REPORT NUMBER: TO1-MGA-2004-009

OBLIQUE RIGID SIDE POLE IMPACT
ES-2RE DRIVER POSITION
TEST DATE: APRIL 29, 2005
Task Order #T0001 / RFP #0004

2005 SAAB 9-3 CONVERTIBLE
NHTSA NUMBER: R50520

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

FINAL REPORT SUBMITTED:
April 12, 2006

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

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

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Prepared by: Shefalika Naik
Shefalika Naik, Project Engineer

Reviewed by: David Winkelbauer
David Winkelbauer, Project Engineer

Approval Date: May 13, 2005

Technicians:	Wayne Dahlke Jordan Haynes Erik Nelson Chris Novak Charles Carlson Nick Kosinski Daniel Sienko Jr.
Engineers:	Gary Strassburg Jay Nutting
Photographic:	Matt Jacobson Alan Raguse
Instrumentation/ Calibration:	Jamie Aide Jessica Gall David Wilcox
Secretary:	Cyndy Kline

FINAL REPORT ACCEPTED BY:

Accepted By: _____
Contract Technical Manager

Acceptance Date: _____

TABLE OF CONTENTS

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)

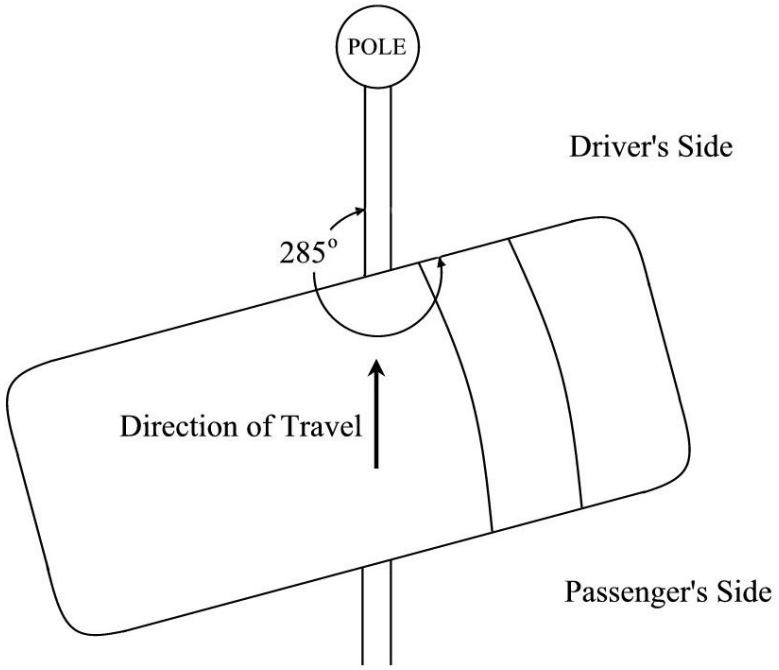
MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 2
SUMMARY OF SIDE IMPACT TEST

An oblique rigid side pole impact test at 75 degrees was performed on a 2005 Saab 9-3. The subject vehicle was towed into an oblique rigid pole at a velocity of 32.3 km/h. The weight of the vehicle as tested was 1787.5 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on April 29, 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:

		Requirement	Left Front
HIC 15 (CFC 1000)	T1 (msec)		48.1
	T2 (msec)		63.1
	HIC 15		239.1
HIC 36 (CFC 1000)	T1 (msec)		44.4
	T2 (msec)		65.3
	HIC 36	< 1000	254.4
Thorax (CFC 180)			
Chest Deflection	Upper Rib Deflection	< 42	-39.0
	Mid Rib Deflection	< 42	-39.5
	Lower Rib Deflection	< 42	-39.0
Lower Spine (CFC 180)			
	Lower Spine Resultant	< 82	49.1
Abdomen (CFC 600)			
	Front Abdominal Force		189
	Mid Abdominal Force		296
	Rear Abdominal Force		506
	Sum of Abdominal Force	< 2500	841
Pelvis (CFC 600)			
	Pubic Symphysis Force	< 6000	-2914

Contact Times	Left Front
Head (msec)	**
Arm (msec)	17.3
Rib (msec)	19.8
Pelvis (msec)	23.7

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

TEST NOTES

Driver Left Femur FZ – No valid data collected
Left Front Sill Y – No valid data after 10msec
LF Door @ Mid Rib Y – No valid data collected after 15 msec
Left B-Post @ Sill Y – No valid data collected after 60 msec

The roll cage deployed during test. See Appendix A for photos.

SECTION 3

ES-2RE SIDE IMPACT DUMMY AND VEHICLE TEST DATA

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005

TEST VEHICLE INFORMATION

Make	Saab
Model	9-3 Linear Convertible
Body Style	Convertible Passenger Car
VIN	YS3FB79N456006134
Color	Black
Odometer Reading (mile)	97
Transmission	Automatic
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	2.0
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	Saab Automobile AB
Date of Manufacture	11/04

GVWR (kg)	2009
GAWR Front (kg)	1152
GAWR Rear (kg)	1048

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Cold Pressure (kPa)	280	260
Recommended Tire Size	P215/55R16	P215/55R16
Tire Size on Vehicle	P215/55R16	P215/55R16
Tire Manufacturer	Pirelli	Pirelli

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket Bench		
Number Of Occupants	2	2		4
Capacity Wt. (VCW) (kg)				352
Cargo Wt. (RCLW) (kg)				79.8

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	496.7	337.9		519.8	390.5	
Right	kg	461.3	337.9		489.4	387.8	
Ratio	%	58.6	41.4		56.5	43.5	
Totals	kg	958.0	675.8	1633.8	1009.2	778.3	1787.5

TARGET TEST WEIGHT

Measured Parameter	Units	Value
As Delivered Vehicle Weight	kg	1633.8
Weight of 1 ES-2RE	kg	80.7
Rated Cargo Weight	kg	79.8
Vehicle Target Weight (TVTW)	kg	1794.3

TEST VEHICLE ATTITUDES

	Unit	As Delivered	Fully Loaded	Ready for Test
Right Door Sill Angle	Deg	0.9 ND	0.5 ND	0.6 ND
Left Door Sill Angle	Deg	0.9 ND	0.6 ND	0.6 ND
Front Bumper Angle	Deg	0.1 RD	0.1 LD	0.1 LD
Rear Bumper Angle	Deg	0.0	0.3 RD	0.1 RD

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

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2675
Weight of Ballast in Cargo Area	kg	0.0
Amount of Water in Fuel Tank	liters	15.1

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Impact Reference Line from Front Axle	mm	1328
Impact Point	mm	3 Forward
Impact Angle Difference	deg	1°

DATA SHEET NO. 1… (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005

NORMAL DESIGN RIDING POSITION

Driver seat back angle: 6° (The seat back angle was measured with an inclinometer on the head restraint tubes)

SEAT FORE/AFT POSITIONS

The driver's seat was power operated. The measurement was taken on the protruding rail, measured at rear edge.

Driver Seat: 71mm outer seat rail (absolute middle position in length, lowest in height)

STEERING COLUMN ADJUSTMENT

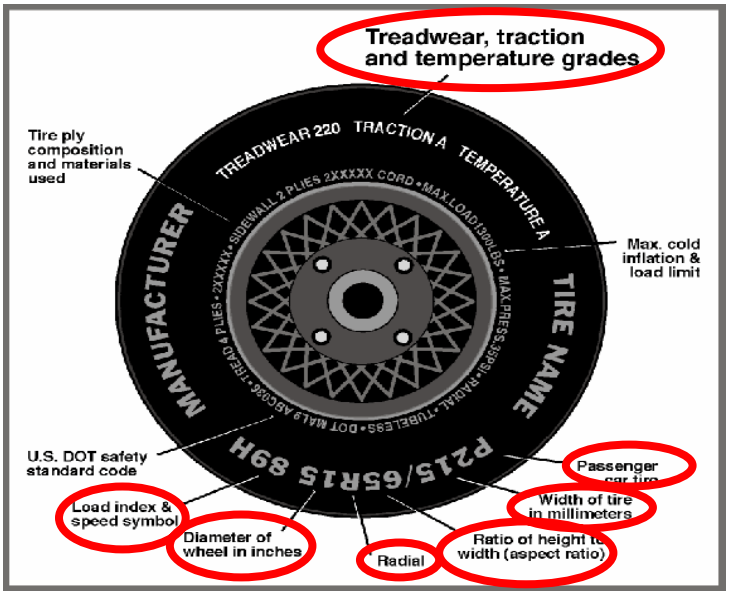
The column was placed in the mid position of travel.

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005

Vehicle Year	2005	Vehicle Make	Saab
VIN	YS3FB79N456006134	Vehicle Model	9-3 Convertible



	Front	Rear
Tire Manufacturer	Pirelli	Pirelli
Tire Name	P6 Four Seasons	P6 Four Seasons
Tire Type	P	P
Tire Width (mm)	215	215
Ratio of Height to Width (aspect ratio)	55	55
Radial	Y	Y
Wheel Diameter	16	16
Load Index & Speed Symbol	93H	93H
Treadwear	400	400
Traction Grade	A	A
Temperature Grade	A	A

DATA SHEET NO. 3

POST TEST OBSERVATIONS

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front
Dummy Type	ES-2RE
Head Contact	Airbag, Soft top, Headrest
Upper Torso Contact	Side Airbag
Lower Torso Contact	Side 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

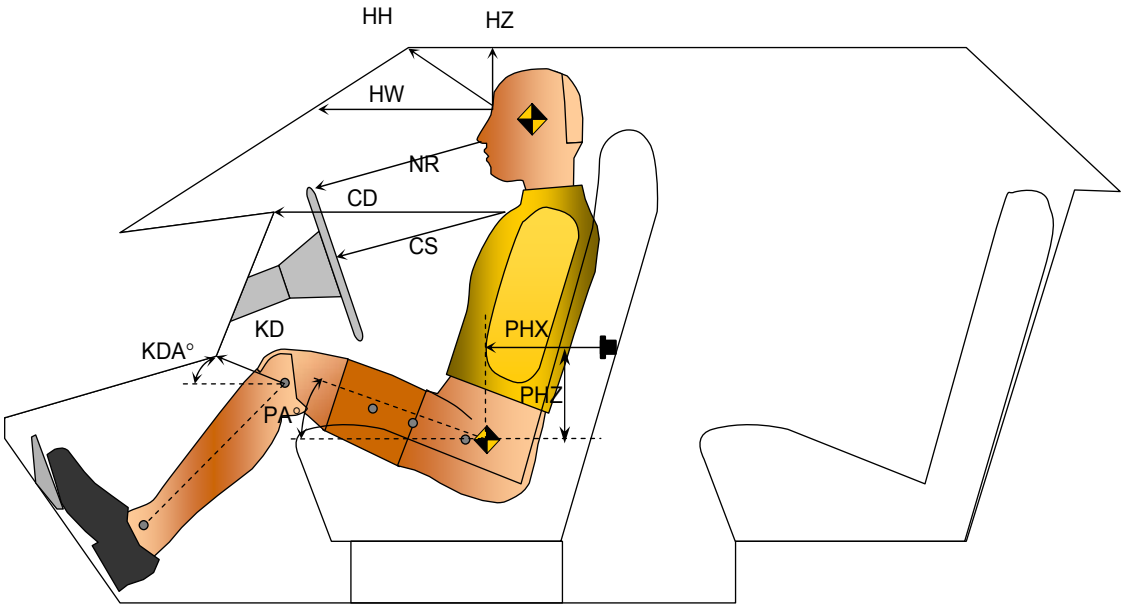
	Driver
Front	No
Side	Yes
Curtain	NA

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 4

ES-2RE LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005

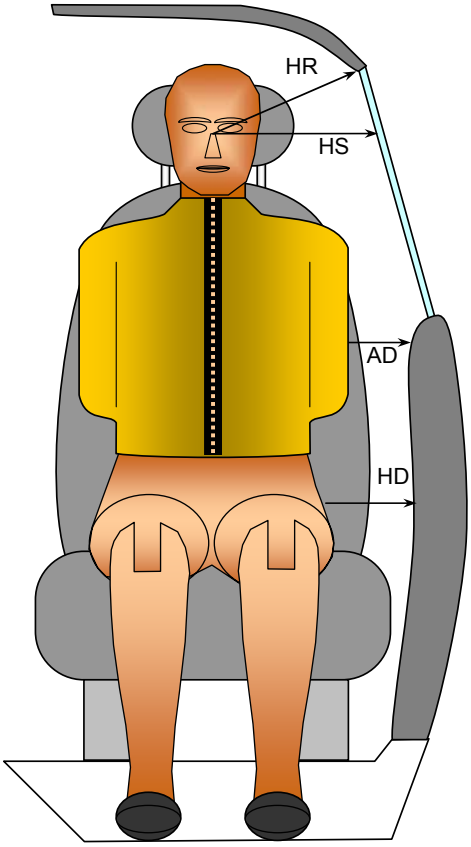


Driver Code	Measurement Description	Left Front	
		Length(mm)	Angle(°)
HH	Head to Header	454	
HW	Head to Windshield	550	
HZ	Head to Roof	128	
NR	Nose to Rim	466	
CD	Chest to Dash (Top of Rib)	555	
CS	Chest to Steering Wheel (Top of Rib)	375	
KDL	Left Knee to Dash	106	32.9
KDR	Right Knee to Dash	112	26.1
PA	Pelvic Angle (Longitudinal)		26.9
PA	Pelvic Angle (Lateral)		27.0
SA	Spine Angle (Longitudinal)		11.3
SA	Spine Angle (Lateral)		0.0
PHX	H-Point to Striker (X-Axis)	470	
PHZ	H-Point to Striker (Z-Axis)	138	

DATA SHEET NO. 5

ES-2RE LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005



FRONT VIEW OF DUMMY

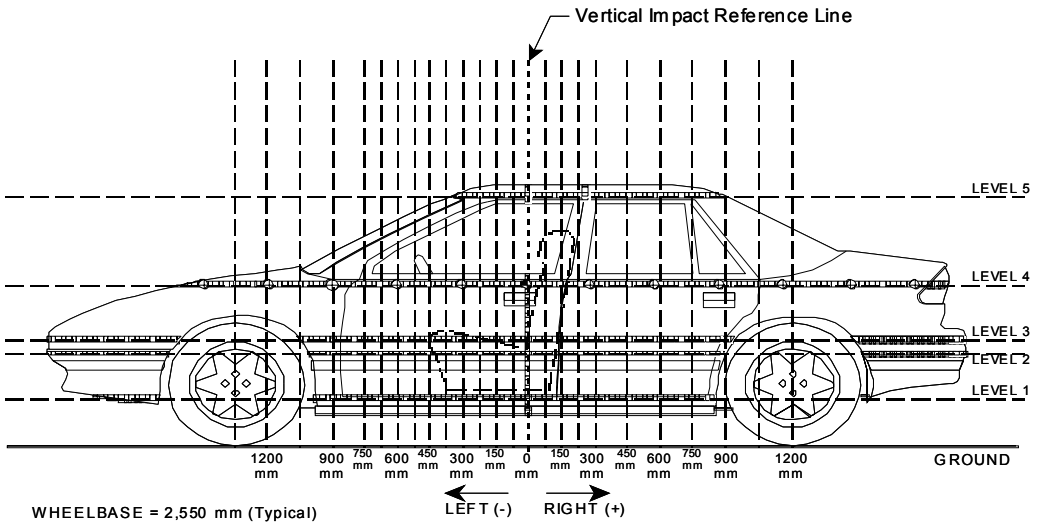
Code	Measurement Description	Units	Left Front
HR	Head to Side Header	mm	211
HS	Head to Side Window	mm	303
AD	Arm to Door	mm	103
HD	H-Point to Door	mm	149

DATA SHEET NO. 6

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005

PRETEST AND POST TEST EXTERIOR PROFILE MEASUREMENTS



LEFT SIDE VIEW

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	1449
4	Window Sill	1042
3	Mid Door	758
2	Occupant H-Point	656
1	Sill Top	420

DATA SHEET NO. 7
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005

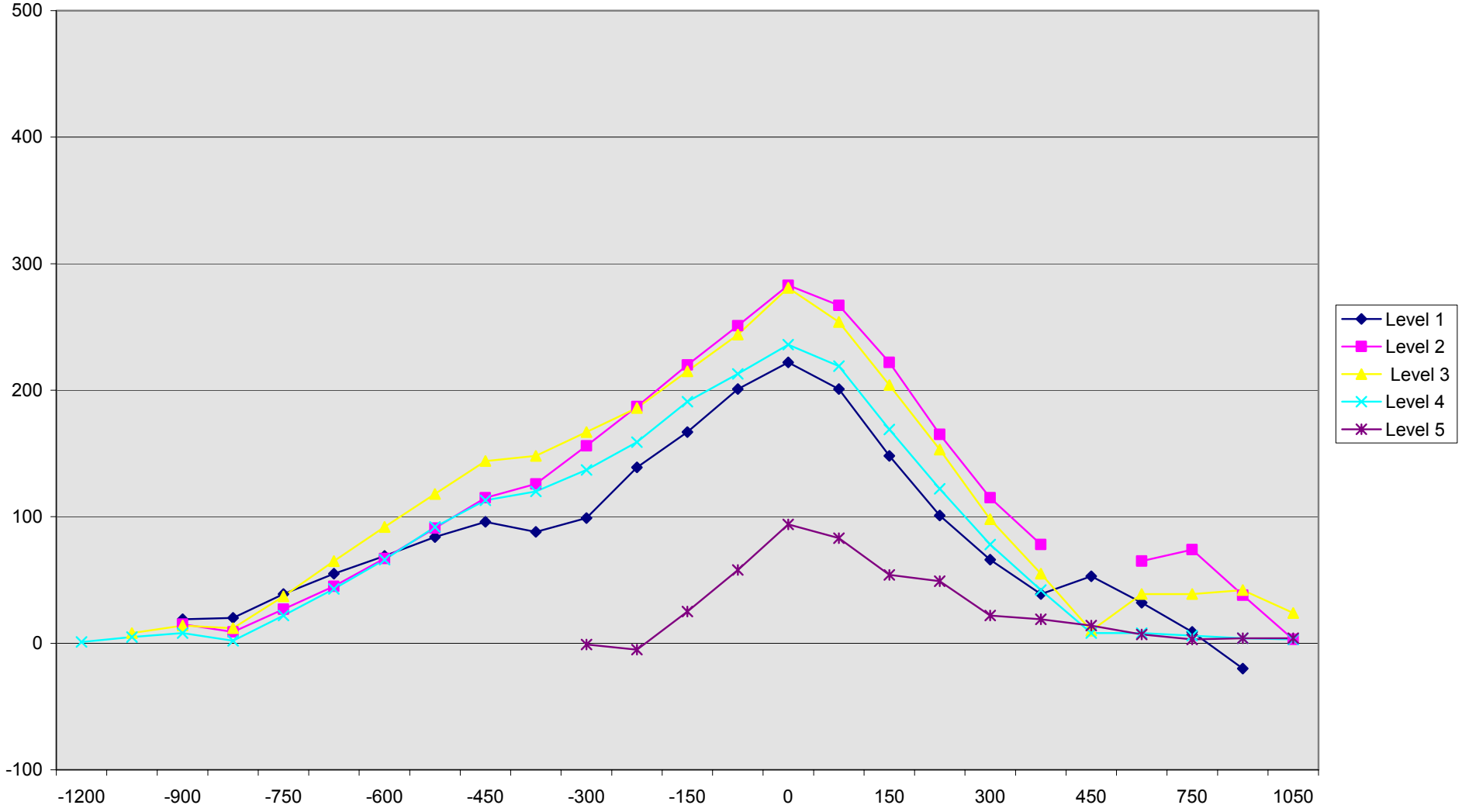
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1575															
-1425															
-1275															
-1200				289					290					1	
-1125															
-1050			230	283				238	288				8	5	
-975															
-900	255	234	232	279		274	249	246	287		19	15	14	8	
-825	255	234	233	279		275	243	245	281		20	9	12	2	
-750	253	233	232	277		292	260	269	299		39	27	37	22	
-675	252	233	231	276		307	278	296	319		55	45	65	43	
-600	251	232	229	276		320	299	321	342		69	67	92	66	
-525	251	231	229	275		335	322	347	367		84	91	118	92	
-450	250	230	228	277		346	345	372	390		96	115	144	113	
-375	249	228	227	275		337	354	375	395		88	126	148	120	
-300	249	224	226	277	459	348	380	393	414	458	99	156	167	137	-1
-225	249	221	225	278	454	388	408	411	437	449	139	187	186	159	-5
-150	248	221	225	280	454	415	441	440	471	479	167	220	215	191	25
-75	247	219	225	280	455	448	470	469	493	513	201	251	244	213	58
0	247	216	224	283	455	469	499	505	519	549	222	283	281	236	94
75	247	216	224	285	454	448	483	478	504	537	201	267	254	219	83
150	246	216	222	288	457	394	438	426	457	511	148	222	204	169	54
225	245	216	223	290	459	346	381	376	412	508	101	165	153	122	49
300	244	216	223	293	462	310	331	321	371	484	66	115	98	78	22
375	245	215	223	297	466	284	293	278	339	485	39	78	55	42	19
450	244		224	302	470	297		234	310	484	53		10	8	14
525															
600	244	215	224	309	478	276	280	263	317	485	32	65	39	8	7
675															
750	243	215	225	316	489	252	289	264	322	492	9	74	39	6	3
825															
900	243	216	226	327	506	223	254	268	331	510	-20	38	42	4	4
975															
1050		215	224	337	518		218	248	340	522		3	24	3	4
1125															
1275															
1425															
1575															
1725															
1875															
1950				468					465					-3	
2025															
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 Saab 9-3 Test Date: April 29, 2005

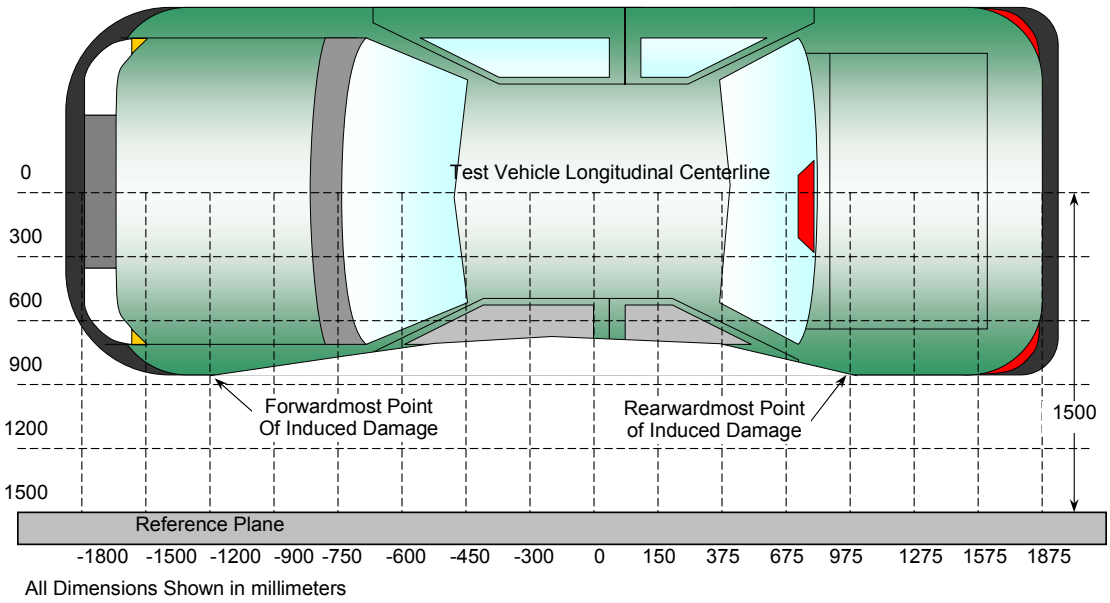


Measurement in mm.

DATA SHEET NO. 8

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005



TOP VIEW

Damage Profile Distances

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	1950 mm	4	468	465	-3
2	1211 mm	4	352	357	5
3	483 mm	1	244	297	53
4	-330 mm	4	276	414	138
5	-1062 mm	4	283	288	5
6	-1800 mm	4	358	366	8

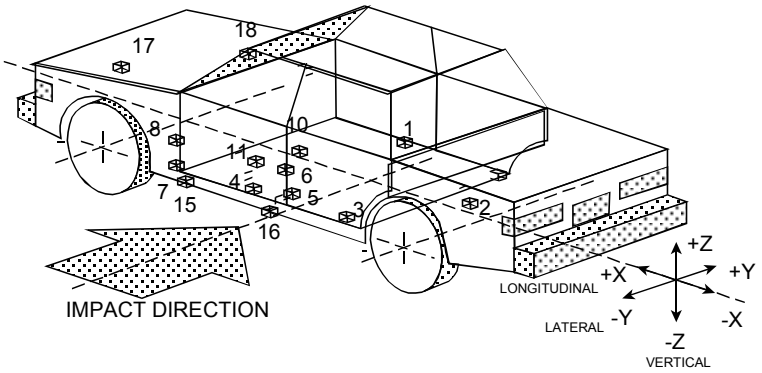
Reference plane is parallel to test vehicle longitudinal centerline.

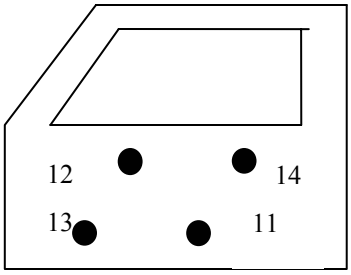
Given dimensions = Reference plane to car body.

DATA SHEET NO. 9

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005





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

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

DATA SHEET NO. 9... (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Long (X) Maximums (g's) (CFC 60)		Lat. (Y) Maximums (g's) (CFC 60)		Vert. (Z) Maximums (g's) (CFC 60)		Resultant (g's) (CFC 60)
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Max.
1	Right Side Sill at Front Seat	1.4	-2.8	19.5	-0.7	2.7	-7.6	20.9
2	Rear Floorpan Above Axle	1.9	-5.8	16.9	-1.2	4.1	-4.5	17.9
3	Left Side Sill at Rear Door			20.7	-2.0			
4	Left Side Sill at Front Door			*	*			
5	Left Lower B-Post			35.2	-9.9			
6	Left Mid B-Post			30.2	-8.7			
7	Left Lower A-Post			19.5	-5.2			
8	Left Mid A-Post			15.8	-5.6			
9	Driver Left Seat Track			53.8	-40.7			
10	Vehicle CG	8.4	-12.1	50.2	-11.8	12.6	-16.8	50.4
11	Left Front Door at Pelvis			165.3	-65.3			
12	Left Front Door at Arm			112.7	-90.1			
13	Left Front Door at Knee			55.5	-34.8			
14	Left Front Door at Rib			**	**			
15	Left A-Post @ Sill			21.2	-1.9			
16	Left B-Post @ Sill			***	***			
17	Upper Engine	2.9	-15.1	17.2	-1.5			
18	Firewall			14.1	-1.2			

* No valid data collected after 10 msec
** No valid data collected after 15 msec
*** No valid data collected after 60 msec

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

DATA SHEET NO. 9... (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005

VEHICLE ACCELEROMETER COORDINATES

Loc. No.	Description	Coordinates (mm)		
		X	Y	Z
1	Right Side Sill at Front Seat	2299	733	212
2	Rear Floorpan Above Axle	965	20	469
3	Left Side Sill at Rear Door	1437	-733	208
4	Left Side Sill at Front Door	2554	-733	198
5	Left Lower B-Post	1951	-774	393
6	Left Mid B-Post	1868	-774	820
7	Left Lower A-Post	3073	-754	394
8	Left Mid A-Post	3069	-793	856
9	Driver Left Seat Track			
10	Vehicle CG	2566	90	392
11	Left Door @ Pelvis	2423	-778	470
12	Left Door @ Arm	2555	-778	843
13	Left Door @ Knee	2791	-778	686
14	Left Door @ Rib	2305	-778	885
15	Left A Pillar Sill	3207	-733	183
16	Left B Pillar Sill	1920	-733	205
17	Engine	3772	0	807
18	Firewall	3597	0	878

Sign Convention X – Rear Bumper (+ forward)

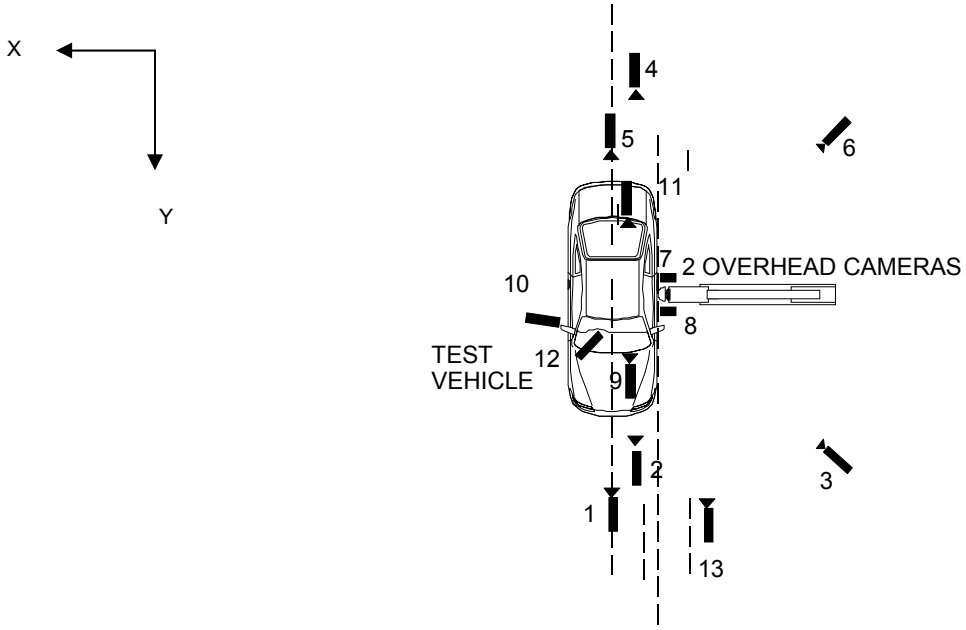
Y – Vehicle Centerline (+ to right)

Z – Ground Plane (+ up)

DATA SHEET NO. 10

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2005 Saab 9-3 Test Date: April 29, 2005



TOP VIEW

No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Front Overall	1980	9740	1485	24	1000
2	Front Close Up	1830	6005	1350	24	1000
3	Front Angle	-2170	3090	1480	24	1000
4	Rear Overall	2795	-6240	1460	24	1000
5	Rear Close Up	2840	-8430	1535	24	1000
6	Rear Angle	-2100	-2905	1325	24	1000
7	Overhead View	-590	90	5340	14	1000
8	Overhead Close Up	85	90	5050	19	1000
9	Onboard Driver Front				16	500
10	Onboard Driver				13	500
11	Onboard Curtain				8	500
12	Onboard Hip to Door				8	500
13	Real Time				13	24

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

APPENDIX A

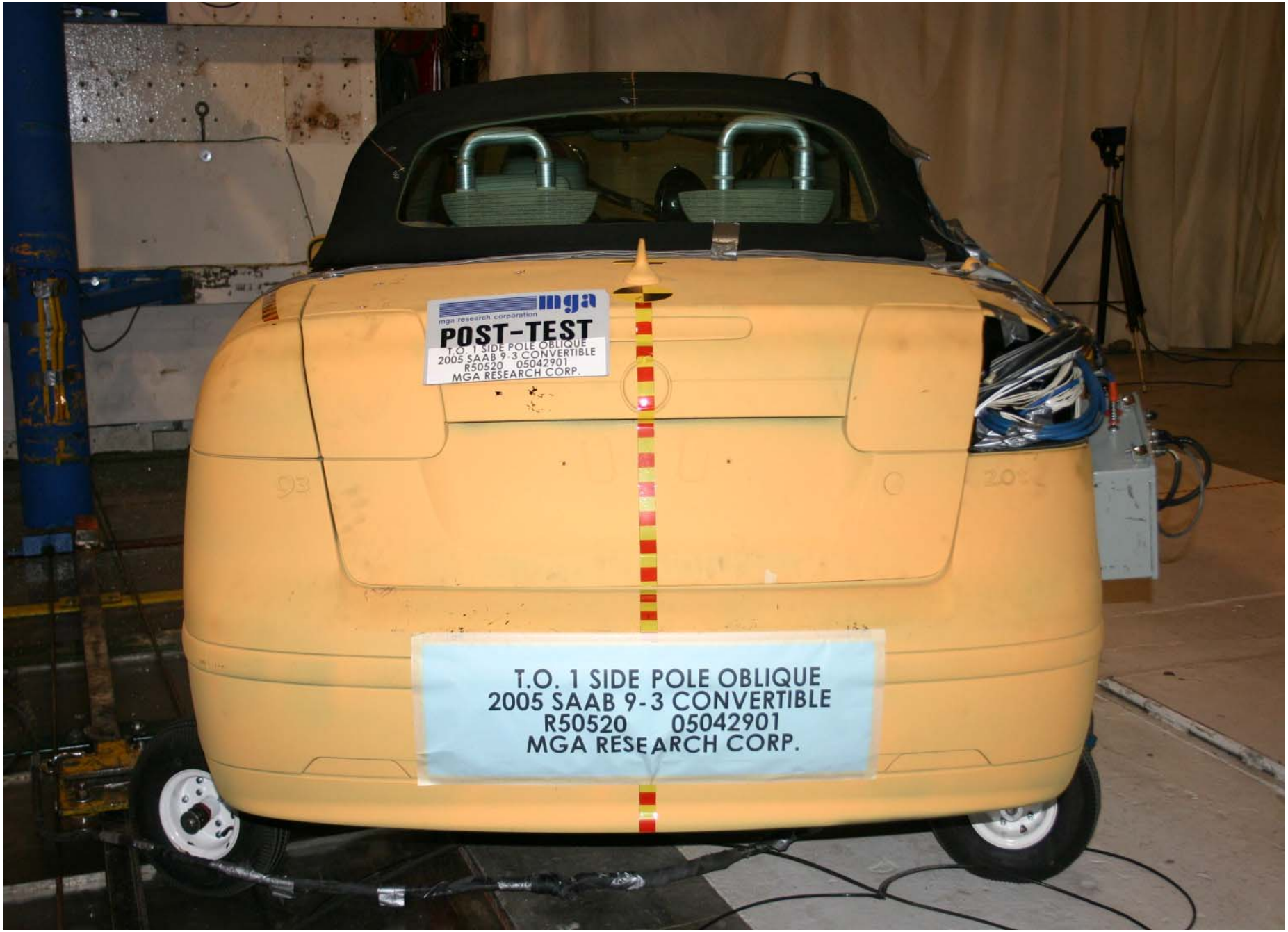
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Pre-Test Front View of Test Vehicle

Post-Test Front View of Test Vehicle

Pre-Test Rear View of Test Vehicle

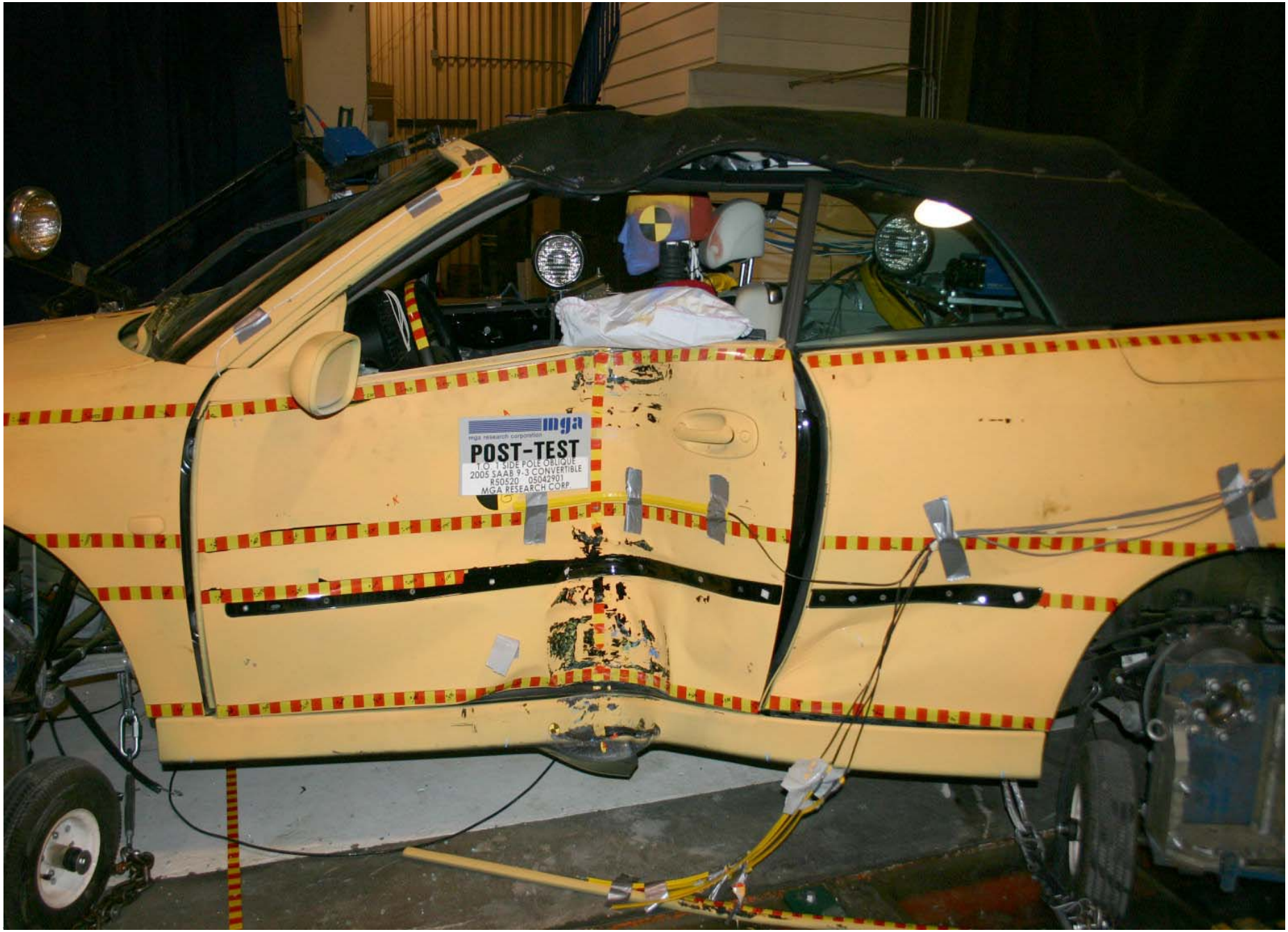


Post-Test Rear View of Test Vehicle

Pre-Test Left Side View of Test Vehicle

Post-Test Left Side View of Test Vehicle

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



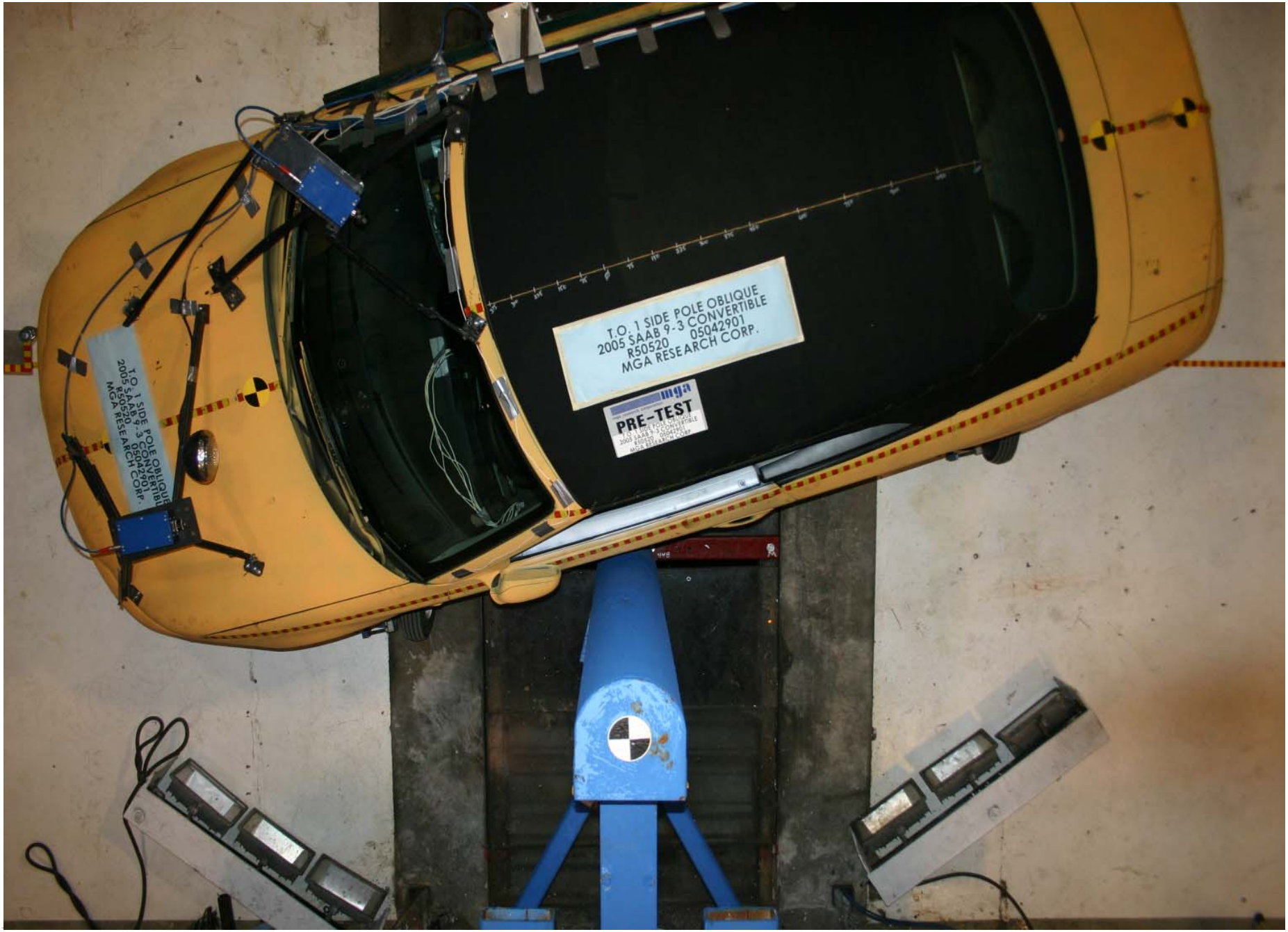
Post-Test Left Side View of Test Vehicle (Close-Up)

Pre-Test Left ¾ Front View of Test Vehicle

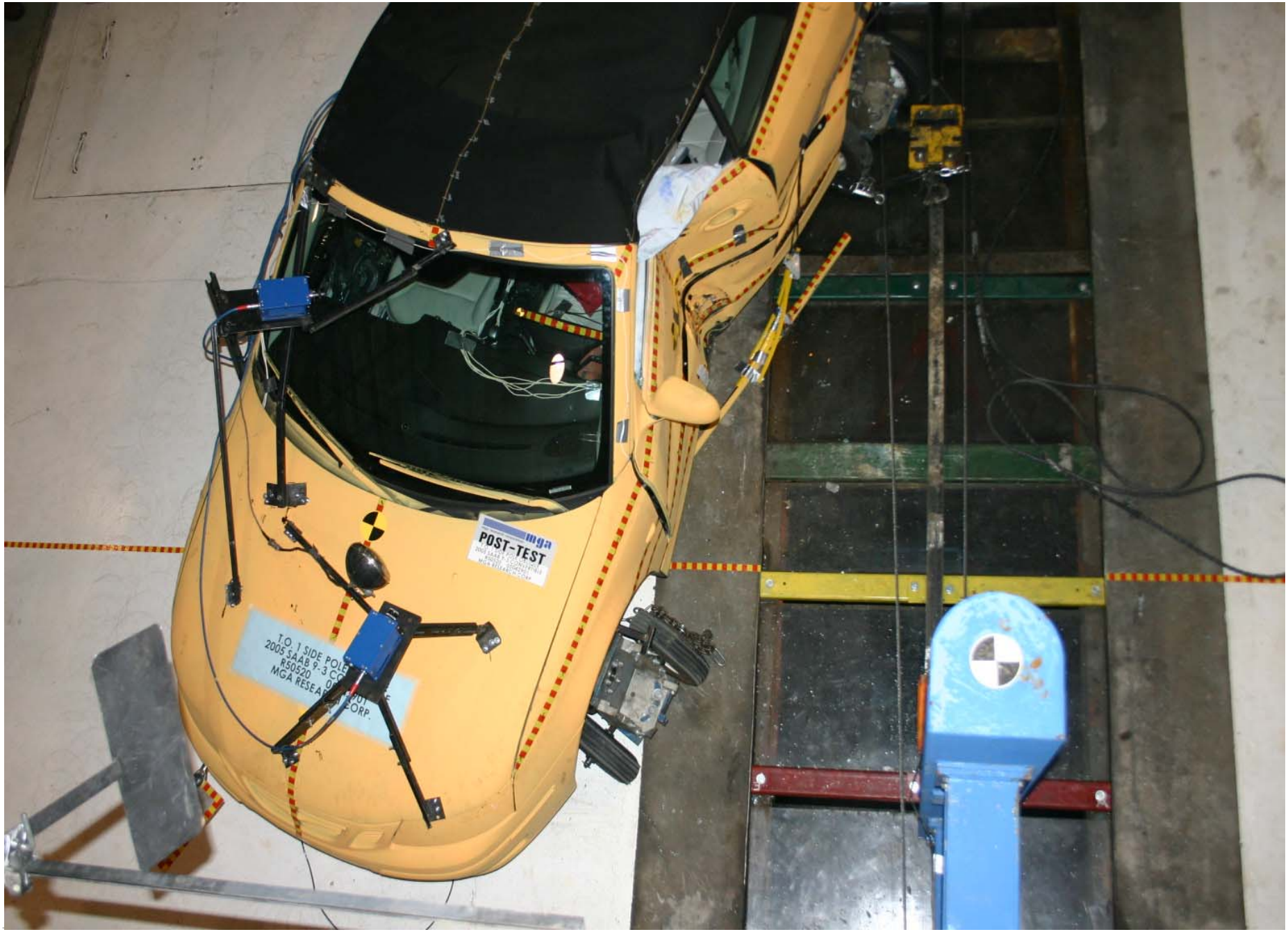
Post-Test Left ¾ Front View of Test Vehicle

Pre-Test Left ¾ Rear View of Test Vehicle

Post-Test Left ¾ 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

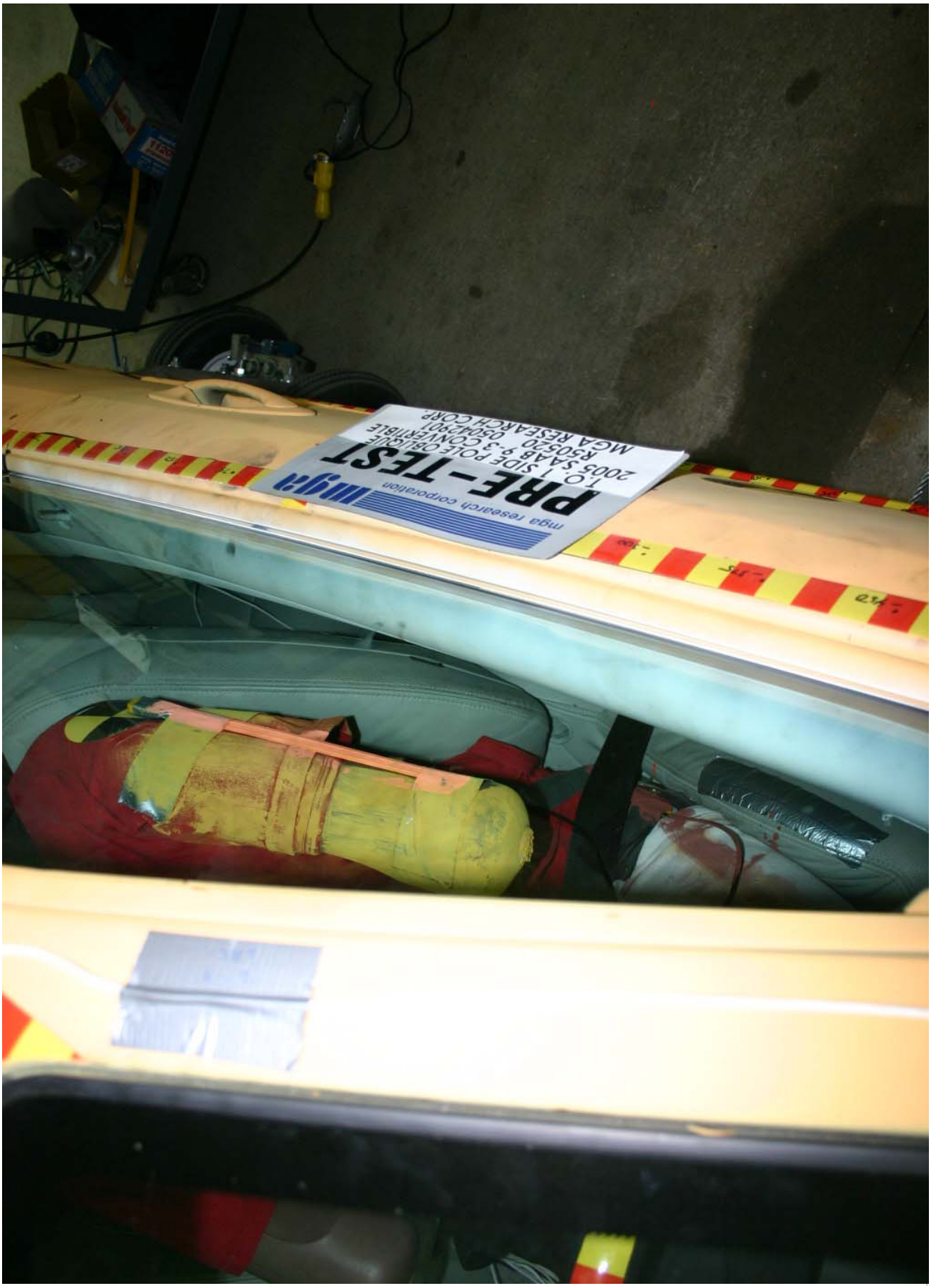
Pre-Test Driver Dummy Left Side View (Door open)

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

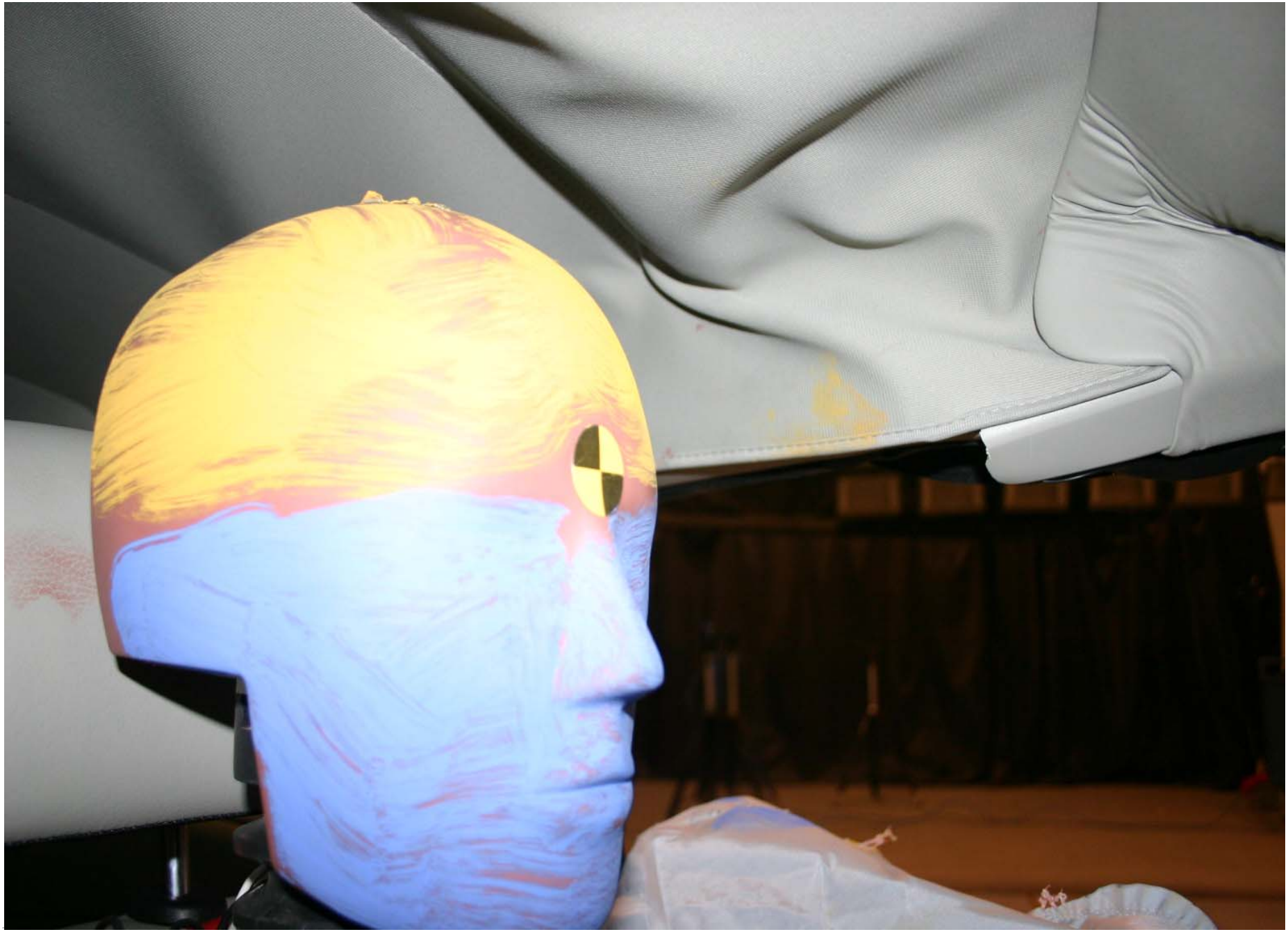


Pre-Test Driver Shoulder and Door Top View

Post-Test Driver Shoulder and Door Top View

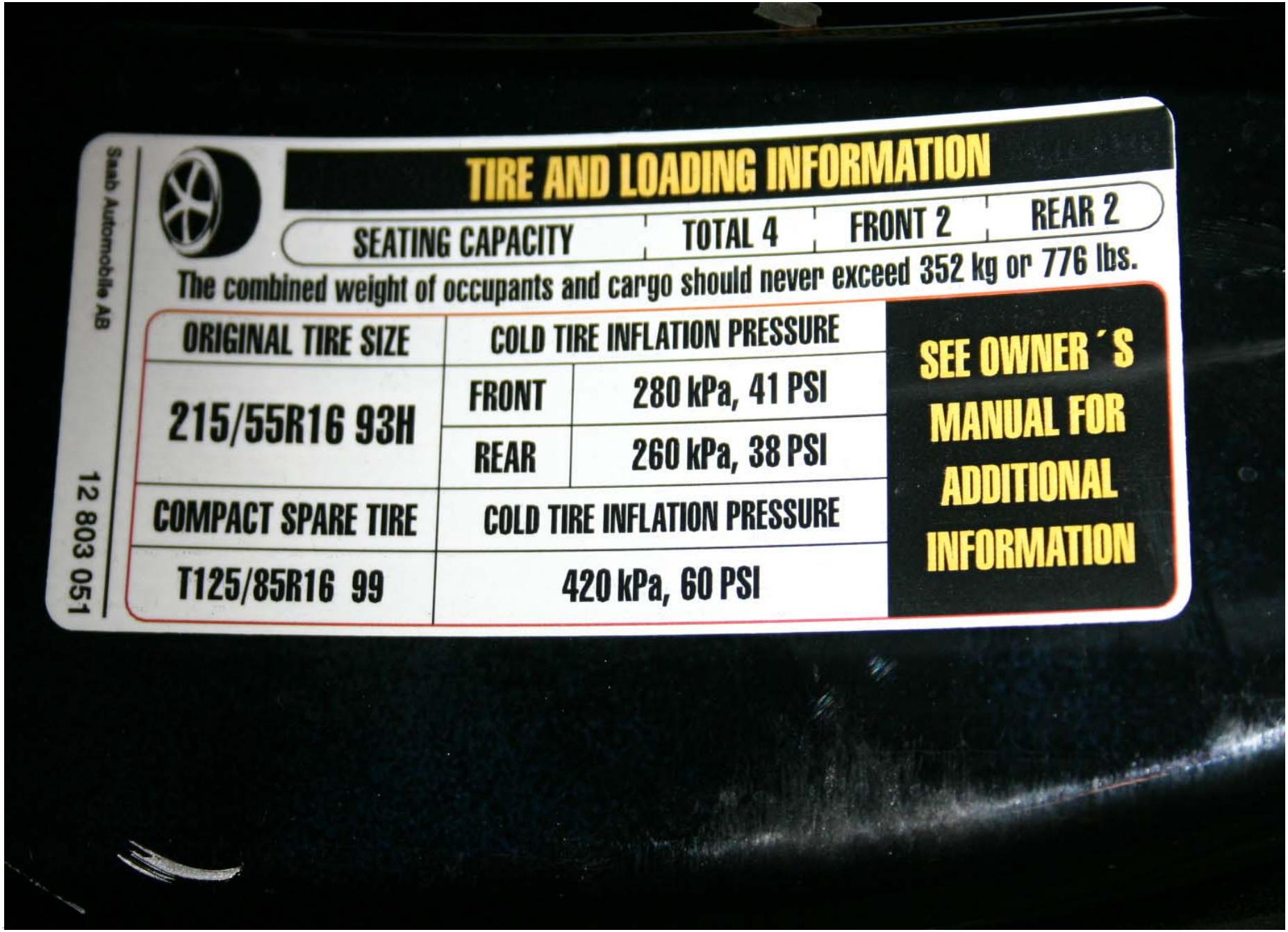
Post-Test Driver Dummy Contact

Post-Test Driver Dummy Head Contact

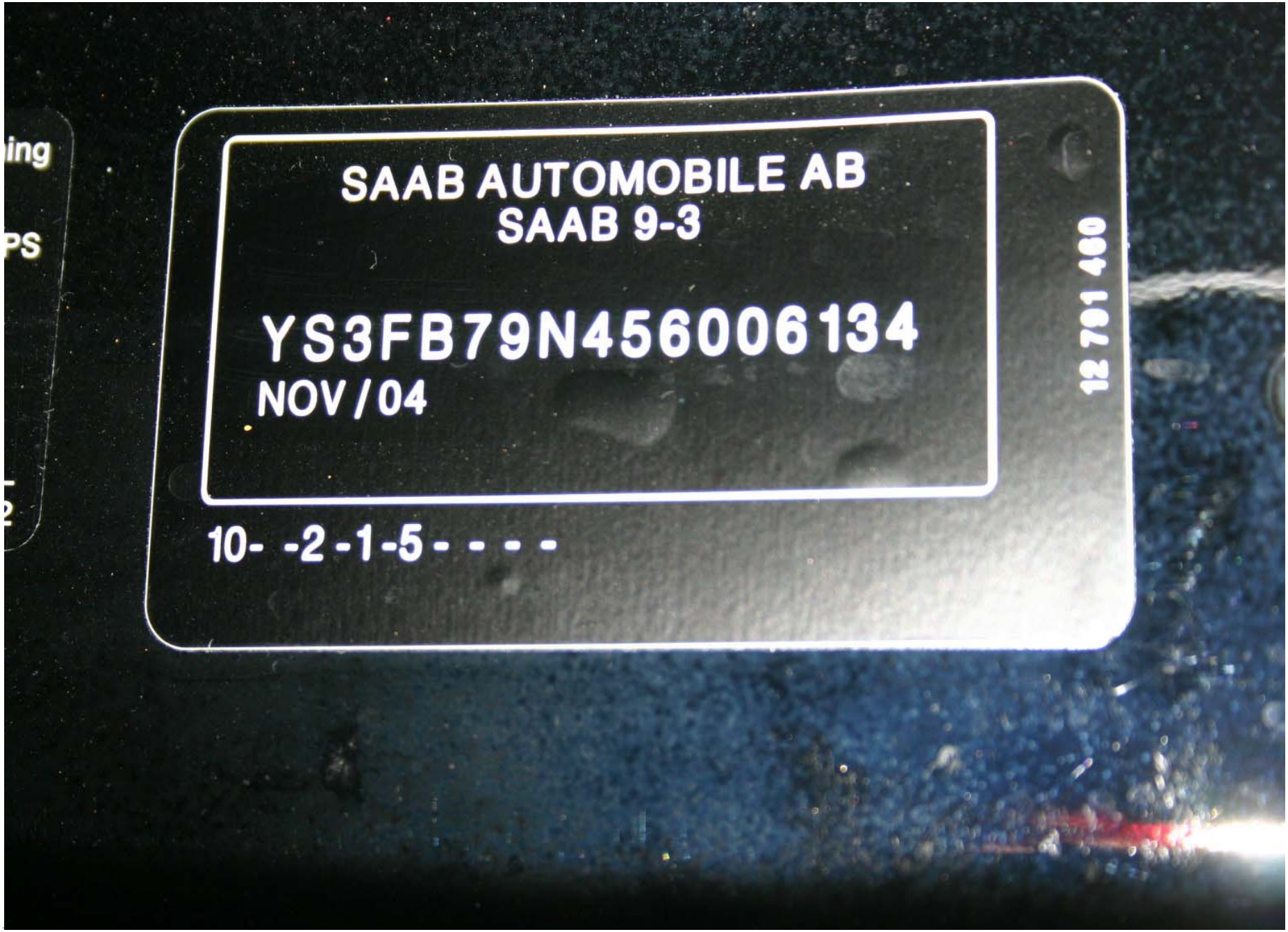


Post-Test Driver Dummy Head Contact

Post-Test Impact Point on Vehicle



Tire Placard


SAAB AUTOMOBILE AB
SAAB 9-3
YS3FB79N456006134
NOV/04
10- -2-1-5- - - -
12 701 400

Pre-Test Point of Impact View

Post-Test Point of Impact View

Post-Test Roll Cage View


T.O. 1 SIDE POLE OBLIQUE
2005 SAAB 9-3 CONVERTIBLE
R50520 05042901
MGA RESEARCH CORP.
29 Apr 2005 10:31 • 33,00 ms • 1,000 fps • T0: 1 • Frame: 34

Impact

APPENDIX B

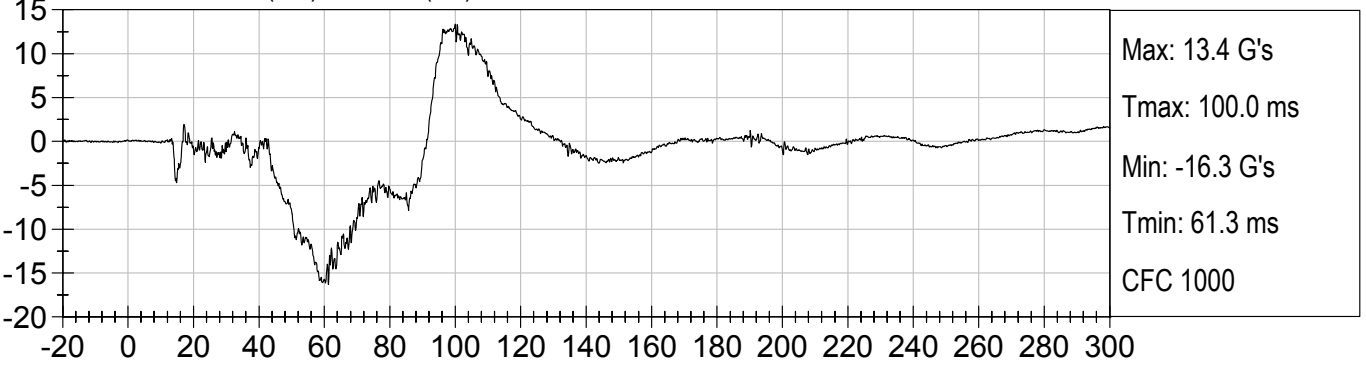
VEHICLE AND DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

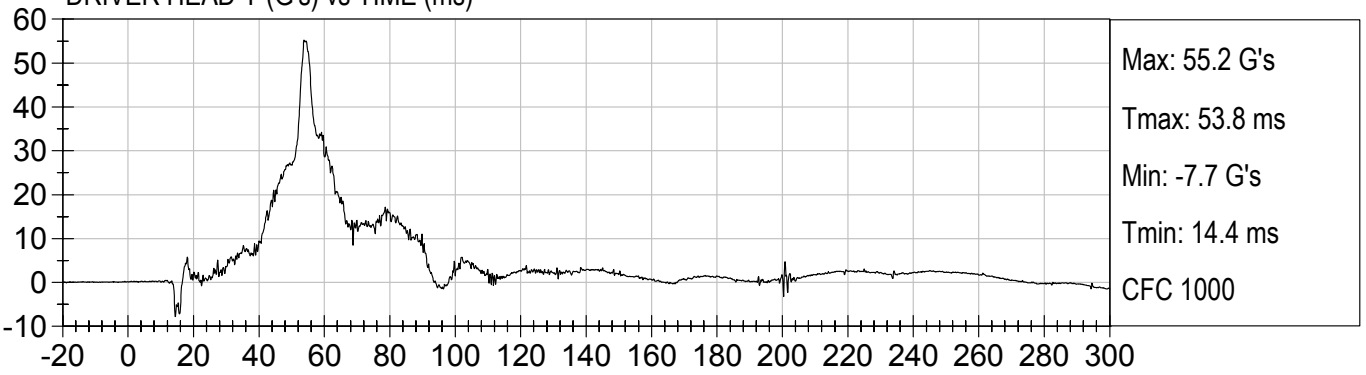
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

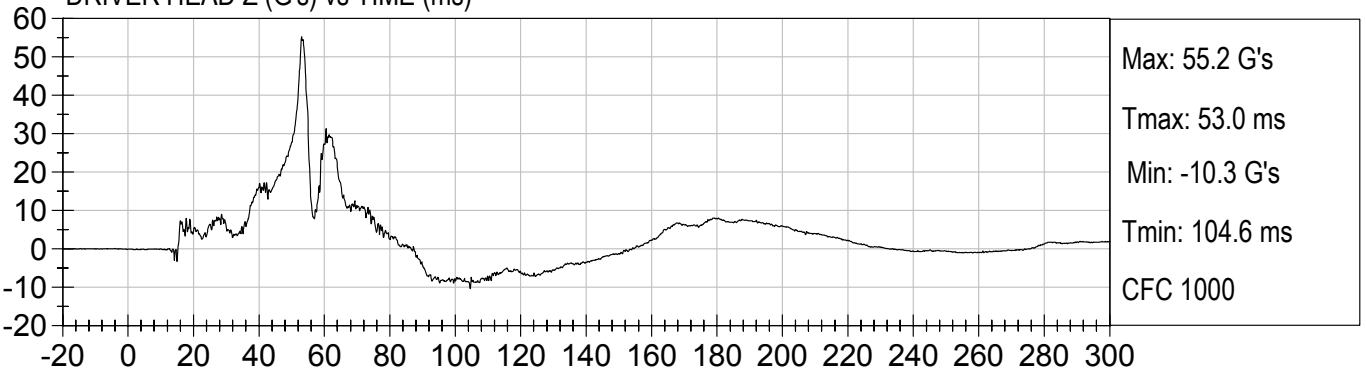
DRIVER HEAD X (G's) vs TIME (ms)



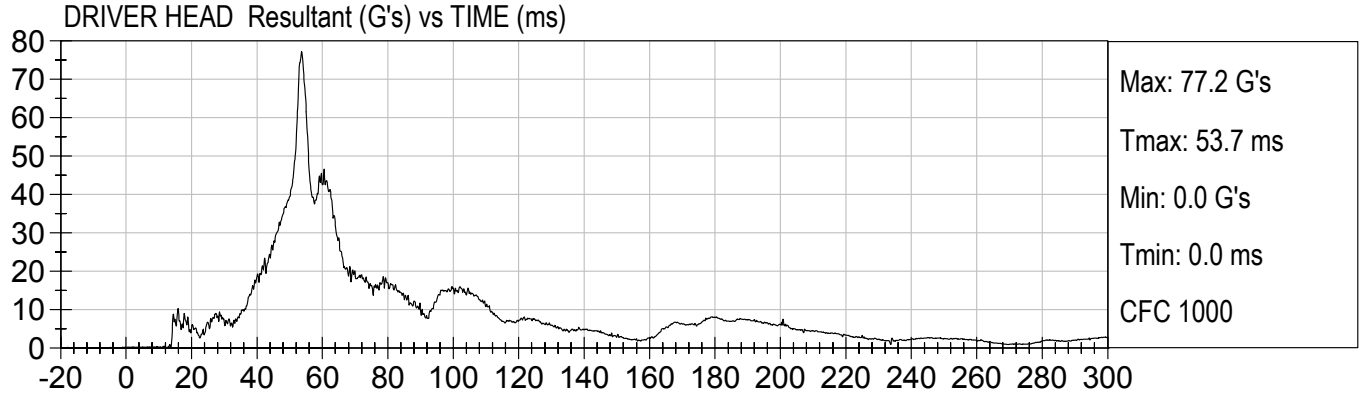
DRIVER HEAD Y (G's) vs TIME (ms)



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



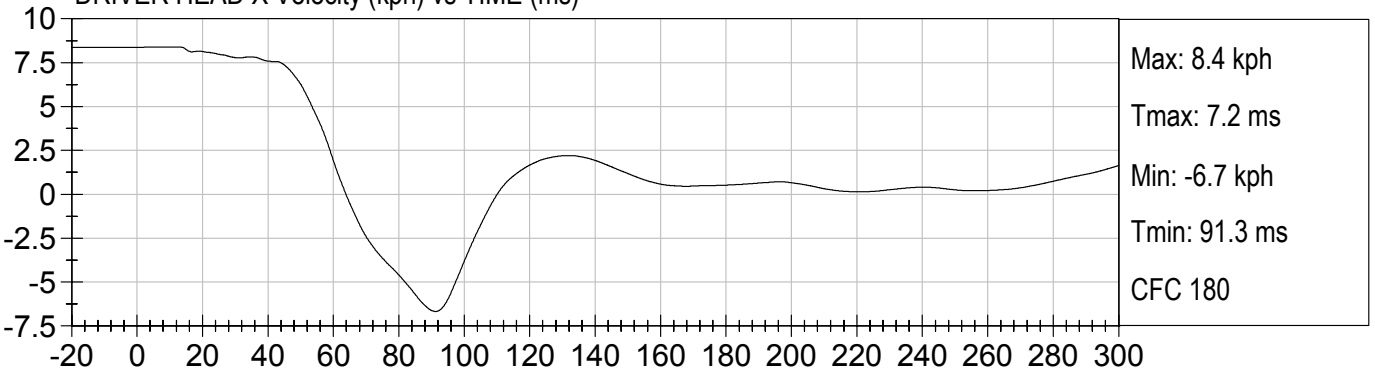
DRIVER HEAD Resultant (G's) vs TIME (ms)



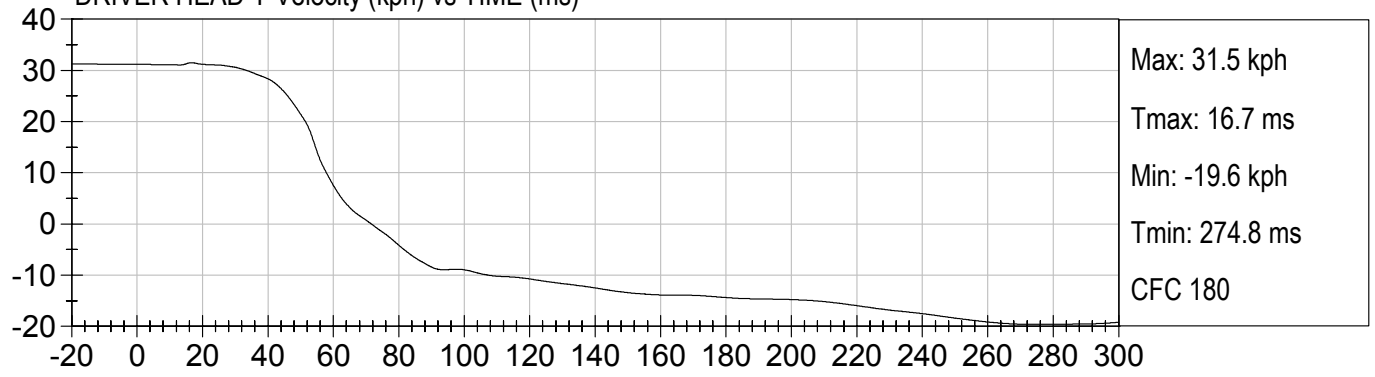
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

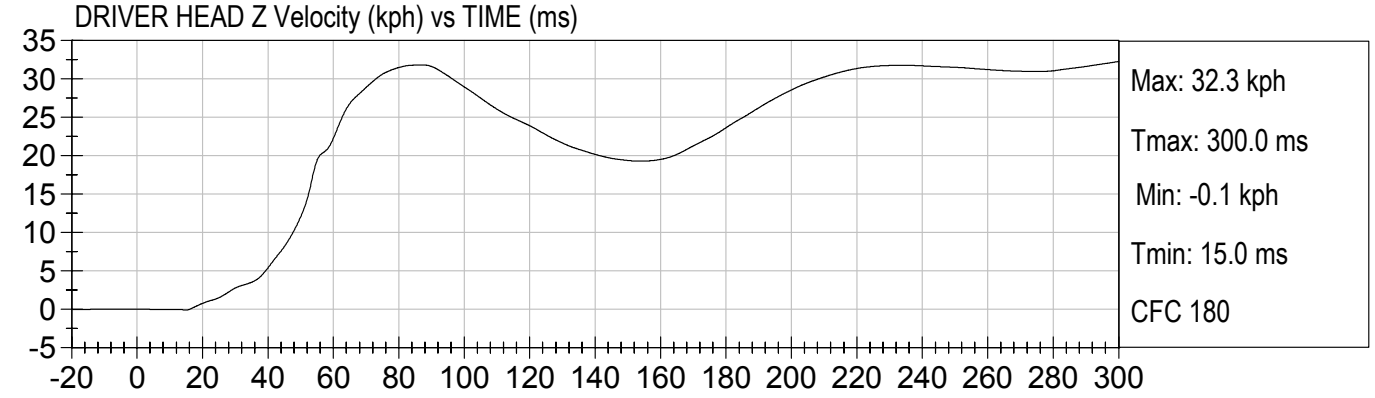
DRIVER HEAD X Velocity (kph) vs TIME (ms)



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



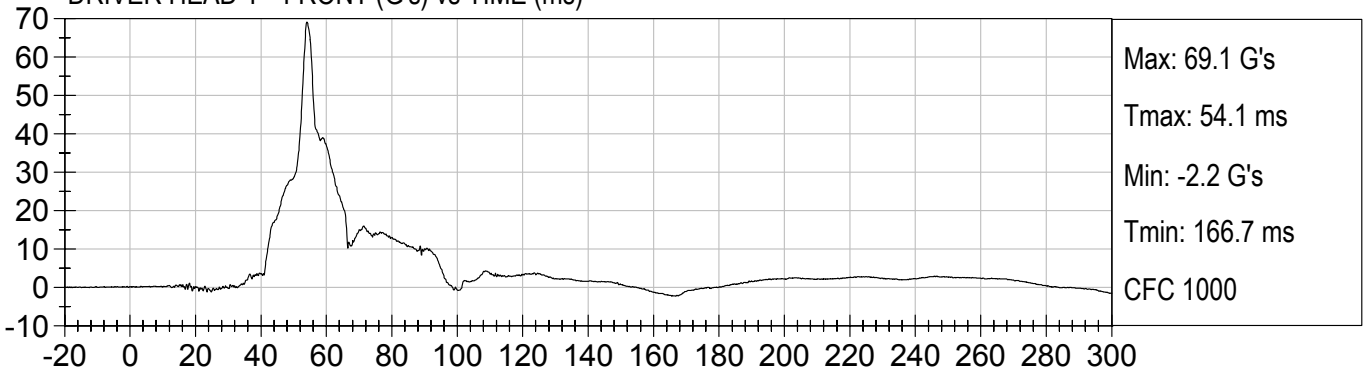
DRIVER HEAD Z Velocity (kph) vs TIME (ms)



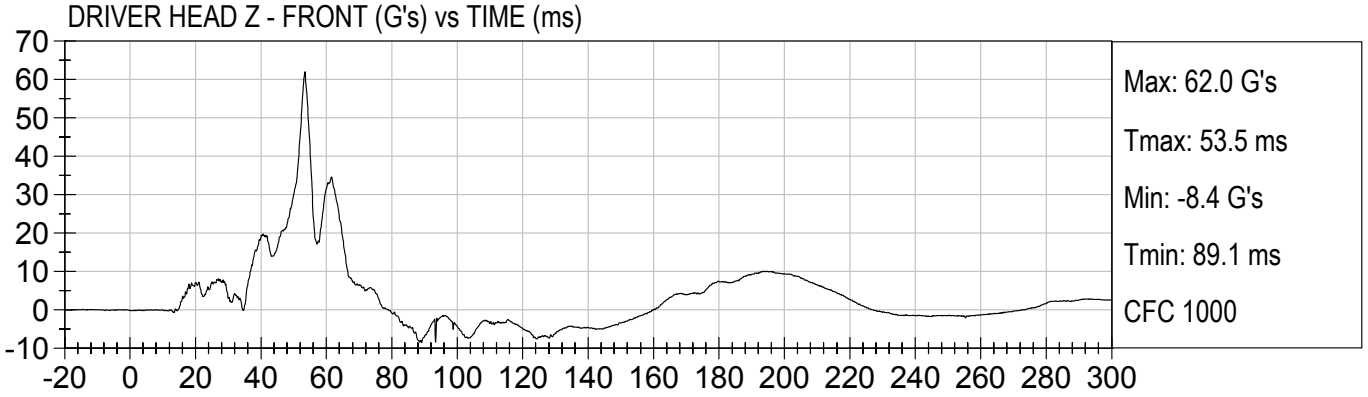
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

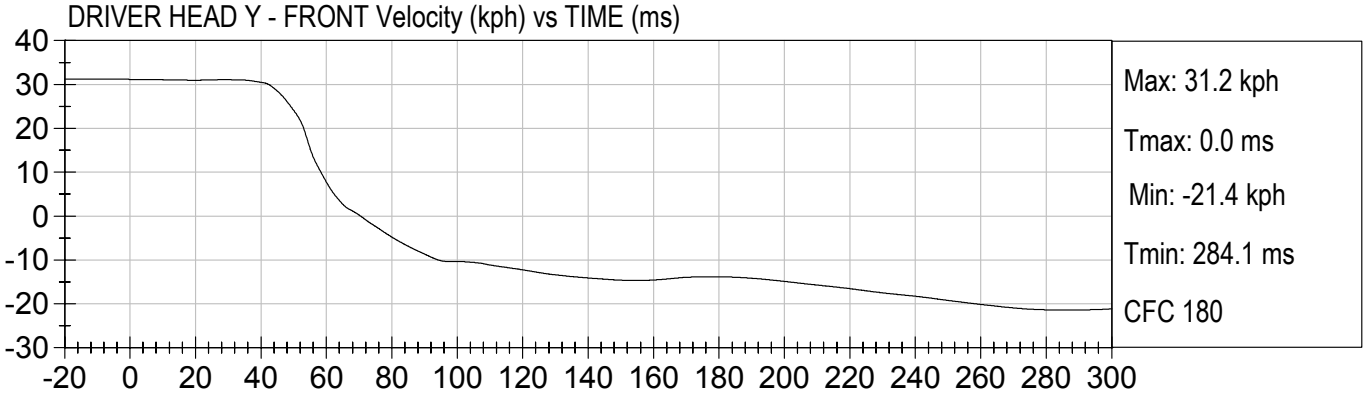
DRIVER HEAD Y - FRONT (G's) vs TIME (ms)



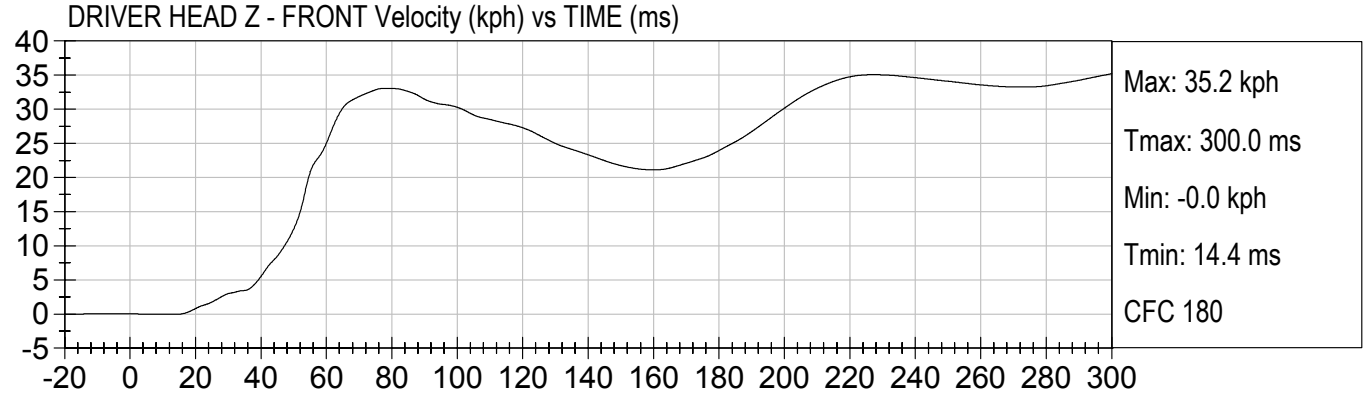
DRIVER HEAD Z - FRONT (G's) vs TIME (ms)



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



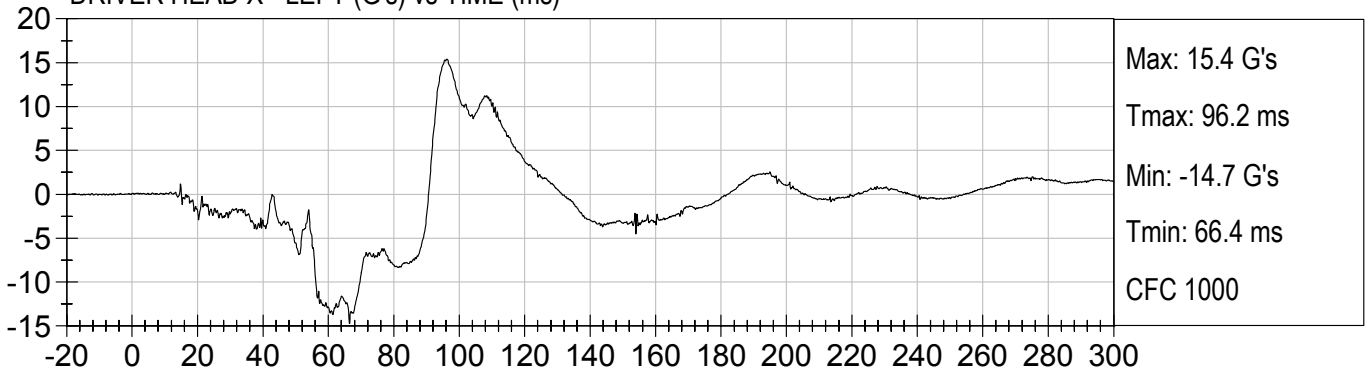
DRIVER HEAD Z - FRONT Velocity (kph) vs TIME (ms)



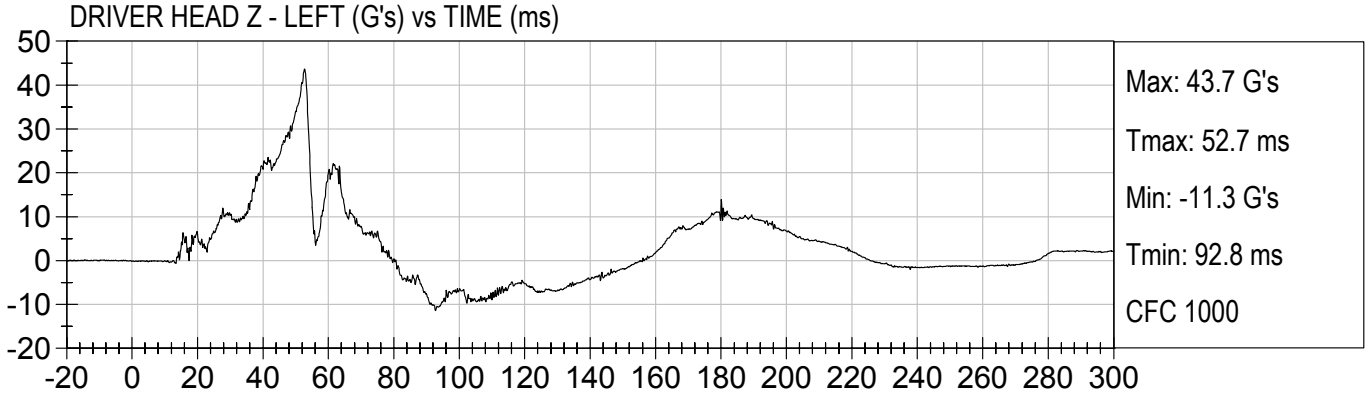
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

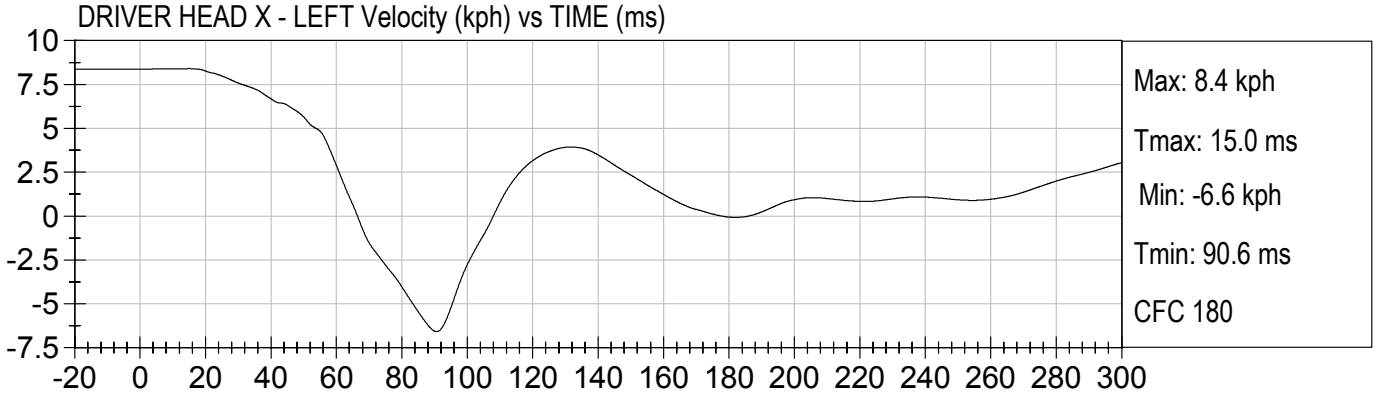
DRIVER HEAD X - LEFT (G's) vs TIME (ms)



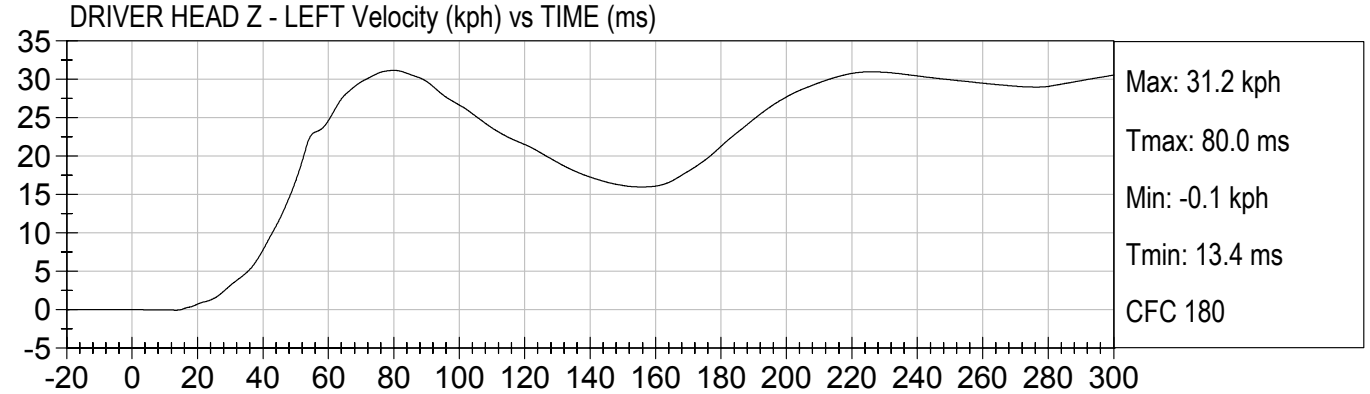
DRIVER HEAD Z - LEFT (G's) vs TIME (ms)



DRIVER HEAD X - LEFT Velocity (kph) vs TIME (ms)



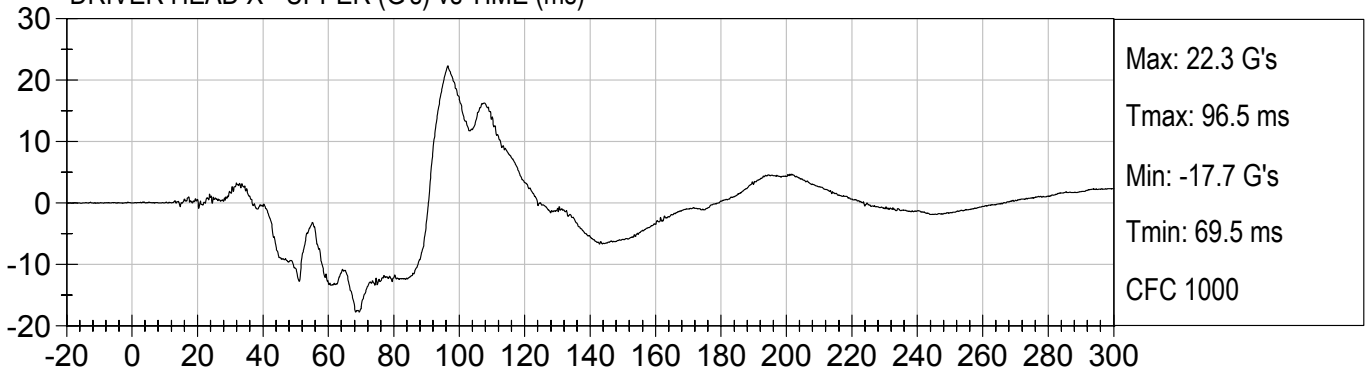
DRIVER HEAD Z - LEFT Velocity (kph) vs TIME (ms)



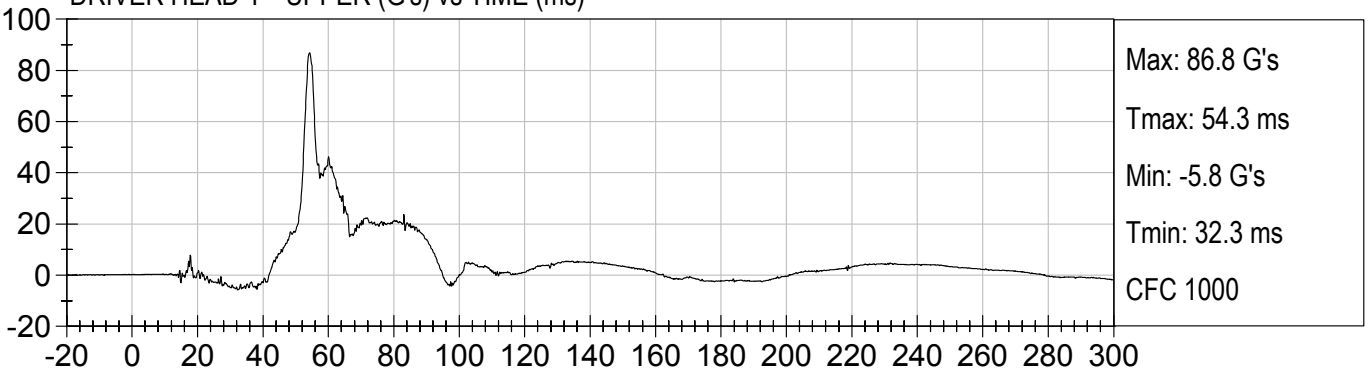
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

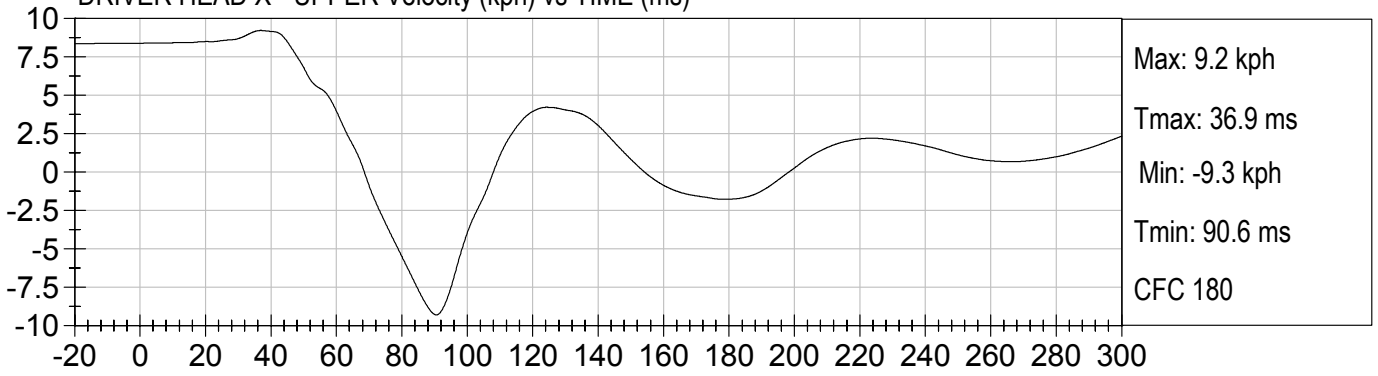
DRIVER HEAD X - UPPER (G's) vs TIME (ms)



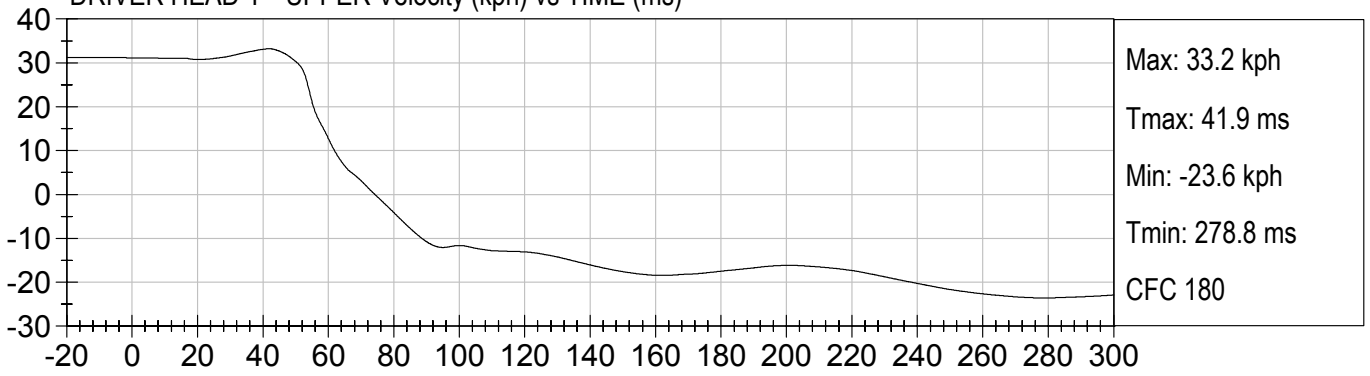
DRIVER HEAD Y - UPPER (G's) vs TIME (ms)



DRIVER HEAD X - UPPER Velocity (kph) vs TIME (ms)



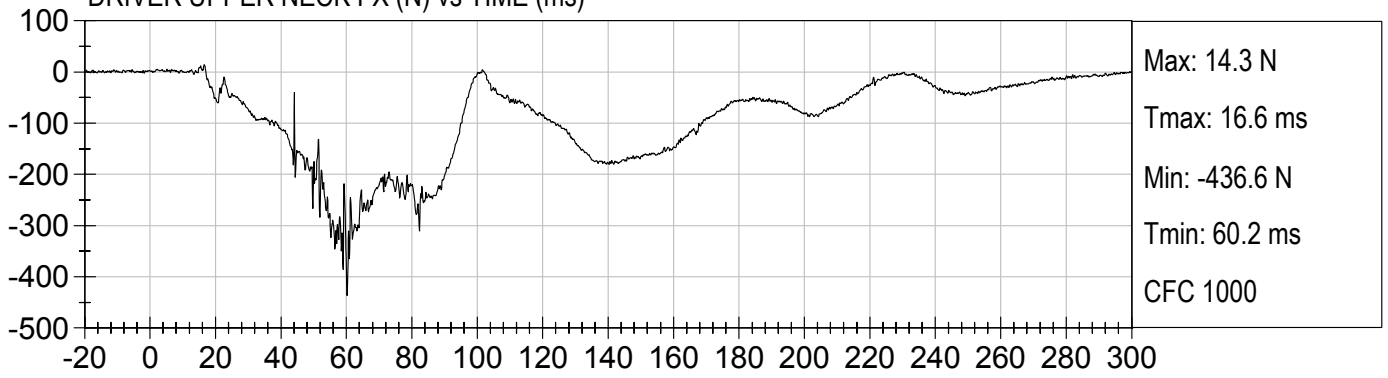
DRIVER HEAD Y - UPPER Velocity (kph) vs TIME (ms)



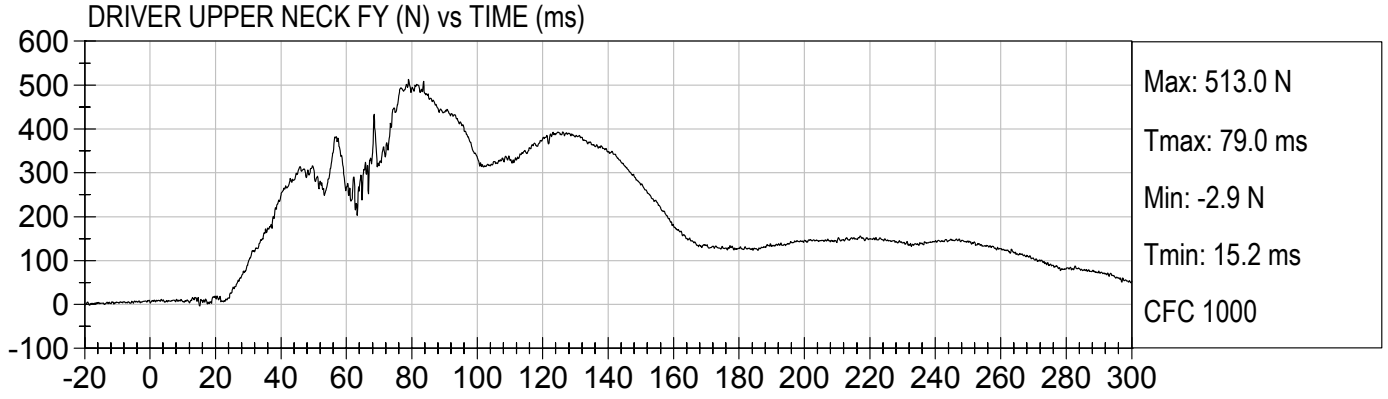
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

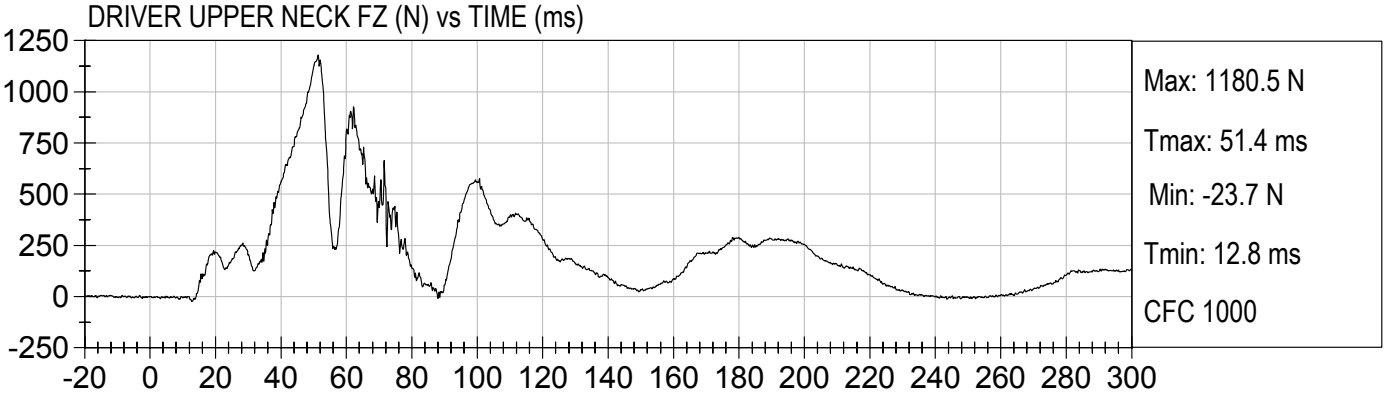
DRIVER UPPER NECK FX (N) vs TIME (ms)



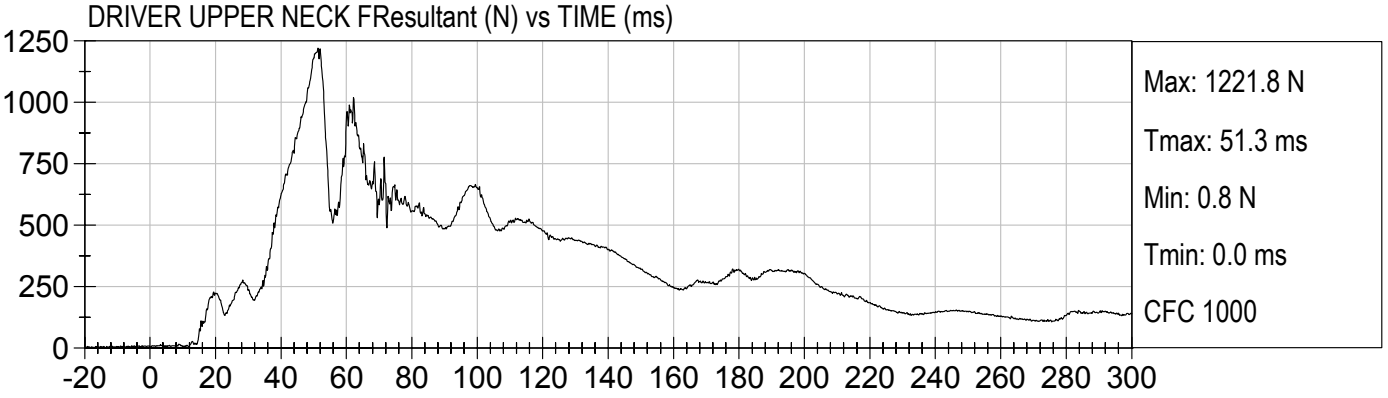
DRIVER UPPER NECK FY (N) vs TIME (ms)



DRIVER UPPER NECK FZ (N) vs TIME (ms)



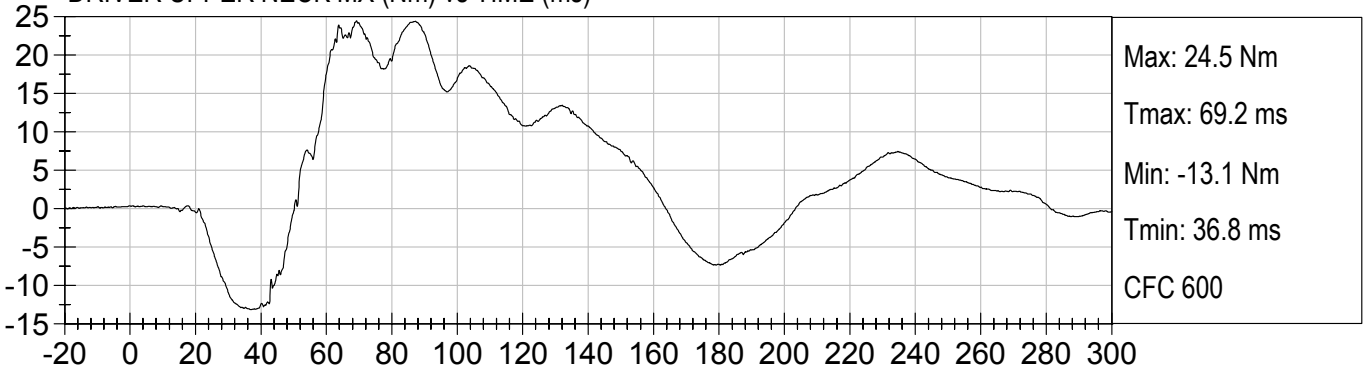
DRIVER UPPER NECK FResultant (N) vs TIME (ms)



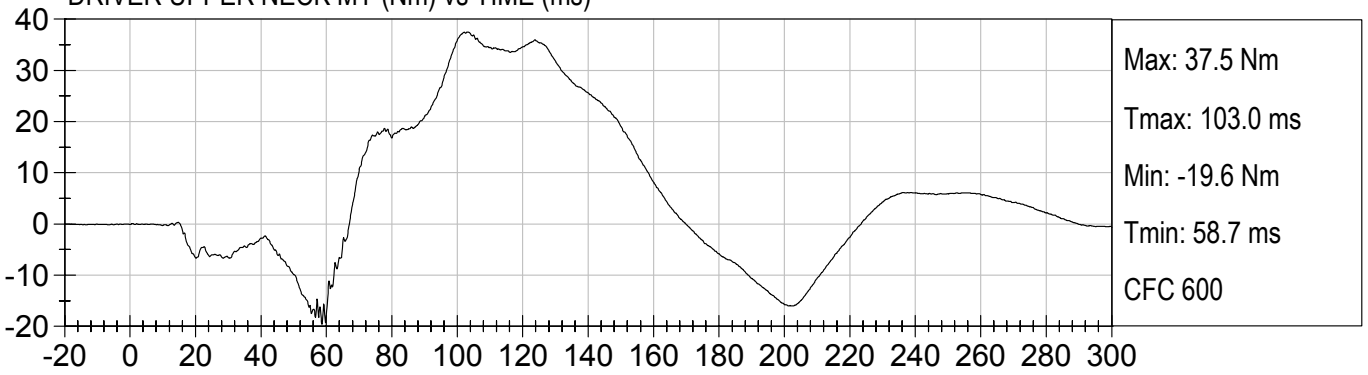
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

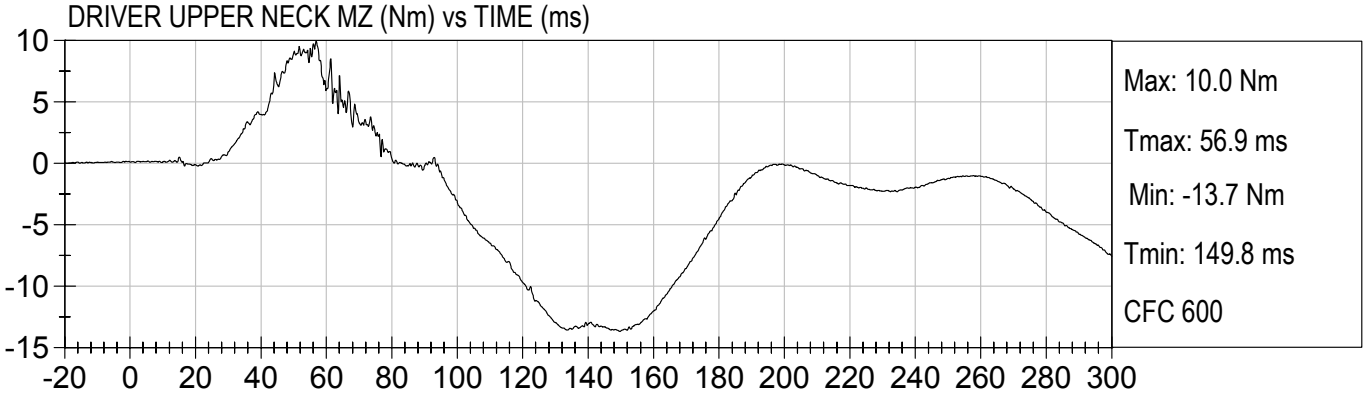
DRIVER UPPER NECK MX (Nm) vs TIME (ms)



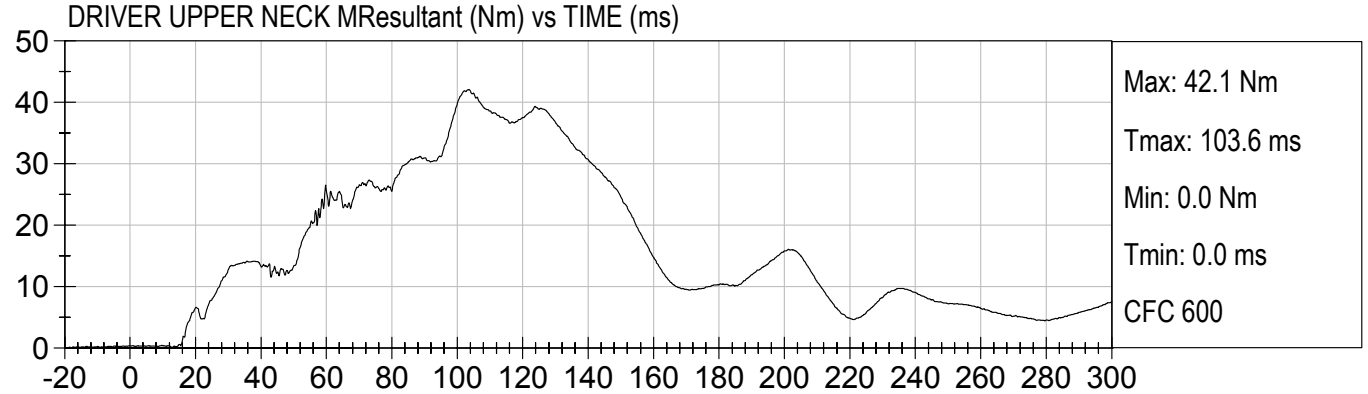
DRIVER UPPER NECK MY (Nm) vs TIME (ms)



DRIVER UPPER NECK MZ (Nm) vs TIME (ms)



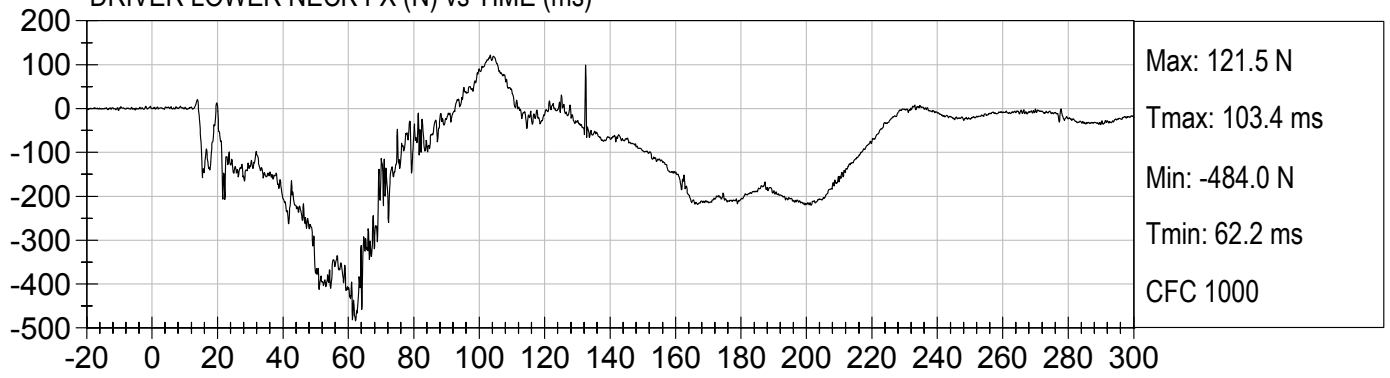
DRIVER UPPER NECK MResultant (Nm) vs TIME (ms)



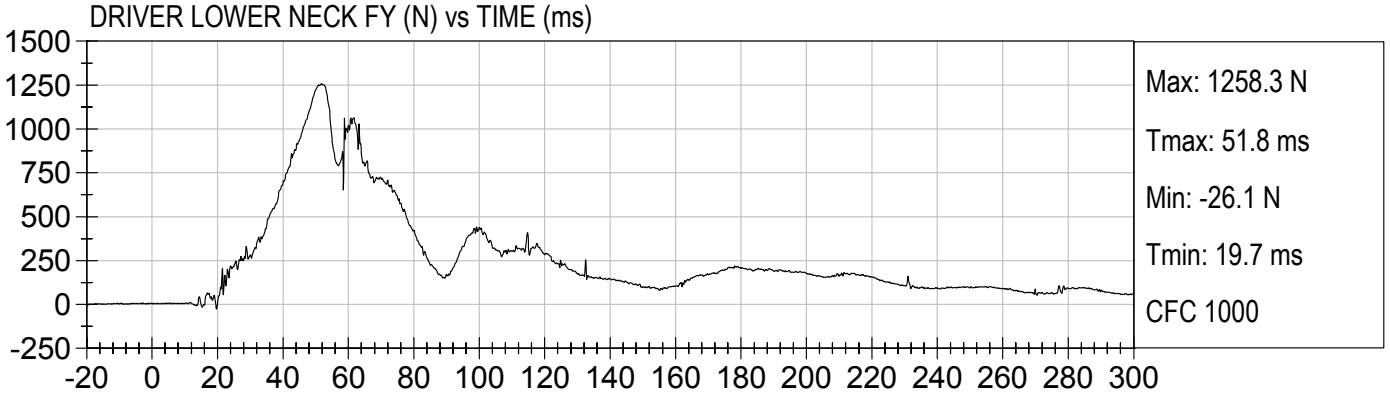
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

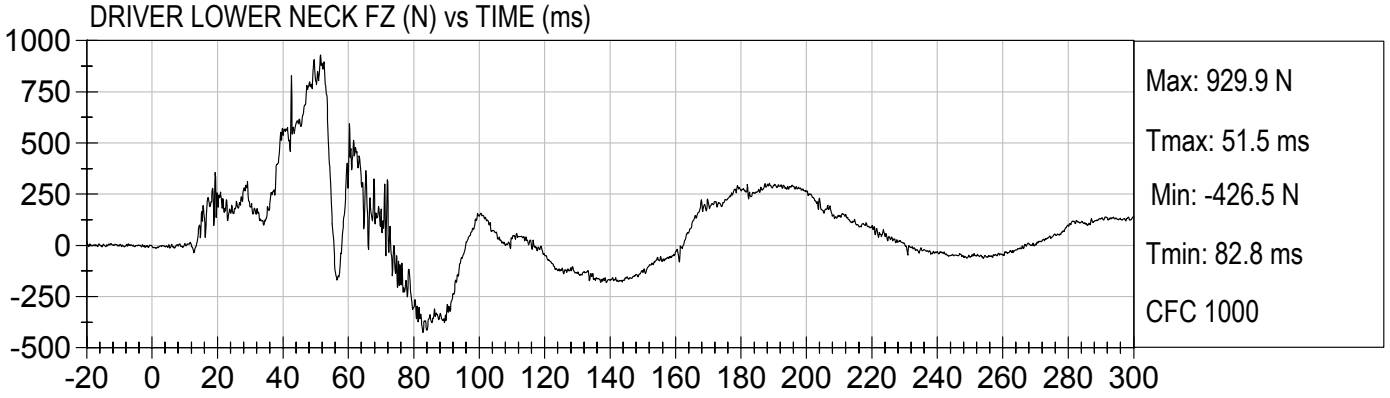
DRIVER LOWER NECK FX (N) vs TIME (ms)



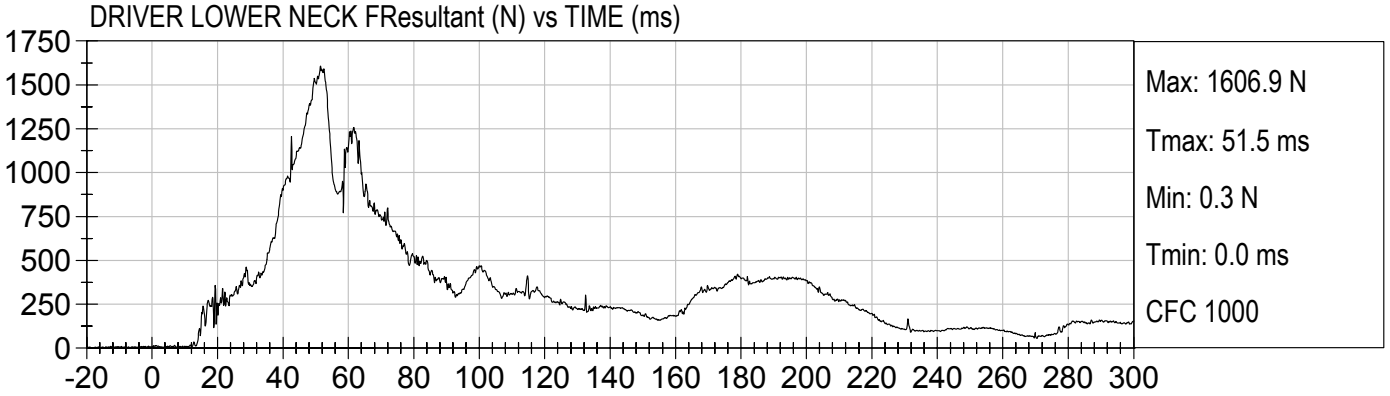
DRIVER LOWER NECK FY (N) vs TIME (ms)



DRIVER LOWER NECK FZ (N) vs TIME (ms)



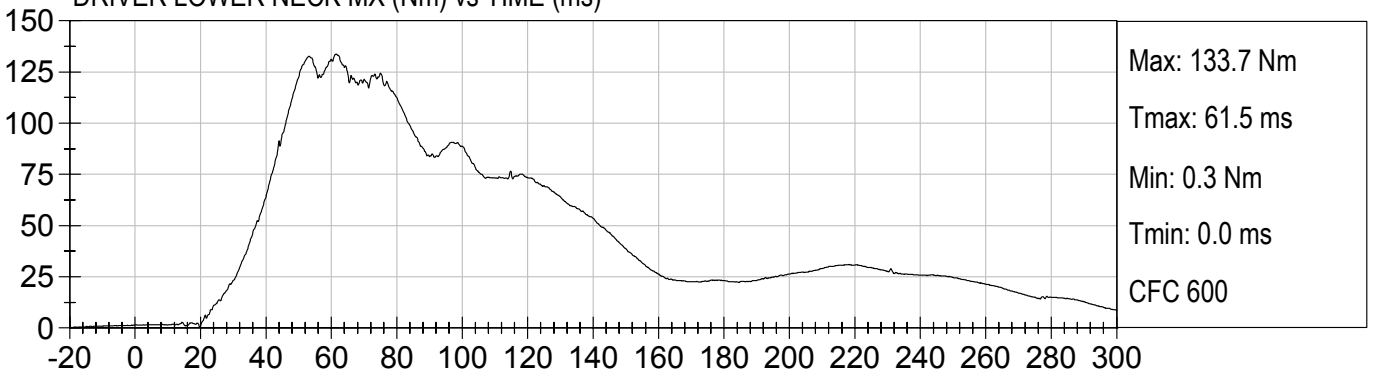
DRIVER LOWER NECK FResultant (N) vs TIME (ms)



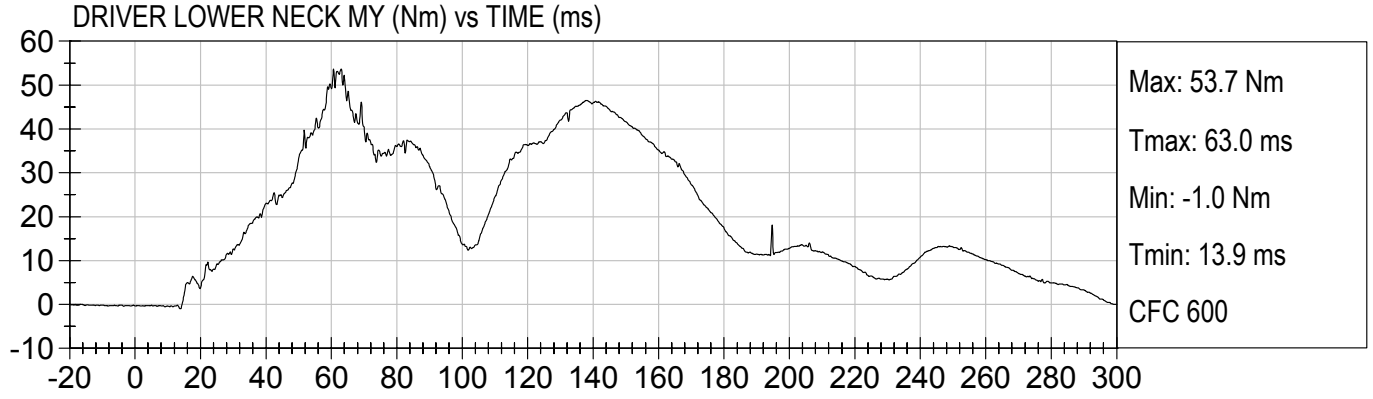
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

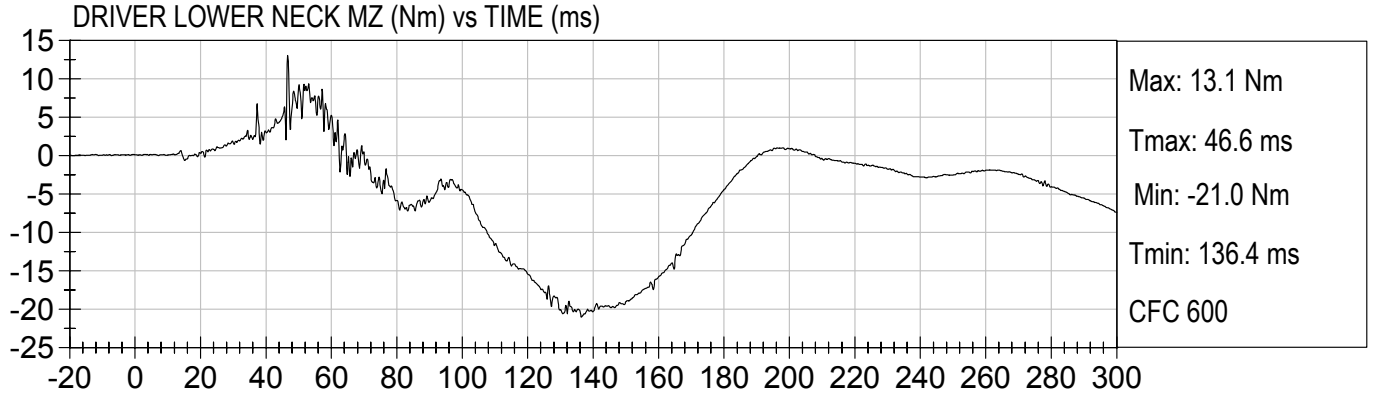
DRIVER LOWER NECK MX (Nm) vs TIME (ms)



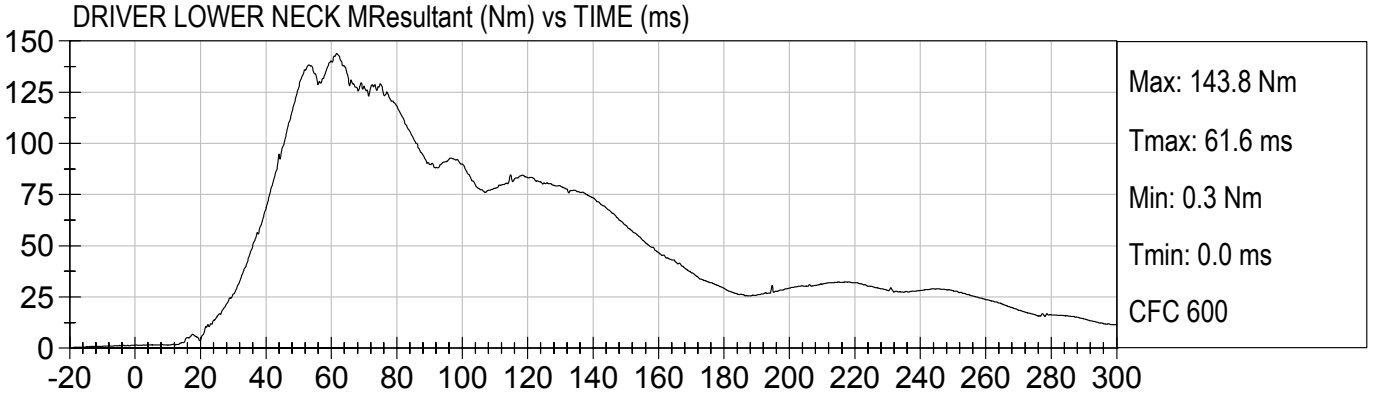
DRIVER LOWER NECK MY (Nm) vs TIME (ms)



DRIVER LOWER NECK MZ (Nm) vs TIME (ms)



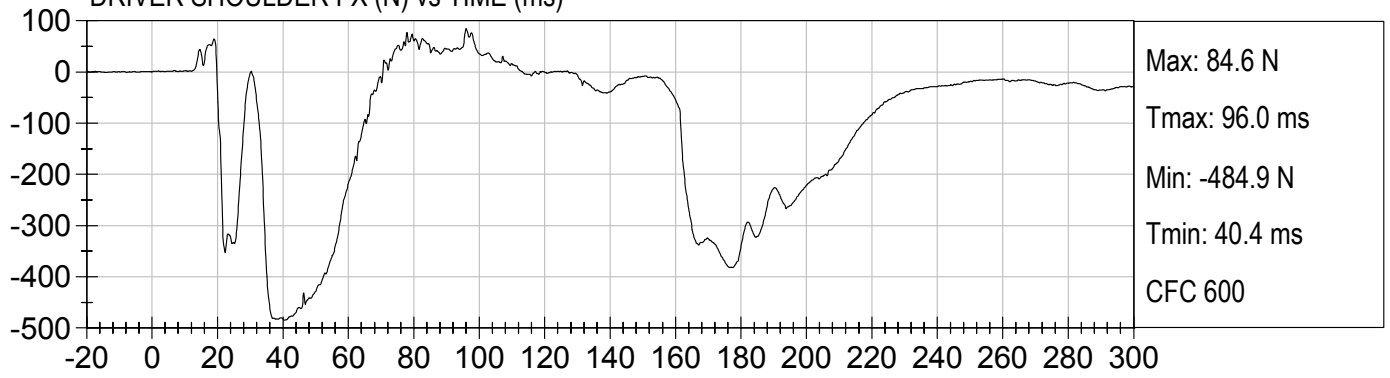
DRIVER LOWER NECK MResultant (Nm) vs TIME (ms)



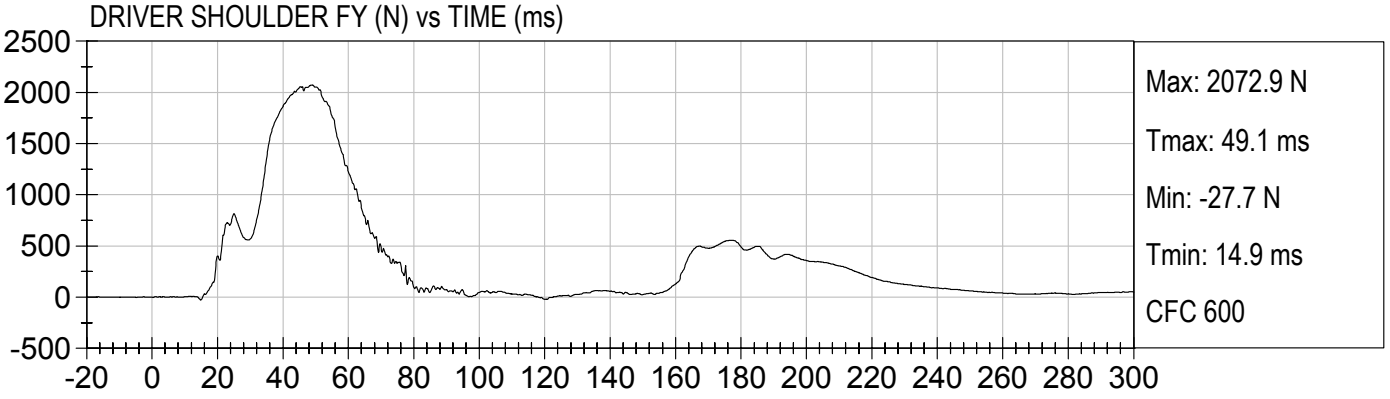
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

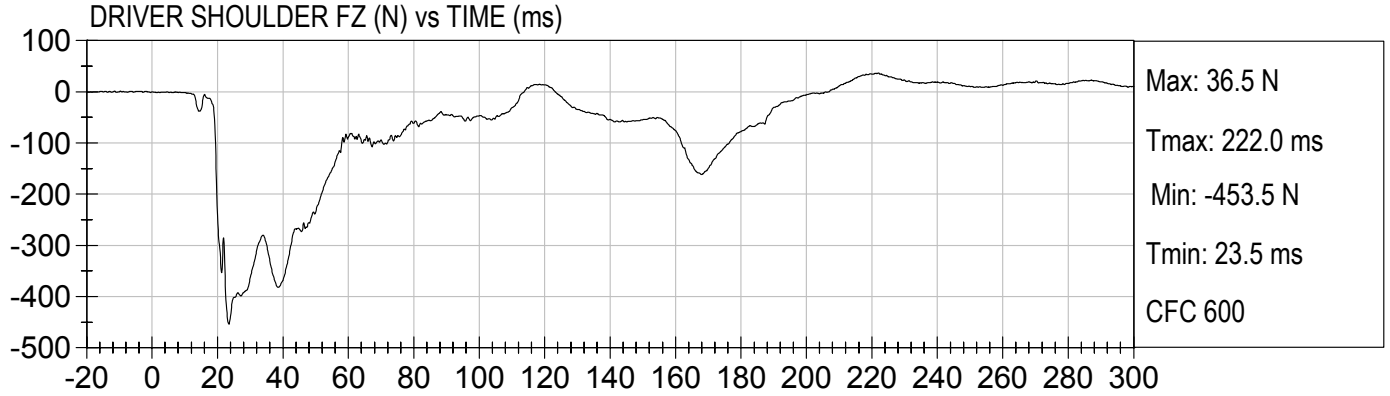
DRIVER SHOULDER FX (N) vs TIME (ms)



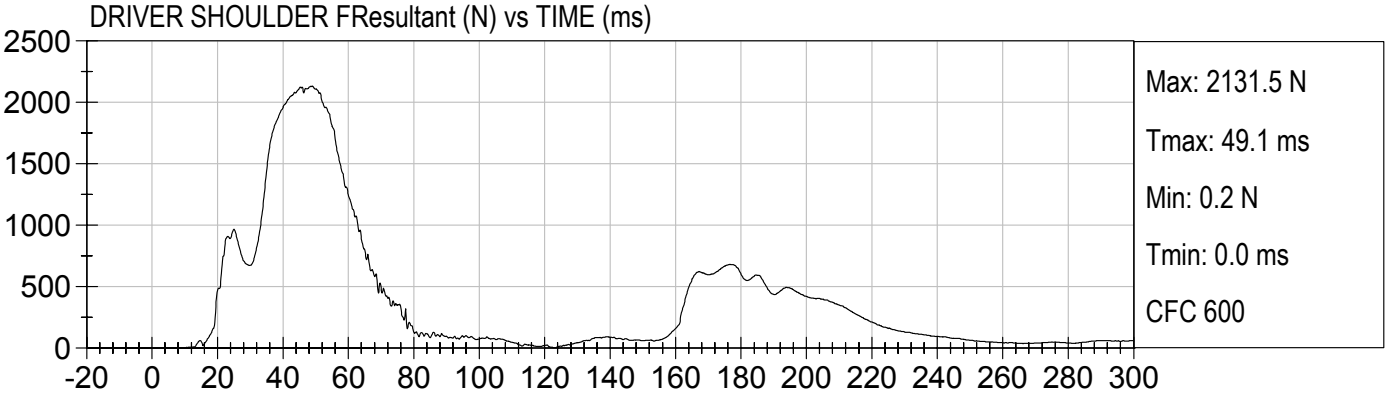
DRIVER SHOULDER FY (N) vs TIME (ms)



DRIVER SHOULDER FZ (N) vs TIME (ms)



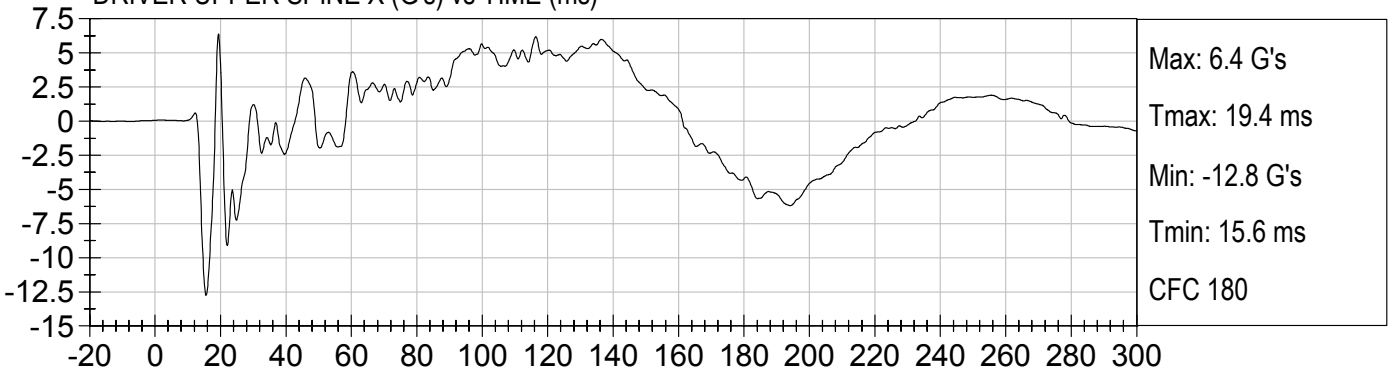
DRIVER SHOULDER FResultant (N) vs TIME (ms)



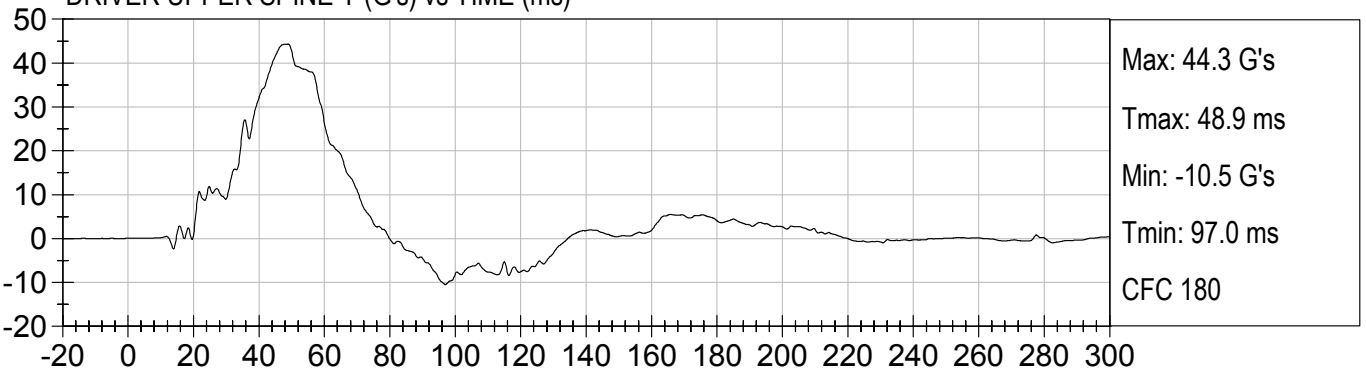
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

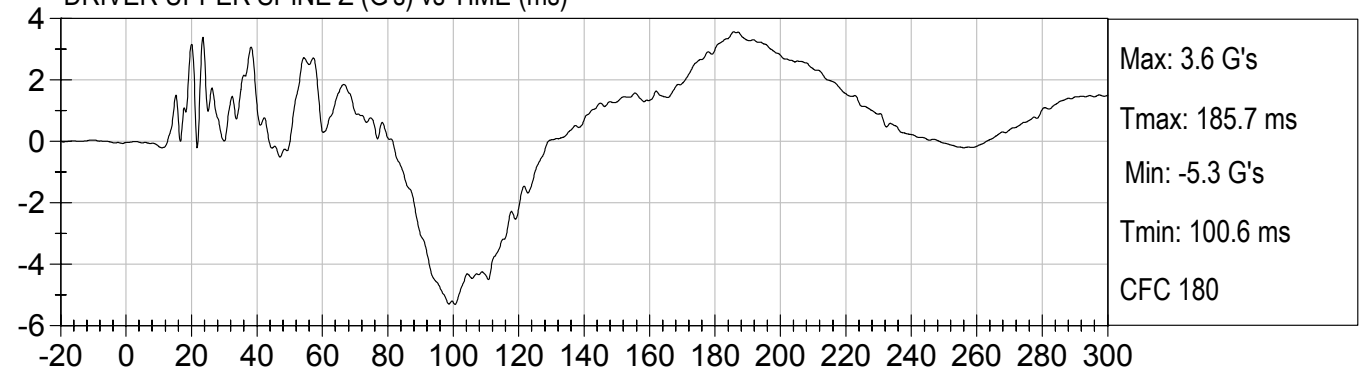
DRIVER UPPER SPINE X (G's) vs TIME (ms)



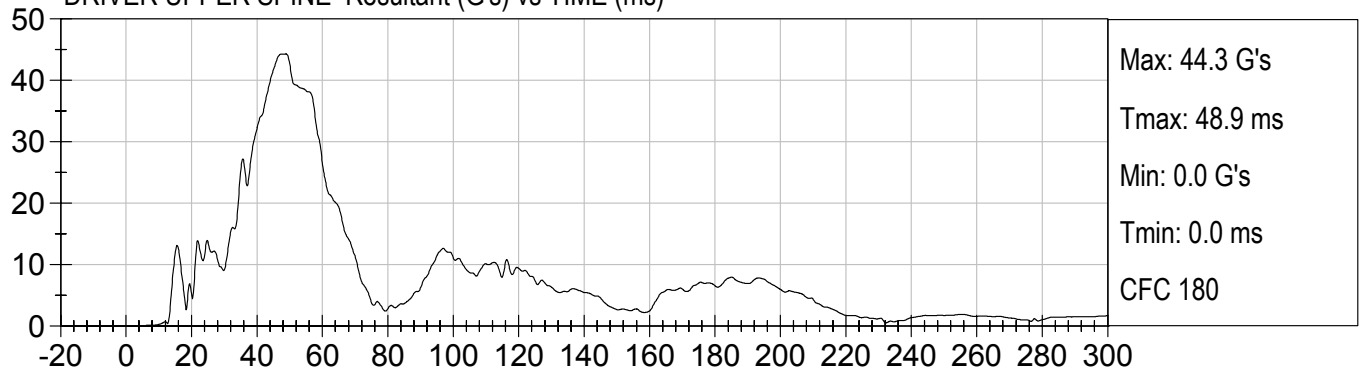
DRIVER UPPER SPINE Y (G's) vs TIME (ms)



DRIVER UPPER SPINE Z (G's) vs TIME (ms)

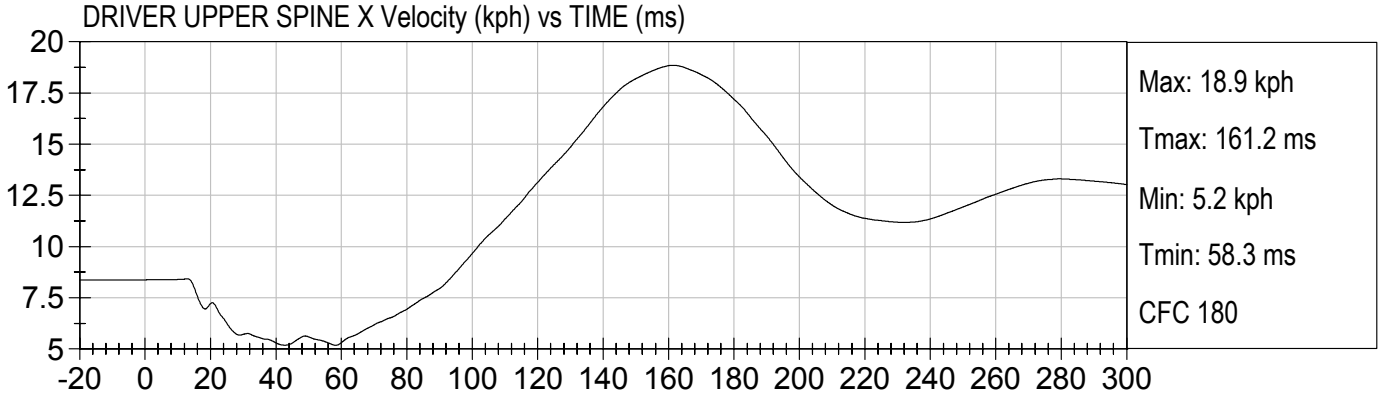


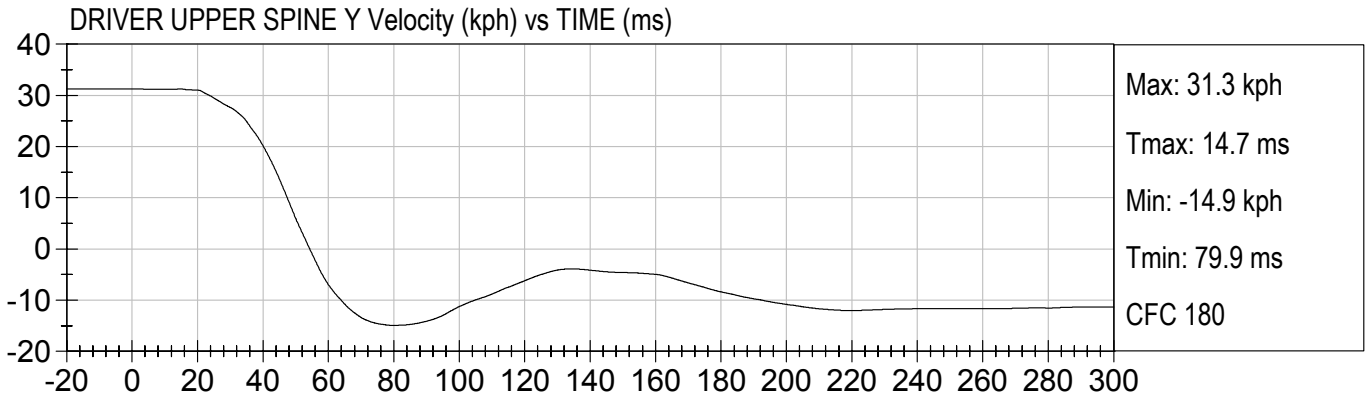
DRIVER UPPER SPINE Resultant (G's) vs TIME (ms)

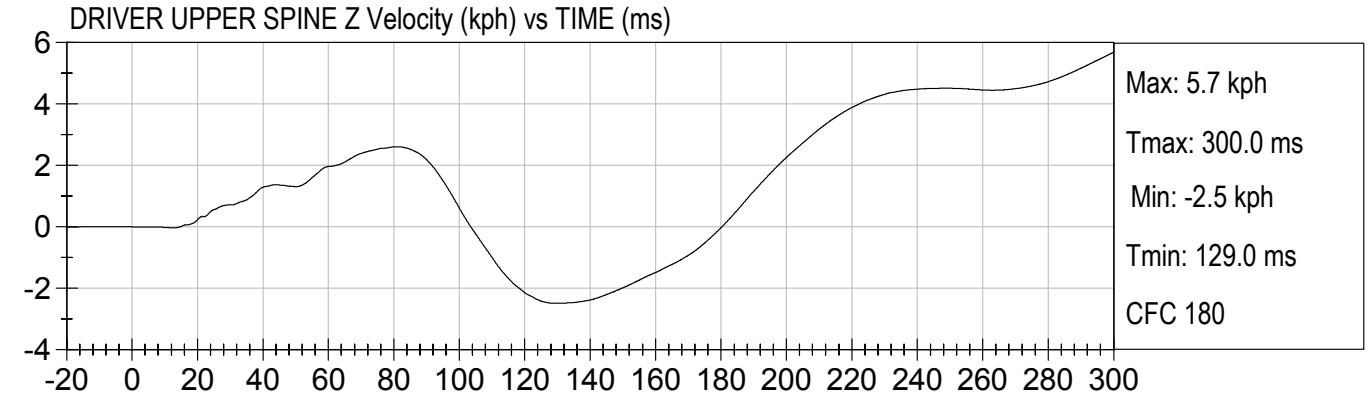


T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)



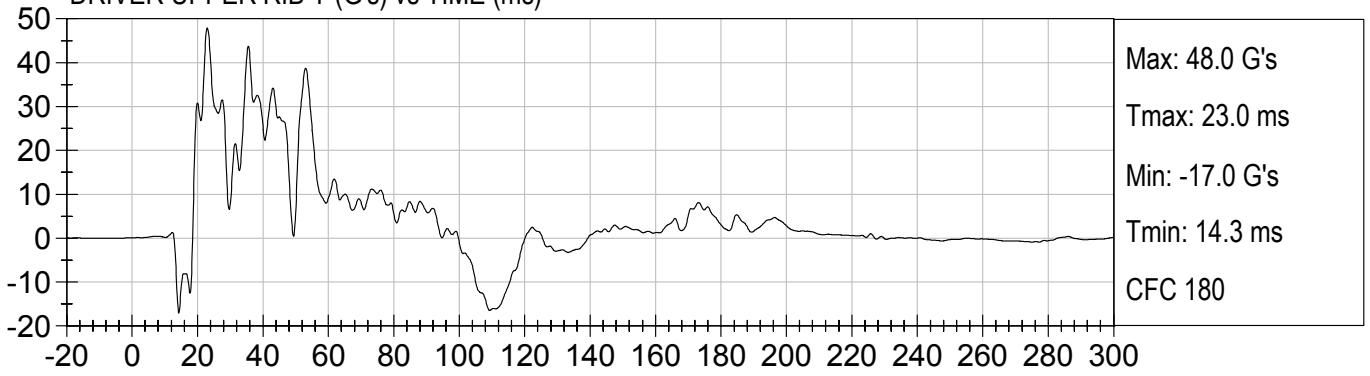




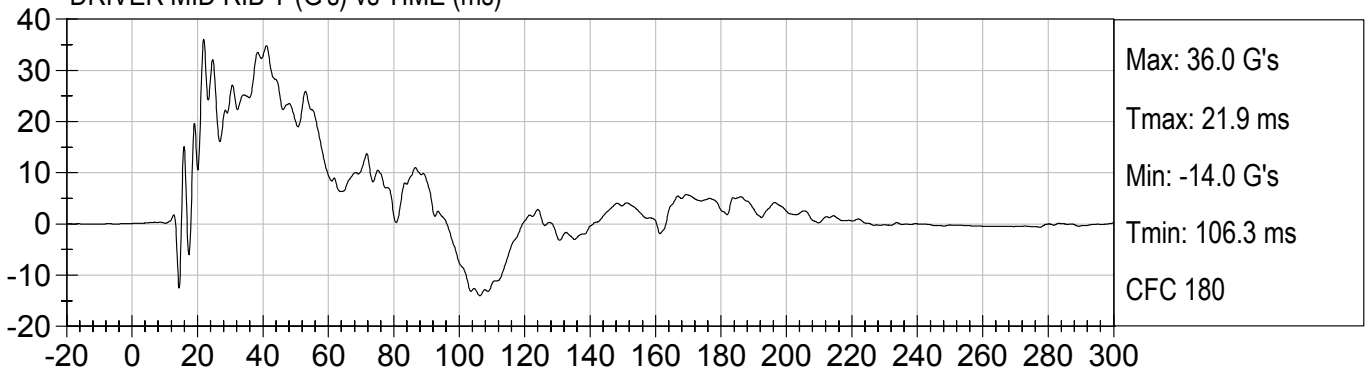
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

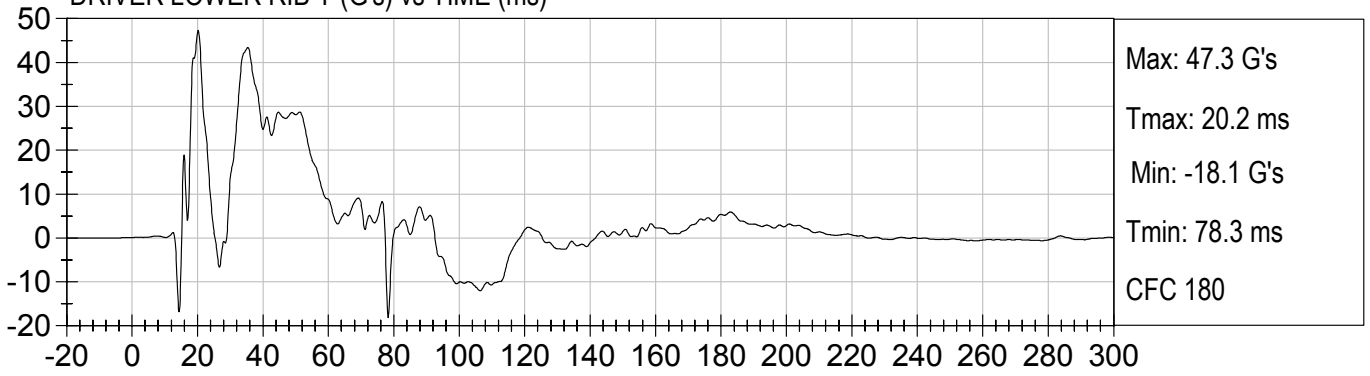
DRIVER UPPER RIB Y (G's) vs TIME (ms)

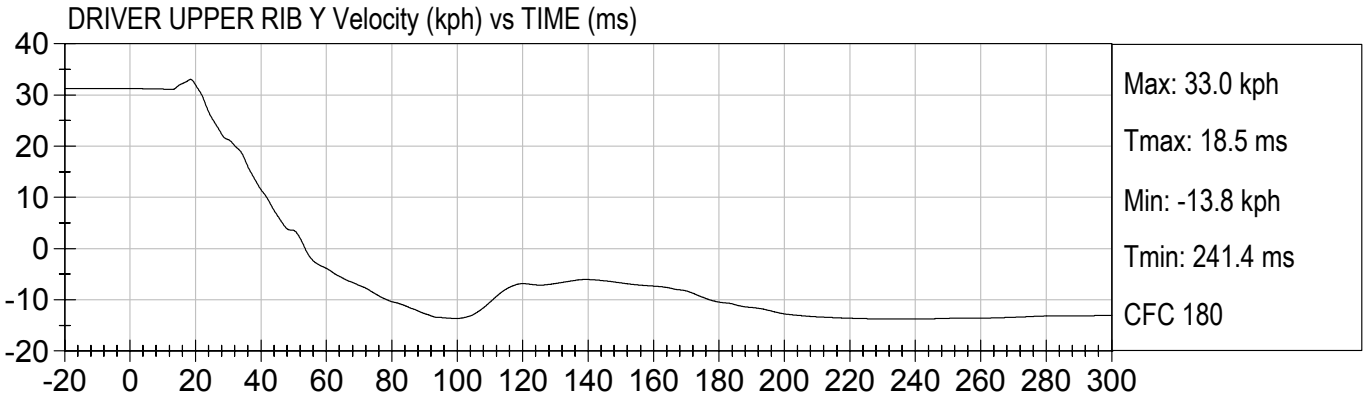


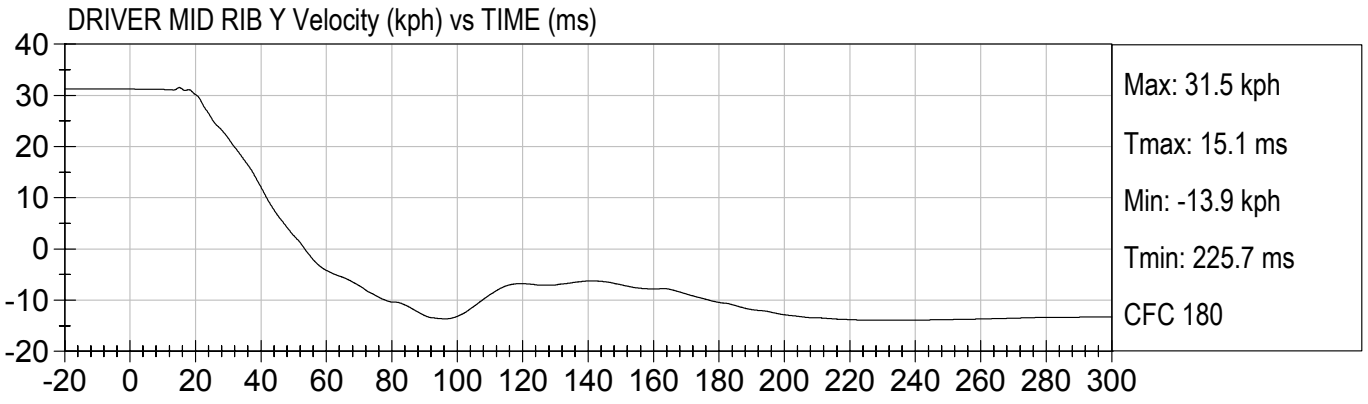
DRIVER MID RIB Y (G's) vs TIME (ms)

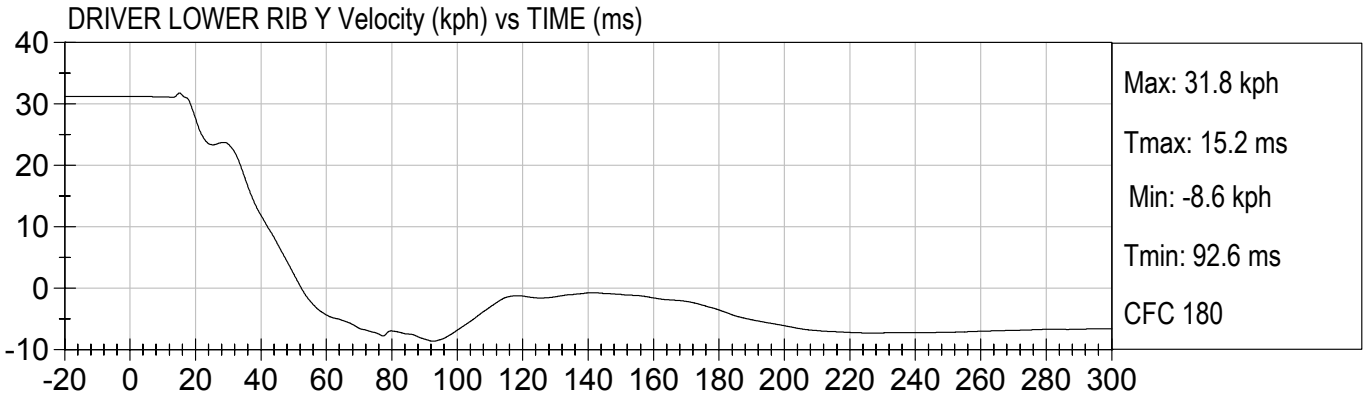


DRIVER LOWER RIB Y (G's) vs TIME (ms)

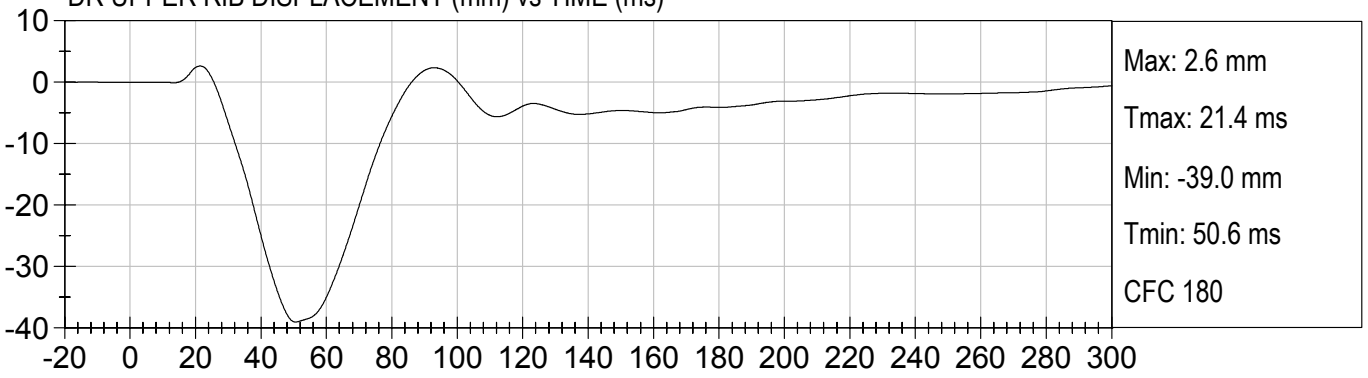



DRIVER UPPER RIB Y Velocity (kph) vs TIME (ms)
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 33.0 kph
Tmax: 18.5 ms
Min: -13.8 kph
Tmin: 241.4 ms
CFC 180

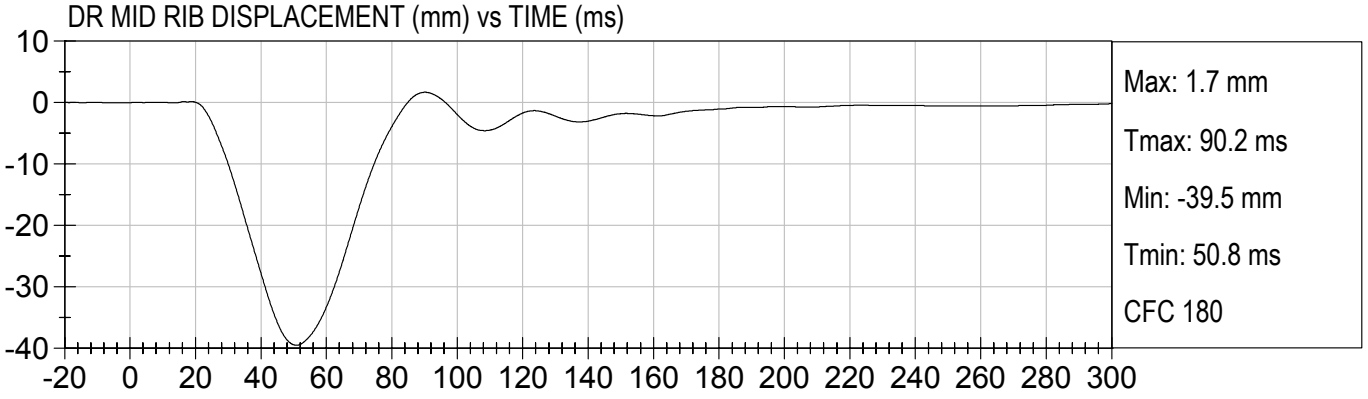

DRIVER MID RIB Y Velocity (kph) vs TIME (ms)
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 31.5 kph
Tmax: 15.1 ms
Min: -13.9 kph
Tmin: 225.7 ms
CFC 180


DRIVER LOWER RIB Y Velocity (kph) vs TIME (ms)
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 31.8 kph
Tmax: 15.2 ms
Min: -8.6 kph
Tmin: 92.6 ms
CFC 180

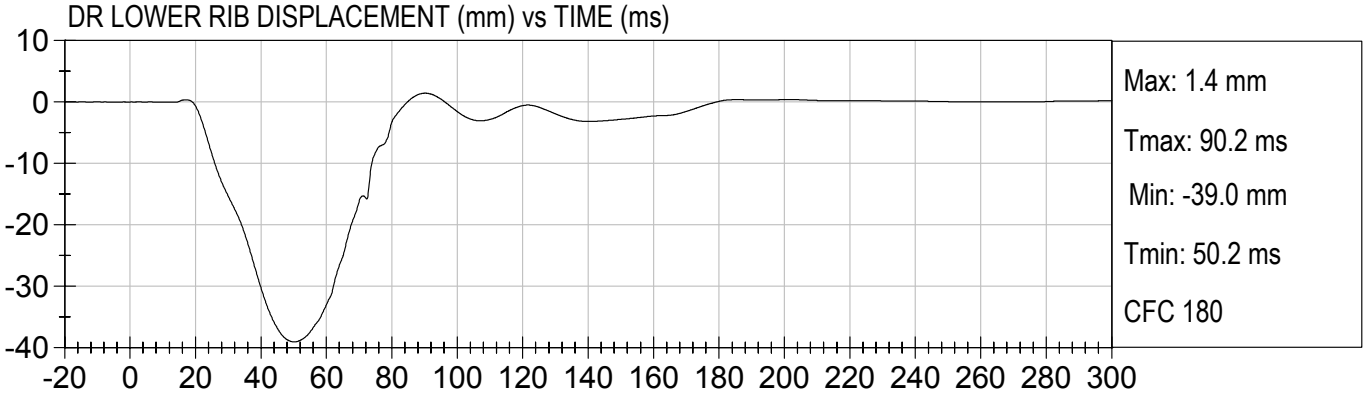
DR UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



DR MID RIB DISPLACEMENT (mm) vs TIME (ms)



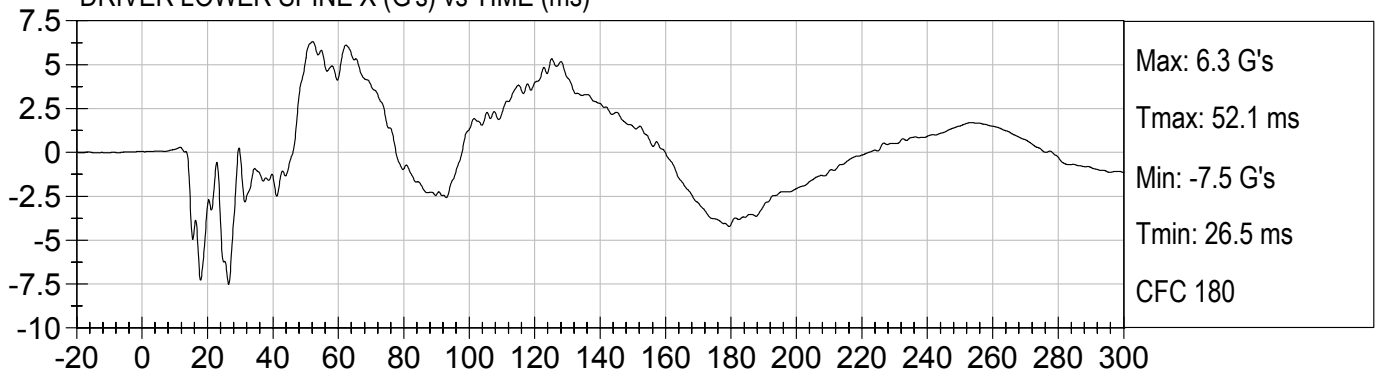
DR LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



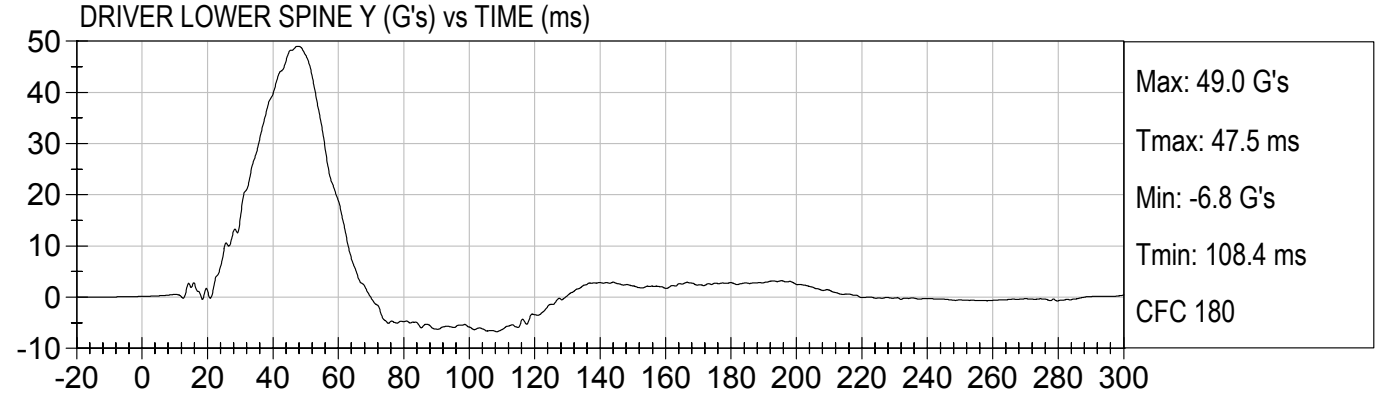
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

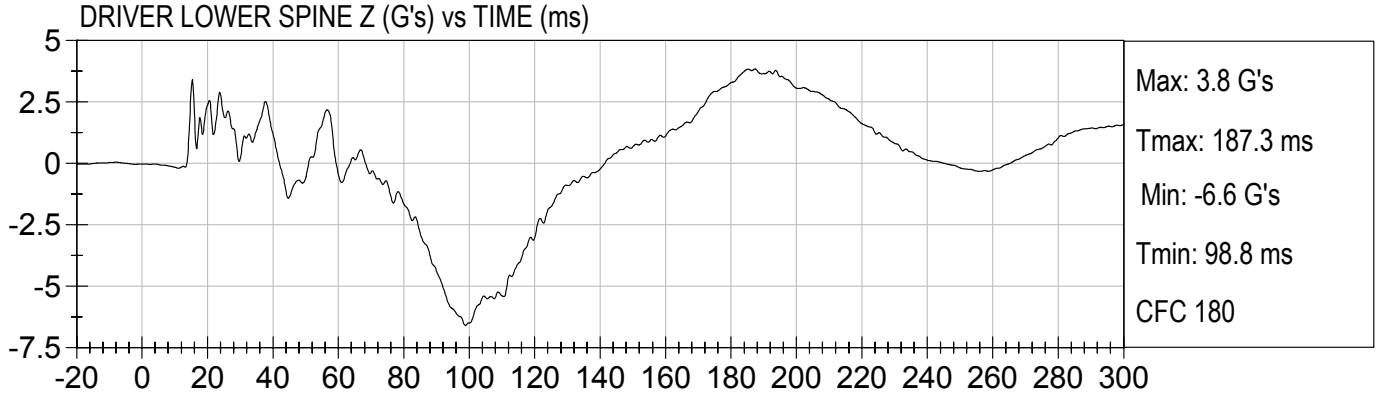
DRIVER LOWER SPINE X (G's) vs TIME (ms)



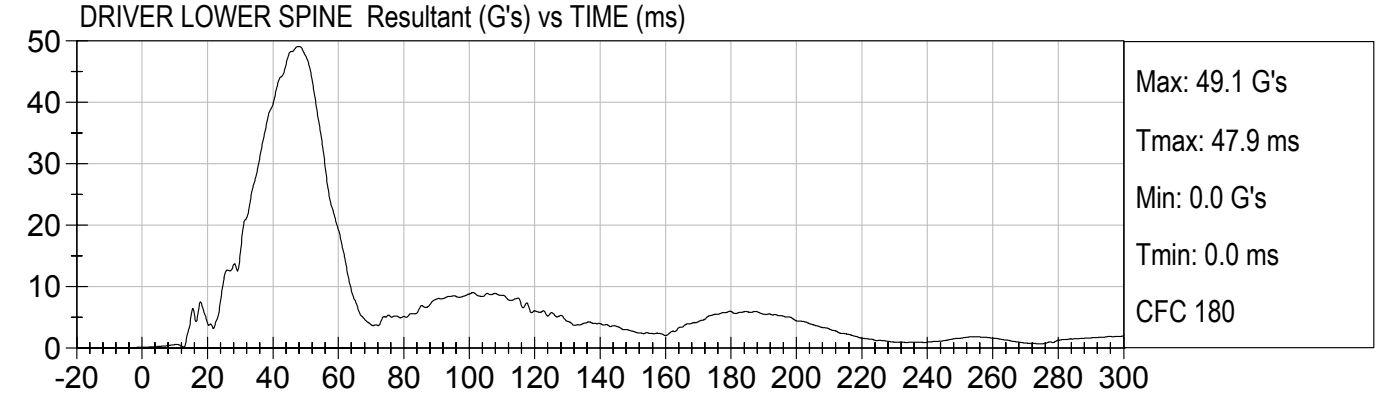
DRIVER LOWER SPINE Y (G's) vs TIME (ms)

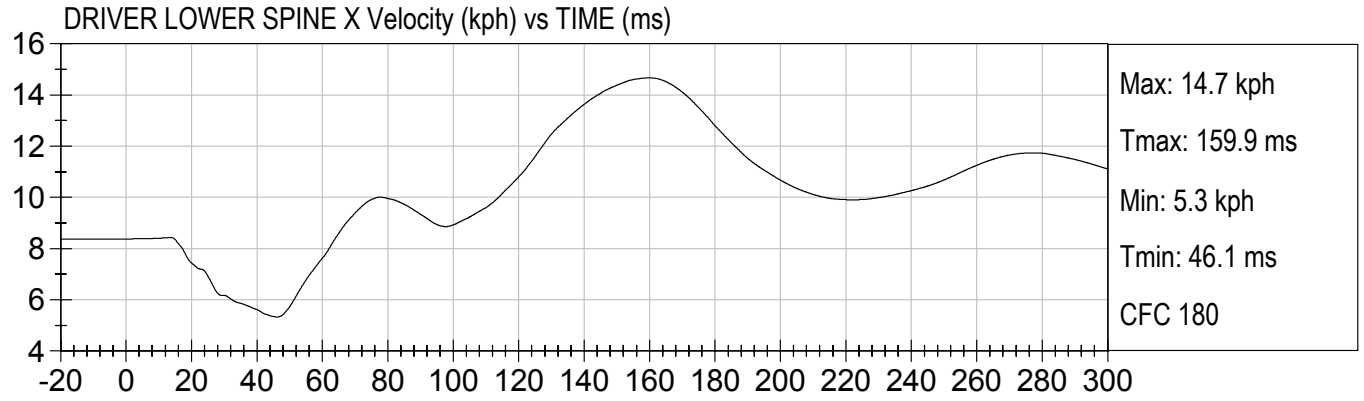


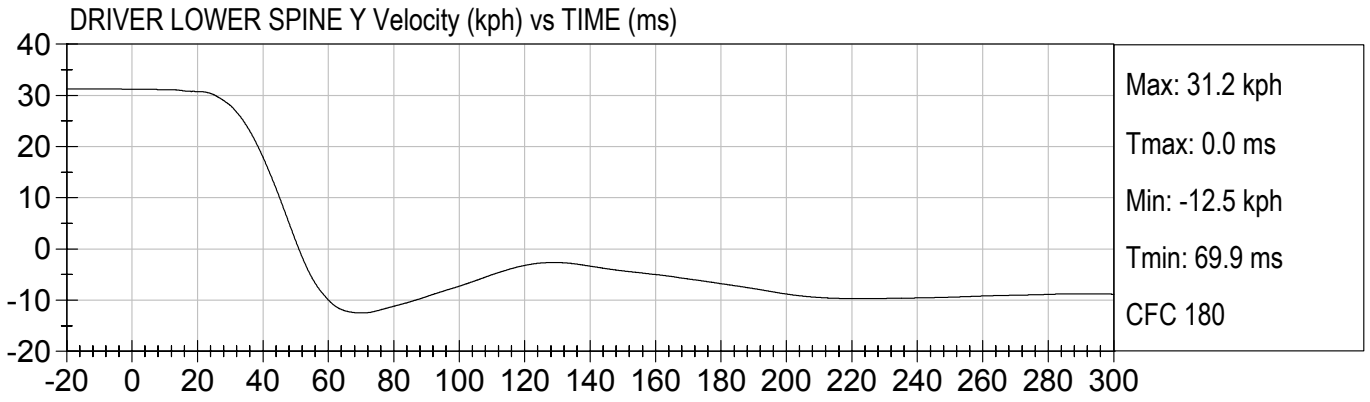
DRIVER LOWER SPINE Z (G's) vs TIME (ms)

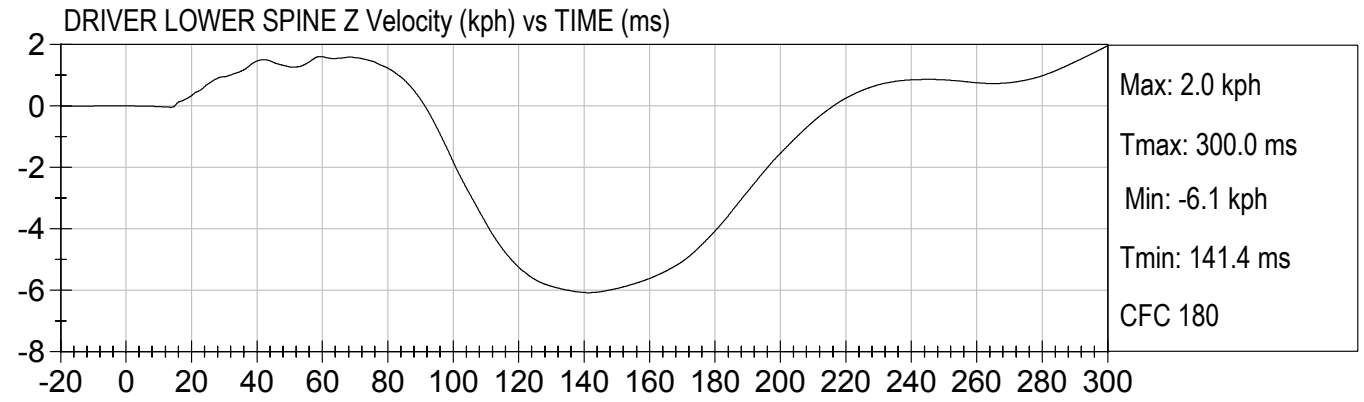


DRIVER LOWER SPINE Resultant (G's) vs TIME (ms)




DRIVER LOWER SPINE X Velocity (kph) vs TIME (ms)
16
14
12
10
8
6
4
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 14.7 kph
Tmax: 159.9 ms
Min: 5.3 kph
Tmin: 46.1 ms
CFC 180

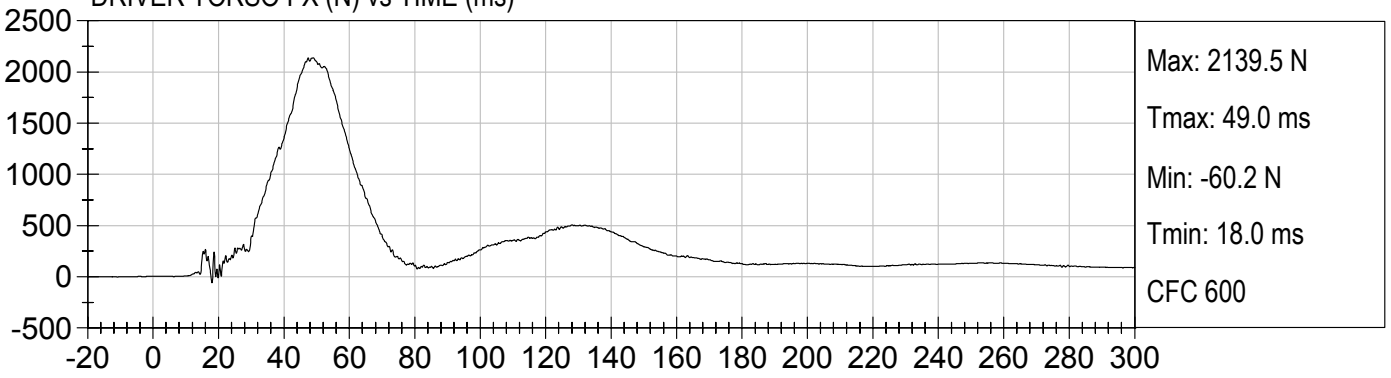

DRIVER LOWER SPINE Y Velocity (kph) vs TIME (ms)
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 31.2 kph
Tmax: 0.0 ms
Min: -12.5 kph
Tmin: 69.9 ms
CFC 180


DRIVER LOWER SPINE Z Velocity (kph) vs TIME (ms)
2
0
-2
-4
-6
-8
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 2.0 kph
Tmax: 300.0 ms
Min: -6.1 kph
Tmin: 141.4 ms
CFC 180

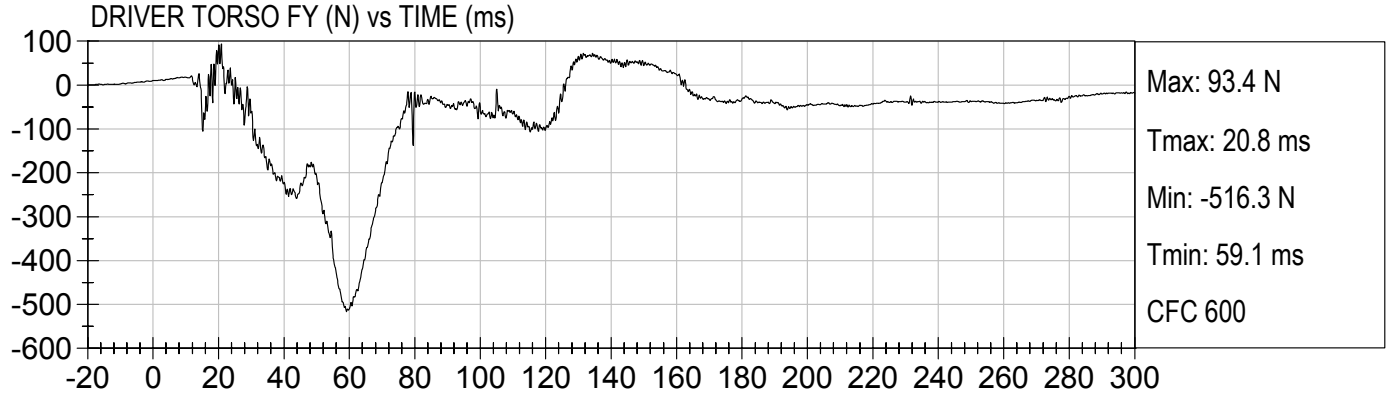
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

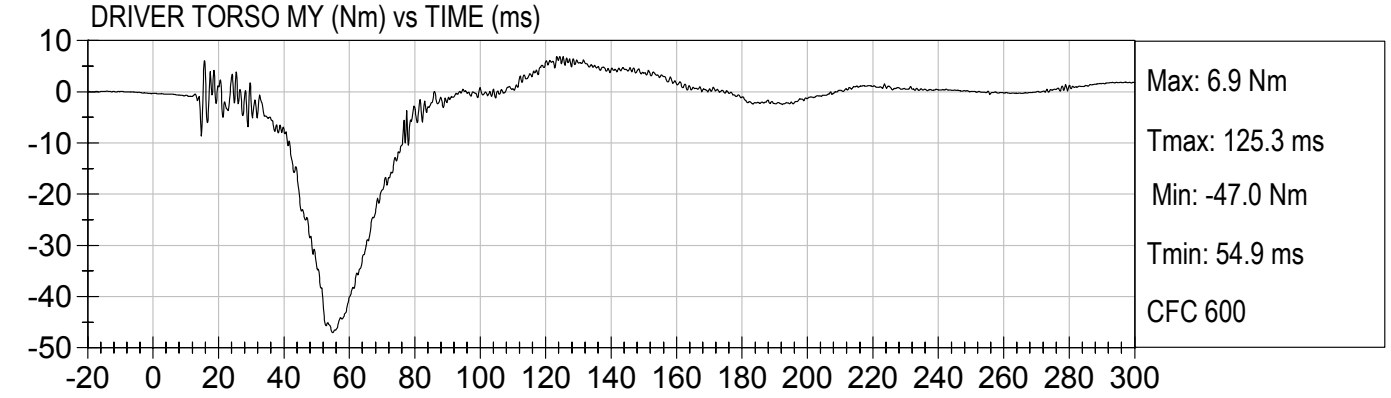
DRIVER TORSO FX (N) vs TIME (ms)



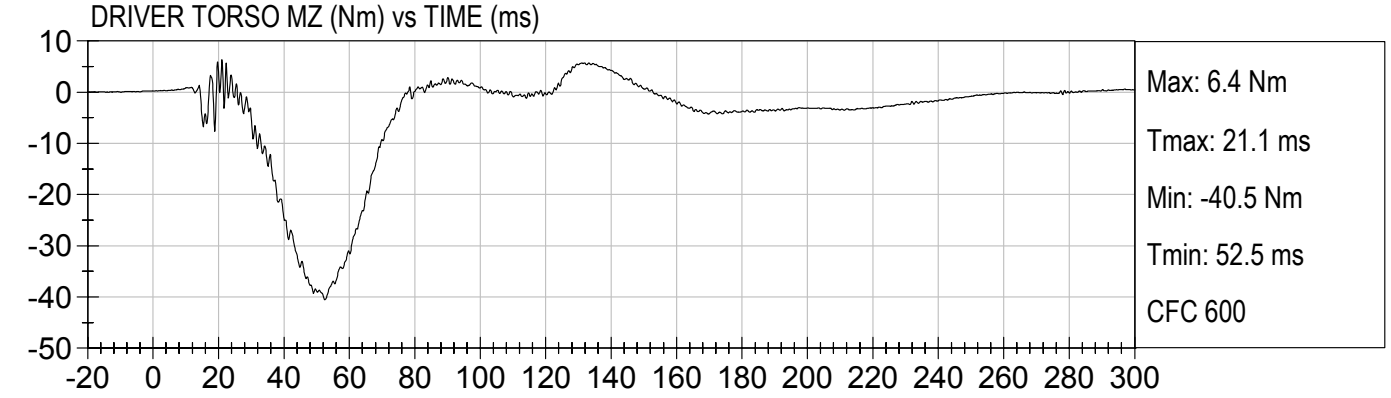
DRIVER TORSO FY (N) vs TIME (ms)



DRIVER TORSO MY (Nm) vs TIME (ms)

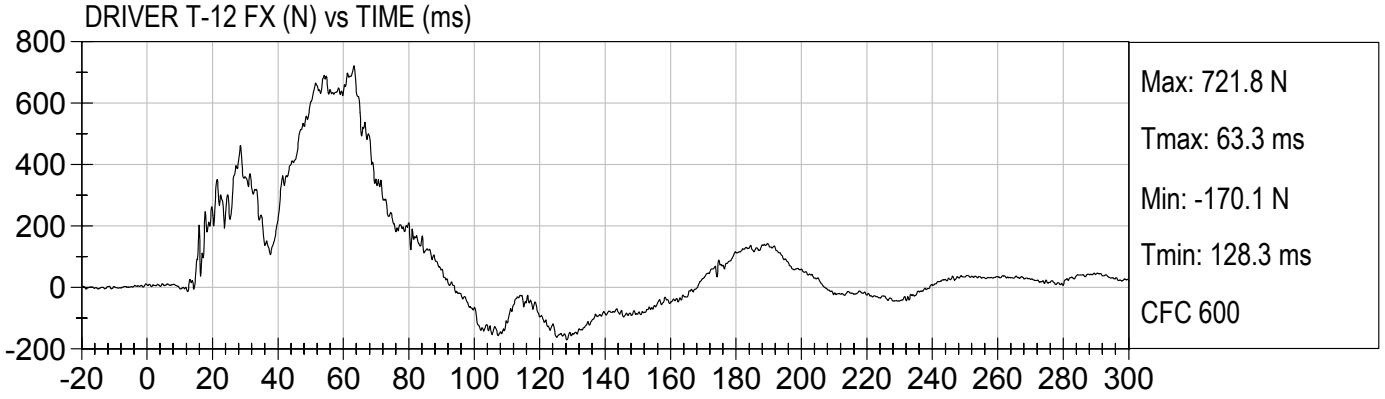


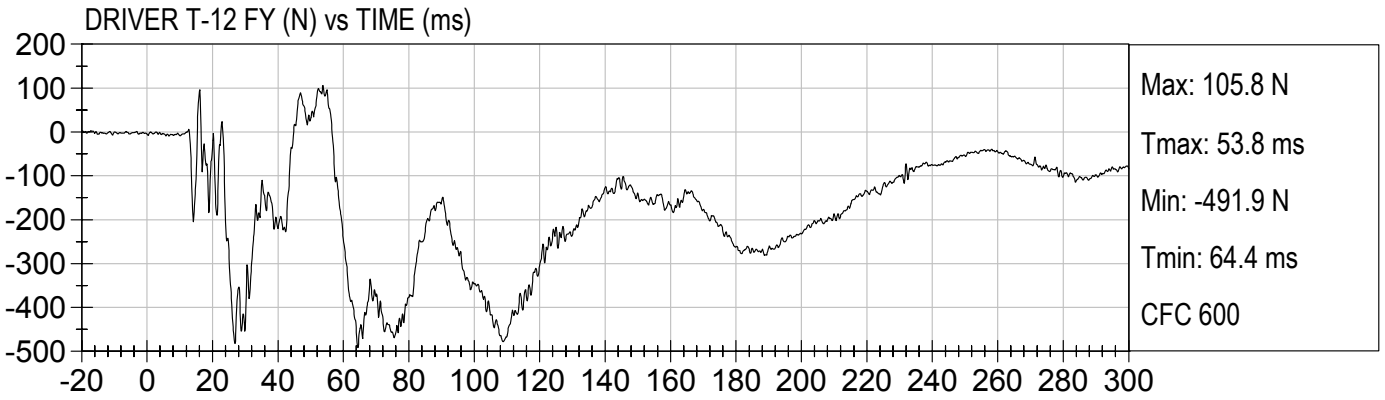
DRIVER TORSO MZ (Nm) vs TIME (ms)

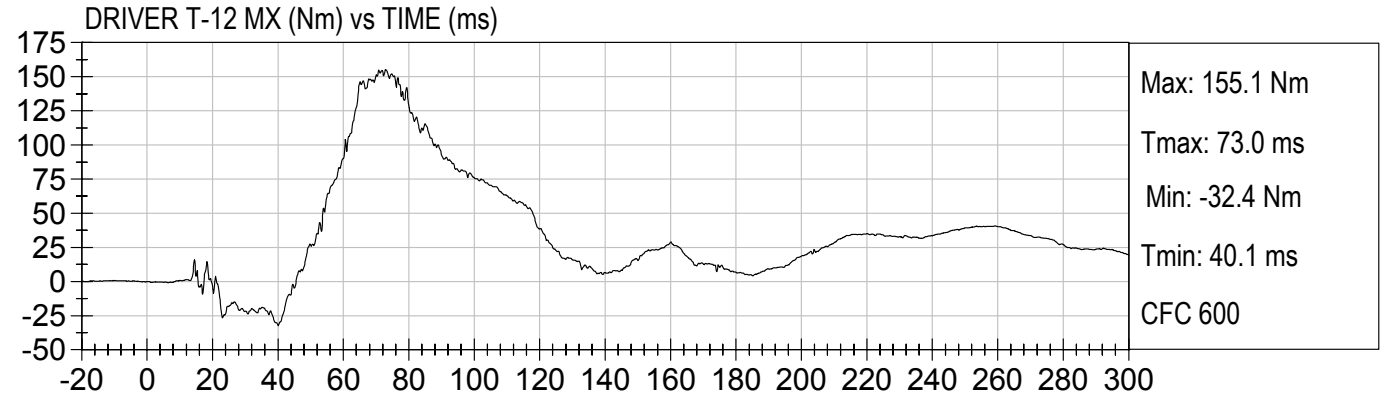


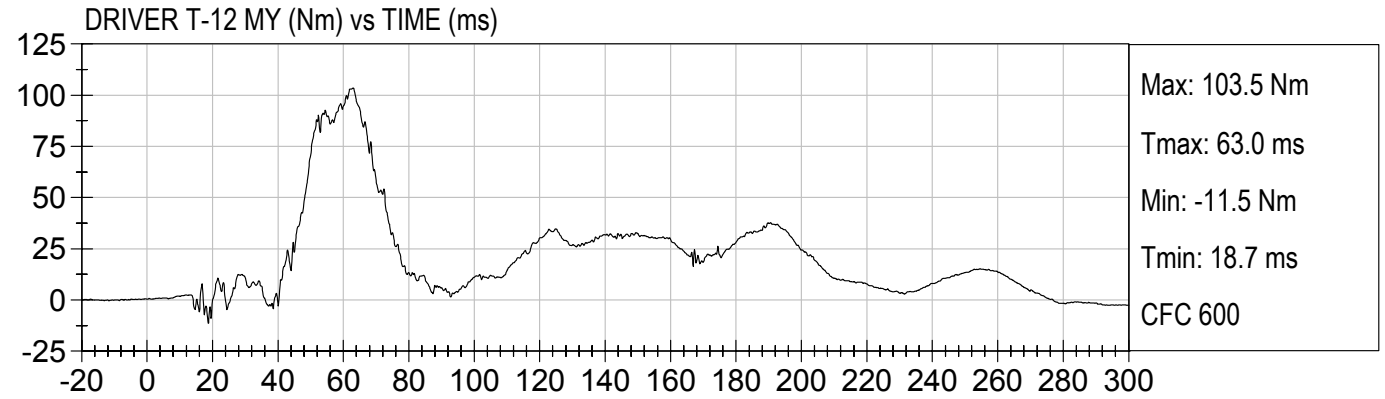
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)





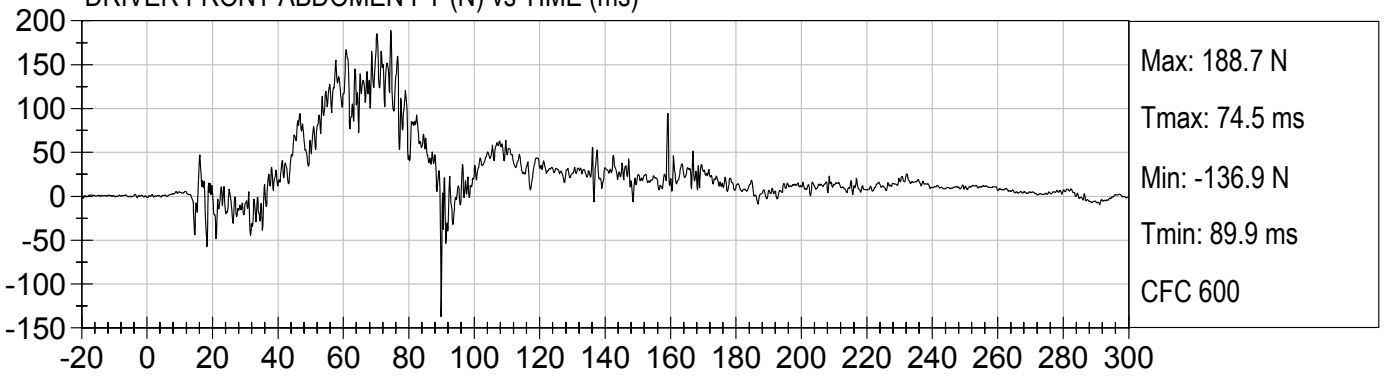




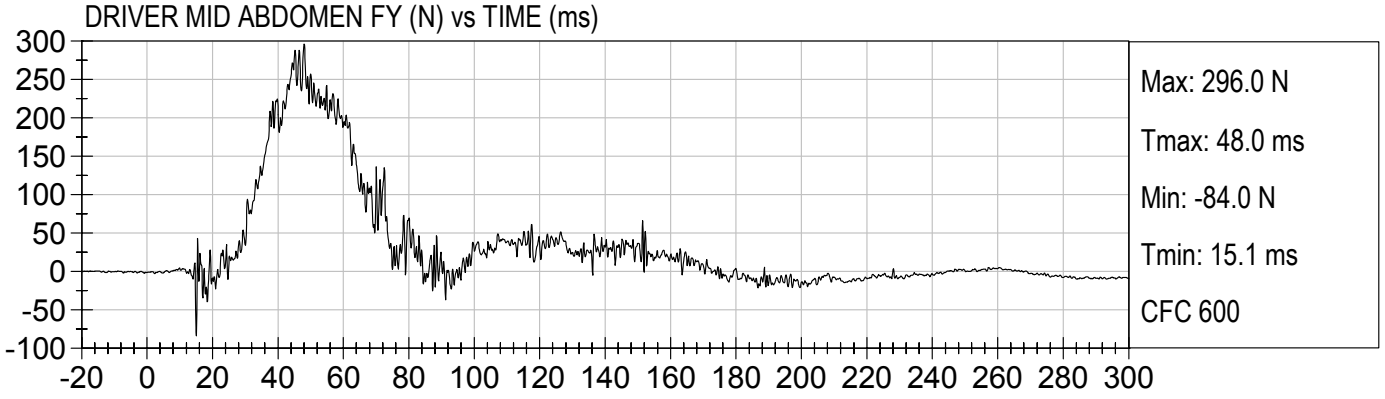
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

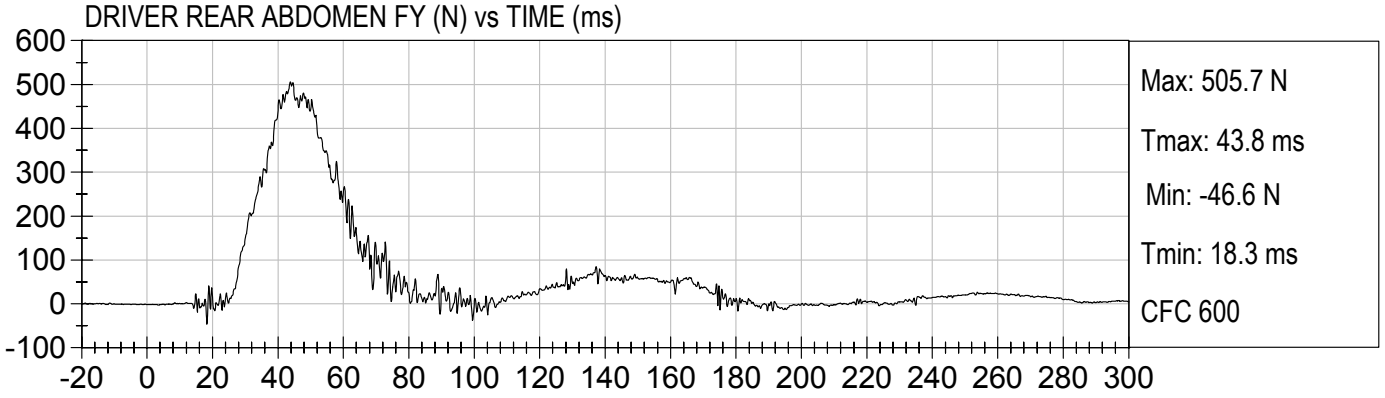
DRIVER FRONT ABDOMEN FY (N) vs TIME (ms)



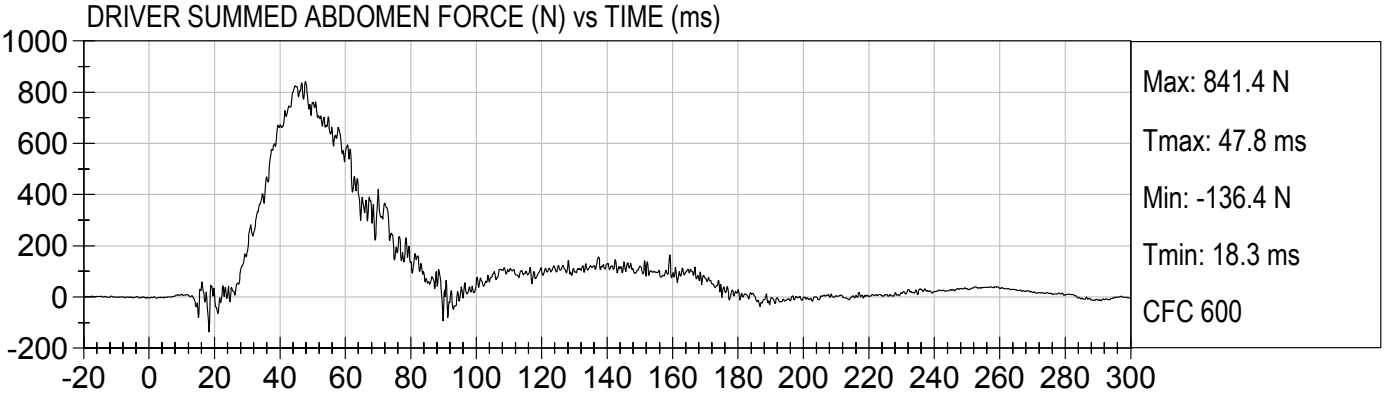
DRIVER MID ABDOMEN FY (N) vs TIME (ms)



DRIVER REAR ABDOMEN FY (N) vs TIME (ms)

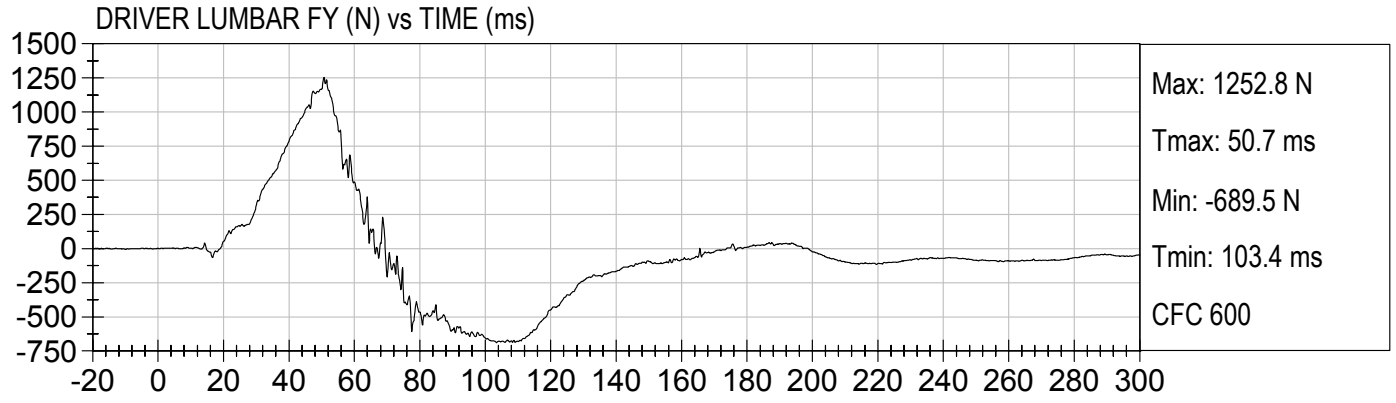


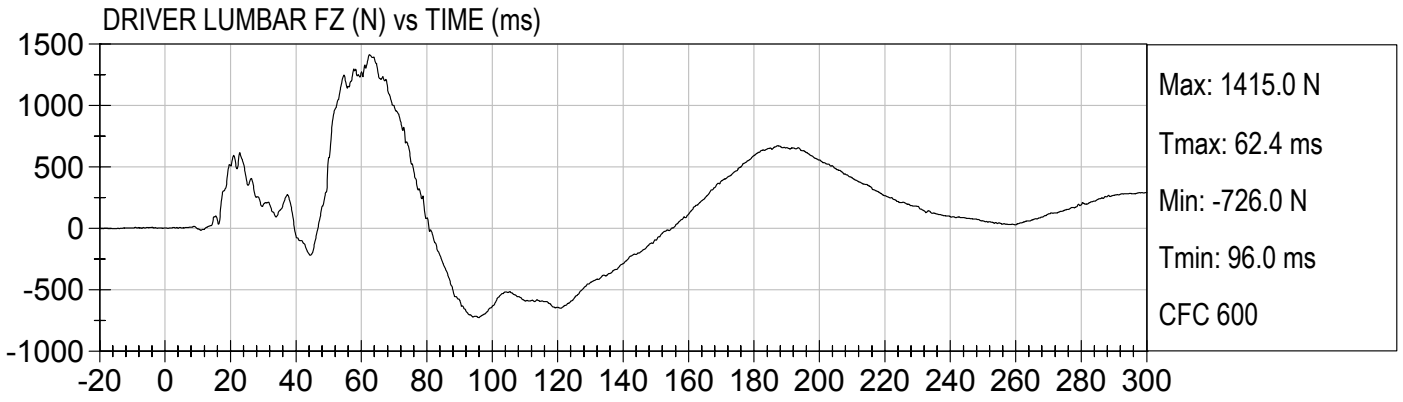
DRIVER SUMMED ABDOMEN FORCE (N) vs TIME (ms)

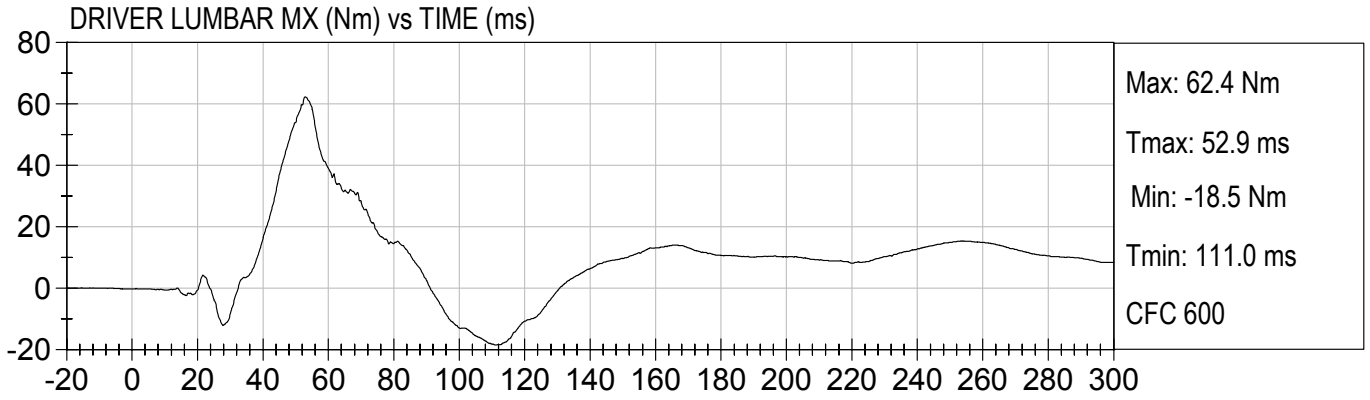


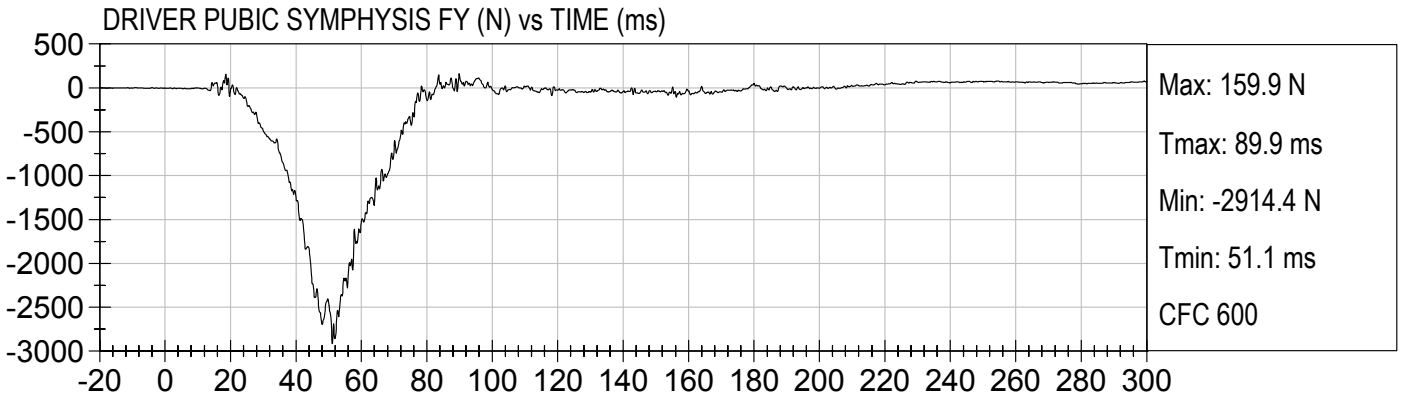
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)





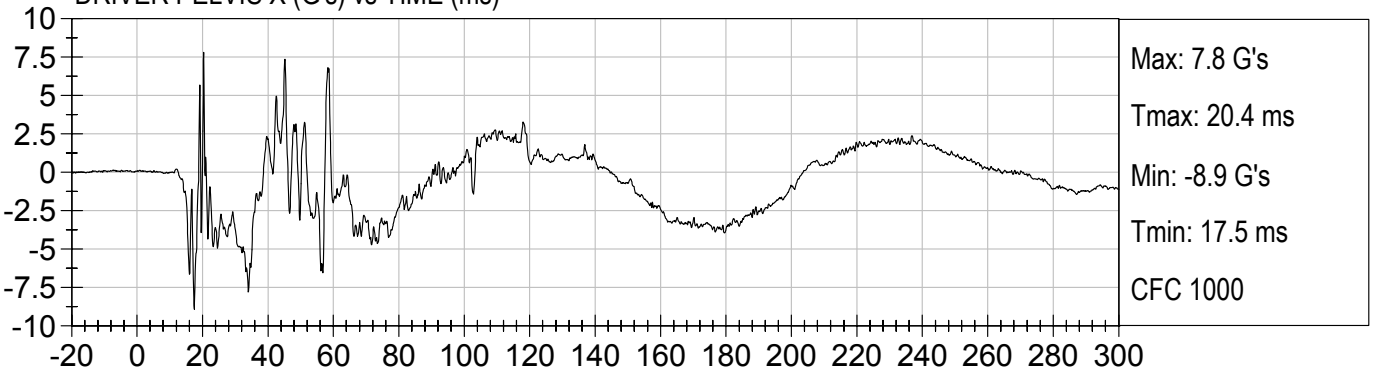




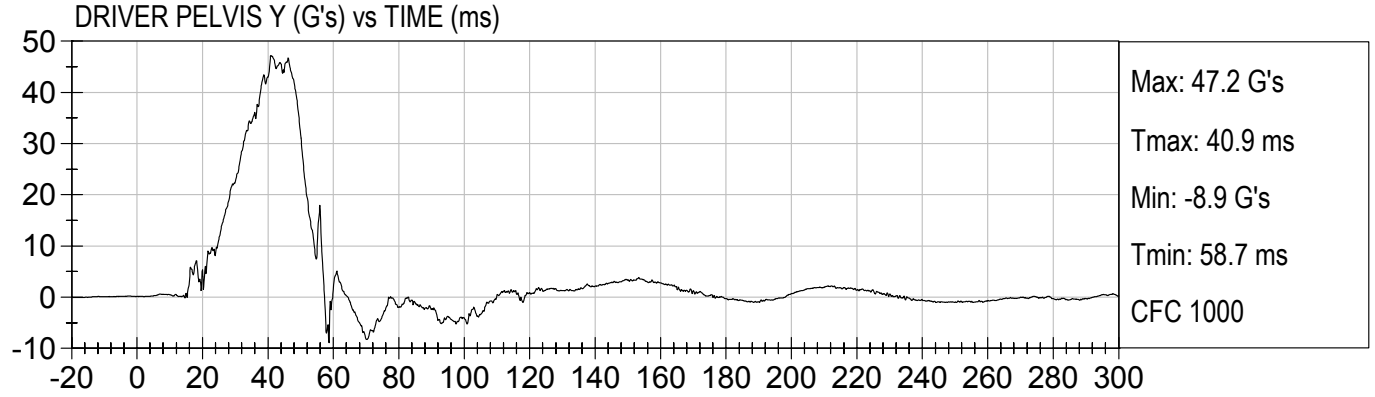
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

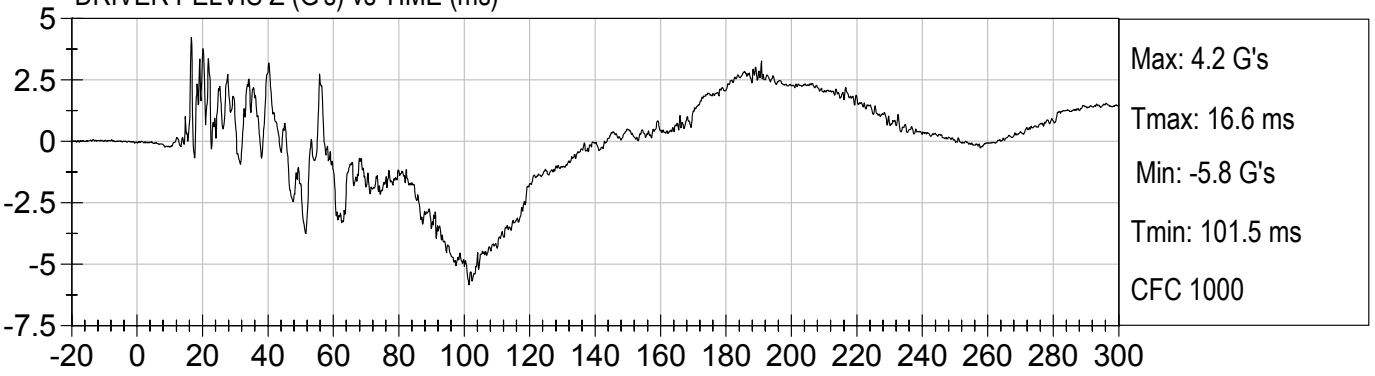
DRIVER PELVIS X (G's) vs TIME (ms)



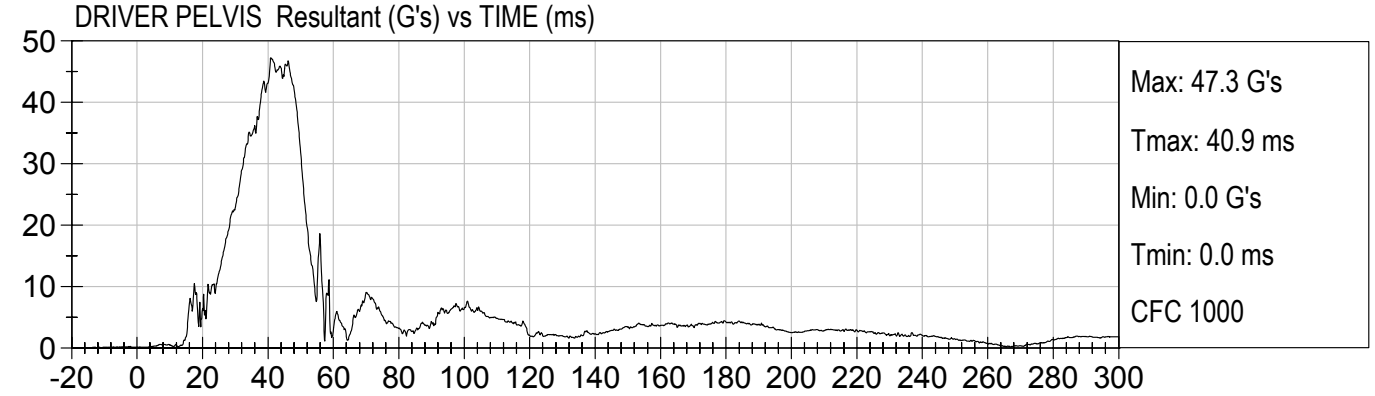
DRIVER PELVIS Y (G's) vs TIME (ms)

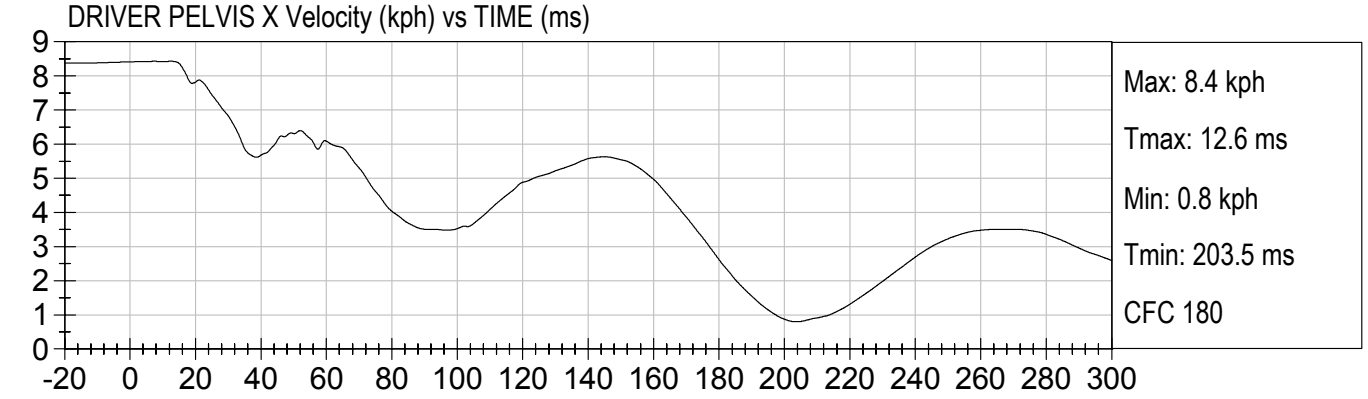


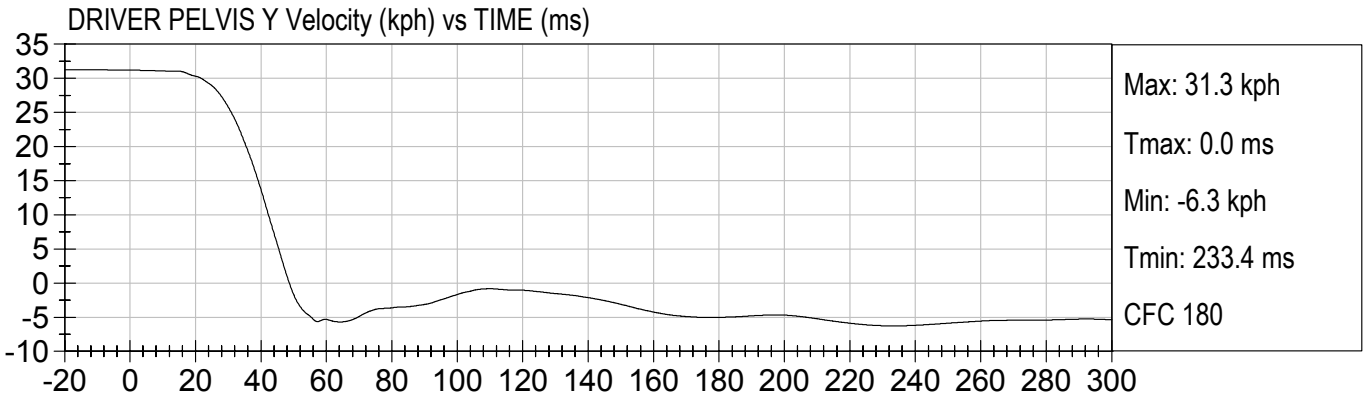
DRIVER PELVIS Z (G's) vs TIME (ms)

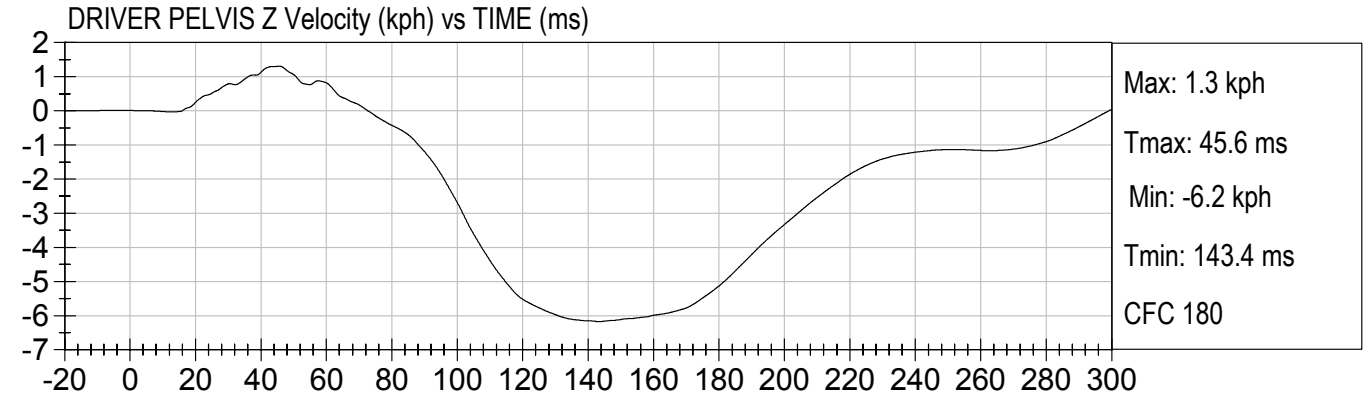


DRIVER PELVIS Resultant (G's) vs TIME (ms)




DRIVER PELVIS X Velocity (kph) vs TIME (ms)
Max: 8.4 kph
Tmax: 12.6 ms
Min: 0.8 kph
Tmin: 203.5 ms
CFC 180

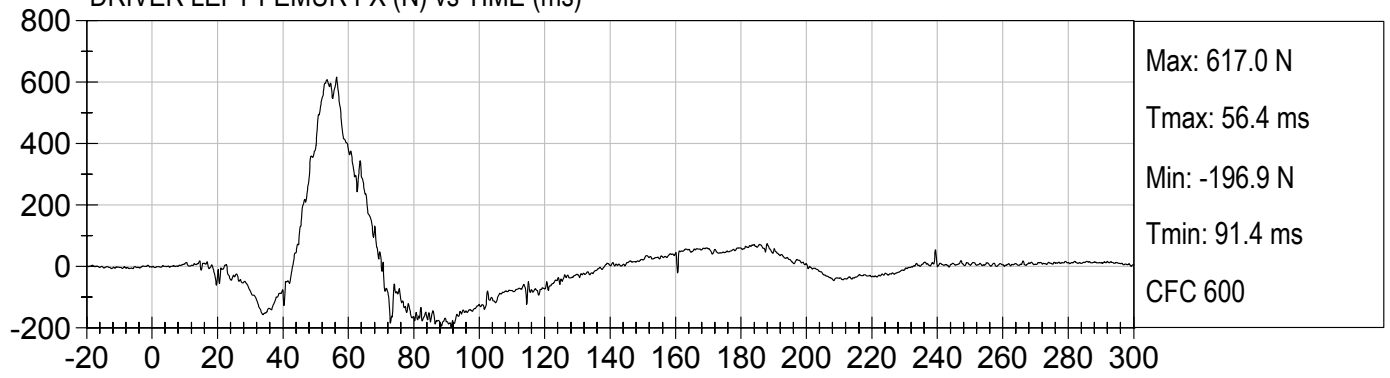

DRIVER PELVIS Y Velocity (kph) vs TIME (ms)
Max: 31.3 kph
Tmax: 0.0 ms
Min: -6.3 kph
Tmin: 233.4 ms
CFC 180


DRIVER PELVIS Z Velocity (kph) vs TIME (ms)
Max: 1.3 kph
Tmax: 45.6 ms
Min: -6.2 kph
Tmin: 143.4 ms
CFC 180

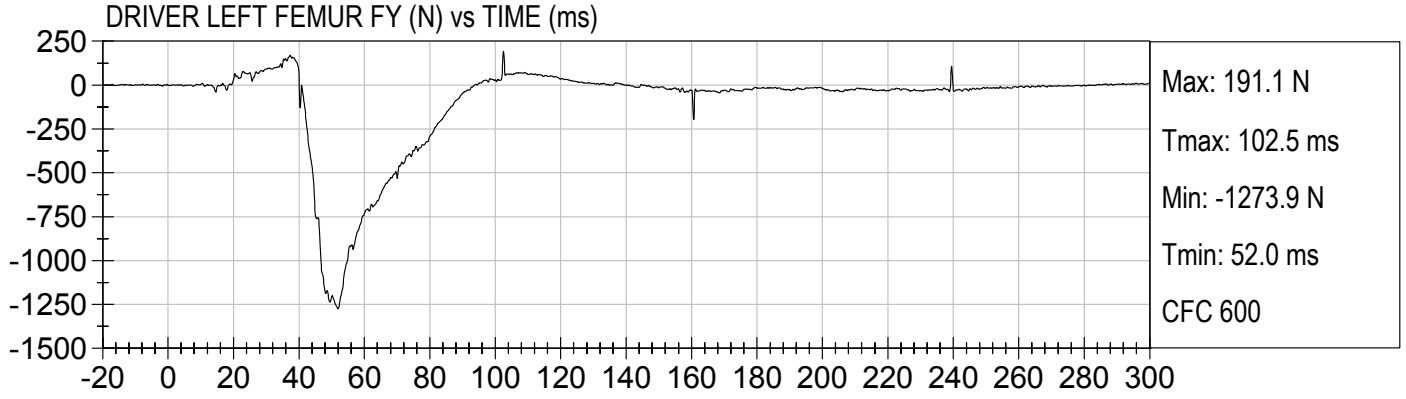
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

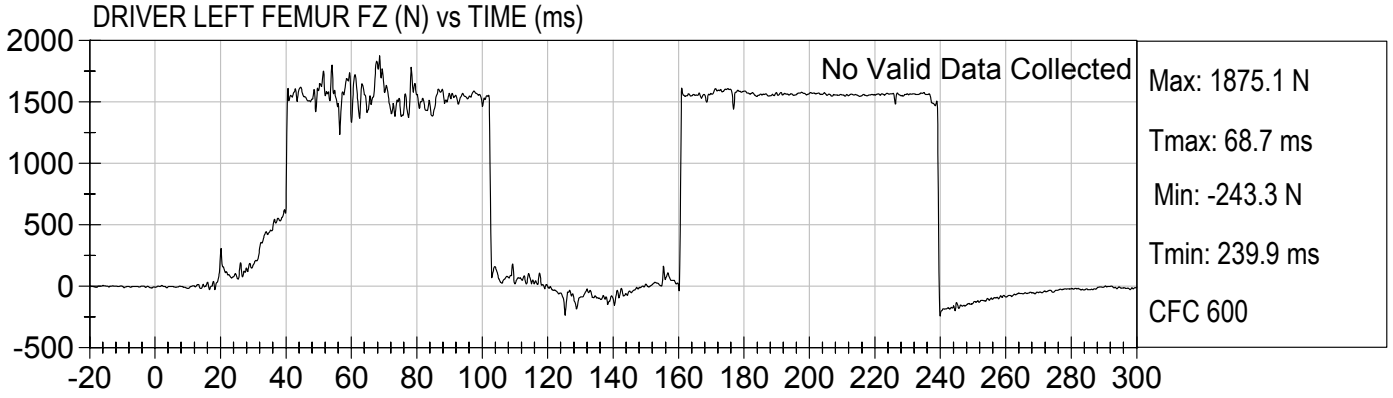
DRIVER LEFT FEMUR FX (N) vs TIME (ms)



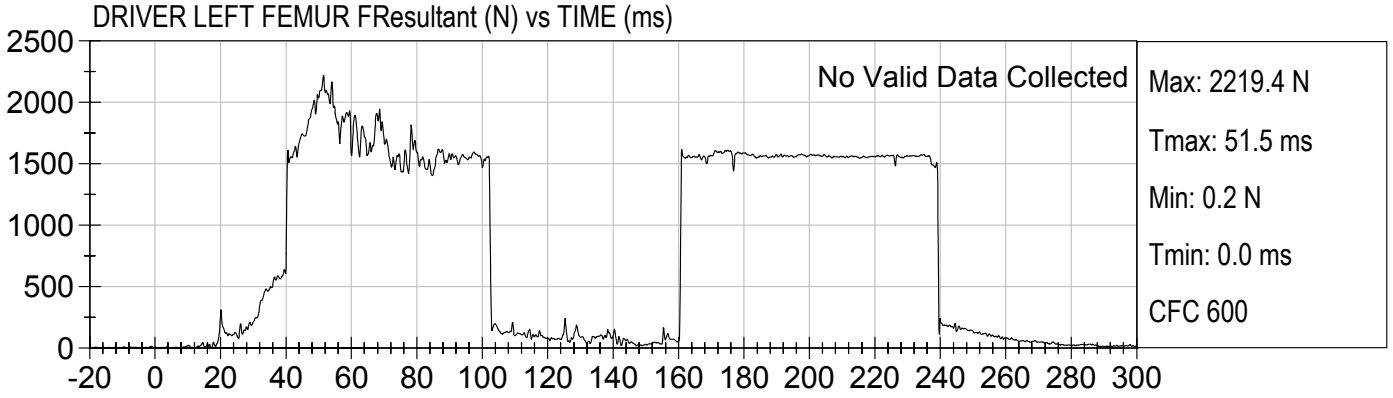
DRIVER LEFT FEMUR FY (N) vs TIME (ms)



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



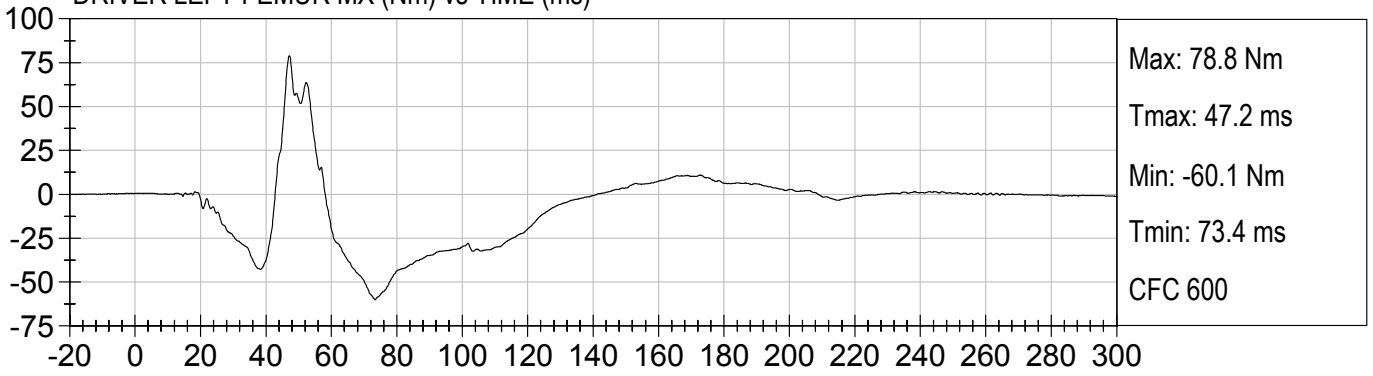
DRIVER LEFT FEMUR FResultant (N) vs TIME (ms)



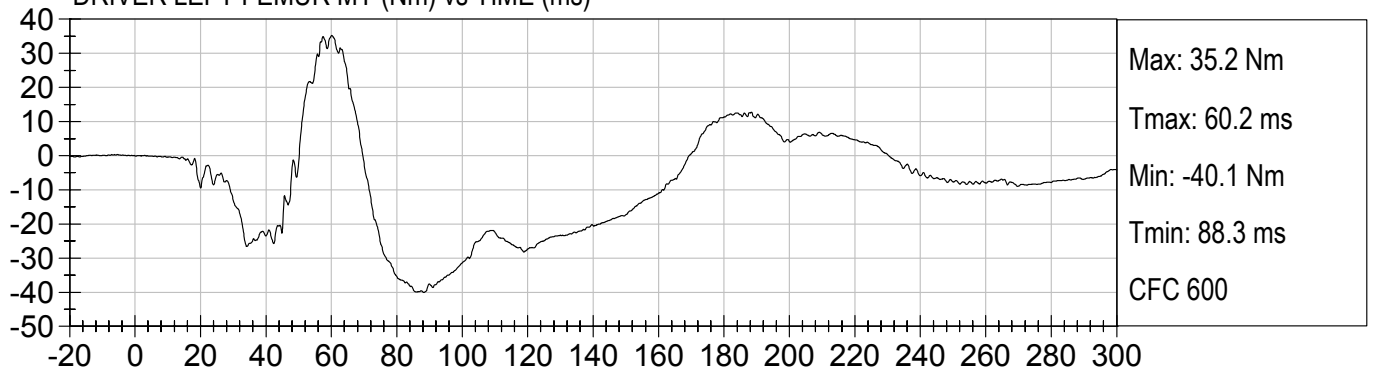
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

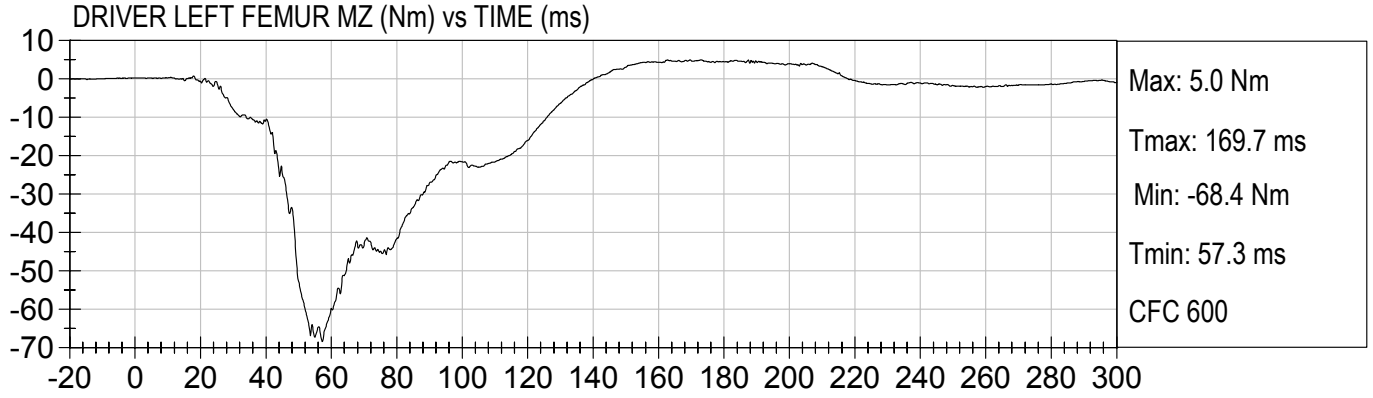
DRIVER LEFT FEMUR MX (Nm) vs TIME (ms)



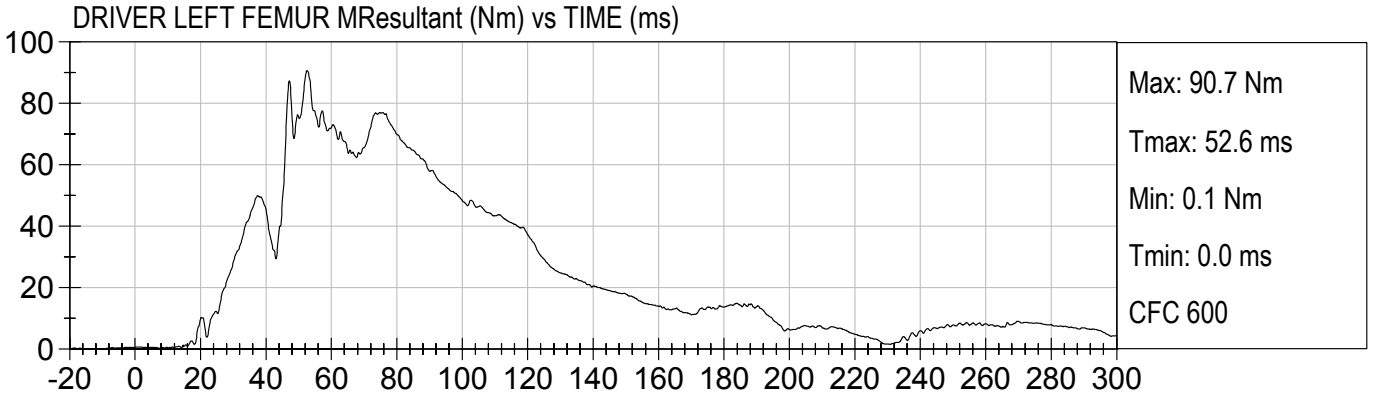
DRIVER LEFT FEMUR MY (Nm) vs TIME (ms)



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



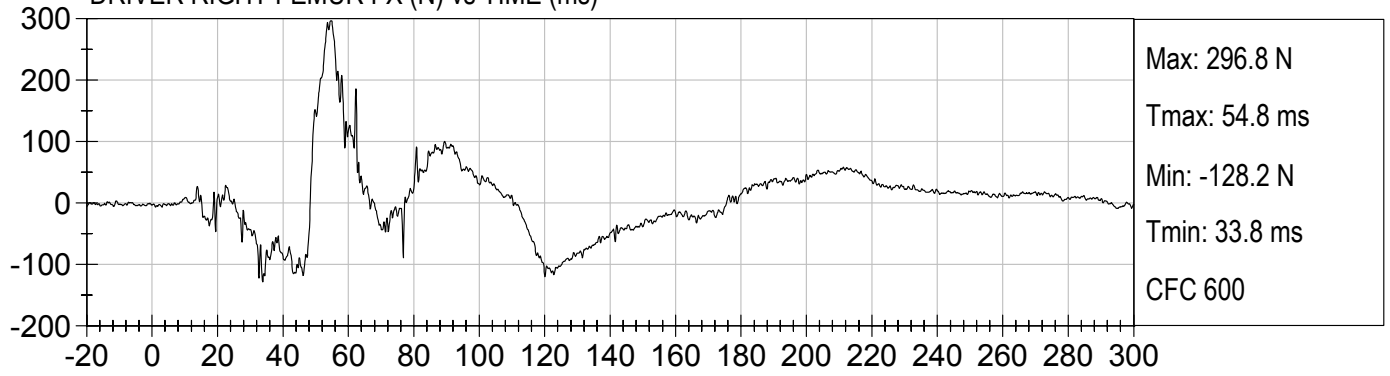
DRIVER LEFT FEMUR MResultant (Nm) vs TIME (ms)



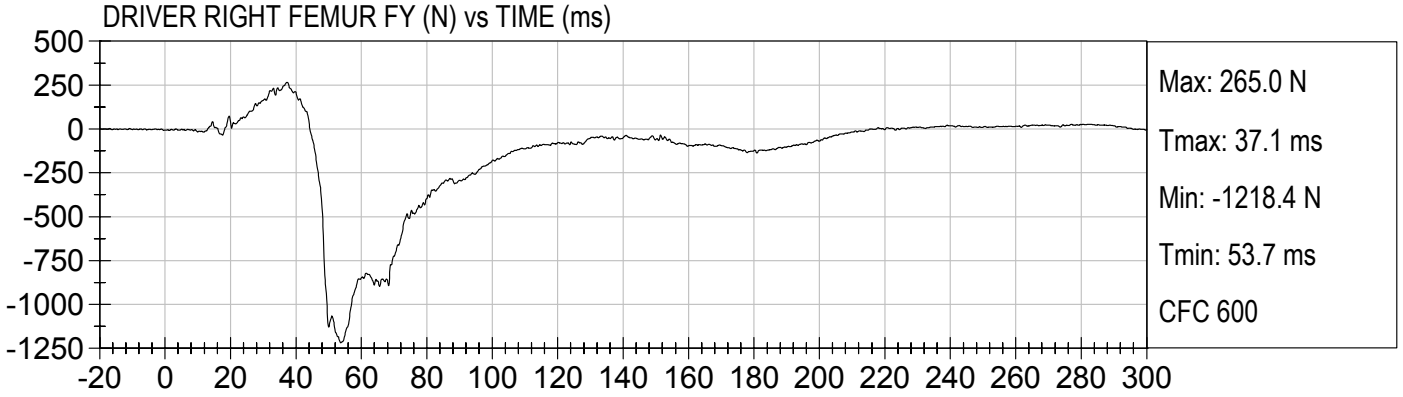
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

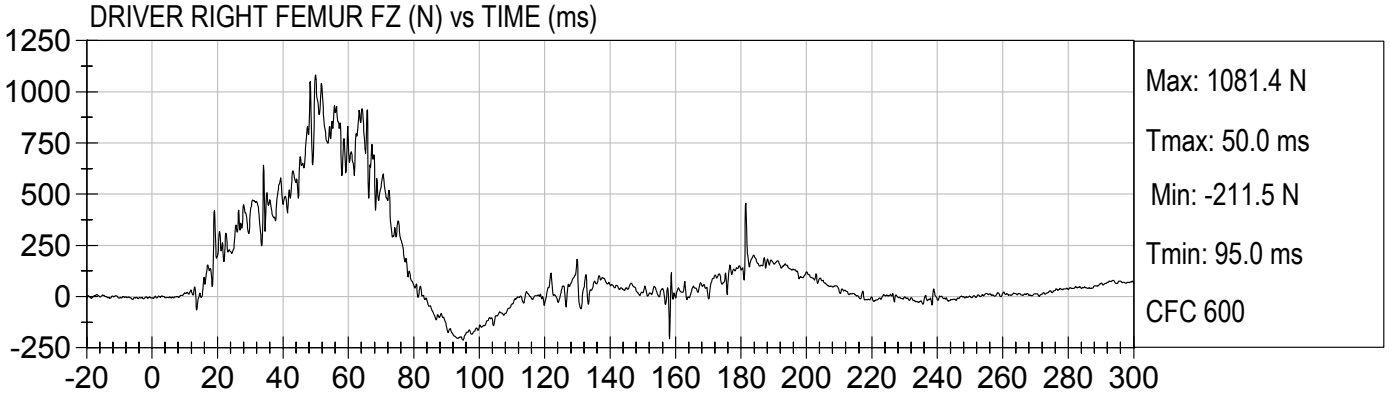
DRIVER RIGHT FEMUR FX (N) vs TIME (ms)



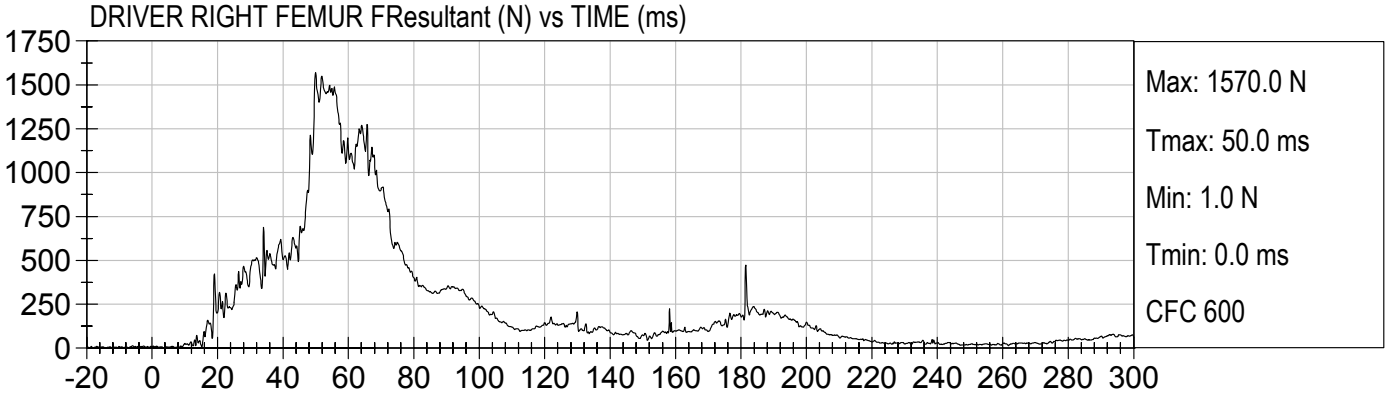
DRIVER RIGHT FEMUR FY (N) vs TIME (ms)



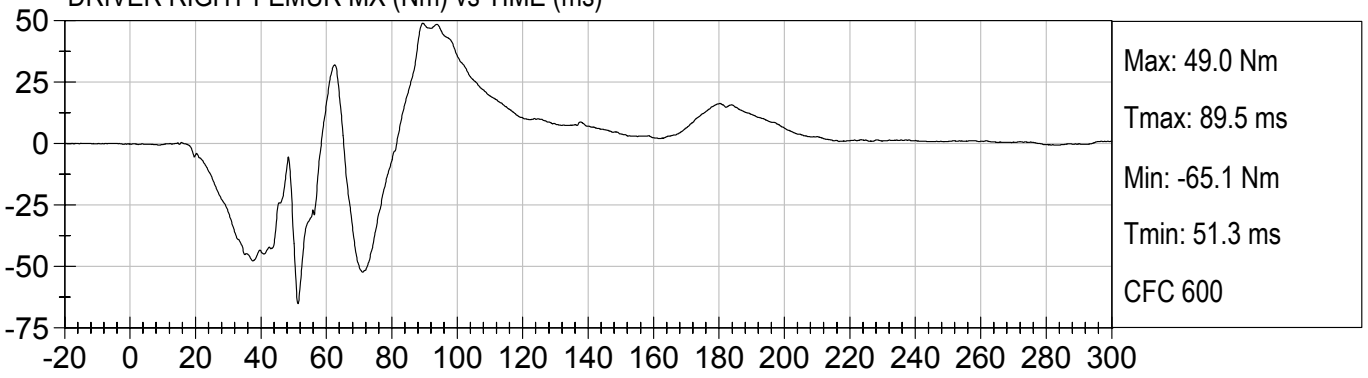
DRIVER RIGHT FEMUR FZ (N) vs TIME (ms)



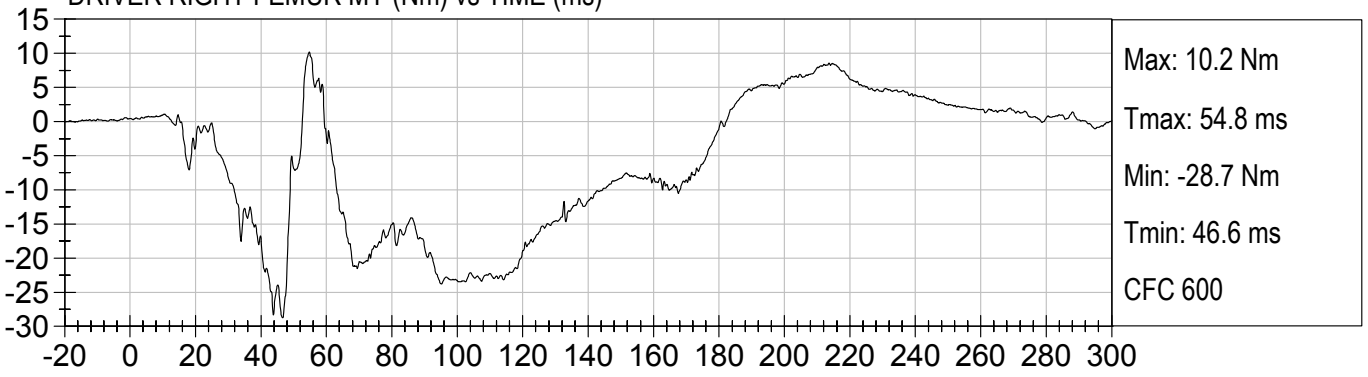
DRIVER RIGHT FEMUR FResultant (N) vs TIME (ms)



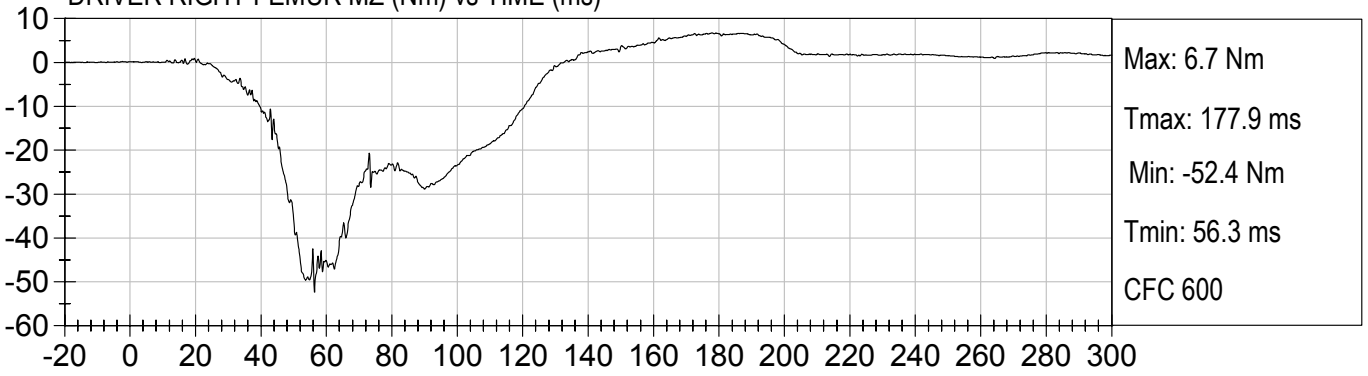
DRIVER RIGHT FEMUR MX (Nm) vs TIME (ms)



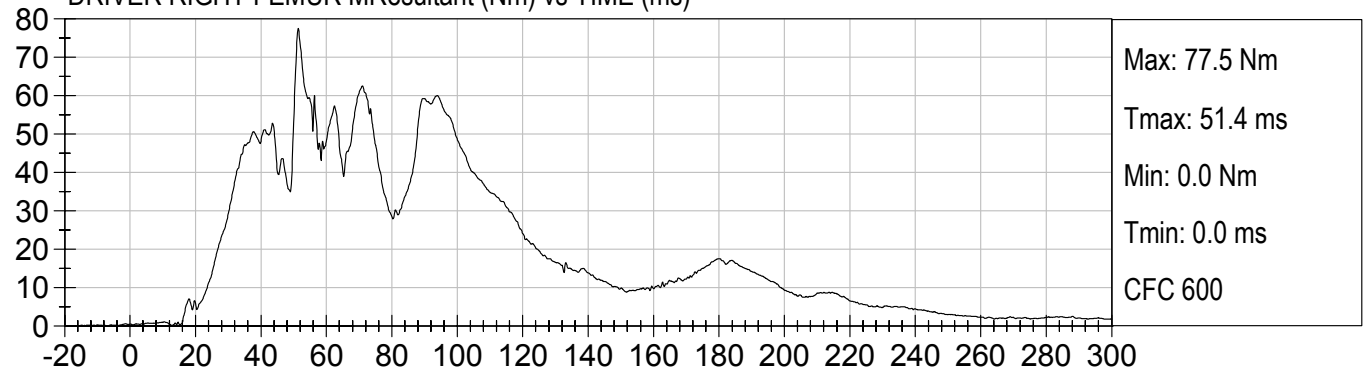
DRIVER RIGHT FEMUR MY (Nm) vs TIME (ms)



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

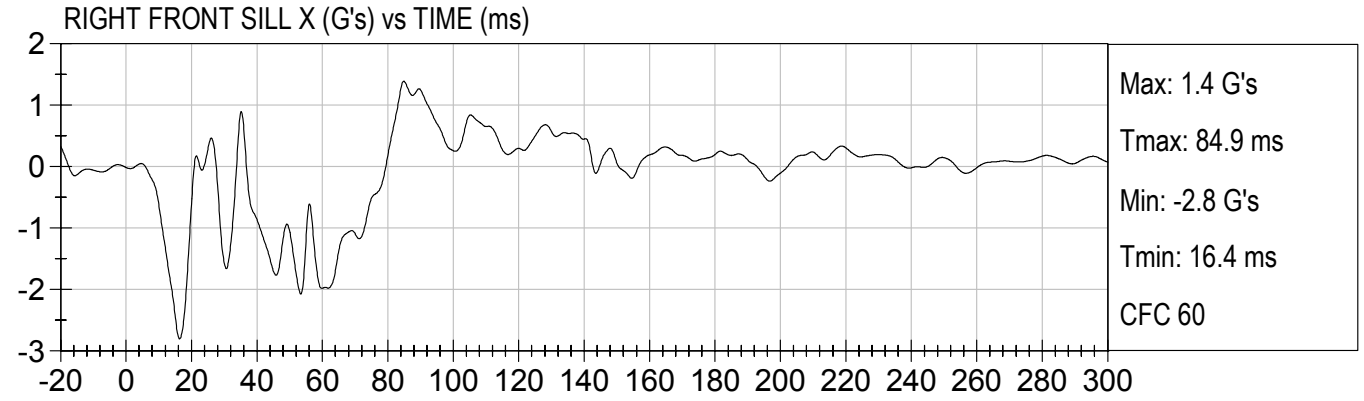


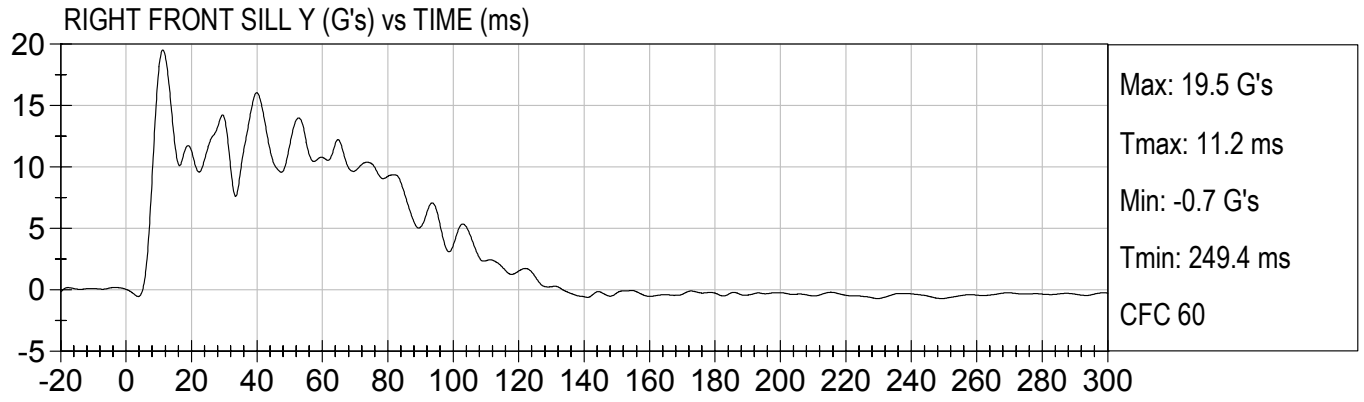
DRIVER RIGHT FEMUR MResultant (Nm) vs TIME (ms)

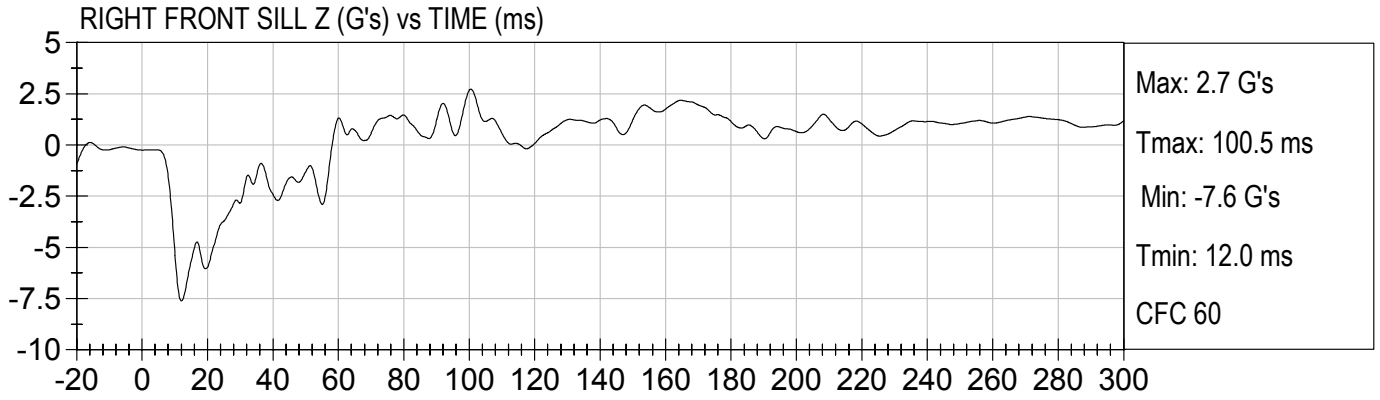


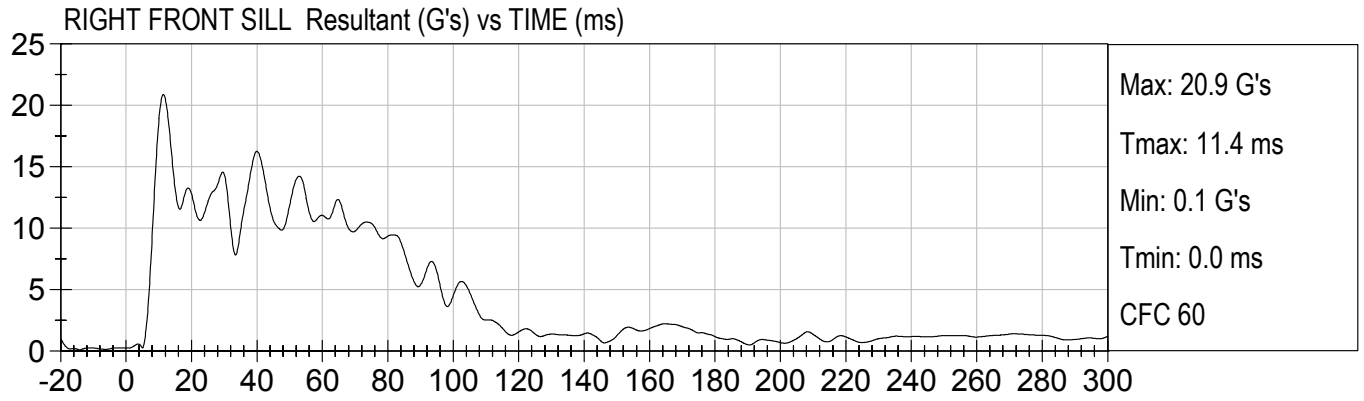
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

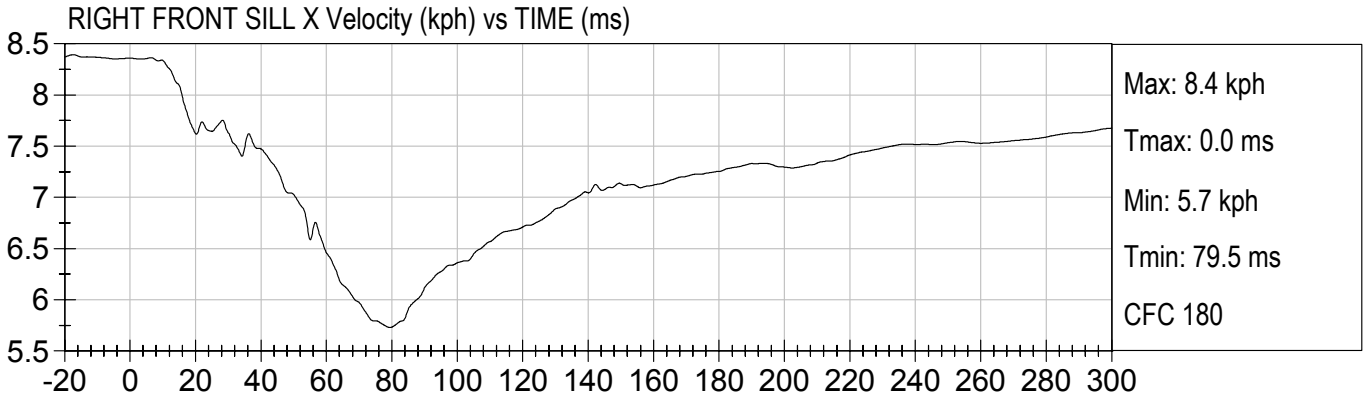
Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

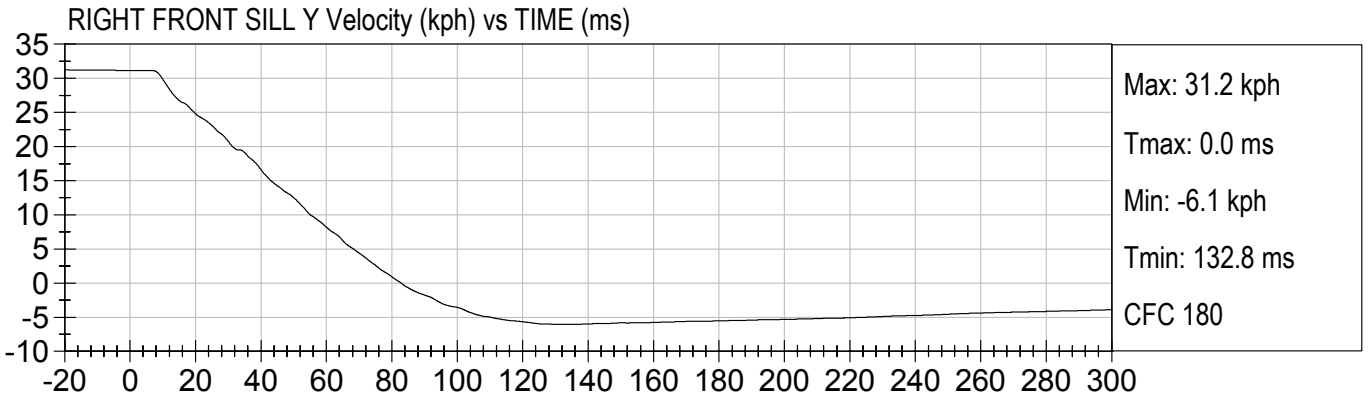


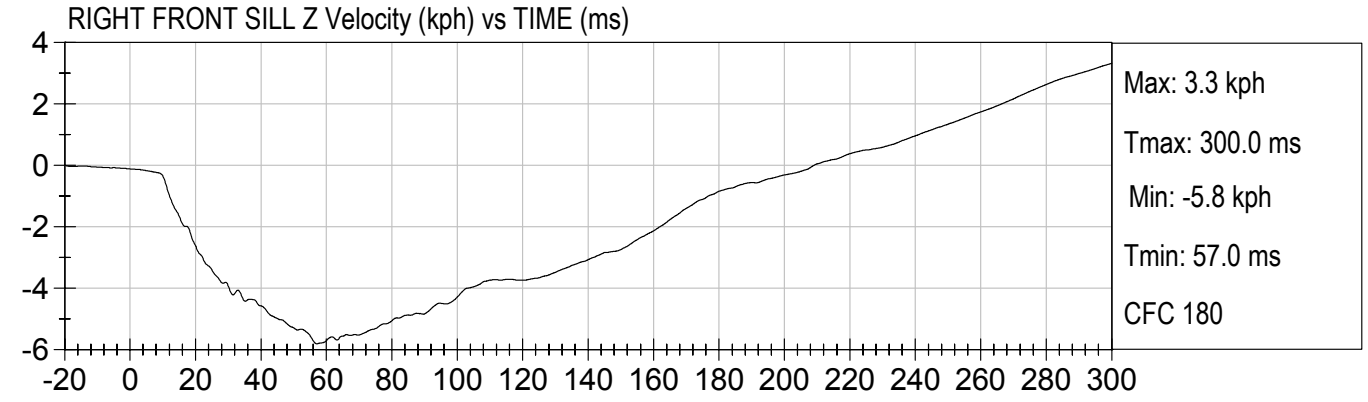







RIGHT FRONT SILL X Velocity (kph) vs TIME (ms)
8.5
8
7.5
7
6.5
6
5.5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 8.4 kph
Tmax: 0.0 ms
Min: 5.7 kph
Tmin: 79.5 ms
CFC 180

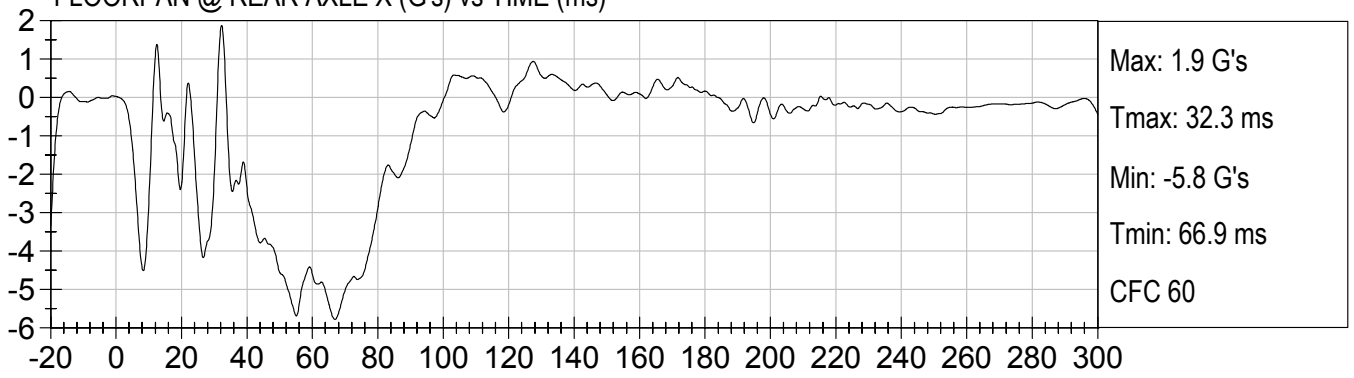

RIGHT FRONT SILL Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 31.2 kph
Tmax: 0.0 ms
Min: -6.1 kph
Tmin: 132.8 ms
CFC 180


RIGHT FRONT SILL Z Velocity (kph) vs TIME (ms)
4
2
0
-2
-4
-6
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 3.3 kph
Tmax: 300.0 ms
Min: -5.8 kph
Tmin: 57.0 ms
CFC 180

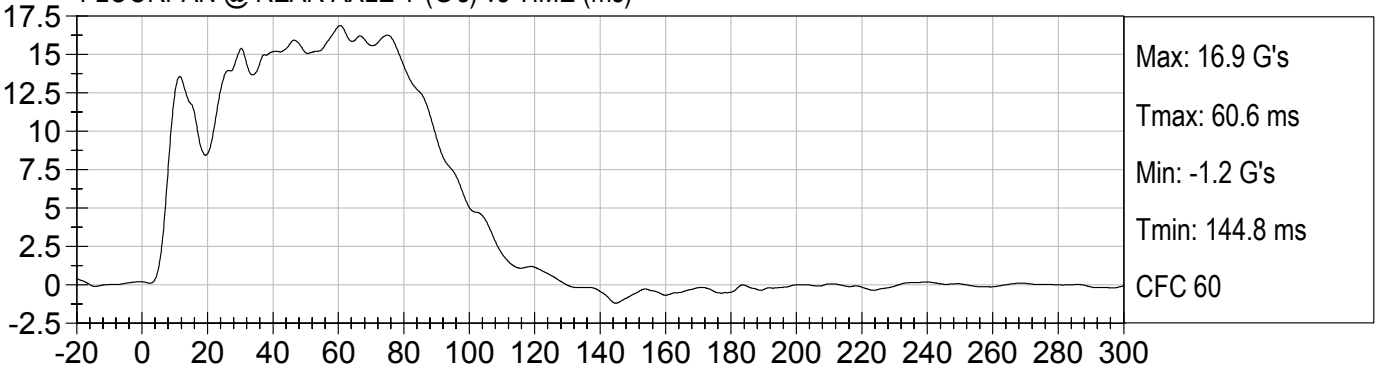
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

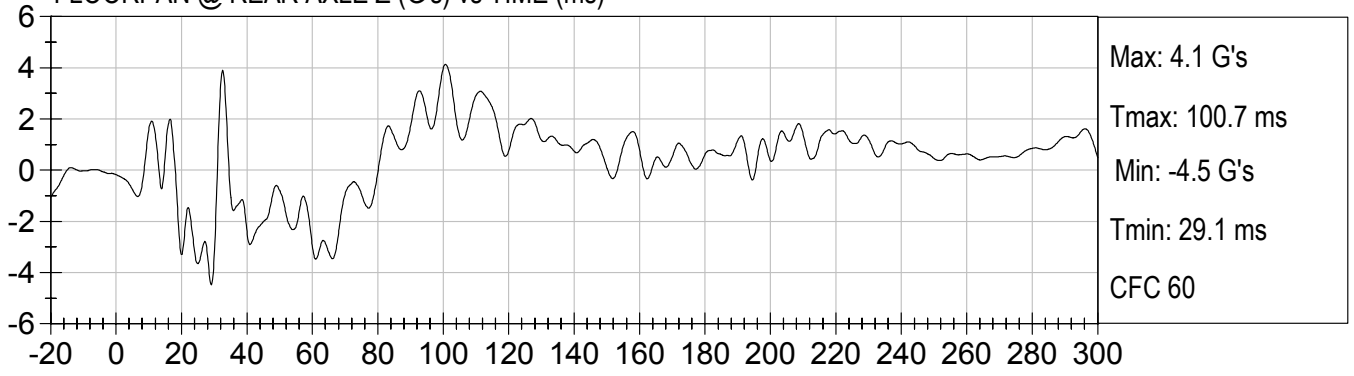
FLOORPAN @ REAR AXLE X (G's) vs TIME (ms)



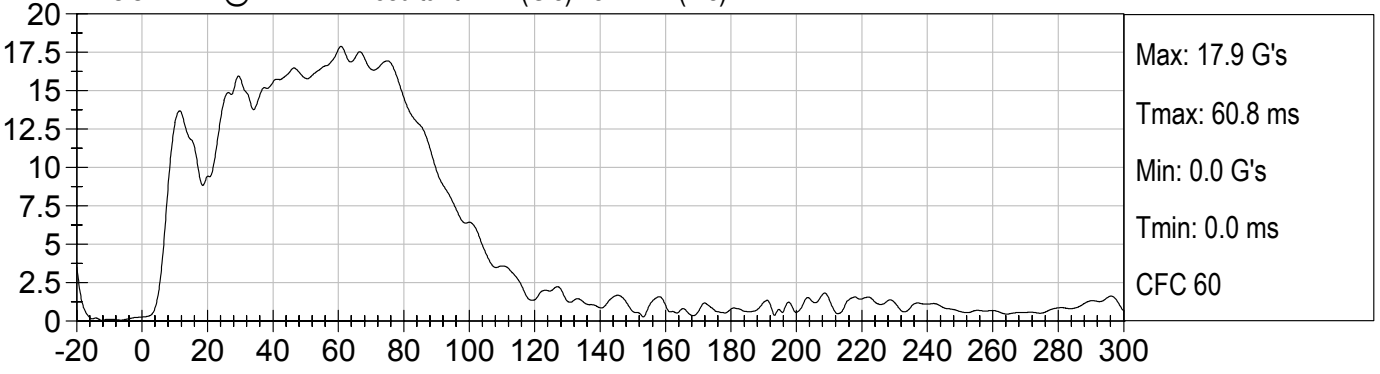
FLOORPAN @ REAR AXLE Y (G's) vs TIME (ms)

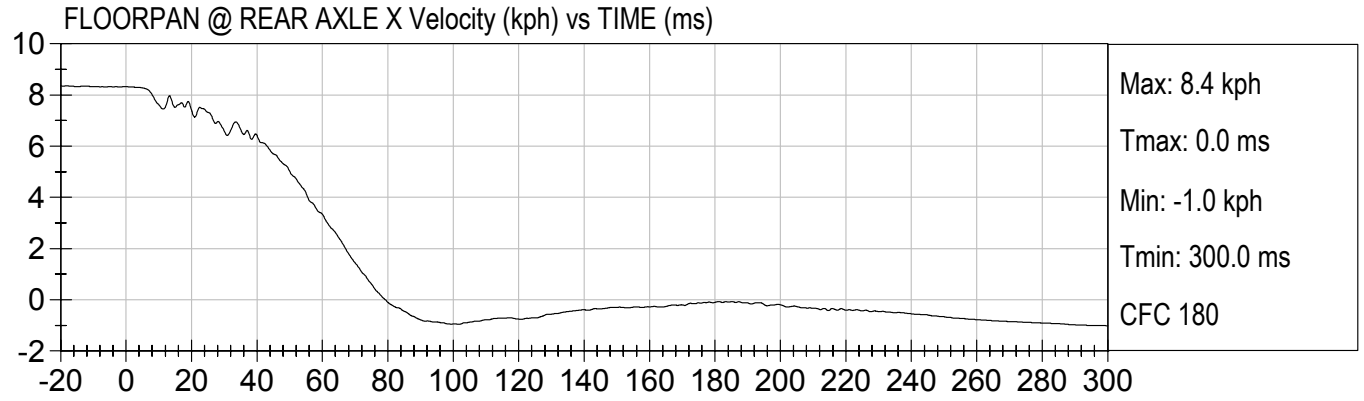


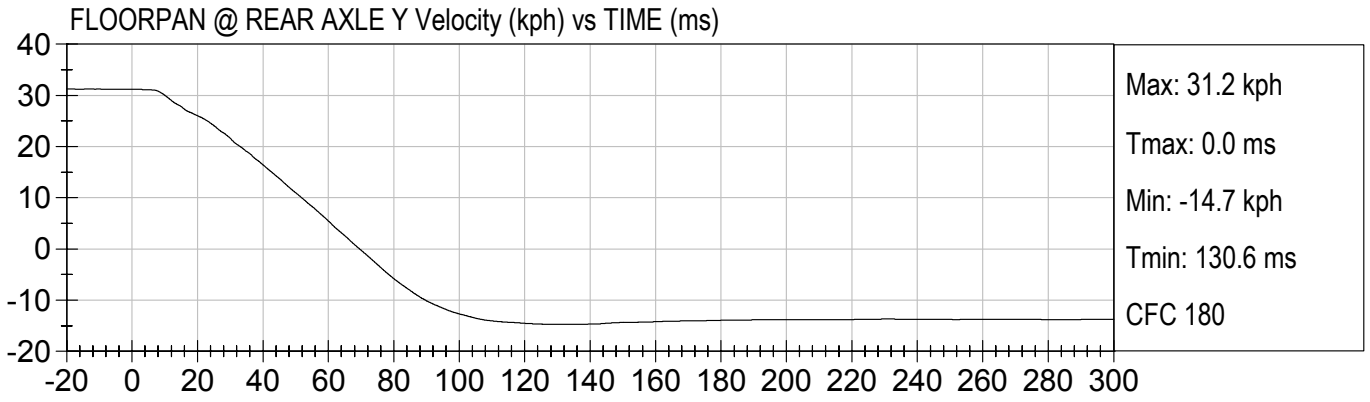
FLOORPAN @ REAR AXLE Z (G's) vs TIME (ms)

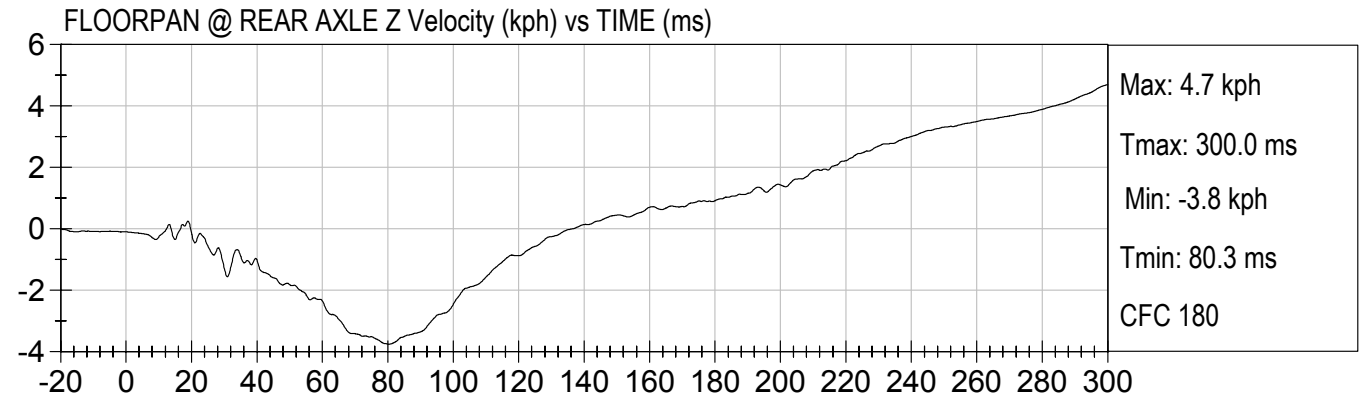


FLOORPAN @ REAR A ResultantLE X (G's) vs TIME (ms)



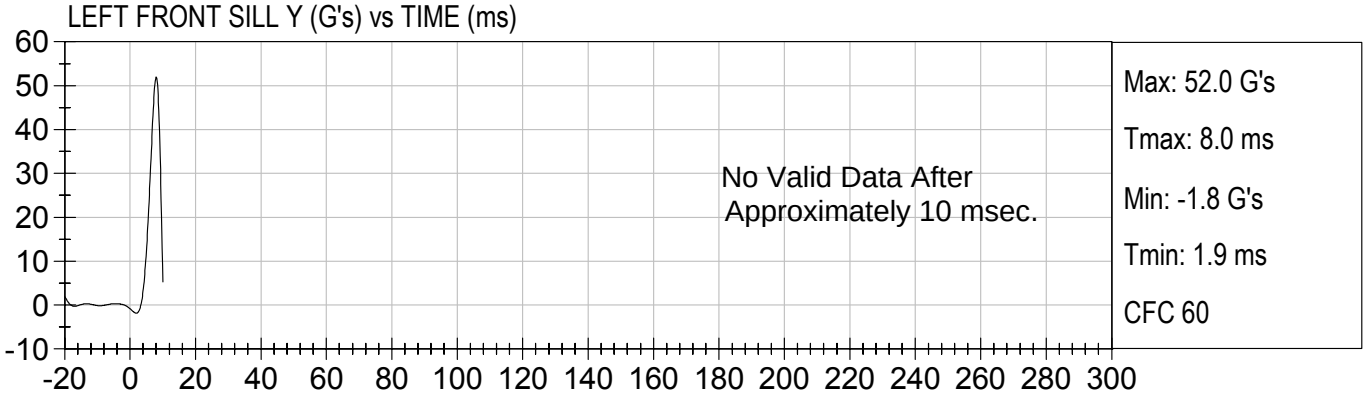

FLOORPAN @ REAR AXLE X Velocity (kph) vs TIME (ms)
10
8
6
4
2
0
-2
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 8.4 kph
Tmax: 0.0 ms
Min: -1.0 kph
Tmin: 300.0 ms
CFC 180

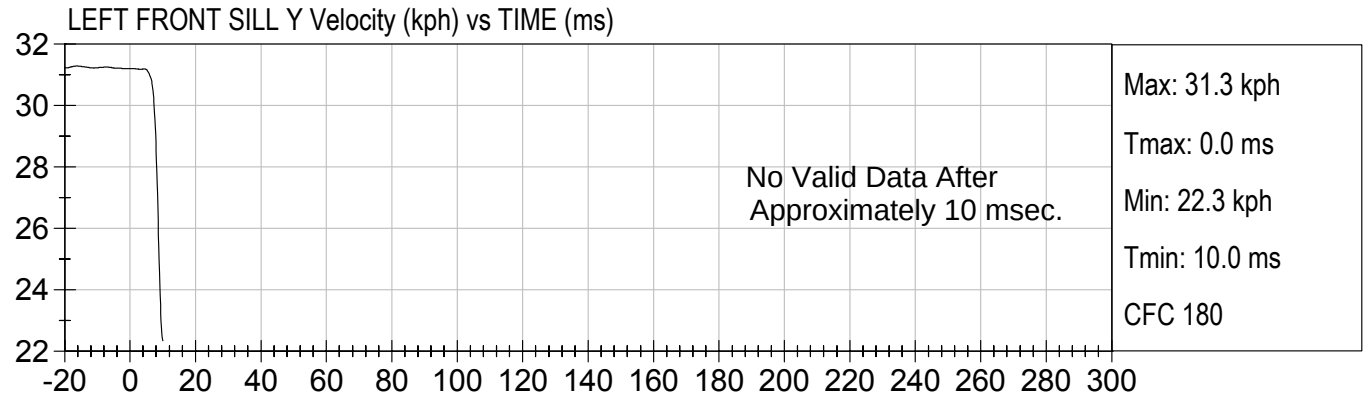

FLOORPAN @ REAR AXLE Y Velocity (kph) vs TIME (ms)
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 31.2 kph
Tmax: 0.0 ms
Min: -14.7 kph
Tmin: 130.6 ms
CFC 180

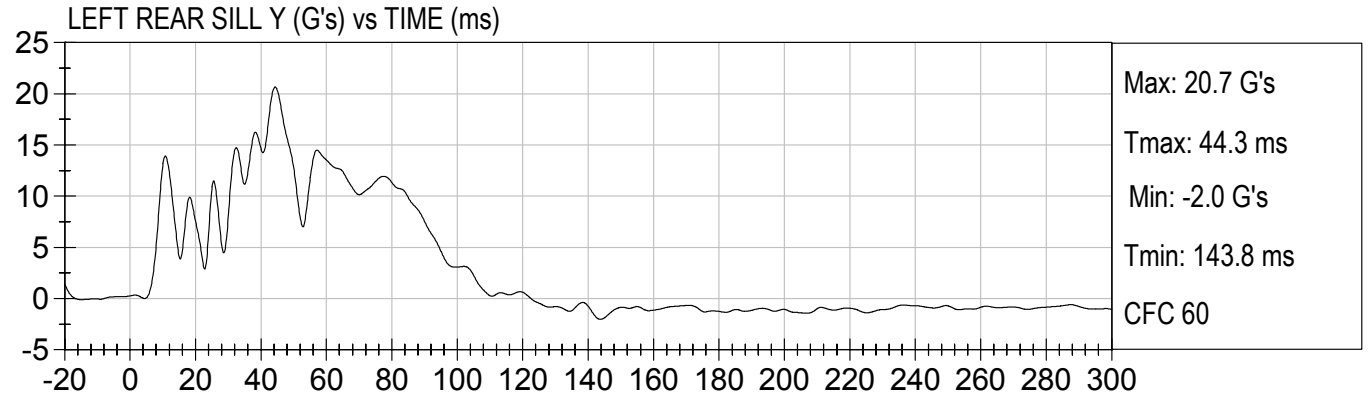

FLOORPAN @ REAR AXLE Z Velocity (kph) vs TIME (ms)
6
4
2
0
-2
-4
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 4.7 kph
Tmax: 300.0 ms
Min: -3.8 kph
Tmin: 80.3 ms
CFC 180

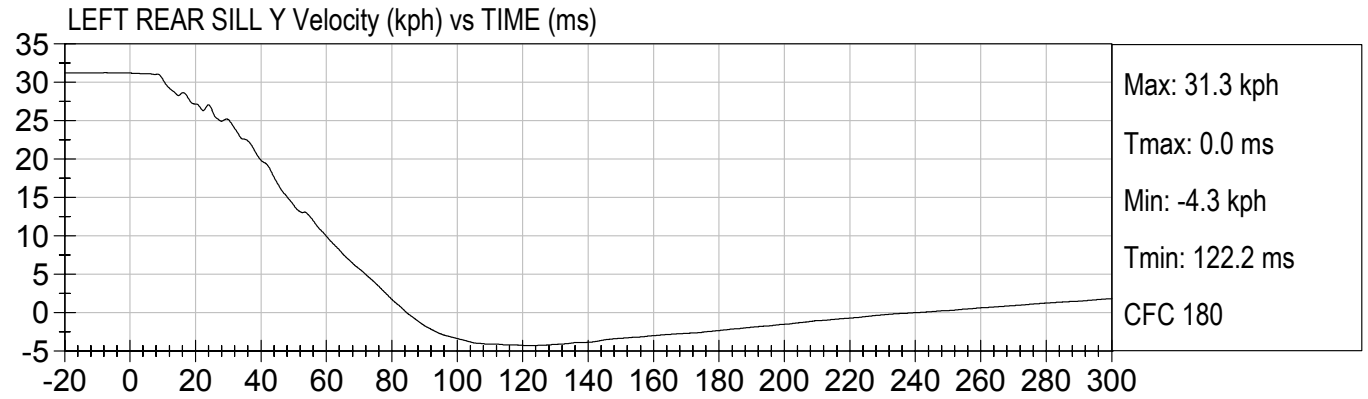
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

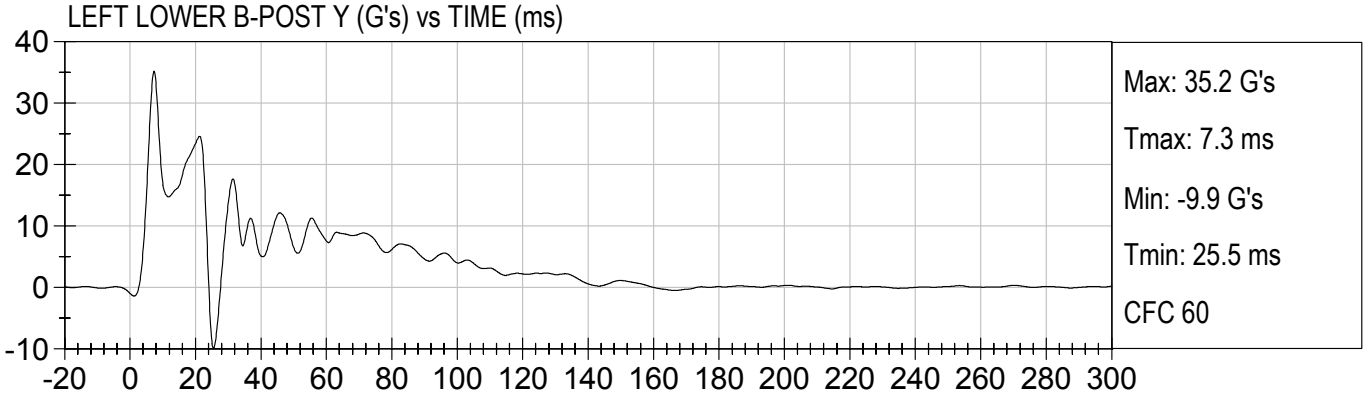
Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

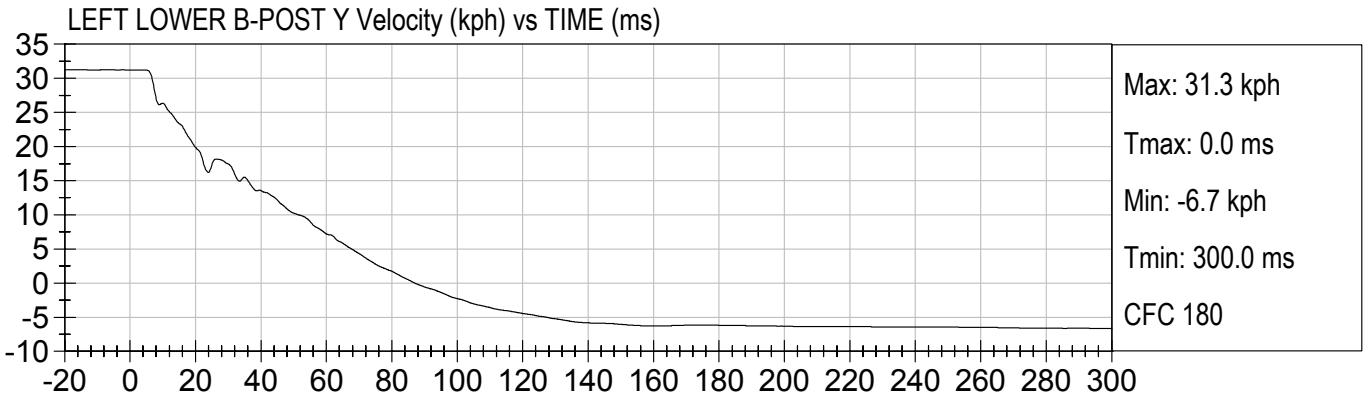


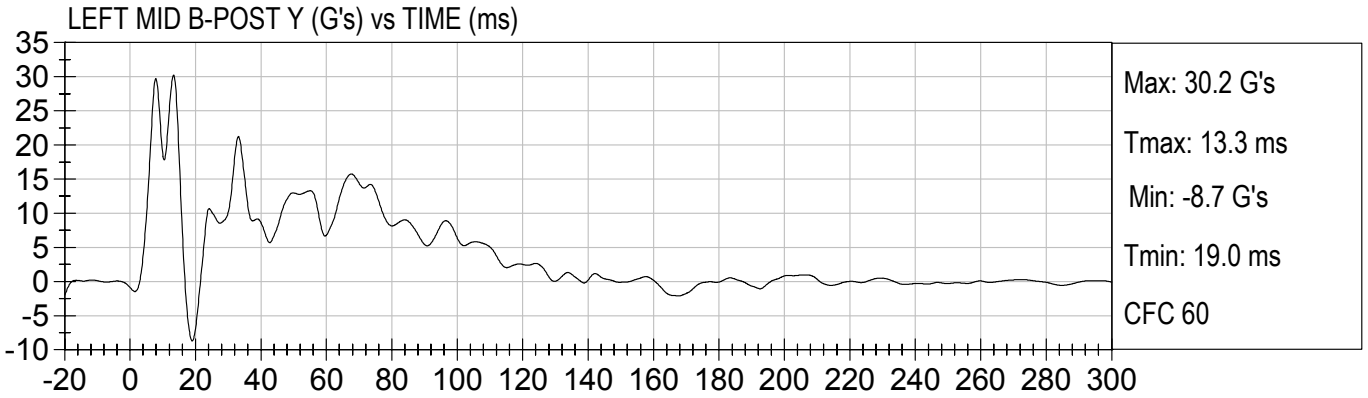


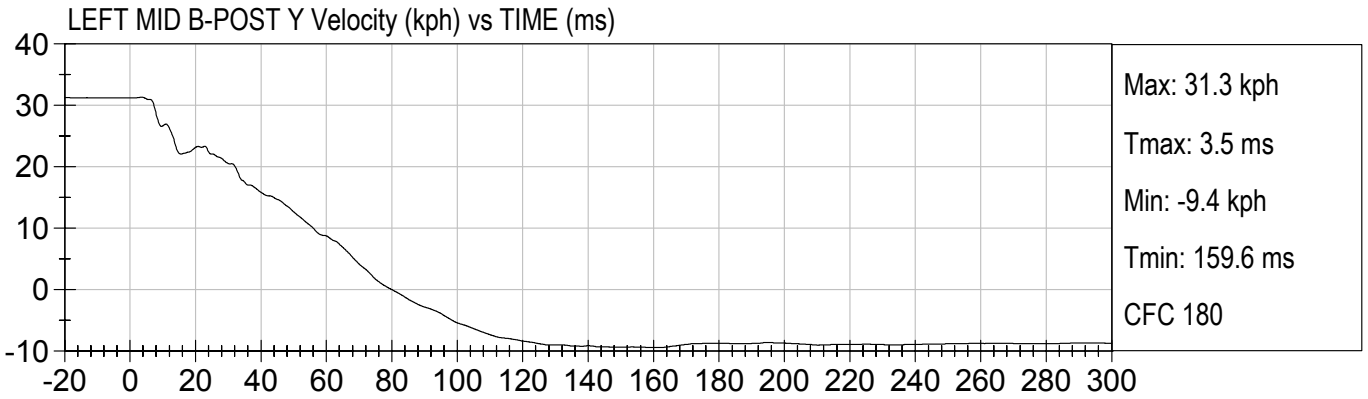





LEFT LOWER B-POST Y (G's) vs TIME (ms)
Max: 35.2 G's
Tmax: 7.3 ms
Min: -9.9 G's
Tmin: 25.5 ms
CFC 60


LEFT LOWER B-POST Y Velocity (kph) vs TIME (ms)
Max: 31.3 kph
Tmax: 0.0 ms
Min: -6.7 kph
Tmin: 300.0 ms
CFC 180

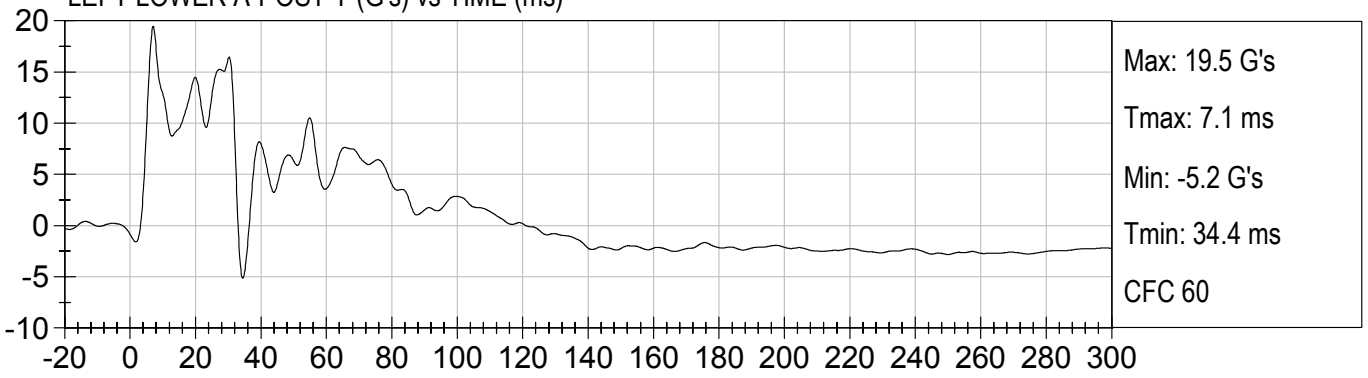

LEFT MID B-POST Y (G's) vs TIME (ms)
Max: 30.2 G's
Tmax: 13.3 ms
Min: -8.7 G's
Tmin: 19.0 ms
CFC 60


LEFT MID B-POST Y Velocity (kph) vs TIME (ms)
Max: 31.3 kph
Tmax: 3.5 ms
Min: -9.4 kph
Tmin: 159.6 ms
CFC 180

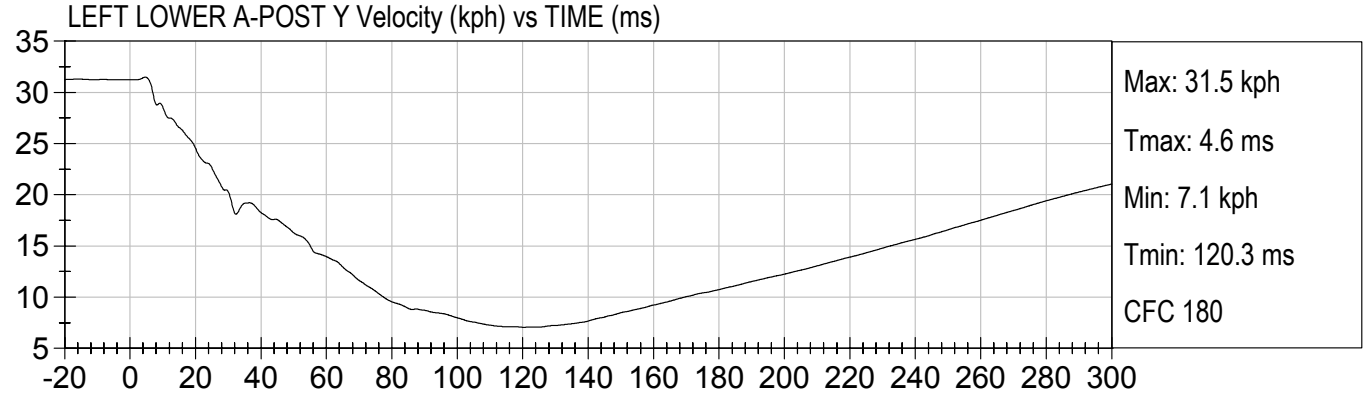
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

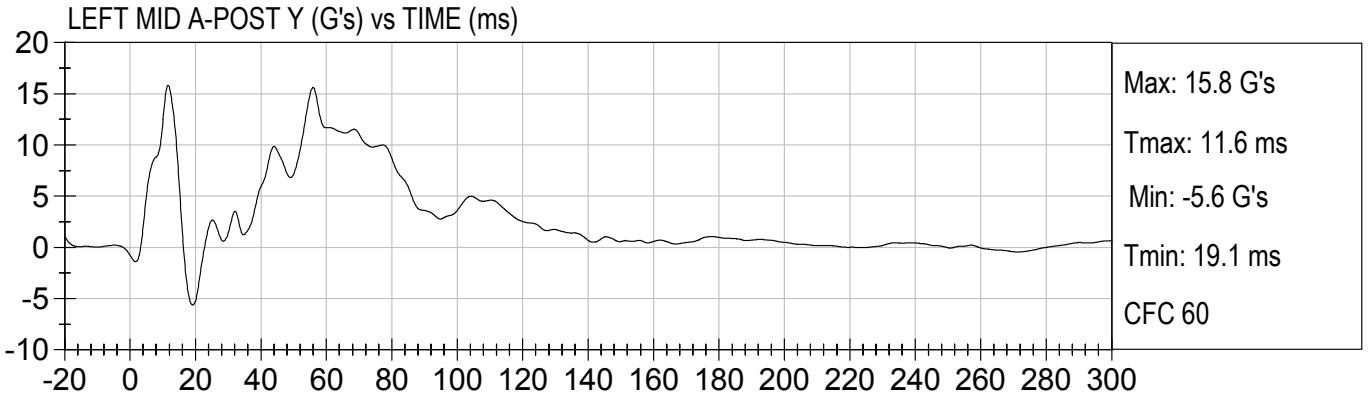
LEFT LOWER A-POST Y (G's) vs TIME (ms)



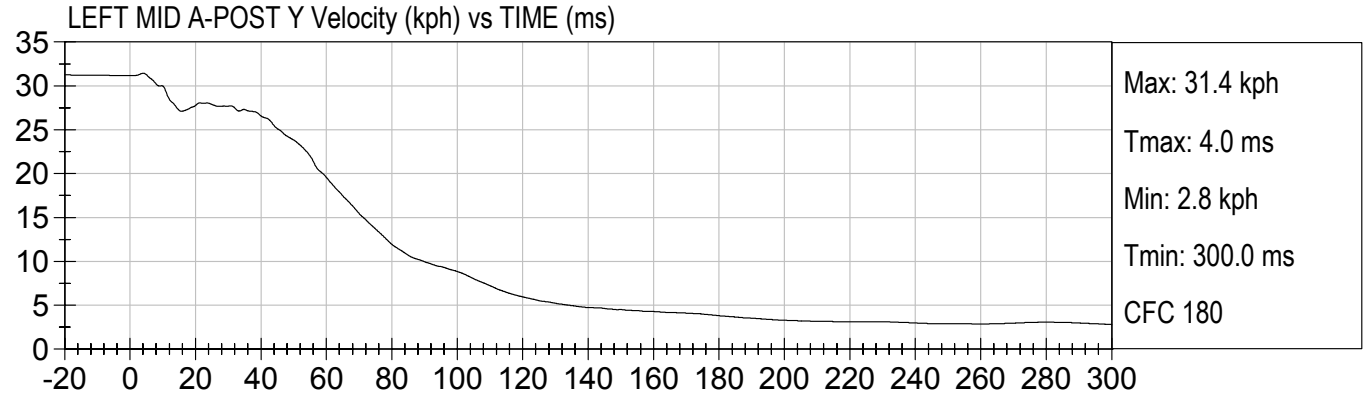
LEFT LOWER A-POST Y Velocity (kph) vs TIME (ms)



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



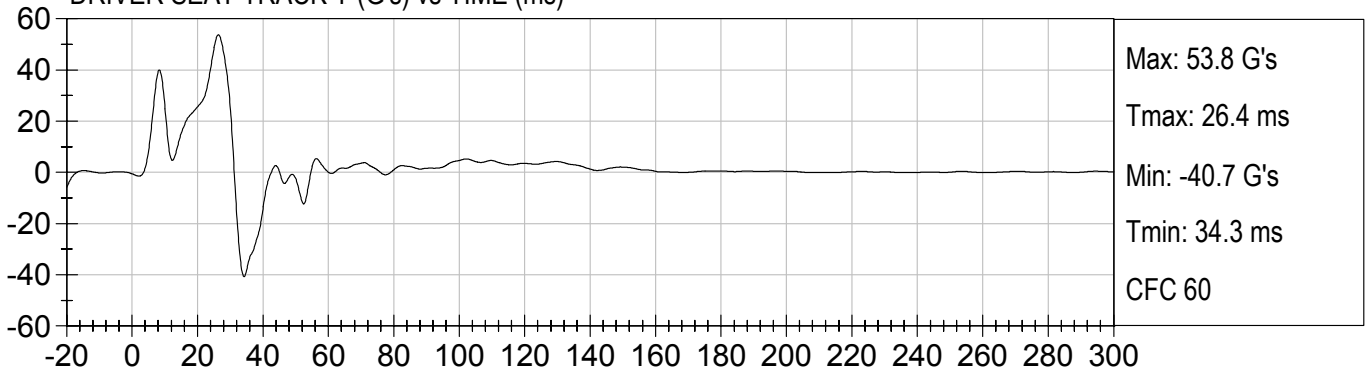
LEFT MID A-POST Y Velocity (kph) vs TIME (ms)



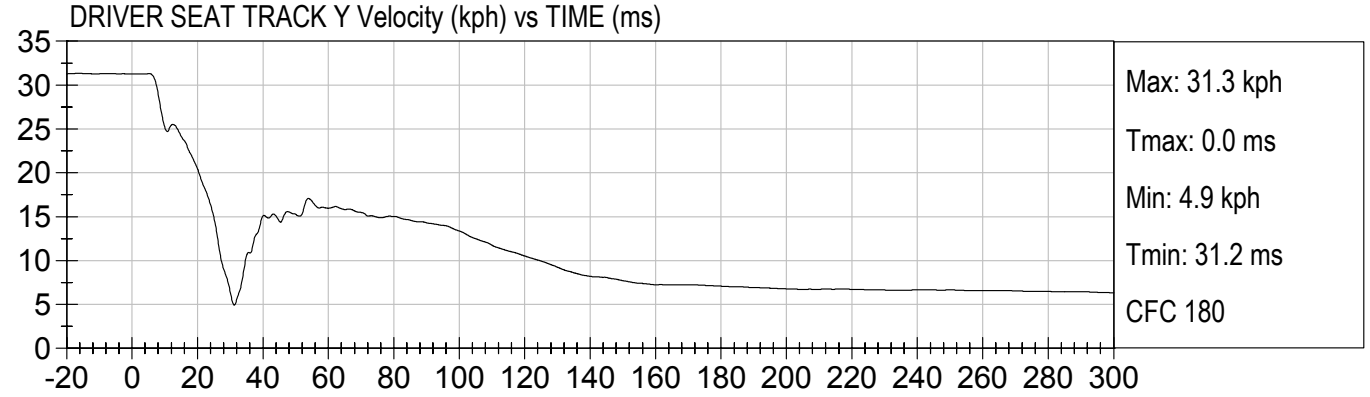
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

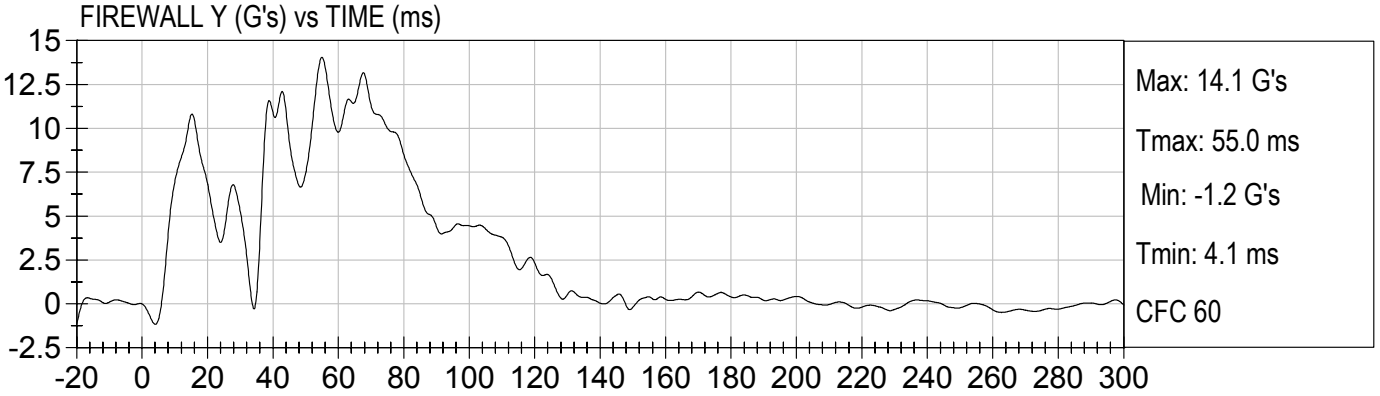
DRIVER SEAT TRACK Y (G's) vs TIME (ms)



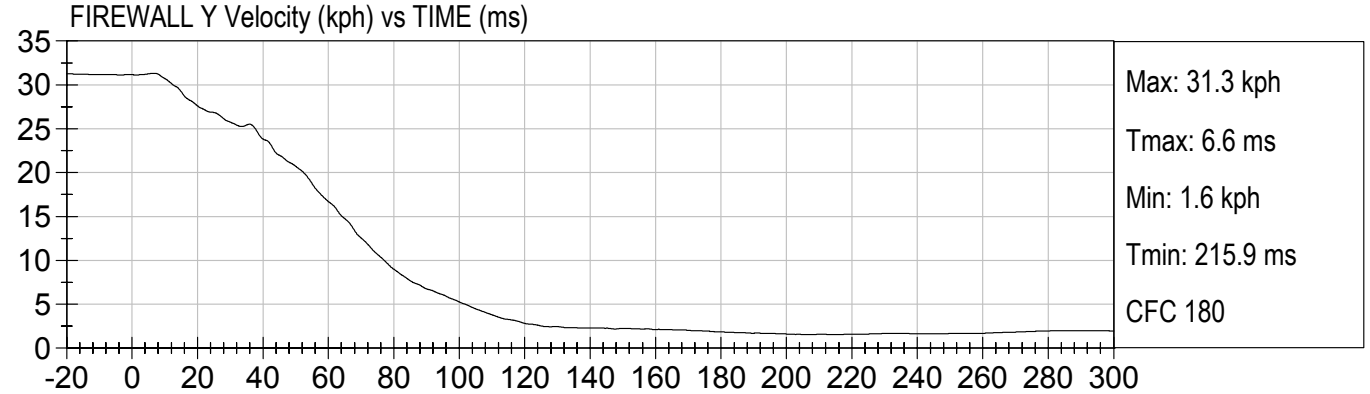
DRIVER SEAT TRACK Y Velocity (kph) vs TIME (ms)

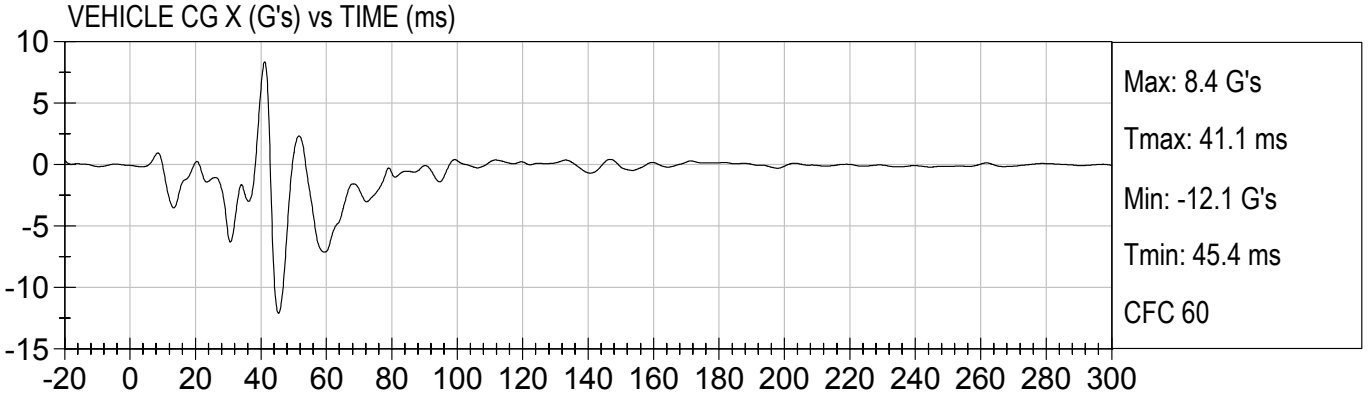


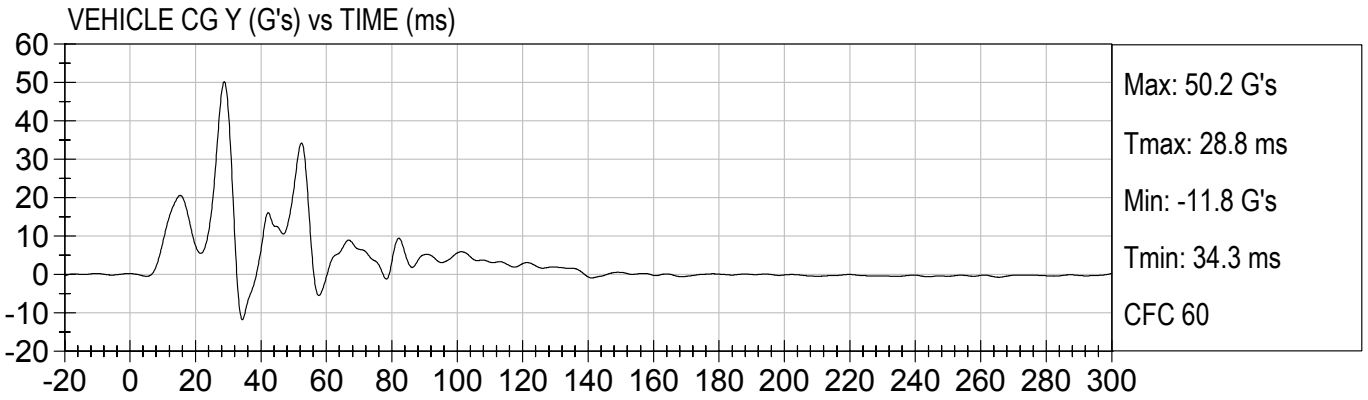
FIREWALL Y (G's) vs TIME (ms)

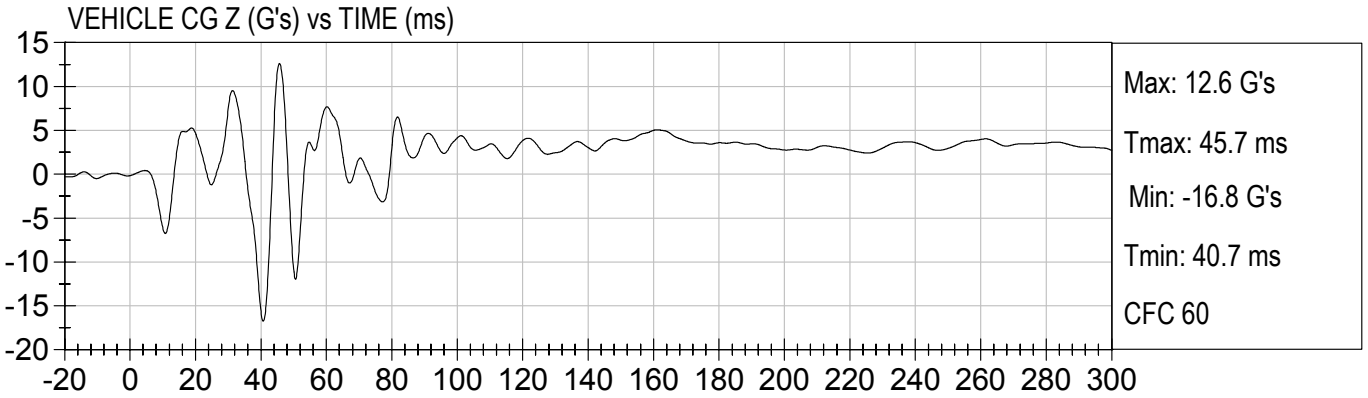


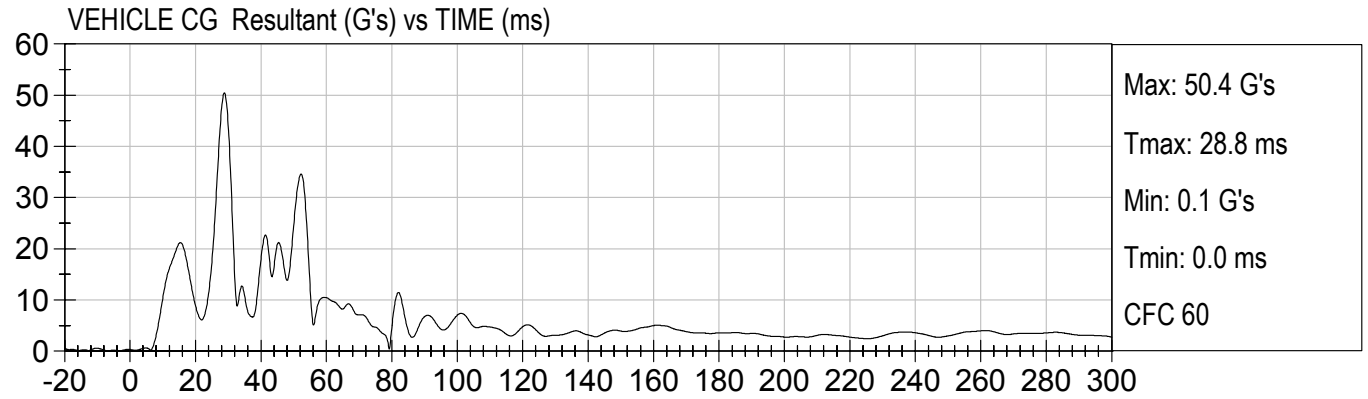
FIREWALL Y Velocity (kph) vs TIME (ms)

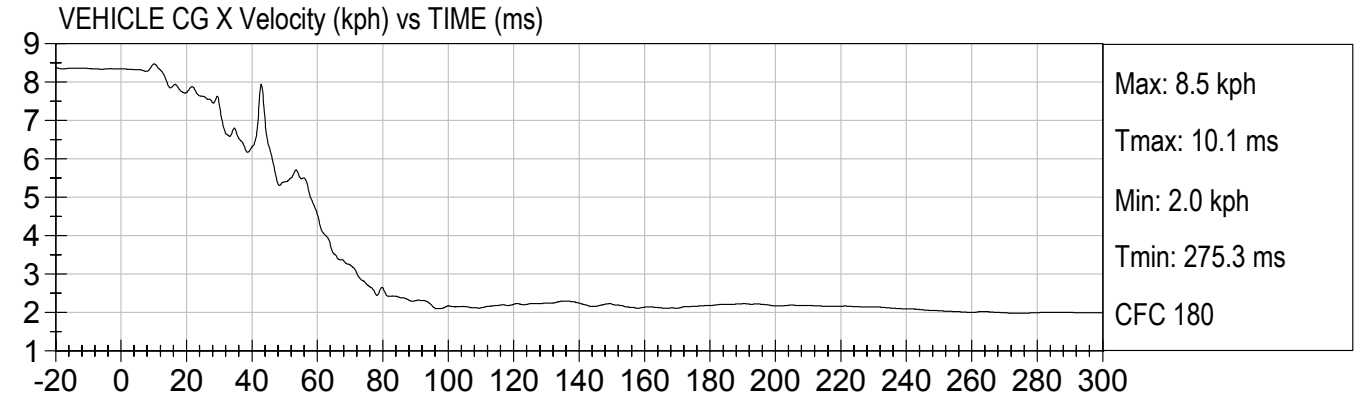


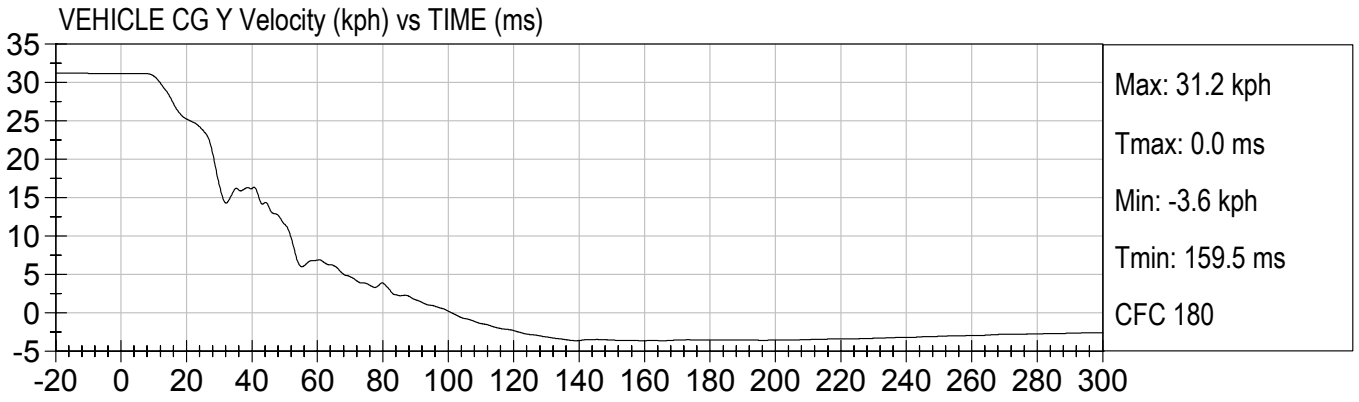

VEHICLE CG X (G's) vs TIME (ms)
Max: 8.4 G's
Tmax: 41.1 ms
Min: -12.1 G's
Tmin: 45.4 ms
CFC 60

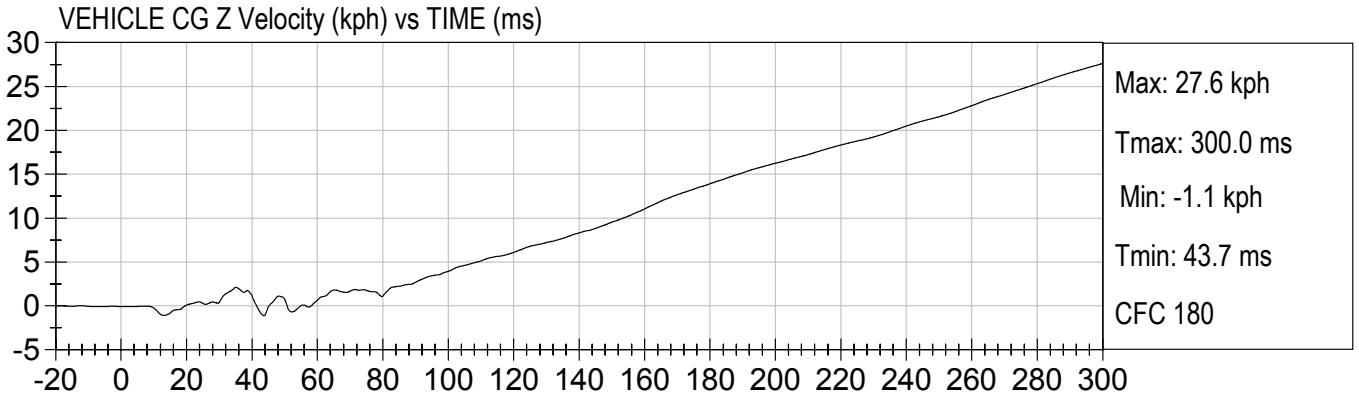

VEHICLE CG Y (G's) vs TIME (ms)
Max: 50.2 G's
Tmax: 28.8 ms
Min: -11.8 G's
Tmin: 34.3 ms
CFC 60


VEHICLE CG Z (G's) vs TIME (ms)
Max: 12.6 G's
Tmax: 45.7 ms
Min: -16.8 G's
Tmin: 40.7 ms
CFC 60


VEHICLE CG Resultant (G's) vs TIME (ms)
Max: 50.4 G's
Tmax: 28.8 ms
Min: 0.1 G's
Tmin: 0.0 ms
CFC 60


VEHICLE CG X Velocity (kph) vs TIME (ms)
9
8
7
6
5
4
3
2
1
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 8.5 kph
Tmax: 10.1 ms
Min: 2.0 kph
Tmin: 275.3 ms
CFC 180

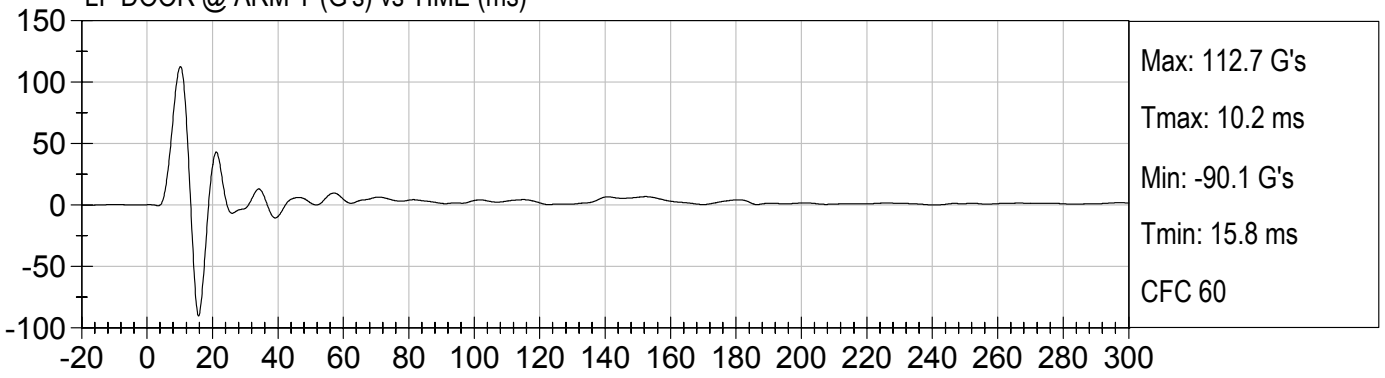

VEHICLE CG Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 31.2 kph
Tmax: 0.0 ms
Min: -3.6 kph
Tmin: 159.5 ms
CFC 180


VEHICLE CG Z Velocity (kph) vs TIME (ms)
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 27.6 kph
Tmax: 300.0 ms
Min: -1.1 kph
Tmin: 43.7 ms
CFC 180

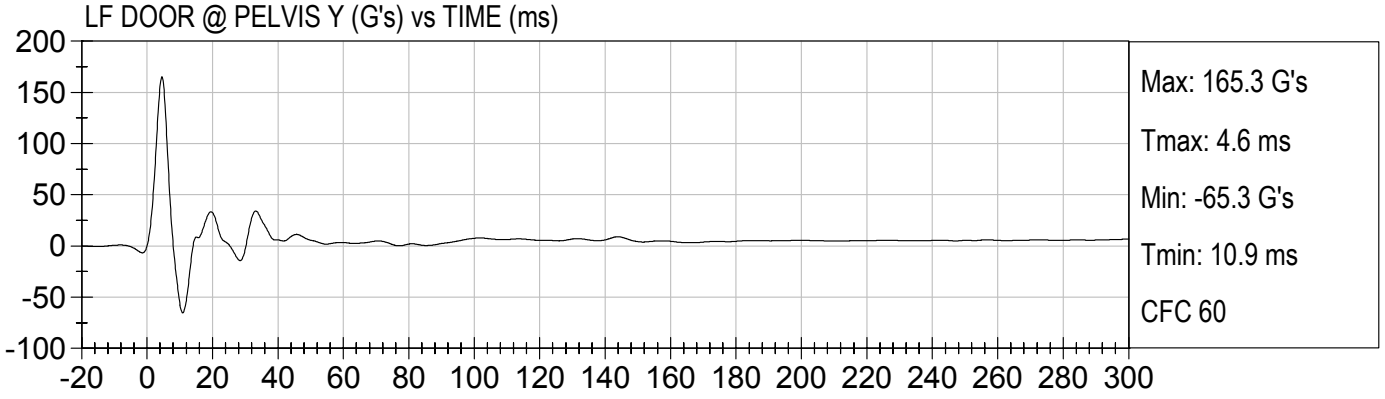
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

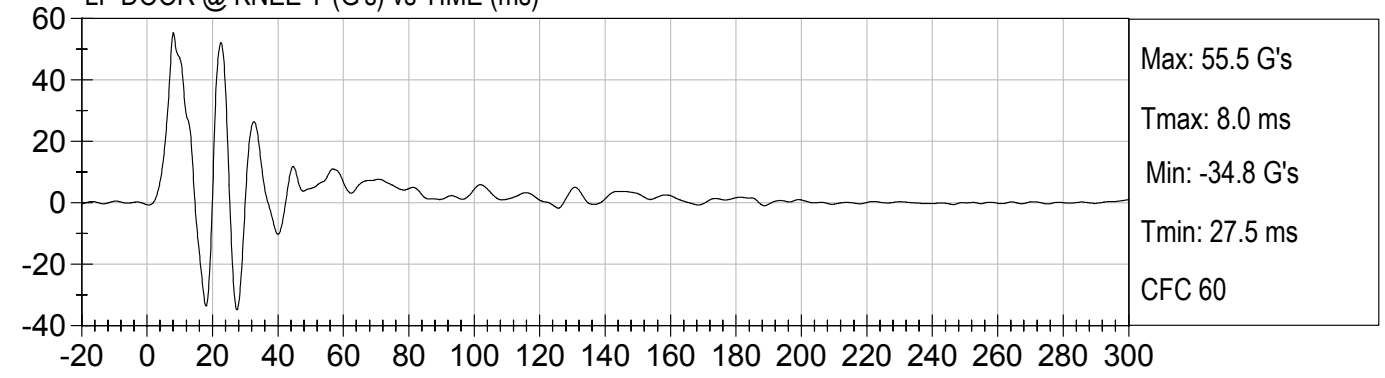
LF DOOR @ ARM Y (G's) vs TIME (ms)



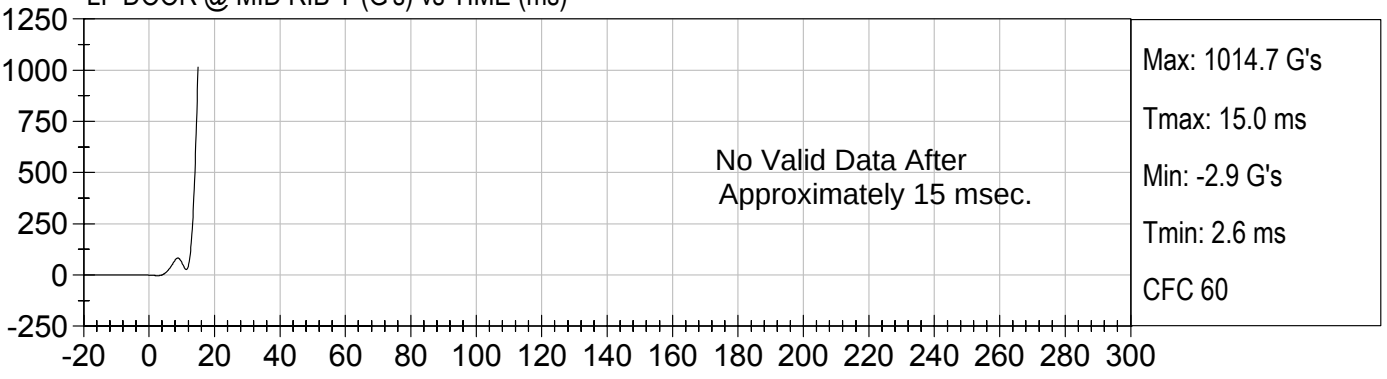
LF DOOR @ PELVIS Y (G's) vs TIME (ms)



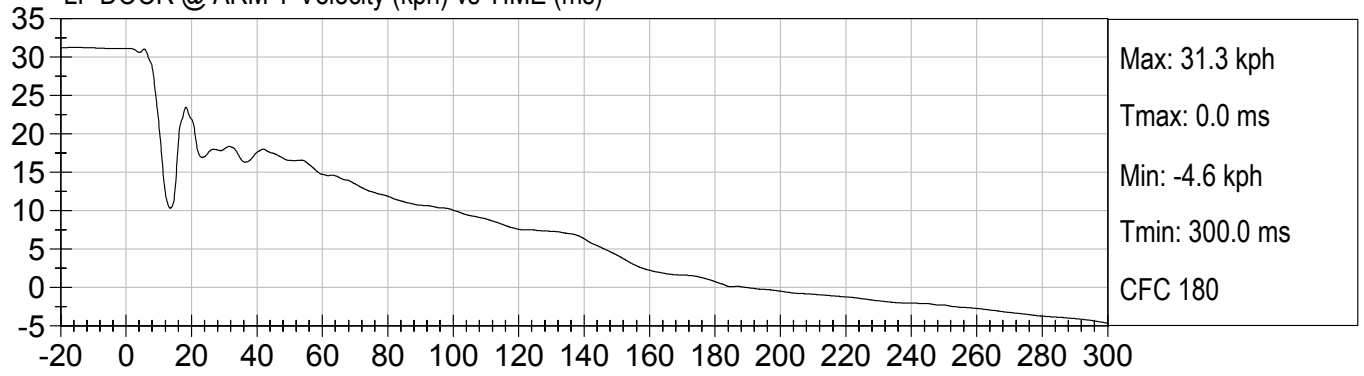
LF DOOR @ KNEE Y (G's) vs TIME (ms)



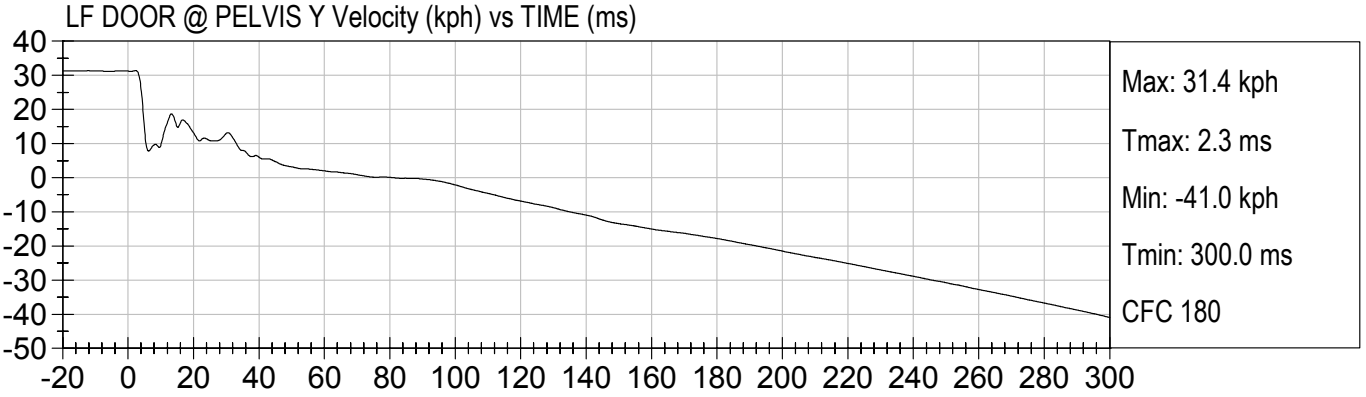
LF DOOR @ MID RIB Y (G's) vs TIME (ms)



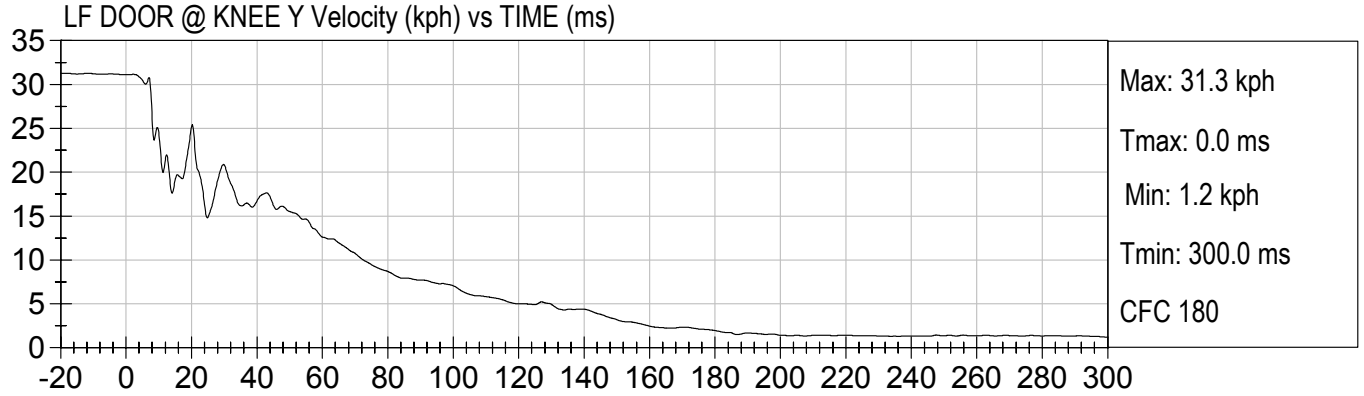
LF DOOR @ ARM Y Velocity (kph) vs TIME (ms)



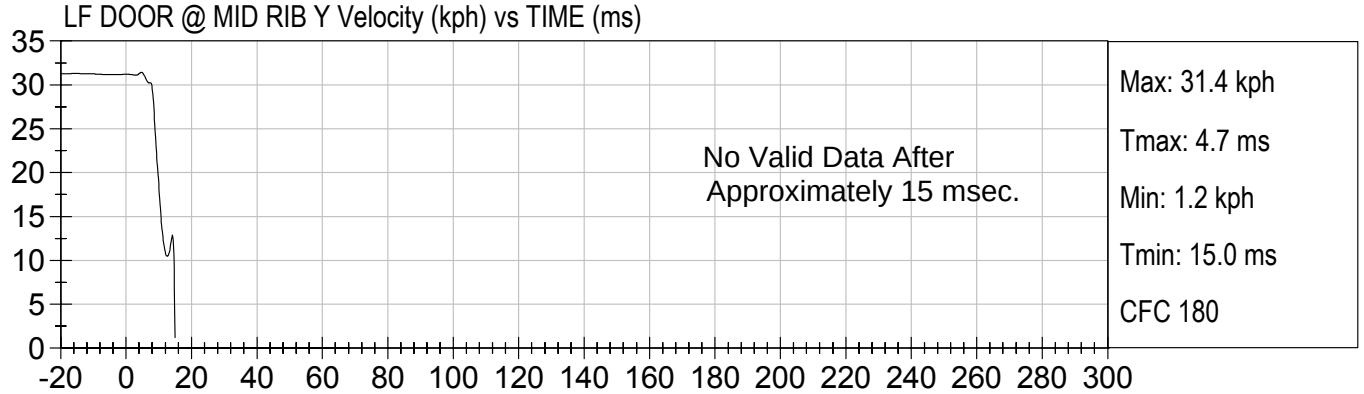
LF DOOR @ PELVIS Y Velocity (kph) vs TIME (ms)



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



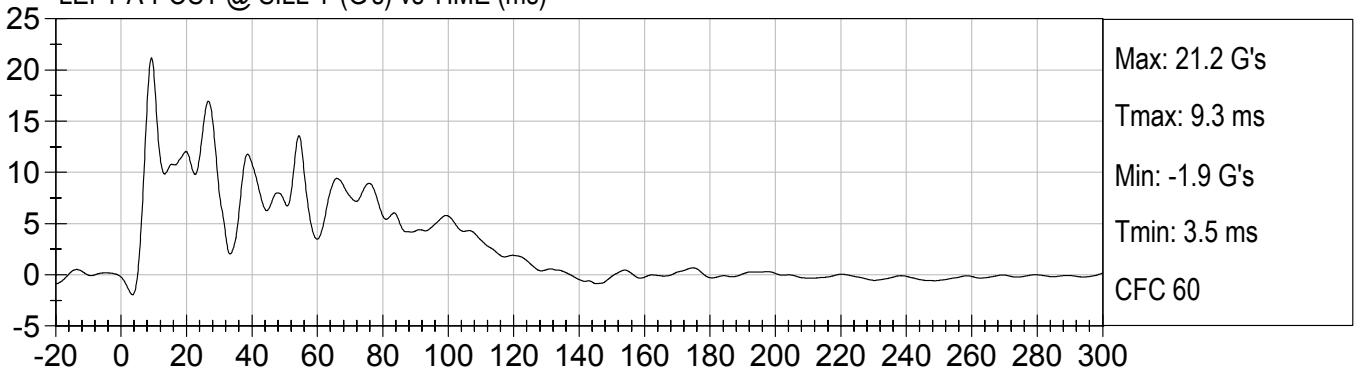
LF DOOR @ MID RIB Y Velocity (kph) vs TIME (ms)



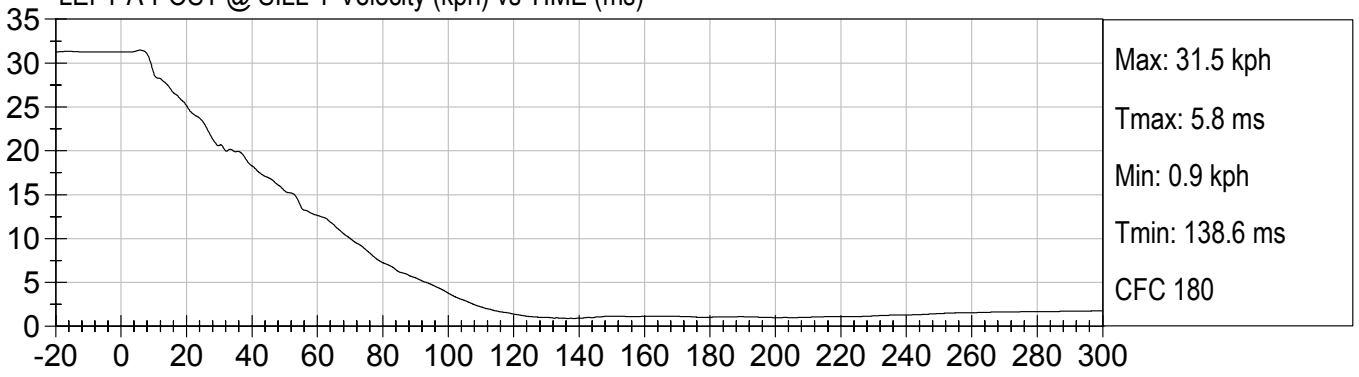
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)

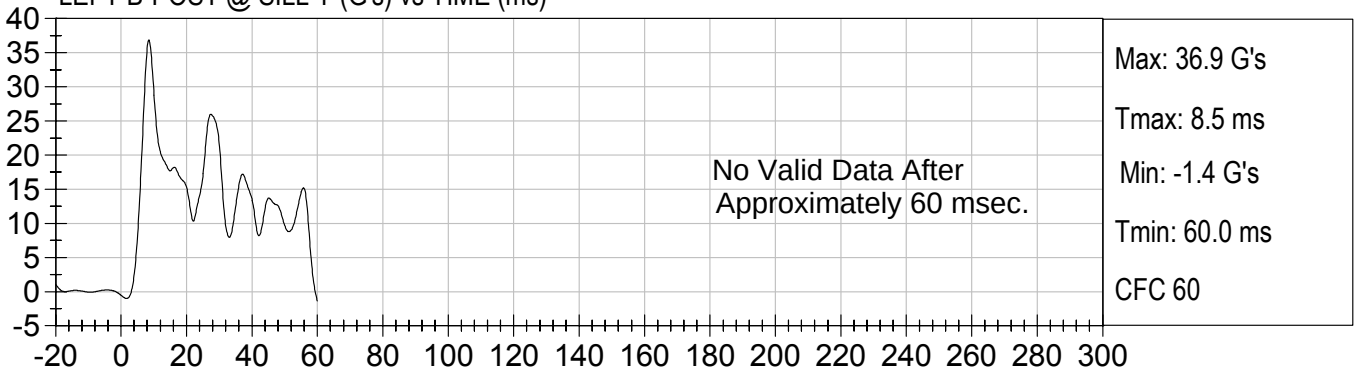
LEFT A-POST @ SILL Y (G's) vs TIME (ms)



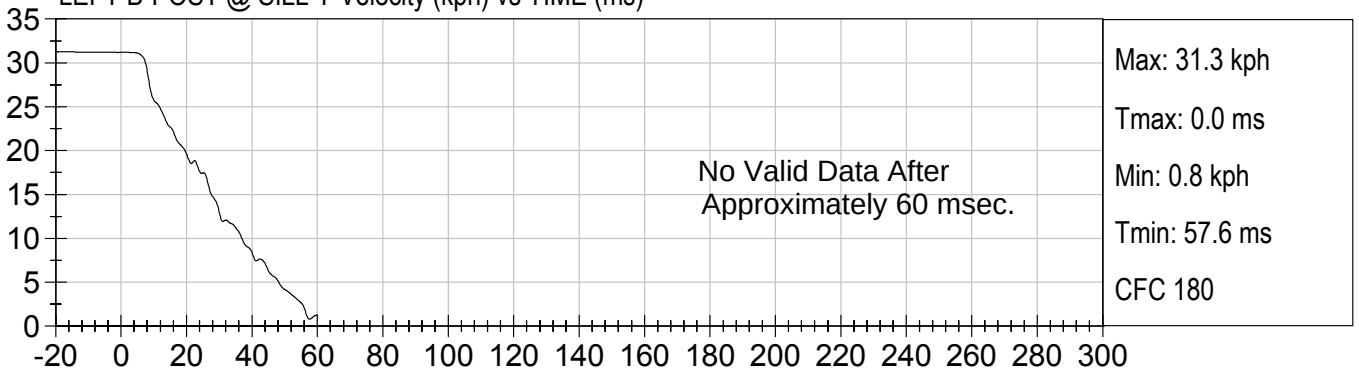
LEFT A-POST @ SILL Y Velocity (kph) vs TIME (ms)



LEFT B-POST @ SILL Y (G's) vs TIME (ms)

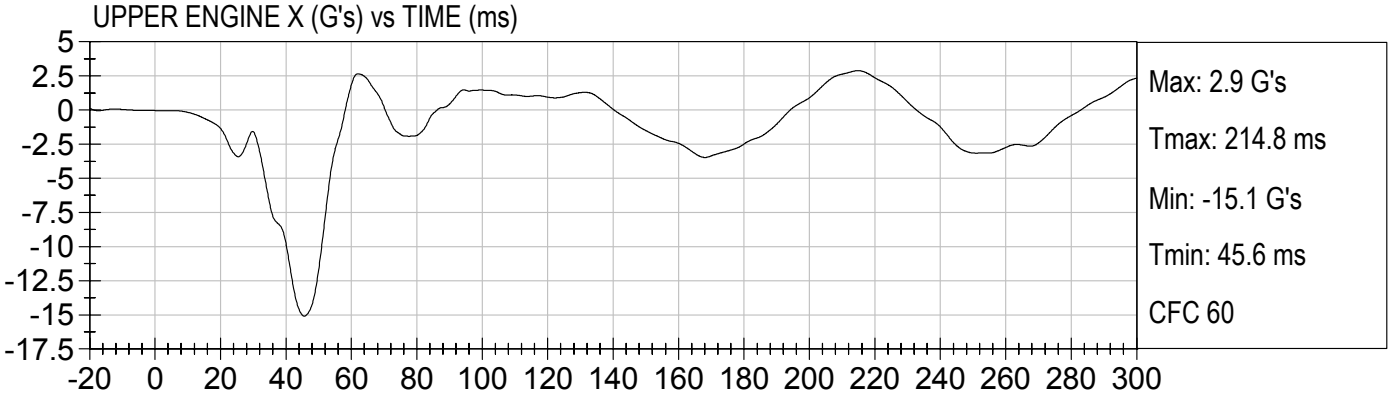


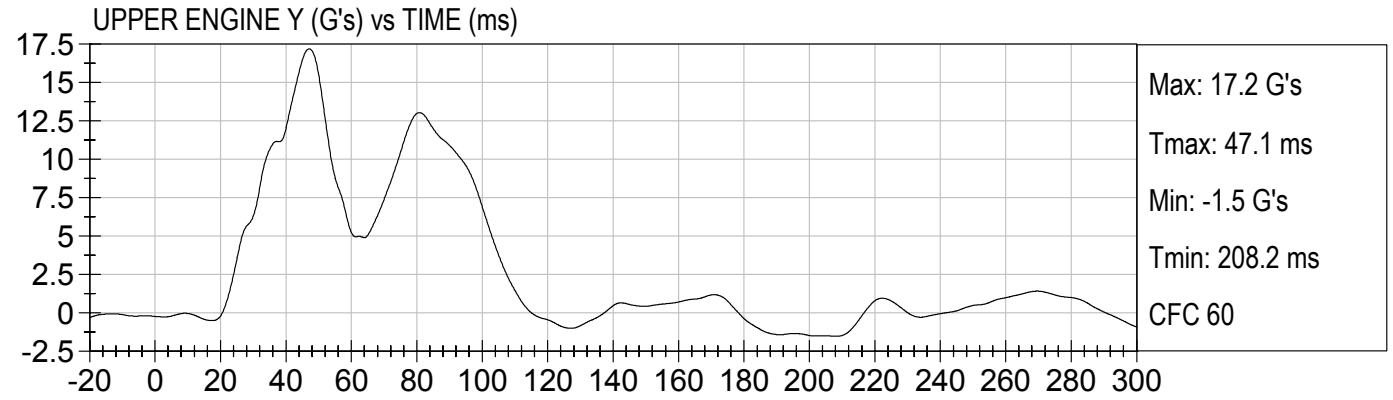
LEFT B-POST @ SILL Y Velocity (kph) vs TIME (ms)

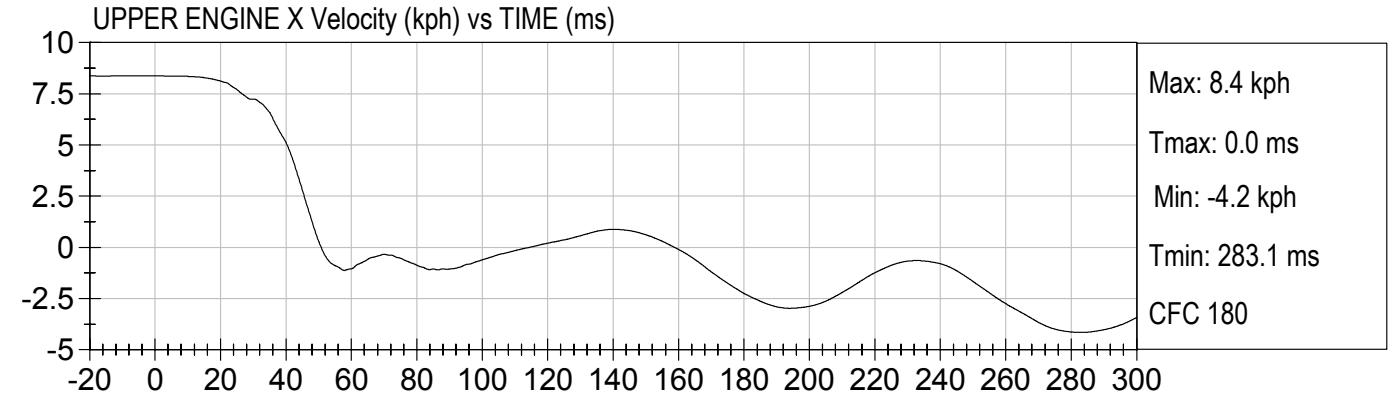


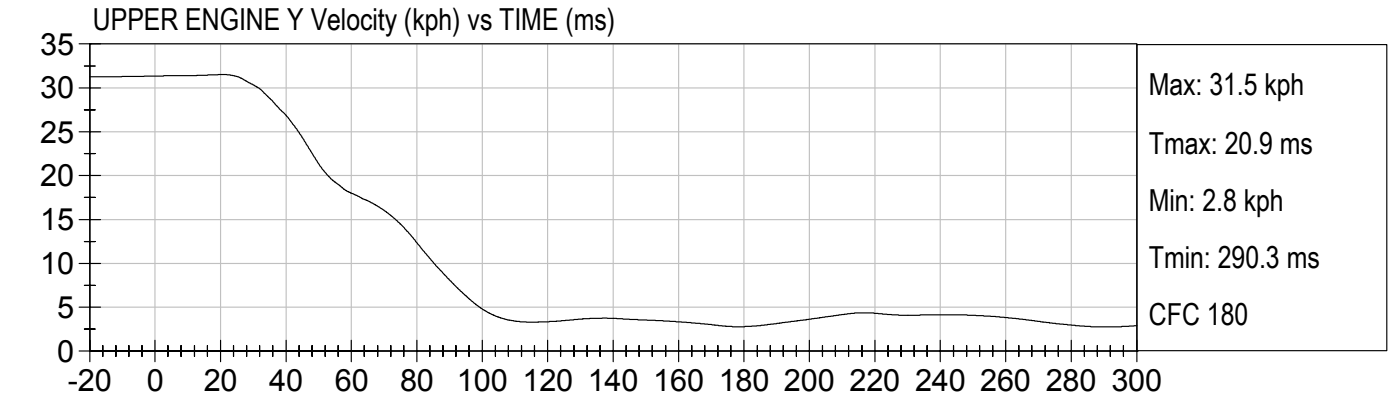
T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)



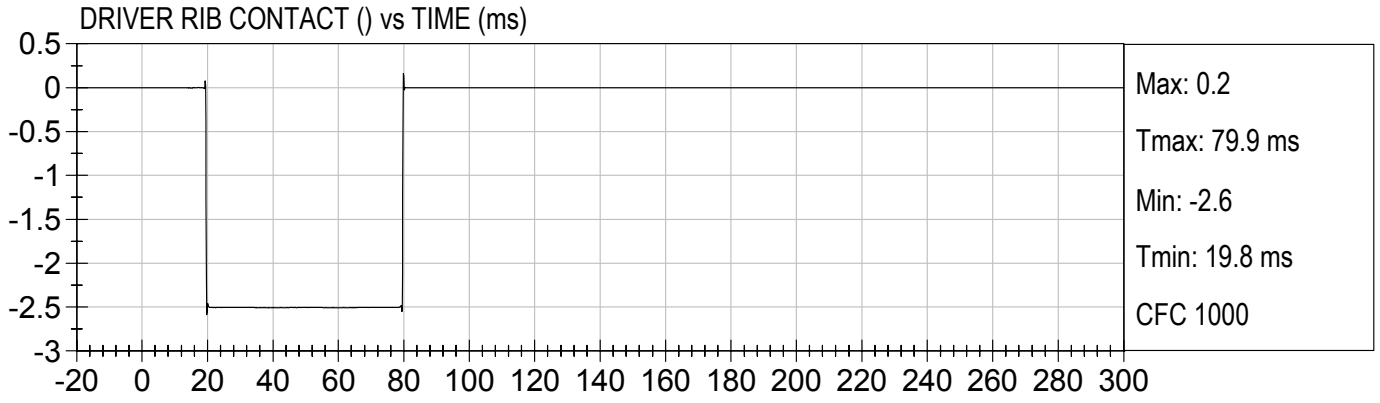


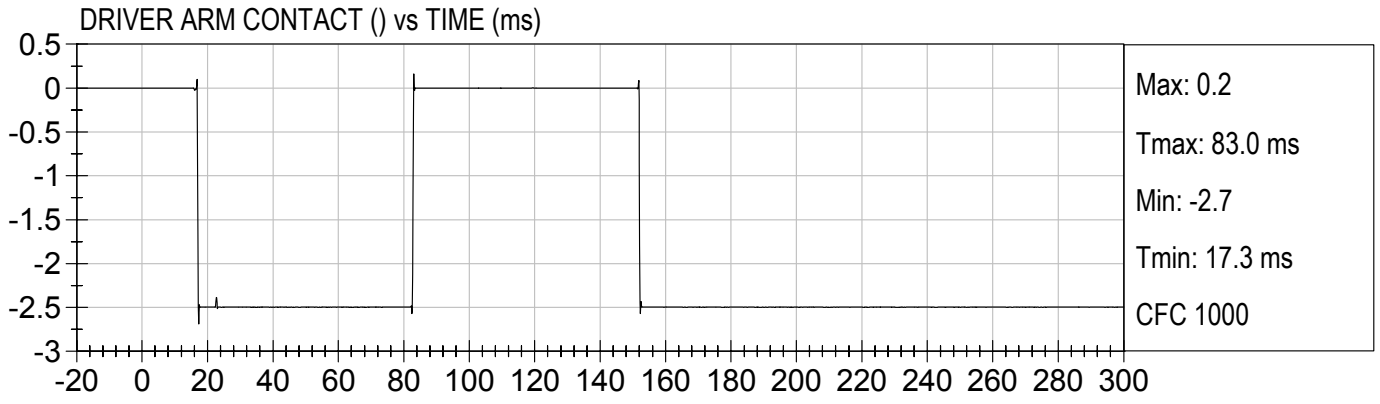


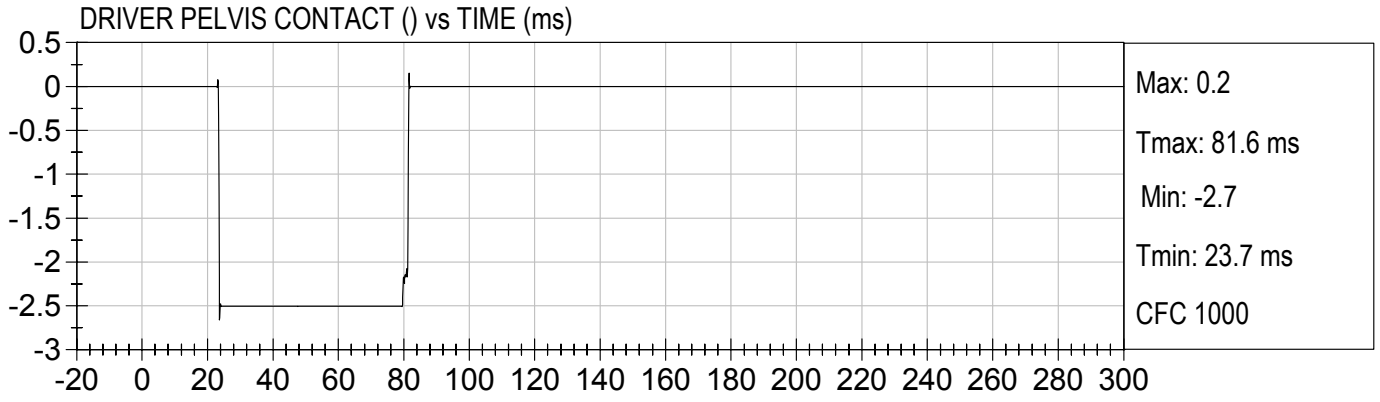


T.O.1 SIDE OBLIQUE POLE
2005 SAAB 9-3 CONVERTIBLE (R50520)

Test Date: 04/29/05
Speed: 20.1 mph (32.3 km/h)







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: 3/16/05

Dummy Serial Number: 009

Test Number: D05791

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.7
Relative Humidity (%)	10 – 70	15
Peak Resultant Acceleration	100 – 150 g's	141
Time of Max. Res. Acceleration	msec	49.9

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

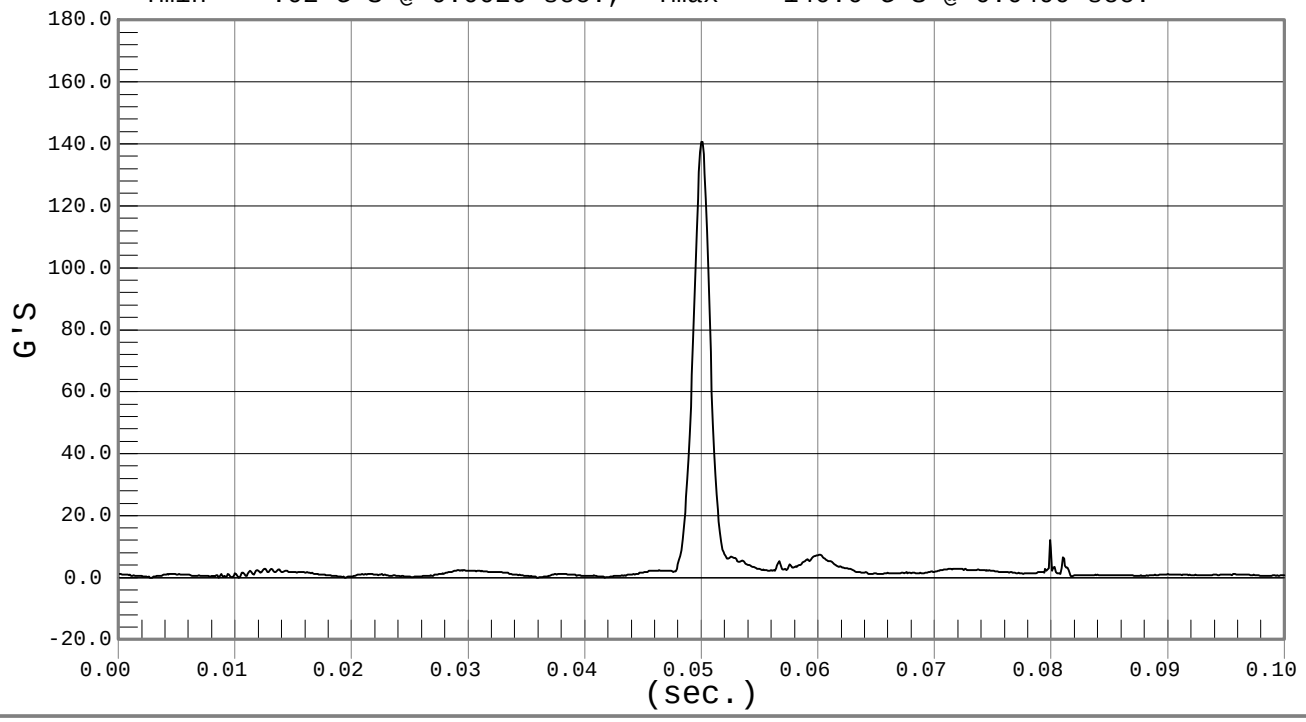
Approved By: David Winkelbauer

PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #009

Test Date: 03-16-05
Speed: 0.0 fps, 0.00 M/s

Ymin = .02 G'S @ 0.0026 sec., Ymax = 140.6 G'S @ 0.0499 sec.



MGA RESEARCH CORPORATION

NECK PENDULUM TEST

EUROSID 2 DUMMY

Date: 3/17/05

Dummy Serial Number: 009

Test Number: D05792

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.4
Relative Humidity (%)		10 – 70	16
Pendulum Speed		3.3 - 3.5	3.45
Pendulum Deceleration	3 msec	¯.25 - ¯.53 m/sec	-.32
	8 msec	¯1.59 - ¯2.04 m/sec	-1.80
	14 msec	¯3.20 - ¯3.85 m/sec	-3.48
Maximum Flexion Angle		49.0 – 59.0 deg	51.5
Time of Max. Flexion Angle		54.0 – 66.0 ms	61.6
Maximum Angle Theta (A)		32.0 – 37.0 deg	32.7
Time of Max. Theta (A)		53.0 – 63.0 ms	61.6
Maximum Angle Theta (B)		28.22 – 30.73 deg	29.09
Time of Max. Theta (B)		54.0 – 64.0 ms	57.0

TEST MEETS SPECIFICATIONS

Technician: Jessica Gall

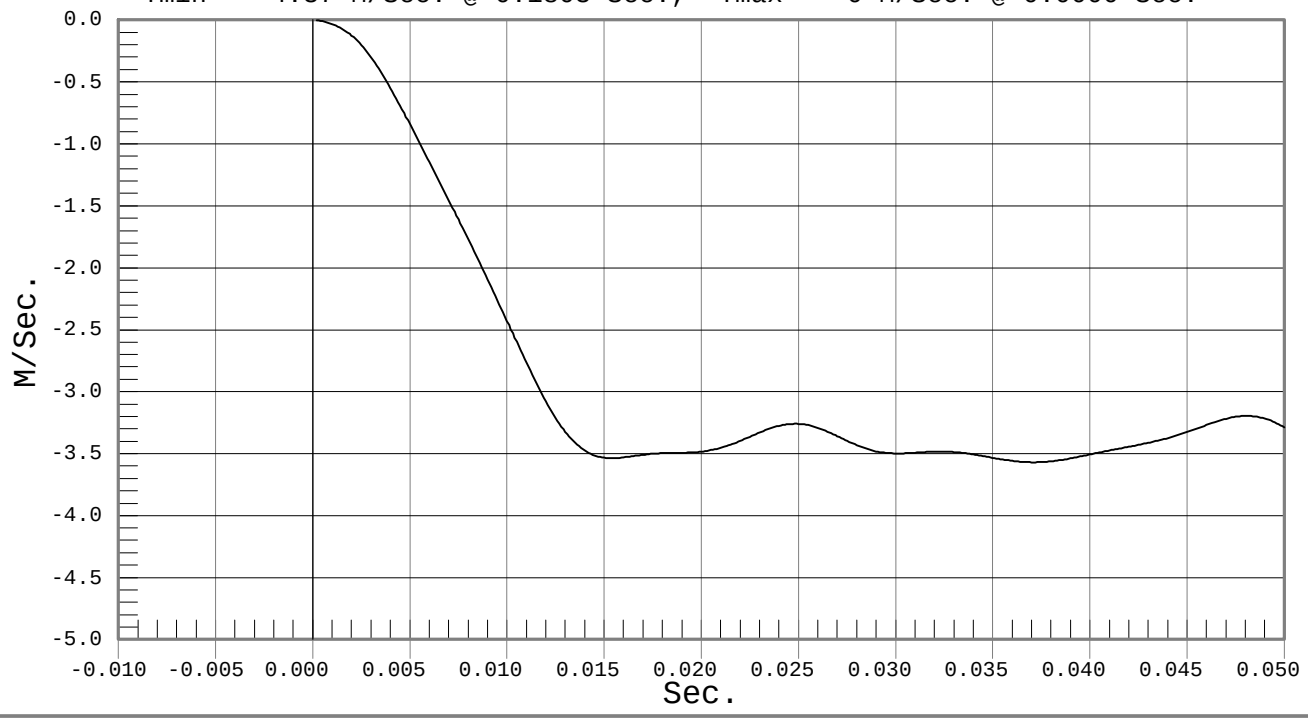
Approved By: David Winkelbauer

PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 03-17-05
Speed: 11.3 fps, 3.45 M/s

Ymin = -4.37 M/Sec. @ 0.1803 Sec., Ymax = 0 M/Sec. @ 0.0000 Sec.

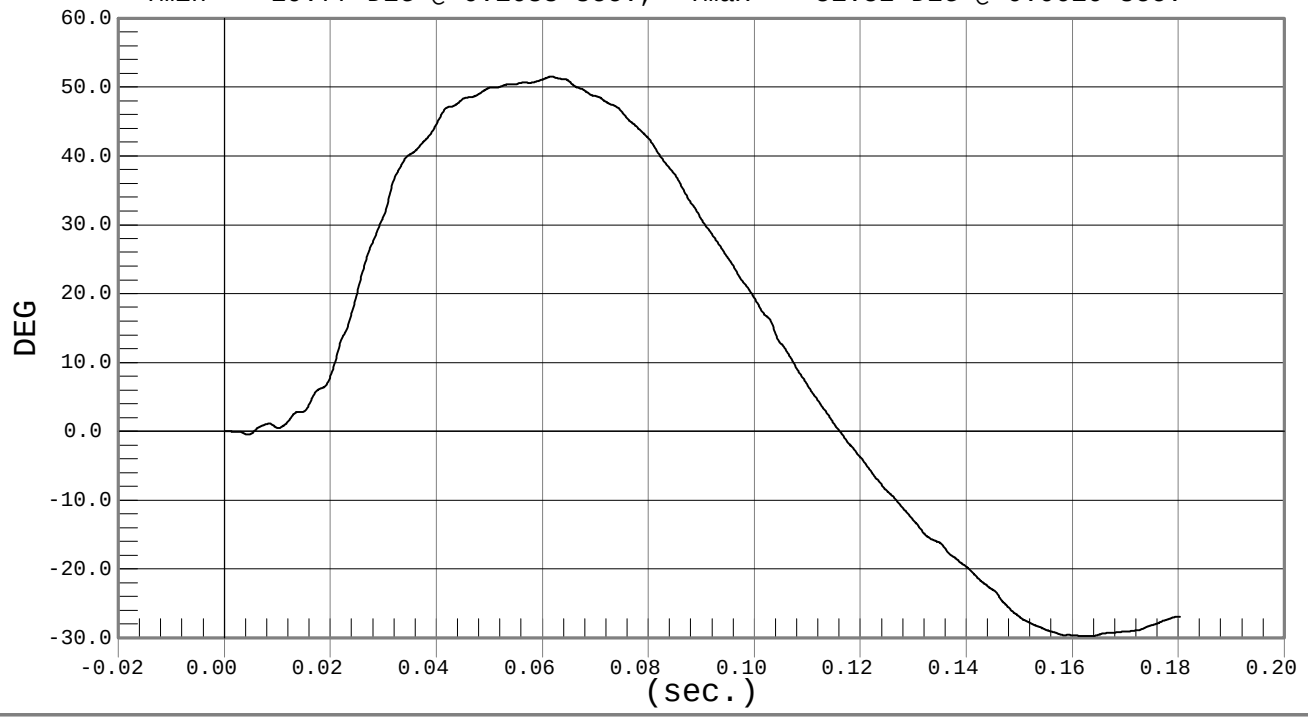


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 03-17-05
Speed: 11.3 fps, 3.45 M/s

Ymin = -29.77 DEG @ 0.1633 sec., Ymax = 51.52 DEG @ 0.0616 sec.

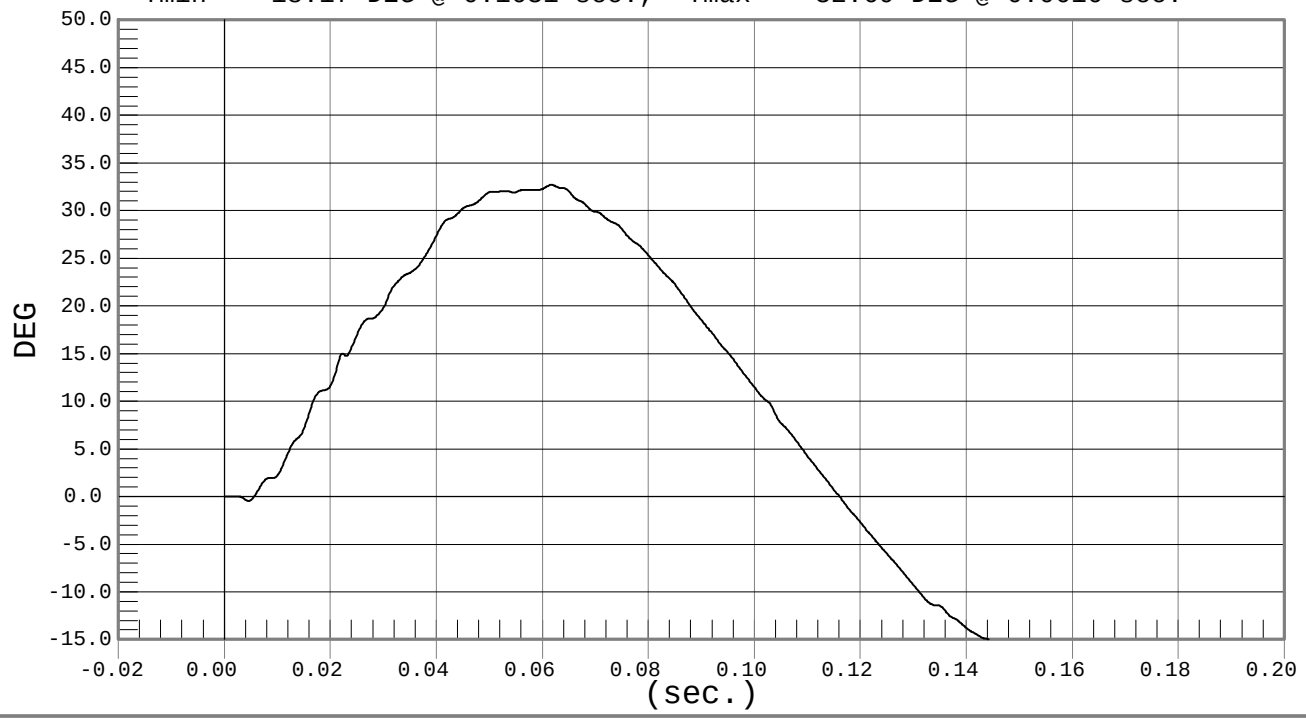


THETA A

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 03-17-05
Speed: 11.3 fps, 3.45 M/s

Ymin = -18.17 DEG @ 0.1631 sec., Ymax = 32.69 DEG @ 0.0616 sec.

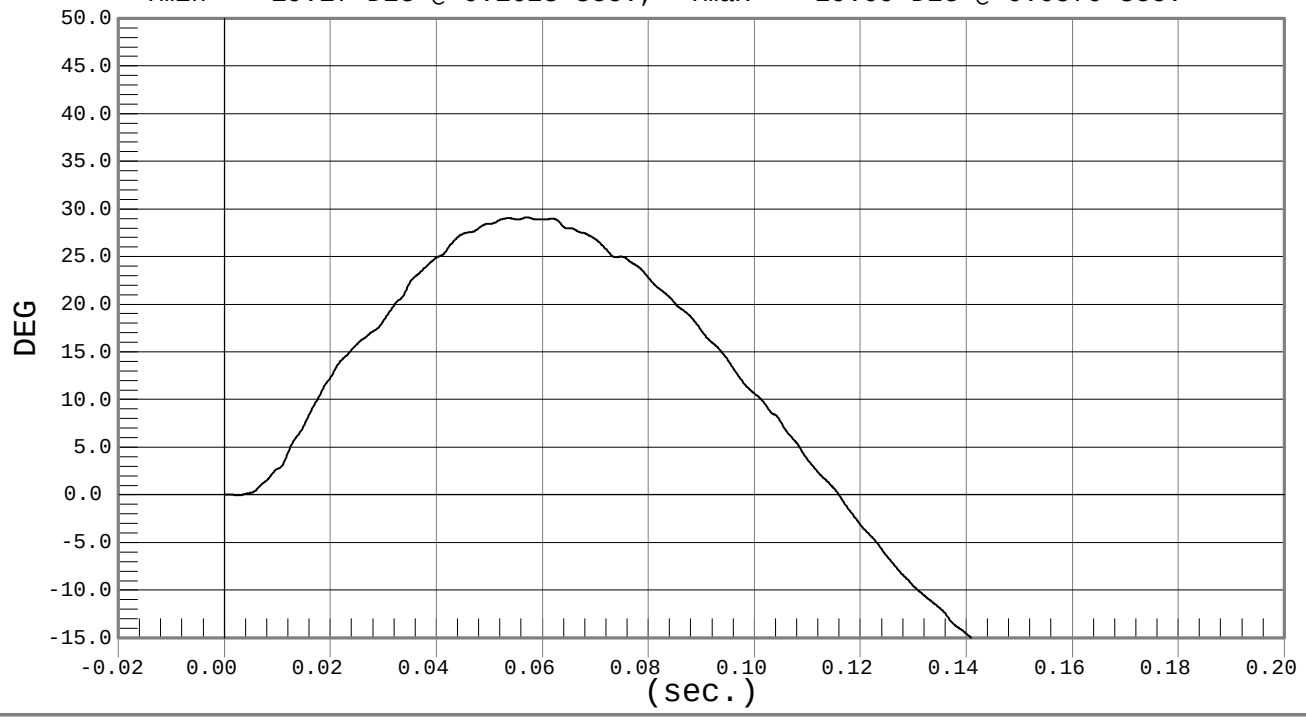


THETA B

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 03-17-05
Speed: 11.3 fps, 3.45 M/s

Ymin = -19.17 DEG @ 0.1623 sec., Ymax = 29.09 DEG @ 0.0570 sec.



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SHOULDER IMPACT TEST

EUROSID 2 DUMMY

Date: 3/17/05

Dummy Serial Number: 009

Test Number: D05793

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.9
Relative Humidity (%)	10 – 70	21
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max. Resultant Acceleration	7.5 – 10.5 g's	10.0
Time of Max. Pendulum Acceleration	msec	11.5

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

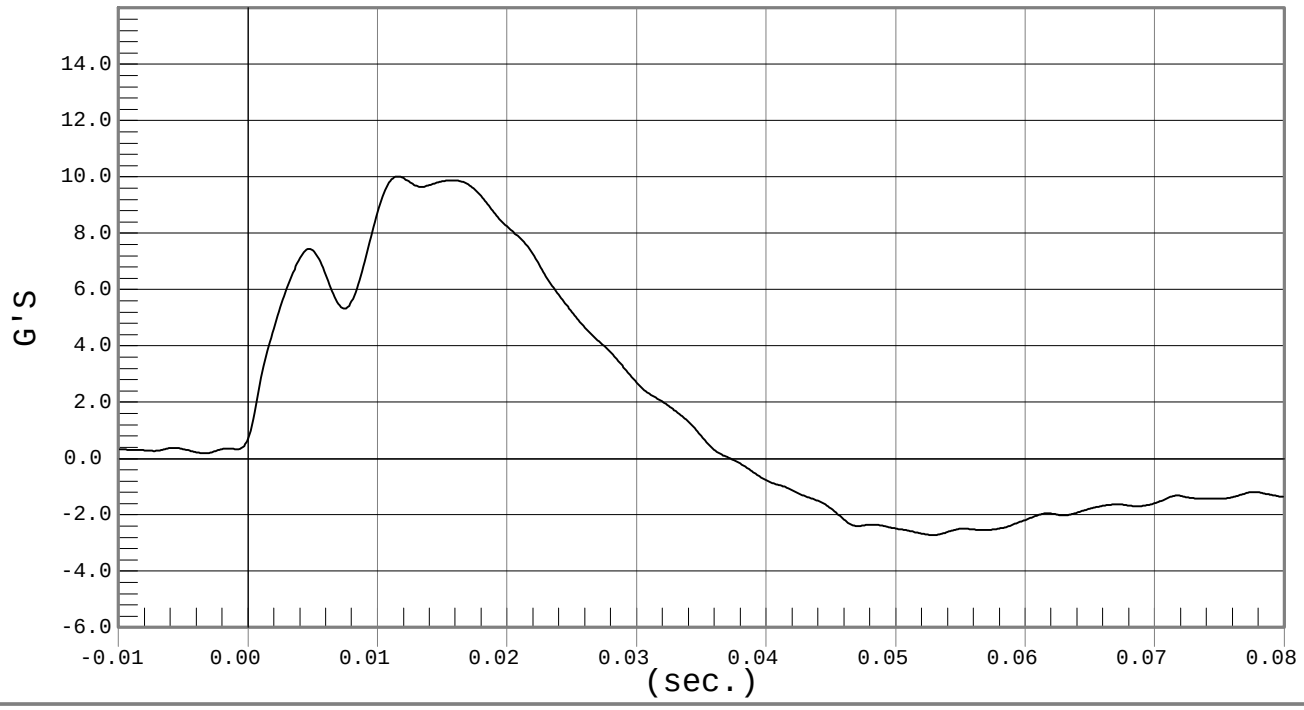
Approved By: David Winkelbauer

SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #009

Test Date: 03-17-05
Speed: 14.0 fps, 4.28 M/s

Ymin = -2.72 G'S @ 0.0528 sec., Ymax = 10.02 G'S @ 0.0115 sec.



MGA RESEARCH CORPORATION

UPPER/MIDDLE/LOWER RIB TESTS

EUROSID 2 DUMMY

Date: 3/16/05

Dummy Serial Number: 009

Test Number: D05794, D05795, D05796

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.7
Relative Humidity (%)	10 – 70	15
Displacement at 2 m/s	23.5 – 27.5 mm	26.6
Displacement at 3 m/s	36.0 – 40.0 mm	38.5
Displacement at 4 m/s	46.0 – 51.0 mm	49.1

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.7
Relative Humidity (%)	10 – 70	15
Displacement at 2 m/s	23.5 – 27.5 mm	26.0
Displacement at 3 m/s	36.0 – 40.0 mm	37.2
Displacement at 4 m/s	46.0 – 51.0 mm	48.5

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.7
Relative Humidity (%)	10 – 70	15
Displacement at 2 m/s	23.5 – 27.5 mm	26.5
Displacement at 3 m/s	36.0 – 40.0 mm	38.5
Displacement at 4 m/s	46.0 – 51.0 mm	49.7

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

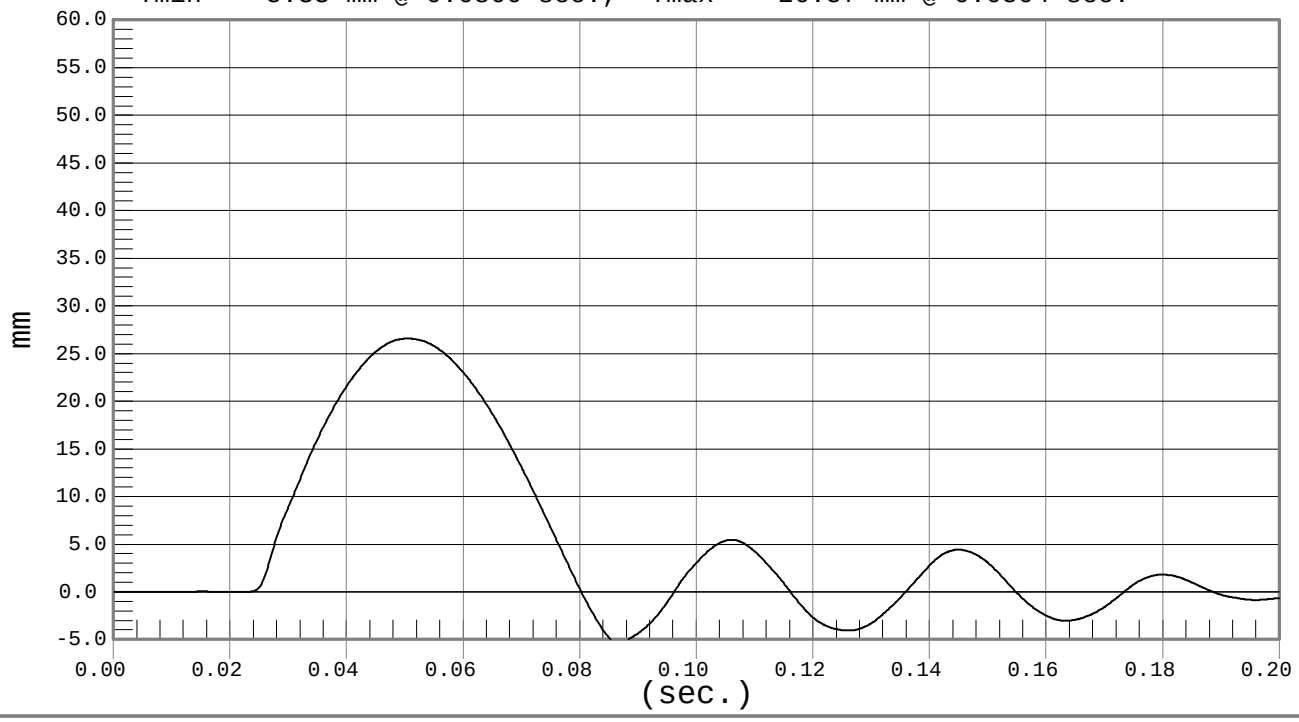
Approved By: David Winkelbauer

UPPER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 03-16-05
Speed: 6.6 fps, 2.00 M/s

Ymin = -5.33 mm @ 0.0866 sec., Ymax = 26.57 mm @ 0.0504 sec.

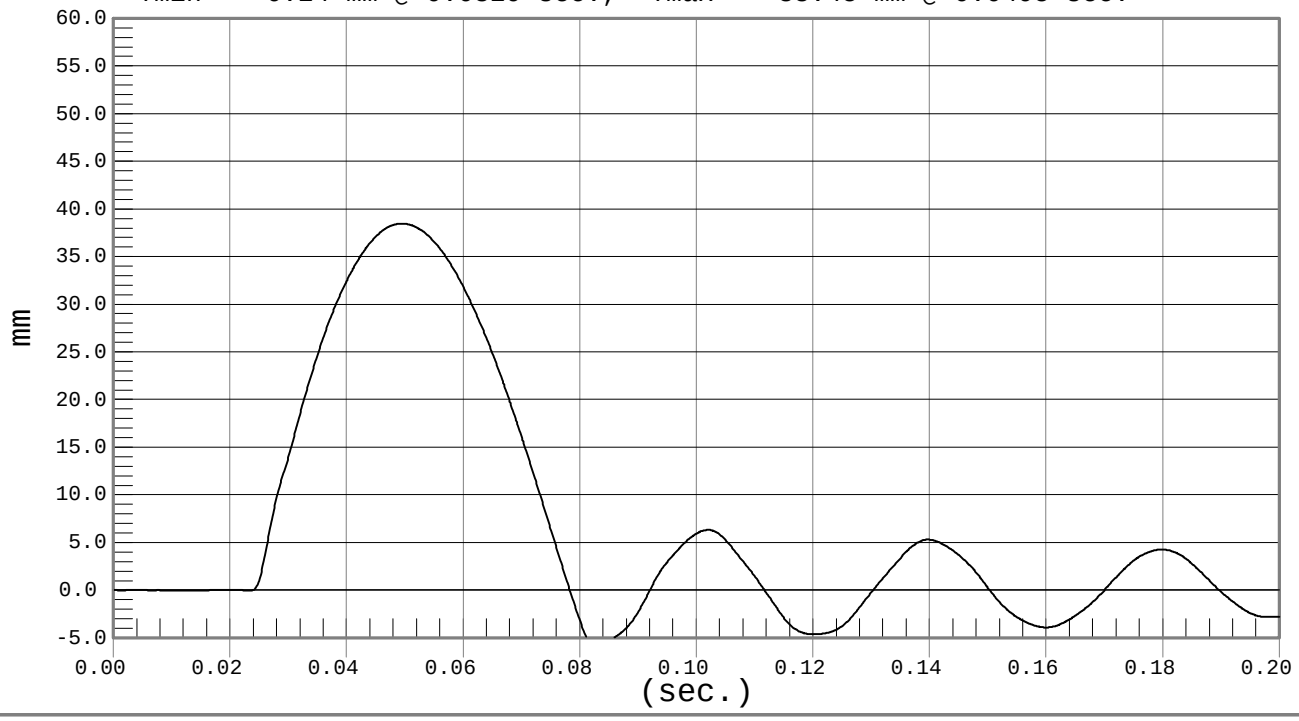


UPPER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 03-16-05
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.24 mm @ 0.0829 sec., Ymax = 38.45 mm @ 0.0495 sec.

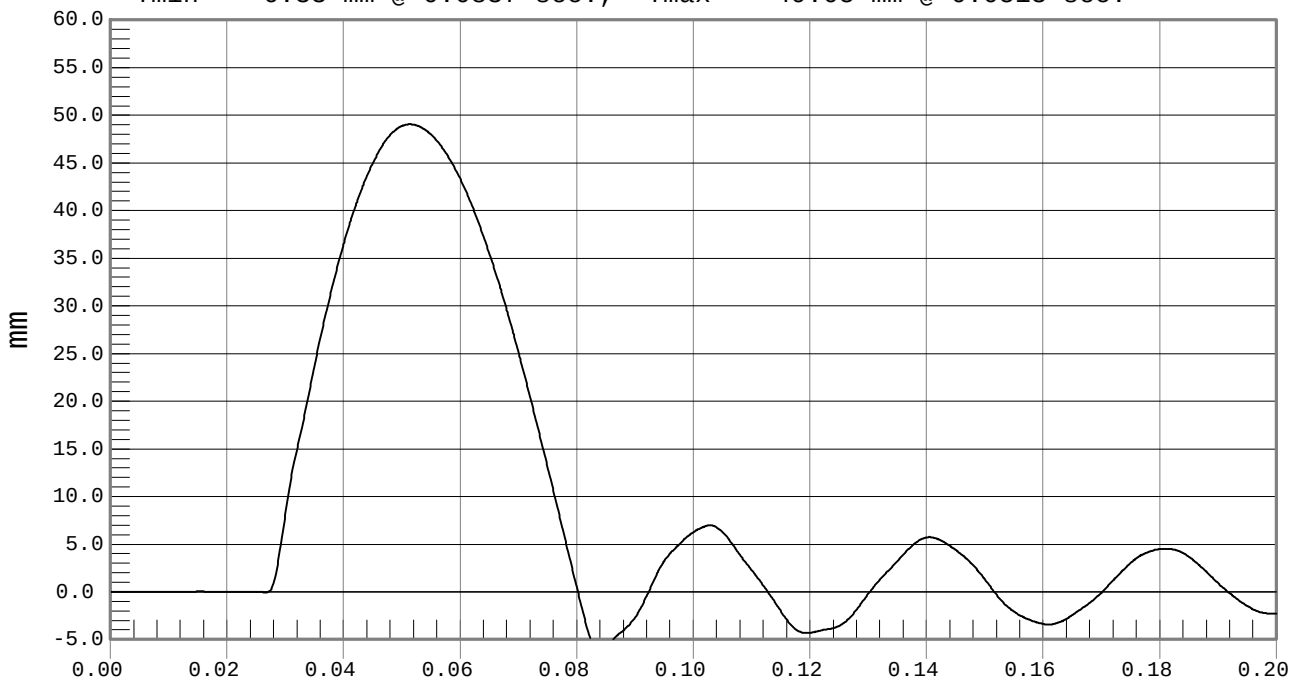


UPPER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 03-16-05
Speed: 13.1 fps, 4.00 M/s

Ymin = -6.33 mm @ 0.0837 sec., Ymax = 49.05 mm @ 0.0513 sec.

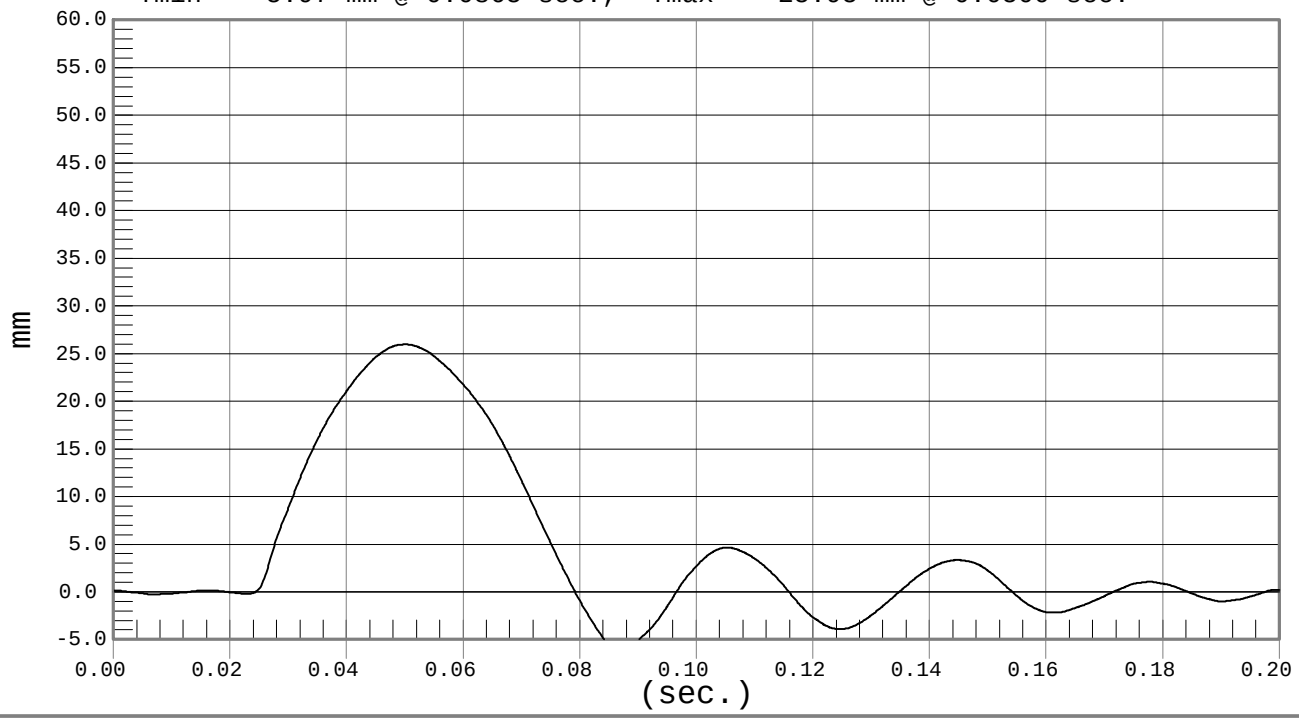


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 03-16-05
Speed: 6.6 fps, 2.00 M/s

Ymin = -5.97 mm @ 0.0865 sec., Ymax = 25.95 mm @ 0.0500 sec.

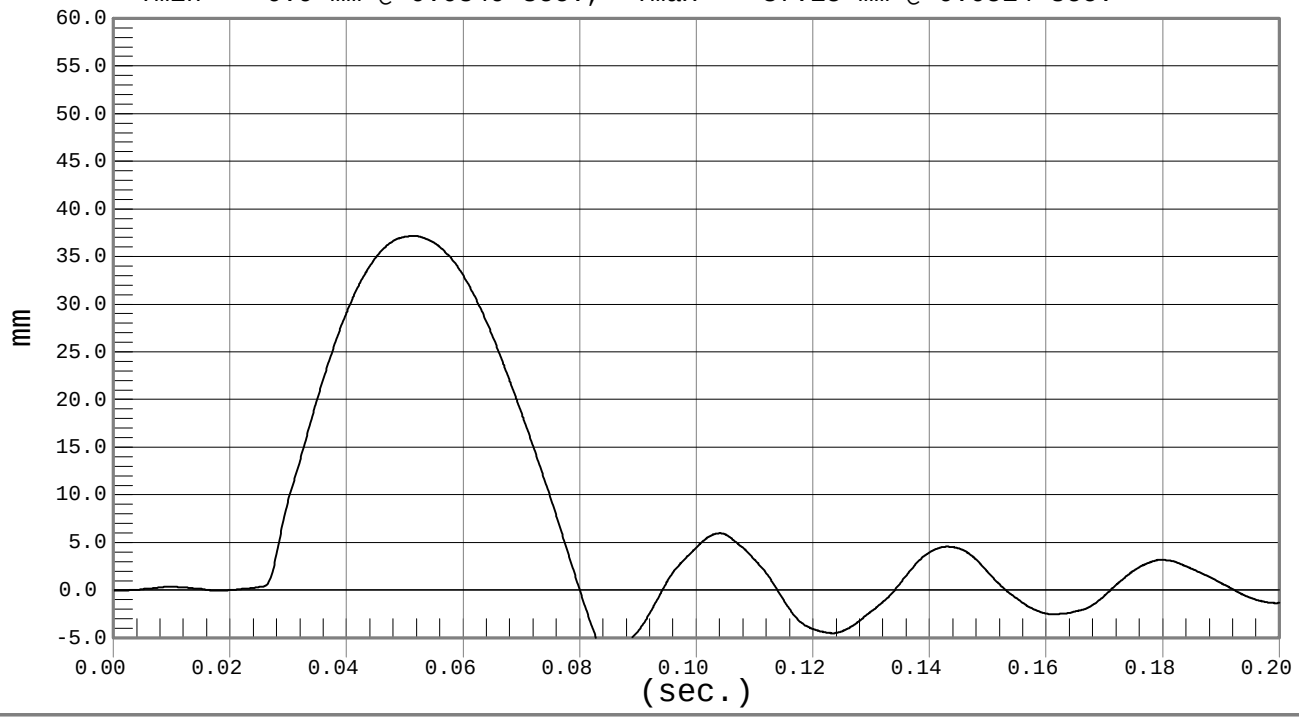


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 03-17-05
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.9 mm @ 0.0849 sec., Ymax = 37.15 mm @ 0.0514 sec.

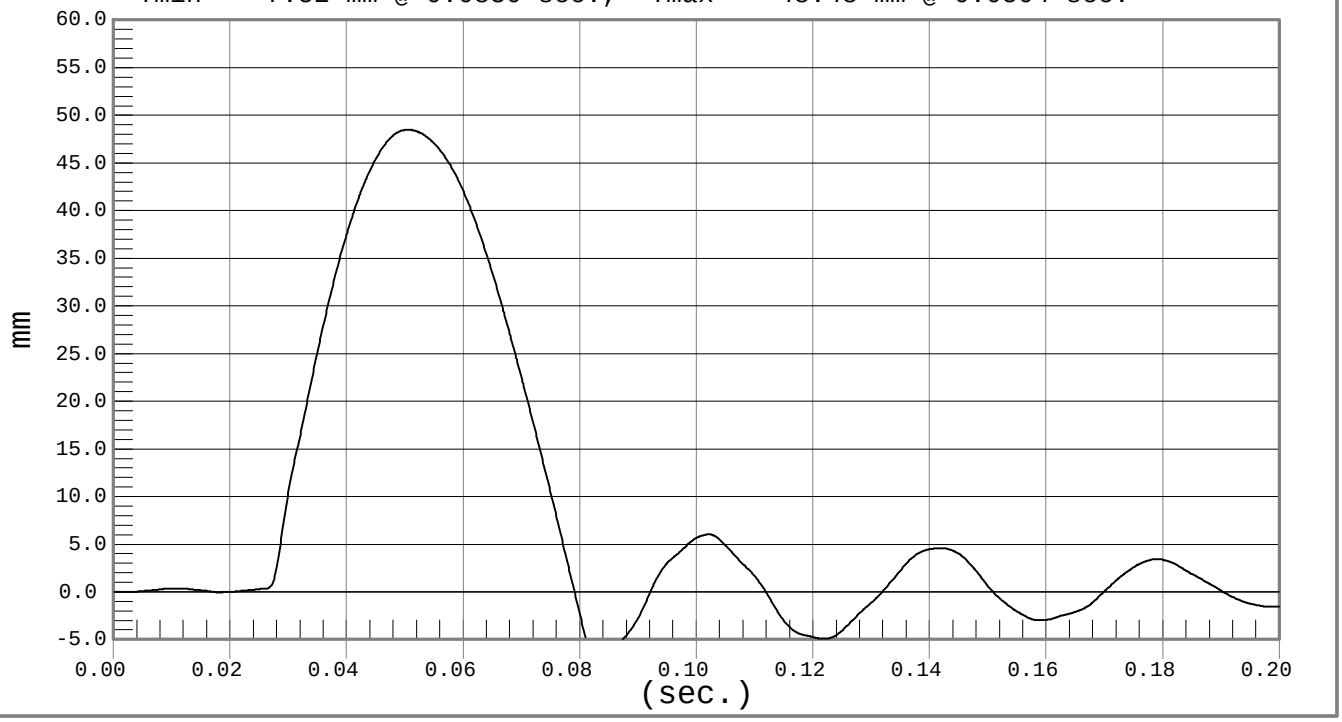


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 03-16-05
Speed: 13.1 fps, 4.00 M/s

Ymin = -7.52 mm @ 0.0830 sec., Ymax = 48.48 mm @ 0.0504 sec.

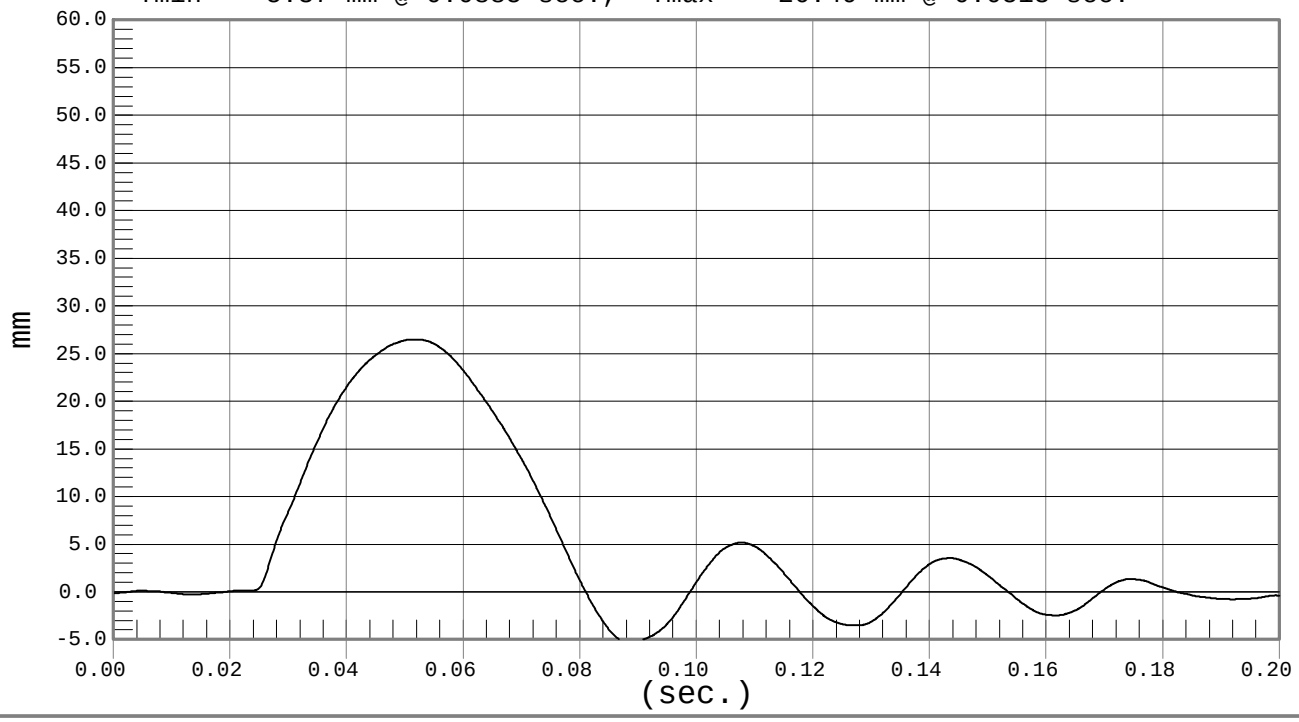


LOWER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 03-17-05
Speed: 6.6 fps, 2.00 M/s

Ymin = -5.37 mm @ 0.0885 sec., Ymax = 26.49 mm @ 0.0513 sec.

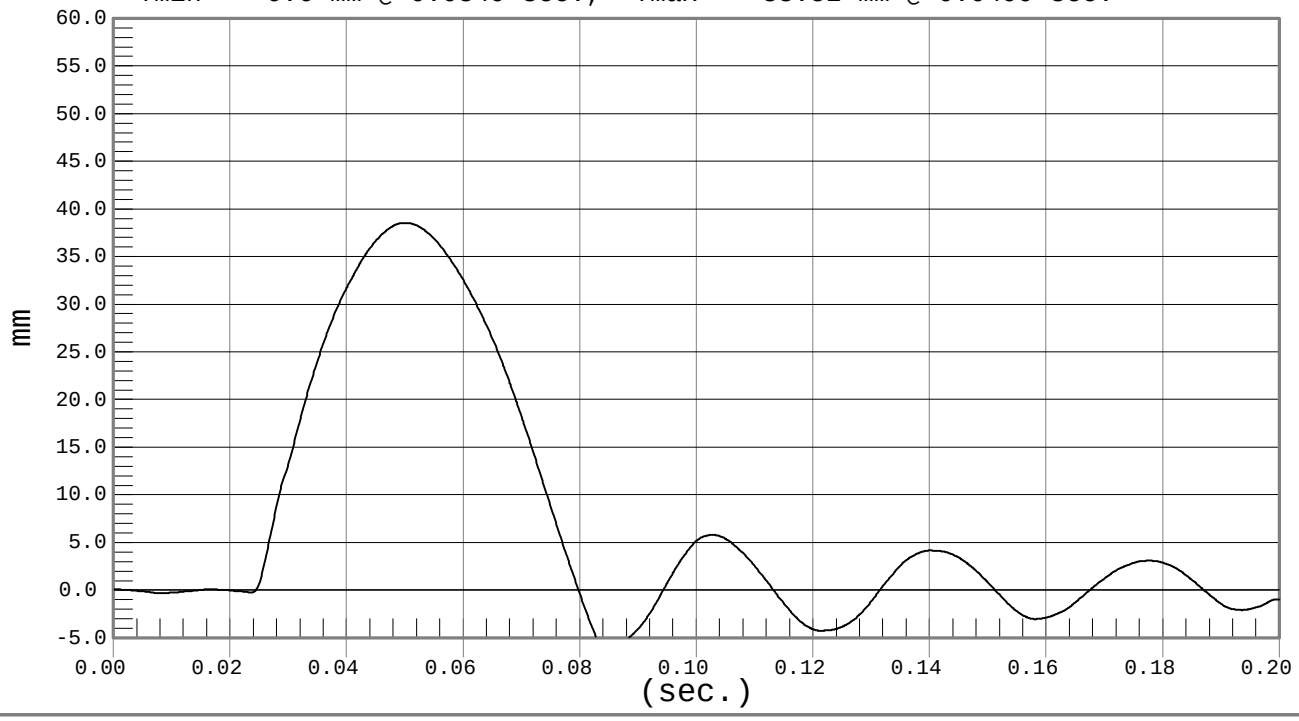


LOWER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 03-17-05
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.6 mm @ 0.0849 sec., Ymax = 38.52 mm @ 0.0499 sec.

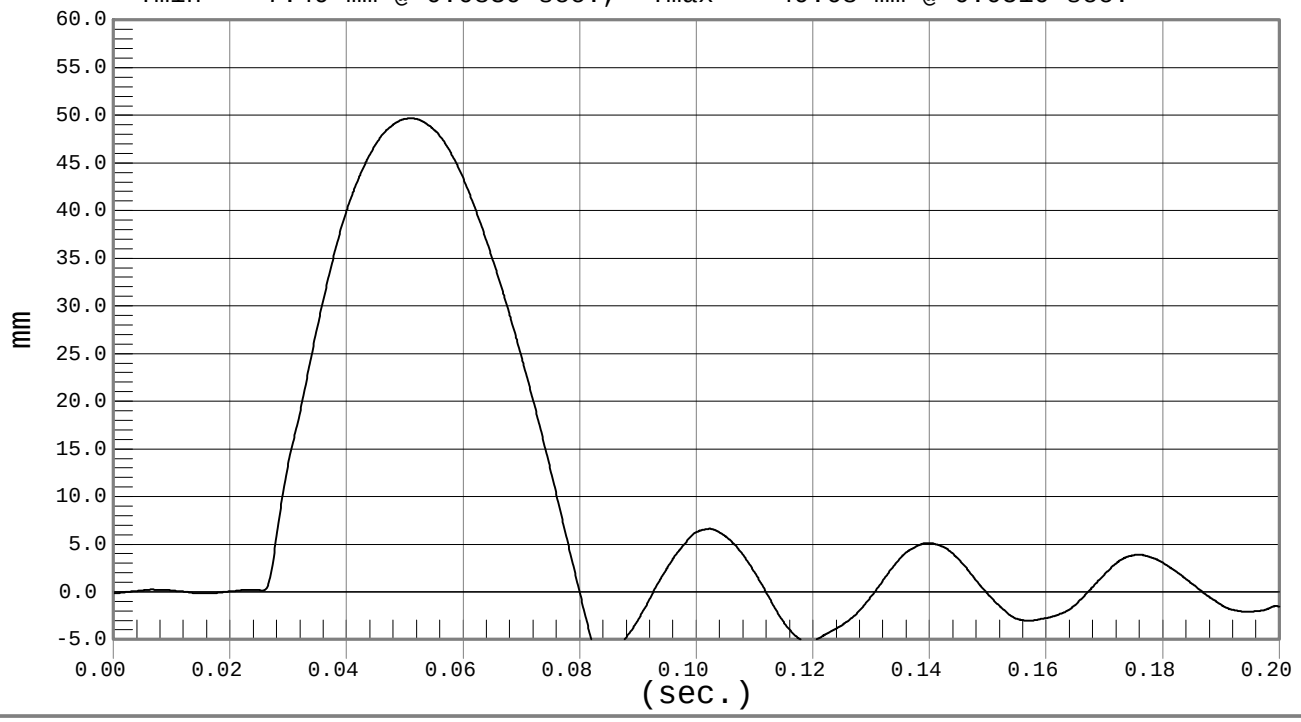


LOWER RIB DISPLACEMENT

Test Desc.: RIB IMPACT
Component: Dummy #009

Test Date: 03-17-05
Speed: 13.1 fps, 4.00 M/s

Ymin = -7.49 mm @ 0.0839 sec., Ymax = 49.68 mm @ 0.0510 sec.



MGA RESEARCH CORPORATION

ABDOMEN TEST

EUROSID 2 DUMMY

Date: 3/17/05

Dummy Serial Number: 009

Test Number: D05797

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.1
Relative Humidity (%)	10 – 70	21
Probe Speed (m/s)	3.90 – 4.10	4.04
Maximum Impact Force	4.00 – 4.80 kN	4.75
Time of Maximum Force	10.60 – 13.00 ms	10.60
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.31
Time of Max. Total Force	10.00 – 12.30 ms	10.90

TEST MEETS SPECIFICATIONS

Technician: Jessica Gall

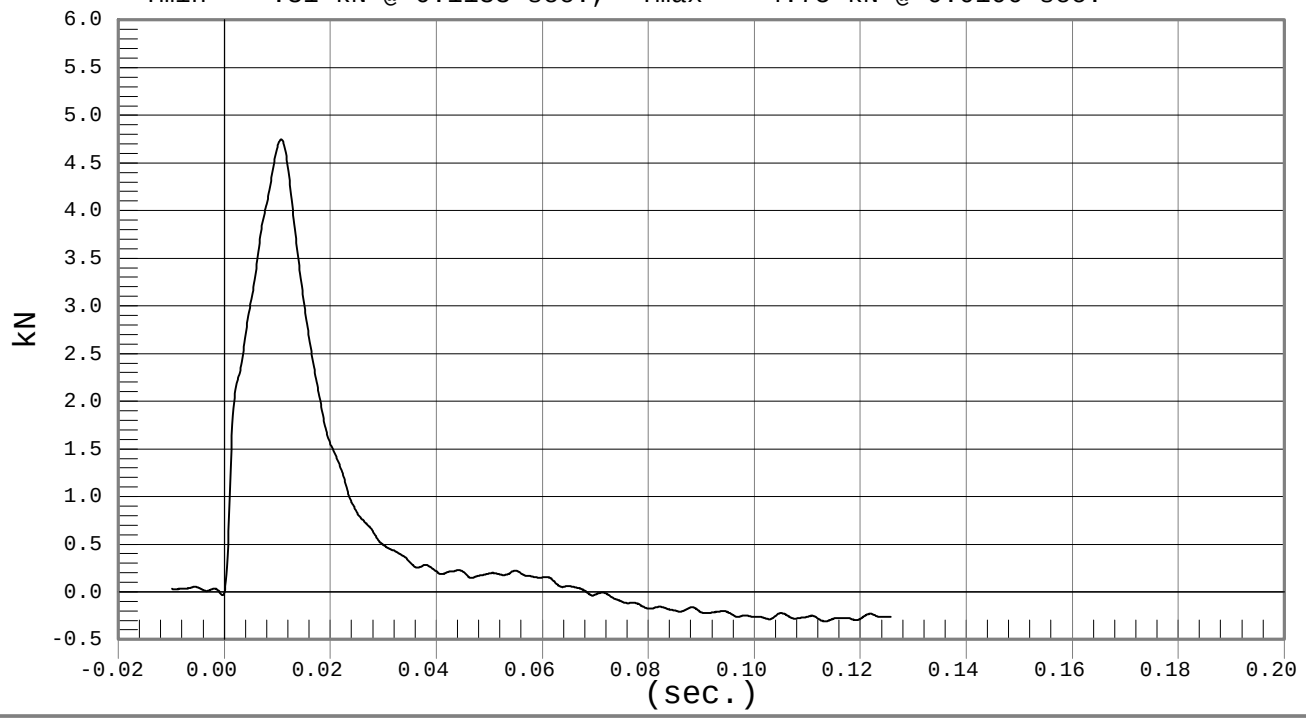
Approved By: David Winkelbauer

IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 03-17-05
Speed: 13.3 fps, 4.04 M/s

Ymin = -.31 kN @ 0.1133 sec., Ymax = 4.75 kN @ 0.0106 sec.

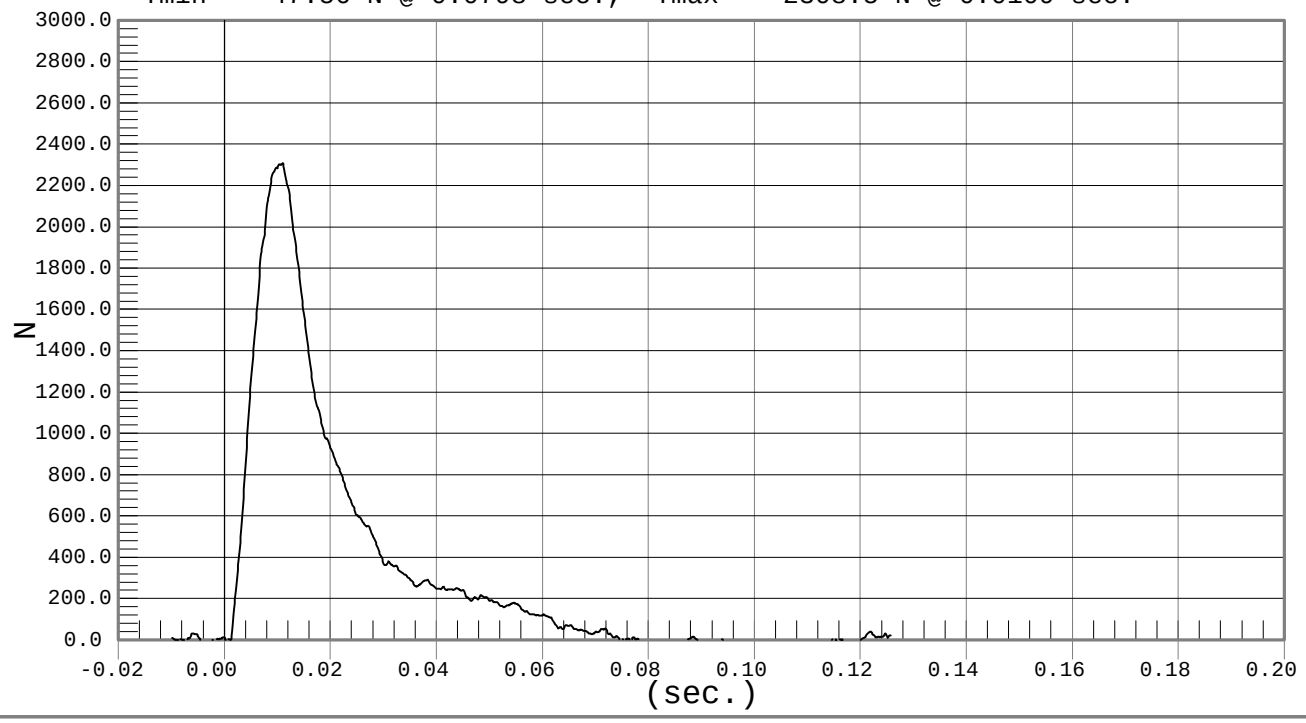


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 03-17-05
Speed: 13.3 fps, 4.04 M/s

Ymin = -47.56 N @ 0.0798 sec., Ymax = 2308.5 N @ 0.0109 sec.



MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

EUROSID 2 DUMMY

Date: 3/17/05

Dummy Serial Number: 009

Test Number: D05798

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.9
Relative Humidity (%)		10 – 70	18
Pendulum Speed		5.95 – 6.15	6.11
Pendulum Deceleration	10 msec	-2.46 - -1.59 m/sec	-2.25
	20 msec	-5.25 - -4.07 m/sec	-5.24
	25 msec	-6.64 - -5.30 m/sec	-6.18
	30 msec	≥ -6.5 m/sec	-6.2
Maximum Flexion Angle		45.0 – 55.0 deg	47.4
Time of Max. Flexion Angle		39.0 – 53.0 ms	44.4
Maximum Angle Theta (A)		31.0 – 35.0 deg	31.1
Time of Max. Theta (A)		44.0 – 52.0 ms	44.4
Maximum Angle Theta (B)		26.85 - 29.35 deg	28.09
Time of Max. Theta (B)		44.0 – 52.0 ms	45.3

TEST MEETS SPECIFICATIONS

Technician: Jessica Gall

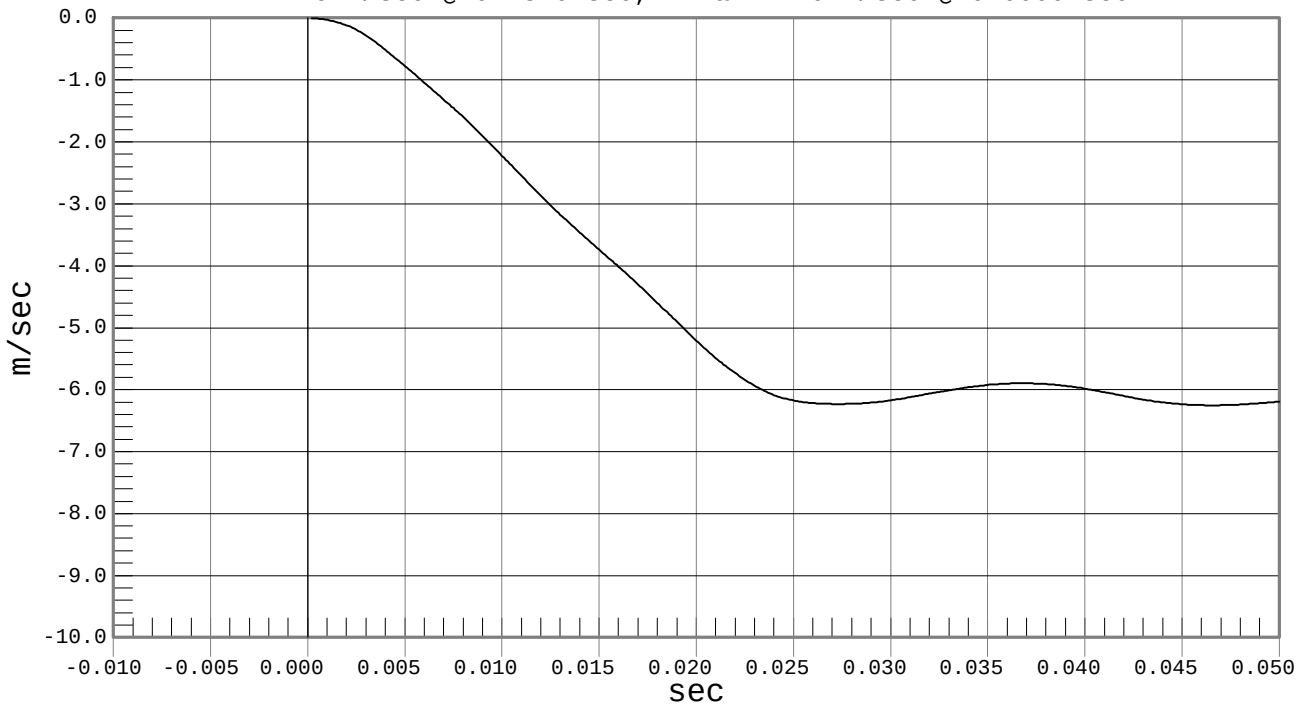
Approved By: David Winkelbauer

PENDULUM DECELERATION

Test Desc.: Lumbar Bending
Component: Dummy #009

Test Date: 03-17-05
Speed: 20.0 fps, 6.11 M/s

Ymin = -7.49 m/sec @ 0.1310 sec, Ymax = 0 m/sec @ 0.0000 sec

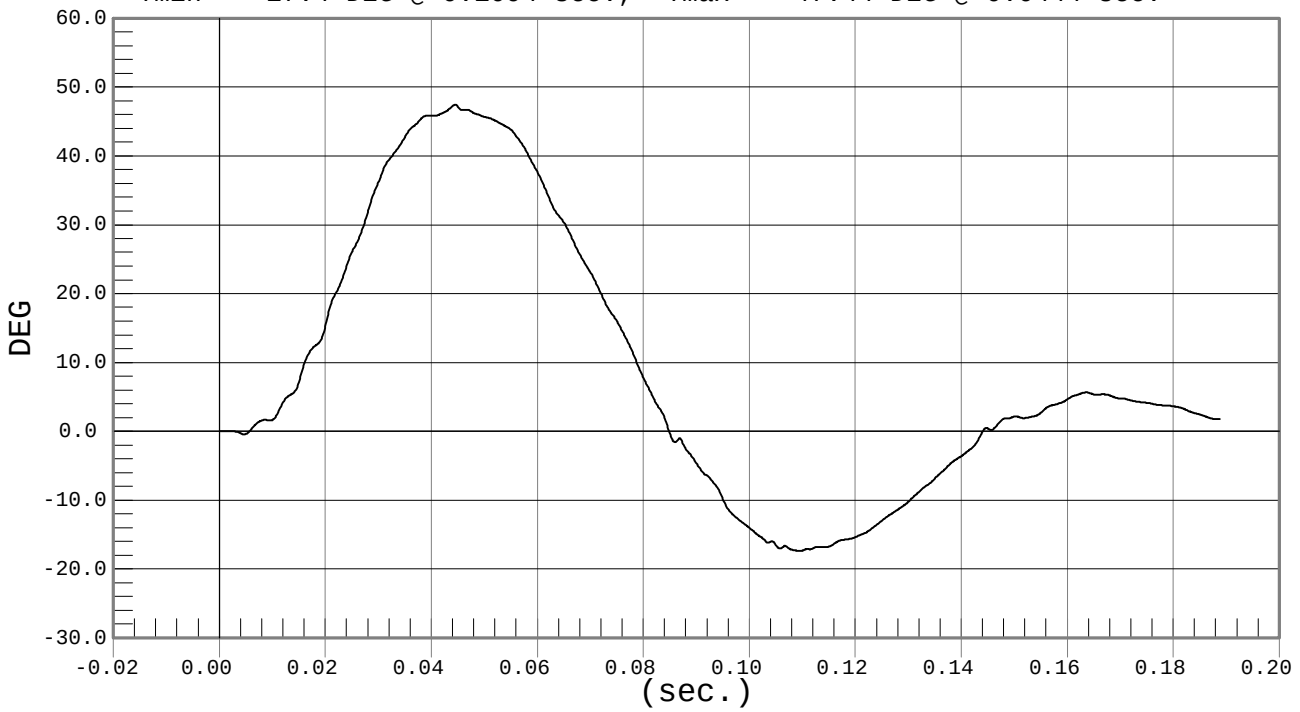


FLEXION ANGLE

Test Desc.: Lumbar Bending
Component: Dummy #009

Test Date: 03-17-05
Speed: 20.0 fps, 6.11 M/s

Ymin = -17.4 DEG @ 0.1094 sec., Ymax = 47.44 DEG @ 0.0444 sec.

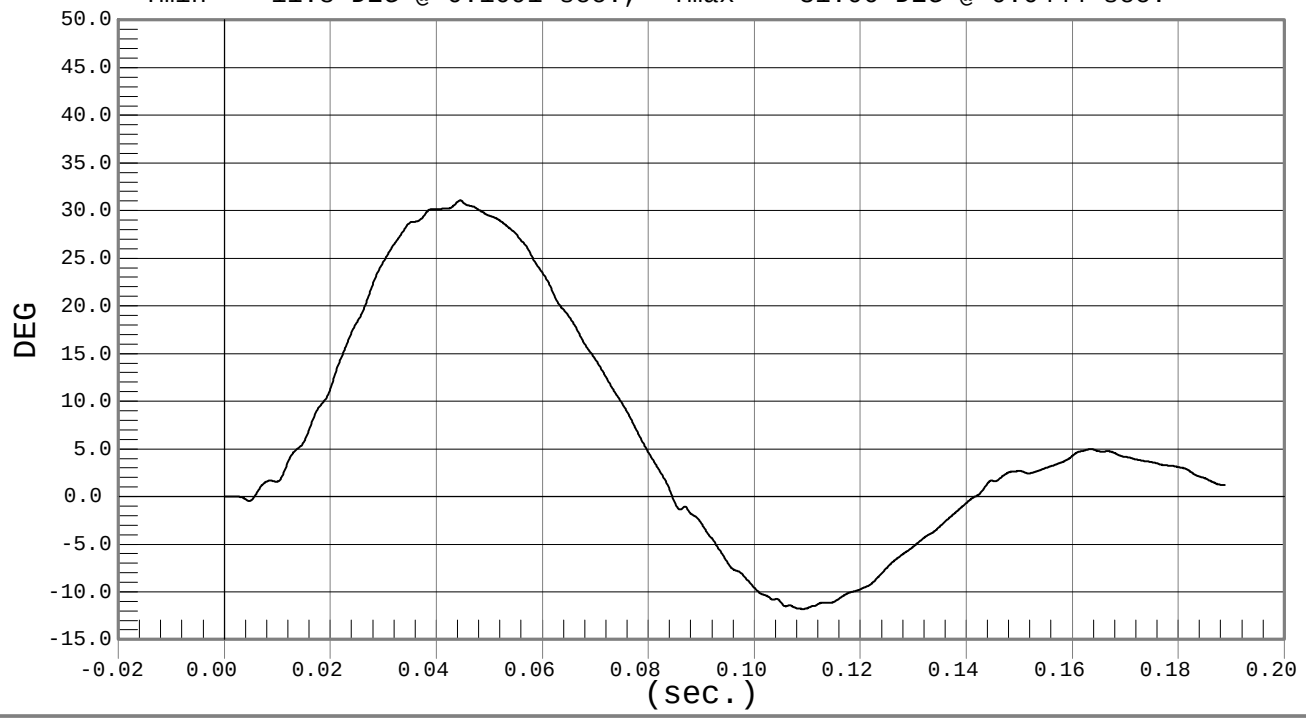


THETA A

Test Desc.: Lumbar Bending
Component: Dummy #009

Test Date: 03-17-05
Speed: 20.0 fps, 6.11 M/s

Ymin = -11.8 DEG @ 0.1091 sec., Ymax = 31.06 DEG @ 0.0444 sec.

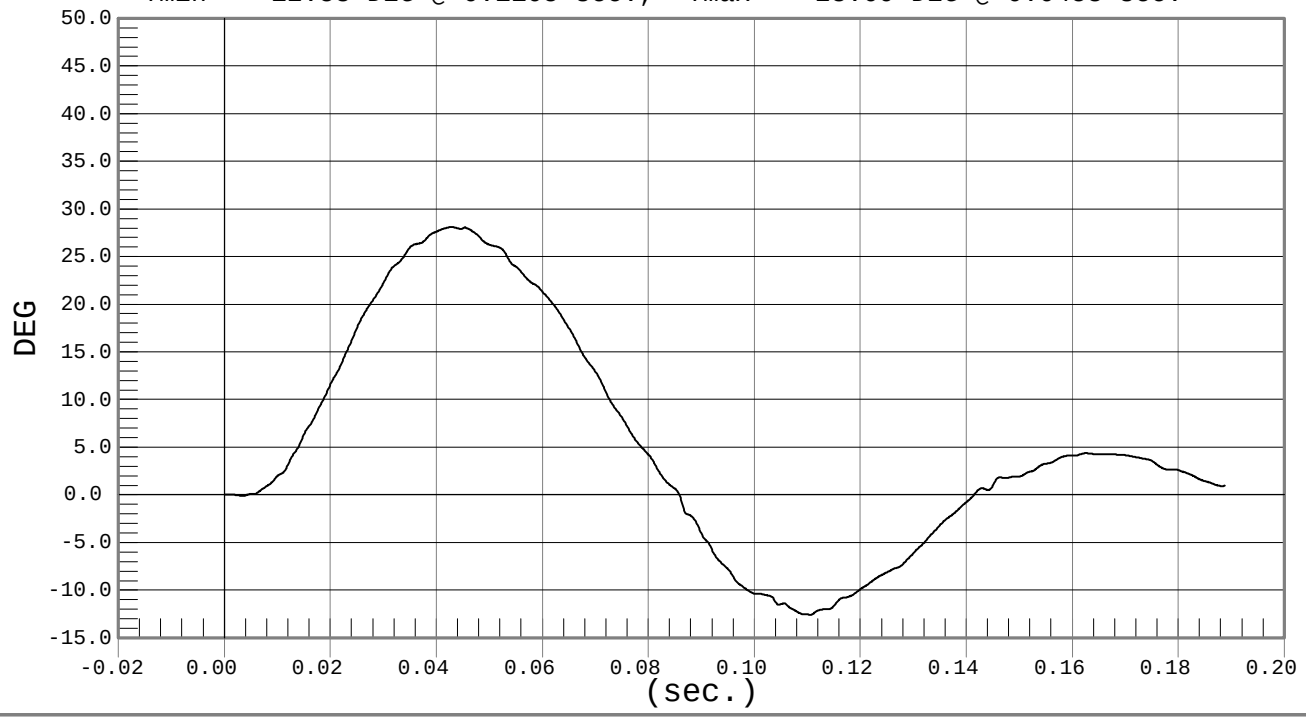


THETA B

Test Desc.: Lumbar Bending
Component: Dummy #009

Test Date: 03-17-05
Speed: 20.0 fps, 6.11 M/s

Ymin = -12.58 DEG @ 0.1105 sec., Ymax = 28.09 DEG @ 0.0453 sec.



MGA RESEARCH CORPORATION

PELVIS TEST

EUROSID 2 DUMMY

Date: 3/17/05

Dummy Serial Number: 009

Test Number: D05799

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	22.0
Relative Humidity (%)	10 – 70	19
Pendulum Speed	4.20 – 4.40 m/s	4.29
Maximum Impactor Force	4.40 – 5.40 kN	4.96
Time of Max. Impactor Force	10.30 – 15.50 ms	12.50
Maximum Pubic Force	1.04 – 1.64 kN	15.4
Time of Max. Pubic Force	9.90 – 15.90 ms	13.6

TEST MEETS SPECIFICATIONS

Technician: Jessica Gall

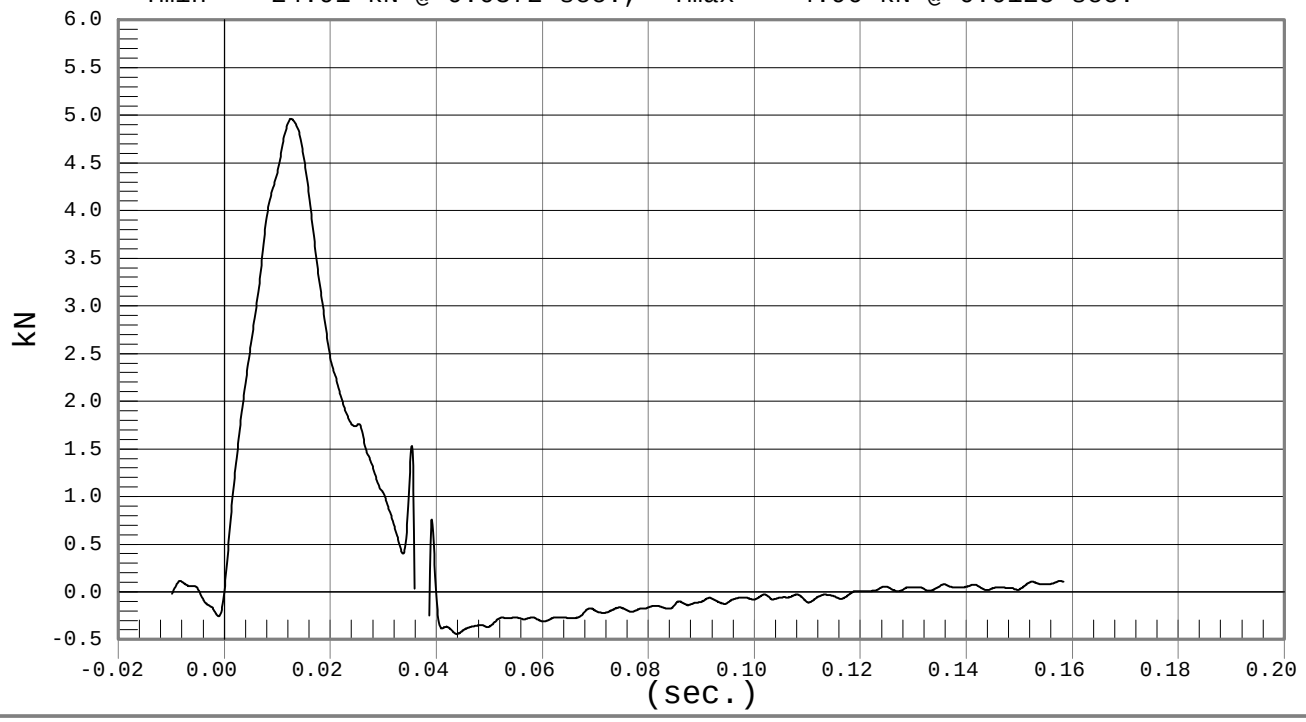
Approved By: David Winkelbauer

IMPACTOR FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 03-17-05
Speed: 14.1 fps, 4.29 M/s

Ymin = -24.91 kN @ 0.0372 sec., Ymax = 4.96 kN @ 0.0125 sec.

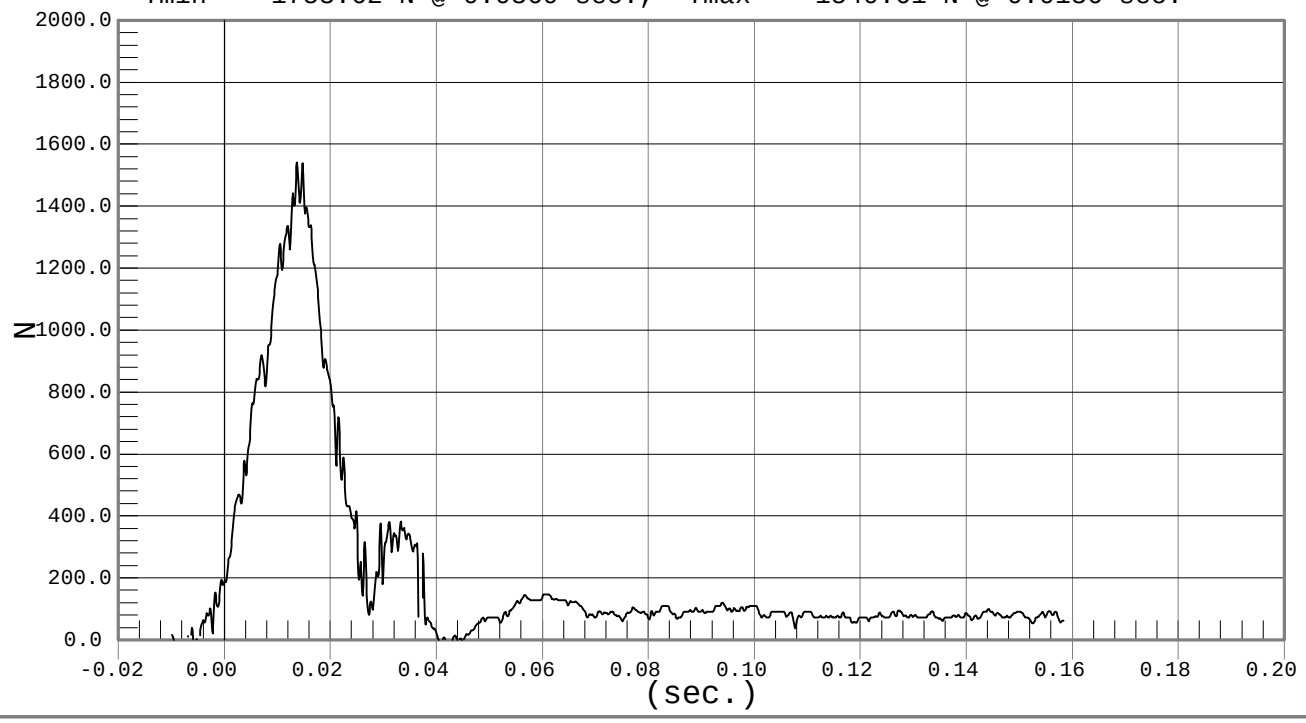


PUBIC FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 03-17-05
Speed: 14.1 fps, 4.29 M/s

Ymin = -1753.62 N @ 0.0369 sec., Ymax = 1540.61 N @ 0.0136 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: 5/2/05

Dummy Serial Number: 009

Test Number: D051181

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.4
Relative Humidity (%)	10 – 70	22
Peak Resultant Acceleration	100 – 150 g's	144
Time of Max. Res. Acceleration	msec	33.1

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

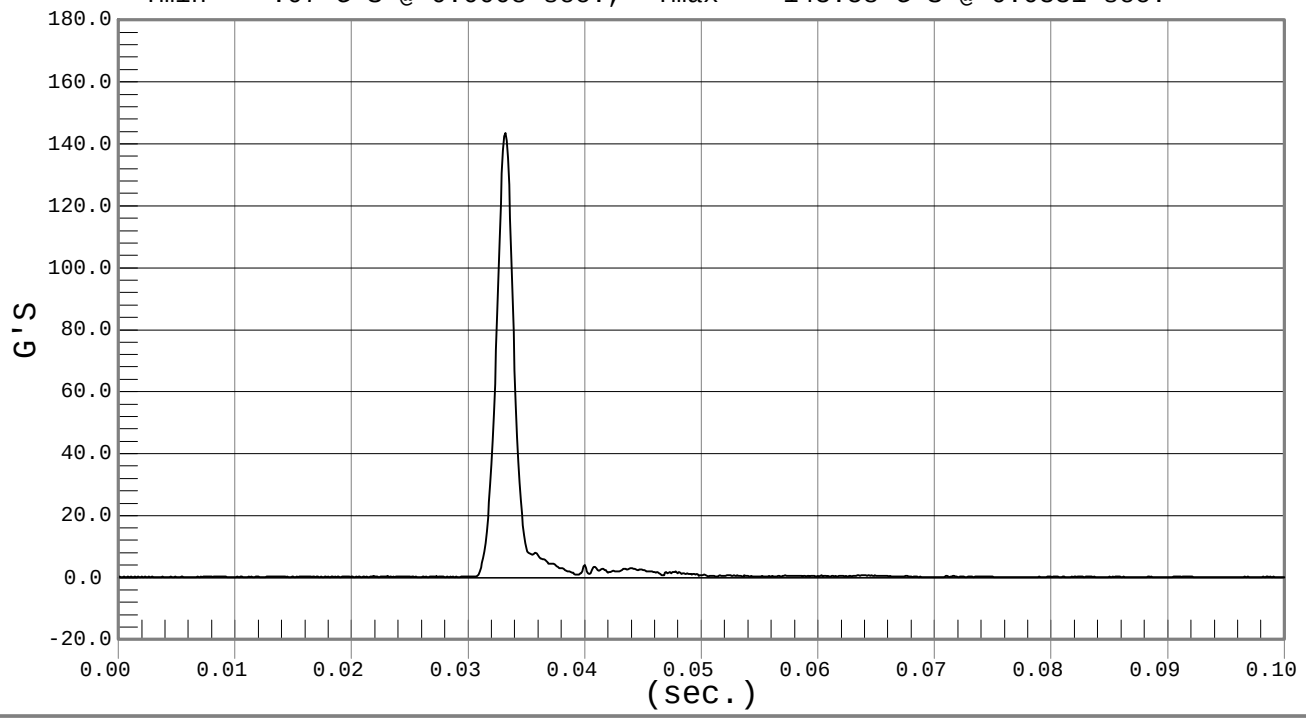
Approved By: David Winkelbauer

PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #009

Test Date: 05-02-05
Speed: 0.0 fps, 0.00 M/s

Ymin = .07 G'S @ 0.0008 sec., Ymax = 143.58 G'S @ 0.0331 sec.



MGA RESEARCH CORPORATION

NECK PENDULUM TEST

EUROSID 2 DUMMY

Date: 5/3/05

Dummy Serial Number: 009

Test Number: D051182

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	20.6
Relative Humidity (%)		10 – 70	22
Pendulum Speed		3.3 - 3.5	3.5
Pendulum Deceleration	3 msec	¯.25 - ¯.53 m/sec	-.32
	8 msec	¯1.59 - ¯2.04 m/sec	-1.68
	14 msec	¯3.20 - ¯3.85 m/sec	-3.44
Maximum Flexion Angle		49.0 – 59.0 deg	53.0
Time of Max. Flexion Angle		54.0 – 66.0 ms	55.7
Maximum Angle Theta (A)		32.0 – 37.0 deg	33.3
Time of Max. Theta (A)		53.0 – 63.0 ms	55.2
Maximum Angle Theta (B)		28.7 – 31.23 deg	30.1
Time of Max. Theta (B)		54.0 – 64.0 ms	55.3

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

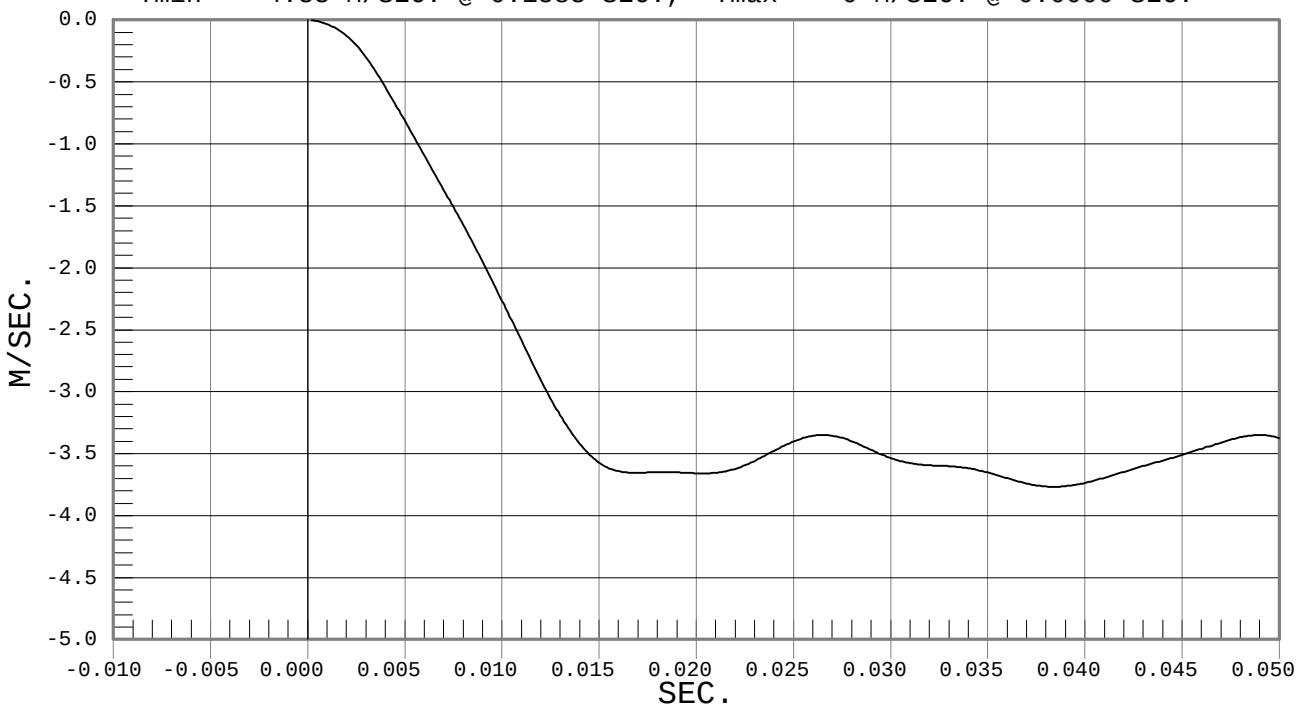
Approved By: David Winkelbauer

PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 05-03-05
Speed: 11.4 fps, 3.48 M/s

Ymin = -4.33 M/SEC. @ 0.1583 SEC., Ymax = 0 M/SEC. @ 0.0000 SEC.

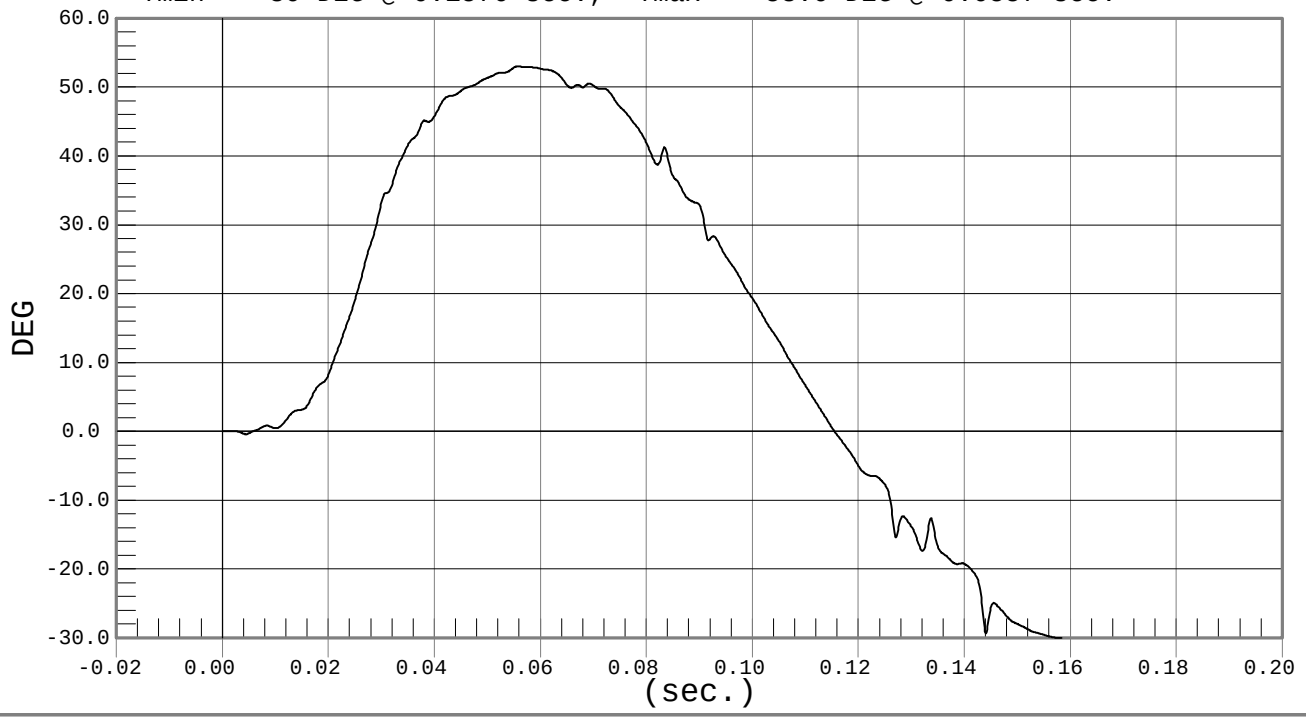


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 05-03-05
Speed: 11.4 fps, 3.48 M/s

Ymin = -30 DEG @ 0.1576 sec., Ymax = 53.0 DEG @ 0.0557 sec.

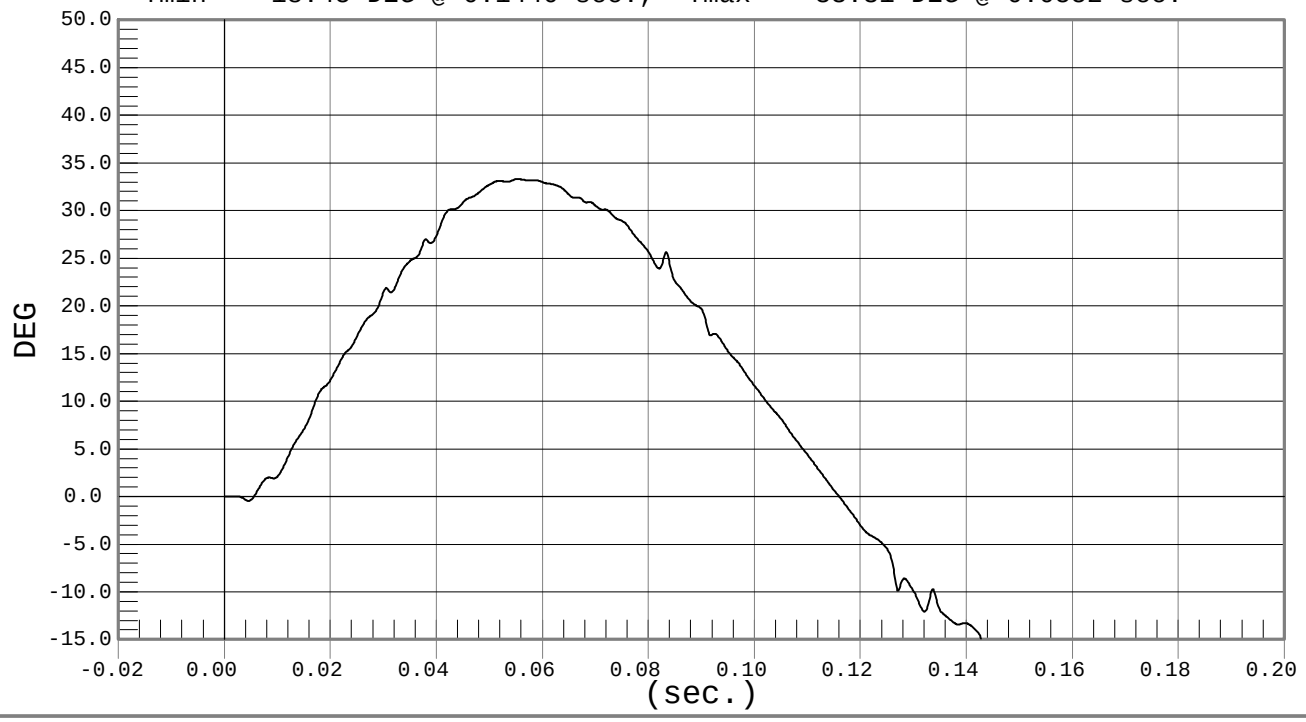


THETA A

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 05-03-05
Speed: 11.4 fps, 3.48 M/s

Ymin = -18.45 DEG @ 0.1440 sec., Ymax = 33.31 DEG @ 0.0552 sec.

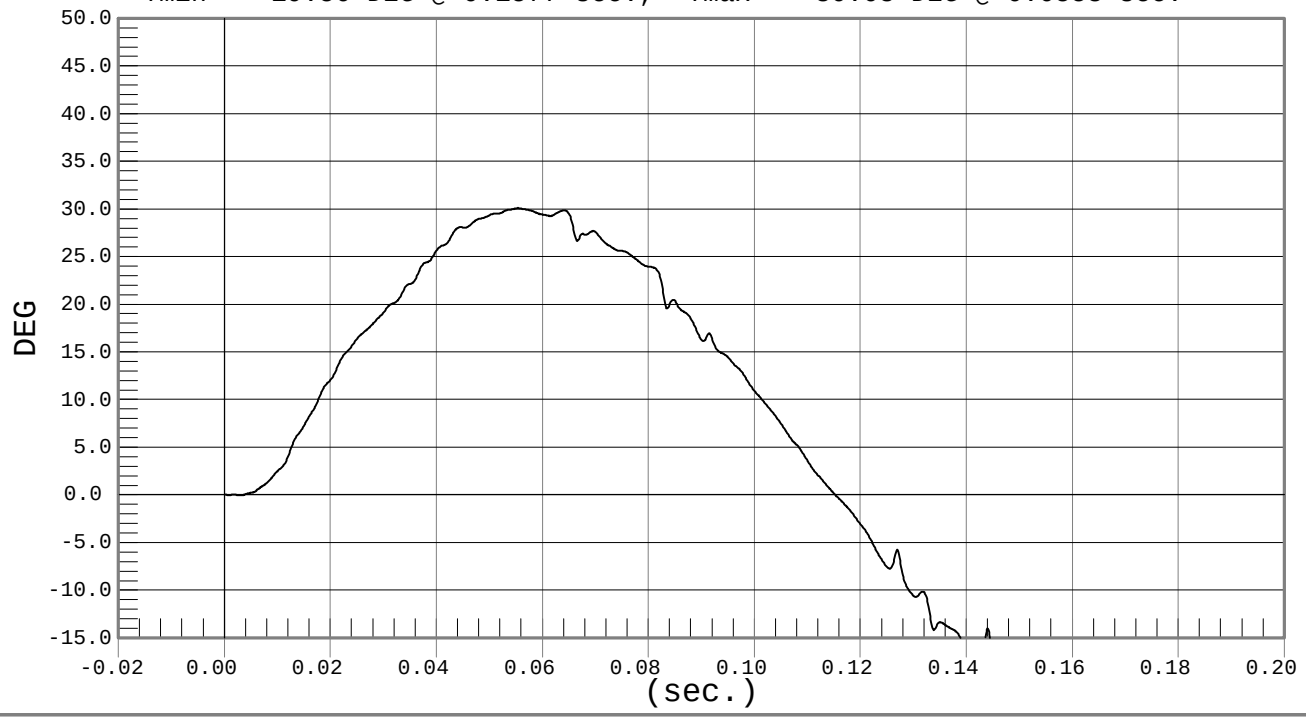


THETA B

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 05-03-05
Speed: 11.4 fps, 3.48 M/s

Ymin = -19.56 DEG @ 0.1577 sec., Ymax = 30.08 DEG @ 0.0553 sec.



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

EUROSID 2 DUMMY

Date: 5/3/05

Dummy Serial Number: 009

Test Number: D051183

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.4
Relative Humidity (%)	10 – 70	22
Pendulum Speed	4.2 – 4.4 m/s	4.4
Max. Resultant Acceleration	7.5 – 10.5 g's	10.2
Time of Max. Pendulum Acceleration	msec	53.6

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

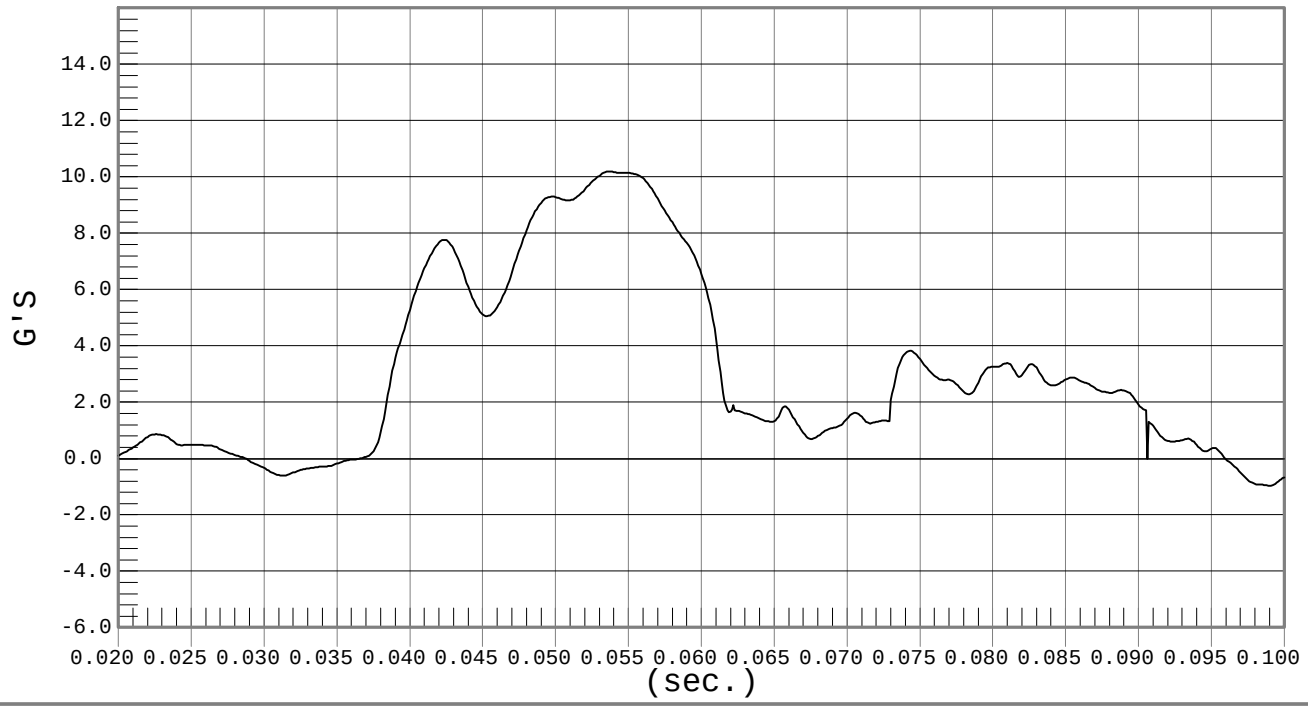
Approved By: David Winkelbauer

SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #009

Test Date: 05-03-05
Speed: 14.3 fps, 4.35 M/s

Ymin = -1.52 G'S @ 0.1530 sec., Ymax = 10.19 G'S @ 0.0536 sec.



MGA RESEARCH CORPORATION

UPPER/MIDDLE/LOWER RIB TESTS

EUROSID 2 DUMMY

Date: 5/2/05

Dummy Serial Number: 009

Test Number: D051184, D051185, D051186

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.4
Relative Humidity (%)	10 – 70	23
Displacement at 2 m/s	23.5 – 27.5 mm	26.7
Displacement at 3 m/s	36.0 – 40.0 mm	37.9
Displacement at 4 m/s	46.0 – 51.0 mm	48.6

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.4
Relative Humidity (%)	10 – 70	23
Displacement at 2 m/s	23.5 – 27.5 mm	26.4
Displacement at 3 m/s	36.0 – 40.0 mm	37.7
Displacement at 4 m/s	46.0 – 51.0 mm	48.5

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.4
Relative Humidity (%)	10 – 70	23
Displacement at 2 m/s	23.5 – 27.5 mm	26.6
Displacement at 3 m/s	36.0 – 40.0 mm	38.4
Displacement at 4 m/s	46.0 – 51.0 mm	49.5

TEST MEETS SPECIFICATIONS

Technician: Jessica Gall

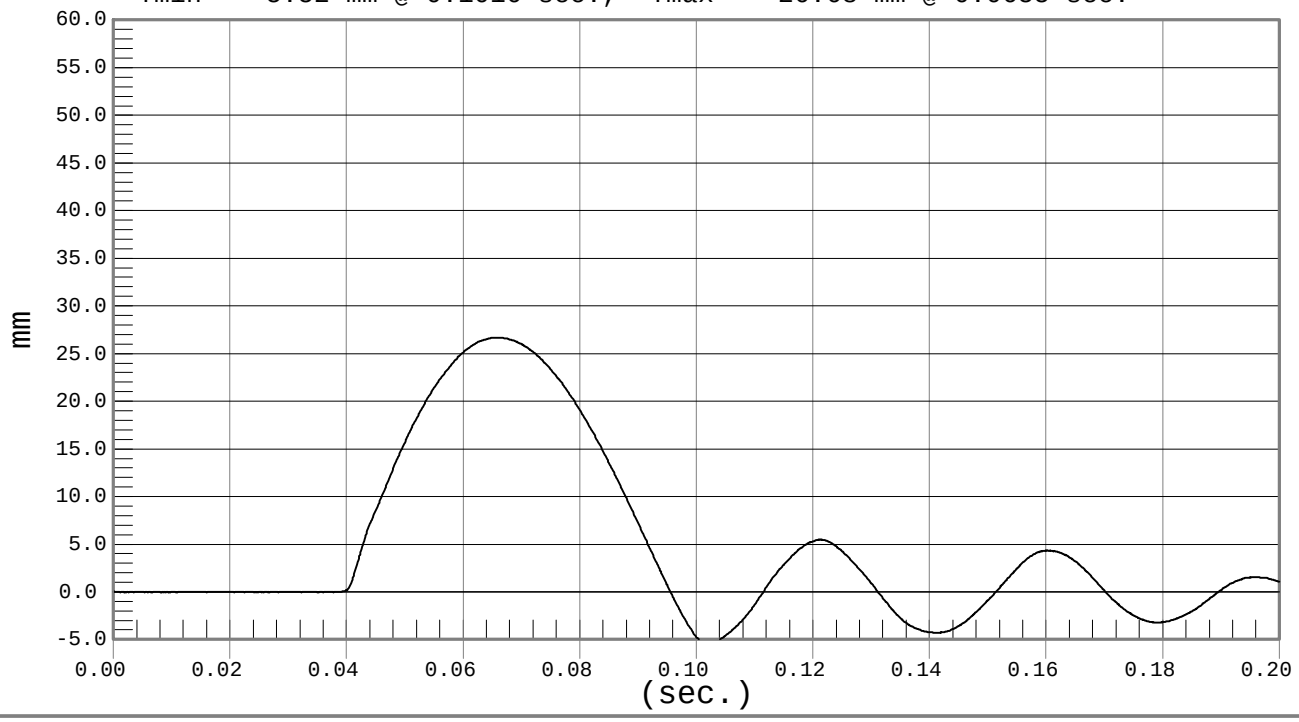
Approved By: David Winkelbauer

UPPER RIB DISPLACEMENT

Test Desc.: Rib Displacement
Component: Dummy #009

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

Ymin = -5.52 mm @ 0.1016 sec., Ymax = 26.68 mm @ 0.0655 sec.

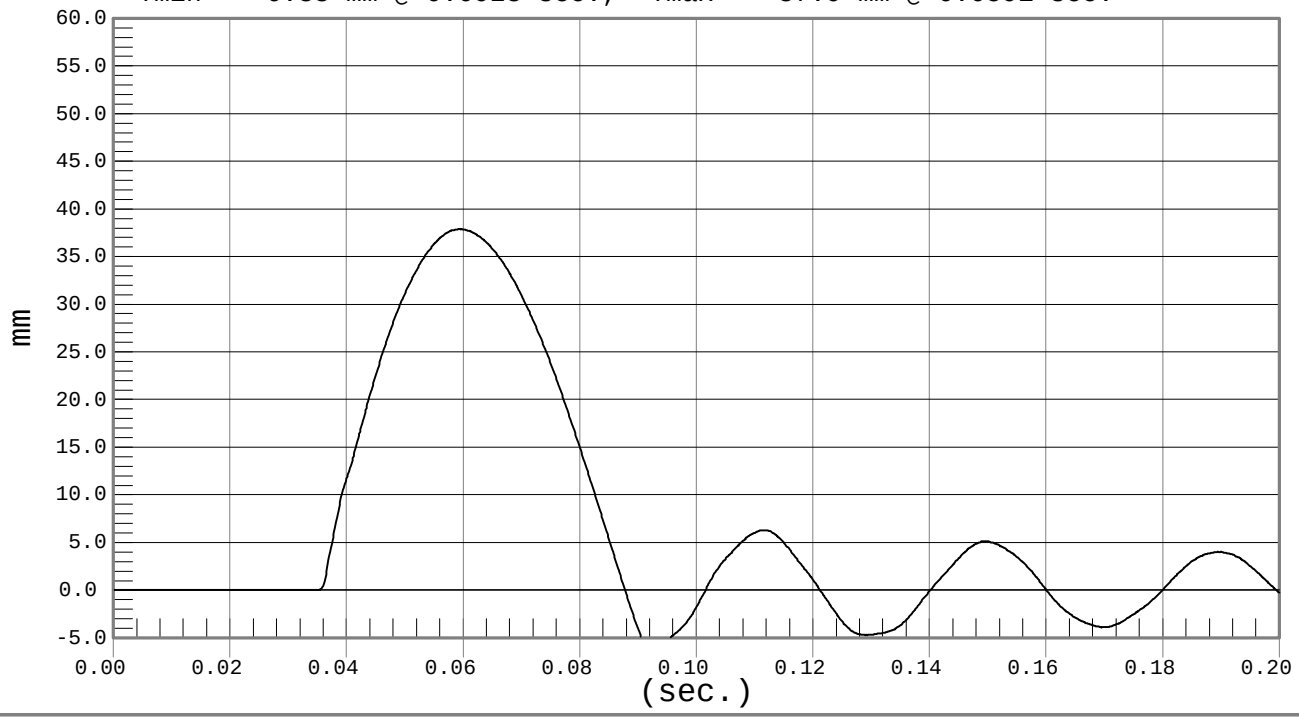


UPPER RIB DISPLACEMENT

Test Desc.: Rib Displacement
Component: Dummy #009

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

Ymin = -6.38 mm @ 0.0923 sec., Ymax = 37.9 mm @ 0.0591 sec.

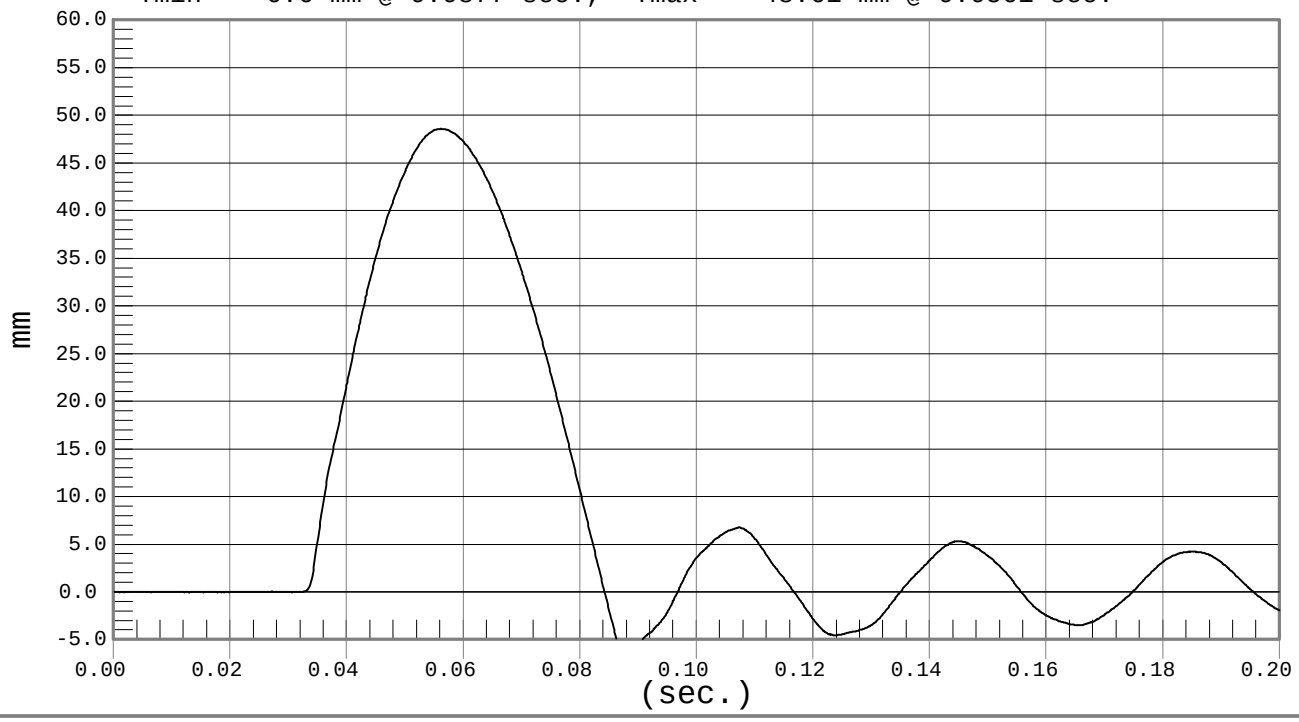


UPPER RIB DISPLACEMENT

Test Desc.: Rib Displacement
Component: Dummy #009

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

Ymin = -6.6 mm @ 0.0877 sec., Ymax = 48.61 mm @ 0.0561 sec.

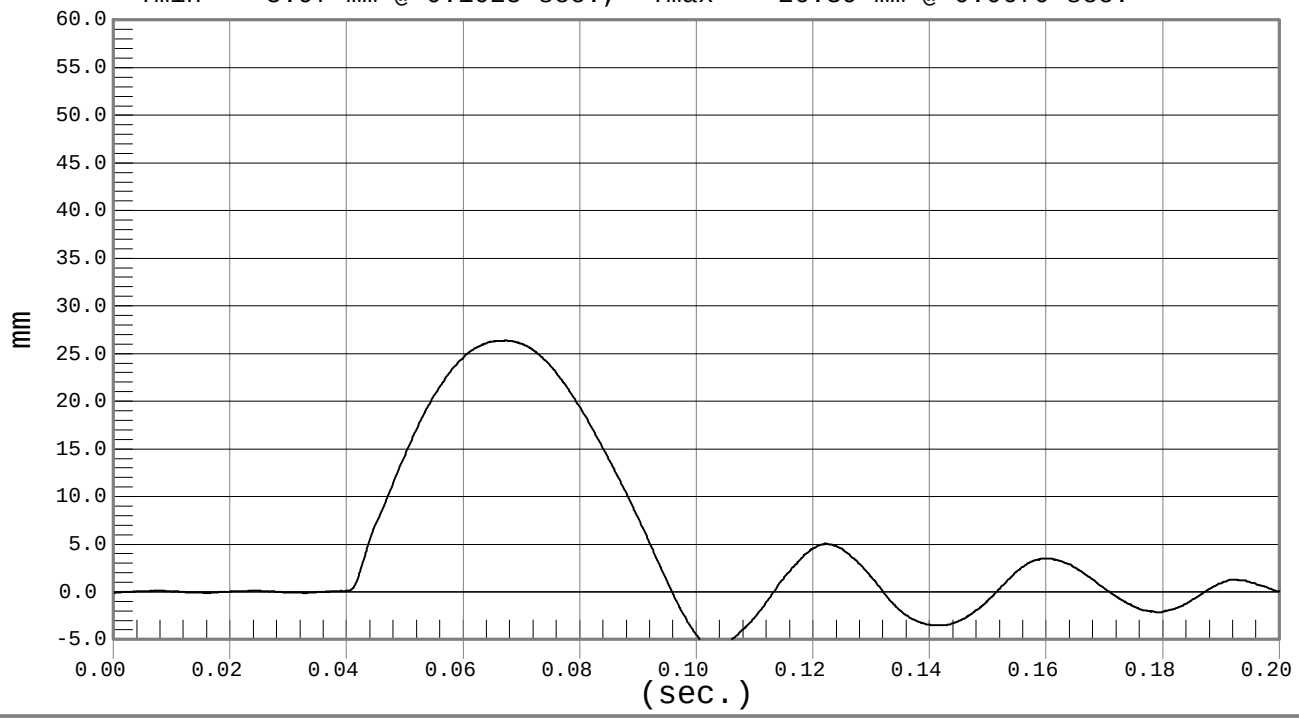


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Displacement
Component: Dummy #009

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

Ymin = -5.97 mm @ 0.1025 sec., Ymax = 26.39 mm @ 0.0670 sec.

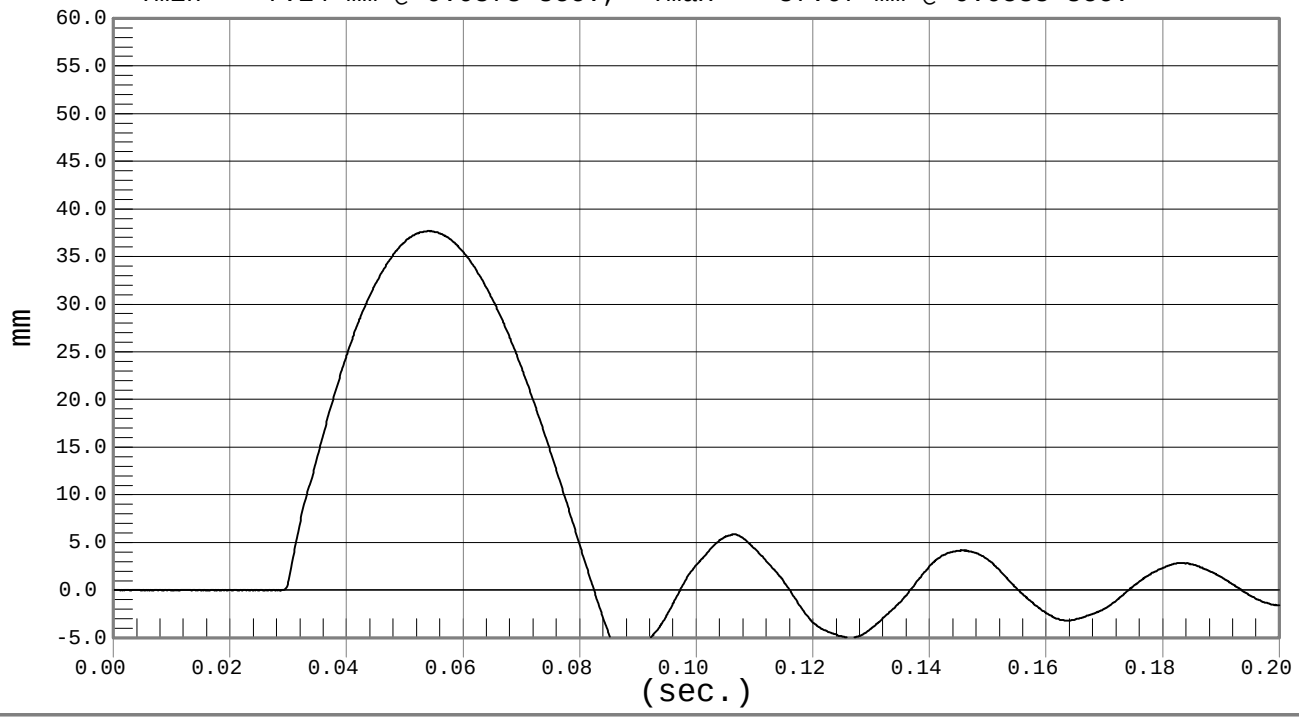


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Displacement
Component: Dummy #009

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

Ymin = -7.14 mm @ 0.0873 sec., Ymax = 37.67 mm @ 0.0538 sec.

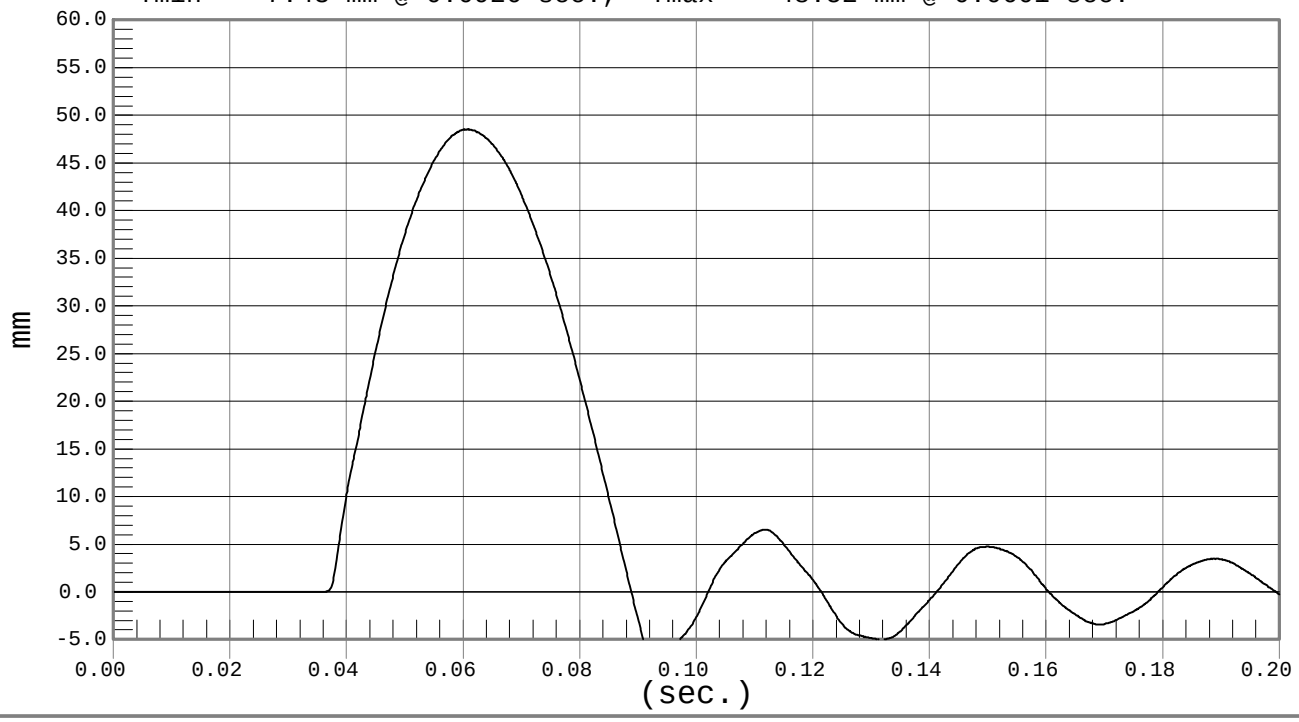


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Displacement
Component: Dummy #009

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

Ymin = -7.43 mm @ 0.0926 sec., Ymax = 48.52 mm @ 0.0601 sec.

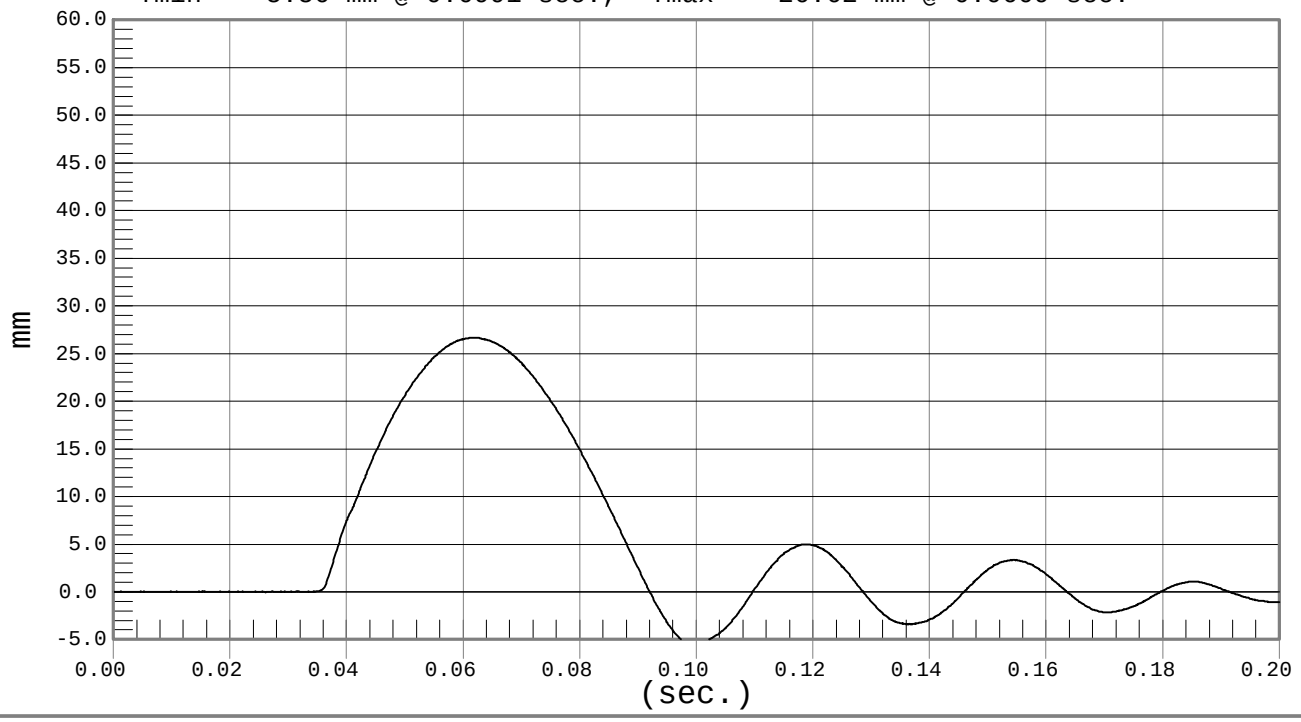


LOWER RIB DISPLACEMENT

Test Desc.: Rib Displacement
Component: Dummy #009

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

Ymin = -5.56 mm @ 0.0991 sec., Ymax = 26.62 mm @ 0.0609 sec.

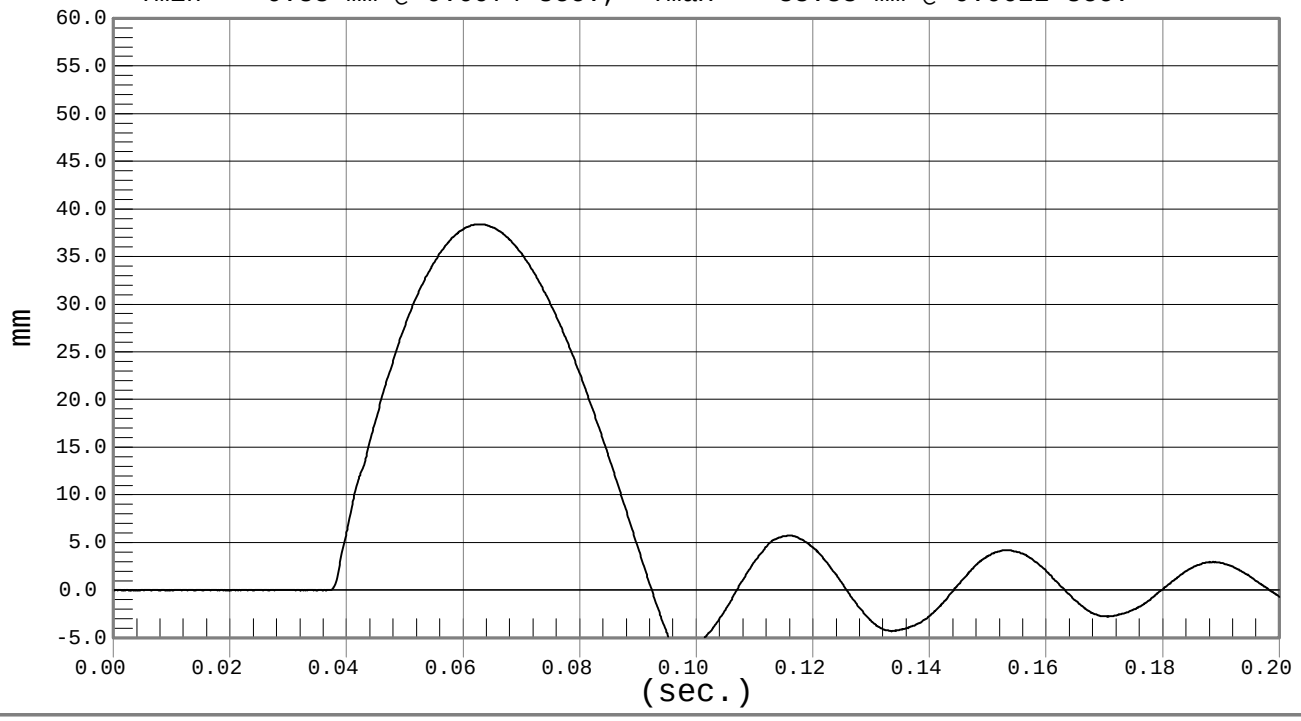


LOWER RIB DISPLACEMENT

Test Desc.: Rib Displacement
Component: Dummy #009

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

Ymin = -6.88 mm @ 0.0974 sec., Ymax = 38.38 mm @ 0.0622 sec.

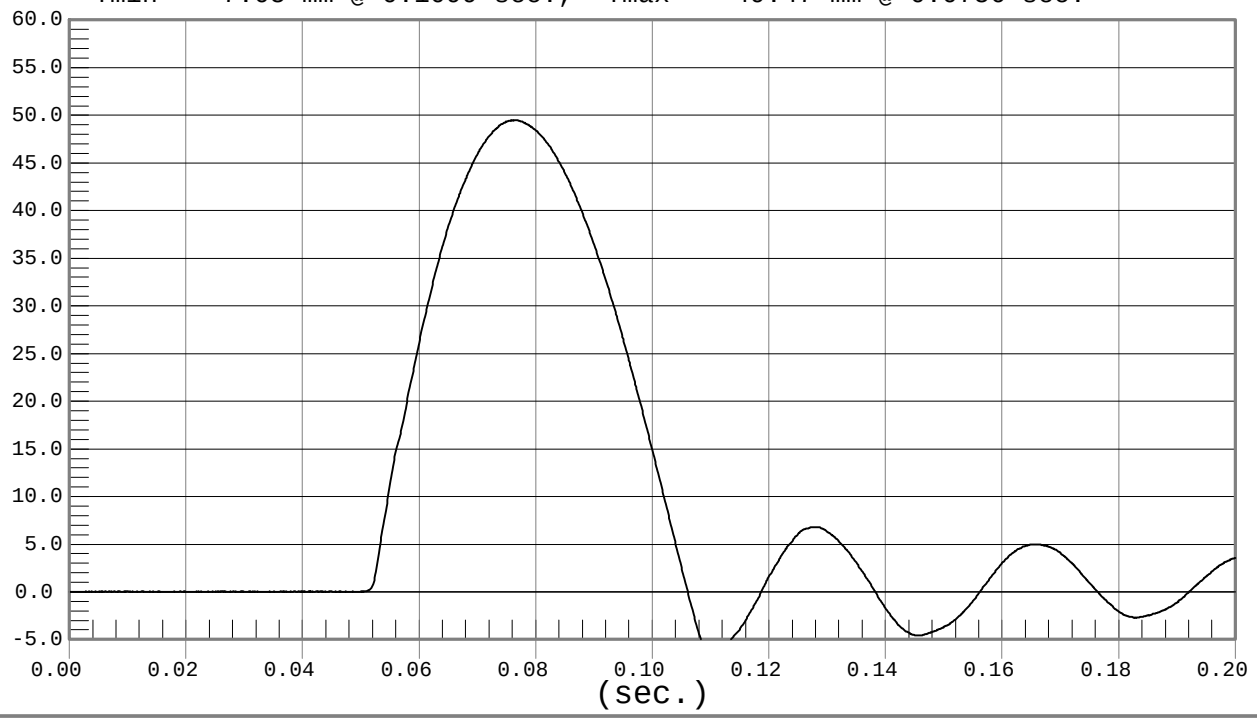


LOWER RIB DISPLACEMENT

Test Desc.: Rib Displacement
Component: Dummy #009

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

Ymin = -7.05 mm @ 0.1099 sec., Ymax = 49.47 mm @ 0.0756 sec.



MGA RESEARCH CORPORATION

ABDOMEN TEST

EUROSID 2 DUMMY

Date: 5/3/05

Dummy Serial Number: 009

Test Number: D051187

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.8
Relative Humidity (%)	10 – 70	22
Probe Speed (m/s)	3.90 – 4.10	4.08
Maximum Impact Force	4.00 – 4.80 kN	4.48
Time of Maximum Force	10.60 – 13.00 ms	10.70
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.21
Time of Max. Total Force	10.00 – 12.30 ms	10.40

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

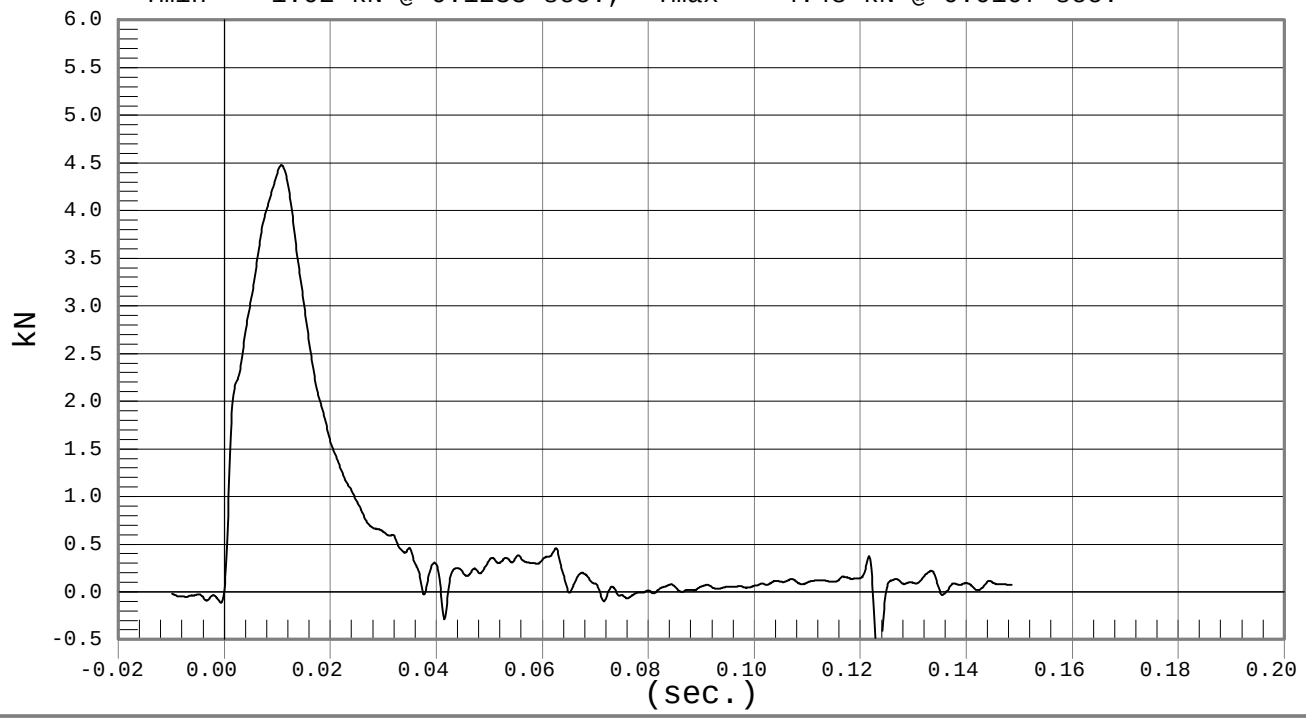
Approved By: David Winkelbauer

IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 05-03-05
Speed: 13.4 fps, 4.08 M/s

Ymin = -1.02 kN @ 0.1233 sec., Ymax = 4.48 kN @ 0.0107 sec.

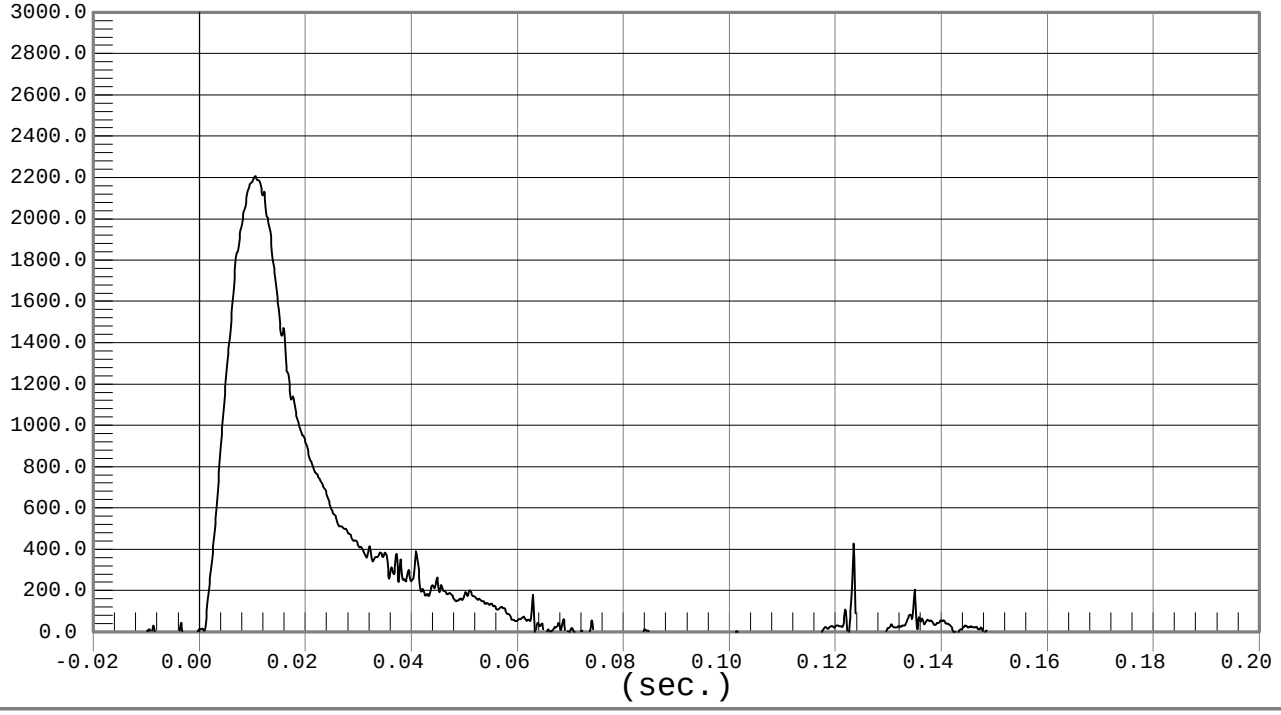


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 05-03-05
Speed: 13.4 fps, 4.08 M/s

Ymin = -71.29 N @ 0.1094 sec., Ymax = 2206.7 N @ 0.0104 sec.



MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

EUROSID 2 DUMMY

Date: 5/3/05

Dummy Serial Number: 009

Test Number: D051188

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	20.7
Relative Humidity (%)		10 – 70	22
Pendulum Speed		5.95 – 6.15	6.15
Pendulum Deceleration	10 msec	-2.46 - -1.59 m/sec	-2.28
	20 msec	-5.25 - -4.07 m/sec	-5.17
	25 msec	-6.64 - -5.30 m/sec	-6.11
	30 msec	≥ -6.5 m/sec	-6.14
Maximum Flexion Angle		45.0 – 55.0 deg	54.6
Time of Max. Flexion Angle		39.0 – 53.0 ms	45.5
Maximum Angle Theta (A)		31.0 – 35.0 deg	33.7
Time of Max. Theta (A)		44.0 – 52.0 ms	45.2
Maximum Angle Theta (B)		28.9 – 31.5 deg	30.9
Time of Max. Theta (B)		44.0 – 52.0 ms	47.3

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

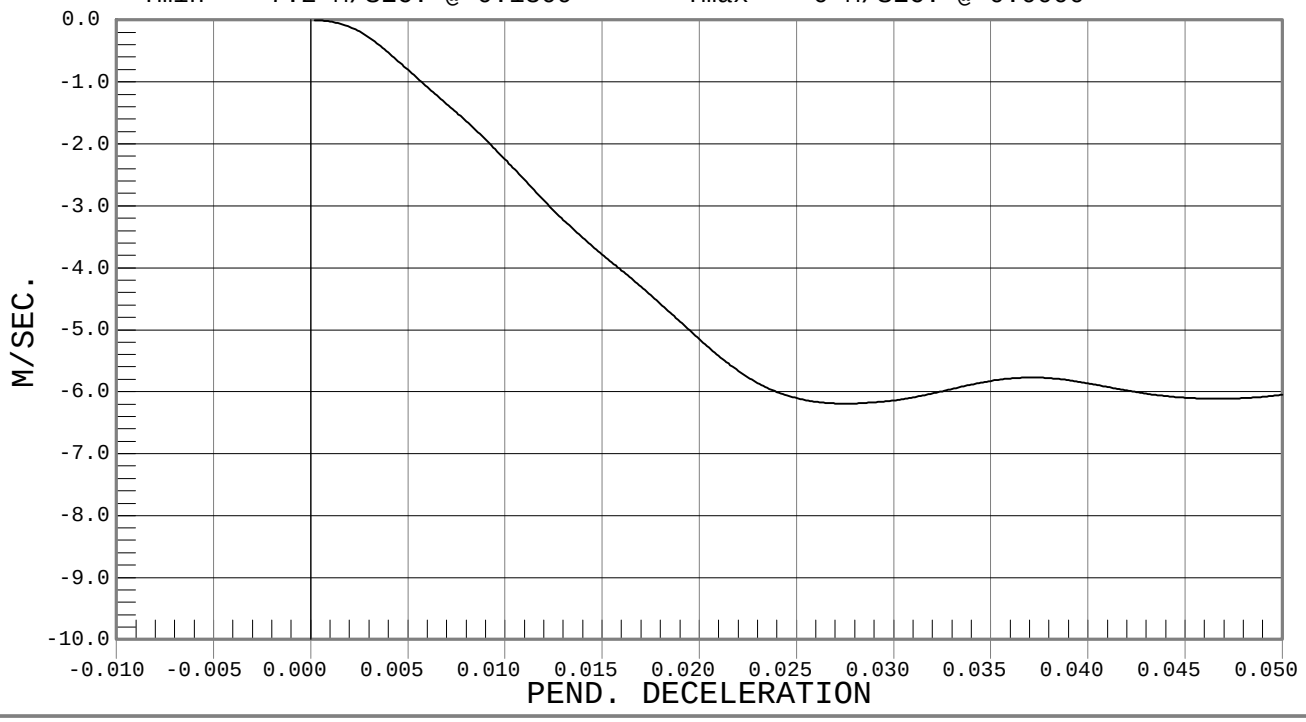
Approved By: David Winkelbauer

PENDULUM DECELERATION

Test Desc.: Lumbar Bending
Component: Dummy #009

Test Date: 05-03-05
Speed: 20.2 fps, 6.15 M/s

Ymin = -7.2 M/SEC. @ 0.1309 Ymax = 0 M/SEC. @ 0.0000

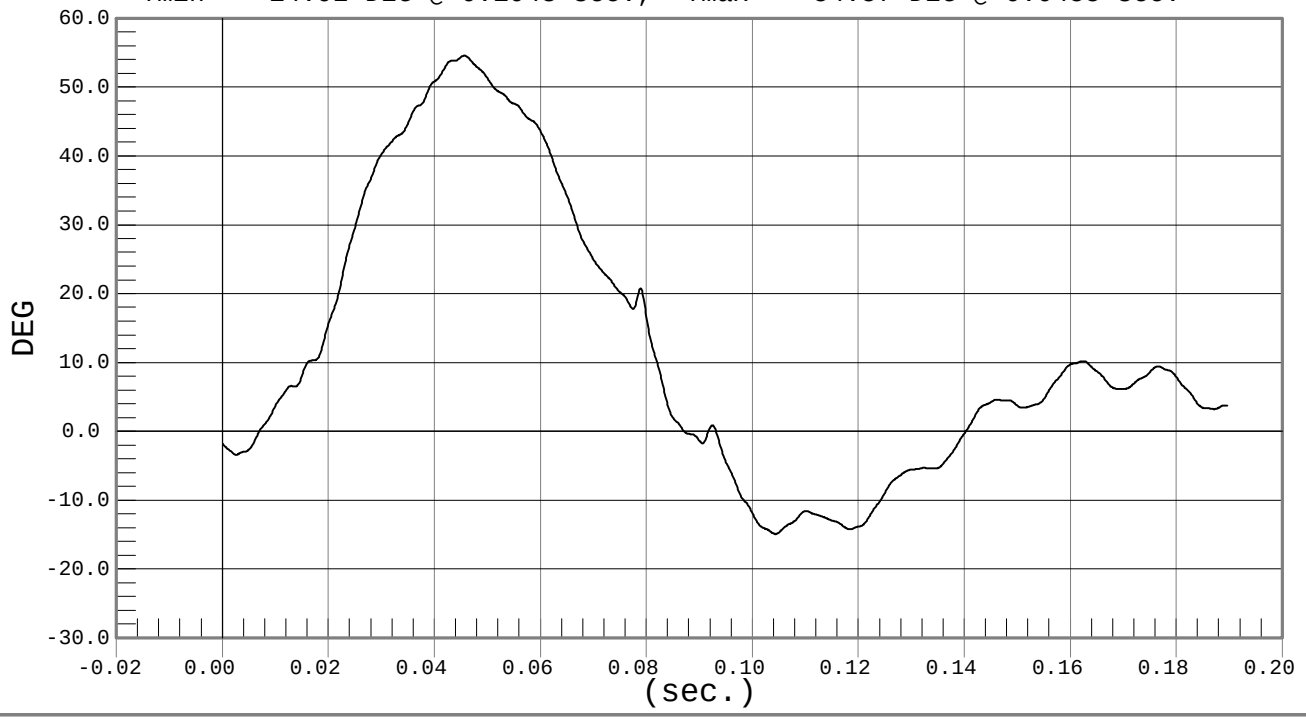


FLEXION ANGLE

Test Desc.: Lumbar Bending
Component: Dummy #009

Test Date: 05-03-05
Speed: 20.2 fps, 6.15 M/s

Ymin = -14.92 DEG @ 0.1043 sec., Ymax = 54.57 DEG @ 0.0455 sec.

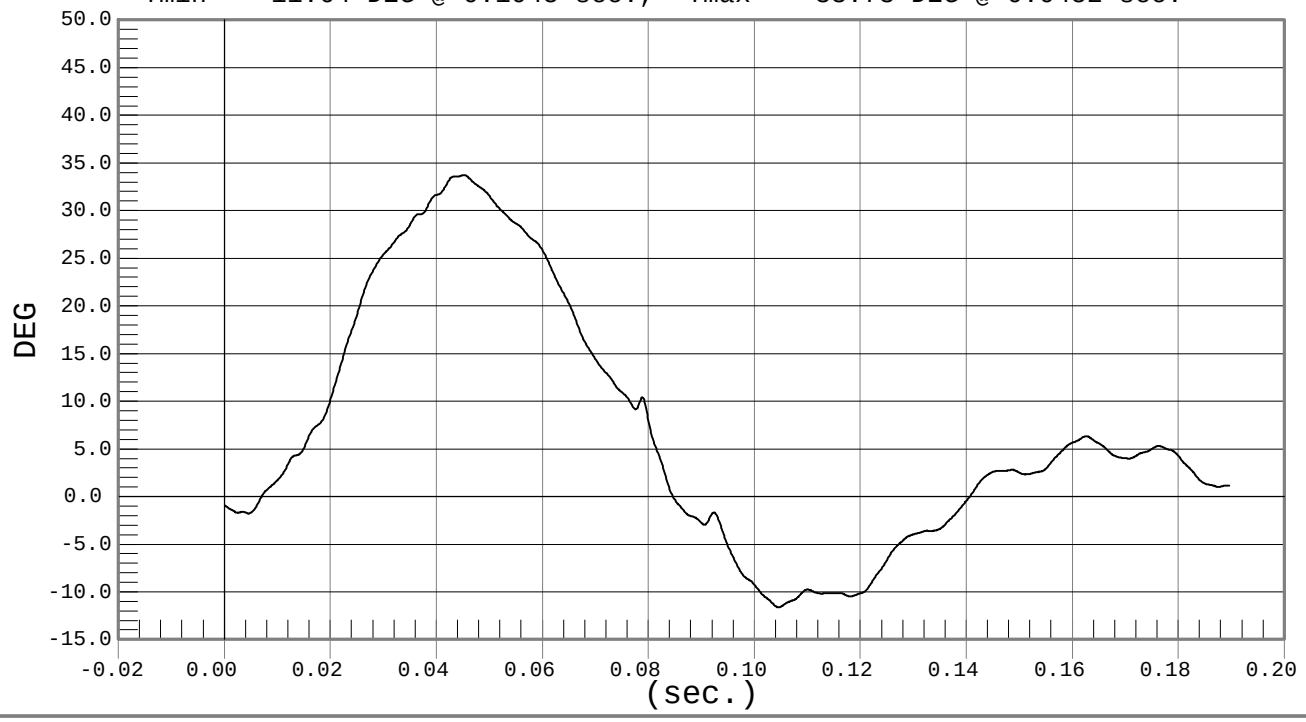


THETA A

Test Desc.: Lumbar Bending
Component: Dummy #009

Test Date: 05-03-05
Speed: 20.2 fps, 6.15 M/s

Ymin = -11.64 DEG @ 0.1045 sec., Ymax = 33.73 DEG @ 0.0452 sec.

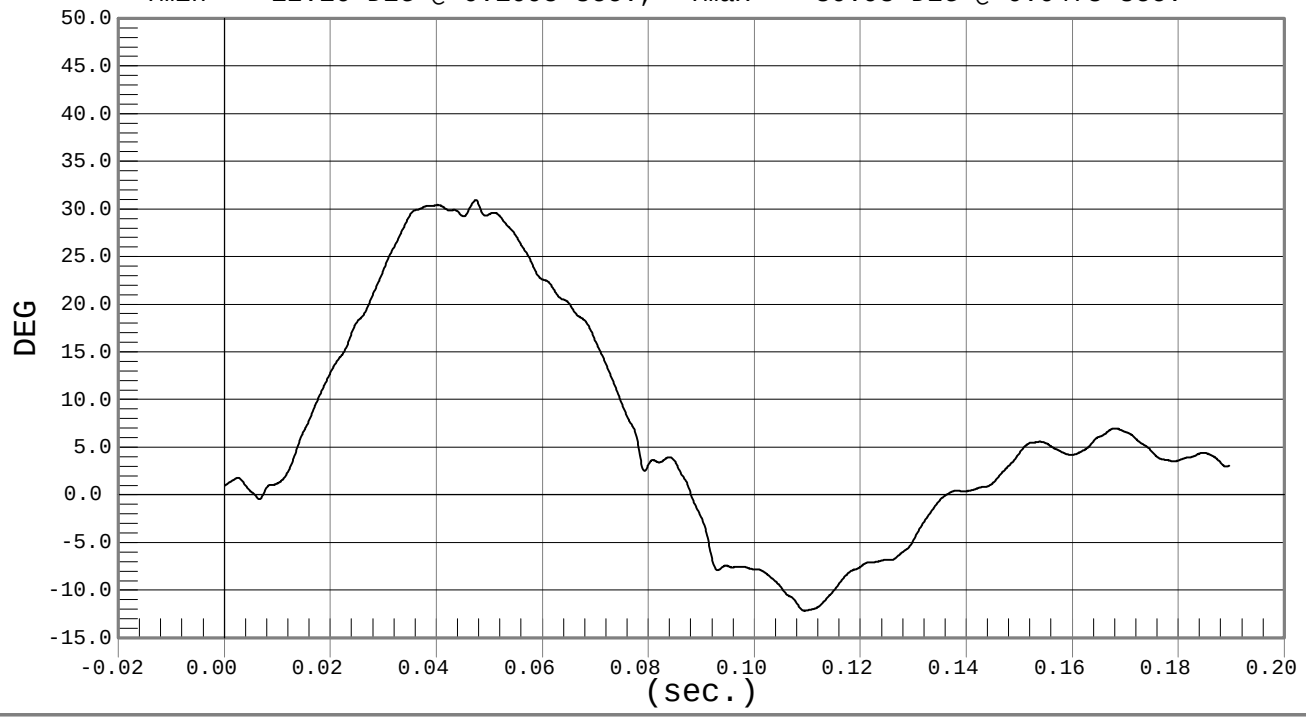


THETA B

Test Desc.: Lumbar Bending
Component: Dummy #009

Test Date: 05-03-05
Speed: 20.2 fps, 6.15 M/s

Ymin = -12.16 DEG @ 0.1095 sec., Ymax = 30.93 DEG @ 0.0473 sec.



MGA RESEARCH CORPORATION

PELVIS TEST

EUROSID 2 DUMMY

Date: 5/3/05

Dummy Serial Number: 009

Test Number: D051189

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.5
Relative Humidity (%)	10 – 70	22
Pendulum Speed	4.20 – 4.40 m/s	4.35
Maximum Impactor Force	4.40 – 5.40 kN	4.69
Time of Max. Impactor Force	10.30 – 15.50 ms	13.60
Maximum Pubic Force	1.04 – 1.64 kN	1.43
Time of Max. Pubic Force	9.90 – 15.90 ms	14.50

TEST MEETS SPECIFICATIONS

Technician: Jessica Hall

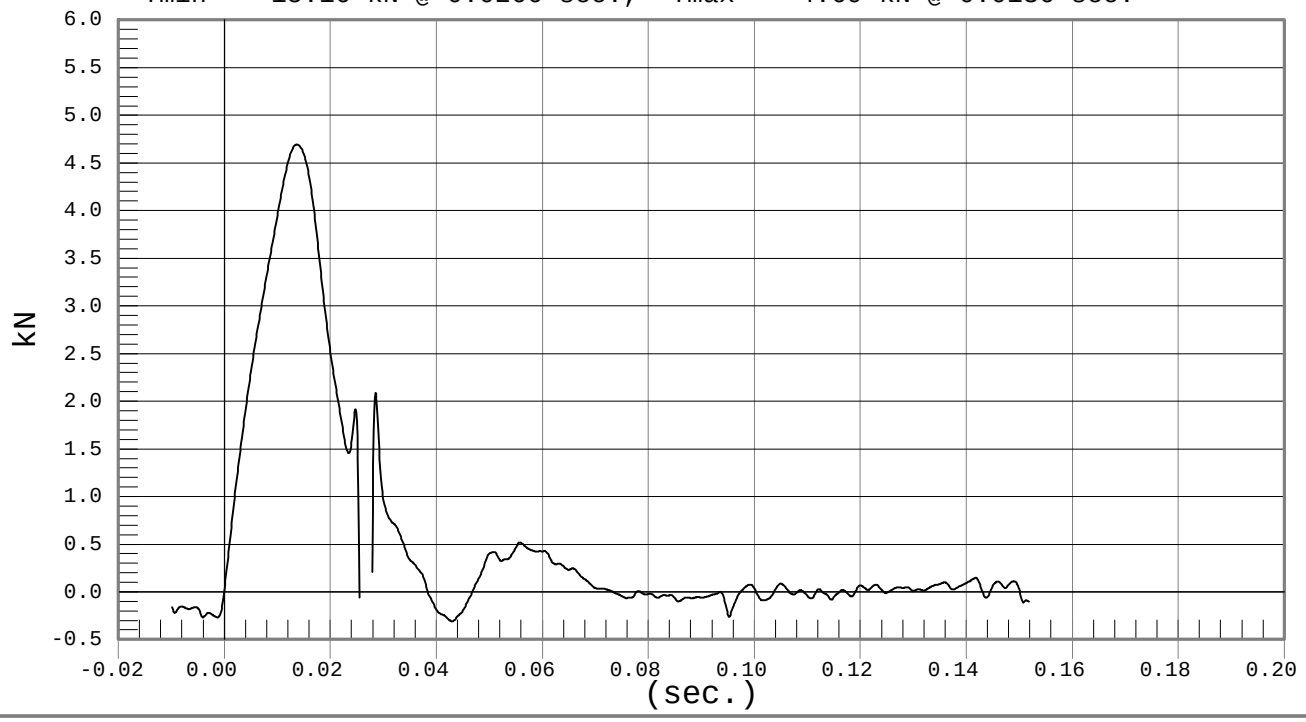
Approved By: David Winkelbauer

IMPACTOR FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 05-03-05
Speed: 14.3 fps, 4.35 M/s

Ymin = -15.16 kN @ 0.0266 sec., Ymax = 4.69 kN @ 0.0136 sec.

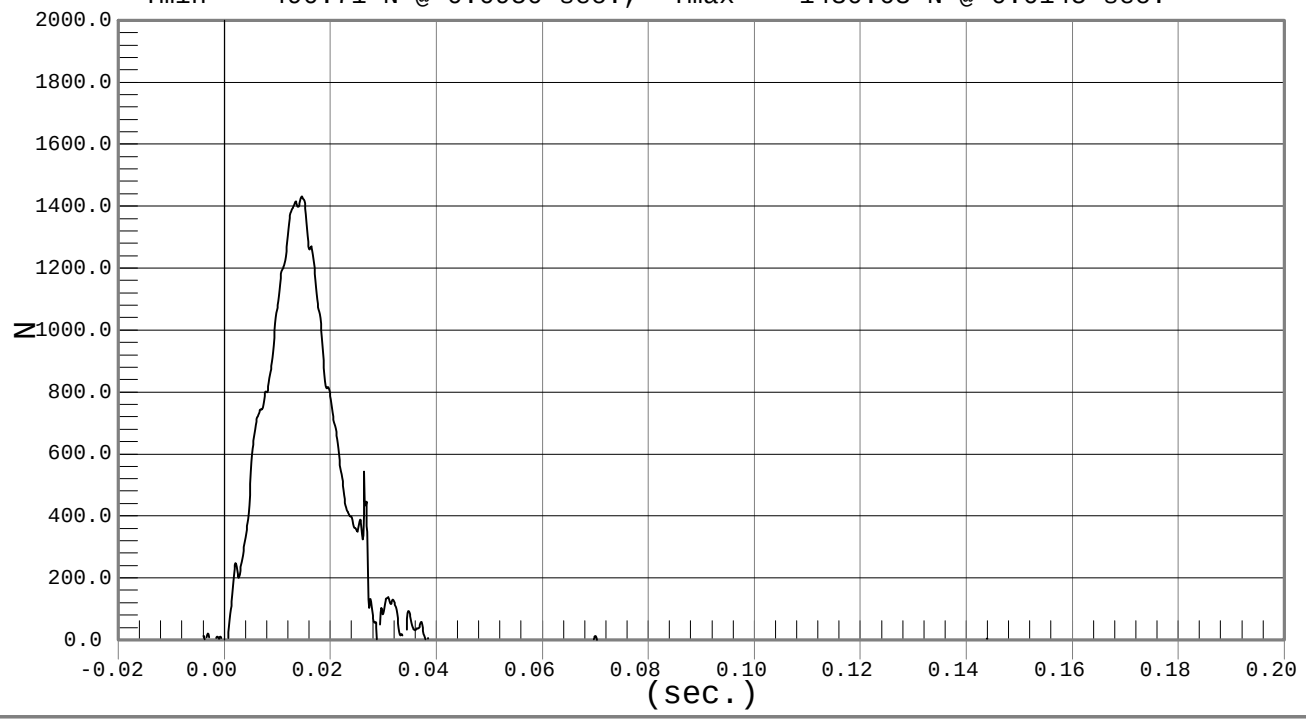


PUBIC FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 05-03-05
Speed: 14.3 fps, 4.35 M/s

Ymin = -490.71 N @ 0.0950 sec., Ymax = 1430.63 N @ 0.0145 sec.



APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY CALIBRATION DATA

	INSTRUMENTS FOR LEFT FRONT DUMMY ES-2RE: 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	Endevco	1/03/05
Lower Spine Y	AJ9D9	Endevco	1/03/05
Lower Spine Z	AJ820	Endevco	1/03/05
Torso Load Cell	102	FTSS	9/29/04
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	C17-J01	Entran	3/11/05
Pelvis Y	A12-Z12	Entran	3/11/05
Pelvis Z	C15-Z02	Entran	3/11/05
Right Femur Load Cell	135	FTSS	9/28/04
Left Femur Load Cell	136	FTSS	9/28/04
Lumbar Load Cell	104	FTSS	9/27/04

VEHICLE INSTRUMENTS CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Mid A-Post Y	L18-N10	Entran	3/09/05
Left Lower A-Post Y	A08-M09	Entran	3/17/05
Left Mid B-Post Y	J23-M10	Entran	12/01/04
Left Lower B-Post Y	L17-D09	Entran	3/09/05
Left A-Post @ Sill Y	C10-Z04	Entran	4/22/05
Left B-Post @ Sill Y	C15-L02	Entran	4/22/05
Driver Seat Track Y	I25-F09	Entran	3/09/05
Right Front Sill X	B16-Z07	Entran	3/03/05
Right Front Sill Y	B19-Z03	Entran	3/03/05
Right Front Sill Z	B16-Z25	Entran	3/03/05
Left Rear Sill Y	C09-Y04	Entran	4/22/05
Left Front Sill Y	C09-Y04	Entran	4/22/05
Floorpan @ Rear Axle X	B23-Z01	Entran	3/24/05
Floorpan @ Rear Axle Y	B16-Z22	Entran	3/24/05
Floorpan @ Rear Axle Z	B28-Z07	Entran	3/17/05
Vehicle CG X	C21-G15	Entran	4/22/05
Vehicle CG Y	C15-L03	Entran	4/22/05
Vehicle CG Z	C20-Z19	Entran	4/22/05
Left Front Door @ Pelvis	J25-R17	Entran	12/01/04
Left Front Door @ Arm	K07-R06	Entran	12/02/04
Left Front Door @ Knee	K20-J09	Entran	3/09/05
Left Front Door @ Mid Rib	J12-Z04	Entran	12/01/04
Upper Engine X	K03-J10	Entran	1/21/05
Upper Engine Y	B16-Z21	Entran	3/03/05
Firewall Y	B28-Z10	Entran	3/17/05