

REPORT NUMBER: TO1-MGA-2004-002

**OBLIQUE RIGID SIDE POLE IMPACT
ES-2RE DRIVER POSITION
TEST DATE: JANUARY 18, 2005
Task Order #T0001 / RFP #0004**

**2005 HONDA CR-V
NHTSA NUMBER: R55358**

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

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

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SECTION 1
PURPOSE AND TEST PROCEDURE

This Side Impact test is conducted as part of Contract No. DTRS57-04-D-30001, RFP 4, task order 1, sponsored by the U.S. Department of Transportation, Volpe National Transportation System Center. The purpose of this test is to evaluate the performance of the vehicle and restraint system when subjected to an oblique rigid pole side impact (75 degrees at 32 km/h impact speed). The ES-2RE dummy was positioned in the driver seat. (ES-2RE is an ES-2 with rib extensions including a modified back plate with linear bearings)

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

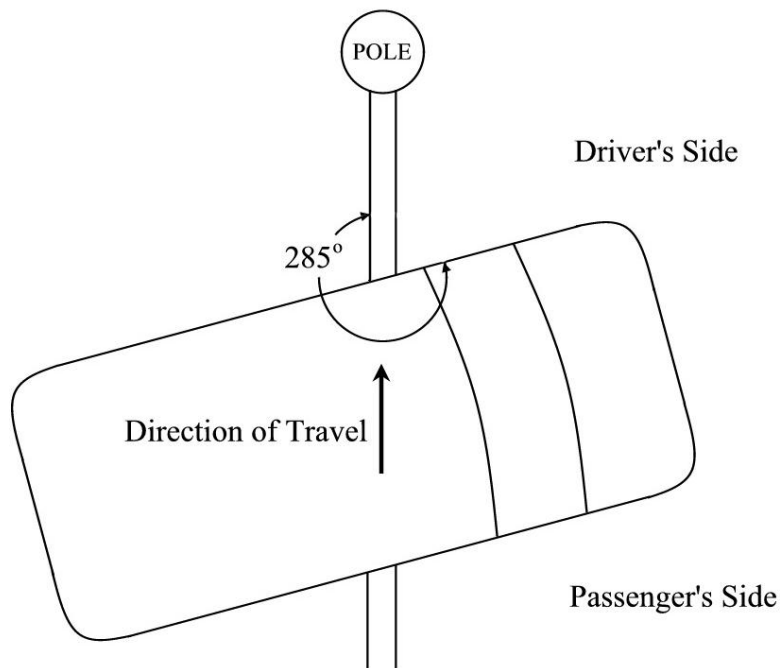
SECTION 2

SUMMARY OF SIDE IMPACT TEST

An oblique rigid side pole impact test at 75 degrees was performed on a 2005 Honda CR-V. The subject vehicle was towed into an oblique rigid pole at a velocity of 32.5 km/h. The weight of the vehicle as tested was 1622.1 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on January 18, 2005. Pre- and post-test photographs of the test vehicle and the dummies are included in Appendix A.

One ES-2RE side impact dummy was placed in the left front designated seating position according to Appendix B of the draft test procedure TP-214P-00 dated May 21, 2004. The side impact event was documented by twelve high speed cameras and one real time camera. Camera locations and other pertinent camera information can be found in this report.

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



SECTION 2...continued
SUMMARY OF SIDE IMPACT TEST

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

		Left Front
HIC 15 (CFC 1000)	T1 (msec)	43.4
	T2 (msec)	58.4
	HIC 15	580.8
HIC 36 (CFC 1000)	T1 (msec)	39.6
	T2 (msec)	62.3
	HIC 36	639.2
Thorax (CFC 180)		
Chest Deflection	Upper Rib Deflection	-43.4
	Mid Rib Deflection	-45.8
	Lower Rib Deflection	-50.2
Lower Spine (CFC 180)		
	Lower Spine Resultant	53.3
Abdomen (CFC 600)		
	Front Abdominal Force	152 *
	Mid Abdominal Force	288
	Rear Abdominal Force	641
	Sum of Abdominal Force	929 *
Pelvis (CFC 600)		
	Pubic Symphysis Force	-903

Contact Times	Left Front
Head (msec)	**
Arm (msec)	23
Rib (msec)	21
Pelvis (msec)	18

TEST NOTES

* The Driver Front Abdomen Force did not collect any data after 36ms

** Not collected during test (due to curtain and side airbags)

Left Front Door @ Pelvis Y – no valid data after 40 msec

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

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2005

TEST VEHICLE INFORMATION

Make	Honda
Model	CR-V
Body Style	MPV
VIN	SHSRD68515U300713
Color	Silver
Odometer Reading (mile)	46
Transmission	Automatic
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	2.4
Engine Placement	Lateral

TEST VEHICLE OPTIONS

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Honda Motor Company	GVWR (kg)	2020
Date of Manufacture	10/04	GAWR Front (kg)	1000
		GAWR Rear (kg)	1040

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Cold Pressure (kPa)	200	200
Recommended Tire Size	P215/65R16	P215/65R16
Tire Size on Vehicle	P215/65R16	P215/65R16
Tire Manufacturer	Bridgestone	Bridgestone

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench		
Number Of Occupants x 68.04 kg.	2	3		5
Capacity Wt. (VCW) (kg)				395
Cargo Wt. (RCLW) (kg)				45.4

DATA SHEET NO. 1... (continued)**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2005 Honda CR-VTest Date: January 18, 2005**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	412.8	334.8		416.4	394.2	
Right	kg	425.0	330.7		451.8	359.7	
Ratio	%	55.7	44.3		53.5	46.5	
Totals	kg	837.8	665.5	1503.3	868.2	753.9	1622.1

TARGET TEST WEIGHT

Measured Parameter	Units	Value
As Delivered Vehicle Weight	kg	1503.3
Weight of 1 ES-2	kg	80.7
Rated Cargo Weight	kg	45.4
Vehicle Target Weight (TVTW)	kg	1629.4

TEST VEHICLE ATTITUDES

	Unit	As Delivered	Fully Loaded	Ready for Test
Right Door Sill Angle	Deg	0.1 ND	0.3 NU	0.3 NU
Left Door Sill Angle	Deg	1.2 NU	0.0	0.0
Front Bumper Angle	Deg	0.4 ND	0.3 ND	0.2 ND
Rear Bumper Angle	Deg	0.3 NU	0.2 ND	0.0

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

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2644
Total Vehicle Length at Left Side	mm	3795
Total Vehicle Length at Centerline	mm	4416
Total Vehicle Length at Right Side	mm	3795
Total Vehicle Width	mm	1770
Weight of Ballast in Cargo Area	kg	0
Amount of Water in Fuel Tank	liters	0

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Impact Reference Line from Front Axle	mm	1369
Impact Point	mm	32 rear
Impact Angle Difference	deg	1°

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2005

NORMAL DESIGN RIDING POSITION

Driver seat back angle: 6th notch, first as 0

SEAT FORE/AFT POSITIONS

The driver's seat is manually operated.

Driver seat fore/aft total travel: 25 detents

Driver seat fore/aft position: 13th detent

SEAT BELT UPPER ANCHORAGE

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

STEERING COLUMN ADJUSTMENT

The column was placed in the mid position of travel.

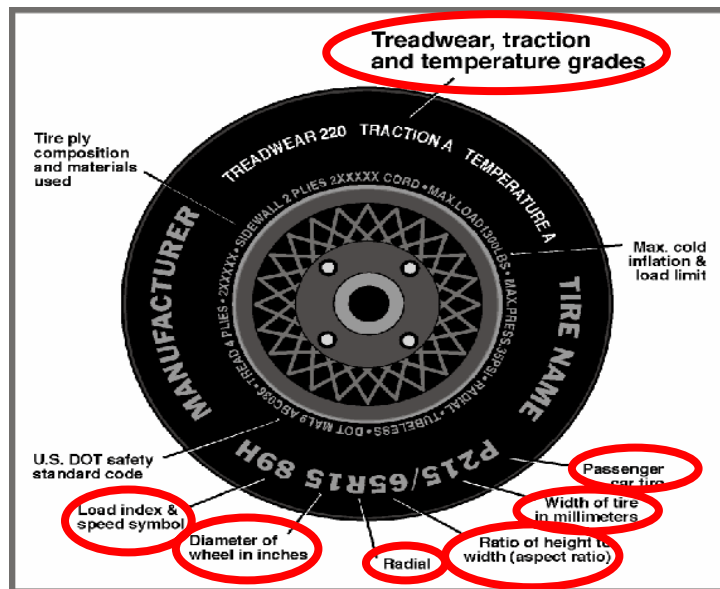
DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2005

Vehicle Year	2005	Vehicle Make	Honda
VIN	SHSRD68515U300713	Vehicle Model	CR-V



	Front	Rear
Tire Manufacturer	Bridgestone	Bridgestone
Tire Name	Dueller H/T	Dueller H/T
Tire Type	P	P
Tire Width (mm)	215	215
Ratio of Height to Width (aspect ratio)	65	65
Radial	R	R
Wheel Diameter	16	16
Load Index & Speed Symbol	98T	98T
Treadwear	300	300
Traction Grade	B	B
Temperature Grade	B	B

DATA SHEET NO. 3
POST TEST OBSERVATIONS

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2005

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front
Dummy Type	ES-2RE
Head Contact	Curtain bag
Upper Torso Contact	Side seat airbag
Lower Torso Contact	Door Panel/ Side seat airbag
Left Knee Contact	Door panel
Right Knee Contact	Left knee

POST TEST DOOR OPENING

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

POST TEST STRUCTURAL OBSERVATIONS

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

AIRBAG DEPLOYMENT

	Driver
Front	No
Side	Yes
Curtain	Yes

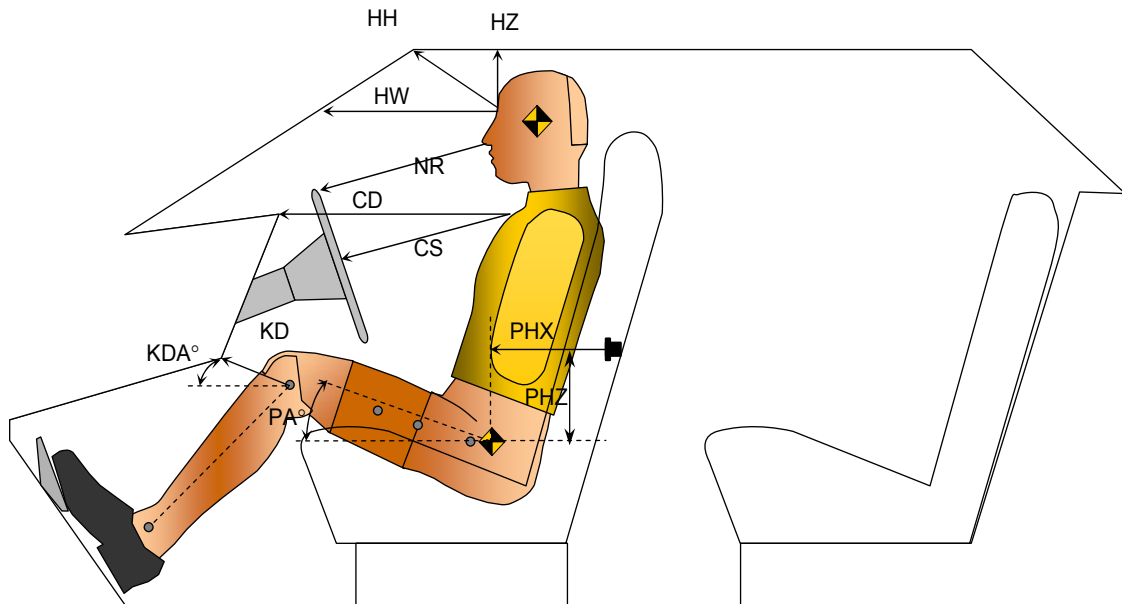
Note: The right side curtain deployed during the test after left side curtain

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 4
ES-2RE LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2005

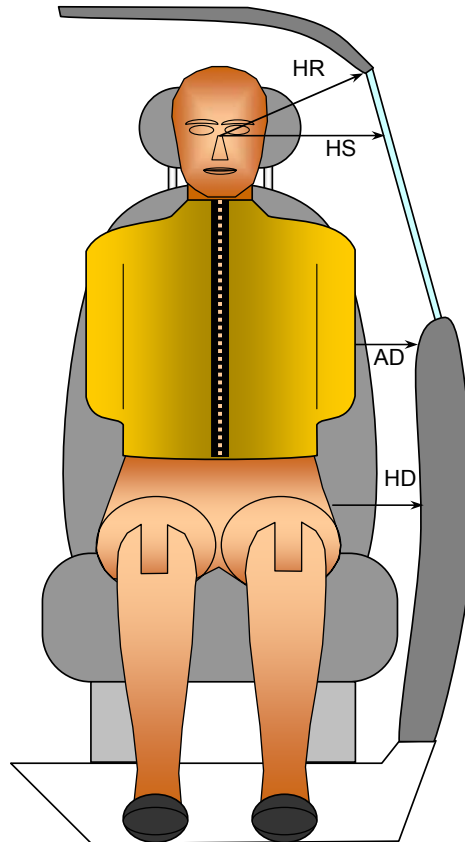


Driver Code	Measurement Description	Left Front	
		Length(mm)	Angle(°)
HH	Head to Header	558	
HW	Head to Windshield	633	
HZ	Head to Roof	193	
NR	Nose to Rim	502	
CD	Chest to Dash (Top of Rib)	584	
CS	Chest to Steering Wheel (Top of Rib)	358	
KDL	Left Knee to Dash	98	19.5
KDR	Right Knee to Dash	111	26.3
PA	Pelvic Angle (Longitudinal)		29.2
PA	Pelvic Angle (Lateral)		0.3
SA	Spine Angle (Longitudinal)		13.3
SA	Spine Angle (Lateral)		0.1
PHX	H-Point to Striker (X-Axis)	234	
PHZ	H-Point to Striker (Z-Axis)	74	

DATA SHEET NO. 5
ES-2RE LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2005



FRONT VIEW OF DUMMY

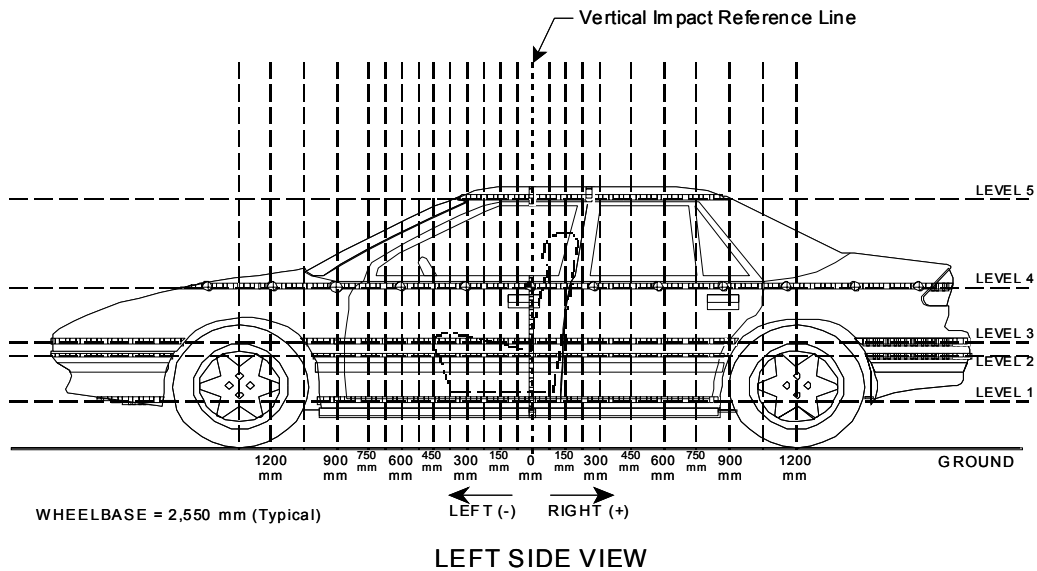
Code	Measurement Description	Units	Left Front
HR	Head to Side Header	mm	178
HS	Head to Side Window	mm	273
AD	Arm to Door	mm	78
HD	H-Point to Door	mm	147

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

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2004

PRETEST AND POST TEST EXTERIOR PROFILE MEASUREMENTS



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

Level	Measurement Description	Height Above Ground
5	Window	1634
4	Window Sill	1107
3	Mid Door	809
2	Occupant H-Point	728
1	Sill Top	437

DATA SHEET NO. 7
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2004

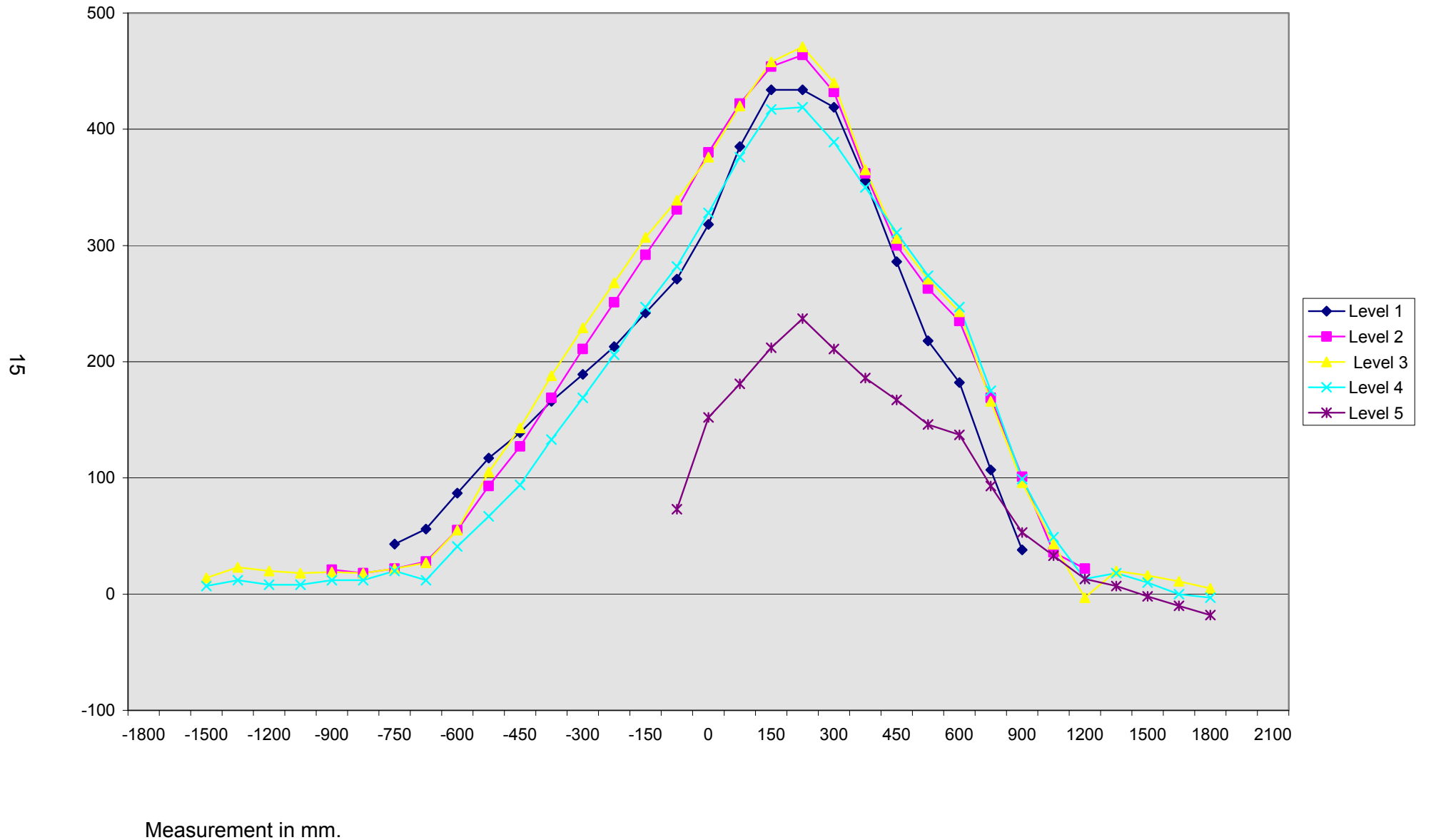
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1800															
-1650															
-1500			243	340				257	347				14	7	
-1350			216	318				239	330				23	12	
-1200			213	304				233	312				20	8	
-1050			213	293				231	301				18	8	
-900		215	219	285			236	238	297			21	19	12	
-825		220	227	283			238	245	295			18	18	12	
-750	238	228	227	281		281	250	249	301		43	22	22	20	
-675	247	227	226	280		303	255	253	292		56	28	27	12	
-600	245	226	225	278		332	281	280	319		87	55	55	41	
-525	244	225	223	278		361	318	328	345		117	93	105	67	
-450	242	224	223	277		381	351	366	371		139	127	143	94	
-375	241	223	221	277		407	392	409	410		166	169	188	133	
-300	241	222	220	276		430	433	449	445		189	211	229	169	
-225	240	221	220	274		453	472	488	480		213	251	268	206	
-150	240	221	219	274		482	513	526	521		242	292	307	247	
-75	240	220	218	275	515	511	551	557	557	588	271	331	339	282	73
0	240	220	218	274	510	558	600	594	602	662	318	380	376	328	152
75	240	219	217	274	507	625	641	637	650	688	385	422	420	376	181
150	239	219	217	273	505	673	673	675	690	717	434	454	458	417	212
225	240	219	217	273	503	674	683	688	692	740	434	464	471	419	237
300	240	218	217	273	505	659	650	657	662	716	419	432	440	389	211
375	243	219	218	274	505	599	581	583	624	691	356	362	365	350	186
450	243	220	218	275	504	529	520	524	586	671	286	300	306	311	167
525	244	220	219	276	505	462	483	490	550	651	218	263	271	274	146
600	246	222	220	278	505	428	457	463	525	642	182	235	243	247	137
750	246	224	222	280	508	353	393	388	455	601	107	169	166	175	93
900	251	226	224	282	510	289	327	320	381	563	38	101	96	99	53
1050		225	227	283	512		261	270	332	545		36	43	49	33
1200		213	221	286	513		235	218	299	526		22	-3	13	13
1350			219	288	514			239	306	521			20	18	7
1500			221	292	517			237	302	515			16	10	-2
1650			234	297	521			245	297	511			11	0	-10
1800			252	301	527			257	298	509			5	-3	-18
1950				310					300					-10	
2100															

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

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

Test Vehicle: 2005 Honda CR-V

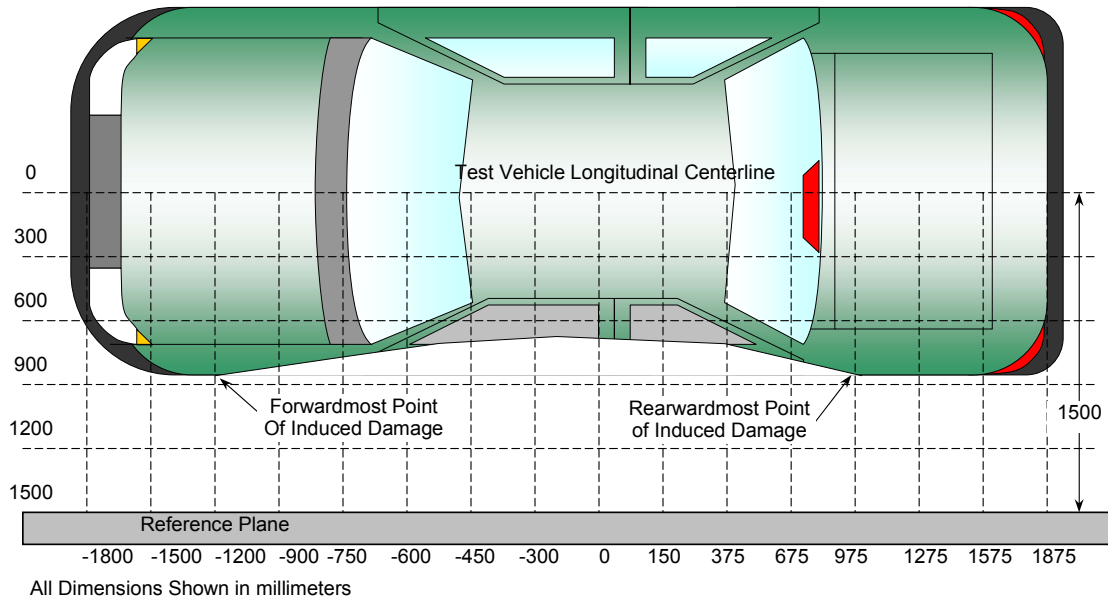
Test Date: January 18, 2004



DATA SHEET NO. 8
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2004



TOP VIEW

Damage Profile Distances

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2025 mm	4	317	310	-7
2	1382 mm	3	219	238	19
3	675 mm	3	221	475	254
4	-105 mm	3	219	541	322
5	-820 mm	3	227	245	18
6	-1500 mm	4	340	347	7

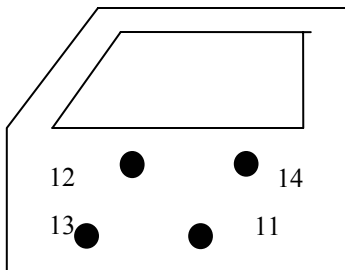
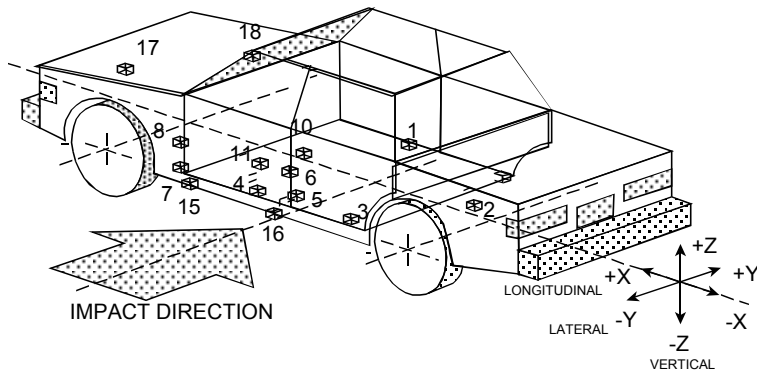
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body.

DATA SHEET NO. 9 **VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY**

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2004



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

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

DATA SHEET NO. 9... (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2004

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Long (X) Maximums (g's) (CFC 60)		Lat. (Y) Maximums (g's) (CFC 60)		Vert. (Z) Maximums (g's) (CFC 60)		Resultant (g's) (CFC 60)
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Max.
1	Right Side Sill at Front Seat	2.6	49	13.3	42	3.5	81	13.6
2	Rear Floorpan Above Axle	3.1	46	12.1	32	2.3	127	12.2
3	Left Side Sill at Rear Door			16.2	37			
4	Left Side Sill at Front Door			42.1	19			
5	Left Lower B-Post			77.6	16			
6	Left Mid B-Post			52.8	5			
7	Left Lower A-Post			12.0	45			
8	Left Mid A-Post			12.6	37			
9	Driver Left Seat Track			47.1	24			
10	Vehicle CG	4.1	82	18.7	40	23.7	61	24.1
11	Left Front Door at Pelvis *			108.7	11			
12	Left Front Door at Arm			63.9	14			
13	Left Front Door at Knee			44.0	29			
14	Left Front Door at Rib			69.5	9			
15	Left A-Post @ Sill			10.1	63			
16	Left B-Post @ Sill			46.6	17			
17	Upper Engine	6.7	98	10.6	85			
18	Firewall			9.4	64			

* No valid data collected after 40 msec

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

DATA SHEET NO. 9... (continued)**VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY**Test Vehicle: 2005 Honda CR-VTest Date: January 18, 2004**VEHICLE ACCELEROMETER COORDINATES**

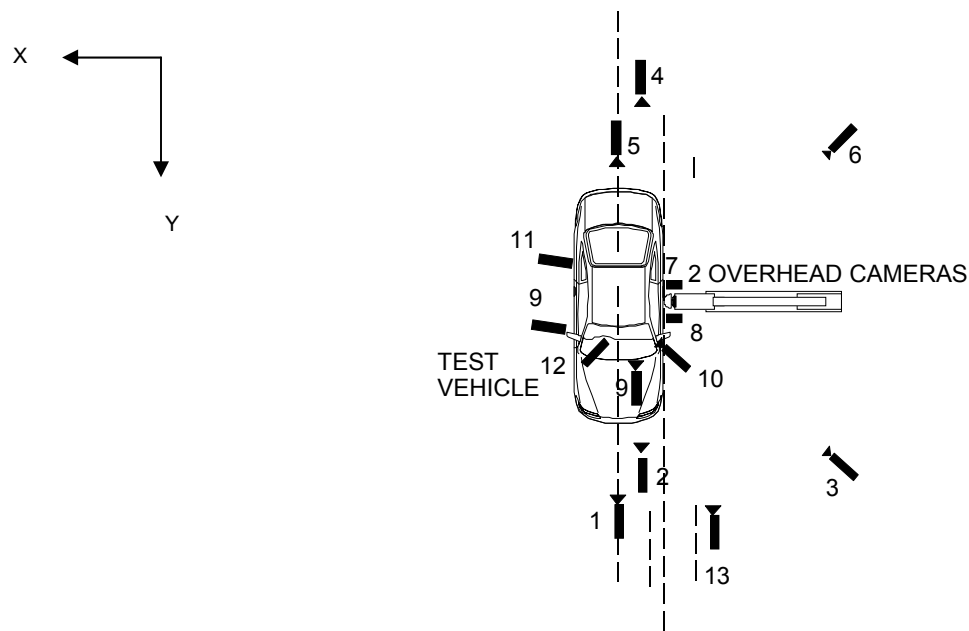
Loc. No.	Description	Coordinates (mm)		
		X	Y	Z
1	Right Side Sill at Front Seat	2414	690	349
2	Rear Floorpan Above Axle	978	0	648
3	Left Side Sill at Rear Door	1662	-680	348
4	Left Side Sill at Front Door	2776	-680	350
5	Left Lower B-Post	1943	-738	535
6	Left Mid B-Post	1954	-715	1065
7	Left Lower A-Post	2862	-680	472
8	Left Mid A-Post	2987	-825	1095
9	Driver Left Seat Track			
10	Vehicle CG	2242	0	422
11	Left Door @ Pelvis	2398	-825	852
12	Left Door @ Arm	2356	-815	1028
13	Left Door @ Knee	2824	-805	780
14	Left Door @ Rib	2467	-800	984
15	Left A Pillar Sill	3028	-675	350
16	Left B Pillar Sill	1988	-690	350
17	Engine	3670	5	908
18	Firewall	3383	0	960

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

DATA SHEET NO. 10
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2005 Honda CR-V

Test Date: January 18, 2004



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Front Overall	2480	9360	1285	19	1000
2	Front Close Up	1905	9900	1457	25	1000
3	Front Angle	-2444	3680	1580	25	1000
4	Rear Overall	455	-7065	1355	19	1000
5	Rear Close Up	1350	-8071	1460	25	1000
6	Rear Angle	-1961	-3942	1650	25	1000
7	Overhead View	-470	0	5035	16	1000
8	Overhead Close Up	0	0	5015	35	1000
9	Onboard Driver Front				13	1000
10	Onboard Driver				8	1000
11	Onboard Curtain				8	1000
12	Onboard Hip to Door				16	1000
13	Real Time				13	24

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

APPENDIX A
PHOTOGRAPHS

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Impact

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A-1.



Pre-Test Front View of Test Vehicle



Post-Test Front View of Test Vehicle



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle

A-5.



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



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



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



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



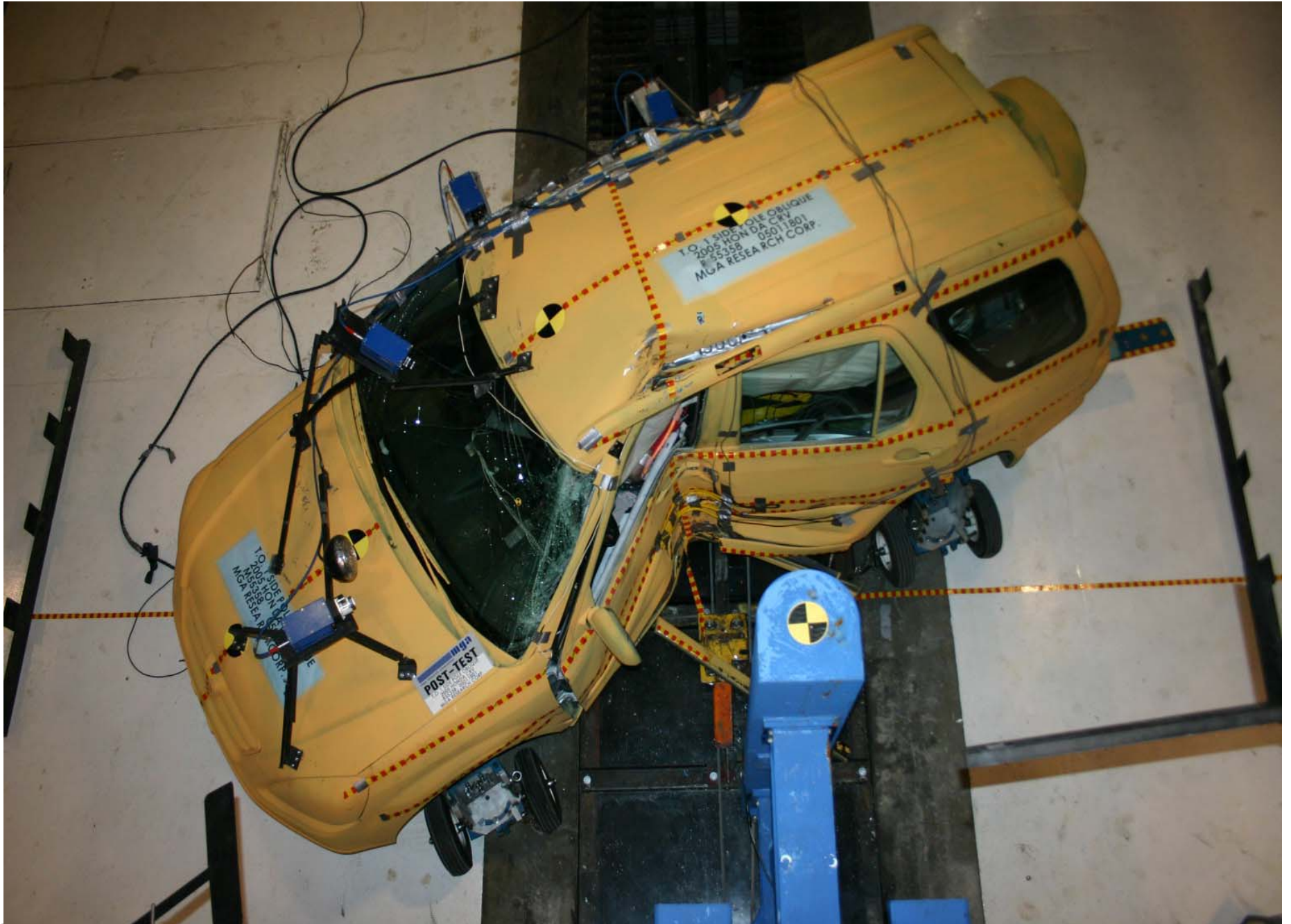
Pre-Test Left $\frac{3}{4}$ Rear View of Test Vehicle



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



Pre-Test Vehicle Overhead View Positioned Against Pole



Post-Test Pole and Vehicle Overhead View



Pre-Test Driver Seat Position



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



Pre-Test Driver Dummy Left Side View



Post-Test Driver Dummy Left Side View



Pre-Test Driver Dummy Right Side View



Post-Test Driver Dummy Right Side View



Pre-Test Driver Shoulder and Door Top View

A-21.



Post-Test Driver Dummy Contact



Post-Test Driver Dummy Lower Body Contact



Post-Test Driver Dummy Head Contact



Post-Test Impact Point on Vehicle



Post-Test Impact Point on Vehicle (Close-up)



Post-Test Hole in Curtain Airbag



Post-Test Right Side Curtain Airbag View



TIRE AND LOADING INFORMATION

SEATING CAPACITY | TOTAL 5 | FRONT 2 | REAR 3

The combined weight of occupants and cargo should never exceed 395kg or 850lbs

ORIGINAL TIRE SIZE	COLD TIRE INFLATION PRESSURE		SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION
	FRONT	200kPa , 29PSI	
215/65R16 98T	REAR	200kPa , 29PSI	

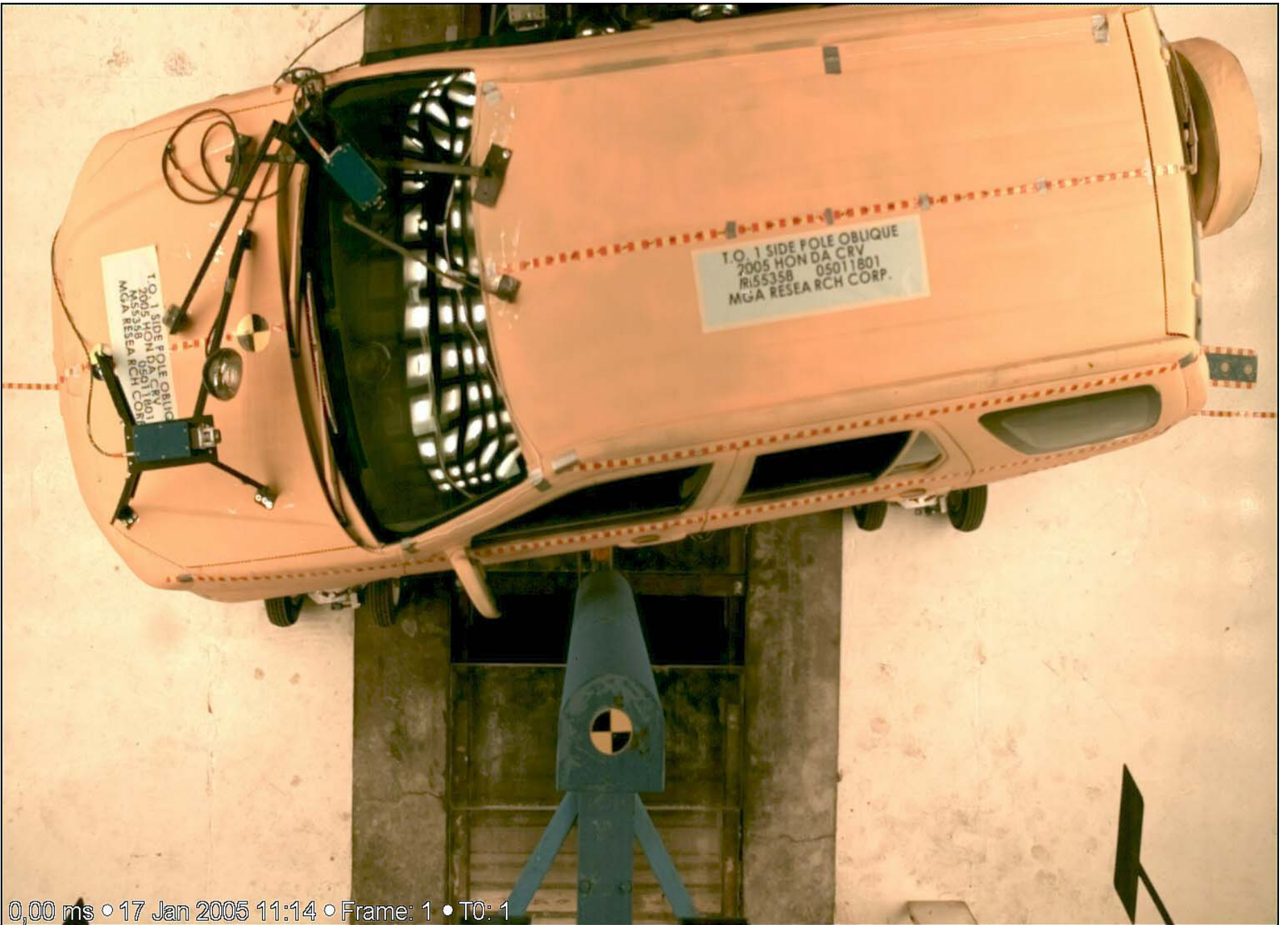
T-S9A-A1

Tire Placard

MFD. BY HONDA OF THE U.K. MFG., LTD. 10/'04
GVWR 2020KG (4450LBS) TIRE SIZE RIM SIZE
GAWR F 1000KG (2200LBS) 215/65R16 98T 16x6.5JJ
GAWR R 1040KG (2290LBS) 215/65R16 98T 16x6.5JJ
THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDE-
RAL MOTOR VEHICLE SAFETY AND THEFT PREVENTION
STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE
SHOWN ABOVE. V.I.N. : SHSRD68515U300713 TYPE: MPV

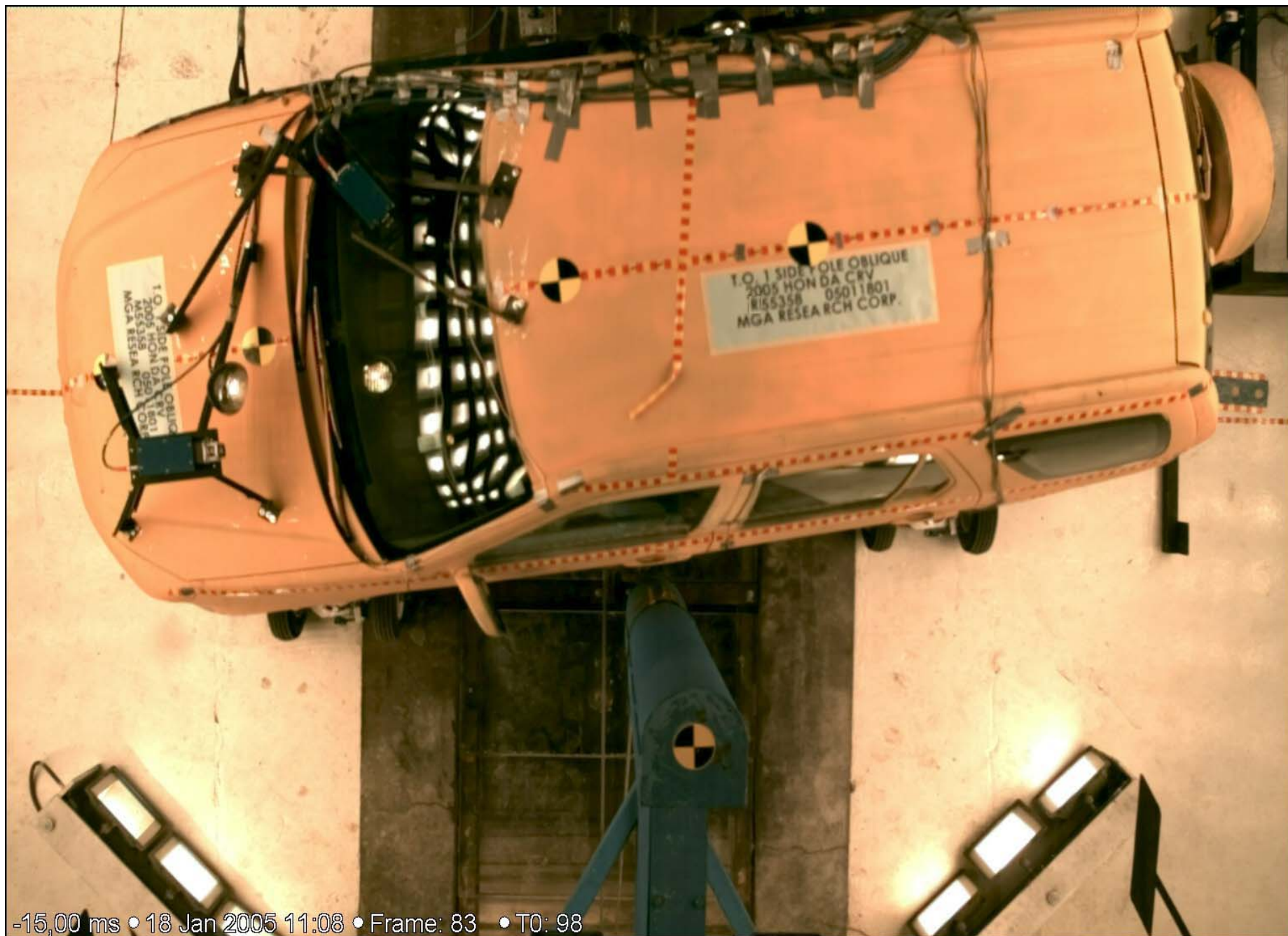


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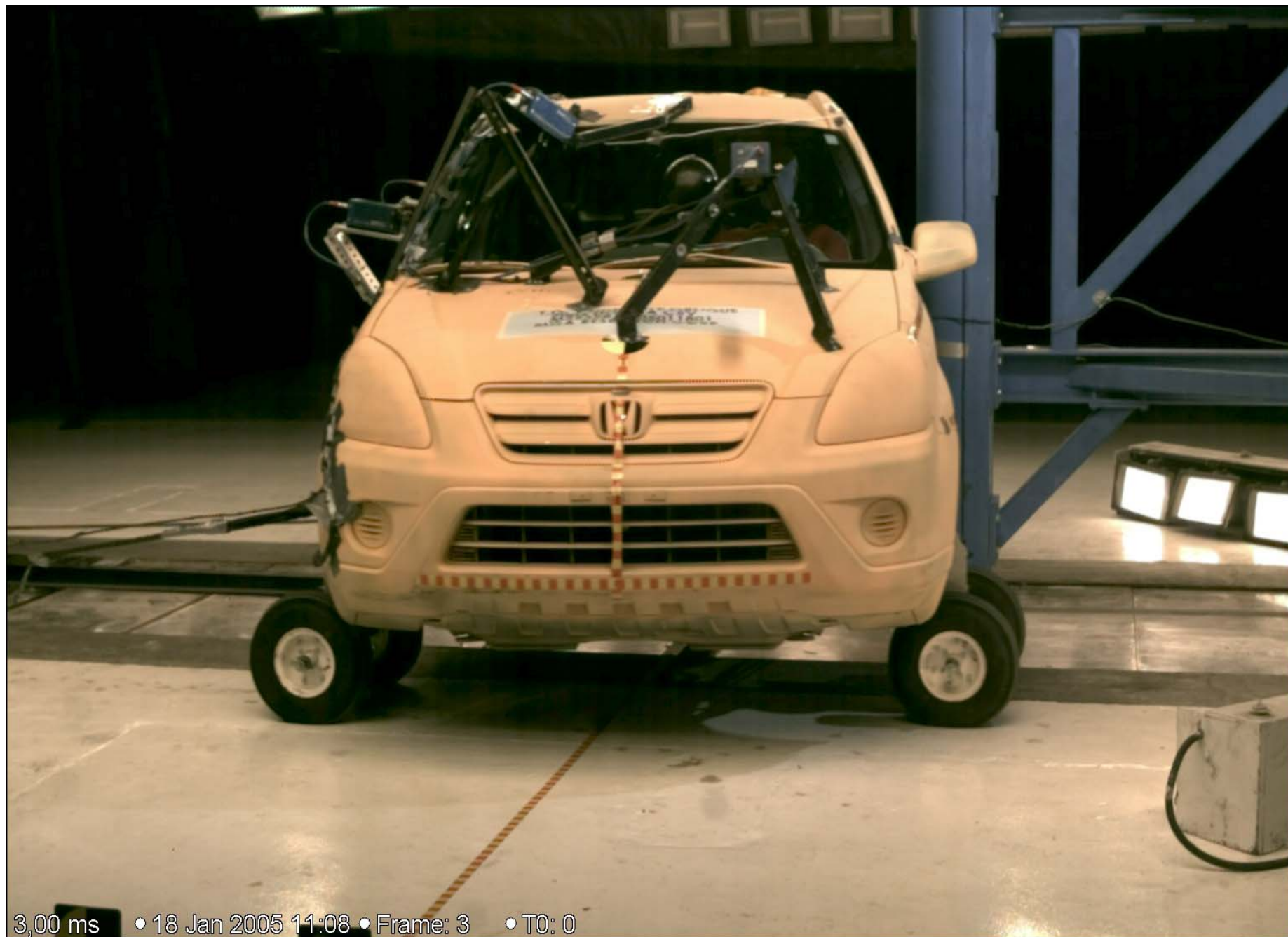


A-30.

Pre-Test Point of Impact View



Post-Test Point of Impact View



Impact

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VEHICLE AND DUMMY RESPONSE DATA

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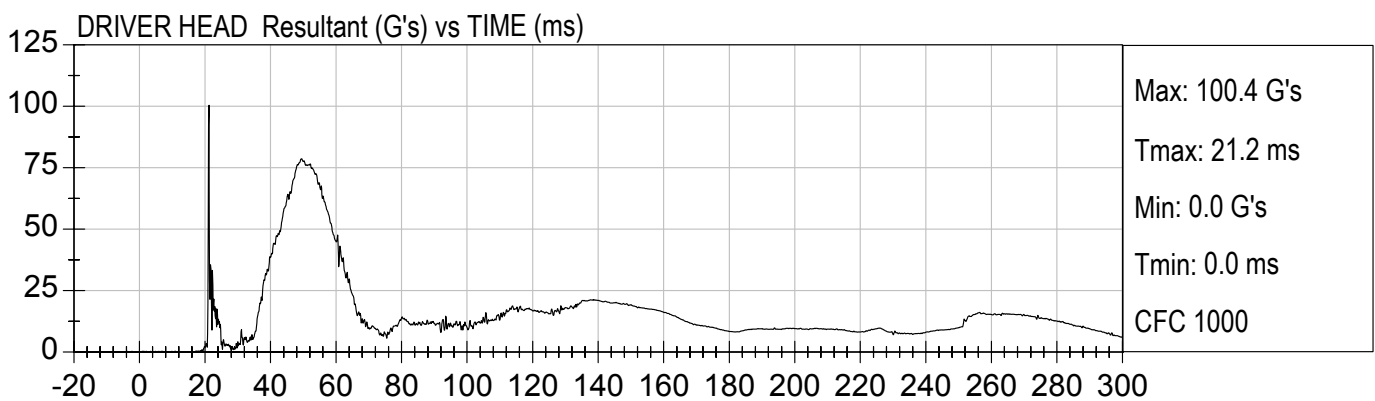
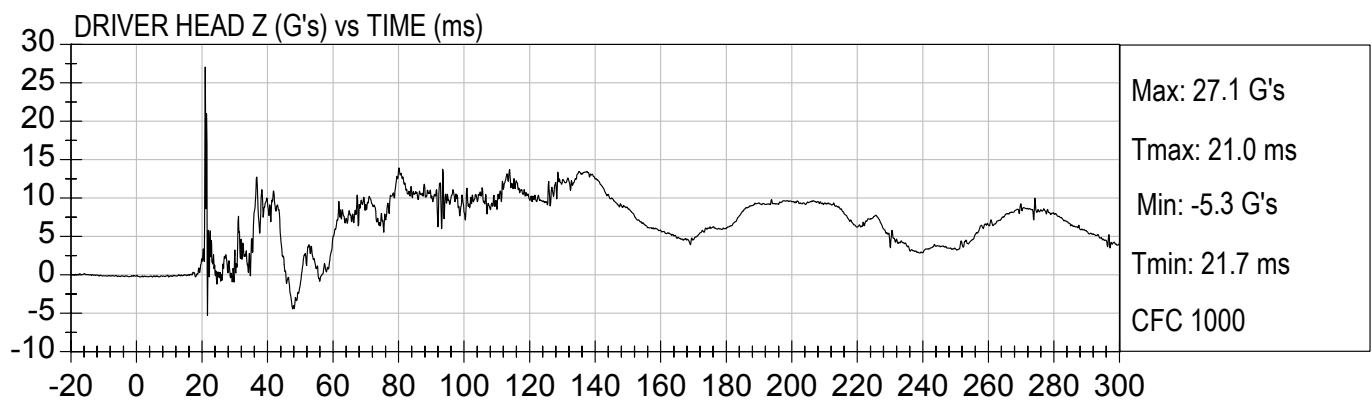
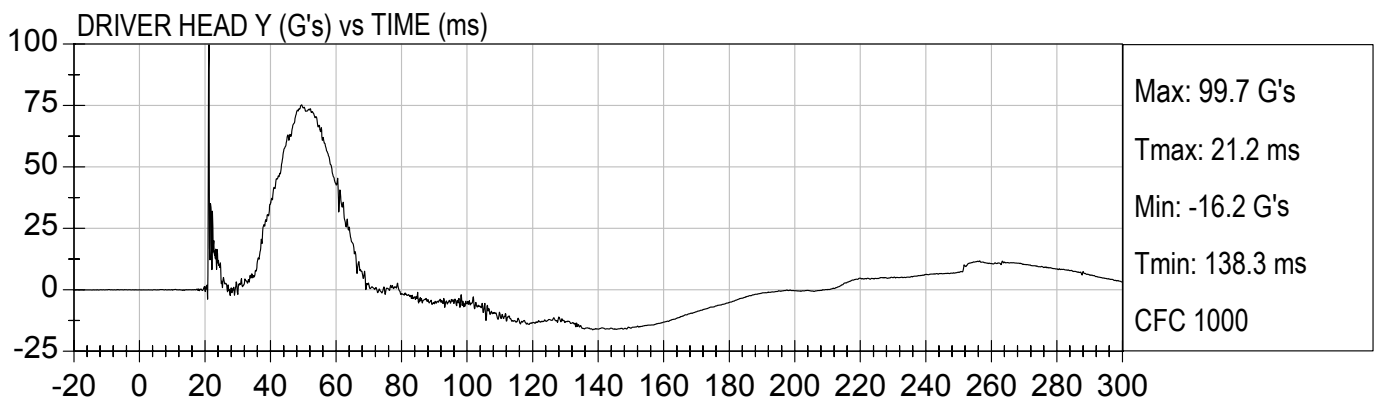
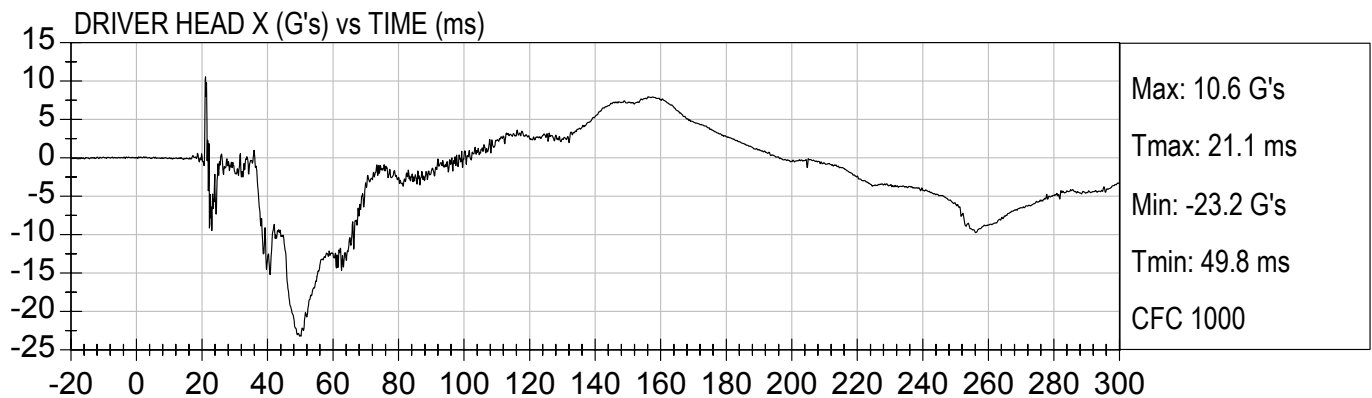
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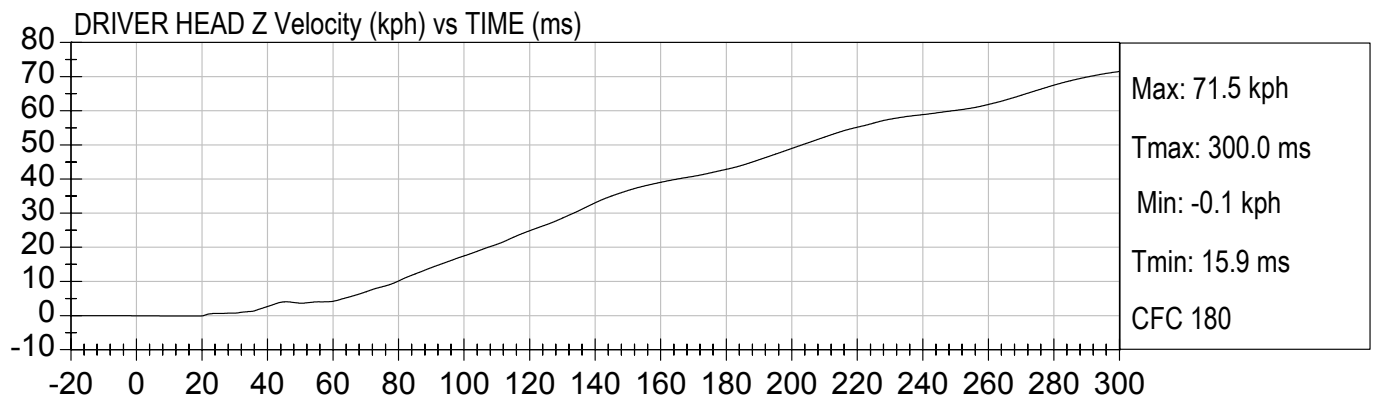
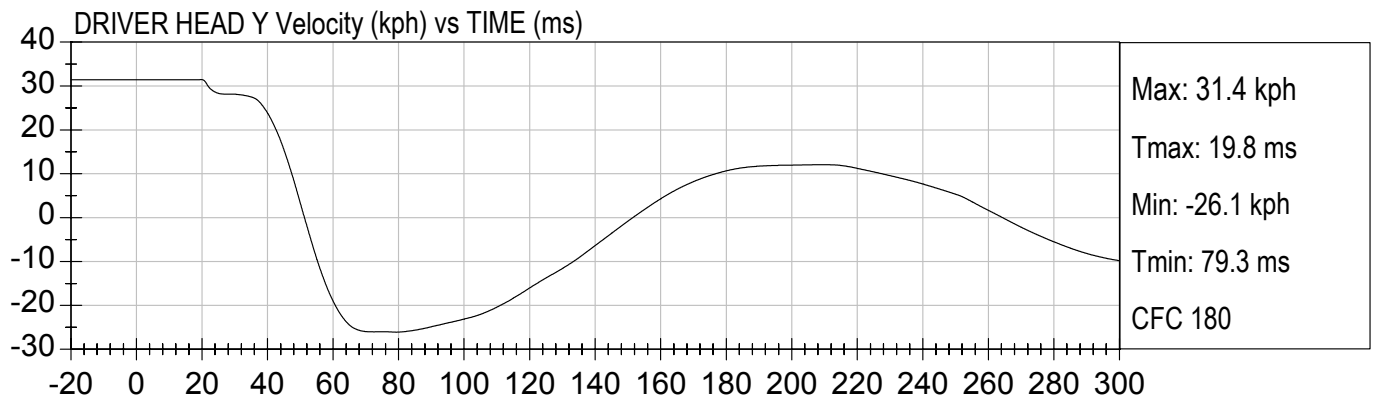
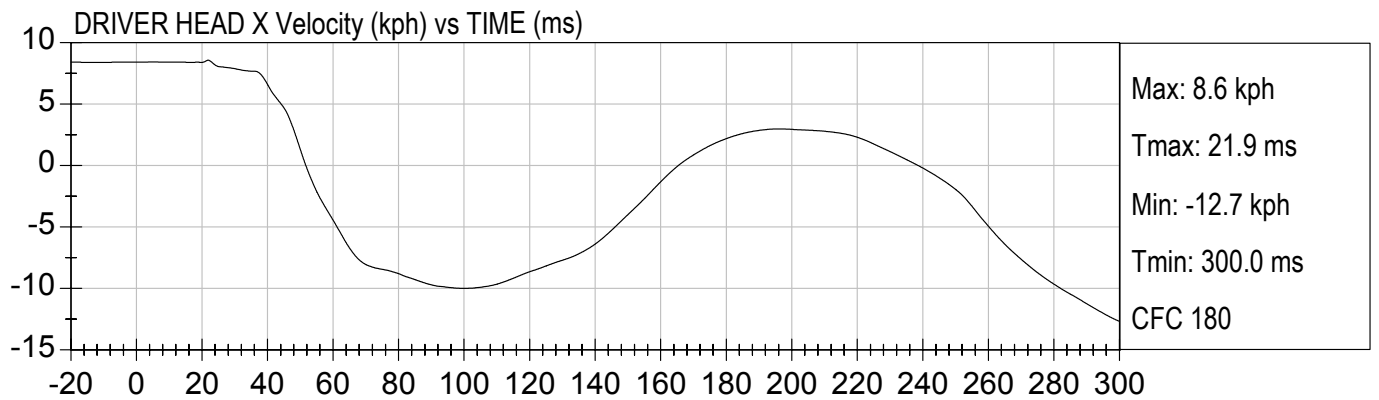
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T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)



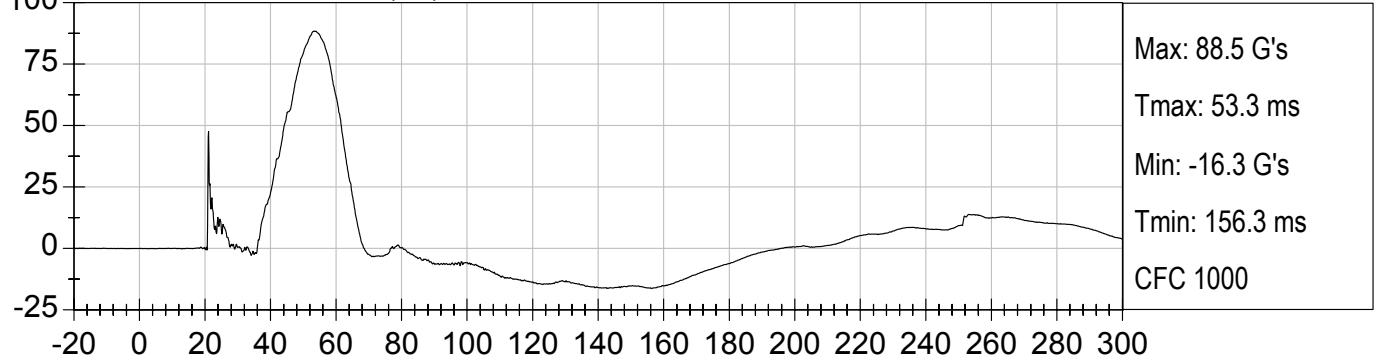




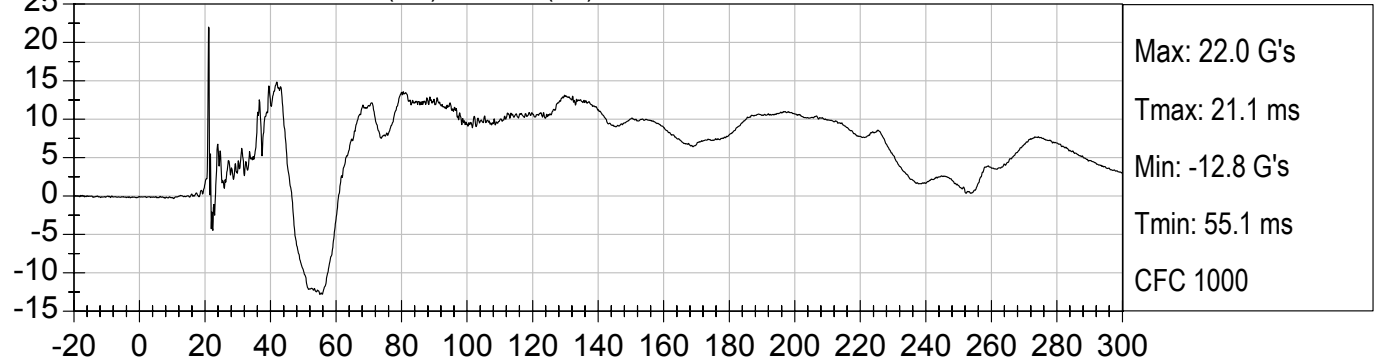
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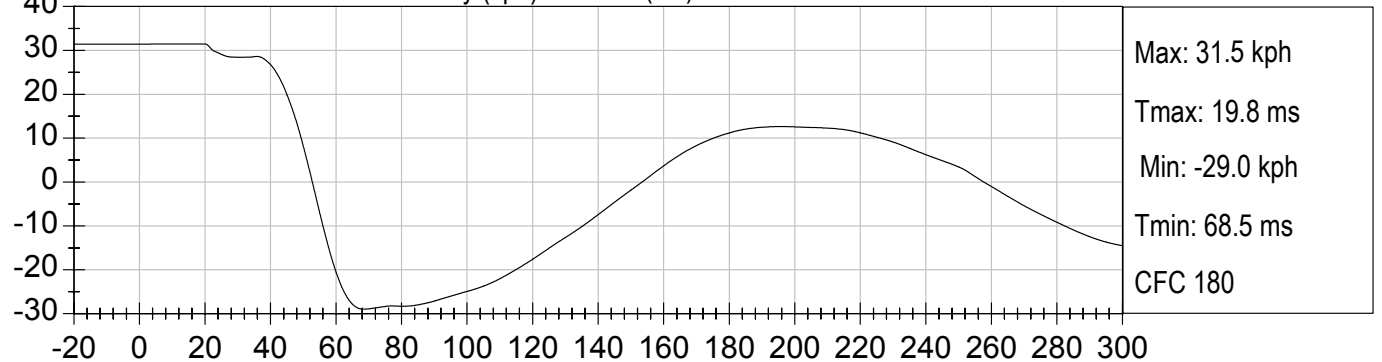
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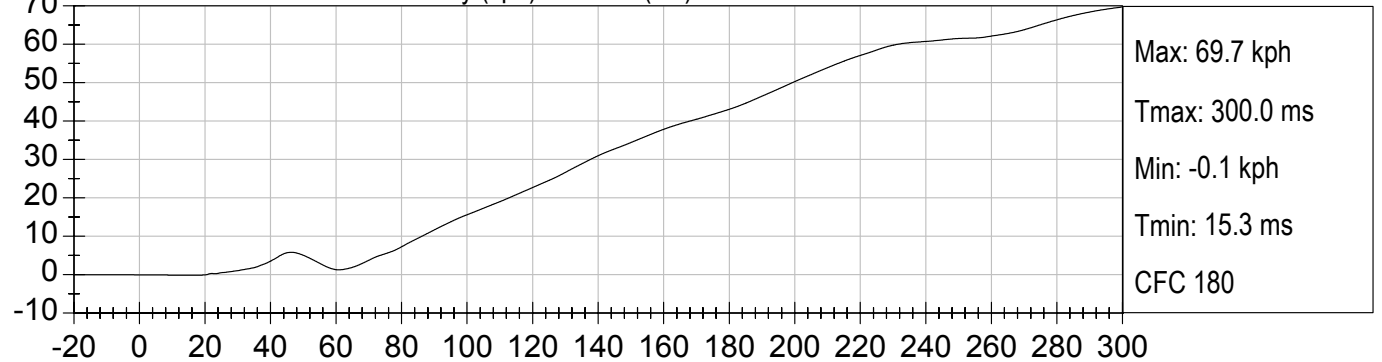
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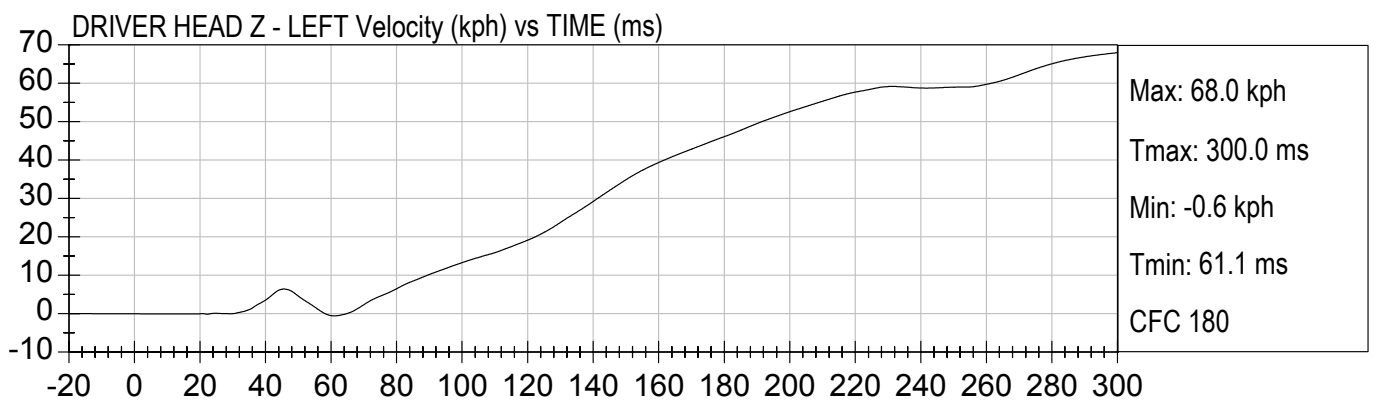
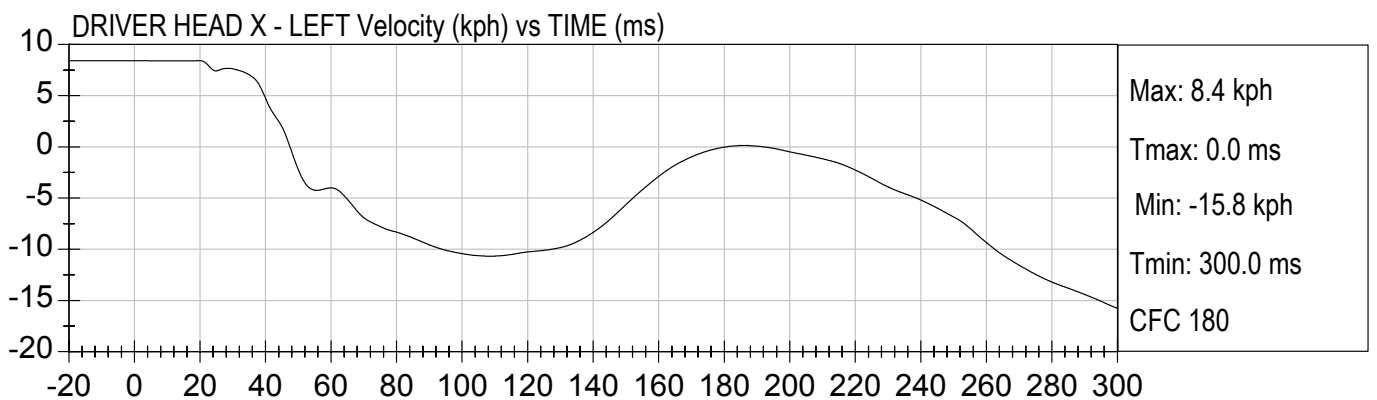
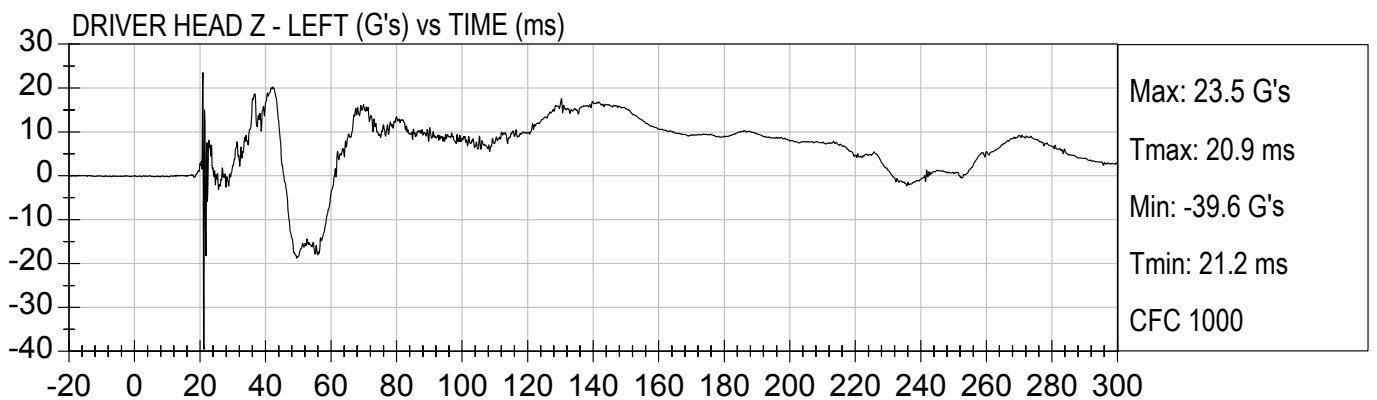
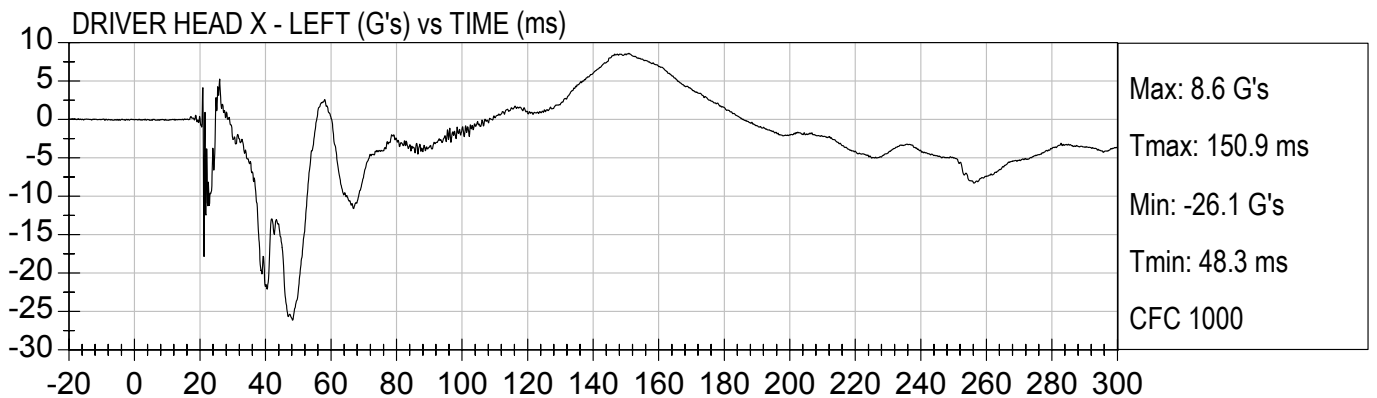


DRIVER HEAD Y - FRONT Velocity (kph) vs TIME (ms)



DRIVER HEAD Z - FRONT Velocity (kph) vs TIME (ms)

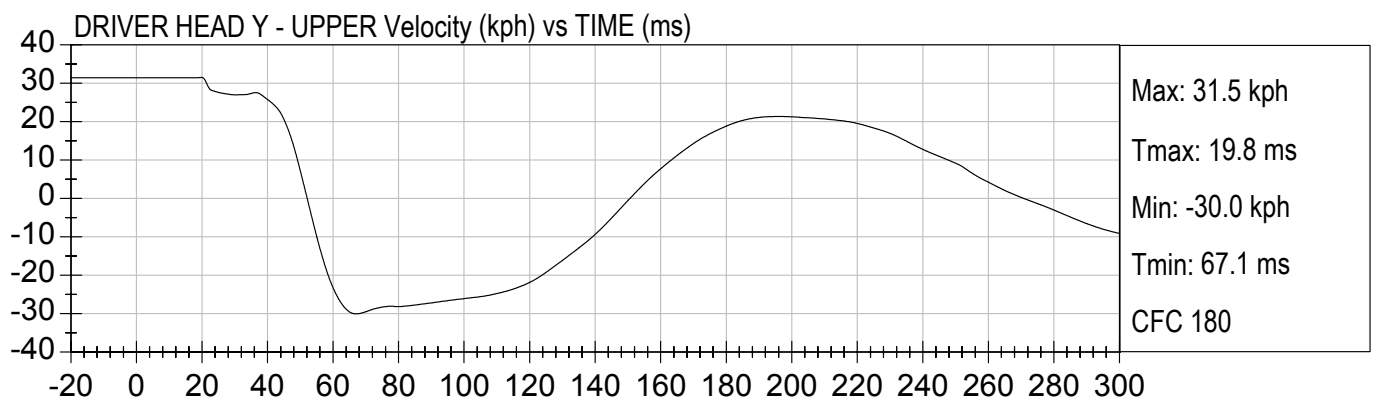
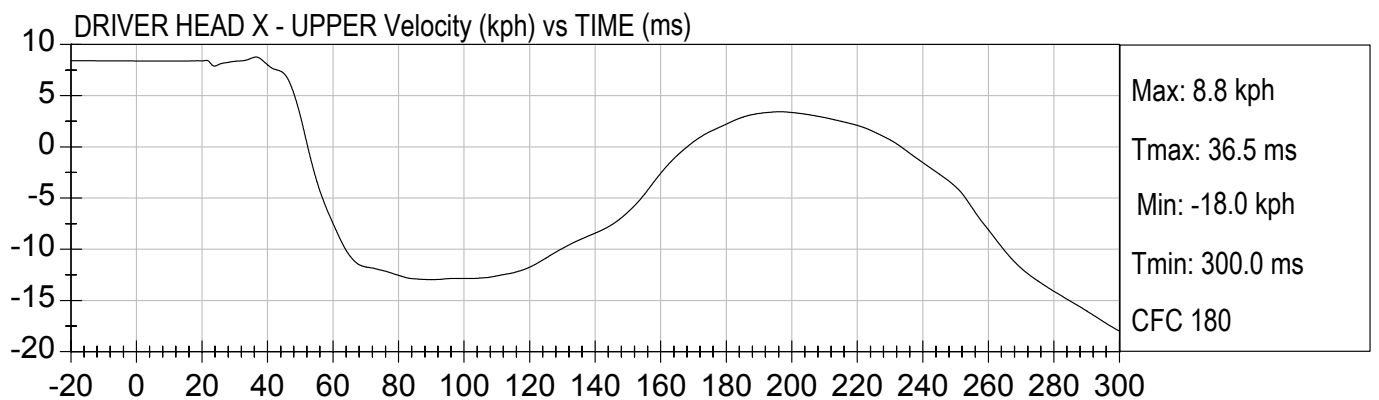
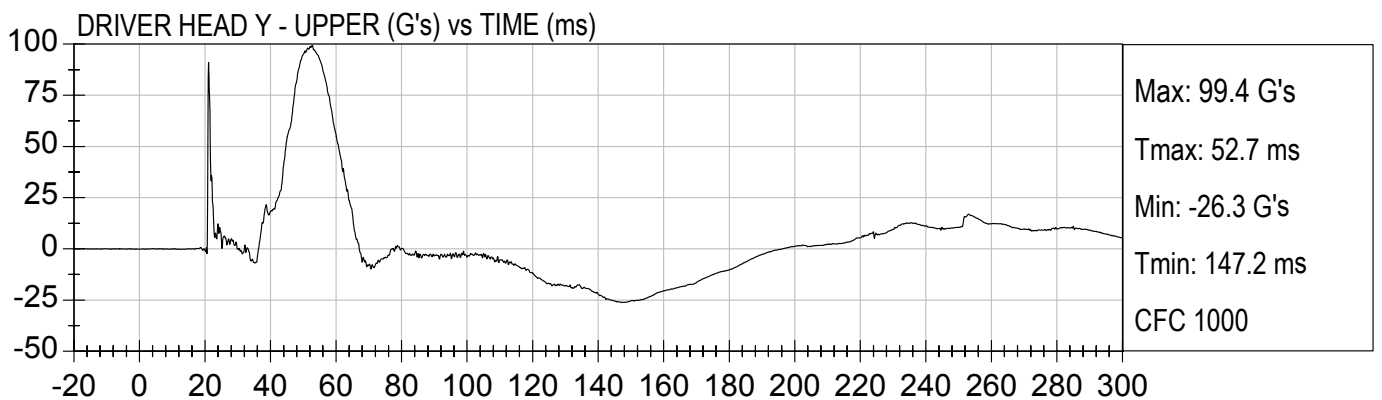
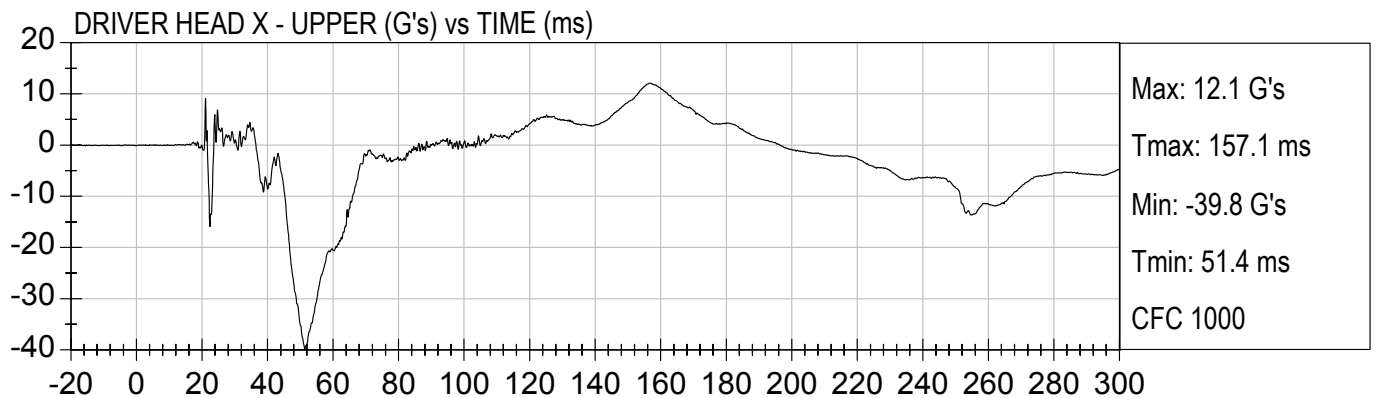






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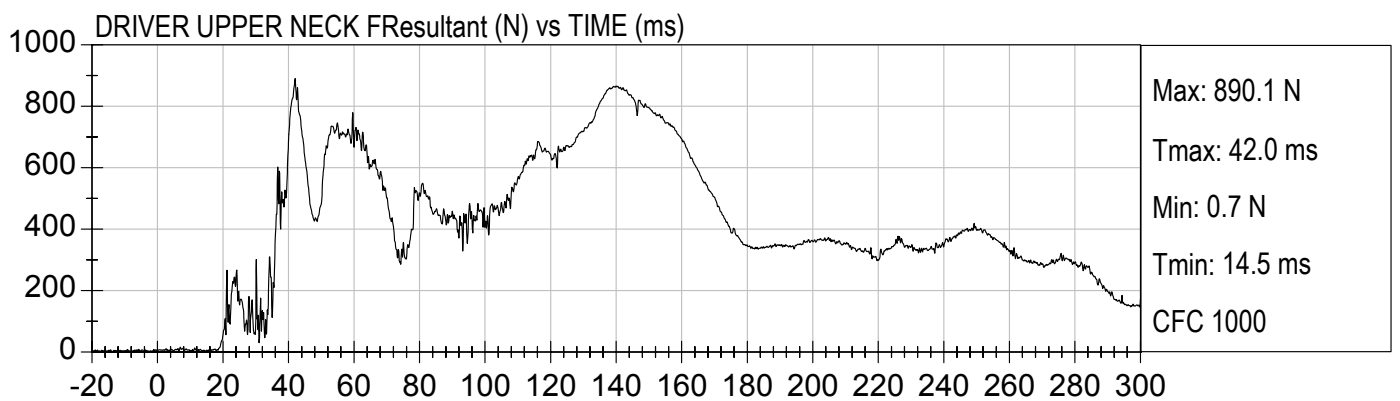
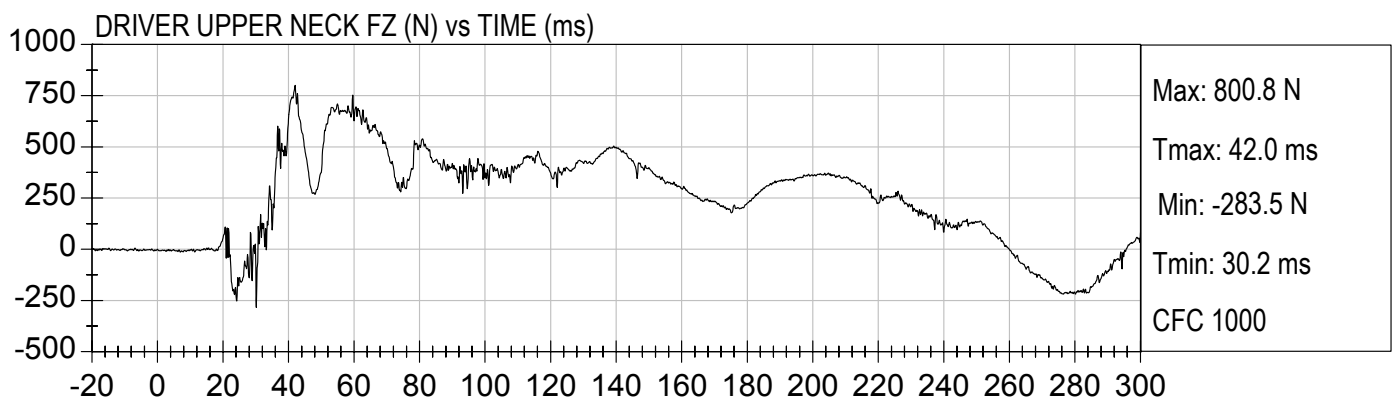
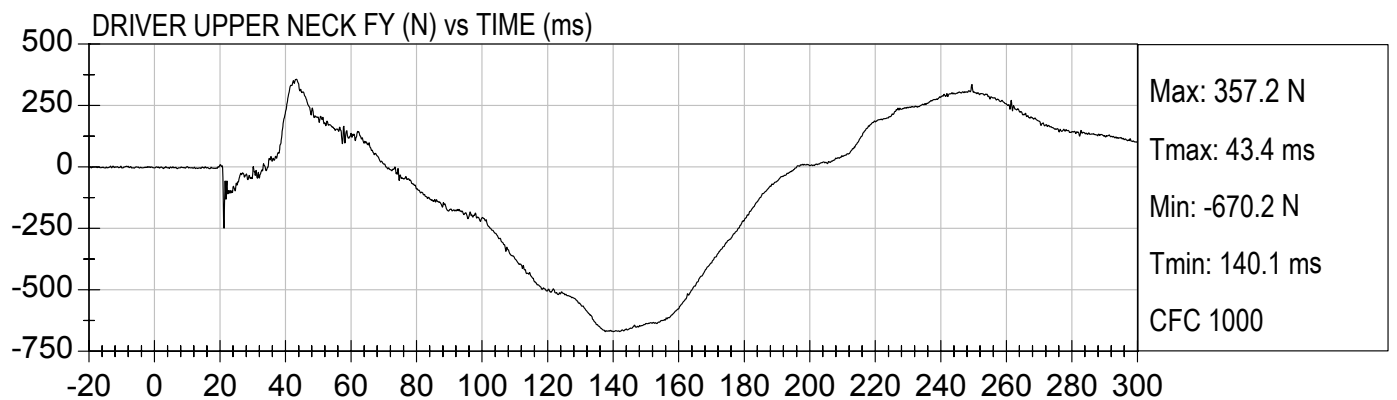
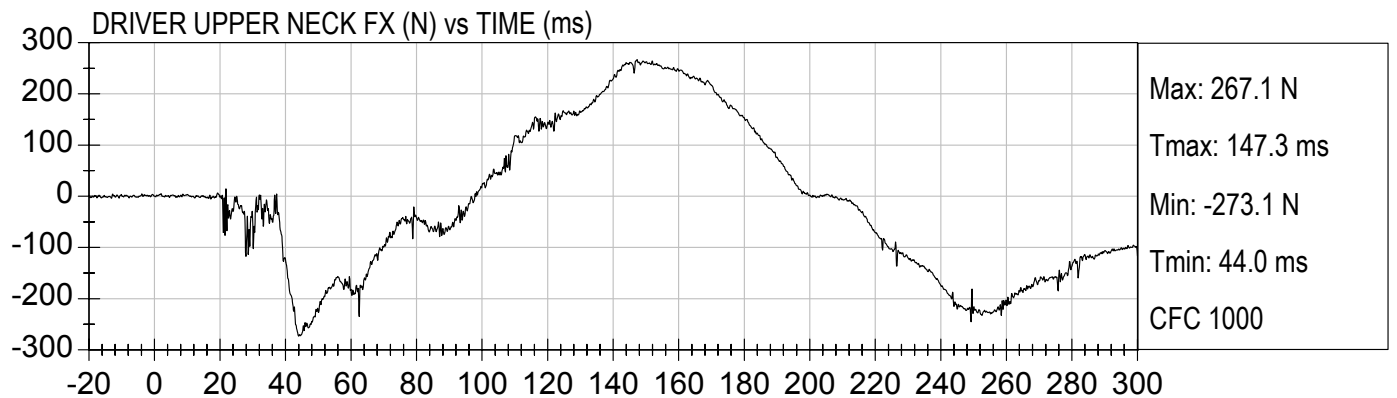
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T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

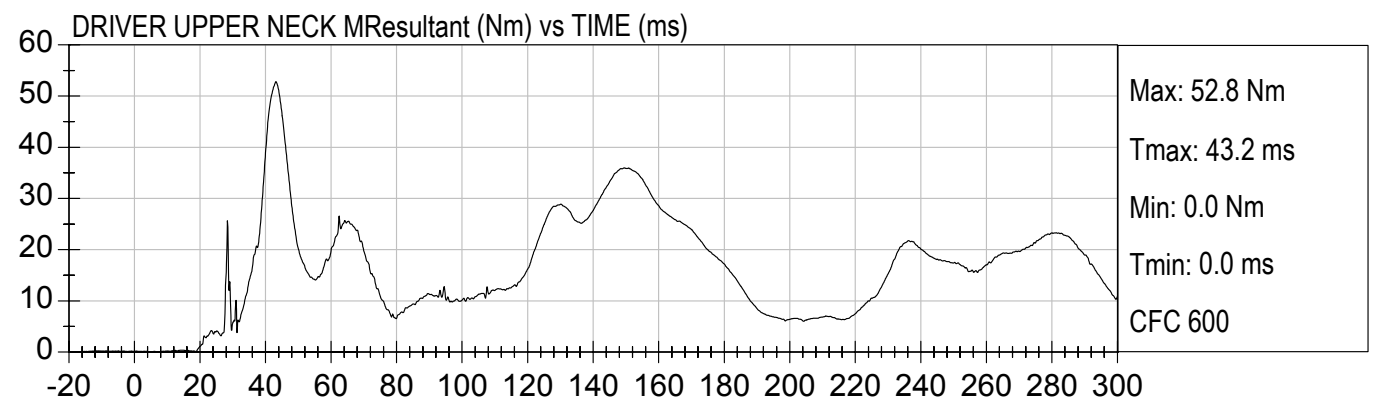
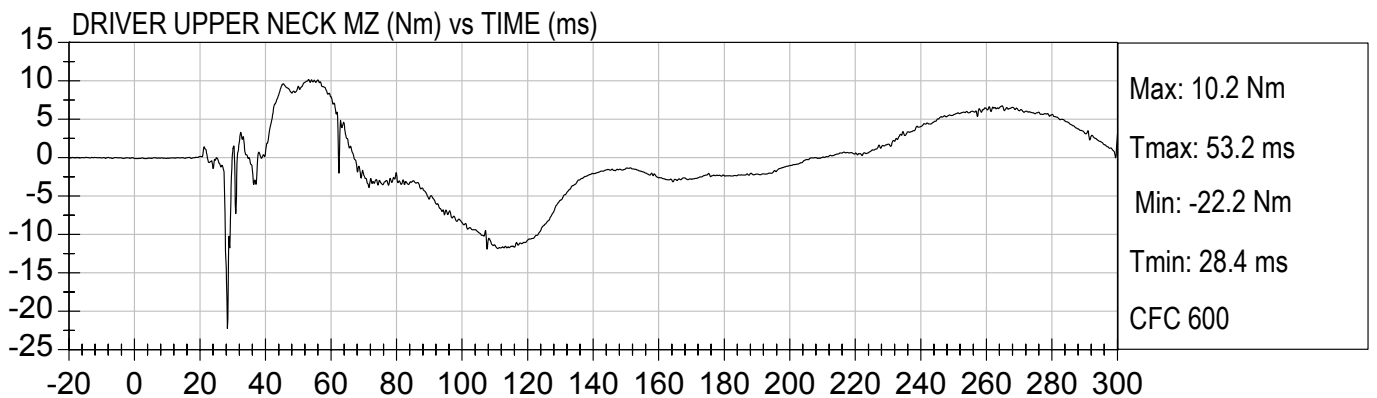
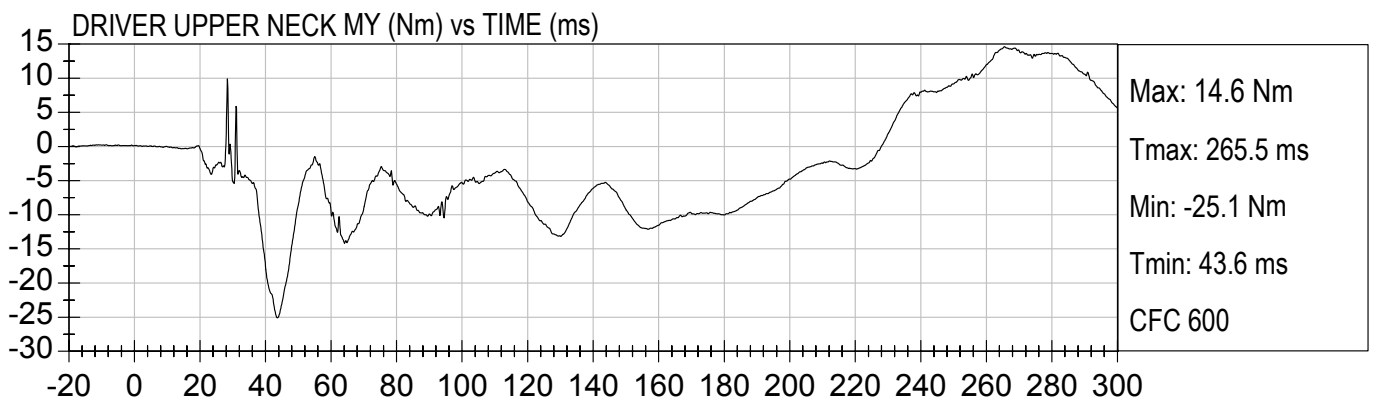
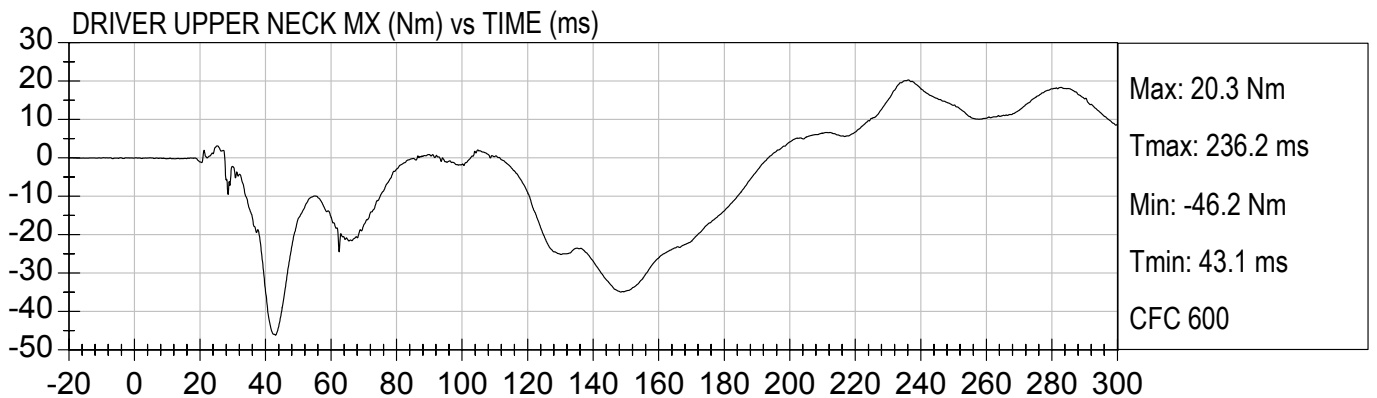
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2005 HONDA CRV (R55358)

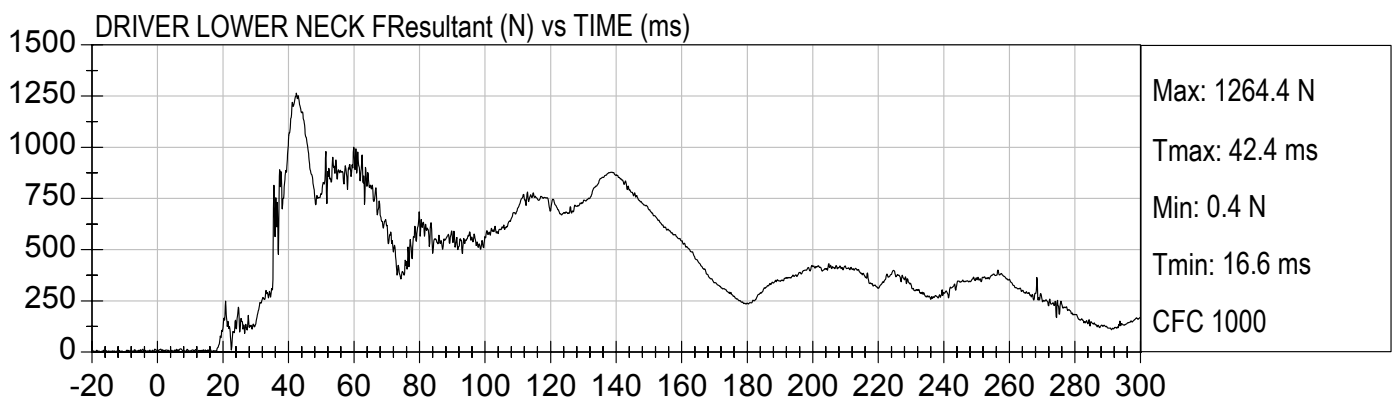
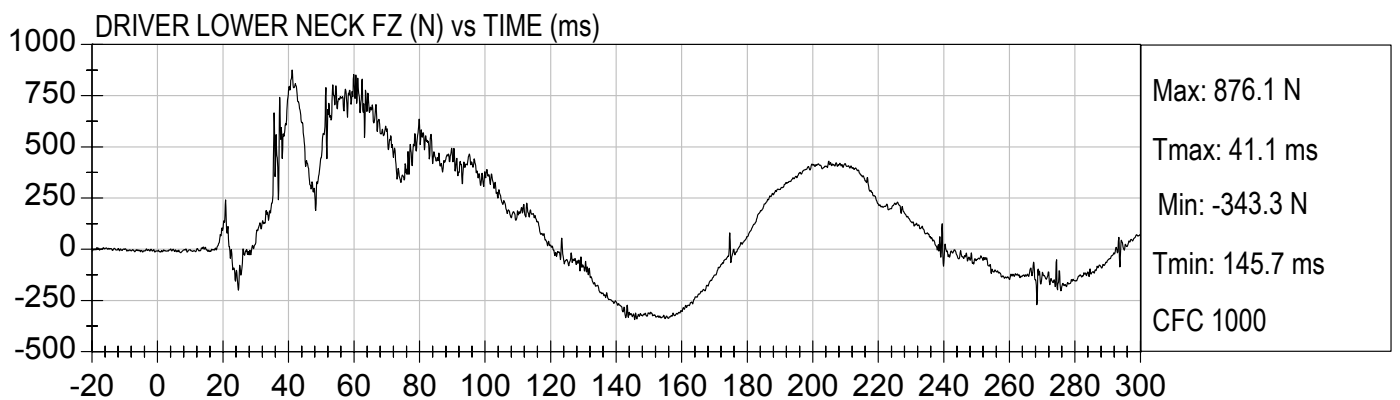
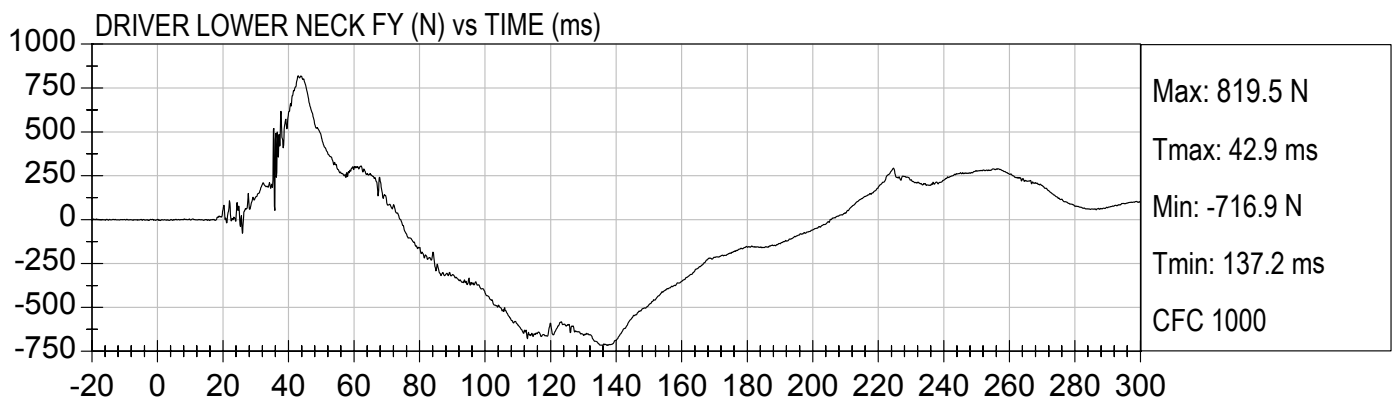
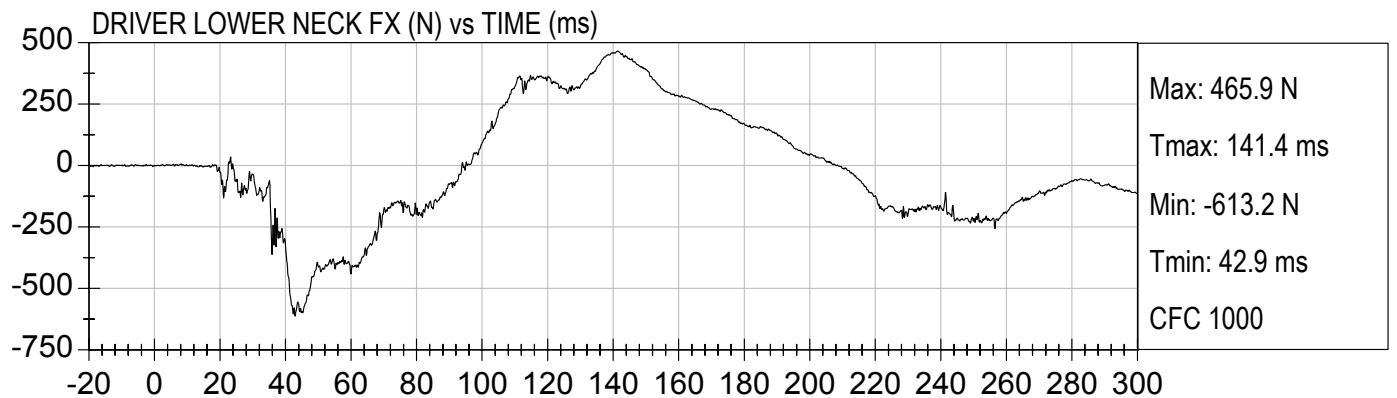
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T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

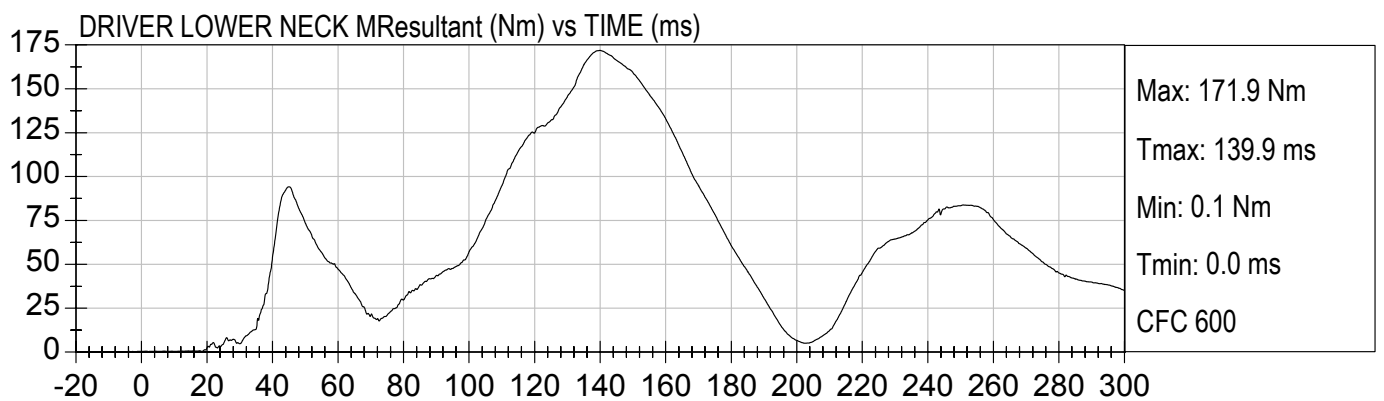
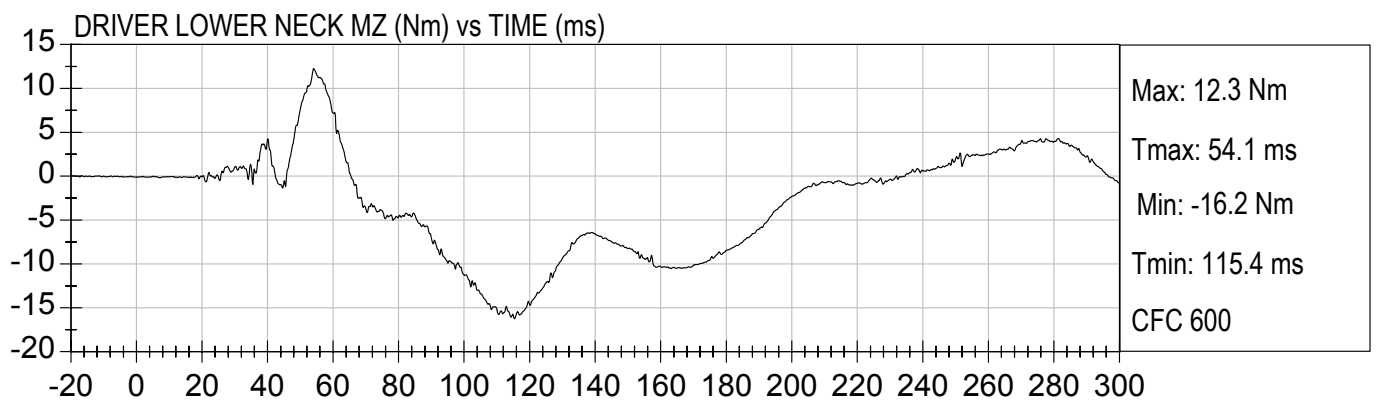
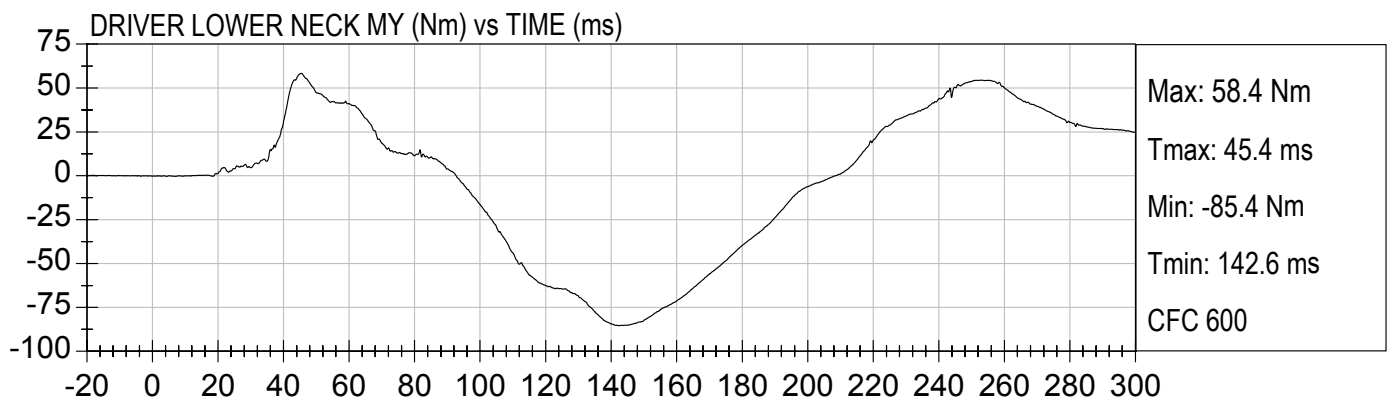
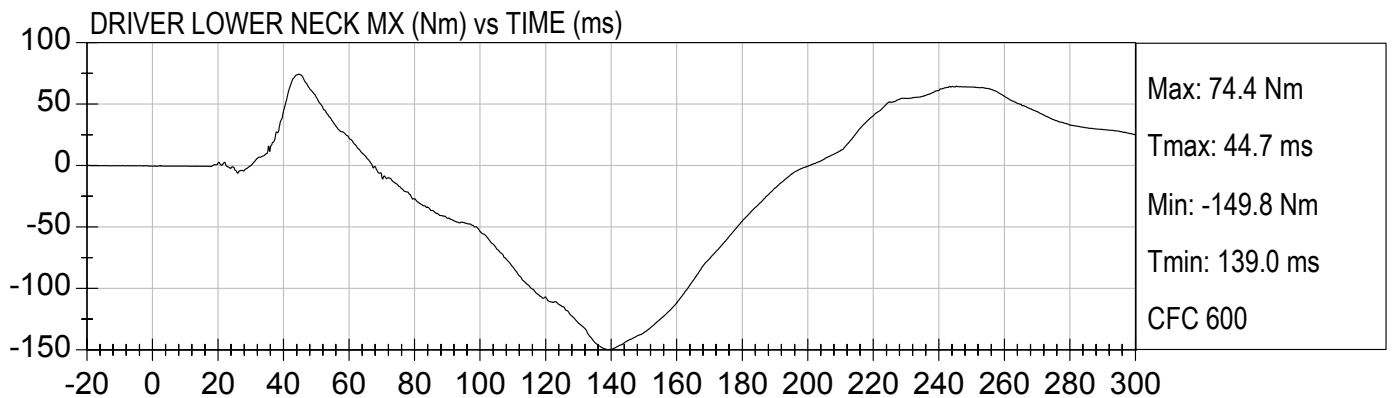
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2005 HONDA CRV (R55358)

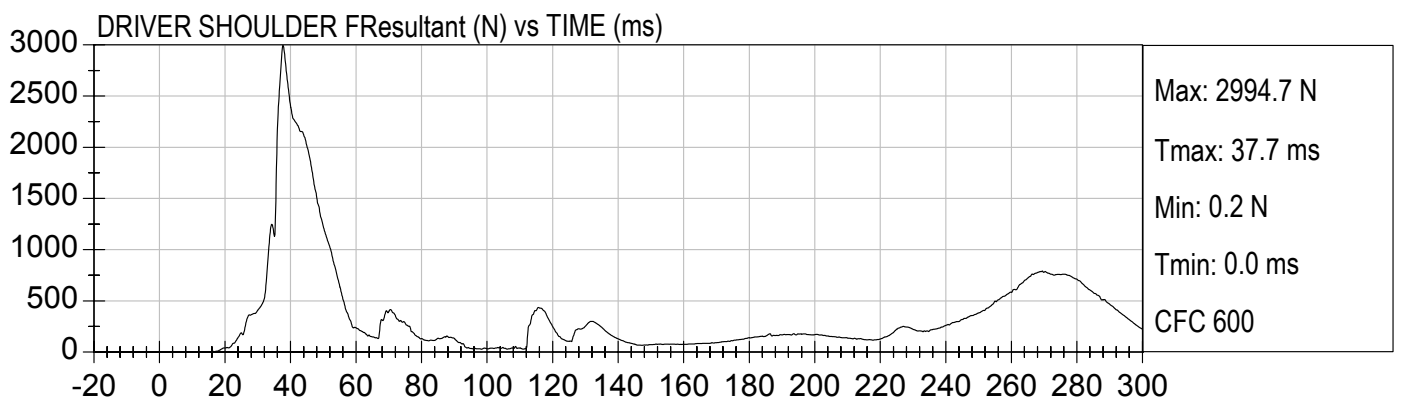
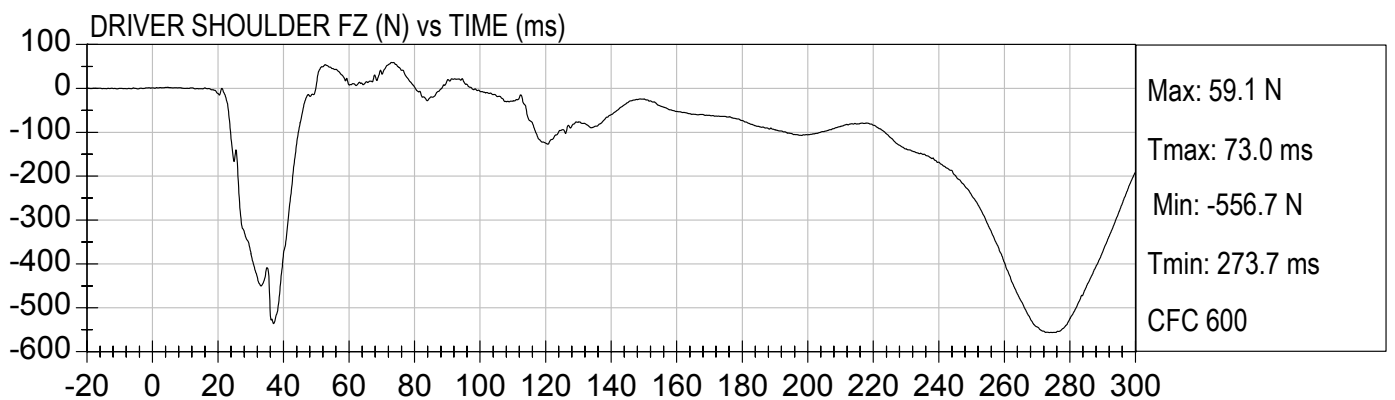
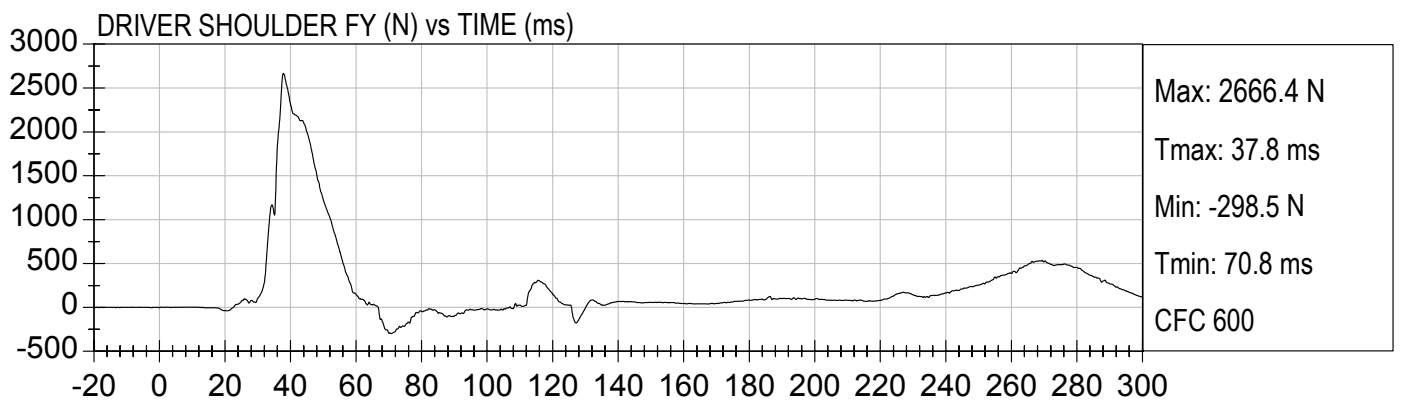
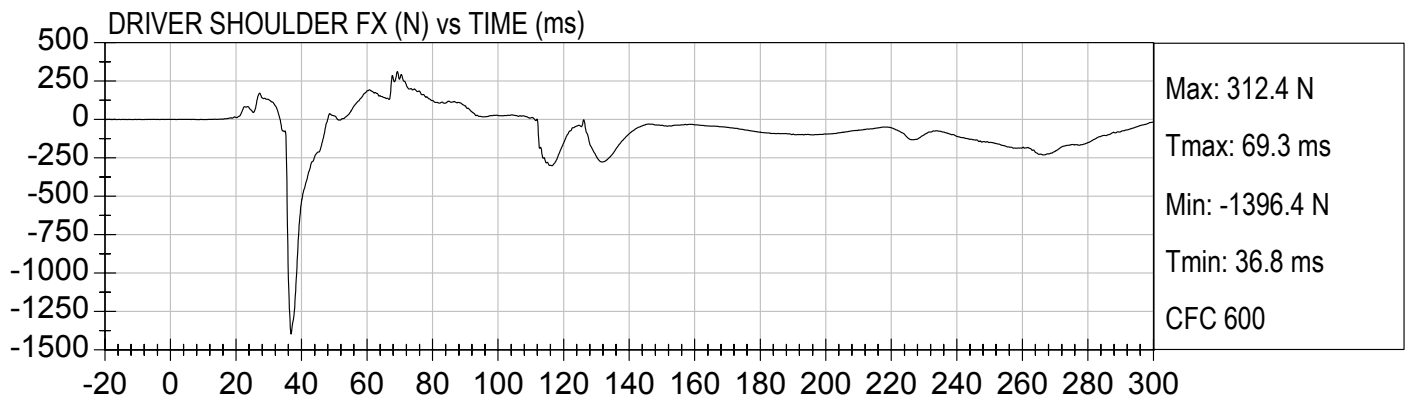
Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)





T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

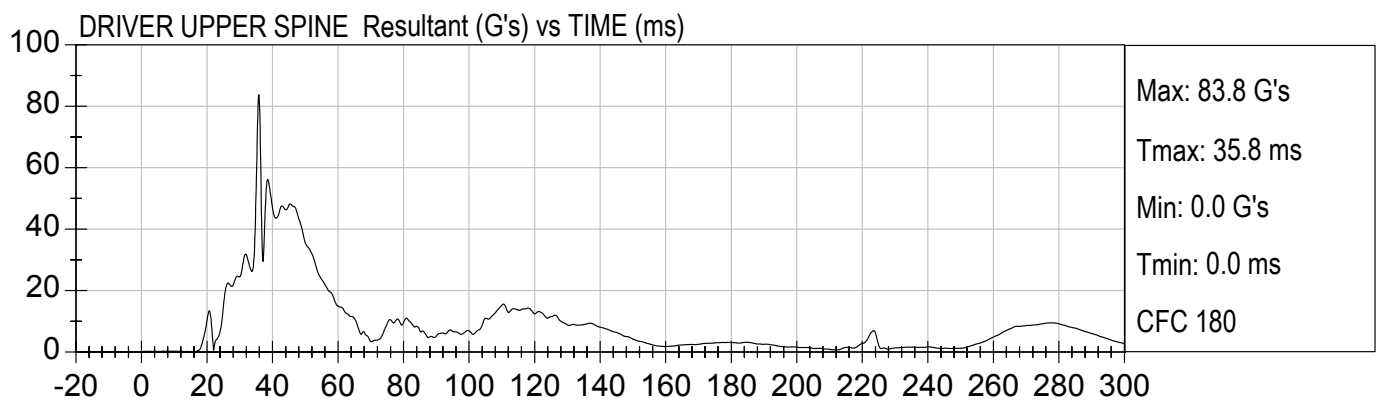
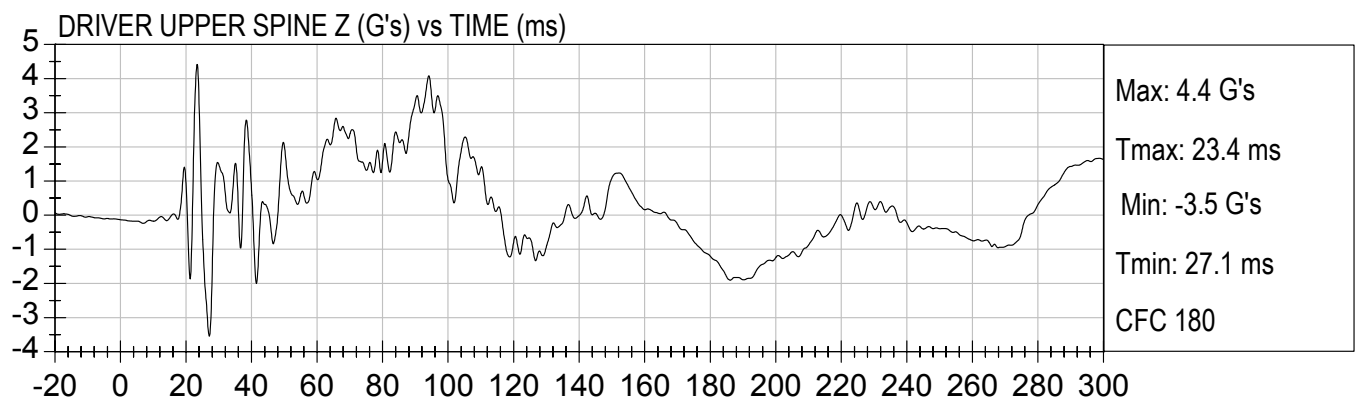
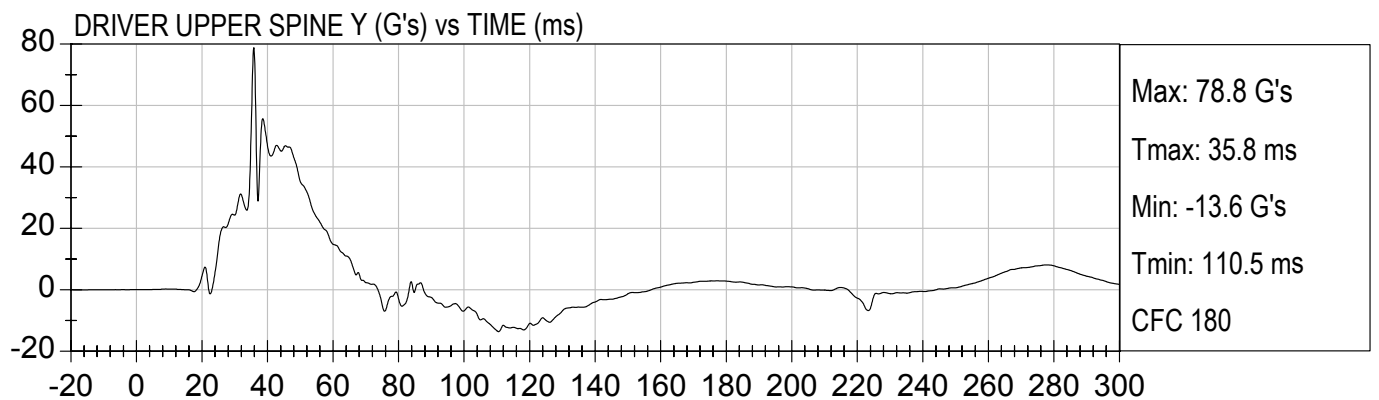
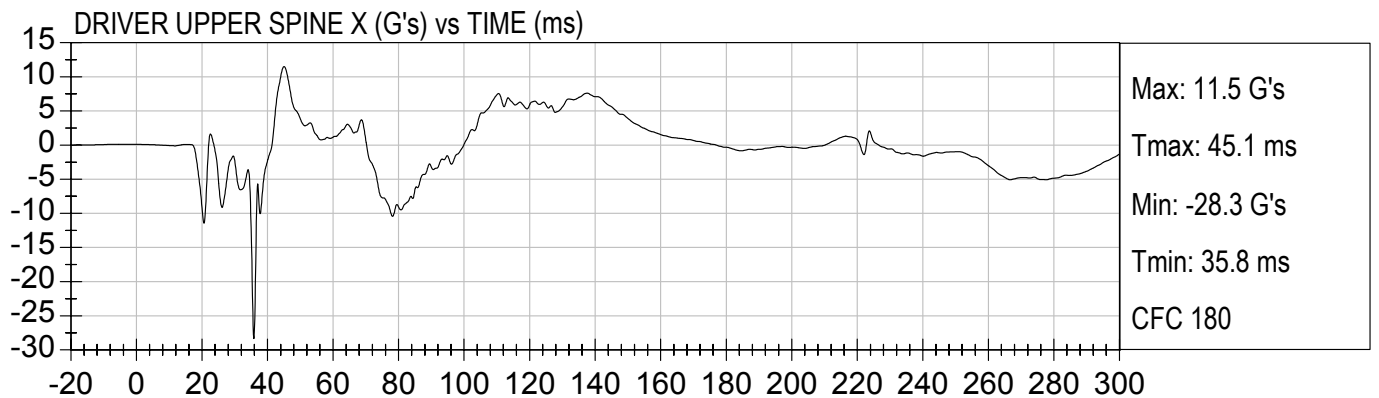
Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)

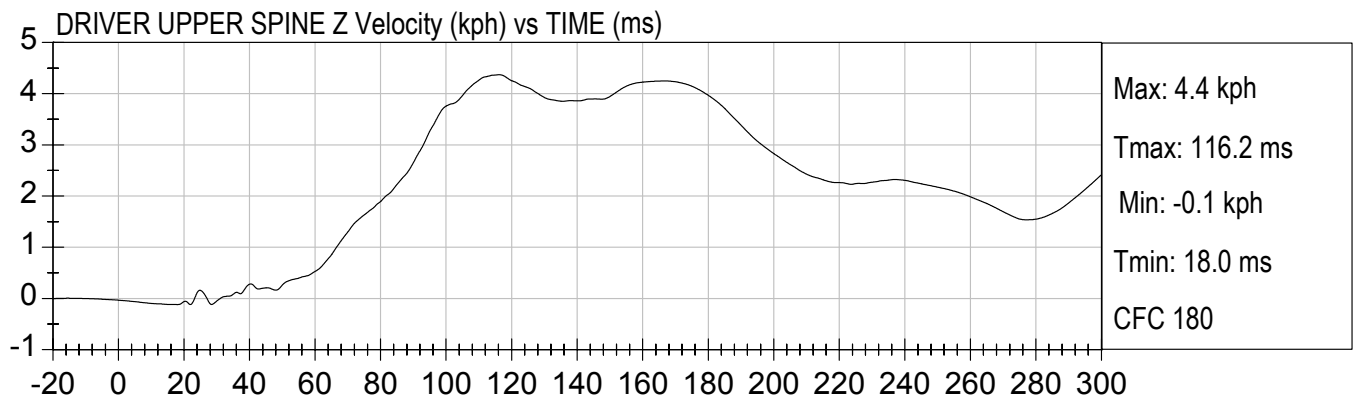
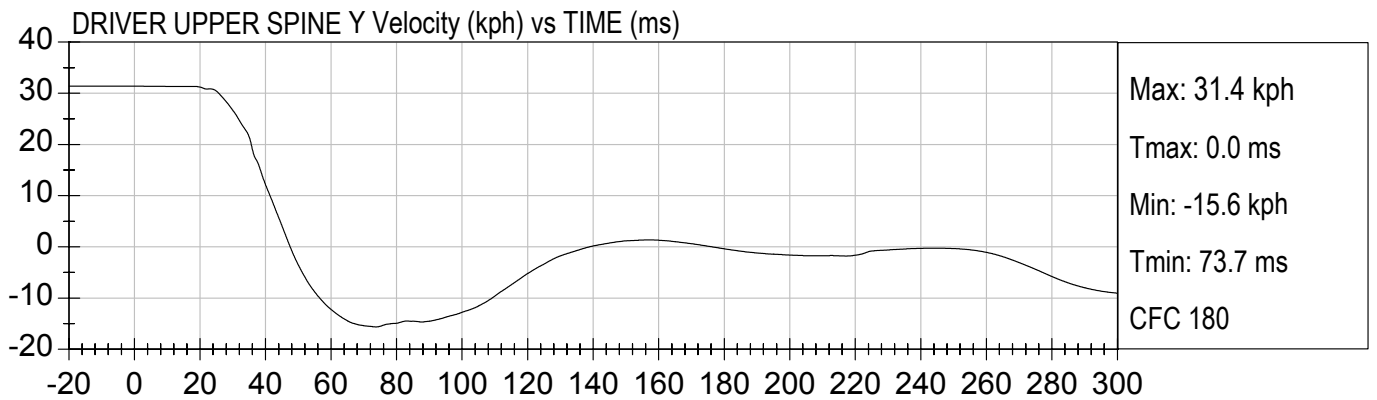
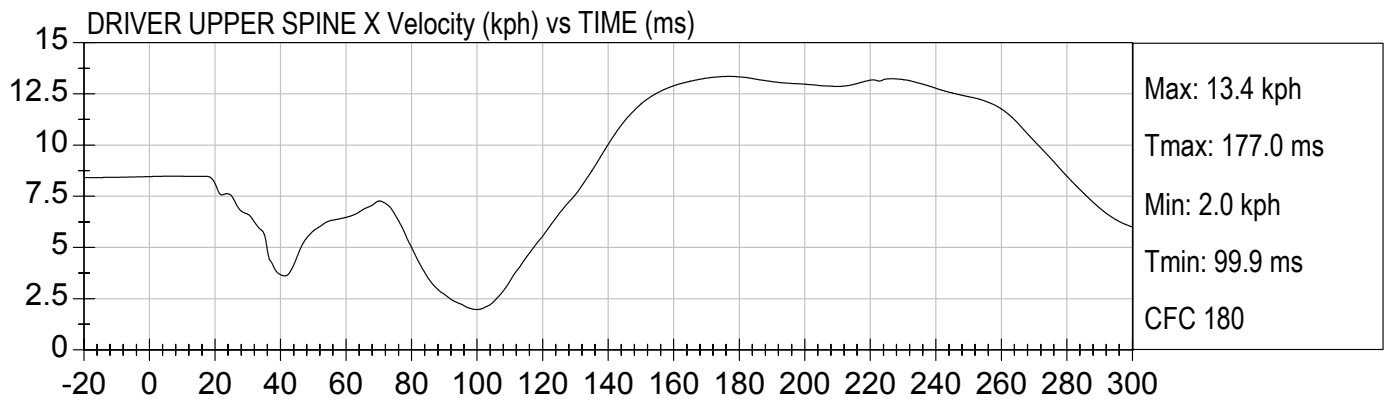




T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

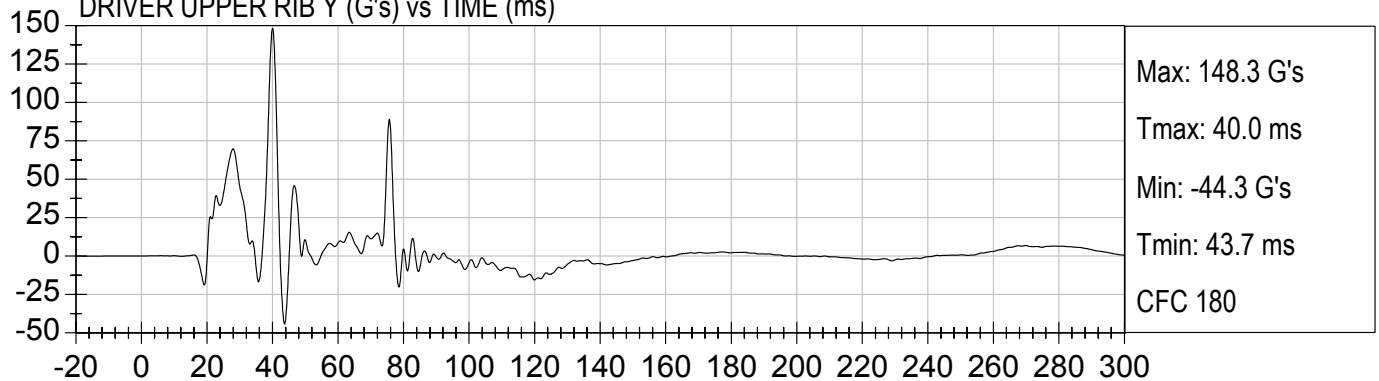
Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)



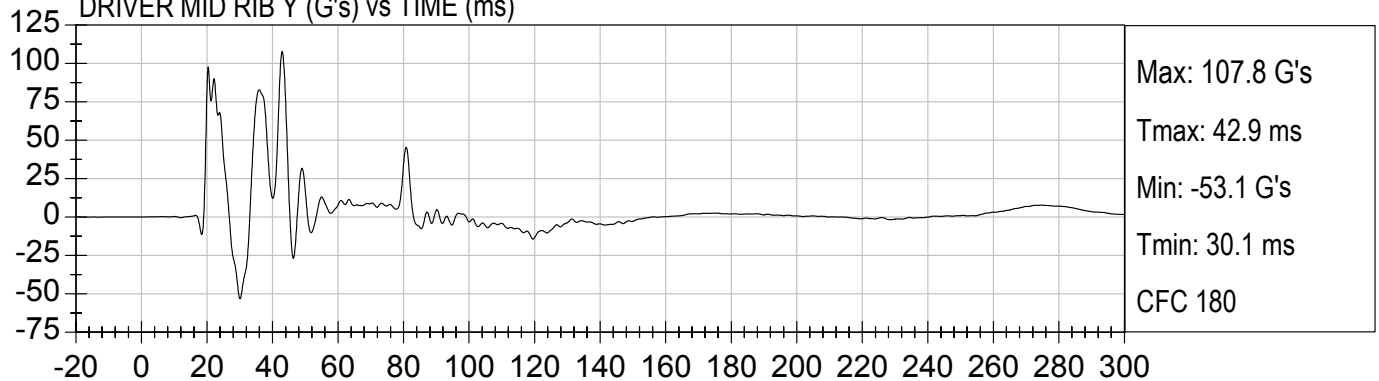




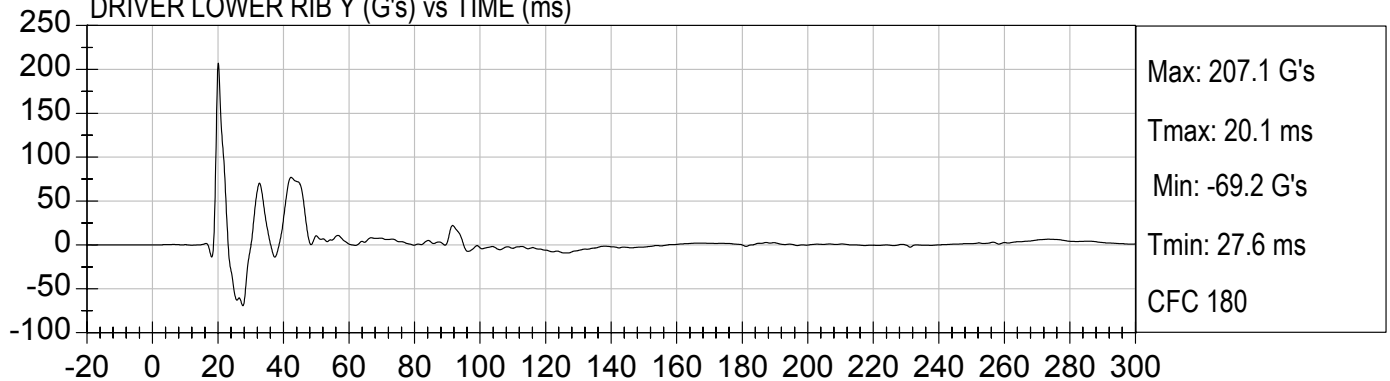
DRIVER UPPER RIB Y (G's) vs TIME (ms)

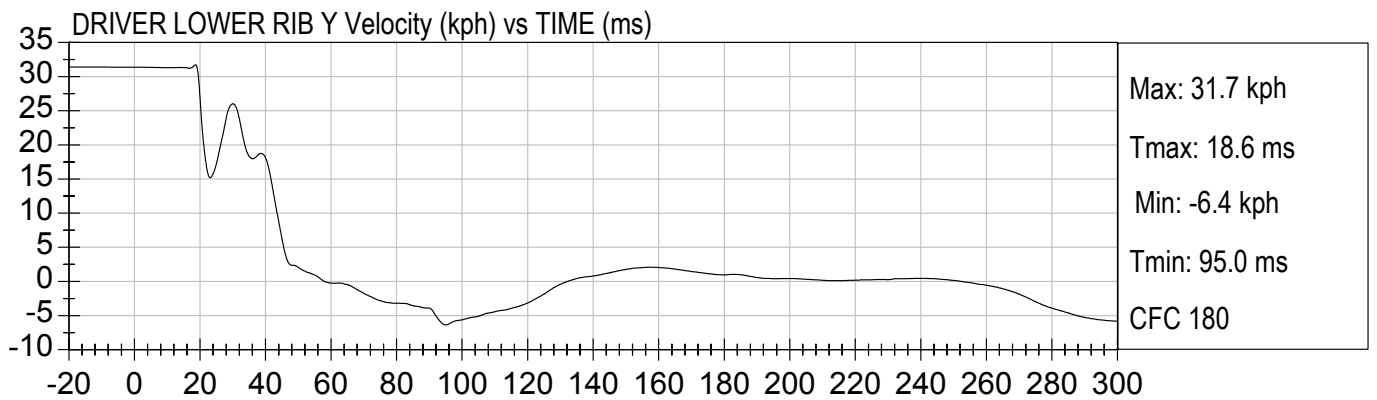
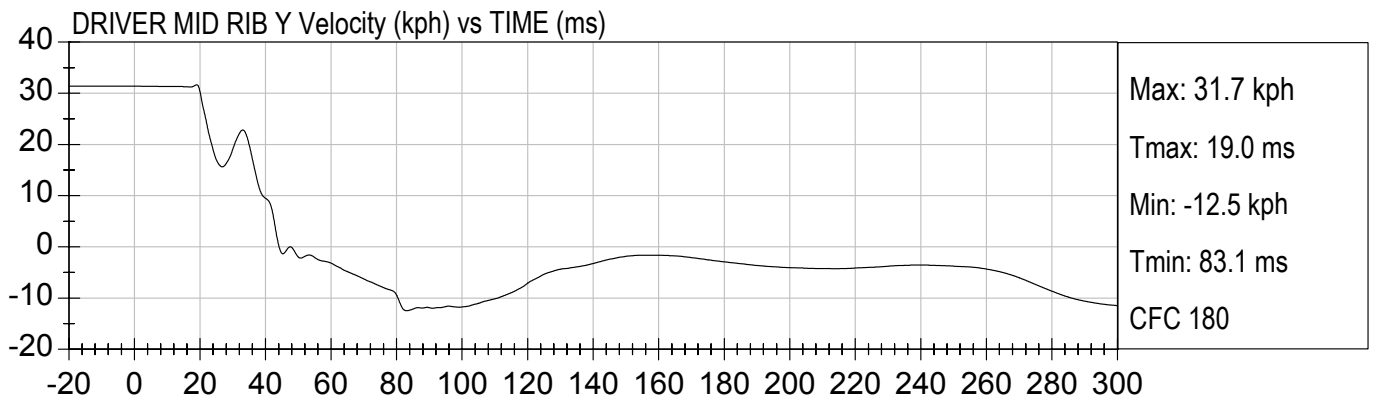
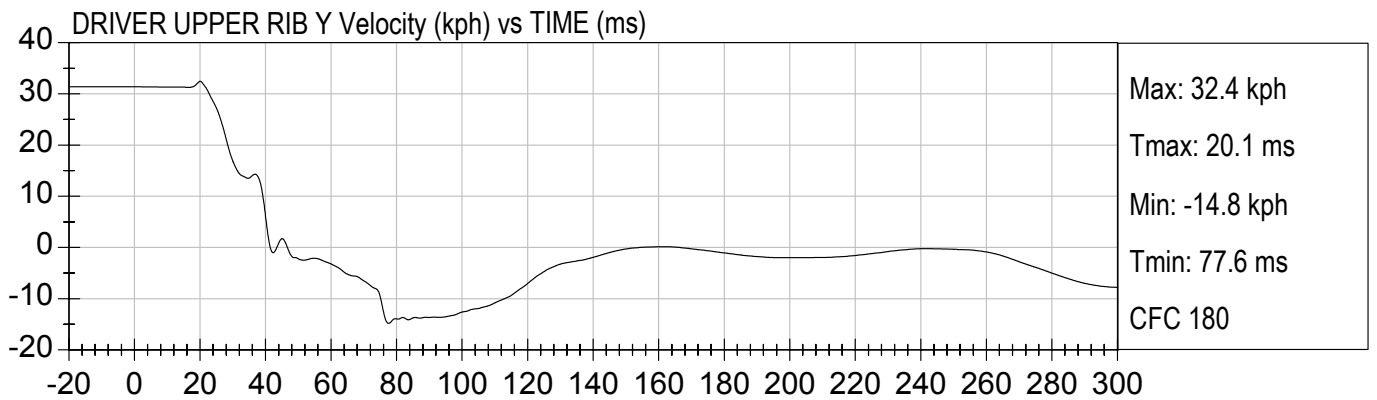


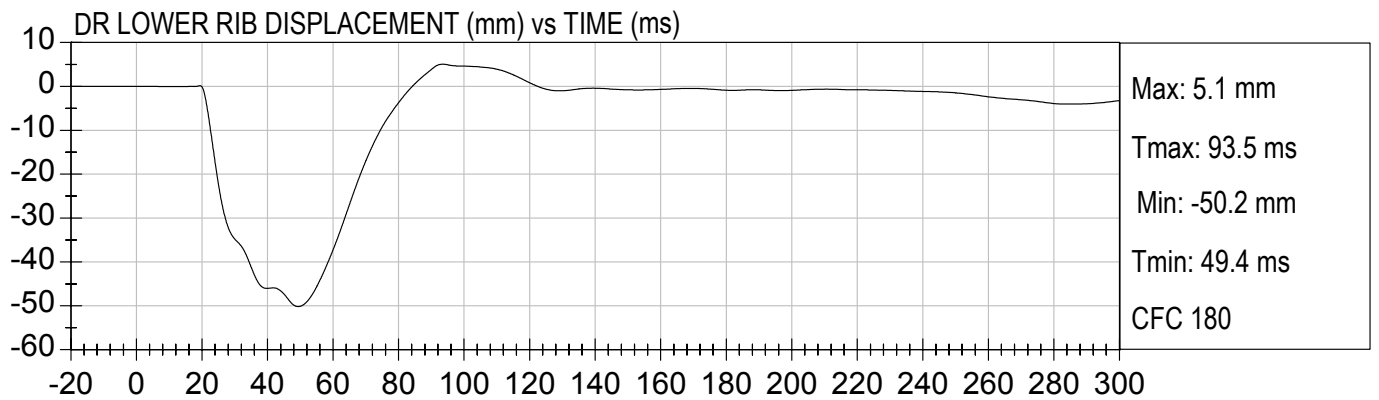
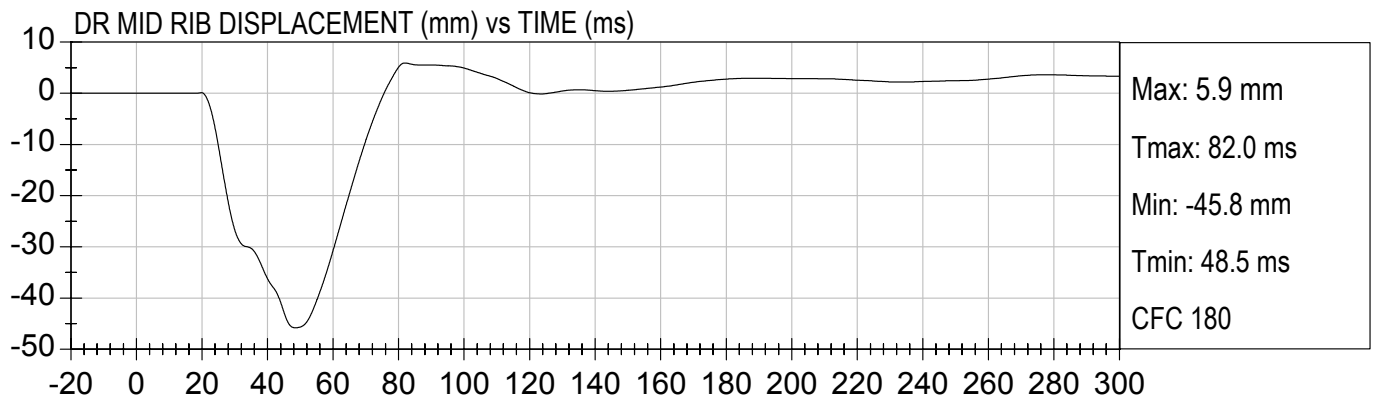
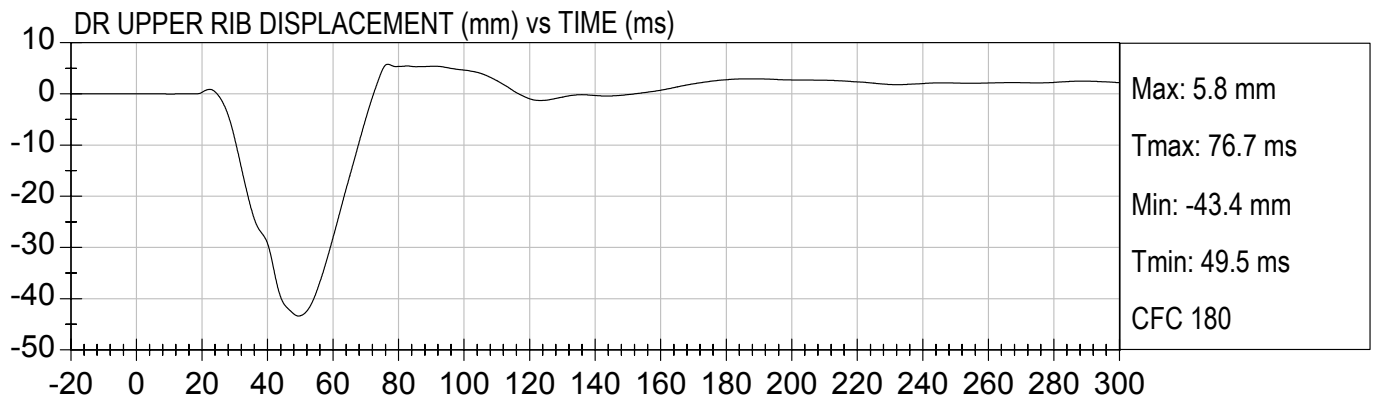
DRIVER MID RIB Y (G's) vs TIME (ms)



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



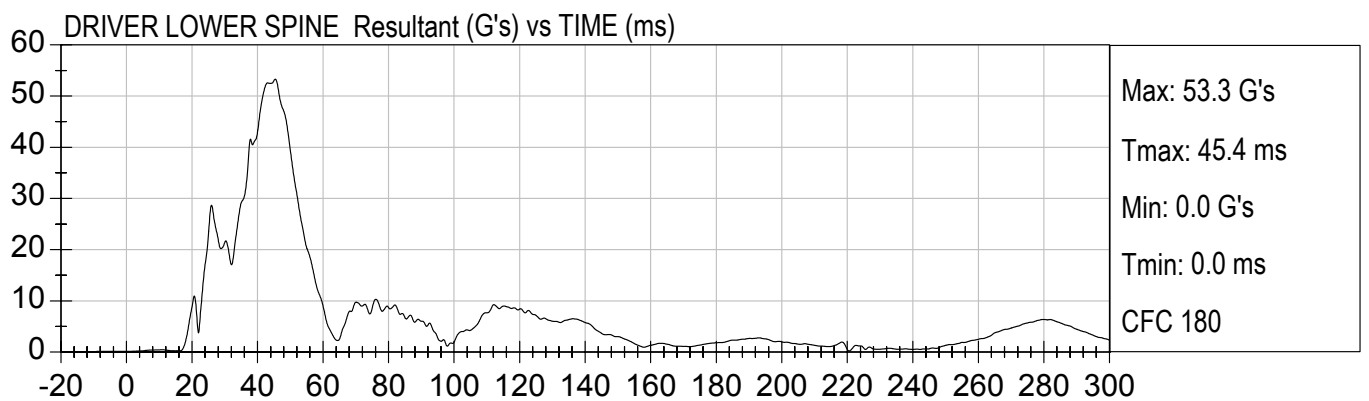
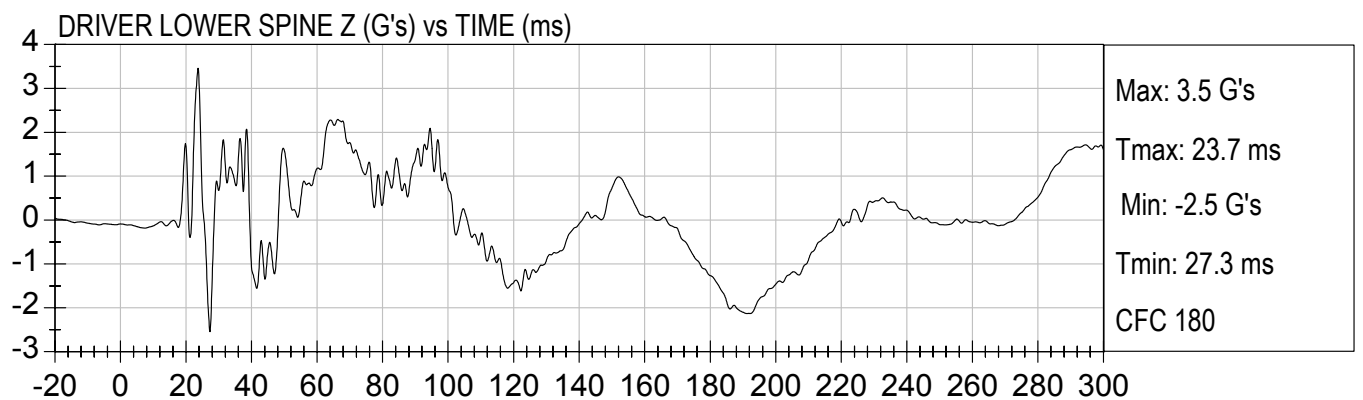
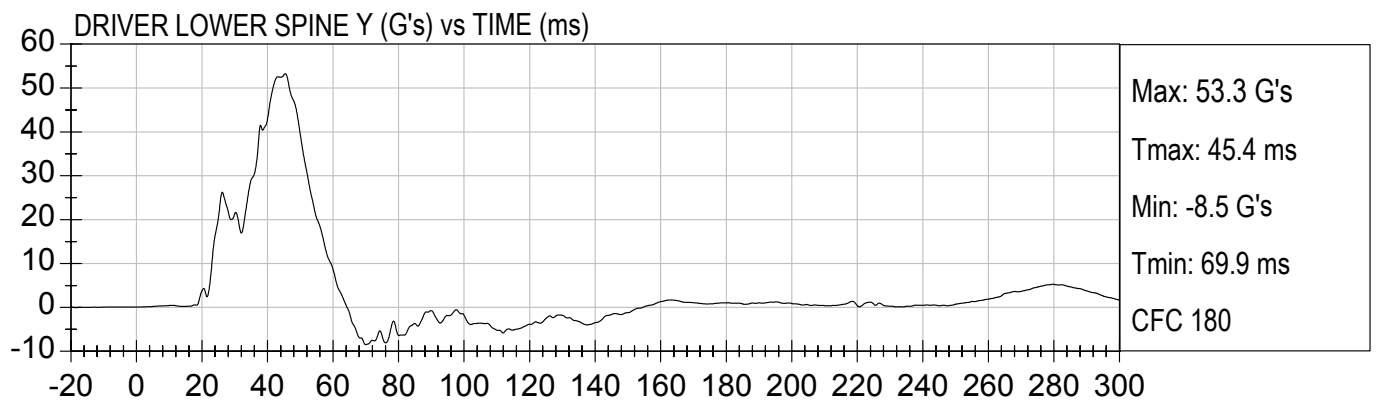
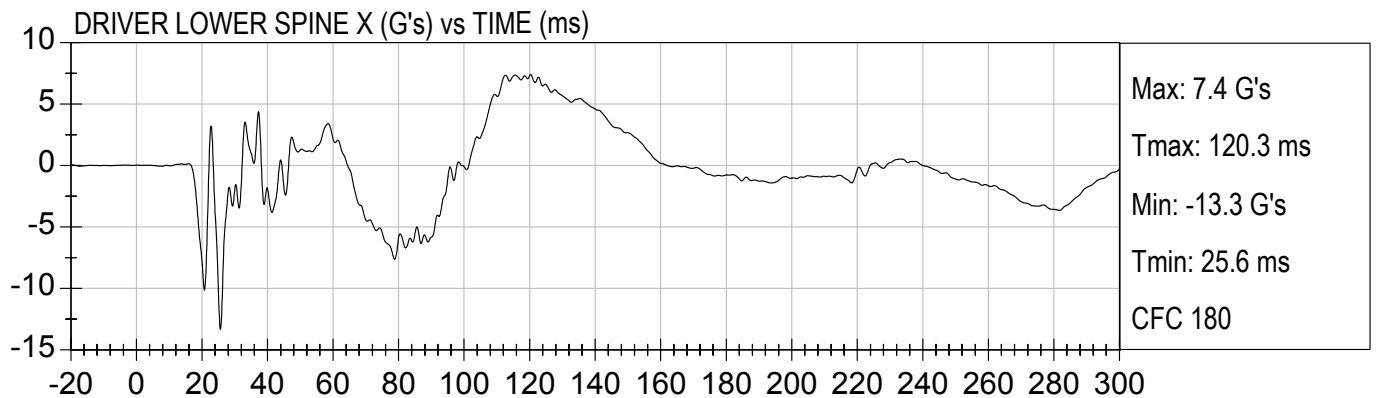






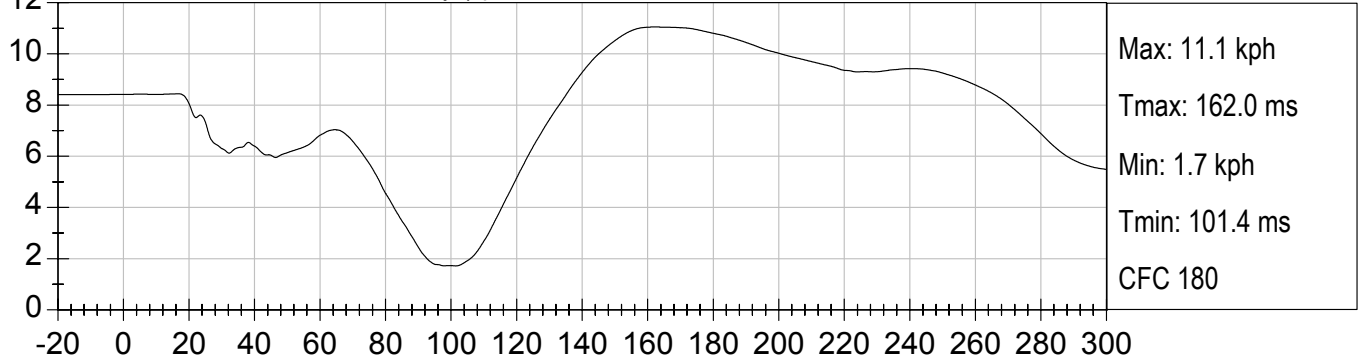
T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)

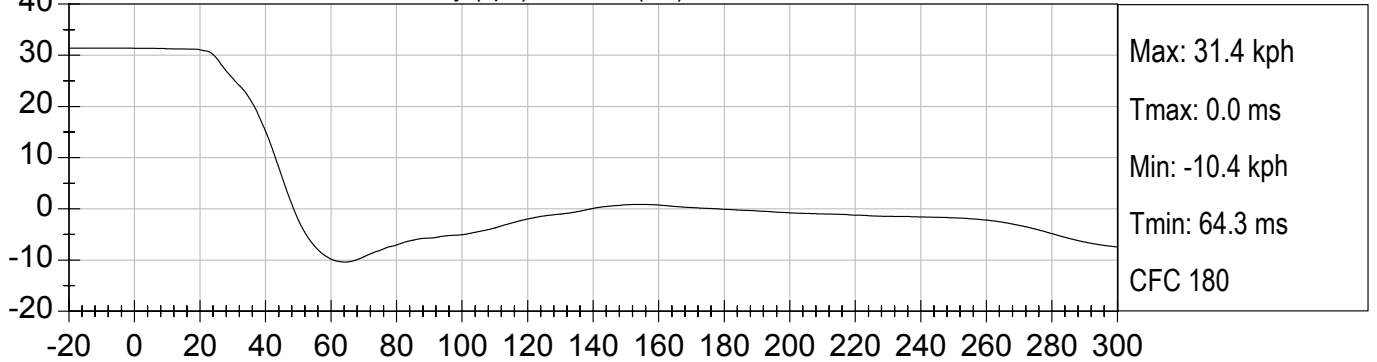




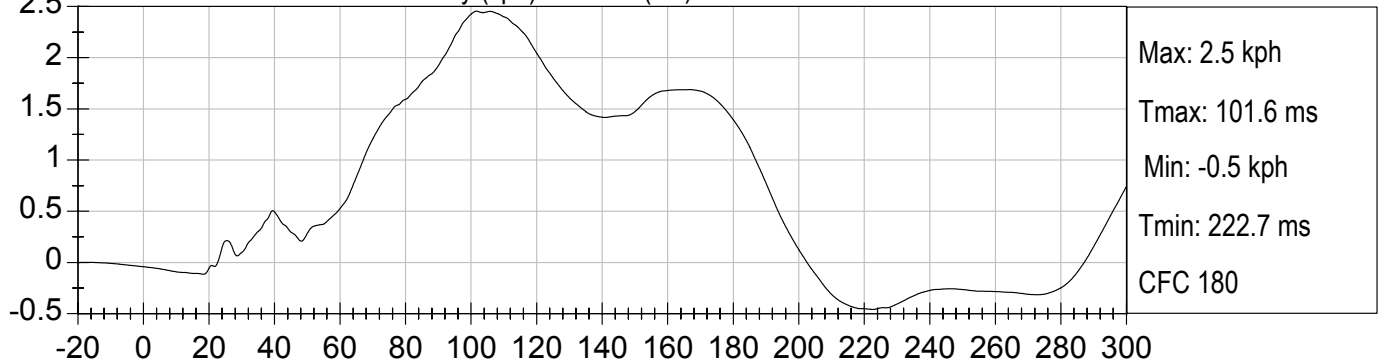
DRIVER LOWER SPINE X Velocity (kph) vs TIME (ms)



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

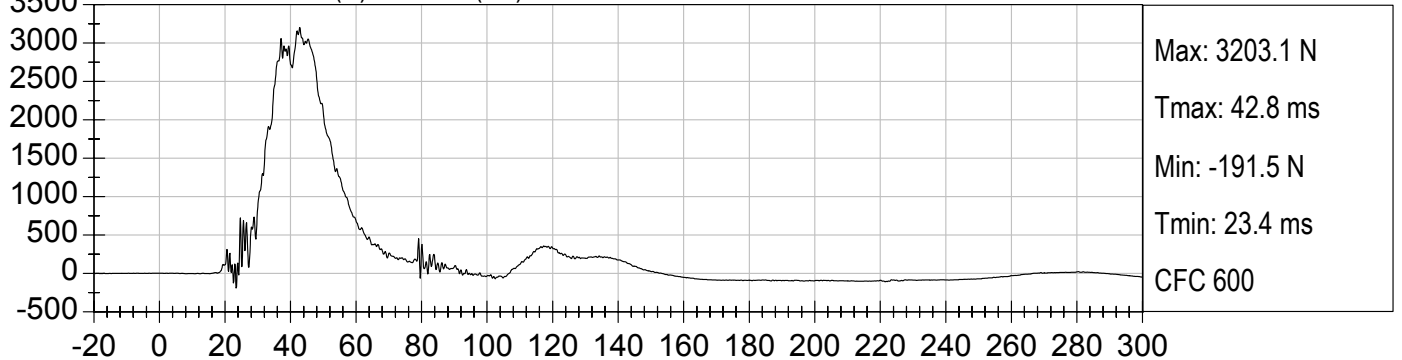


DRIVER LOWER SPINE Z Velocity (kph) vs TIME (ms)

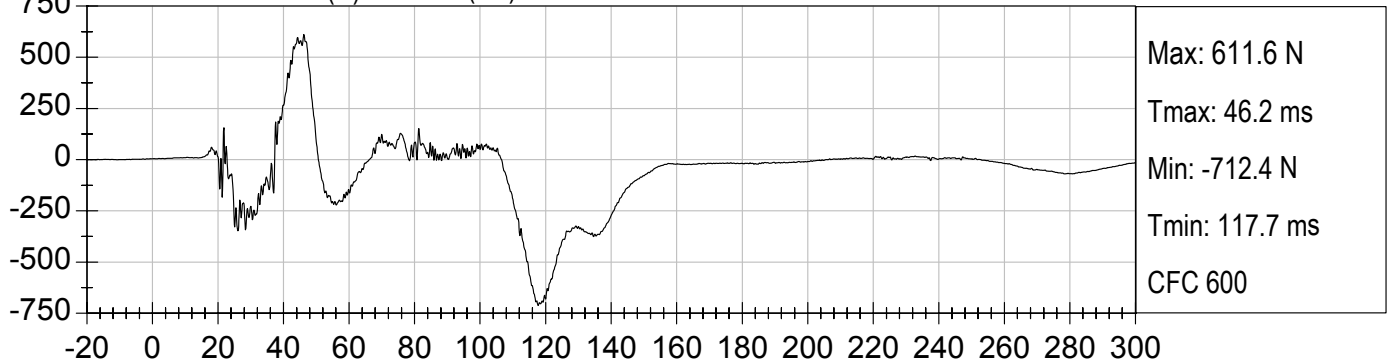




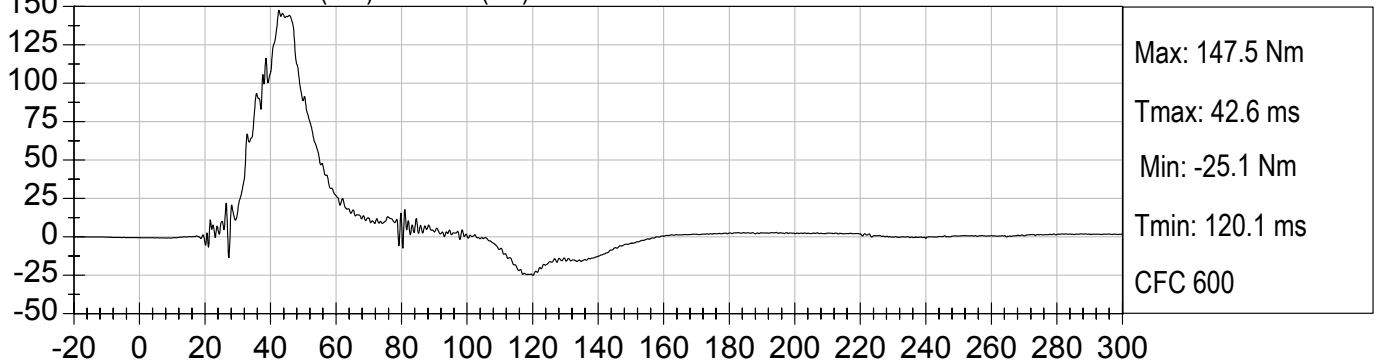
DRIVER TORSO FX (N) vs TIME (ms)



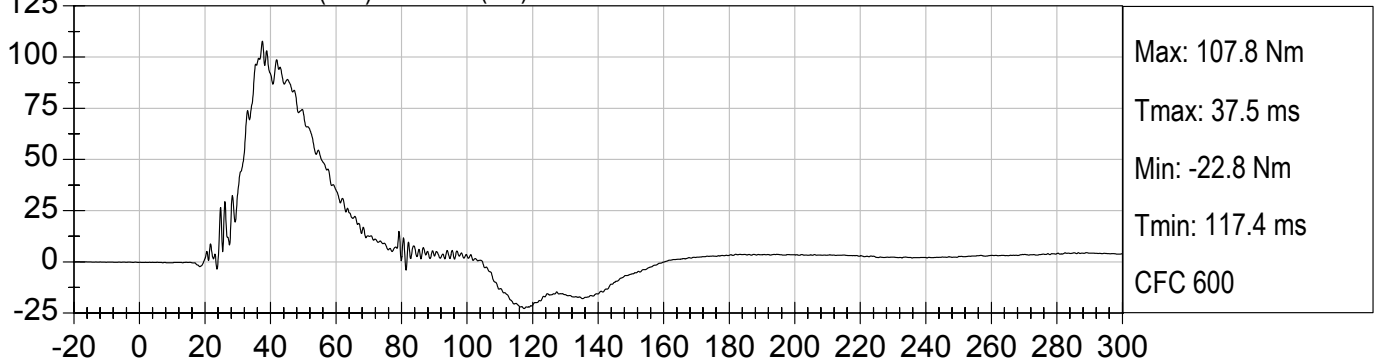
DRIVER TORSO FY (N) vs TIME (ms)



DRIVER TORSO MY (Nm) vs TIME (ms)



DRIVER TORSO MZ (Nm) vs TIME (ms)

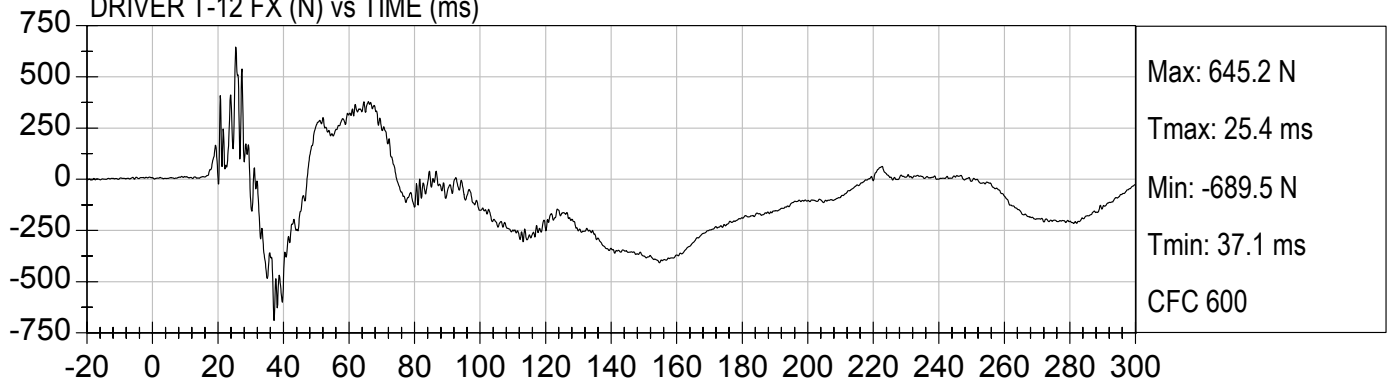




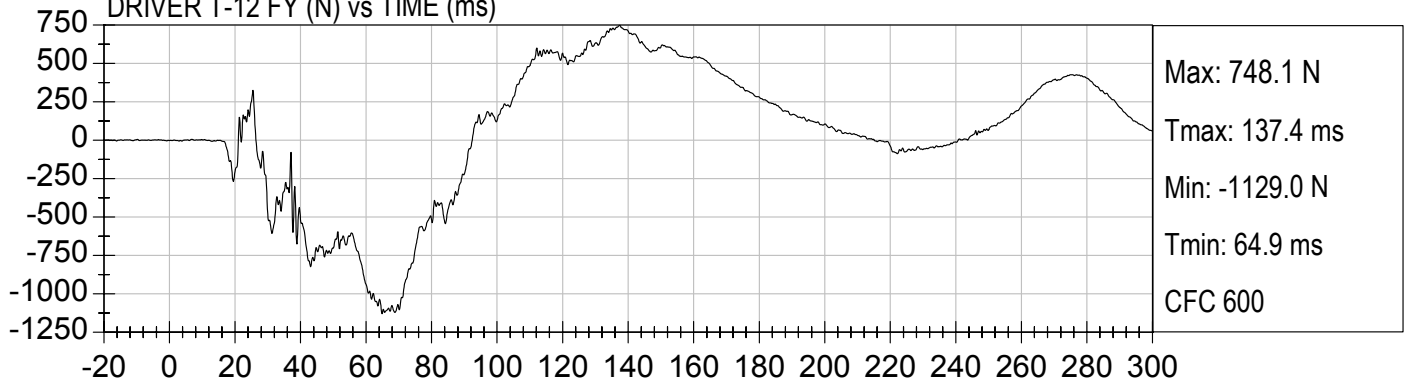
T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)

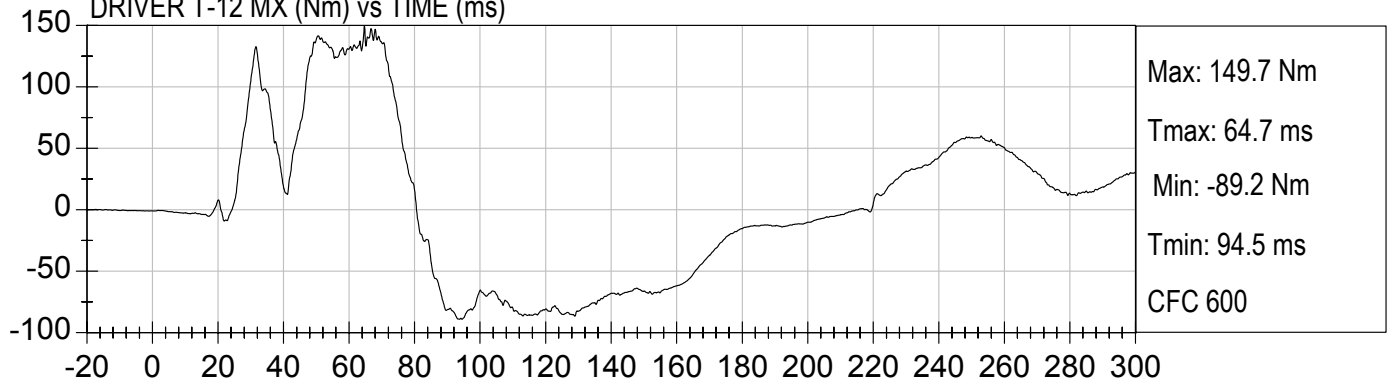
DRIVER T-12 FX (N) vs TIME (ms)



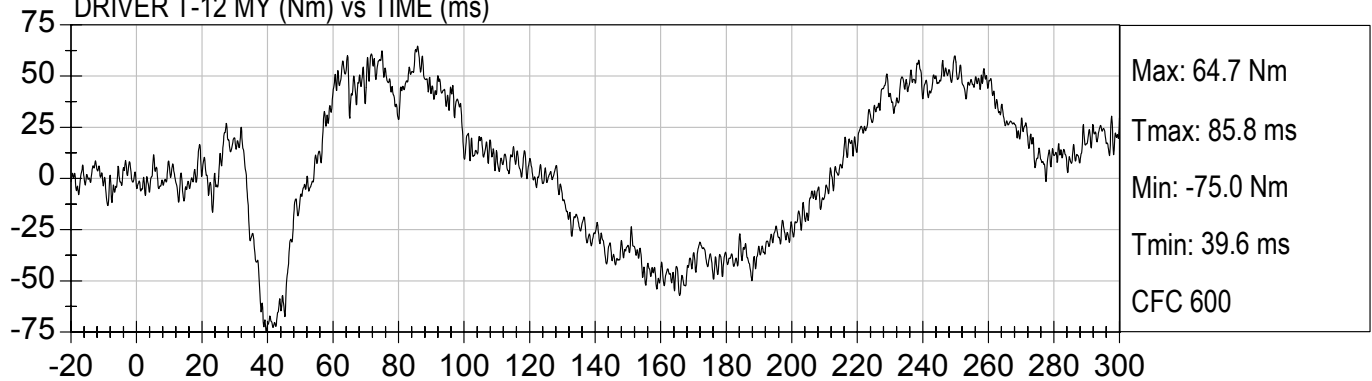
DRIVER T-12 FY (N) vs TIME (ms)

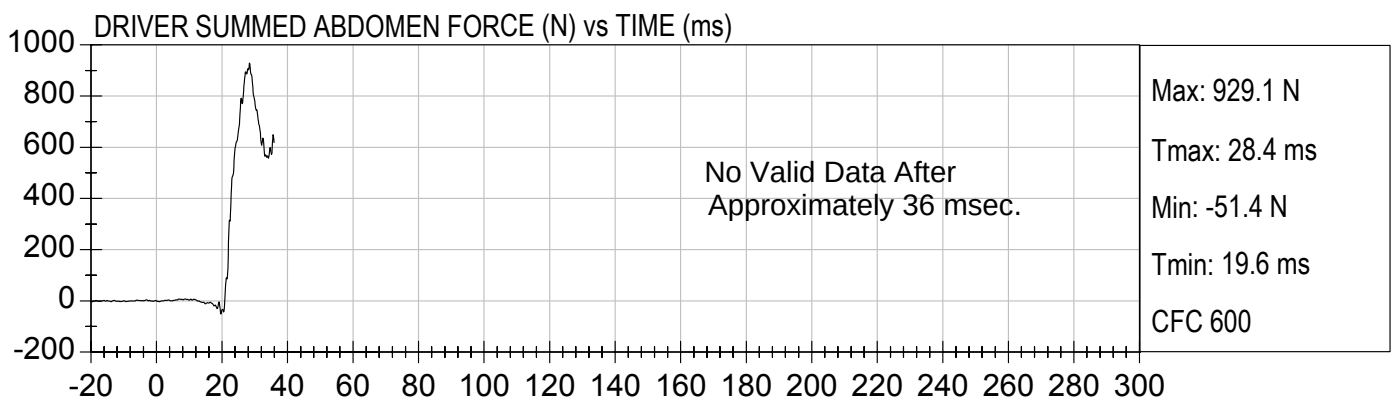
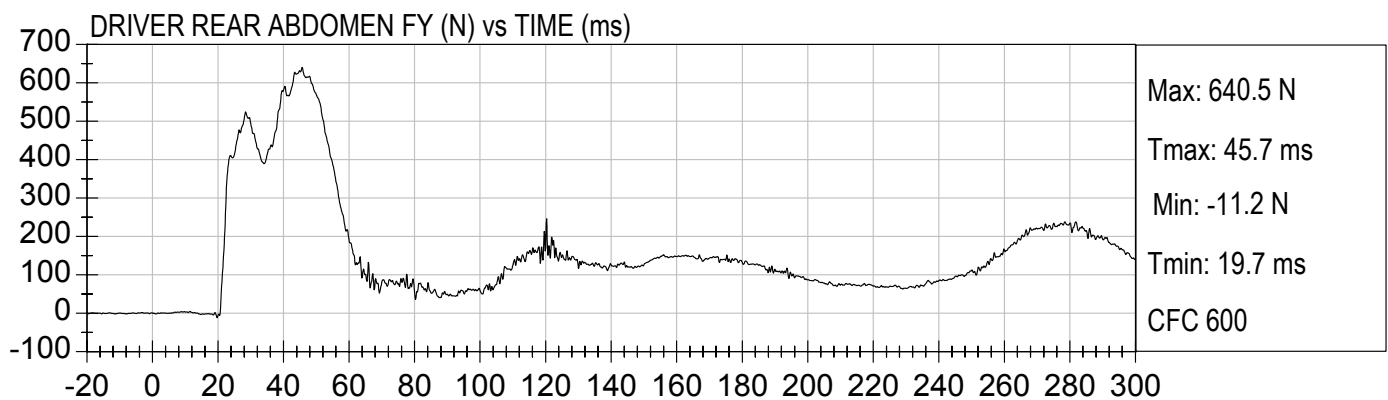
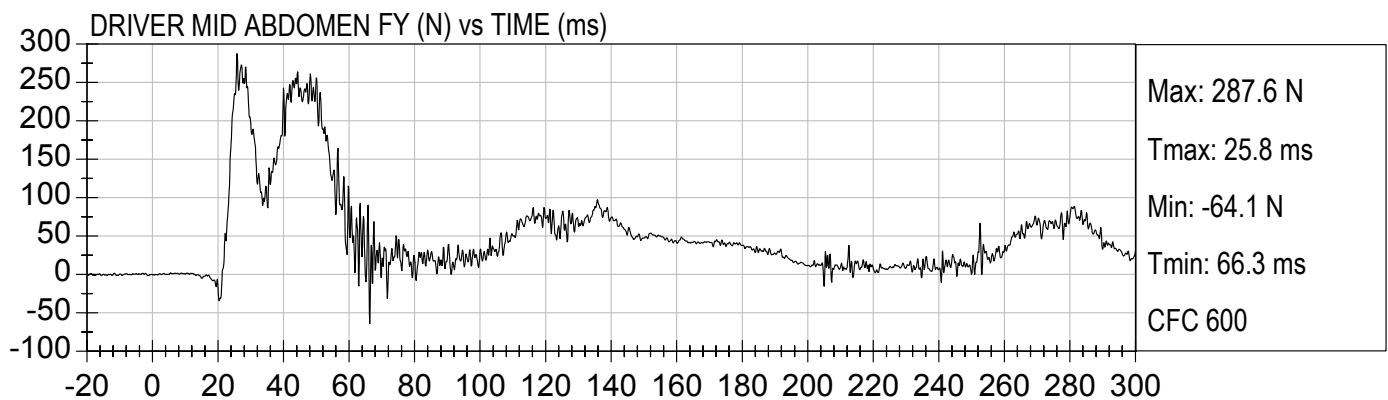
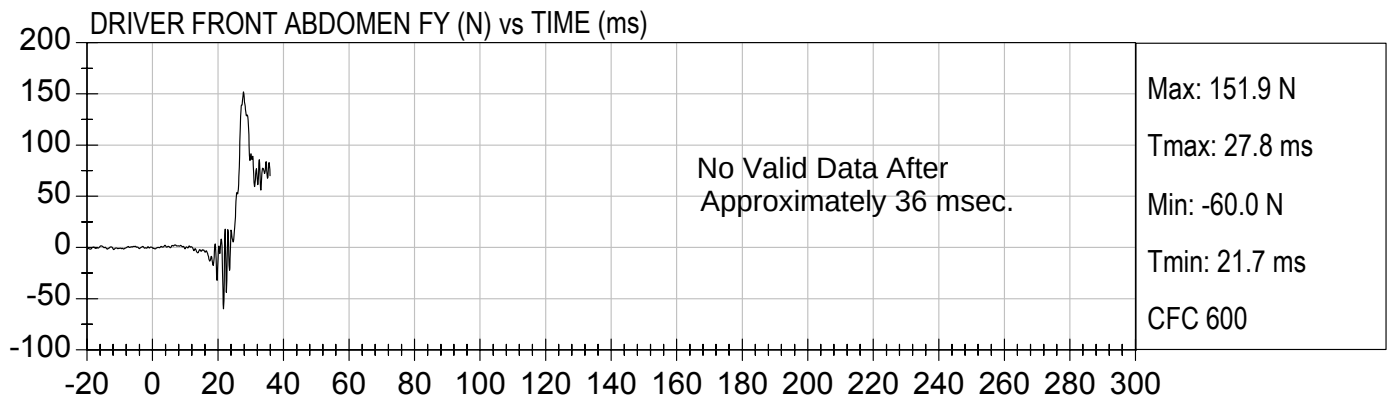


DRIVER T-12 MX (Nm) vs TIME (ms)



DRIVER T-12 MY (Nm) vs TIME (ms)



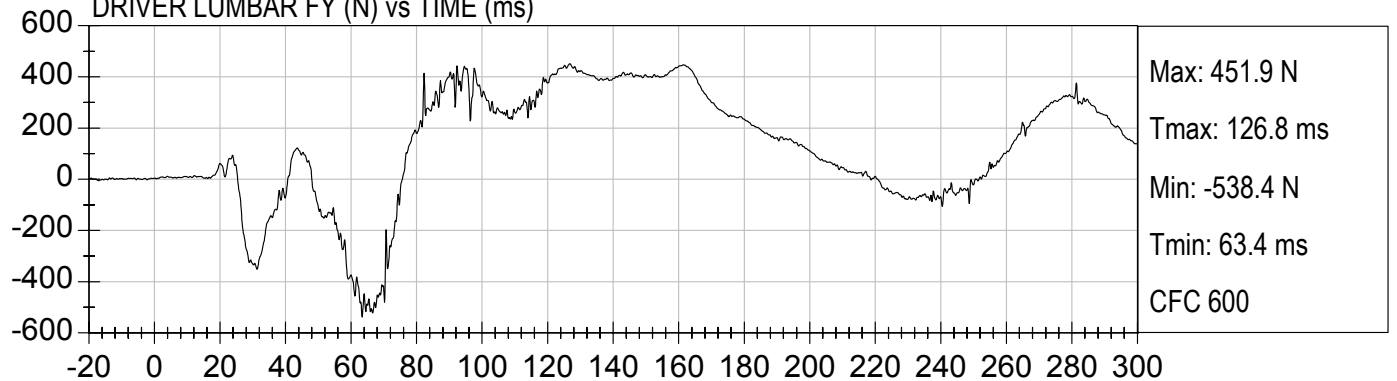




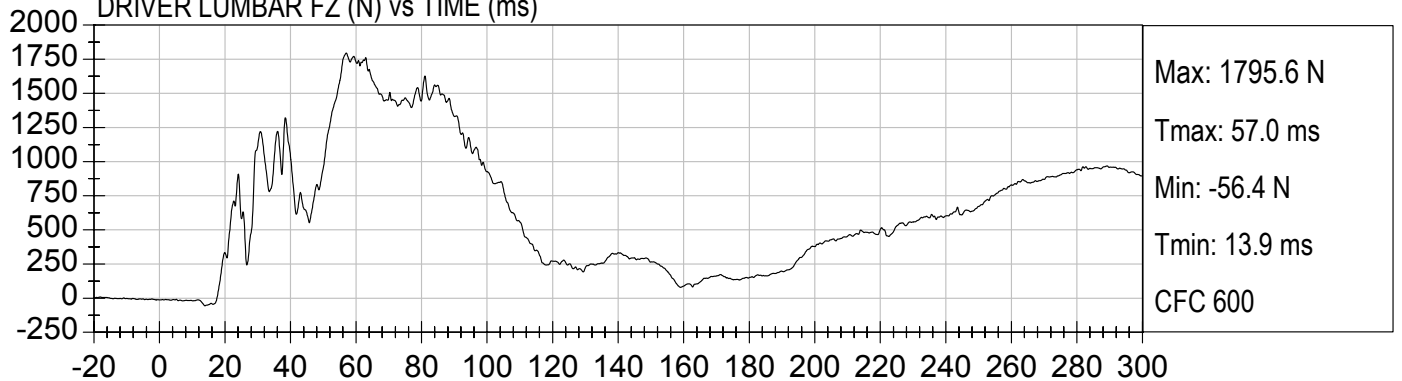
T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)

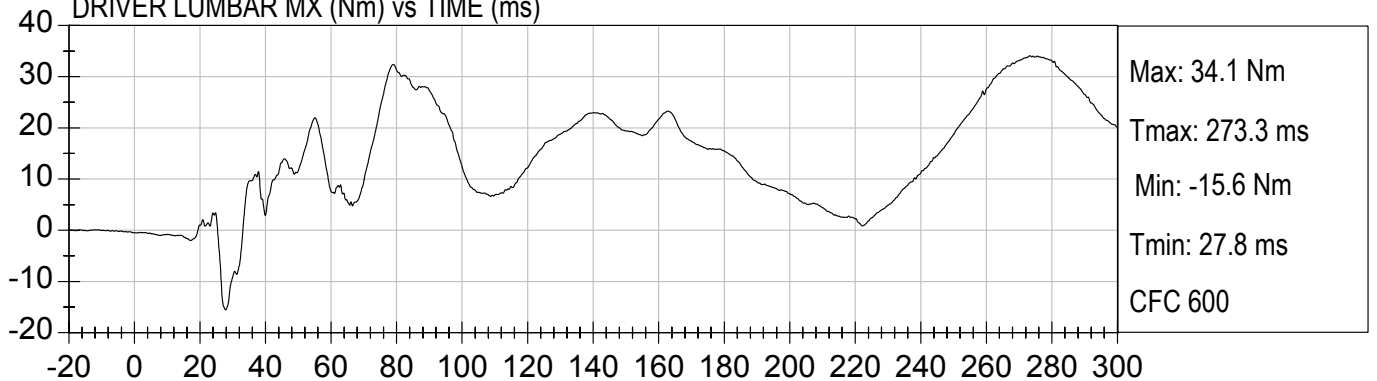
DRIVER LUMBAR FY (N) vs TIME (ms)



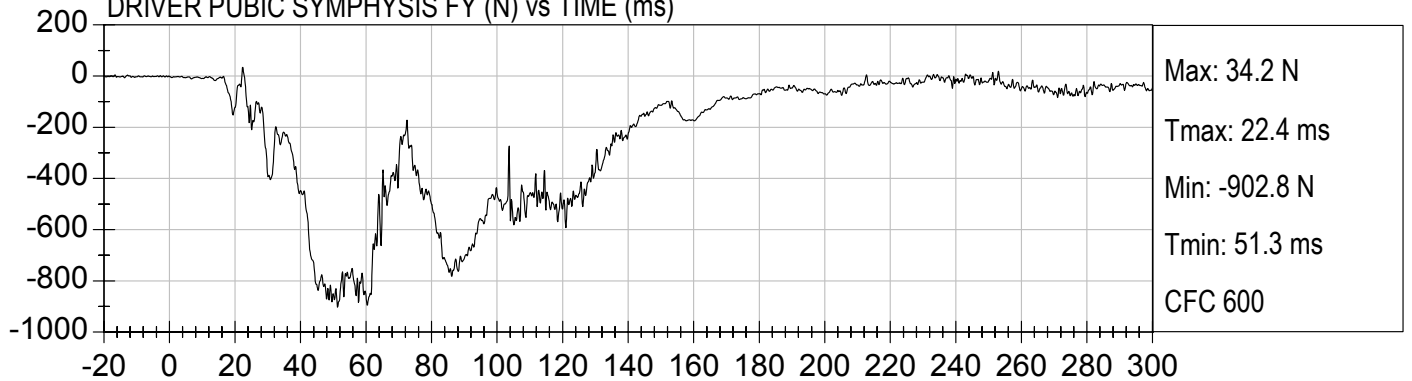
DRIVER LUMBAR FZ (N) vs TIME (ms)



DRIVER LUMBAR MX (Nm) vs TIME (ms)



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

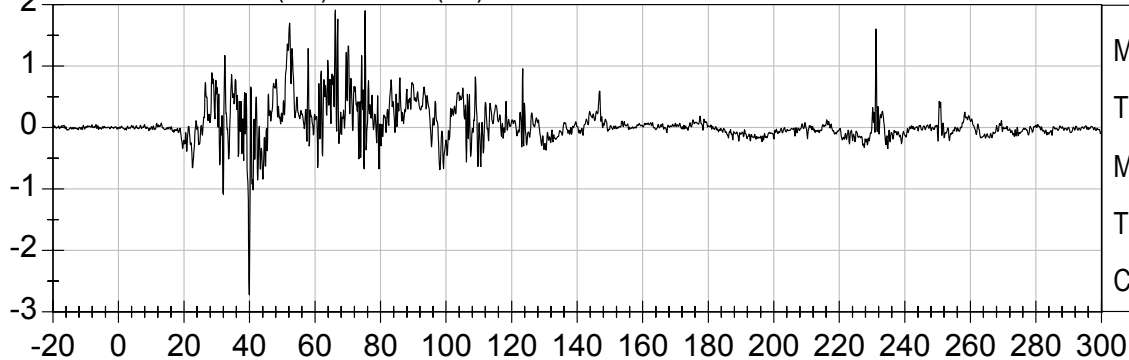




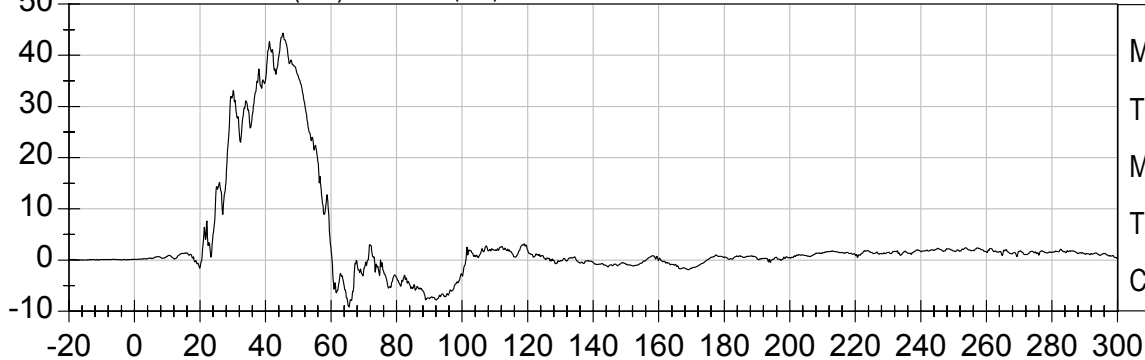
T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)

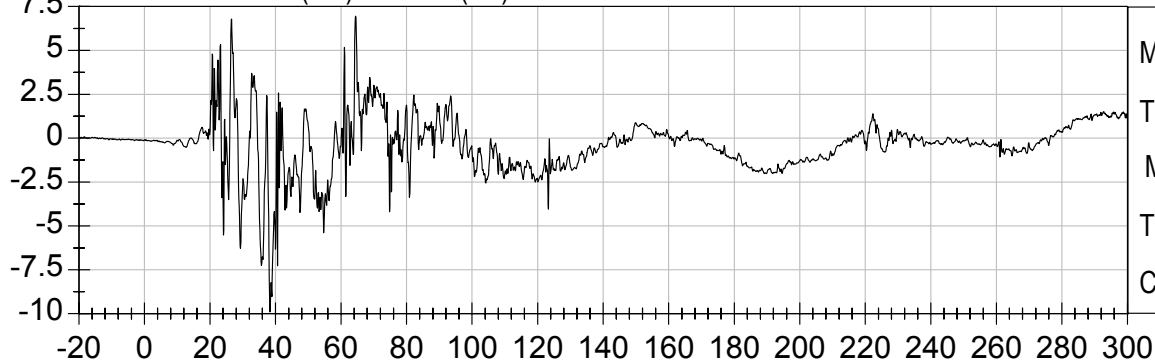
DRIVER PELVIS X (G's) vs TIME (ms)



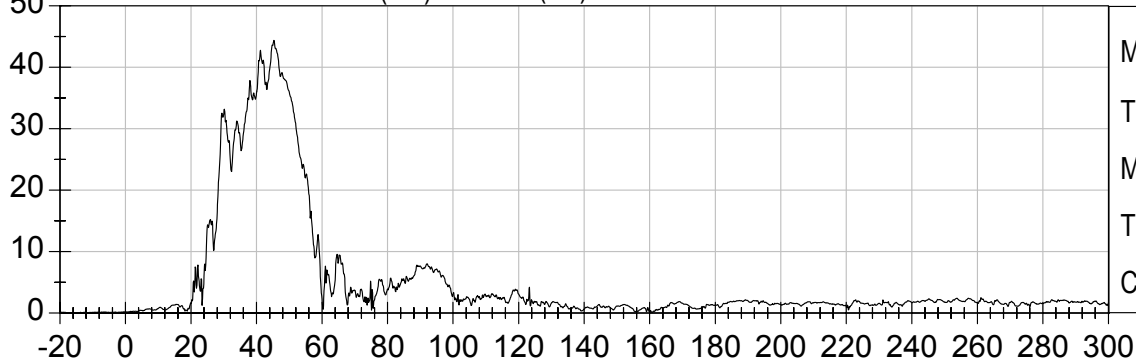
DRIVER PELVIS Y (G's) vs TIME (ms)



DRIVER PELVIS Z (G's) vs TIME (ms)

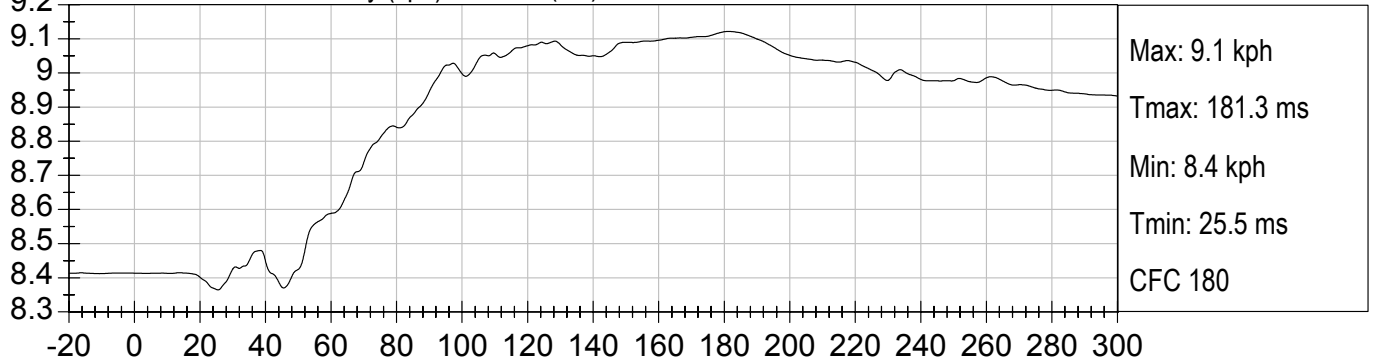


DRIVER PELVIS Resultant (G's) vs TIME (ms)

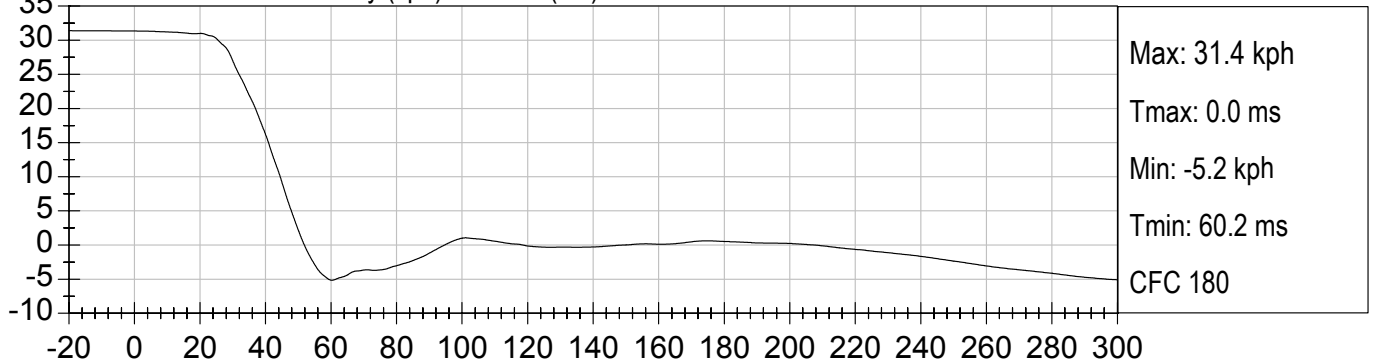




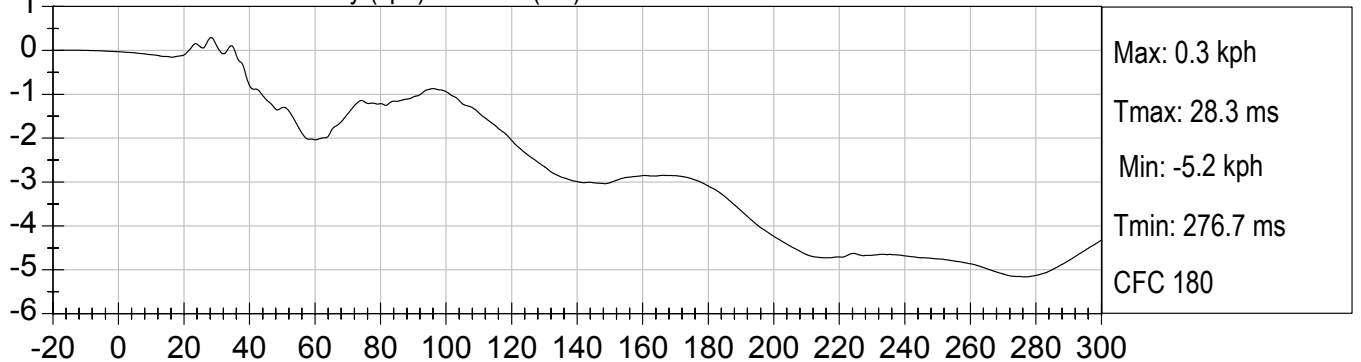
DRIVER PELVIS X Velocity (kph) vs TIME (ms)



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



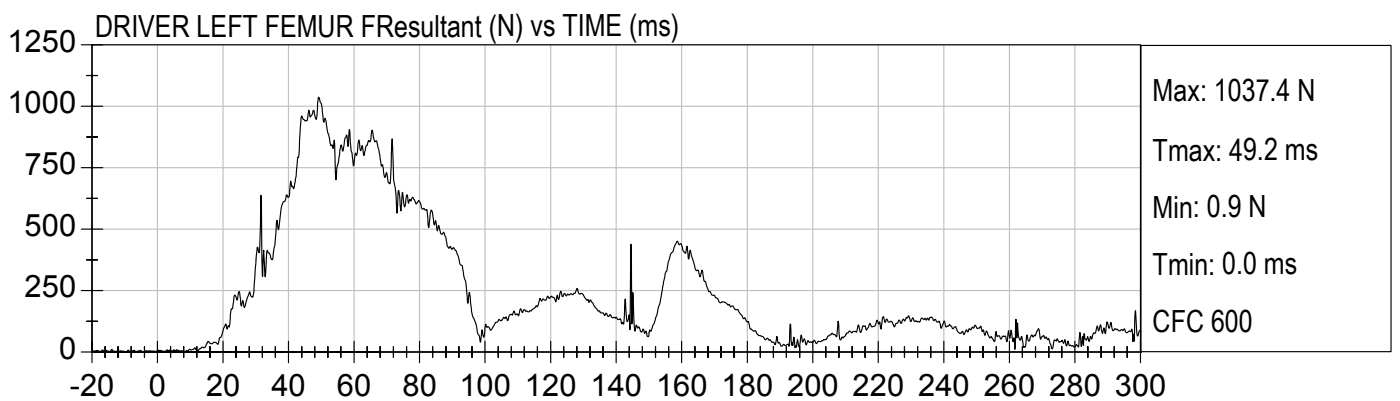
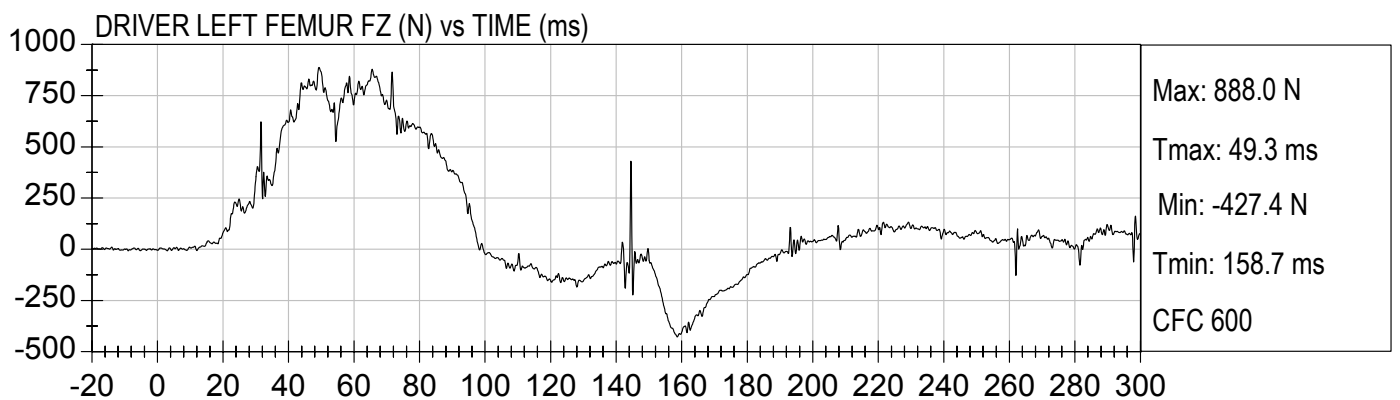
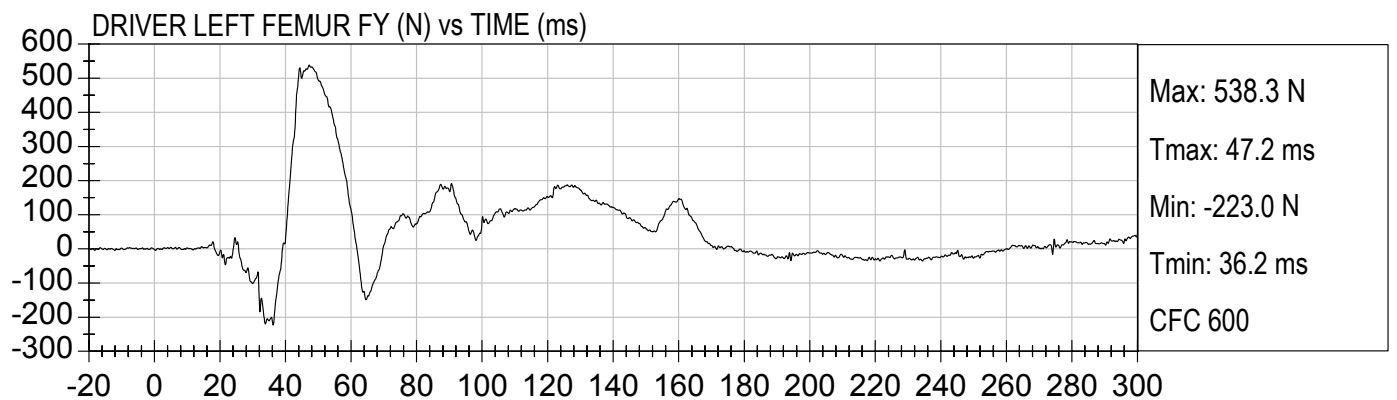
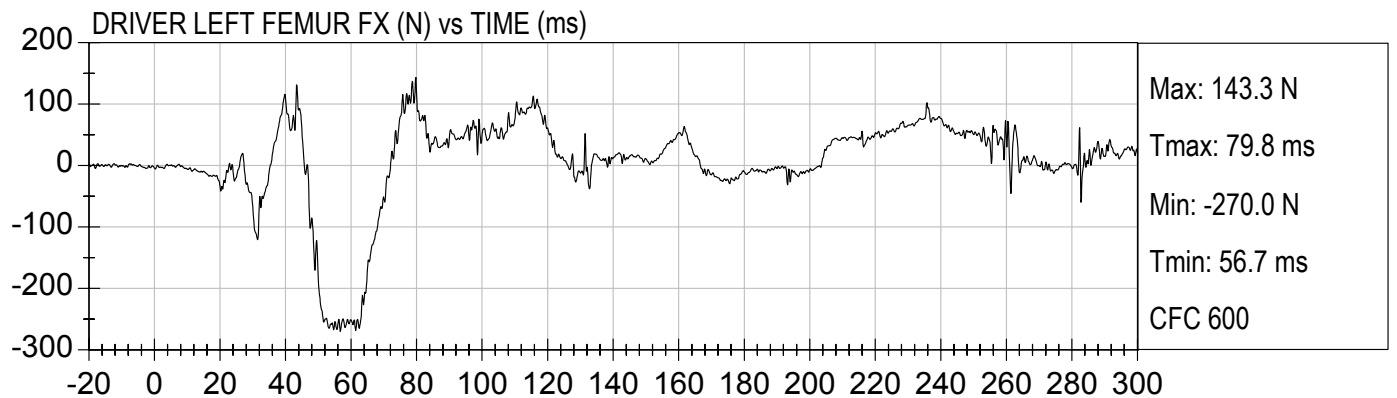
DRIVER PELVIS Z Velocity (kph) vs TIME (ms)





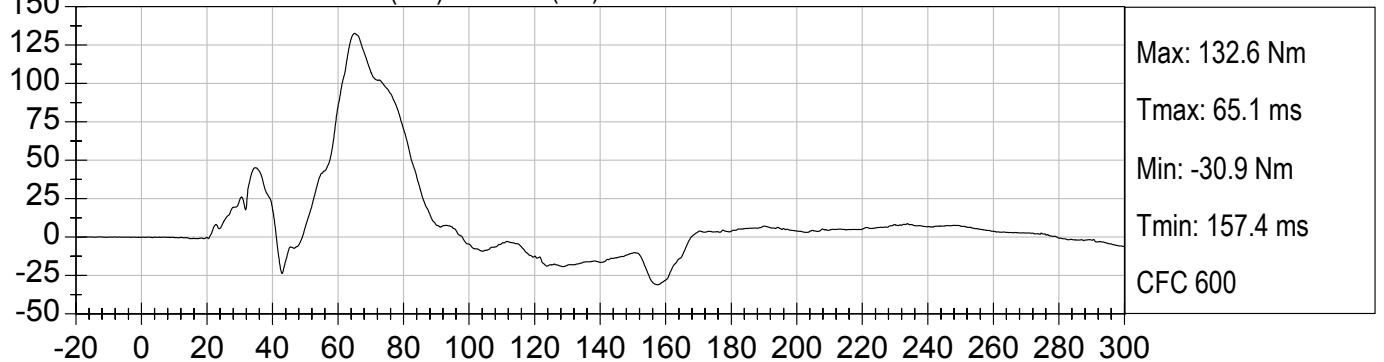
T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)





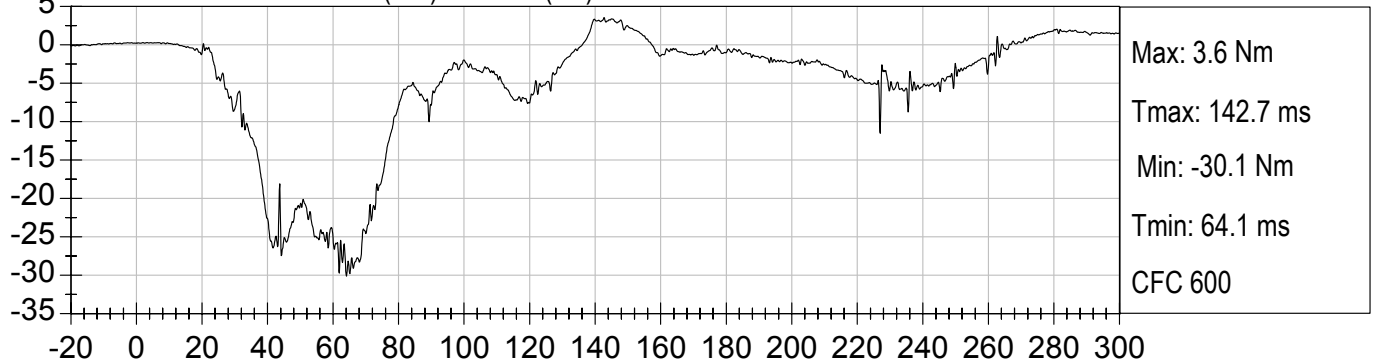
DRIVER LEFT FEMUR MX (Nm) vs TIME (ms)



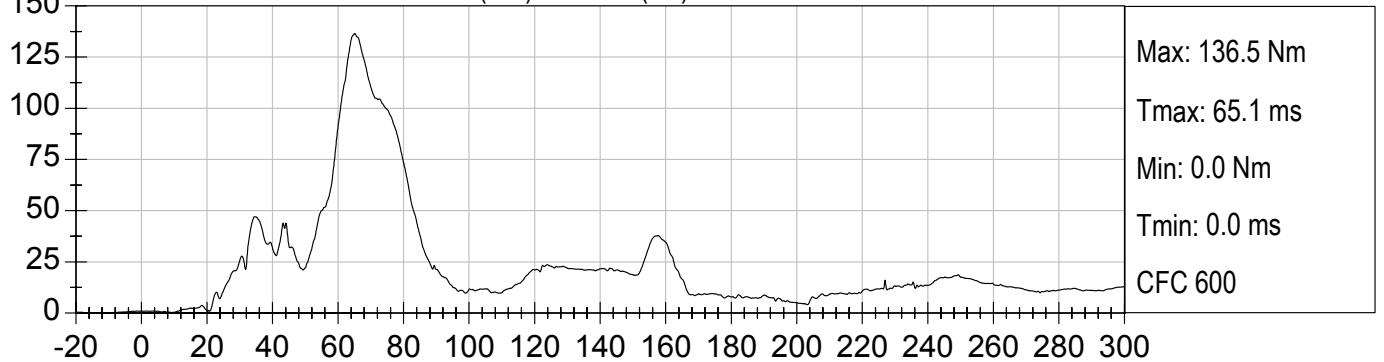
DRIVER LEFT FEMUR MY (Nm) vs TIME (ms)



DRIVER LEFT FEMUR MZ (Nm) vs TIME (ms)



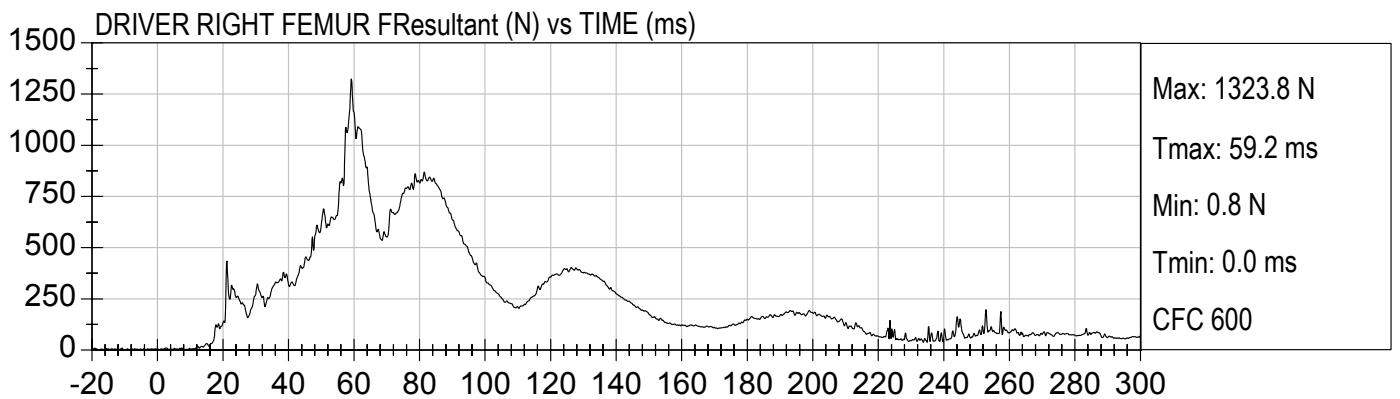
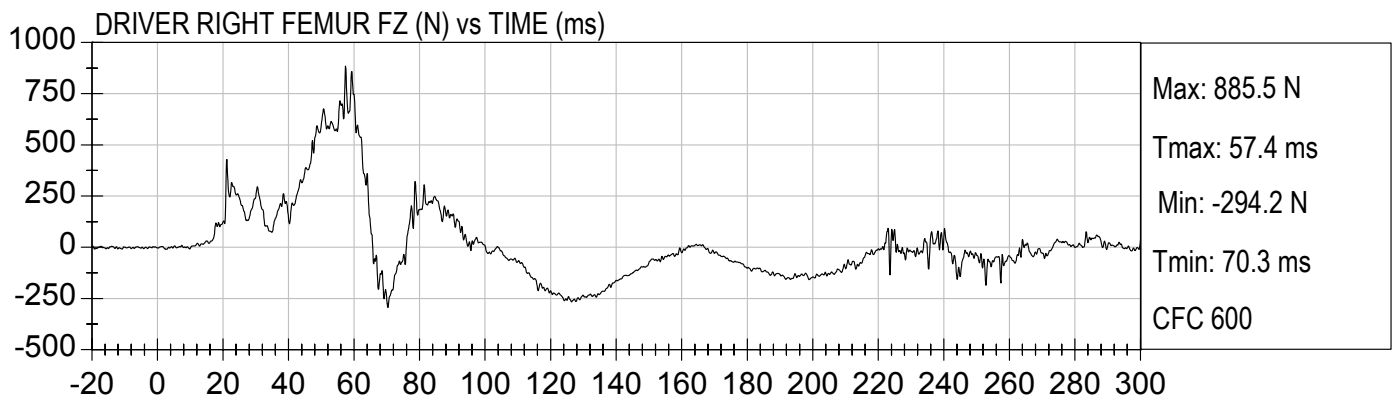
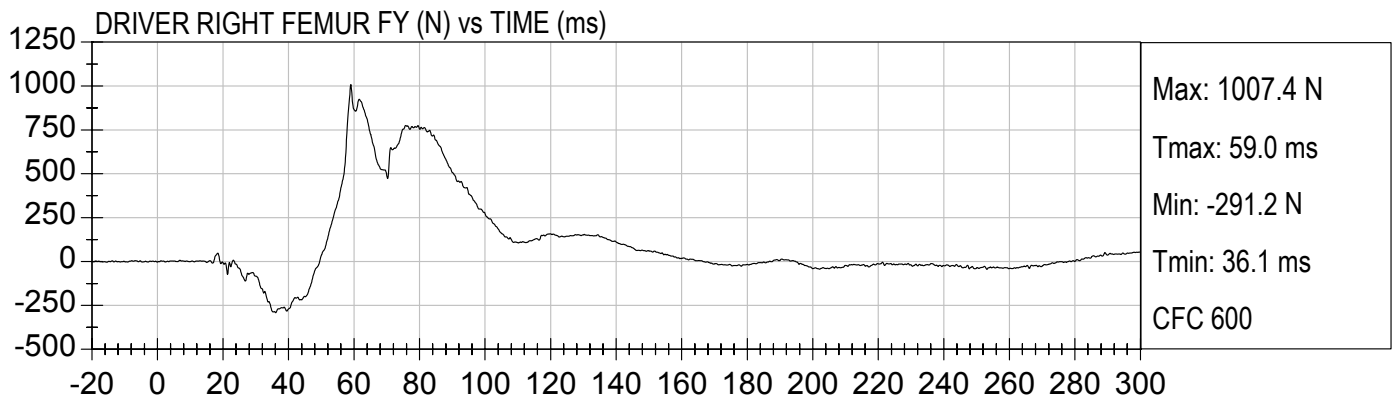
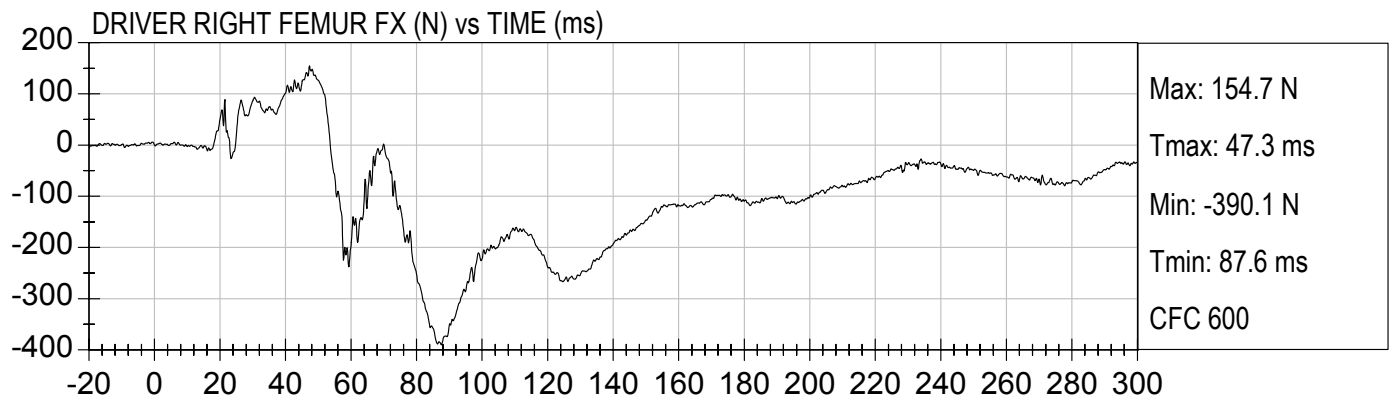
DRIVER LEFT FEMUR MResultant (Nm) vs TIME (ms)

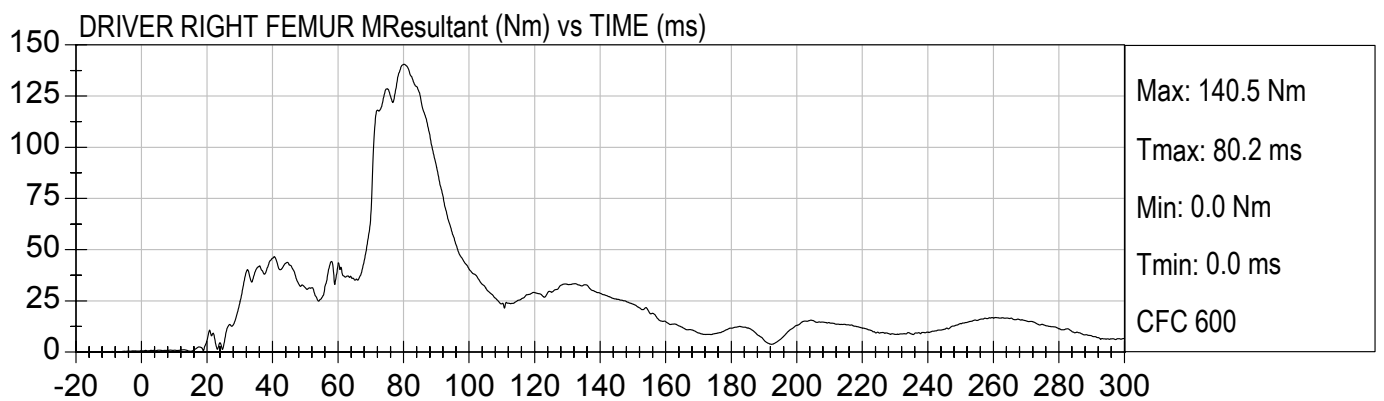
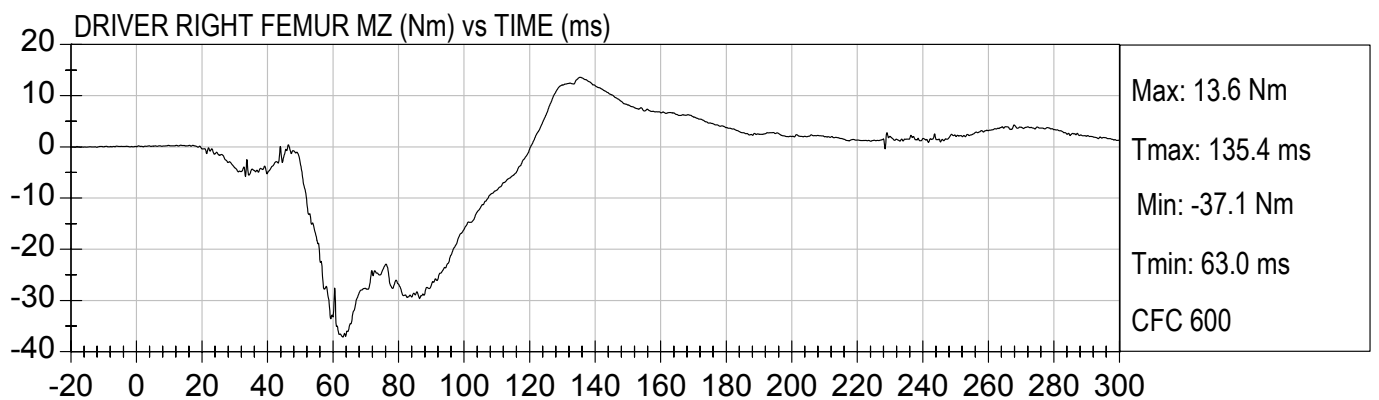
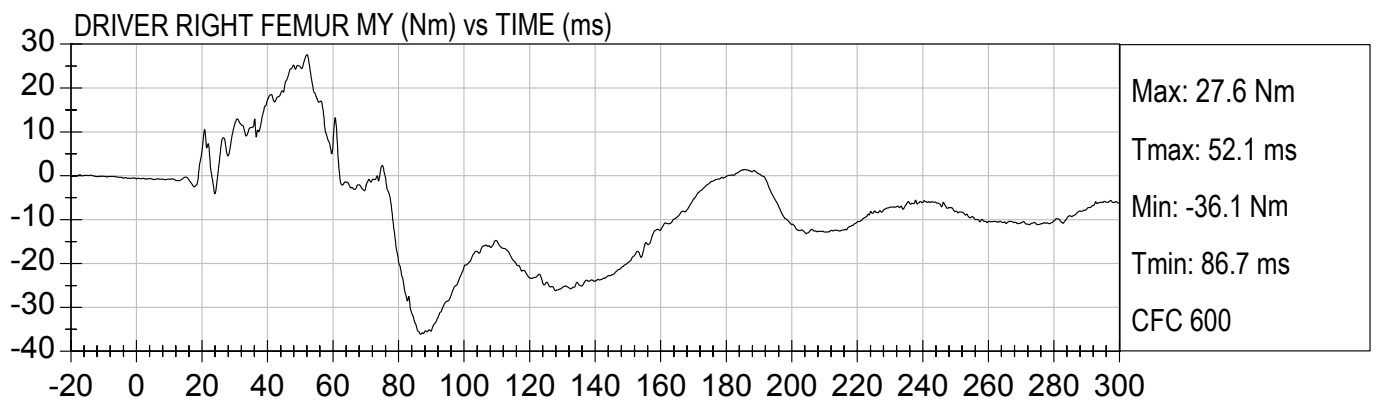
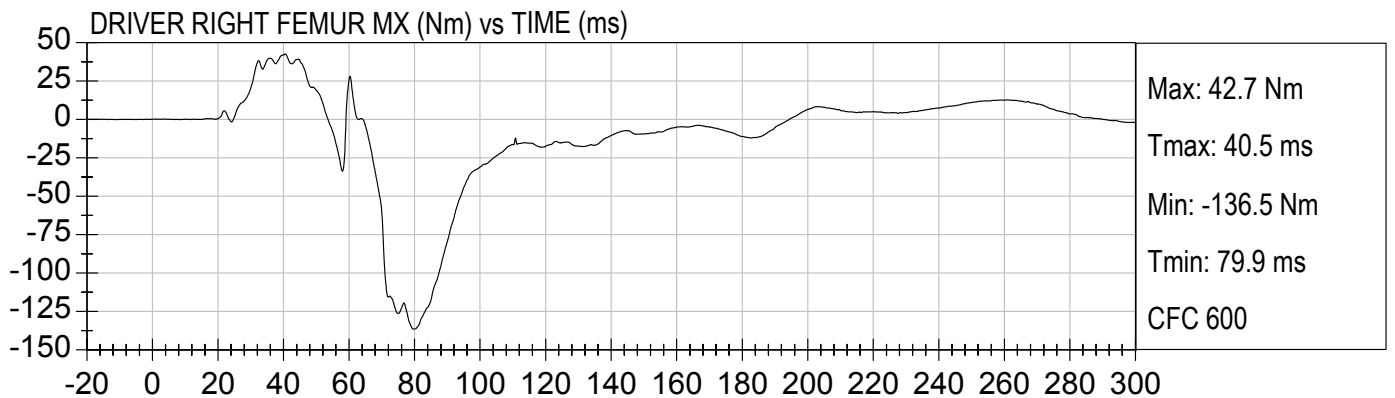




T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

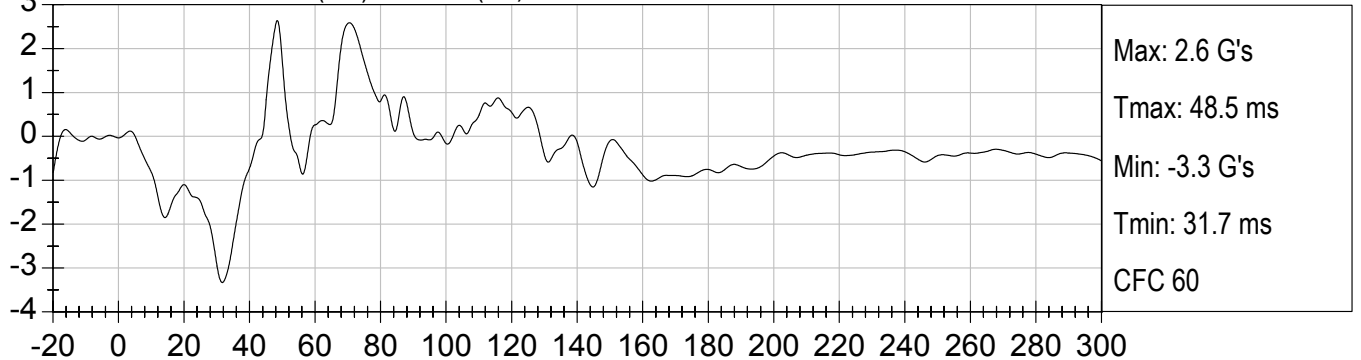
Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)



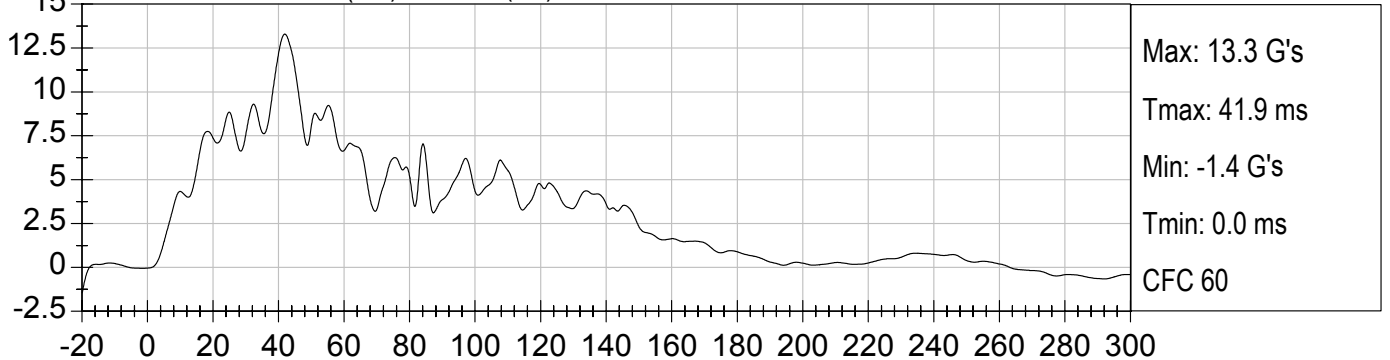




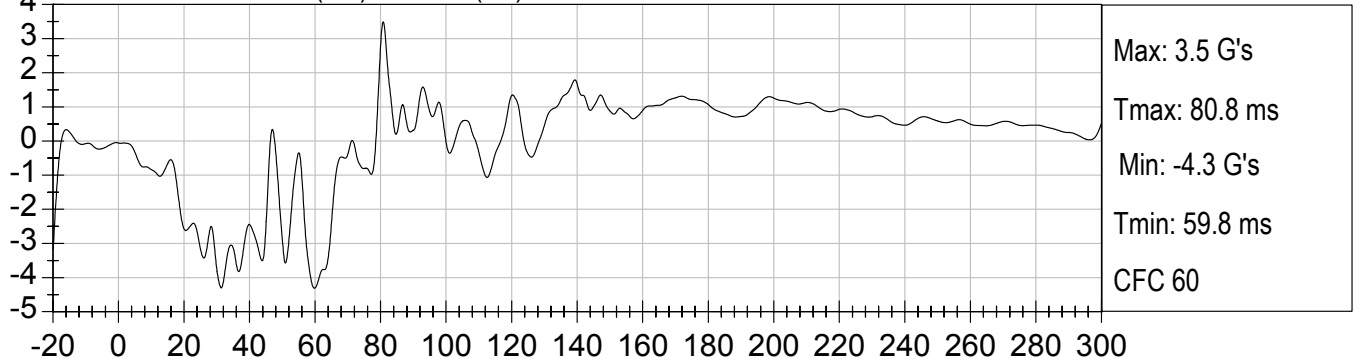
RIGHT FRONT SILL X (G's) vs TIME (ms)



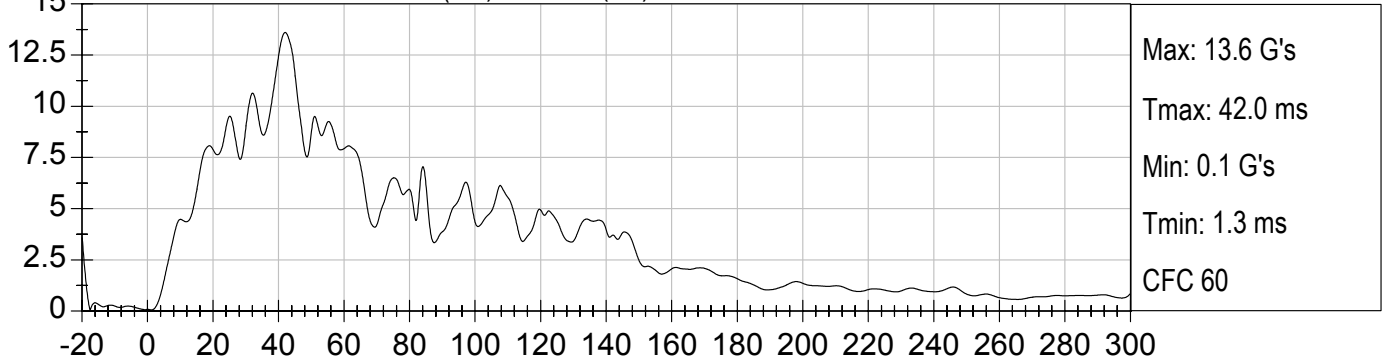
RIGHT FRONT SILL Y (G's) vs TIME (ms)



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

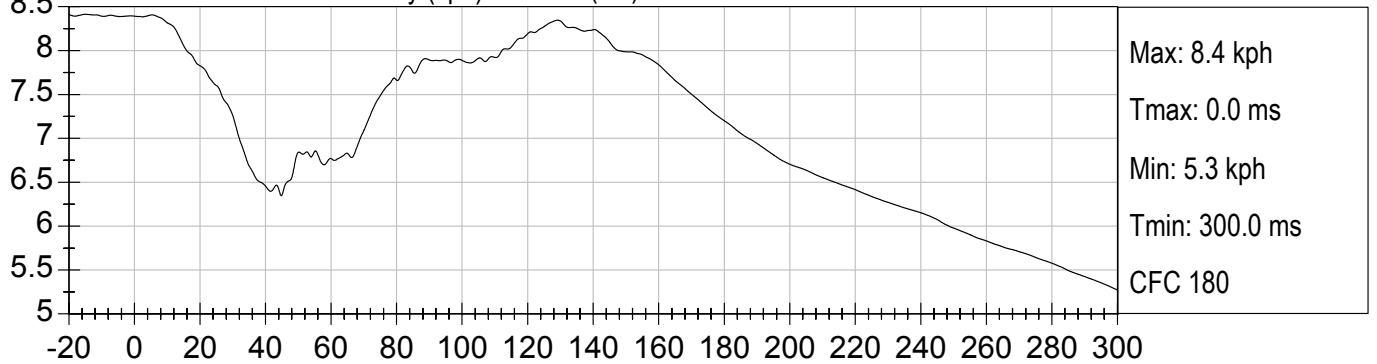


RIGHT FRONT SILL Resultant (G's) vs TIME (ms)

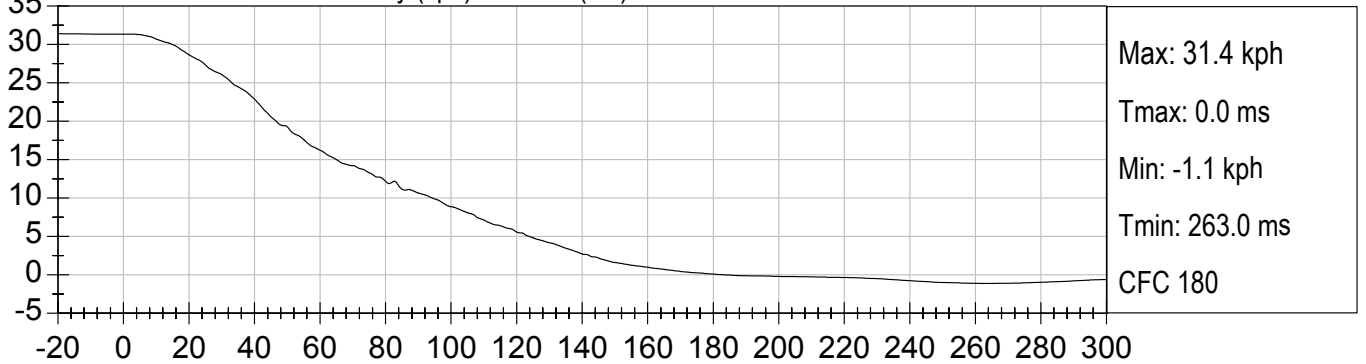




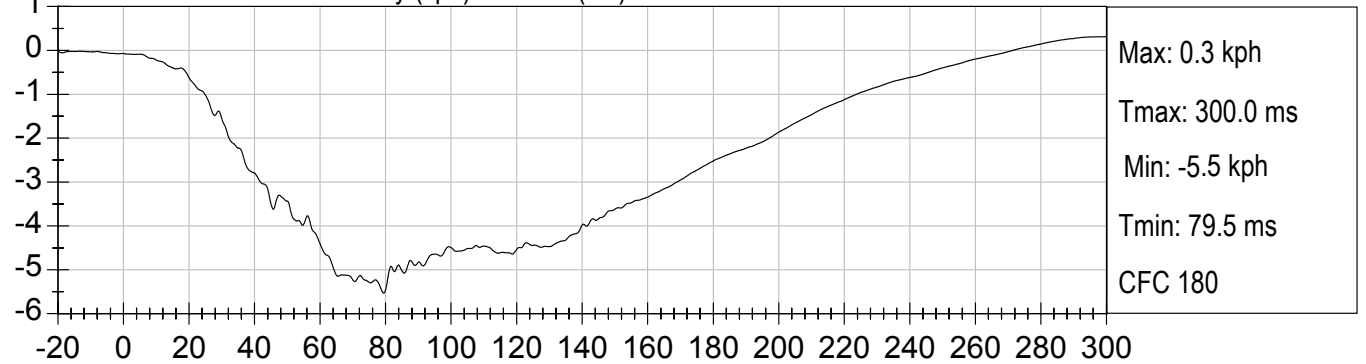
RIGHT FRONT SILL X Velocity (kph) vs TIME (ms)



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



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

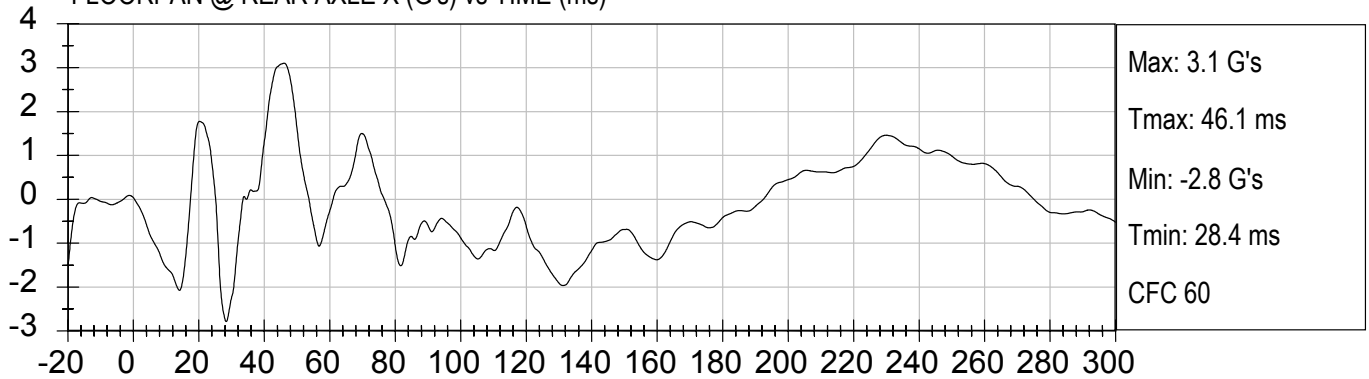




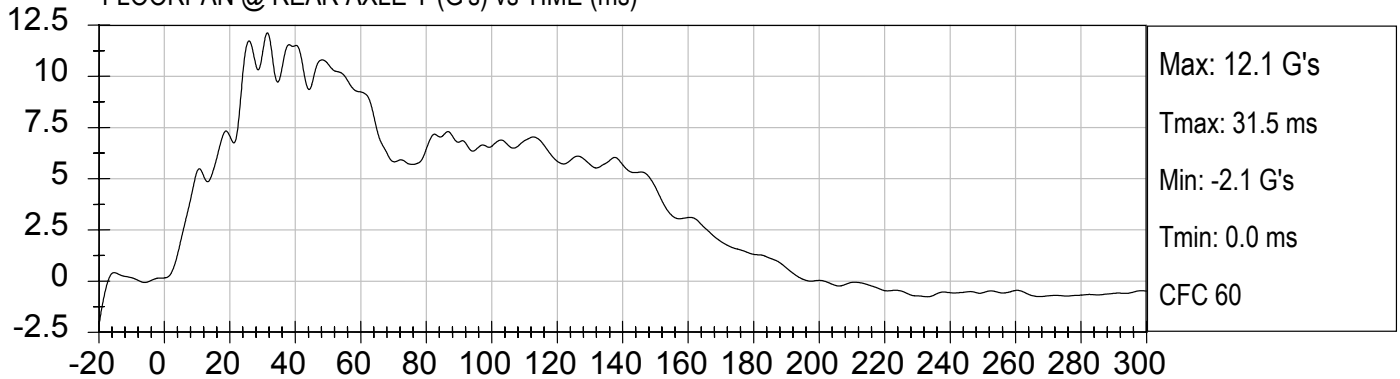
T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)

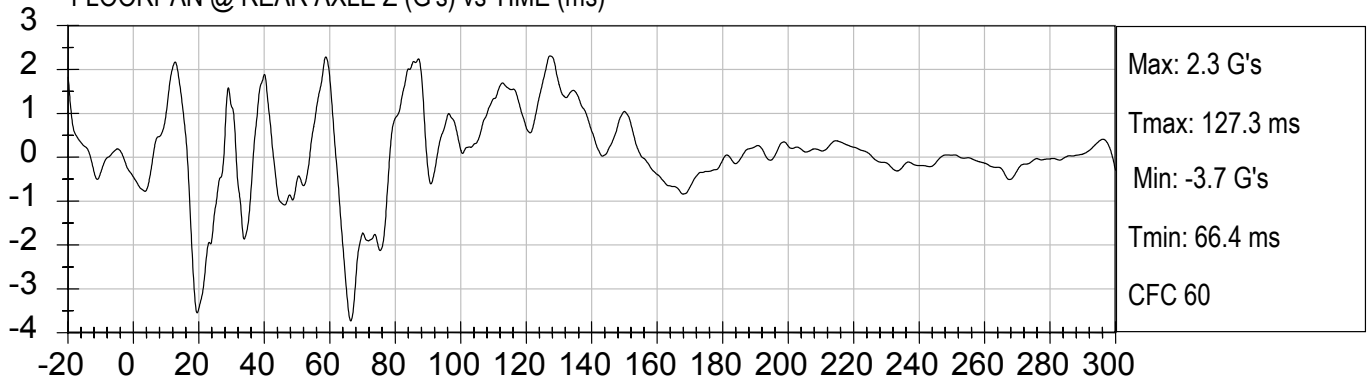
FLOORPAN @ REAR AXLE X (G's) vs TIME (ms)



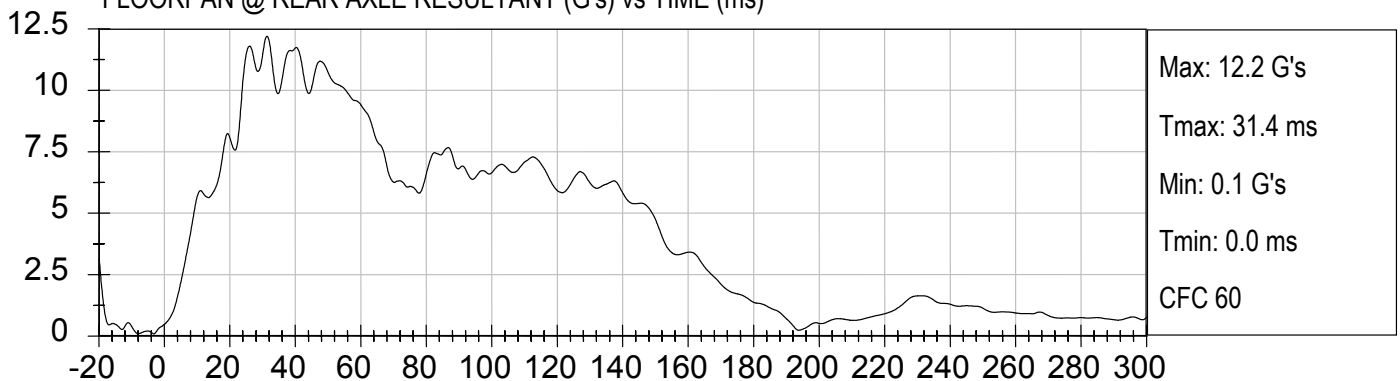
FLOORPAN @ REAR AXLE Y (G's) vs TIME (ms)

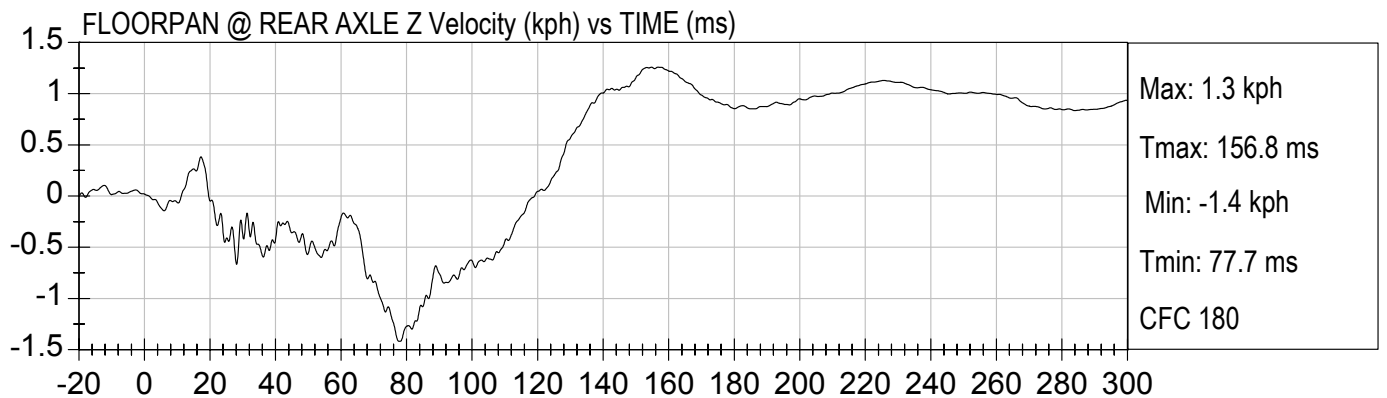
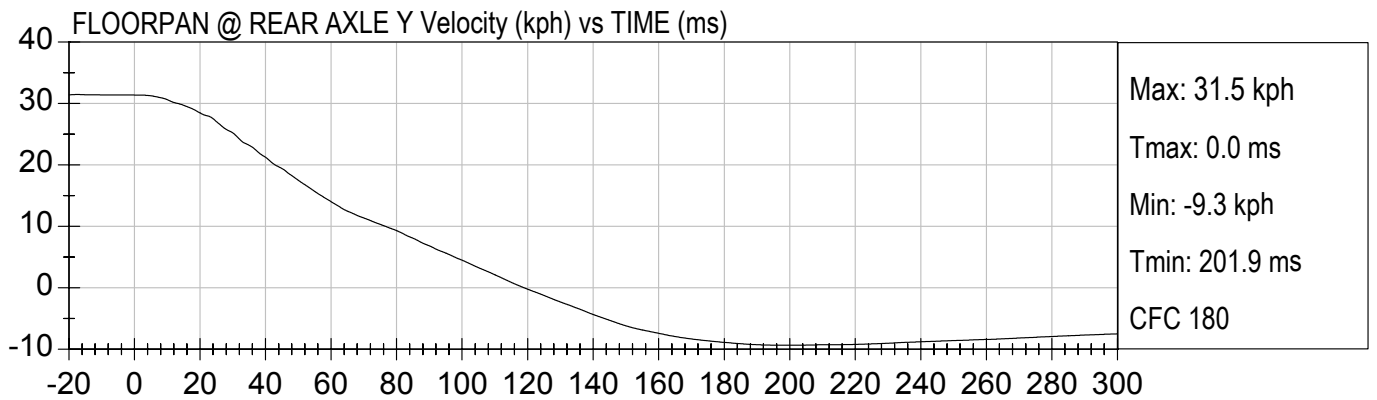
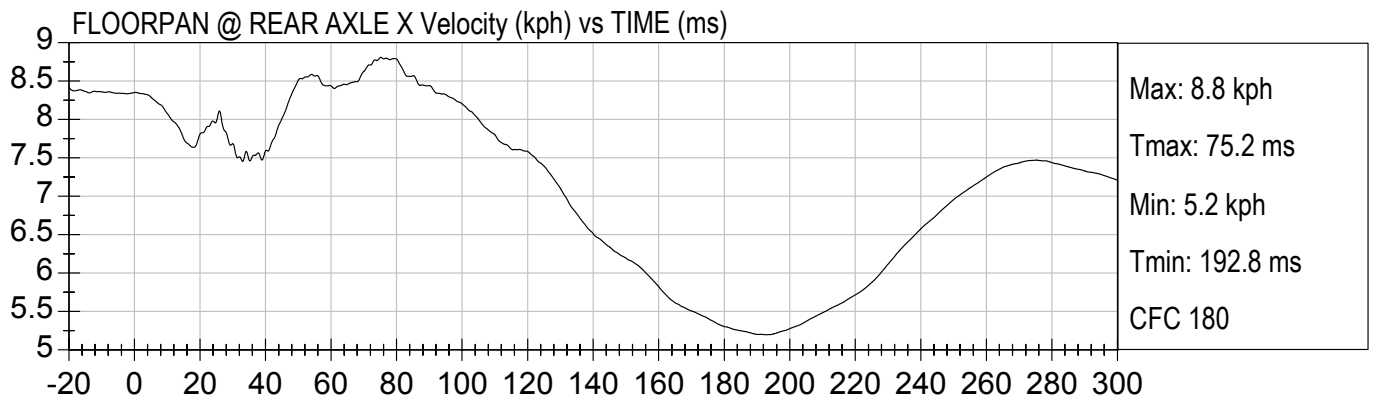


FLOORPAN @ REAR AXLE Z (G's) vs TIME (ms)



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

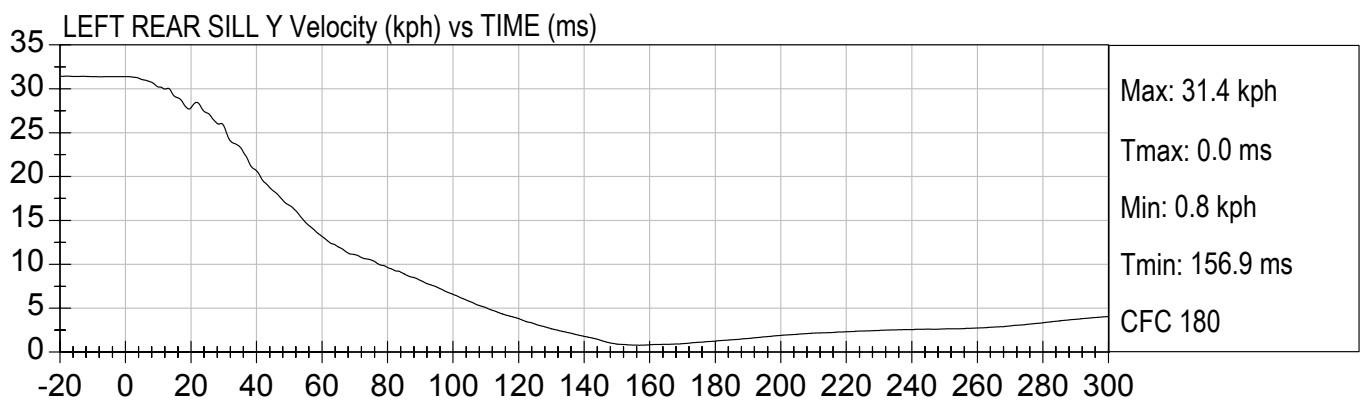
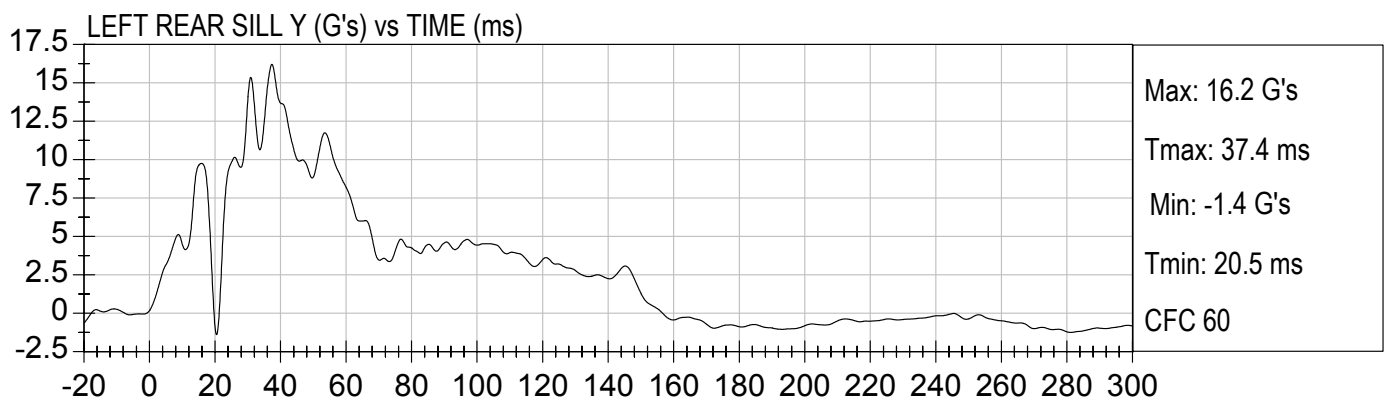
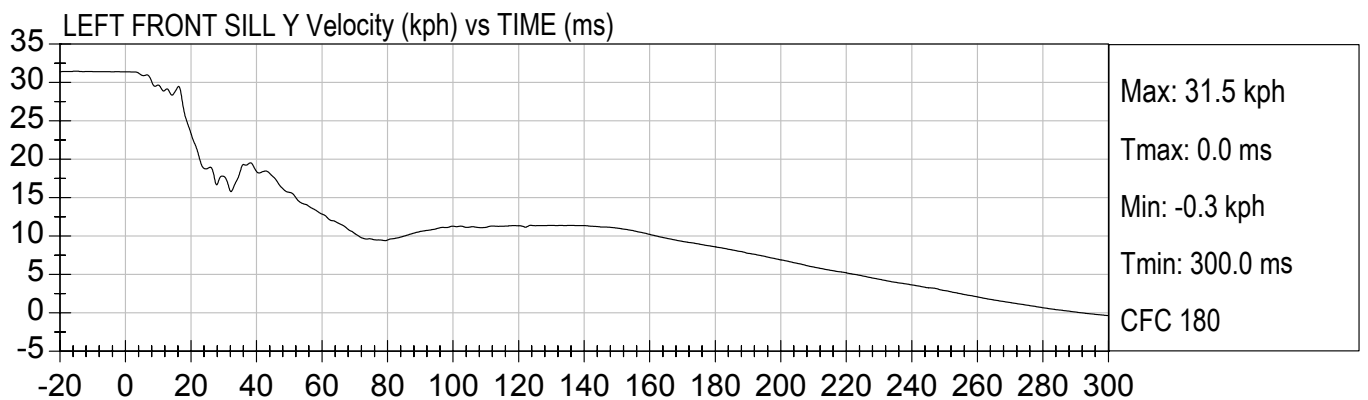
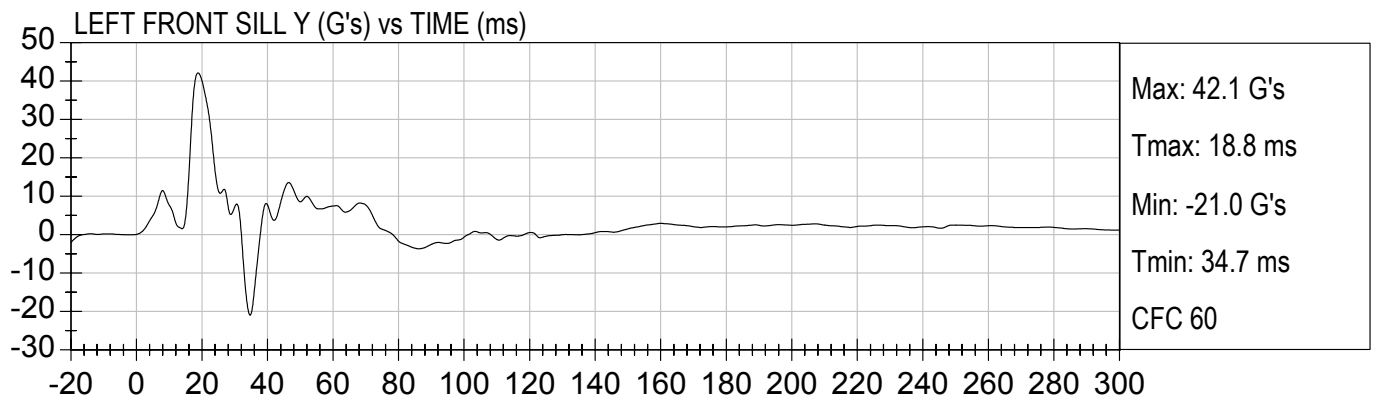


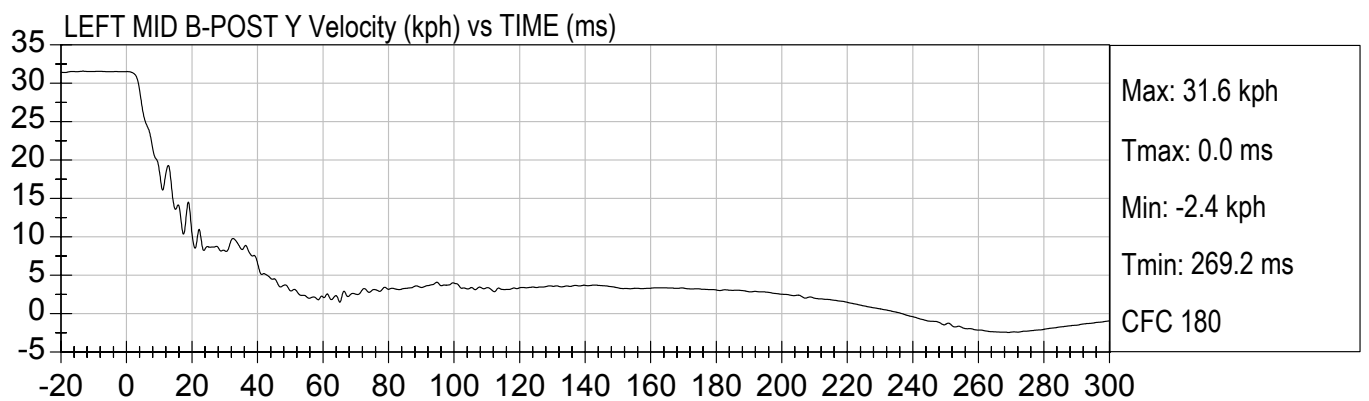
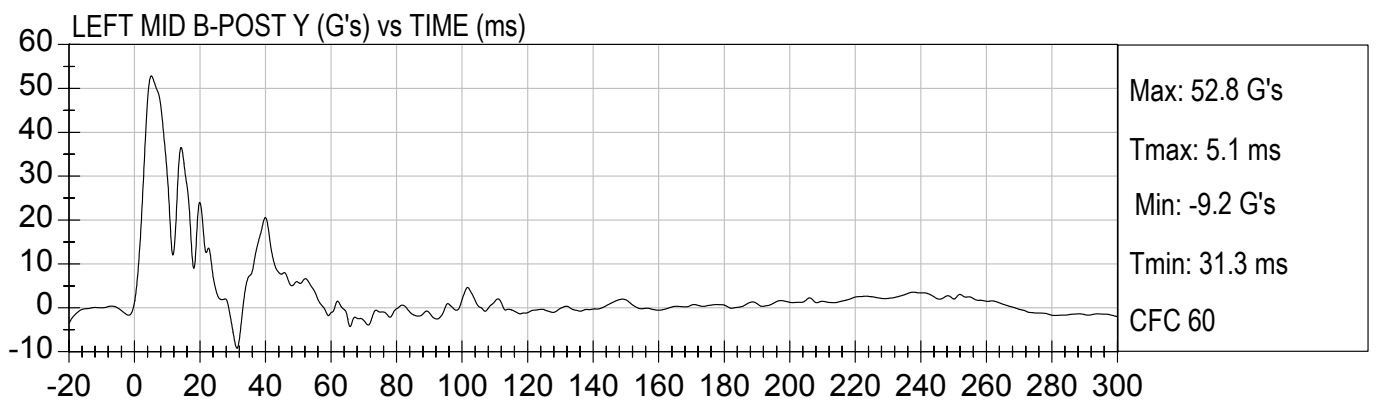
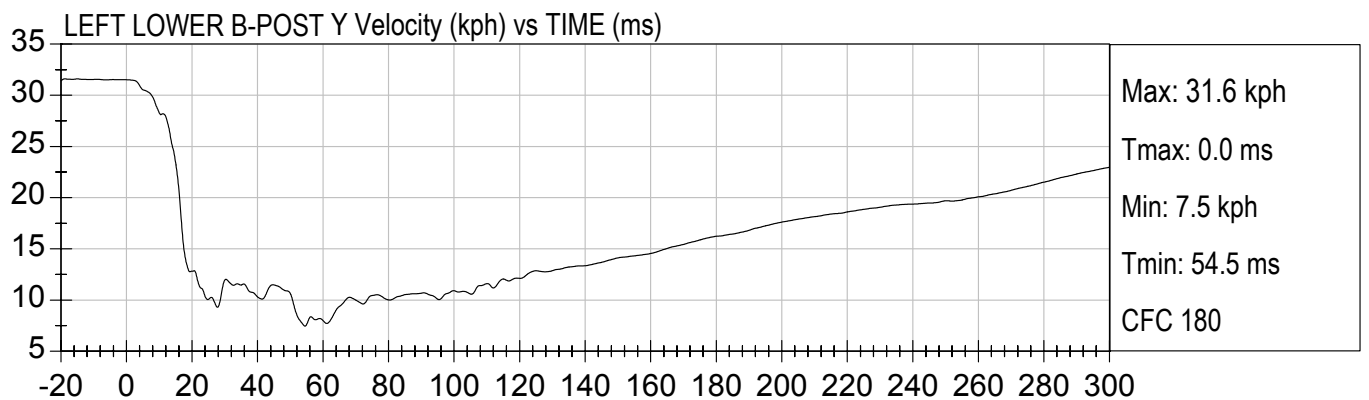
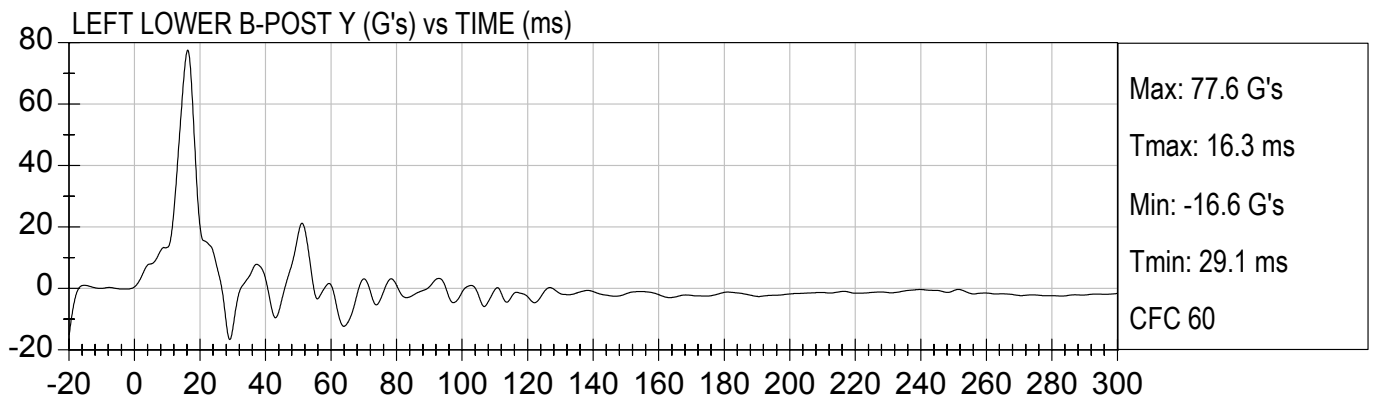




T.O 1 SIDE POLE OBLIQUE
2005 HONDA CRV (R55358)

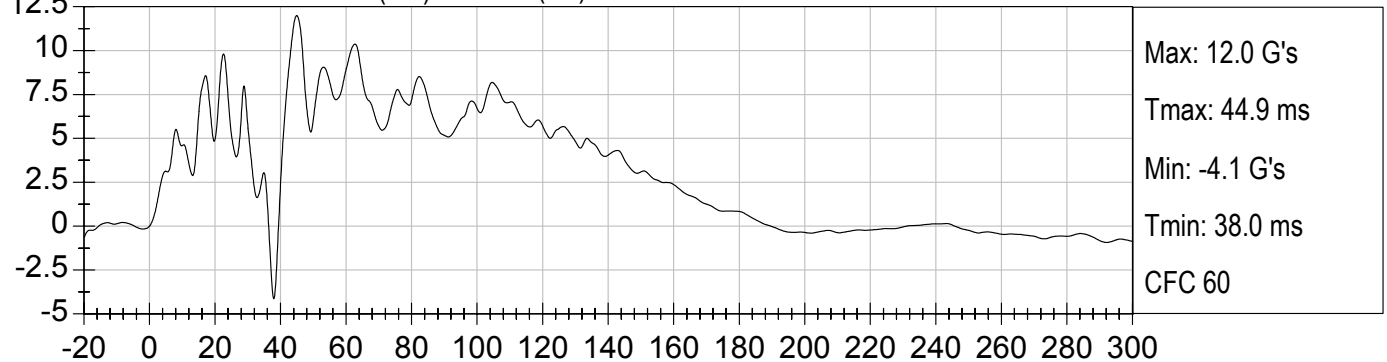
Test Date: 01/18/05
Speed: 20.2 mph (32.5 km/h)



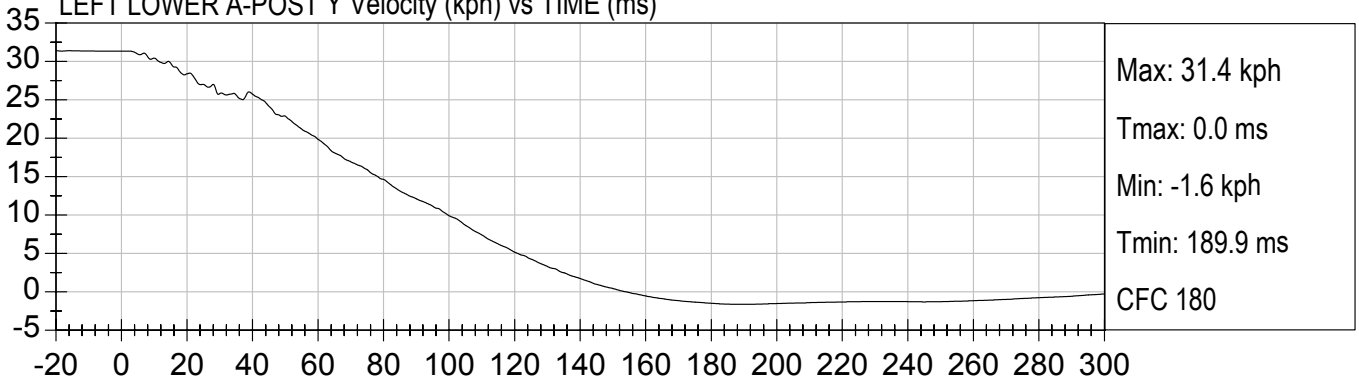




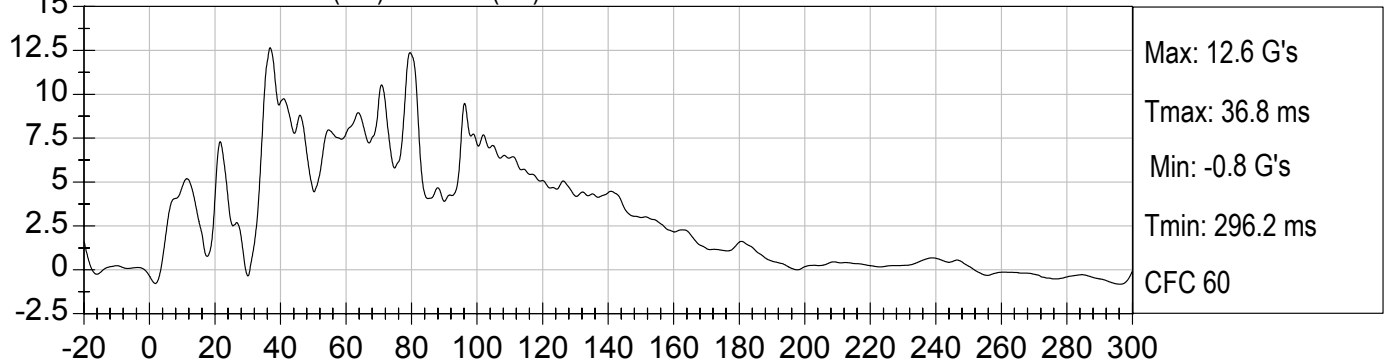
LEFT LOWER A-POST Y (G's) vs TIME (ms)



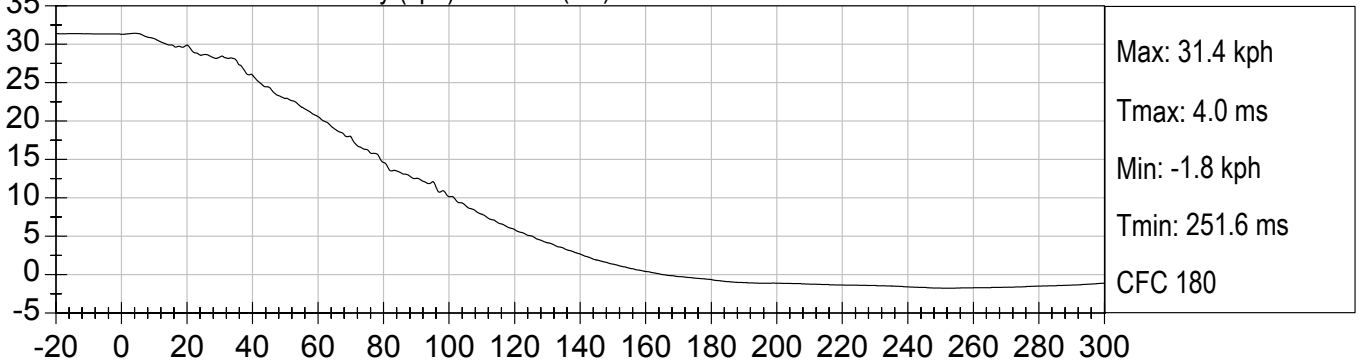
LEFT LOWER A-POST Y Velocity (kph) vs TIME (ms)

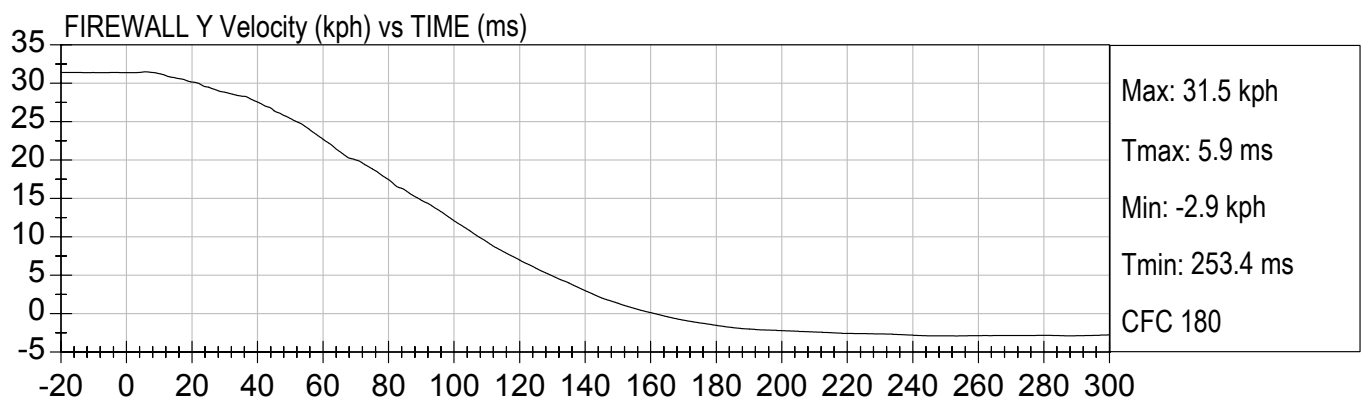
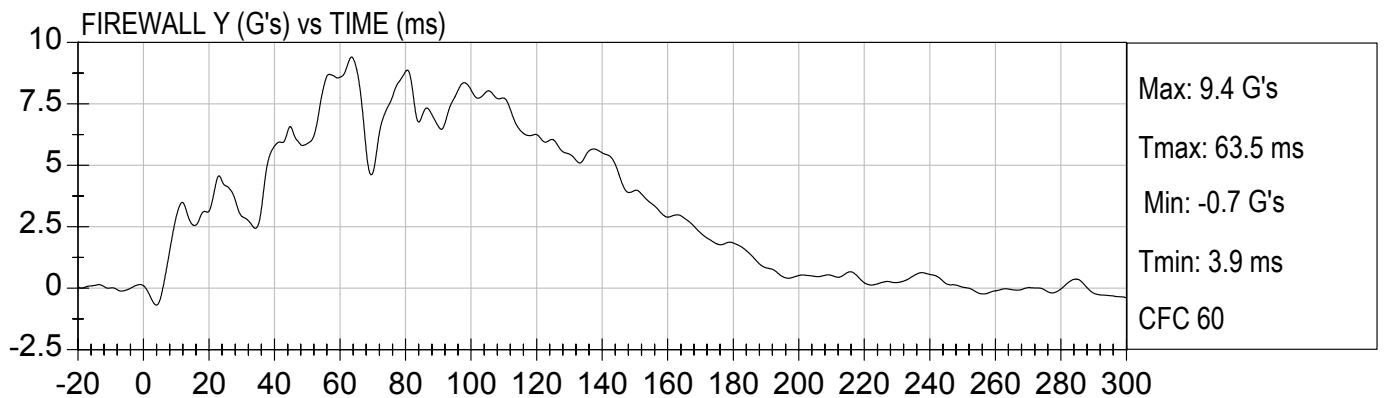
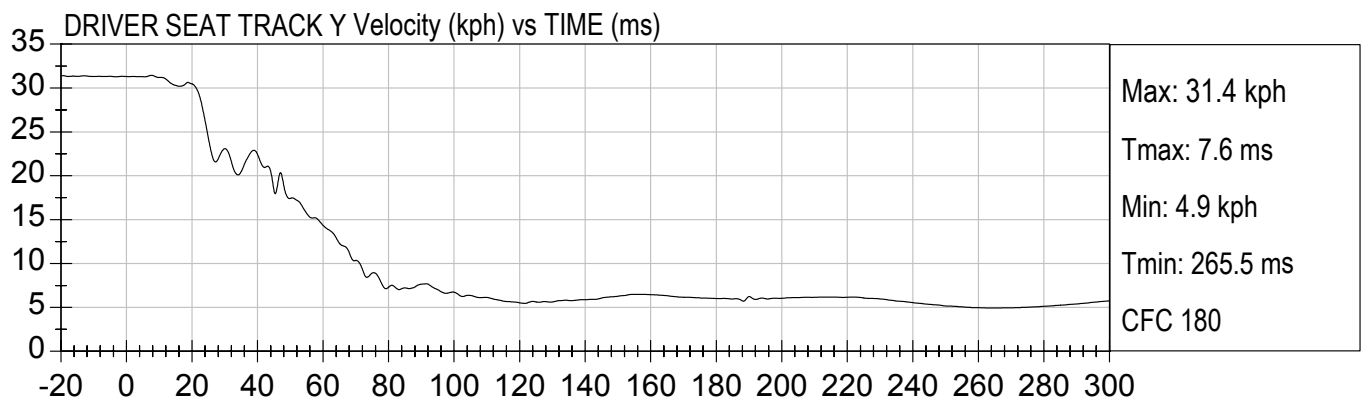
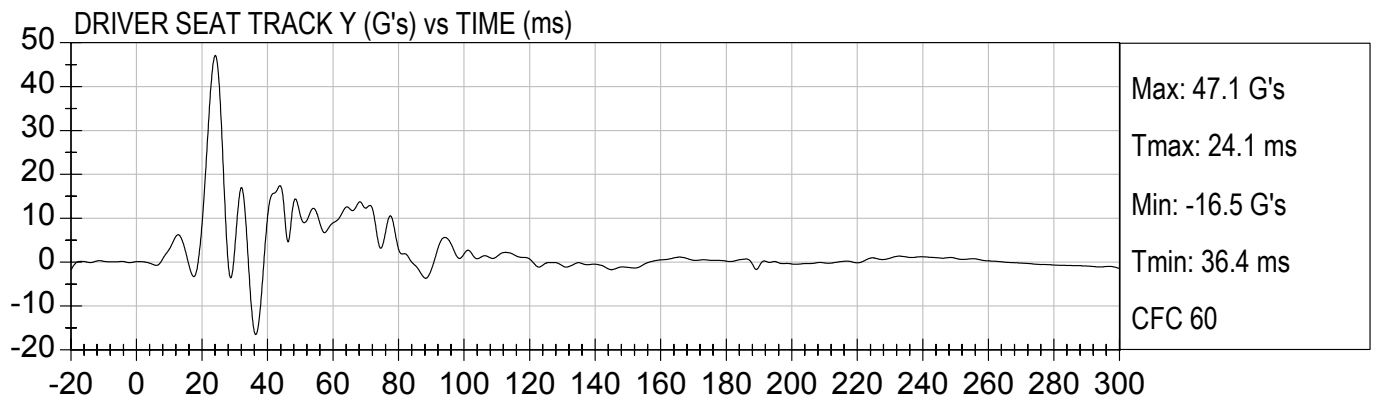


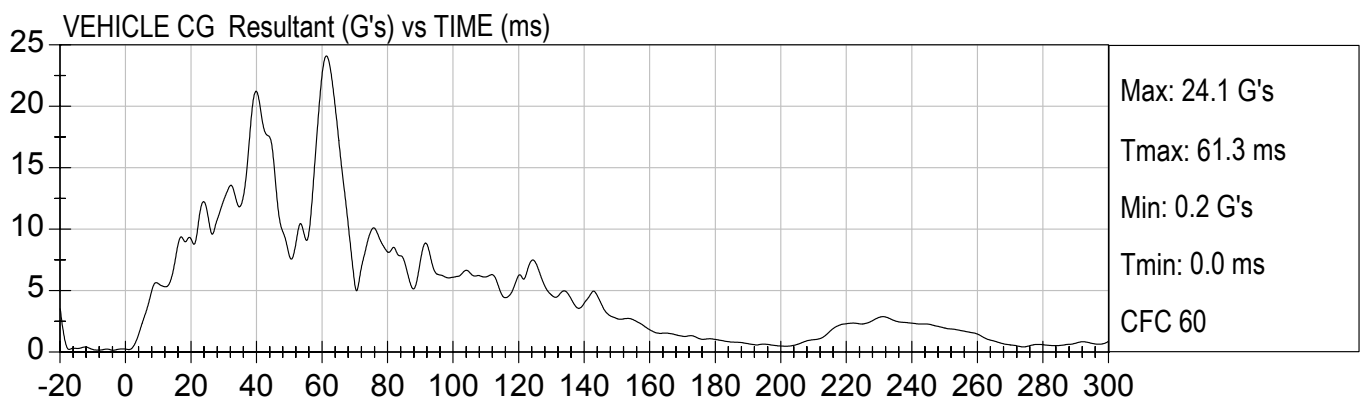
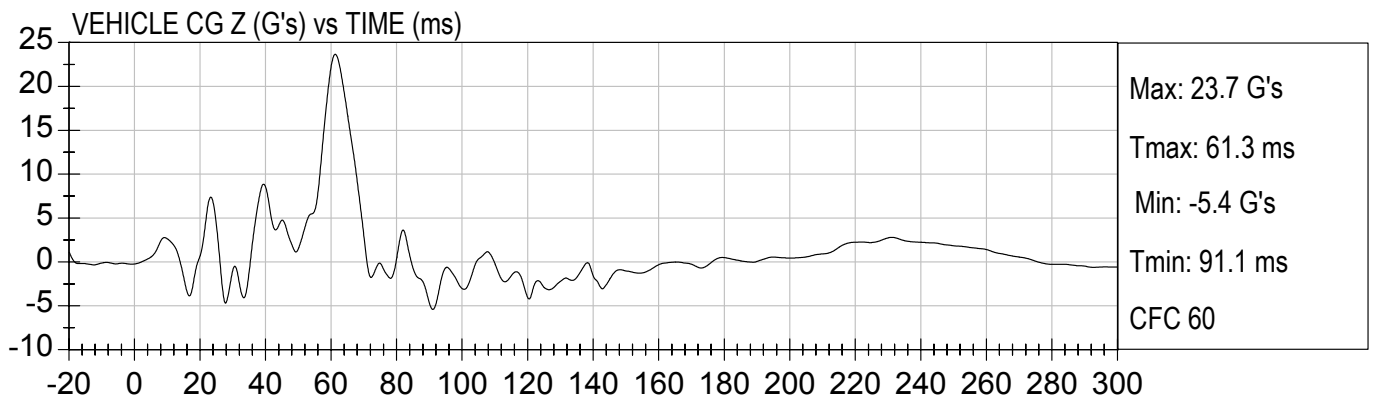
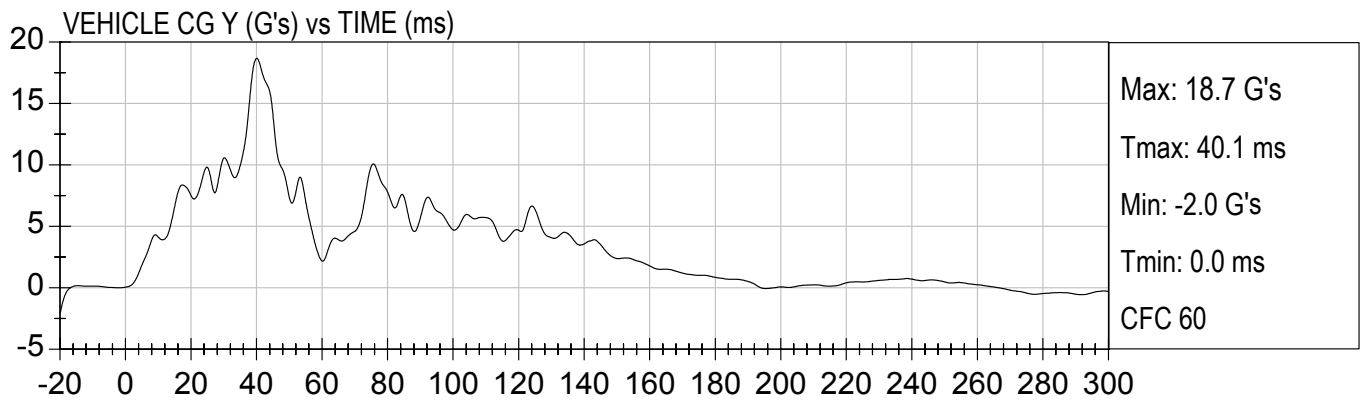
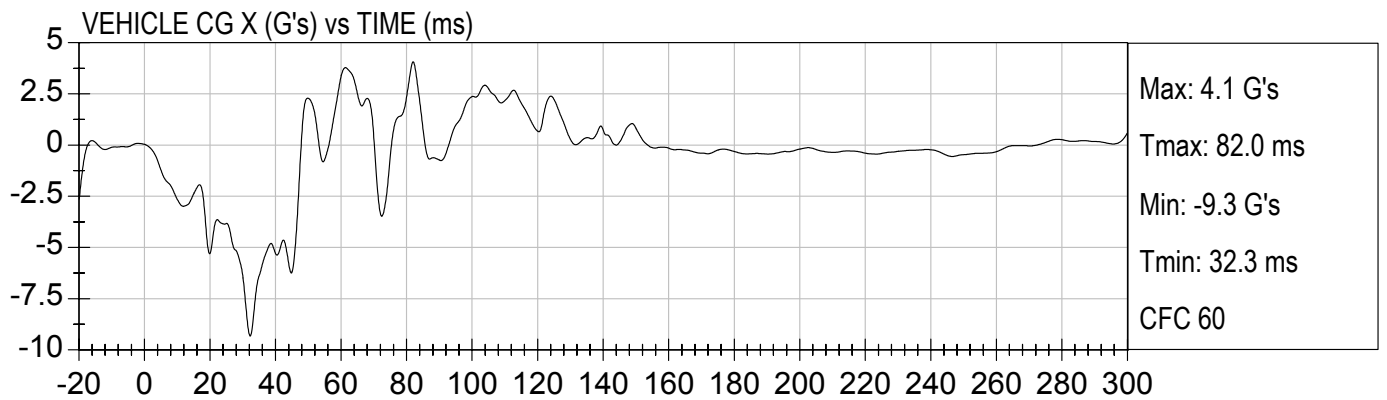
LEFT MID A-POST Y (G's) vs TIME (ms)



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

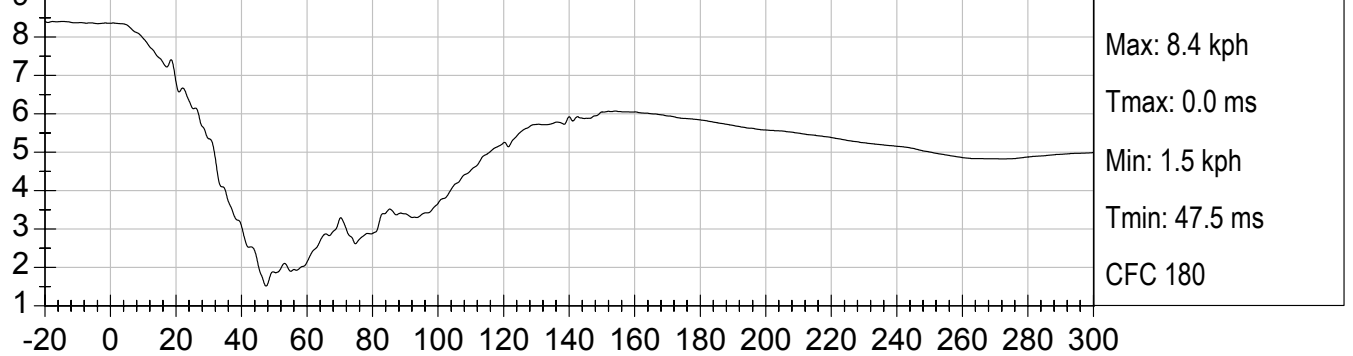




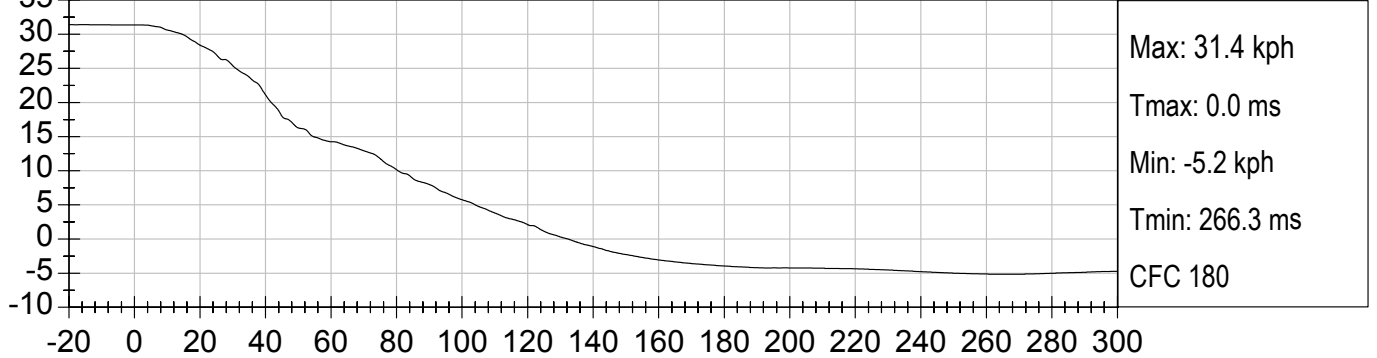




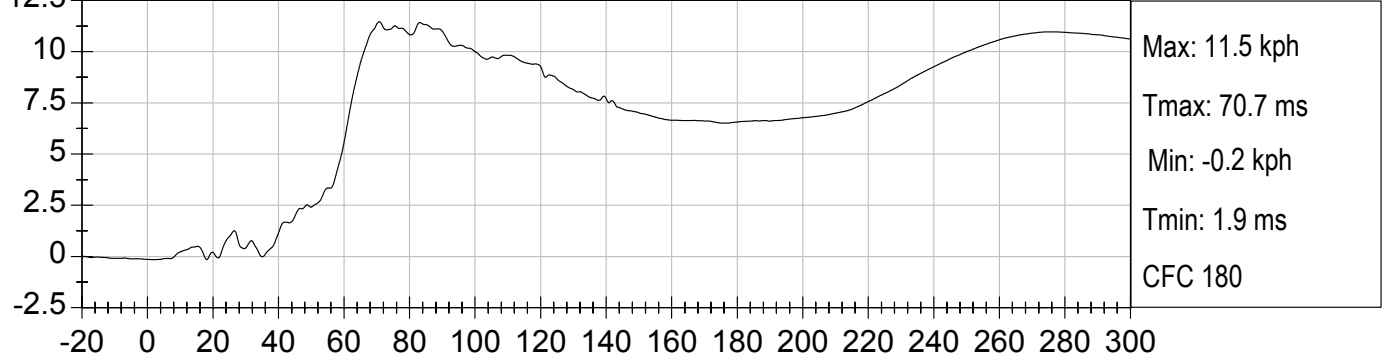
9 VEHICLE CG X Velocity (kph) vs TIME (ms)

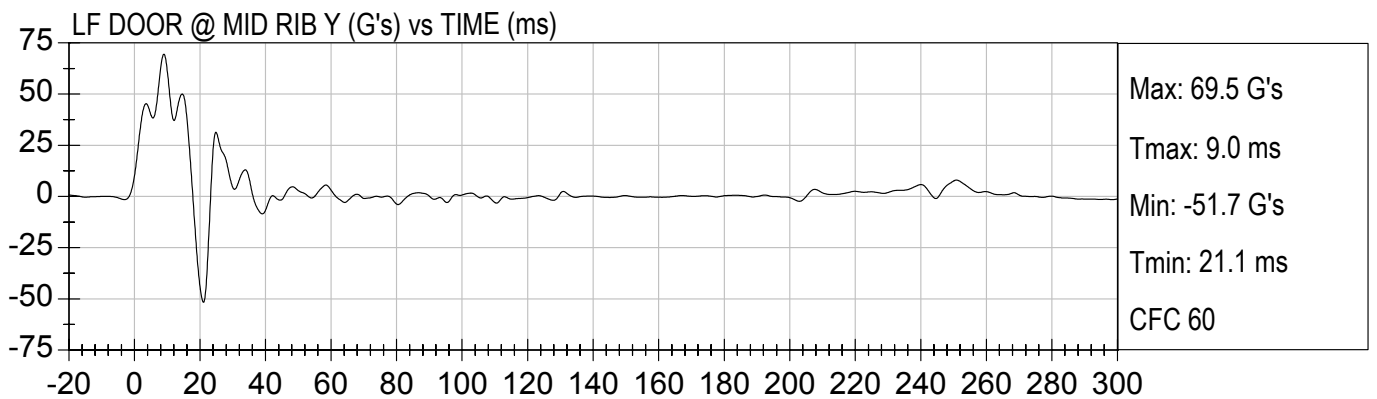
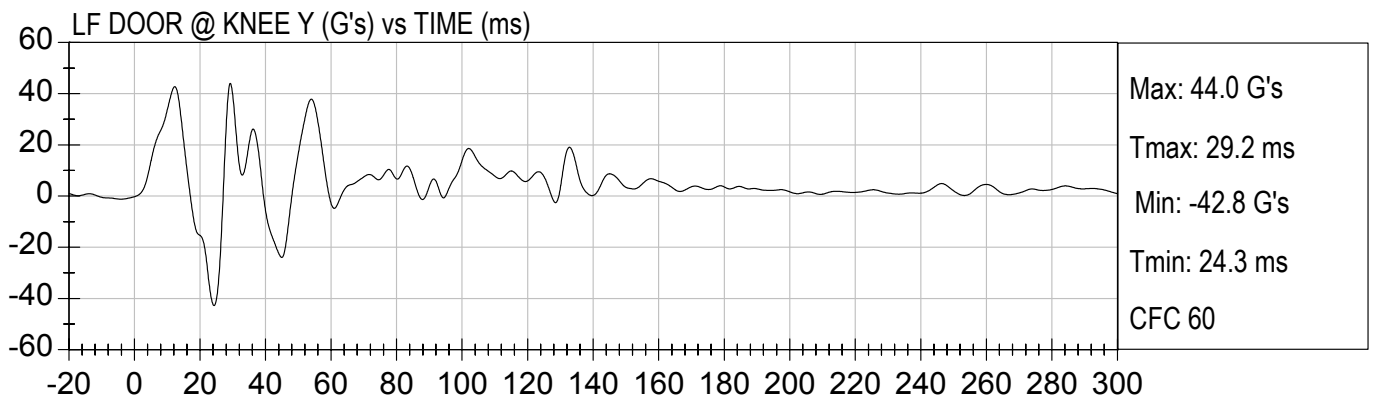
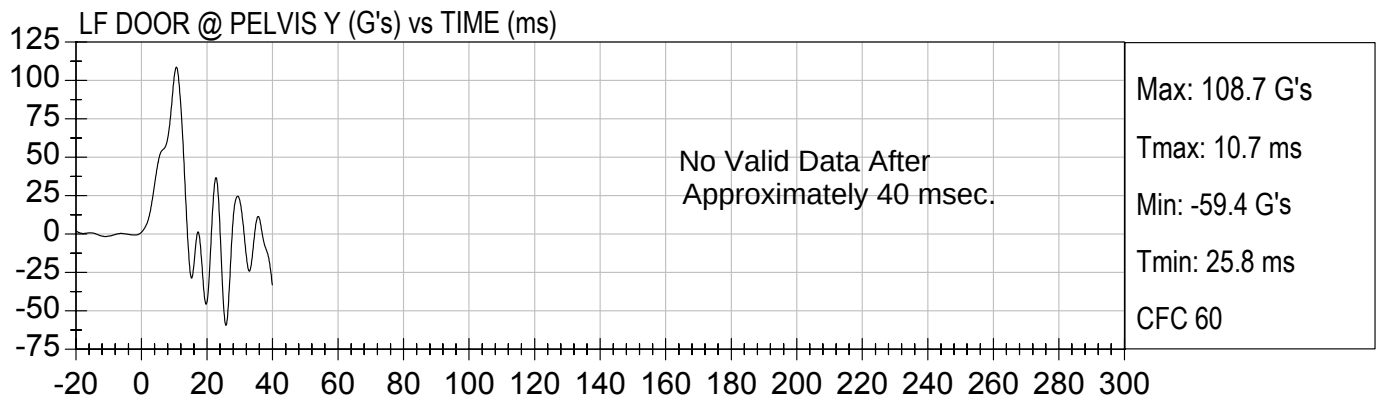
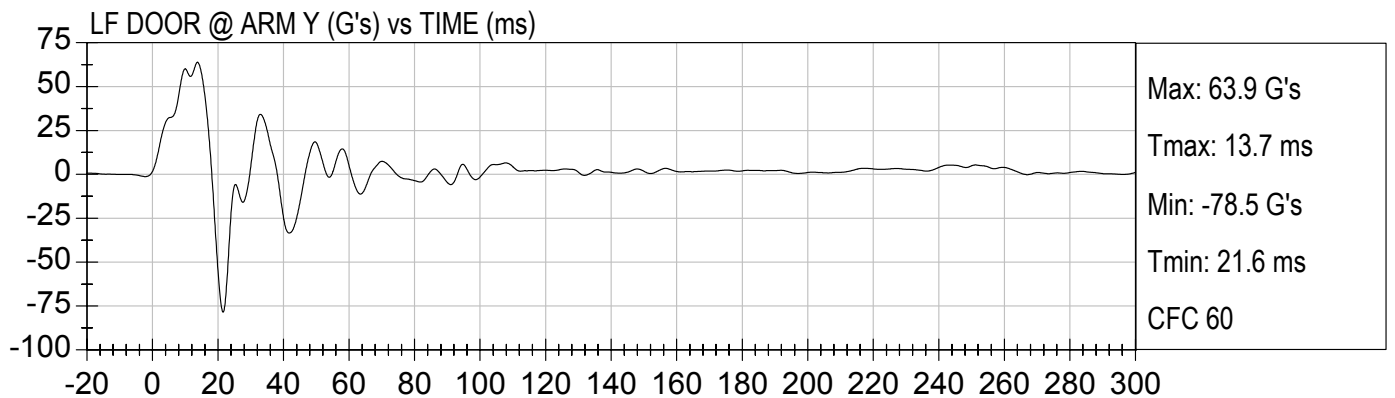


35 VEHICLE CG Y Velocity (kph) vs TIME (ms)



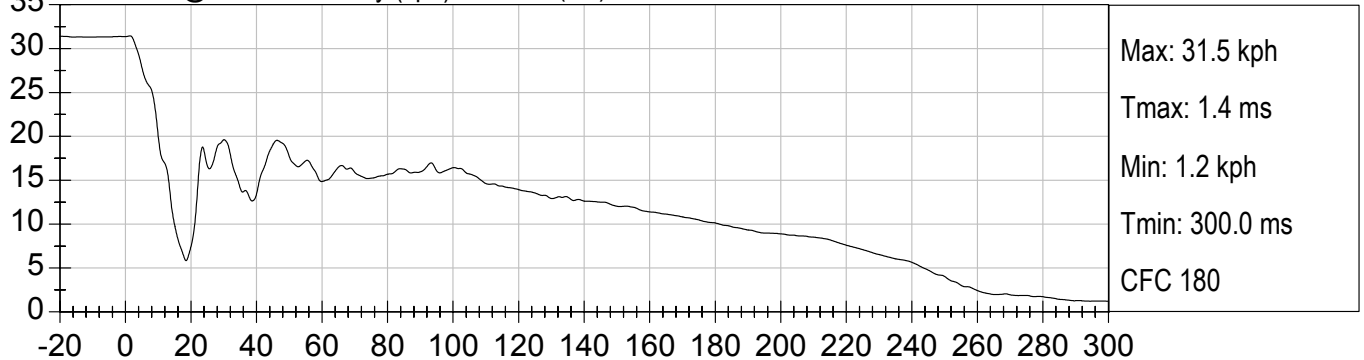
12.5 VEHICLE CG Z Velocity (kph) vs TIME (ms)



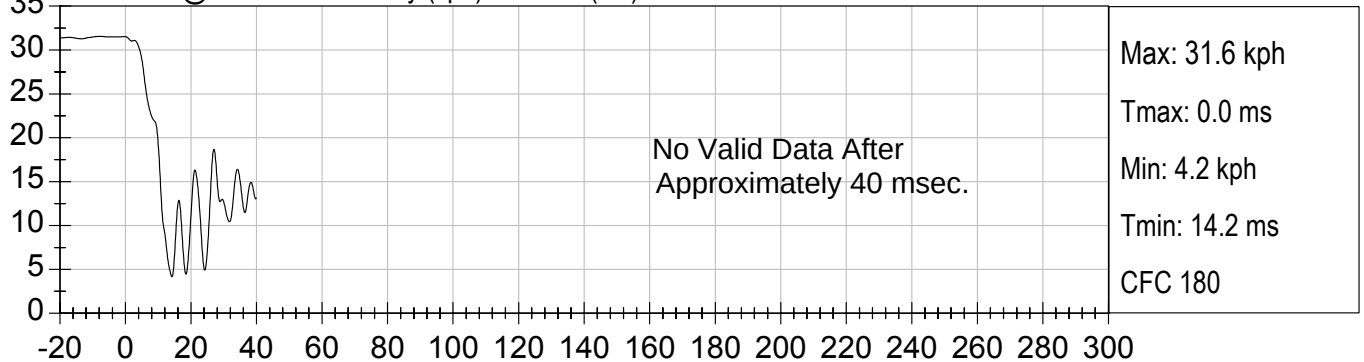




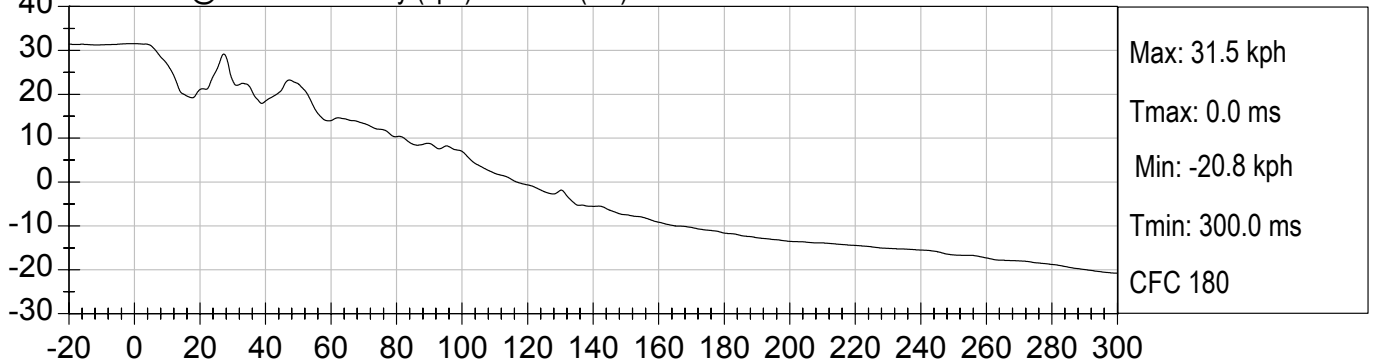
LF DOOR @ ARM Y Velocity (kph) vs TIME (ms)



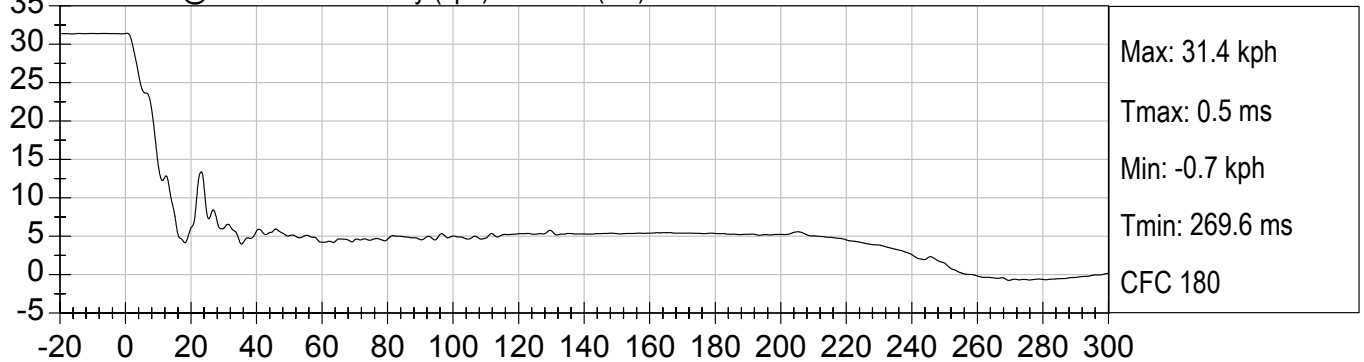
LF DOOR @ PELVIS Y Velocity (kph) vs TIME (ms)

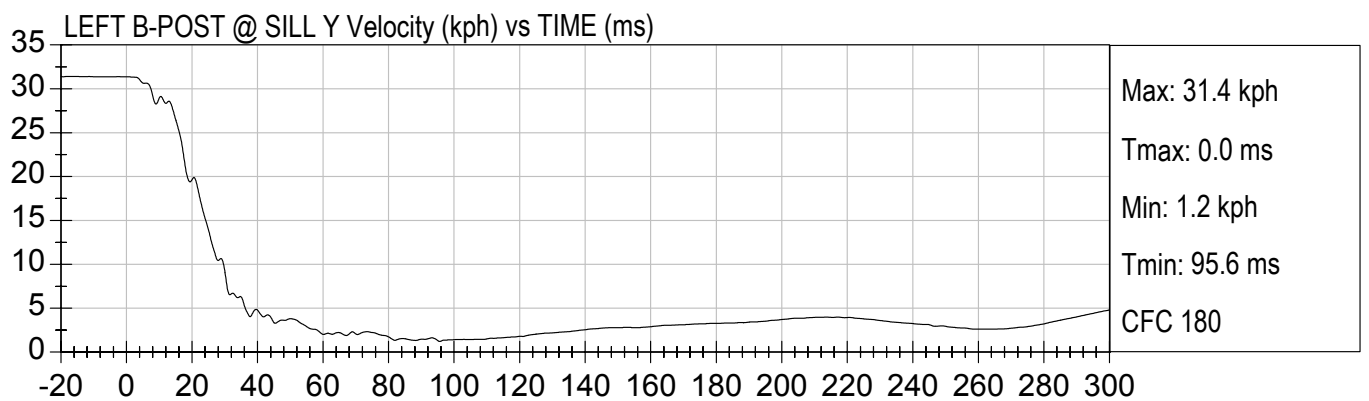
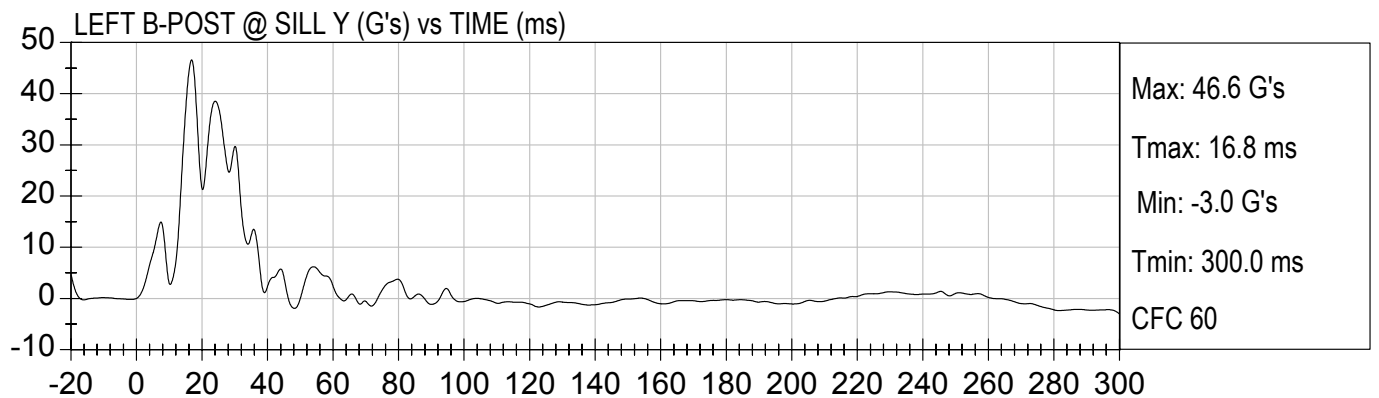
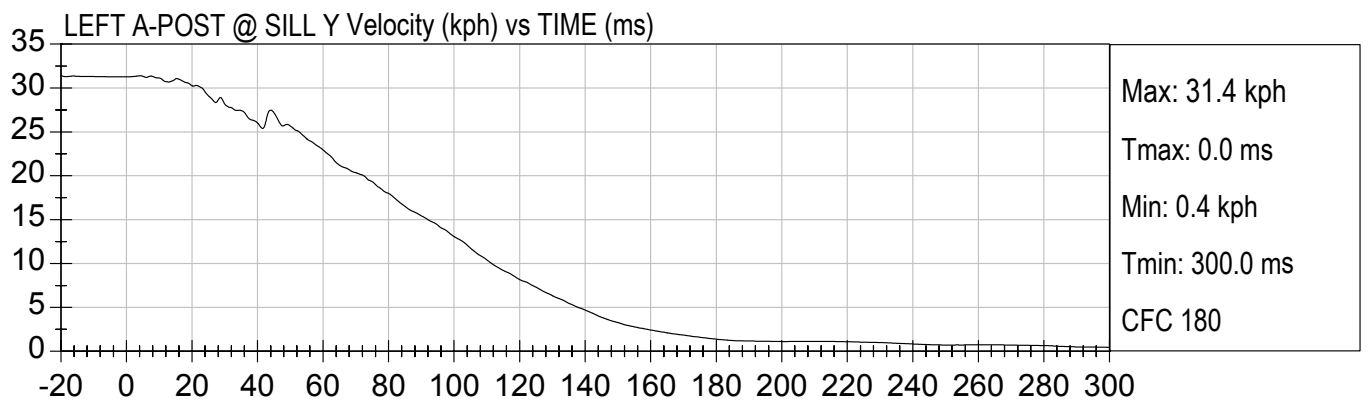
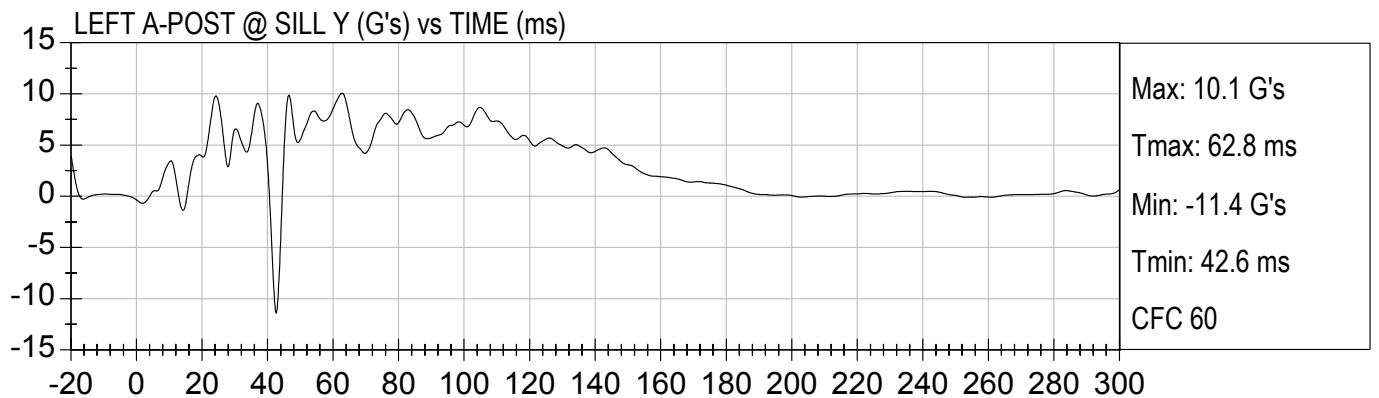


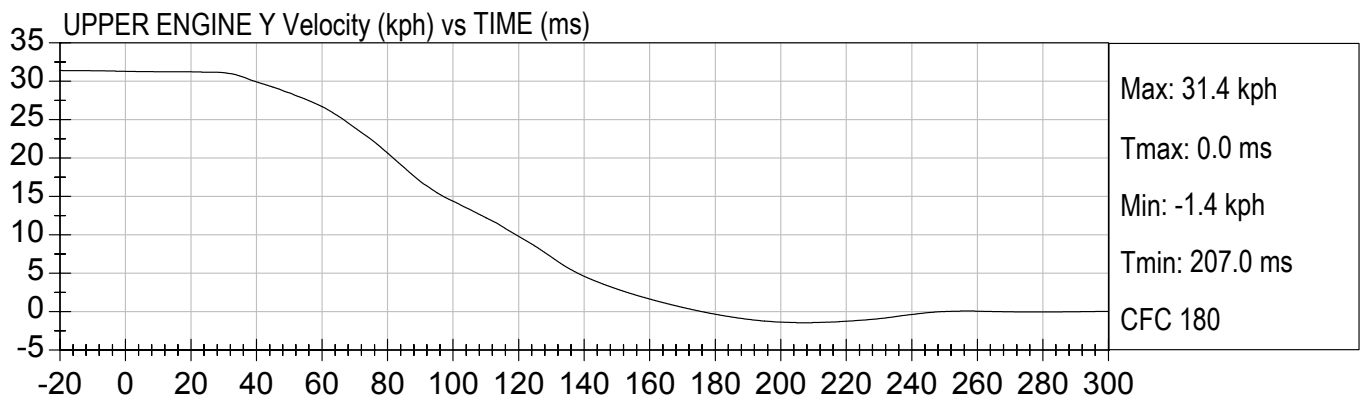
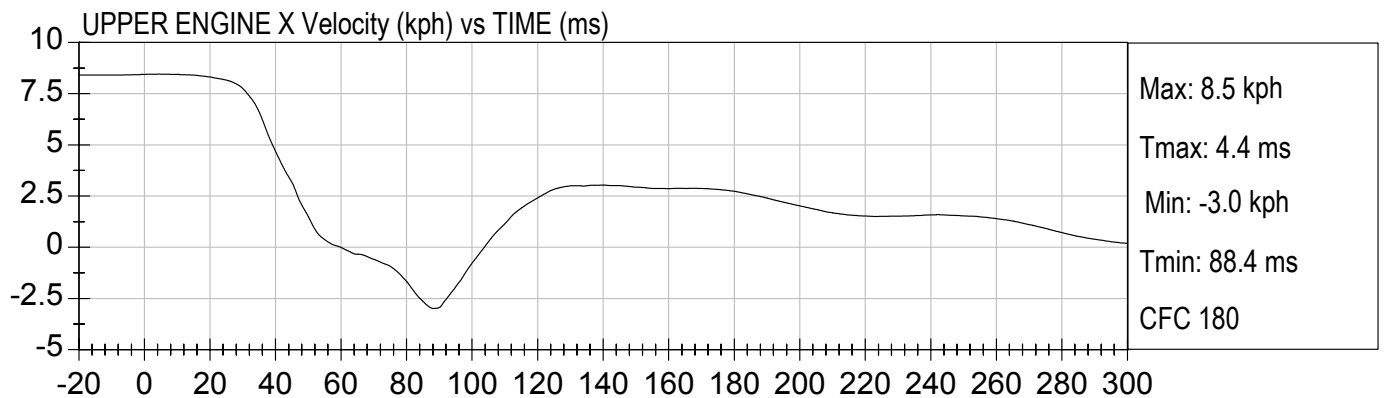
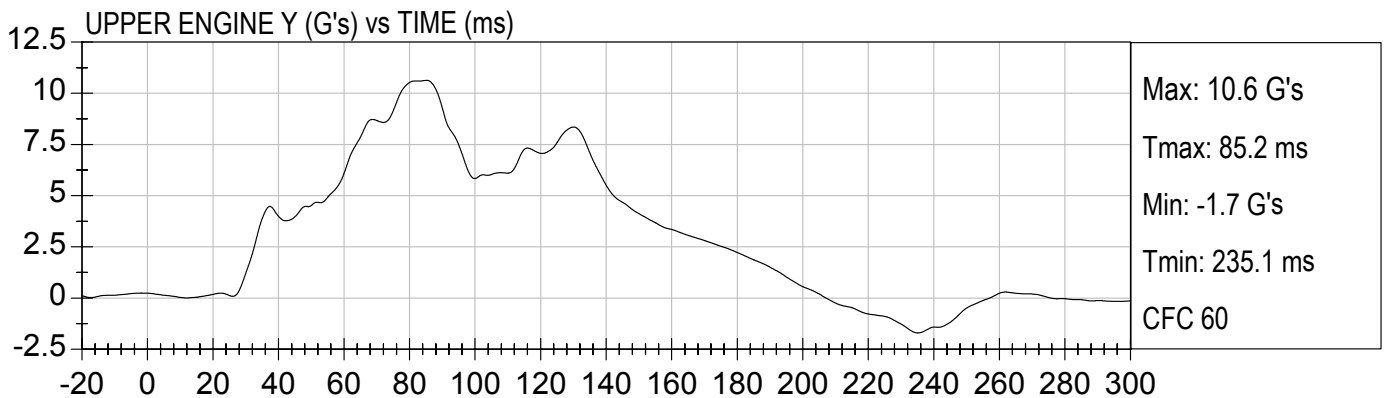
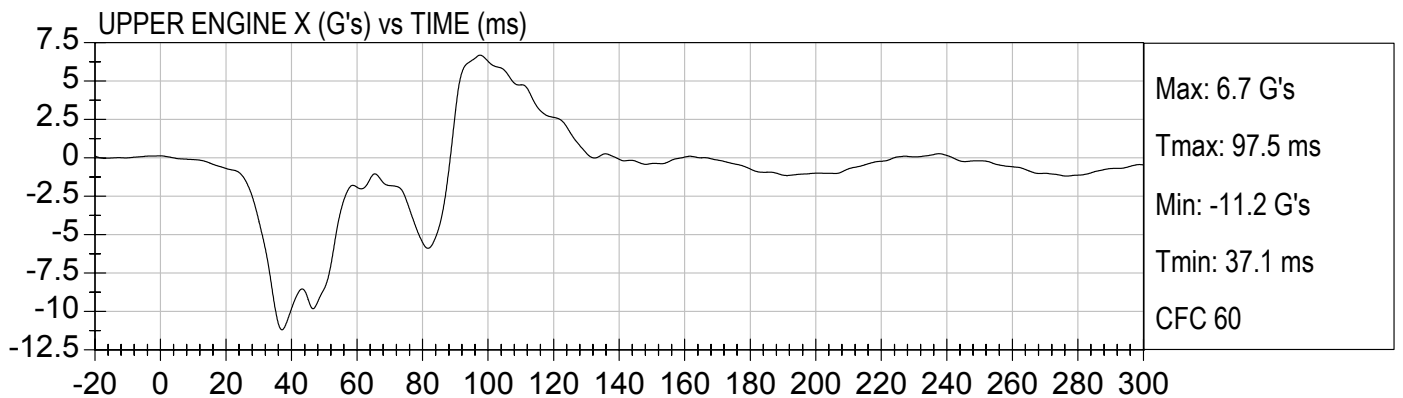
LF DOOR @ KNEE Y Velocity (kph) vs TIME (ms)

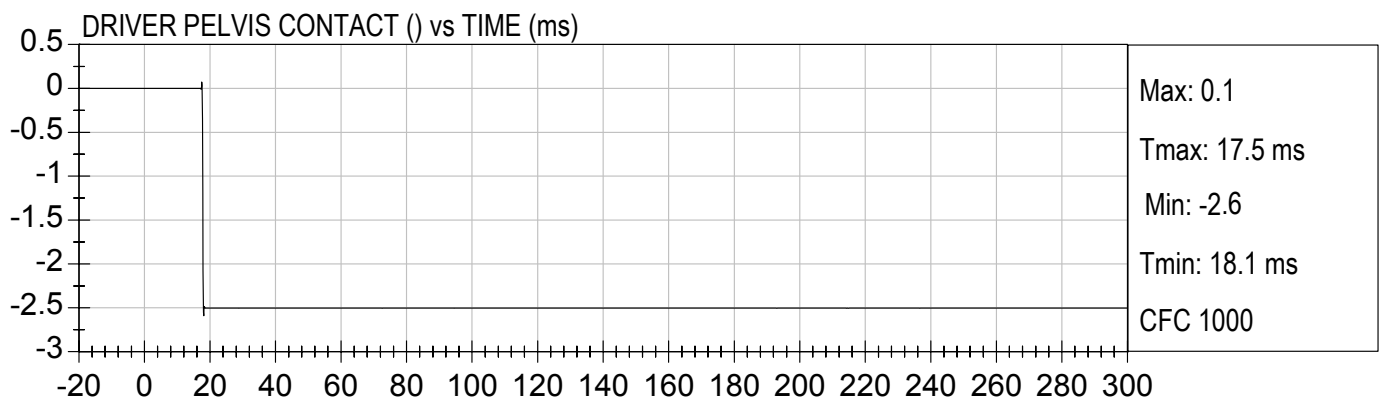
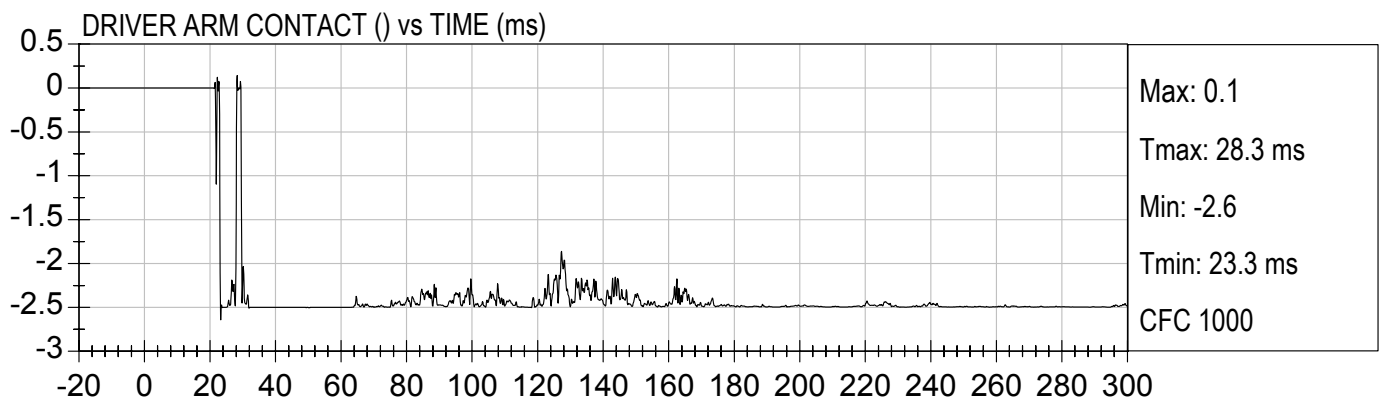
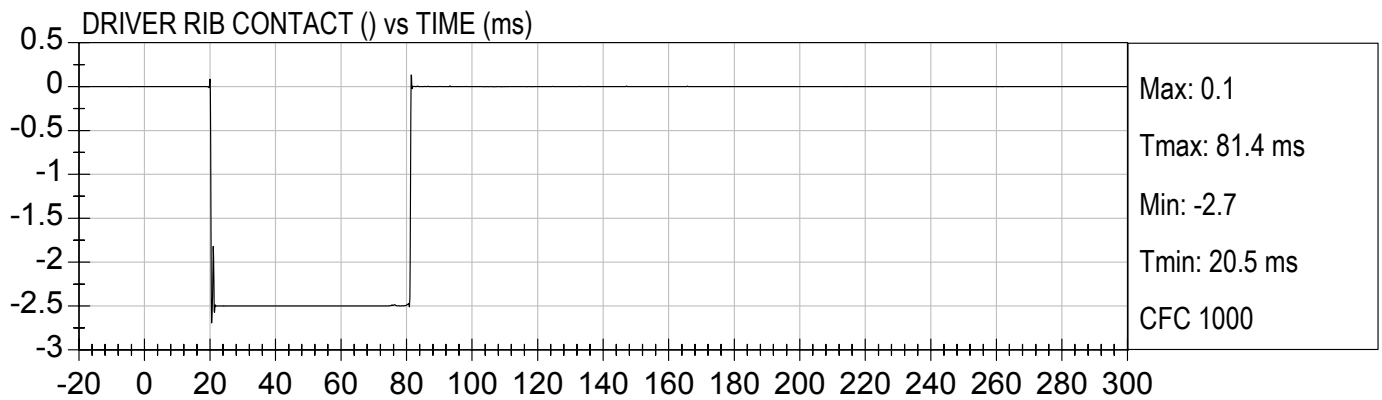


LF DOOR @ MID RIB Y Velocity (kph) vs TIME (ms)









APPENDIX C

ES-2RE 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: 1/3/05
Dummy Serial Number: 009
Test Number: D05001

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.9
Relative Humidity (%)	10 – 70	24
Peak Resultant Acceleration	100 – 150 g's	142.8
Time of Max. Res. Acceleration	msec	38.3

TEST MEETS SPECIFICATIONS

Technician: Jessica Gall

Approved By: David Winkelbauer

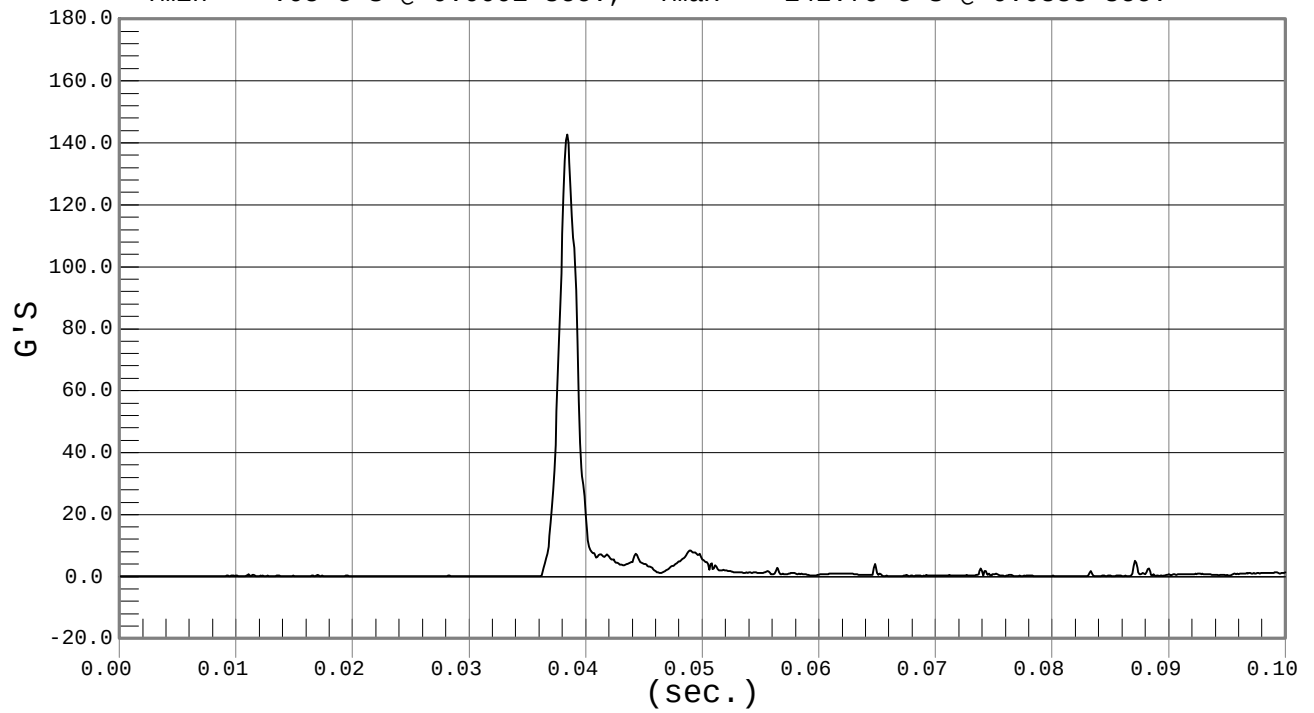


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #009

Test Date: 01-03-05
Speed: 0.0 fps, 0.00 M/s

Ymin = .05 G'S @ 0.0001 sec., Ymax = 142.79 G'S @ 0.0383 sec.



MGA RESEARCH CORPORATION
NECK PENDULUM TEST
EUROSID 2 DUMMY

Date: 1/4/05
Dummy Serial Number: 009
Test Number: D05002

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.5
Relative Humidity (%)		10 – 70	20
Pendulum Speed		3.3 - 3.5	3.4
Pendulum Deceleration	3 msec	1.25 - 1.53 m/sec	-.36
	8 msec	1.59 - 2.04 m/sec	-1.89
	14 msec	3.20 - 3.85 m/sec	-3.49
Maximum Flexion Angle		49.0 – 59.0 deg	56.2
Time of Max. Flexion Angle		54.0 – 66.0 ms	60.4
Maximum Angle Theta (A)		32.0 – 37.0 deg	34.6
Time of Max. Theta (A)		53.0 – 63.0 ms	59.2
Maximum Angle Theta (B)		29.75 – 32.25 deg	30.8
Time of Max. Theta (B)		54.0 – 64.0 ms	61.2

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

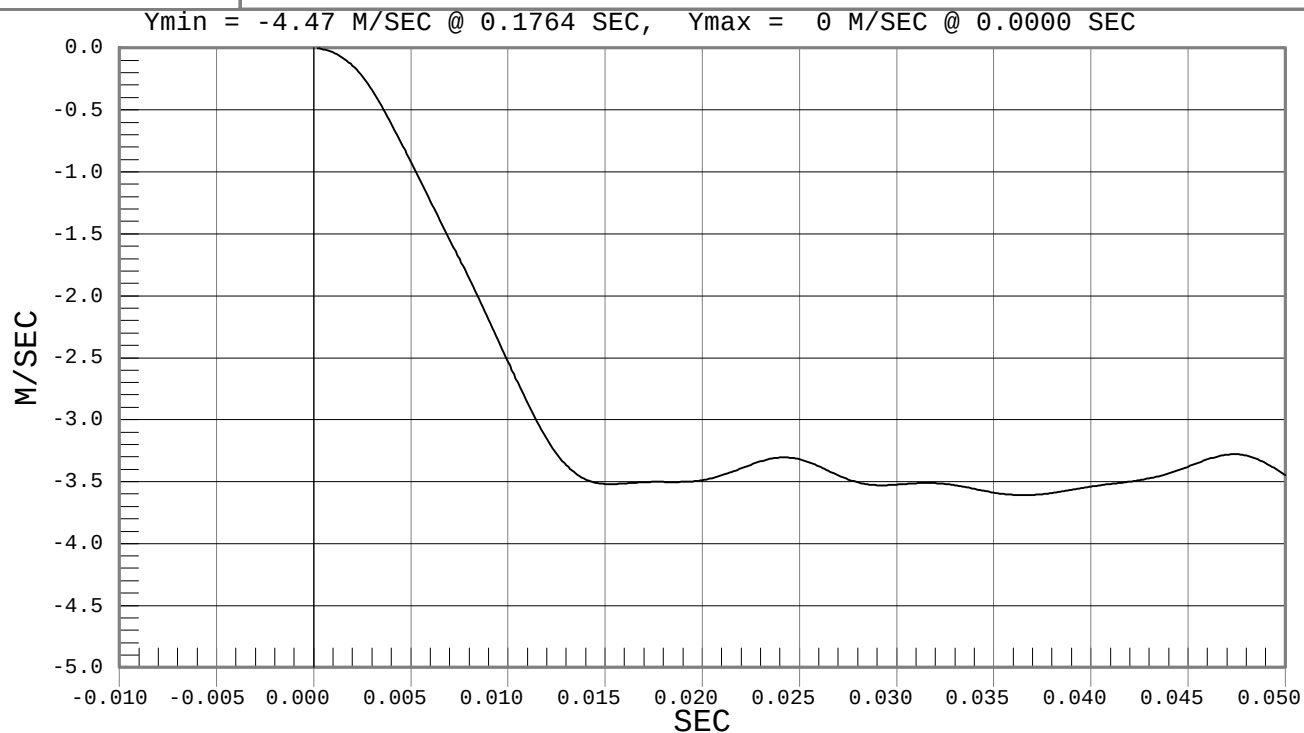
Approved By: David Winkelbauer



PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #009

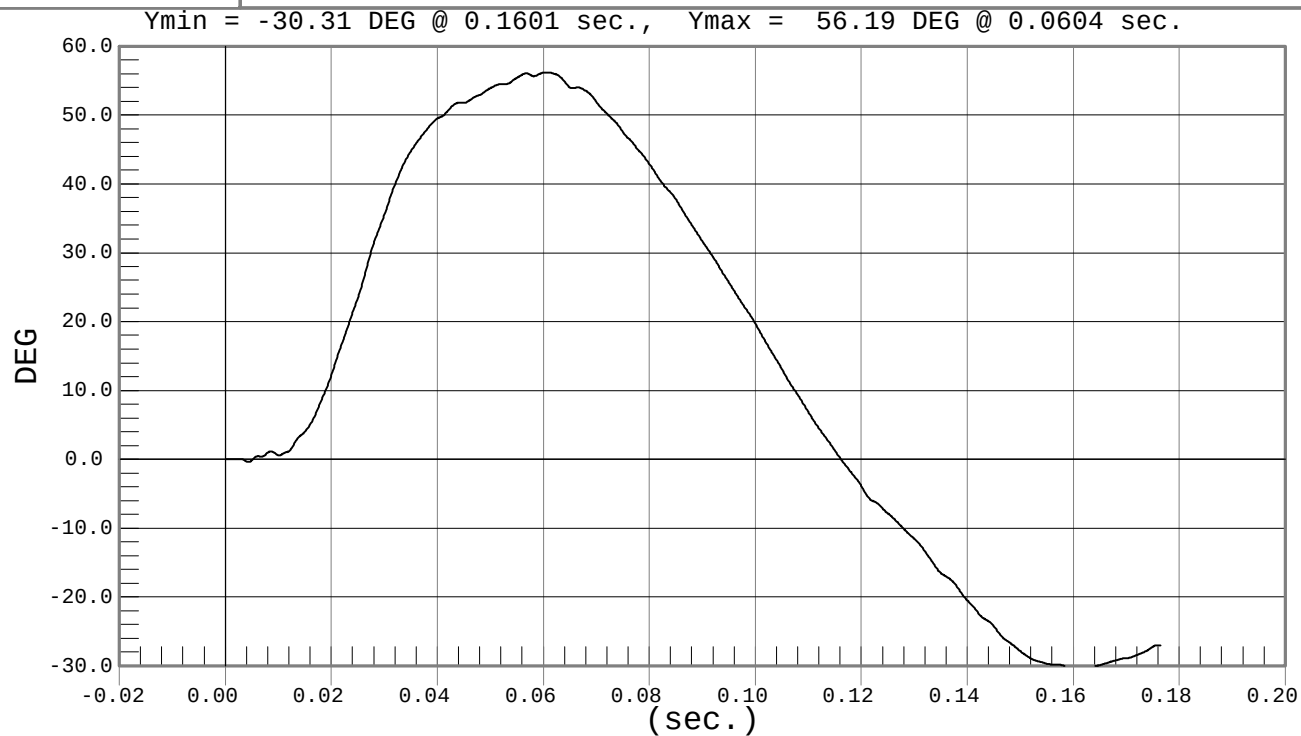
Test Date: 01-04-05
Speed: 11.3 fps, 3.44 M/s



FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 01-04-05
Speed: 11.3 fps, 3.44 M/s



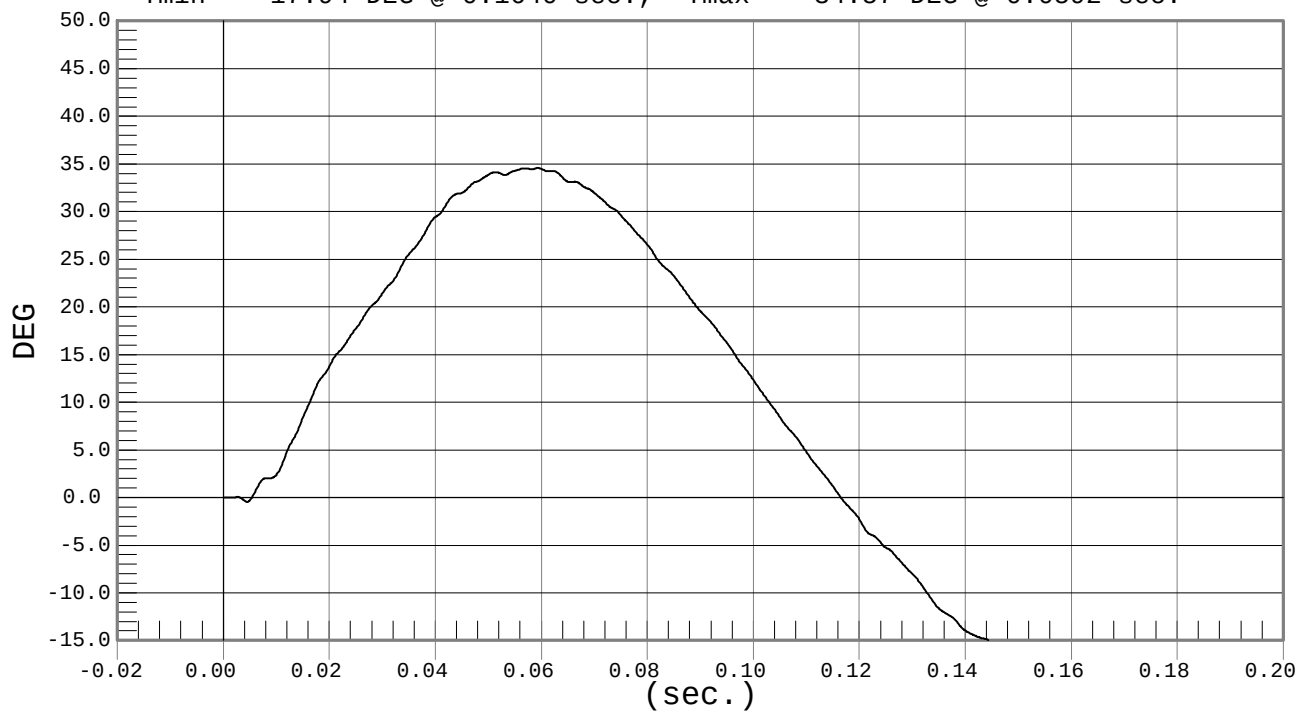


Test Desc.: Neck Bending
Component: Dummy #009

THETA A

Test Date: 01-04-05
Speed: 11.3 fps, 3.44 M/s

Ymin = -17.94 DEG @ 0.1640 sec., Ymax = 34.57 DEG @ 0.0592 sec.

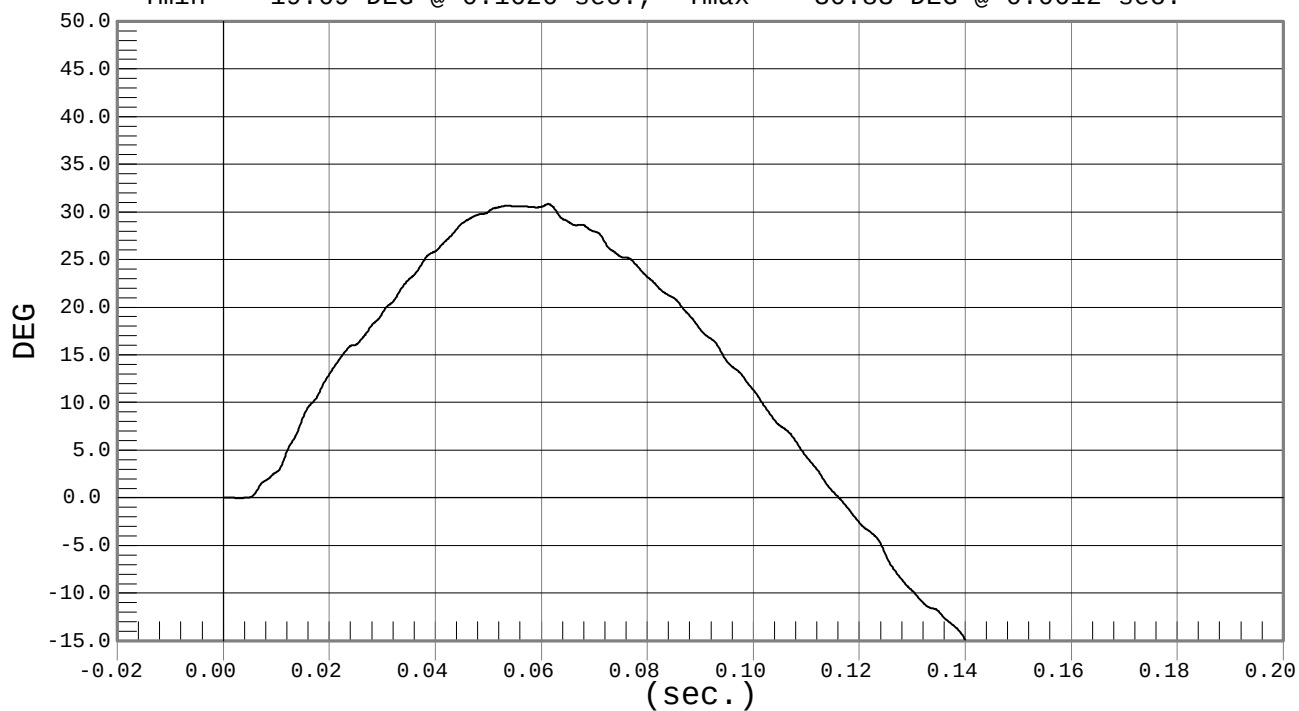


Test Desc.: Neck Bending
Component: Dummy #009

THETA B

Test Date: 01-04-05
Speed: 11.3 fps, 3.44 M/s

Ymin = -19.69 DEG @ 0.1626 sec., Ymax = 30.83 DEG @ 0.0612 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 1/4/05
Dummy Serial Number: 009
Test Number: D05003

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.4
Relative Humidity (%)	10 – 70	27
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max. Resultant Acceleration	7.5 – 10.5 g's	10.2
Time of Max. Pendulum Acceleration	msec	54.8

TEST MEETS SPECIFICATIONS

Technician: _____

Jessica Gall

Approved By: _____

David Winkelbauer

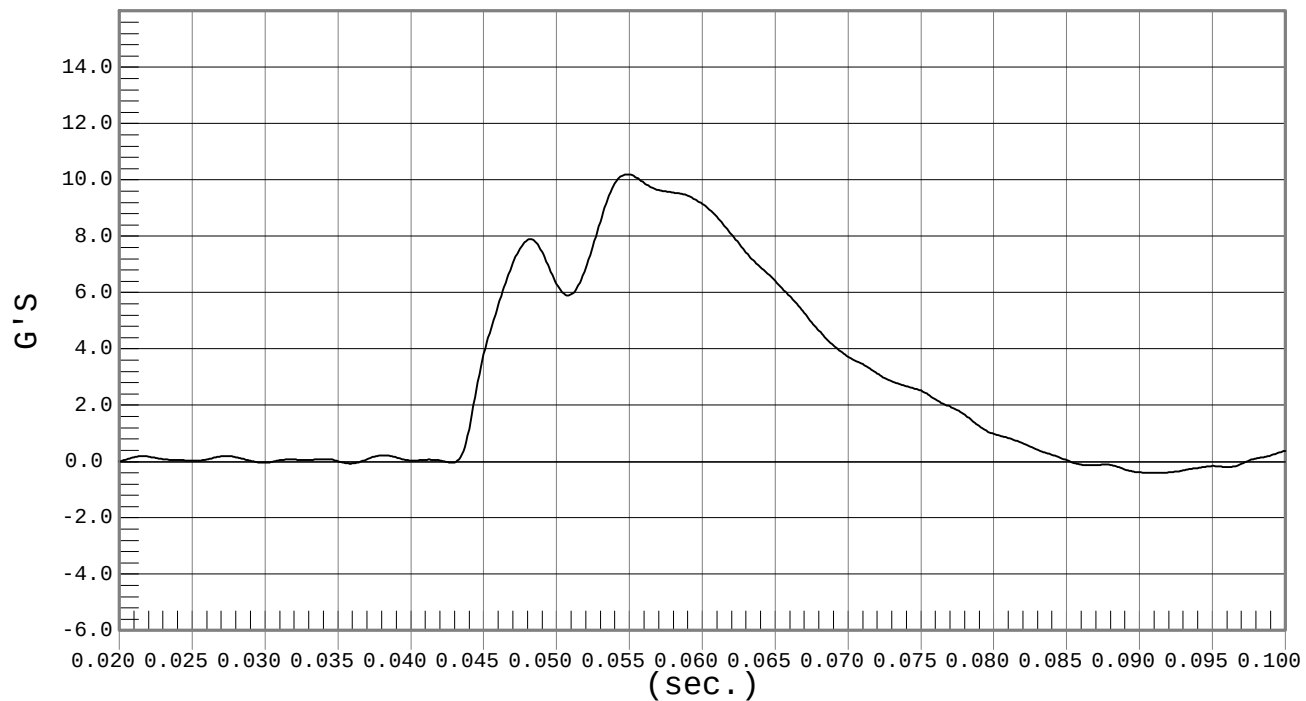


SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #009

Test Date: 01-04-05
Speed: 14.0 fps, 4.27 M/s

Ymin = -1.04 G'S @ 0.1522 sec., Ymax = 10.2 G'S @ 0.0548 sec.



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

Date: 1/3/05
Dummy Serial Number: 009
Test Number: D05004, D05005, D05006

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.5
Relative Humidity (%)	10 – 70	22
Displacement at 2 m/s	23.5 – 27.5 mm	26.4
Displacement at 3 m/s	36.0 – 40.0 mm	36.8
Displacement at 4 m/s	46.0 – 51.0 mm	46.5

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.5
Relative Humidity (%)	10 – 70	22
Displacement at 2 m/s	23.5 – 27.5 mm	25.5
Displacement at 3 m/s	36.0 – 40.0 mm	37.2
Displacement at 4 m/s	46.0 – 51.0 mm	47.6

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.5
Relative Humidity (%)	10 – 70	22
Displacement at 2 m/s	23.5 – 27.5 mm	26.9
Displacement at 3 m/s	36.0 – 40.0 mm	38.7
Displacement at 4 m/s	46.0 – 51.0 mm	49.7

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

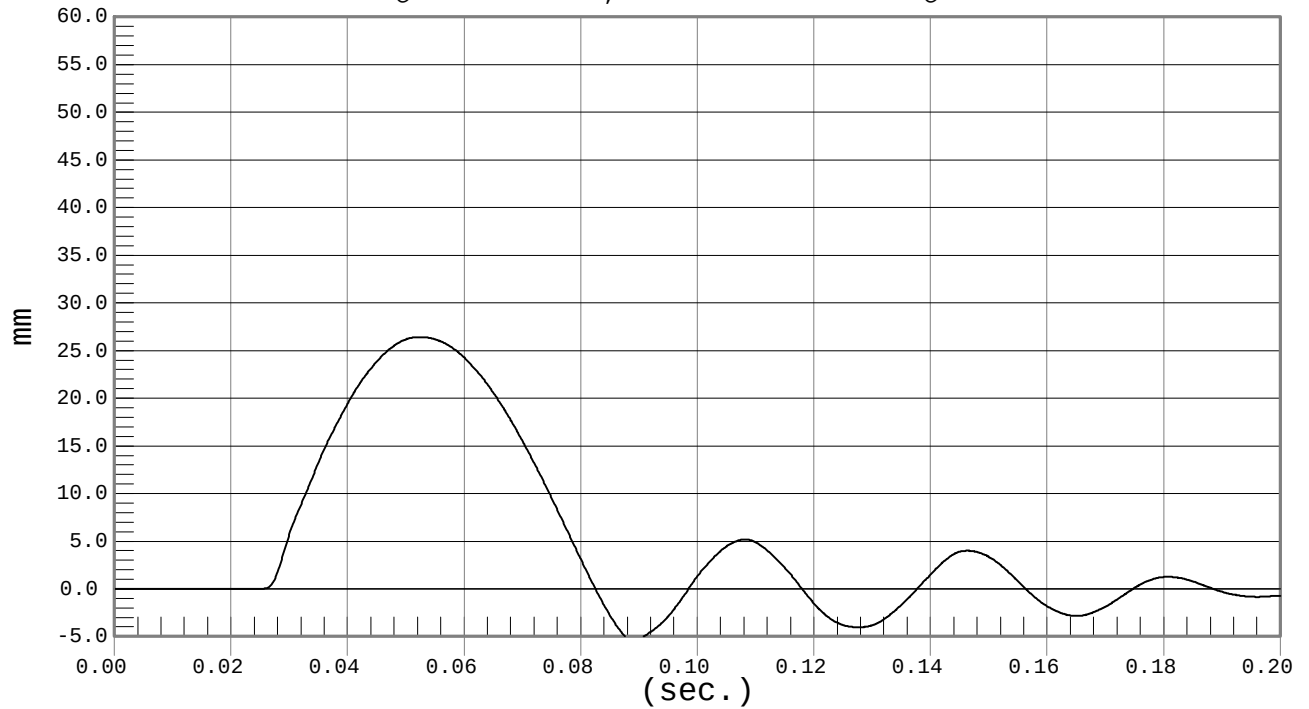


UPPER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-03-05
Speed: 6.6 fps, 2.00 M/s

Ymin = -5.37 mm @ 0.0890 sec., Ymax = 26.41 mm @ 0.0523 sec.

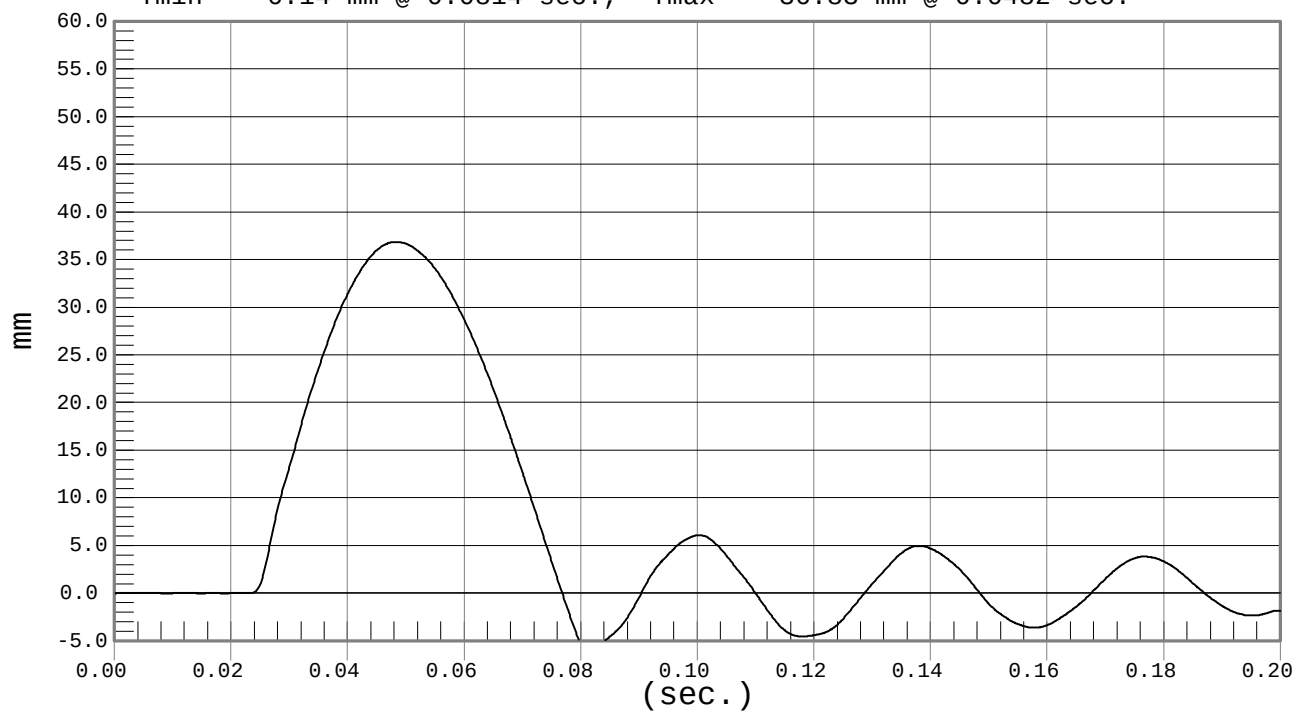


UPPER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-03-05
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.14 mm @ 0.0814 sec., Ymax = 36.83 mm @ 0.0482 sec.



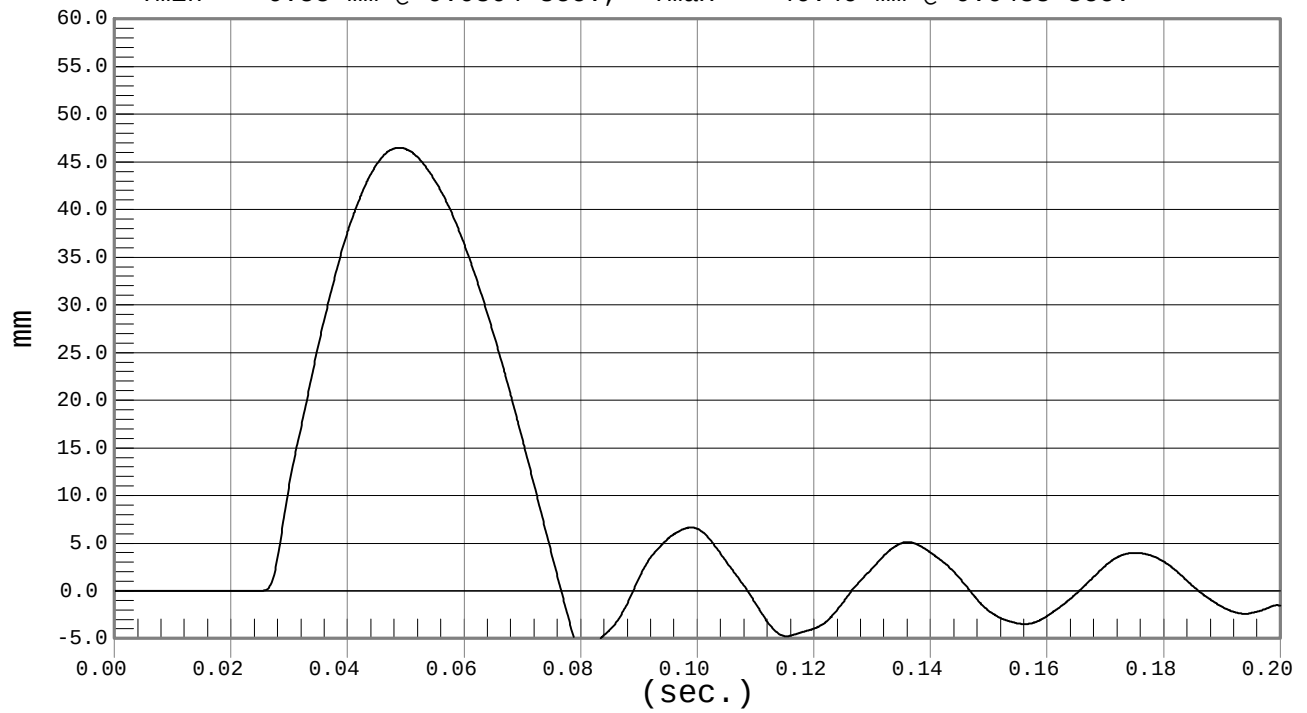


UPPER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-03-05
Speed: 13.1 fps, 4.00 M/s

Ymin = -6.55 mm @ 0.0804 sec., Ymax = 46.49 mm @ 0.0488 sec.



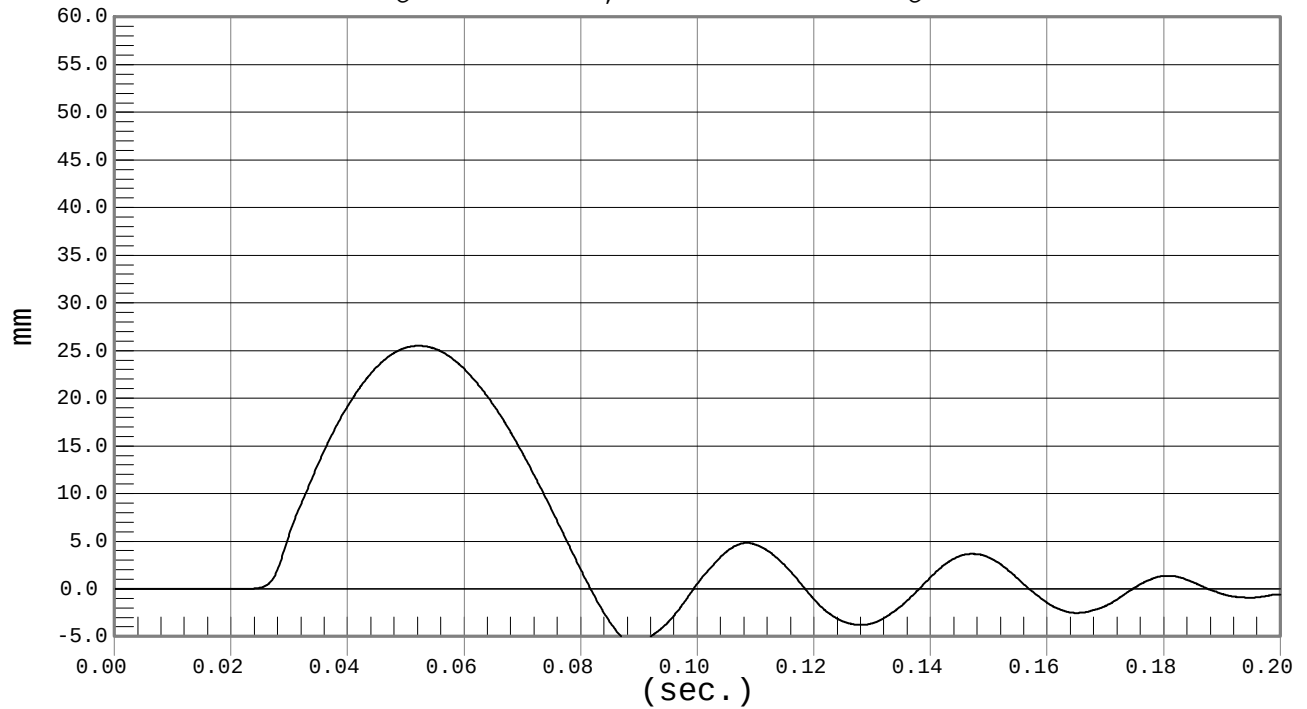


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-03-05
Speed: 6.6 fps, 2.00 M/s

Ymin = -5.76 mm @ 0.0890 sec., Ymax = 25.5 mm @ 0.0521 sec.

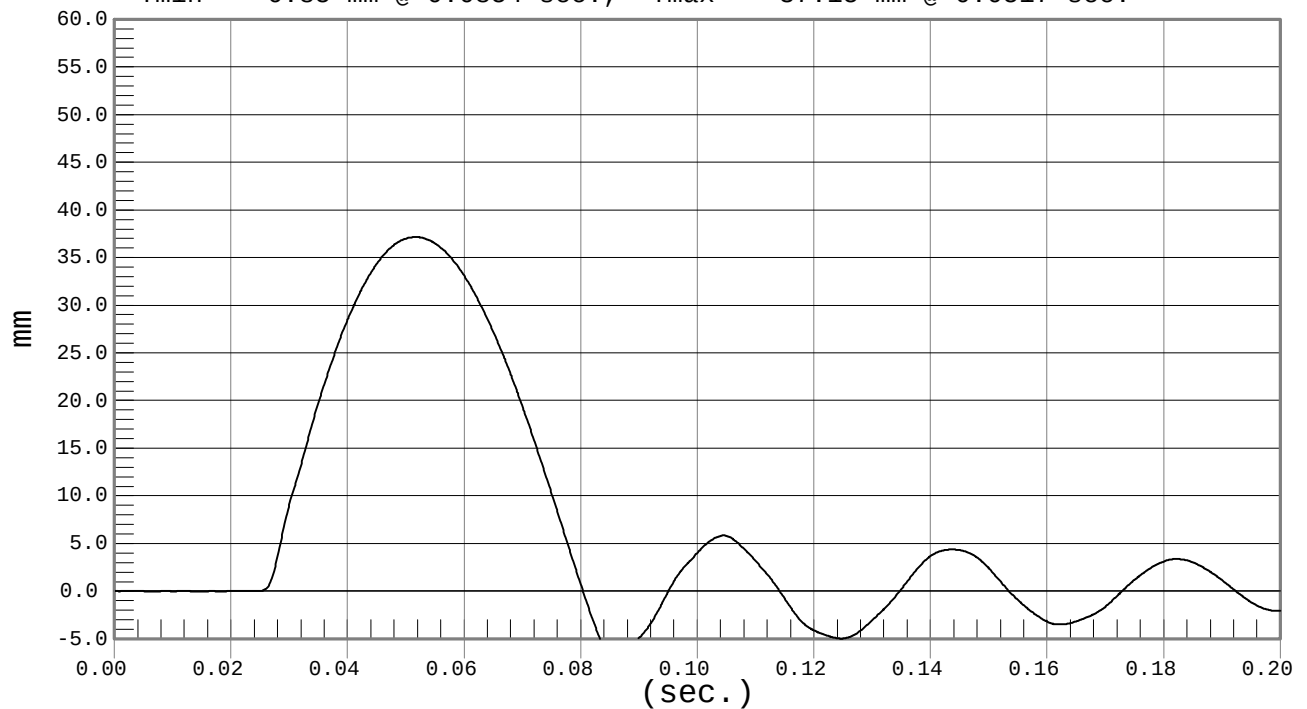


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-03-05
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.85 mm @ 0.0854 sec., Ymax = 37.15 mm @ 0.0517 sec.



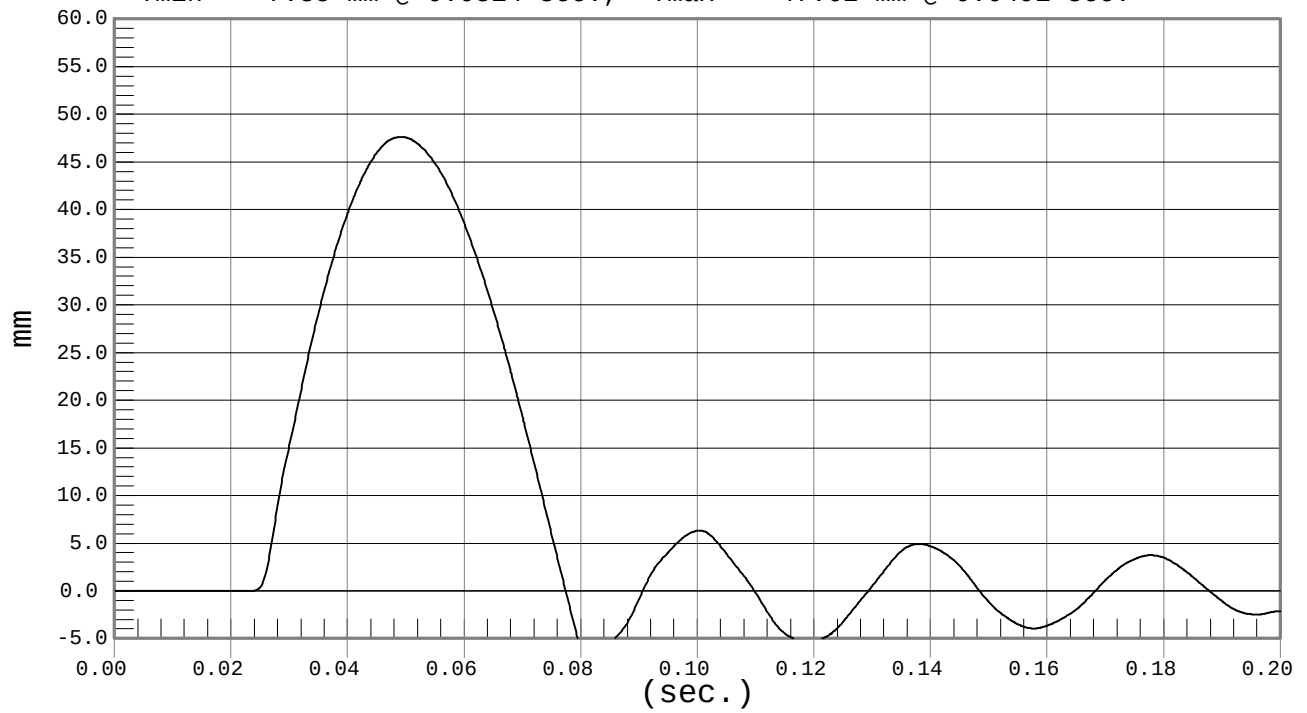


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-03-05
Speed: 13.1 fps, 4.00 M/s

Ymin = -7.35 mm @ 0.0814 sec., Ymax = 47.62 mm @ 0.0491 sec.



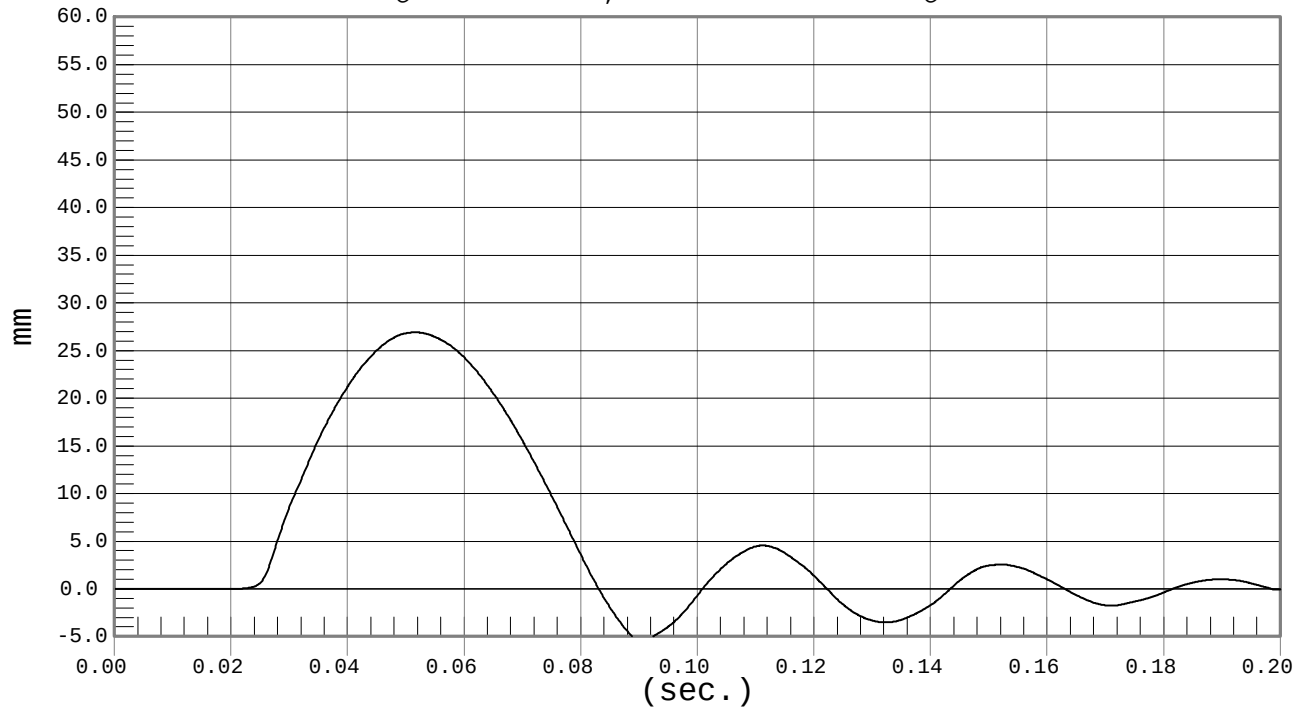


LOWER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-03-05
Speed: 6.6 fps, 2.00 M/s

Ymin = -5.38 mm @ 0.0904 sec., Ymax = 26.91 mm @ 0.0515 sec.

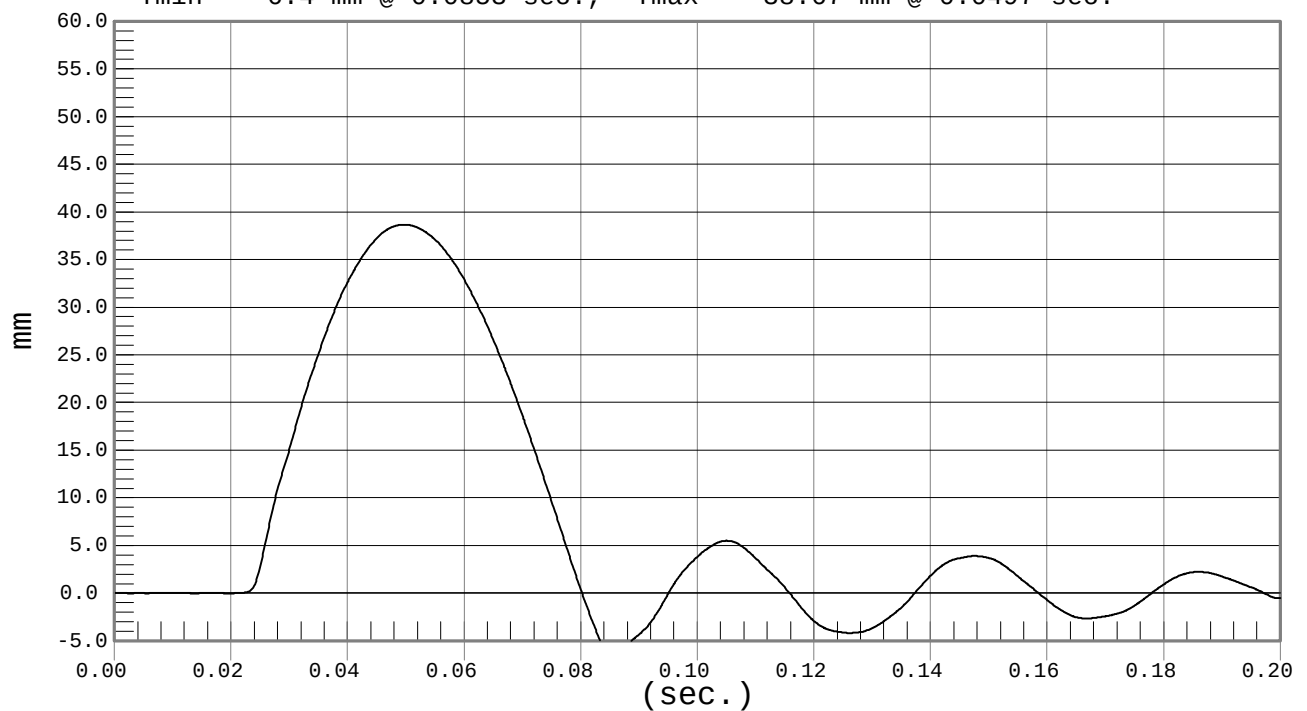


LOWER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-03-05
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.4 mm @ 0.0853 sec., Ymax = 38.67 mm @ 0.0497 sec.



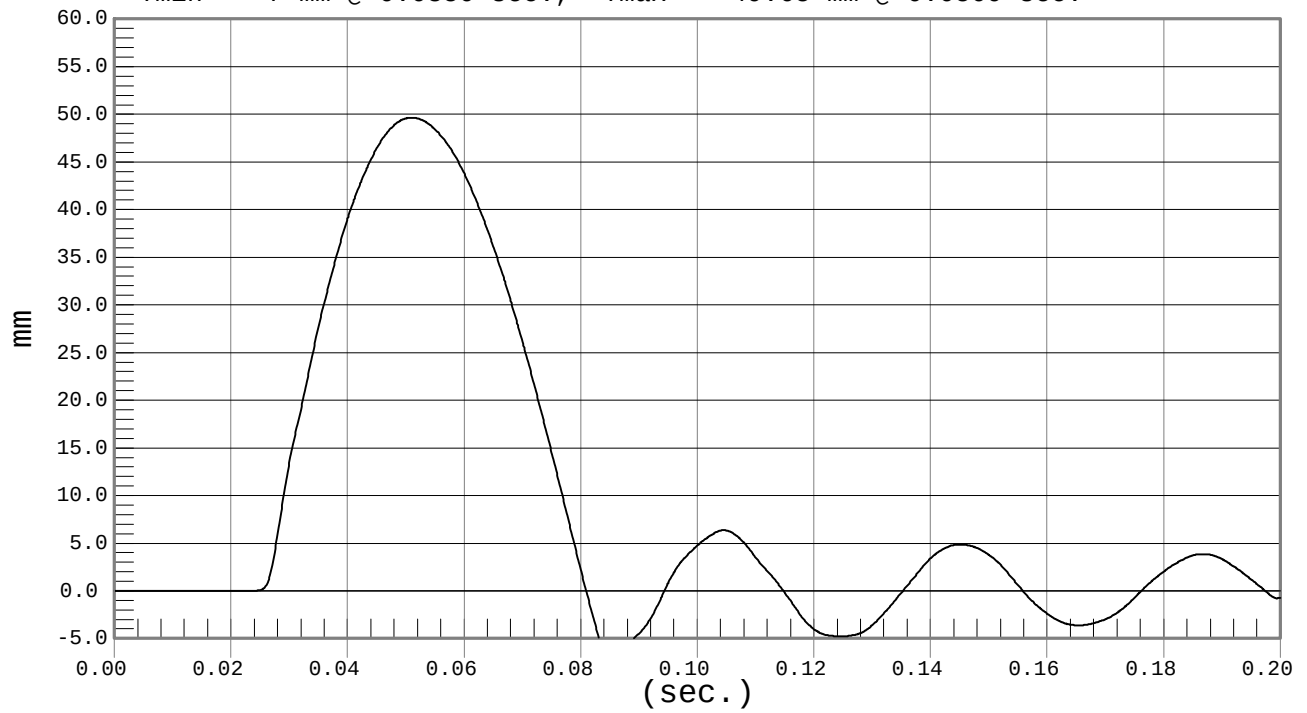


LOWER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-03-05
Speed: 13.1 fps, 4.00 M/s

Ymin = -7 mm @ 0.0850 sec., Ymax = 49.65 mm @ 0.0509 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 1/4/05
Dummy Serial Number: 009
Test Number: D05007

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.4
Relative Humidity (%)	10 – 70	23
Probe Speed (m/s)	3.90 – 4.10	4.03
Maximum Impact Force	4.00 – 4.80 kN	4.63
Time of Maximum Force	10.60 – 13.00 ms	10.70
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.29
Time of Max. Total Force	10.00 – 12.30 ms	10.30

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

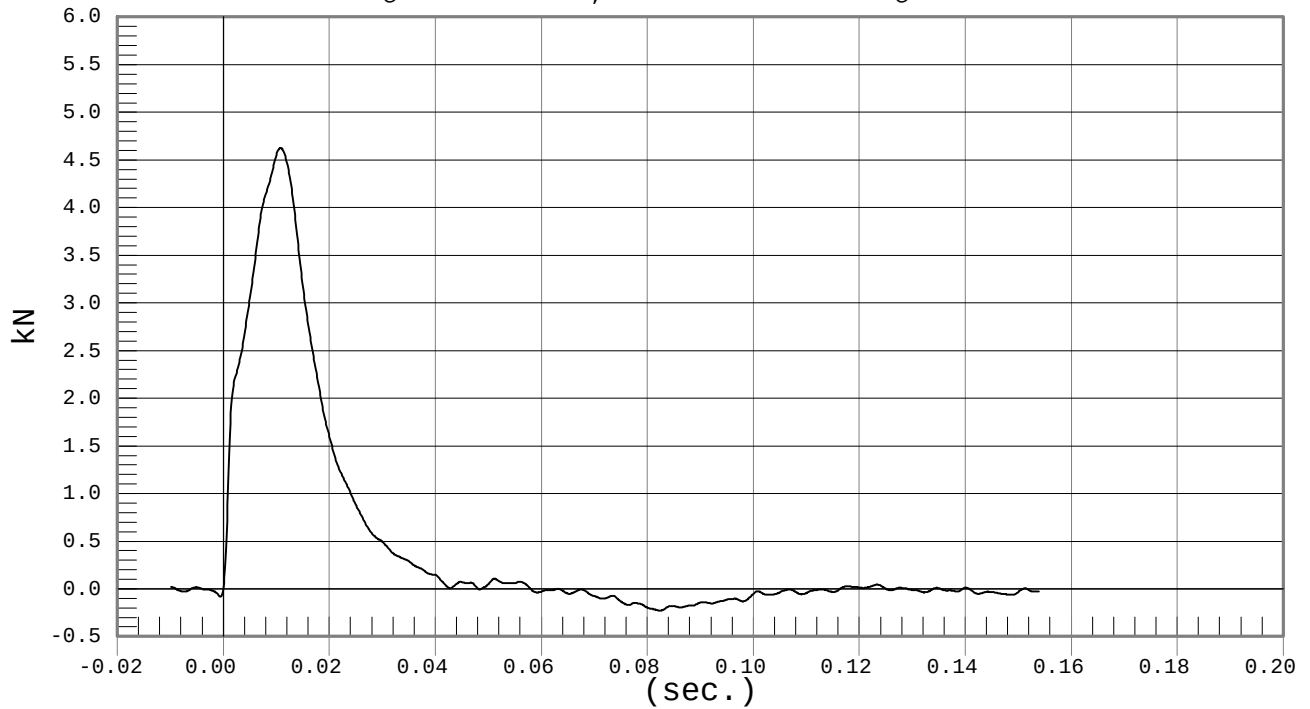


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 01-04-05
Speed: 13.2 fps, 4.03 M/s

Ymin = -.23 kN @ 0.0823 sec., Ymax = 4.63 kN @ 0.0107 sec.

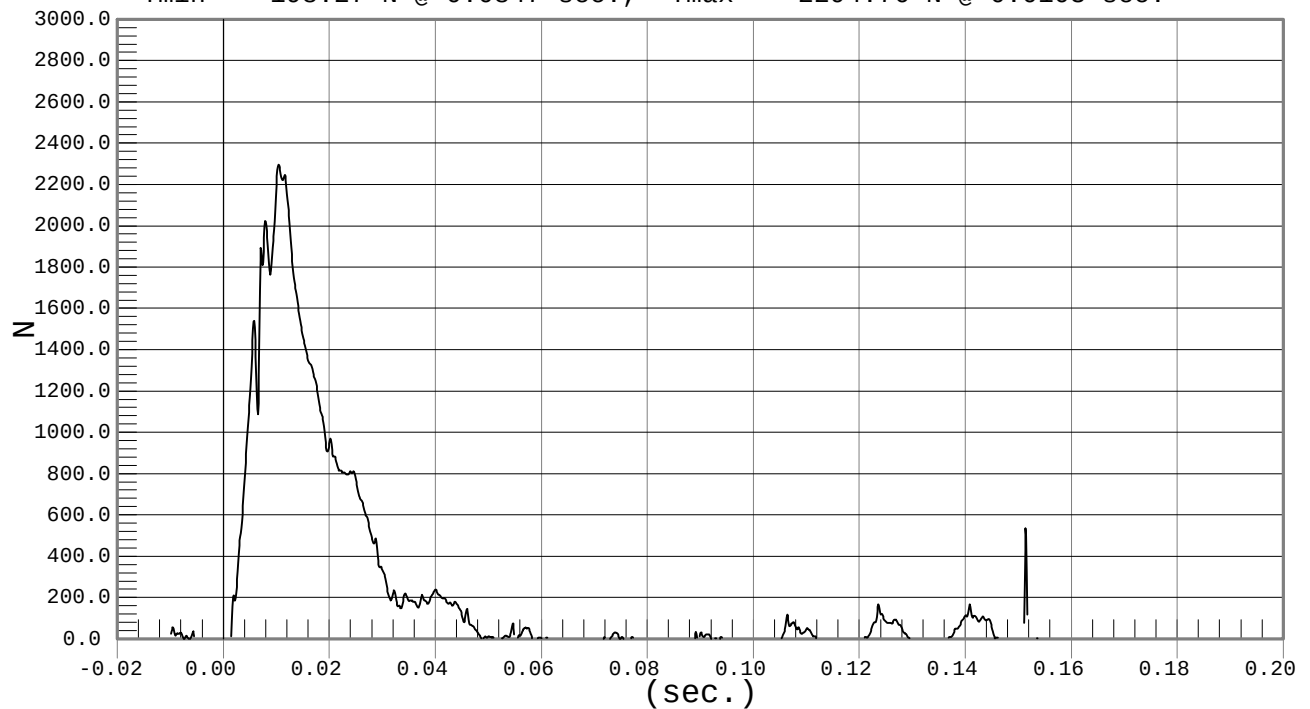


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 01-04-05
Speed: 13.2 fps, 4.03 M/s

Ymin = -198.27 N @ 0.0847 sec., Ymax = 2294.76 N @ 0.0103 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 1/4/05
Dummy Serial Number: 009
Test Number: D05008

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.3
Relative Humidity (%)		10 – 70	21
Pendulum Speed		5.95 – 6.15	6.13
Pendulum Deceleration	10 msec	$\bar{2}.46 - \bar{1}.59$ m/sec	-2.13
	20 msec	$\bar{5}.25 - \bar{4}.07$ m/sec	-4.89
	25 msec	$\bar{6}.64 - \bar{5}.30$ m/sec	-6.04
	30 msec	≥ -6.5 m/sec	-6.30
Maximum Flexion Angle		45.0 – 55.0 deg	49.7
Time of Max. Flexion Angle		39.0 – 53.0 ms	42.1
Maximum Angle Theta (A)		31.0 – 35.0 deg	31.7
Time of Max. Theta (A)		44.0 – 52.0 ms	46.6
Maximum Angle Theta (B)		27.39– 29.89 deg	28.3
Time of Max. Theta (B)		44.0 – 52.0 ms	44.4

TEST MEETS SPECIFICATIONS

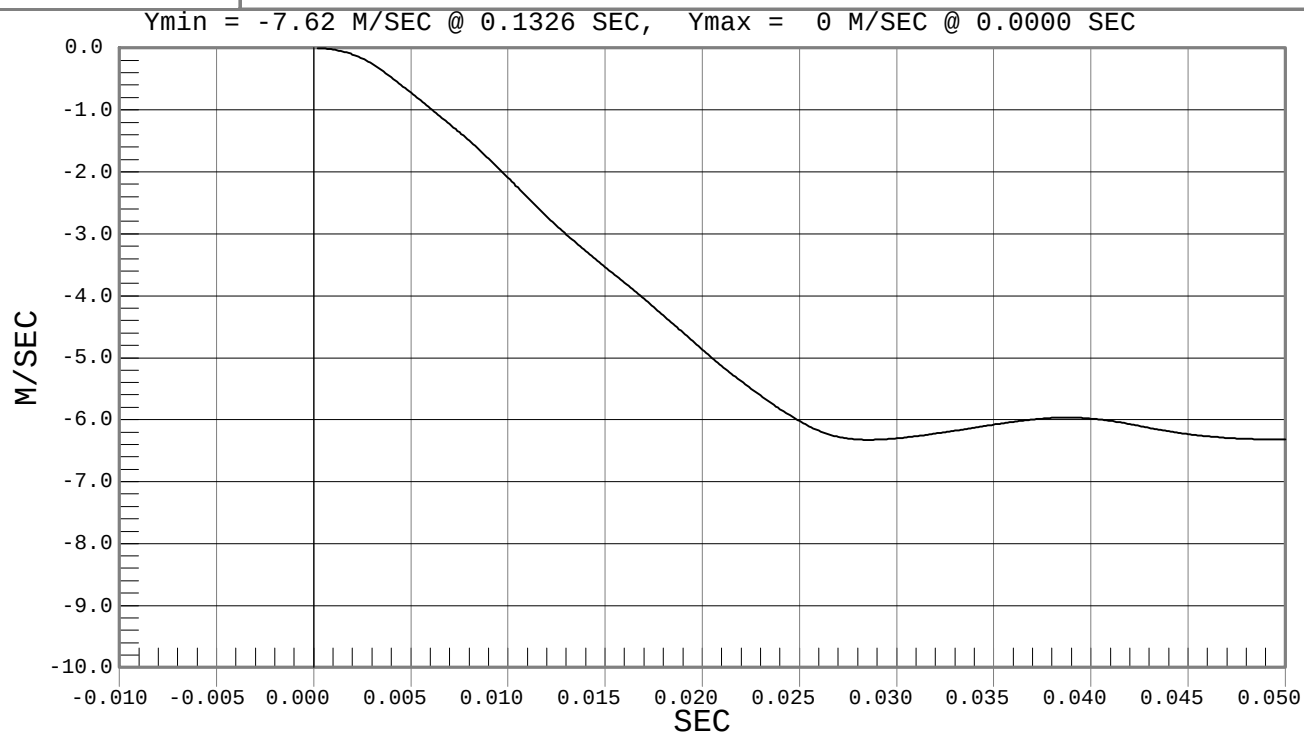
Technician: Jessica Hall
Approved By: David Winkelbauer



PENDULUM DECELERATION

Test Desc.: Lumbar Bending
Component: Dummy #009

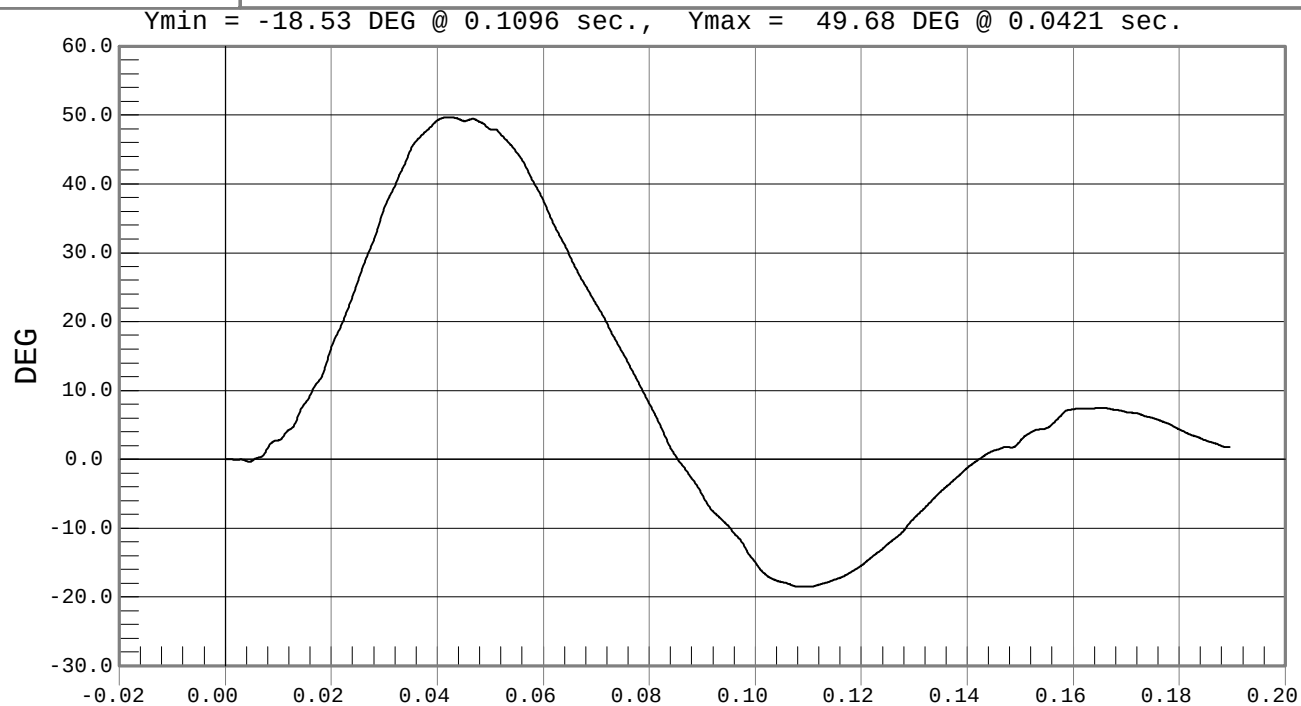
Test Date: 01-04-05
Speed: 20.1 fps, 6.13 M/s



FLEXION ANGLE

Test Desc.: Lumbar Bending
Component: Dummy #009

Test Date: 01-04-05
Speed: 20.1 fps, 6.13 M/s



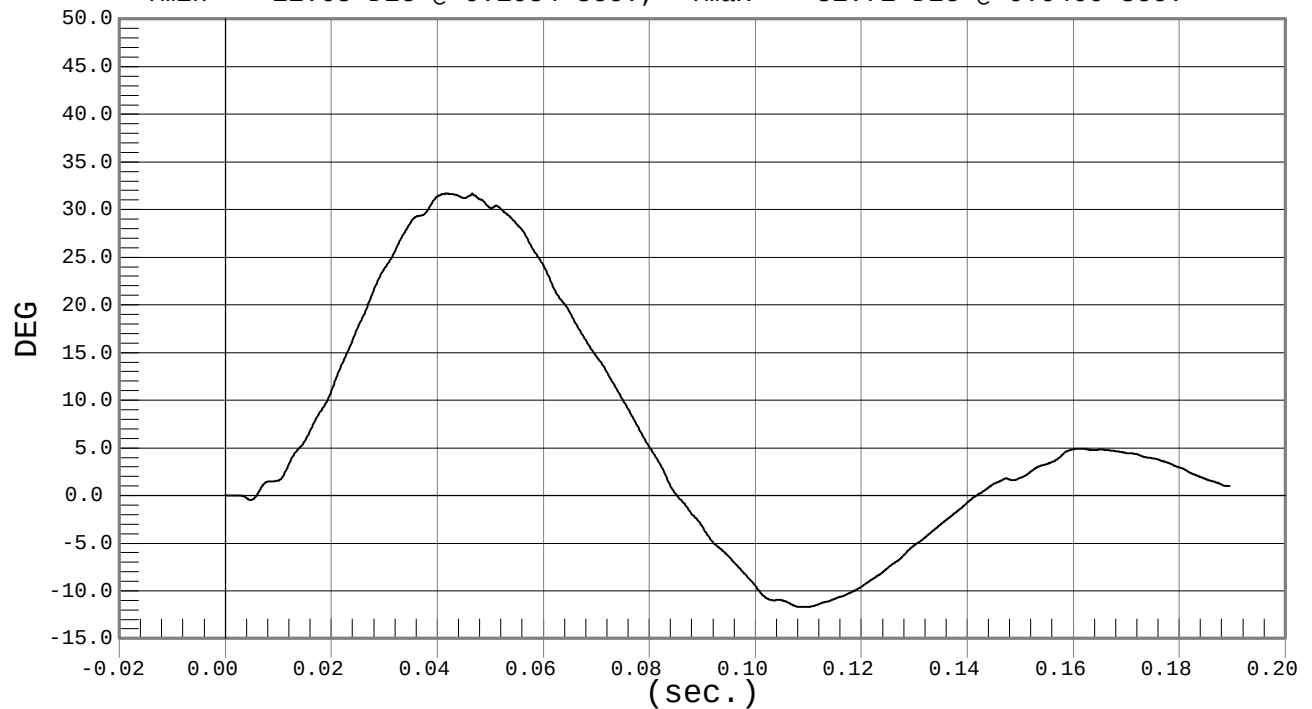


Test Desc.: Lumbar Bending
Component: Dummy #009

THETA A

Test Date: 01-04-05
Speed: 20.1 fps, 6.13 M/s

Ymin = -11.68 DEG @ 0.1084 sec., Ymax = 31.71 DEG @ 0.0466 sec.

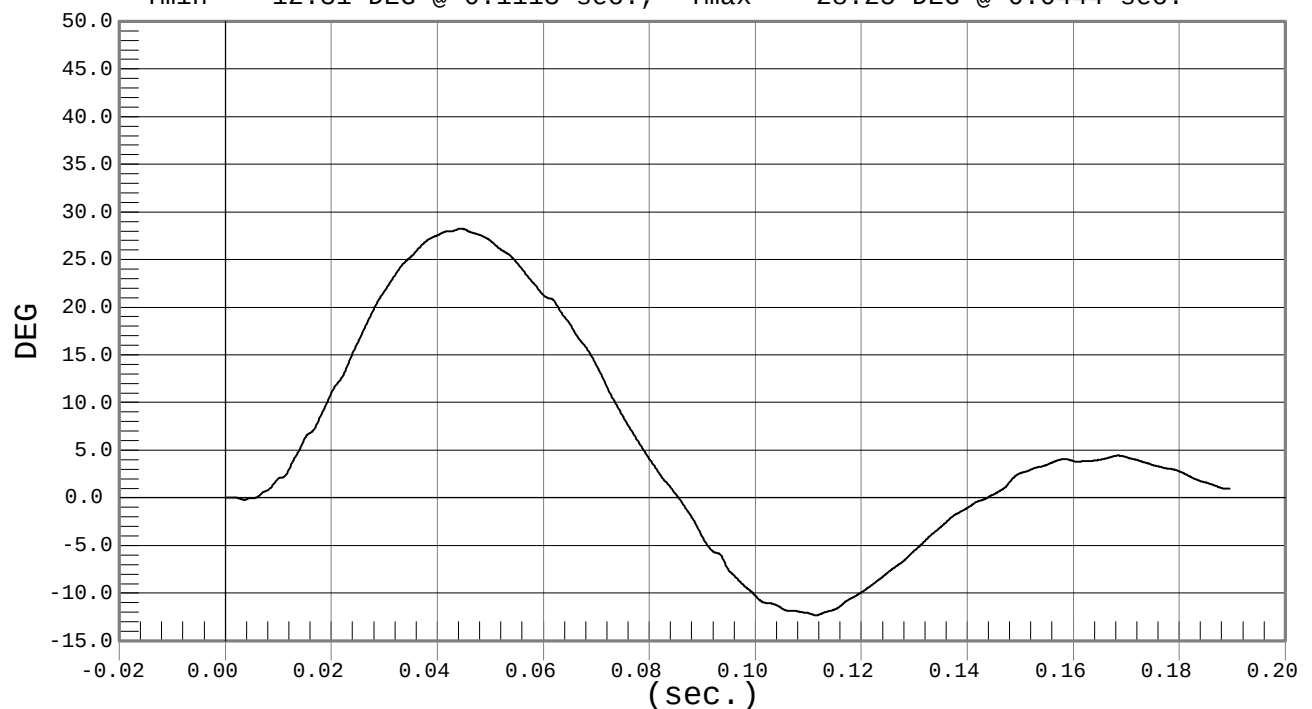


Test Desc.: Lumbar Bending
Component: Dummy #009

THETA B

Test Date: 01-04-05
Speed: 20.1 fps, 6.13 M/s

Ymin = -12.31 DEG @ 0.1113 sec., Ymax = 28.25 DEG @ 0.0444 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 1/4/05
Dummy Serial Number: 009
Test Number: D05009

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.8
Relative Humidity (%)	10 – 70	23
Pendulum Speed	4.20 – 4.40 m/s	4.25
Maximum Impactor Force	4.40 – 5.40 kN	5.02
Time of Max. Impactor Force	10.30 – 15.50 ms	12.00
Maximum Pubic Force	1.04 – 1.64 kN	1.58
Time of Max. Pubic Force	9.90 – 15.90 ms	12.30

TEST MEETS SPECIFICATIONS

Technician: _____

Jessica Hall

Approved By: _____

David Winkelbauer

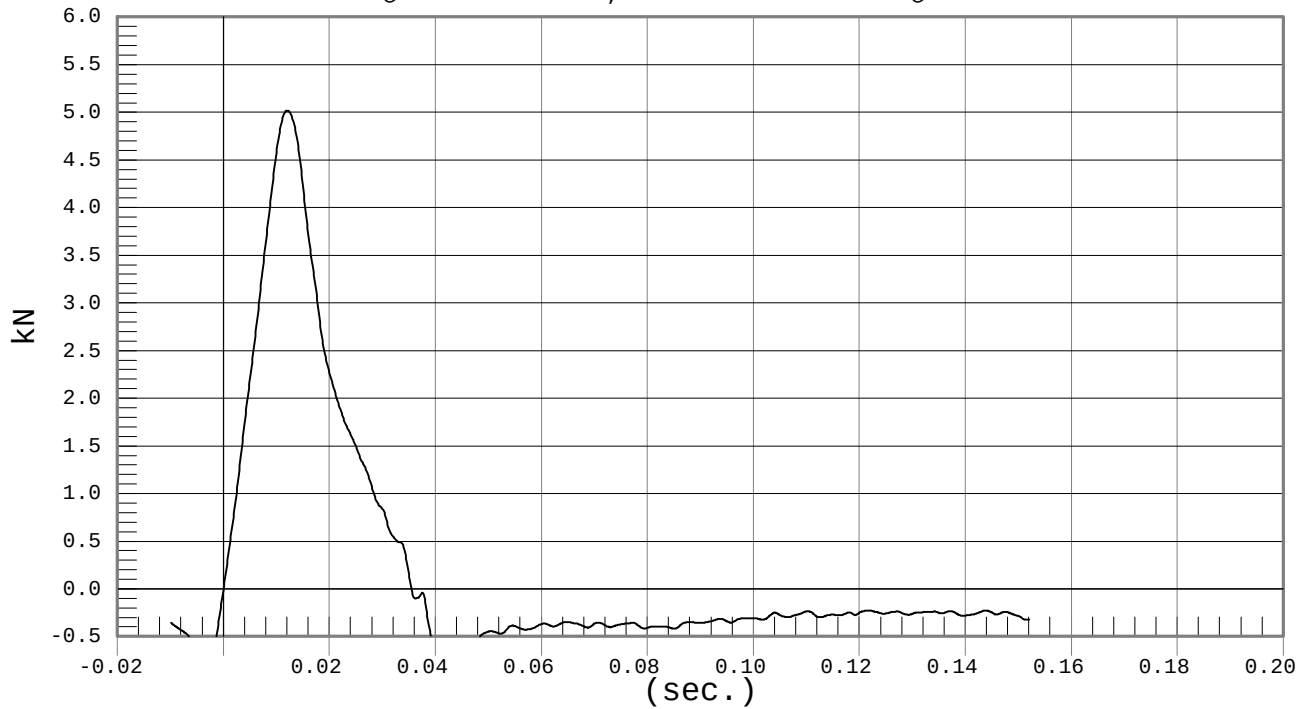


IMPACTOR FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 01-04-05
Speed: 13.9 fps, 4.25 M/s

Ymin = -.87 kN @ -0.0027 sec., Ymax = 5.02 kN @ 0.0120 sec.

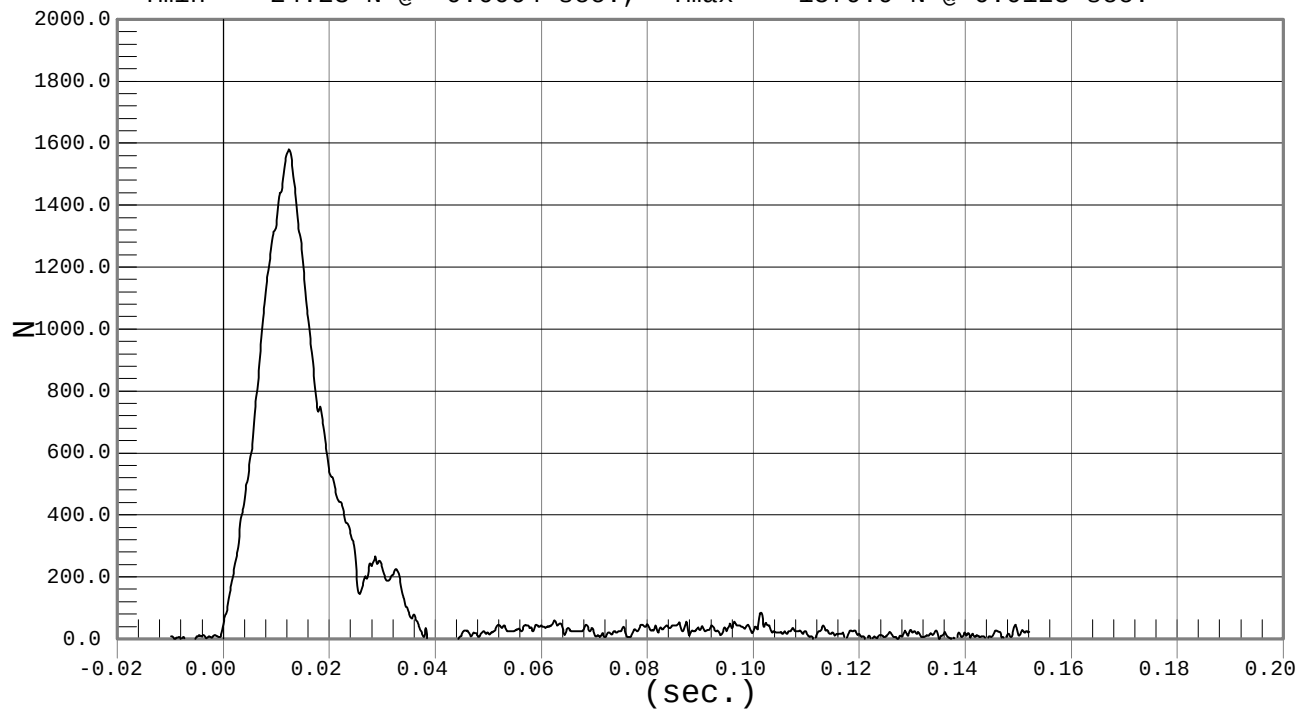


PUBIC FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 01-04-05
Speed: 13.9 fps, 4.25 M/s

Ymin = -24.23 N @ -0.0064 sec., Ymax = 1579.9 N @ 0.0123 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: 1/19/05

Dummy Serial Number: 009

Test Number: D05131

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.1
Relative Humidity (%)	10 – 70	21
Peak Resultant Acceleration	100 – 150 g's	134
Time of Max. Res. Acceleration	msec	46.9

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

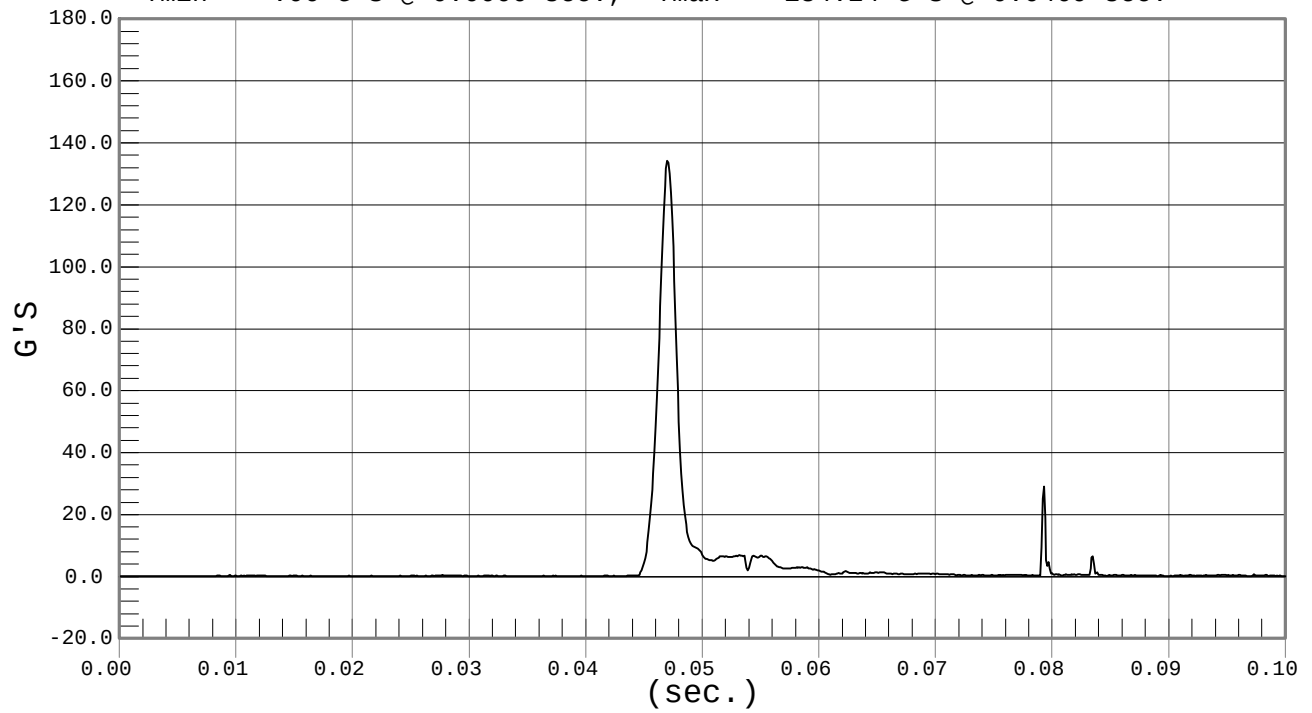


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #009

Test Date: 01-19-05
Speed: 0.0 fps, 0.00 M/s

Ymin = .06 G'S @ 0.0000 sec., Ymax = 134.24 G'S @ 0.0469 sec.



MGA RESEARCH CORPORATION
NECK PENDULUM TEST
EUROSID 2 DUMMY

Date: 1/19/05

Dummy Serial Number: 009

Test Number: D05132

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.2
Relative Humidity (%)		10 – 70	21
Pendulum Speed		3.3 - 3.5	3.4
Pendulum Deceleration	3 msec	1.25 - 1.53 m/sec	1.33
	8 msec	1.59 - 2.04 m/sec	1.75
	14 msec	3.20 - 3.85 m/sec	3.39
Maximum Flexion Angle		49.0 – 59.0 deg	55.4
Time of Max. Flexion Angle		54.0 – 66.0 ms	59.3
Maximum Angle Theta (A)		32.0 – 37.0 deg	33.8
Time of Max. Theta (A)		53.0 – 63.0 ms	59.3
Maximum Angle Theta (B)		29.15 – 31.65 deg	30.10
Time of Max. Theta (B)		54.0 – 64.0 ms	60.1

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

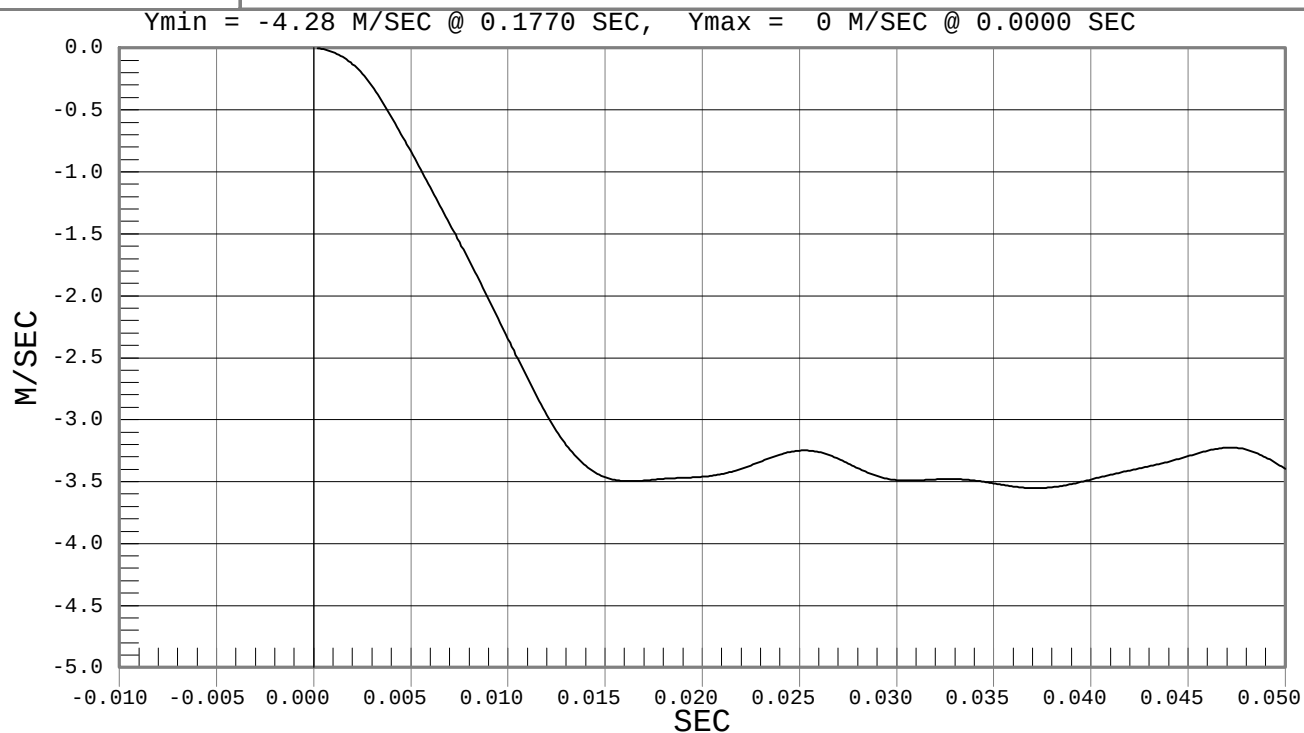
Approved By: David Winkelbauer



PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #009

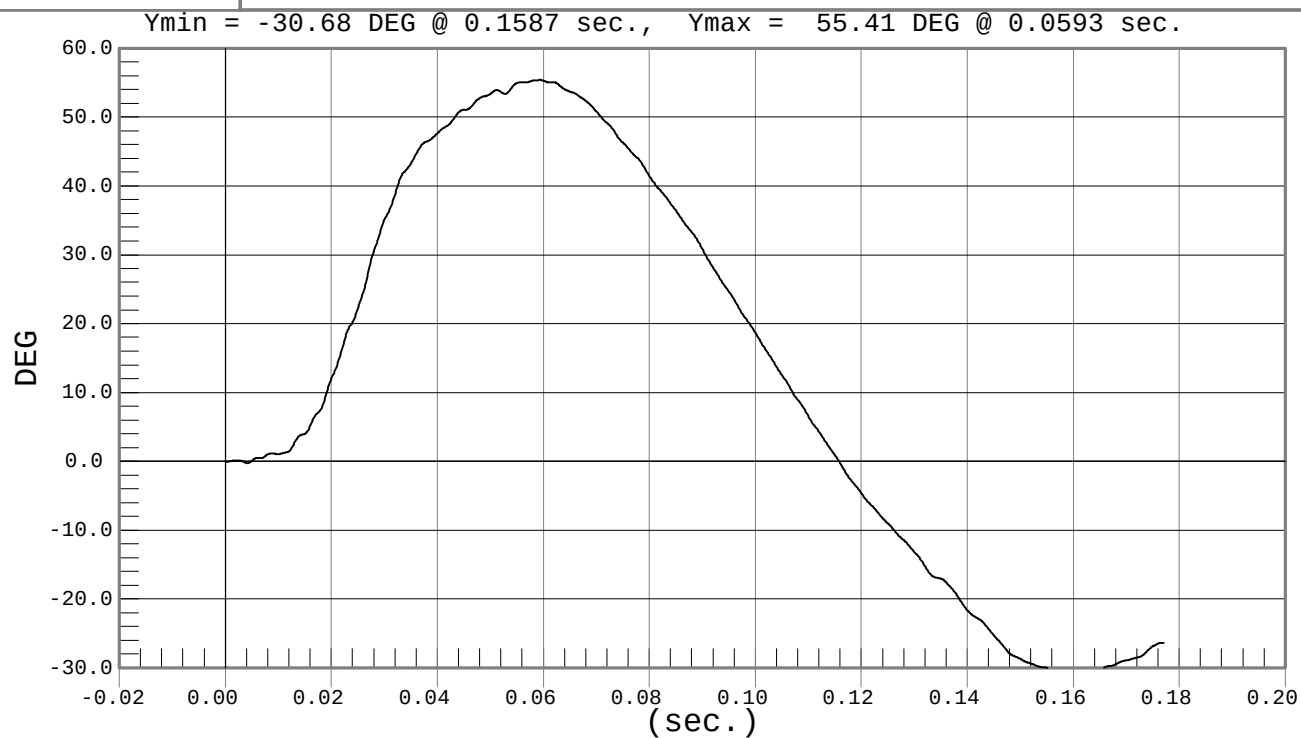
Test Date: 01-19-05
Speed: 11.1 fps, 3.37 M/s



FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 01-19-05
Speed: 11.1 fps, 3.37 M/s



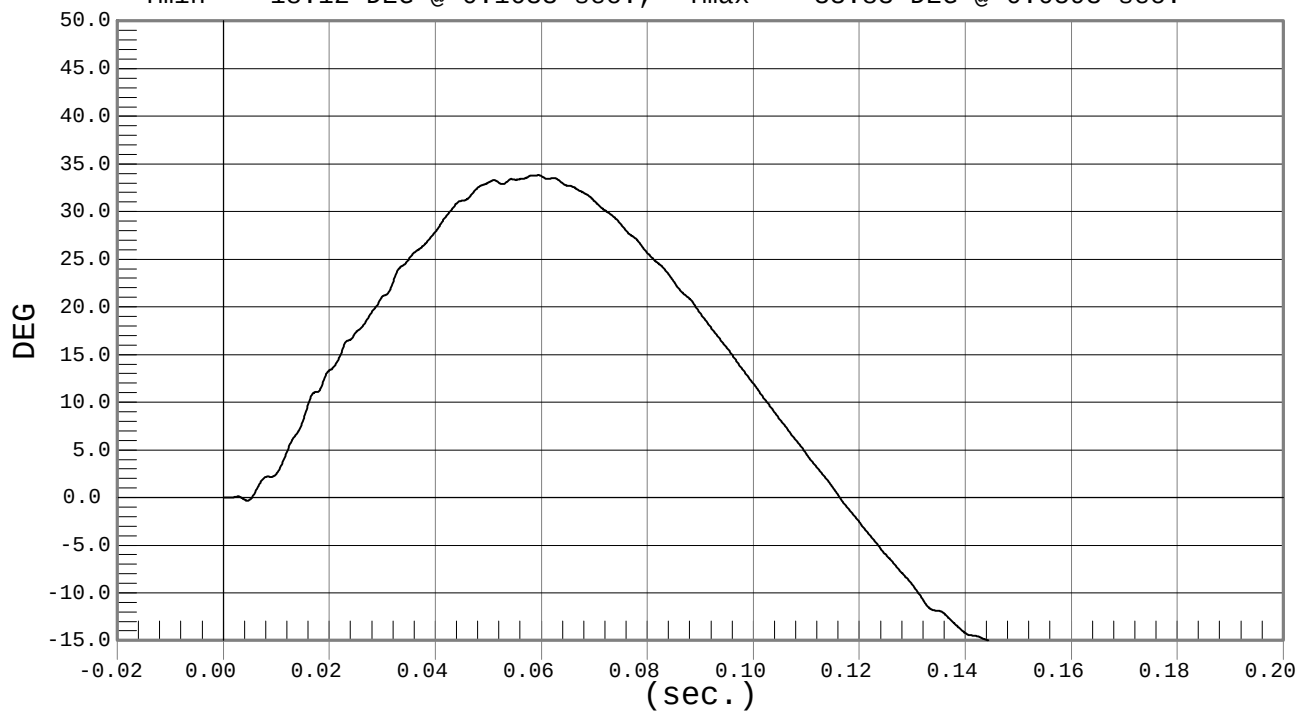


Test Desc.: Neck Bending
Component: Dummy #009

THETA A

Test Date: 01-19-05
Speed: 11.1 fps, 3.37 M/s

Ymin = -18.12 DEG @ 0.1633 sec., Ymax = 33.83 DEG @ 0.0593 sec.

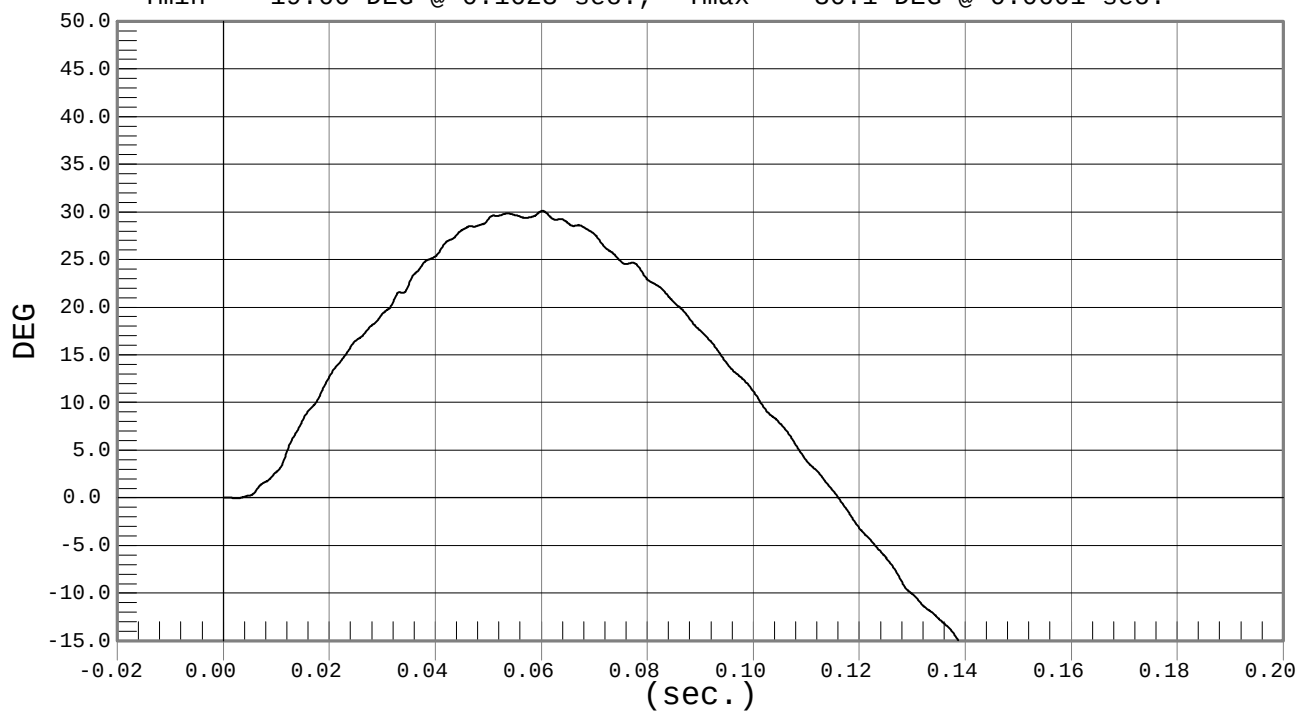


Test Desc.: Neck Bending
Component: Dummy #009

THETA B

Test Date: 01-19-05
Speed: 11.1 fps, 3.37 M/s

Ymin = -19.66 DEG @ 0.1623 sec., Ymax = 30.1 DEG @ 0.0601 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 1/19/05

Dummy Serial Number: 009

Test Number: D05133

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.1
Relative Humidity (%)	10 – 70	23
Pendulum Speed	4.2 – 4.4 m/s	4.2
Max. Resultant Acceleration	7.5 – 10.5 g's	9.4
Time of Max. Pendulum Acceleration	msec	58.1

TEST MEETS SPECIFICATIONS

Technician: _____

Jessica Hall

Approved By: _____

David Winkelbauer

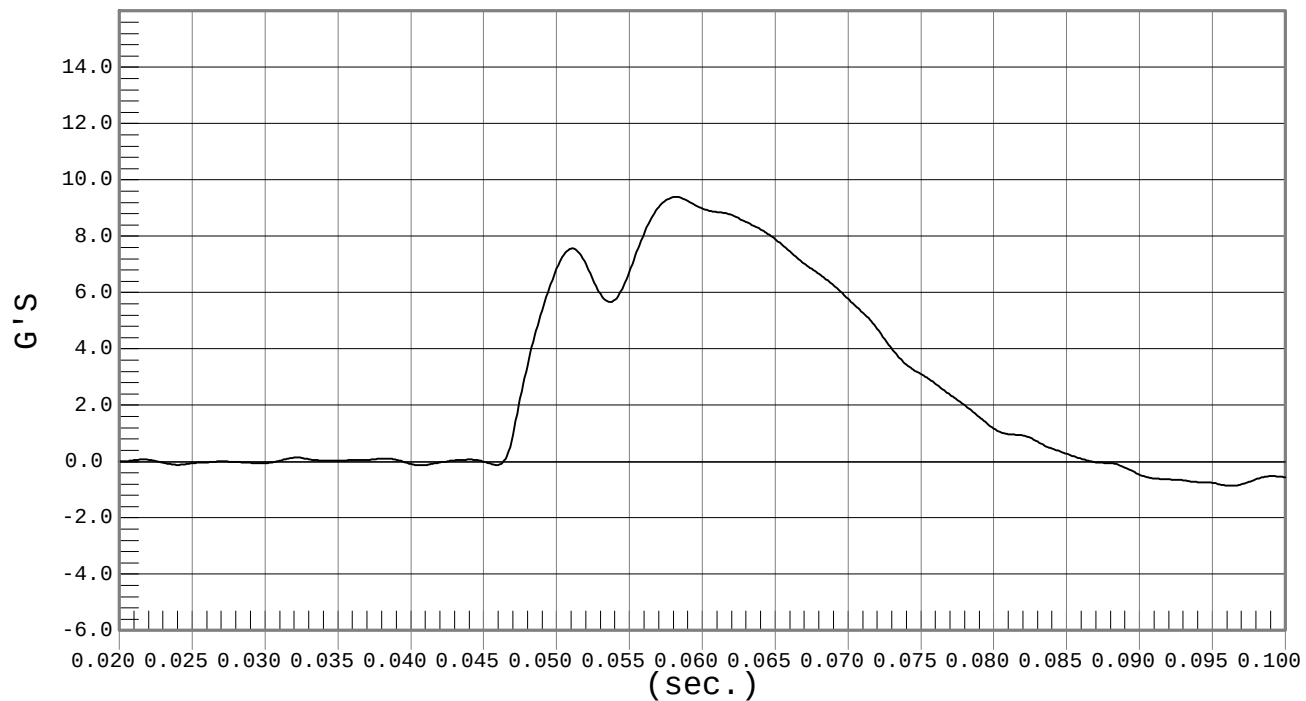


SHOULDER ACCELERATION

Test Desc.: SHOULDER IMPACT
Component: Dummy #009

Test Date: 01-20-05
Speed: 13.9 fps, 4.24 M/s

Ymin = -1.06 G'S @ 0.1569 sec., Ymax = 9.4 G'S @ 0.0581 sec.



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

Date: 1/20/05
Dummy Serial Number: 009
Test Number: D05134, D05135, D05136

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.1
Relative Humidity (%)	10 – 70	19
Displacement at 2 m/s	23.5 – 27.5 mm	26.3
Displacement at 3 m/s	36.0 – 40.0 mm	38.0
Displacement at 4 m/s	46.0 – 51.0 mm	47.9

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.1
Relative Humidity (%)	10 – 70	19
Displacement at 2 m/s	23.5 – 27.5 mm	25.7
Displacement at 3 m/s	36.0 – 40.0 mm	37.1
Displacement at 4 m/s	46.0 – 51.0 mm	48.3

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.1
Relative Humidity (%)	10 – 70	19
Displacement at 2 m/s	23.5 – 27.5 mm	27.1
Displacement at 3 m/s	36.0 – 40.0 mm	38.9
Displacement at 4 m/s	46.0 – 51.0 mm	50.3

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

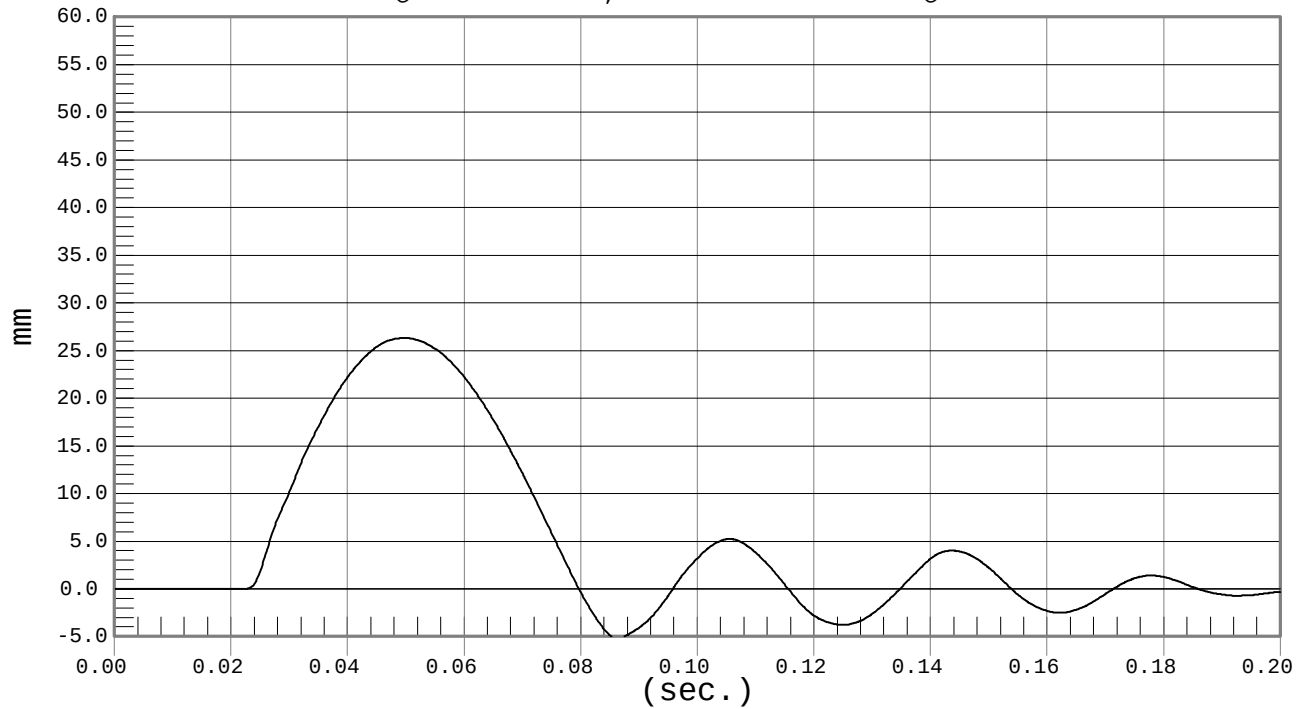


UPPER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-20-05
Speed: 6.6 fps, 2.00 M/s

Ymin = -5.18 mm @ 0.0862 sec., Ymax = 26.32 mm @ 0.0497 sec.

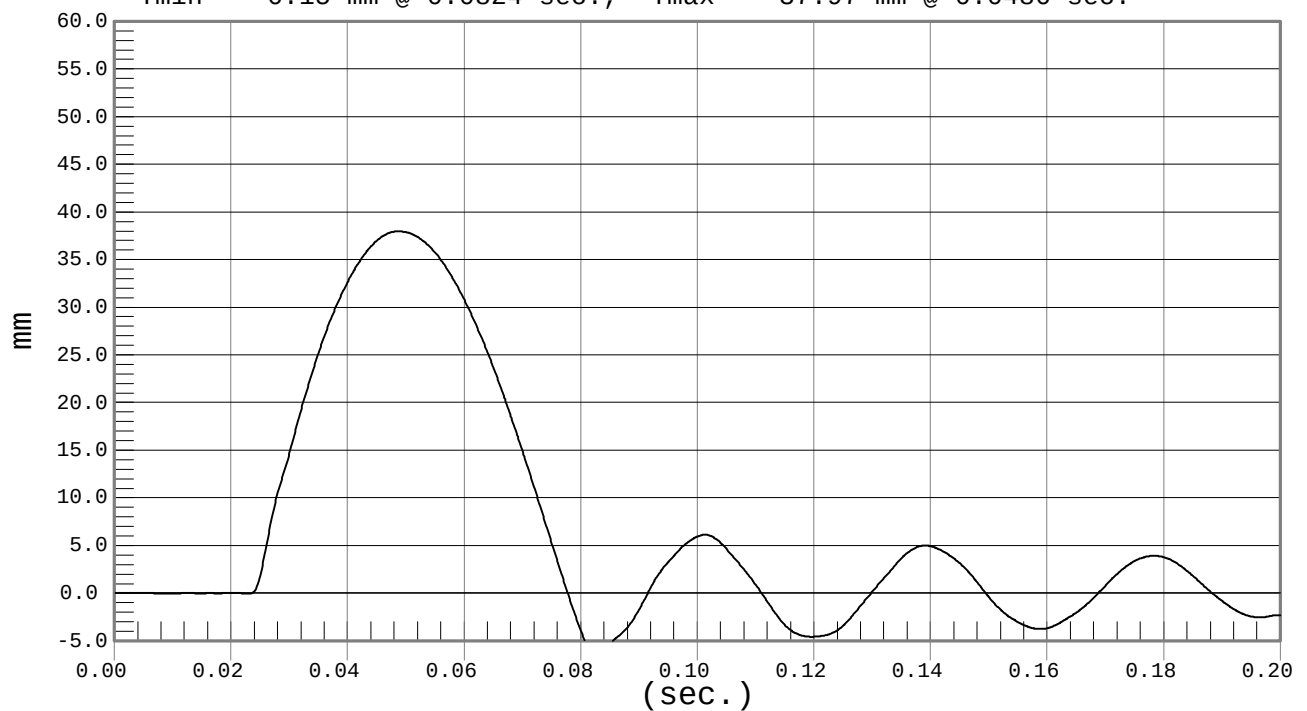


UPPER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-20-05
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.15 mm @ 0.0824 sec., Ymax = 37.97 mm @ 0.0486 sec.



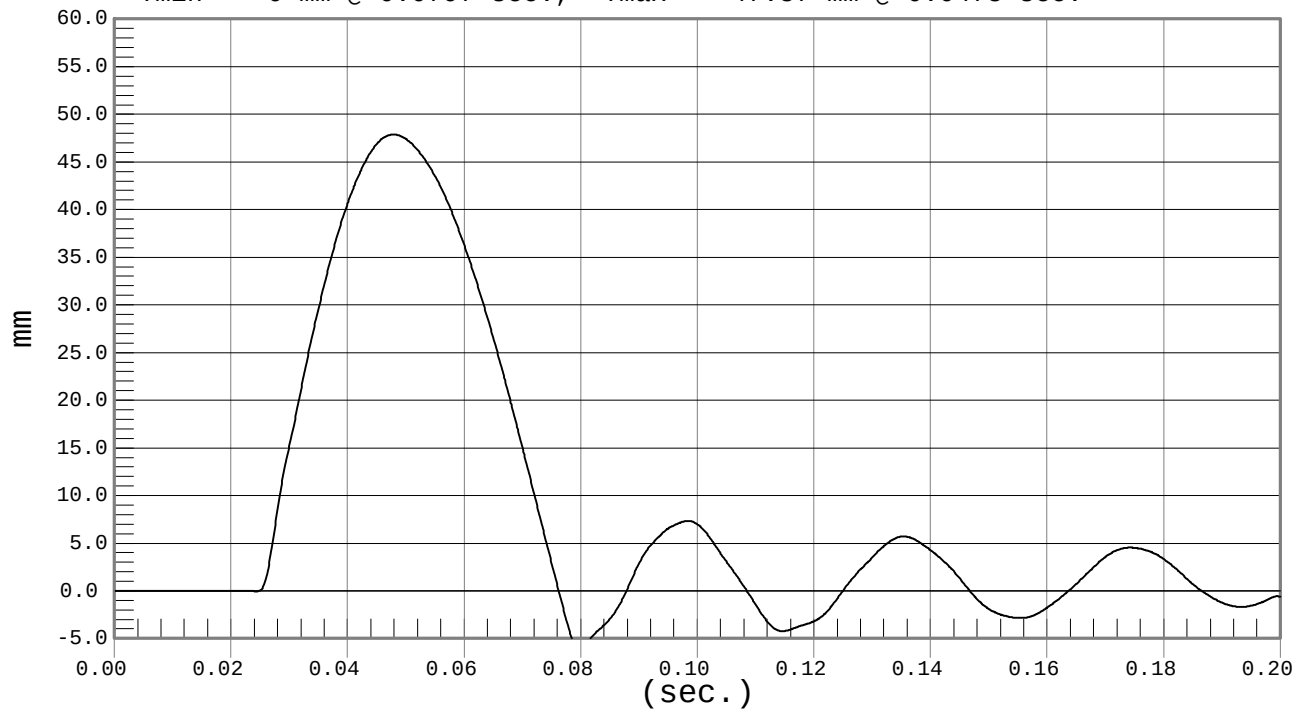


UPPER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-20-05
Speed: 13.1 fps, 4.00 M/s

Ymin = -6 mm @ 0.0797 sec., Ymax = 47.87 mm @ 0.0478 sec.



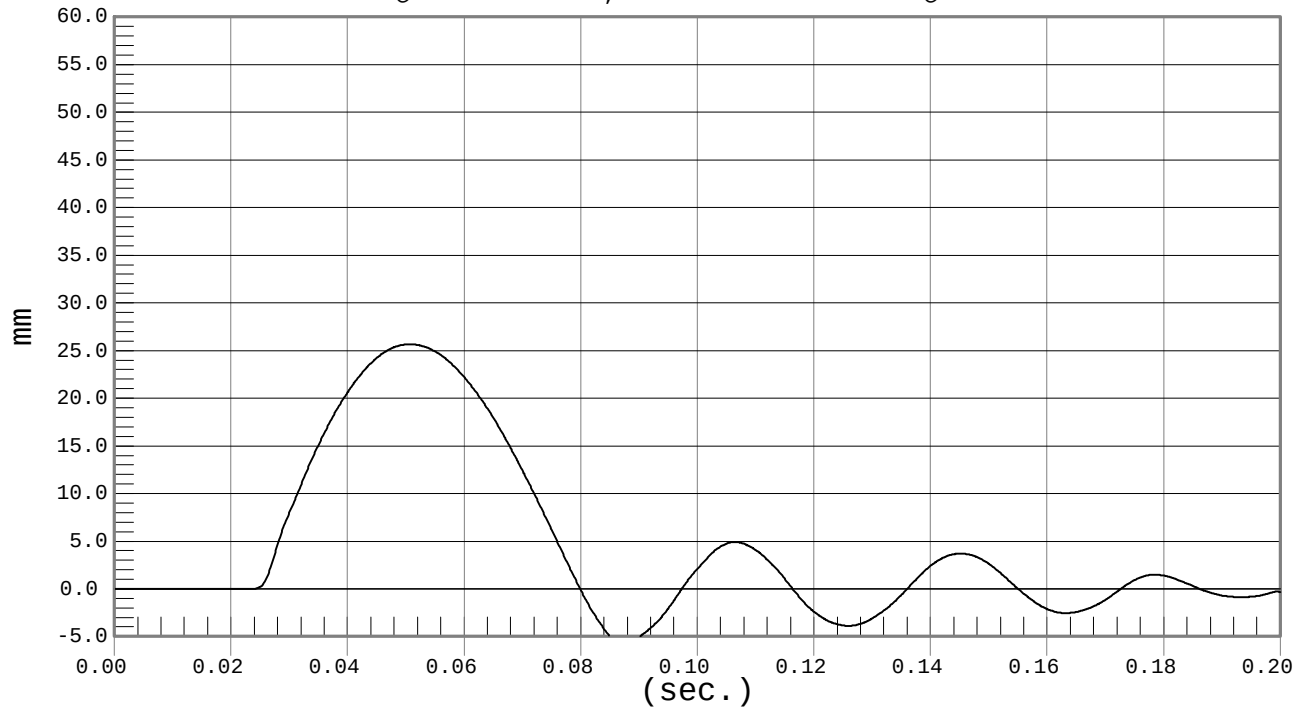


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-20-05
Speed: 6.6 fps, 2.00 M/s

Ymin = -5.82 mm @ 0.0870 sec., Ymax = 25.66 mm @ 0.0506 sec.

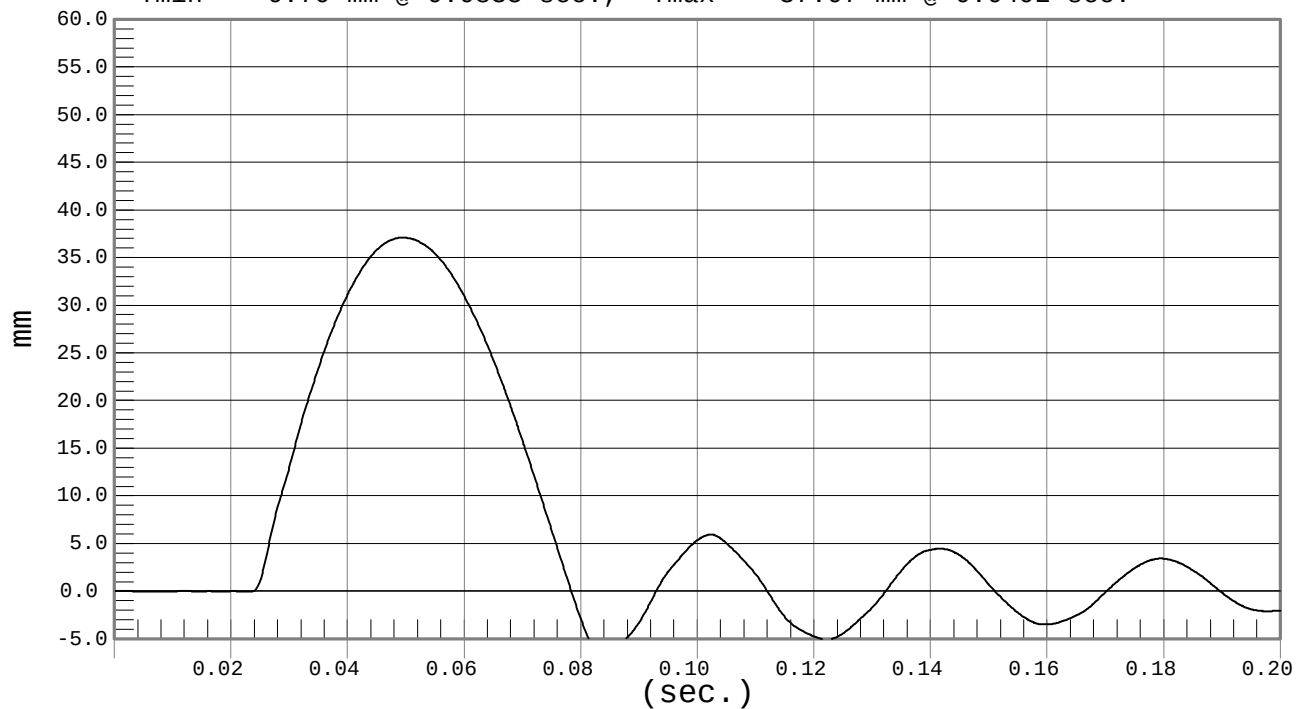


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-20-05
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.79 mm @ 0.0835 sec., Ymax = 37.07 mm @ 0.0492 sec.



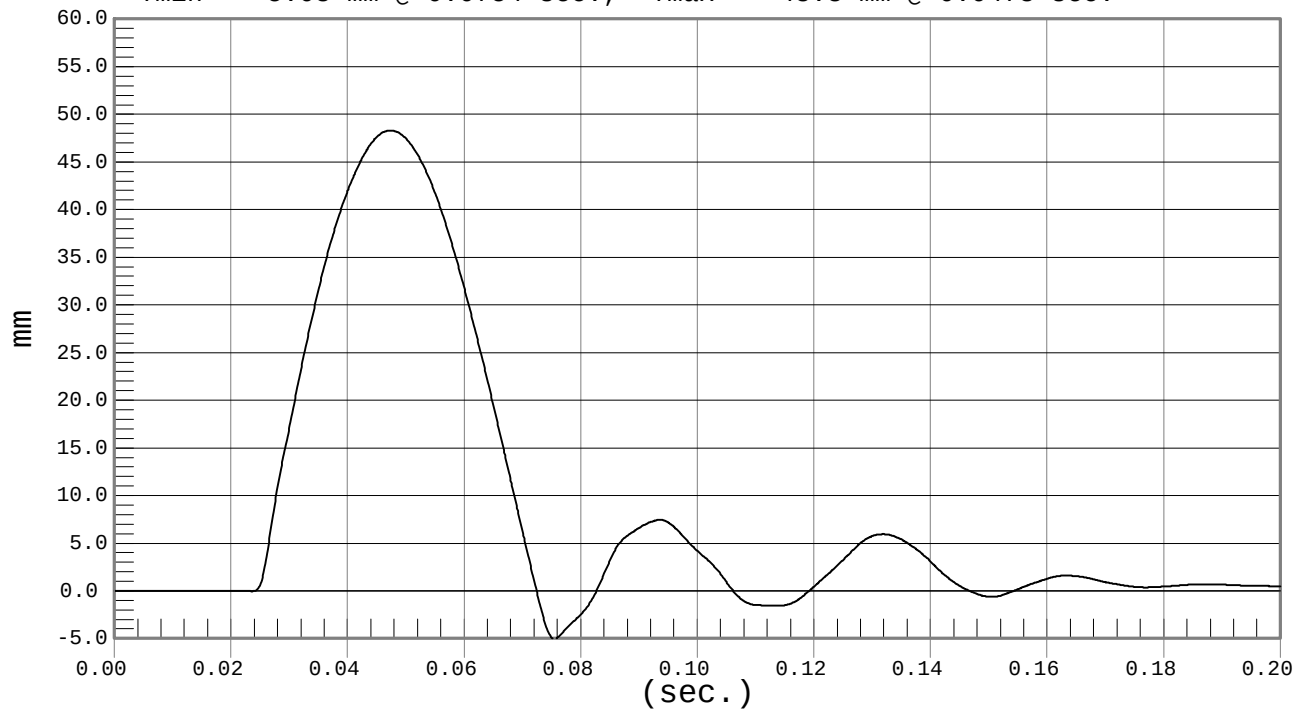


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-20-05
Speed: 13.1 fps, 4.00 M/s

Ymin = -5.03 mm @ 0.0754 sec., Ymax = 48.3 mm @ 0.0473 sec.



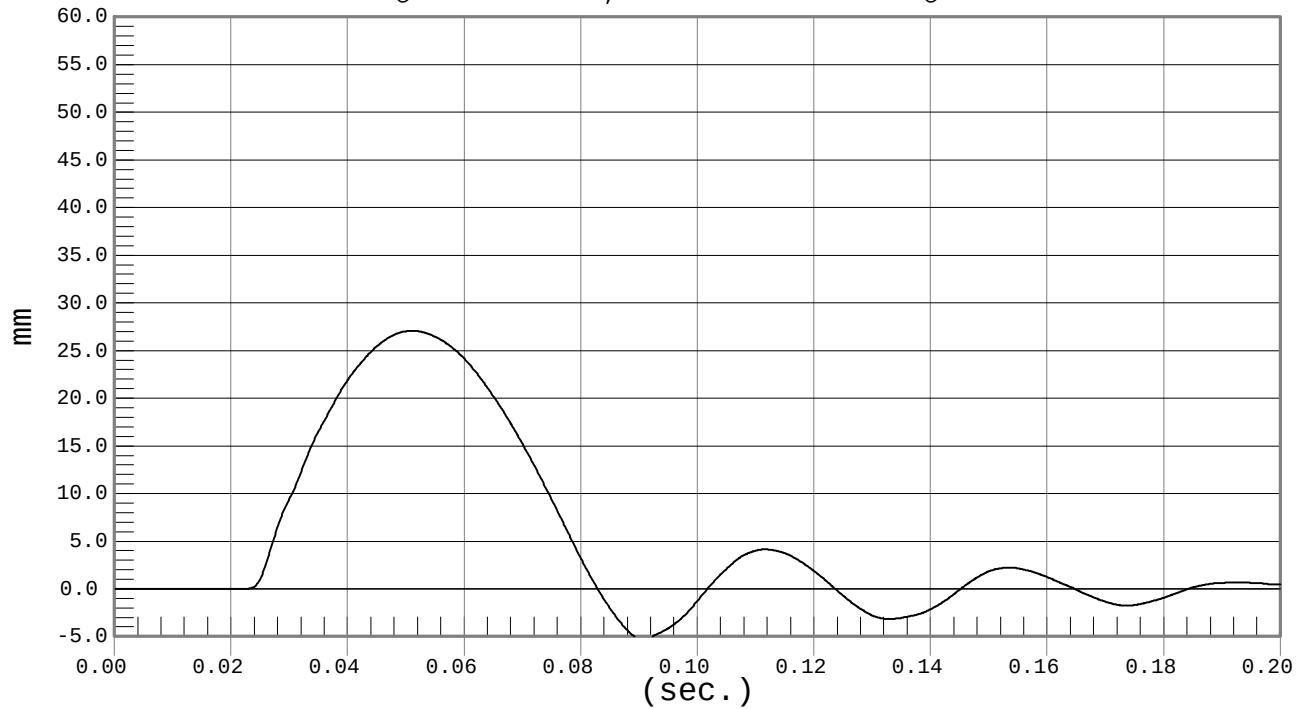


LOWER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-20-05
Speed: 6.6 fps, 2.00 M/s

Ymin = -5.25 mm @ 0.0905 sec., Ymax = 27.07 mm @ 0.0511 sec.

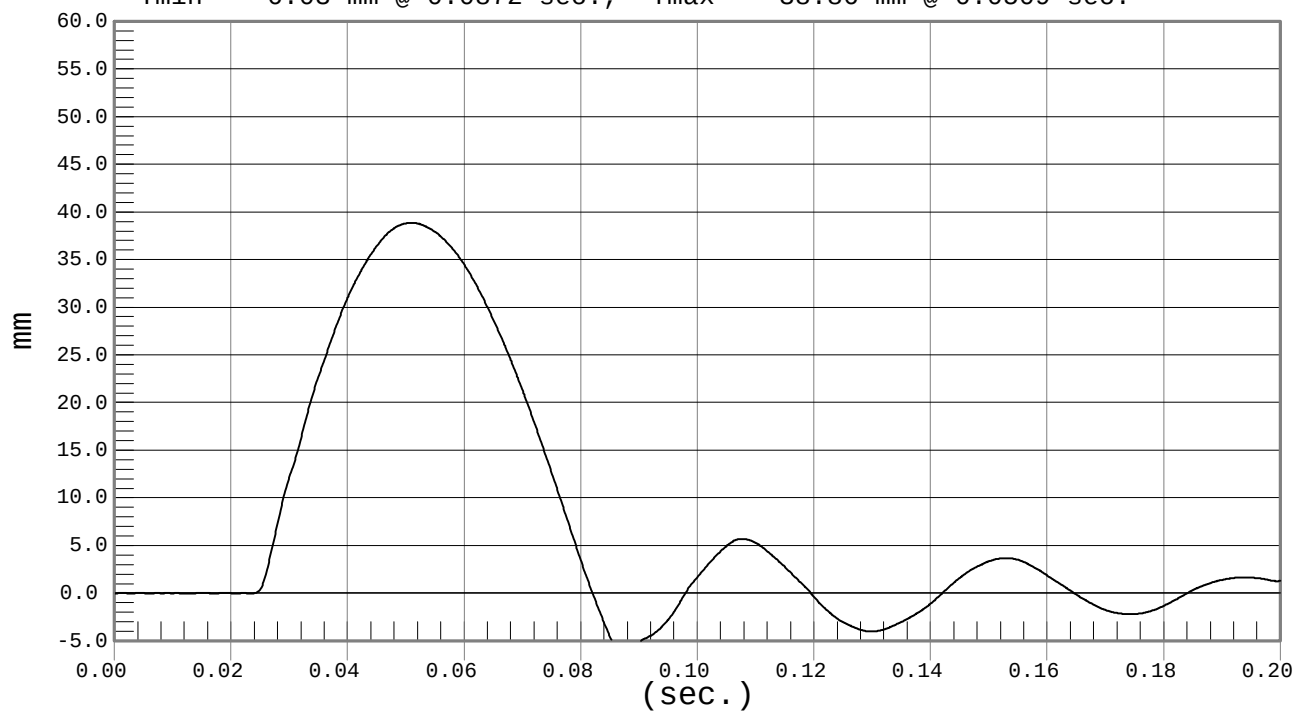


LOWER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-20-05
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.03 mm @ 0.0872 sec., Ymax = 38.86 mm @ 0.0509 sec.



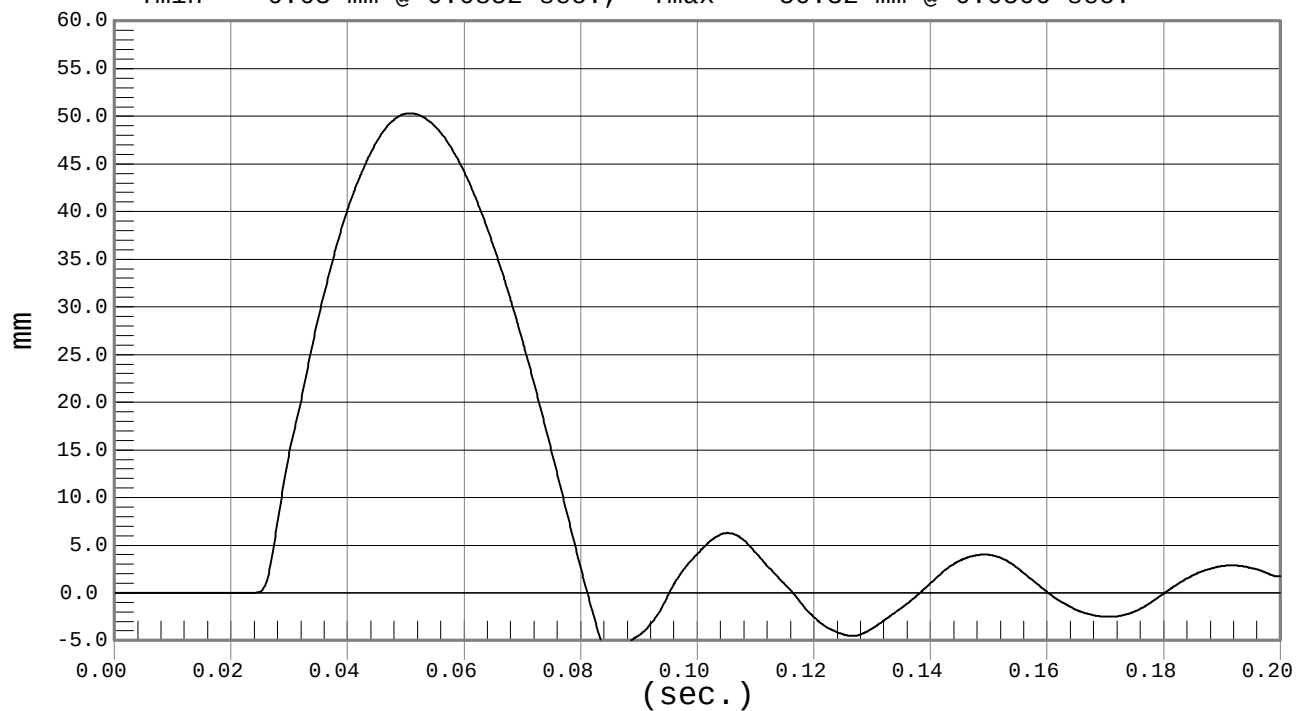


LOWER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 01-20-05
Speed: 13.1 fps, 4.00 M/s

Ymin = -6.63 mm @ 0.0852 sec., Ymax = 50.32 mm @ 0.0506 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 1/20/05

Dummy Serial Number: 009

Test Number: D05137

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.0
Relative Humidity (%)	10 – 70	22
Probe Speed (m/s)	3.90 – 4.10	4.02
Maximum Impact Force	4.00 – 4.80 kN	4.75
Time of Maximum Force	10.60 – 13.00 ms	11.90
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.21
Time of Max. Total Force	10.00 – 12.30 ms	10.20

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

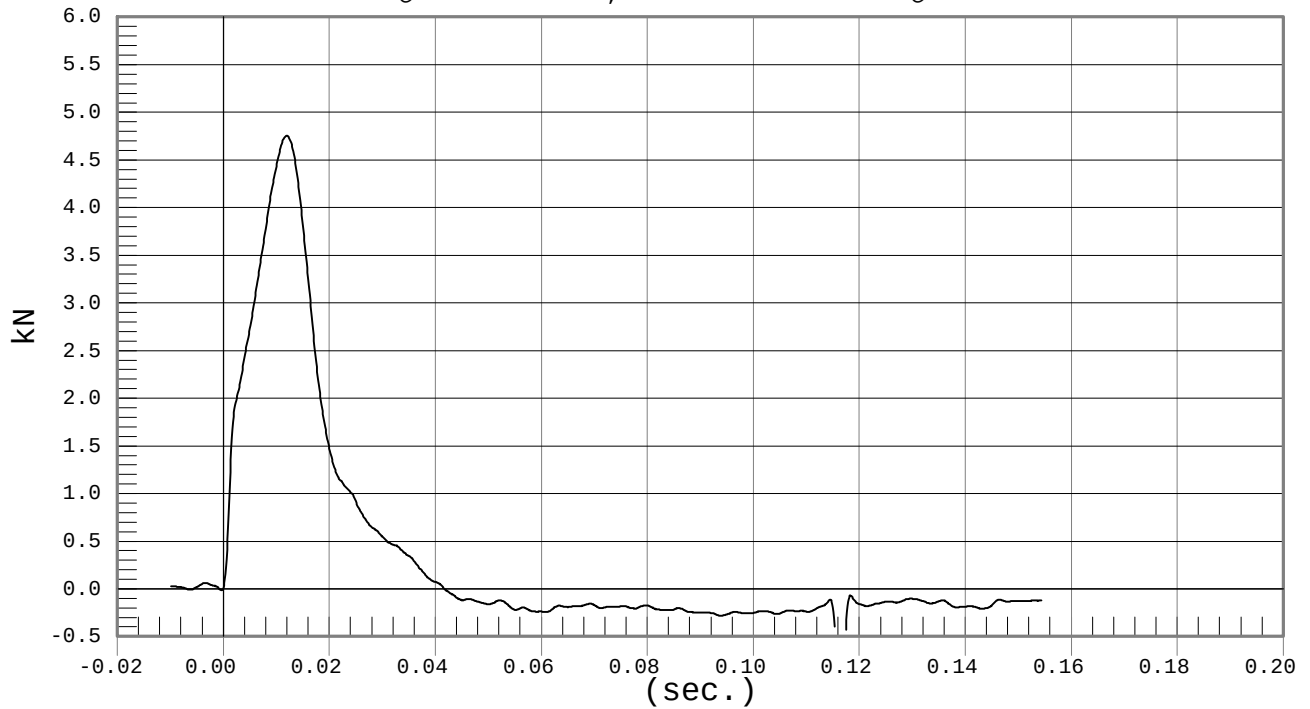


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 01-20-05
Speed: 13.2 fps, 4.03 M/s

Ymin = -2.19 kN @ 0.1163 sec., Ymax = 4.75 kN @ 0.0119 sec.

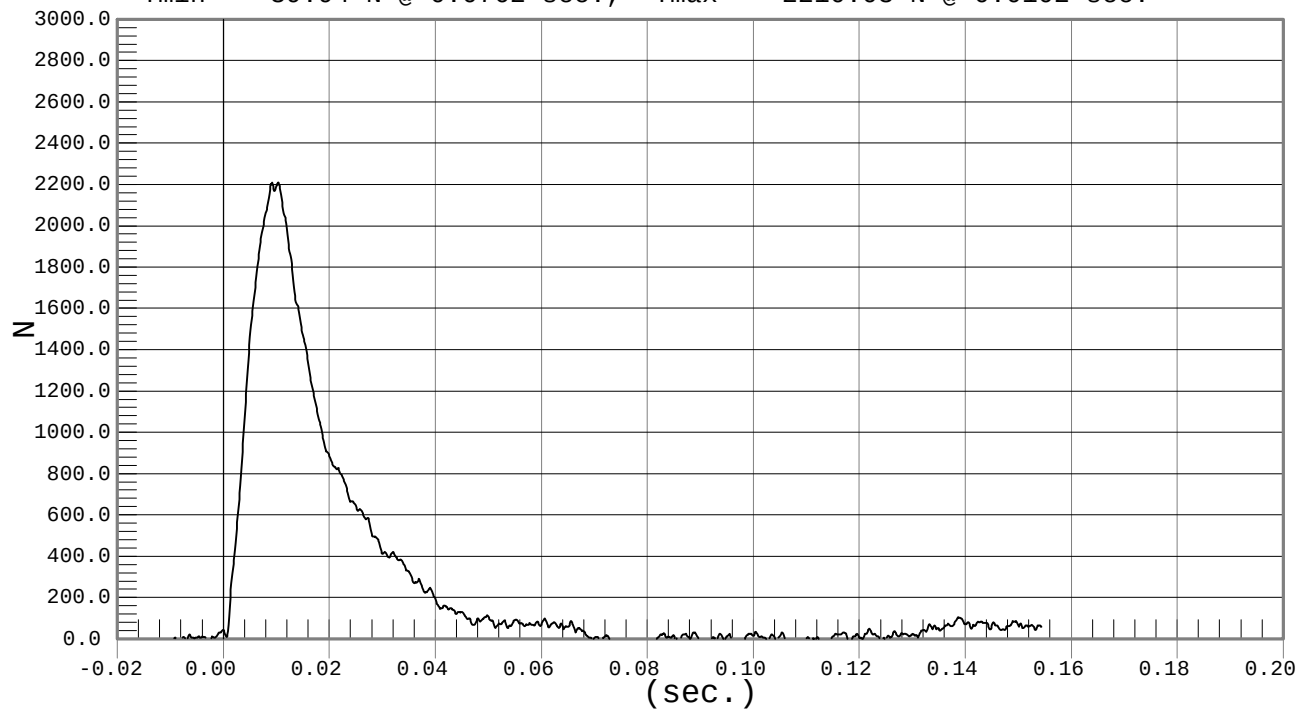


ABDOMEN FORCE

Test Desc.: ABDOMEN IMPACT
Component: Dummy #009

Test Date: 01-20-05
Speed: 13.3 fps, 4.05 M/s

Ymin = -39.94 N @ 0.0762 sec., Ymax = 2210.03 N @ 0.0102 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 1/20/05

Dummy Serial Number: 009

Test Number: D05138

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	20.9
Relative Humidity (%)		10 – 70	20
Pendulum Speed		5.95 – 6.15	6.10
Pendulum Deceleration	10 msec	$\dot{2}.46 - \dot{1}.59$ m/sec	$\dot{2}.25$
	20 msec	$\dot{5}.25 - \dot{4}.07$ m/sec	$\dot{5}.10$
	25 msec	$\dot{6}.64 - \dot{5}.30$ m/sec	$\dot{6}.24$
	30 msec	≥ -6.5 m/sec	$\dot{6}.35$
Maximum Flexion Angle		45.0 – 55.0 deg	51.1
Time of Max. Flexion Angle		39.0 – 53.0 ms	46.2
Maximum Angle Theta (A)		31.0 – 35.0 deg	32.4
Time of Max. Theta (A)		44.0 – 52.0 ms	44.9
Maximum Angle Theta (B)		27.92– 30.42 deg	29.38
Time of Max. Theta (B)		44.0 – 52.0 ms	44.4

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

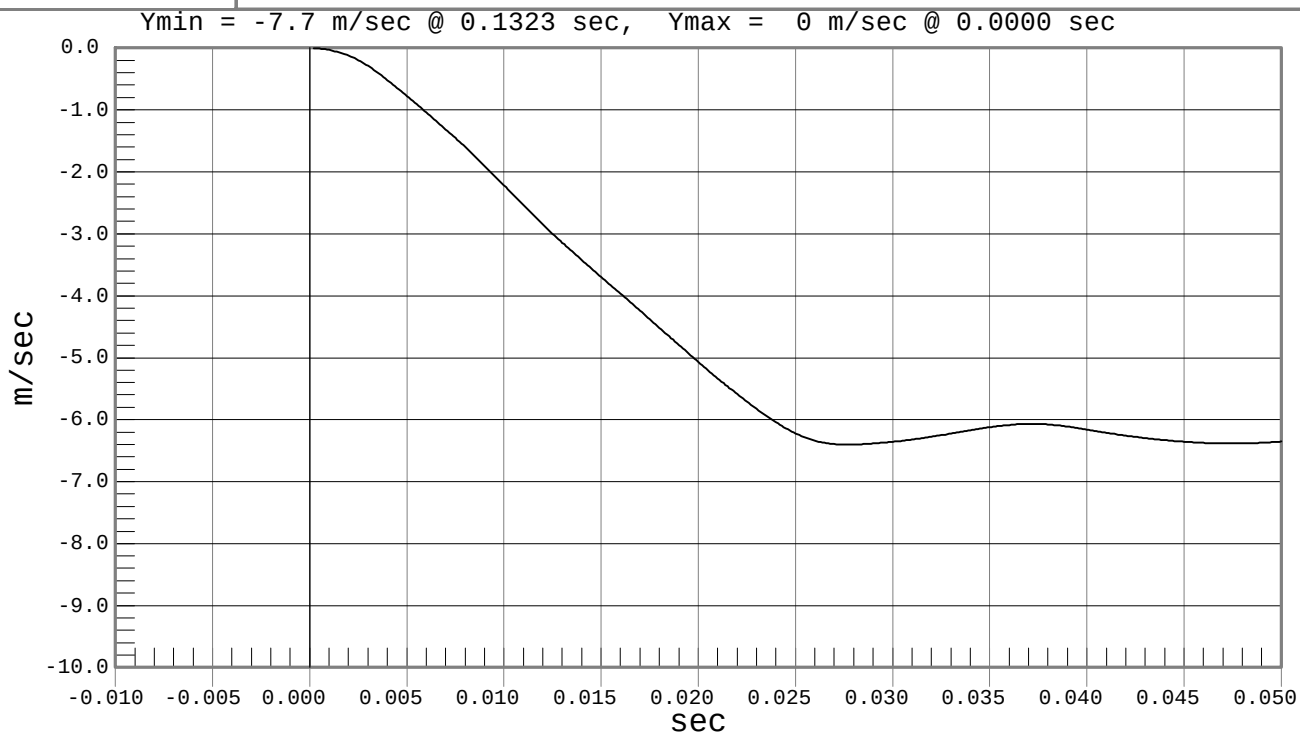
Approved By: David Winkelbauer



PENDULUM DECELERATION

Test Desc.: Lumbar Bending
Component: Dummy #009

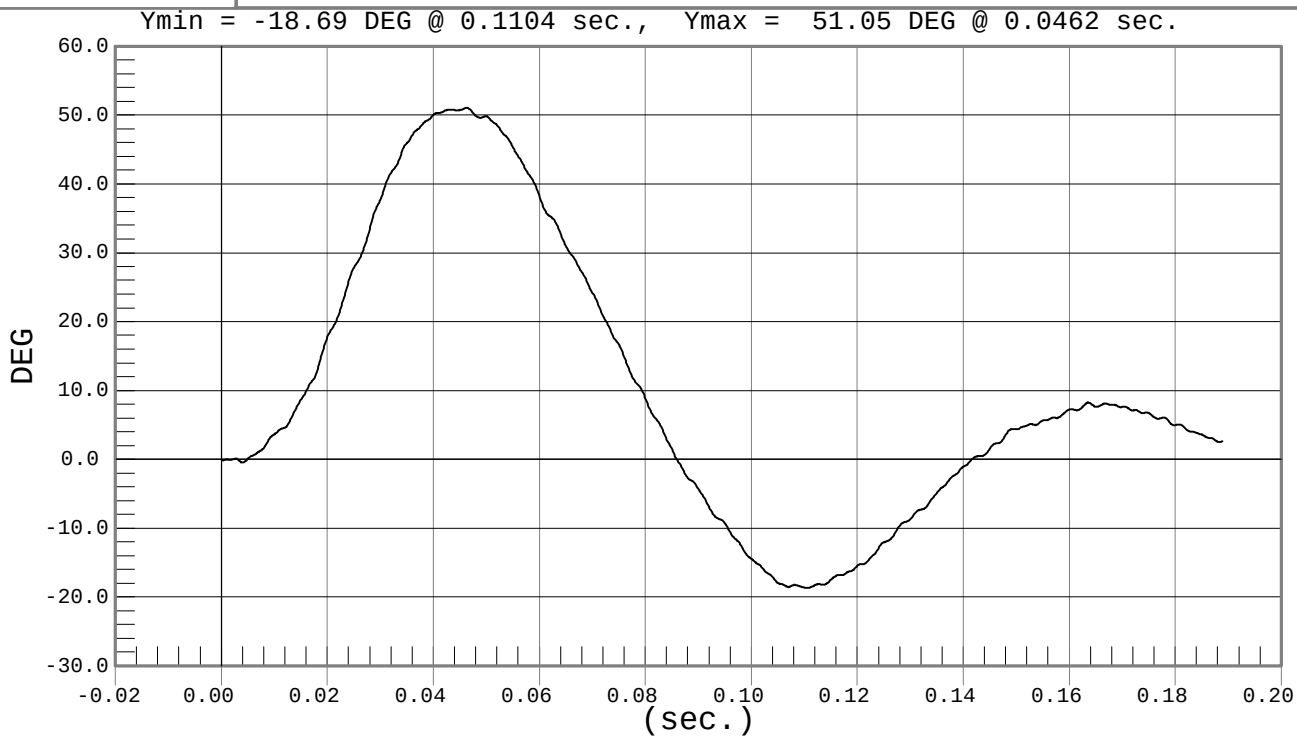
Test Date: 01-20-05
Speed: 20.0 fps, 6.10 M/s



FLEXION ANGLE

Test Desc.: Lumbar Bending
Component: Dummy #009

Test Date: 01-20-05
Speed: 20.0 fps, 6.10 M/s



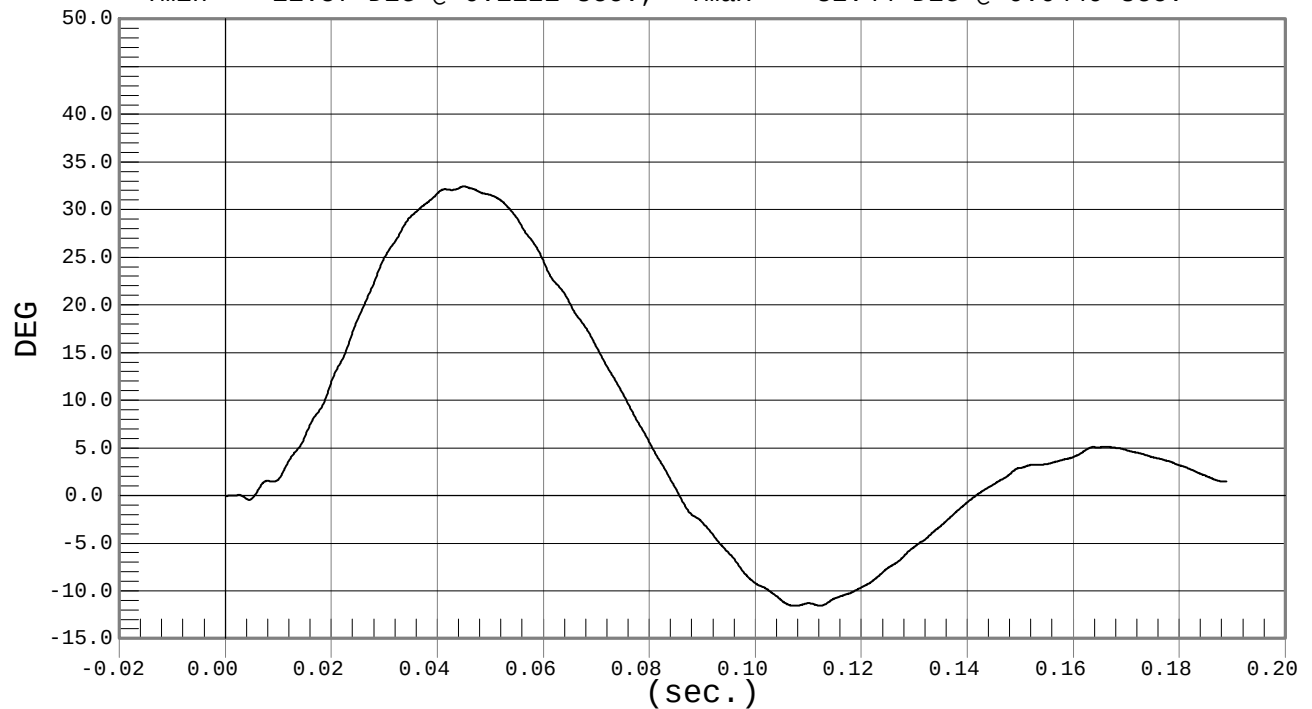


Test Desc.: Lumbar Bending
Component: Dummy #009

THETA A

Test Date: 01-20-05
Speed: 20.0 fps, 6.10 M/s

Ymin = -11.57 DEG @ 0.1121 sec., Ymax = 32.44 DEG @ 0.0449 sec.

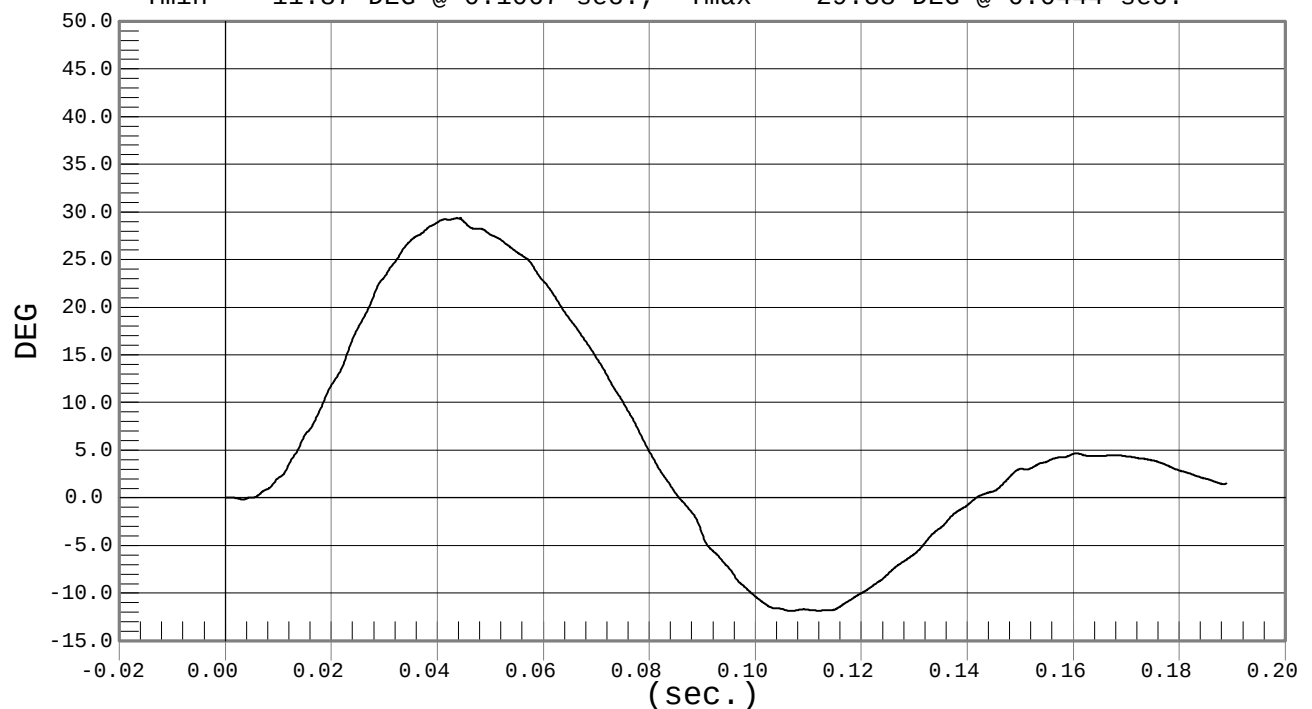


Test Desc.: Lumbar Bending
Component: Dummy #009

THETA B

Test Date: 01-20-05
Speed: 20.0 fps, 6.10 M/s

Ymin = -11.87 DEG @ 0.1067 sec., Ymax = 29.38 DEG @ 0.0444 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 1/21/05

Dummy Serial Number: 009

Test Number: D05139

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.5
Relative Humidity (%)	10 – 70	18
Pendulum Speed	4.20 – 4.40 m/s	4.27
Maximum Impactor Force	4.40 – 5.40 kN	4.87
Time of Max. Impactor Force	10.30 – 15.50 ms	13.70
Maximum Pubic Force	1.04 – 1.64 kN	1.34
Time of Max. Pubic Force	9.90 – 15.90 ms	15.40

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

Approved By: David Winkelbauer

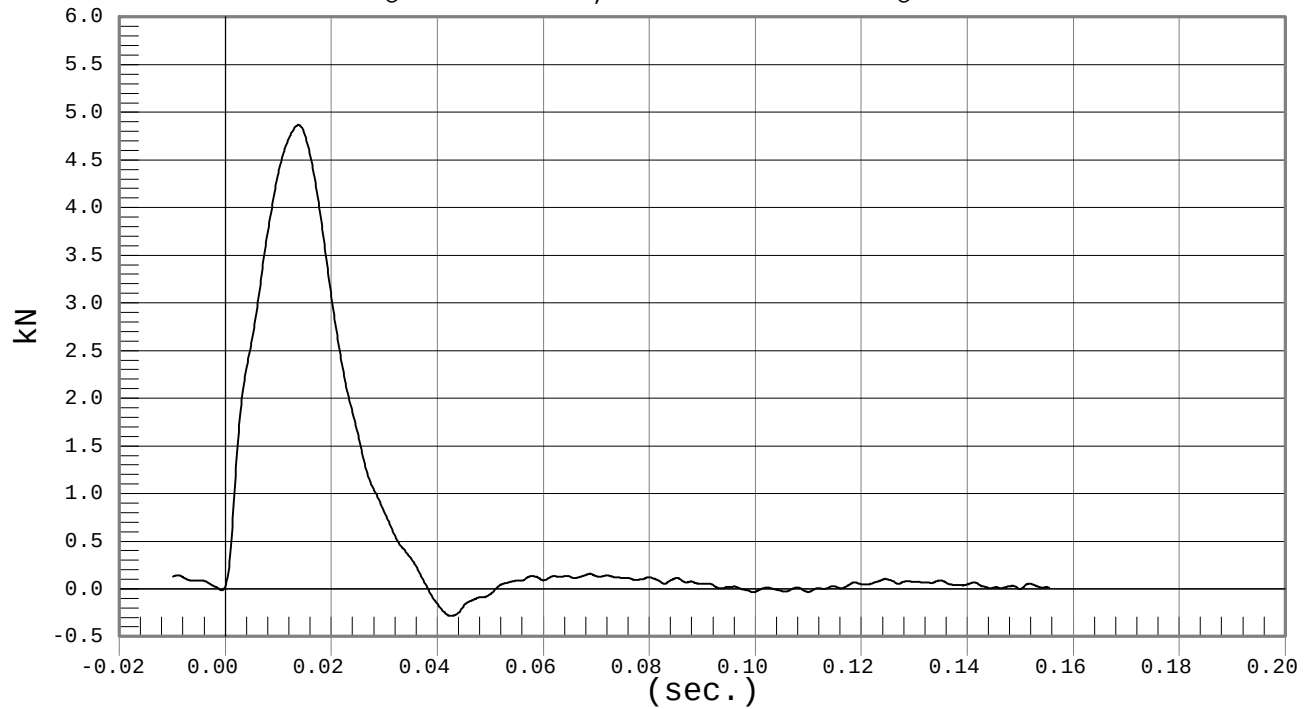


IMPACTOR FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 01-21-05
Speed: 14.0 fps, 4.27 M/s

Ymin = -.28 kN @ 0.0425 sec., Ymax = 4.87 kN @ 0.0137 sec.

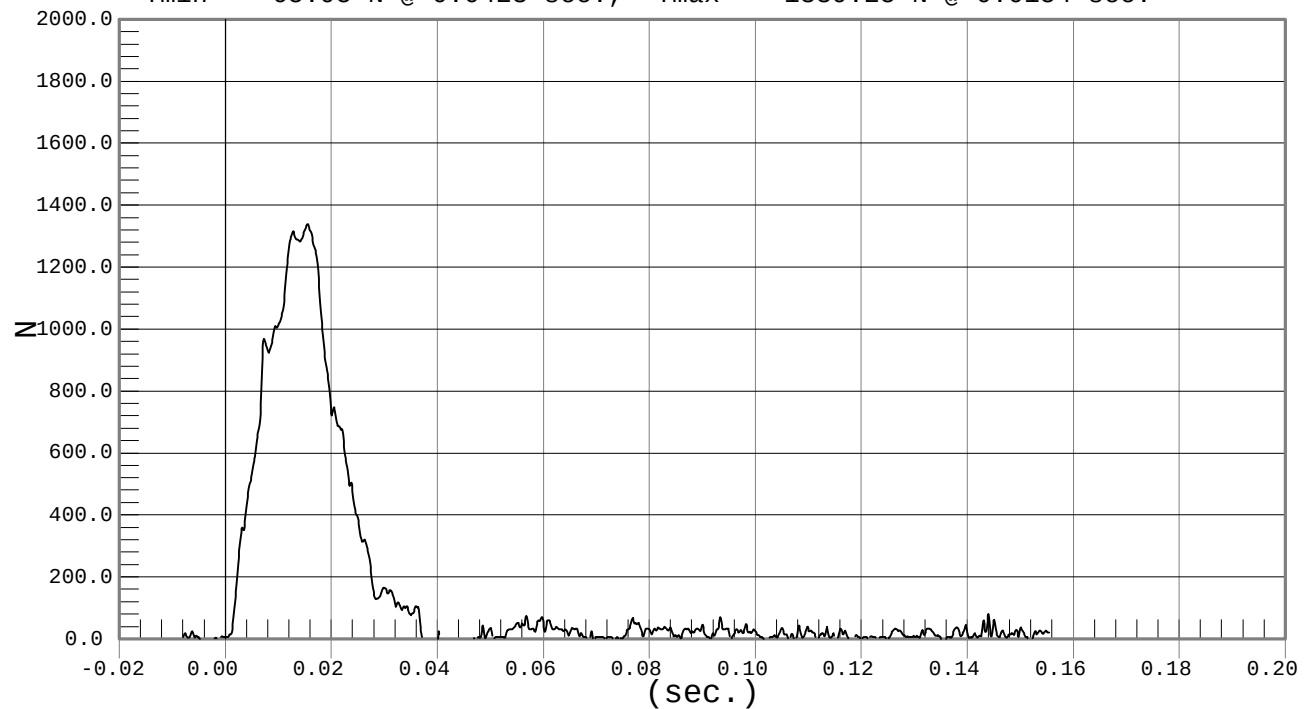


PUBIC FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 01-21-05
Speed: 14.0 fps, 4.27 M/s

Ymin = -65.95 N @ 0.0423 sec., Ymax = 1339.25 N @ 0.0154 sec.



APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY CALIBRATION DATA

	INSTRUMENTS FOR LEFT FRONT DUMMY ES2: 009		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X Accelerometer	AGTB5	Endevco	1/03/05
Head Y Accelerometer	ANAN3	Endevco	1/03/05
Head Z Accelerometer	ANAN6	Endevco	1/03/05
Head Y - Front	F16-F14	Entran	11/23/04
Head Z - Front	F28-N03	Entran	11/23/04
Head X – Left	AH0D1	Endevco	11/16/04
Head Z – Left	J11014	Endevco	11/16/04
Head X – Upper	J10730	Endevco	11/16/04
Head Y – Upper	AP2G9	Endevco	11/16/04
Upper Neck Load Cell	105	FTSS	9/27/04
Lower Neck Load Cell	110	FTSS	9/27/04
Shoulder Load Cell	119	Endevco	9/24/04
T12 Load Cell	103	Endevco	9/24/04
Upper Spine X	J22034	Endevco	11/16/04
Upper Spine Y	AJ9T6	Endevco	1/03/05
Upper Spine Z	AH0M0	Endevco	11/16/04
Lower Spine X	AGM47	Entran	1/03/05
Lower Spine Y	AJ9D9	Endevco	1/03/05
Lower Spine Z	AJ820	Endevco	1/03/05
Upper Rib Y	AN8D5	Endevco	1/03/05
Mid Rib Y	AC913	Endevco	1/03/05
Lower Rib Y	J12450	Endevco	1/03/05
Rib Displacement	009	Honeywell	1/03/05
Front Abdomen FY	ABG122FY	FTSS	9/30/04
Mid Abdomen FY	ABG123FY	FTSS	9/30/04
Rear Abdomen FY	ABG124FY	FTSS	9/30/04
Pubic Symphysis FY	PG115FY	FTSS	9/24/04
Pelvis X	SGTM2	FTSS	1/03/05
Pelvis Y	P24261	Endevco	1/03/04
Pelvis Z	P21352	Endevco	1/03/05
Right Femur Load Cell	135	FTSS	9/28/04
Left Femur Load Cell	136	FTSS	9/28/04

VEHICLE INSTRUMENTS CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Mid A-Post Y	H20-R08	Entran	9/24/04
Left Lower A-Post Y	A29-F09	Entran	9/13/04
Left Mid B-Post Y	J07-M19	Entran	10/29/04
Left Lower B-Post Y	F15-M09	Entran	9/27/04
Left A-Post @ Sill Y	K18-D14	Entran	12/02/04
Left B-Post @ Sill Y	H21-N16	Entran	10/27/04
Driver Seat Track Y	K11-Z01	Entran	10/22/04
Right Front Sill X	L18-N12	Entran	10/22/04
Right Front Sill Y	J25-R17	Entran	12/01/04
Right Front Sill Z	J25-R20	Entran	12/01/04
Left Rear Sill Y	A29-B06	Entran	9/13/04
Left Front Sill Y	K20-J10	Entran	12/02/04
Floorpan @ Rear Axle X	K07-R11	Entran	8/25/04
Floorpan @ Rear Axle Y	L18-J07	Entran	8/24/04
Floorpan @ Rear Axle Z	A27-R17	Entran	10/22/04
Vehicle CG X	K18-J04	Entran	12/04/04
Vehicle CG Y	K18-D18	Entran	12/02/04
Vehicle CG Z	K18-D15	Entran	12/02/04
Left Front Door @ Pelvis	C12-M03	Entran	11/02/04
Left Front Door @ Arm	I28-H43	Entran	10/29/04
Left Front Door @ Knee	K07-R09	Entran	12/02/04
Left Front Door @ Mid Rib	L17-D08	Entran	9/13/04
Upper Engine X	C24-B02	Entran	9/30/04
Upper Engine Y	H20-R07	Entran	10/27/04
Firewall Y	K18-D11	Entran	12/02/04