REPORT NUMBER: NCAPSIDE-MGA-2005-003

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

VOLVO GOTHENBURG SWEDEN
2005 Volvo V70 Station Wagon
NHTSA NUMBER: M55901

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

Test Date: October 20, 2004

Report Date: October 28, 2004

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
400 SEVENTH STREET, SW, ROOM 5311
WASHINGTON, D.C. 20590

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-03-D-12005.

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Reviewed by: David Winkelbauer Date: 10/28/04
David Winkelbauer, Facility Director

FINAL REPORT ACCEPTED BY:

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COTR, Side Impact

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Date of Acceptance

Technical Report Documentation Page

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15. Supplementary Notes

16. Abstract

A 55/28 km/h 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 2005 Volvo V70 Station Wagon to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on October 20, 2004. The impact velocity of the Moving Deformable Barrier (MDB) was 62.3 km/h, and the ambient temperature at the struck side (driver's) of the vehicle was 21°C. The target vehicle's maximum post test static crush was 328 mm at level 2. The test vehicle's occupant performance is as follows:

	DRIVER	PASS.
Left Upper Rib (LUR) Accel., g	38.5	44.0
Left Lower Rib (LLR) Accel., g	45.7	44.5
Lower Spine (T_{12}) Accel., g	58.9	52.4
Thoracic Trauma Index (TTI)	52.3	48.5
Pelvis (PEV) Accel., g	79.8	85.1
HIC	237.9	188.9

The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.

17. Key Words	18. Distribution Statement
New Car Assessment Program (NCAP) Side Impact Side Impact Hybrid III Dummy (SID/HIII) Occupant Side Impact Protection	Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, Room 5108 (NPO-230) 400 Seventh Street, S.W. Washington, D.C. 20590

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SECTION 1
PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This side impact test was conducted as part of the FY' 2005 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-03-D-12005. The purpose of this test was to evaluate side impact protection in a 2005 Volvo V70 Station Wagon manufactured by Volvo Gothenburg Sweden.

1.2 TEST PROCEDURE

The side impact test was conducted in accordance with the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002 and the corresponding MGA Research Corporation Test Procedure MGA-NHTSA5. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

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

SECTION 2

SUMMARY OF NCAP SIDE IMPACT TEST

2.1 SUMMARY OF SIDE IMPACT TEST

A model year 2005 Volvo V70 Station Wagon was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.3 km/h. The specified impact velocity range is from 61.1 to 62.7 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1806.2 kg and the test weight of the MDB was 1361.2 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on October 20, 2004.

One (1) real-time motion picture camera and nine (9) high-speed motion picture cameras were used to document the impact event. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information are documented in the data sheets. Pre- and post-test photographs of the vehicle and Side Impact Dummies (SID/HIIIs) can be found in Appendix A. Two 50th percentile adult male SID/HIII's were placed in the driver and left rear passenger designated seating positions according to instructions specified in the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002. Each SID/HIII was instrumented in the following locations:

- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)
- Head Center of Gravity (CG) tri-axial accelerometers (X, Y and Z axes primary and redundant)
- Upper Neck load cell (Fx, Fy, Fz, Mx, My, Mz)

The test vehicle was instrumented with twenty-five (25) structural accelerometers and the MDB was instrumented with six (6) accelerometers and two (2) contact switches on the bumper to compare left side to right side bumper impact timing. All data channels were recorded with a fully self contained on-board DTS TDAS Pro Data Acquisition System. The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 328 mm at level 2, 1200 mm rearward of the left vertical impact point. The driver and passenger SID/HIII's, Serial Nos. 271 and 904 respectively, were calibrated just prior to this test. The SID/HIII's injury criteria are summarized as follows:

Measurements	Units	Driver	Passenger
Thoracic Trauma Index (TTI)	G's	52.3	48.5
Peak Pelvic G's (PEV)	G's	79.8	85.1
Head Injury Criteria (HIC)	none	237.9	188.9

Test summaries and post-test observations are presented in Section 3. The vehicle, camera, and occupant measurements are presented in Section 4. Appendix A contains the still photograph prints. Appendix B contains the driver and passenger SID/HIII's, vehicle, and MDB response data traces. Appendix C contains the SID/HIII's configuration and performance verification data. Appendix D contains the test equipment information.

TEST NOTES

The left rear door had approximately 120 mm opening at the top of the vehicle (See Appendix A for photo.)

There was questionable data collected for the following channels.

Mid Rear of LF Door Y after 10 ms
LR Door Upper Centerline Y after 10 ms

SECTION 3

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

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	English Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressure	lbf/in^2	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	=(tf -32)/1.8
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

*Based on the Recommended Practice in SAE J916, May 85

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

TEST VEHICLE INFORMATION

Make	Volvo
Model	V70
Body Style	Station wagon
NHTSA No.	M55901
VIN	YV1SW612552461937
Color	White
Delivery Date	9/13/04
Odometer Reading (mile)	168
Dealer	Maple Hill Volvo
Transmission	Automatic
Final Drive	Front
Number of Cylinders	5
Engine Displacement (L)	2.4
Engine Placement	Lateral
Automatic Door Locks (ADL)	No
Owner's Manual Details Instructions on Disabling ADLs	NA

TEST VEHICLE OPTIONS

Front Airbag	Yes
Side Airbags	Yes
Power Windows	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Power Brakes	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	Yes
Anti-lock Brakes	Yes
AM/FM/CD	Yes
Anti-theft System	Yes
Cruise Control	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Volvo Gothenburg Sweden
Date of Manufacture	07/04

GVWR (kg)	2127
GAWR Front (kg)	1057
GAWR Rear (kg)	1120

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	360	360
Cold / Test Pressure (kPa)	260	260
Recommended Tire Size	195/65R15	195/65R15
Tire Size on Vehicle	195/65R15	195/65R15
Tire Manufacturer	Michelin	Michelin

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				420
Cargo Wt. (RCLW) (kg)				81.6

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	441.8	352.0		486.7	452.2	
Right	kg	435.9	342.5		432.3	435.0	
Ratio	%	55.8	44.2		50.9	49.1	
Totals	kg	877.7	694.5	1572.2	919.0	887.2	1806.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1572.2
Weight of 2 P572E ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	81.6
Calculated Vehicle Target Weight (TVTW)	kg	1815.3

* Actual As Tested Weight (ATW) will be TVTW -5/-10 kg

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	678	685	700	701	1217
As Tested	mm	667	680	662	673	1354
Fully Loaded	mm	662	680	660	673	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2756
Total Vehicle Length at Left Side	mm	3973
Total Vehicle Length at Centerline	mm	4687
Total Vehicle Length at Right Side	mm	3970
Total Vehicle Width	mm	1910
Weight of Ballast in Cargo Area	kg	67.6
Amount of Stoddard Solvent in Fuel Tank	liters	64.4

TEST VEHICLE VERTICAL IMPACT LINE DATA

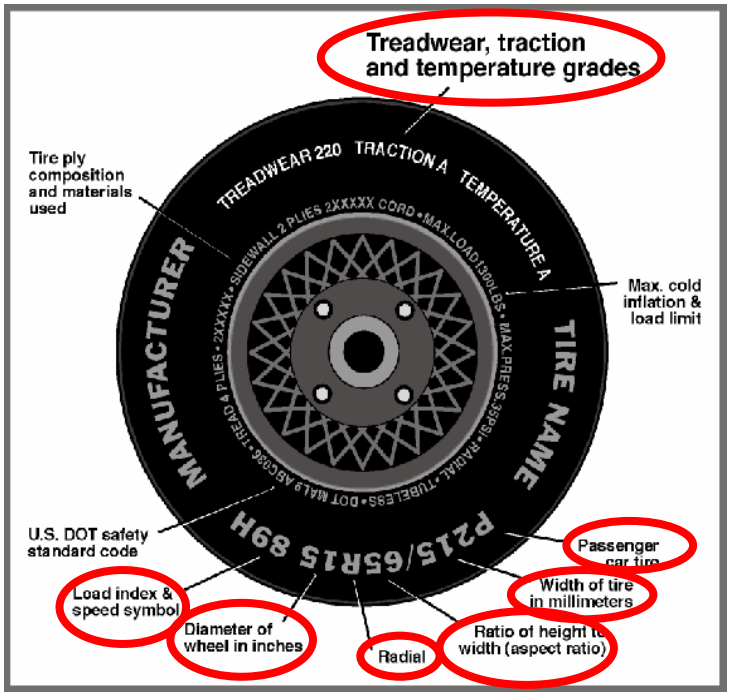
Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2756
Target Impact Point Aft of Front Axle	mm	438
Actual Impact Point Aft of Front Axle	mm	440

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle:	2005 Volvo V70 Station Wagon	NHTSA No.:	M55901
Test Program:	NCAP Side Impact	Test Date:	10/20/04

Vehicle Year	2005	Vehicle Make	Volvo
VIN	YV1SW612552461937	Vehicle Model	V70 Station Wagon



	Front	Rear
Tire Manufacturer	Michelin	Michelin
Tire Name	Energy MXV4 Plus	Energy MXV4 Plus
Tire Type	P	P
Tire Width (mm)	195	195
Ratio of Height to Width (aspect ratio)	65	65
Radial	R	R
Wheel Diameter	15	15
Load Index & Speed Symbol	91H	91H
Treadwear	400	400
Traction Grade	A	A
Temperature Grade	A	A

DATA SHEET NO. 3

TEST VEHICLE INFORMATION

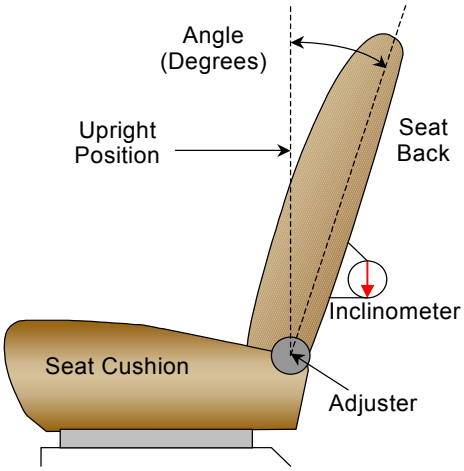
Test Vehicle:	2005 Volvo V70 Station Wagon	NHTSA No.	M55901
Test Program:	NCAP Side Impact	Test Date:	10/20/04

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle.

Driver seat back angle: 19° from upright position.

The rear seat has no adjustable mechanism.



FRONT SEAT ASSEMBLY

SEAT FORE/AFT POSITIONS

Position of the driver seat and the passenger seat:

Driver seat fore/aft total travel:	288 mm
Driver seat fore/aft position:	144 of 288 mm

The rear seat has no adjustable mechanism.

DATA SHEET NO. 3... (continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

FUEL TANK CAPACITY DATA

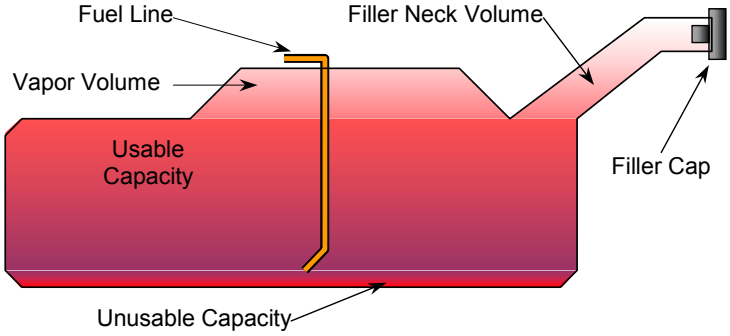
The "Usable Capacity" of the standard equipment fuel tank is: 69.7 liters

The "Usable Capacity" of any optional equipment fuel tank is: N/A liters

The "Usable Capacity" used for certification to FMVSS 301 requirements: 69.7 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 64.4 liters

The fuel pump will pump fuel when the ignition key is turned two notches from initial position.



VEHICLE FUEL TANK ASSEMBLY

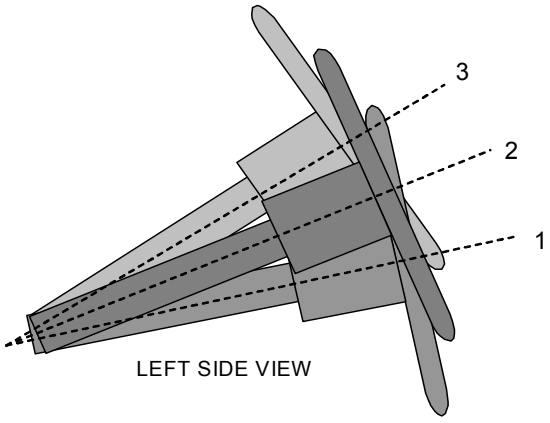
STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes, when it is moved through its full range of driving positions.

Lowermost, position 1: 21.9°

Geometric center, position 2: 23.4°

Uppermost. Position 3: 25.8°



STEERING COLUMN ASSEMBLY

DATA SHEET NO. 4

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	441.8	352.0		486.7	452.2	
Right	kg	435.9	342.5		432.3	435.0	
Weight Ratio	%	55.8	44.2		50.9	49.1	
Totals	kg	877.7	694.5	1572.2	919.0	887.2	1806.2

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	245	320
Level 2	Occupant H-Point	mm	328	429
Level 3	Mid Door	mm	296	650
Level 4	Window Sill	mm	326	904
Level 5	Window Top	mm	136	1305
N/A	Maximum Penetration	mm	328	429

INSTRUMENTATION

Driver SID/HIII Instrumentation	22
Passenger SID/HIII Instrumentation	22
Vehicle Structure Accelerometers	25
MDB Accelerometers	6
Total	75

DATA SHEET NO. 5

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2587
C.G. Location aft of Front Axle	1103

MDB WEIGHTS

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

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.3
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.3
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.8

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

Vertical Location			From Centerline		Max. Crush
Level	Description	Height	Distance	Direction	
1	Center of Bumper (mm)	432	800	Right	194
2	Top of Bumper (mm)	533	800	Left	133
3	Mid Level (mm)	686	800	Left	138
4	Top of Stack (mm)	813	800	Left	157

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	6
Contact Switches	2
High Speed Cameras	2

DATA SHEET NO. 6

POST TEST OBSERVATIONS

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID/HIII	Rear Seat SID/HIII
Dummy Type / Serial No.	SID/HIII / 271	SID/HIII / 904
Head Contact	Curtain airbag, Headrest	Curtain airbag, Headrest
Upper Torso Contact	Side Airbag	Door Panel
Lower Torso Contact	Side Airbag	Arm rest
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	Left Knee	Left Knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Locked/Unlocked Doors	Doors were unlocked	Doors were unlocked
Left Side Door Opening	Door remained closed and latched	Door remained closed and latched
Right Side Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Seat Movement	0	0
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	Windshield broke
Window Damage	Left Front and Rear Broke
Other Notable Effects	The left rear door opened at the top about 120mm.

AIRBAG DEPLOYMENT

	Driver	Front Passenger	Rear Passenger
Front	No	No	N/A
Side (Torso Bag)	Yes	No	N/A
Curtain	Yes	No	Yes

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	2 mm rear
Vertical Offset	mm	+/-20	1 mm up

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 7

SID/HIII INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

THORAX AND PELVIS PEAK ACCELERATIONS (FIR 100 Filtered)

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	38.5	14	-10.0	83	44.0	33	-2.3	114
Upper Rib (LUR) (R)	Y	G's	38.9	14	-10.4	82	41.5	33	-2.4	114
Lower Rib (LLR)	Y	G's	45.7	22	-12.1	66	44.5	32	-5.3	73
Lower Rib (LLR) (R)	Y	G's	48.0	22	-12.1	66	43.5	46	-5.3	66
Lower Spine (T_{12})	Y	G's	58.9	28	-14.9	79	52.4	42	-13.4	65
Lower Spine (T_{12}) (R)	Y	G's	58.4	28	-15.5	78	51.9	41	-13.5	65
Pelvis (PEV)	Y	G's	79.8	24	-19.0	62	85.1	35	-12.4	75
Pelvis (PEV) (R)	Y	G's	81.0	24	-19.0	62	86.1	35	-12.0	76

THORACIC TRAUMA INDEX (TTI) AND PELVIC ACCELERATION (FIR 100 Filtered)

Location	Driver				Passenger			
	LLR	T_{12}	TTI(g)	PEV(g)	LLR	T_{12}	TTI(g)	PEV(g)
Rib, Spine, and Pelvis	45.7	58.9	52.3	79.8	44.5	52.4	48.5	85.1
Rib, Spine, and Pelvis (R)	48.0	58.4	53.2	81.0	43.5	51.9	47.7	86.1

HEAD CG PEAK ACCELERATIONS (SAE CLASS 1000 Filtered)

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	7.0	231	-20.1	52	7.8	52	-10.9	73
Head CG	Y	G's	76.4	53	-4.3	175	38.1	49	-7.2	179
Head CG	Z	G's	39.4	52	-5.8	23	16.6	42	-39.1	61
Head CG Resultant		G's	86.3	53			42.8	52		

HEAD INJURY CRITERIA (SAE CLASS 1000 Filtered)

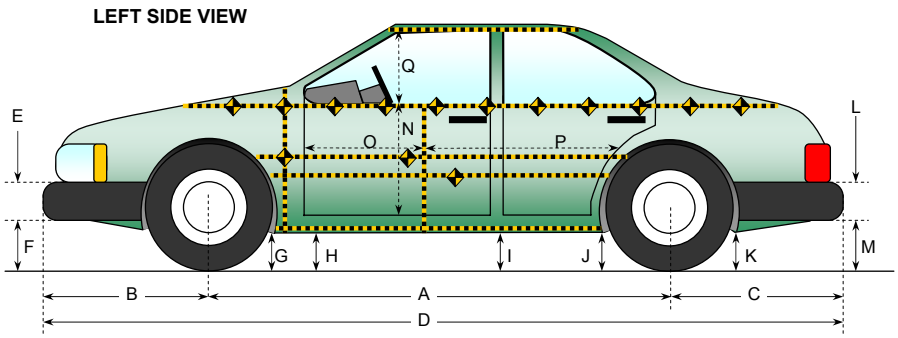
Location	Driver				Passenger			
	HIC	T^1	T^2	Avg G's	HIC	T^1	T^2	Avg G's
Head CG	237.9	35.4	60.8	38.8	188.9	40.6	68.8	33.9

Positive Acceleration Polarities: Longitudinal (X) = Forward
(Conforms to SAE J211) Lateral (Y) = Right
Vertical (Z) = Down

DATA SHEET NO. 8

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04



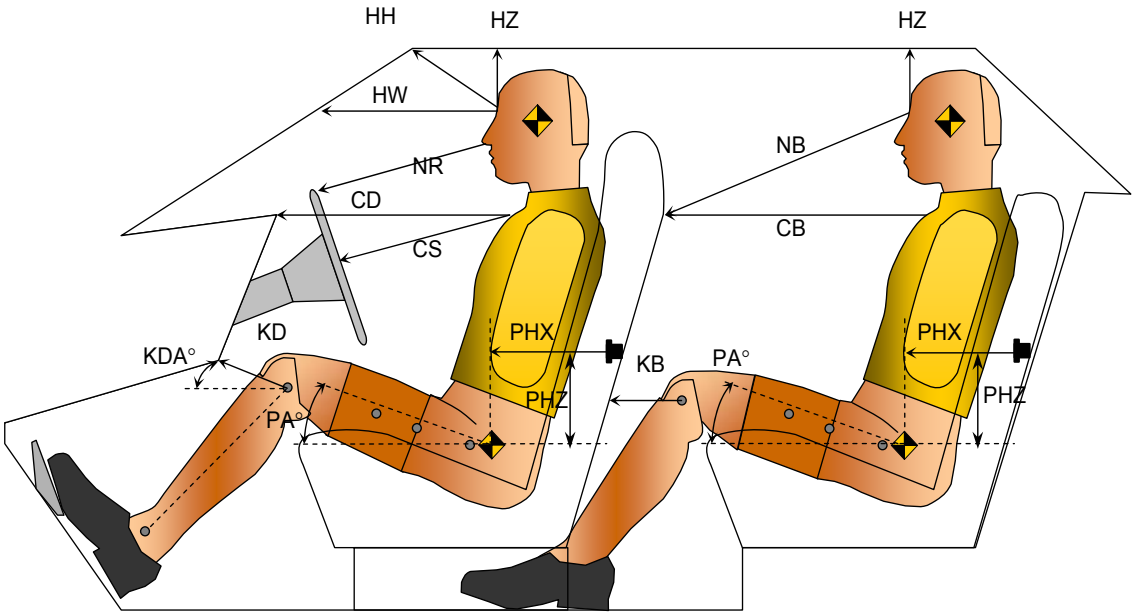
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2756	2721	35
B	Front Axle to FSOV	985	910	75
C	Rear Axle to RSOV	975	1031	-56
D	Total Length at Centerline	4687	4662	25
E	Front Bumper Thickness	155	155	0
F	Front Bumper Bottom to Ground	380	387	-7
G	Sill Height at Front Wheel Well	178	179	-1
H	Sill Height at Front Door Leading Edge	154	165	-11
I	Sill Height at "B" Pillar	173	159	14
J1	Sill Height at Rear Wheel Well	152	109	43
J2	Pinch Weld Height at Rear Wheel Well	166	144	22
K	Sill Height Aft of Rear Wheel Well	198	199	-1
L	Rear Bumper Thickness	153	153	0
M	Rear Bumper Bottom to Ground	357	381	-24
N	Sill Height to Window Bottom Sill	705	596	109
O	Front Door Leading Edge to Impact CL	754	740	14
P	Rear Door Trailing Edge to Impact CL	1210	1035	175
Q	Front Window Opening	398	365	33
R	Right Side Length	3970	3975	-5
S	Left Side Length	3973	3909	64
T	Vehicle Width at "B" Post	1808	1592	216

DATA SHEET NO. 9

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

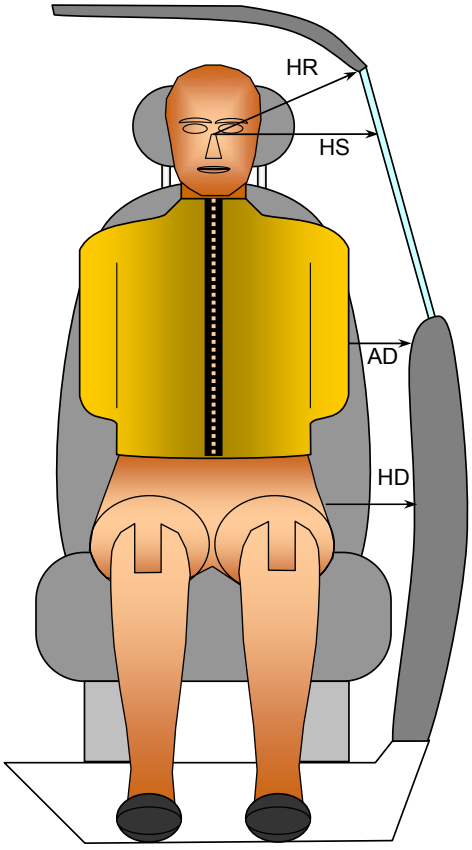


Driver Code	Pass. Code	Measurement Description	Driver S/N 271		Passenger S/N 904	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	444			
HW		Head to Windshield	711			
HZ	HZ	Head to Roof	178		147	
NR	NB	Nose to Rim/Nose to Seatback	483		630	
CD	CB	Chest to Dash or Seatback	572		528	
CS		Chest to Steering Wheel	350			
KDL	KBL	Left Knee to Dash or Seatback	168	30.6	156	18.8
KDR	KBR	Right Knee to Dash or Seatback	162	35.3	170	17.4
PA	PA	Pelvic Angle		23.8		23.4
PHX	PHX	H-Point to Striker (X-Axis)	216		210	
PHZ	PHZ	H-Point to Striker (Z-Axis)	217		201	

DATA SHEET NO. 10

SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04



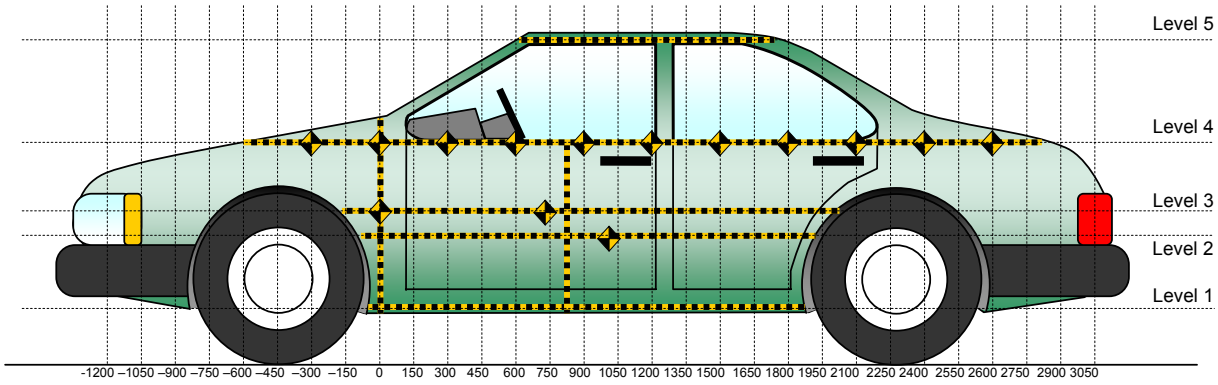
FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver S/N 271	Passenger S/N 904
HR	Head to Side Header	mm	201	172
HS	Head to Side Window	mm	290	304
AD	Arm to Door	mm	84	55
HD	H-Point to Door	mm	139	111

DATA SHEET NO. 11

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04



All Measurements Shown in mm

LEFT SIDE VIEW

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

Level	Measurement Description	Height Above Ground
5	Window	1305
4	Window Sill	904
3	Mid Door	650
2	Occupant H-Point	429
1	Sill Top	320

DATA SHEET NO. 12

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900				307					309					2	
-750				292					301					9	
-600				281					298					17	
-450				275					297					22	
-300				271					300					29	
-150			198	269				236	304				38	35	
0	229	209	199	269		298	281	250	308		69	72	51	39	
150	231	211	202	270		384	393	364	378		153	182	162	108	
300	233	210	203	268		414	459	422	376		181	249	219	108	
450	233	209	205	269		428	481	423	395		195	272	218	126	
600	233	208	206	266		437	486	427	410		204	278	221	144	
750	234	206	207	267	504	448	491	432	423	544	214	285	225	156	40
900	232	206	208	265	496	459	501	445	433	560	227	295	237	168	64
1050	232	207	209	268	495	454	513	466	445	581	222	306	257	177	86
1200	232	208	210	268	496	477	536	487	500	609	245	328	277	232	113
1350	232	209	210	270	497	443	523	483	596	633	211	314	273	326	136
1500	232	210	209	270	497	393	467	501	508	592	161	257	292	238	95
1650	233	212	207	274	497	343	426	503	523	567	110	214	296	249	70
1800	233	216	206	274	495	297	364	447	439	542	64	148	241	165	47
1950		219	204	280	493		254	320	342	521		35	116	62	28
2100			203	282	492			228	307	511			25	25	19
2250			203	289	491			221	307	506			18	18	15
2400			207	295	492			220	308	502			13	13	10
2550			218	303	495			228	309	502			10	6	7
2700			230	310	497			235	312	504			5	2	7
2850			245	319	503			246	317	504			1	-2	1
3000			265	330				262	323				-3	-7	

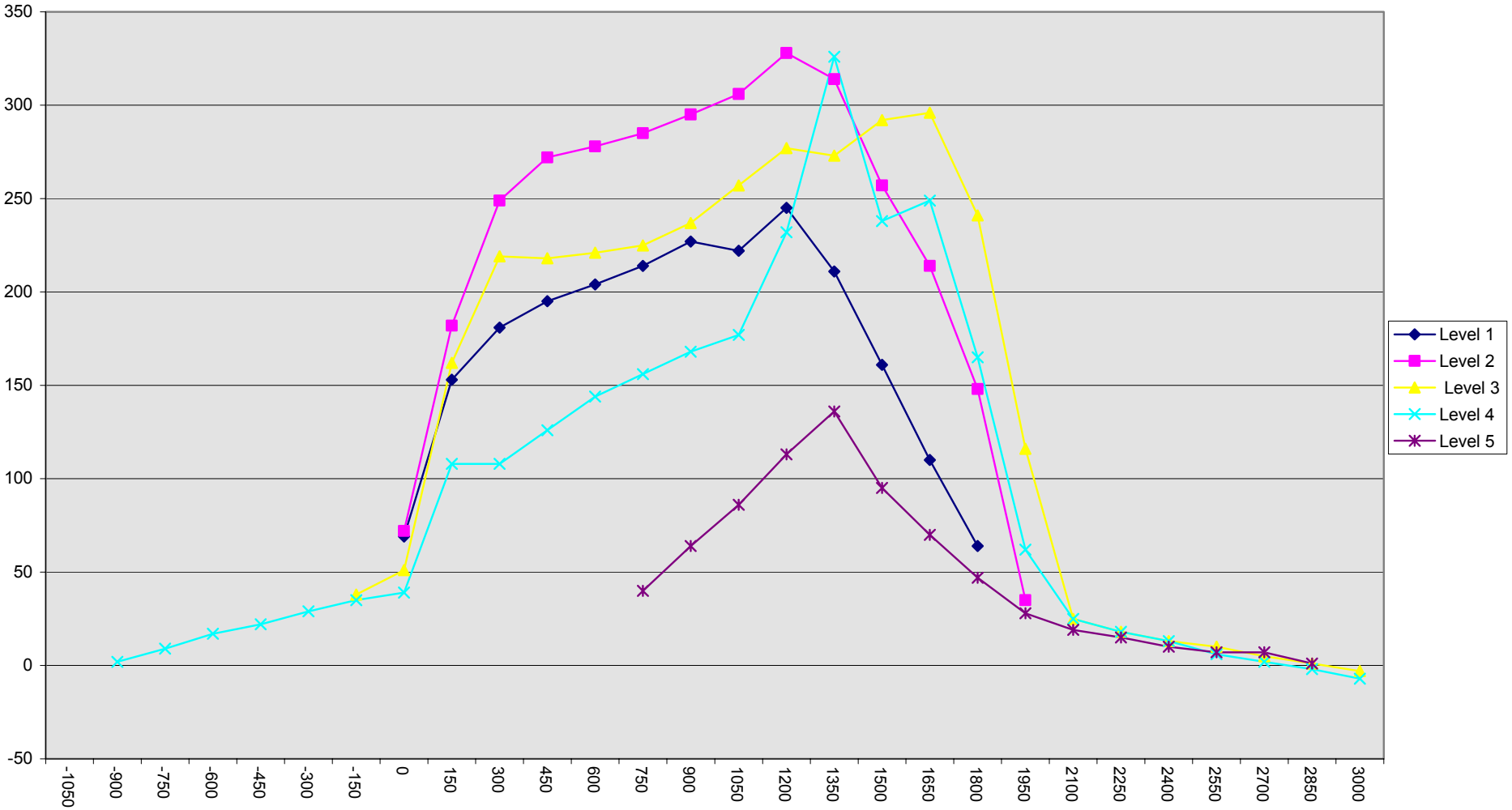
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

DATA SHEET NO. 12...(continued)

VEHICLE EXTERIOR CRUSH PROFILES

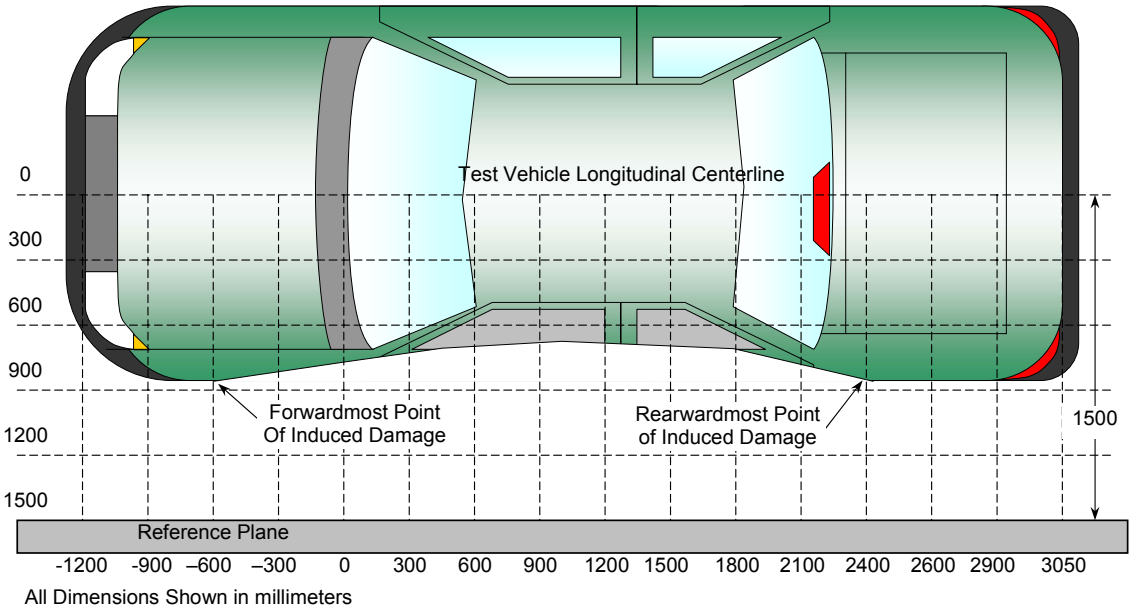
Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04



DATA SHEET NO. 13

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04



TOP VIEW

DAMAGE PROFILE DISTANCES

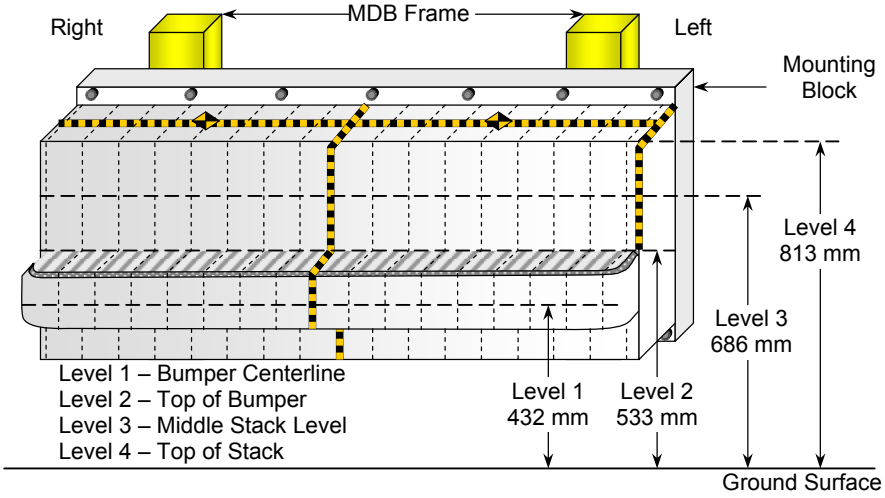
DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2700 mm	4	312	310	2
2	2021 mm	4	293	281	12
3	1200 mm	2	536	208	328
4	503 mm	2	486	209	277
5	-171 mm	3	237	197	40
6	-900 mm	4	309	307	2

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

DATA SHEET NO. 14

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04



DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C_L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	194	176	150	114	90	84	77	75	81	84	88	93	99	105	121	158	193
2	82	66	57	40	29	25	24	28	38	43	50	57	64	70	81	113	133
3	34	7	7	11	14	22	26	20	16	22	28	45	63	73	81	94	138
4	50	-5	-3	3	12	31	38	30	26	28	35	43	55	67	89	114	157

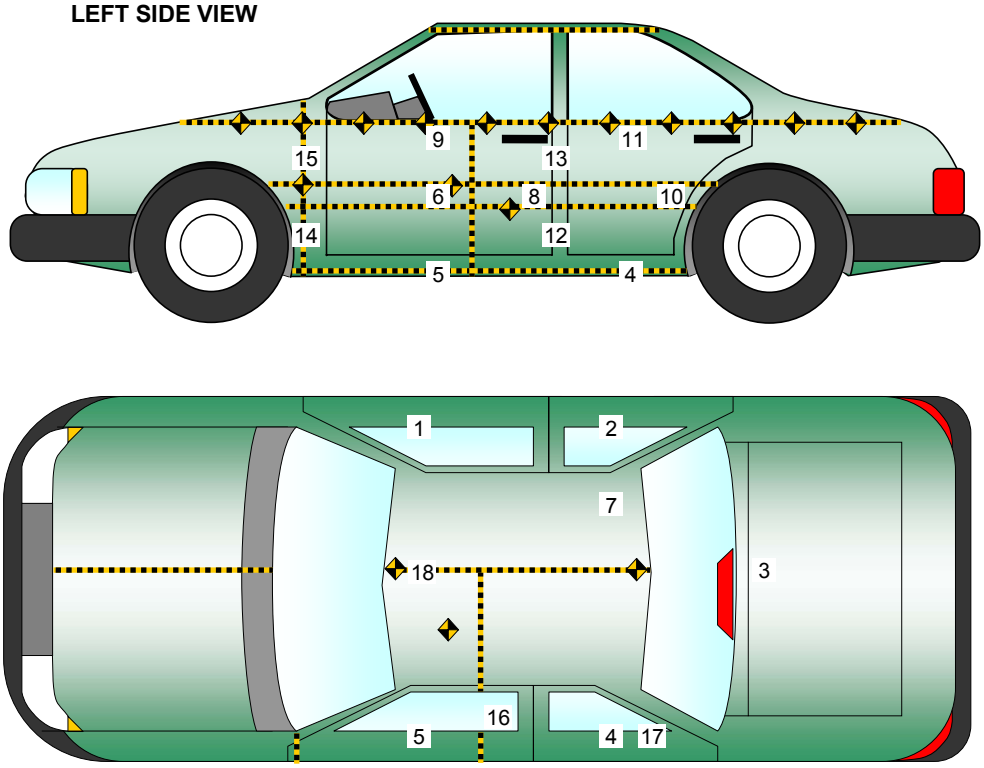
All Dimensions in mm

DATA SHEET NO. 15

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

LEFT SIDE VIEW



No.	Location
1	Right Sill at Front Seat
2	Right Sill at Rear Seat
3	Rear Floorpan Above Axle
4	Left Sill at Rear Door
5	Left Sill at Front Door
6	Left Front Door Centerline
7	Right Rear Occupant Compartment
8	Left Front Door Mid-Rear
9	Left Front Door Upper Centerline

No.	Location
10	Left Rear Door Mid-Rear
11	Left Rear Door Upper Centerline
12	Left Lower B-Post
13	Left Middle B-Post
14	Left Lower A-Post
15	Left Middle A-Post
16	Front Seat Track
17	Rear Seat Track or Structure
18	Vehicle CG

DATA SHEET NO. 15...(continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)			Peak Values (G's)				
		X	Y	Z	Axis	Max	Time	Min	Time
1	Right Sill at Front Seat	2676	632	215	X	2.0	72	-7.4	20
					Y	23.2	6	-2.2	160
					Z	4.7	158	-3.2	9
					RES	23.6	6		
2	Right Sill at Rear Seat	1797	670	250	X	2.6	26	-6.1	13
					Y	21.1	6	-2.5	77
					Z	5.3	42	-5.9	25
					RES	21.4	6		
3	Rear Floorpan Above Axle	1138	10	585	X	2.2	30	-8.0	8
					Y	21.7	7	-2.3	300
					Z	9.2	10	-4.0	300
					RES	22.9	7		
4	Left Sill at Rear Door	1842	-712	235	Y	31.7	7	-5.1	25
5	Left Sill at Front Door	2707	-712	232	Y	45.1	4	-7.8	50
6	Left Front Door C/L	2763	-740	440	Y	183.2	4	-74.0	20
7	Rear Occupant Compartment	1887	195	285	Y	21.4	6	-2.1	160
8	Left Front Door Mid-Rear	2533	-740	450	Y	*	*	*	*
9	Left Front Door Upper C/L	2708	-742	708	Y	164.4	7	-66.8	28
10	Left Rear Door Mid-Rear	1550	-750	645	Y	105.9	20	-68.1	16
11	Left Rear Door Upper C/L	1962	-745	728	Y	*	*	*	*
12	Left Lower B-Post	2139	-720	465	Y	127.4	3	-48.4	23
13	Left Middle B-Post	2070	-730	989	Y	93.5	4	-92.5	48
14	Left Lower A-Post	3214	-771	386	Y	65.3	1	-15.5	19
15	Left Middle A-Post	3194	-795	851	Y	55.2	10	-5.4	16
16	Front Seat Track	2304	-646	382	Y	55.7	10	-25.1	24
17	Rear Seat Track or Structure				Y				
18	Vehicle CG	2591	22	342	X	3.8	68	-11.1	12
					Y	40.8	20	-3.1	53
					Z	13.1	25	-12.4	18
					RES	42.3	20		

* No Valid Data collected after 10ms

See reference points on the following page.

DATA SHEET NO. 15...(continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle:	2005 Volvo V70 Station Wagon	NHTSA No.	M55901
Test Program:	NCAP Side Impact	Test Date:	10/20/04

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

DATA SHEET NO. 16

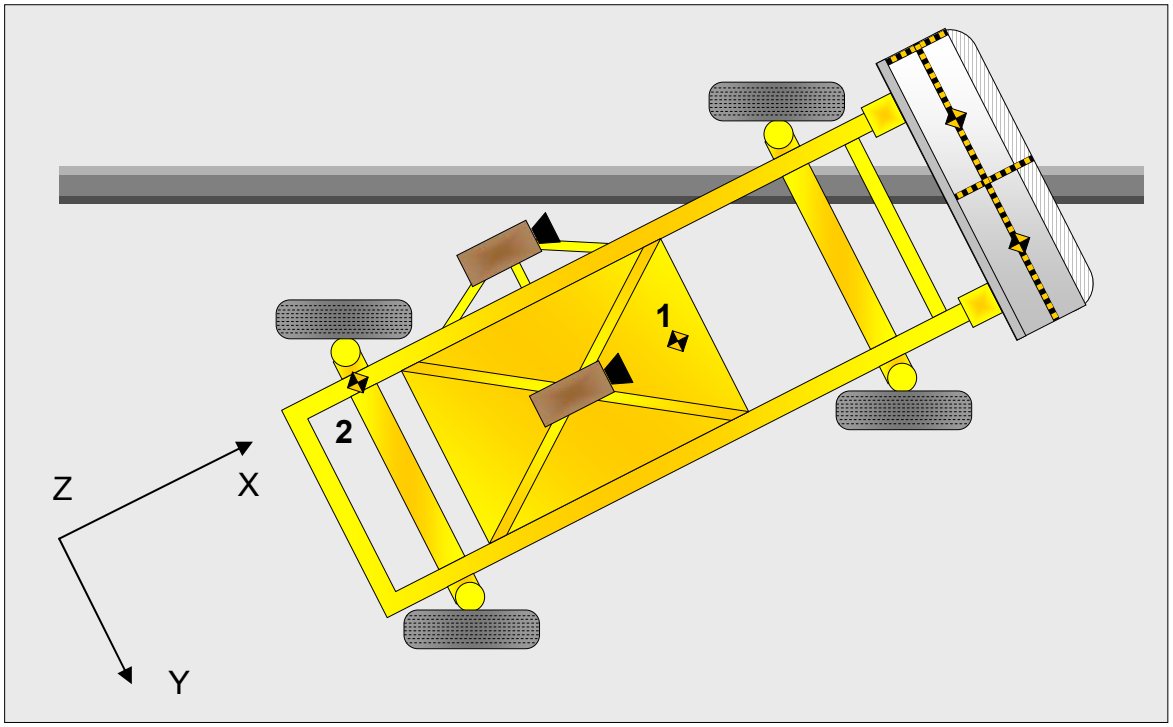
MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

MDB ACCELEROMETER PEAK DATA AND LOCATIONS

Loc. No.	Accelerometer Location	Measurement (mm)			Peak Values (G's)				
		X	Y	Z	Axis	Max	Time	Min	Time
1	MDB CG	-1092	0	-483	X	1.1	93	-20.8	39
					Y	2.5	58	-6.9	41
					Z	27.3	58	-25.7	64
					RES	28.8	58		
2	MDB Rear	-2591	-625	-622	X	1.6	123	-23.1	31
					Y	4.4	29	-2.0	59
					Z	4.7	60	-2.2	55
					RES	23.4	31		

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



DATA SHEET NO. 17

VEHICLE STRUCTURAL MEASUREMENTS

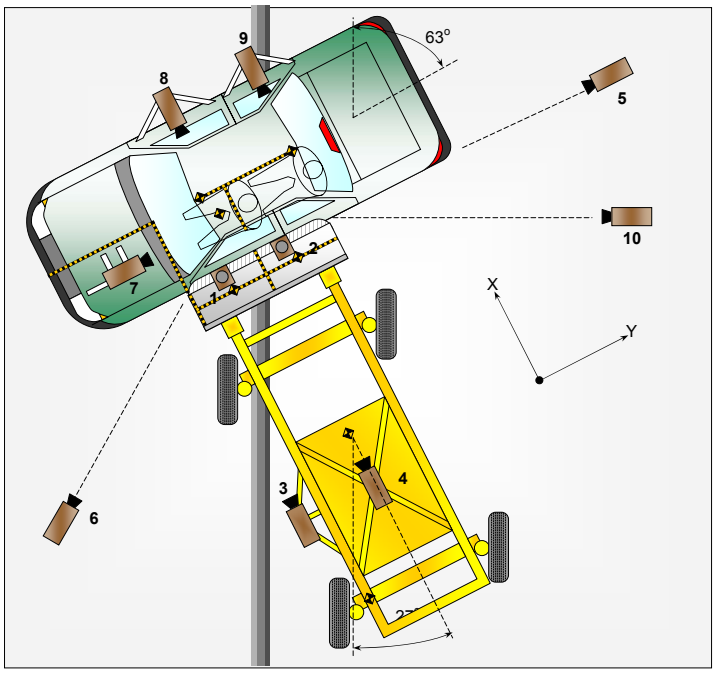
Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

	Elements	Pre-Test (mm)
1	Total Length	4687
2	Total Width	1910
3	Bumper Top Height	550
4	Bumper Bottom Height	365
5	Longitudinal Member Top Height	235
6	Distance between Longitudinal Members	1180
7	Longitudinal Member Width	110
8	Engine Top Height	770
9	Engine Bottom Height	155
10	Engine and gearbox width	1050
11	Front bumper-engine distance	300
12	Front shock absorber fixing height	905
13	Bonnet leading edge height	370
14	Front shock absorber fixing width	1170
15	Front bumper – front axle distance	890
16	Front axle – a pillar distance	545
17	A-pillar – B-pillar distance	1160
18	B-Pillar – rear axle distance	1170
19	B-pillar – C-pillar distance	910
20	Roof sill bottom height	1394
21	Roof sill top height	1428
22	Floor sill bottom height	220
23	Floor sill top height	272

DATA SHEET NO. 18

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Close-up	90	1185	5920	50	1000
2	Overhead Overall	260	545	5050	16	1000
3	MDB Onboard, Impact Point Close-up				25	1000
4	MDB Onboard, Centerline of Impact				13	1000
5	Right Side, Ground Level, Overall	50	5110	1333	19	1000
6	Left Side, Ground Level, Overall	160	-8250	1362	19	1000
7	Vehicle Onboard Front SID/HIII, Front				13	1000
8	Vehicle Onboard Front SID/HIII, Side				10	1000
9	Vehicle Onboard Rear SID/HIII, Side				16	1000
10	Real Time Coverage				13	24

Reference Points X - Impact Line
Y - MDB Left Edge Impact Point
Z - Ground Plane

DATA SHEET NO. 19

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

Test Time: 1:13 pm Temperature at Time of Impact: 21°C

STODDARD SOLVENT SPILLAGE MEASUREMENTS

A. From impact until vehicle motion ceases: 0 oz.
(Maximum Allowable = 1 ounce)

B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 ounces)

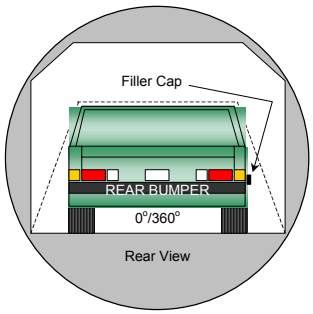
C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)

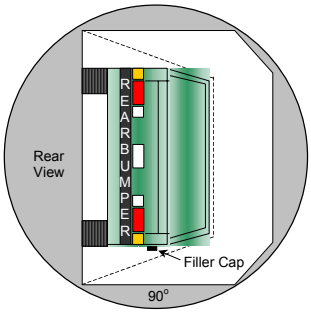
D. Spillage Details: None

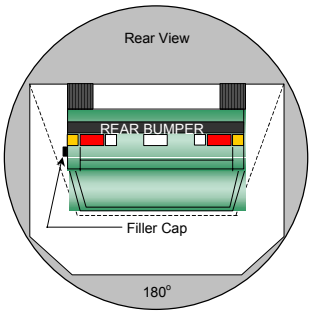
DATA SHEET NO. 20

FMVSS 301 STATIC ROLLOVER DATA SHEET

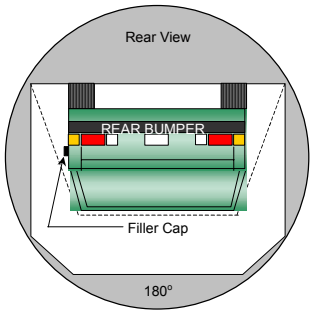
Test Vehicle: 2005 Volvo V70 Station Wagon NHTSA No. M55901
Test Program: NCAP Side Impact Test Date: 10/20/04

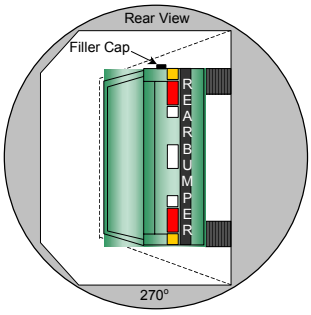


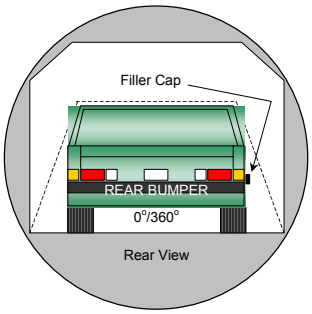




0^O to 90^O 90^O to 180^O







180^O to 270^O 270^O to 360^O

1. The specified fixture rollover rate for each 90^o of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent Spillage locations: None

Rollover Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	162	300	0
90° to 180°	148	300	0
180° to 270°	152	300	0
270° to 360°	171	300	0

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Left Rear of Vehicle As Received

A-1.

Right Front of Vehicle As Received

Vehicle Certification Label

Tire Placard

Pre-Test Front View of Test Vehicle

Post-Test Front View of Test Vehicle

Pre-Test Left Front ¾ View of Test Vehicle

Post-Test Left Front ¾ View of Test Vehicle

Pre-Test Left Side View of Test Vehicle

Post-Test Left Side View of Test Vehicle

Pre-Test Left Rear ¾ View of Test Vehicle

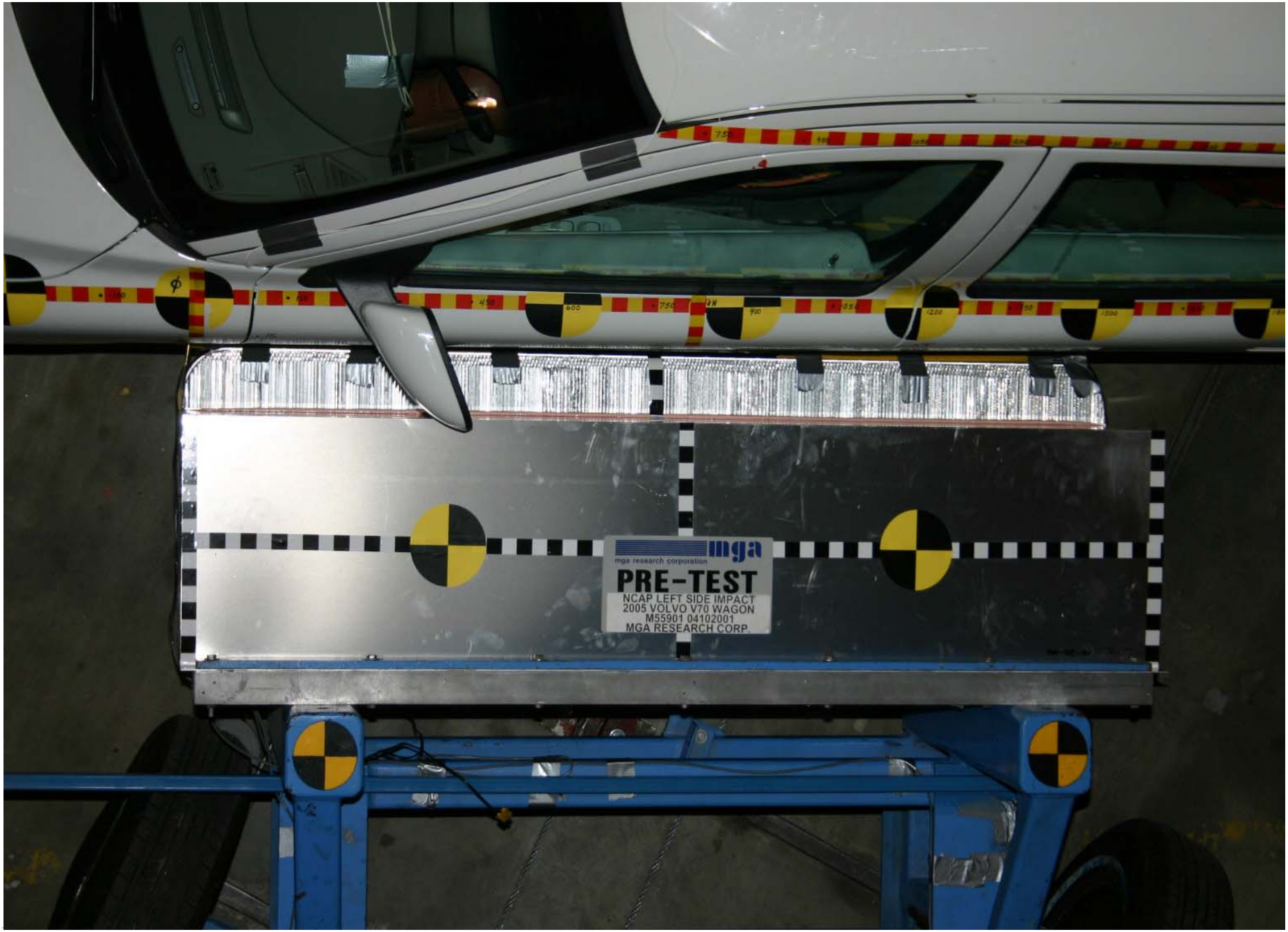
Post-Test Left Rear ¾ View of Test Vehicle

Pre-Test Rear View of Test Vehicle

Post-Test Rear View of Test Vehicle

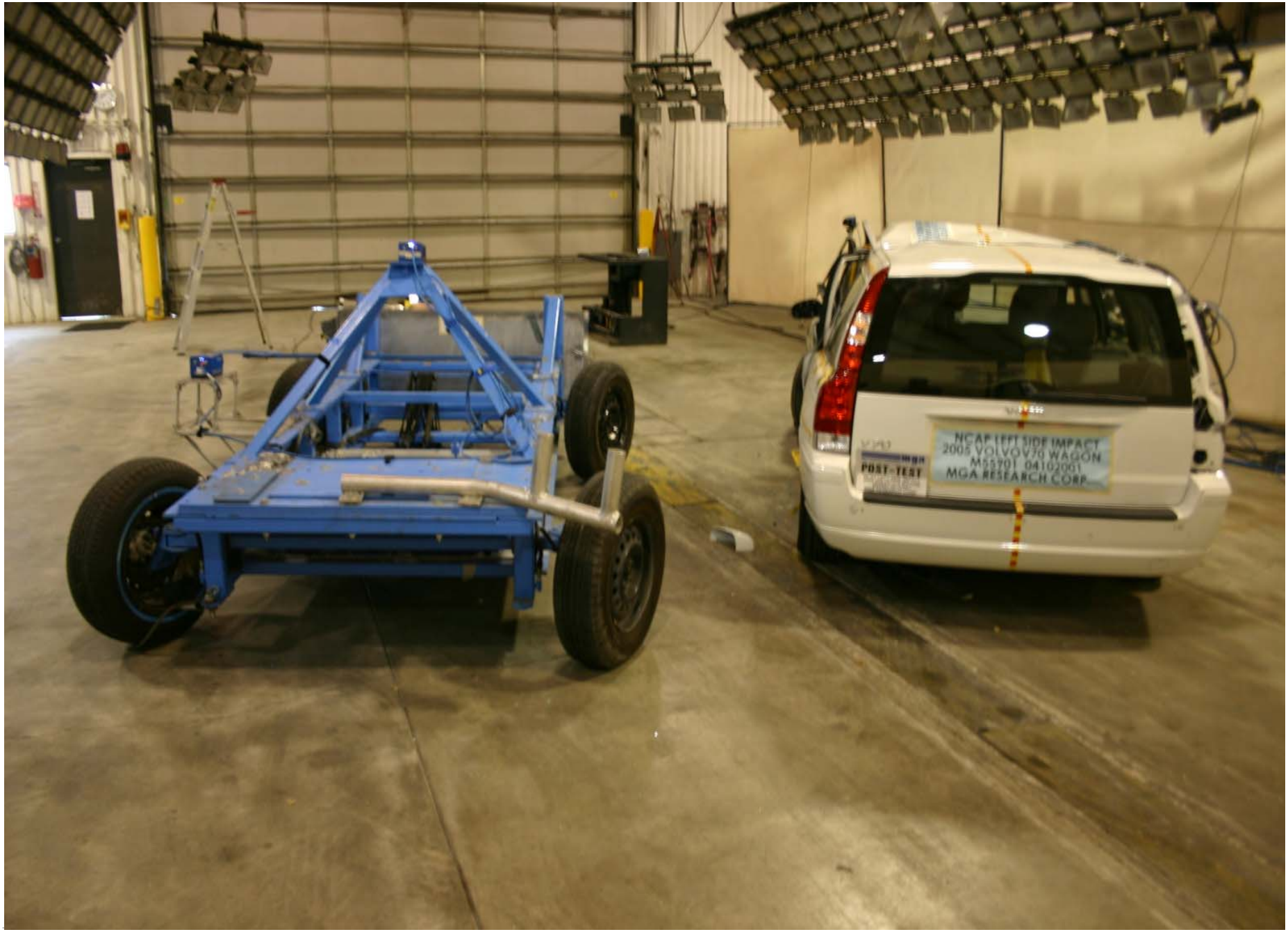
Pre-Test MDB (Front) Positioned Against Vehicle

Pre-Test MDB (Rear) Positioned Against Vehicle



Pre-Test MDB Positioned Against Vehicle Overhead View

Post-Test MDB (left side) and Vehicle



Post-Test MDB (right side) and Vehicle

Post-Test MDB and Vehicle Overhead View

Pre-Test Impact Point on Vehicle

Post-Test Impact Point on Vehicle

Pre-Test Fuel Filler Cap View

Post-Test Fuel Filler Cap View

Pre-Test Three-Quarter View of Left Side Doors of Test Vehicle

Post-Test Three-Quarter View of Left Side Doors of Test Vehicle

Pre-Test Three-Quarter View of Right Side Doors of Test Vehicle

Post-Test Three-Quarter View of Right Side Doors of Test Vehicle

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 Shoulder and Door Top View

Post-Test Driver Dummy Shoulder and Door Top View

Pre-Test Driver Dummy Right Side View

Post-Test Driver Dummy Right Side View

Post-Test Driver Dummy Contact

Post-Test Driver Dummy Head Contact

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

Pre-Test Passenger Dummy Left Side View

Post-Test Passenger Dummy Left Side View

Pre-Test Passenger Dummy Shoulder and Door Top View

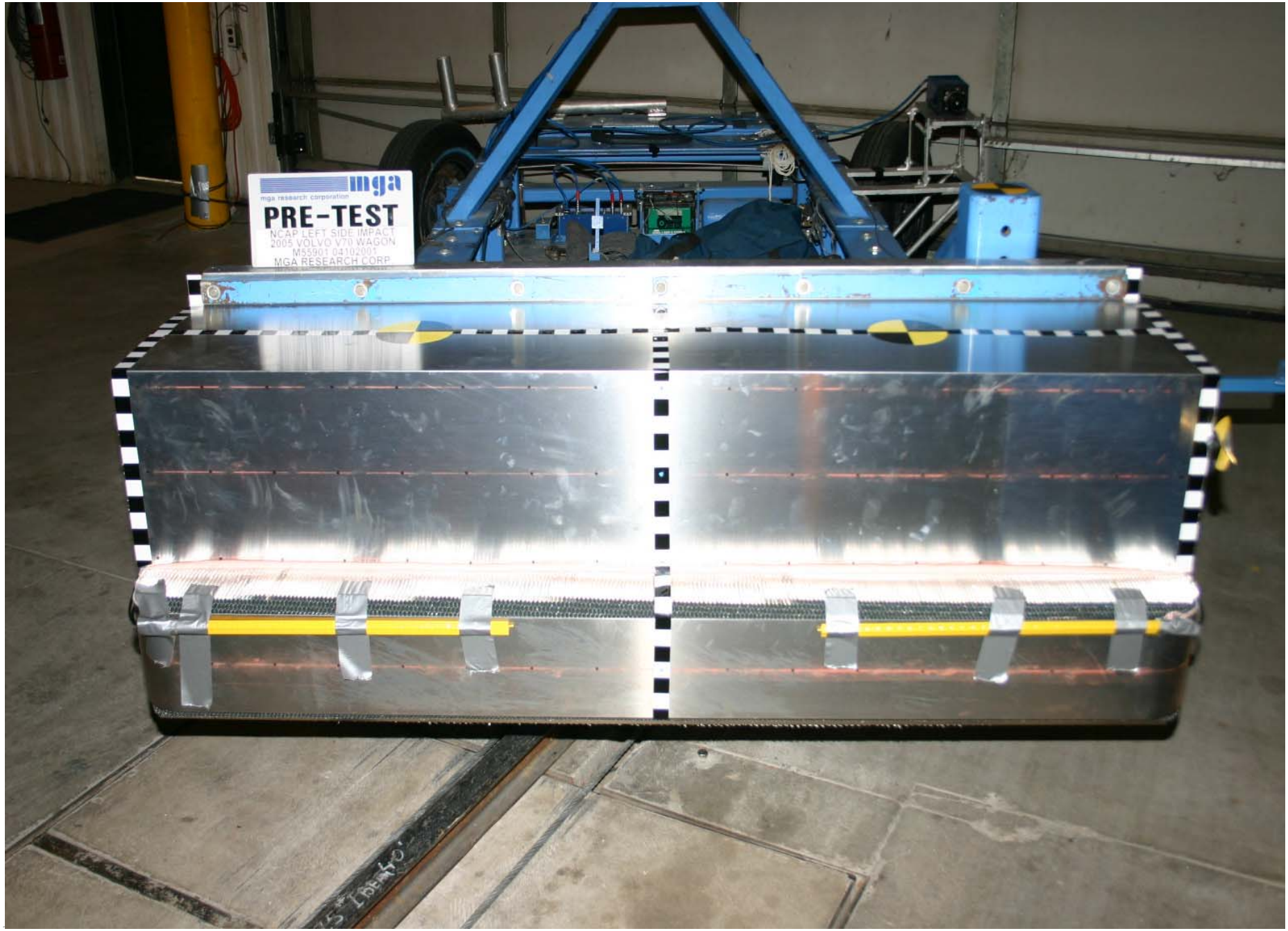
Post-Test Passenger Dummy Shoulder and Door Top View

Pre-Test Passenger Dummy Right Side View

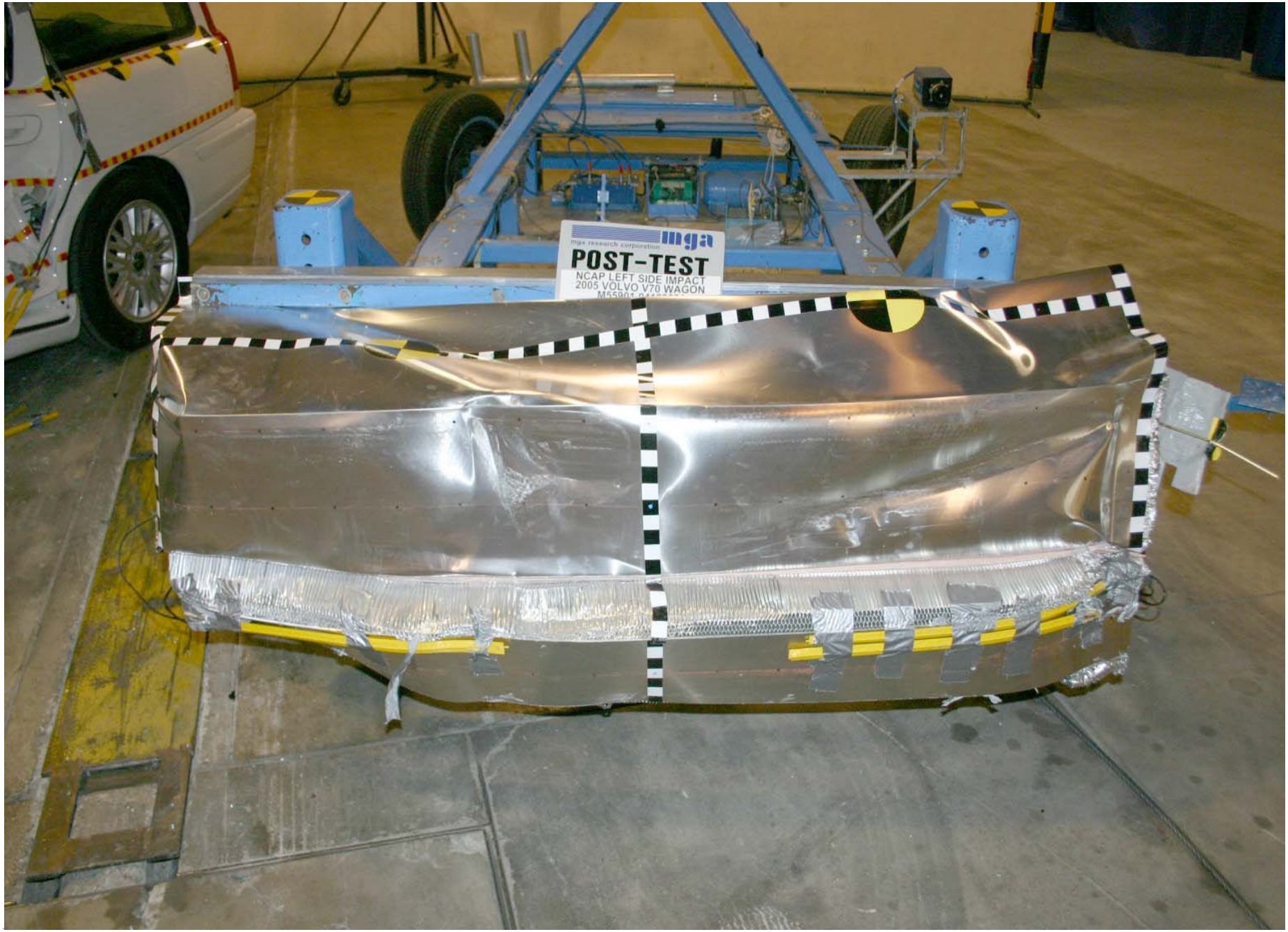
Post-Test Passenger Dummy Right Side View

Post-Test Passenger Dummy Contact

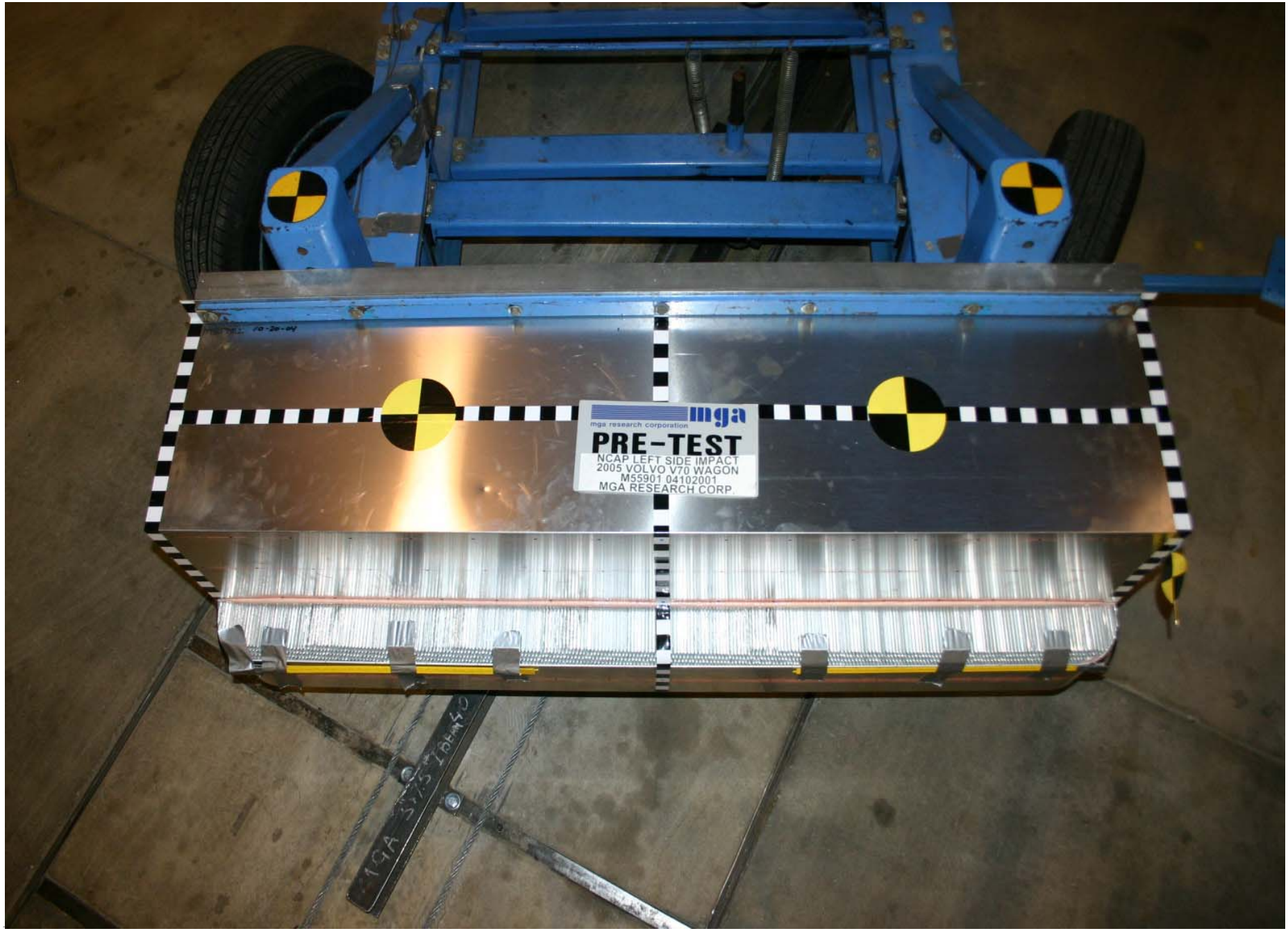
Post-Test Passenger Dummy Head Contact



Pre-Test MDB Front View



Post-Test MDB Front View

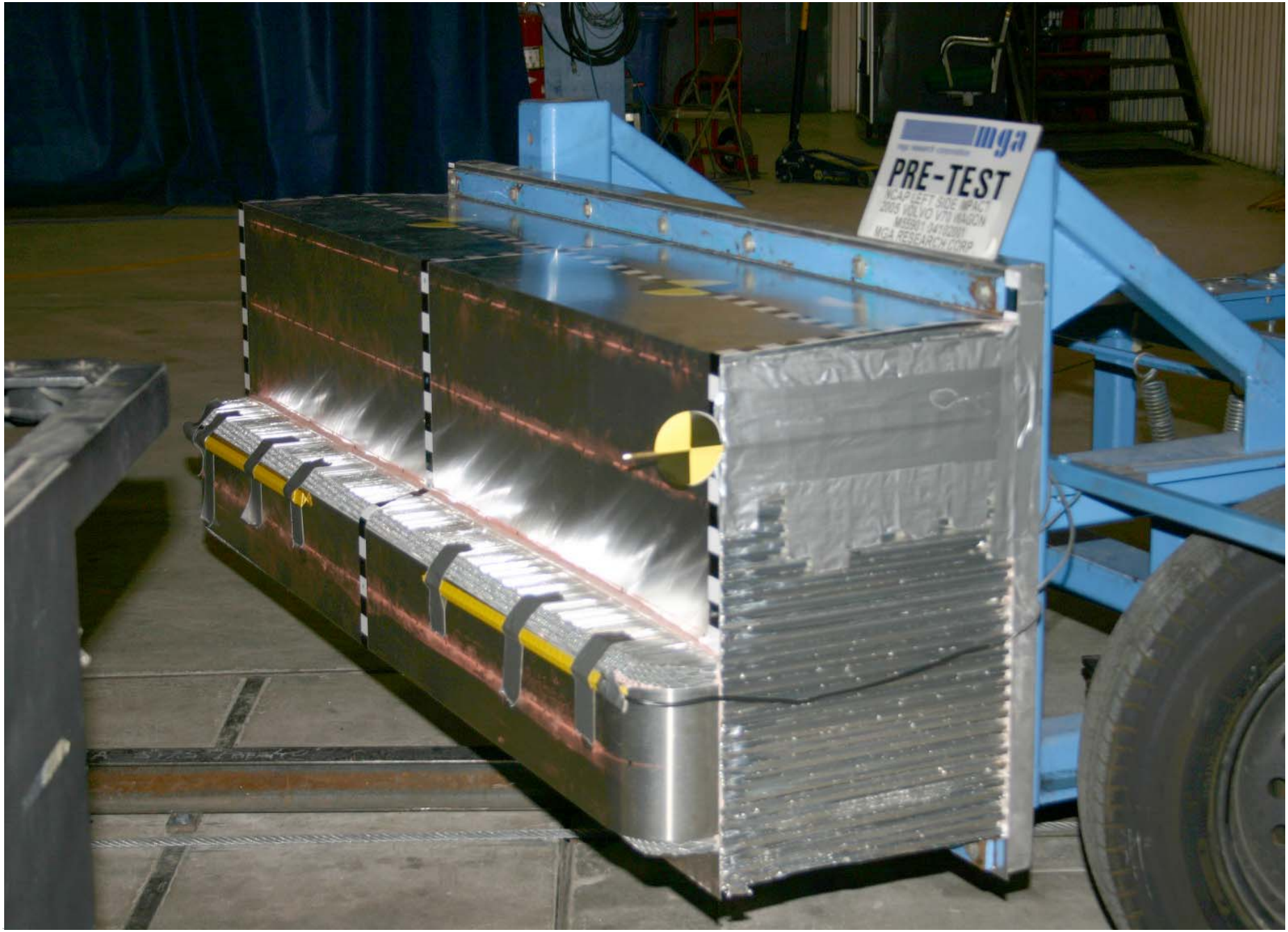


Pre-Test MDB Top View

Post-Test MDB Top View

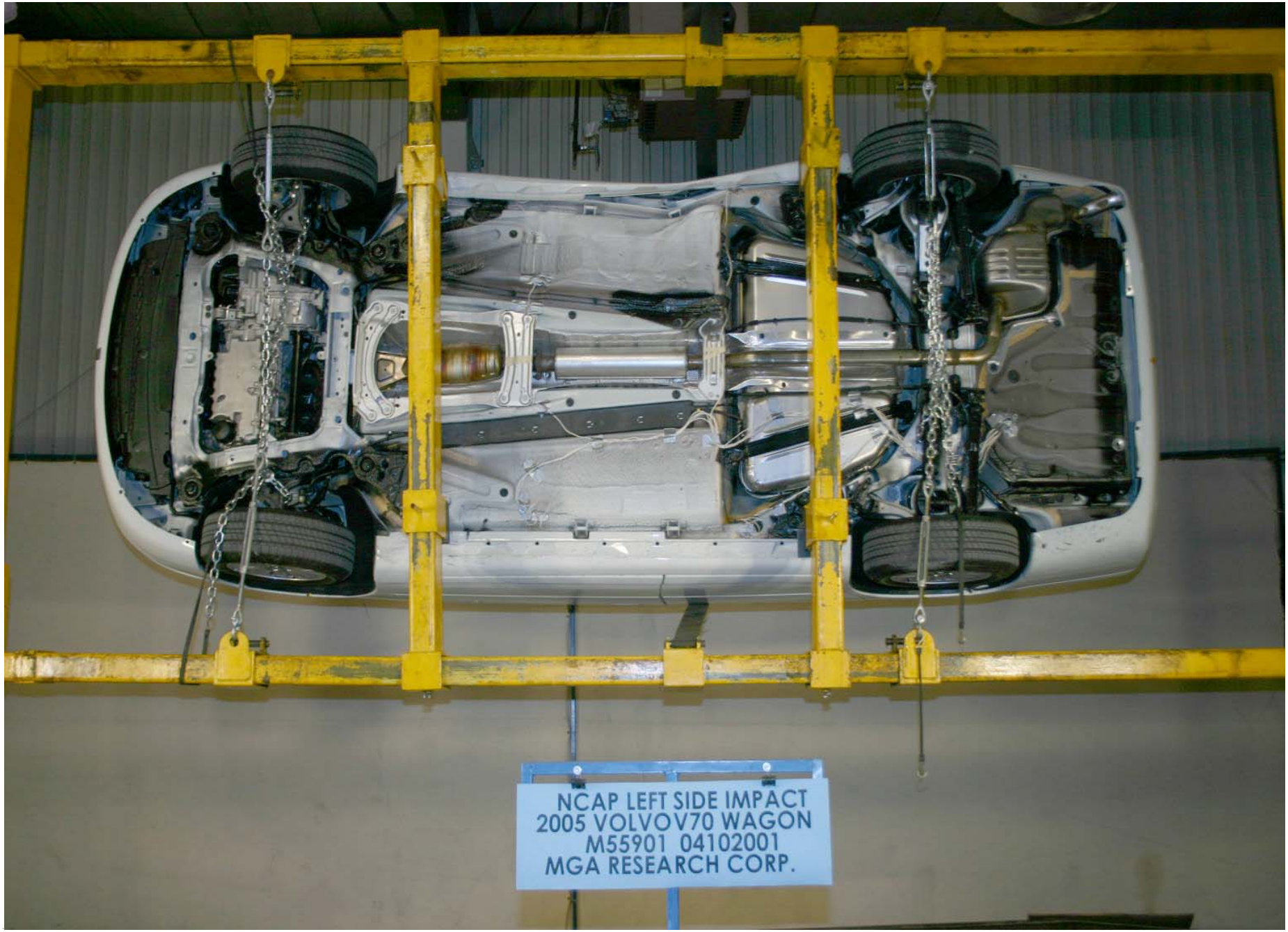
Pre-Test MDB Right Side View

Post-Test MDB Right Side View



Pre-Test MDB Left Side View

Post-Test MDB Left Side View



Rollover 90 Degrees

Rollover 180 Degrees

Rollover 270 Degrees

Rollover 360 Degrees

Vehicle Impact

Post-Test Left Rear Door Opening

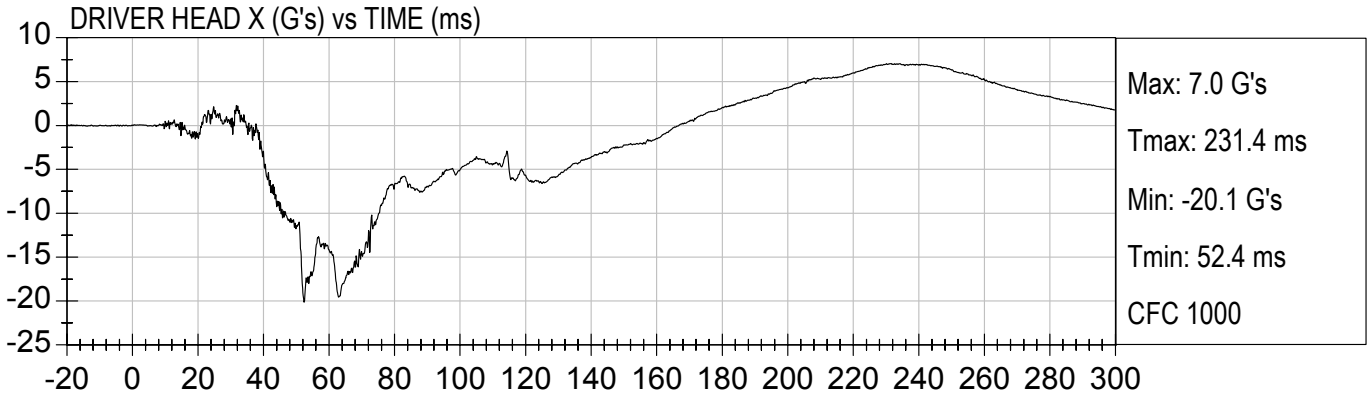
APPENDIX B

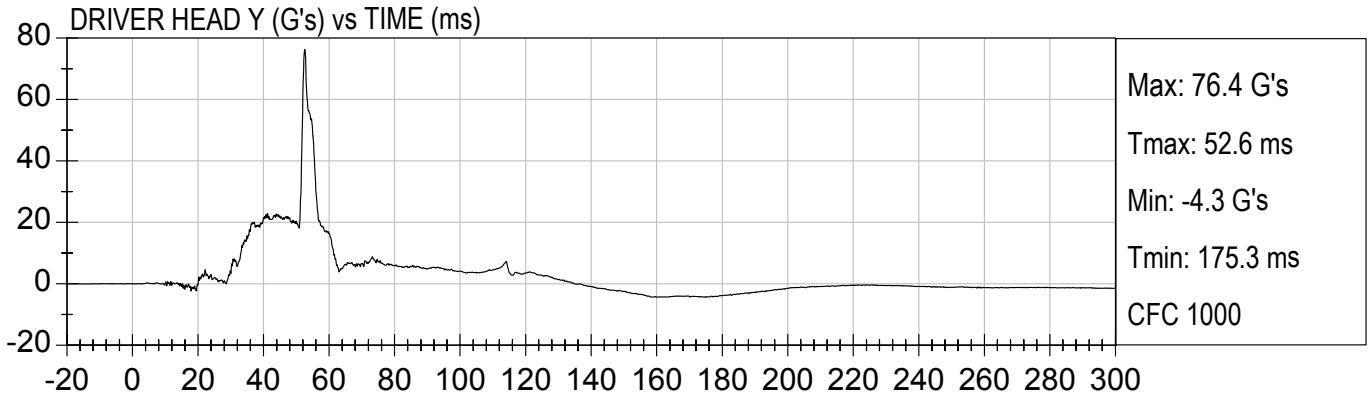
SID/HIII, VEHICLE, AND MDB RESPONSE DATA

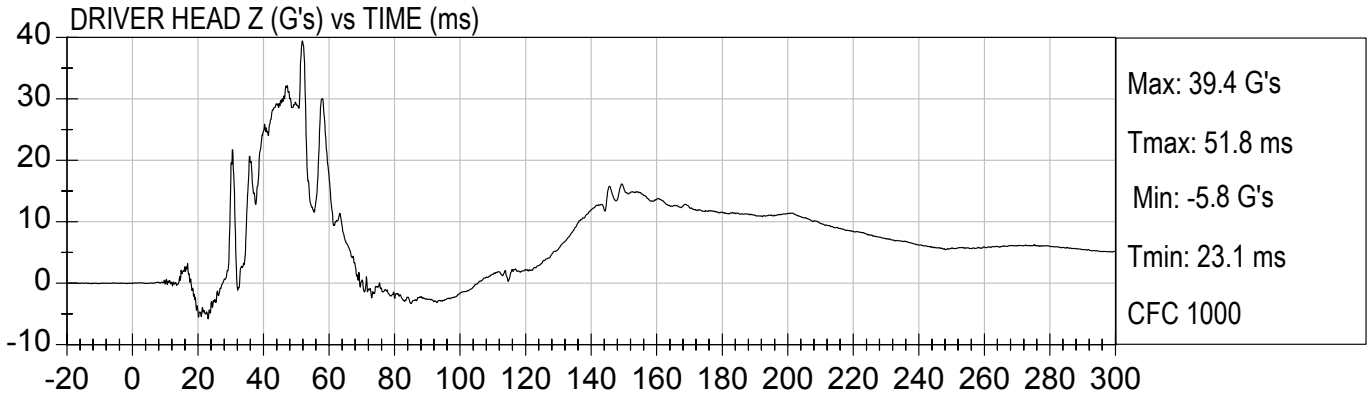
TABLE OF DATA PLOTS

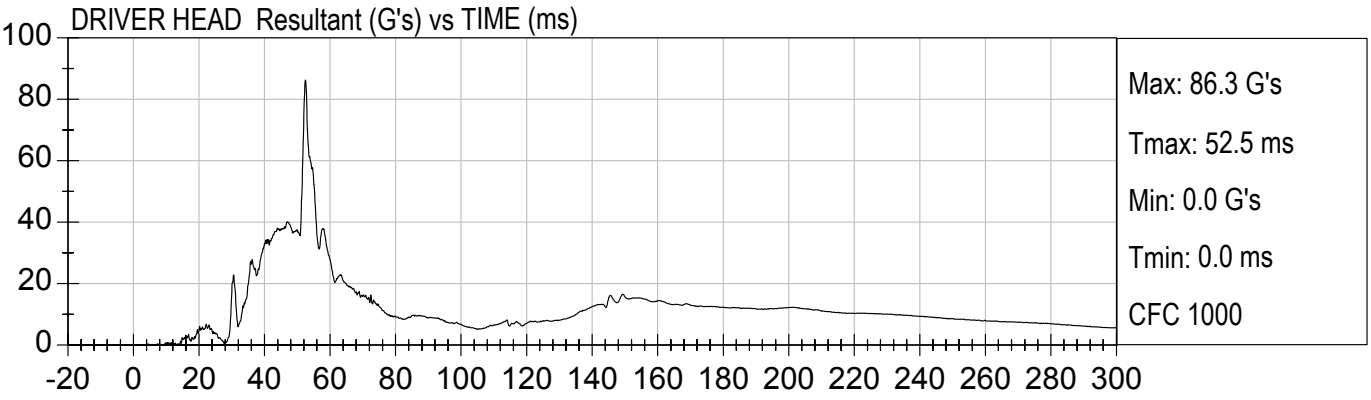
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

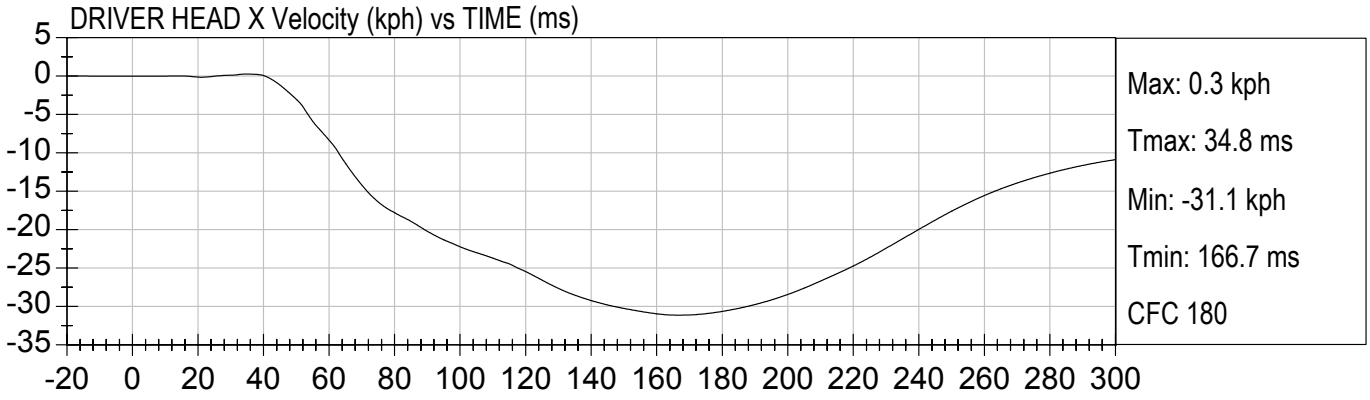
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

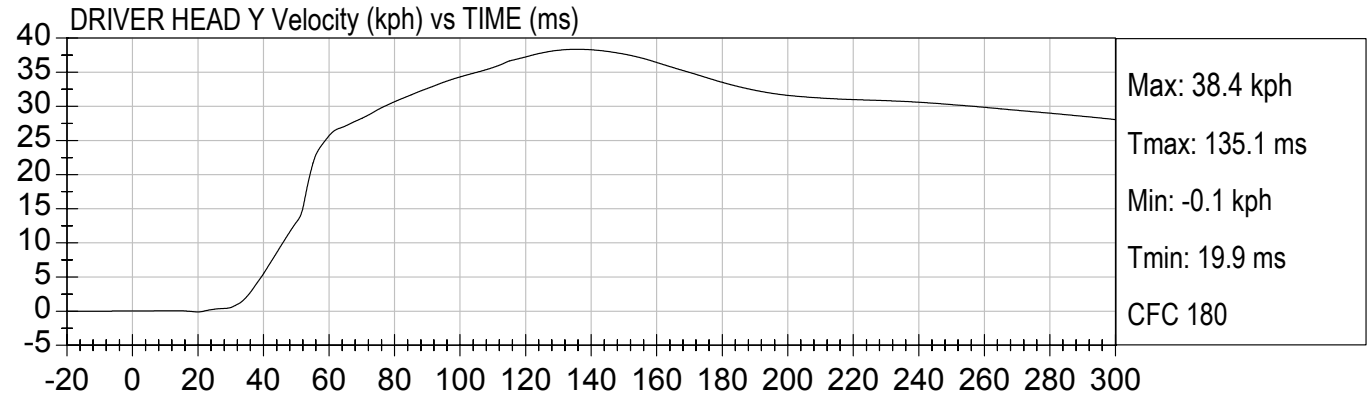


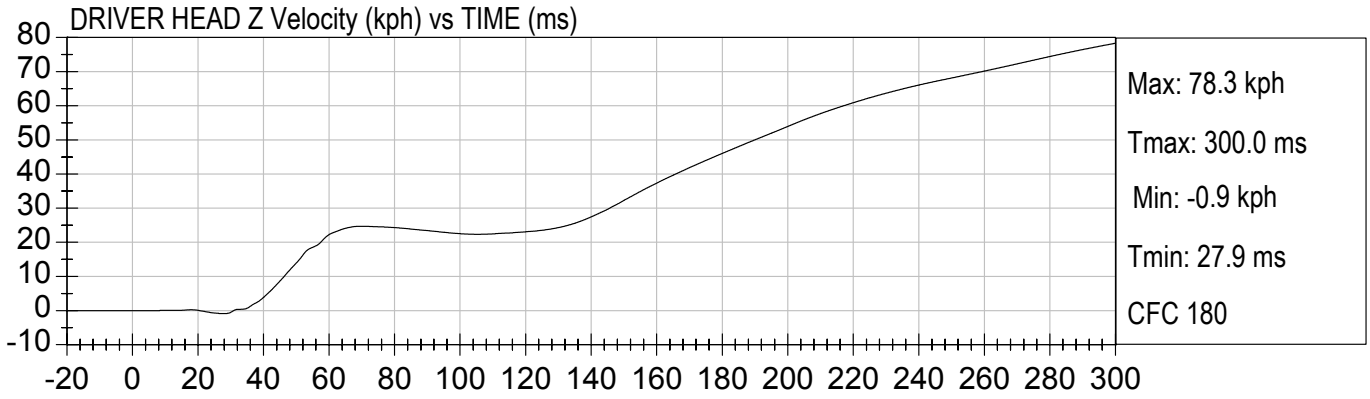






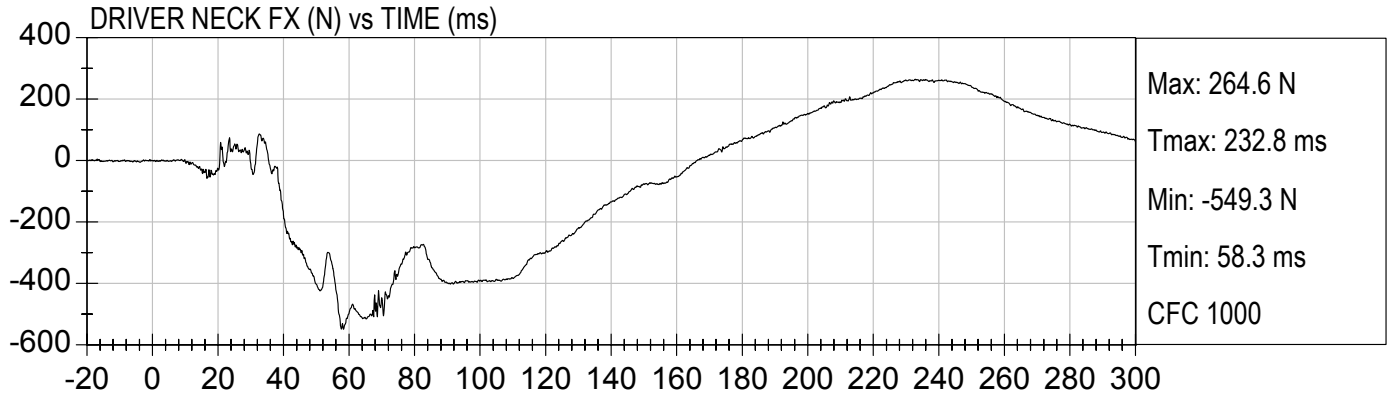

DRIVER HEAD X Velocity (kph) vs TIME (ms)
5
0
-5
-10
-15
-20
-25
-30
-35
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.3 kph
Tmax: 34.8 ms
Min: -31.1 kph
Tmin: 166.7 ms
CFC 180

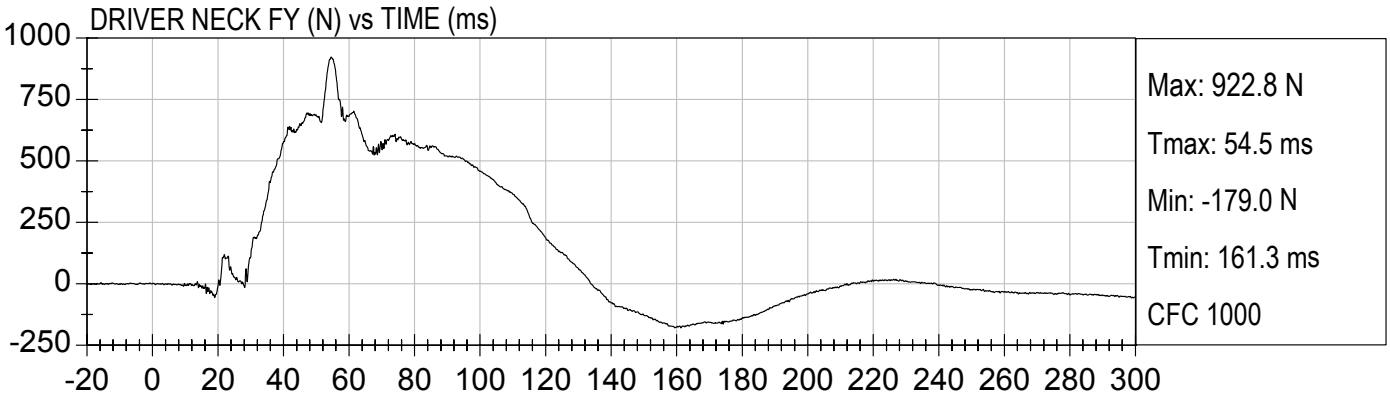

DRIVER HEAD Y Velocity (kph) vs TIME (ms)
40
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 38.4 kph
Tmax: 135.1 ms
Min: -0.1 kph
Tmin: 19.9 ms
CFC 180

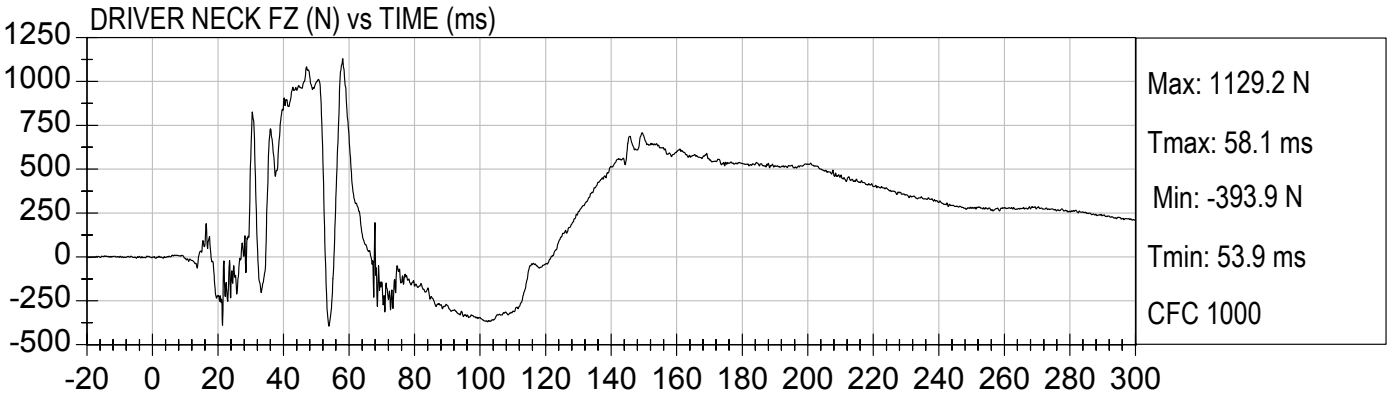

DRIVER HEAD Z Velocity (kph) vs TIME (ms)
80
70
60
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 78.3 kph
Tmax: 300.0 ms
Min: -0.9 kph
Tmin: 27.9 ms
CFC 180

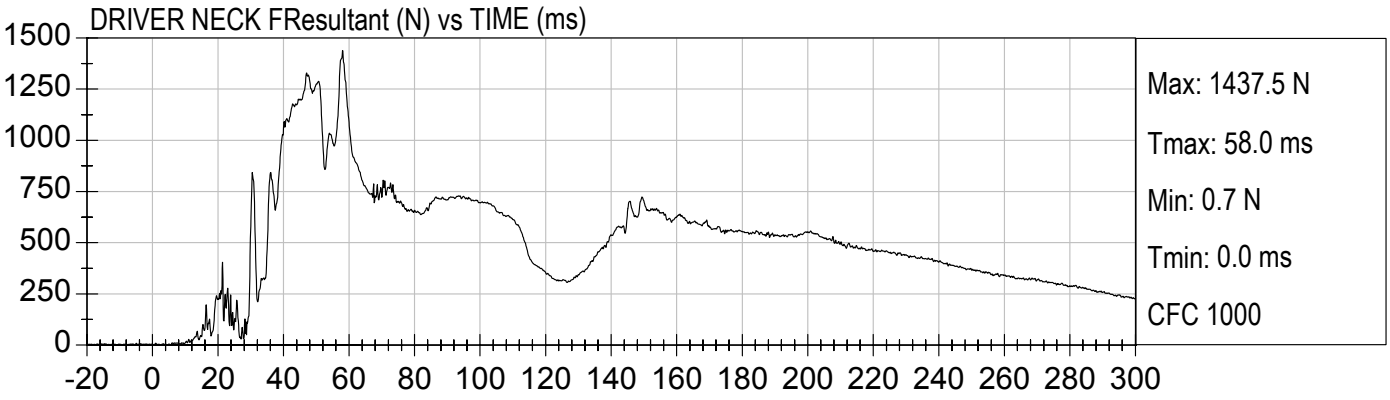
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

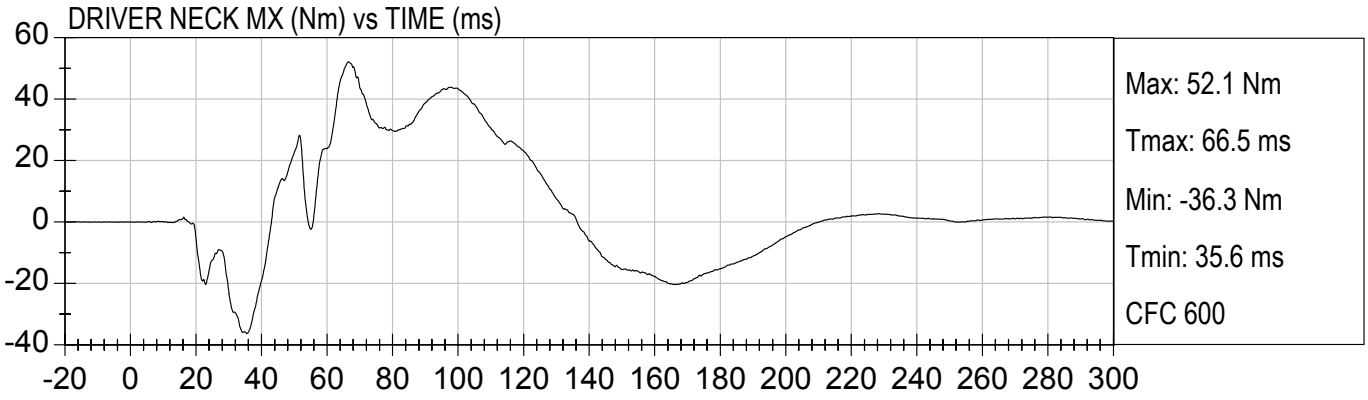
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

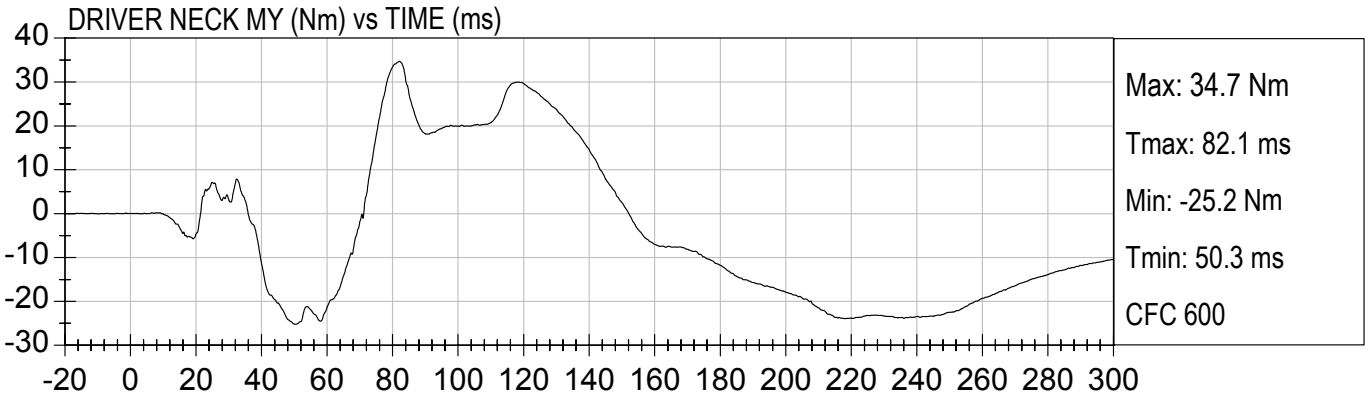


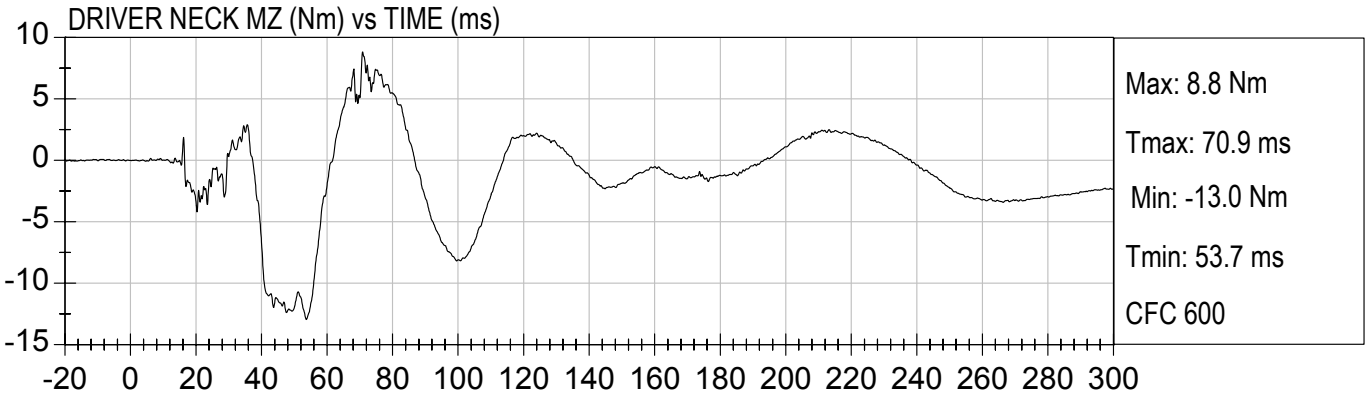


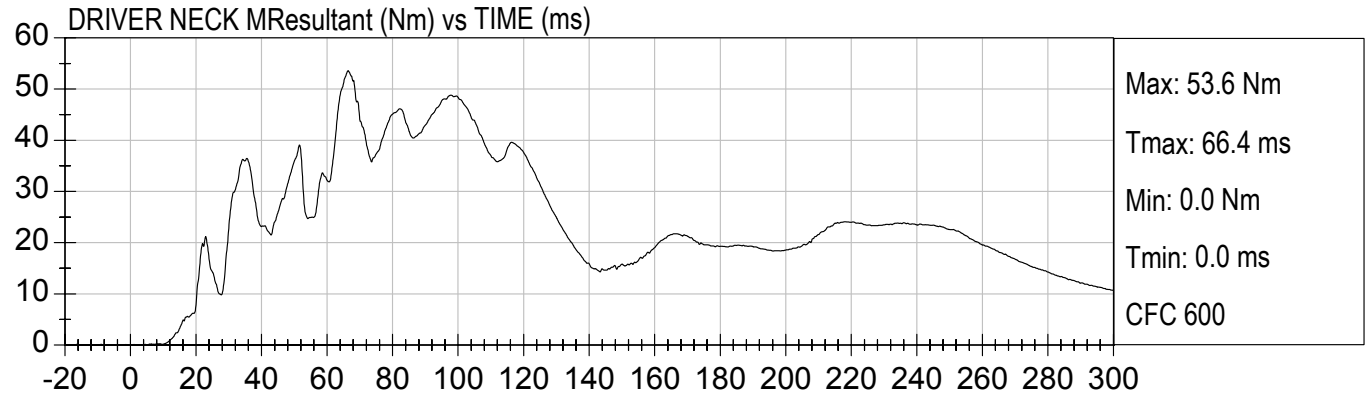





DRIVER NECK MX (Nm) vs TIME (ms)
60
40
20
0
-20
-40
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 52.1 Nm
Tmax: 66.5 ms
Min: -36.3 Nm
Tmin: 35.6 ms
CFC 600

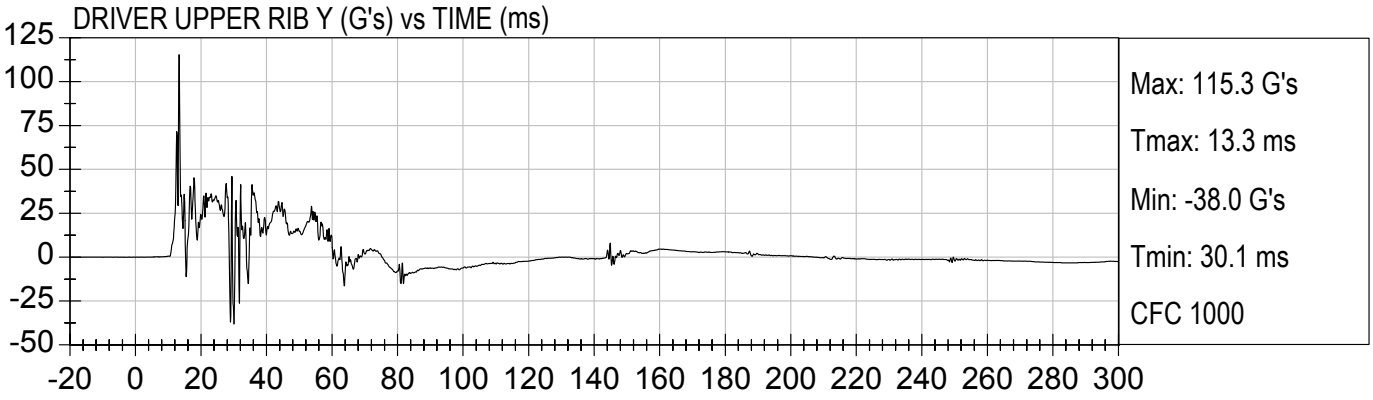

DRIVER NECK MY (Nm) vs TIME (ms)
40
30
20
10
0
-10
-20
-30
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 34.7 Nm
Tmax: 82.1 ms
Min: -25.2 Nm
Tmin: 50.3 ms
CFC 600

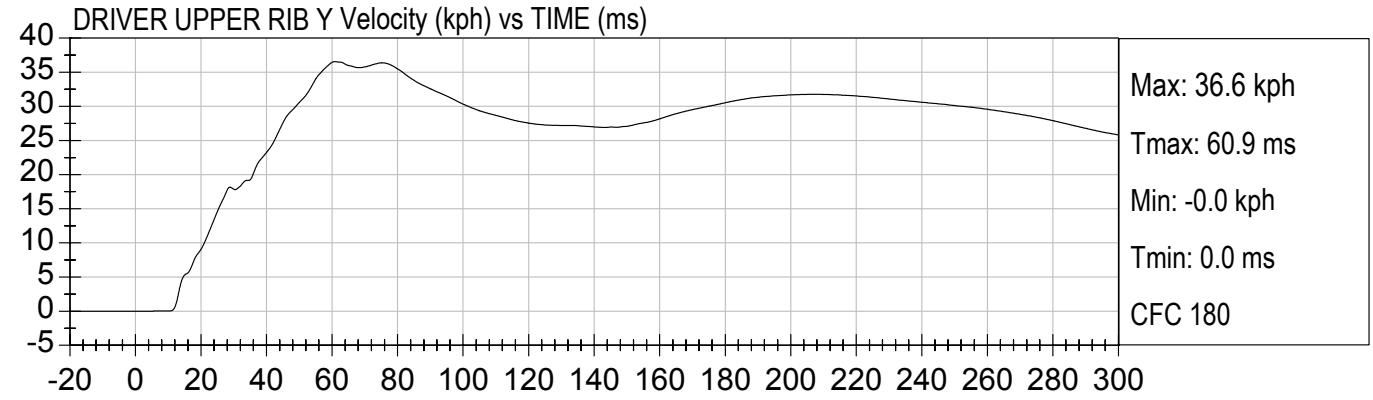

DRIVER NECK MZ (Nm) vs TIME (ms)
10
5
0
-5
-10
-15
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 8.8 Nm
Tmax: 70.9 ms
Min: -13.0 Nm
Tmin: 53.7 ms
CFC 600

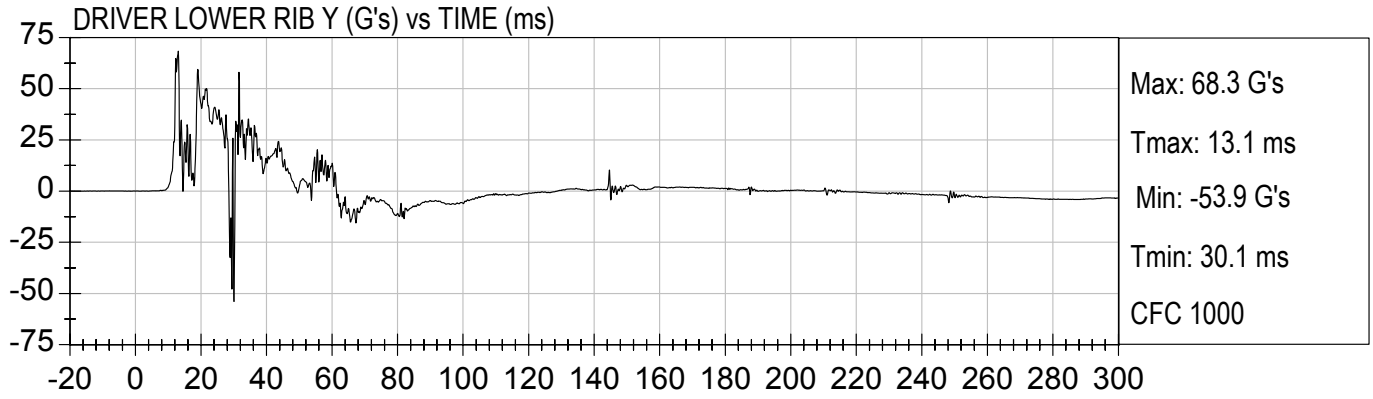

DRIVER NECK MResultant (Nm) vs TIME (ms)
60
50
40
30
20
10
0
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 53.6 Nm
Tmax: 66.4 ms
Min: 0.0 Nm
Tmin: 0.0 ms
CFC 600

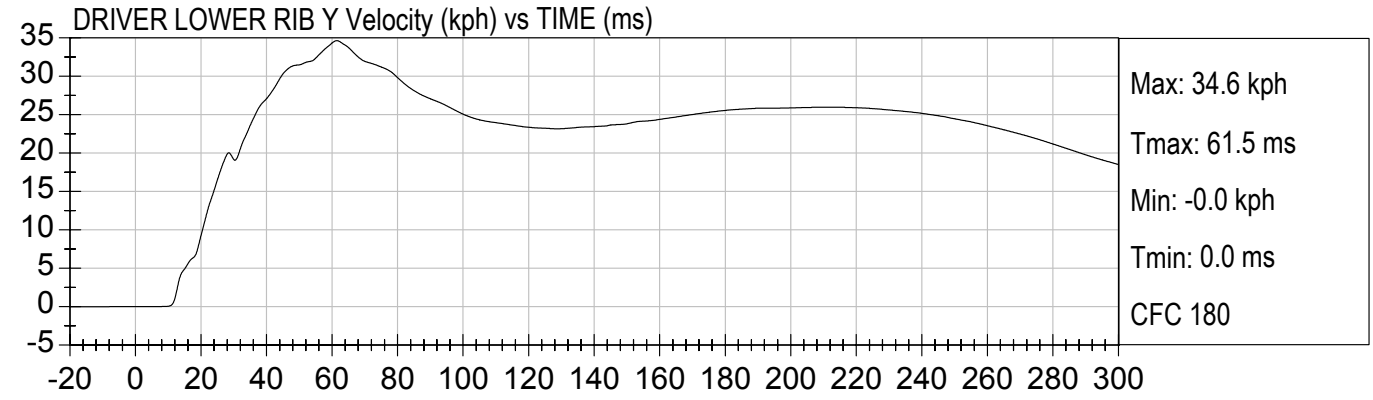
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)





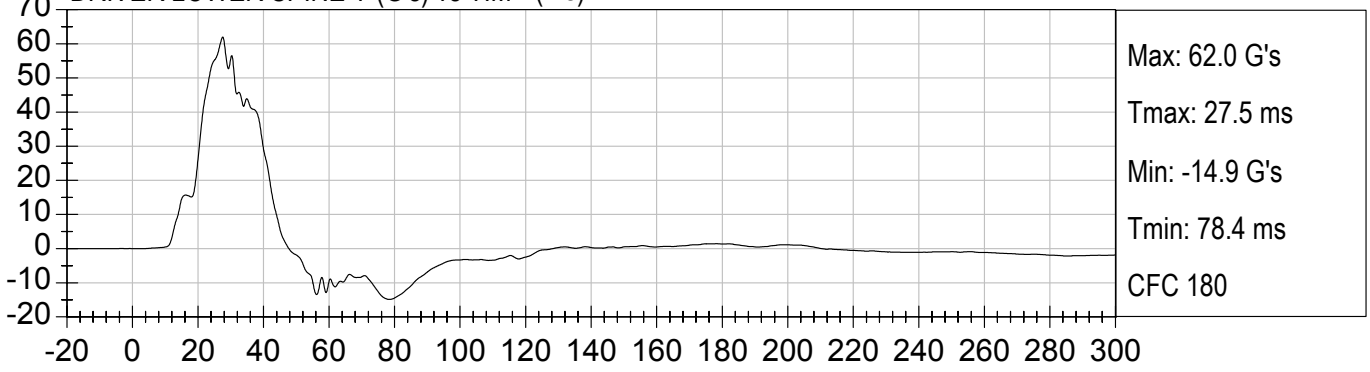




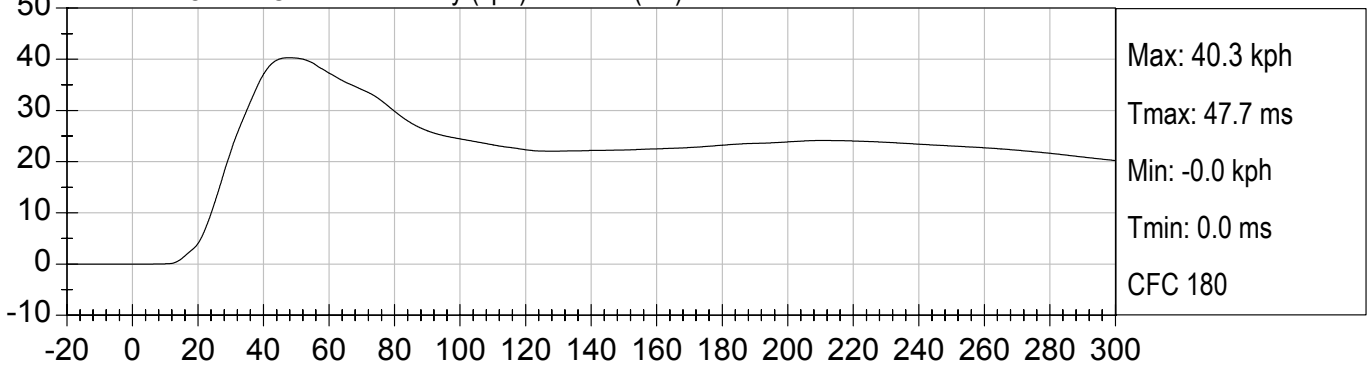
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

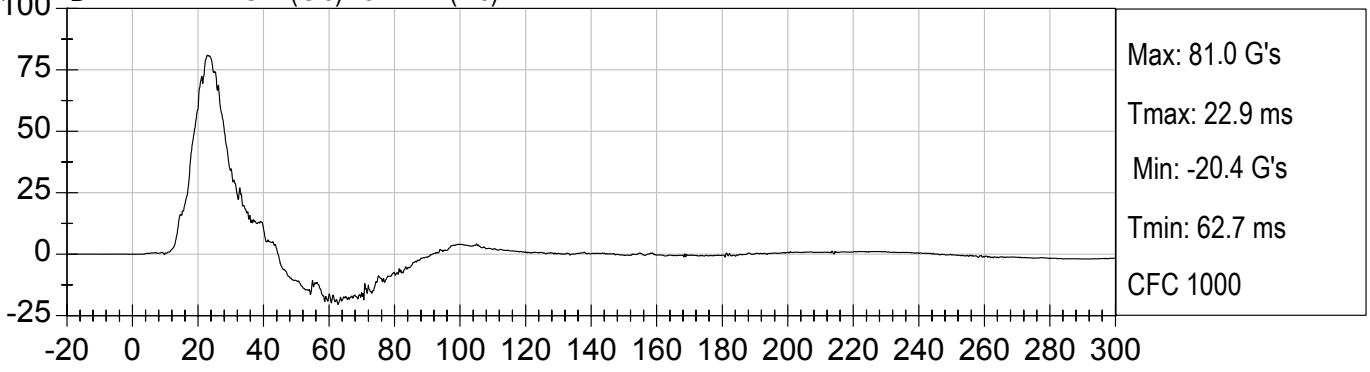
DRIVER LOWER SPINE Y (G's) vs TIME (ms)



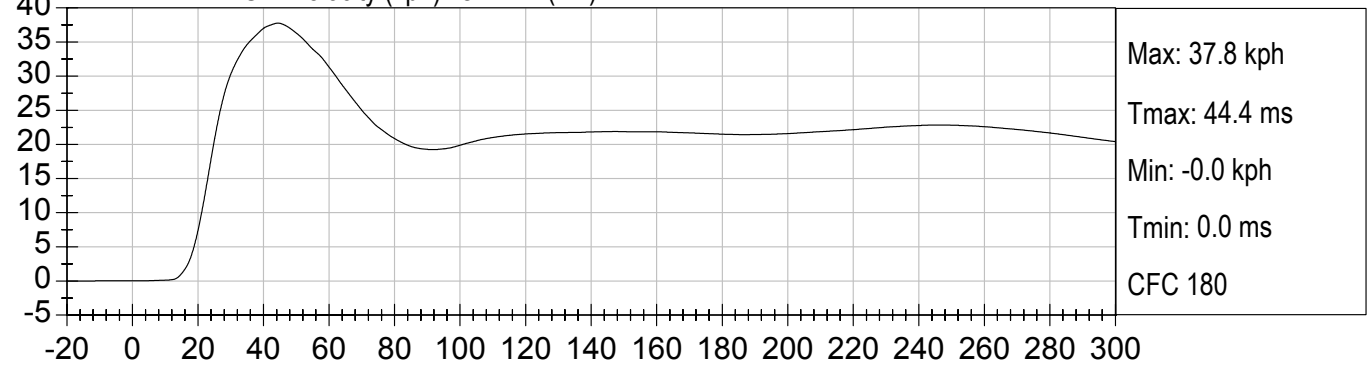
DRIVER LOWER SPINE Y Velocity (kph) vs TIME (ms)



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

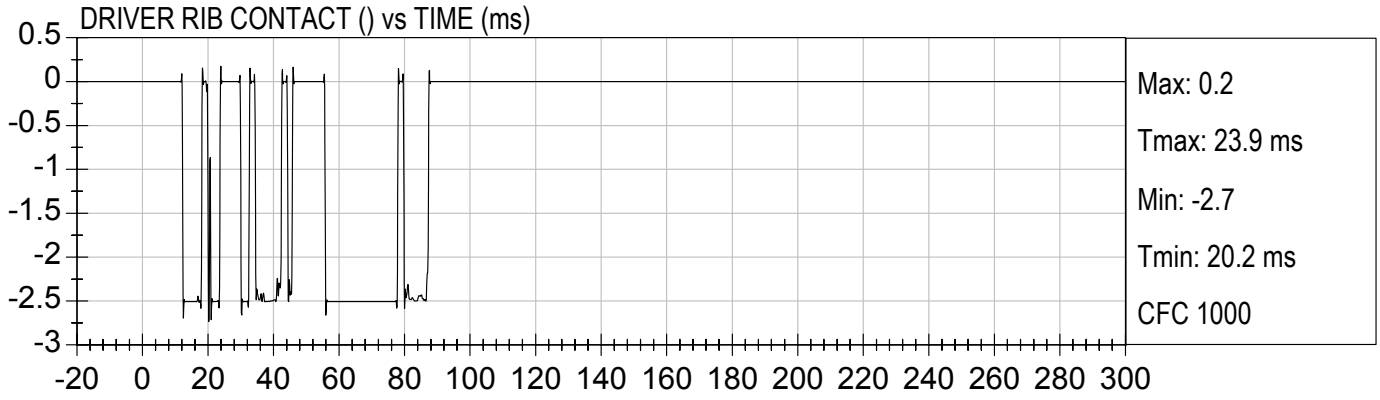


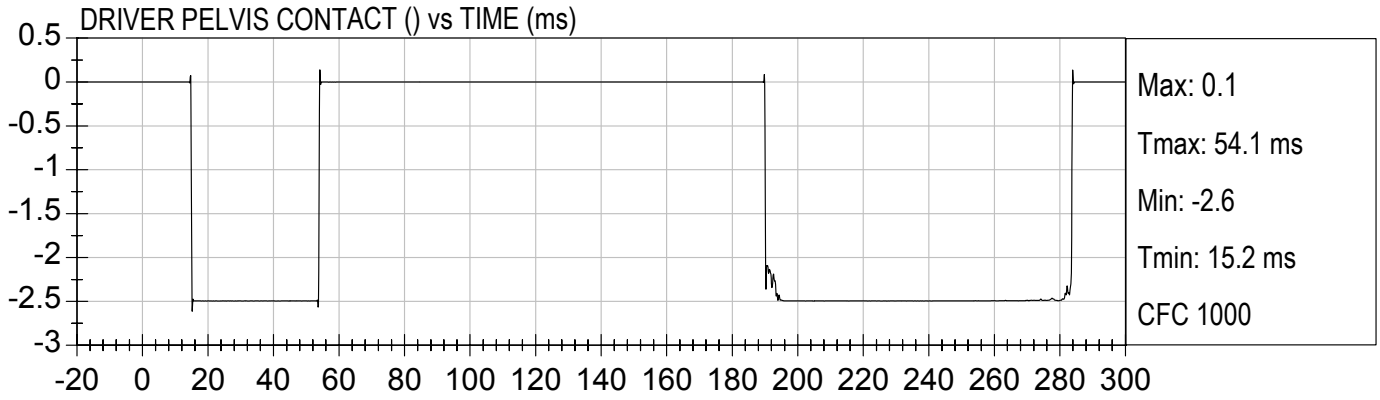
DRIVER PELVIS Y Velocity (kph) vs TIME (ms)



NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

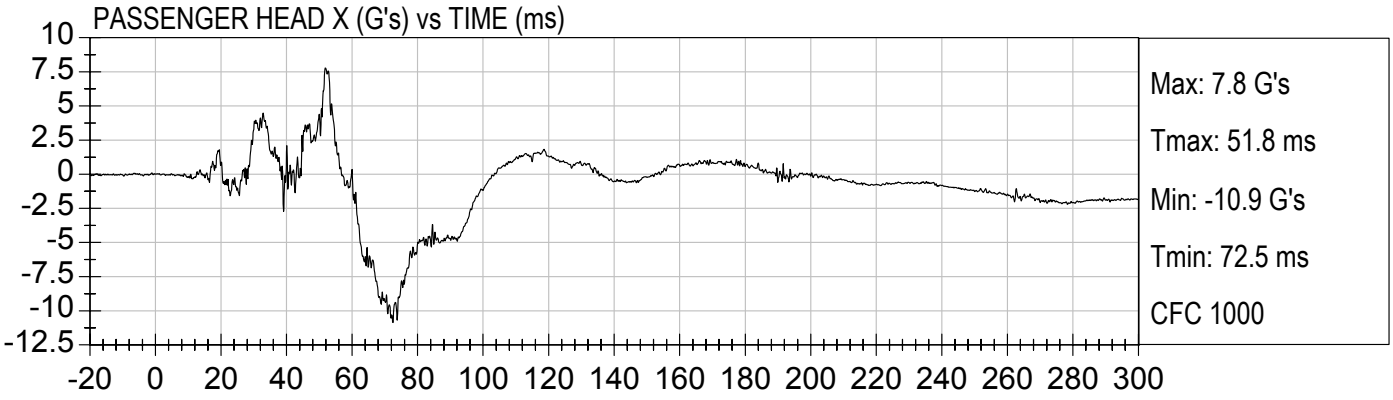
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

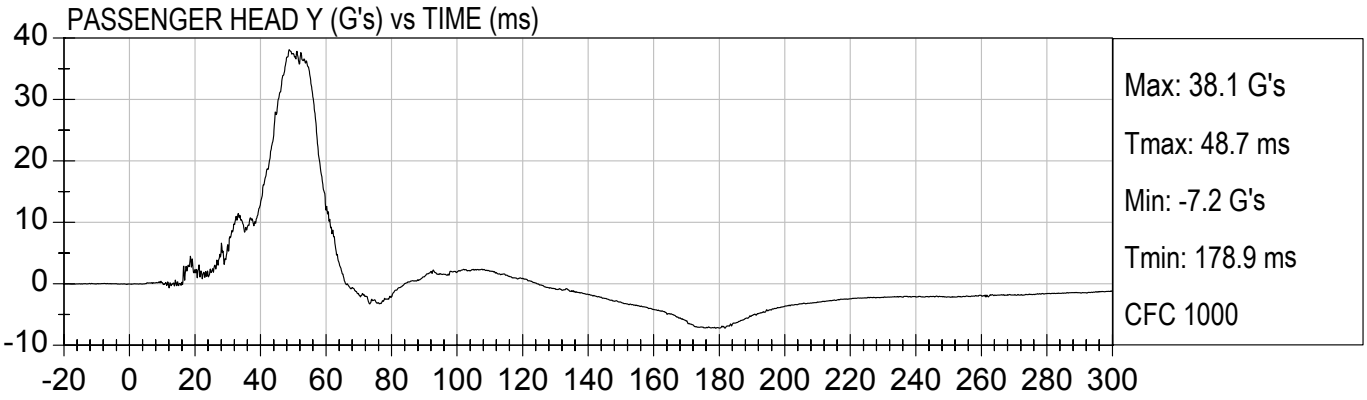


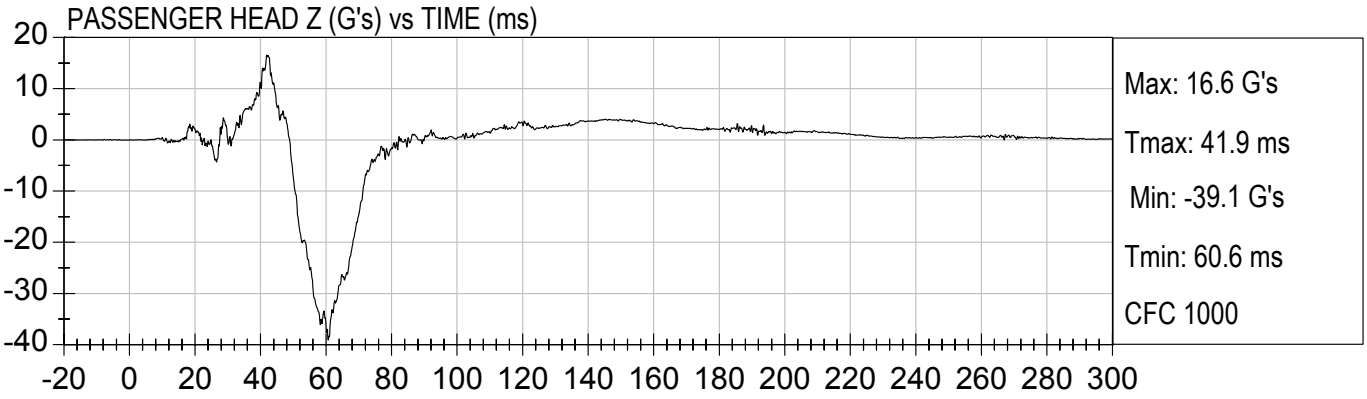


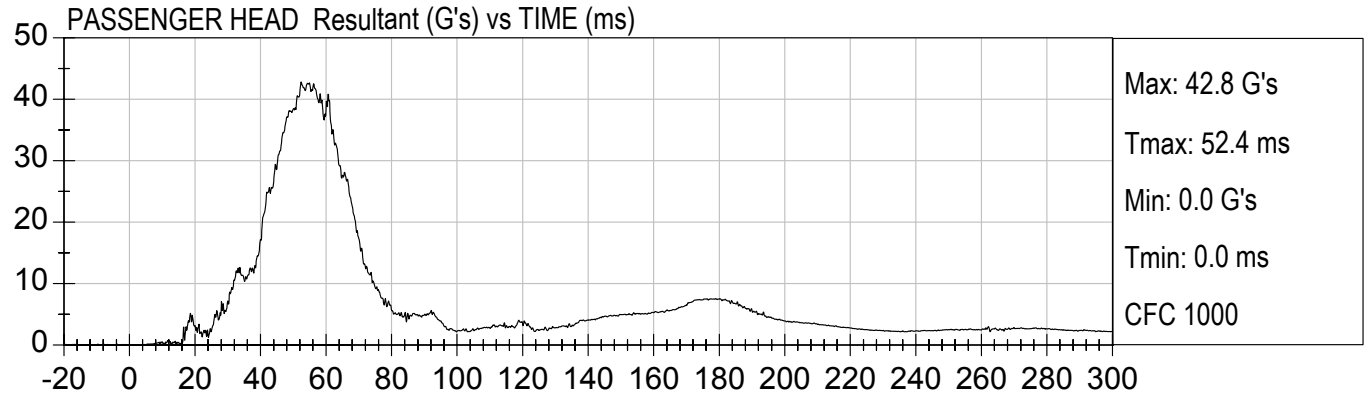
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

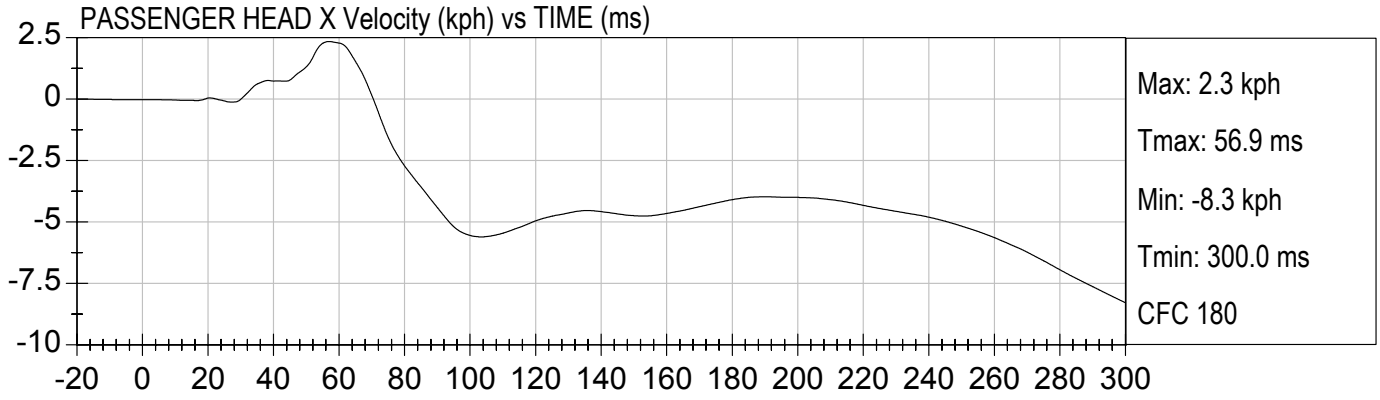
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

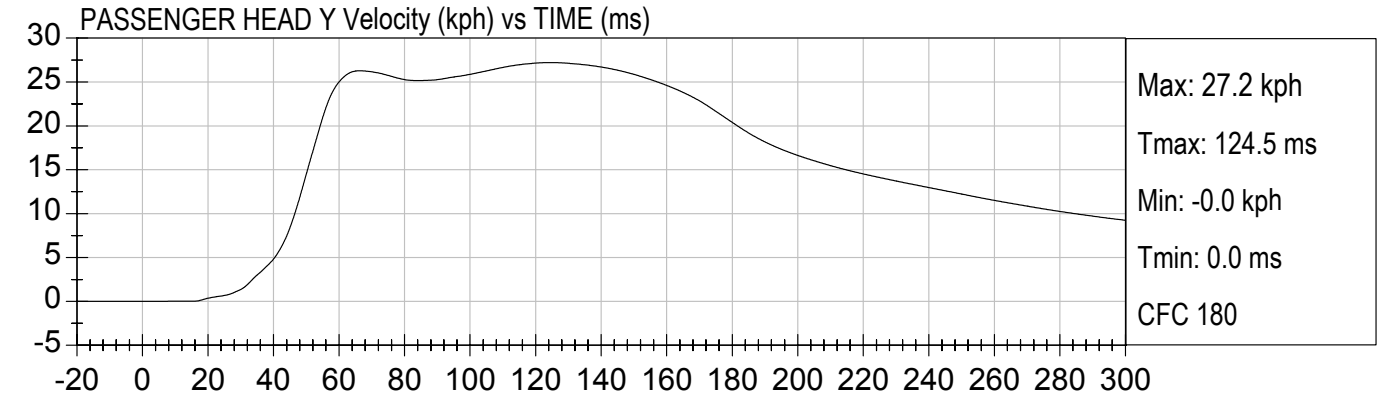


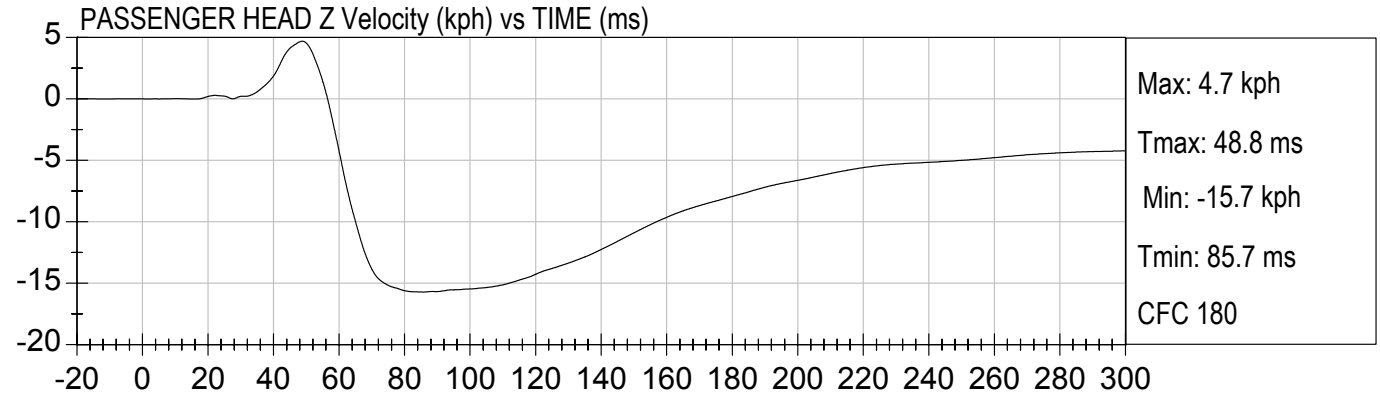






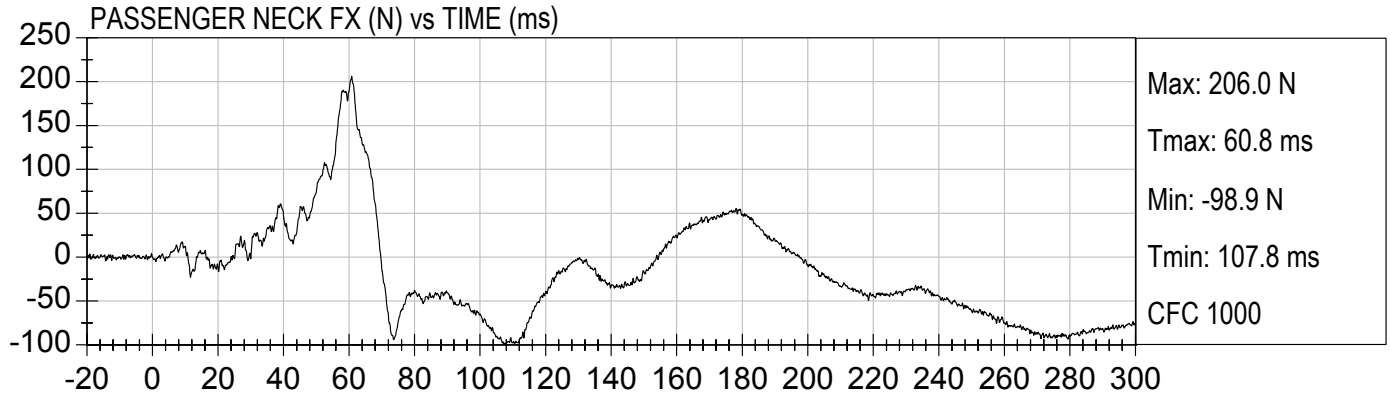

PASSENGER HEAD X Velocity (kph) vs TIME (ms)
2.5
0
-2.5
-5
-7.5
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 2.3 kph
Tmax: 56.9 ms
Min: -8.3 kph
Tmin: 300.0 ms
CFC 180

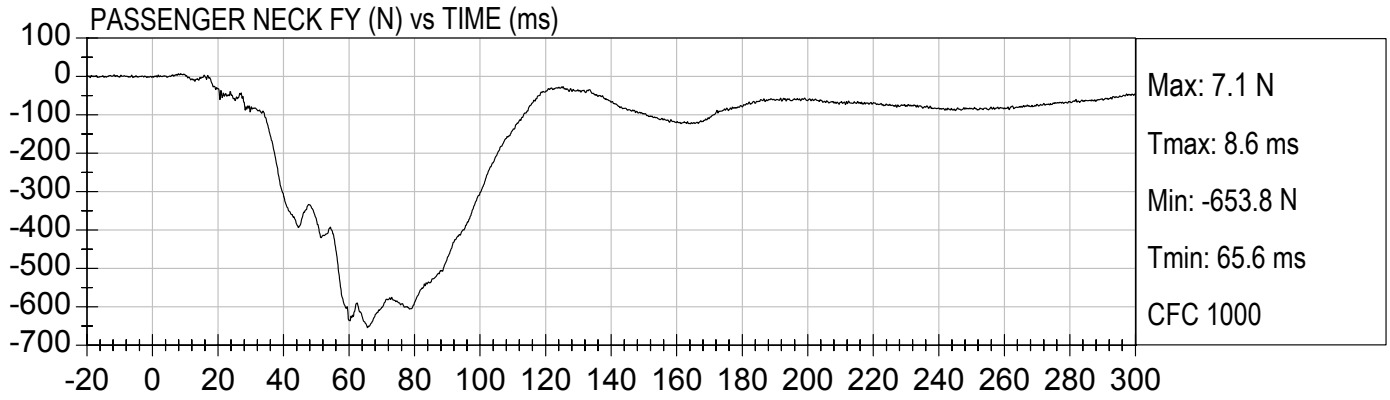

PASSENGER HEAD Y Velocity (kph) vs TIME (ms)
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 27.2 kph
Tmax: 124.5 ms
Min: -0.0 kph
Tmin: 0.0 ms
CFC 180

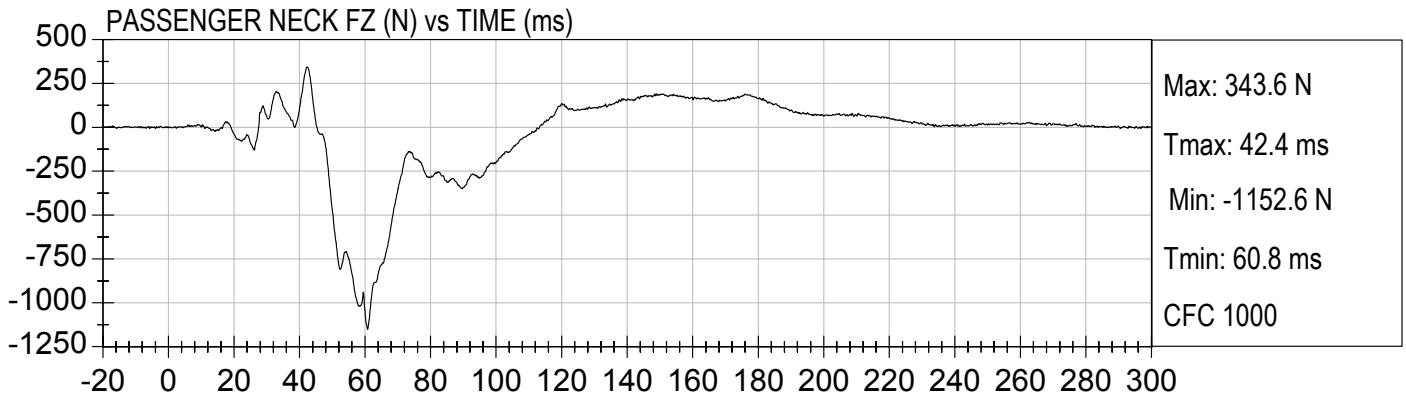

PASSENGER HEAD Z Velocity (kph) vs TIME (ms)
5
0
-5
-10
-15
-20
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 4.7 kph
Tmax: 48.8 ms
Min: -15.7 kph
Tmin: 85.7 ms
CFC 180

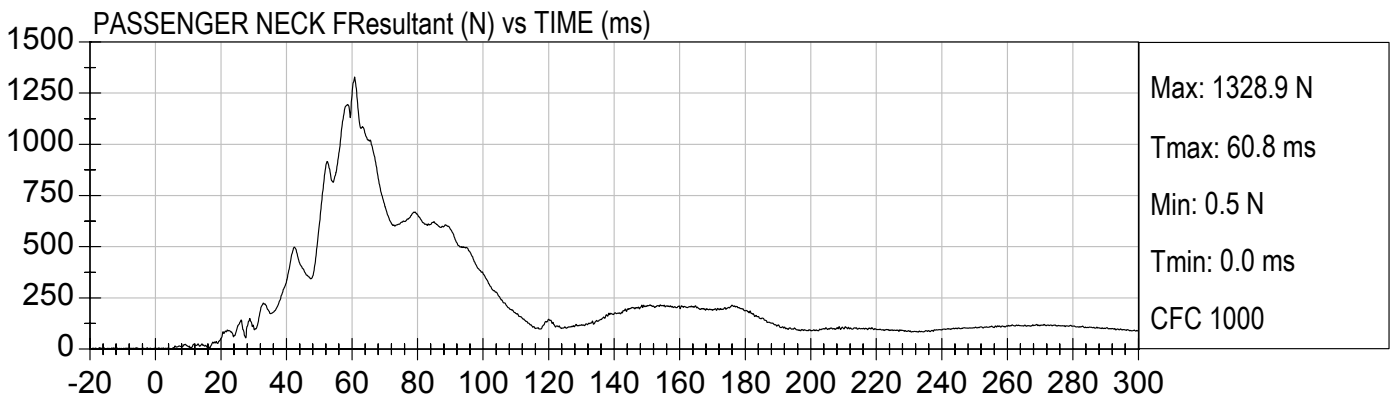
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)



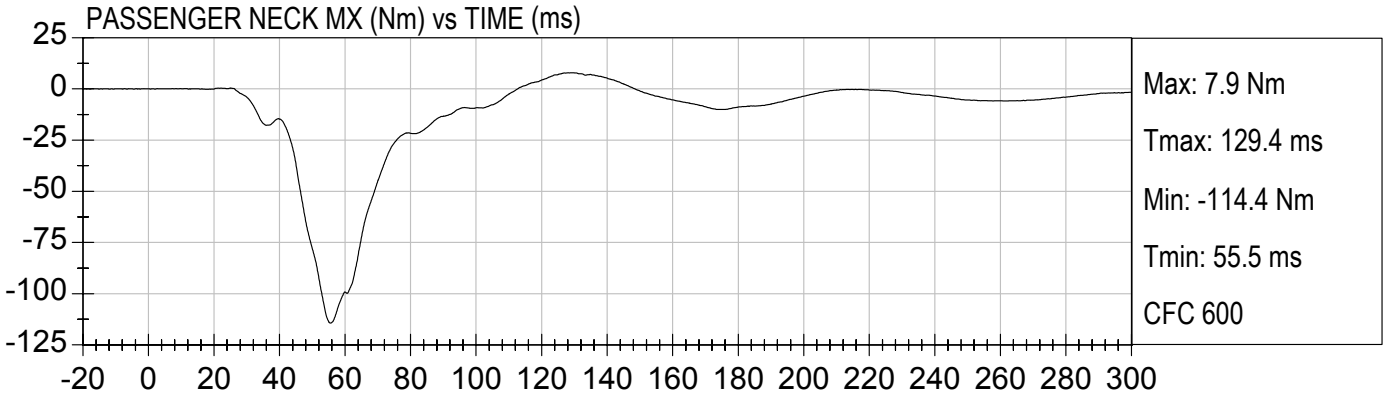


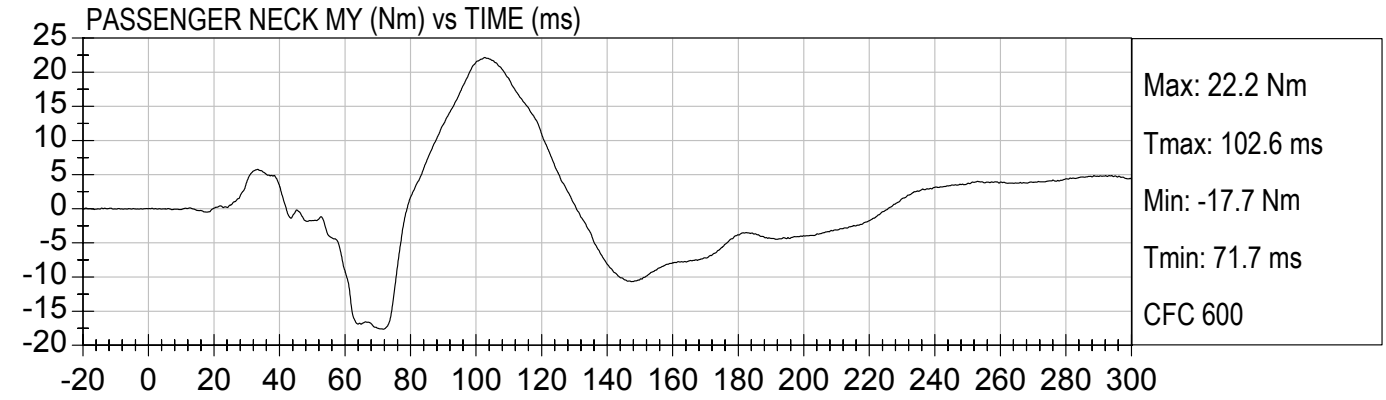


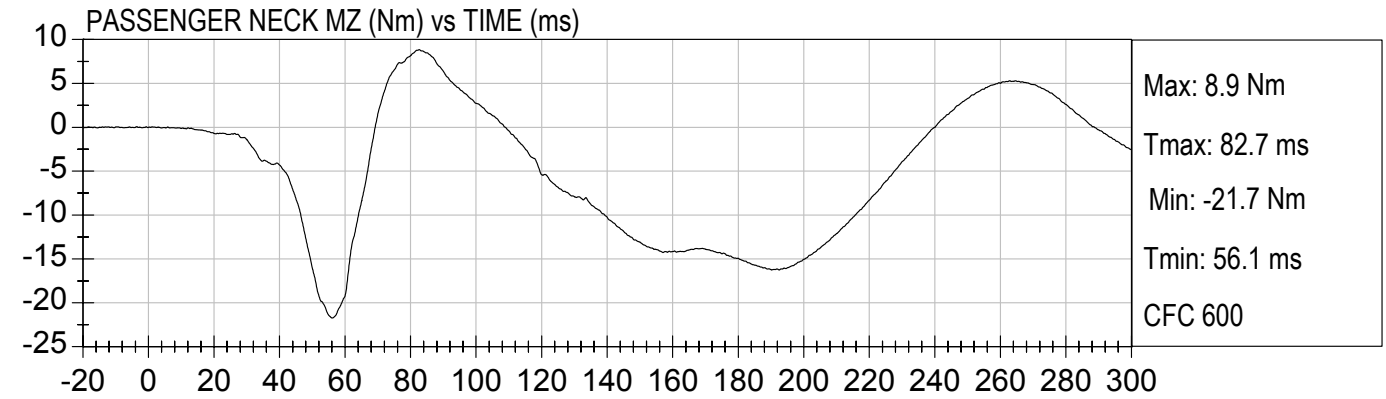


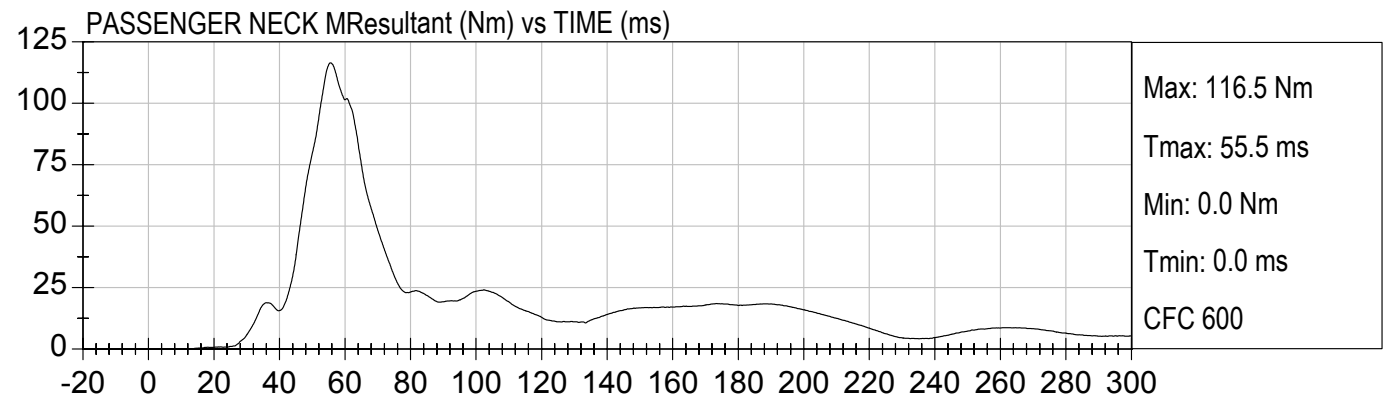
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

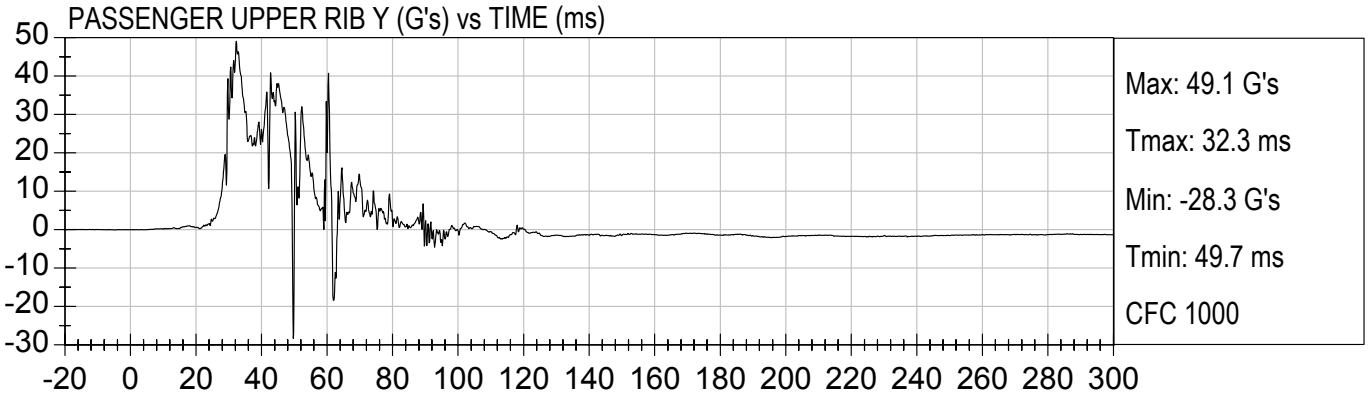
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

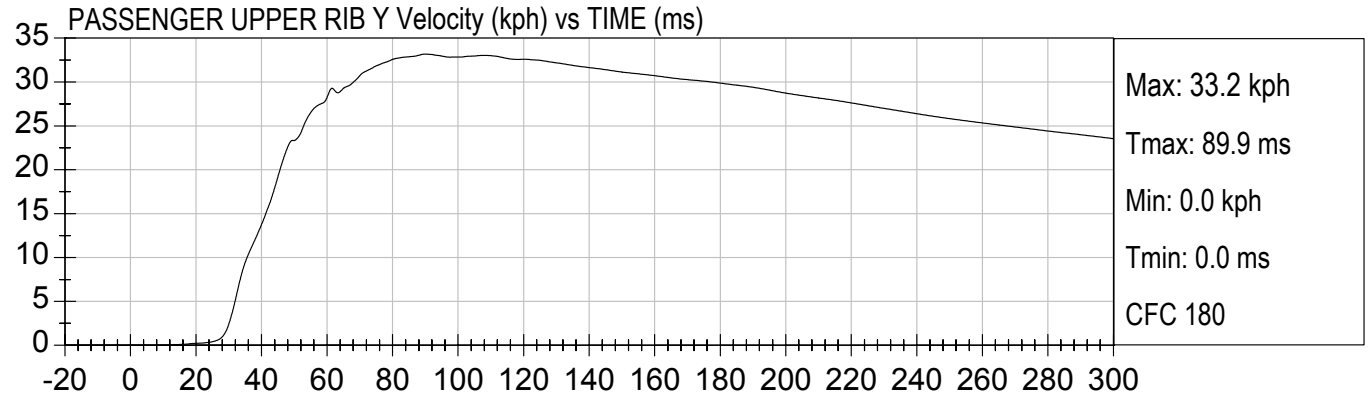


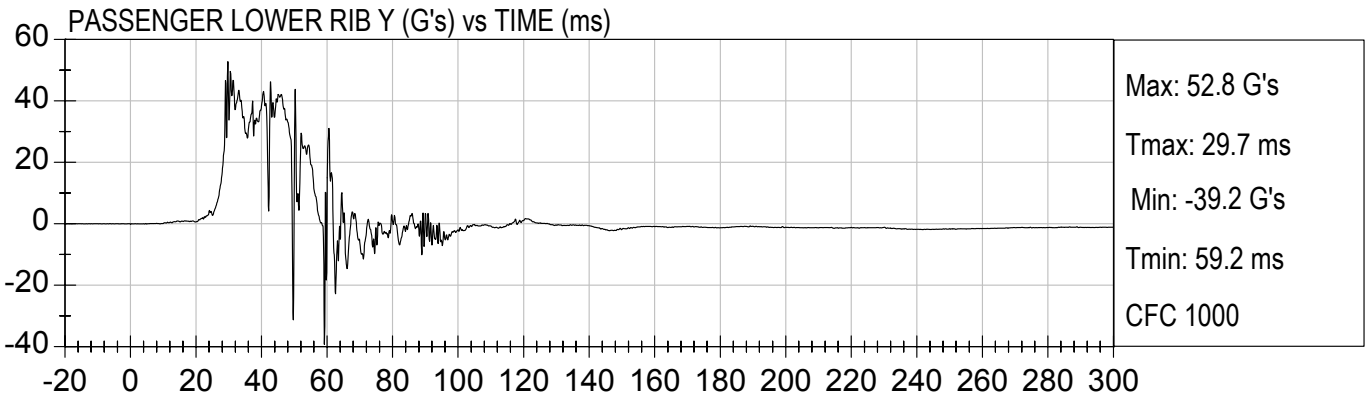


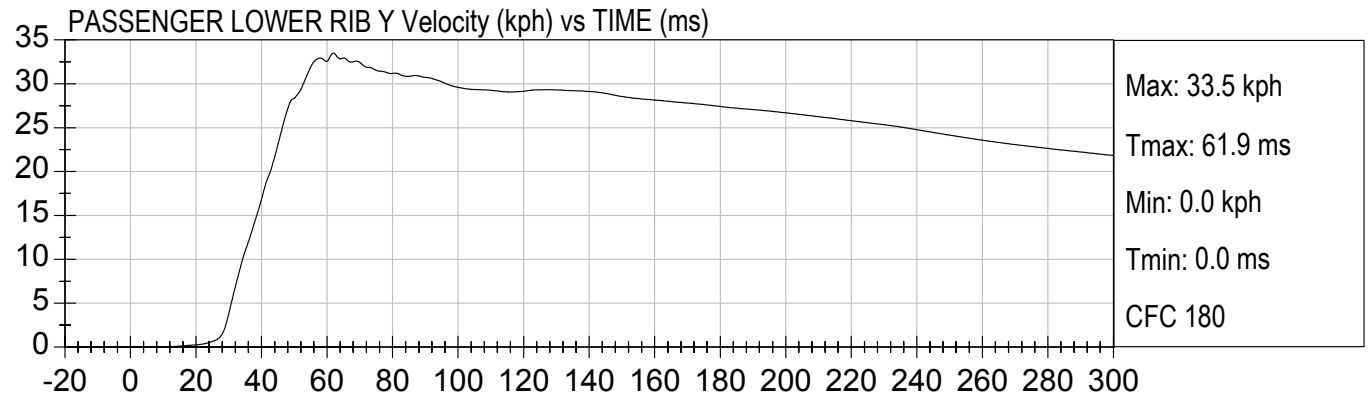





PASSENGER UPPER RIB Y (G's) vs TIME (ms)
50
40
30
20
10
0
-10
-20
-30
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 49.1 G's
Tmax: 32.3 ms
Min: -28.3 G's
Tmin: 49.7 ms
CFC 1000

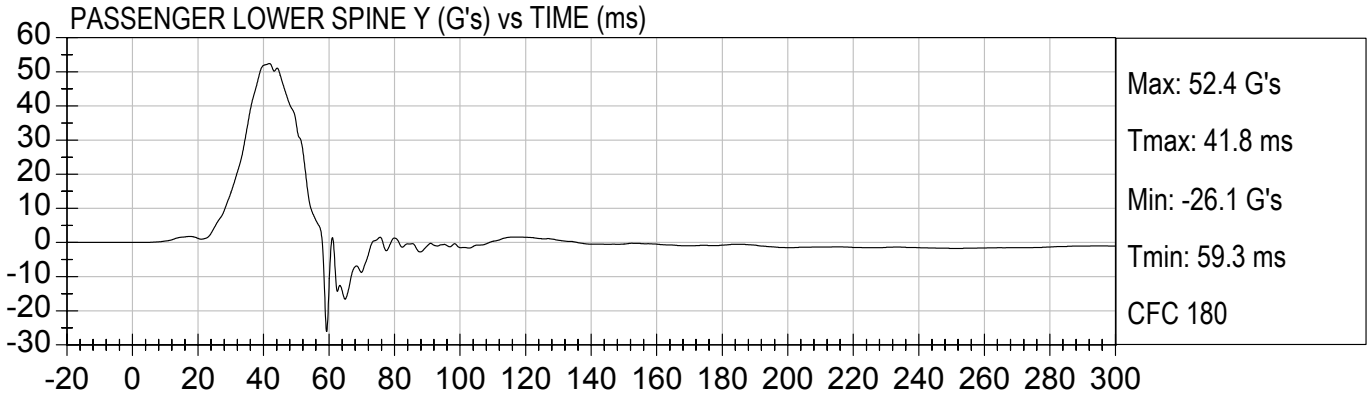

PASSENGER UPPER RIB Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 33.2 kph
Tmax: 89.9 ms
Min: 0.0 kph
Tmin: 0.0 ms
CFC 180

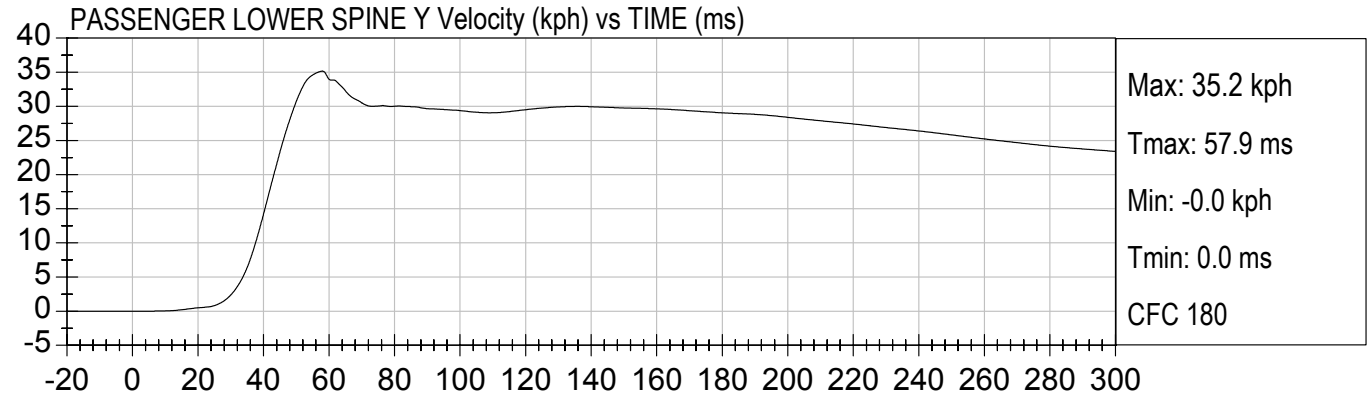

PASSENGER LOWER RIB Y (G's) vs TIME (ms)
60
40
20
0
-20
-40
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 52.8 G's
Tmax: 29.7 ms
Min: -39.2 G's
Tmin: 59.2 ms
CFC 1000

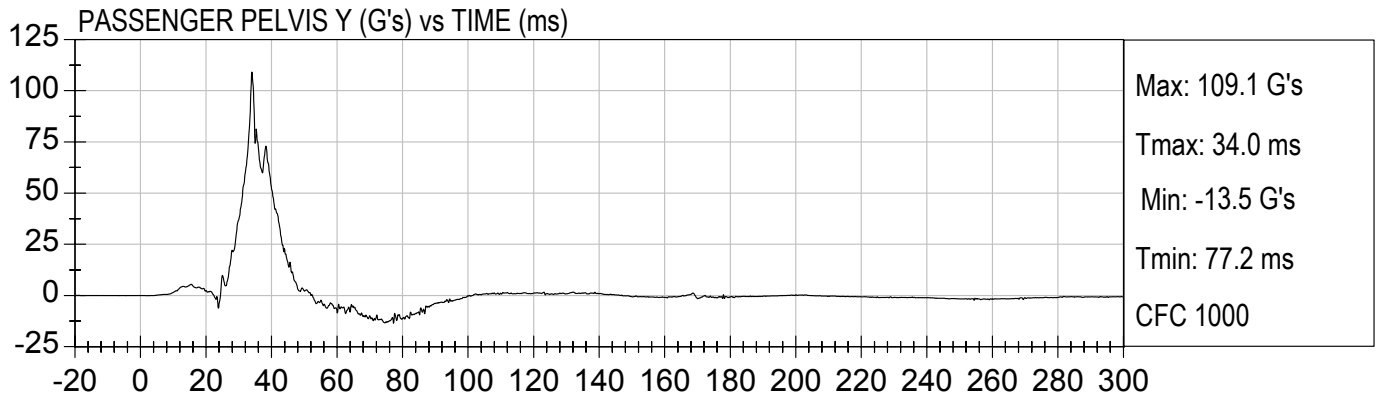

PASSENGER LOWER RIB Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 33.5 kph
Tmax: 61.9 ms
Min: 0.0 kph
Tmin: 0.0 ms
CFC 180

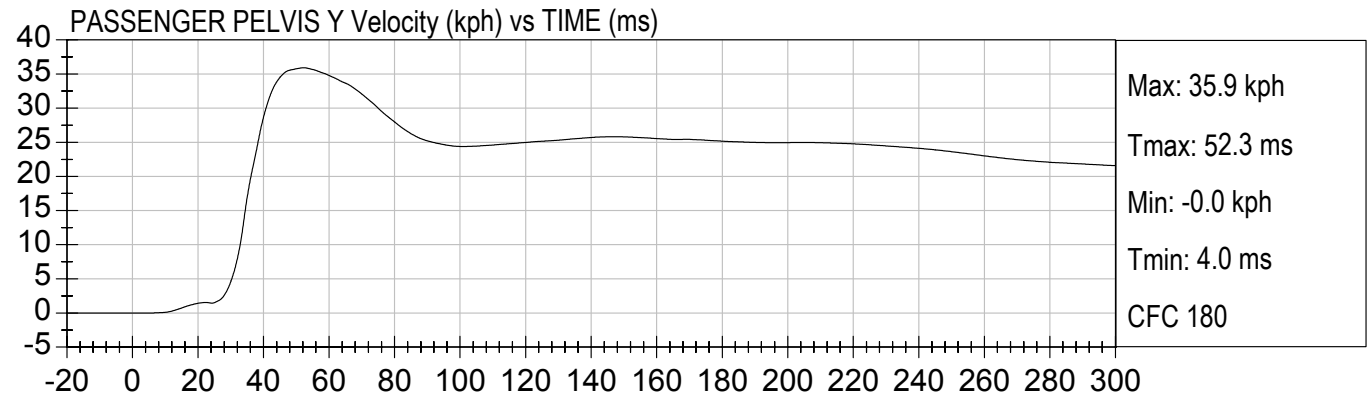
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

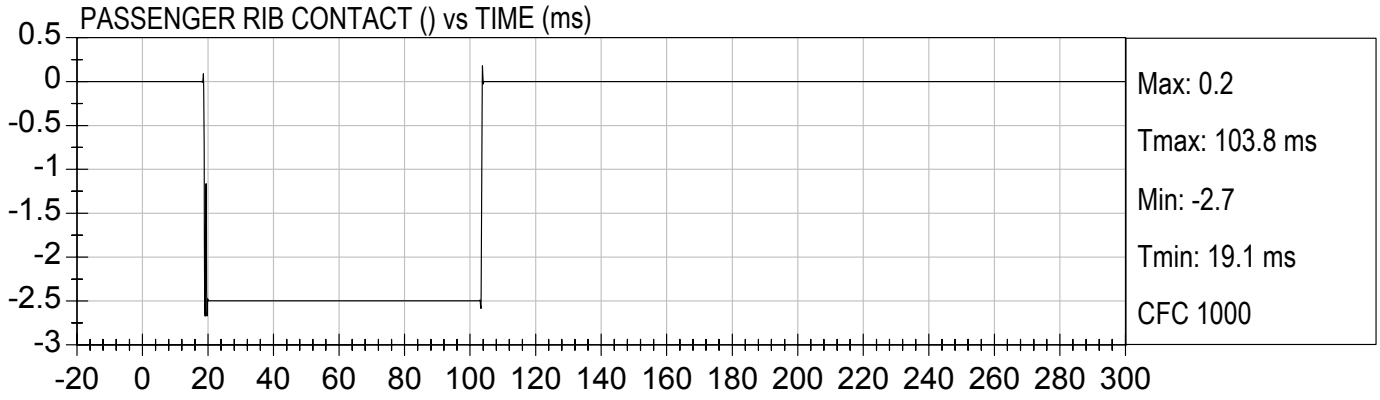
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

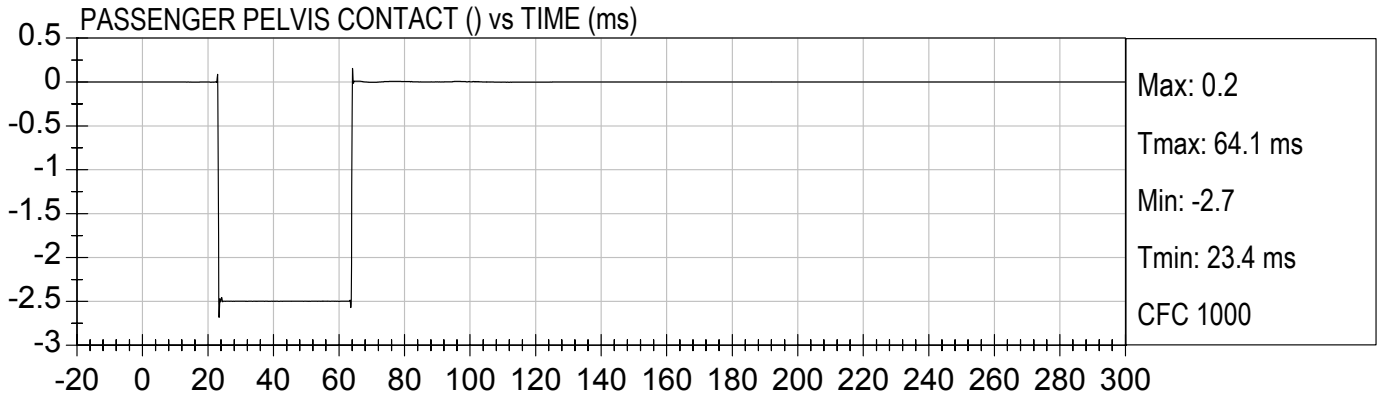






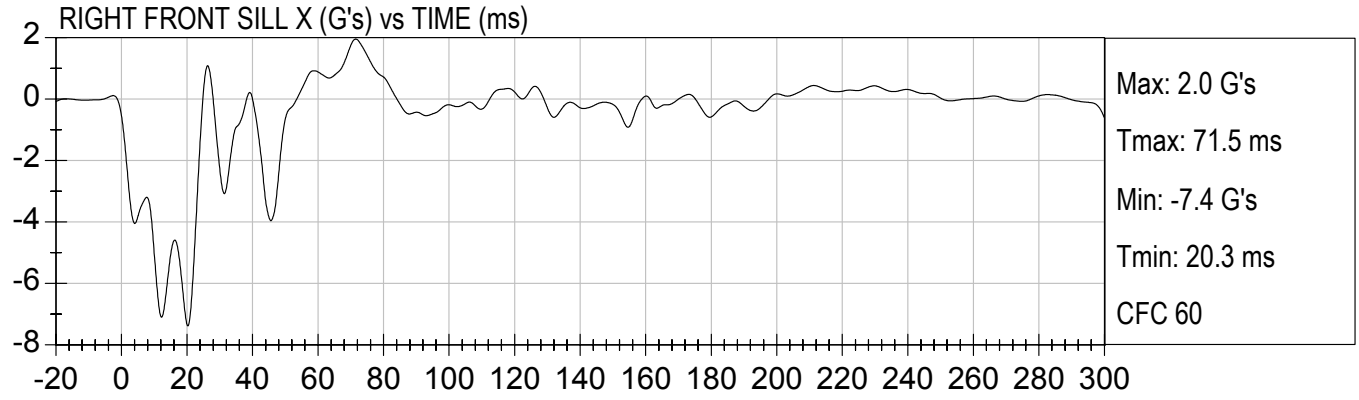


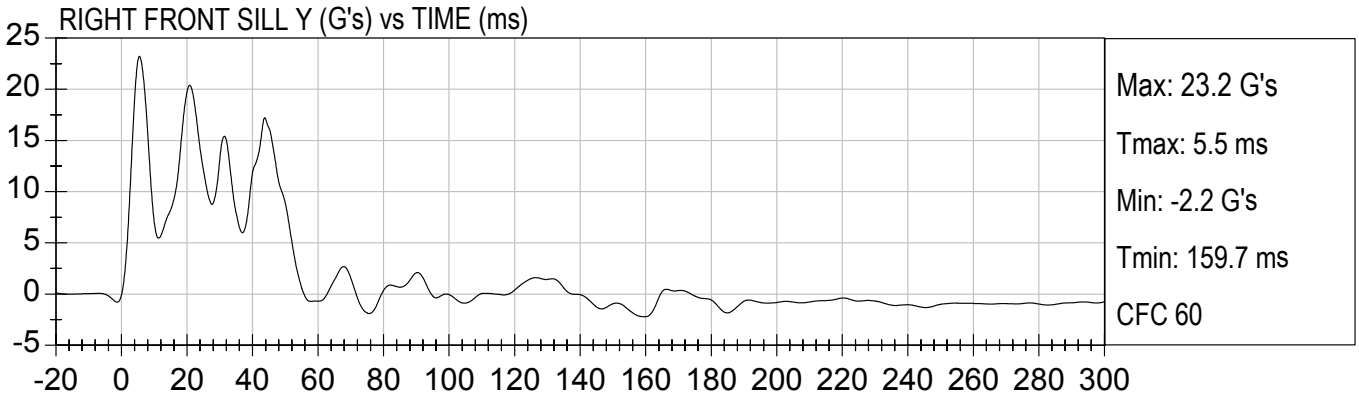

PASSENGER RIB CONTACT () vs TIME (ms)
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.2
Tmax: 103.8 ms
Min: -2.7
Tmin: 19.1 ms
CFC 1000

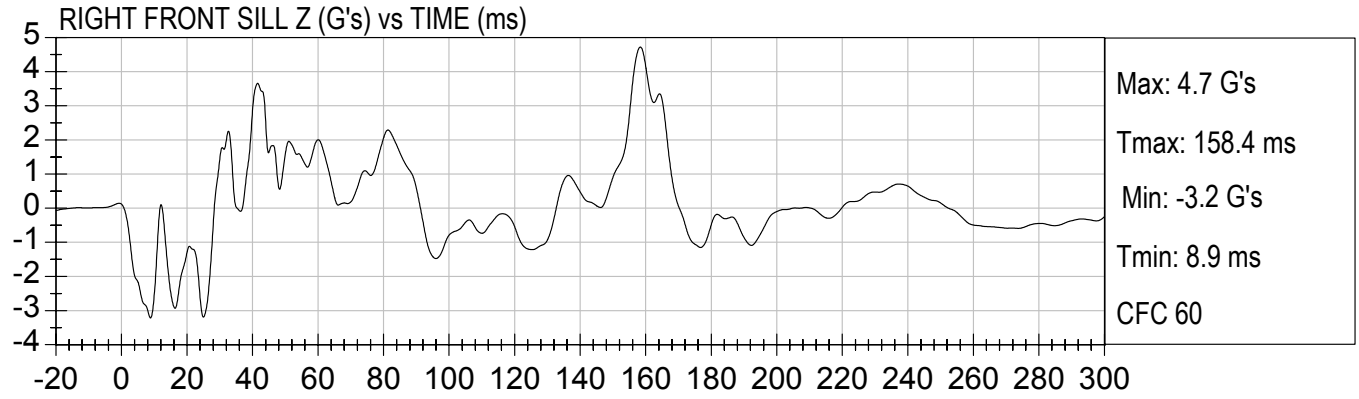

PASSENGER PELVIS CONTACT () vs TIME (ms)
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.2
Tmax: 64.1 ms
Min: -2.7
Tmin: 23.4 ms
CFC 1000

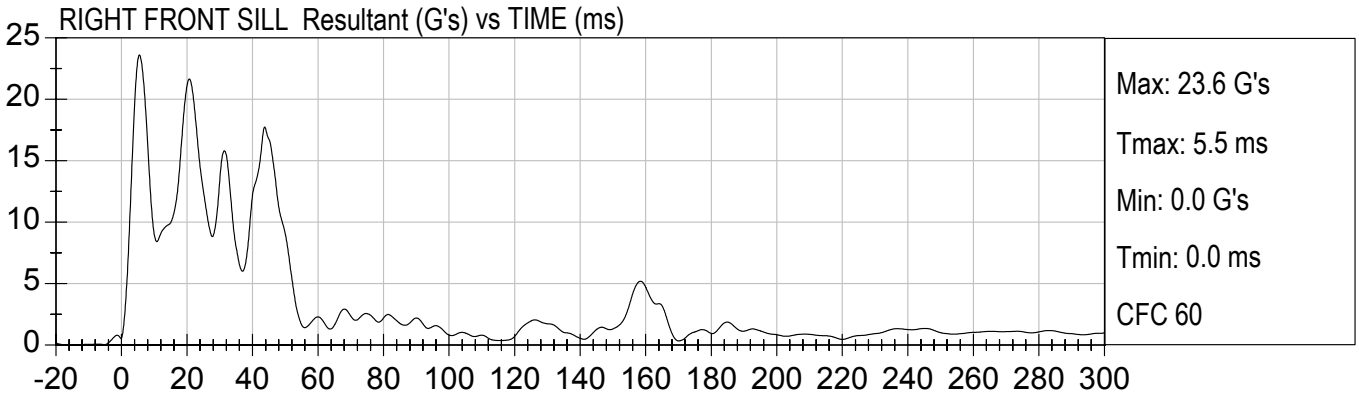
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

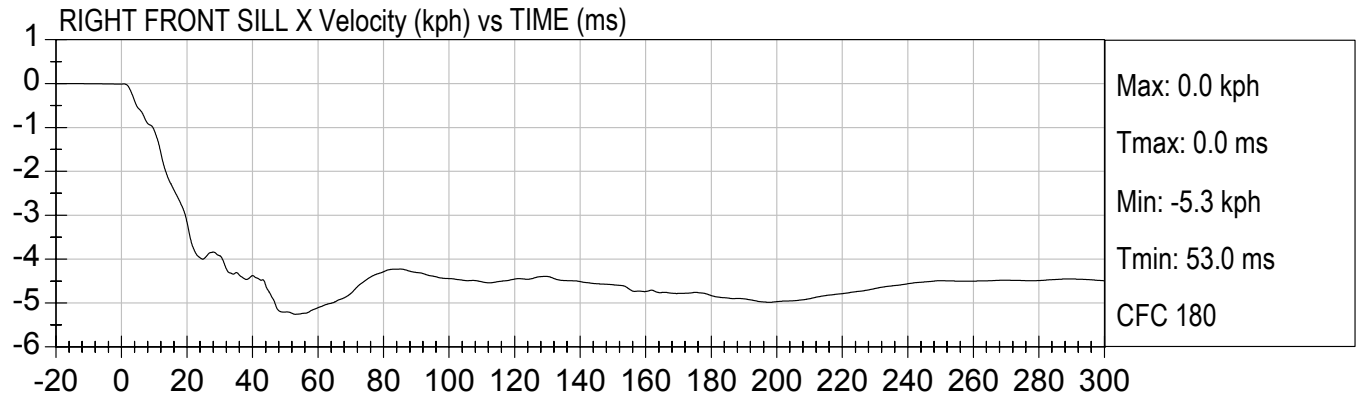
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

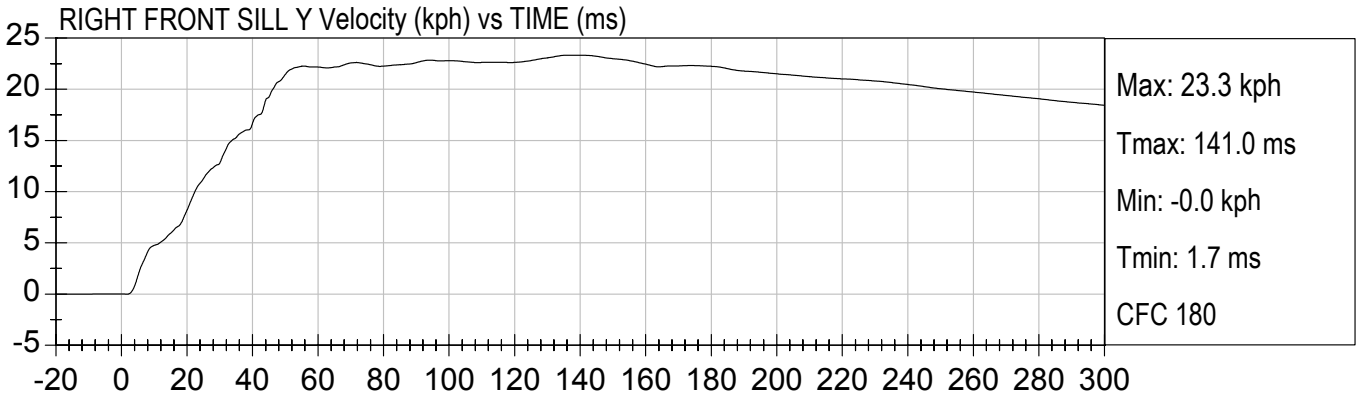


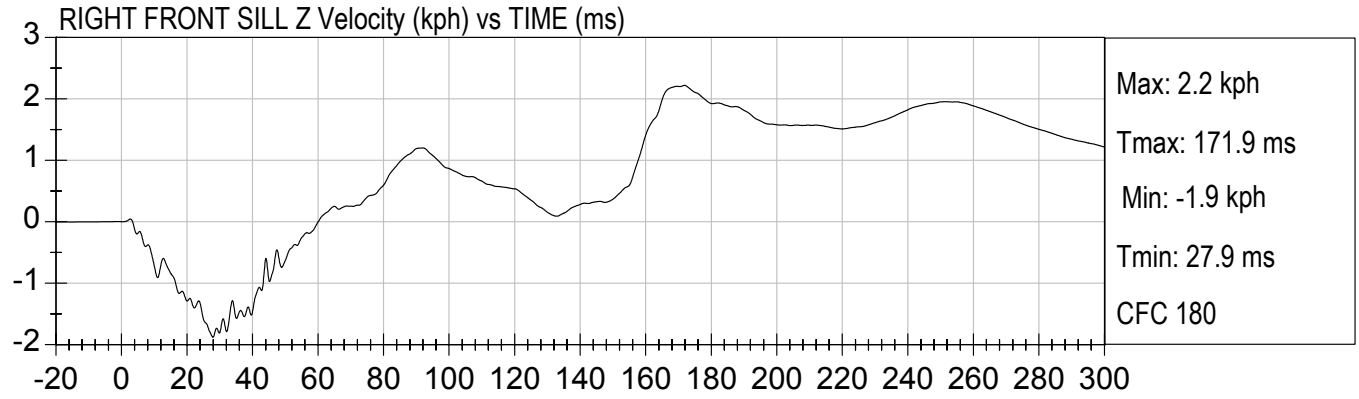


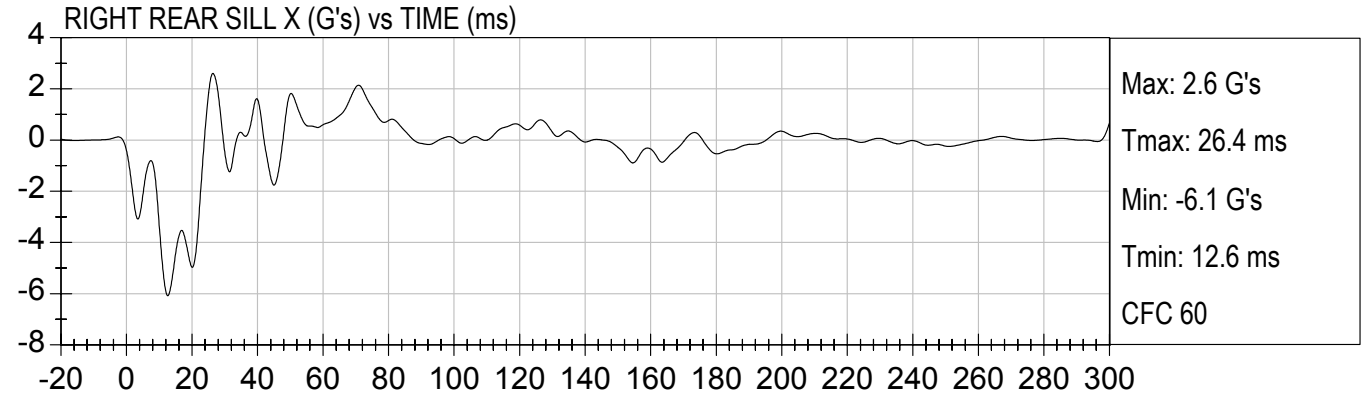


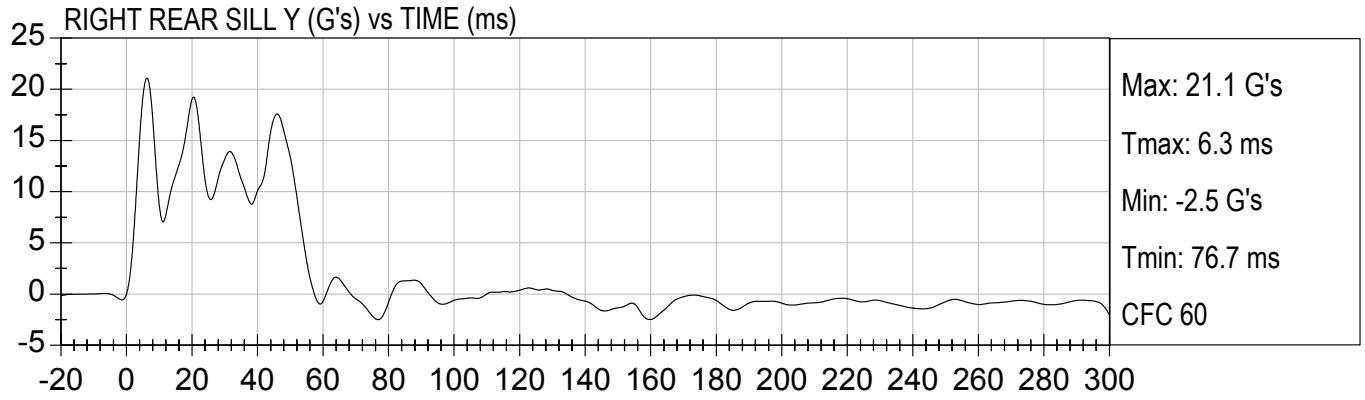


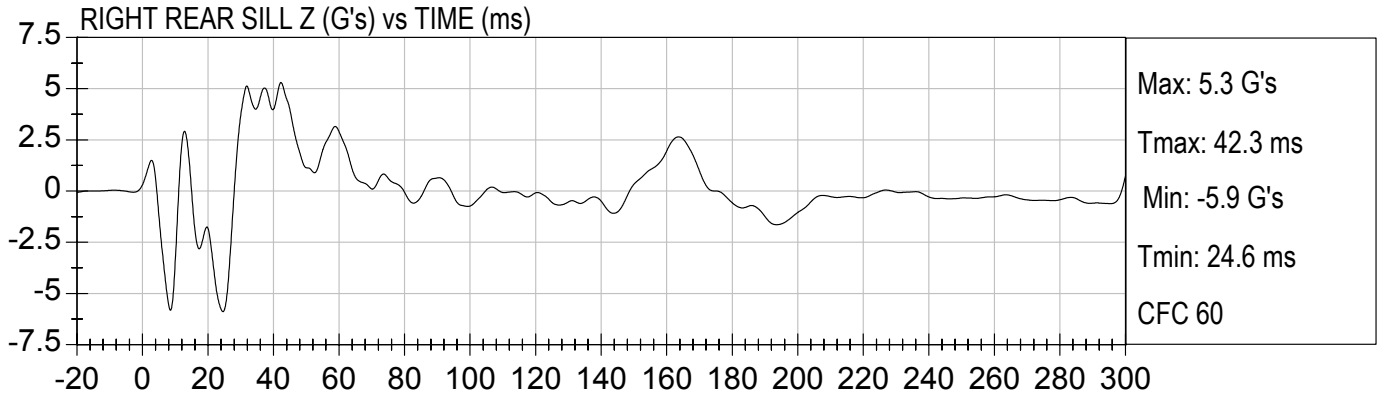

RIGHT FRONT SILL X Velocity (kph) vs TIME (ms)
1
0
-1
-2
-3
-4
-5
-6
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.0 kph
Tmax: 0.0 ms
Min: -5.3 kph
Tmin: 53.0 ms
CFC 180

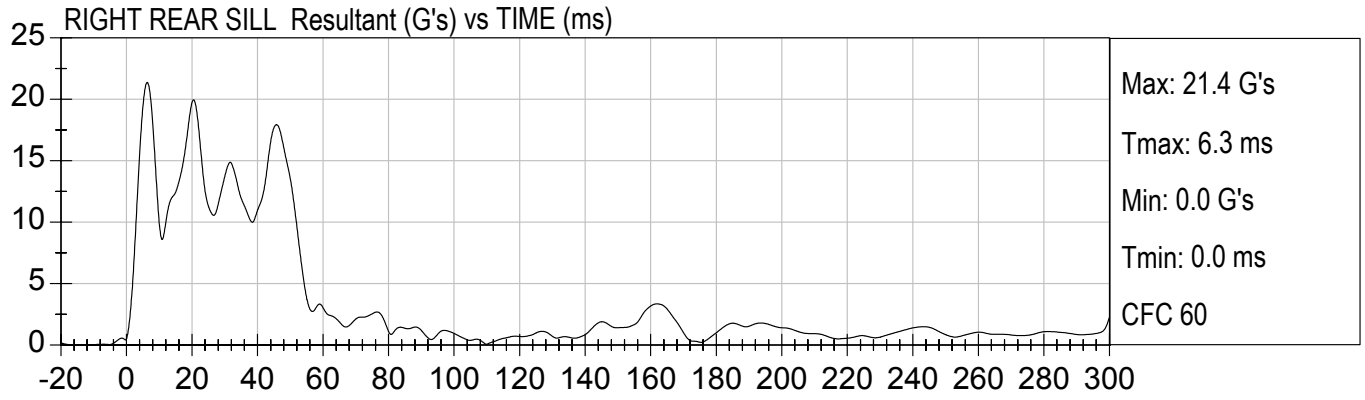

RIGHT FRONT SILL Y Velocity (kph) vs TIME (ms)
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 23.3 kph
Tmax: 141.0 ms
Min: -0.0 kph
Tmin: 1.7 ms
CFC 180

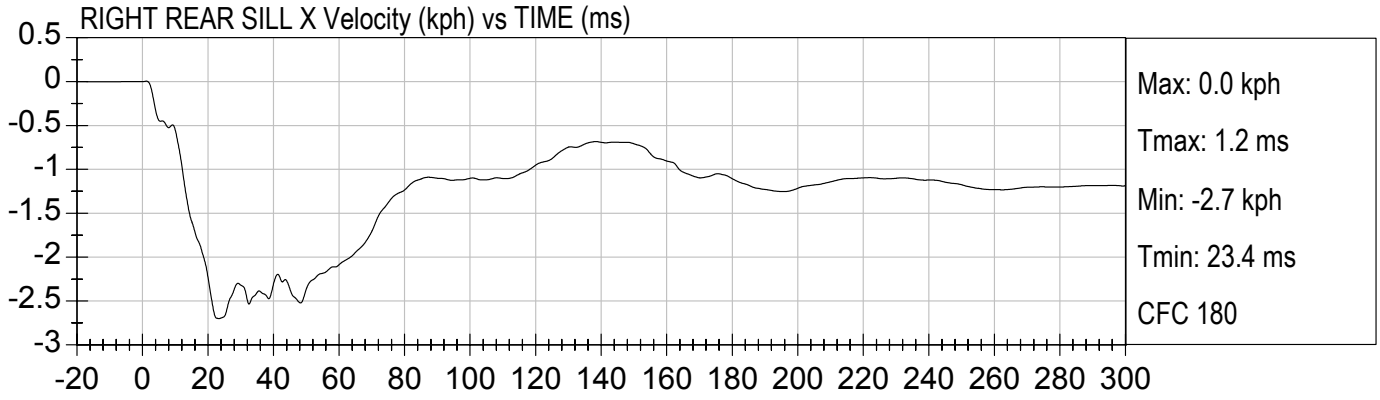

RIGHT FRONT SILL Z Velocity (kph) vs TIME (ms)
3
2
1
0
-1
-2
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 2.2 kph
Tmax: 171.9 ms
Min: -1.9 kph
Tmin: 27.9 ms
CFC 180

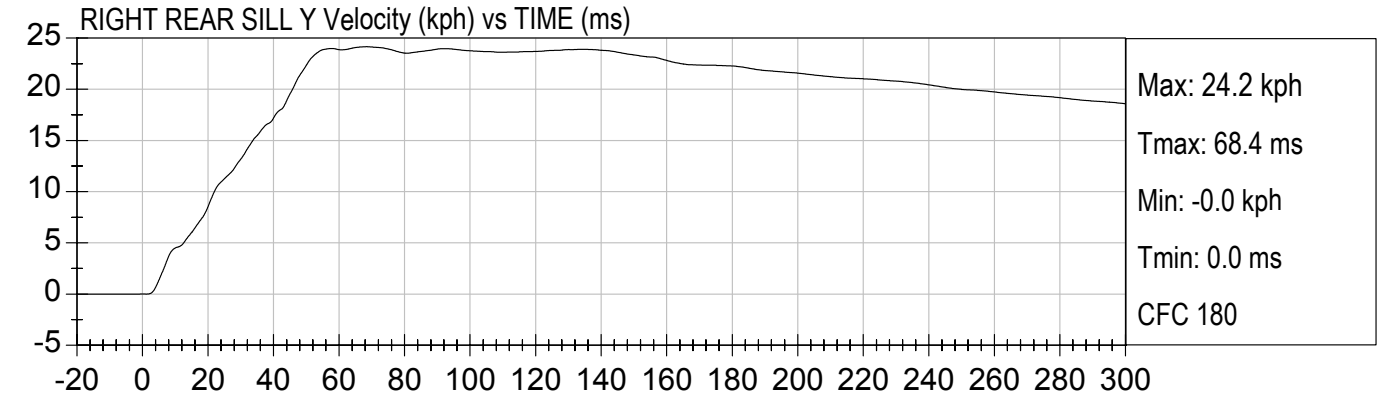

RIGHT REAR SILL X (G's) vs TIME (ms)
4
2
0
-2
-4
-6
-8
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 2.6 G's
Tmax: 26.4 ms
Min: -6.1 G's
Tmin: 12.6 ms
CFC 60

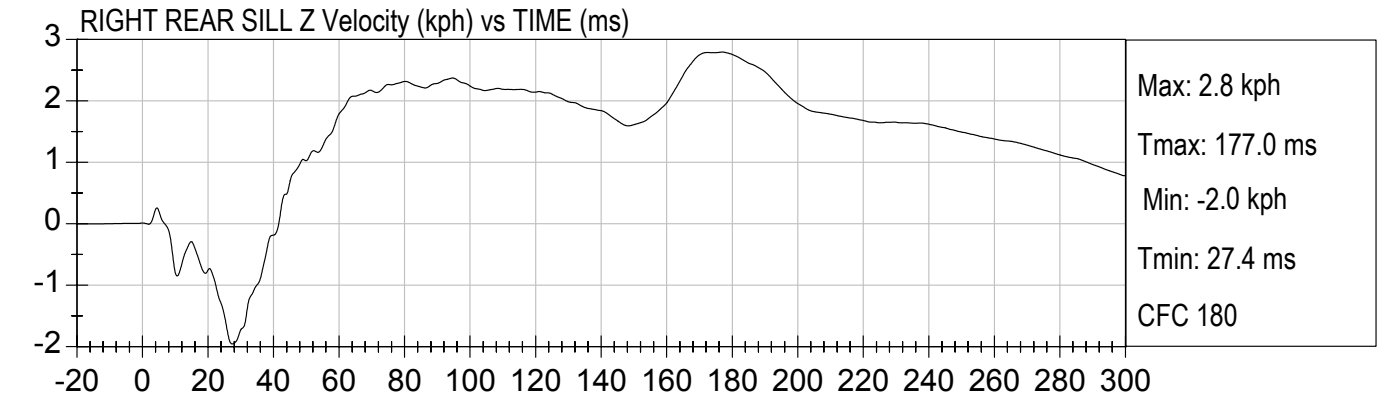

RIGHT REAR SILL Y (G's) vs TIME (ms)
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 21.1 G's
Tmax: 6.3 ms
Min: -2.5 G's
Tmin: 76.7 ms
CFC 60


RIGHT REAR SILL Z (G's) vs TIME (ms)
7.5
5
2.5
0
-2.5
-5
-7.5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 5.3 G's
Tmax: 42.3 ms
Min: -5.9 G's
Tmin: 24.6 ms
CFC 60


RIGHT REAR SILL Resultant (G's) vs TIME (ms)
25
20
15
10
5
0
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 21.4 G's
Tmax: 6.3 ms
Min: 0.0 G's
Tmin: 0.0 ms
CFC 60

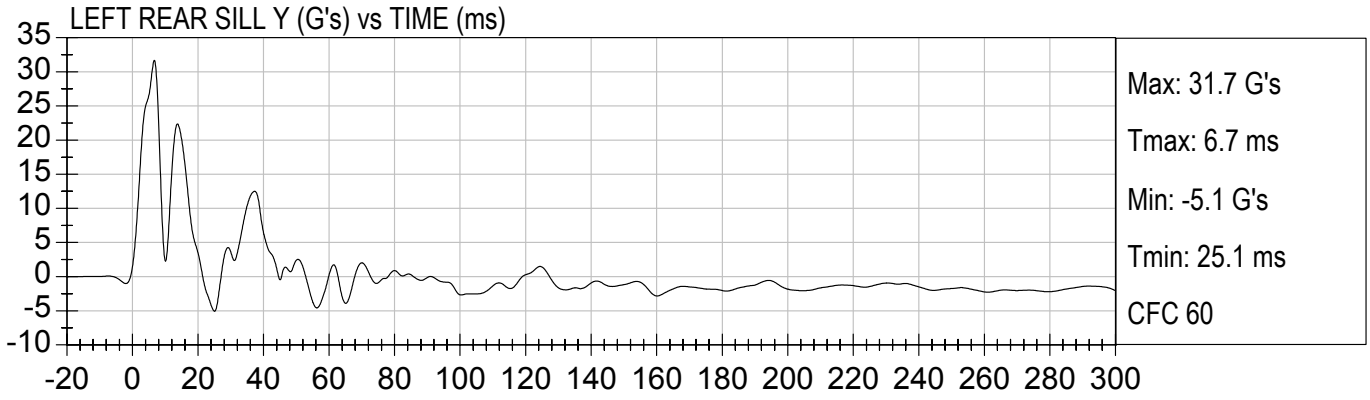

RIGHT REAR SILL X Velocity (kph) vs TIME (ms)
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.0 kph
Tmax: 1.2 ms
Min: -2.7 kph
Tmin: 23.4 ms
CFC 180

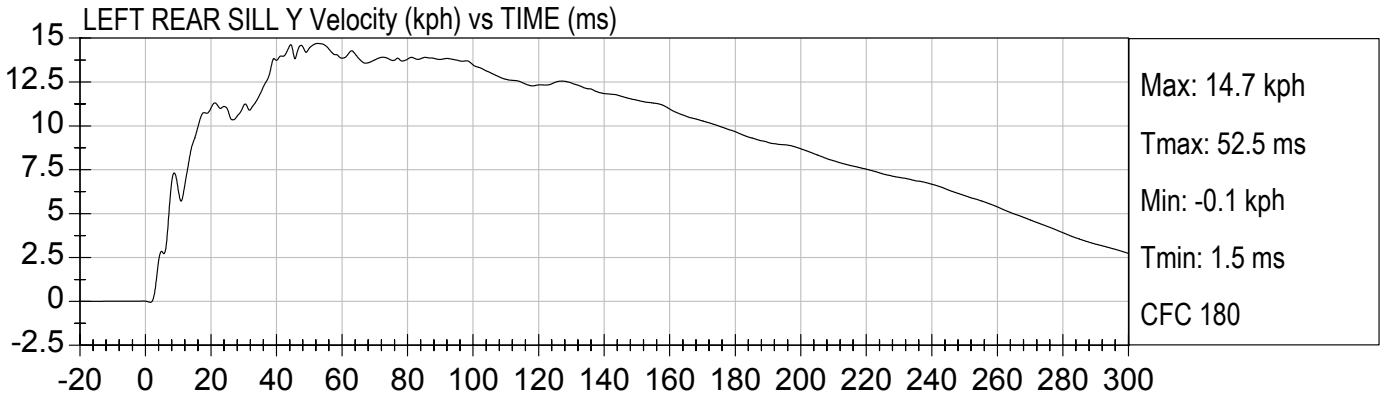

RIGHT REAR SILL Y Velocity (kph) vs TIME (ms)
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 24.2 kph
Tmax: 68.4 ms
Min: -0.0 kph
Tmin: 0.0 ms
CFC 180

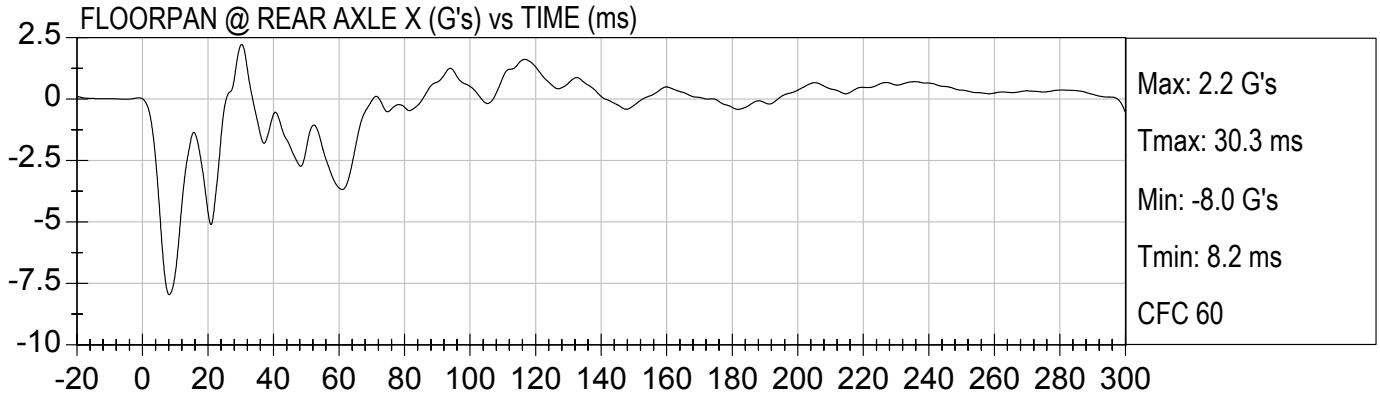

RIGHT REAR SILL Z Velocity (kph) vs TIME (ms)
3
2
1
0
-1
-2
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 2.8 kph
Tmax: 177.0 ms
Min: -2.0 kph
Tmin: 27.4 ms
CFC 180

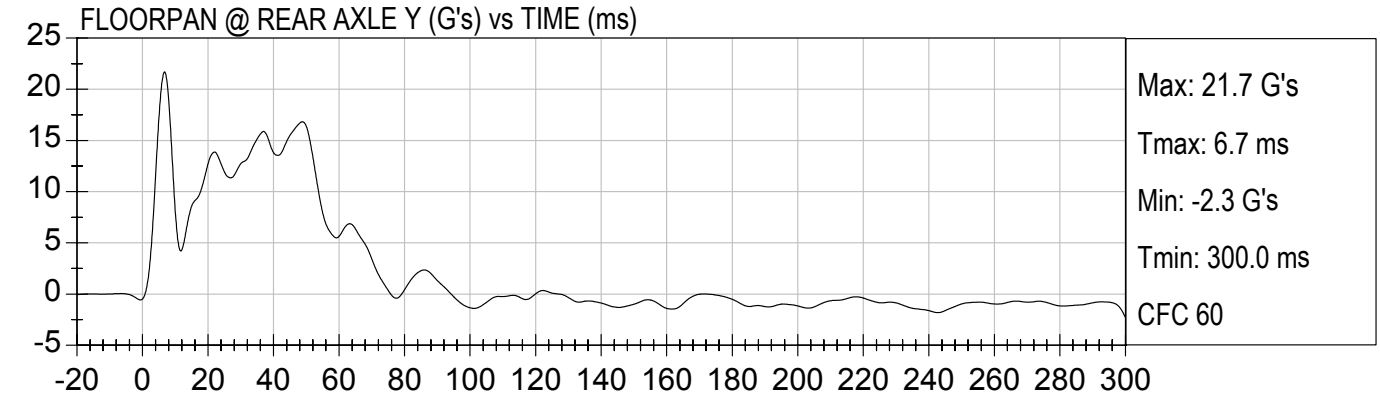
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

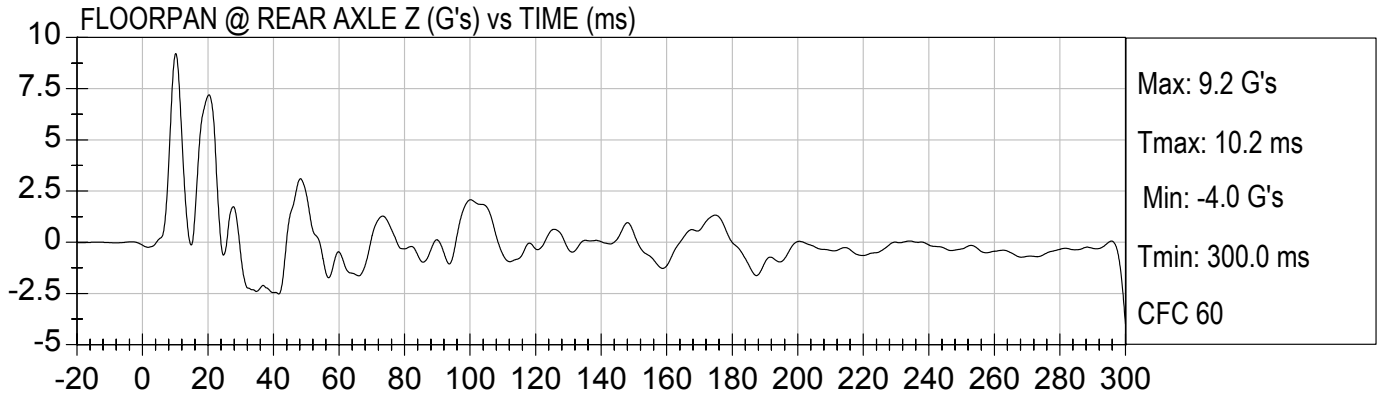
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

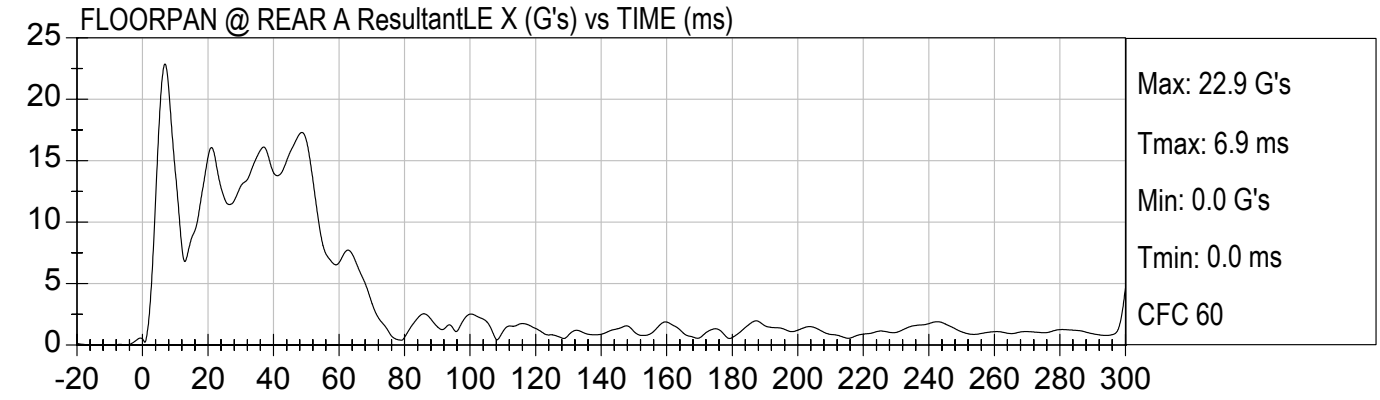


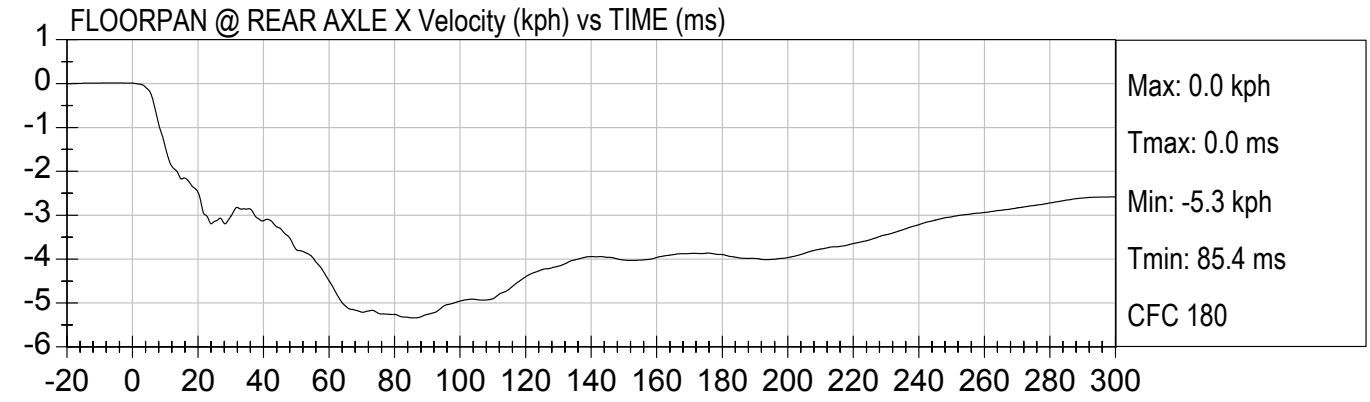


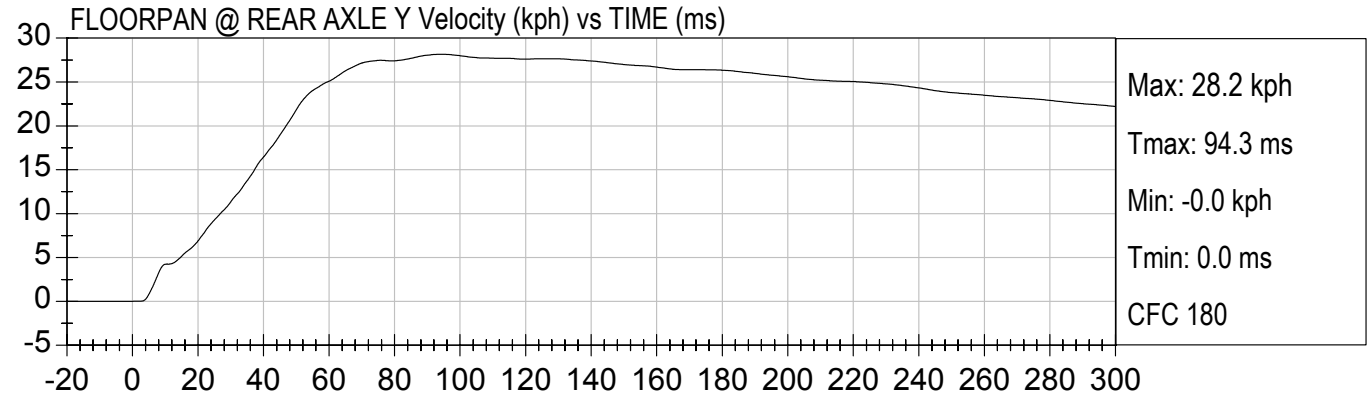

FLOORPAN @ REAR AXLE X (G's) vs TIME (ms)
2.5
0
-2.5
-5
-7.5
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 2.2 G's
Tmax: 30.3 ms
Min: -8.0 G's
Tmin: 8.2 ms
CFC 60

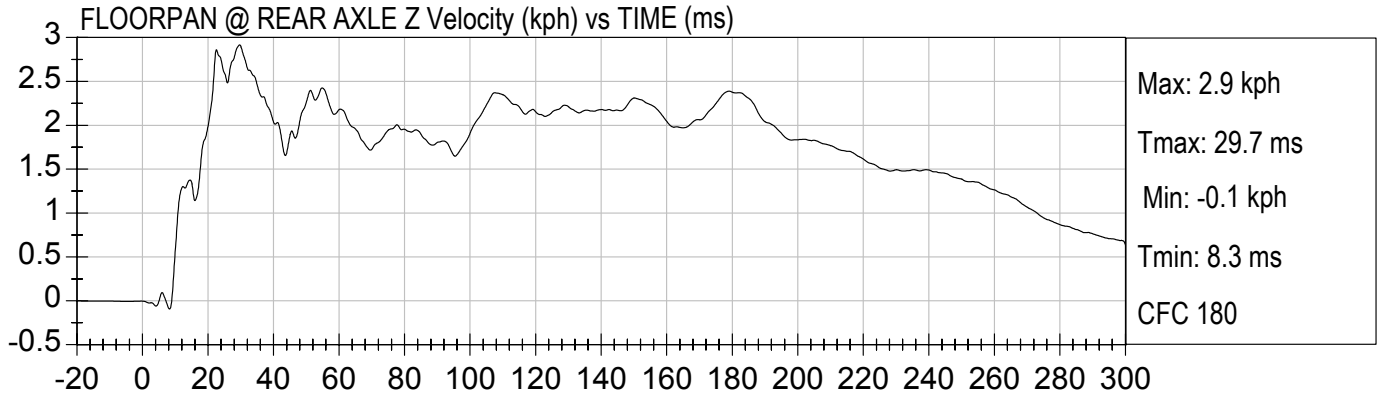

FLOORPAN @ REAR AXLE Y (G's) vs TIME (ms)
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 21.7 G's
Tmax: 6.7 ms
Min: -2.3 G's
Tmin: 300.0 ms
CFC 60


FLOORPAN @ REAR AXLE Z (G's) vs TIME (ms)
10
7.5
5
2.5
0
-2.5
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 9.2 G's
Tmax: 10.2 ms
Min: -4.0 G's
Tmin: 300.0 ms
CFC 60


FLOORPAN @ REAR A ResultantLE X (G's) vs TIME (ms)
25
20
15
10
5
0
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 22.9 G's
Tmax: 6.9 ms
Min: 0.0 G's
Tmin: 0.0 ms
CFC 60

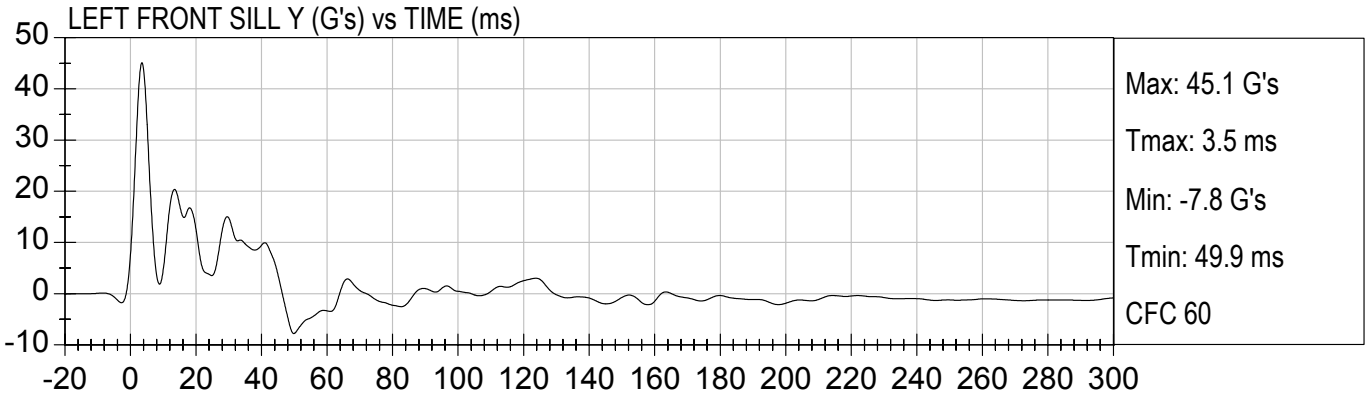

FLOORPAN @ REAR AXLE X Velocity (kph) vs TIME (ms)
1
0
-1
-2
-3
-4
-5
-6
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.0 kph
Tmax: 0.0 ms
Min: -5.3 kph
Tmin: 85.4 ms
CFC 180

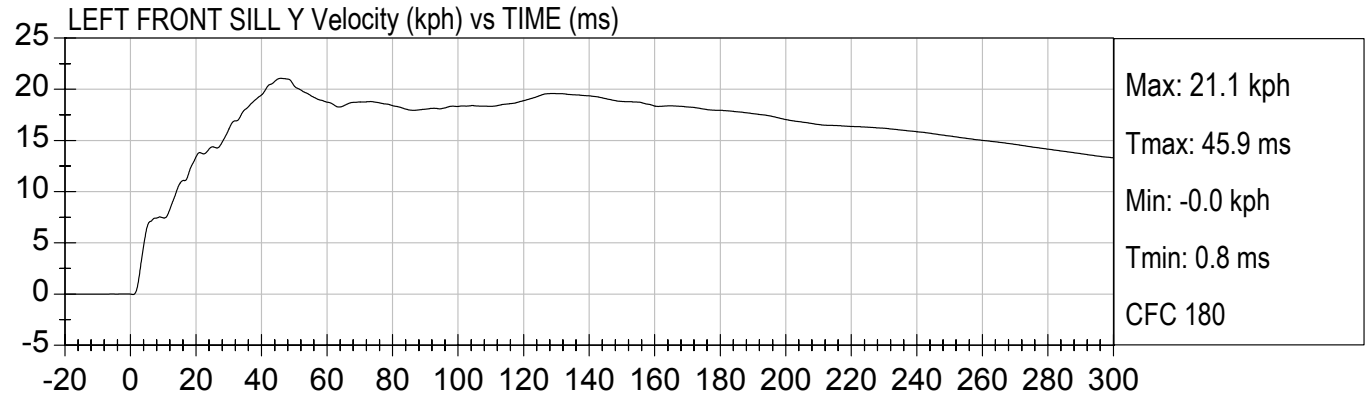

FLOORPAN @ REAR AXLE Y Velocity (kph) vs TIME (ms)
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 28.2 kph
Tmax: 94.3 ms
Min: -0.0 kph
Tmin: 0.0 ms
CFC 180

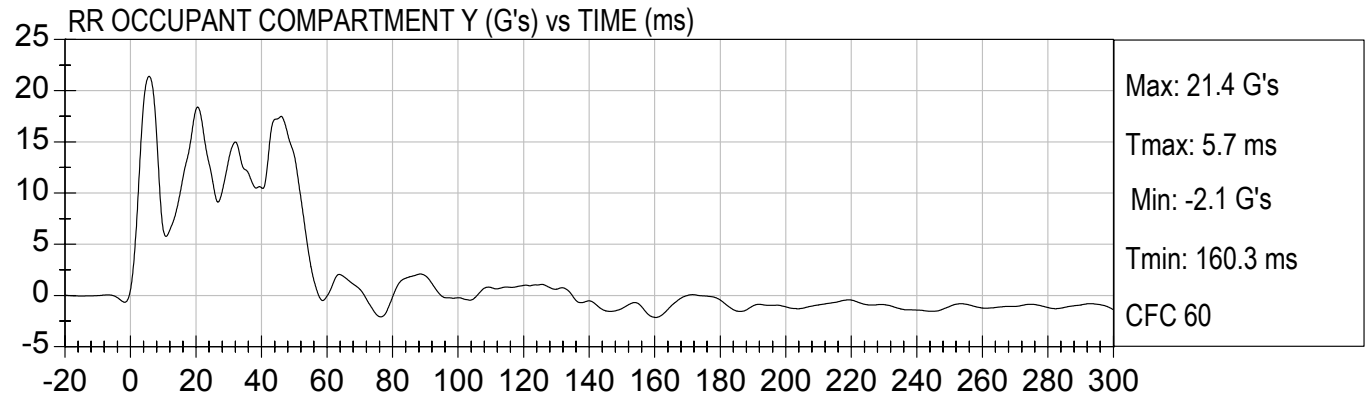

FLOORPAN @ REAR AXLE Z Velocity (kph) vs TIME (ms)
3
2.5
2
1.5
1
0.5
0
-0.5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 2.9 kph
Tmax: 29.7 ms
Min: -0.1 kph
Tmin: 8.3 ms
CFC 180

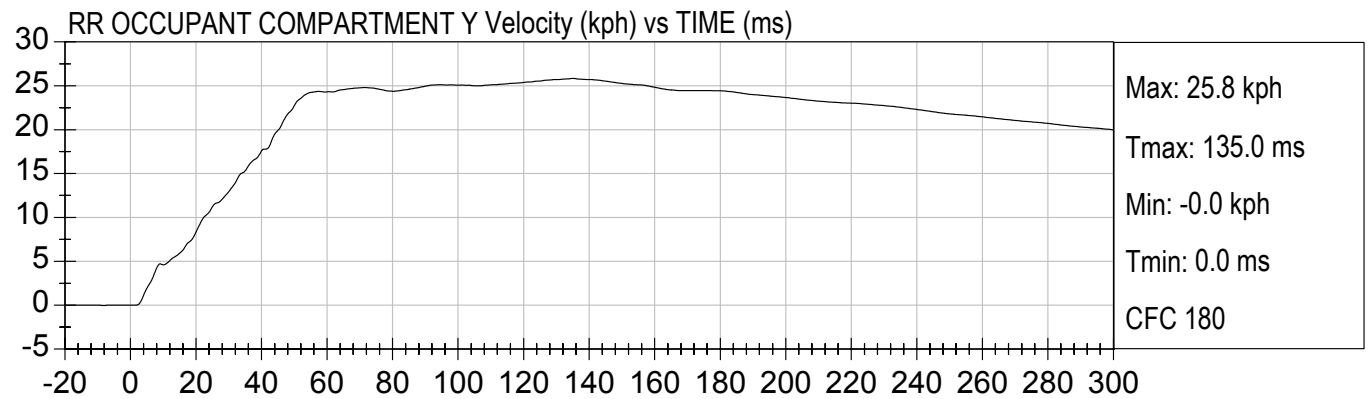
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

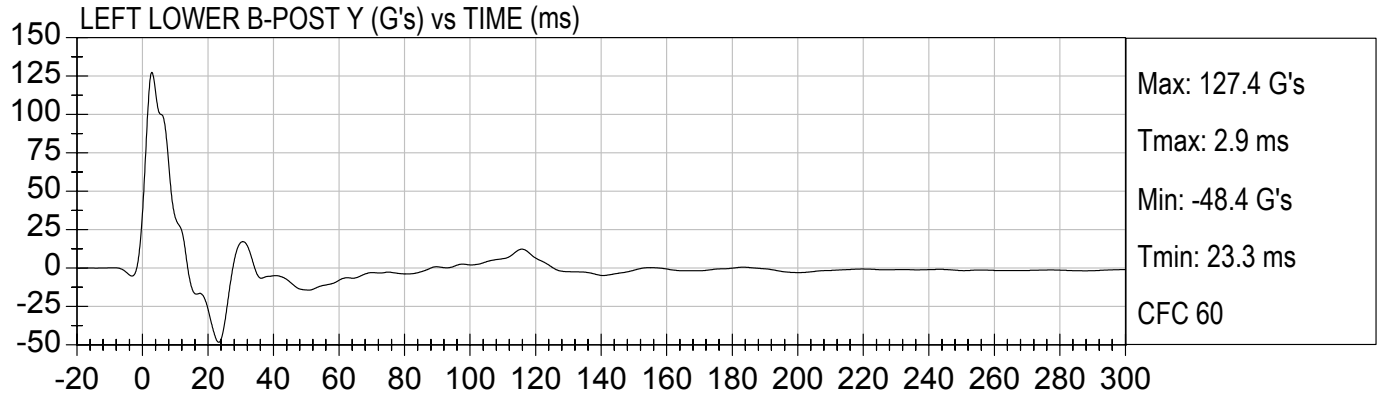
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

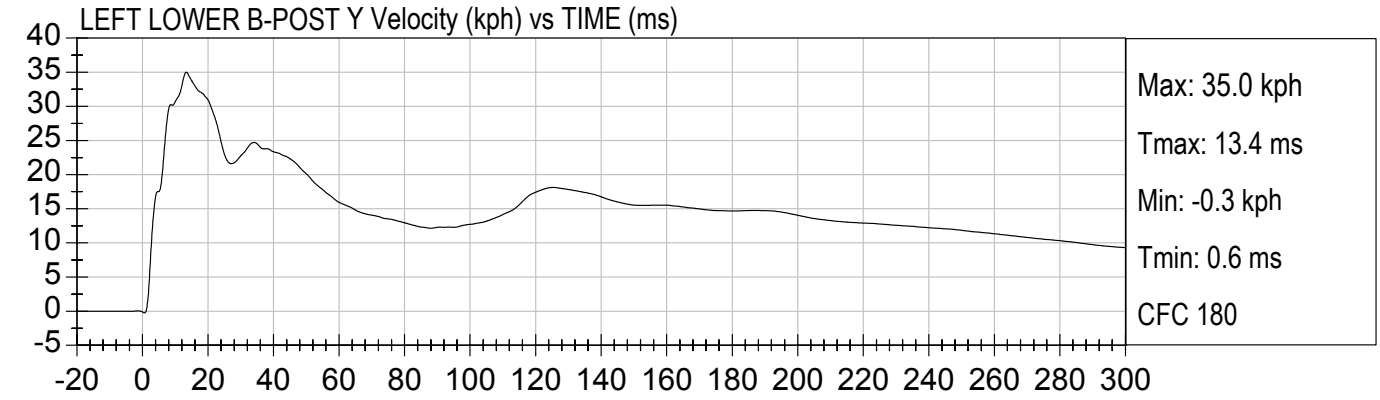


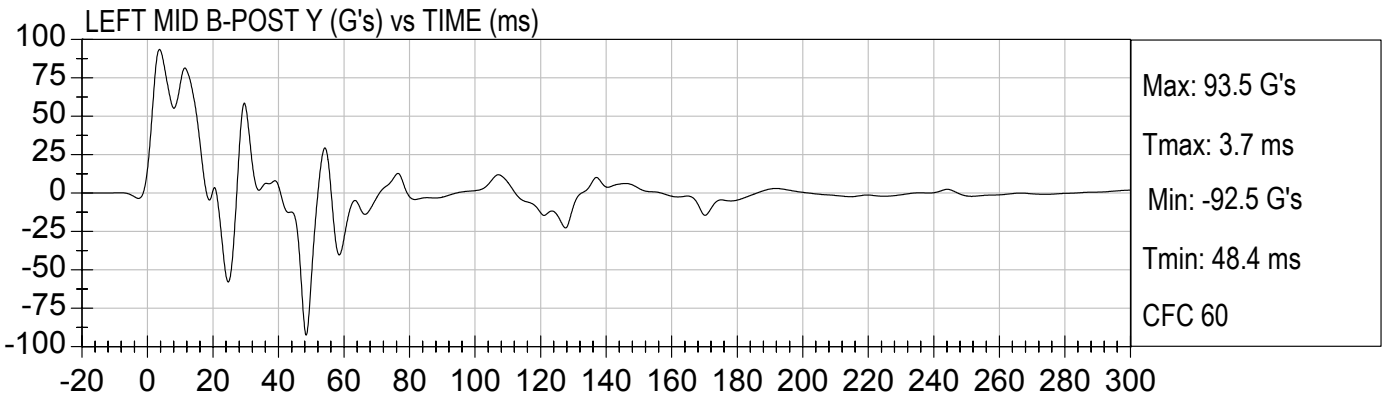


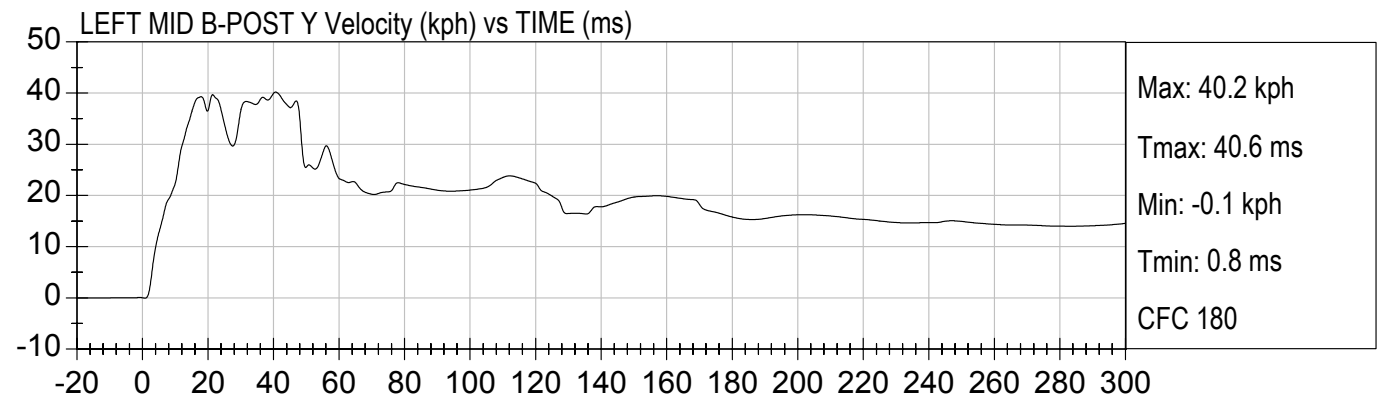


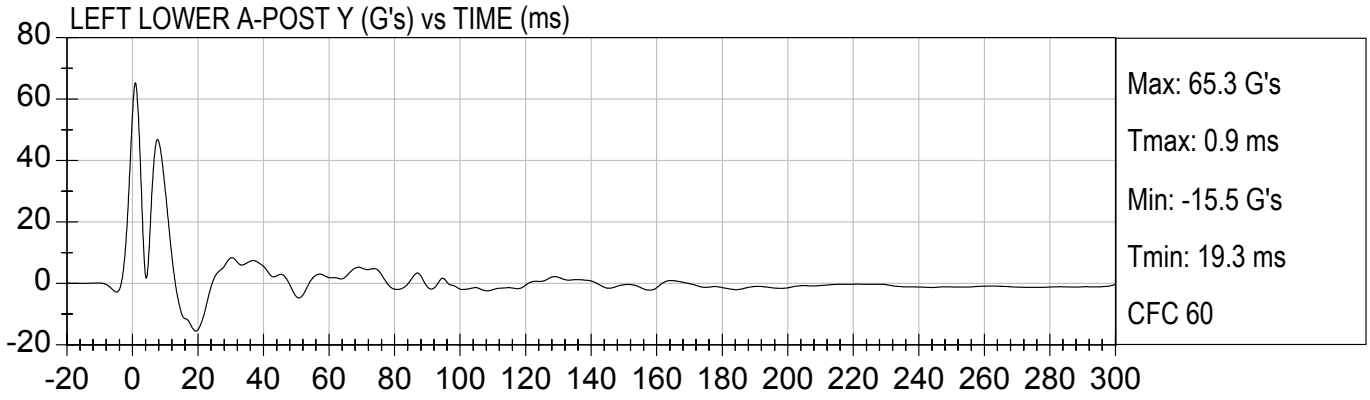


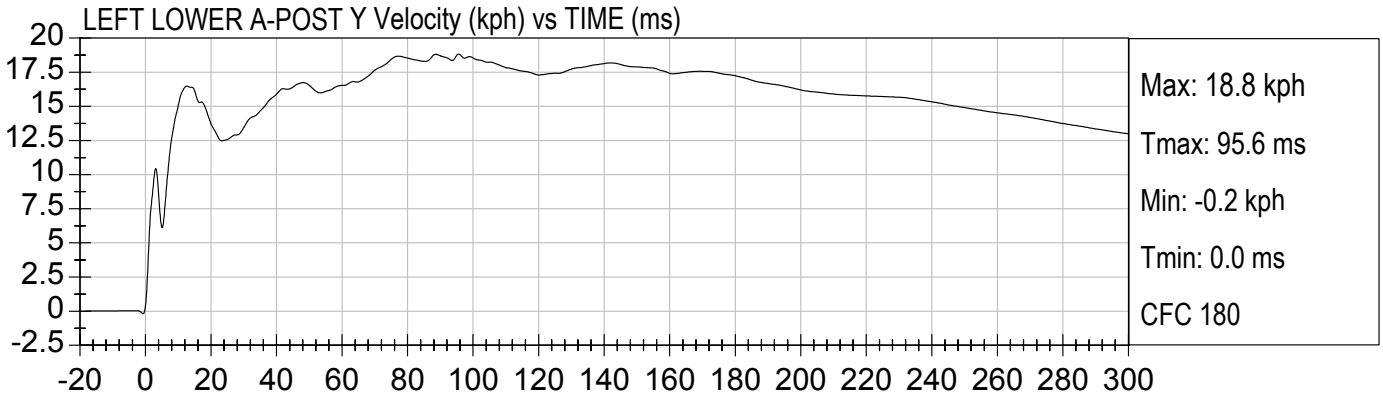

LEFT LOWER B-POST Y (G's) vs TIME (ms)
Max: 127.4 G's
Tmax: 2.9 ms
Min: -48.4 G's
Tmin: 23.3 ms
CFC 60

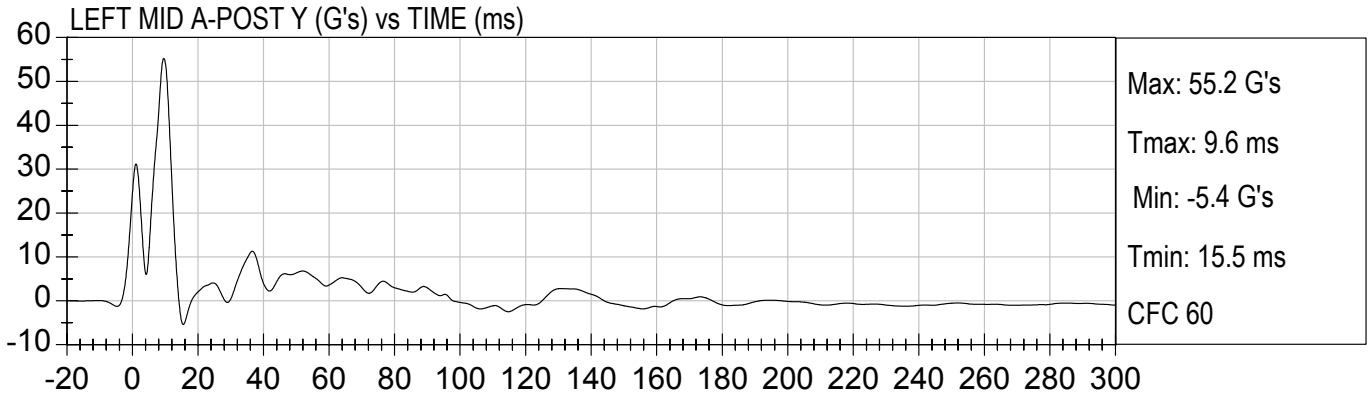

LEFT LOWER B-POST Y Velocity (kph) vs TIME (ms)
Max: 35.0 kph
Tmax: 13.4 ms
Min: -0.3 kph
Tmin: 0.6 ms
CFC 180

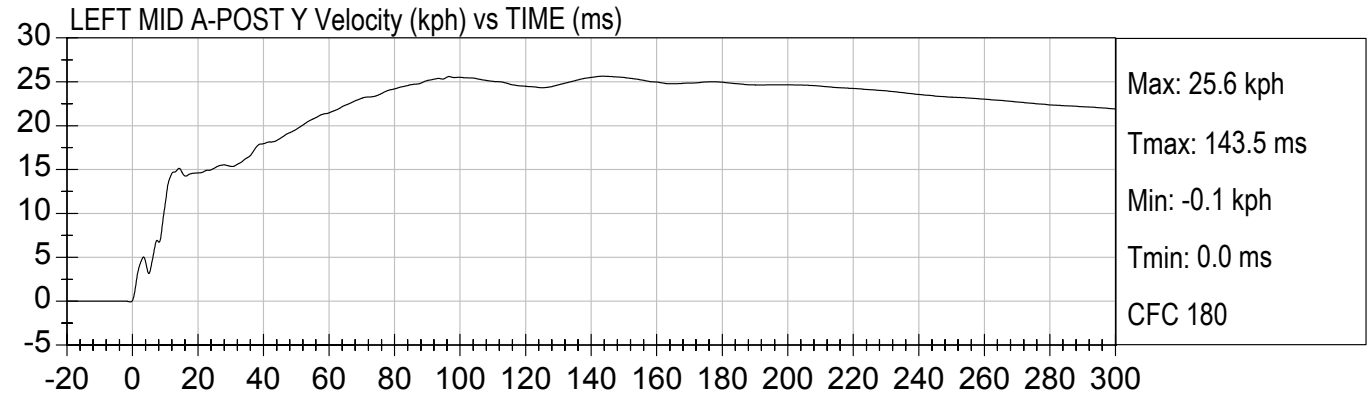

LEFT MID B-POST Y (G's) vs TIME (ms)
Max: 93.5 G's
Tmax: 3.7 ms
Min: -92.5 G's
Tmin: 48.4 ms
CFC 60


LEFT MID B-POST Y Velocity (kph) vs TIME (ms)
Max: 40.2 kph
Tmax: 40.6 ms
Min: -0.1 kph
Tmin: 0.8 ms
CFC 180


LEFT LOWER A-POST Y (G's) vs TIME (ms)
Max: 65.3 G's
Tmax: 0.9 ms
Min: -15.5 G's
Tmin: 19.3 ms
CFC 60

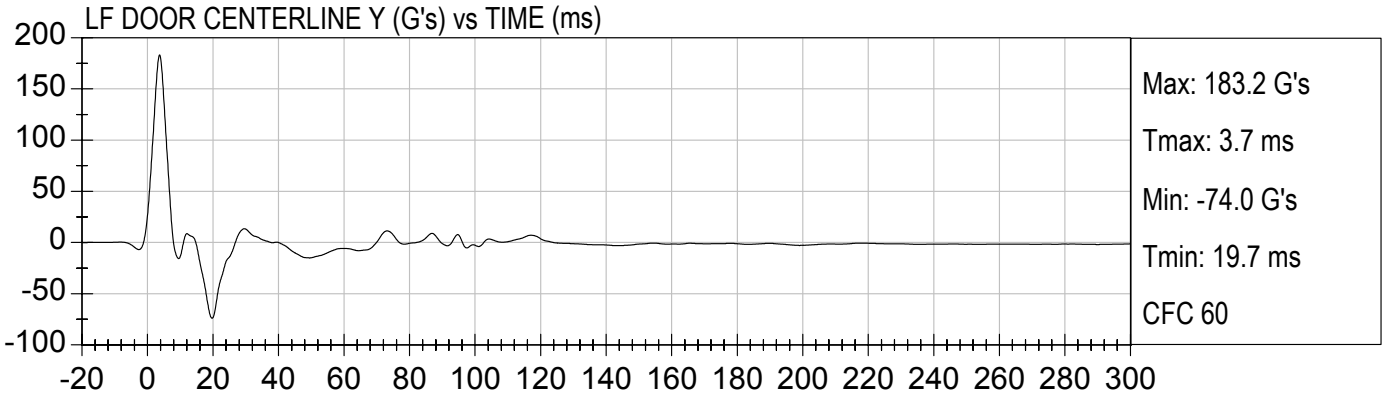

LEFT LOWER A-POST Y Velocity (kph) vs TIME (ms)
Max: 18.8 kph
Tmax: 95.6 ms
Min: -0.2 kph
Tmin: 0.0 ms
CFC 180

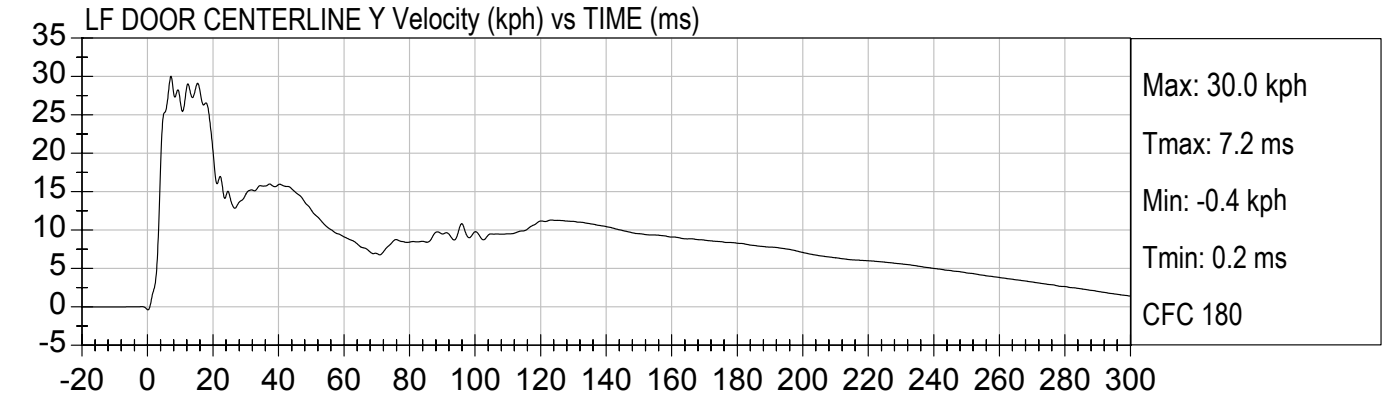

LEFT MID A-POST Y (G's) vs TIME (ms)
Max: 55.2 G's
Tmax: 9.6 ms
Min: -5.4 G's
Tmin: 15.5 ms
CFC 60

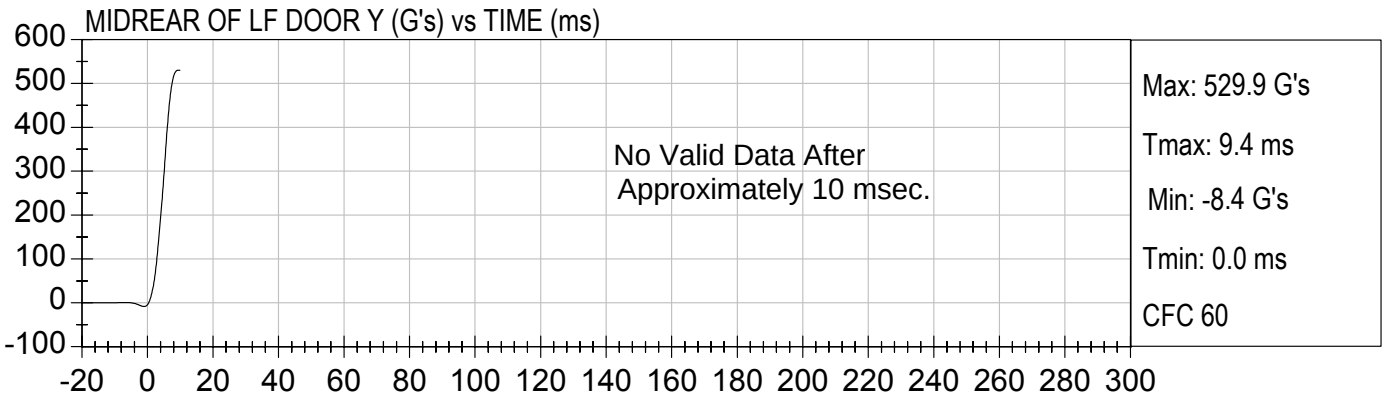

LEFT MID A-POST Y Velocity (kph) vs TIME (ms)
Max: 25.6 kph
Tmax: 143.5 ms
Min: -0.1 kph
Tmin: 0.0 ms
CFC 180

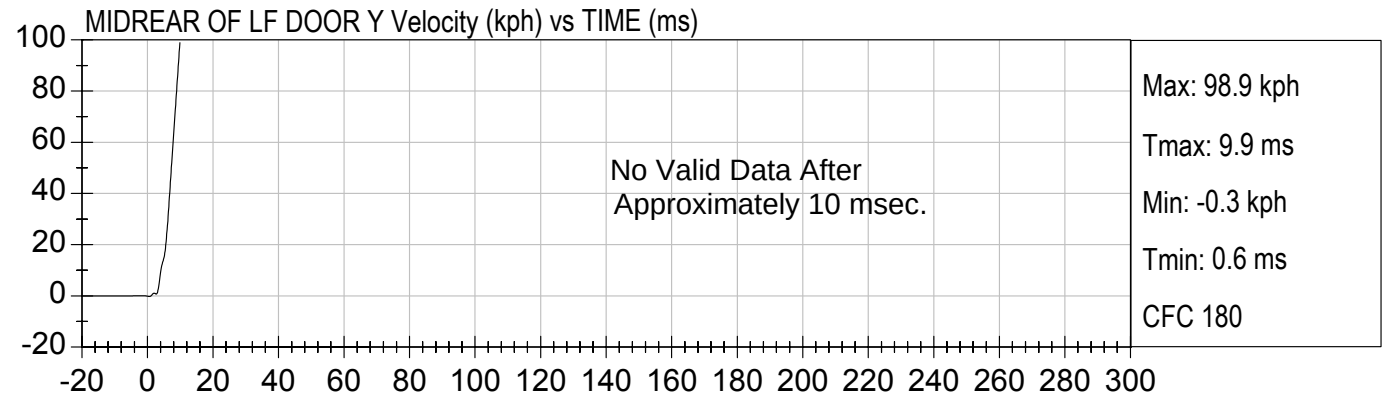
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)



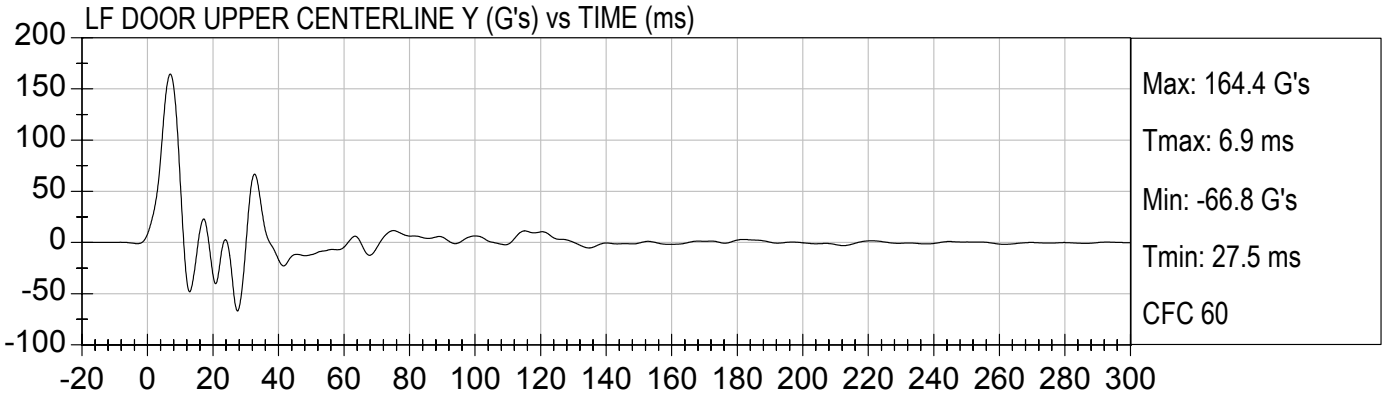


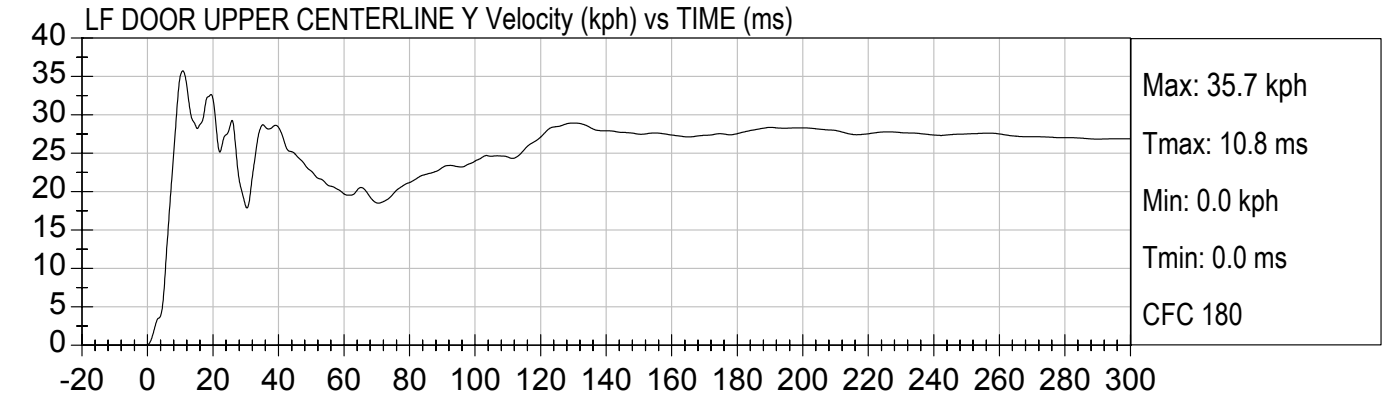


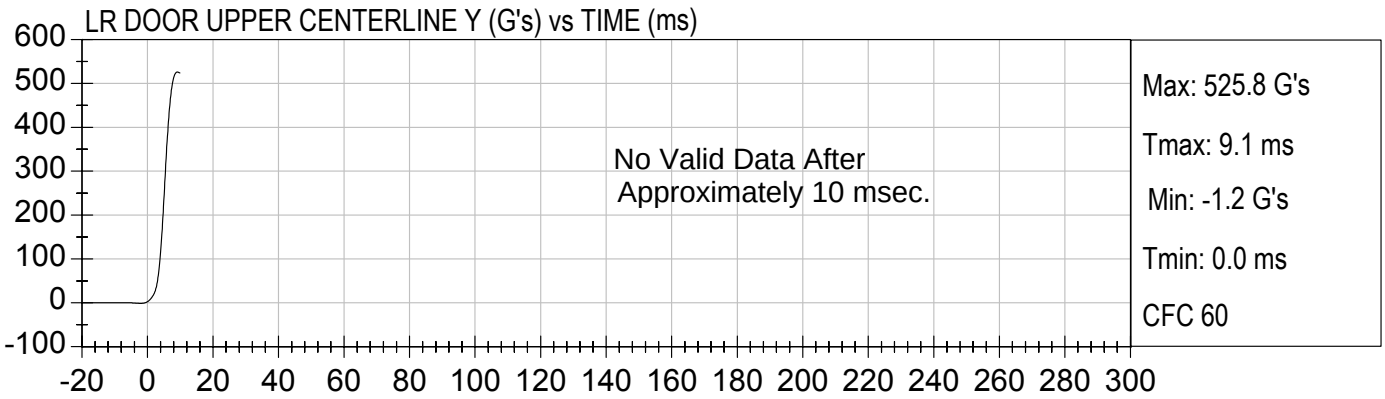


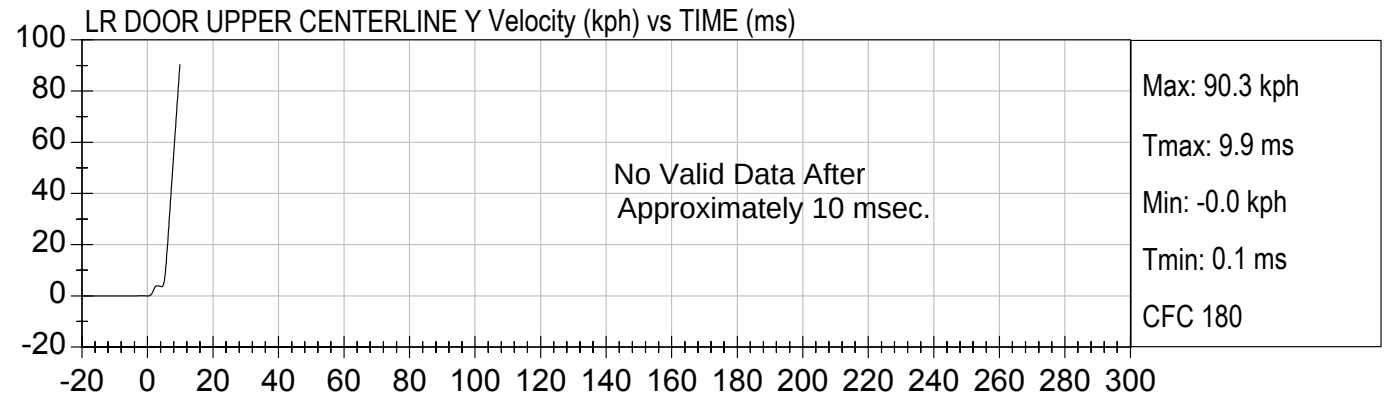
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

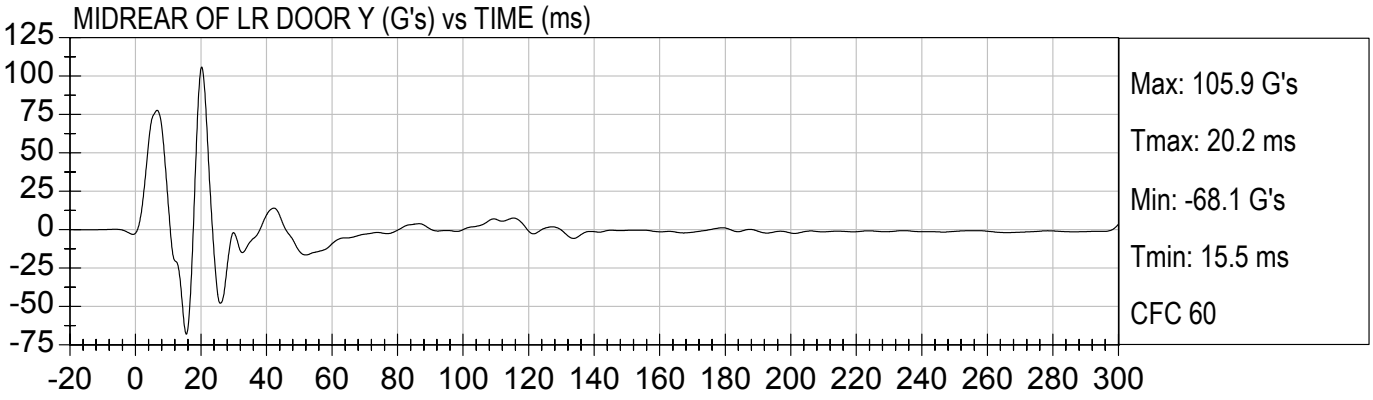
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

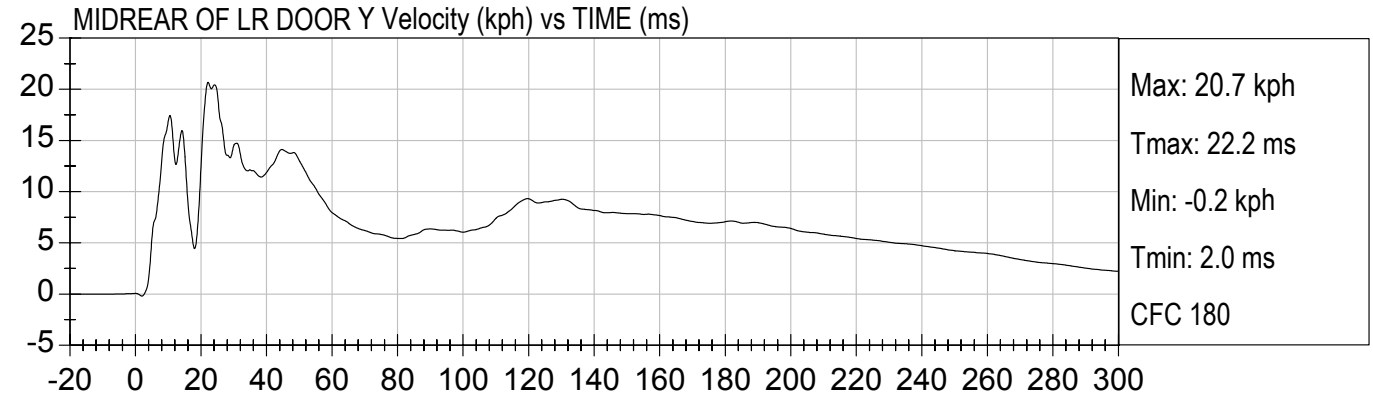


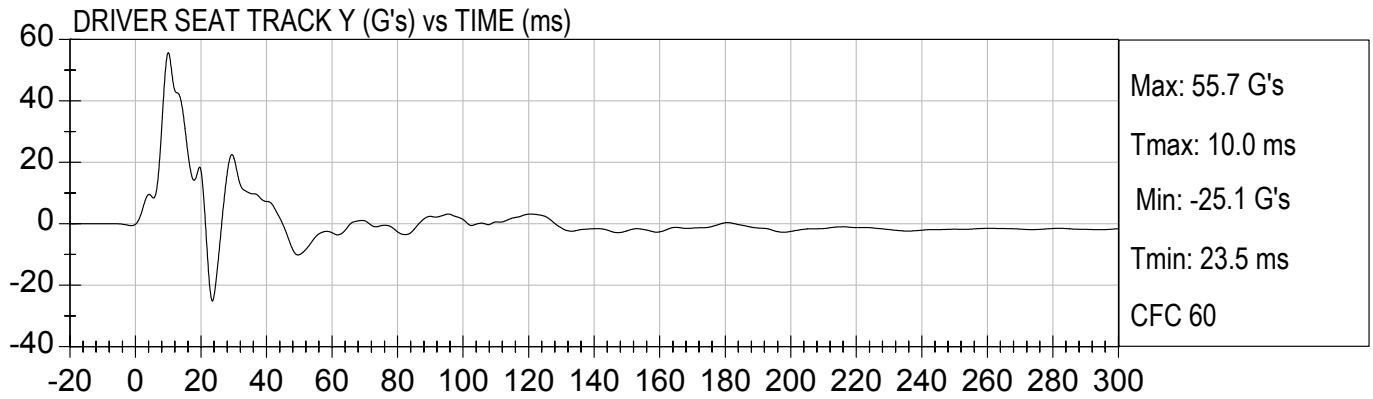


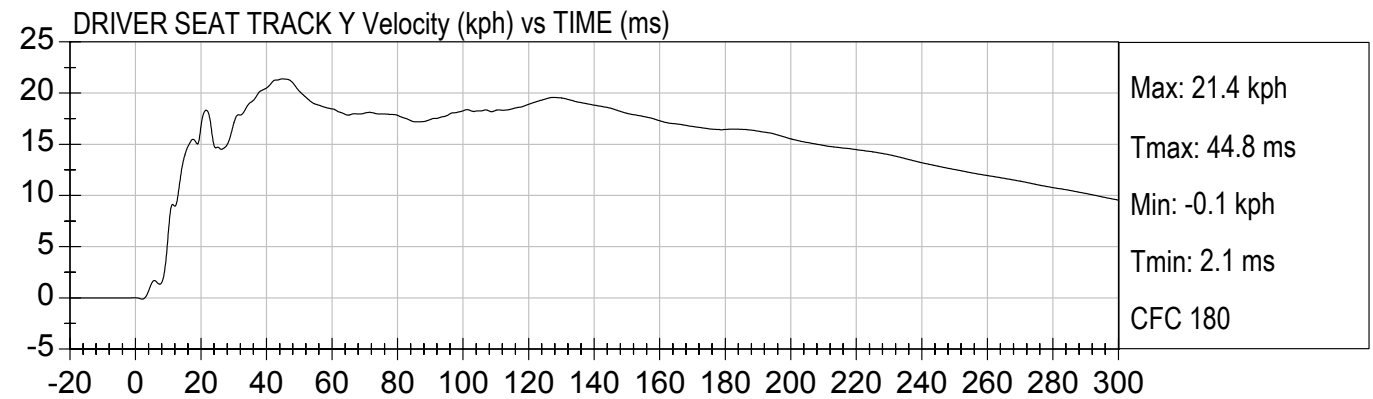





MIDREAR OF LR DOOR Y (G's) vs TIME (ms)
125
100
75
50
25
0
-25
-50
-75
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 105.9 G's
Tmax: 20.2 ms
Min: -68.1 G's
Tmin: 15.5 ms
CFC 60

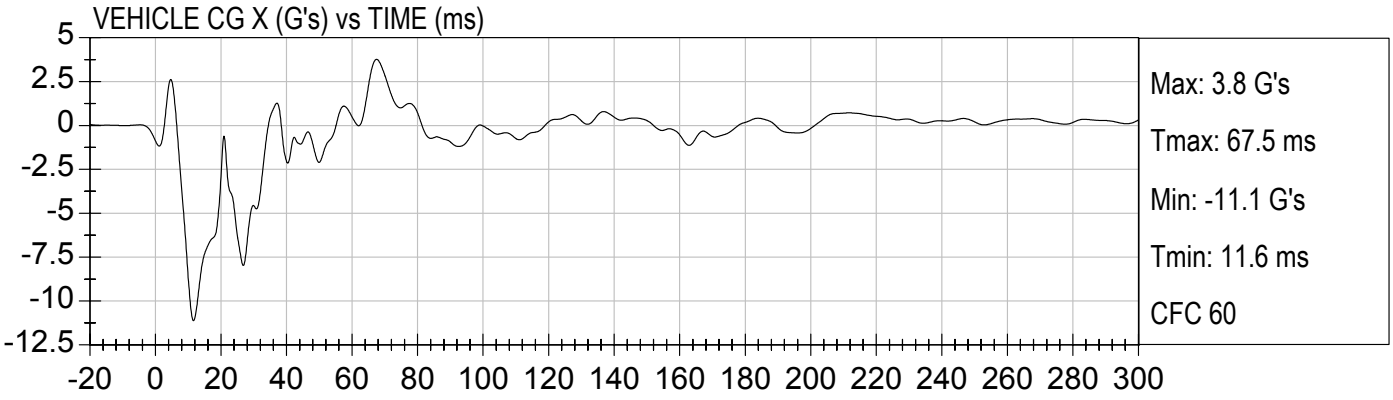

MIDREAR OF LR DOOR Y Velocity (kph) vs TIME (ms)
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 20.7 kph
Tmax: 22.2 ms
Min: -0.2 kph
Tmin: 2.0 ms
CFC 180

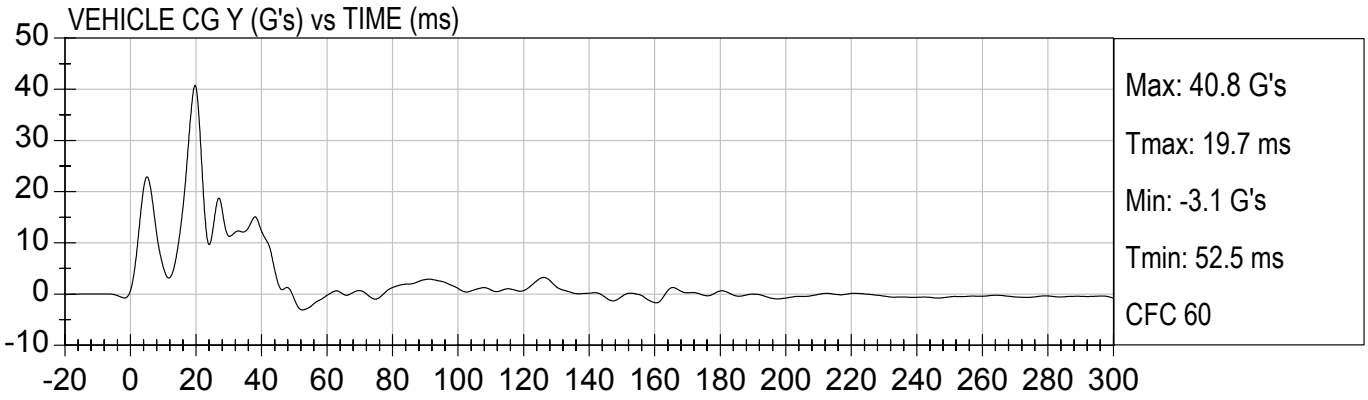

DRIVER SEAT TRACK Y (G's) vs TIME (ms)
60
40
20
0
-20
-40
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 55.7 G's
Tmax: 10.0 ms
Min: -25.1 G's
Tmin: 23.5 ms
CFC 60

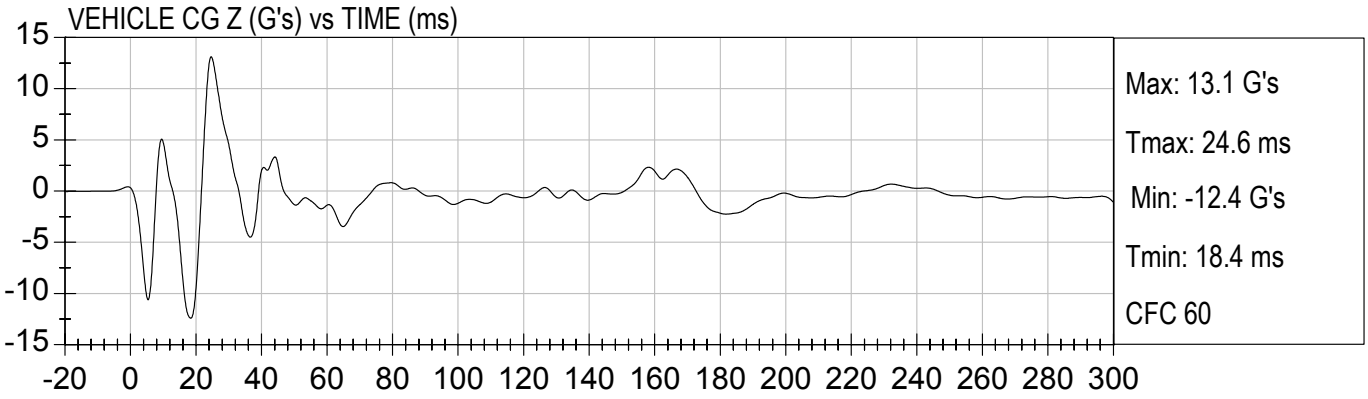

DRIVER SEAT TRACK Y Velocity (kph) vs TIME (ms)
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 21.4 kph
Tmax: 44.8 ms
Min: -0.1 kph
Tmin: 2.1 ms
CFC 180

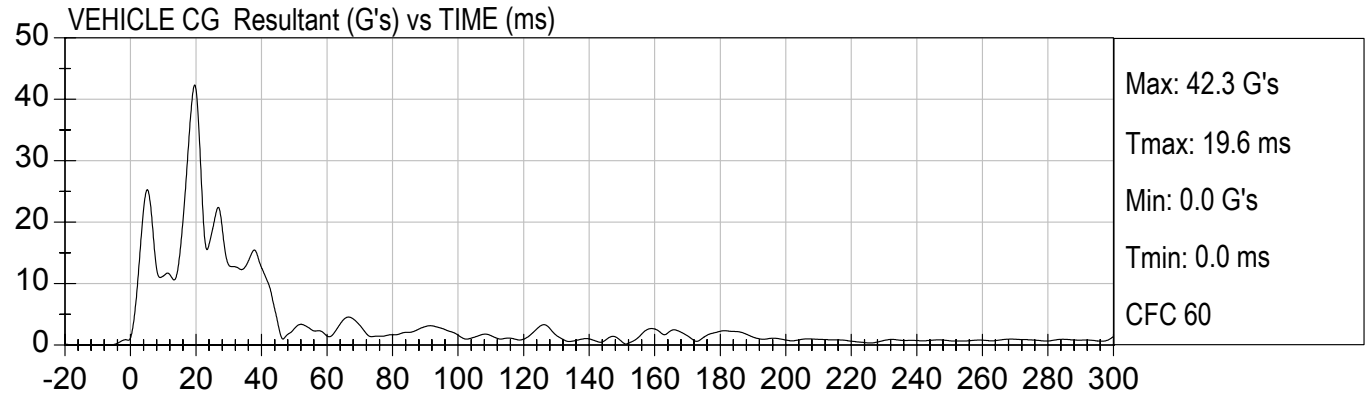
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

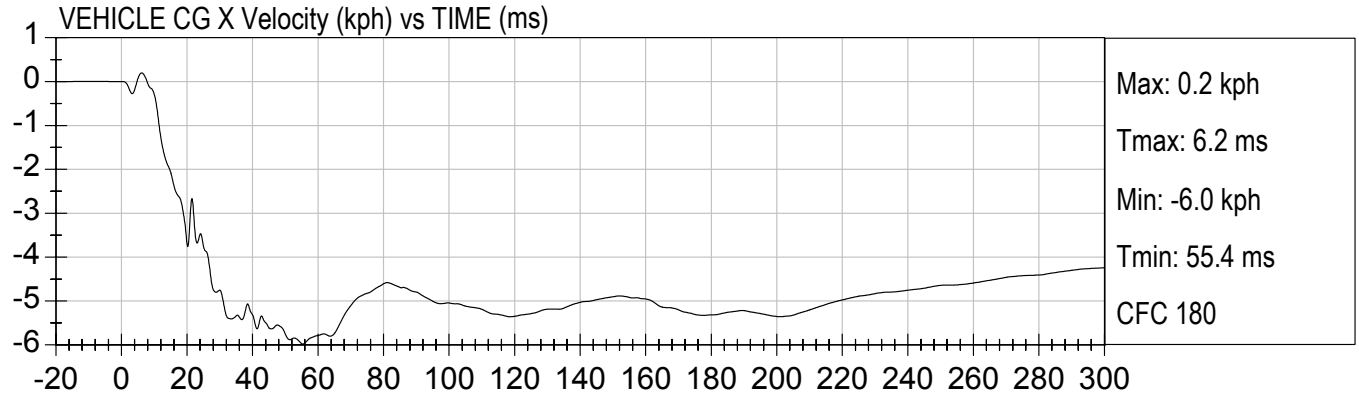
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

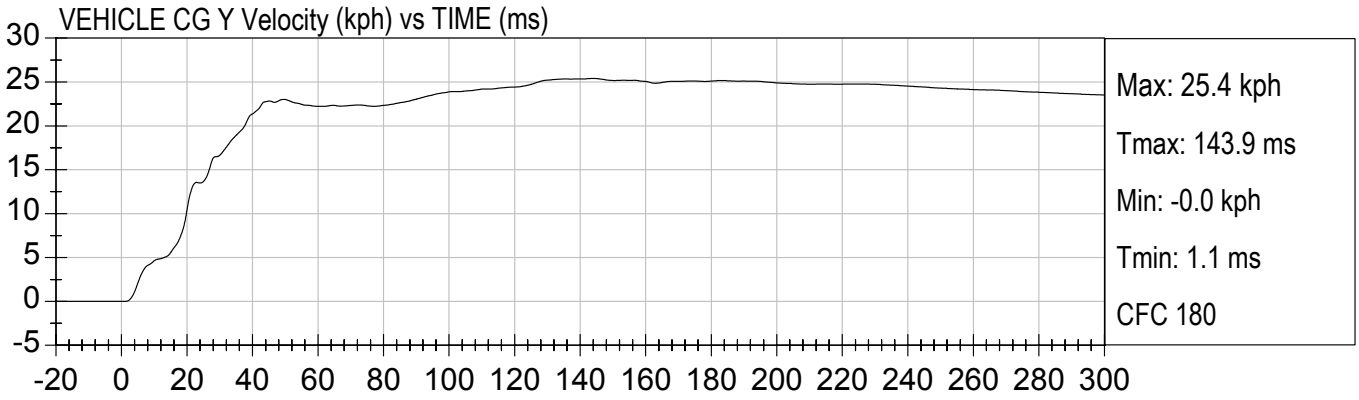


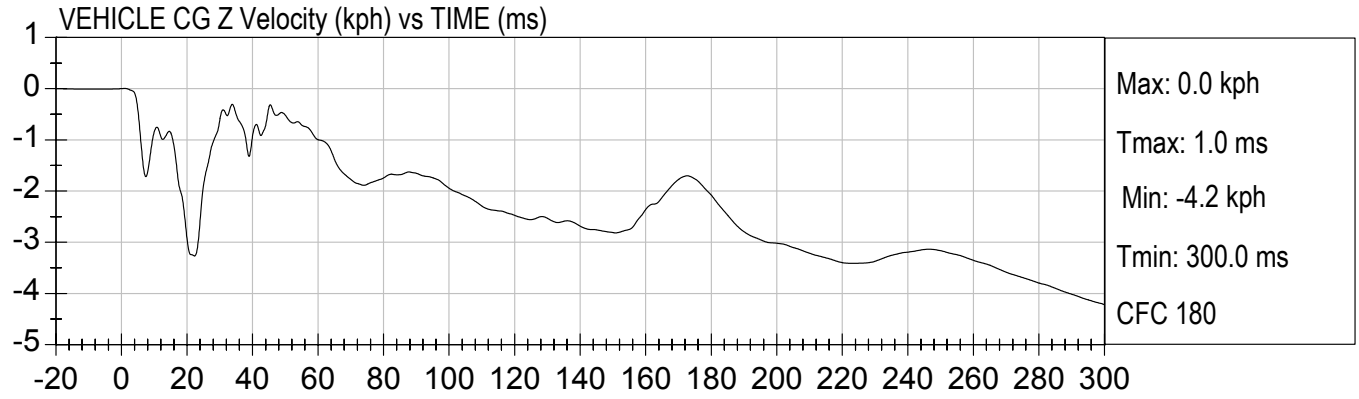






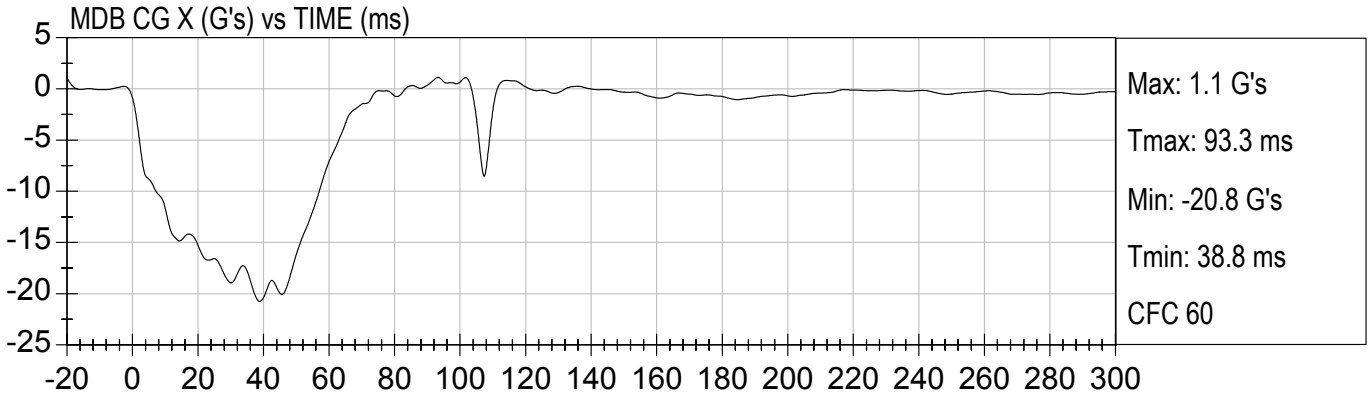

VEHICLE CG X Velocity (kph) vs TIME (ms)
1
0
-1
-2
-3
-4
-5
-6
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.2 kph
Tmax: 6.2 ms
Min: -6.0 kph
Tmin: 55.4 ms
CFC 180

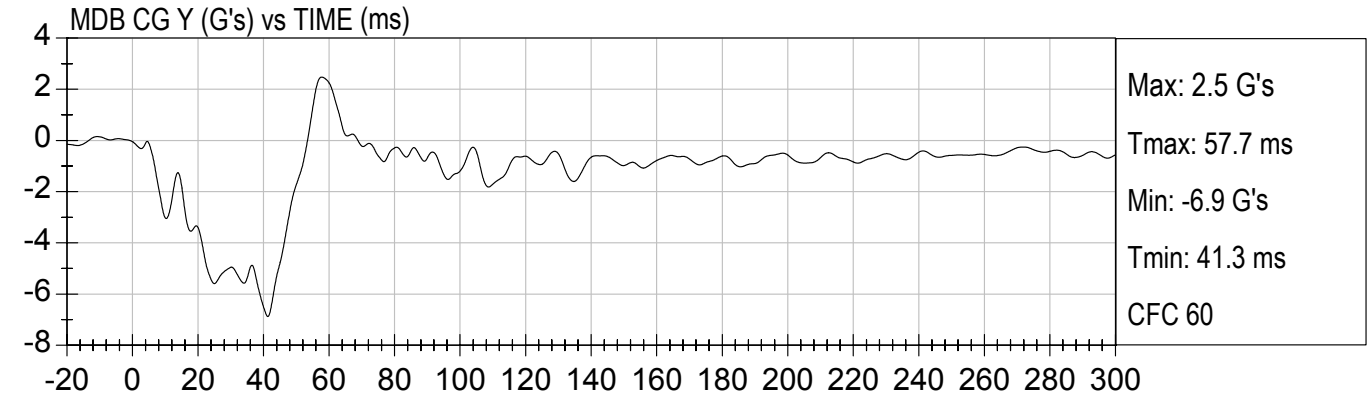

VEHICLE CG Y Velocity (kph) vs TIME (ms)
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 25.4 kph
Tmax: 143.9 ms
Min: -0.0 kph
Tmin: 1.1 ms
CFC 180

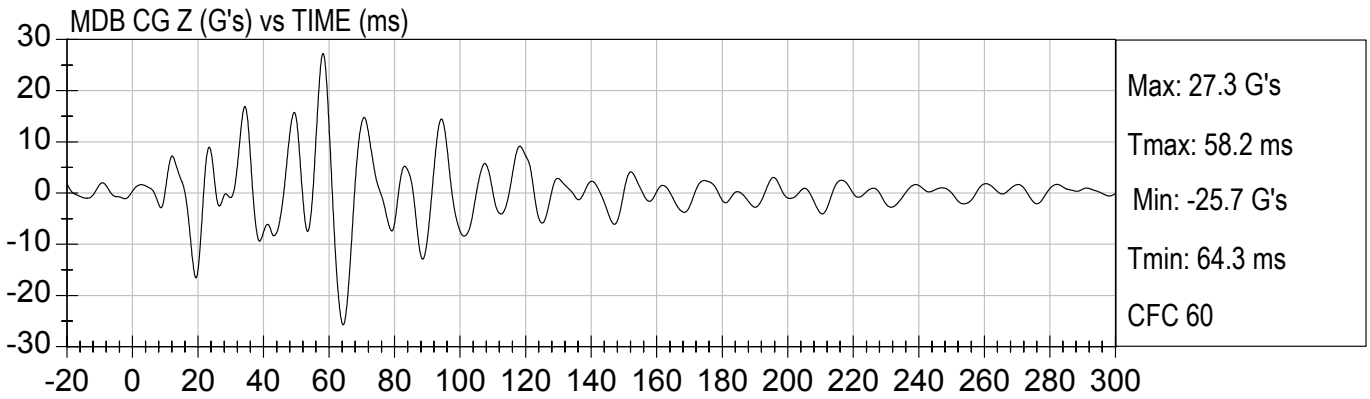

VEHICLE CG Z Velocity (kph) vs TIME (ms)
1
0
-1
-2
-3
-4
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.0 kph
Tmax: 1.0 ms
Min: -4.2 kph
Tmin: 300.0 ms
CFC 180

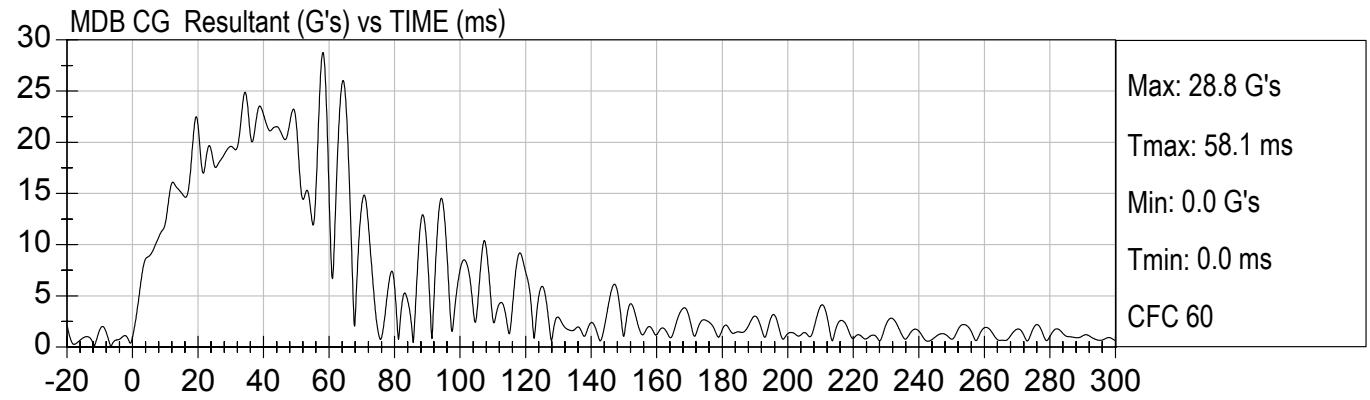
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)



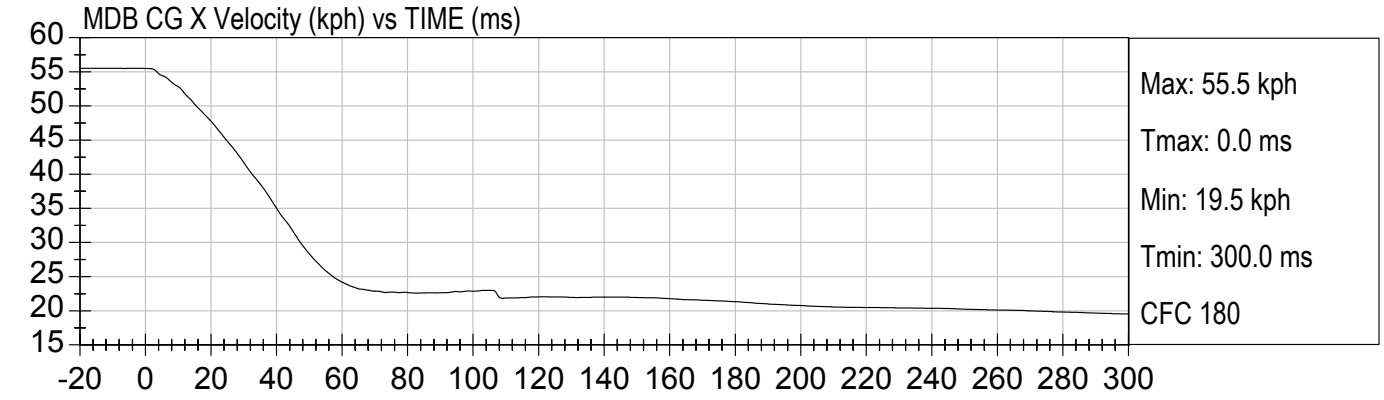


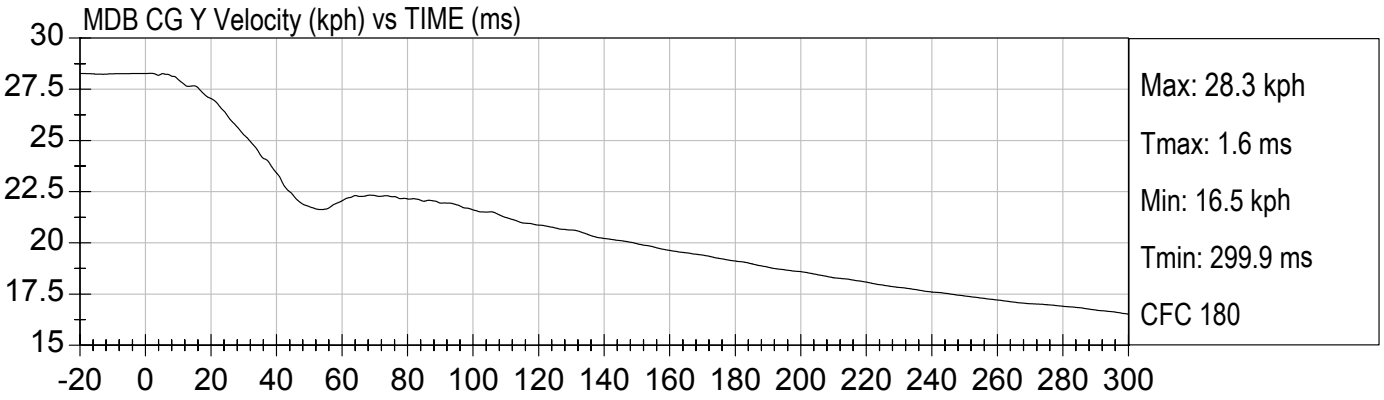


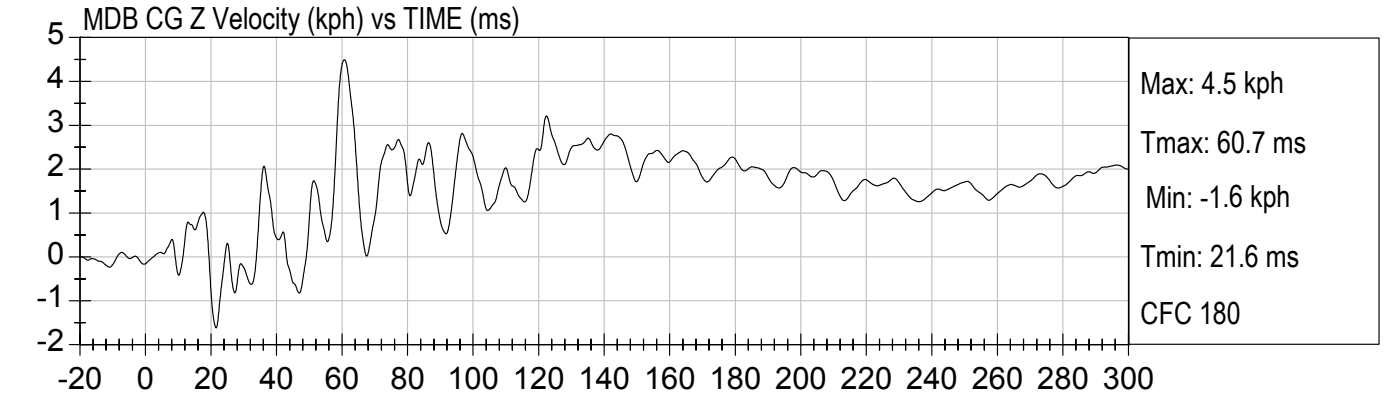


NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

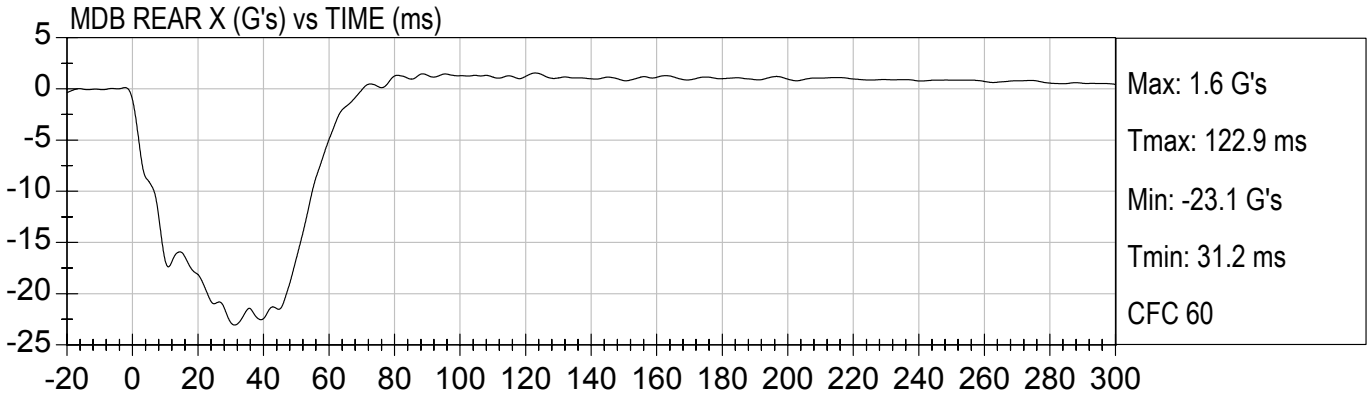


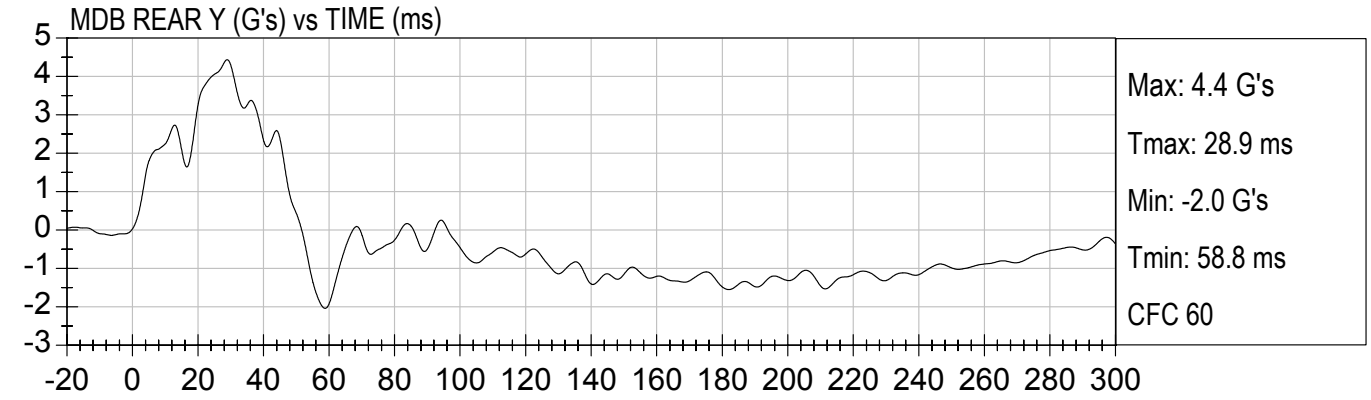


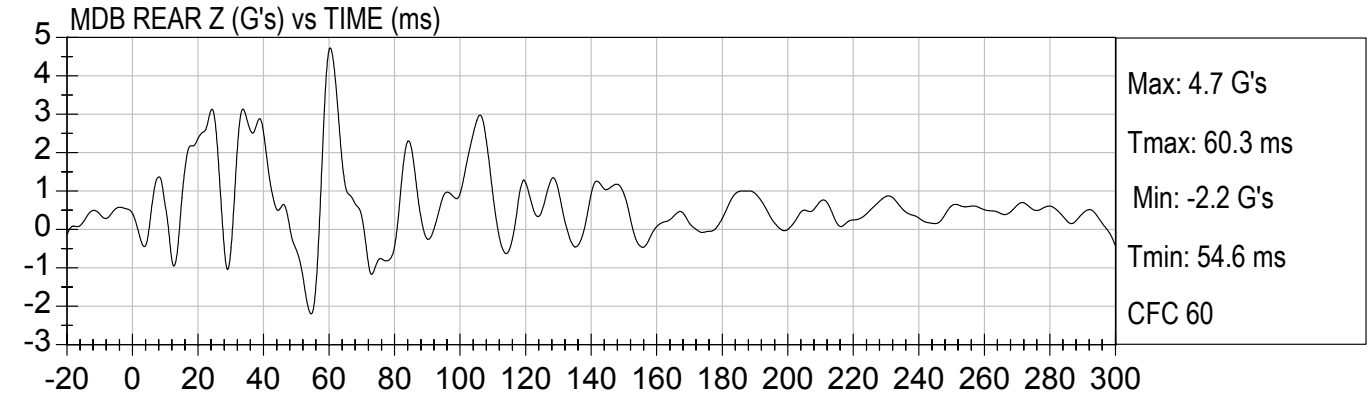


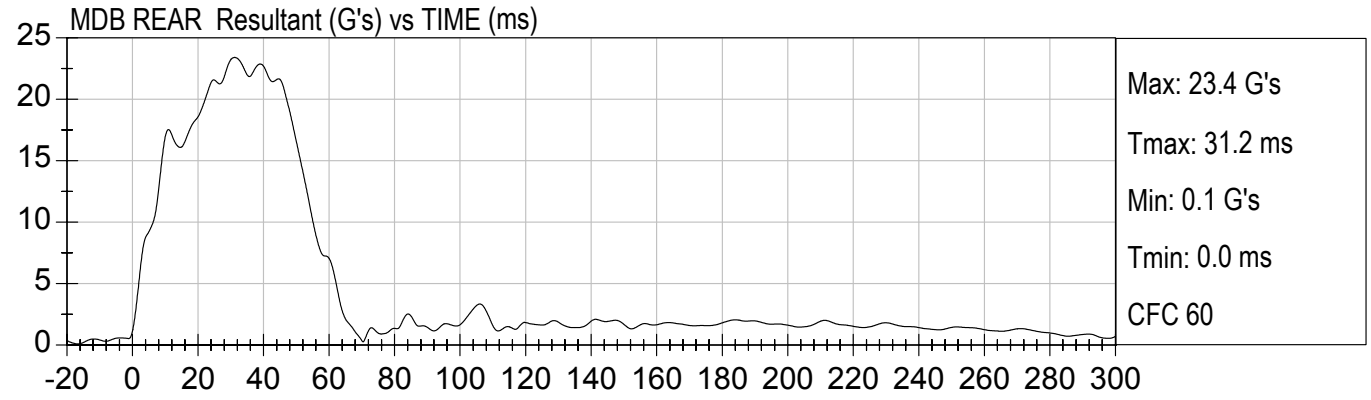
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

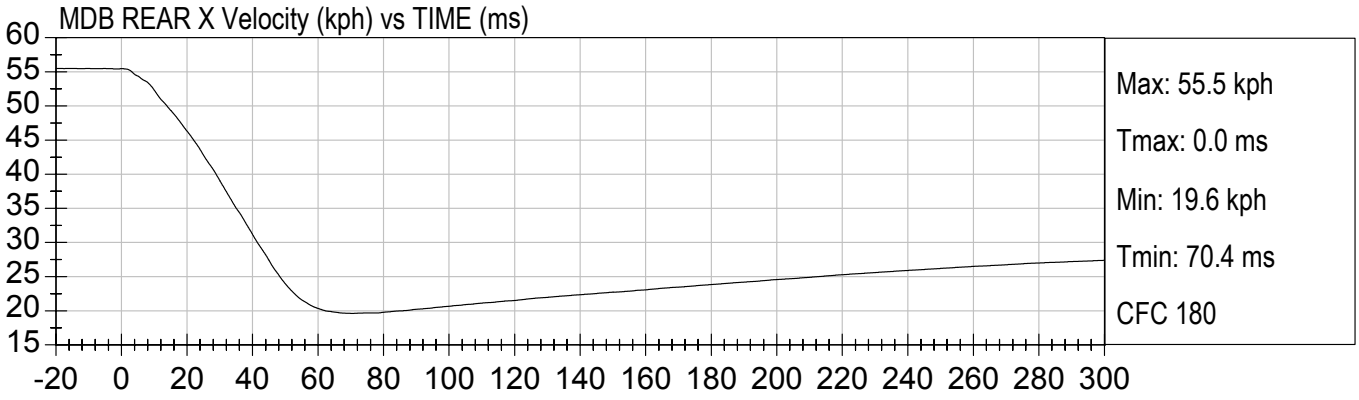
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

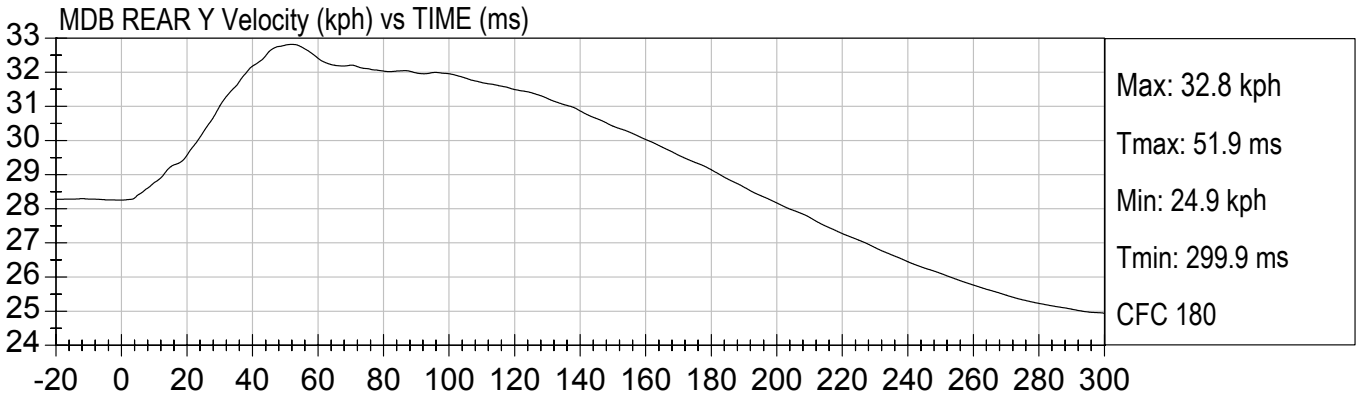


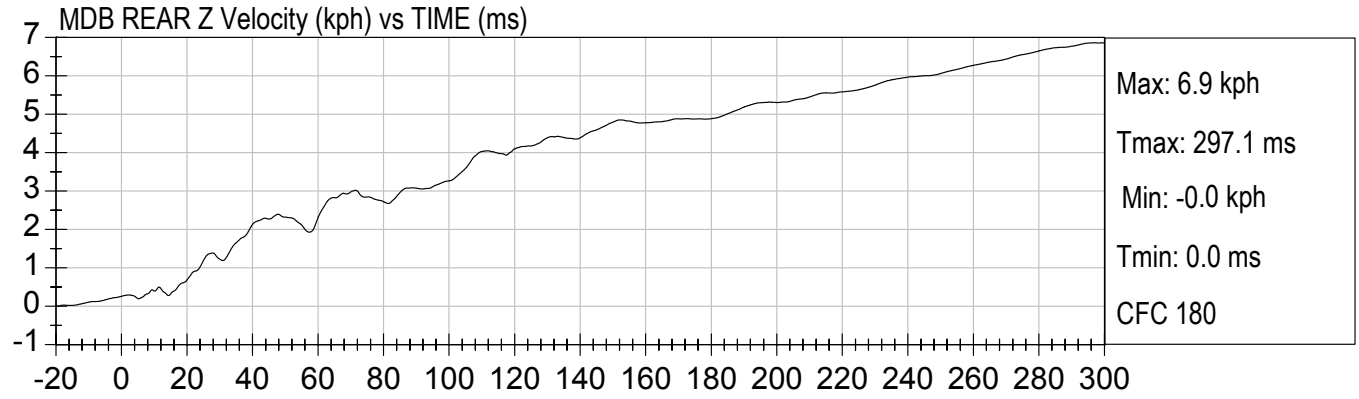


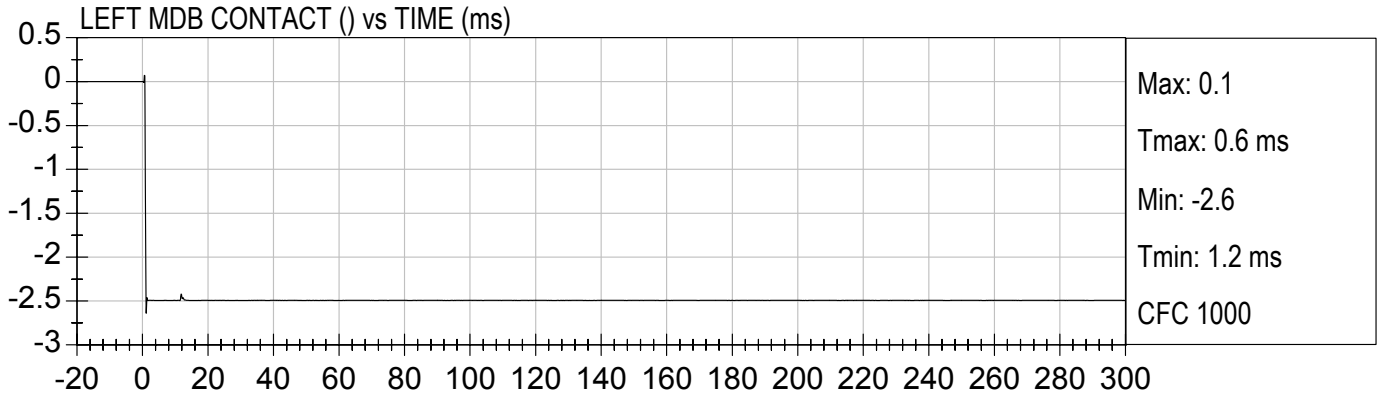


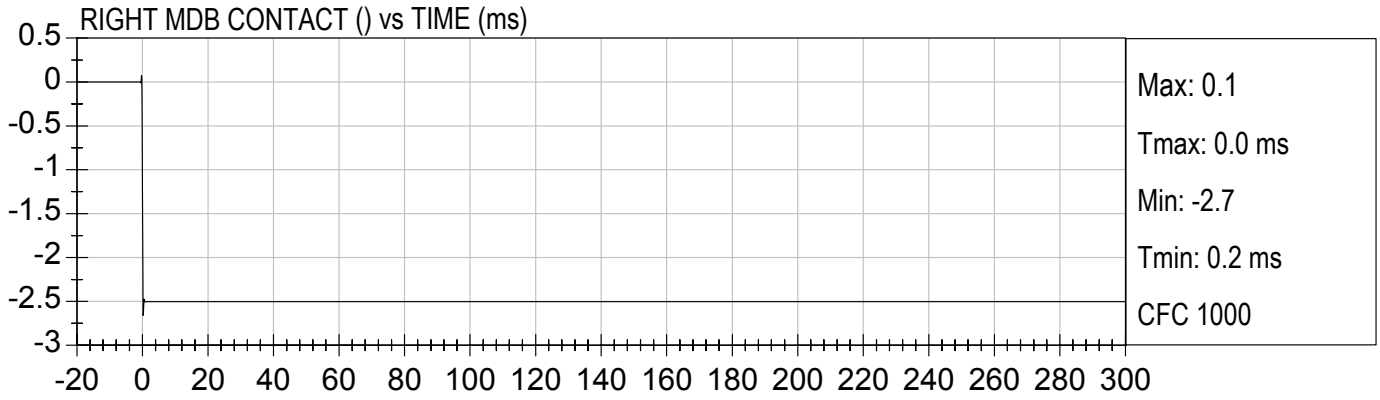



MDB REAR X Velocity (kph) vs TIME (ms)
60
55
50
45
40
35
30
25
20
15
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 55.5 kph
Tmax: 0.0 ms
Min: 19.6 kph
Tmin: 70.4 ms
CFC 180


MDB REAR Y Velocity (kph) vs TIME (ms)
33
32
31
30
29
28
27
26
25
24
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 32.8 kph
Tmax: 51.9 ms
Min: 24.9 kph
Tmin: 299.9 ms
CFC 180

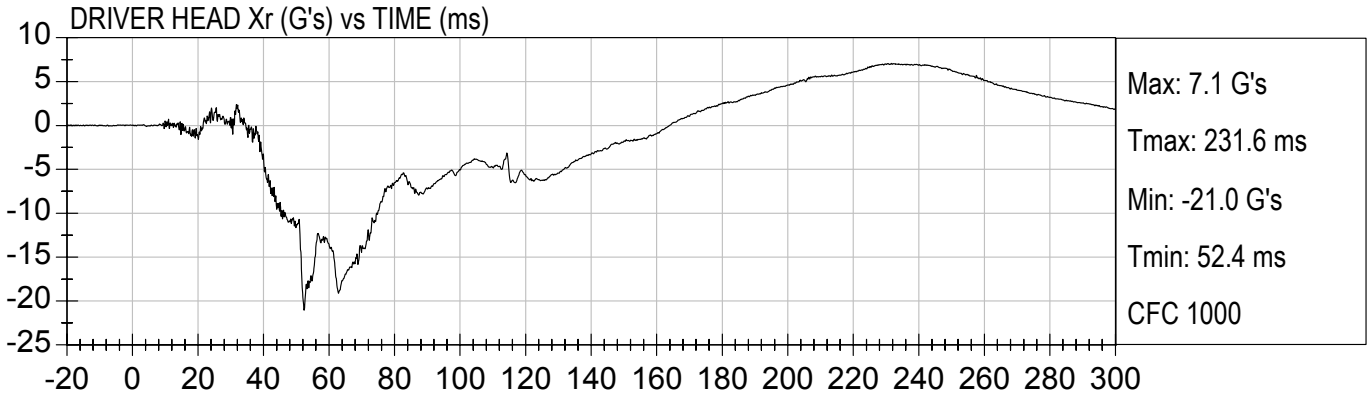

MDB REAR Z Velocity (kph) vs TIME (ms)
7
6
5
4
3
2
1
0
-1
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 6.9 kph
Tmax: 297.1 ms
Min: -0.0 kph
Tmin: 0.0 ms
CFC 180

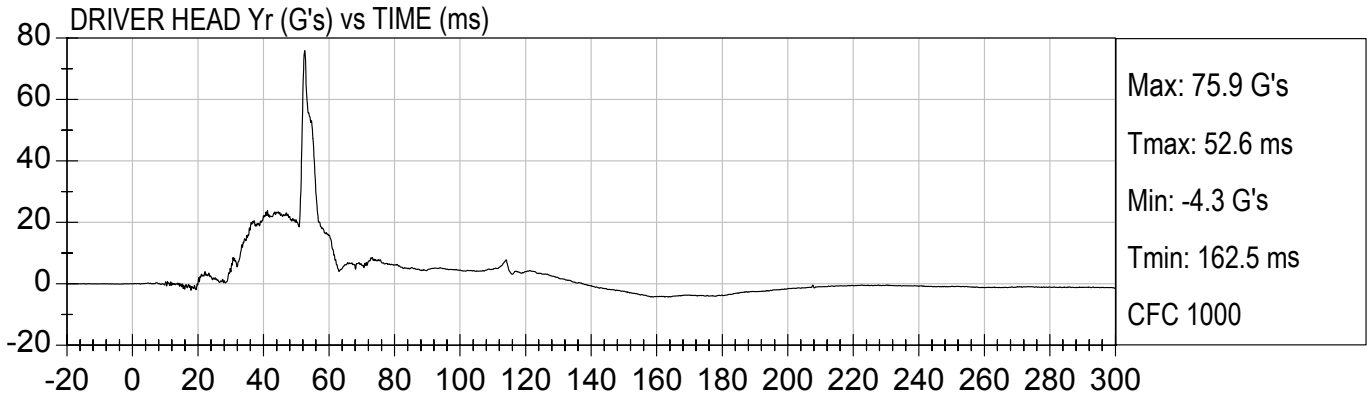

LEFT MDB CONTACT () vs TIME (ms)
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.1
Tmax: 0.6 ms
Min: -2.6
Tmin: 1.2 ms
CFC 1000

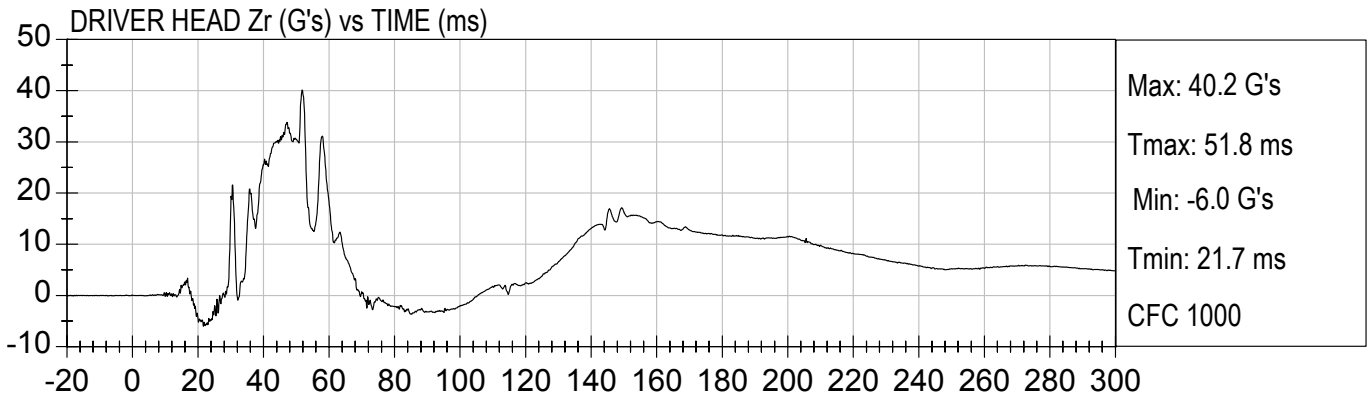

RIGHT MDB CONTACT () vs TIME (ms)
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.1
Tmax: 0.0 ms
Min: -2.7
Tmin: 0.2 ms
CFC 1000

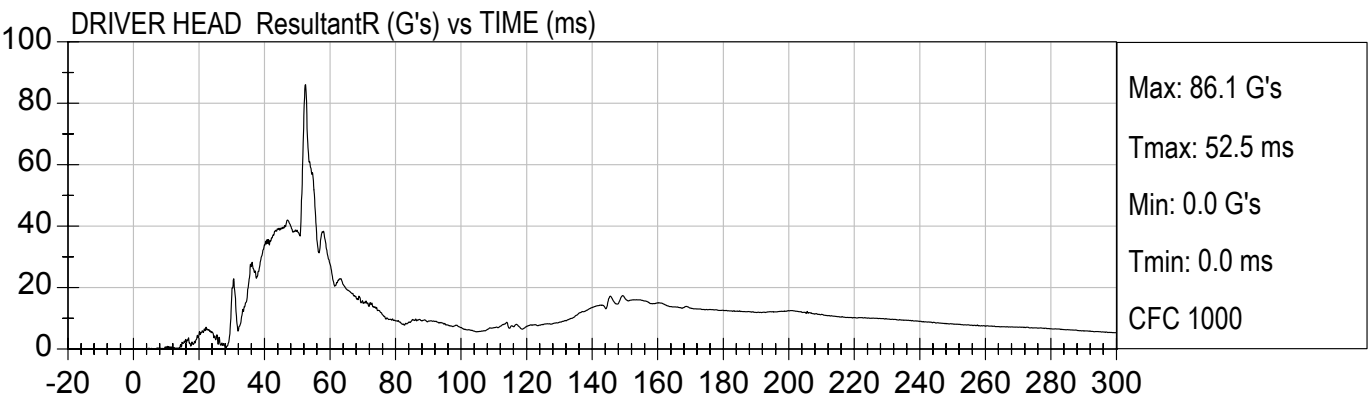
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

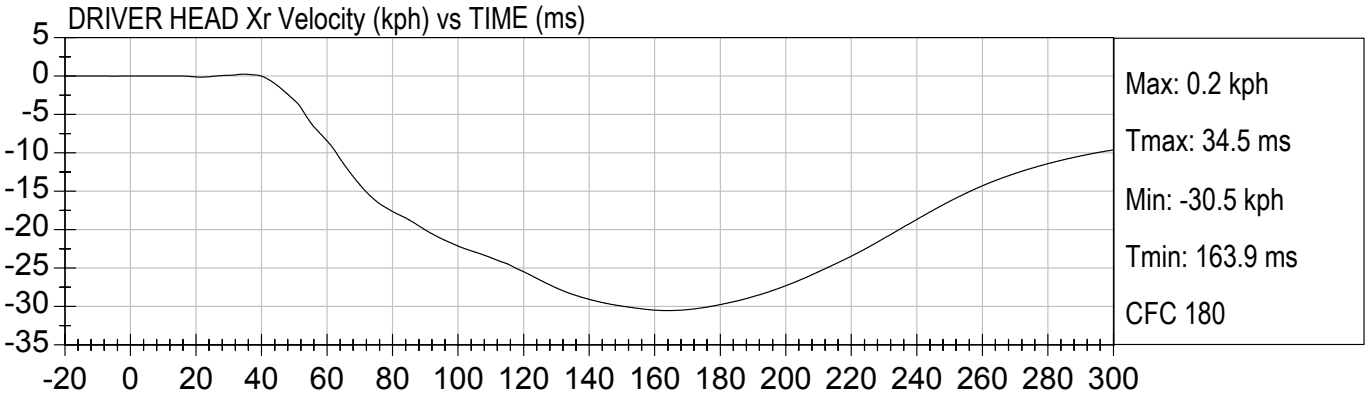
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

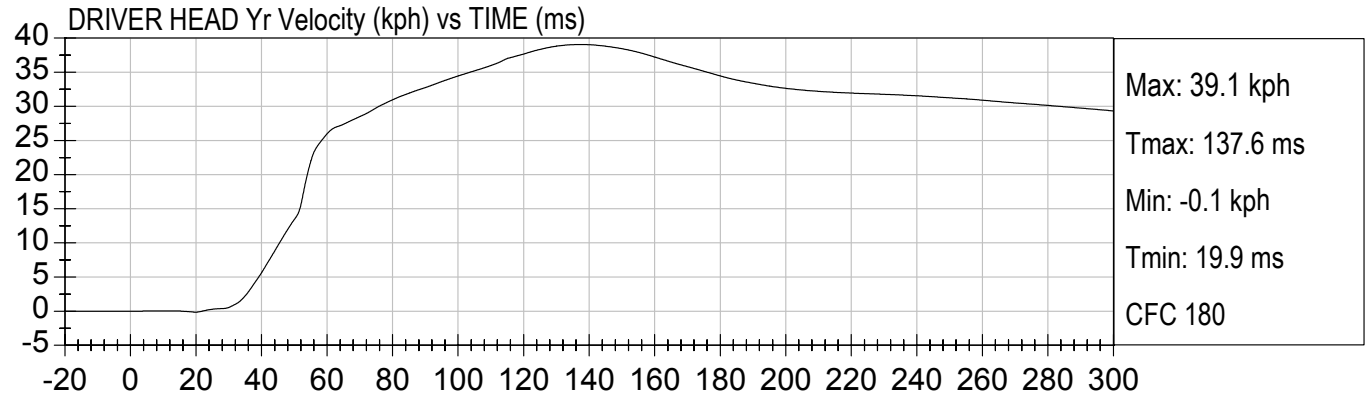


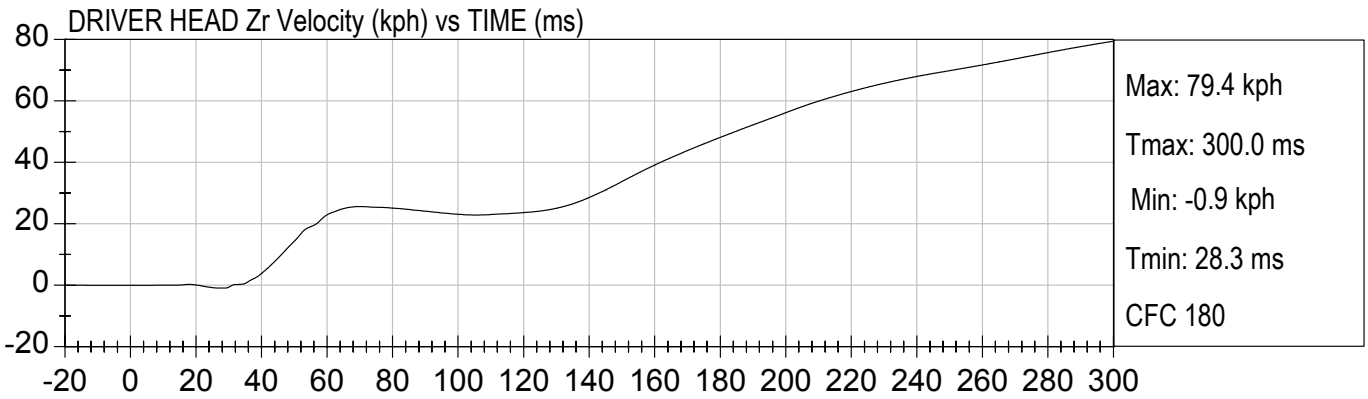






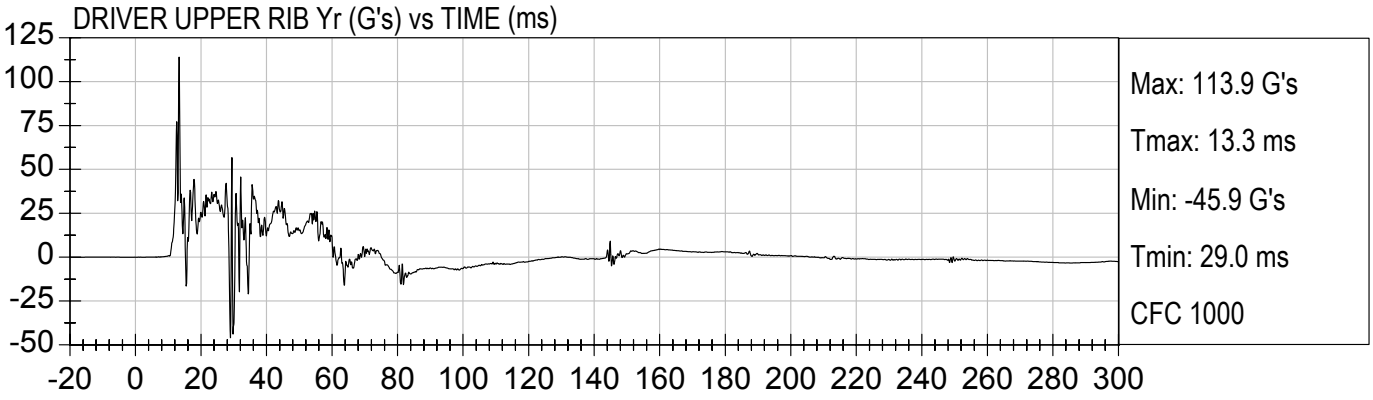

DRIVER HEAD Xr Velocity (kph) vs TIME (ms)
5
0
-5
-10
-15
-20
-25
-30
-35
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.2 kph
Tmax: 34.5 ms
Min: -30.5 kph
Tmin: 163.9 ms
CFC 180

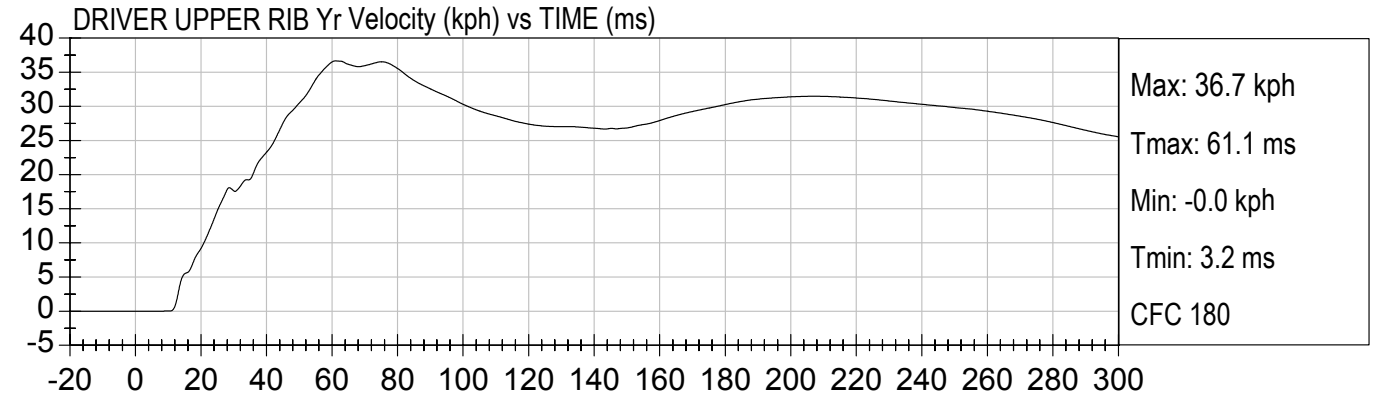

DRIVER HEAD Yr Velocity (kph) vs TIME (ms)
40
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 39.1 kph
Tmax: 137.6 ms
Min: -0.1 kph
Tmin: 19.9 ms
CFC 180

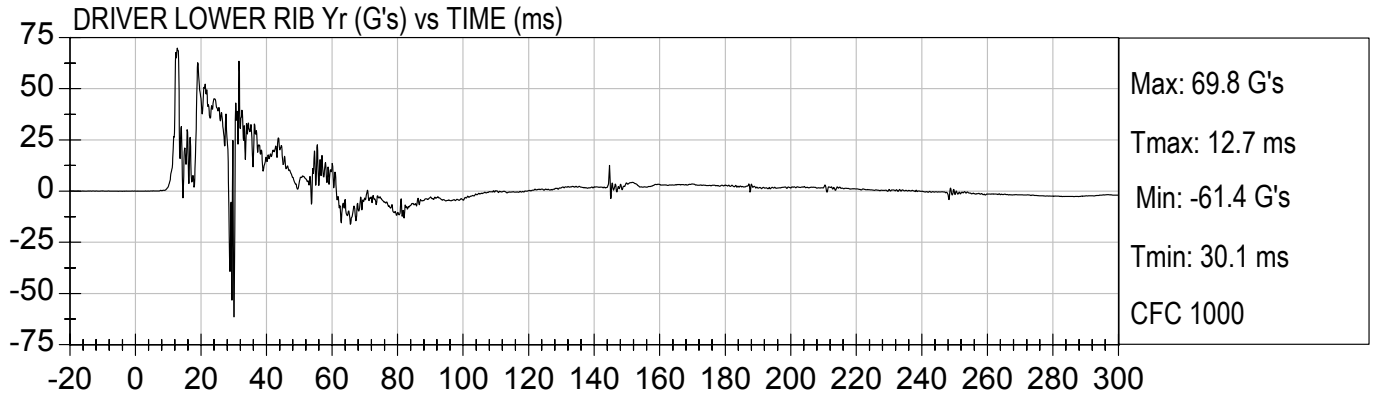

DRIVER HEAD Zr Velocity (kph) vs TIME (ms)
80
60
40
20
0
-20
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 79.4 kph
Tmax: 300.0 ms
Min: -0.9 kph
Tmin: 28.3 ms
CFC 180

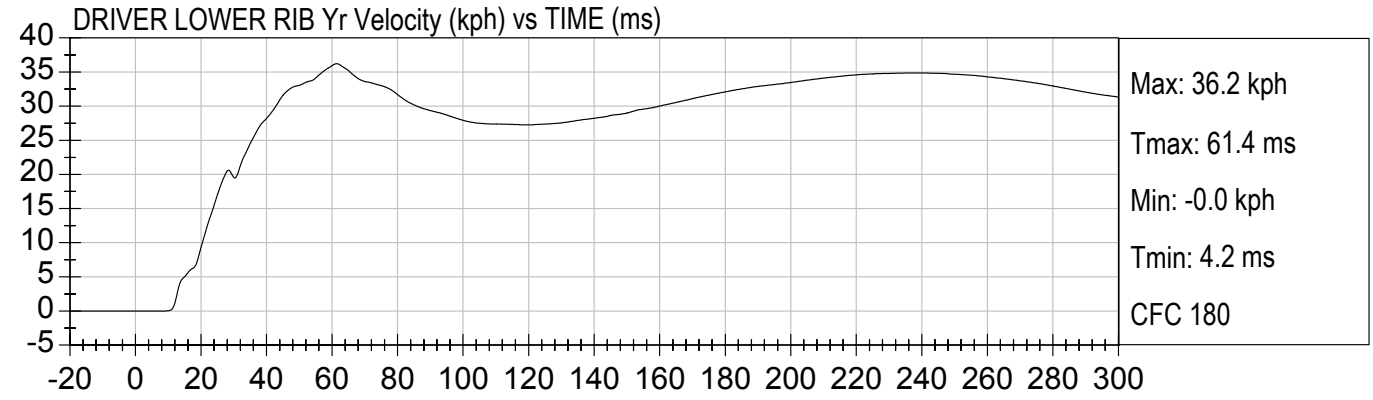
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)



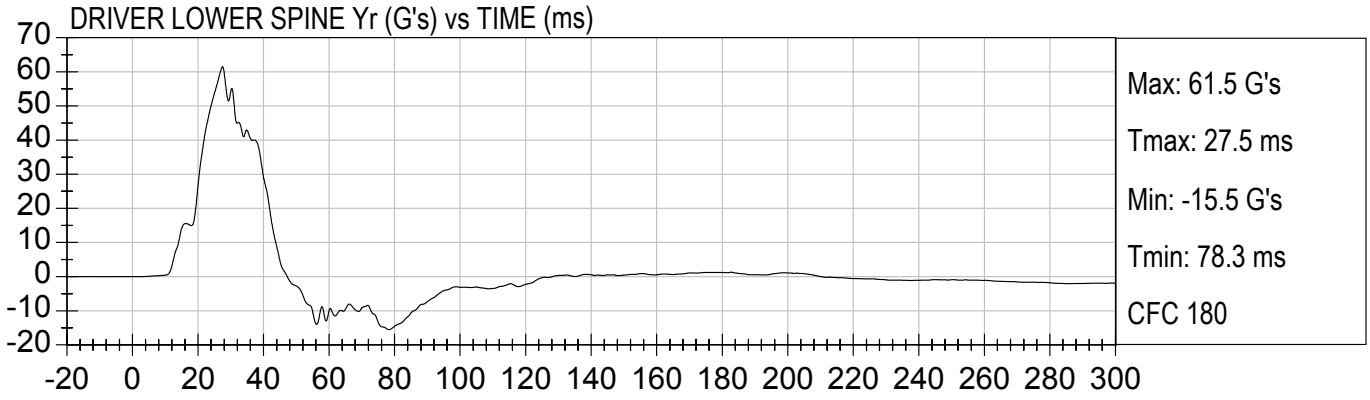


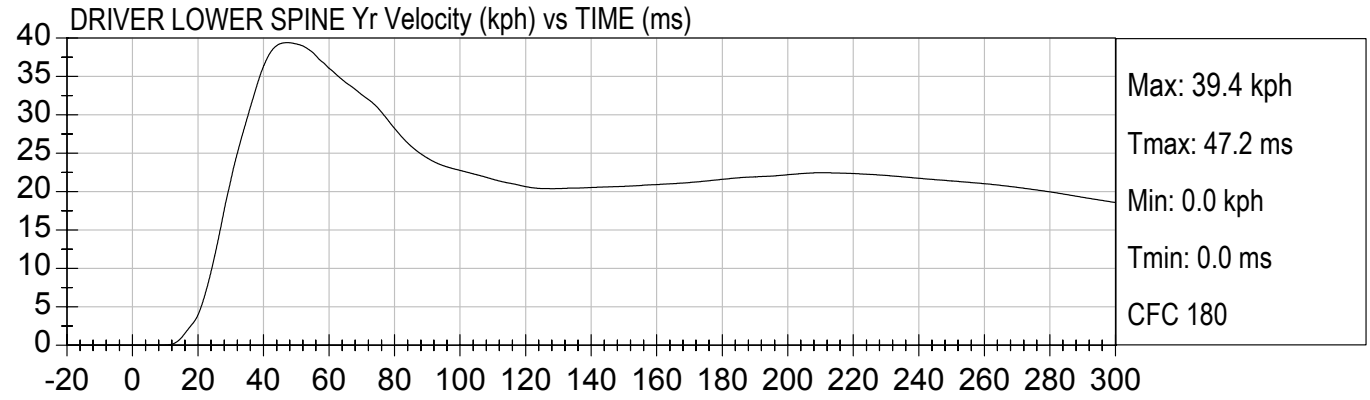


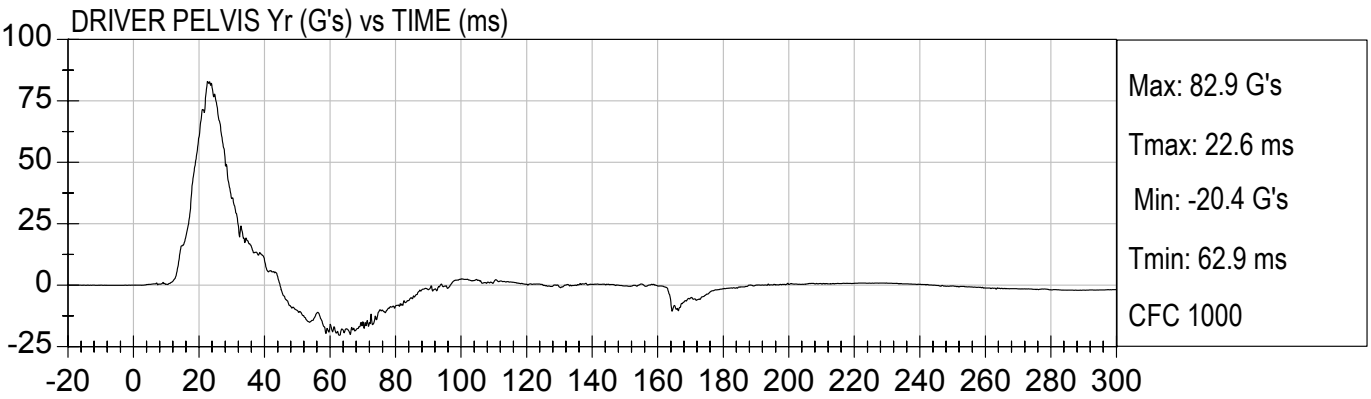


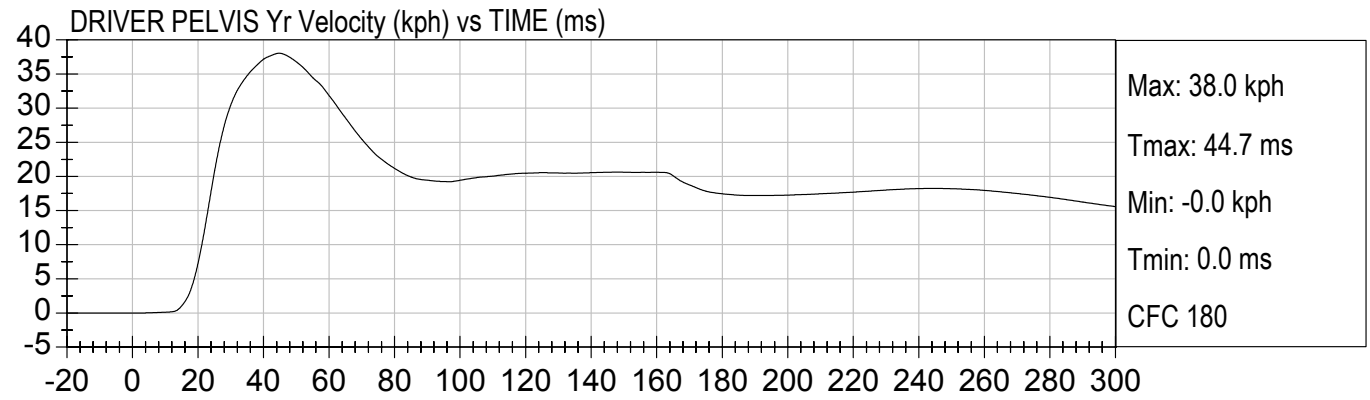
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)



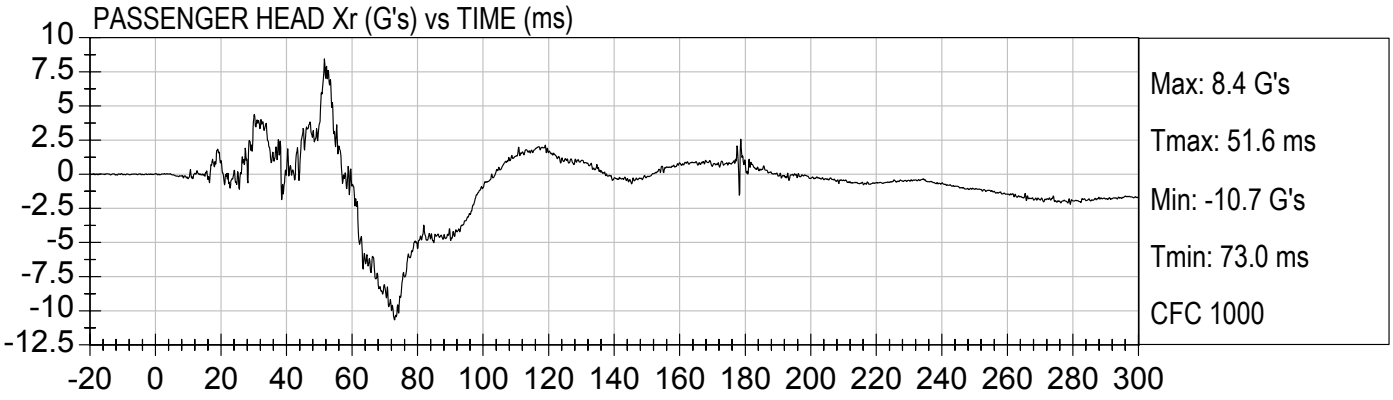


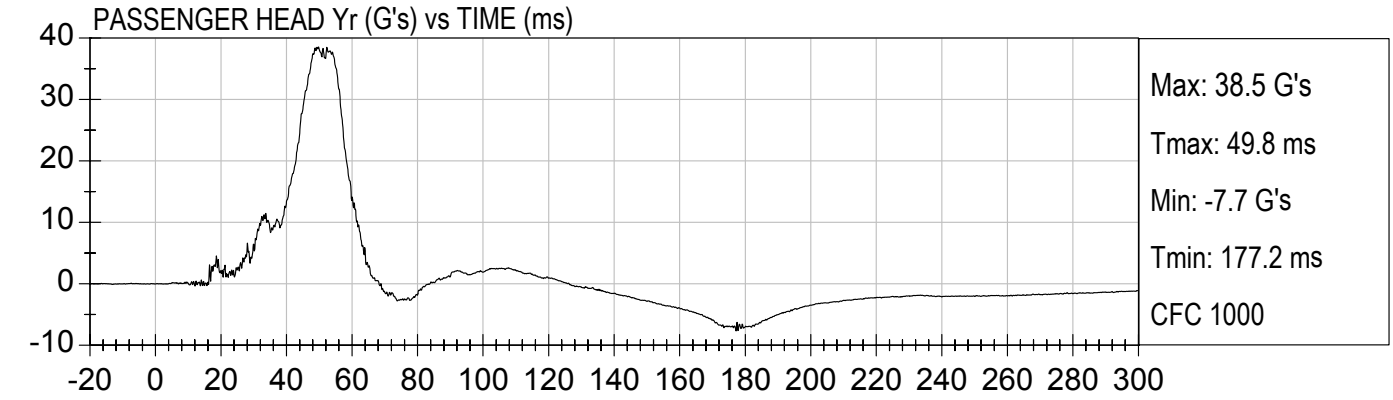


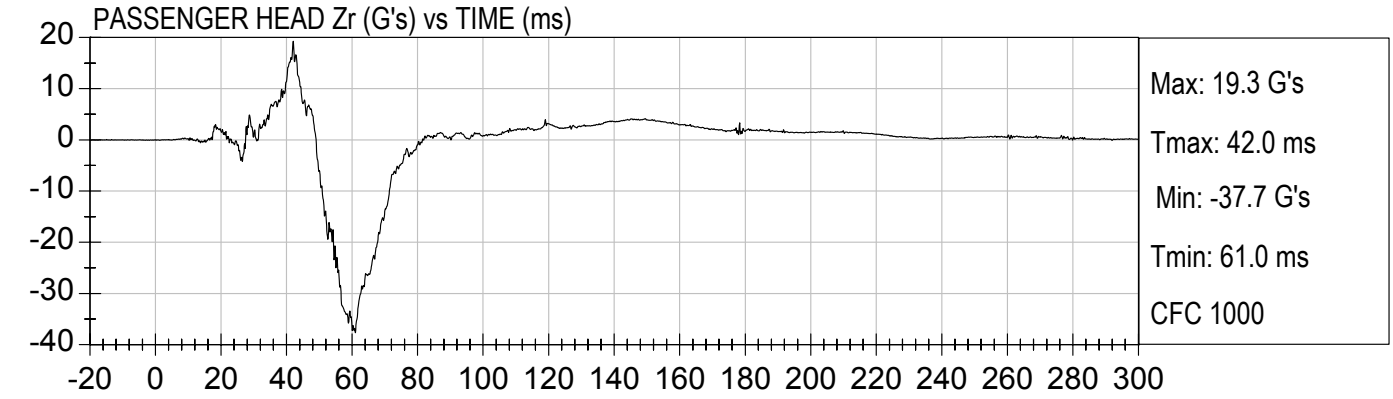


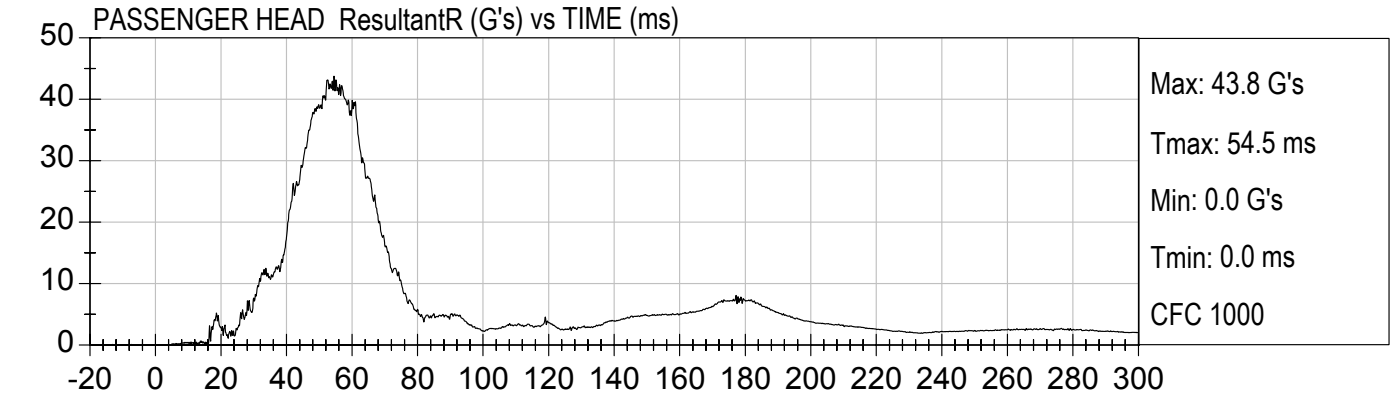
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

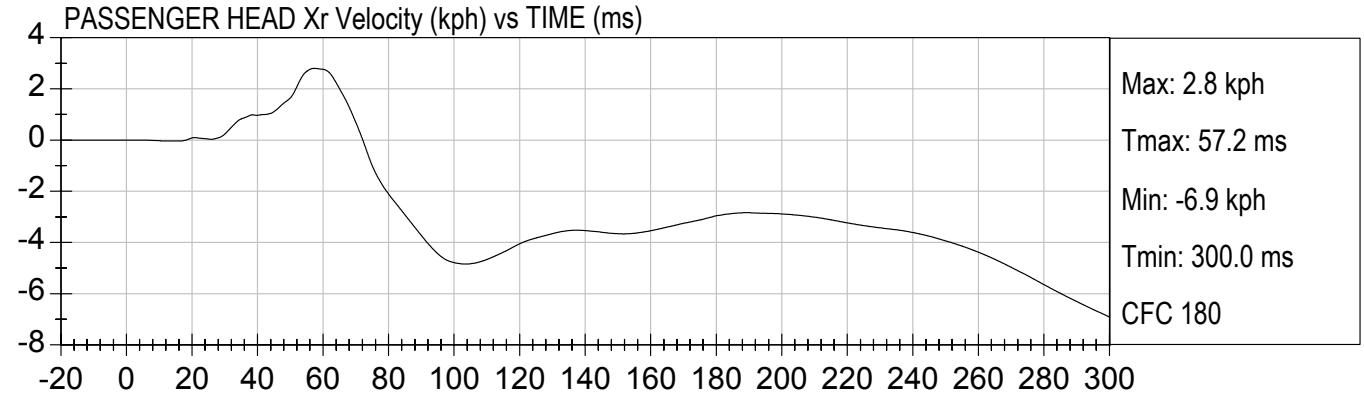
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

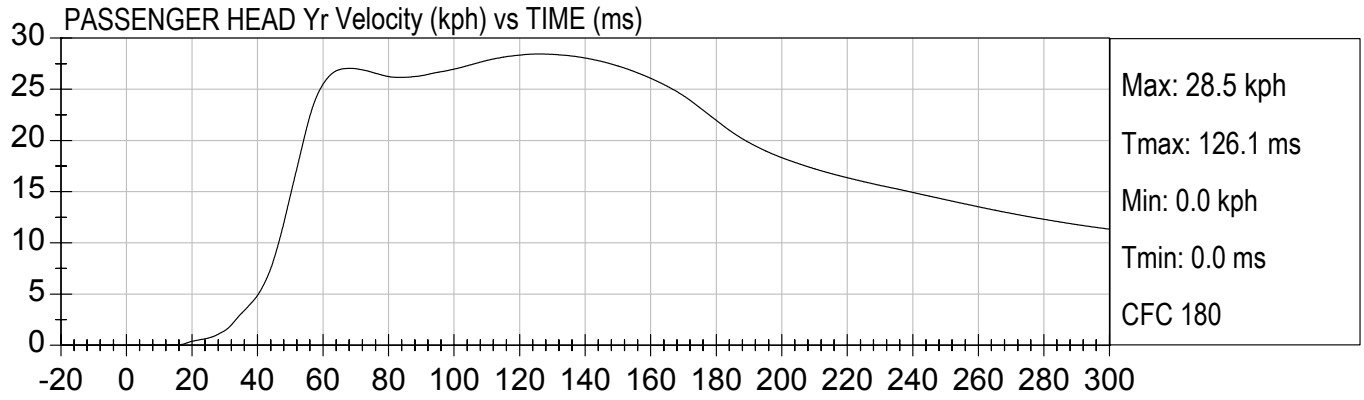


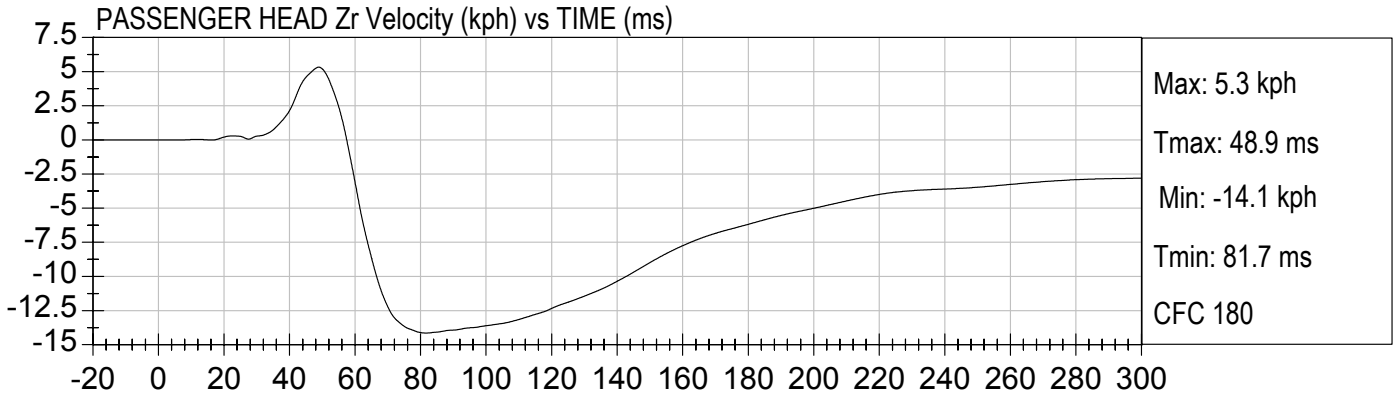






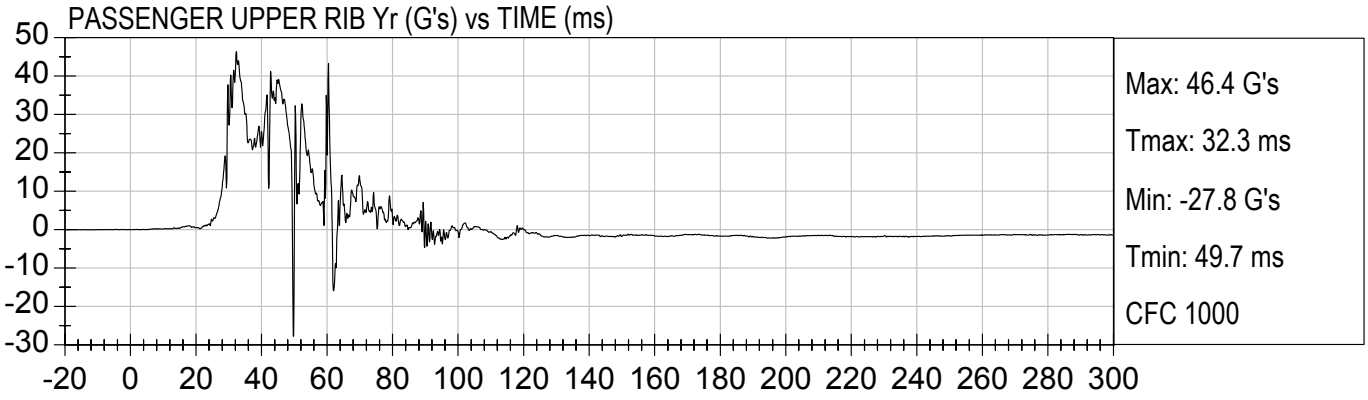

PASSENGER HEAD Xr Velocity (kph) vs TIME (ms)
4
2
0
-2
-4
-6
-8
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 2.8 kph
Tmax: 57.2 ms
Min: -6.9 kph
Tmin: 300.0 ms
CFC 180

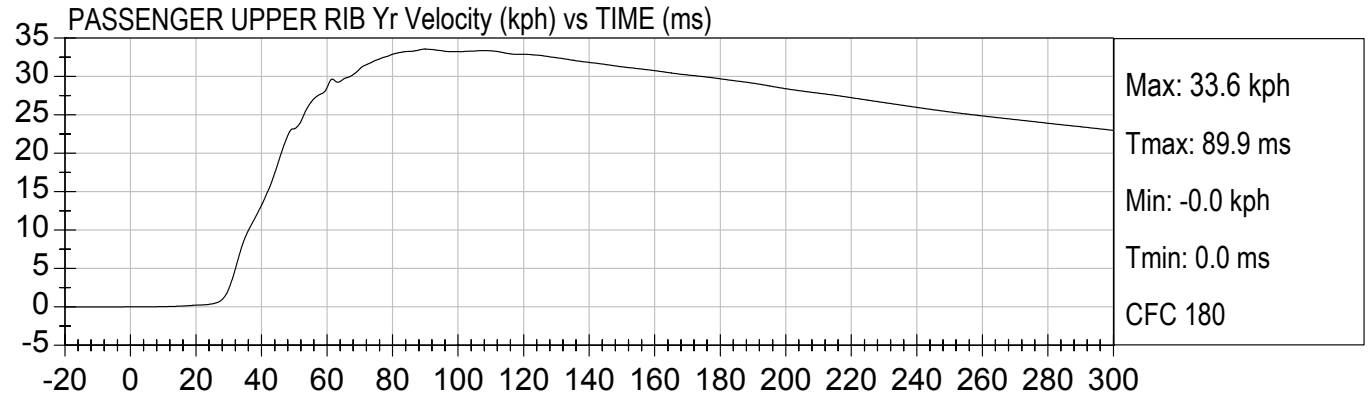

PASSENGER HEAD Yr Velocity (kph) vs TIME (ms)
30
25
20
15
10
5
0
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 28.5 kph
Tmax: 126.1 ms
Min: 0.0 kph
Tmin: 0.0 ms
CFC 180

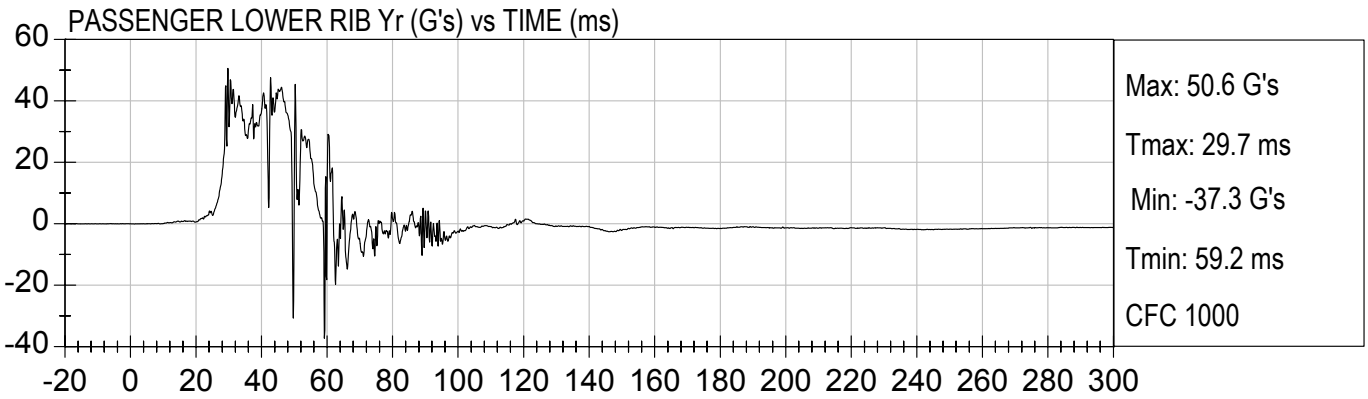

PASSENGER HEAD Zr Velocity (kph) vs TIME (ms)
7.5
5
2.5
0
-2.5
-5
-7.5
-10
-12.5
-15
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 5.3 kph
Tmax: 48.9 ms
Min: -14.1 kph
Tmin: 81.7 ms
CFC 180

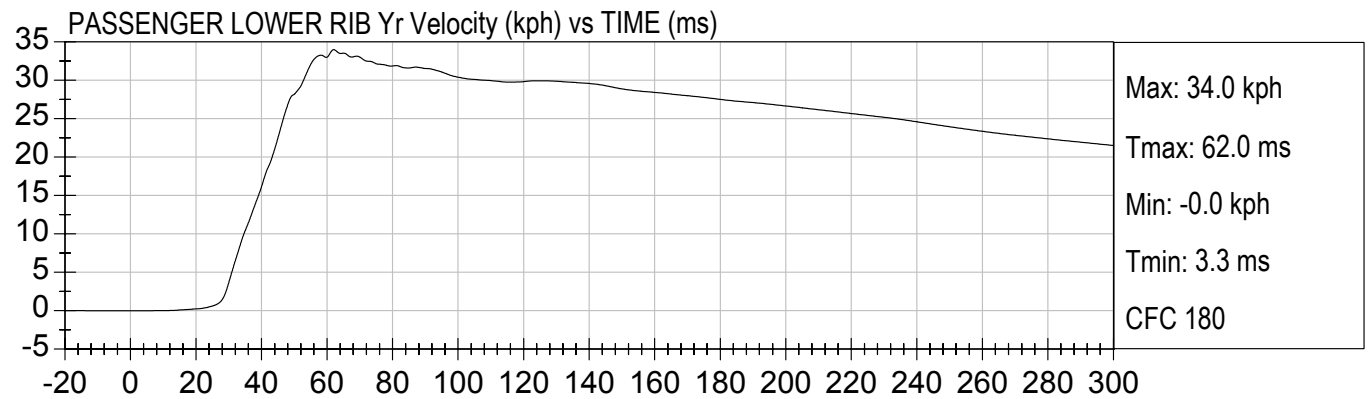
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)



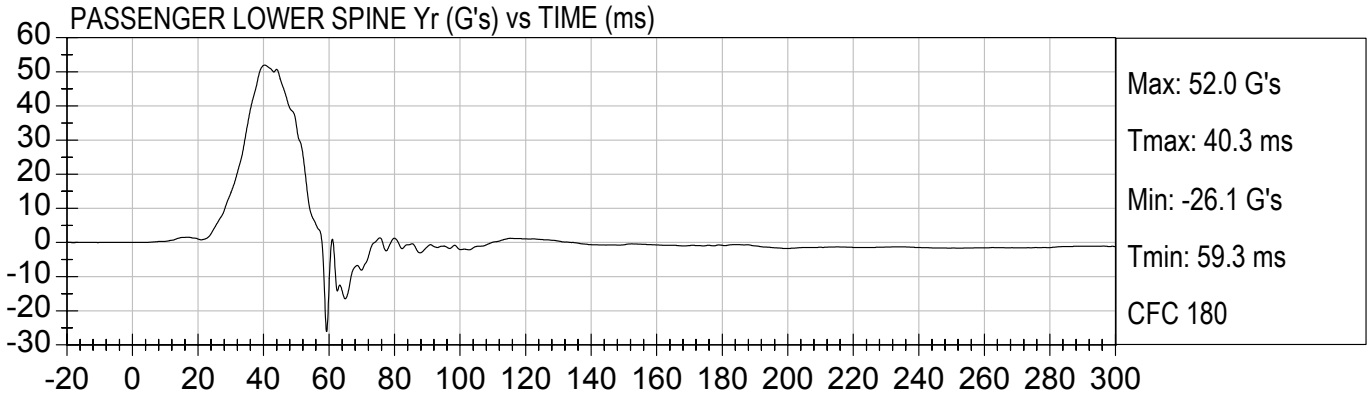


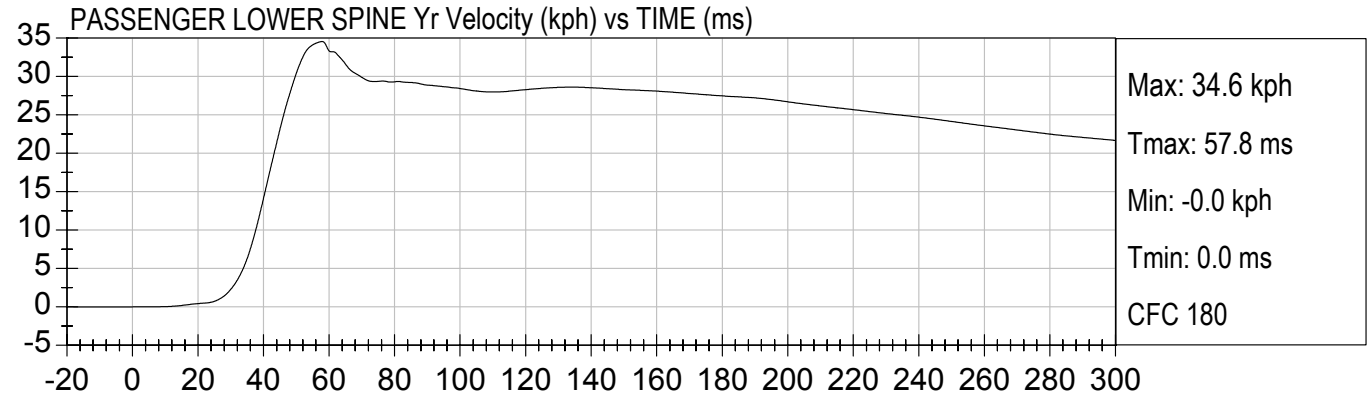


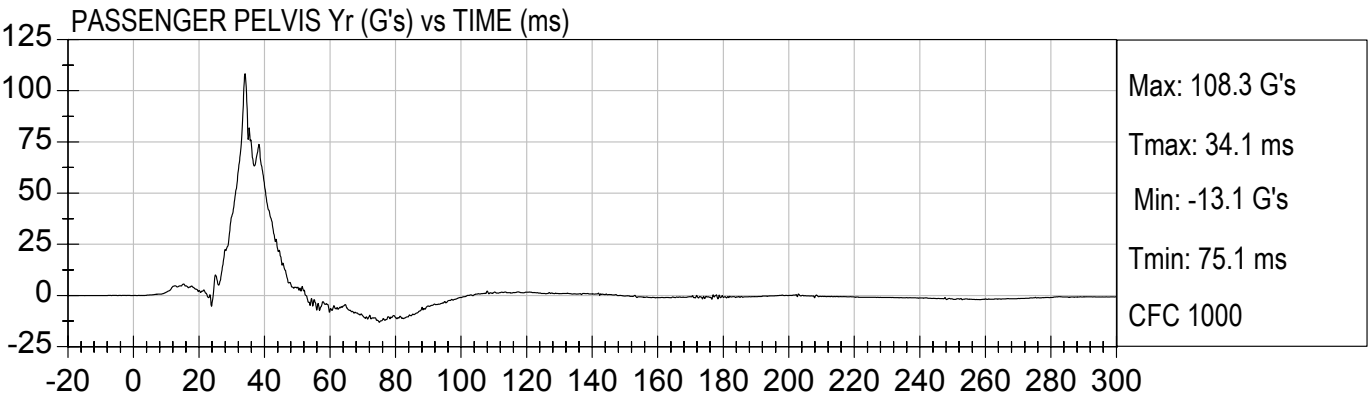


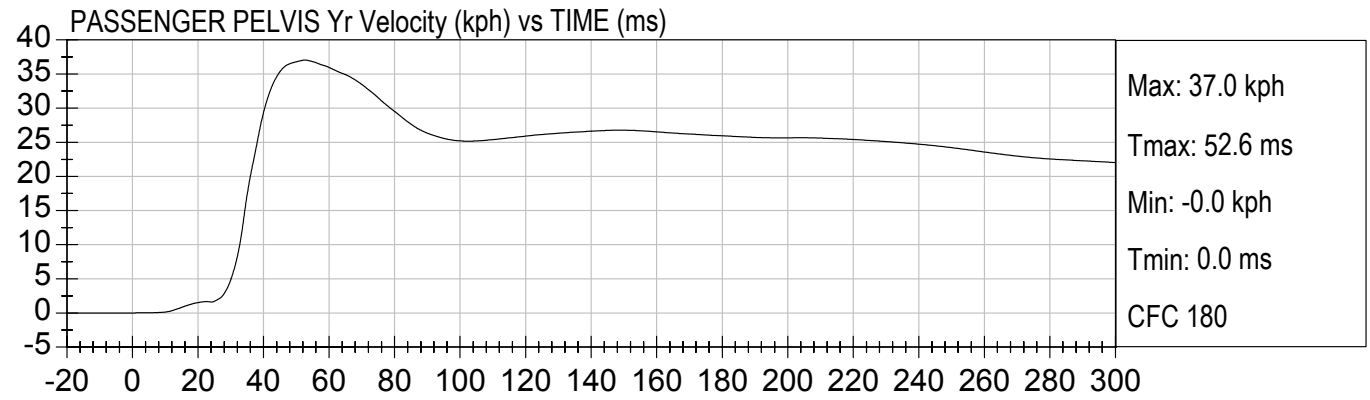
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

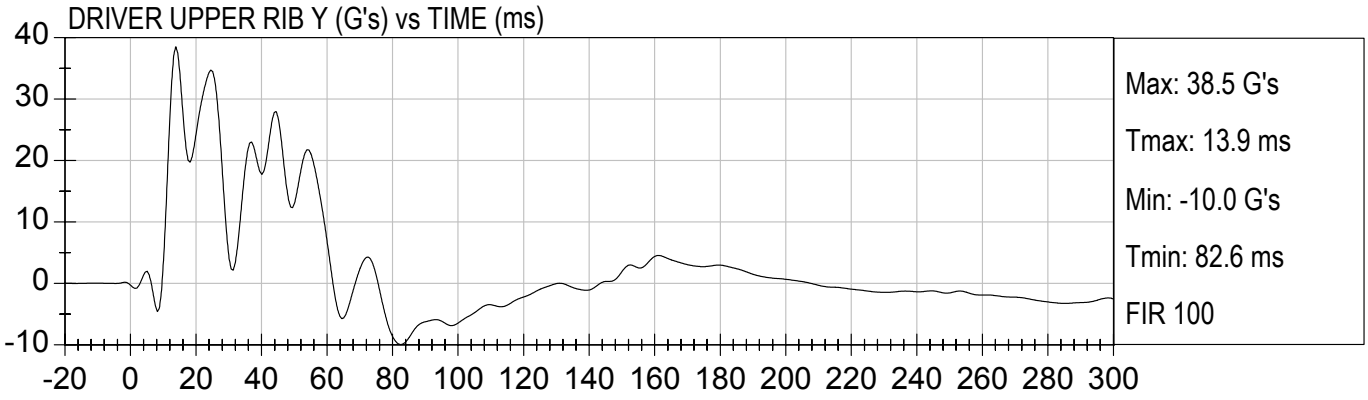
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

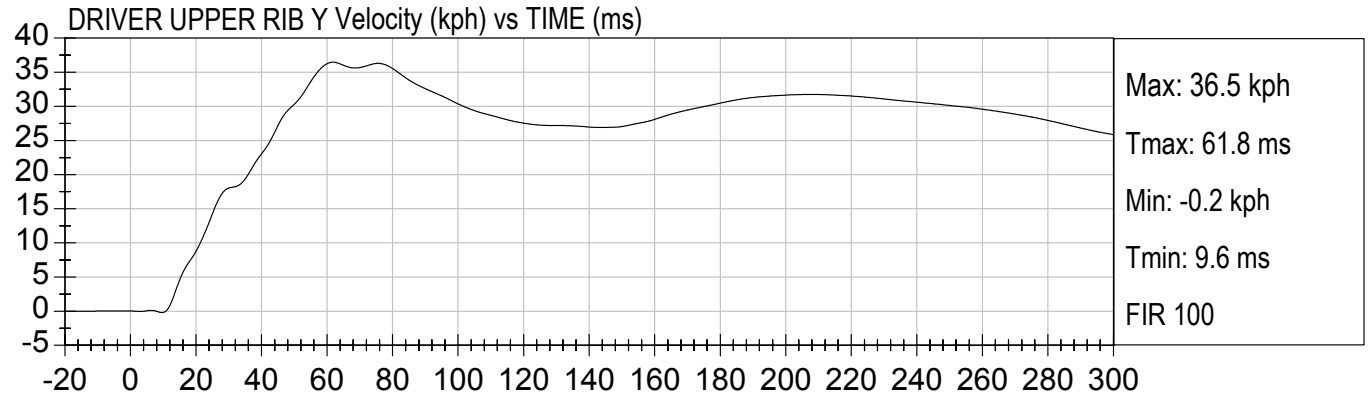


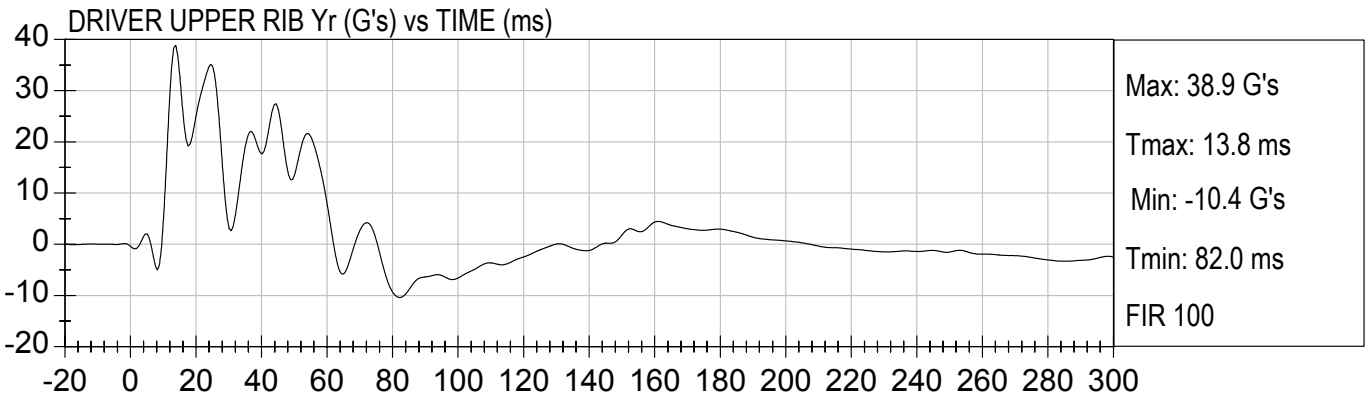


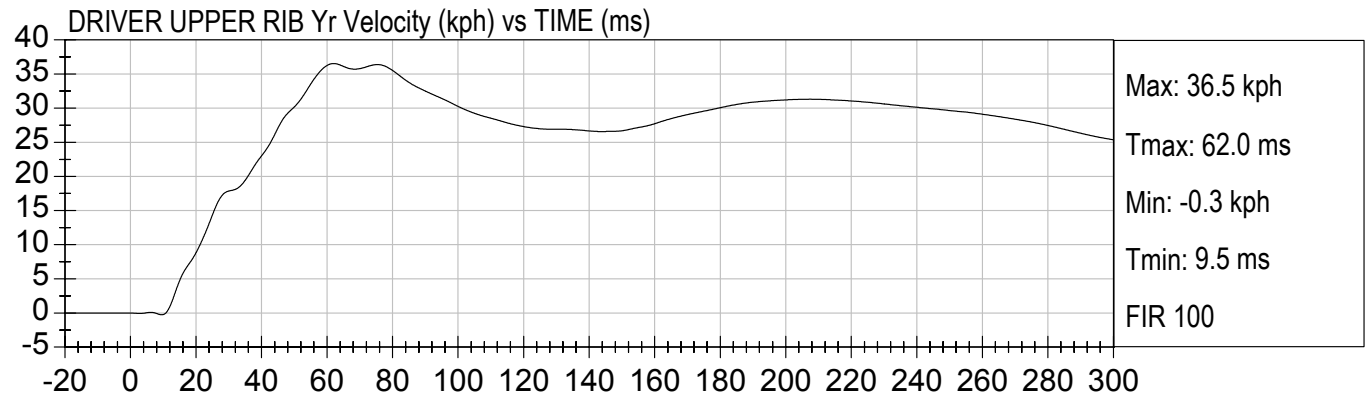


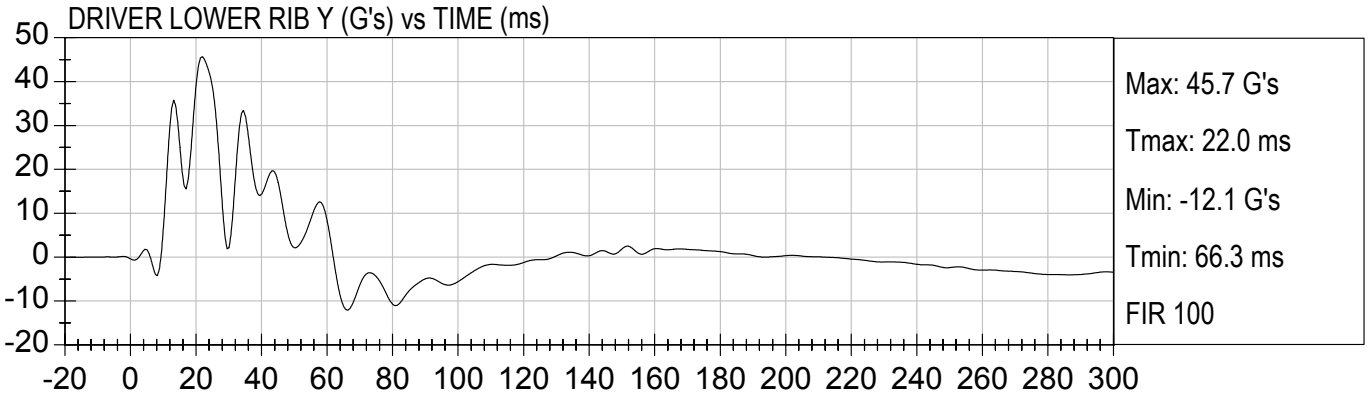


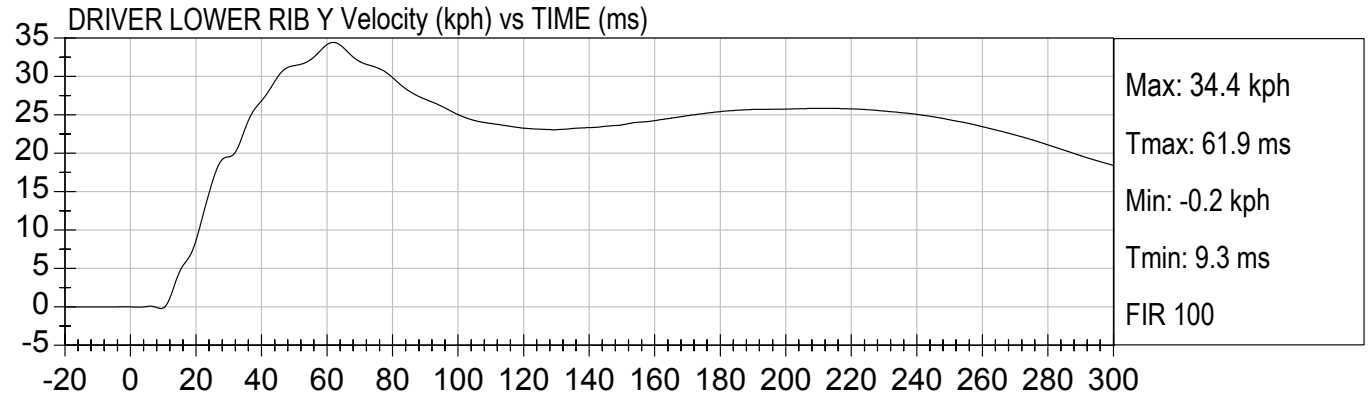

DRIVER UPPER RIB Y (G's) vs TIME (ms)
Max: 38.5 G's
Tmax: 13.9 ms
Min: -10.0 G's
Tmin: 82.6 ms
FIR 100

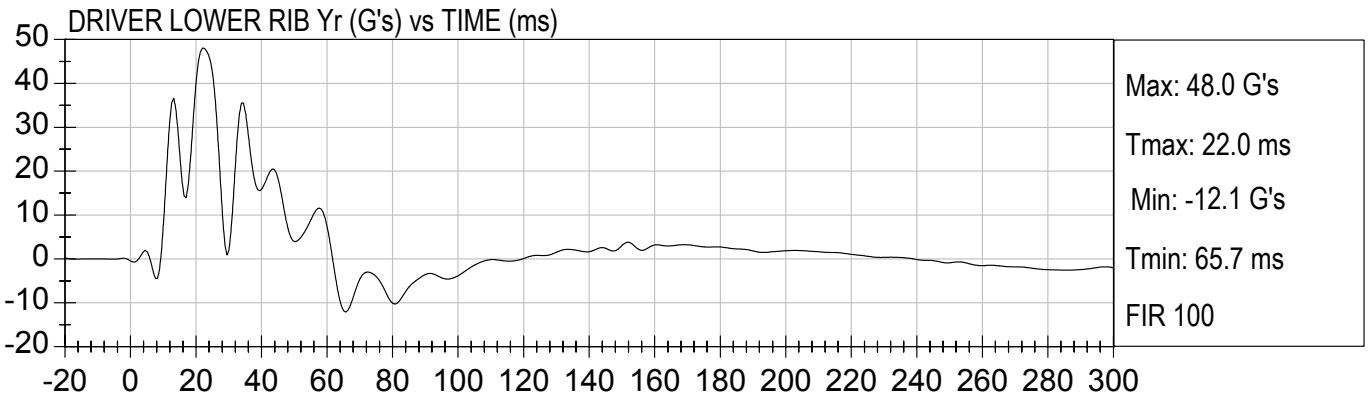

DRIVER UPPER RIB Y Velocity (kph) vs TIME (ms)
Max: 36.5 kph
Tmax: 61.8 ms
Min: -0.2 kph
Tmin: 9.6 ms
FIR 100

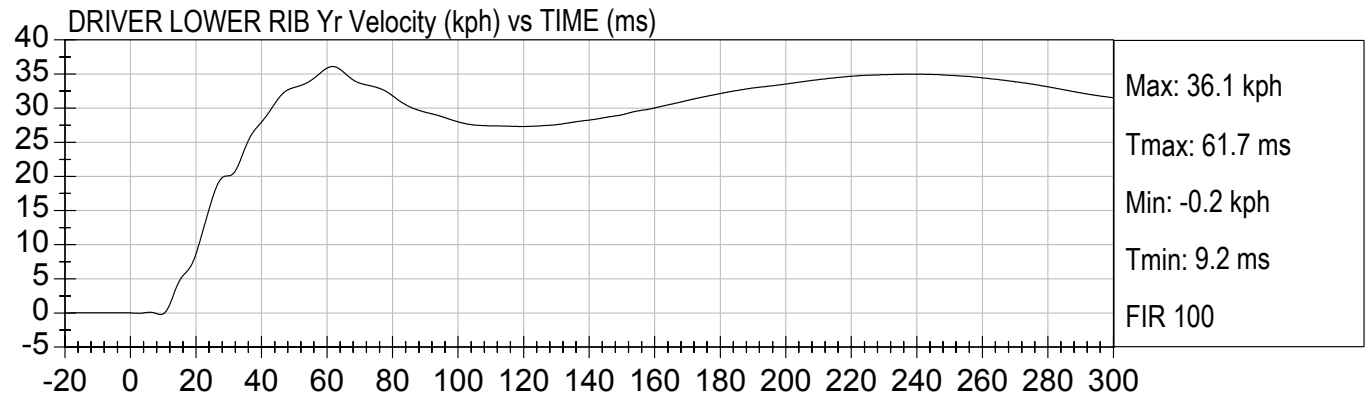

DRIVER UPPER RIB Yr (G's) vs TIME (ms)
Max: 38.9 G's
Tmax: 13.8 ms
Min: -10.4 G's
Tmin: 82.0 ms
FIR 100


DRIVER UPPER RIB Yr Velocity (kph) vs TIME (ms)
Max: 36.5 kph
Tmax: 62.0 ms
Min: -0.3 kph
Tmin: 9.5 ms
FIR 100


DRIVER LOWER RIB Y (G's) vs TIME (ms)
Max: 45.7 G's
Tmax: 22.0 ms
Min: -12.1 G's
Tmin: 66.3 ms
FIR 100

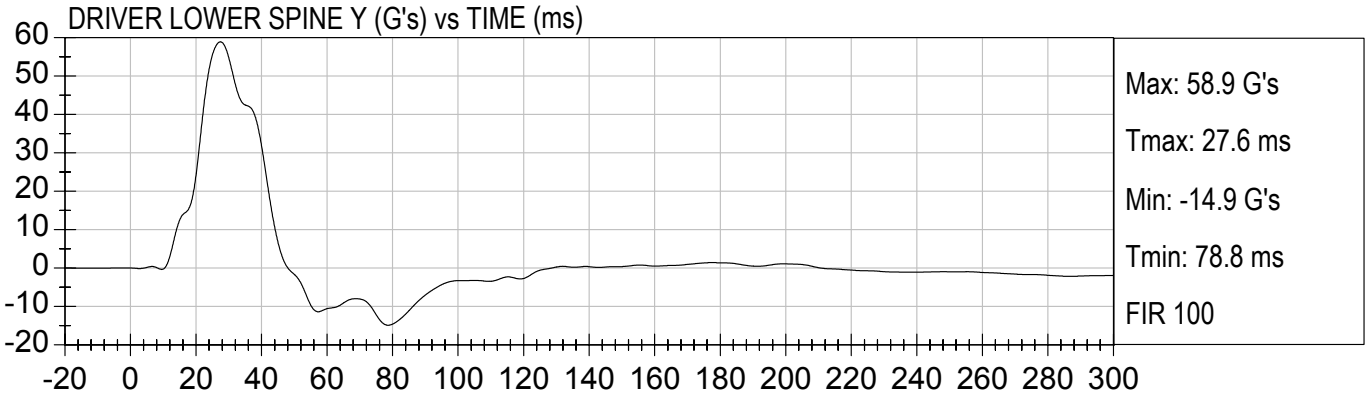

DRIVER LOWER RIB Y Velocity (kph) vs TIME (ms)
Max: 34.4 kph
Tmax: 61.9 ms
Min: -0.2 kph
Tmin: 9.3 ms
FIR 100

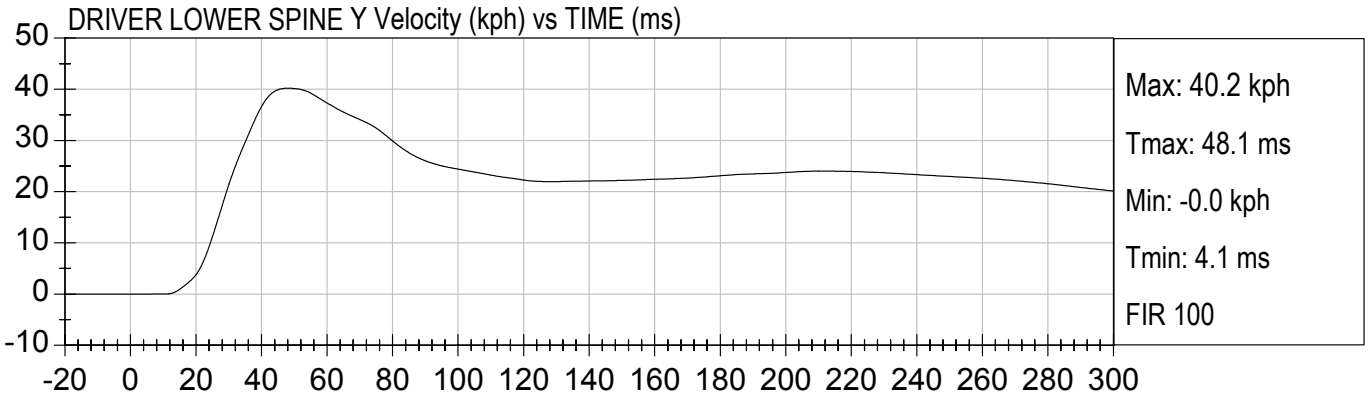

DRIVER LOWER RIB Yr (G's) vs TIME (ms)
Max: 48.0 G's
Tmax: 22.0 ms
Min: -12.1 G's
Tmin: 65.7 ms
FIR 100

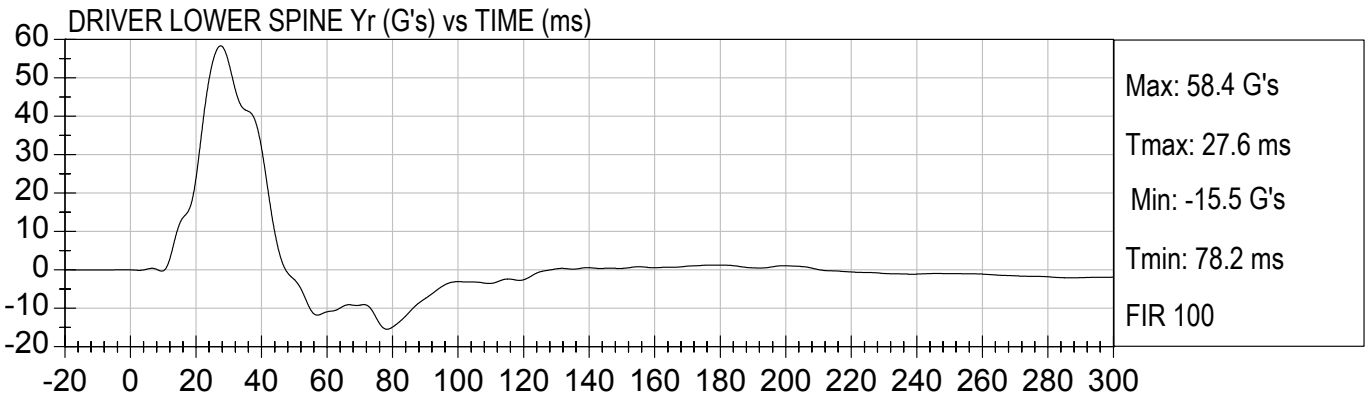

DRIVER LOWER RIB Yr Velocity (kph) vs TIME (ms)
Max: 36.1 kph
Tmax: 61.7 ms
Min: -0.2 kph
Tmin: 9.2 ms
FIR 100

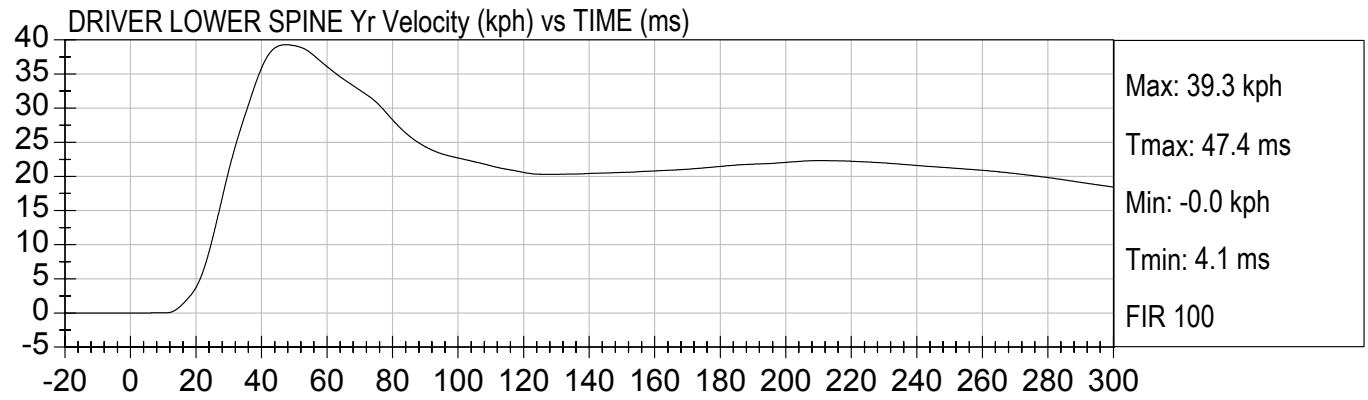
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

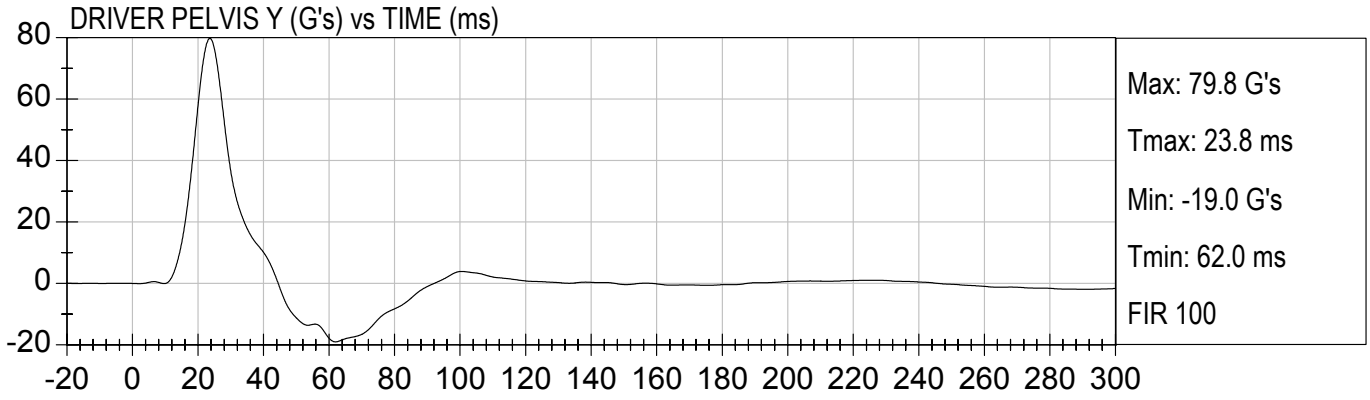
Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)

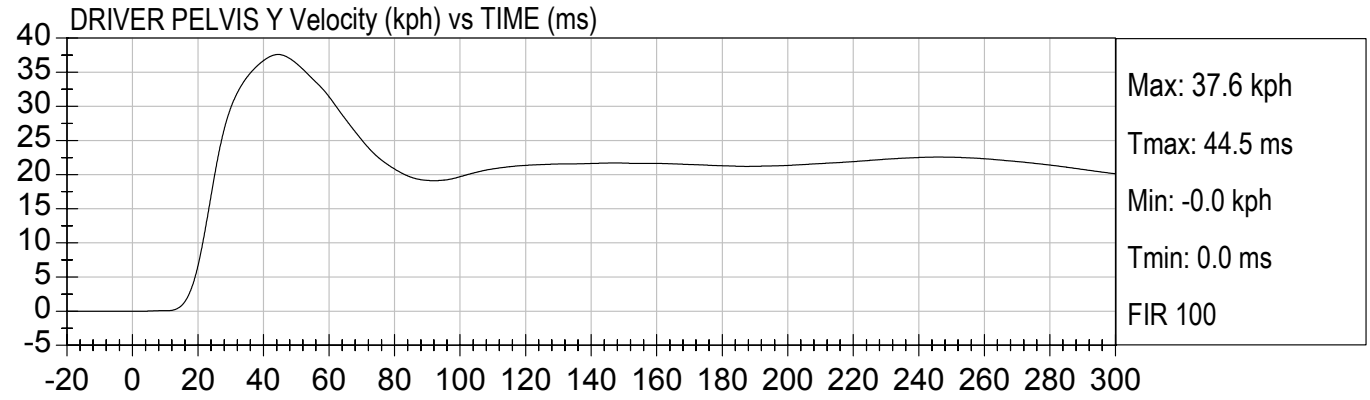


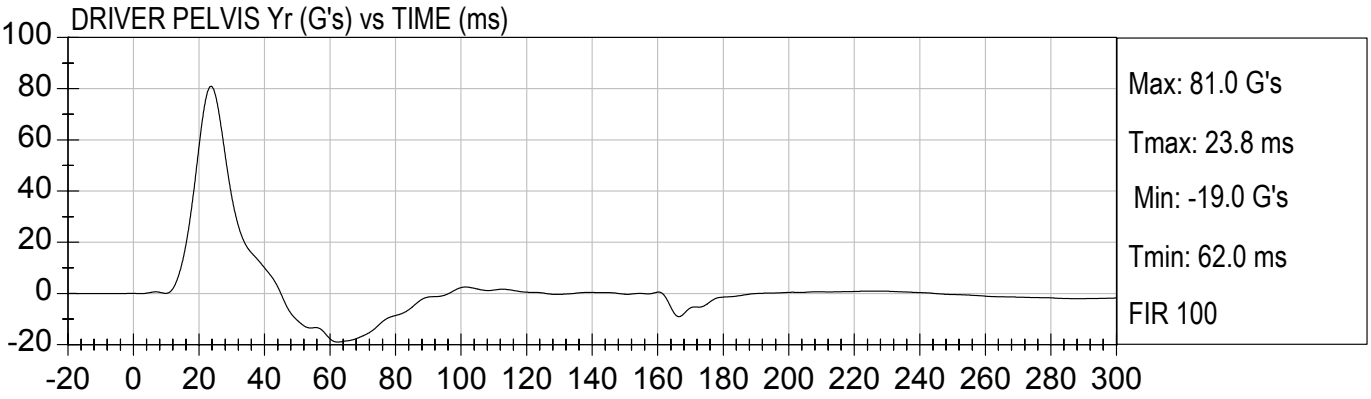


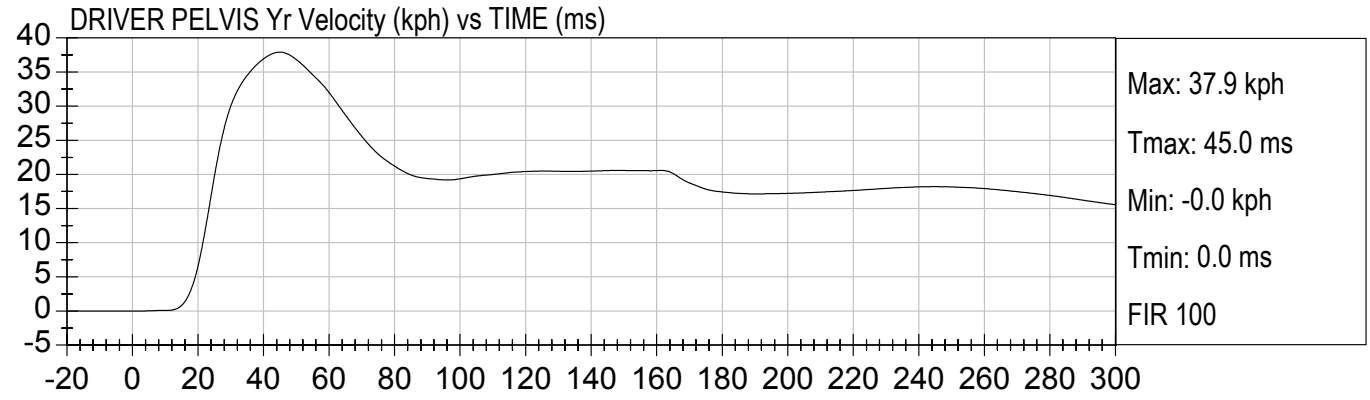


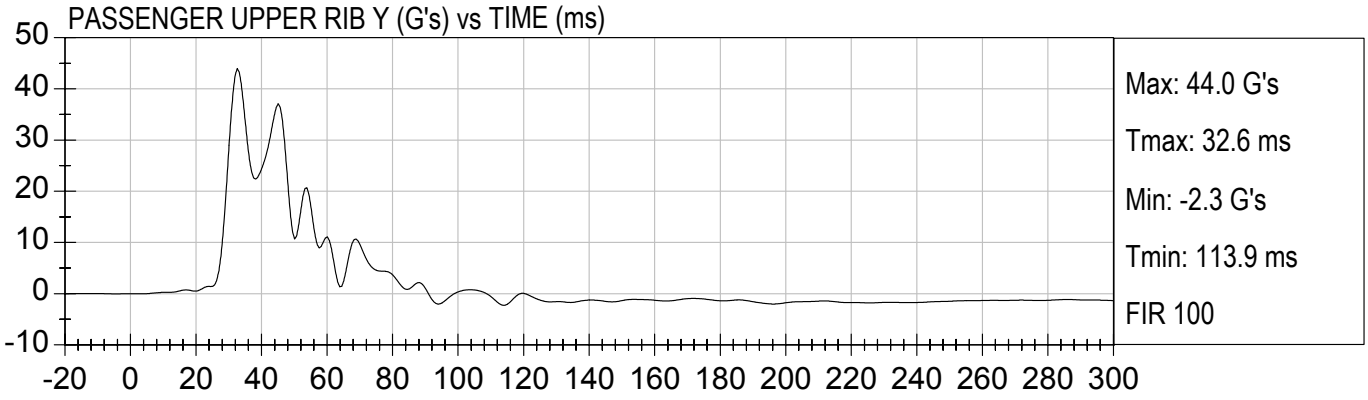


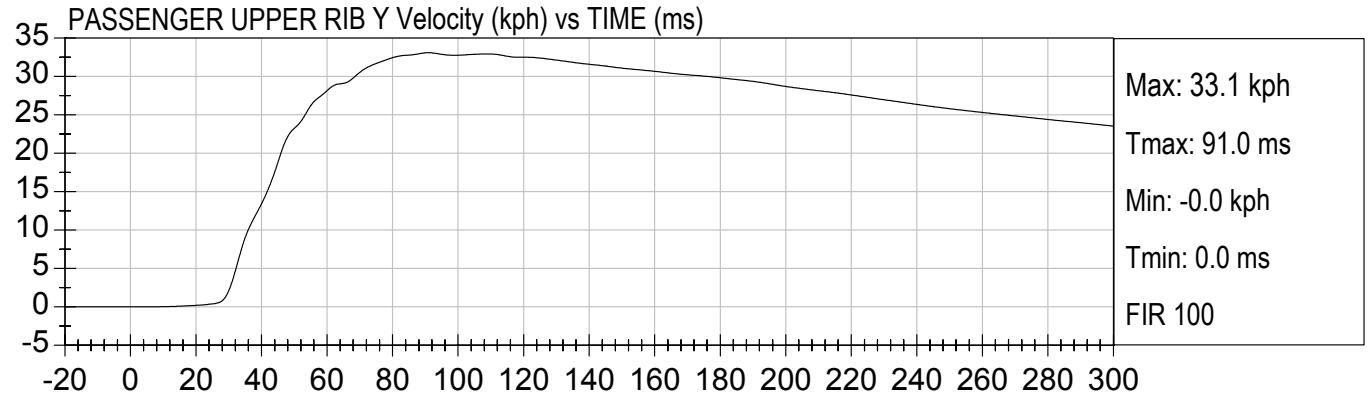

DRIVER PELVIS Y (G's) vs TIME (ms)
Max: 79.8 G's
Tmax: 23.8 ms
Min: -19.0 G's
Tmin: 62.0 ms
FIR 100

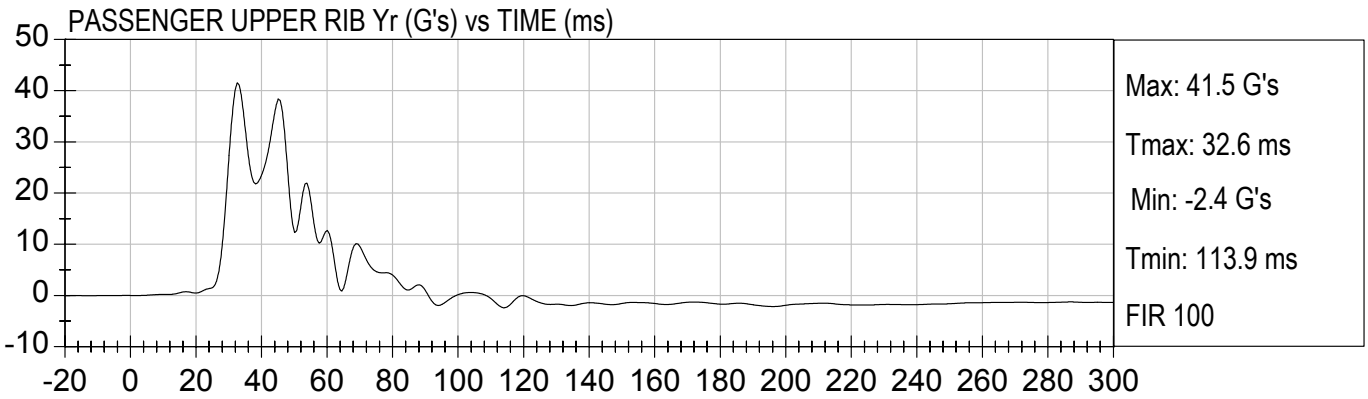

DRIVER PELVIS Y Velocity (kph) vs TIME (ms)
Max: 37.6 kph
Tmax: 44.5 ms
Min: -0.0 kph
Tmin: 0.0 ms
FIR 100

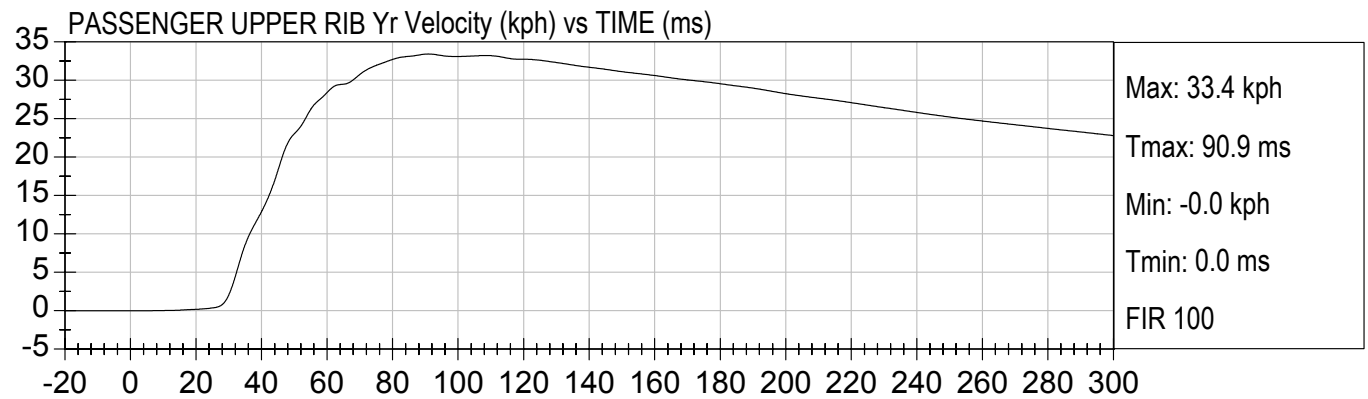

DRIVER PELVIS Yr (G's) vs TIME (ms)
Max: 81.0 G's
Tmax: 23.8 ms
Min: -19.0 G's
Tmin: 62.0 ms
FIR 100

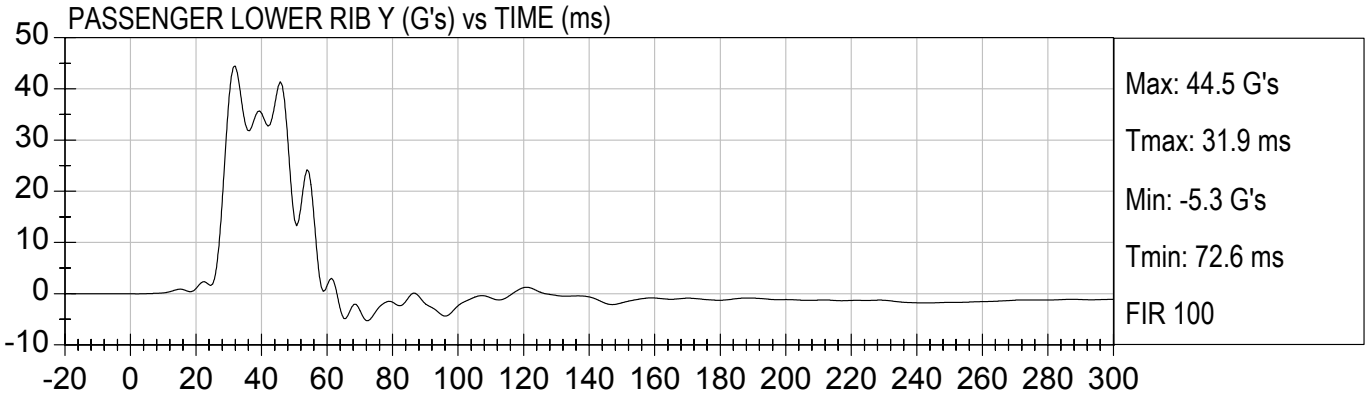

DRIVER PELVIS Yr Velocity (kph) vs TIME (ms)
Max: 37.9 kph
Tmax: 45.0 ms
Min: -0.0 kph
Tmin: 0.0 ms
FIR 100

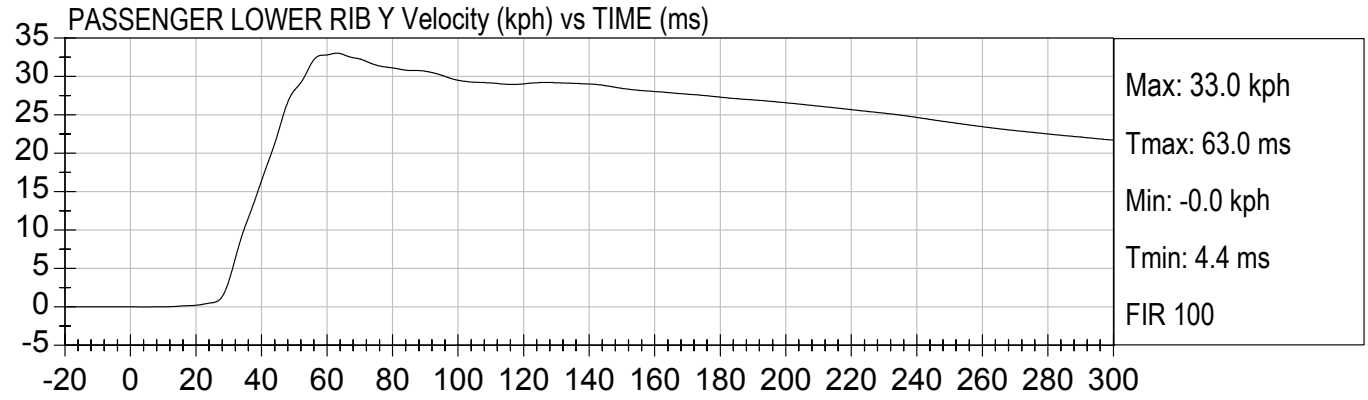

PASSENGER UPPER RIB Y (G's) vs TIME (ms)
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 44.0 G's
Tmax: 32.6 ms
Min: -2.3 G's
Tmin: 113.9 ms
FIR 100

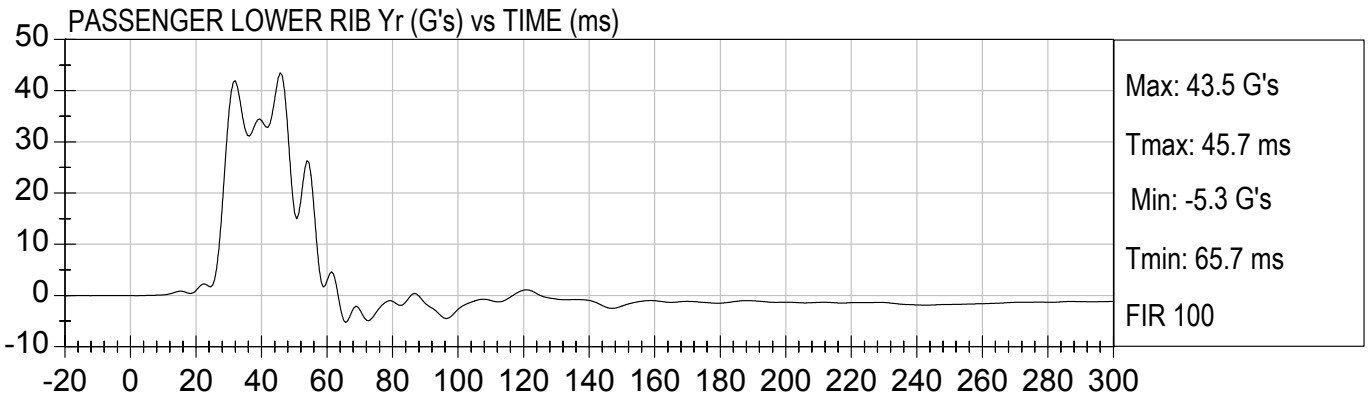

PASSENGER UPPER RIB Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 33.1 kph
Tmax: 91.0 ms
Min: -0.0 kph
Tmin: 0.0 ms
FIR 100

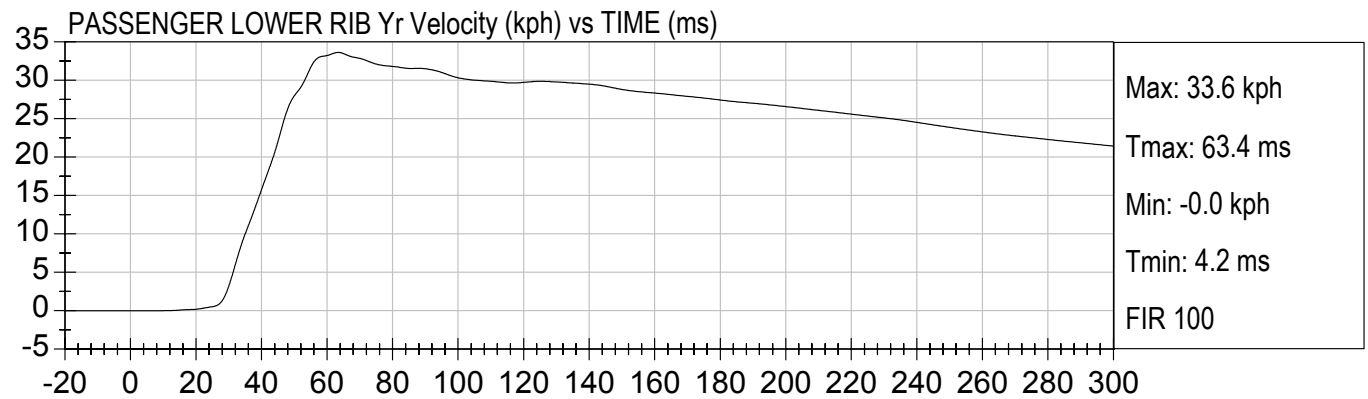

PASSENGER UPPER RIB Yr (G's) vs TIME (ms)
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 41.5 G's
Tmax: 32.6 ms
Min: -2.4 G's
Tmin: 113.9 ms
FIR 100

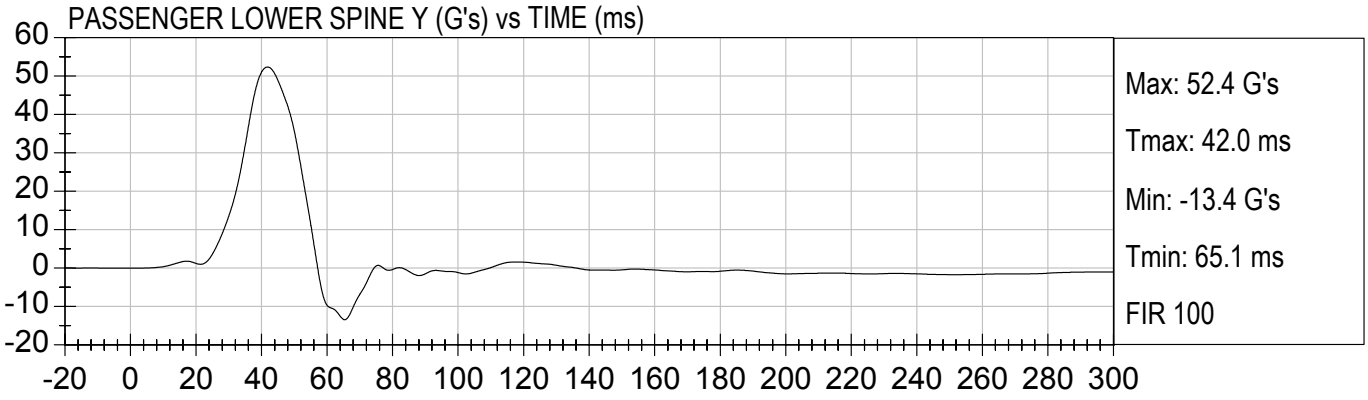

PASSENGER UPPER RIB Yr Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 33.4 kph
Tmax: 90.9 ms
Min: -0.0 kph
Tmin: 0.0 ms
FIR 100

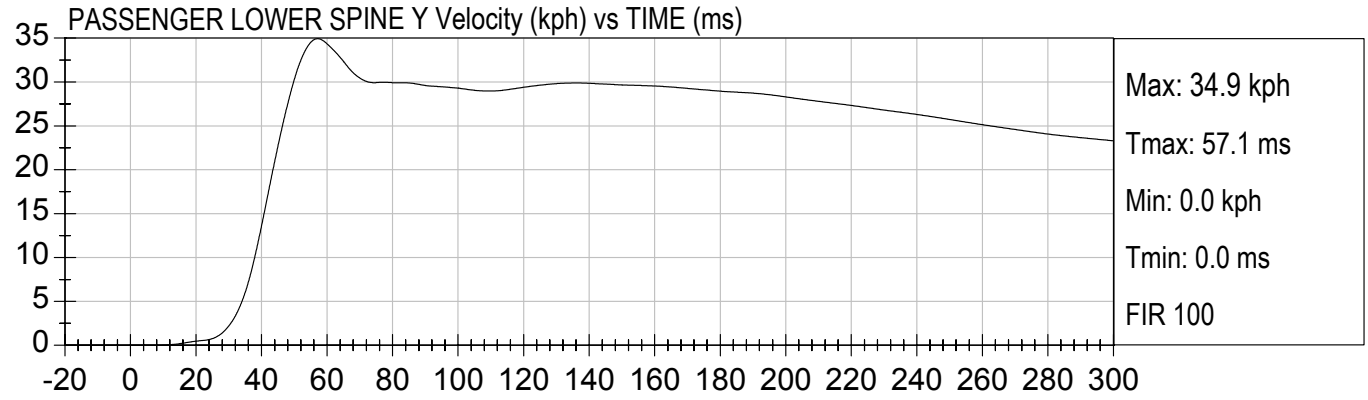

PASSENGER LOWER RIB Y (G's) vs TIME (ms)
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 44.5 G's
Tmax: 31.9 ms
Min: -5.3 G's
Tmin: 72.6 ms
FIR 100

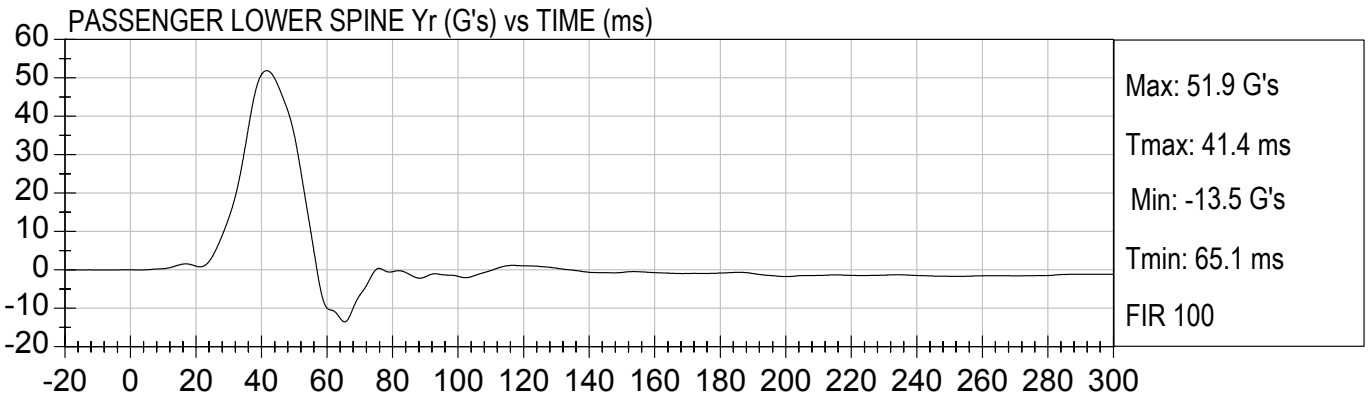

PASSENGER LOWER RIB Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 33.0 kph
Tmax: 63.0 ms
Min: -0.0 kph
Tmin: 4.4 ms
FIR 100

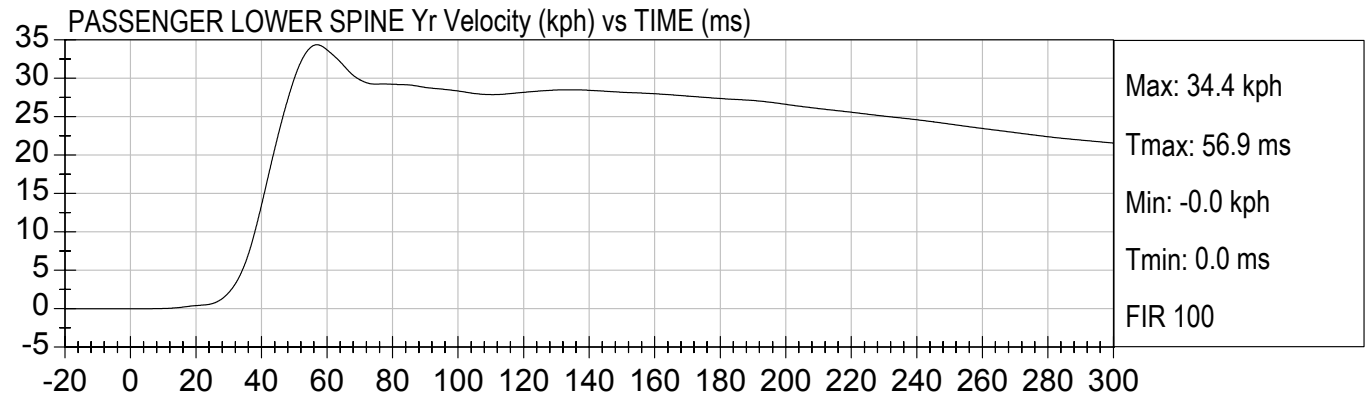

PASSENGER LOWER RIB Yr (G's) vs TIME (ms)
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 43.5 G's
Tmax: 45.7 ms
Min: -5.3 G's
Tmin: 65.7 ms
FIR 100


PASSENGER LOWER RIB Yr Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 33.6 kph
Tmax: 63.4 ms
Min: -0.0 kph
Tmin: 4.2 ms
FIR 100


PASSENGER LOWER SPINE Y (G's) vs TIME (ms)
Max: 52.4 G's
Tmax: 42.0 ms
Min: -13.4 G's
Tmin: 65.1 ms
FIR 100

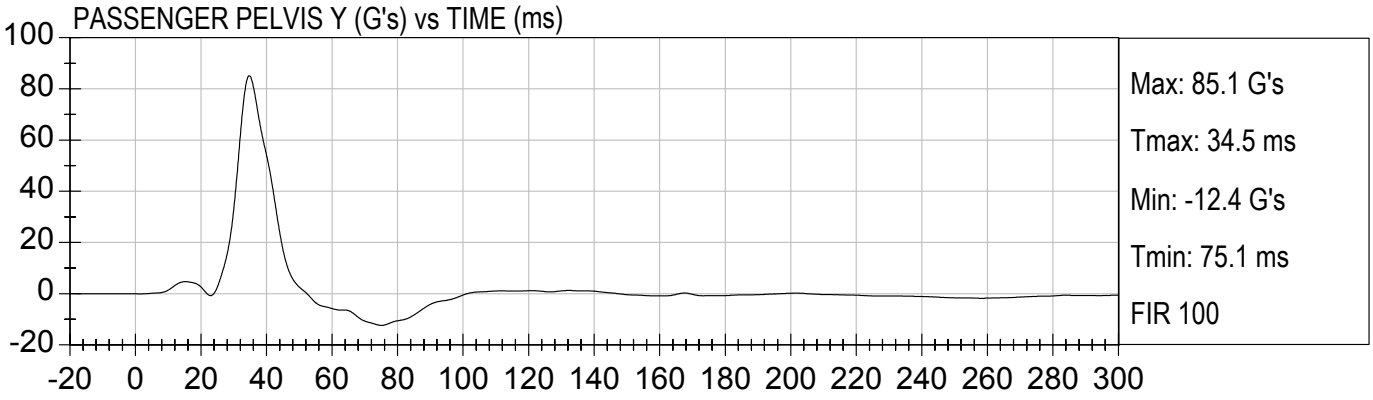

PASSENGER LOWER SPINE Y Velocity (kph) vs TIME (ms)
Max: 34.9 kph
Tmax: 57.1 ms
Min: 0.0 kph
Tmin: 0.0 ms
FIR 100

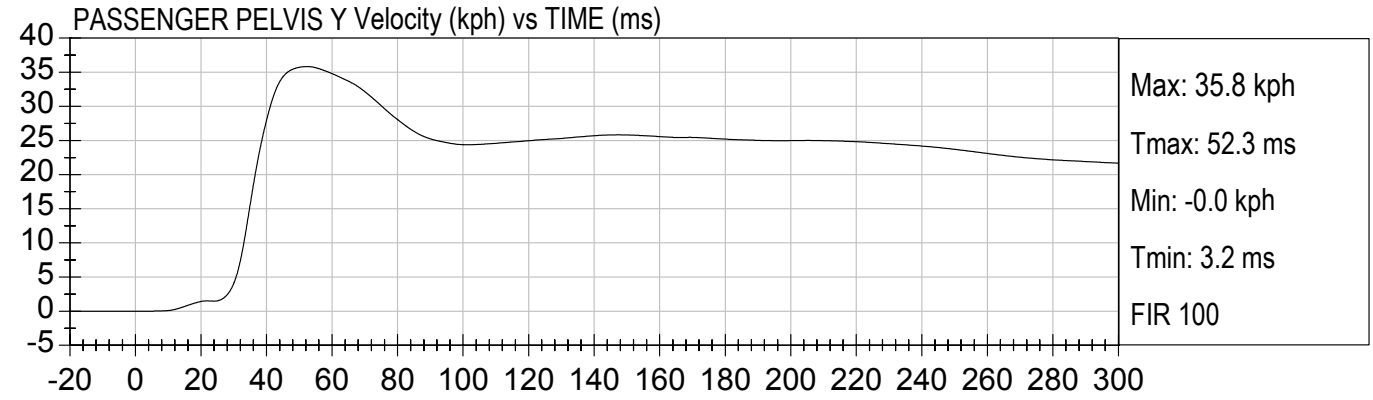

PASSENGER LOWER SPINE Yr (G's) vs TIME (ms)
Max: 51.9 G's
Tmax: 41.4 ms
Min: -13.5 G's
Tmin: 65.1 ms
FIR 100

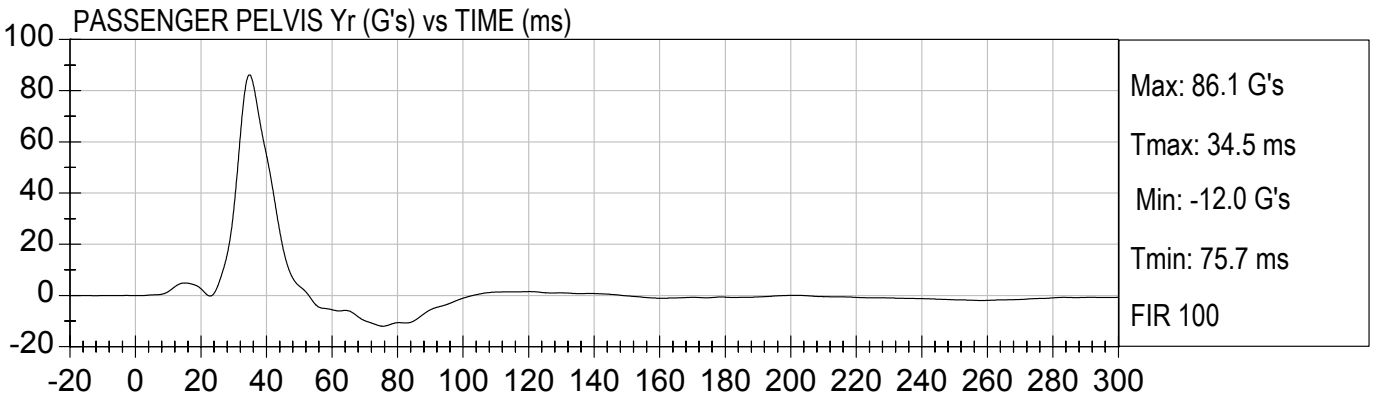

PASSENGER LOWER SPINE Yr Velocity (kph) vs TIME (ms)
Max: 34.4 kph
Tmax: 56.9 ms
Min: -0.0 kph
Tmin: 0.0 ms
FIR 100

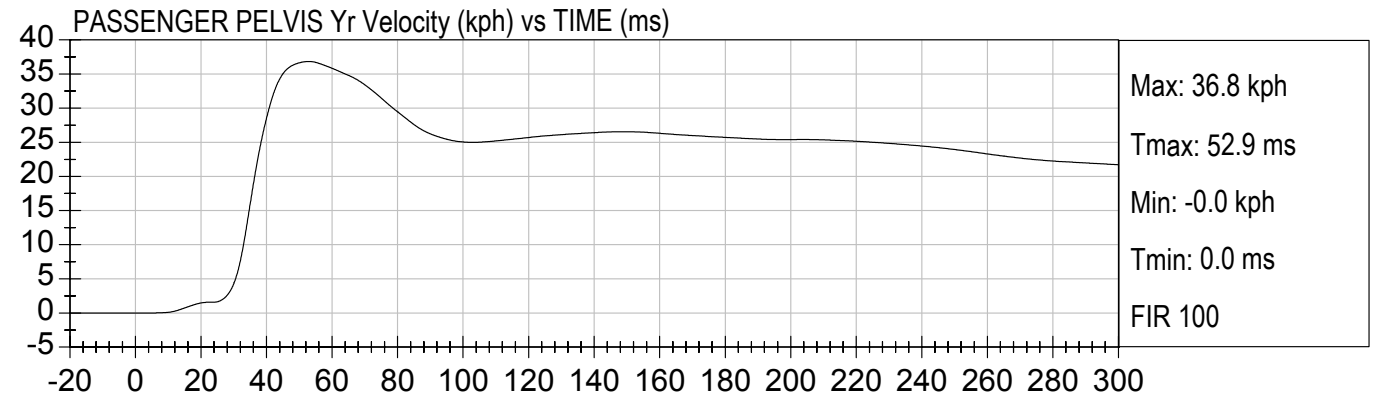
NCAP SIDE IMPACT
2005 VOLVO V70 STATION WAGON (M55901)

Test Date: 10/20/04
Speed: 38.7 mph (62.3 km/h)









APPENDIX C

SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CERTIFICATION DATA

Dummy Serial Number: 271

Calibration Test Results Summary

Dummy Serial Number: 271

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID Calibration Data Sheet

Side Impact Dummy

External Measurements

ATD Serial No: 271 **Test I.D:** D04225

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	905	Pass
RH - Rib Height	mm	501 - 521	512	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	233	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	525	Pass
SW - Knee Pivot to Floor	mm	490 - 505	499	Pass
HW - Hip Width	mm	356 - 391	362	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

08/27/2004
Test Date

David Winkelbauer
Approved By

SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 271 **Test I.D:** D042251

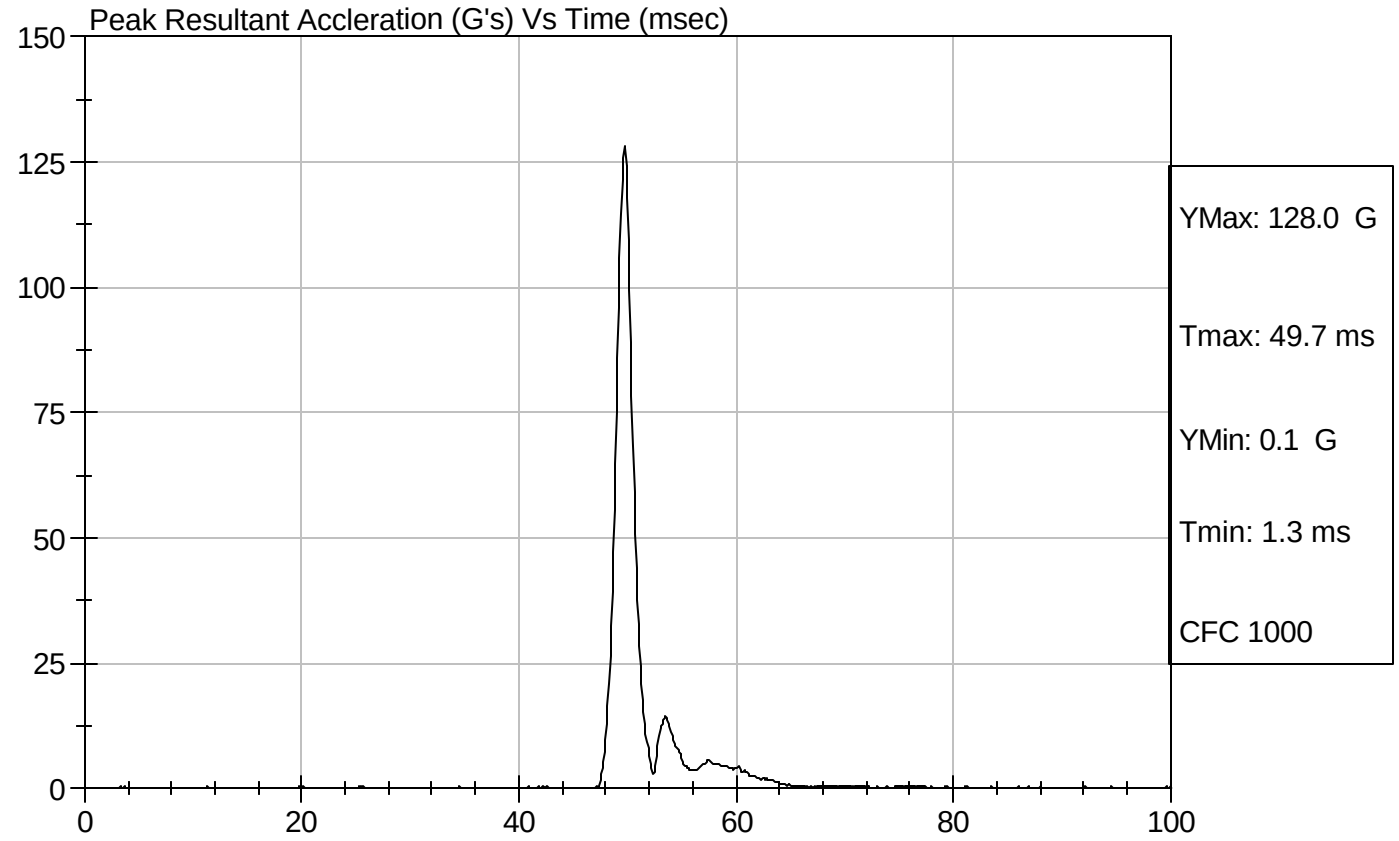
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Peak Resultant Acceleration	G's	120 to 150	128	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-11	Pass
		Overall Test Results		Pass

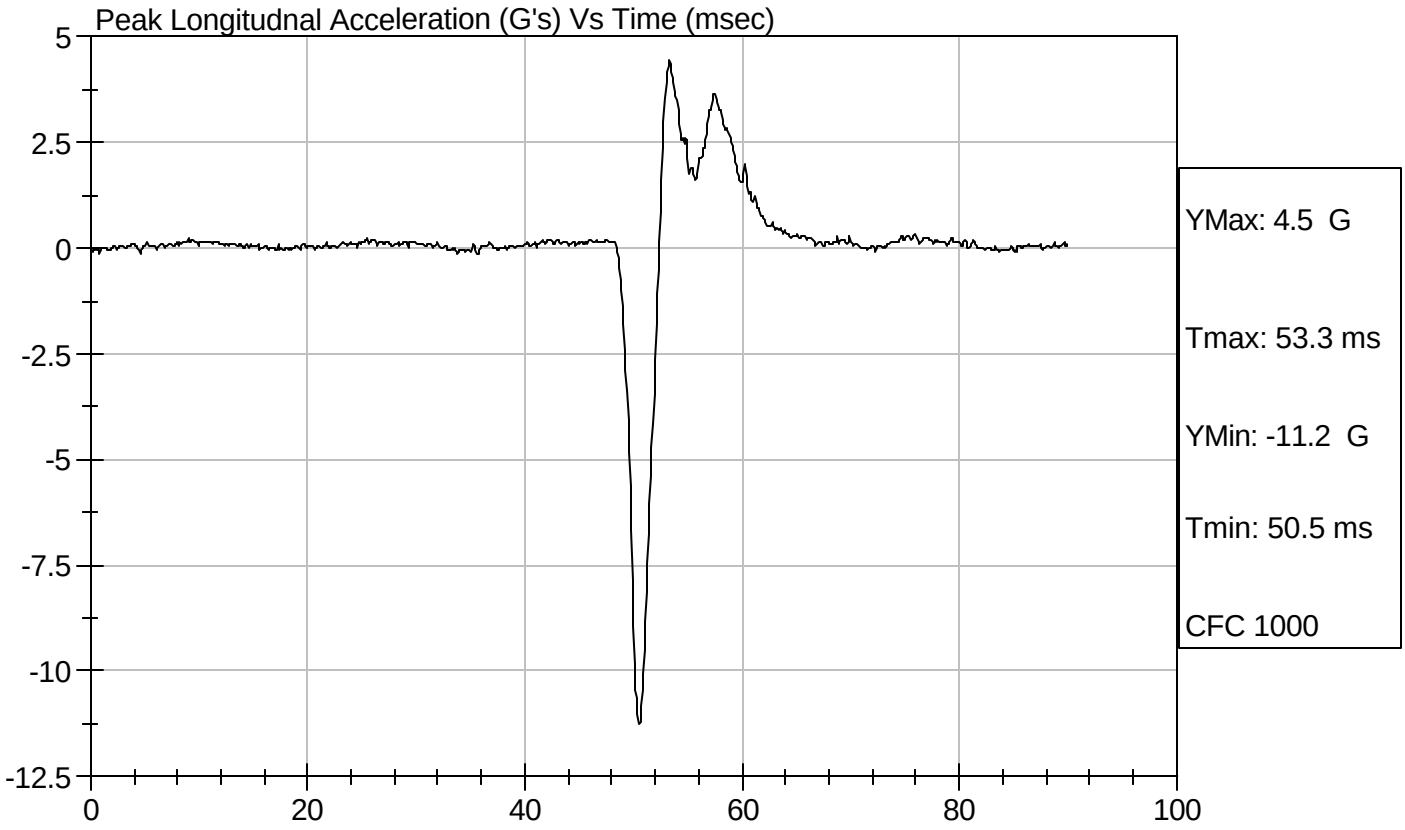
Jessica Hall
Laboratory Technician

09/21/2004
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 09/21/2004
	Component: D042251	Speed: 0 ft/s, 0.00 m/s





SID Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 271 **Test I.D:** D042252

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Velocity	m/s	4.27 - 4.33	4.28	Pass
Upper Rib	G's	37 - 46	45	Pass
Lower Rib	G's	37 - 46	45	Pass
Lower Spine	G's	15 - 22	21	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

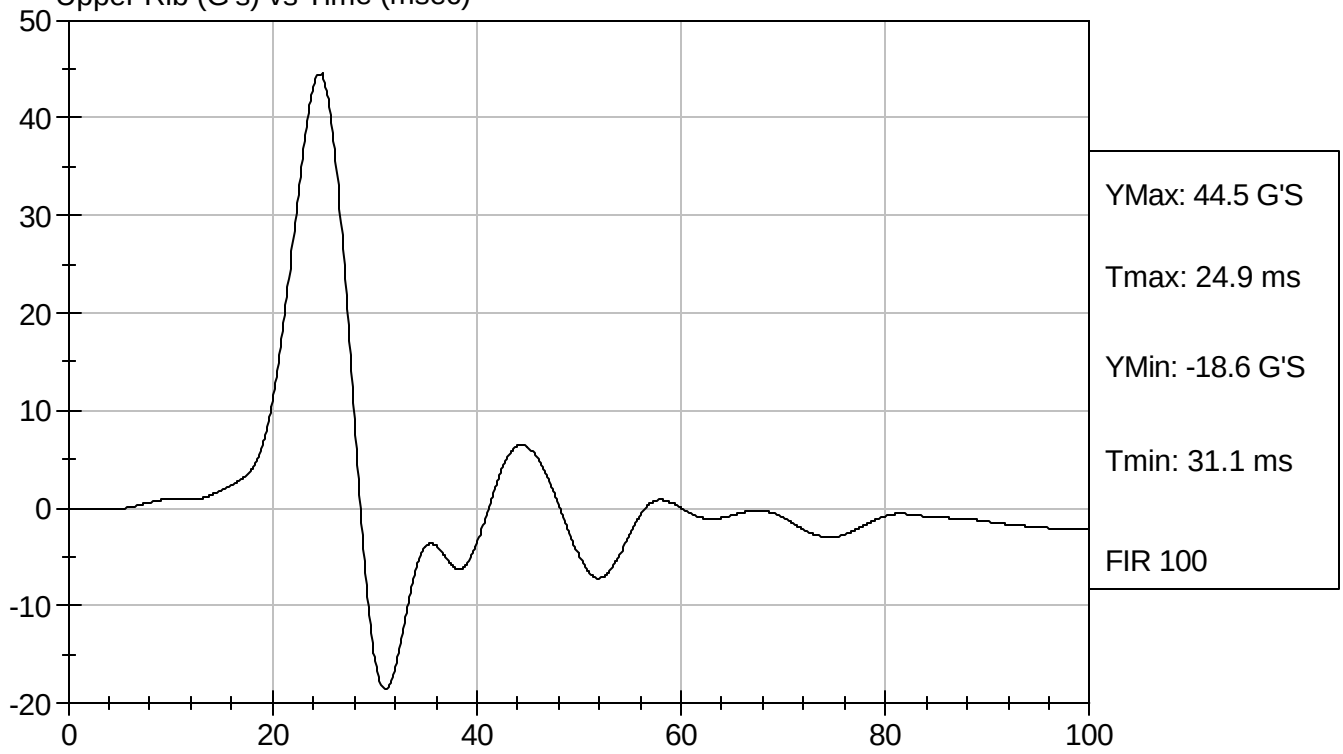
09/21/2004
Test Date

David Winkelbauer
Approved By

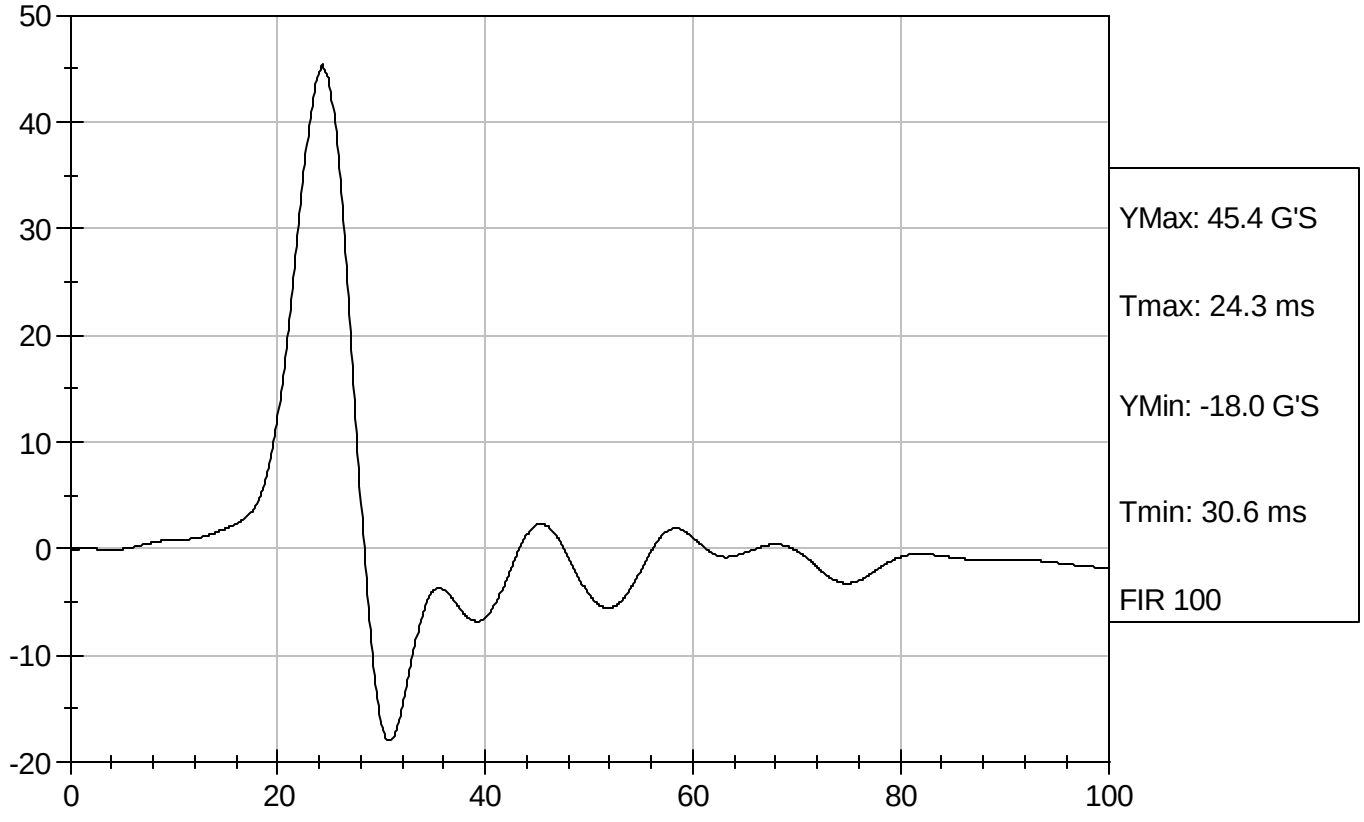
Test Desc: Thorax Impact
Component ID: D042252

Test Date: 09/21/2004
Speed: 14.04 ft/sec, 4.28 m/sec

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

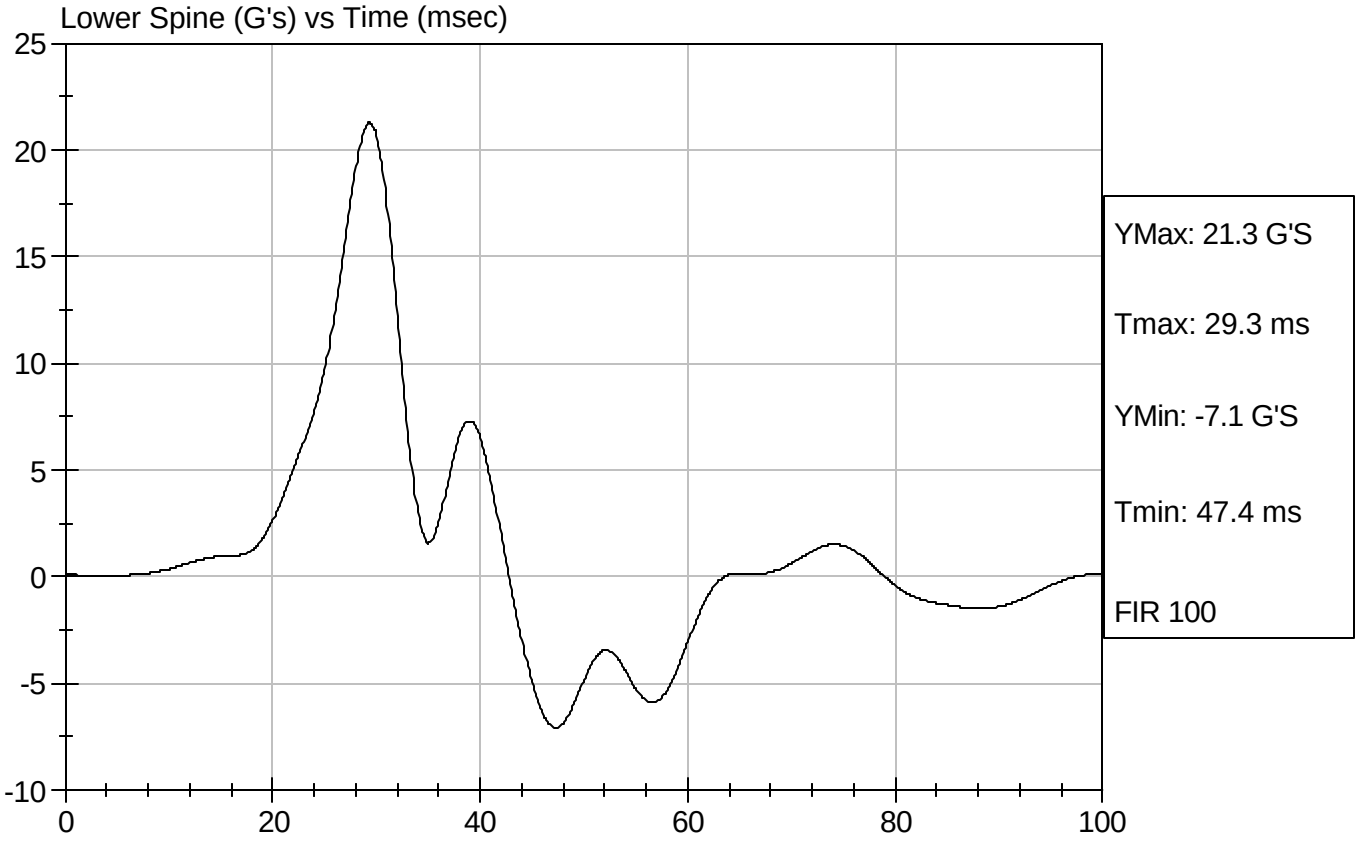


Lower Rib (G's) vs Time (msec)



Test Desc: Thorax Impact
Component ID: D042252

Test Date: 09/21/2004
Speed: 14.04 ft/sec, 4.28 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 271 **Test I.D:** D042253

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Probe Velocity	m/s	4.27 - 4.33	4.28	Pass
Pelvis Acceleration	G's	40 - 60	48	Pass
		Overall Test Results		Pass

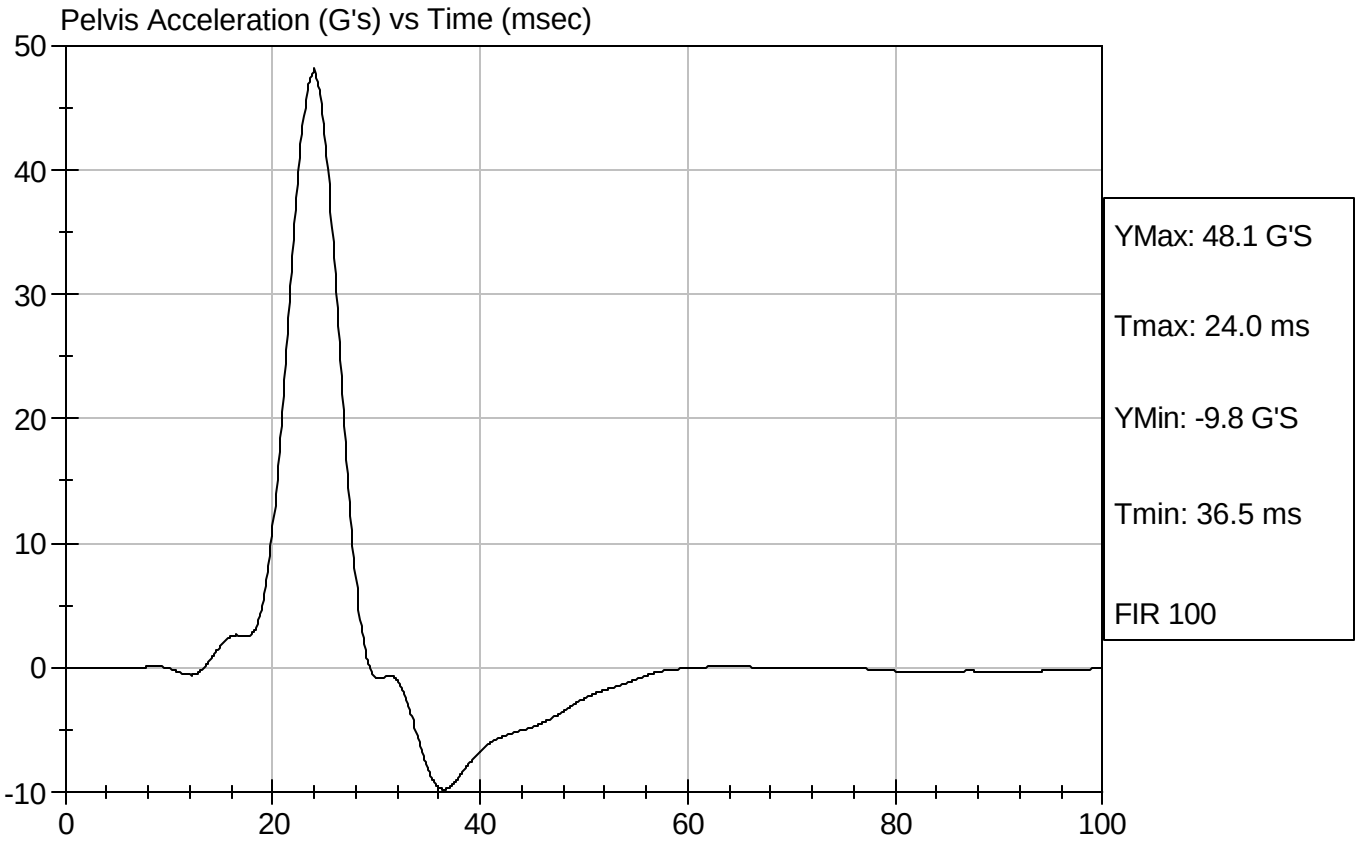
Jessica Hall
Laboratory Technician

09/21/2004
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D042253

Test Date: 09/21/2004
Speed: 14.04 ft/sec, 4.28 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271 **Test I.D:** D042254

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Force At 12.7 mm	N	104 -162	149	Pass
Force At 19 mm	N	163 - 222	207	Pass
Force At 25.4 mm	N	222 - 280	273	Pass
Force At 33 mm	N	325 - 391	389	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

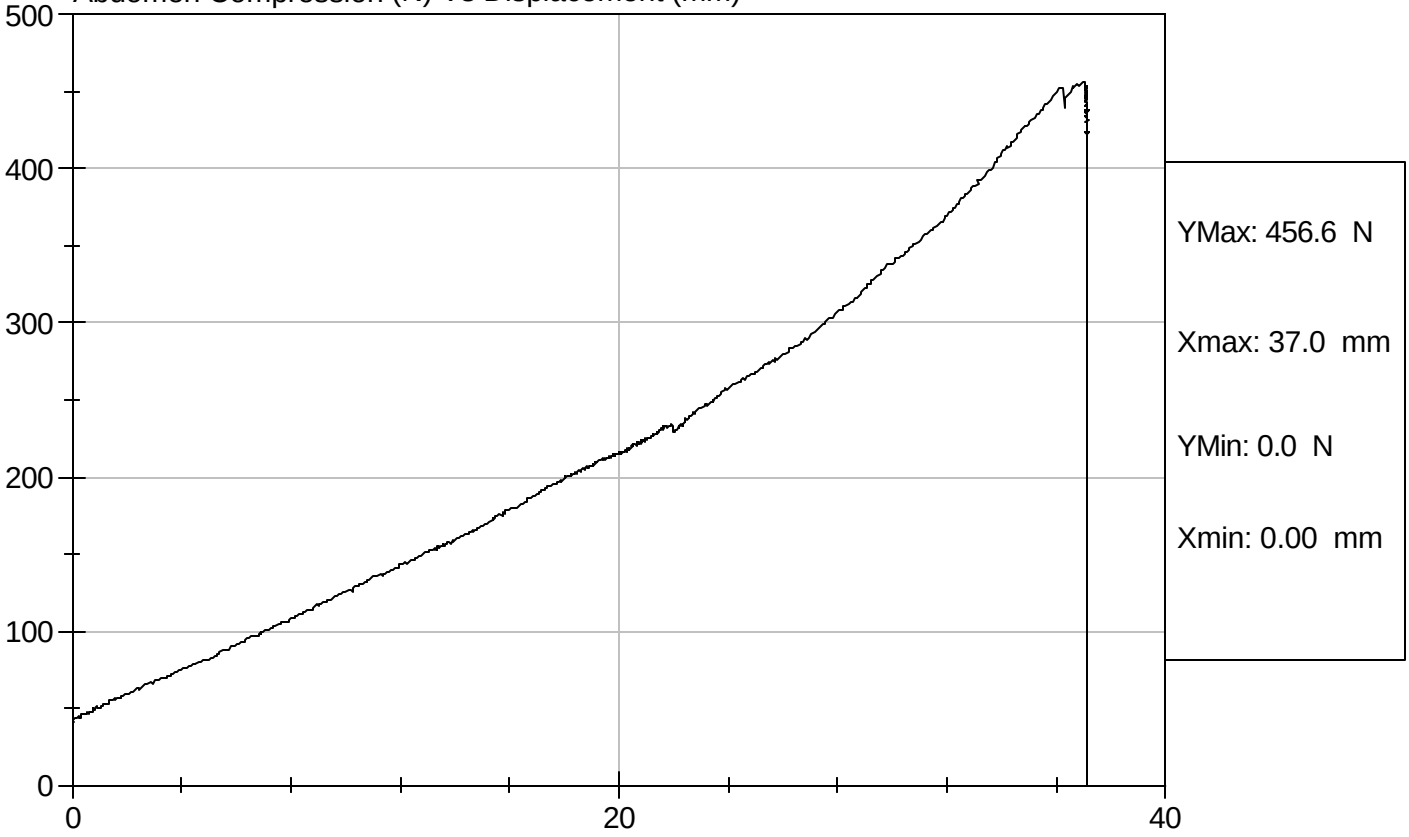
09/21/2004
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression Test Date: 09/21/2004

Component: D042254 Speed: 0 ft/sec, 0 m/sec

Abdomen Compression (N) Vs Displacement (mm)



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 271 **Test I.D:** D042255

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	116.3	Pass
Force At 30 deg	N	151.2 - 204.6	172.7	Pass
Force At 40 deg	N	204.6 - 258.0	214.9	Pass
Return Angle	Deg	12 Maximum	6	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

09/21/2004
Test Date

David Winkelbauer
Approved By

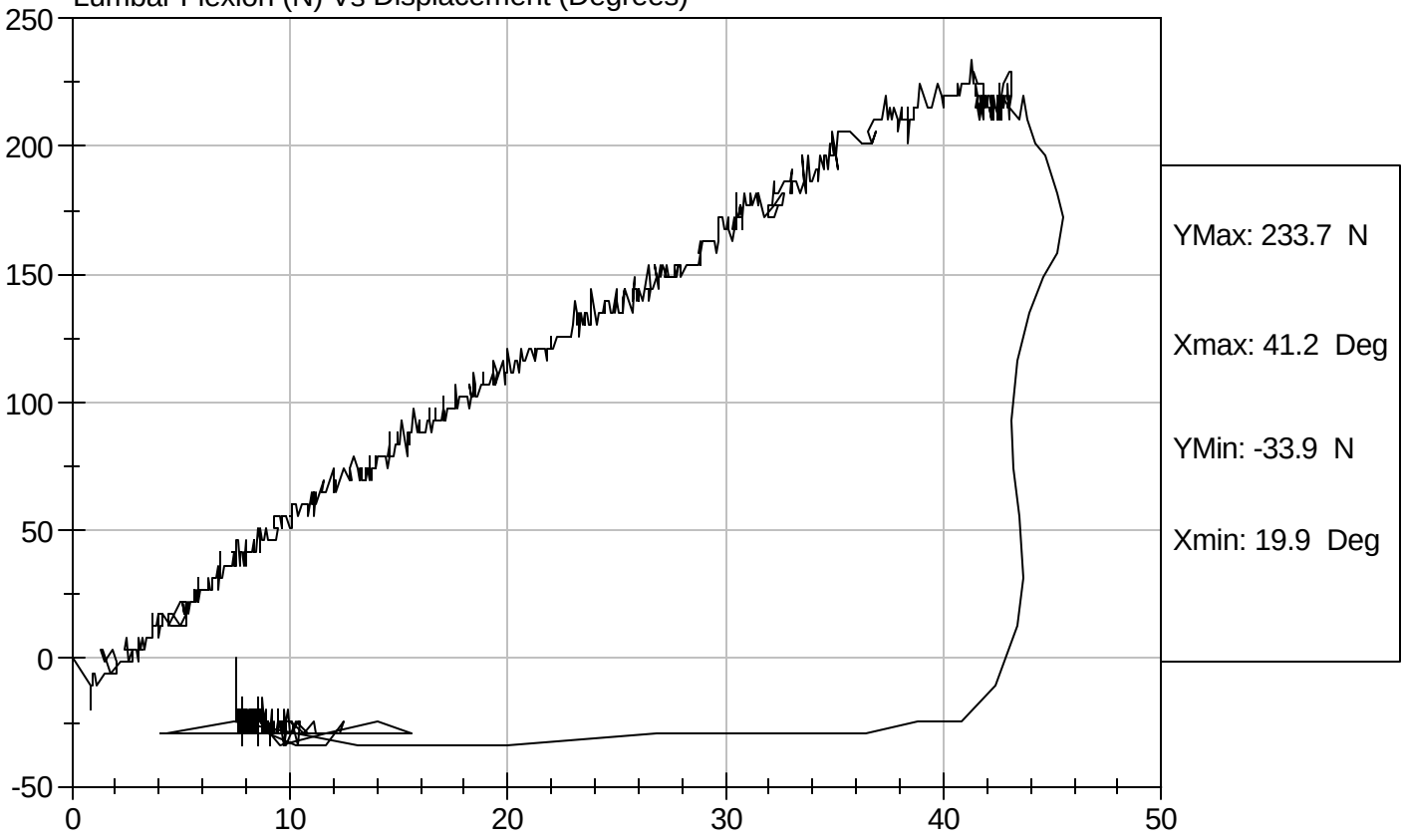
Test Description: Lumbar Flexion

Test Date: 09/21/2004

Component: D042255

Speed: 0 ft/sec, 0 m/sec

Lumbar Flexion (N) Vs Displacement (Degrees)



SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 271 **Test I.D:** D042259

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	42	Pass
Impact Velocity		m/s	6.89 to 7.13	7.05	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.22	Pass
	20 msec	m/s	4.12 to 5.10	4.48	Pass
	30 msec	m/s	5.73 to 7.01	6.36	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.19	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	79	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	60	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	12	Pass

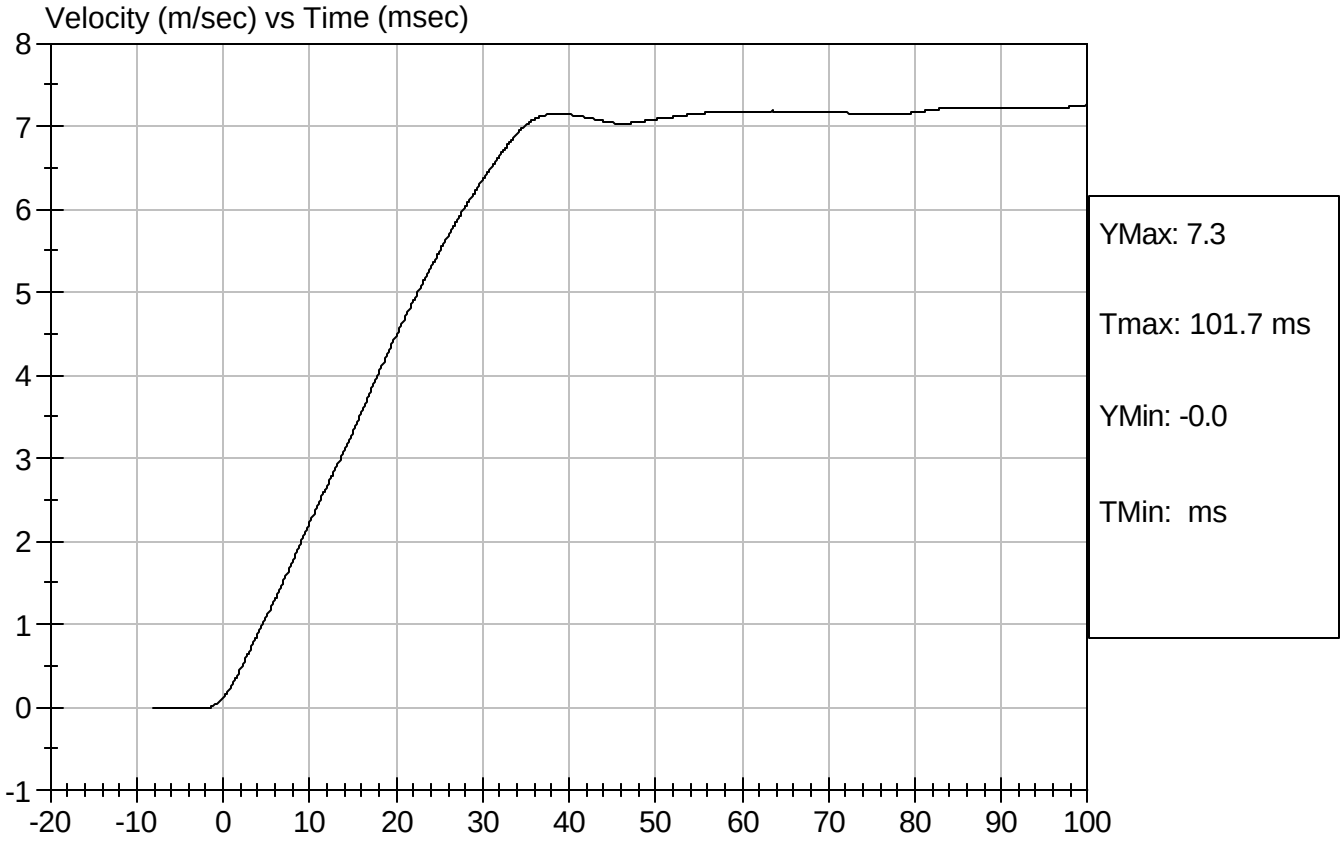
Jessica Hall
Laboratory Technician

09/21/2004
Test Date

David Winkelbauer
Approved By

Test Desc: Neck Flexion
Component ID: D042259

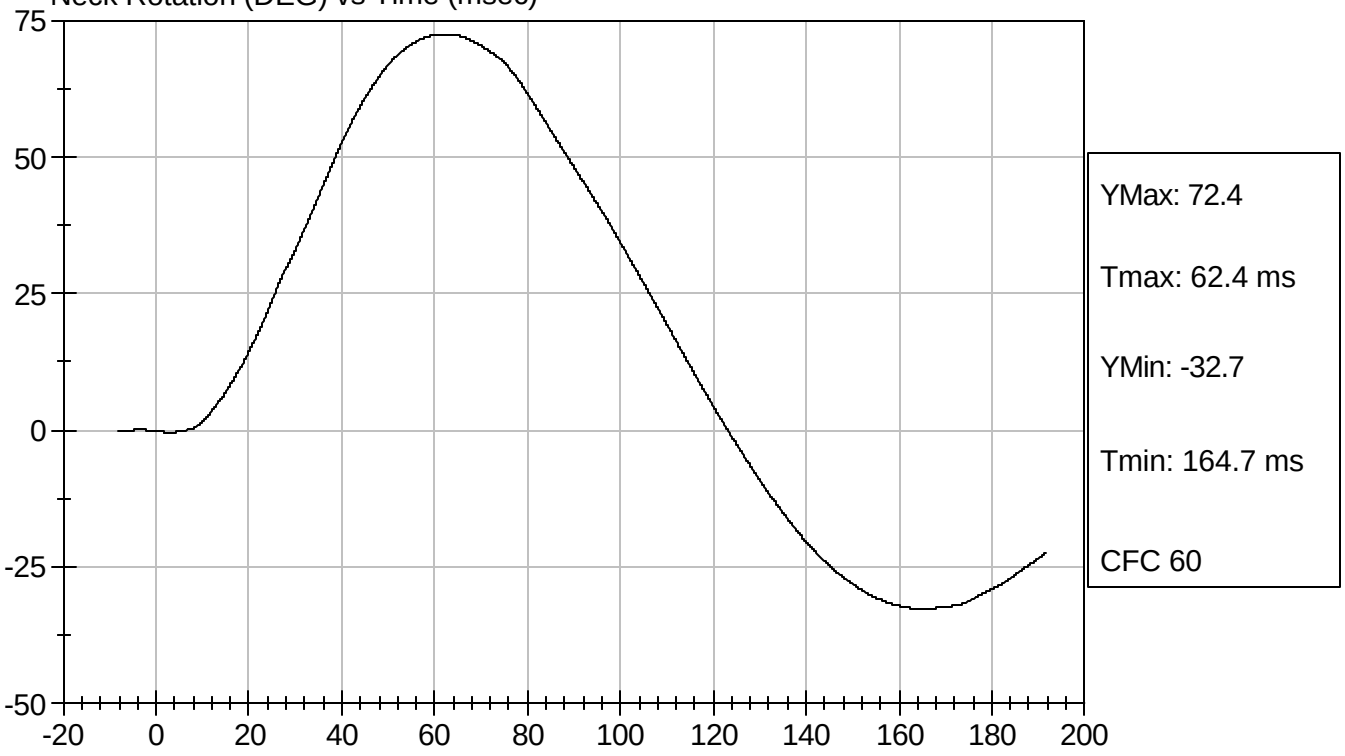
Test Date: 09/21/2004
Speed: 23.14 ft/sec, 7.05 m/sec



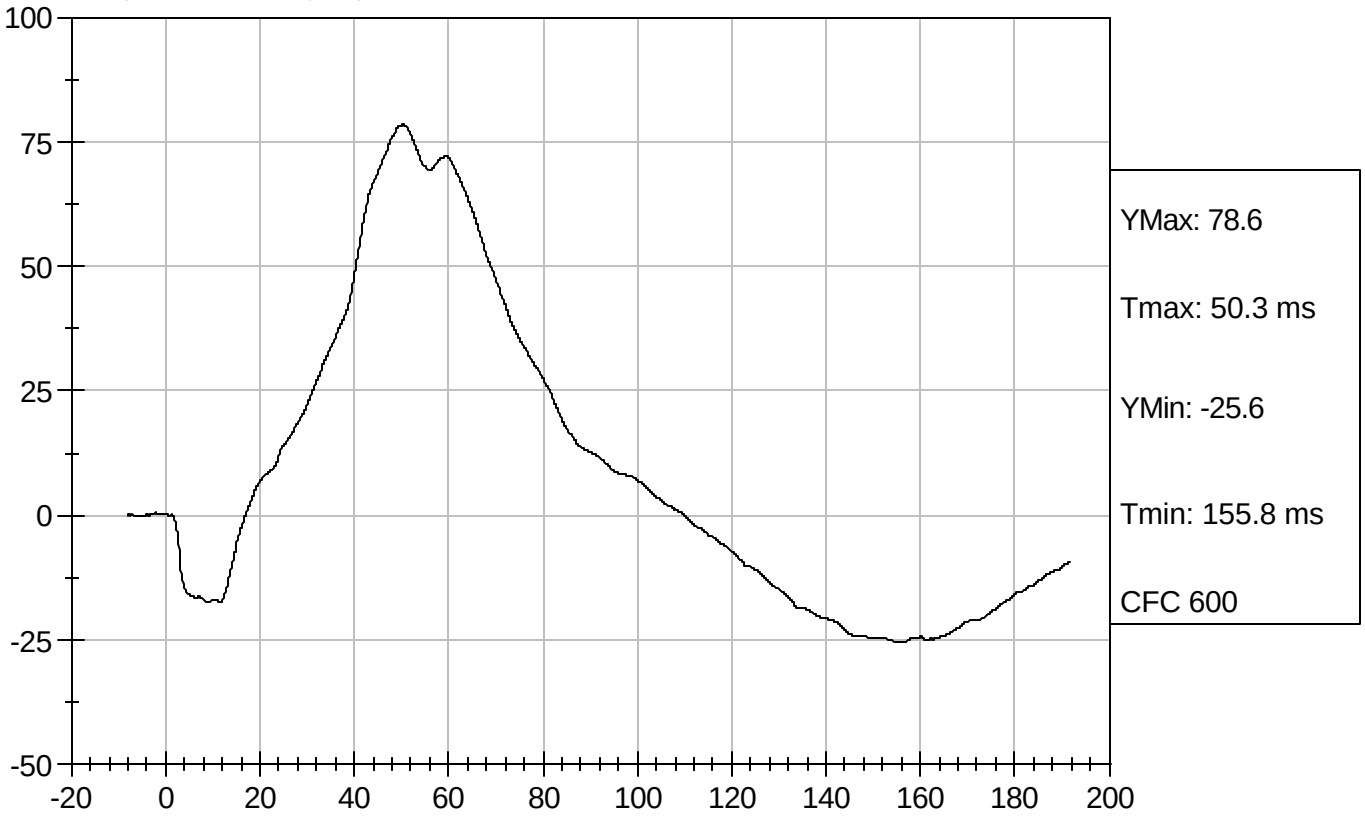
Test Desc: Neck Flexion
Component ID: D042259

Test Date: 09/21/2004
Speed: 23.14 ft/sec, 7.05 m/sec

Neck Rotation (DEG) vs Time (msec)



Occipital Moment (Nm) vs Time (msec)



Calibration Test Results Summary

Dummy Serial Number: 271

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 271 **Test I.D:** D042441

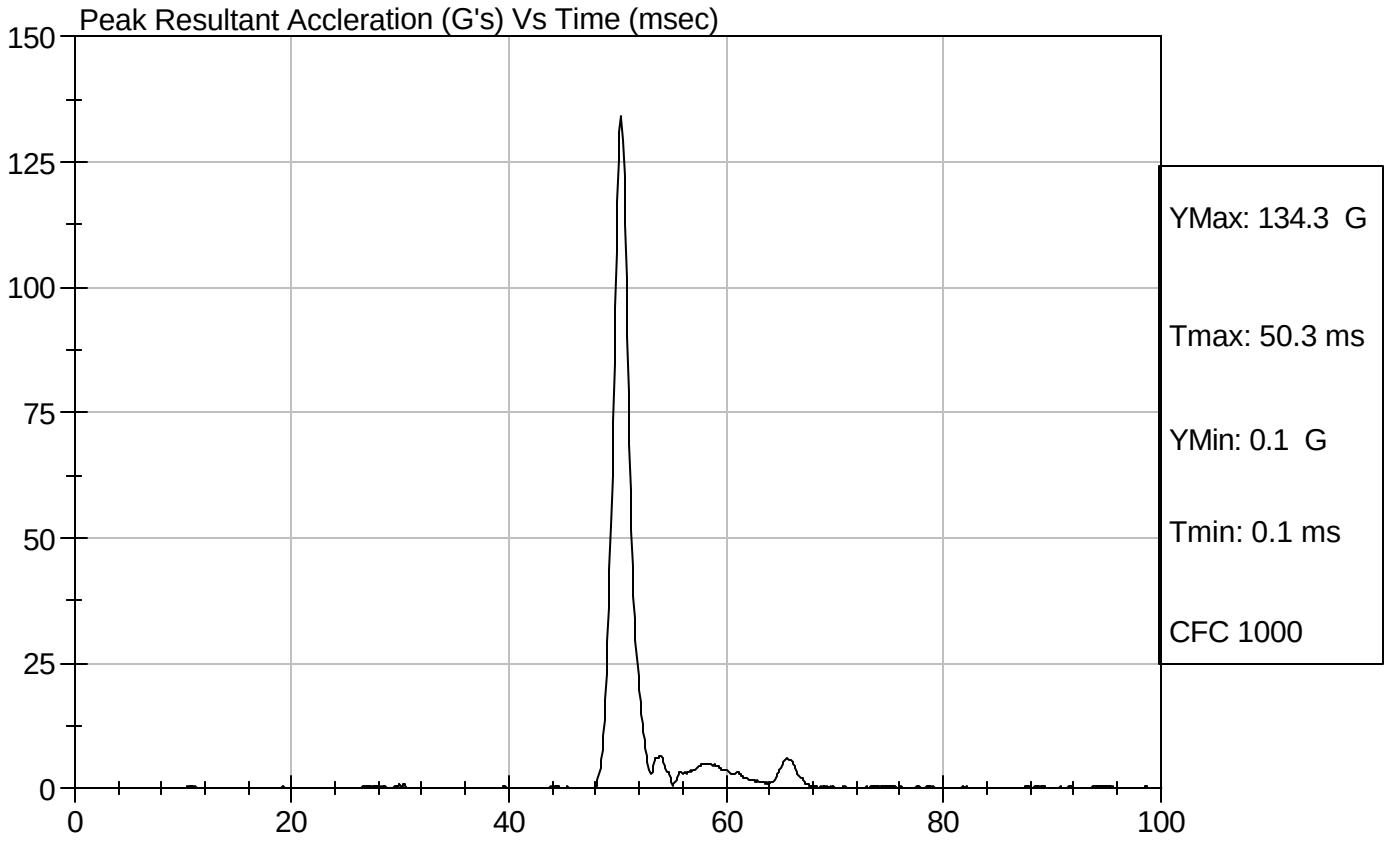
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Peak Resultant Acceleration	G's	120 to 150	134	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-9	Pass
		Overall Test Results		Pass

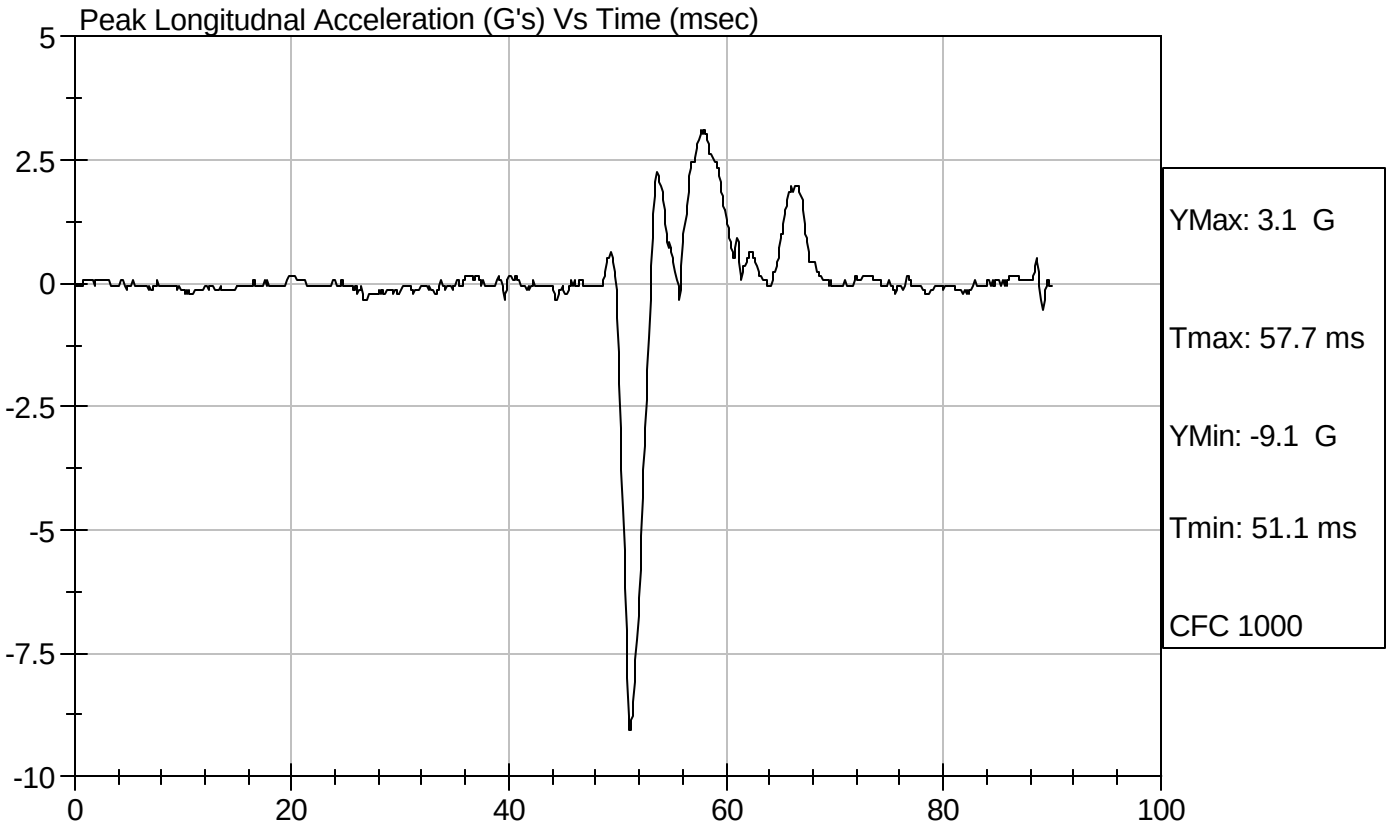
Jessica Hall
Laboratory Technician

10/21/2004
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 10/21/2004
	Component: D042441	Speed: 0 ft/s, 0.00 m/s





SID Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 271 **Test I.D:** D042442

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Probe Velocity	m/s	4.27 - 4.33	4.27	Pass
Upper Rib	G's	37 - 46	43	Pass
Lower Rib	G's	37 - 46	43	Pass
Lower Spine	G's	15 - 22	21	Pass
		Overall Test Results		Pass

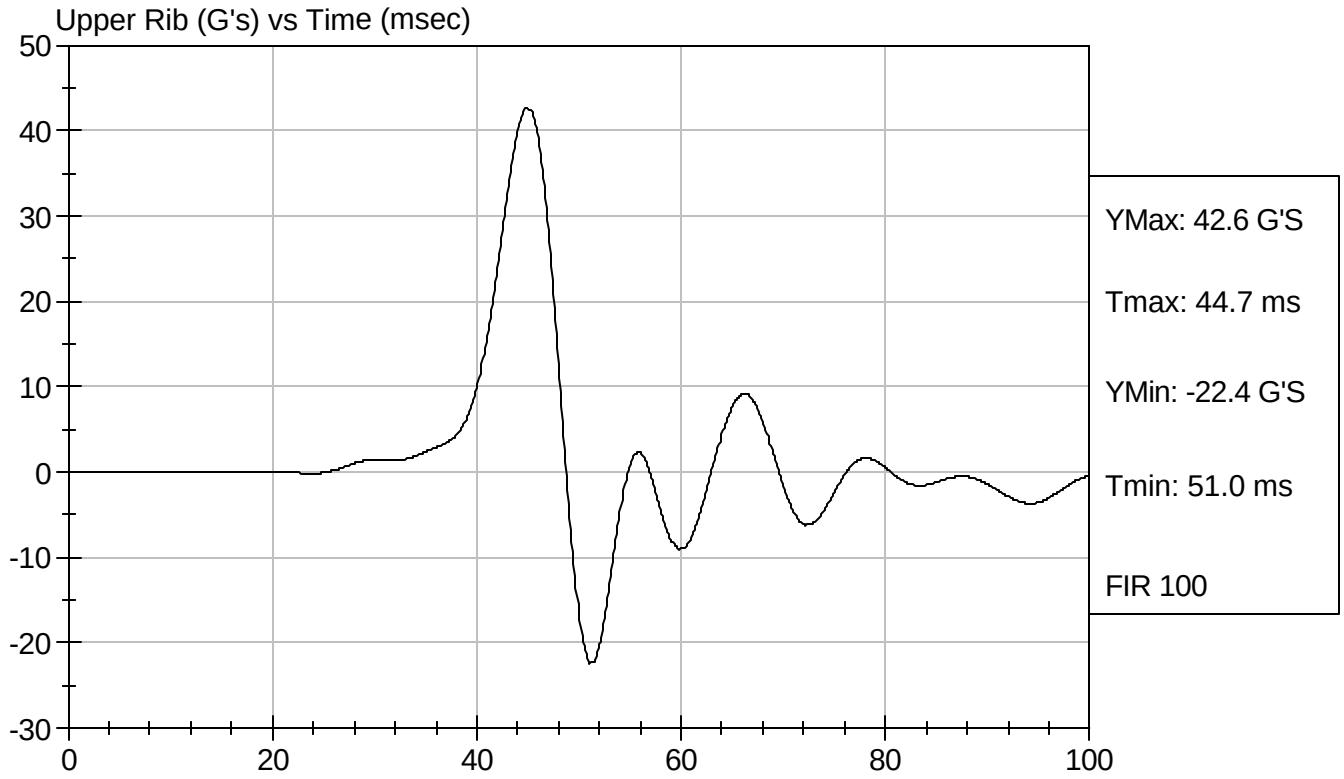
Jessica Hall
Laboratory Technician

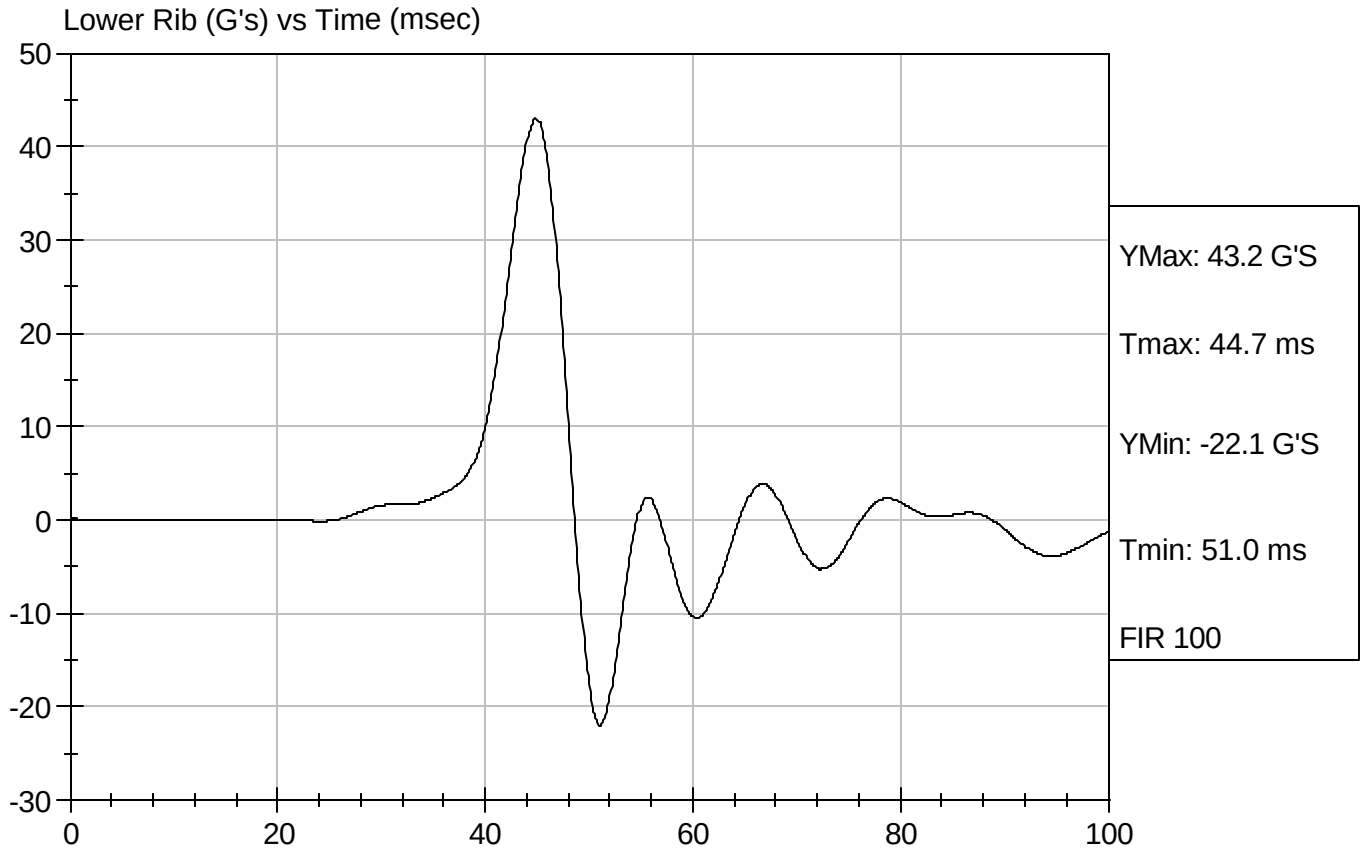
10/20/2004
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D042442

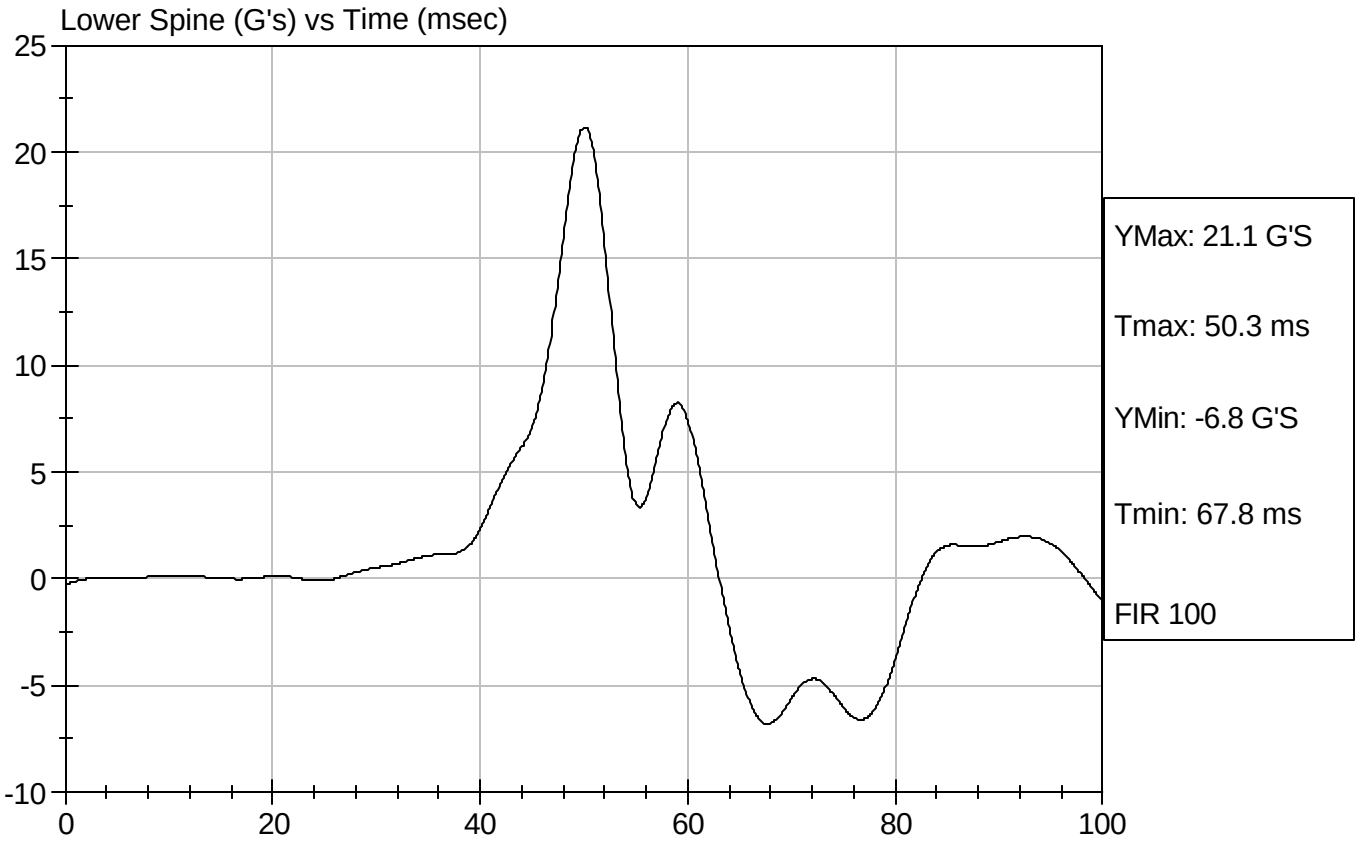
Test Date: 10/20/2004
Speed: 14.01 ft/sec, 4.27 m/sec





Test Desc: Thorax Impact
Component ID: D042442

Test Date: 10/20/2004
Speed: 14.01 ft/sec, 4.27 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 271 **Test I.D:** D042443

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Probe Velocity	m/s	4.27 - 4.33	4.31	Pass
Pelvis Acceleration	G's	40 - 60	45	Pass
		Overall Test Results		Pass

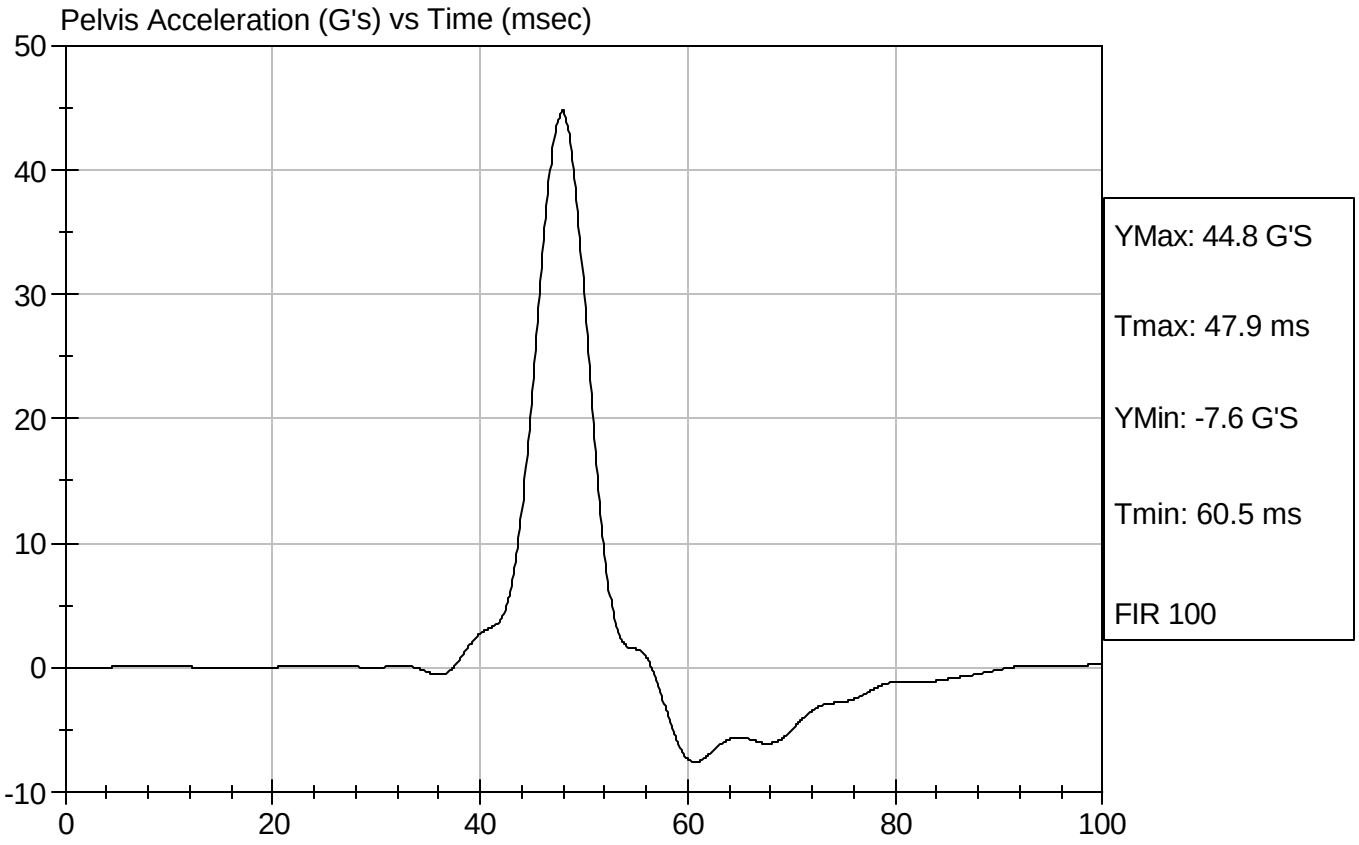
Jessica Hall
Laboratory Technician

10/20/2004
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D042443

Test Date: 10/20/2004
Speed: 14.14 ft/sec, 4.31 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271 **Test I.D:** D042444

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Force At 12.7 mm	N	104 -162	145	Pass
Force At 19 mm	N	163 - 222	200	Pass
Force At 25.4 mm	N	222 - 280	268	Pass
Force At 33 mm	N	325 - 391	370	Pass
		Overall Test Results		Pass

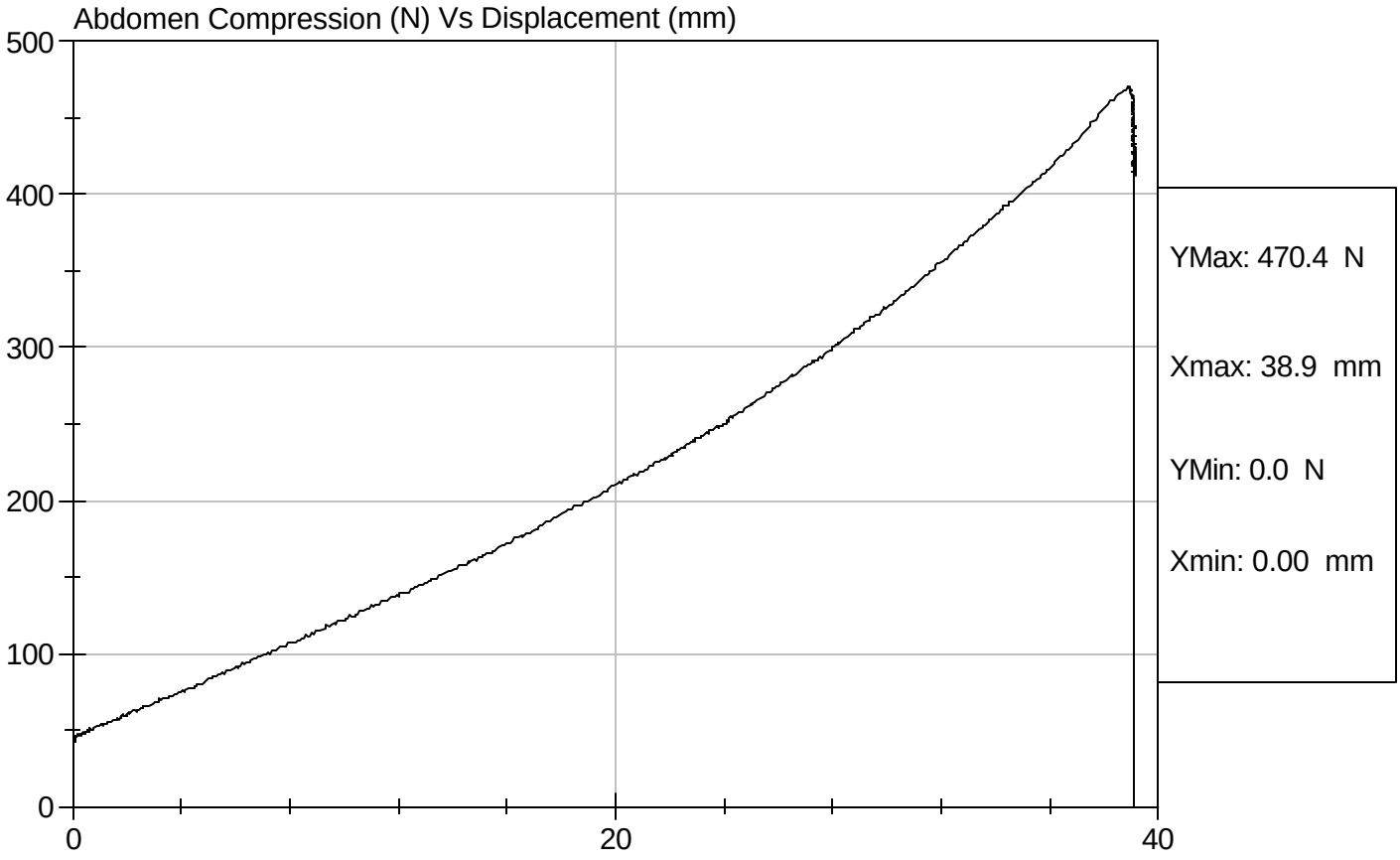
Jessica Hall
Laboratory Technician

10/21/2004
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression Test Date: 10/21/2004

Component: D042444 Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 271 **Test I.D:** D042445

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	111.9	Pass
Force At 30 deg	N	151.2 - 204.6	167.8	Pass
Force At 40 deg	N	204.6 - 258.0	218.6	Pass
Return Angle	Deg	12 Maximum	6	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

10/21/2004
Test Date

David Winkelbauer
Approved By

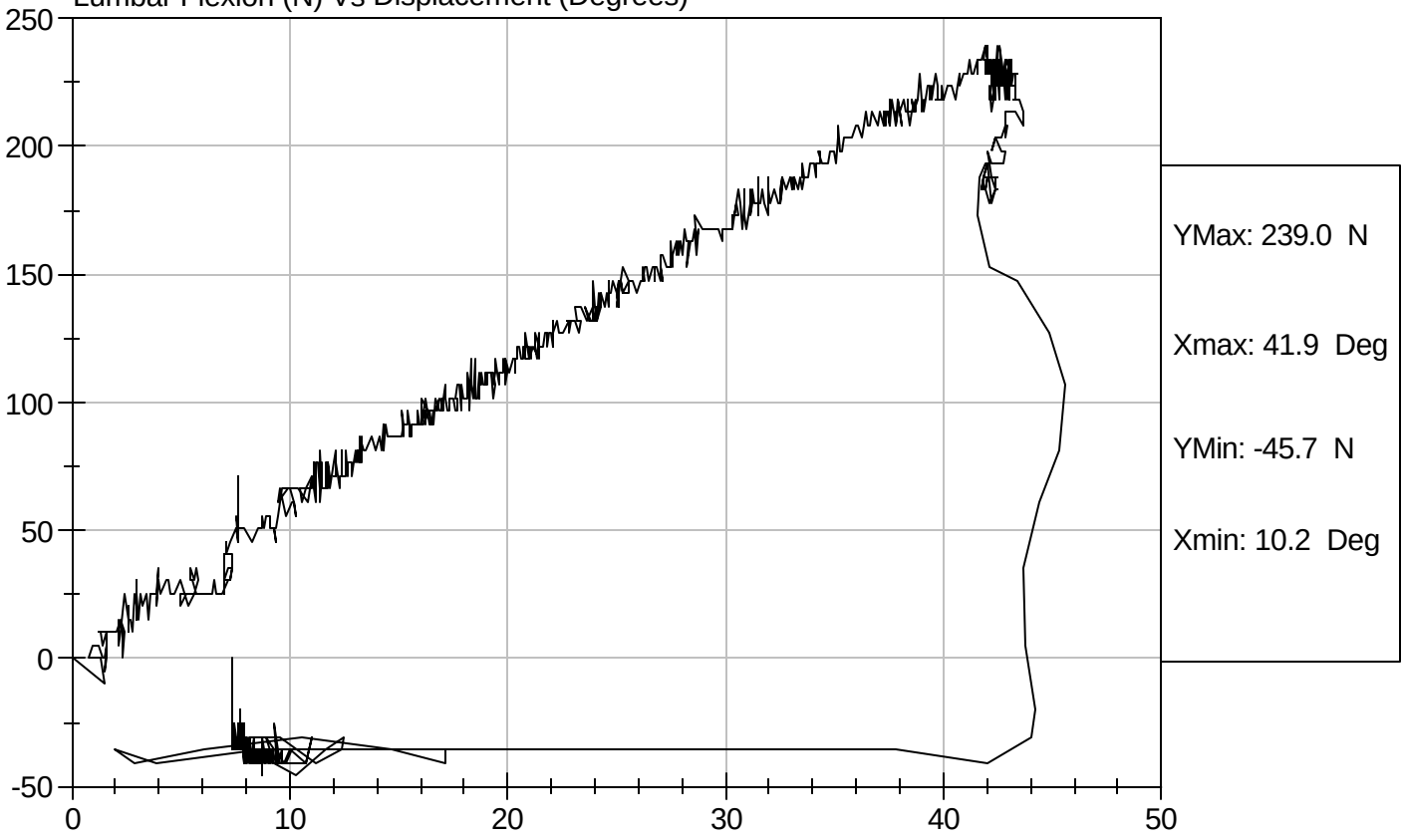
Test Description: Lumbar Flexion

Test Date: 10/21/2004

Component: D042445

Speed: 0 ft/sec, 0 m/sec

Lumbar Flexion (N) Vs Displacement (Degrees)



SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 271 **Test I.D:** D042449

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	40	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.23	Pass
	20 msec	m/s	4.12 to 5.10	4.51	Pass
	30 msec	m/s	5.73 to 7.01	6.41	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.14	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	76	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	62	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	75	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	60	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	14	Pass

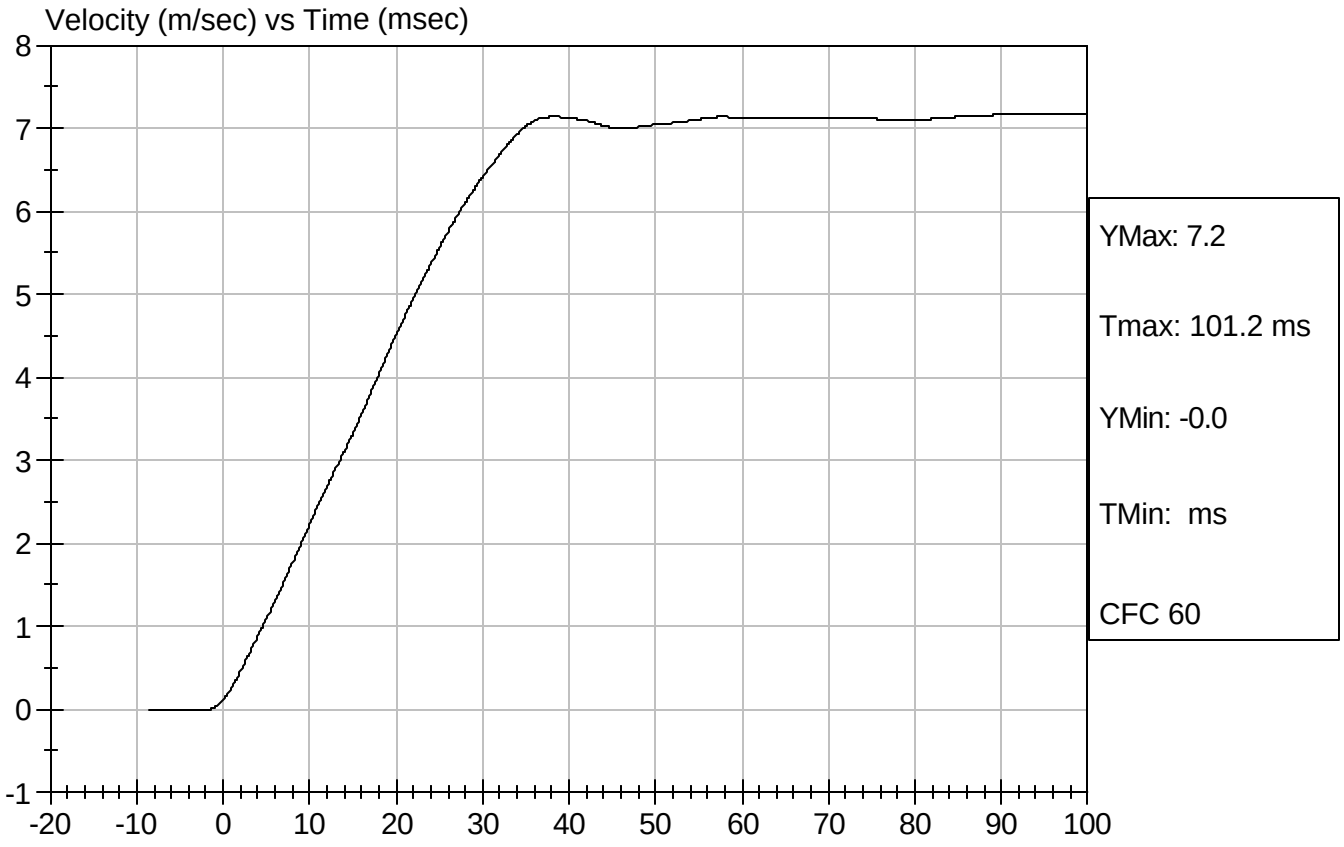
Jessica Hall
Laboratory Technician

10/21/2004
Test Date

David Winkelbauer
Approved By

Test Desc: Neck Bending
Component ID: D042449

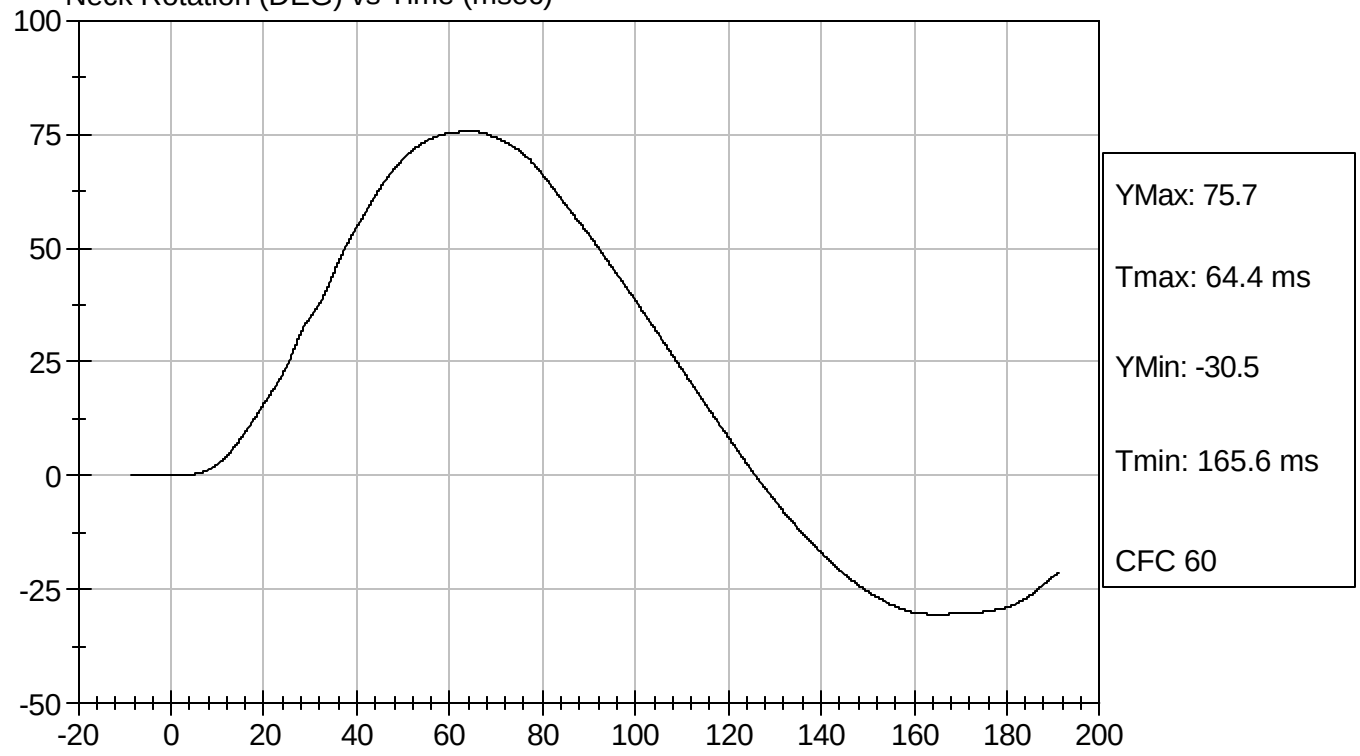
Test Date: 10/21/2004
Speed: 23.15 ft/sec, 7.06 m/sec



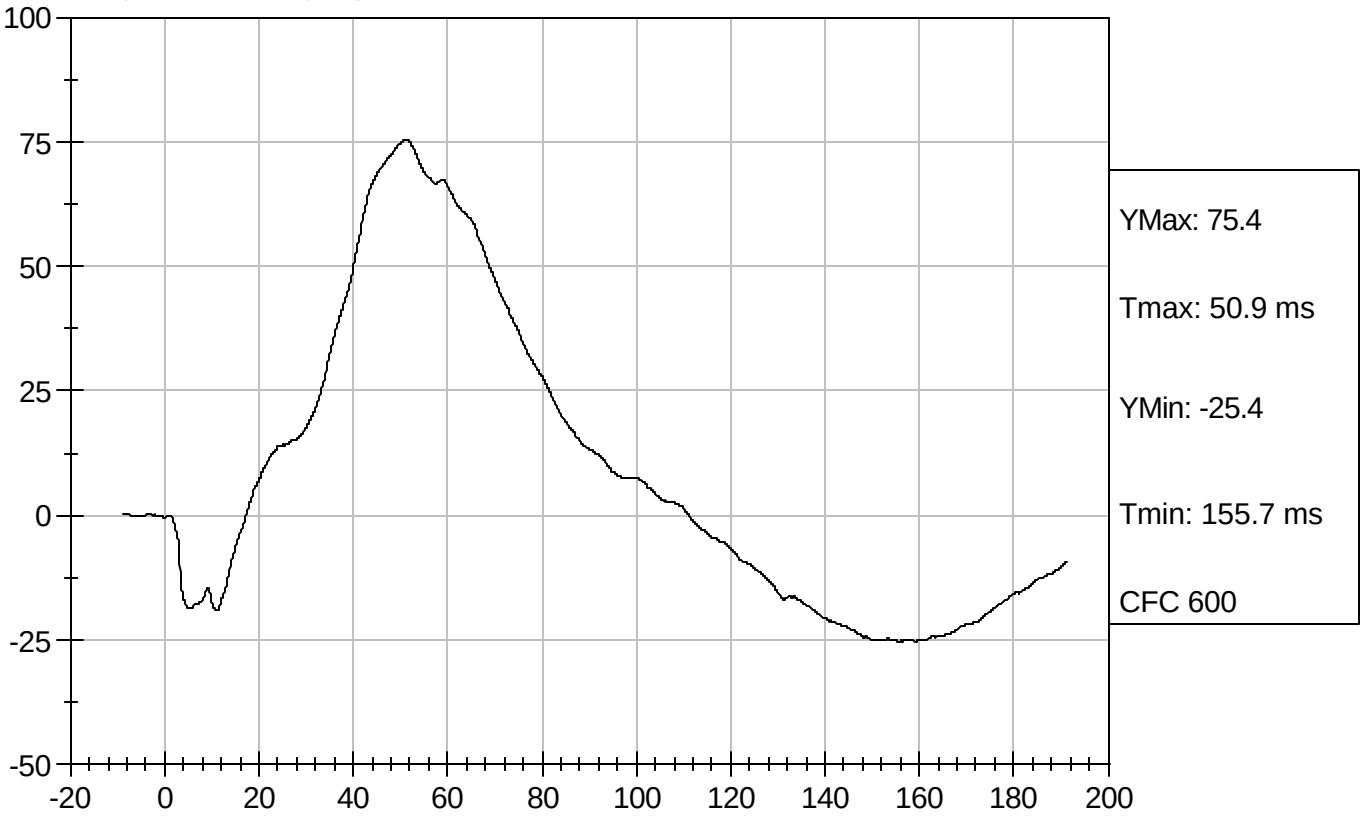
Test Desc: Neck Bending
Component ID: D042449

Test Date: 10/21/2004
Speed: 23.15 ft/sec, 7.06 m/sec

Neck Rotation (DEG) vs Time (msec)



Occipital Moment (Nm) vs Time (msec)



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 271

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Sternum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass

Jessica Hall
Laboratory Technician

10/20/2004
Test Date

David Winkelbauer
Approved By

CERTIFICATION DATA

Dummy Serial Number: 904

Calibration Test Results Summary

Dummy Serial Number: 904

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID Calibration Data Sheet

Side Impact Dummy

External Measurements

ATD Serial No: 904 **Test I.D:** D04226

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	906	Pass
RH - Rib Height	mm	501 - 521	507	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	241	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	517	Pass
SW - Knee Pivot to Floor	mm	490 - 505	497	Pass
HW - Hip Width	mm	356 - 391	360	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

08/27/2004
Test Date

David Winkelbauer
Approved By

SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 904 **Test I.D:** D042261

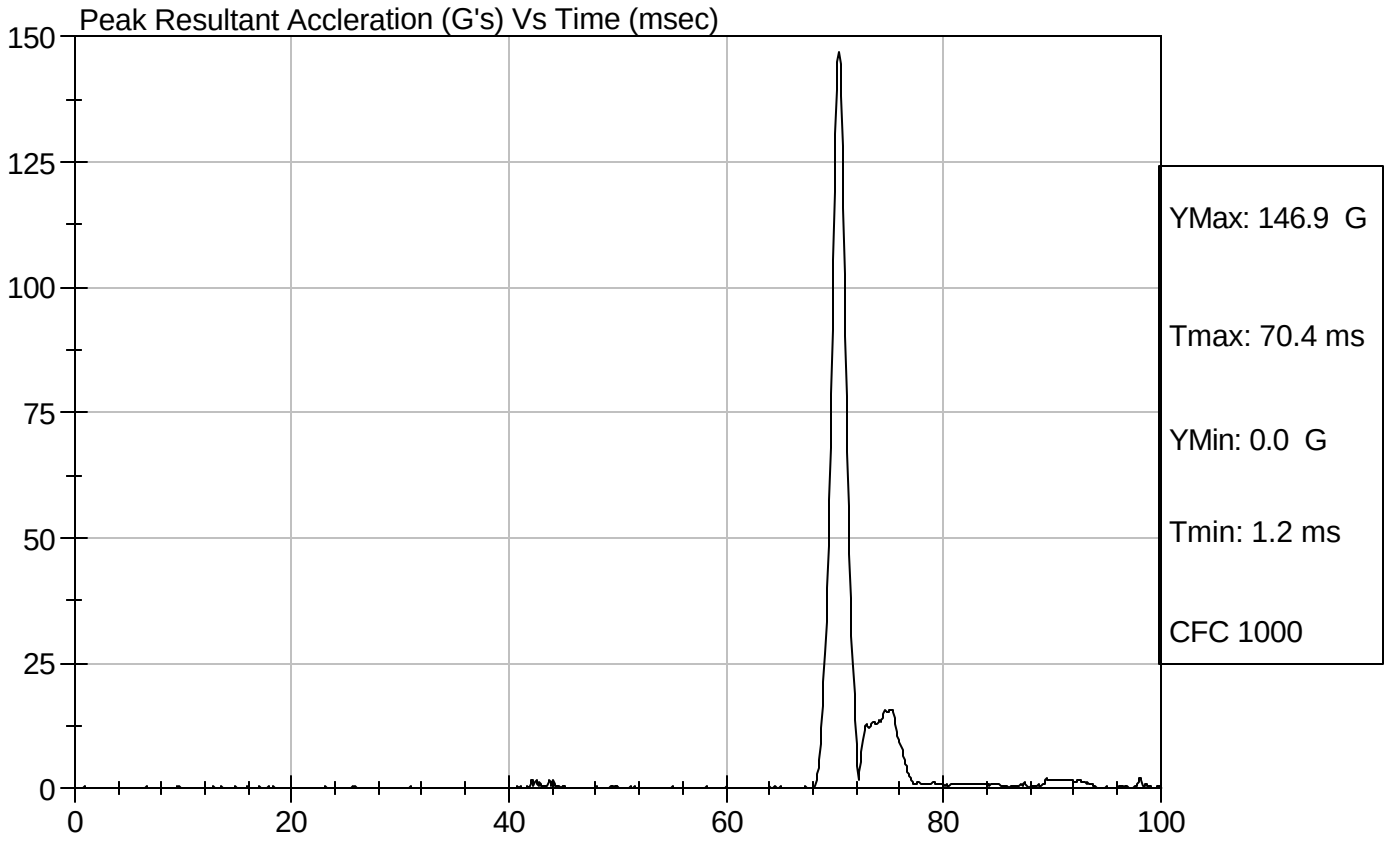
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Peak Resultant Acceleration	G's	120 to 150	147	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	9	Pass
		Overall Test Results		Pass

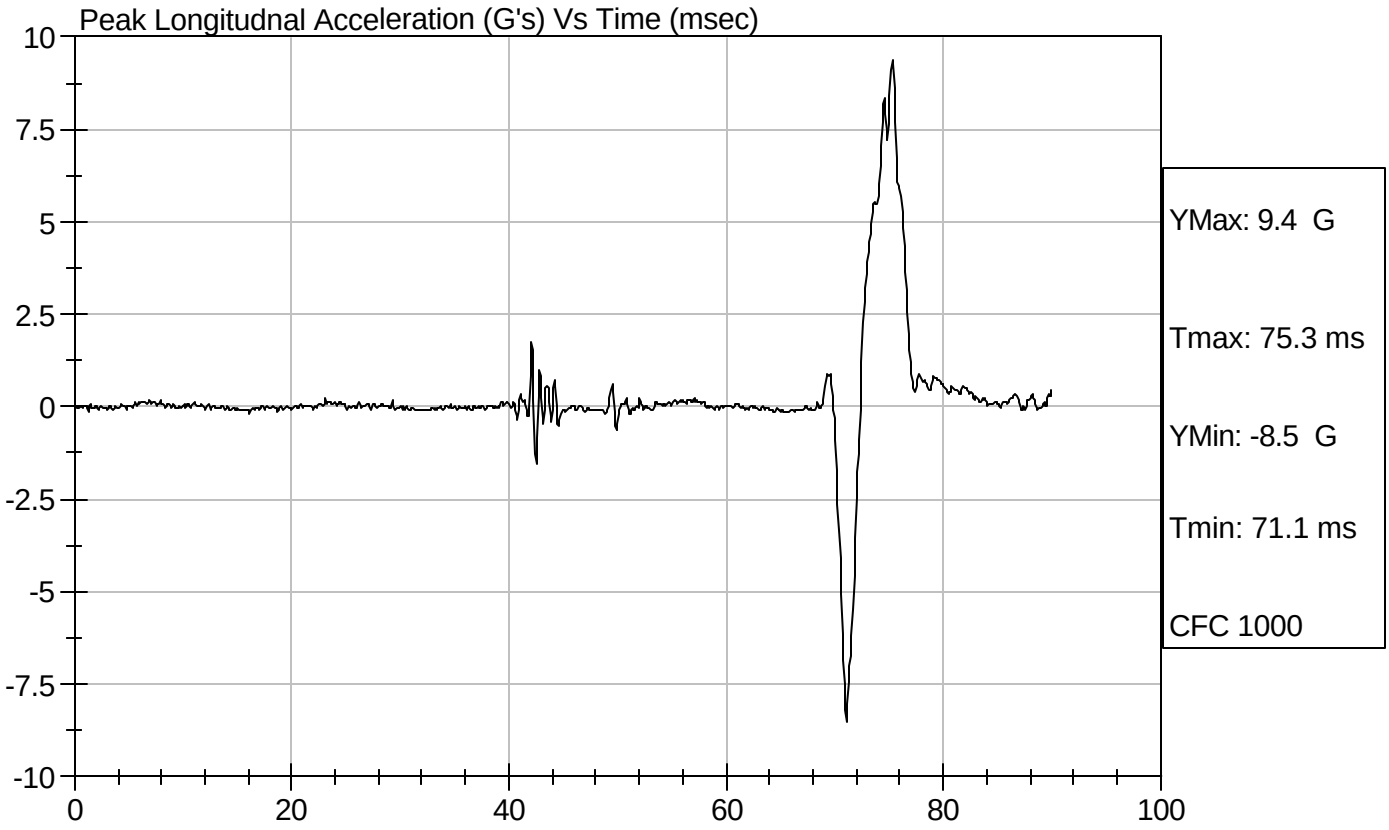
Jessica Hall
Laboratory Technician

09/21/2004
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 09/21/2004
	Component: D042261	Speed: 0 ft/s, 0.00 m/s





SID Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 904 **Test I.D:** D042262

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Velocity	m/s	4.27 - 4.33	4.27	Pass
Upper Rib	G's	37 - 46	41	Pass
Lower Rib	G's	37 - 46	41	Pass
Lower Spine	G's	15 - 22	20	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

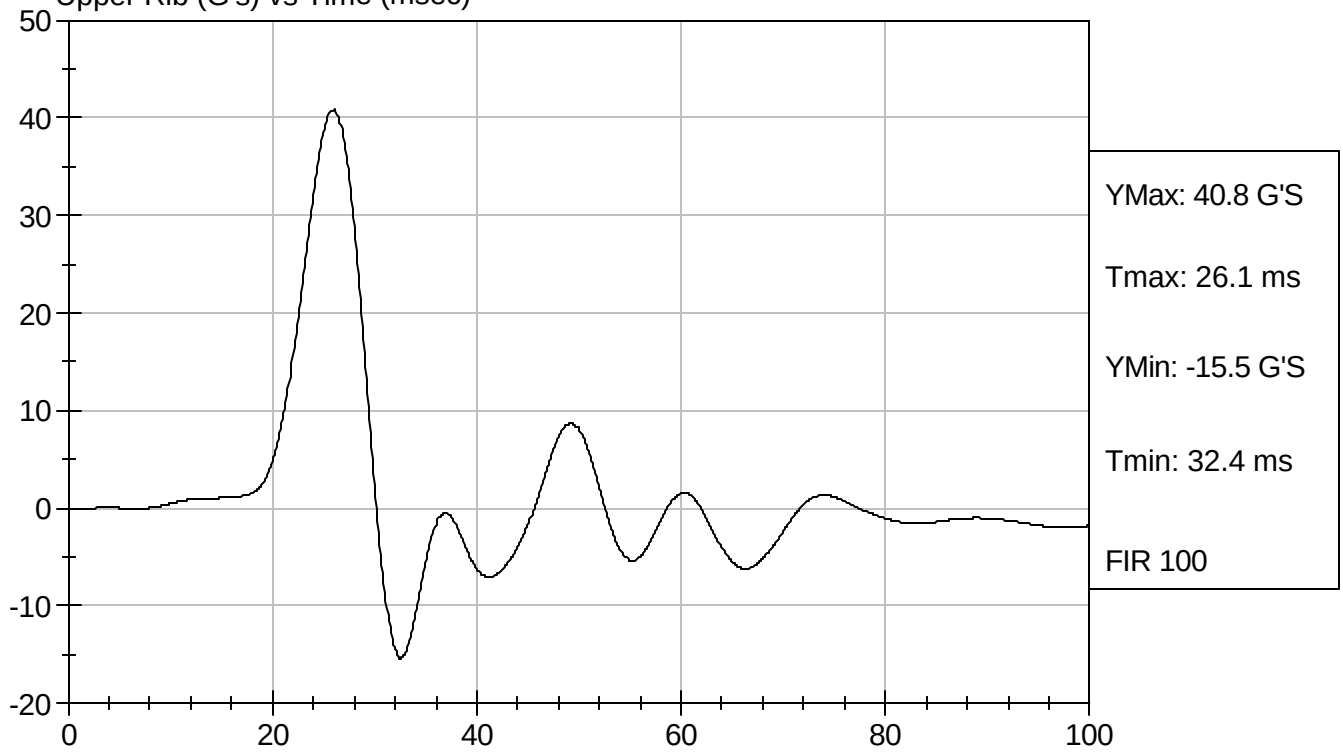
09/21/2004
Test Date

David Winkelbauer
Approved By

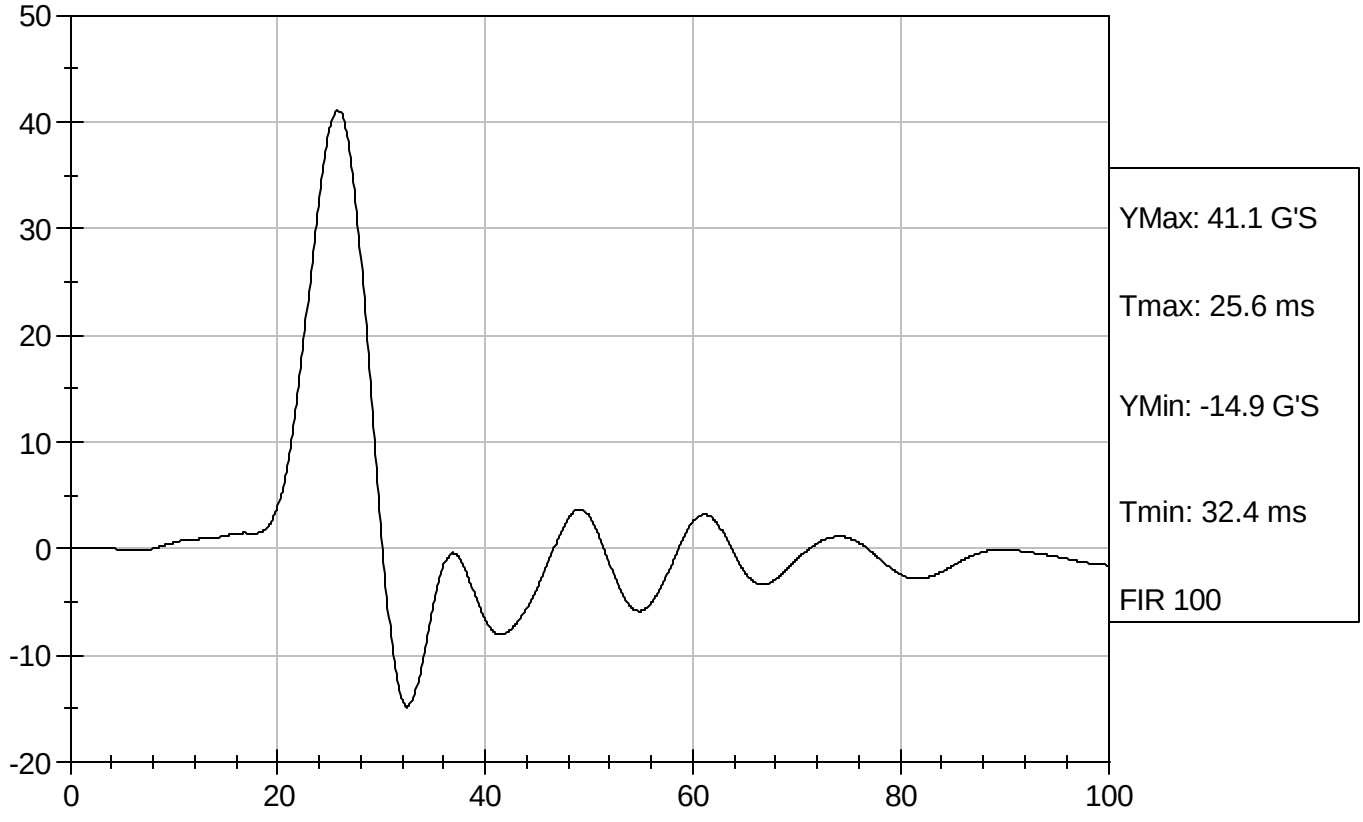
Test Desc: Thorax Impact
Component ID: D042262

Test Date: 09/21/2004
Speed: 14.02 ft/sec, 4.27 m/sec

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

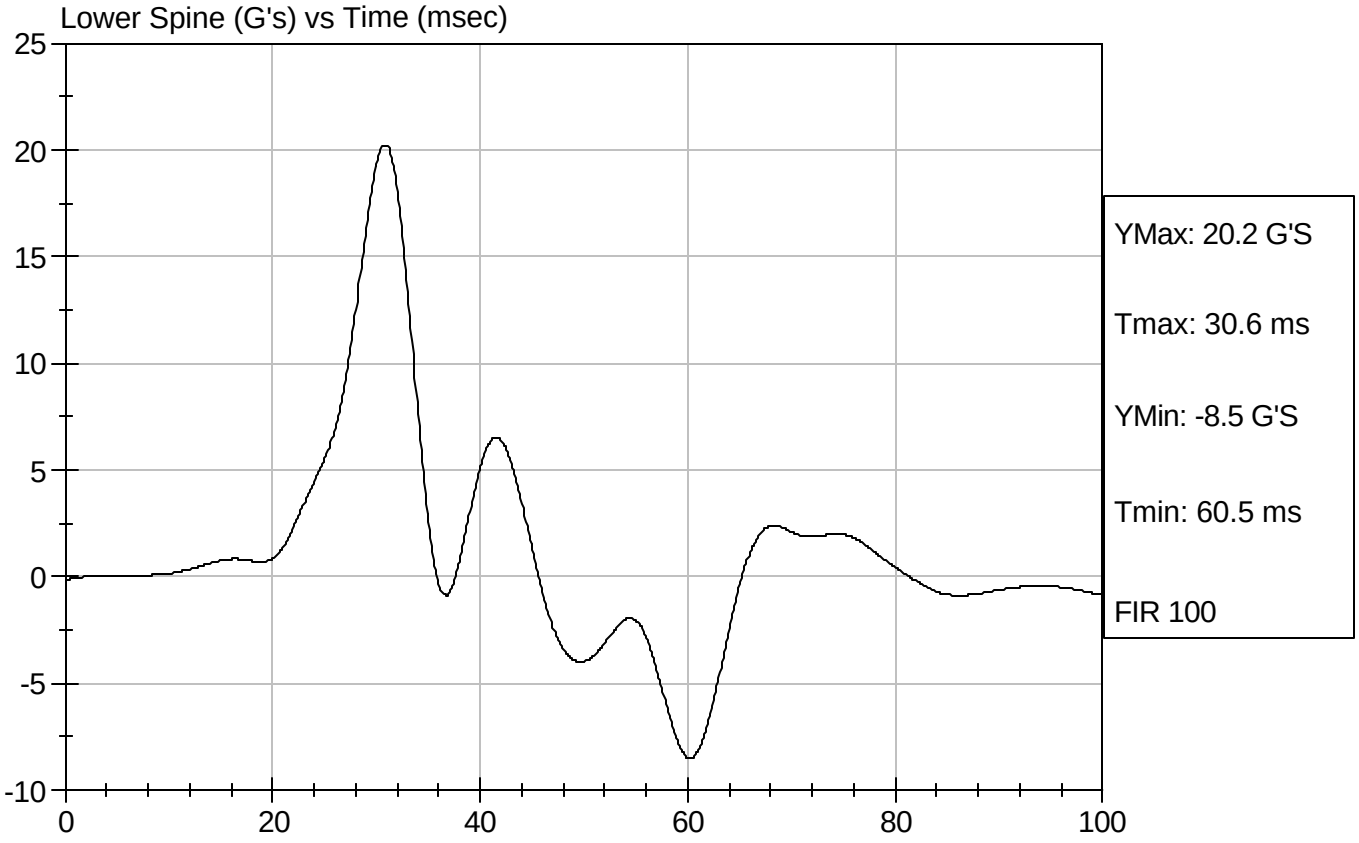


Lower Rib (G's) vs Time (msec)



Test Desc: Thorax Impact
Component ID: D042262

Test Date: 09/21/2004
Speed: 14.02 ft/sec, 4.27 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 904 **Test I.D:** D042263

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Velocity	m/s	4.27 - 4.33	4.29	Pass
Pelvis Acceleration	G's	40 - 60	52	Pass
		Overall Test Results		Pass

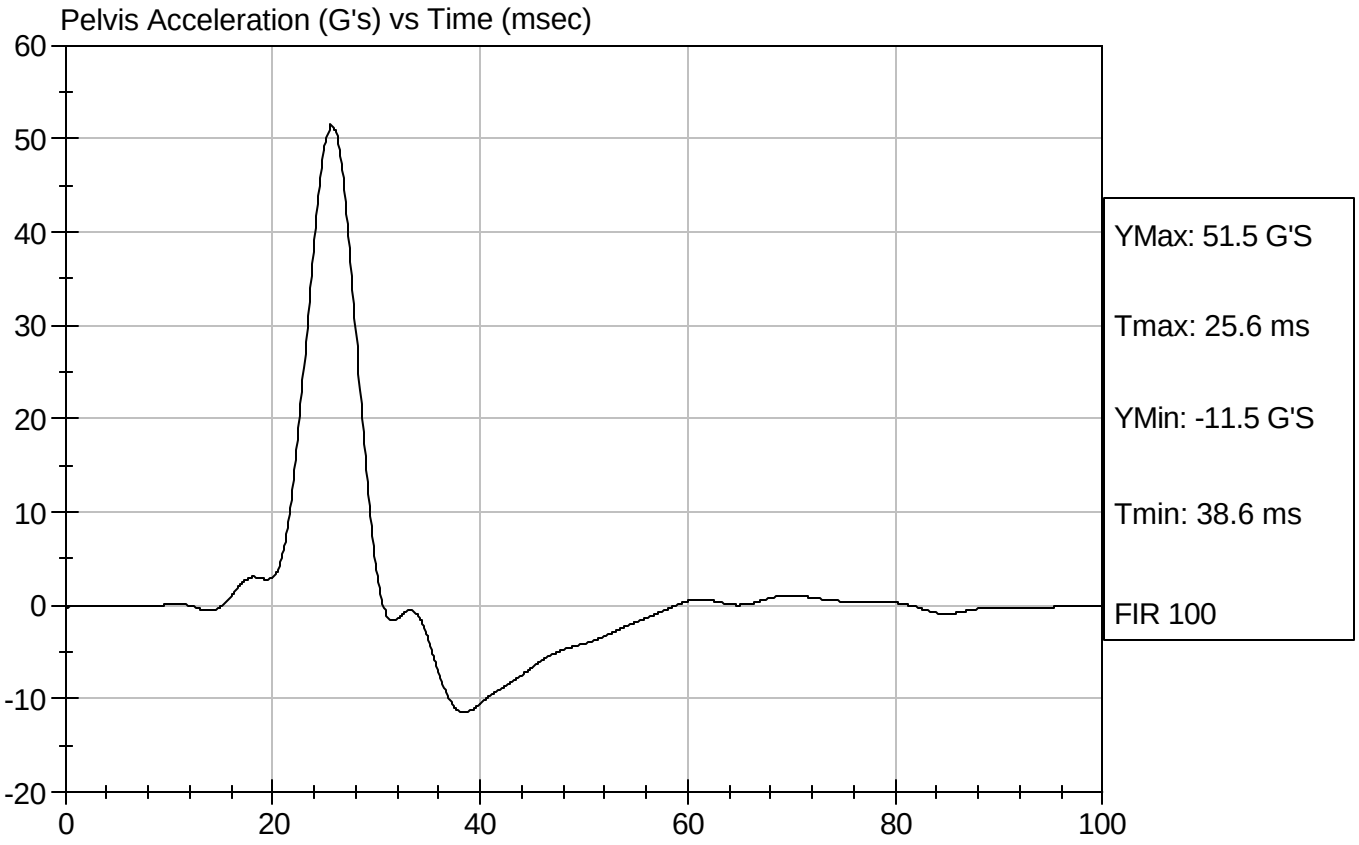
Jessica Hall
Laboratory Technician

09/21/2004
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D042263

Test Date: 09/21/2004
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: 904 **Test I.D:** D042264

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Force At 12.7 mm	N	104 -162	140	Pass
Force At 19 mm	N	163 - 222	198	Pass
Force At 25.4 mm	N	222 - 280	270	Pass
Force At 33 mm	N	325 - 391	378	Pass
		Overall Test Results		Pass

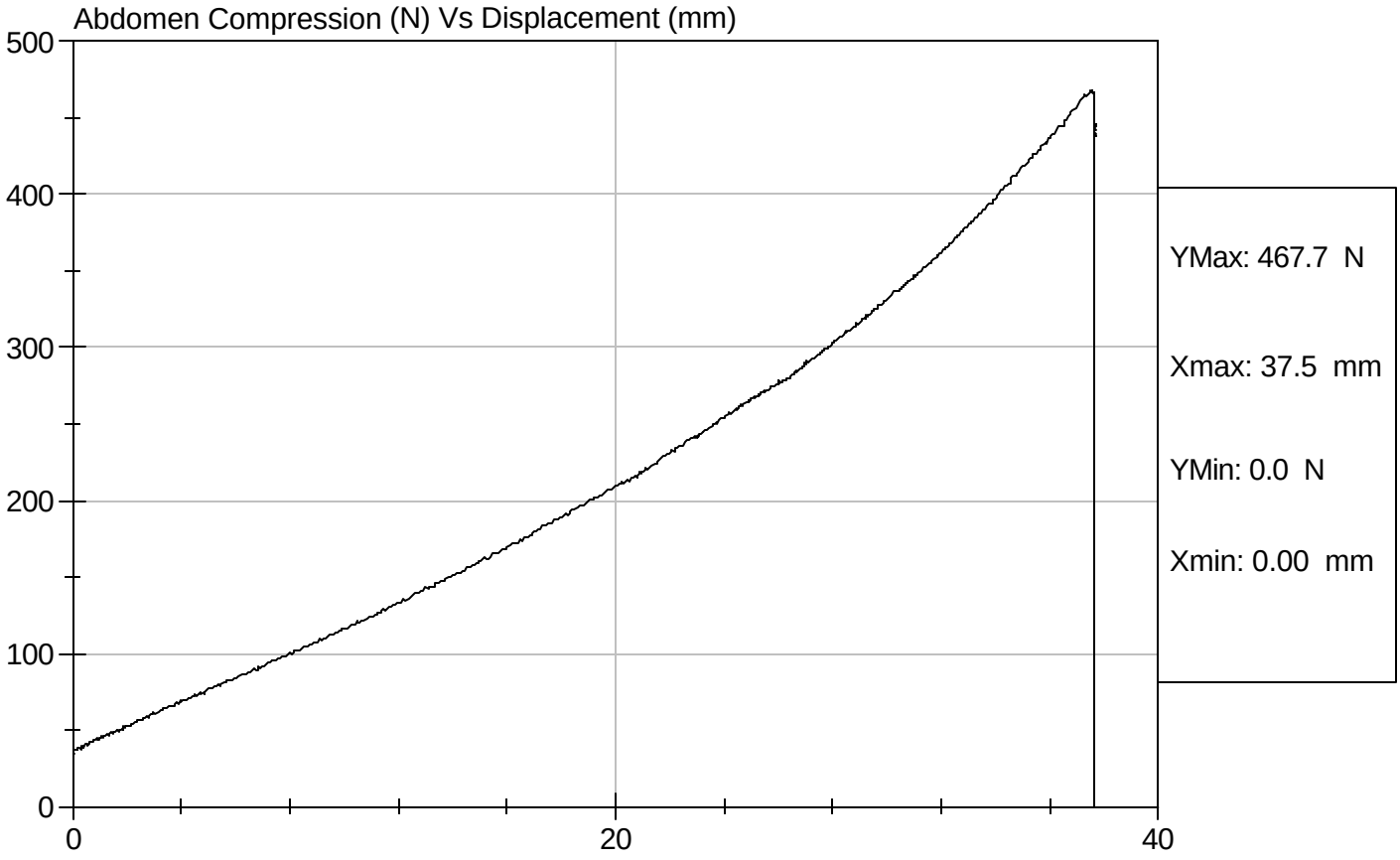
Jessica Hall
Laboratory Technician

09/21/2004
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression Test Date: 09/21/2004

Component: D042264 Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 904 **Test I.D:** D042265

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	135.4	Pass
Force At 30 deg	N	151.2 - 204.6	196.4	Pass
Force At 40 deg	N	204.6 - 258.0	248.1	Pass
Return Angle	Deg	12 Maximum	7	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

09/21/2004
Test Date

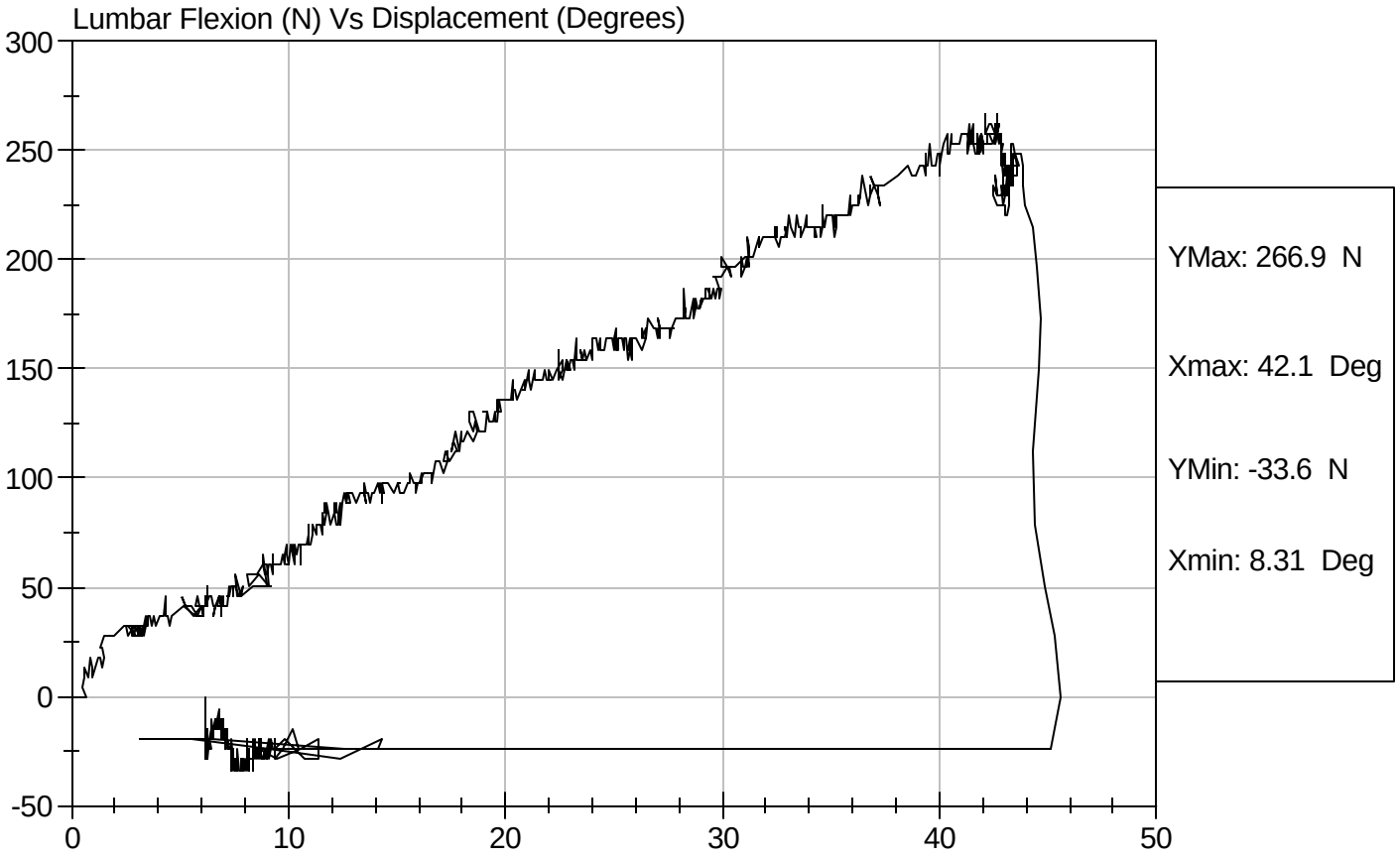
David Winkelbauer
Approved By

Test Description: Lumbar Flexion

Test Date: 09/21/2004

Component: D042265

Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 904 **Test I.D:** D042269

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity		%	10 to 70	40	Pass
Impact Velocity		m/s	6.89 to 7.13	7.07	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.15	Pass
	20 msec	m/s	4.12 to 5.10	4.21	Pass
	30 msec	m/s	5.73 to 7.01	5.92	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.10	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	69	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	60	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	77	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	58	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	10	Pass

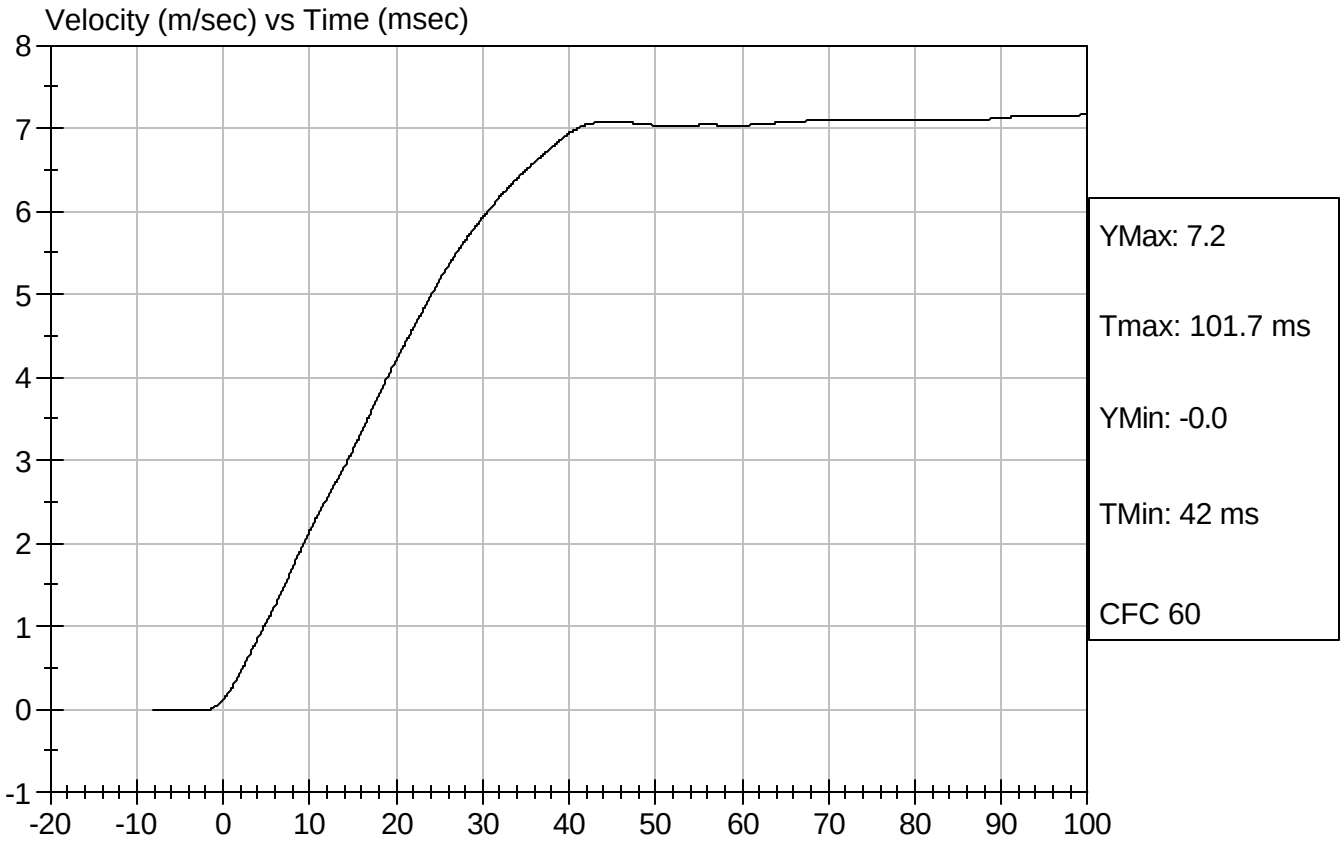
Jessica Hall
Laboratory Technician

09/21/2004
Test Date

David Winkelbauer
Approved By

Test Desc: Neck Bending
Component ID: D042269

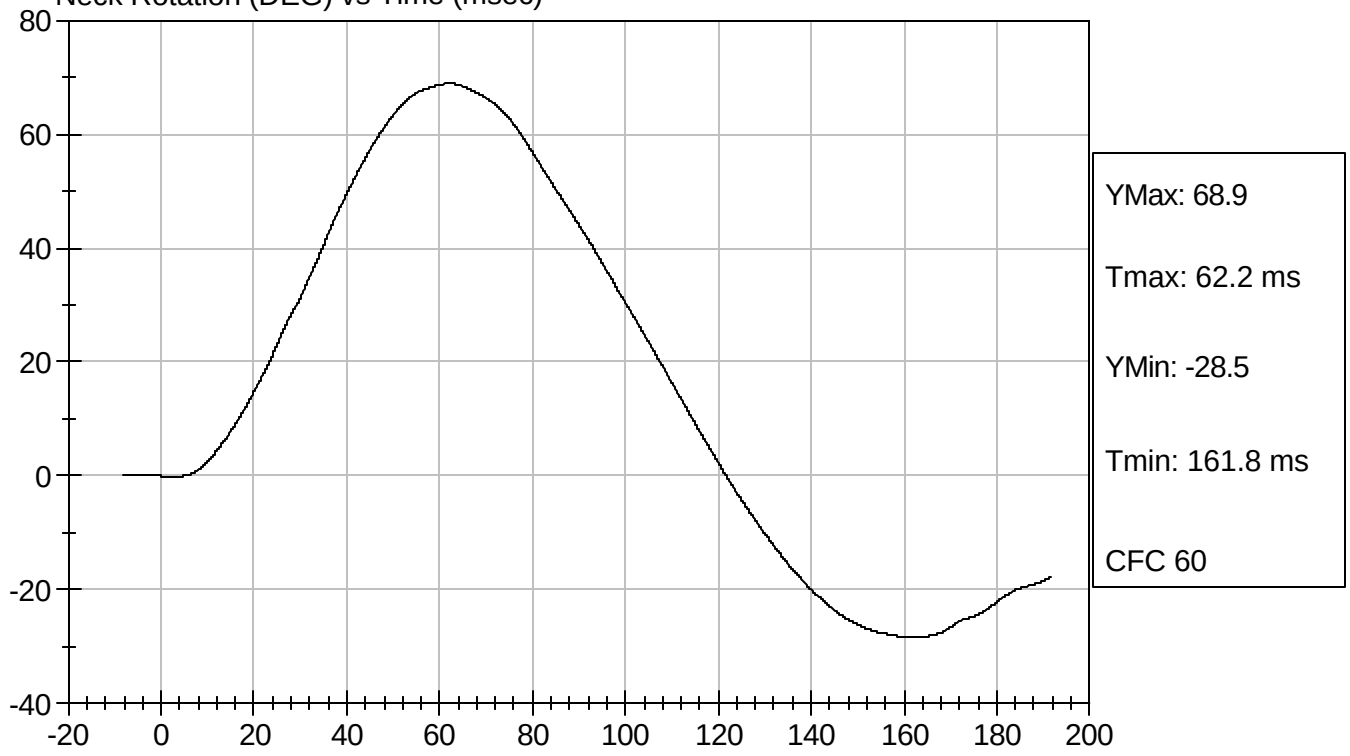
Test Date: 09/21/2004
Speed: 23.18 ft/sec, 7.07 m/sec



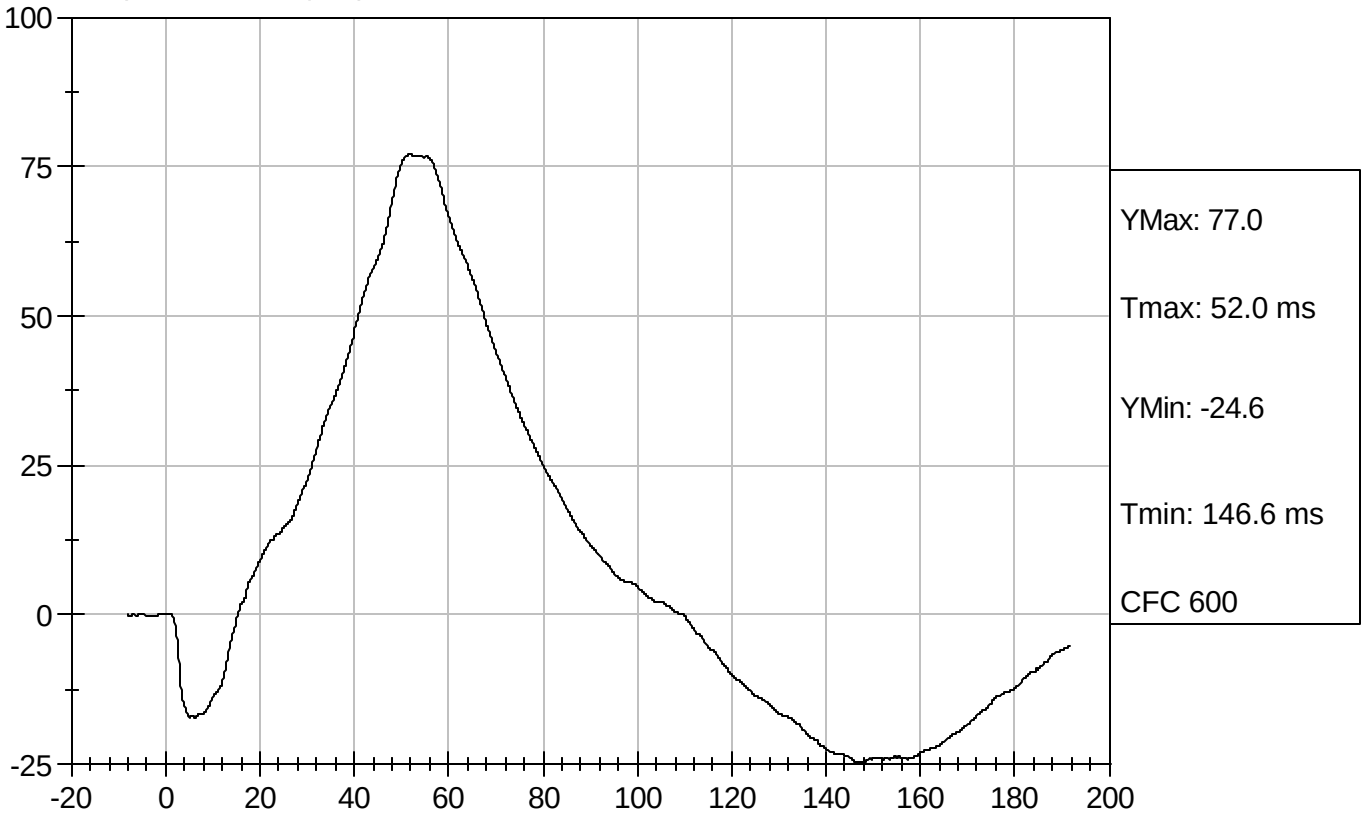
Test Desc: Neck Bending
Component ID: D042269

Test Date: 09/21/2004
Speed: 23.18 ft/sec, 7.07 m/sec

Neck Rotation (DEG) vs Time (msec)



Occipital Moment (Nm) vs Time (msec)



Calibration Test Results Summary

Dummy Serial Number: 904

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 904 **Test I.D:** D042451

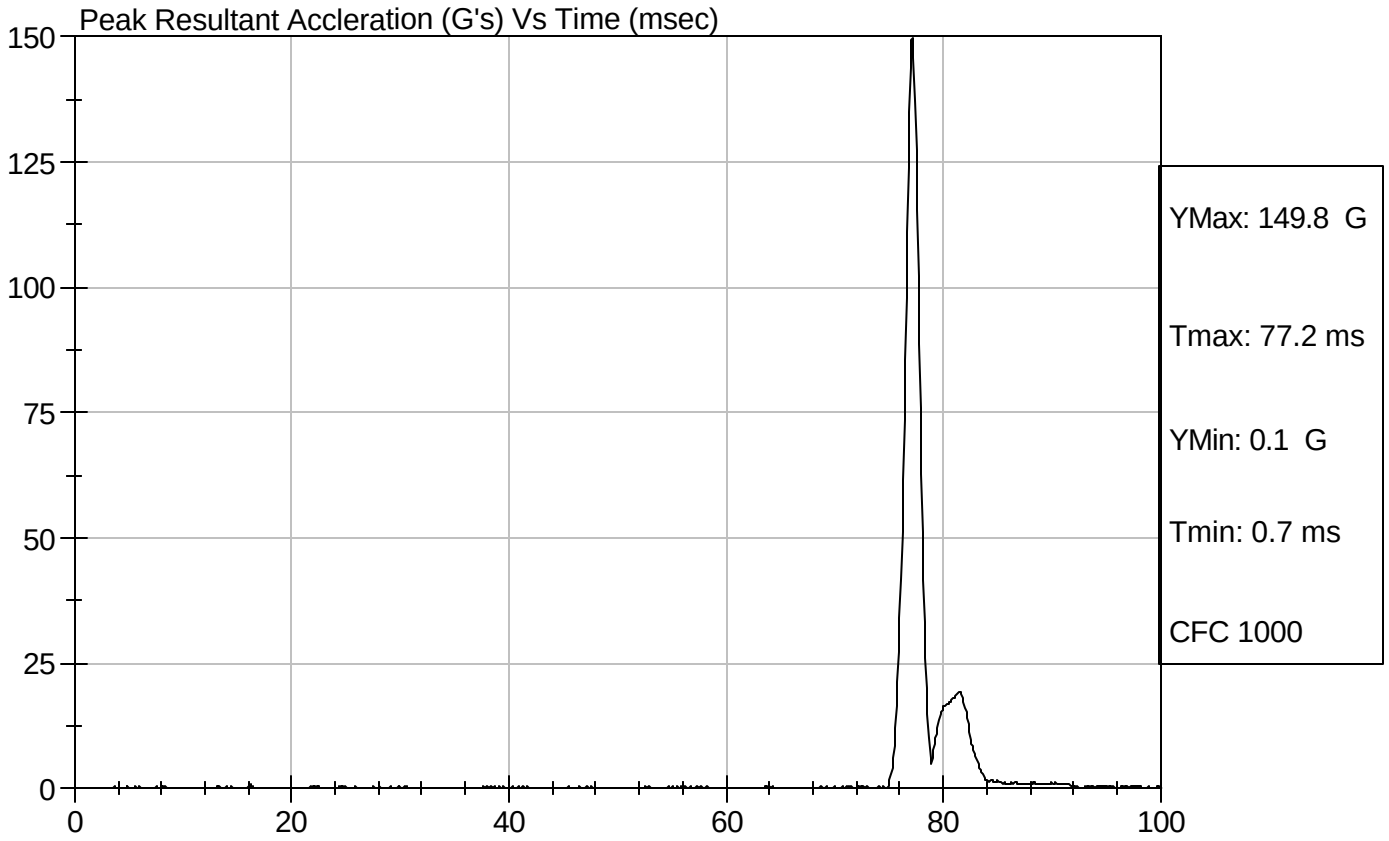
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Peak Resultant Acceleration	G's	120 to 150	150	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-10	Pass
		Overall Test Results		Pass

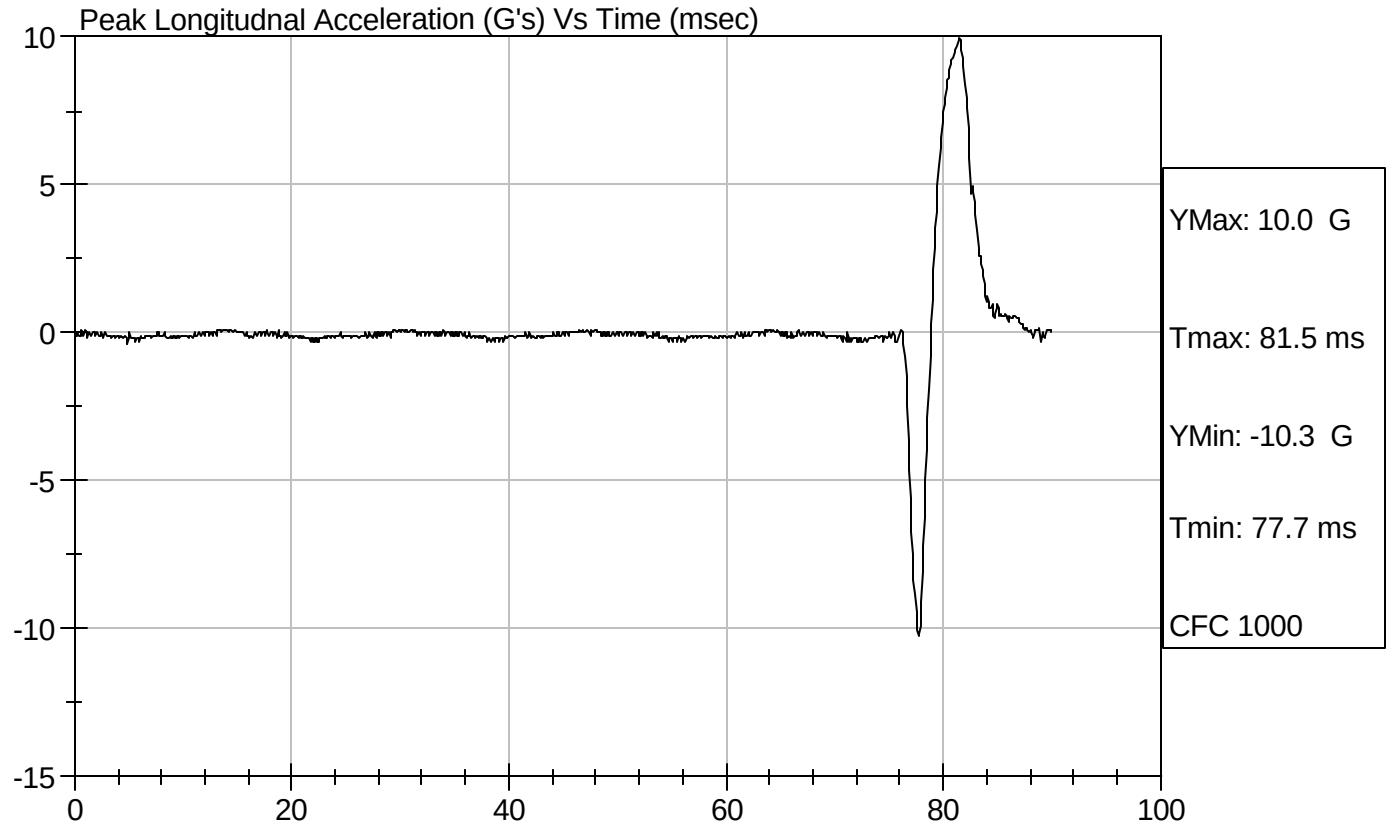
Jessica Hall
Laboratory Technician

10/21/2004
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 10/21/2004
	Component: D042451	Speed: 0 ft/s, 0.00 m/s





SID Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 904 **Test I.D:** D042452

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Probe Velocity	m/s	4.27 - 4.33	4.27	Pass
Upper Rib	G's	37 - 46	41	Pass
Lower Rib	G's	37 - 46	42	Pass
Lower Spine	G's	15 - 22	21	Pass
		Overall Test Results		Pass

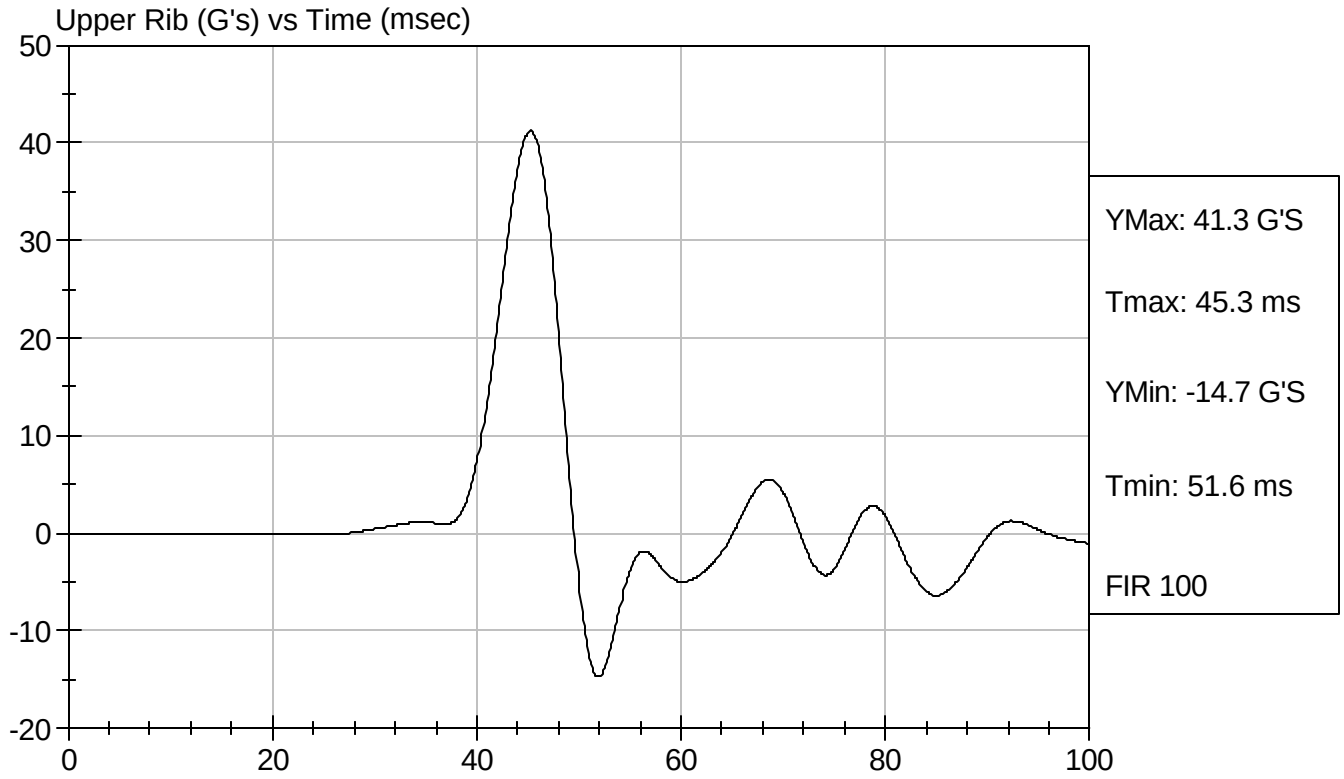
Jessica Hall
Laboratory Technician

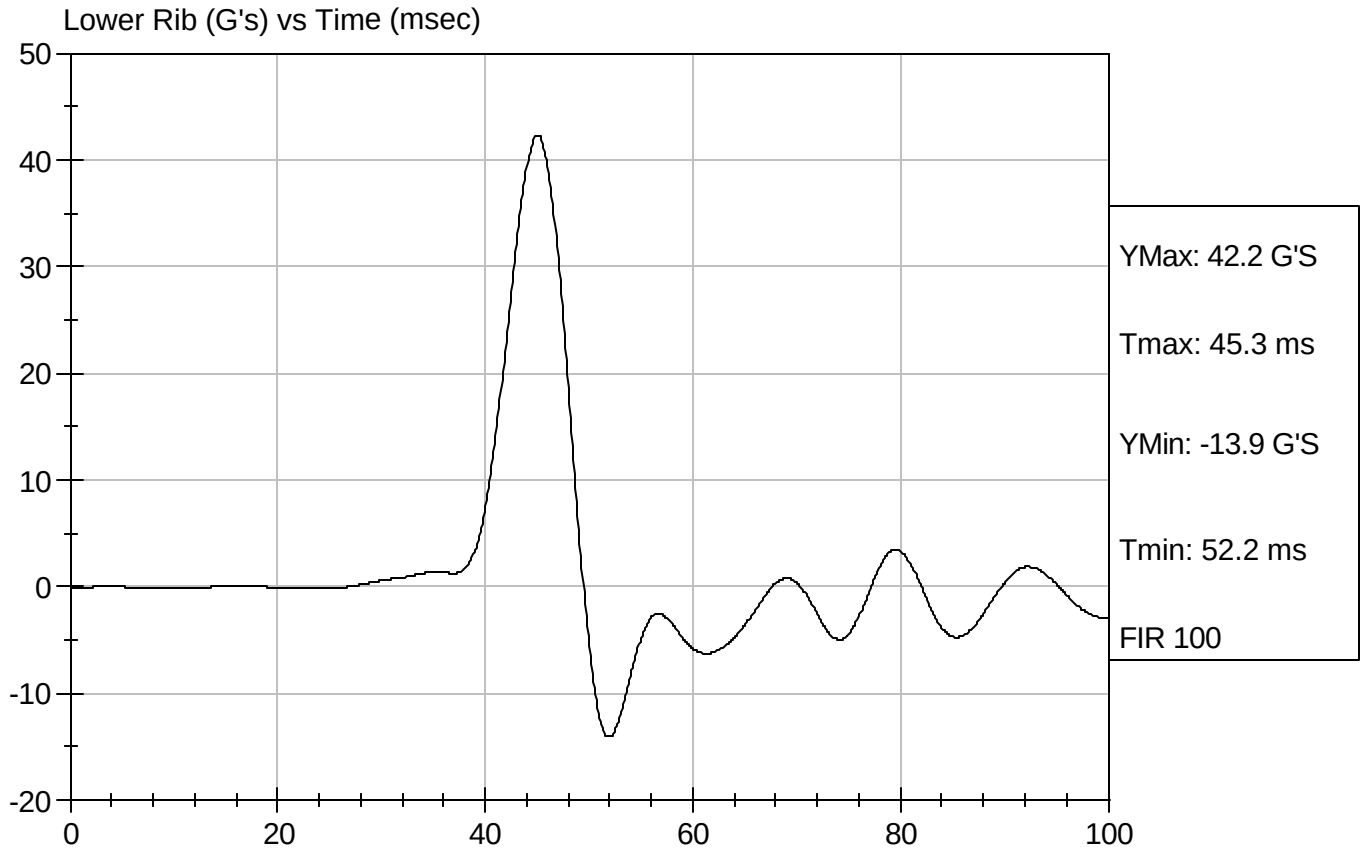
10/21/2004
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D042452

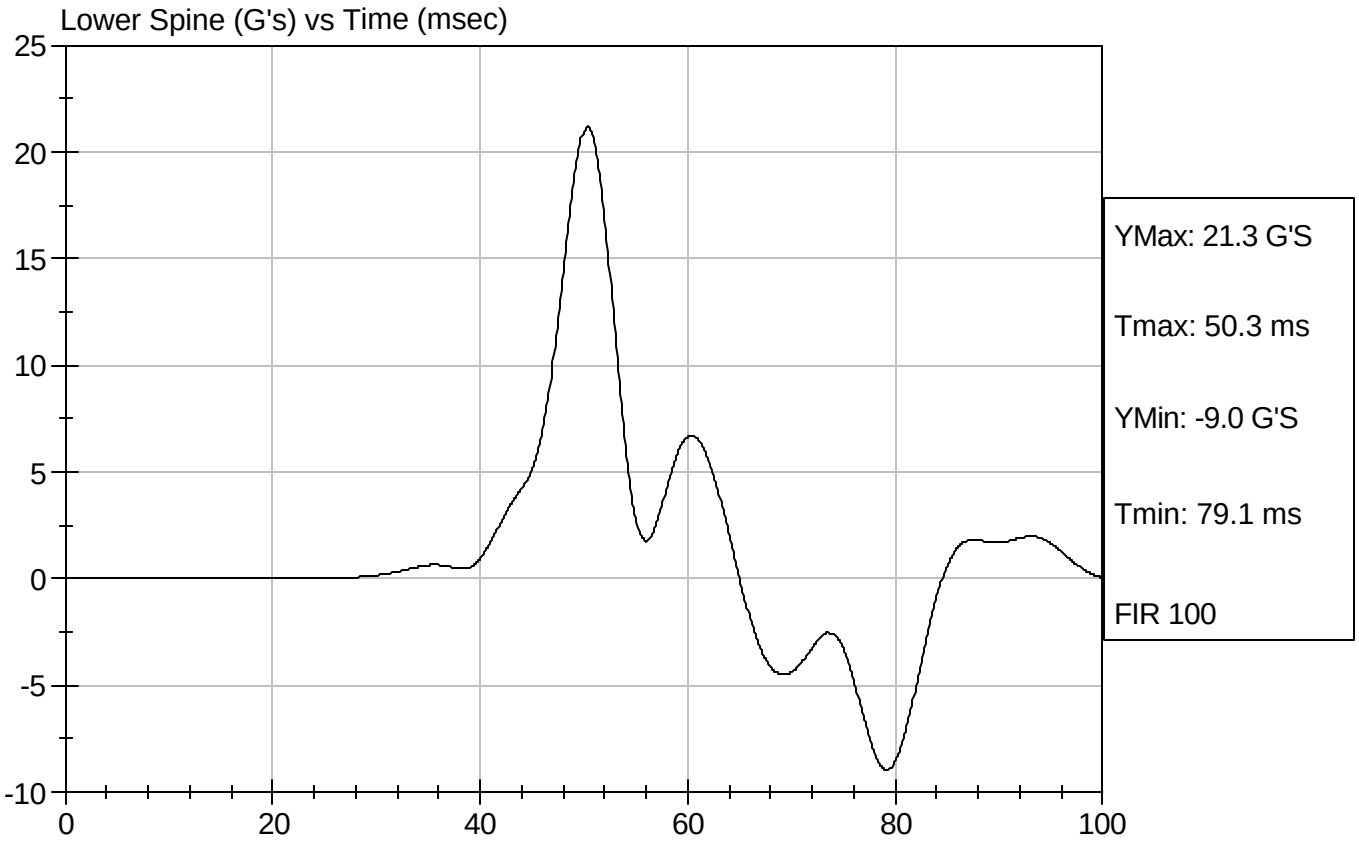
Test Date: 10/21/2004
Speed: 14.0 ft/sec, 4.27 m/sec





Test Desc: Thorax Impact
Component ID: D042452

Test Date: 10/21/2004
Speed: 14.0 ft/sec, 4.27 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 904 **Test I.D:** D042453

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Probe Velocity	m/s	4.27 - 4.33	4.27	Pass
Pelvis Acceleration	G's	40 - 60	49	Pass
		Overall Test Results		Pass

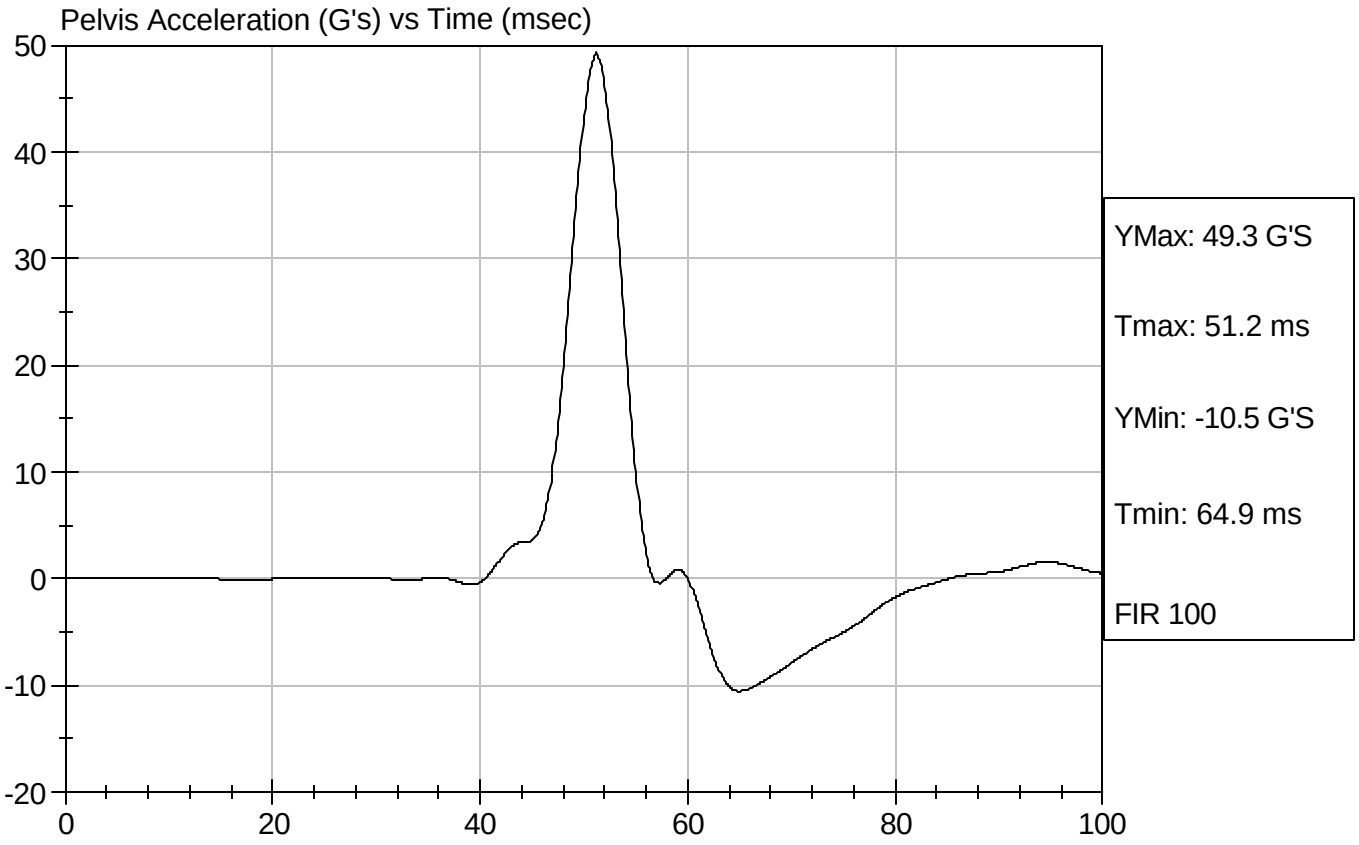
Jessica Hall
Laboratory Technician

10/21/2004
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D042453

Test Date: 10/21/2004
Speed: 14.0 ft/sec, 4.27 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 904 **Test I.D:** D042454

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Force At 12.7 mm	N	104 -162	143	Pass
Force At 19 mm	N	163 - 222	198	Pass
Force At 25.4 mm	N	222 - 280	263	Pass
Force At 33 mm	N	325 - 391	368	Pass
		Overall Test Results		Pass

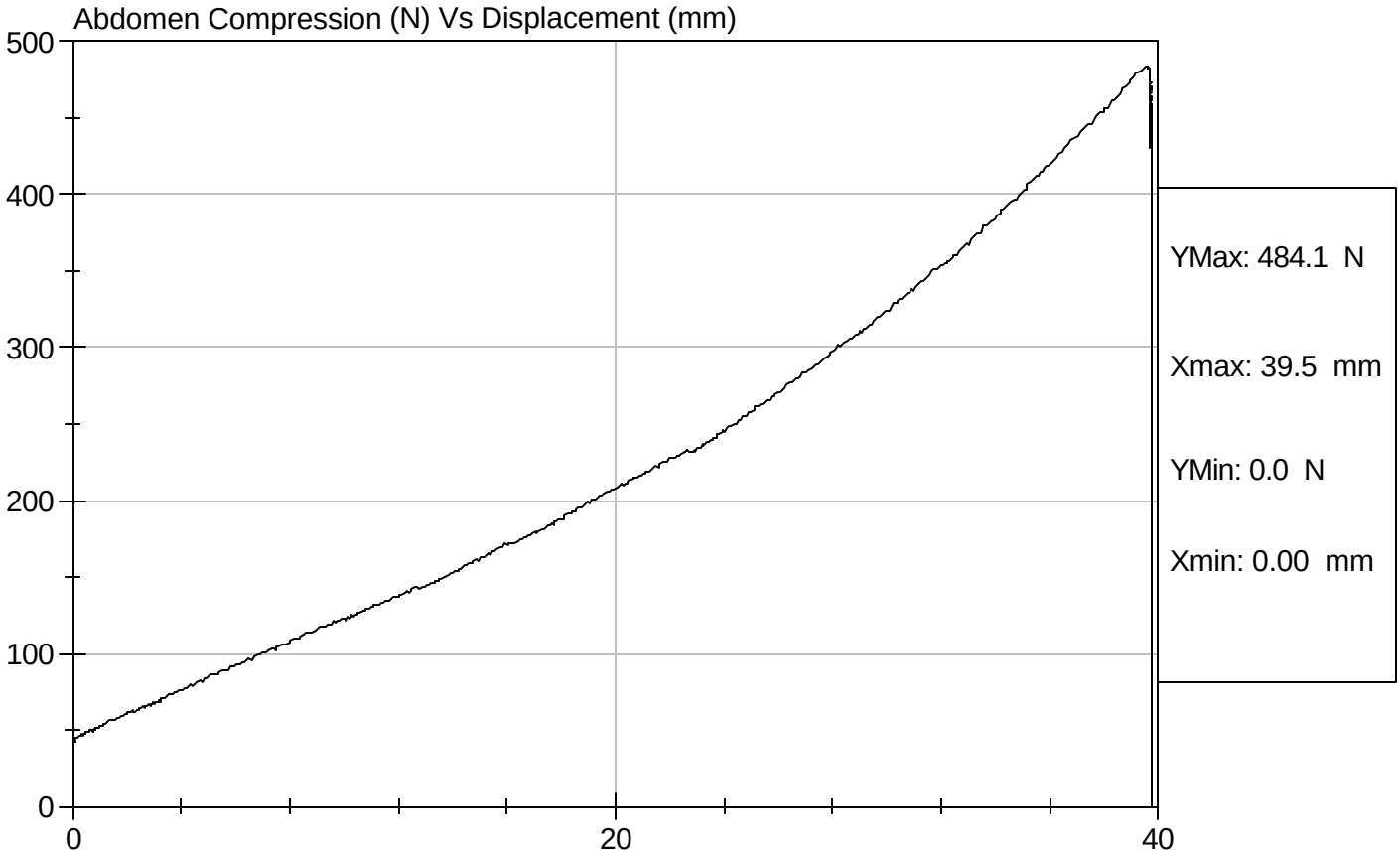
Jessica Hall
Laboratory Technician

10/21/2004
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression Test Date: 10/21/2004

Component: D042454 Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 904 **Test I.D:** D042455

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	123.1	Pass
Force At 30 deg	N	151.2 - 204.6	174.0	Pass
Force At 40 deg	N	204.6 - 258.0	255.3	Pass
Return Angle	Deg	12 Maximum	6	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

10/21/2004
Test Date

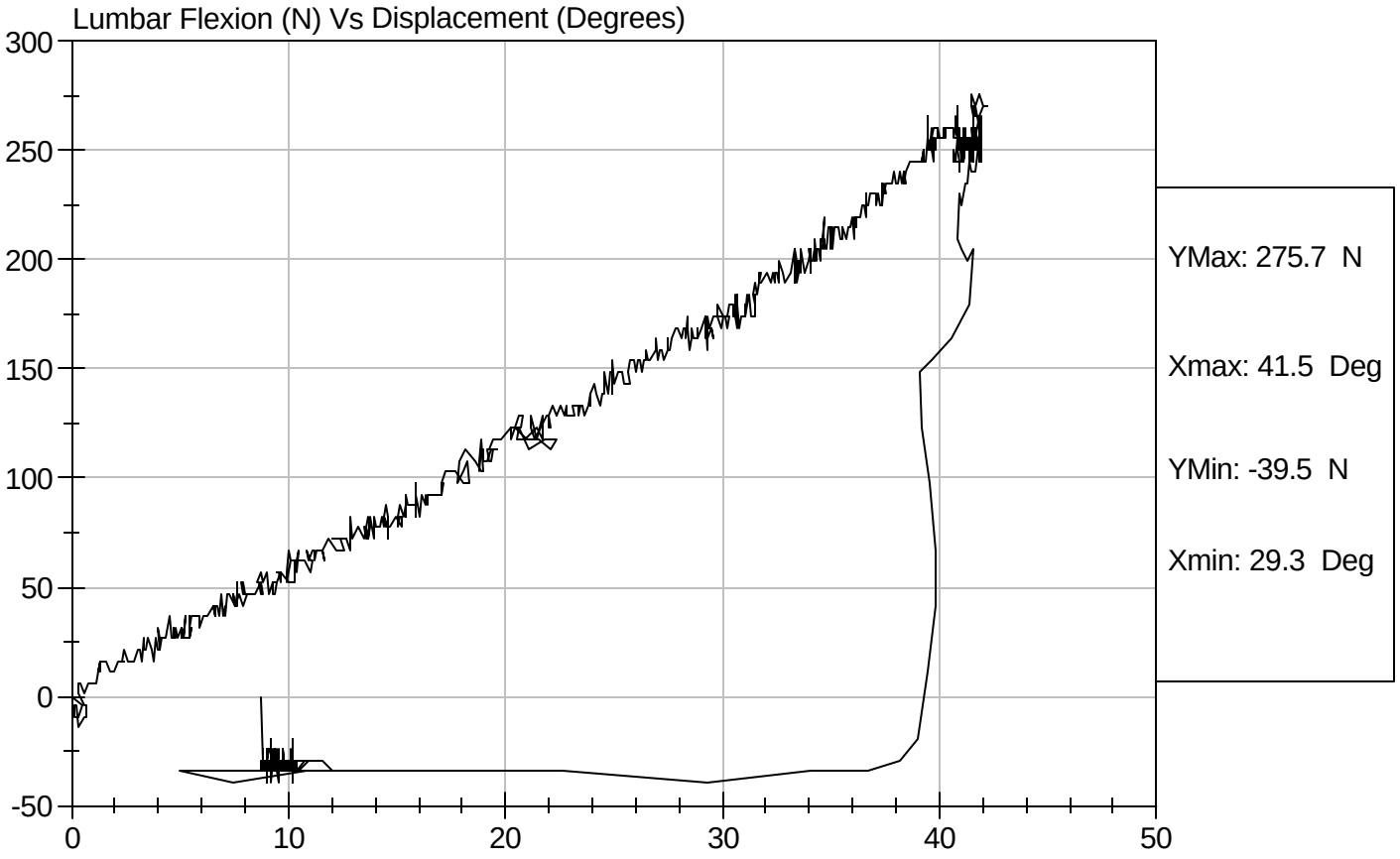
David Winkelbauer
Approved By

Test Description: Lumbar Flexion

Test Date: 10/21/2004

Component: D042455

Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 904 **Test I.D:** D042459

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	40	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.30	Pass
	20 msec	m/s	4.12 to 5.10	4.57	Pass
	30 msec	m/s	5.73 to 7.01	6.43	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.28	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	72	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	56	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	11	Pass

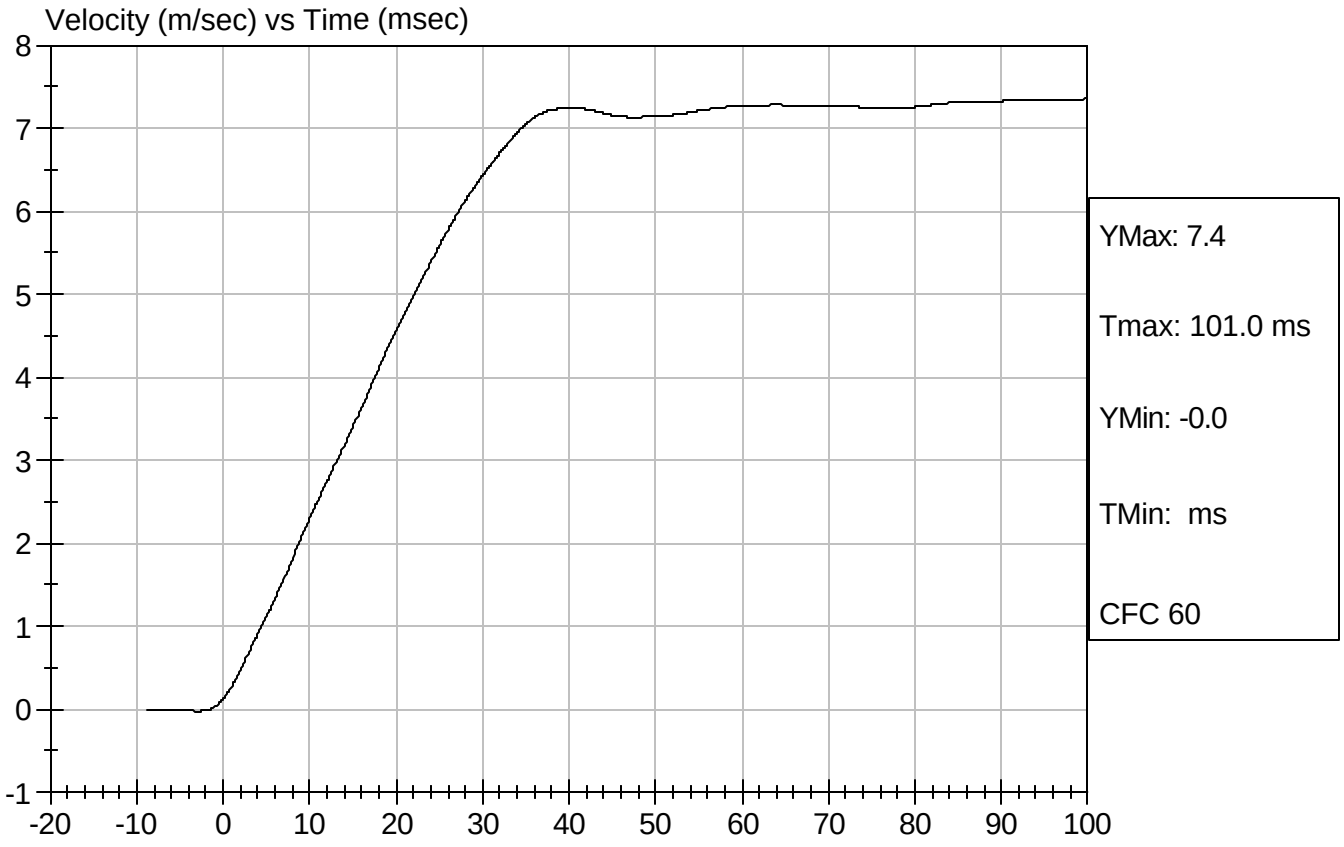
Jessica Hall
Laboratory Technician

10/22/2004
Test Date

David Winkelbauer
Approved By

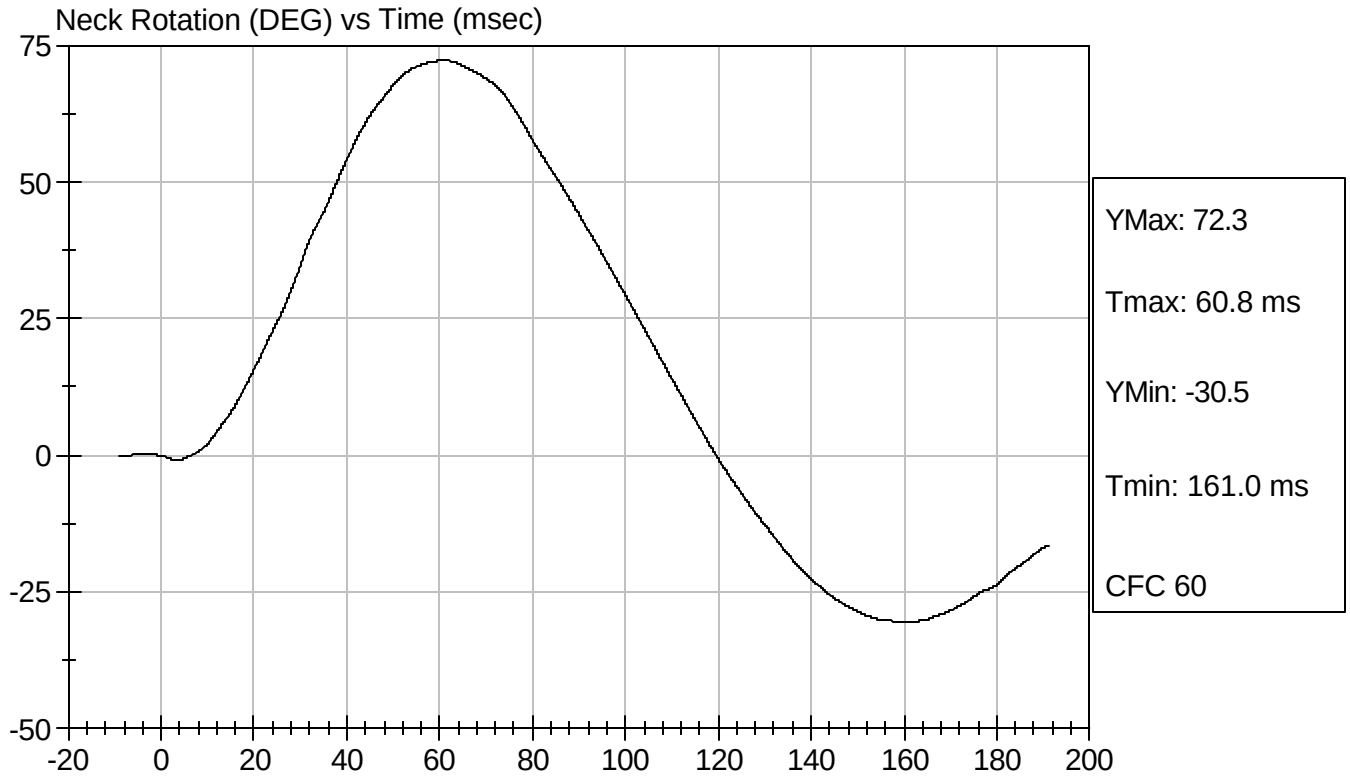
Test Desc: Neck Bending
Component ID: D042459

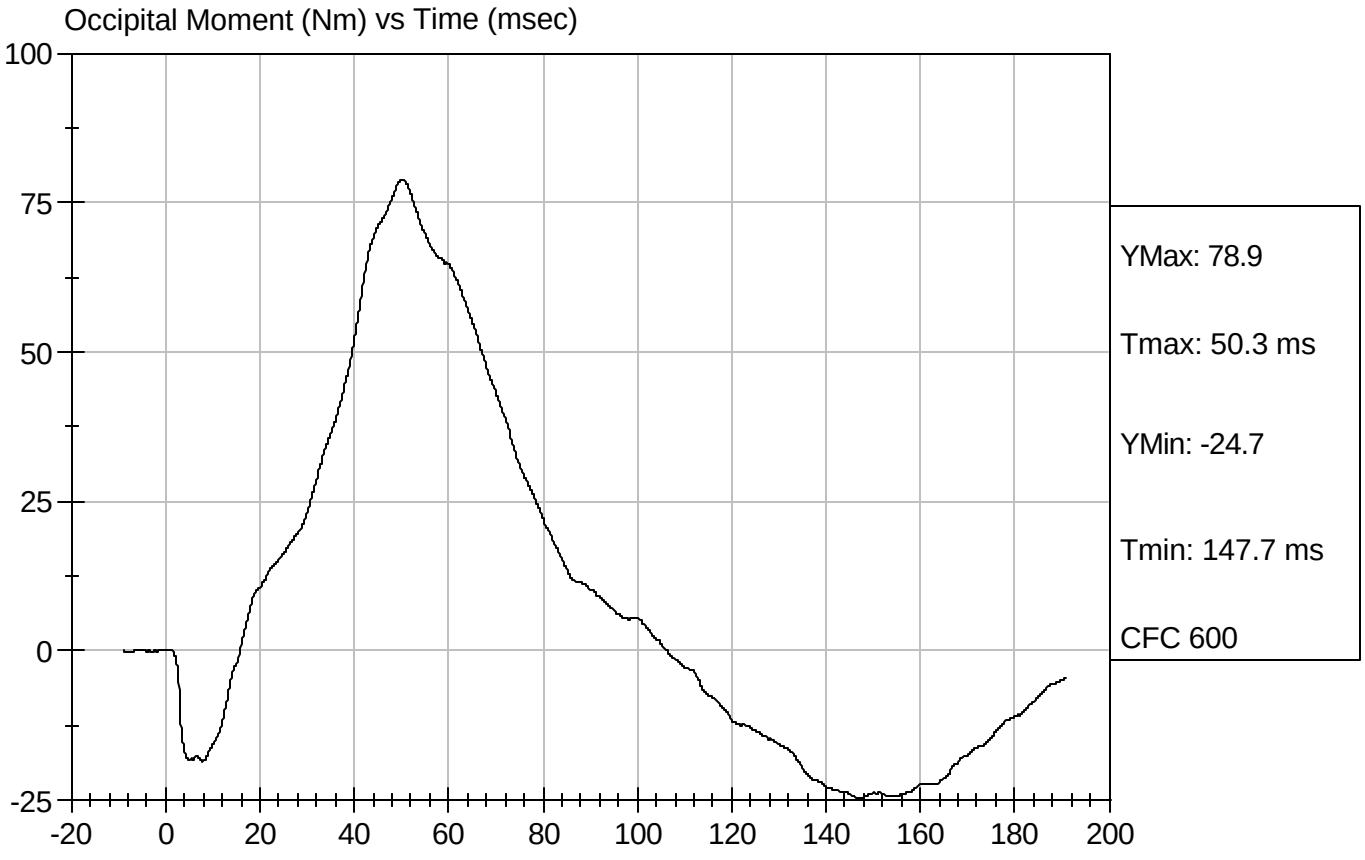
Test Date: 10/22/2004
Speed: 23.16 ft/sec, 7.06 m/sec



Test Desc: Neck Bending
Component ID: D042459

Test Date: 10/22/2004
Speed: 23.16 ft/sec, 7.06 m/sec





SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 904

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Sternum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass

Jessica Gall
Laboratory Technician

10/20/2004
Test Date

David Winkelbauer
Approved By

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

DUMMY AND VEHICLE CALIBRATION DATA

	INSTRUMENTS FOR DRIVER DUMMY NO.271		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AHR15	Endevco	8/19/04
Lower Rib Y	J21612	Endevco	8/19/04
Lower Spine Y	ALCR0	Endevco	8/23/04
Pelvis Y	AGTM8	Endevco	8/24/04
Upper Rib Redundant Y	AP2D6	Endevco	8/19/04
Lower Rib Redundant Y	AHW95	Endevco	8/19/04
Lower Spine Redundant Y	AH0N9	Endevco	8/23/04
Pelvis Redundant Y	AMRR4	Endevco	8/23/04
Head X	F14-B19	Entran	9/10/04
Head Y	F09-N09	Entran	9/10/04
Head Z	F14-A12	Entran	9/10/04
Head Redundant X	F11-H07	Entran	9/10/04
Head Redundant Y	F11-H19	Entran	9/10/04
Head Redundant Z	F28-N04	Entran	9/10/04
Neck Load Cell	253	Denton	4/27/04

	INSTRUMENTS FOR PASSENGER DUMMY NO. 904		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	J03-J09	Entran	8/23/04
Lower Rib Y	J23-J08	Entran	8/23/04
Lower Spine Y	J14-J17	Entran	8/19/04
Pelvis Y	AH0A2	Endevco	8/24/04
Upper Rib Redundant Y	J14-J14	Entran	8/23/04
Lower Rib Redundant Y	J23-J04	Entran	8/23/04
Lower Spine Redundant Y	AHY54	Endevco	7/26/04
Pelvis Redundant Y	AJ462	Endevco	8/24/04
Head X	AGTY6	Endevco	8/23/04
Head Y	AALH1	Endevco	8/23/04
Head Z	J13943	Endevco	8/23/04
Head Redundant X	AN8D2	Endevco	8/23/04
Head Redundant Y	J10195	Endevco	8/23/04
Head Redundant Z	J11166	Endevco	8/23/04
Neck Load Cell	1673	Entran	6/22/04

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Front Door Centerline Y	I16-B03	Entran	9/24/04
Midrear of Left Front Door Y	A27-R08	Entran	9/30/04
Left Front Door Upper Centerline Y	H01-N12	Entran	8/24/04
Midrear of Left Rear Door Y	K07-R20	Entran	9/24/04
Left Rear Door Upper Centerline Y	H21-J04	Entran	6/04/04
Left Mid A-Post Y	F08-Z14	Entran	9/27/04
Left Lower A-Post Y	F03-F03	Entran	9/27/04
Left Mid B-Post Y	A27-R06	Entran	9/13/04
Left Lower B-Post Y	C15-Z18	Entran	9/30/04
Floorpan @ Rear Axle X	F03-F05	Entran	9/24/04
Floorpan @ Rear Axle Y	E01-F01	Entran	9/30/04
Floorpan @ Rear Axle Z	G10-F04	Entran	9/30/04
Right Front Sill X	C17-J03	Entran	9/30/04
Right Front Sill Y	C25-Z23	Entran	9/30/04
Right Front Sill Z	C24-B01	Entran	9/30/04
Right Rear Sill X	C12-R14	Entran	9/30/04
Right Rear Sill Y	A08-M05	Entran	9/30/04
Right Rear Sill Z	C24-B02	Entran	9/30/04
Left Front Sill Y	C17-J07	Entran	9/30/04
Left Rear Sill Y	C12-M02	Entran	9/30/04
Right Rear Occupant Compartment Y	I15-Z05	Entran	5/28/05
Vehicle CG X	H21-J06	Entran	9/30/04
Vehicle CG Y	H21-J08	Entran	9/30/04
Vehicle CG Z	I16-B07	Entran	9/30/04
Driver Seat Track Y	A09-N37	Entran	9/24/04