REPORT NUMBER: TO11-MGA-2002-006

FULL SCALE SIDE IMPACT POLE TESTS OF BASELINE VEHICLES

Task Order #T0007 RFP # 0011

SAAB AUTOMOBILE AB
2000 Saab/ 9-5/ 4 Door
NHTSA NUMBER: RY0513

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

TEST DATE: October 24, 2002

FINAL REPORT

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

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TABLE OF CONTENTS

SECTION 1
PURPOSE AND TEST PROCEDURE

This Side Impact test is conducted as part of Contract No. DTRS57-98-D-00041, task order T0007, RFP NO.0011, sponsored by the U.S. Department of Transportation, Volpe National Transportation System Center. The purpose of this test is to evaluate the responses of the ES-2 and SID/HIII dummies in a 2000 Saab/ 9-5/ 4 door, when subjected to a rigid pole side impact at 285 degrees.

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

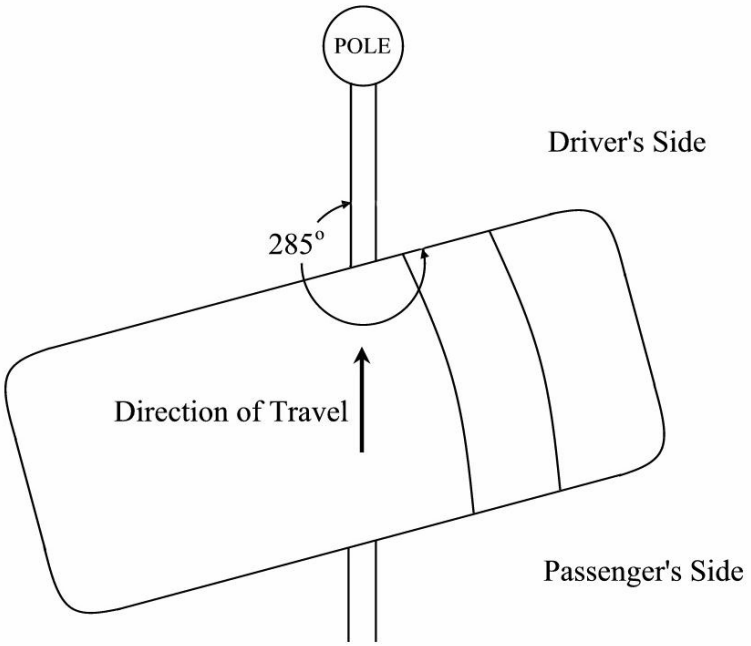
SECTION 2

SUMMARY OF SIDE IMPACT TEST

A rigid pole side impact test at 285 degrees was performed on a 2000 Saab/ 9-5/ 4 door. The subject vehicle was towed into a rigid pole at a velocity of 32.0 km/h. The weight of the vehicle as tested was 1698.8 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on October 24, 2002. Pre- and post-test photographs of the test vehicle and the dummies are included in Appendix A.

One SID/HIII side impact dummy was placed in the left front designated seating position according to instructions specified in the FMVSS 201P Laboratory Test Procedure which is dated April 21, 2000. The side impact event was documented by nine high speed cameras. Camera locations and other pertinent camera information can be found in this report.

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



SECTION 2...continued

SUMMARY OF SIDE IMPACT TEST

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

		Left Front
HIC	T1 (msec)	60.6
	T2 (msec)	61.4
	T2 – T1 (msec)	0.8
	HIC	5155.4

Fir Filtered	Left Front
Upper Rib Y (g's)	106.1
Lower Rib Y (g's)	100.0
Upper Spine Y (g's)	78.9
Lower Spine Y (g's)	75.0
Pelvis Y (g's)	79.2
TTI (g's)	90.5

Contacts	Left Front
Rib (msec)	9.5
Pelvis (msec)	67.4

TEST NOTES

**** Post test it was observed that the side airbag had holes on both the inside and outside. See photos A32, A33 and A34.

SECTION 3

SIDE IMPACT DUMMY (SID/HIII) AND VEHICLE TEST DATA

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

TEST VEHICLE INFORMATION

Make	Saab
Model	9-5
Body Style	4 Door
VIN	YS3EF48Z7Y3004743
Color	Painted Orange
Odometer Reading (mile)	53226
Transmission	4 speed Automatic
Final Drive	Front wheel
Number of Cylinders	6
Engine Placement	lateral

TEST VEHICLE OPTIONS

Front Airbag	Yes
Side Airbags	Seat side
Power Windows	Yes
Power Steering	Yes
Power Door	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	09/99

GVWR (kg)	2091
GAWR Front (kg)	1136
GAWR Rear (kg)	1050

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	273	273
Cold Pressure (kPa)	220	220
Recommended Tire Size	P215/55VR16	P215/55VR16
Tire Size on Vehicle	P215/55VR16	P215/55VR16
Tire Manufacturer	Michelin	Michelin

Measured Parameter	Front	Rear	Third	Total
Type of Seats	bucket	bench		
Number Of Occupants x 68.04 kg.	2	3		5
Capacity Wt. (VCW) (kg)				418.2
Cargo Wt. (RCLW) (kg)				77.3

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	510.0	317.3		544.3	318.0	
Right	kg	492.3	308.6		523.5	313.0	
Ratio	%	61.6	38.4		62.9	37.1	
Totals	kg	1002.3	625.9	1628.2	1067.8	631.0	1698.8

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Calculated Vehicle Target Weight (TVTW)	kg	1698.8

TEST VEHICLE ATTITUDES

	Unit	As Delivered	Fully Loaded	Ready for Test
Right Door Sill Angle	Deg	0.6 ND	0.2 ND	0.6 ND
Left Door Sill Angle	Deg	0.6 ND	0.2 ND	0.6 ND
Front Bumper Angle	Deg	0.9 LD	0.3 LD	0.3 LD
Rear Bumper Angle	Deg	0.2 LD	1.2 LD	0.3 LD

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

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2704
Total Vehicle Length at Left Side	mm	4065
Total Vehicle Length at Centerline	mm	4837
Total Vehicle Length at Right Side	mm	4069
Total Vehicle Width	mm	1790
Weight of Ballast in Cargo Area	kg	0
Amount of water in Fuel Tank	liters	0

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Actual Impact Point	mm	19 Rear

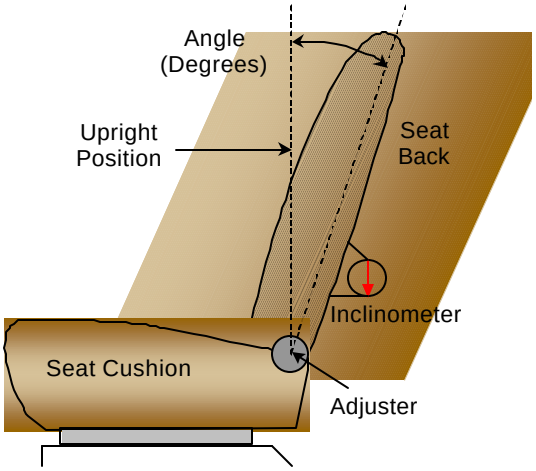
DATA SHEET NO. 1… (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

NORMAL DESIGN RIDING POSITION

Driver seat back angle: 18 degrees



FRONT SEAT ASSEMBLY

SEAT FORE/AFT POSITIONS

The driver's seat is electronically operated.

The fore/aft is set to the middle position for the driver's seat.

Driver seat fore/aft total travel: 280 mm

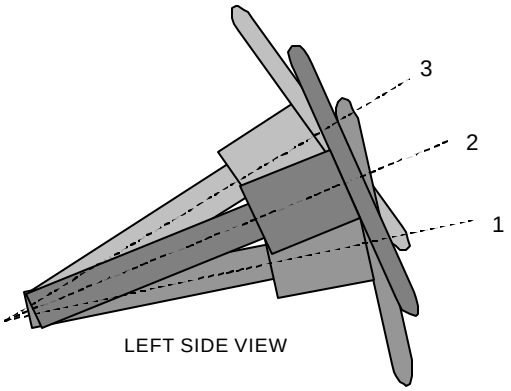
Driver seat fore/aft position: 140 mm

SEAT BELT UPPER ANCHORAGE

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

STEERING COLUMN AD JUSTMENT

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



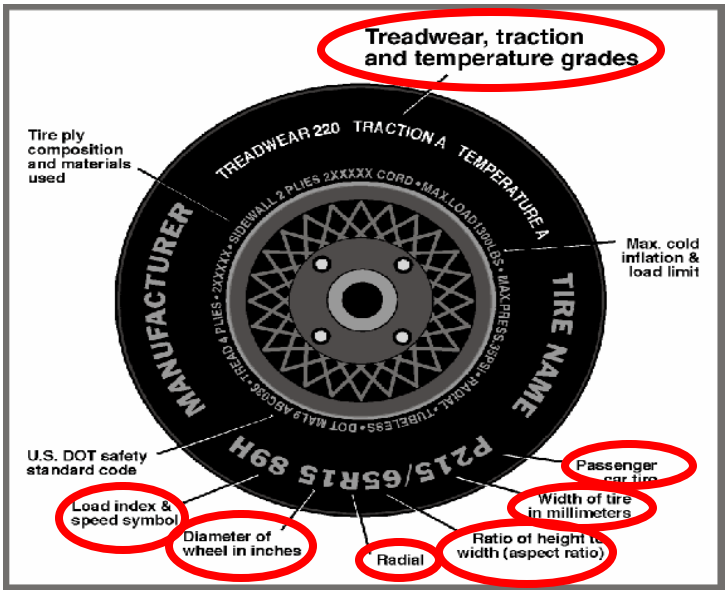
STEERING COLUMN ASSEMBLY

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

Vehicle Year	2000	Vehicle Make	Saab
Vin	YS3EF48Z7Y3004743	Vehicle Model	9-5/ 4 door



	Front	Rear
Tire Manufacturer	Michelin	Michelin
Tire Name	Energy HXV4	Energy HXV4
Tire Type	XSE	XSE
Tire Width (mm)	215	215
Ratio of Height to Width (aspect ratio)	55	55
Radial	Yes	Yes
Wheel Diameter	16	16
Load Index & Speed Symbol	93V	93V
Treadwear	340	340
Traction Grade	A	A
Temperature Grade	A	A

DATA SHEET NO. 3

POST TEST OBSERVATIONS

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front
Dummy Type	SID HIII
Head Contact	Pole/ side bag/ head rest
Upper Torso Contact	Side airbag
Lower Torso Contact	Arm rest
Left Knee Contact	Left door below arm rest
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	None
Sill Separation	None
Windshield Damage	LF windshield breakage
Window Damage	None
Other Notable Effects	None

AIRBAG DEPLOYMENT

	Driver
Front	Yes
Side	Yes
Curtain	None

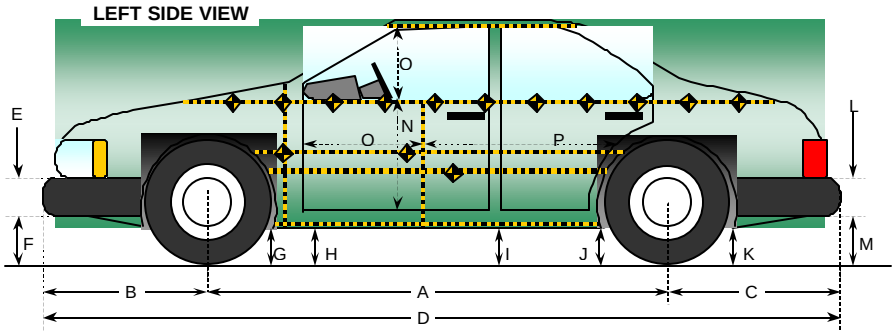
SECTION 4

OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 4

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002



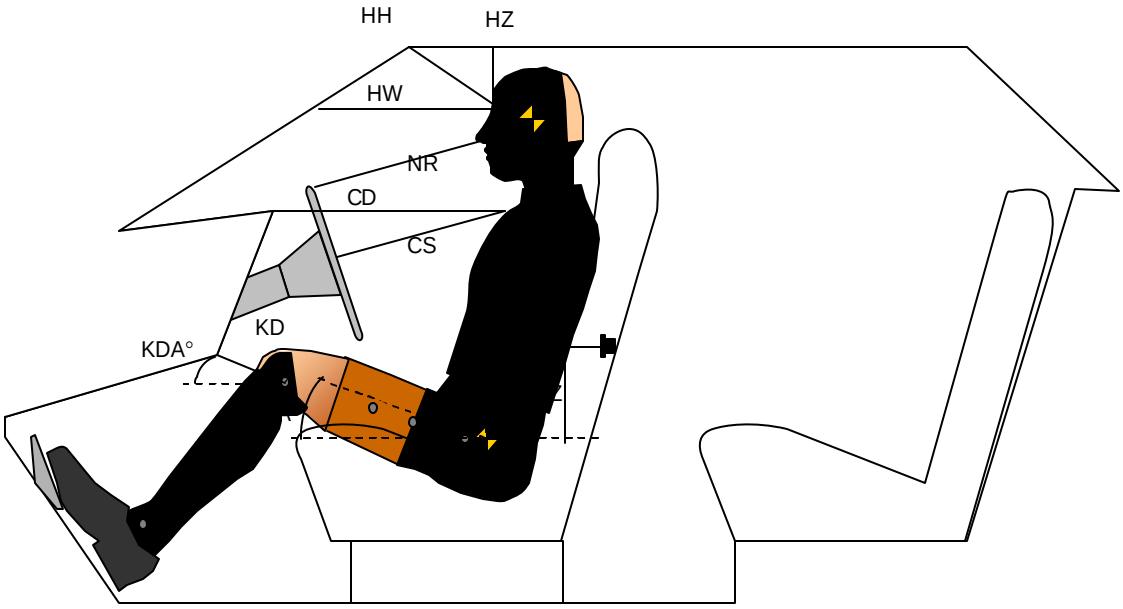
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2704	2521	-183
B	Front Axle to FSOV	1015	1047	32
C	Rear Axle to RSOV	1118	1154	36
D	Total Length at Centerline	4837	4722	-115
E	Front Bumper Thickness	150	150	0
F	Front Bumper Bottom to Ground	498	404	-94
G	Sill Height at Front Wheel Well	291	183	-108
H	Sill Height at Front Door Leading Edge	304	174	-130
I	Sill Height at "B" Pillar	323	179	-144
J1	Sill Height at Rear Wheel Well	322	238	-84
J2	Pinch Weld Height at Rear Wheel Well	335	239	-96
K	Sill Height Aft of Rear Wheel Well	381	321	-60
L	Rear Bumper Thickness	185	185	0
M	Rear Bumper Bottom to Ground	534	460	-74
N	Sill Height to Window Bottom Sill	680	670	-10
O	Front Door Leading Edge to Impact CL	845	705	-140
P	Rear Door Trailing Edge to Impact CL	1118	960	-158
Q	Front Window Opening	465	435	-30
R	Right Side Length	4065	4102	37
S	Left Side Length	4069	3870	-199
T	Vehicle Width at "B" Post	1790	1515	-275

DATA SHEET NO. 5

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

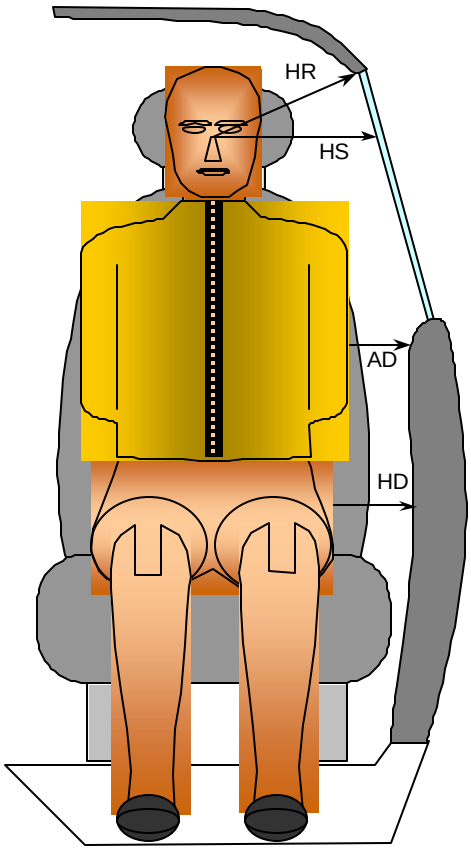


Driver Code	Measurement Description	Left Front	
		Length(mm)	Angle(°)
HH	Head to Header	366	
HW	Head to Windshield	522	
HZ	Head to Roof	149	
NR	Nose to Rim	419	
CD	Chest to Dash	513	
CS	Chest to Steering Wheel	321	
KDL	Left Knee to Dash	248	0
KDR	Right Knee to Dash	237	0
PA	Pelvic Angle (Longitudinal)		24.4
PHX	H-Point to Striker (X-Axis)	193	
PHZ	H-Point to Striker (Z-Axis)	106	

DATA SHEET NO. 6

SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002



FRONT VIEW OF DUMMY

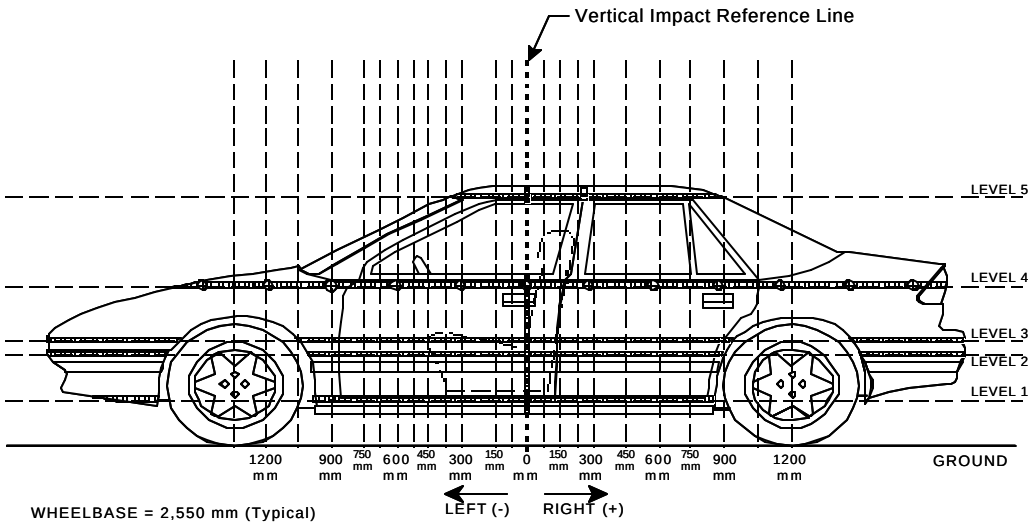
Code	Measurement Description	Units	Left Front
HR	Head to Side Header	mm	211
HS	Head to Side Window	mm	312
AD	Arm to Door	mm	120
HD	H-Point to Door	mm	162

DATA SHEET NO. 7

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

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	1482
4	Window Sill	999
3	Mid Door	727
2	Occupant H-Point	654
1	Sill Top	919

DATA SHEET NO. 8

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1950															
-1800															
-1650				320					378					58	
-1500				302					380					78	
-1350				290					384					94	
-1200				279					394					115	
-1050			222	272				371	403				149	131	
-900	251	224	224	266		434	410	404	423		183	186	180	157	
-825	252	225	224	264		448	436	427	439		196	211	203	175	
-750	253	224	223	263		520	477	468	469		267	253	245	206	
-675	254	223	221	263		554	509	508	498		300	286	287	235	
-600	255	222	220	261		591	550	550	535		336	328	330	274	
-525	256	221	219	260		626	597	596	584		370	376	377	324	
-450	257	220	218	260		662	648	643	634		405	428	425	374	
-375	258	220	217	259		706	701	696	688		448	481	479	429	
-300	259	220	217	259		751	757	750	748		492	537	533	489	
-225	260	220	216	259		798	811	798	793		538	591	582	534	
-150	261	220	216	258	507	851	860	849	843	850	590	640	633	585	343
-75	262	220	216	258	506	886	893	889	888	892	624	673	673	630	386
0	262	219	215	258	505	892	908	909	913	931	630	689	694	655	426
75	262	218	215	259	505	858	877	881	889	905	596	659	666	630	400
150	262	218	215	260	507	797	812	815	834	863	535	594	600	574	356
225	263	219	215	260	507	739	752	748	767	833	476	533	533	507	326
300	263	220	215	263	509	694	672	673	723	805	431	452	458	460	296
375	263	220	217	264	513	640	633	635	695	805	377	413	418	431	292
450	262	220	218	266	513	589	587	588	662	778	327	367	370	396	265
600	259	220	218	271	513	507	511	520	604	742	248	291	302	333	229
750	257	221	220	276	517	441	448	464	554	710	184	227	244	278	193
900	255	222	222	282	523	383	400	412	503	685	128	178	190	221	162
1050		223	226	290	527		367	366	457	658		144	140	167	131
1200				299	537				415	658				116	121
1350				309					425					116	
1500				318					420					102	
1650			255	332				341	413				86	81	
1800			281	348				349	408				68	60	
1950			302	365				344	400				42	35	
2100				386					396					10	

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

DATA SHEET NO. 8 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

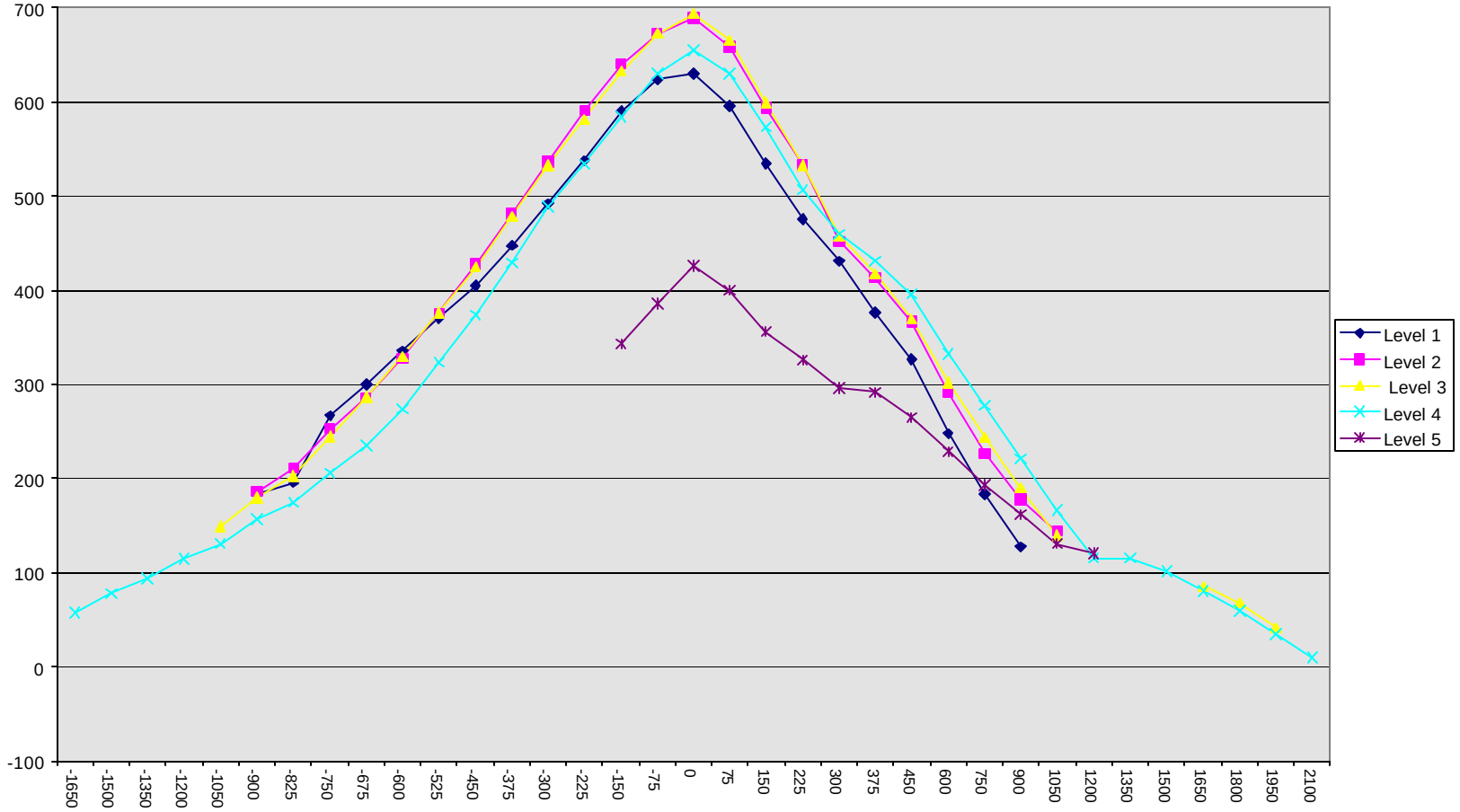
	Pre Test Level 6	Post Test Level 6	Difference at Level 6
-2100	1080	1082	2
-1950	1080	1073	-7
-1800	1079	1065	-14
-1650	1079	1053	-26
-1500	1077	1040	-37
-1350	1078	1032	-46
-1200	1079	1023	-56
-1050			
-975			
-900			
-825			
-750			
-675			
-600			
-525			
-450			
-375			
-300	1084	965	-119
-225	1083	964	-119
-150	1082	964	-118
-75	1081	965	-116
0	1081	963	-118
75	1080	961	-119
150	1078	964	-114
225	1076	964	-112
300	1076	965	-111
375	1073	967	-106
450	1075	980	-95
525			
600	1073	989	-84
750	1073	995	-78
900	1074	1000	-74
1050	1074	1006	-68
1200	1077	1011	-66
1350			
1500			
1650			
1800			
1950			
2100	1080	1077	-3

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

DATA SHEET NO. 8... (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

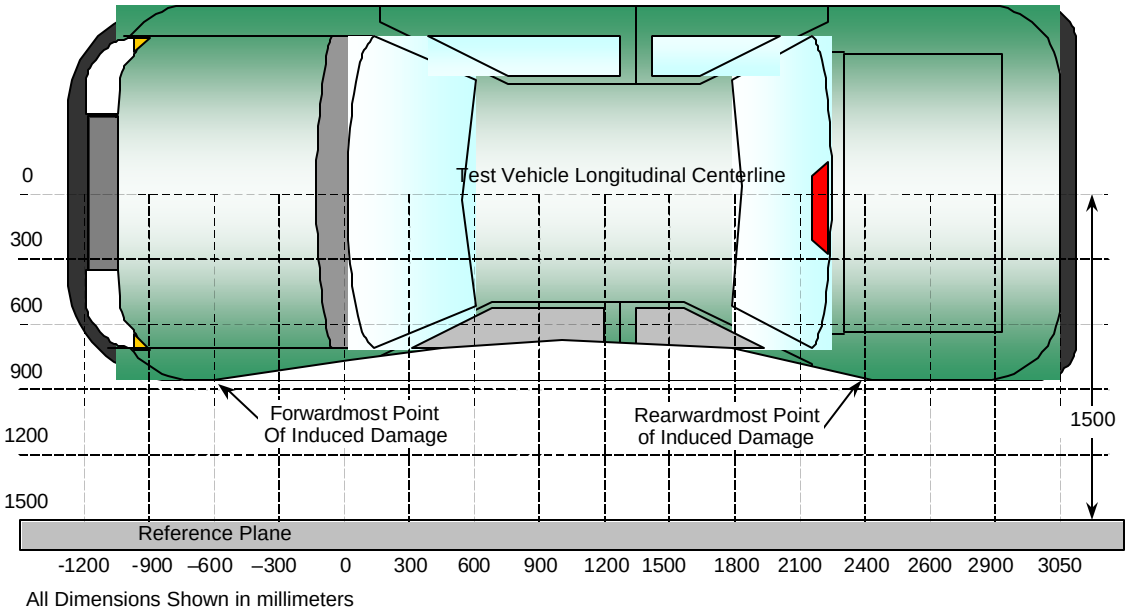


Measurement in mm.

DATA SHEET NO. 9

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002



TOP VIEW

Damage Profile Distances

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2250 mm	4	420	418	-2
2	1500 mm	4	318	367	49
3	780 mm	4	277	468	191
4	0 mm	3	215	791	576
5	-900 mm	2	224	337	113
6	-1650 mm	4	320	352	32

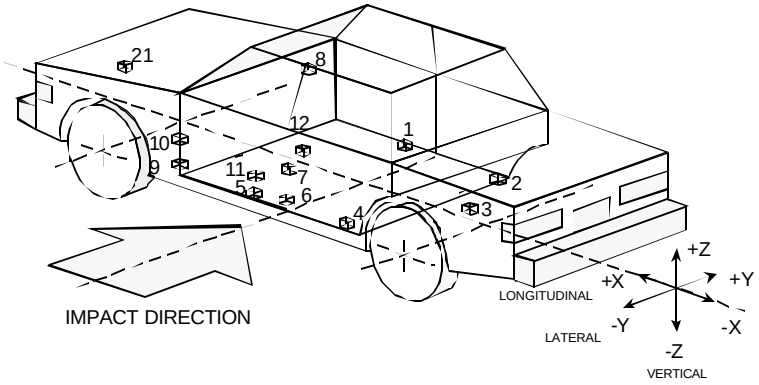
Reference plane is parallel to test vehicle longitudinal centerline.

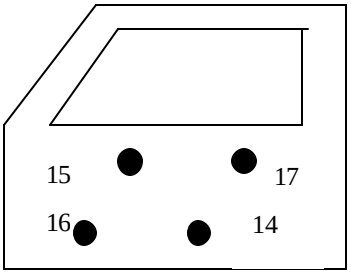
Given dimensions = Reference plane to car body.

DATA SHEET NO. 10

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002





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

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

DATA SHEET NO. 10... (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

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	1.1	-2.9	11.0	-0.2	8.1	-4.1	13.4
2	Right Side Sill at Rear Seat	2.5	-1.9	12.0	-0.3	4.9	-2.1	12.4
3	Rear Floorpan Above Axle	2.5	-3.2	13.0	-0.4	3.4	-3.7	13.3
4	Left Side Sill at Rear Door			14.4	-0.7			
5	Left Side Sill at Front Door*			24.6	-0.2			
6	Left Lower B-Post			43.9	-0.9			
7	Left Mid B-Post							
8	Left Upper B-Post			59.7	-6.0			
9	Left Lower A-Post			18.9	-1.8			
10	Left Mid A-Post			15.4	-1.1			
11	Driver Left Seat Track*			13.8	-4.1			
12	Vehicle CG	1.2	-3.8	21.3	-5.3	8.2	-5.2	21.6
13	Left A- Pillar at Roof			53.0	-3.0			
14	Left Front Door at Pelvis			109.7	-56.1			
15	Left Front Door at Arm			86.3	-23.3			
16	Left Front Door at Knee							
17	Left Front Door at Rib							
19	Left Driver Seat Frame							
20	Right Driver Seat Frame							
21	Lower Center Radiator Support	1.4	-6.0	7.7	-2.9	2.3	-5.3	8.0

*= QD after 20 msec.

Sign Convention X - Test Vehicle Rear Bumper (+ forward)
Y - Test Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

DATA SHEET NO. 10... (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002

VEHICLE ACCELEROMETER COORDINATES

Loc. No.	Description	Coordinates (mm)		
		X	Y	Z
1	Right Side Sill at Front Seat	2492	675	227
2	Right Side Sill at Rear Seat	1872	675	244
3	Rear Floorpan Above Axle	1097	10	544
4	Left Side Sill at Rear Door	1488	-675	236
5	Left Side Sill at Front Door	2724	-675	219
6	Left Lower B-Post	2178	-657	332
7	Left Mid B-Post	*	*	*
8	Left Upper B-Post	2129	-516	1384
9	Left Lower A-Post	3267	-704	273
10	Left Mid A-Post	3317	-788	903
11	Driver Left Seat Track	2333	-549	339
12	Vehicle CG	2817	90	339
13	Left A-Pillar @ Roof	2707	-567	1275
14	Left Door @ Pelvis	2523	-764	658
15	Left Door @ Arm	2708	-757	832
16	Left Door @ Knee			
17	Left Door @ Rib			
19	Left Driver Seat Frame	*	*	*
20	Right Driver Seat Frame	*	*	*
21	Lower Center Radiator Support	4372	0	213

Sign Convention X – Rear Bumper (+ forward)

Y – Vehicle Centerline (+ to right)

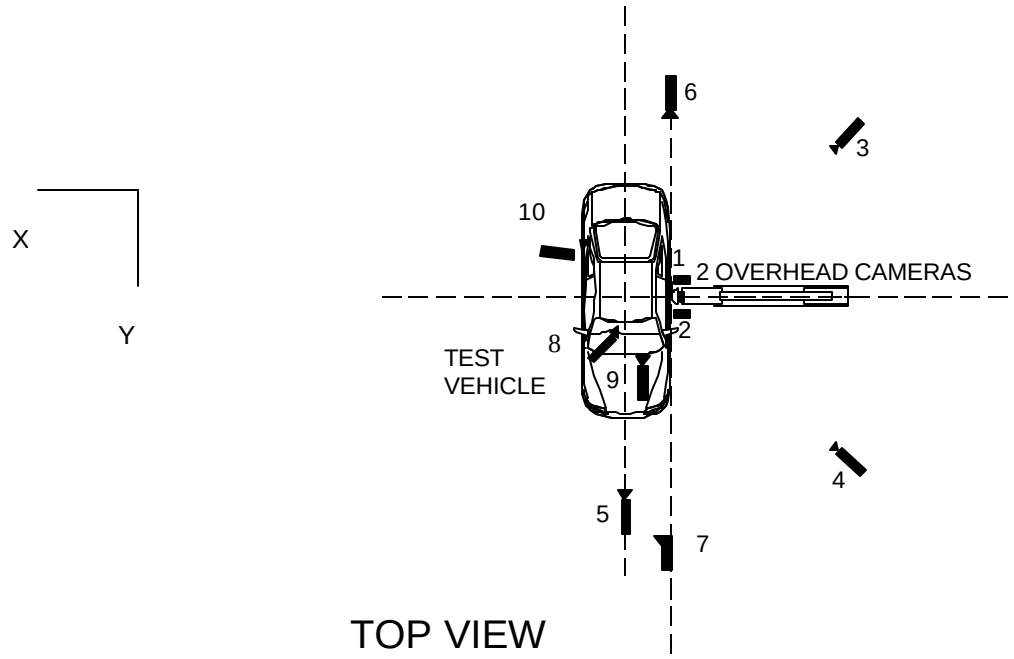
Z – Ground Plane (+ up)

* = Not used to avoid interference with restraint system.

DATA SHEET NO. 11

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2000 Saab/ 9-5/ 4 Door Test Date: October 24, 2002



TOP VIEW

No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	600	0	5000	8	1010
2	Overhead Close-up	0	0	5000	13	1010
3	Left Side 45 deg. Rearward Pole View	-3000	-6000	1430	50	1005
4	Left Side 45 deg. Forward Pole View	-3300	5100	1370	50	1000
5	Real Time					
6	Left Side Rear Pole View	500	-9000	1560	25	909
7	Front Ground Level Vehicle/Pole Impact	750	9150	1700	25	833
8	Test Vehicle Onboard Driver Head Contact				8	500
9	Test Vehicle Onboard Hood				13	524
10	Test Vehicle Onboard Driver Hip				13	526

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

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

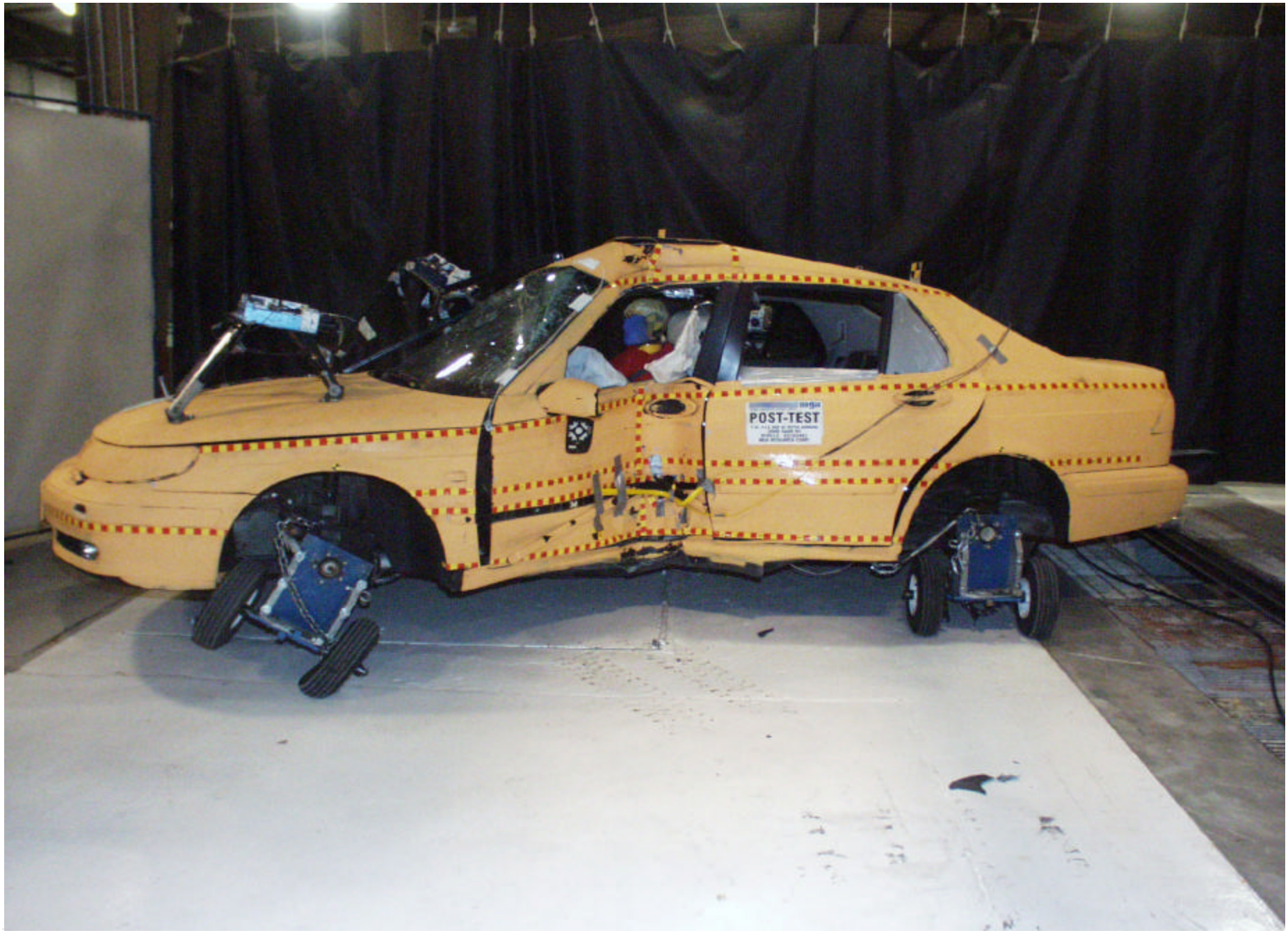
Pre-Test Front View of Test Vehicle

Post-Test Front View of Test Vehicle

Pre-Test Rear View of Test Vehicle

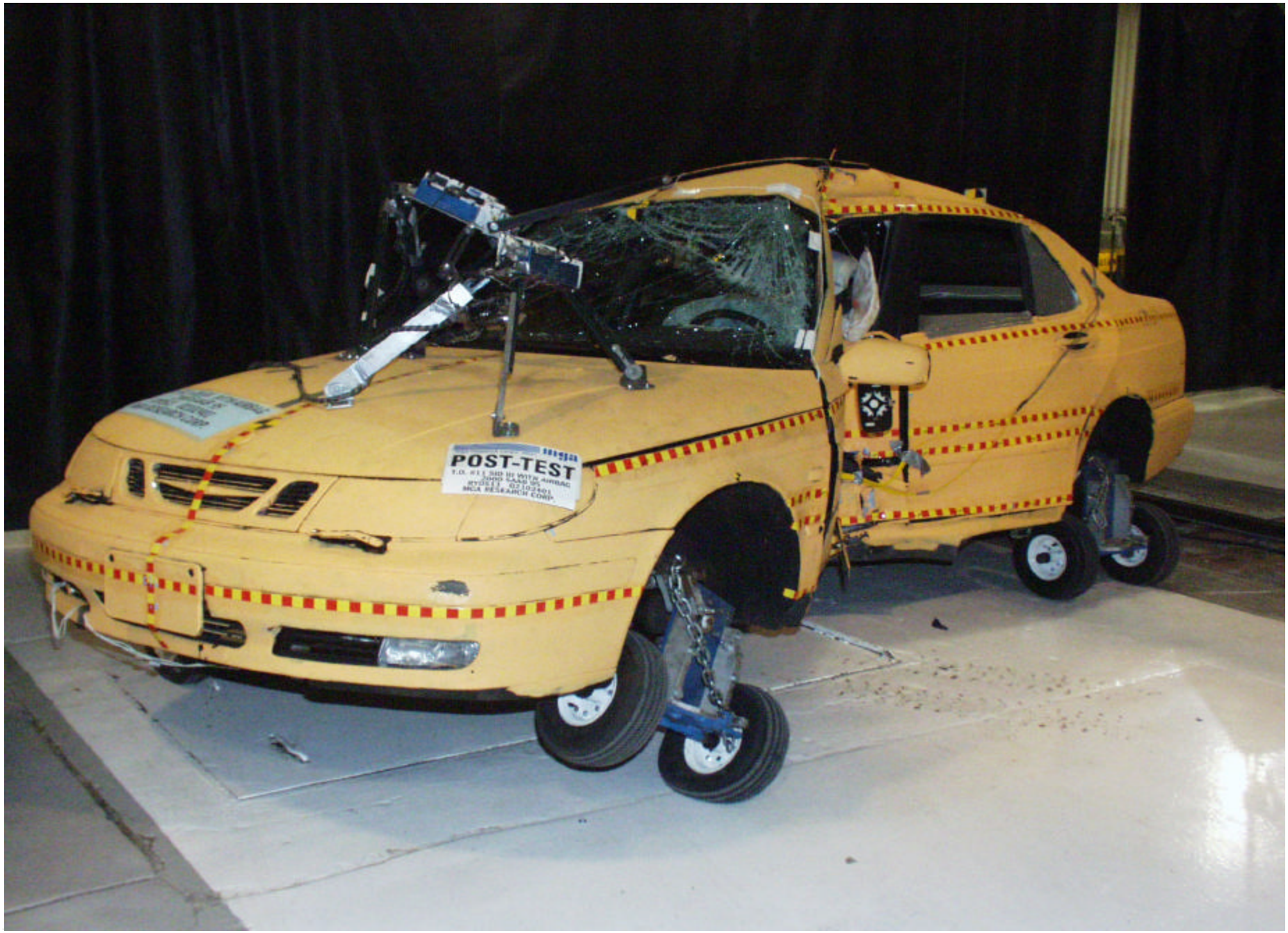
Post-Test Rear View of Test Vehicle

Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle

Pre-Test Left ¾ Front View of Test Vehicle



Post-Test Left ¾ Front View of Test Vehicle

Pre-Test Left ¾ Rear View of Test Vehicle

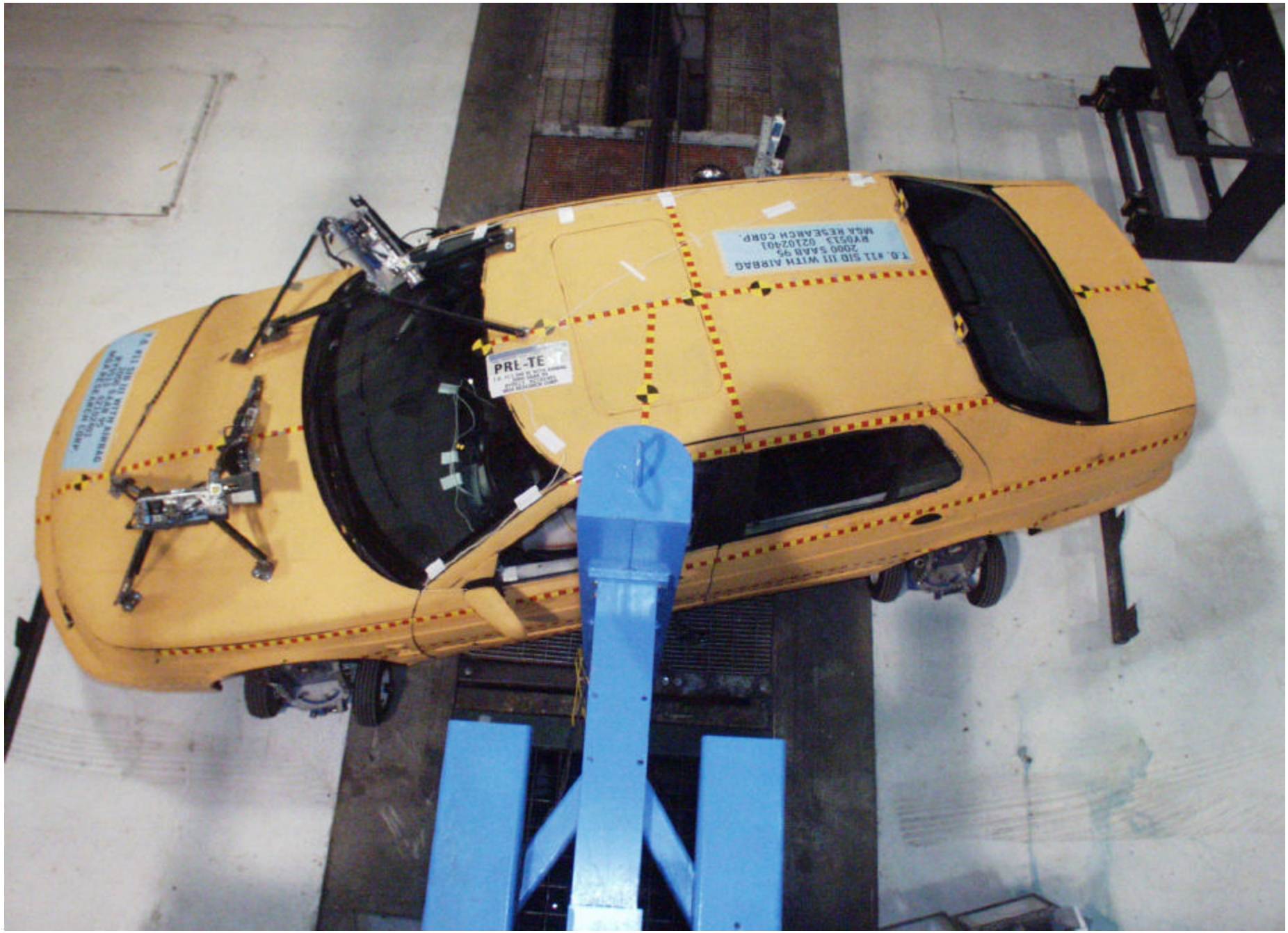
Post-Test Left ¾ Rear View of Test Vehicle

Pre-Test Vehicle Positioned Against Pole (left side)

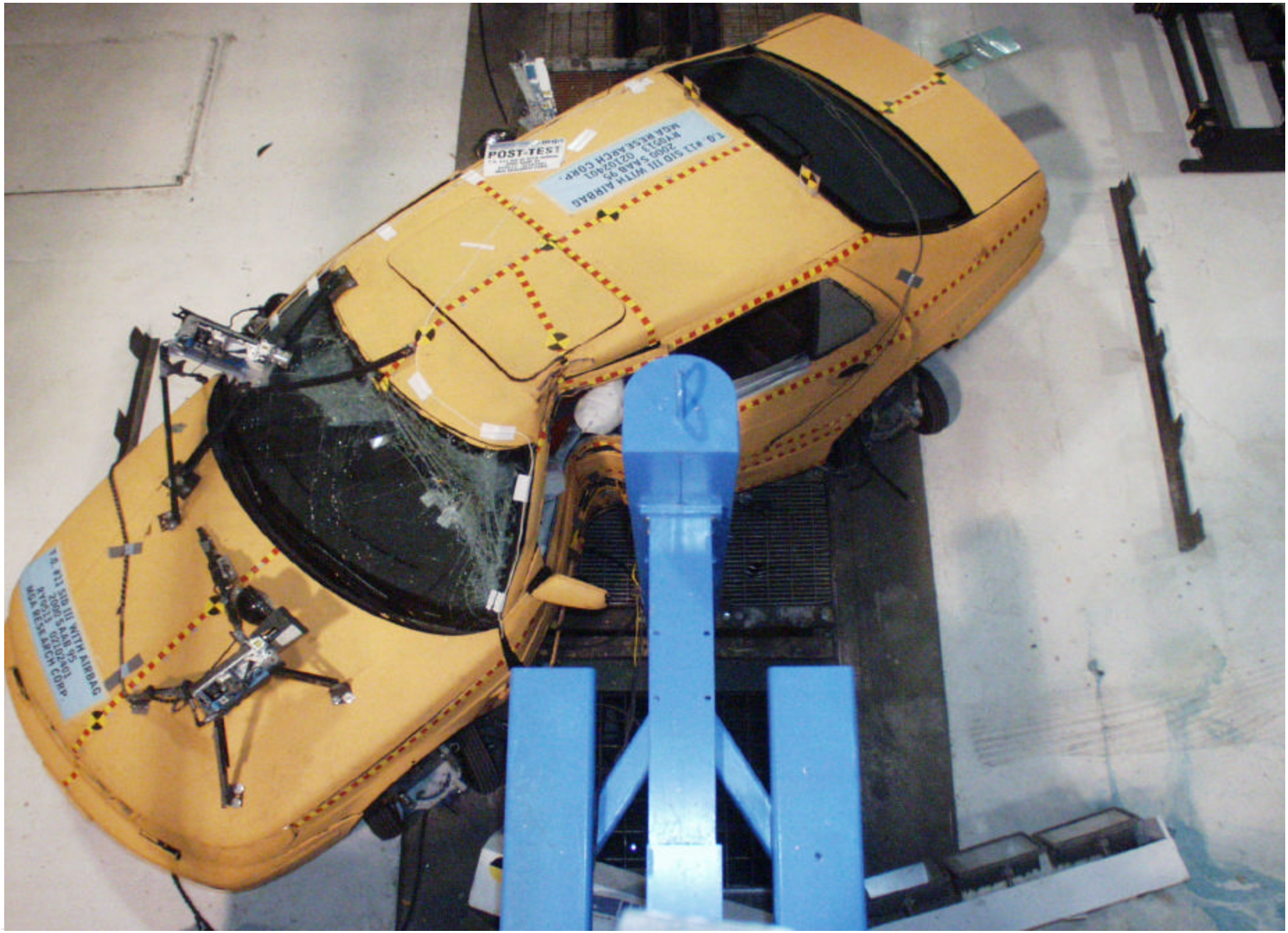
Post-Test Pole and Vehicle (left side)

Pre-Test Vehicle Positioned Against Pole (right side)

Post-Test Pole and Vehicle (right side)



Pre-Test Vehicle Positioned Against Pole Overhead View



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 Dummy Shoulder and Door Top View

Post-Test Driver Dummy Contact

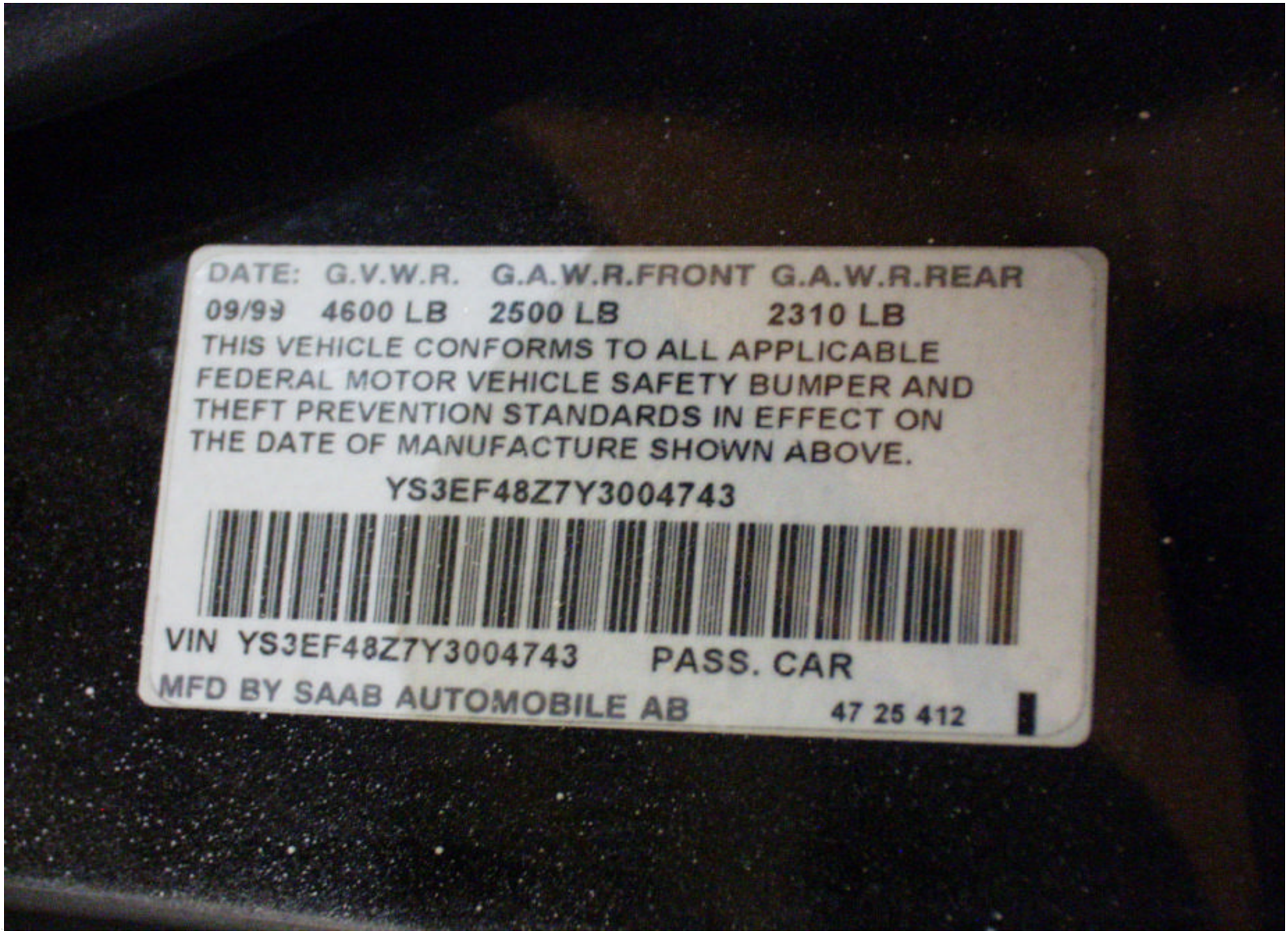
Post-Test Driver Dummy Lower Body Contact

Post-Test Driver Dummy Head Contact

Pre-Test Impact Point on Vehicle

Post-Test Impact Point on Vehicle

Impact



Vehicle Certification Label

Tire Placard

Airbag Damage (Inside view)

Airbag Damage (Inside View)

Airbag Damage (Outside View)

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

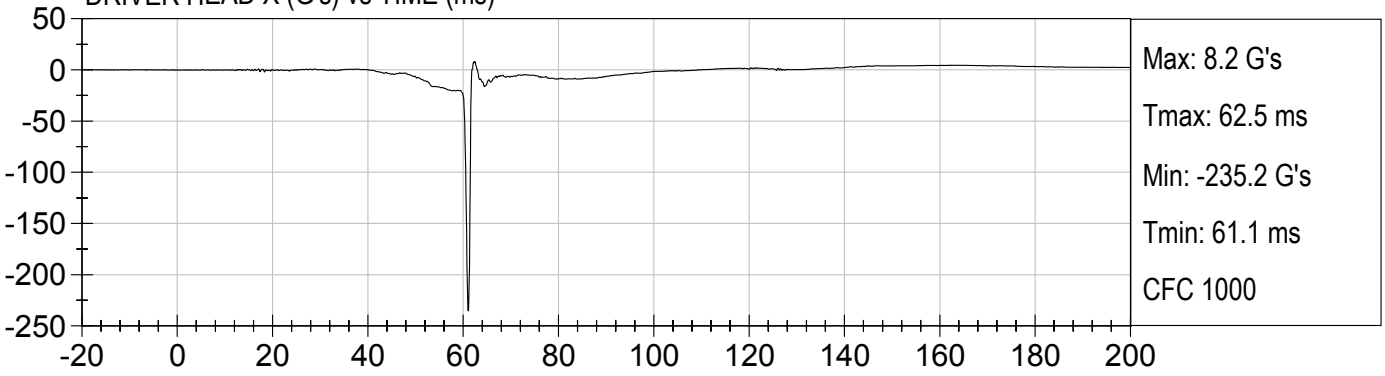
* = No Valid data after approximately 20 msec.

* = No Valid data after approximately 20 msec.

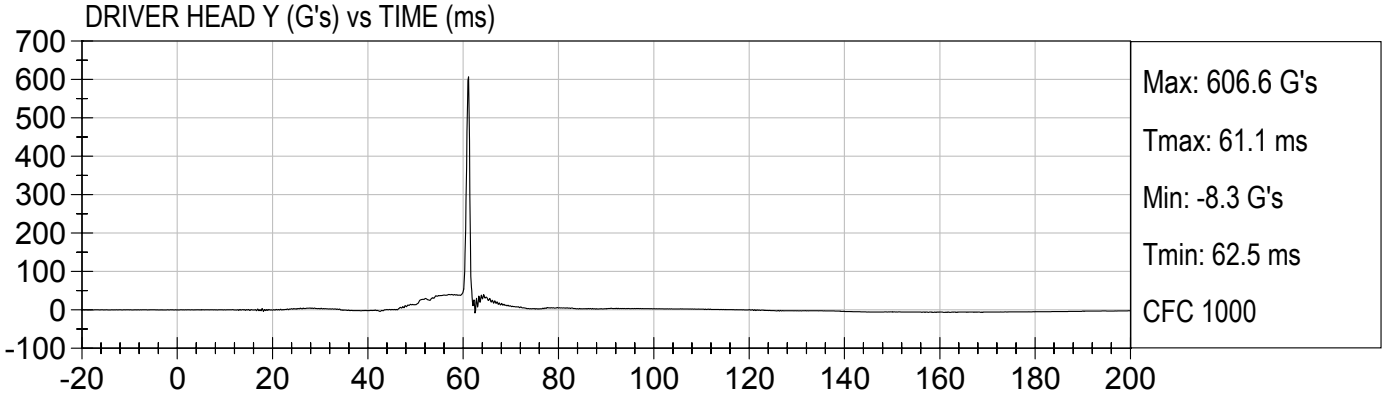
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

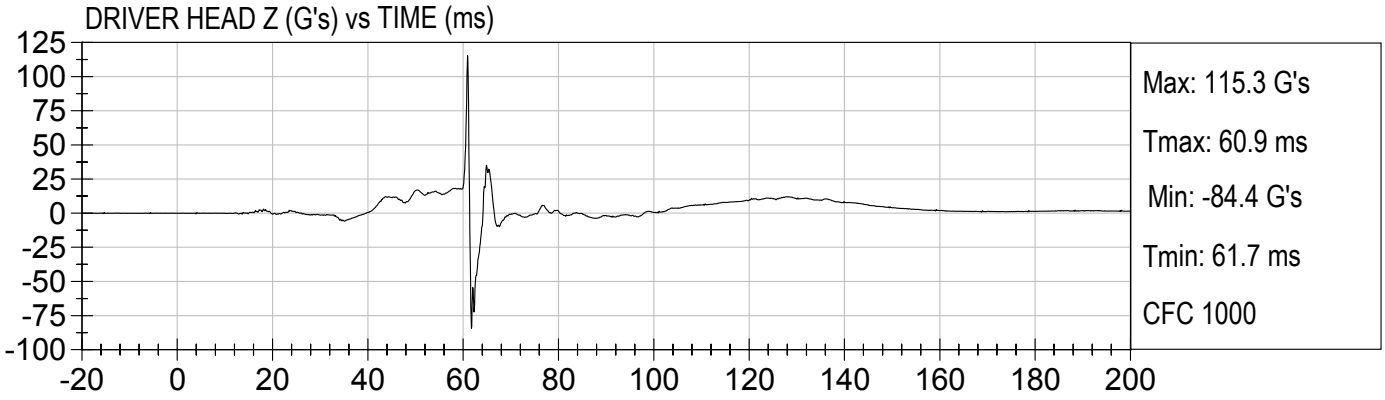
DRIVER HEAD X (G's) vs TIME (ms)



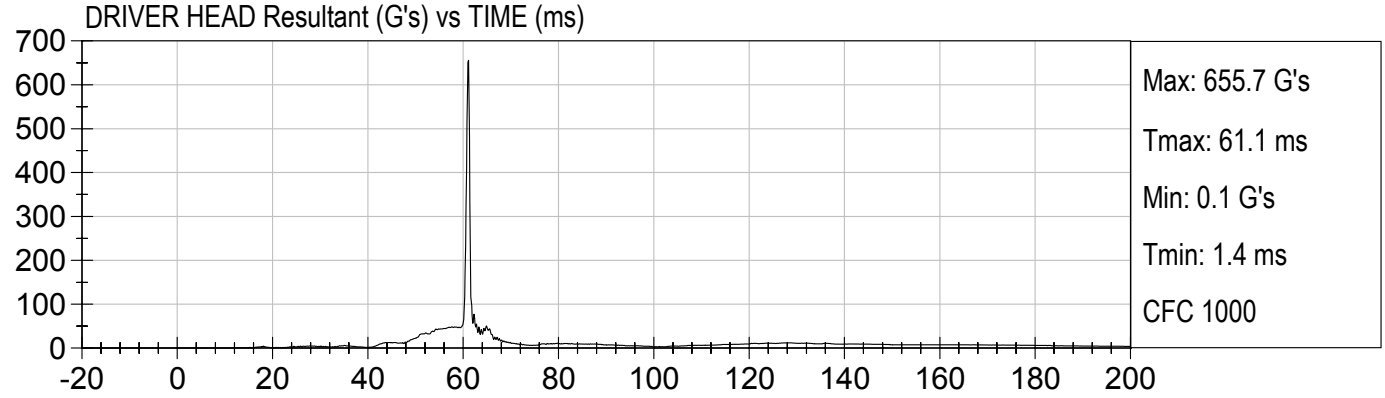
DRIVER HEAD Y (G's) vs TIME (ms)



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

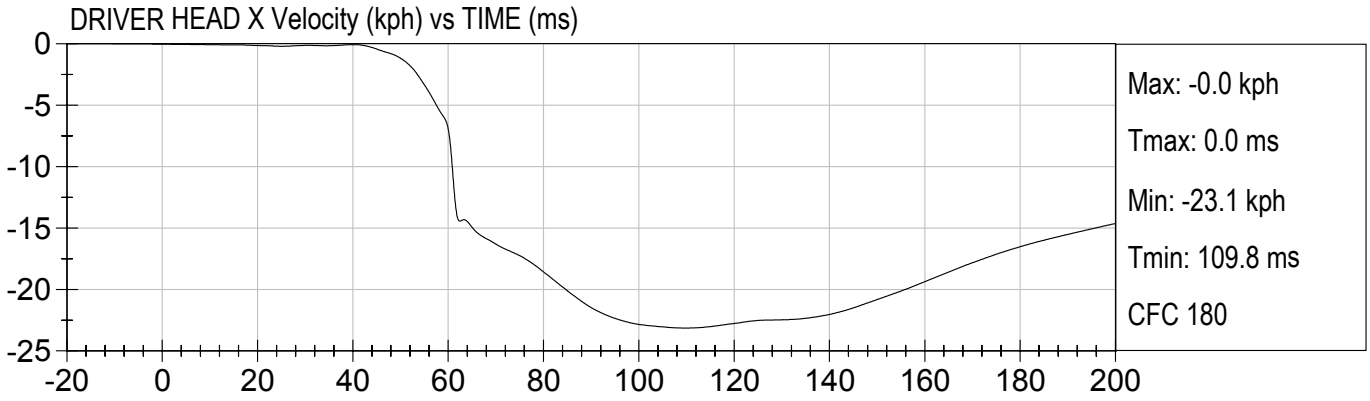


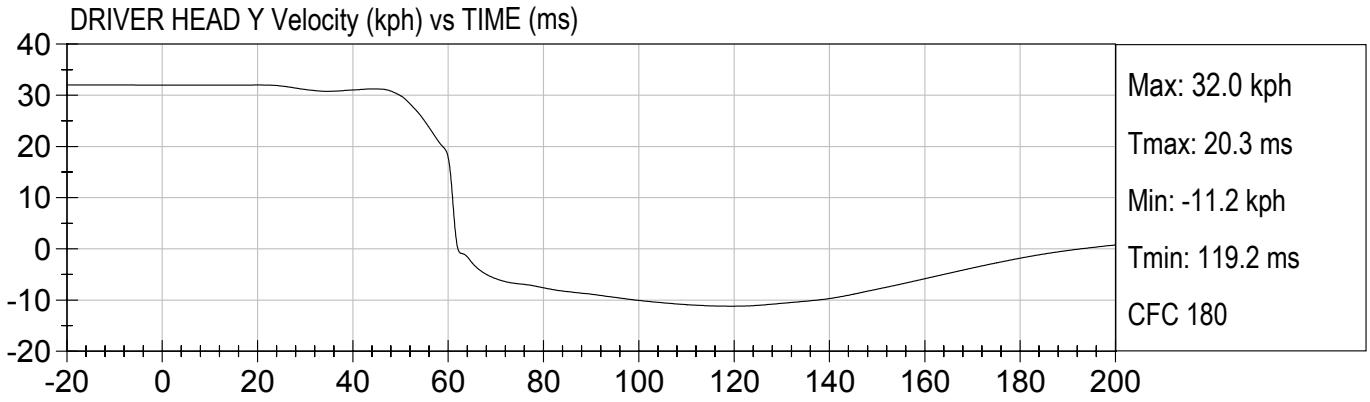
DRIVER HEAD Resultant (G's) vs TIME (ms)

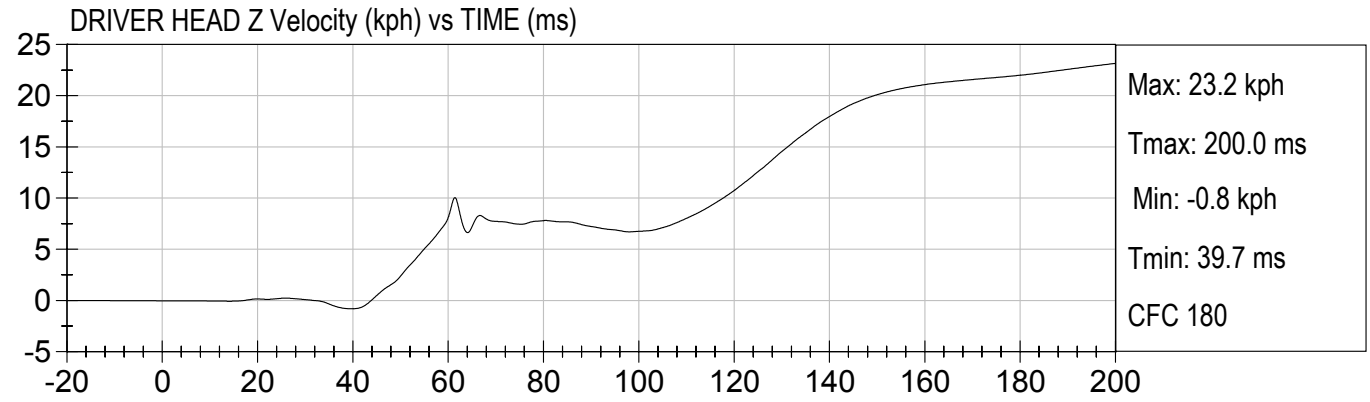


20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)



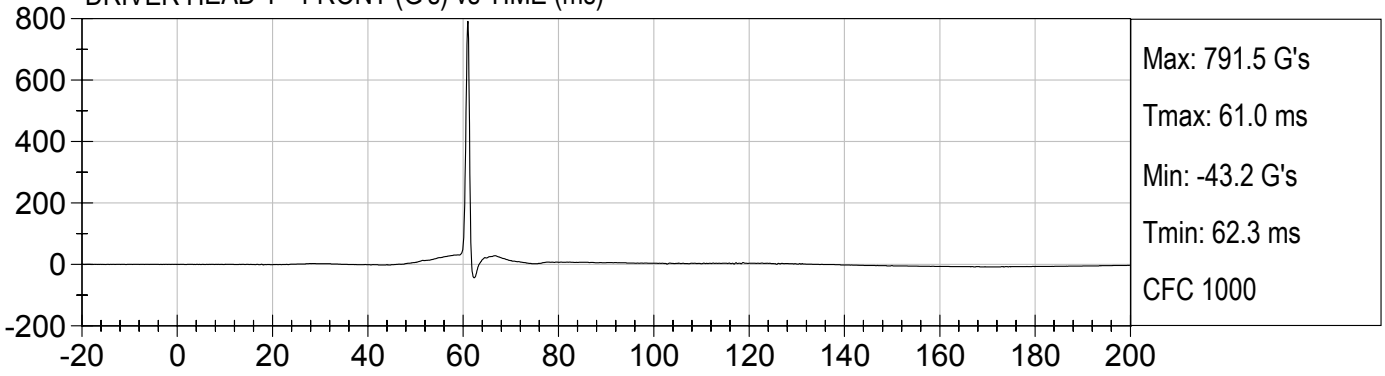




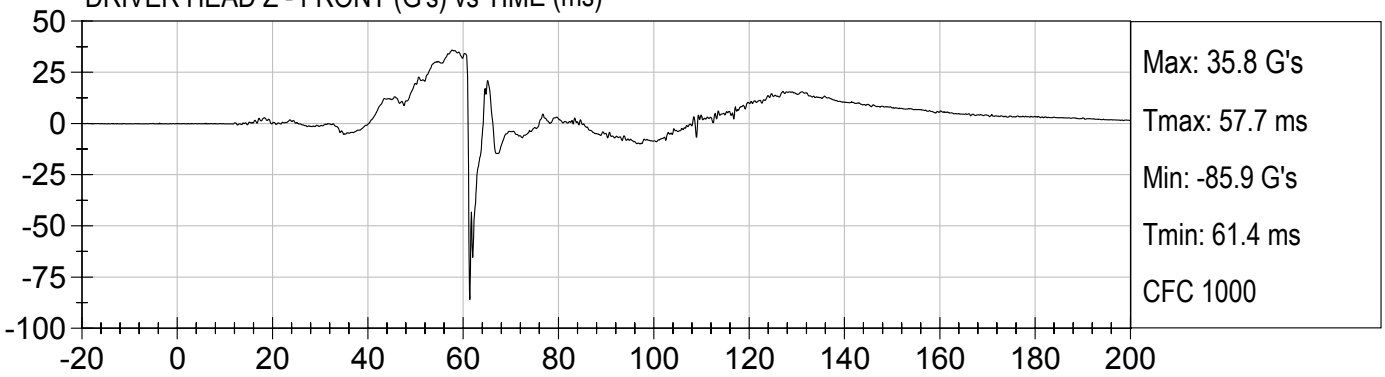
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

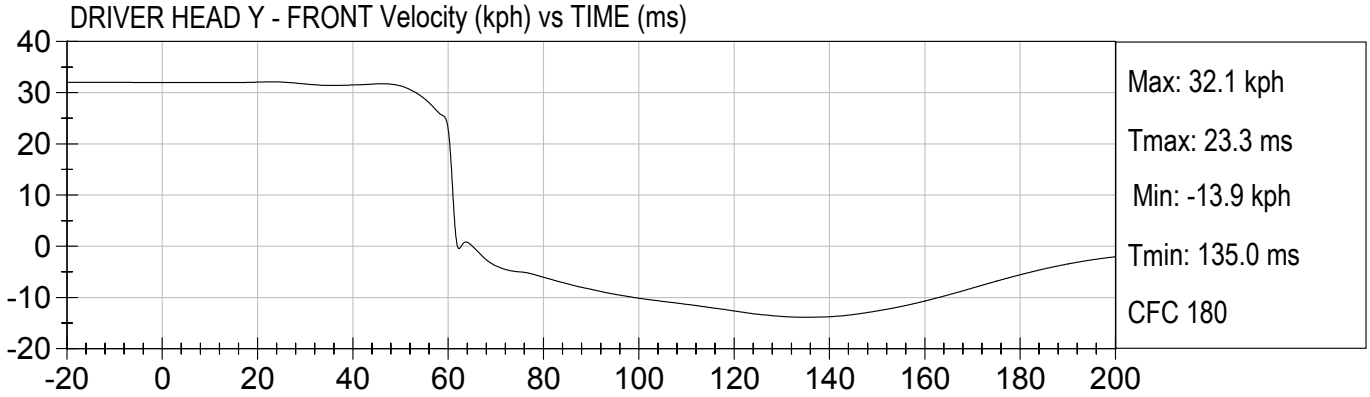
DRIVER HEAD Y - FRONT (G's) vs TIME (ms)



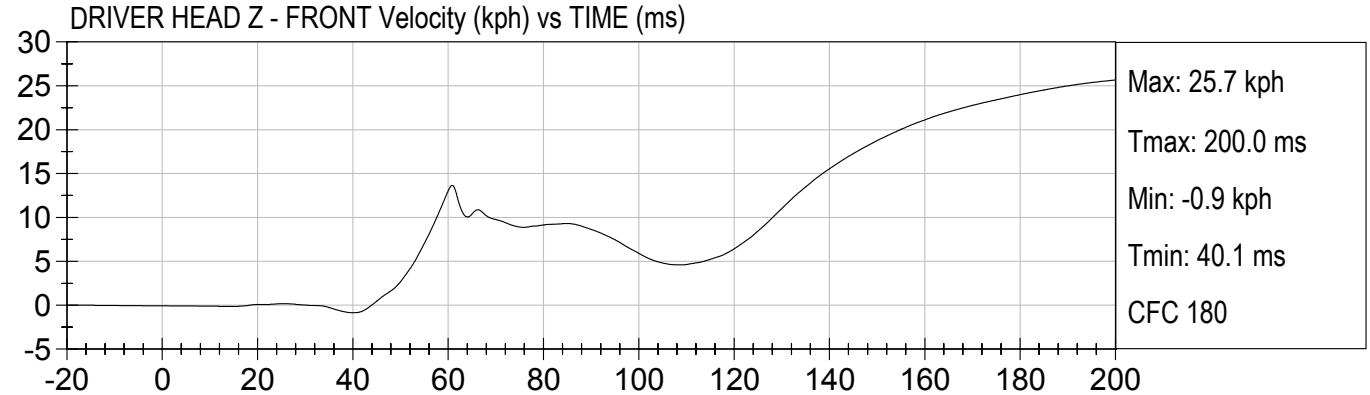
DRIVER HEAD Z - FRONT (G's) vs TIME (ms)



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



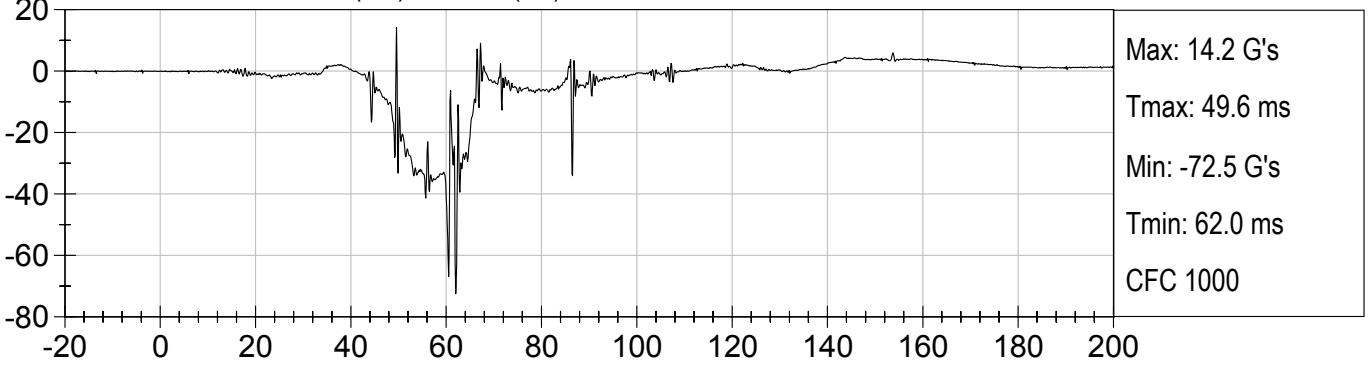
DRIVER HEAD Z - FRONT Velocity (kph) vs TIME (ms)



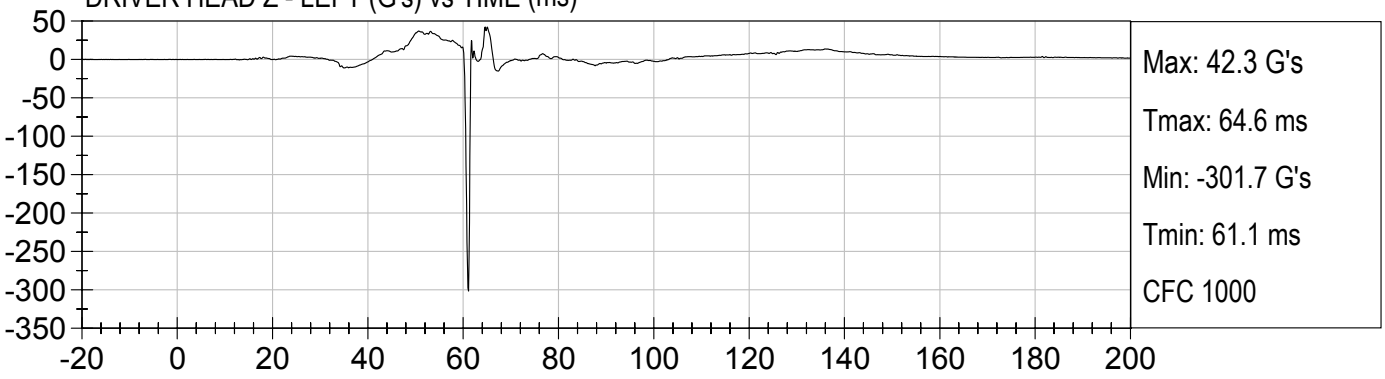
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

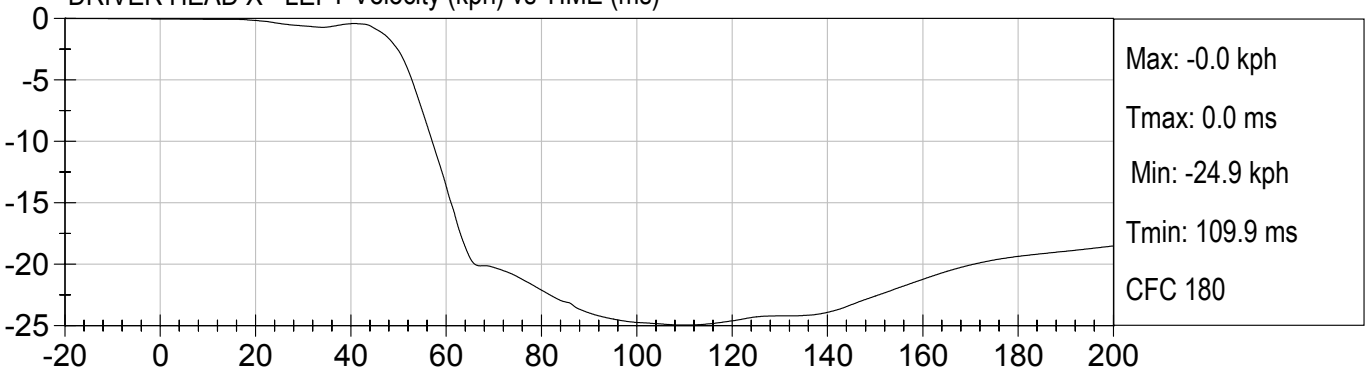
DRIVER HEAD X - LEFT (G's) vs TIME (ms)



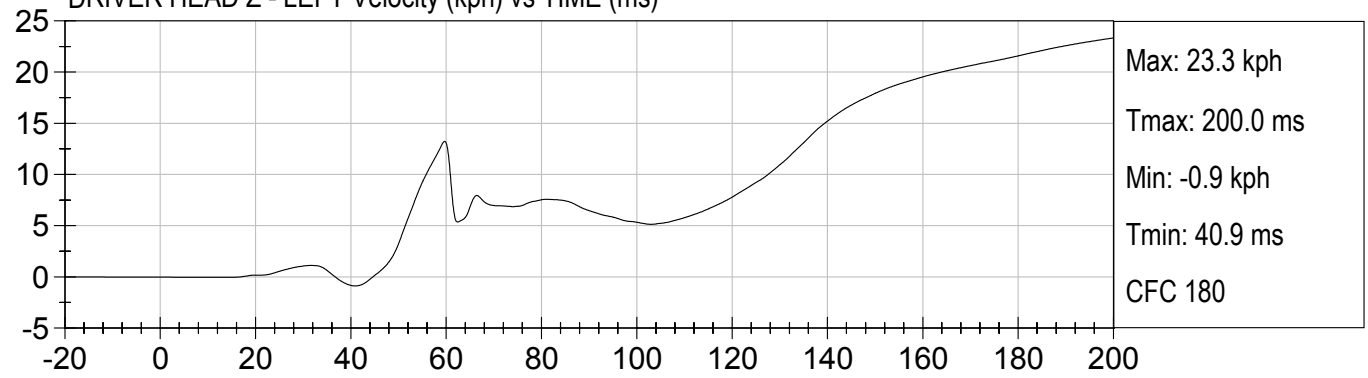
DRIVER HEAD Z - LEFT (G's) vs TIME (ms)



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



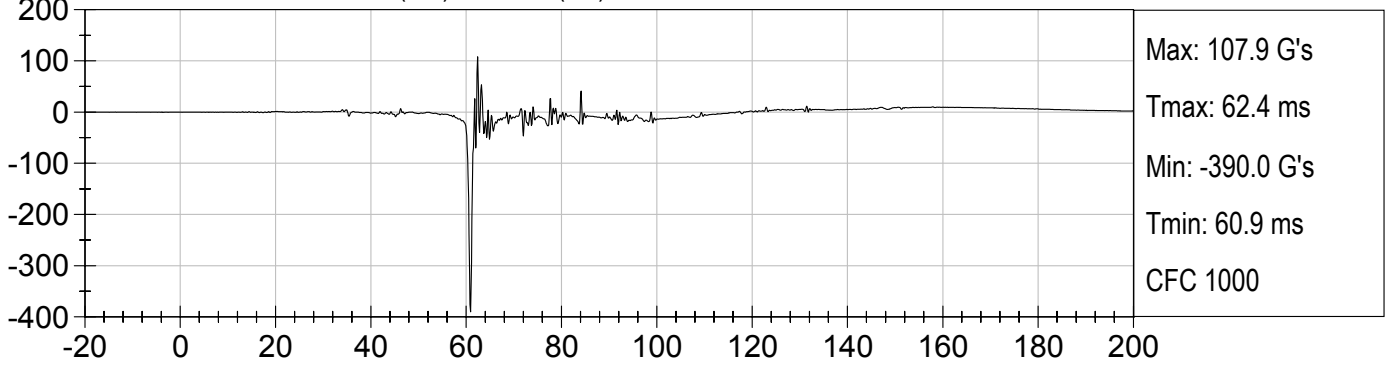
DRIVER HEAD Z - LEFT Velocity (kph) vs TIME (ms)



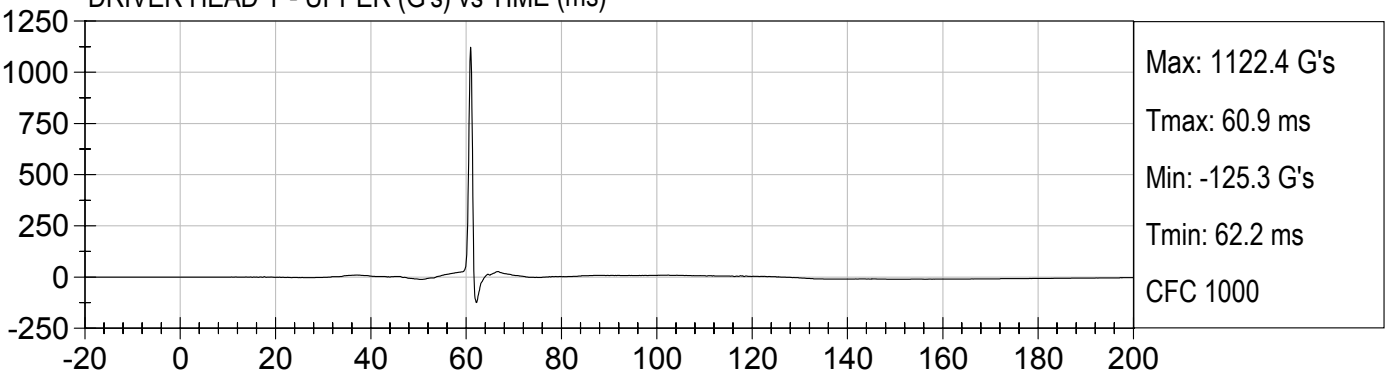
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

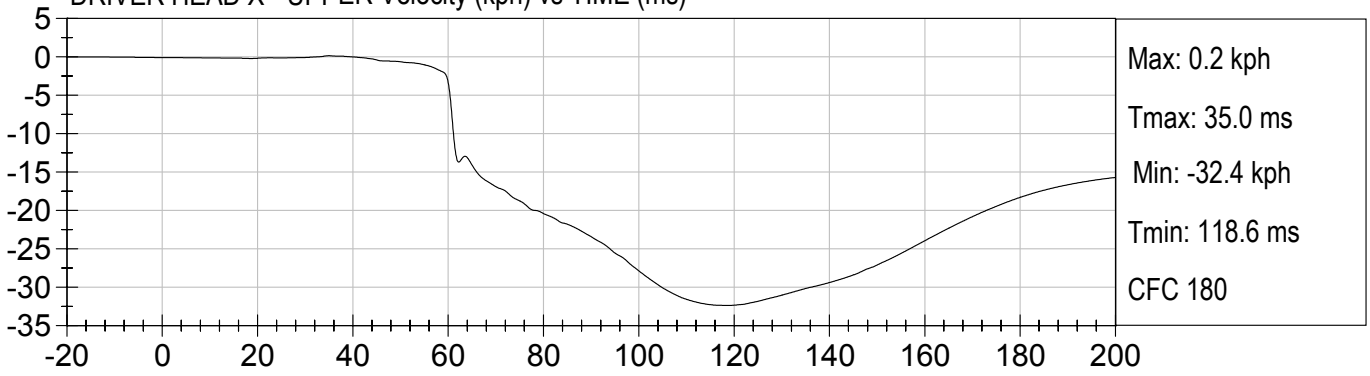
DRIVER HEAD X - UPPER (G's) vs TIME (ms)



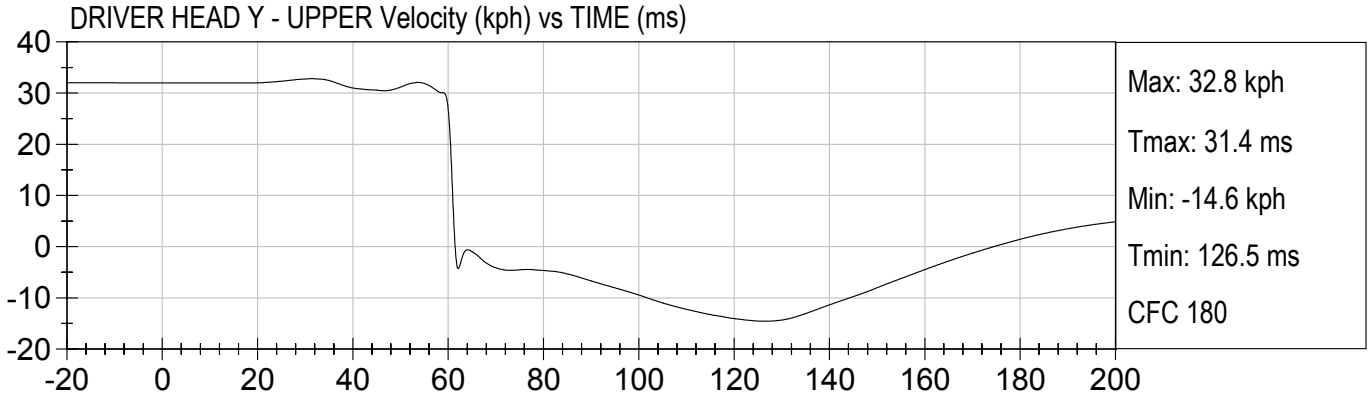
DRIVER HEAD Y - UPPER (G's) vs TIME (ms)



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



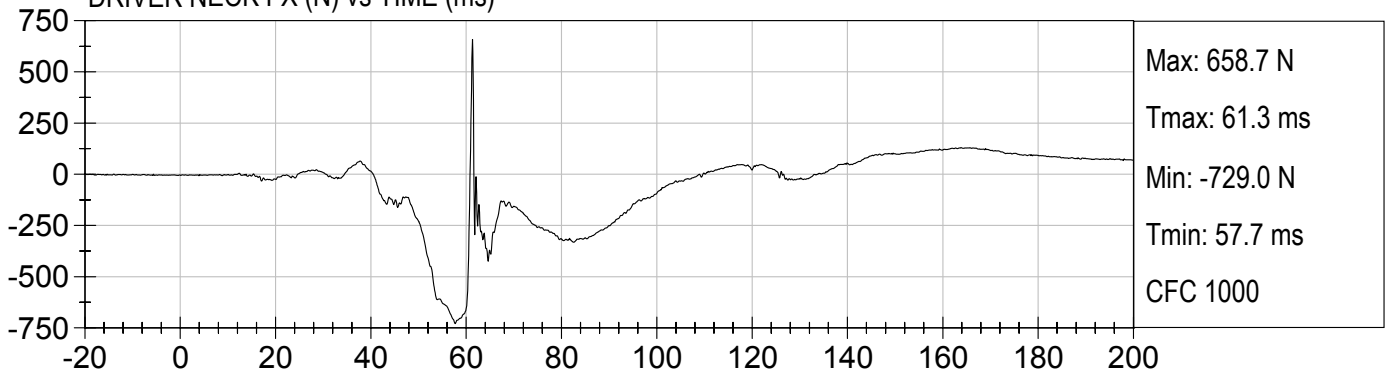
DRIVER HEAD Y - UPPER Velocity (kph) vs TIME (ms)



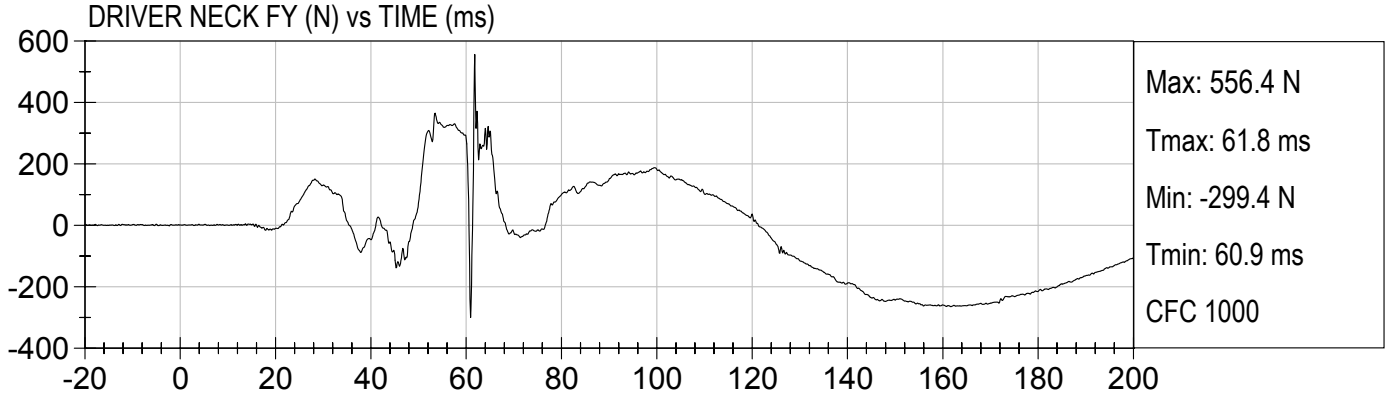
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

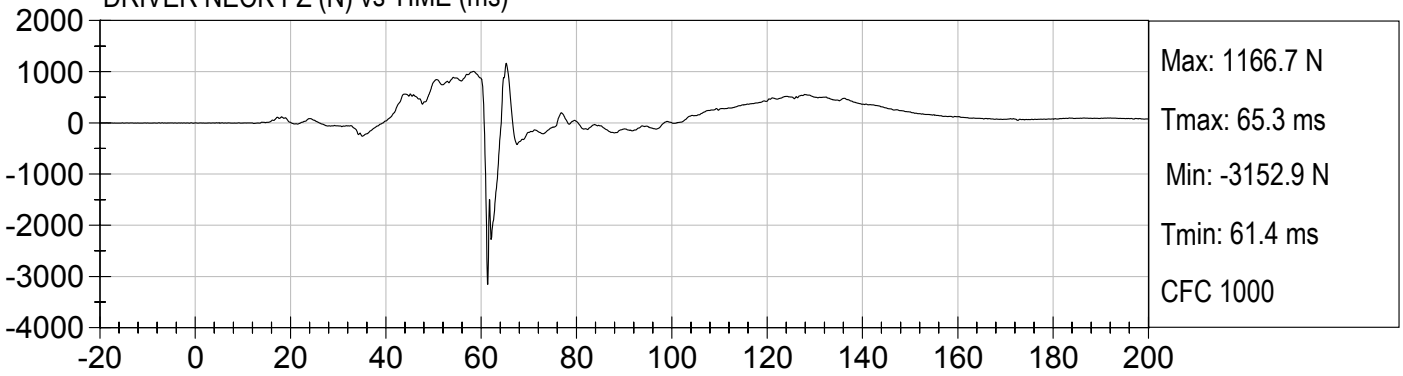
DRIVER NECK FX (N) vs TIME (ms)



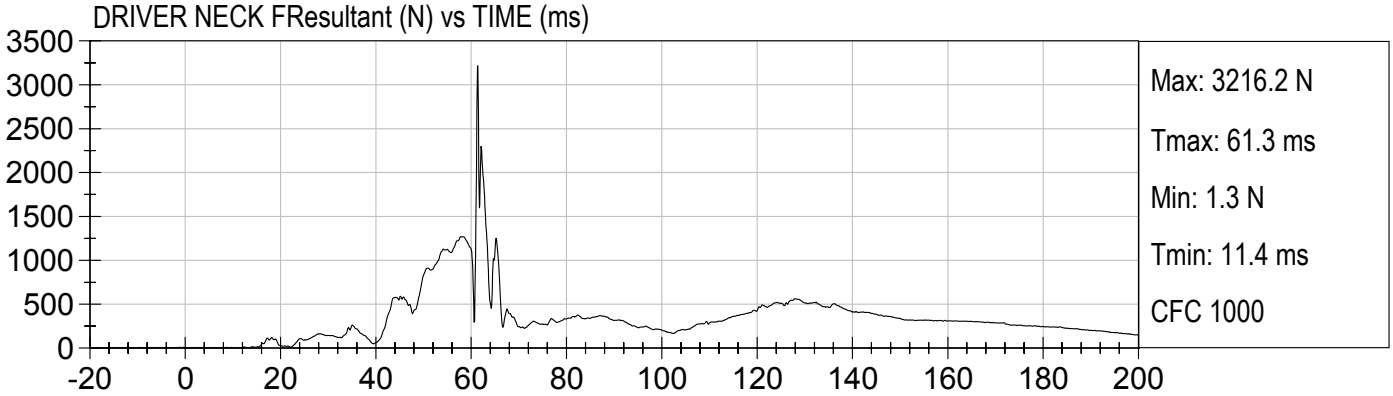
DRIVER NECK FY (N) vs TIME (ms)

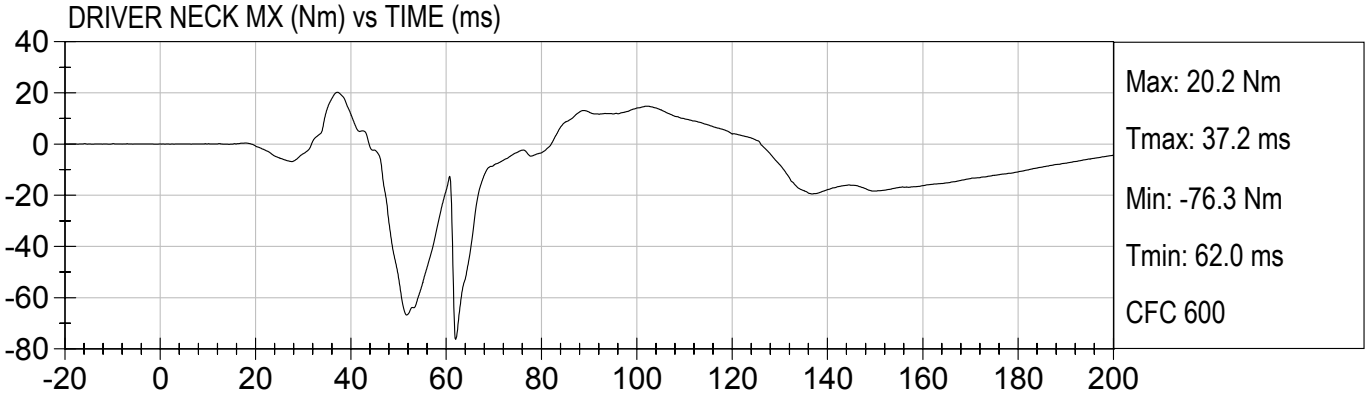


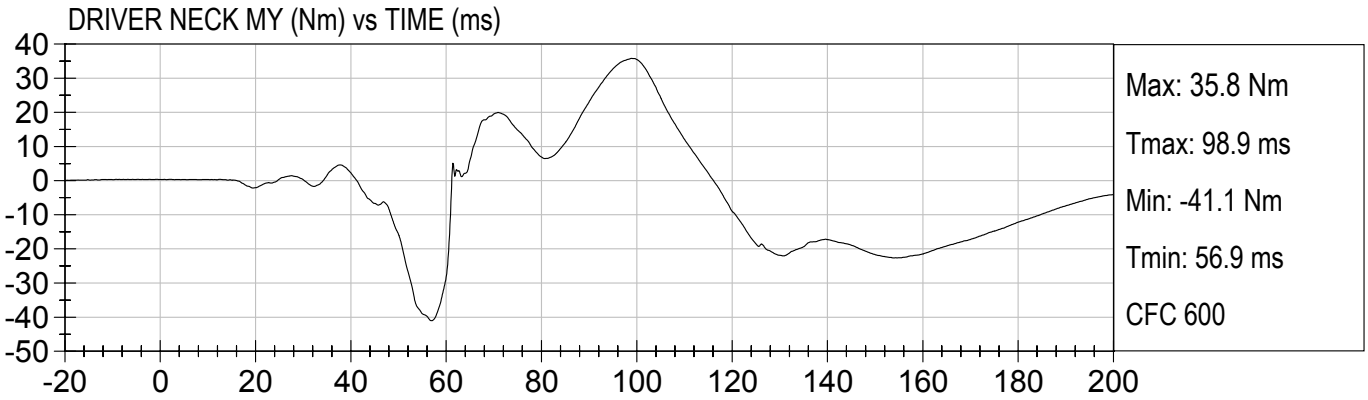
DRIVER NECK FZ (N) vs TIME (ms)

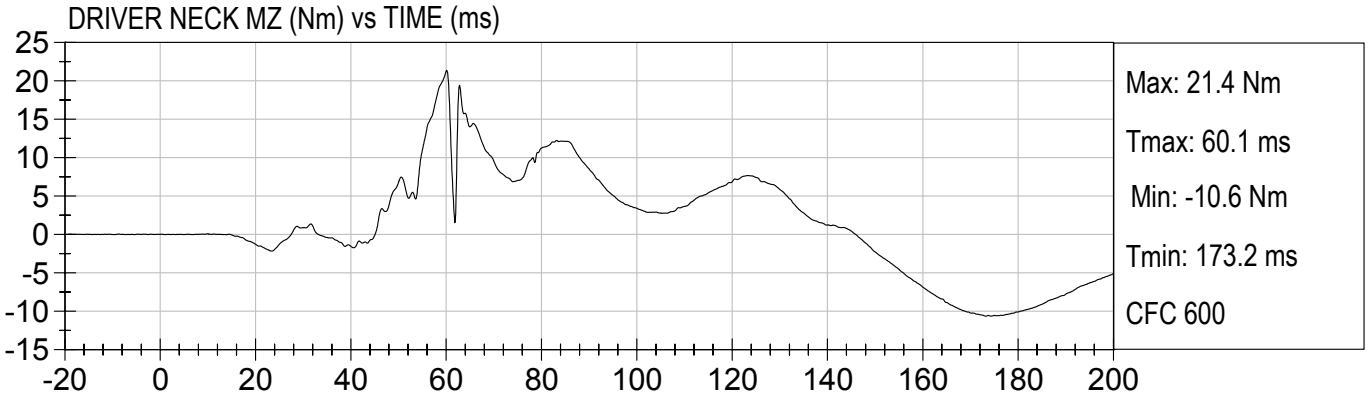


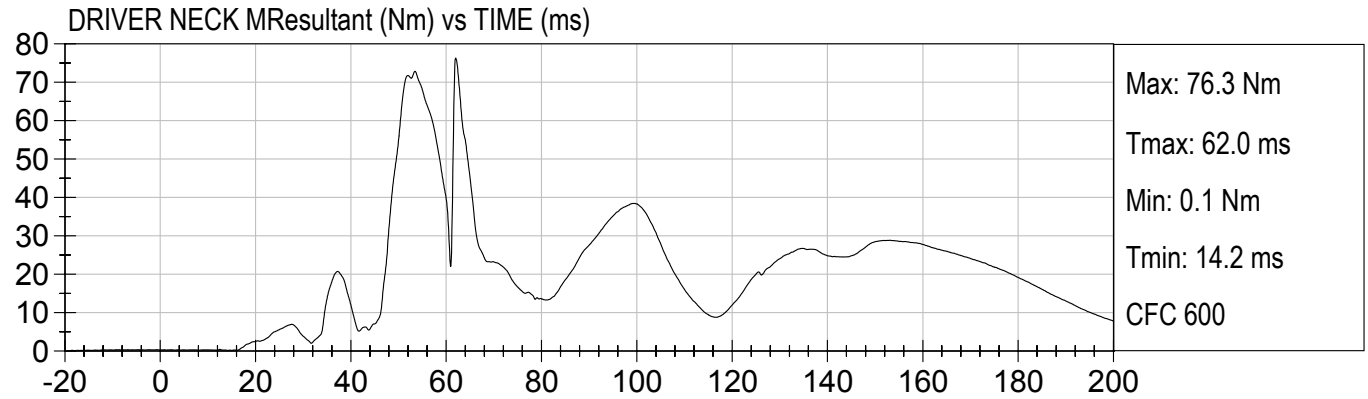
DRIVER NECK FResultant (N) vs TIME (ms)




DRIVER NECK MX (Nm) vs TIME (ms)
Max: 20.2 Nm
Tmax: 37.2 ms
Min: -76.3 Nm
Tmin: 62.0 ms
CFC 600


DRIVER NECK MY (Nm) vs TIME (ms)
Max: 35.8 Nm
Tmax: 98.9 ms
Min: -41.1 Nm
Tmin: 56.9 ms
CFC 600

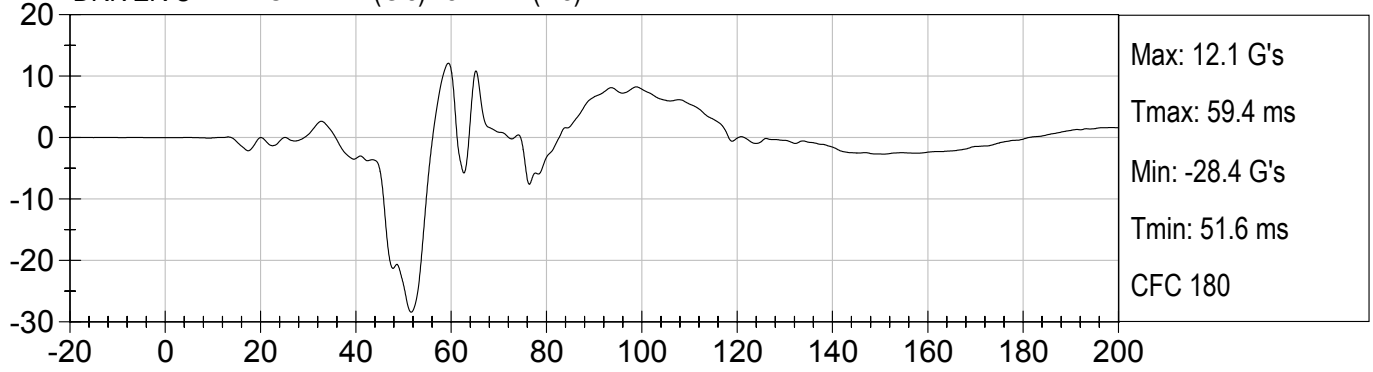

DRIVER NECK MZ (Nm) vs TIME (ms)
Max: 21.4 Nm
Tmax: 60.1 ms
Min: -10.6 Nm
Tmin: 173.2 ms
CFC 600


DRIVER NECK MResultant (Nm) vs TIME (ms)
Max: 76.3 Nm
Tmax: 62.0 ms
Min: 0.1 Nm
Tmin: 14.2 ms
CFC 600

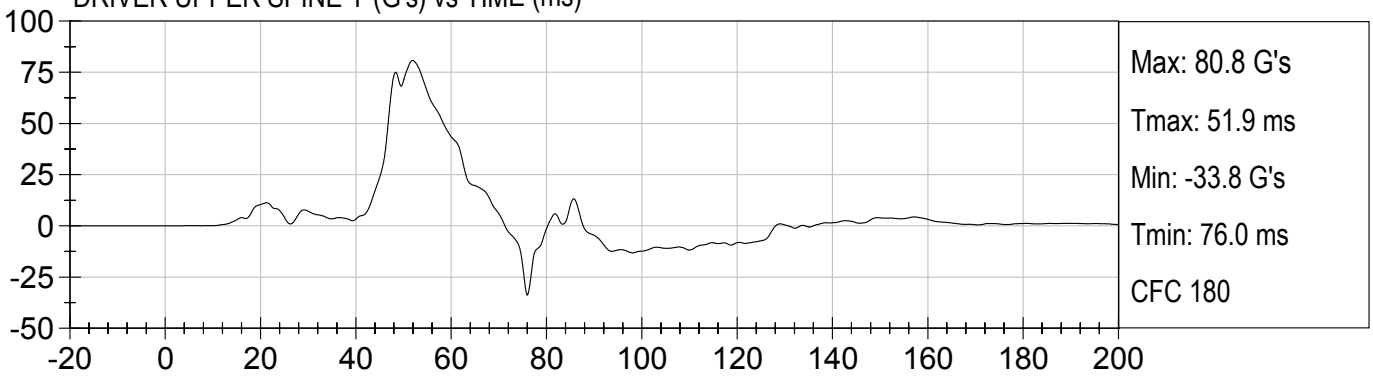
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

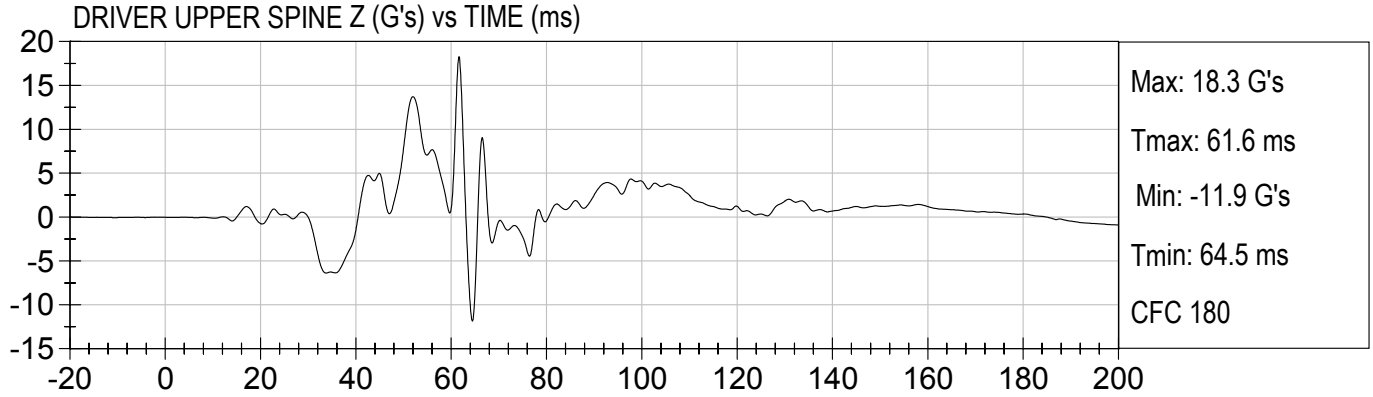
DRIVER UPPER SPINE X (G's) vs TIME (ms)



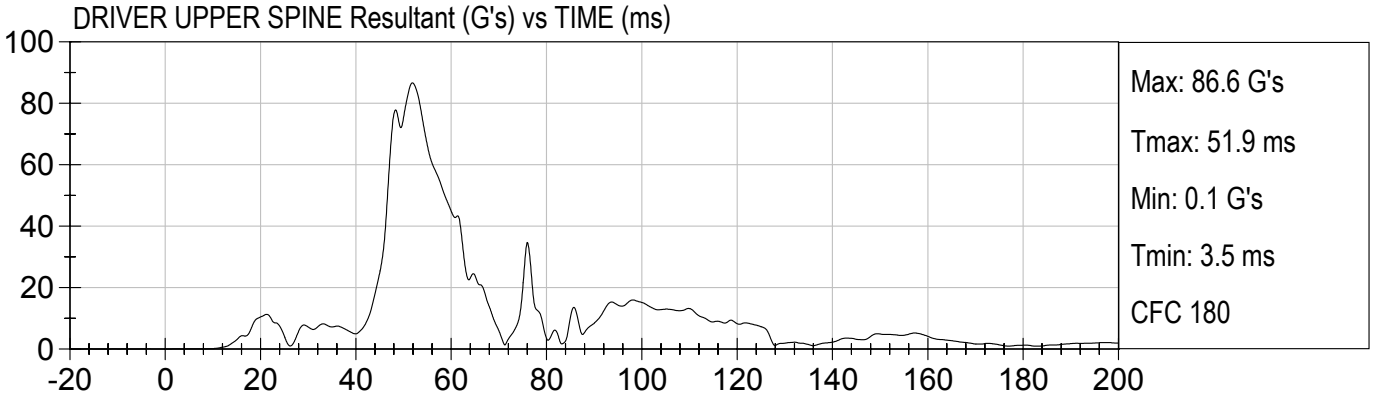
DRIVER UPPER SPINE Y (G's) vs TIME (ms)

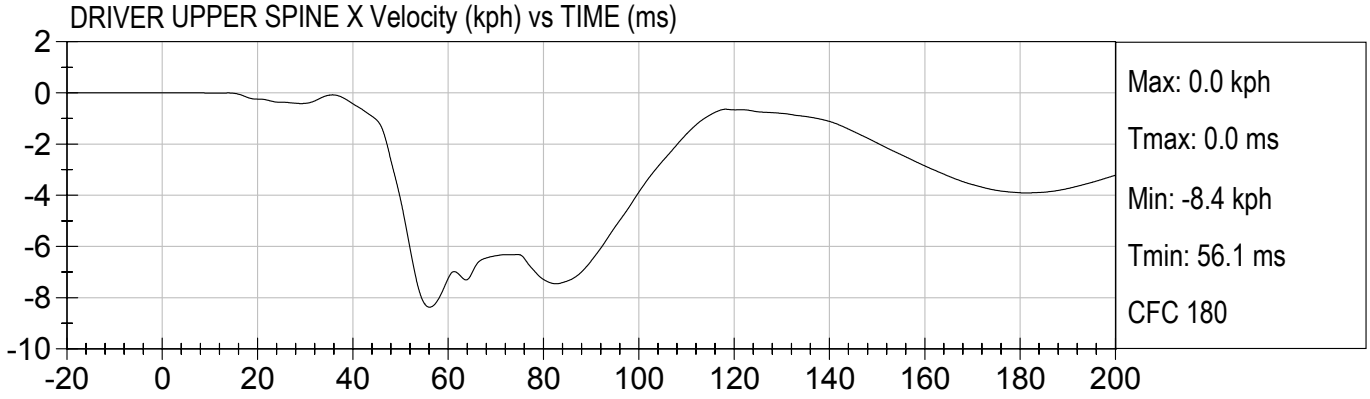


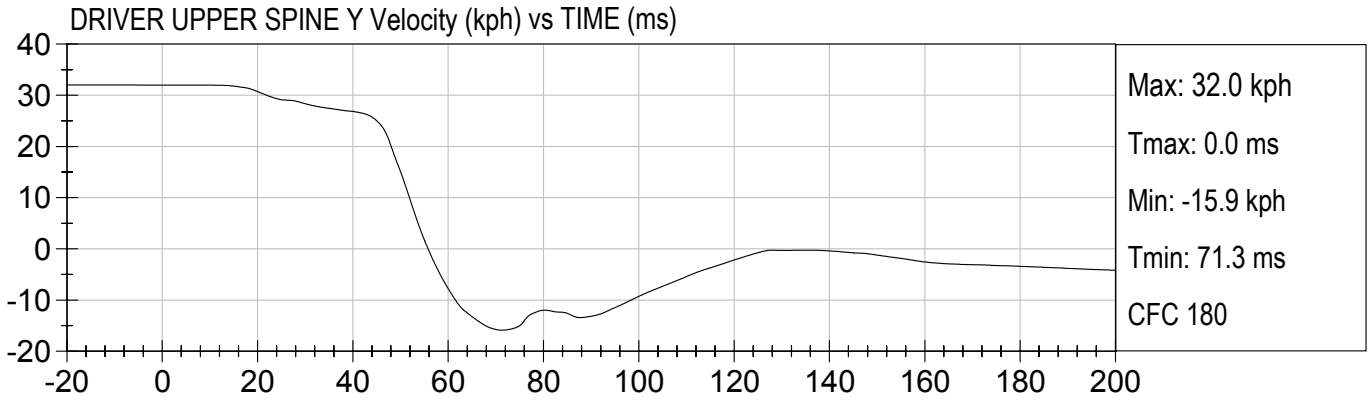
DRIVER UPPER SPINE Z (G's) vs TIME (ms)

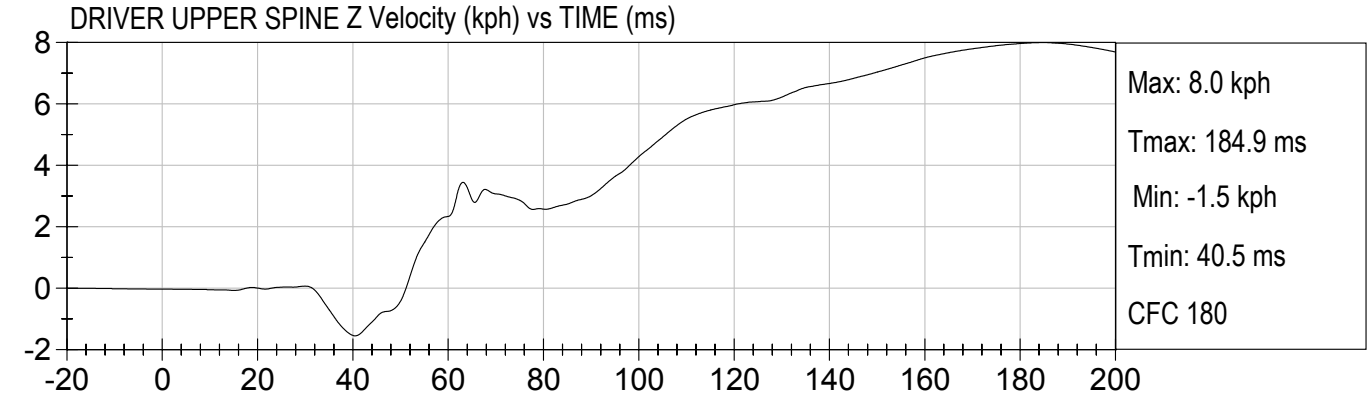


DRIVER UPPER SPINE Resultant (G's) vs TIME (ms)




DRIVER UPPER SPINE X Velocity (kph) vs TIME (ms)
2
0
-2
-4
-6
-8
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.0 kph
Tmax: 0.0 ms
Min: -8.4 kph
Tmin: 56.1 ms
CFC 180

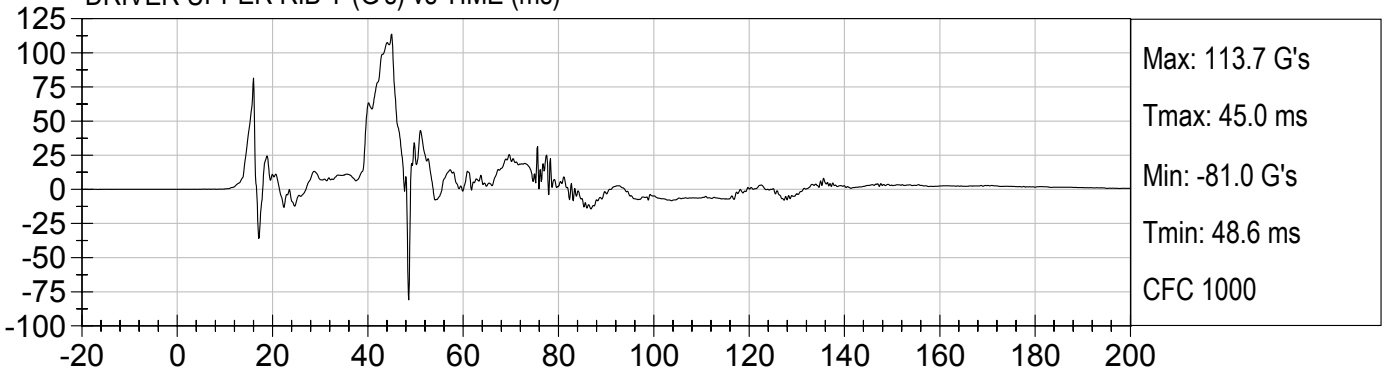

DRIVER UPPER SPINE Y Velocity (kph) vs TIME (ms)
40
30
20
10
0
-10
-20
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 32.0 kph
Tmax: 0.0 ms
Min: -15.9 kph
Tmin: 71.3 ms
CFC 180


DRIVER UPPER SPINE Z Velocity (kph) vs TIME (ms)
8
6
4
2
0
-2
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 8.0 kph
Tmax: 184.9 ms
Min: -1.5 kph
Tmin: 40.5 ms
CFC 180

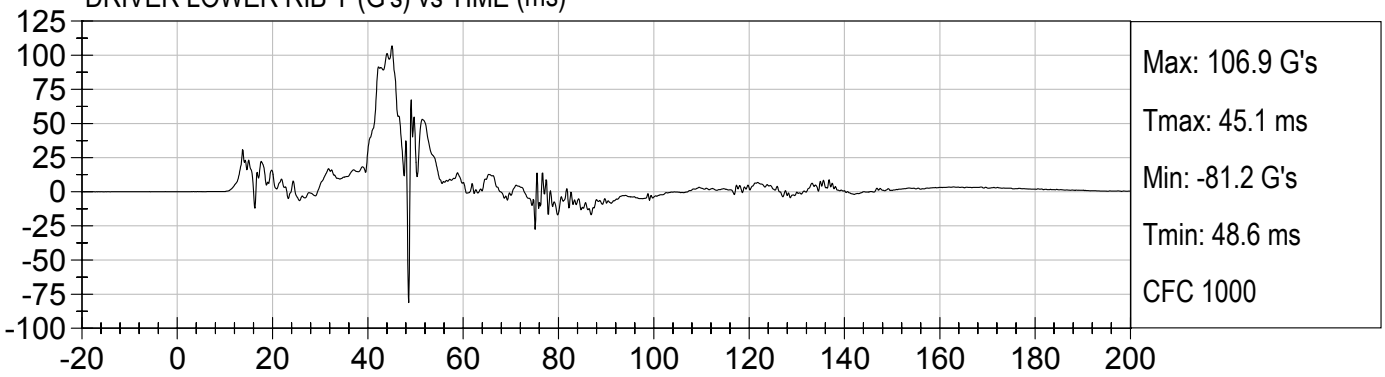
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

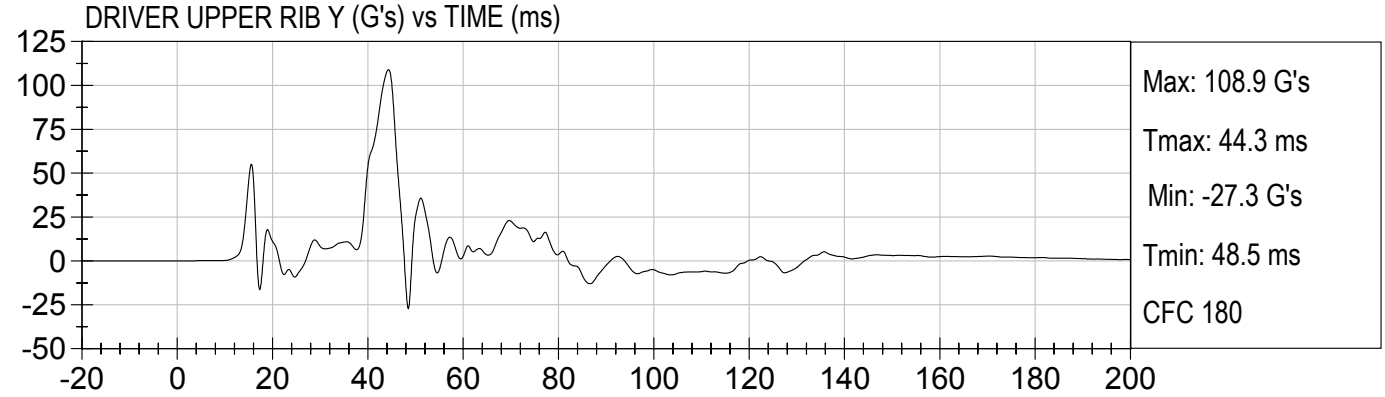
DRIVER UPPER RIB Y (G's) vs TIME (ms)



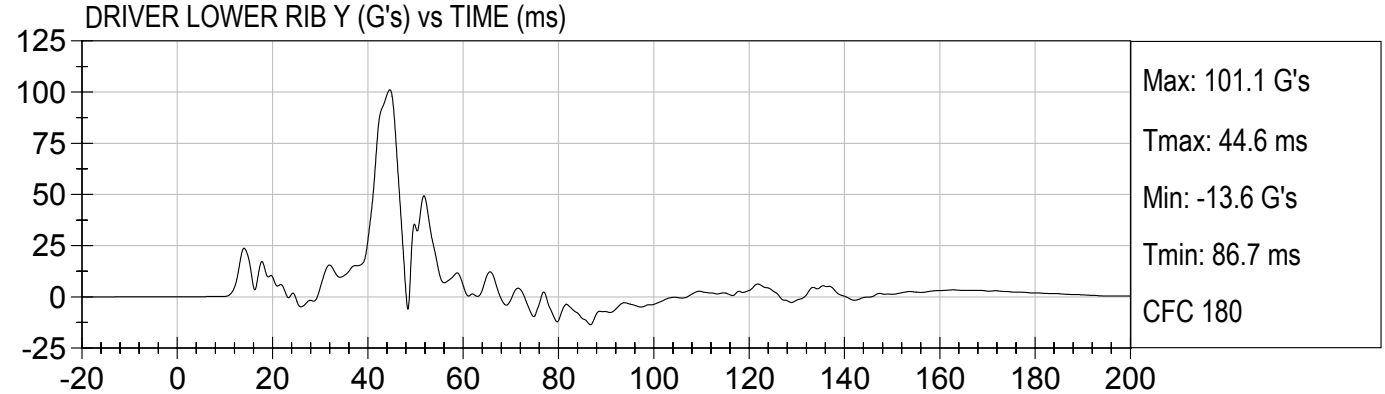
DRIVER LOWER RIB Y (G's) vs TIME (ms)



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



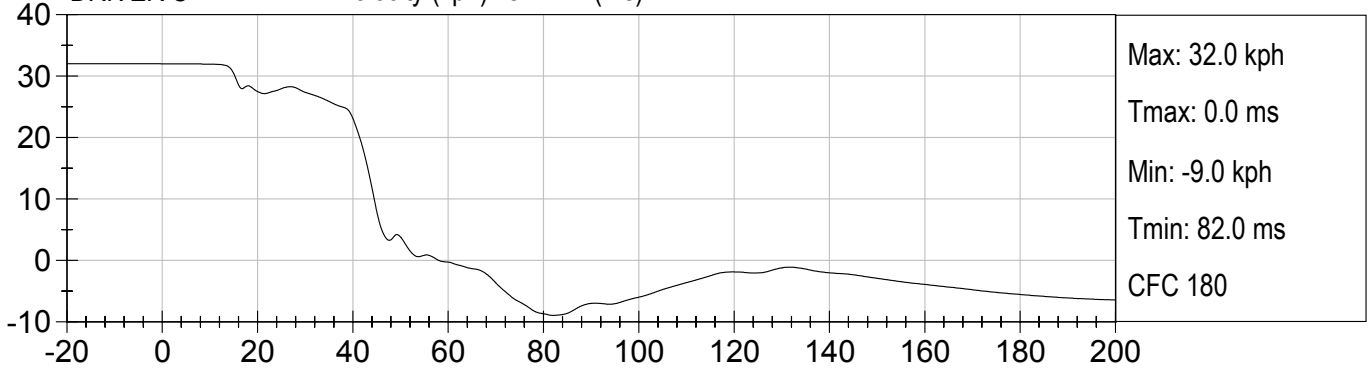
DRIVER LOWER RIB Y (G's) vs TIME (ms)



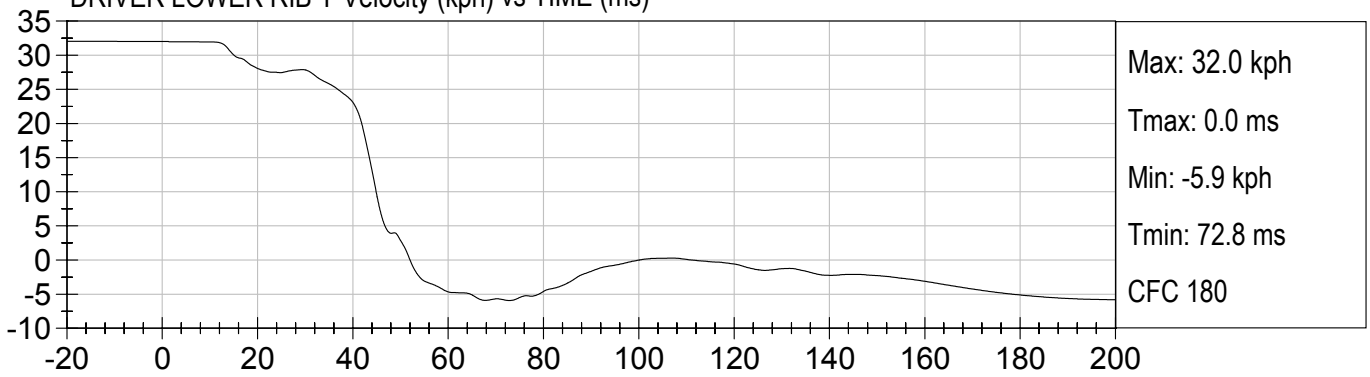
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

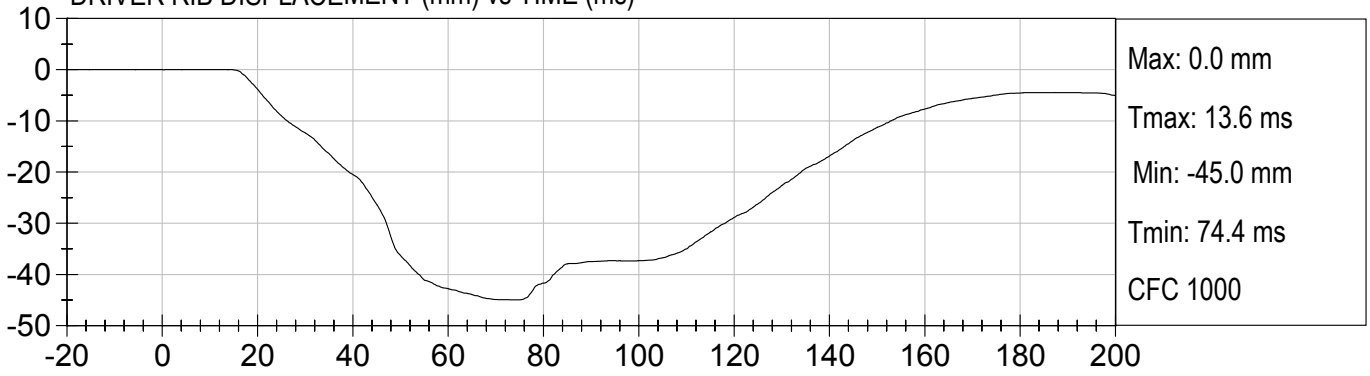
DRIVER UPPER RIB Y Velocity (kph) vs TIME (ms)



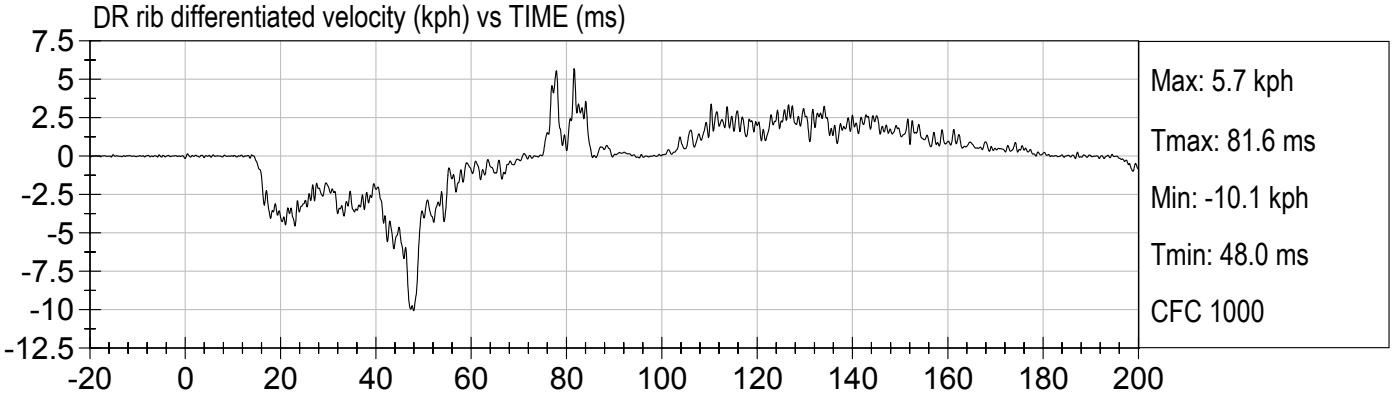
DRIVER LOWER RIB Y Velocity (kph) vs TIME (ms)



DRIVER RIB DISPLACEMENT (mm) vs TIME (ms)



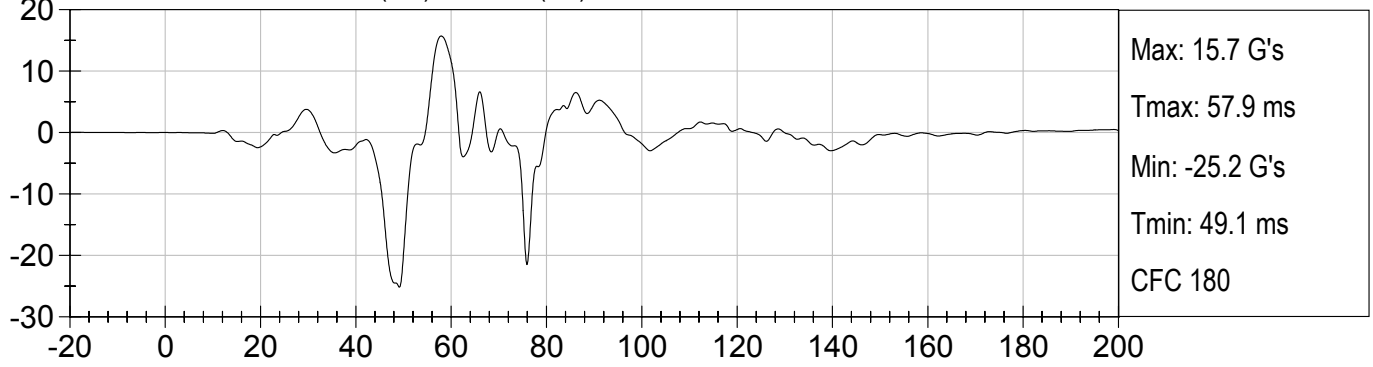
DR rib differentiated velocity (kph) vs TIME (ms)



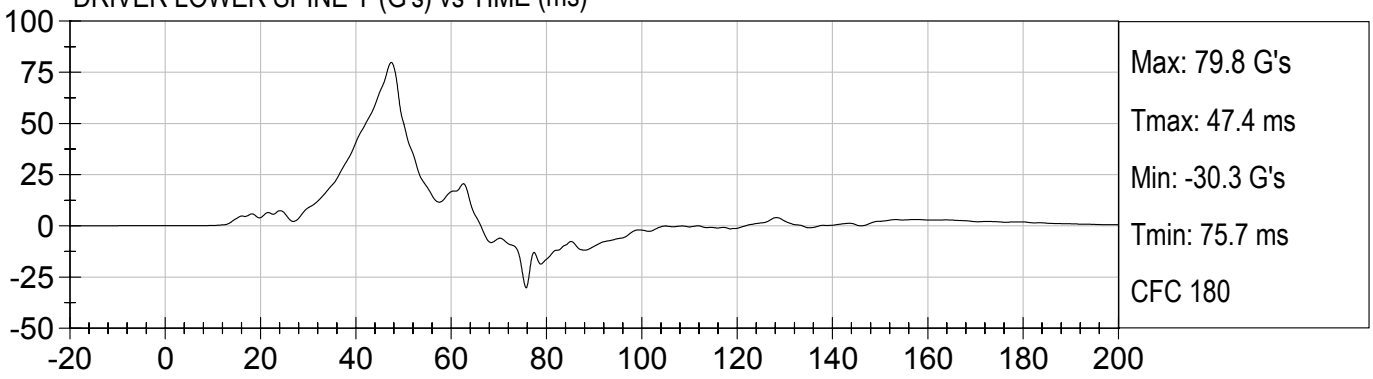
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

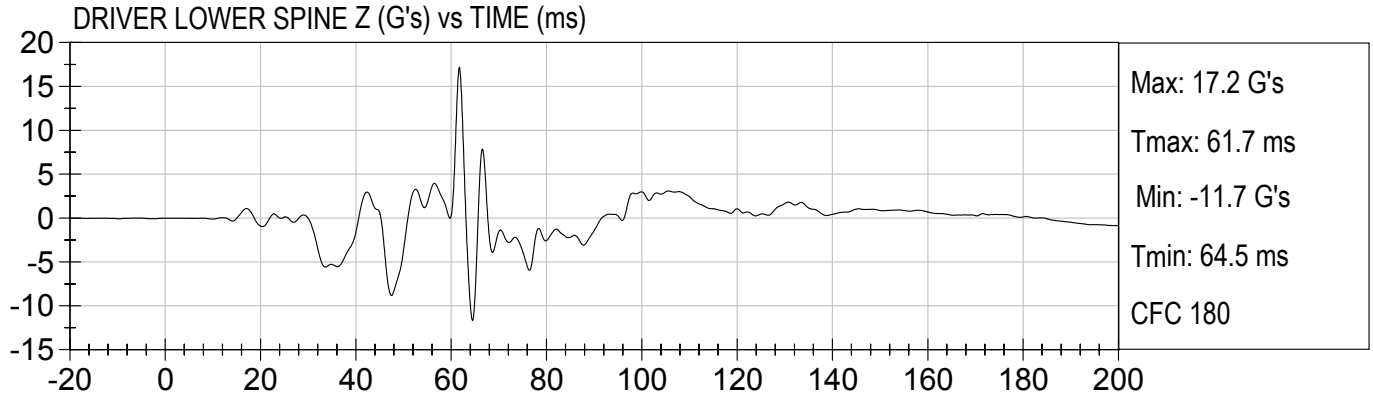
DRIVER LOWER SPINE X (G's) vs TIME (ms)



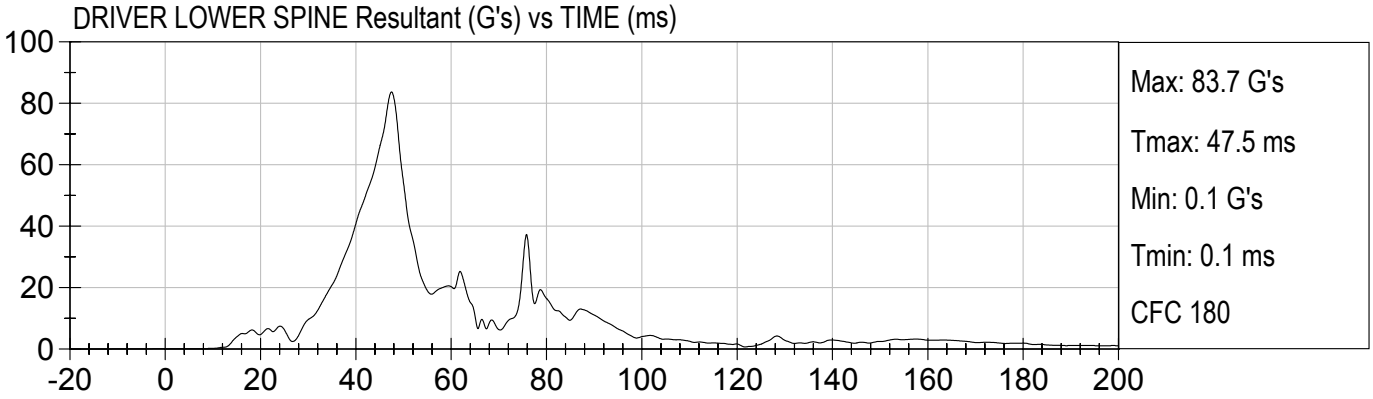
DRIVER LOWER SPINE Y (G's) vs TIME (ms)

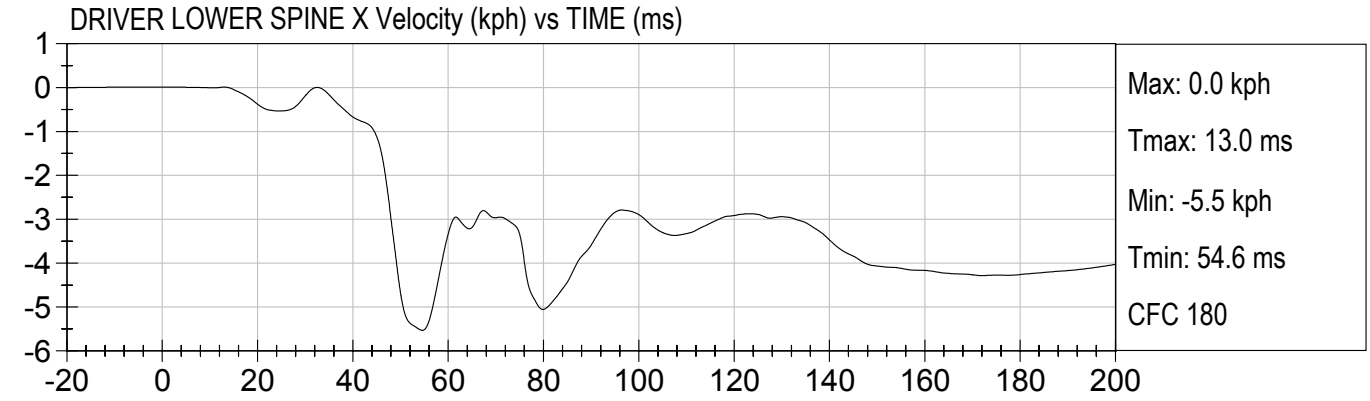


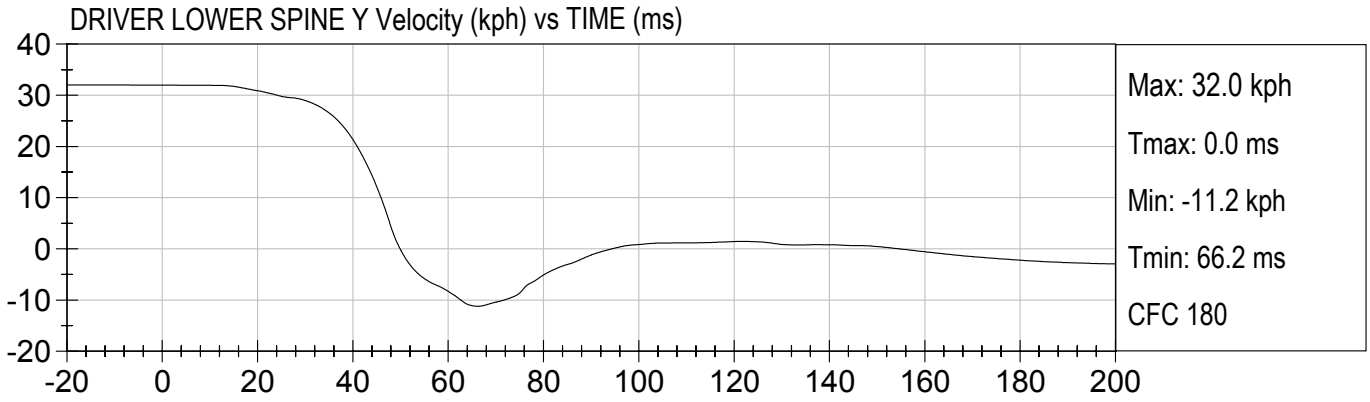
DRIVER LOWER SPINE Z (G's) vs TIME (ms)

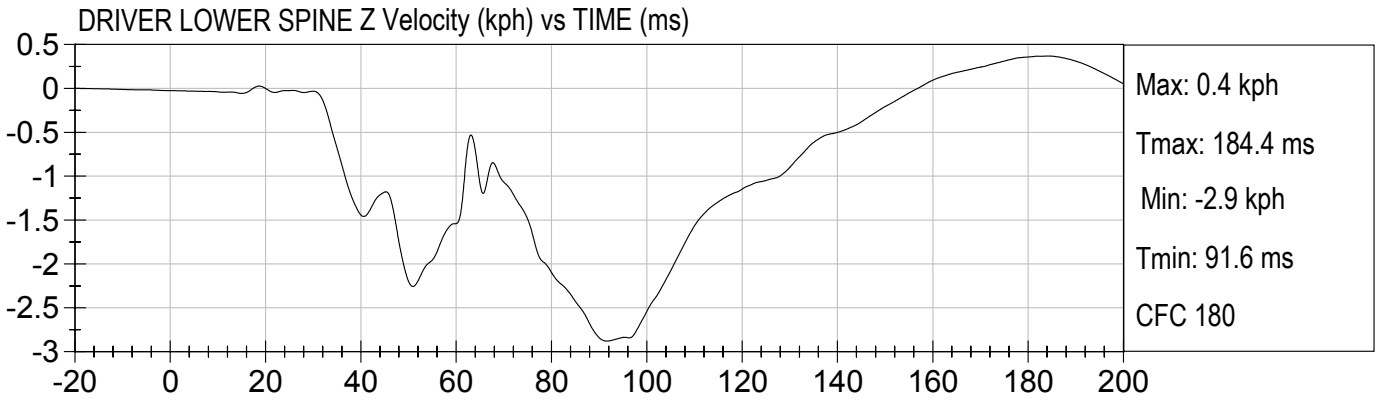


DRIVER LOWER SPINE Resultant (G's) vs TIME (ms)




DRIVER LOWER SPINE X Velocity (kph) vs TIME (ms)
1
0
-1
-2
-3
-4
-5
-6
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.0 kph
Tmax: 13.0 ms
Min: -5.5 kph
Tmin: 54.6 ms
CFC 180

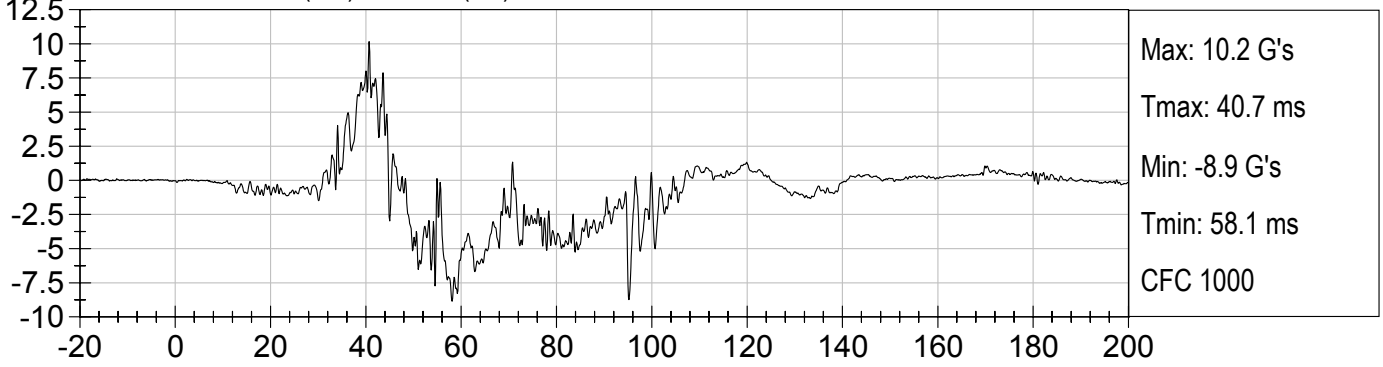

DRIVER LOWER SPINE Y Velocity (kph) vs TIME (ms)
40
30
20
10
0
-10
-20
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 32.0 kph
Tmax: 0.0 ms
Min: -11.2 kph
Tmin: 66.2 ms
CFC 180


DRIVER LOWER SPINE Z Velocity (kph) vs TIME (ms)
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.4 kph
Tmax: 184.4 ms
Min: -2.9 kph
Tmin: 91.6 ms
CFC 180

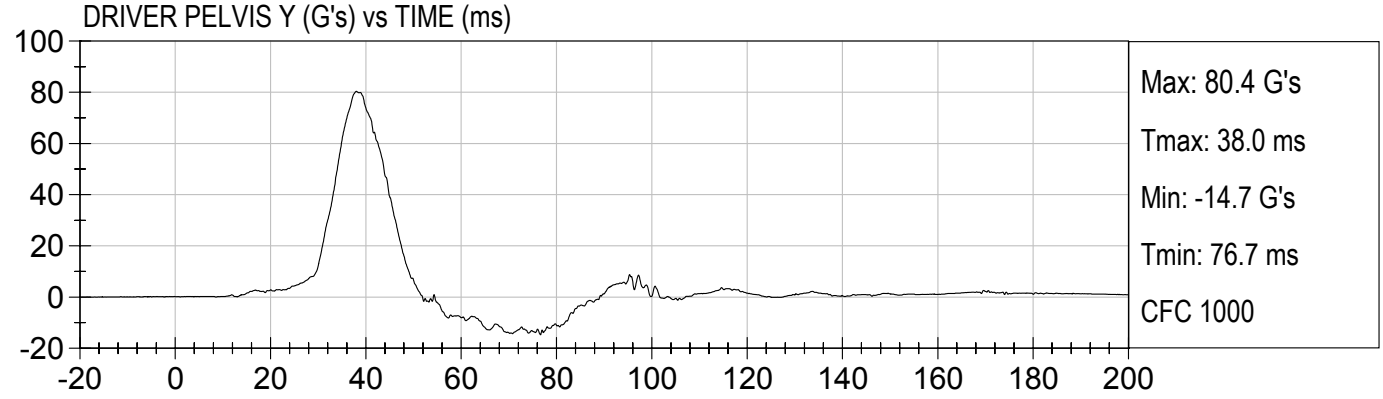
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

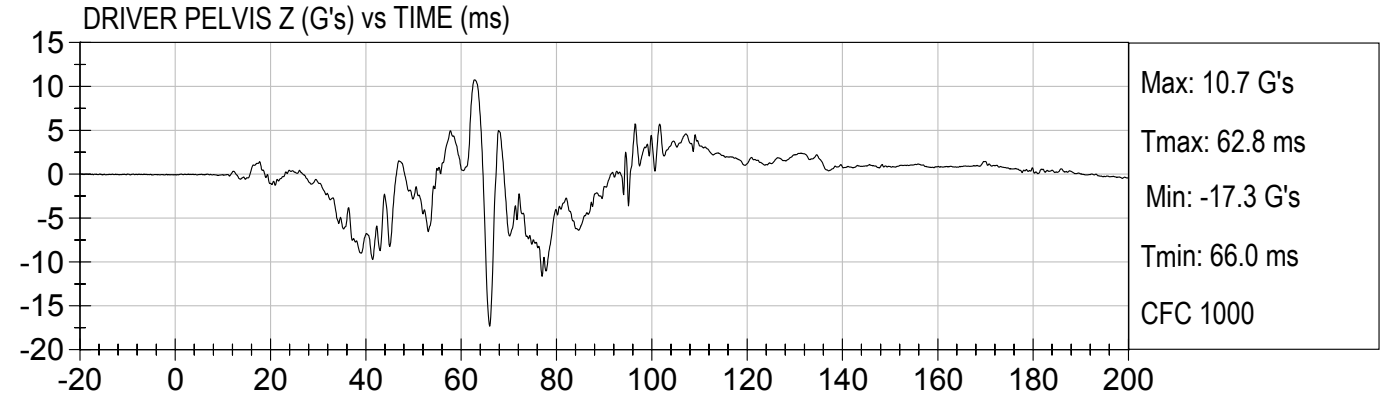
DRIVER PELVIS X (G's) vs TIME (ms)



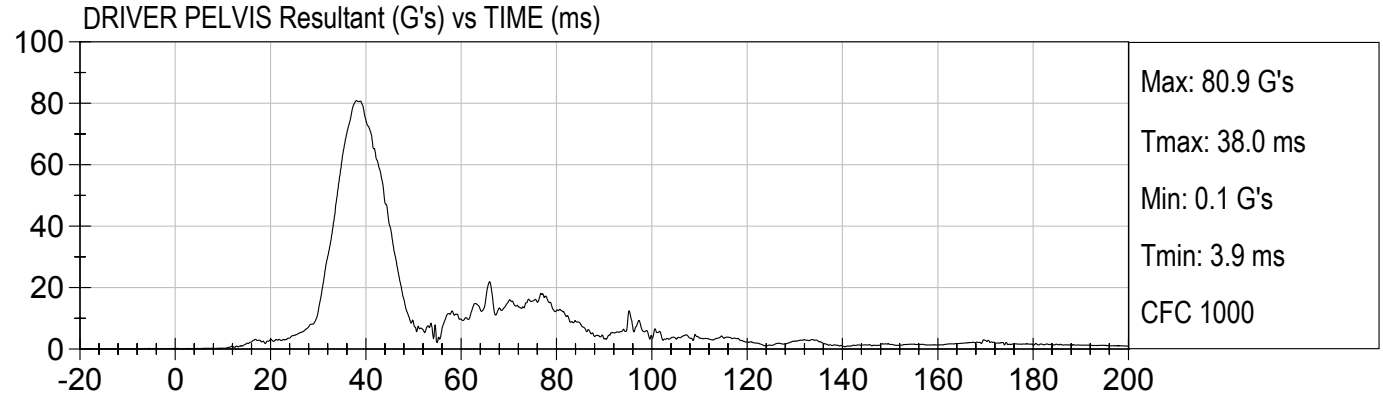
DRIVER PELVIS Y (G's) vs TIME (ms)

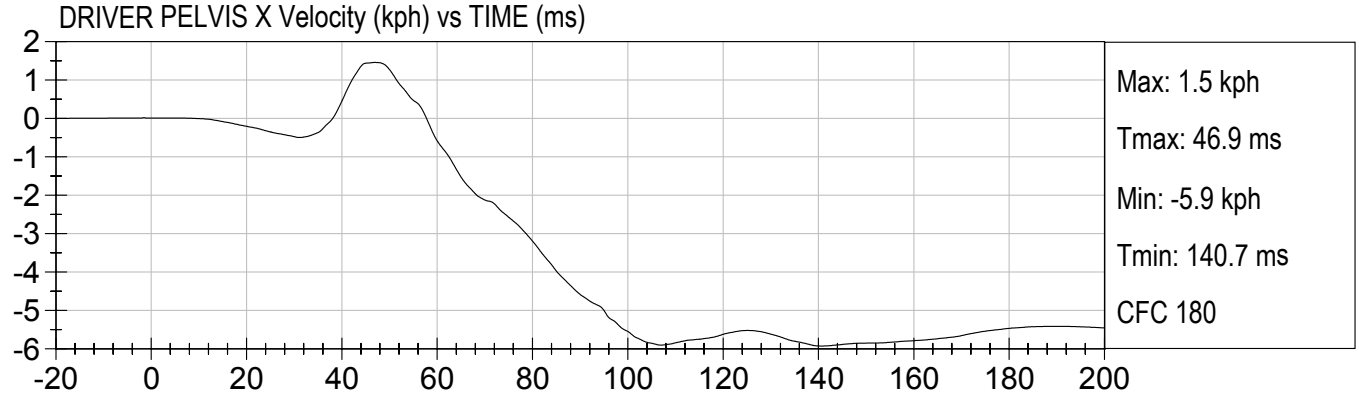


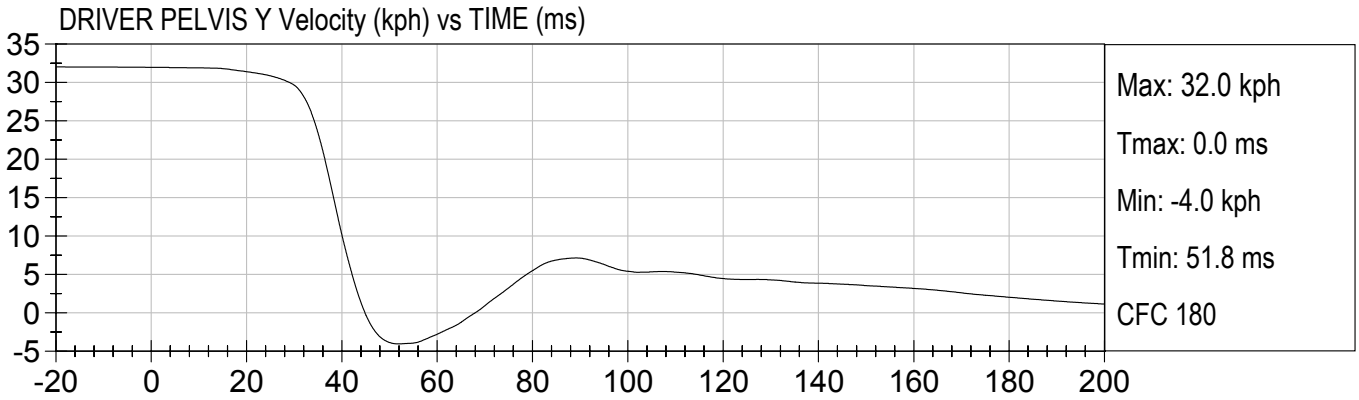
DRIVER PELVIS Z (G's) vs TIME (ms)

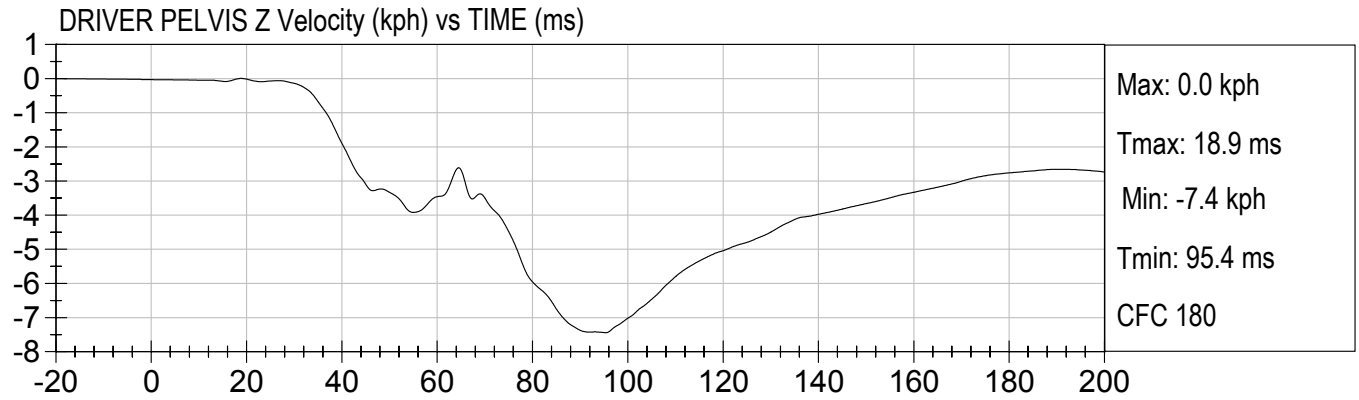


DRIVER PELVIS Resultant (G's) vs TIME (ms)




DRIVER PELVIS X Velocity (kph) vs TIME (ms)
Max: 1.5 kph
Tmax: 46.9 ms
Min: -5.9 kph
Tmin: 140.7 ms
CFC 180

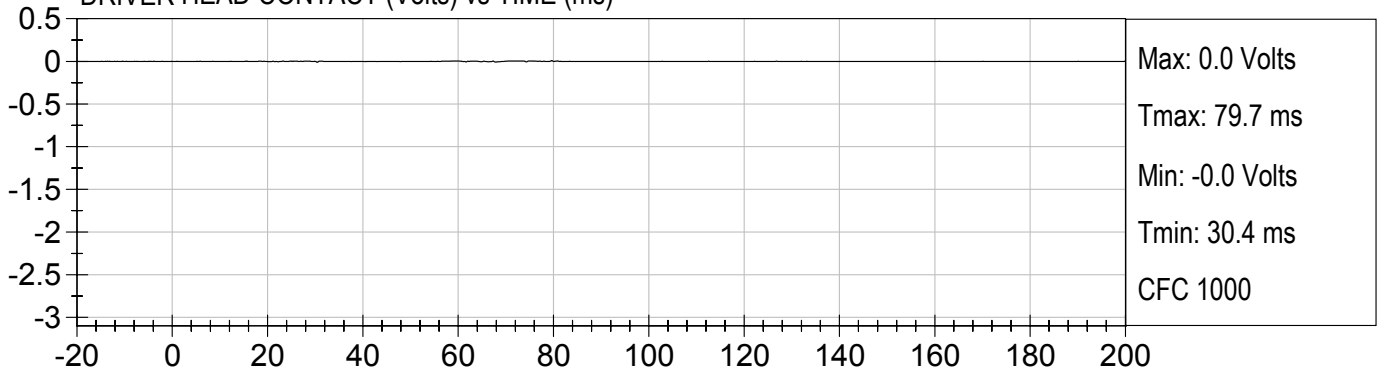

DRIVER PELVIS Y Velocity (kph) vs TIME (ms)
Max: 32.0 kph
Tmax: 0.0 ms
Min: -4.0 kph
Tmin: 51.8 ms
CFC 180


DRIVER PELVIS Z Velocity (kph) vs TIME (ms)
Max: 0.0 kph
Tmax: 18.9 ms
Min: -7.4 kph
Tmin: 95.4 ms
CFC 180

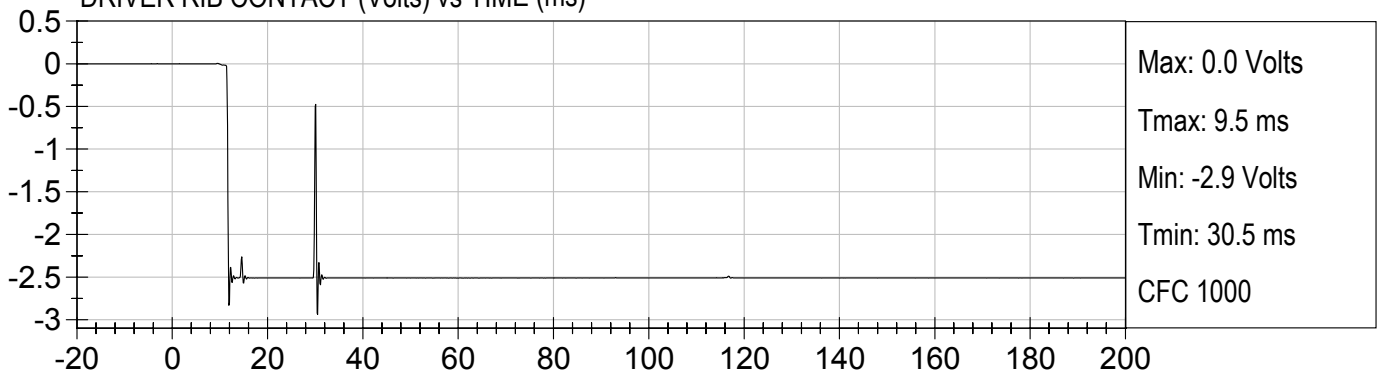
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

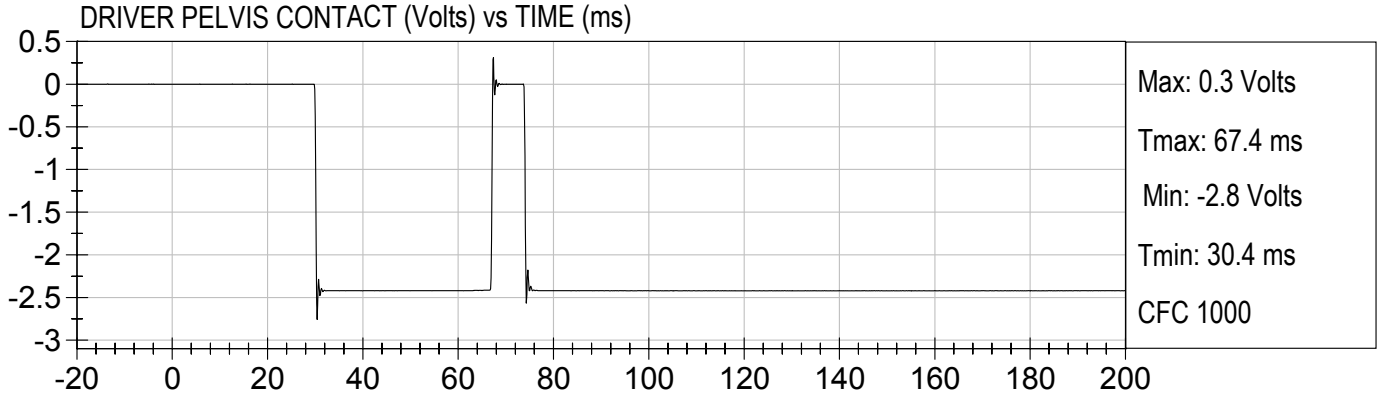
DRIVER HEAD CONTACT (Volts) vs TIME (ms)



DRIVER RIB CONTACT (Volts) vs TIME (ms)



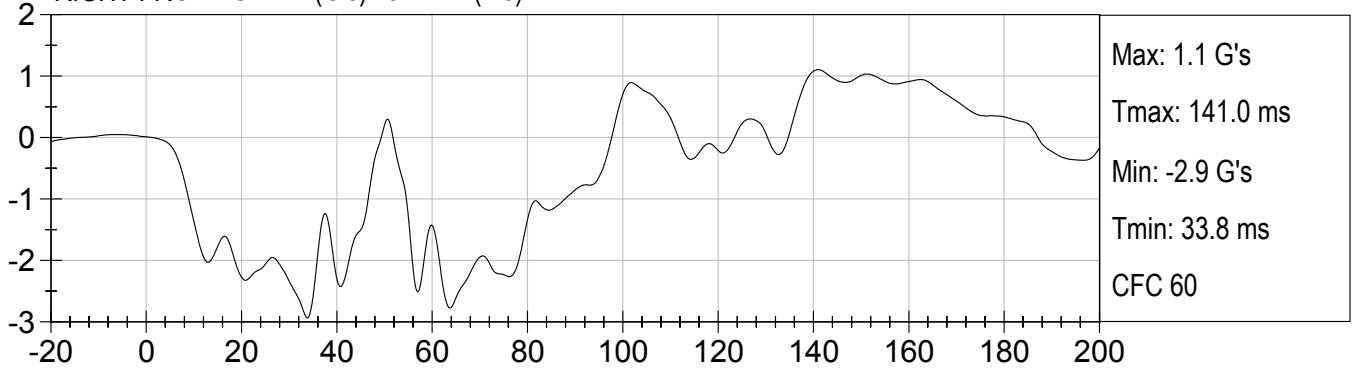
DRIVER PELVIS CONTACT (Volts) vs TIME (ms)



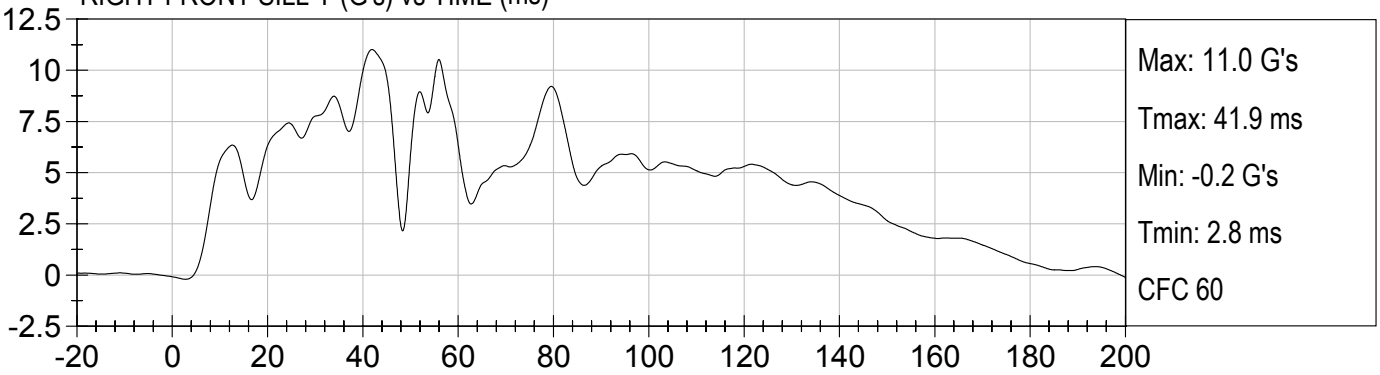
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

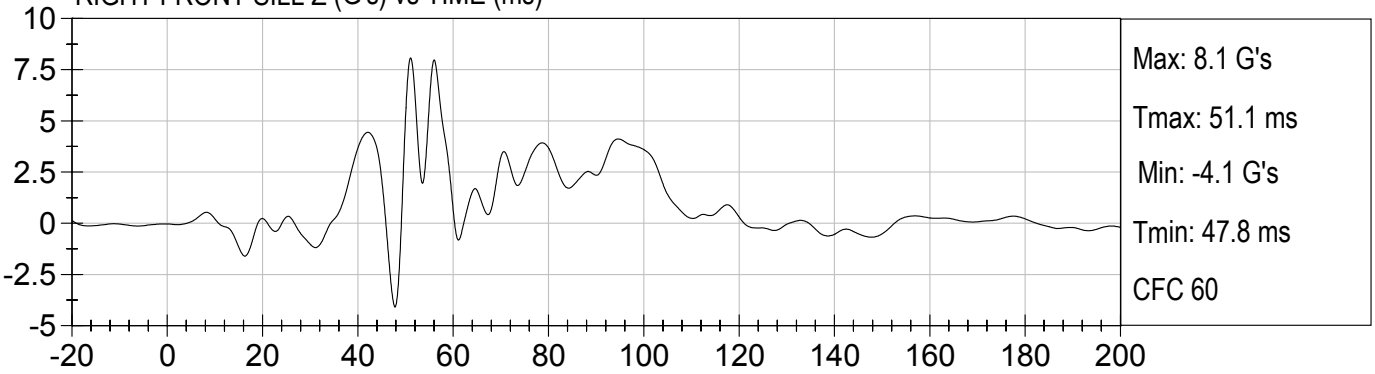
RIGHT FRONT SILL X (G's) vs TIME (ms)



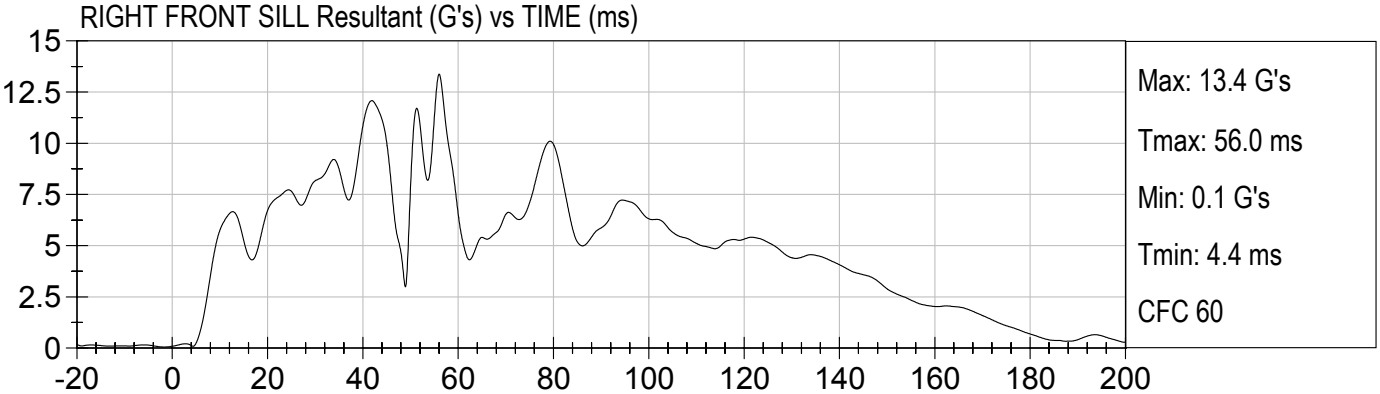
RIGHT FRONT SILL Y (G's) vs TIME (ms)

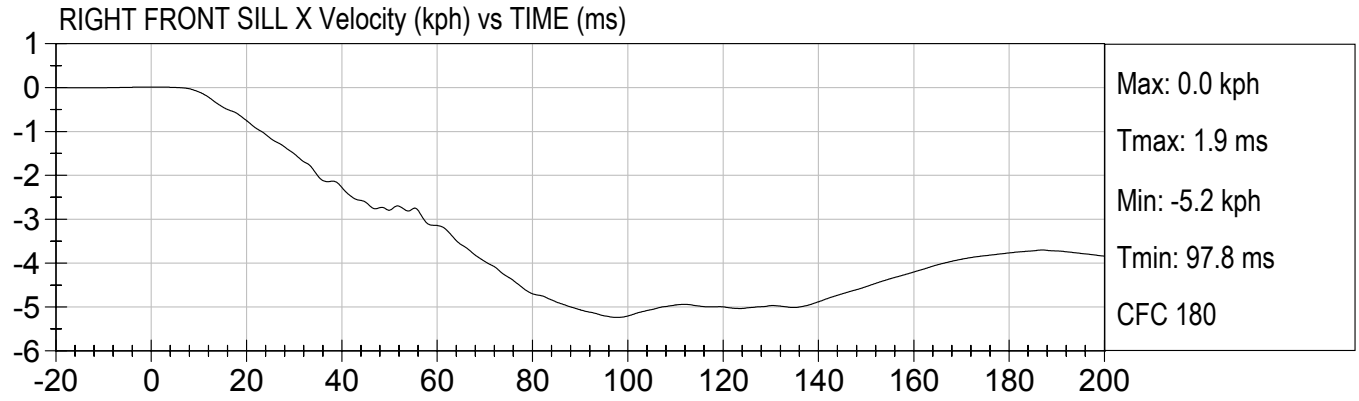


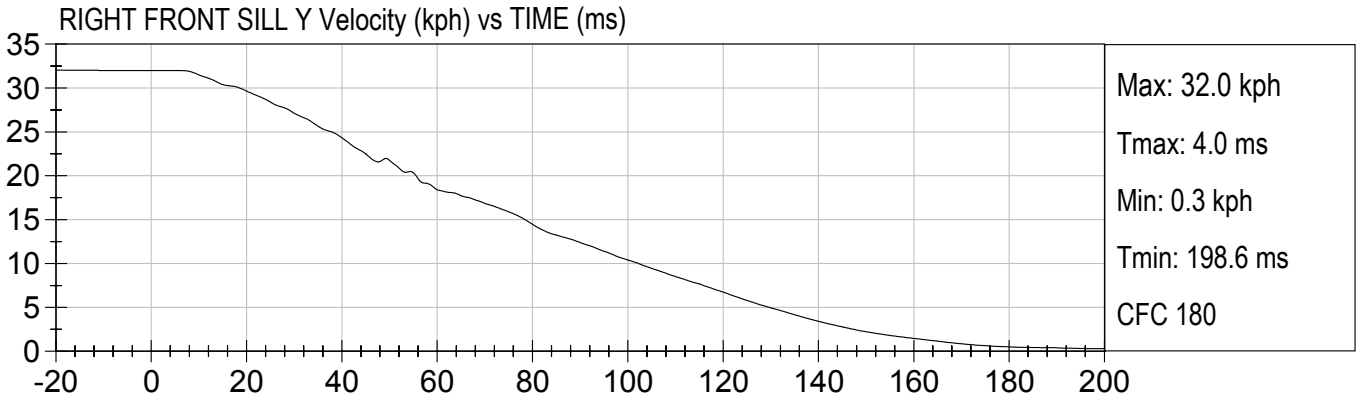
RIGHT FRONT SILL Z (G's) vs TIME (ms)

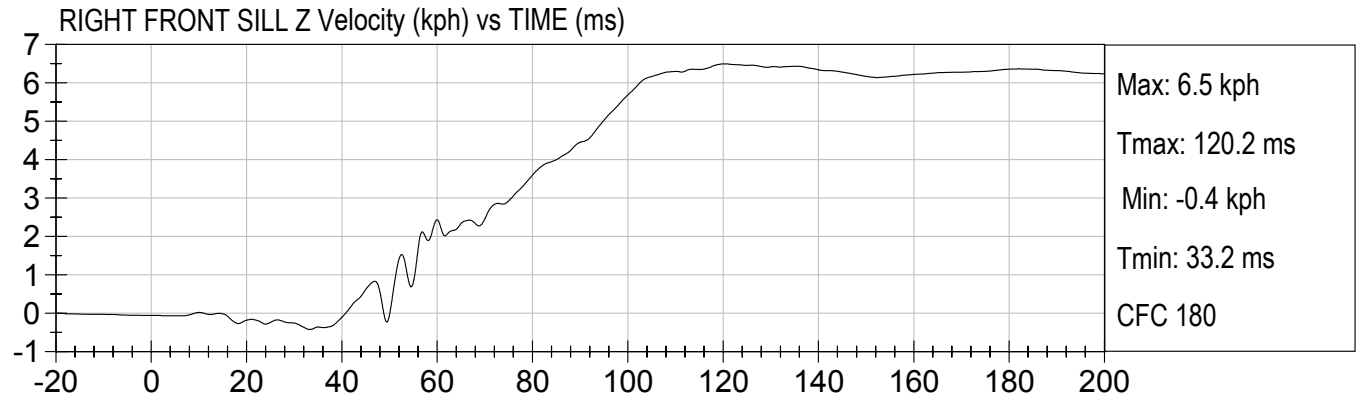


RIGHT FRONT SILL Resultant (G's) vs TIME (ms)

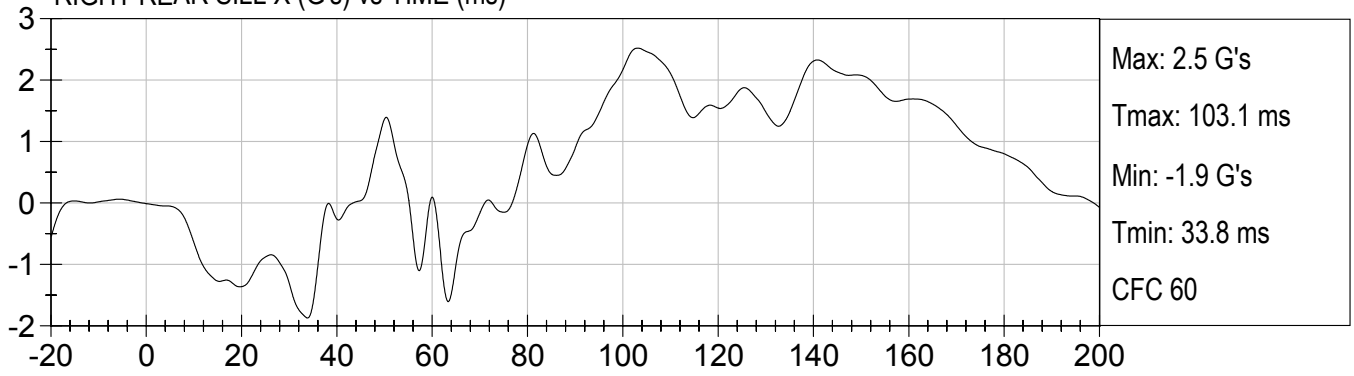



RIGHT FRONT SILL X Velocity (kph) vs TIME (ms)
1
0
-1
-2
-3
-4
-5
-6
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.0 kph
Tmax: 1.9 ms
Min: -5.2 kph
Tmin: 97.8 ms
CFC 180

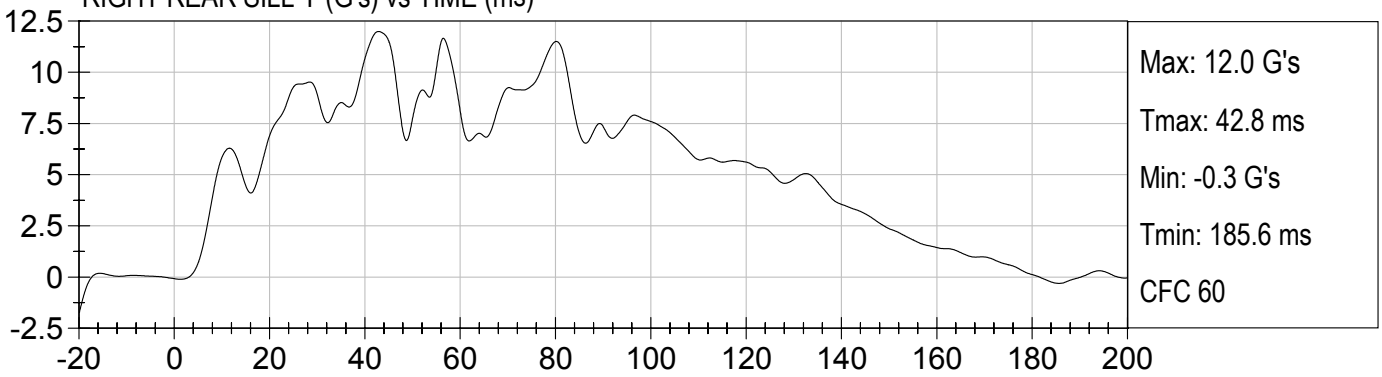

RIGHT FRONT SILL Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 32.0 kph
Tmax: 4.0 ms
Min: 0.3 kph
Tmin: 198.6 ms
CFC 180


RIGHT FRONT SILL Z Velocity (kph) vs TIME (ms)
7
6
5
4
3
2
1
0
-1
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 6.5 kph
Tmax: 120.2 ms
Min: -0.4 kph
Tmin: 33.2 ms
CFC 180

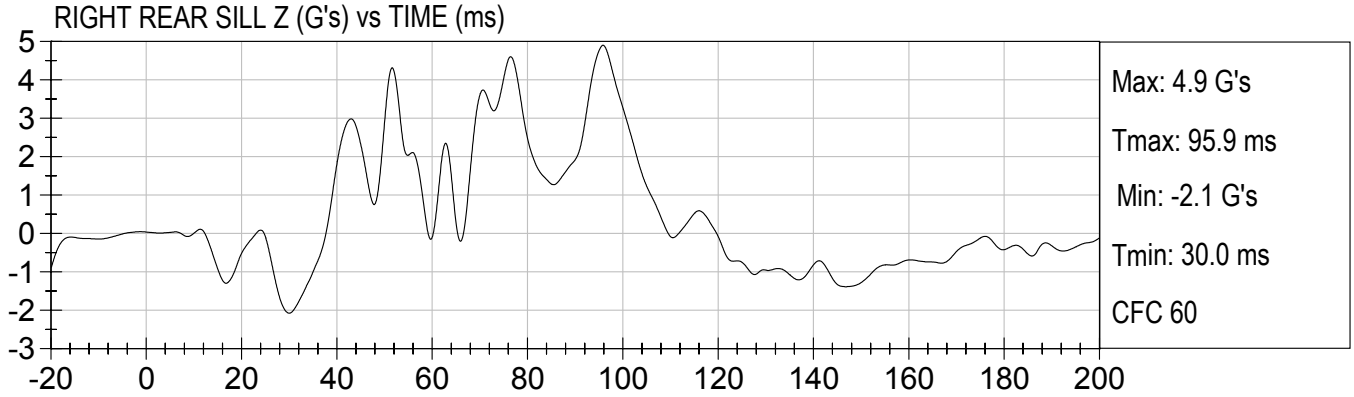
RIGHT REAR SILL X (G's) vs TIME (ms)



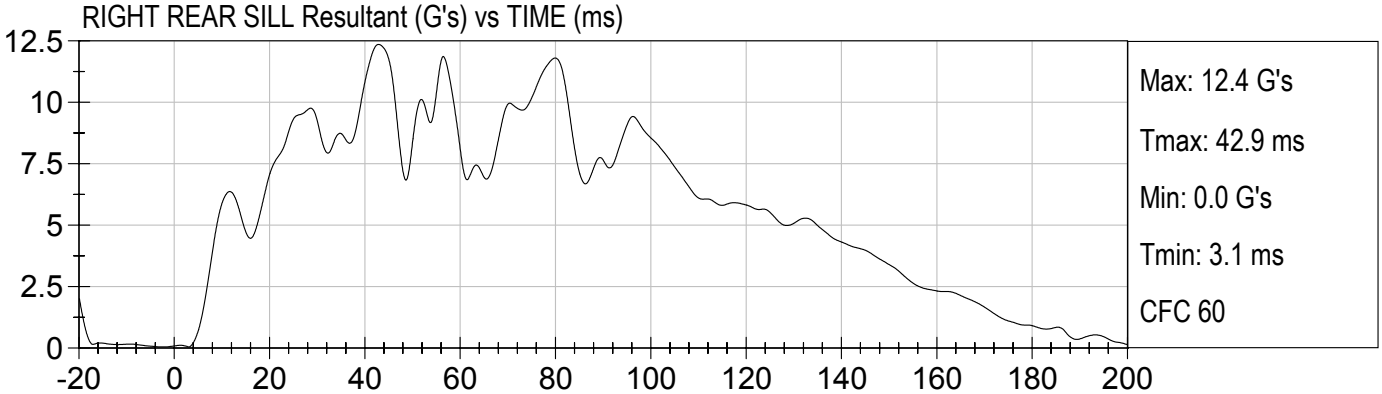
RIGHT REAR SILL Y (G's) vs TIME (ms)

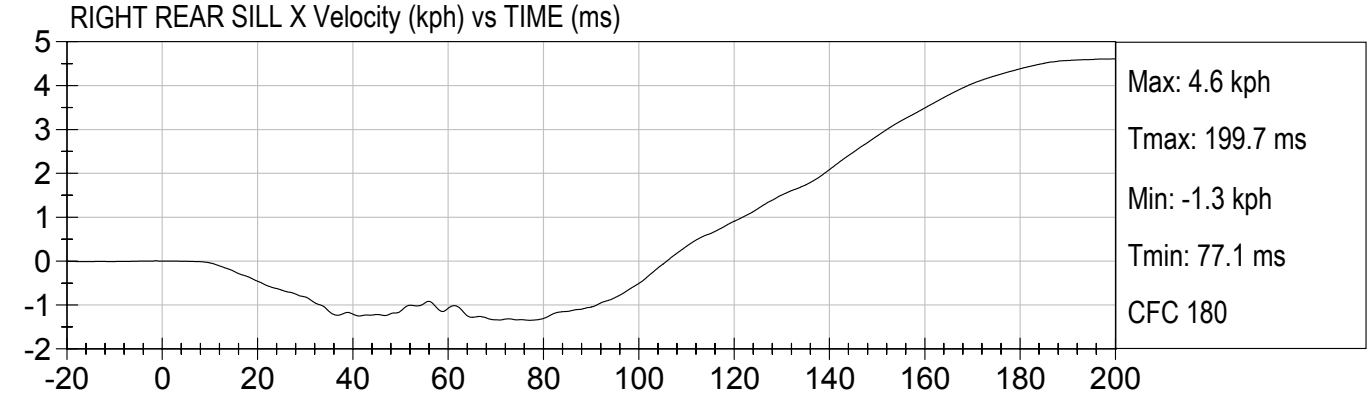


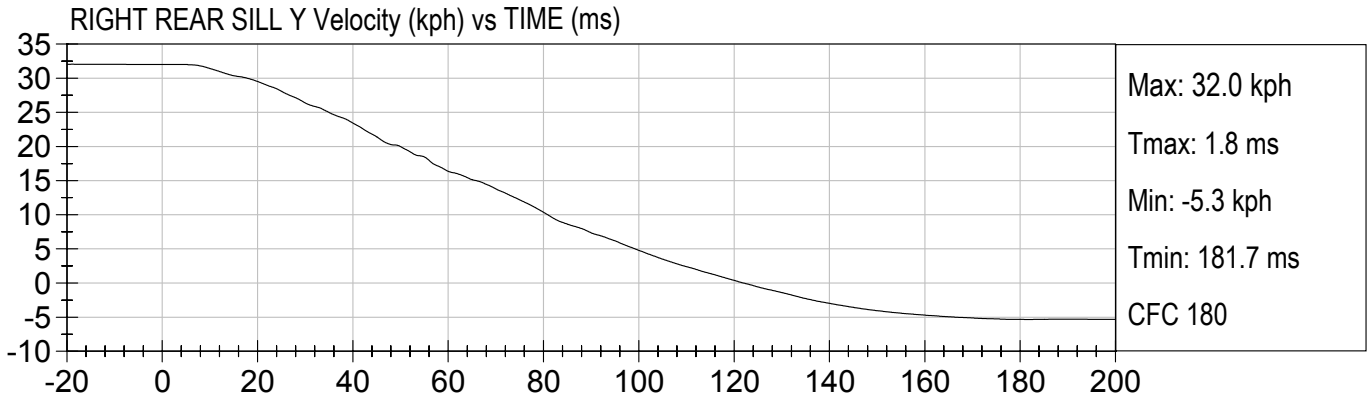
RIGHT REAR SILL Z (G's) vs TIME (ms)

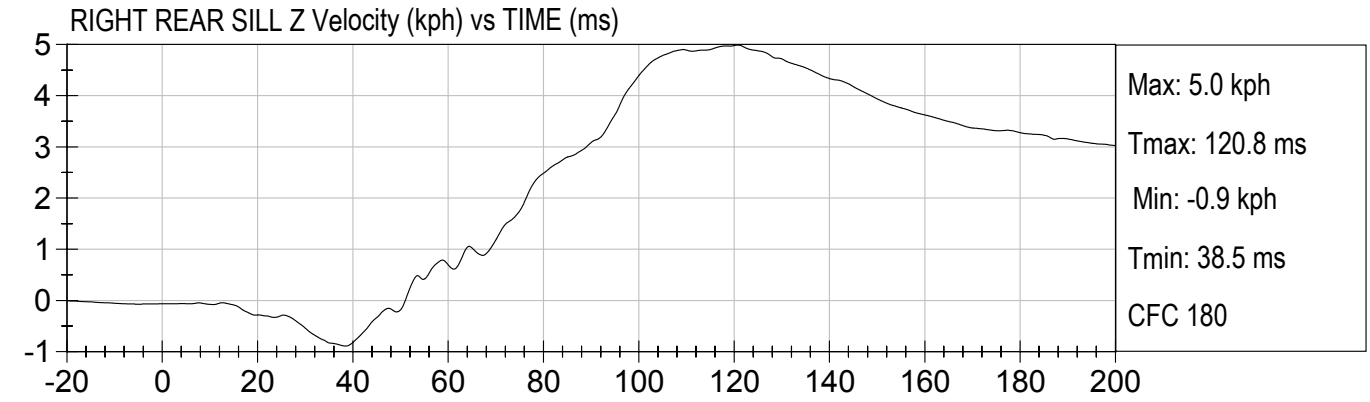


RIGHT REAR SILL Resultant (G's) vs TIME (ms)




RIGHT REAR SILL X Velocity (kph) vs TIME (ms)
5
4
3
2
1
0
-1
-2
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 4.6 kph
Tmax: 199.7 ms
Min: -1.3 kph
Tmin: 77.1 ms
CFC 180

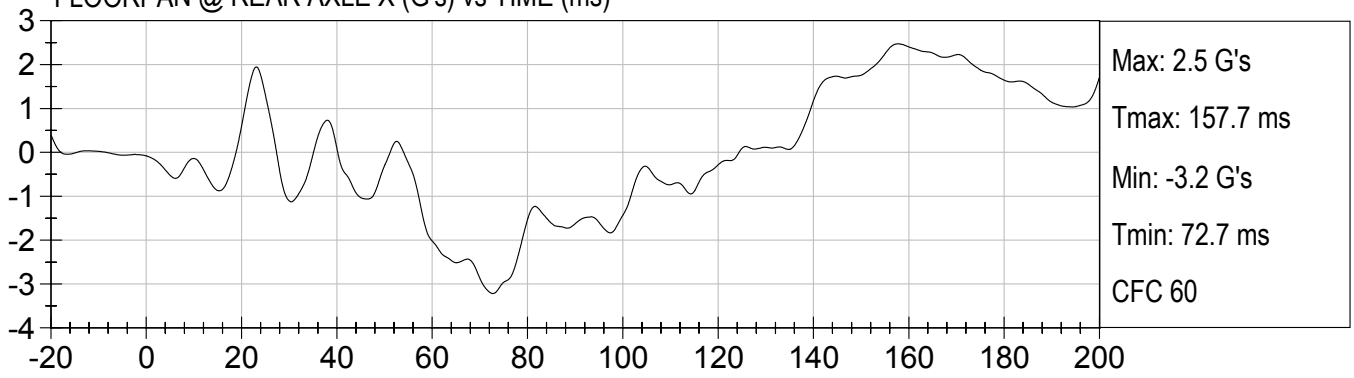

RIGHT REAR SILL Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 32.0 kph
Tmax: 1.8 ms
Min: -5.3 kph
Tmin: 181.7 ms
CFC 180


RIGHT REAR SILL Z Velocity (kph) vs TIME (ms)
5
4
3
2
1
0
-1
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 5.0 kph
Tmax: 120.8 ms
Min: -0.9 kph
Tmin: 38.5 ms
CFC 180

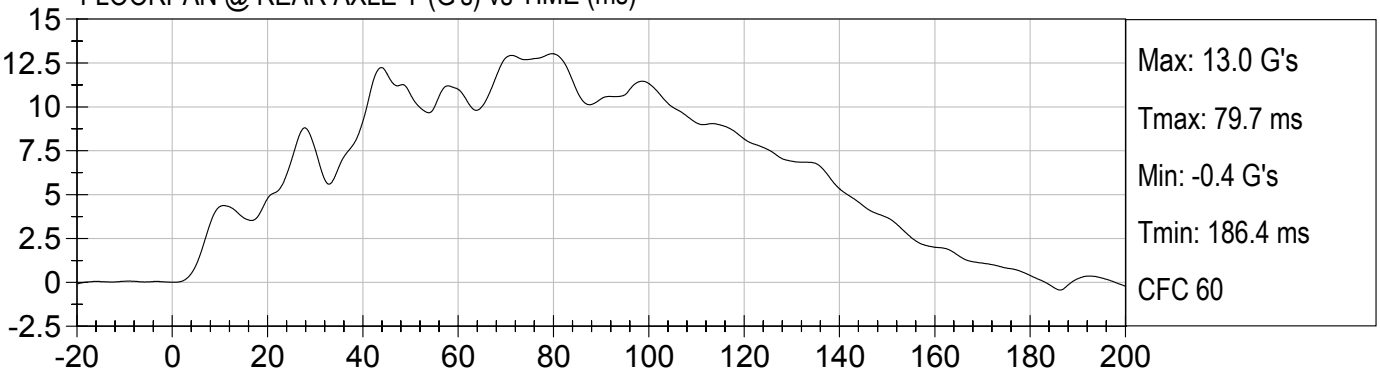
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

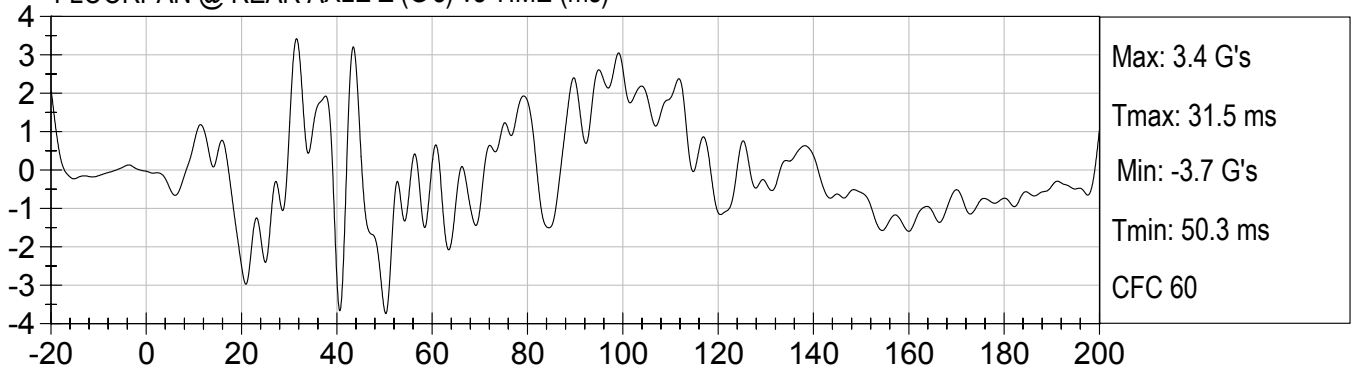
FLOORPAN @ REAR AXLE X (G's) vs TIME (ms)



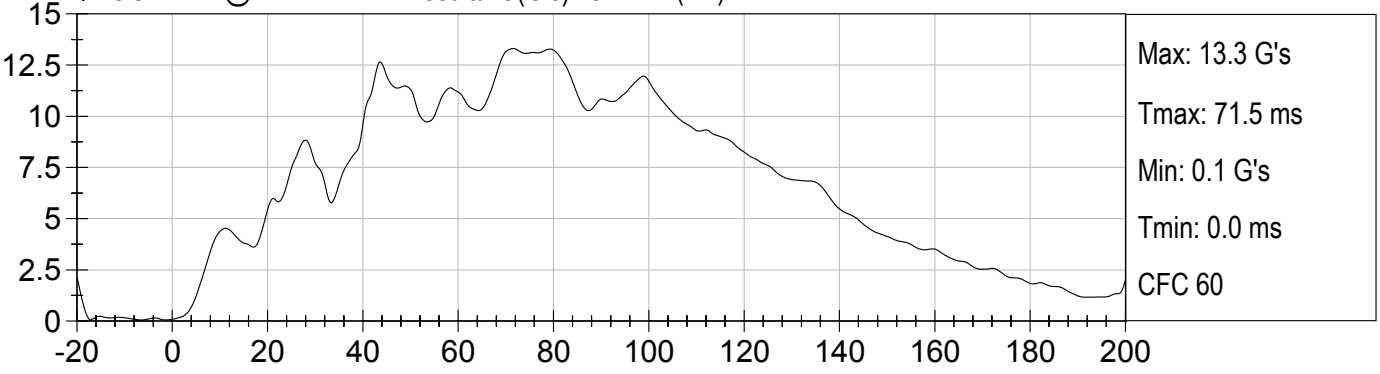
FLOORPAN @ REAR AXLE Y (G's) vs TIME (ms)

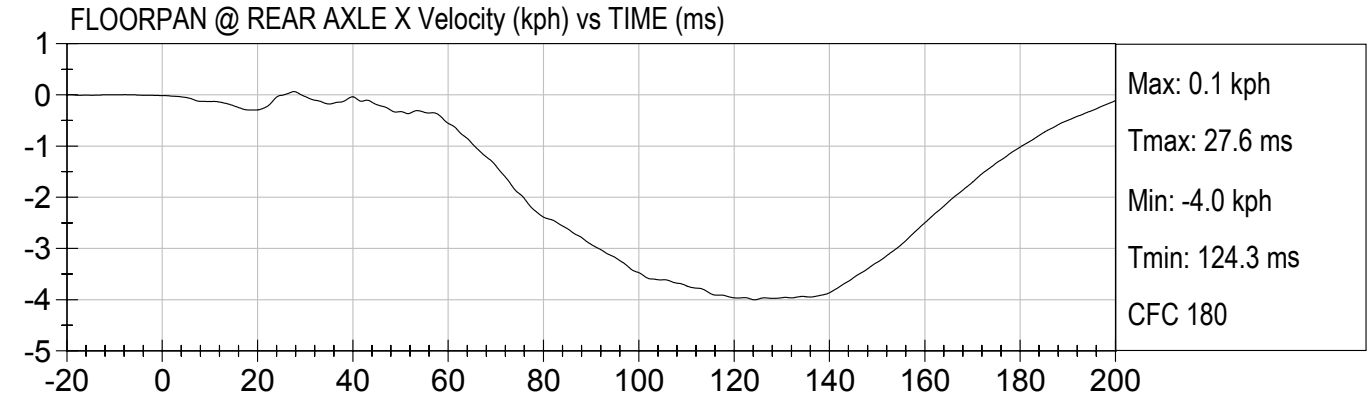


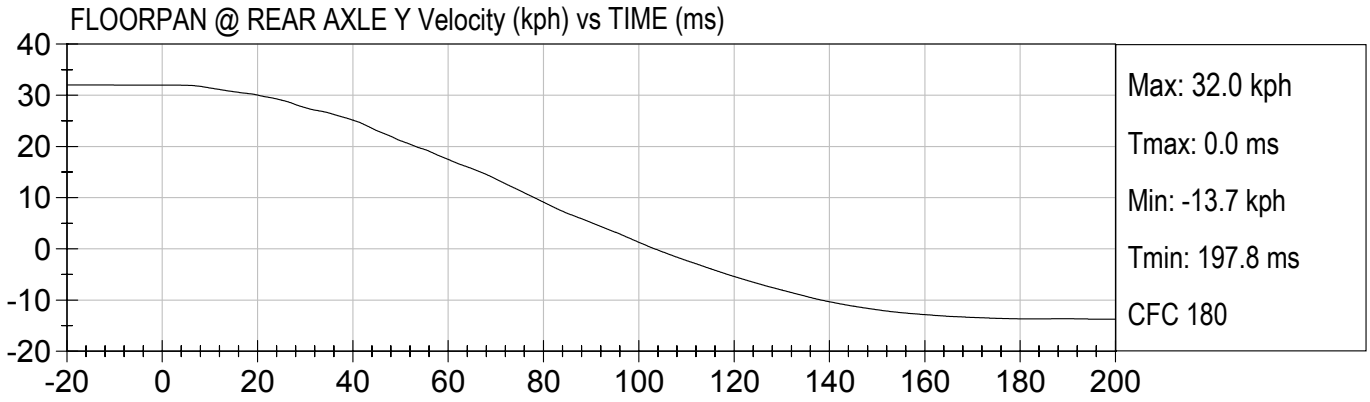
FLOORPAN @ REAR AXLE Z (G's) vs TIME (ms)

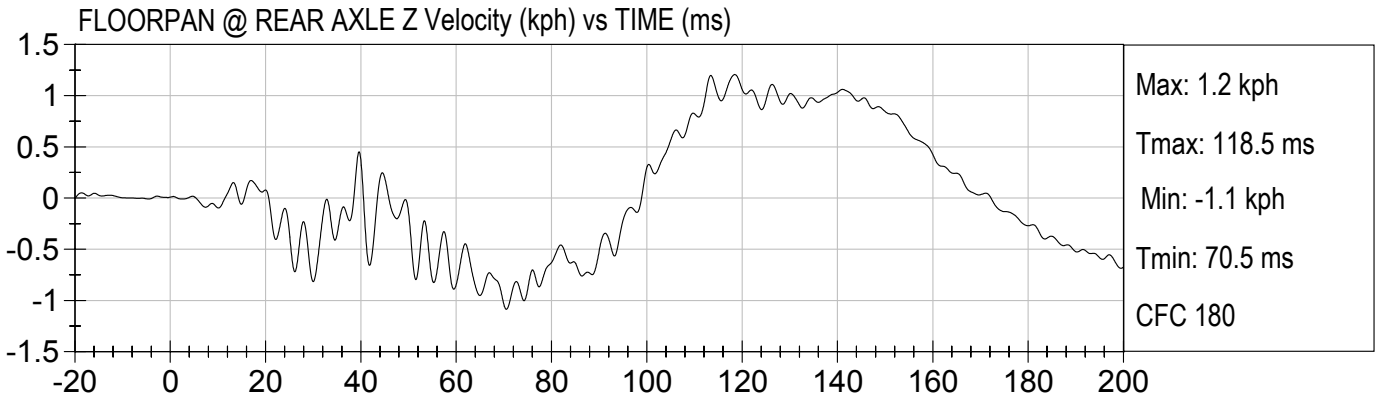


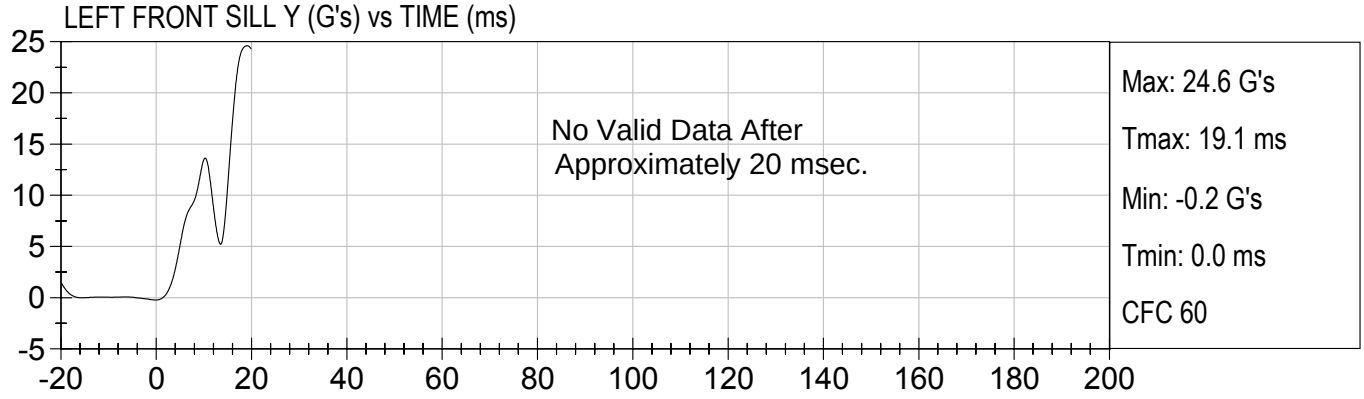
FLOORPAN @ REAR AXLE Resultant (G's) vs TIME (ms)

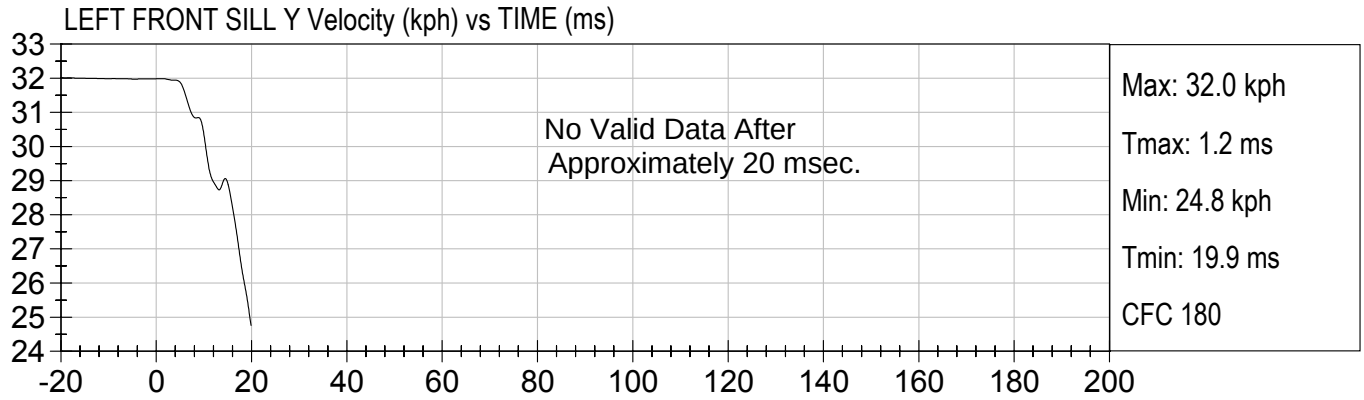


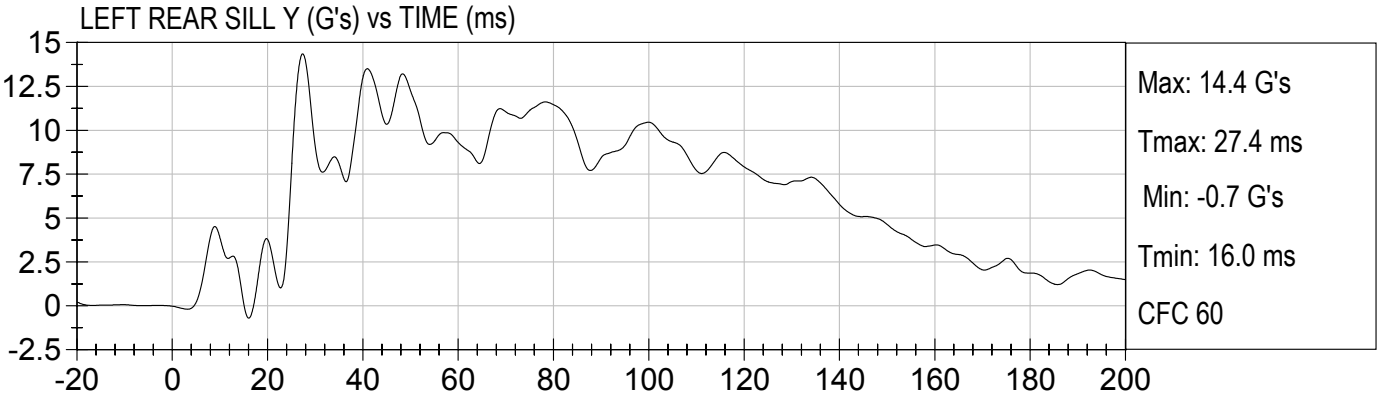

FLOORPAN @ REAR AXLE X Velocity (kph) vs TIME (ms)
1
0
-1
-2
-3
-4
-5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.1 kph
Tmax: 27.6 ms
Min: -4.0 kph
Tmin: 124.3 ms
CFC 180

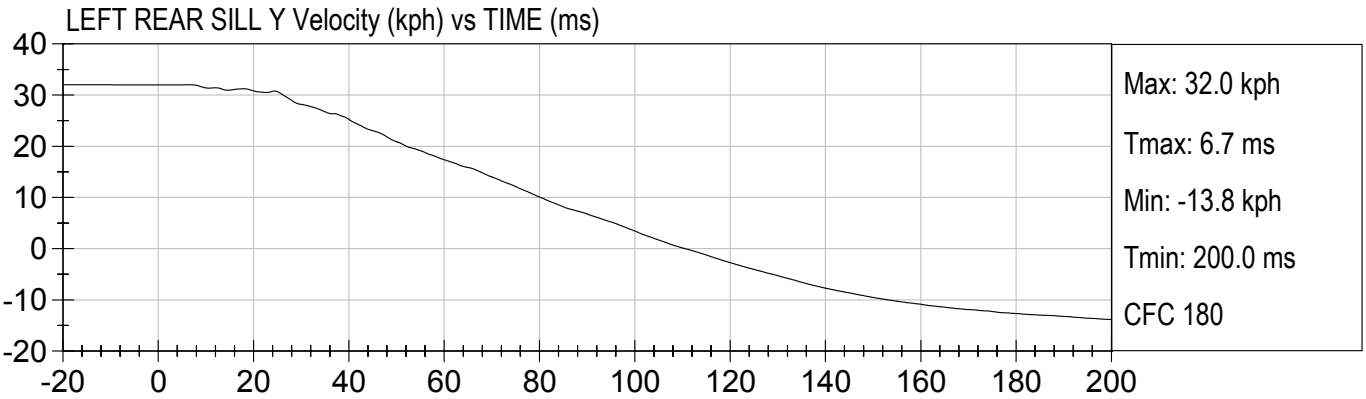

FLOORPAN @ REAR AXLE Y Velocity (kph) vs TIME (ms)
40
30
20
10
0
-10
-20
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 32.0 kph
Tmax: 0.0 ms
Min: -13.7 kph
Tmin: 197.8 ms
CFC 180

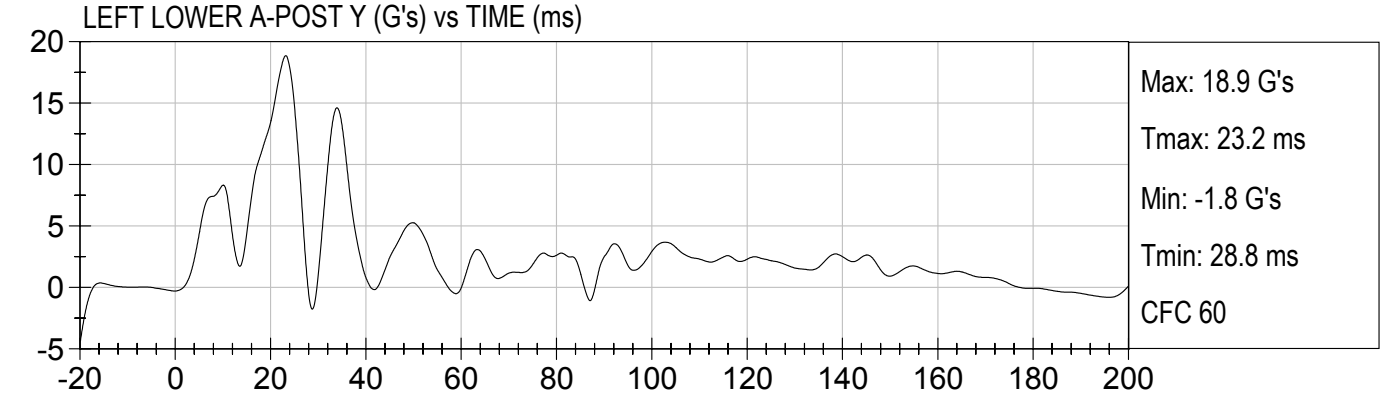

FLOORPAN @ REAR AXLE Z Velocity (kph) vs TIME (ms)
1.5
1
0.5
0
-0.5
-1
-1.5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 1.2 kph
Tmax: 118.5 ms
Min: -1.1 kph
Tmin: 70.5 ms
CFC 180

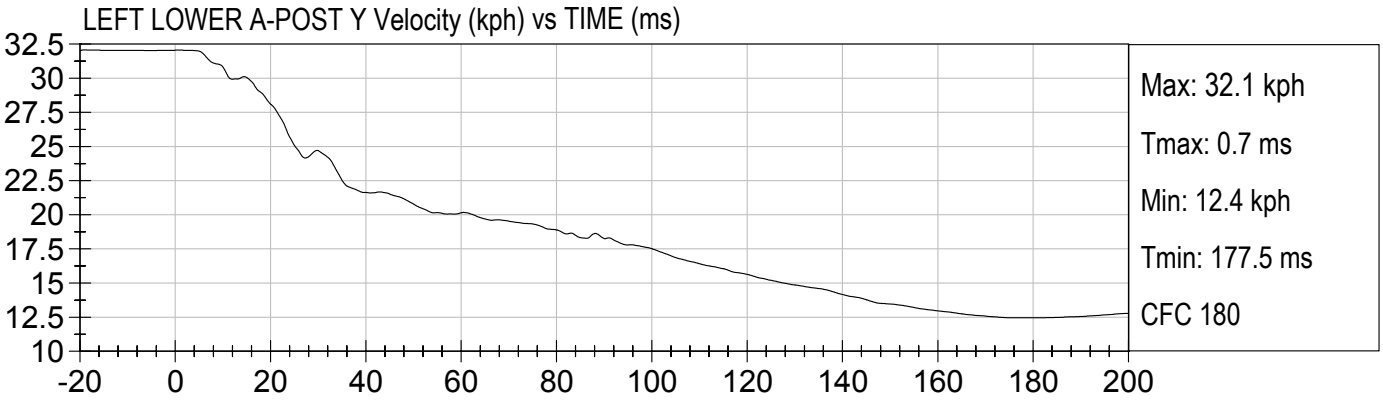

LEFT FRONT SILL Y (G's) vs TIME (ms)
No Valid Data After
Approximately 20 msec.
Max: 24.6 G's
Tmax: 19.1 ms
Min: -0.2 G's
Tmin: 0.0 ms
CFC 60

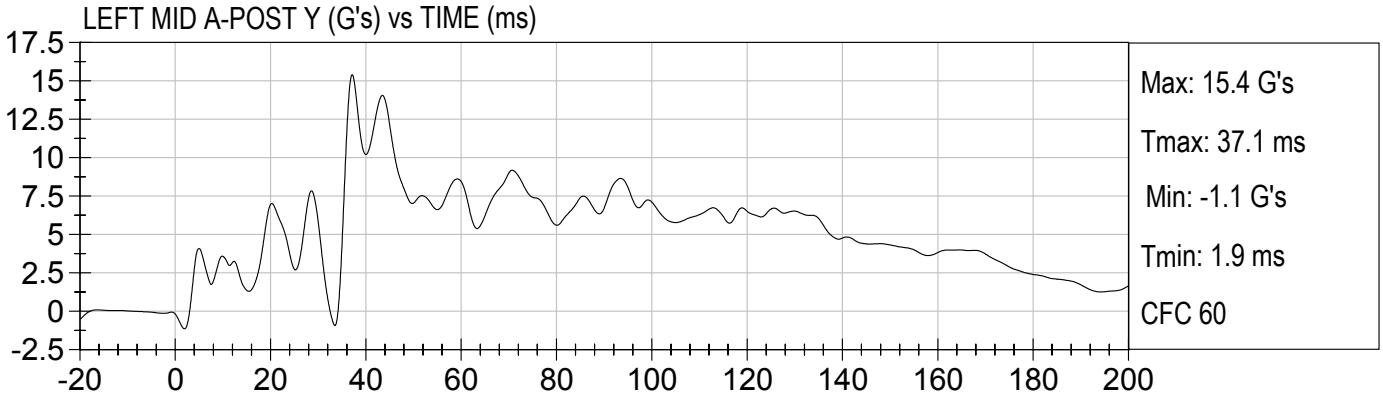

LEFT FRONT SILL Y Velocity (kph) vs TIME (ms)
No Valid Data After
Approximately 20 msec.
Max: 32.0 kph
Tmax: 1.2 ms
Min: 24.8 kph
Tmin: 19.9 ms
CFC 180

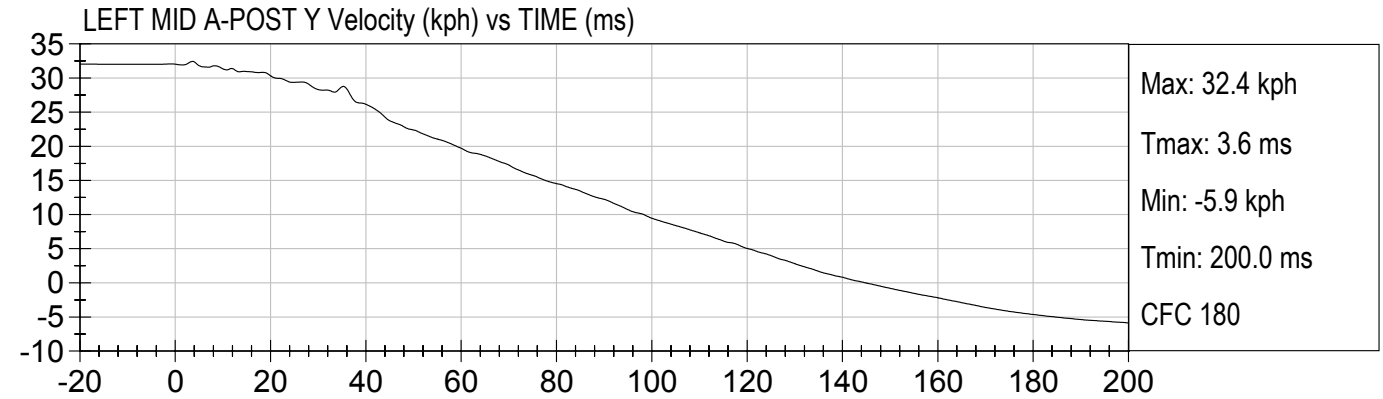

LEFT REAR SILL Y (G's) vs TIME (ms)
Max: 14.4 G's
Tmax: 27.4 ms
Min: -0.7 G's
Tmin: 16.0 ms
CFC 60


LEFT REAR SILL Y Velocity (kph) vs TIME (ms)
Max: 32.0 kph
Tmax: 6.7 ms
Min: -13.8 kph
Tmin: 200.0 ms
CFC 180


LEFT LOWER A-POST Y (G's) vs TIME (ms)
Max: 18.9 G's
Tmax: 23.2 ms
Min: -1.8 G's
Tmin: 28.8 ms
CFC 60


LEFT LOWER A-POST Y Velocity (kph) vs TIME (ms)
Max: 32.1 kph
Tmax: 0.7 ms
Min: 12.4 kph
Tmin: 177.5 ms
CFC 180

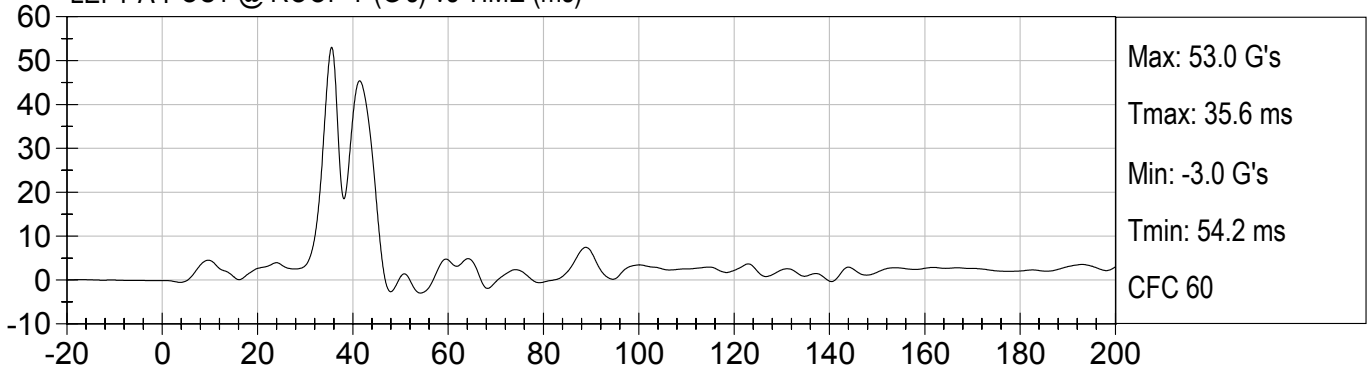

LEFT MID A-POST Y (G's) vs TIME (ms)
Max: 15.4 G's
Tmax: 37.1 ms
Min: -1.1 G's
Tmin: 1.9 ms
CFC 60


LEFT MID A-POST Y Velocity (kph) vs TIME (ms)
Max: 32.4 kph
Tmax: 3.6 ms
Min: -5.9 kph
Tmin: 200.0 ms
CFC 180

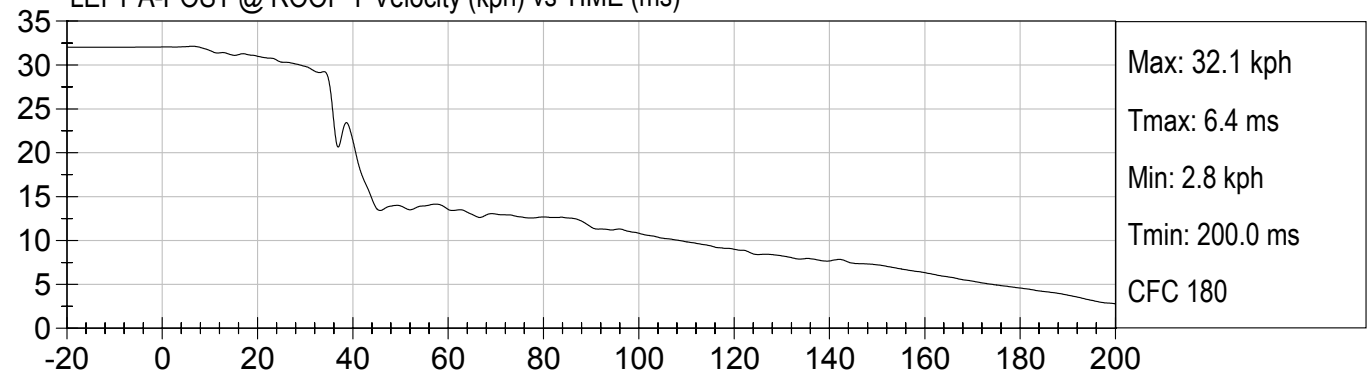
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

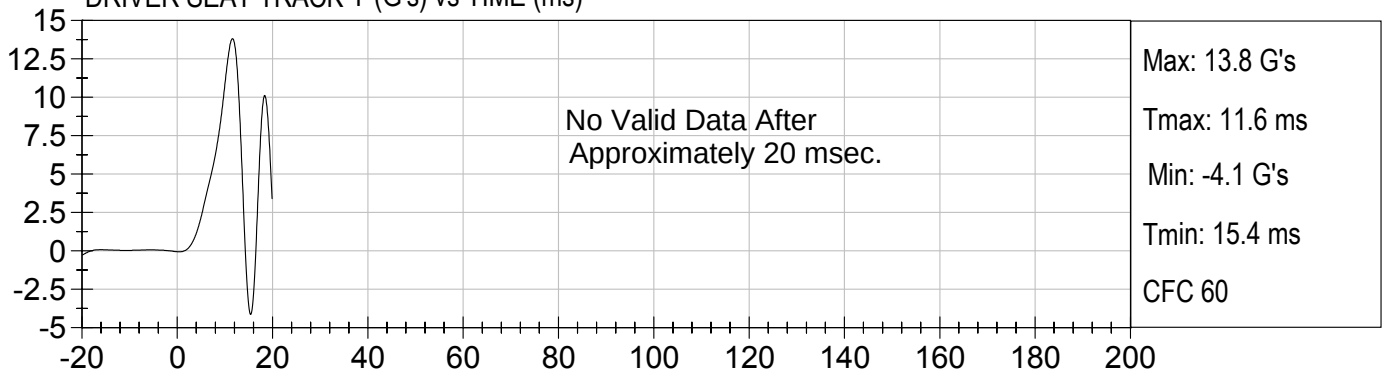
LEFT A-POST @ ROOF Y (G's) vs TIME (ms)



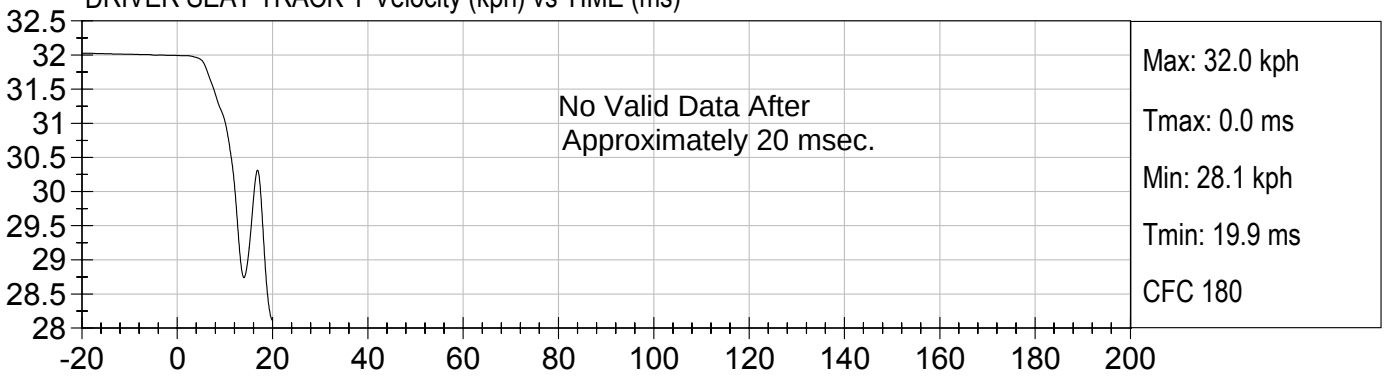
LEFT A-POST @ ROOF Y Velocity (kph) vs TIME (ms)

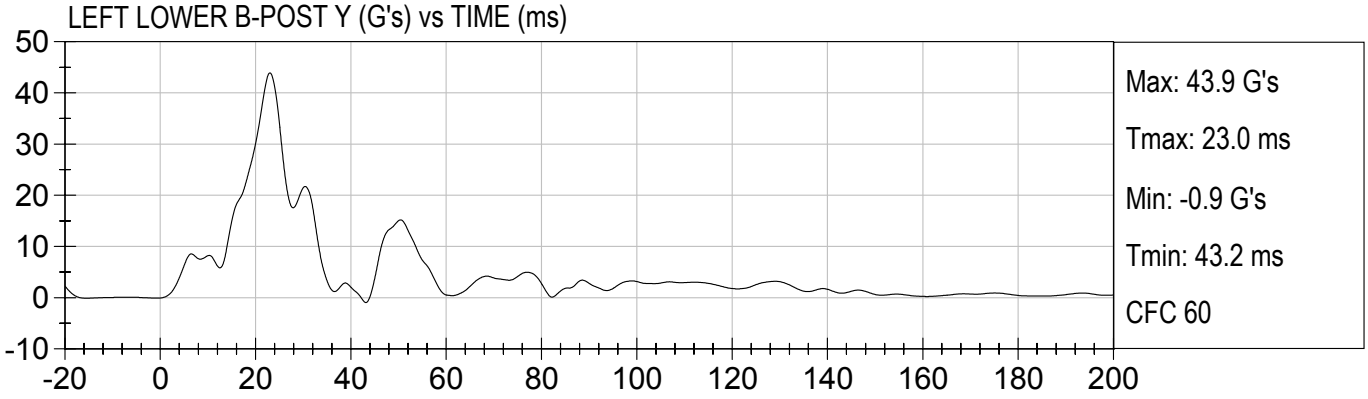


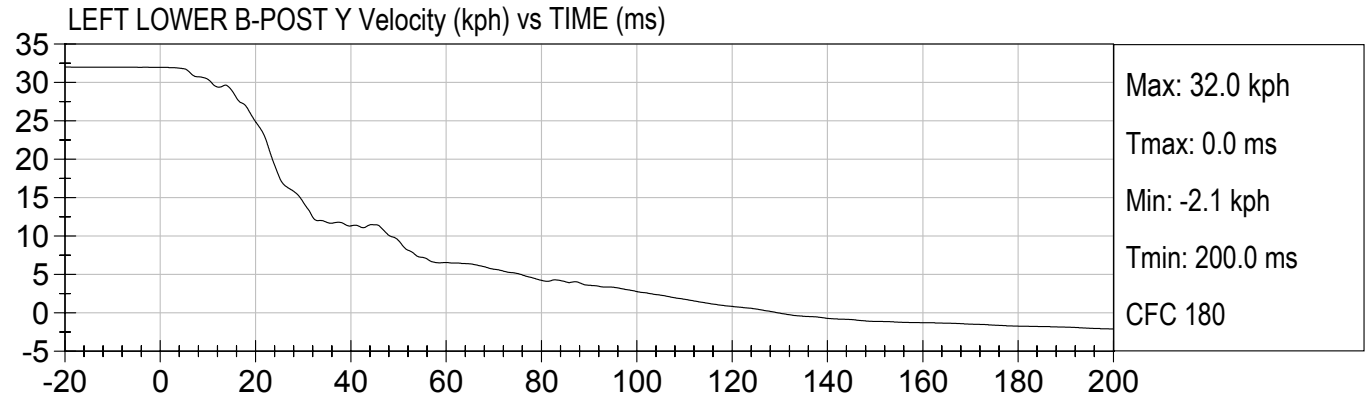
DRIVER SEAT TRACK Y (G's) vs TIME (ms)

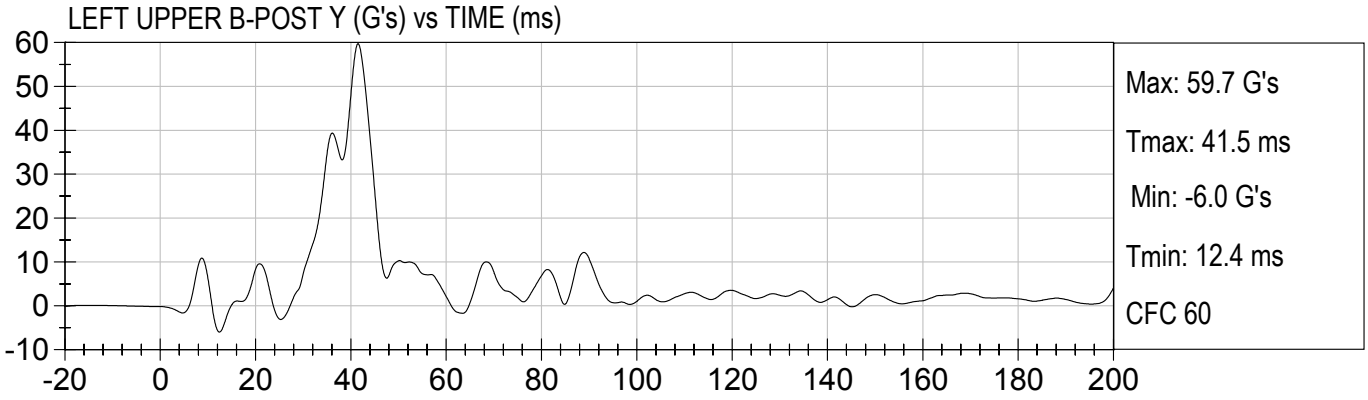


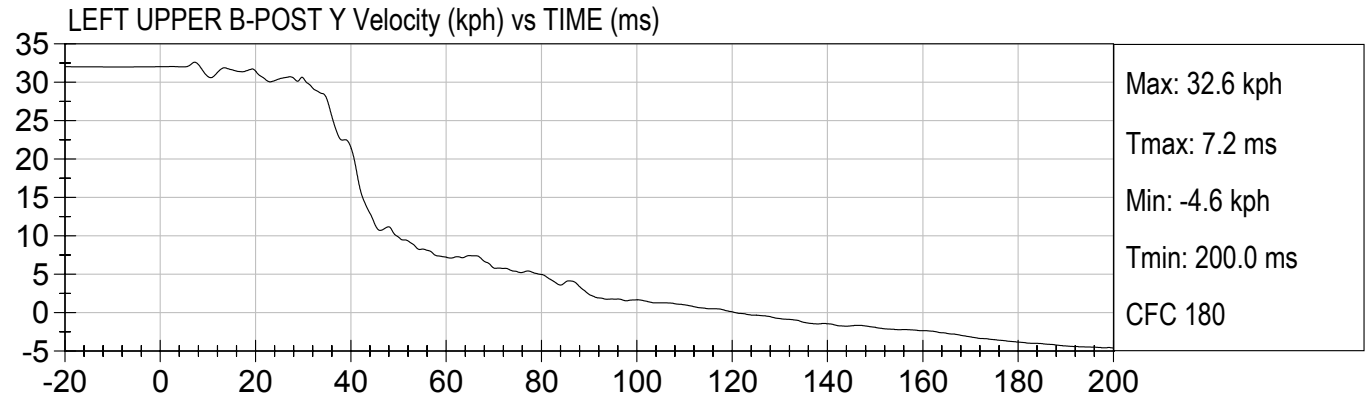
DRIVER SEAT TRACK Y Velocity (kph) vs TIME (ms)




LEFT LOWER B-POST Y (G's) vs TIME (ms)
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 43.9 G's
Tmax: 23.0 ms
Min: -0.9 G's
Tmin: 43.2 ms
CFC 60


LEFT LOWER B-POST 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
Max: 32.0 kph
Tmax: 0.0 ms
Min: -2.1 kph
Tmin: 200.0 ms
CFC 180

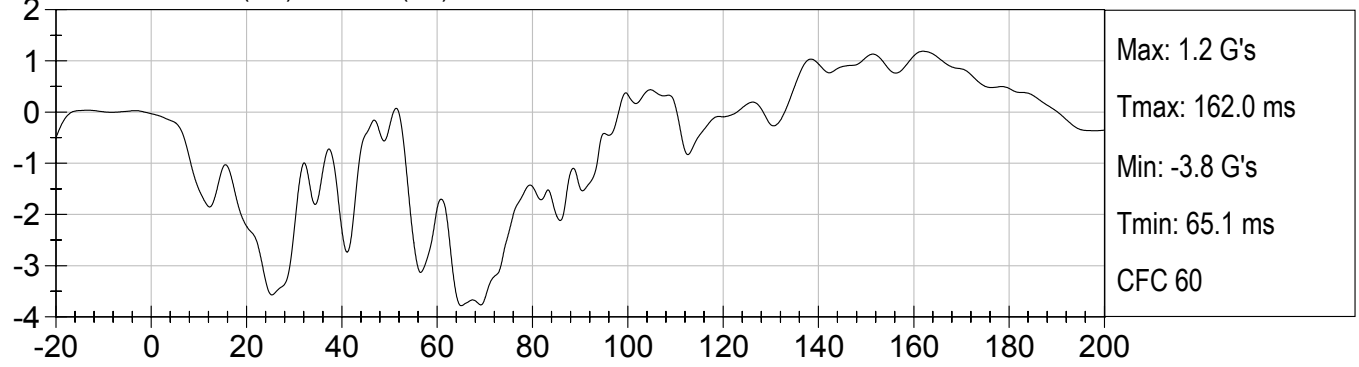

LEFT UPPER B-POST Y (G's) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 59.7 G's
Tmax: 41.5 ms
Min: -6.0 G's
Tmin: 12.4 ms
CFC 60


LEFT UPPER B-POST 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
Max: 32.6 kph
Tmax: 7.2 ms
Min: -4.6 kph
Tmin: 200.0 ms
CFC 180

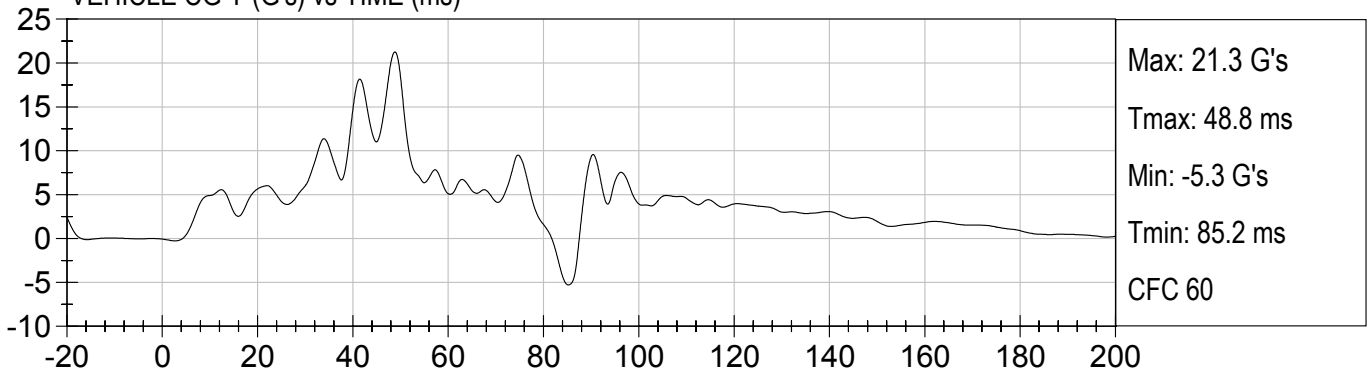
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

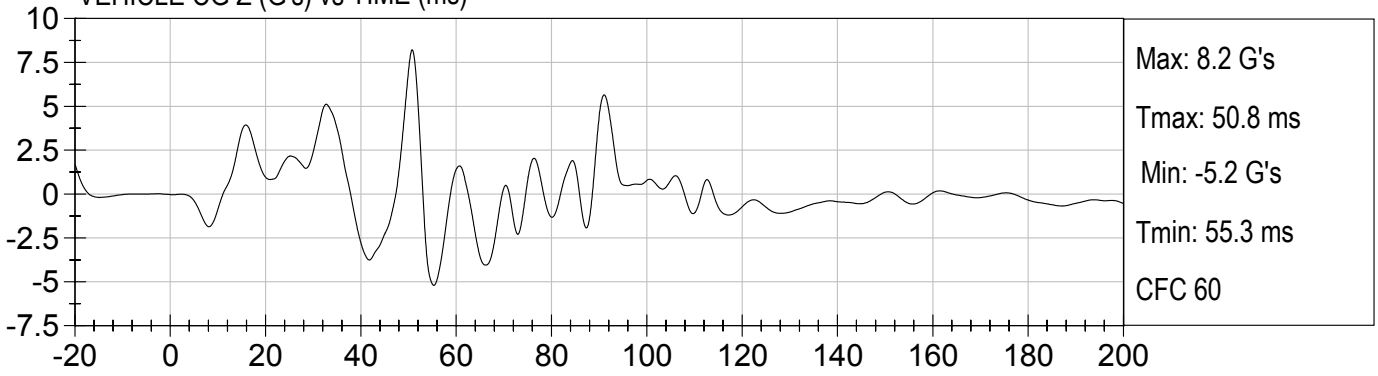
VEHICLE CG X (G's) vs TIME (ms)



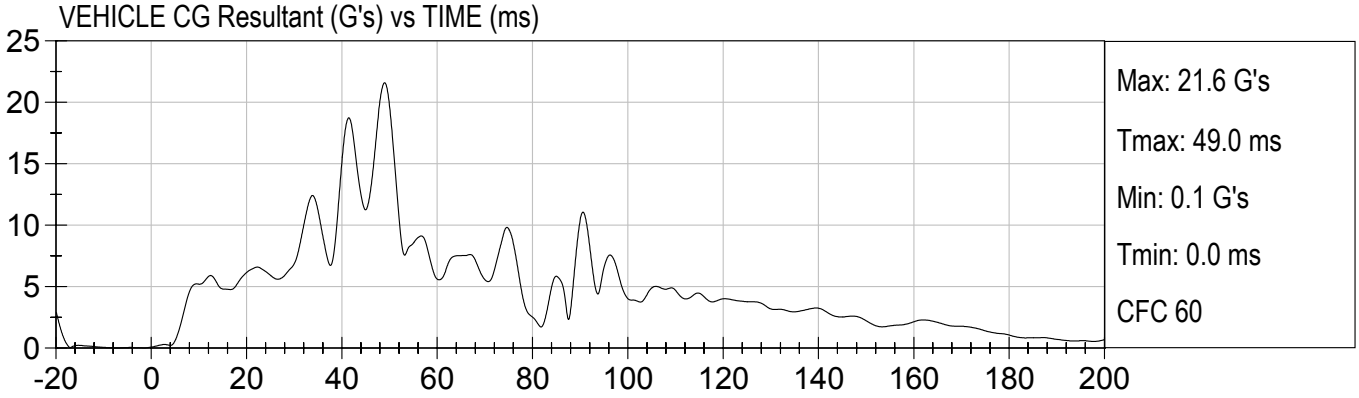
VEHICLE CG Y (G's) vs TIME (ms)

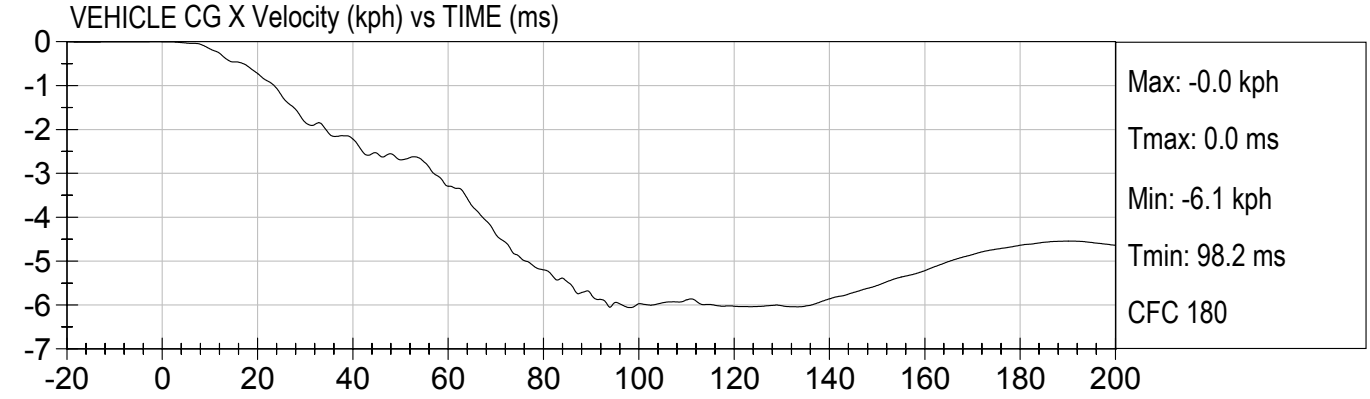


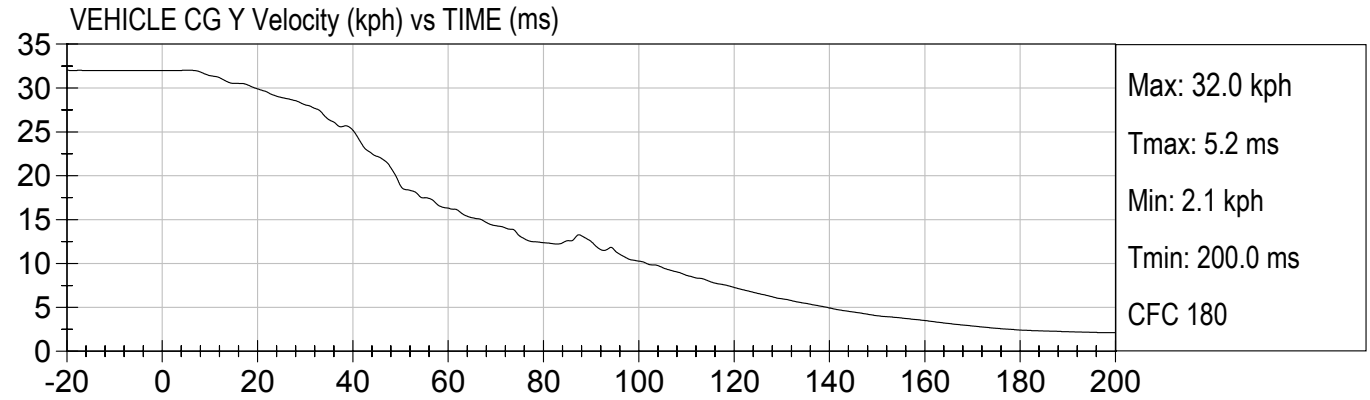
VEHICLE CG Z (G's) vs TIME (ms)

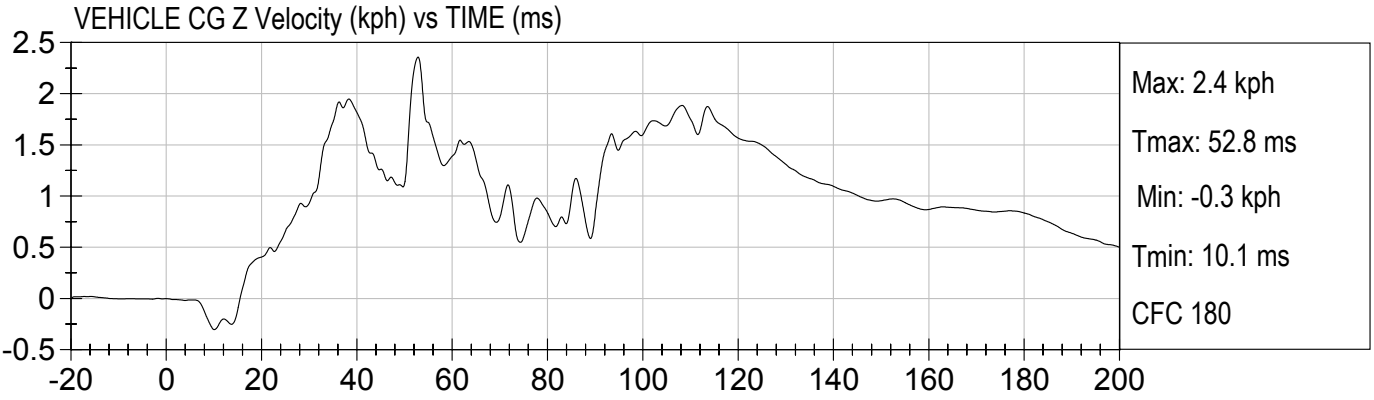


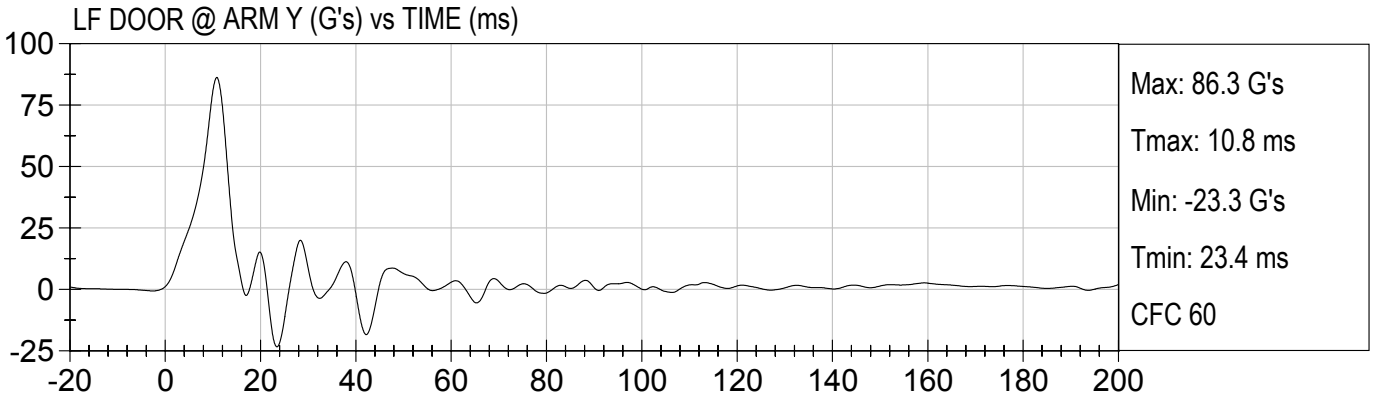
VEHICLE CG Resultant (G's) vs TIME (ms)

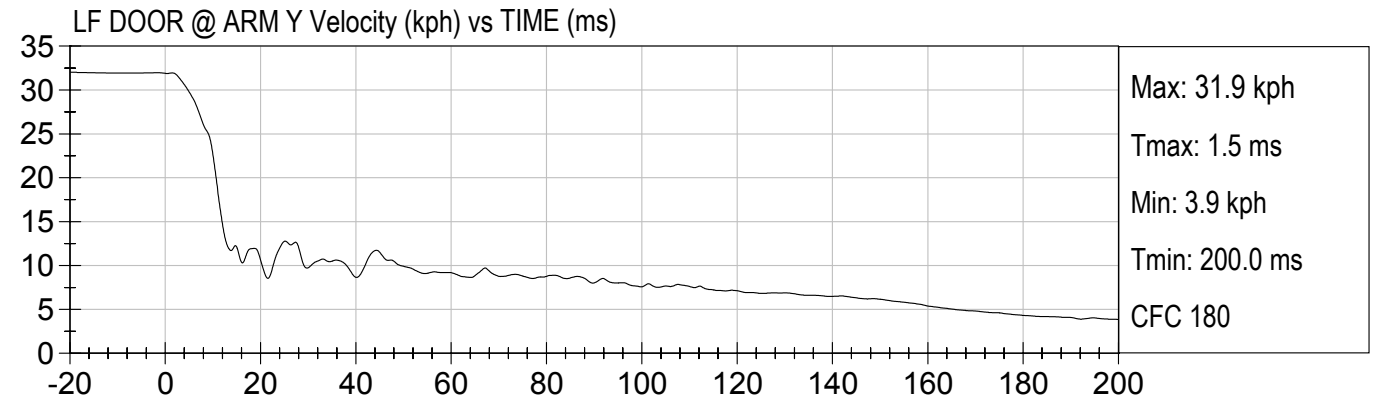


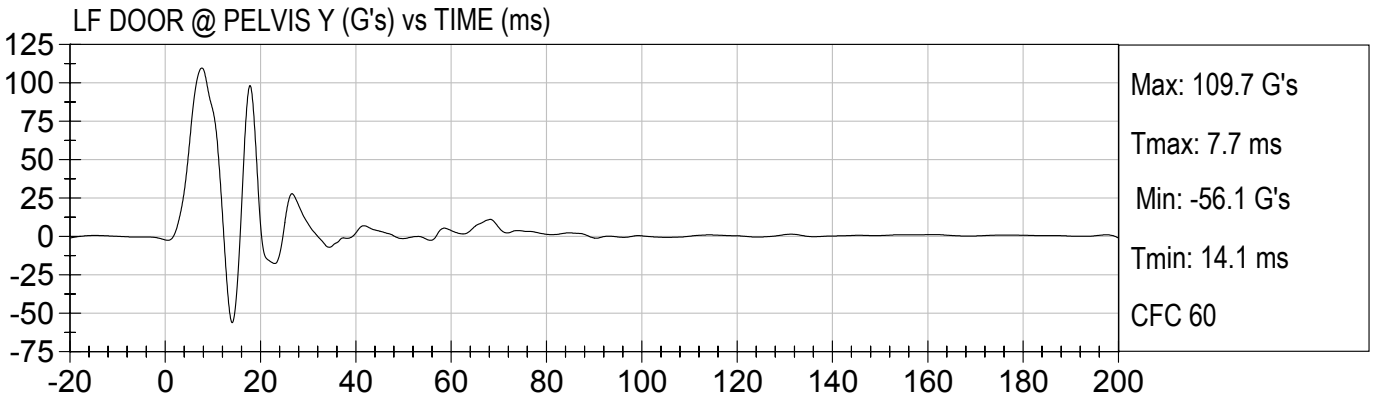

VEHICLE CG X Velocity (kph) vs TIME (ms)
0
-1
-2
-3
-4
-5
-6
-7
-20
0
20
40
60
80
100
120
140
160
180
200
Max: -0.0 kph
Tmax: 0.0 ms
Min: -6.1 kph
Tmin: 98.2 ms
CFC 180

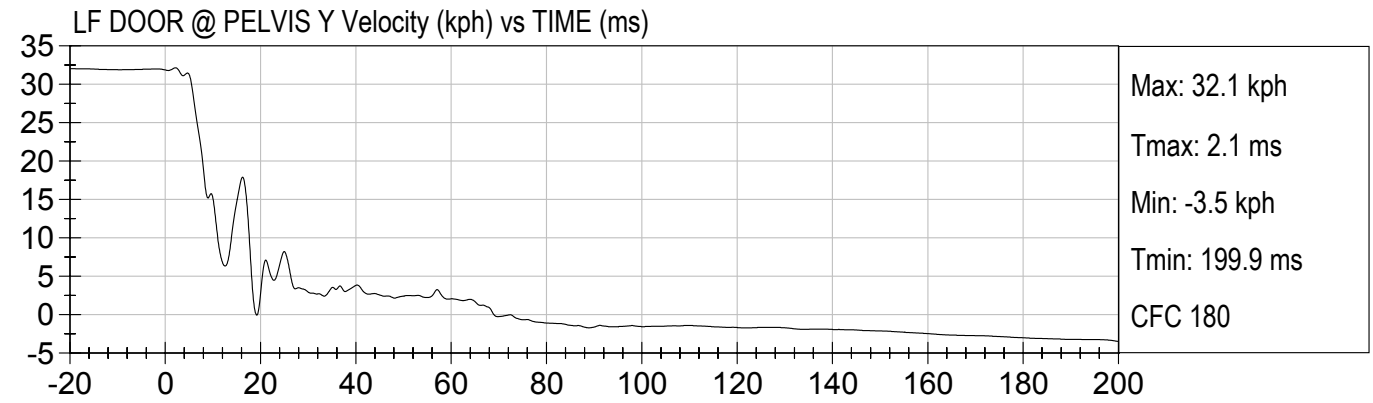

VEHICLE CG Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 32.0 kph
Tmax: 5.2 ms
Min: 2.1 kph
Tmin: 200.0 ms
CFC 180


VEHICLE CG Z Velocity (kph) vs TIME (ms)
2.5
2
1.5
1
0.5
0
-0.5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 2.4 kph
Tmax: 52.8 ms
Min: -0.3 kph
Tmin: 10.1 ms
CFC 180


LF DOOR @ ARM Y (G's) vs TIME (ms)
Max: 86.3 G's
Tmax: 10.8 ms
Min: -23.3 G's
Tmin: 23.4 ms
CFC 60


LF DOOR @ ARM Y Velocity (kph) vs TIME (ms)
Max: 31.9 kph
Tmax: 1.5 ms
Min: 3.9 kph
Tmin: 200.0 ms
CFC 180

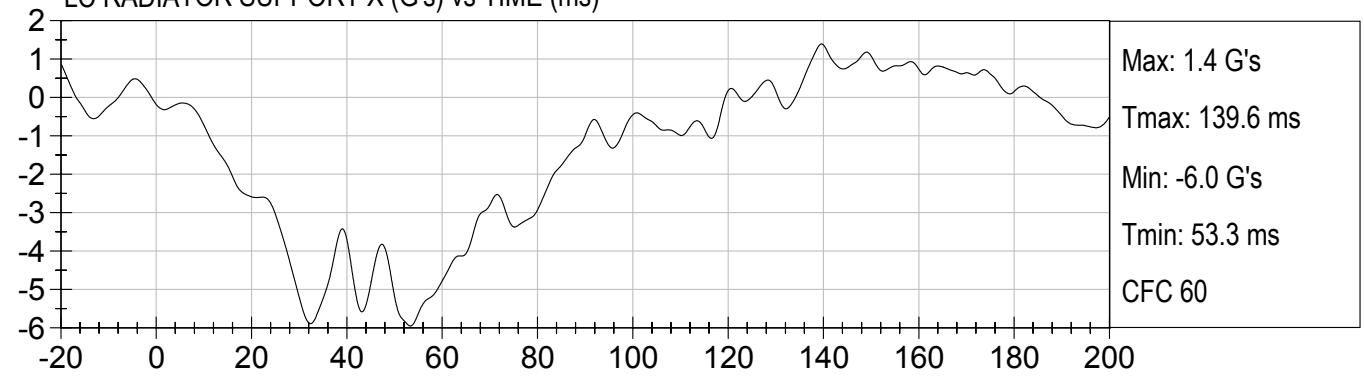

LF DOOR @ PELVIS Y (G's) vs TIME (ms)
Max: 109.7 G's
Tmax: 7.7 ms
Min: -56.1 G's
Tmin: 14.1 ms
CFC 60


LF DOOR @ PELVIS Y Velocity (kph) vs TIME (ms)
Max: 32.1 kph
Tmax: 2.1 ms
Min: -3.5 kph
Tmin: 199.9 ms
CFC 180

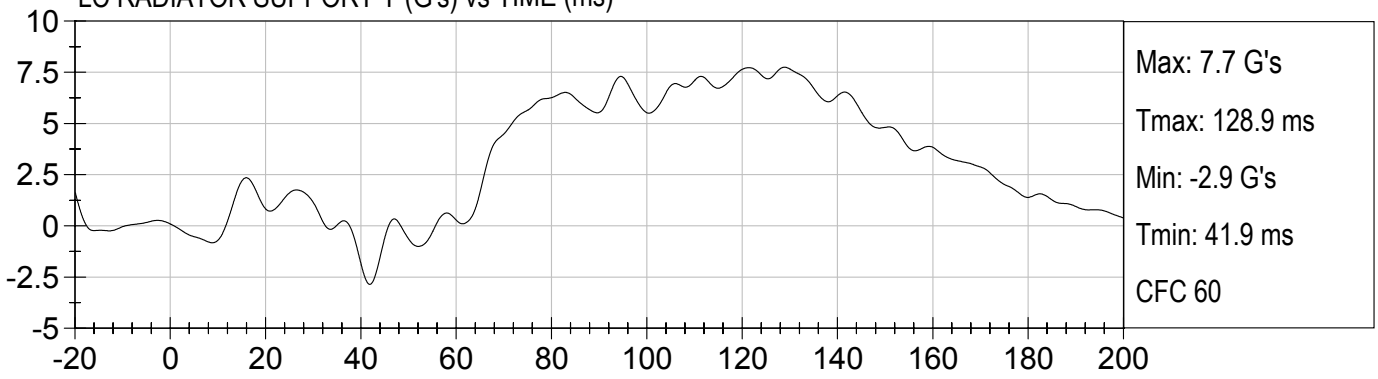
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

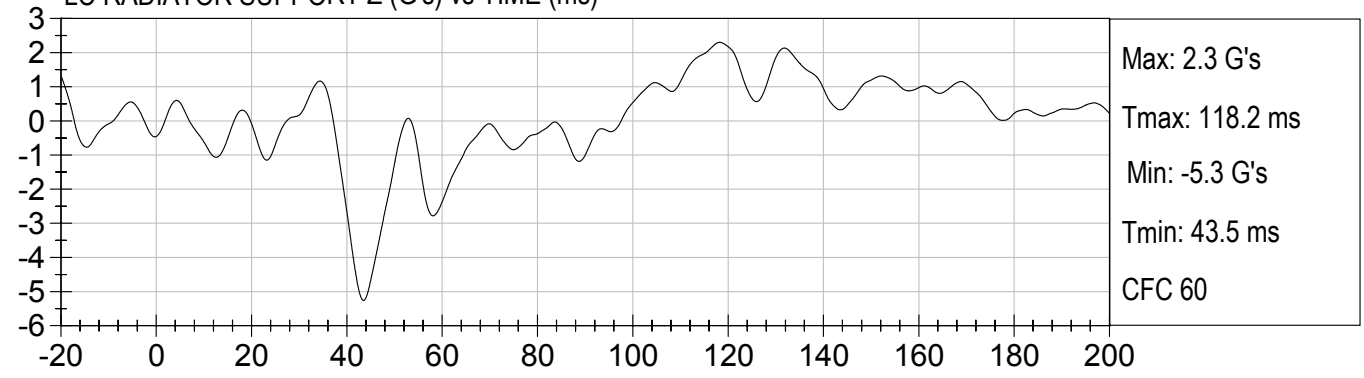
LC RADIATOR SUPPORT X (G's) vs TIME (ms)



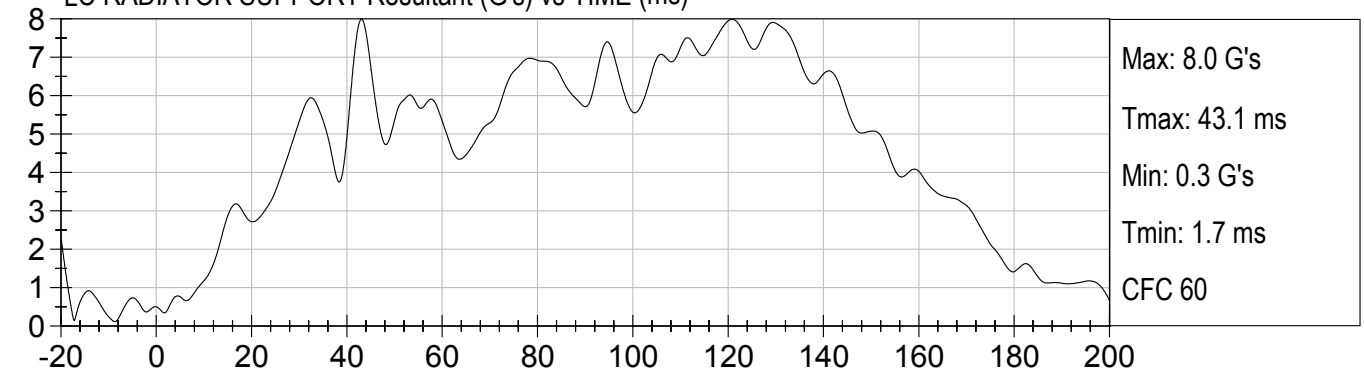
LC RADIATOR SUPPORT Y (G's) vs TIME (ms)

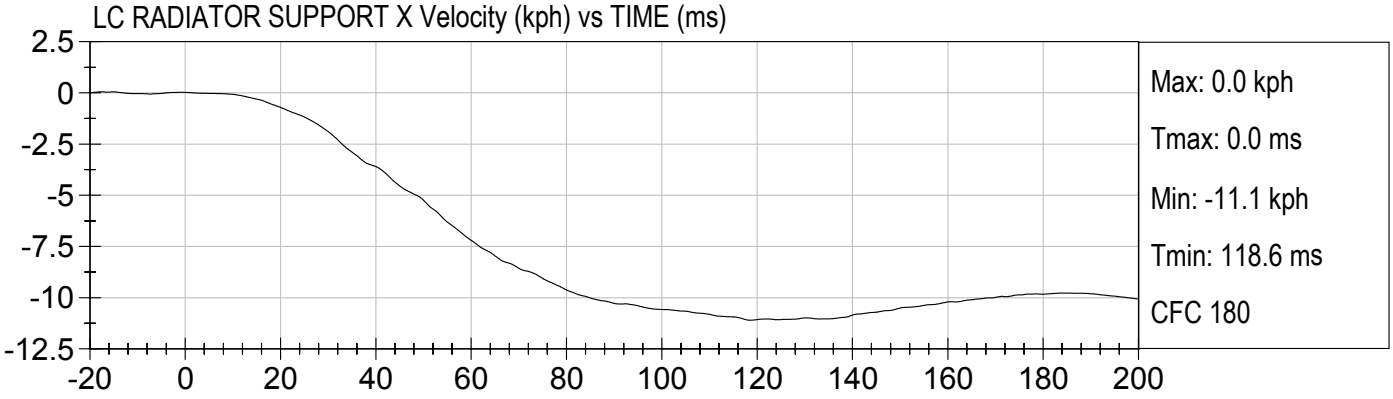


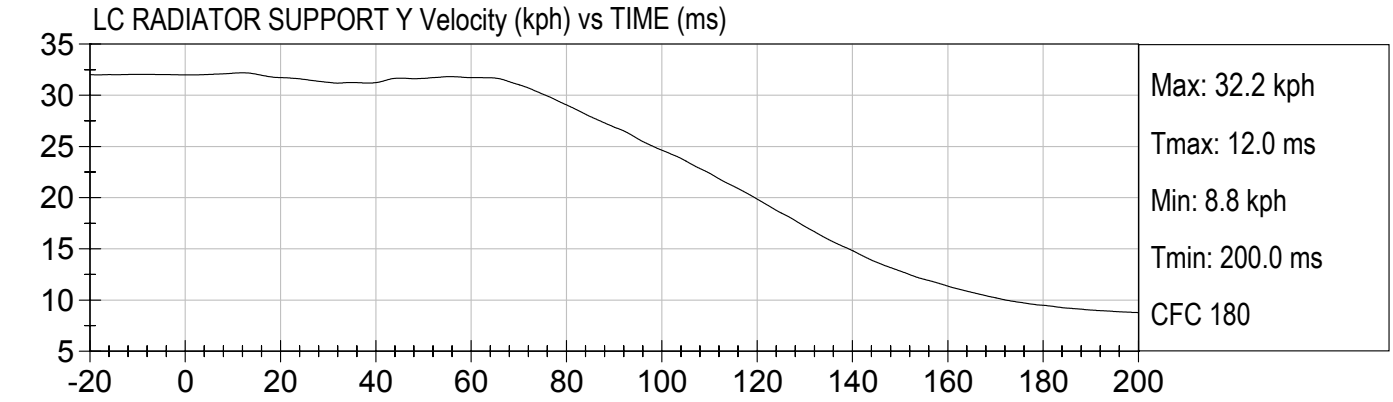
LC RADIATOR SUPPORT Z (G's) vs TIME (ms)

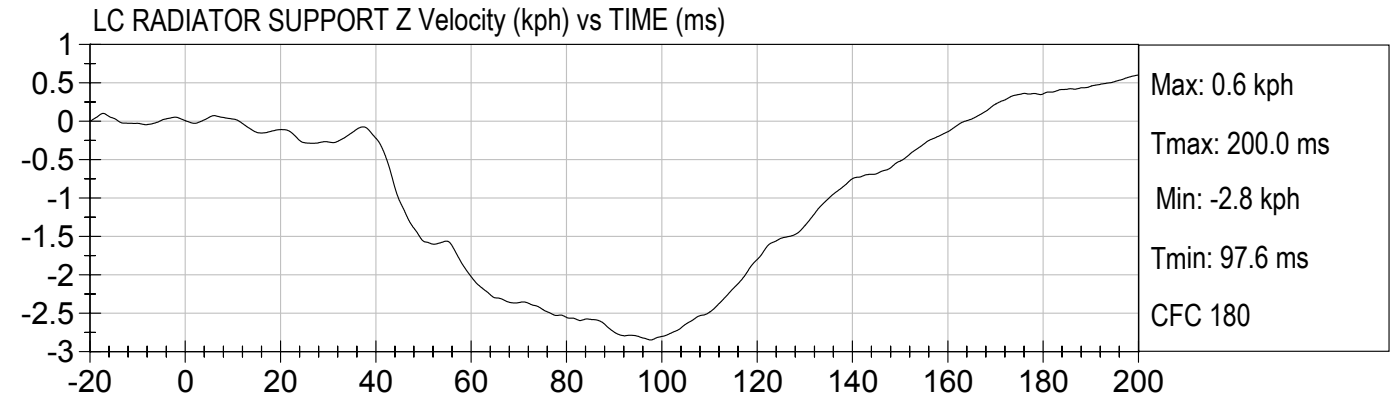


LC RADIATOR SUPPORT Resultant (G's) vs TIME (ms)




LC RADIATOR SUPPORT X Velocity (kph) vs TIME (ms)
2.5
0
-2.5
-5
-7.5
-10
-12.5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.0 kph
Tmax: 0.0 ms
Min: -11.1 kph
Tmin: 118.6 ms
CFC 180

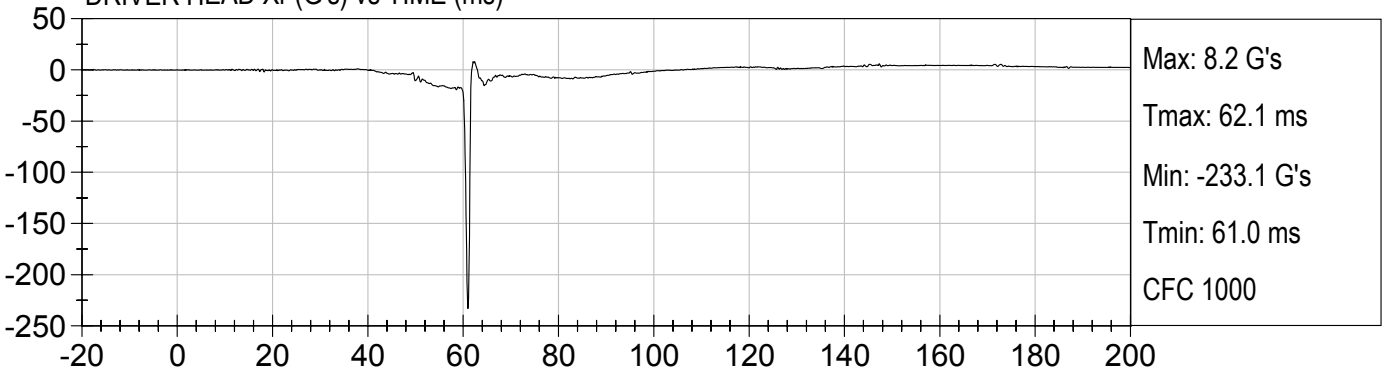

LC RADIATOR SUPPORT Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 32.2 kph
Tmax: 12.0 ms
Min: 8.8 kph
Tmin: 200.0 ms
CFC 180


LC RADIATOR SUPPORT Z Velocity (kph) vs TIME (ms)
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.6 kph
Tmax: 200.0 ms
Min: -2.8 kph
Tmin: 97.6 ms
CFC 180

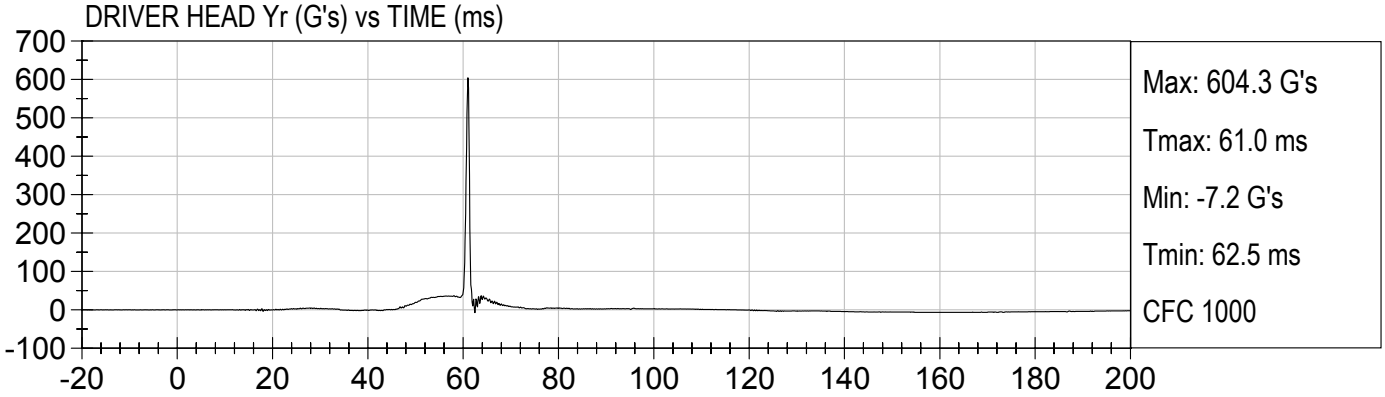
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

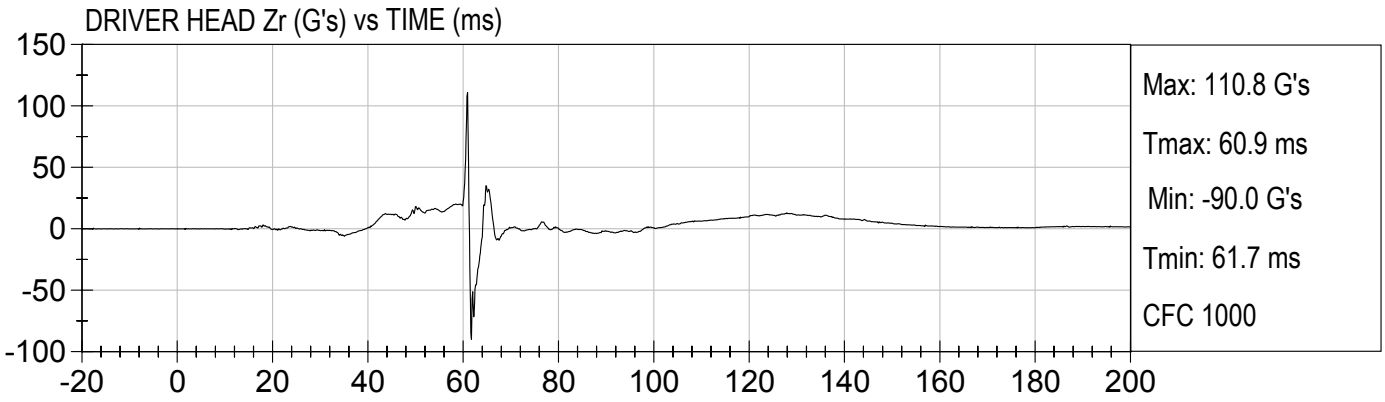
DRIVER HEAD Xr (G's) vs TIME (ms)



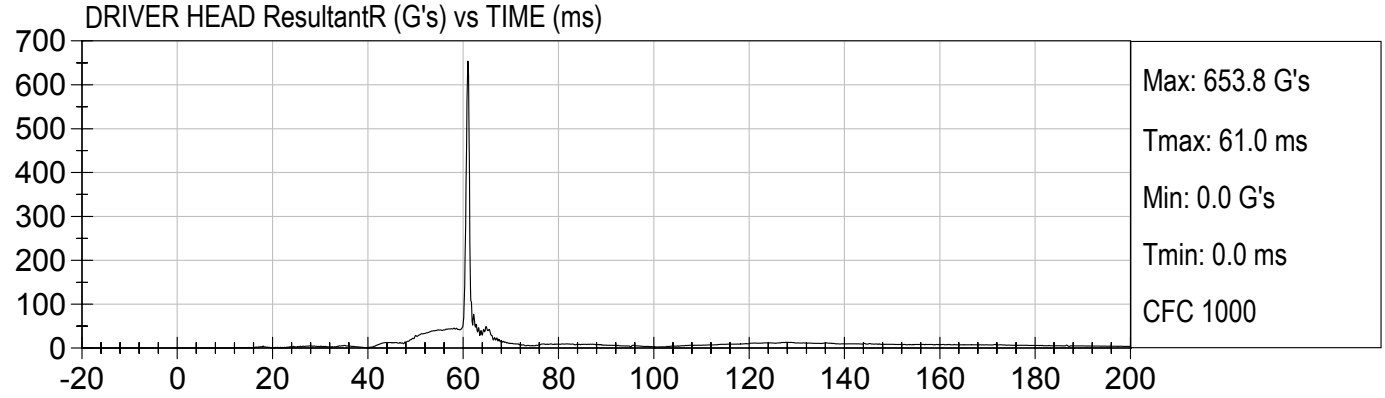
DRIVER HEAD Yr (G's) vs TIME (ms)

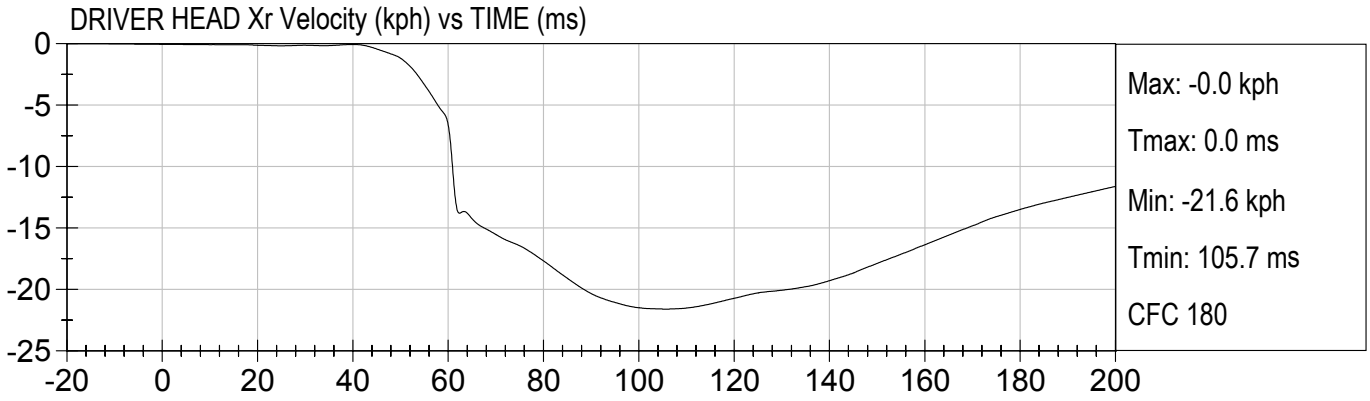


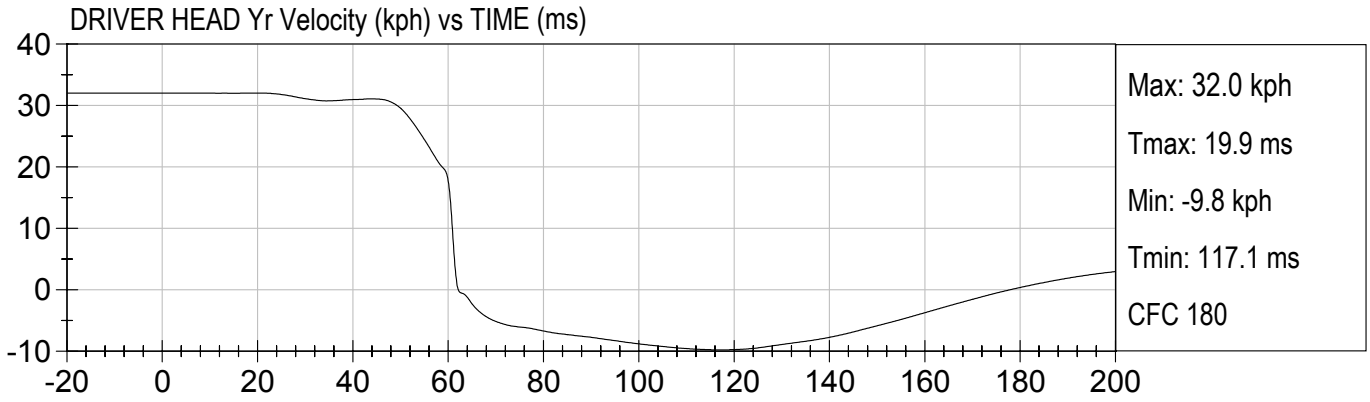
DRIVER HEAD Zr (G's) vs TIME (ms)

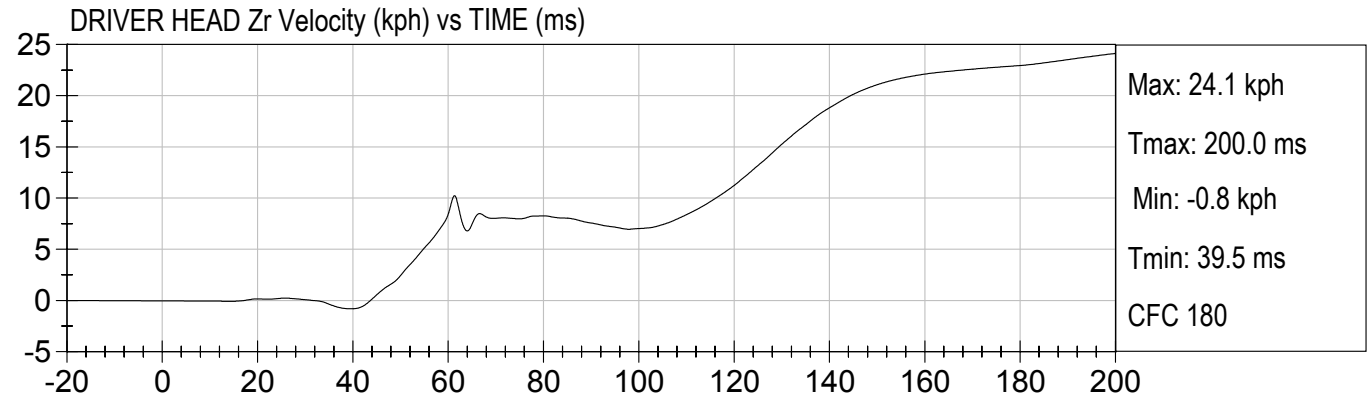


DRIVER HEAD ResultantR (G's) vs TIME (ms)




DRIVER HEAD Xr Velocity (kph) vs TIME (ms)
0
-5
-10
-15
-20
-25
-20
0
20
40
60
80
100
120
140
160
180
200
Max: -0.0 kph
Tmax: 0.0 ms
Min: -21.6 kph
Tmin: 105.7 ms
CFC 180

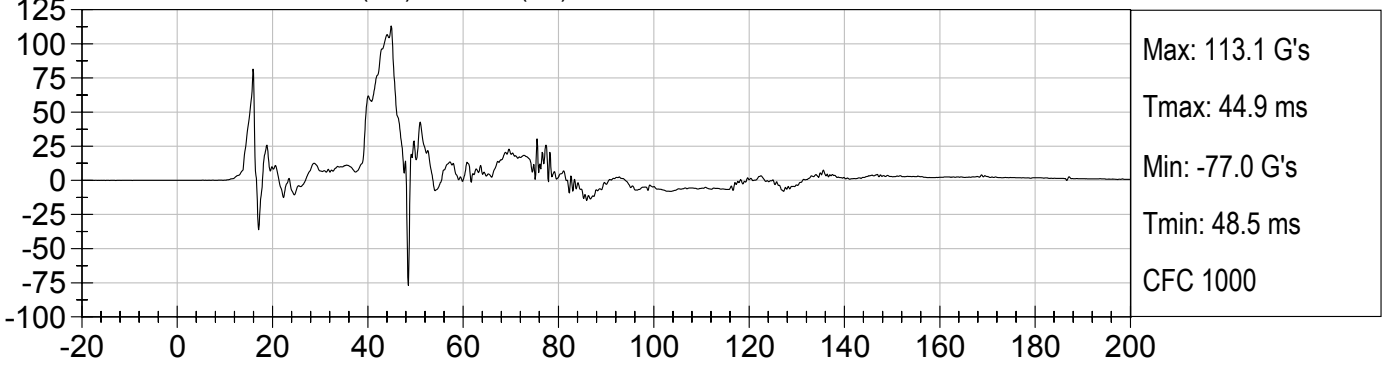

DRIVER HEAD Yr Velocity (kph) vs TIME (ms)
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 32.0 kph
Tmax: 19.9 ms
Min: -9.8 kph
Tmin: 117.1 ms
CFC 180


DRIVER HEAD Zr Velocity (kph) vs TIME (ms)
25
20
15
10
5
0
-5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 24.1 kph
Tmax: 200.0 ms
Min: -0.8 kph
Tmin: 39.5 ms
CFC 180

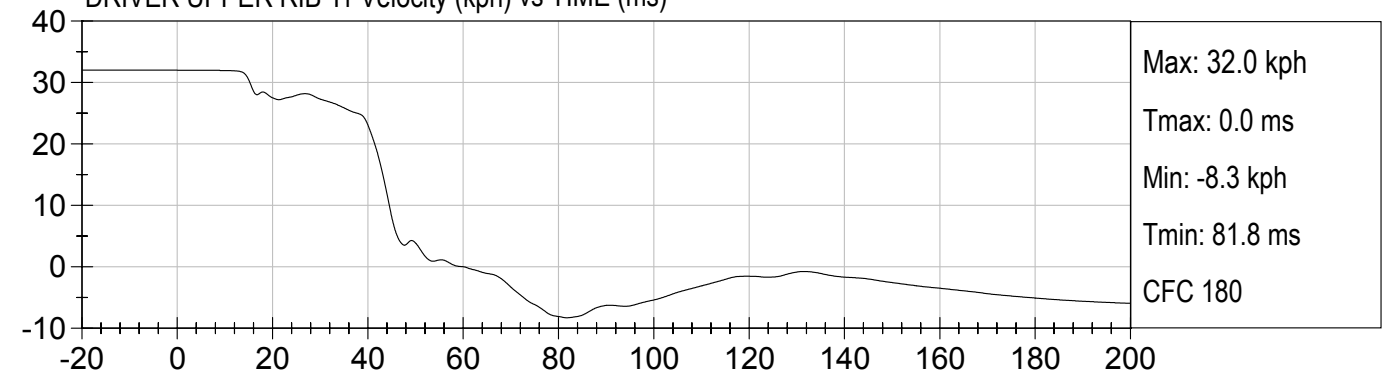
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

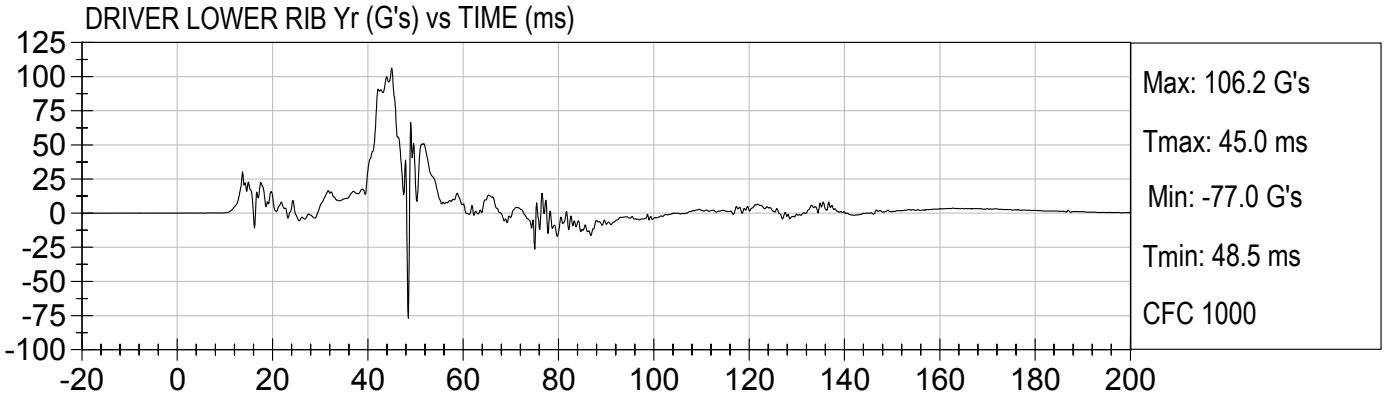
DRIVER UPPER RIB Yr (G's) vs TIME (ms)



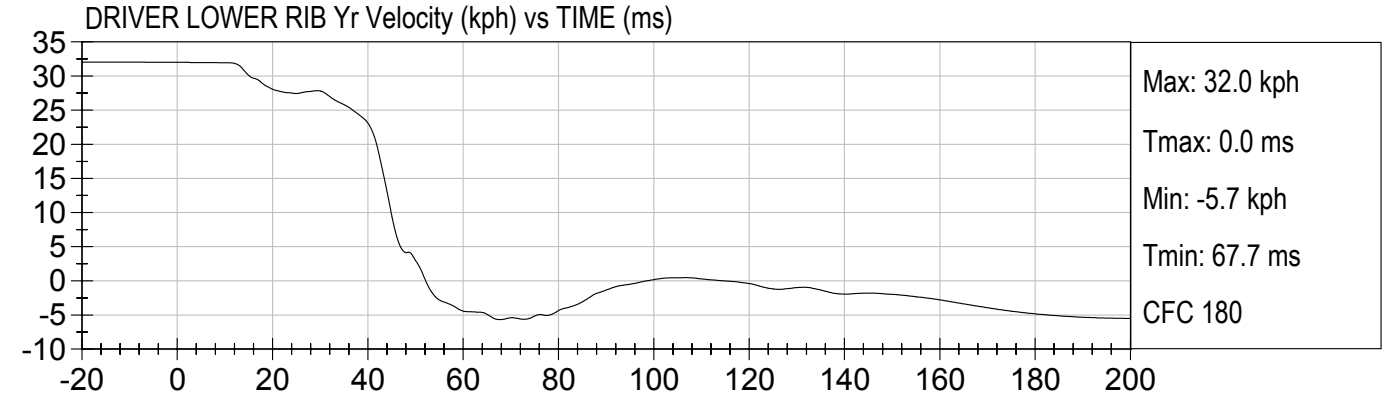
DRIVER UPPER RIB Yr Velocity (kph) vs TIME (ms)



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



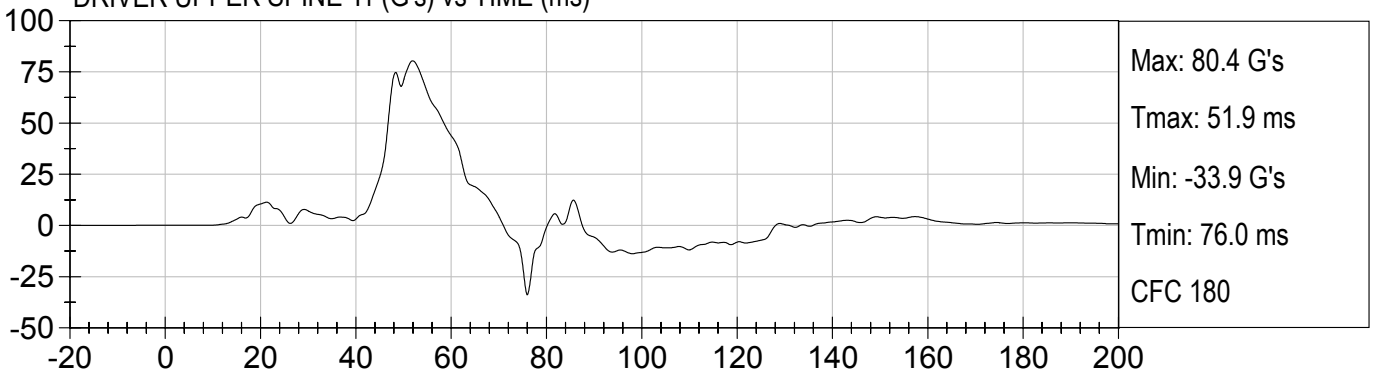
DRIVER LOWER RIB Yr Velocity (kph) vs TIME (ms)



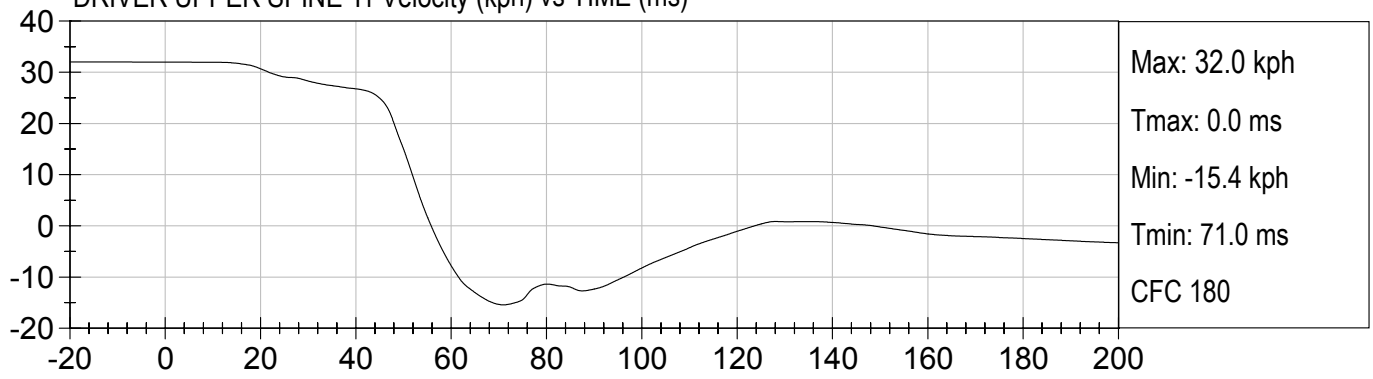
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

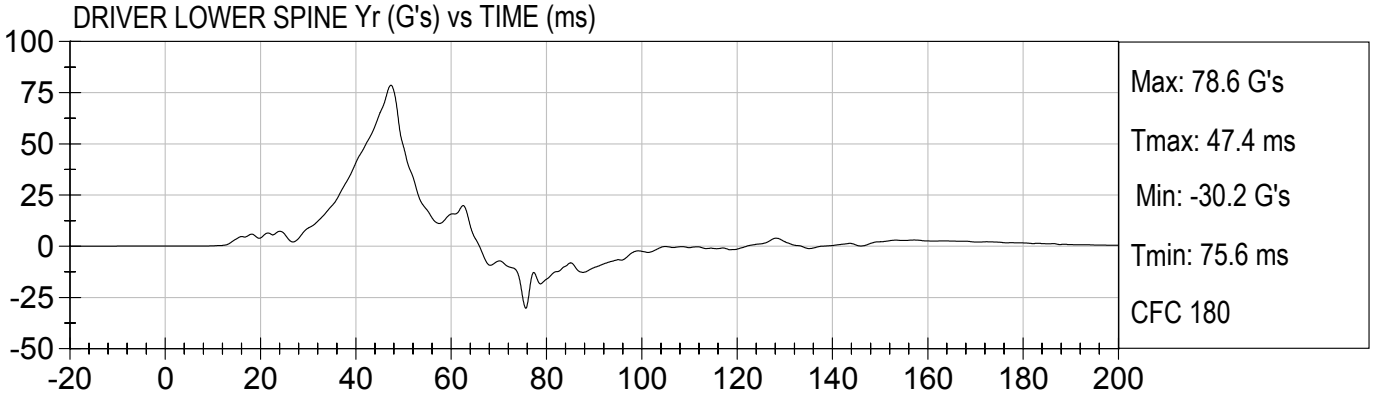
DRIVER UPPER SPINE Yr (G's) vs TIME (ms)



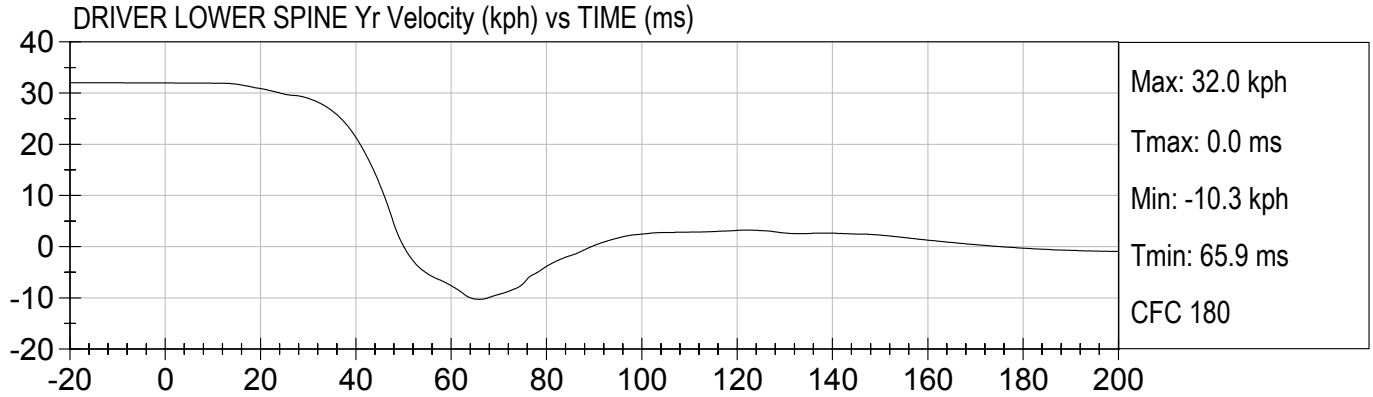
DRIVER UPPER SPINE Yr Velocity (kph) vs TIME (ms)



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

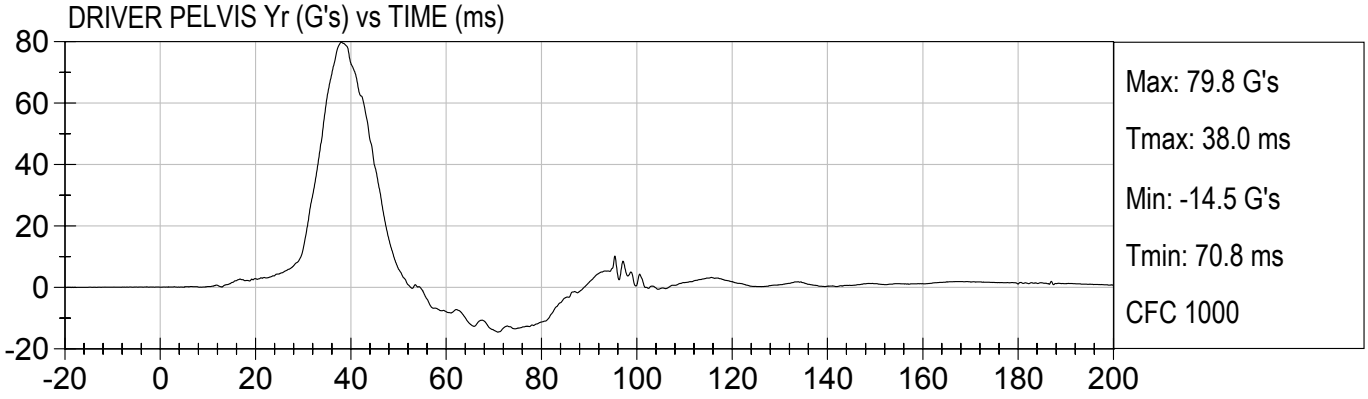


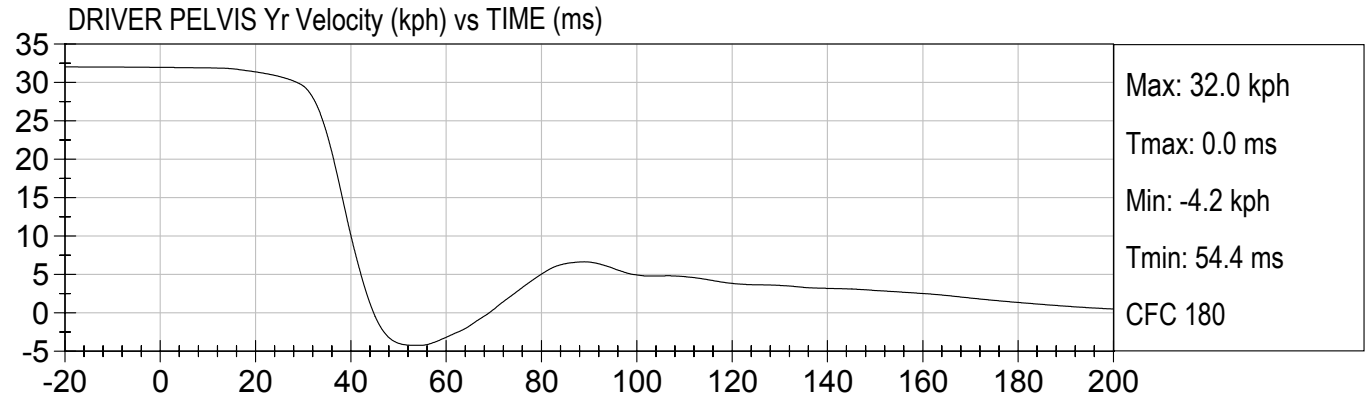
DRIVER LOWER SPINE Yr Velocity (kph) vs TIME (ms)



20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

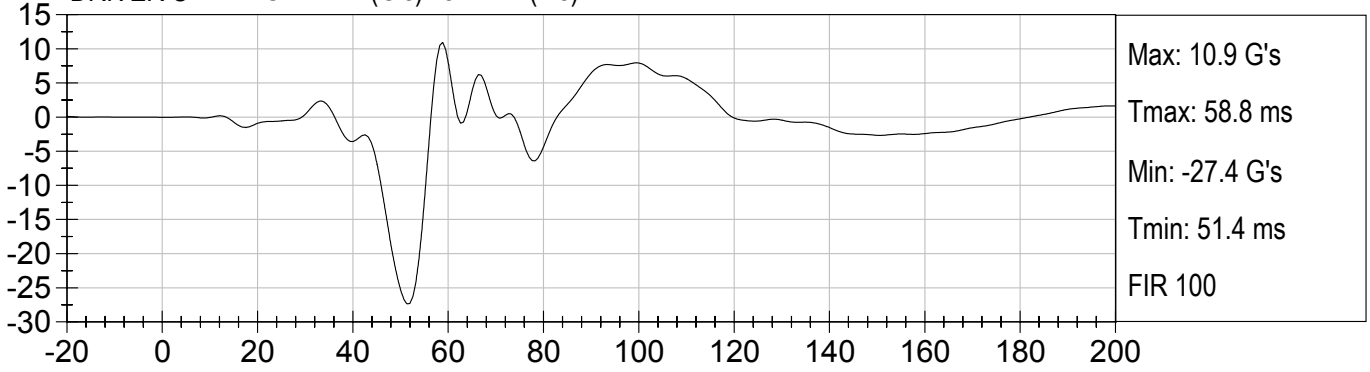




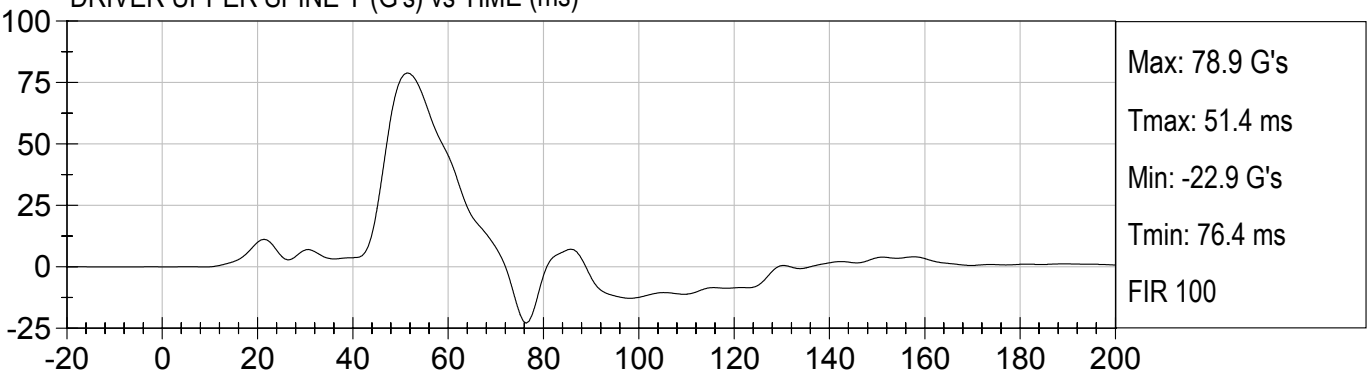
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

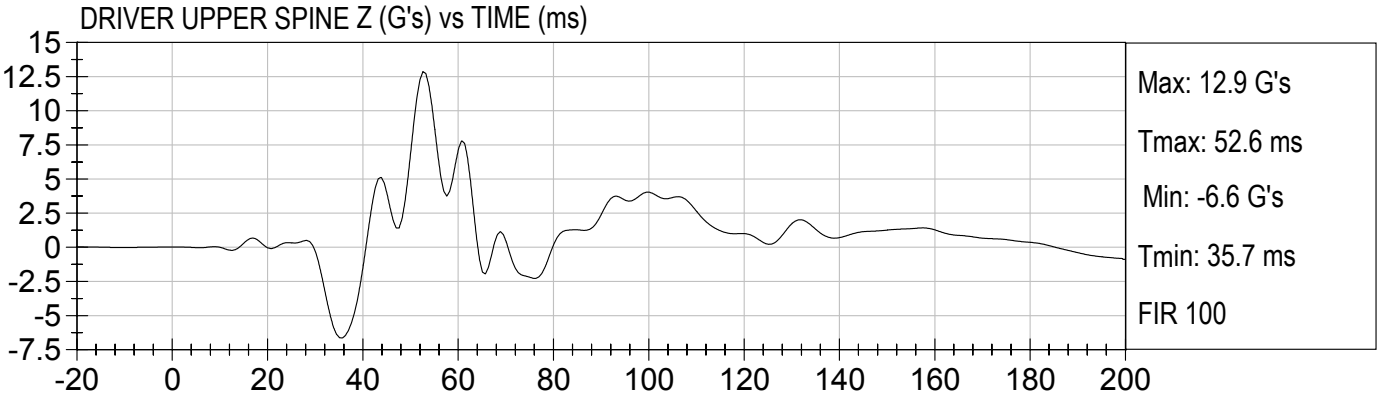
DRIVER UPPER SPINE X (G's) vs TIME (ms)



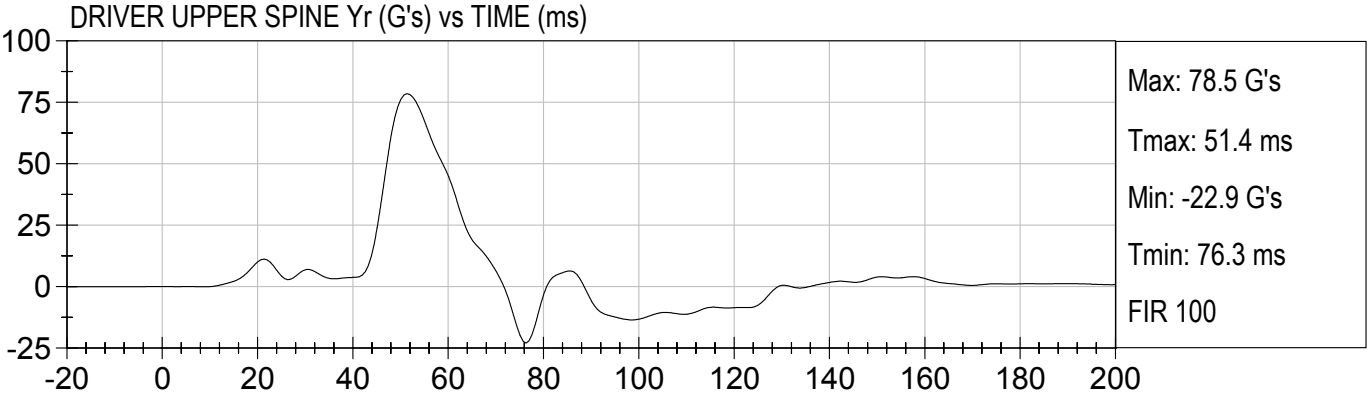
DRIVER UPPER SPINE Y (G's) vs TIME (ms)



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



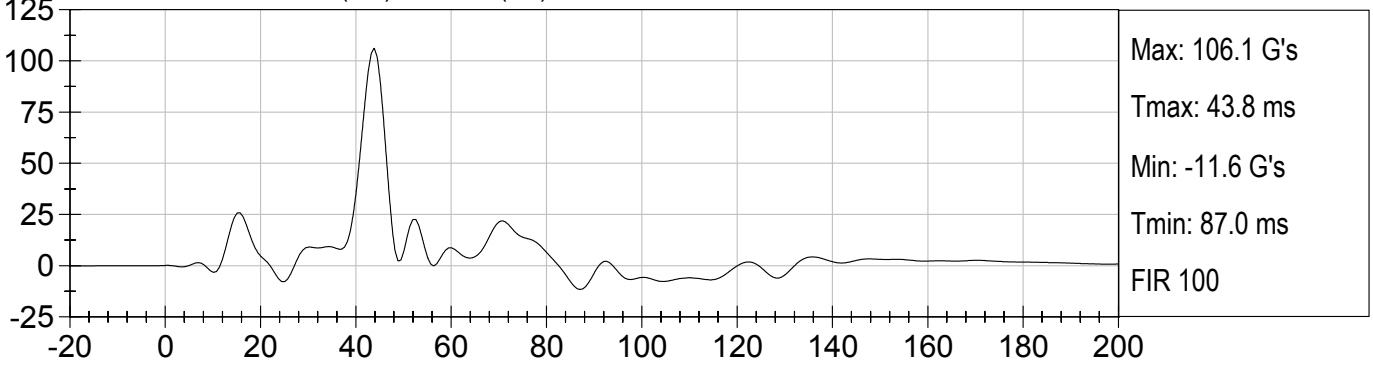
DRIVER UPPER SPINE Yr (G's) vs TIME (ms)



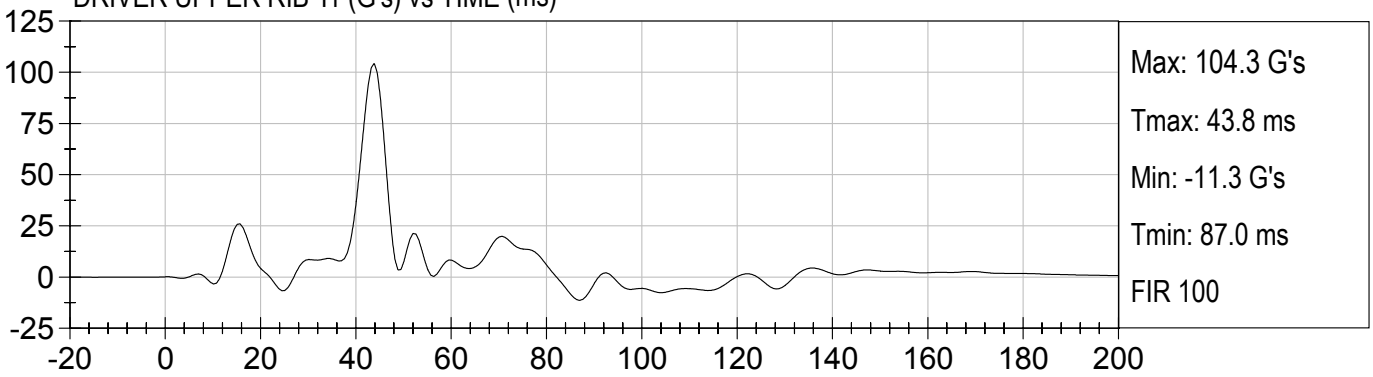
20MPH SIDE POLE
2000 SAAB/9-5/4 DOOR

Test Date: 10/24/2002
Speed: 19.9 mph (32.0 km/h)

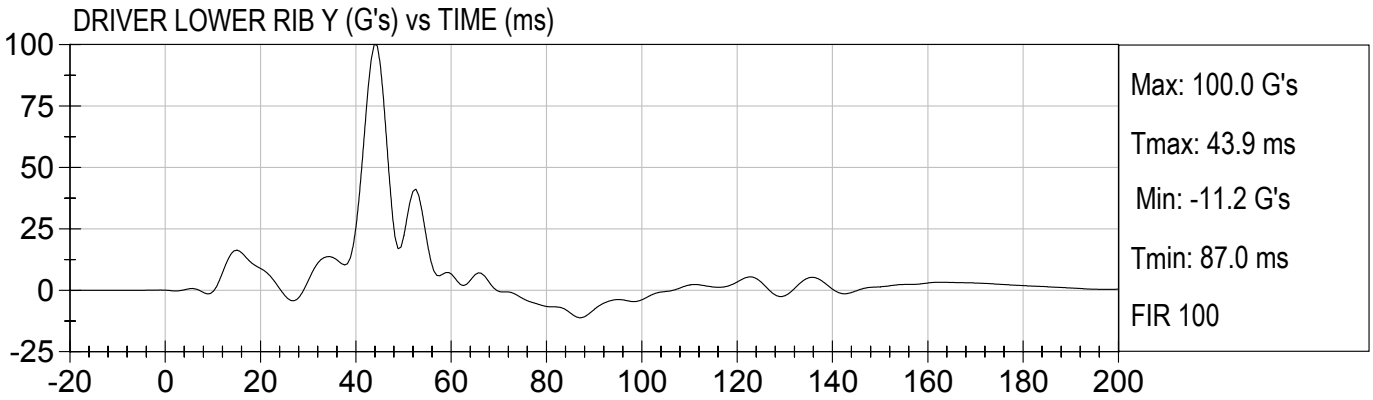
DRIVER UPPER RIB Y (G's) vs TIME (ms)



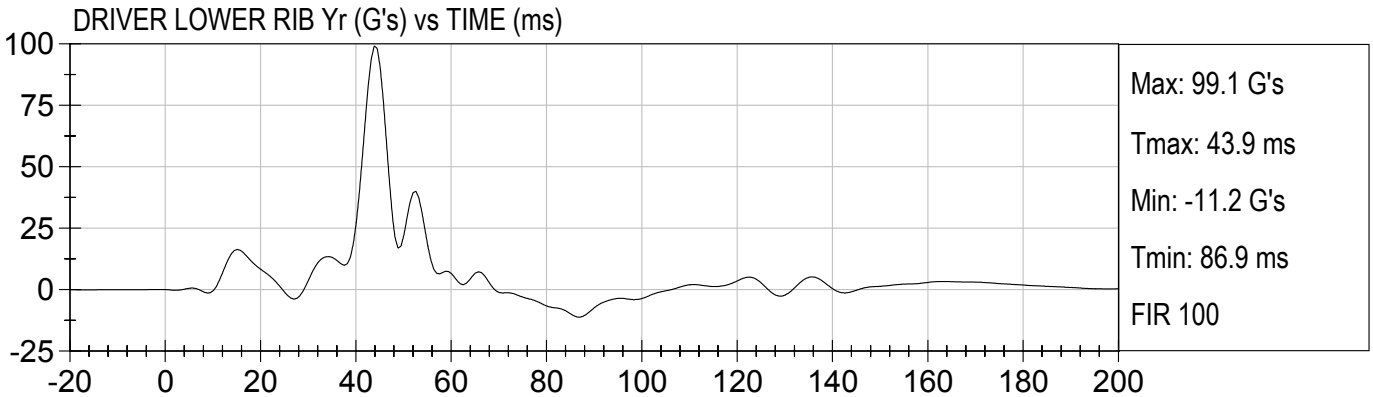
DRIVER UPPER RIB Yr (G's) vs TIME (ms)



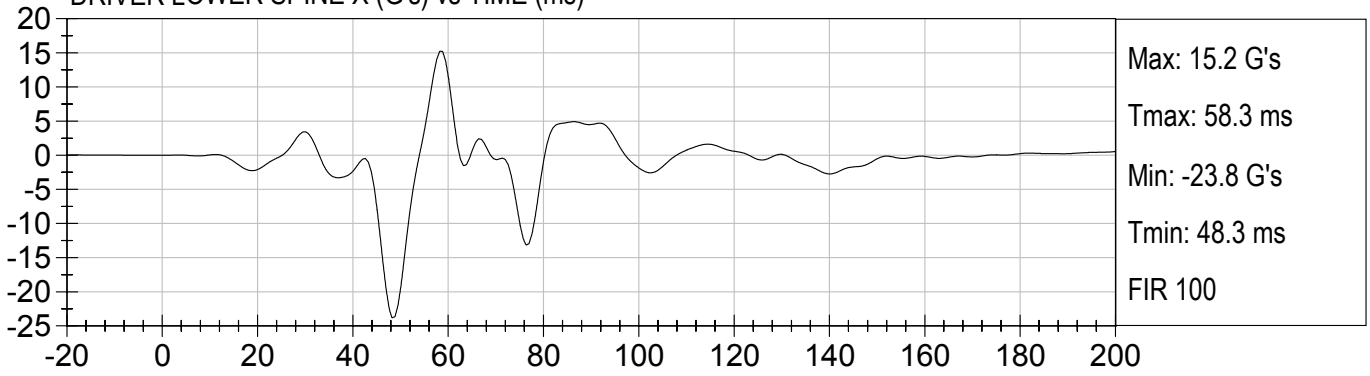
DRIVER LOWER RIB Y (G's) vs TIME (ms)



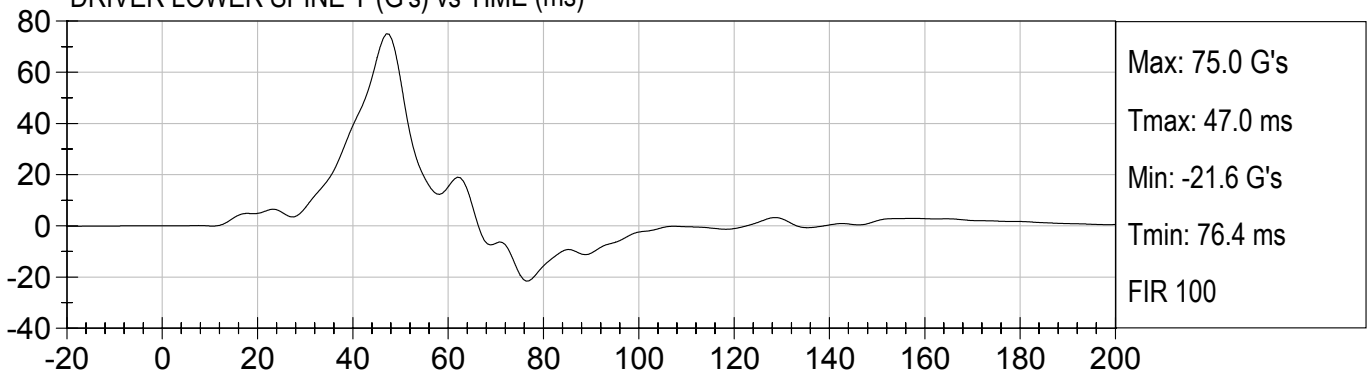
DRIVER LOWER RIB Yr (G's) vs TIME (ms)



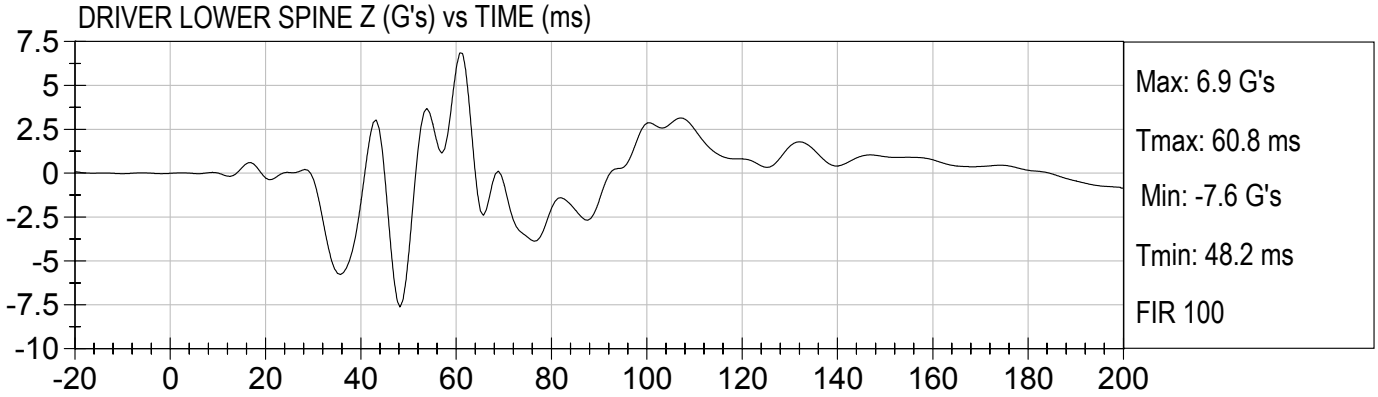
DRIVER LOWER SPINE X (G's) vs TIME (ms)



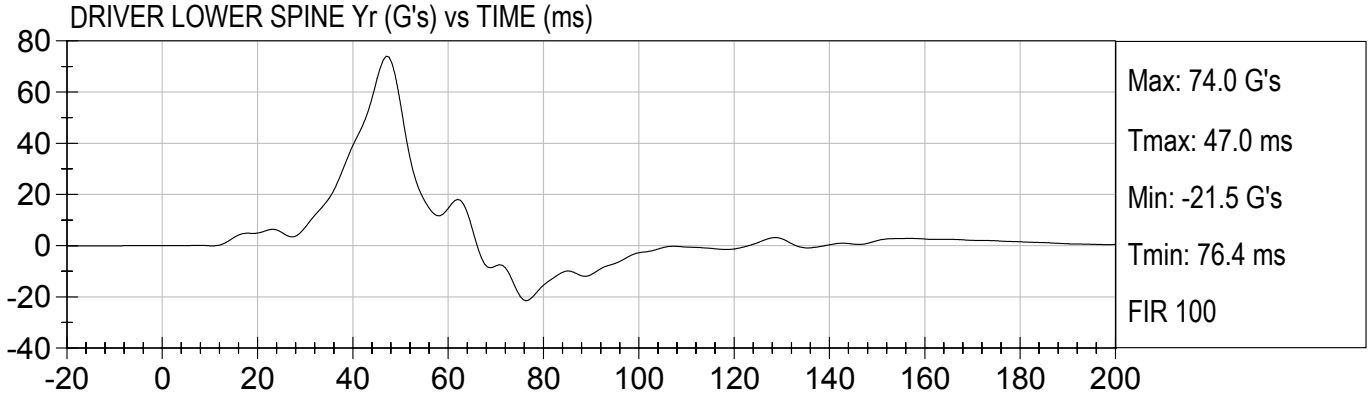
DRIVER LOWER SPINE Y (G's) vs TIME (ms)

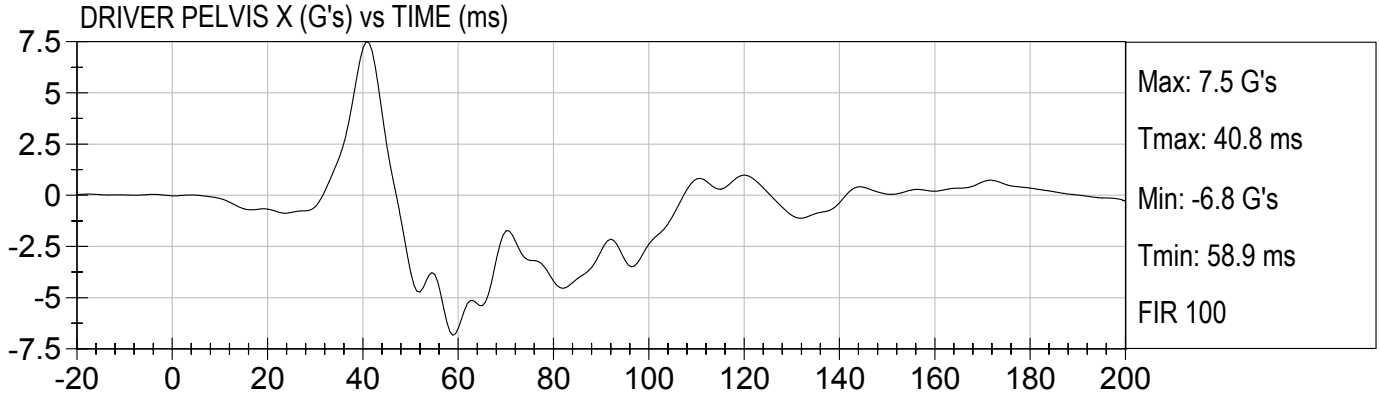


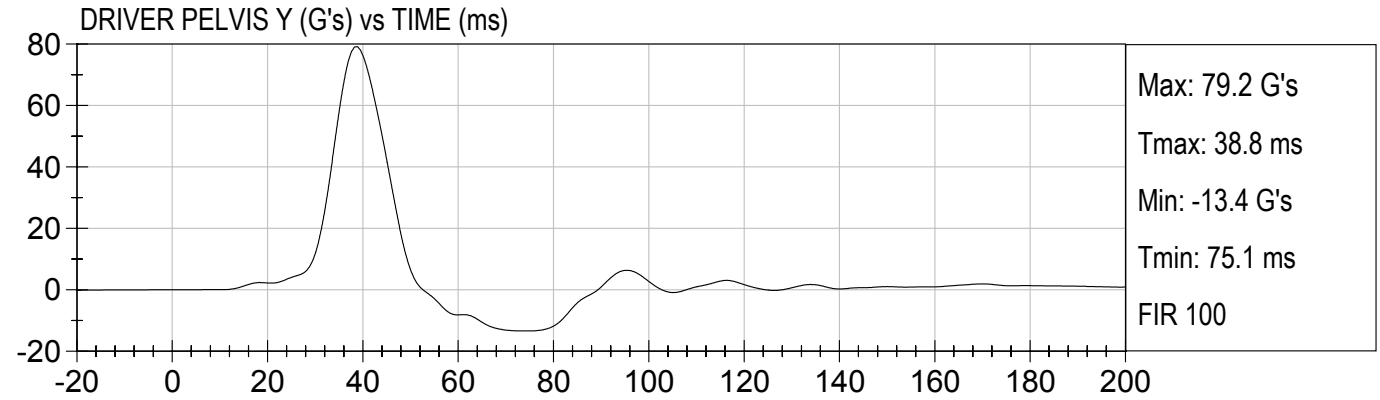
DRIVER LOWER SPINE Z (G's) vs TIME (ms)

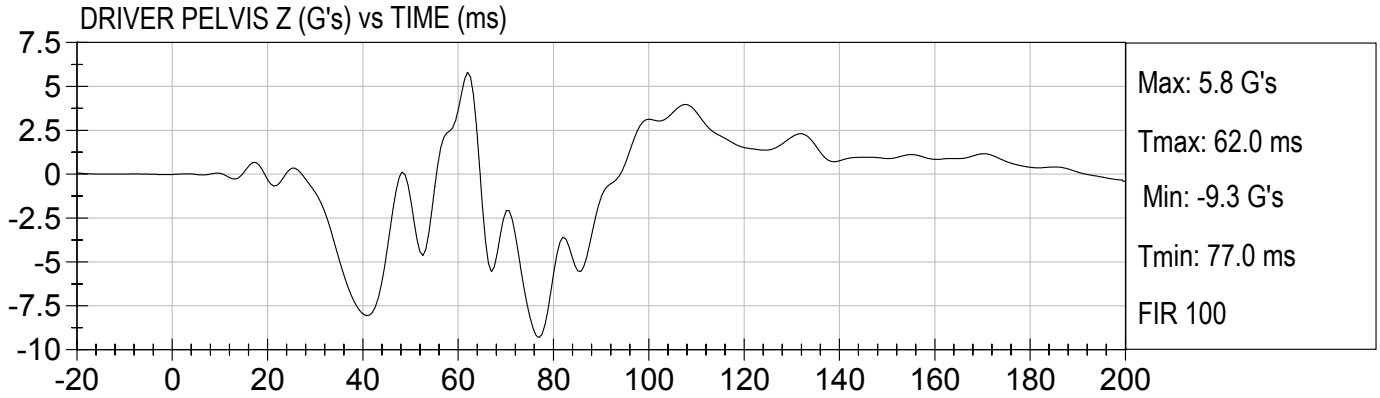


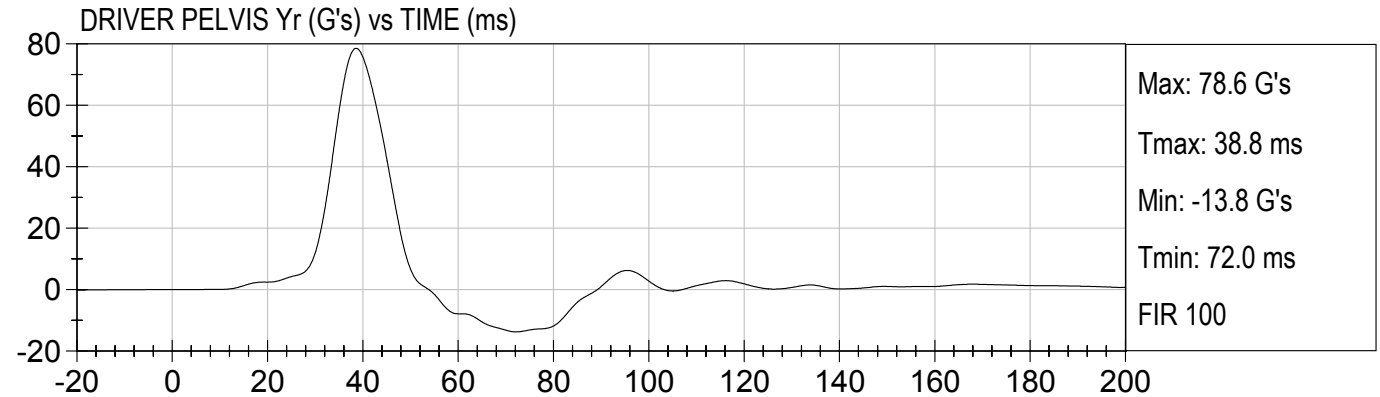
DRIVER LOWER SPINE Yr (G's) vs TIME (ms)




DRIVER PELVIS X (G's) vs TIME (ms)
7.5
5
2.5
0
-2.5
-5
-7.5
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 7.5 G's
Tmax: 40.8 ms
Min: -6.8 G's
Tmin: 58.9 ms
FIR 100


DRIVER PELVIS Y (G's) vs TIME (ms)
80
60
40
20
0
-20
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 79.2 G's
Tmax: 38.8 ms
Min: -13.4 G's
Tmin: 75.1 ms
FIR 100


DRIVER PELVIS Z (G's) vs TIME (ms)
7.5
5
2.5
0
-2.5
-5
-7.5
-10
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 5.8 G's
Tmax: 62.0 ms
Min: -9.3 G's
Tmin: 77.0 ms
FIR 100


DRIVER PELVIS Yr (G's) vs TIME (ms)
80
60
40
20
0
-20
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 78.6 G's
Tmax: 38.8 ms
Min: -13.8 G's
Tmin: 72.0 ms
FIR 100

APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 036 **Test I.D:** D021231

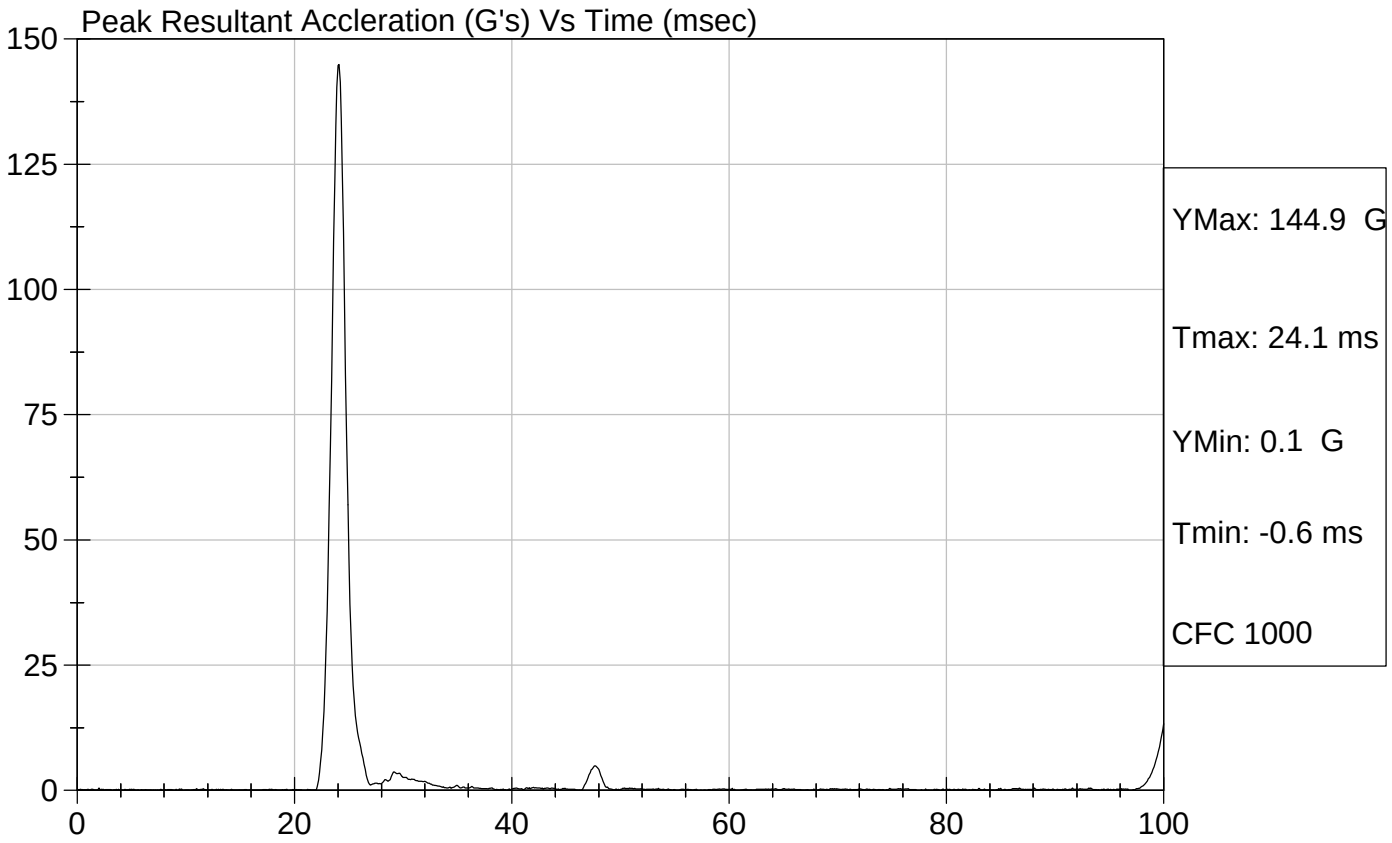
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	56	Pass
Peak Resultant Acceleration	G's	120 to 150	145	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-10	Pass
		Overall Test Results		Pass

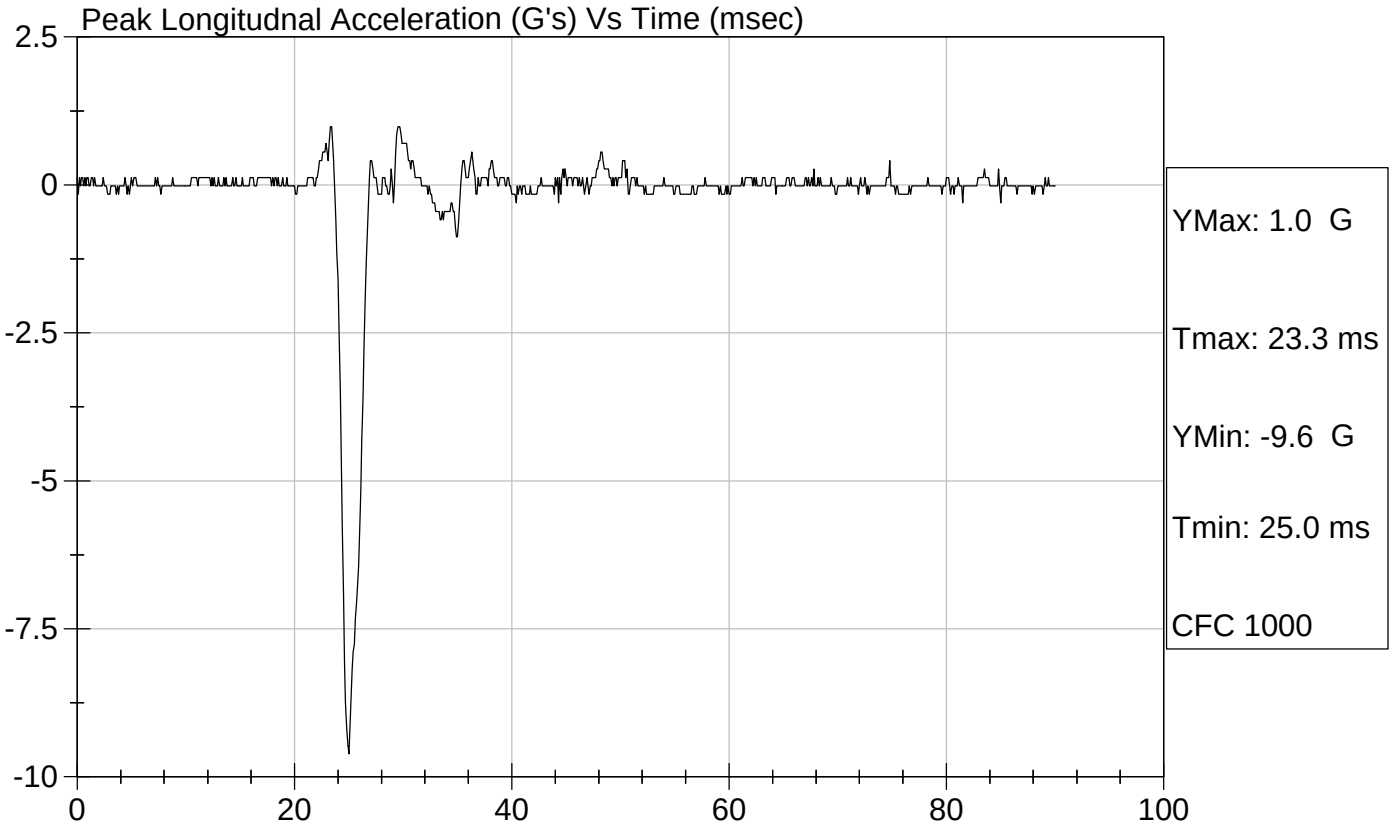
Laboratory Technician

09/18/2002
Test Date

Approved By

	Test Description: Head Drop	Test Date: 09/18/2002
	Component: D021231	Speed: 0 ft/s, 0.00 m/s





SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 036 **Test I.D:** D021239

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.9 to 25.5	20.8	Pass
Laboratory Relative Humidity		%	10 to 70	51	Pass
Impact Velocity		m/s	6.89 to 7.13	7.05	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.24	Pass
	20 msec	m/s	4.12 to 5.10	4.46	Pass
	30 msec	m/s	5.73 to 7.01	6.24	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.93	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	72	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	61	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	77	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	56	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	11	Pass

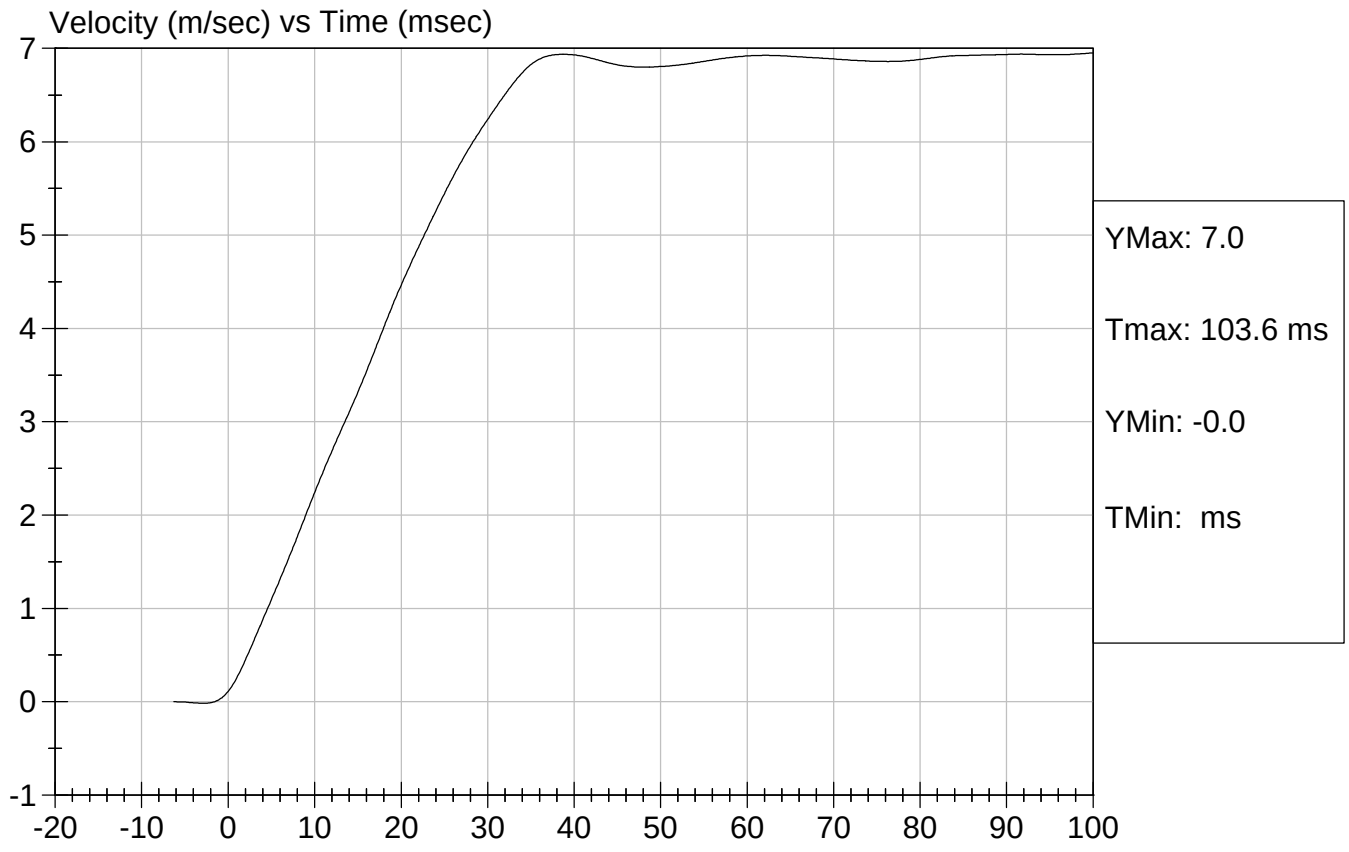
Laboratory Technician

09/18/2002
Test Date

Approved By

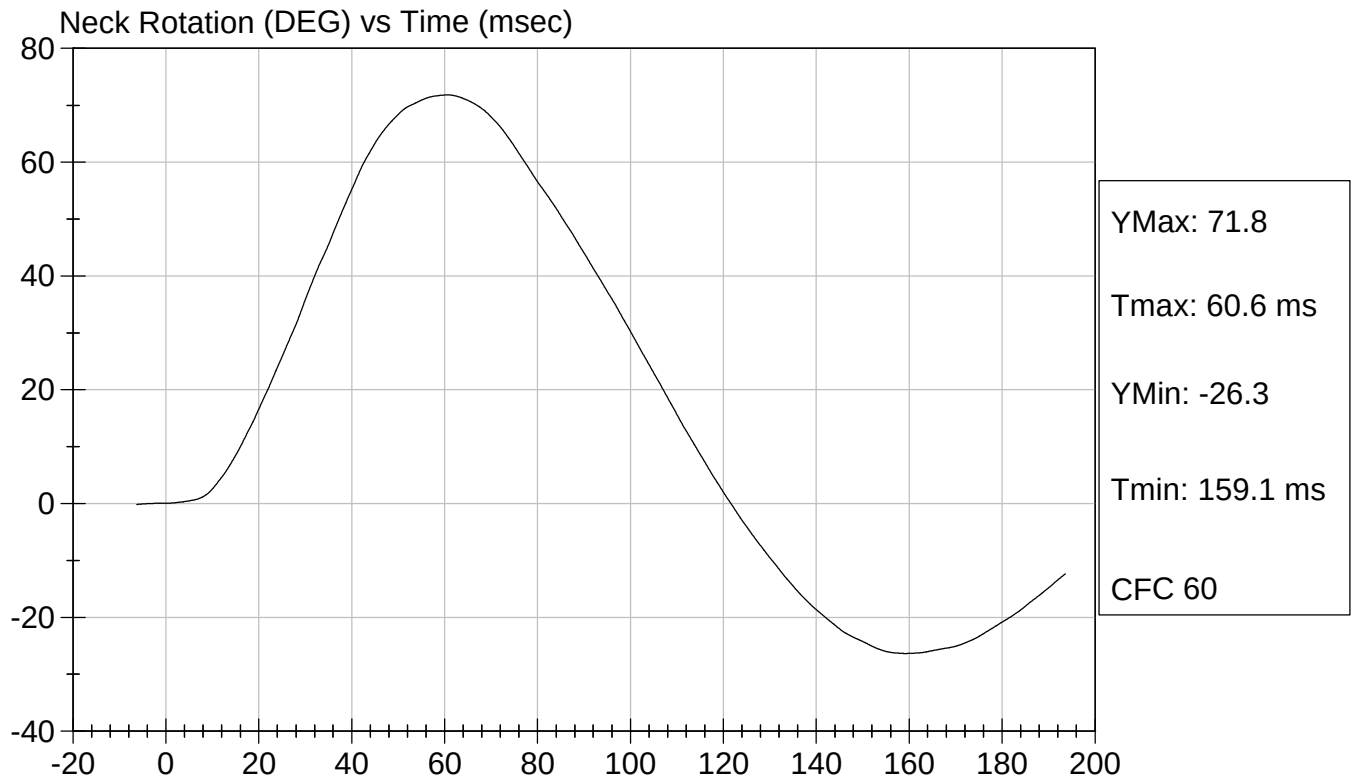
Test Desc: Neck Bending
Component ID: D021239

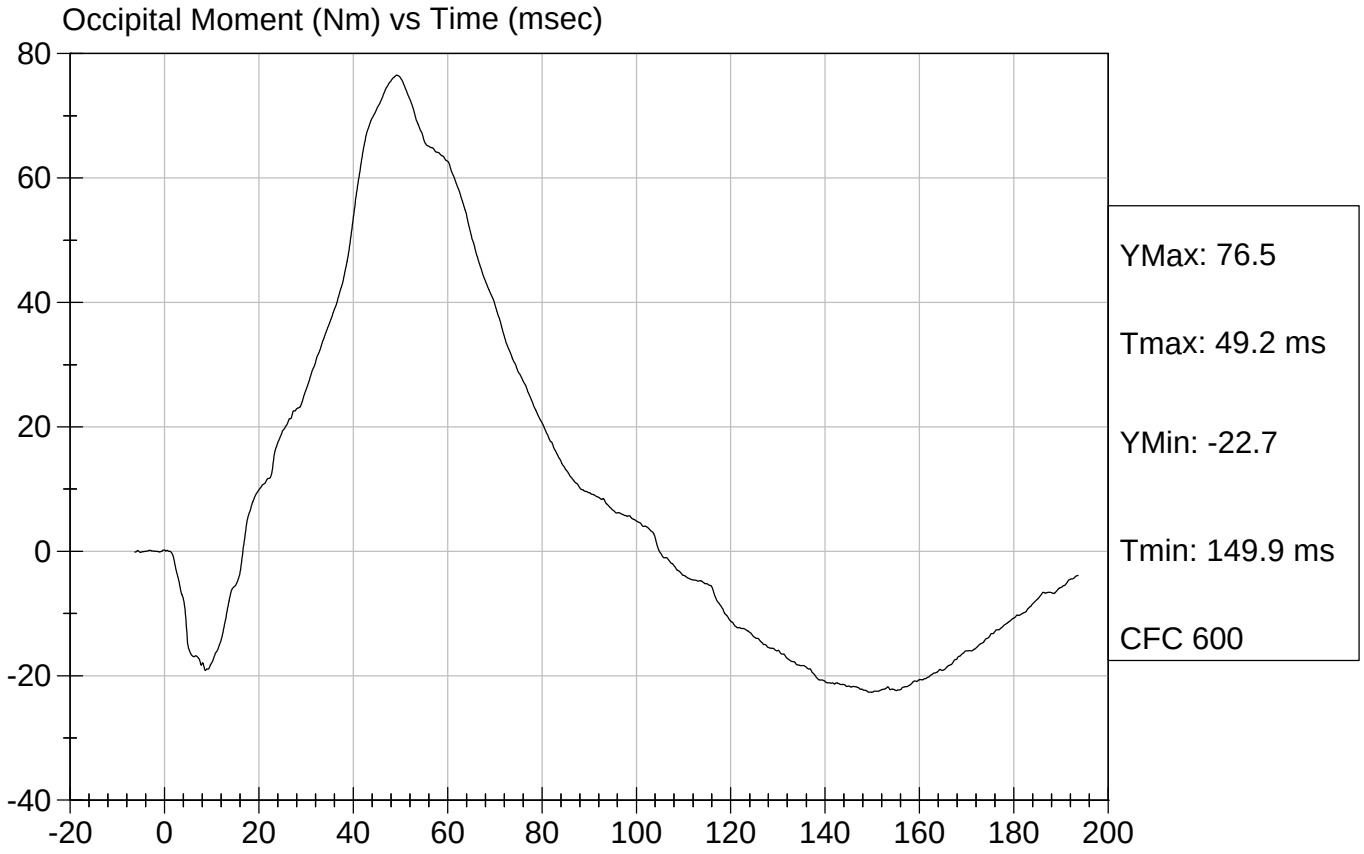
Test Date: 09/18/2002
Speed: 23.13 ft/sec, 7.05 m/sec



Test Desc: Neck Bending
Component ID: D021239

Test Date: 09/18/2002
Speed: 23.13 ft/sec, 7.05 m/sec





SID Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 036 **Test I.D:** D021232

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Velocity	m/s	4.27 - 4.33	4.28	Pass
Upper Rib	G's	37 - 46	43	Pass
Lower Rib	G's	37 - 46	46	Pass
Lower Spine	G's	15 - 22	18	Pass
		Overall Test Results		Pass

Laboratory Technician

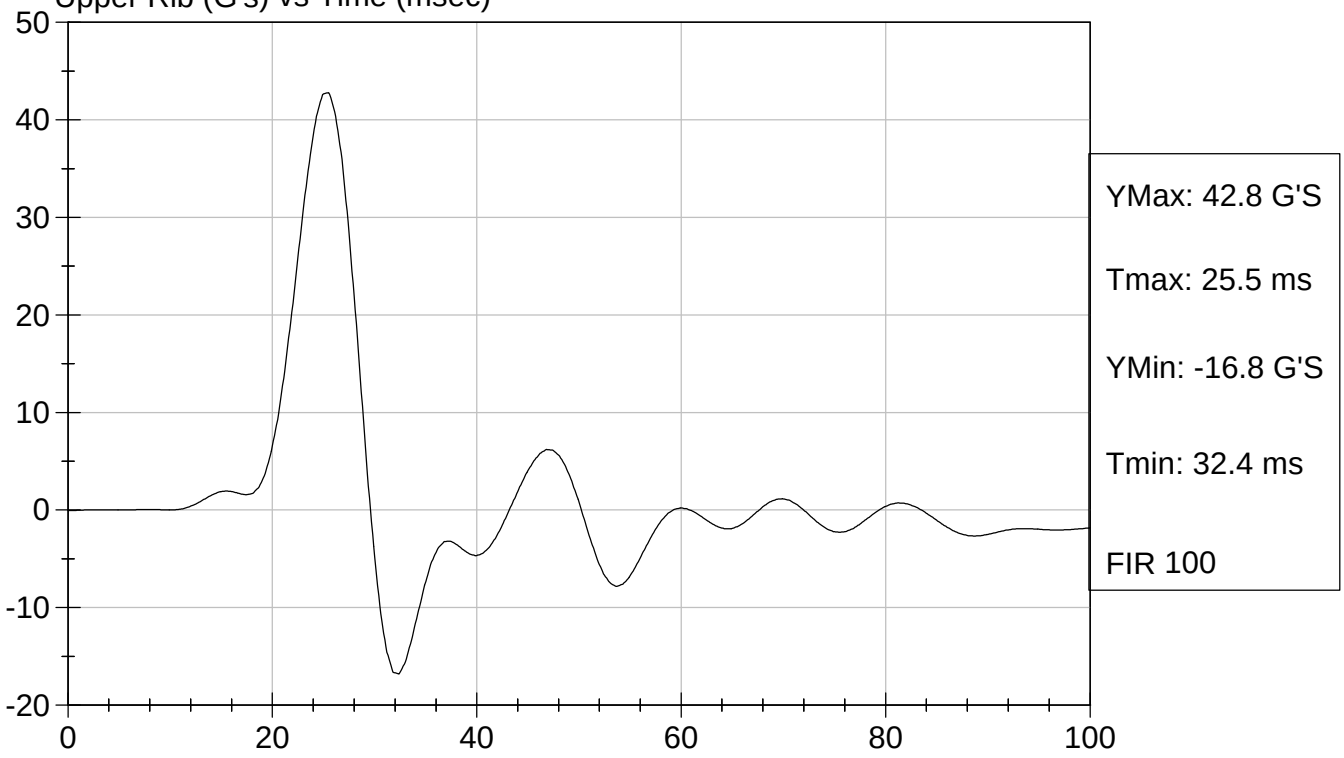
09/17/2002
Test Date

Approved By

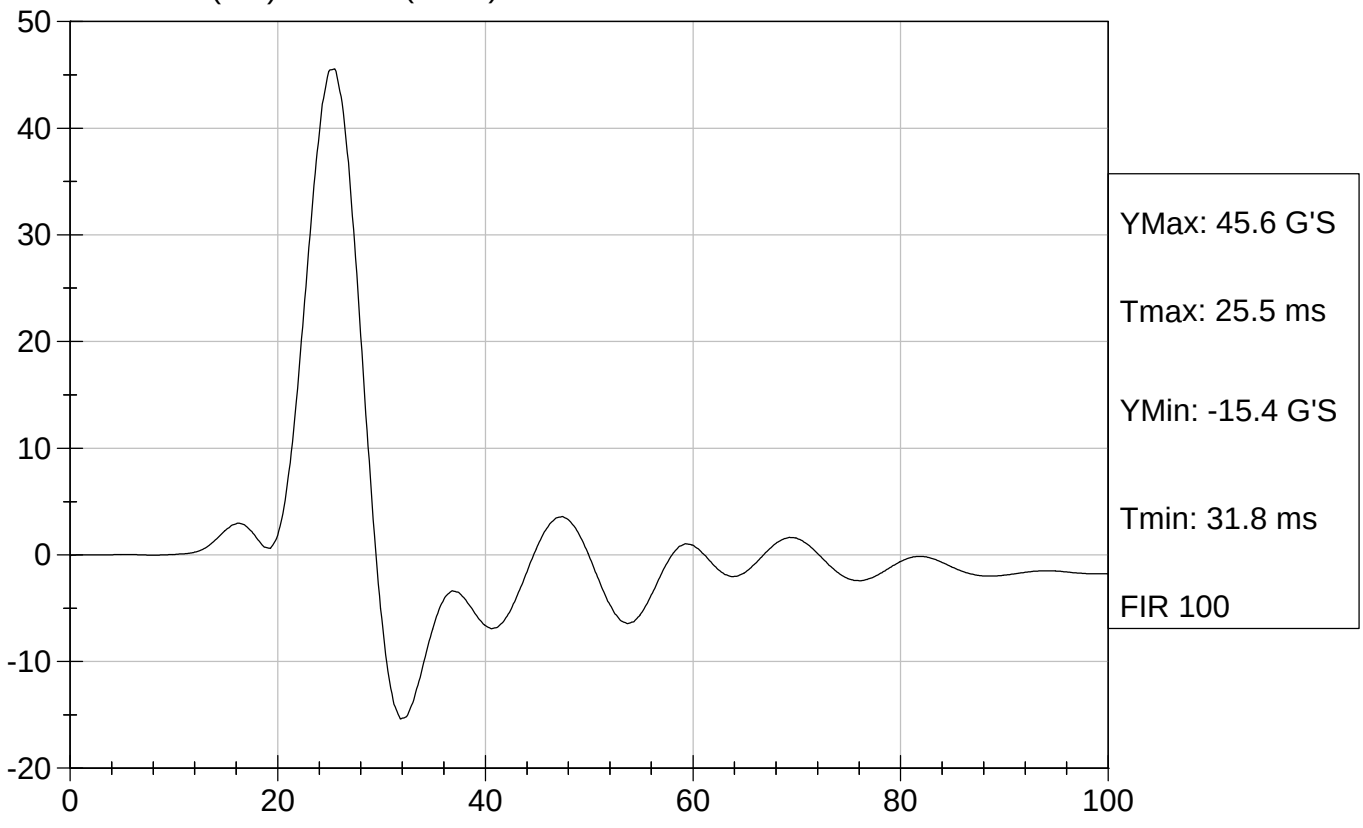
Test Desc: Thorax Impact
Component ID: D021232

Test Date: 09/17/2002
Speed: 14.05 ft/sec, 4.28 m/sec

Upper Rib (G's) vs Time (msec)

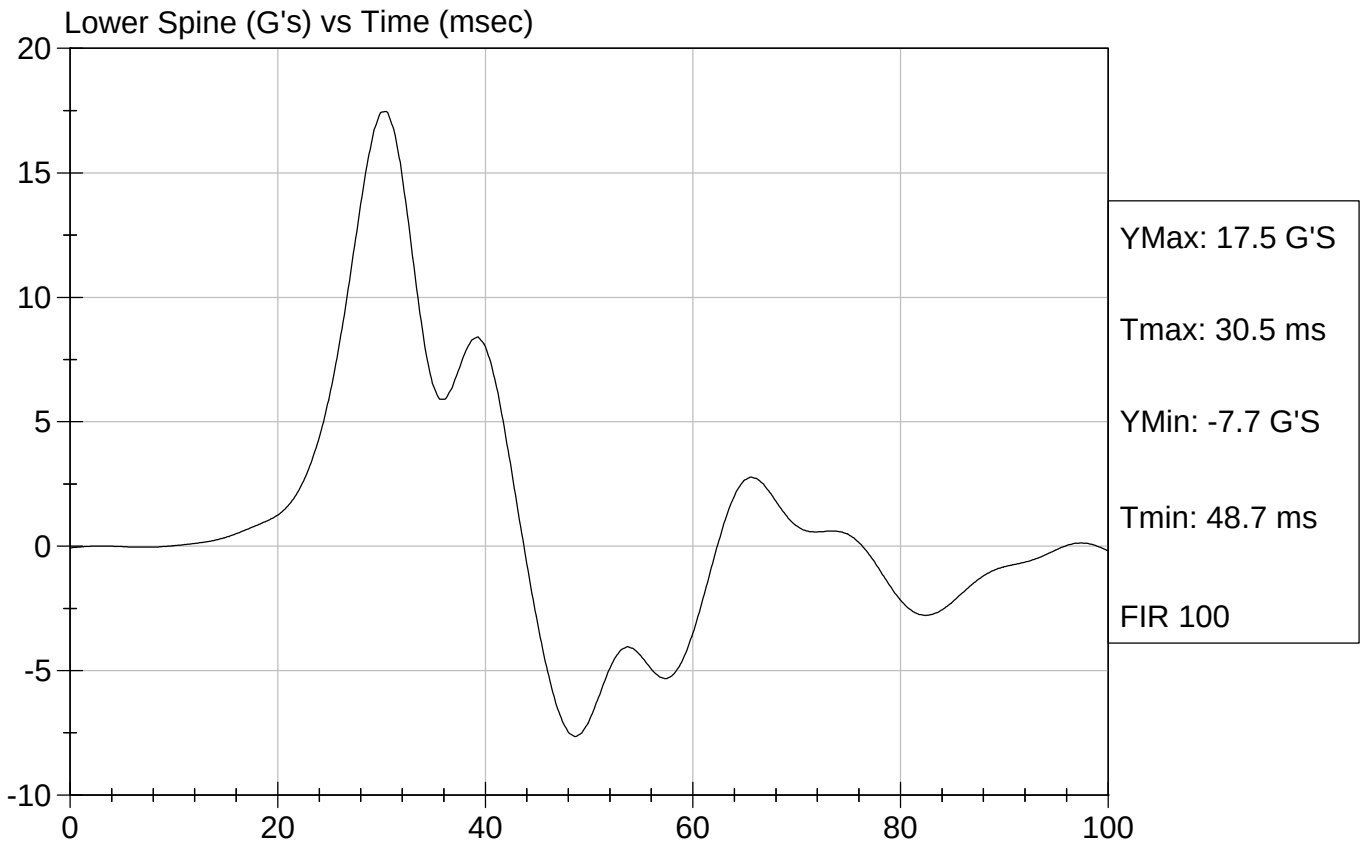


Lower Rib (G's) vs Time (msec)



Test Desc: Thorax Impact
Component ID: D021232

Test Date: 09/17/2002
Speed: 14.05 ft/sec, 6.65 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 036 **Test I.D:** D021233

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Velocity	m/s	4.27 - 4.33	4.29	Pass
Pelvis Acceleration	G's	40 - 60	50	Pass
		Overall Test Results		Pass

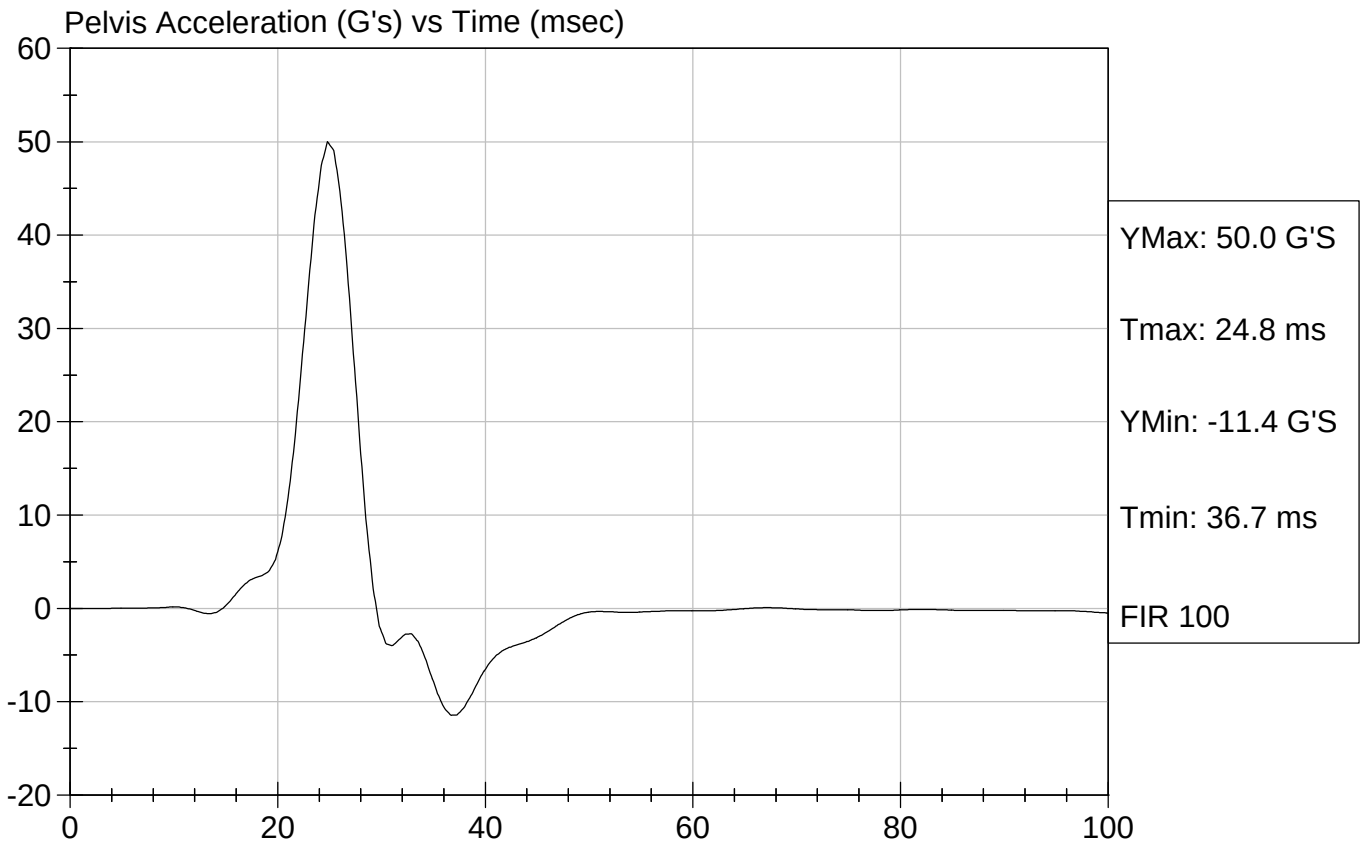
Laboratory Technician

09/17/2002
Test Date

Approved By

Test Desc: Pelvis Impact
Component ID: D021233

Test Date: 09/17/2002
Speed: 14.06 ft/sec, 4.29 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 036 **Test I.D:** D021234

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	54	Pass
Force At 12.7 mm	N	104 -162	150	Pass
Force At 19 mm	N	163 - 222	206	Pass
Force At 25.4 mm	N	222 - 280	273	Pass
Force At 33 mm	N	325 - 391	380	Pass
		Overall Test Results		Pass

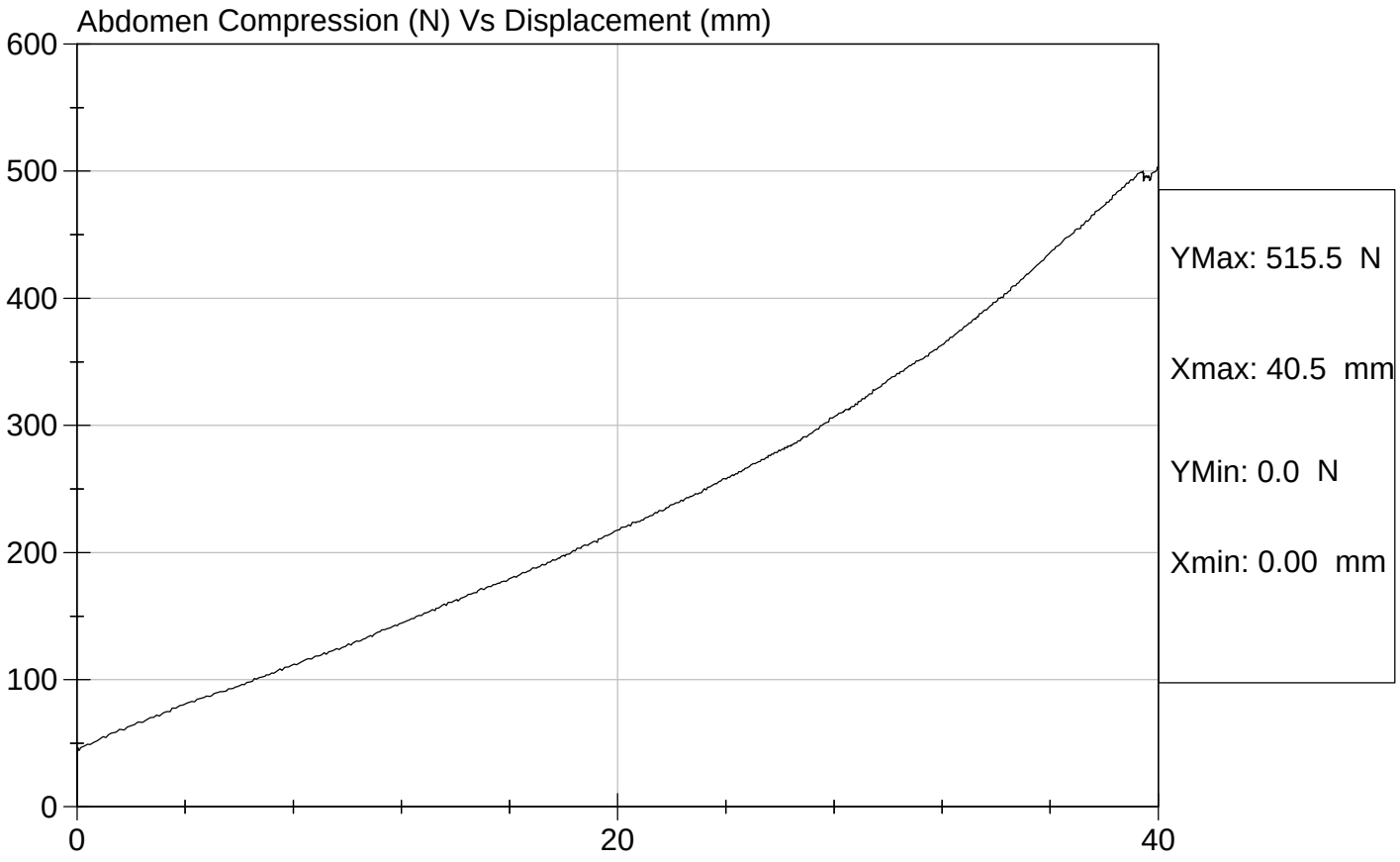
Laboratory Technician

09/18/2002
Test Date

Approved By

Test Description: Abdomen Compression Test Date: 09/18/2002

Component: D021234 Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 036 **Test I.D:** D021235

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	53	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	103.1	Pass
Force At 30 deg	N	151.2 - 204.6	163.5	Pass
Force At 40 deg	N	204.6 - 258.0	231.9	Pass
Return Angle	Deg	12 Maximum	5	Pass
		Overall Test Results		Pass

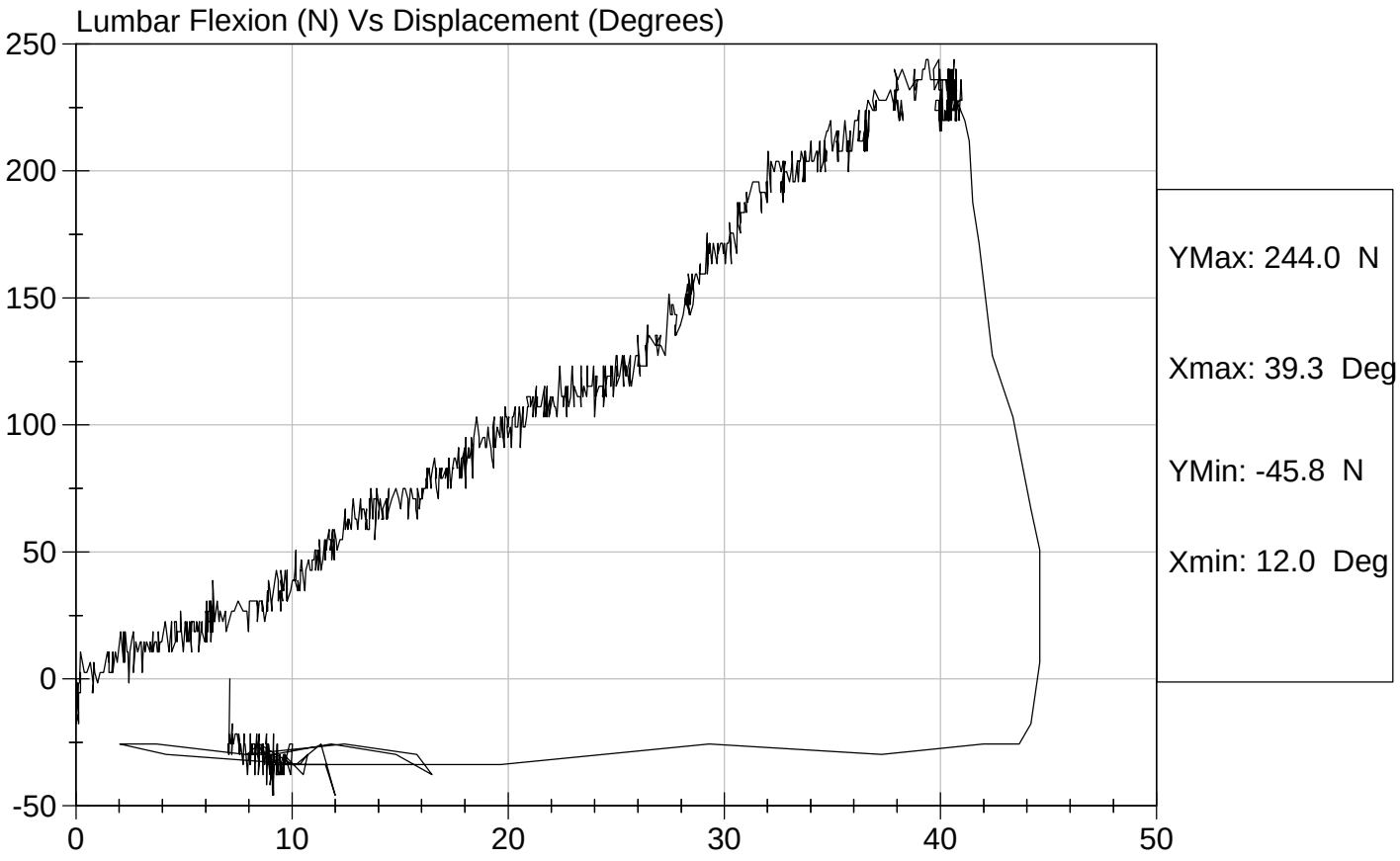
Laboratory Technician

09/18/2002
Test Date

Approved By

Test Description: Lumbar Flexion | Test Date: 09/18/2002

Component: D021235 | Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 036 **Test I.D:** D021411

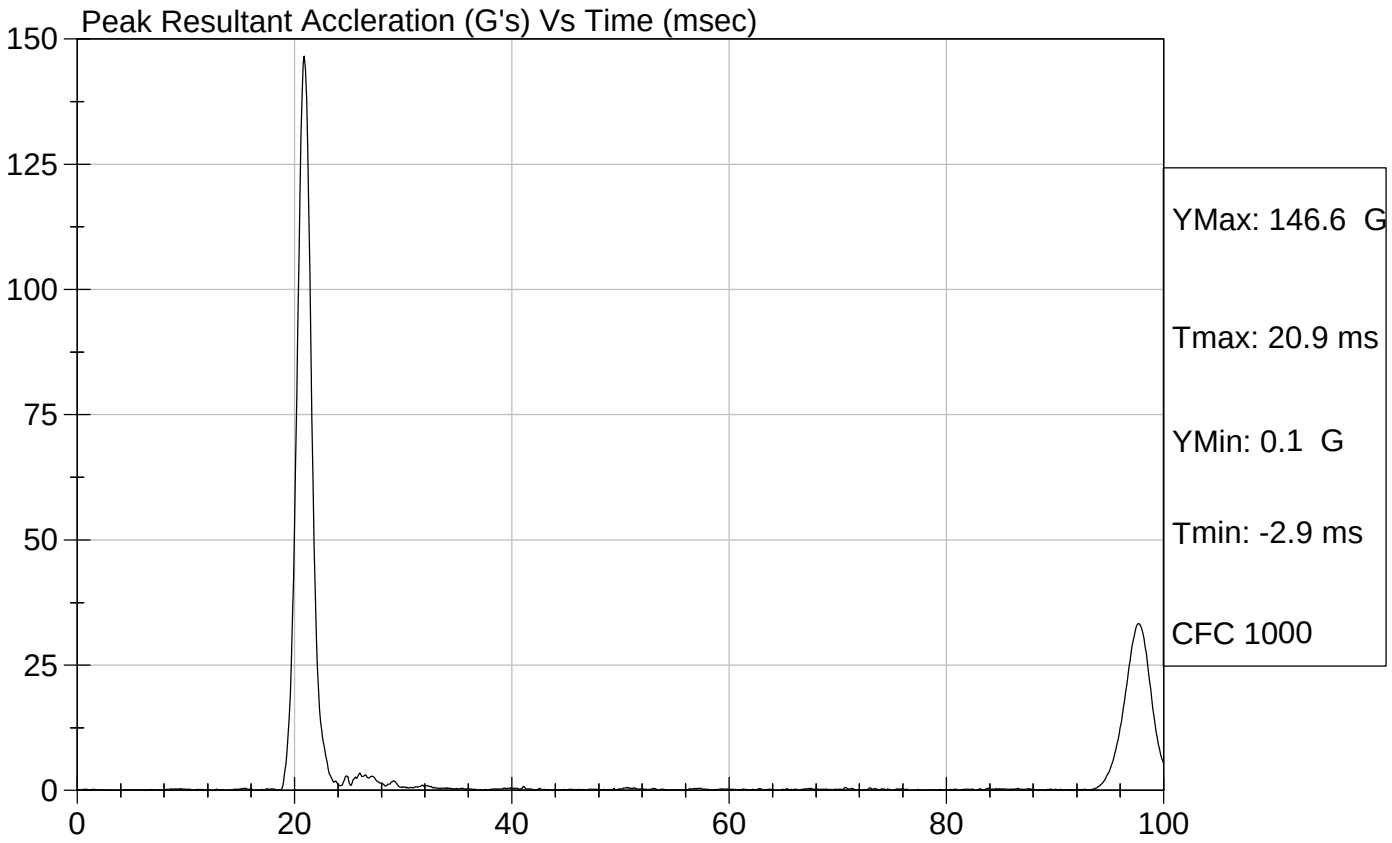
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Peak Resultant Acceleration	G's	120 to 150	147	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-7	Pass
		Overall Test Results		Pass

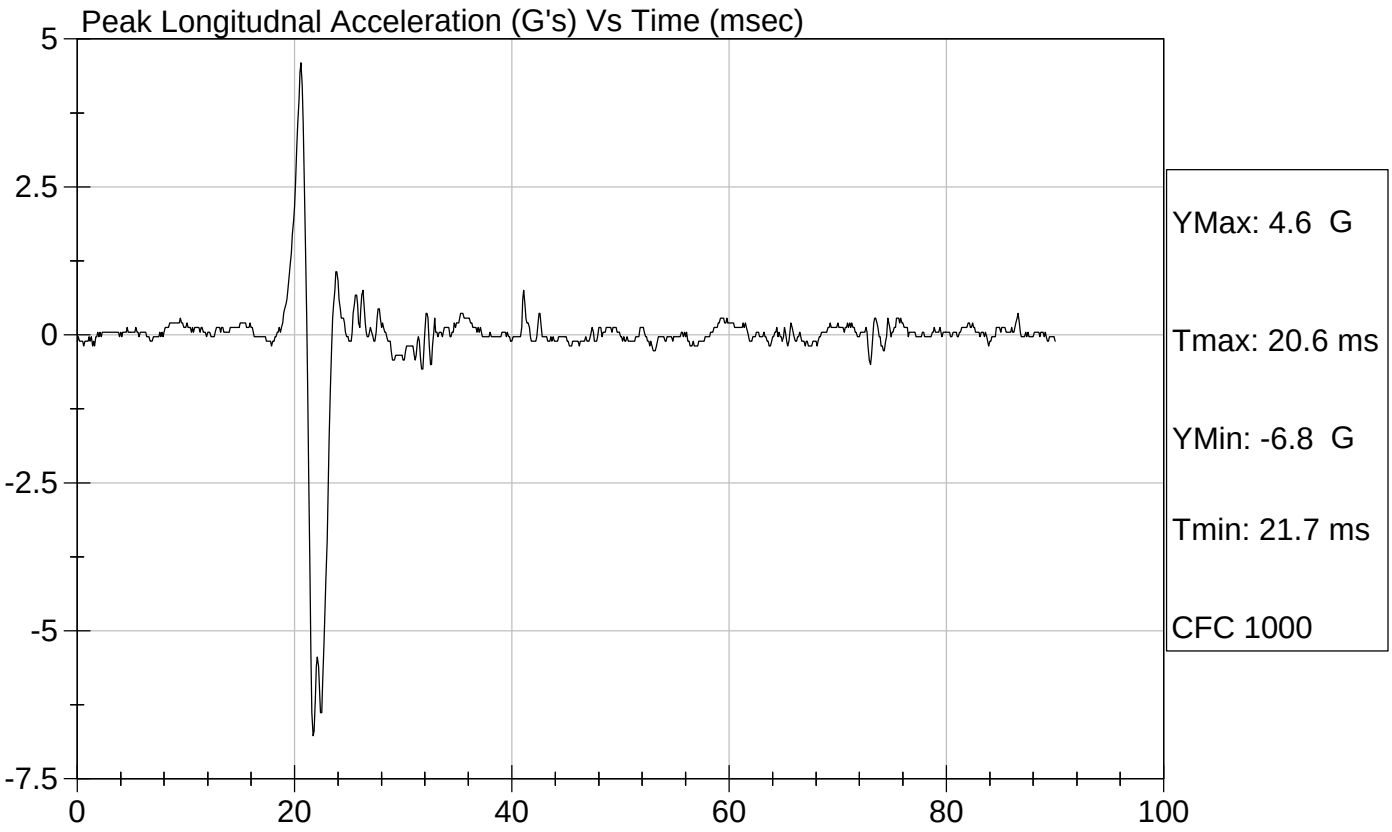
Laboratory Technician

11/01/2002
Test Date

Approved By

	Test Description: Head Drop	Test Date: 11/01/2002
	Component: D021411	Speed: 0 ft/s, 0.00 m/s





SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 036 **Test I.D:** D021419

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	26	Pass
Impact Velocity		m/s	6.89 to 7.13	7.05	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.41	Pass
	20 msec	m/s	4.12 to 5.10	4.76	Pass
	30 msec	m/s	5.73 to 7.01	6.61	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.88	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	73	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	79	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	57	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	15	Pass

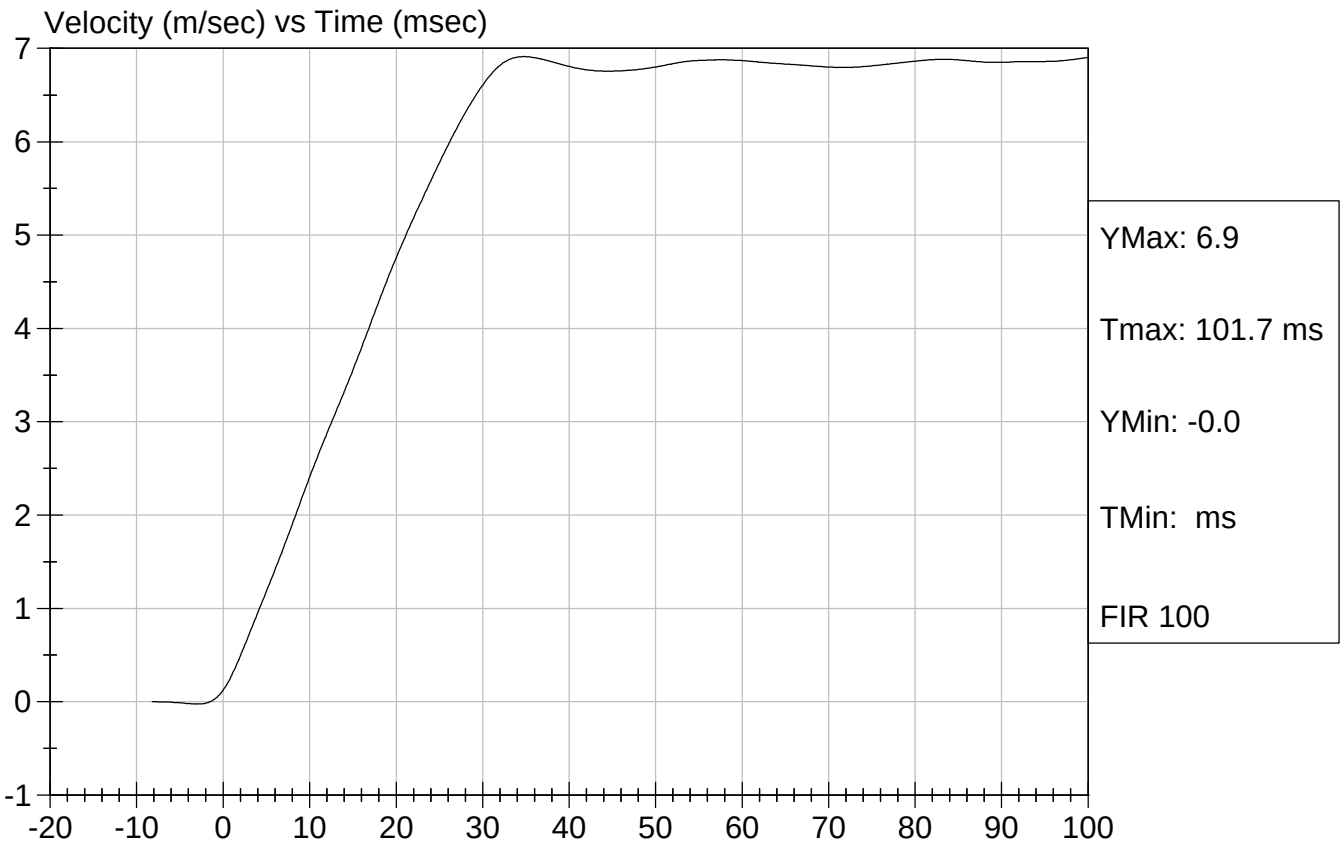
Laboratory Technician

11/01/2002
Test Date

Approved By

Test Desc: Neck Bending
Component ID: D021419

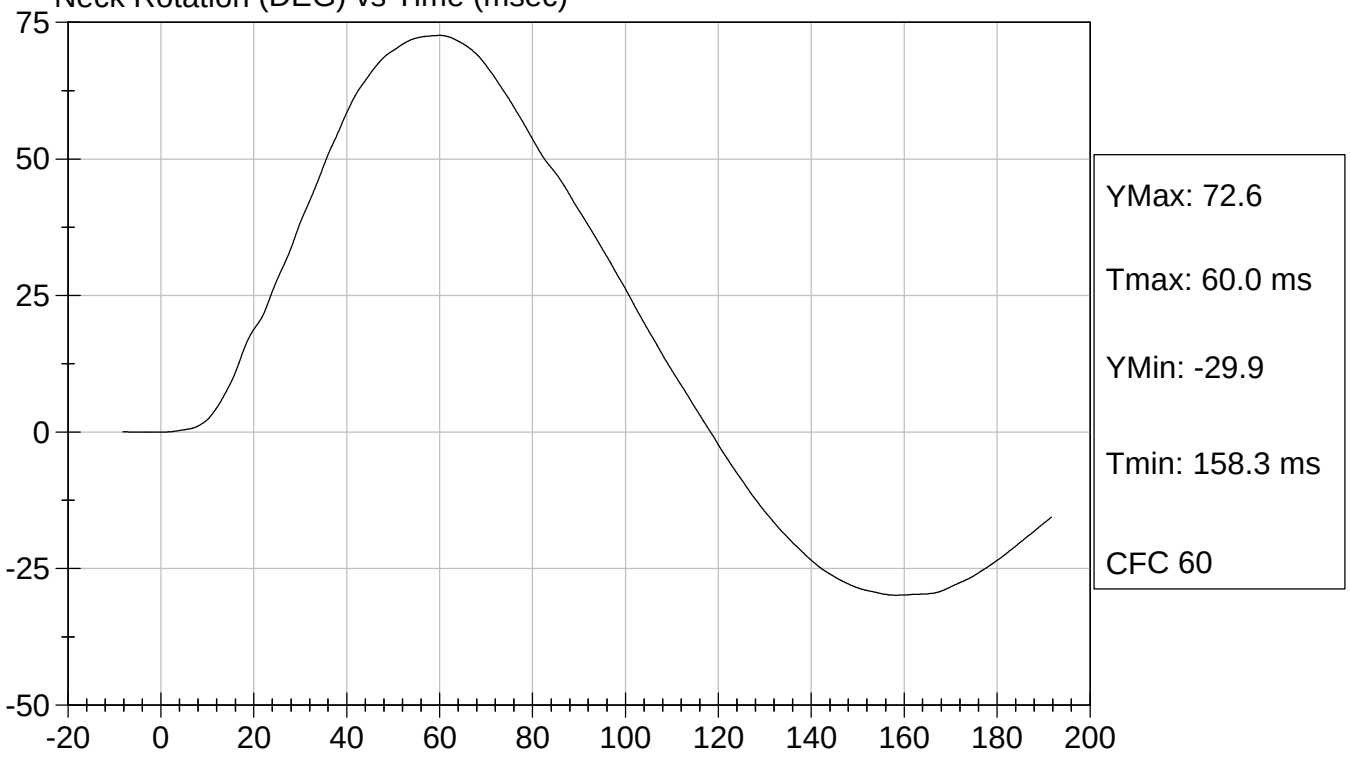
Test Date: 11/01/2002
Speed: 23.14 ft/sec, 7.05 m/sec



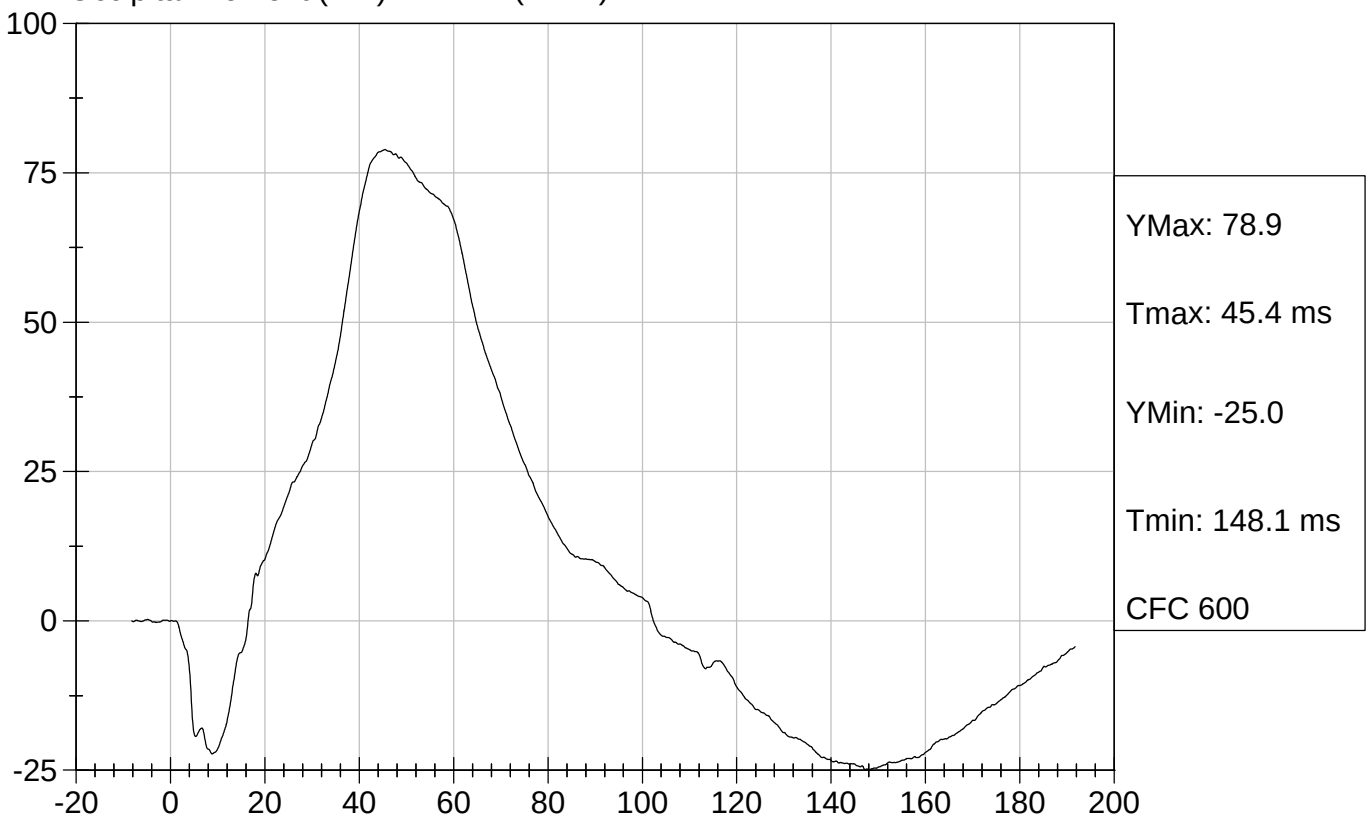
Test Desc: Neck Bending
Component ID: D021419

Test Date: 11/01/2002
Speed: 23.14 ft/sec, 7.05 m/sec

Neck Rotation (DEG) vs Time (msec)



Occipital Moment (Nm) vs Time (msec)



SID Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 036 **Test I.D:** D021412

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Probe Velocity	m/s	4.27 - 4.33	4.27	Pass
Upper Rib	G's	37 - 46	46	Pass
Lower Rib	G's	37 - 46	45	Pass
Lower Spine	G's	15 - 22	19	Pass
		Overall Test Results		Pass

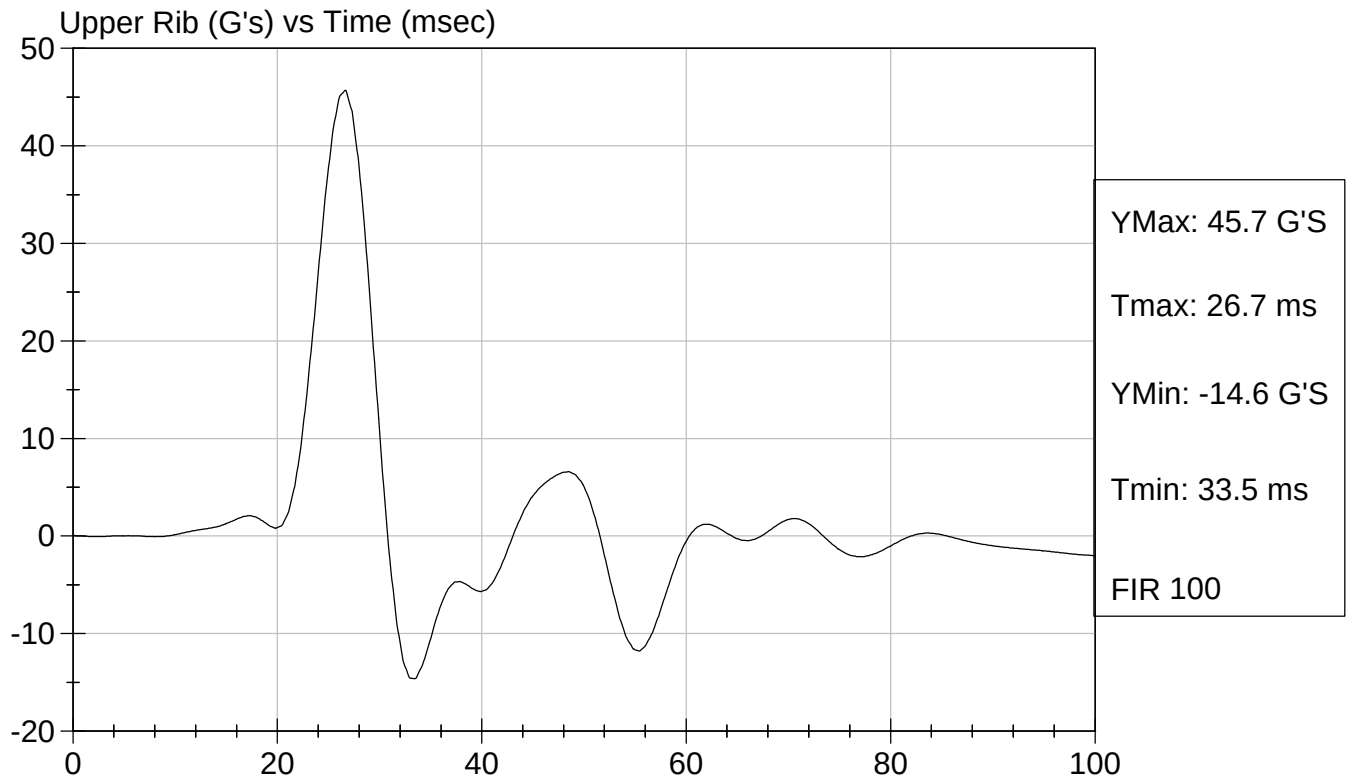
Laboratory Technician

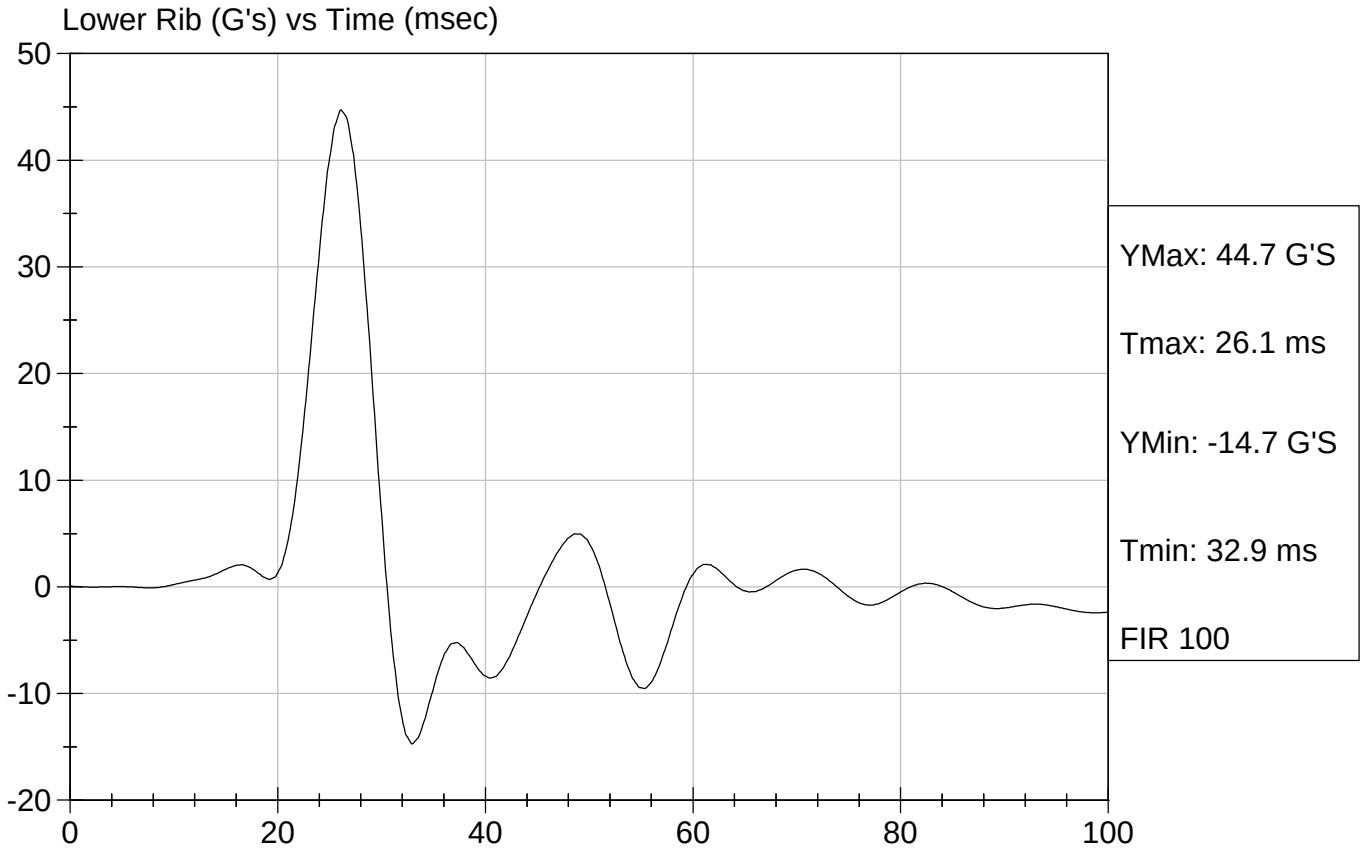
11/01/2002
Test Date

Approved By

Test Desc: Thorax Impact
Component ID: D021412

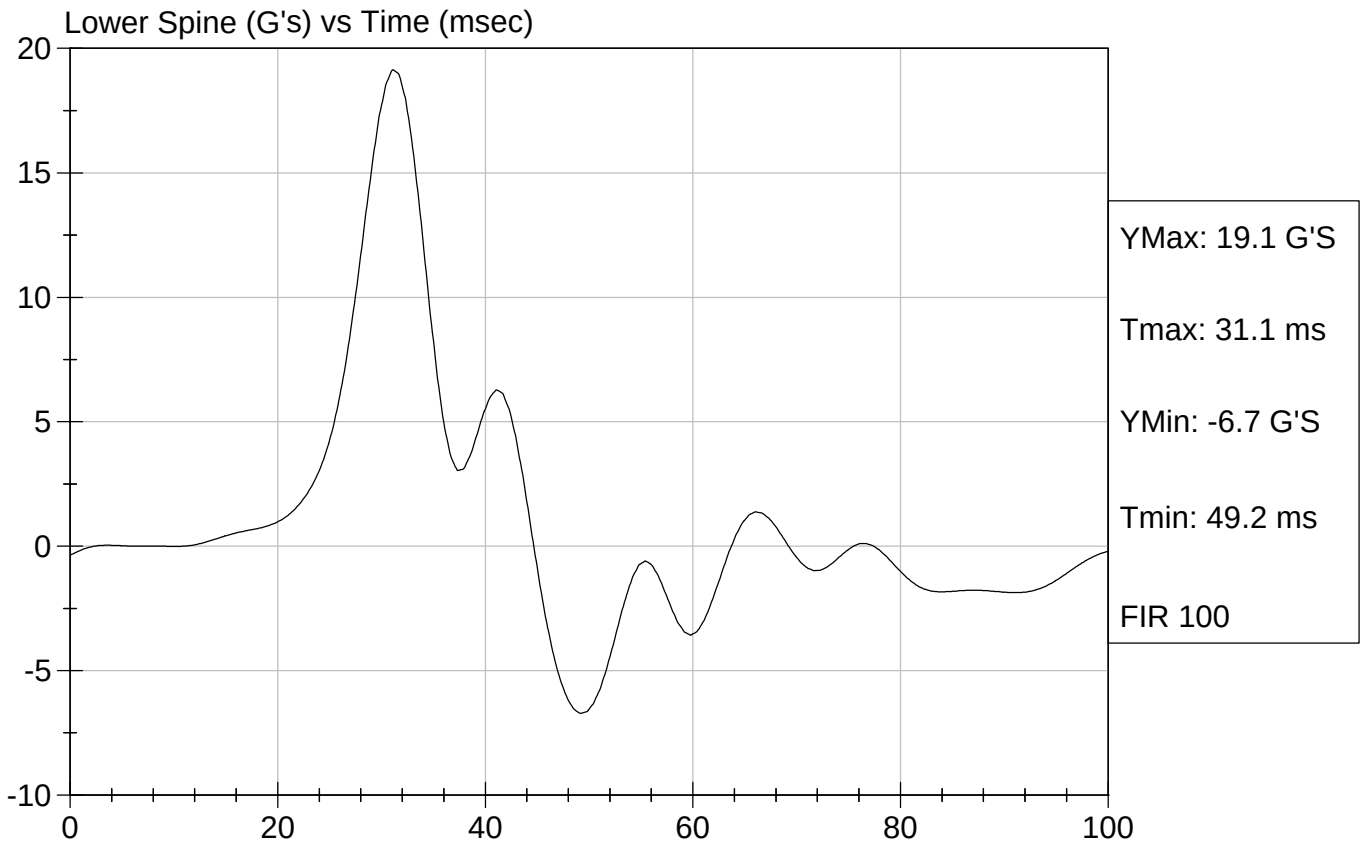
Test Date: 11/01/2002
Speed: 14.02 ft/sec, 4.27 m/sec





Test Desc: Thorax Impact
Component ID: D021412

Test Date: 11/01/2002
Speed: 14.02 ft/sec, m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 036 **Test I.D:** D021413

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Probe Velocity	m/s	4.27 - 4.33	4.29	Pass
Pelvis Acceleration	G's	40 - 60	45	Pass
		Overall Test Results		Pass

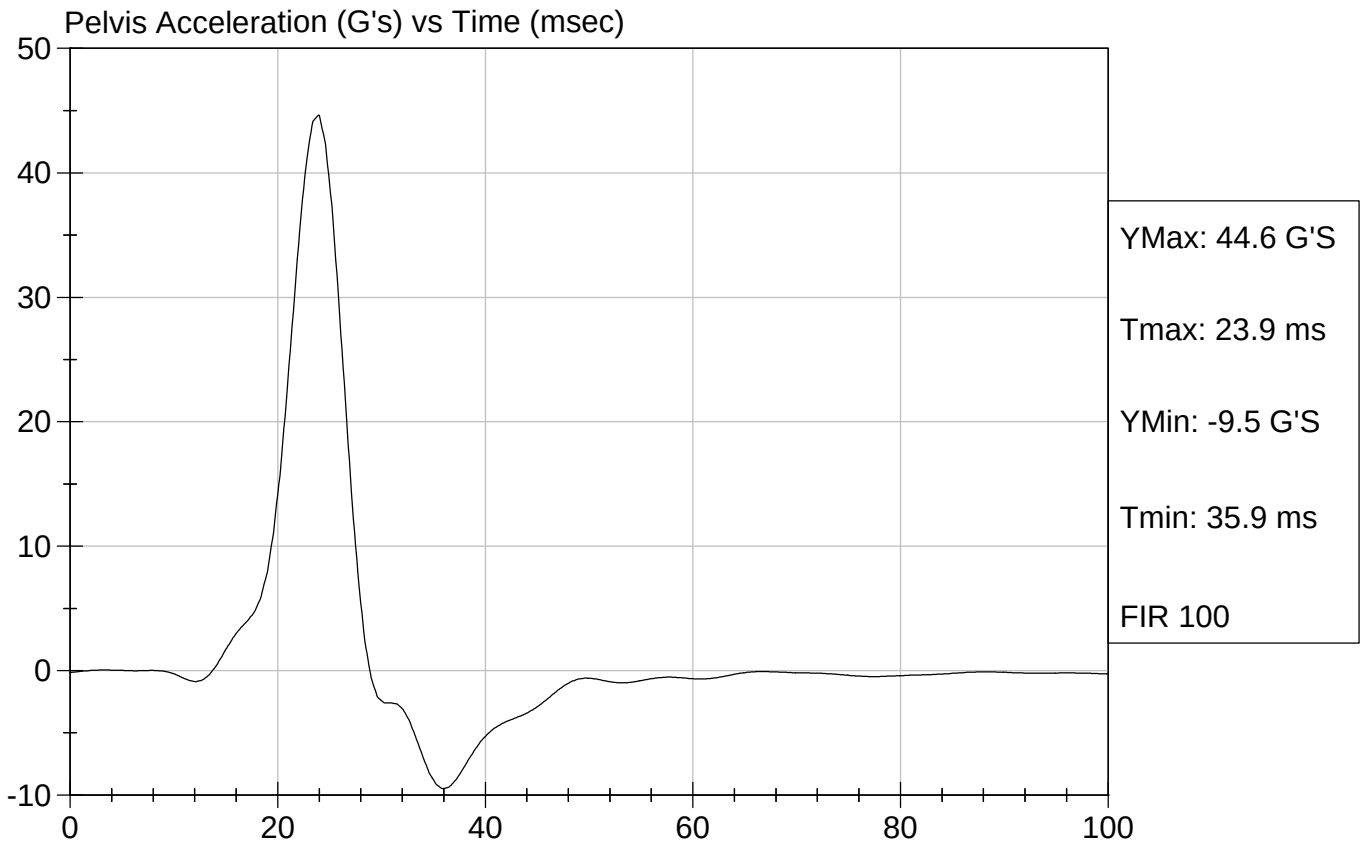
Laboratory Technician

11/01/2002
Test Date

Approved By

Test Desc: Pelvis Impact
Component ID: D021413

Test Date: 11/01/2002
Speed: 14.07 ft/sec, 4.29 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 036 **Test I.D:** D021414

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Force At 12.7 mm	N	104 -162	147	Pass
Force At 19 mm	N	163 - 222	201	Pass
Force At 25.4 mm	N	222 - 280	269	Pass
Force At 33 mm	N	325 - 391	373	Pass
		Overall Test Results		Pass

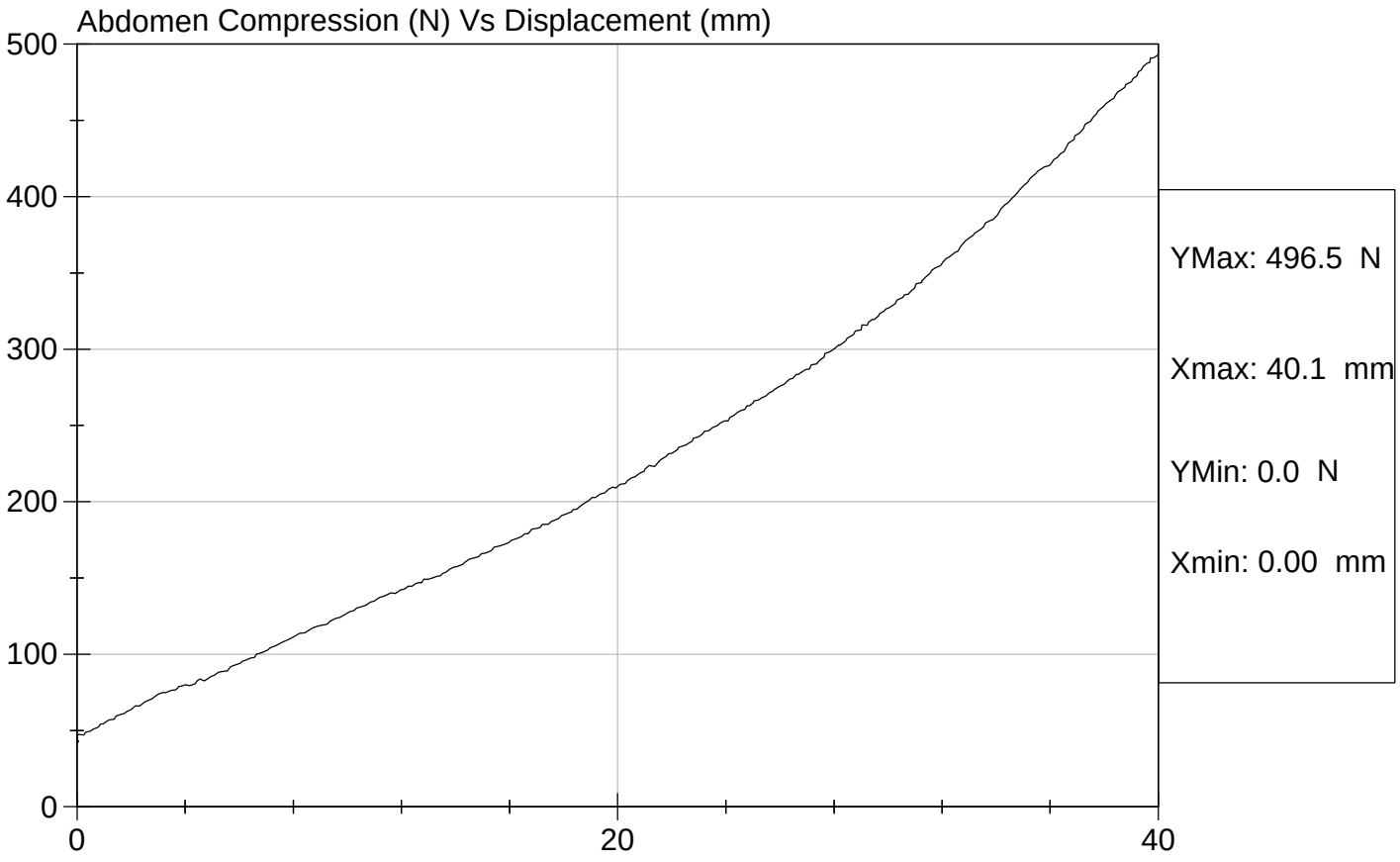
Laboratory Technician

11/01/2002
Test Date

Approved By

Test Description: Abdomen Compression Test Date: 11/01/2002

Component: D021414 Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 036 **Test I.D:** D021415

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	102.0	Pass
Force At 30 deg	N	151.2 - 204.6	154.3	Pass
Force At 40 deg	N	204.6 - 258.0	234.8	Pass
Return Angle	Deg	12 Maximum	6	Pass
		Overall Test Results		Pass

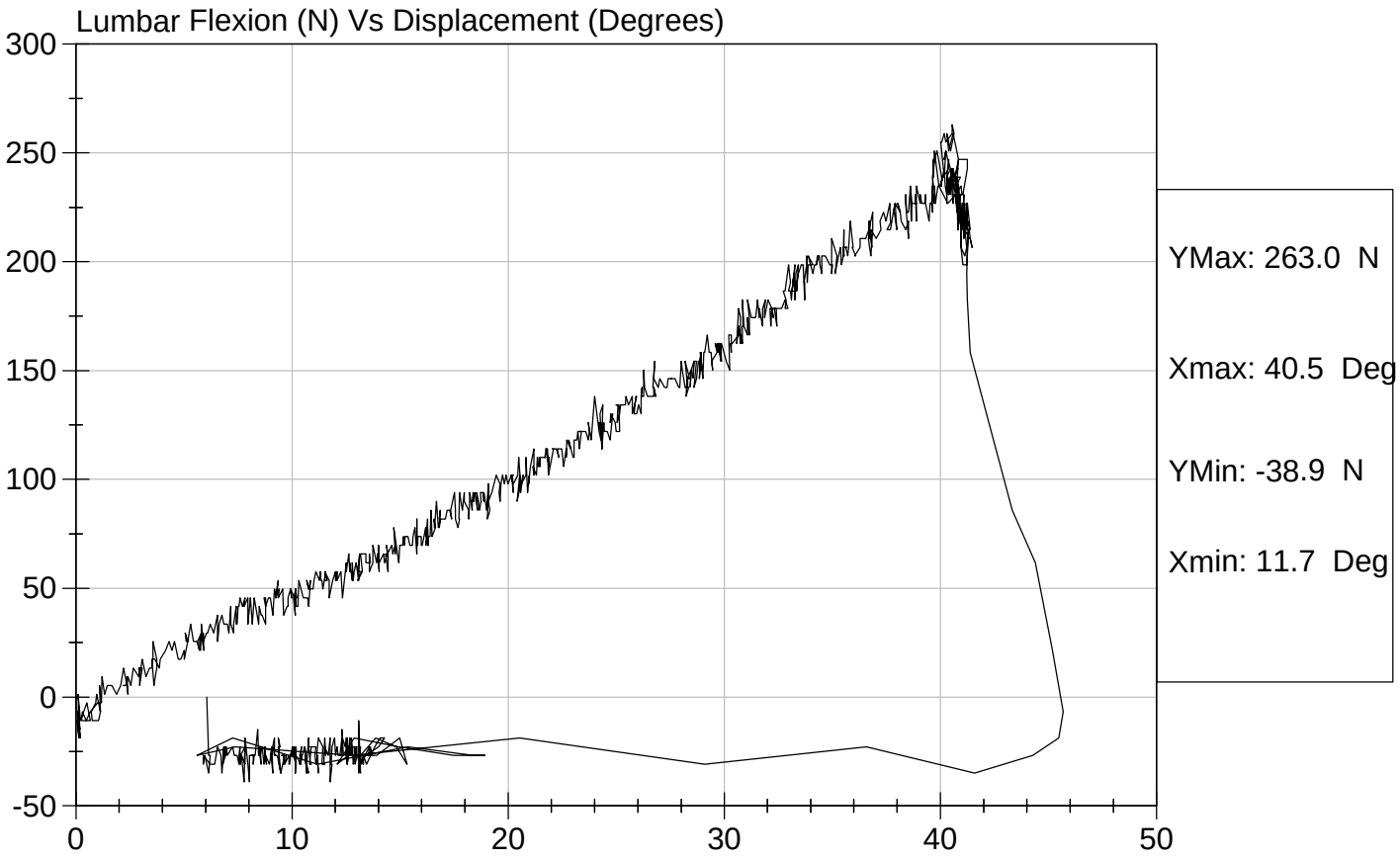
Laboratory Technician

11/01/2002
Test Date

Approved By

Test Description: Lumbar Flexion | Test Date: 11/01/2002

Component: D021415 | Speed: 0 ft/sec, 0 m/sec



APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA

	INSTRUMENTS FOR LEFT FRONT DUMMY NO. 009		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X Accelerometer	J17709	Endevco	6/25/02
Head Y Accelerometer	J20298	Endevco	6/25/02
Head Z Accelerometer	J20473	Endevco	6/25/02
Head Y-Front Accelerometer	J13424	Endevco	9/9/02
Head Z-Front Accelerometer	J14007	Endevco	9/9/02
Head X-Left Accelerometer	AP2C4	Endevco	9/9/02
Head Z-Left Accelerometer	ALBA7	Endevco	9/9/02
Head X-Upper Accelerometer	AKAA6	Endevco	9/9/02
Head Y-Upper Accelerometer	J13650	Endevco	9/9/02
Neck Force X Load Cell	N442FX	Denton	10/9/02
Neck Force Y Load Cell	N442FY	Denton	10/9/02
Neck Force Z Load Cell	N442FZ	Denton	10/9/02
Neck Moment X	N442MX	Denton	10/9/02
Neck Moment Y	N442MY	Denton	10/9/02
Neck Moment Z	N442MZ	Denton	10/9/02
Upper Spine X Accelerometer	ANBP7	Endevco	7/2/02
Upper Spine Y Accelerometer	AP1C6	Endevco	7/2/02
Upper Spine Z Accelerometer	AJ9N4	Endevco	7/2/02
Upper Rib Y Accelerometer	AC913	Endevco	7/3/02
Lower Rib Y Accelerometer	J19173	Endevco	10/9/02
Rib Displacement	036	Servo	9/9/02
Lower Spine X Accelerometer	AGM47	Endevco	9/6/02
Lower Spine Y Accelerometer	AJ9D9	Endevco	9/6/02
Lower Spine Z Accelerometer	ANAN3	Endevco	10/16/02
Pelvis X Acceleration	ACCH1	Endevco	9/9/02
Pelvis Y Acceleration	AGM41	Endevco	9/9/02
Pelvis Z Acceleration	J13984	Endevco	9/9/02
Head Xr Acceleration	ALEK9	Endevco	6/25/02
Head Yr Acceleration	AP042	Endevco	6/25/02
Head Zr Acceleration	AP120	Endevco	6/25/02
Upper Rib Yr Accelerometer	AGTT3	Endevco	7/3/02
Lower Rib Yr Accelerometer	J13656	Endevco	10/9/02
Upper Spine Yr Accelerometer	AJ808	Endevco	7/2/02
Lower Spine Yr Accelerometer	ANAN6	Endevco	10/16/02
Pelvis Yr Acceleration	J14774	Endevco	9/9/02

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Mid A-Post Y	G01-N18	ENTRAN	7/31/02
Left Lower A-Post Y	G01-N02	ENTRAN	7/31/02
Left A-Post @ Roof Y	C25-A25	ENTRAN	9/6/02
Left Lower B-Post Y	A08-A10	ENTRAN	6/24/02
Left Upper B-Post Y	K21-N10	ENTRAN	9/6/02
Rear Floorpan Above Axle X	99F216	ENTRAN	4/22/02
Rear Floorpan Above Axle Y	99F349	ENTRAN	4/22/02
Rear Floorpan Above Axle Z	99F254	ENTRAN	4/22/02
Driver Seat Track Y	G01-N05	ENTRAN	7/23/02
Right Front Sill X	E03-H24	ENTRAN	9/6/02
Right Front Sill Y	F07-A14	ENTRAN	9/6/02
Right Front Sill Z	G03-N11	ENTRAN	9/6/02
Right Rear Sill X	H14-N09	ENTRAN	10/8/02
Right Rear Sill Y	H14-A11	ENTRAN	10/7/02
Right Rear Sill Z	A08-A11	ENTRAN	10/7/02
Left Side Sill at Front Seat Y	I12-F14	ENTRAN	6/24/02
Left Side Sill at Rear Seat Y	G13-B03	ENTRAN	6/24/02
Vehicle CG X	I12-F05	ENTRAN	5/29/02
Vehicle CG Y	E10-F20	ENTRAN	6/17/02
Vehicle CG Z	99F253	ENTRAN	4/22/02
Left Front Door @ Pelvis Y	G01-N21	ENTRAN	7/23/02
Left Front Door @ Arm Y	G01-N20	ENTRAN	7/31/02
Lower Center Radiator Support X	G03-N15	ENTRAN	9/6/02
Lower Center Radiator Support Y	G03-N02	ENTRAN	9/6/02
Lower Center Radiator Support Z	A08-A13	ENTRAN	9/6/02

Note: All Endevco accelerometers are Model No. 7264-2000
All Entran accelerometers are Model No. EGE-73

APPENDIX E
DUMMY PEAK RESPONSES

DRIVER PEAK RESPONSE TABLE

Location	Peak Values								
				1999 Saab 10/23/01 ES-2		2000 Saab 9/19/02 ES-2		2000 Saab 10/24/02 SID HIII	
	Class	Axis	Units	Peak	Time	Peak	Time	Peak	Time
Head	1000	X	G	-8.2	63	-60.8	64	-235.2	61
	1000	Y	G	31.9	58	100.9	64	606.6	61
	1000	Z	G	13.9	58	25.9	64	115.3	61
	1000	RES	G	35.0	58	119.6	64	655.7	61
Head Injury Criteria (HIC)				114		243		5155.4	
t1				42.8		50.8		60.6	
t2				69.9		66.2		61.4	
Upper Neck Force	1000	X	N	-211	63	-424	63	-729	58
	1000	Y	N	-258	186	-328	167	556	62
	1000	Z	N	476	46	512	96	-3154	61
	1000	RES	N	481	46	674	62	3216	61
Upper Neck Moment	600	X	Nm	-23.5	173	-28.3	157	-76.3	62
	600	Y	Nm	17.6	104	-41.2	63	-41.1	57
	600	Z	Nm	18.8	69	27.4	70	21.4	60
	600	RES	Nm	27.4	175	47.7	63	76.3	62
Lower Neck Force	1000	X	N	-209	60	-679	63		
	1000	Y	N	286	29	-500	53		
	1000	Z	N	438	46	517	55		
	1000	RES	N	443	46	789	63		
Lower Neck Moment	600	X	Nm	-60.0	189	-67.8	168		
	600	Y	Nm	32.2	81	74.1	64		
	600	Z	Nm	14.7	73	29.4	60		
	600	RES	Nm	67.7	189	89.2	64		
Shoulder Force	600	X	N	381	21	-615	20		
	600	Y	N	1161	21	1295	20		
	600	Z	N	386	22	-379	19		

DRIVER PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values								
				1999 Saab 10/23/01 ES-2		2000 Saab 9/19/02 ES-2		2000 Saab 10/24/02 SID HIII	
	Class	Axis	Units	Peak	Time	Peak	Time	Peak	Time
Upper Spine	180	X	G	7.1	53	-10.7	44	-28.4	52
	180	Y	G	37.7	55	57.6	55	80.8	52
	180	Z	G	4.7	68	-4.9	53	18.3	62
	180	Res	G	38.4	55	57.8	55	86.6	52
Lower Spine	180	X	G	8.1	45	-5.9	86	-25.2	49
	180	Y	G	39.7	53	58.3	52	79.8	47
	180	Z	G	4.3	68	-5.2	92	17.2	62
	180	Res	G	40.2	51	58.3	52	83.7	48
Upper Rib	180	Y	G	97.9	49	180.9	48	108.9	44
Mid Rib	180	Y	G	122.5	15	148.8	46		
Lower Rib	180	Y	G	136.5	14	106.2	48	101.1	45
Upper Rib Deflection	180	Y	mm	37.8	58	-49.9	59		
Mid Rib Deflection	180	Y	mm	29.4	57	-43.0	56		
Lower Rib Deflection	180	Y	mm	29.1	56	-33.2	55		
Upper Rib VC	180	Y	m/sec	0.50	51	1.3	51		
Mid Rib VC	180	Y	m/sec	0.31	53	0.9	51		
Lower Rib VC	180	Y	m/sec	0.29	52	0.5	51		
Torso Force	600	X	N	534	49	286	58		
	600	Y	N	-225	63	-423	51		
Torso Moment	600	Y	Nm	13.4	47	-7	62		
	600	Z	Nm	22.4	50	16.9	58		

DRIVER PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values								
				1999 Saab 10/23/01 ES-2		2000 Saab 9/19/02 ES-2		2000 Saab 10/24/02 SID HIII	
	Class	Axis	Units	Peak	Time	Peak	Time	Peak	Time
T12 Force	600	X	N	619	58	893	61		
	600	Y	N	1172	50	1975	49		
T12 Moment	600	X	Nm			-124.3	49		
	600	Y	Nm	84	58	126.0	68		
Abdomen Front Force	600		N	103	71	219	49		
Abdomen Mid Force	600		N	255	50	466	48		
Abdomen Rear Force	600		N	556	49	702	48		
Abdomen Summed Force	600		N	849	50	1382	49		
Pubic Symphysis Force	600		N	1733	55	-2673	47		
Right Femur Force	600	X	N	352	59	330	89		
	600	Y	N	-1207	63	1083	86		
	600	Z	N	680	79	1064	100		
	600	Res	N	1237	63	1439	86		
Right Femur Moment	600	X	Nm	-105.0	44	-123.8	81		
	600	Y	Nm	-28.3	69	-33.8	120		
	600	Z	Nm	-30.0	56	-33.4	92		
	600	Res	Nm	106.9	44	125.4	81		

DRIVER PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values								
				1999 Saab 10/23/01 ES-2		2000 Saab 9/19/02 ES-2		2000 Saab 10/24/02 SID HIII	
	Class	Axis	Units	Peak	Time	Peak	Time	Peak	Time
Left Femur Force	600	X	N	472	73	459	97.9		
	600	Y	N	-795	58	701	82.3		
	600	Z	N	1046	60	1207	81.3		
	600	Res	N	1298	60	1393	82.3		
Left Femur Moment	600	X	Nm	-82.2	40	75.9	84.1		
	600	Y	Nm	-25.6	49	-40.4	70.0		
	600	Z	Nm	-30.1	62	25.6	143.6		
	600	Res	Nm	82.6	40	78.1	84		
Pelvis	1000	X		18.9	59	-11.3	39.7	10.2	41
	1000	Y		50.2	42	79.2	42	80.4	38
	1000	Z		-6.6	18	-9.2	96	10.7	63