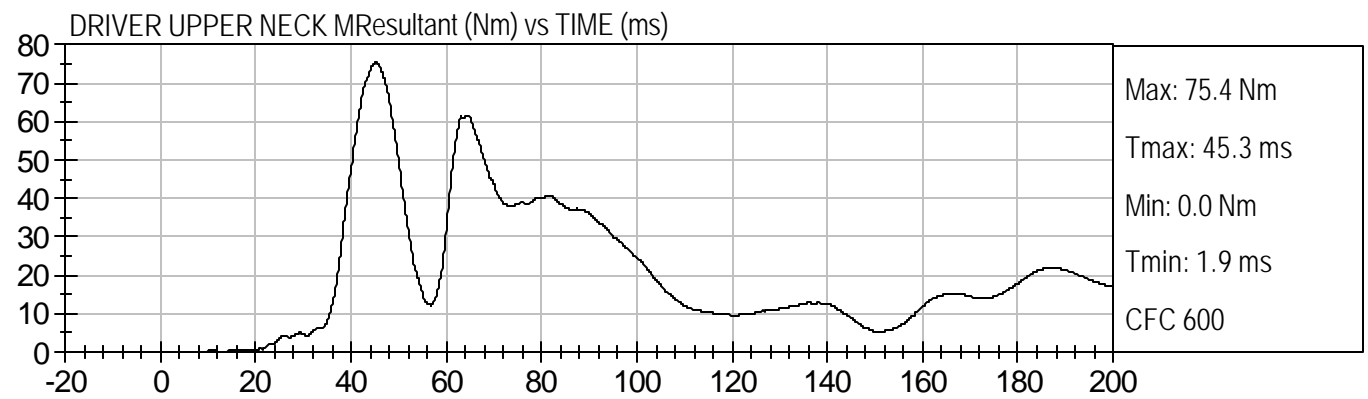
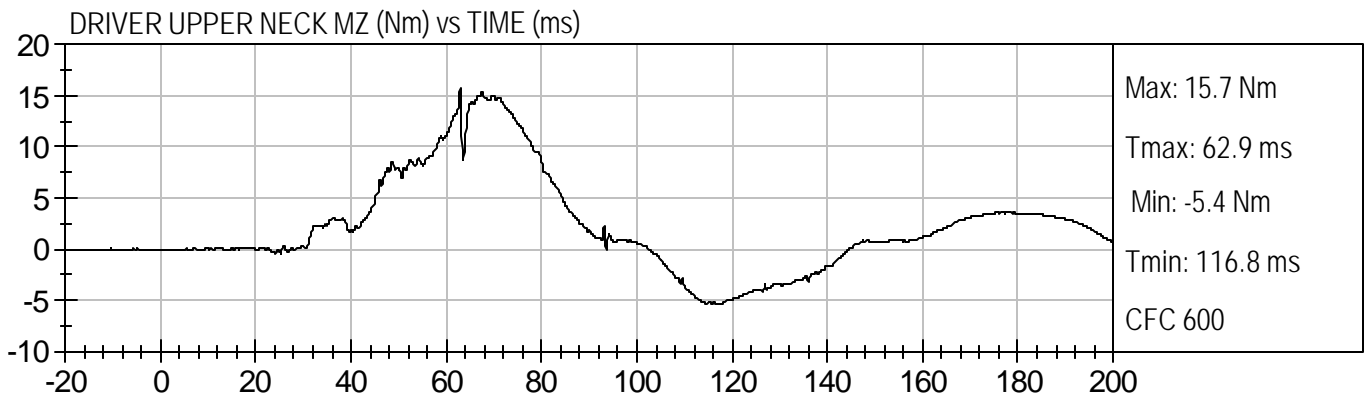
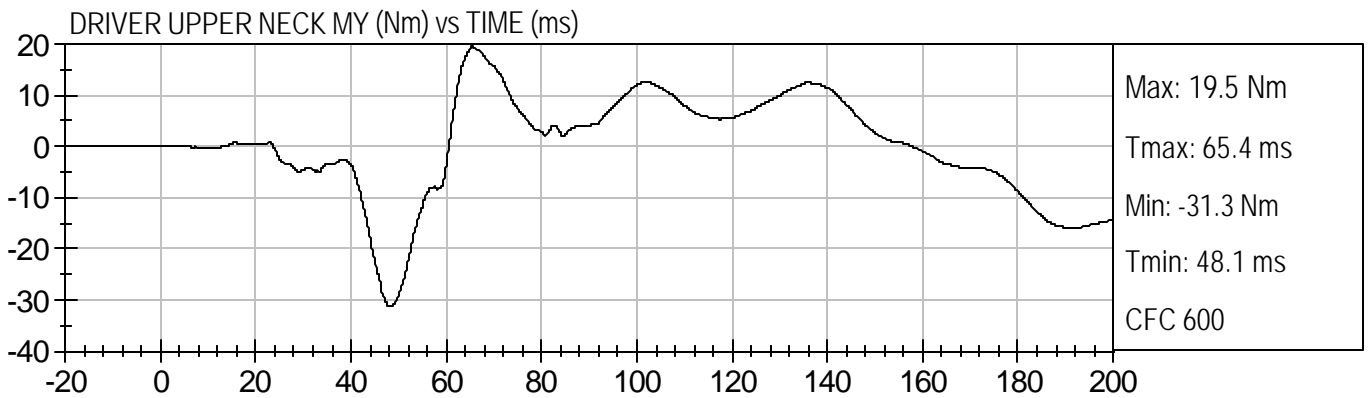
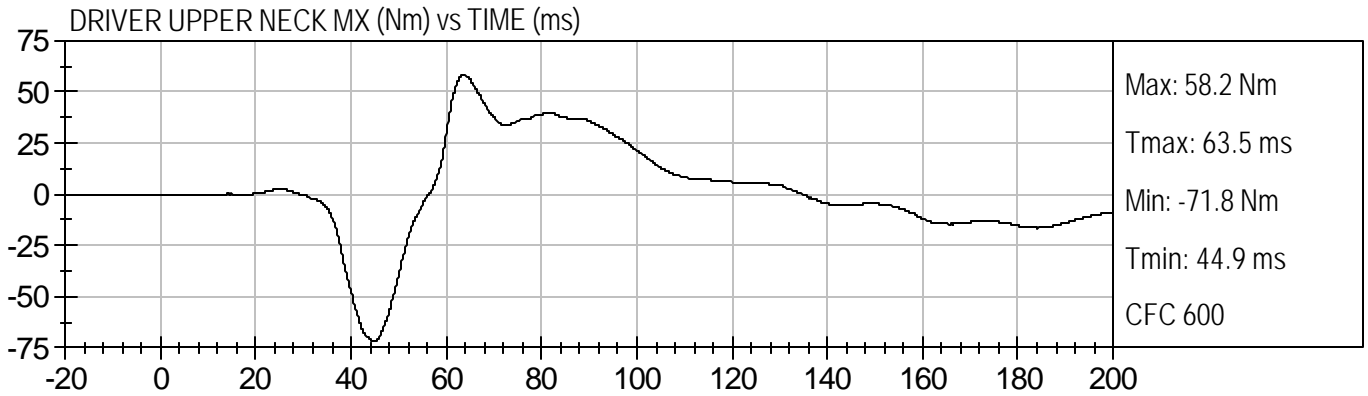


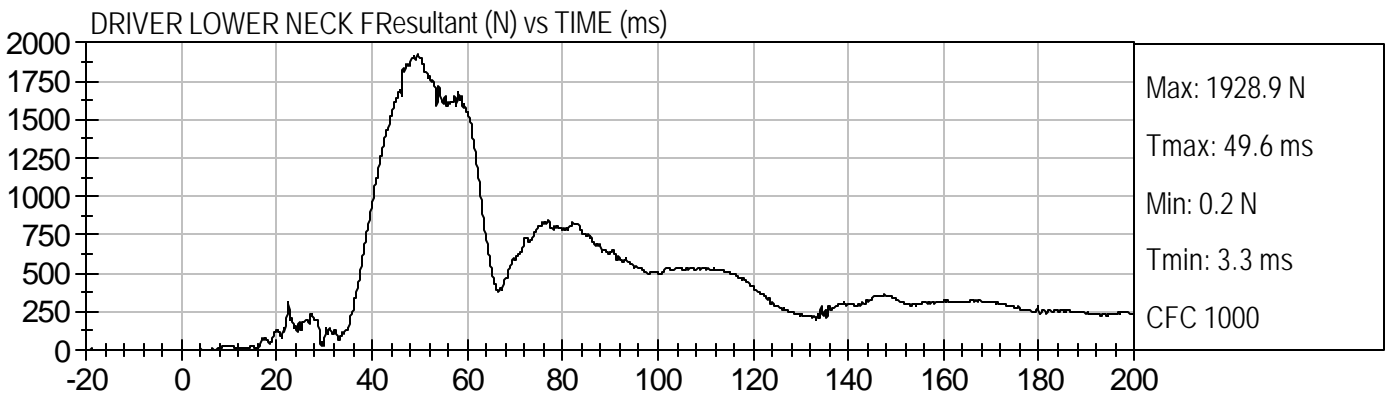
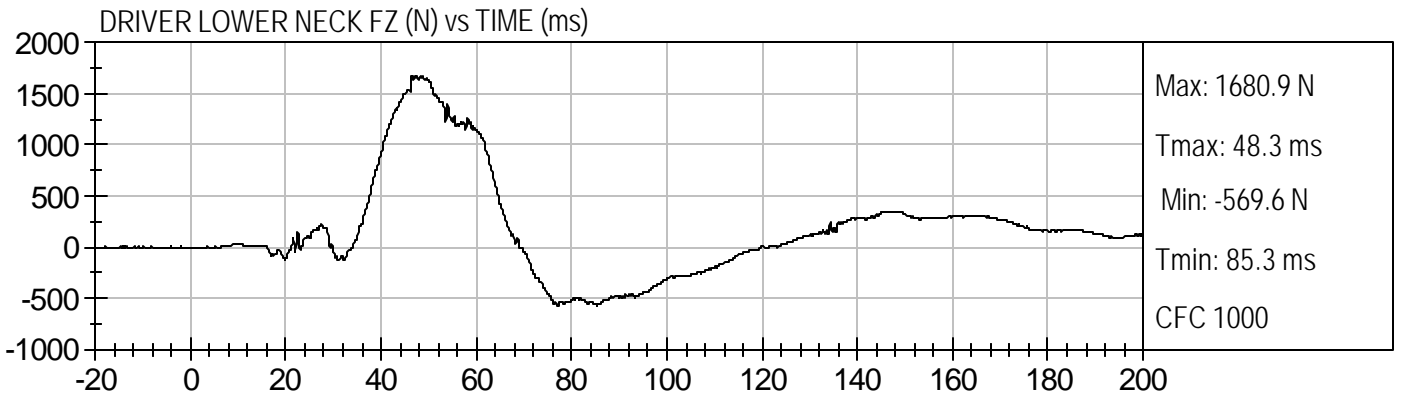
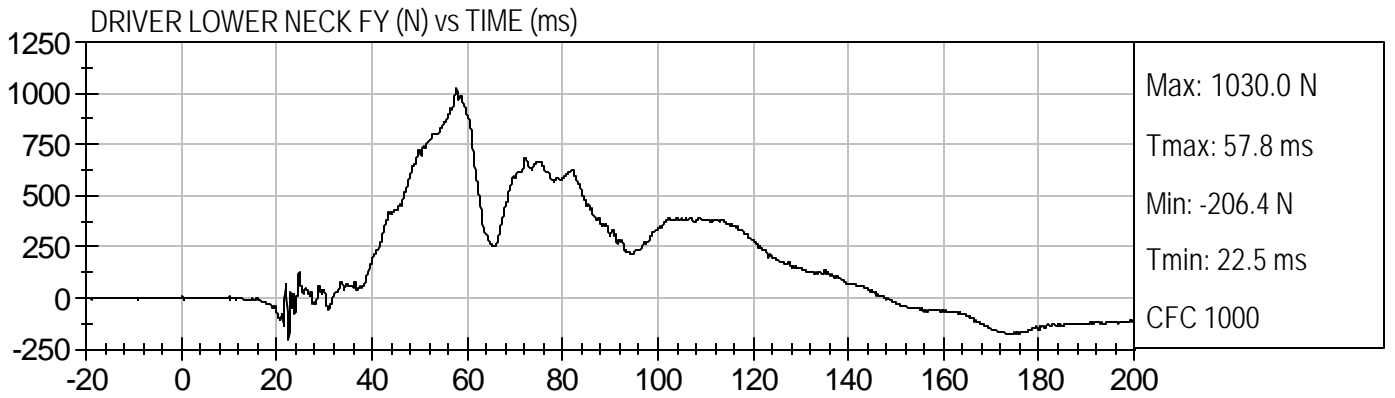
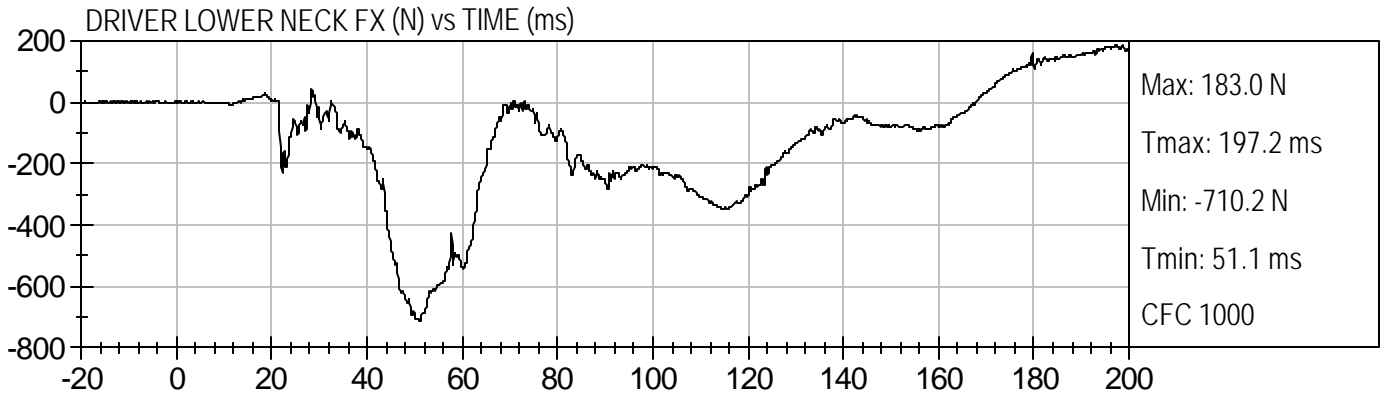


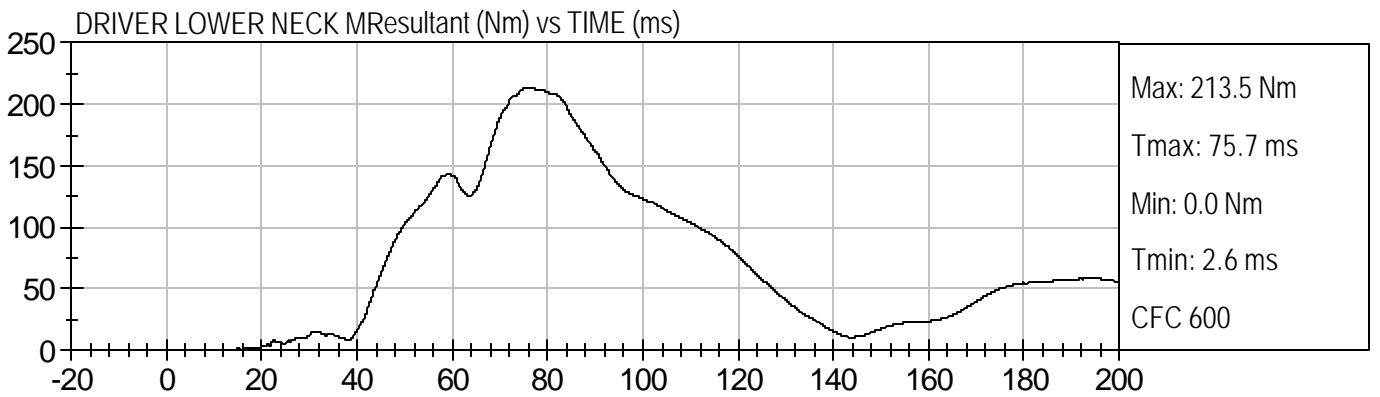
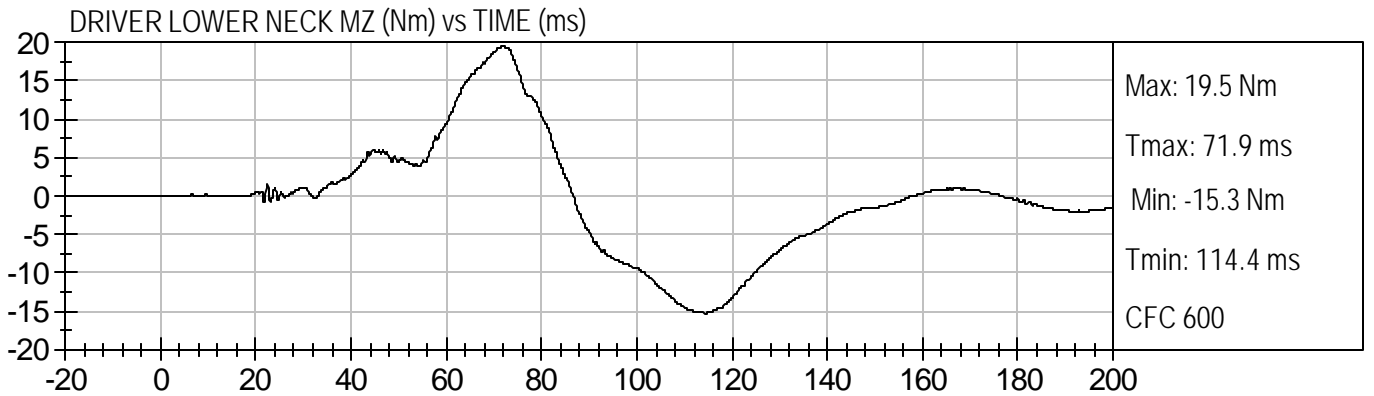
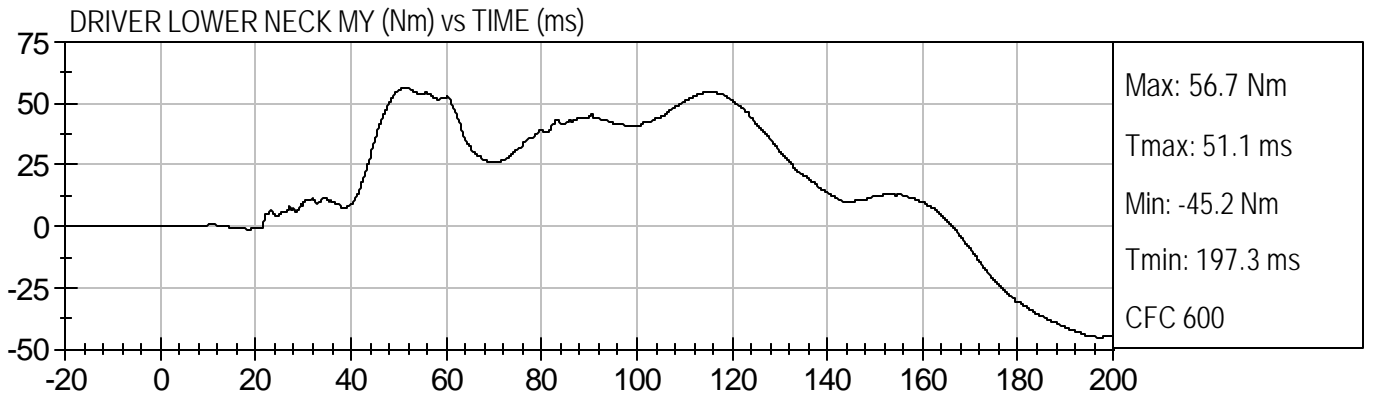
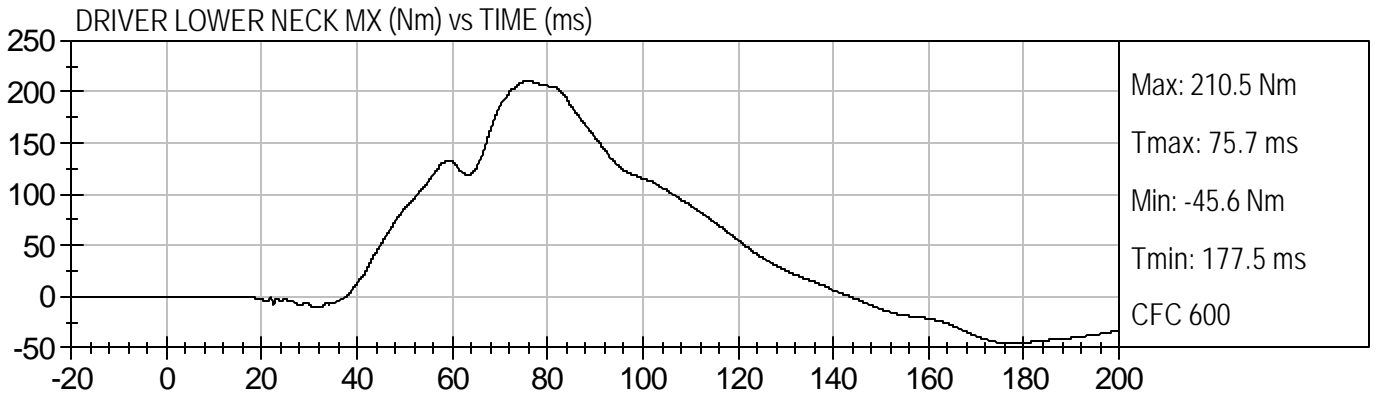


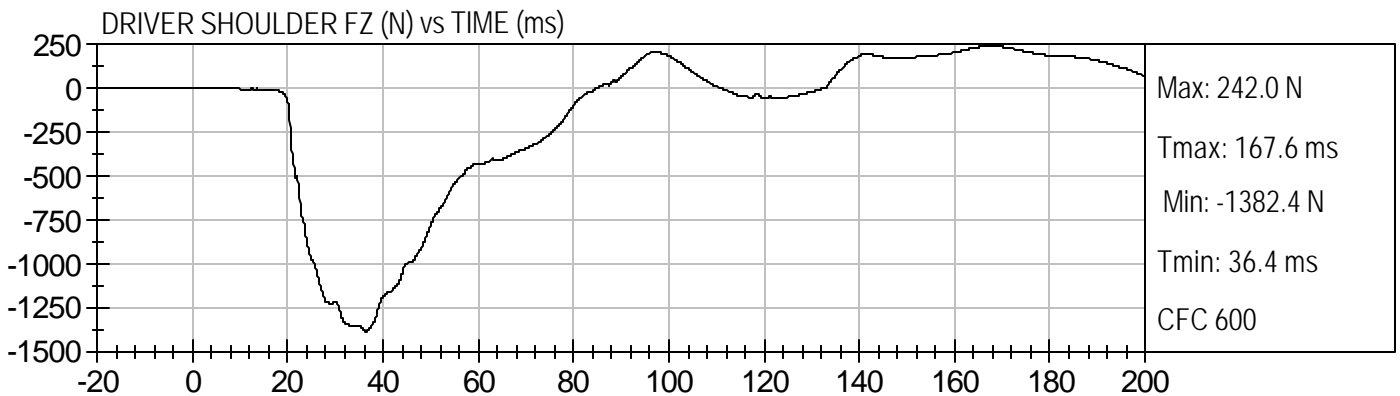
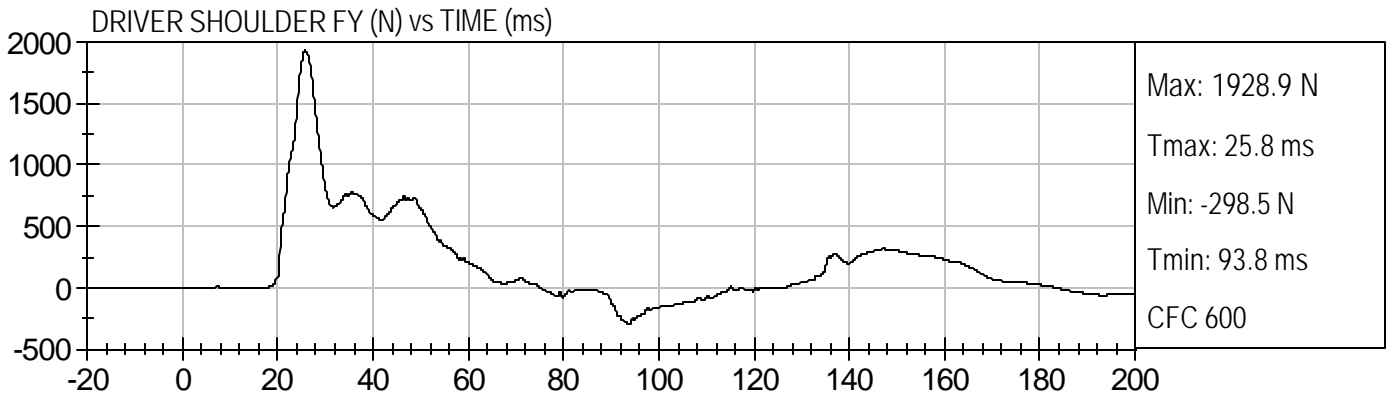
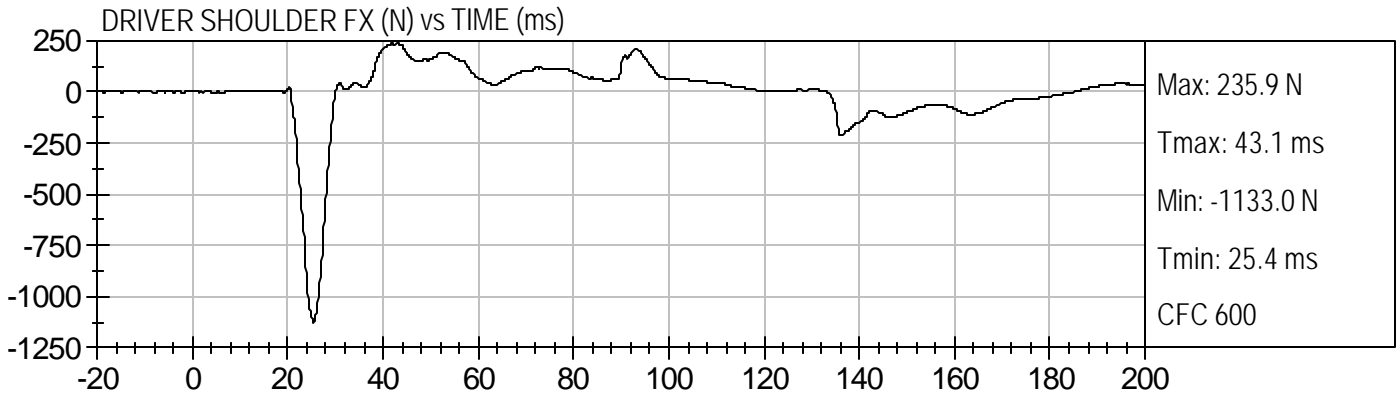


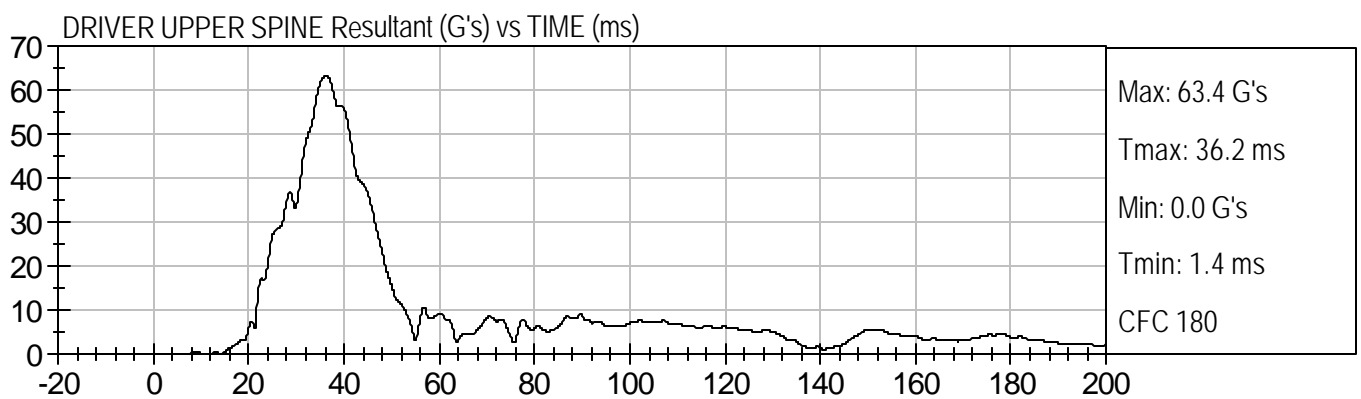
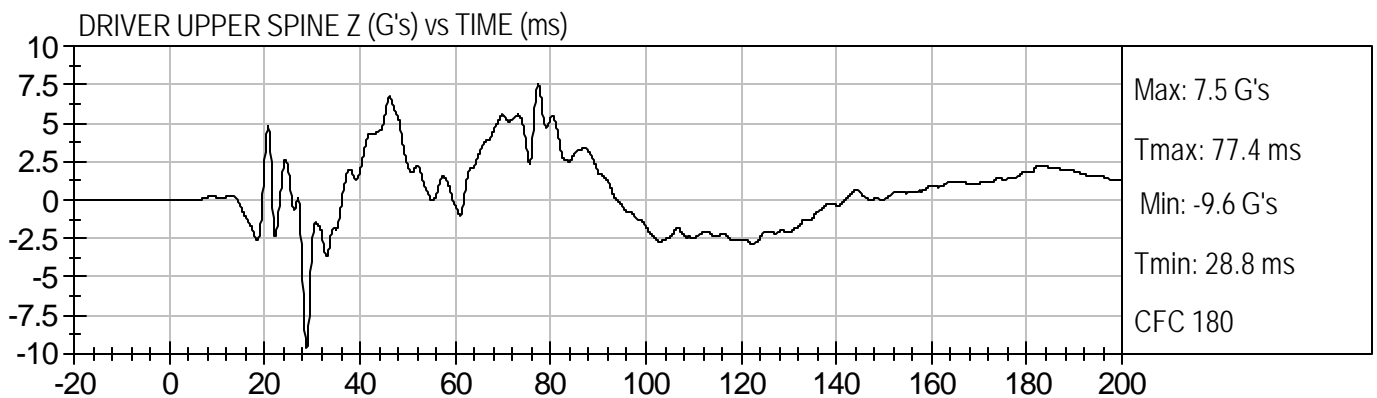
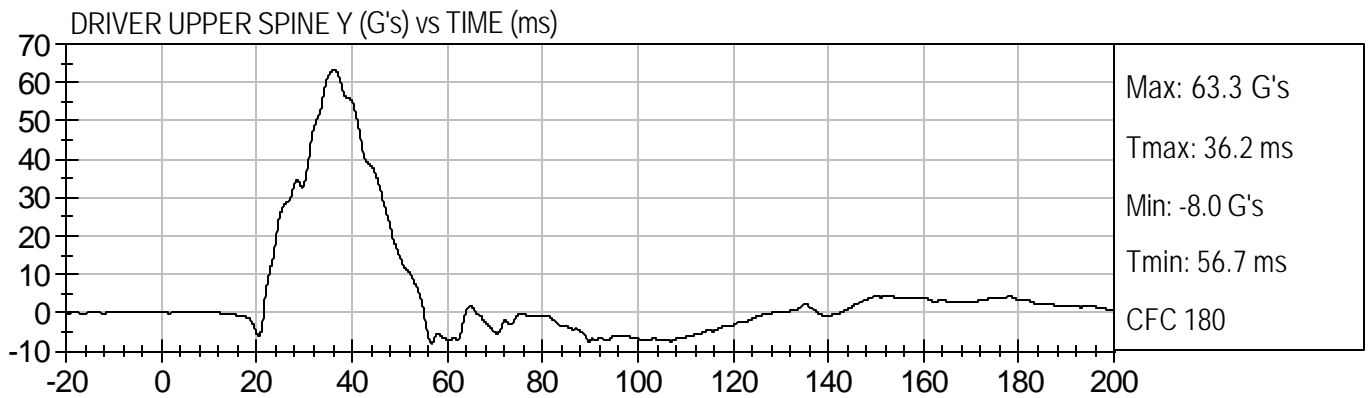
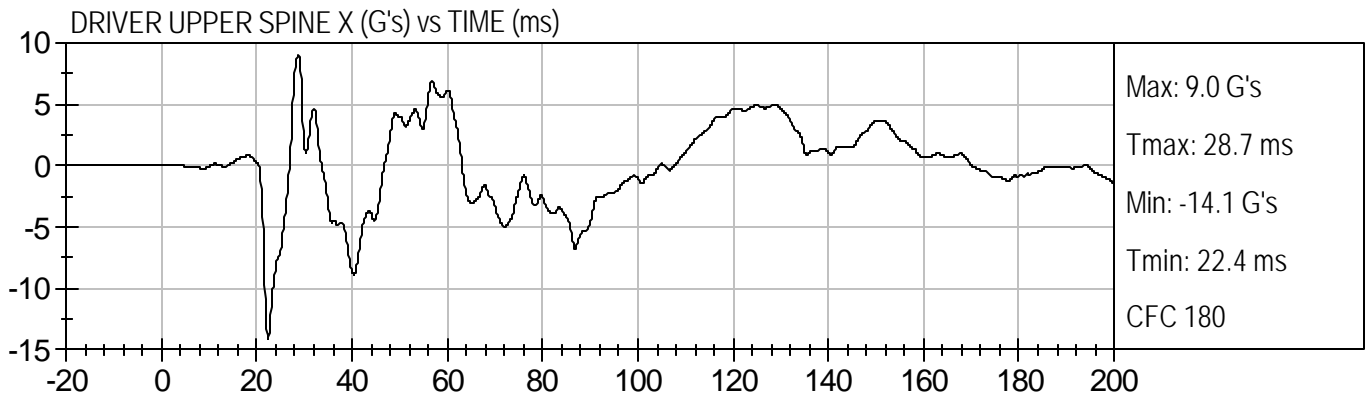


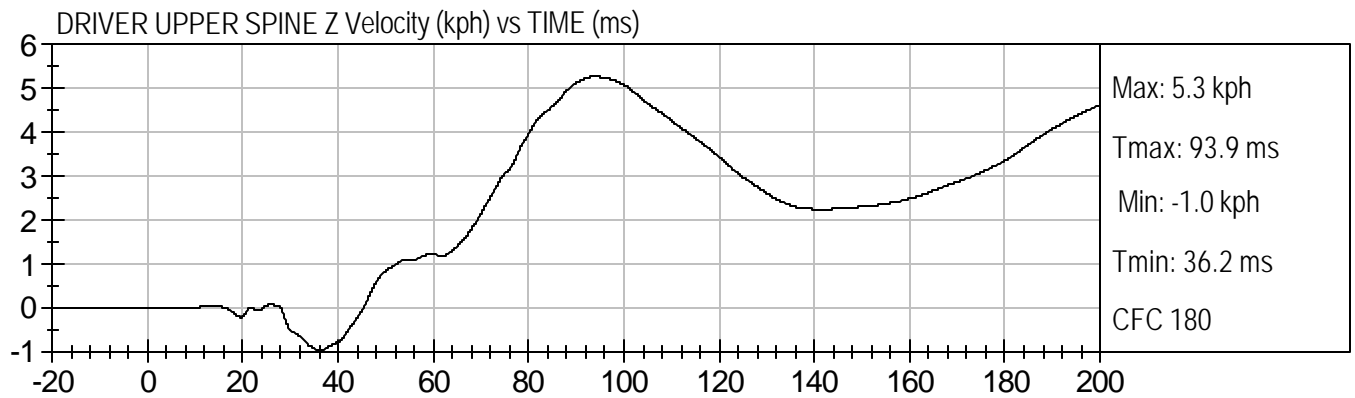
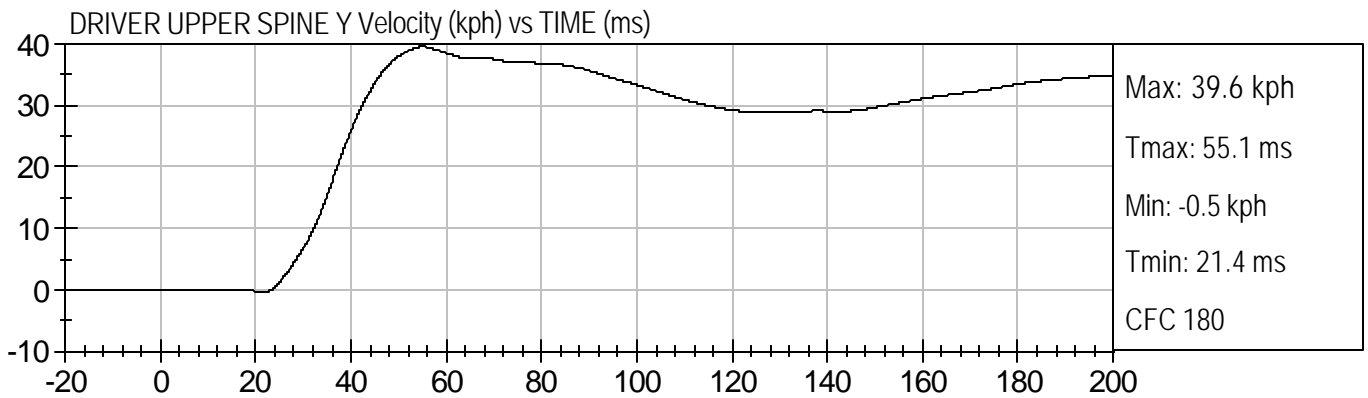
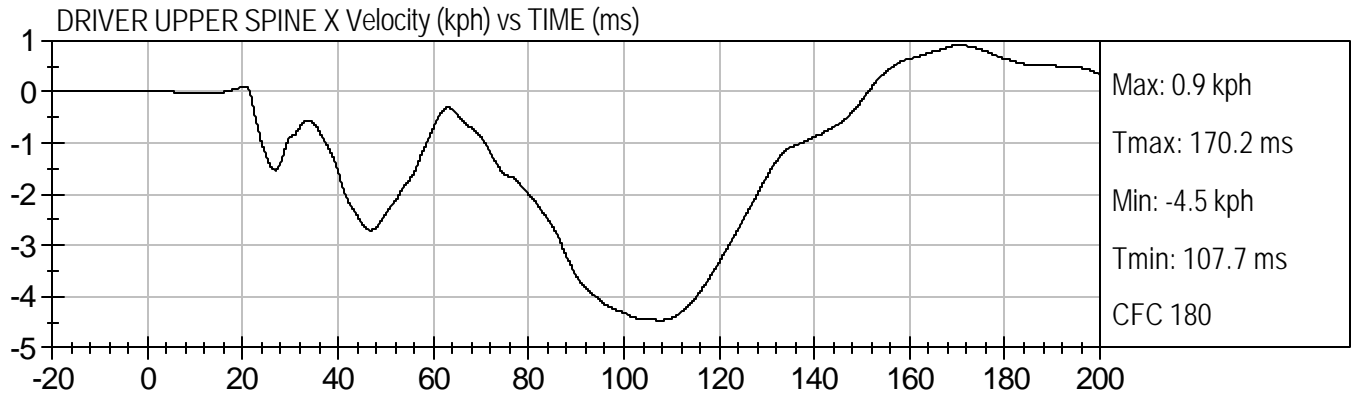


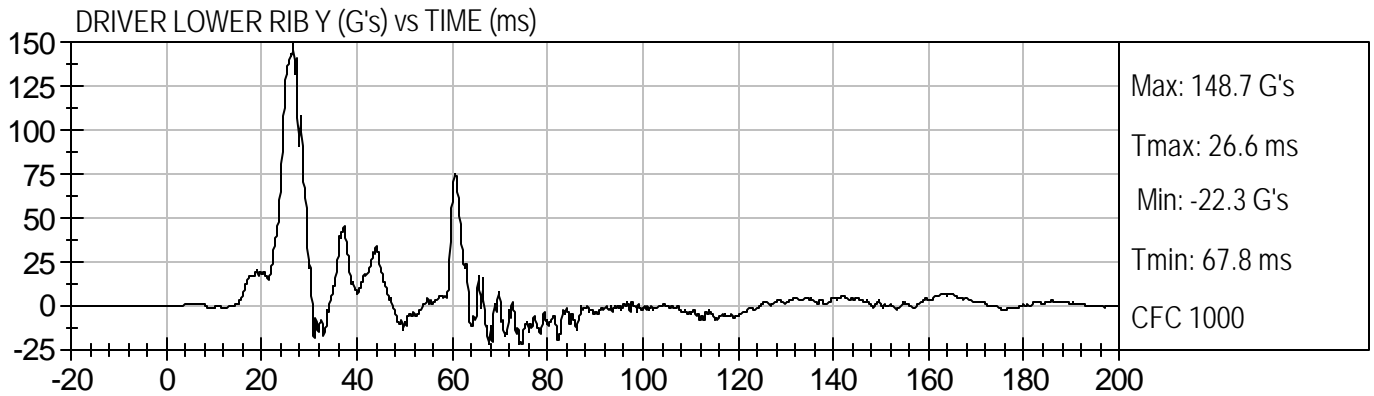
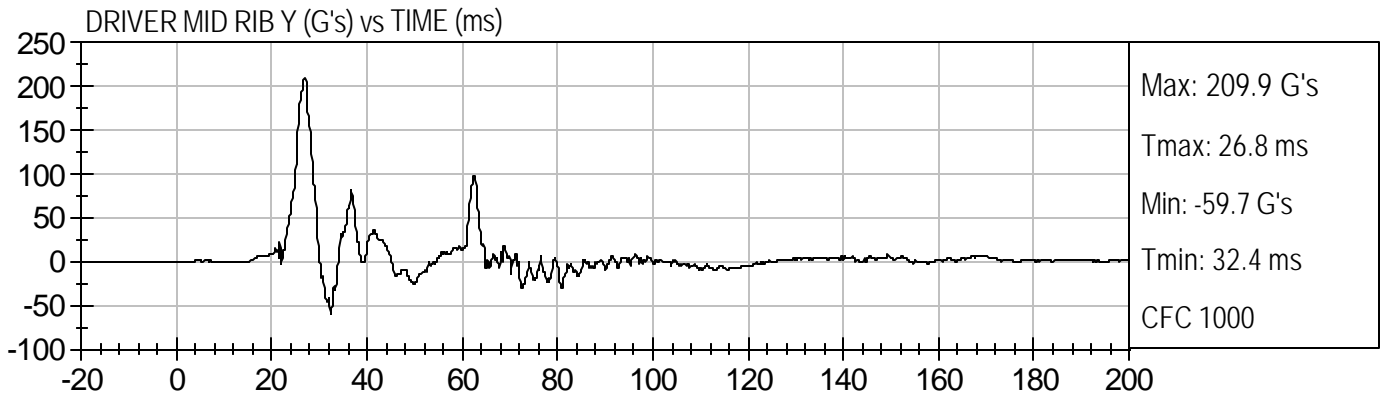
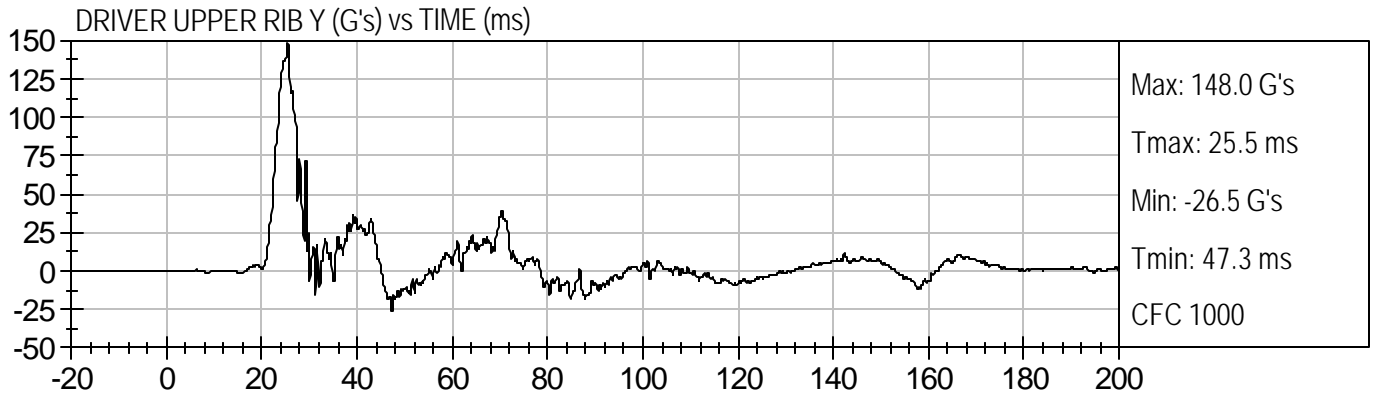






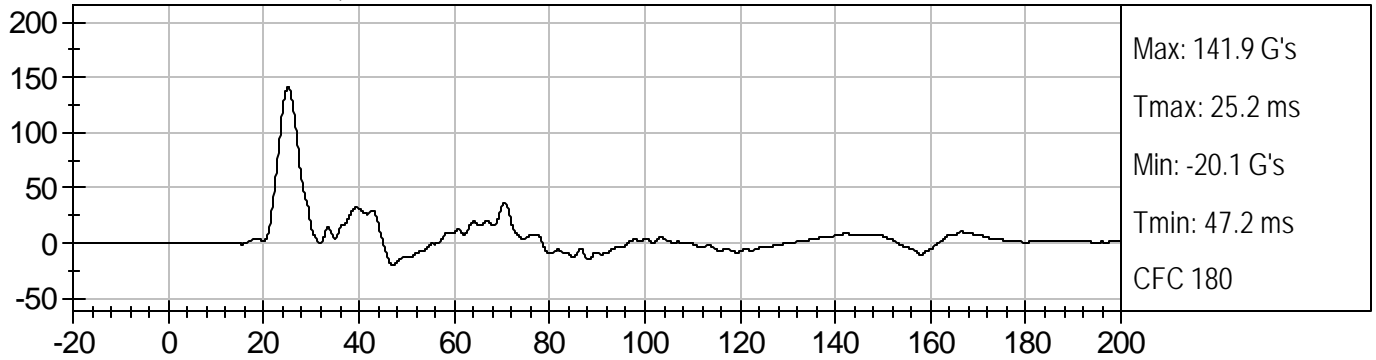




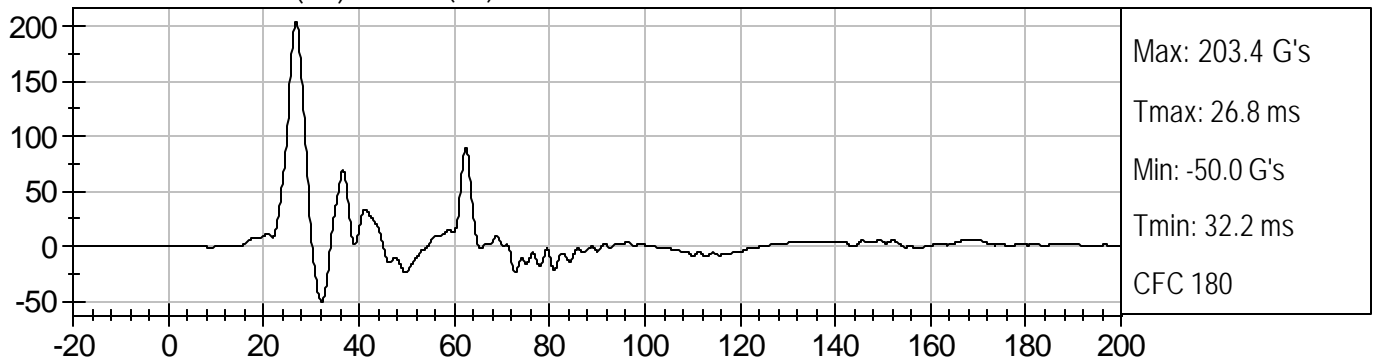




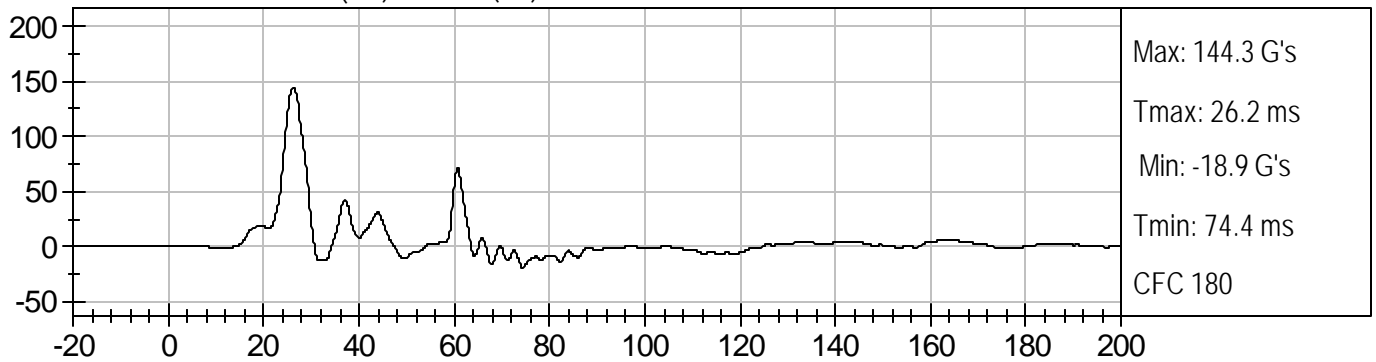
DRIVER UPPER RIB Y (G's) vs TIME (ms)

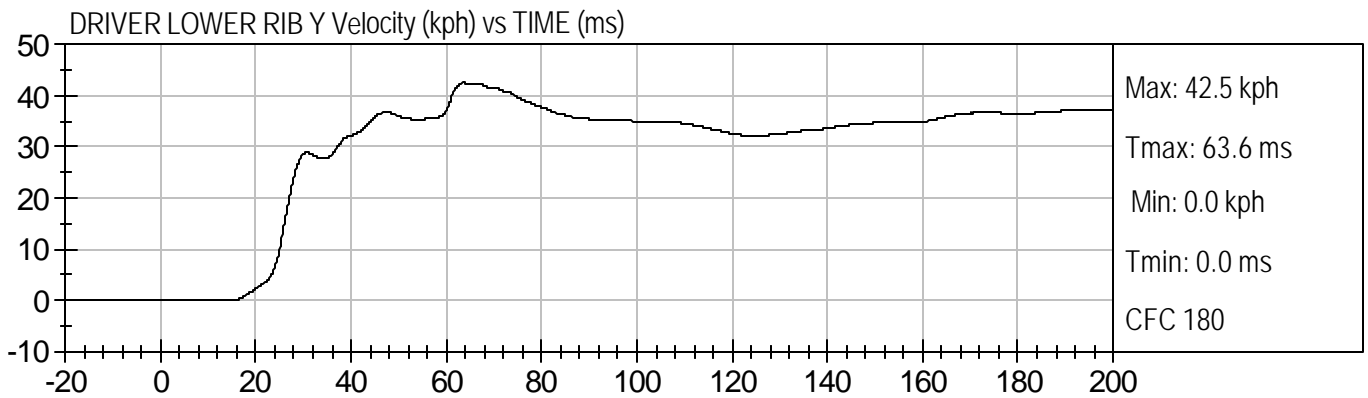
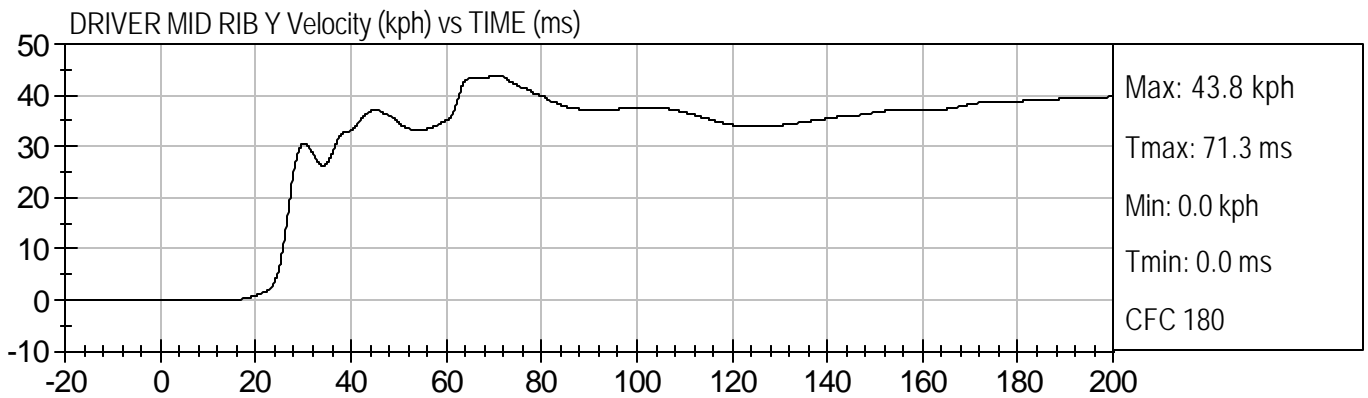
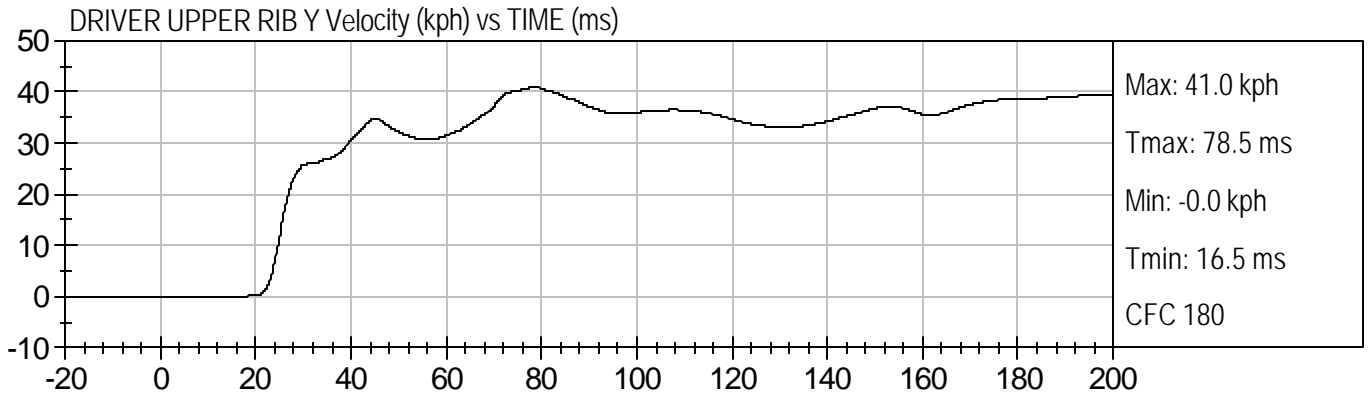


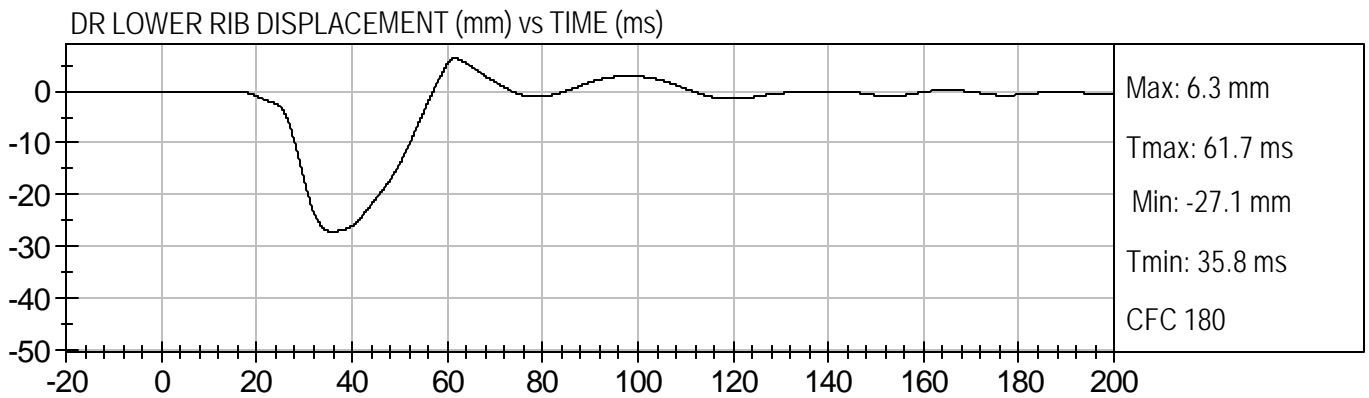
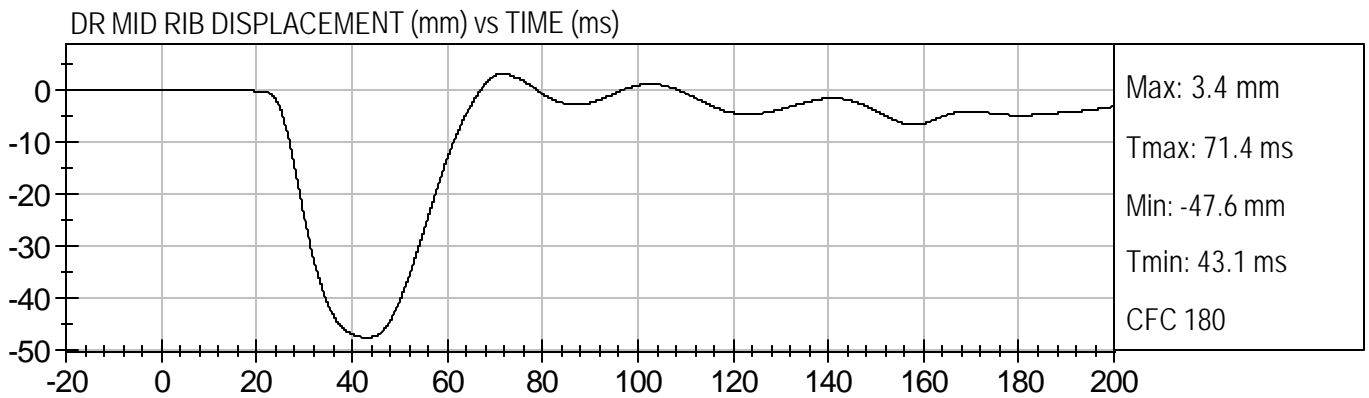
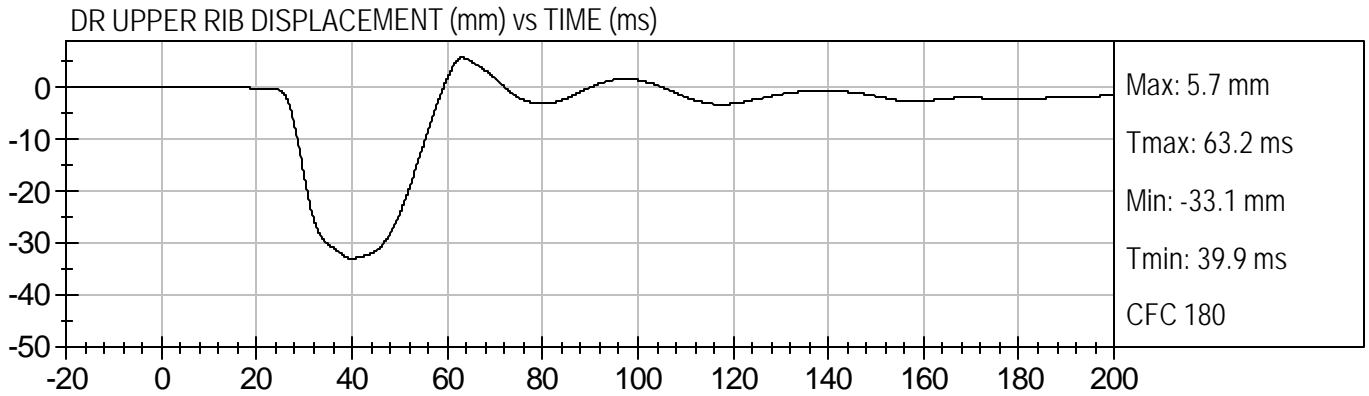
DRIVER MID RIB Y (G's) vs TIME (ms)

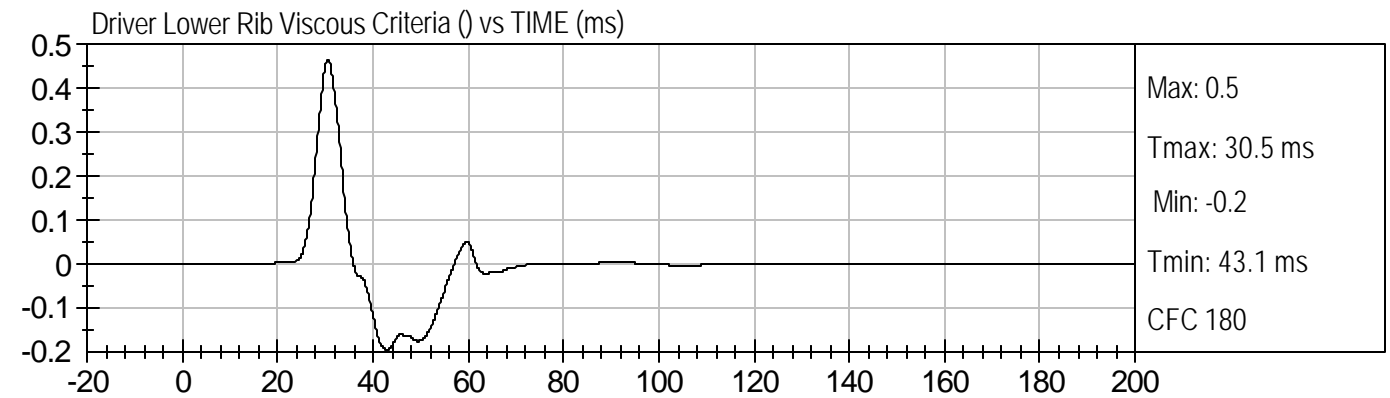
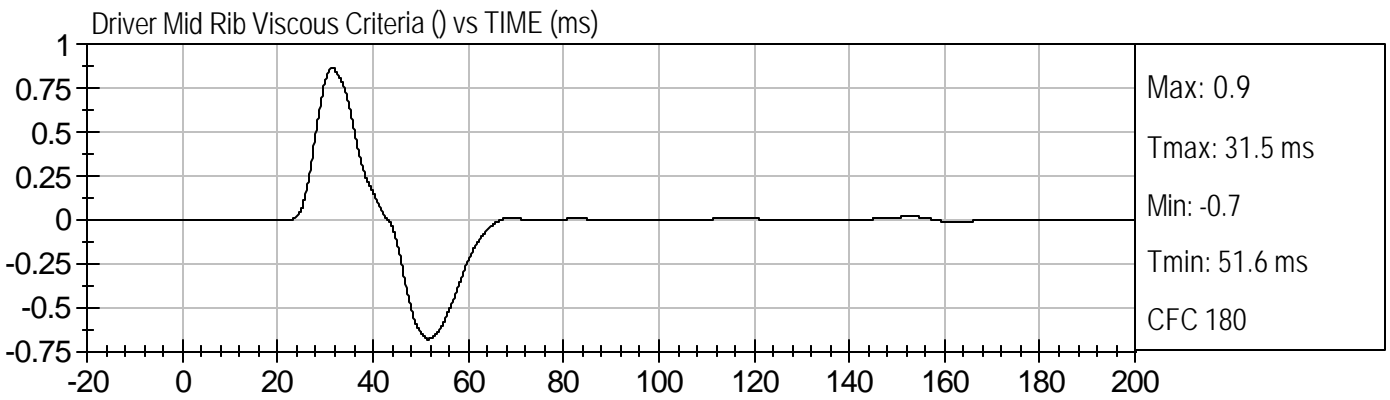
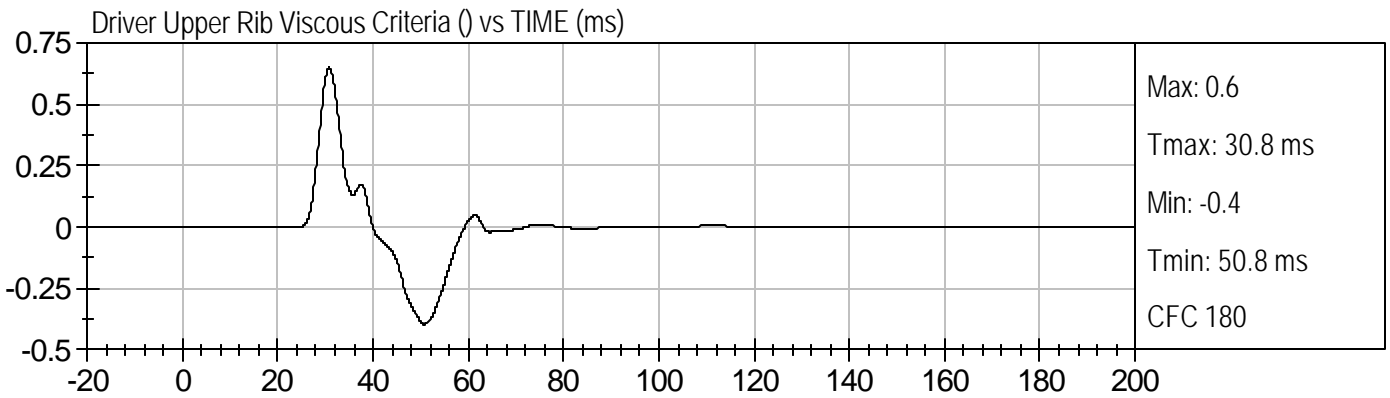


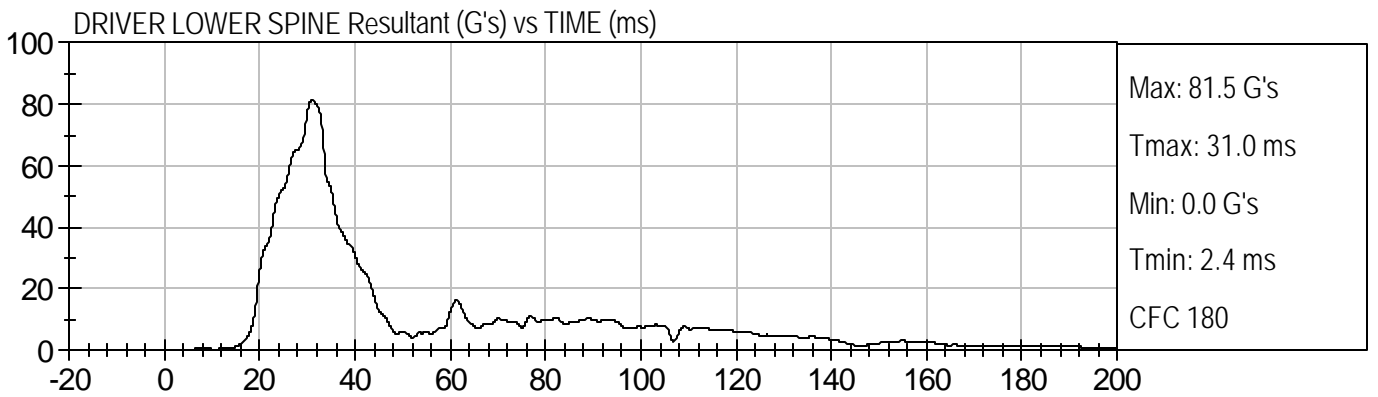
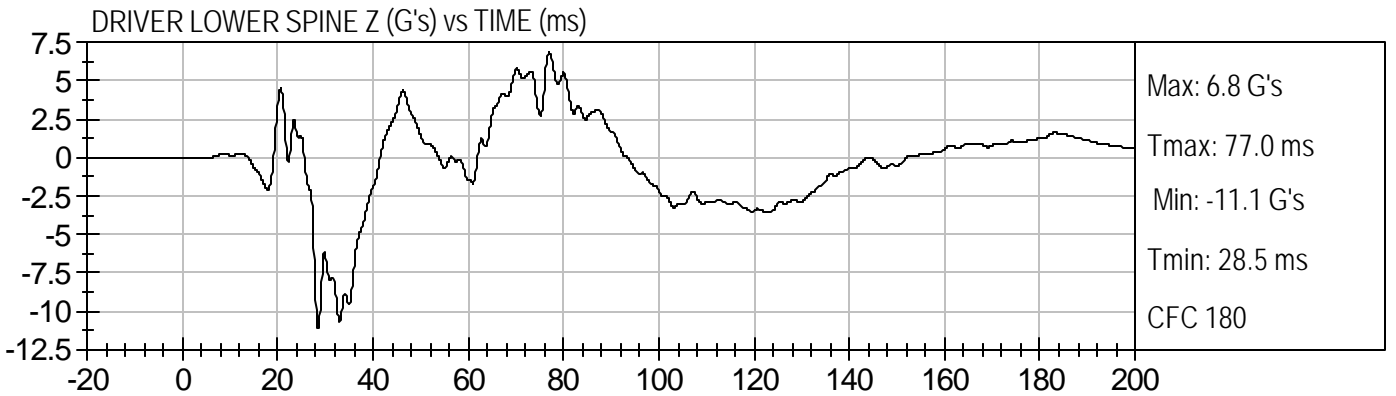
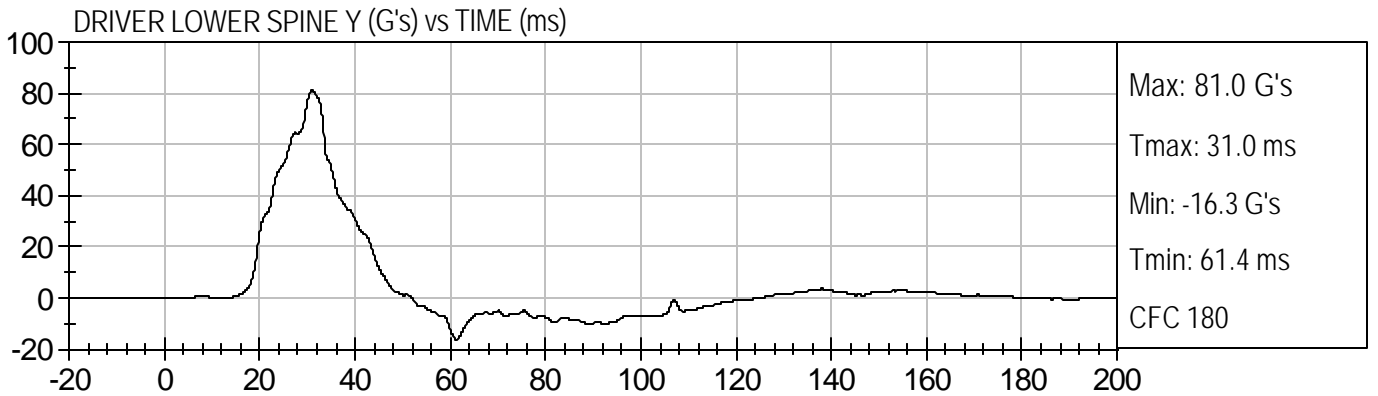
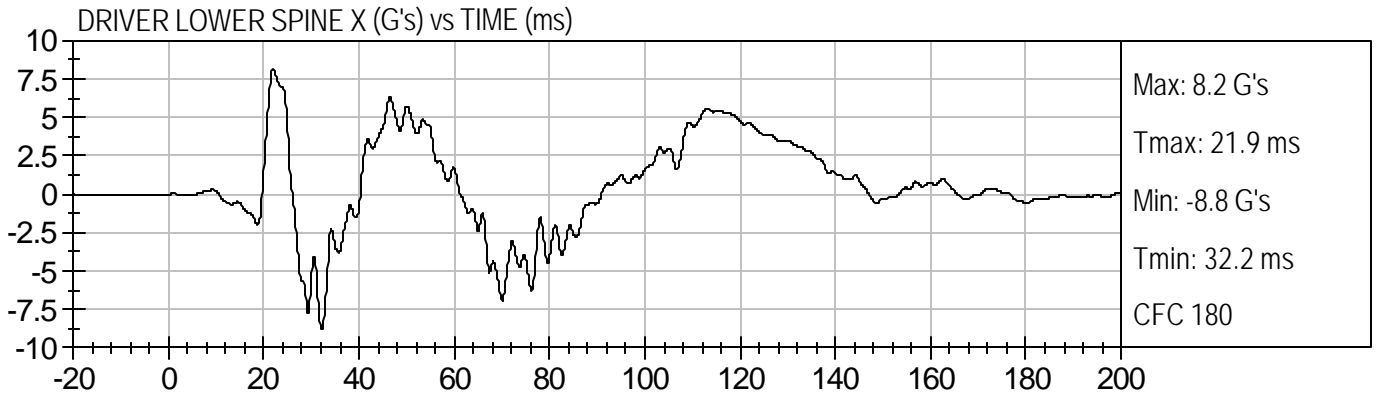
DRIVER LOWER RIB Y (G's) vs TIME (ms)

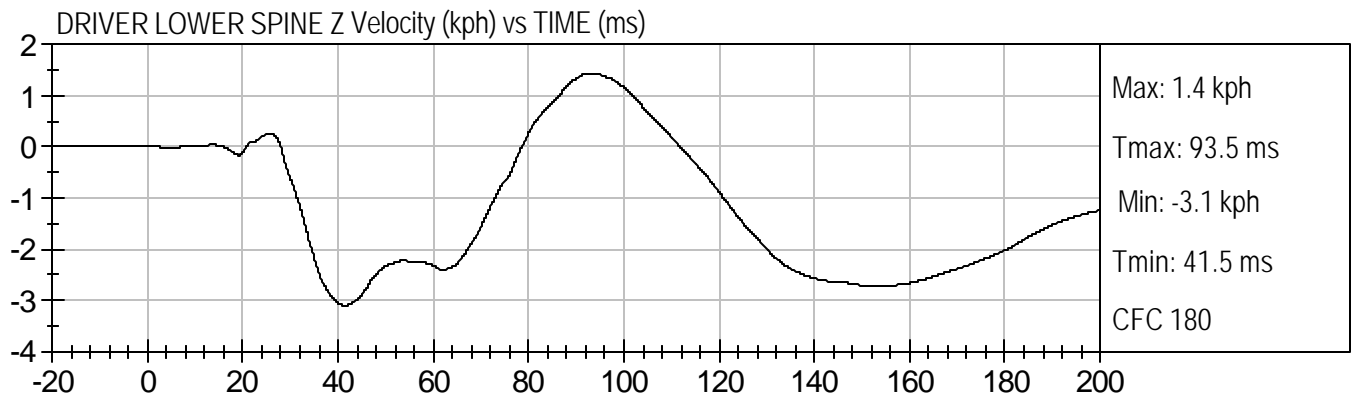
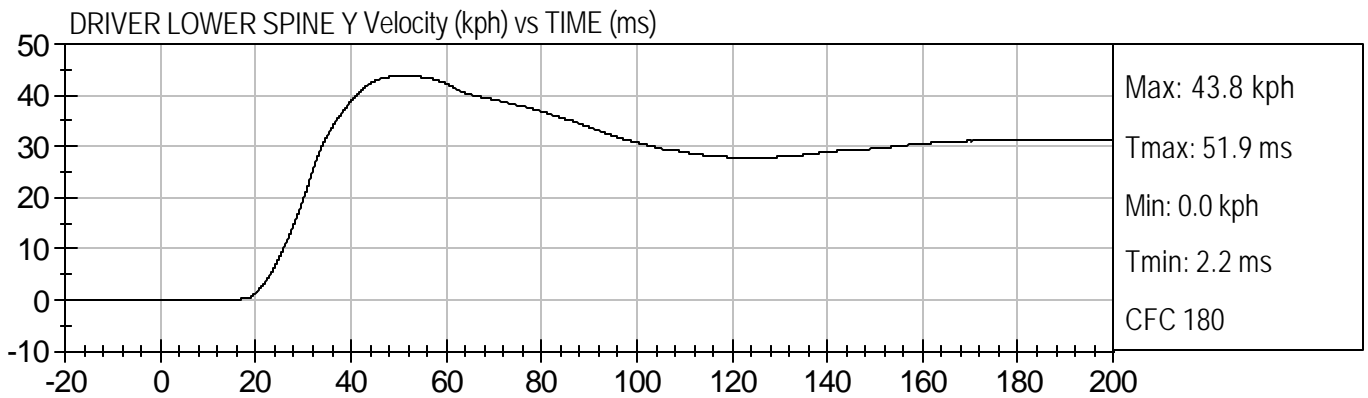
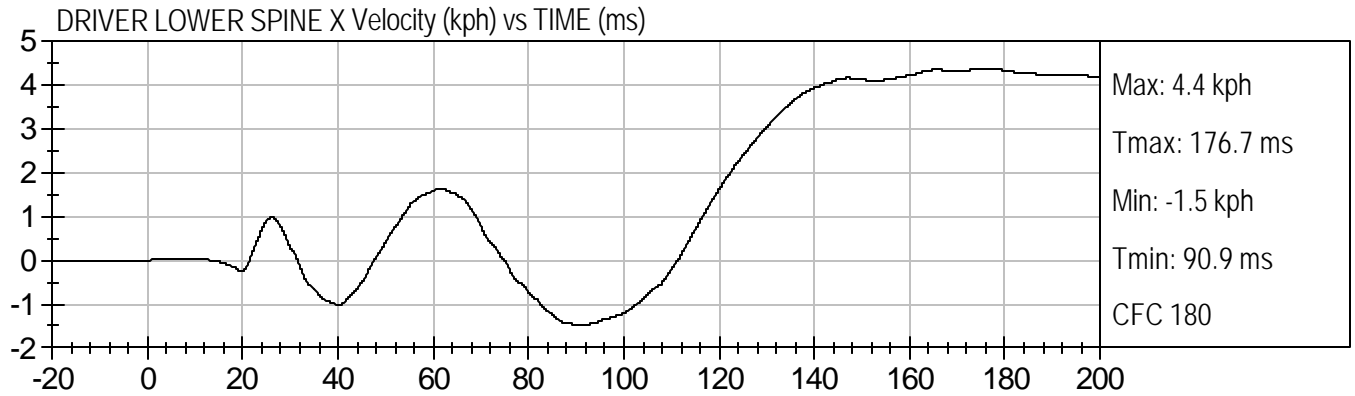


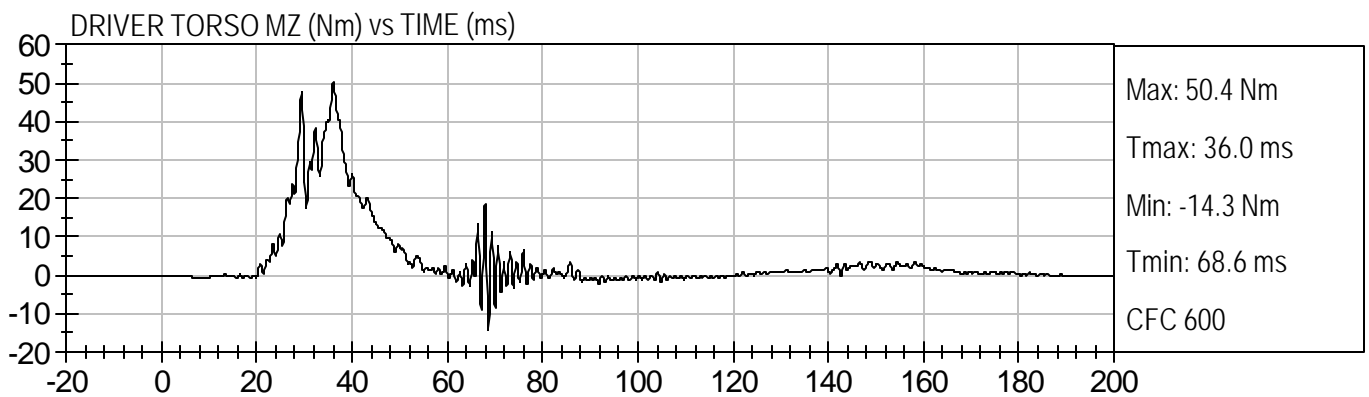
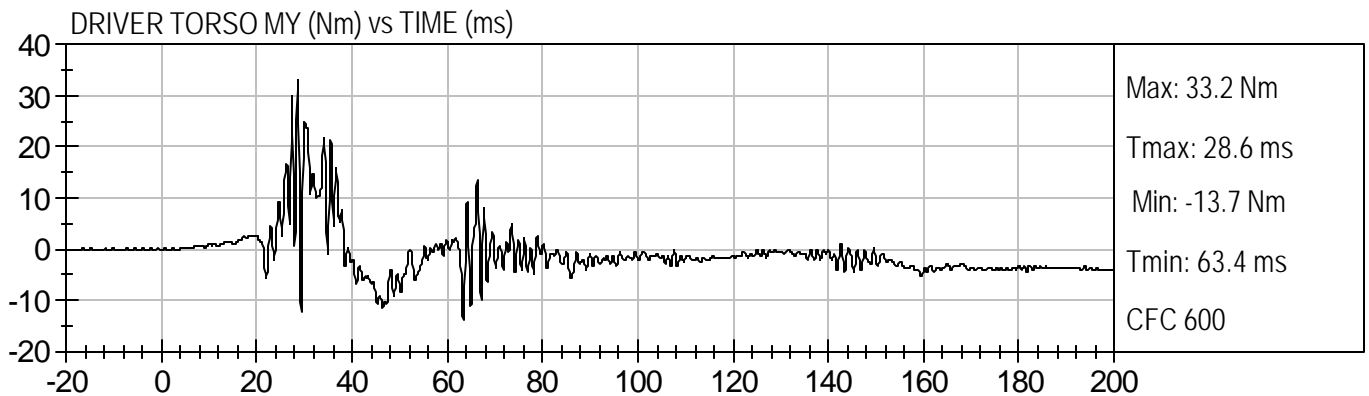
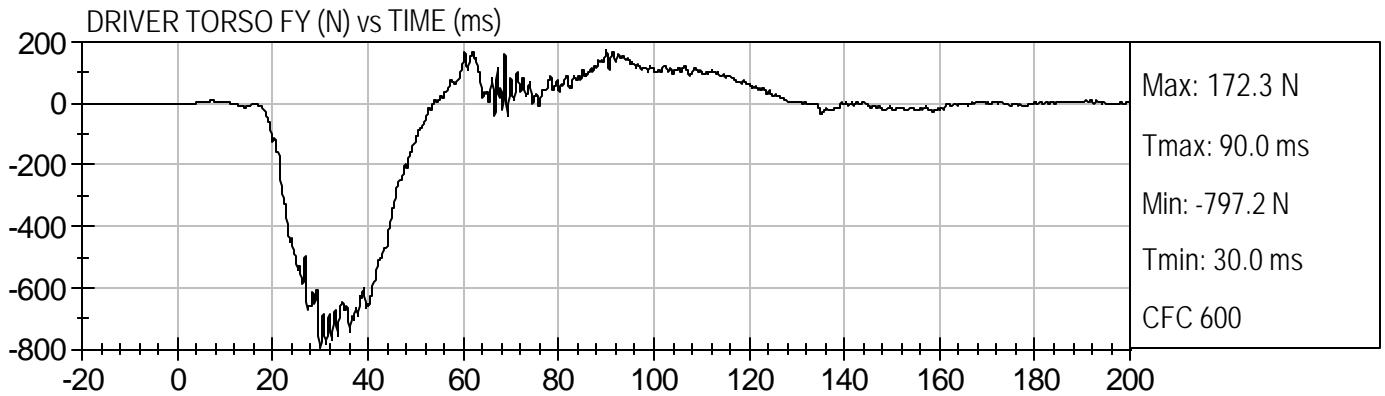
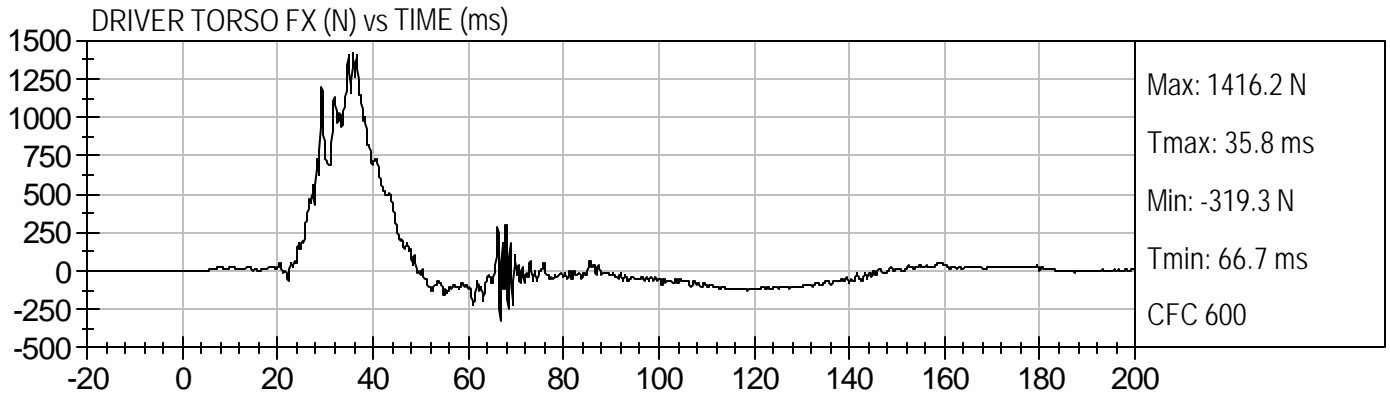


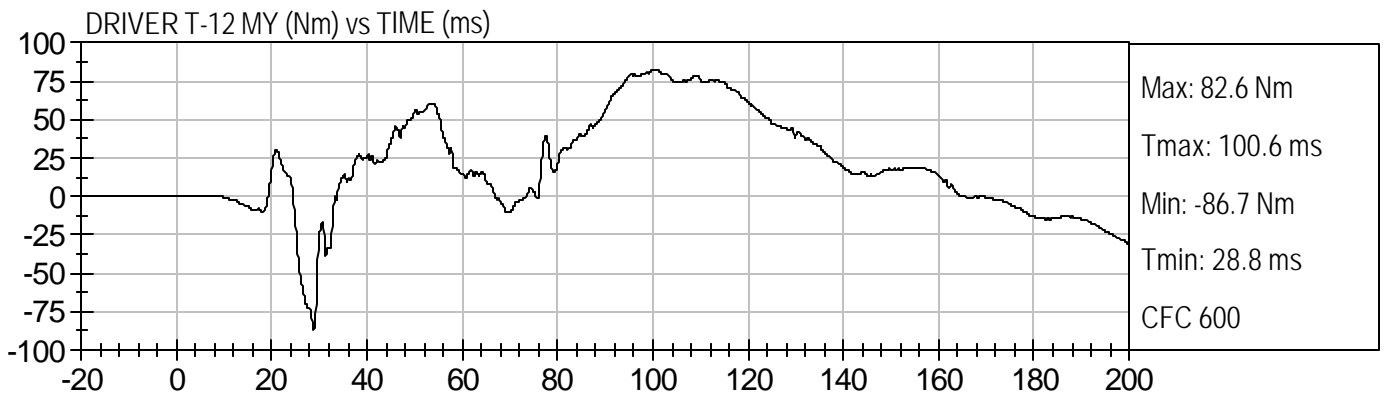
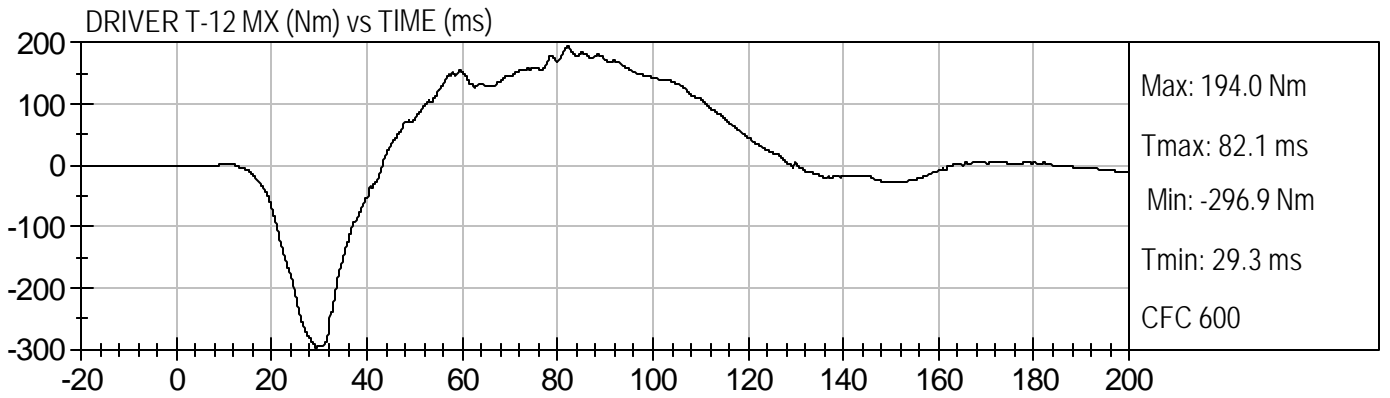
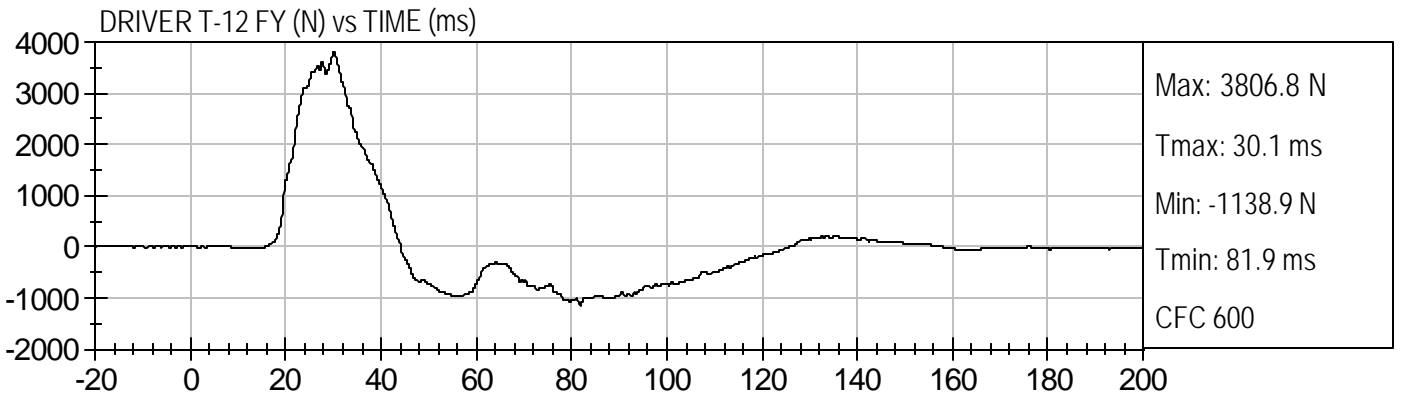
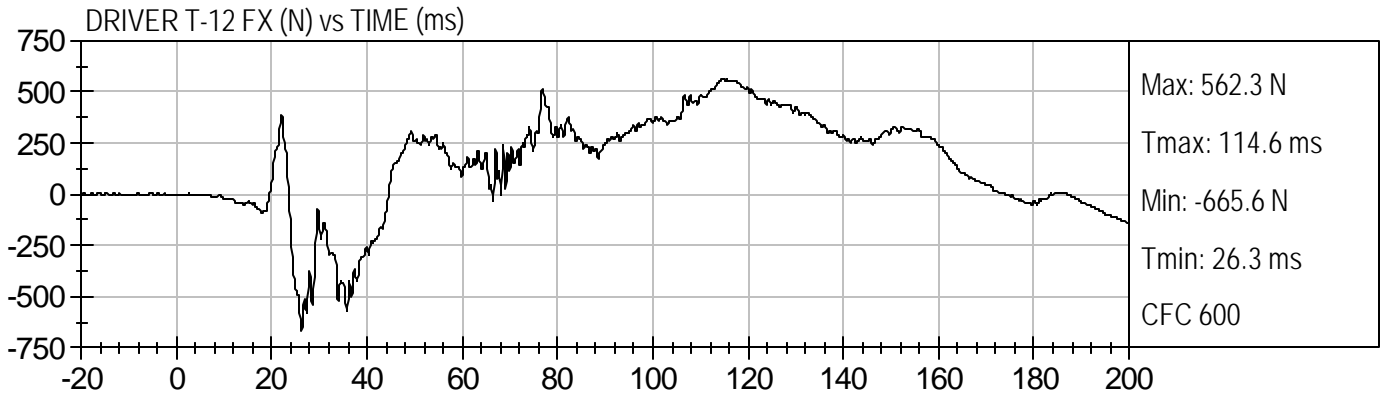


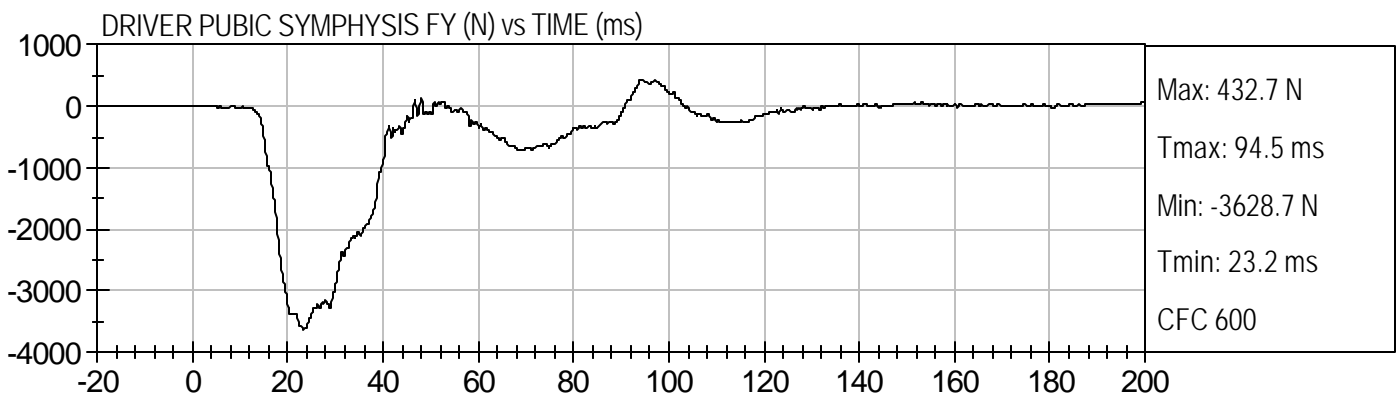
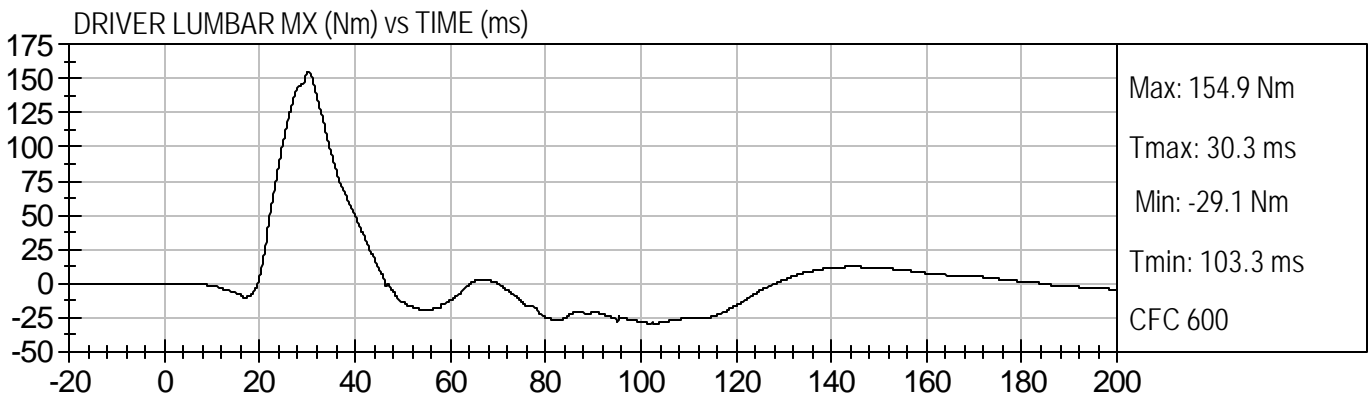
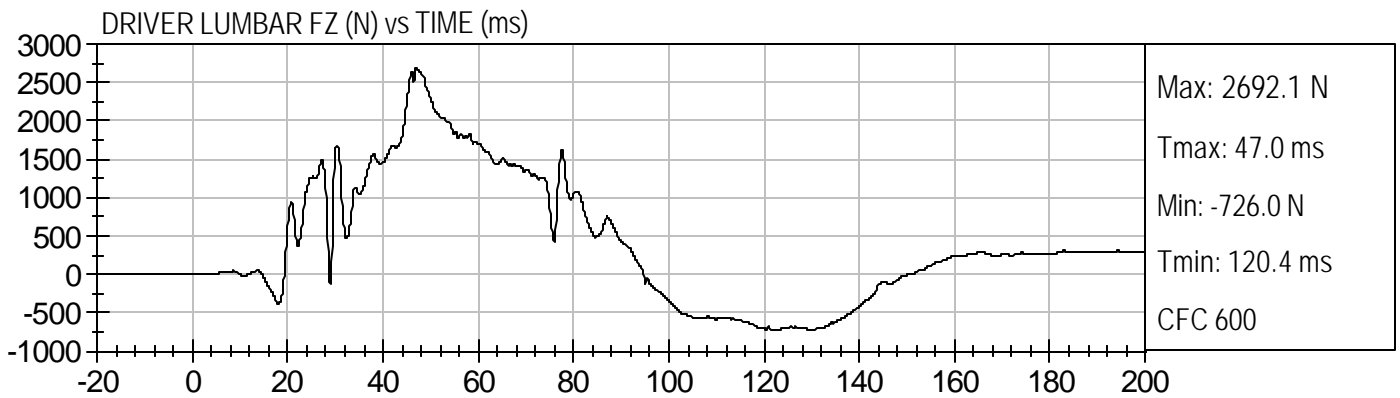
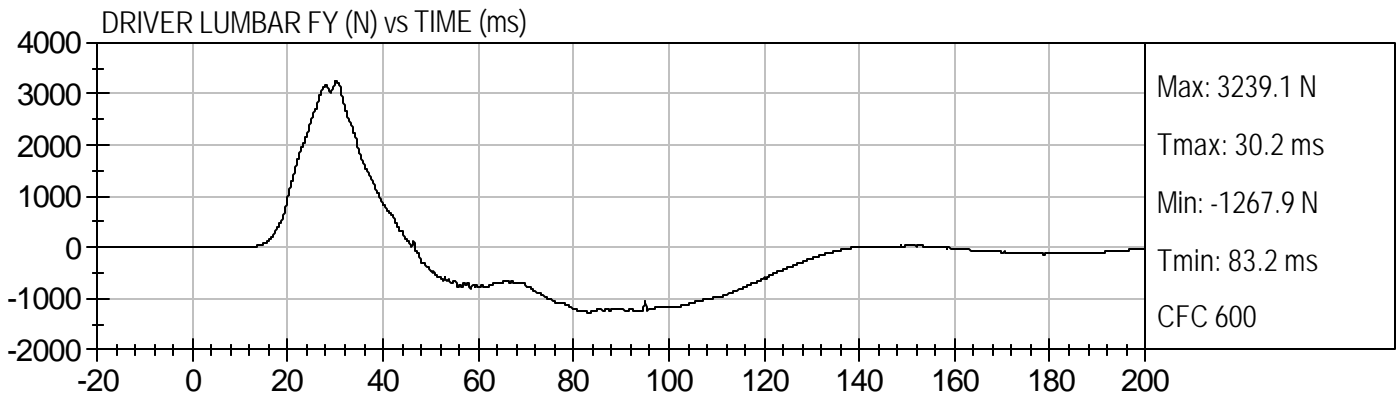


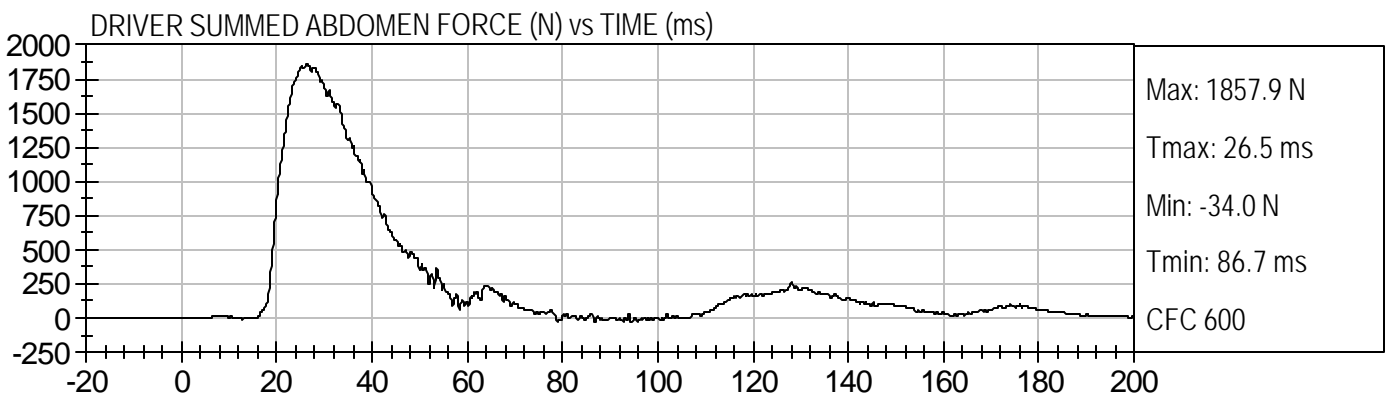
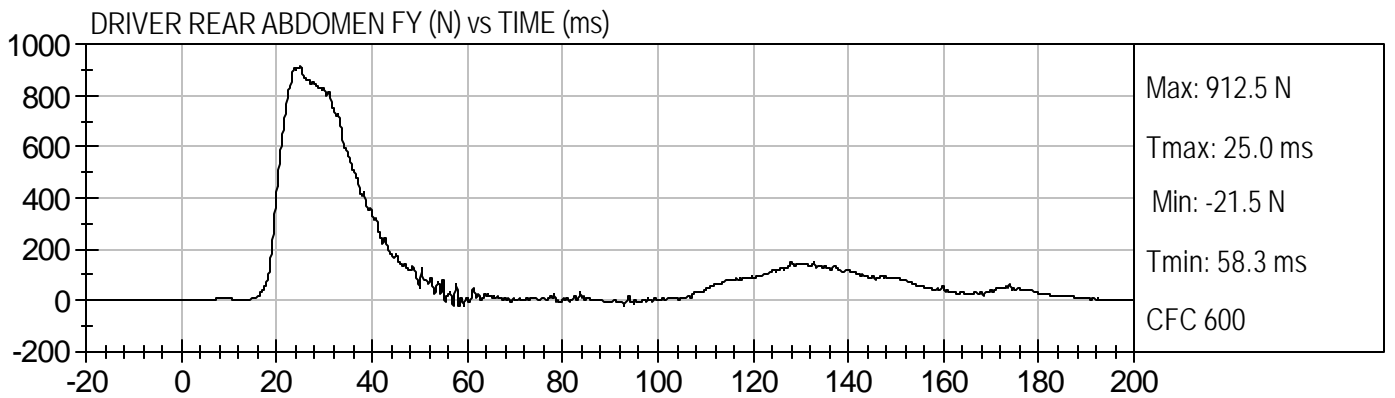
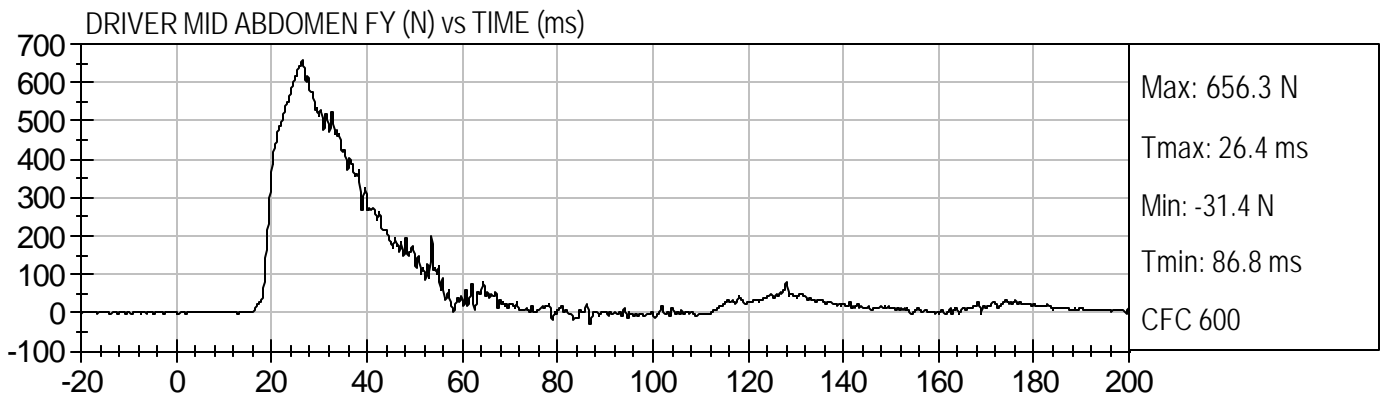
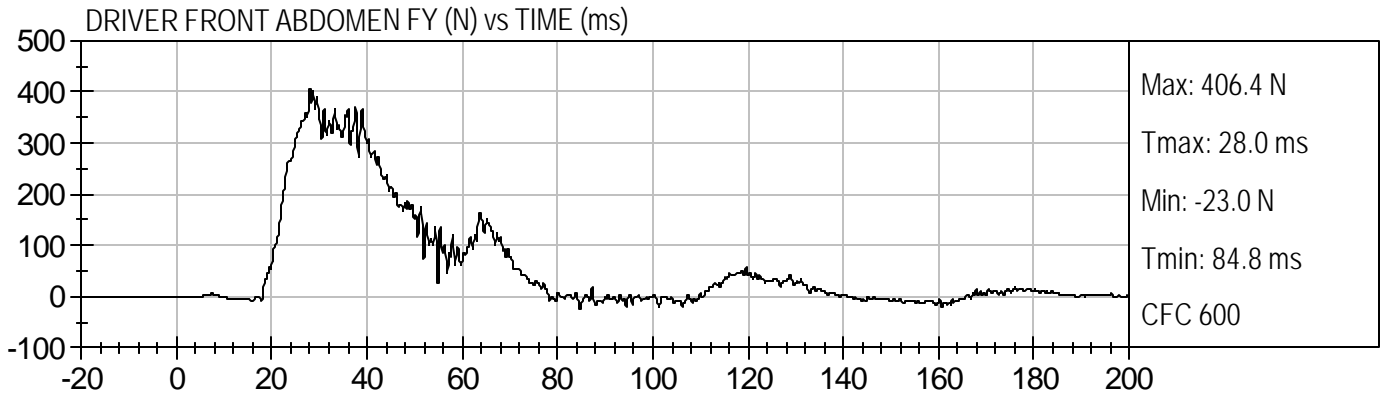


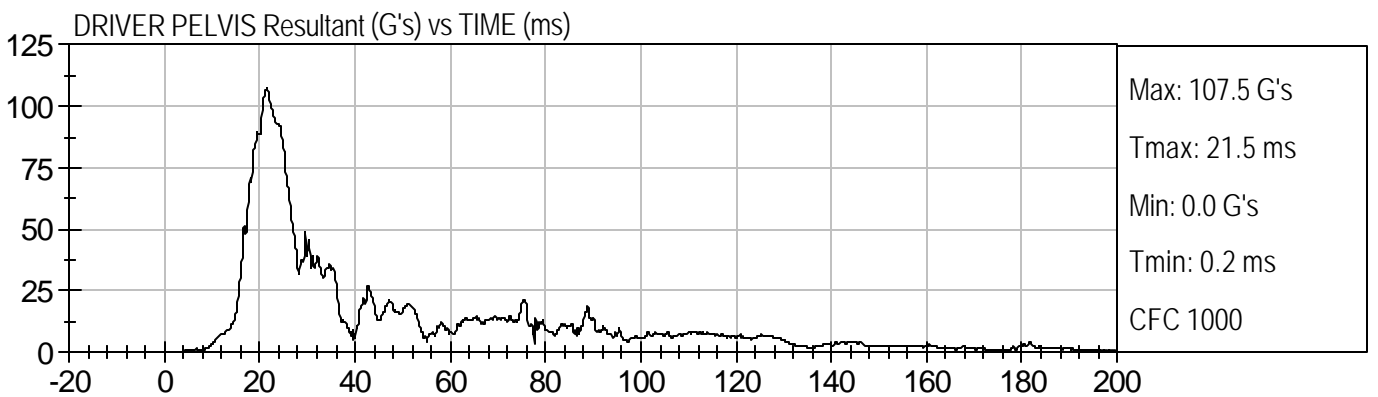
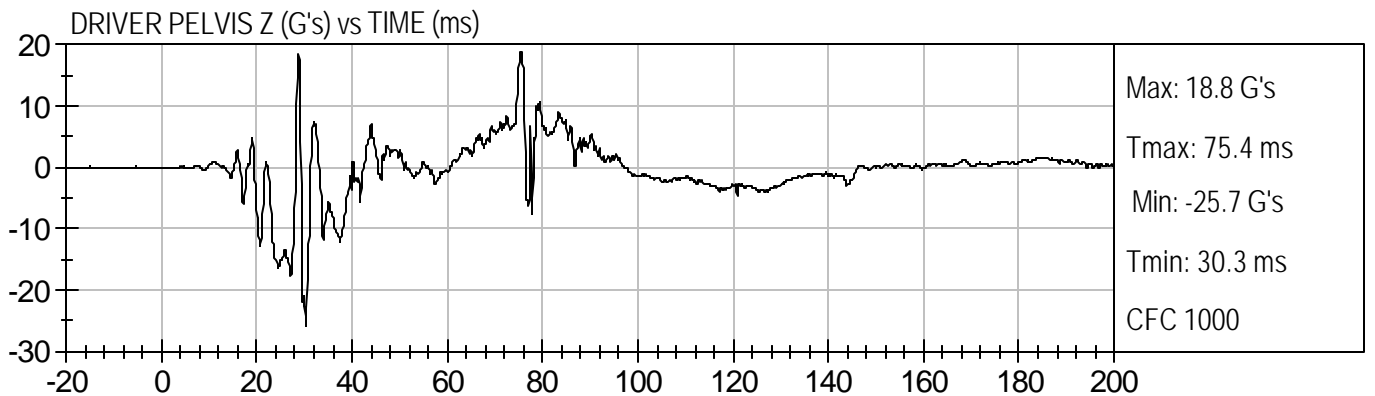
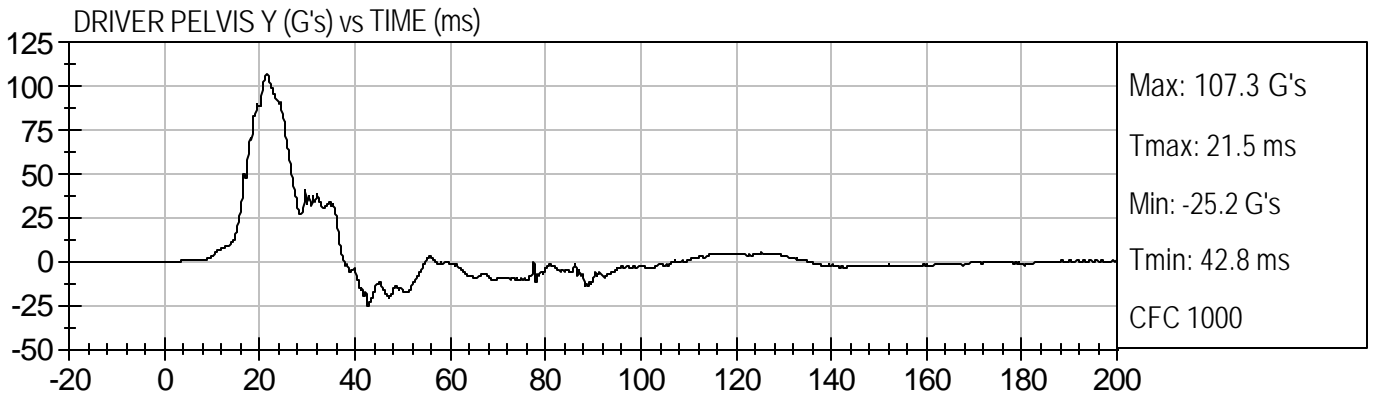
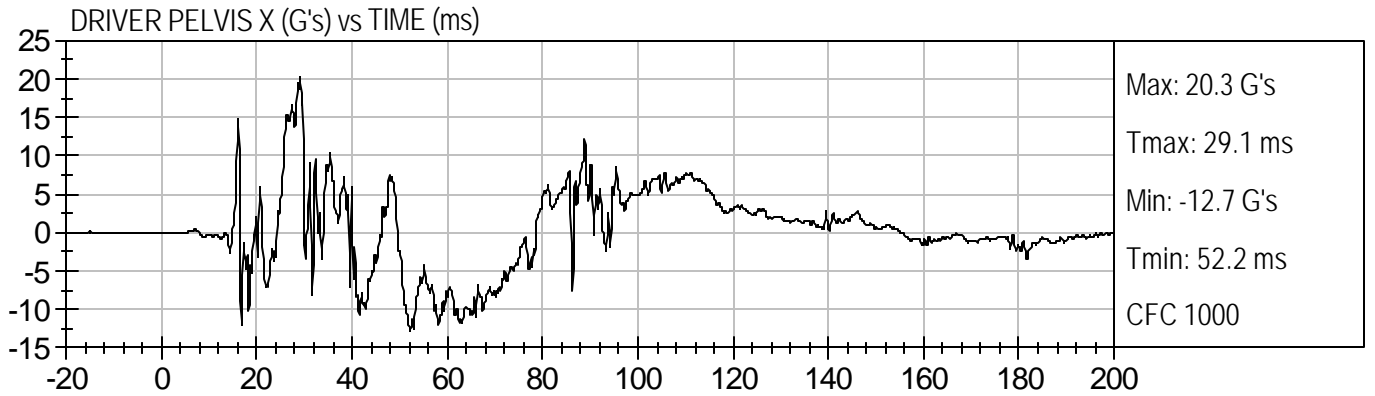


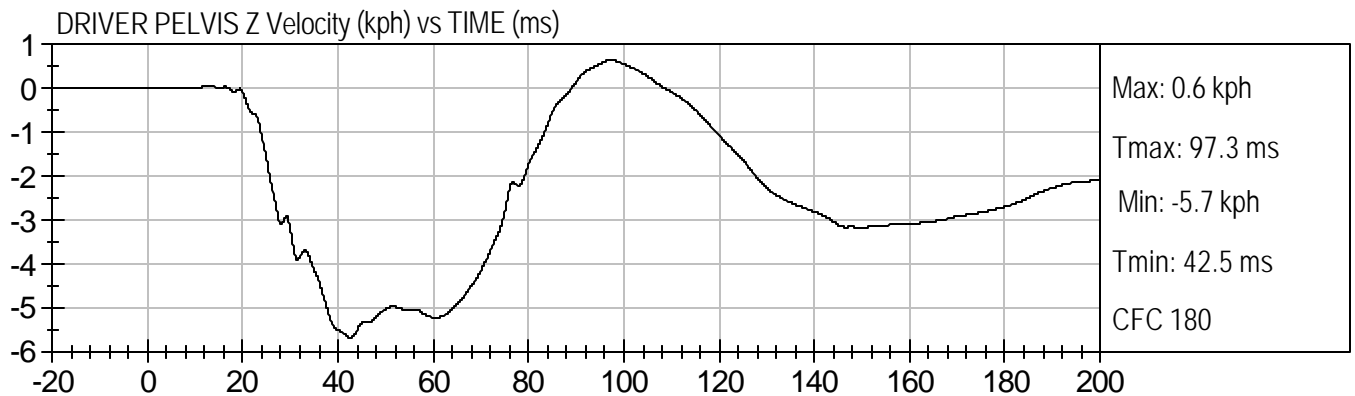
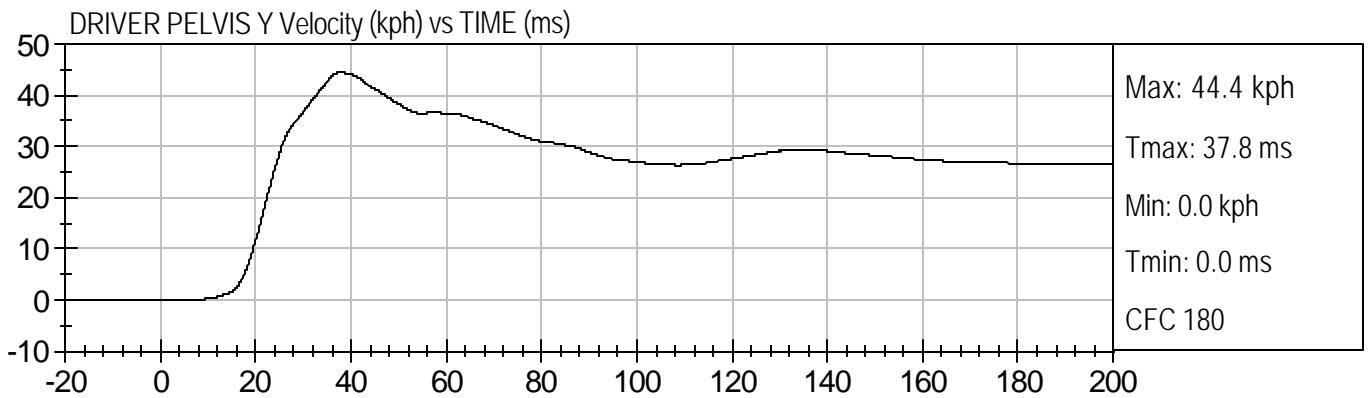
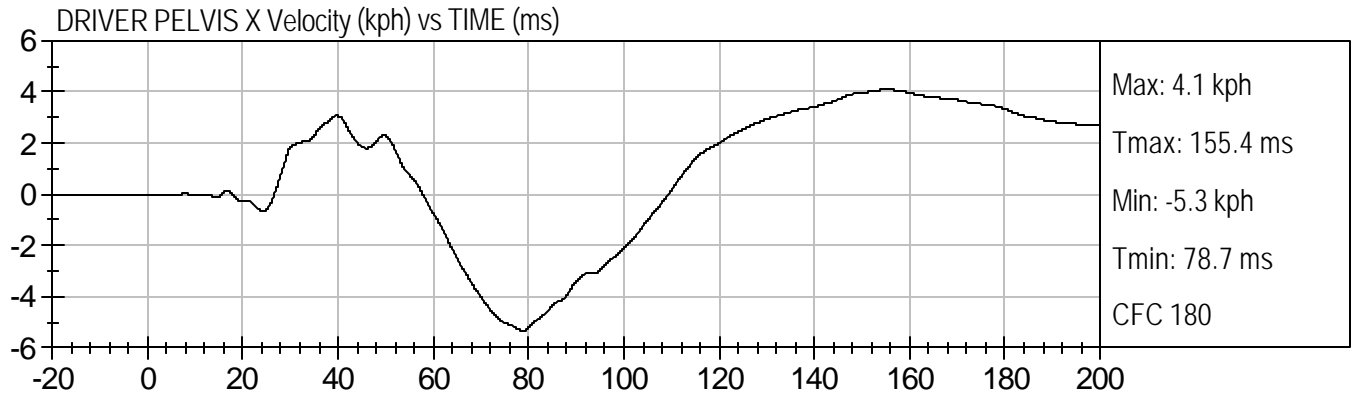






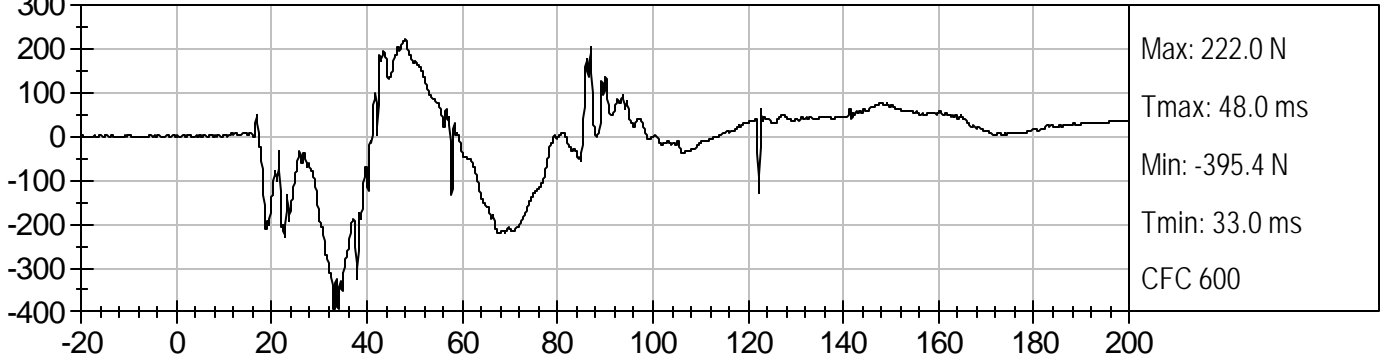




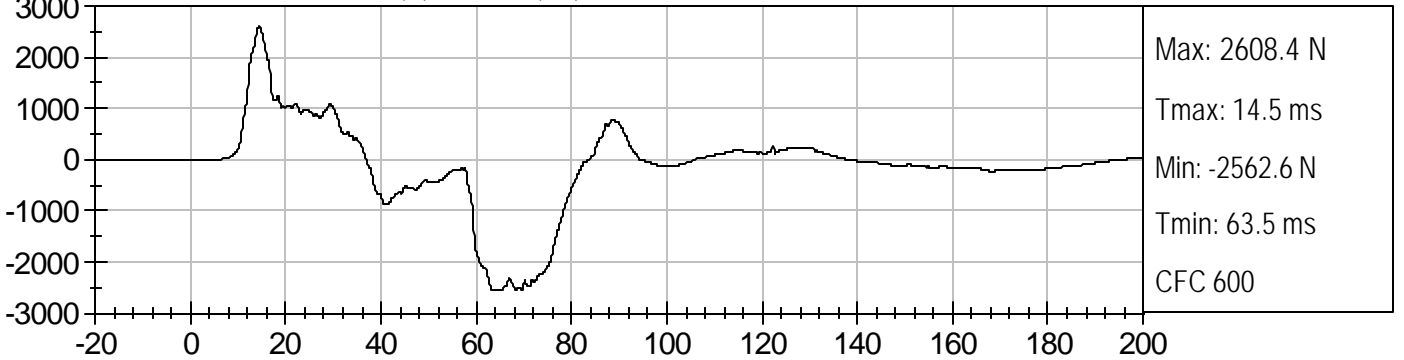




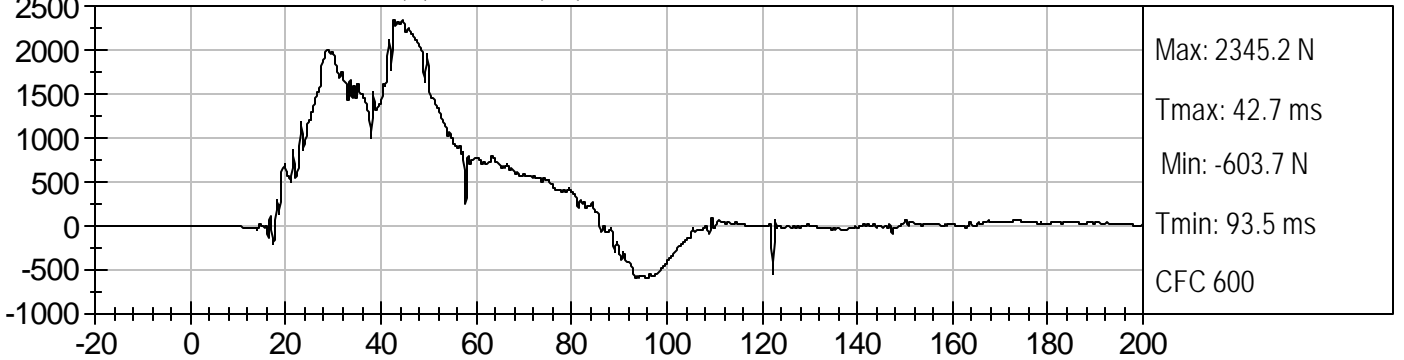
DRIVER LEFT FEMUR FX (N) vs TIME (ms)



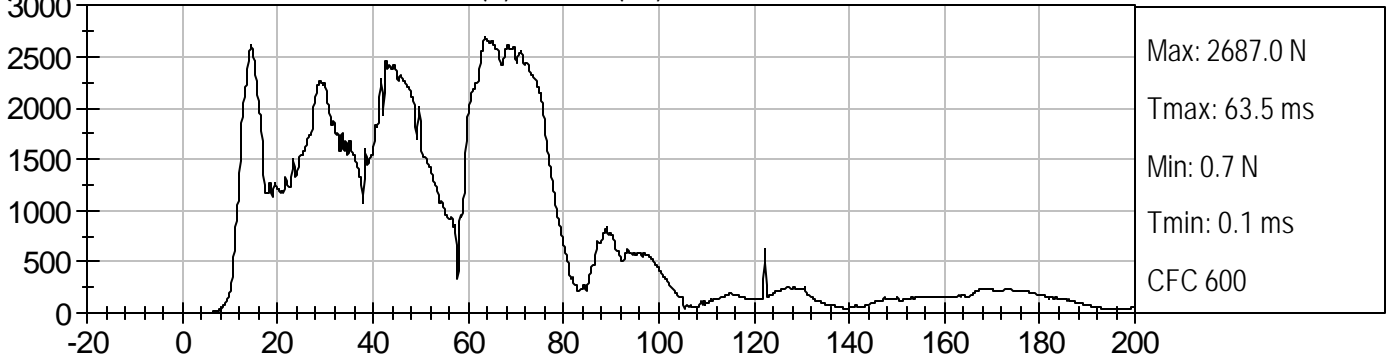
DRIVER LEFT FEMUR FY (N) vs TIME (ms)

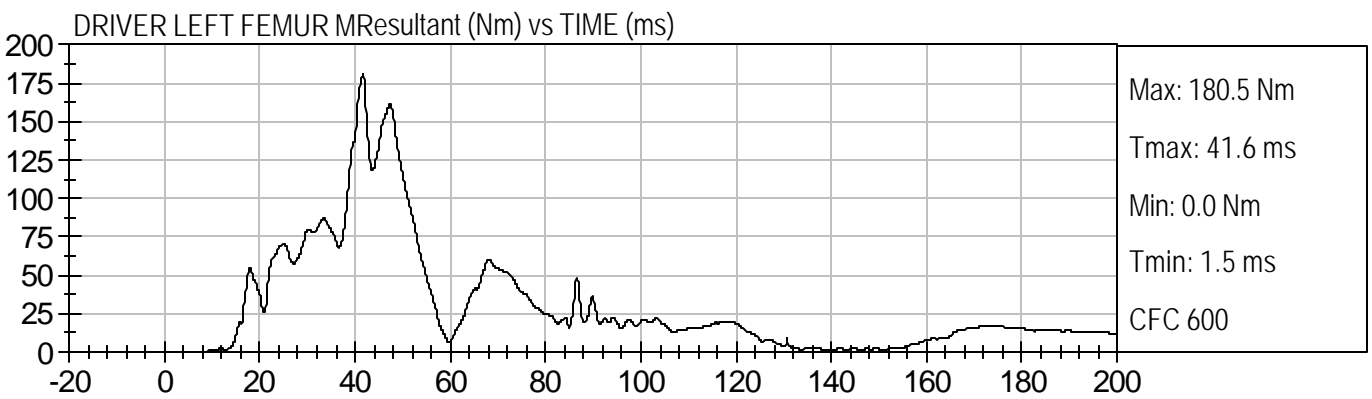
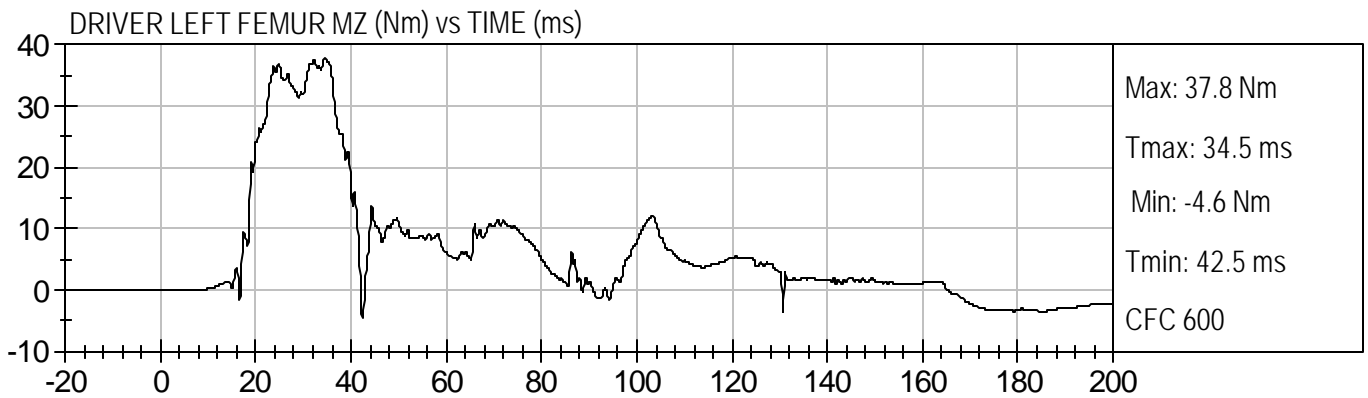
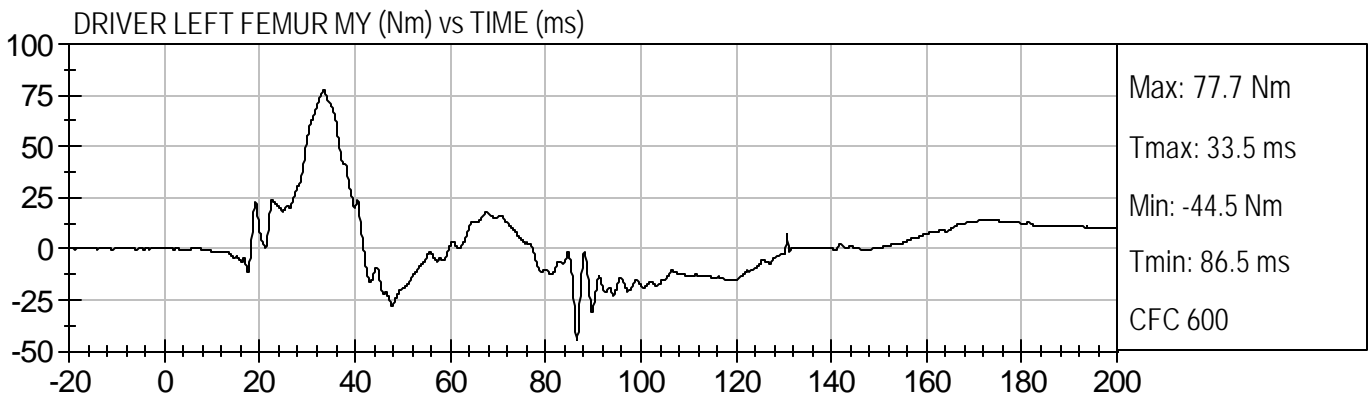
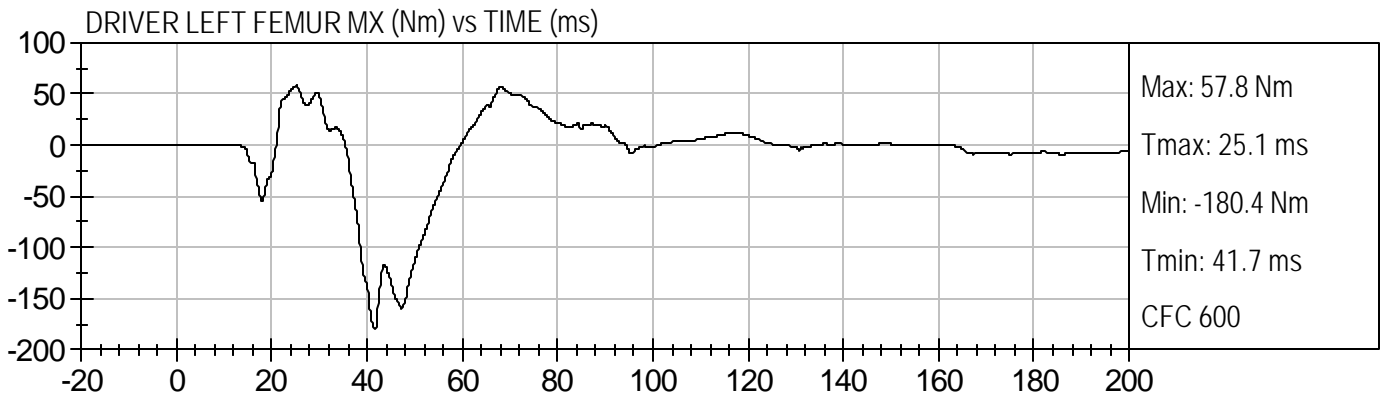


DRIVER LEFT FEMUR FZ (N) vs TIME (ms)



DRIVER LEFT FEMUR FResultant (N) vs TIME (ms)



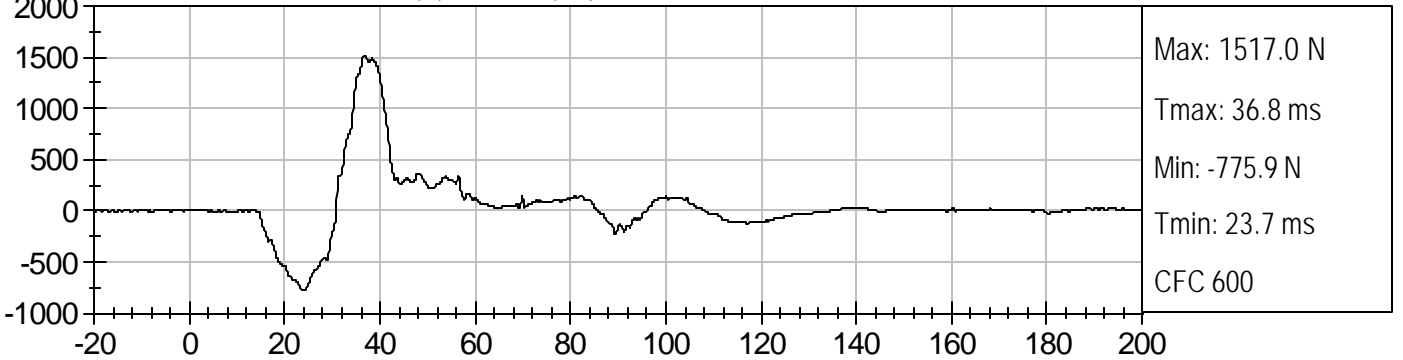




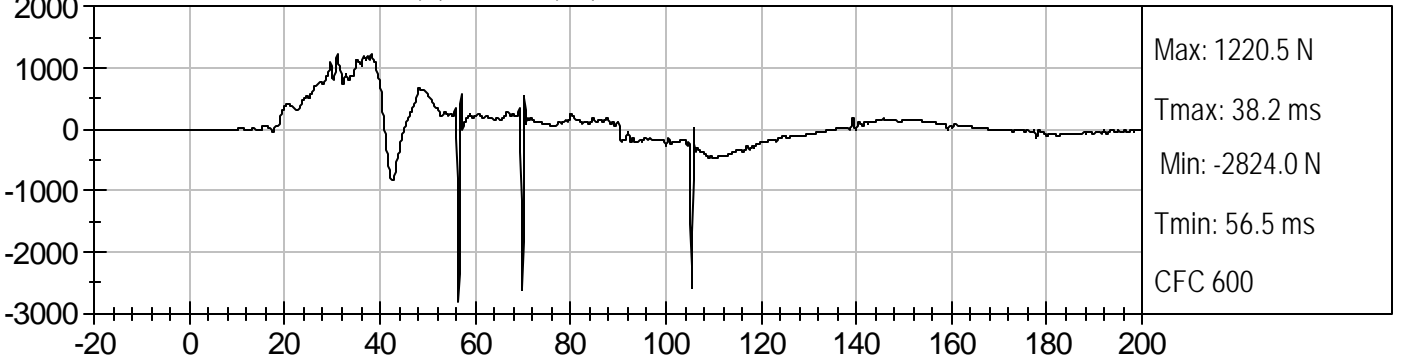
DRIVER RIGHT FEMUR FX (N) vs TIME (ms)



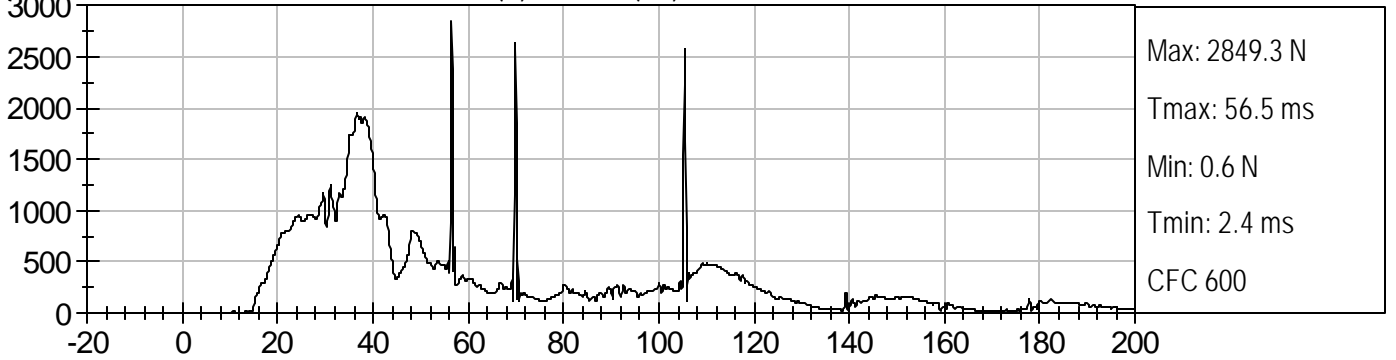
DRIVER RIGHT FEMUR FY (N) vs TIME (ms)

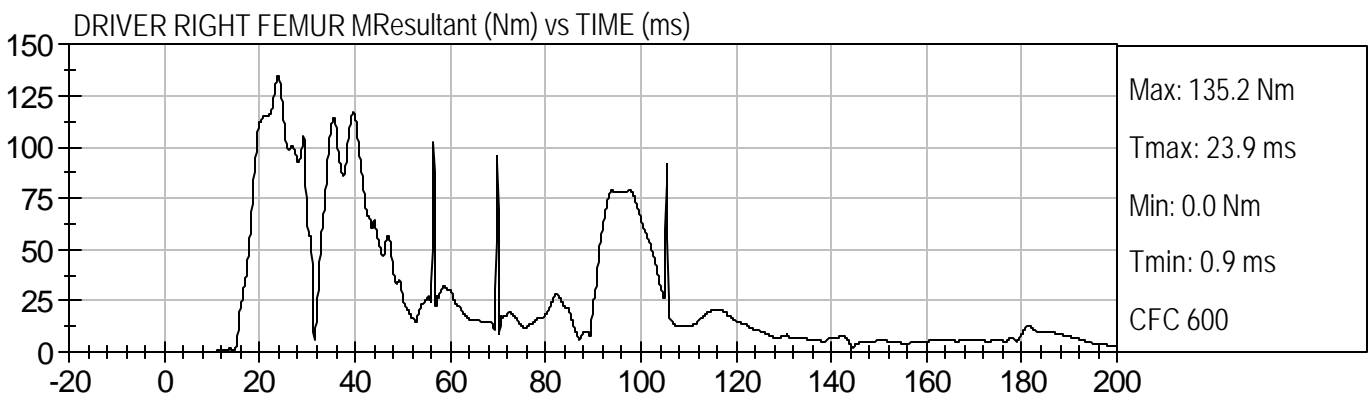
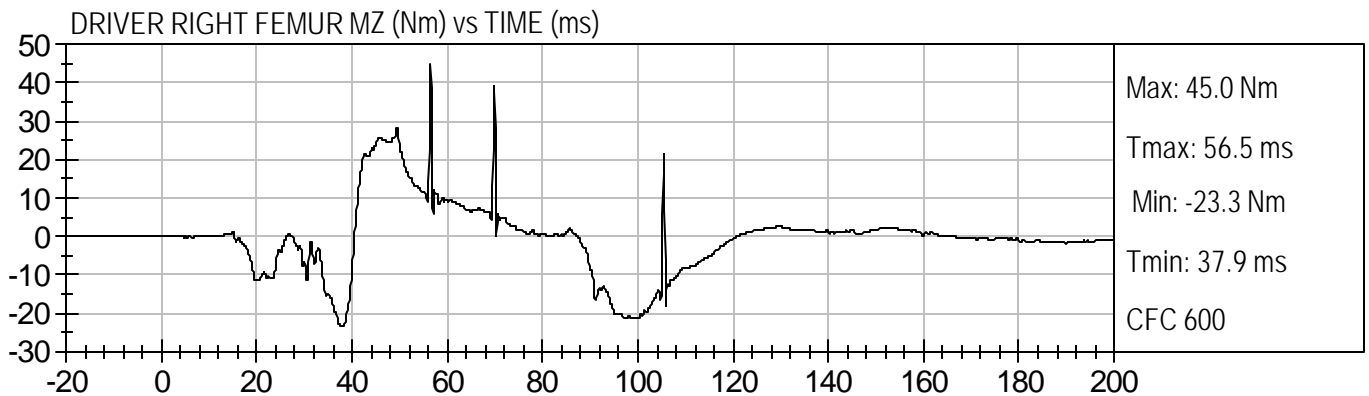
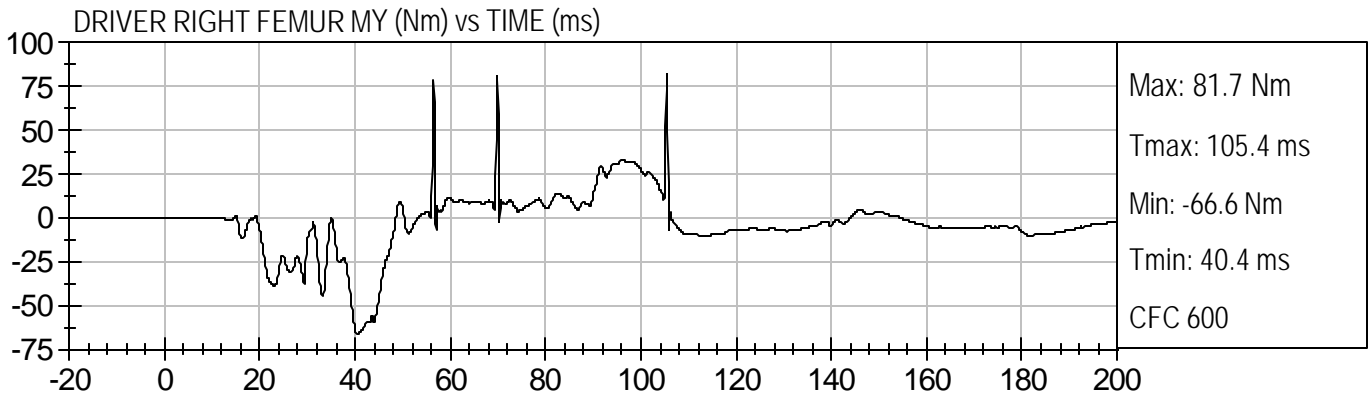
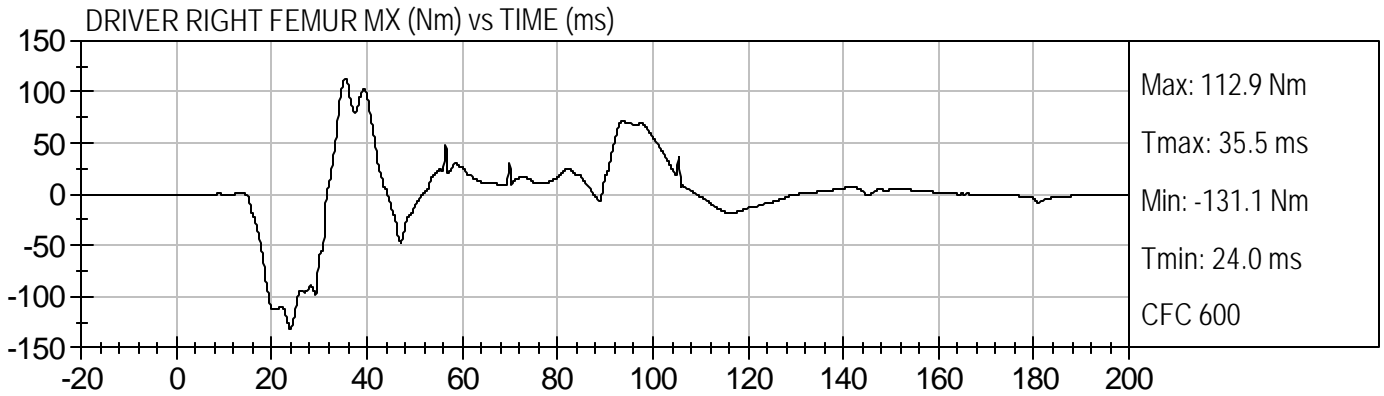


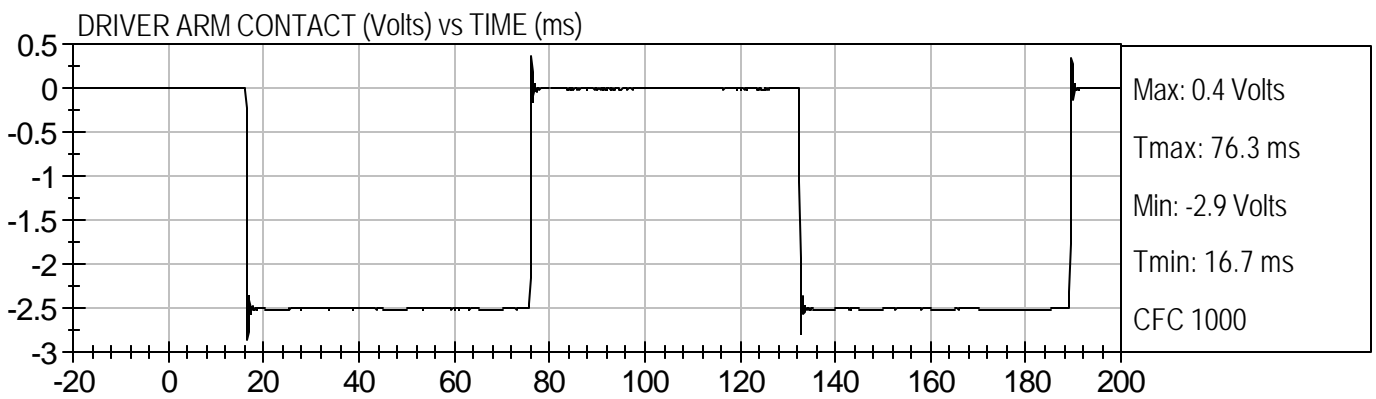
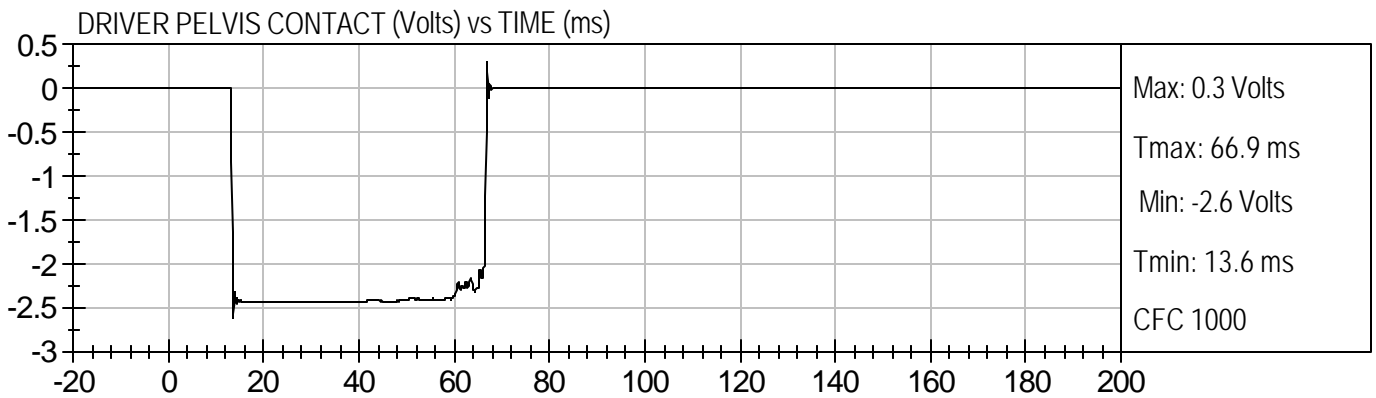
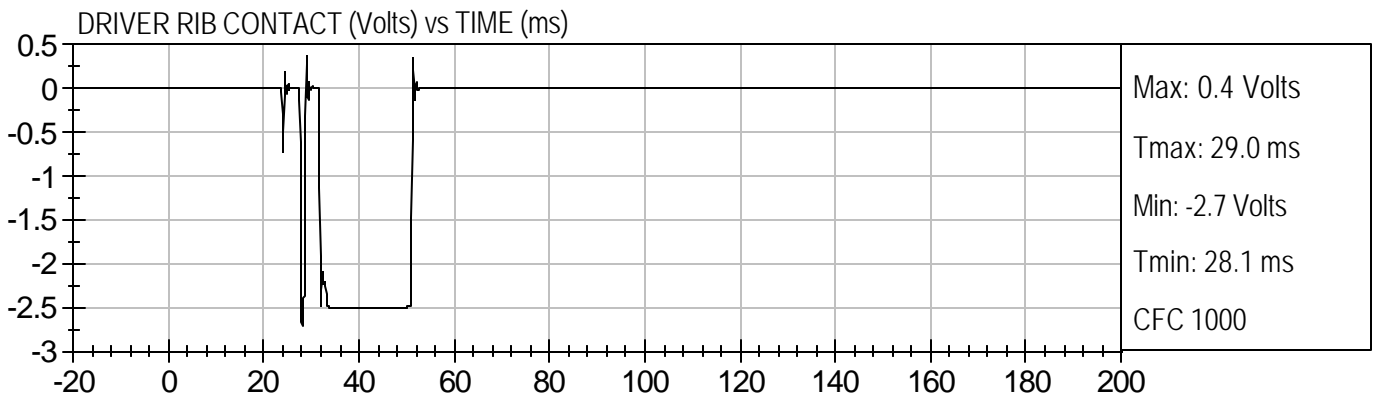
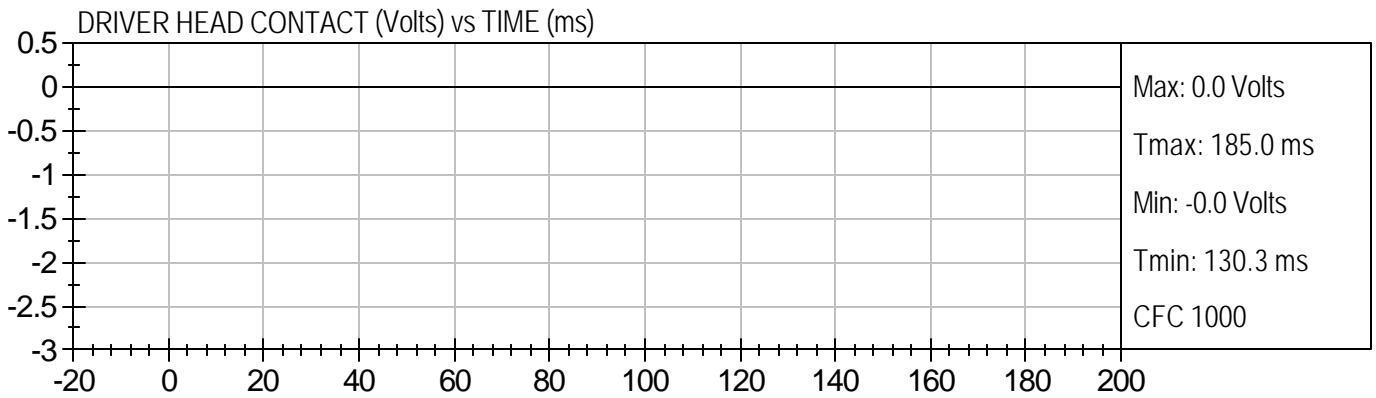
DRIVER RIGHT FEMUR FZ (N) vs TIME (ms)

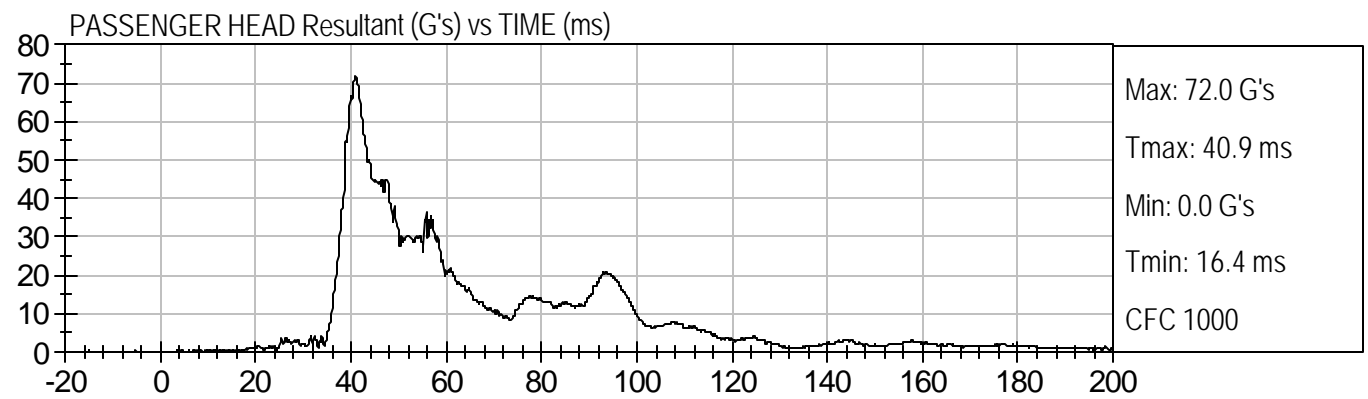
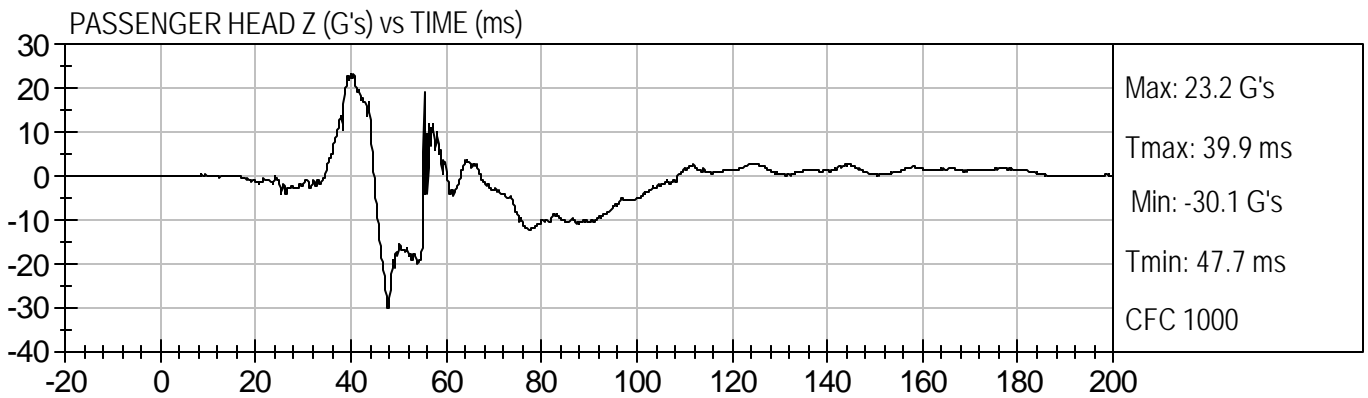
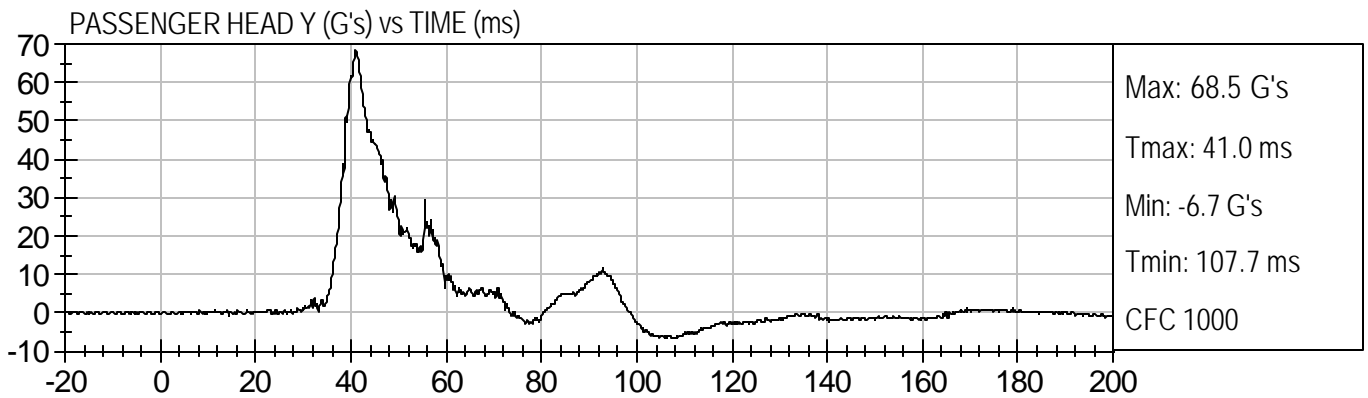
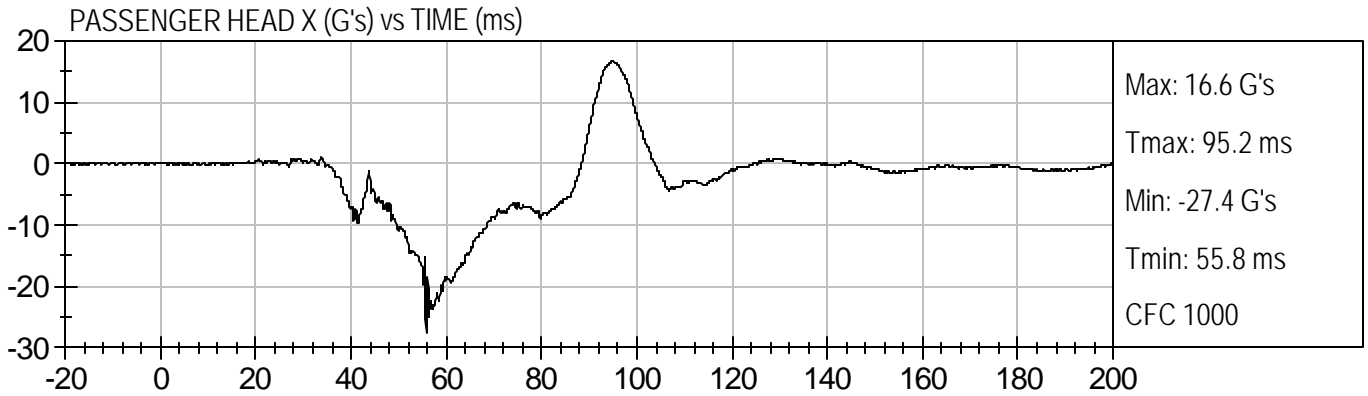


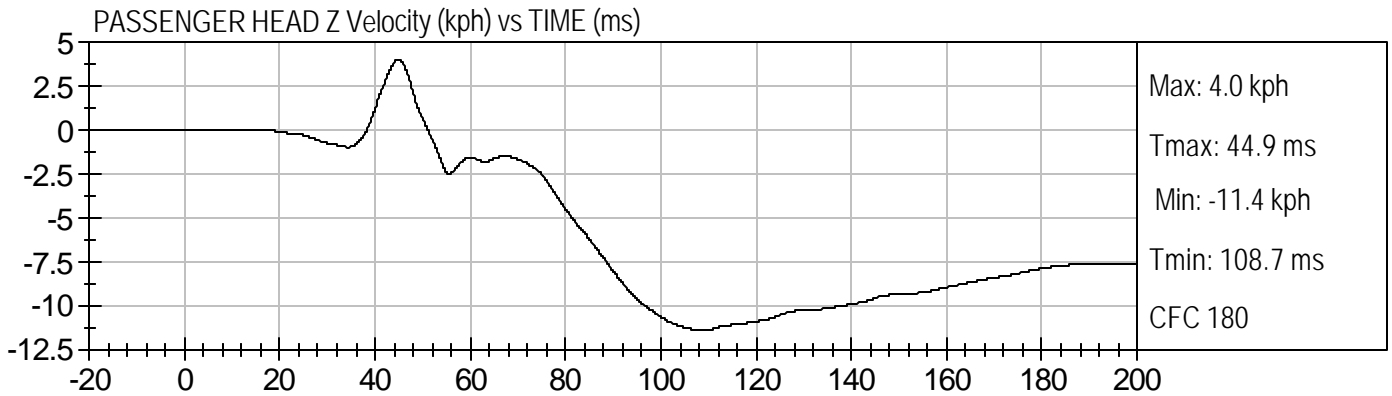
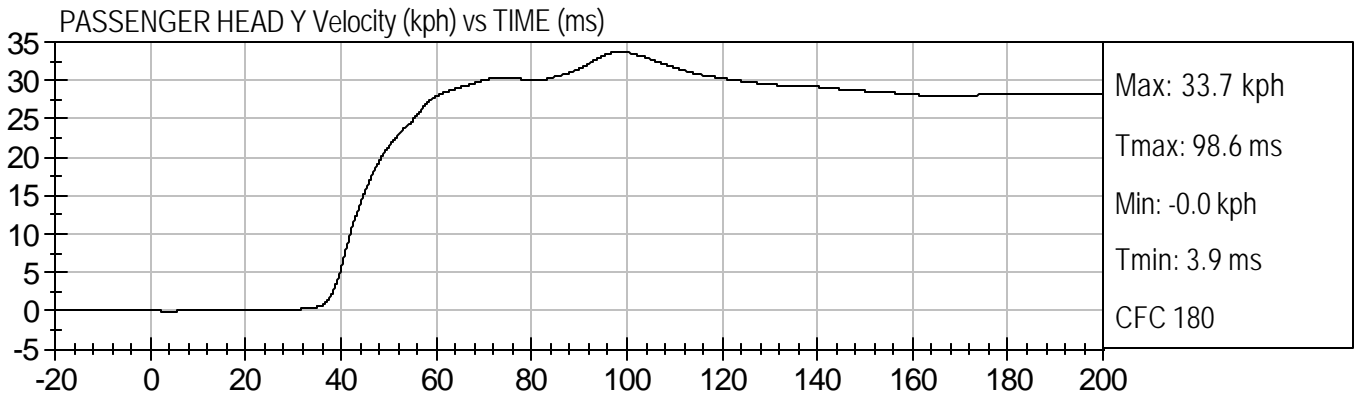
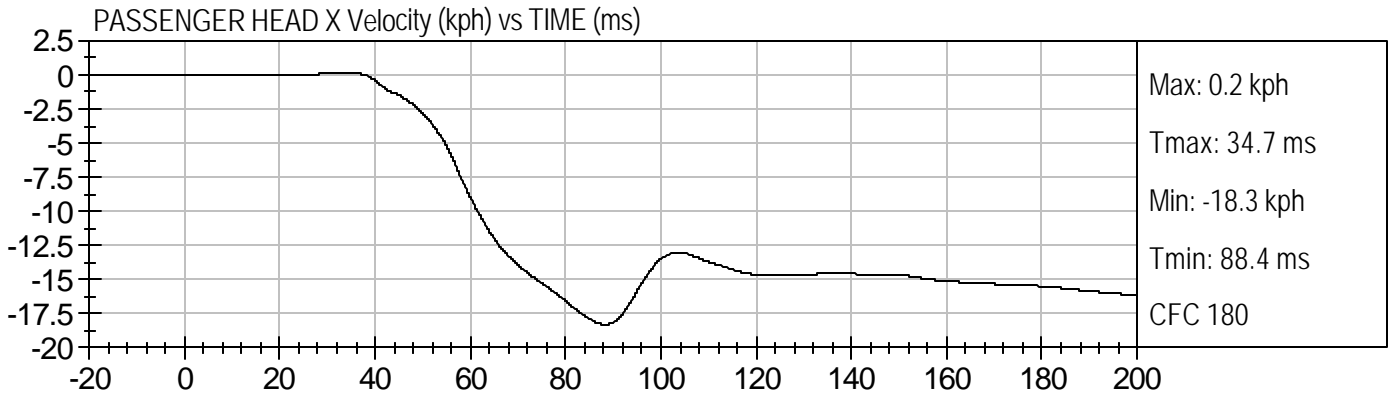
DRIVER RIGHT FEMUR FResultant (N) vs TIME (ms)

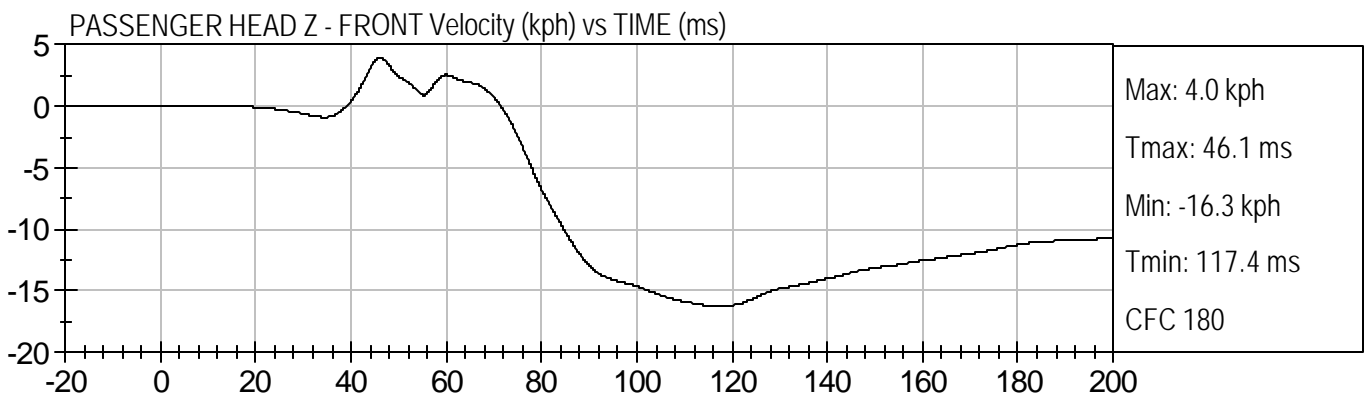
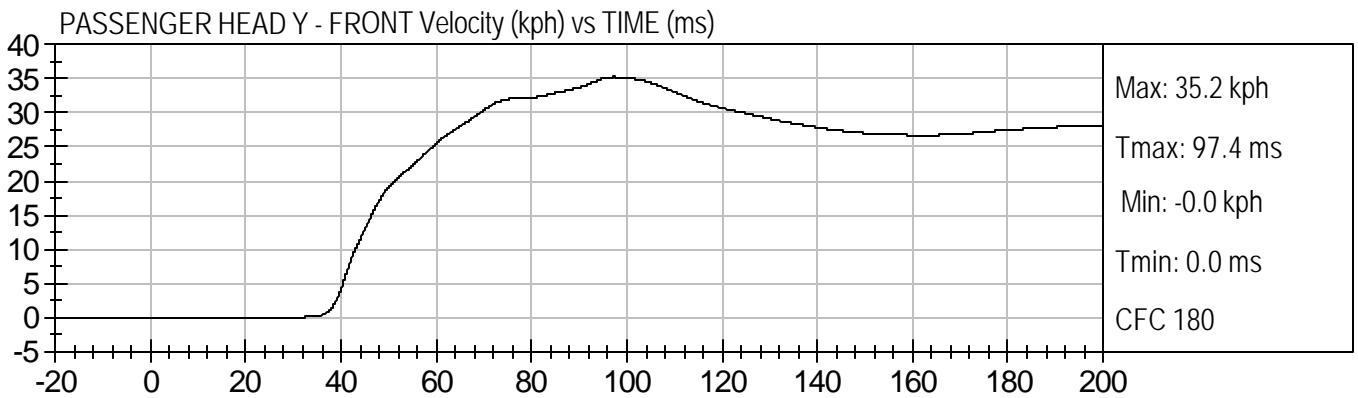
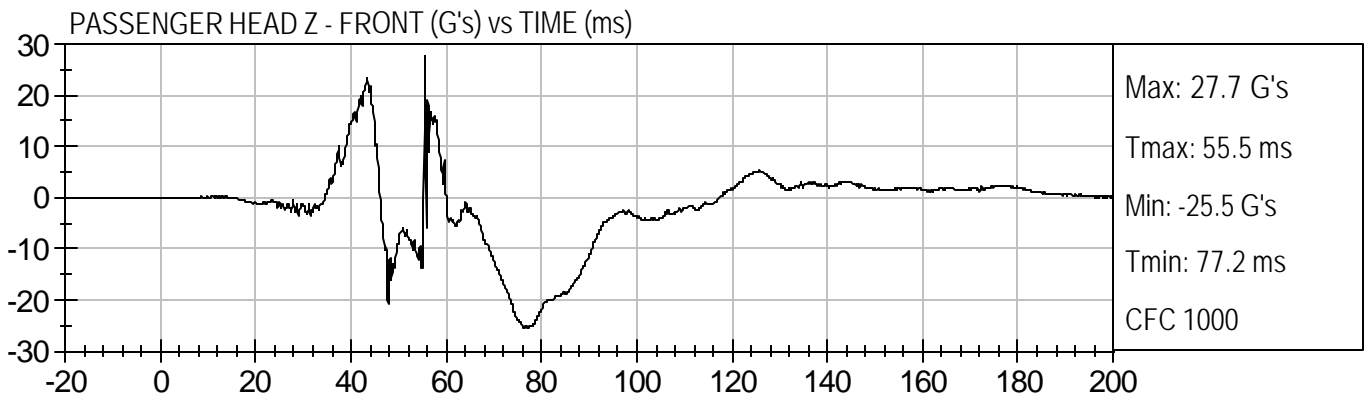
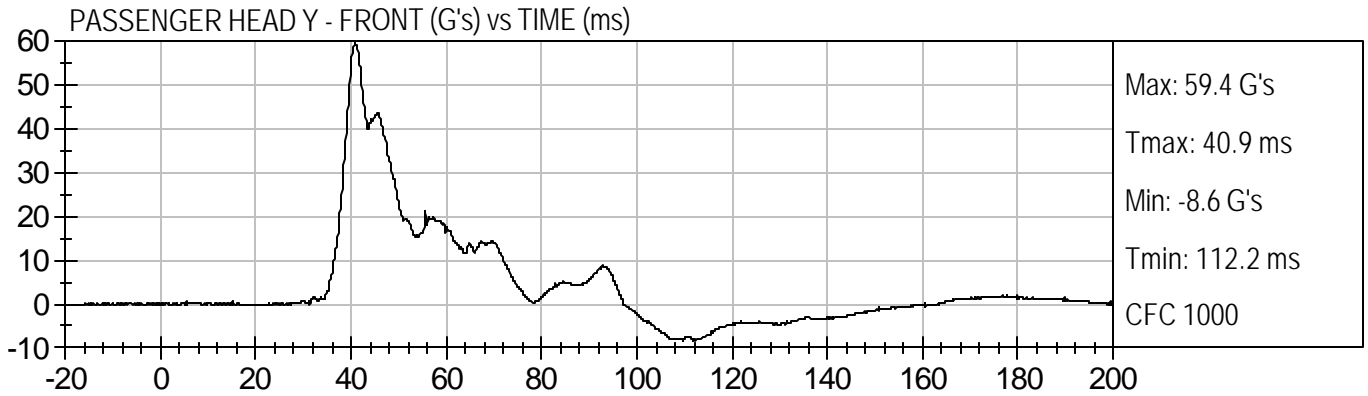


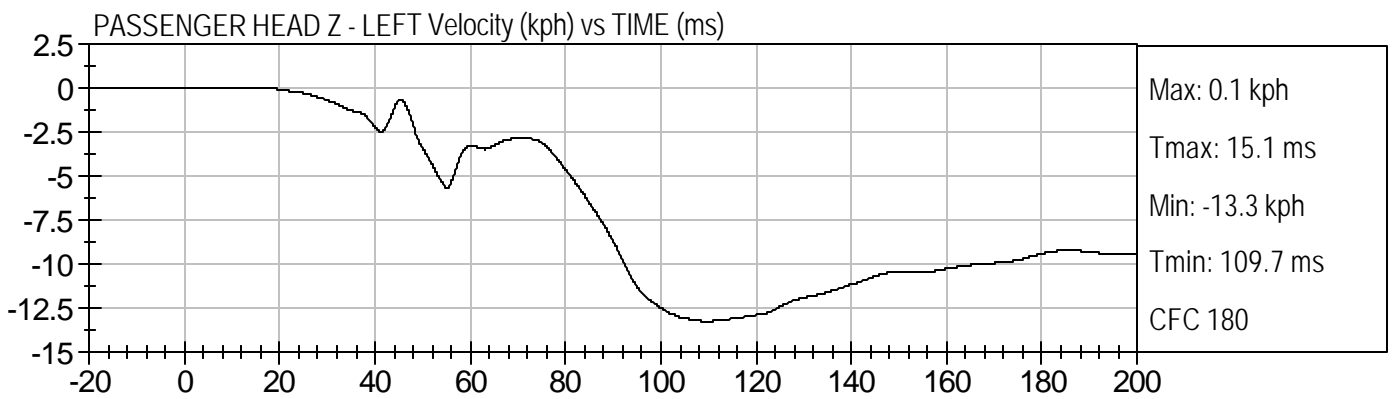
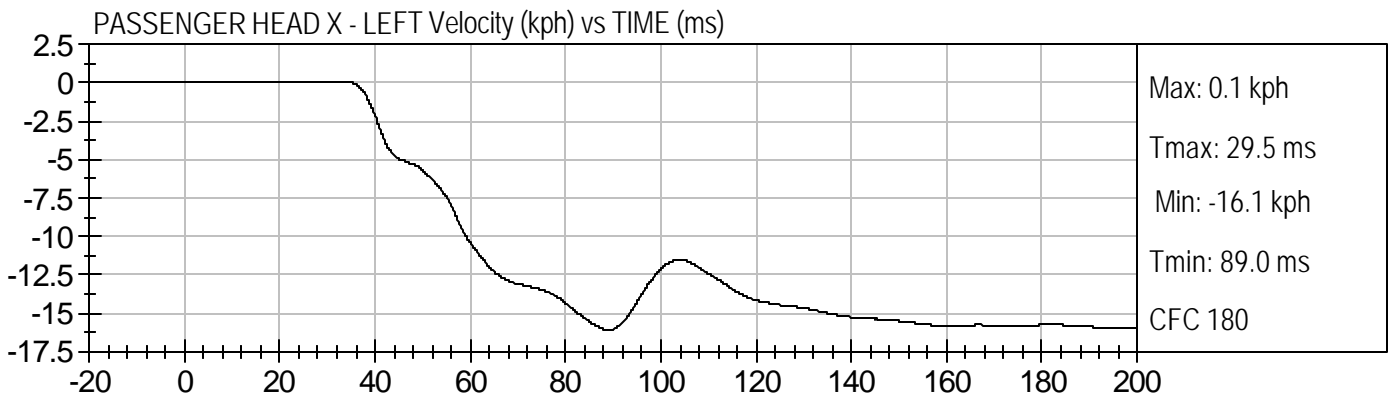
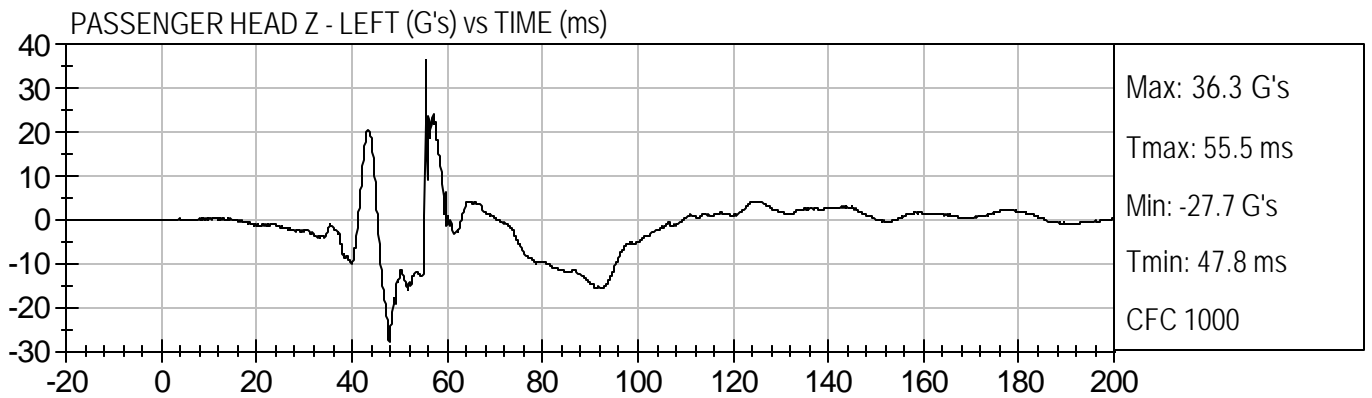
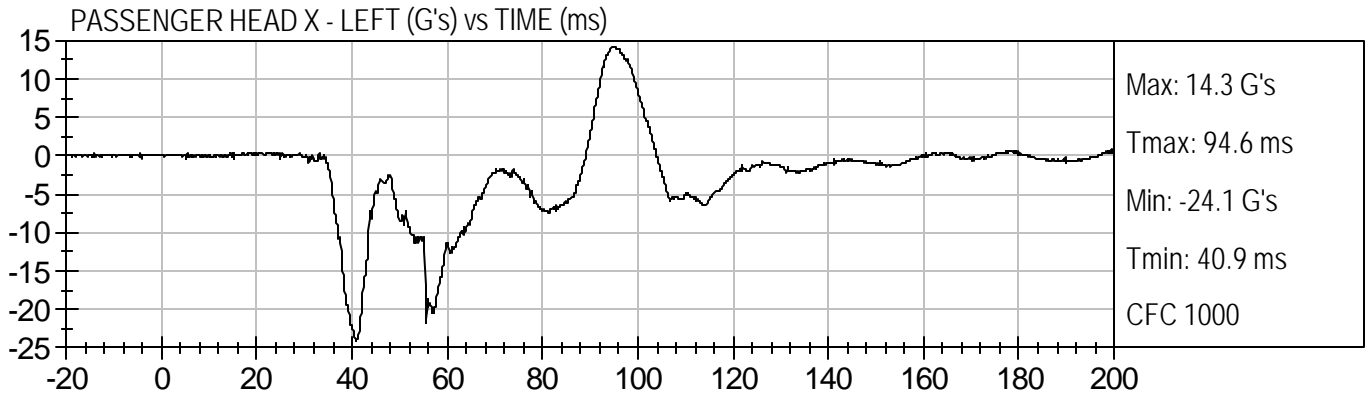


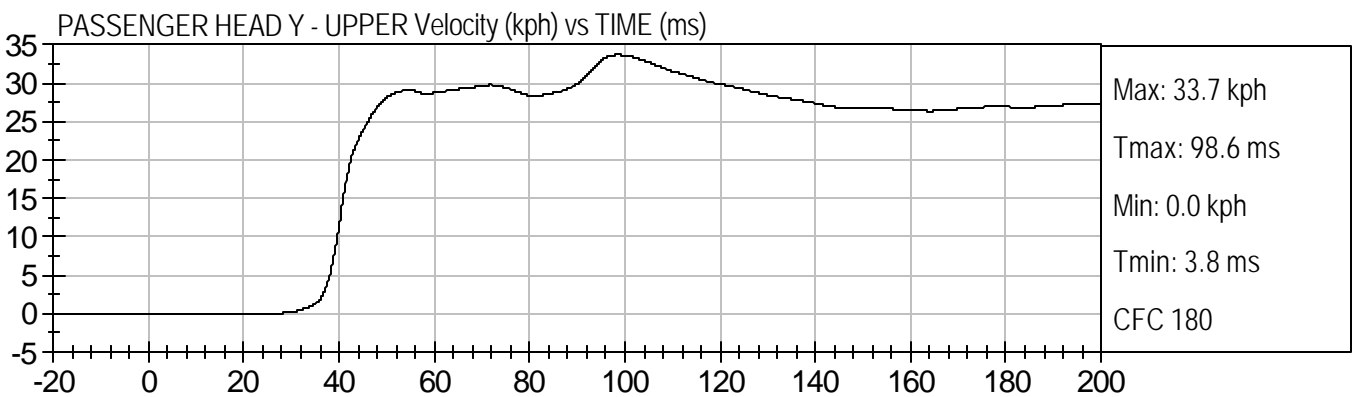
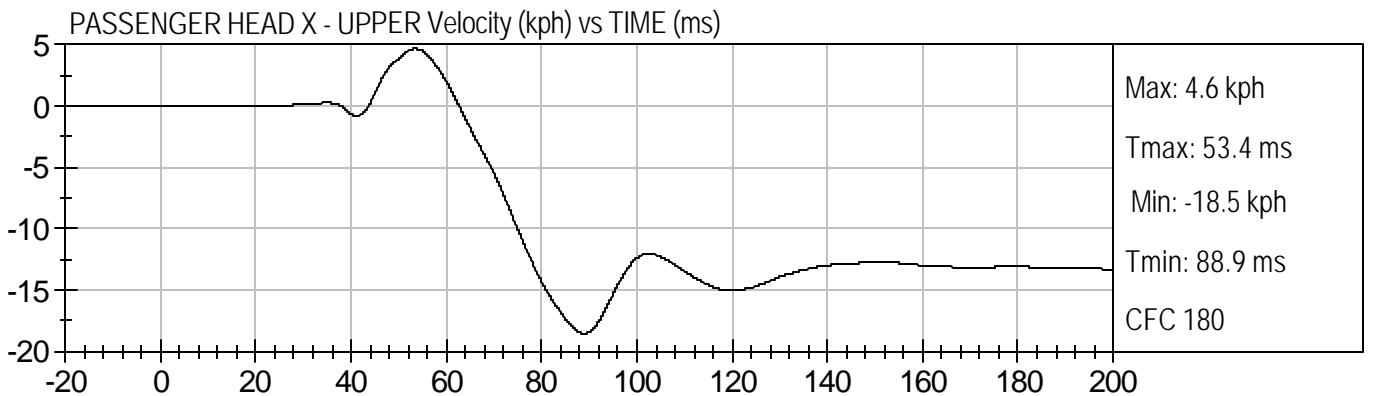
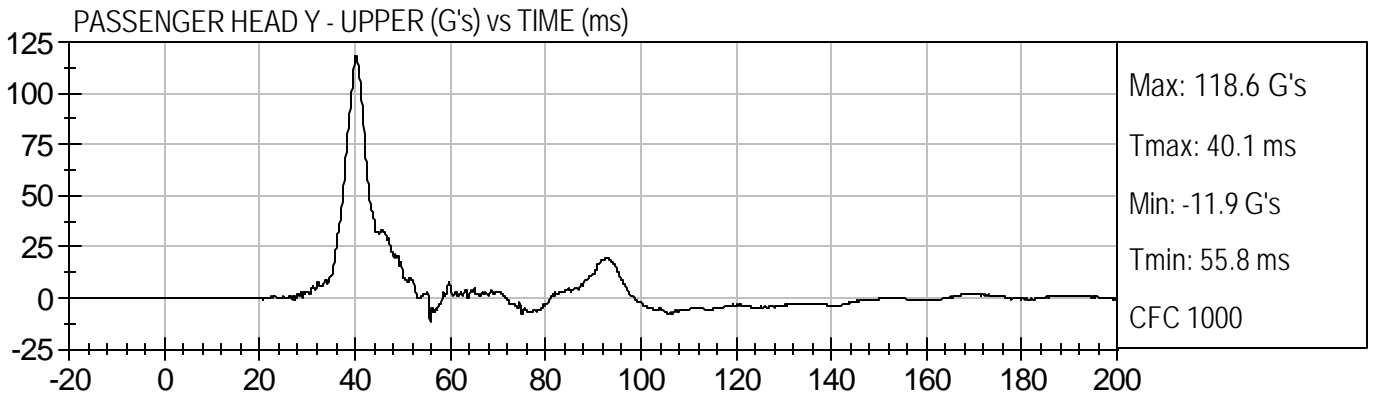
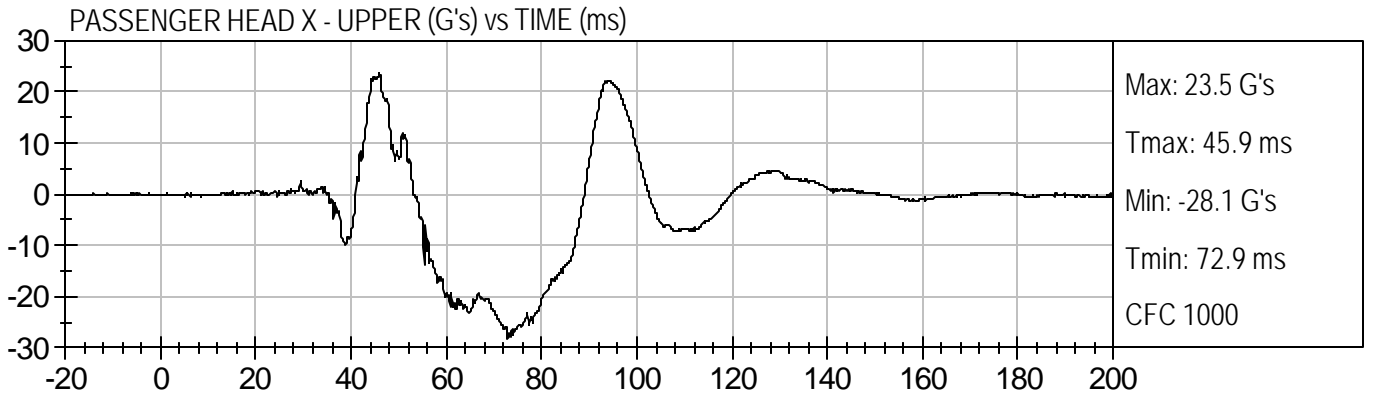


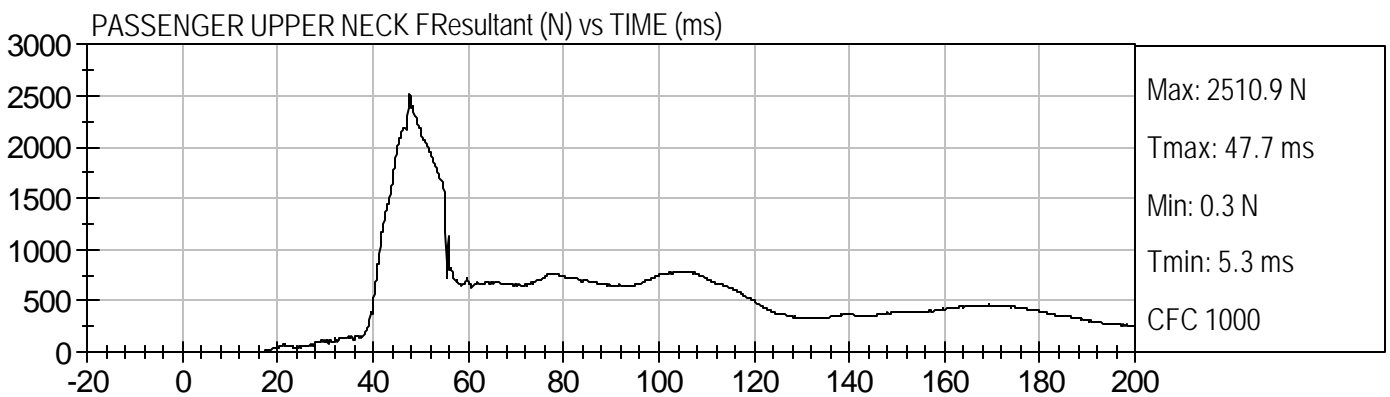
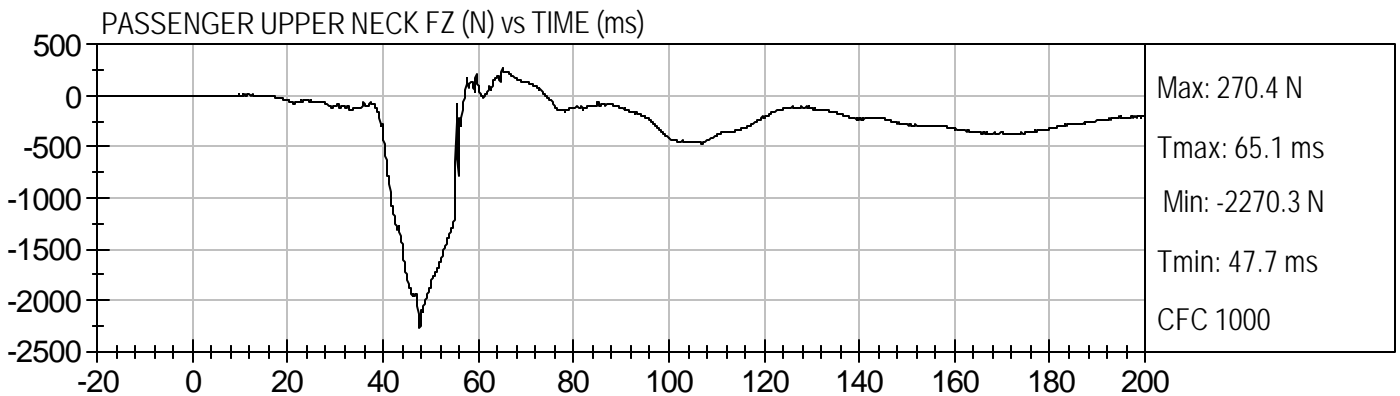
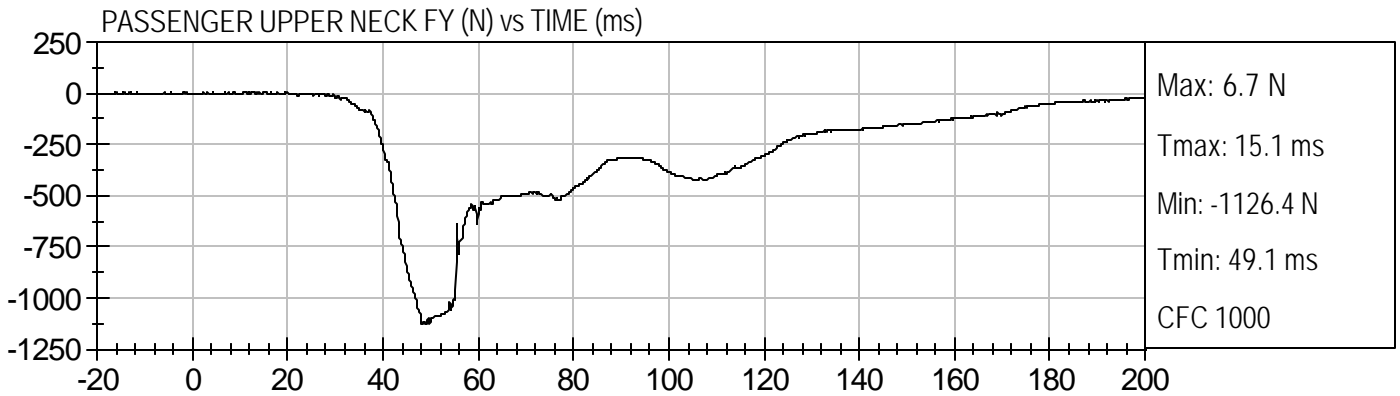
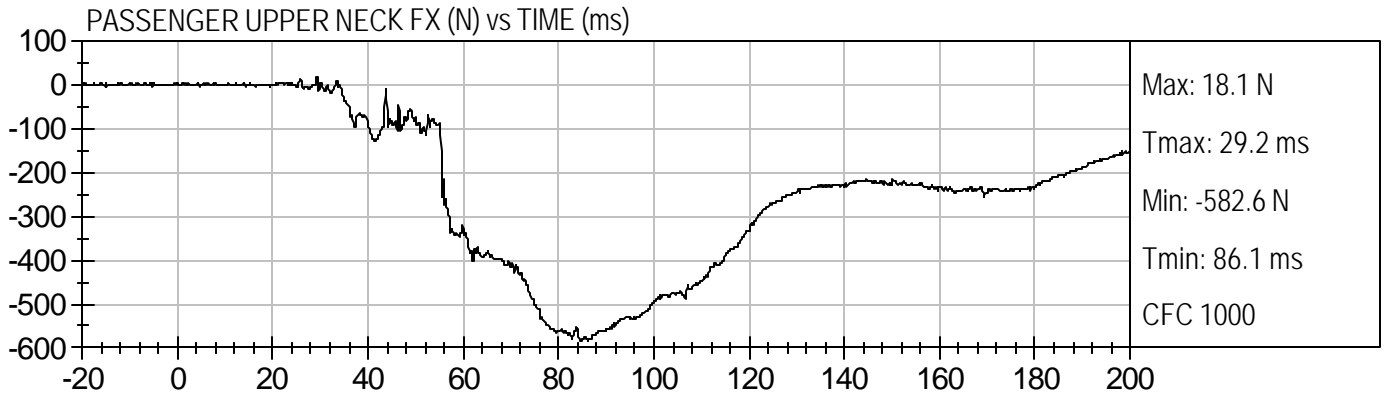


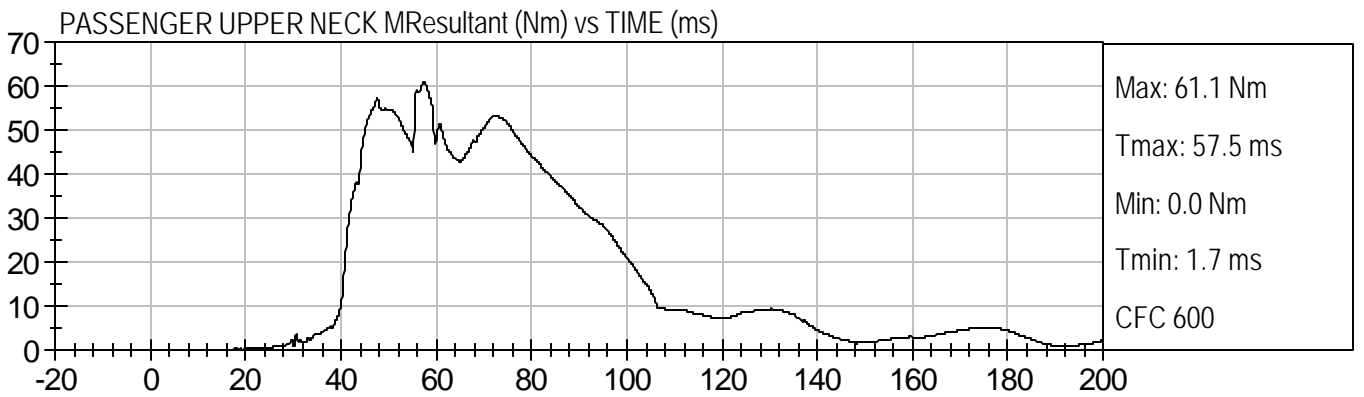
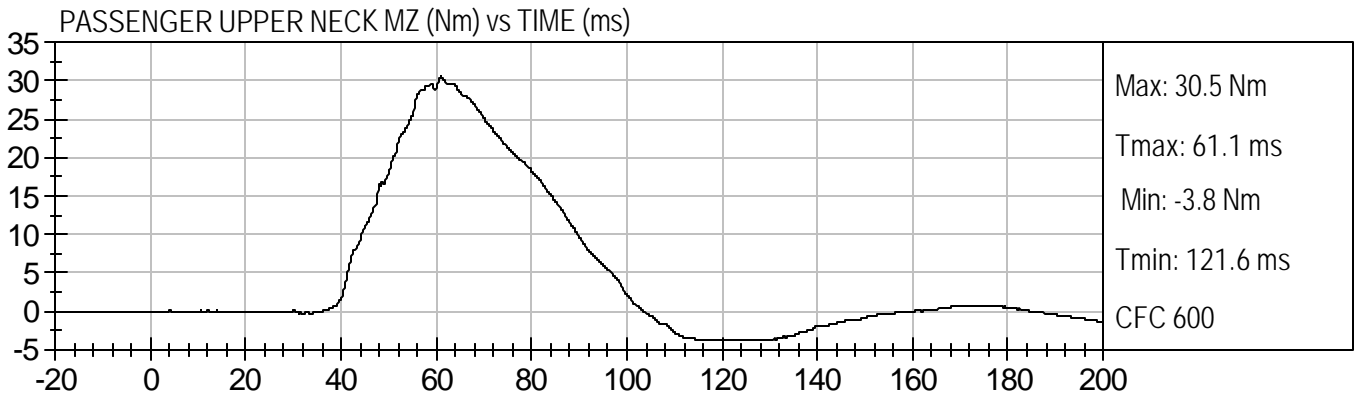
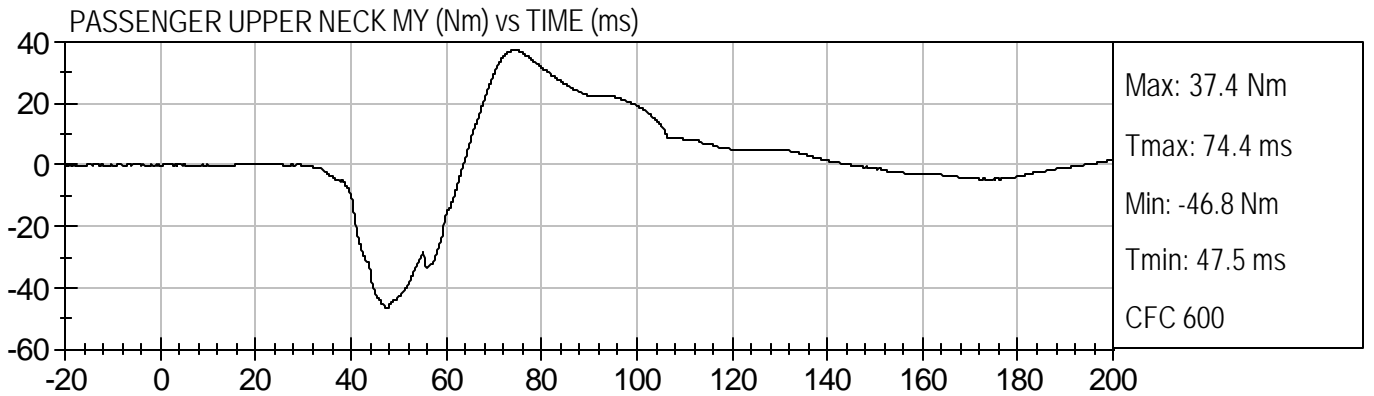
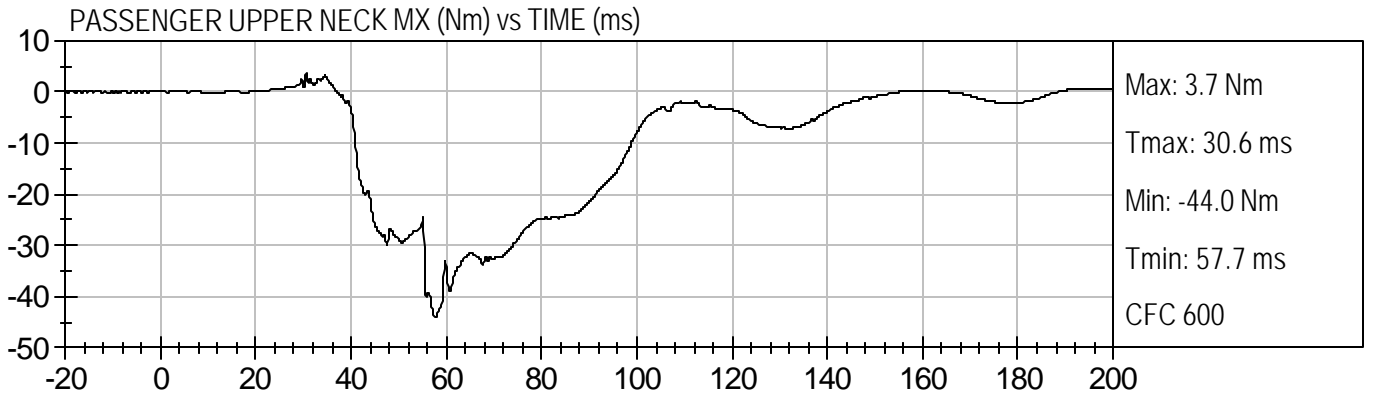


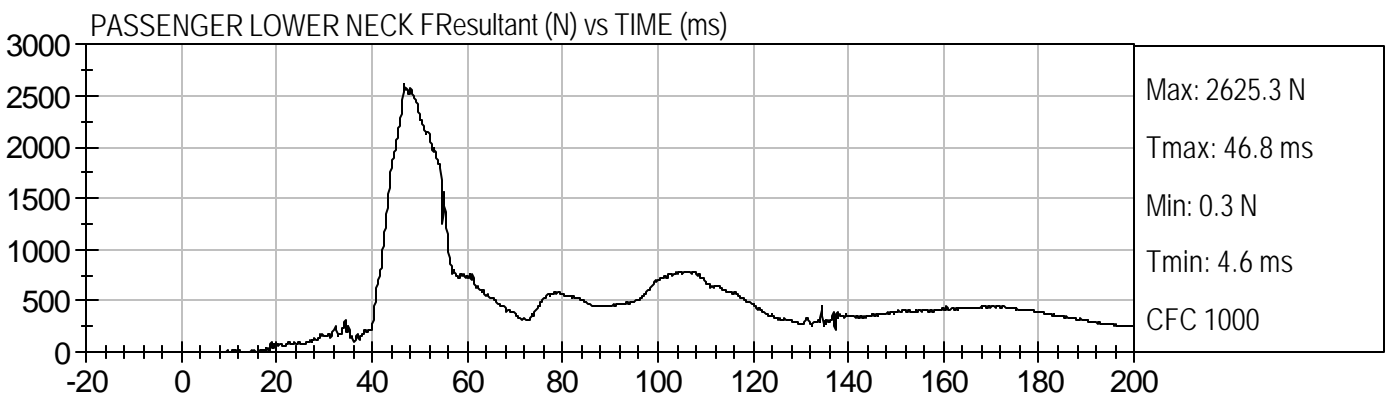
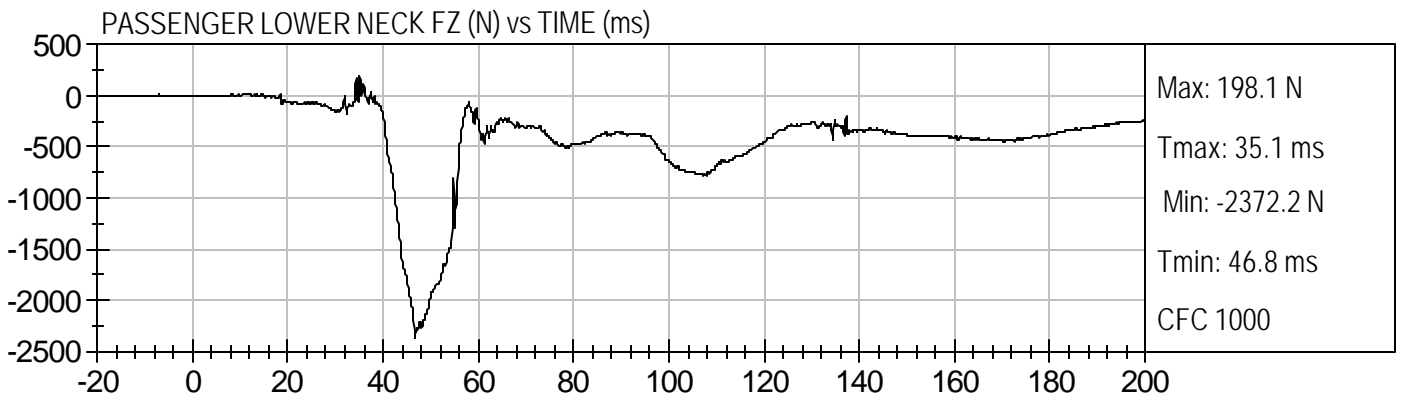
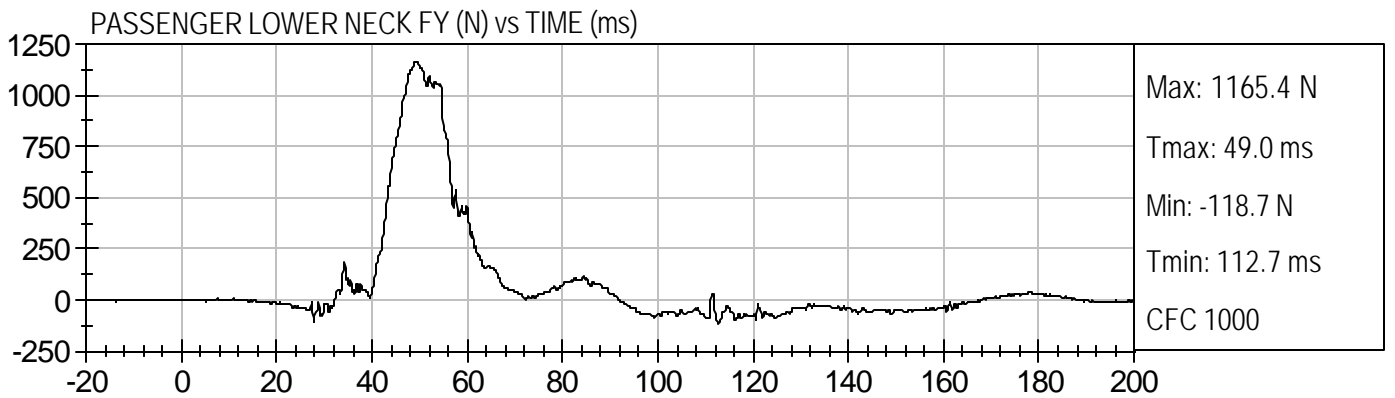
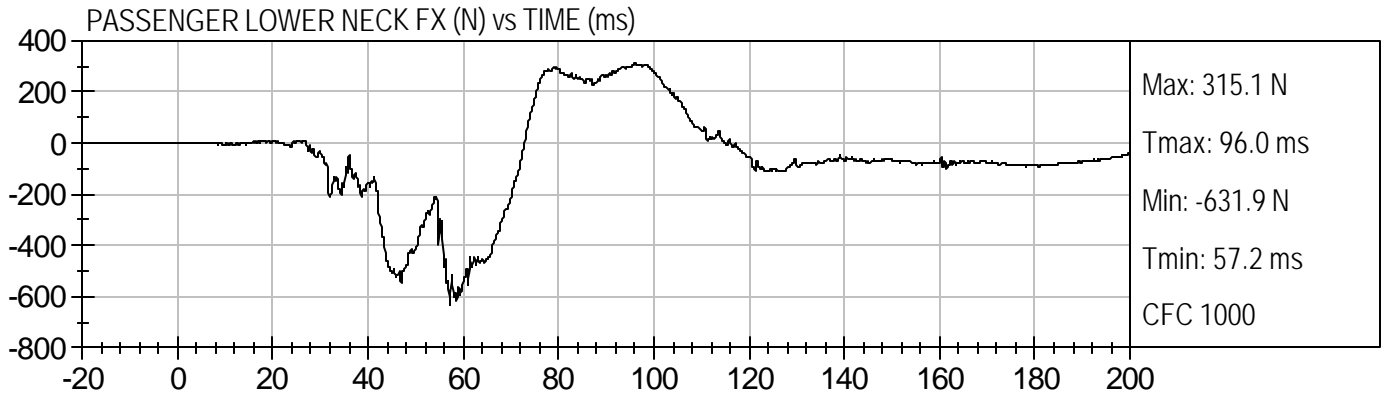


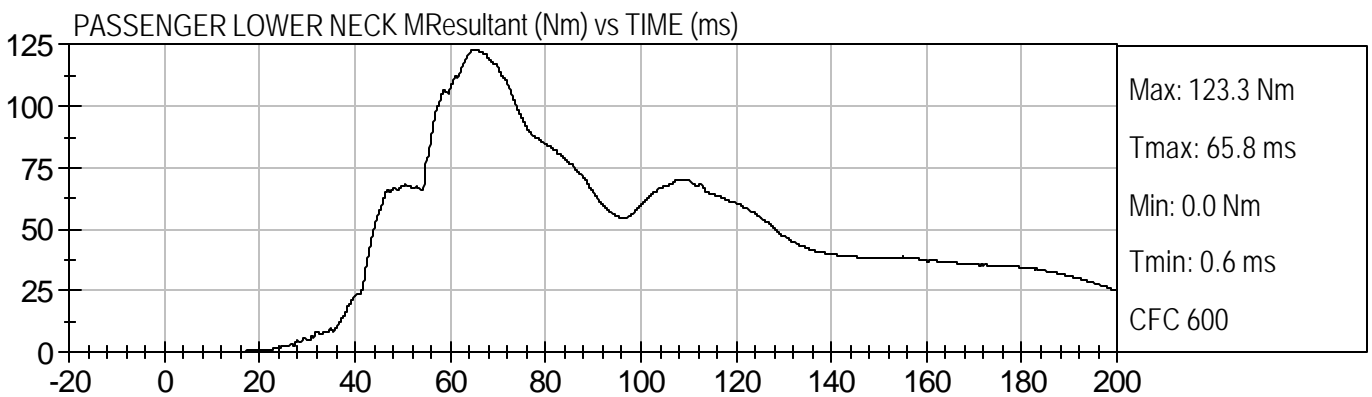
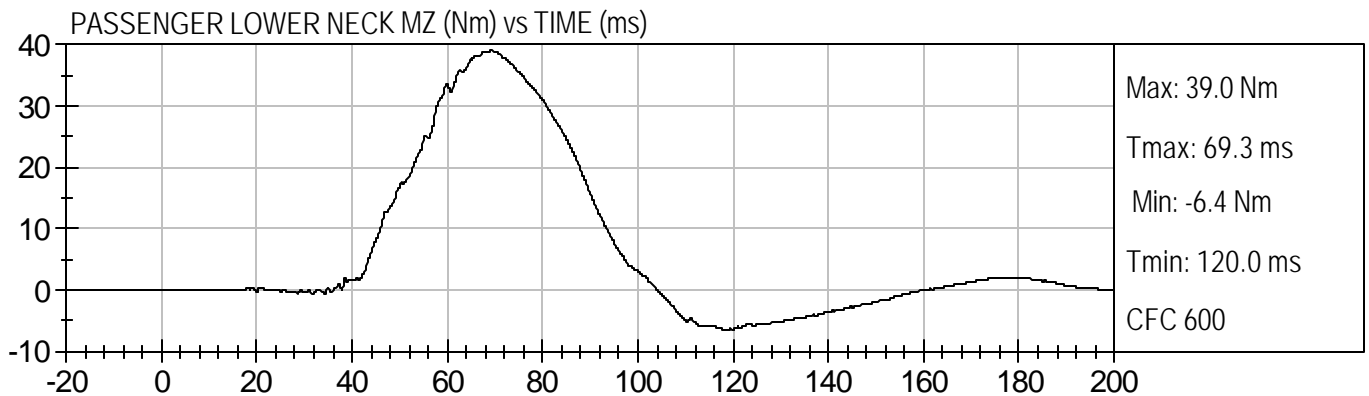
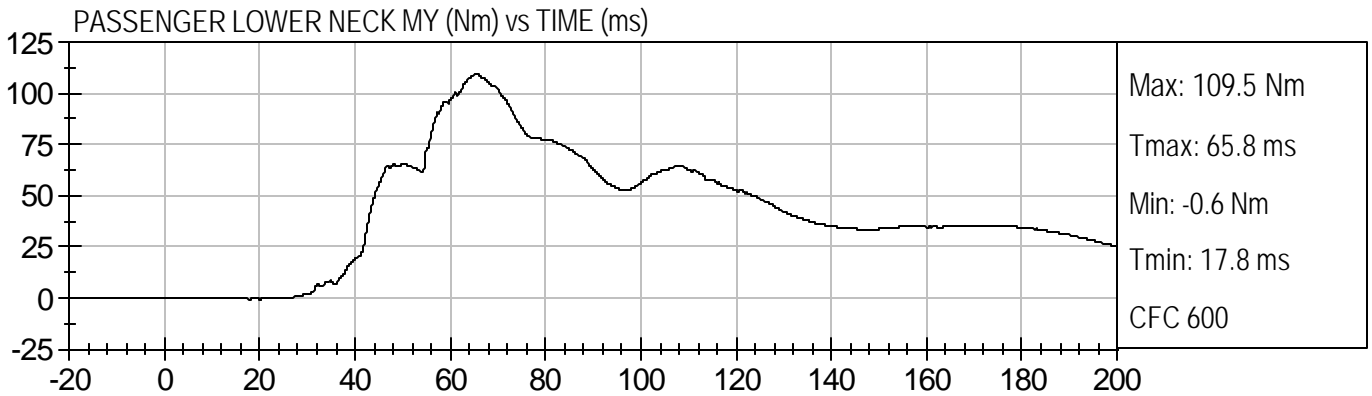
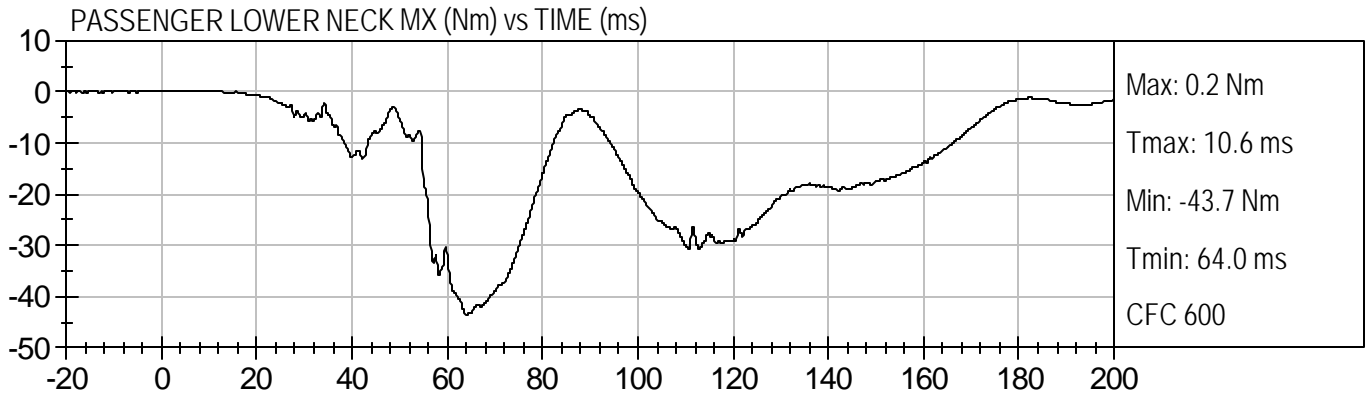


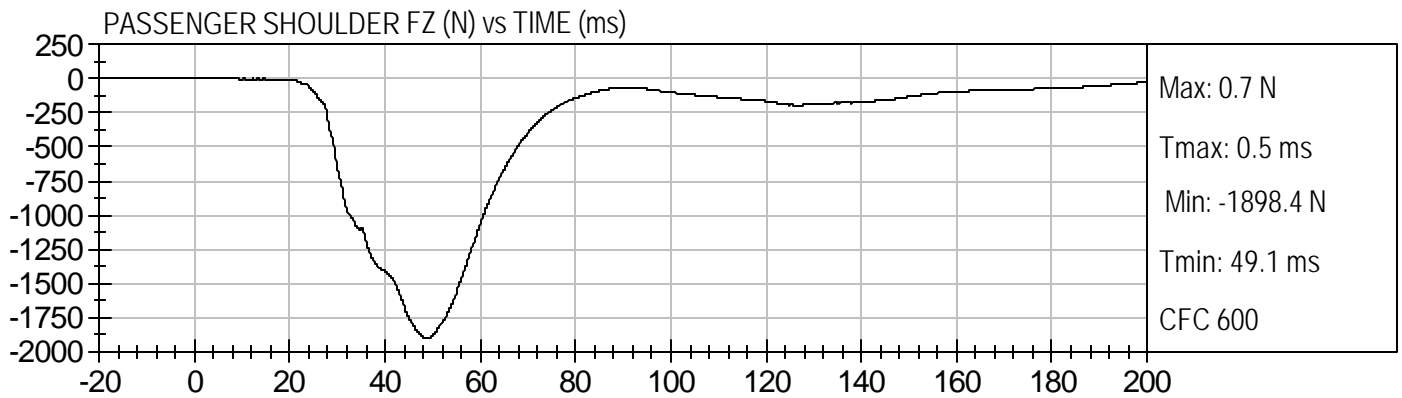
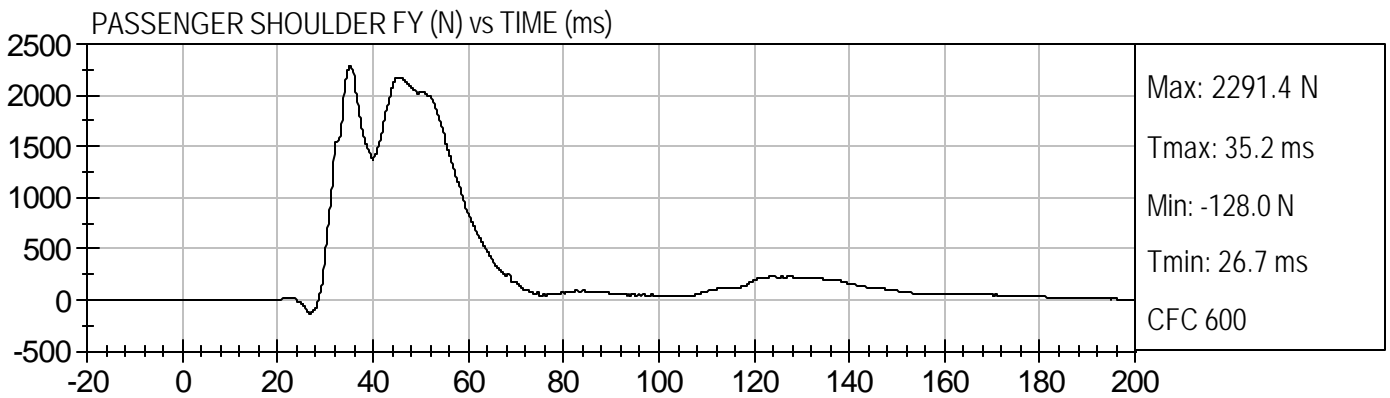
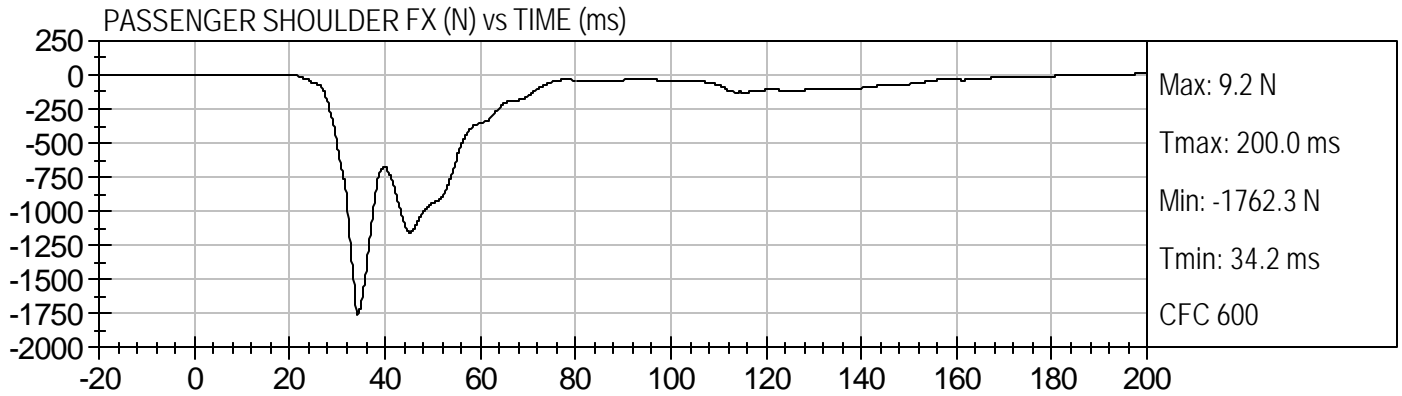


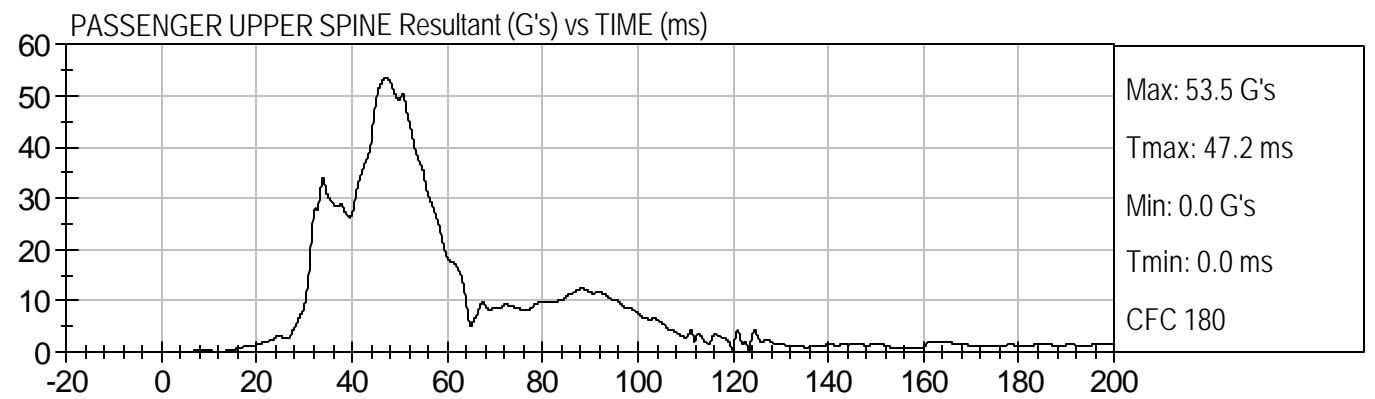
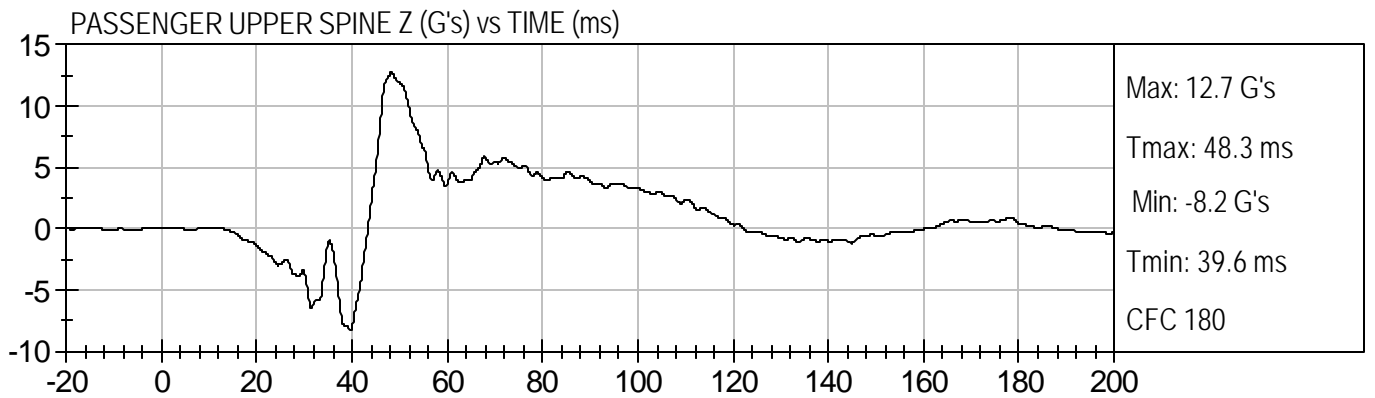
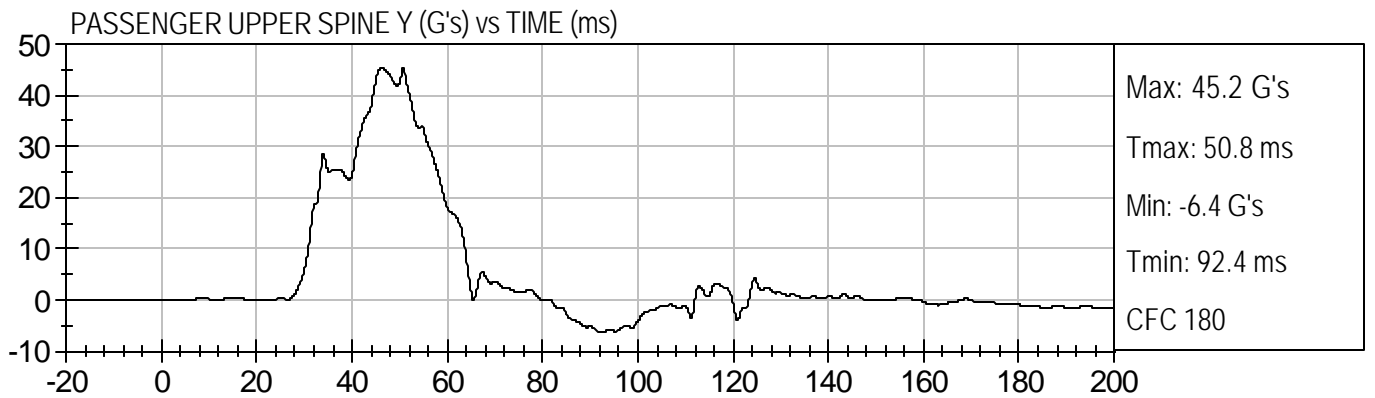
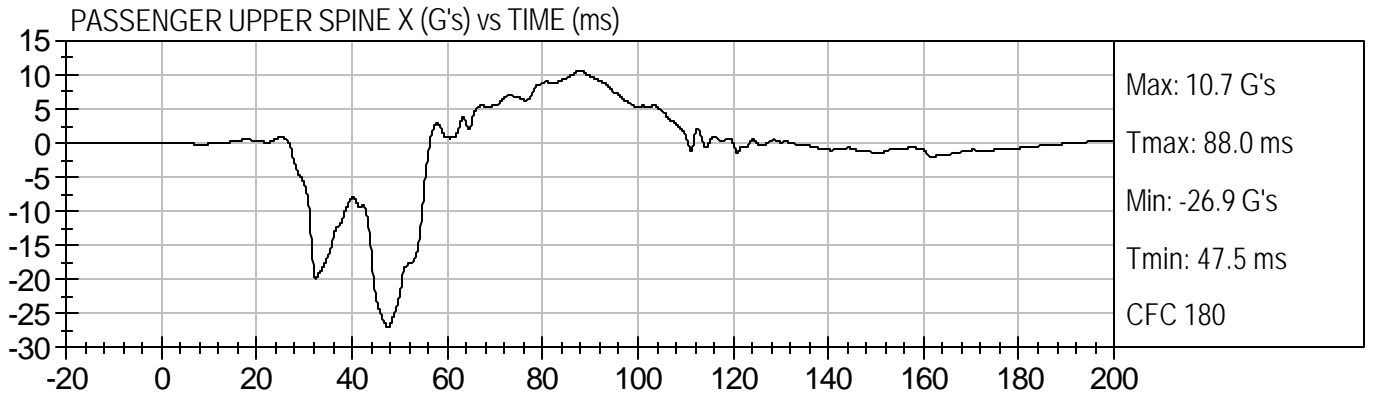


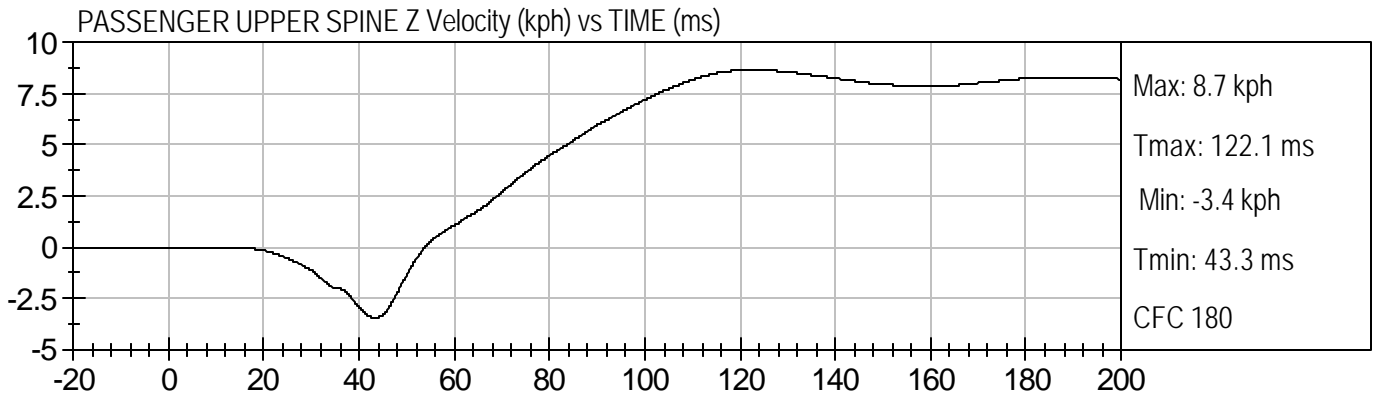
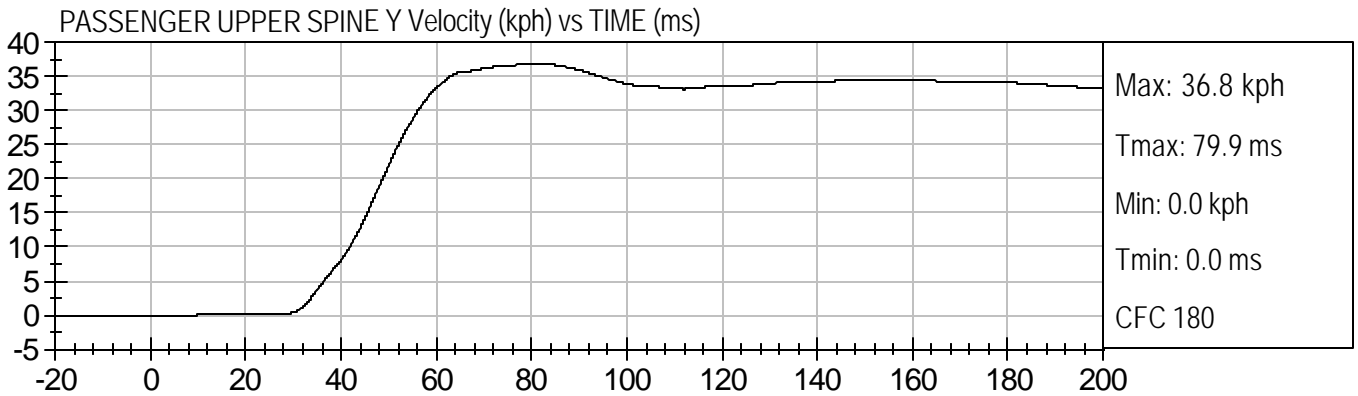
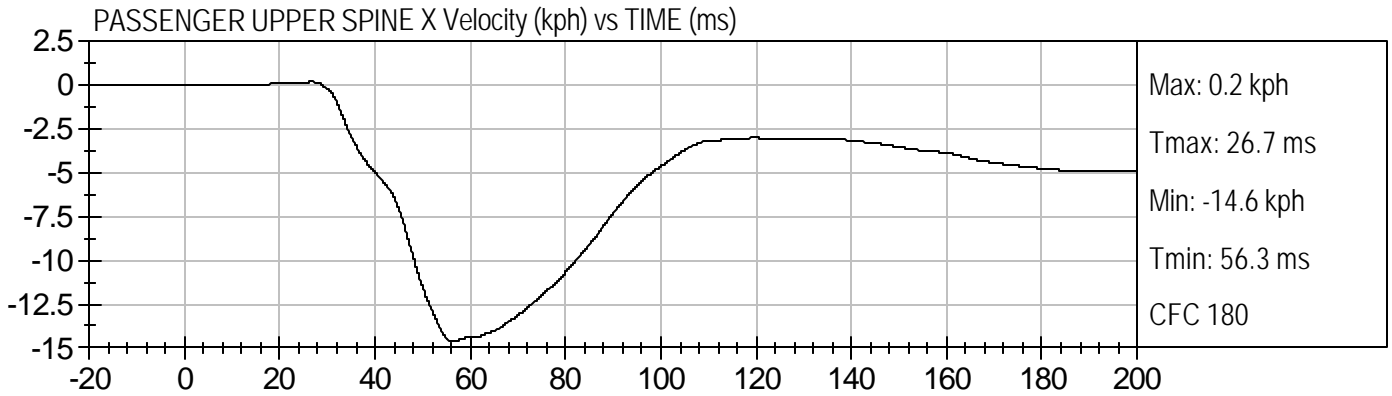


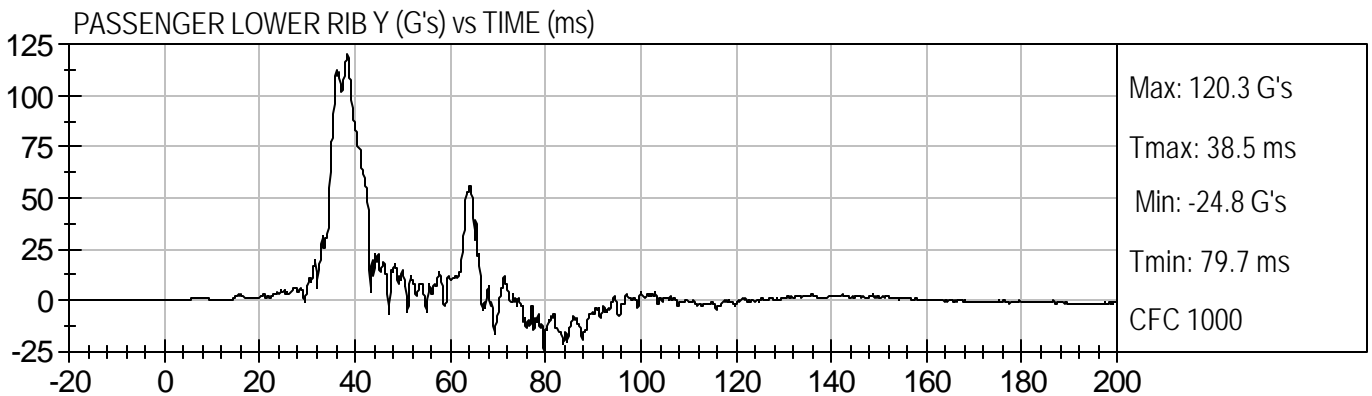
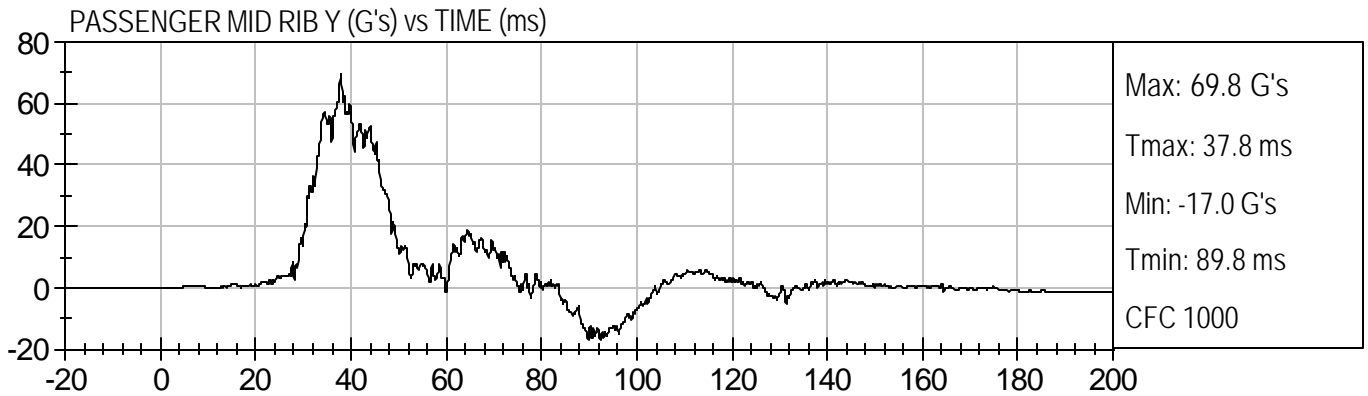
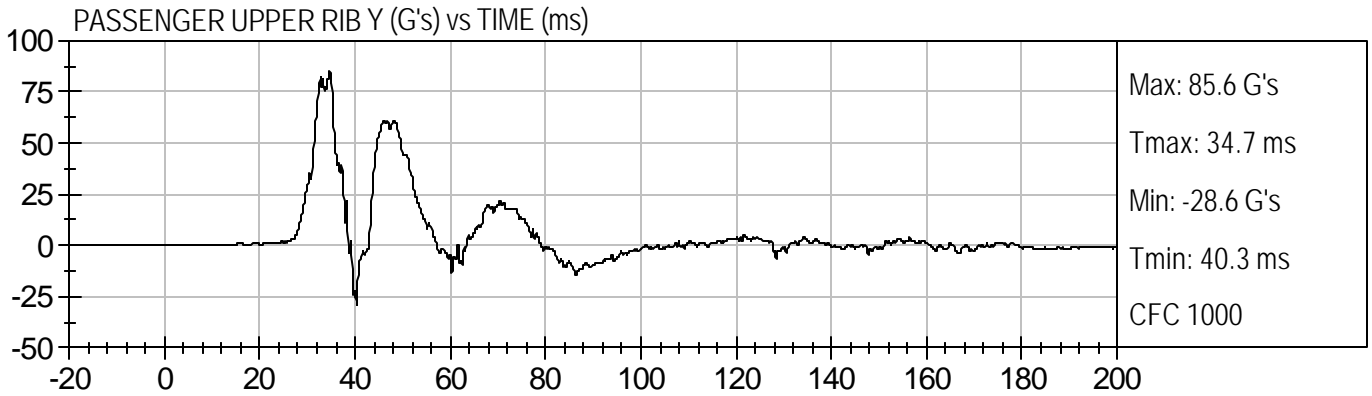






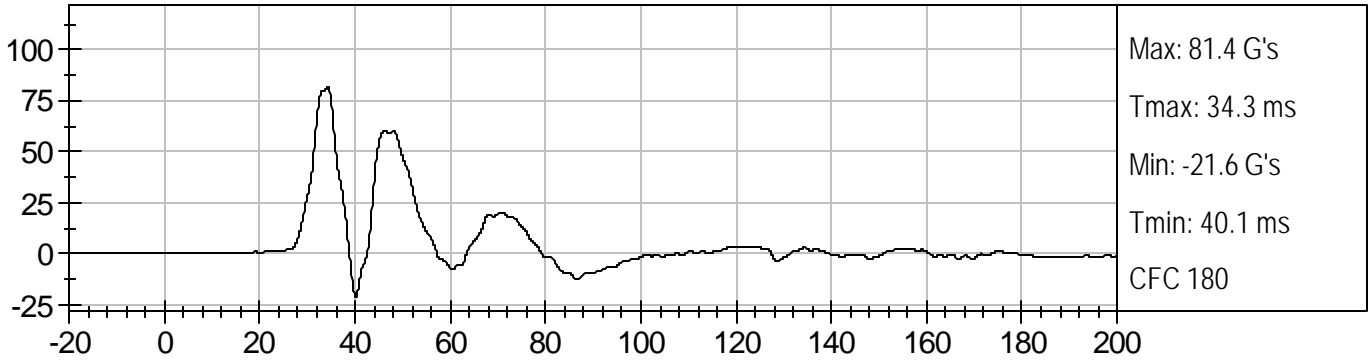




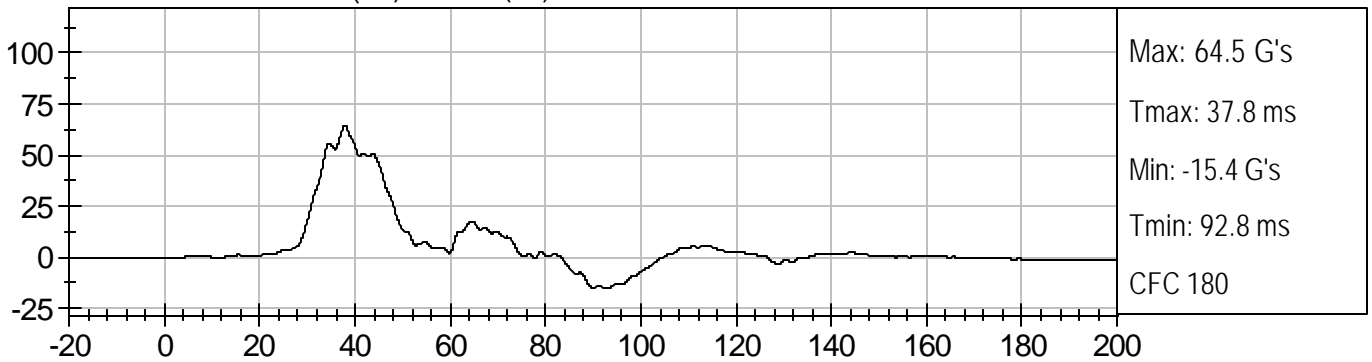




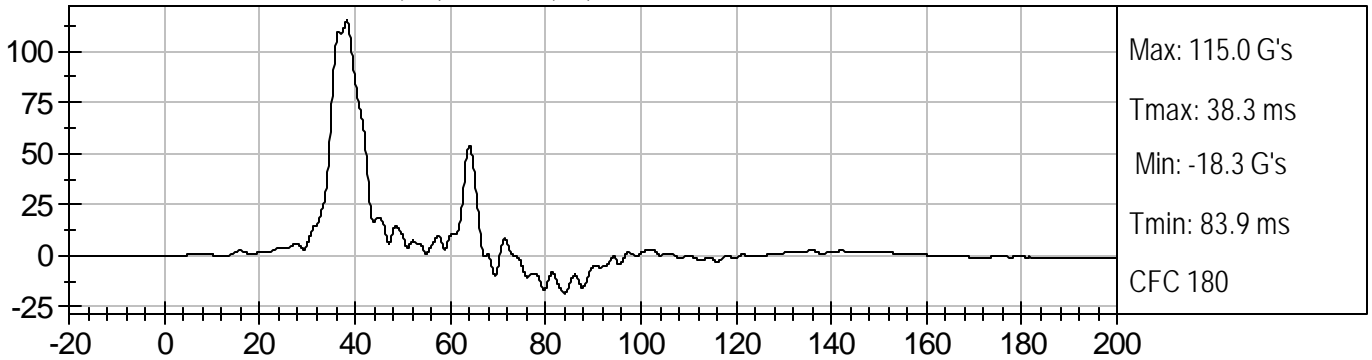
PASSENGER UPPER RIB Y (G's) vs TIME (ms)

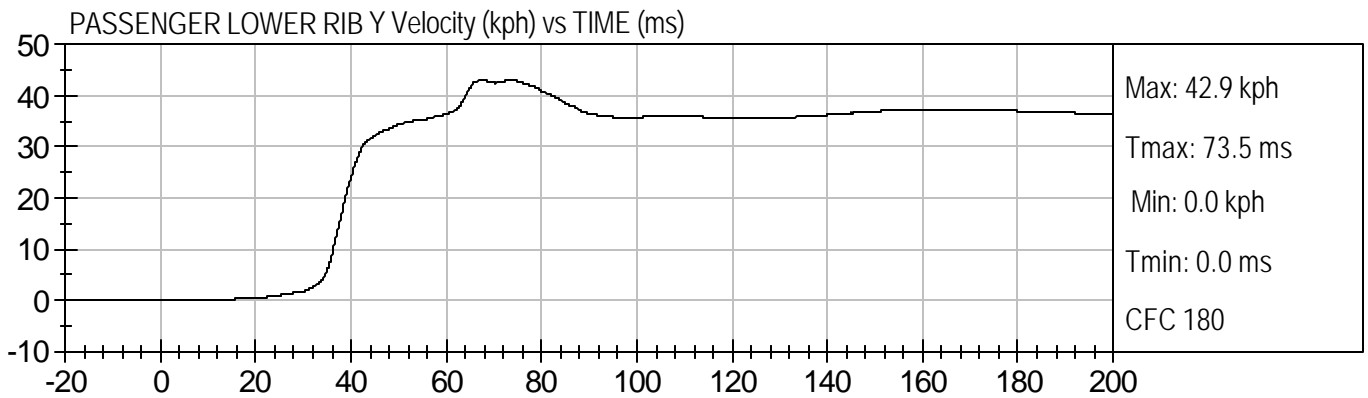
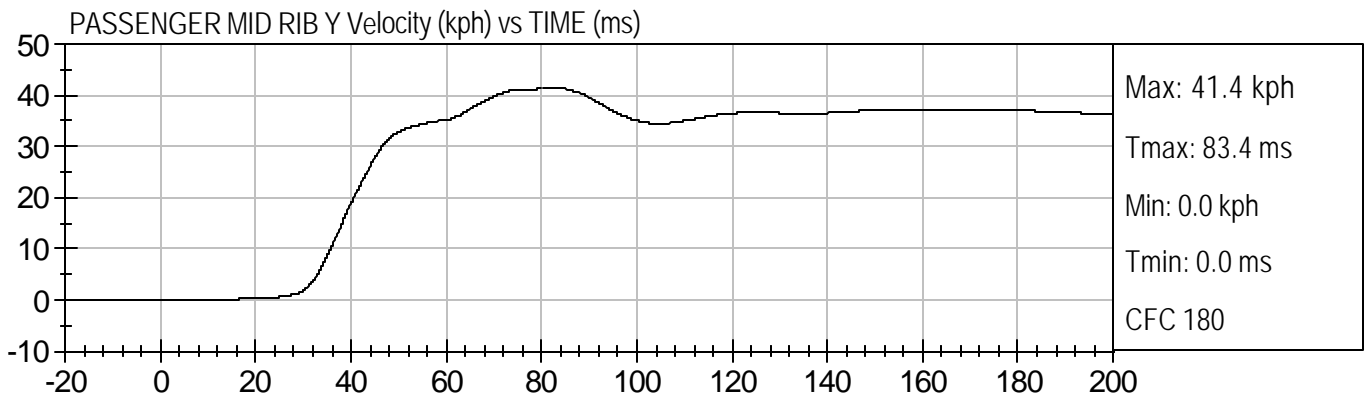
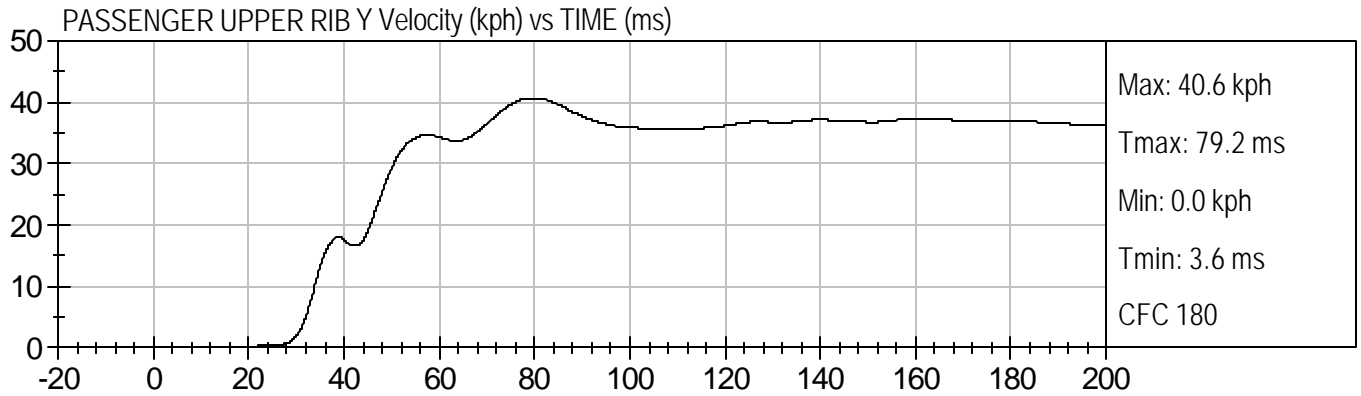


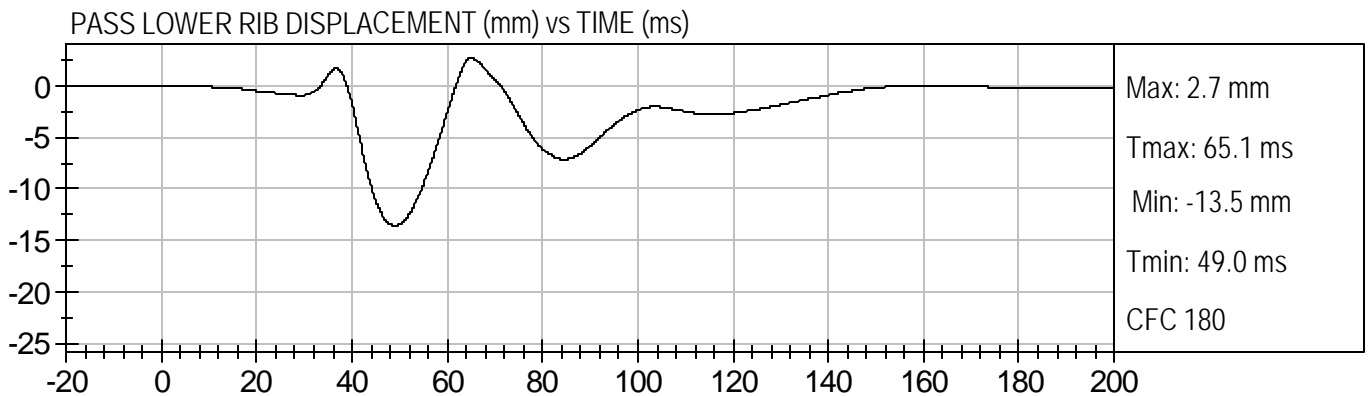
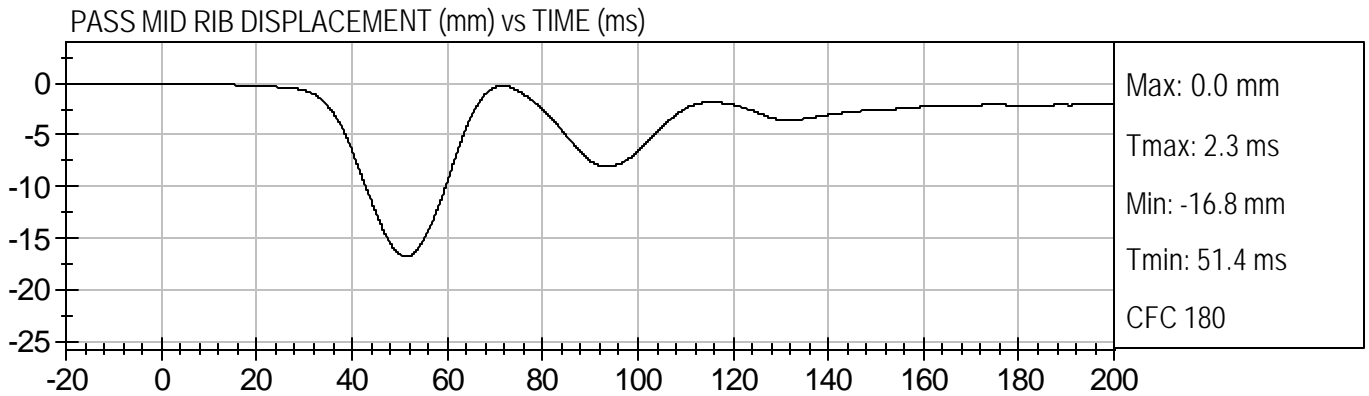
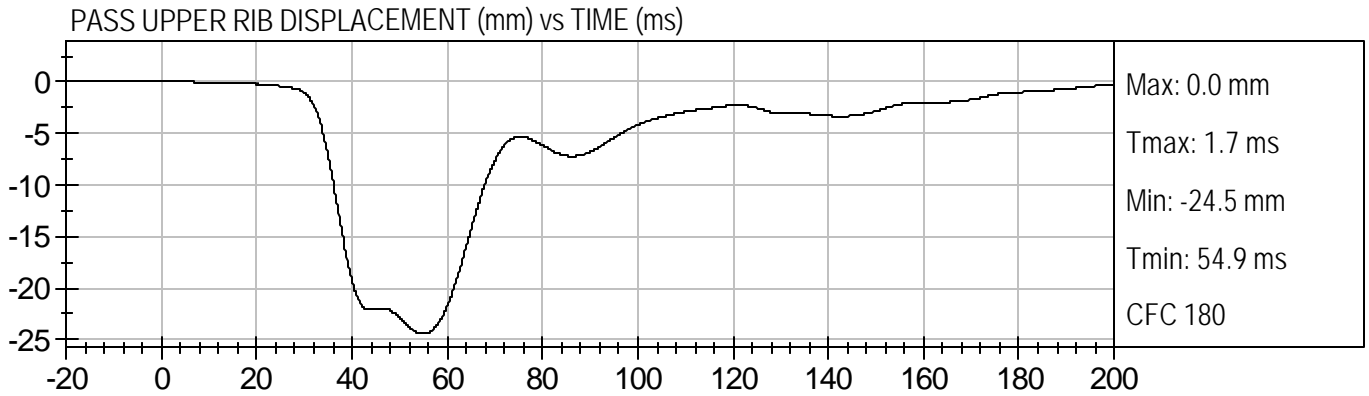
PASSENGER MID RIB Y (G's) vs TIME (ms)

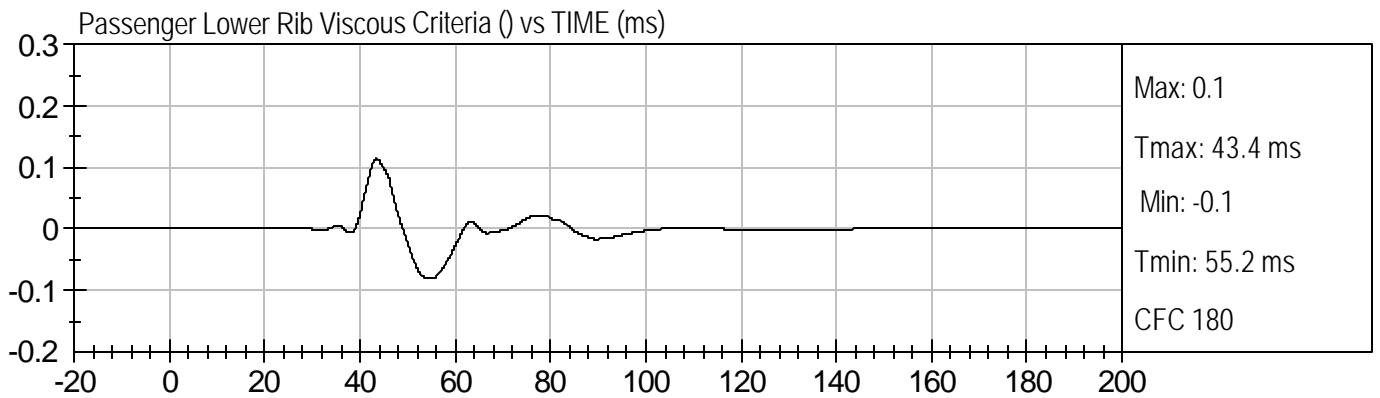
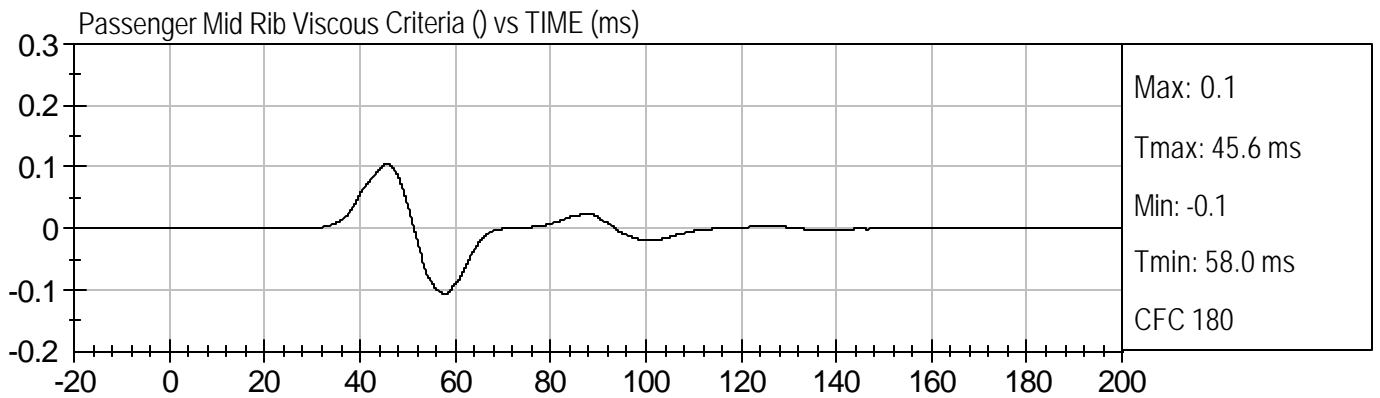
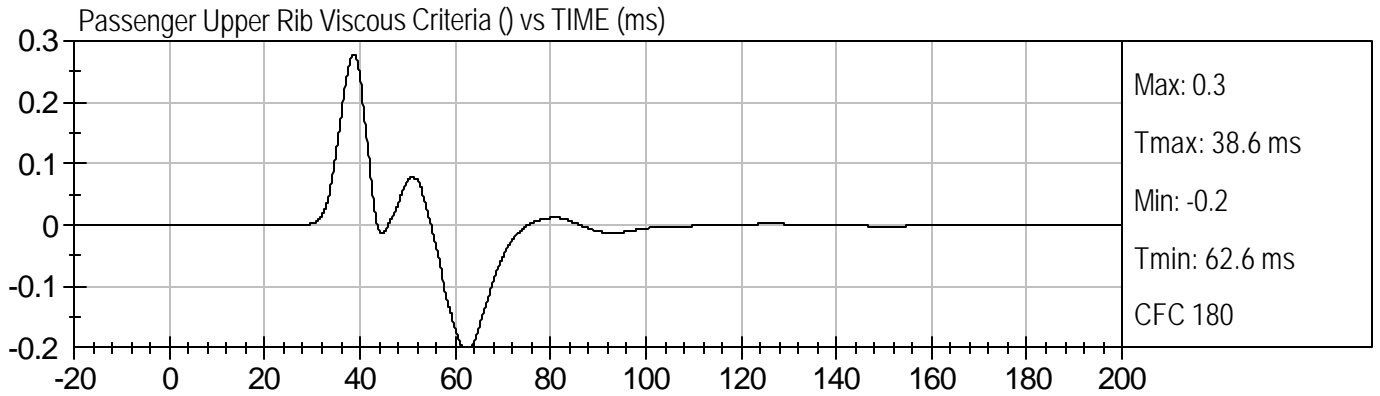


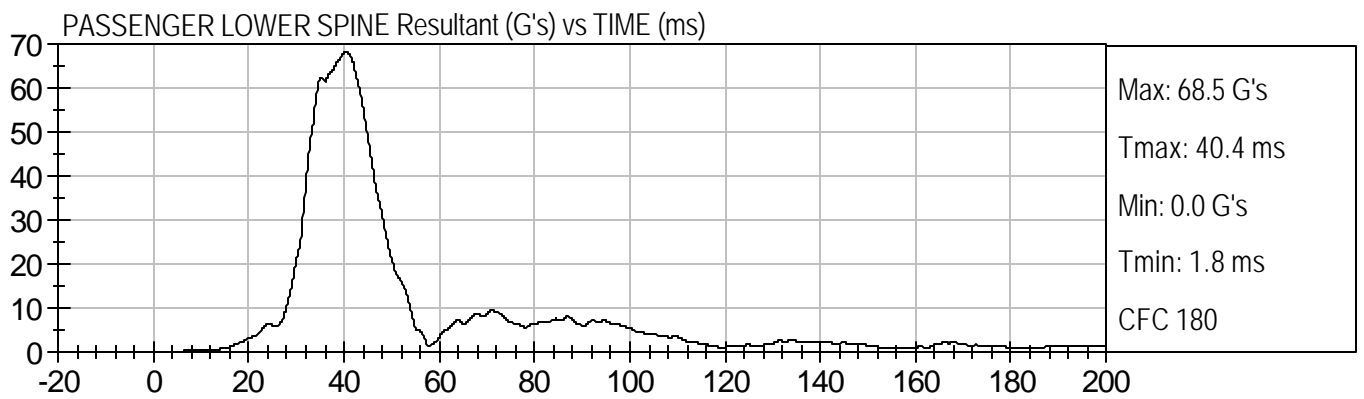
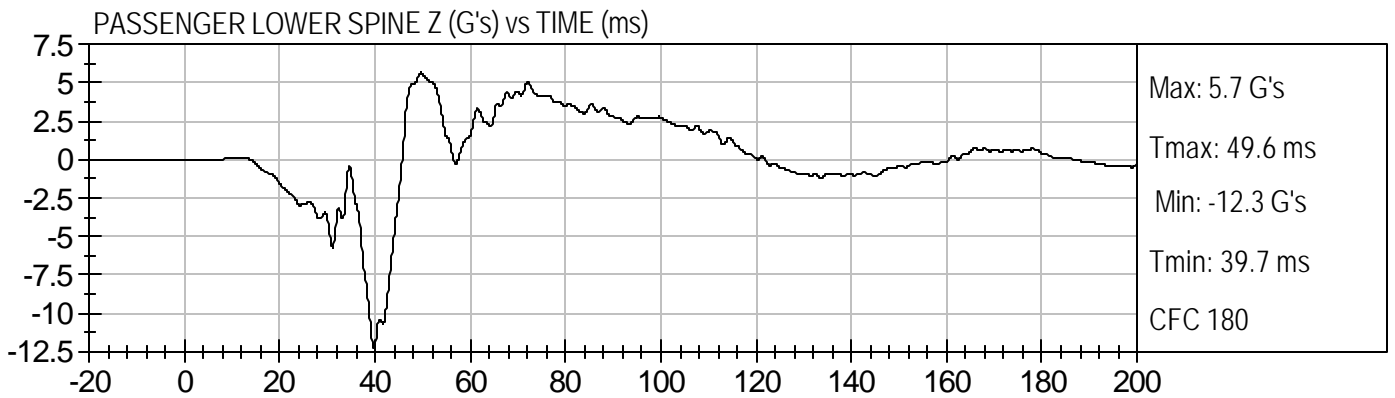
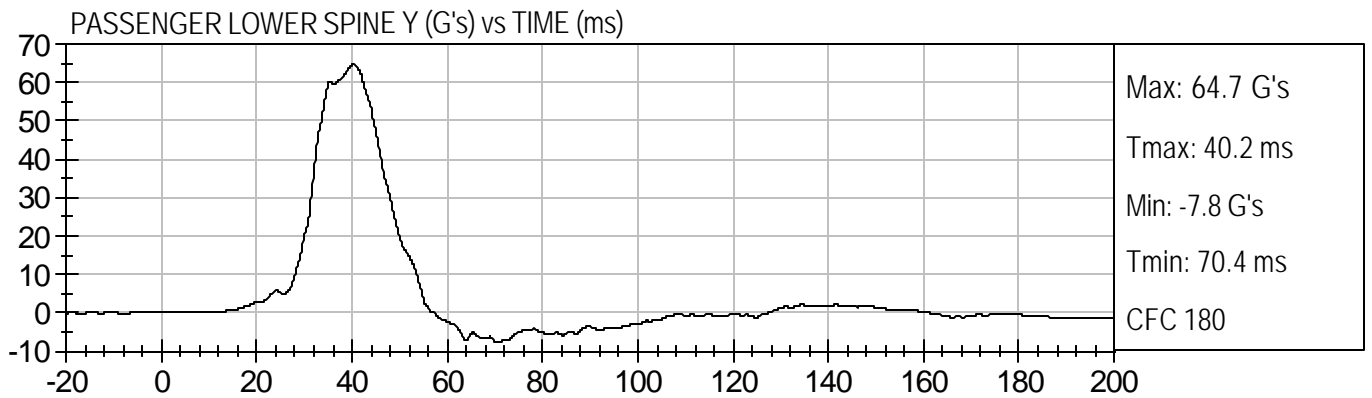
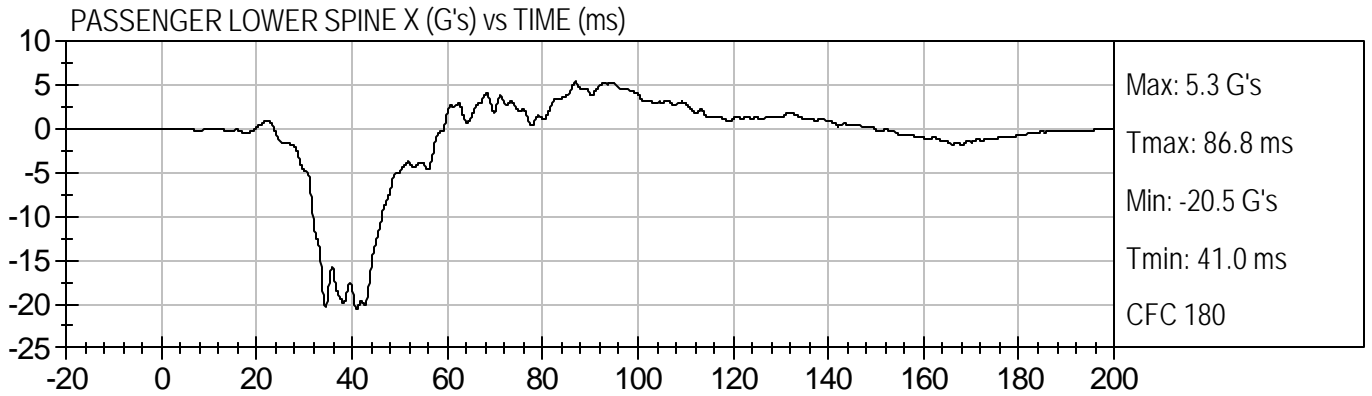
PASSENGER LOWER RIB Y (G's) vs TIME (ms)

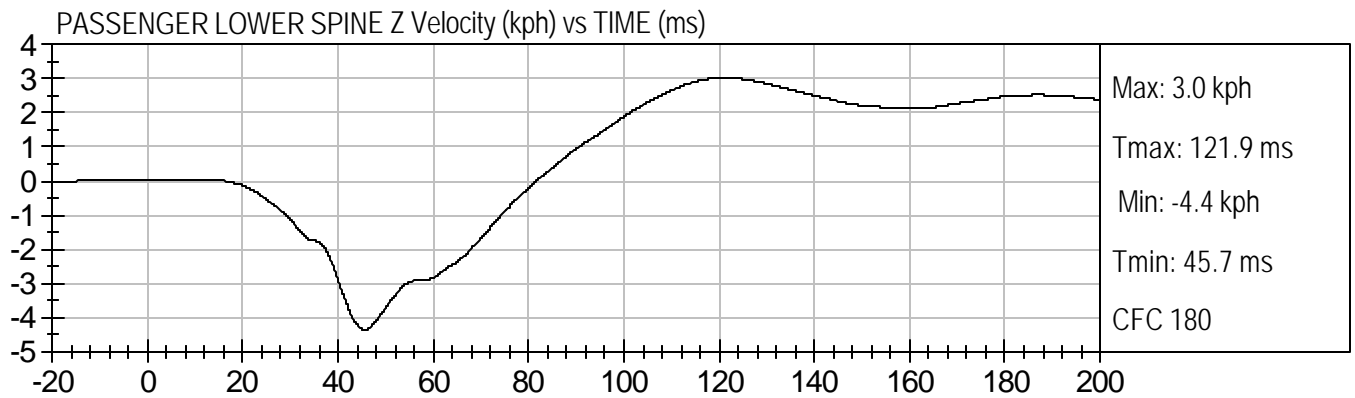
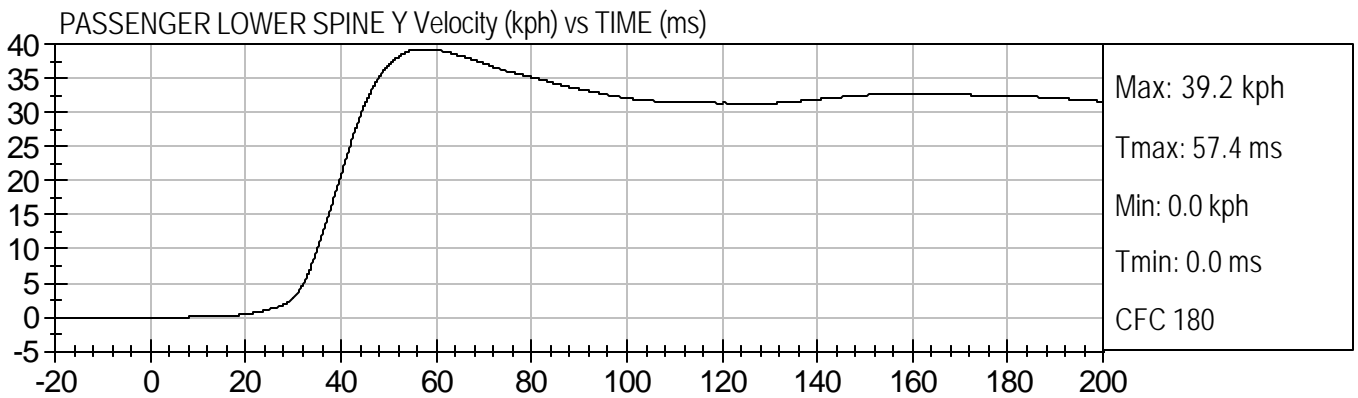
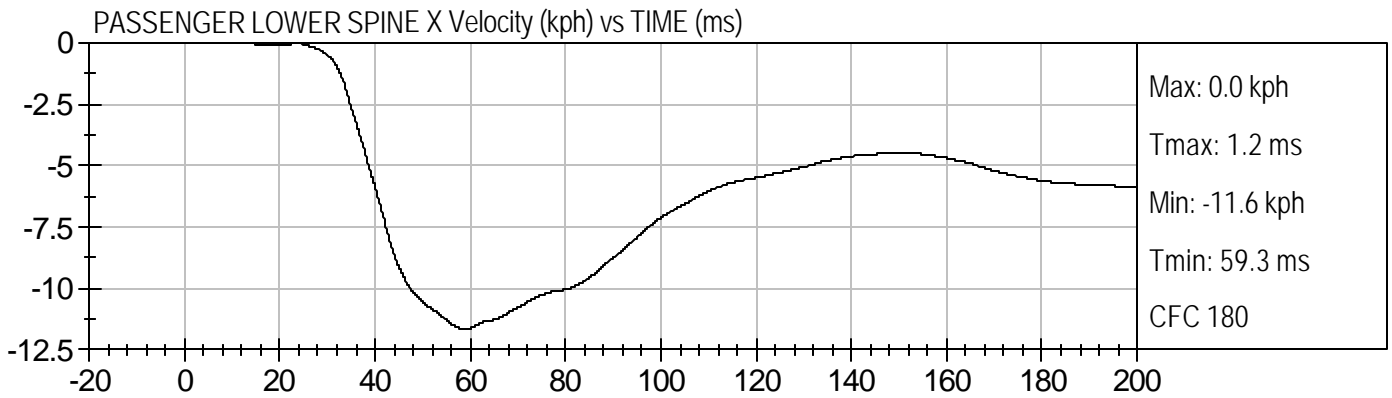


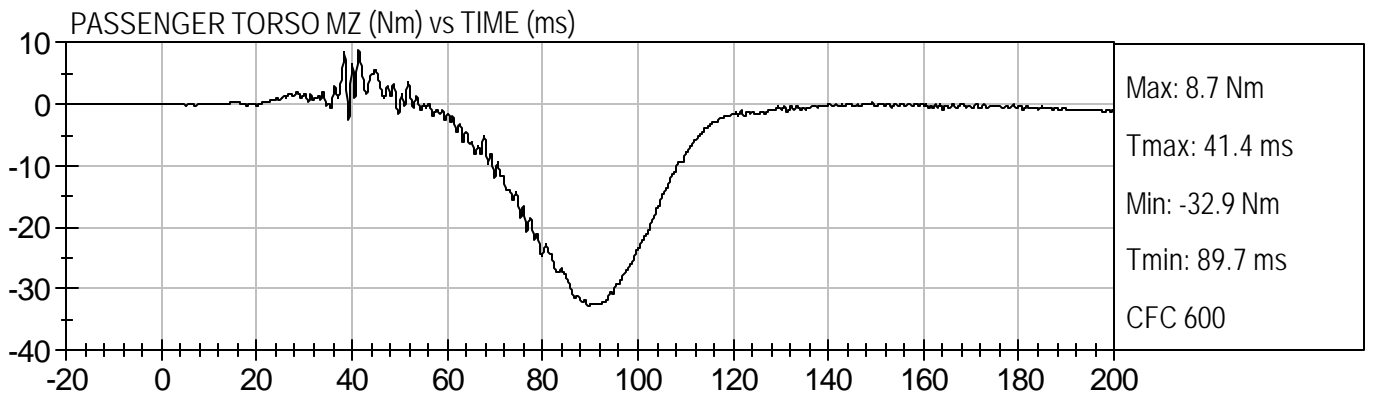
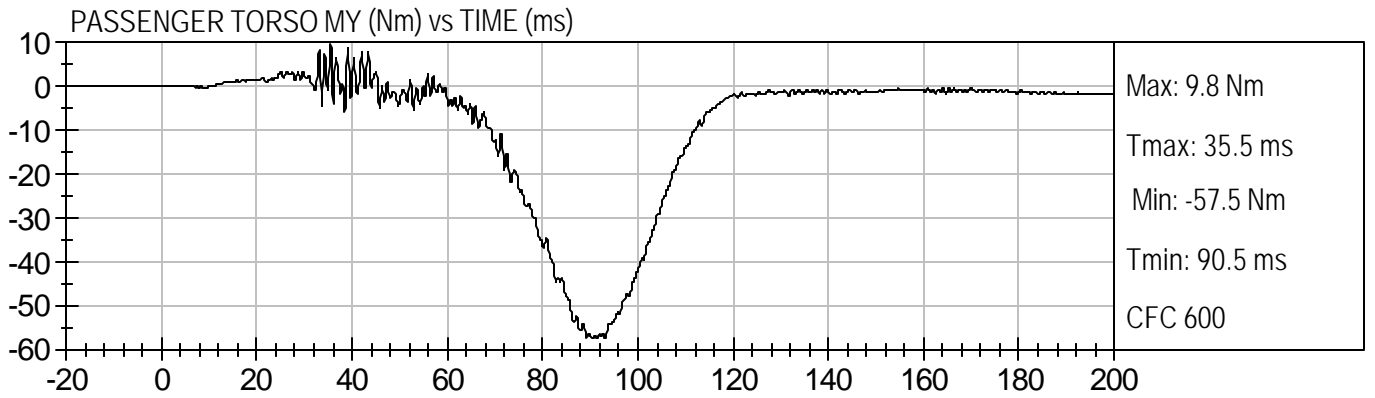
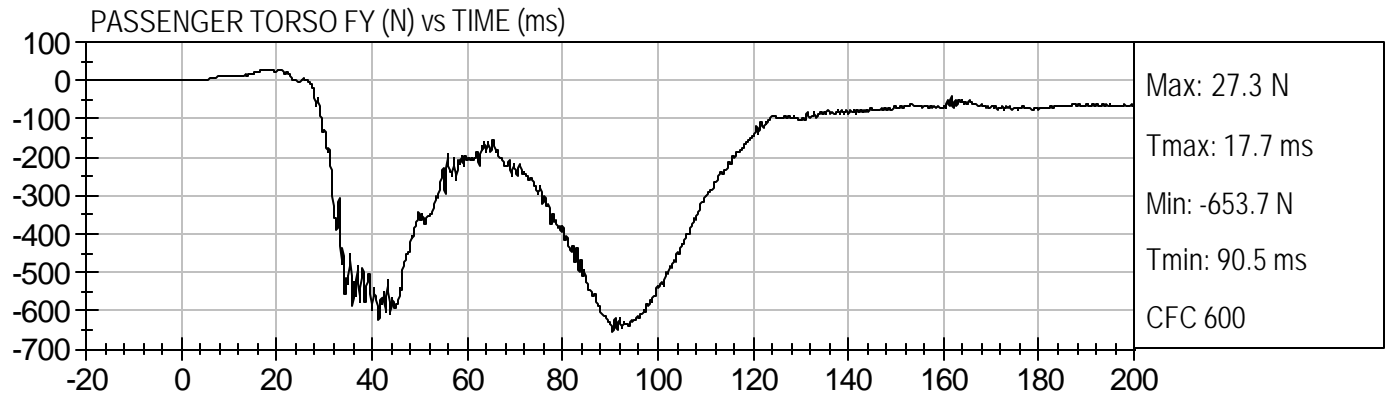
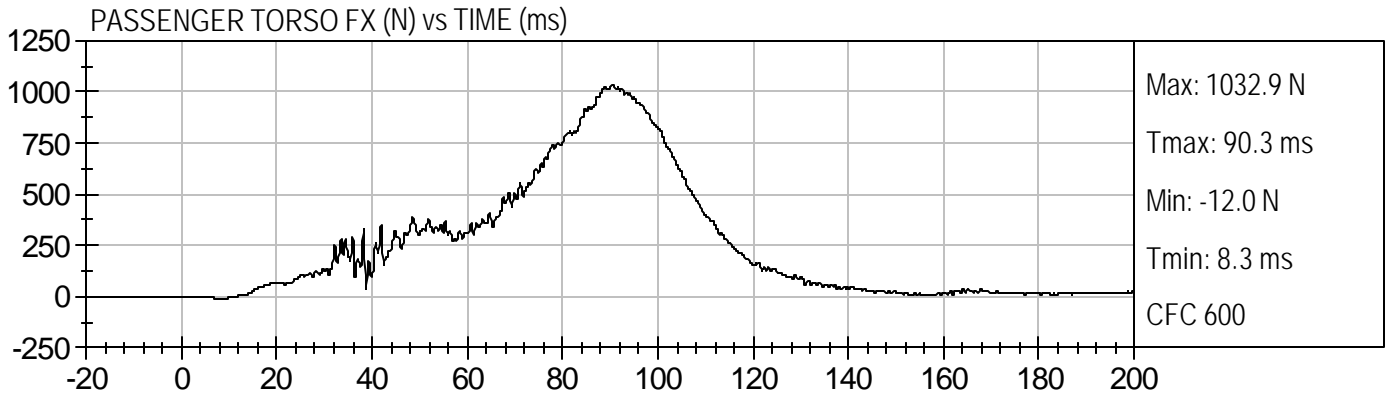


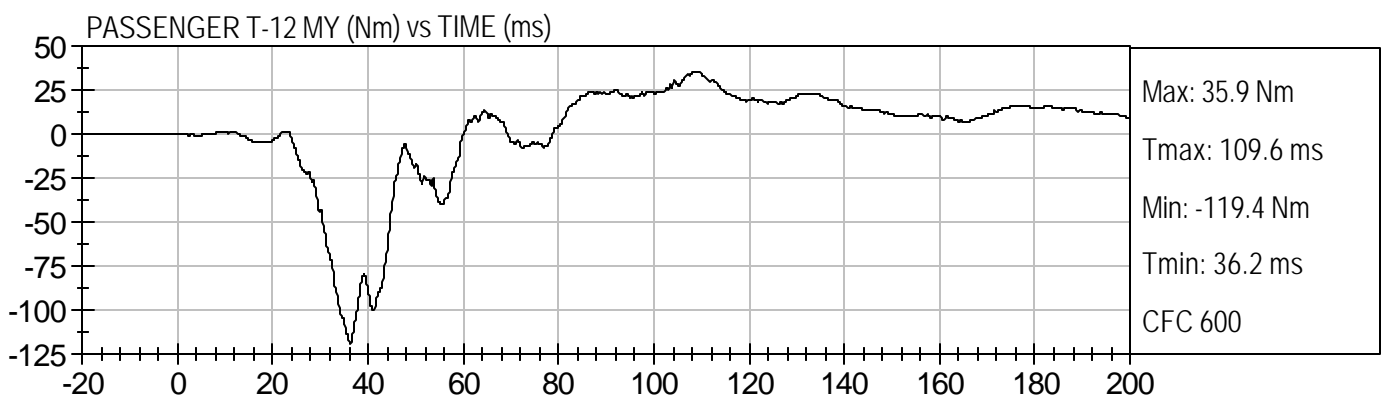
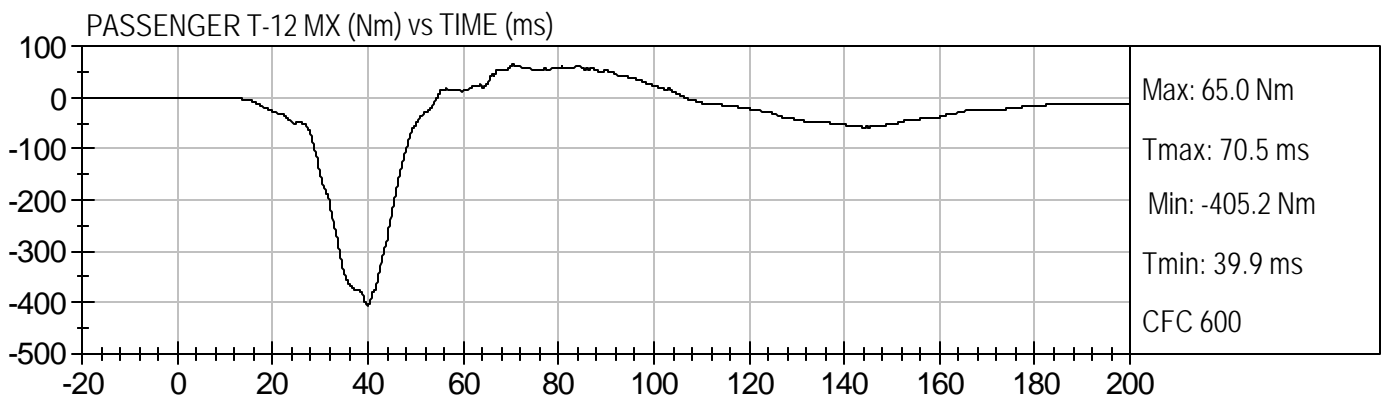
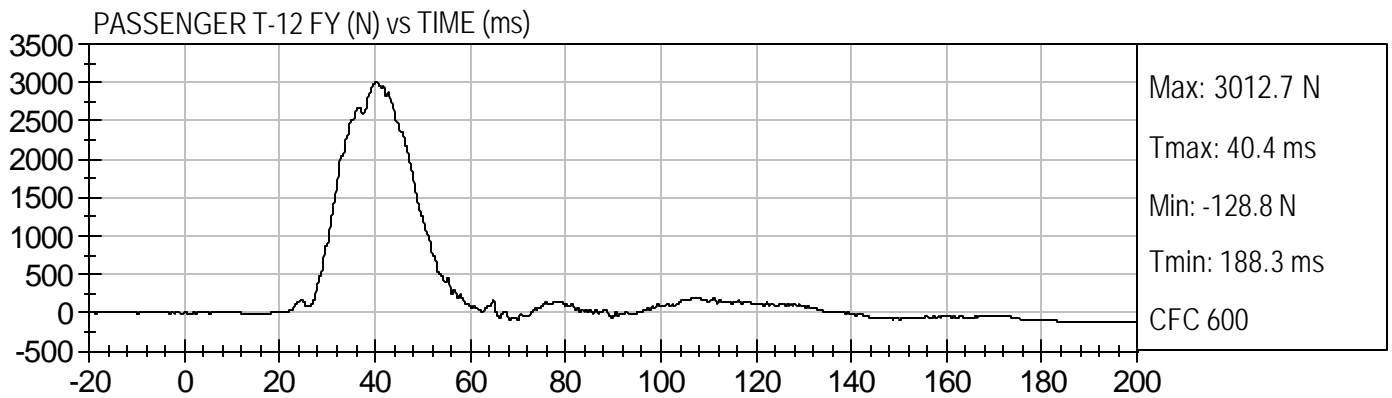
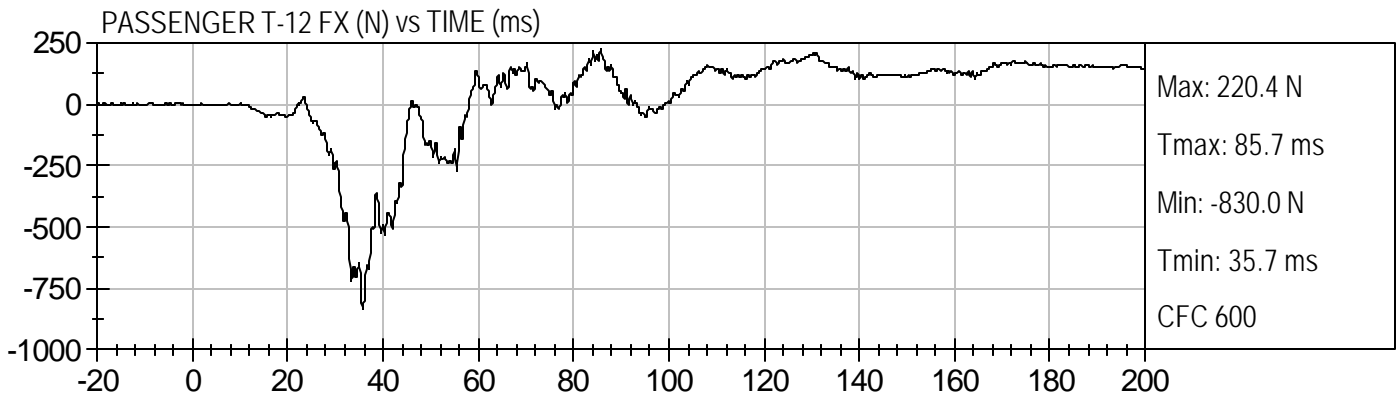






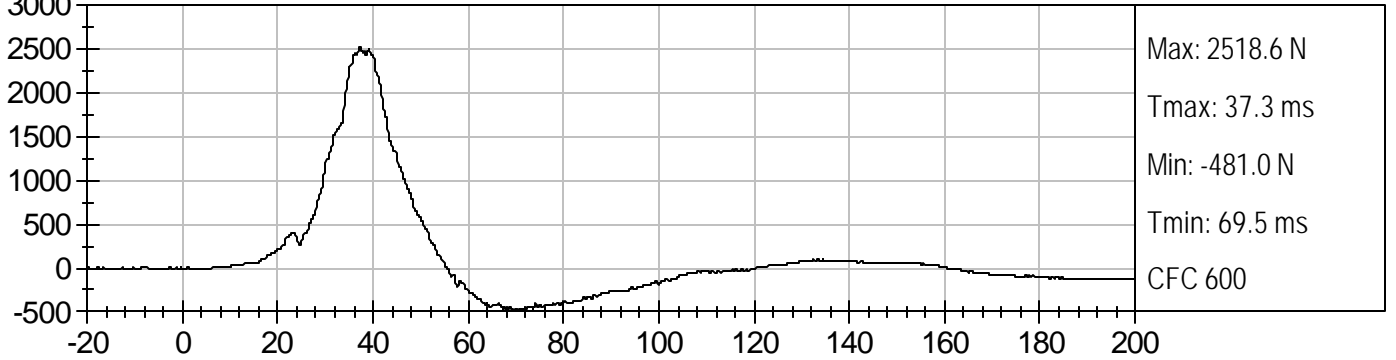




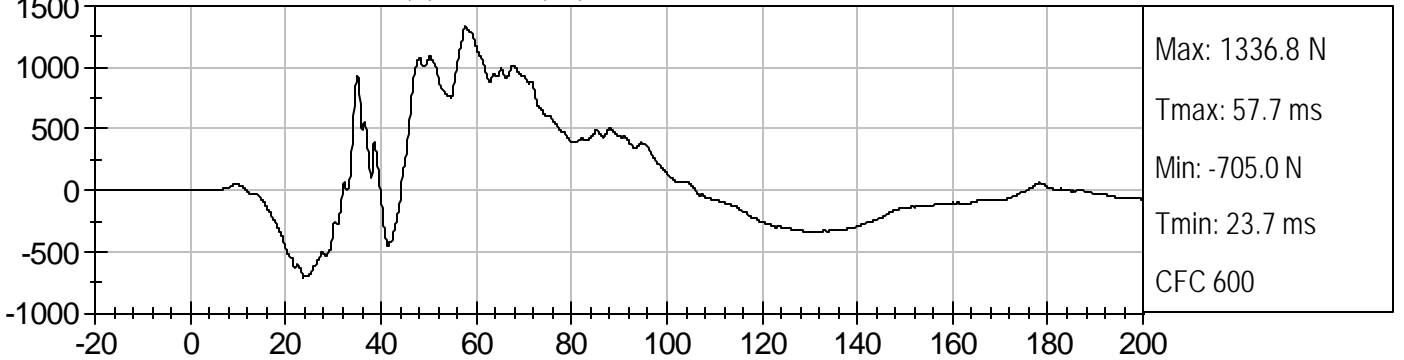




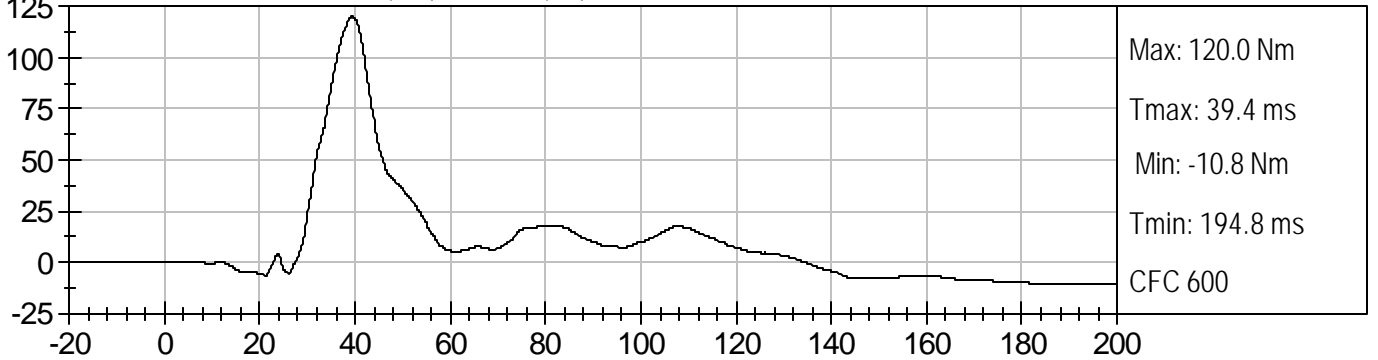
PASSENGER LUMBAR FY (N) vs TIME (ms)



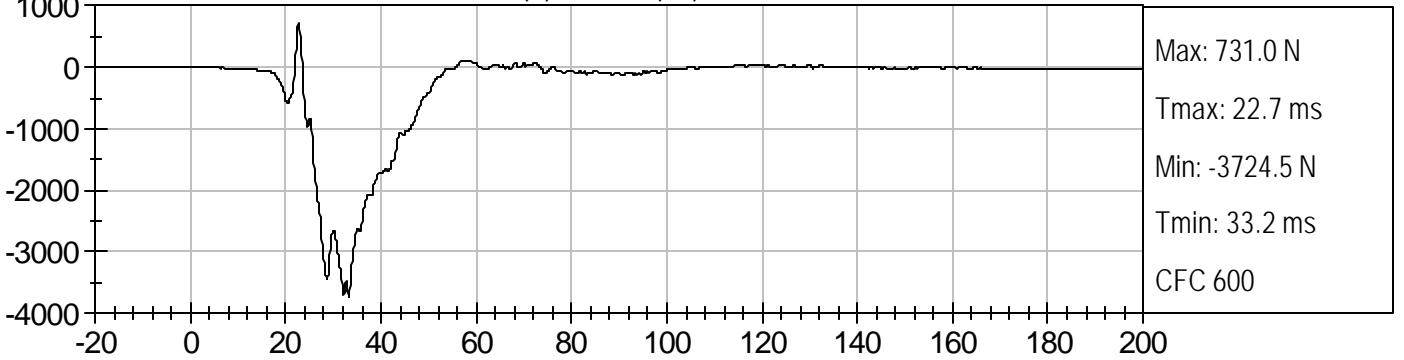
PASSENGER LUMBAR FZ (N) vs TIME (ms)

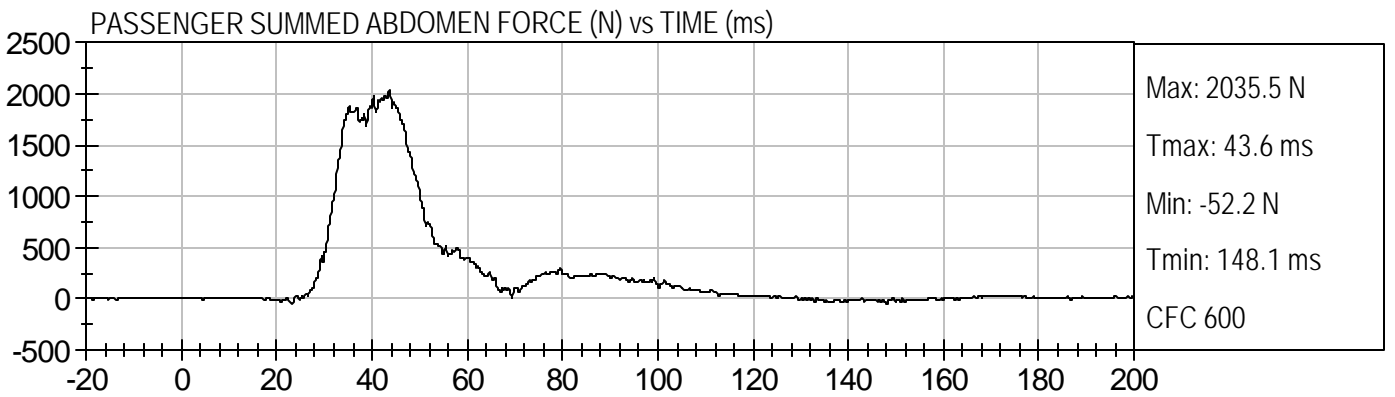
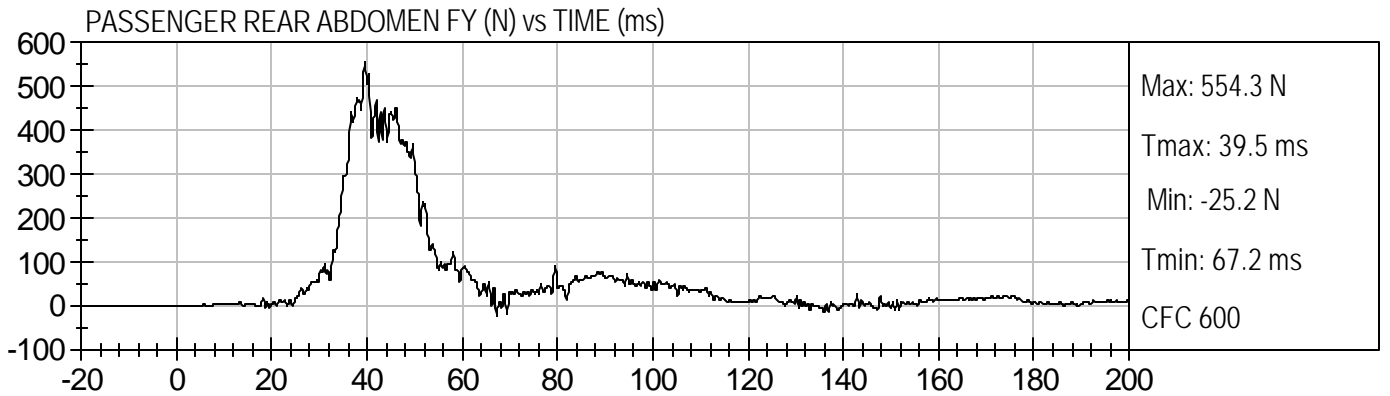
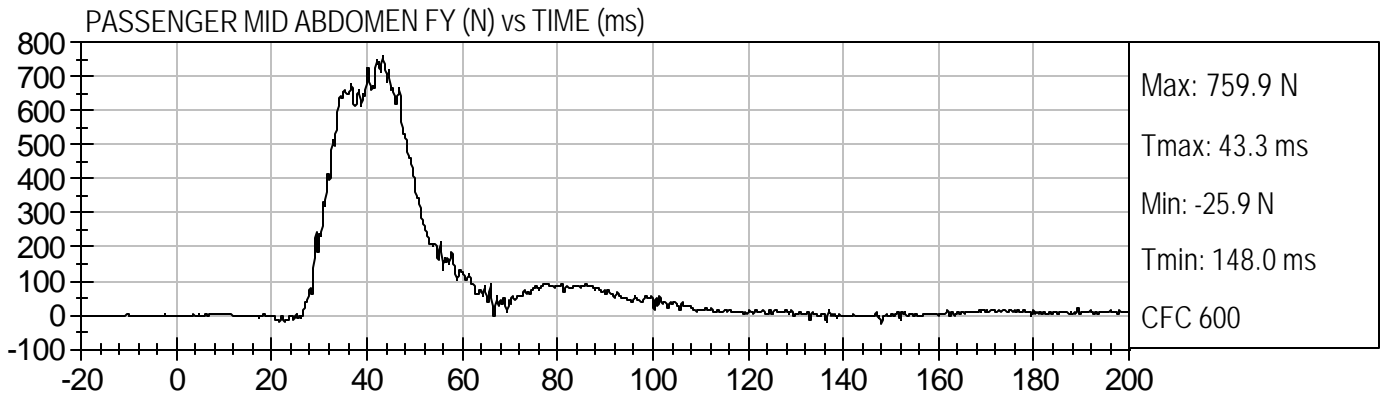
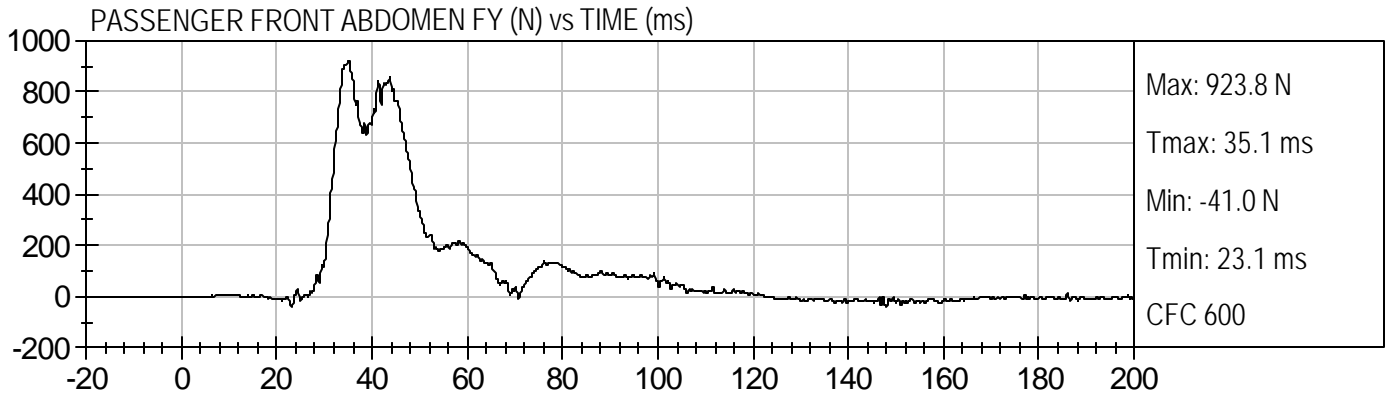


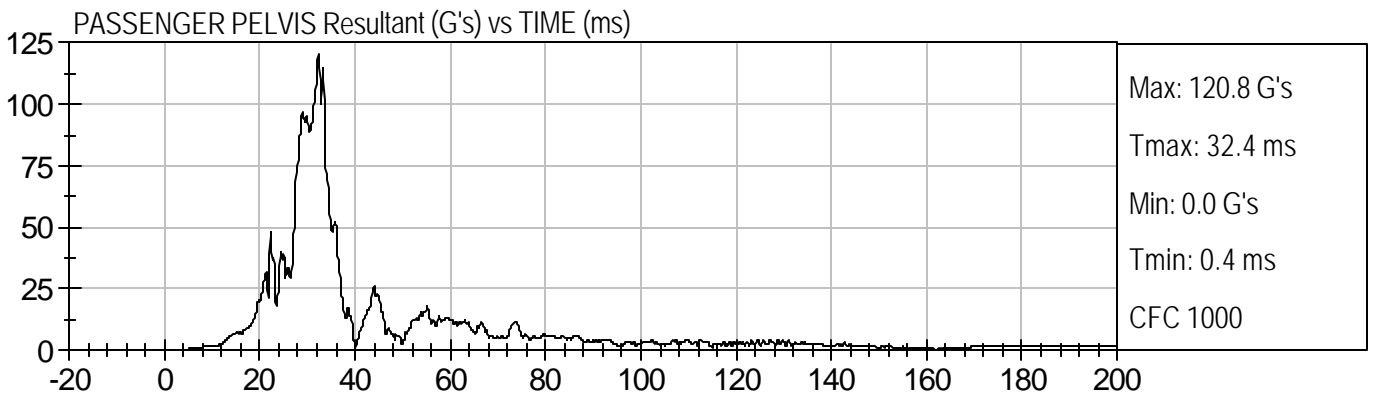
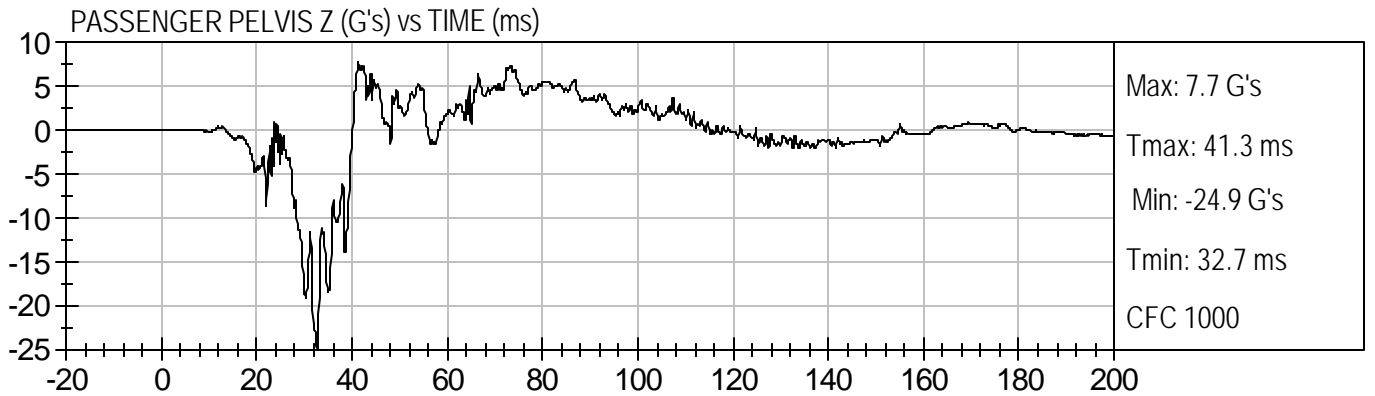
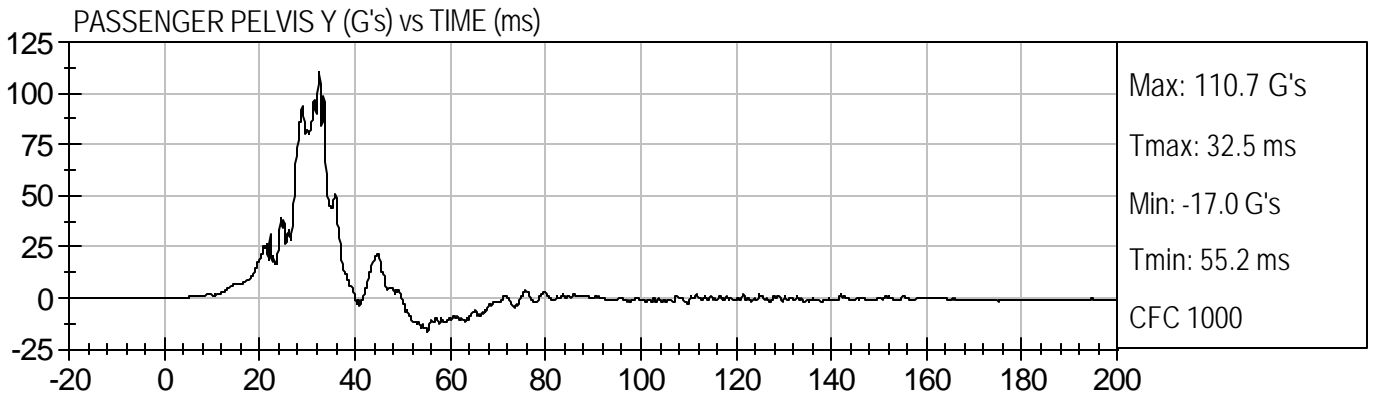
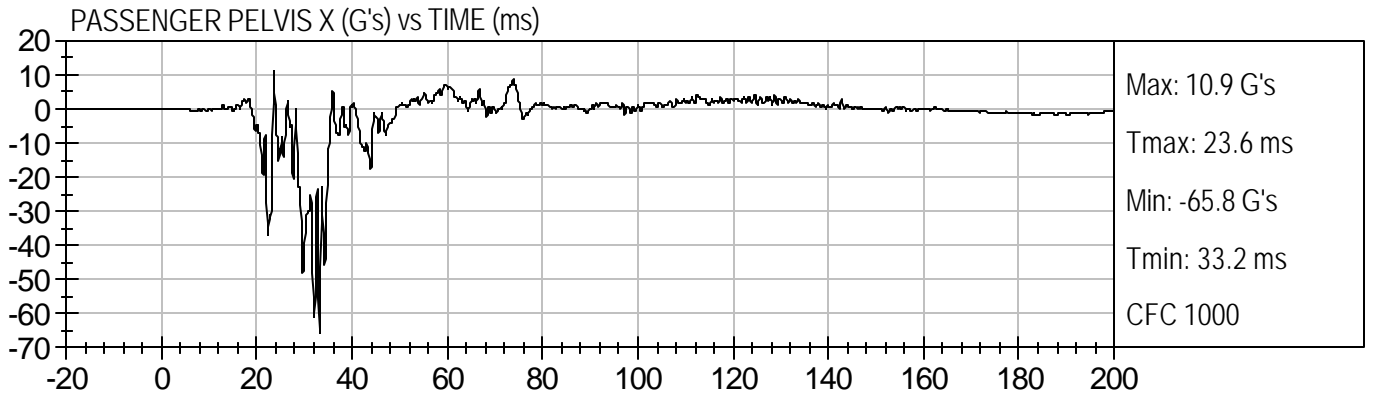
PASSENGER LUMBAR MX (Nm) vs TIME (ms)

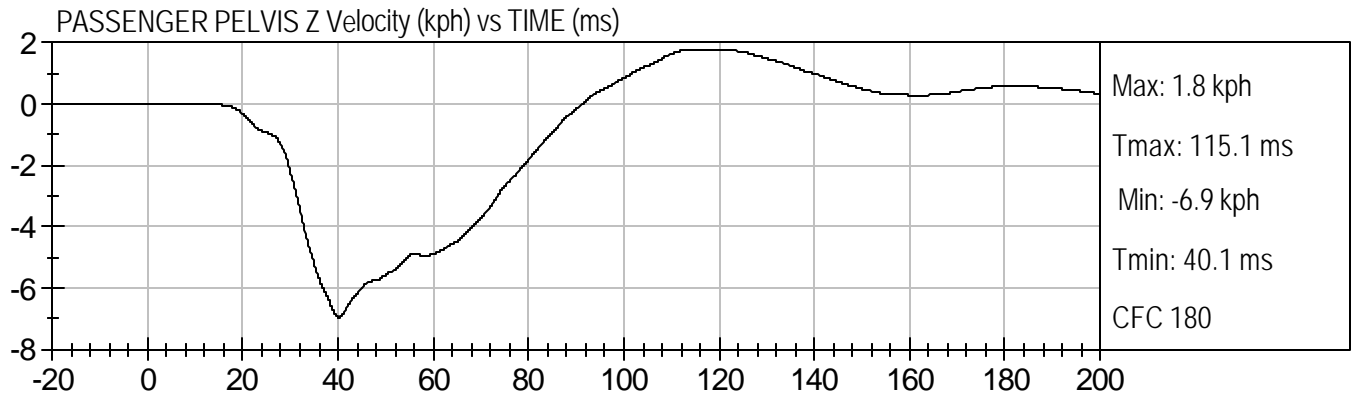
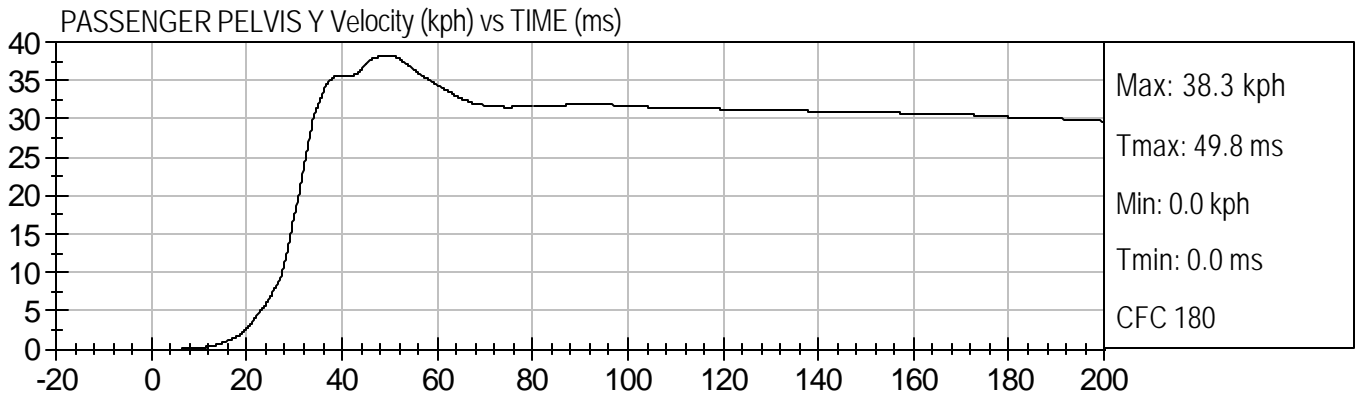
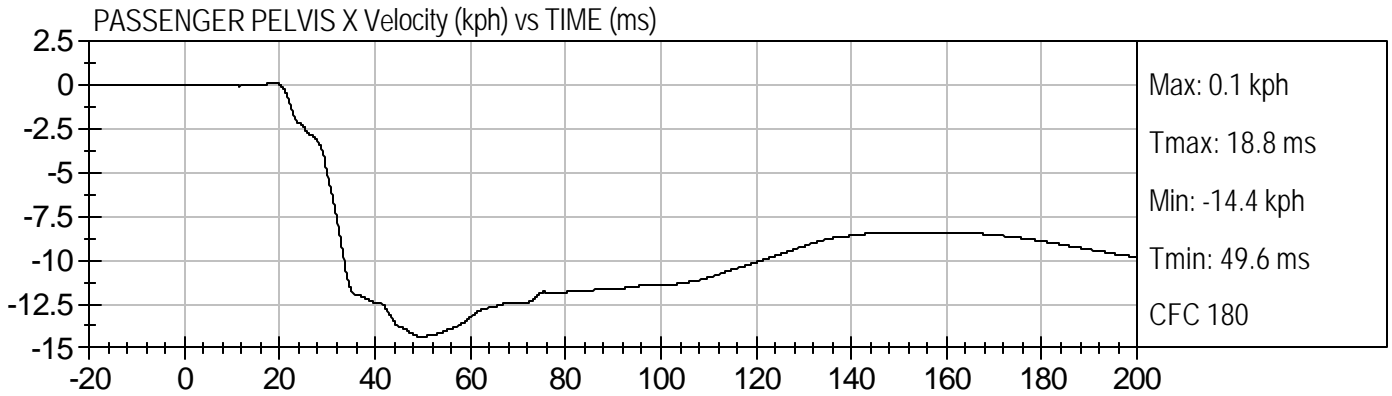


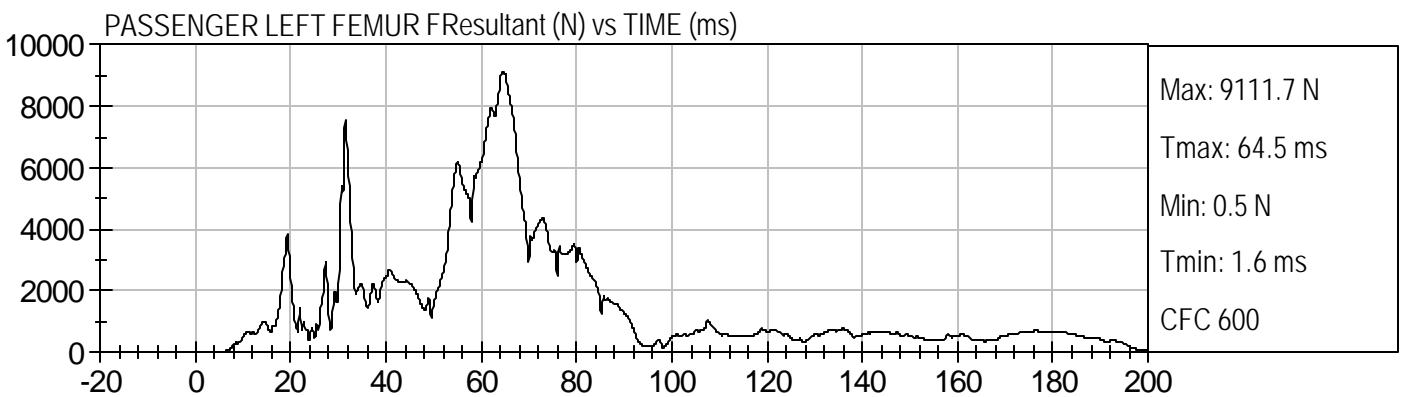
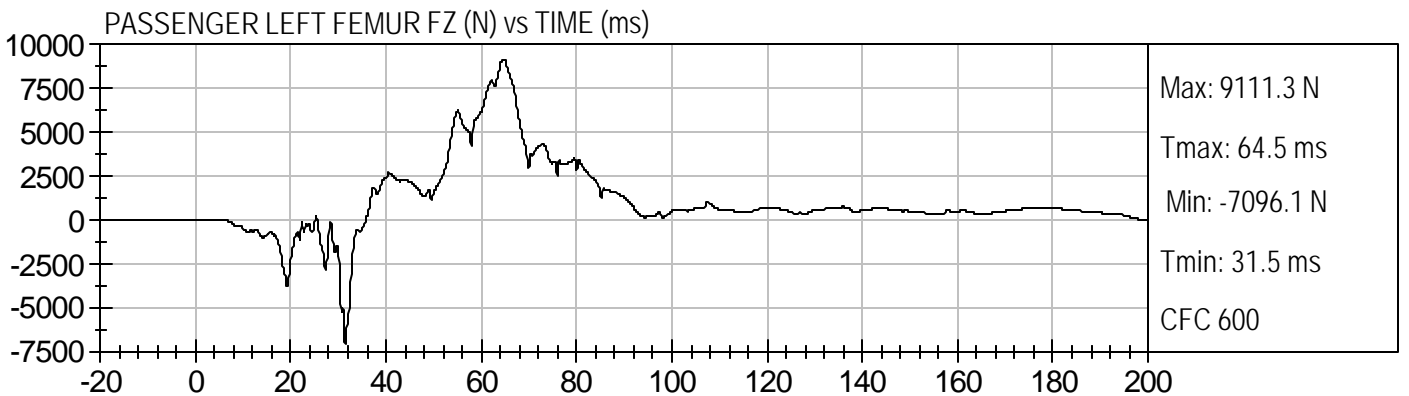
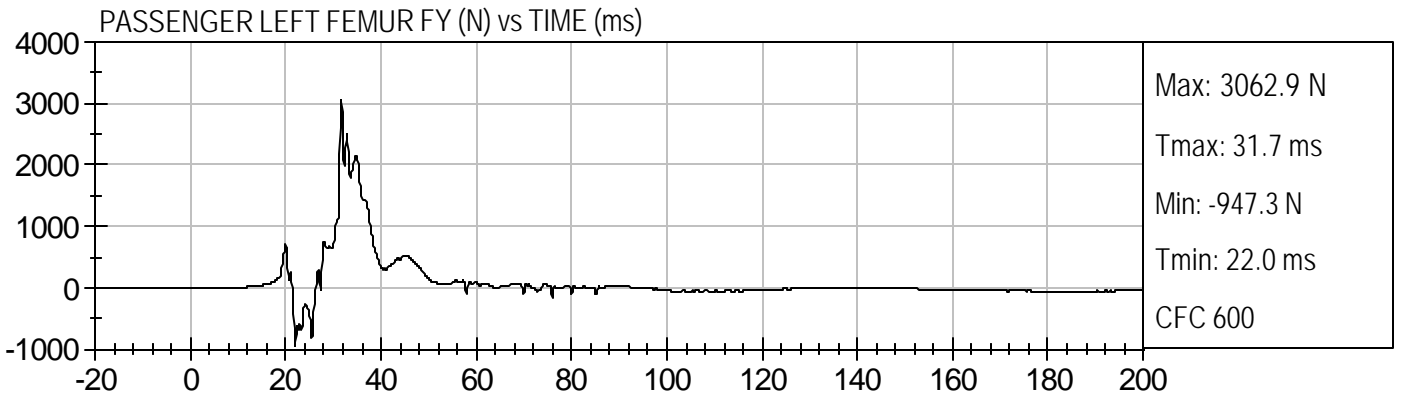
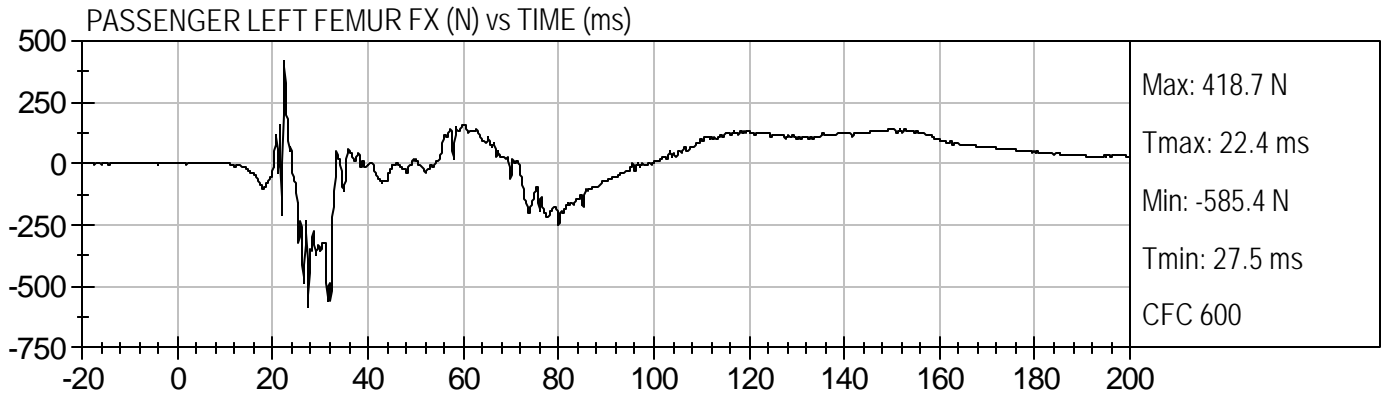
PASSENGER PUBIC SYMPHYSIS FY (N) vs TIME (ms)

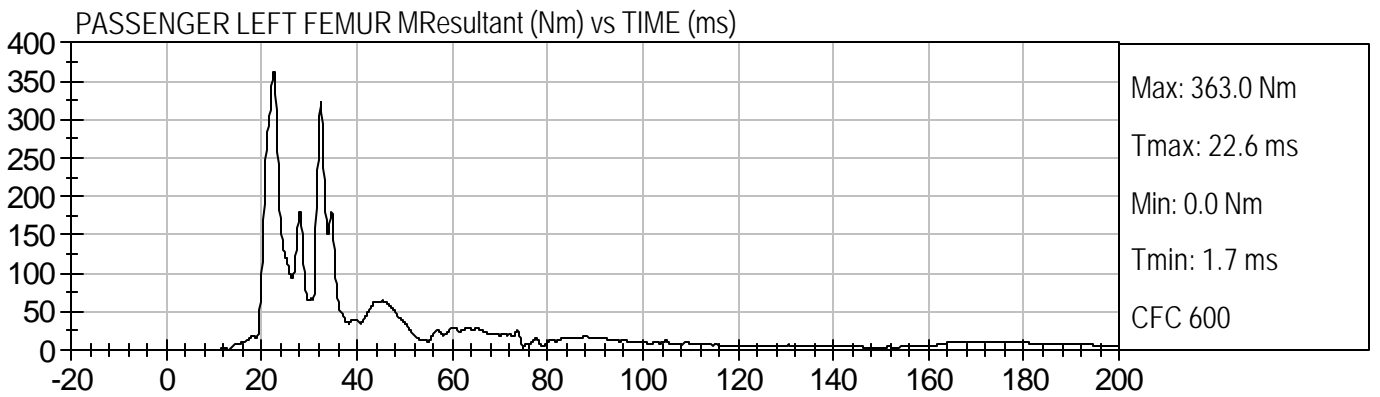
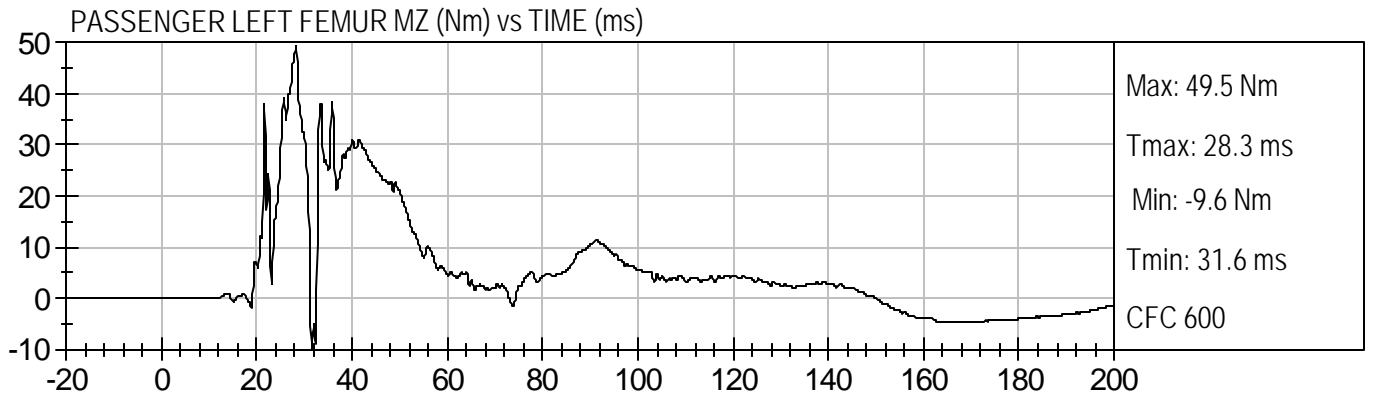
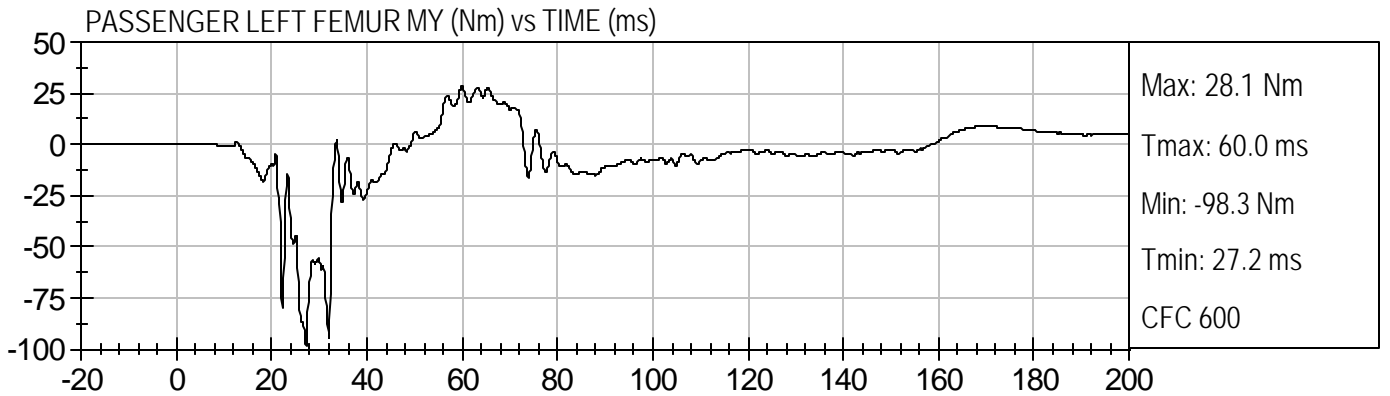
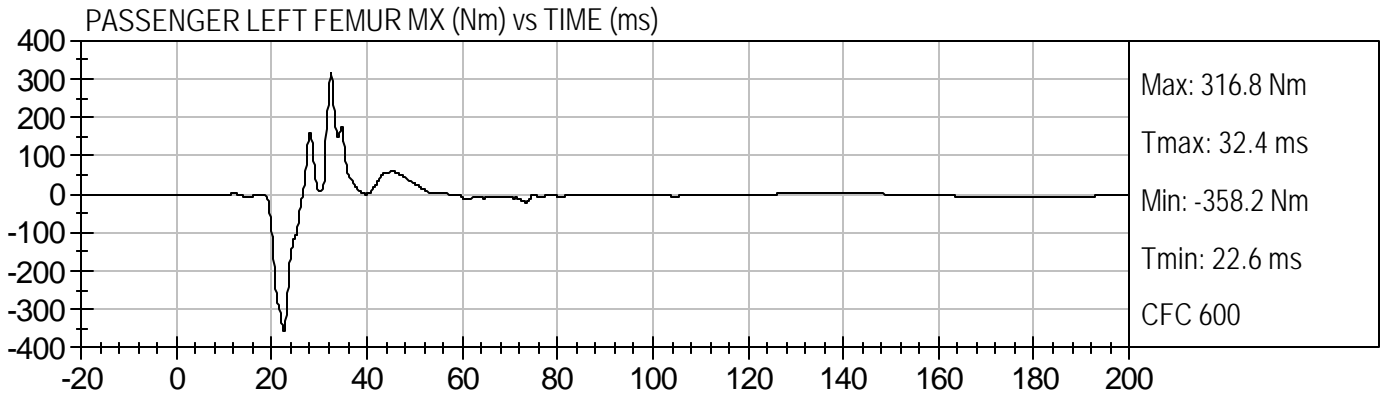


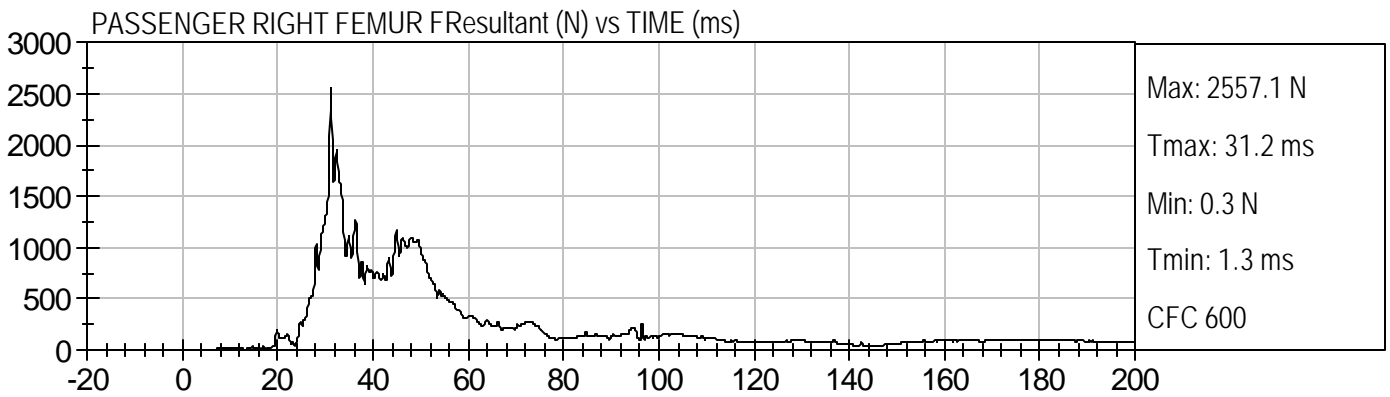
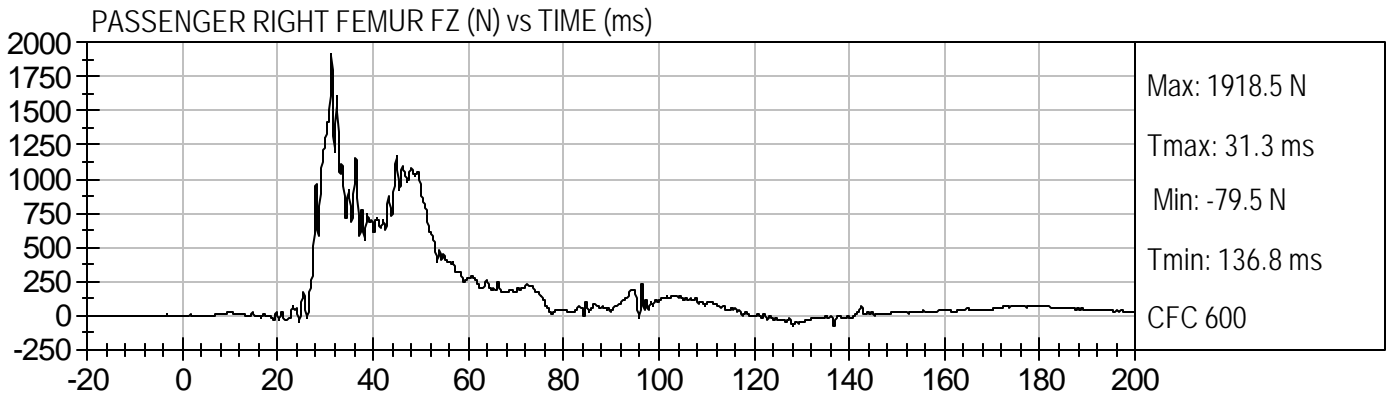
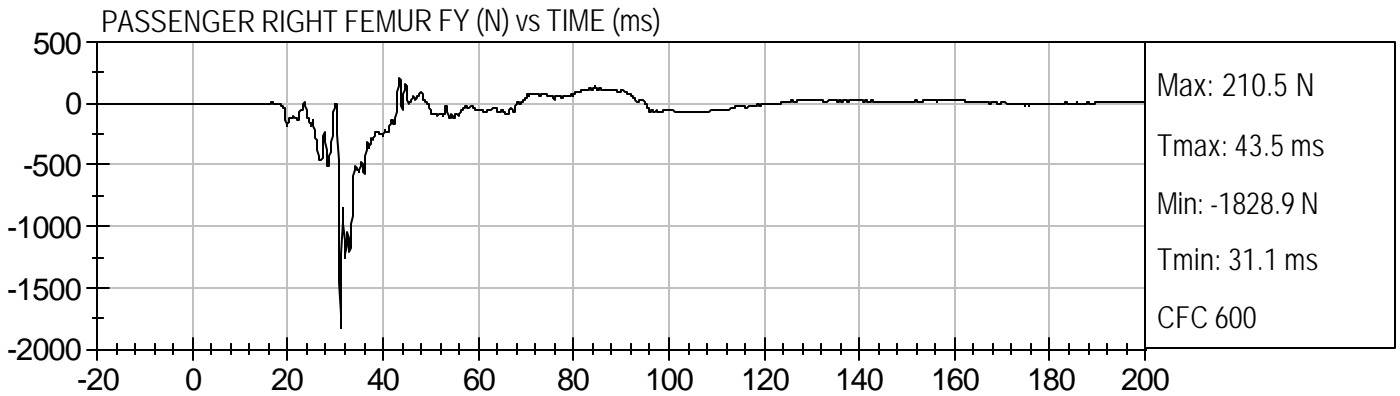
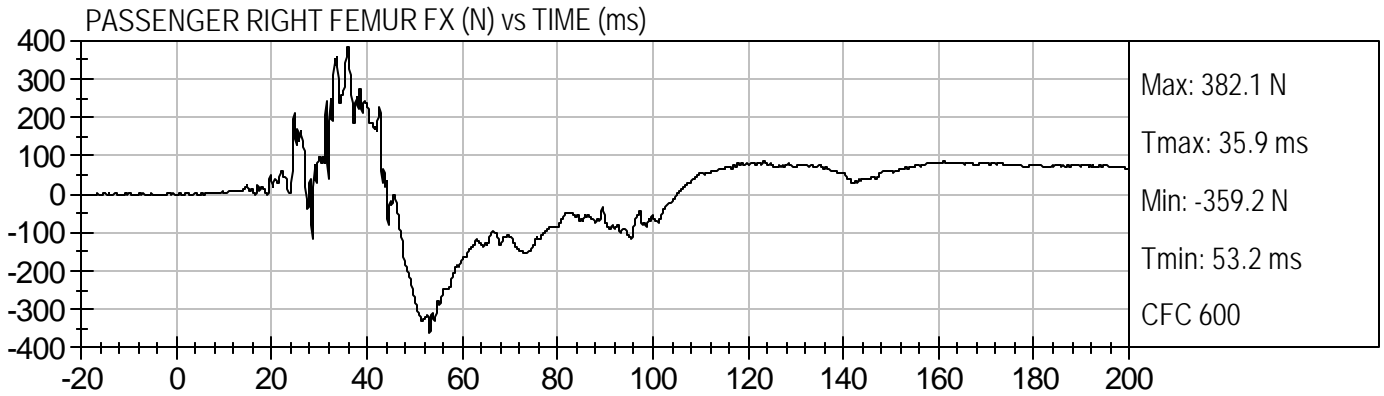


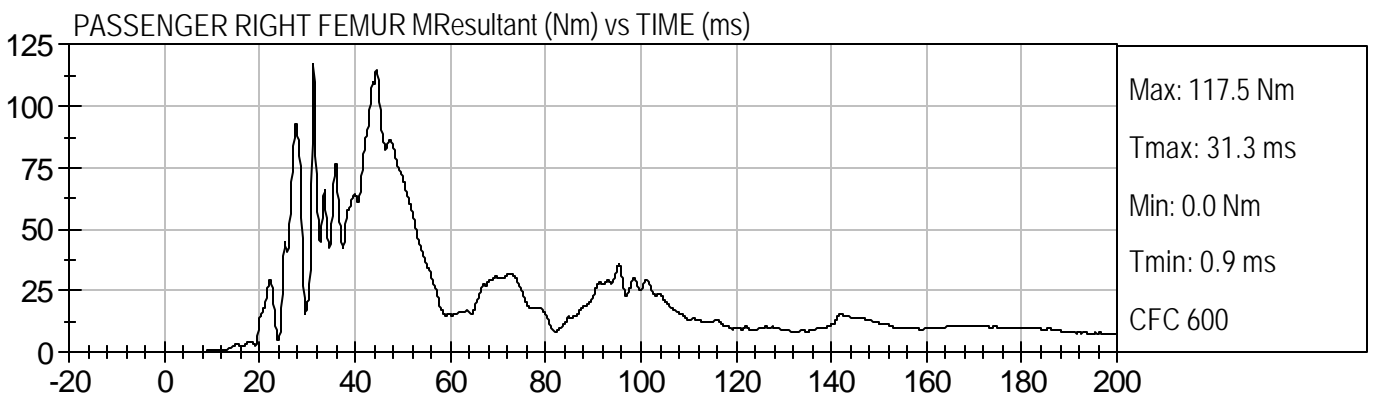
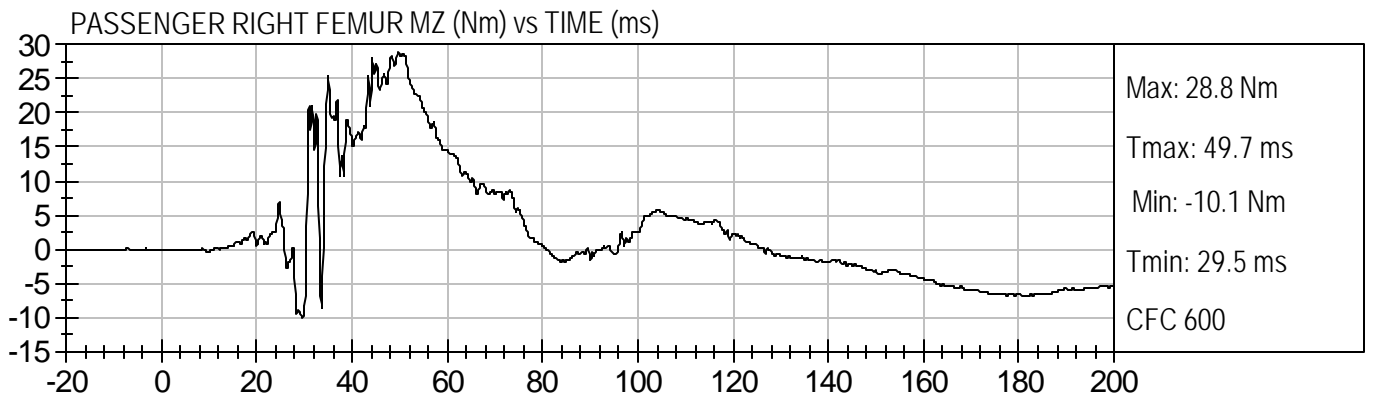
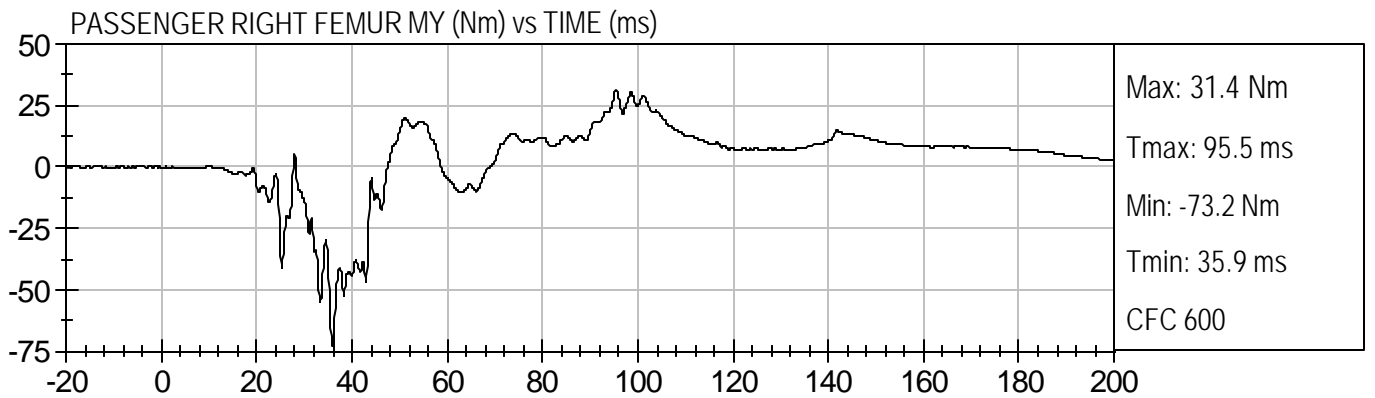
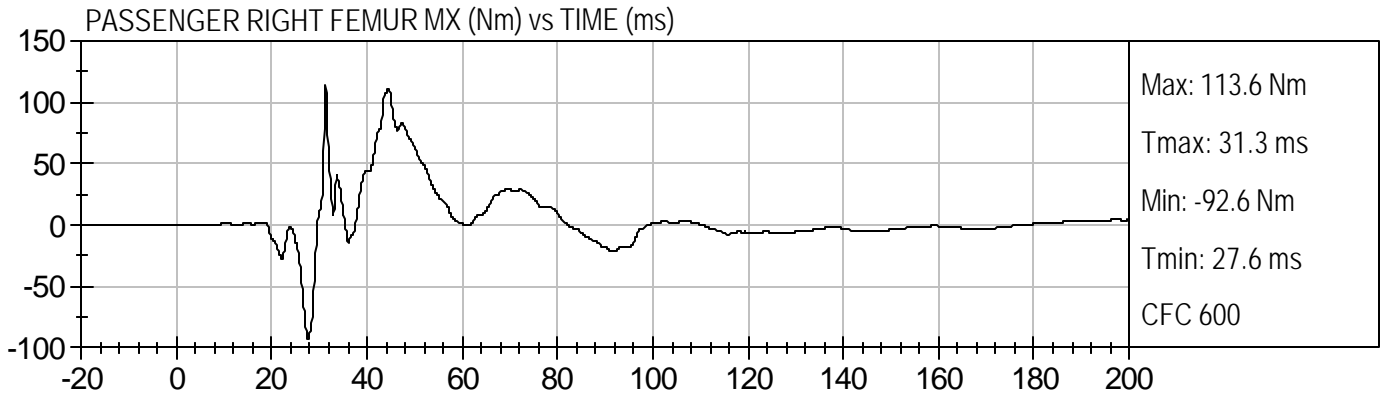


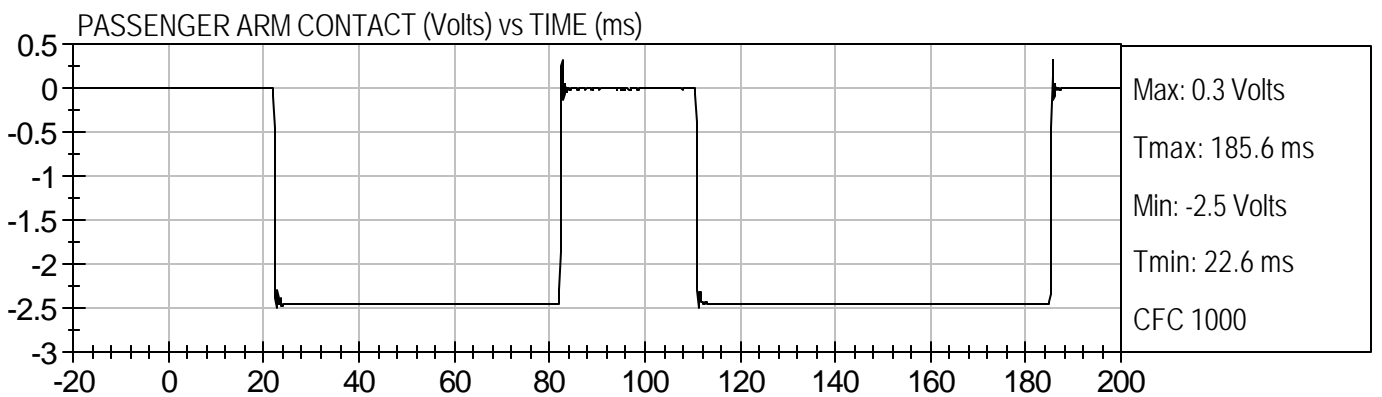
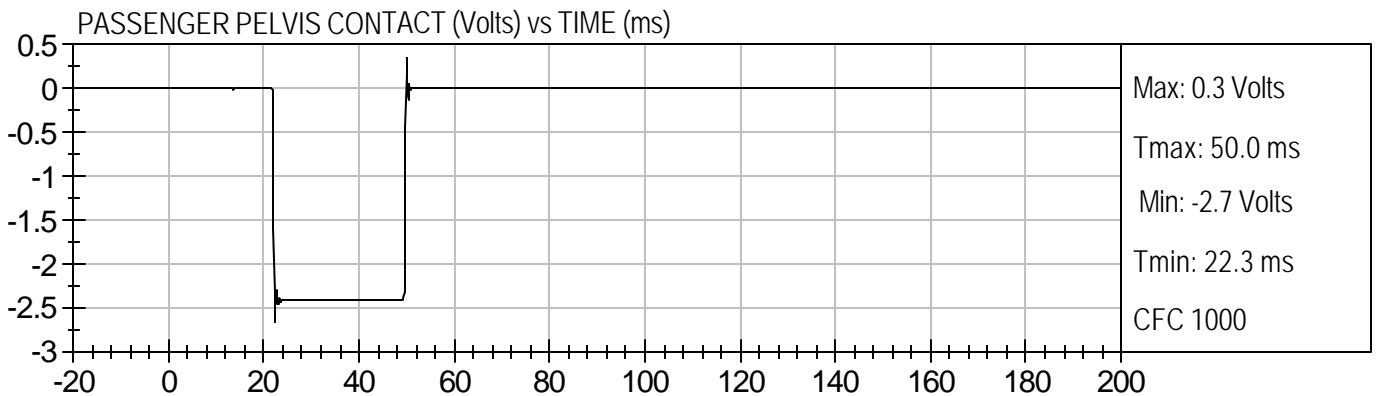
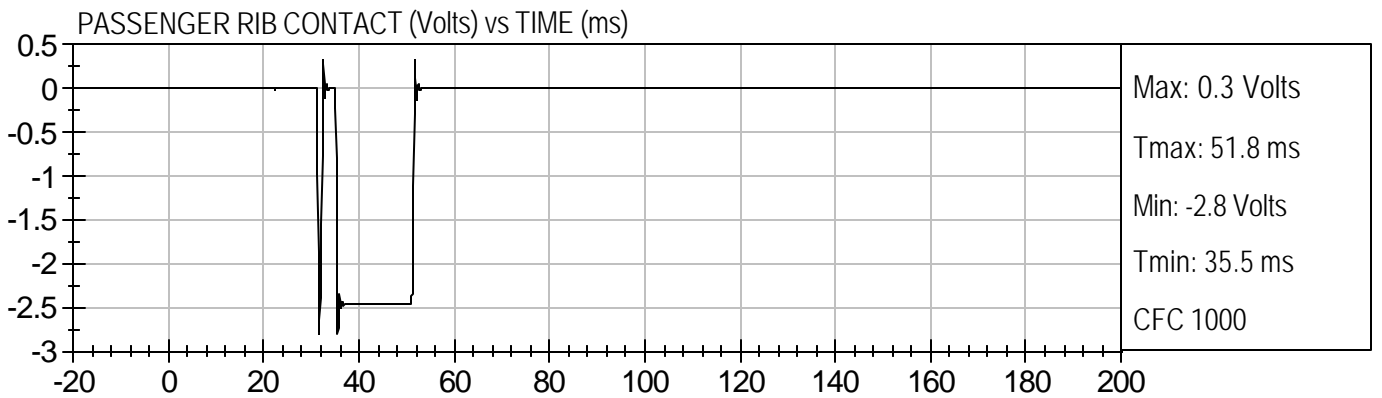
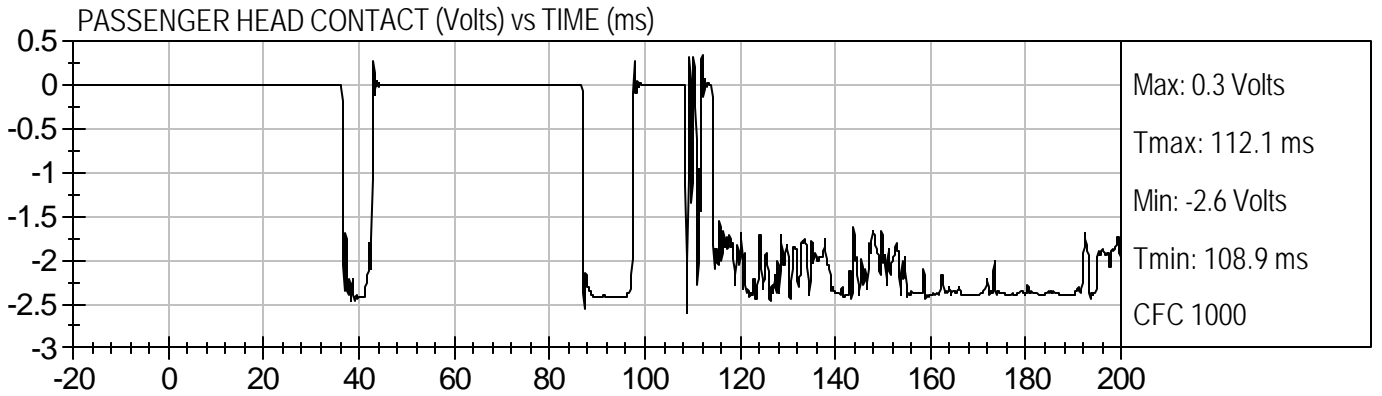


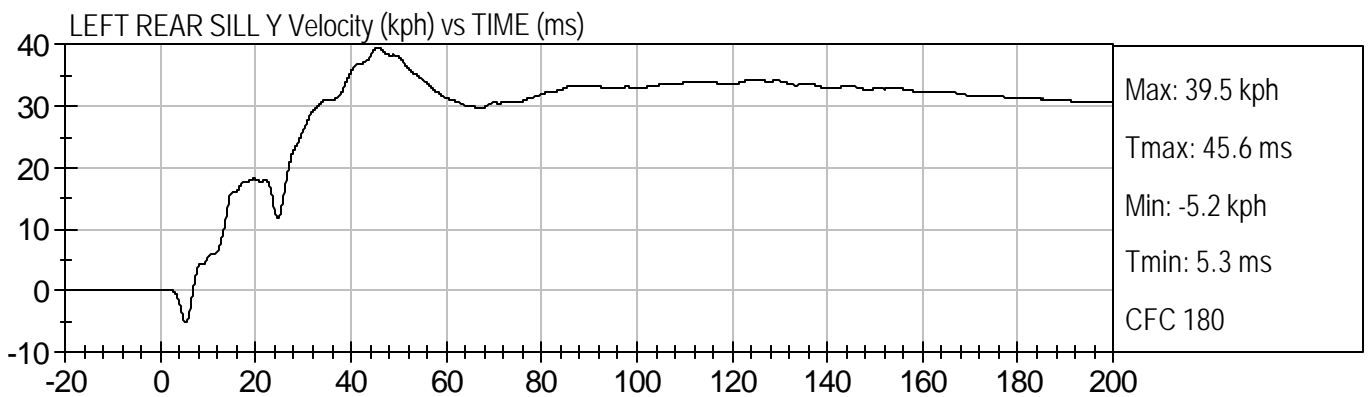
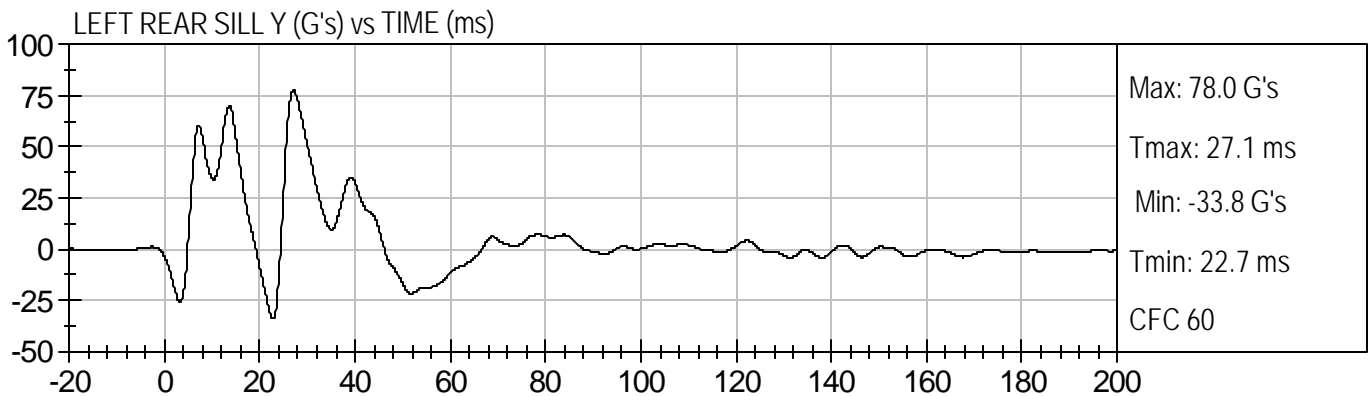
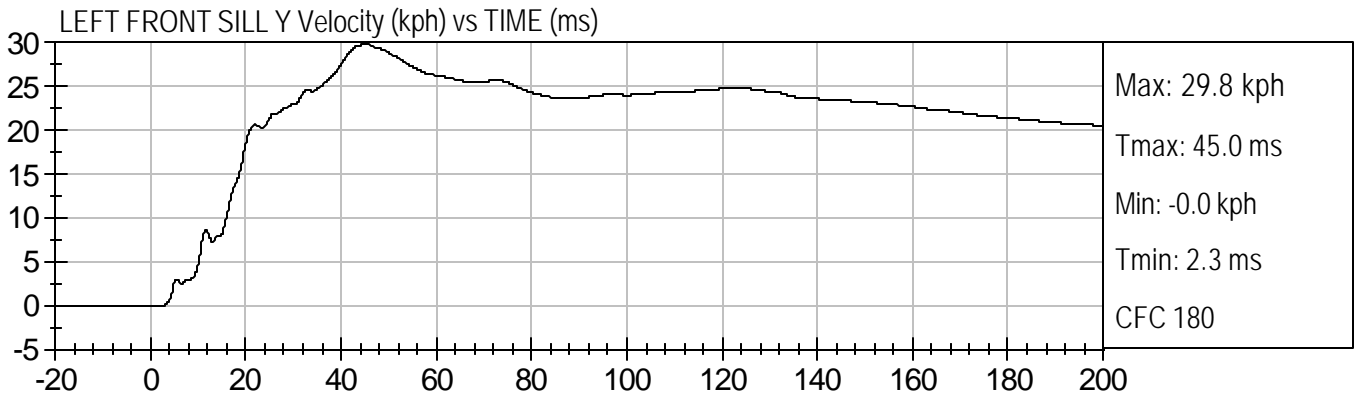
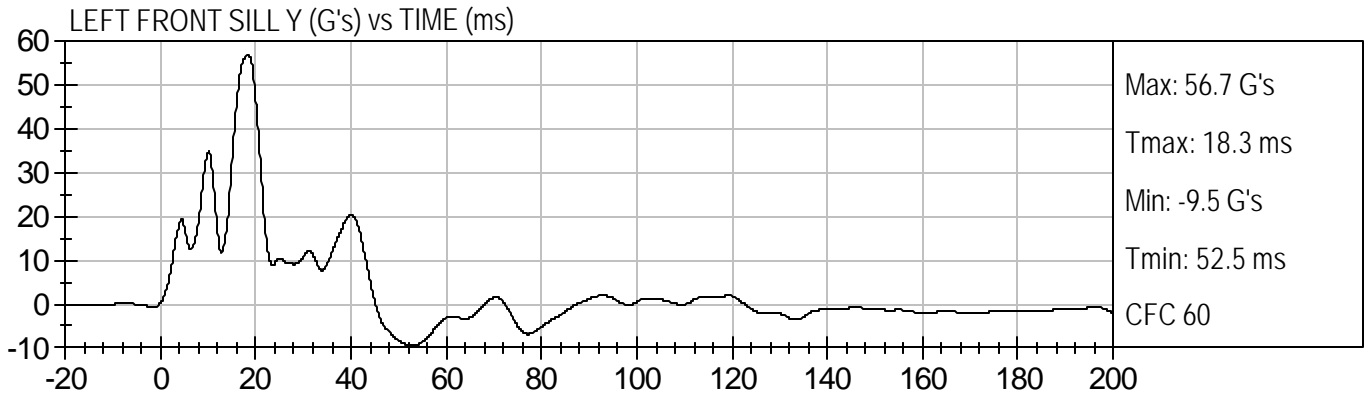






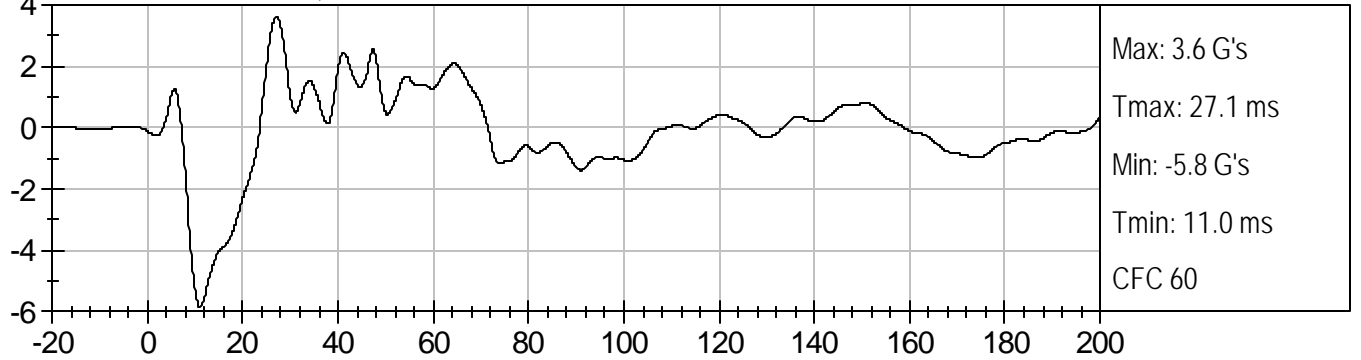




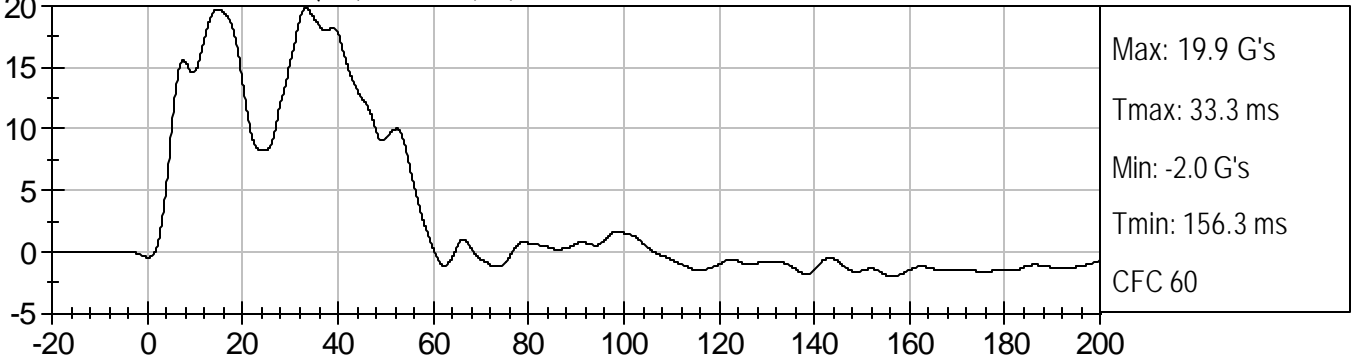




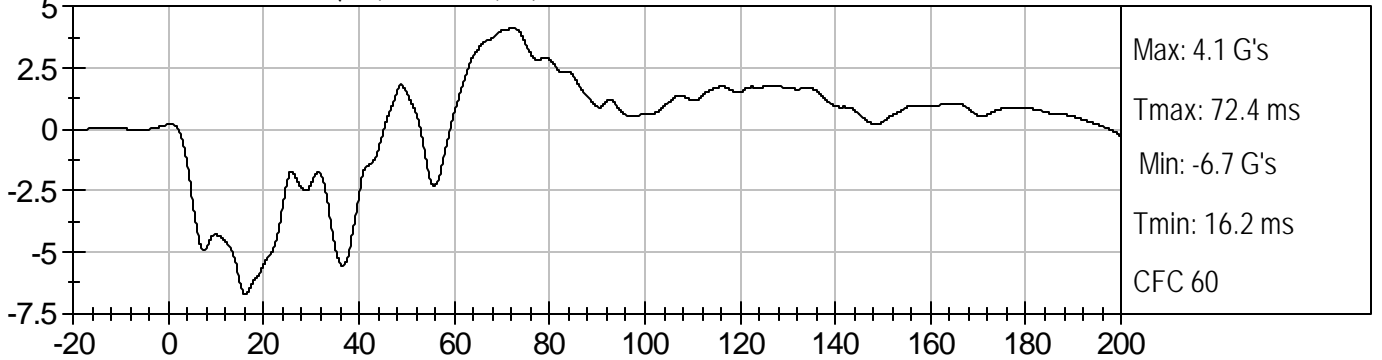
RIGHT FRONT SILL X (G's) vs TIME (ms)



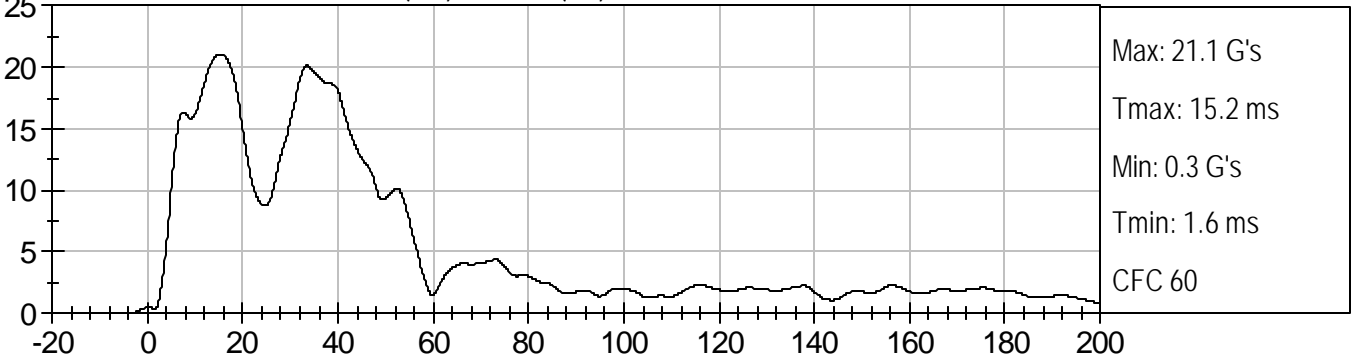
RIGHT FRONT SILL Y (G's) vs TIME (ms)

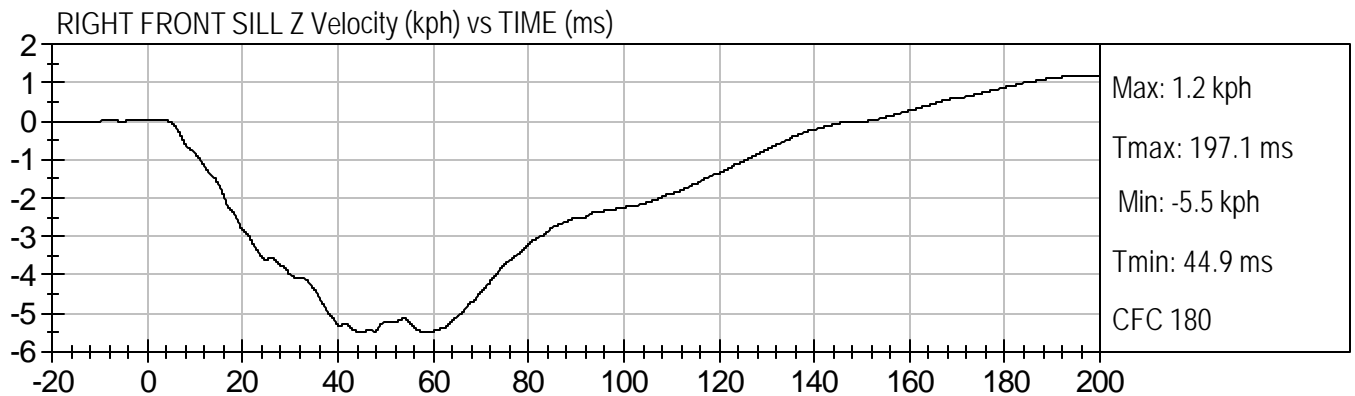
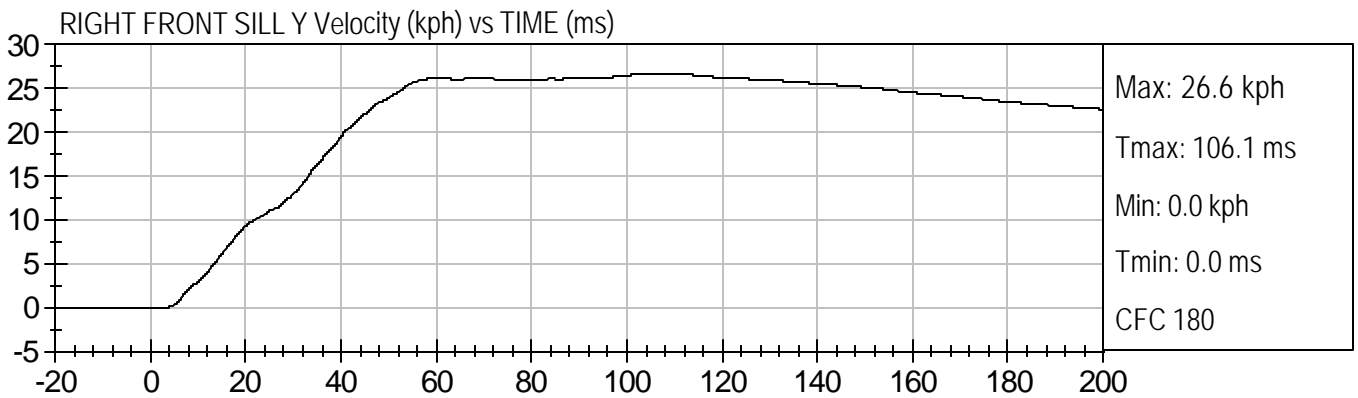
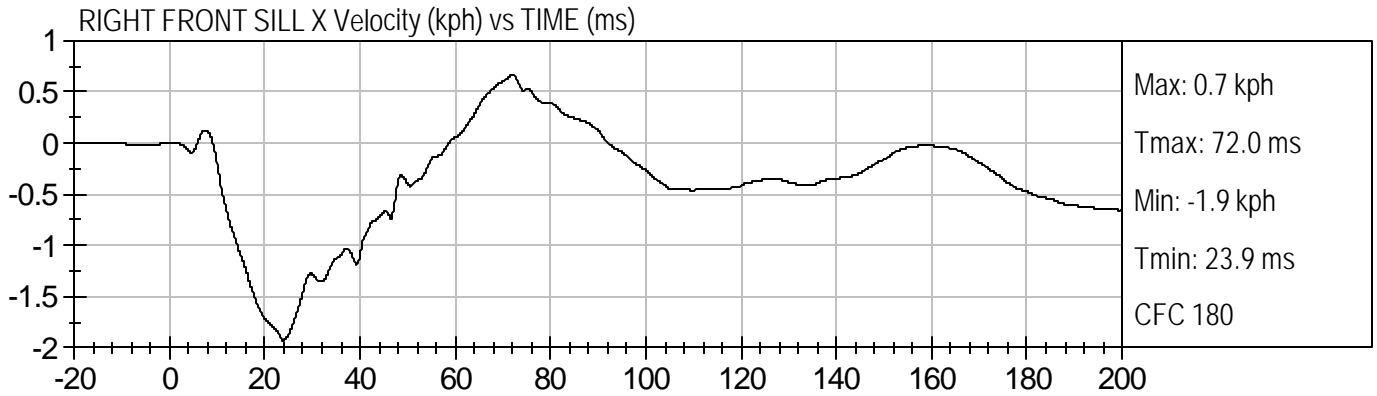


RIGHT FRONT SILL Z (G's) vs TIME (ms)



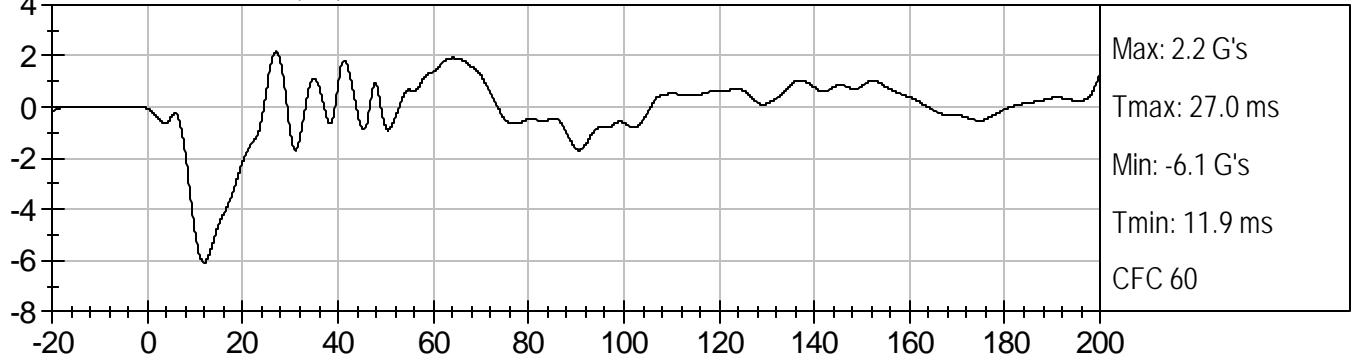
RIGHT FRONT SILL Resultant (G's) vs TIME (ms)



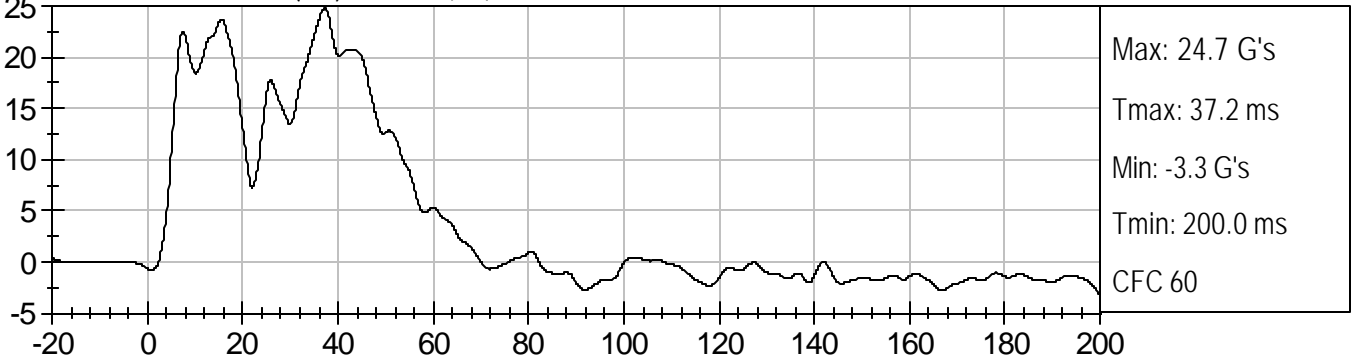




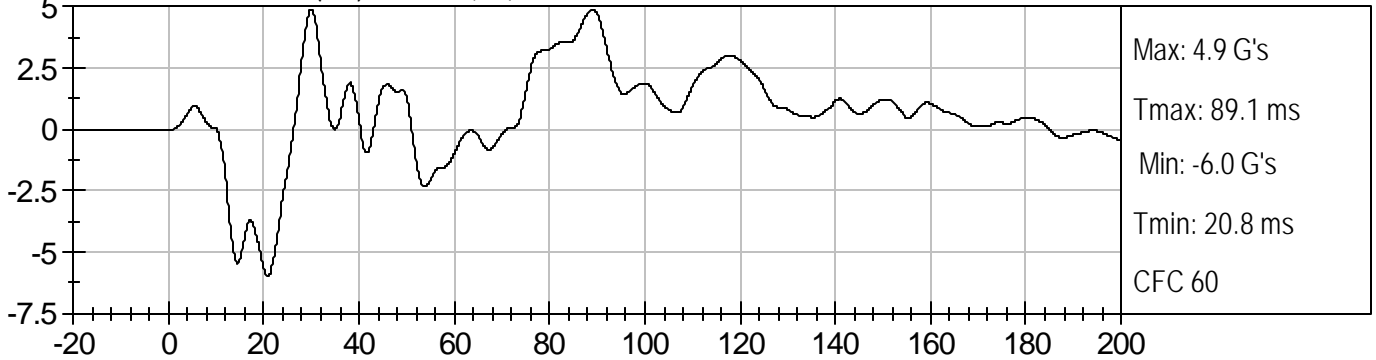
RIGHT REAR SILL X (G's) vs TIME (ms)



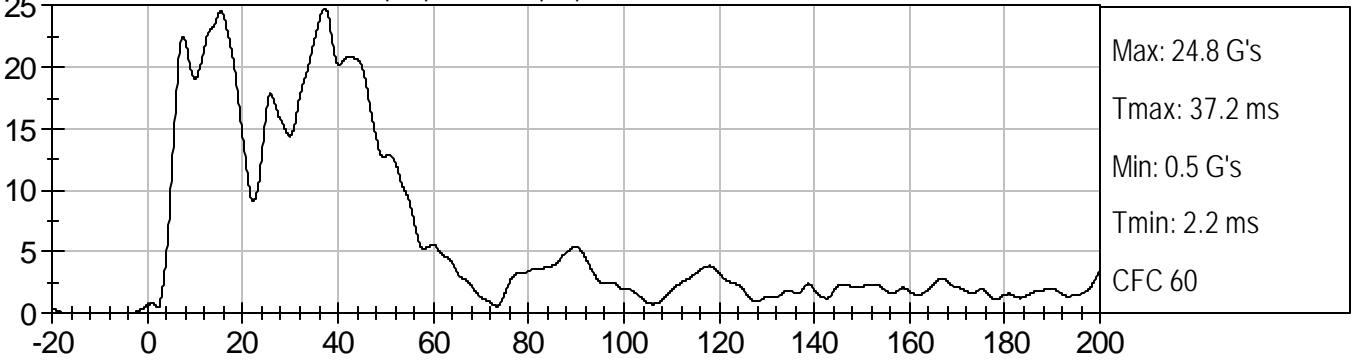
RIGHT REAR SILL Y (G's) vs TIME (ms)

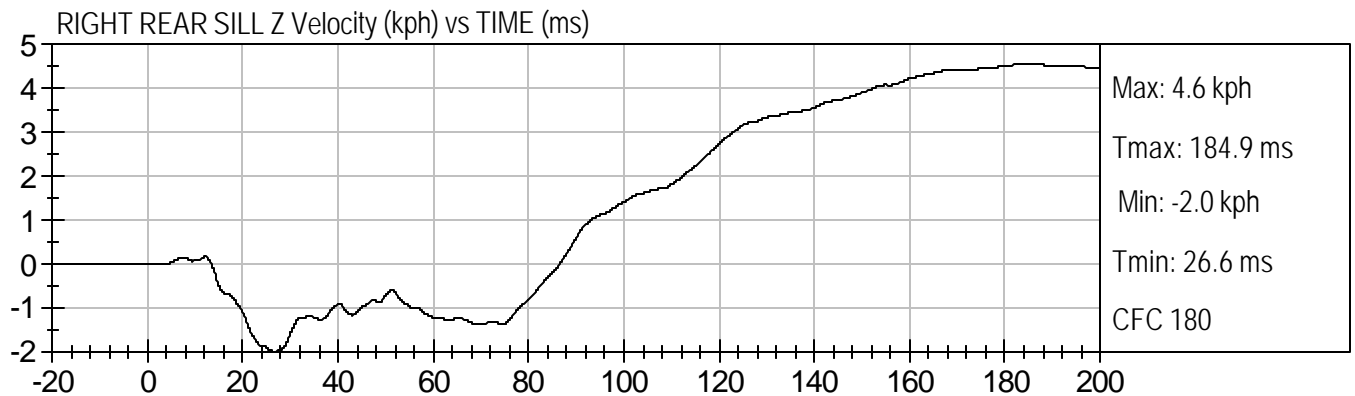
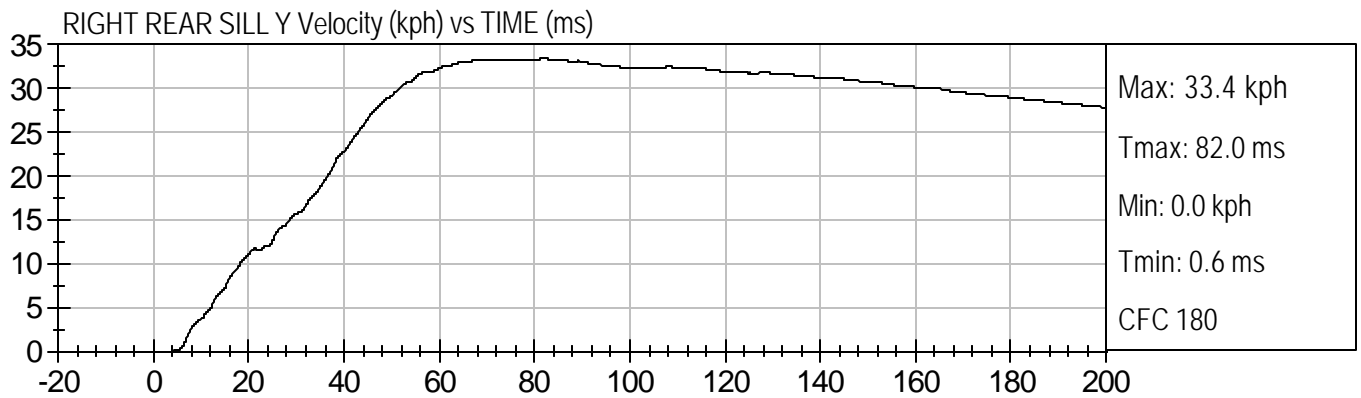
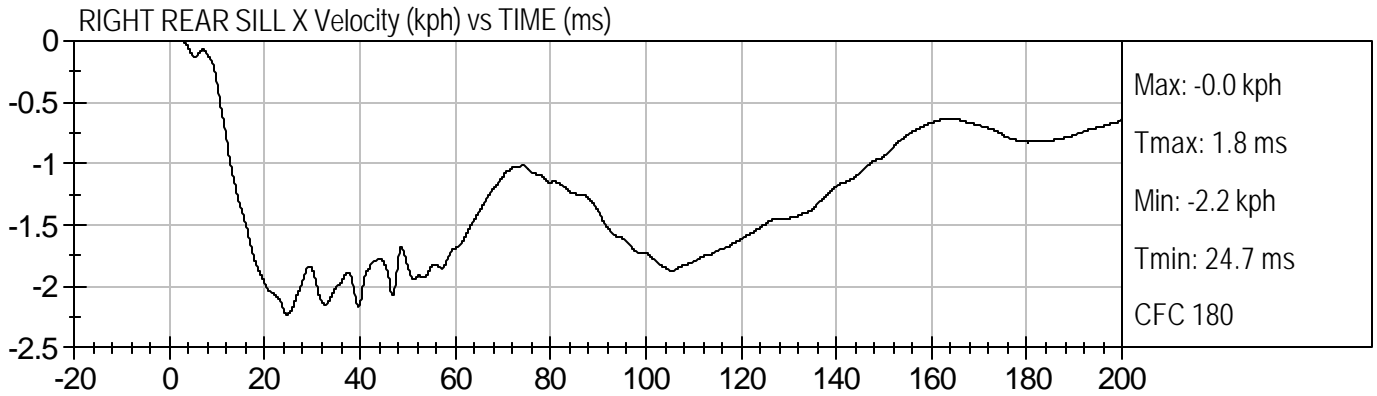


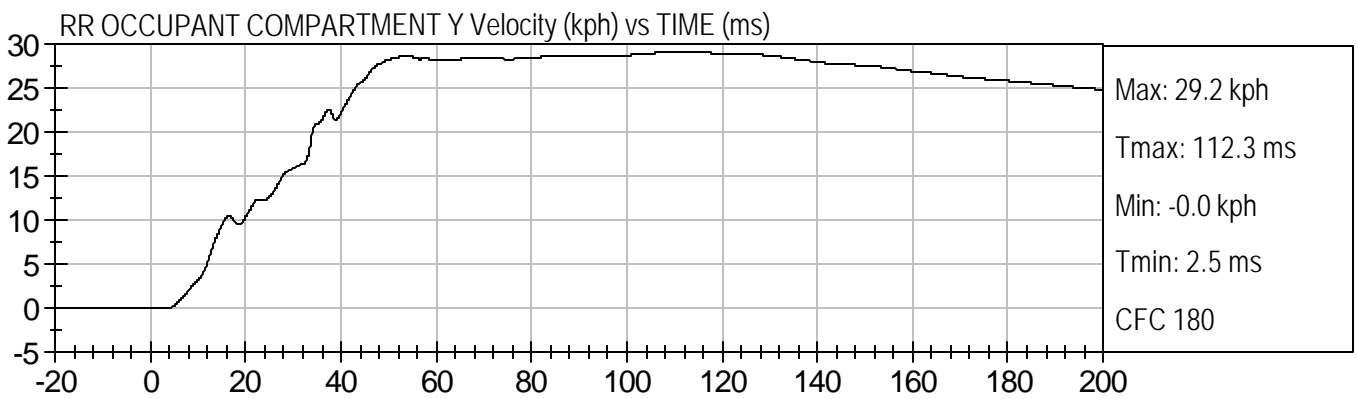
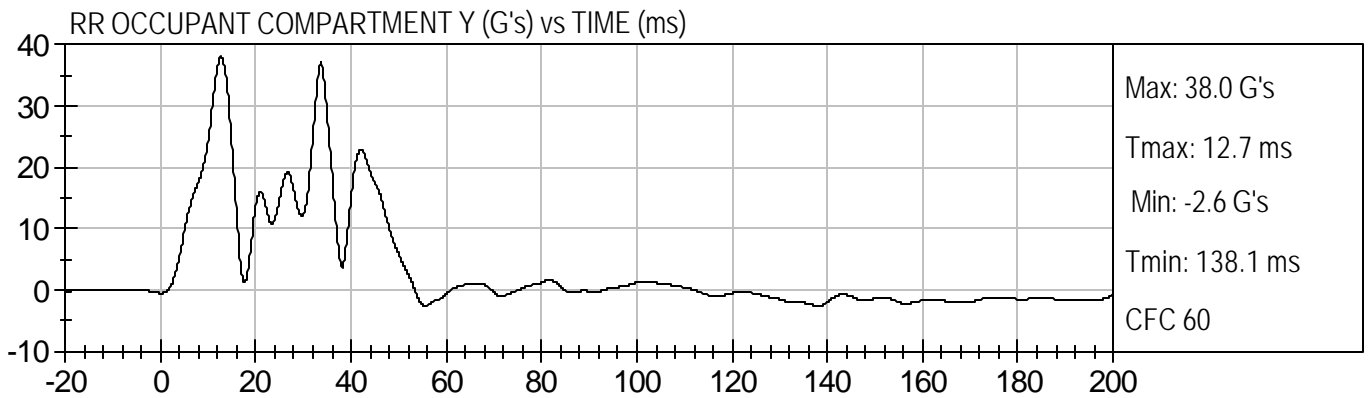
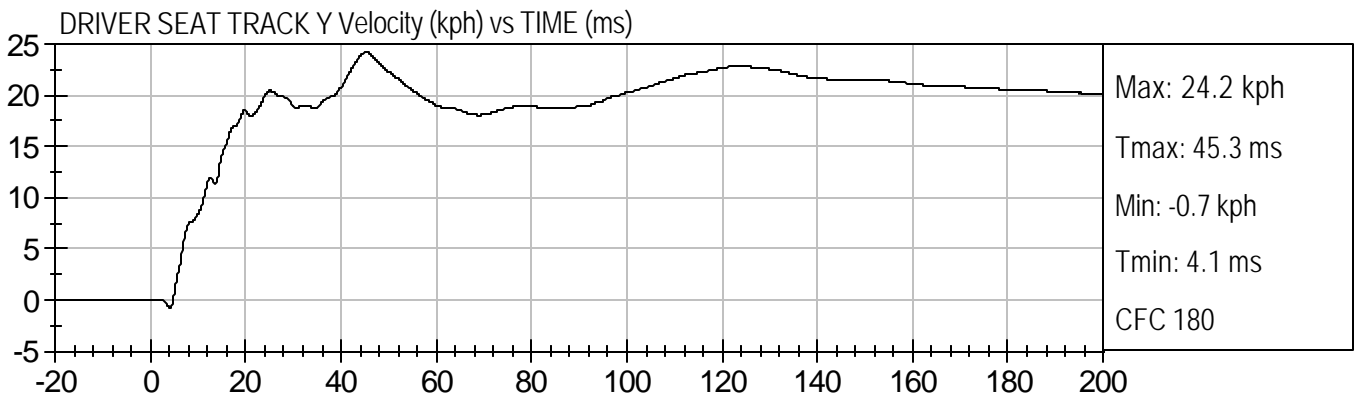
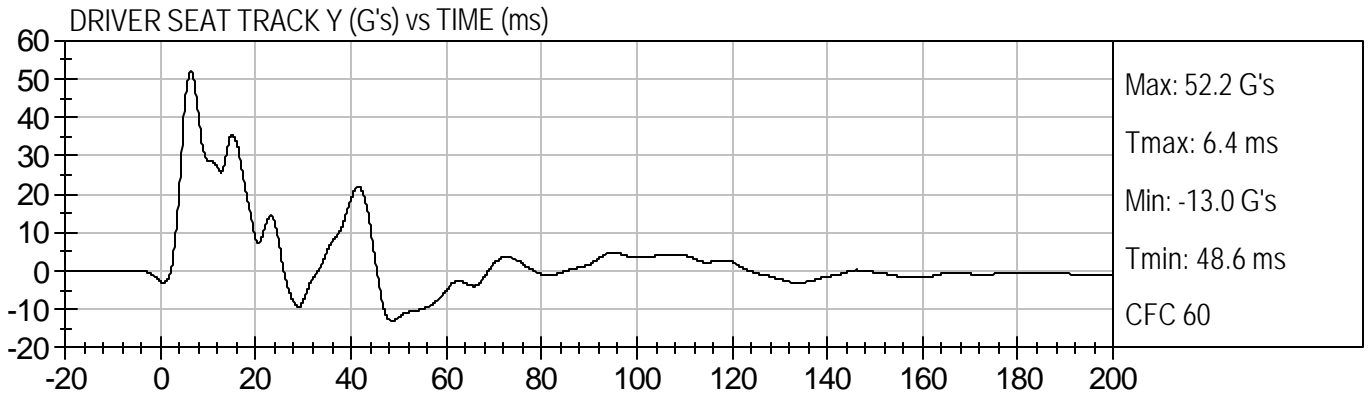
RIGHT REAR SILL Z (G's) vs TIME (ms)

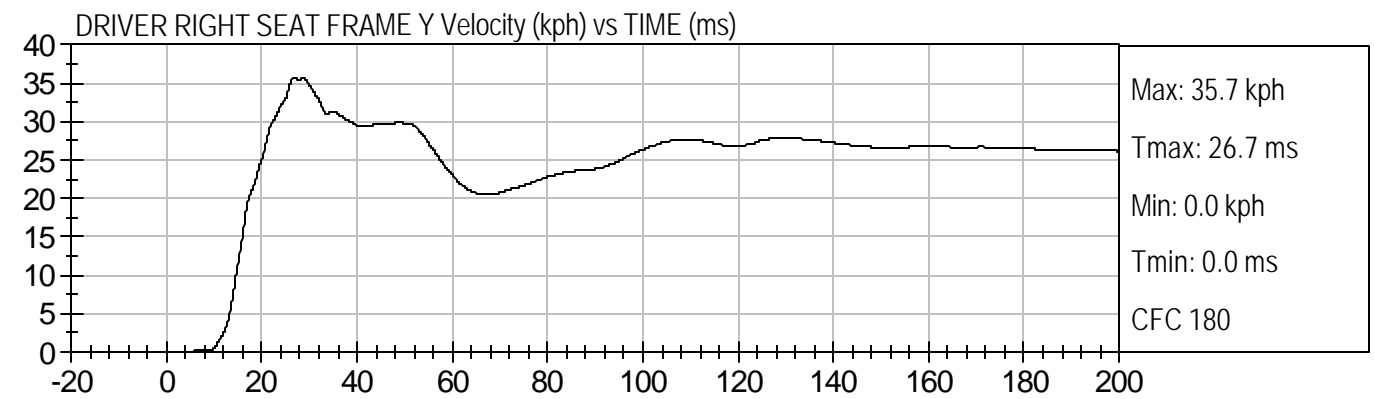
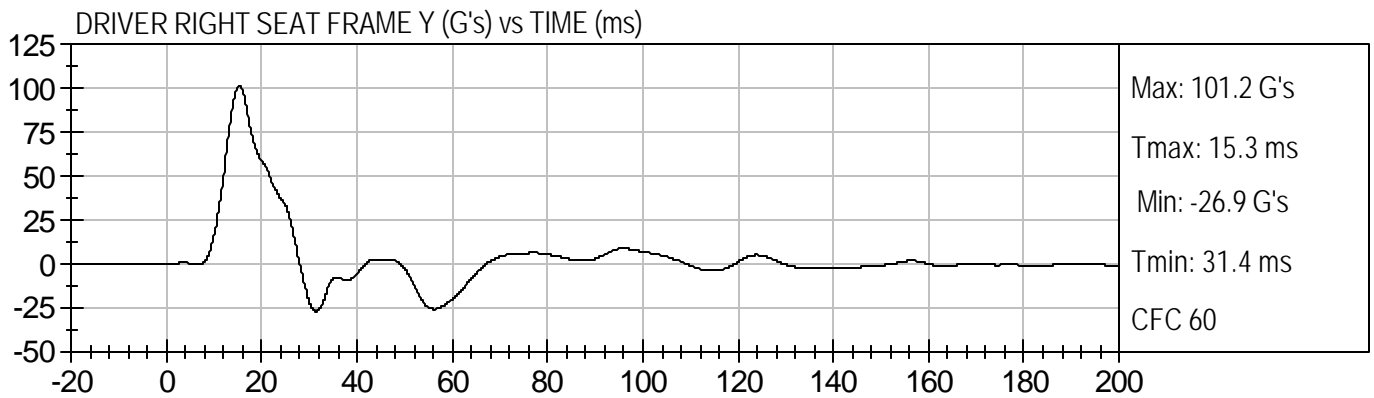
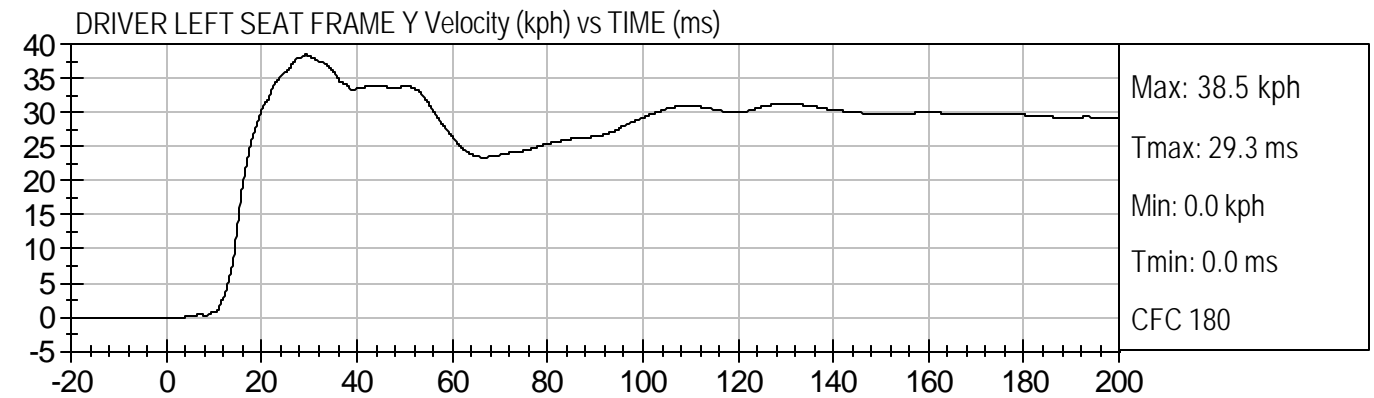
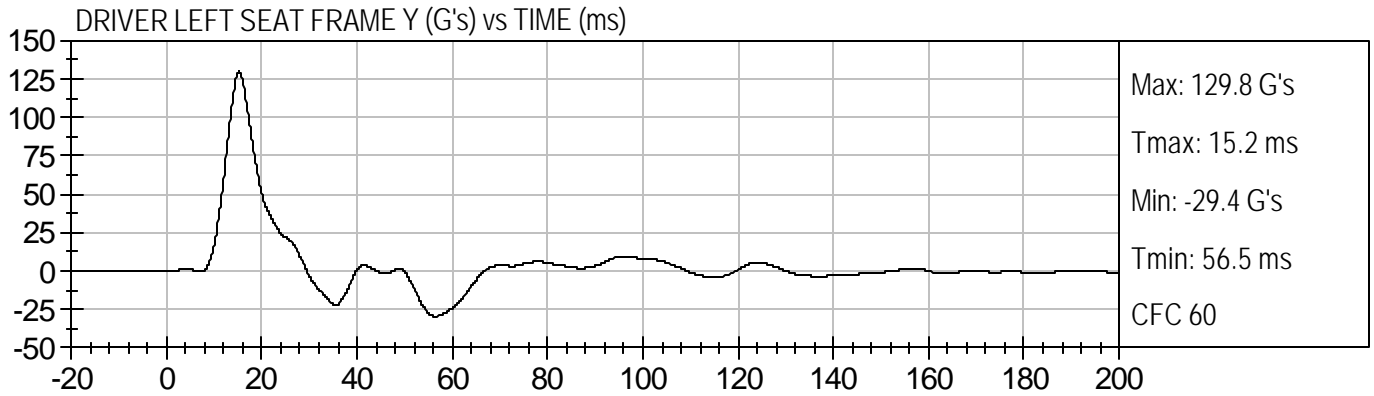


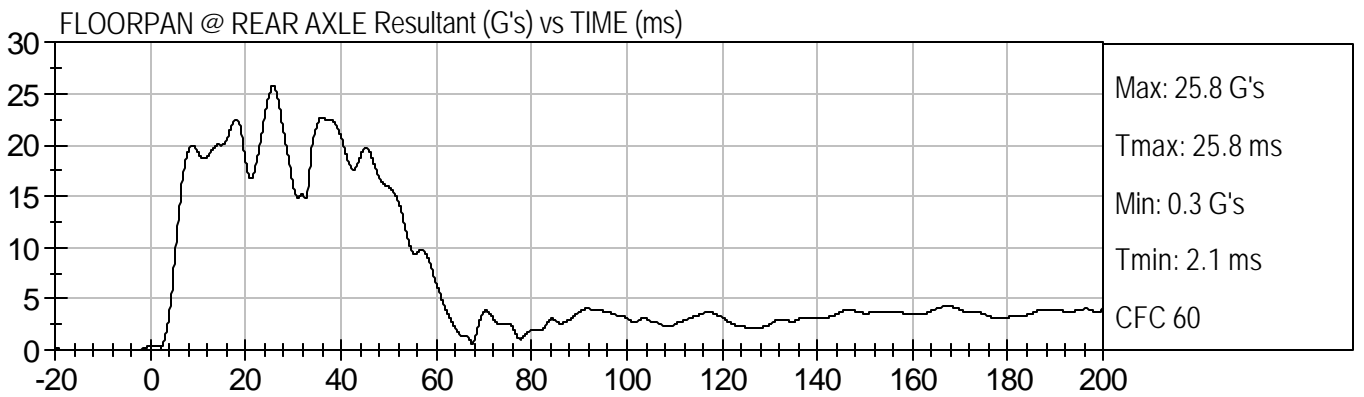
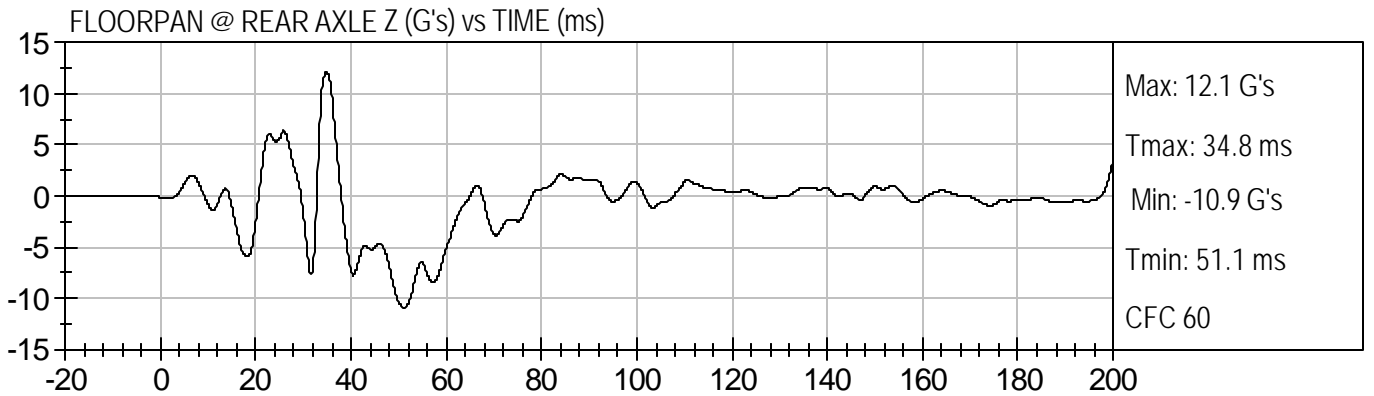
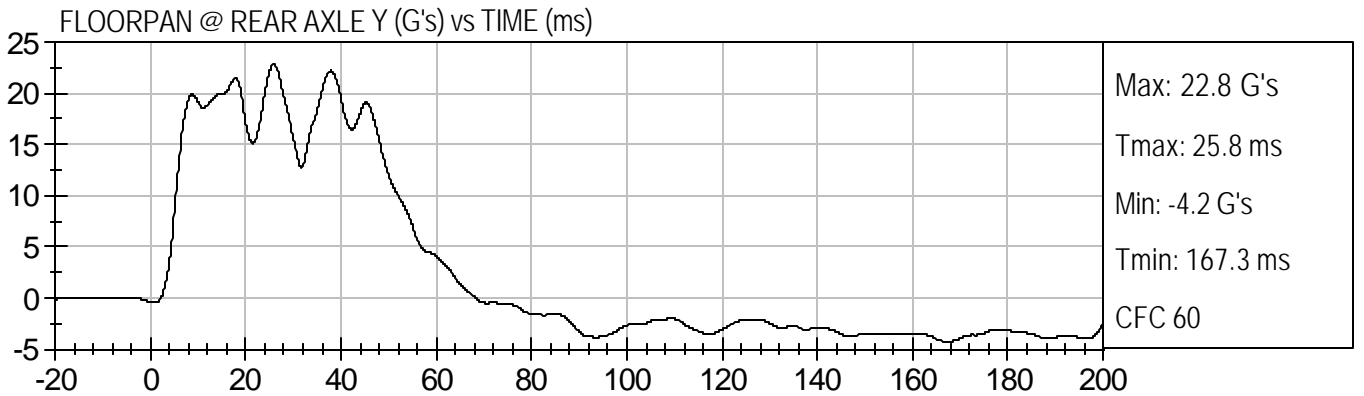
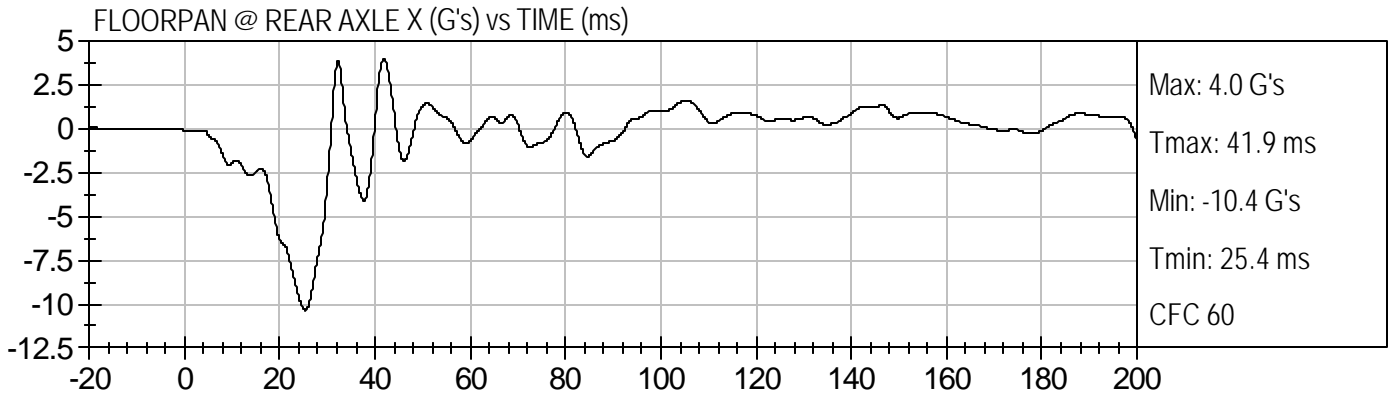
RIGHT REAR SILL Resultant (G's) vs TIME (ms)

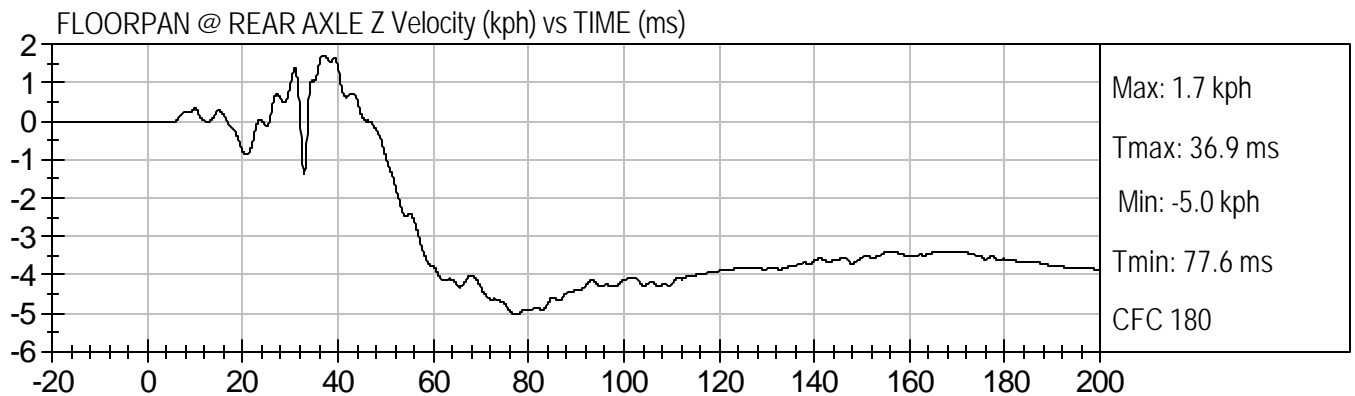
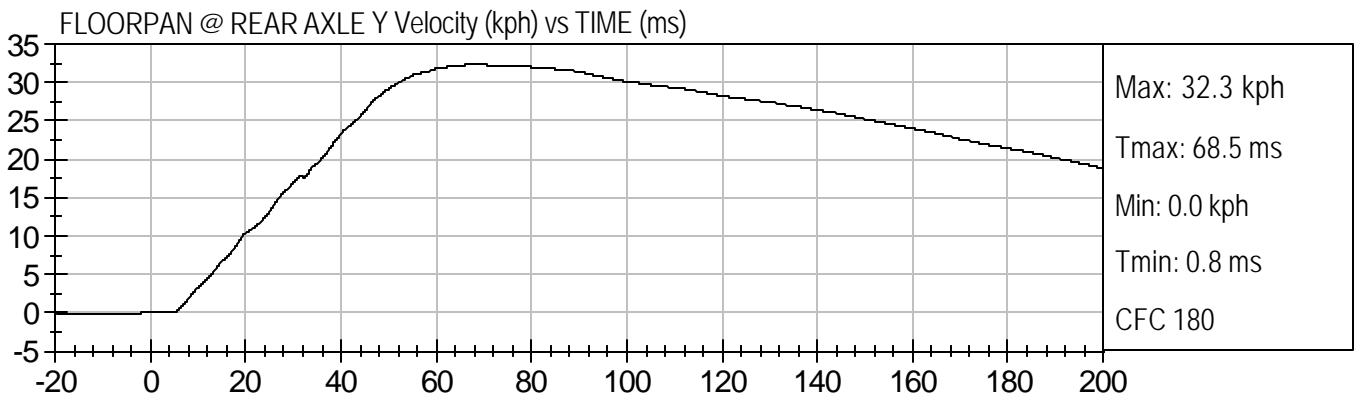
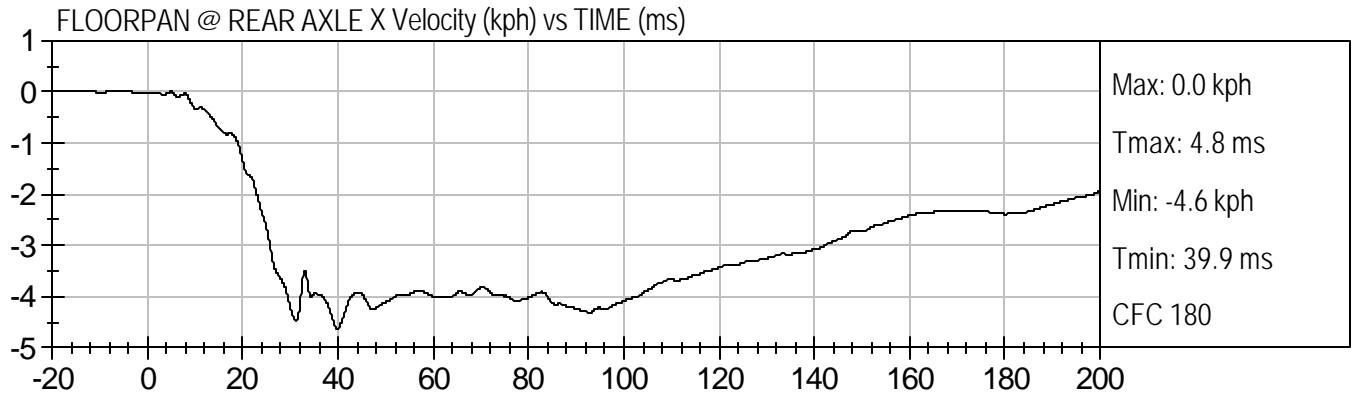


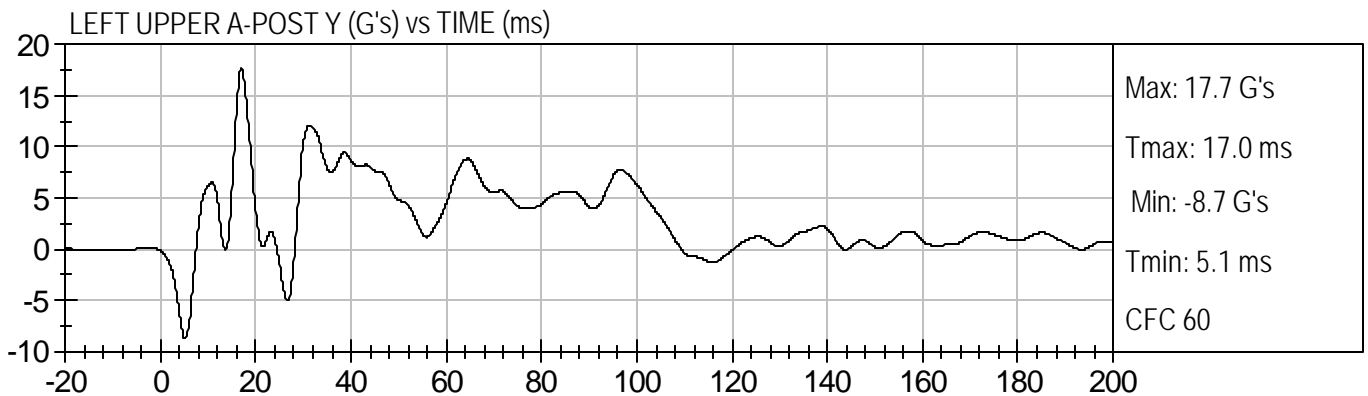
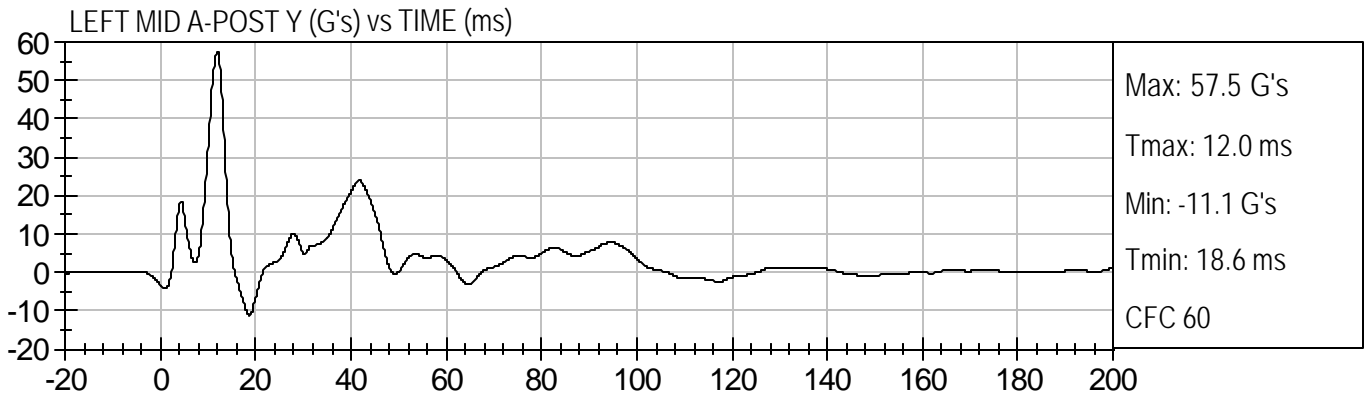
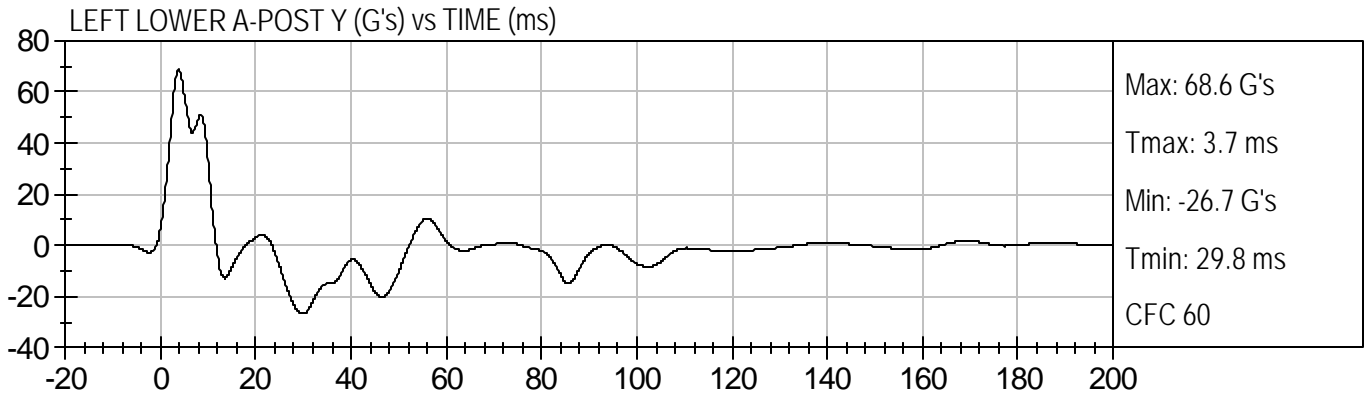


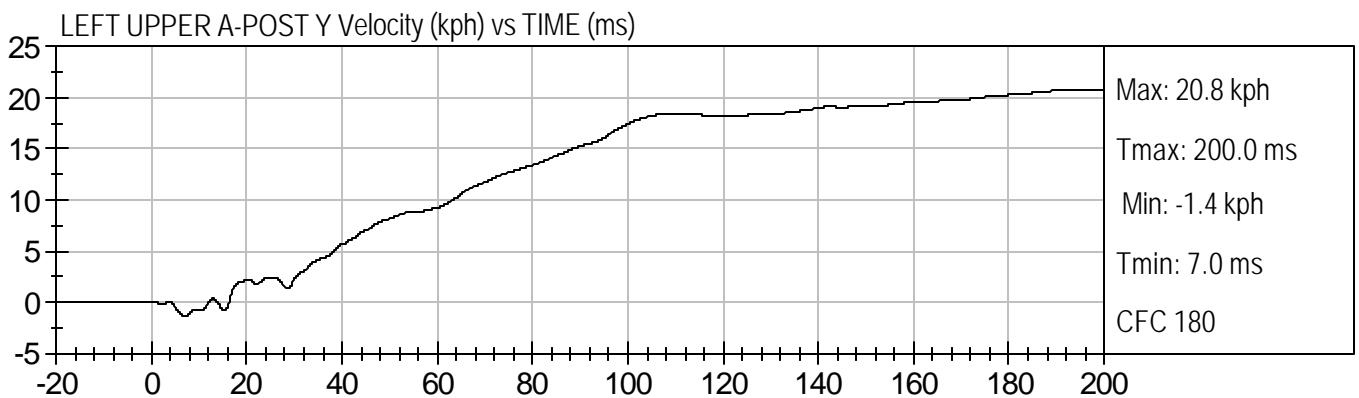
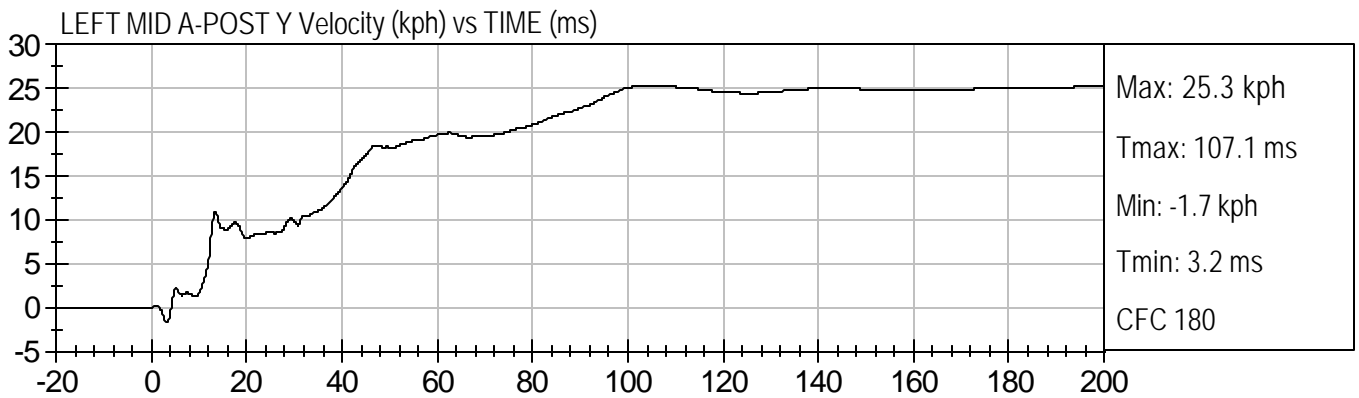
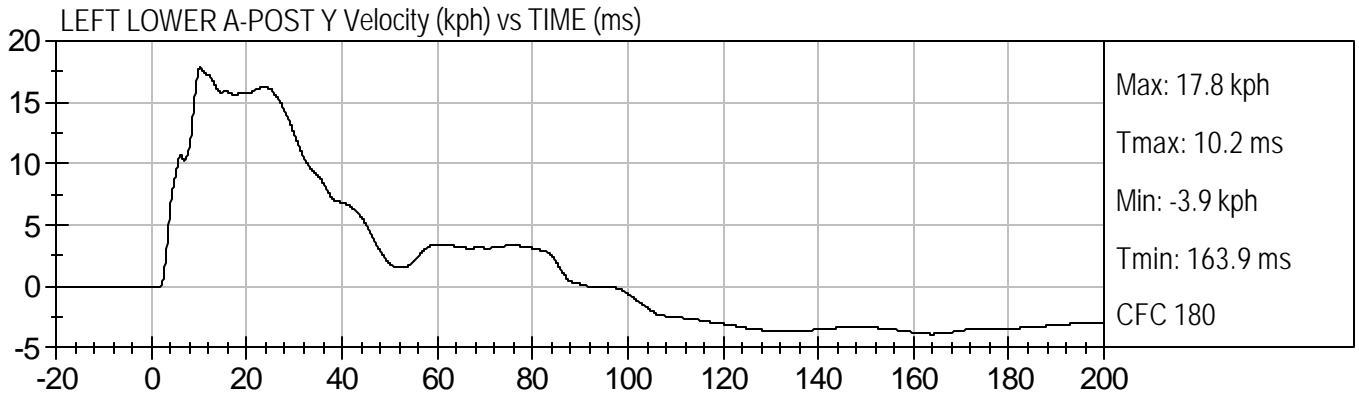


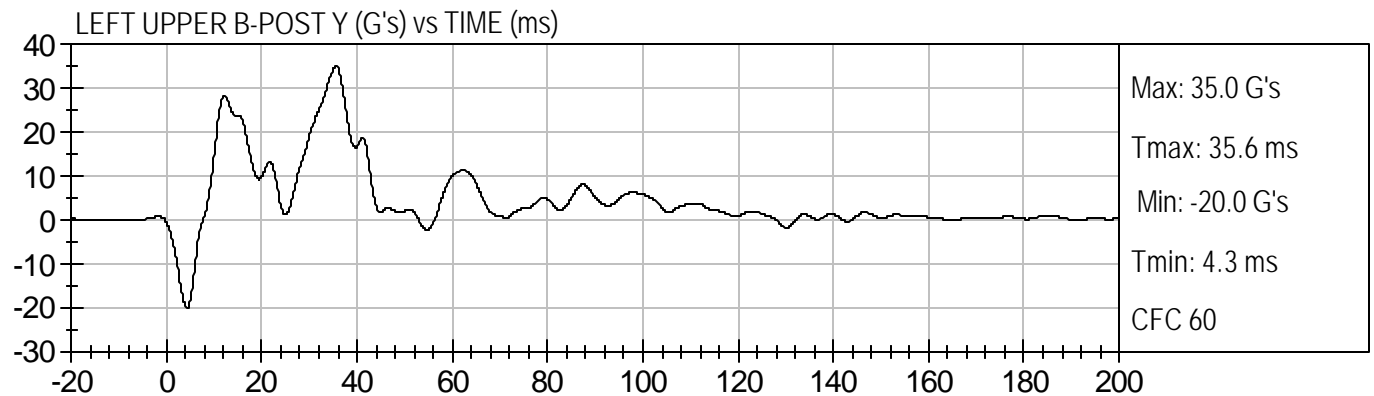
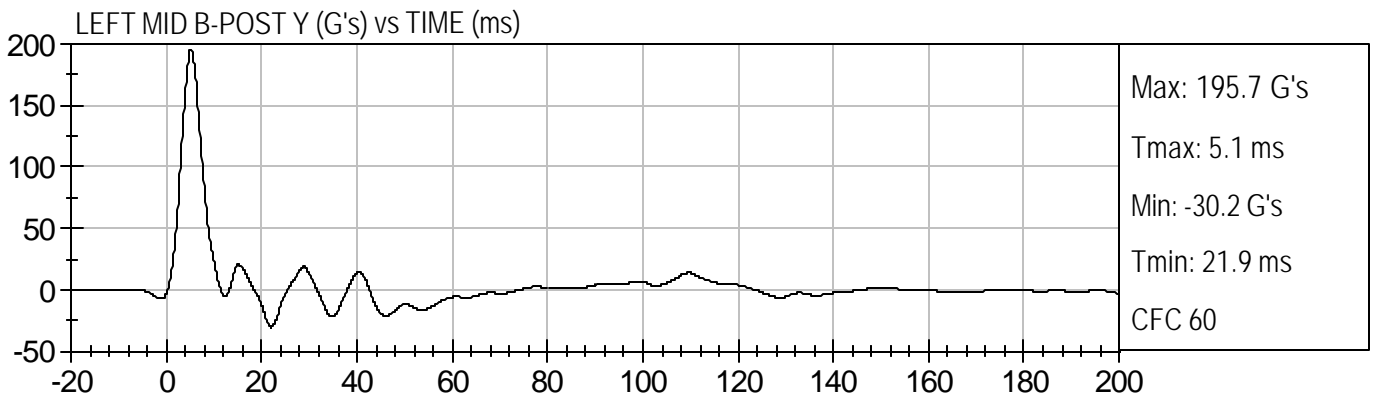
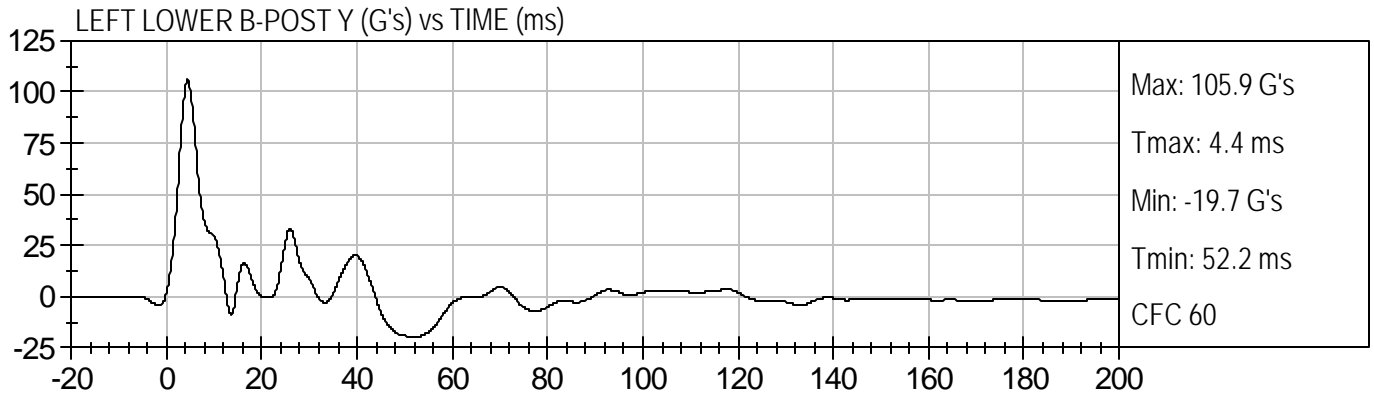


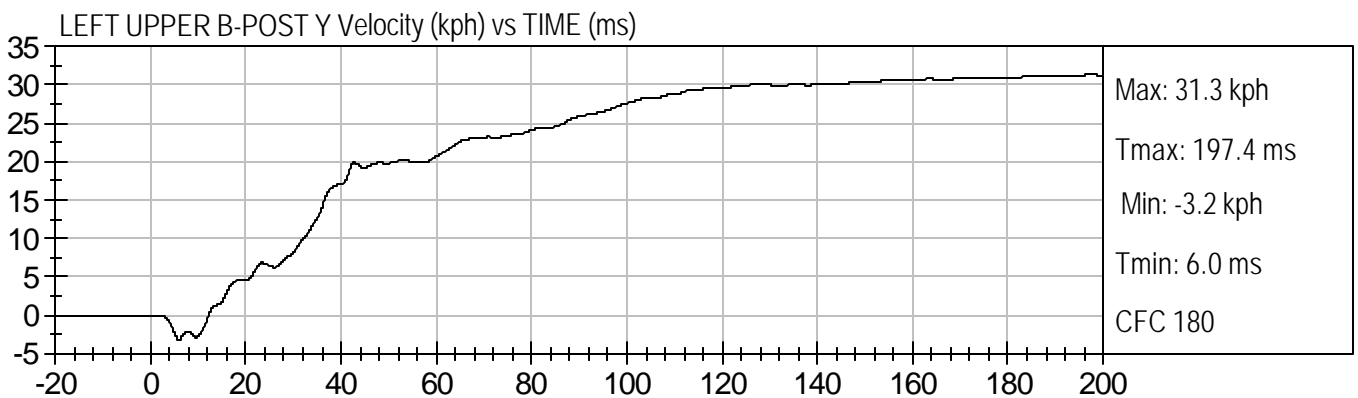
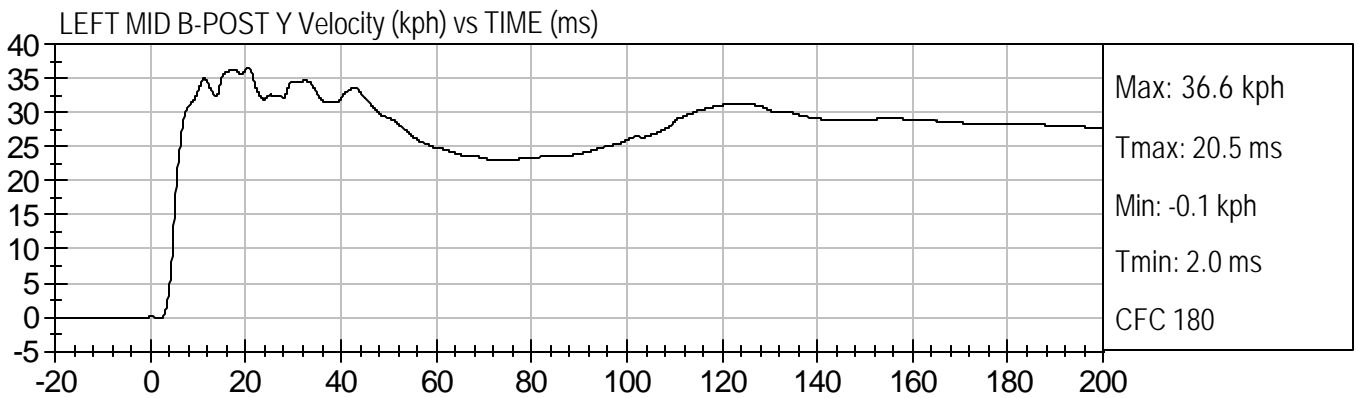
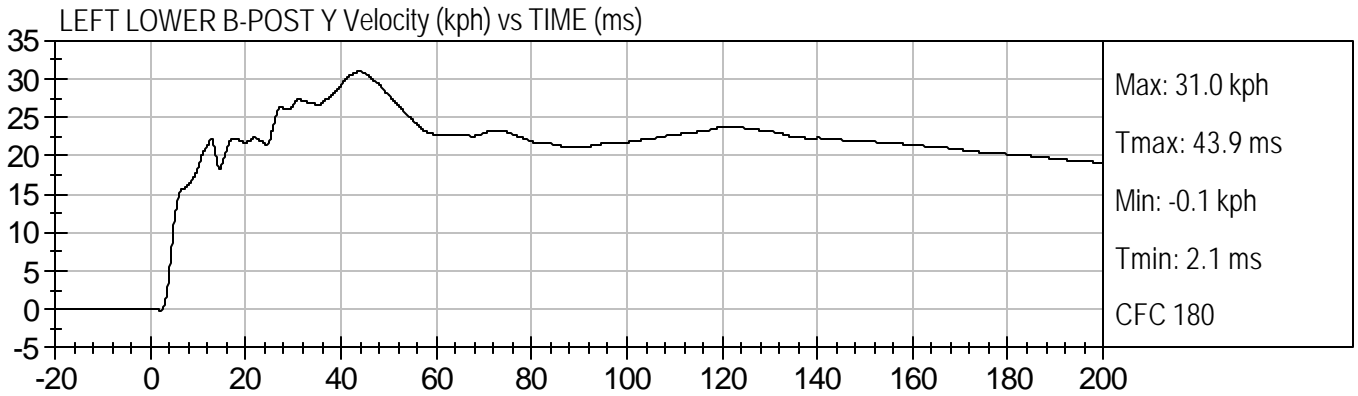


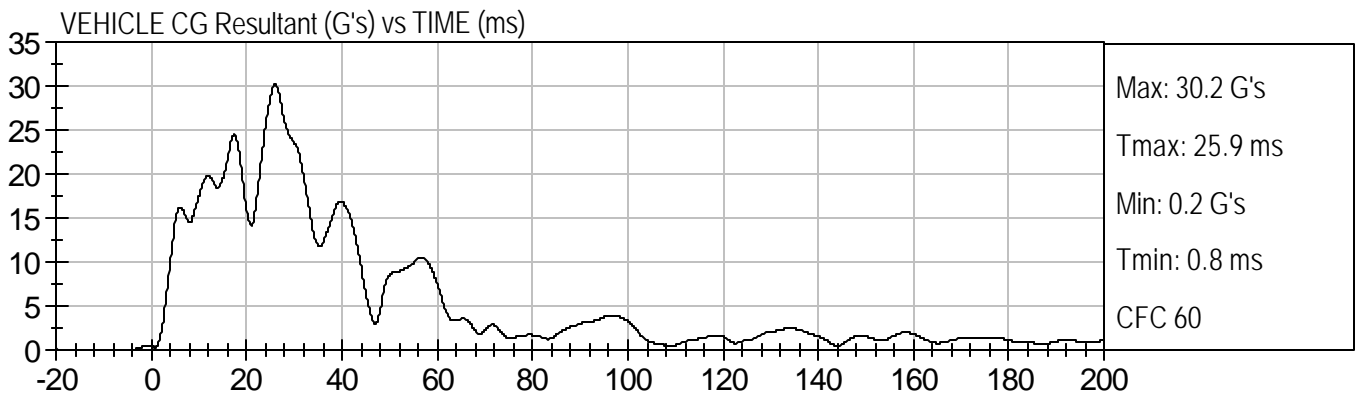
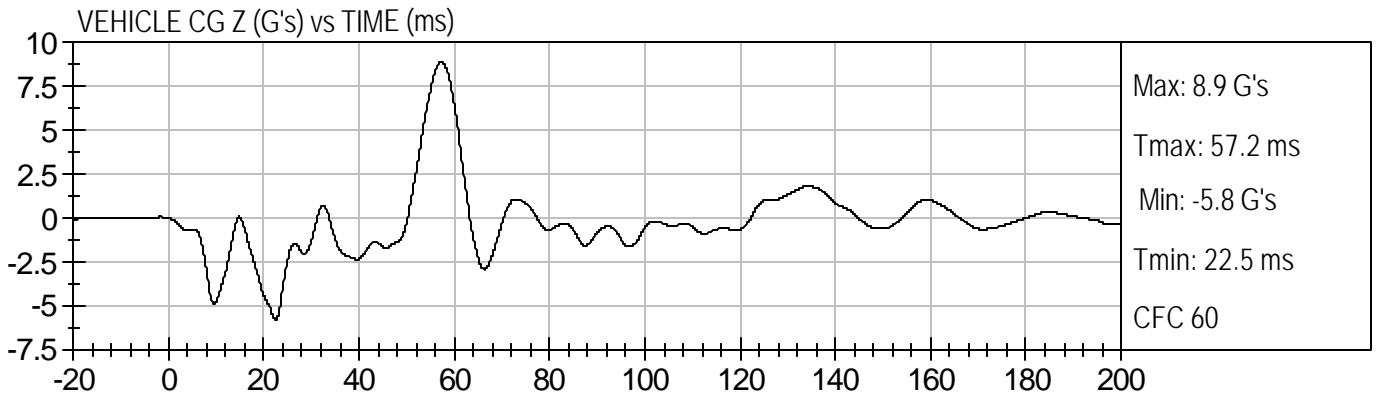
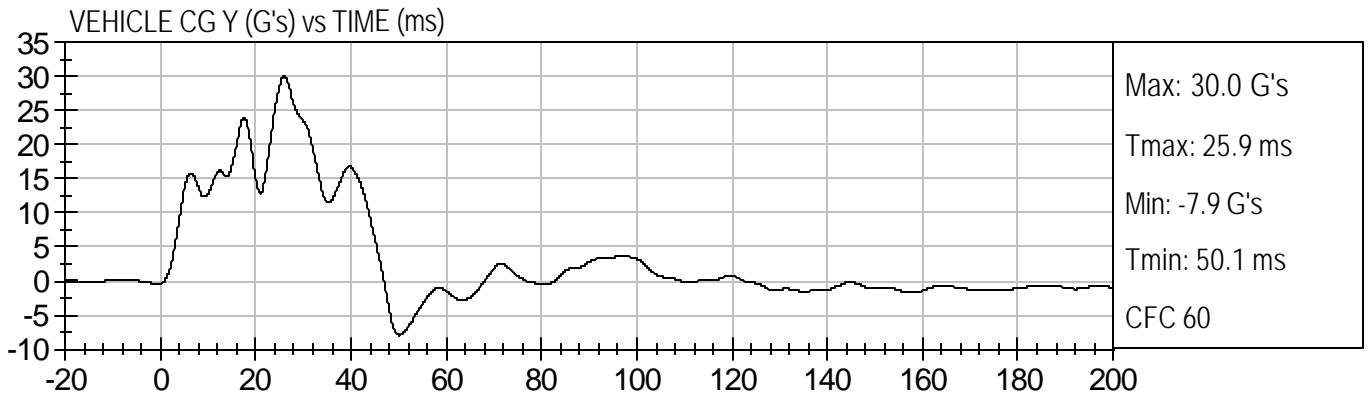
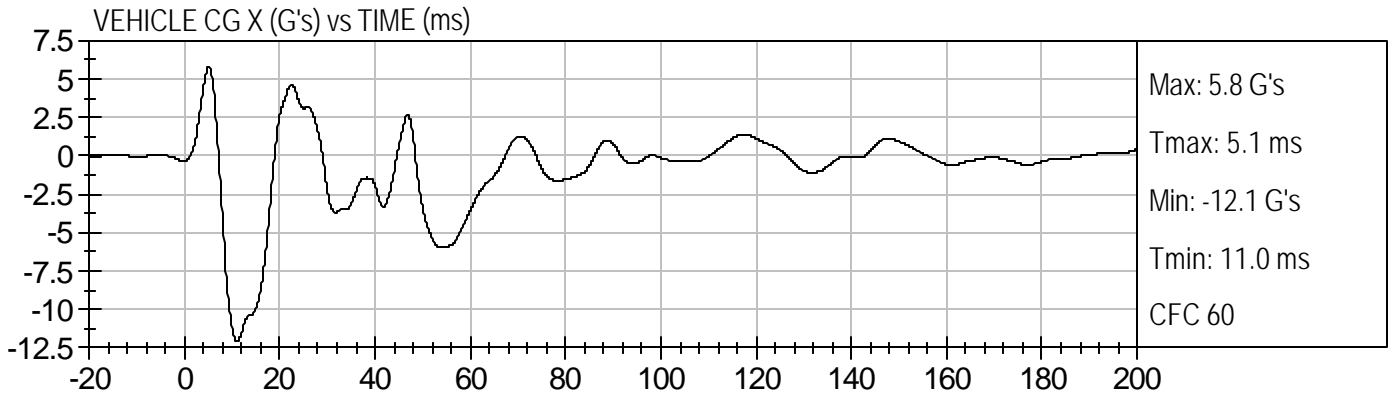






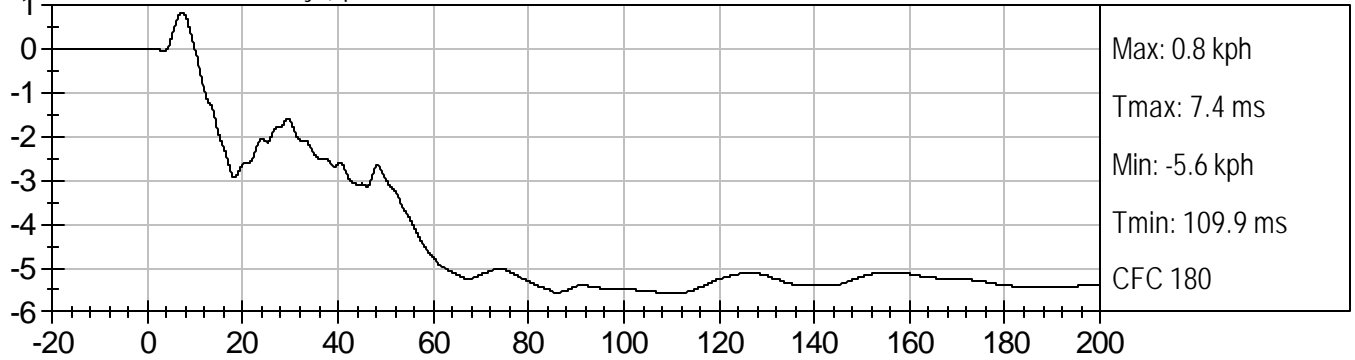




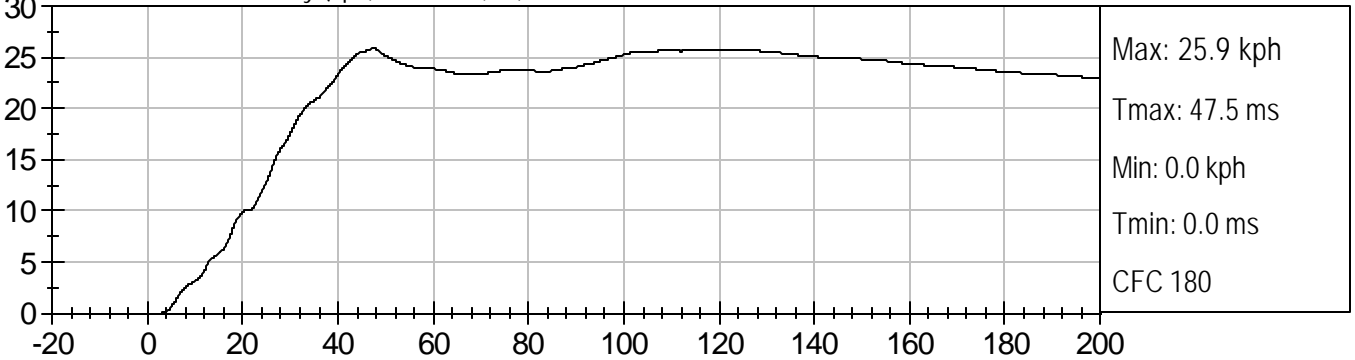




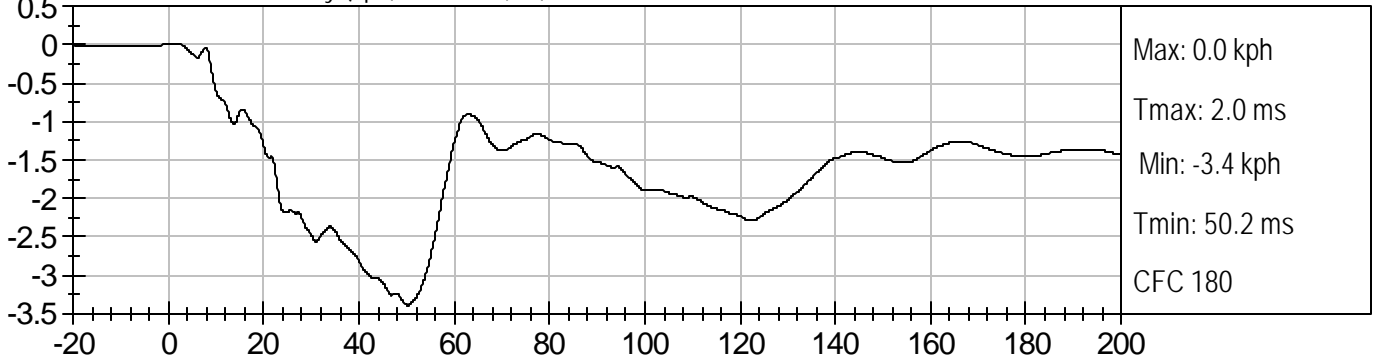
VEHICLE CG X Velocity (kph) vs TIME (ms)

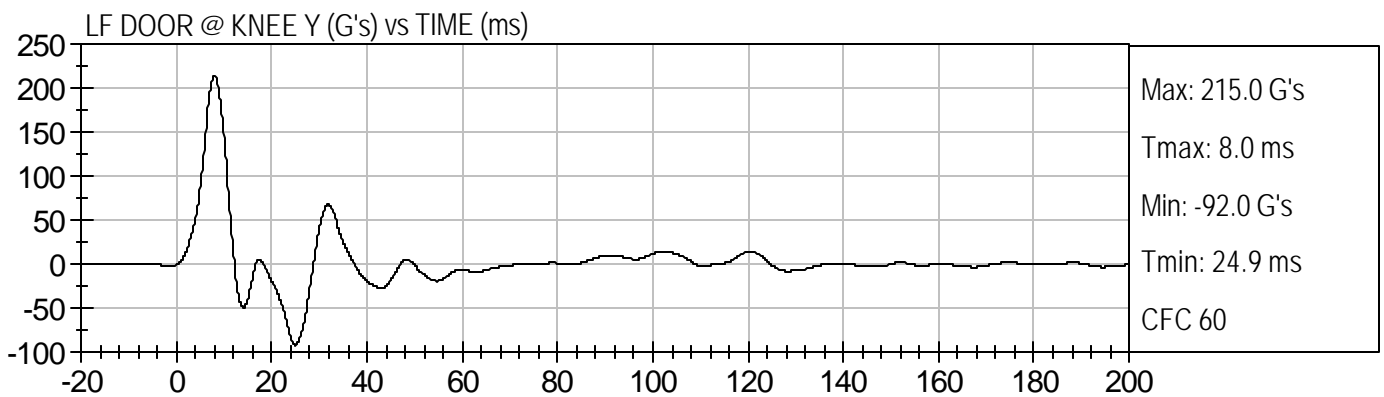
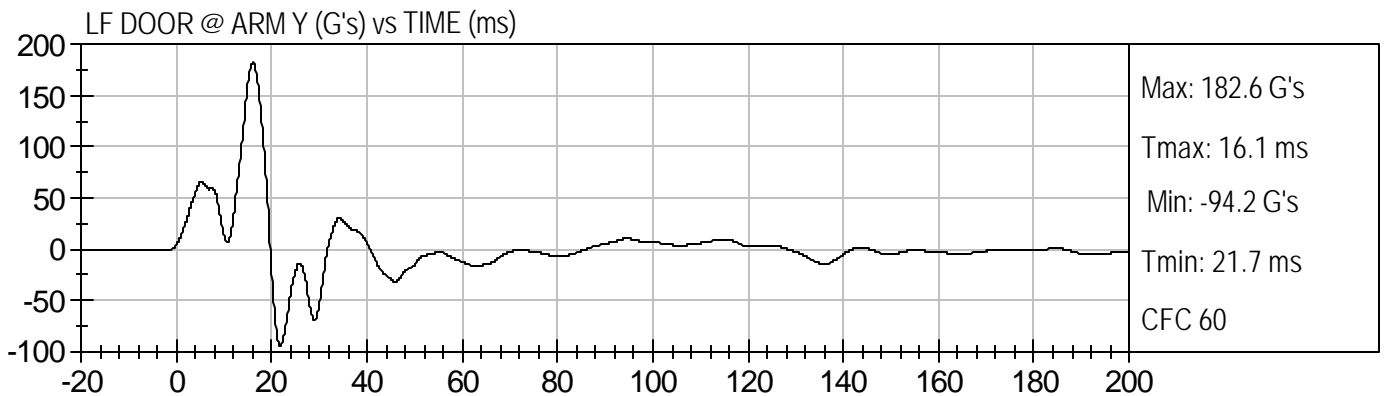
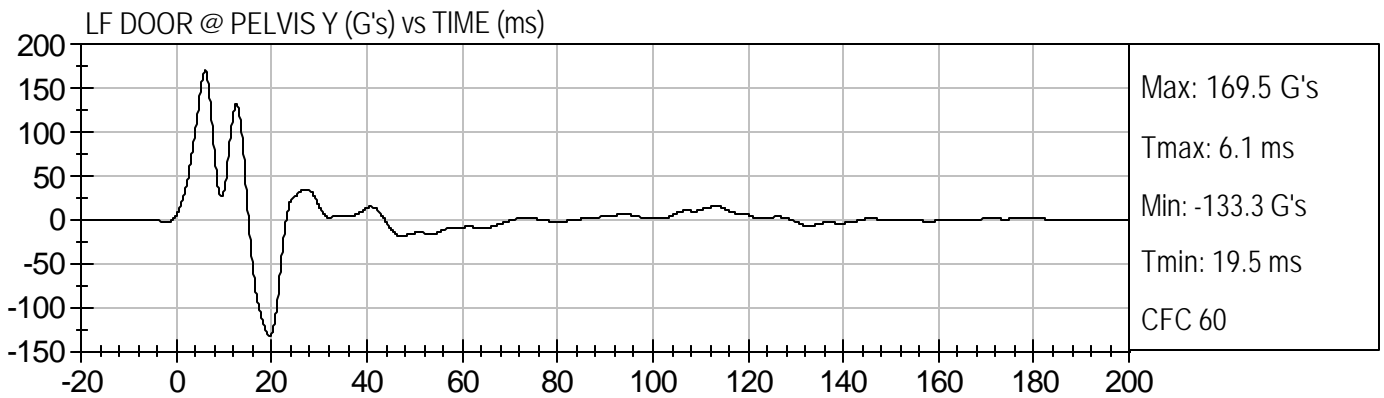
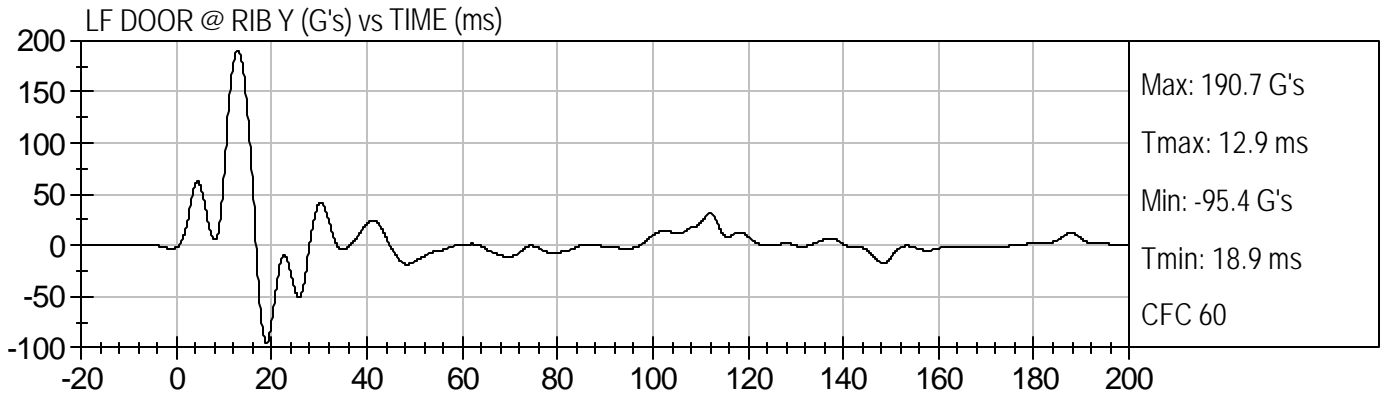


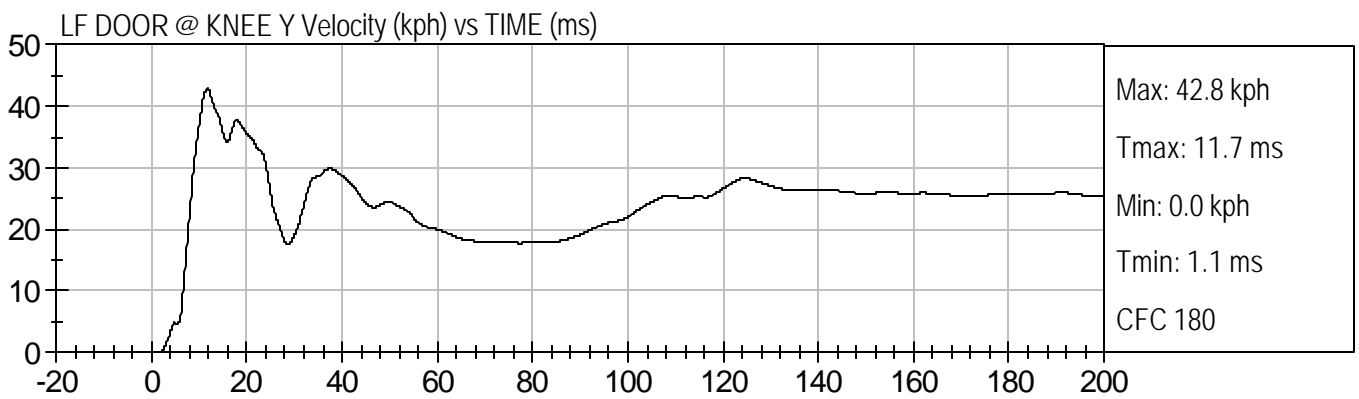
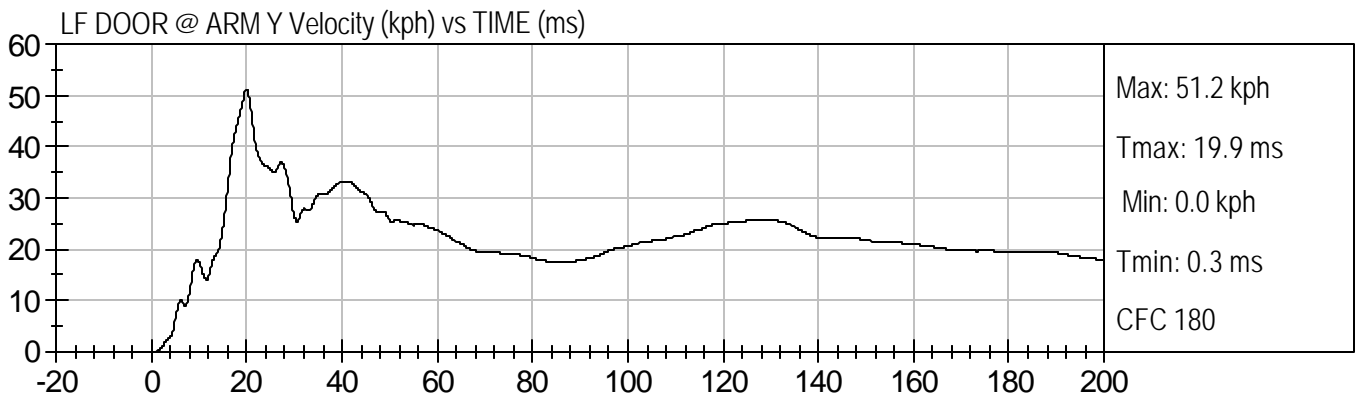
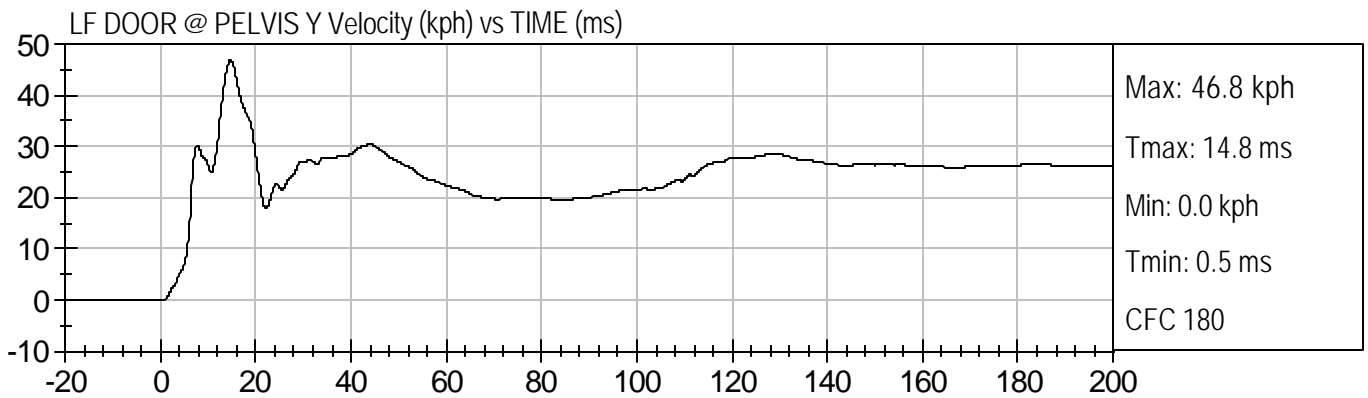
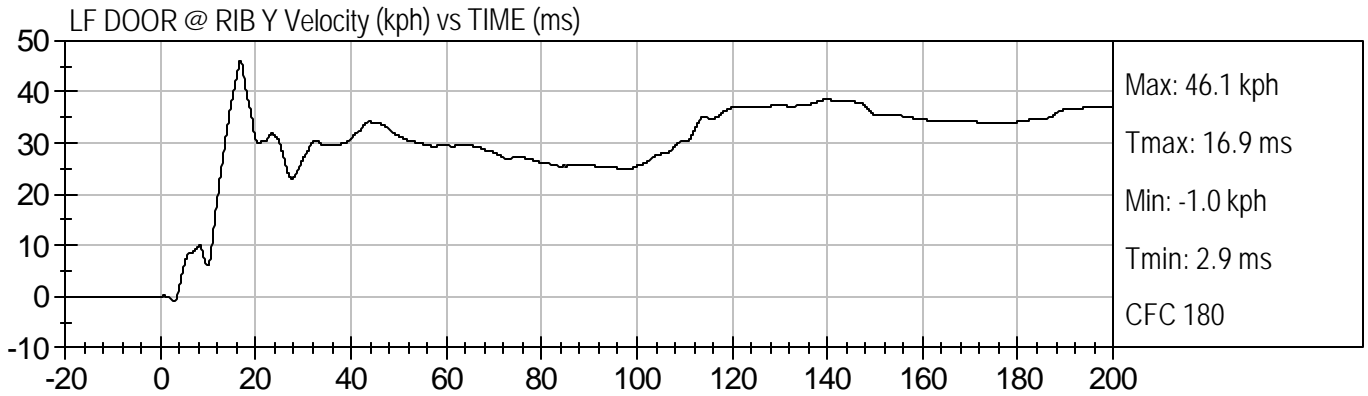
VEHICLE CG Y Velocity (kph) vs TIME (ms)

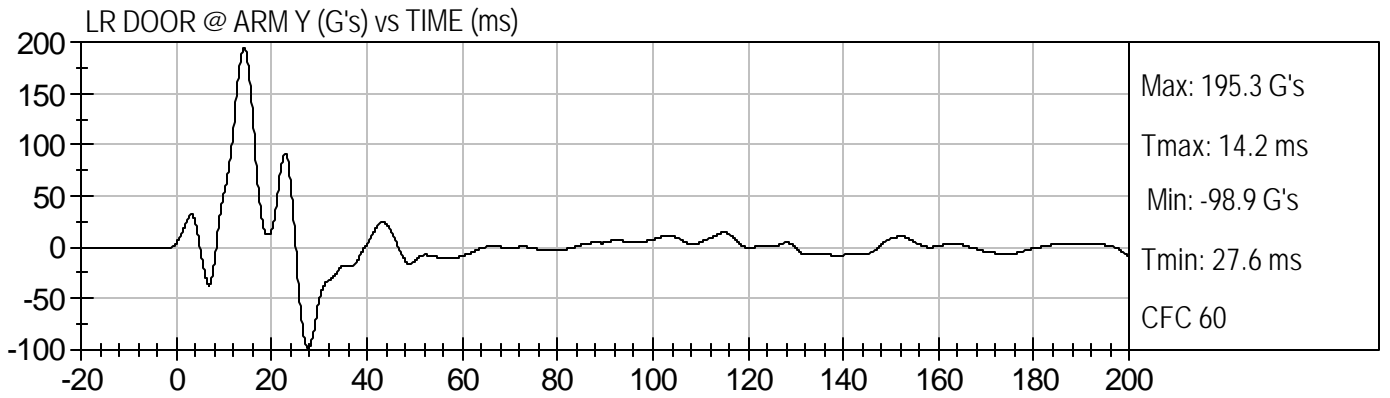
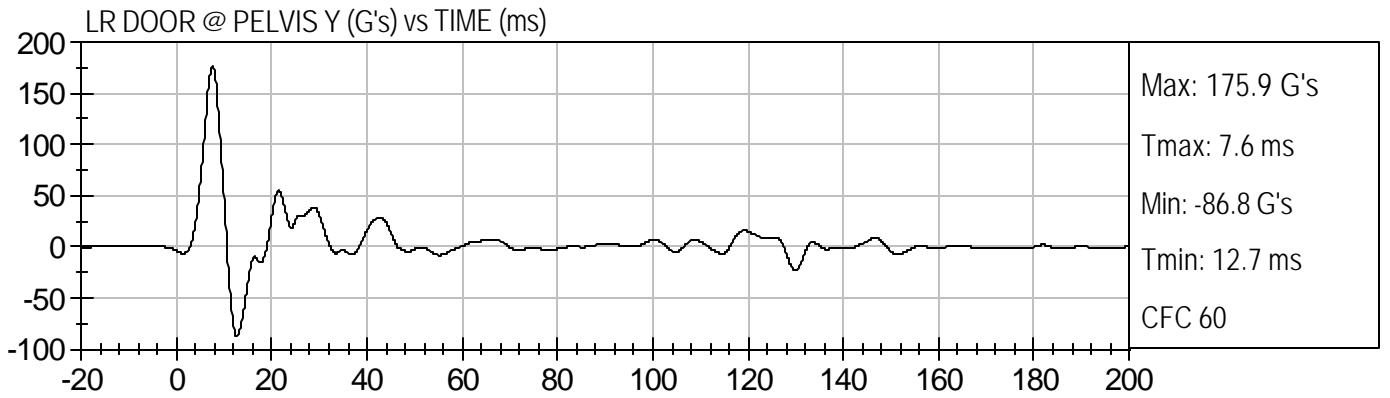
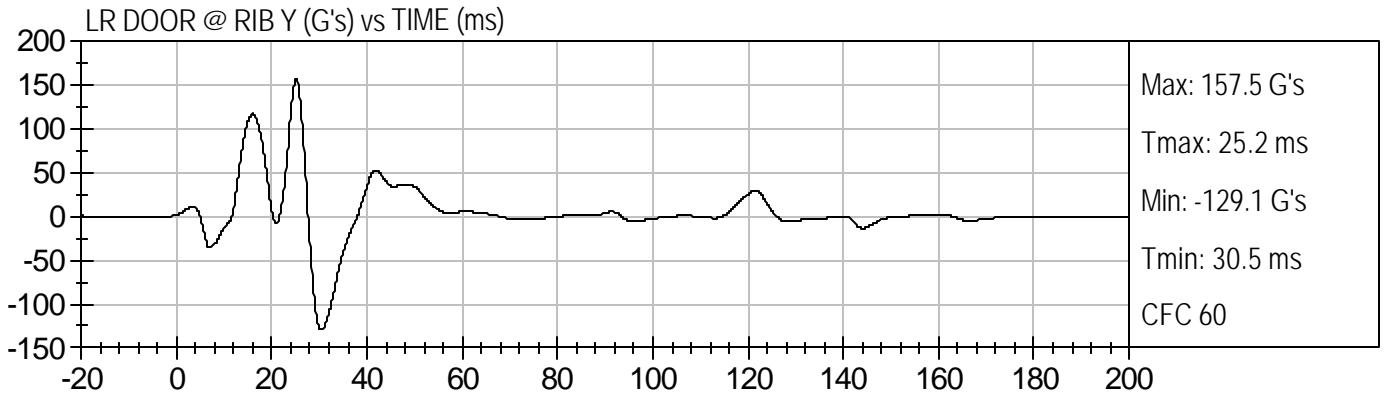


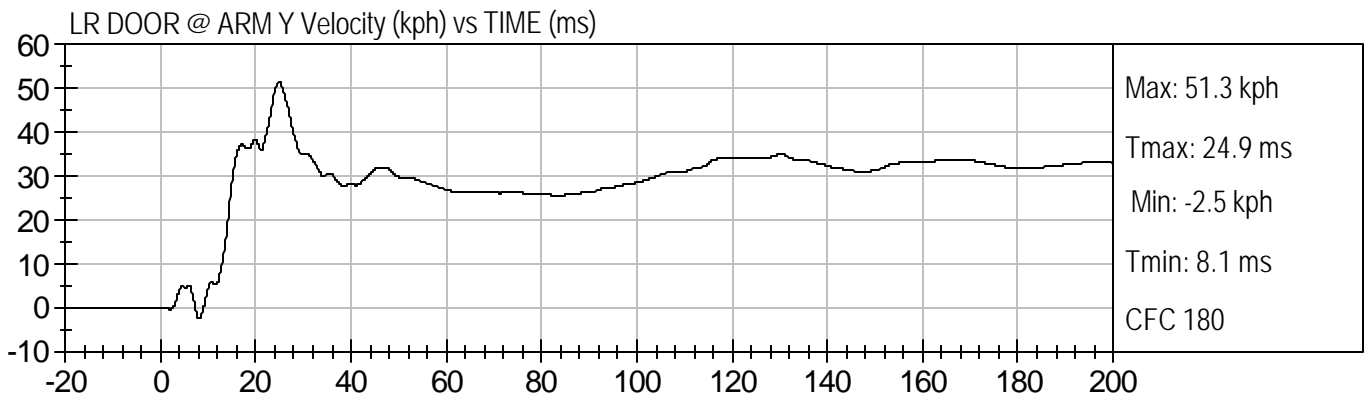
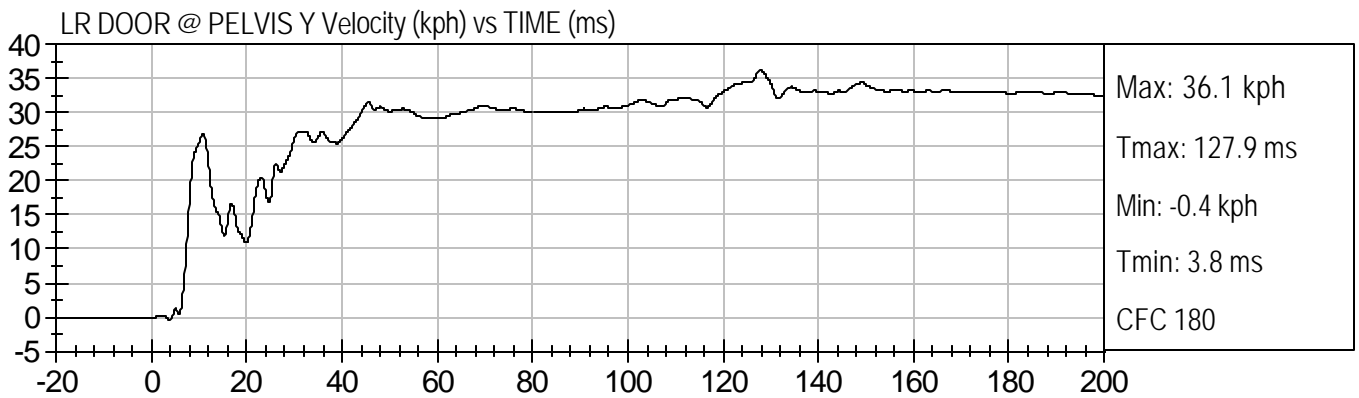
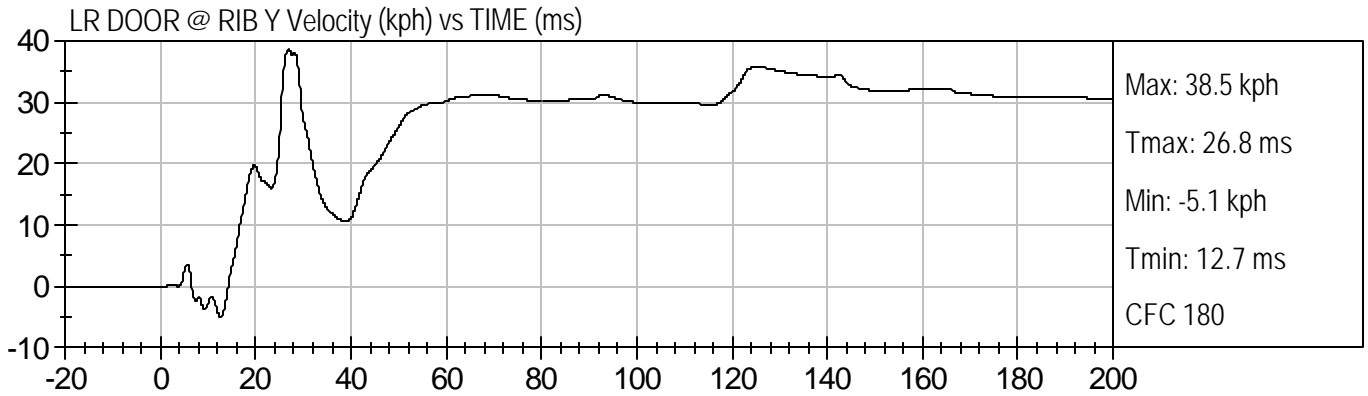
VEHICLE CG Z Velocity (kph) vs TIME (ms)

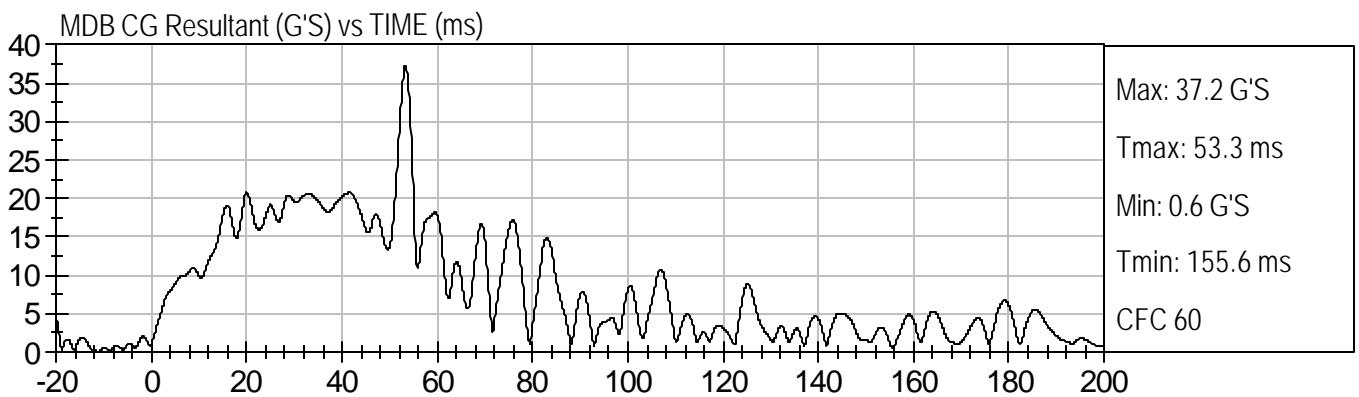
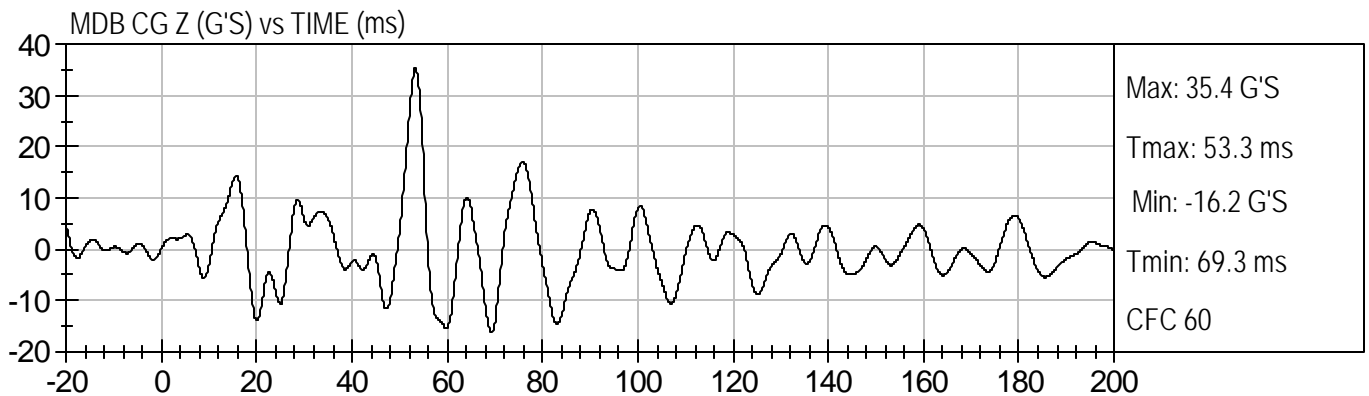
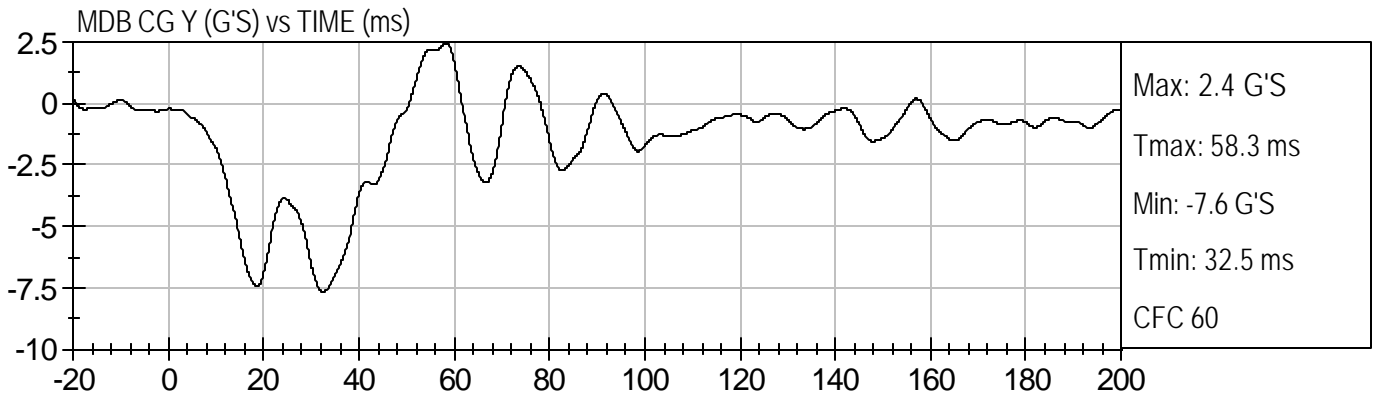
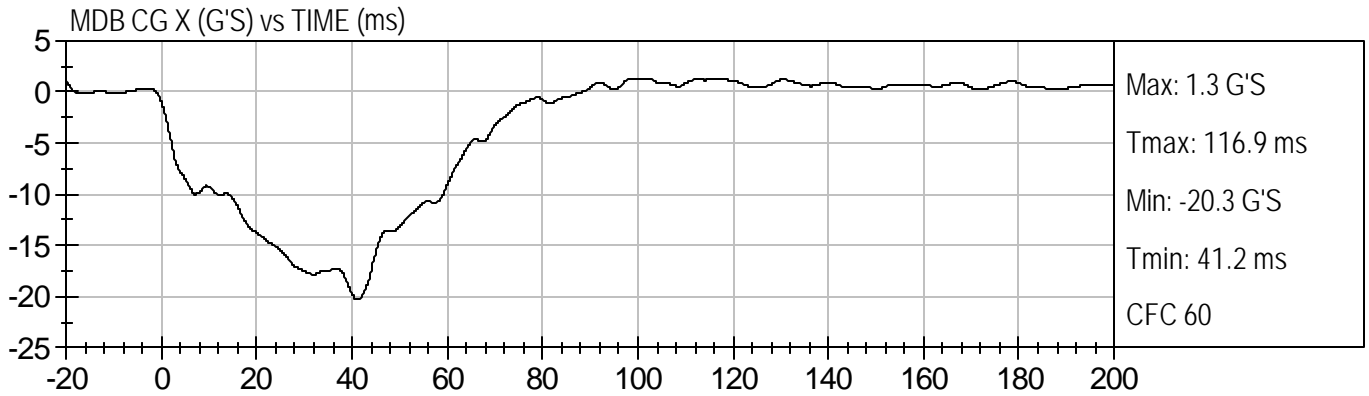


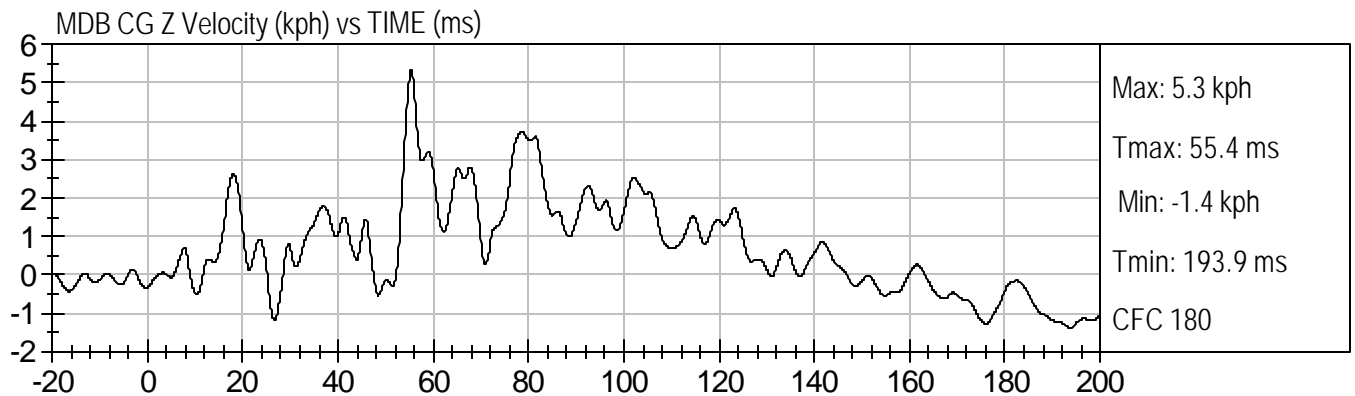
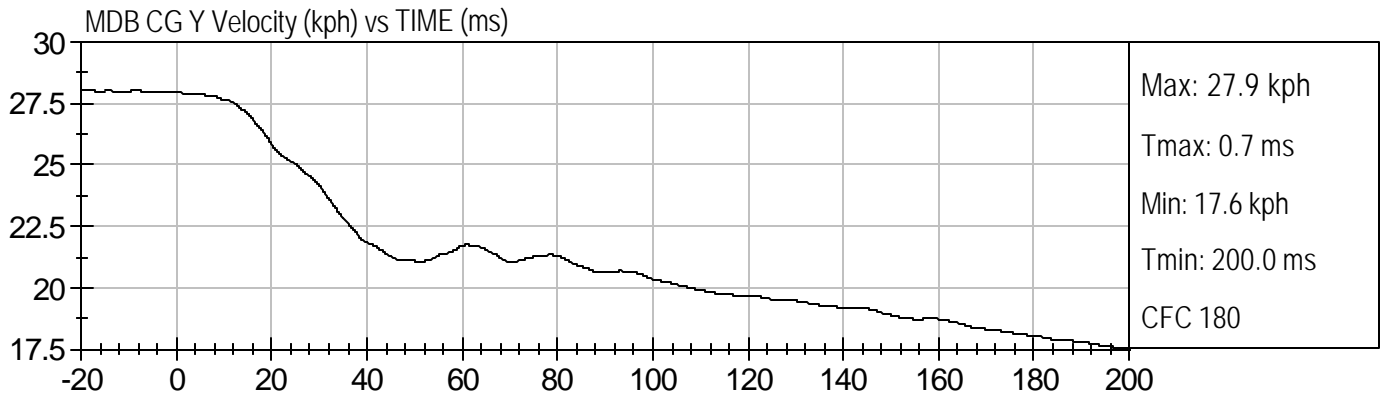
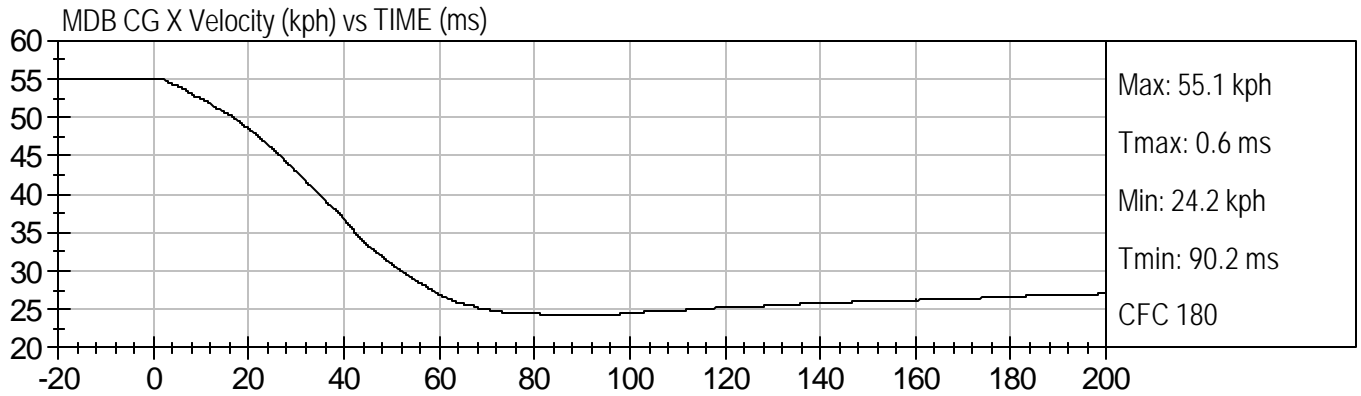


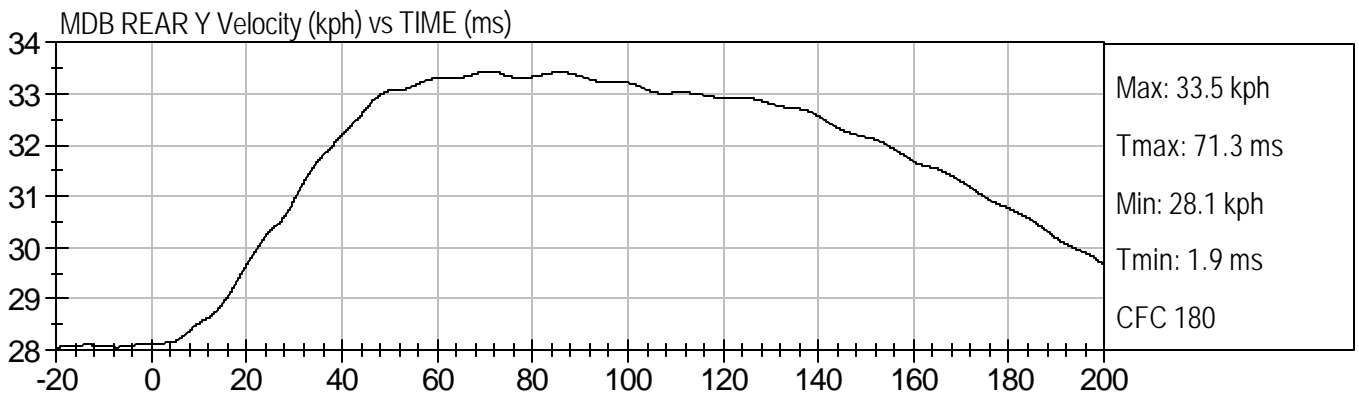
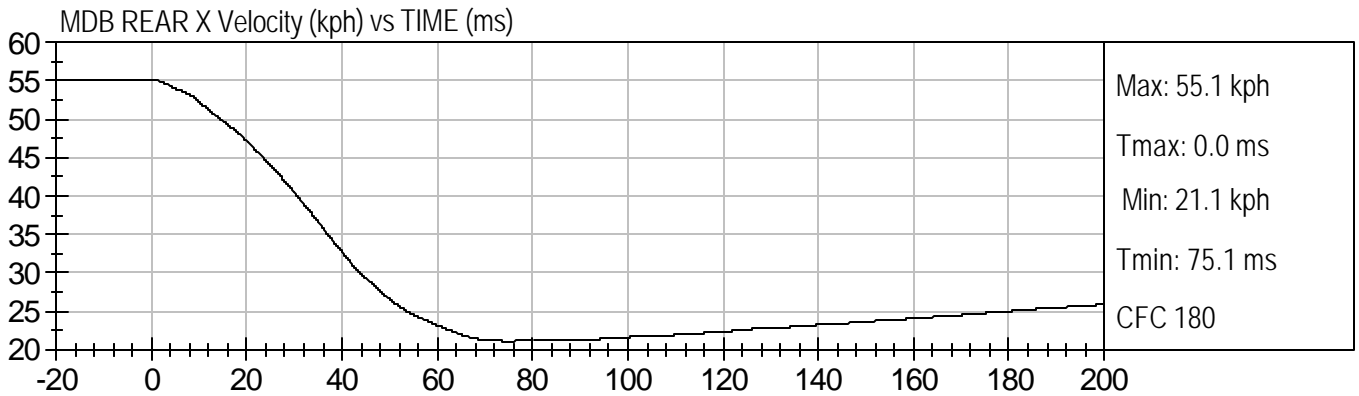
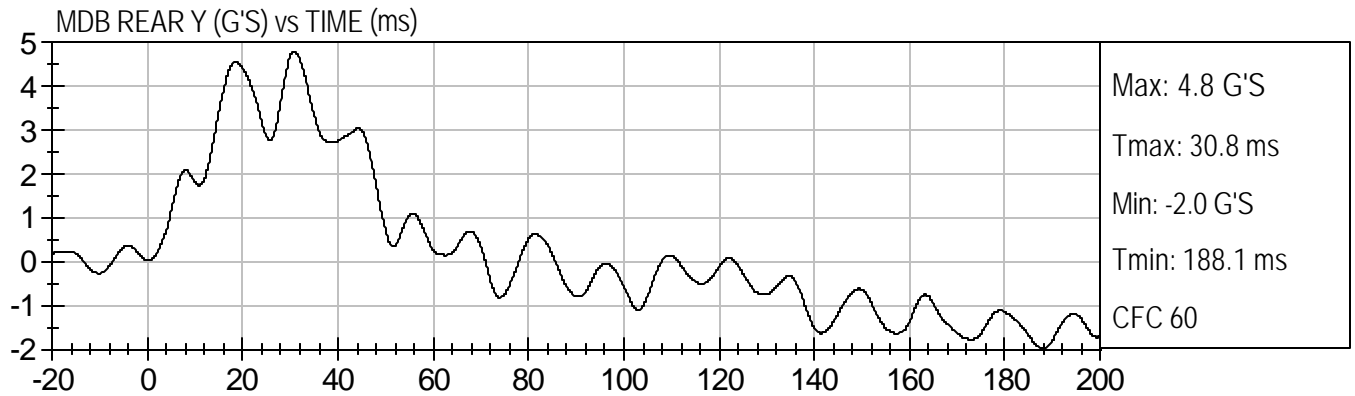
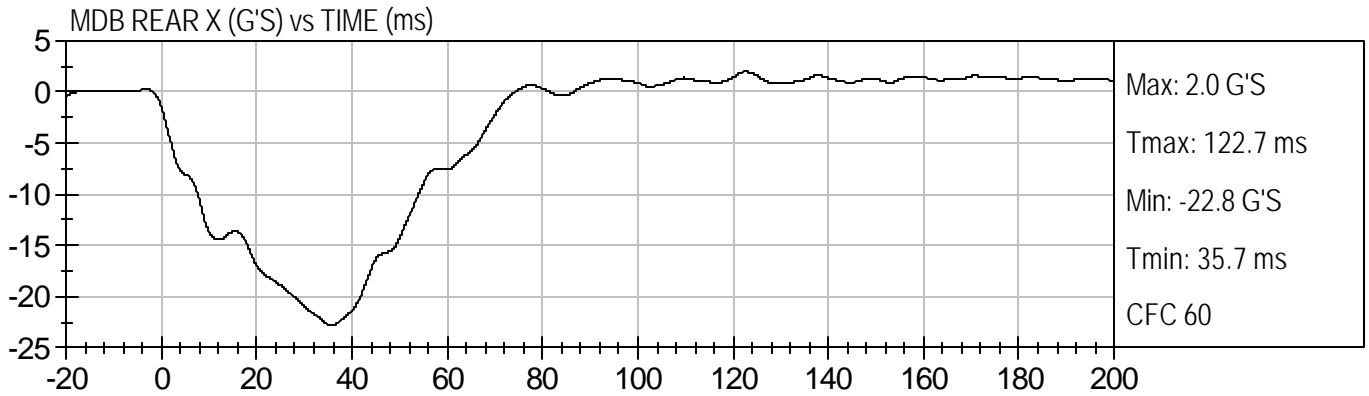


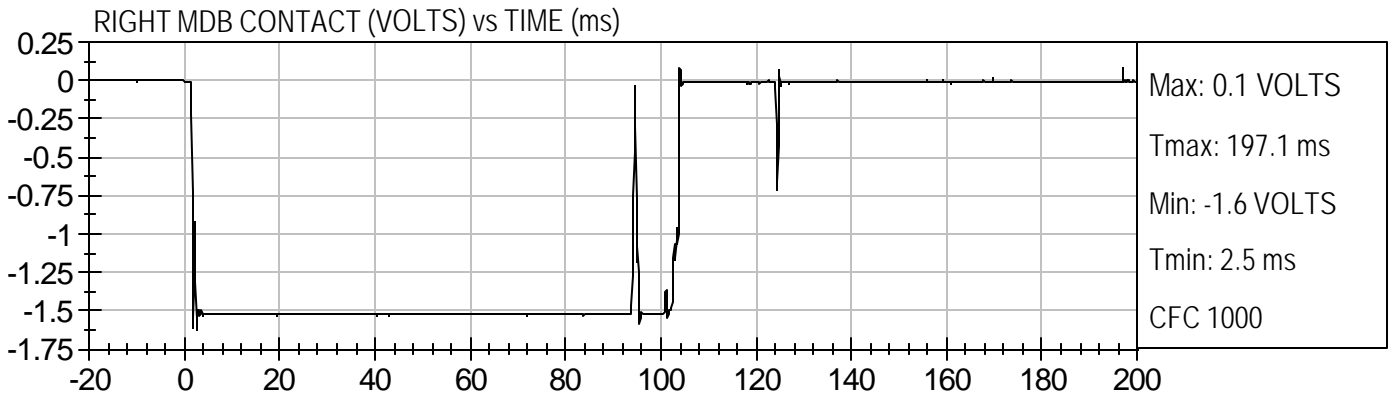
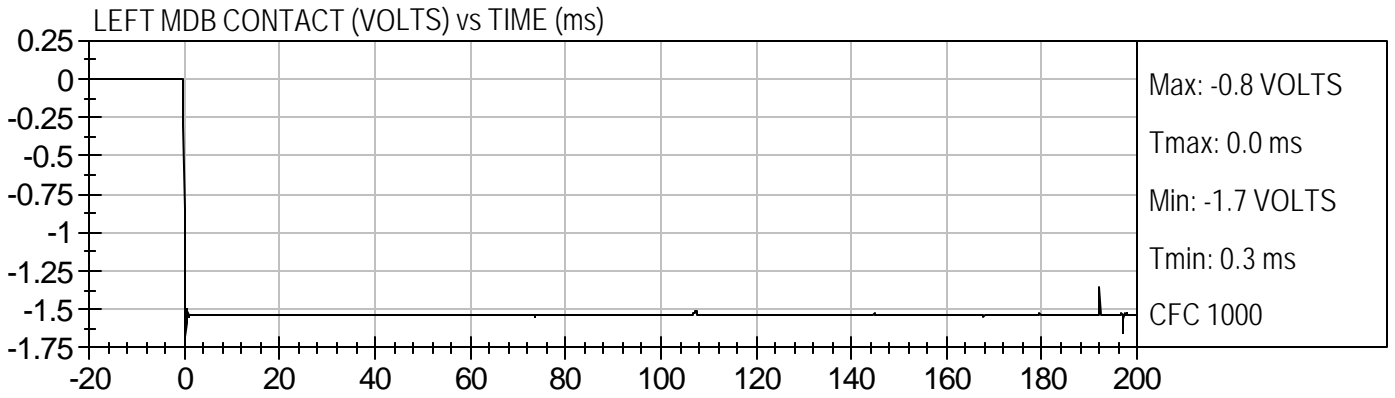


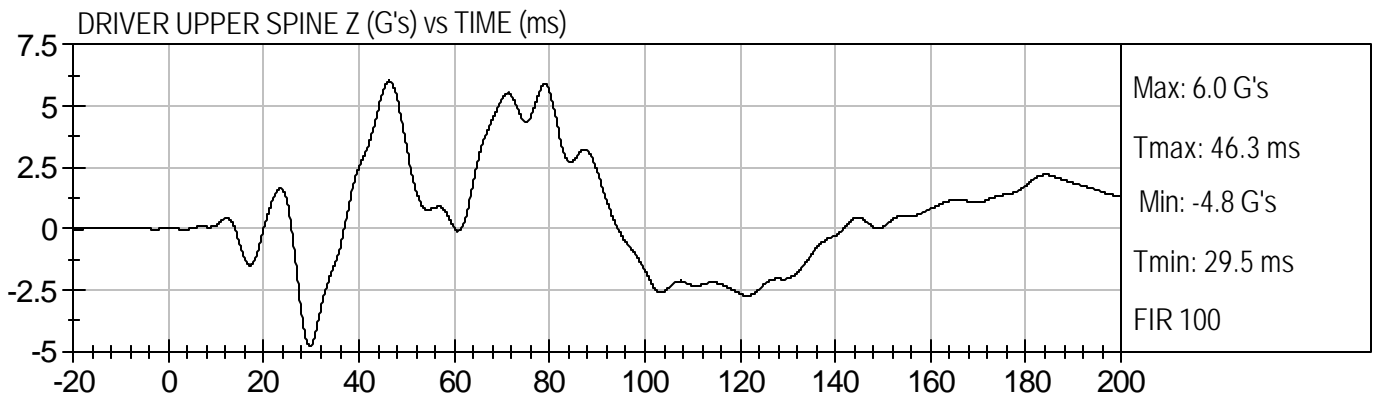
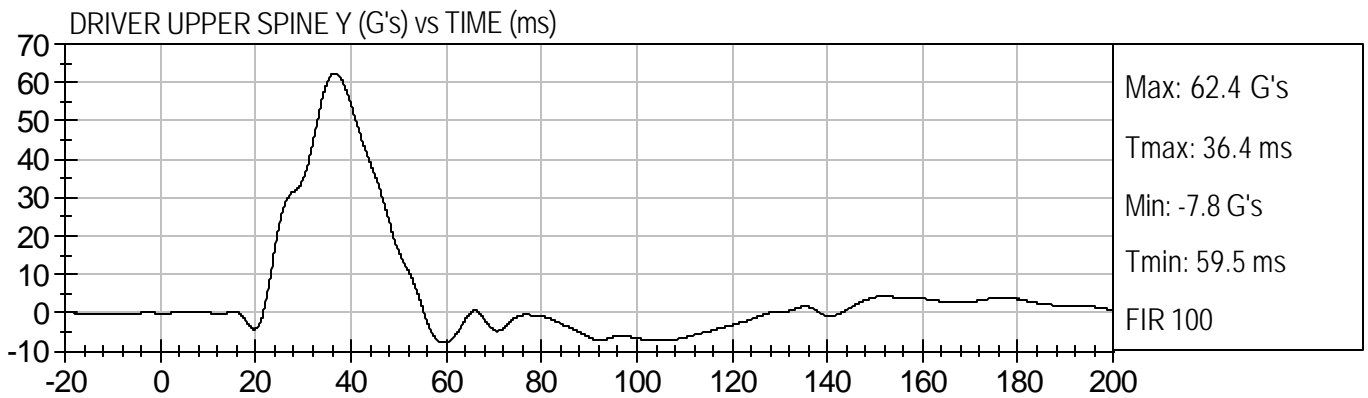
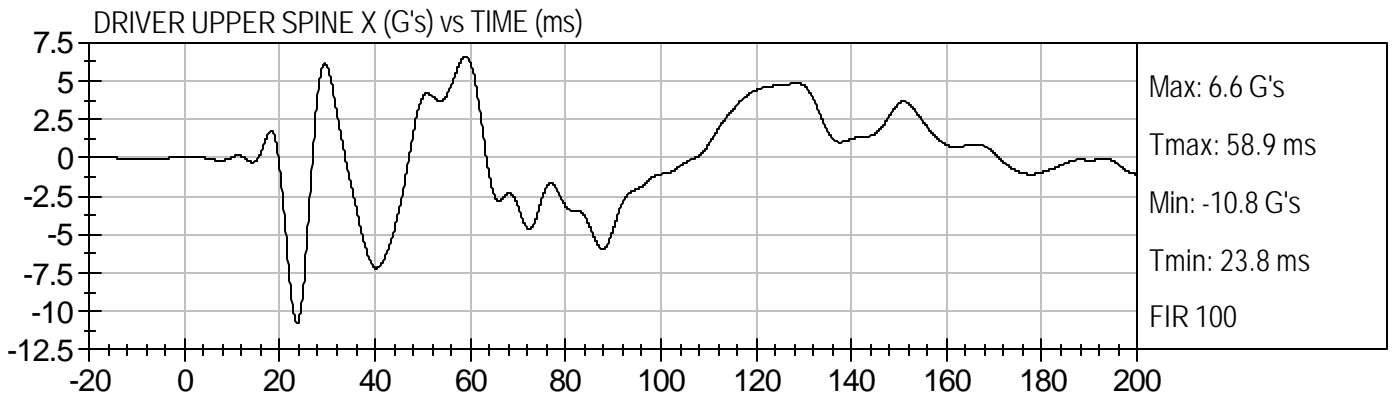


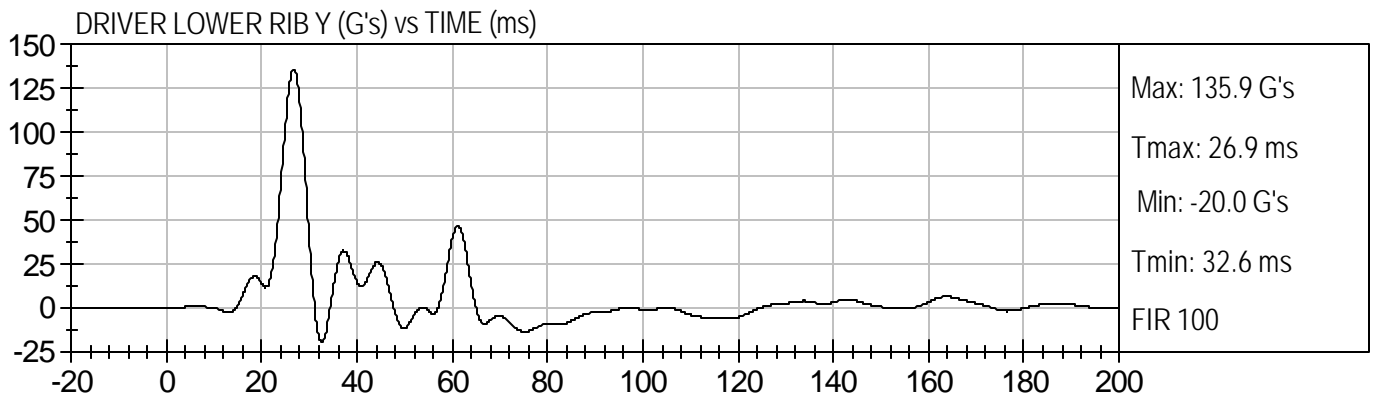
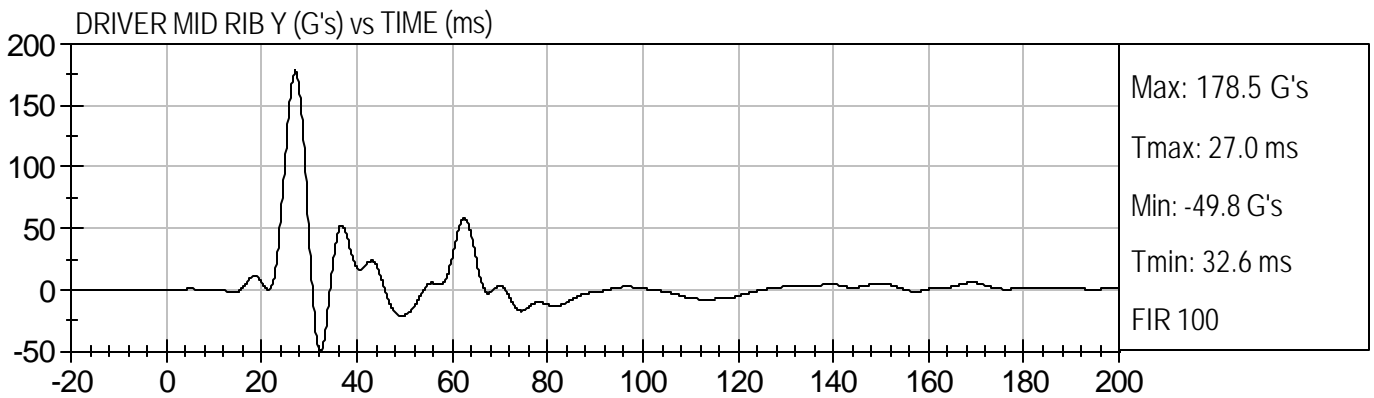
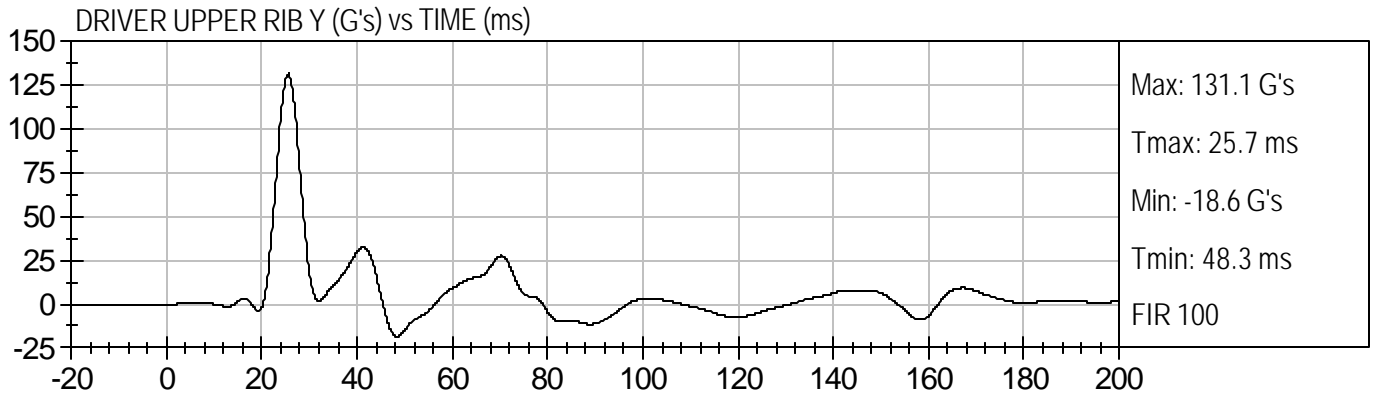


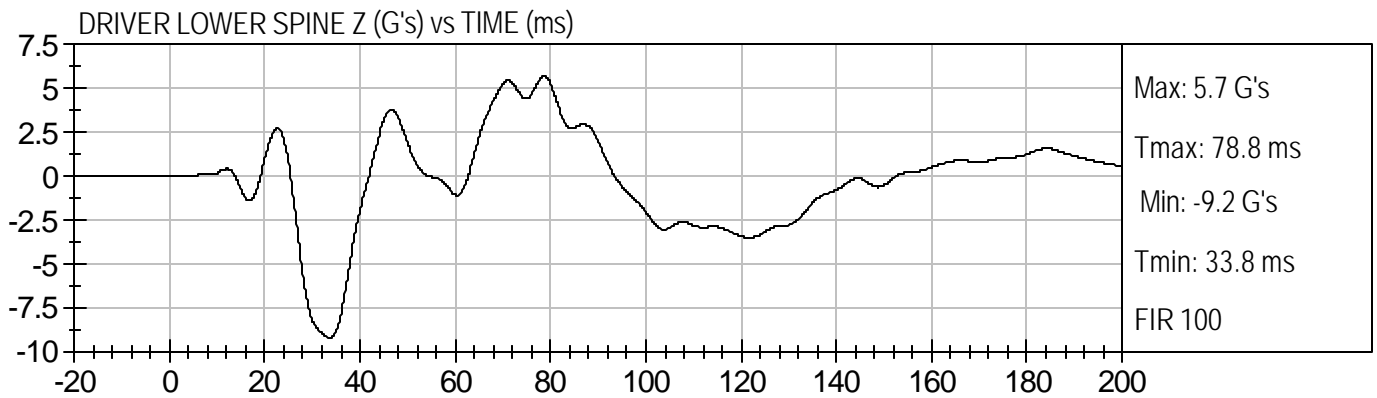
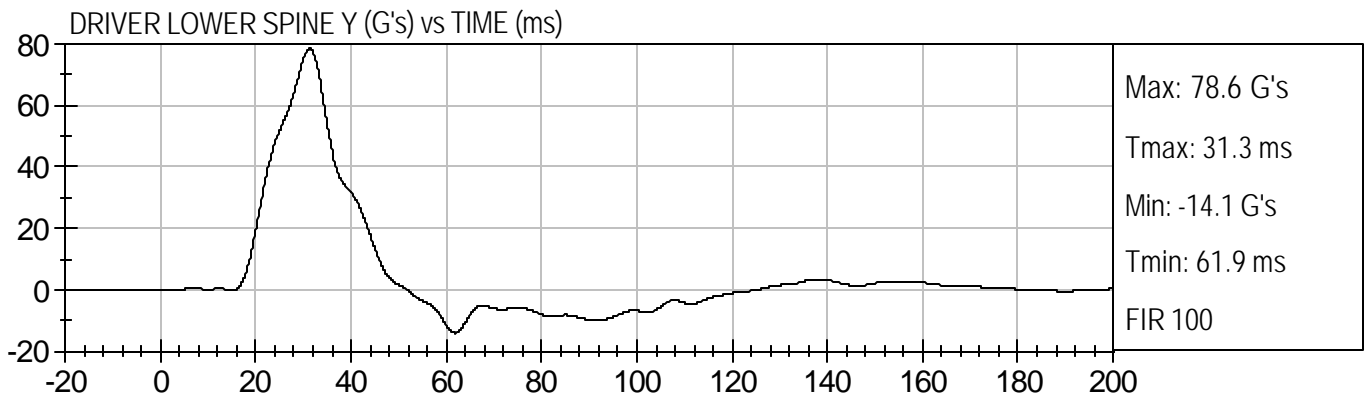
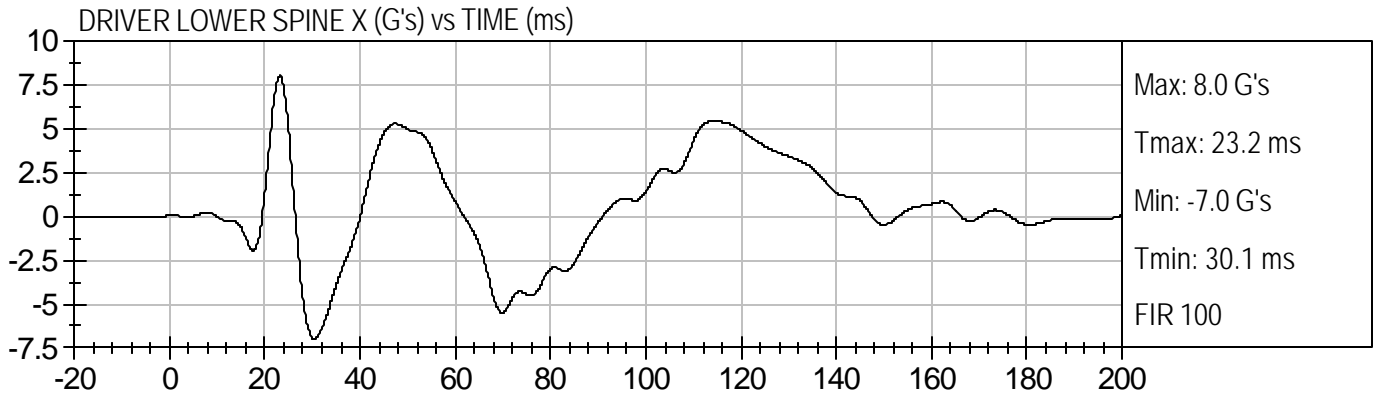


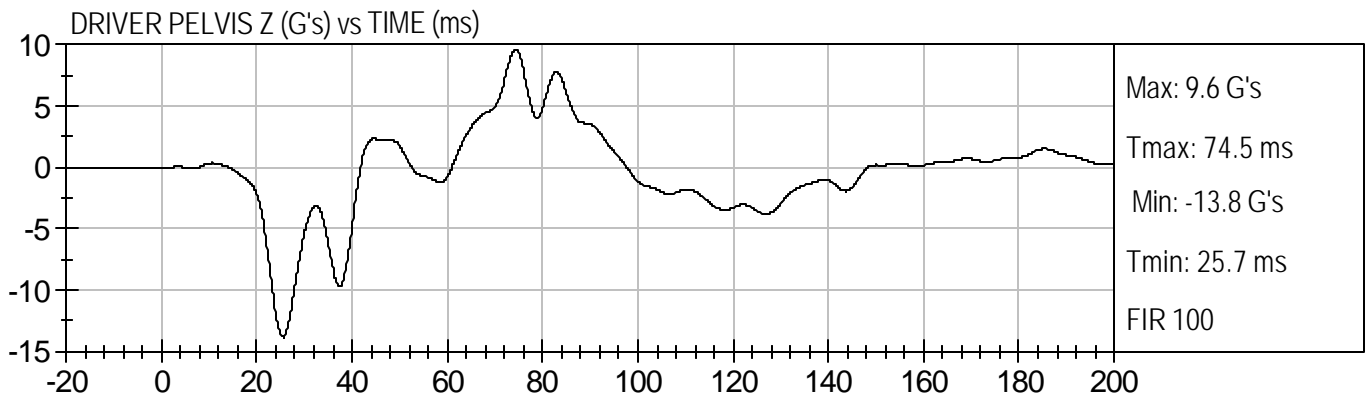
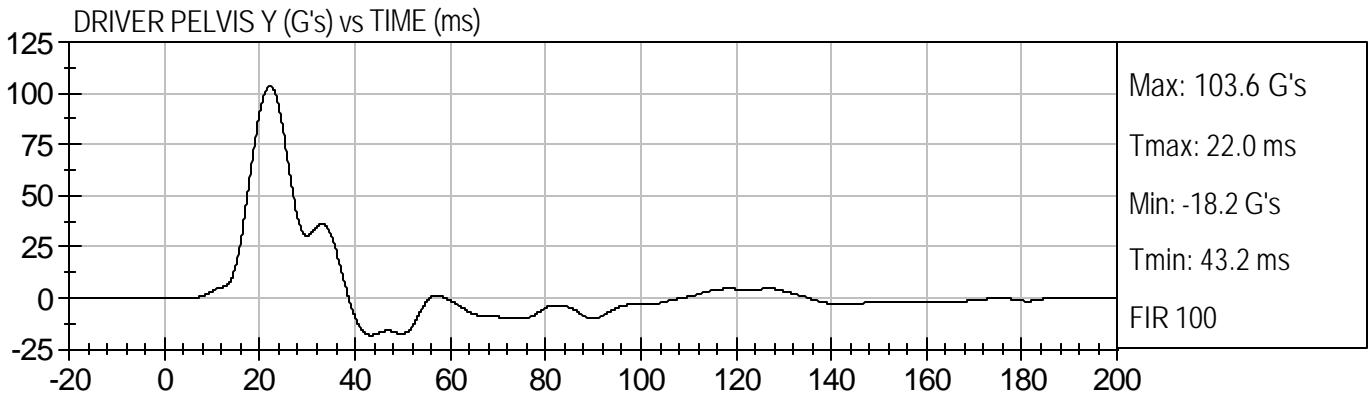
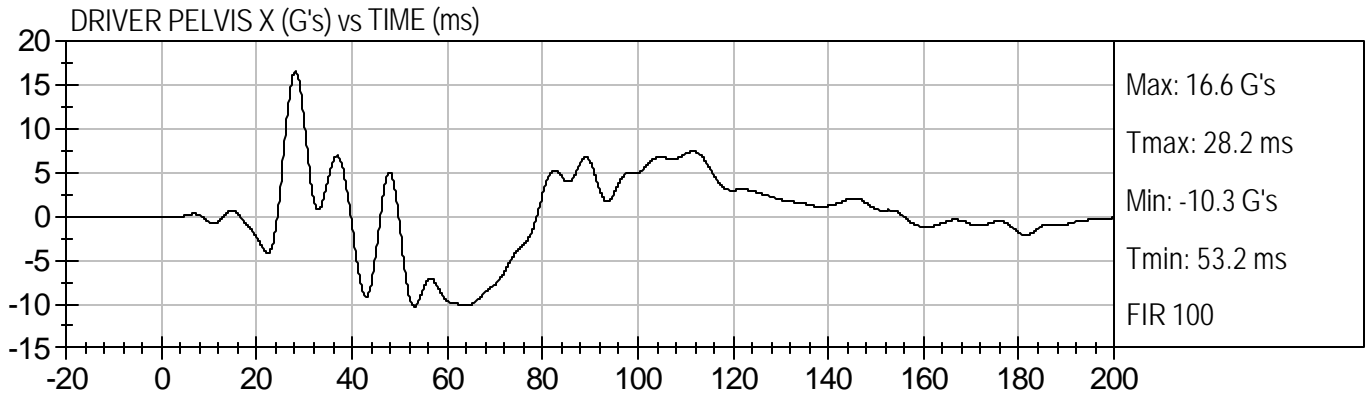


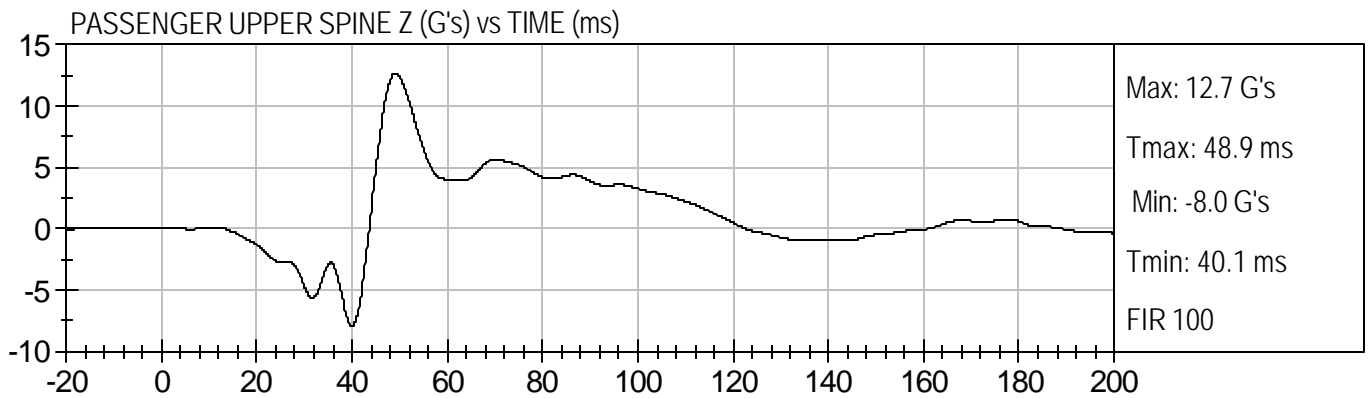
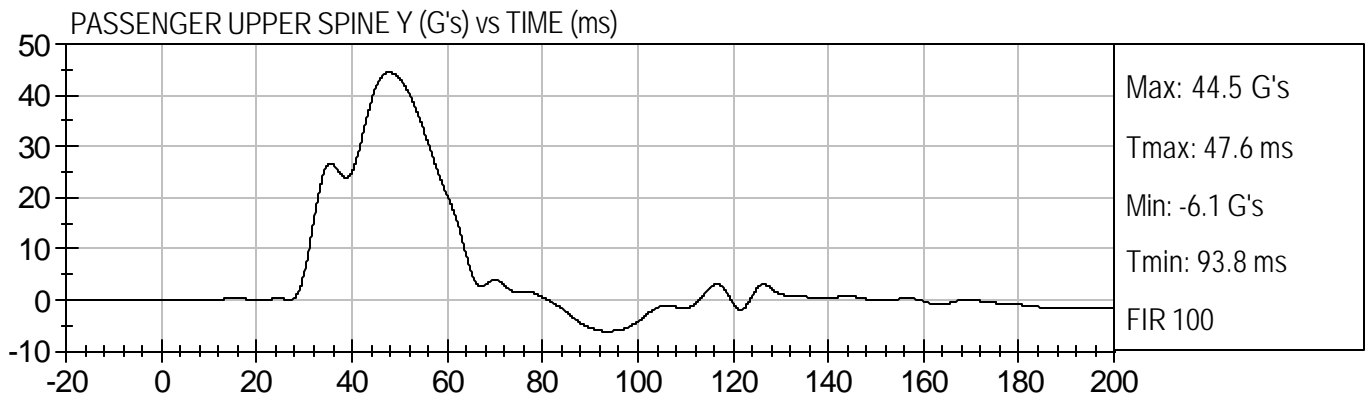
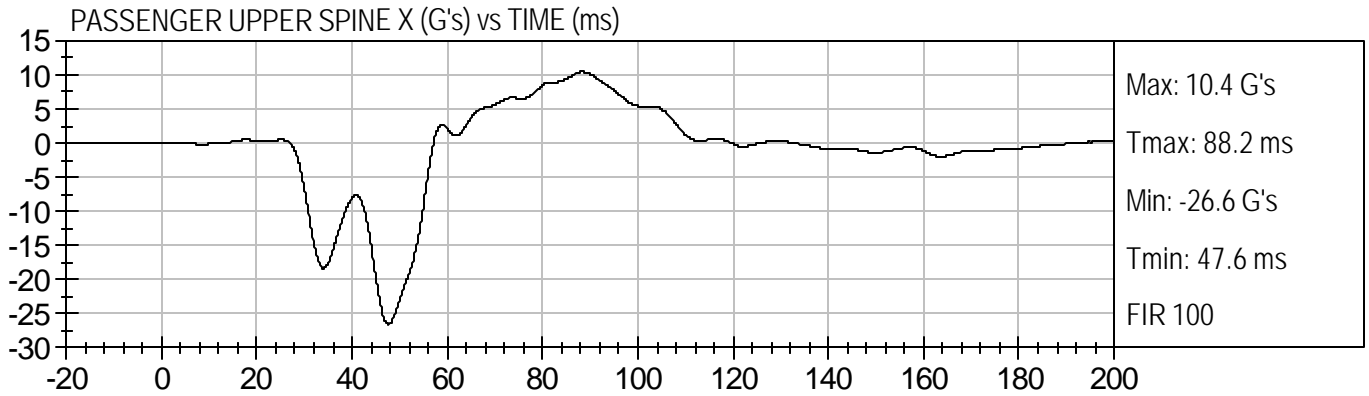


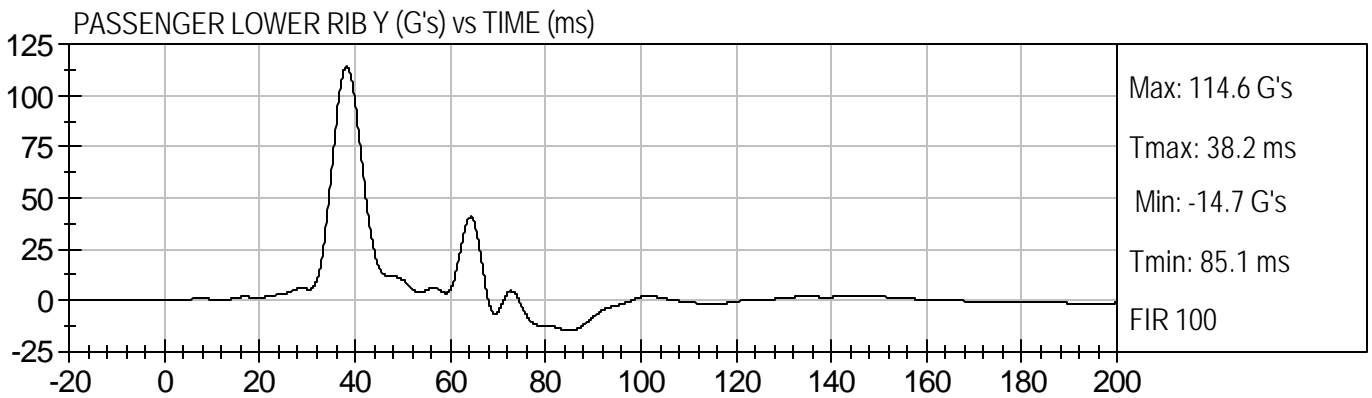
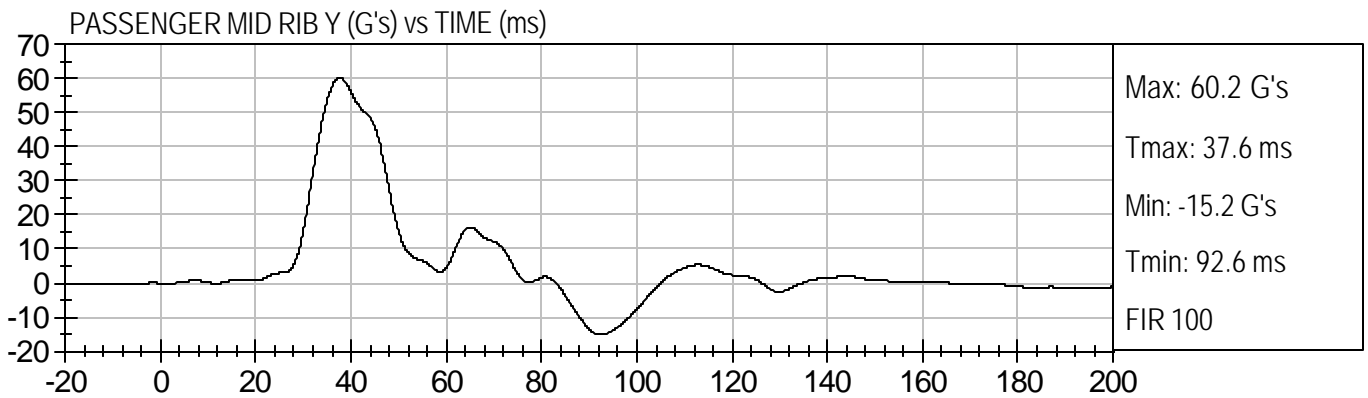
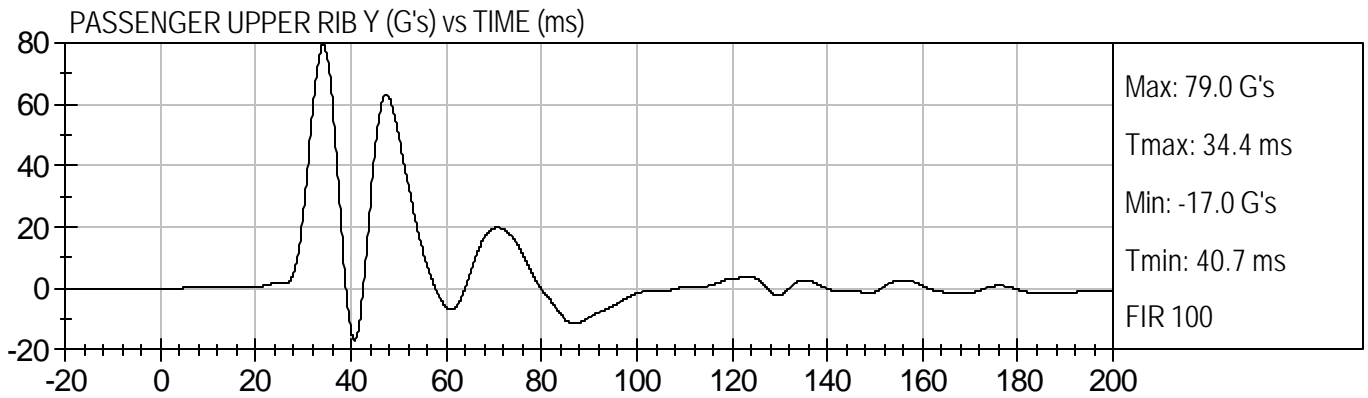


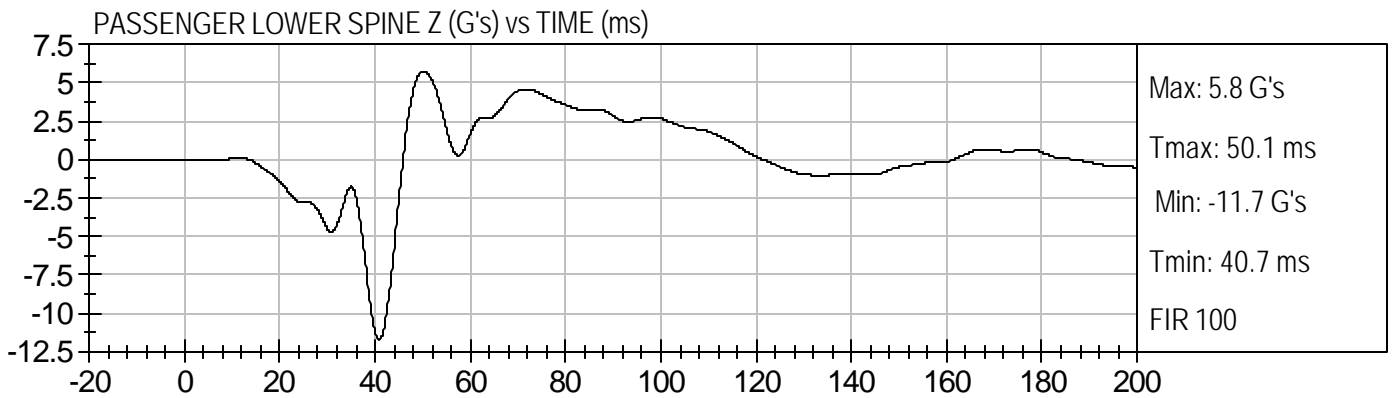
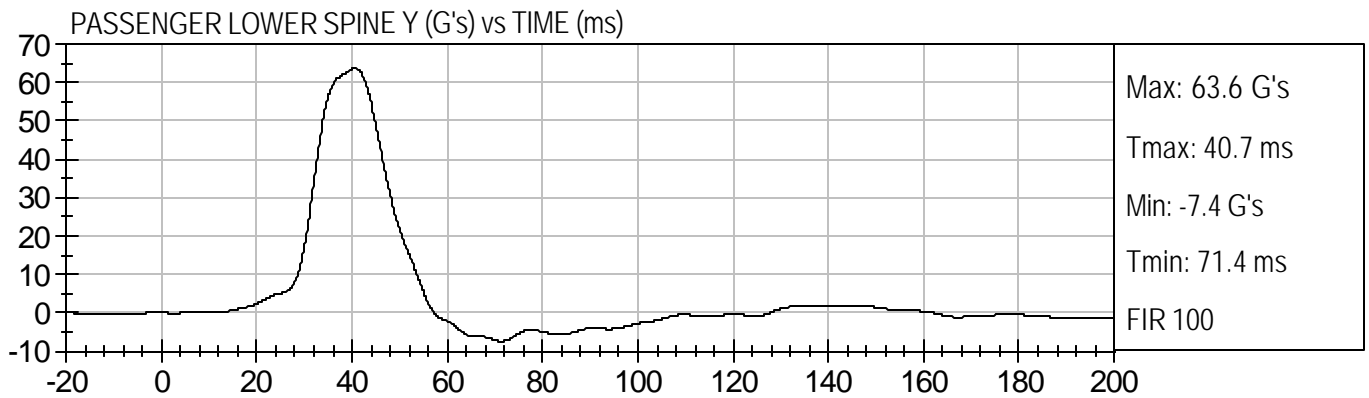
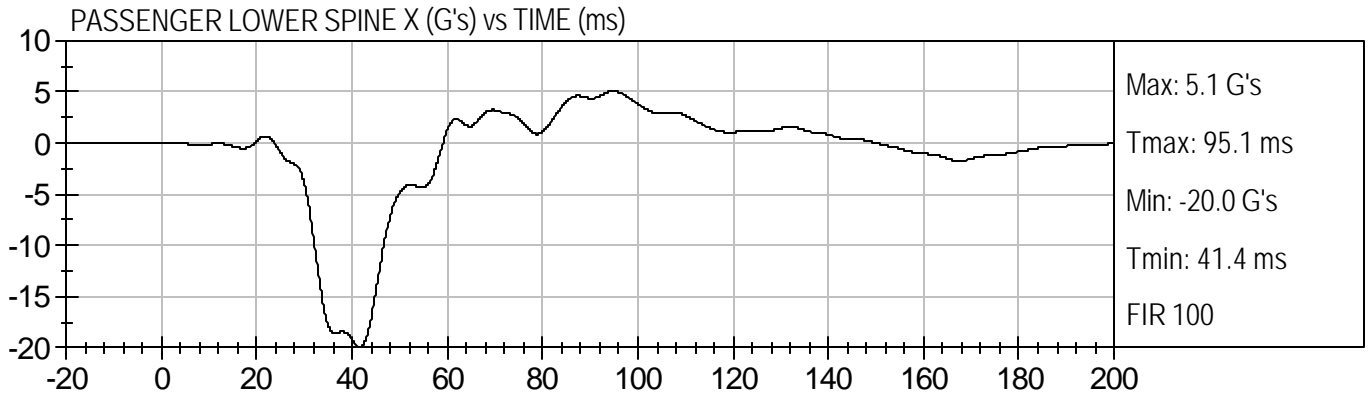


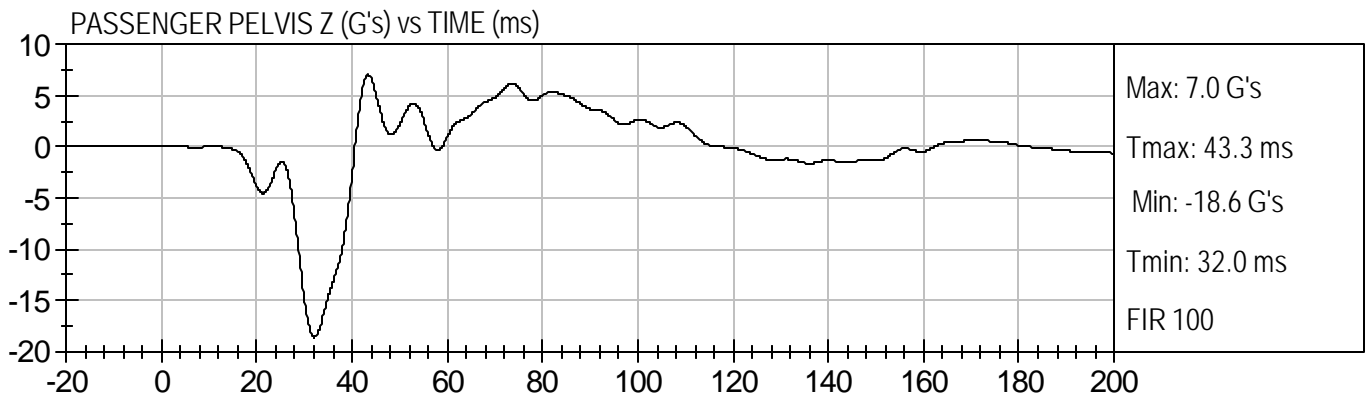
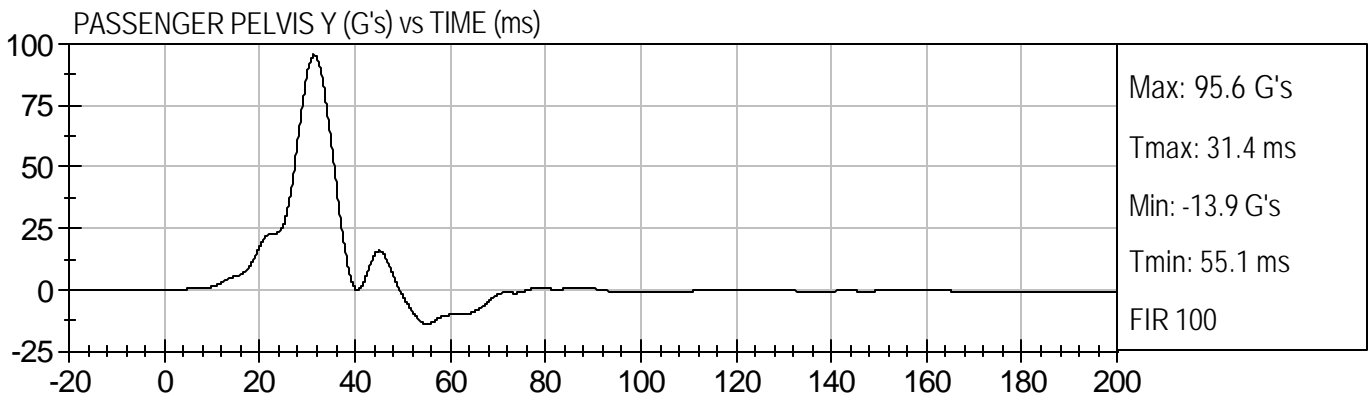
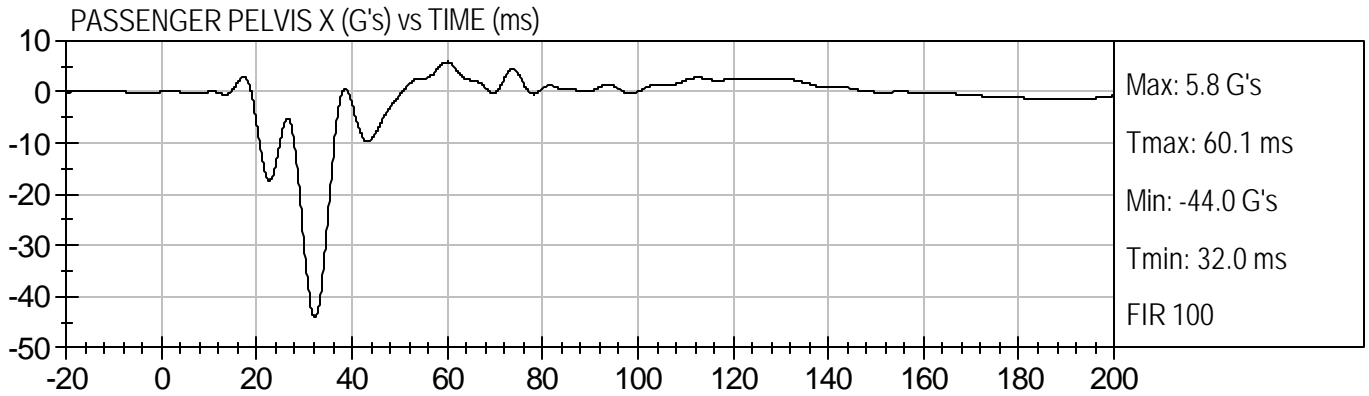


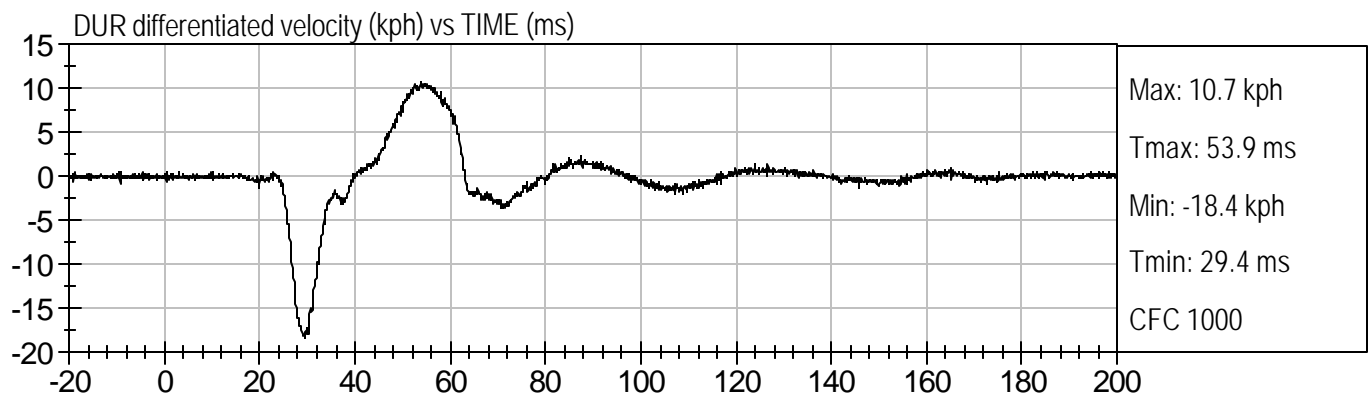
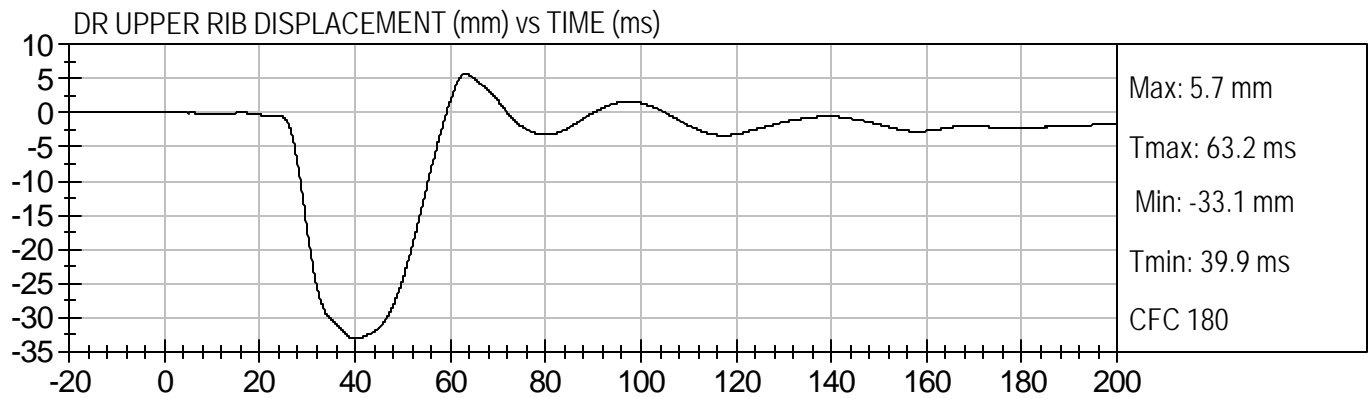
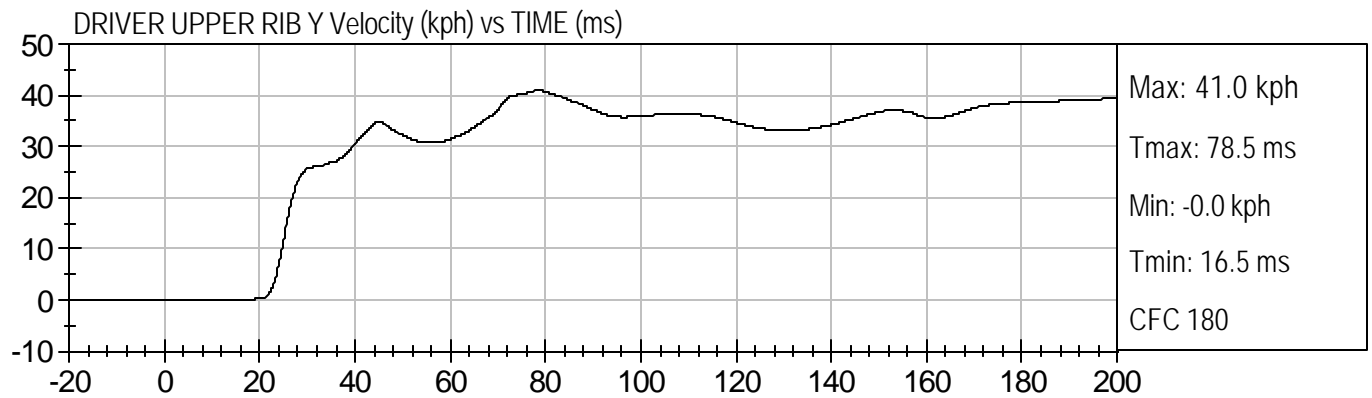
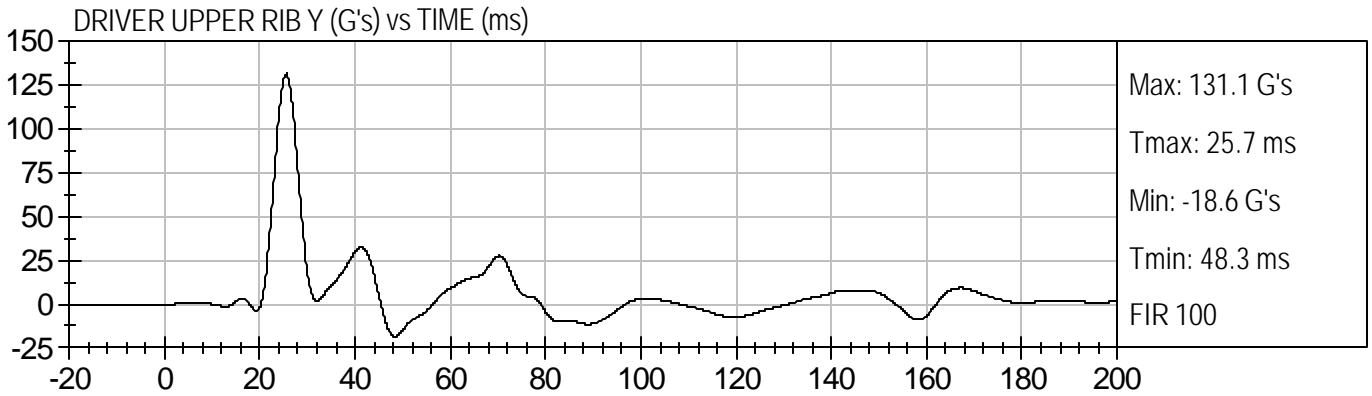


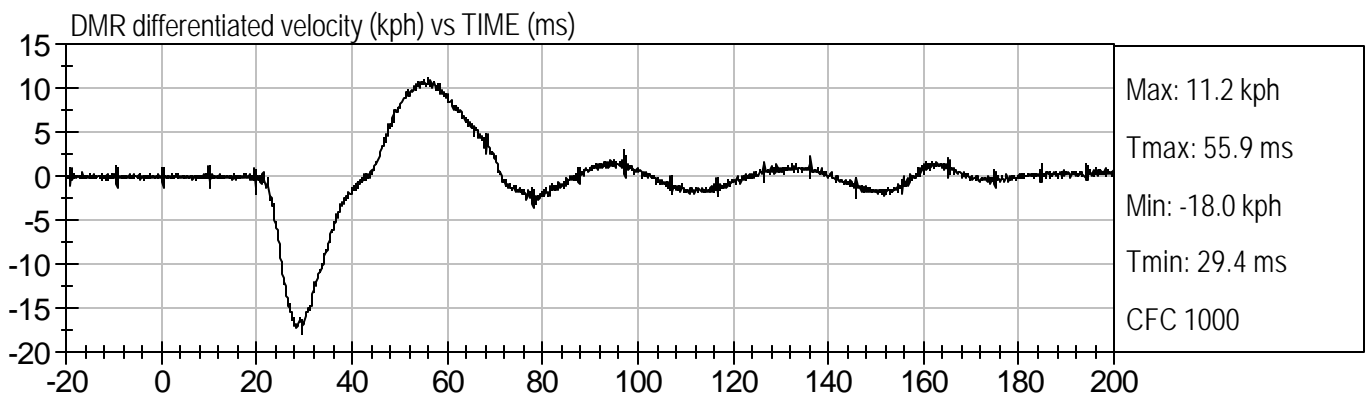
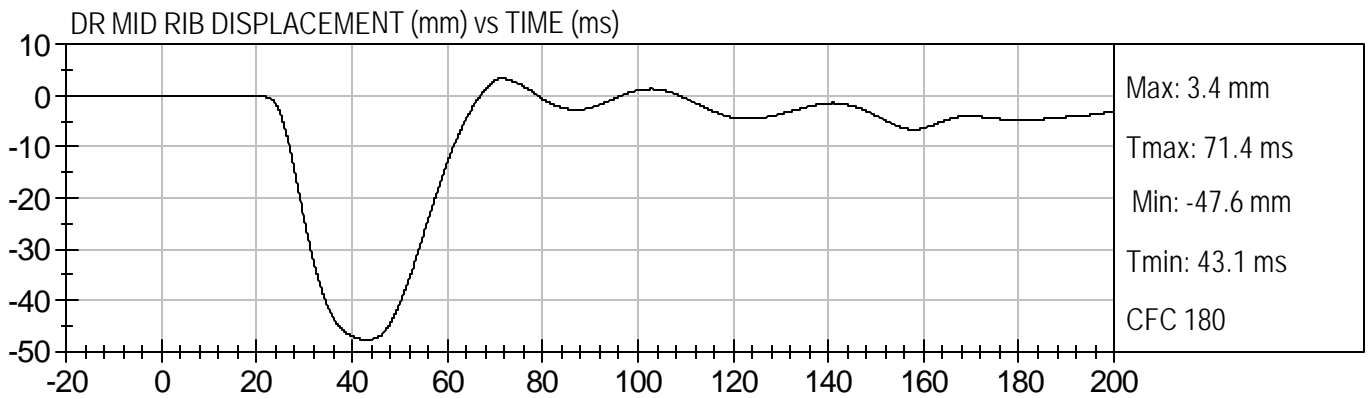
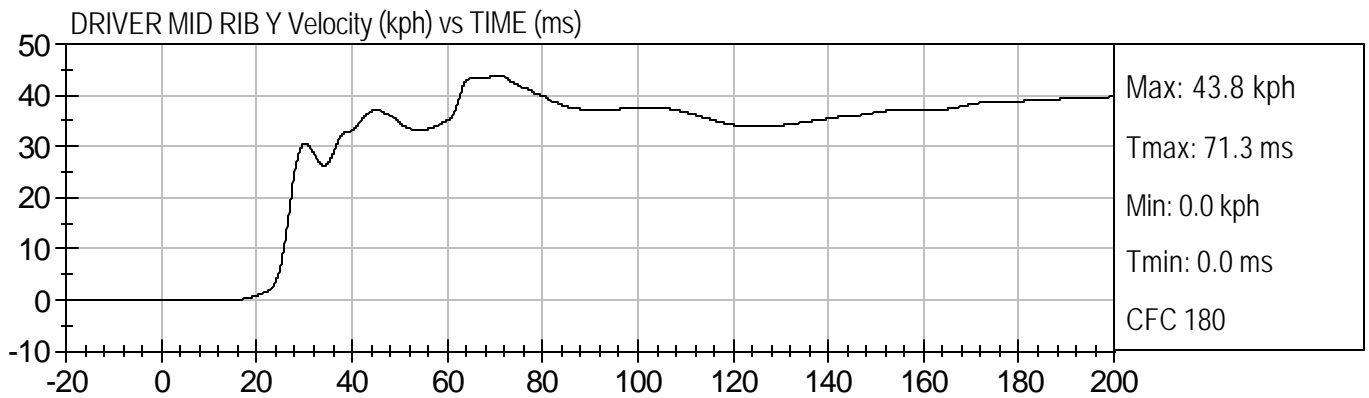
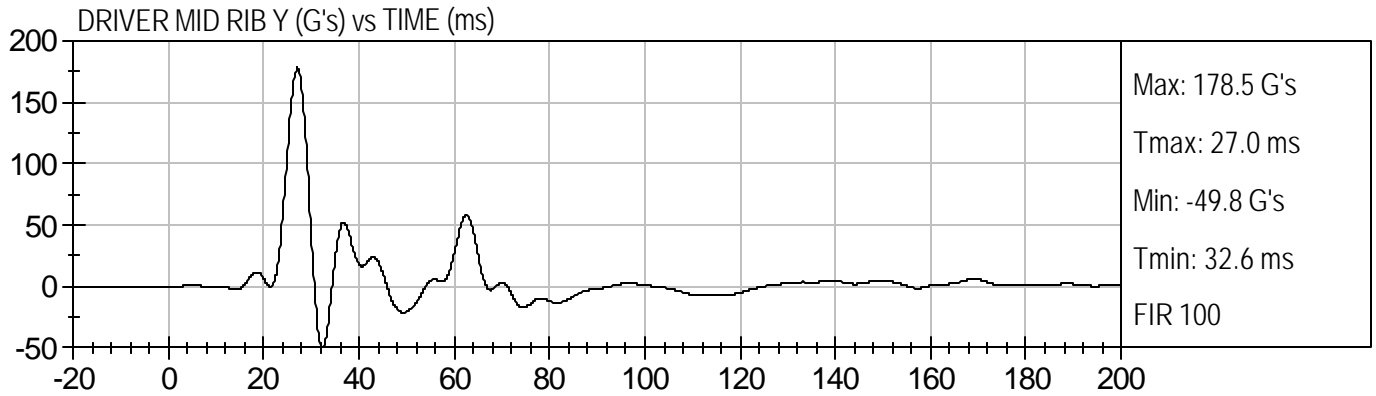


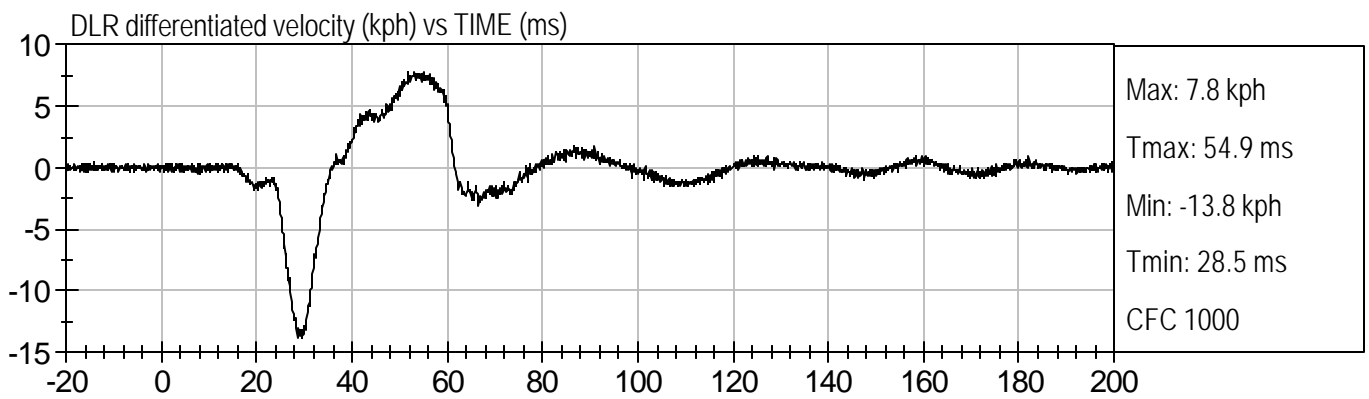
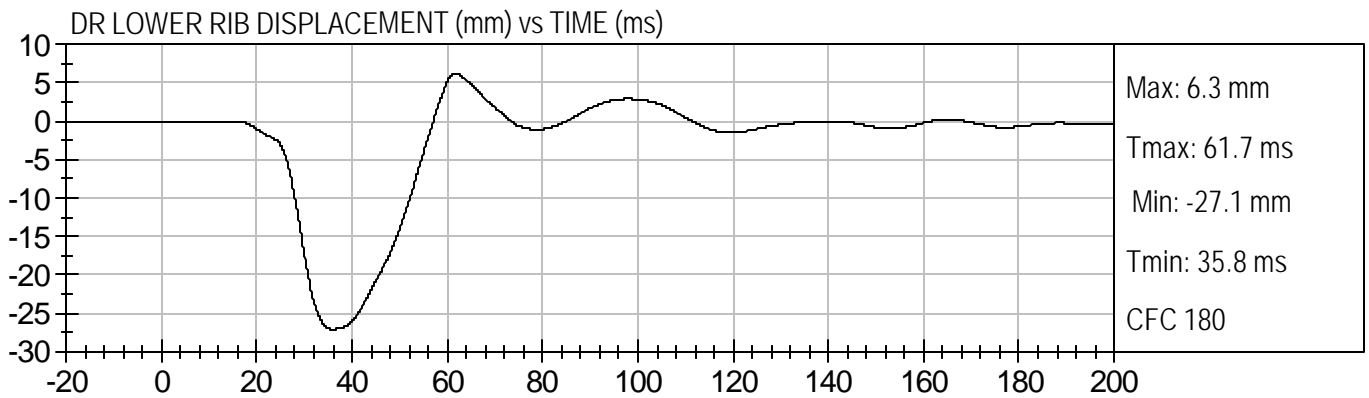
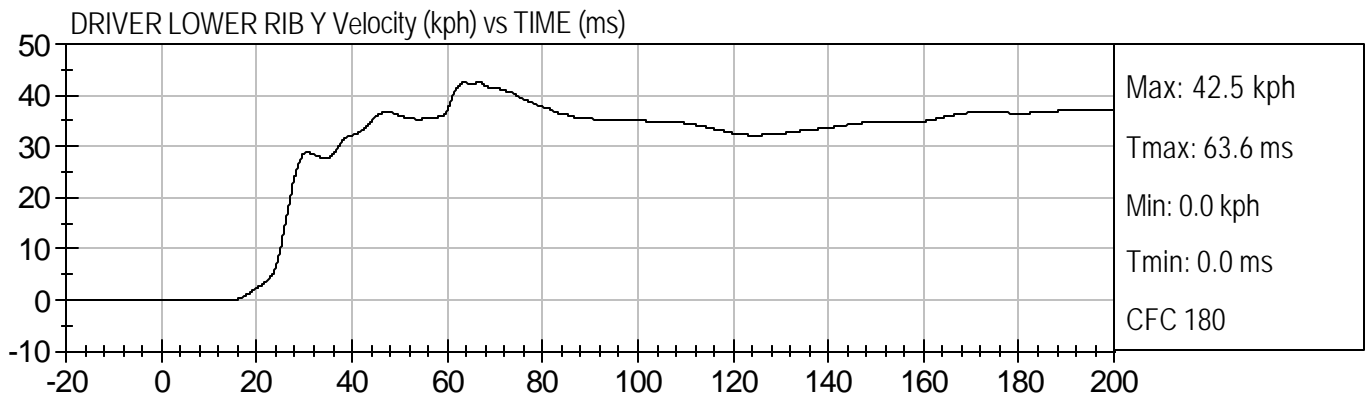
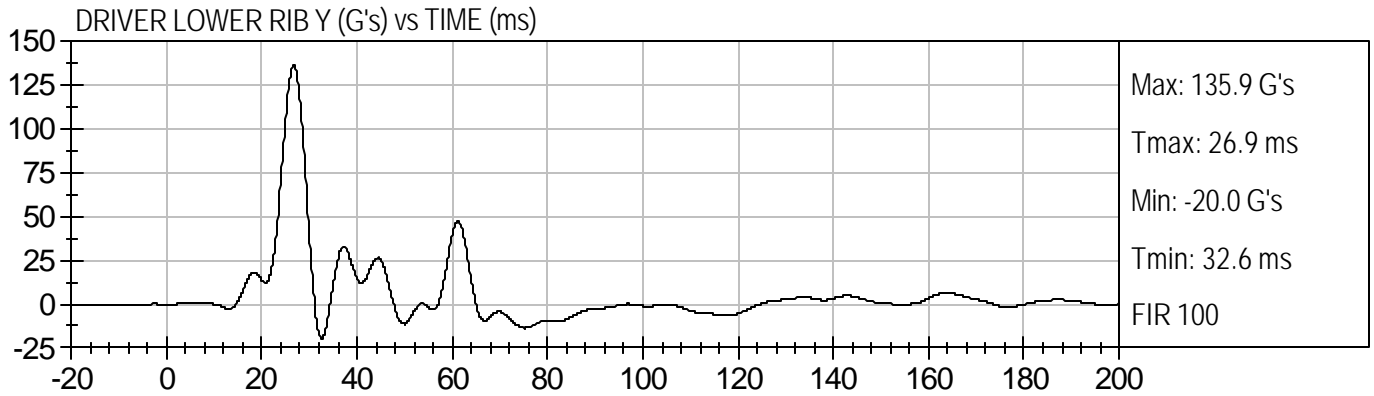


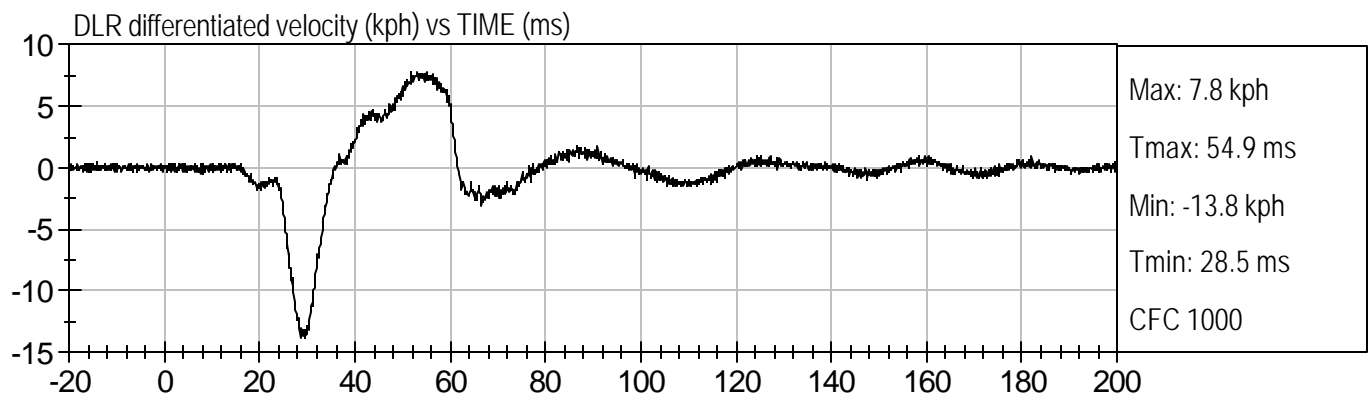
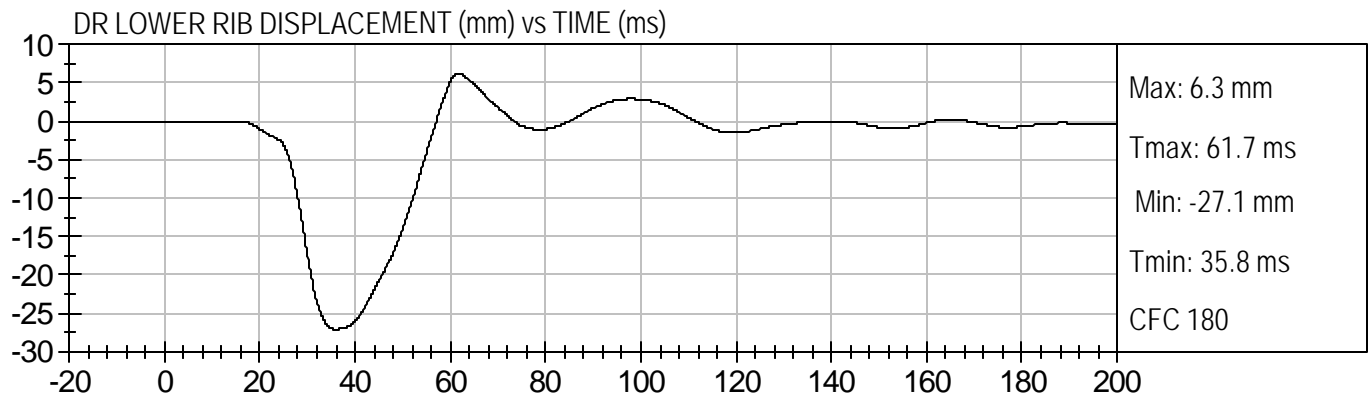
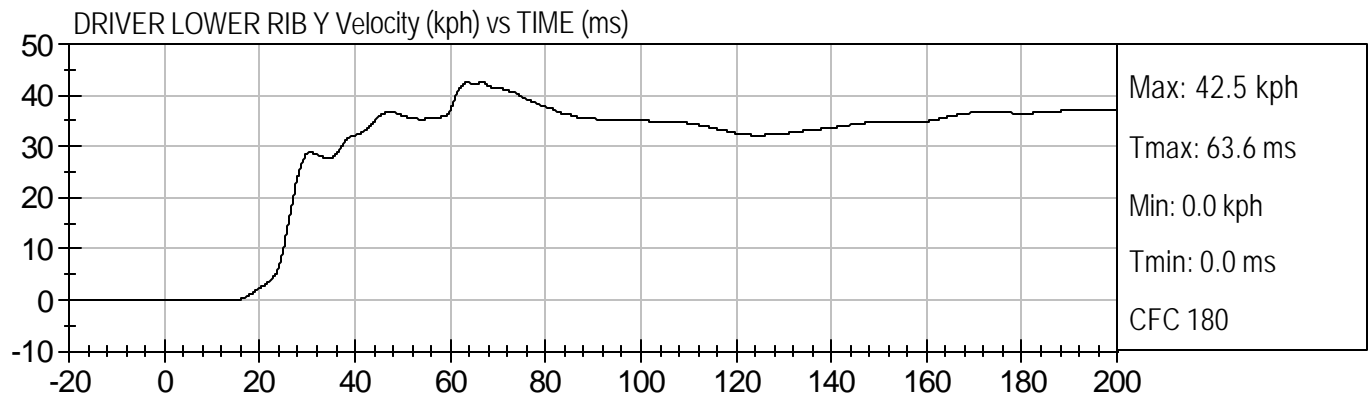
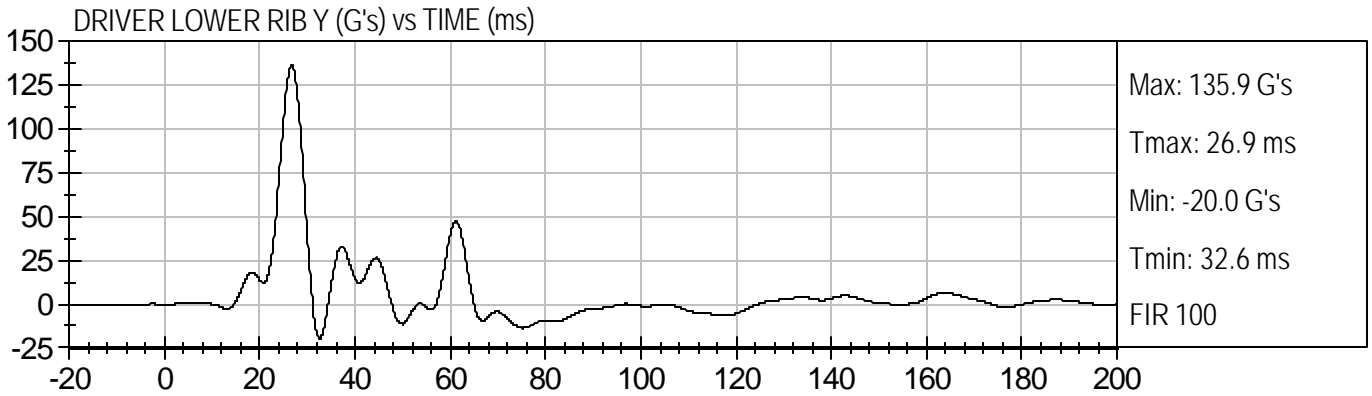












APPENDIX C

ES-2 CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CERTIFICATION DATA

Dummy Serial Number: 009

Calibration Test Results Summary

Dummy Serial Number: 009

Pre-Test Calibration

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

MGA RESEARCH CORPORATION
HEAD DROP TEST
EUROSID 2 DUMMY

Date: 11/4/02
Dummy Serial Number: 009
Test Number: D021421

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.9
Relative Humidity (%)	10 – 70	27
Peak Resultant Acceleration	100 – 150 g's	147
Time of Max. Res. Acceleration	msec	2.4

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

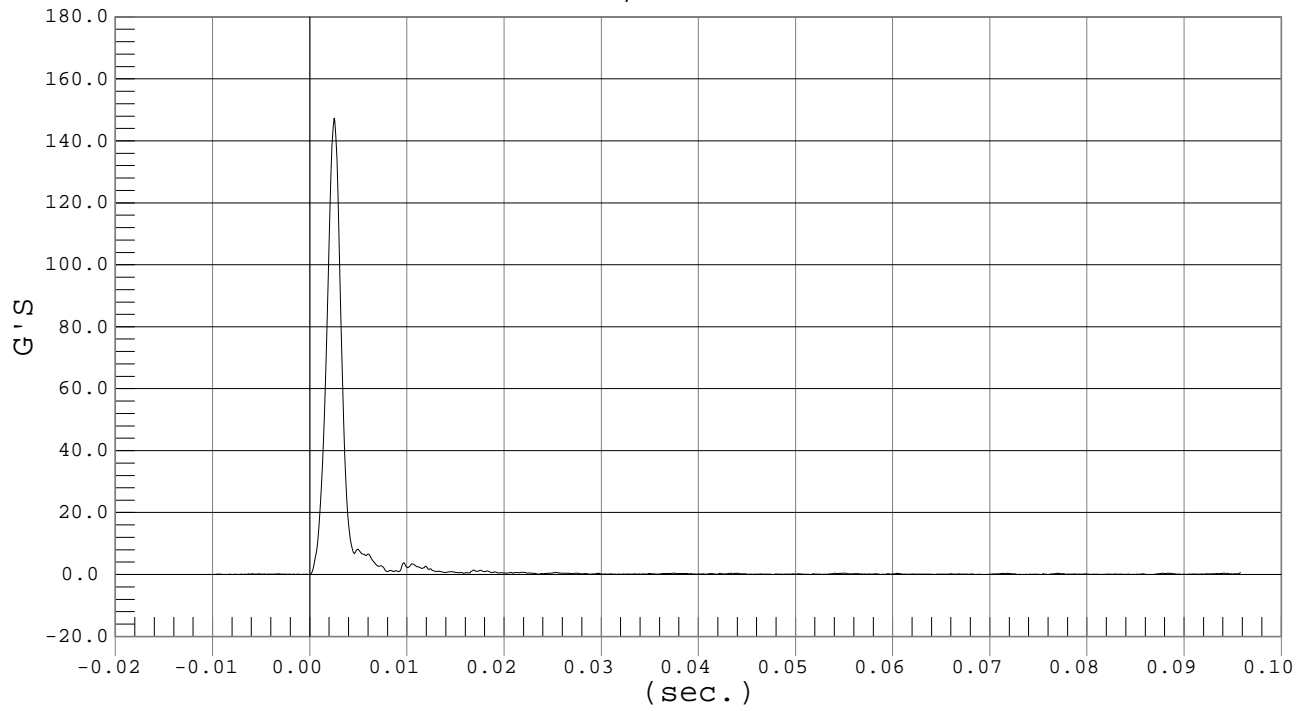


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #009

Test Date: 11-04-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .04 G'S @ -0.0087 sec., Ymax = 147.3 G'S @ 0.0024 sec.



MGA RESEARCH CORPORATION
NECK PENDULUM TEST
EUROSID 2 DUMMY

Date: 11/4/02
 Dummy Serial Number: 009
 Test Number: D021422

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.3
Relative Humidity (%)		10 – 70	29
Pendulum Speed		3.3 - 3.5	3.3
Pendulum Deceleration	3 msec	~.25 - ~.53 m/sec	-.36
	8 msec	~1.59 - ~2.04 m/sec	-1.85
	14 msec	~3.20 - ~3.85 m/sec	-3.46
Maximum Flexion Angle		49.0 – 59.0 deg	56.0
Time of Max. Flexion Angle		54.0 – 66.0 ms	56.9
Maximum Angle Theta (A)		32.0 – 37.0 deg	34.9
Time of Max. Theta (A)		53.0 – 63.0 ms	56.7
Maximum Angle Theta (B)		30.02 – 32.51 deg	31.7
Time of Max. Theta (B)		54.0 – 64.0 ms	56.7

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

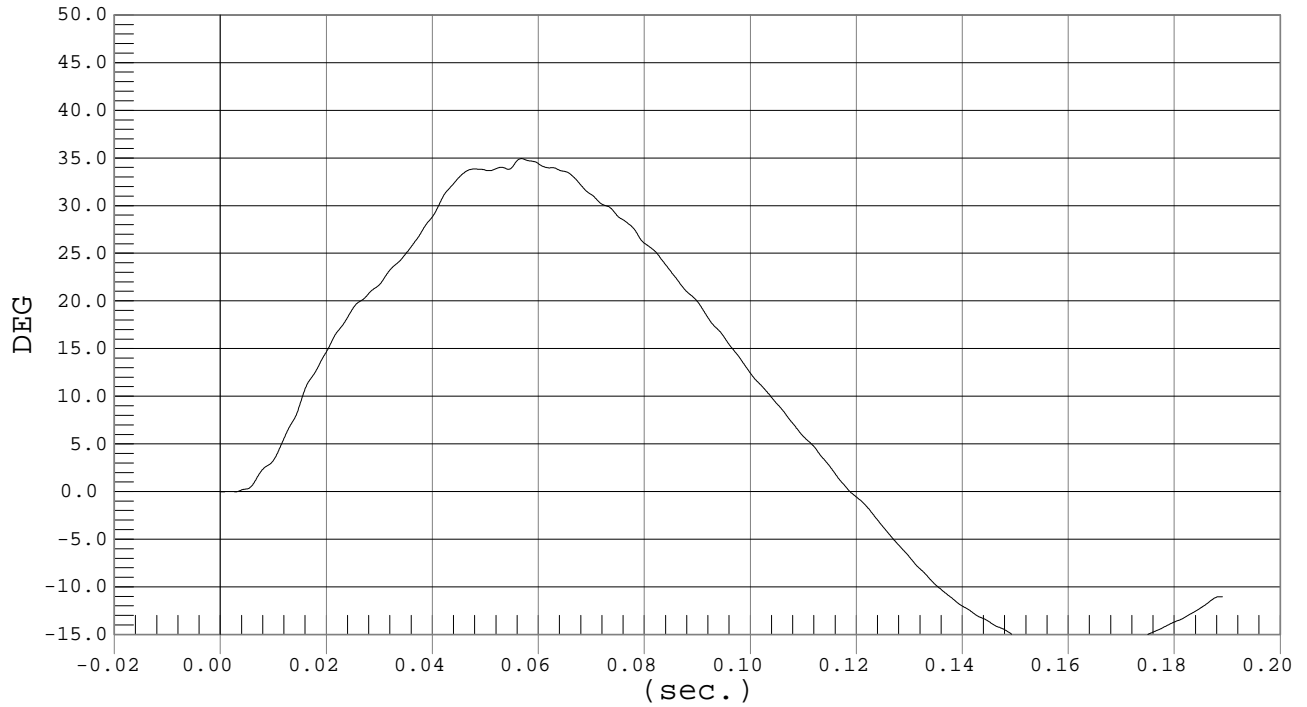


Test Desc.: Neck Bending
Component: Dummy #009

THETA A

Test Date: 11-04-02
Speed: 11.0 fps, 3.34 M/s

Ymin = -16.65 DEG @ 0.1623 sec., Ymax = 34.93 DEG @ 0.0567 sec.

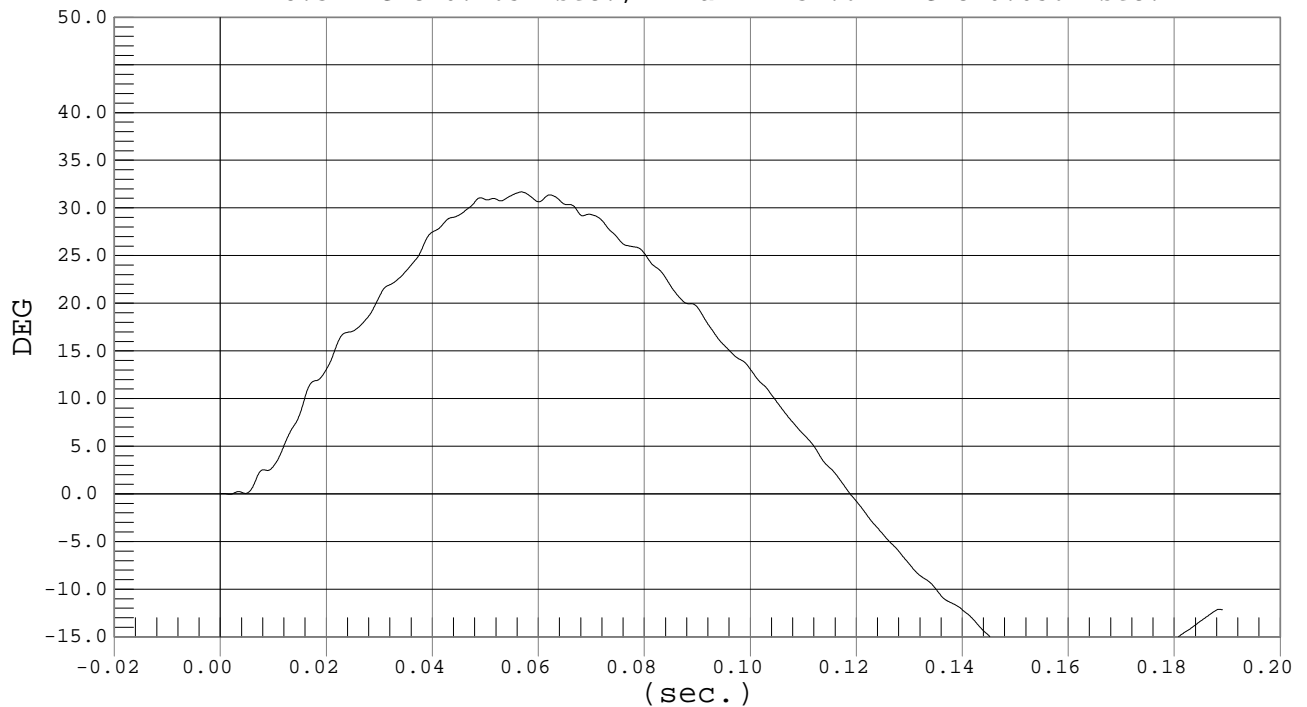


Test Desc.: Neck Bending
Component: Dummy #009

THETA B

Test Date: 11-04-02
Speed: 11.0 fps, 3.34 M/s

Ymin = -18.3 DEG @ 0.1651 sec., Ymax = 31.67 DEG @ 0.0567 sec.



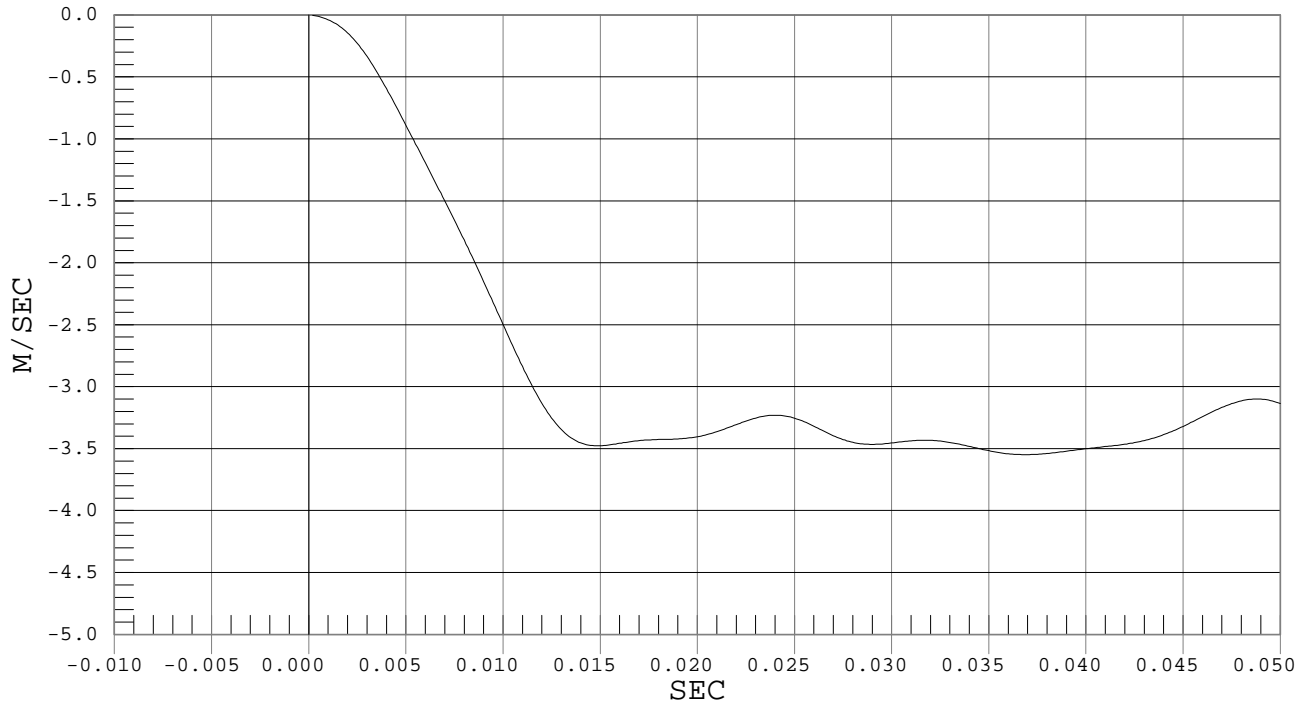


PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 11-04-02
Speed: 11.0 fps, 3.34 M/s

Ymin = -4.51 M/SEC @ 0.1890 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

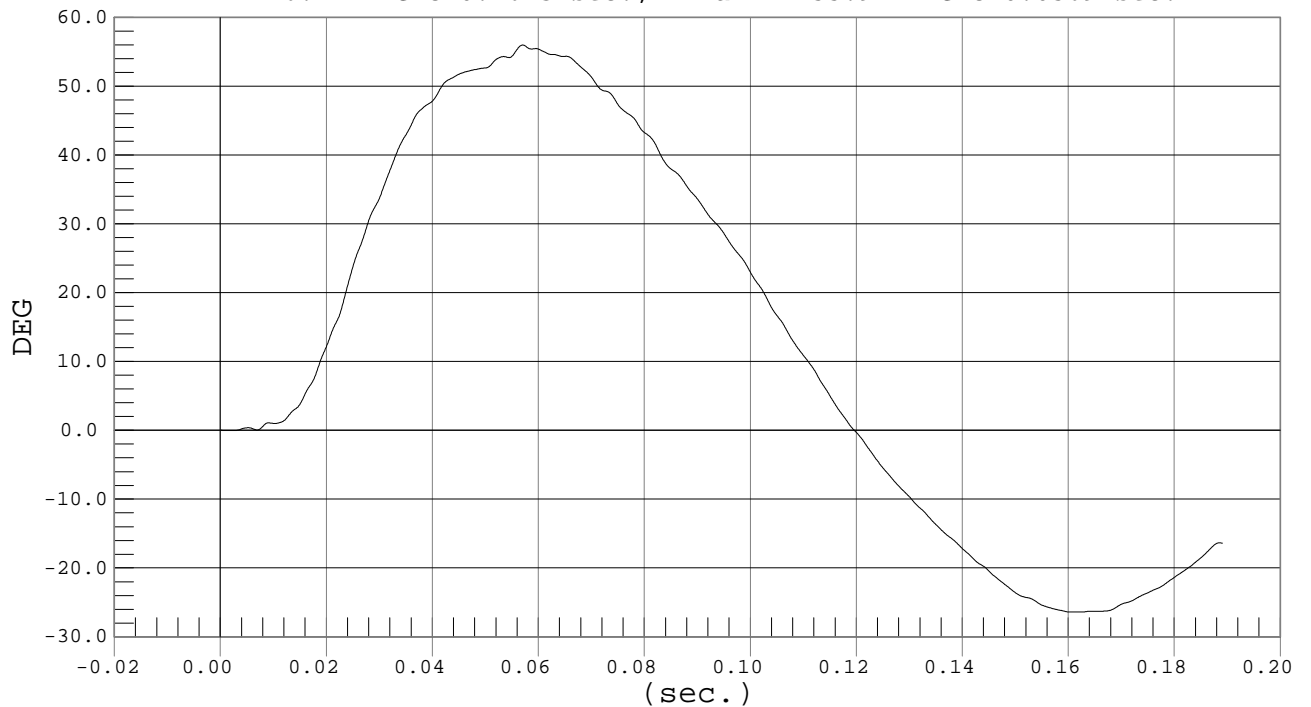


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 11-04-02
Speed: 11.0 fps, 3.34 M/s

Ymin = -26.41 DEG @ 0.1623 sec., Ymax = 55.97 DEG @ 0.0569 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 11/4/02
Dummy Serial Number: 009
Test Number: D021423

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.8
Relative Humidity (%)	10 – 70	27
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max. Resultant Acceleration	7.5 – 10.5 g's	9.4
Time of Max. Pendulum Acceleration	msec	11.6

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

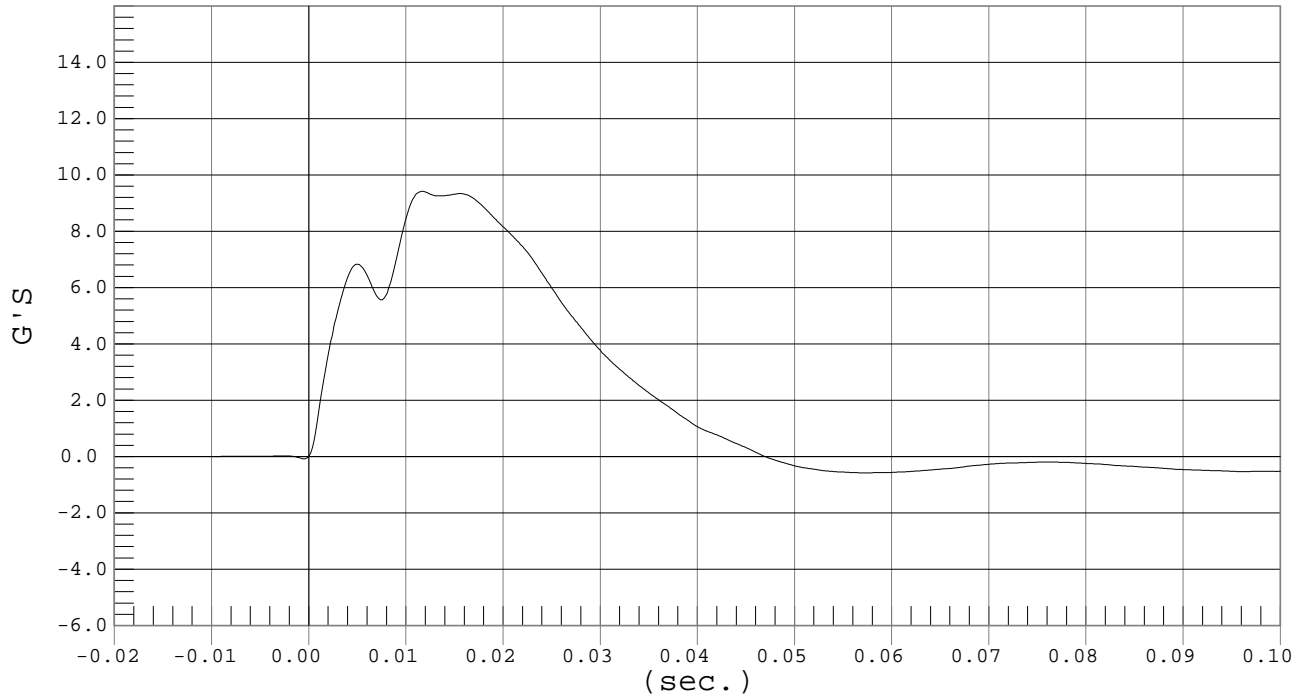


SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #009

Test Date: 11-04-02
Speed: 14.2 fps, 4.34 M/s

Ymin = -.58 G'S @ 0.0571 sec., Ymax = 9.42 G'S @ 0.0116 sec.



MGA RESEARCH CORPORATION
 UPPER/MIDDLE/LOWER RIB TESTS
 EUROSID 2 DUMMY

Date: 11/5/02
 Dummy Serial Number: 009
 Test Number: D021424/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.3
Relative Humidity (%)	10 – 70	31
Displacement at 2 m/s	23.5 – 27.5 mm	27.0
Displacement at 3 m/s	36.0 – 40.0 mm	37.7
Displacement at 4 m/s	46.0 – 51.0 mm	49.5

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.3
Relative Humidity (%)	10 – 70	31
Displacement at 2 m/s	23.5 – 27.5 mm	26.4
Displacement at 3 m/s	36.0 – 40.0 mm	39.6
Displacement at 4 m/s	46.0 – 51.0 mm	50.5

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.3
Relative Humidity (%)	10 – 70	31
Displacement at 2 m/s	23.5 – 27.5 mm	25.6
Displacement at 3 m/s	36.0 – 40.0 mm	37.2
Displacement at 4 m/s	46.0 – 51.0 mm	47.8

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

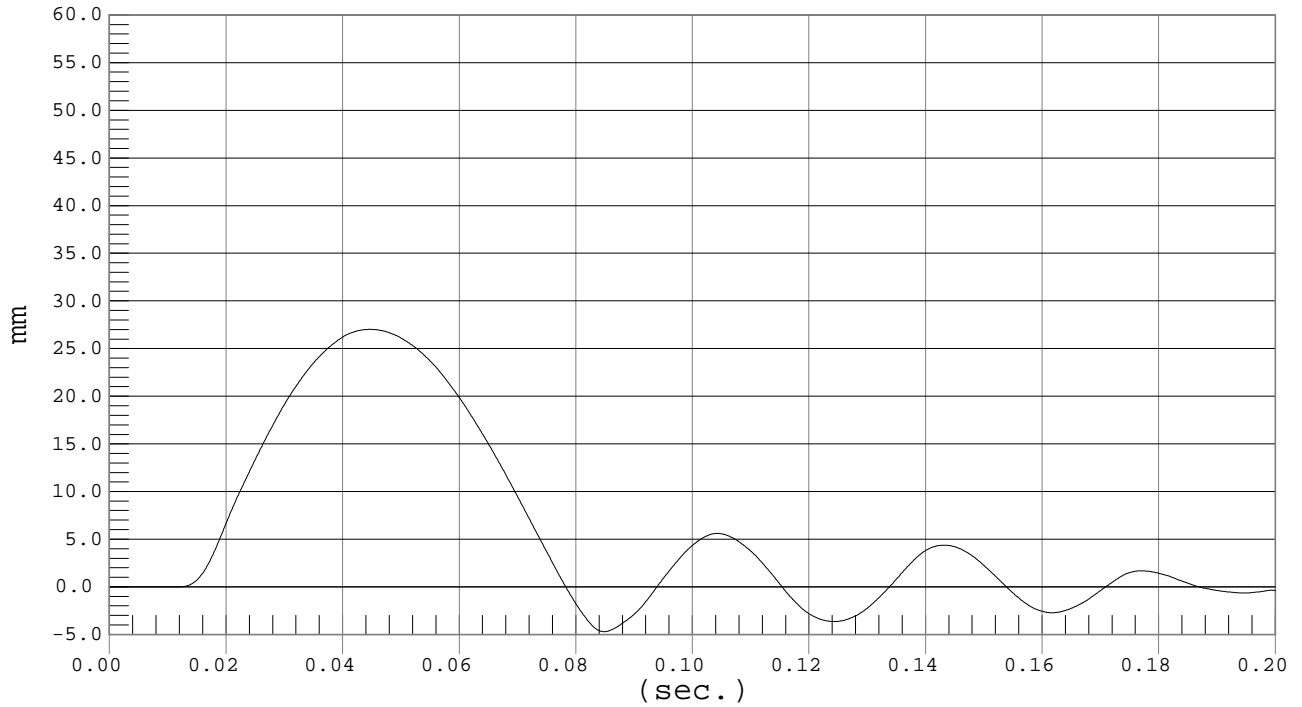


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 11-05-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -4.7 mm @ 0.0848 sec., Ymax = 27.01 mm @ 0.0445 sec.

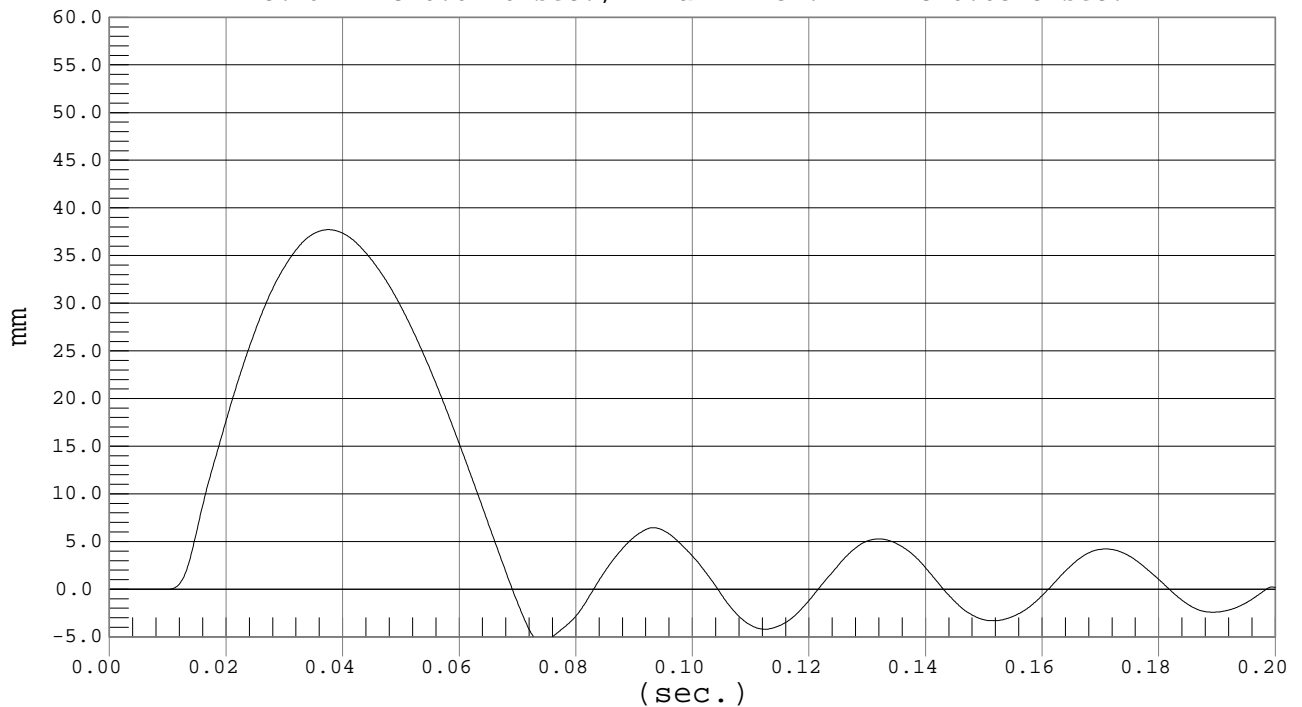


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 11-05-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -5.49 mm @ 0.0740 sec., Ymax = 37.71 mm @ 0.0375 sec.



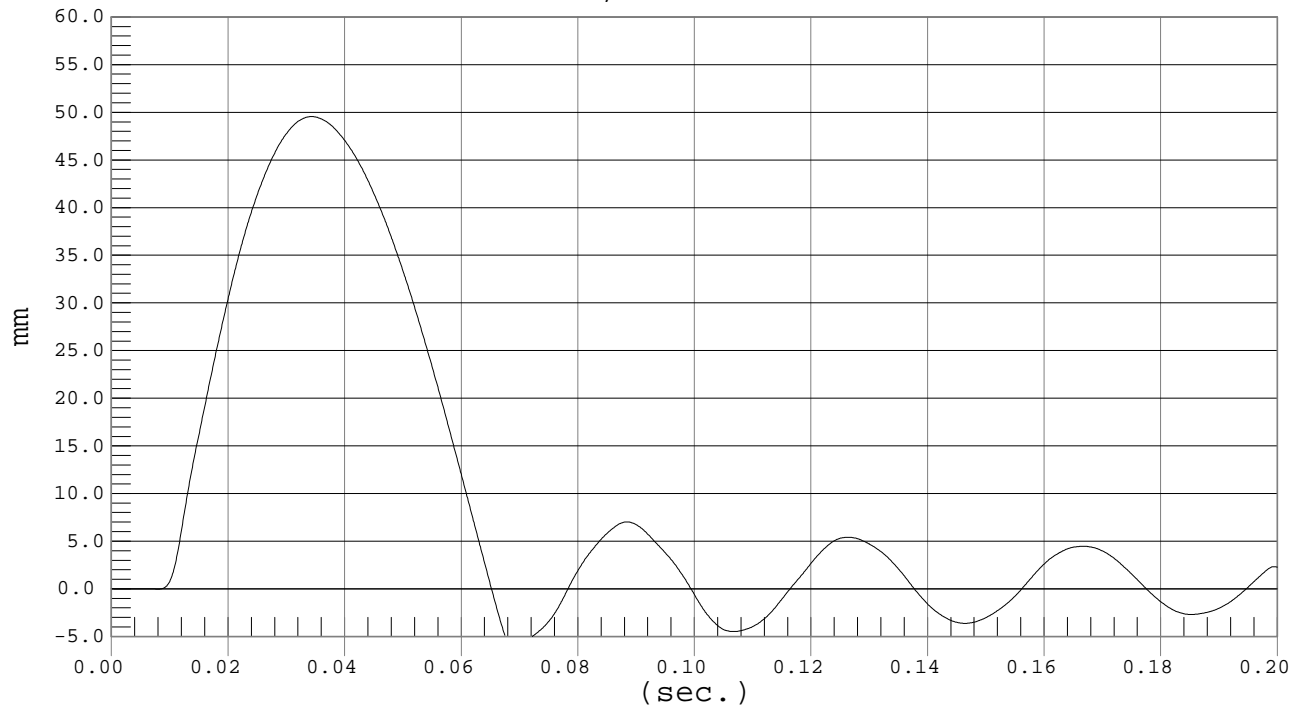


Test Desc.: Rib Module
Component: Dummy #009

UPPER RIB DISPLACEMENT

Test Date: 11-05-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -6.19 mm @ 0.0690 sec., Ymax = 49.54 mm @ 0.0343 sec.



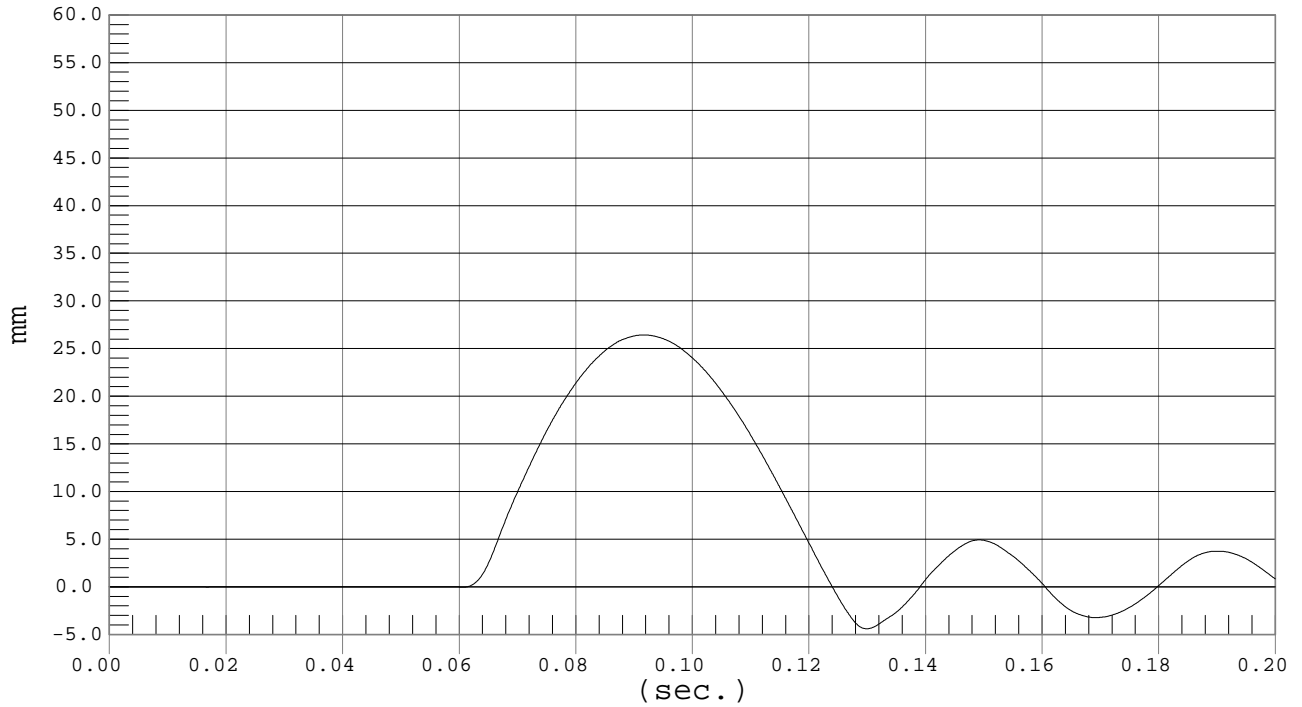


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 11-05-02
Speed: 6.9 fps, 2.09 M/s

Ymin = -4.39 mm @ 0.1298 sec., Ymax = 26.44 mm @ 0.0916 sec.

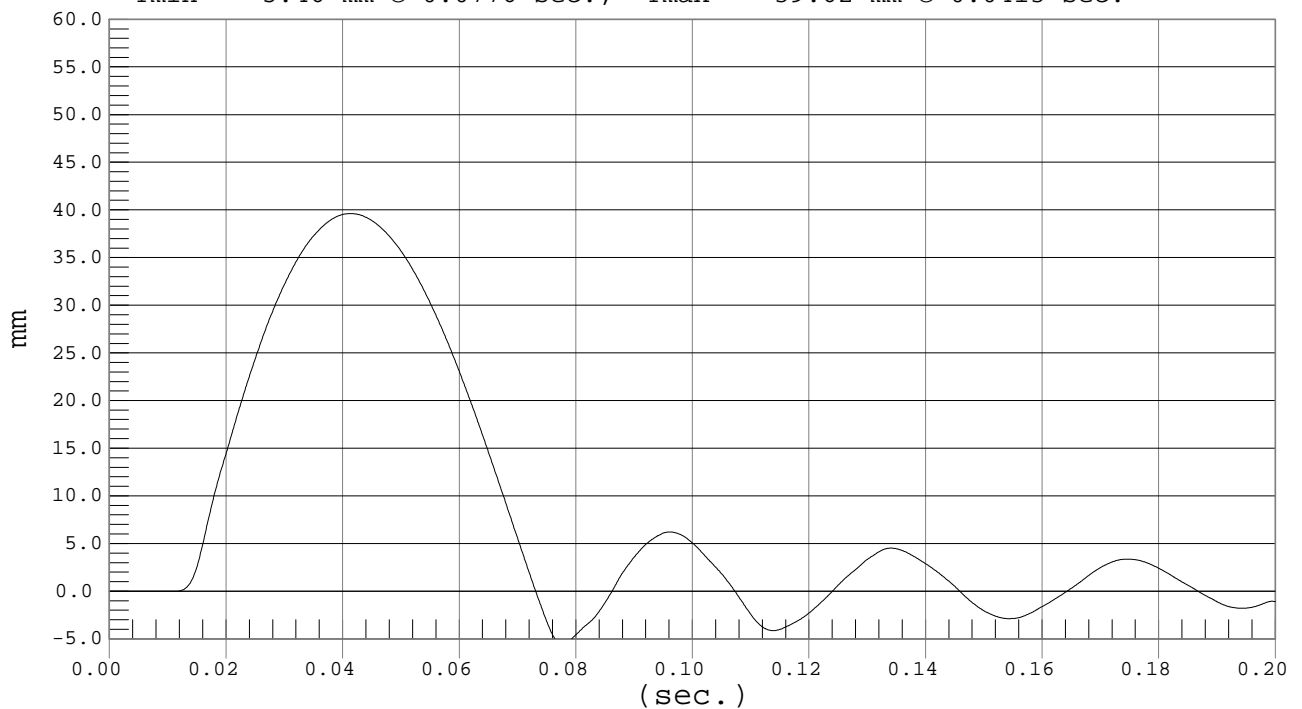


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 11-05-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -5.46 mm @ 0.0776 sec., Ymax = 39.62 mm @ 0.0413 sec.



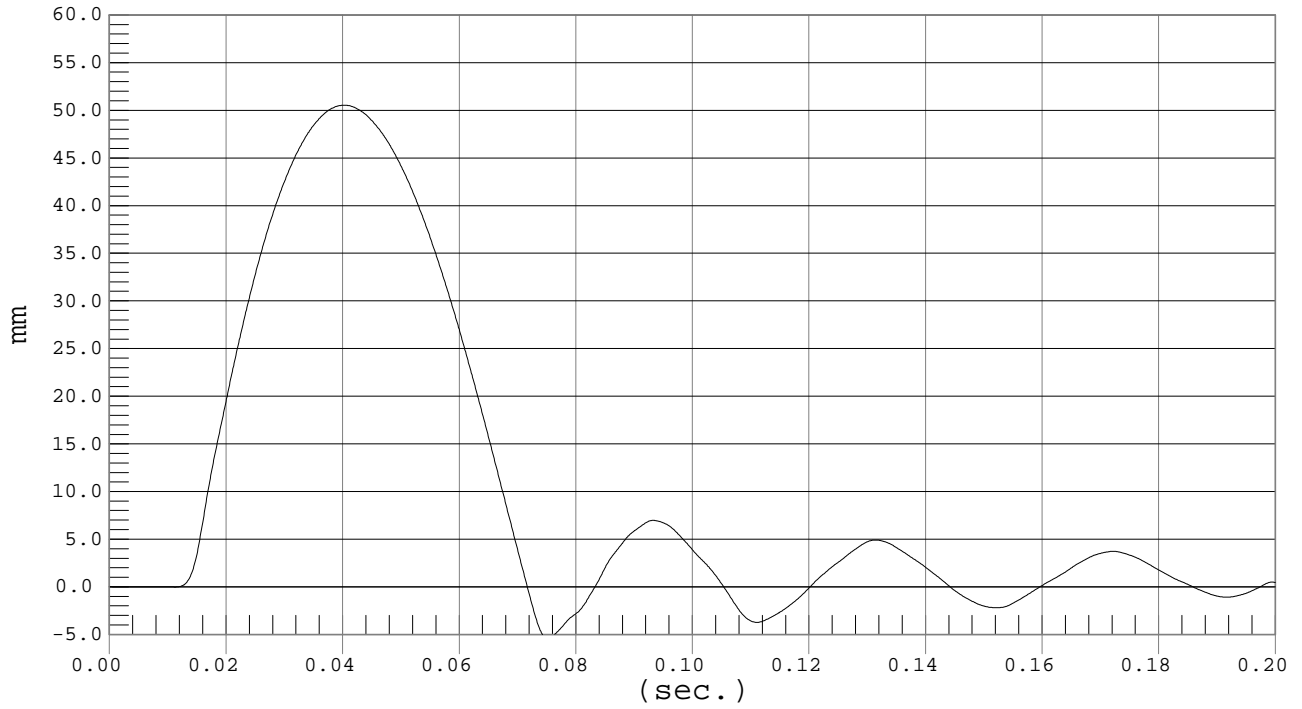


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 11-05-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -5.34 mm @ 0.0750 sec., Ymax = 50.54 mm @ 0.0402 sec.



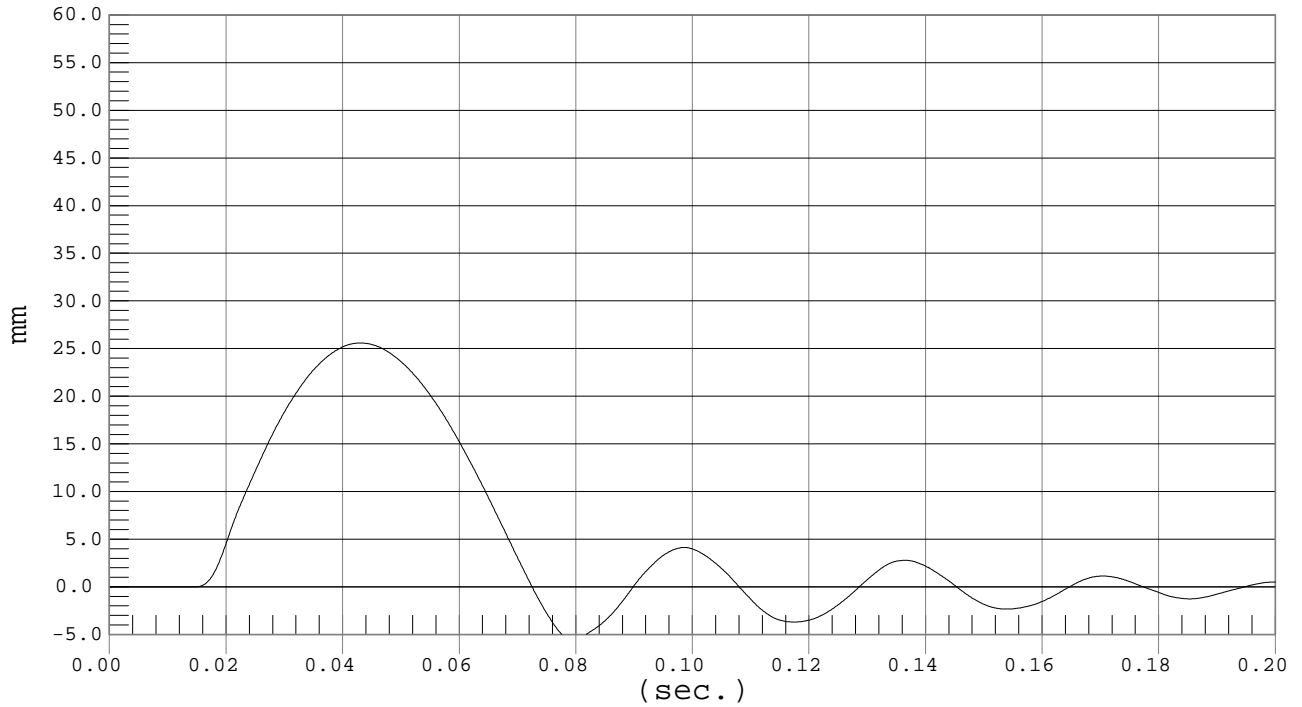


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 11-05-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -5.55 mm @ 0.0794 sec., Ymax = 25.59 mm @ 0.0429 sec.

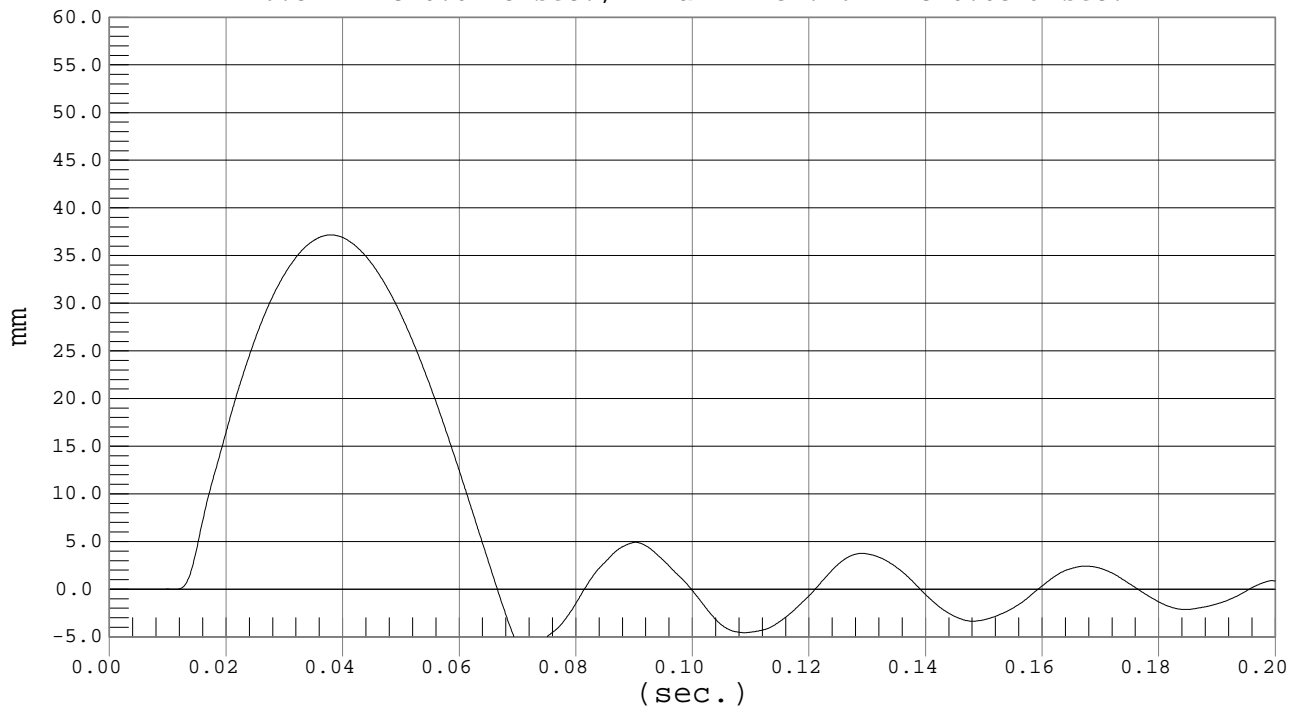


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 11-05-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.57 mm @ 0.0715 sec., Ymax = 37.16 mm @ 0.0379 sec.



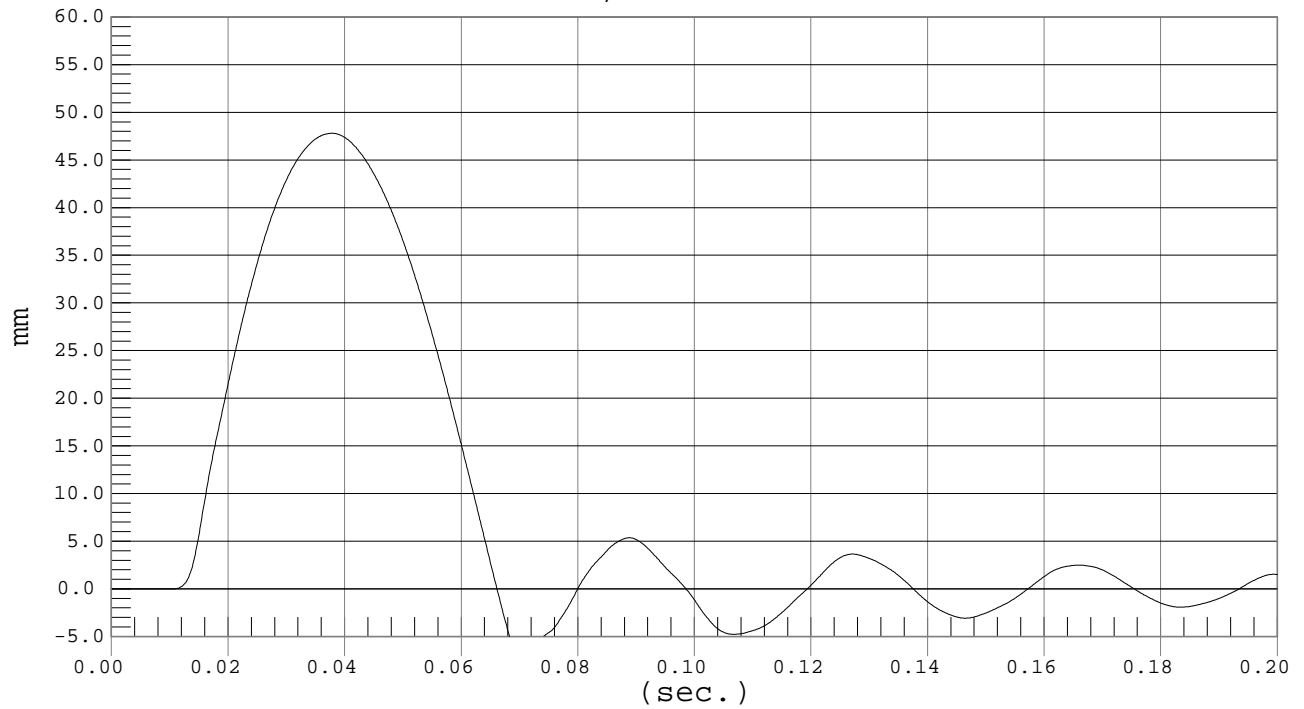


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 11-05-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -7.02 mm @ 0.0701 sec., Ymax = 47.79 mm @ 0.0378 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 11/4/02
Dummy Serial Number: 009
Test Number: D021427

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.8
Relative Humidity (%)	10 – 70	26
Probe Speed (m/s)	3.90 – 4.10	4.03
Maximum Impact Force	4.00 – 4.80 kN	4.58
Time of Maximum Force	10.60 – 13.00 ms	10.70
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.27
Time of Max. Total Force	10.00 – 12.30 ms	10.60

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

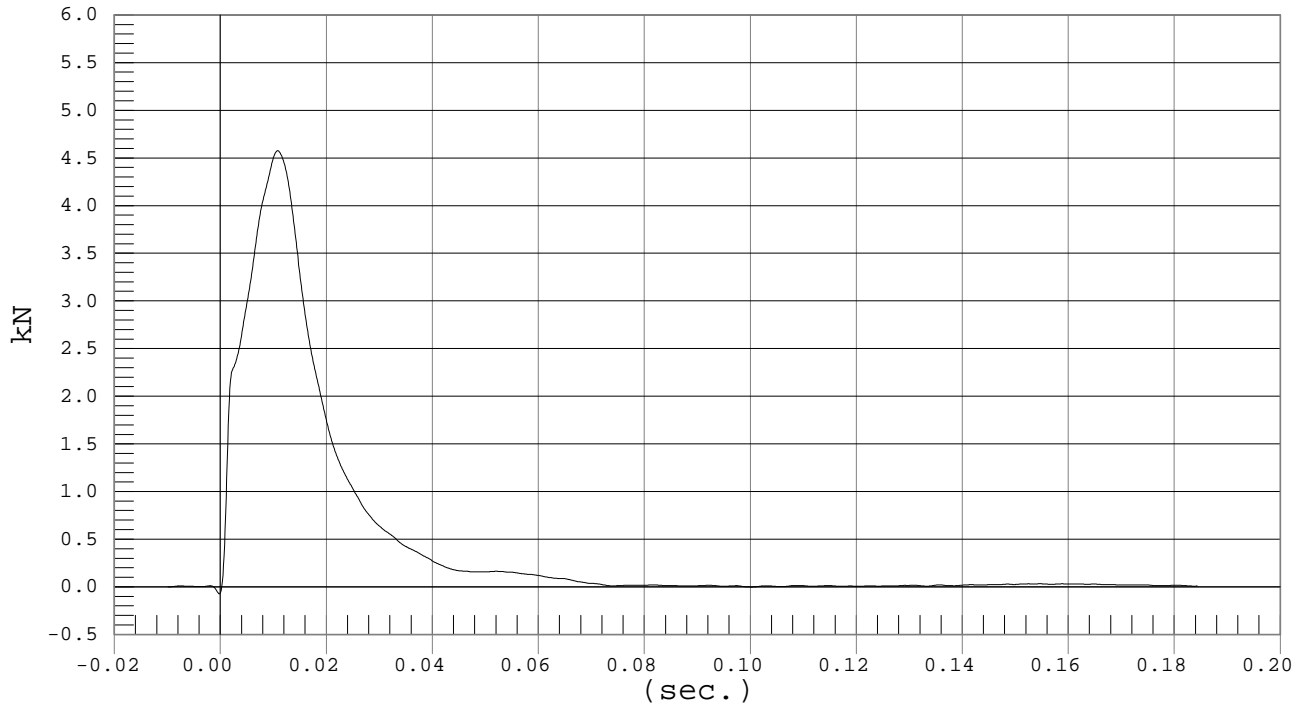


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 11-04-02
Speed: 13.2 fps, 4.03 M/s

Ymin = -.07 kN @ -0.0003 sec., Ymax = 4.58 kN @ 0.0107 sec.

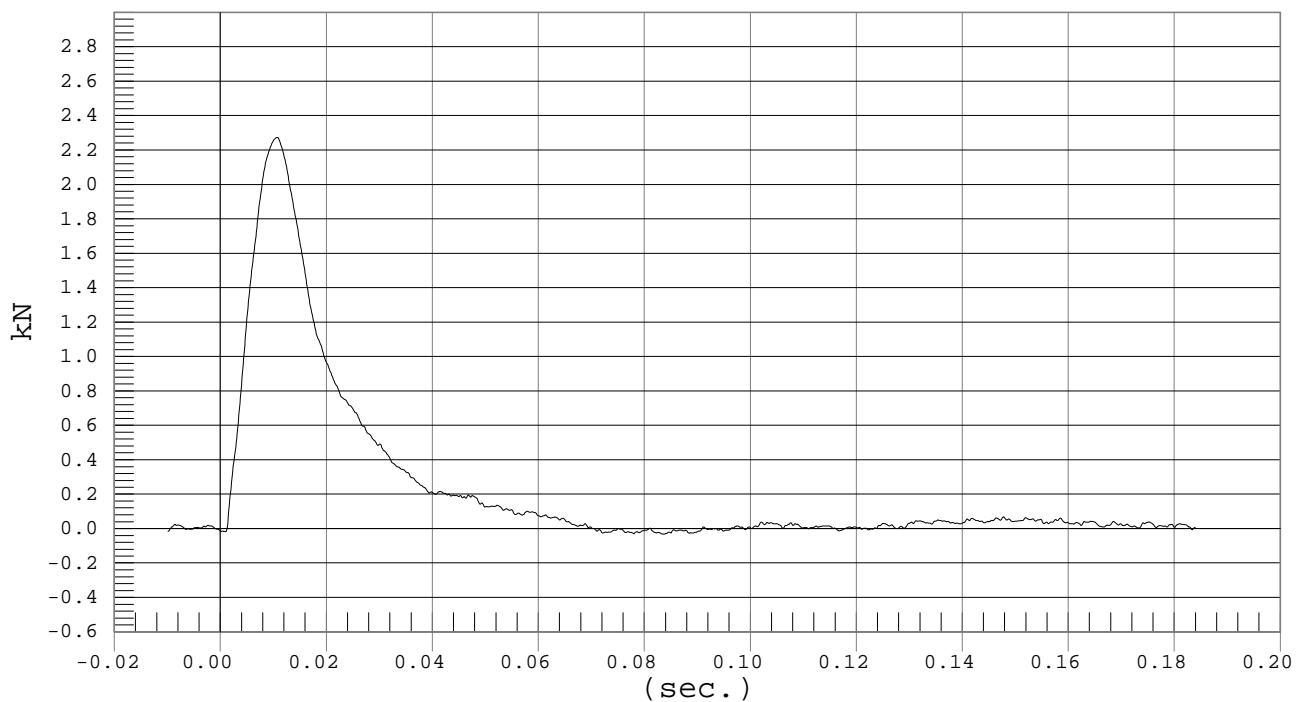


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 11-04-02
Speed: 13.2 fps, 4.03 M/s

Ymin = -.03 kN @ 0.0836 sec., Ymax = 2.27 kN @ 0.0106 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 11/4/02
 Dummy Serial Number: 009
 Test Number: D021428

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.3
Relative Humidity (%)		10 – 70	29
Pendulum Speed		5.95 – 6.15	6.11
Pendulum Deceleration	10 msec	-2.46 - -1.59 m/sec	-2.11
	20 msec	-5.25 - -4.07 m/sec	-4.75
	25 msec	-6.64 - -5.30 m/sec	-5.82
	30 msec	≥ -6.5 m/sec	-6.23
Maximum Flexion Angle		45.0 – 55.0 deg	46.3
Time of Max. Flexion Angle		39.0 – 53.0 ms	45.0
Maximum Angle Theta (A)		31.0 – 35.0 deg	31.5
Time of Max. Theta (A)		44.0 – 52.0 ms	45.0
Maximum Angle Theta (B)		27.20– 29.70 deg	28.2
Time of Max. Theta (B)		44.0 – 52.0 ms	46.3

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

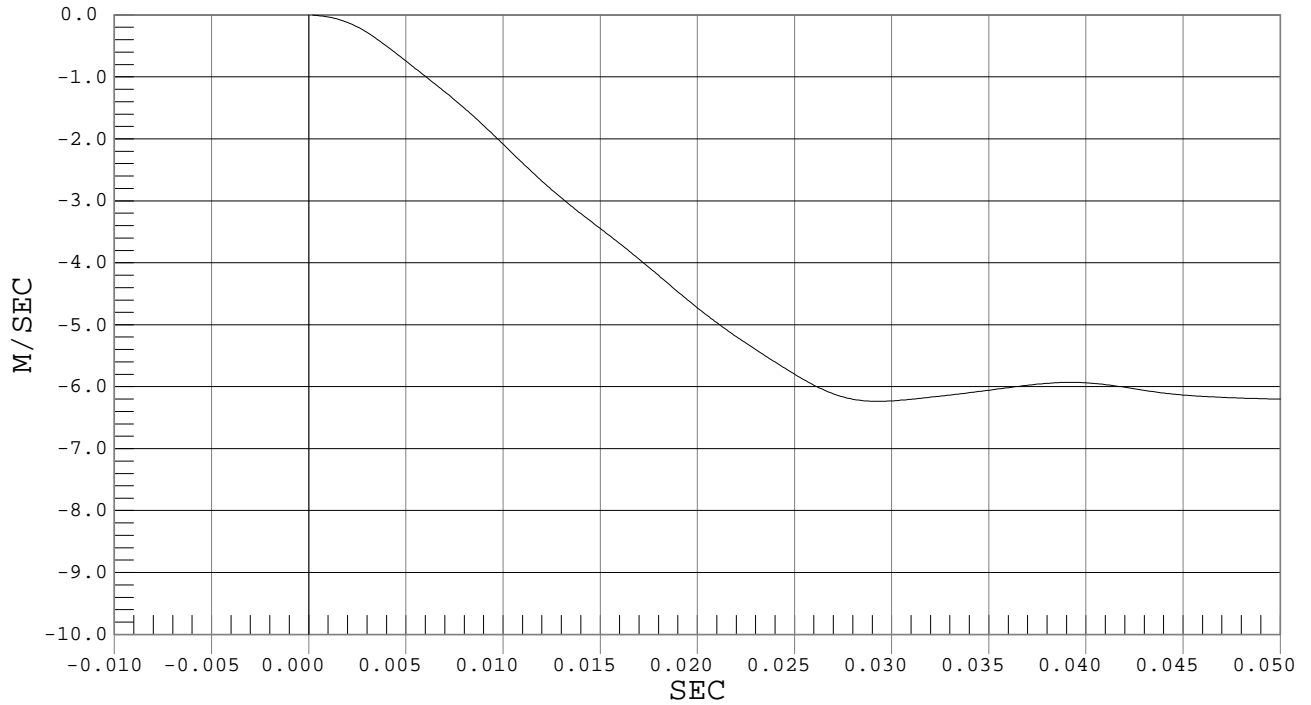


PENDULUM DECELERATION

Test Desc.: Lumbar Flexion
Component: Dummy #009

Test Date: 11-04-02
Speed: 20.0 fps, 6.11 M/s

Ymin = -7.58 M/SEC @ 0.1377 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

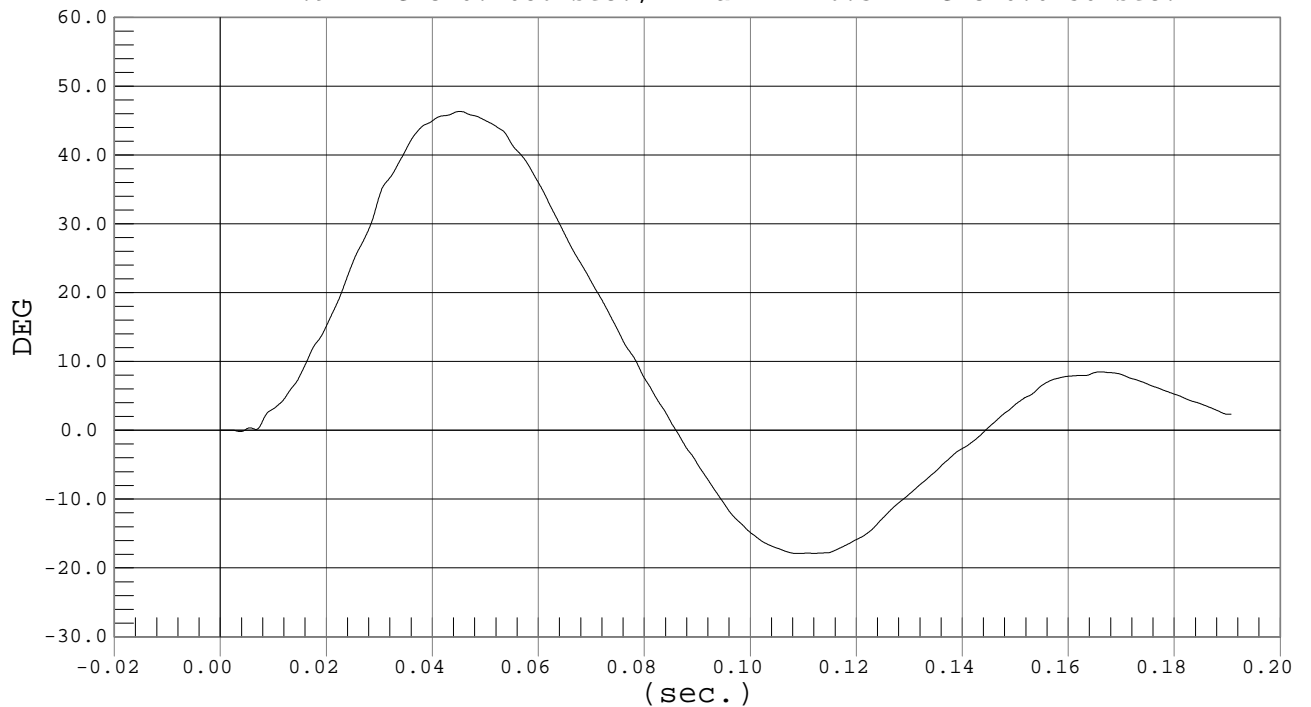


FLEXION ANGLE

Test Desc.: Lumbar Flexion
Component: Dummy #009

Test Date: 11-04-02
Speed: 20.0 fps, 6.11 M/s

Ymin = -17.91 DEG @ 0.1086 sec., Ymax = 46.32 DEG @ 0.0450 sec.



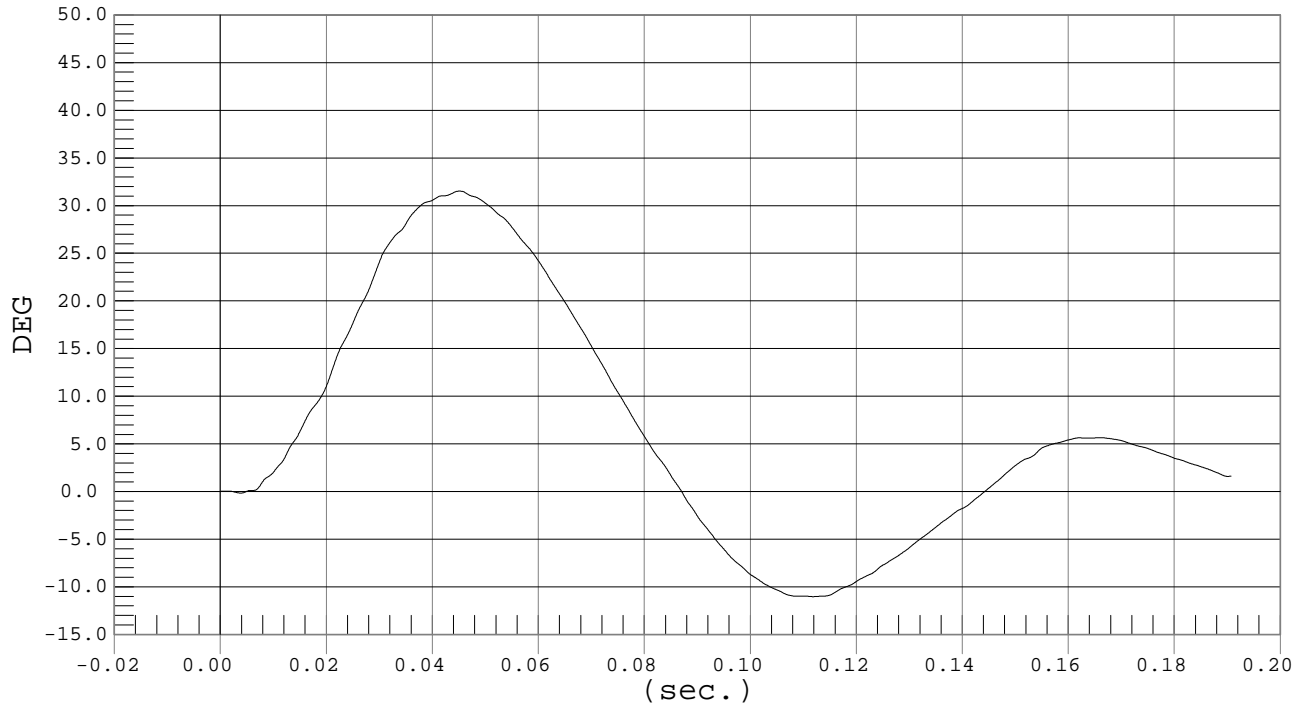


Test Desc.: Lumbar Flexion
Component: Dummy #009

THETA A

Test Date: 11-04-02
Speed: 20.0 fps, 6.11 M/s

Ymin = -11.02 DEG @ 0.1117 sec., Ymax = 31.53 DEG @ 0.0450 sec.

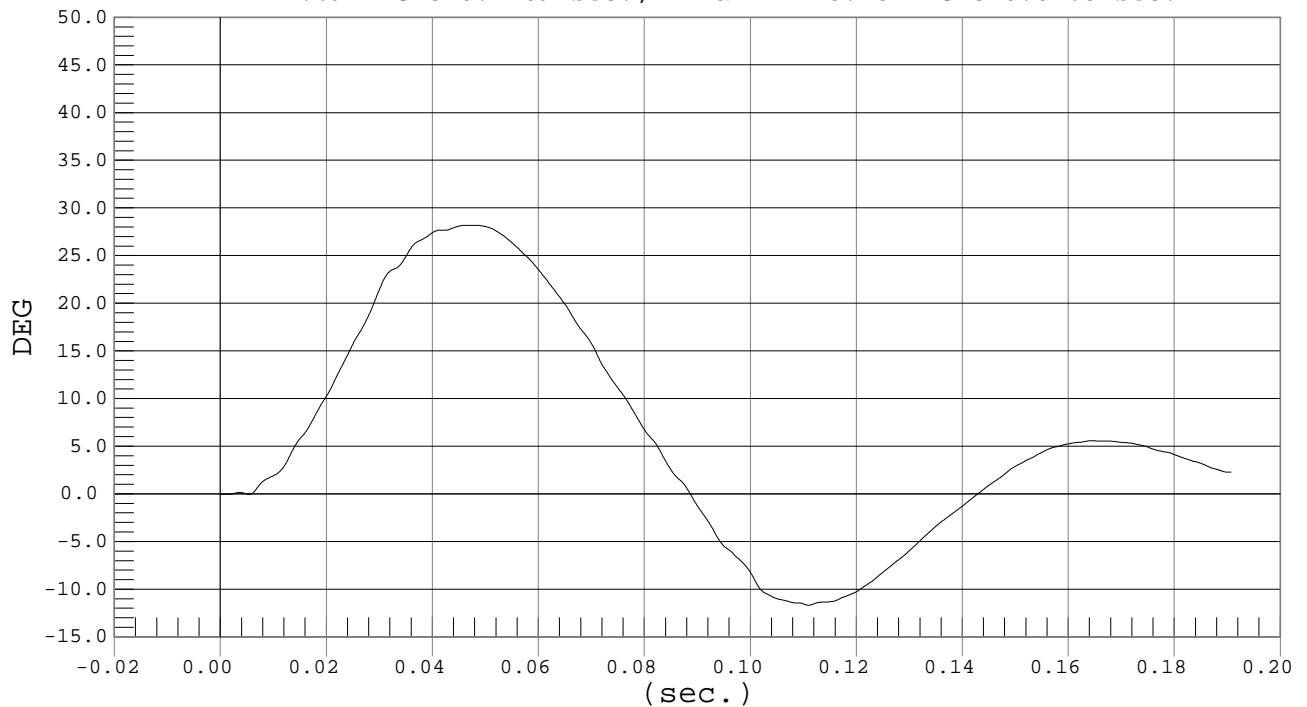


Test Desc.: Lumbar Flexion
Component: Dummy #009

THETA B

Test Date: 11-04-02
Speed: 20.0 fps, 6.11 M/s

Ymin = -11.69 DEG @ 0.1109 sec., Ymax = 28.18 DEG @ 0.0463 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 11/4/02
Dummy Serial Number: 009
Test Number: D021429

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.8
Relative Humidity (%)	10 – 70	24
Pendulum Speed	4.20 – 4.40 m/s	4.33
Maximum Impactor Force	4.40 – 5.40 kN	4.96
Time of Max. Impactor Force	10.30 – 15.50 ms	14.30
Maximum Pubic Force	1.04 – 1.64 kN	1.42
Time of Max. Pubic Force	9.90 – 15.90 ms	15.50

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

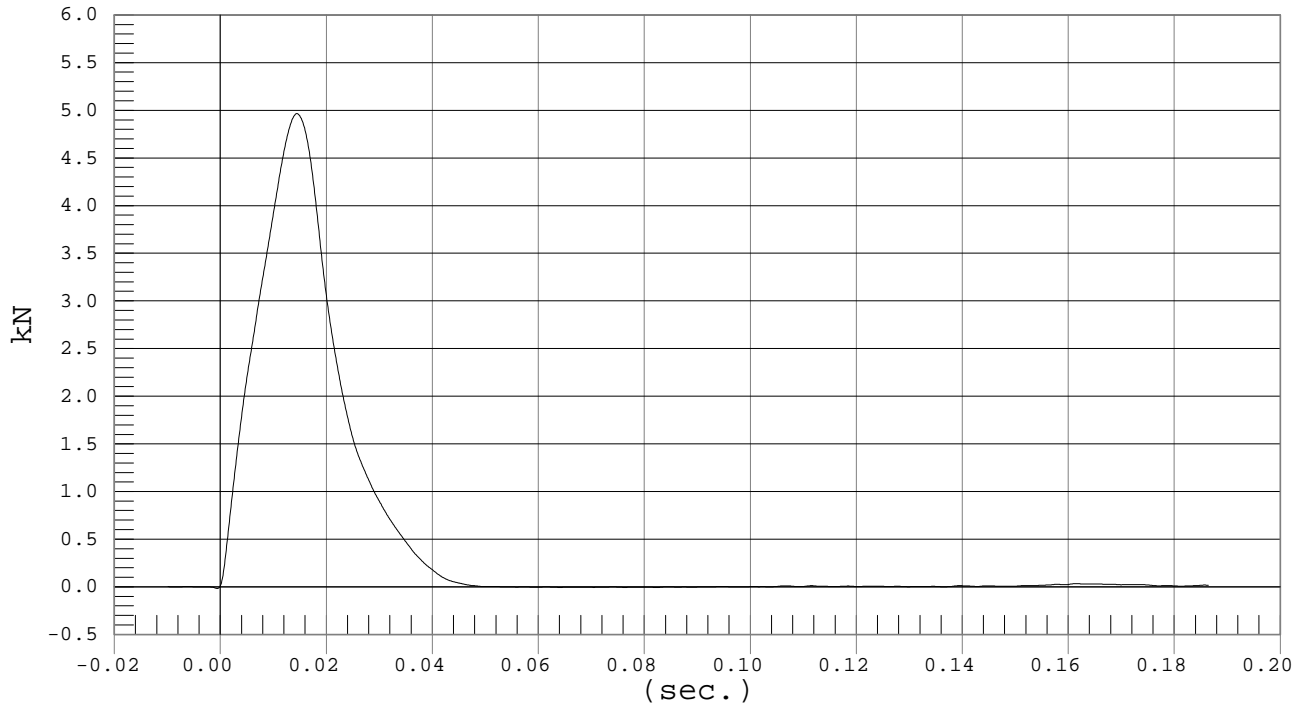


IMPACTOR FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 11-04-02
Speed: 14.2 fps, 4.33 M/s

Ymin = -.02 kN @ -0.0007 sec., Ymax = 4.96 kN @ 0.0143 sec.

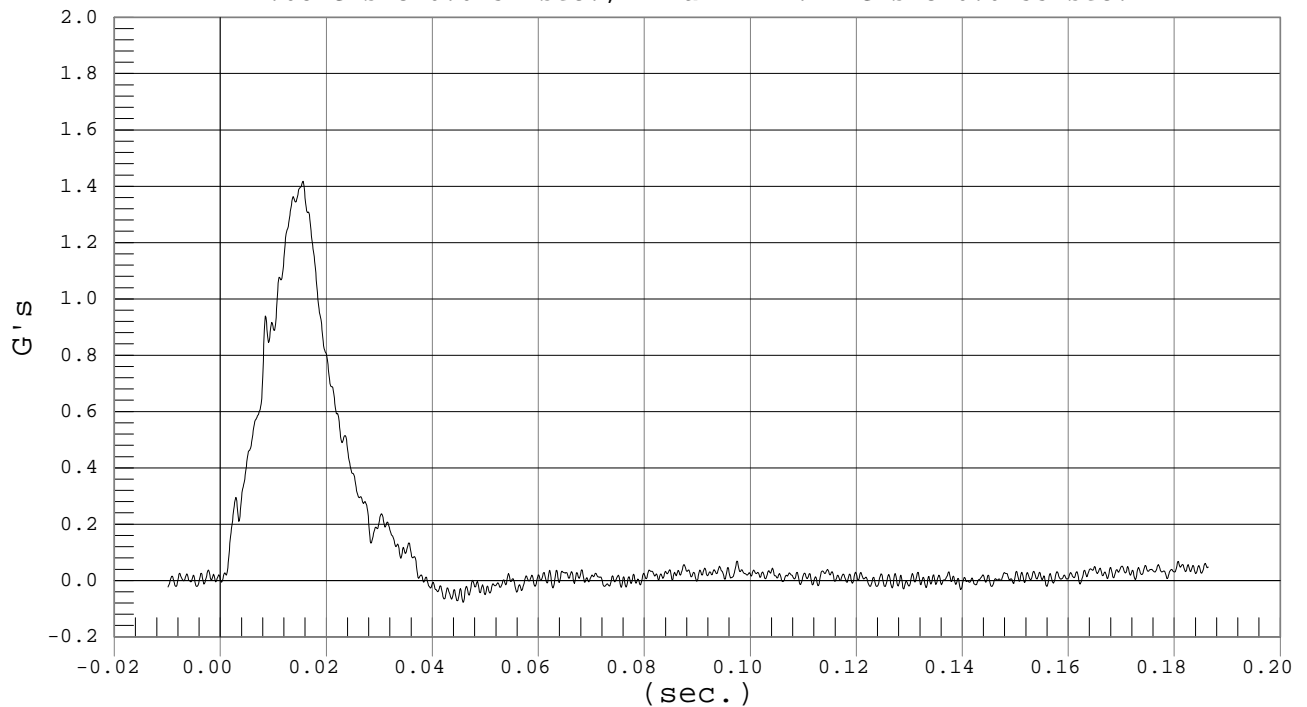


PUBIC FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 11-04-02
Speed: 14.2 fps, 4.33 M/s

Ymin = -.08 G's @ 0.0457 sec., Ymax = 1.42 G's @ 0.0155 sec.



CERTIFICATION DATA

Dummy Serial Number: 010

Calibration Test Results Summary

Dummy Serial Number: 010

Pre-Test Calibration

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

MGA RESEARCH CORPORATION
HEAD DROP TEST
EUROSID 2 DUMMY

Date: 12/6/02
Dummy Serial Number: 010
Test Number: D021541

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.4
Relative Humidity (%)	10 – 70	17
Peak Resultant Acceleration	100 – 150 g's	133
Time of Max. Res. Acceleration	msec	2.4

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

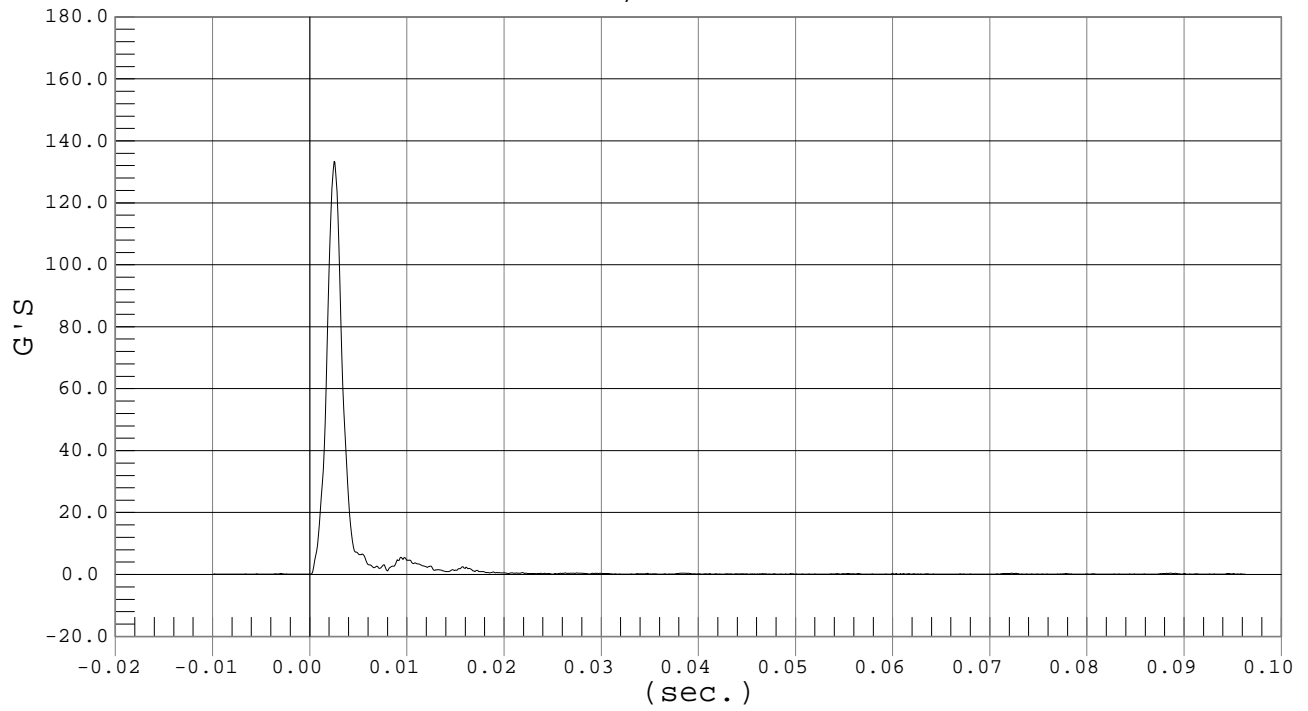


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #010

Test Date: 12-06-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .09 G'S @ -0.0071 sec., Ymax = 133.39 G'S @ 0.0024 sec.



MGA RESEARCH CORPORATION
 NECK PENDULUM TEST
 EUROSID 2 DUMMY

Date: 12/6/02
 Dummy Serial Number: 010
 Test Number: D021542

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	20.9
Relative Humidity (%)		10 – 70	18
Pendulum Speed		3.3 - 3.5	3.3
Pendulum Deceleration	3 msec	~.25 - ~.53 m/sec	-.32
	8 msec	~1.59 - ~2.04 m/sec	-1.71
	14 msec	~3.20 - ~3.85 m/sec	-3.34
Maximum Flexion Angle		49.0 – 59.0 deg	56.1
Time of Max. Flexion Angle		54.0 – 66.0 ms	61.4
Maximum Angle Theta (A)		32.0 – 37.0 deg	35.3
Time of Max. Theta (A)		53.0 – 63.0 ms	61.5
Maximum Angle Theta (B)		30.34 – 32.84 deg	31.03
Time of Max. Theta (B)		54.0 – 64.0 ms	61.3

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

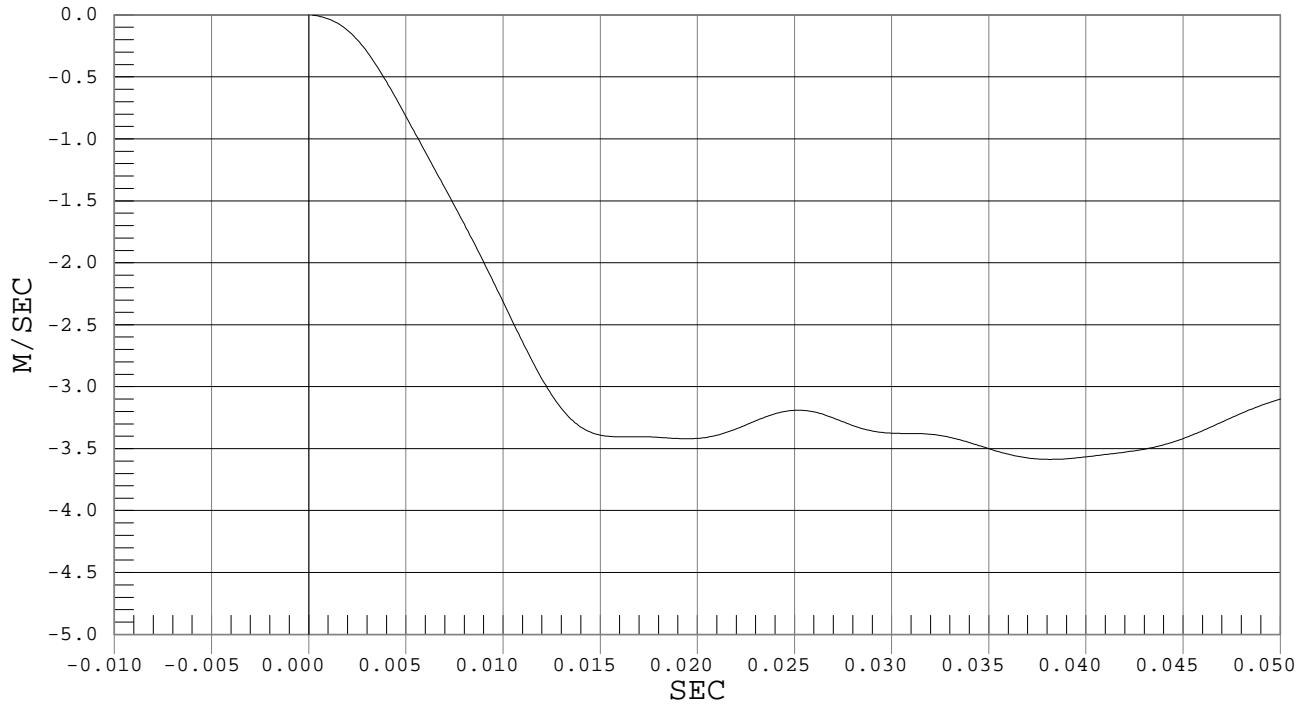


PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 12-06-02
Speed: 10.9 fps, 3.31 M/s

Ymin = -4.23 M/SEC @ 0.1863 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

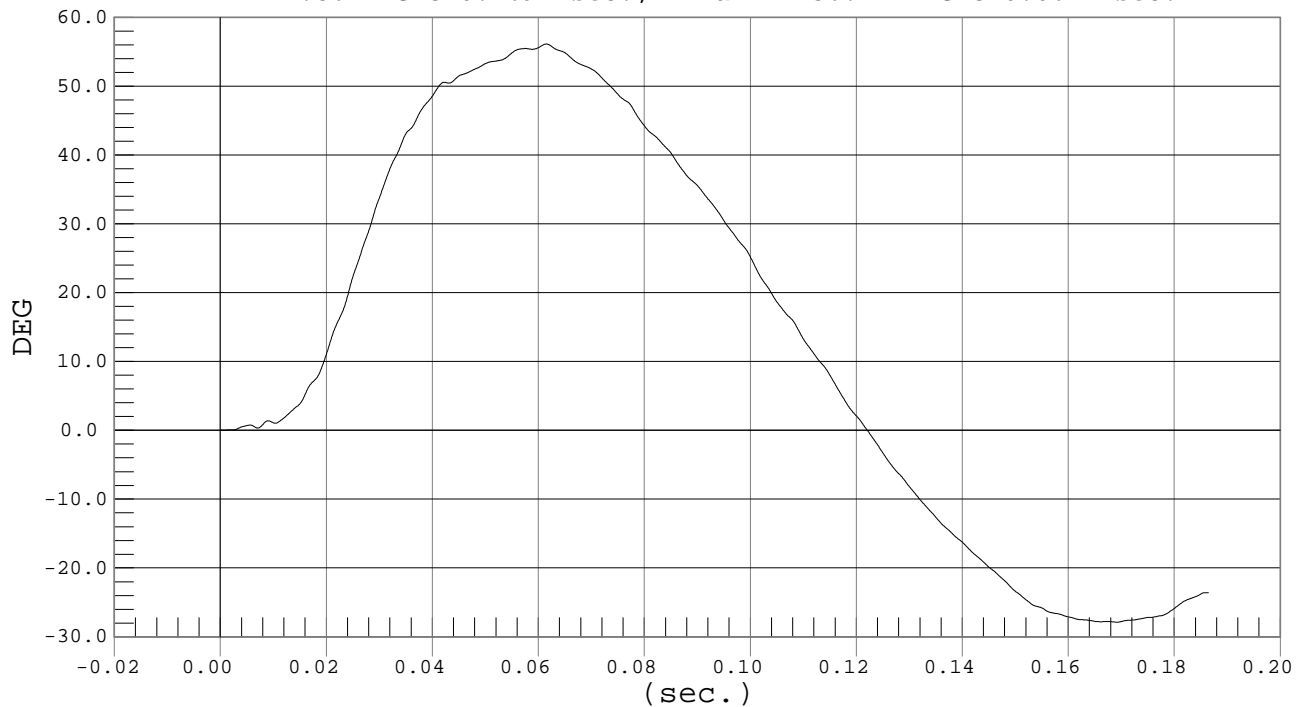


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 12-06-02
Speed: 10.9 fps, 3.31 M/s

Ymin = -27.86 DEG @ 0.1691 sec., Ymax = 56.11 DEG @ 0.0614 sec.



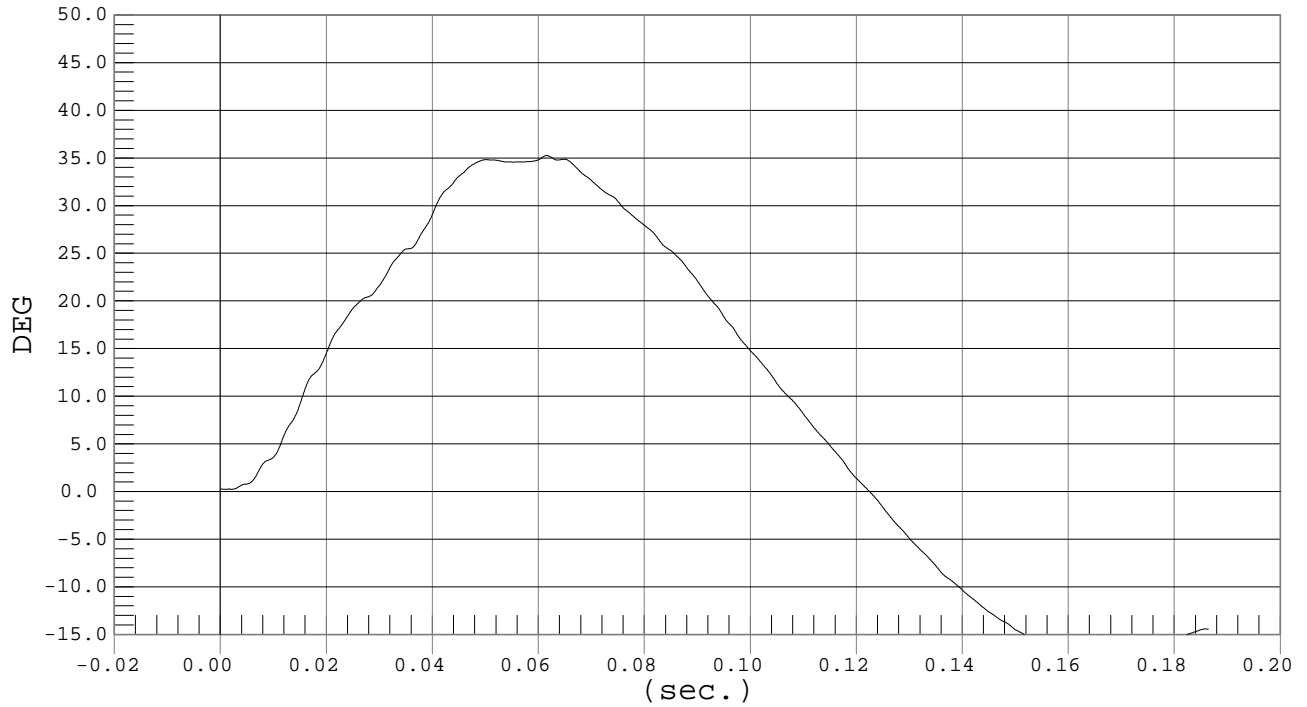


Test Desc.: Neck Bending
Component: Dummy #010

THETA A

Test Date: 12-06-02
Speed: 10.9 fps, 3.31 M/s

Ymin = -17.22 DEG @ 0.1689 sec., Ymax = 35.25 DEG @ 0.0615 sec.

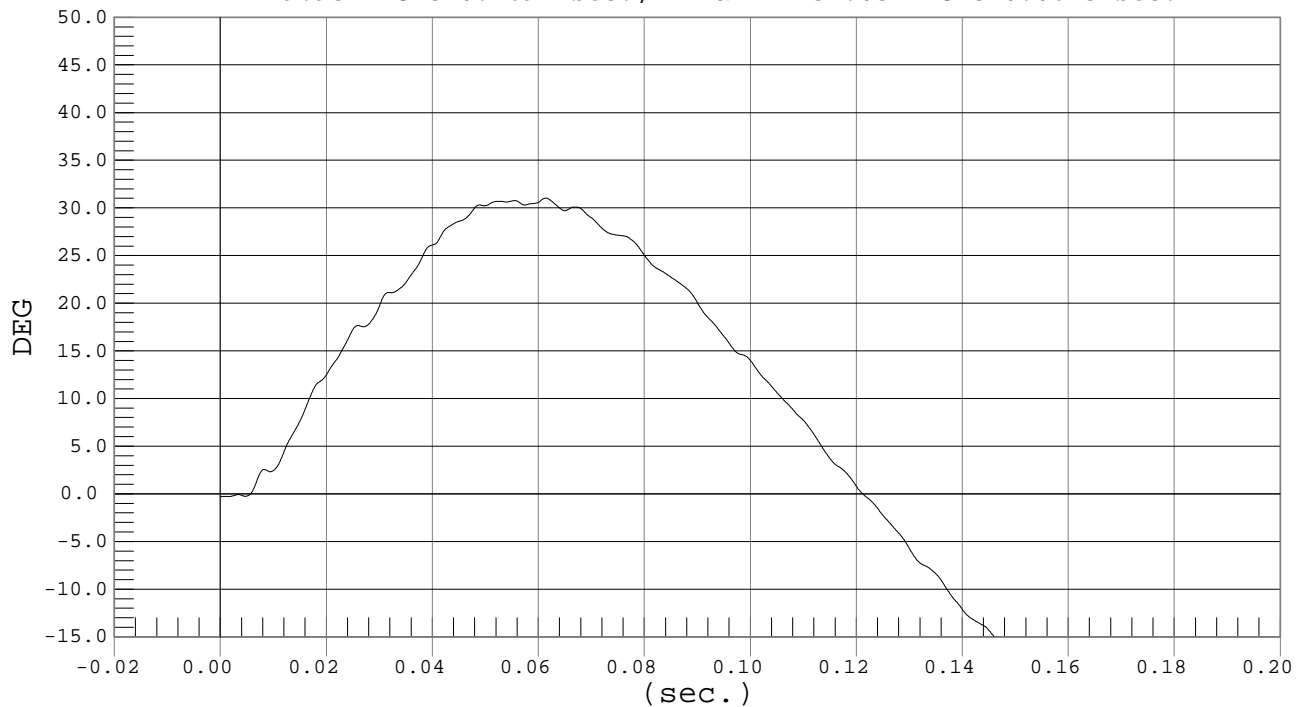


Test Desc.: Neck Bending
Component: Dummy #010

THETA B

Test Date: 12-06-02
Speed: 10.9 fps, 3.31 M/s

Ymin = -19.93 DEG @ 0.1697 sec., Ymax = 31.03 DEG @ 0.0613 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 12/6/02
Dummy Serial Number: 010
Test Number: D021543

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.4
Relative Humidity (%)	10 – 70	17
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max. Resultant Acceleration	7.5 – 10.5 g's	10.3
Time of Max. Pendulum Acceleration	msec	11.2

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

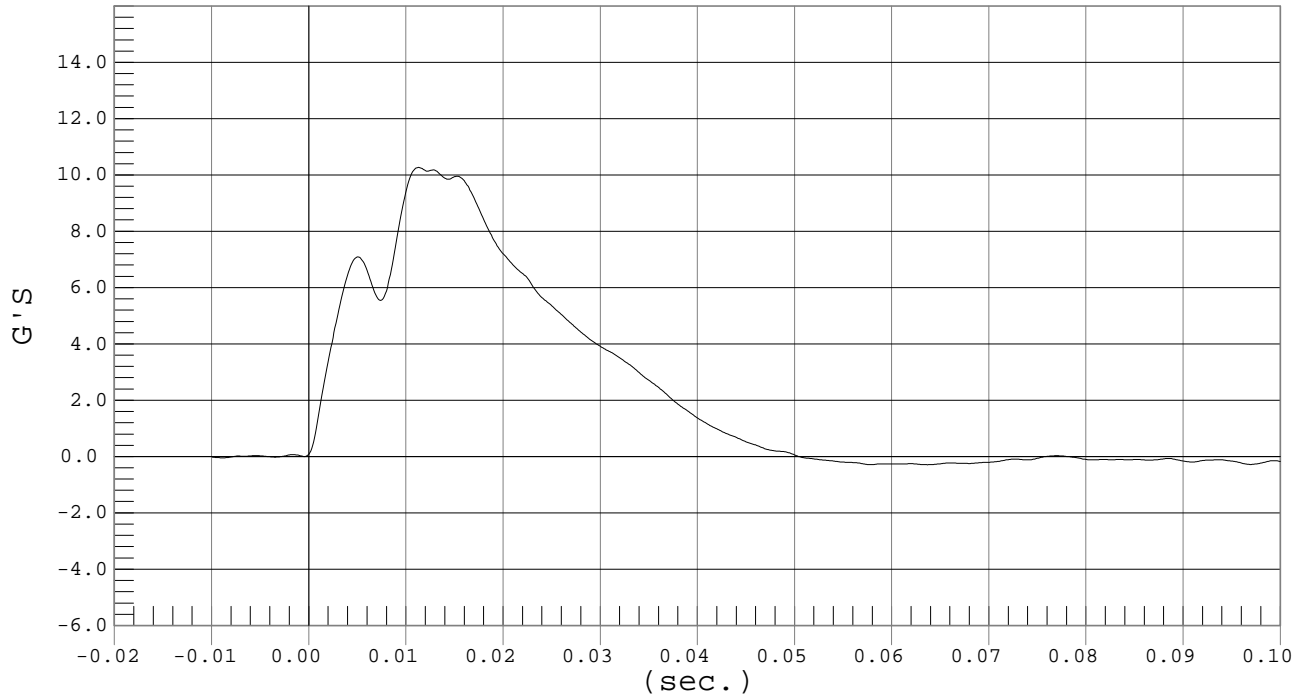


SHOULDER ACCELERATION

Test Desc.: Shopulder Impact
Component: Dummy #010

Test Date: 12-06-02
Speed: 14.1 fps, 4.30 M/s

Ymin = -.37 G'S @ 0.1074 sec., Ymax = 10.27 G'S @ 0.0112 sec.



MGA RESEARCH CORPORATION
 UPPER/MIDDLE/LOWER RIB TESTS
 EUROSID 2 DUMMY

Date: 12/6/02
 Dummy Serial Number: 010
 Test Number: D021544/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.6
Relative Humidity (%)	10 – 70	18
Displacement at 2 m/s	23.5 – 27.5 mm	25.2
Displacement at 3 m/s	36.0 – 40.0 mm	38.5
Displacement at 4 m/s	46.0 – 51.0 mm	50.5

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.6
Relative Humidity (%)	10 – 70	18
Displacement at 2 m/s	23.5 – 27.5 mm	25.4
Displacement at 3 m/s	36.0 – 40.0 mm	37.5
Displacement at 4 m/s	46.0 – 51.0 mm	49.7

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.6
Relative Humidity (%)	10 – 70	18
Displacement at 2 m/s	23.5 – 27.5 mm	25.0
Displacement at 3 m/s	36.0 – 40.0 mm	37.5
Displacement at 4 m/s	46.0 – 51.0 mm	49.6

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

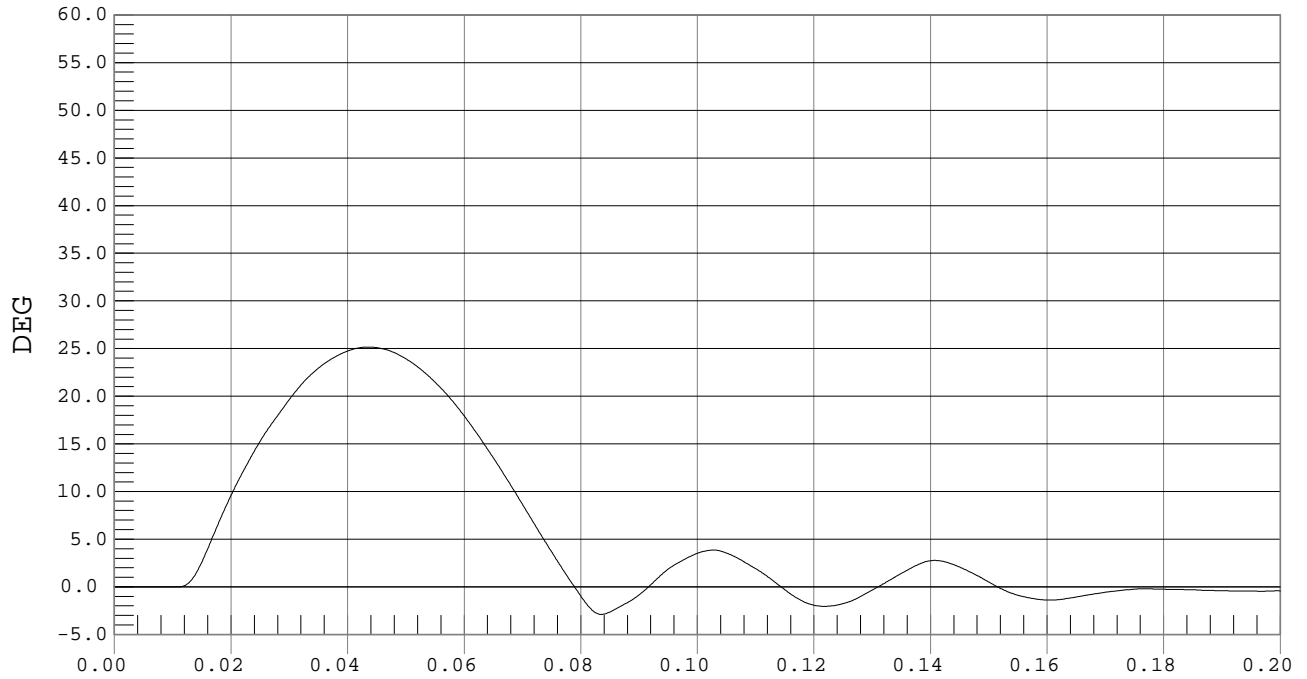


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-06-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -2.89 DEG @ 0.0834 sec., Ymax = 25.15 DEG @ 0.0435 sec.

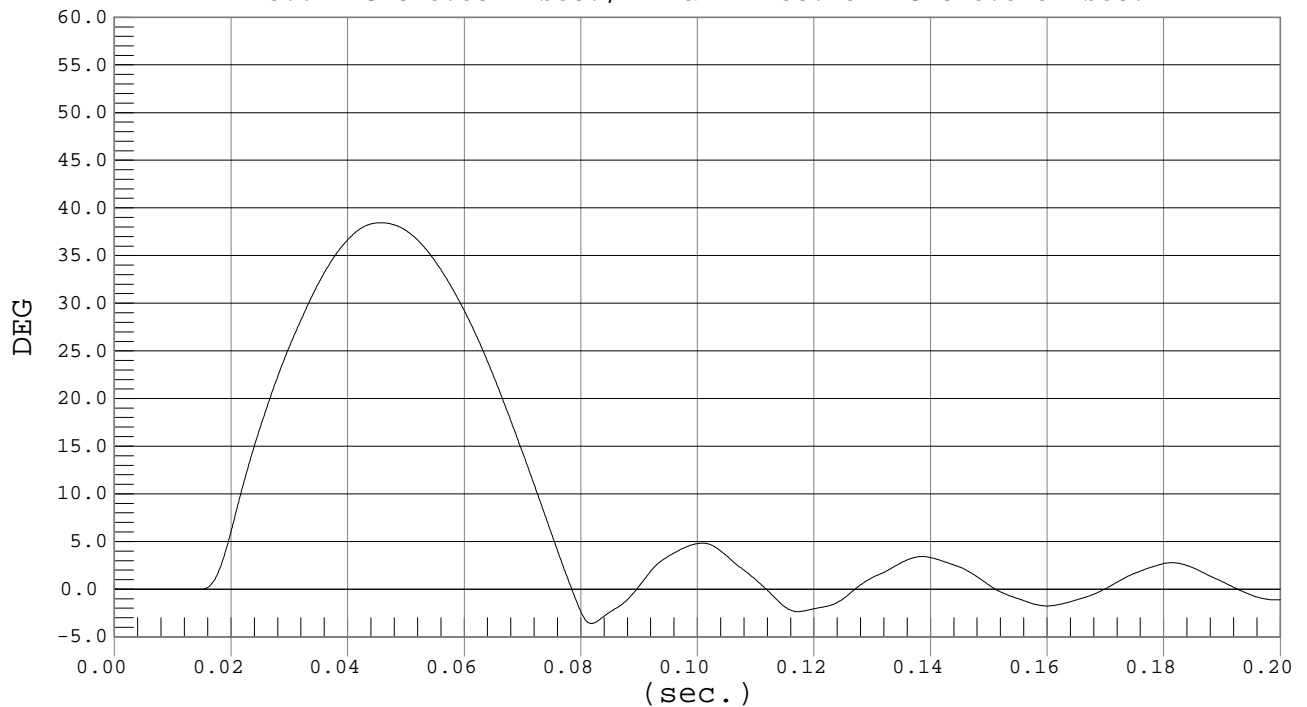


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-06-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -3.6 DEG @ 0.0817 sec., Ymax = 38.45 DEG @ 0.0457 sec.



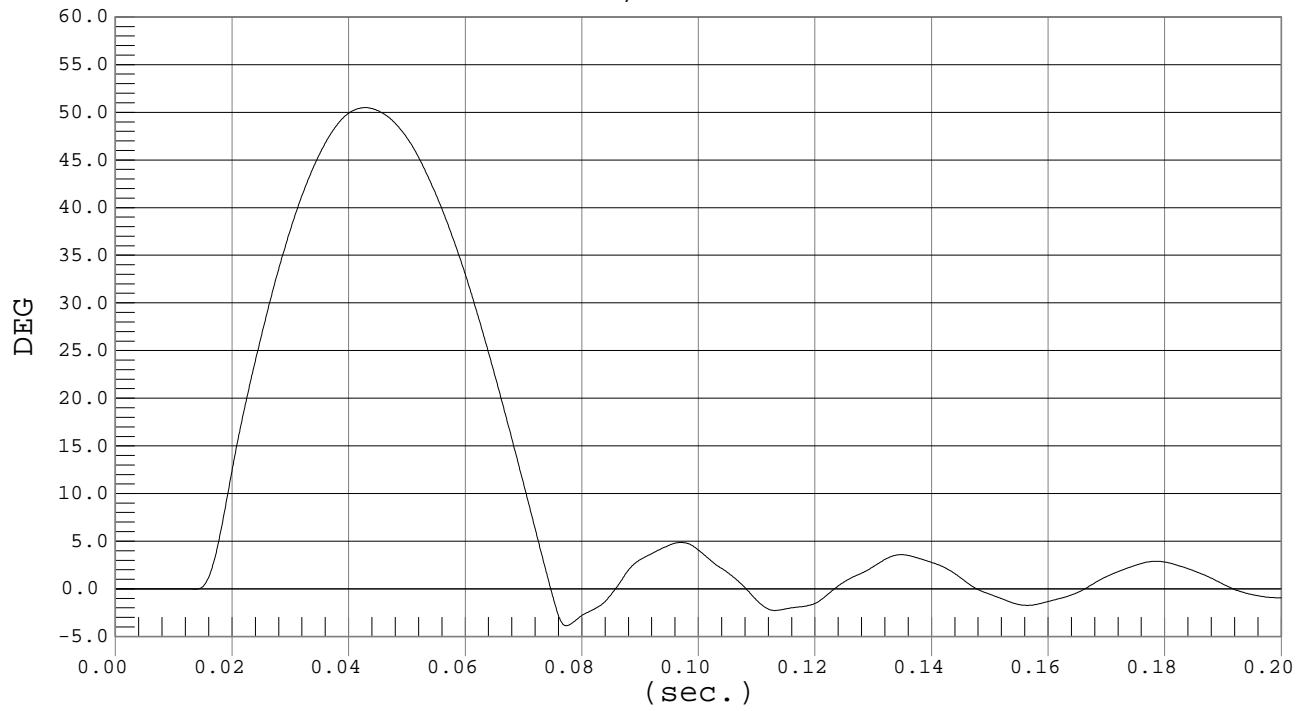


Test Desc.: Rib Module
Component: Dummy #010

UPPER RIB DISPLACEMENT

Test Date: 12-06-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -3.86 DEG @ 0.0772 sec., Ymax = 50.48 DEG @ 0.0428 sec.



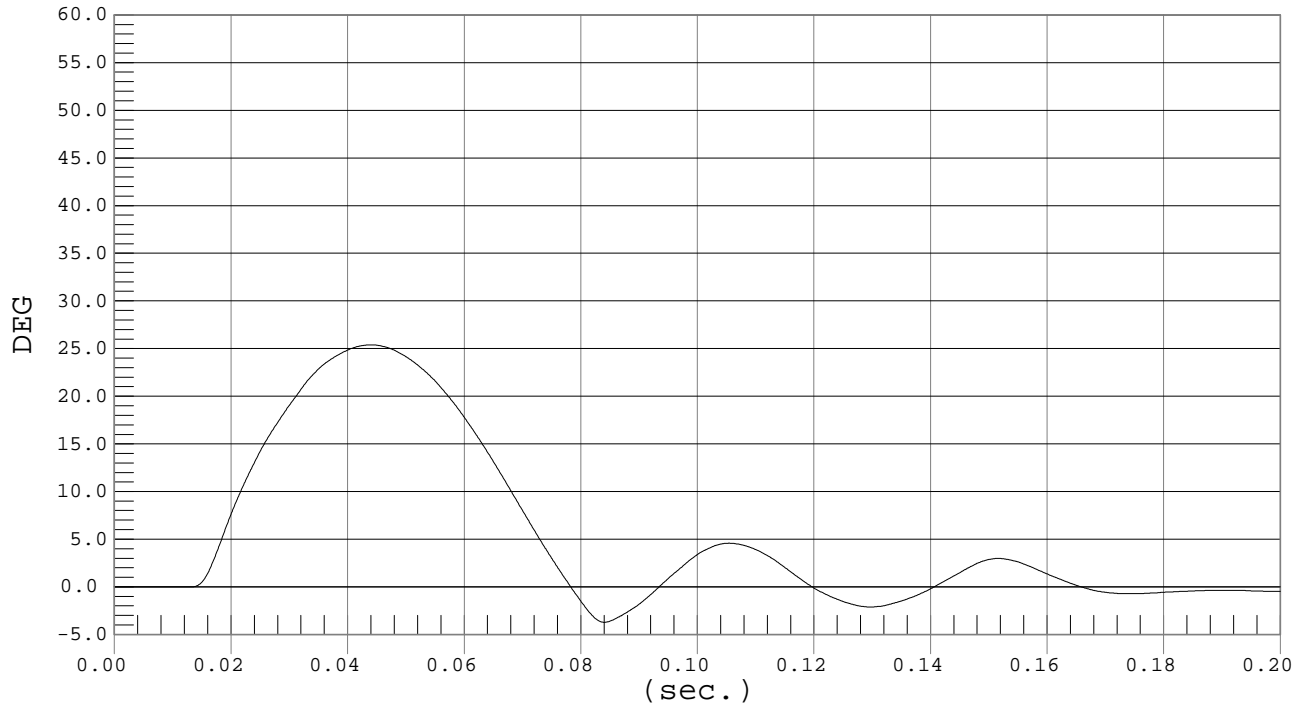


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-06-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -3.72 DEG @ 0.0840 sec., Ymax = 25.4 DEG @ 0.0440 sec.

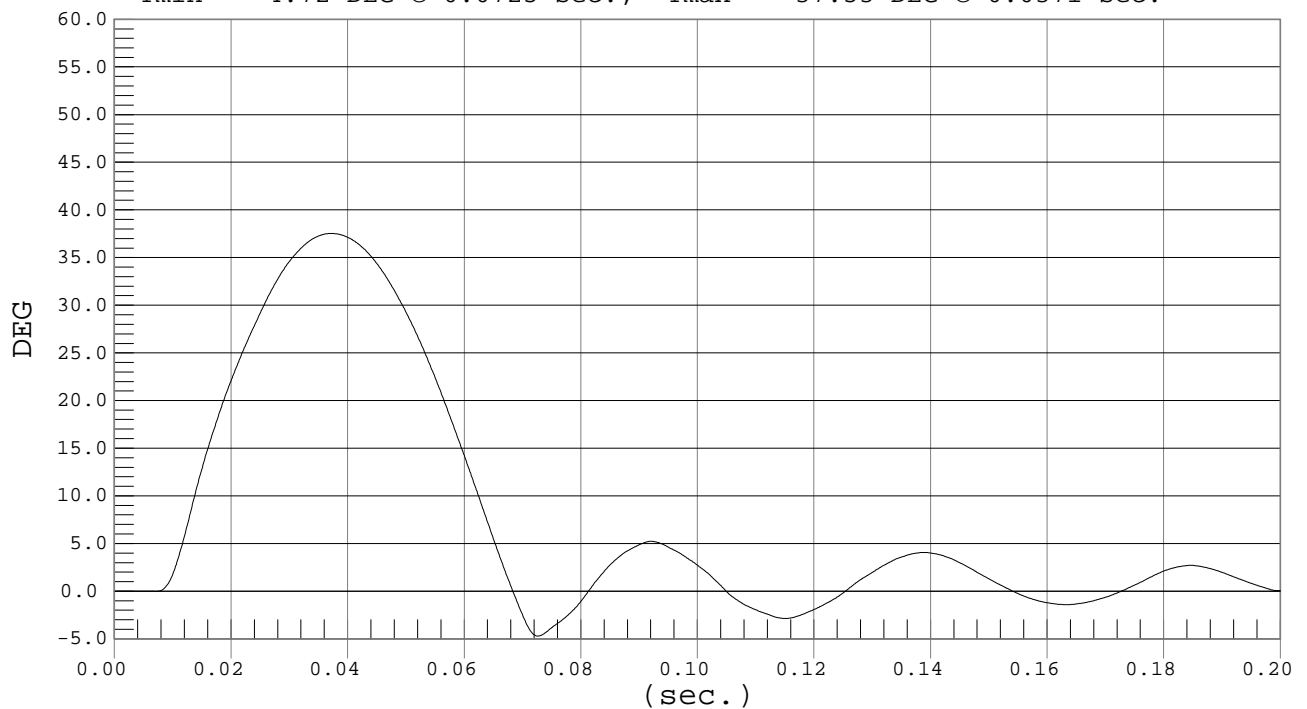


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-06-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -4.72 DEG @ 0.0725 sec., Ymax = 37.53 DEG @ 0.0371 sec.



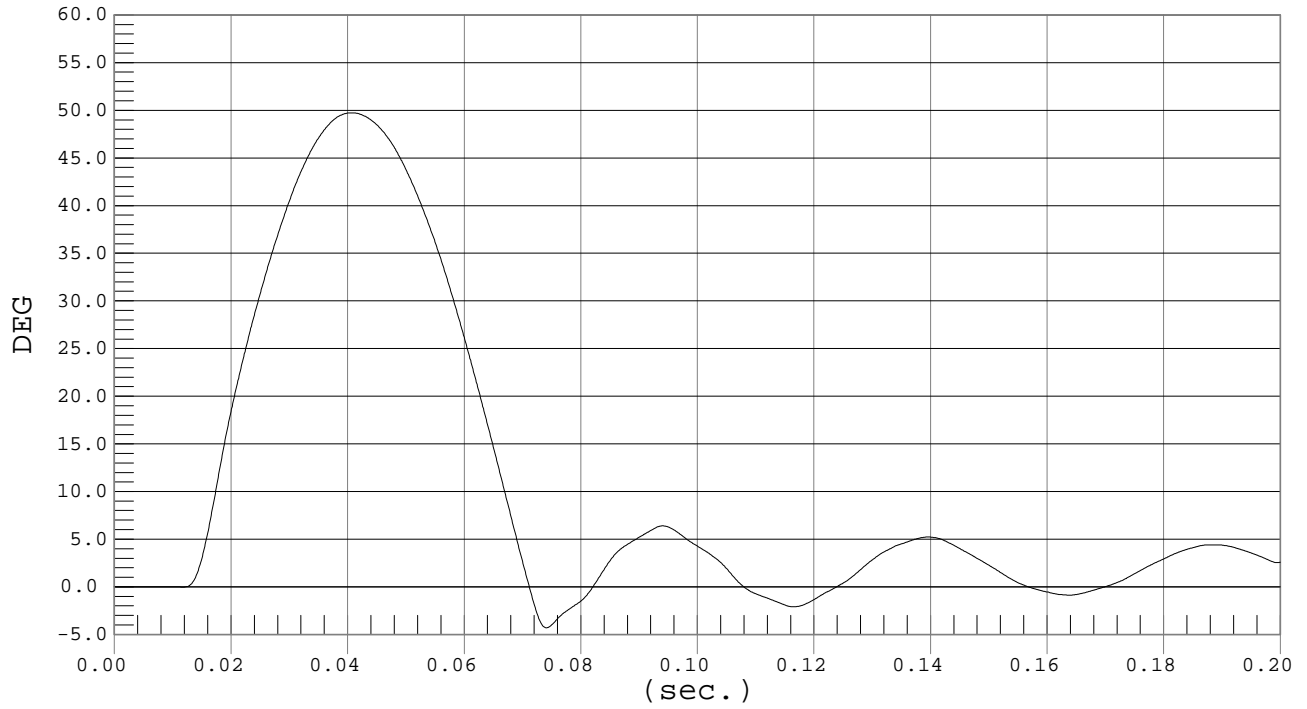


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-06-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -4.3 DEG @ 0.0740 sec., Ymax = 49.74 DEG @ 0.0407 sec.



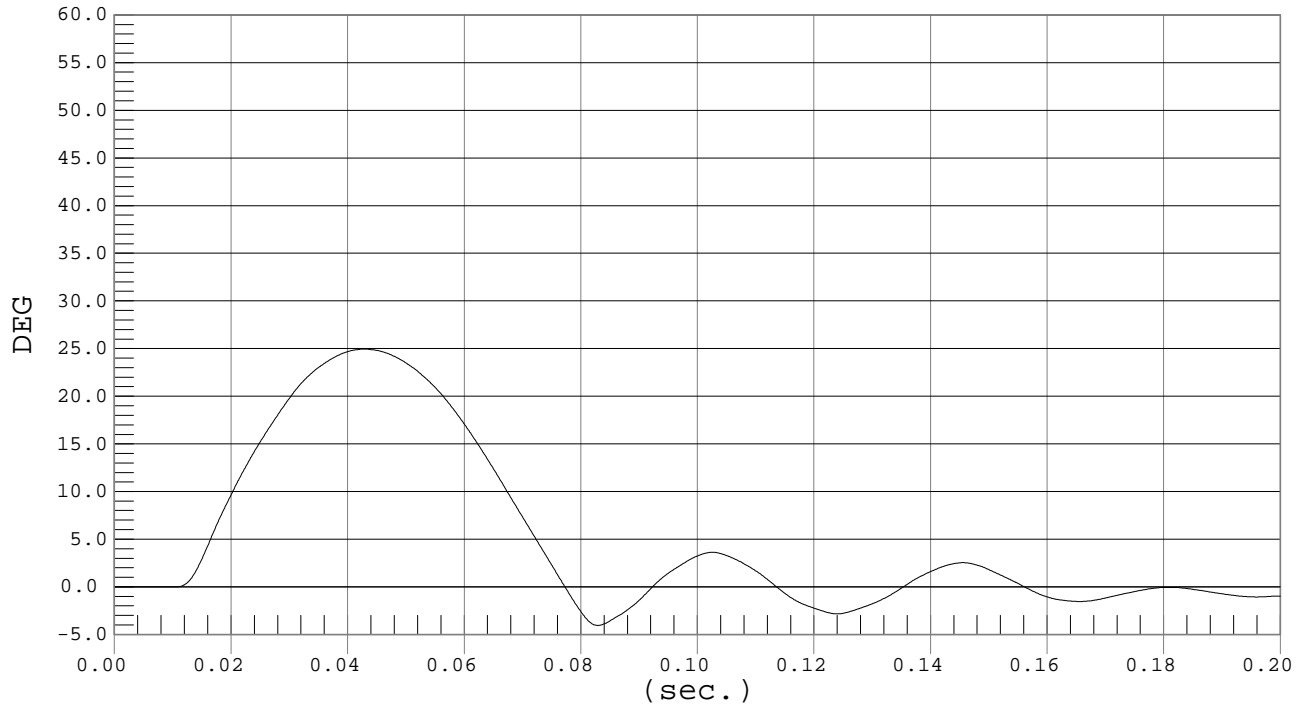


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-06-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -4.05 DEG @ 0.0828 sec., Ymax = 24.95 DEG @ 0.0427 sec.

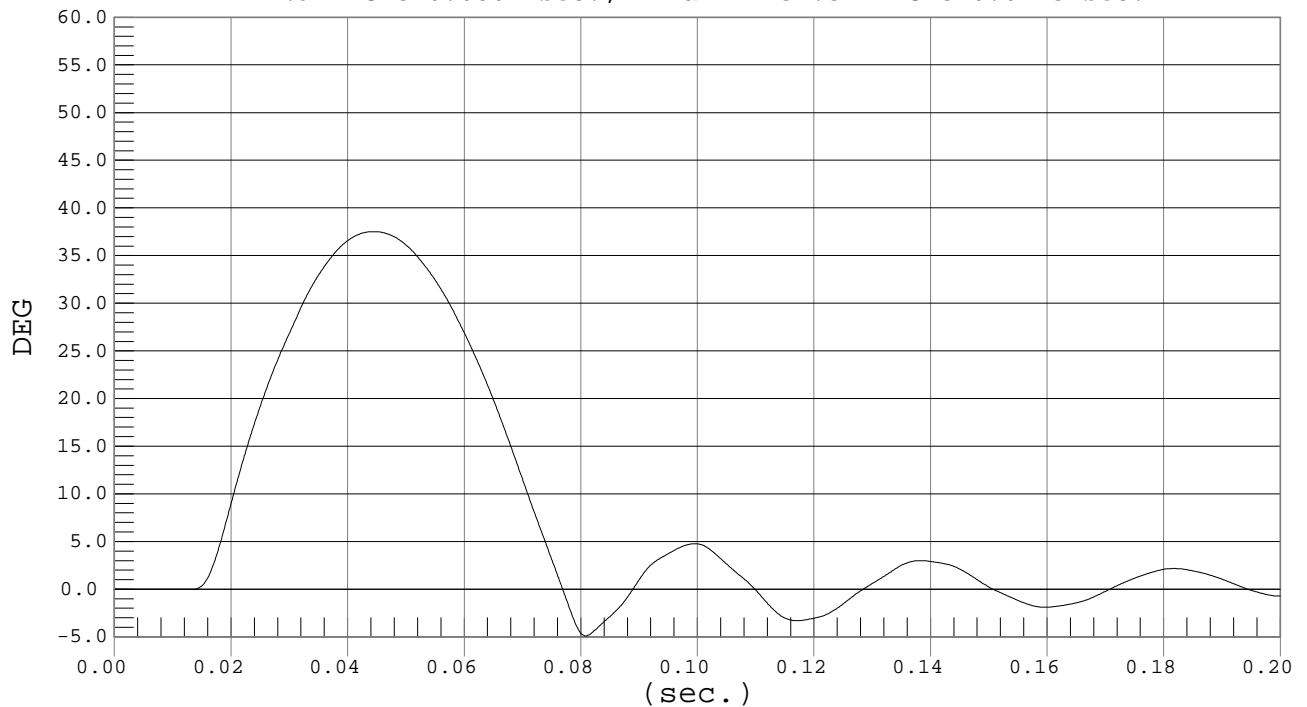


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-06-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -4.9 DEG @ 0.0807 sec., Ymax = 37.51 DEG @ 0.0445 sec.



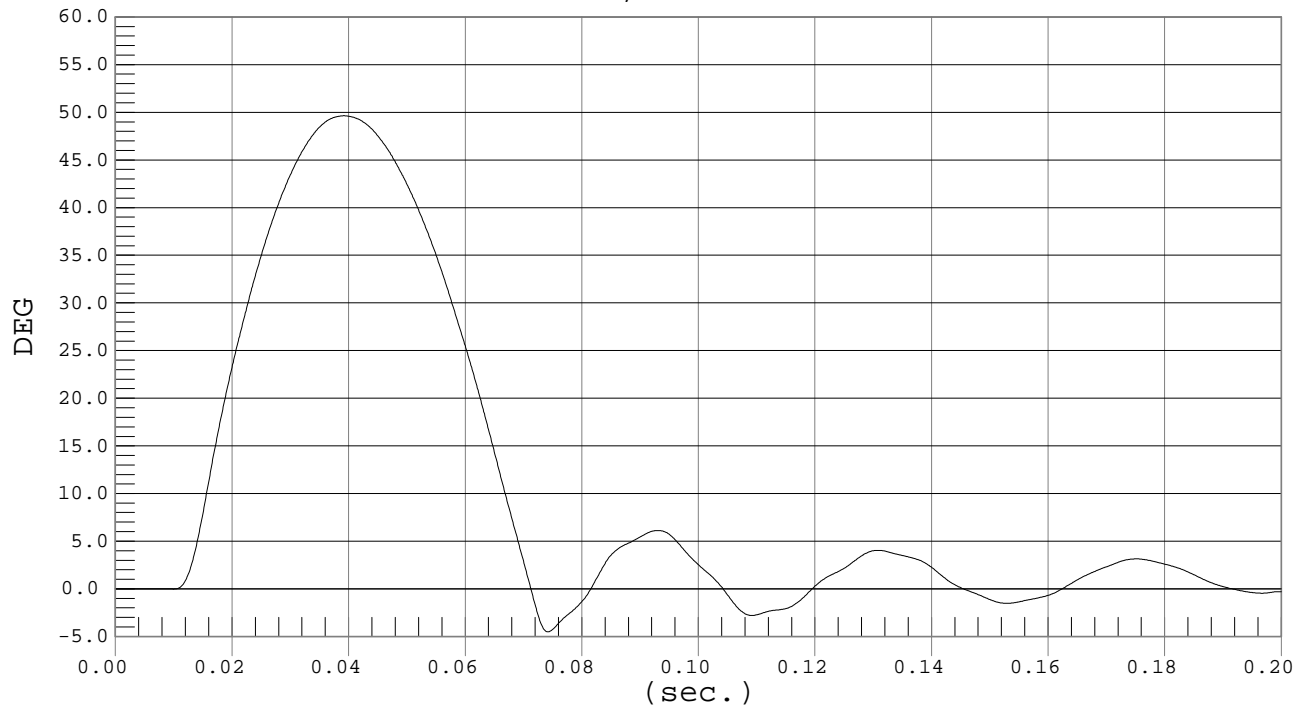


Test Desc.: Rib Module
Component: Dummy #010

LOWER RIB DISPLACEMENT

Test Date: 12-06-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -4.51 DEG @ 0.0741 sec., Ymax = 49.63 DEG @ 0.0391 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 12/6/02
Dummy Serial Number: 010
Test Number: D021547

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.4
Relative Humidity (%)	10 – 70	17
Probe Speed (m/s)	3.90 – 4.10	4.02
Maximum Impact Force	4.00 – 4.80 kN	4.63
Time of Maximum Force	10.60 – 13.00 ms	11.90
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.52
Time of Max. Total Force	10.00 – 12.30 ms	11.90

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

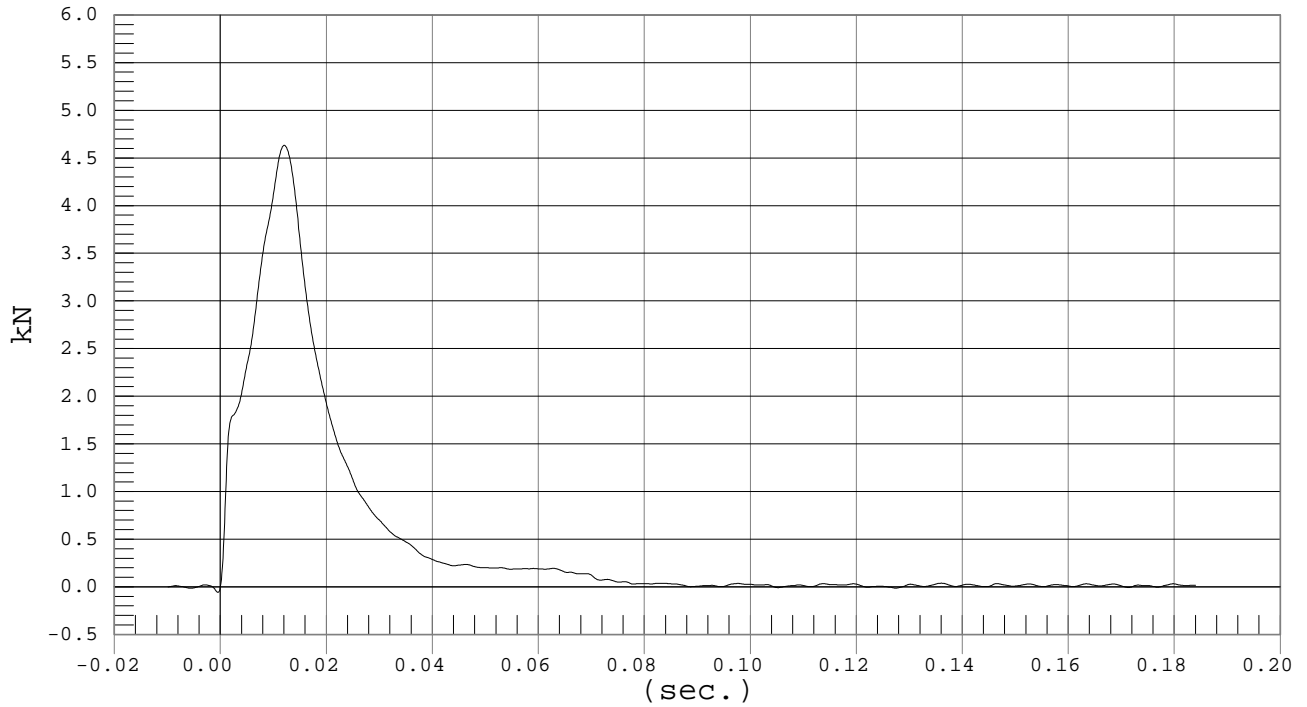


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 12-06-02
Speed: 13.2 fps, 4.02 M/s

Ymin = -.06 kN @ -0.0005 sec., Ymax = 4.63 kN @ 0.0119 sec.

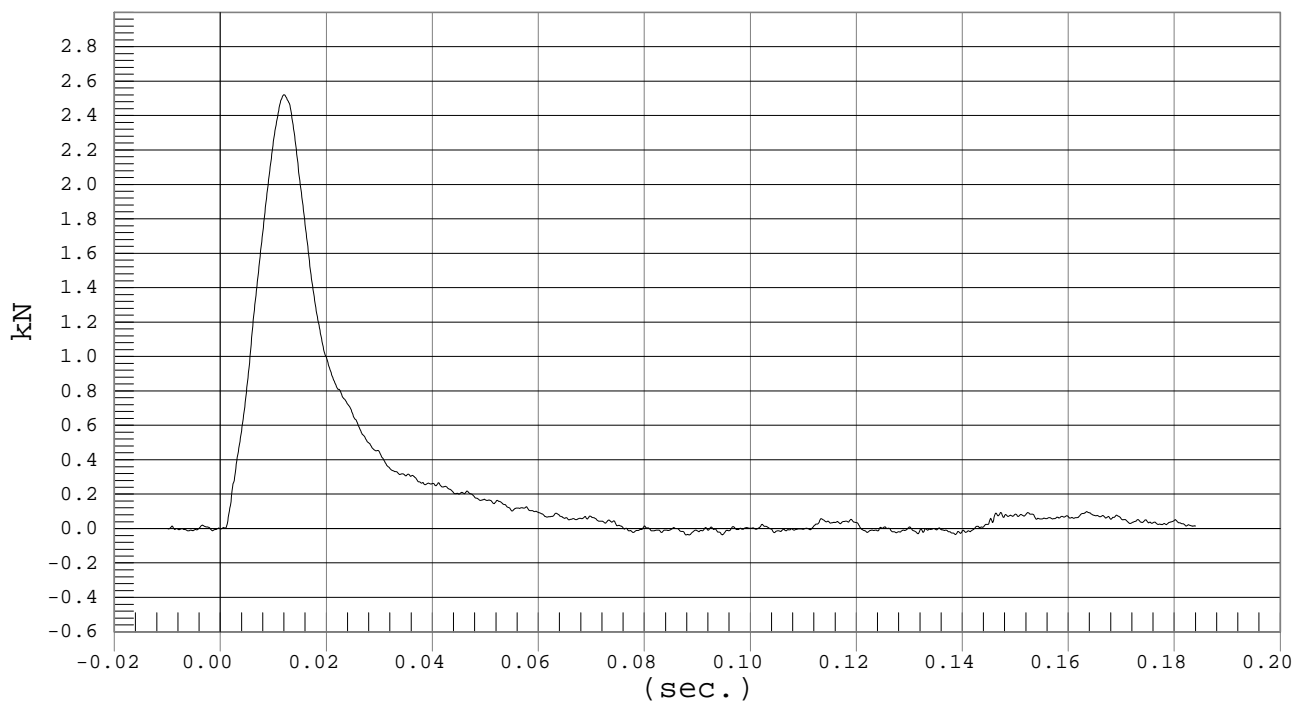


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 12-06-02
Speed: 13.2 fps, 4.02 M/s

Ymin = -.04 kN @ 0.0884 sec., Ymax = 2.52 kN @ 0.0119 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 12/6/02
 Dummy Serial Number: 010
 Test Number: D021548

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	20.9
Relative Humidity (%)		10 – 70	18
Pendulum Speed		5.95 – 6.15	6.08
Pendulum Deceleration	10 msec	-2.46 - -1.59 m/sec	-2.02
	20 msec	-5.25 - -4.07 m/sec	-4.65
	25 msec	-6.64 - -5.30 m/sec	-5.79
	30 msec	≥ -6.5 m/sec	-6.22
Maximum Flexion Angle		45.0 – 55.0 deg	50.4
Time of Max. Flexion Angle		39.0 – 53.0 ms	48.0
Maximum Angle Theta (A)		31.0 – 35.0 deg	32.8
Time of Max. Theta (A)		44.0 – 52.0 ms	44.3
Maximum Angle Theta (B)		28.24– 30.74 deg	29.09
Time of Max. Theta (B)		44.0 – 52.0 ms	49.2

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

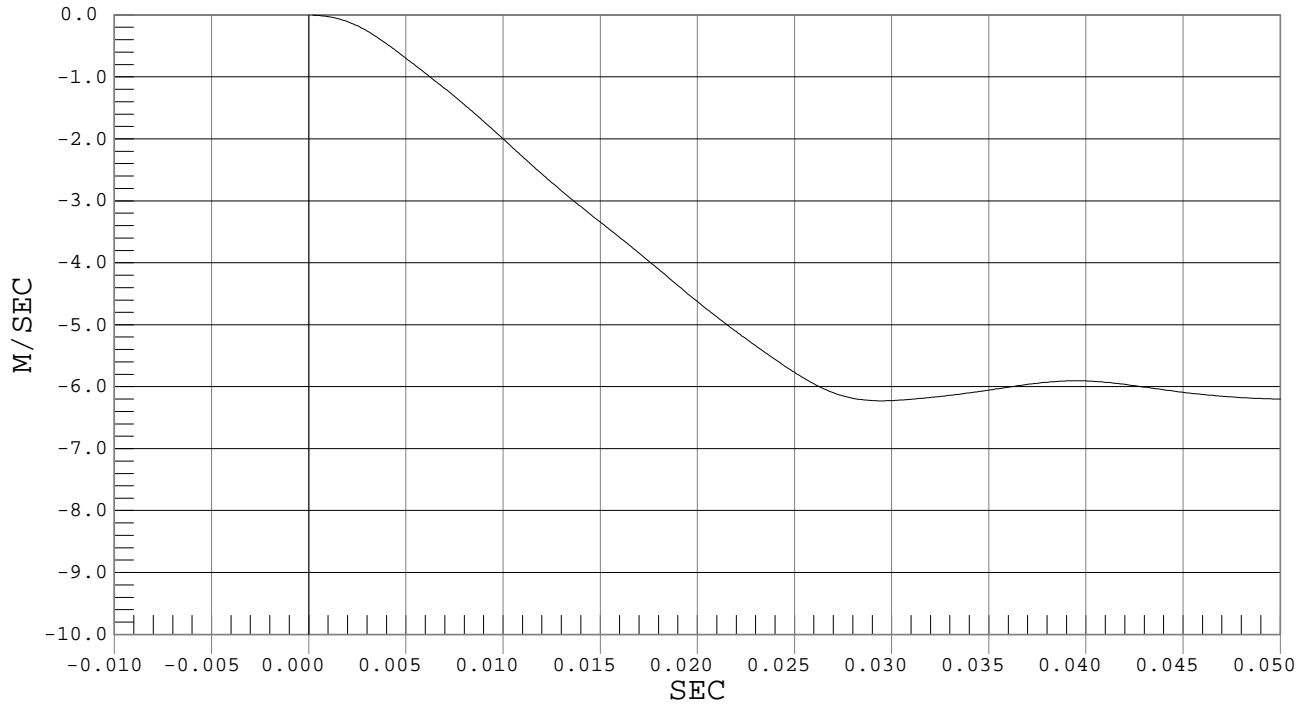


PENDULUM DECELERATION

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 12-06-02
Speed: 19.9 fps, 6.08 M/s

Ymin = -7.59 M/SEC @ 0.1397 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

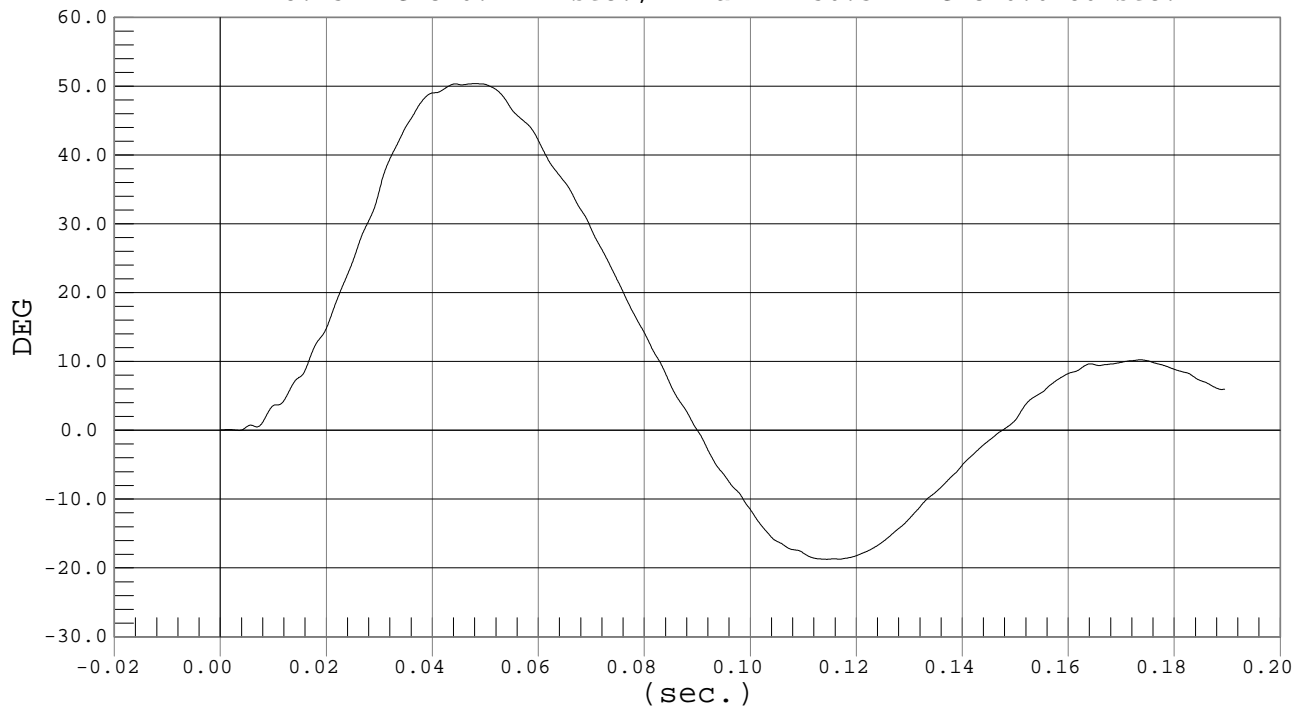


FLEXION ANGLE

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 12-06-02
Speed: 19.9 fps, 6.08 M/s

Ymin = -18.75 DEG @ 0.1144 sec., Ymax = 50.37 DEG @ 0.0480 sec.



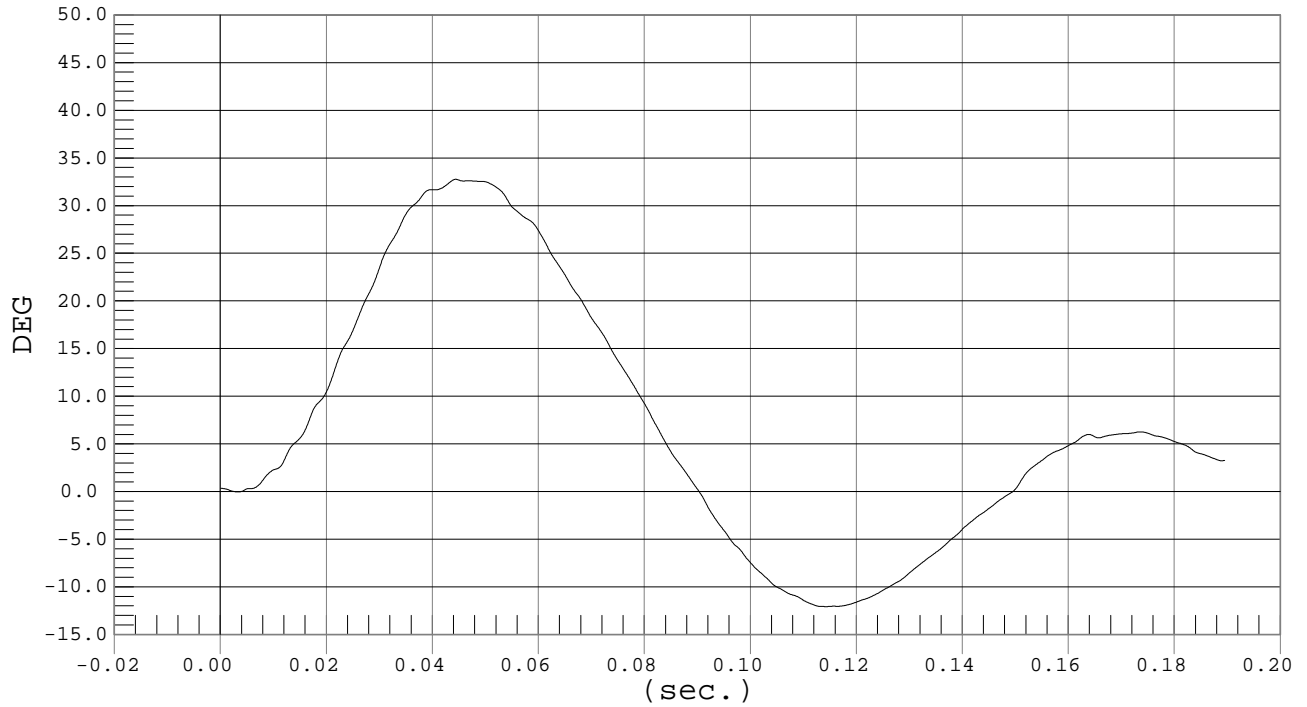


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA A

Test Date: 12-06-02
Speed: 19.9 fps, 6.08 M/s

Ymin = -12.08 DEG @ 0.1142 sec., Ymax = 32.76 DEG @ 0.0443 sec.

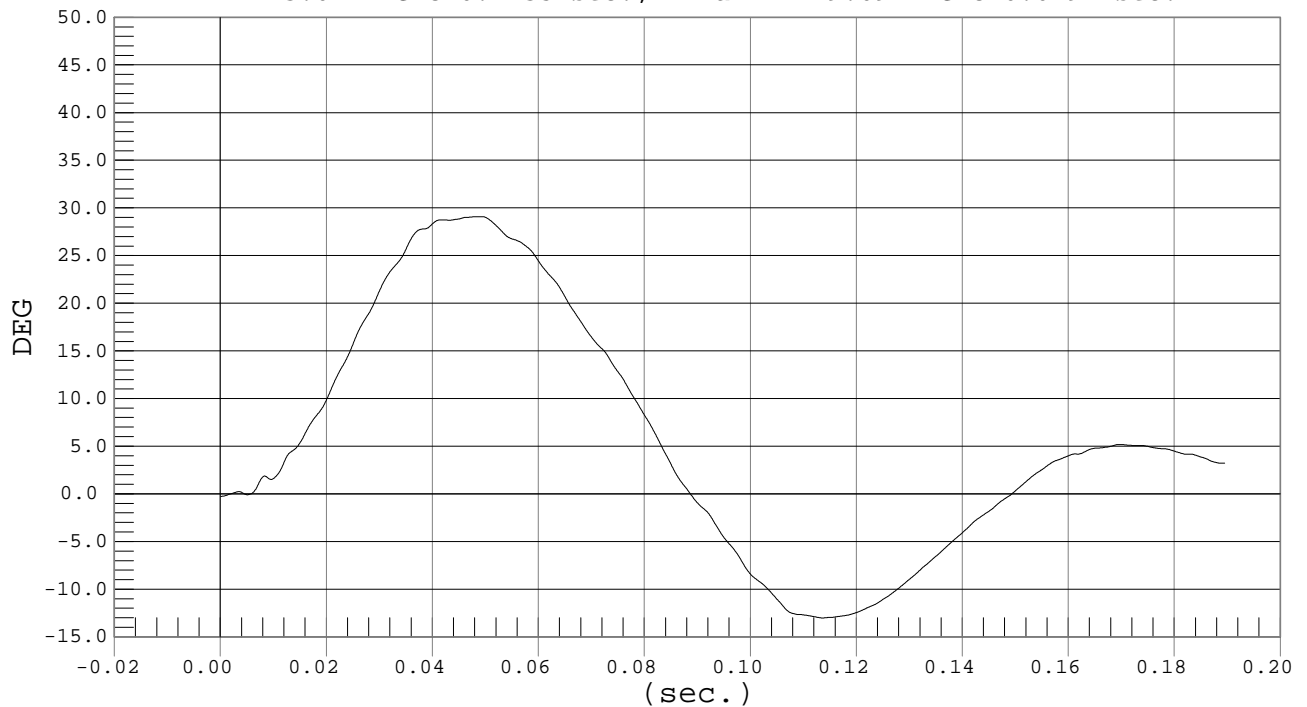


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA B

Test Date: 12-06-02
Speed: 19.9 fps, 6.08 M/s

Ymin = -13.02 DEG @ 0.1135 sec., Ymax = 29.09 DEG @ 0.0492 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 12/6/02
Dummy Serial Number: 010
Test Number: D021549

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.4
Relative Humidity (%)	10 – 70	17
Pendulum Speed	4.20 – 4.40 m/s	4.30
Maximum Impactor Force	4.40 – 5.40 kN	5.00
Time of Max. Impactor Force	10.30 – 15.50 ms	13.4
Maximum Pubic Force	1.04 – 1.64 kN	1.51
Time of Max. Pubic Force	9.90 – 15.90 ms	13.70

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

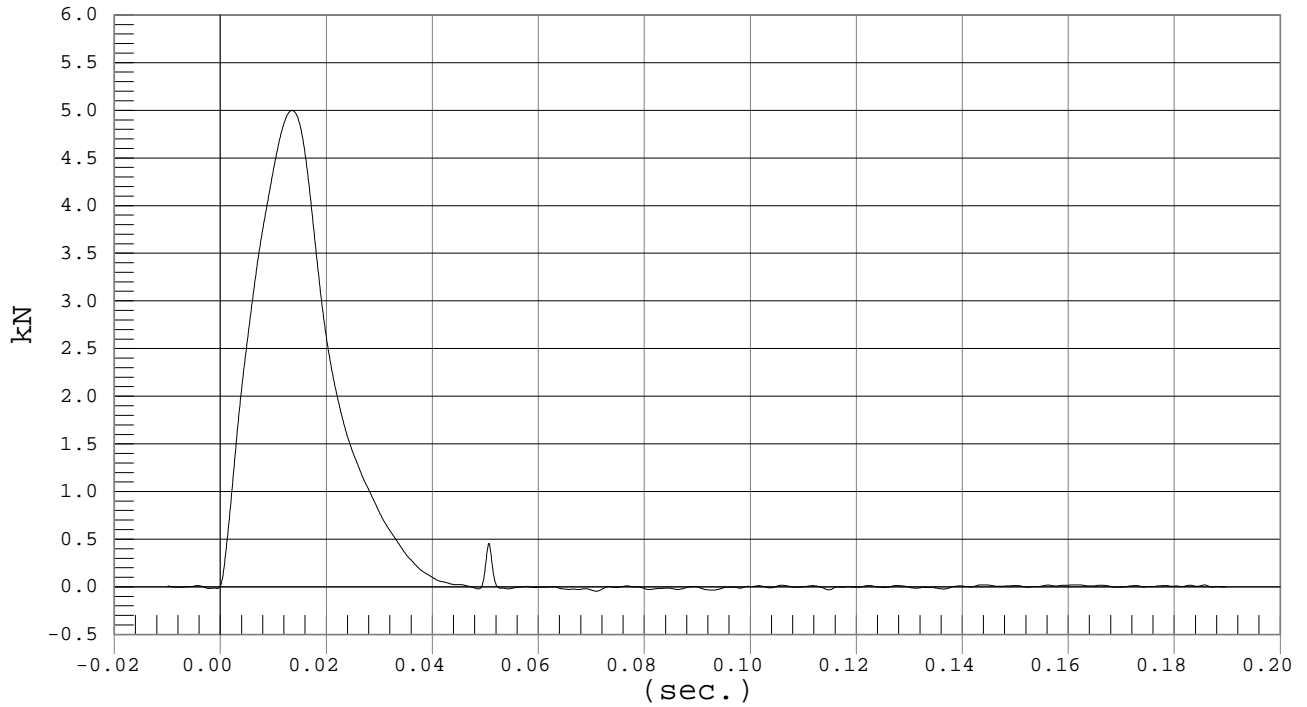


IMPACTOR FORCE

Test Desc.: Pelvis Impact
Component: Dummy #010

Test Date: 12-06-02
Speed: 14.1 fps, 4.30 M/s

Ymin = -.05 kN @ 0.0709 sec., Ymax = 5 kN @ 0.0134 sec.

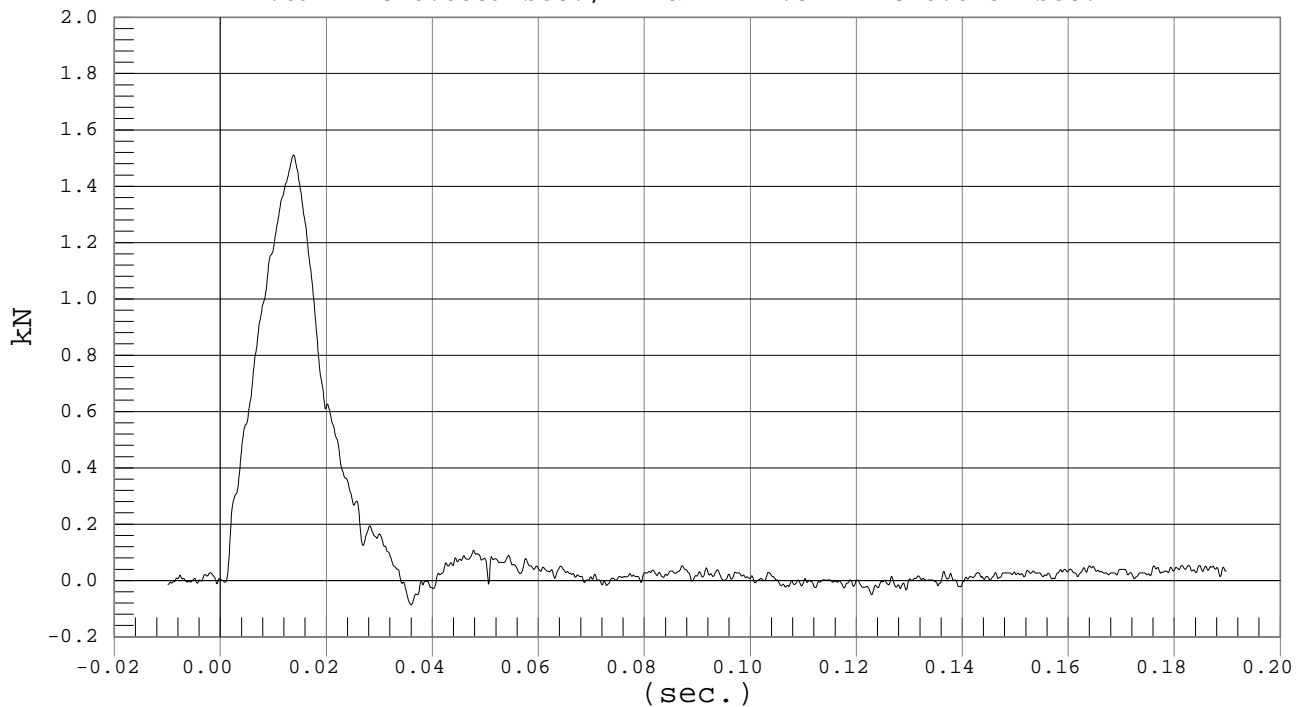


PUBIC FORCE

Test Desc.: Pelvis Impact
Component: Dummy #010

Test Date: 12-06-02
Speed: 14.1 fps, 4.30 M/s

Ymin = -.09 kN @ 0.0359 sec., Ymax = 1.51 kN @ 0.0137 sec.



CERTIFICATION DATA

Dummy Serial Number: 009

Calibration Test Results Summary

Dummy Serial Number: 009

Post-Test Calibration

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

MGA RESEARCH CORPORATION
HEAD DROP TEST
EUROSID 2 DUMMY

Date: 12/11/02

Dummy Serial Number: 009

Test Number: D021592

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.8
Relative Humidity (%)	10 – 70	21
Peak Resultant Acceleration	100 – 150 g's	142
Time of Max. Res. Acceleration	msec	2.4

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

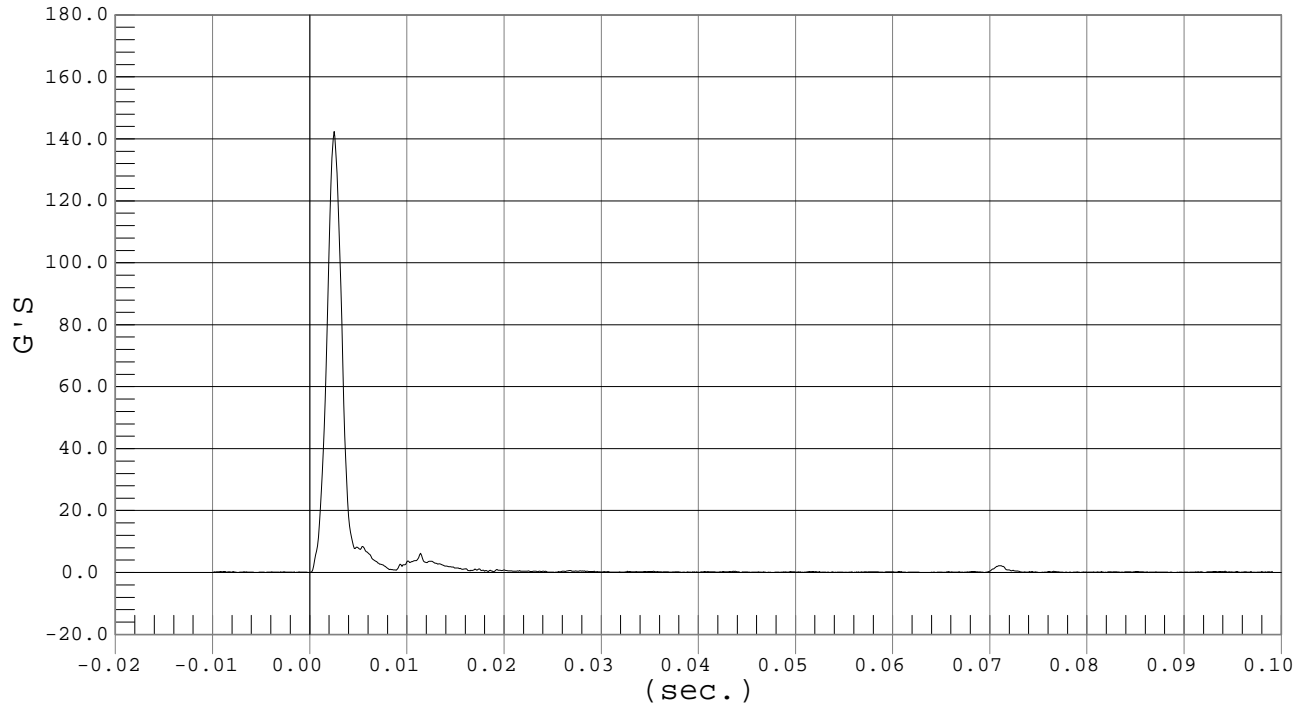


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #009

Test Date: 12-11-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .05 G'S @ -0.0076 sec., Ymax = 142.37 G'S @ 0.0024 sec.



MGA RESEARCH CORPORATION
 NECK PENDULUM TEST
 EUROSID 2 DUMMY

Date: 12/12/02
 Dummy Serial Number: 009
 Test Number: D021592

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.6
Relative Humidity (%)		10 – 70	23
Pendulum Speed		3.3 - 3.5	3.4
Pendulum Deceleration	3 msec	~.25 - ~.53 m/sec	-.32
	8 msec	~1.59 - ~2.04 m/sec	-1.73
	14 msec	~3.20 - ~3.85 m/sec	-3.40
Maximum Flexion Angle		49.0 – 59.0 deg	57.6
Time of Max. Flexion Angle		54.0 – 66.0 ms	60.2
Maximum Angle Theta (A)		32.0 – 37.0 deg	34.6
Time of Max. Theta (A)		53.0 – 63.0 ms	58.2
Maximum Angle Theta (B)		29.78 – 32.28 deg	31.60
Time of Max. Theta (B)		54.0 – 64.0 ms	56.3

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

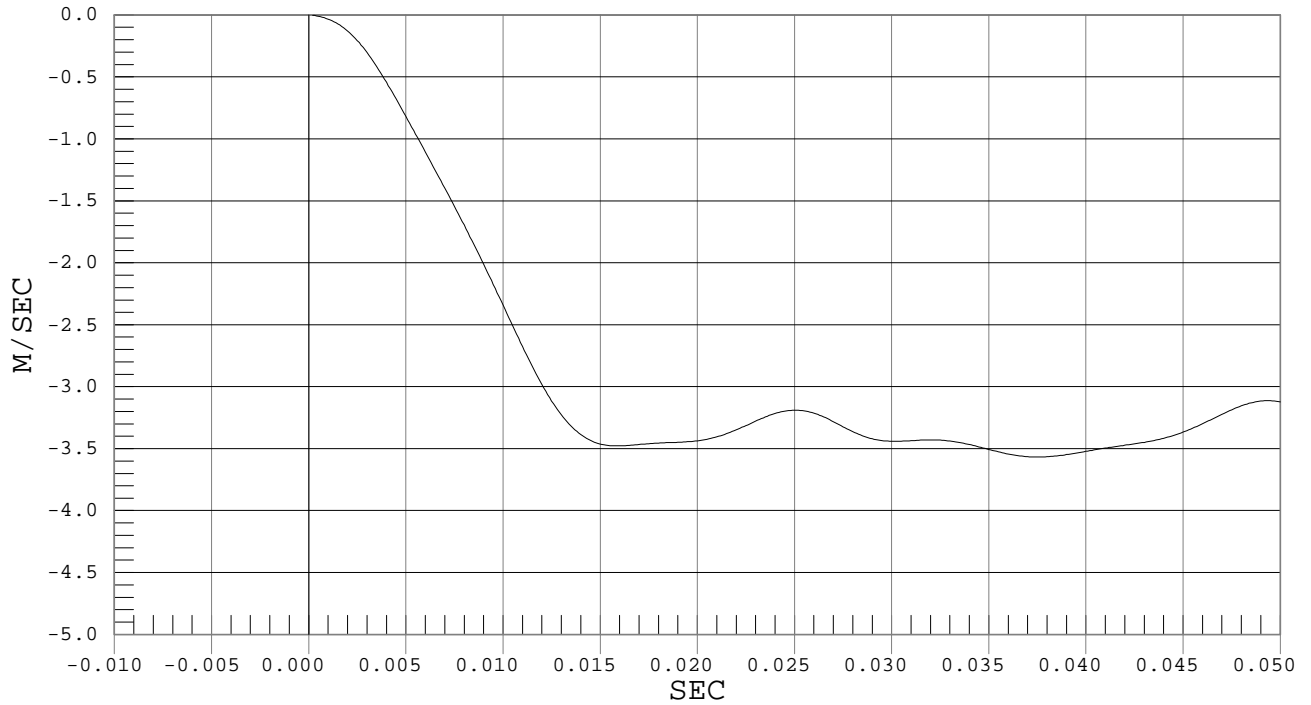


PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 12-12-02
Speed: 11.1 fps, 3.38 M/s

Ymin = -4.45 M/SEC @ 0.0198 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

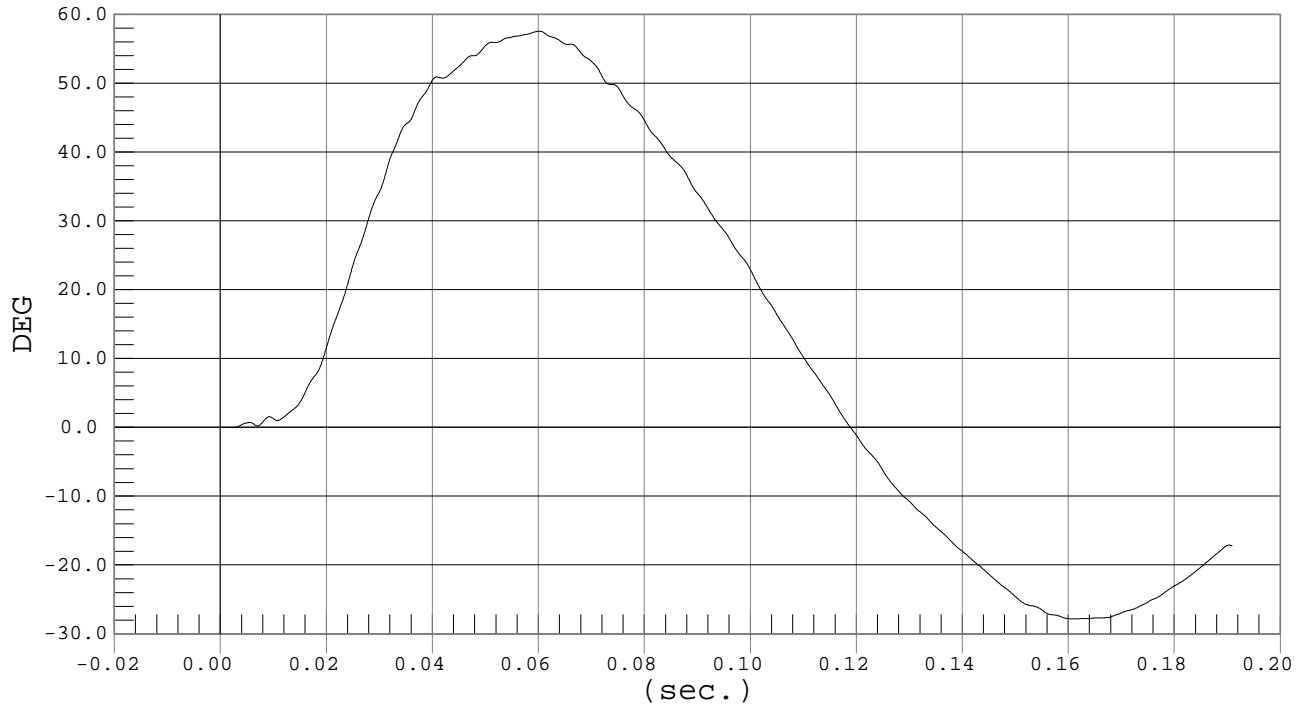


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 12-12-02
Speed: 11.1 fps, 3.38 M/s

Ymin = -27.83 DEG @ 0.1609 sec., Ymax = 57.55 DEG @ 0.0602 sec.



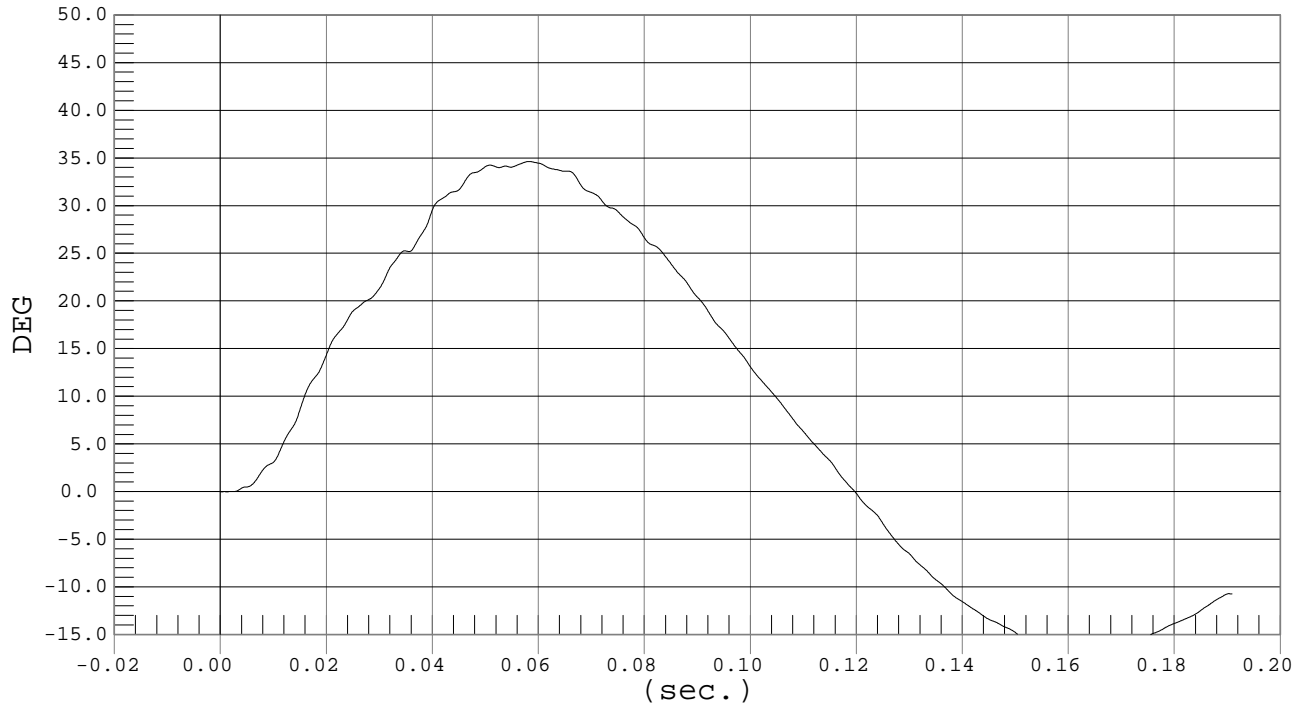


Test Desc.: Neck Bending
Component: Dummy #009

THETA A

Test Date: 12-12-02
Speed: 11.1 fps, 3.38 M/s

Ymin = -16.64 DEG @ 0.1665 sec., Ymax = 34.62 DEG @ 0.0582 sec.

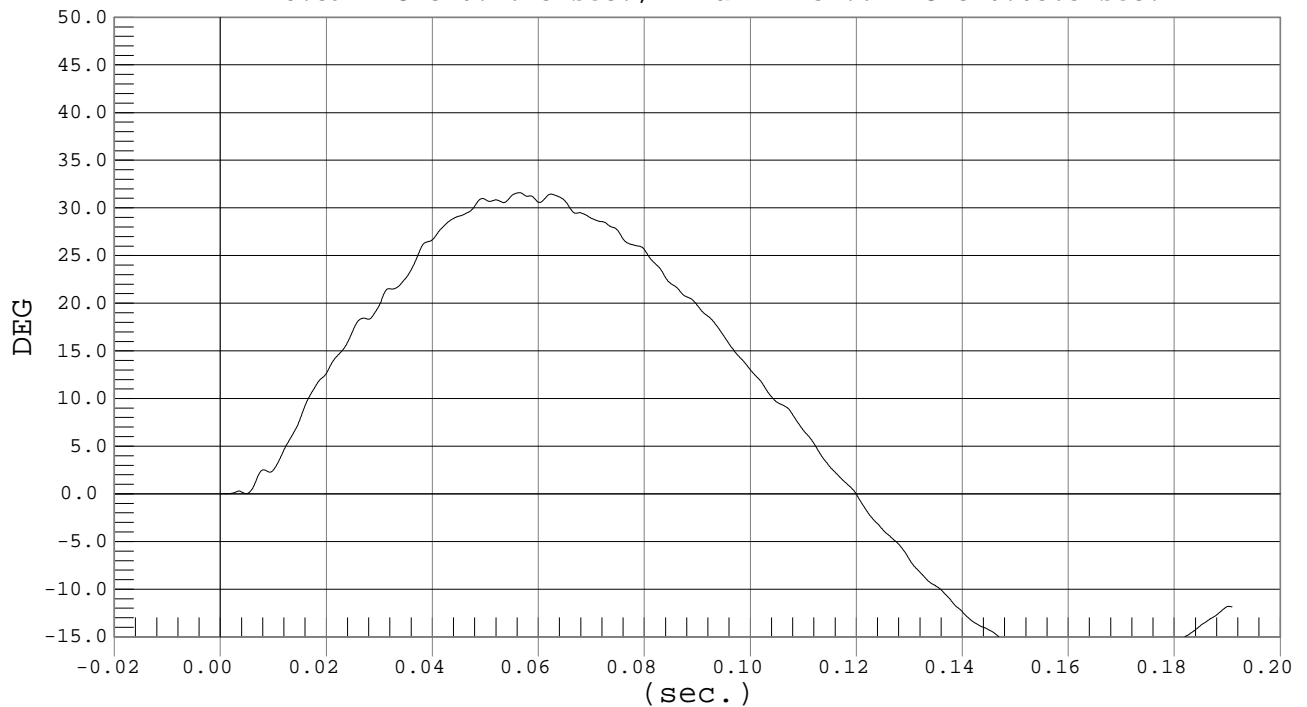


Test Desc.: Neck Bending
Component: Dummy #009

THETA B

Test Date: 12-12-02
Speed: 11.1 fps, 3.38 M/s

Ymin = -18.59 DEG @ 0.1615 sec., Ymax = 31.6 DEG @ 0.0563 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 12/11/02

Dummy Serial Number: 009

Test Number: D021593

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.5
Relative Humidity (%)	10 – 70	20
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max. Resultant Acceleration	7.5 – 10.5 g's	10.3
Time of Max. Pendulum Acceleration	msec	15.3

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

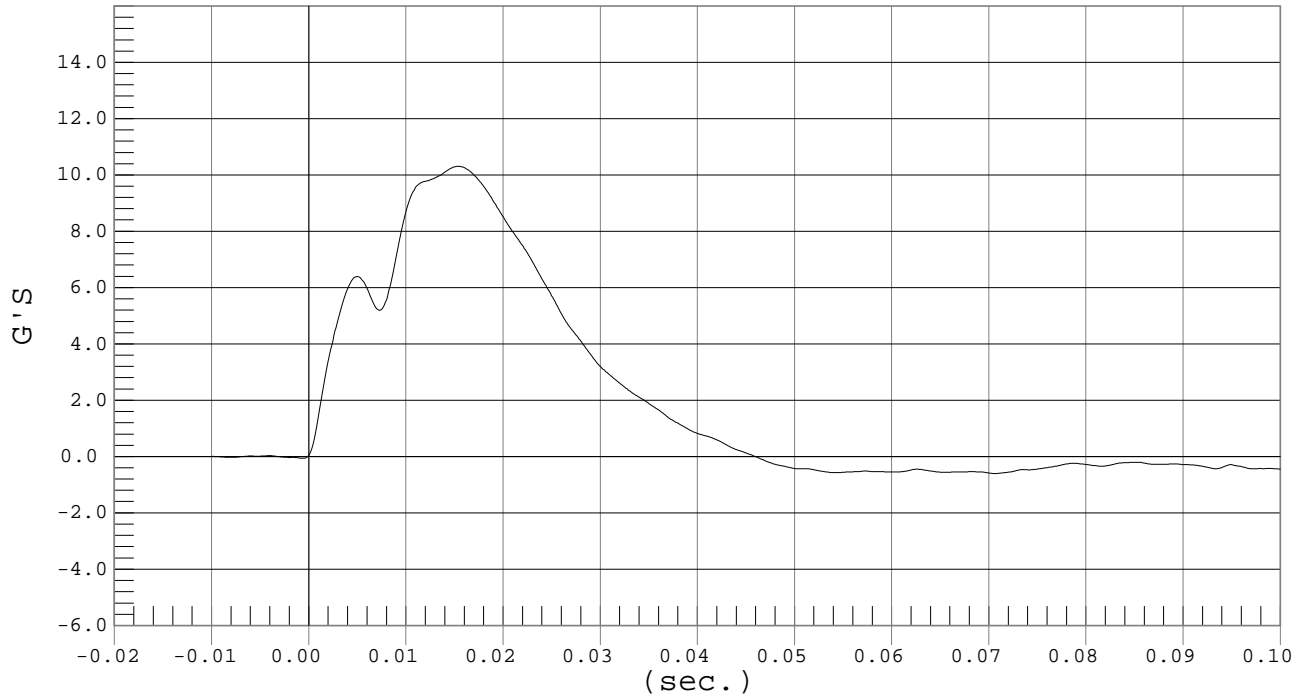


SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #009

Test Date: 12-11-02
Speed: 14.2 fps, 4.31 M/s

Ymin = -0.6 G'S @ 0.0705 sec., Ymax = 10.31 G'S @ 0.0153 sec.



MGA RESEARCH CORPORATION
 UPPER/MIDDLE/LOWER RIB TESTS
 EUROSID 2 DUMMY

Date: 12/12/02
 Dummy Serial Number: 009
 Test Number: D021594/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.7
Relative Humidity (%)	10 – 70	21
Displacement at 2 m/s	23.5 – 27.5 mm	25.5
Displacement at 3 m/s	36.0 – 40.0 mm	39.1
Displacement at 4 m/s	46.0 – 51.0 mm	47.6

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.7
Relative Humidity (%)	10 – 70	21
Displacement at 2 m/s	23.5 – 27.5 mm	27.1
Displacement at 3 m/s	36.0 – 40.0 mm	39.7
Displacement at 4 m/s	46.0 – 51.0 mm	50.6

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.7
Relative Humidity (%)	10 – 70	21
Displacement at 2 m/s	23.5 – 27.5 mm	24.0
Displacement at 3 m/s	36.0 – 40.0 mm	36.6
Displacement at 4 m/s	46.0 – 51.0 mm	48.0

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

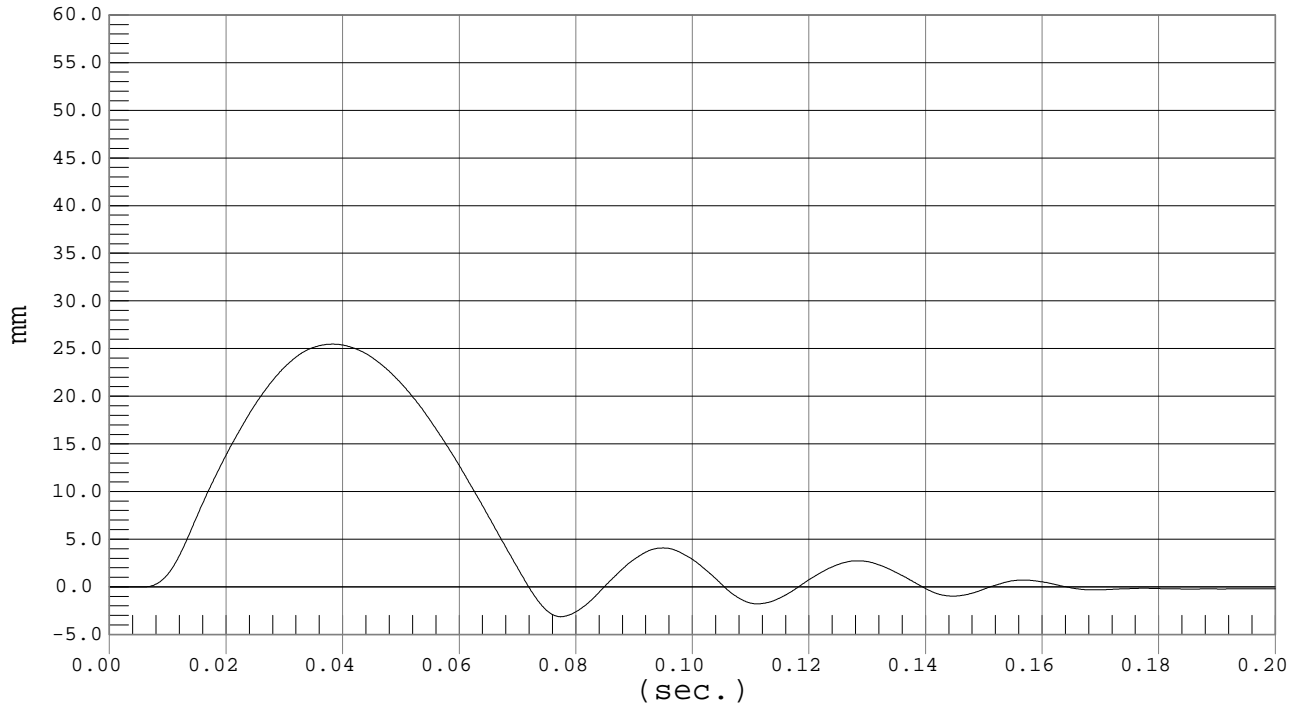


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 12-12-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -3.14 mm @ 0.0773 sec., Ymax = 25.46 mm @ 0.0382 sec.

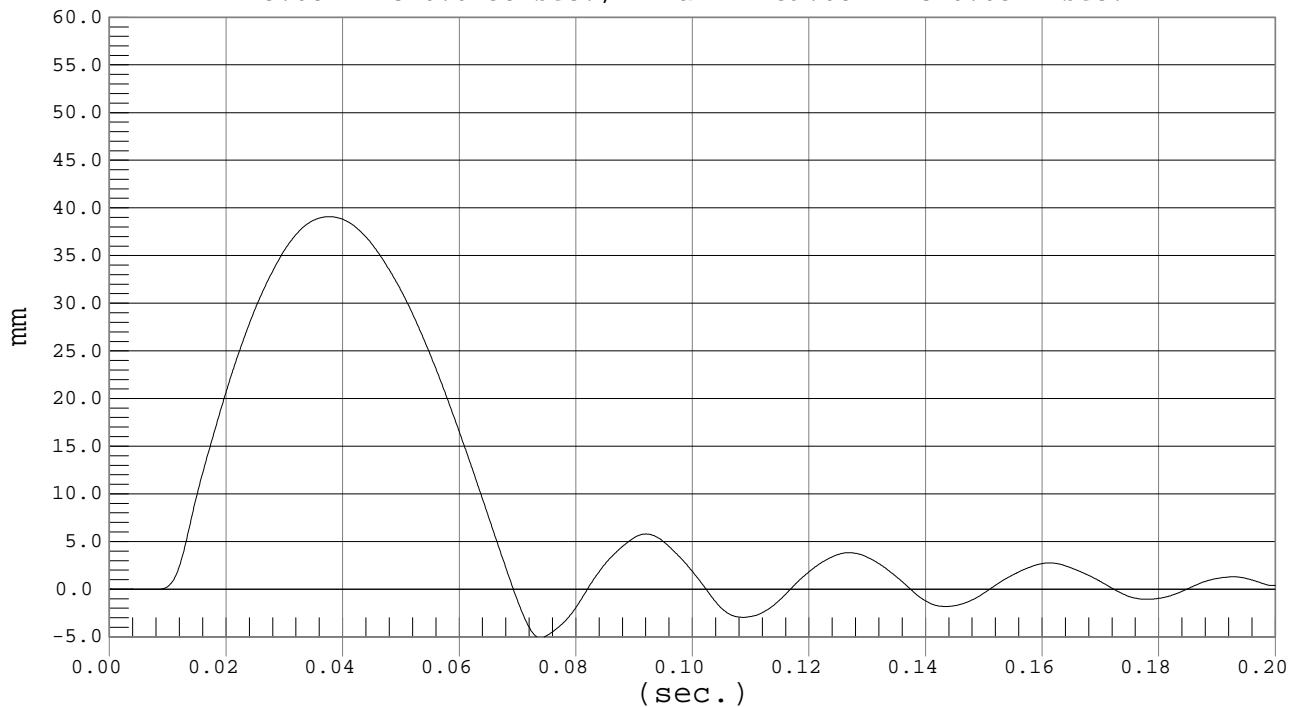


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 12-12-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -5.08 mm @ 0.0738 sec., Ymax = 39.08 mm @ 0.0377 sec.



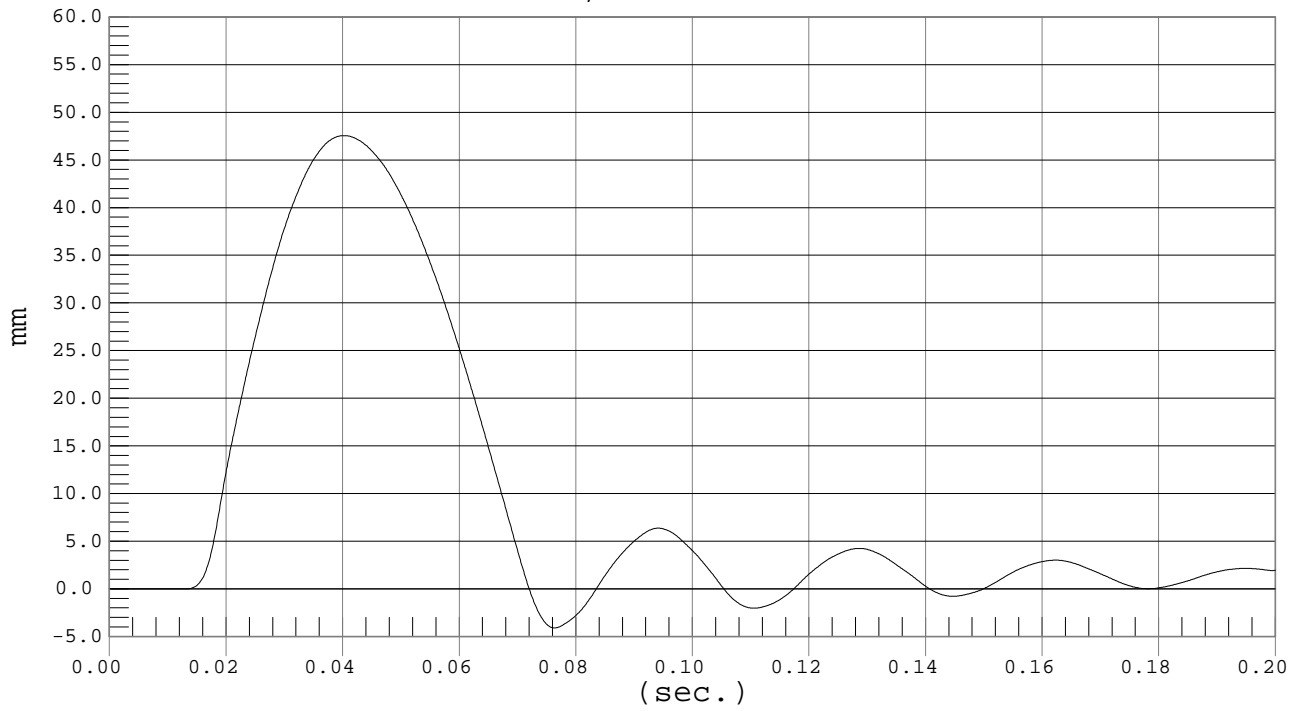


Test Desc.: Rib Module
Component: Dummy #009

UPPER RIB DISPLACEMENT

Test Date: 12-12-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -4.1 mm @ 0.0762 sec., Ymax = 47.56 mm @ 0.0402 sec.



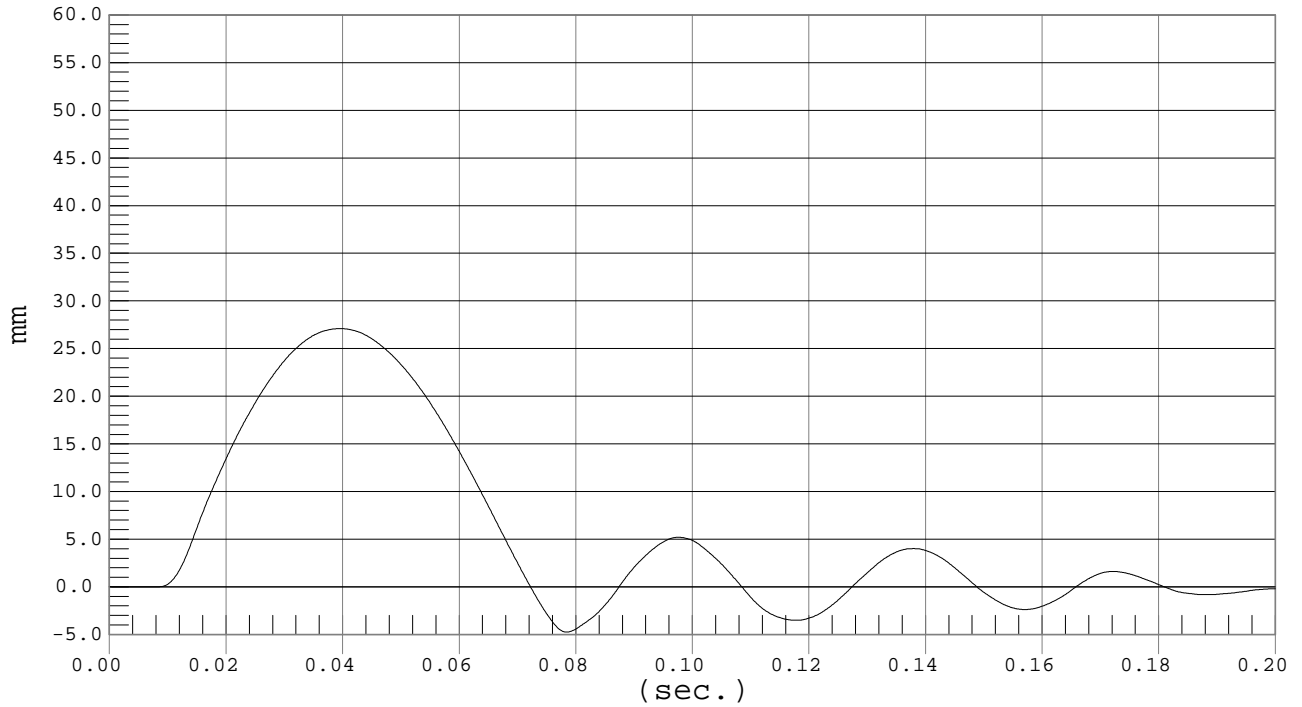


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 12-12-02
Speed: 6.5 fps, 1.98 M/s

Ymin = -4.74 mm @ 0.0783 sec., Ymax = 27.1 mm @ 0.0397 sec.

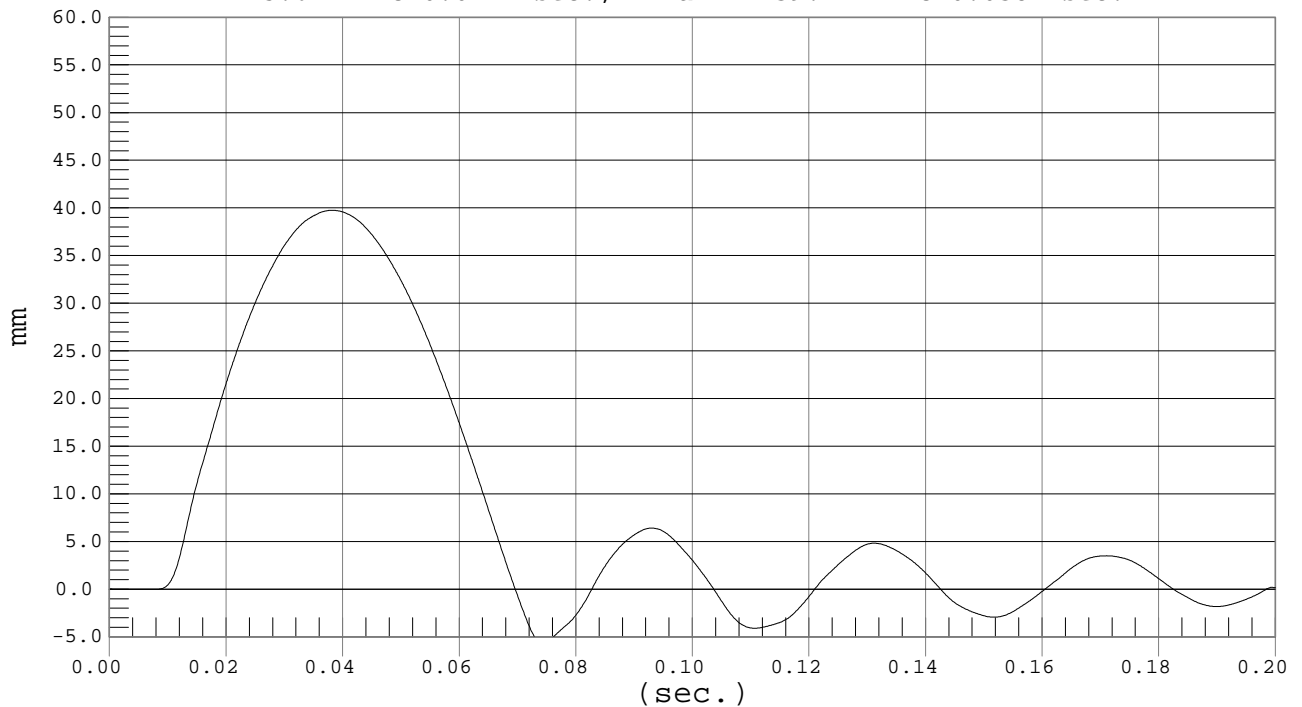


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 12-12-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -5.61 mm @ 0.0742 sec., Ymax = 39.74 mm @ 0.0381 sec.



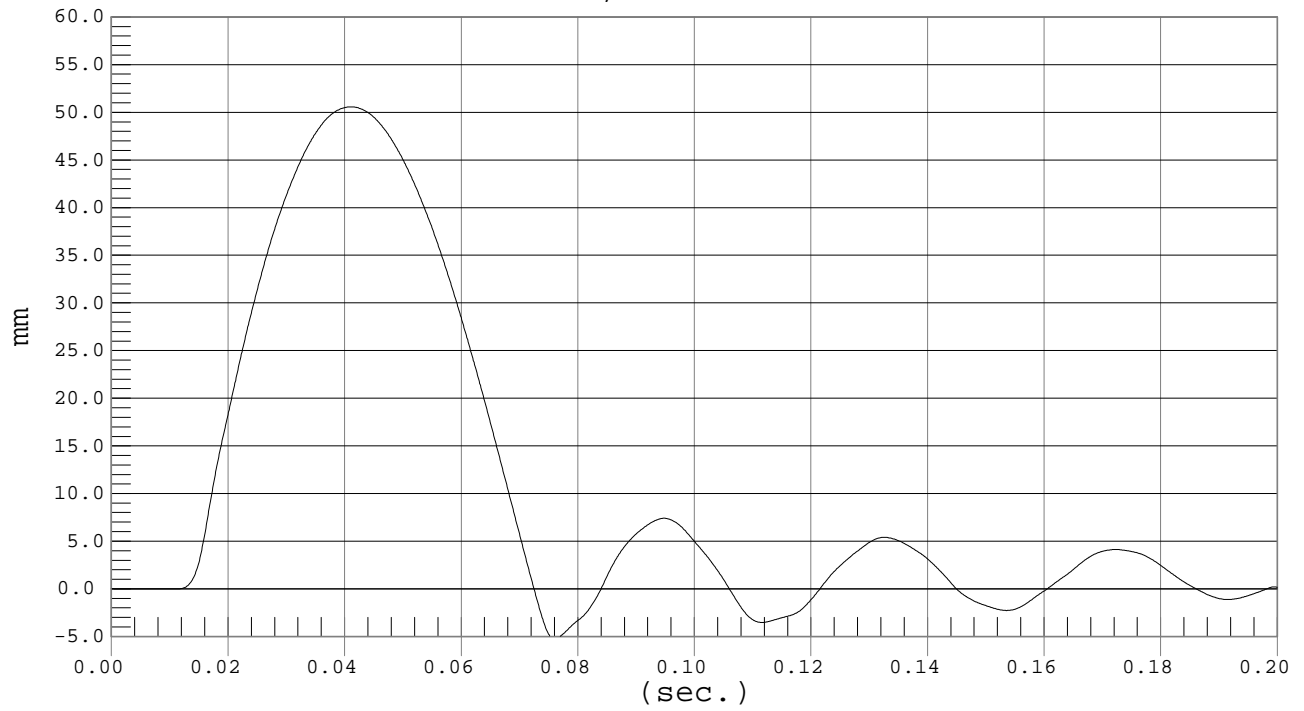


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 12-12-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -5.24 mm @ 0.0759 sec., Ymax = 50.56 mm @ 0.0410 sec.



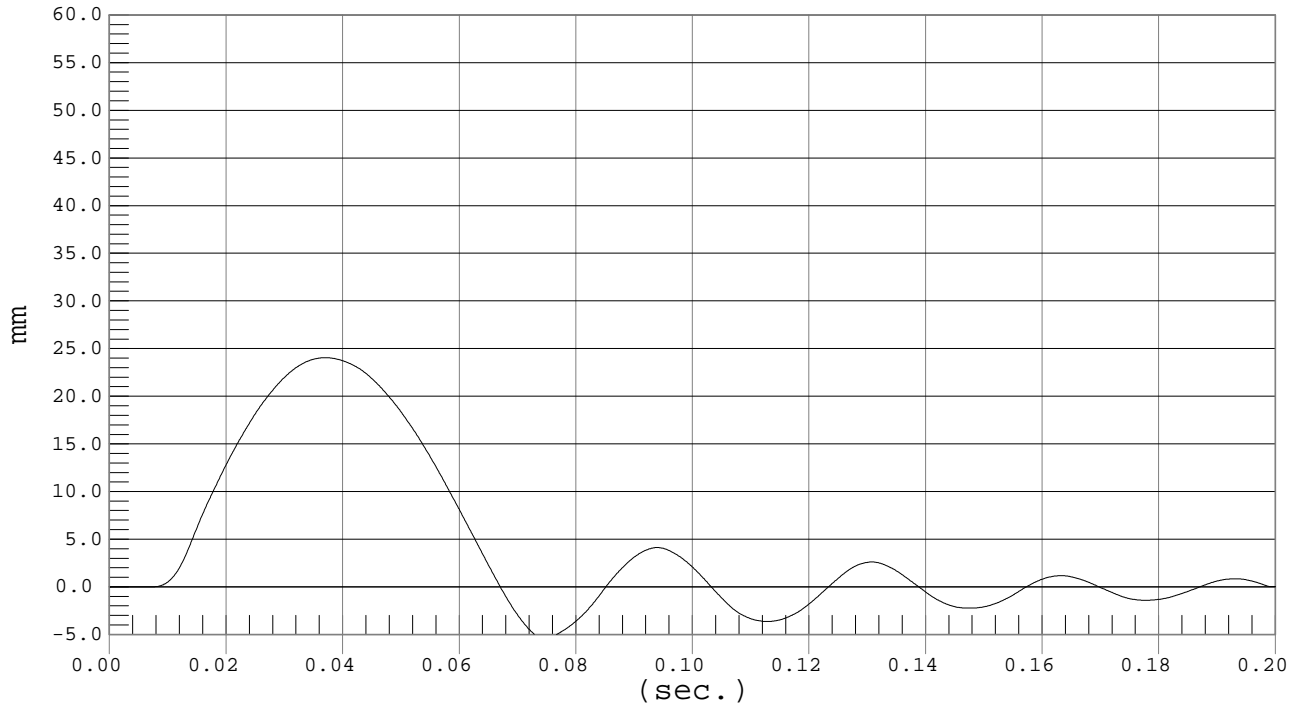


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 12-12-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -5.41 mm @ 0.0746 sec., Ymax = 24.04 mm @ 0.0369 sec.

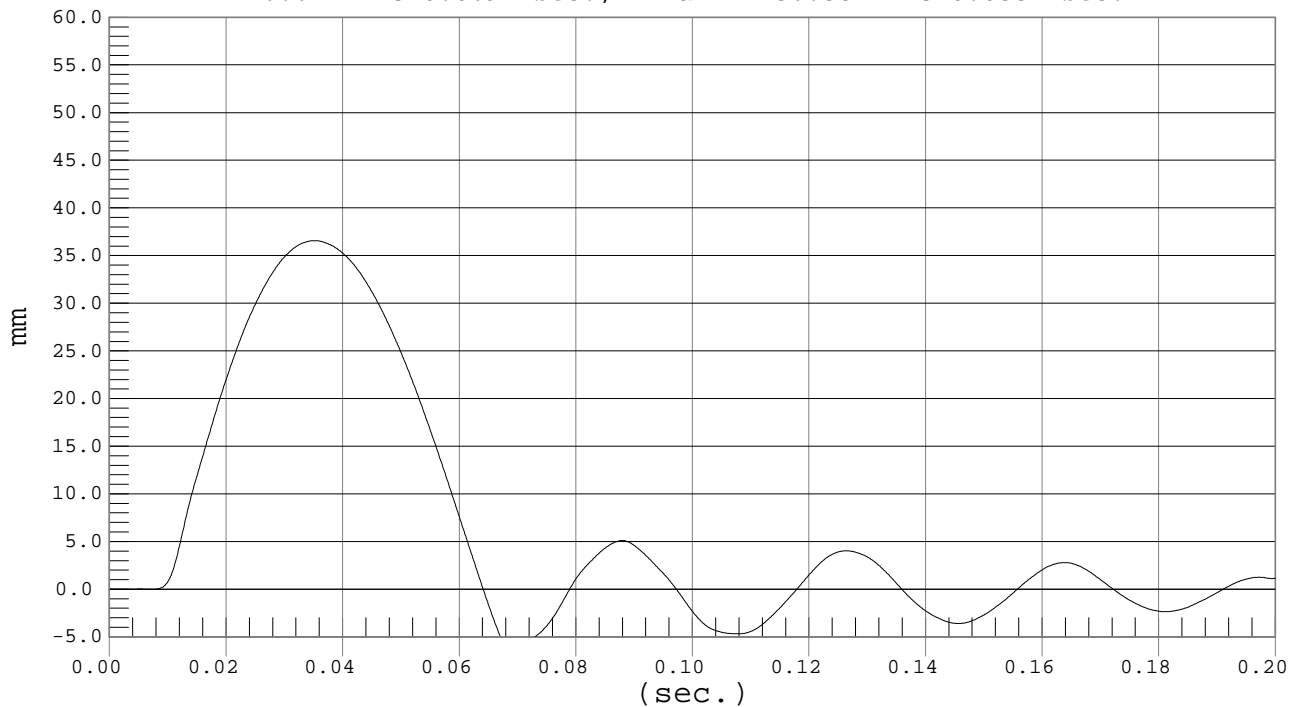


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 12-12-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.61 mm @ 0.0692 sec., Ymax = 36.58 mm @ 0.0351 sec.



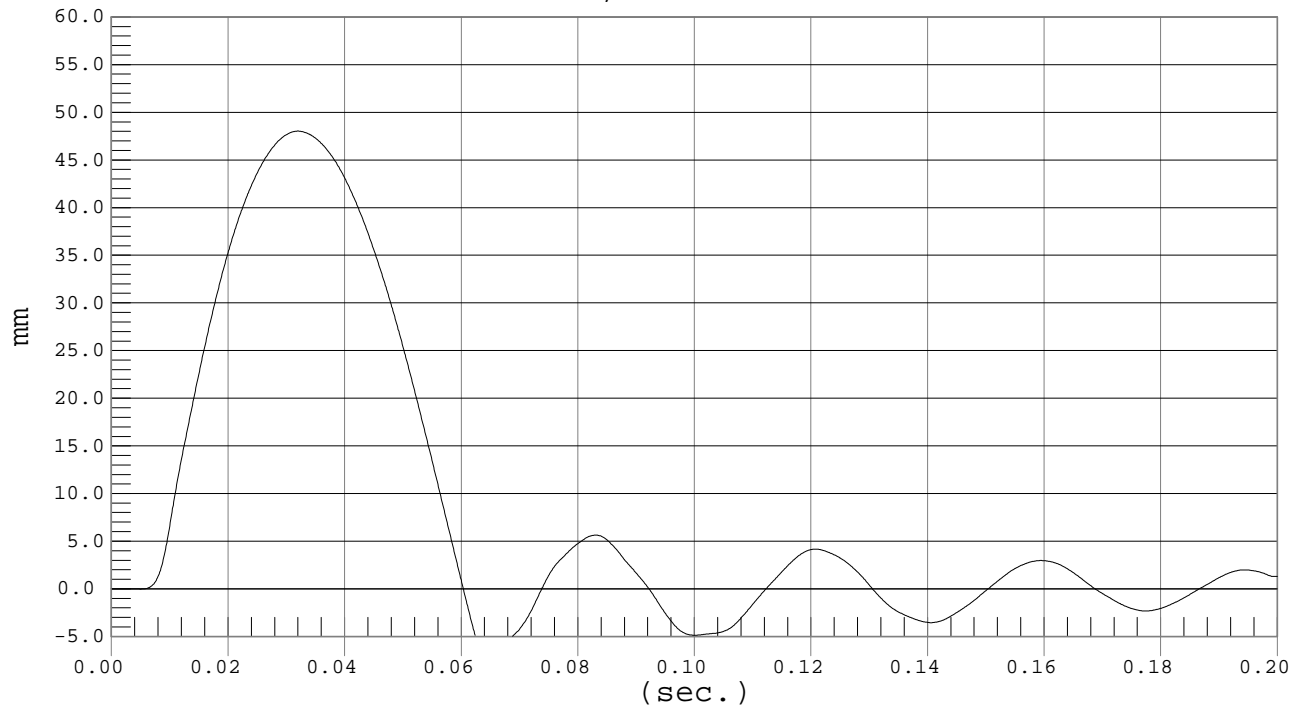


Test Desc.: Rib Module
Component: Dummy #009

LOWER RIB DISPLACEMENT

Test Date: 12-12-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -7.19 mm @ 0.0643 sec., Ymax = 48.03 mm @ 0.0319 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 12/11/02

Dummy Serial Number: 009

Test Number: D021597

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.5
Relative Humidity (%)	10 – 70	20
Probe Speed (m/s)	3.90 – 4.10	3.95
Maximum Impact Force	4.00 – 4.80 kN	4.52
Time of Maximum Force	10.60 – 13.00 ms	11.00
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.22
Time of Max. Total Force	10.00 – 12.30 ms	10.20

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

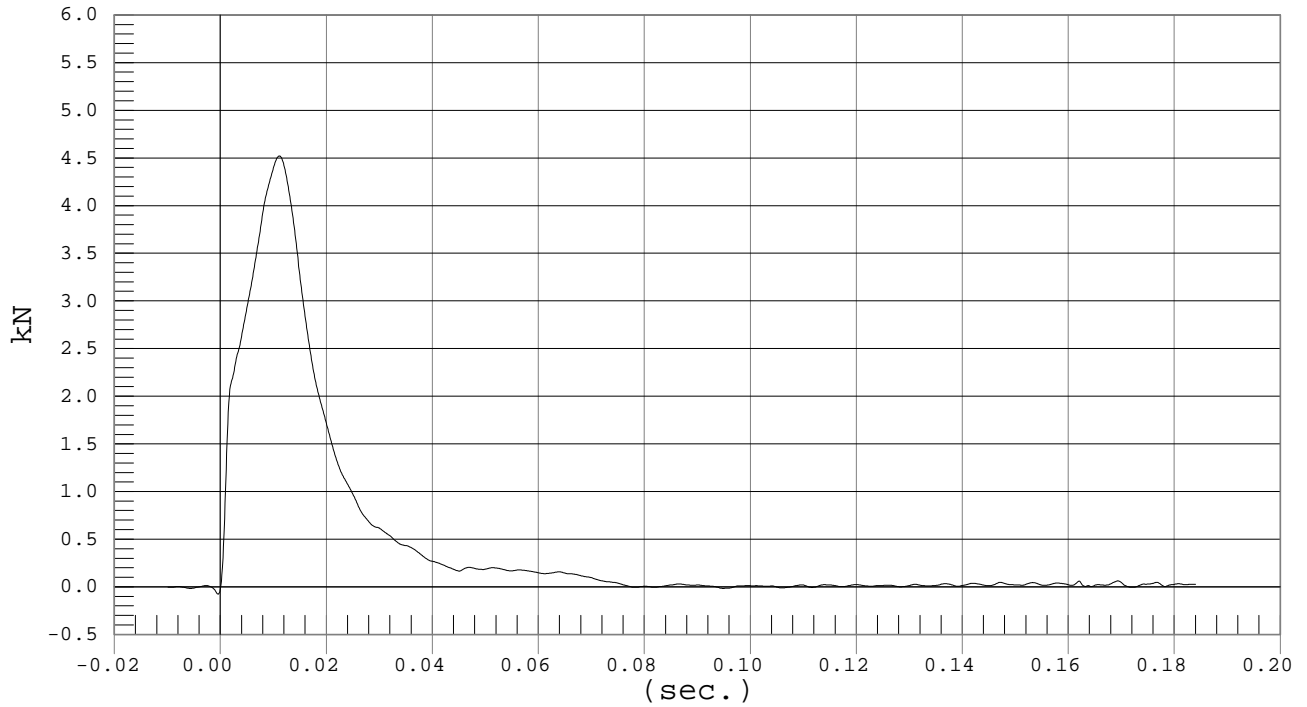


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 12-11-02
Speed: 13.0 fps, 3.95 M/s

Ymin = -.08 kN @ -0.0005 sec., Ymax = 4.52 kN @ 0.0110 sec.

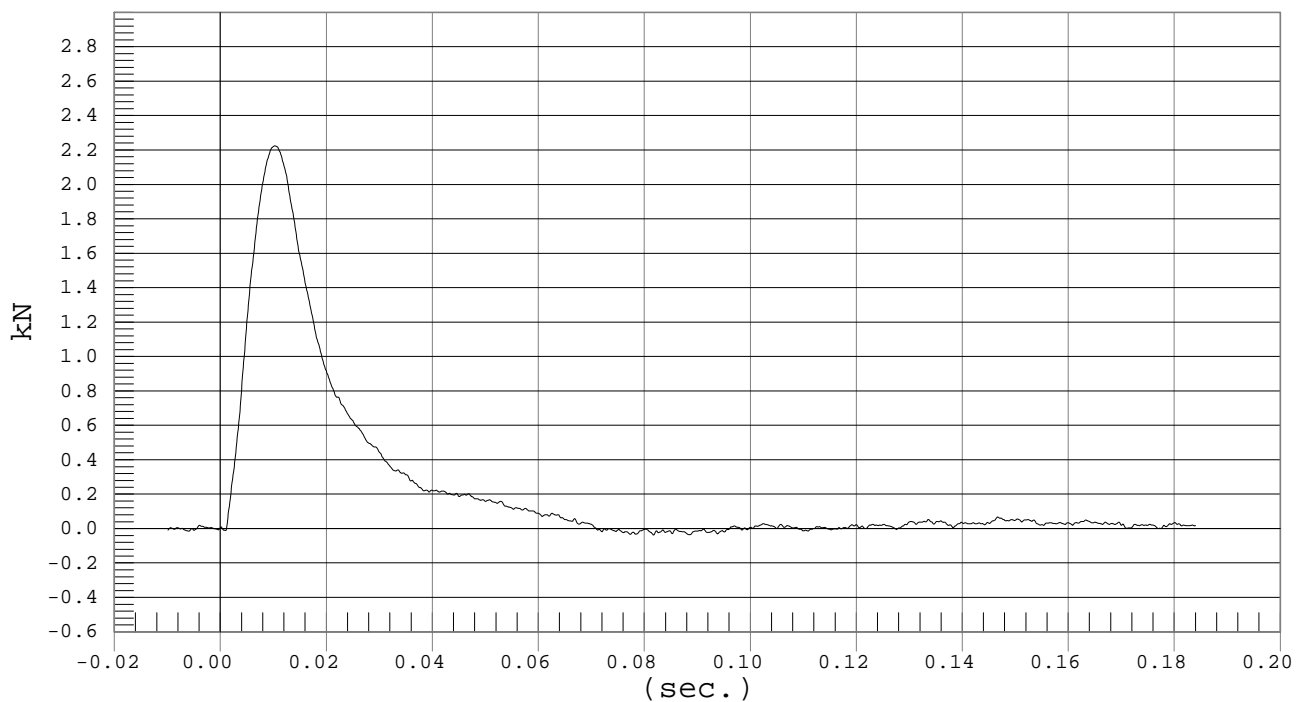


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 12-11-02
Speed: 13.0 fps, 3.95 M/s

Ymin = -.04 kN @ 0.0816 sec., Ymax = 2.22 kN @ 0.0102 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 12/12/02
 Dummy Serial Number: 009
 Test Number: D021598

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.4
Relative Humidity (%)		10 – 70	23
Pendulum Speed		5.95 – 6.15	6.12
Pendulum Deceleration	10 msec	-2.46 - -1.59 m/sec	-1.97
	20 msec	-5.25 - -4.07 m/sec	-4.47
	25 msec	-6.64 - -5.30 m/sec	-5.62
	30 msec	≥ -6.5 m/sec	-6.28
Maximum Flexion Angle		45.0 – 55.0 deg	49.4
Time of Max. Flexion Angle		39.0 – 53.0 ms	44.1
Maximum Angle Theta (A)		31.0 – 35.0 deg	31.6
Time of Max. Theta (A)		44.0 – 52.0 ms	44.1
Maximum Angle Theta (B)		27.28– 29.78 deg	27.82
Time of Max. Theta (B)		44.0 – 52.0 ms	45.3

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

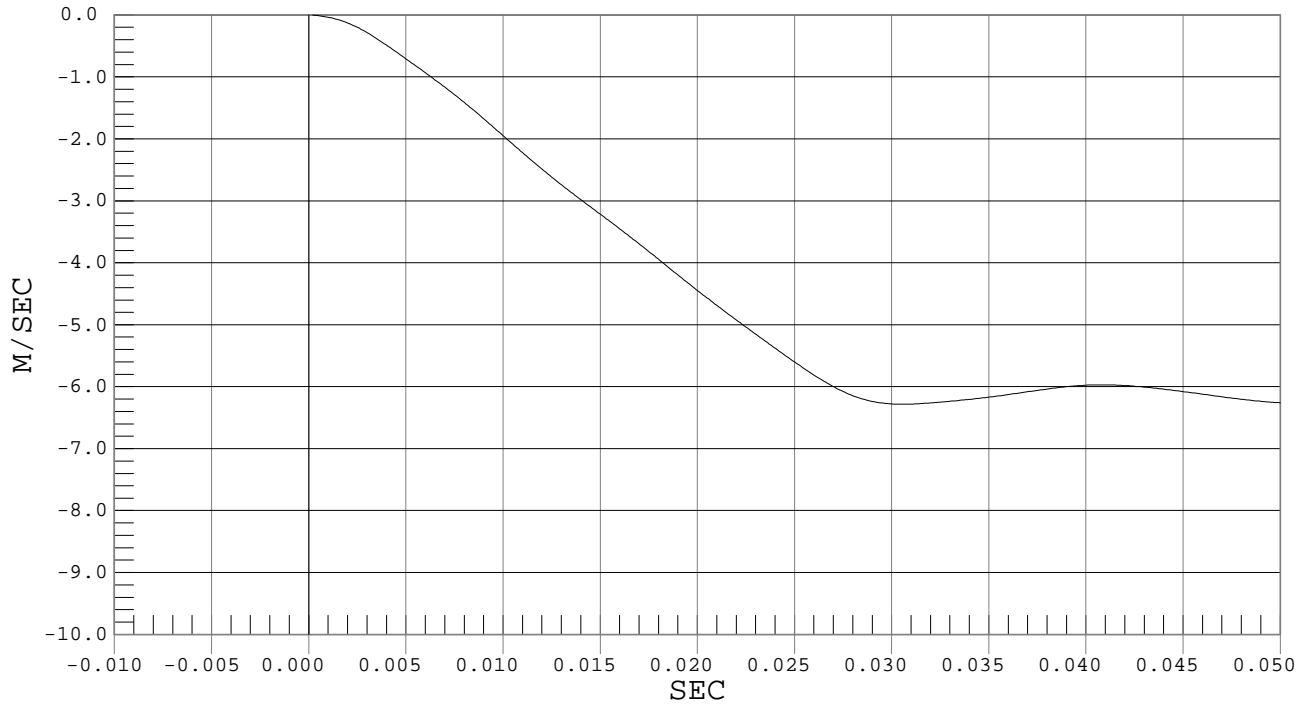


PENDULUM DECELERATION

Test Desc.: Lumbar Flexion
Component: Dummy #009

Test Date: 12-12-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -7.58 M/SEC @ 0.1362 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

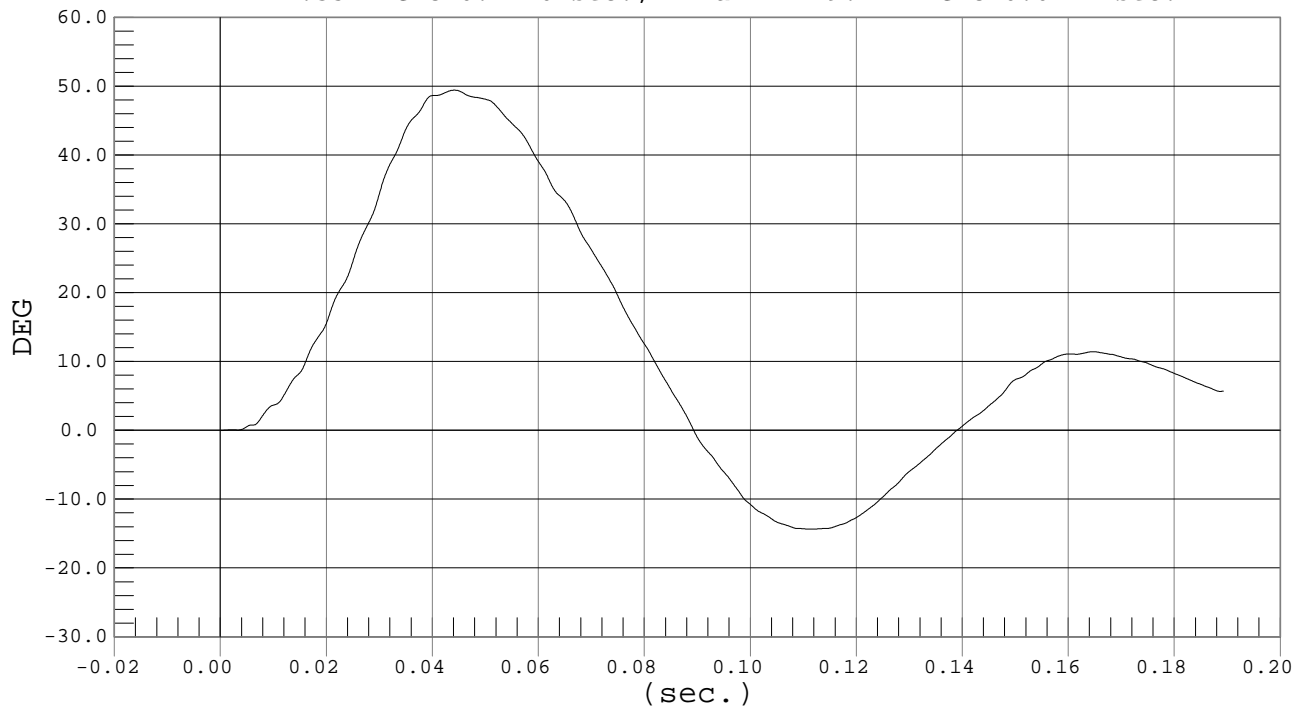


FLEXION ANGLE

Test Desc.: Lumbar Flexion
Component: Dummy #009

Test Date: 12-12-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -14.35 DEG @ 0.1120 sec., Ymax = 49.42 DEG @ 0.0441 sec.



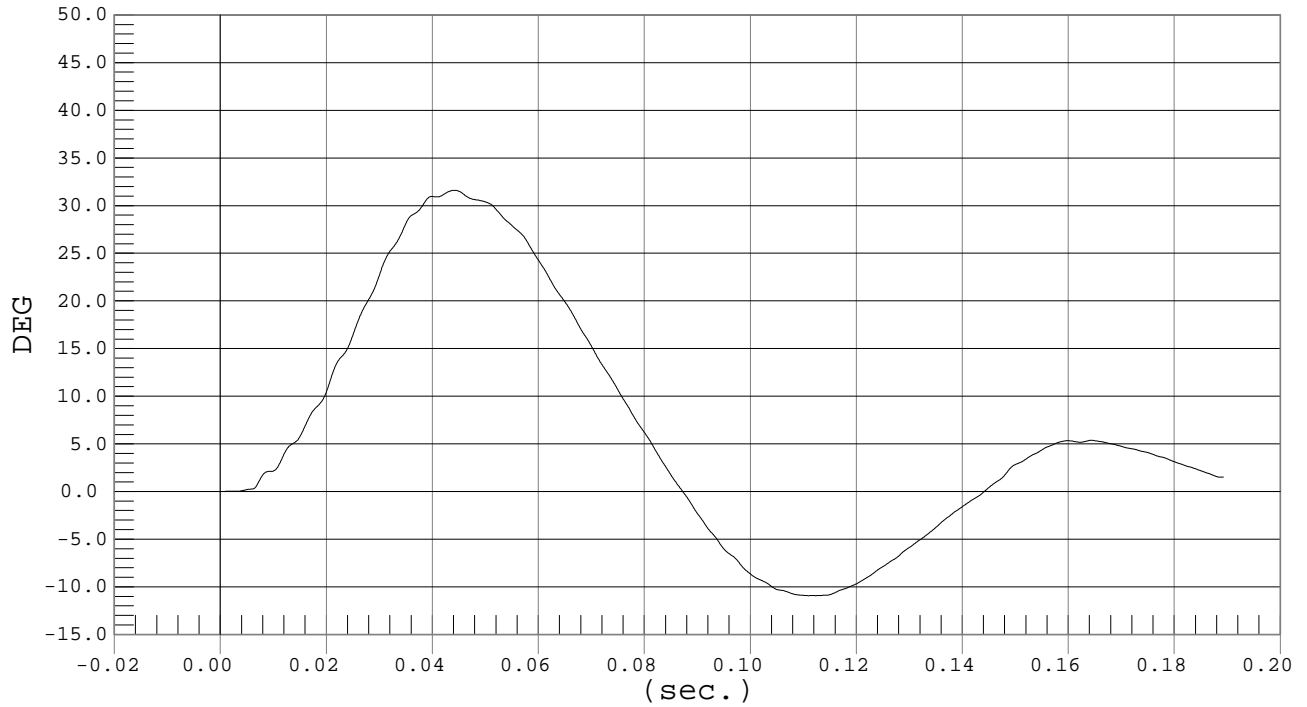


Test Desc.: Lumbar Flexion
Component: Dummy #009

THETA A

Test Date: 12-12-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -10.93 DEG @ 0.1109 sec., Ymax = 31.6 DEG @ 0.0441 sec.

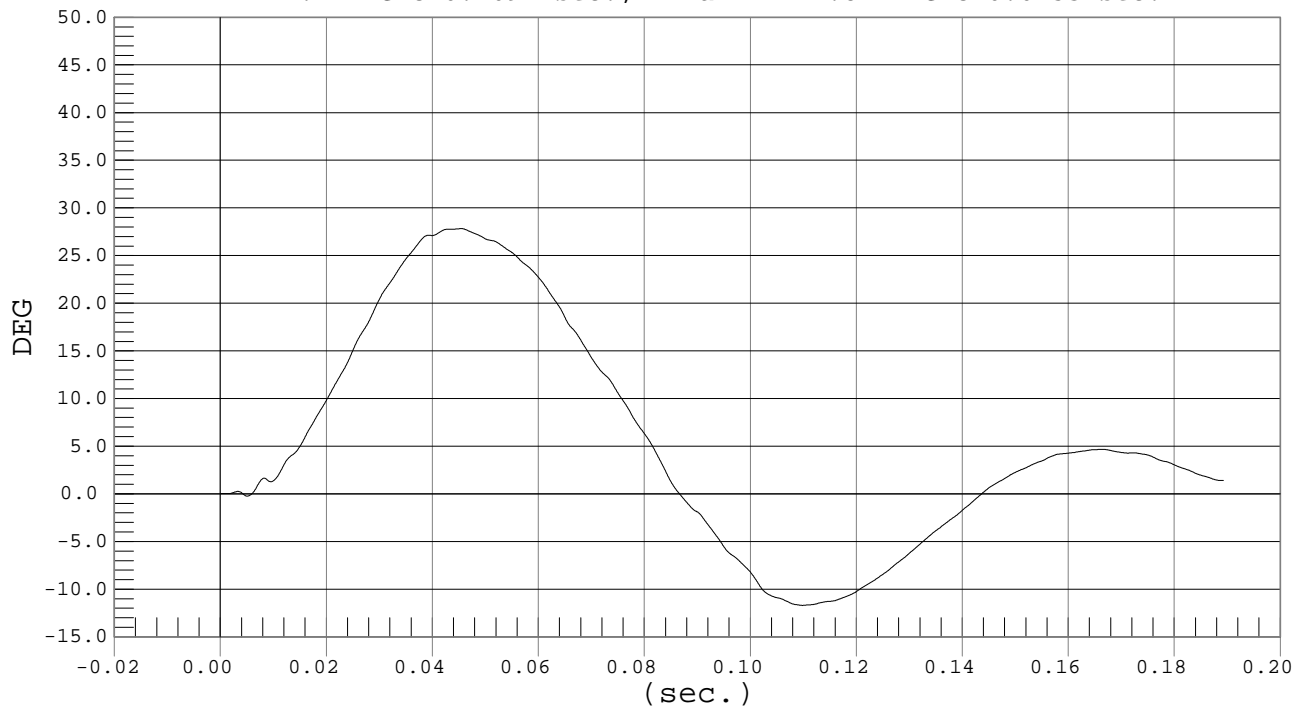


Test Desc.: Lumbar Flexion
Component: Dummy #009

THETA B

Test Date: 12-12-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -11.7 DEG @ 0.1097 sec., Ymax = 27.82 DEG @ 0.0453 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 12/11/02

Dummy Serial Number: 009

Test Number: D021599

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.5
Relative Humidity (%)	10 – 70	20
Pendulum Speed	4.20 – 4.40 m/s	4.31
Maximum Impactor Force	4.40 – 5.40 kN	4.51
Time of Max. Impactor Force	10.30 – 15.50 ms	15.30
Maximum Pubic Force	1.04 – 1.64 kN	1.17
Time of Max. Pubic Force	9.90 – 15.90 ms	15.00

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

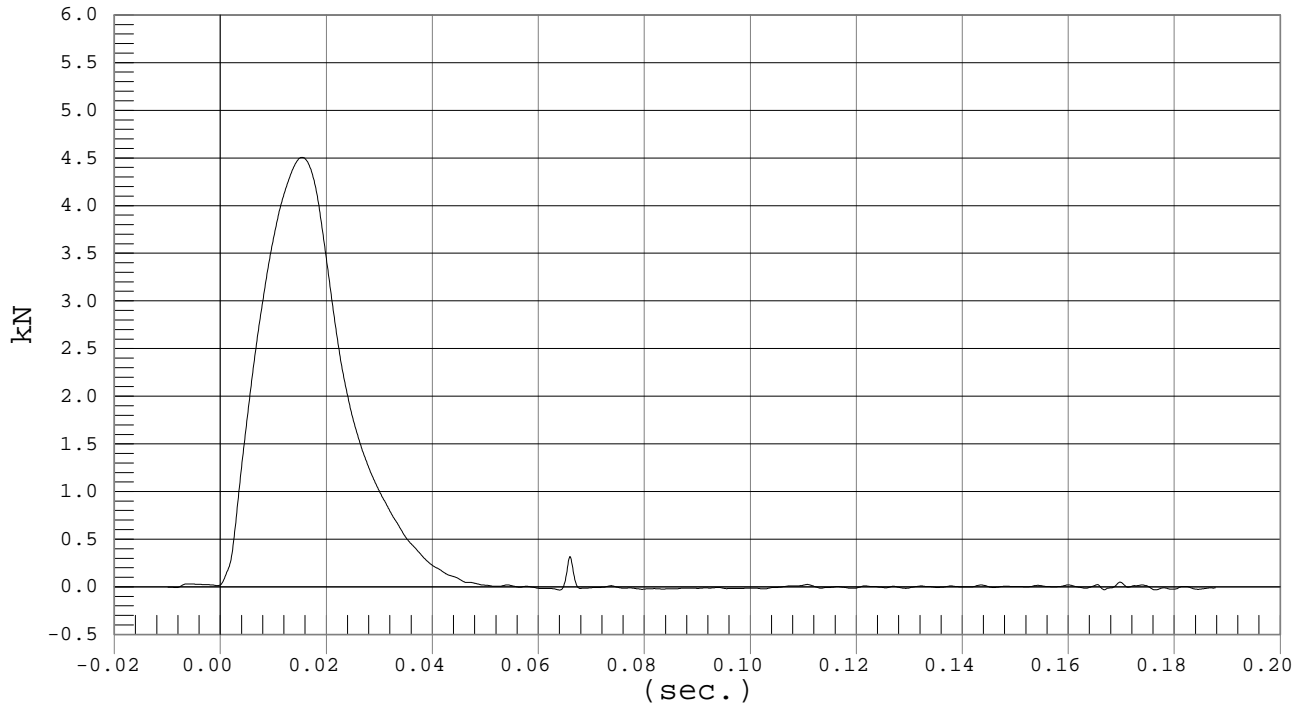


Test Desc.: Pelvis Impact
Component: Dummy #009

IMPACTOR FORCE

Test Date: 12-11-02
Speed: 14.1 fps, 4.31 M/s

Ymin = -.03 kN @ 0.0639 sec., Ymax = 4.51 kN @ 0.0153 sec.

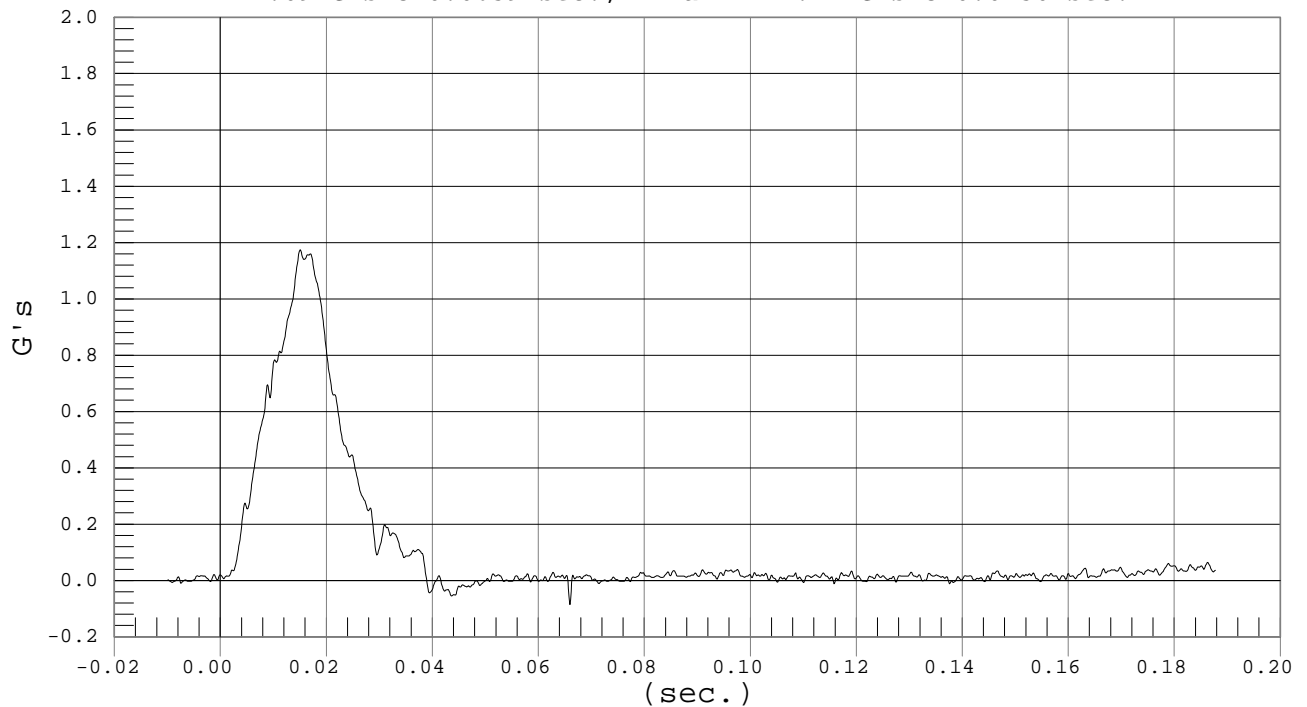


Test Desc.: Pelvis Impact
Component: Dummy #009

PUBIC FORCE

Test Date: 12-11-02
Speed: 14.1 fps, 4.31 M/s

Ymin = -.09 G's @ 0.0659 sec., Ymax = 1.17 G's @ 0.0150 sec.



CERTIFICATION DATA

Dummy Serial Number: 010

Calibration Test Results Summary

Dummy Serial Number: 010

Post-Test Calibration

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

MGA RESEARCH CORPORATION
HEAD DROP TEST
EUROSID 2 DUMMY

Date: 12/11/02

Dummy Serial Number: 010

Test Number: D021601

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.8
Relative Humidity (%)	10 – 70	21
Peak Resultant Acceleration	100 – 150 g's	131.6
Time of Max. Res. Acceleration	msec	3.1

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

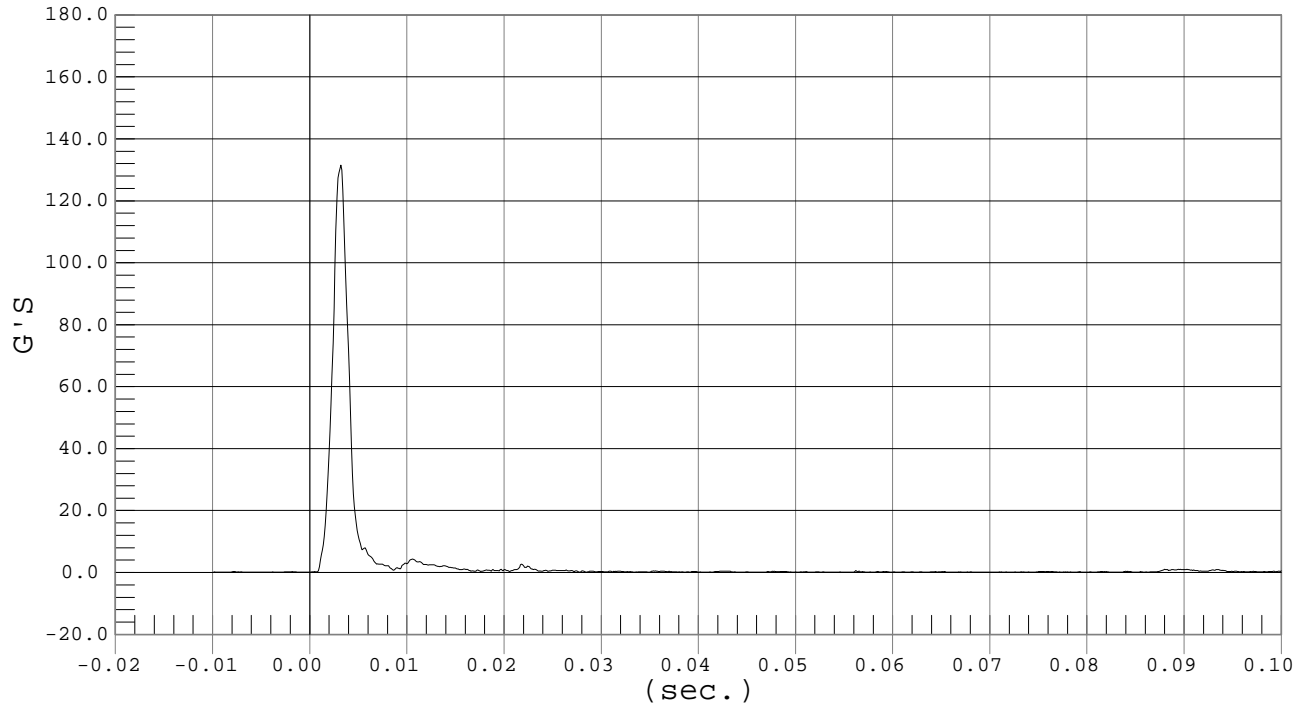


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #010

Test Date: 12-11-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .09 G'S @ -0.0100 sec., Ymax = 131.56 G'S @ 0.0031 sec.



MGA RESEARCH CORPORATION
NECK PENDULUM TEST
EUROSID 2 DUMMY

Date: 12/12/02

Dummy Serial Number: 010

Test Number: D021602

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.6
Relative Humidity (%)		10 – 70	23
Pendulum Speed		3.3 - 3.5	3.4
Pendulum Deceleration	3 msec	~.25 - ~.53 m/sec	-.35
	8 msec	~1.59 - ~2.04 m/sec	-1.77
	14 msec	~3.20 - ~3.85 m/sec	-3.41
Maximum Flexion Angle		49.0 – 59.0 deg	58.7
Time of Max. Flexion Angle		54.0 – 66.0 ms	59.3
Maximum Angle Theta (A)		32.0 – 37.0 deg	36.4
Time of Max. Theta (A)		53.0 – 63.0 ms	59.2
Maximum Angle Theta (B)		31.23 – 33.73 deg	32.74
Time of Max. Theta (B)		54.0 – 64.0 ms	59.2

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

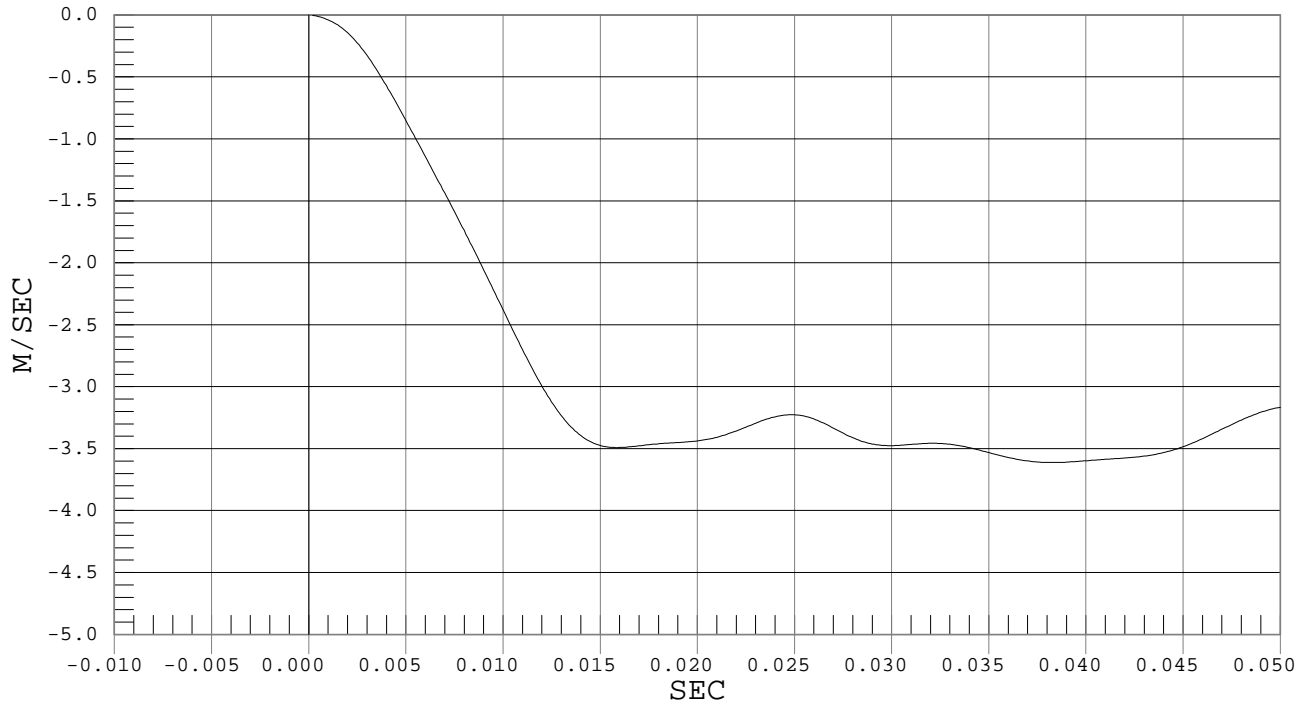


PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 12-12-02
Speed: 11.1 fps, 3.38 M/s

Ymin = -4.56 M/SEC @ 0.01910 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

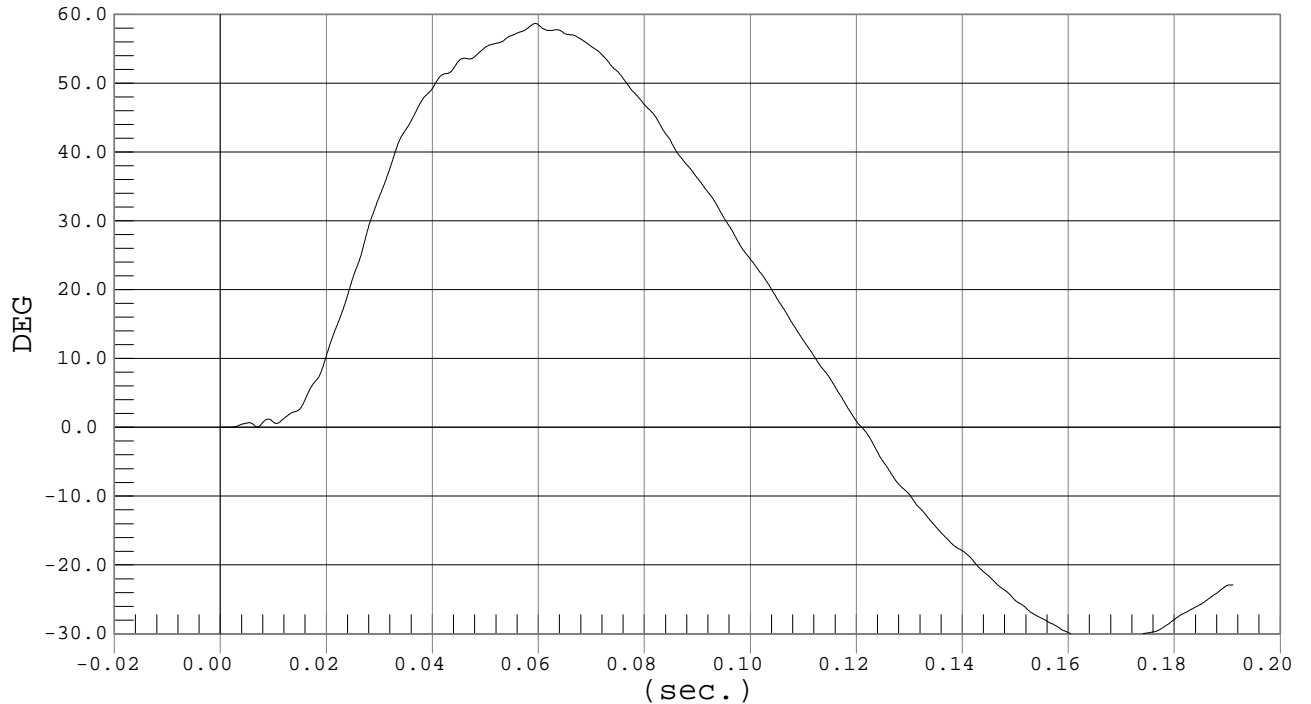


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 12-12-02
Speed: 11.1 fps, 3.38 M/s

Ymin = -30.97 DEG @ 0.1676 sec., Ymax = 58.66 DEG @ 0.0593 sec.



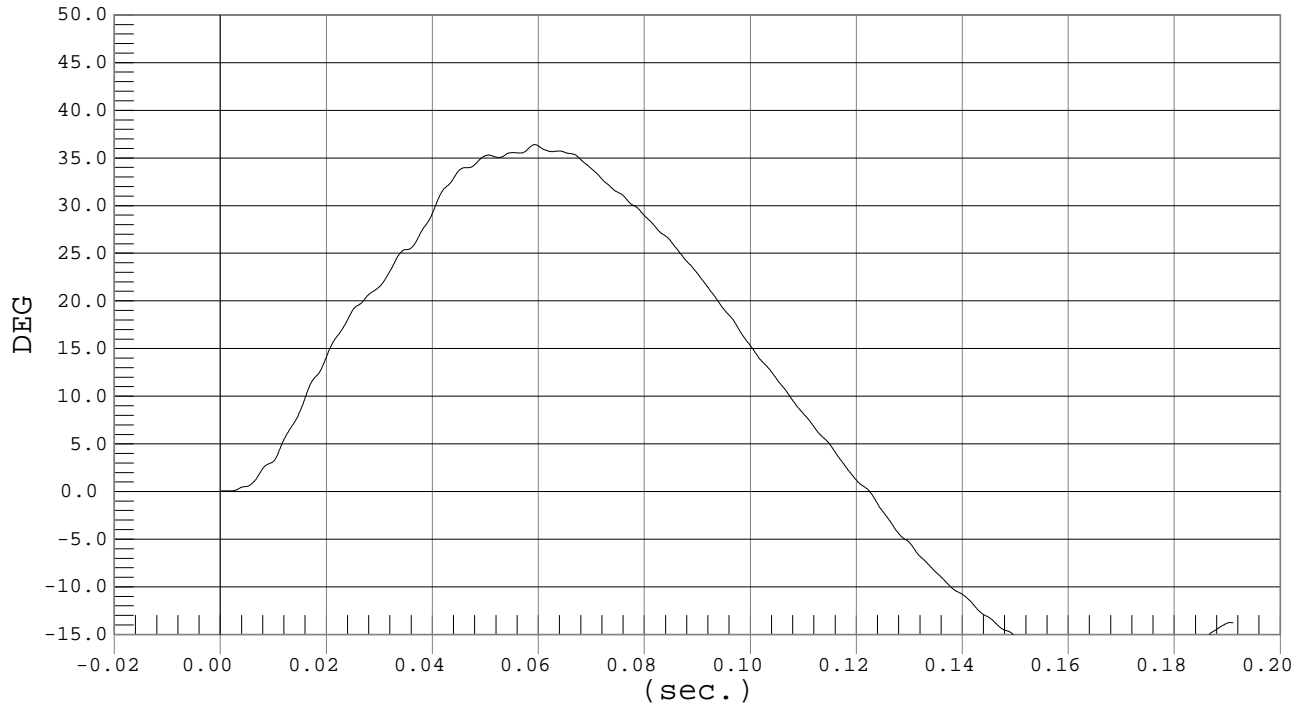


Test Desc.: Neck Bending
Component: Dummy #010

THETA A

Test Date: 12-12-02
Speed: 11.1 fps, 3.38 M/s

Ymin = -18.53 DEG @ 0.1674 sec., Ymax = 36.41 DEG @ 0.0592 sec.

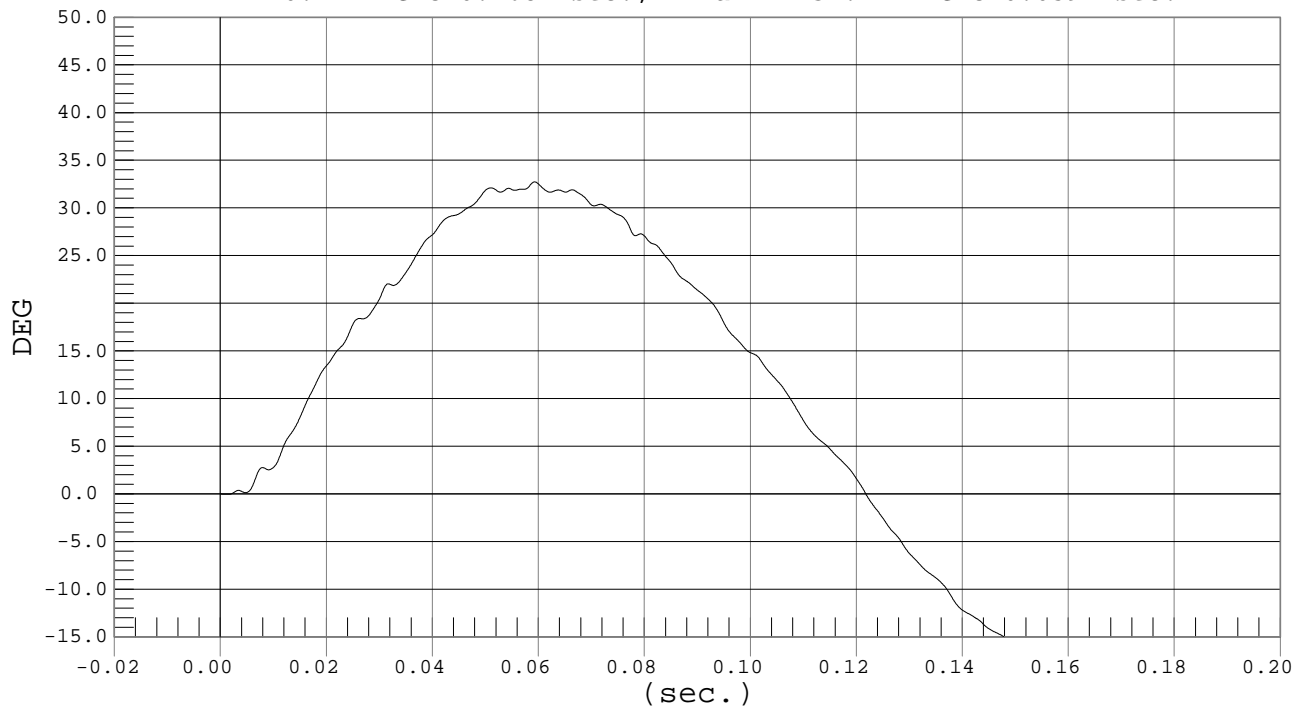


Test Desc.: Neck Bending
Component: Dummy #010

THETA B

Test Date: 12-12-02
Speed: 11.1 fps, 3.38 M/s

Ymin = -20.14 DEG @ 0.1682 sec., Ymax = 32.74 DEG @ 0.0592 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 12/11/02

Dummy Serial Number: 010

Test Number: D021603

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.6
Relative Humidity (%)	10 – 70	21
Pendulum Speed	4.2 – 4.4 m/s	4.30
Max. Resultant Acceleration	7.5 – 10.5 g's	10.4
Time of Max. Pendulum Acceleration	msec	11.3

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

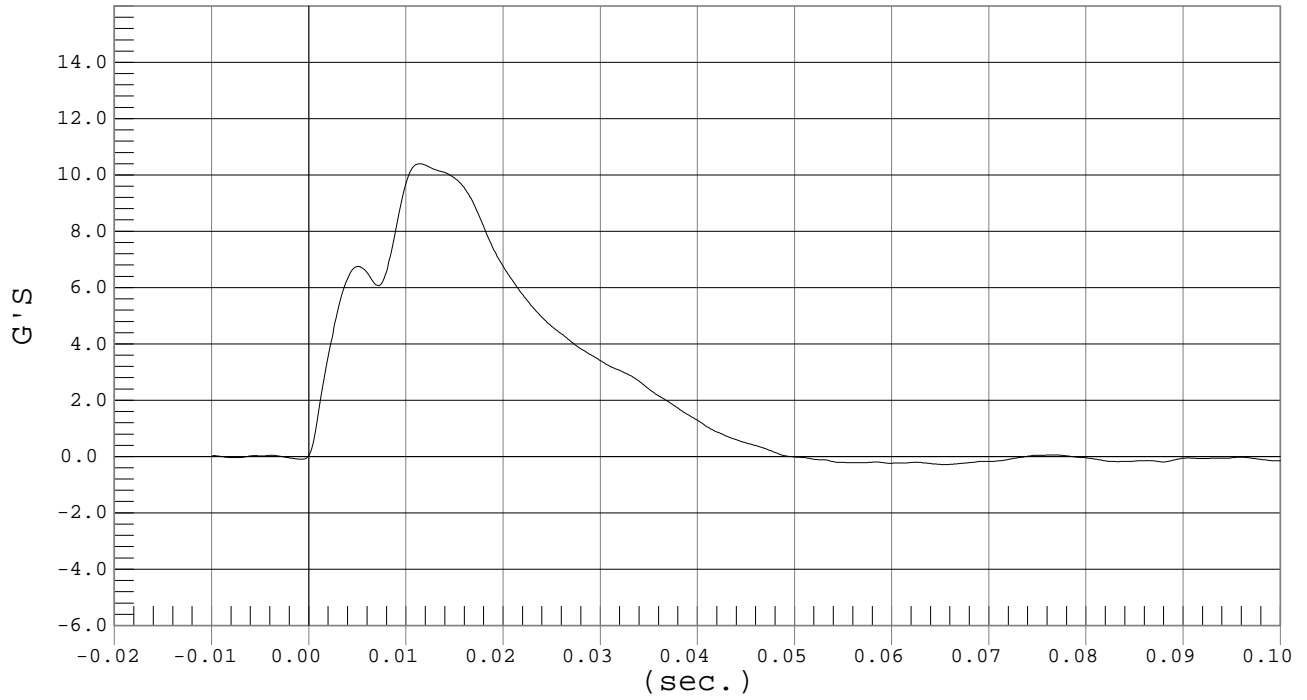


SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #010

Test Date: 12-11-02
Speed: 14.1 fps, 4.30 M/s

Ymin = -.35 G'S @ 0.1370 sec., Ymax = 10.39 G'S @ 0.0113 sec.



MGA RESEARCH CORPORATION
 UPPER/MIDDLE/LOWER RIB TESTS
 EUROSID 2 DUMMY

Date: 12/12/02
 Dummy Serial Number: 010
 Test Number: D021604/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.6
Relative Humidity (%)	10 – 70	23
Displacement at 2 m/s	23.5 – 27.5 mm	25.8
Displacement at 3 m/s	36.0 – 40.0 mm	39.0
Displacement at 4 m/s	46.0 – 51.0 mm	50.8

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.6
Relative Humidity (%)	10 – 70	23
Displacement at 2 m/s	23.5 – 27.5 mm	25.0
Displacement at 3 m/s	36.0 – 40.0 mm	37.9
Displacement at 4 m/s	46.0 – 51.0 mm	50.0

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.6
Relative Humidity (%)	10 – 70	23
Displacement at 2 m/s	23.5 – 27.5 mm	25.2
Displacement at 3 m/s	36.0 – 40.0 mm	38.0
Displacement at 4 m/s	46.0 – 51.0 mm	49.8

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

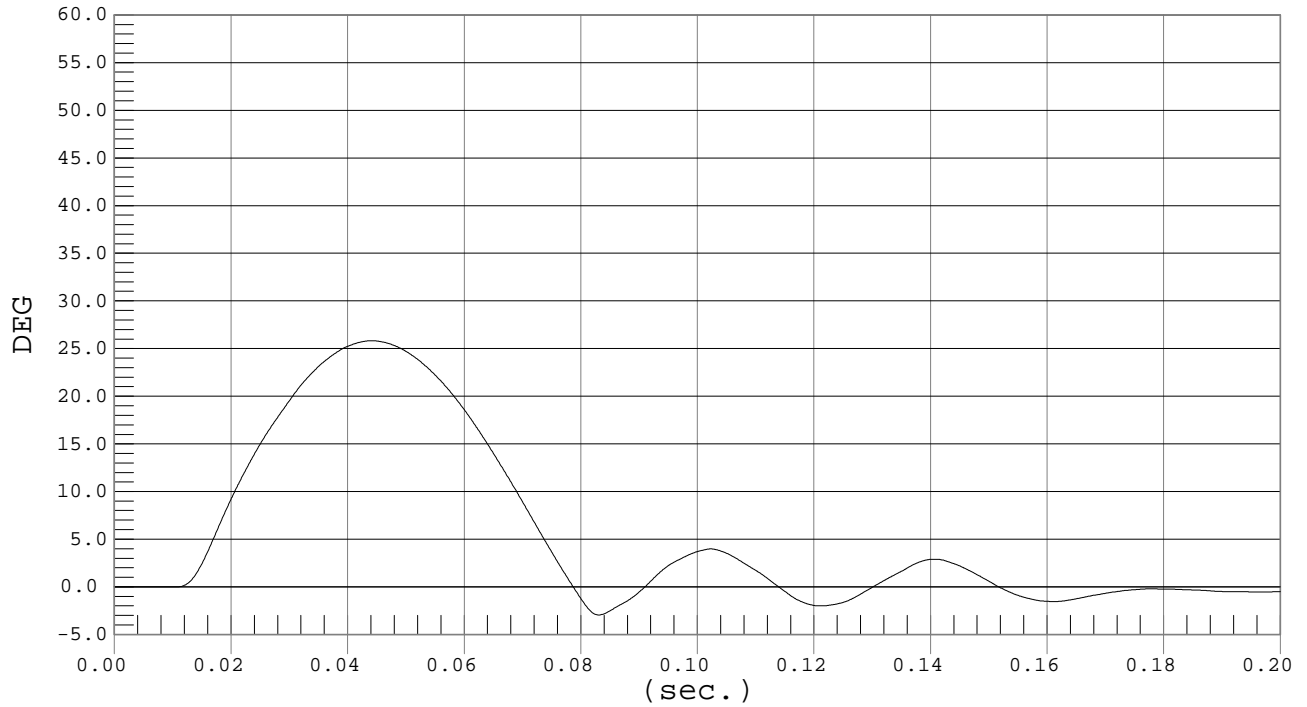


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-12-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -2.95 DEG @ 0.0830 sec., Ymax = 25.81 DEG @ 0.0440 sec.

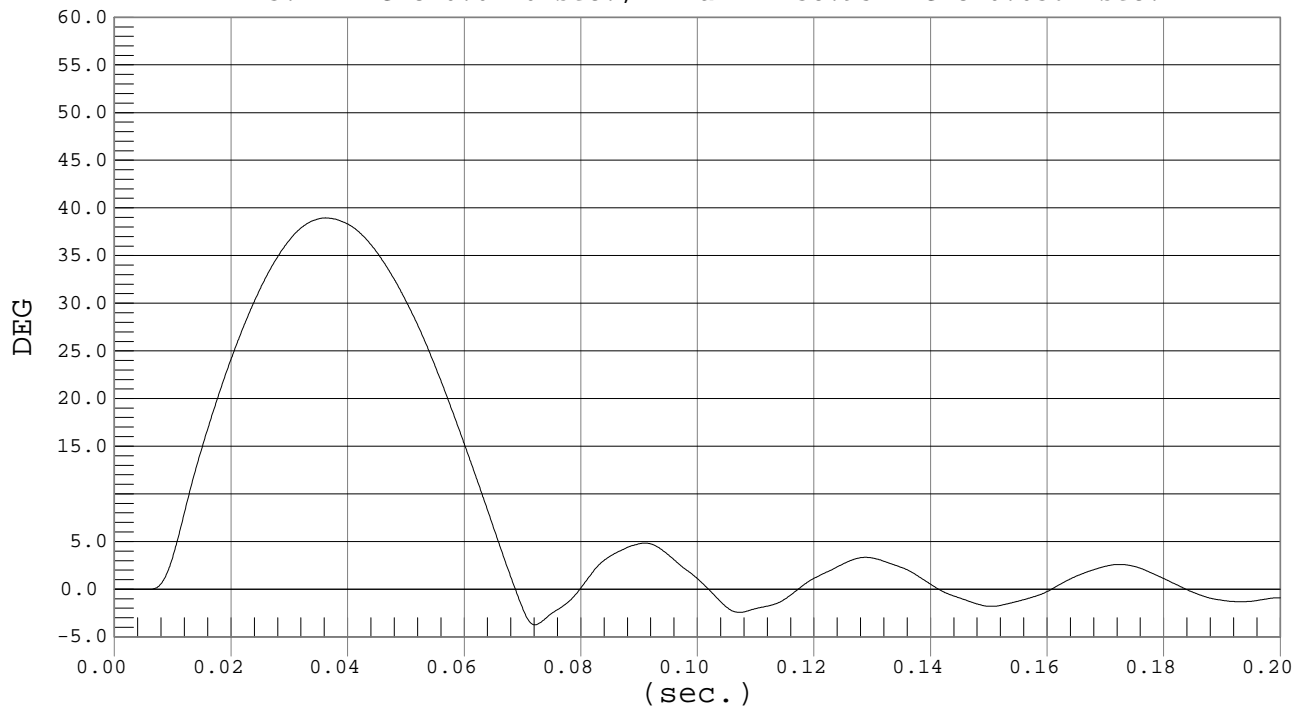


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-12-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -3.74 DEG @ 0.0720 sec., Ymax = 38.95 DEG @ 0.0361 sec.



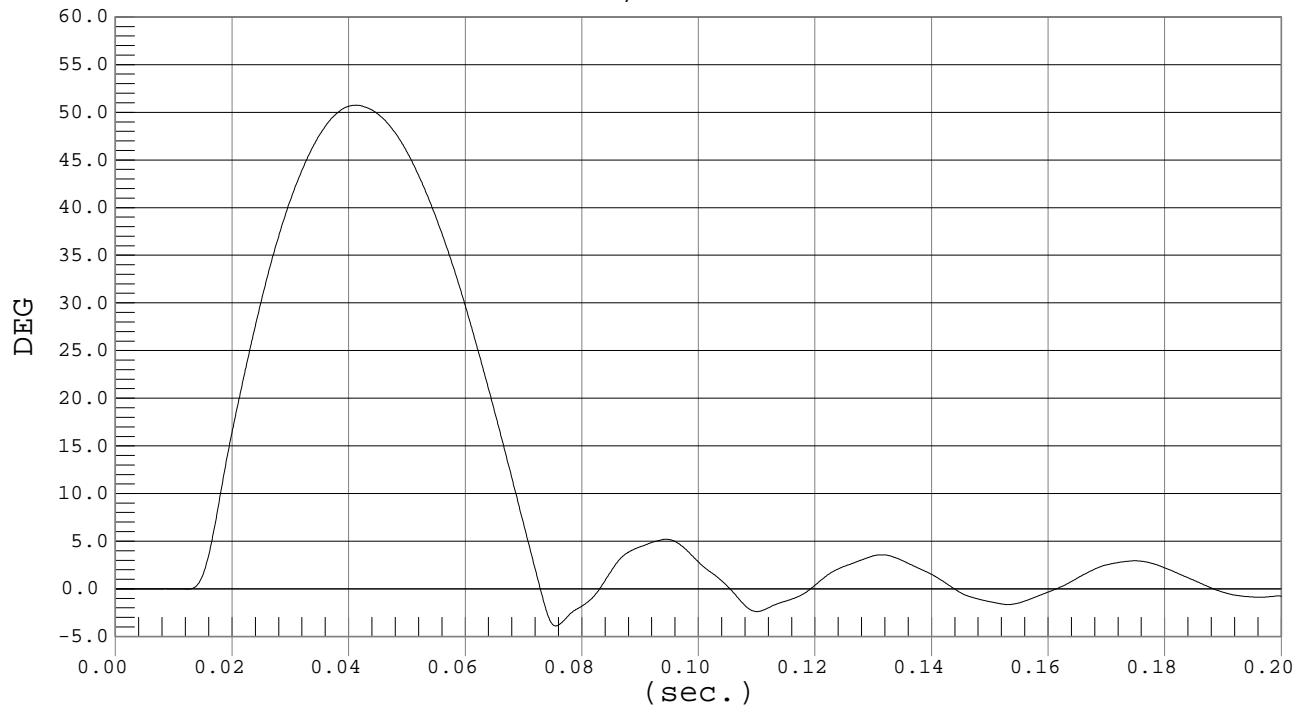


Test Desc.: Rib Module
Component: Dummy #010

UPPER RIB DISPLACEMENT

Test Date: 12-12-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -3.88 DEG @ 0.0754 sec., Ymax = 50.75 DEG @ 0.0412 sec.



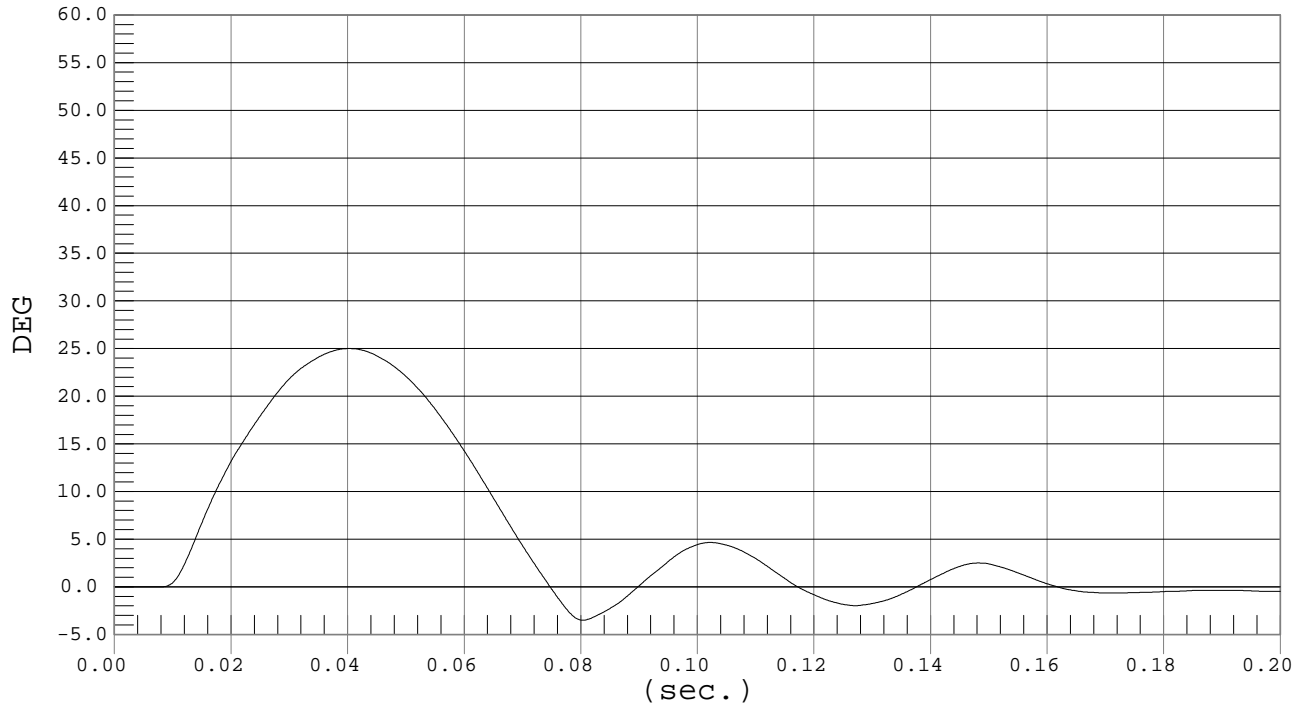


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-12-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -3.5 DEG @ 0.0802 sec., Ymax = 25 DEG @ 0.0401 sec.

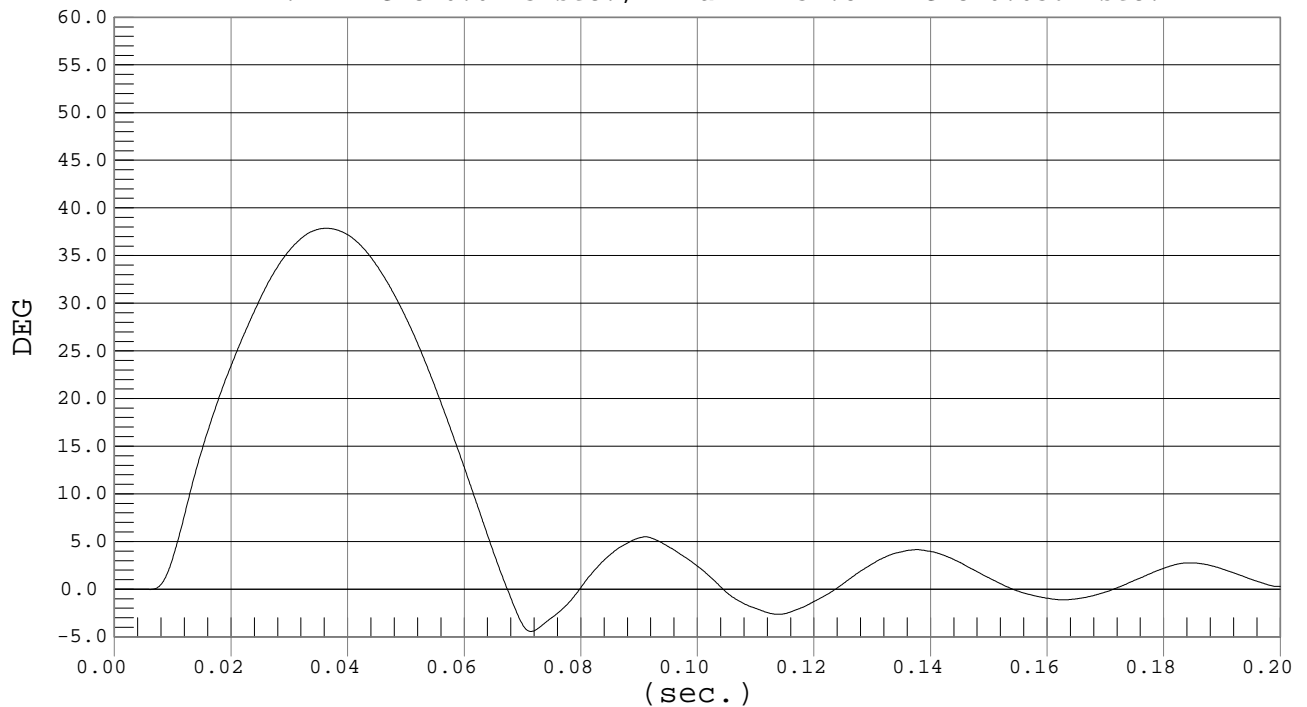


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-12-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -4.44 DEG @ 0.0713 sec., Ymax = 37.87 DEG @ 0.0362 sec.



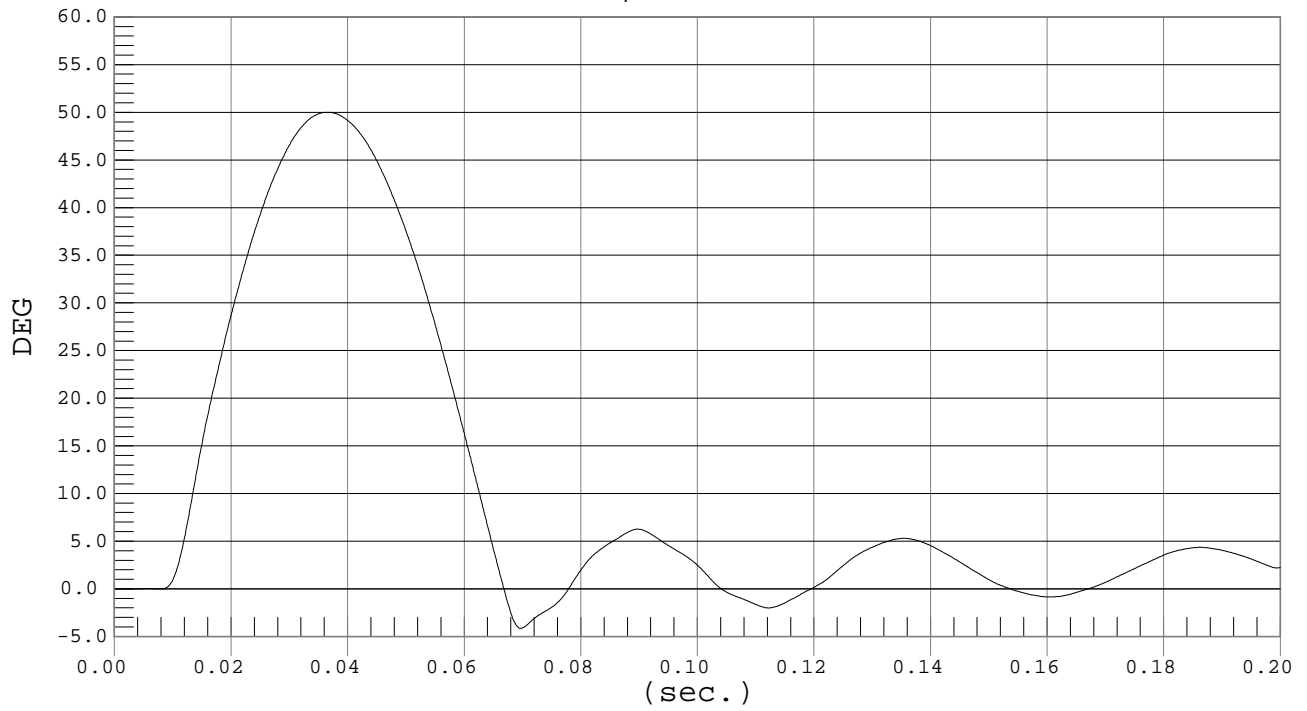


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-12-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -4.14 DEG @ 0.0696 sec., Ymax = 50 DEG @ 0.0364 sec.



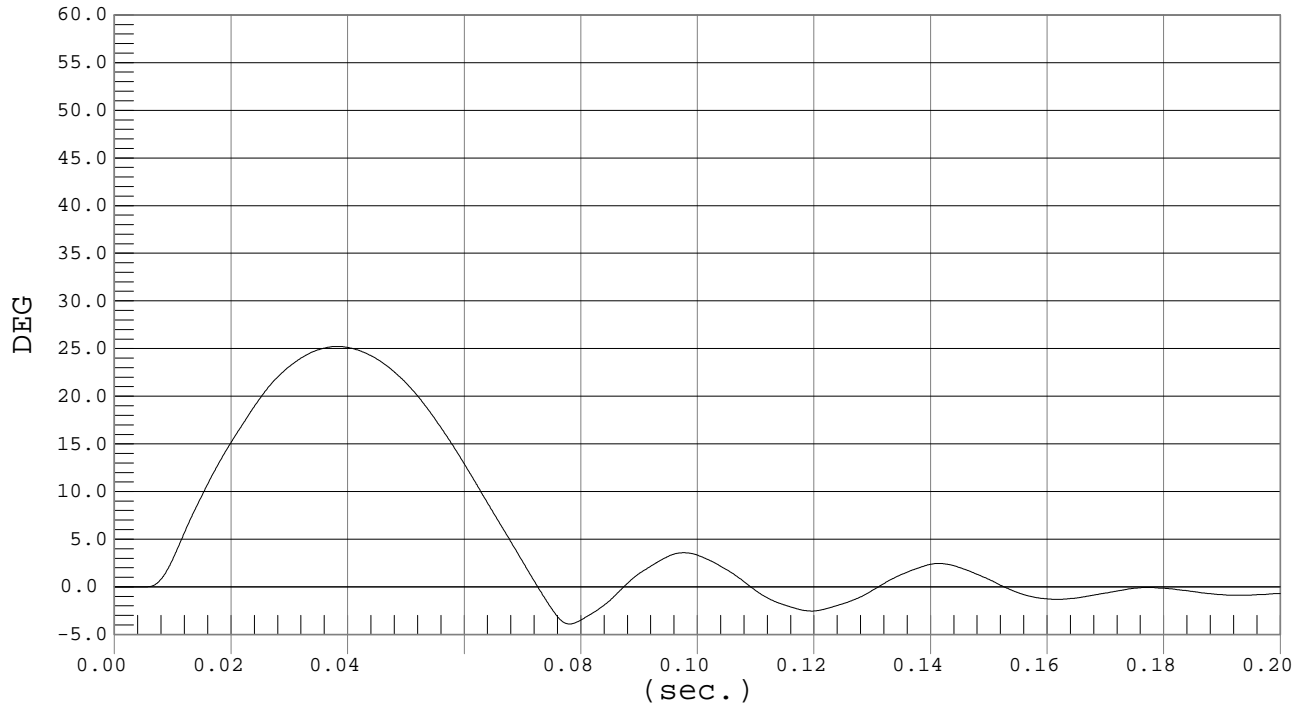


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-12-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -3.89 DEG @ 0.0780 sec., Ymax = 25.23 DEG @ 0.0381 sec.

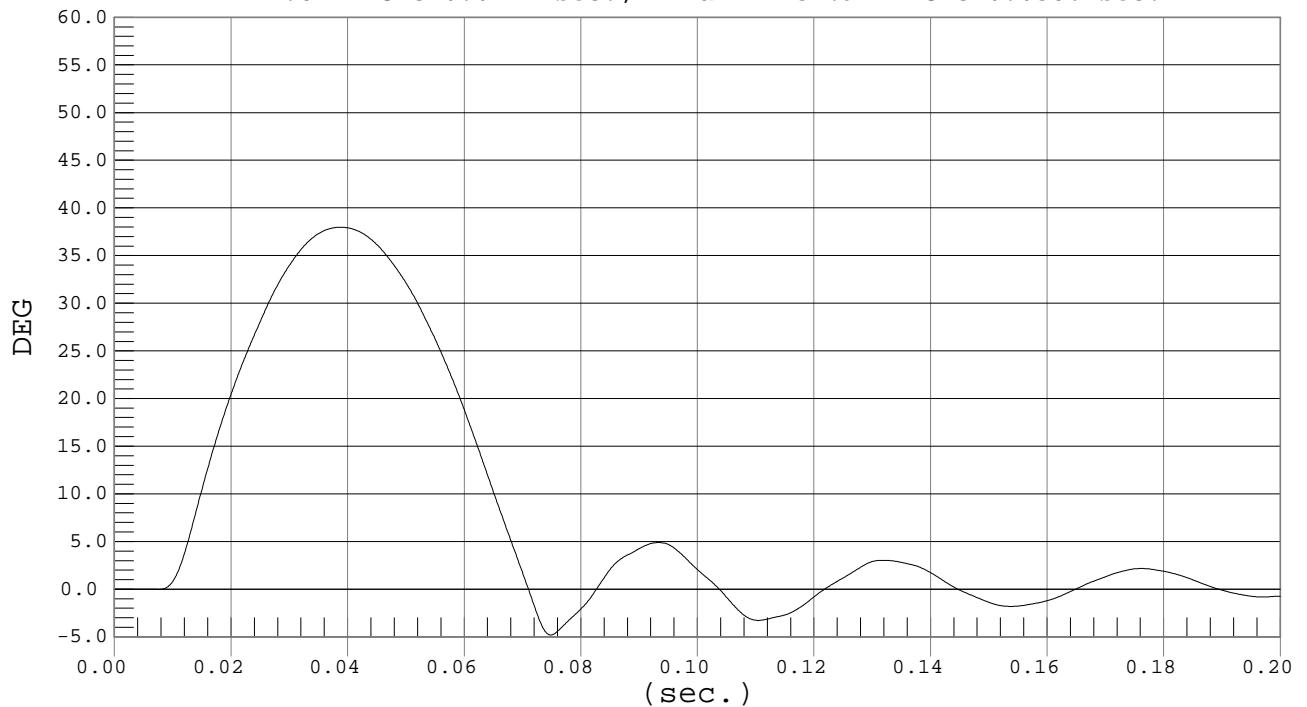


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 12-12-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -4.81 DEG @ 0.0747 sec., Ymax = 37.97 DEG @ 0.0386 sec.



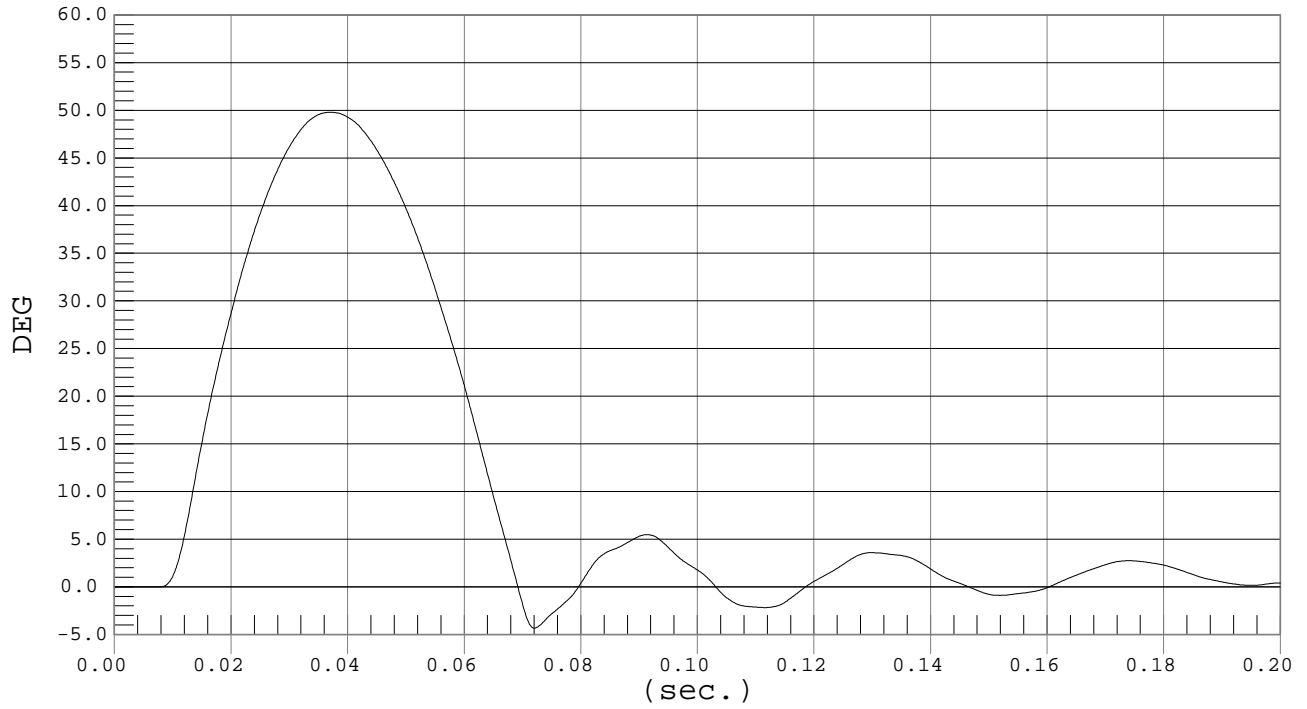


Test Desc.: Rib Module
Component: Dummy #010

LOWER RIB DISPLACEMENT

Test Date: 12-12-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -4.33 DEG @ 0.0720 sec., Ymax = 49.79 DEG @ 0.0369 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 12/11/02

Dummy Serial Number: 010

Test Number: D021607

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.7
Relative Humidity (%)	10 – 70	21
Probe Speed (m/s)	3.90 – 4.10	3.95
Maximum Impact Force	4.00 – 4.80 kN	4.76
Time of Maximum Force	10.60 – 13.00 ms	12.20
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.44
Time of Max. Total Force	10.00 – 12.30 ms	11.90

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

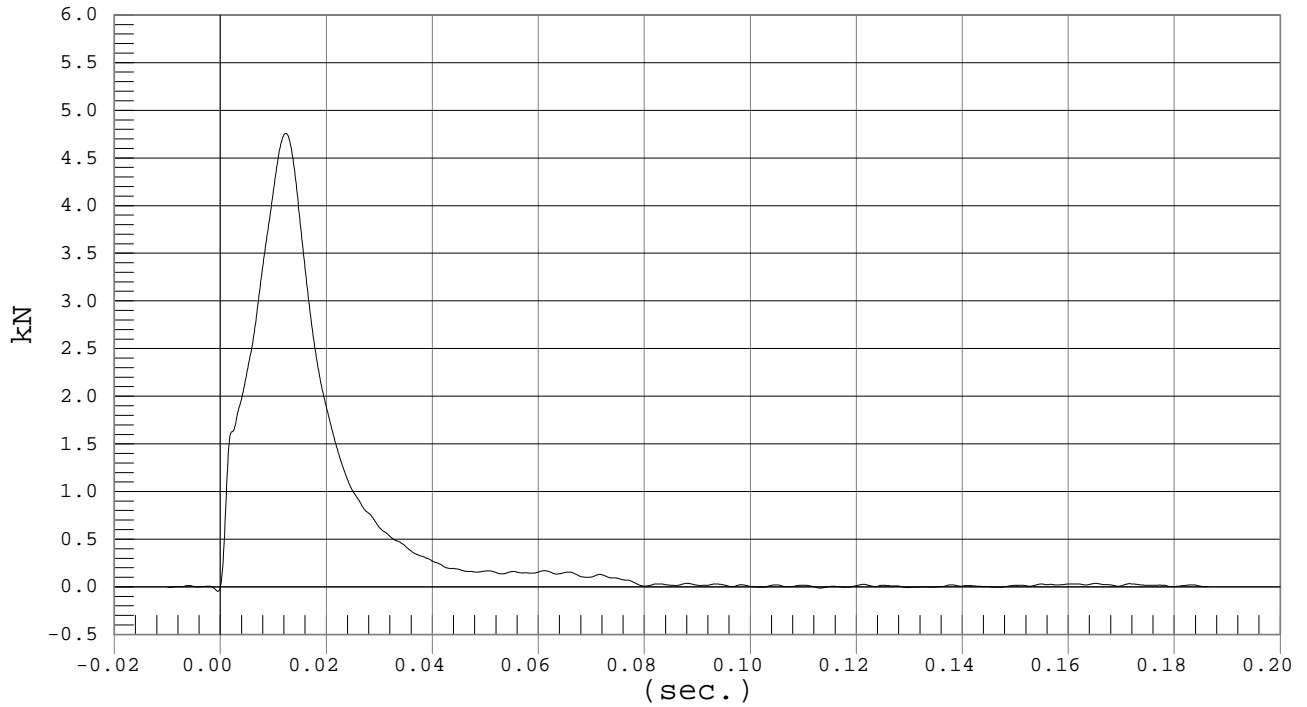


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 12-11-02
Speed: 12.9 fps, 3.95 M/s

Ymin = -.05 kN @ -0.0005 sec., Ymax = 4.76 kN @ 0.0122 sec.

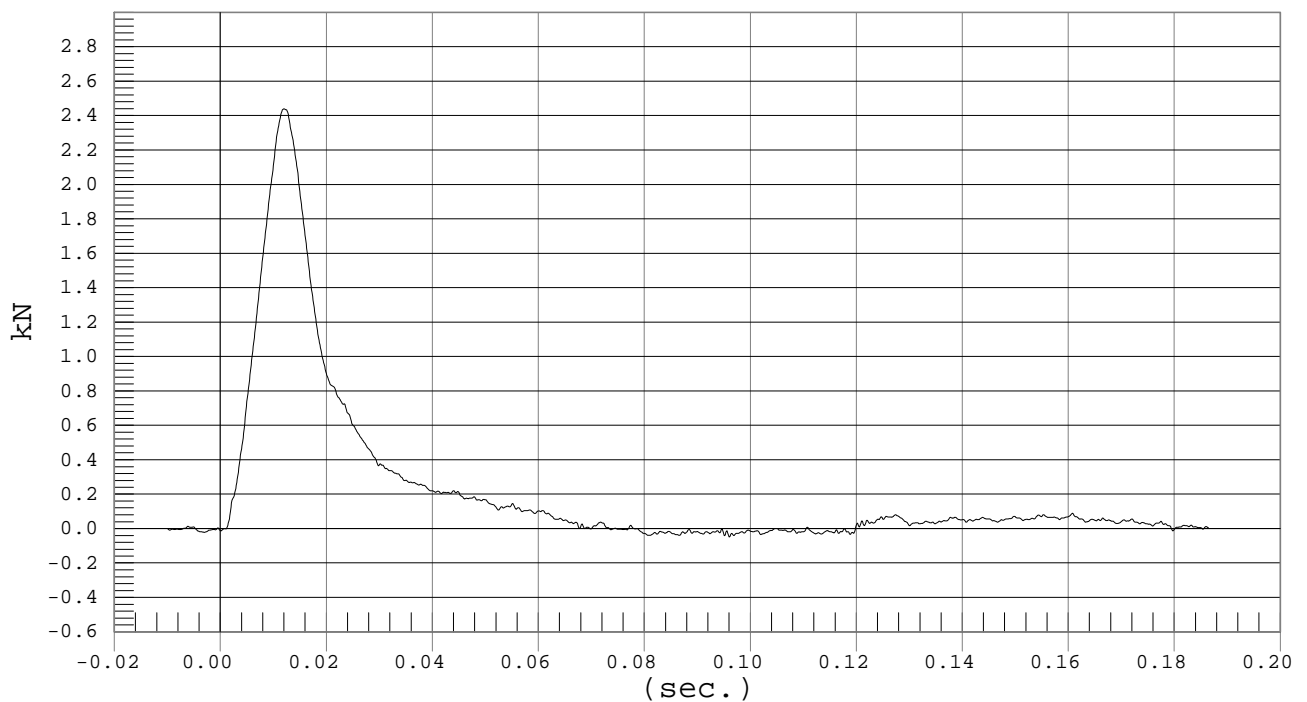


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 12-11-02
Speed: 12.9 fps, 3.95 M/s

Ymin = -.05 kN @ 0.0960 sec., Ymax = 2.44 kN @ 0.0119 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 12/12/02
 Dummy Serial Number: 010
 Test Number: D021608

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.4
Relative Humidity (%)		10 – 70	23
Pendulum Speed		5.95 – 6.15	6.12
Pendulum Deceleration	10 msec	-2.46 - -1.59 m/sec	-2.01
	20 msec	-5.25 - -4.07 m/sec	-4.49
	25 msec	-6.64 - -5.30 m/sec	-5.61
	30 msec	≥ -6.5 m/sec	-6.24
Maximum Flexion Angle		45.0 – 55.0 deg	49.0
Time of Max. Flexion Angle		39.0 – 53.0 ms	44.4
Maximum Angle Theta (A)		31.0 – 35.0 deg	31.8
Time of Max. Theta (A)		44.0 – 52.0 ms	44.2
Maximum Angle Theta (B)		27.44– 29.94 deg	28.78
Time of Max. Theta (B)		44.0 – 52.0 ms	46.5

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

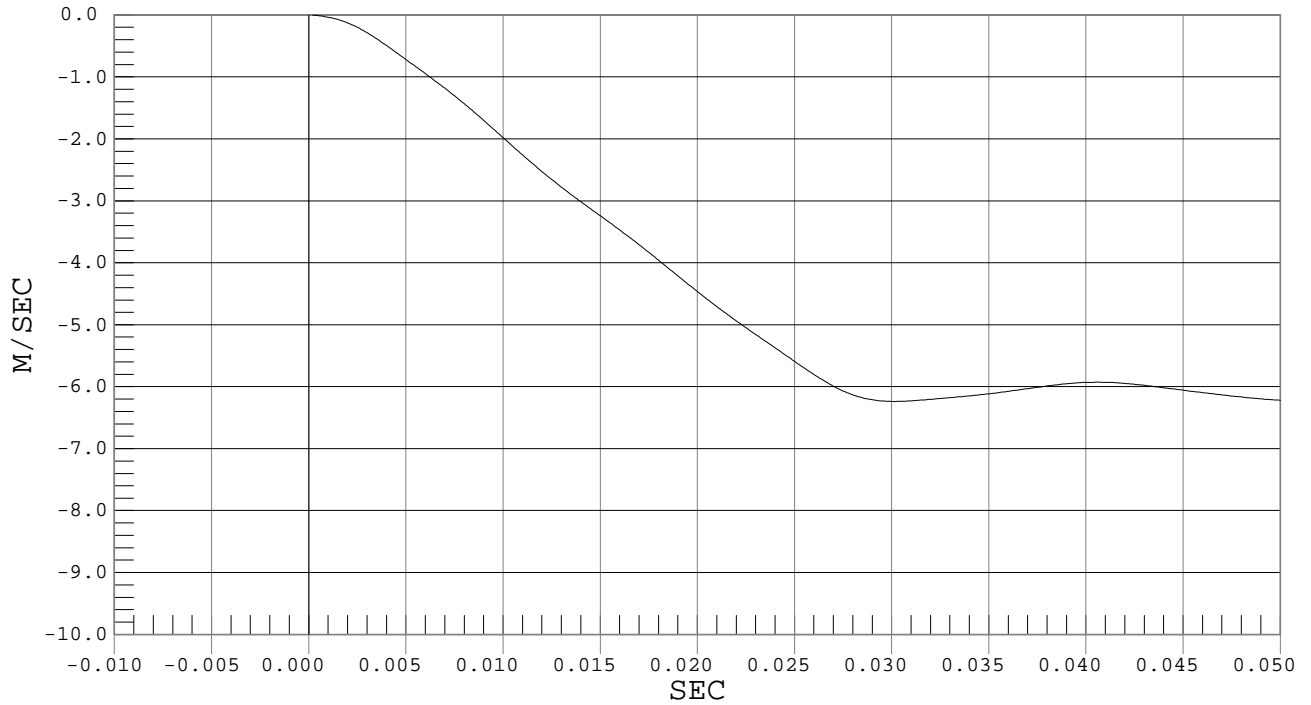


PENDULUM DECELERATION

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 12-12-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -7.52 M/SEC @ 0.1383 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

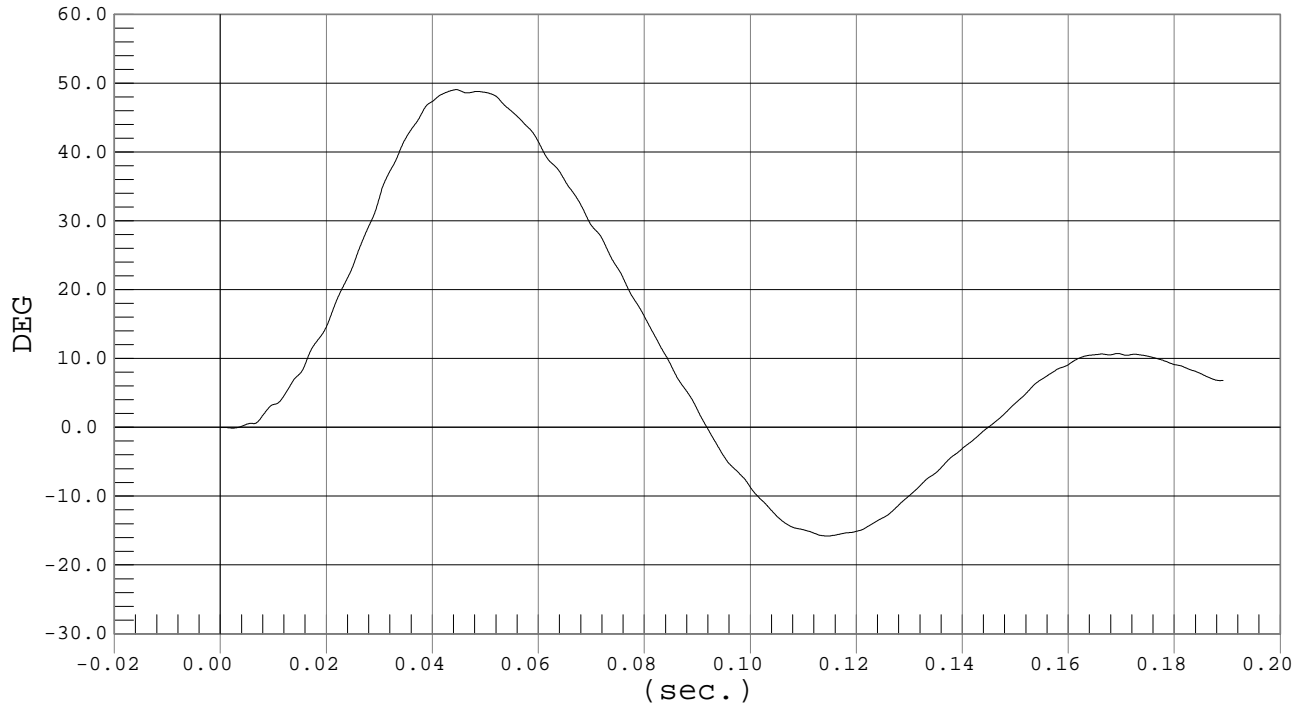


FLEXION ANGLE

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 12-12-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -15.79 DEG @ 0.1145 sec., Ymax = 49.04 DEG @ 0.0444 sec.



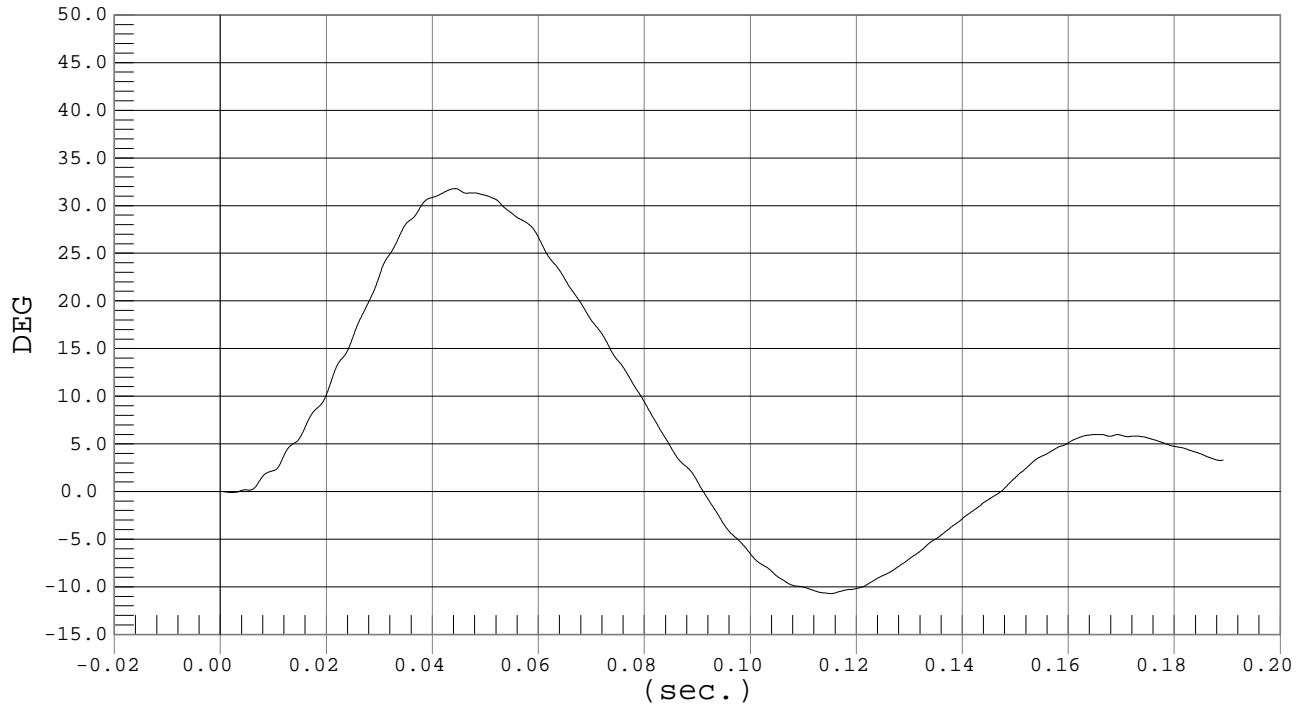


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA A

Test Date: 12-12-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -10.7 DEG @ 0.1151 sec., Ymax = 31.78 DEG @ 0.0442 sec.

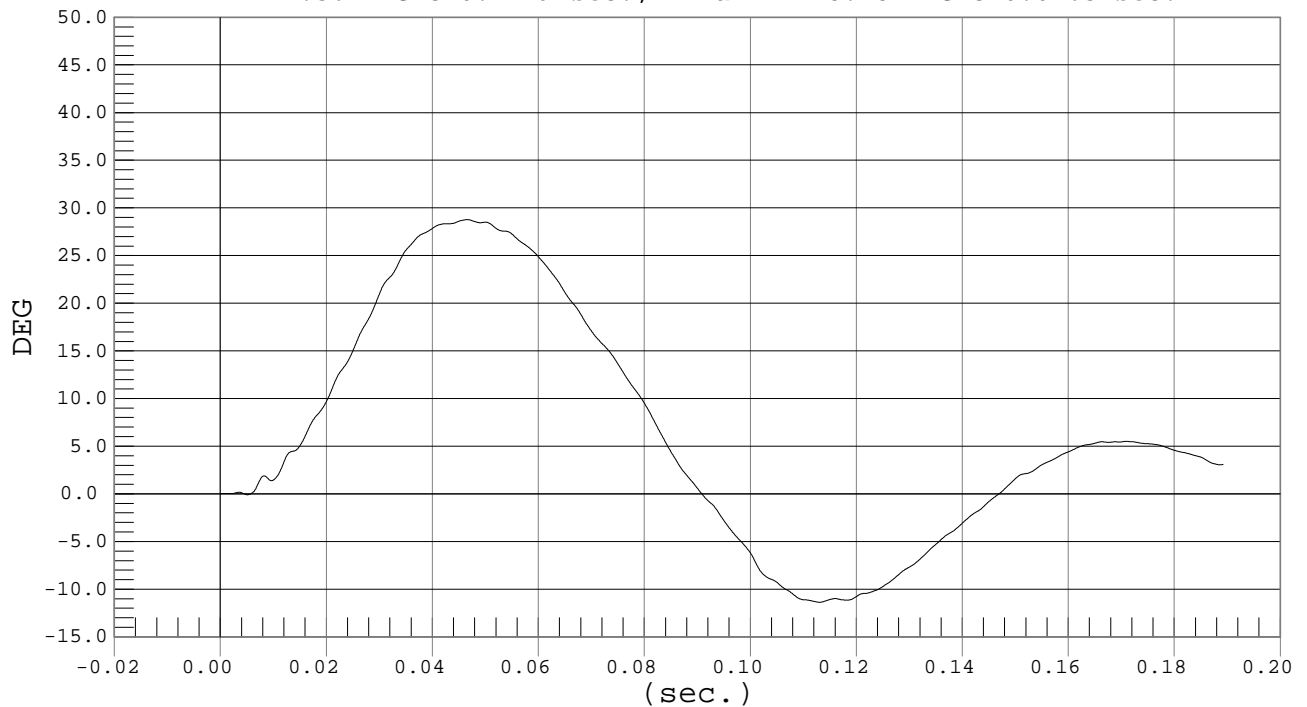


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA B

Test Date: 12-12-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -11.36 DEG @ 0.1129 sec., Ymax = 28.78 DEG @ 0.0465 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 12/11/02

Dummy Serial Number: 010

Test Number: D021609

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.6
Relative Humidity (%)	10 – 70	21
Pendulum Speed	4.20 – 4.40 m/s	4.31
Maximum Impactor Force	4.40 – 5.40 kN	4.99
Time of Max. Impactor Force	10.30 – 15.50 ms	13.20
Maximum Pubic Force	1.04 – 1.64 kN	1.24
Time of Max. Pubic Force	9.90 – 15.90 ms	11.40

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

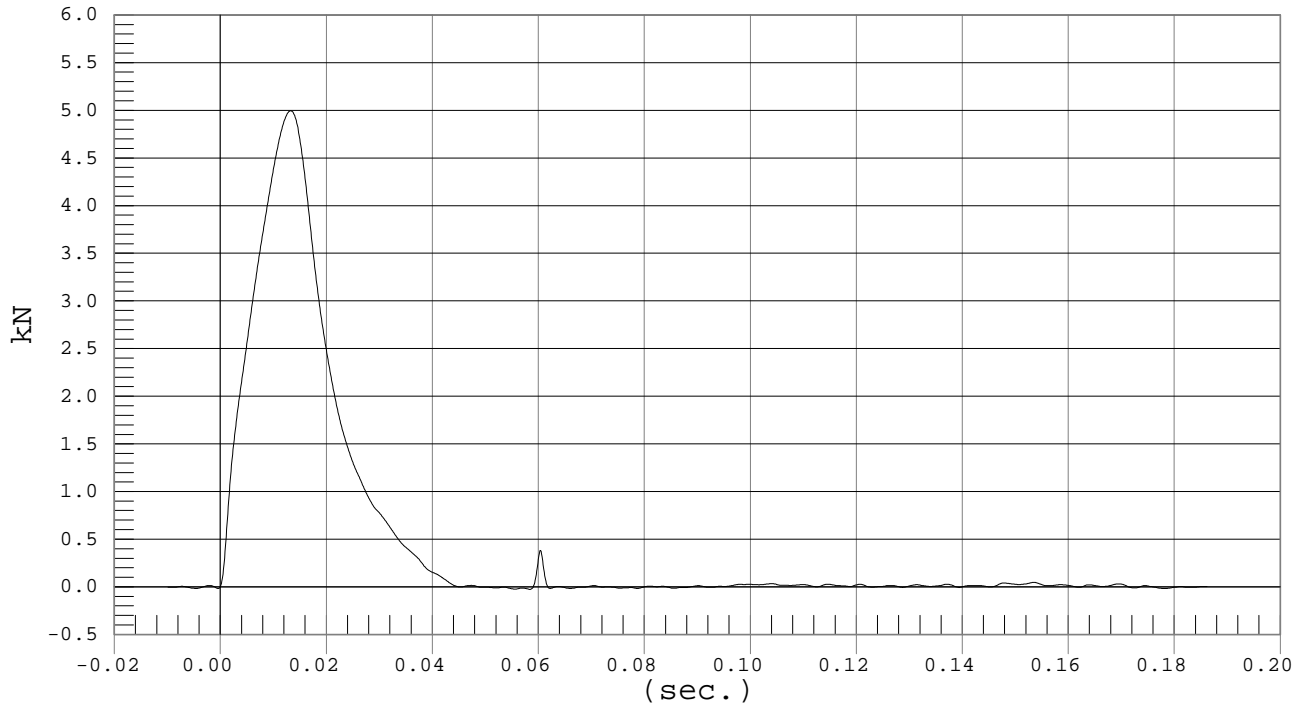


Test Desc.: Pelvis Impact
Component: Dummy #010

IMPACTOR FORCE

Test Date: 12-11-02
Speed: 14.1 fps, 4.31 M/s

Ymin = -.03 kN @ 0.0583 sec., Ymax = 4.99 kN @ 0.0132 sec.

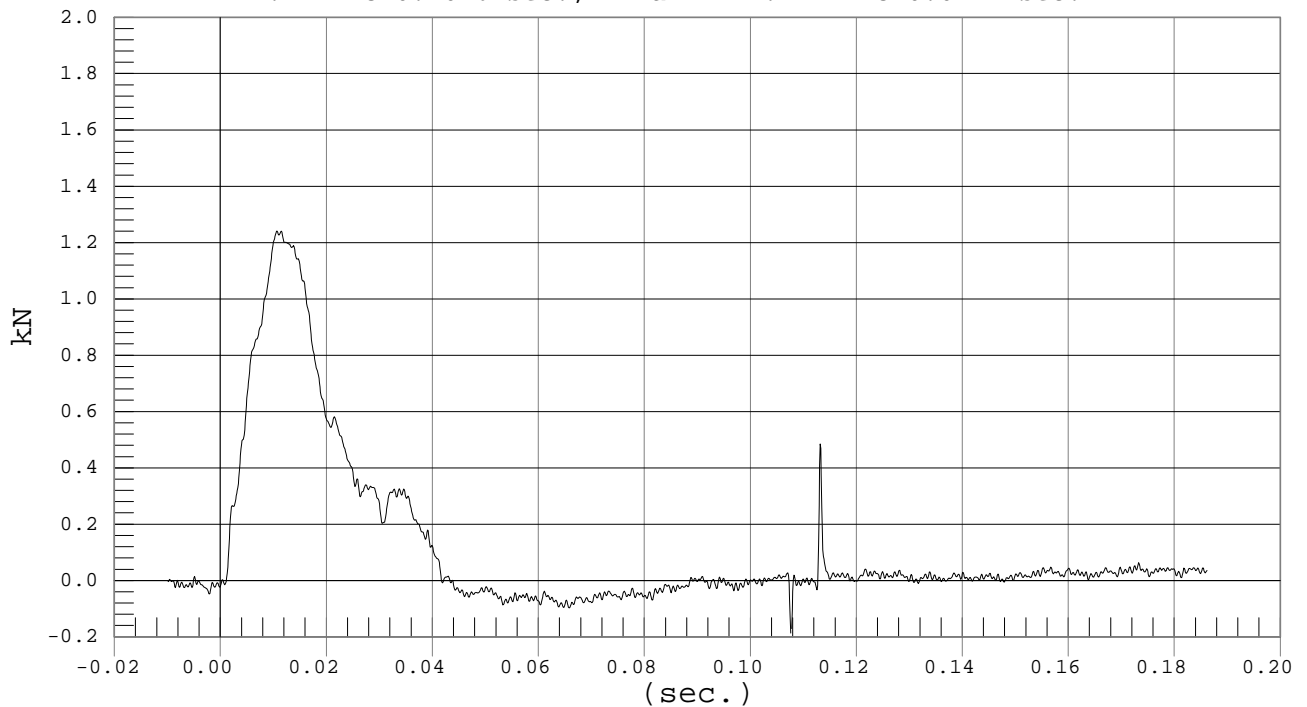


Test Desc.: Pelvis Impact
Component: Dummy #010

PUBIC FORCE

Test Date: 12-11-02
Speed: 14.1 fps, 4.31 M/s

Ymin = -.2 kN @ 0.1076 sec., Ymax = 1.24 kN @ 0.0114 sec.



APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA

	INSTRUMENTS FOR LEFT FRONT DUMMY NO.		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Driver Head X	P22180	Endevco	7/23/02
Driver Head Y	P22805	Endevco	7/23/02
Driver Head Z	P23012	Endevco	7/23/02
Driver Upper Neck Force X	N105FX	FTSS	5/13/02
Driver Upper Neck Force Y	N105FY	FTSS	5/13/02
Driver Upper Neck Force Z	N105FZ	FTSS	5/13/02
Driver Upper Neck Moment X	N105MX	FTSS	5/13/02
Driver Upper Neck Moment Y	N105MY	FTSS	5/13/02
Driver Upper Neck Moment Z	N105MZ	FTSS	5/13/02
Driver Lower Neck Force X	N110FX	FTSS	5/16/02
Driver Lower Neck Force Y	N110FY	FTSS	5/16/02
Driver Lower Neck Force Z	N110FZ	FTSS	5/16/02
Driver Lower Neck Moment X	N110MX	FTSS	5/16/02
Driver Lower Neck Moment Y	N110MY	FTSS	5/16/02
Driver Lower Neck Moment Z	N110MZ	FTSS	5/16/02
Driver Shoulder Force X	S119FX	FTSS	5/10/02
Driver Shoulder Force Y	S119FY	FTSS	5/10/02
Driver Shoulder Force Z	S119FZ	FTSS	5/10/02
Driver Upper Spine X	P24216	Endevco	7/22/02
Driver Upper Spine Y	P24226	Endevco	7/22/02
Driver Upper Spine Z	P23059	Endevco	7/22/02
Driver Upper Rib Y	P22107	Endevco	7/22/02
Driver Mid Rib Y	P22687	Endevco	7/22/02
Driver Lower Rib Y	P22454	Endevco	7/22/02
Driver Upper Rib Displacement	009U	Honeywell	5/22/02
Driver Mid Rib Displacement	009M	Honeywell	5/22/02
Driver Lower Rib Displacement	009L	Honeywell	5/22/02
Driver Lower Spine X	P21352	Endevco	7/22/02
Driver Lower Spine Y	P22695	Endevco	7/22/02
Driver Lower Spine Z	P22659	Endevco	7/22/02
Driver Torso Force X	ET100FX	FTSS	10/31/02
Driver Torso Force Y	ET100FY	FTSS	10/31/02
Driver Torso Moment Y	ET100MY	FTSS	10/31/02
Driver Torso Moment Z	ET100MZ	FTSS	10/31/02
Driver T-12 Force X	LS103FX	FTSS	5/13/02
Driver T-12 Force Y	LS103FY	FTSS	5/13/02
Driver T-12 Moment X	LS103MX	FTSS	5/13/02
Driver T-12 Moment Y	LS103MY	FTSS	5/13/02
Driver Front Abdomen Force	A122FY	FTSS	5/16/02
Driver Mid Abdomen Force	A123FY	FTSS	5/16/02

Driver Rear Abdomen Force	A124FY	FTSS	5/16/02
Driver Pubic Symphysis Force	P115FY	Denton	5/13/02
Driver Pelvis X	P22084	Endevco	7/23/02
Driver Pelvis Y	P22099	Endevco	7/23/02
Driver Pelvis Z	P22972	Endevco	7/23/02
Driver Right Femur Force X	F135FX	FTSS	5/13/02
Driver Right Femur Force Y	F135FY	FTSS	5/13/02
Driver Right Femur Force Z	F135FZ	FTSS	5/13/02
Driver Right Femur Moment X	F135MX	FTSS	5/13/02
Driver Right Femur Moment Y	F135MY	FTSS	5/13/02
Driver Right Femur Moment Z	F135MZ	FTSS	5/13/02
Driver Left Femur Force X	F136FX	FTSS	5/13/02
Driver Left Femur Force Y	F136FY	FTSS	5/13/02
Driver Left Femur Force Z	F136FZ	FTSS	5/13/02
Driver Left Femur Moment X	F136MX	FTSS	5/13/02
Driver Left Femur Moment Y	F136MY	FTSS	5/13/02
Driver Left Femur Moment Z	F136MZ	FTSS	5/13/02
Driver Lumbar Force Y	L104FX	FTSS	5/10/02
Driver Lumbar Force Z	L104FY	FTSS	8/15/02
Driver Lumbar Moment X	L104FZ	FTSS	8/15/02

	INSTRUMENTS FOR LEFT REAR DUMMY NO.		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Passenger Head X	J33416	Endevco	8/6/02
Passenger Head Y	J13927	Endevco	8/6/02
Passenger Head Z	AHTB2	Endevco	8/6/02
Pass. Upper Neck Force X	N106FX	FTSS	6/5/02
Pass. Upper Neck Force Y	N106FY	FTSS	6/5/02
Passenger Upper Neck Force Z	N106FZ	FTSS	6/5/02
Pass. Upper Neck Moment X	N106MX	FTSS	6/5/02
Pass. Upper Neck Moment Y	N106MY	FTSS	6/5/02
Pass. Upper Neck Moment Z	N106MZ	FTSS	6/5/02
Pass. Lower Neck Force X	N11FX	FTSS	6/2/02
Pass. Lower Neck Force Y	N11FY	FTSS	6/2/02
Passenger Lower Neck Force Z	N11FZ	FTSS	6/2/02
Pass. Lower Neck Moment X	N11MX	FTSS	6/2/02
Pass. Lower Neck Moment Y	N11MY	FTSS	6/2/02
Pass. Lower Neck Moment Z	N11MZ	FTSS	6/2/02
Pass. Shoulder Force X	S120FX	FTSS	5/31/02
Pass. Shoulder Force Y	S120FY	FTSS	5/31/02
Pass. Shoulder Force Z	S120FZ	FTSS	5/31/02
Pass. Upper Spine X	J13530	Endevco	8/6/02
Pass. Upper Spine Y	AP2E1	Endevco	8/6/02
Pass. Upper Spine Z	J13535	Endevco	8/6/02
Pass. Upper Rib Y	J13630	Endevco	8/6/02
Passenger Mid Rib Y	ANAT6	Endevco	8/6/02
Passenger Lower Rib Y	J13938	Endevco	8/6/02
Pass. Upper Rib Displacement	010U	Honeywell	5/22/02
Pass. Mid Rib Displacement	010M	Honeywell	5/22/02
Pass. Lower Rib Displacement	010L	Honeywell	5/22/02
Passenger Lower Spine X	AH0F0	Endevco	8/6/02
Passenger Lower Spine Y	AH097	Endevco	8/6/02
Passenger Lower Spine Z	AH1F9	Endevco	8/6/02
Passenger Torso Force X	ET104FX	FTSS	12/5/02
Passenger Torso Force Y	ET104FY	FTSS	12/5/02
Passenger Torso Force Z	ET104FZ	FTSS	12/5/02
Passenger T-12 Force X	LS102FX	FTSS	6/5/02
Passenger T-12 Force Y	LS102FY	FTSS	6/5/02
Passenger T-12 Moment X	LS102MX	FTSS	6/5/02
Passenger T-12 Moment Y	LS102MY	FTSS	6/5/02
Pass. Front Abdomen Force	A119FY	Endevco	6/3/02
Passenger Mid Abdomen Force	A120FY	Endevco	6/3/02
Pass. Rear Abdomen Force	A121FY	Endevco	6/3/02
Pass. Pubic Symphysis Force	P113FY	FTSS	5/16/02
Passenger Pelvis X	AGP20	Endevco	8/8/02

Passenger Pelvis Y	ALDY8	Endevco	8/8/02
Passenger Pelvis Z	AP0E1	Endevco	8/8/02
Pass. Right Femur Force X	F137FX	FTSS	6/3/02
Pass. Right Femur Force Y	F137FY	FTSS	6/3/02
Pass. Right Femur Force Z	F137FZ	FTSS	6/3/02
Pass. Right Femur Moment X	F137MX	FTSS	6/3/02
Pass. Right Femur Moment Y	F137MY	FTSS	6/3/02
Pass. Right Femur Moment Z	F137MZ	FTSS	6/3/02
Passenger Left Femur Force X	F138FX	FTSS	6/3/02
Passenger Left Femur Force Y	F138FY	FTSS	6/3/02
Passenger Left Femur Force Z	F138FZ	FTSS	6/3/02
Pass. Left Femur Moment X	F138MX	FTSS	6/3/02
Pass. Left Femur Moment Y	F138MY	FTSS	6/3/02
Pass. Left Femur Moment Z	F138MZ	FTSS	6/3/02
Pass.Lumbar Force Y	L105FY	FTSS	5/31/02
Pass.Lumbar Force Z	L105FZ	FTSS	5/31/02
Pass. Lumbar Moment x	L105MX	FTSS	5/31/02

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Mid A-Post Y	ALFP5	ENDEVCO	11/4/02
Left Lower A-Post Y	J14771	ENDEVCO	1/21/02
Left Upper B-Post Y	G03-N02	ENTRAN	9/6/02
Left Mid B-Post Y	G01-N18	ENTRAN	7/31/02
Left Lower B-Post Y	K16-X08	ENTRAN	11/19/02
Rear Floorpan Above Axle X	H01-N23	ENTRAN	11/19/02
Rear Floorpan Above Axle Y	H05-F14	ENTRAN	11/19/02
Rear Floorpan Above Axle Z	H01-N32	ENTRAN	11/19/02
Driver Seat Track Y	E10-F20	ENTRAN	6/17/02
Driver Left Seat Frame	C25-A25	ENTRAN	9/6/02
Driver Right Seat Frame	H14-N01	ENTRAN	6/17/02
Right Side Sill at Front Seat X	AMP95	ENDEVCO	6/25/02
Right Side Sill at Front Seat Y	G01-N25	ENTRAN	7/24/02
Right Side Sill at Front Seat Z	G01-N03	ENTRAN	7/23/02
Right Side Sill at Rear Seat X	G23-N10	ENTRAN	9/23/02
Right Side Sill at Rear Seat Y	H05-F07	ENTRAN	11/19/02
Right Side Sill at Rear Seat Z	H01-N33	ENTRAN	11/19/02
Left Side Sill at Front Seat Y	D11-F01	ENTRAN	11/19/02
Left Side Sill at Rear Seat Y	G13-B07	ENTRAN	10/8/02
Vehicle CG X	I12-F11	ENTRAN	6/17/02
Vehicle CG Y	H14-N03	ENTRAN	6/17/02
Vehicle CG Z	D11-F05	ENTRAN	9/6/02
Left Front Door @ Mid Rib Y	H01-N26	ENTRAN	11/19/02
Left Front Door @ Pelvis Y	99F216	ENTRAN	10/31/02
Left Front Door @ Knee Y	AK956	ENDEVCO	11/4/02
Left Front Door @ End of Arm Y	H01-N09	ENTRAN	11/19/02
Left Rear Door @ Mid Rib Y	H01-N14	ENTRAN	10/31/02
Left Rear Door @ Pelvis Y	H01-N13	ENTRAN	10/30/02
Left Rear Door @ Knee Y	H01-N12	ENTRAN	10/30/02
Left Rear Door @ Child Seat Y	H01-N31	ENTRAN	11/19/02
Right Rear Occ. Compartment Y	A08-A13	ENTRAN	9/6/02

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

APPENDIX E
PROCEDURE USED FOR ES-2 POSITIONING

Installation of the Side Impact Dummy (recommended practice)

1. GENERAL

- 1.1 The dummy to be used for the following installation procedure is described in Annex 6 to this regulation.
- 1.2 Adjust the knee joints so that they just support the leg when it is extended horizontally (1 to 2 g).
- 1.3 Clothe the dummy in form fitting cotton stretch mid-calf length pants. Each foot is equipped with a shoe.

2. INSTALLATION

- 2.1 Place the dummy in the outboard front seat of the impact side as described in the test specifications.
- 2.2 The mid-sagittal plane of the dummy shall coincide with the centerplane of the occupant (as determined according to Annex 3, paragraph 2.8) with a tolerance of 2°.
- 2.3 The pelvis of the dummy shall be positioned according to the following:
 - 2.3.1 The pelvis pitch angle shall be 20.0° +/- 2.5°.
 - 2.3.2 A line passing through the dummy H-points shall pass through an imaginary circle in the mid-sagittal plane of the dummy. This circle has a radius of 10 mm and is located 20 mm horizontally forward and 5 mm vertically above the reference H-point, determined by the 3D H-point machine.
- 2.4 The upper torso of the dummy shall be positioned according to the following:
 - 2.4.1 The upper torso shall be bent forward and then laid back against the seat back. The shoulder of the dummy shall be set fully rearward.
 - 2.4.2 The torso reference line pitch angle shall be 25.0° +/- 2.5°. The torso reference line is defined as the thoracic spine center line.
- 2.5 The arms shall be positioned in such a way that the angle between the projection of the arm centerline on the mid-sagittal plane of the dummy and the torso reference line is 40° +/- 5°.
- 2.6 For the driver's seating position, without inducing pelvis or torso movement, place the right foot of the dummy on the undepressed accelerator pedal with the heel resting as far forward as possible on the floorpan. Set the left foot perpendicular to the lower leg with the heel resting on the floorpan in the same lateral line as the right heel. Set the knees of the dummy such that their outside surfaces are 150 +/- 10mm from the plane of symmetry of the dummy. If possible, within these constraints, place the thighs of the dummy in contact with the seat cushion.
- 2.7 For other seating positions, without inducing pelvis or torso movement, place the heels of the dummy as far forward as possible on the floorpan without compressing the seat cushion more than the compression due to the weight of the leg. Set the knees of the dummy such that their outside surfaces are 150 +/- 10 mm from the plane of symmetry of the dummy.

APPENDIX F
ES-2 PEAK RESPONSES

DRIVER (ES-2) PEAK RESPONSE TABLE

Location	Peak Response						
				2001 Focus 10/5/01 NCAP Side		2001 Focus 12/10/02 NCAP Side	
	Class	Axis	Units	Peak	Time (ms)	Peak	Time (ms)
Head	1000	X	G	-13.8	84	-15.3	49
	1000	Y	G	23.4	46	25.0	47
	1000	Z	G	50.4	57	46.2	50
	1000	RES	G	53.2	54	53.1	49
Head Injury Criteria (HIC)				299		272	
t1				43.6		42.7	
t2				79.6		78.7	
Upper Neck Force	1000	X	N	-655	86	-508	81
	1000	Y	N	832	81	827	77
	1000	Z	N	1885	59	1724.0	58
	1000	RES	N	1953	59	1809	58
Upper Neck Moment	600	X	Nm	-78.9	45	-71.8	45
	600	Y	Nm	15.6	116	-31.3	48
	600	Z	Nm	12.2	69	15.7	63
	600	RES	Nm	78.9	45	75.4	45
Lower Neck Force	1000	X	N	-673	54	-710	51
	1000	Y	N	1074	58	1030	58
	1000	Z	N	1744	57	1681	48
	1000	RES	N	2085	57	1929	50
Lower Neck Moment	600	X	Nm	229.5	77	210.5	76
	600	Y	Nm	78.7	105	56.7	51
	600	Z	Nm	-22.5	108	19.5	72
	600	RES	Nm	233.8	77	213.5	76
Shoulder Force	600	X	N	451	26	-1133	25
	600	Y	N	867	27	1929	26
	600	Z	N	-1061	30	-1382	36
	600	RES	N				

DRIVER (ES-2) PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values						
				2001 Focus 10/5/01 NCAP Side		2001 Focus 12/10/02 NCAP Side	
	Class	Axis	Units	Peak	Time (ms)	Peak	Time (ms)
Upper Spine	180	X	G	-27.3	25	-14.1	22
	180	Y	G	82.8	36	63.3	36
	180	Z	G	6.6	43	-9.6	29
	180	Res	G	82.8	36	63.4	36
Lower Spine	180	X	G	-15.4	30	-8.8	32
	180	Y	G	72.3	30	81.0	31
	180	Z	G	8.3	33	-11.1	29
	180	Res	G	73.5	30	81.5	31
Upper Rib	180	Y	G	165.5	26	141.9	25
Mid Rib	180	Y	G	138.8	25	203.4	27
Lower Rib	180	Y	G	154.3	29	144.3	26
Upper Rib Deflection	180	Y	mm	-46.4	41	33.1	40
Mid Rib Deflection	180	Y	mm	-34.5	37	-47.6	43
Lower Rib Deflection	180	Y	mm	-22.0	36	-27.1	36
Upper Rib VC	180	Y	m/sec	1.15	34	0.65	31
Mid Rib VC	180	Y	m/sec	0.66	33	0.87	32
Lower Rib VC	180	Y	m/sec	0.38	32	0.47	31
Torso Force	600	X	N	434	37	1416	36
	600	Y	N	1214	39	-797	30
Torso Moment	600	Y	Nm	19.6	40	33.2	29
	600	Z	Nm	16.8	37	50.4	36
T12 Force	600	X	N	528	65	-666	26
	600	Y	N	NOT COLLECTED		3807	30
T12 Moment	600	X	Nm	NOT COLLECTED		-296.9	29
	600	Y	Nm	NOT COLLECTED		-86.7	29

DRIVER (ES-2) PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values						
				2001 Focus 10/5/01 NCAP Side		2001 Focus 12/10/02 NCAP Side	
	Class	Axis	Units	Peak	Time (ms)	Peak	Time (ms)
Abdomen Front Force	600	Y	N	281	30	406	28
Abdomen Mid Force	600	Y	N	593	27	656	26
Abdomen Rear Force	600	Y	N	960	26	913	25
Abdomen Summed Force	600	Y	N	1785	27	1858	27
Pubic Symphysis Force	600	Y	N	-3561	25	-3629	23
Right Femur Force	600	X	N	317	23	362	33
	600	Y	N	1545	38	1517	37
	600	Z	N	1370	32	-2824	57
	600	RES	N	1877	38	2849	57
Right Femur Moment	600	X	Nm	-126.9	23	-131.1	24.0
	600	Y	Nm	43.3	23	81.7	105
	600	Z	Nm	42.2	51	45.0	57
	600	RES	Nm	134.4	23	135.2	24
Left Femur Force	600	X	N	-406	35	-395	33
	600	Y	N	-771	28	2608	15
	600	Z	N	1854	29	2345	43
	600	RES	N	2002	29	2687	64
Left Femur Moment	600	X	Nm	-145.0	44	-180.4	42
	600	Y	Nm	-70.6	34	77.7	34
	600	Z	Nm	38.0	28	37.8	35
	600	RES	Nm	145.1	44	180.5	42
Pelvis	1000	X	G	28.7	47	20.3	29
	1000	Y	G	96.7	23	107.3	22
	1000	Z	G	25.7	31	-25.7	30

PASSENGER (ES-2) PEAK RESPONSE TABLE

Location	Peak Response						
				2001 Focus 10/5/01 NCAP Side		2001 Focus 12/10/02 NCAP Side	
	Class	Axis	Units	Peak	Time (ms)	Peak	Time (ms)
Head	1000	X	G	22.4	103	-27.4	56
	1000	Y	G	79.5	43	68.5	41
	1000	Z	G	15.9	84	-30.1	48
	1000	RES	G	81.1	43	72	41
Head Injury Criteria (HIC)				188		236	
t1				40.3		37.3	
t2				46.4		58.8	
Upper Neck Force	1000	X	N	-659	87	-583	86
	1000	Y	N	-957	52	-1126	49
	1000	Z	N	-1614	47	-2270	48
	1000	RES	N	1823	49	2511	48
Upper Neck Moment	600	X	Nm	-57.3	63	-44.0	58
	600	Y	Nm	-33.5	47	-46.8	48
	600	Z	Nm	34.4	64	30.5	61
	600	RES	Nm	69.0	63	61.1	58
Lower Neck Force	1000	X	N	NOT COLLECTED		-632	57
	1000	Y	N			1165	49
	1000	Z	N			-2372	47
	1000	RES	N			2625	47
Lower Neck Moment	600	X	Nm	NOT COLLECTED		-43.7	64
	600	Y	Nm			109.5	66
	600	Z	Nm			39.0	69
	600	RES	Nm			123.3	66
Shoulder Force	600	X	N	-1497	35	-1762	34
	600	Y	N	2127	55	2291	35
	600	Z	N	-1439	55	-1898	49
	600	RES	N				

PASSENGER (ES-2) PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values						
				2001 Focus 10/5/01 NCAP Side		2001 Focus 12/10/02 NCAP Side	
	Class	Axis	Units	Peak	Time (ms)	Peak	Time (ms)
Upper Spine	180	X	G	-23.2	47	-26.9	48
	180	Y	G	44.1	53	45.2	51
	180	Z	G	9.2	51	12.7	48
	180	Res	G	46.9	53	53.5	47
Lower Spine	180	X	G	-21.0	44	-20.5	41
	180	Y	G	61.3	40	64.7	40
	180	Z	G	-8.8	37	-12.3	40
	180	Res	G	63.4	41	68.5	40
Upper Rib	180	Y	G	85.7	33	81.4	34
Mid Rib	180	Y	G	45.8	34	64.5	38
Lower Rib	180	Y	G	57.4	41	115	38
Upper Rib Deflection	180	Y	mm	-17.5	53	-24.5	55
Mid Rib Deflection	180	Y	mm	-12.7	49	-16.8	51
Lower Rib Deflection	180	Y	mm	-8.0	51	-13.5	49
Upper Rib VC	180	Y	m/sec	0.19	38	0.3	39
Mid Rib VC	180	Y	m/sec	0.06	38	0.1	46
Lower Rib VC	180	Y	m/sec	-0.03	56	0.1	43
Torso Force	600	X	N	-803	97	1033	90
	600	Y	N	-492	44	-654	91
Torso Moment	600	Y	Nm	-38.8	99	-57.5	91
	600	Z	Nm	-30.0	100	-32.9	90
T12 Force	600	X	N	-511	35	-830	36
	600	Y	N	2488	45	3013	40
T12 Moment	600	X	Nm	NOT COLLECTED		-405.2	40
	600	Y	Nm	-79.8	38	-119.4	36

PASSENGER (ES-2) PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values						
				2001 Focus 10/5/01 NCAP Side		2001 Focus 12/10/02 NCAP Side	
	Class	Axis	Units	Peak	Time (ms)	Peak	Time (ms)
Abdomen Front Force	600	Y	N	545	37	924	35
Abdomen Mid Force	600	Y	N	475	37	760	43
Abdomen Rear Force	600	Y	N	262	50	554	40
Abdomen Summed Force	600	Y	N	1188	47	2036	44
Pubic Symphysis Force	600	Y	N	-3678	38	-3725	33
Right Femur Force	600	X	N	-706	34	381	36
	600	Y	N	-952	34	-1829	31
	600	Z	N	2427	34	1919	31
	600	RES	N	2527	34	2557	31
Right Femur Moment	600	X	Nm	230.9	35	113.6	31
	600	Y	Nm	104.5	34	-73.2	36
	600	Z	Nm	32.8	34	28.8	50
	600	RES	Nm	241.7	35	117.5	31
Left Femur Force	600	X	N	388	37	-585	28
	600	Y	N	2526	35	3063	32
	600	Z	N	1964	34	9111	65
	600	RES	N			9112	65
Left Femur Moment	600	X	Nm	-337.3	23	-358.2	23
	600	Y	Nm	-83.2	36	-98.2	27
	600	Z	Nm	48.1	34	49.5	28
	600	RES	Nm	344.9	23	363	23
Pelvis	1000	X	G	-71.0	36	-65.8	33
	1000	Y	G	93.3	31	110.7	33
	1000	Z	G	-24.4	36	-24.9	33

APPENDIX G
ES-2 POLARITY CHECKLIST

ES-2 POLARITY CHECKLIST

Location	Channel	Dummy Manipulation	Polarity
Upper Neck	Fx	Head Rearward, Chest Forward	+
	Fy	Head Leftward, Chest Rightward	+
	Fz	Head Upward, Chest Downward	+
	Mx	Left Ear Toward Left Shoulder	+
	My	Chin Toward Sternum	+
	Mz	Chin Toward Left Shoulder	+
Lower Neck	Fx	Head Rearward, Chest Forward	+
	Fy	Head Leftward, Chest Rightward	+
	Fz	Head Upward, Chest Downward	+
	Mx	Left Ear Toward Left Shoulder	+
	My	Chin Toward Sternum	+
	Mz	Chin Toward Left Shoulder	+
Shoulder	Fx	Shoulder Forward, Chest Rearward	+
	Fy	Shoulder Rightward, Chest Leftward	+
	Fz	Shoulder Downward, Chest Upward	+
Torso Back Plate	Fx	Push Backplate in the +X Direction	+
	Fy	Push Backplate to the Right (+Y)	+
	My	Push Bottom Half and Pull Top Half of Backplate	+
	Mz	Push Left Half and Pull Right Half of Backplate	+
Thorax Upper Rib	Dy	Push Rib Rightward	+
Thorax Mid Rib	Dy	Push Rib Rightward	+
Thorax Lower Rib	Dy	Push Rib Rightward	+
Pubic Load	Fy	Right H-Point Pad Leftward, Left Pad Rightward	(-)
T12 Load	Fx	Chest Rearward, Pelvis Forward	+
	Fy	Chest Leftward, Pelvis Rightward	+
	Mx	Left Shoulder Toward Left Hip	+
	My	Sternum Toward Front of Legs	+
Left Iliac Load	Fy	Left Iliac Rightward, Chest Leftward	+
Ant. Ab. Load	Fy	Left Side of Abdomen Rightward, Chest Leftward	+
Mid Ab. Load	Fy	Left Side of Abdomen Rightward, Chest Leftward	+
Post. Ab. Load	Fy	Left Side of Abdomen Rightward, Chest Leftward	+
Left Upper Leg Load	Fx	Knee Upward, Upper Femur Downward	+
	Fy	Knee Rightward, Upper Femur Leftward	+
	Fz	Knee Forward, Pelvis Rearward	+
	Mx	Knee Leftward, Hold Upper Femur in Place	+
	My	Knee Upward, Hold Upper Femur in Place	+
	Mz	Tibia Leftward, Hold Pelvis in Place	+

ES-2 POLARITY CHECKLIST (CONTINUED)

Location	Channel	Dummy Manipulation	Polarity
Lumbar Spine	Fx	Knee Upward, Upper Femur Downward	+
	Fy	Knee Rightward, Upper Femur Leftward	+
	Fz	Knee Forward, Pelvis Rearward	+
	Mx	Knee Leftward, Hold Upper Femur in Place	+
	My	Knee Upward, Hold Upper Femur in Place	+
	Mz	Tibia Leftward, Hold Pelvis in Place	+