REPORT NUMBER: NCAPSIDE-MGA-2004-001

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

Ford Motor Company
2004 Ford Freestar S
NHTSA NUMBER: F40201

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

Test Date: November 13, 2003

Report Date: February 17, 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.

Prepared by: Shefalika Agarwal Date: 2/17/04
Shefalika Agarwal, Project Engineer

Reviewed by: David Winkelbauer Date: 2/17/04
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 2004 Ford Freestar S 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 November 13, 2003. The impact velocity of the Moving Deformable Barrier (MDB) was 62.1km/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 340 mm at level 3. The test vehicle's occupant performance is as follows:

	DRIVER	PASS.
Left Upper Rib (LUR) Accel., g	52	34
Left Lower Rib (LLR) Accel., g	43	41
Lower Spine (T_{12}) Accel., g	72	48
Thoracic Trauma Index (TTI)	62	45
Pelvis (PEV) Accel., g	69	71
HIC	214	218

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 New Car Assessment Program (NCAP) Side Impact Side Impact Hybrid III Dummy (SID/HIII) Occupant Side Impact Protection		*18. Distribution Statement* 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' 2004 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 2004 Ford Freestar S manufactured by Ford Motor Company.

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 2004 Ford Freestar S 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 62.1 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 2156.9 kg and the test weight of the MDB was 1361.2 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on November 13, 2003

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 Hybrid III 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-six (26) 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 EME 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 340 mm at level 3, 2100 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	62	45
Peak Pelvic G's (PEV)	G's	69	71
Head Injury Criteria (HIC)	none	214	218

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 sliding door had an opening at the top but remained latched. The opening was approximately 1 foot at the top. See Photos A25, A26, and A27.

There was no valid data collected for the following:
Left Rear Sill Y after 10 msec
LF Door Centerline Y after 7 msec
Midrear of LR Door after 30 msec
Left Lower B-Post Y after 5 msec

SECTION 3

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

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

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: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

TEST VEHICLE INFORMATION

Make	Ford
Model	Freestar
Body Style	Minivan
NHTSA No.	F40201
VIN	2FMZA50664BA16578
Color	Medium Steel Blue
Delivery Date	11/7/03
Odometer Reading (mile)	11
Dealer	Miller Motors
Transmission	Automatic
Final Drive	Front
Number of Cylinders	6
Engine Displacement (L)	3.9
Engine Placement	Lateral

TEST VEHICLE OPTIONS

Front Airbag	Yes
Side Airbags	No
Power Windows	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Power Brakes	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	Yes
Anti-lock Brakes	Yes
AM/FM/Clock	Yes
Anti-theft System	Yes
Cruise Control	No

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.
Date of Manufacture	10/03

GVWR (kg)	2567
GAWR Front (kg)	1322
GAWR Rear (kg)	1251

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	280	280
Cold / Test Pressure (kPa)	240	240
Recommended Tire Size	P225/60R16	P225/60R16
Tire Size on Vehicle	P225/60R16	P225/60R16
Tire Manufacturer	Michelin	Michelin

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	Bench	
Number Of Occupants	2	2	3	7
Capacity Wt. (VCW) (kg)				544
Cargo Wt. (RCLW) (kg)				68

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	573.8	391.0		636.4	477.2	
Right	kg	579.2	388.7		587.9	455.4	
Ratio	%	59.7	40.3		56.8	43.2	
Totals	kg	1153.0	779.7	1932.7	1224.3	932.6	2156.9

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1932.7
Weight of 2 P572E ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	68.0
Calculated Vehicle Target Weight (TVTW)	kg	2162.2

* 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	756	755	774	776	1243
As Tested	mm	747	751	747	753	1332
Fully Loaded	mm	739	750	738	752	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	3081
Total Vehicle Length at Left Side	mm	4186
Total Vehicle Length at Centerline	mm	5105
Total Vehicle Length at Right Side	mm	4186
Total Vehicle Width	mm	1940
Weight of Ballast in Cargo Area	kg	81.6
Amount of Stoddard Solvent in Fuel Tank	liters	93.5

TEST VEHICLE VERTICAL IMPACT LINE DATA

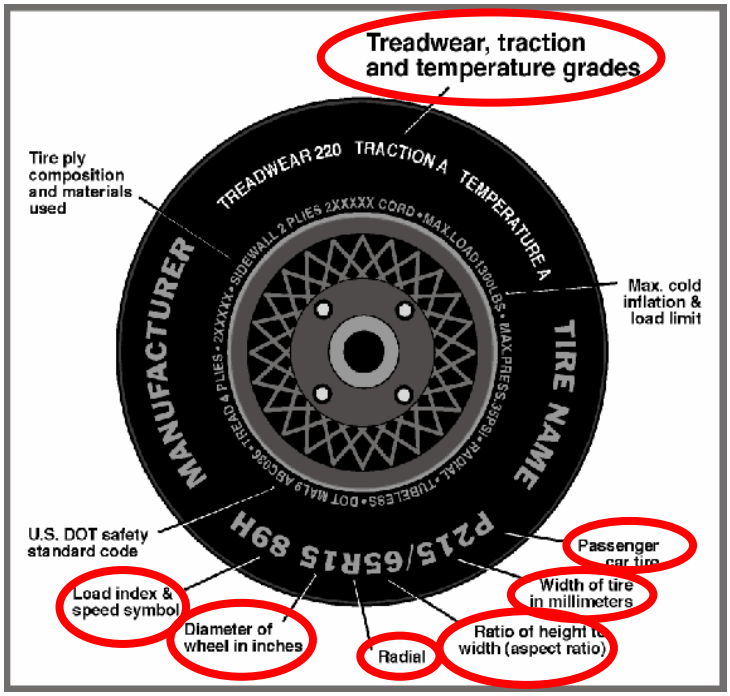
Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	3081
Target Impact Point Aft of Front Axle	mm	508
Actual Impact Point Aft of Front Axle	mm	522

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle:	2004 Ford Freestar S	NHTSA No.:	F40201
Test Program:	NCAP Side Impact	Test Date:	11/13/03

Vehicle Year	2004	Vehicle Make	Ford
VIN	2FMZA50664BA16578	Vehicle Model	Freestar S



	Front	Rear
Tire Manufacturer	Michelin	Michelin
Tire Name	Symmetry	Symmetry
Tire Type	All Season	All Season
Tire Width (mm)	225	225
Ratio of Height to Width (aspect ratio)	60	60
Radial	R	R
Wheel Diameter	16	16
Load Index & Speed Symbol	97S	97S
Treadwear	460	460
Traction Grade	A	A
Temperature Grade	B	B

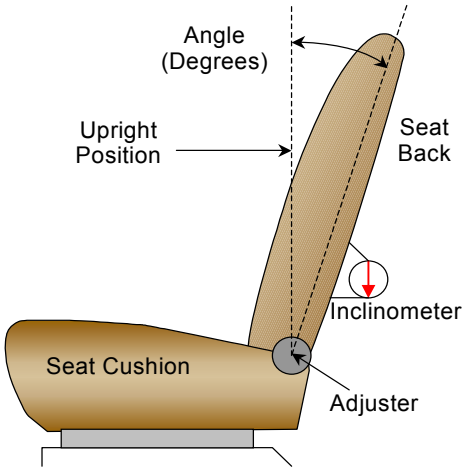
DATA SHEET NO. 3

TEST VEHICLE INFORMATION

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

NORMAL DESIGN RIDING POSITION

The driver seat is positioned to the manufacturer's designated angle. The seat back angle is measured relative to the rocker sill. Remove the seat back panel and position inclinometer 13 inches above the back pivot point on the rear outboard seat frame. Avoid taking measurement on reinforcement plates. The seat back angle for the driver and the passenger seats is 18 degrees.



FRONT SEAT ASSEMBLY

Driver seat back angle: 18.3°
Left Rear Passenger seat back angle: 17.3°

SEAT FORE/AFT POSITIONS

Position the seat in the mechanical mid-position. Reference points are scribed on the seat and the seat track. The total seat travel is measured and the seat is then positioned in the center of seat travel.

Driver seat fore/aft total travel: 180 mm
Left Rear Passenger seat fore/aft total travel: non adjustable
Driver seat fore/aft position: 10th of 19 notch
Left Rear Passenger seat fore/aft position: non adjustable

DATA SHEET NO. 3... (continued)

TEST VEHICLE INFORMATION

Test Vehicle:	2004 Ford Freestar S	NHTSA No.	F40201
Test Program:	NCAP Side Impact	Test Date:	11/13/03

FUEL TANK CAPACITY DATA

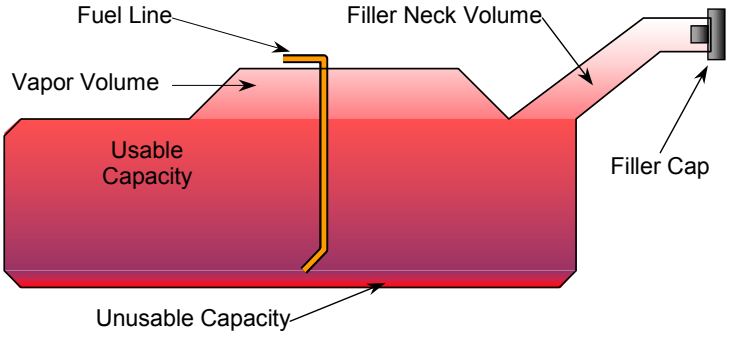
The "Usable Capacity" of the standard equipment fuel tank is: 98.4 liters

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

The "Usable Capacity" used for certification to FMVSS 301 requirements: 98.4 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 93.5 liters

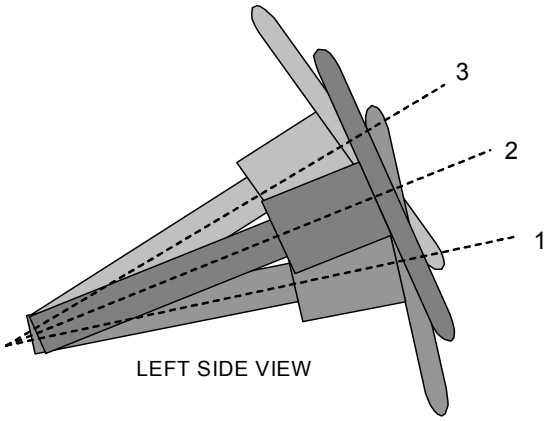
The electric fuel pump operates for 2 seconds to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 2 seconds following ignition actuation the fuel pump will shut off. The fuel pump operates continuously while the engine is running. If the engine stalls the fuel pump is deactivated. Also, a fuel pump shut-off switch is provided, designed to stop fuel flow to the engine if the vehicle sustains an impact above a certain magnitude.



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. Vehicle is equipped with a 5 position tilt column. Test position is mid-position. The steering column was placed in the 3rd position of 5.



STEERING COLUMN ASSEMBLY

DATA SHEET NO. 4
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2004 Ford Freestar S
Test Program: NCAP Side Impact
NHTSA No. F40201
Test Date: 11/13/03

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	573.8	391.0		636.4	477.2	
Right	kg	579.2	388.7		587.9	455.4	
Weight Ratio	%	59.7	40.3		56.8	43.2	
Totals	kg	1153.0	779.7	1932.7	1224.3	932.6	2156.9

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	165	308
Level 2	Occupant H-Point	mm	327	651
Level 3	Mid Door	mm	340	766
Level 4	Window Sill	mm	293	1001
Level 5	Window Top	mm	3	1604
N/A	Maximum Penetration	mm	340	766

INSTRUMENTATION

Driver SID/HIII Instrumentation	20
Passenger SID/HIII Instrumentation	20
Vehicle Structure Accelerometers	26
MDB Accelerometers	6
Total	72

DATA SHEET NO. 5

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

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	62.1
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.1
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	107
2	Top of Bumper (mm)	533	800	Right	63
3	Mid Level (mm)	686	800	Left	41
4	Top of Stack (mm)	813	800	Left	114

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	6
Contact Switches	2
High Speed Cameras	2

DATA SHEET NO. 6

POST TEST OBSERVATIONS

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

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	Headrest, Left Shoulder	Seat Belt
Upper Torso Contact	Door Panel	Door Panel
Lower Torso Contact	Door Panel	Door Panel
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
Left Side Door Opening	Door remained closed and latched; Door opened without tools	Remained latched but there was almost a foot opening on the top part of door.
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	None
Window Damage	Left Rear and Left Third Seating Row
Other Notable Effects	The left rear sliding door had an opening of about 1 foot.

AIRBAG DEPLOYMENT

	Driver	Front Passenger	Rear Passenger
Front	No	No	N/A
Side	N/A	N/A	N/A

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	14mm Rear
Vertical Offset	mm	+/-20	14mm High

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 7

SID/HIII INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

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	52.3	55	-10.4	91	33.6	74	-5.2	112
Upper Rib (LUR) (R)	Y	G's	53.7	55	-10.0	91	33.9	74	-4.6	113
Lower Rib (LLR)	Y	G's	43.0	40	-8.0	101	40.7	61	-4.7	113
Lower Rib (LLR) (R)	Y	G's	42.9	45	-8.2	90	41.1	61	-4.3	113
Lower Spine (T_{12})	Y	G's	71.6	44	-7.6	121	48.4	58	-5.4	107
Lower Spine (T_{12}) (R)	Y	G's	70.3	43	-7.7	120	47.6	58	-5.7	107
Pelvis (PEV)	Y	G's	69.1	38	-13.9	60	70.8	53	-9.0	90
Pelvis (PEV) (R)	Y	G's	65.5	38	-12.8	60	74.0	53	-10.2	90

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

Location	Driver				Passenger			
	LUR	T_{12}	TTI(g)	PEV(g)	LLR	T_{12}	TTI(g)	PEV(g)
Rib, Spine, and Pelvis	52.3	71.6	62	69.1	40.7	48.4	45	70.8
Rib, Spine, and Pelvis (R)	53.7	70.3	62	65.5	41.1	47.6	44	74.0

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	5.2	21	-15.5	95	1.1	200	-9.4	88
Head CG	Y	G's	18.5	90	-5.7	40	18.1	113	-12.6	60
Head CG	Z	G's	50.6	66	-5.3	52	46.5	90	-4.0	70
Head CG Resultant		G's	53.4	66			48.1	90		

HEAD INJURY CRITERIA (SAE CLASS 1000 Filtered)

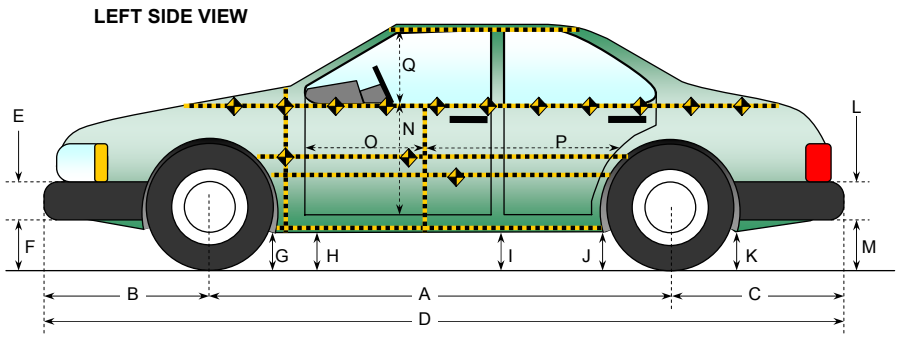
Location	Driver				Passenger			
	HIC	T^1	T^2	Avg G's	HIC	T^1	T^2	Avg G's
Head CG	214	56.5	92.5	32.3	218	80.4	116.4	32.6

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: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03



All Measurements in mm

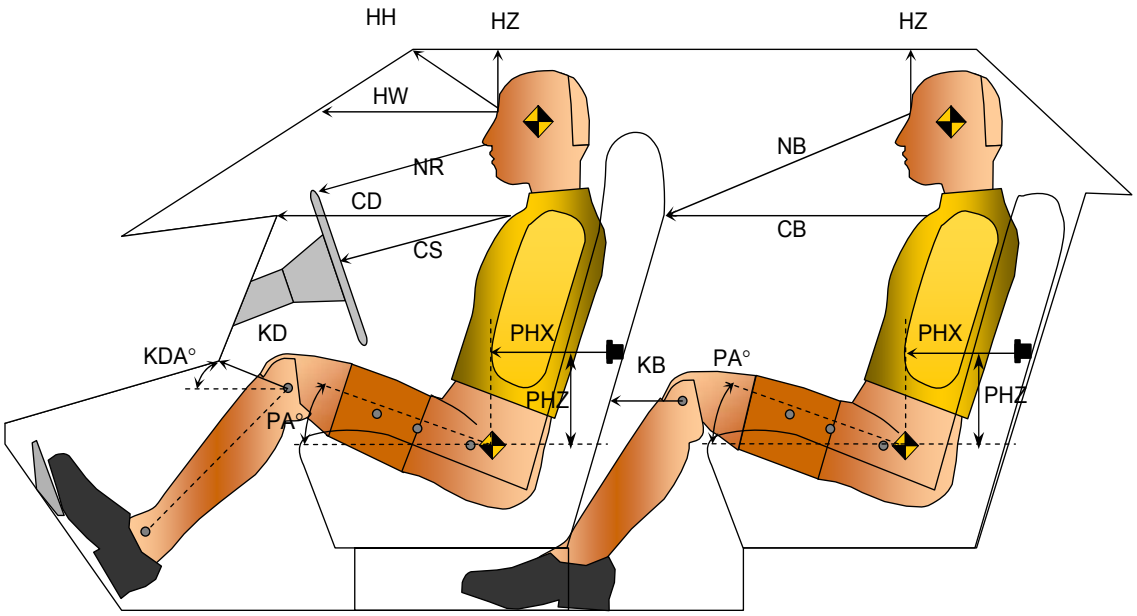
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3081	3052	29
B	Front Axle to FSOV	998	1002	-4
C	Rear Axle to RSOV	1026	1034	-8
D	Total Length at Centerline	5105	5095	10
E	Front Bumper Thickness	187	187	0
F	Front Bumper Bottom to Ground	398	399	-1
G	Sill Height at Front Wheel Well	178	179	-1
H	Sill Height at Front Door Leading Edge	182	194	-12
I	Sill Height at "B" Pillar	193	203	-10
J1	Sill Height at Rear Wheel Well	205	221	-16
J2	Pinch Weld Height at Rear Wheel Well	199	214	-15
K	Sill Height Aft of Rear Wheel Well	279	296	-17
L	Rear Bumper Thickness	190	190	0
M	Rear Bumper Bottom to Ground	317	302	15
N	Sill Height to Window Bottom Sill	768	620	148
O	Front Door Leading Edge to Impact CL	925	780	145
P	Rear Door Trailing Edge to Impact CL	1194	1059	135
Q	Front Window Opening	603	592	11
R	Right Side Length	4186	4182	4
S	Left Side Length	4186	4122	64
T	Vehicle Width at "B" Post	1940	1644	296

DATA SHEET NO. 9

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2004 Ford Freestar S
Test Program: NCAP Side Impact

NHTSA No. F40201
Test Date: 11/13/03



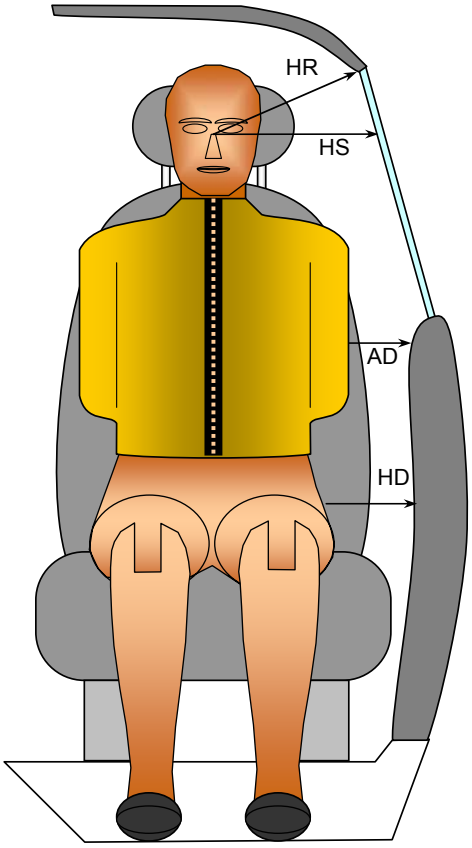
Driver Code	Pass. Code	Measurement Description	Driver 271		Passenger 904	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	484			
HW		Head to Windshield	697			
HZ	HZ	Head to Roof	165		208	
NR	NB	Nose to Rim/Nose to Seatback	533		560	
CD	CB	Chest to Dash or Seatback	588		527	
CS		Chest to Steering Wheel	409			
KDL	KBL	Left Knee to Dash or Seatback	172	24.3	228	15.7
KDR	KBR	Right Knee to Dash or Seatback	162	22.5	239	4.0
PA	PA	Pelvic Angle		23.2		24.5
PHX	PHX	H-Point to Striker (X-Axis)	200		253	
PHZ	PHZ	H-Point to Striker (Z-Axis)	34		80	

DATA SHEET NO. 10

SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2004 Ford Freestar S
Test Program: NCAP Side Impact

NHTSA No. F40201
Test Date: 11/13/03



FRONT VIEW OF DUMMY

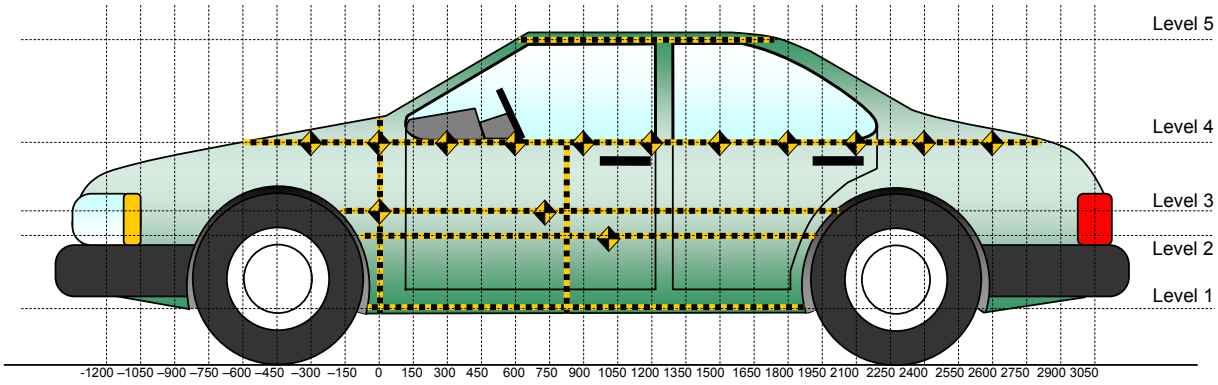
Code	Measurement Description	Units	Driver S/N 271	Passenger S/N 904
HR	Head to Side Header	mm	178	315
HS	Head to Side Window	mm	308	475
AD	Arm to Door	mm	113	192
HD	H-Point to Door	mm	184	404

DATA SHEET NO. 11

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2004 Ford Freestar S
Test Program: NCAP Side Impact

NHTSA No. F40201
Test Date: 11/13/03



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	1604
4	Window Sill	1001
3	Mid Door	766
2	Occupant H-Point	651
1	Sill Top	308

DATA SHEET NO. 12

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1050															
-900			196	263				194	264				-2	1	
-750			170	243				174	243				4	0	
-600			156	230				168	230				12	0	
-450			150	219				165	222				15	3	
-300			151	210				167	222				16	12	
-150		161	156	209			181	173	226			20	17	17	
0	204	167	163	205		235	254	242	235		31	87	79	30	
150	202	167	163	205		276	375	380	277		74	208	217	72	
300	200	165	160	204		311	419	428	214		111	254	268	10	
450	201	163	158	203		323	448	450	351		122	285	292	148	
600	201	160	157	202	461	334	472	464	374	442	133	312	307	172	-19
750	201	159	155	202	454	345	486	473	403	402	144	327	318	201	-52
900	202	159	154	202	454	355	466	477	418	429	153	307	323	216	-25
1050	201	158	154	202	452	366	472	468	449	455	165	314	314	247	3
1200	201	158	155	204	453	299	450	495	497	442	98	292	340	293	-11
1350	202	161	157	206	455	294	442	483	486	382	92	281	326	280	-73
1500	202	163	160	209	456	294	434	478	431	322	92	271	318	222	-134
1650	203	165	161	211	459	293	437	450	382	264	90	272	289	171	-195
1800	204	167	164	214	460	258	367	373	343	204	54	200	209	129	-256
1950	204	170	167	217	464	135	224	235	272	147	-69	54	68	55	-317
2100	204	167	166	220	469	202	207	210	270	90	-2	40	44	50	-379
2250		159	162	225	468		175	191	276	451		16	29	51	-17
2400			168	230	472			184	270	453			16	40	-19
2550			157	236	479			185	263	457			28	27	-22
2700			160	239	487			179	257	461			19	18	-26
2850			170	243	499			178	252	468			8	9	-31
3000			190	250				190	247				0	-3	
3150			214	256				206	242				-8	-14	
3300															

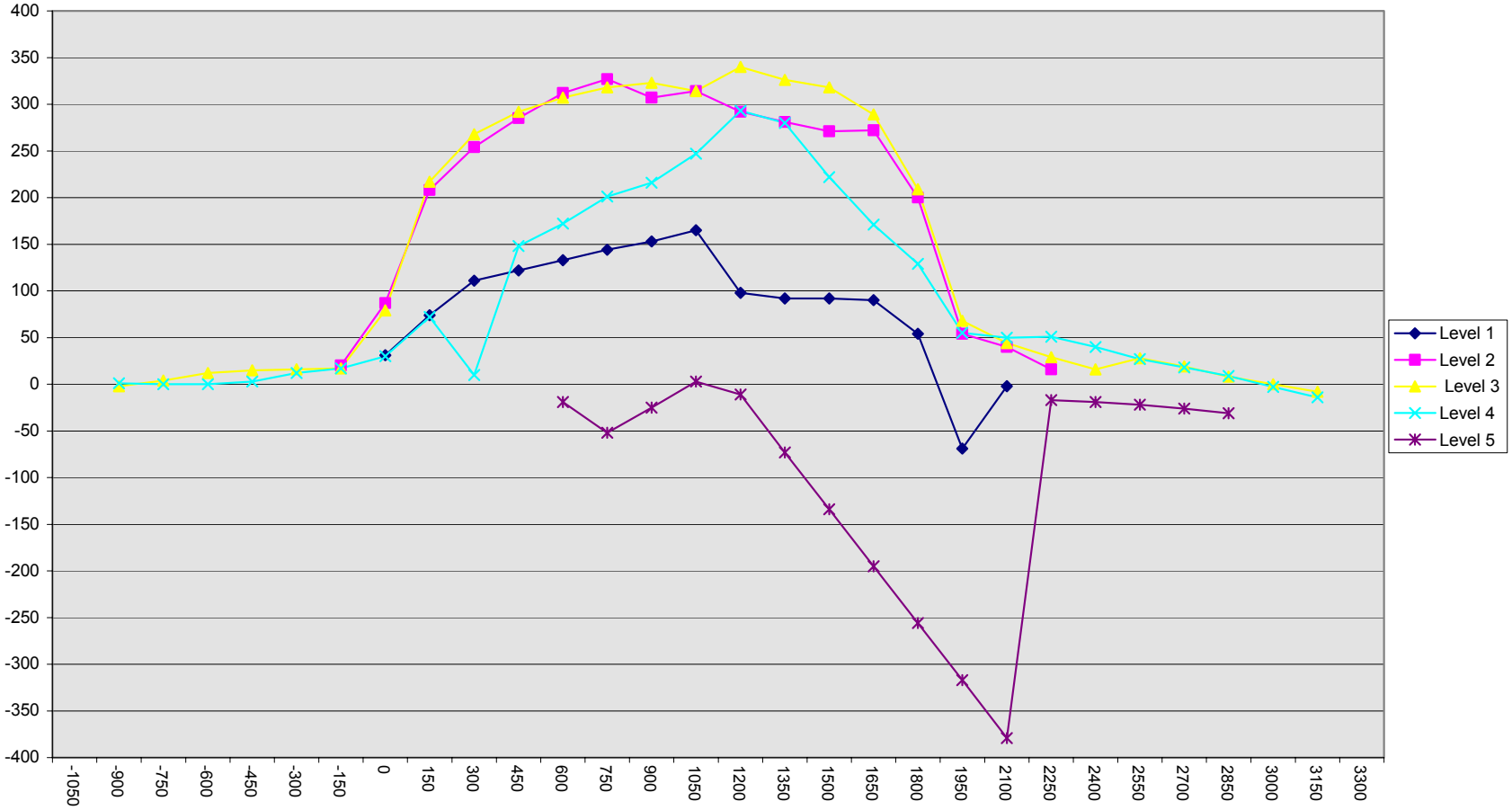
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

DATA SHEET NO. 12...(continued)

VEHICLE EXTERIOR CRUSH PROFILES

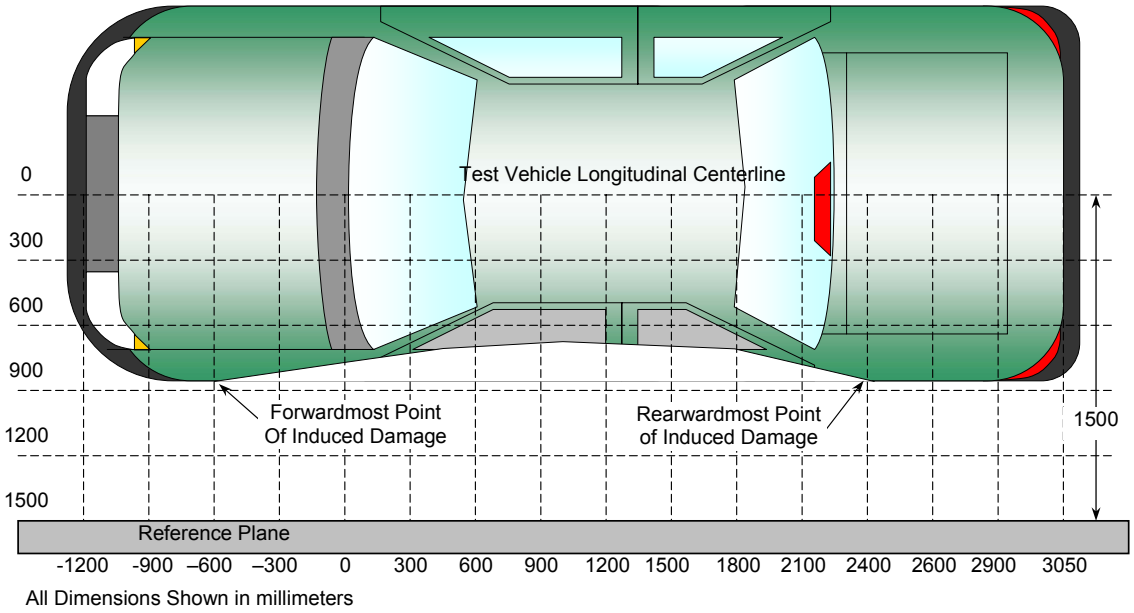
Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03



DATA SHEET NO. 13

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03



TOP VIEW

DAMAGE PROFILE DISTANCES

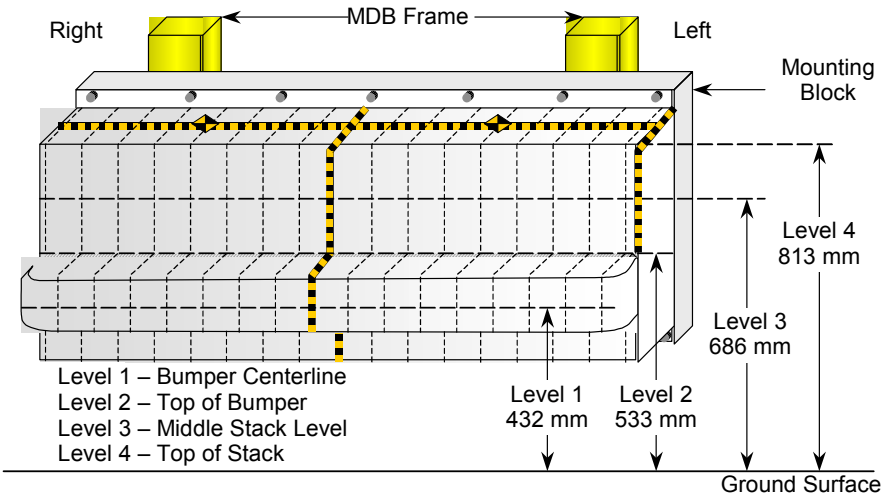
DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	3000 mm	4	250	247	-3
2	2280 mm	4	226	289	63
3	1480 mm	3	159	494	335
4	760 mm	2	159	499	340
5	40 mm	4	205	269	64
6	-600 mm	4	230	230	0

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: 2004 Ford Freestar S
Test Program: NCAP Side Impact
NHTSA No. F40201
Test Date: 11/13/03



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	107	101	97	94	91	88	87	84	79	74	70	67	65	63	62	64	72
2	63	57	54	52	49	46	44	42	40	30	33	31	31	30	30	32	39
3	39	6	8	10	4	5	8	18	28	10	8	6	6	8	18	33	41
4	97	50	14	0	0	6	26	50	51	34	26	28	36	46	66	89	114

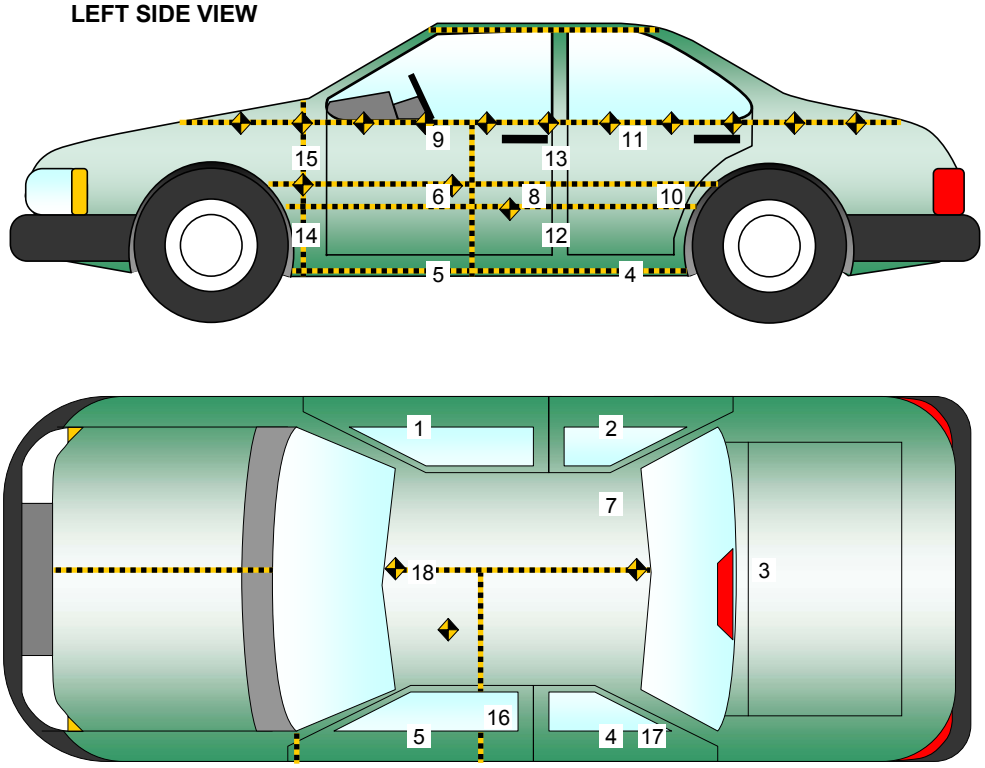
All Dimensions in mm

DATA SHEET NO. 15

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

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: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

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	3055	780	223	X	4.7	53	-2.6	21
					Y	24.4	8	-10.7	25
					Z	5.9	25	-8.0	12
					RES	25.5	8		
2	Right Sill at Rear Seat	1491	780	259	X	3.8	53	-3.0	21
					Y	20.1	8	-6.1	137
					Z	5.6	102	-10.4	26
					RES	20.5	8		
3	Rear Floorpan Above Axle	882	0	510	X	2.1	54	-5.1	40
					Y	18.1	41	-2.8	130
					Z	4.5	31	-4.1	81
					RES	18.7	40		
4	Left Sill at Rear Door	1570	-780	265	Y	*	*	*	*
5	Left Sill at Front Door	3040	-780	237	Y	40.2	8	-15.7	37
6	Left Front Door C/L	2983	-806	735	Y	**	**	**	**
7	Rear Occupant Compartment	2185	225	556	Y	68.5	40	-74.9	52
8	Left Front Door Mid-Rear	2640	-818	726	Y	213.3	7	-216.3	19
9	Left Front Door Upper C/L	3007	-800	986	Y	76.9	18	-55.0	112
10	Left Rear Door Mid-Rear	1783	-865	830	Y	***	***	***	***
11	Left Rear Door Upper C/L	2018	-850	1034	Y	149.6	12	-76.0	52
12	Left Lower B-Post	2414	-781	495	Y	****	****	****	****
13	Left Middle B-Post	2425	-785	1175	Y	115.2	8	-64.8	14
14	Left Lower A-Post	3494	740	470	Y	31.9	5	-29.9	77
15	Left Middle A-Post	3602	824	1090	Y	25.6	14	-11.5	56
16	Front Seat Track	2648	-648	625	Y	59.9	26	-41.3	38
17	Rear Seat Track or Structure	1940	-270	580	Y	58.5	40	-54.2	53
18	Vehicle CG	2814	0	380	X	1.2	52	-5.3	39
					Y	19.8	11	-2.2	144
					Z	17.3	40	-17.4	33
					RES	21.1	13		

See notes on the following page.

DATA SHEET NO. 15...(continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle:	2004 Ford Freestar S	NHTSA No.	F40201
Test Program:	NCAP Side Impact	Test Date:	11/13/03

* No valid data after 10 msec
** No valid data after 7 msec
*** No valid data after 30 msec
**** No valid data after 5 msec

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

DATA SHEET NO. 16

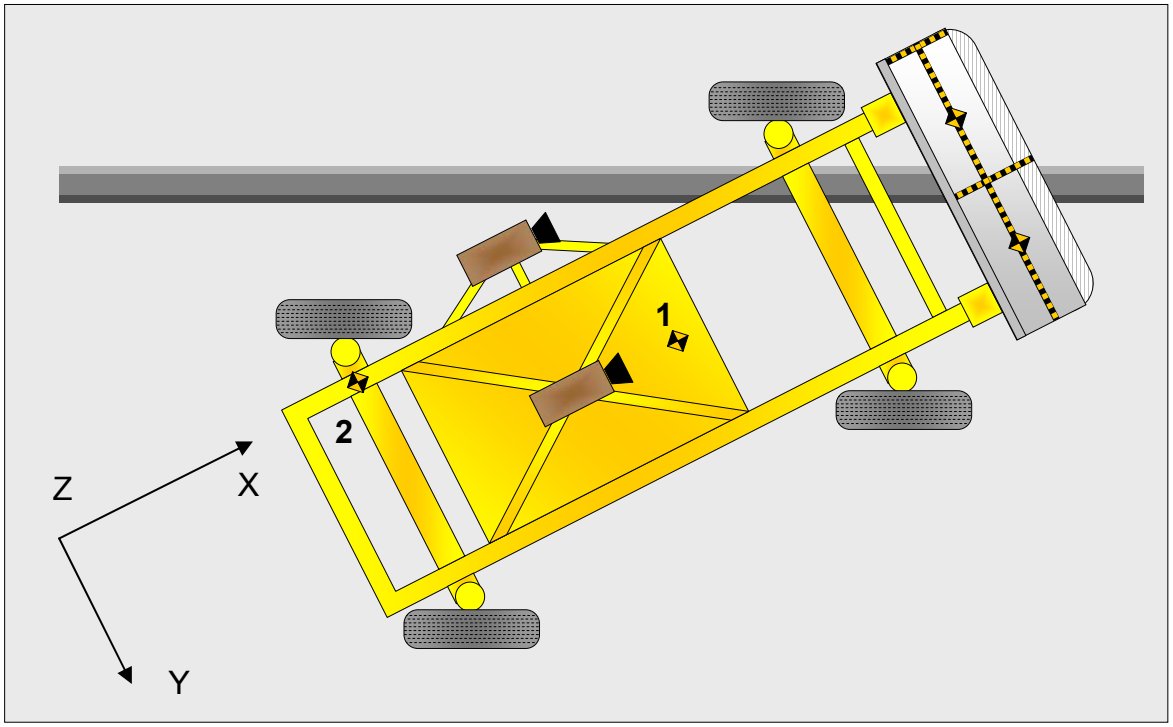
MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

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	2.8	123	-19.0	48
					Y	1.9	196	-6.9	38
					Z	12.9	80	-15.3	18
					RES	20.7	48		
2	MDB Rear	-2591	-625	-622	X	2.1	151	-20.7	36
					Y	4.5	26	-1.9	200
					Z	3.6	33	-3.2	54
					RES	21.1	36		

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



DATA SHEET NO. 17

VEHICLE STRUCTURAL MEASUREMENTS

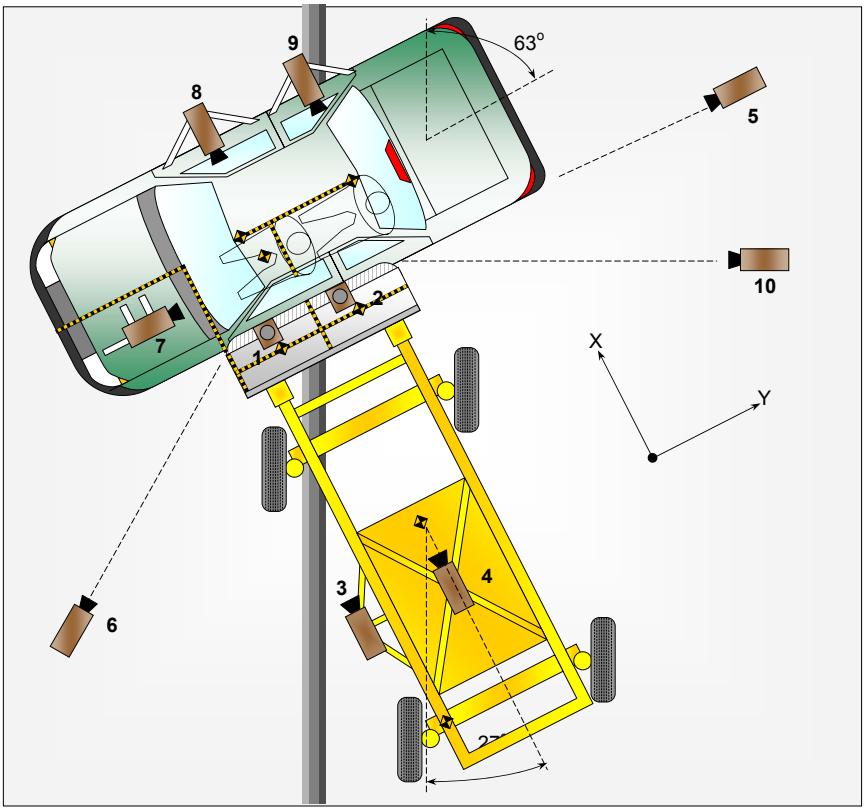
Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

	Elements	Pre-Test (mm)
1	Total Length	5105
2	Total Width	1934
3	Bumper Top Height	592
4	Bumper Bottom Height	406
5	Longitudinal Member Top Height	261
6	Distance between Longitudinal Members	985
7	Longitudinal Member Width	90
8	Engine Top Height	764
9	Engine Bottom Height	188
10	Engine and gearbox width	585
11	Front bumper-engine distance	401
12	Front shock absorber fixing height	947
13	Bonnet leading edge height	840
14	Front shock absorber fixing width	1192
15	Front bumper – front axle distance	1040
16	Front axle – a pillar distance	535
17	A-pillar – B-pillar distance	1080
18	B-Pillar – rear axle distance	1473
19	B-pillar – C-pillar distance	971
20	Roof sill bottom height	1651
21	Roof sill top height	1692
22	Floor sill bottom height	267
23	Floor sill top height	332

DATA SHEET NO. 18

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	0	0	5000	13	*
2	Overhead Close-up	640	290	5000	13	1130
3	MDB Onboard, Impact Point Close-up				35	521
4	MDB Onboard, Centerline of Impact				13	633
5	Right Side, Ground Level, Overall	532	8901	1894	25	1010
6	Left Side, Ground Level, Overall	106	5176	1728	13	1015
7	Vehicle Onboard Front SID/HIII, Front				13	526
8	Vehicle Onboard Front SID/HIII, Side				8	508
9	Vehicle Onboard Rear SID/HIII, Side				8	521
10	Real Time Coverage				13	24

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

* no timing marks

DATA SHEET NO. 19

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

Test Time: 2:11 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)

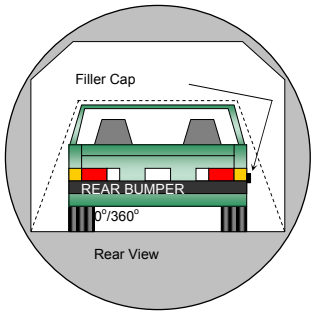
C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)

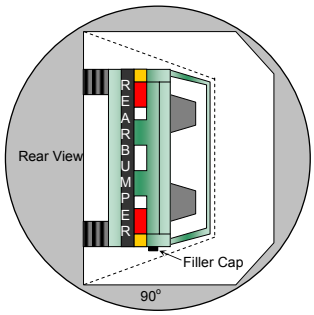
D. Spillage Details: None

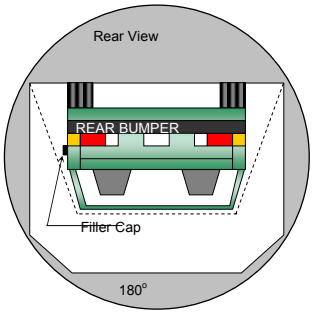
DATA SHEET NO. 20

FMVSS 301 STATIC ROLLOVER DATA SHEET

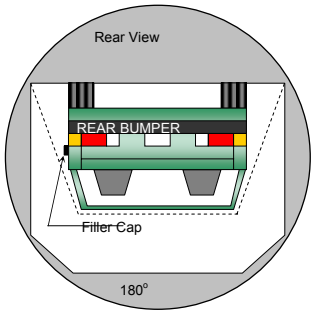
Test Vehicle: 2004 Ford Freestar S NHTSA No. F40201
Test Program: NCAP Side Impact Test Date: 11/13/03

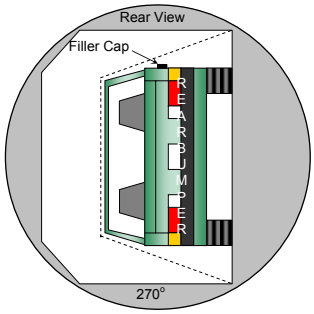


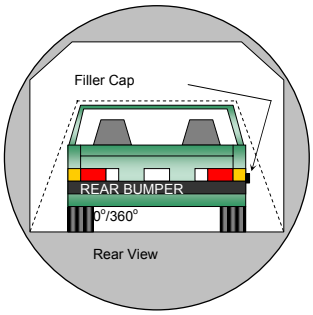




0^O to 90^O 90^O to 180^O







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°	163	300	0
90° to 180°	144	300	0
180° to 270°	145	300	0
270° to 360°	167	300	0

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

A-1.

Left Front of Vehicle As Received

Right Rear 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

Post-Test Left Side View of Test Vehicle

Pre-Test Left Rear ¾ View of Test Vehicle

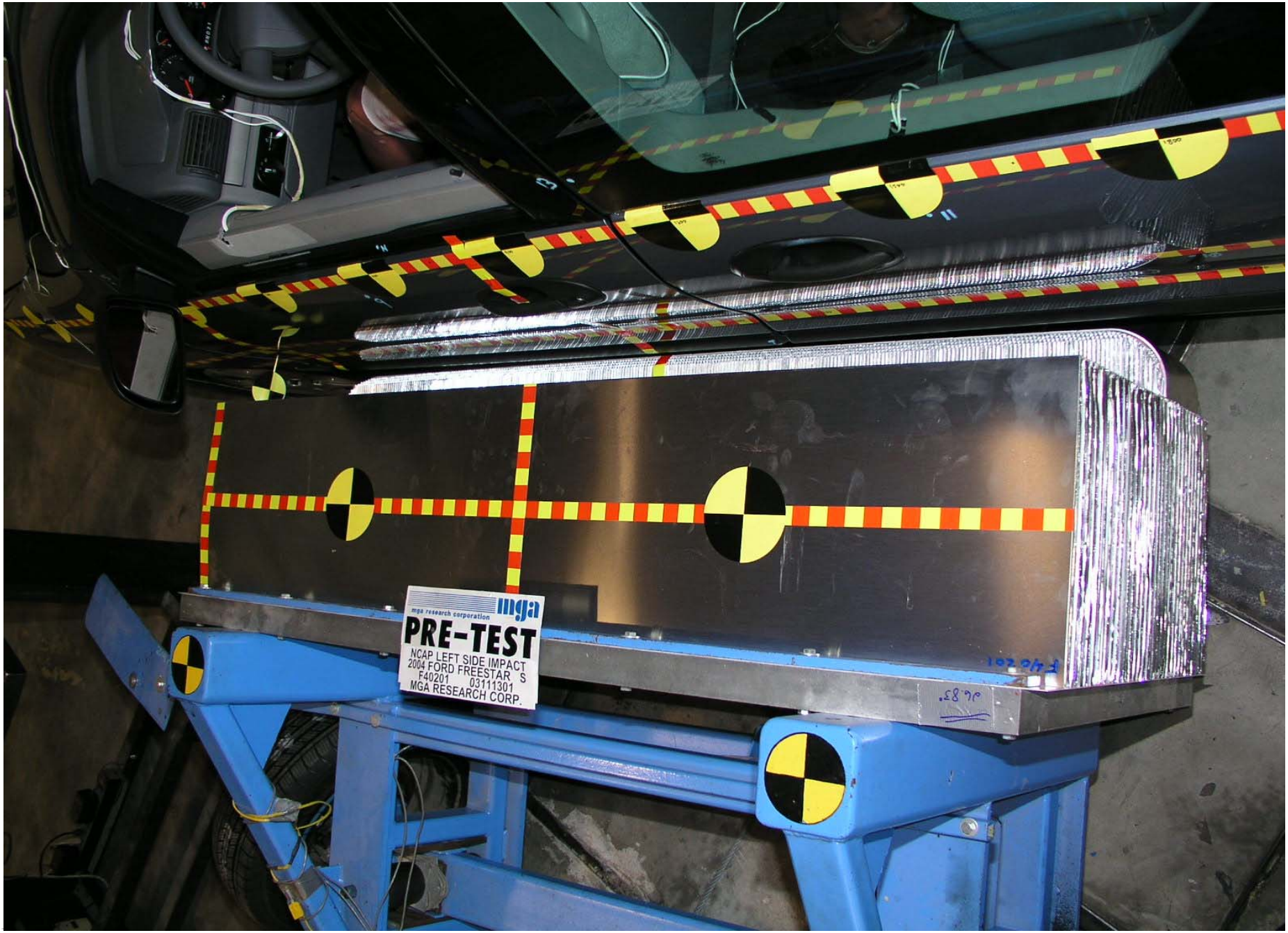
Post-Test Left Rear ¾ View of Test Vehicle

Pre-Test Rear View of Test Vehicle

Post-Test Rear View of Test Vehicle

Pre-Test MDB Positioned Against Vehicle (left side)

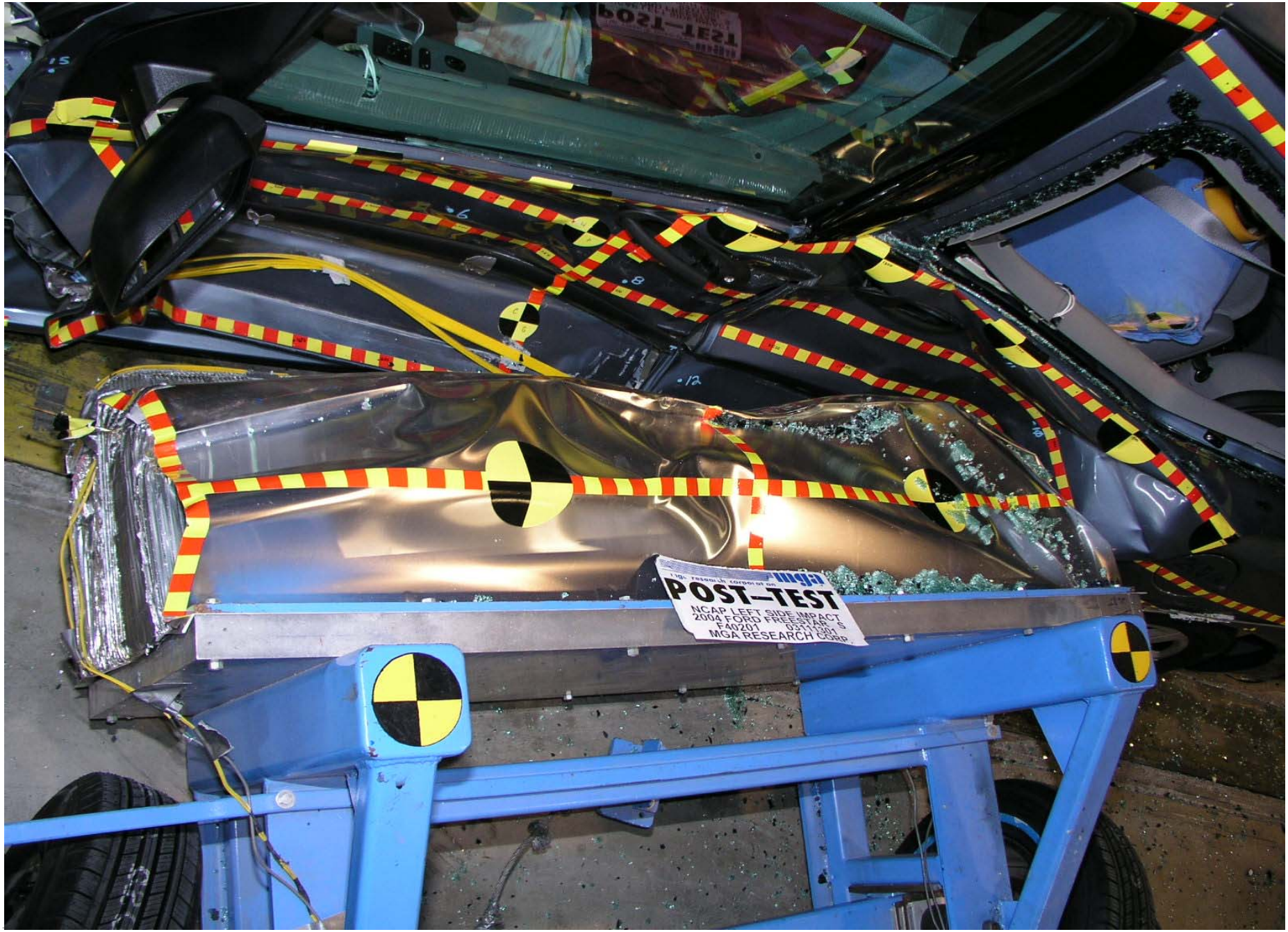
Pre-Test MDB Positioned Against Vehicle (right side)



Pre-Test MDB Positioned Against Vehicle Overhead View

Post-Test MDB and Vehicle (left side)

Post-Test MDB and Vehicle (right side)



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

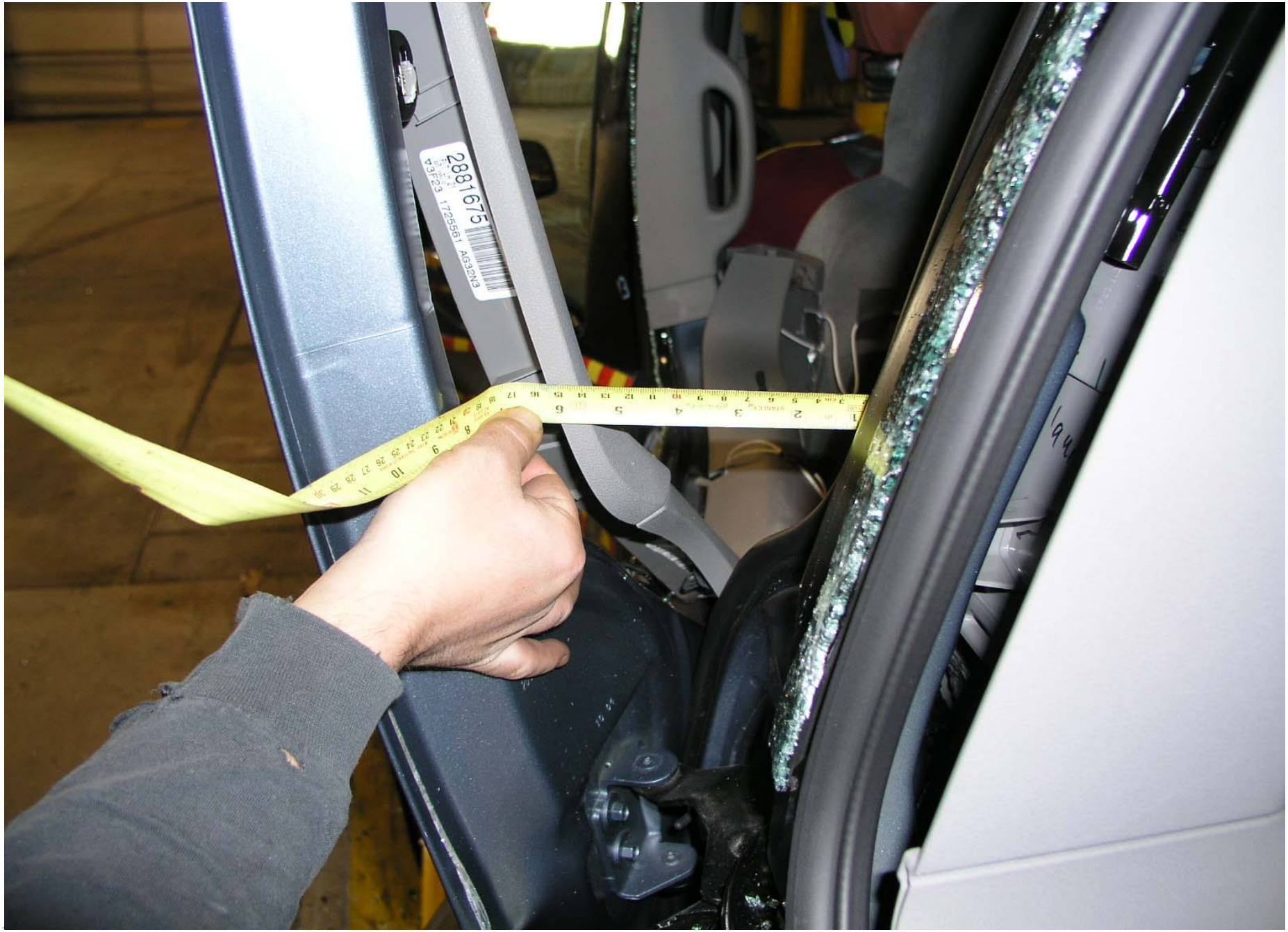
Post-Test Fuel Filler Cap View

Pre-Test Rear ¾ View of Left Front Door of Test Vehicle

Pre-Test Rear ¾ View of Left Rear Door of Test Vehicle

Post-Test Rear ¾ View of Left Side Doors of Test Vehicle

Post-Test Left Rear Door Opening



Post-Test Left Rear Door Opening

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 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

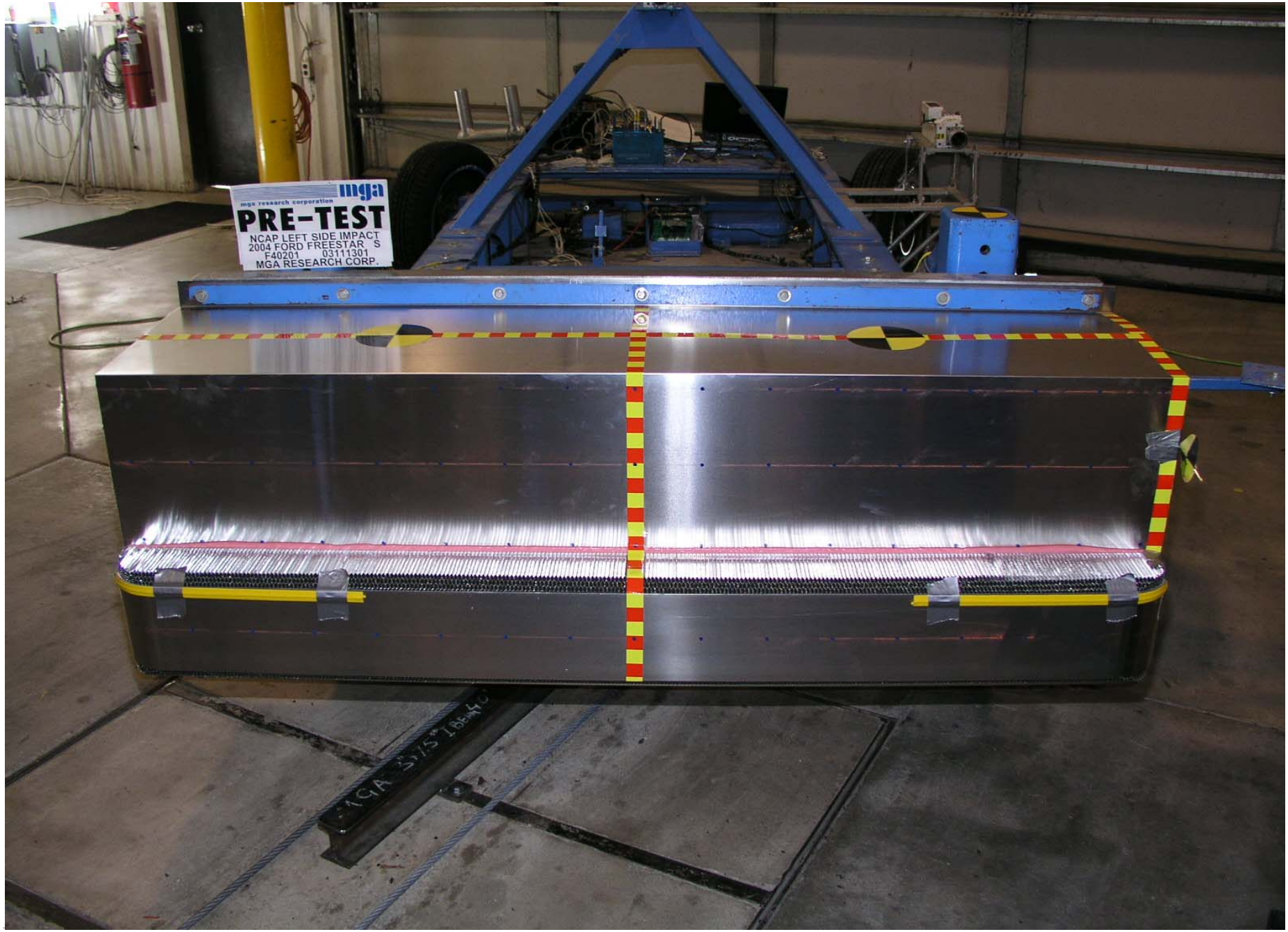
Pre-Test Passenger Dummy Shoulder and Door Top View

Post-Test Passenger Dummy Shoulder and Door Top View

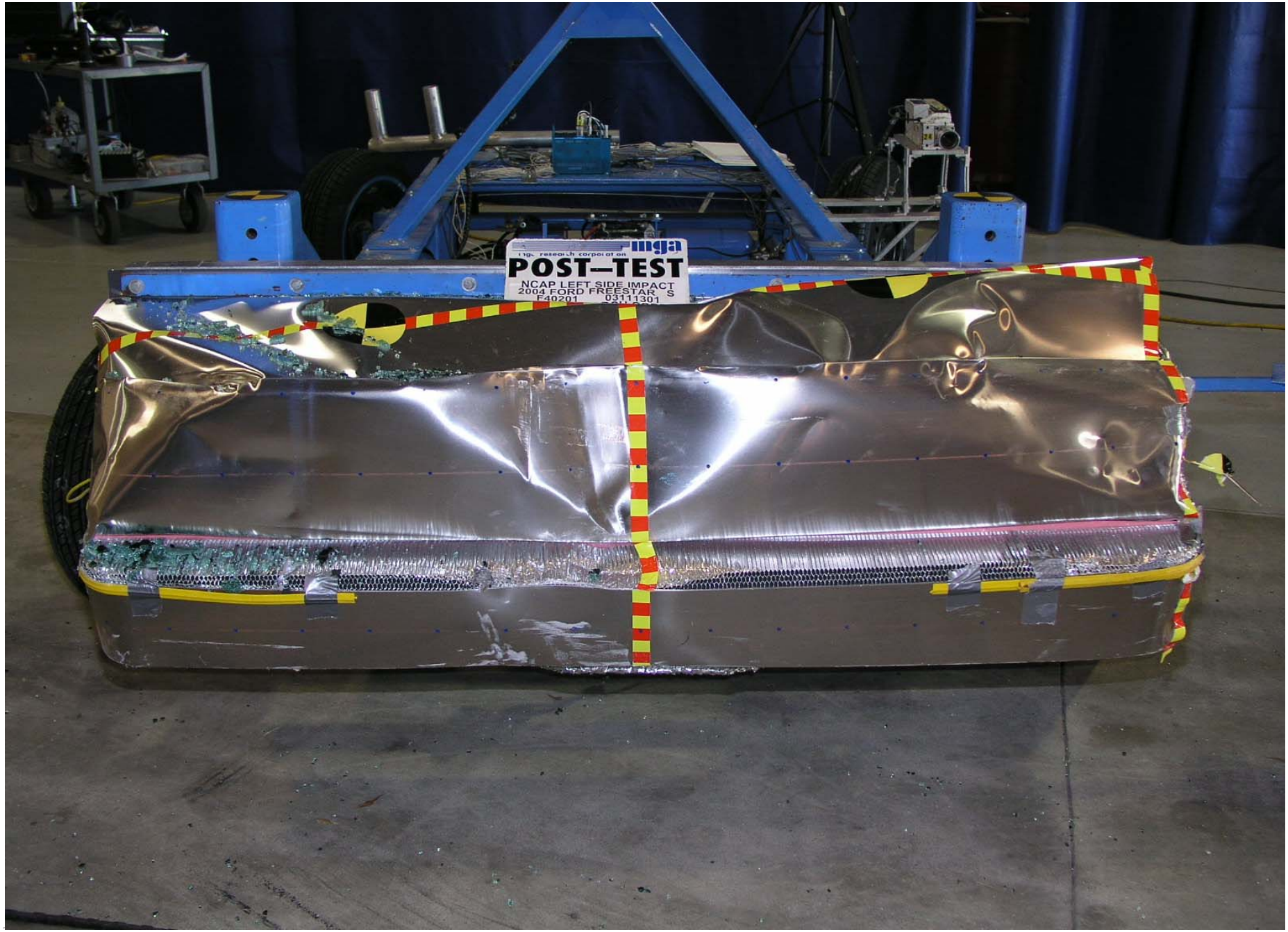
Pre-Test Passenger Dummy Right Side View

Post-Test Passenger Dummy Right Side View

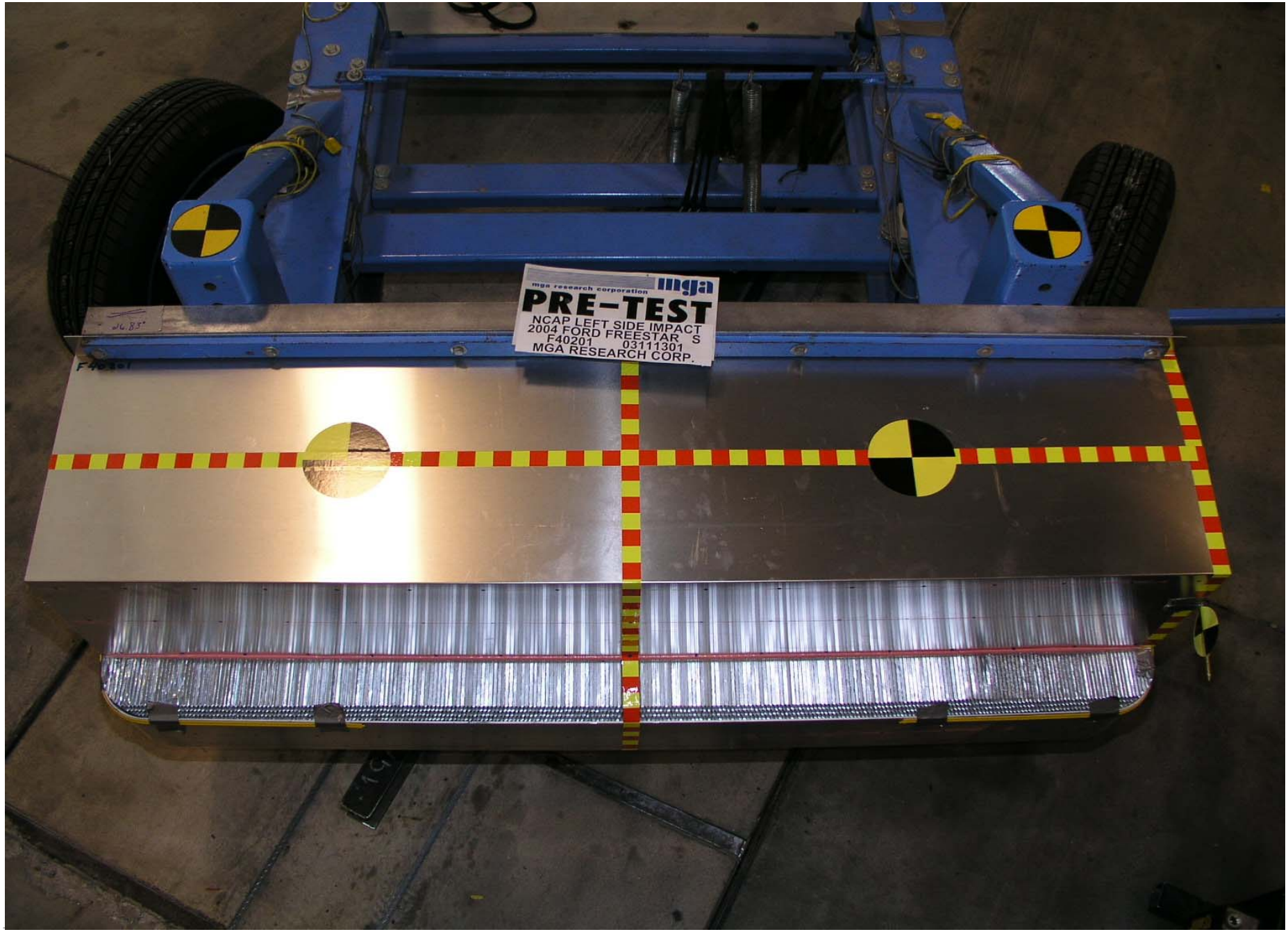
Post-Test Passenger Dummy Contact



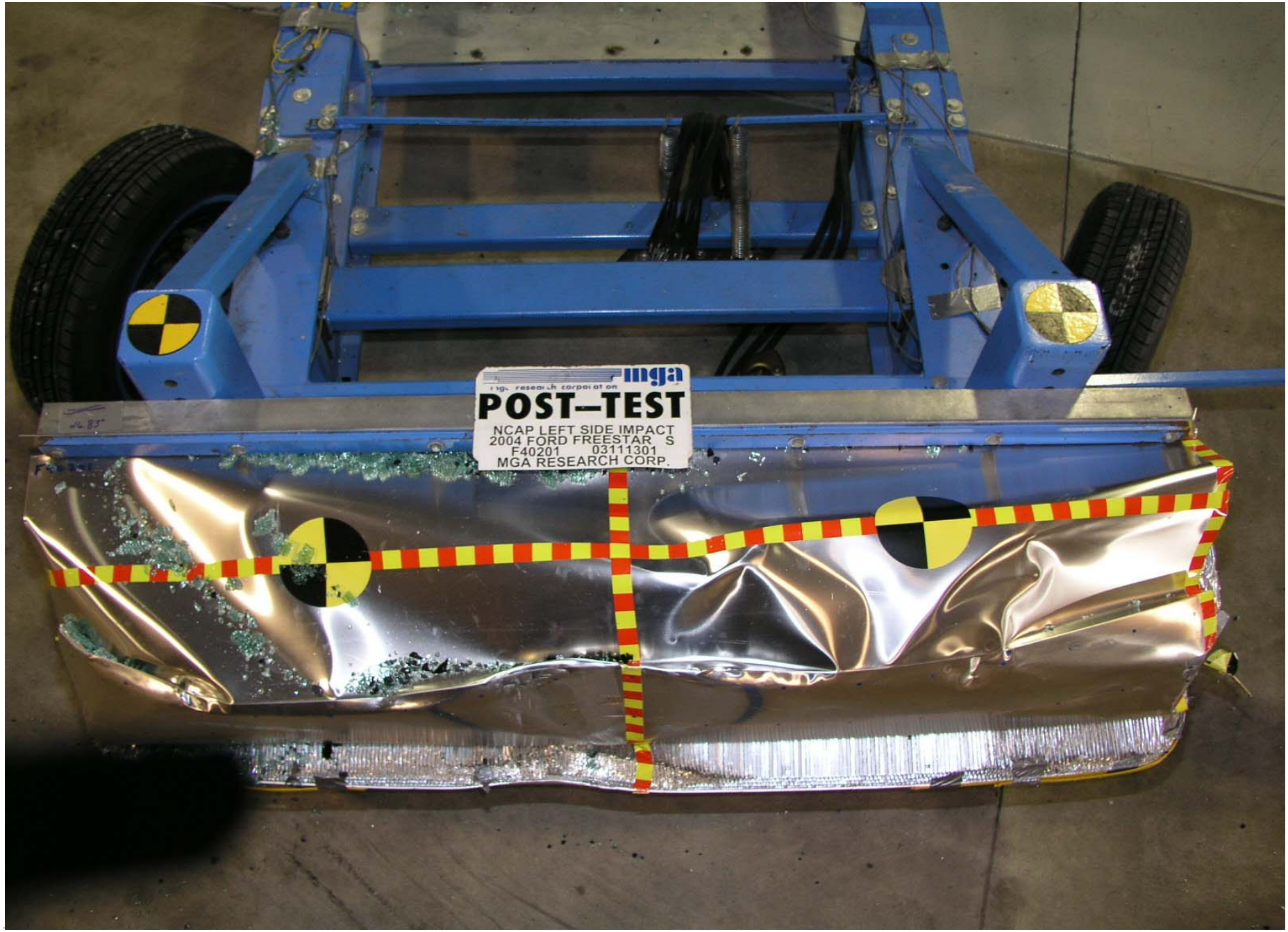
Pre-Test MDB Front View



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

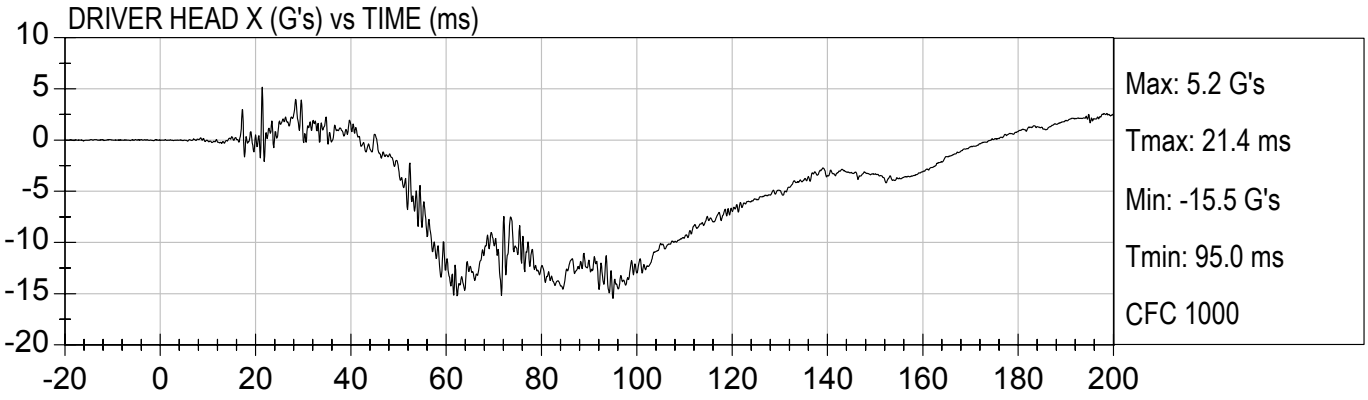
APPENDIX B

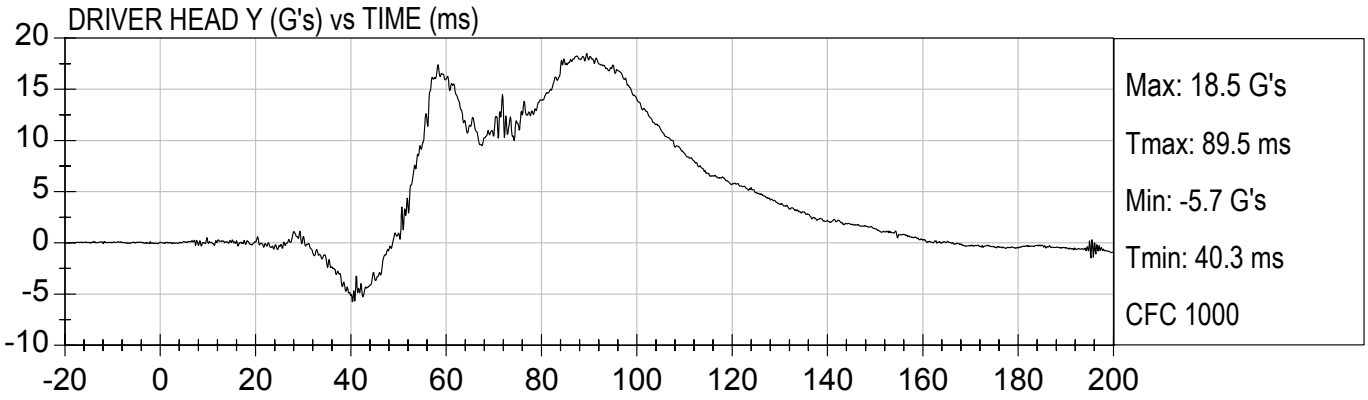
SID/HIII, VEHICLE, AND MDB RESPONSE DATA

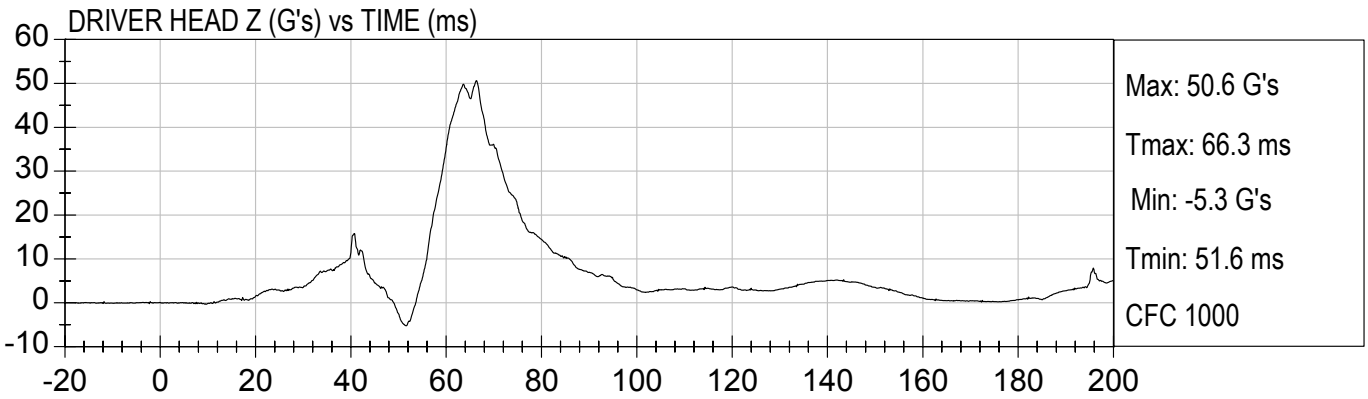
TABLE OF DATA PLOTS

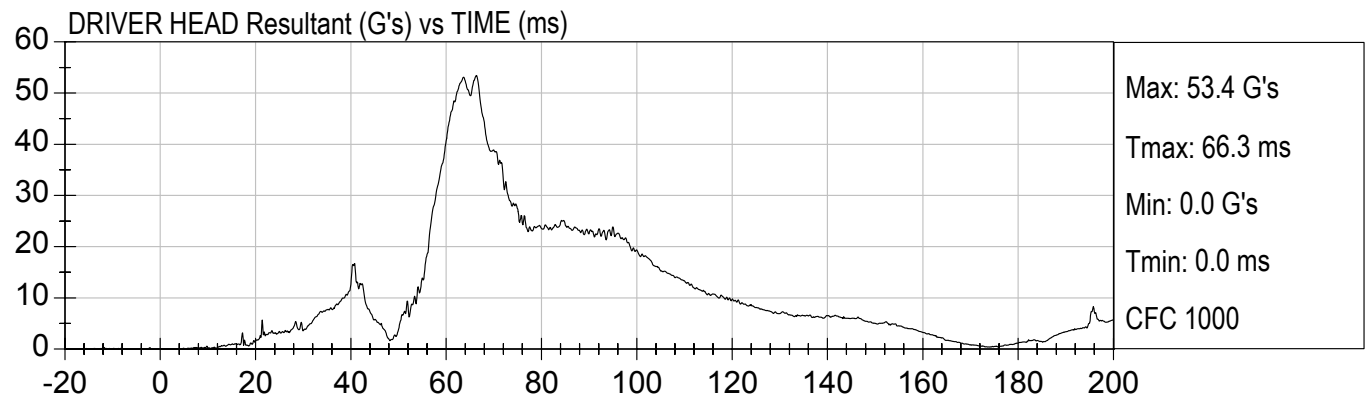
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



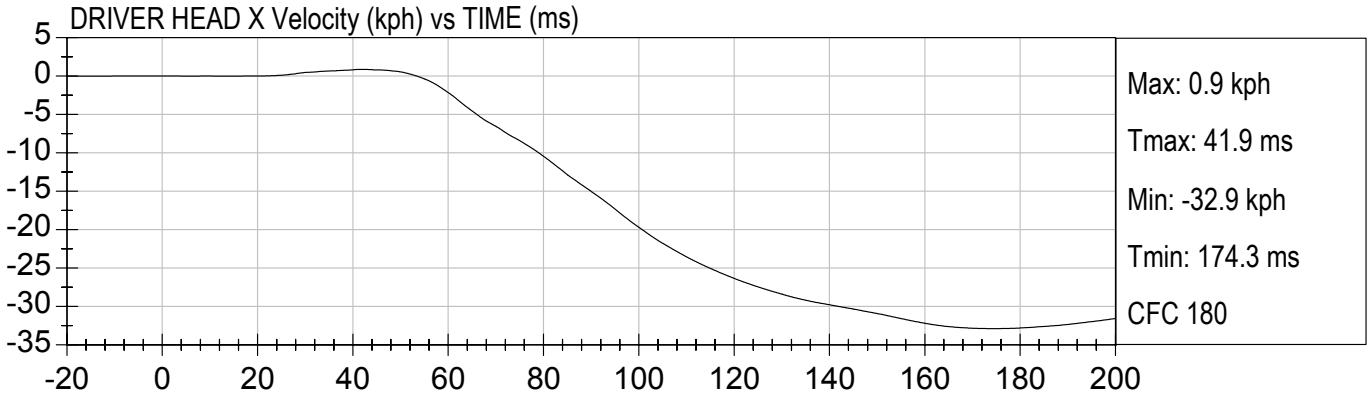


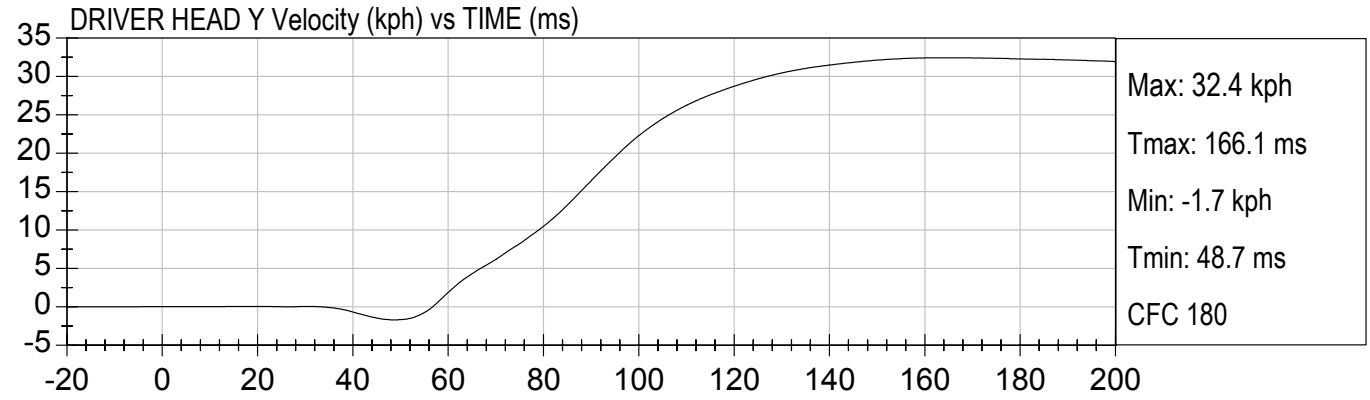


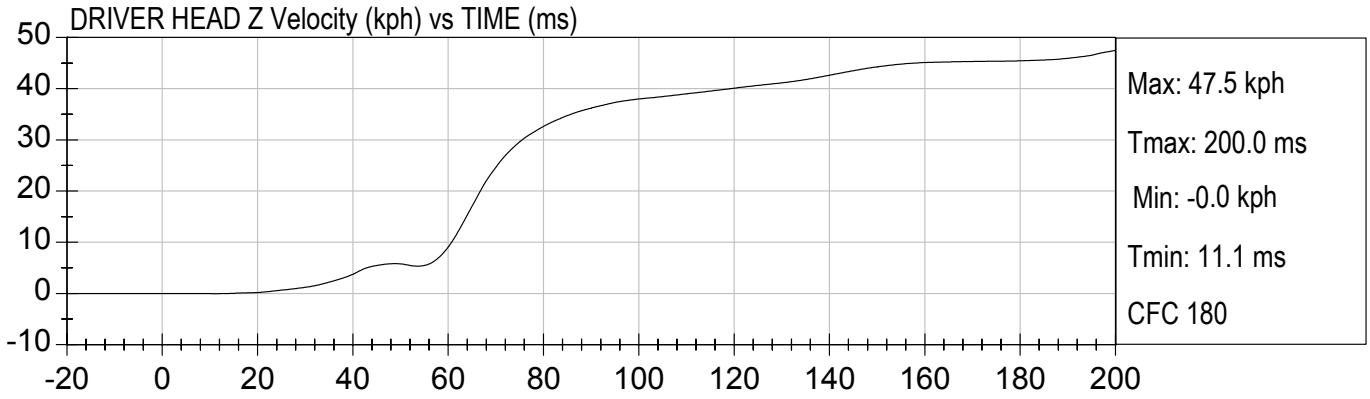


NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

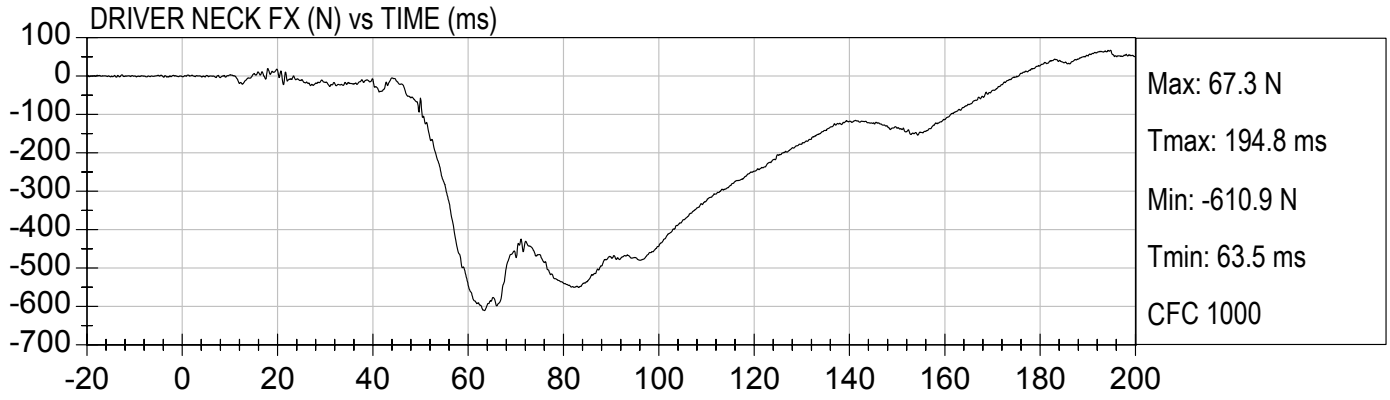


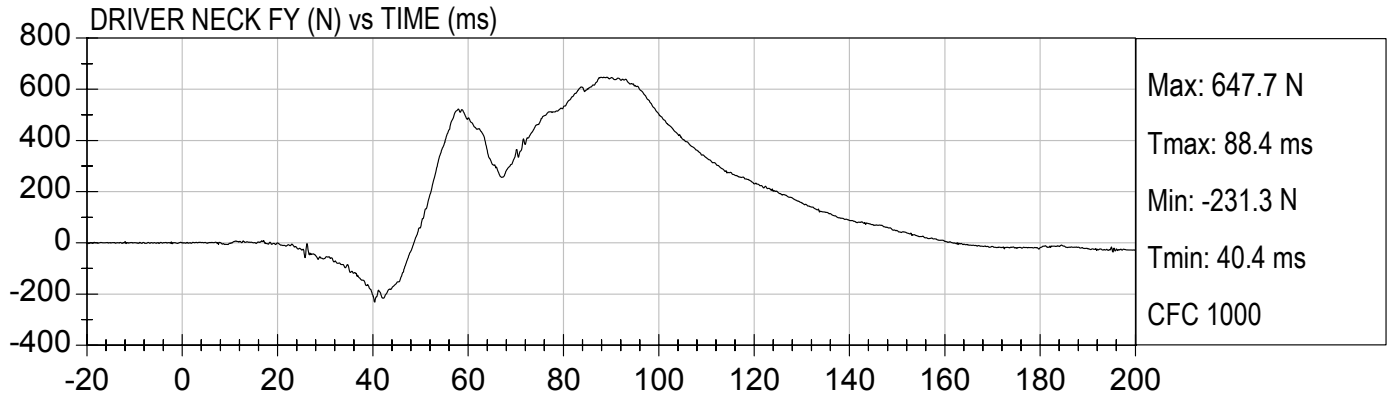


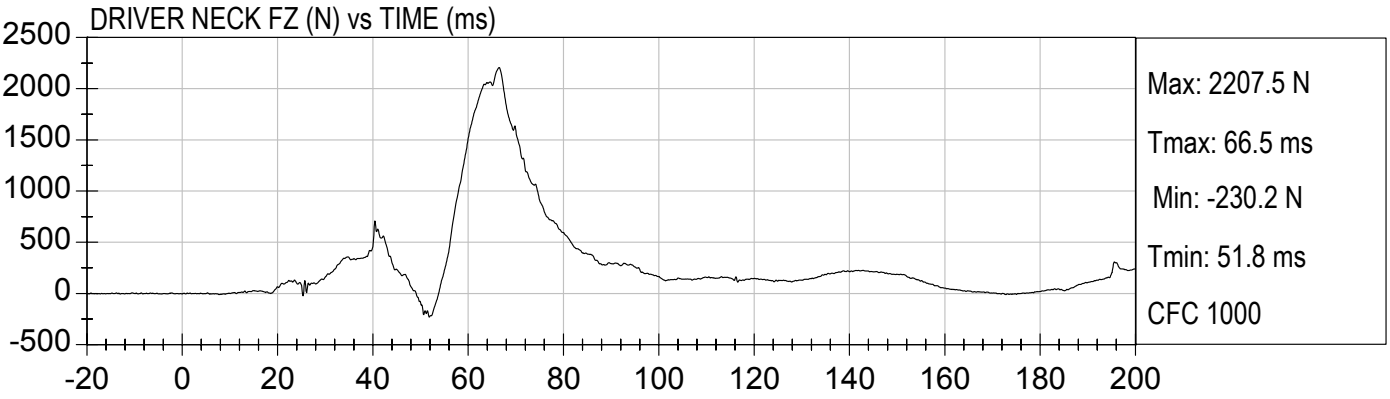


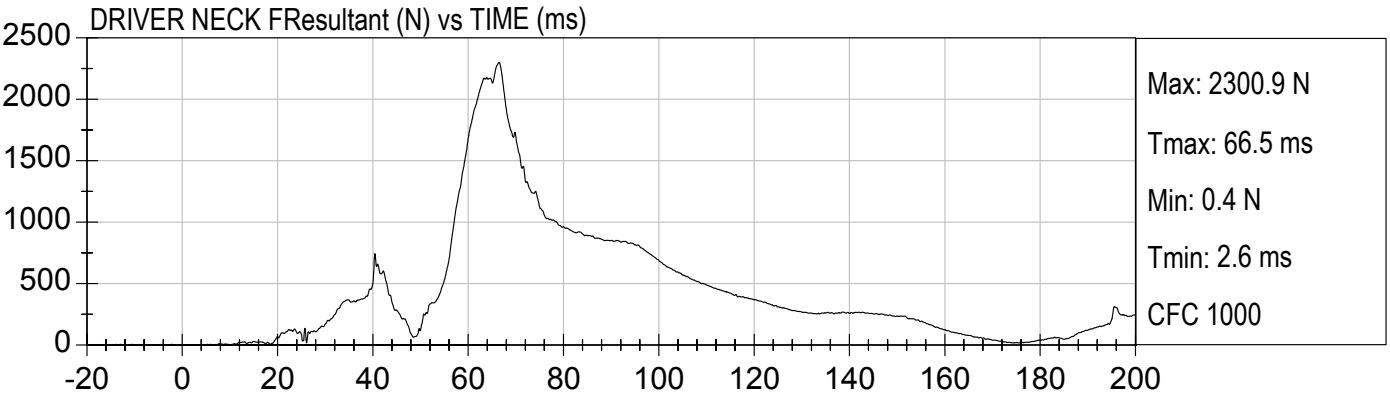
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



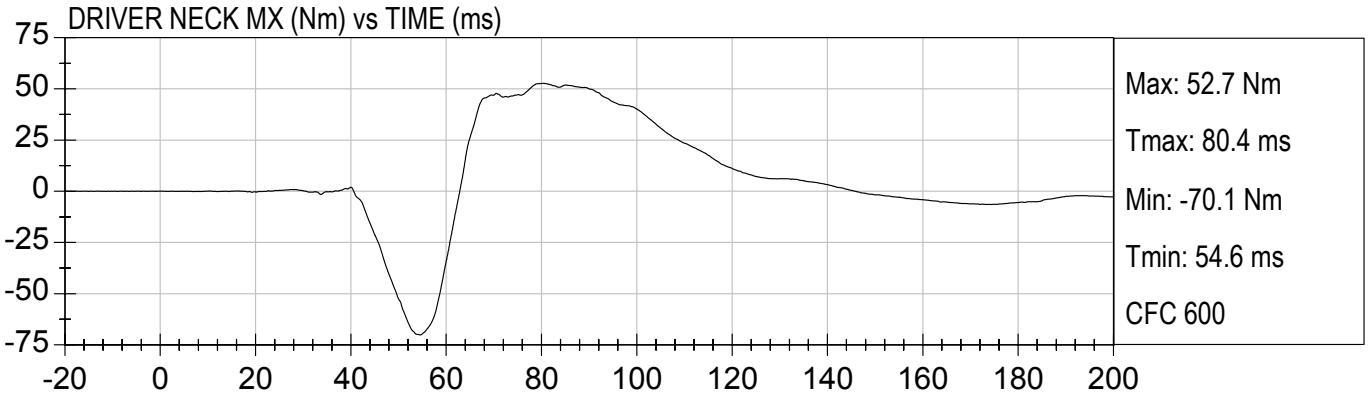


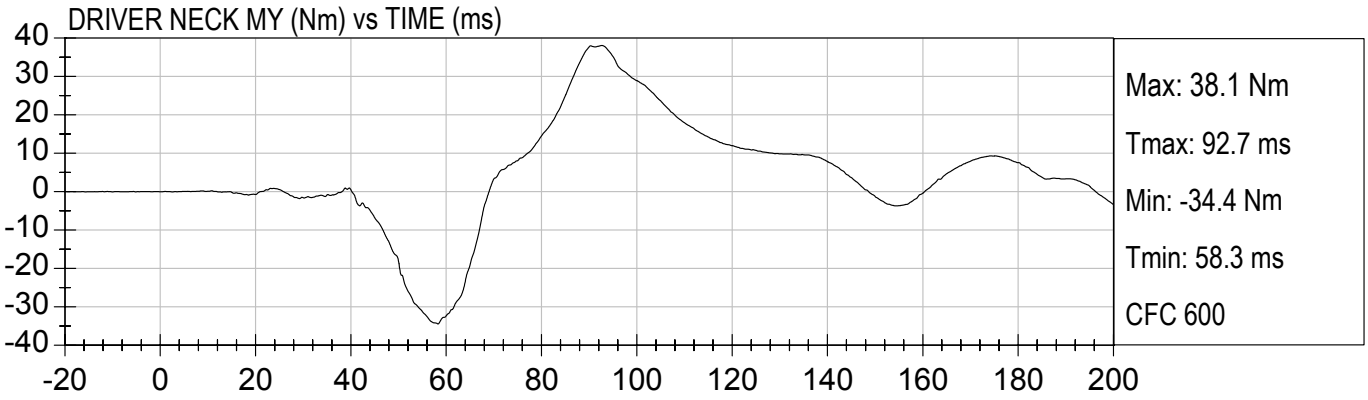


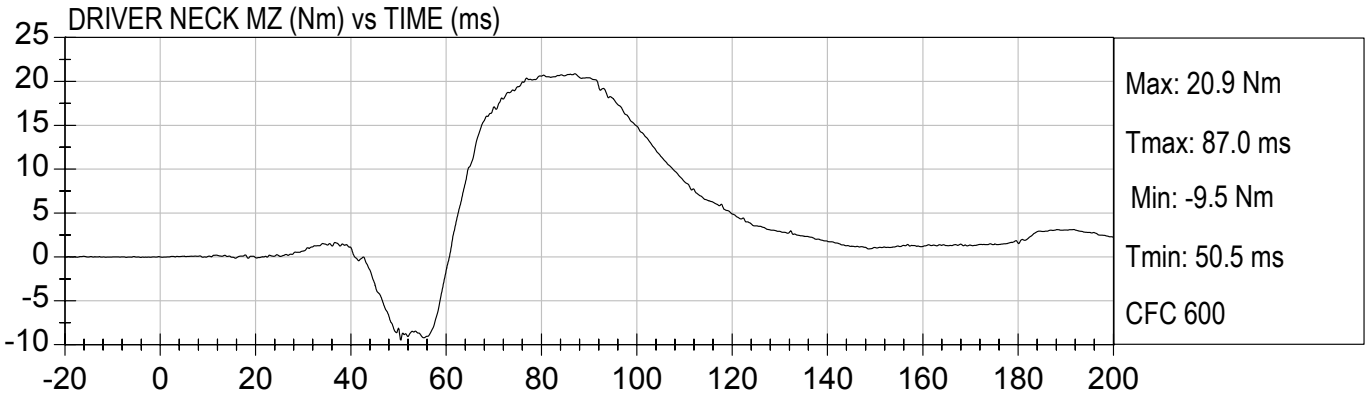


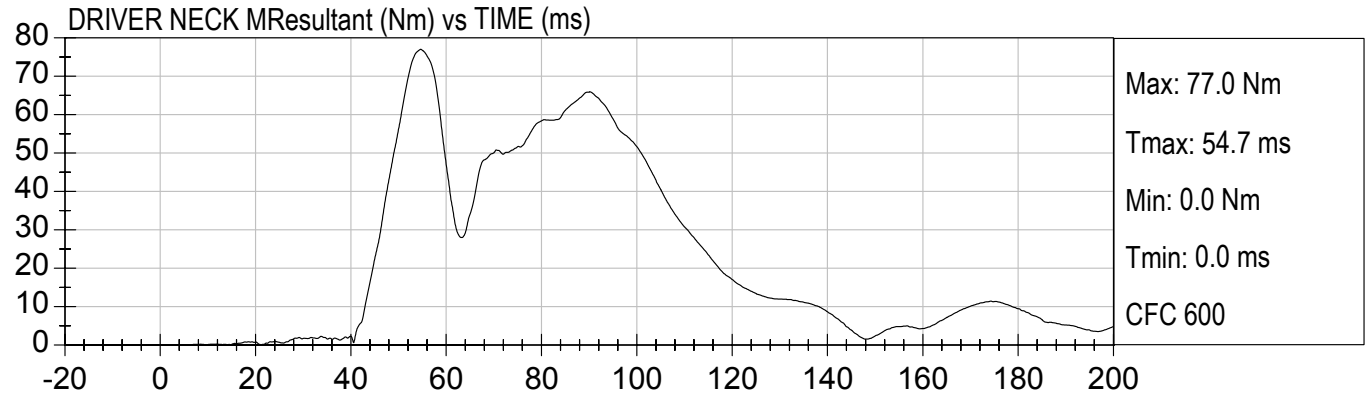
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



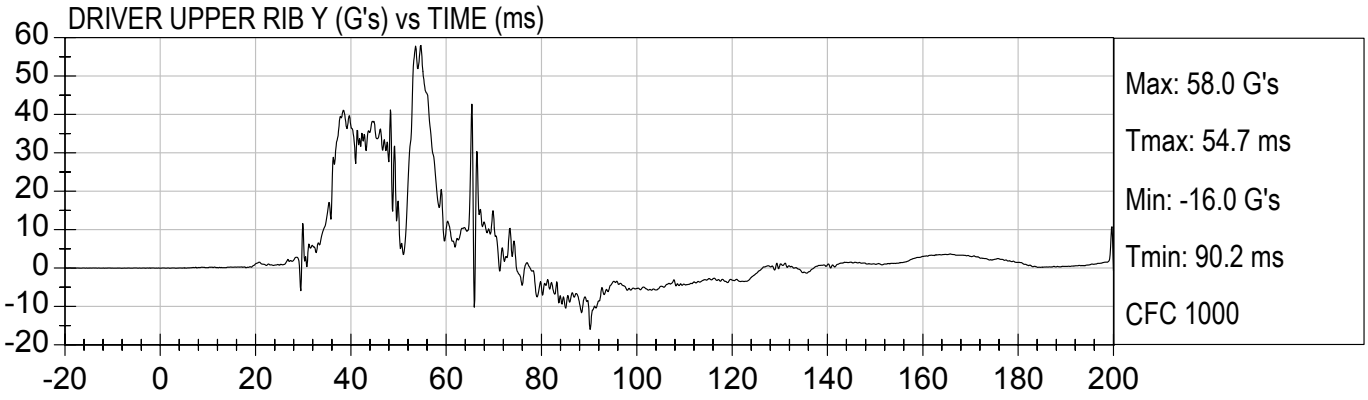


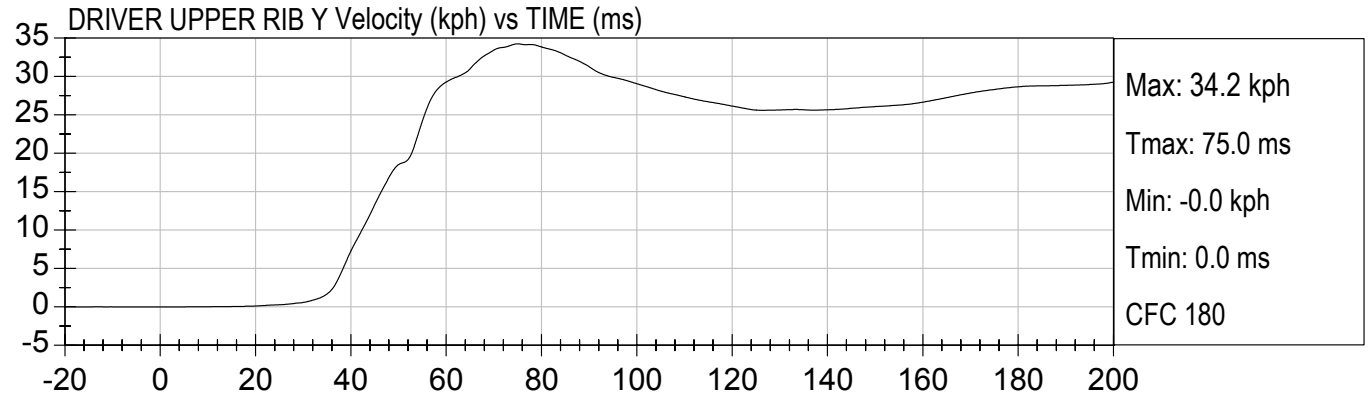


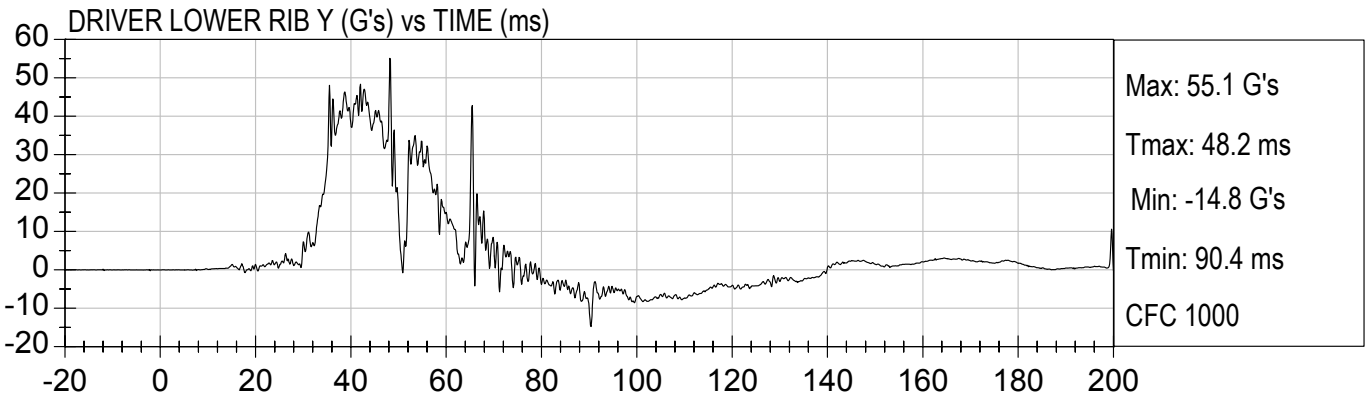


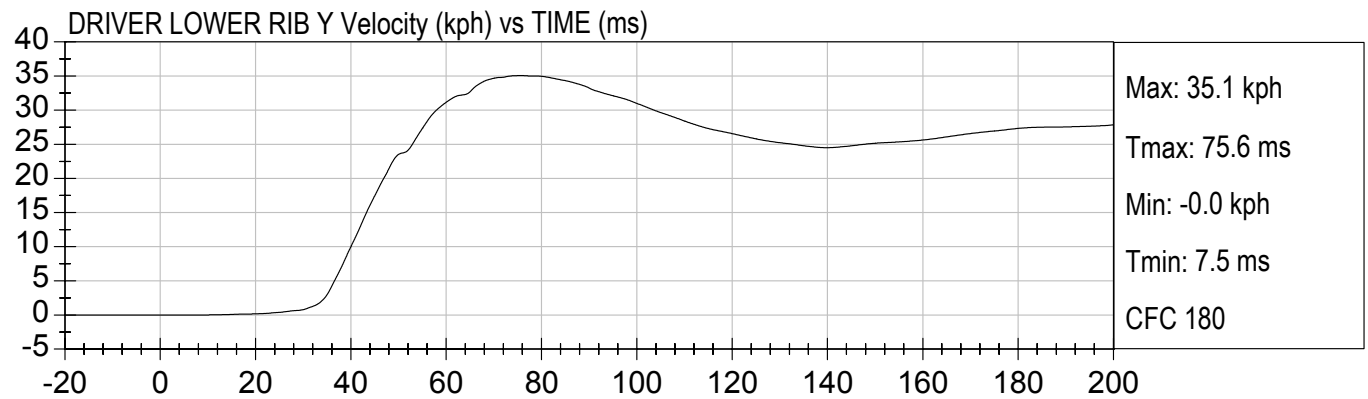
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



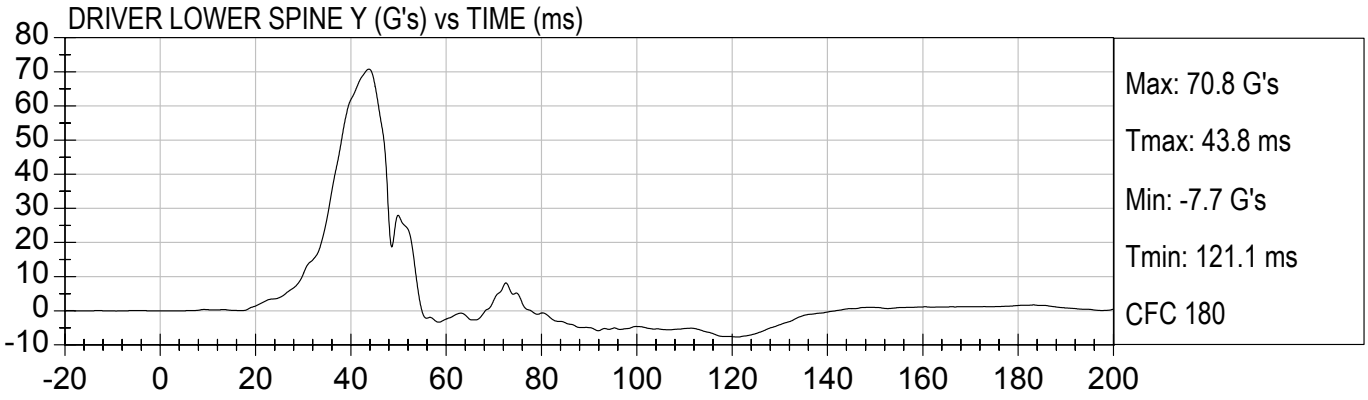


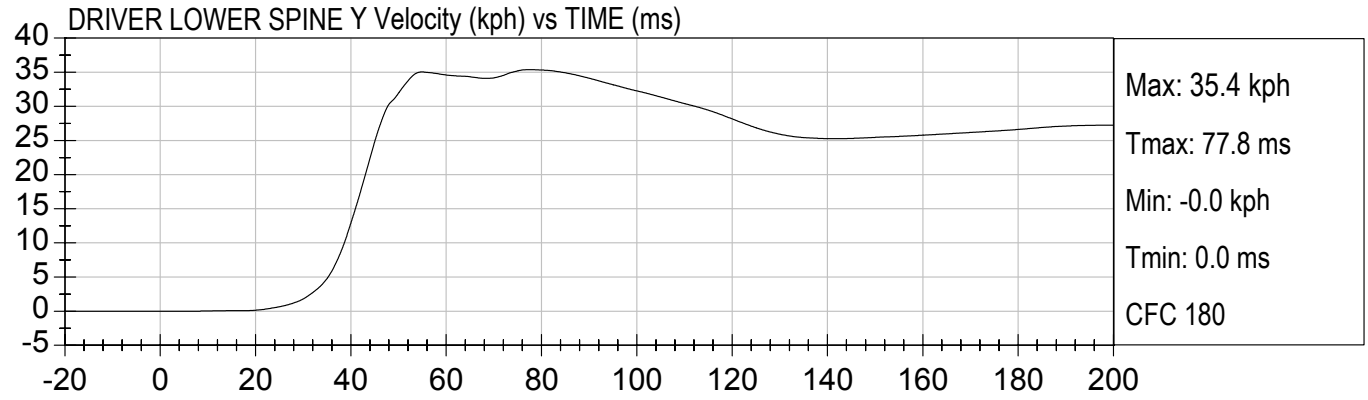


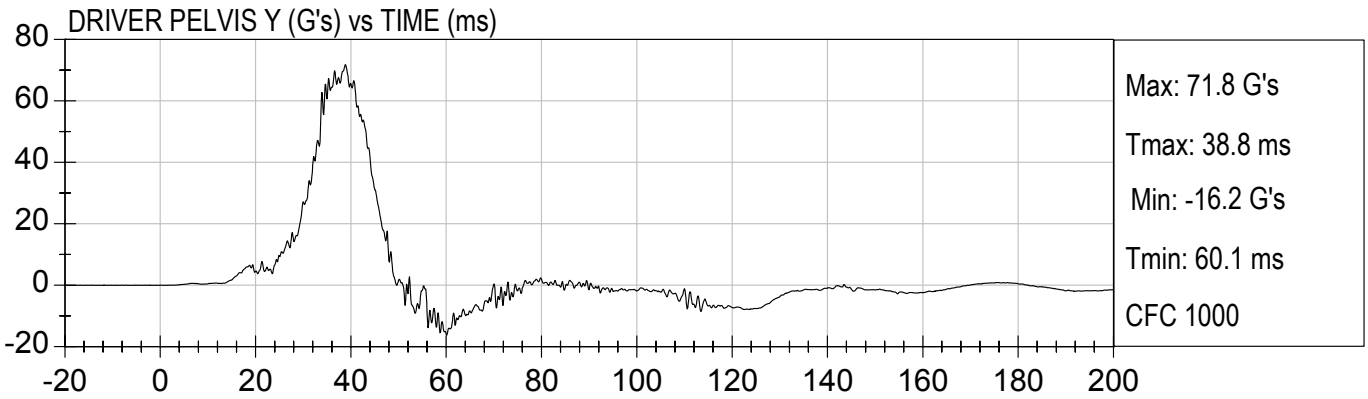


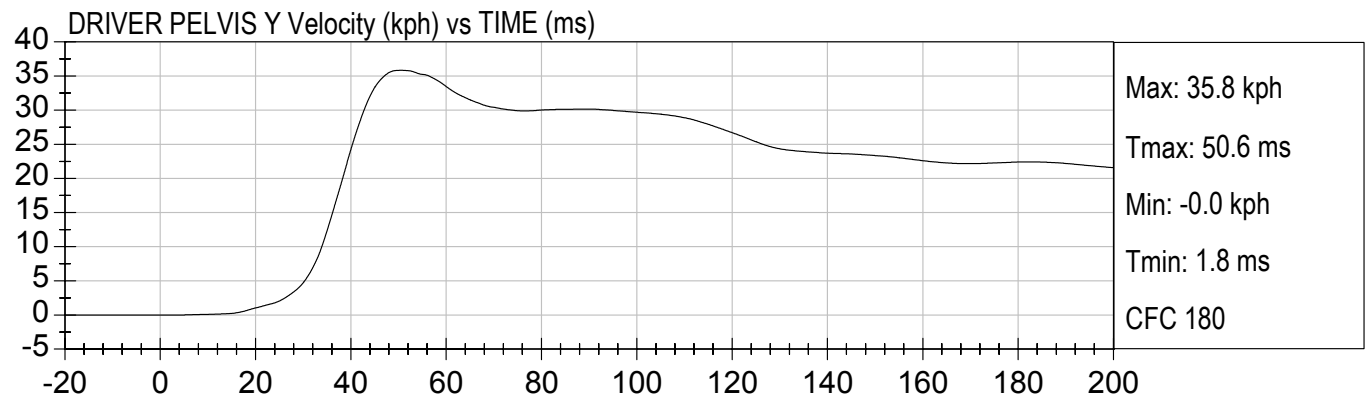
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



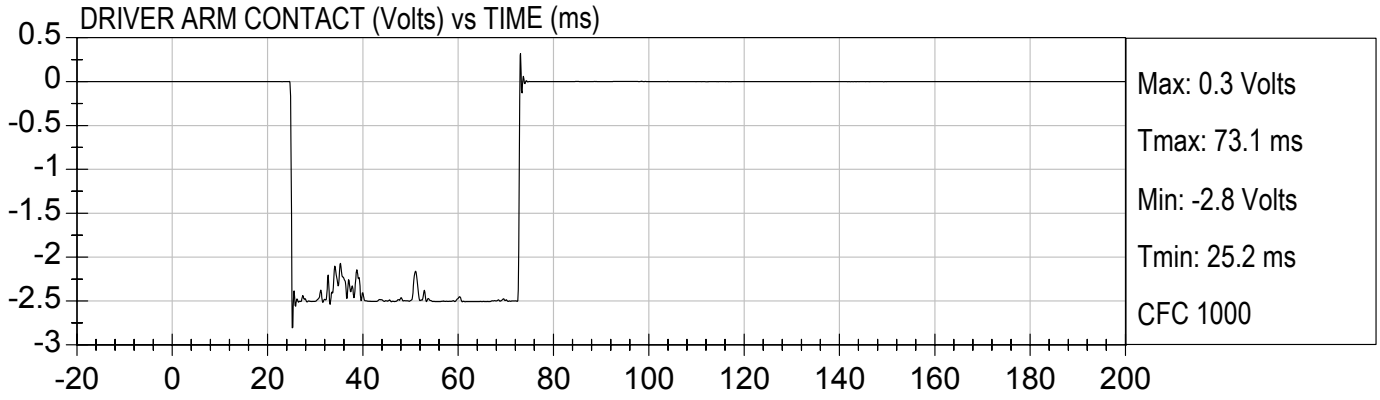


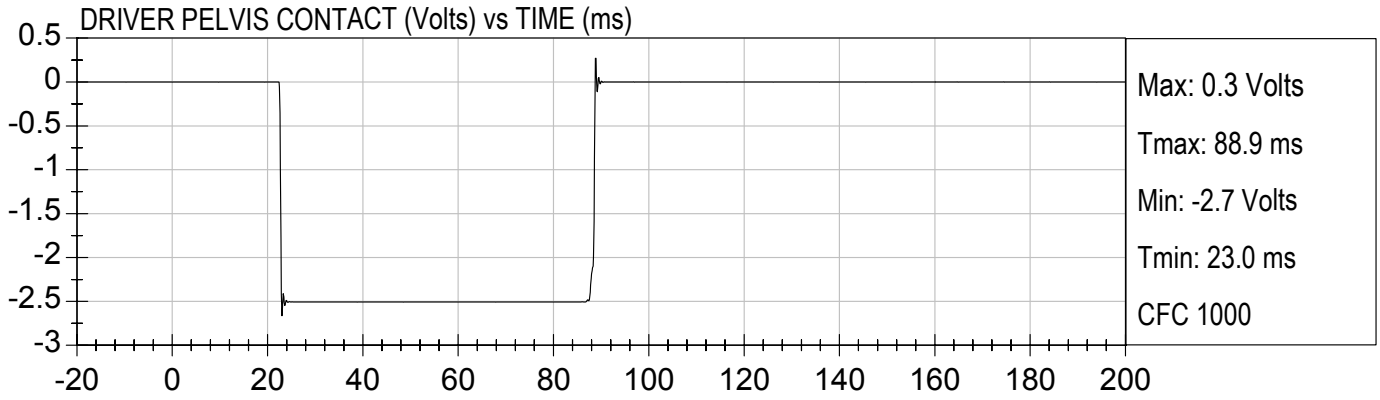




NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

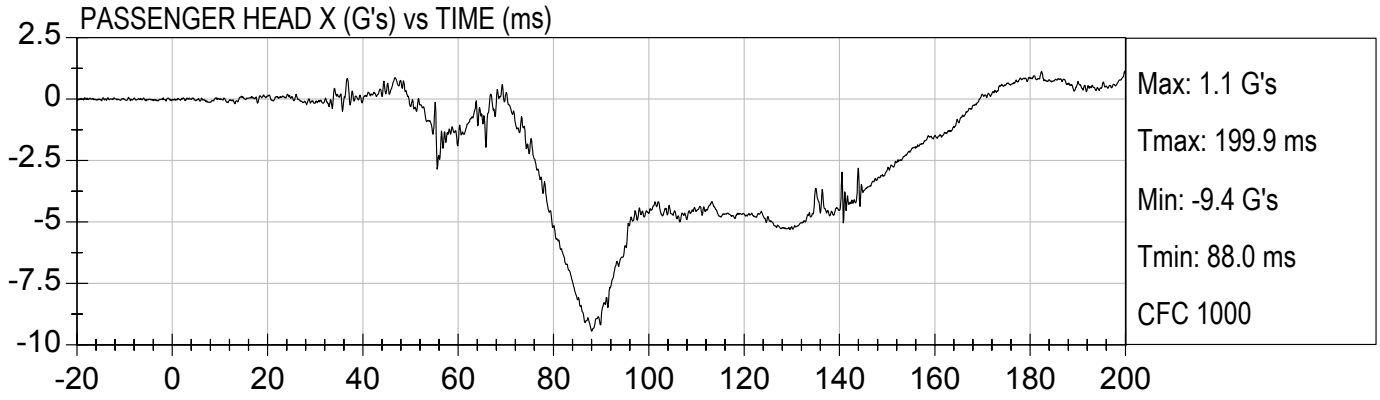
Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

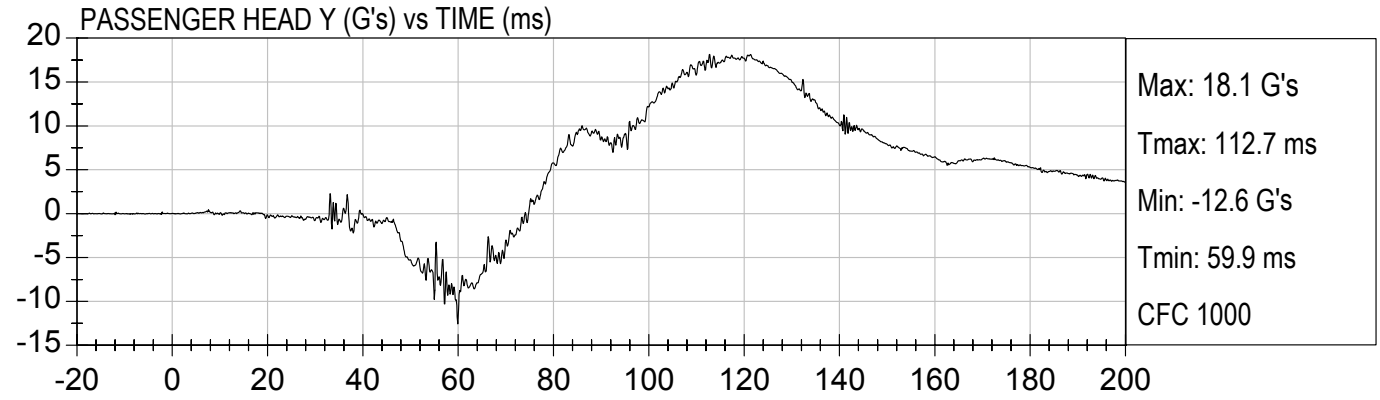


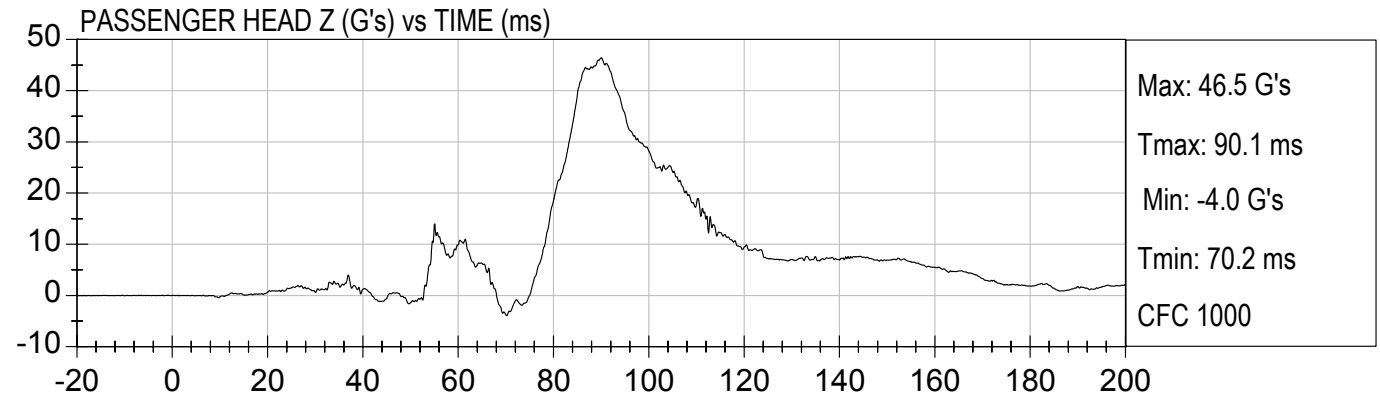


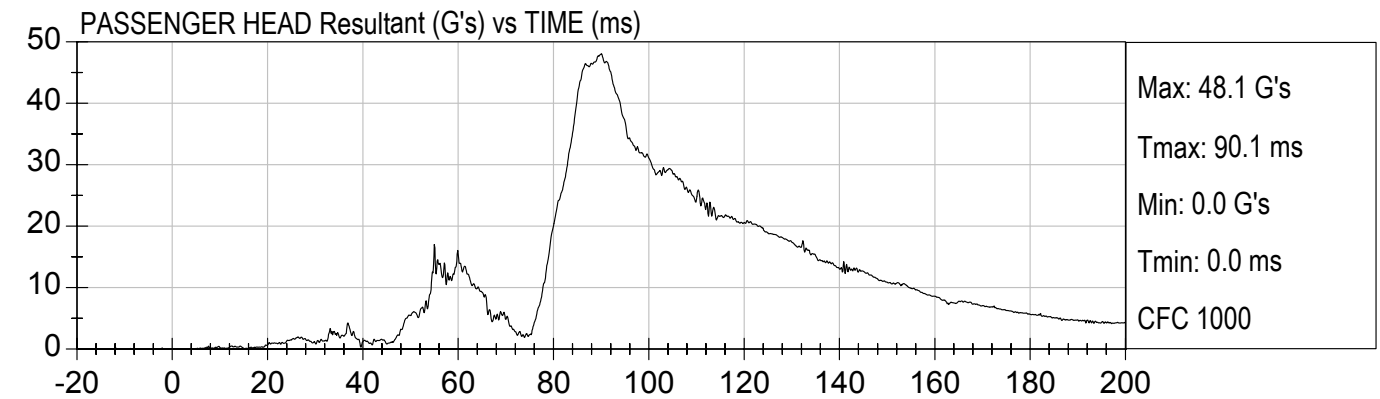
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

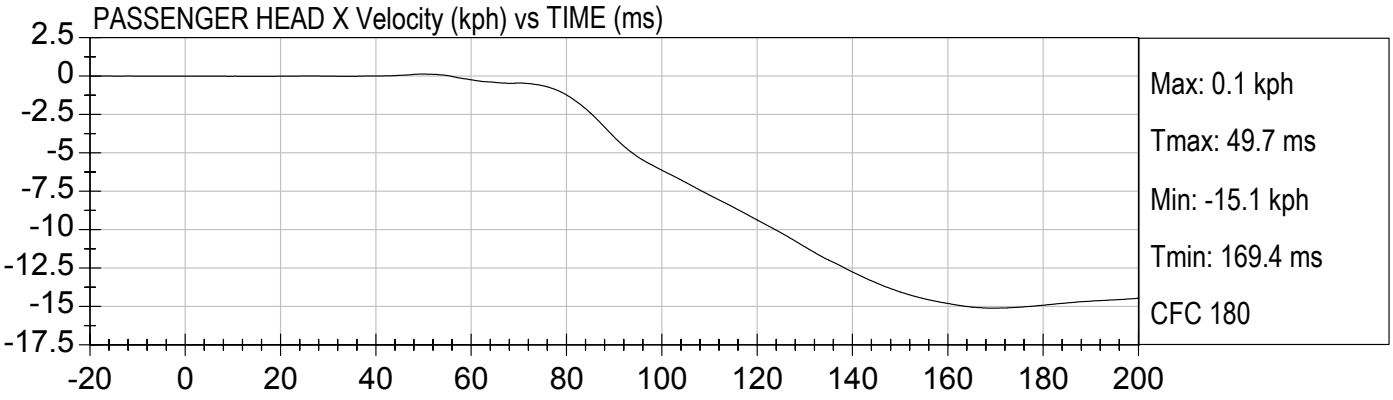
Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

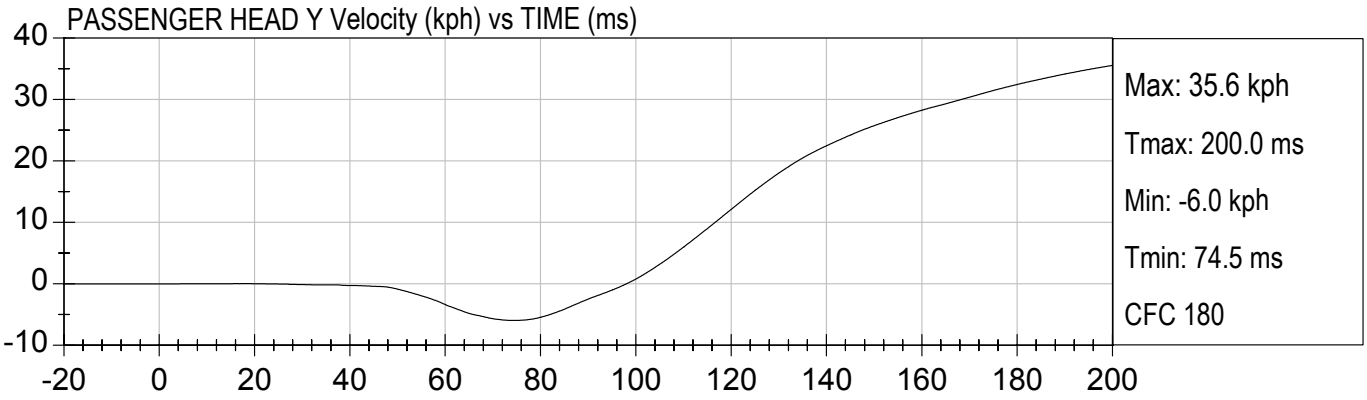


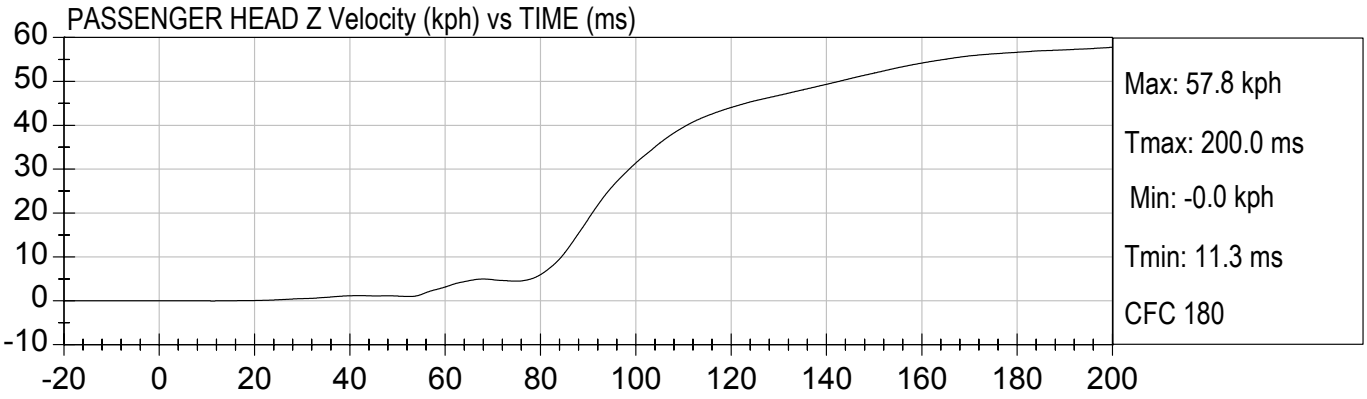






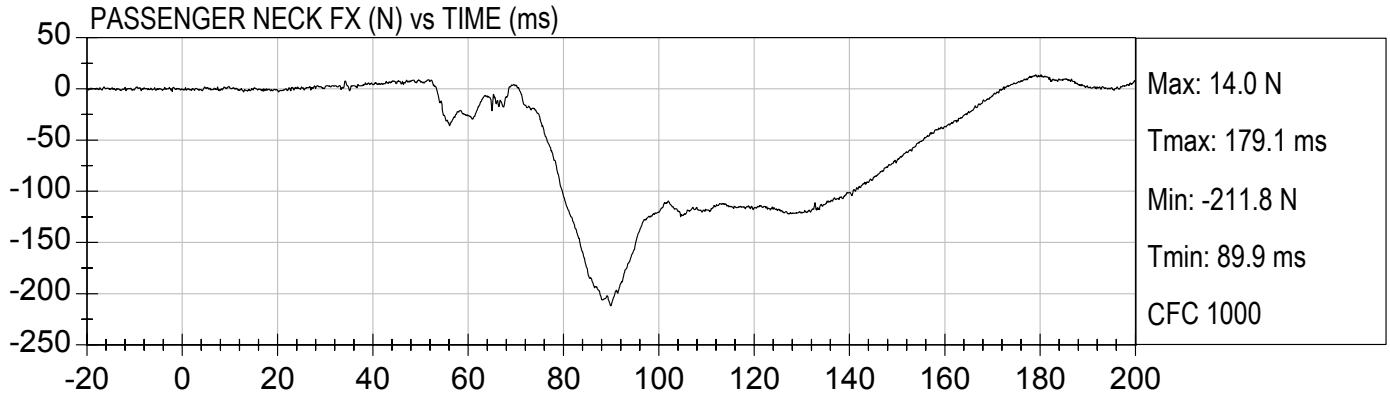

PASSENGER HEAD X Velocity (kph) vs TIME (ms)
2.5
0
-2.5
-5
-7.5
-10
-12.5
-15
-17.5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.1 kph
Tmax: 49.7 ms
Min: -15.1 kph
Tmin: 169.4 ms
CFC 180

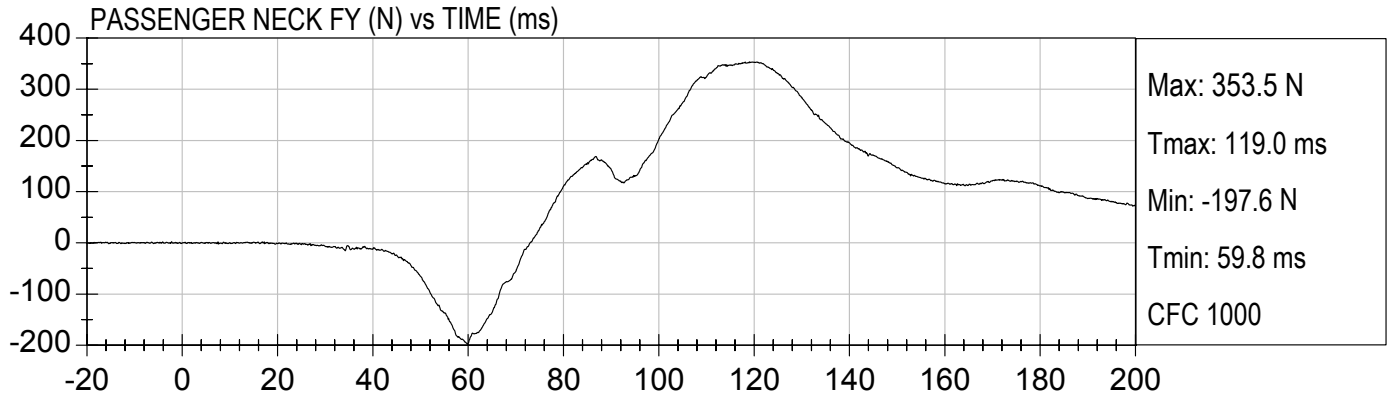

PASSENGER HEAD Y Velocity (kph) vs TIME (ms)
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 35.6 kph
Tmax: 200.0 ms
Min: -6.0 kph
Tmin: 74.5 ms
CFC 180

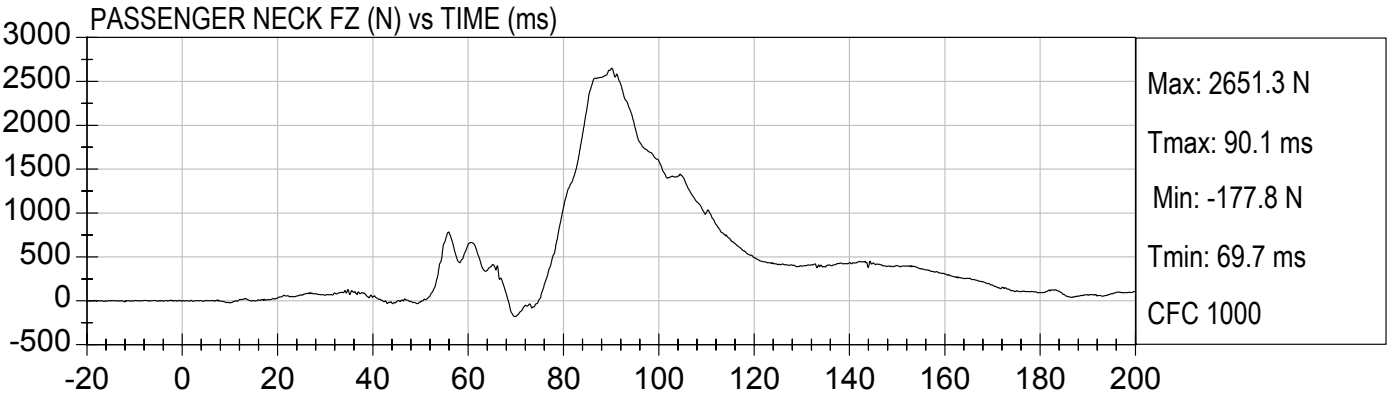

PASSENGER HEAD Z Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 57.8 kph
Tmax: 200.0 ms
Min: -0.0 kph
Tmin: 11.3 ms
CFC 180

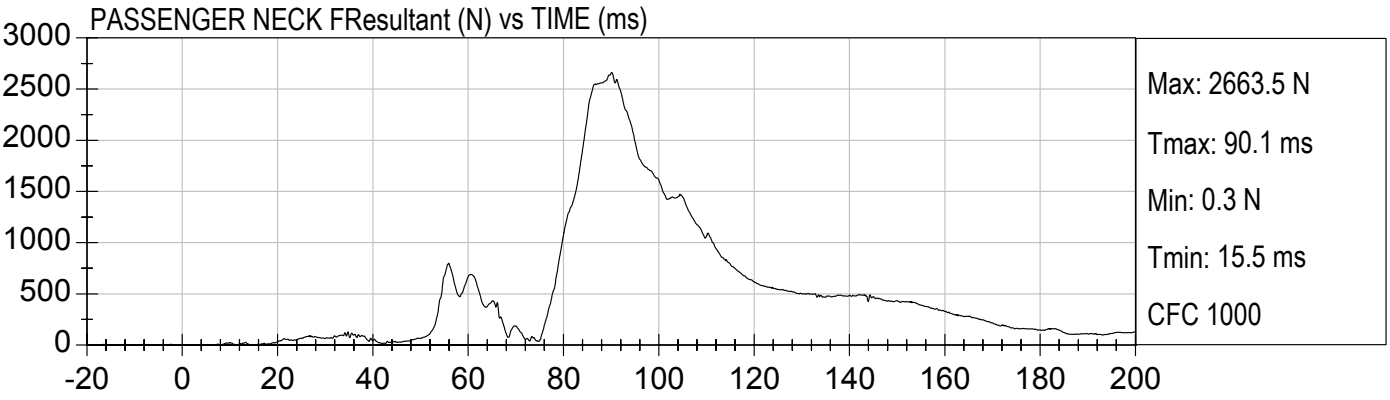
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



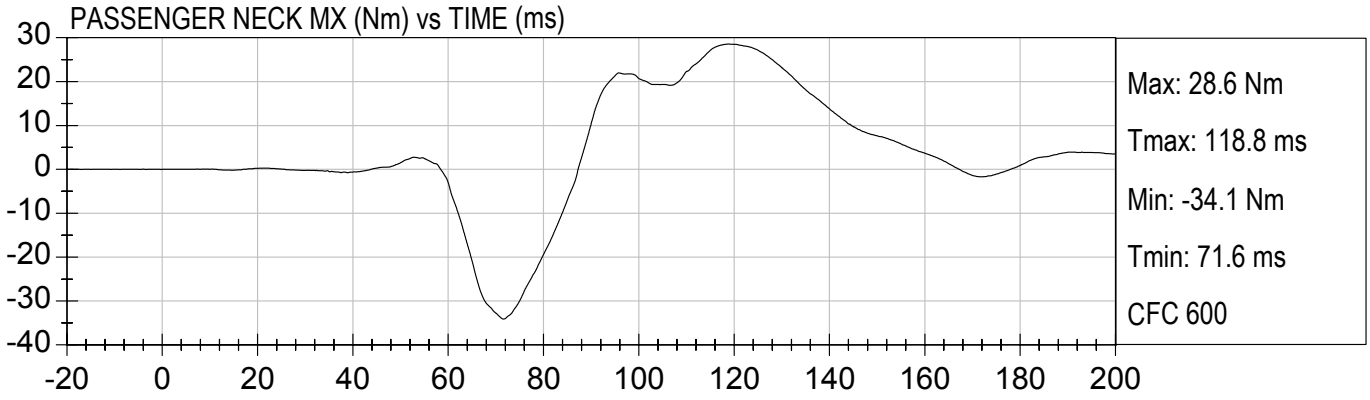


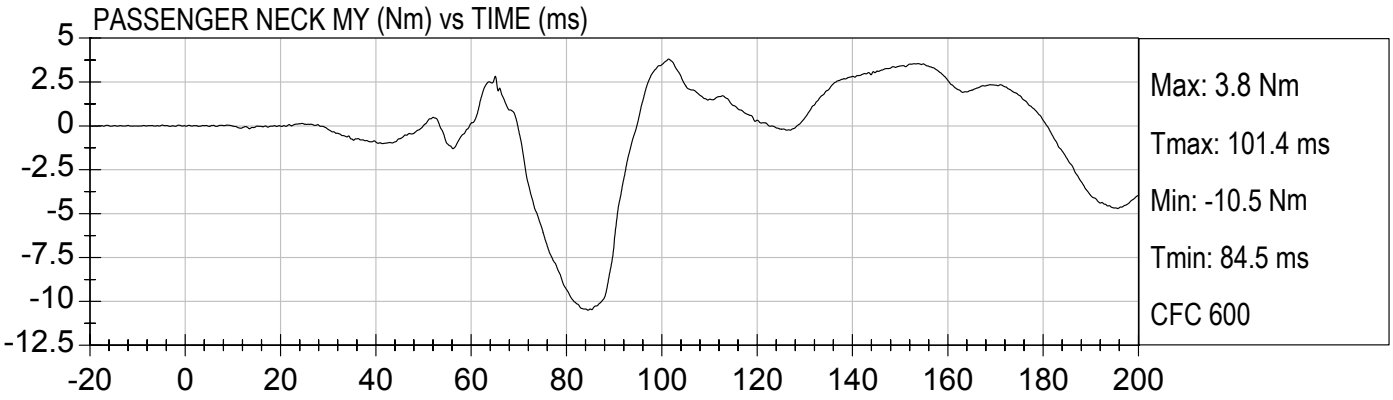


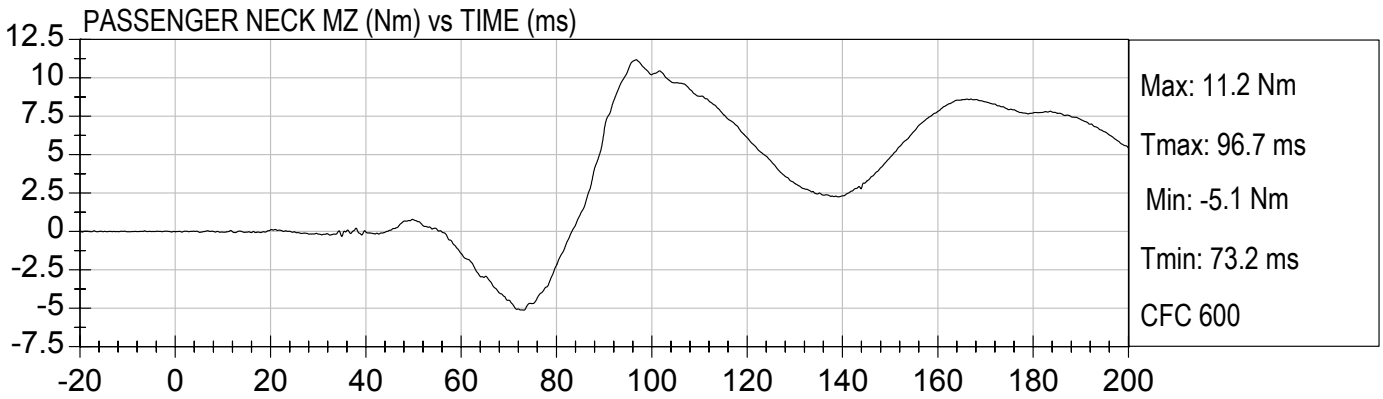


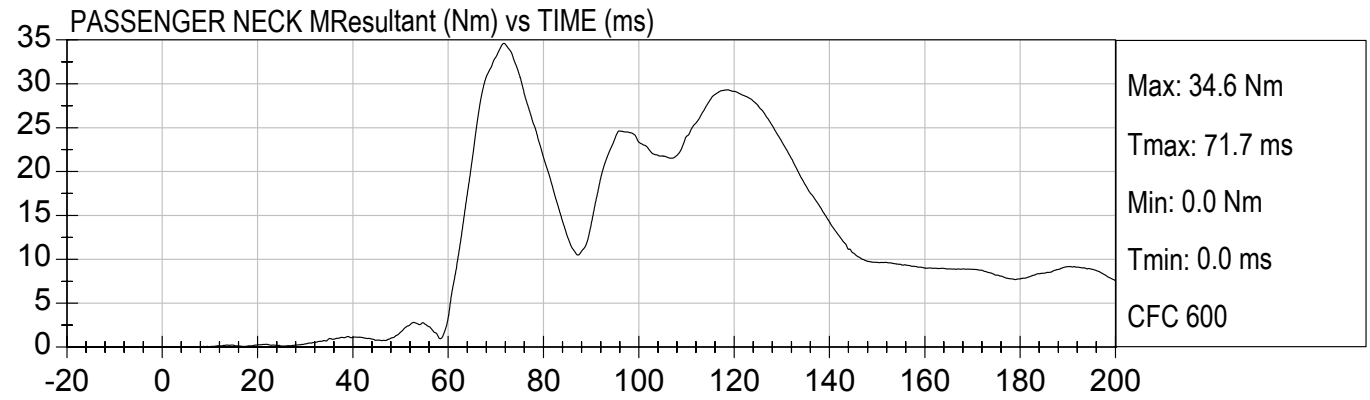
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



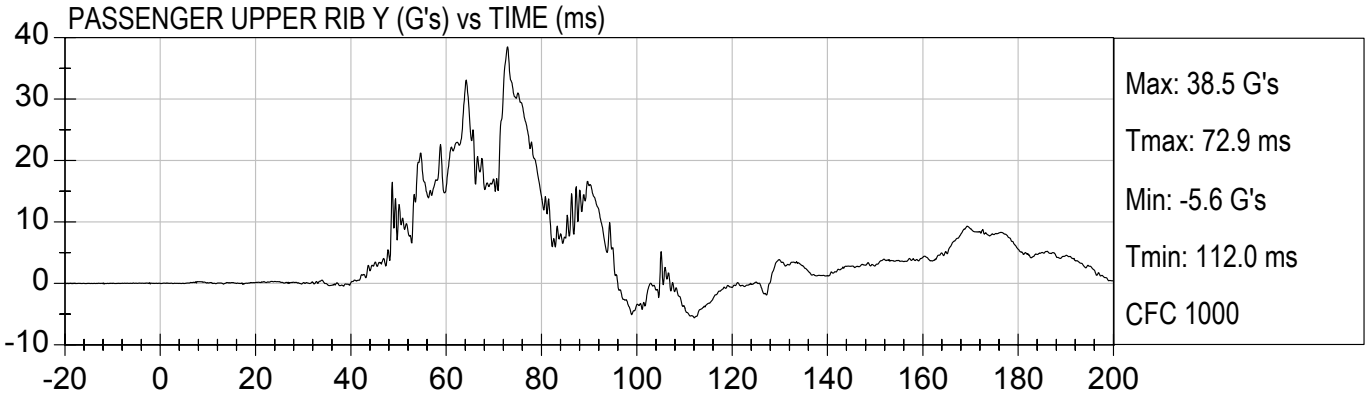


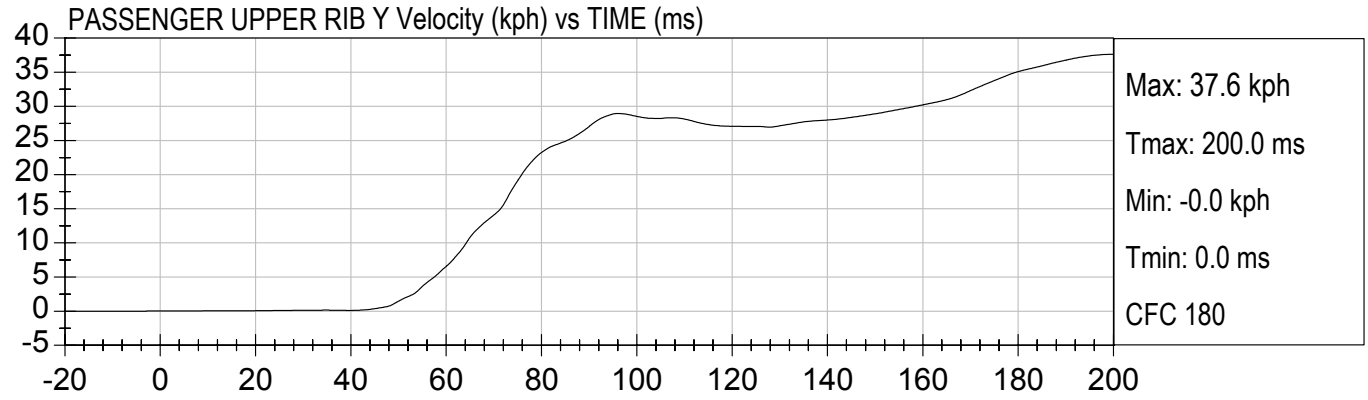


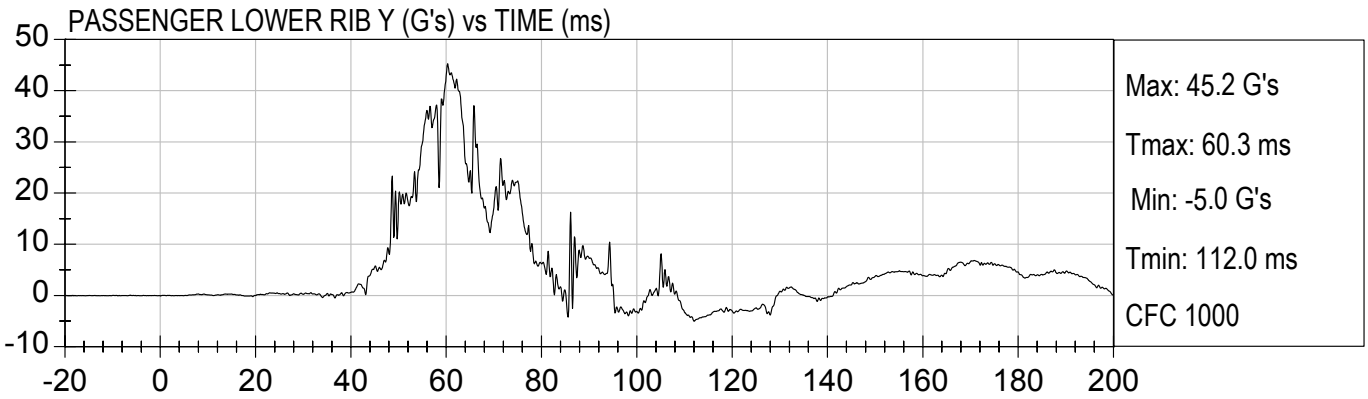


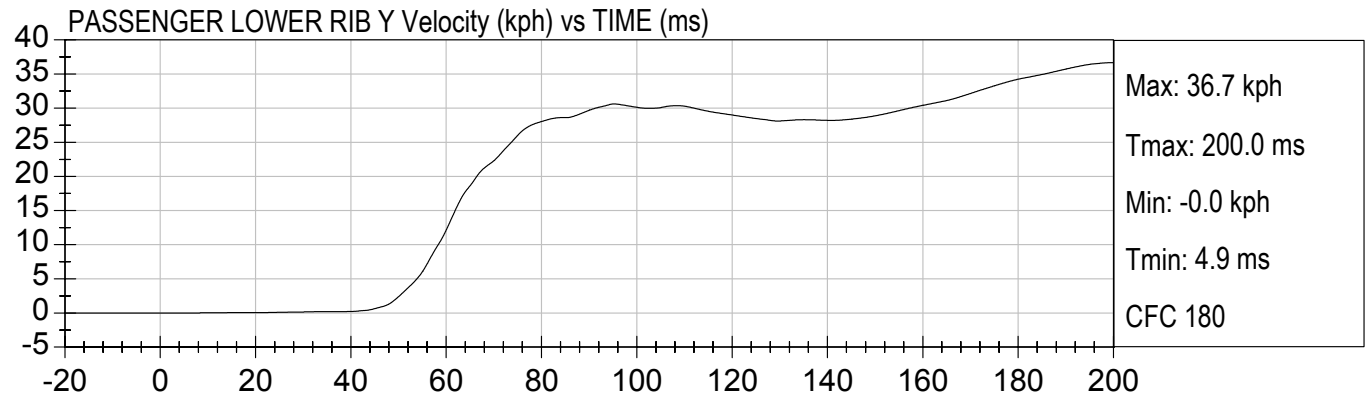
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



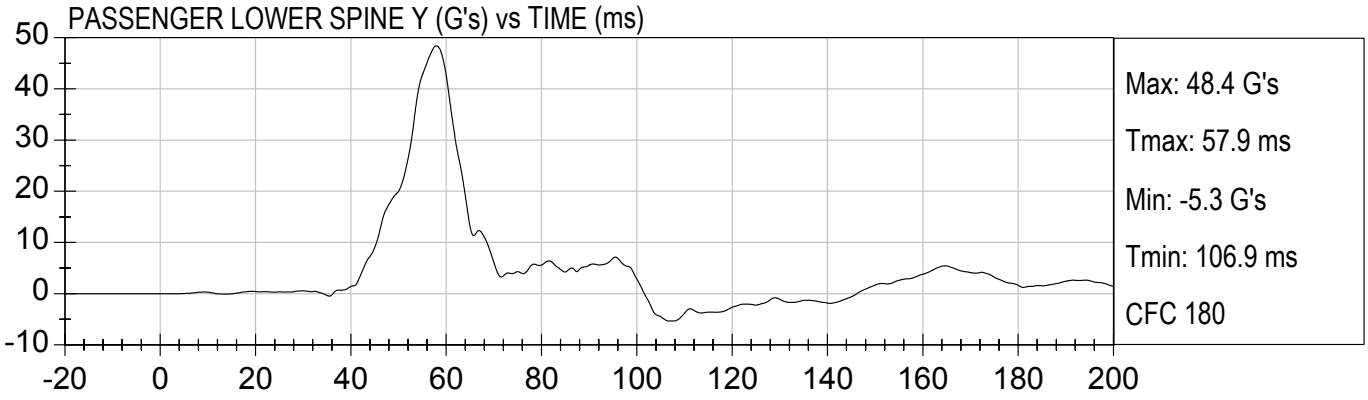


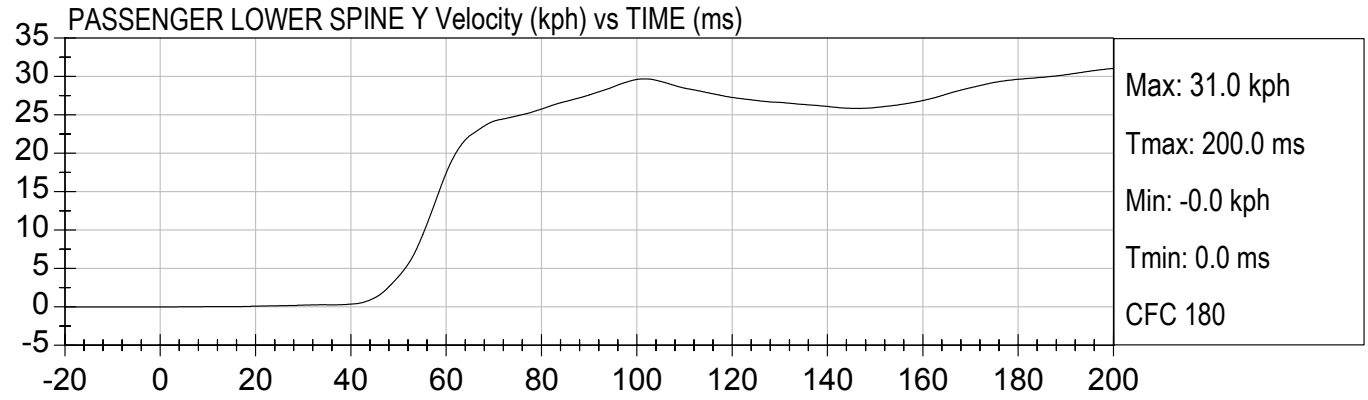


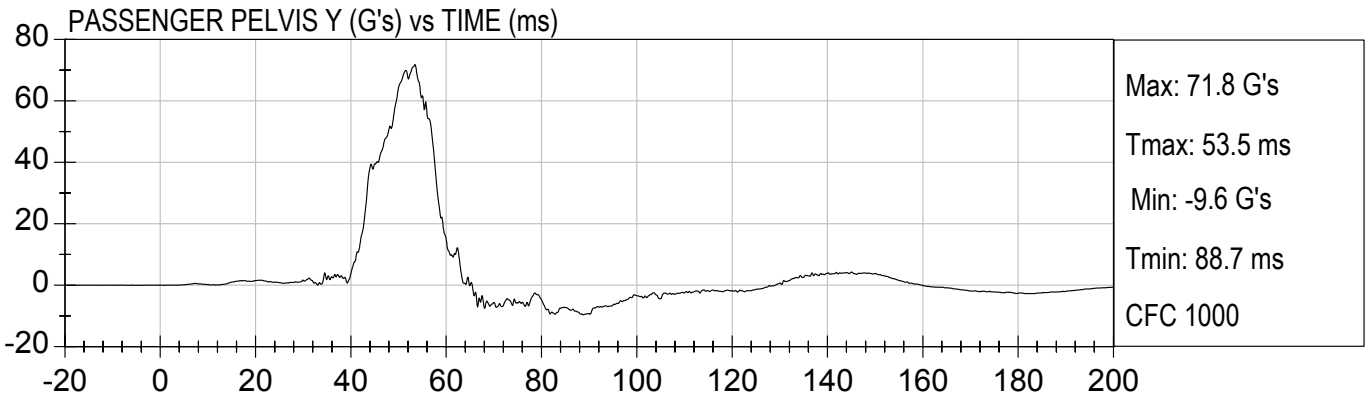


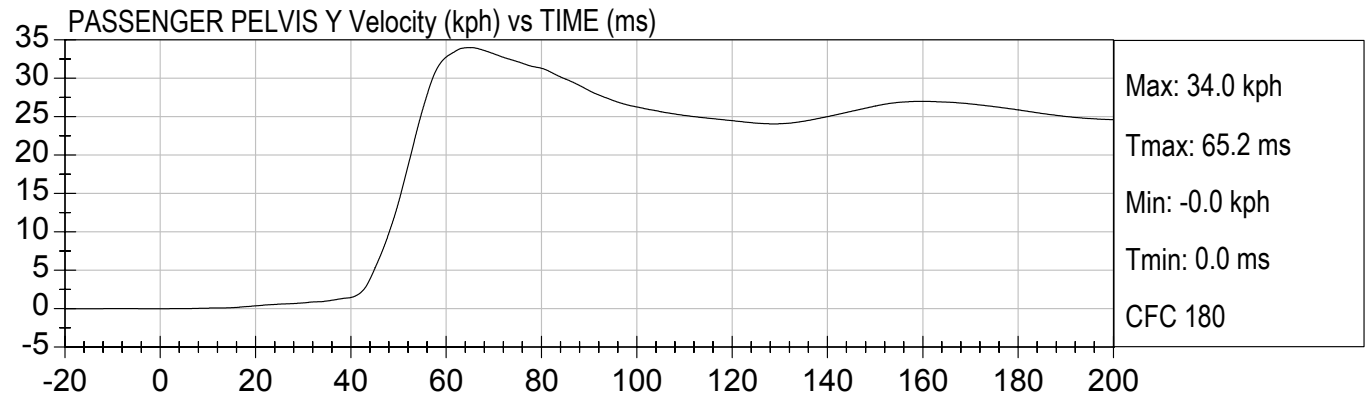
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

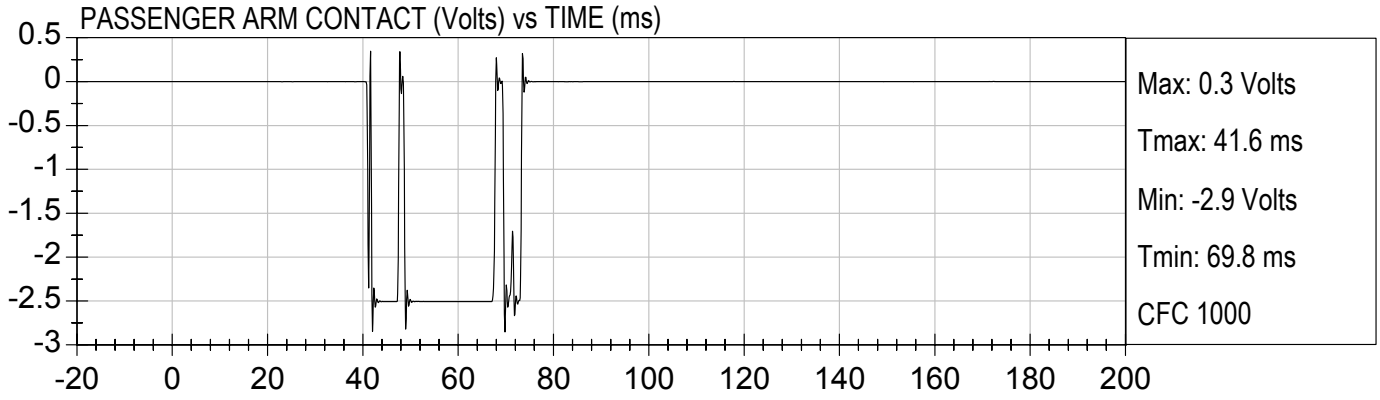
Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

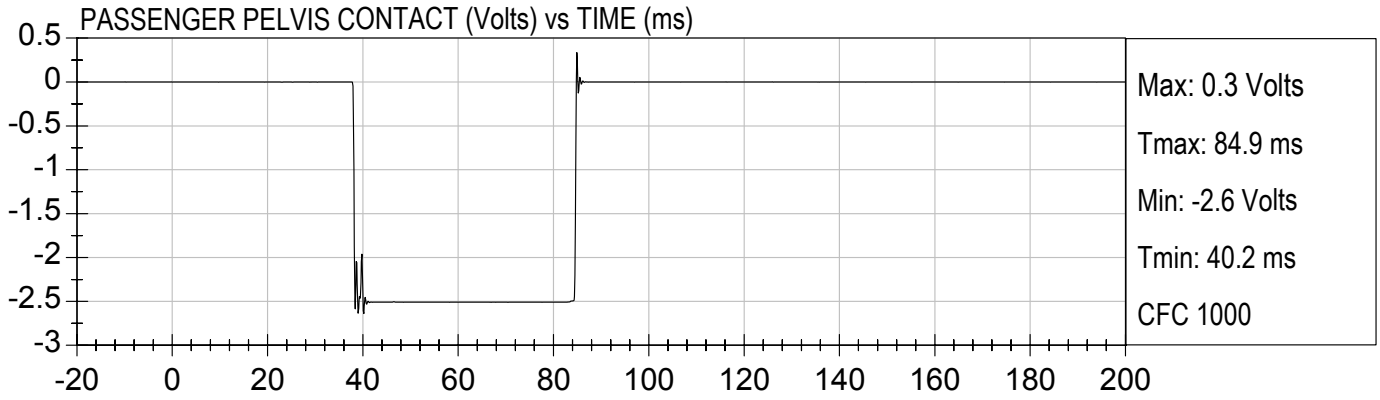






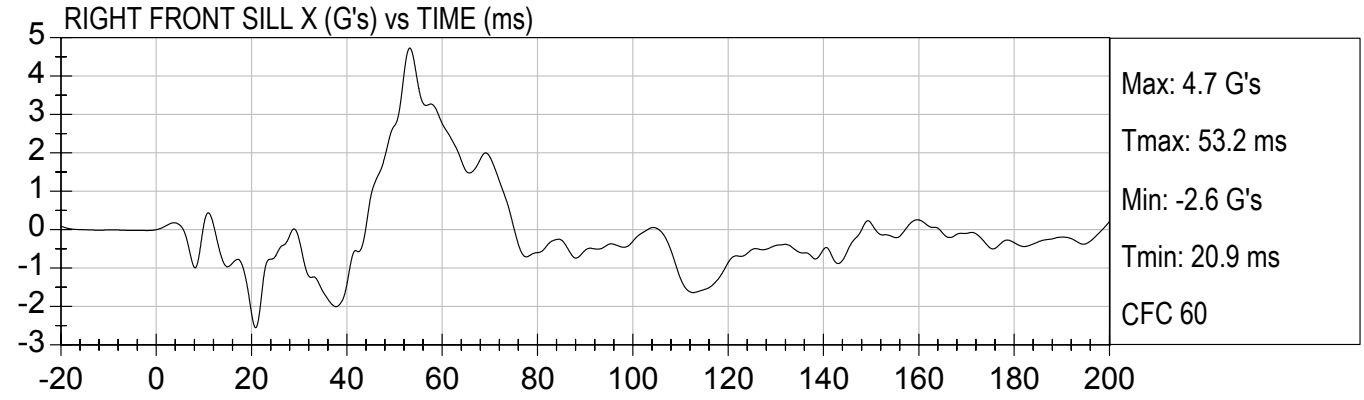


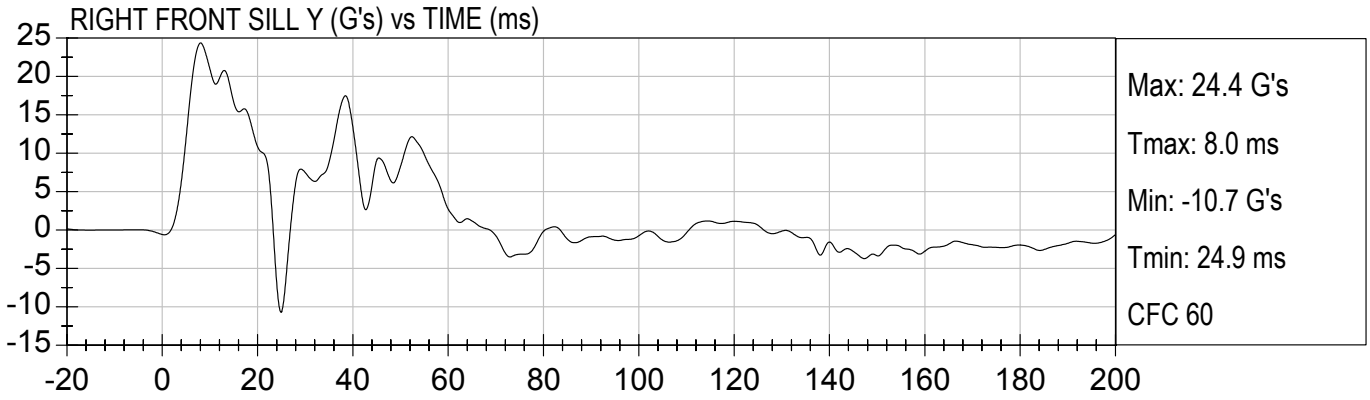

PASSENGER ARM CONTACT (Volts) vs TIME (ms)
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.3 Volts
Tmax: 41.6 ms
Min: -2.9 Volts
Tmin: 69.8 ms
CFC 1000

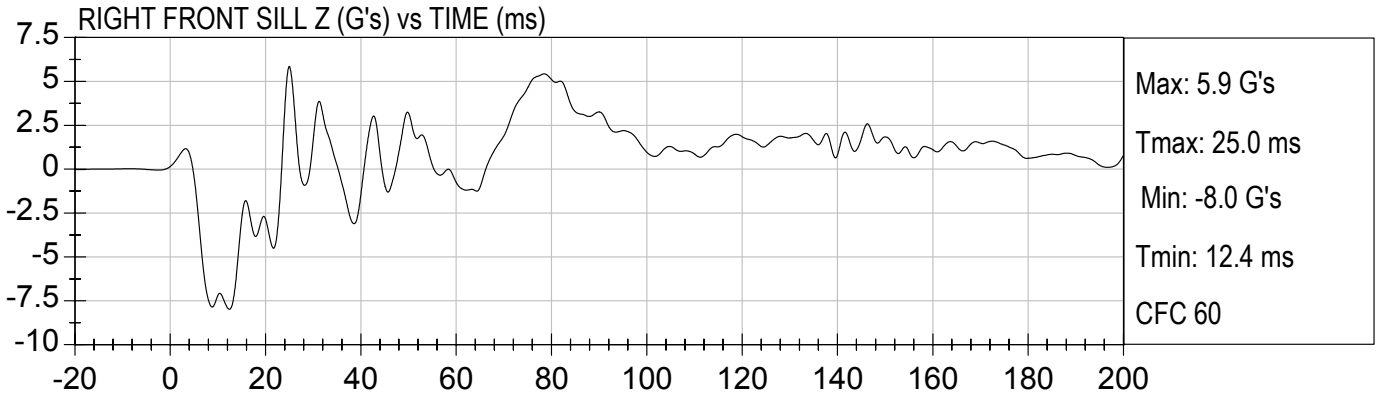

PASSENGER PELVIS CONTACT (Volts) vs TIME (ms)
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.3 Volts
Tmax: 84.9 ms
Min: -2.6 Volts
Tmin: 40.2 ms
CFC 1000

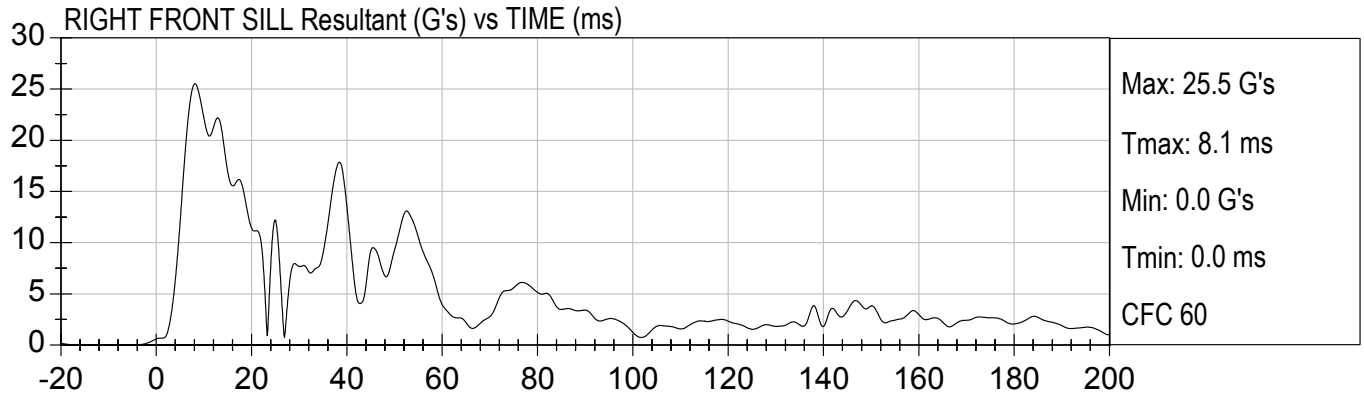
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



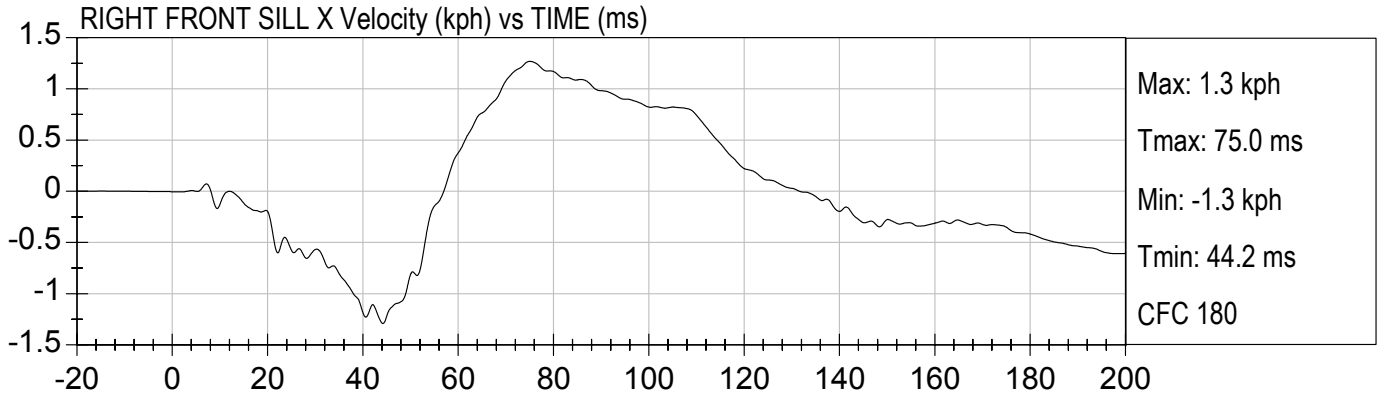


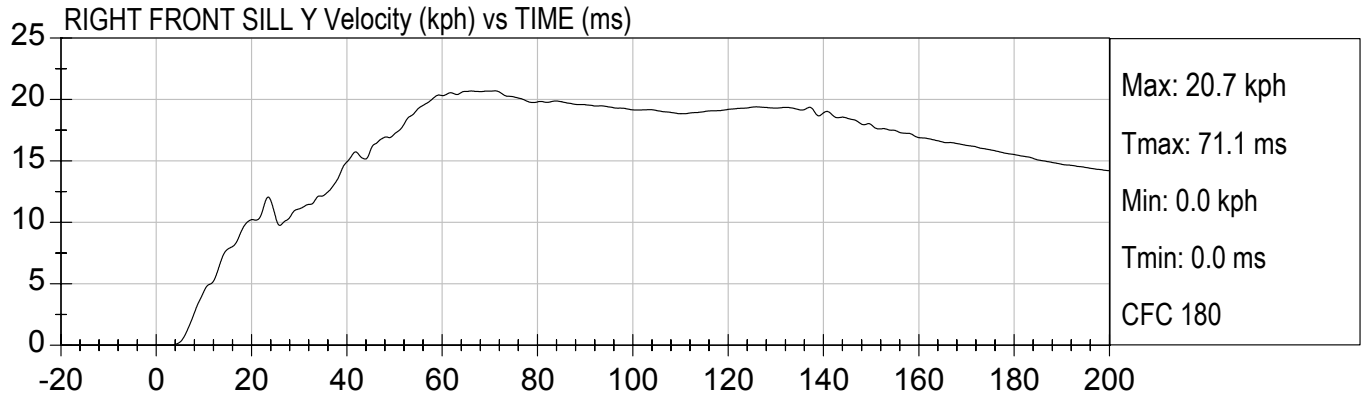


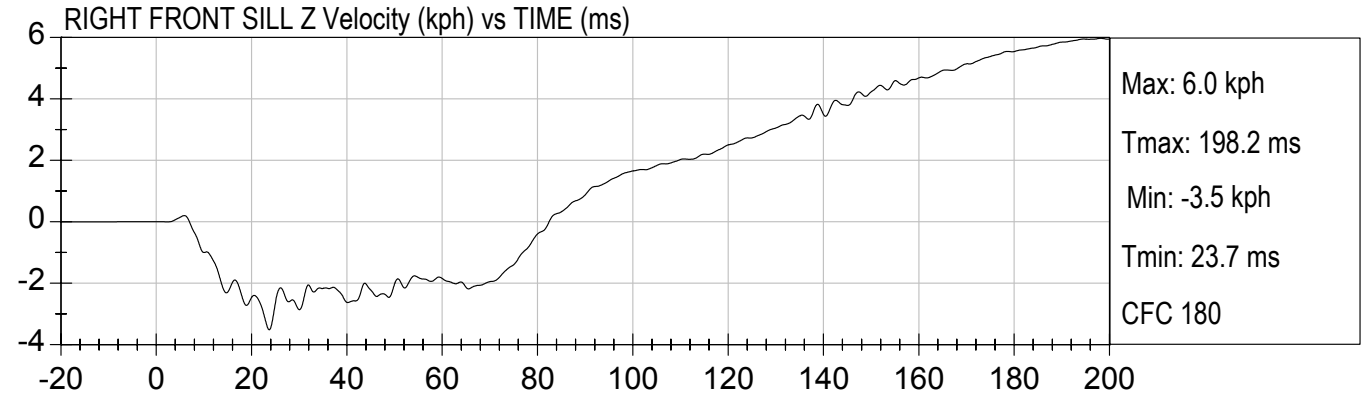


NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

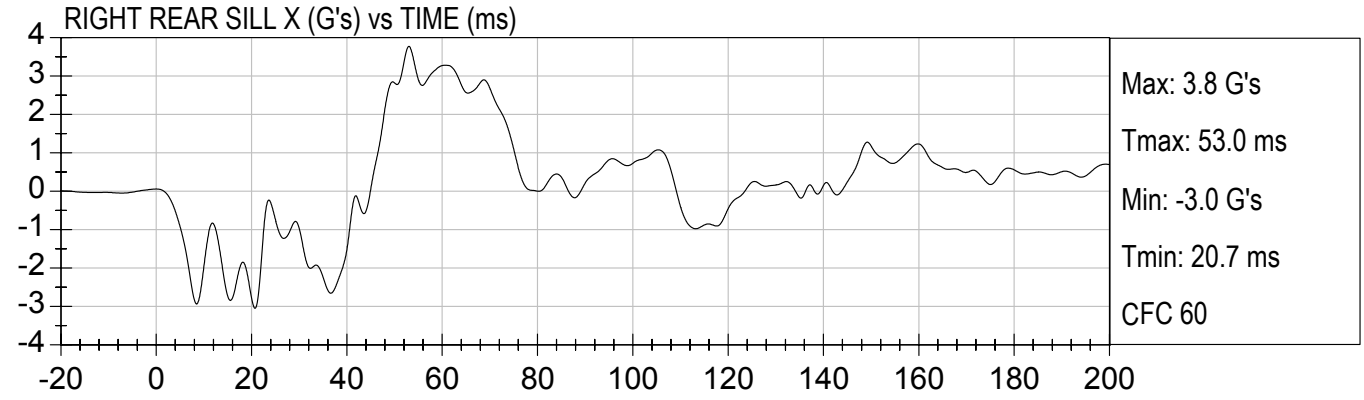


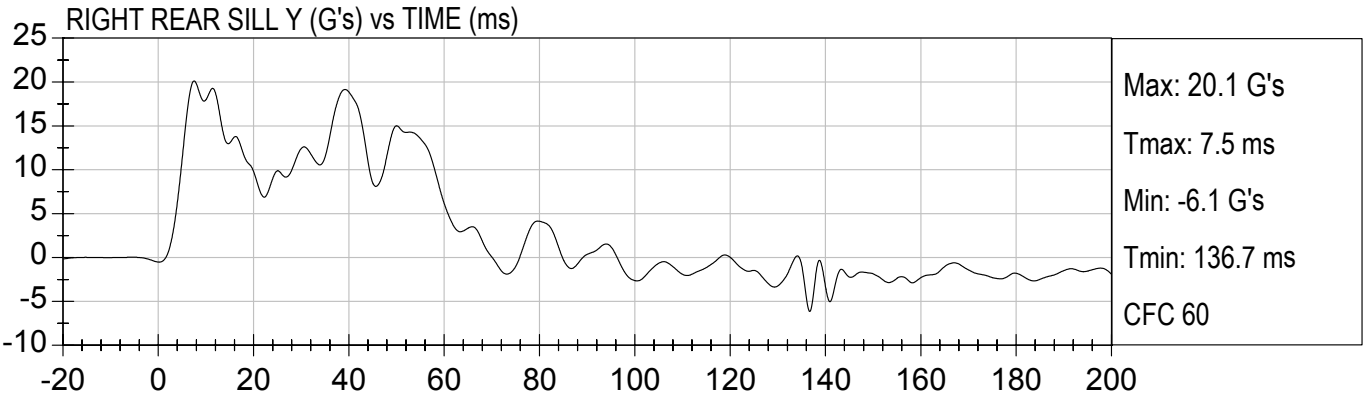


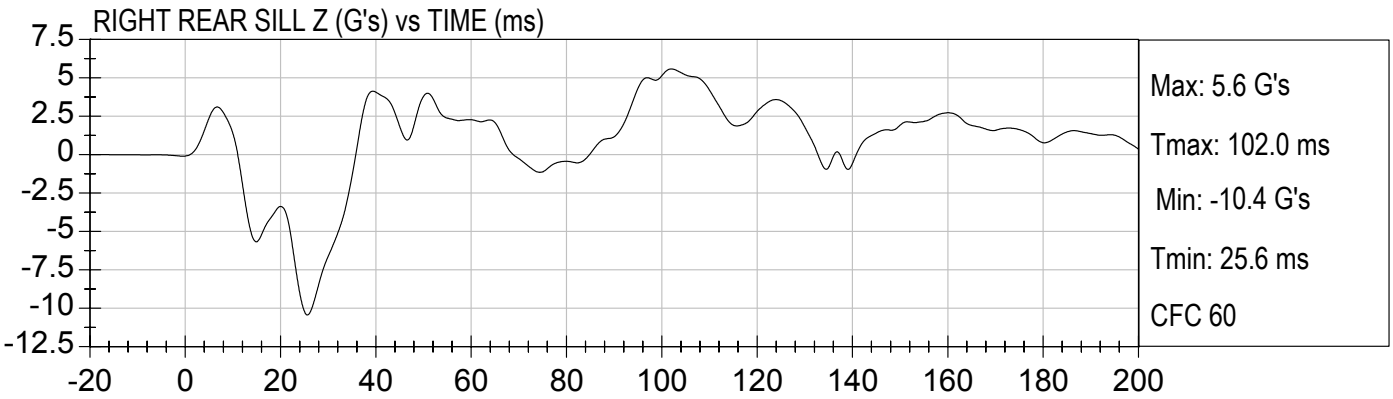


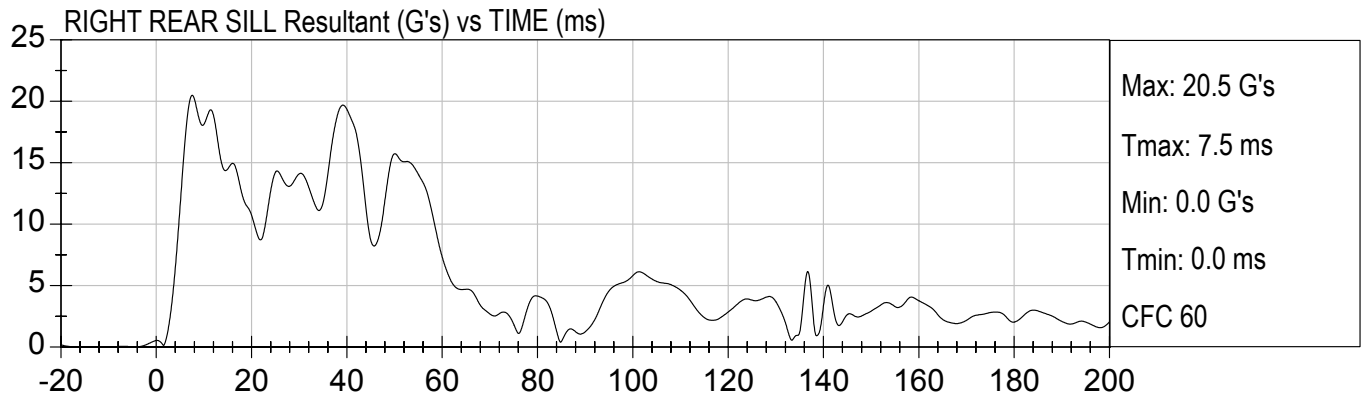
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

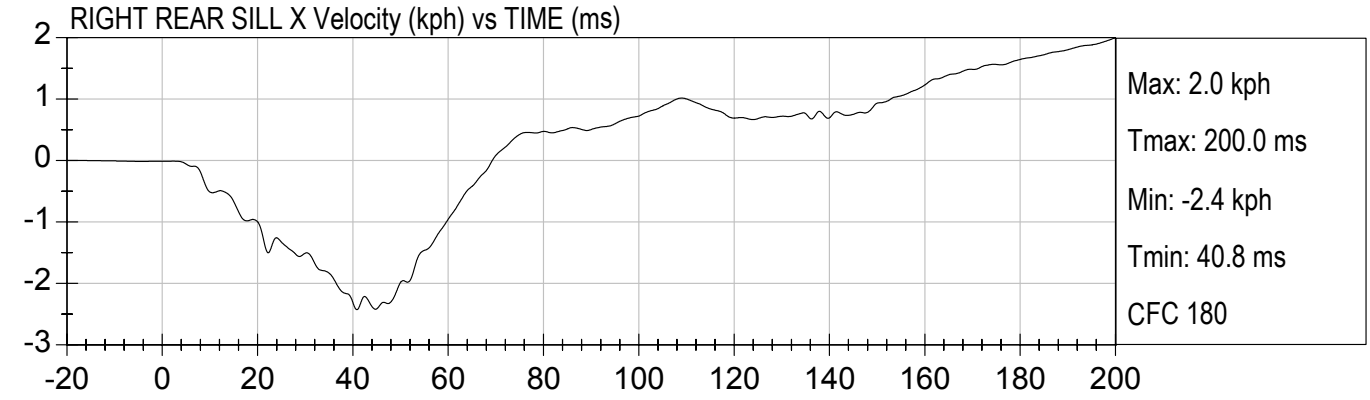
Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

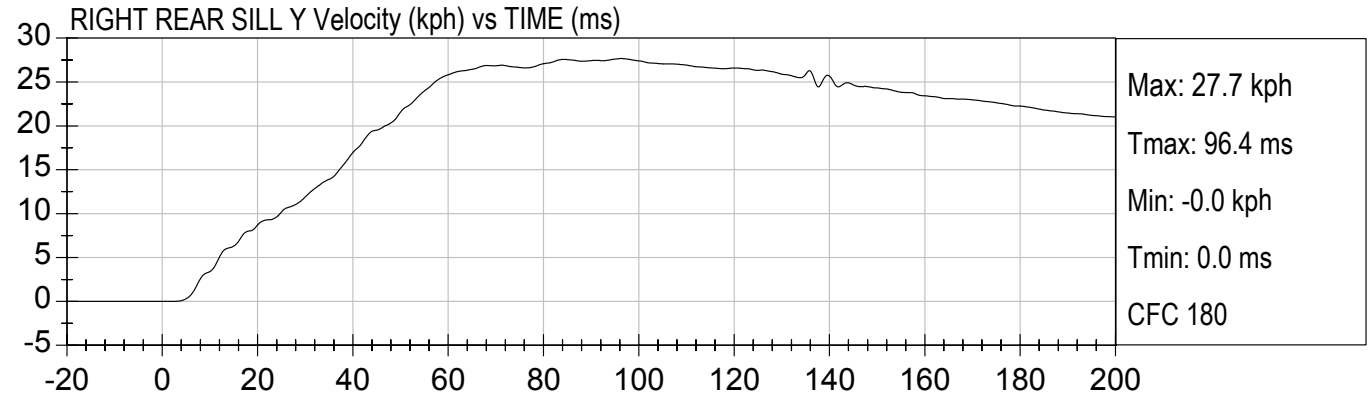


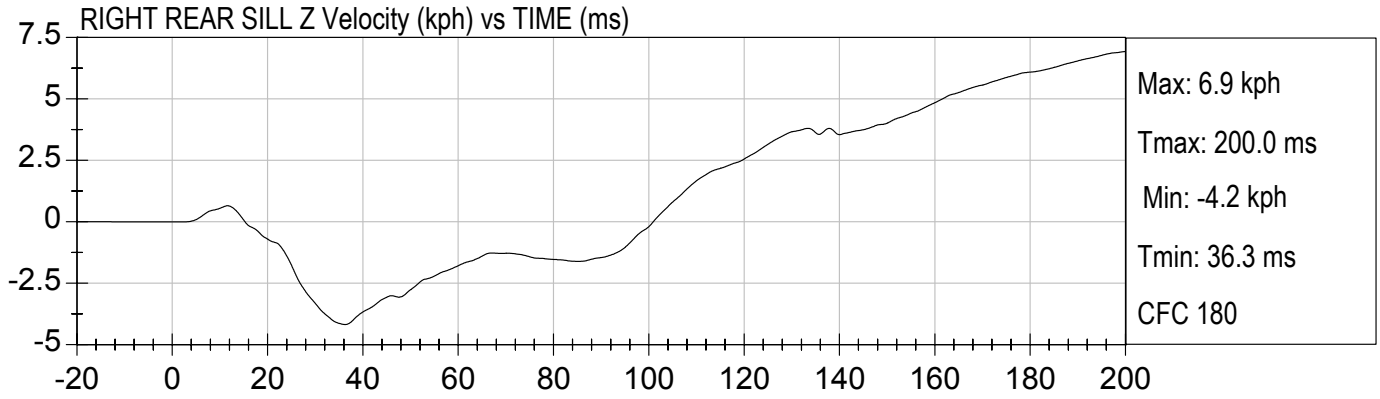






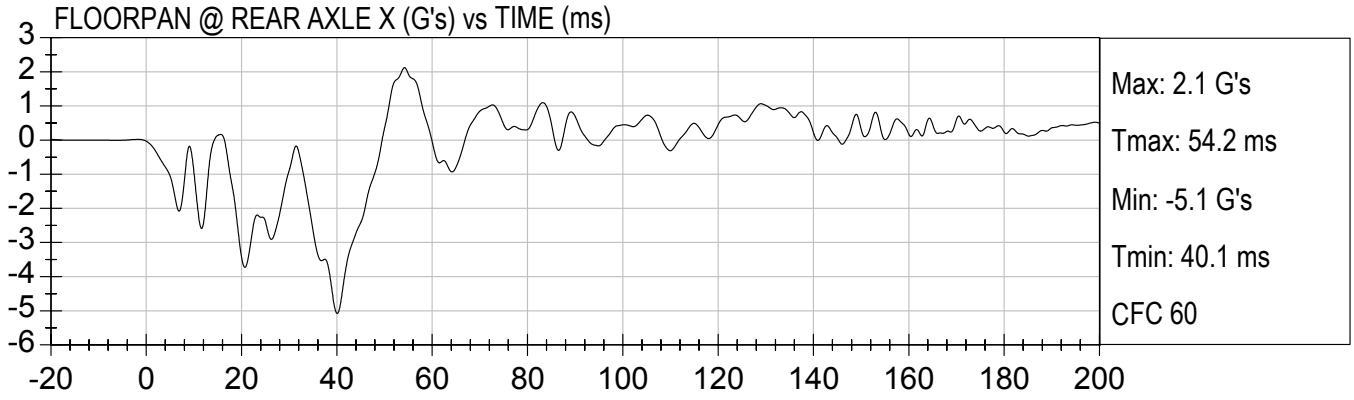

RIGHT REAR SILL X Velocity (kph) vs TIME (ms)
2
1
0
-1
-2
-3
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 2.0 kph
Tmax: 200.0 ms
Min: -2.4 kph
Tmin: 40.8 ms
CFC 180

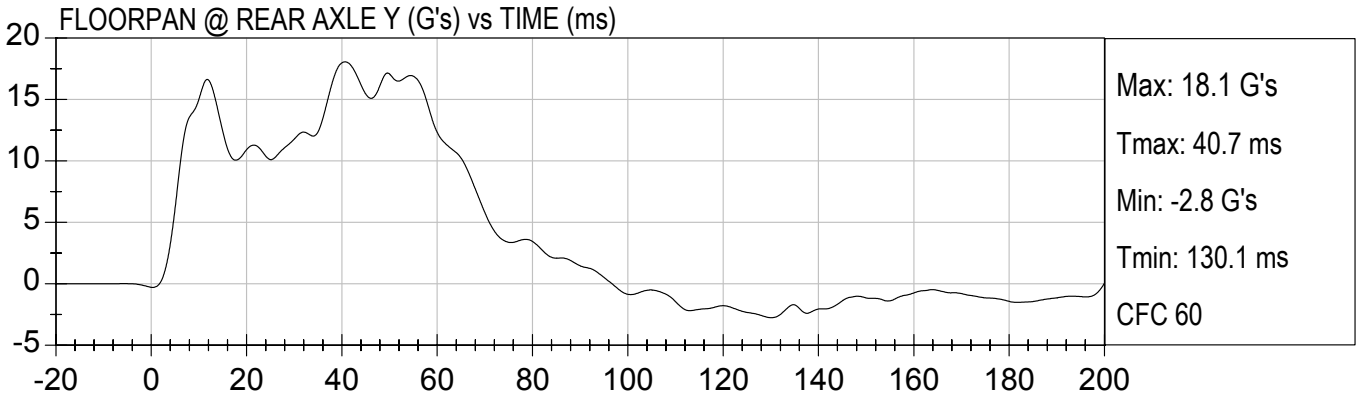

RIGHT REAR SILL Y Velocity (kph) vs TIME (ms)
30
25
20
15
10
5
0
-5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 27.7 kph
Tmax: 96.4 ms
Min: -0.0 kph
Tmin: 0.0 ms
CFC 180

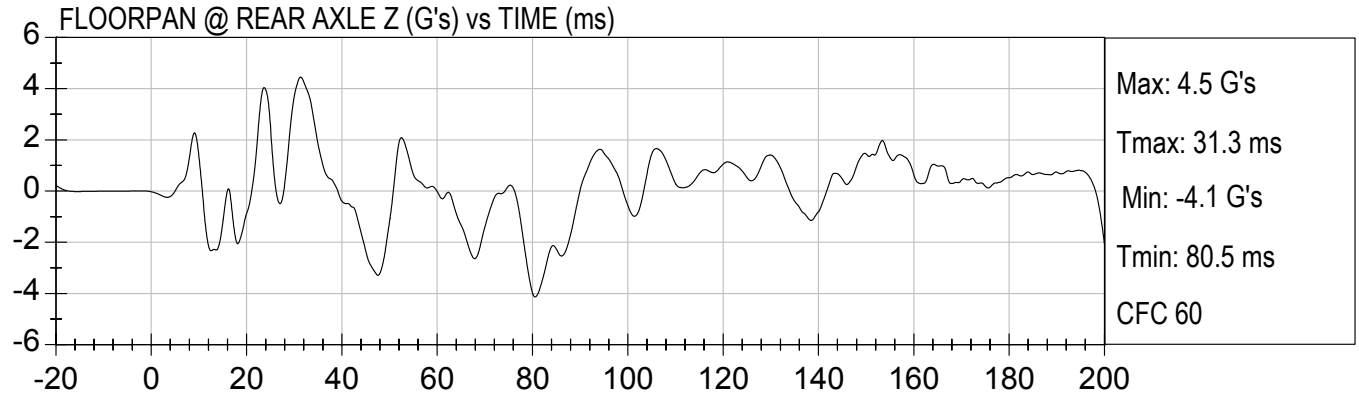

RIGHT REAR SILL Z Velocity (kph) vs TIME (ms)
7.5
5
2.5
0
-2.5
-5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 6.9 kph
Tmax: 200.0 ms
Min: -4.2 kph
Tmin: 36.3 ms
CFC 180

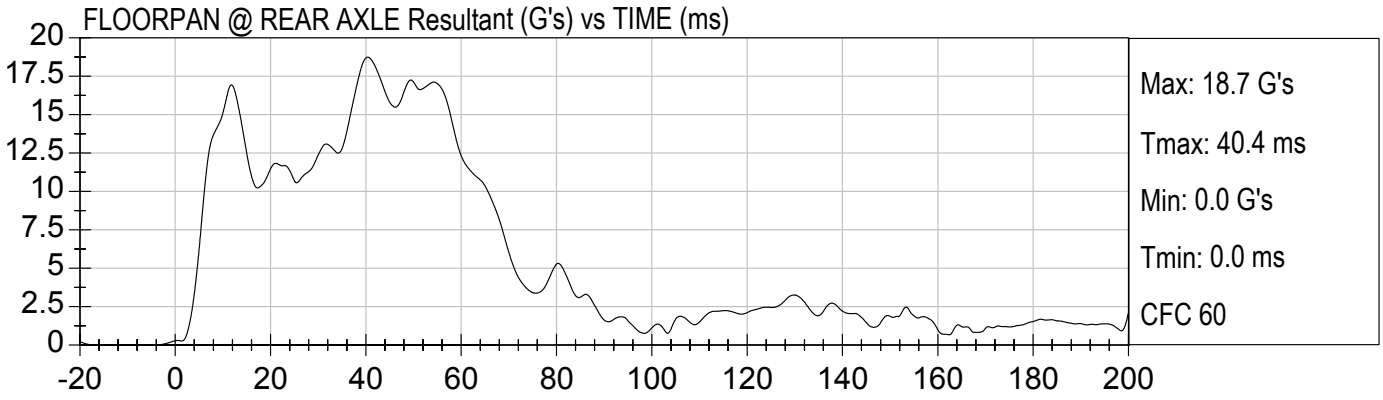
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

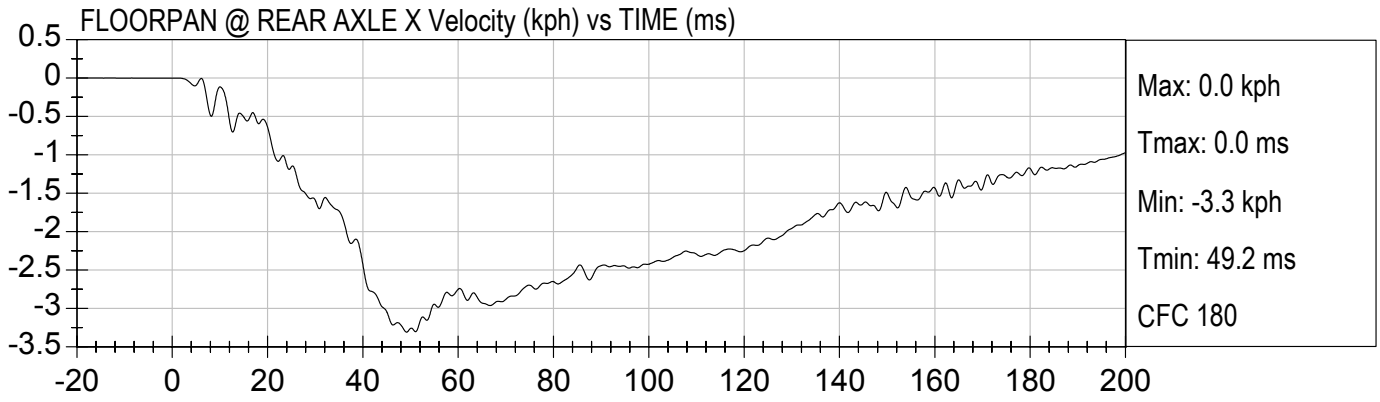
Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

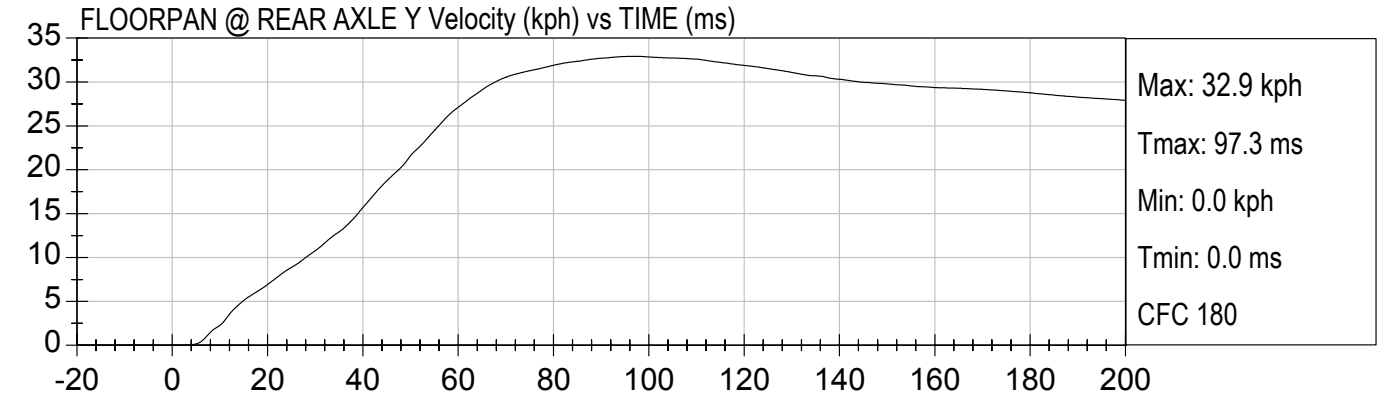


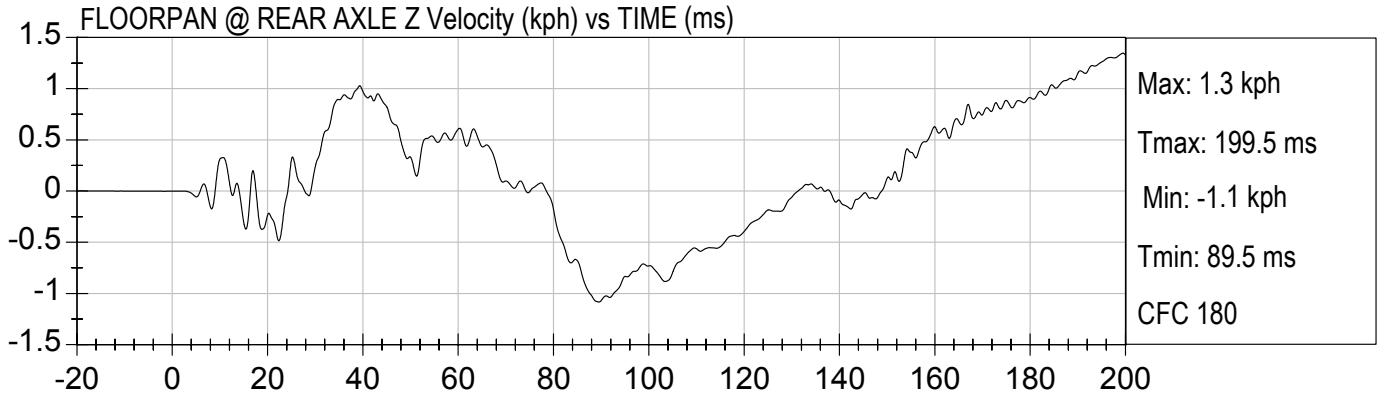






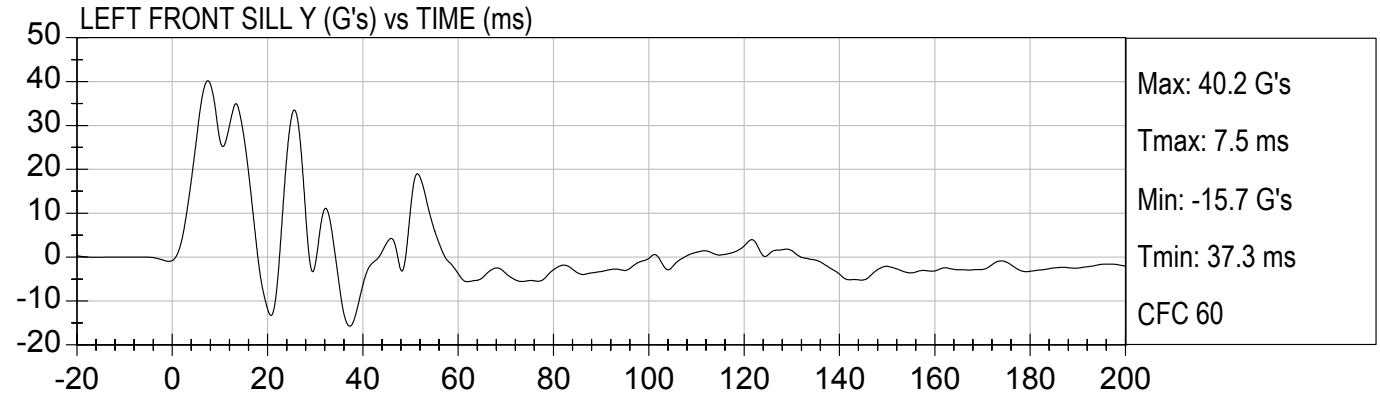

FLOORPAN @ REAR AXLE X Velocity (kph) vs TIME (ms)
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.0 kph
Tmax: 0.0 ms
Min: -3.3 kph
Tmin: 49.2 ms
CFC 180

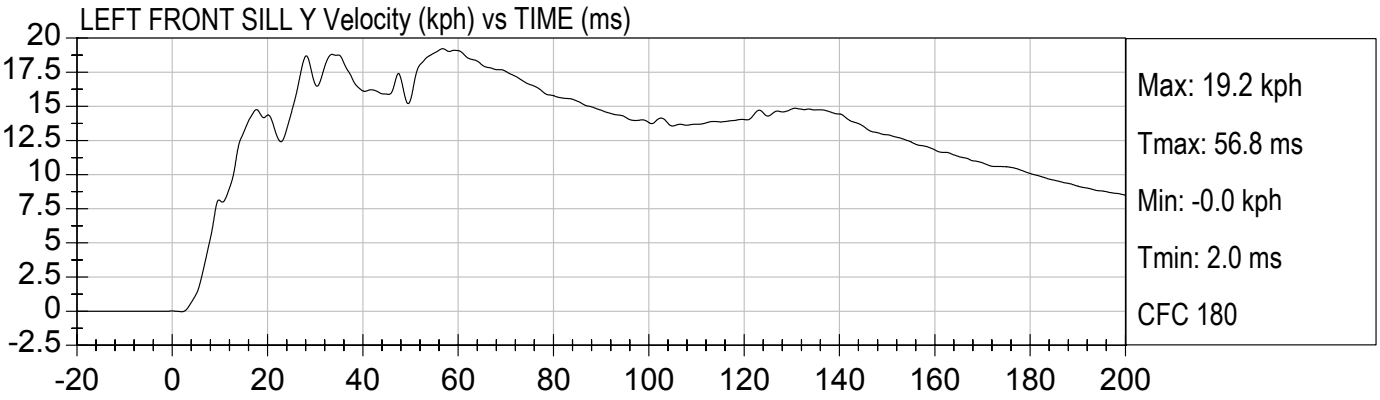

FLOORPAN @ REAR AXLE Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 32.9 kph
Tmax: 97.3 ms
Min: 0.0 kph
Tmin: 0.0 ms
CFC 180

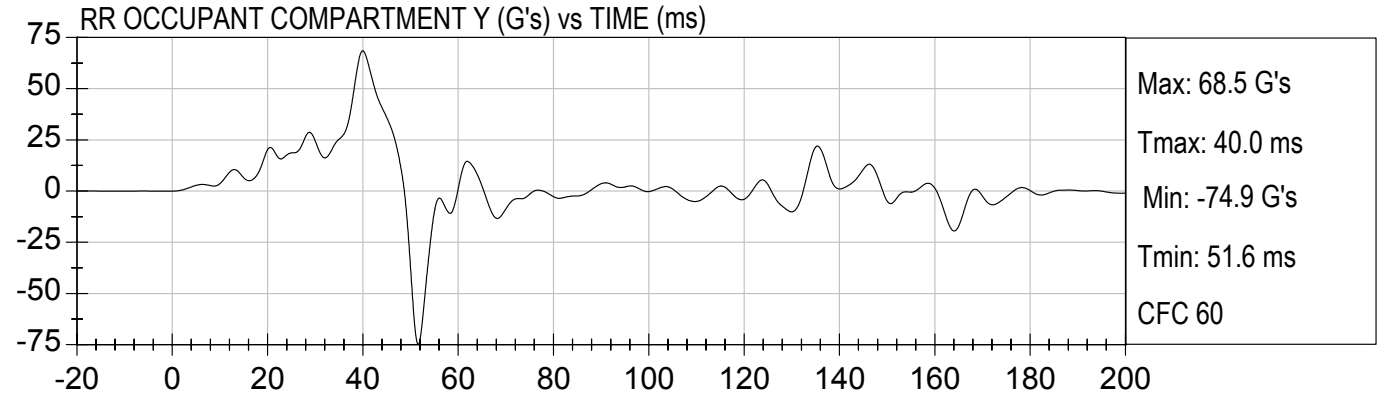

FLOORPAN @ REAR AXLE Z Velocity (kph) vs TIME (ms)
1.5
1
0.5
0
-0.5
-1
-1.5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 1.3 kph
Tmax: 199.5 ms
Min: -1.1 kph
Tmin: 89.5 ms
CFC 180

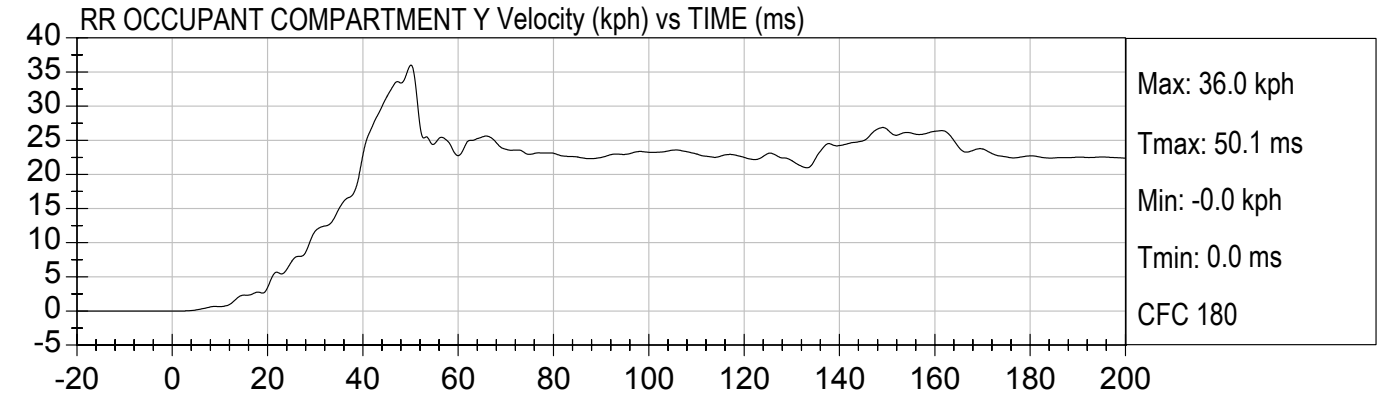
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



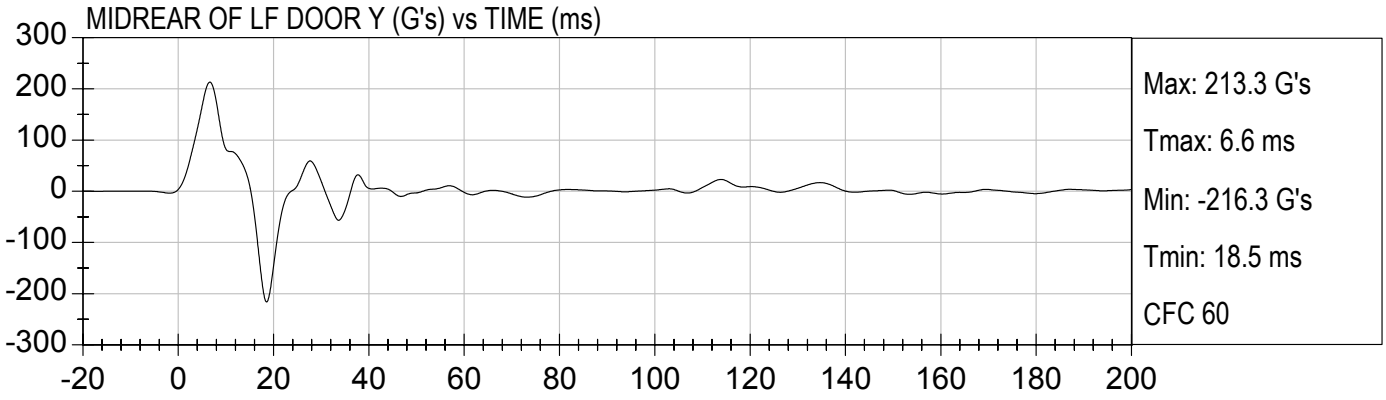


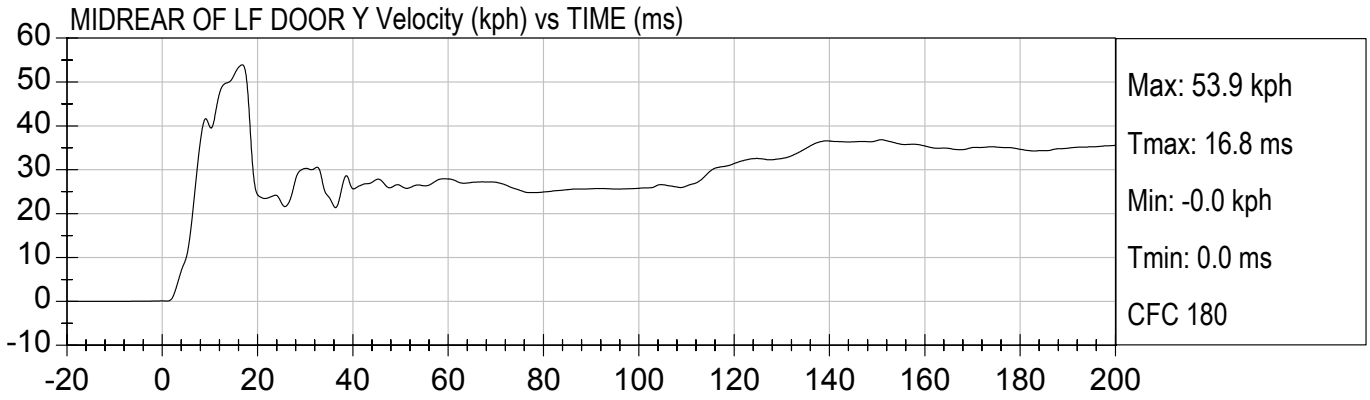


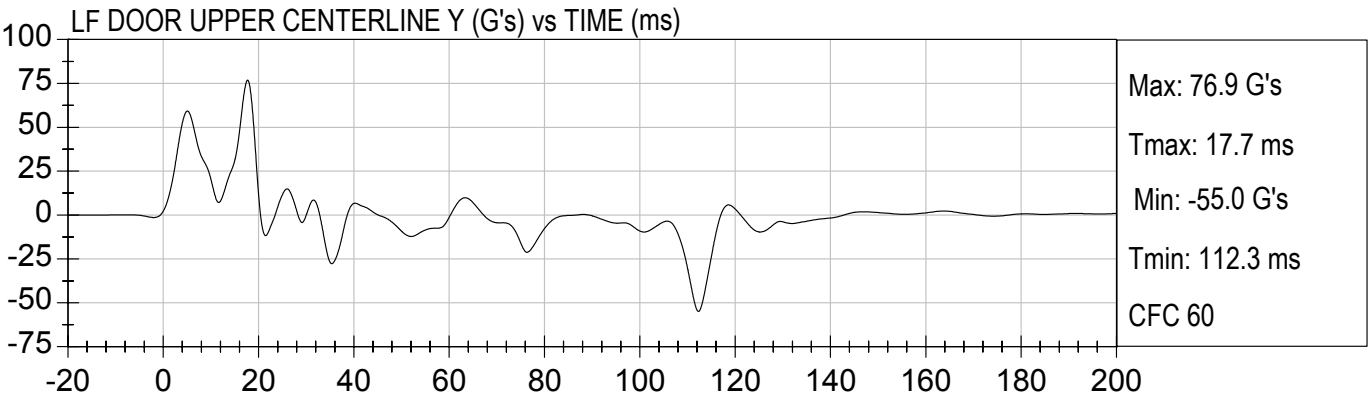


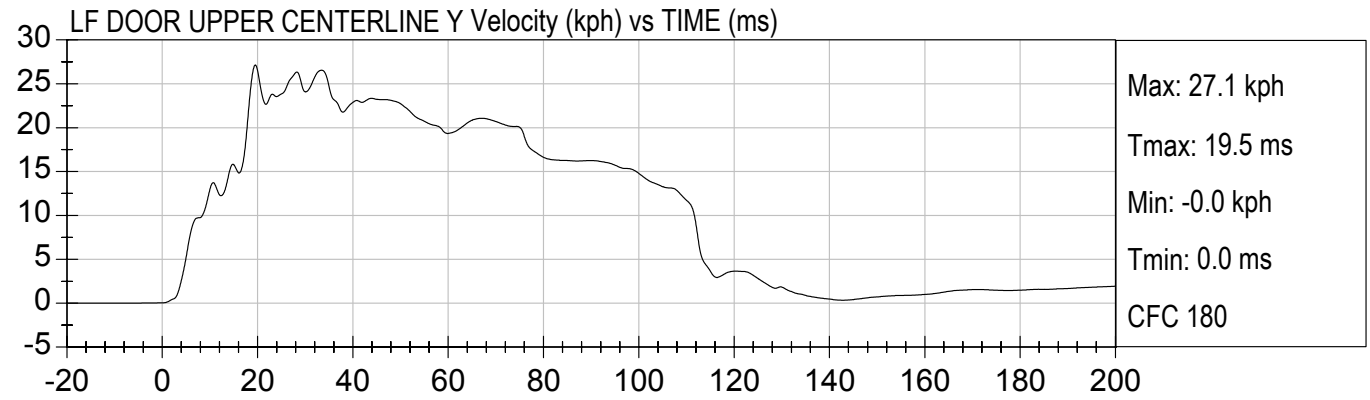
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



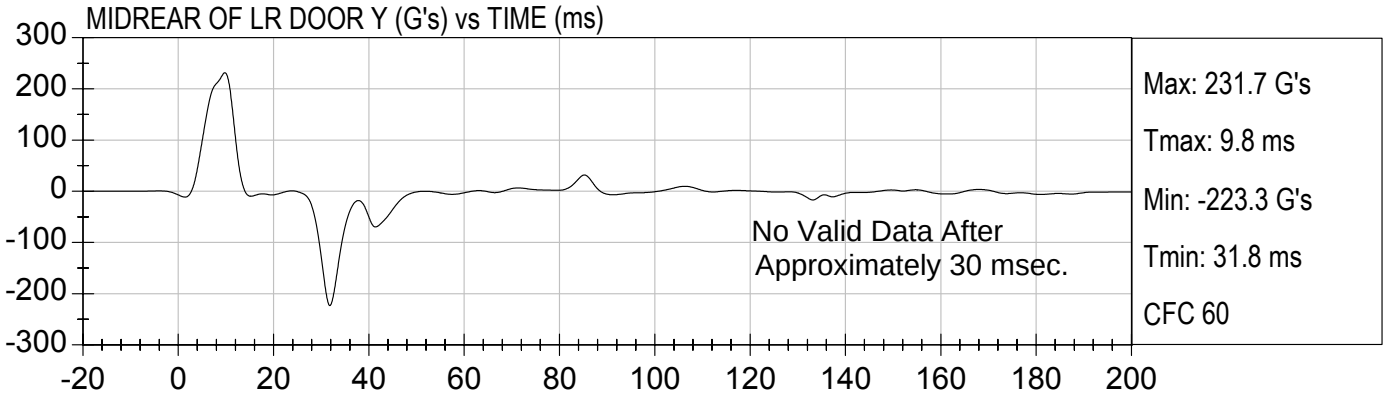


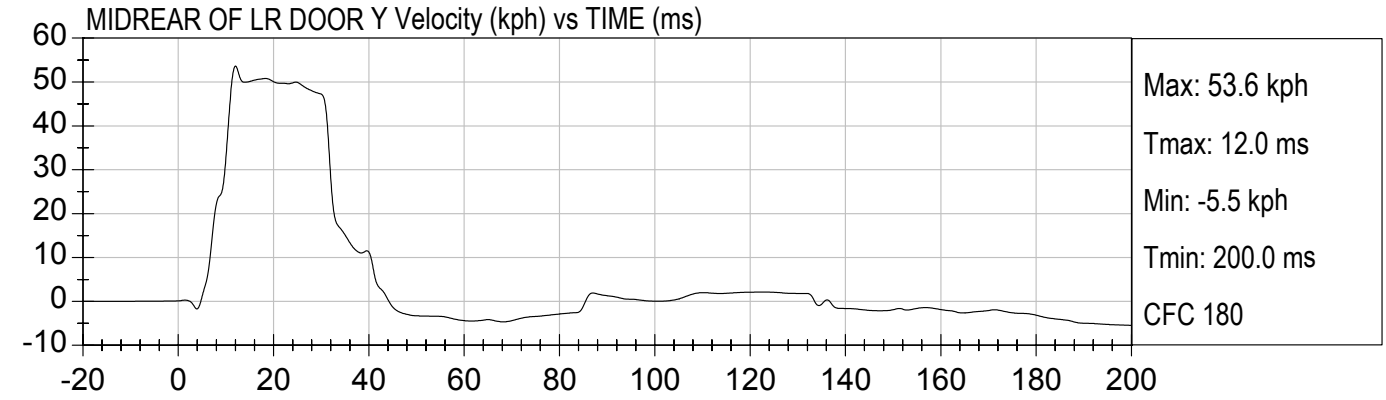


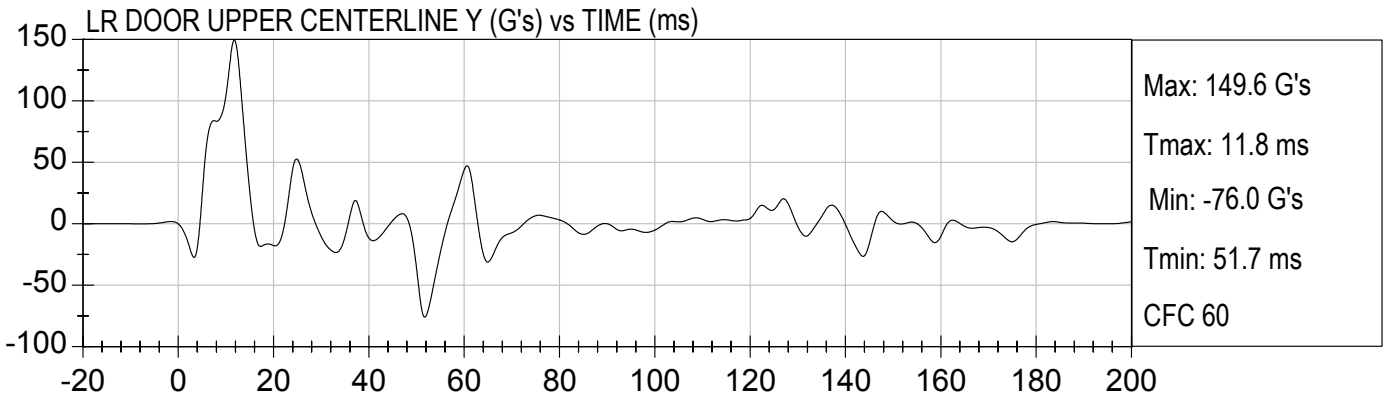


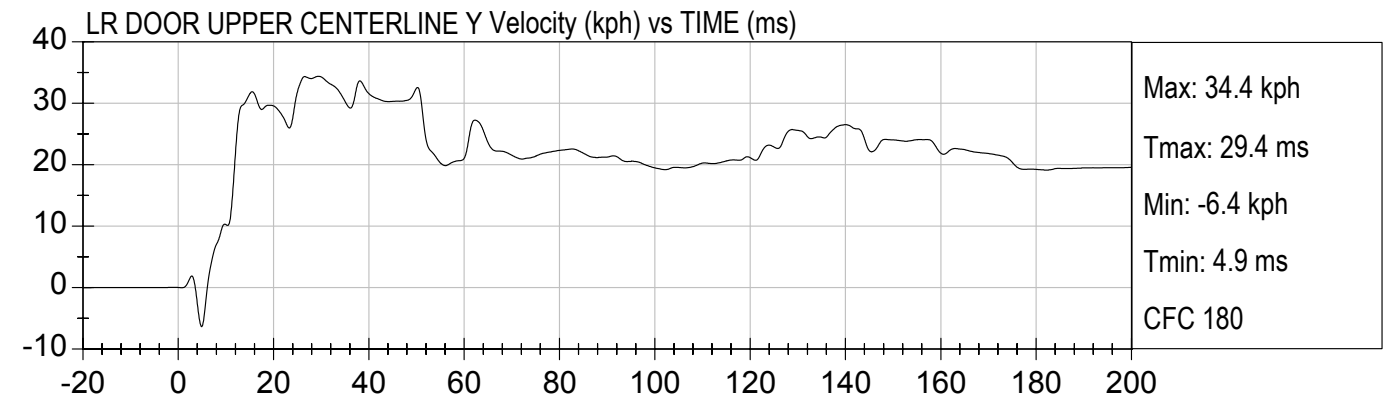
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



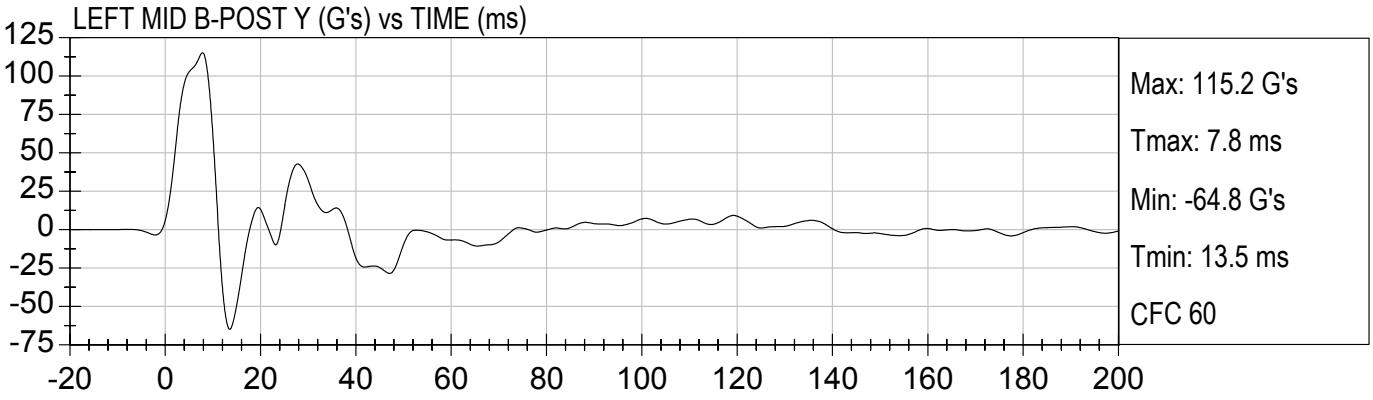


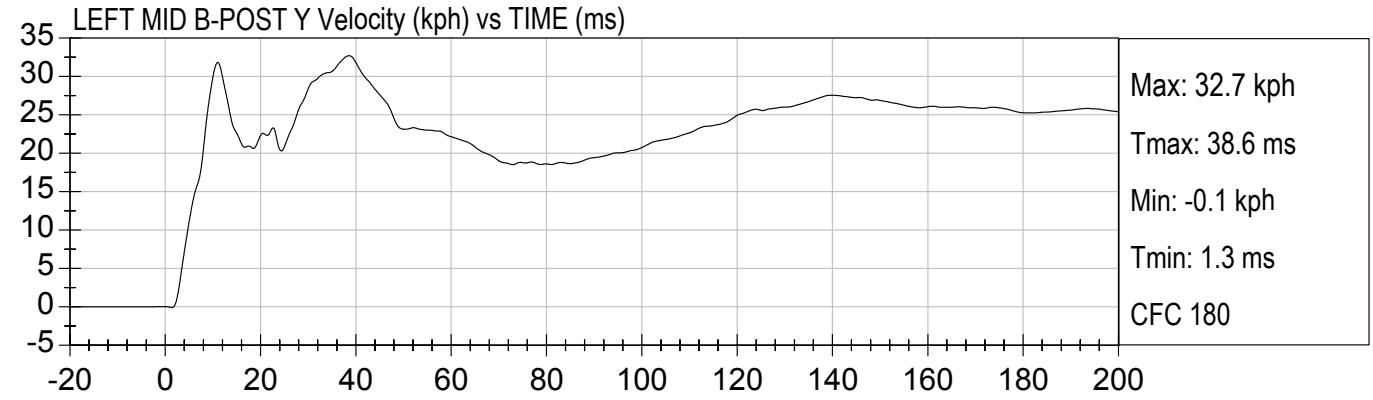




NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

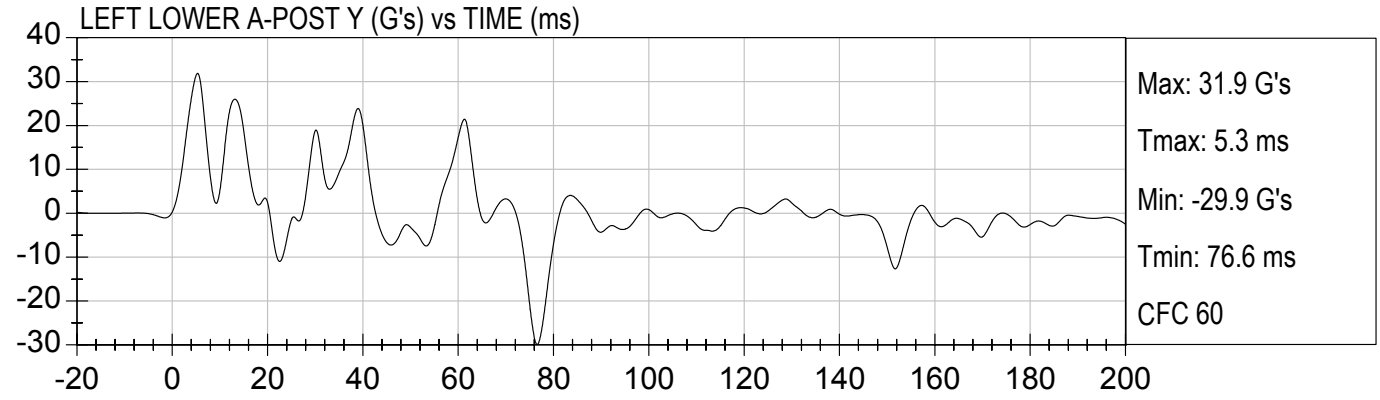
Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

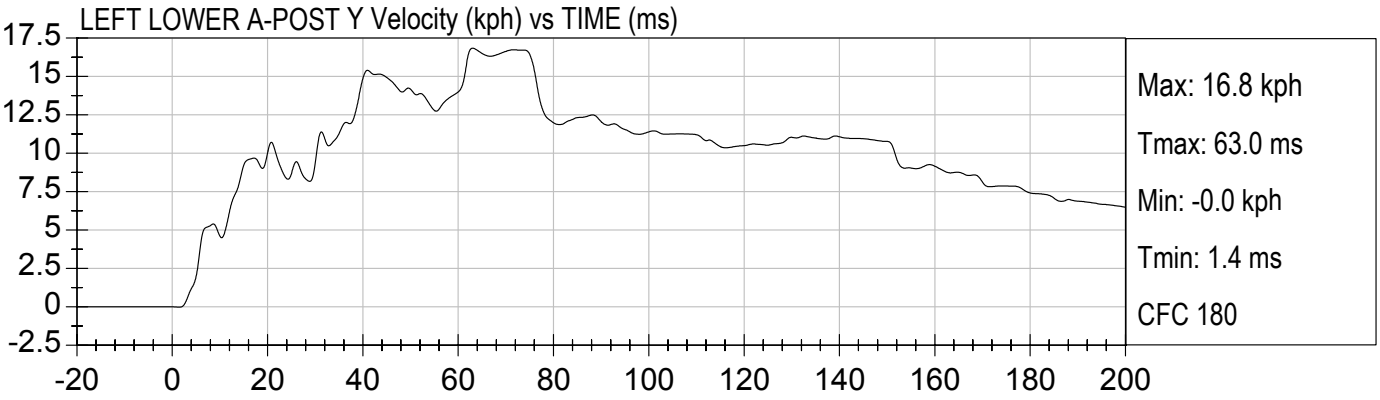


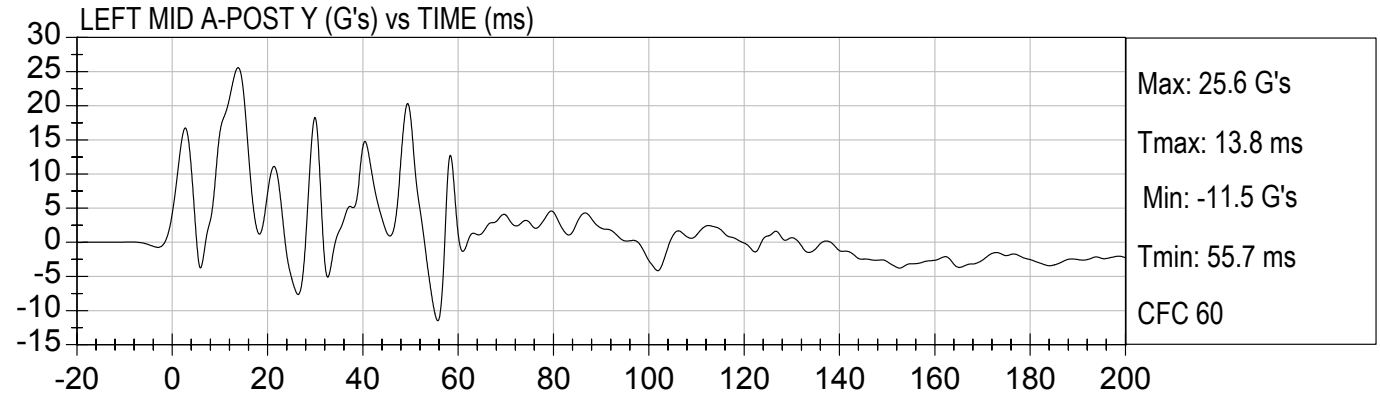


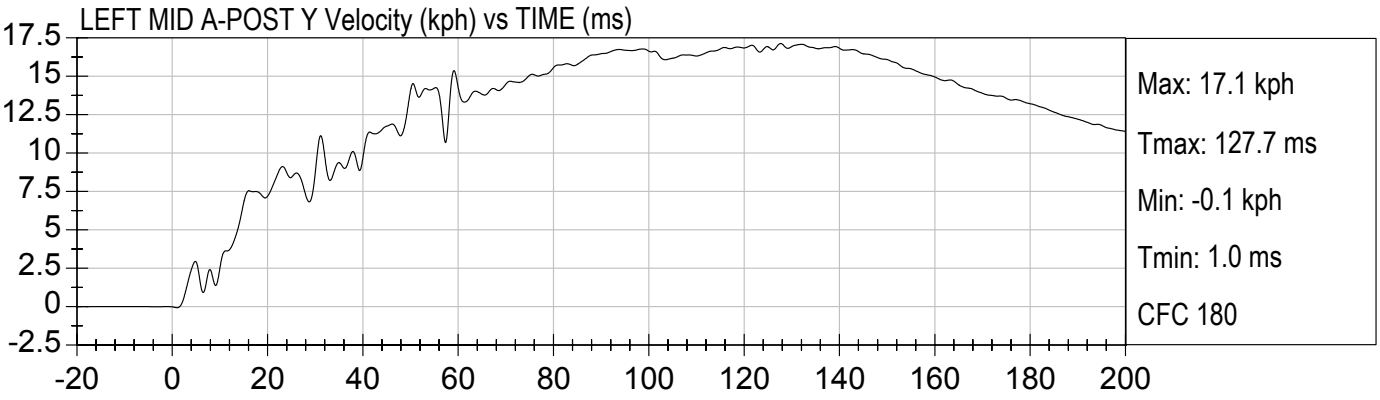
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



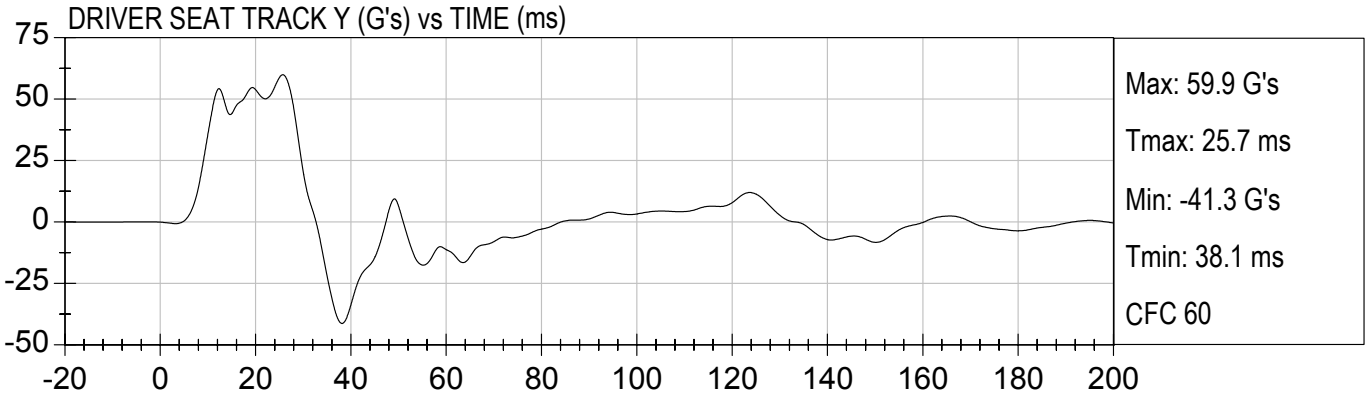


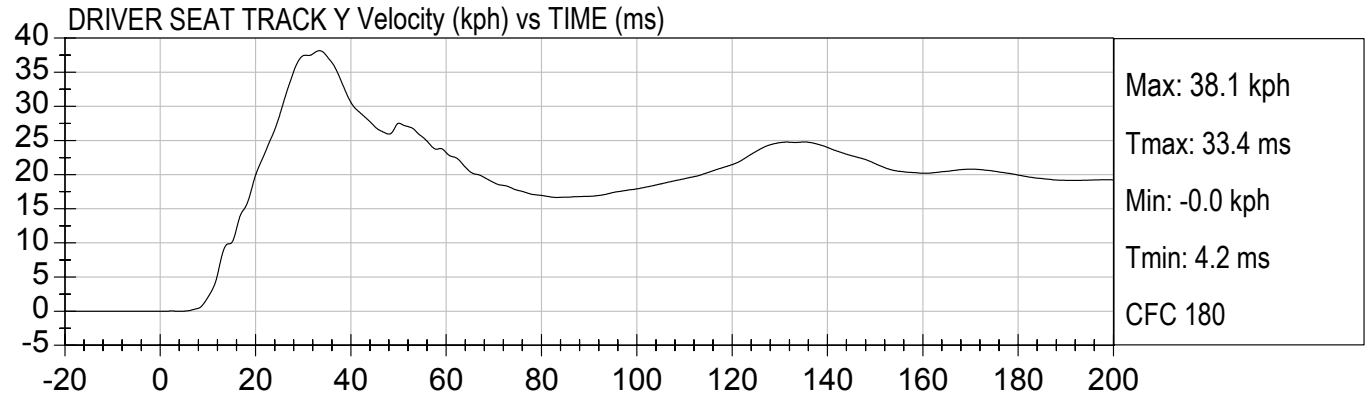


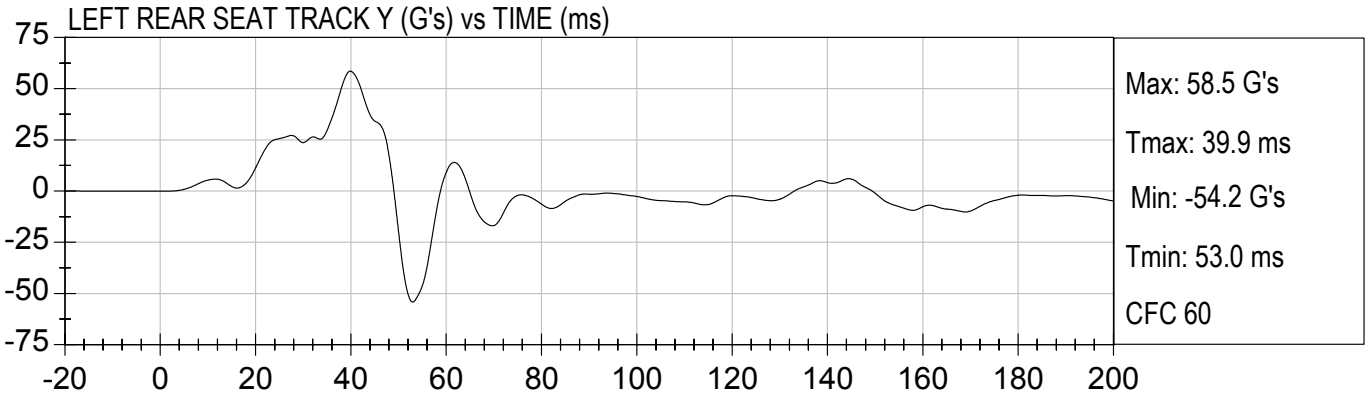


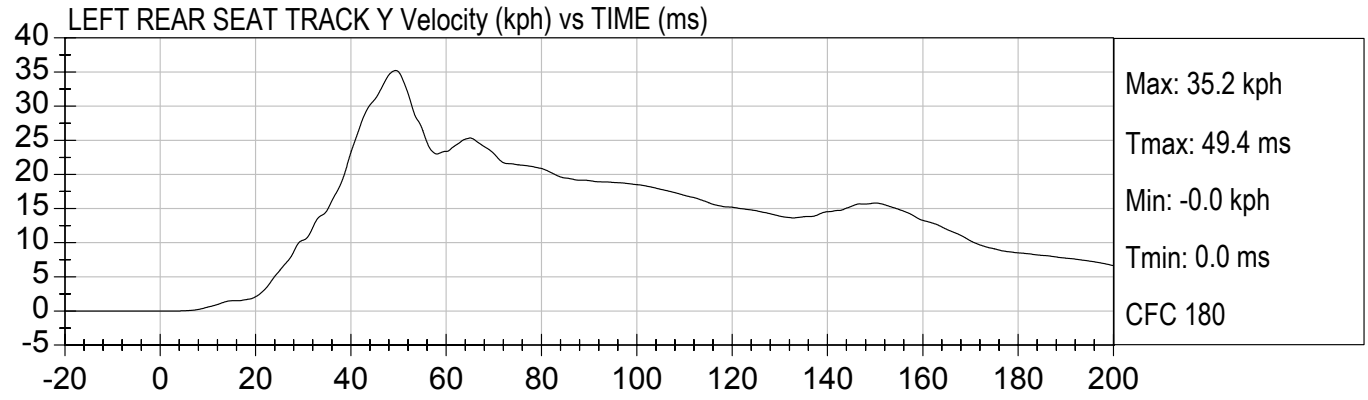
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



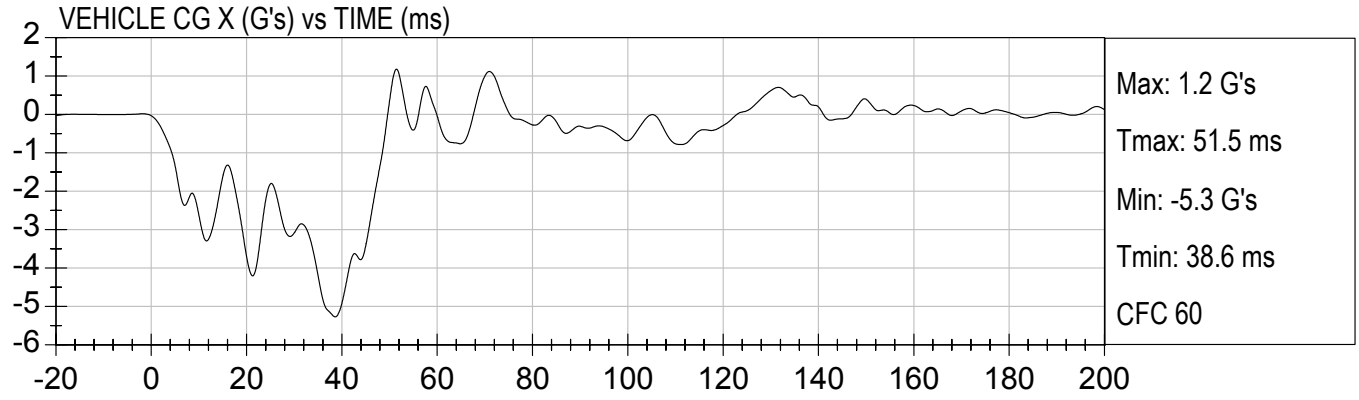


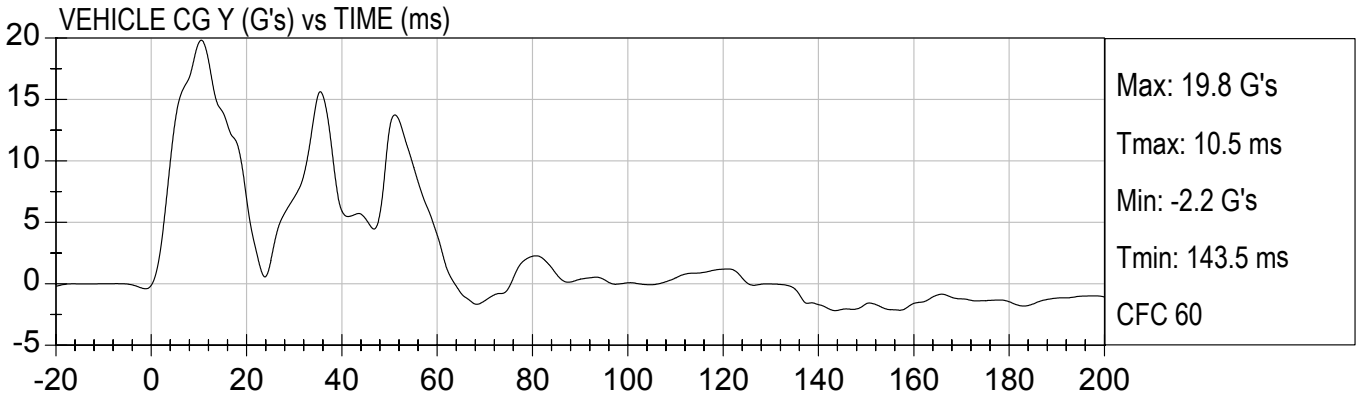


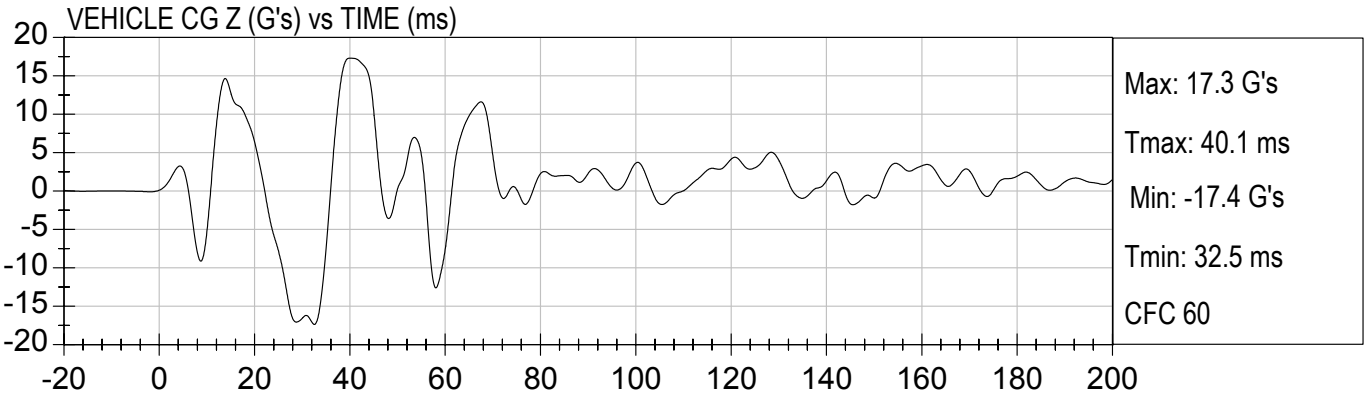


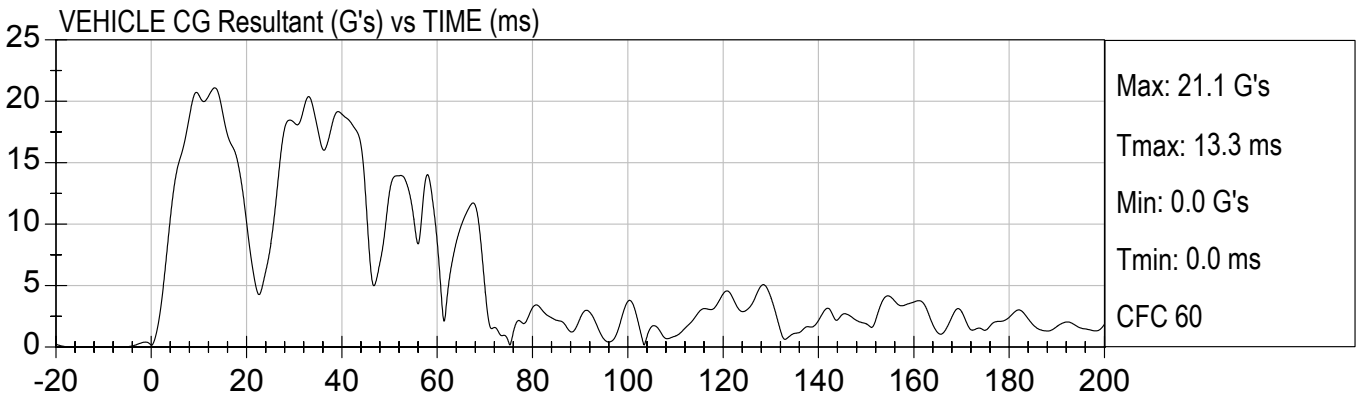
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



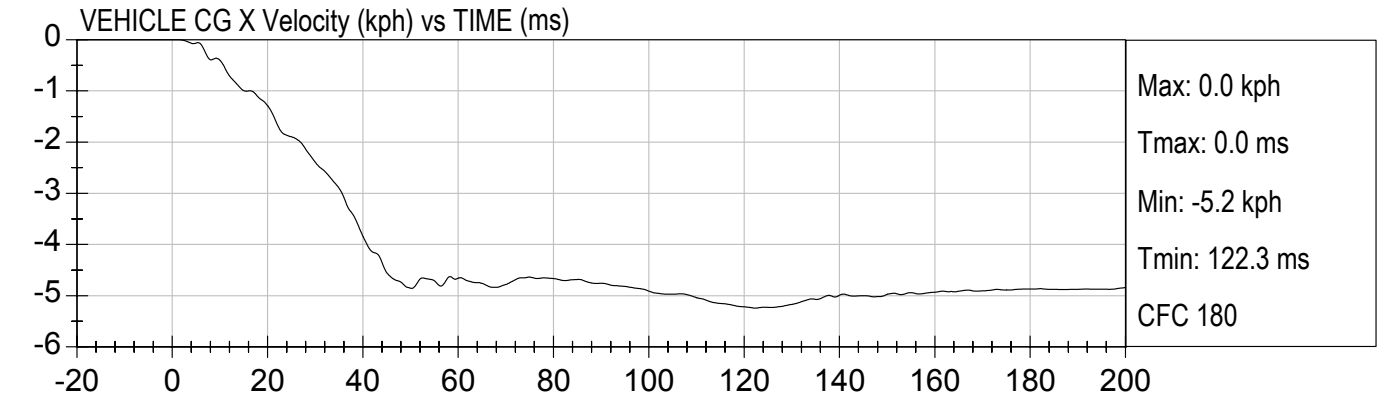


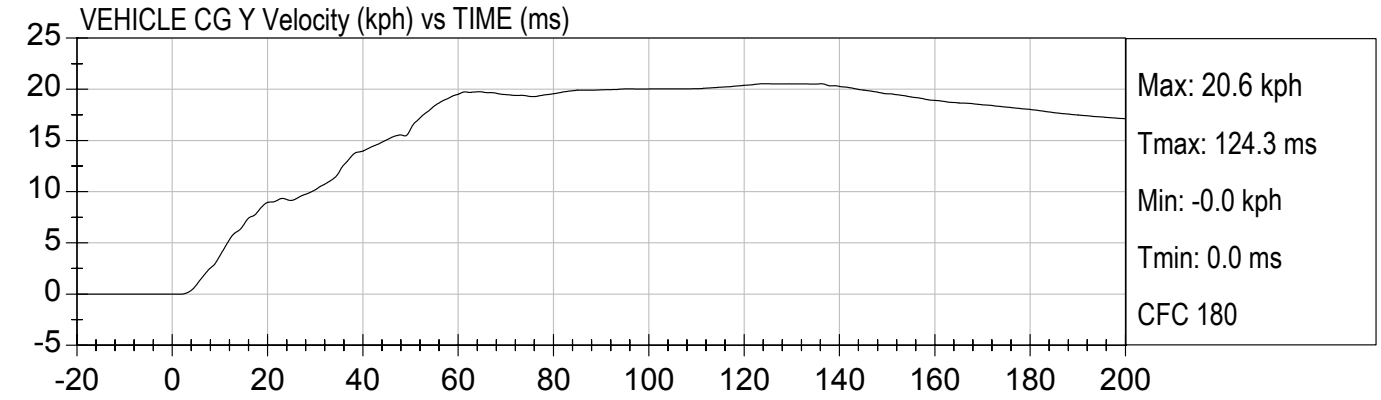


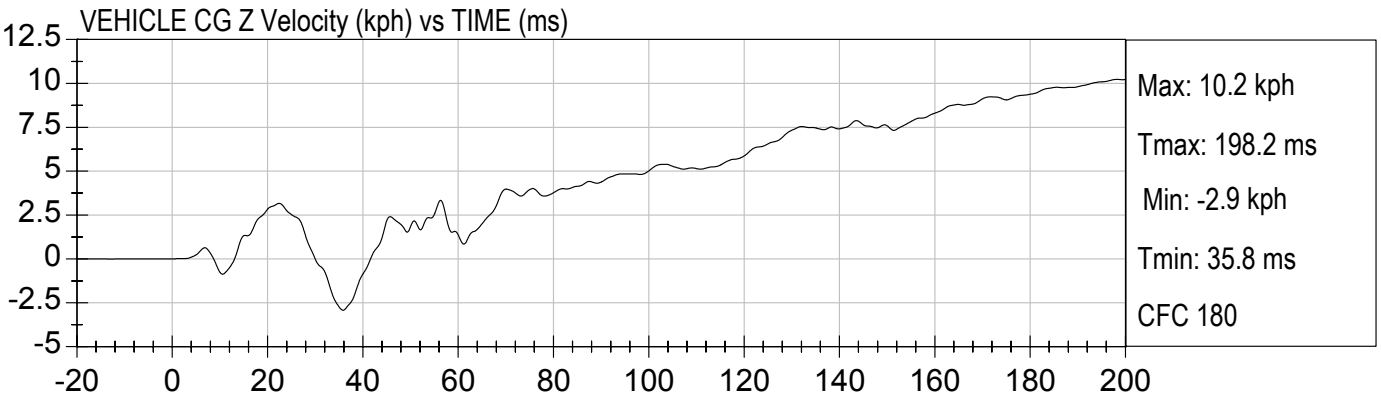


NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

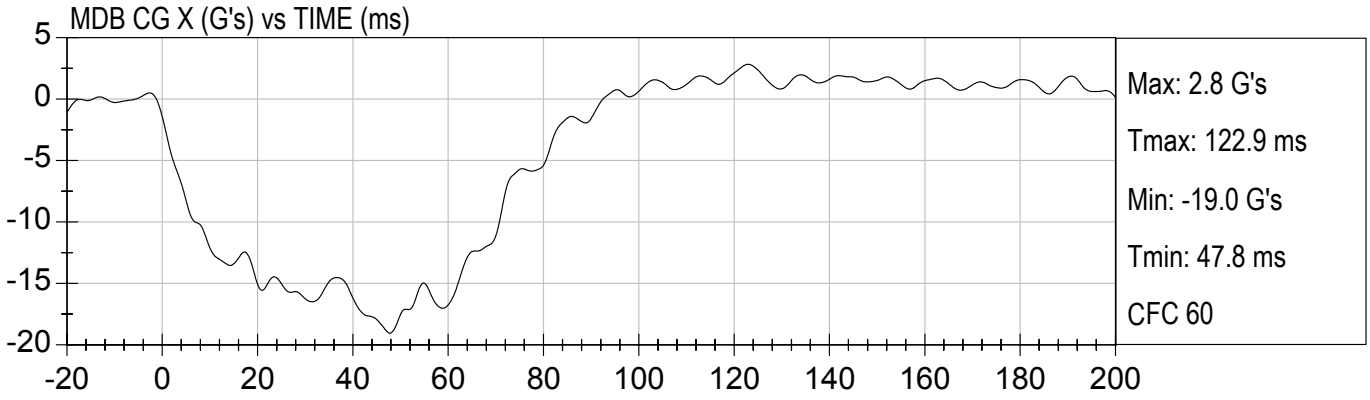


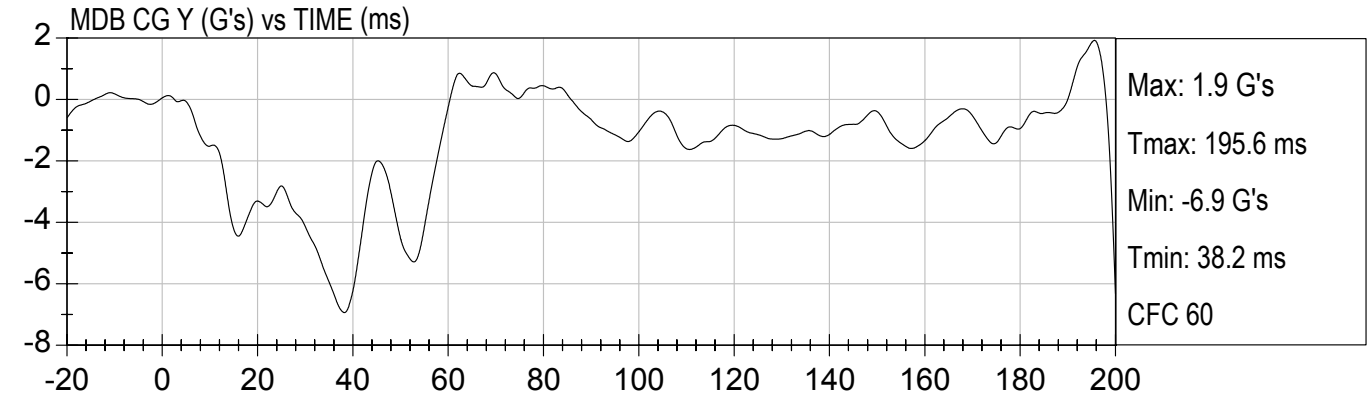


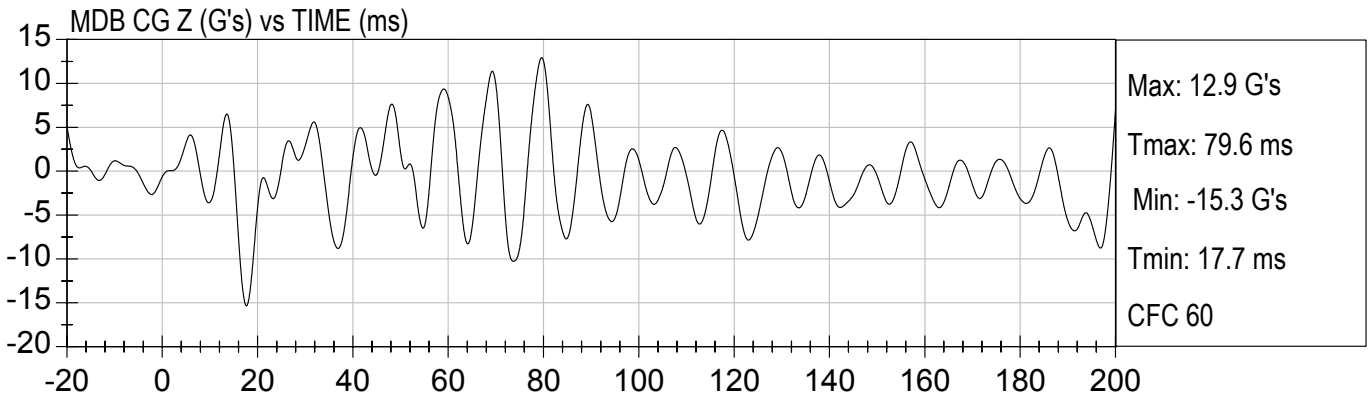


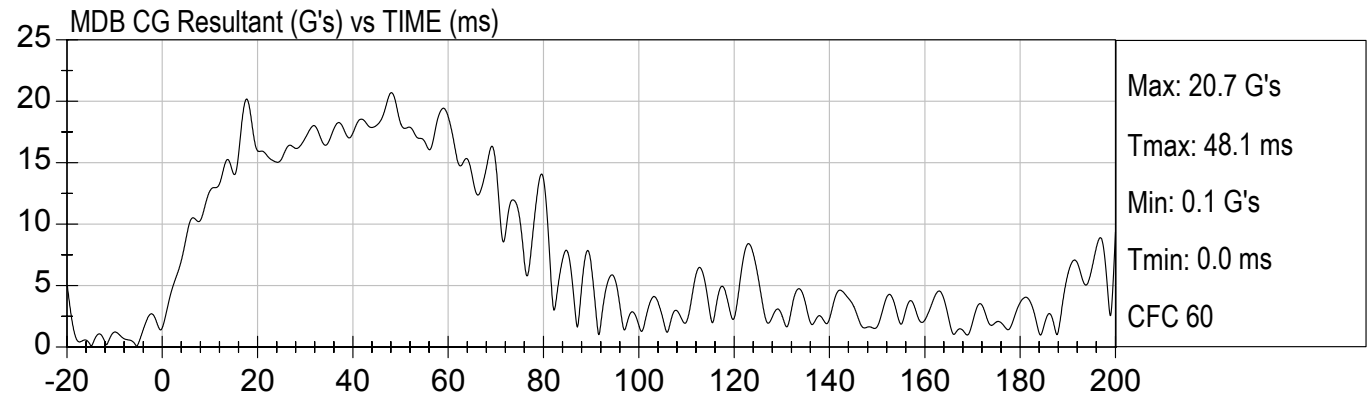
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



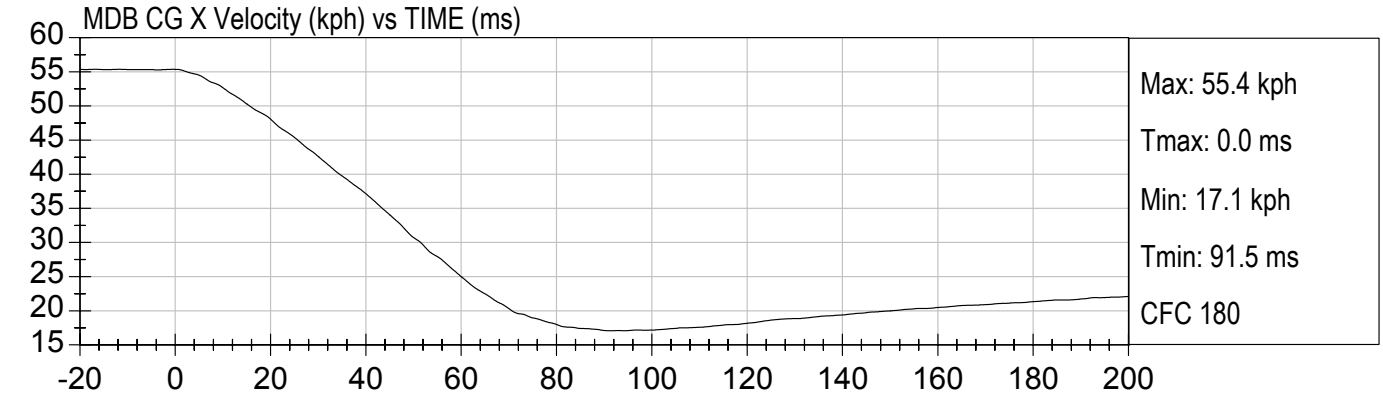


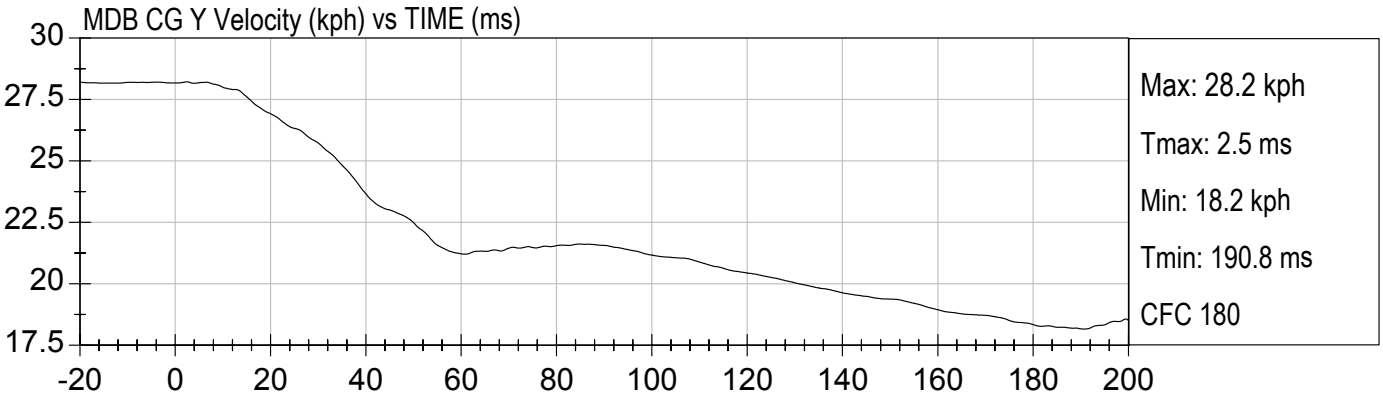


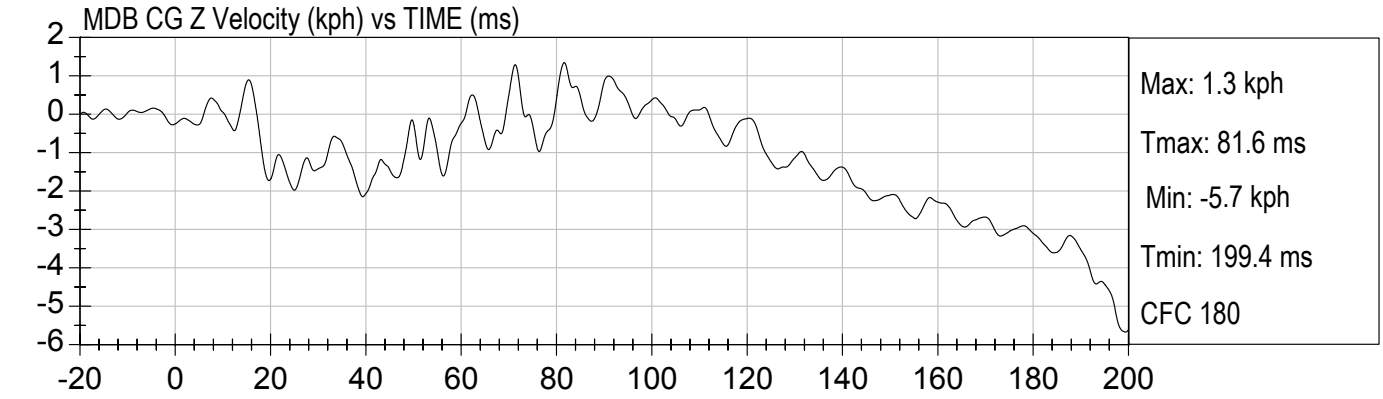


NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

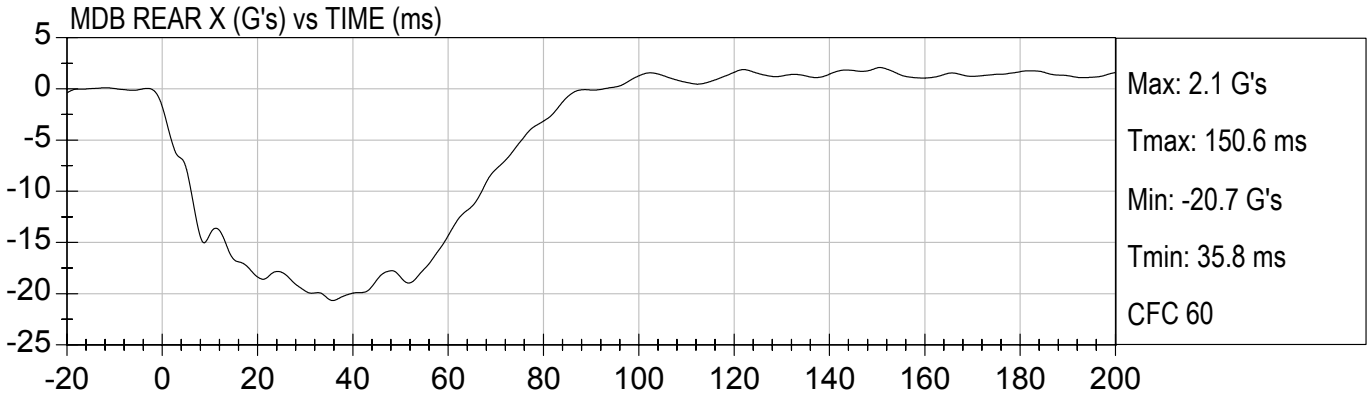


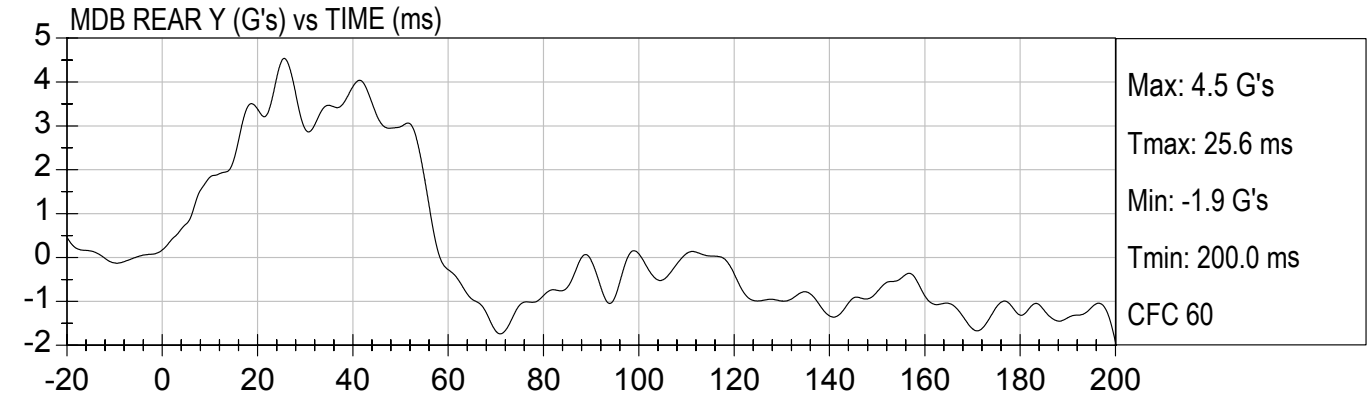


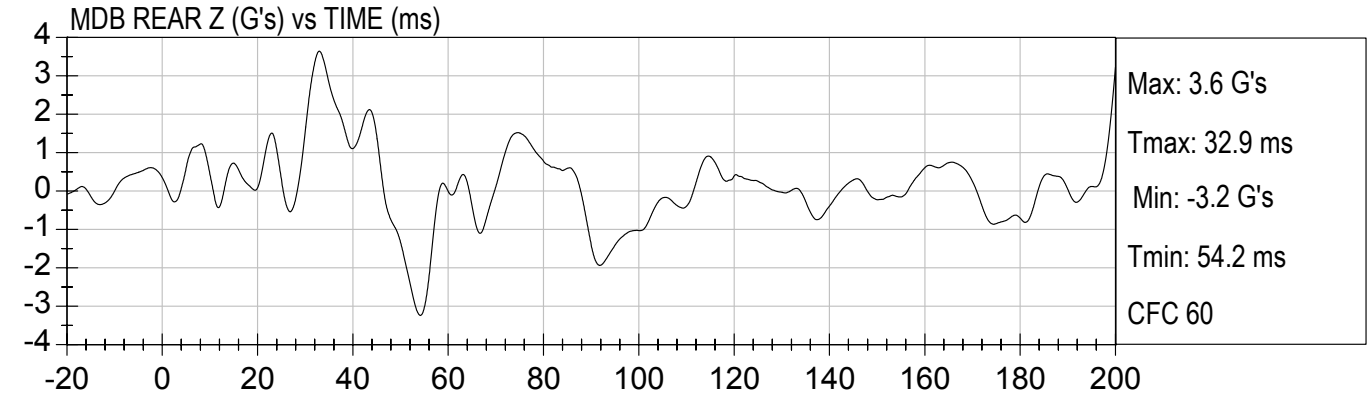


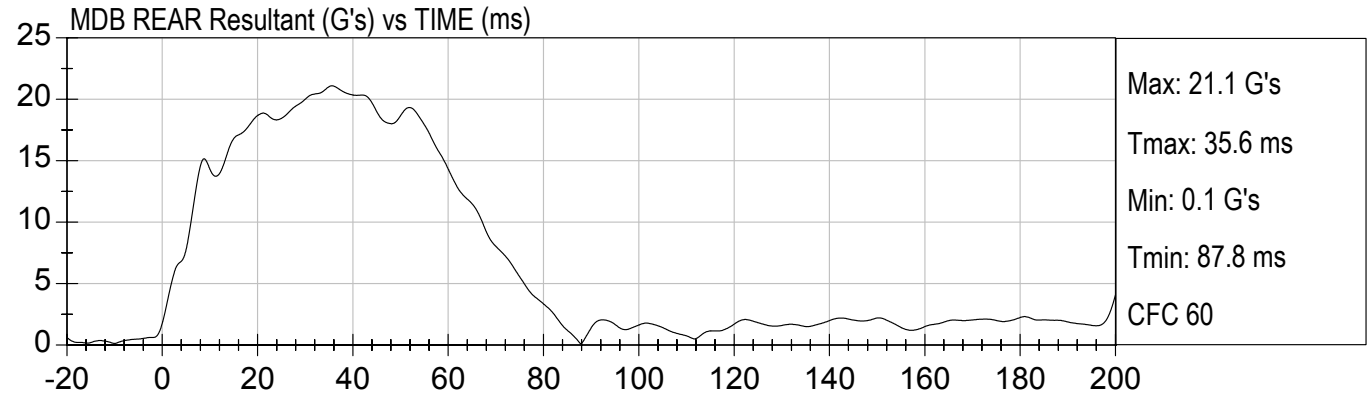
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



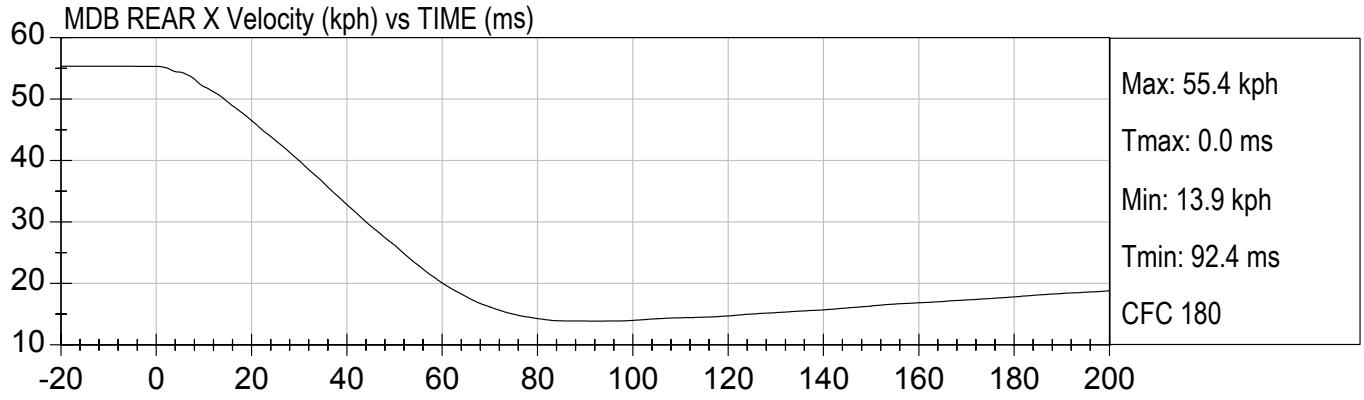


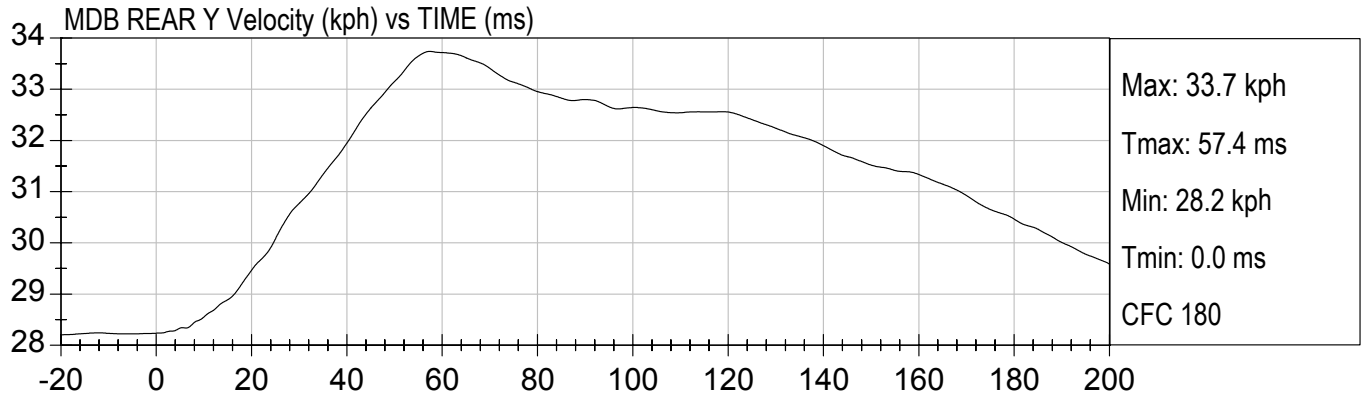


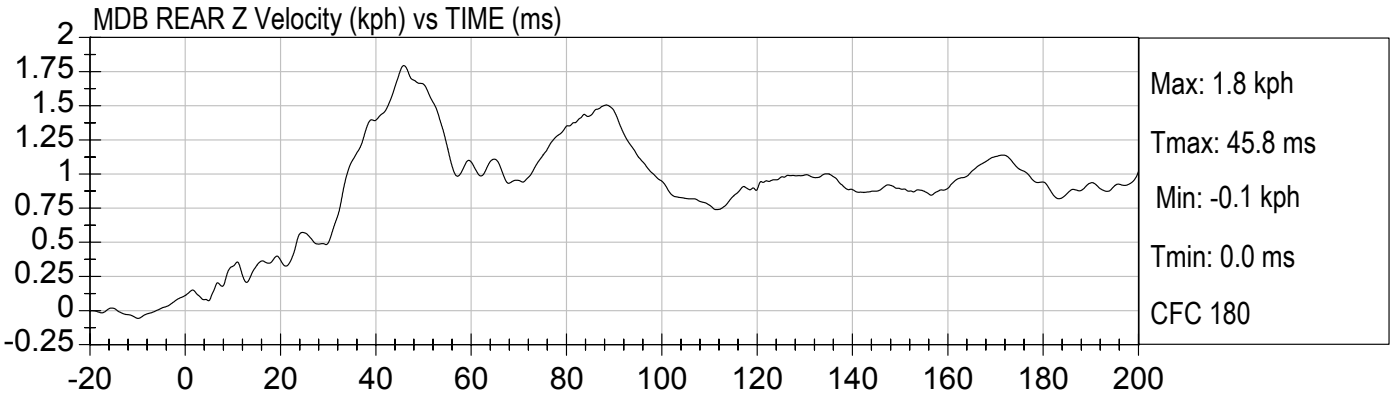


NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

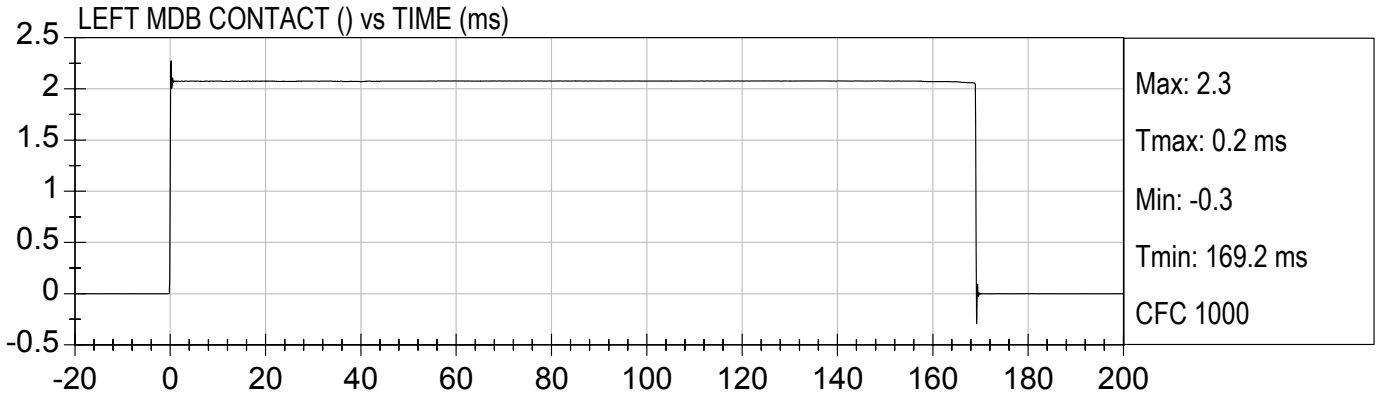


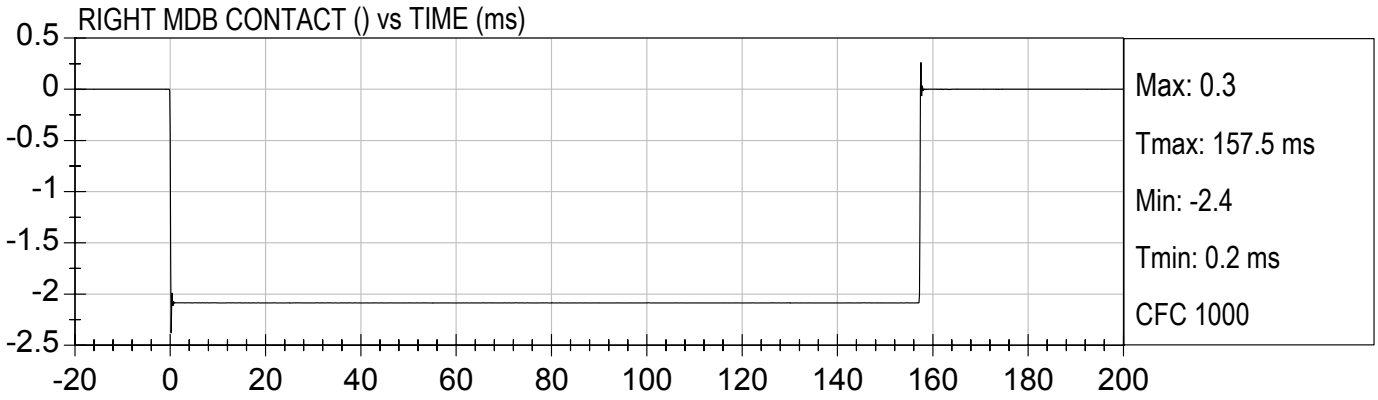




NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

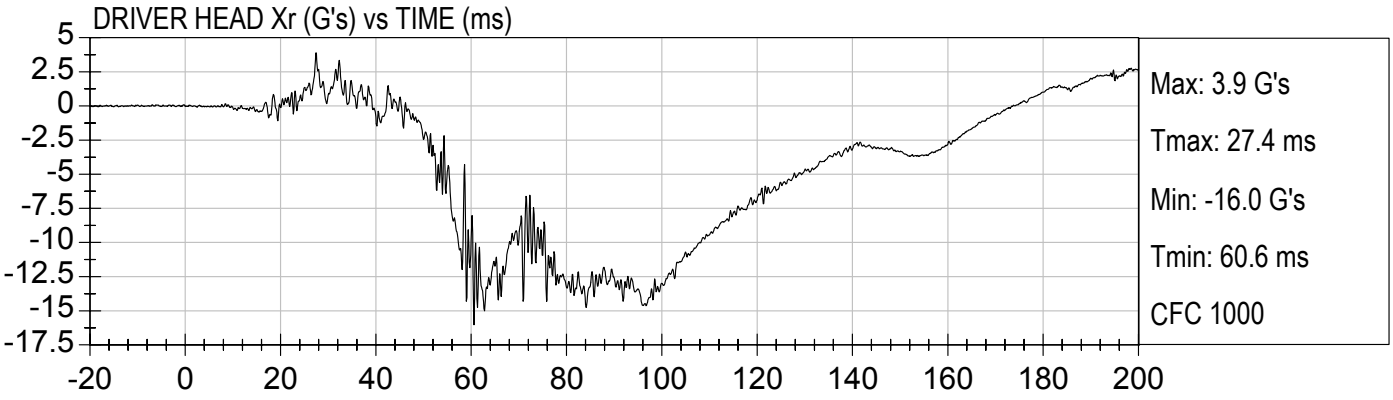
Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

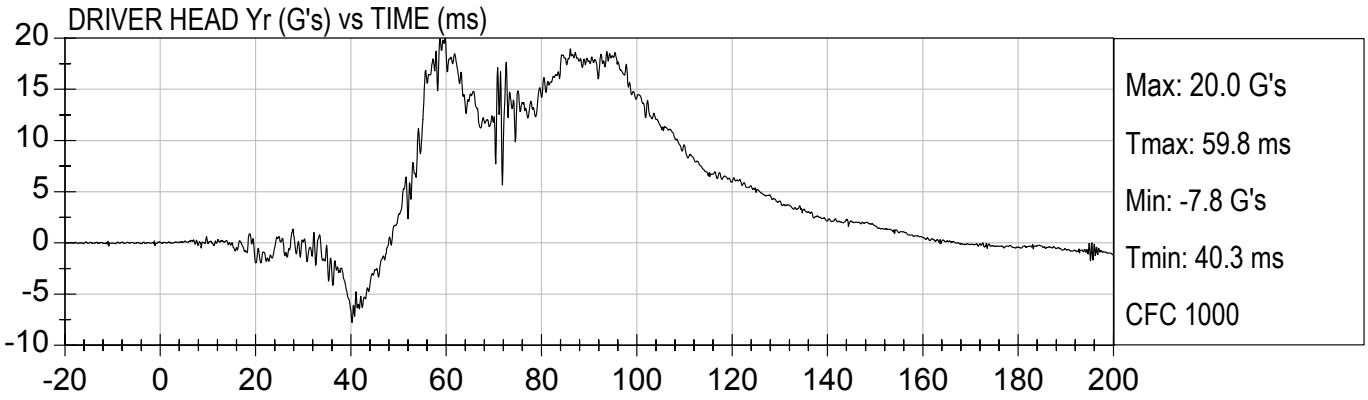


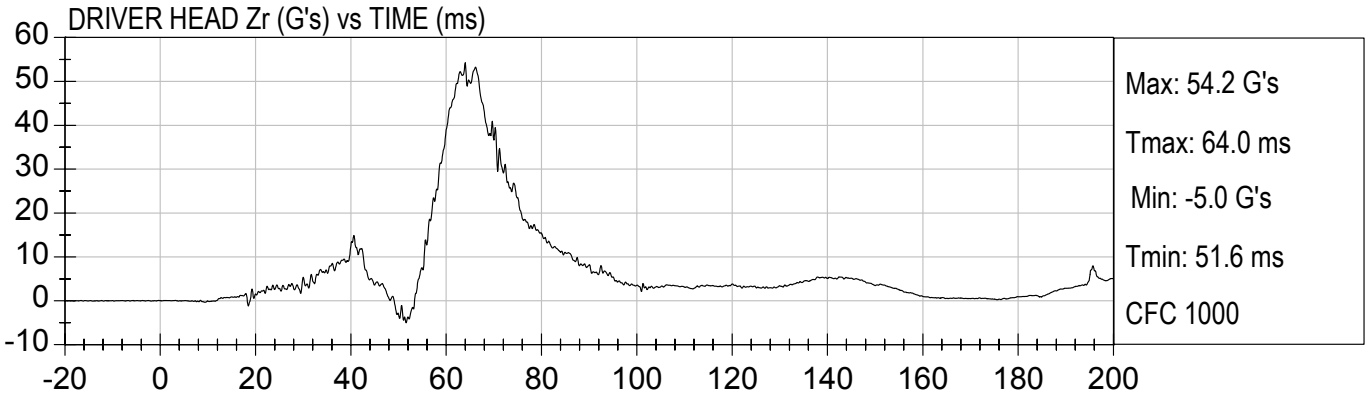


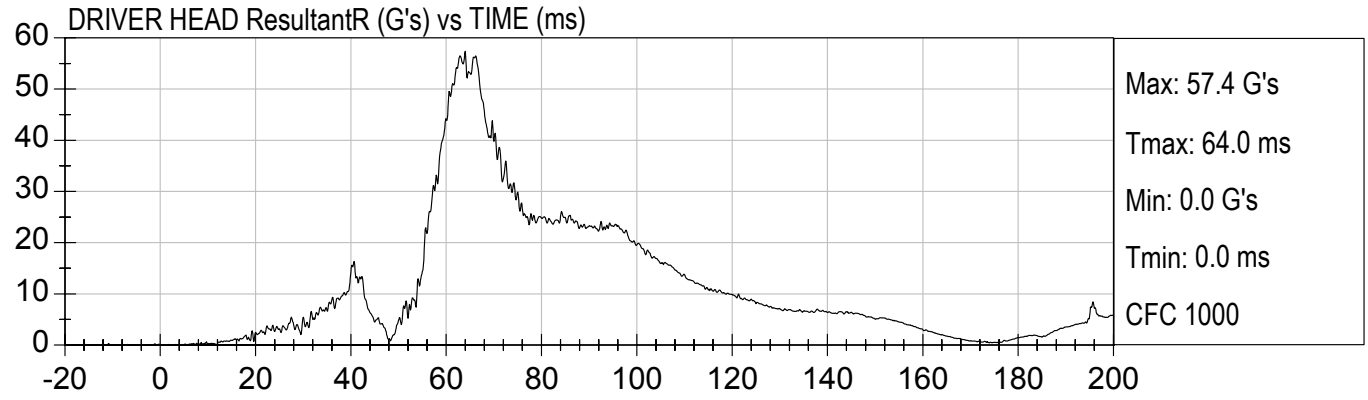
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

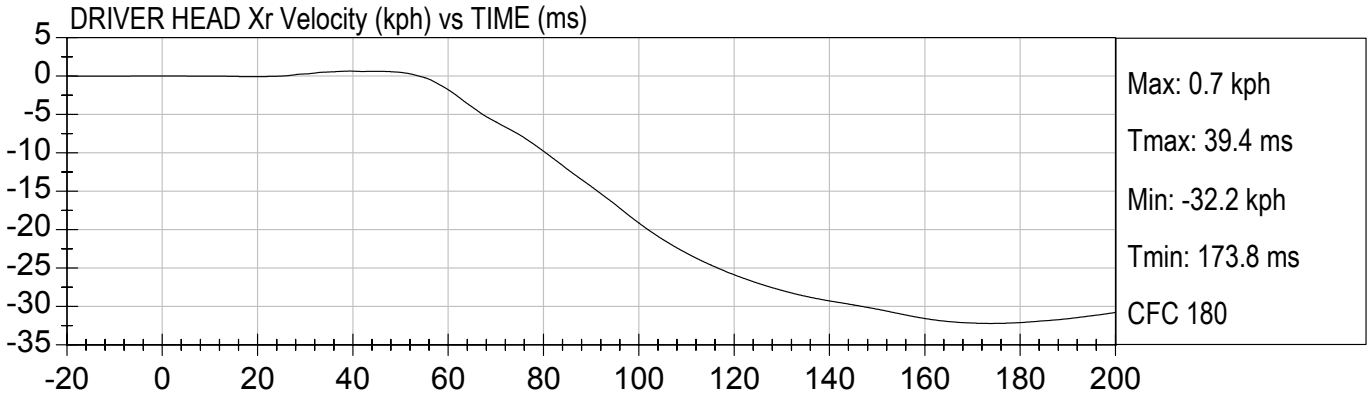
Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

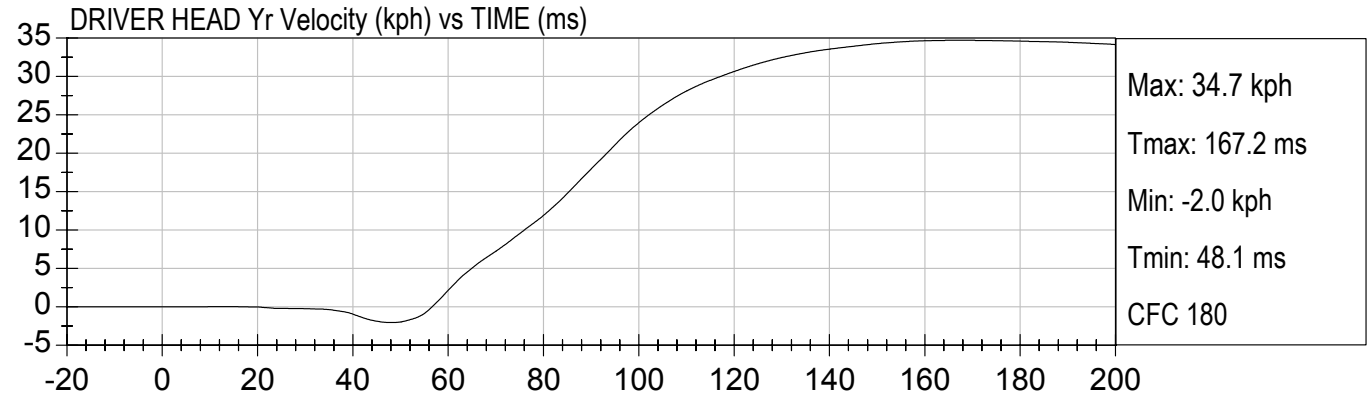


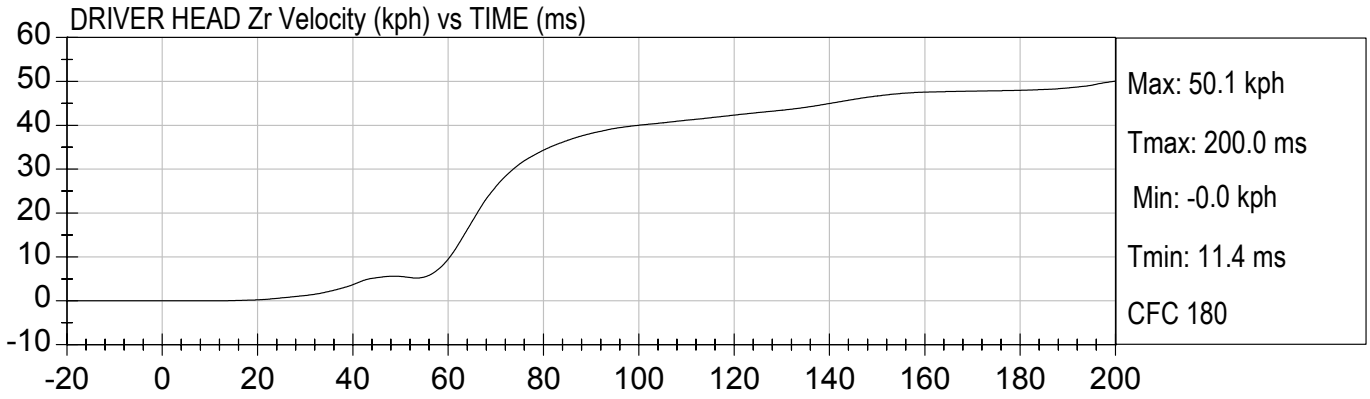






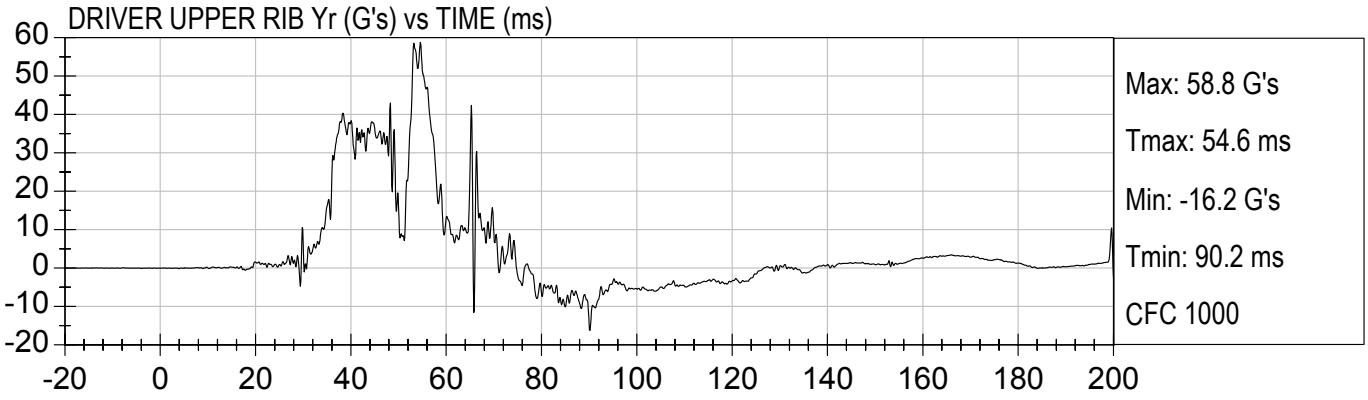

DRIVER HEAD Xr Velocity (kph) vs TIME (ms)
5
0
-5
-10
-15
-20
-25
-30
-35
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.7 kph
Tmax: 39.4 ms
Min: -32.2 kph
Tmin: 173.8 ms
CFC 180

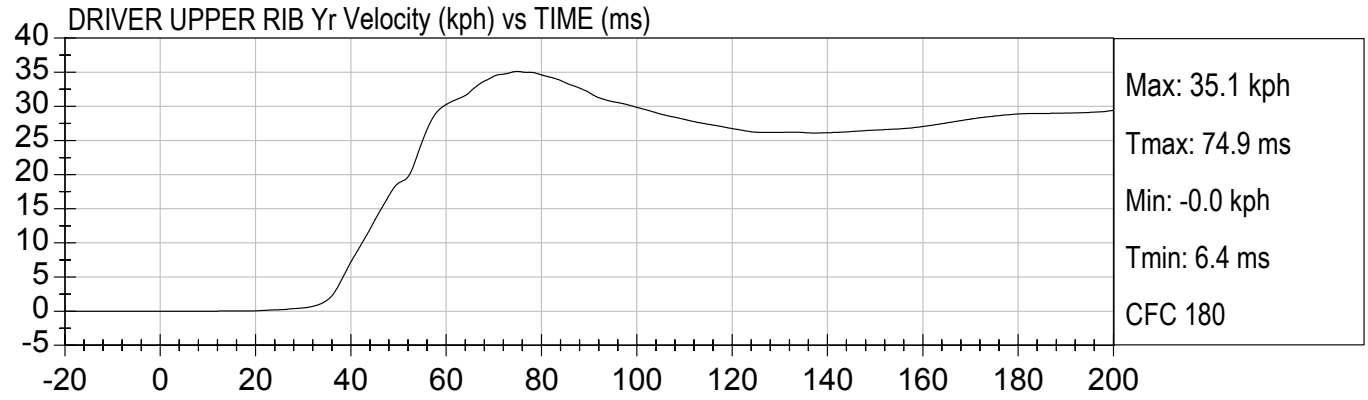

DRIVER HEAD Yr Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 34.7 kph
Tmax: 167.2 ms
Min: -2.0 kph
Tmin: 48.1 ms
CFC 180

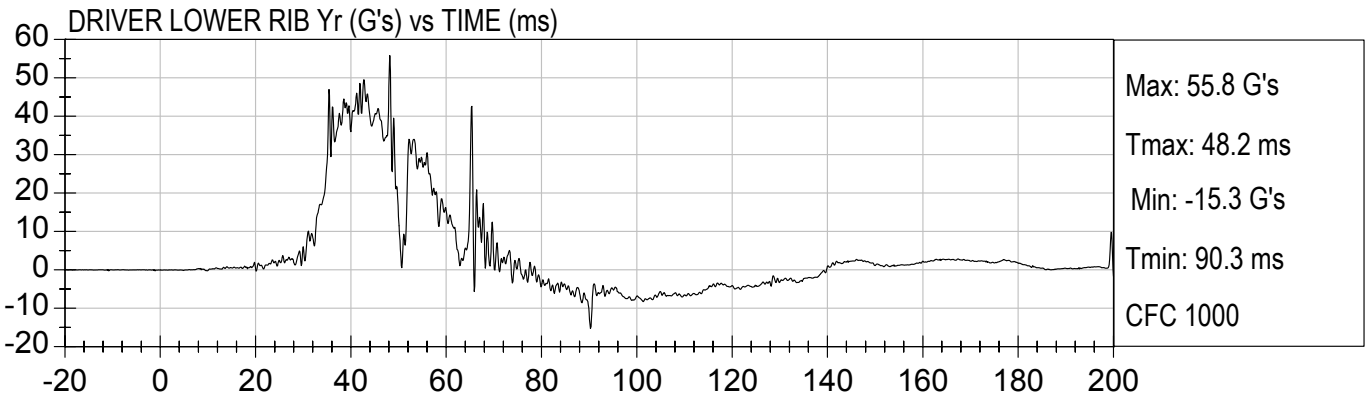

DRIVER HEAD Zr Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 50.1 kph
Tmax: 200.0 ms
Min: -0.0 kph
Tmin: 11.4 ms
CFC 180

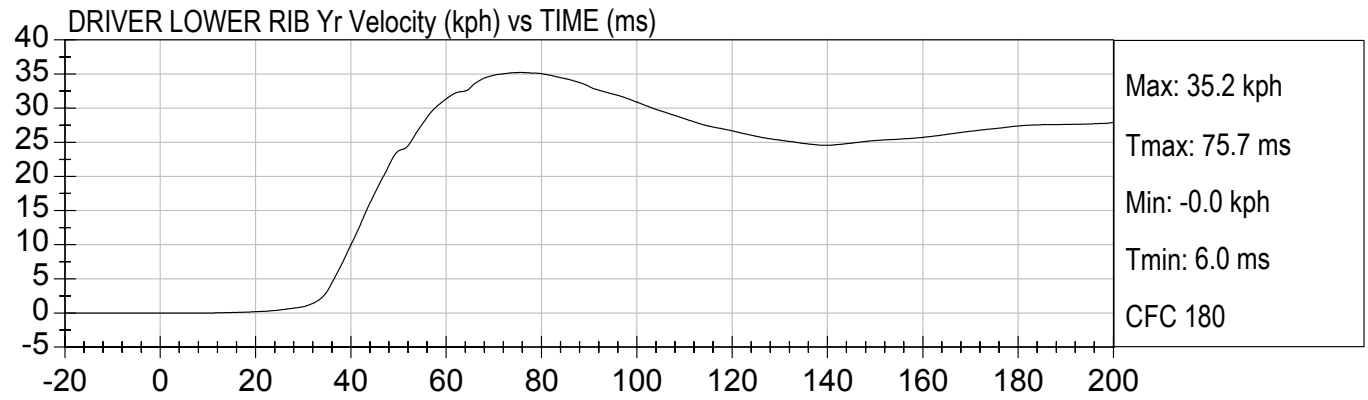
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



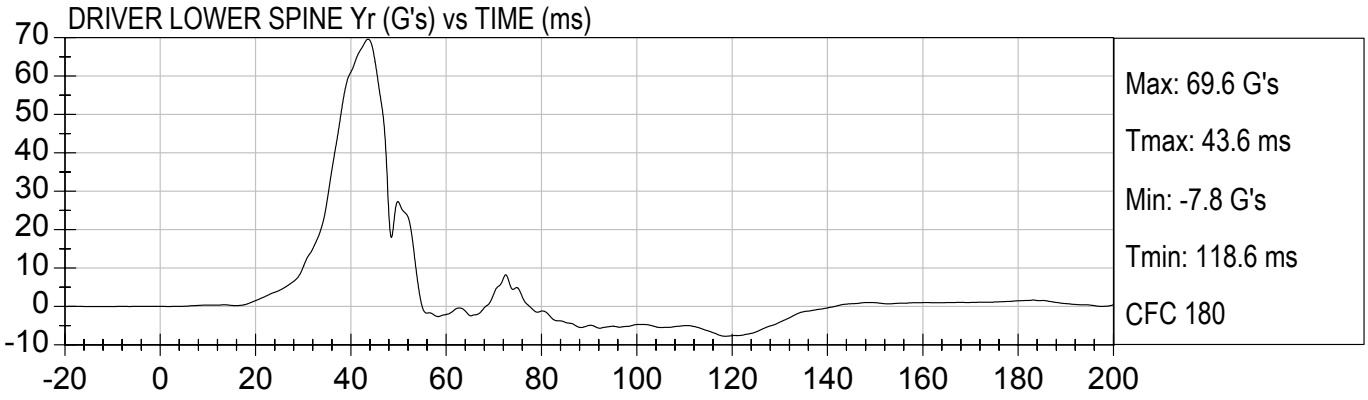


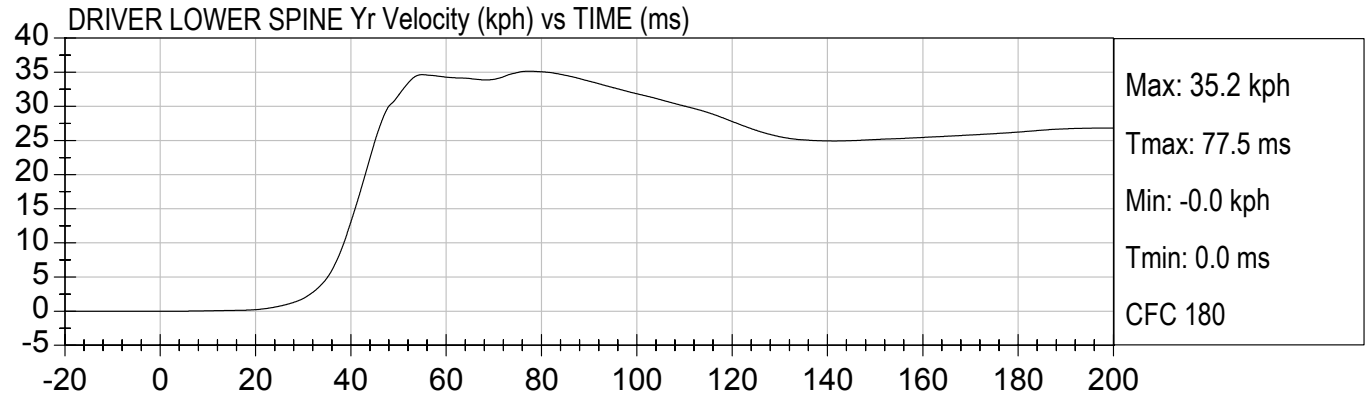


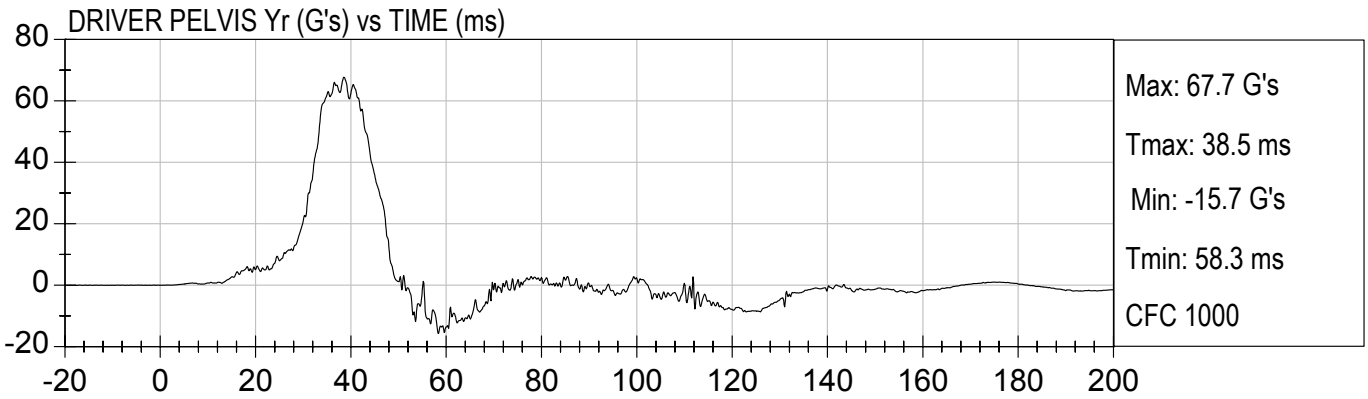


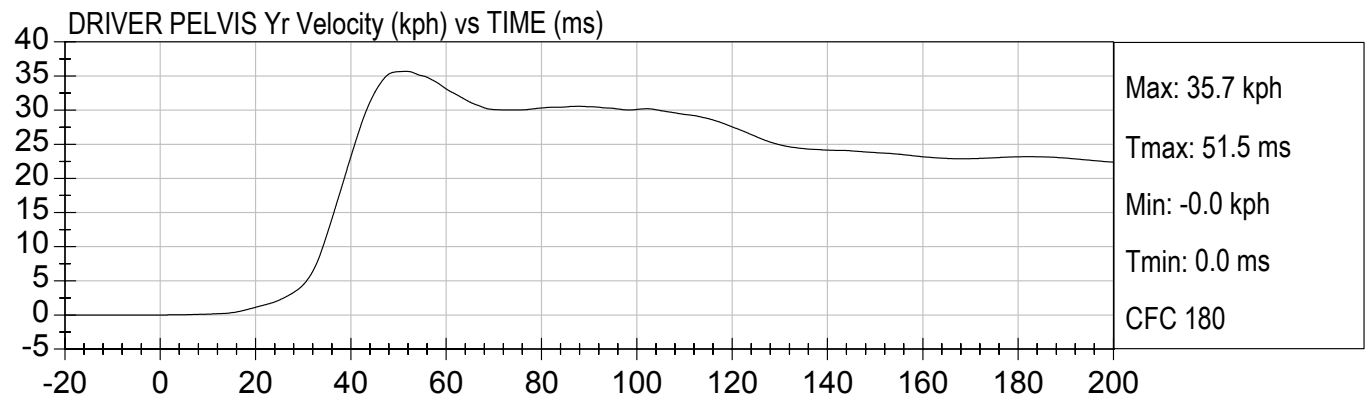
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



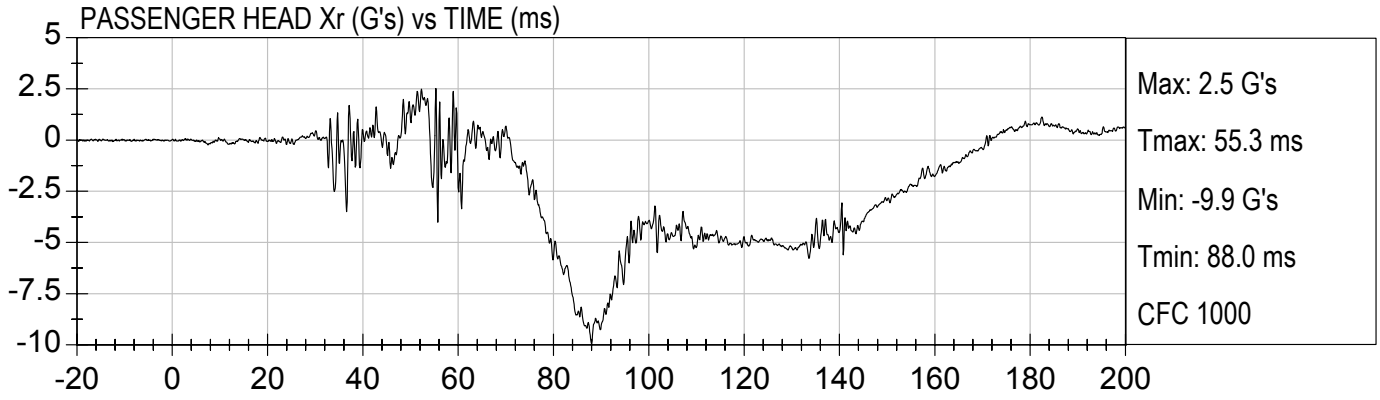


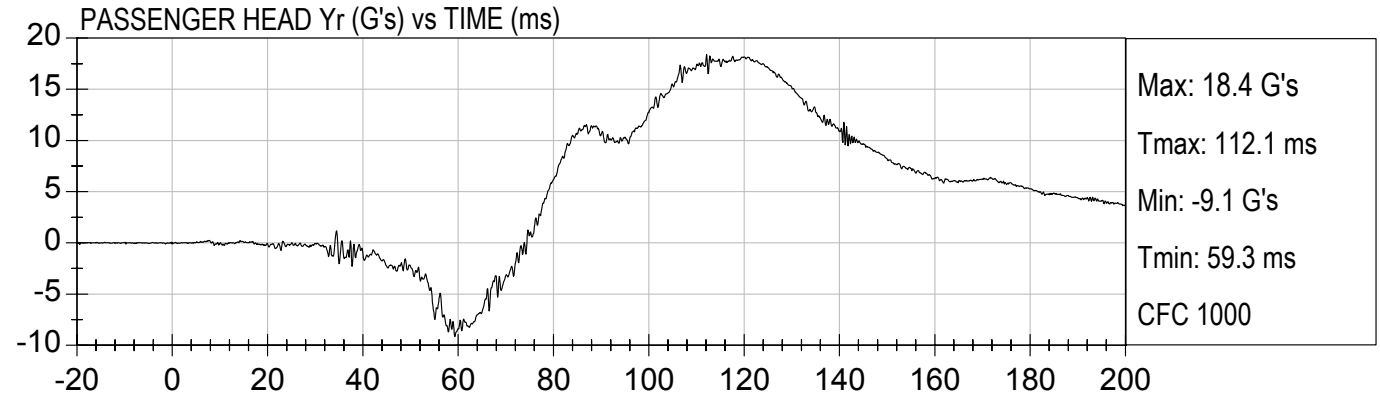


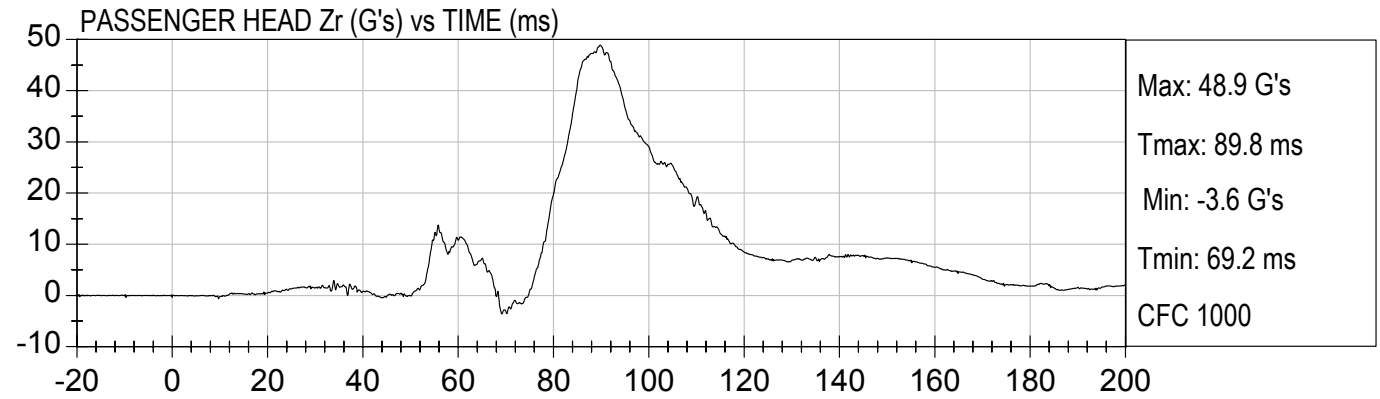


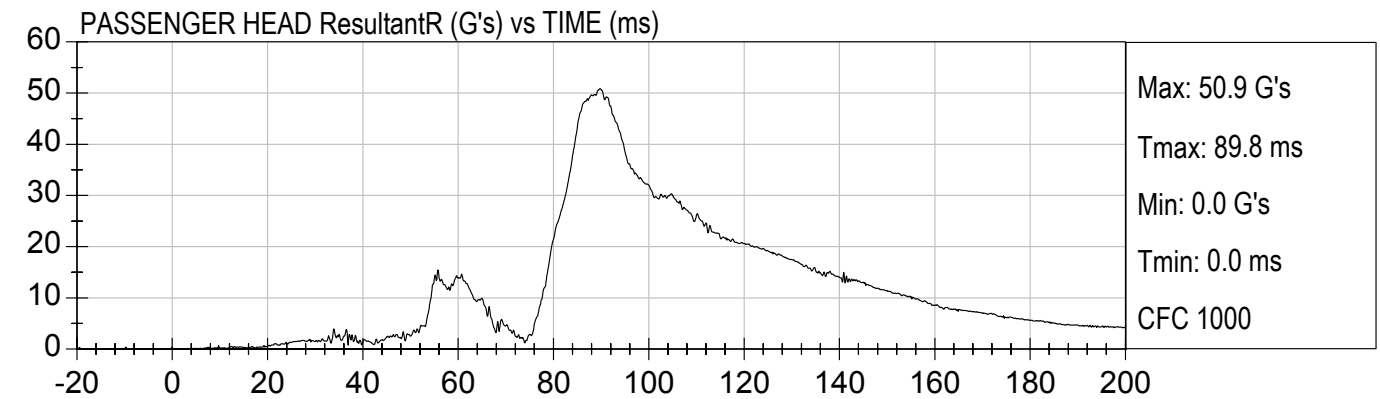
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

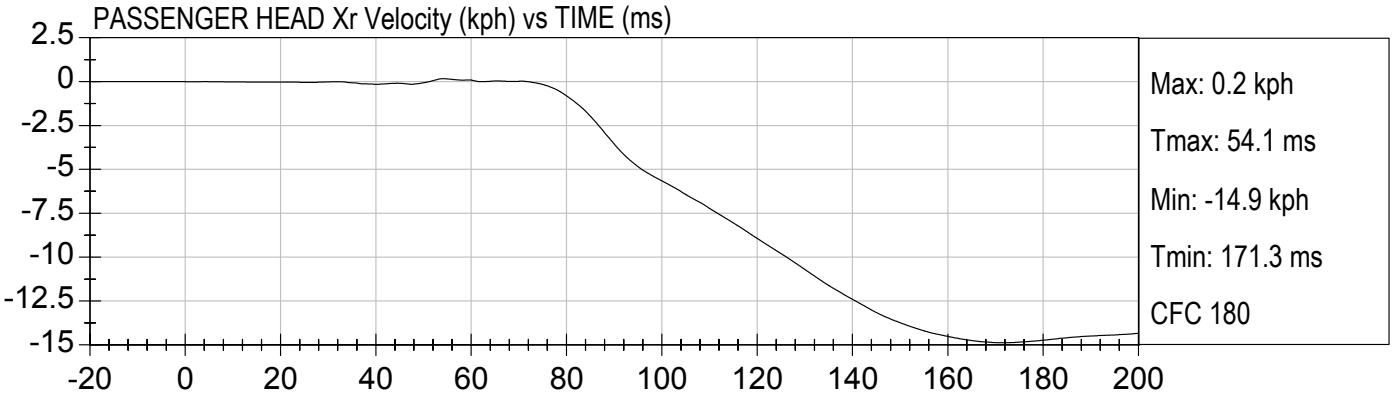
Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

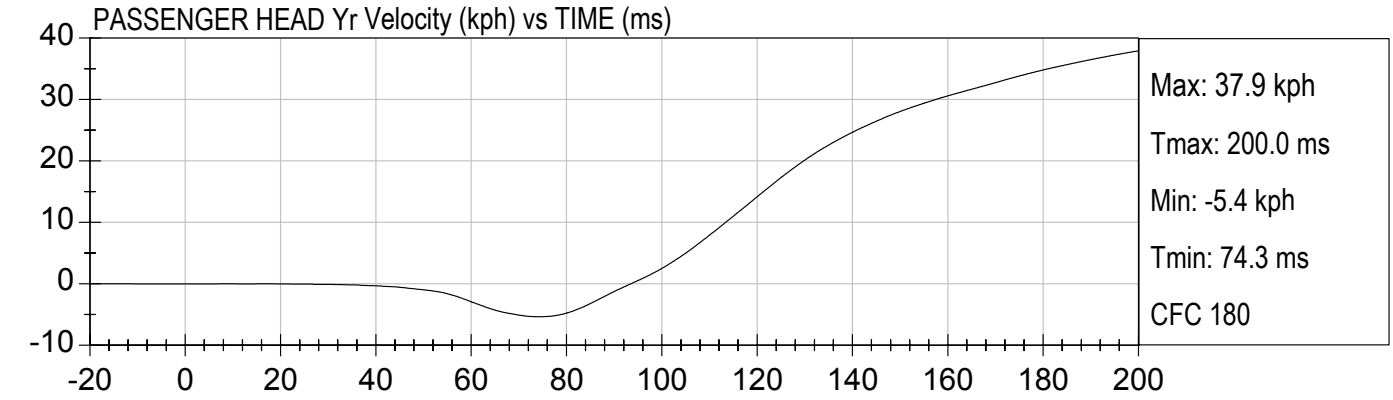


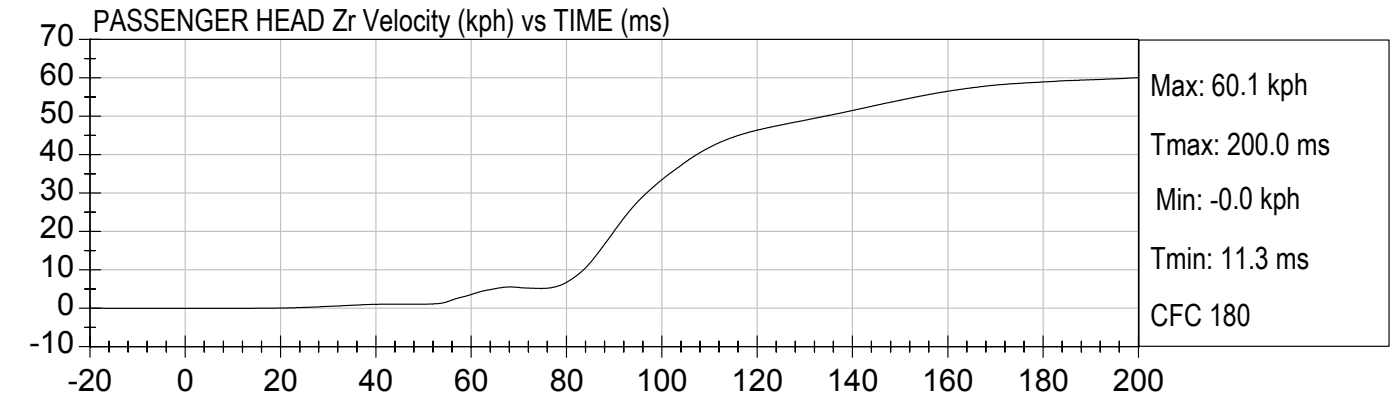






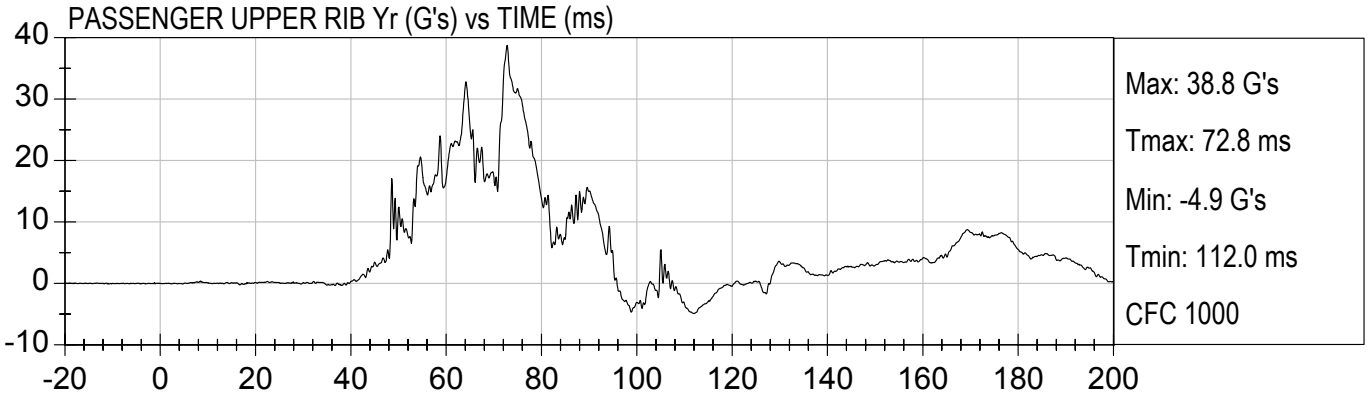

PASSENGER HEAD Xr Velocity (kph) vs TIME (ms)
2.5
0
-2.5
-5
-7.5
-10
-12.5
-15
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 0.2 kph
Tmax: 54.1 ms
Min: -14.9 kph
Tmin: 171.3 ms
CFC 180

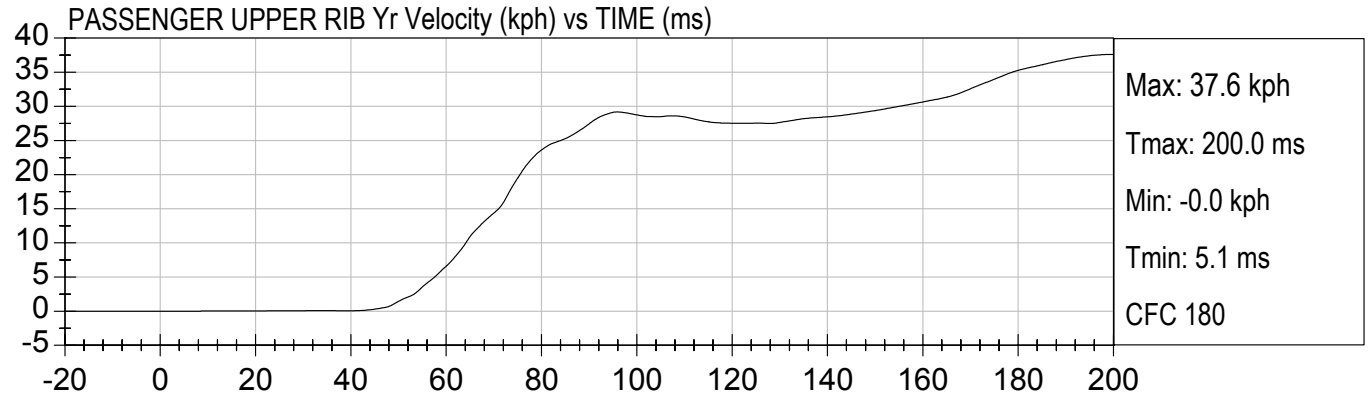

PASSENGER HEAD Yr Velocity (kph) vs TIME (ms)
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 37.9 kph
Tmax: 200.0 ms
Min: -5.4 kph
Tmin: 74.3 ms
CFC 180

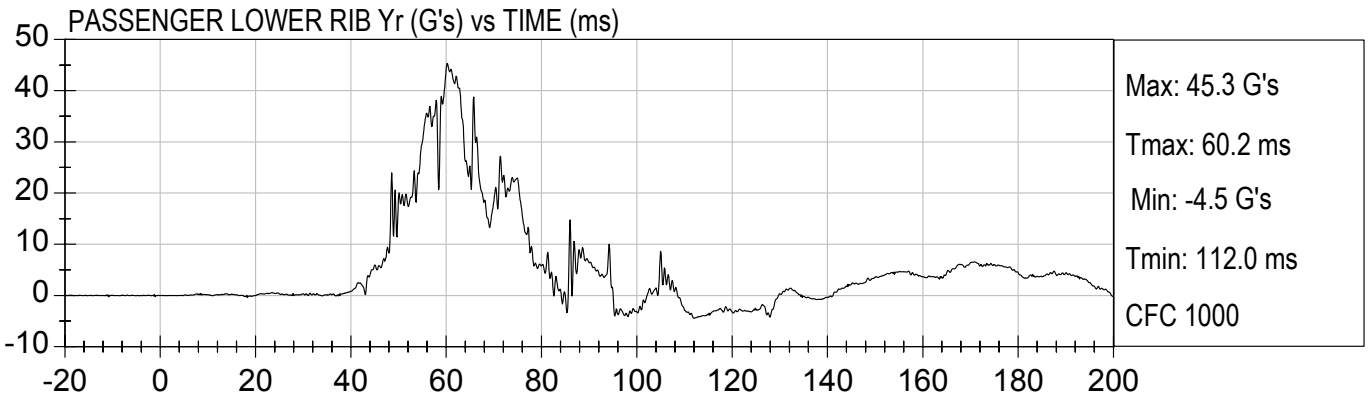

PASSENGER HEAD Zr Velocity (kph) vs TIME (ms)
70
60
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 60.1 kph
Tmax: 200.0 ms
Min: -0.0 kph
Tmin: 11.3 ms
CFC 180

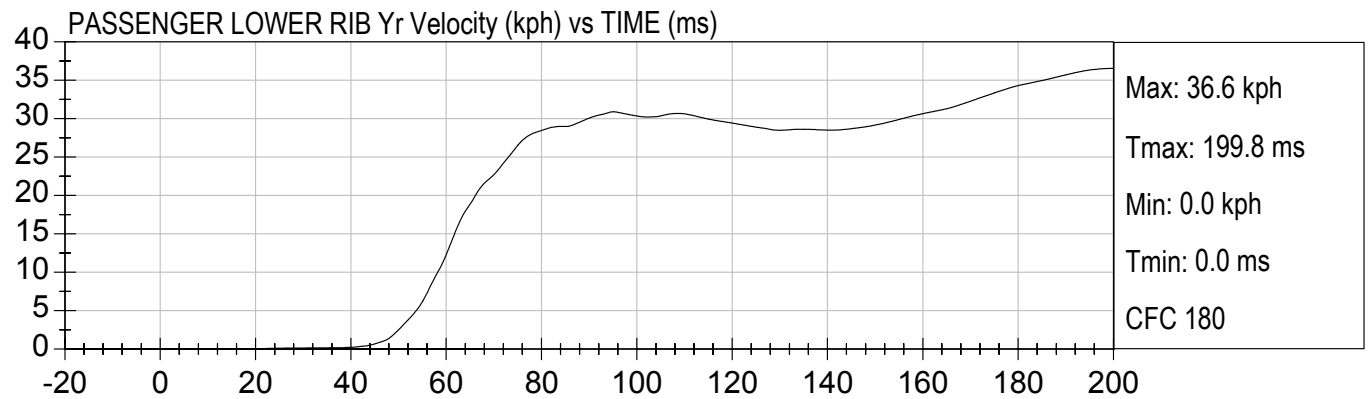
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



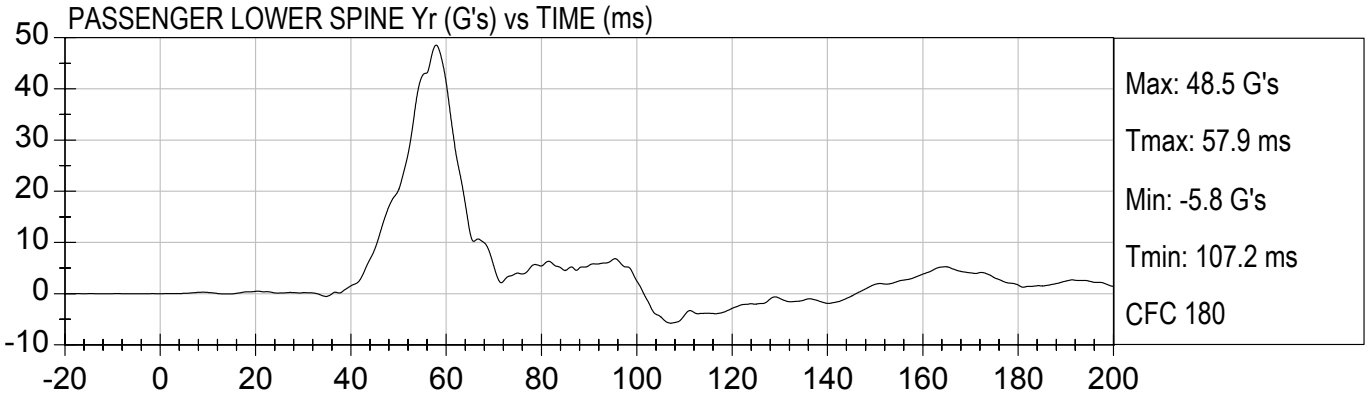


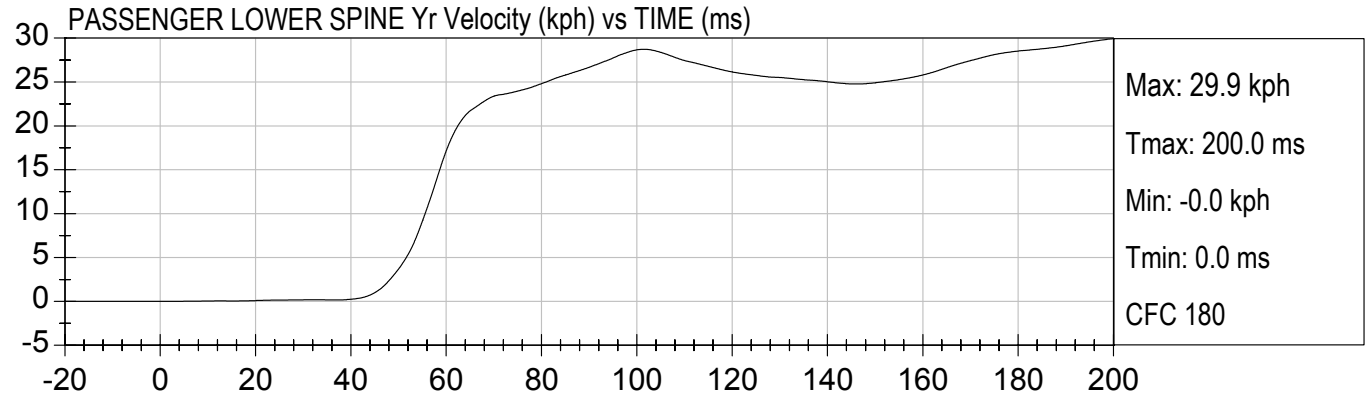


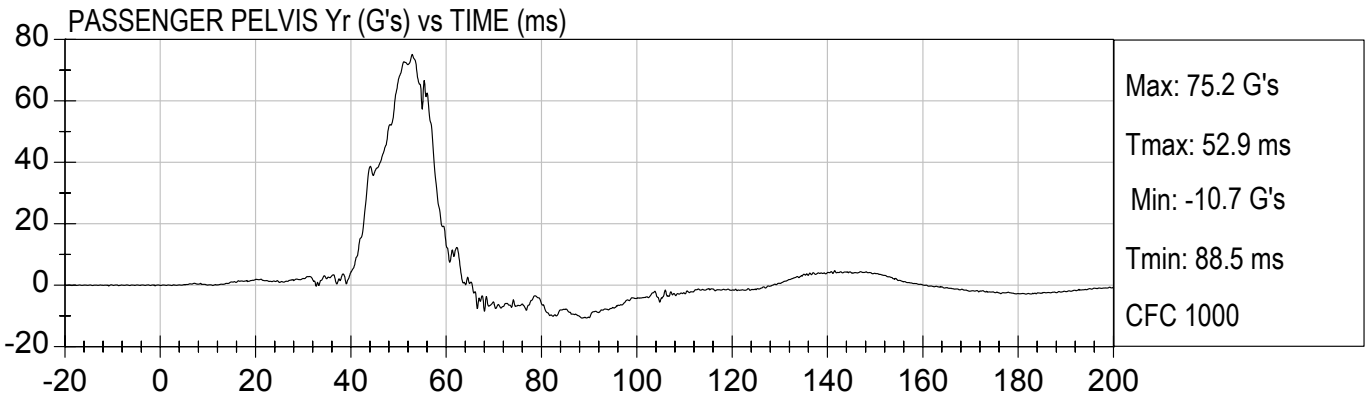


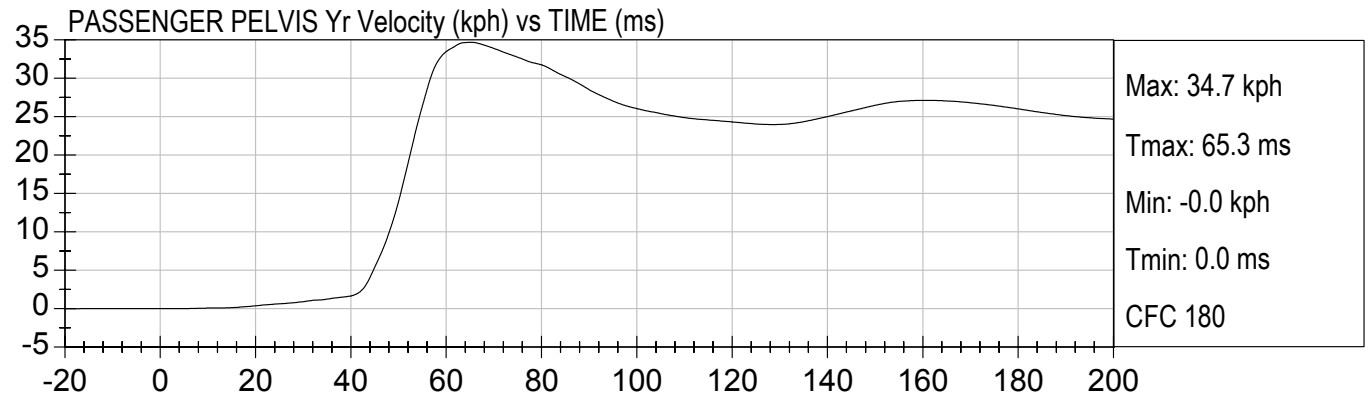
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



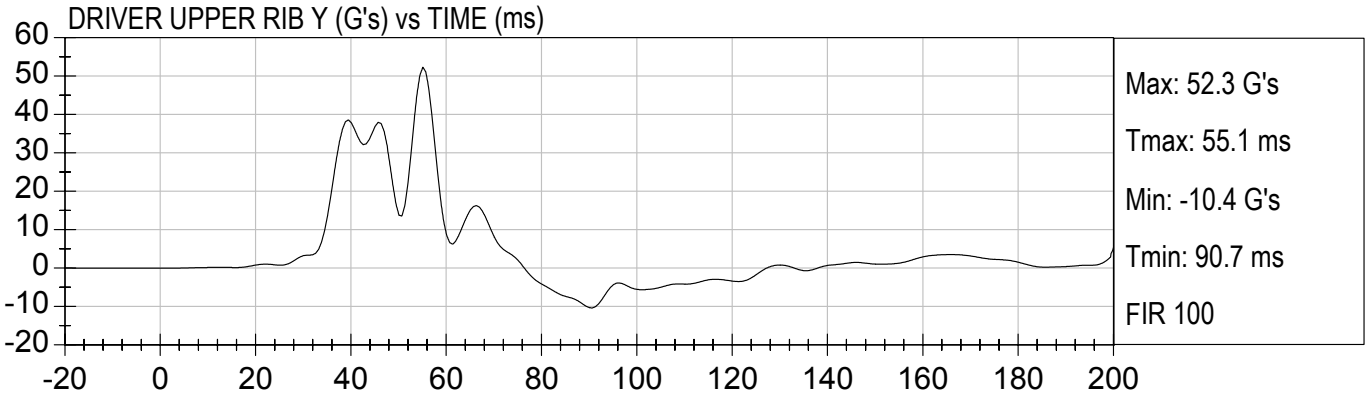


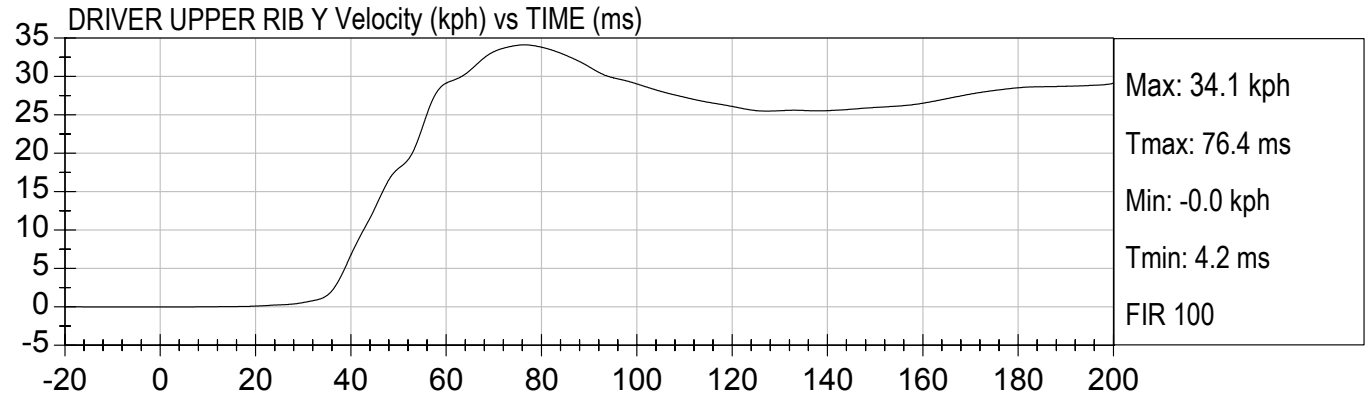


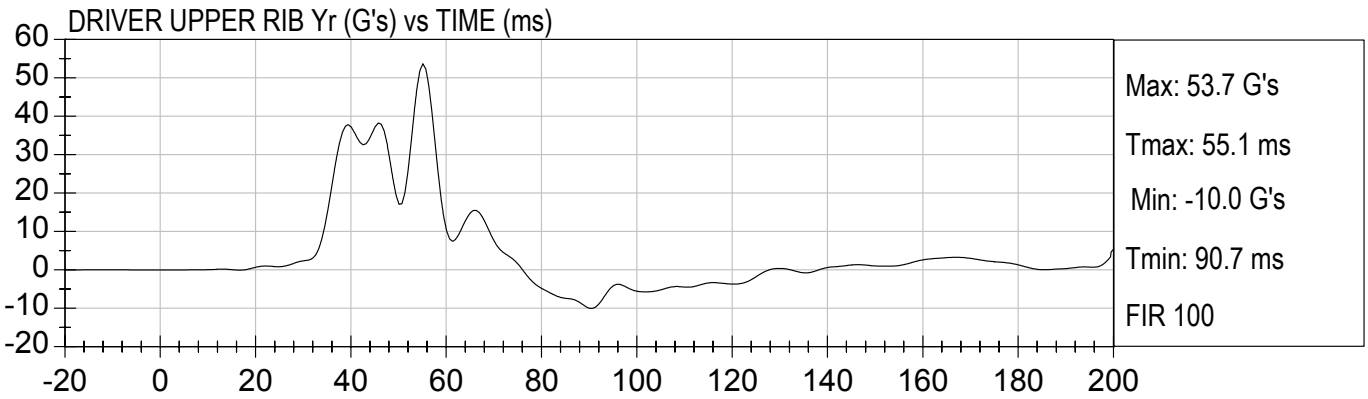


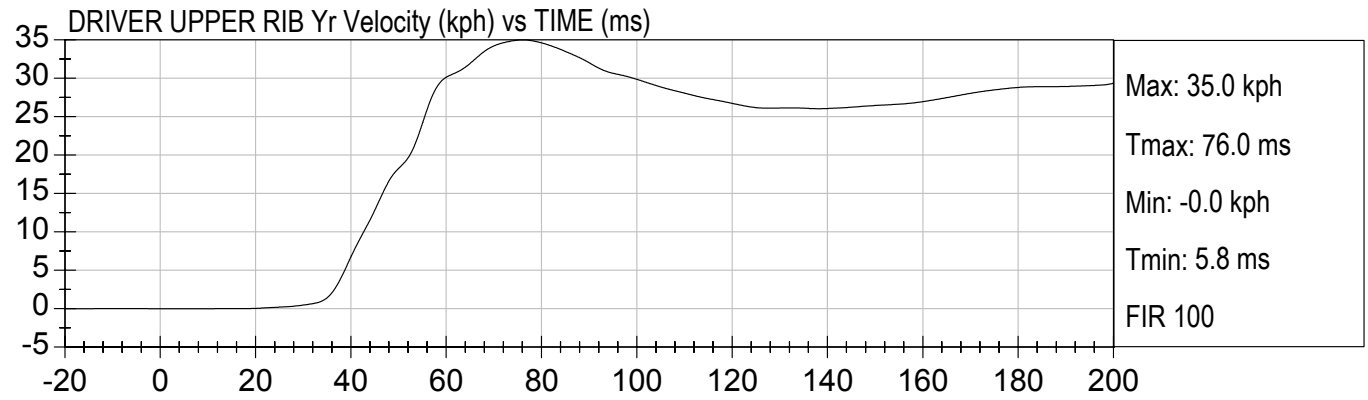
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

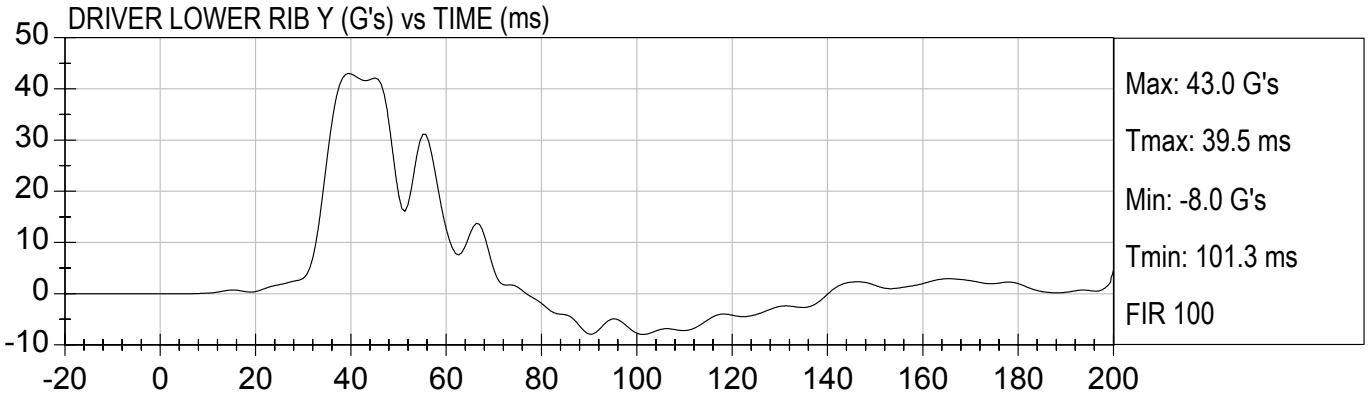
Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

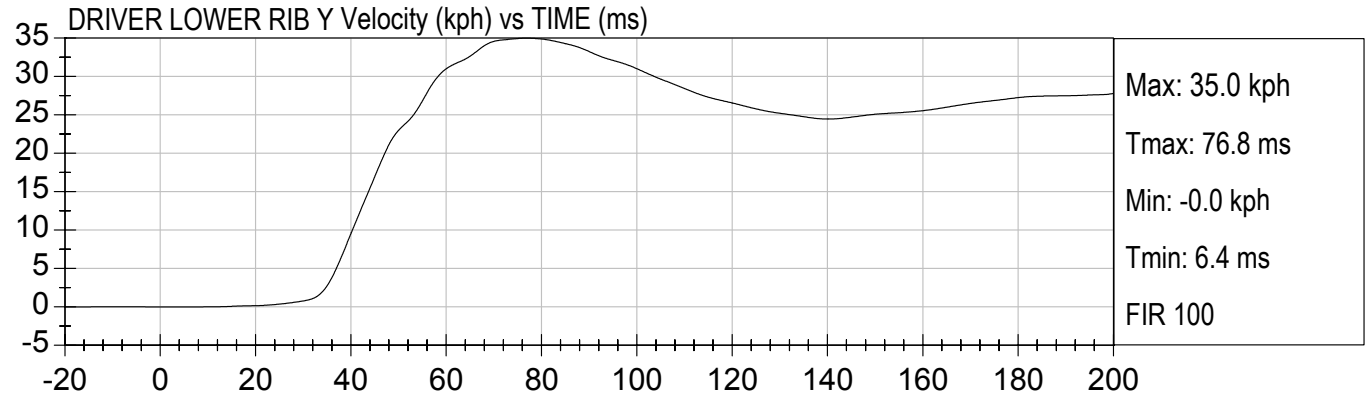


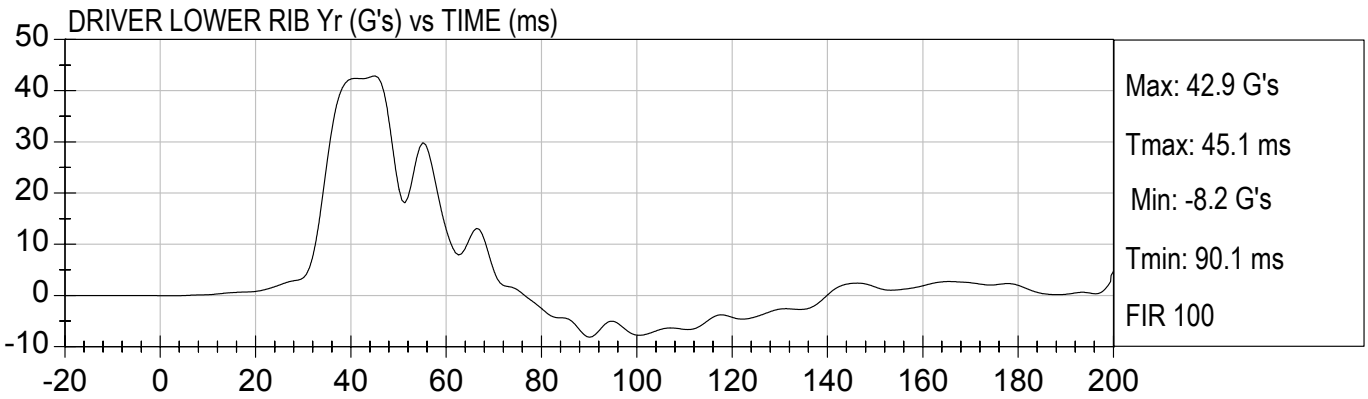


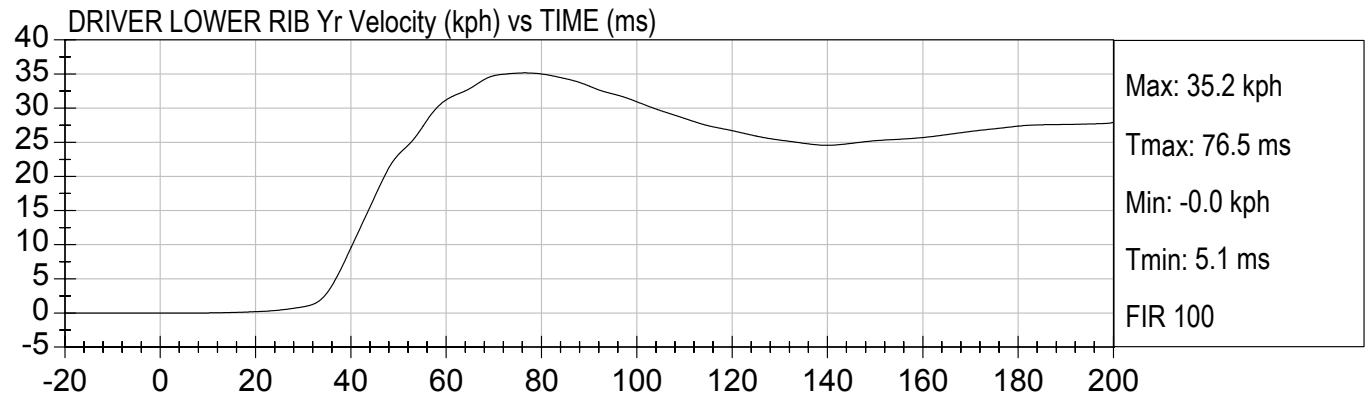





DRIVER LOWER RIB Y (G's) vs TIME (ms)
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 43.0 G's
Tmax: 39.5 ms
Min: -8.0 G's
Tmin: 101.3 ms
FIR 100

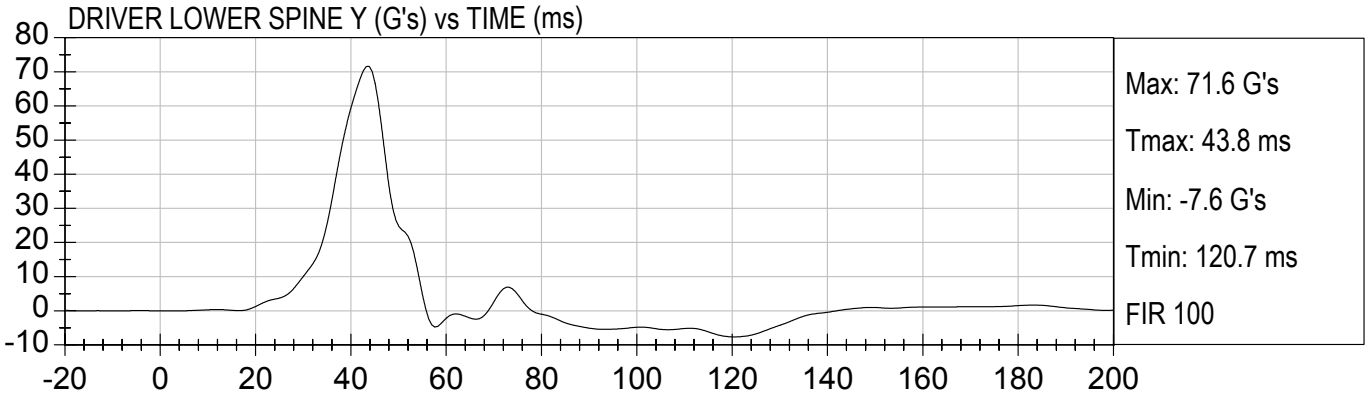

DRIVER LOWER RIB Y Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 35.0 kph
Tmax: 76.8 ms
Min: -0.0 kph
Tmin: 6.4 ms
FIR 100

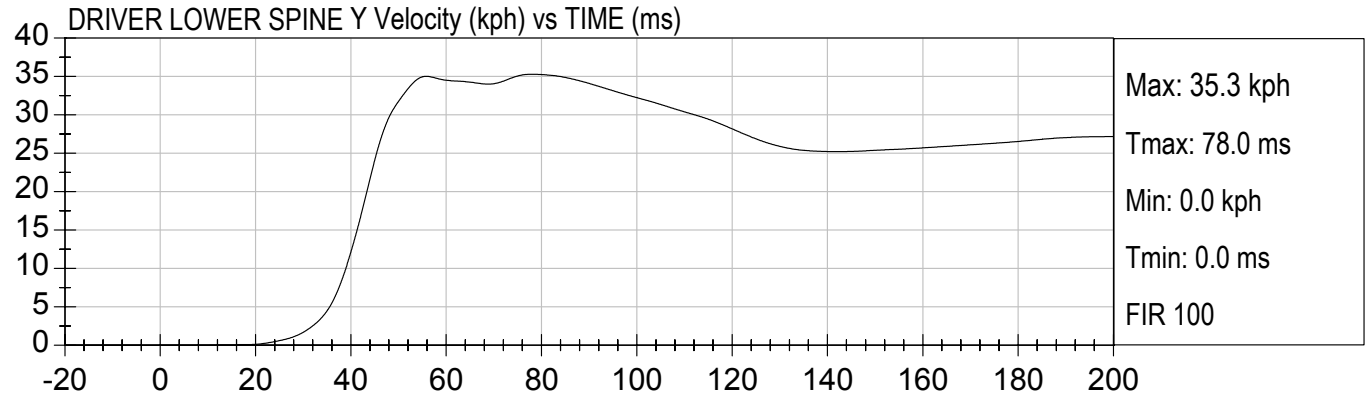

DRIVER LOWER RIB Yr (G's) vs TIME (ms)
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 42.9 G's
Tmax: 45.1 ms
Min: -8.2 G's
Tmin: 90.1 ms
FIR 100

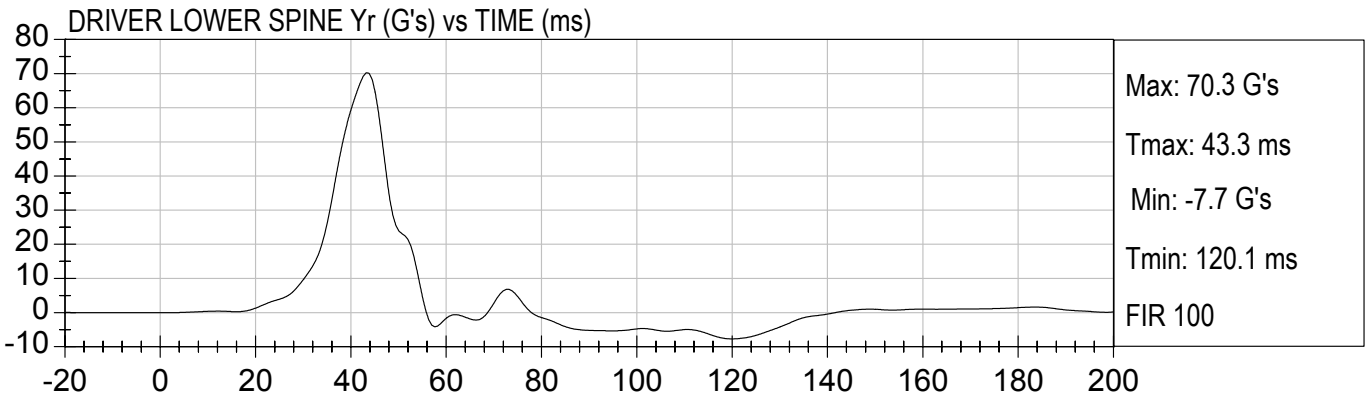

DRIVER LOWER RIB Yr Velocity (kph) vs TIME (ms)
40
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 35.2 kph
Tmax: 76.5 ms
Min: -0.0 kph
Tmin: 5.1 ms
FIR 100

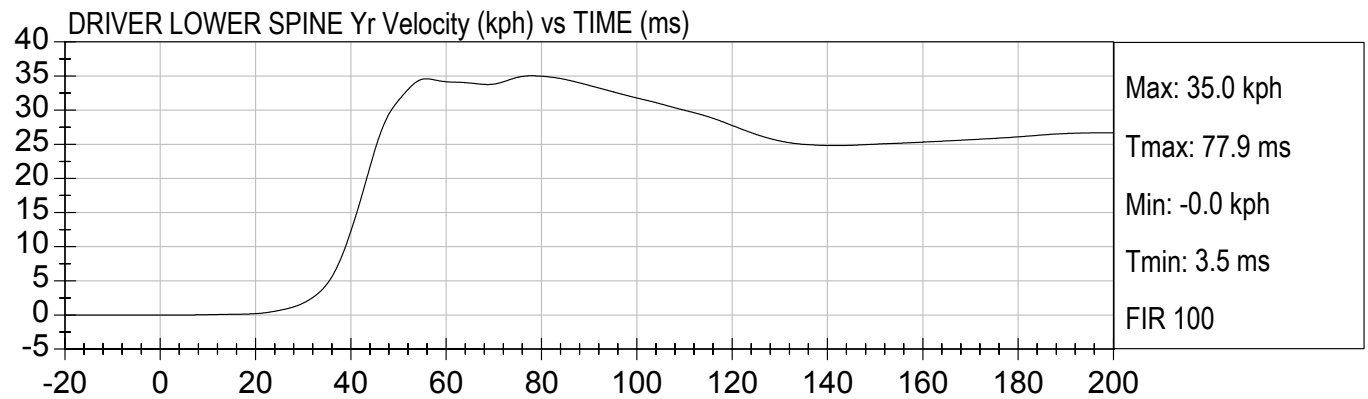
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

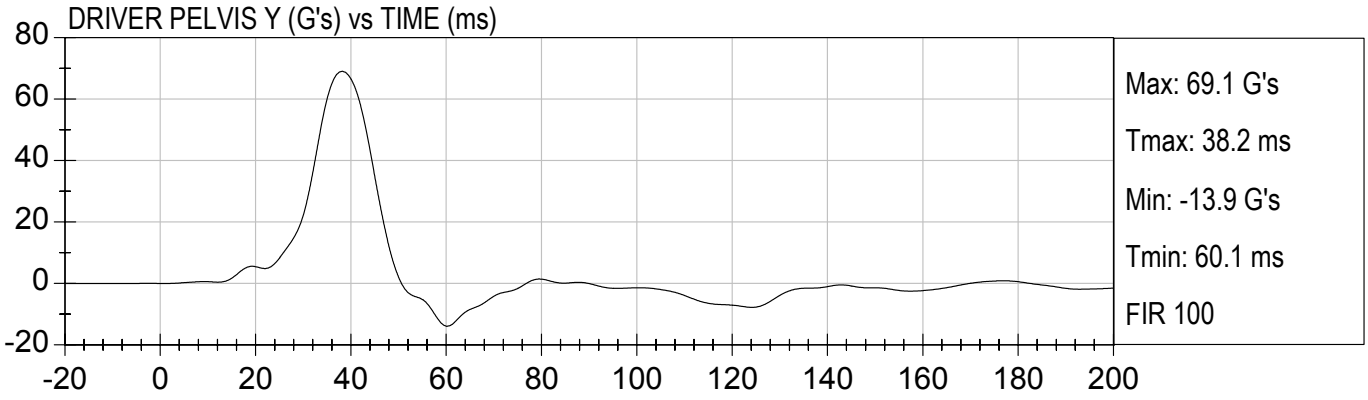
Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)

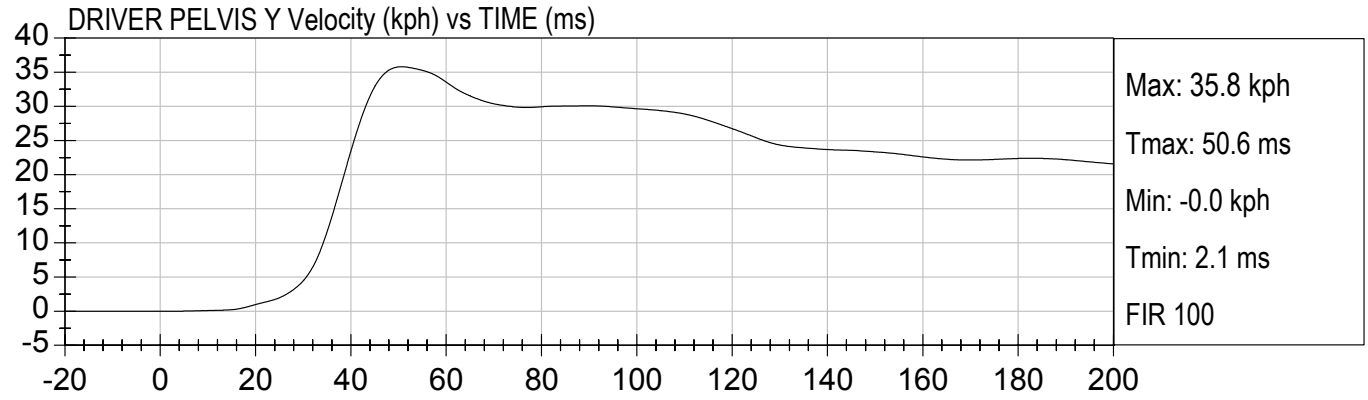


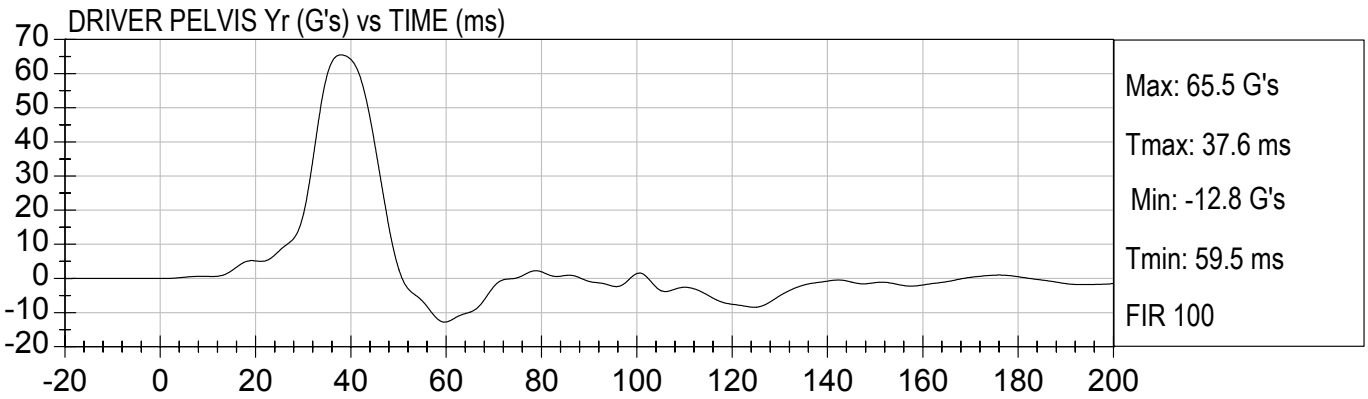


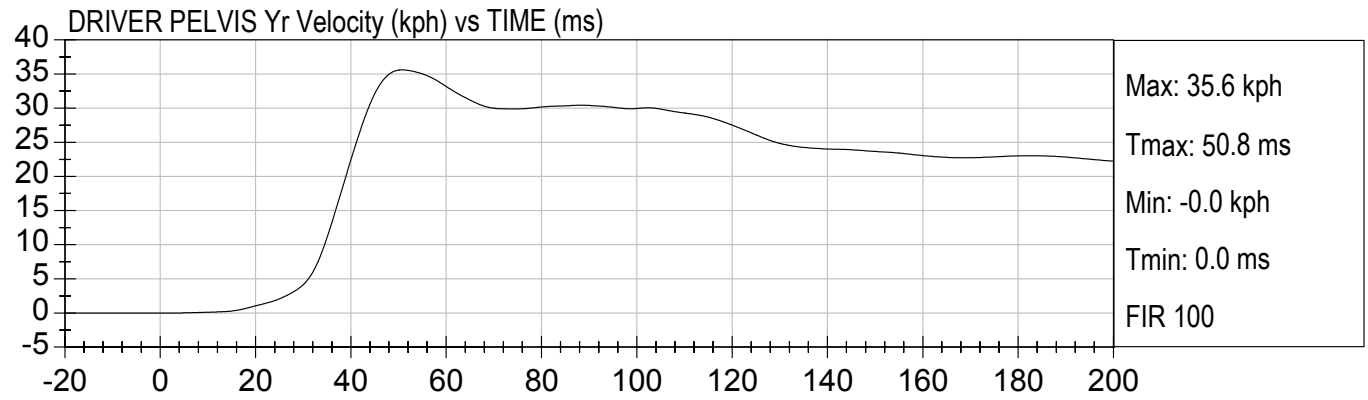





DRIVER PELVIS Y (G's) vs TIME (ms)
80
60
40
20
0
-20
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 69.1 G's
Tmax: 38.2 ms
Min: -13.9 G's
Tmin: 60.1 ms
FIR 100

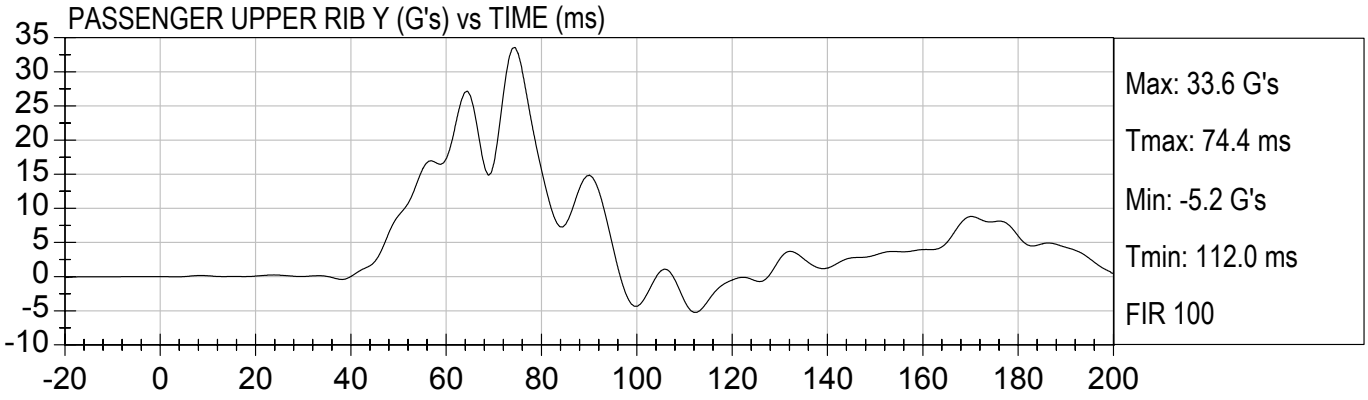

DRIVER PELVIS Y Velocity (kph) vs TIME (ms)
40
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 35.8 kph
Tmax: 50.6 ms
Min: -0.0 kph
Tmin: 2.1 ms
FIR 100

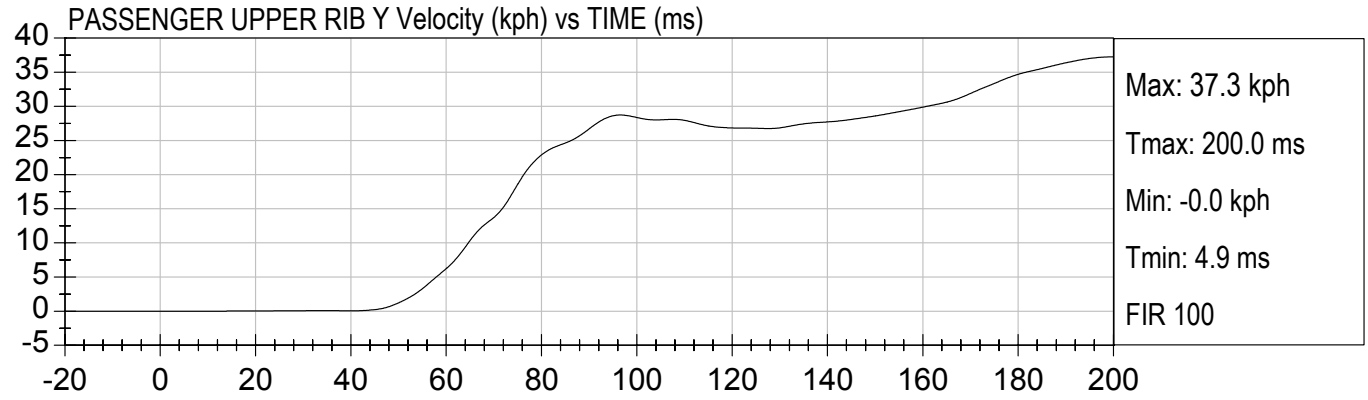

DRIVER PELVIS Yr (G's) vs TIME (ms)
70
60
50
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 65.5 G's
Tmax: 37.6 ms
Min: -12.8 G's
Tmin: 59.5 ms
FIR 100

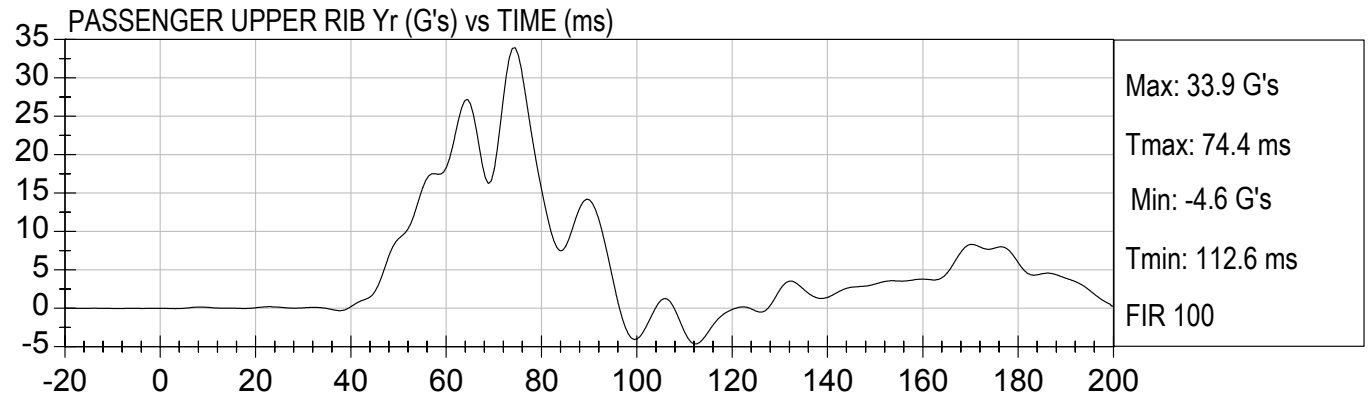

DRIVER PELVIS Yr Velocity (kph) vs TIME (ms)
40
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 35.6 kph
Tmax: 50.8 ms
Min: -0.0 kph
Tmin: 0.0 ms
FIR 100

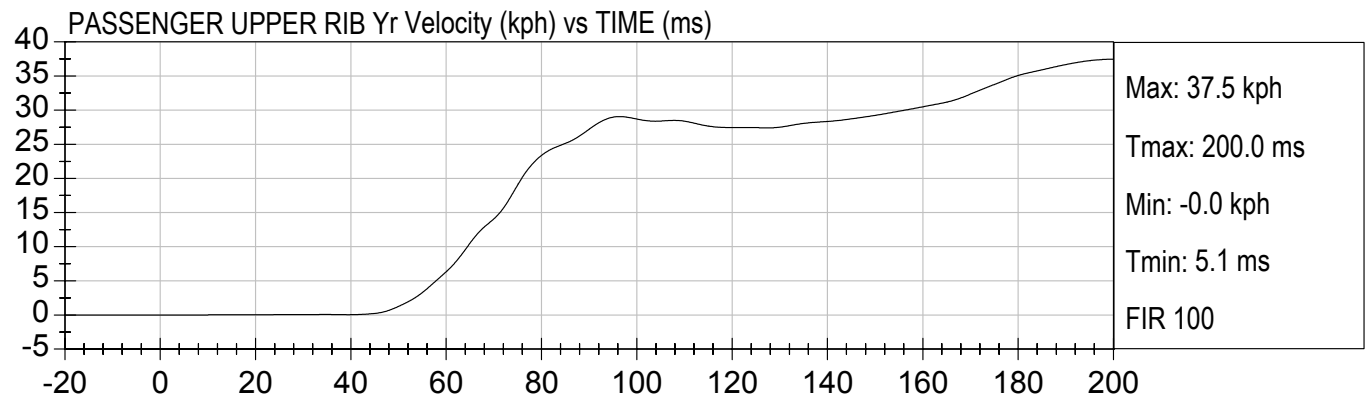
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



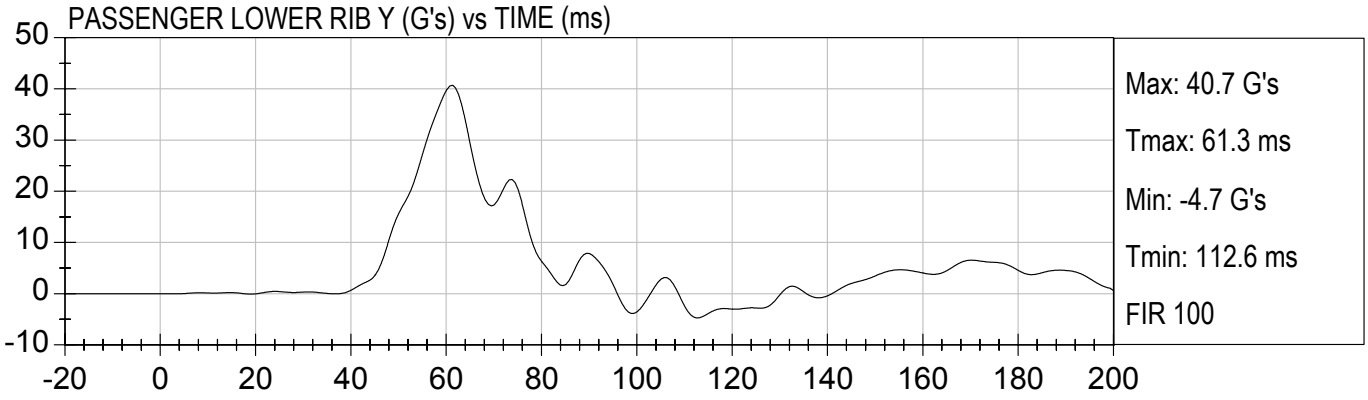


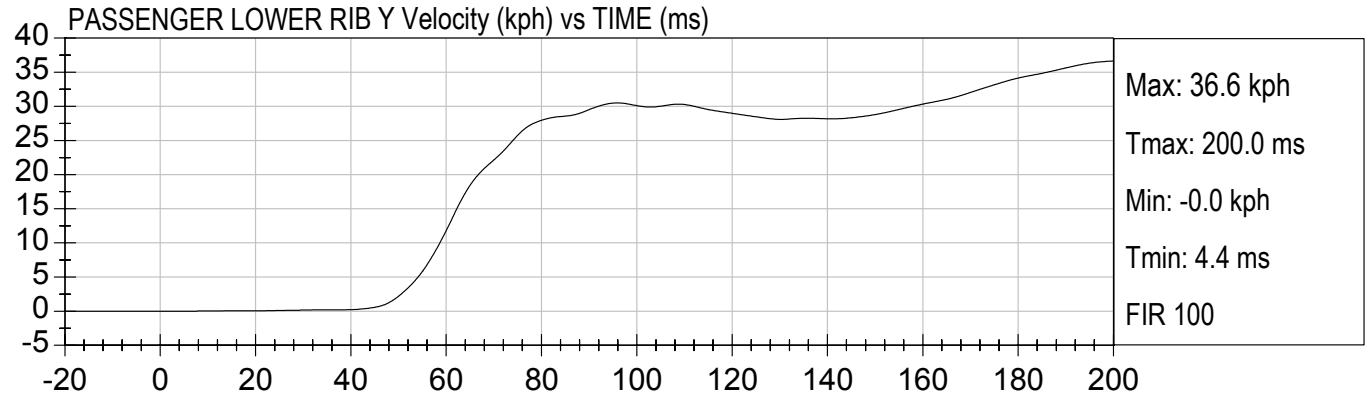


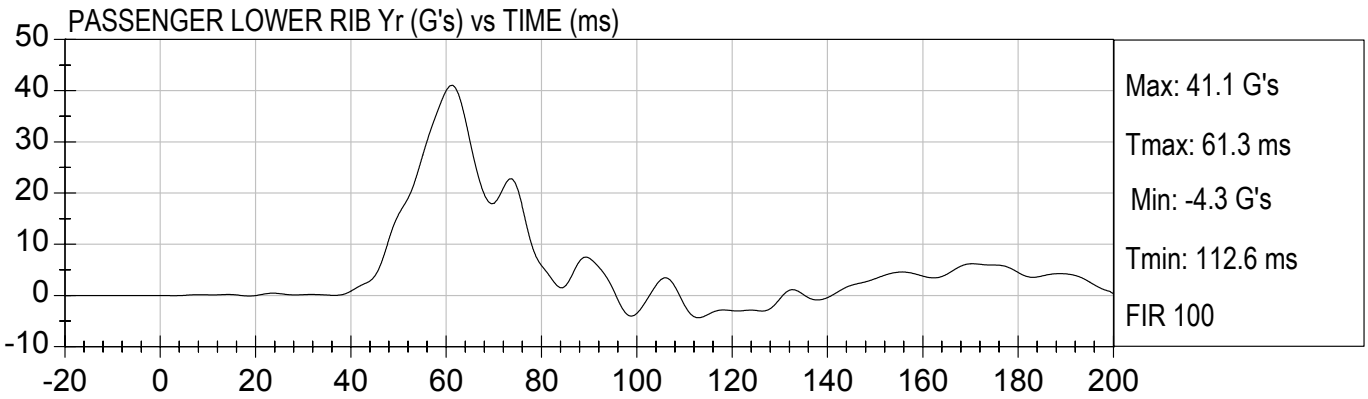


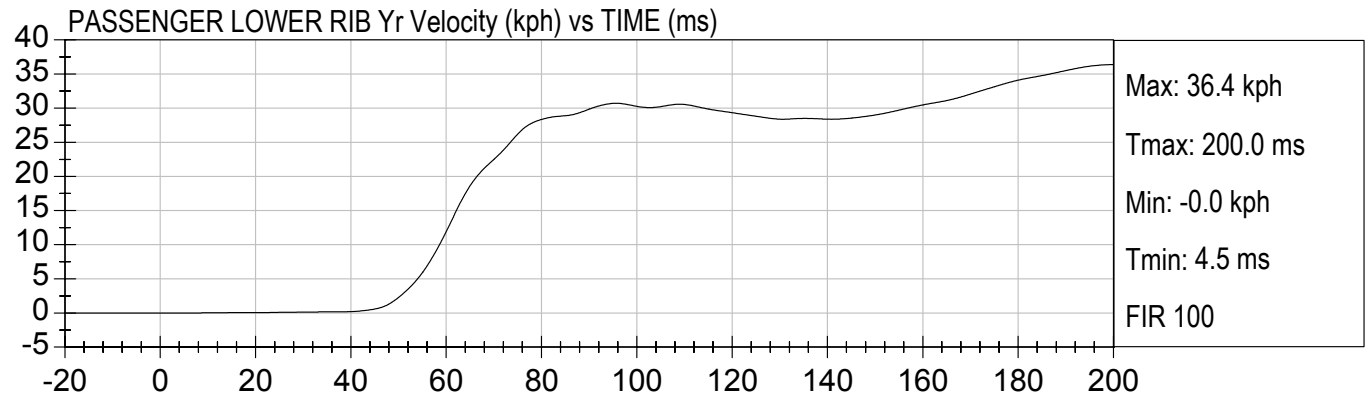
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



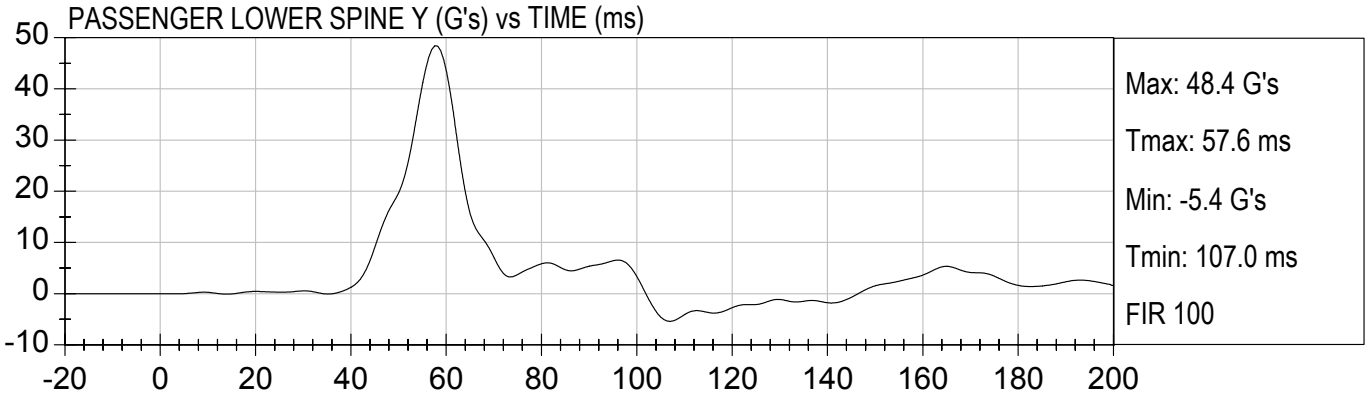


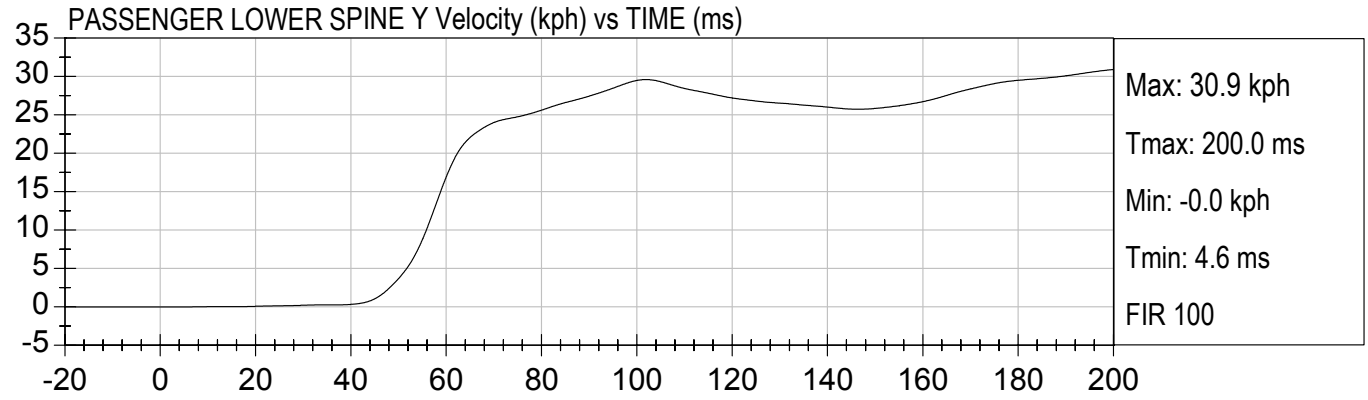


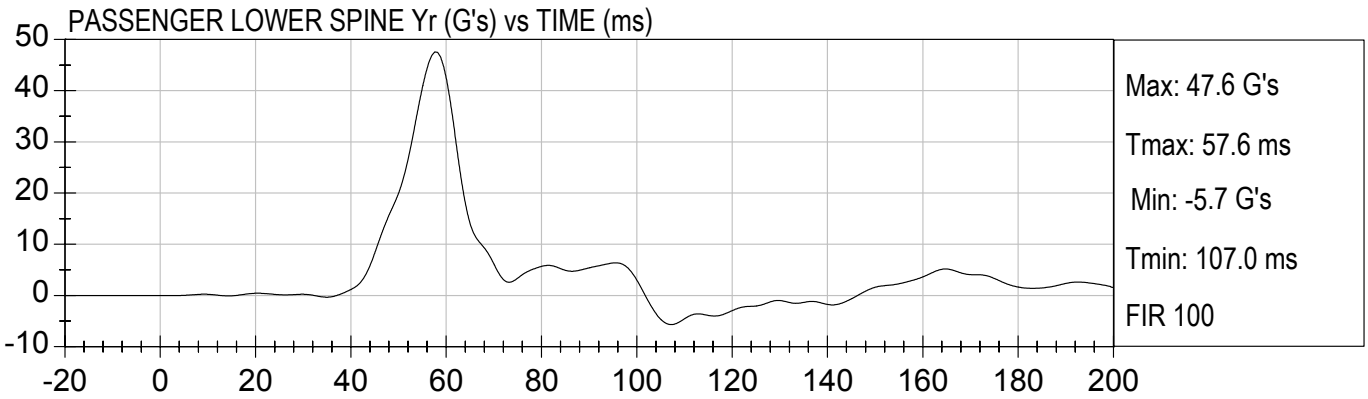


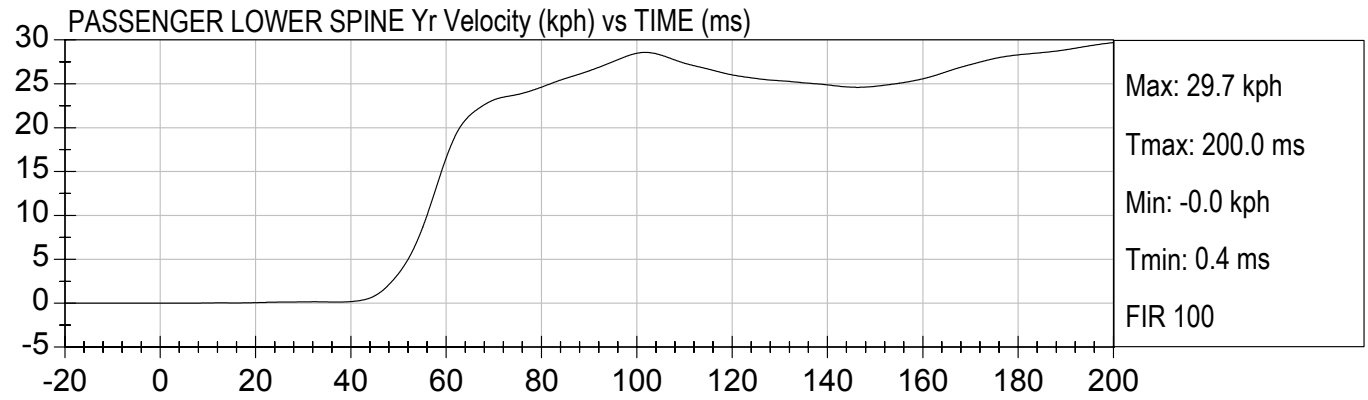
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 km/h)



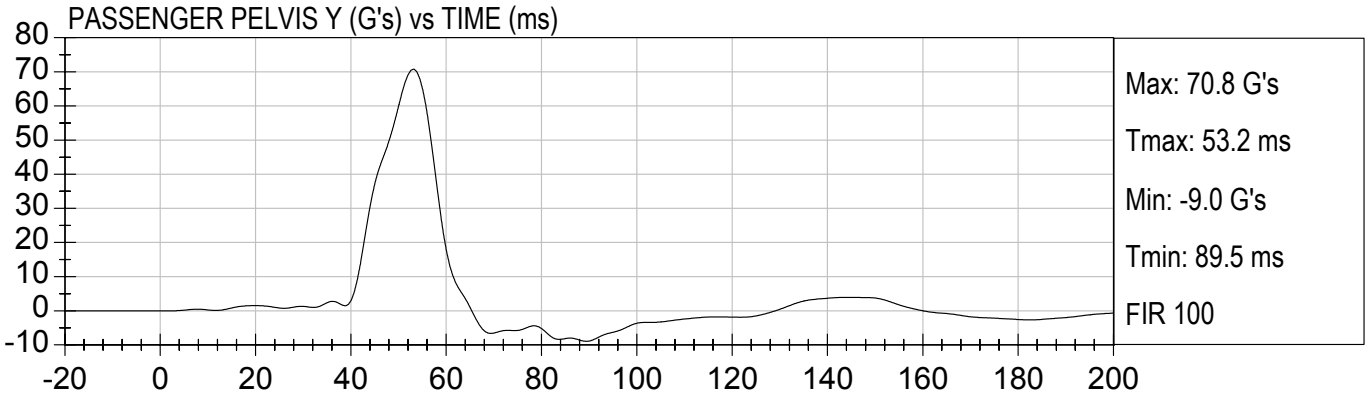


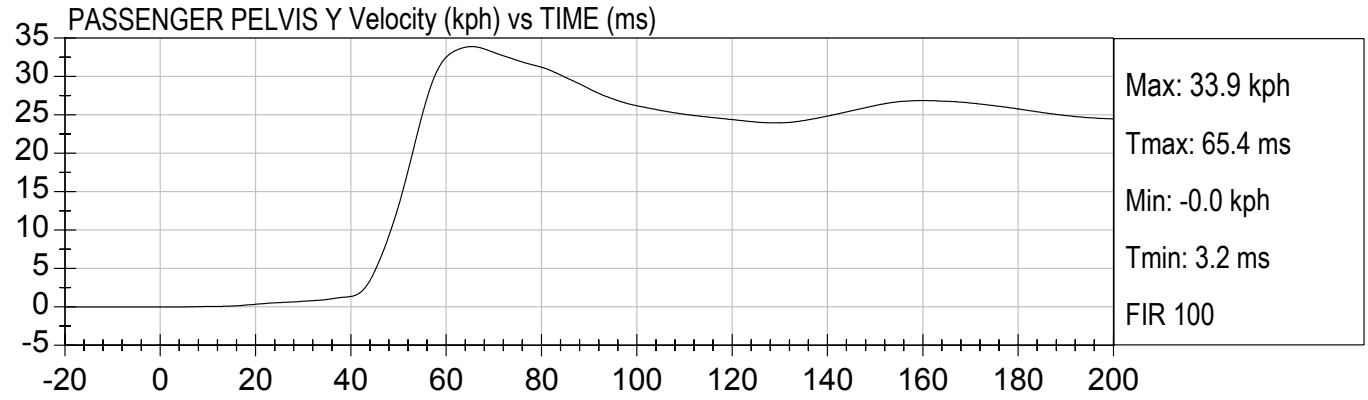


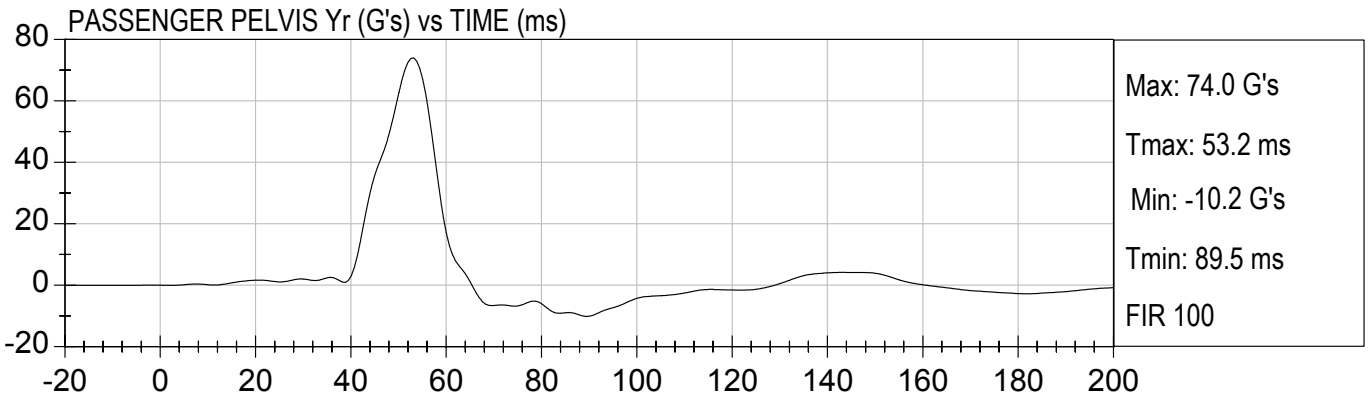


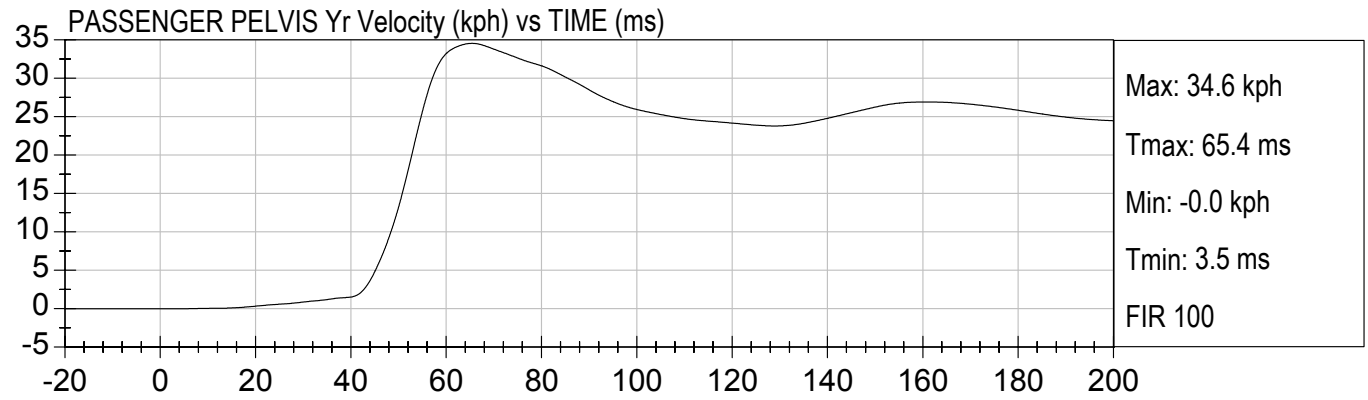
NCAP LEFT SIDE IMPACT
2004 FORD FREESTAR

Test Date: 11/13/03
Speed: 38.6 mph (62.1 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.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.

SID Calibration Data Sheet

Side Impact Dummy

External Measurements

ATD Serial No: 271 **Test I.D:** D03181

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	905	Pass
RH - Rib Height	mm	501 - 521	502	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	239	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	526	Pass
SW - Knee Pivot to Floor	mm	490 - 505	497	Pass
HW - Hip Width	mm	356 - 391	371	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

11/12/2003
Test Date

Shefalika Jgarwal
Approved By

SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 271 **Test I.D:** D031811

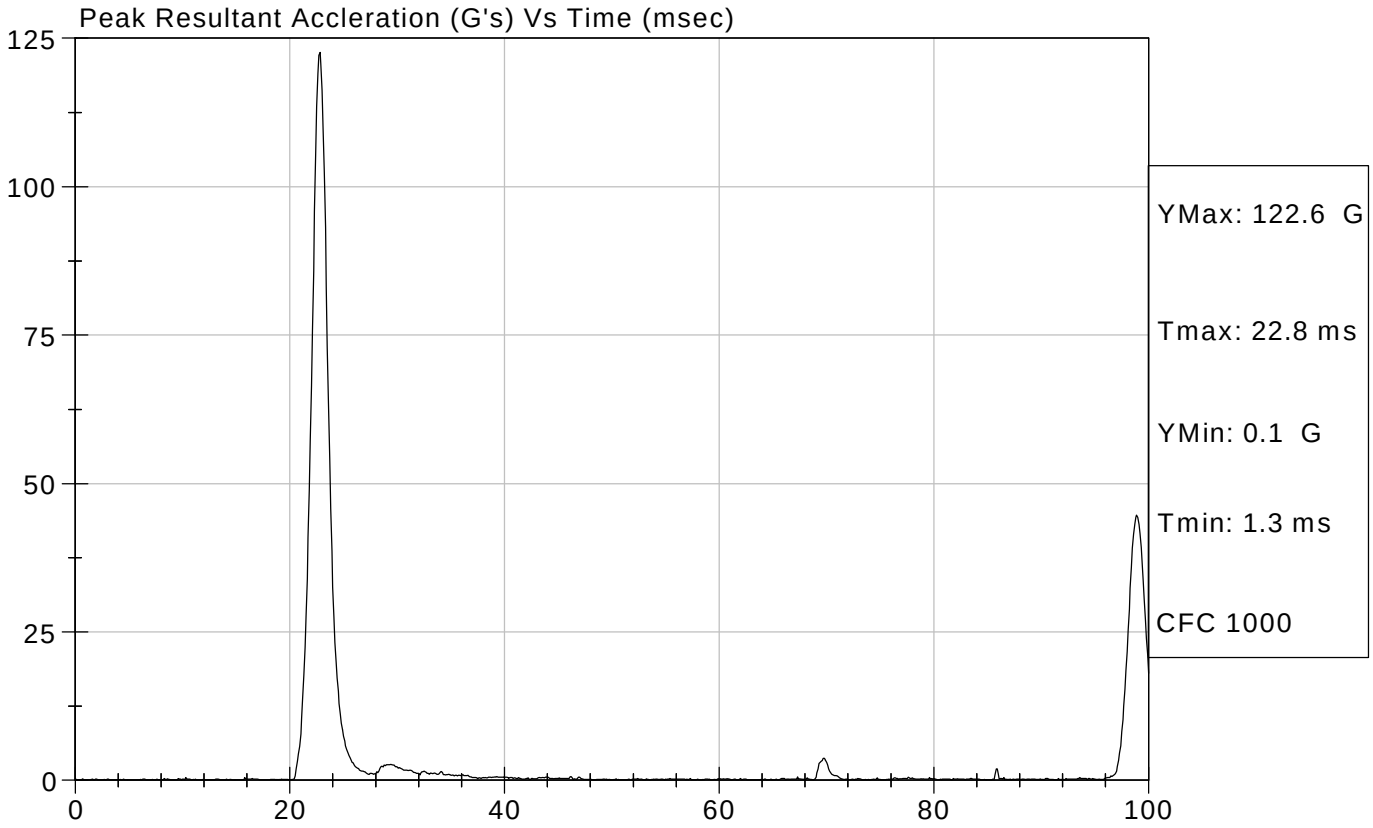
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	22.2	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Peak Resultant Acceleration	G's	120 to 150	123	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-7	Pass
		Overall Test Results		Pass

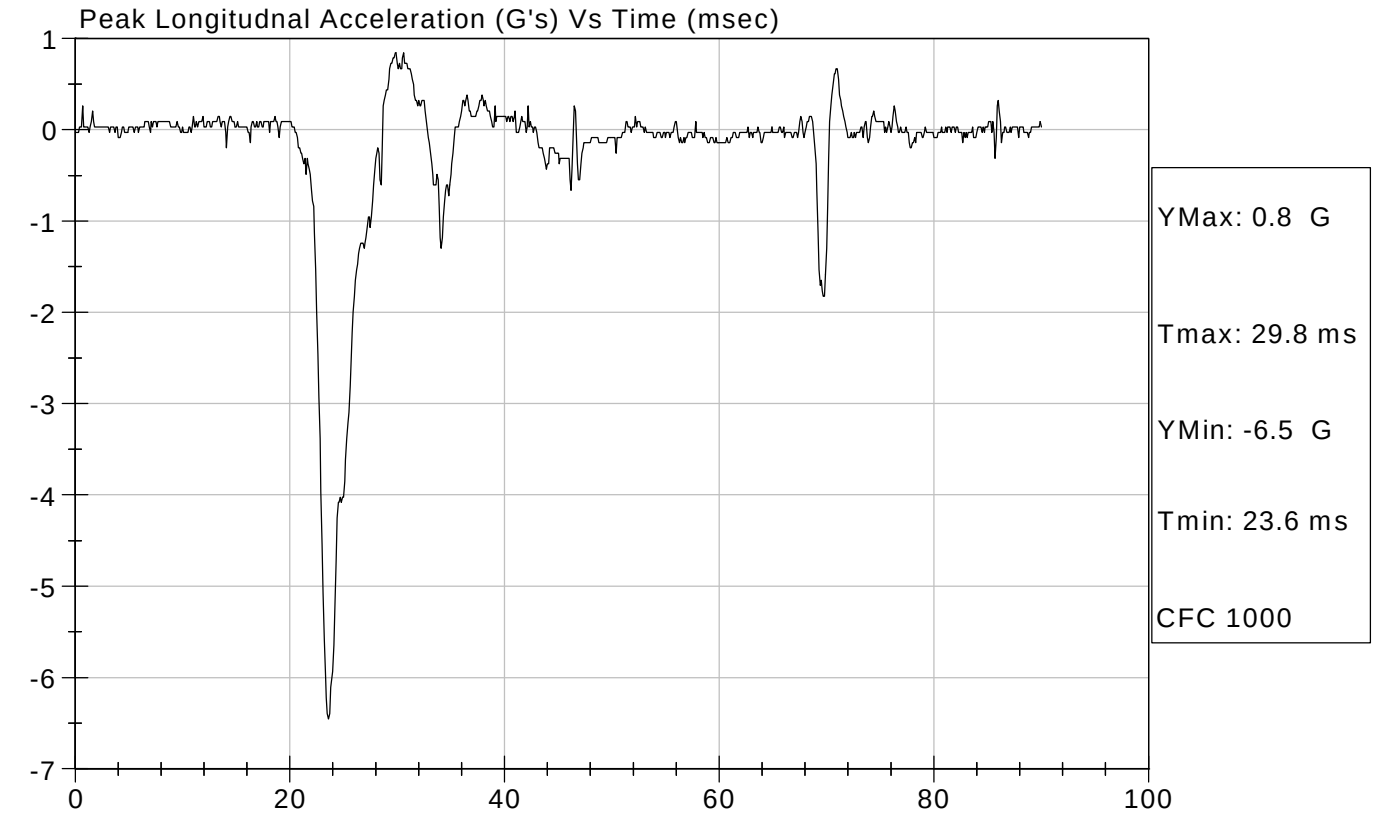
Jessica Gall
Laboratory Technician

11/05/2003
Test Date

Shefalika Jgarwal
Approved By

	Test Description: Head Drop	Test Date: 11/05/2003
	Component: D031811	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:** D031812

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Probe Velocity	m/s	4.27 - 4.33	4.32	Pass
Upper Rib	G's	37 - 46	42	Pass
Lower Rib	G's	37 - 46	40	Pass
Lower Spine	G's	15 - 22	19	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

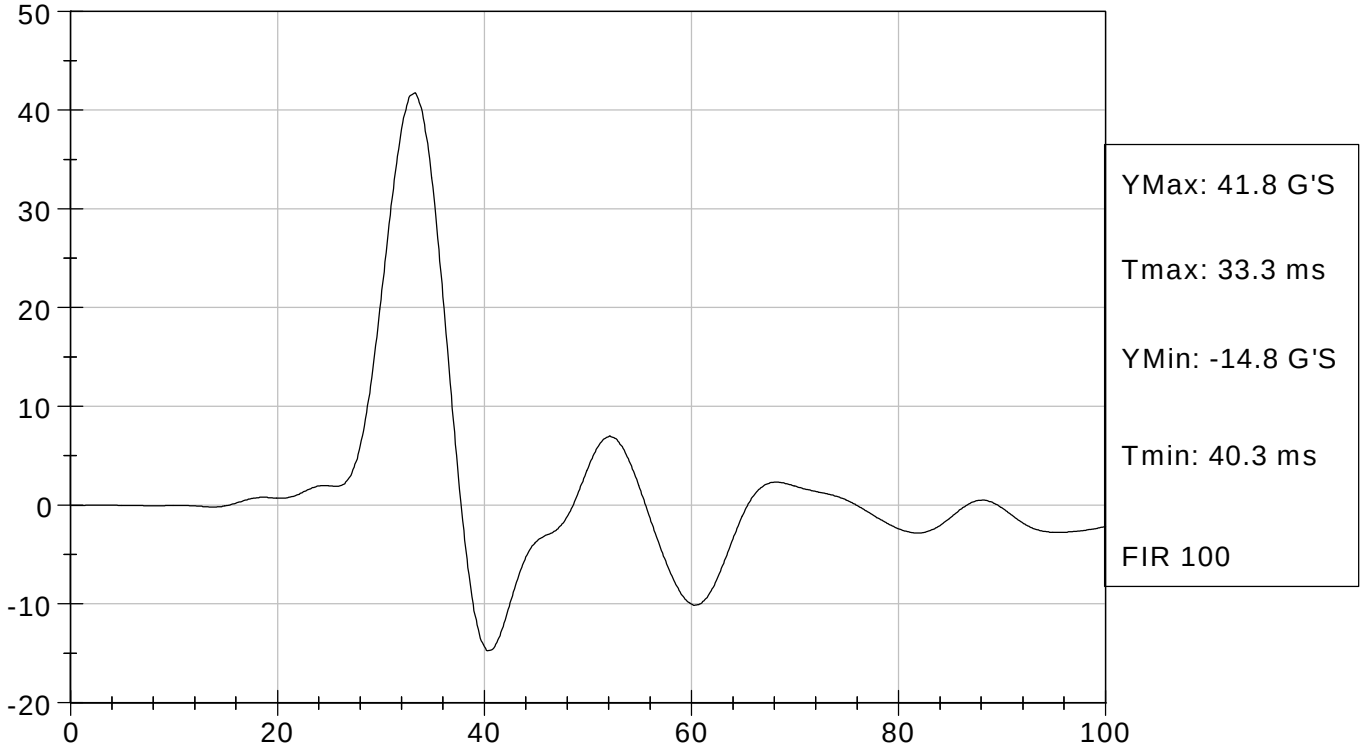
11/11/2003
Test Date

Shefalika Jgarwal
Approved By

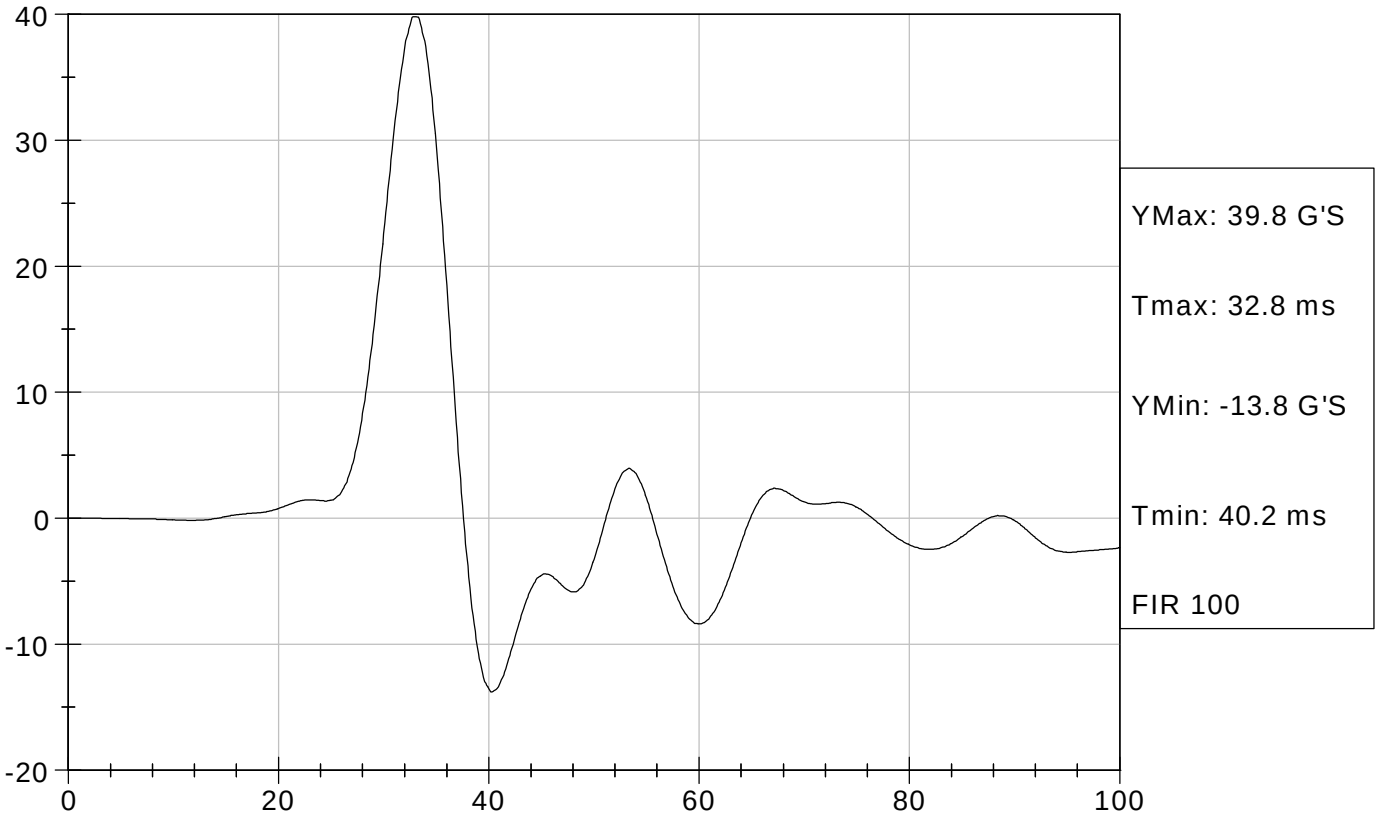
Test Desc: Thorax Impact
Component ID: D031812

Test Date: 11/11/2003
Speed: 14.18 ft/sec, 4.32 m/sec

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

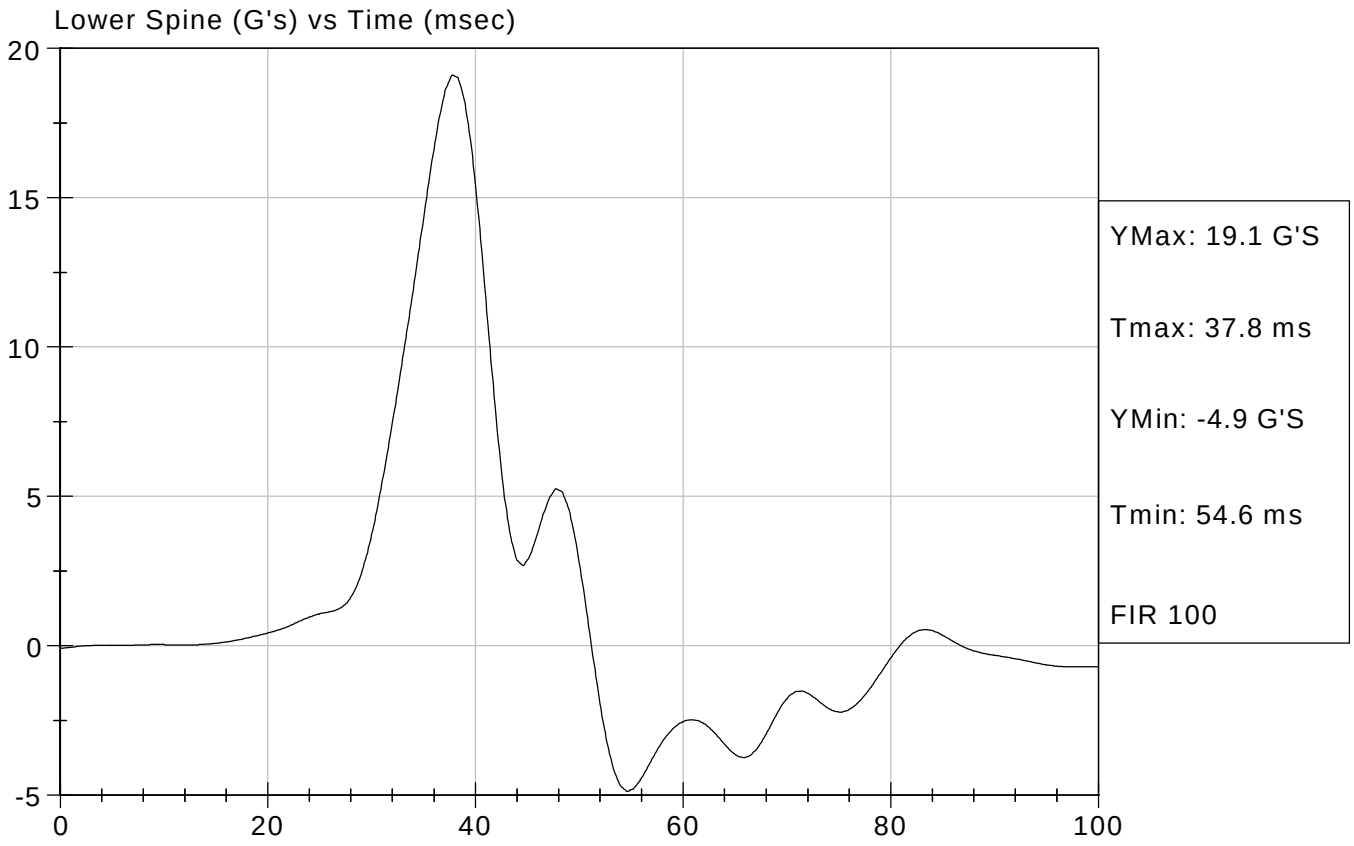


Lower Rib (G's) vs Time (msec)



Test Desc: Thorax Impact
Component ID: D031812

Test Date: 11/11/2003
Speed: 14.18 ft/sec, 4.32 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 271 **Test I.D:** D031813

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	32	Pass
Probe Velocity	m/s	4.27 - 4.33	4.32	Pass
Pelvis Acceleration	G's	40 - 60	45	Pass
		Overall Test Results		Pass

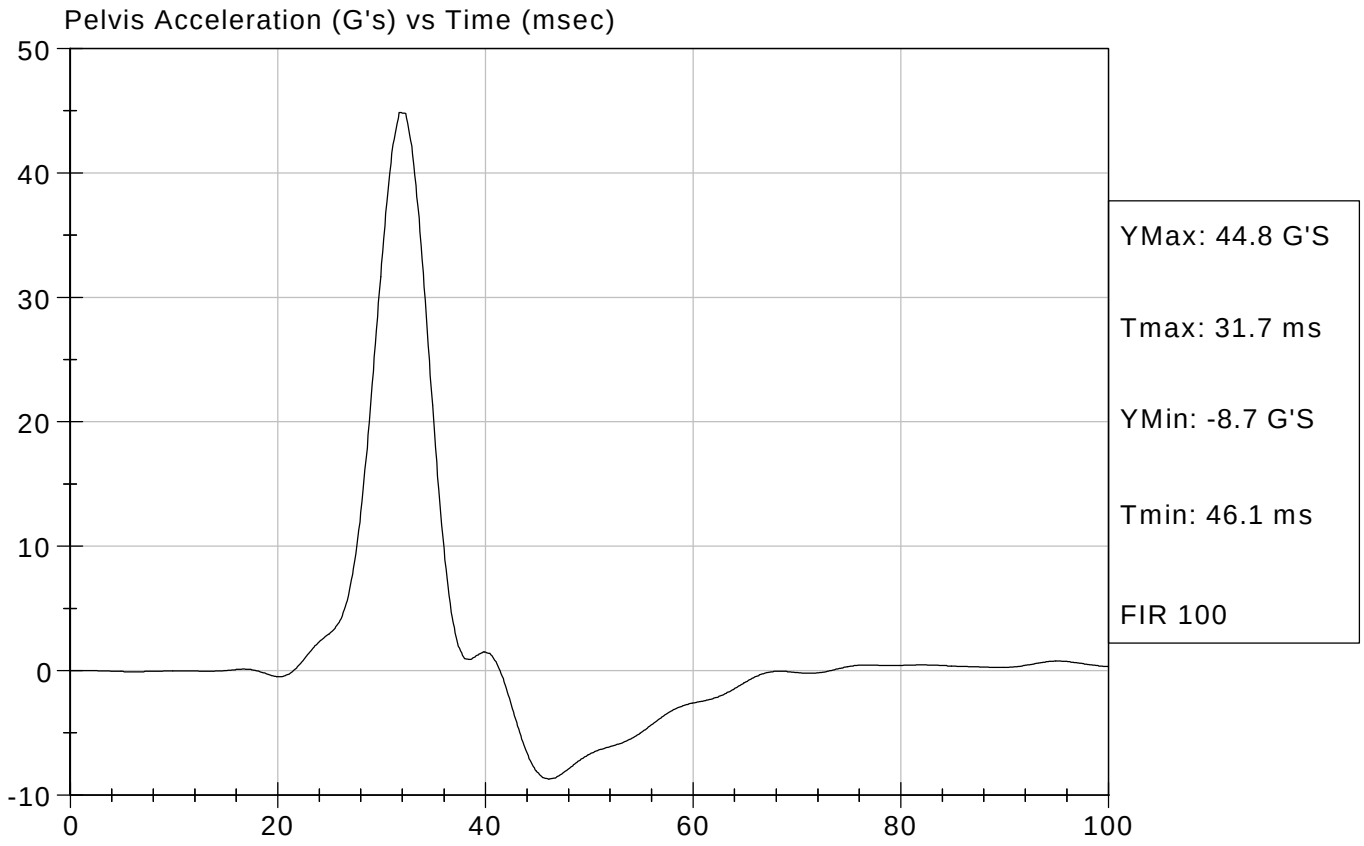
Jessica Gall
Laboratory Technician

11/11/2003
Test Date

Shefalika Jgarwal
Approved By

Test Desc: Pelvis Impact
Component ID: D031813

Test Date: 11/11/2003
Speed: 14.18 ft/sec, 4.32 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271 **Test I.D:** D031814

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	25	Pass
Laboratory Relative Humidity	%	10 to 70	70	Pass
Force At 12.7 mm	N	104 -162	139	Pass
Force At 19 mm	N	163 - 222	191	Pass
Force At 25.4 mm	N	222 - 280	257	Pass
Force At 33 mm	N	325 - 391	352	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

11/6/2003
Test Date

Shefalika Jaiswal
Approved By

Test Description: Abdomen Compression Test Date: 11/6/2003

Component: D031814 Speed: 0 ft/sec, 0 m/sec

SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 271 **Test I.D:** D031815

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.2	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	102.6	Pass
Force At 30 deg	N	151.2 - 204.6	176.3	Pass
Force At 40 deg	N	204.6 - 258.0	233.7	Pass
Return Angle	Deg	12 Maximum	6	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

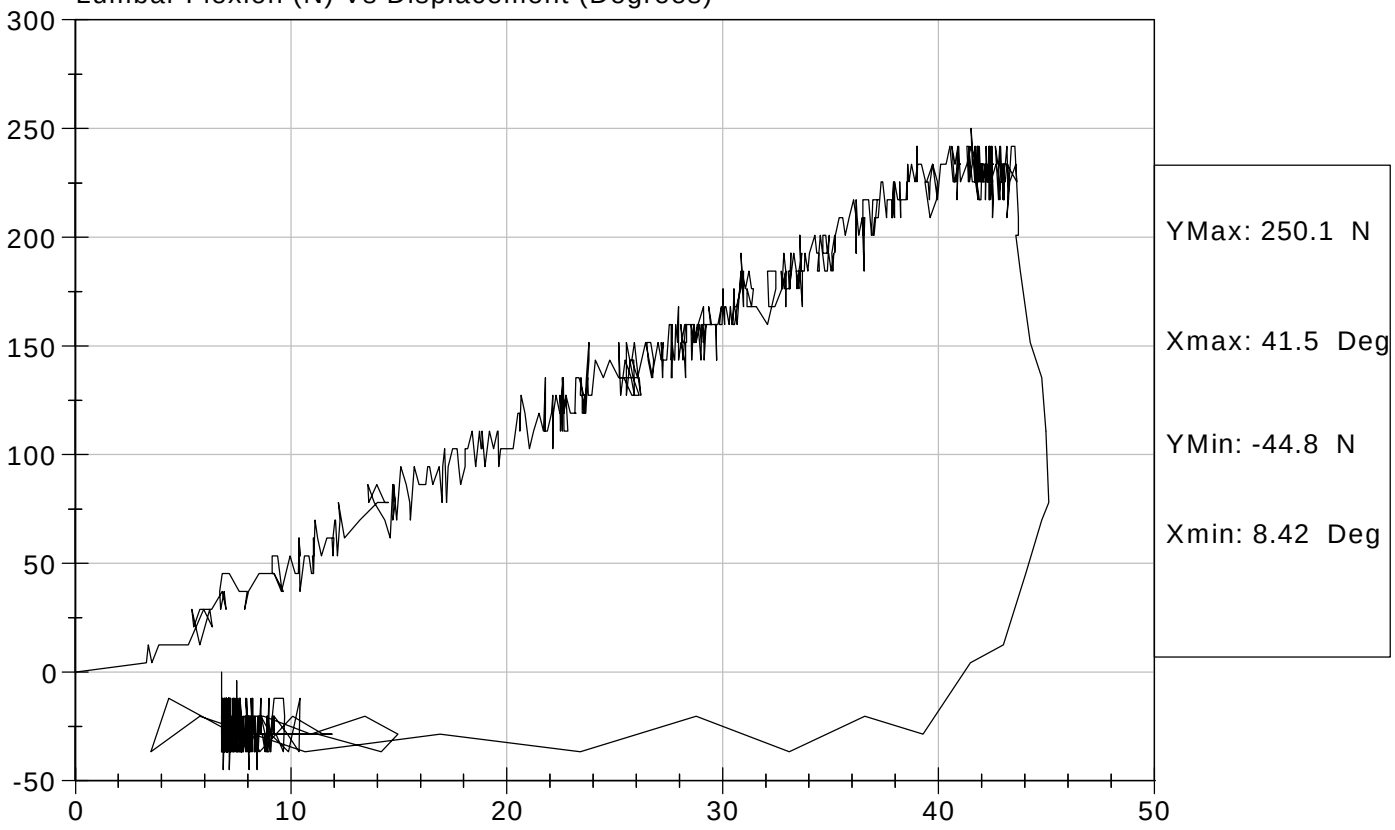
11/06/2003
Test Date

Mustafa Agarwal
Approved By

Test Description: Lumbar Flexion | Test Date: 11/06/2003

Component: D031815 | Speed: 0 ft/sec, 0 m/sec

Lumbar Flexion (N) Vs Displacement (Degrees)



SID Calibration Data Sheet

Side Impact Dummy

Thorasic Shock Absorber Calibration

ATD Serial No: 271 **Test I.D:** D031818

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	24	Pass
Velocity 3.05 m/s	Force	N	836 - 1125	893	Pass
	Displacement	mm	30 - 35	32	Pass
Velocity 4.27 m/s	Force	N	1730 - 2099	1,748	Pass
	Displacement	mm	32 - 37	35	Pass
Velocity 6.1 m/s	Force	N	3741 - 4448	4,271	Pass
	Displacement	mm	33 - 40	38	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

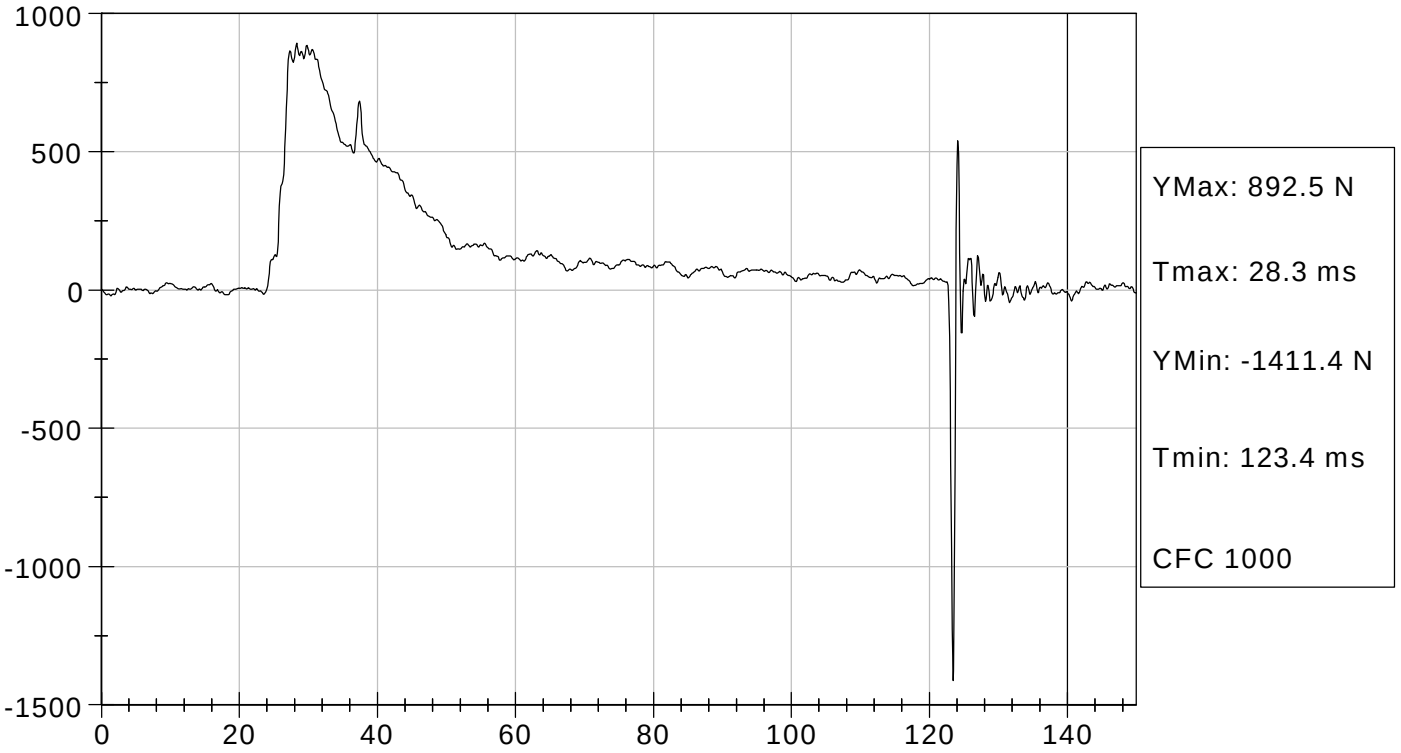
11/07/2003
Test Date

Shefalika Jgarwal
Approved By

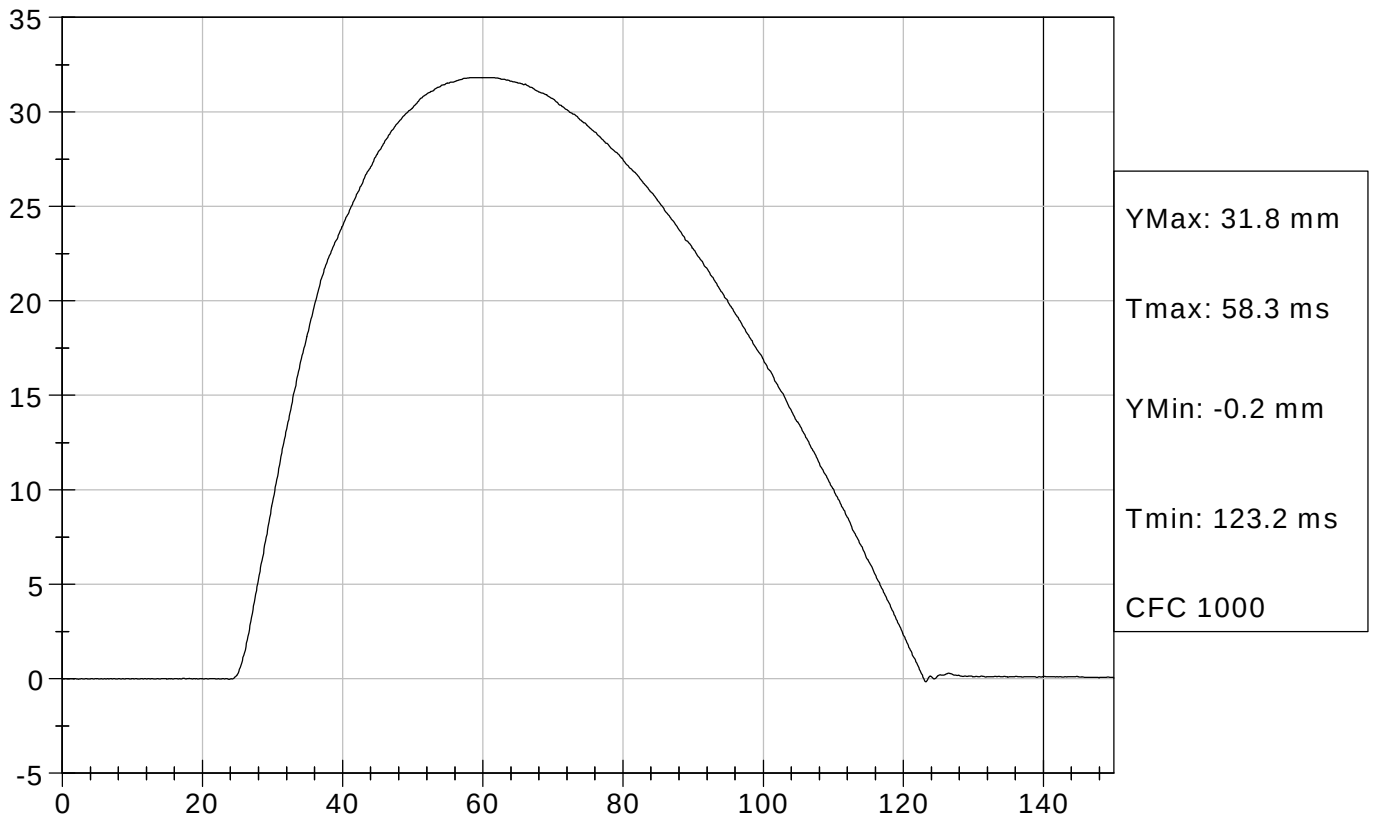
Test Desc: Dampener Impact
Component ID: D031816

Test Date: 11/07/2003
Speed: 10 ft/sec, 3.048 m/sec

FORCE (N) vs TIME (ms)



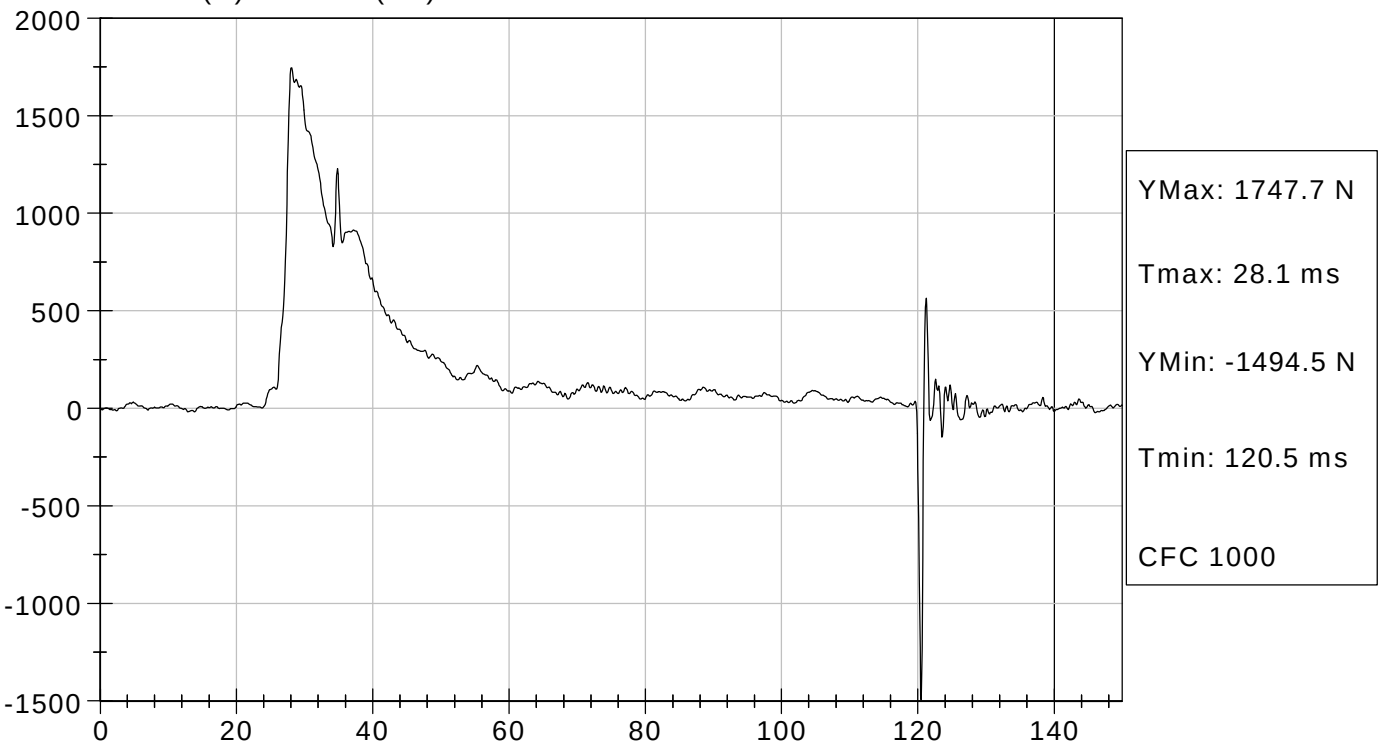
DISPLACEMENT (mm) vs TIME (ms)



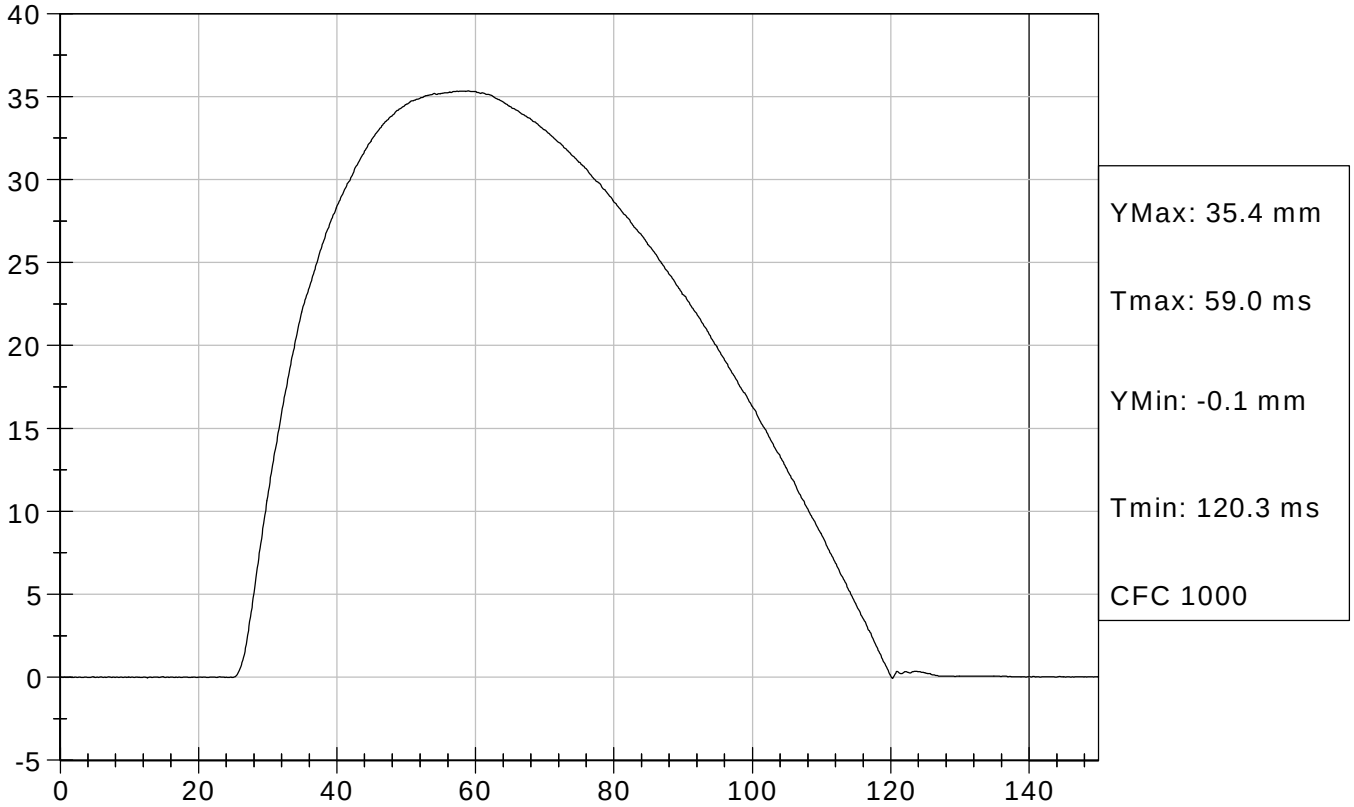
Test Desc: Dampener Impact
Component ID: D031817

Test Date: 11/07/2003
Speed: 14.0 ft/sec, 4.27 m/sec

FORCE (N) vs TIME (ms)



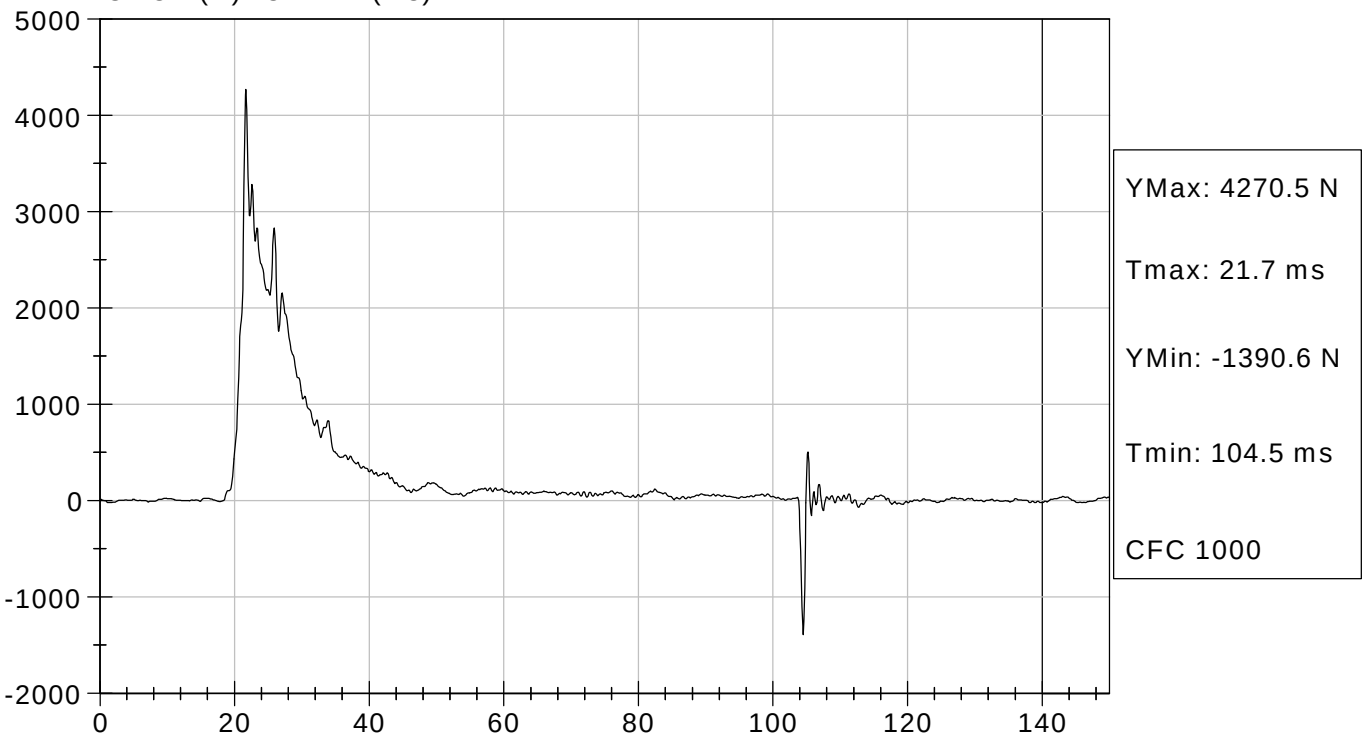
DISPLACEMENT (mm) vs TIME (ms)



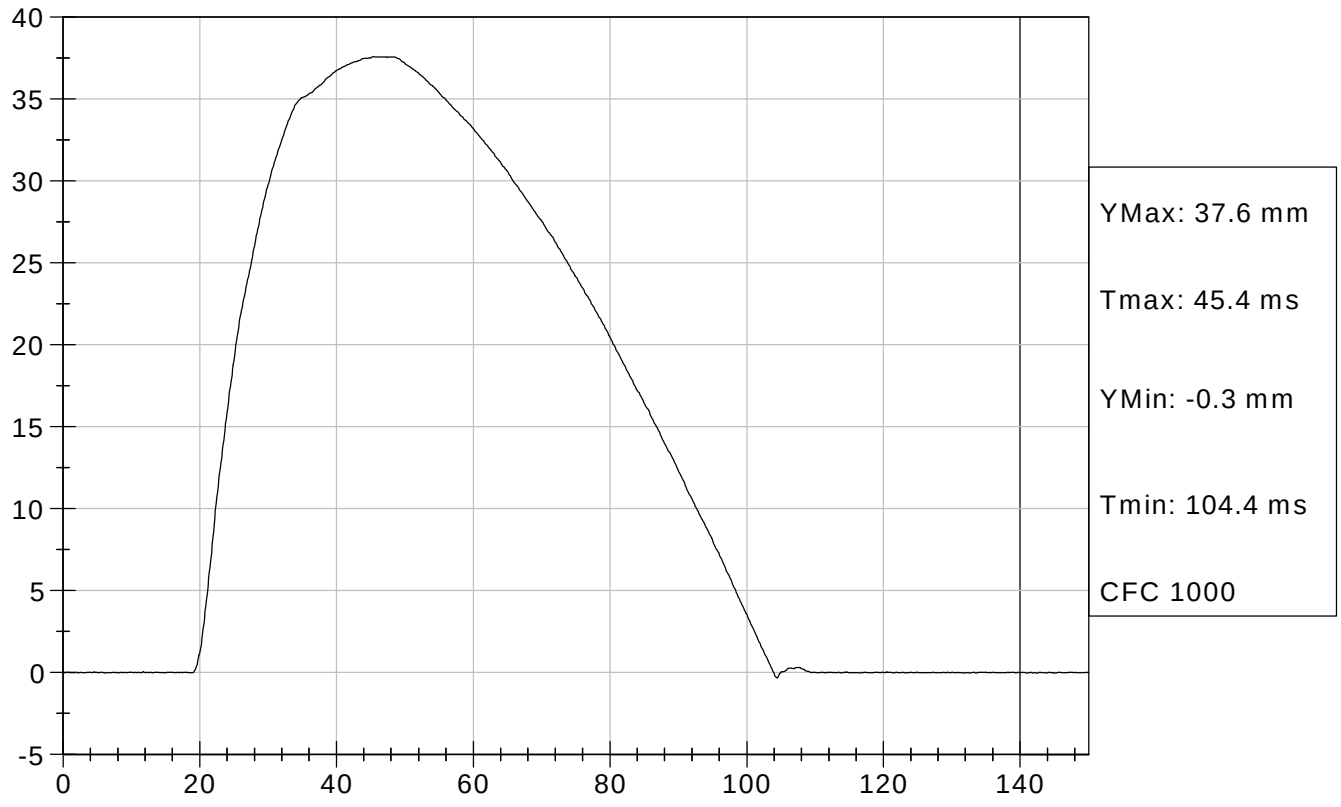
Test Desc: Dampener Impact
Component ID: D031818

Test Date: 11/07/2003
Speed: 20 ft/sec, 6.096 m/sec

FORCE (N) vs TIME (ms)



DISPLACEMENT (mm) vs TIME (ms)



SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 271 **Test I.D:** D031819

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.1	Pass
Laboratory Relative Humidity		%	10 to 70	19	Pass
Impact Velocity		m/s	6.89 to 7.13	6.97	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.33	Pass
	20 msec	m/s	4.12 to 5.10	4.55	Pass
	30 msec	m/s	5.73 to 7.01	6.31	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.88	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	67	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	60	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	75	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	55	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	9	Pass

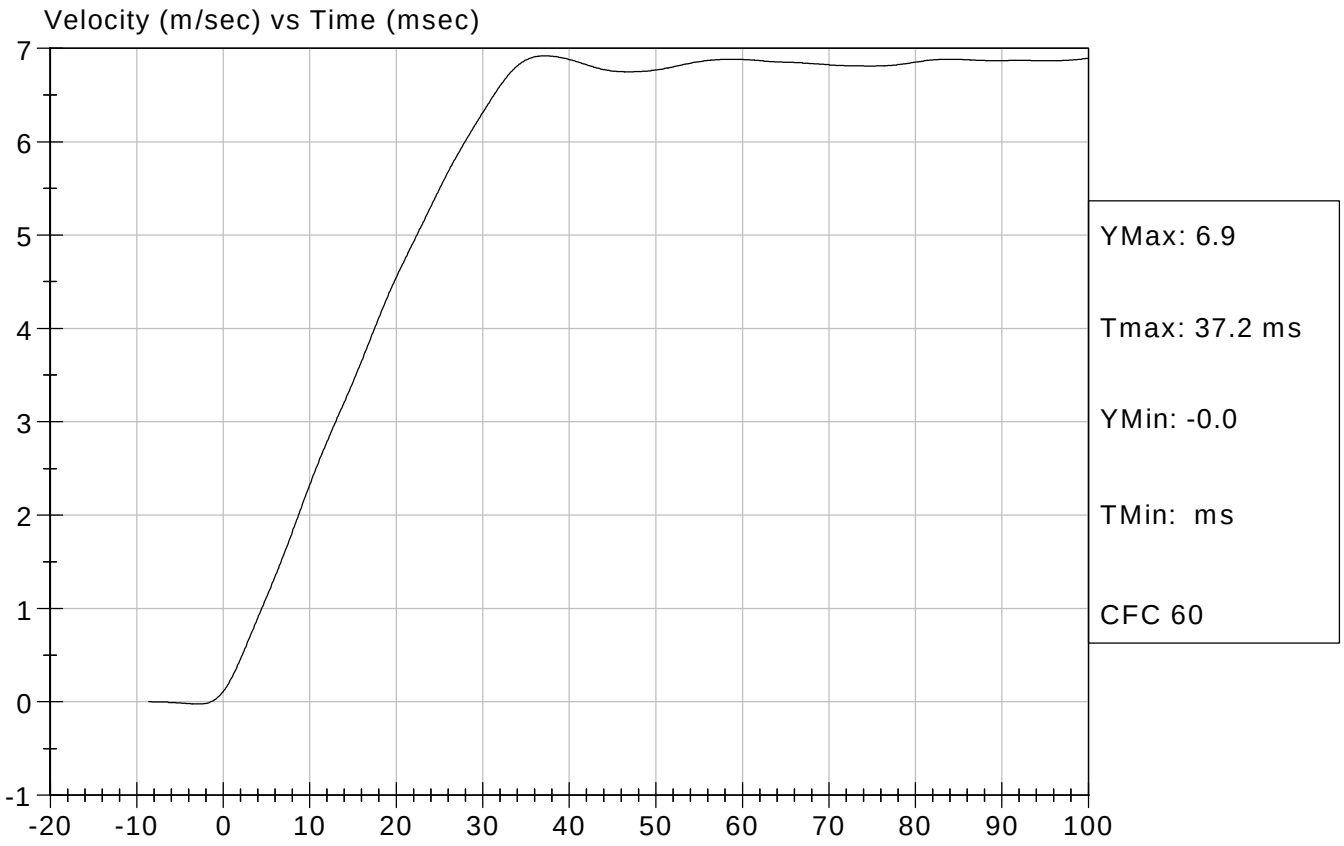
Jessica Gall
Laboratory Technician

11/06/2003
Test Date

Shefalika Jgarwal
Approved By

Test Desc: Neck Bending
Component ID: D031819

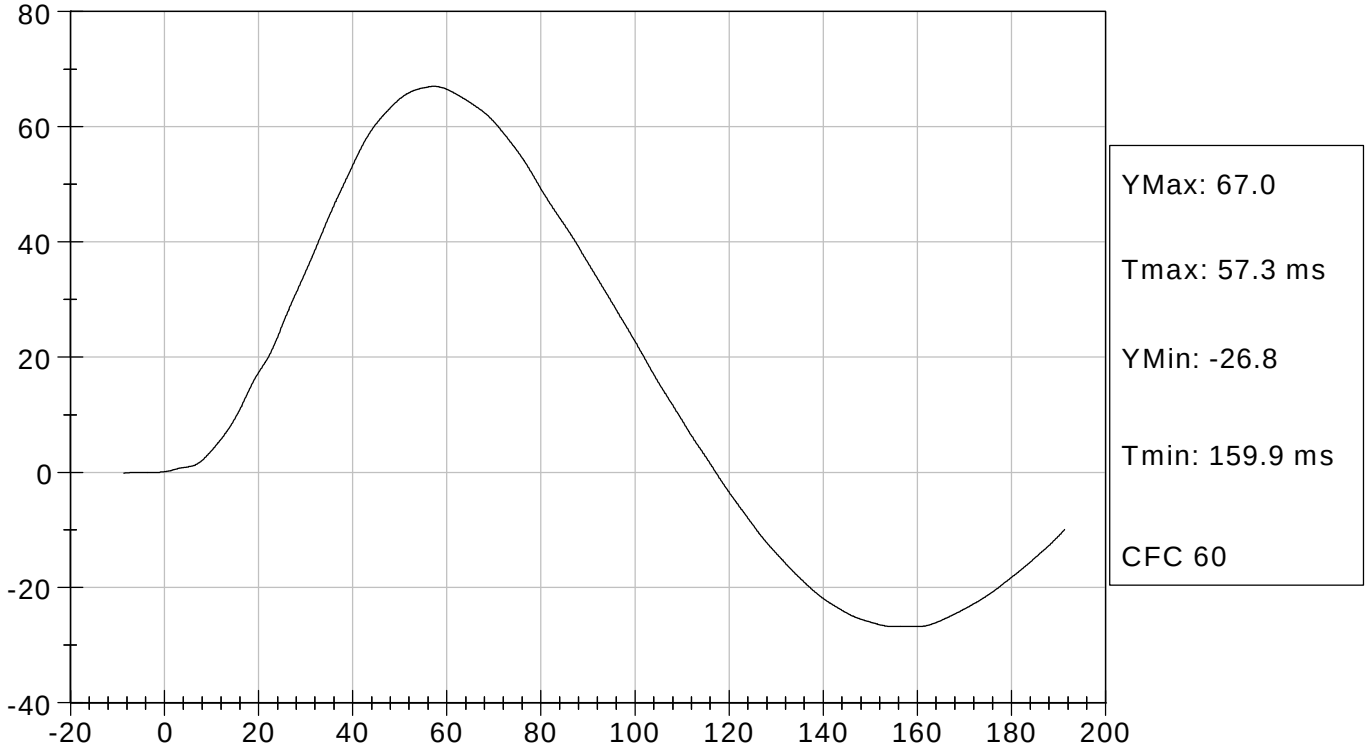
Test Date: 11/06/2003
Speed: 22.86 ft/sec, 6.97 m/sec



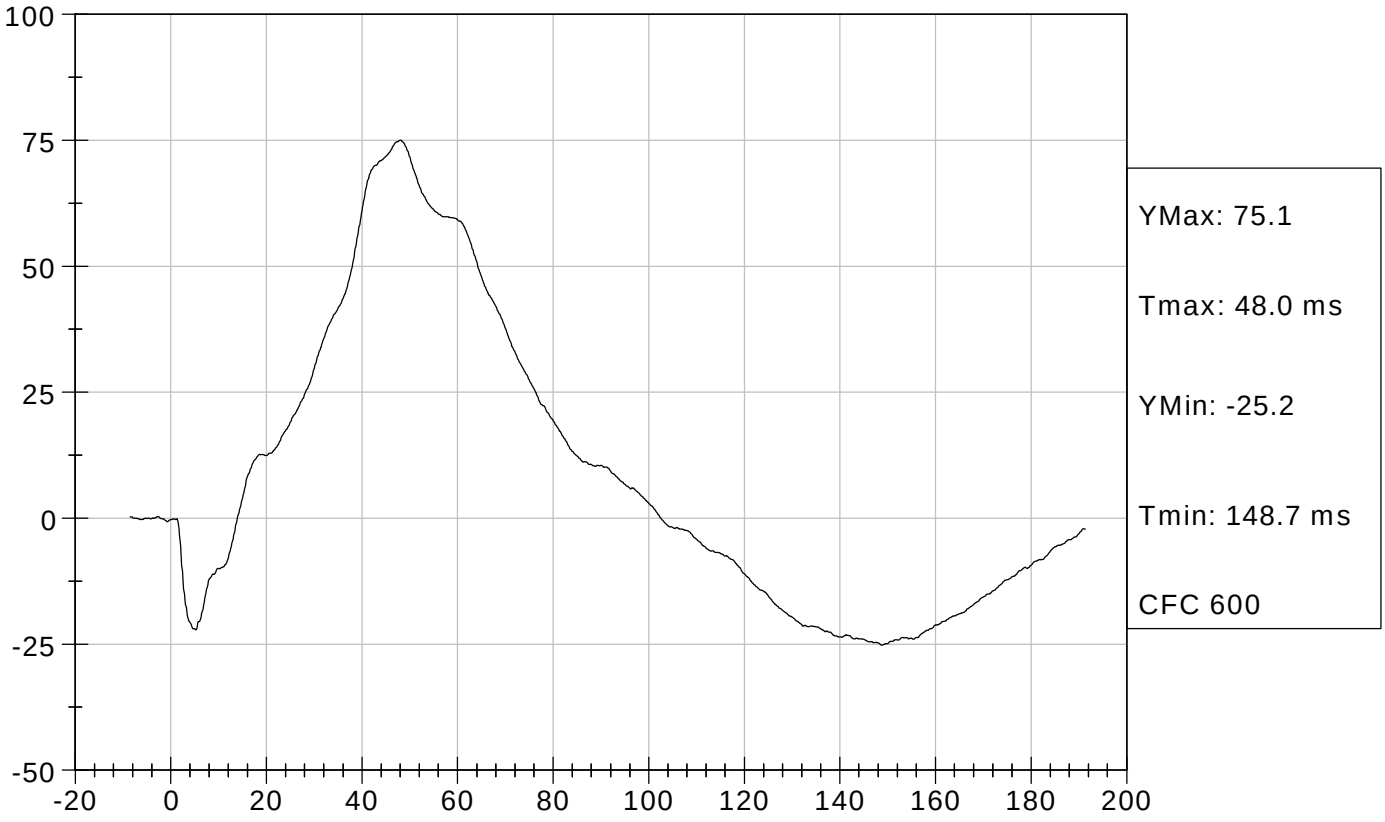
Test Desc: Neck Bending
Component ID: D031819

Test Date: 11/06/2003
Speed: 22.86 ft/sec, 6.97 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 Gall

Laboratory Technician

11/11/2003

Test Date

Shefalika Agarwal

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.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.

SID Calibration Data Sheet

Side Impact Dummy

External Measurements

ATD Serial No: 904 **Test I.D:** D03182

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	903	Pass
RH - Rib Height	mm	501 - 521	509	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	240	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	525	Pass
SW - Knee Pivot to Floor	mm	490 - 505	500	Pass
HW - Hip Width	mm	356 - 391	368	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

11/12/2003
Test Date

Shefalika Agarwal
Approved By

SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 904 **Test I.D:** D031821

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	22.2	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Peak Resultant Acceleration	G's	120 to 150	148	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-7	Pass
		Overall Test Results		Pass

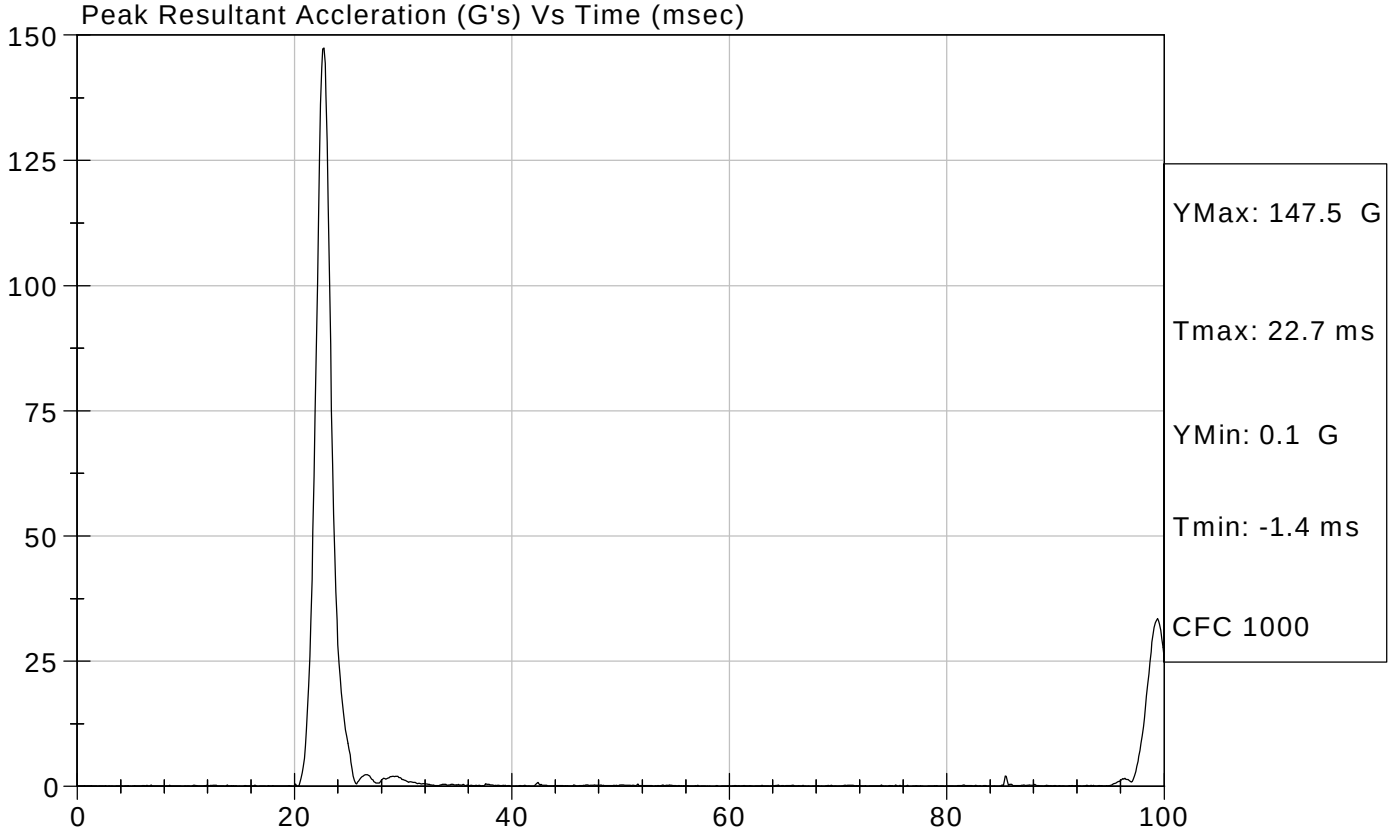
Jessica Gall
Laboratory Technician

11/05/2003
Test Date

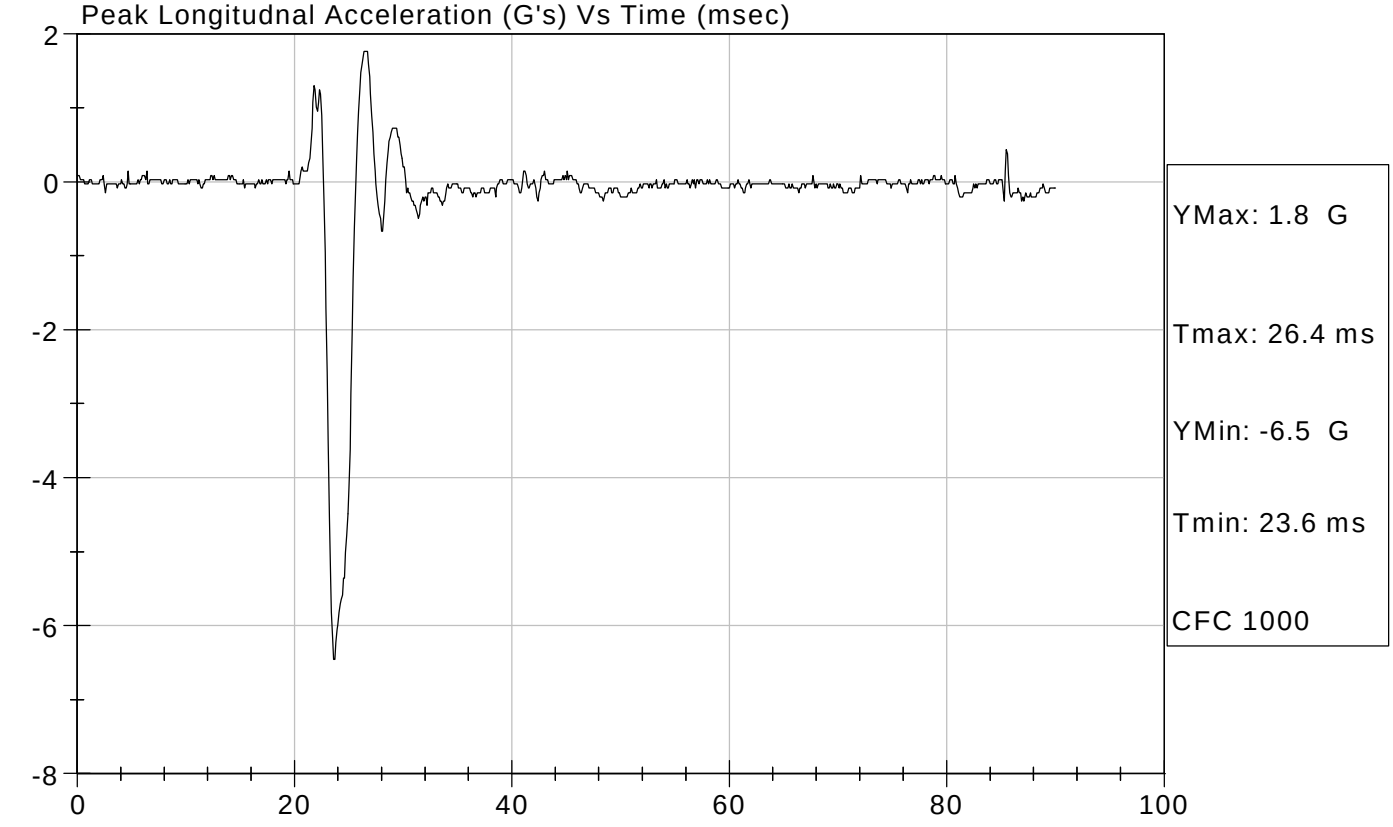
Shefalika Agarwal
Approved By

	Test Description: Head Drop	Test Date: 11/05/2003
	Component: D031821	Speed: 0 ft/s, 0.00 m/s

Peak Resultant Accleration (G's) Vs Time (msec)



Peak Longitudnal Acceleration (G's) Vs Time (msec)



SID Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 904 **Test I.D:** D031822

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Velocity	m/s	4.27 - 4.33	4.33	Pass
Upper Rib	G's	37 - 46	40	Pass
Lower Rib	G's	37 - 46	38	Pass
Lower Spine	G's	15 - 22	17	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

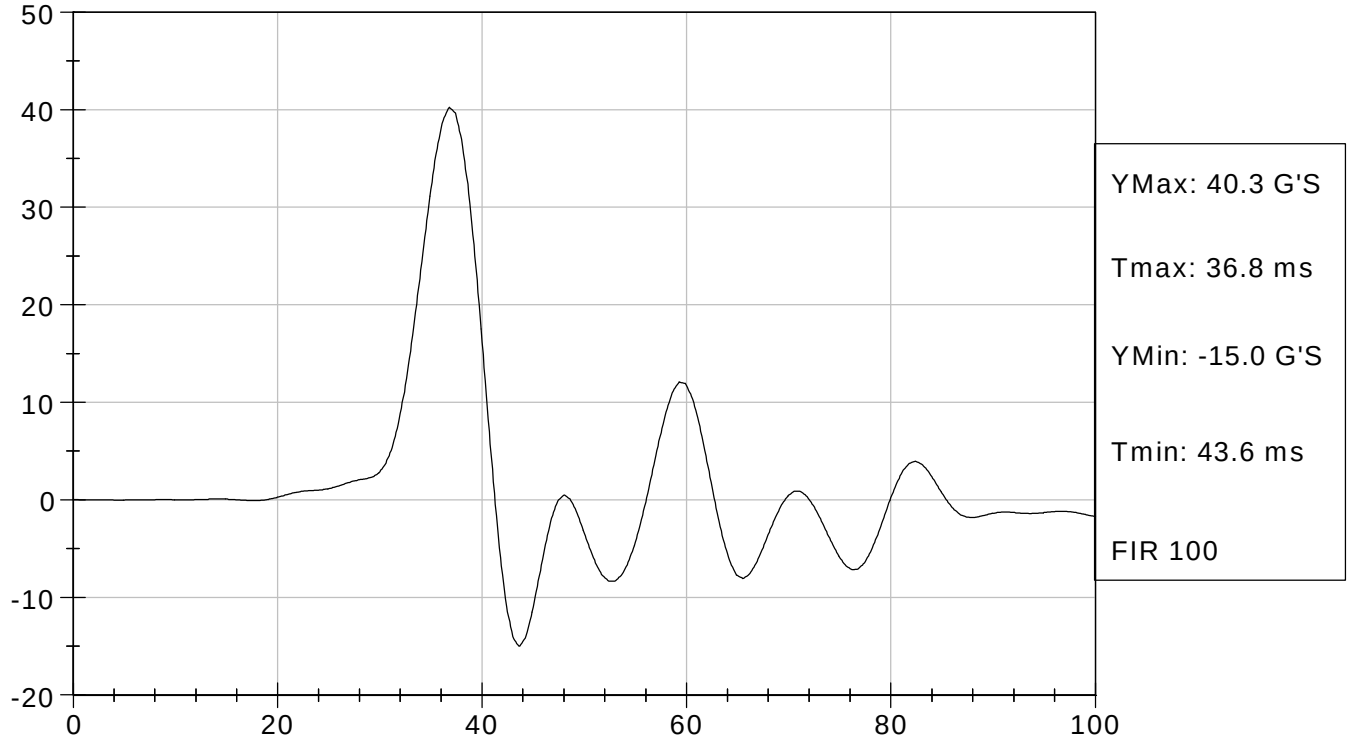
11/10/2003
Test Date

Mufalika Agarwal
Approved By

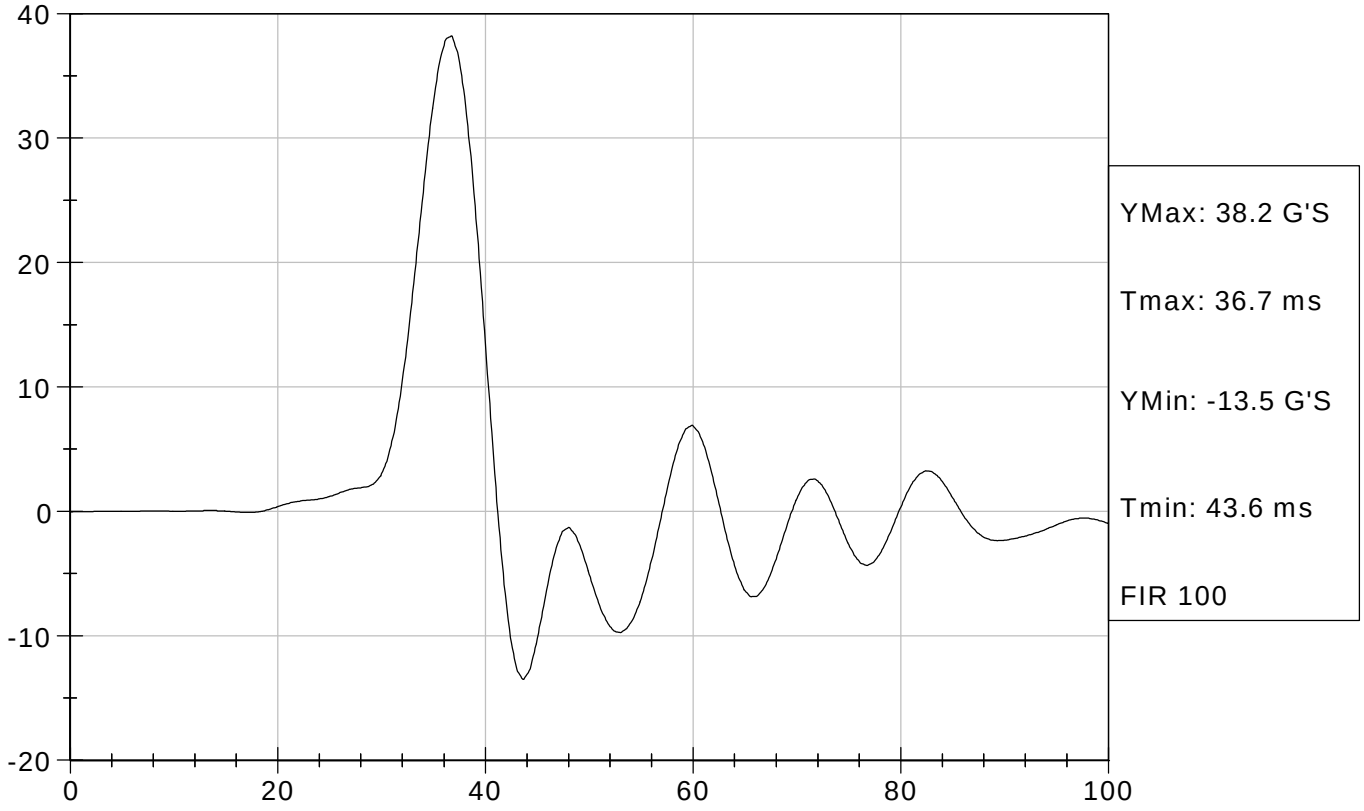
Test Desc: Thorax Impact
Component ID: D031822

Test Date: 11/10/2003
Speed: 14.2 ft/sec, 4.33 m/sec

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

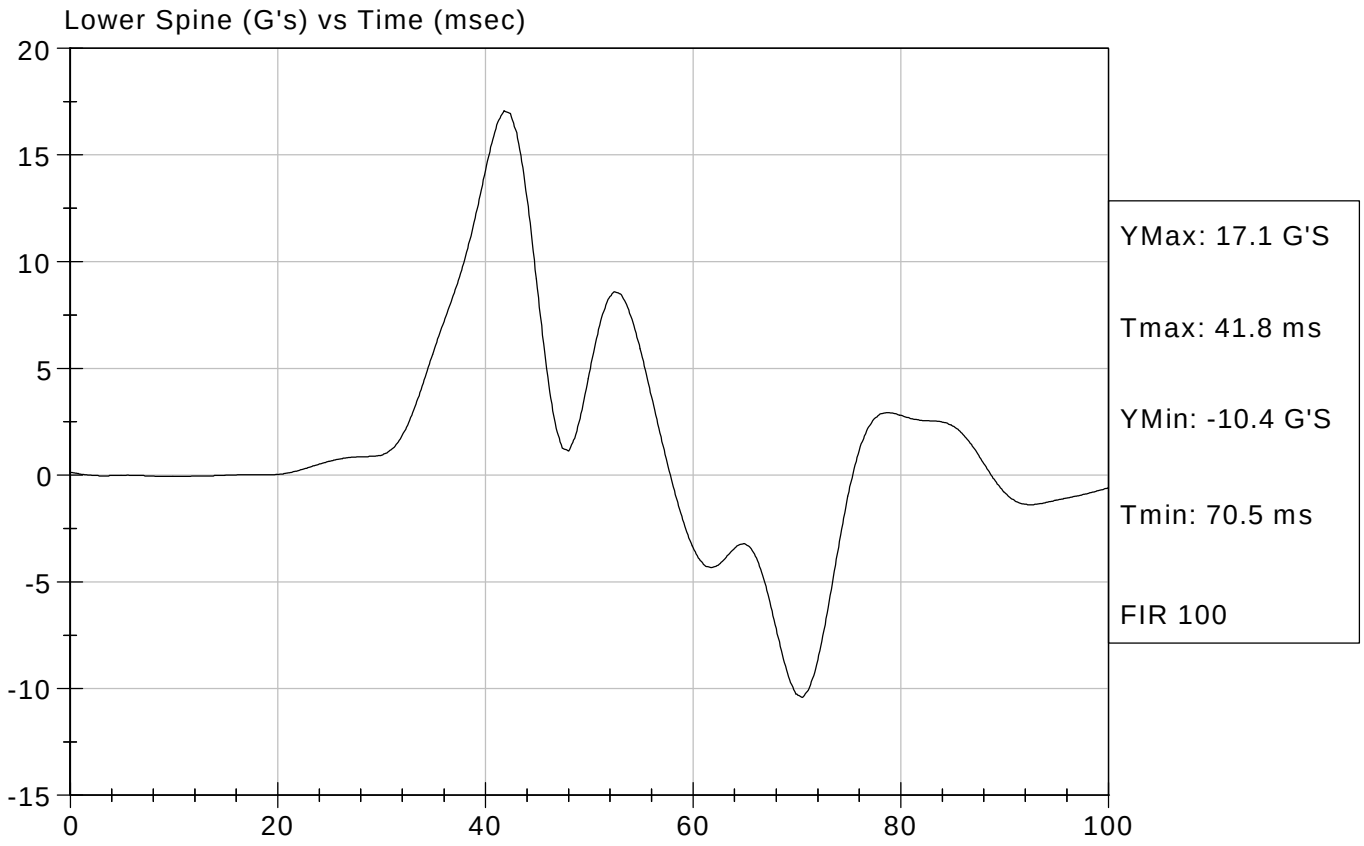


Lower Rib (G's) vs Time (msec)



Test Desc: Thorax Impact
Component ID: D031822

Test Date: 11/10/2003
Speed: 14.2 ft/sec, 17.0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 904 **Test I.D:** D031823

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	4.27 - 4.33	4.33	Pass
Pelvis Acceleration	G's	40 - 60	41	Pass
		Overall Test Results		Pass

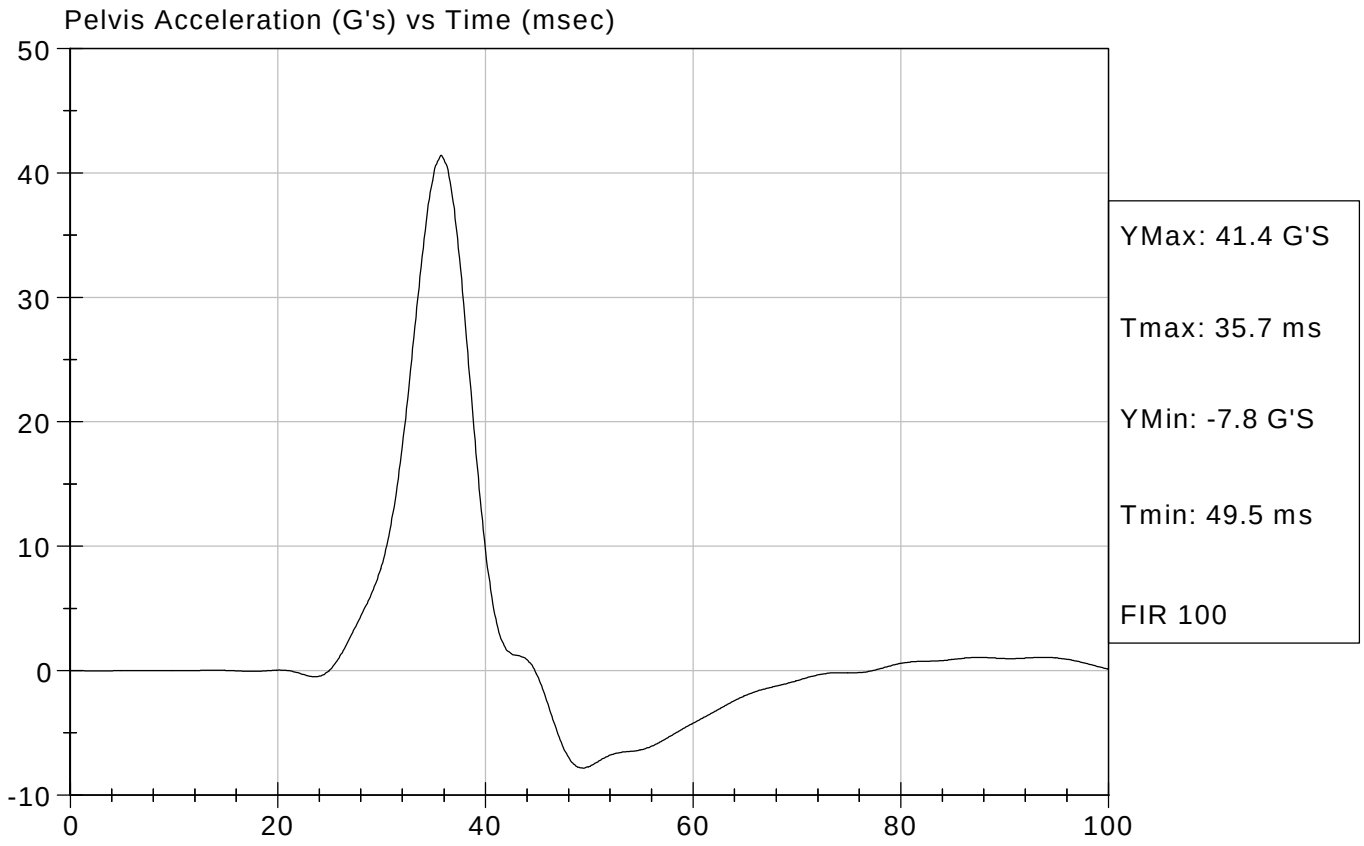
Jessica Hall
Laboratory Technician

11/11/2003
Test Date

Mustafa Agarwal
Approved By

Test Desc: Pelvis Impact
Component ID: D031823

Test Date: 11/11/2003
Speed: 14.2 ft/sec, 4.33 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 904 **Test I.D:** D031824

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Force At 12.7 mm	N	104 -162	145	Pass
Force At 19 mm	N	163 - 222	201	Pass
Force At 25.4 mm	N	222 - 280	265	Pass
Force At 33 mm	N	325 - 391	362	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

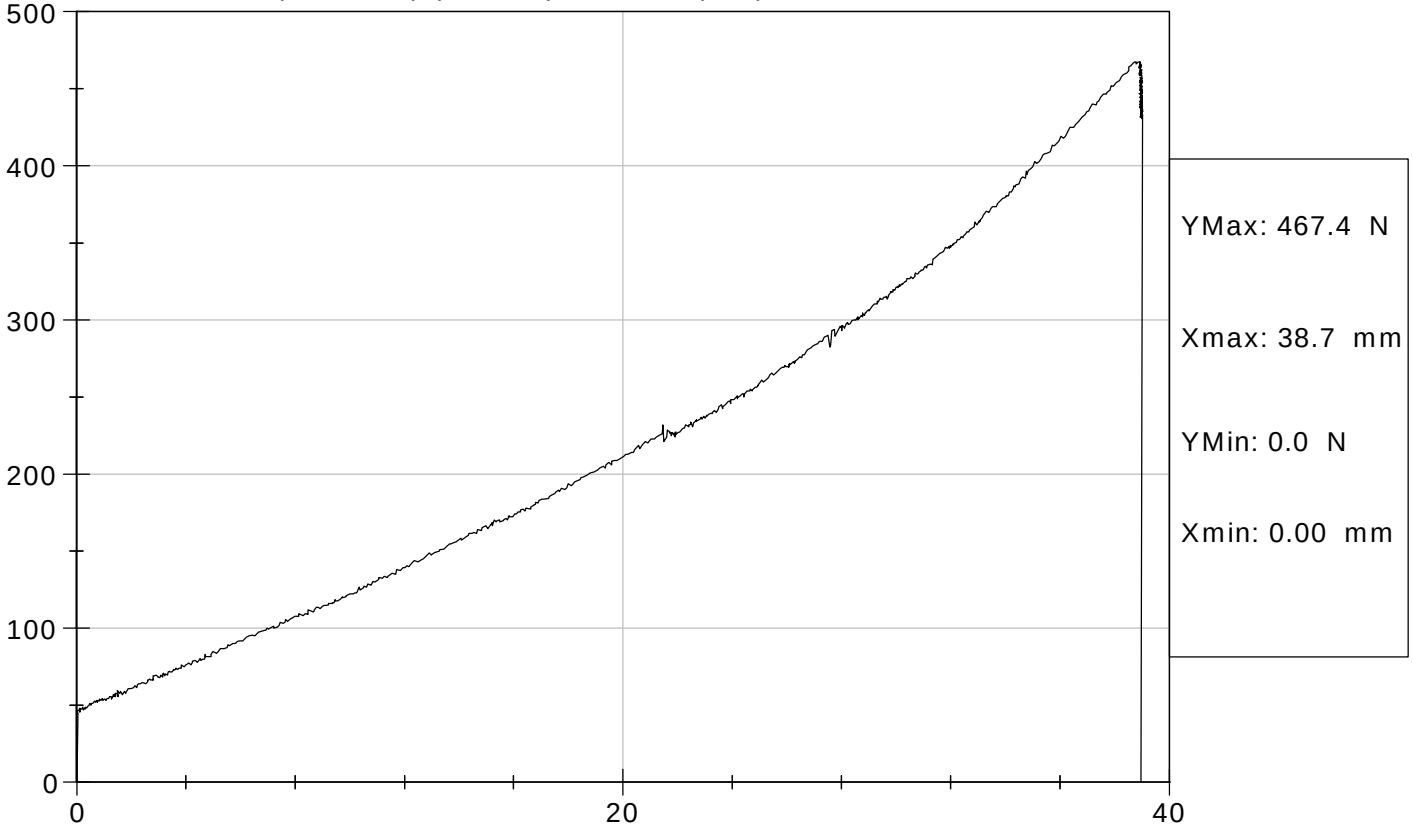
11/06/2003
Test Date

Shefalika Jaiswal
Approved By

Test Description: Abdomen Compression Test Date: 11/06/2003

Component: D031824 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: 904 **Test I.D:** D031825

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.2	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	105.3	Pass
Force At 30 deg	N	151.2 - 204.6	155.4	Pass
Force At 40 deg	N	204.6 - 258.0	222.2	Pass
Return Angle	Deg	12 Maximum	7	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

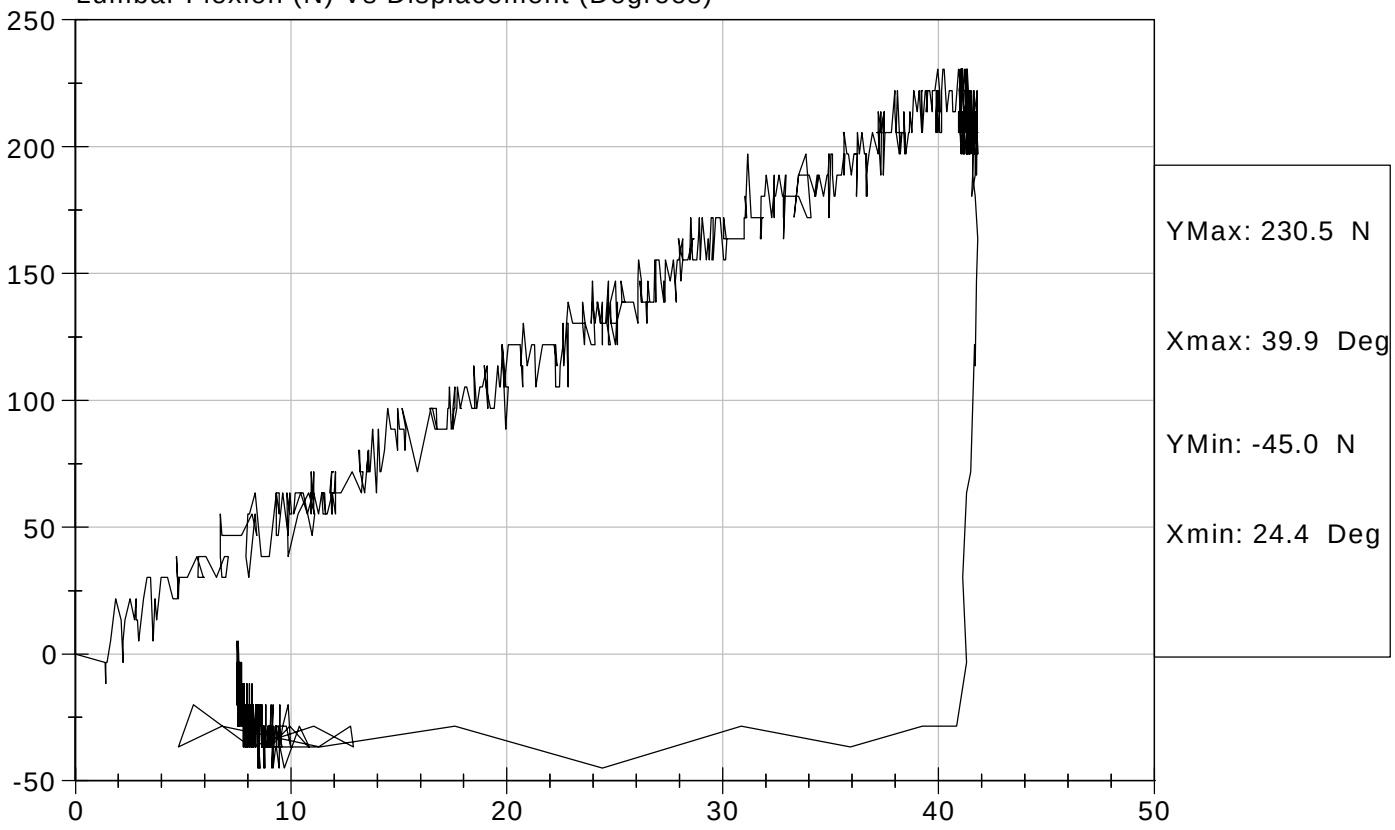
11/06/2003
Test Date

Mustafa Agarwal
Approved By

Test Description: Lumbar Flexion | Test Date: 11/06/2003

Component: D031825 | Speed: 0 ft/sec, 0 m/sec

Lumbar Flexion (N) Vs Displacement (Degrees)



SID Calibration Data Sheet

Side Impact Dummy

Thorasic Shock Absorber Calibration

ATD Serial No: 904 **Test I.D:** D031828

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.9 to 25.5	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	24	Pass
Velocity 3.05 m/s	Force	N	836 - 1125	954	Pass
	Displacement	mm	30 - 35	33	Pass
Velocity 4.27 m/s	Force	N	1730 - 2099	1,893	Pass
	Displacement	mm	32 - 37	35	Pass
Velocity 6.1 m/s	Force	N	3741 - 4448	3,962	Pass
	Displacement	mm	33 - 40	37	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

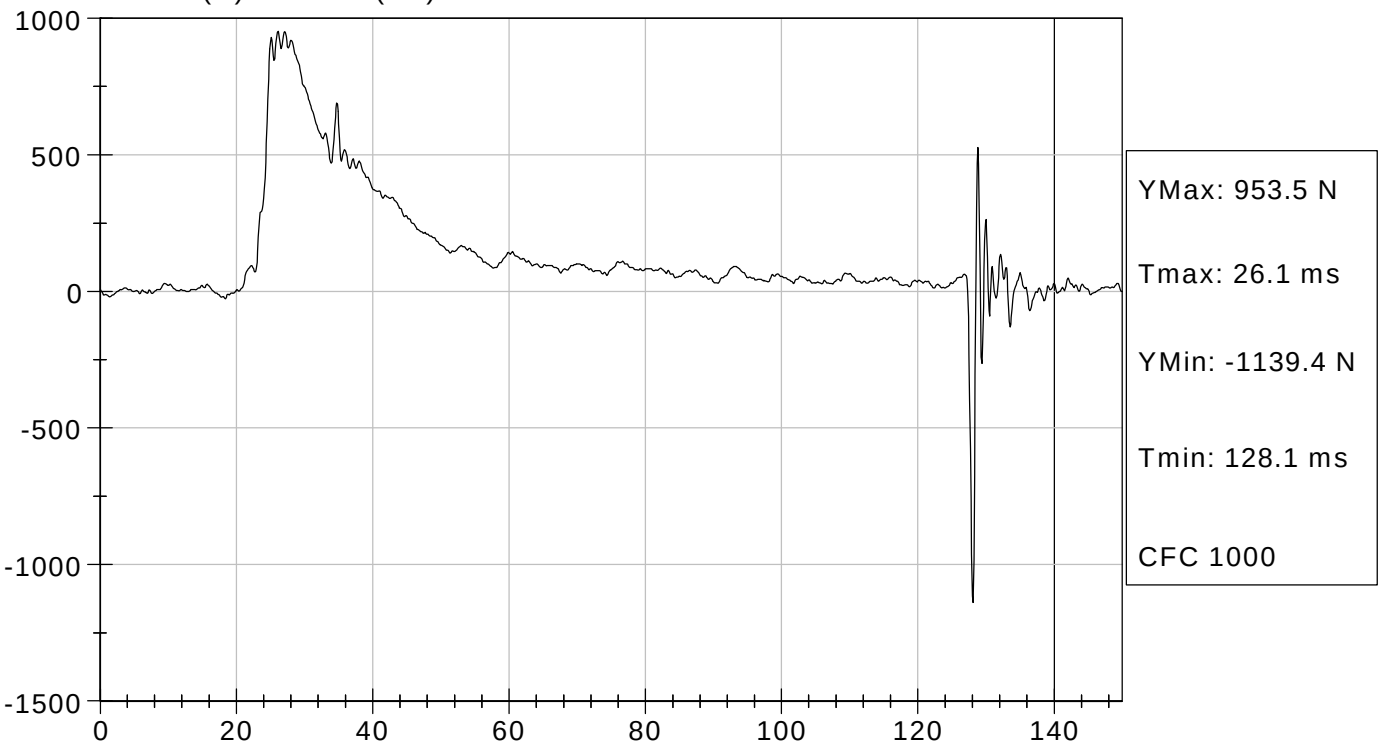
11/07/2003
Test Date

Shefalika Jgarwal
Approved By

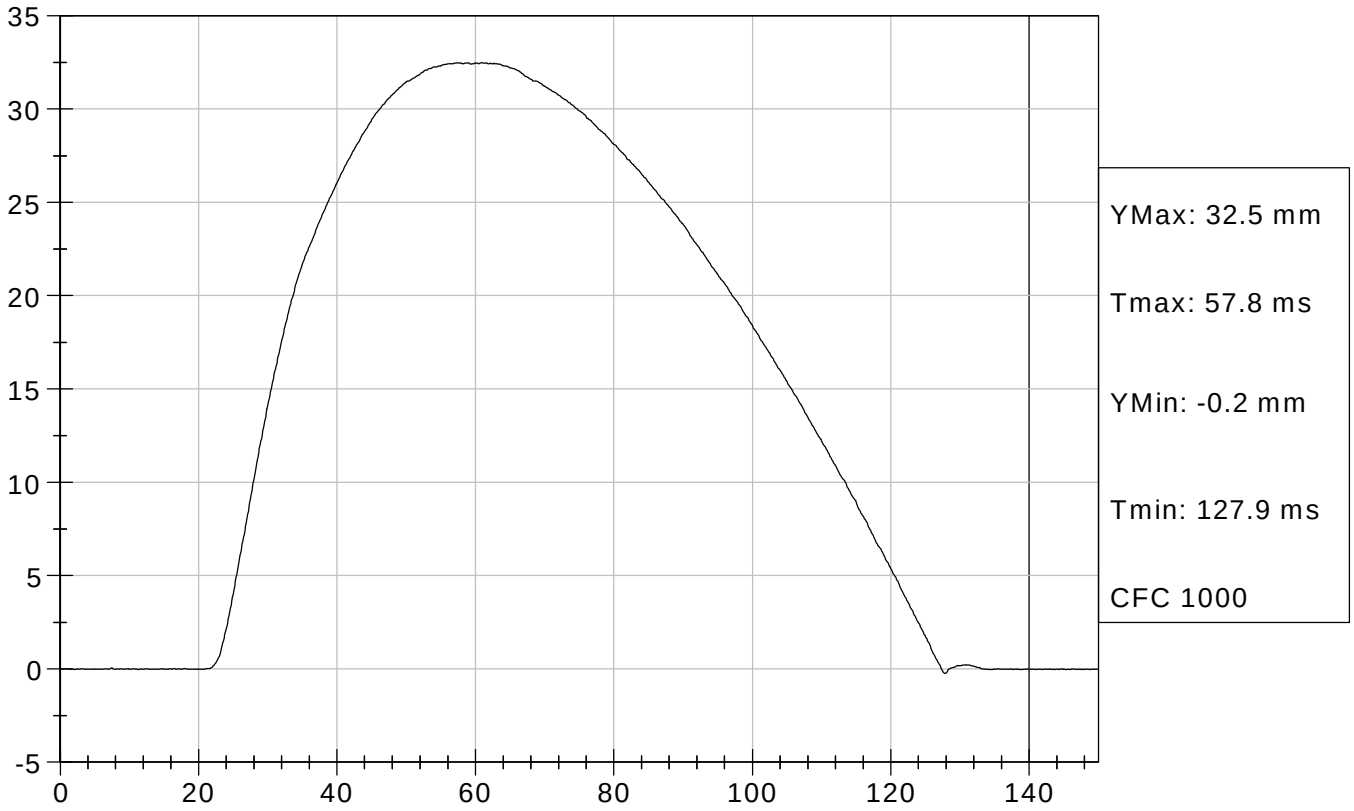
Test Desc: Dampener Impact
Component ID: D031826

Test Date: 11/07/2003
Speed: 10.0 ft/sec, 3.048 m/sec

FORCE (N) vs TIME (ms)



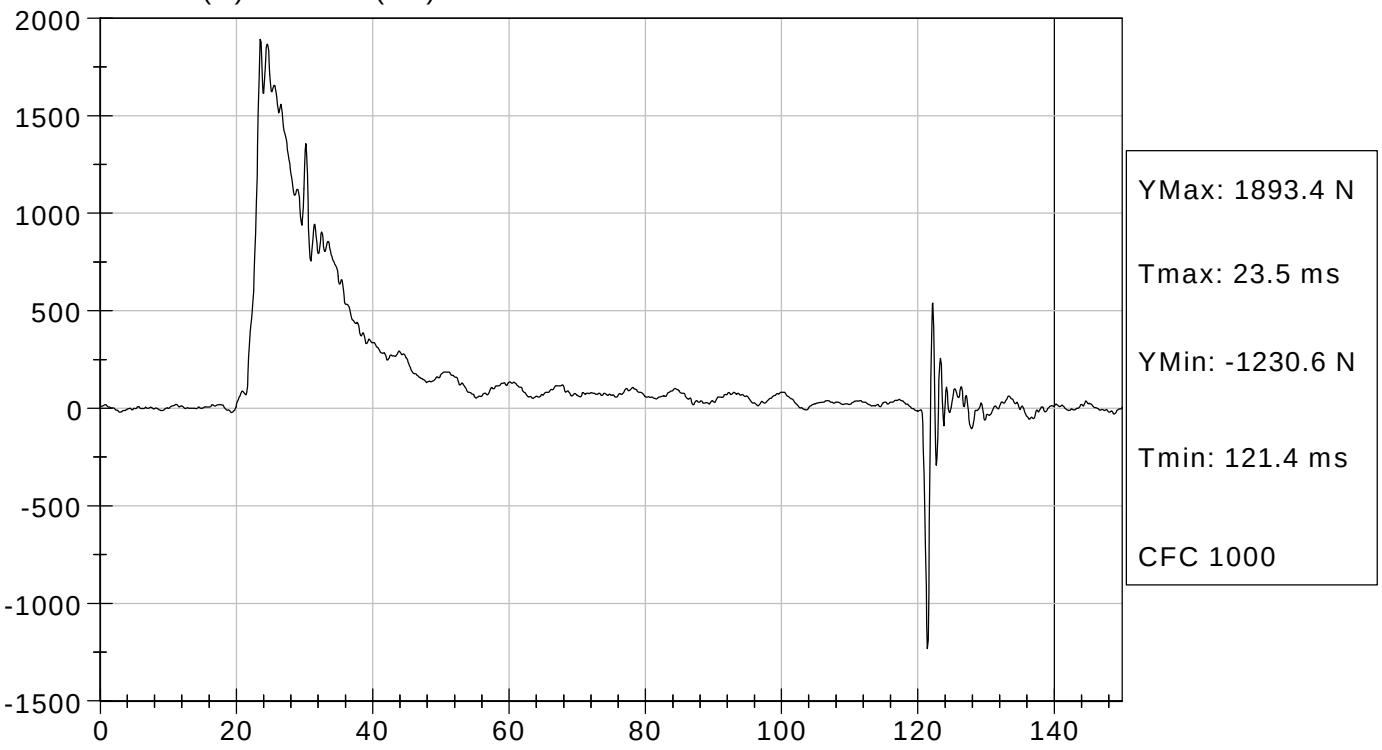
DISPLACEMENT (mm) vs TIME (ms)



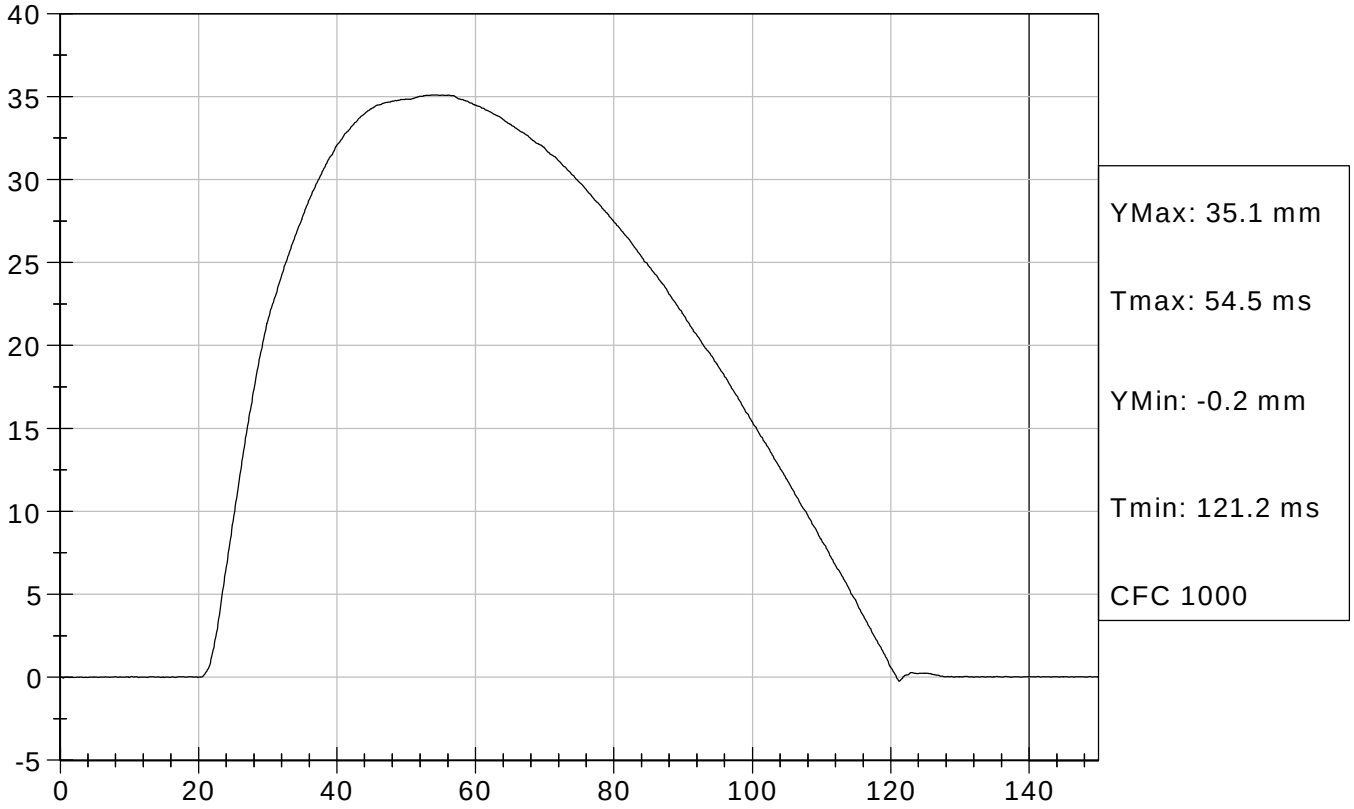
Test Desc: Dampener Impact
Component ID: D031827

Test Date: 11/07/2003
Speed: 13.96 ft/sec, 4.255 m/sec

FORCE (N) vs TIME (ms)



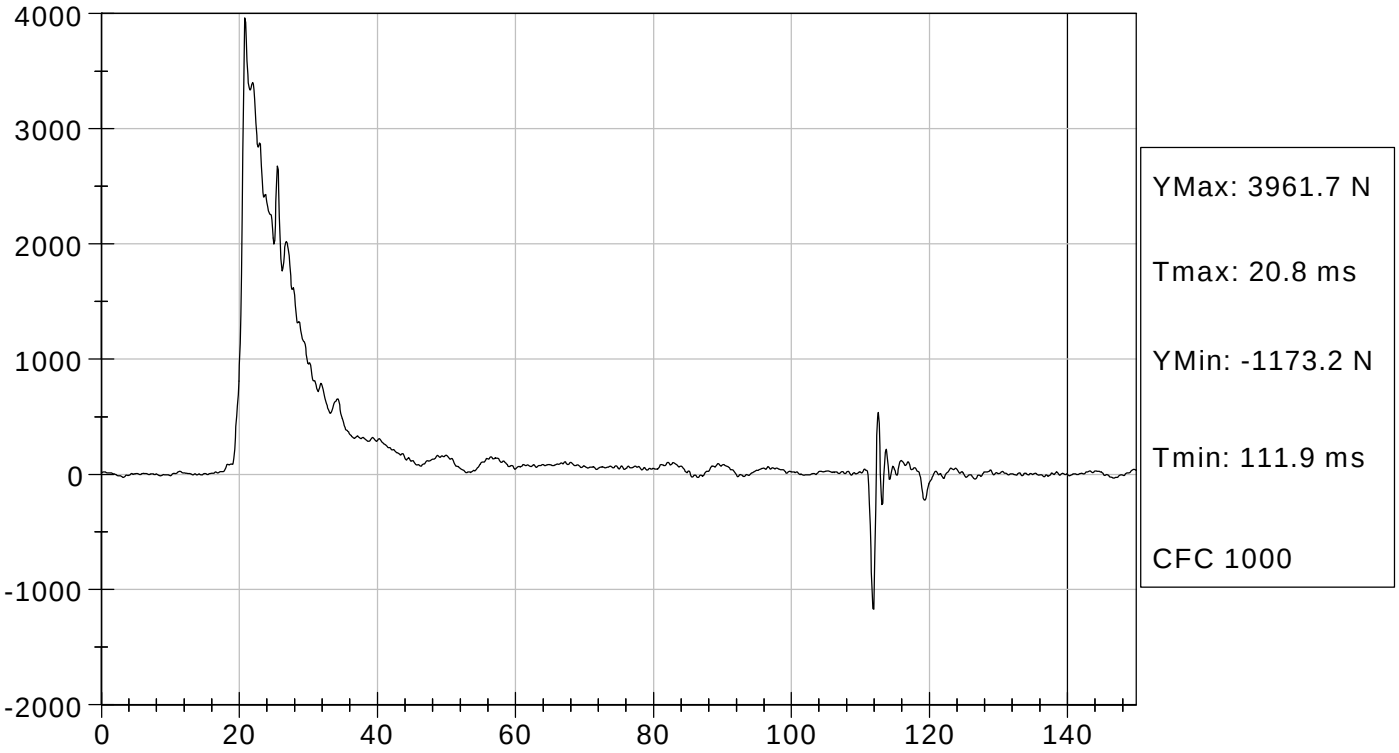
DISPLACEMENT (mm) vs TIME (ms)



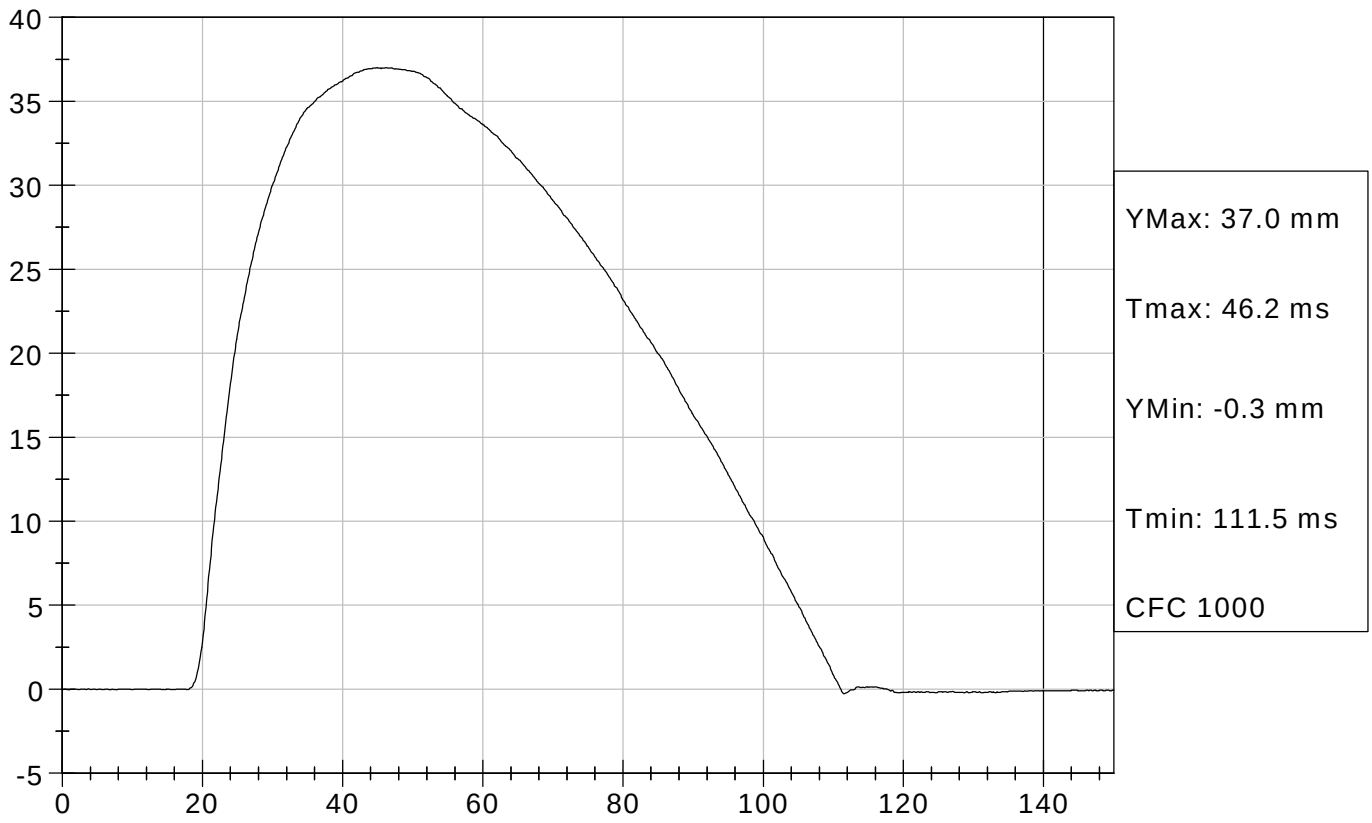
Test Desc: Dampener Impact
Component ID: D031828

Test Date: 11/07/2003
Speed: 20.02 ft/sec, 6.102 m/sec

FORCE (N) vs TIME (ms)



DISPLACEMENT (mm) vs TIME (ms)



SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 904 **Test I.D:** D031829

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.2	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Impact Velocity		m/s	6.89 to 7.13	6.92	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.30	Pass
	20 msec	m/s	4.12 to 5.10	4.53	Pass
	30 msec	m/s	5.73 to 7.01	6.31	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.87	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	69	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	61	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	73	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	55	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	13	Pass

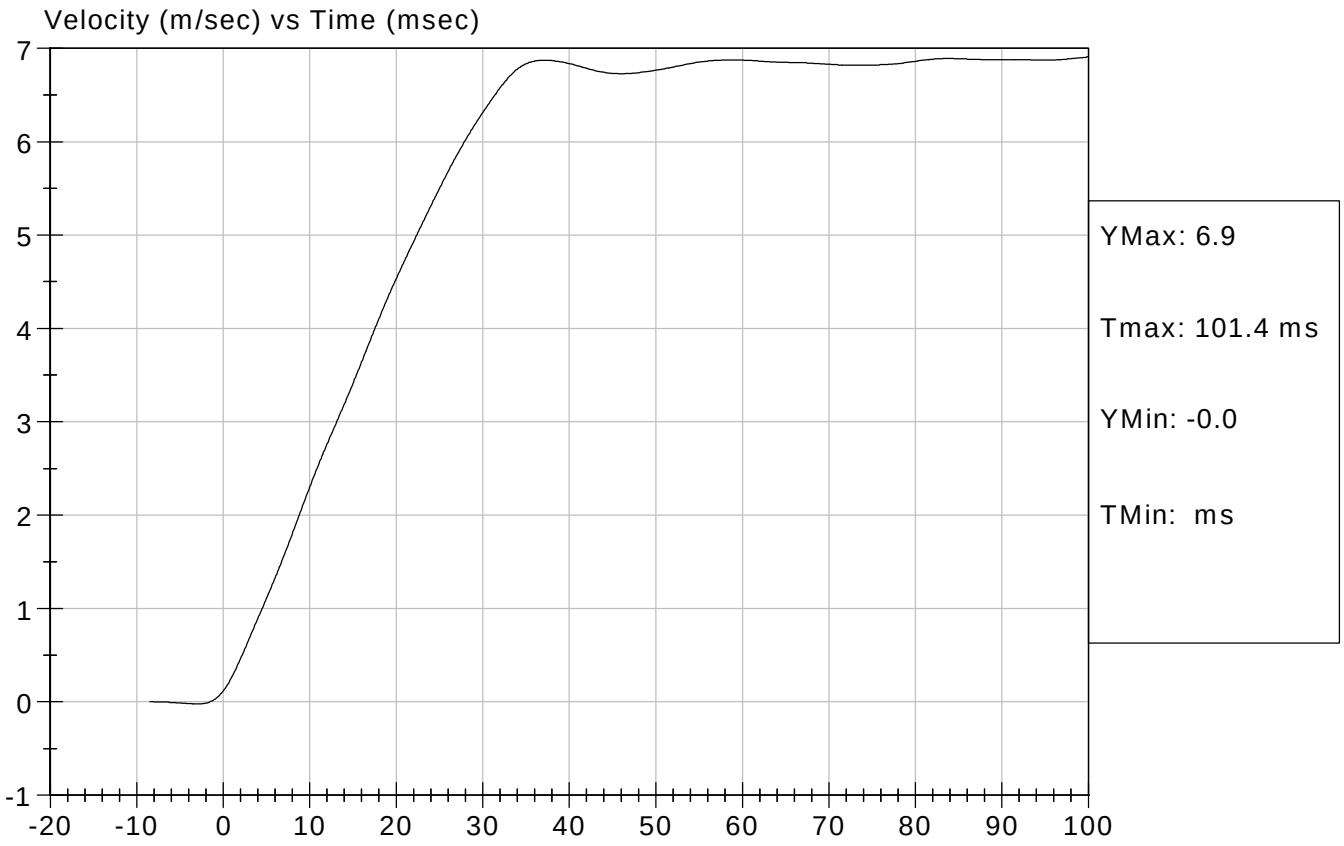
Jessica Hall
Laboratory Technician

11/06/2003
Test Date

Shefalika Jgarwal
Approved By

Test Desc: Neck Bending
Component ID: D031829

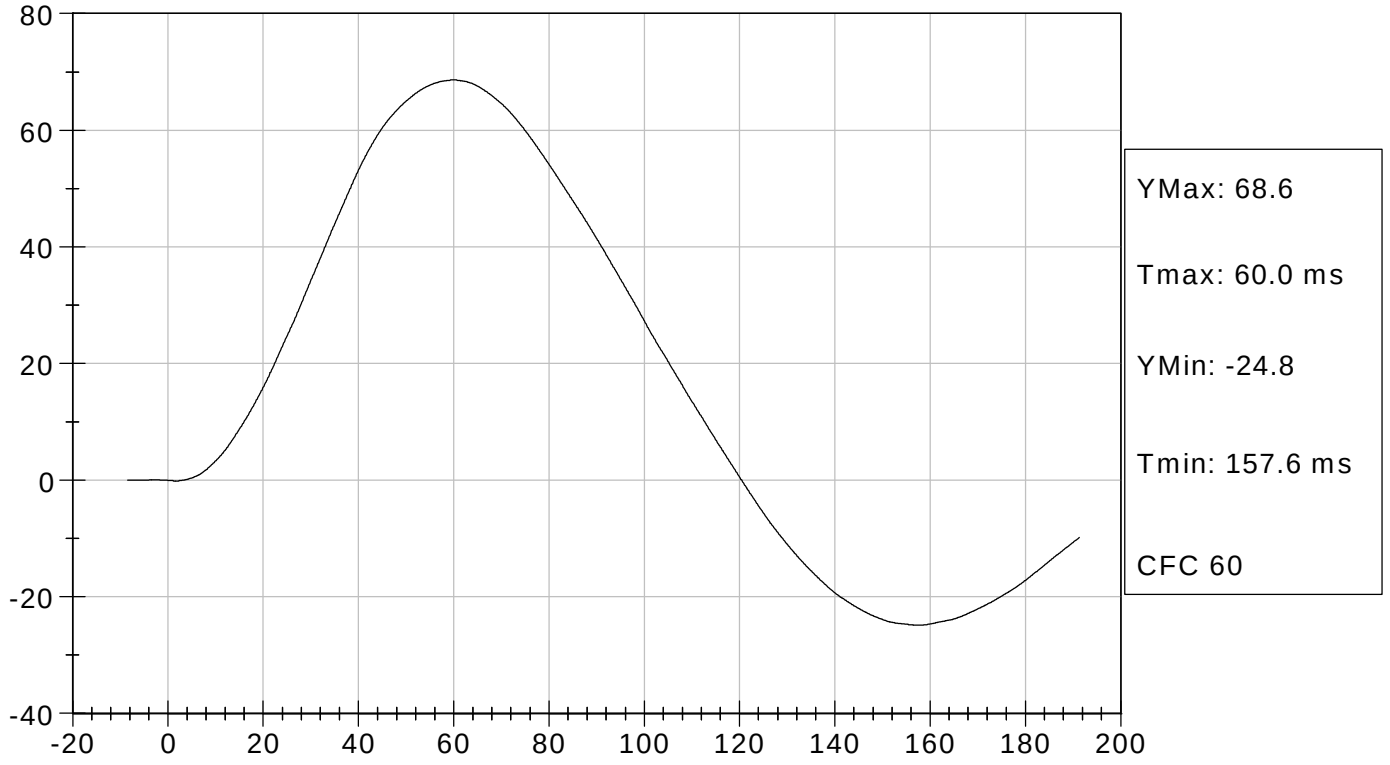
Test Date: 11/06/2003
Speed: 22.69 ft/sec, 6.92 m/sec



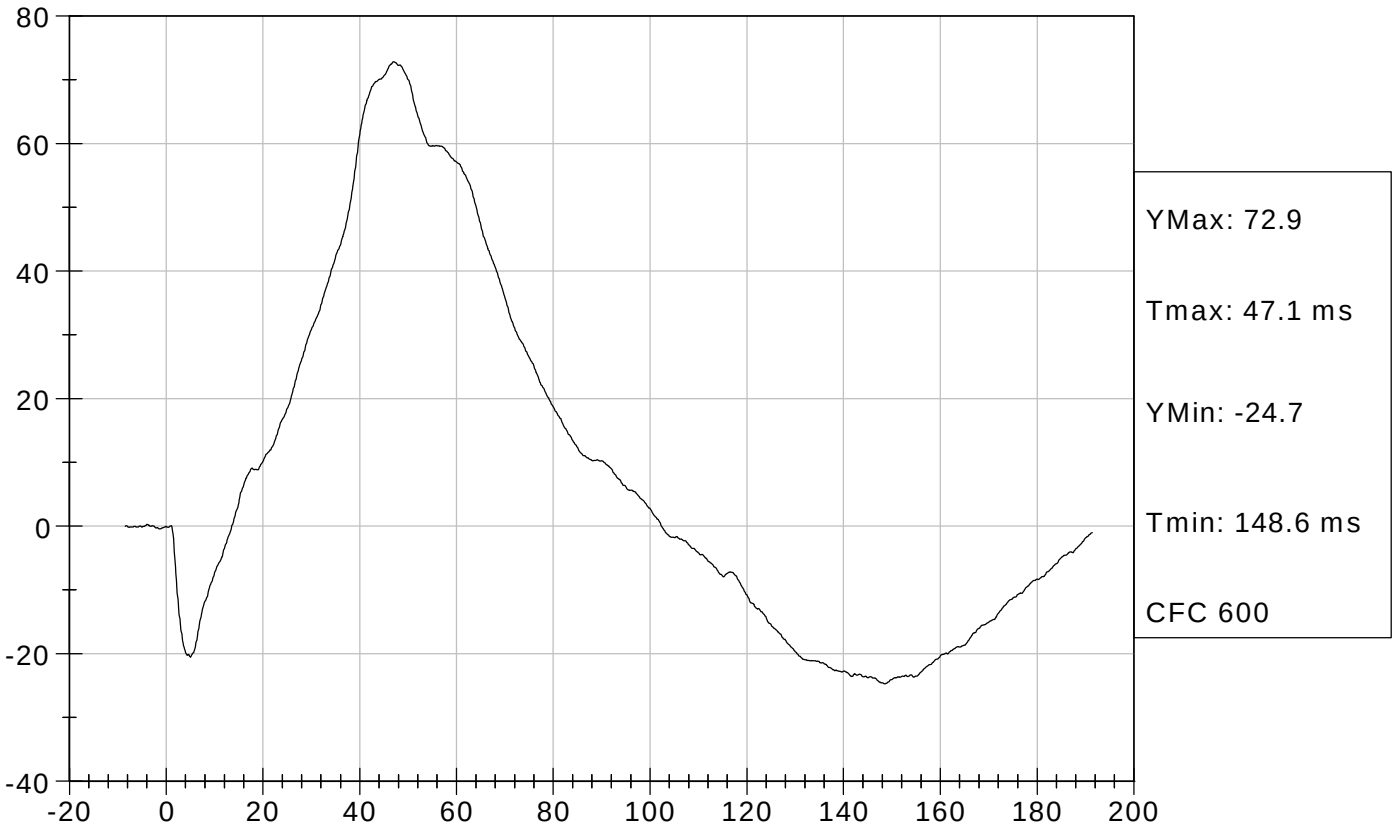
Test Desc: Neck Bending
Component ID: D031829

Test Date: 11/06/2003
Speed: 22.69 ft/sec, 6.92 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: 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 Hall

Laboratory Technician

11/11/2003

Test Date

Shefalika Agarwal

Approved By

CERTIFICATION DATA

Dummy Serial Number: 271

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.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.

SID Calibration Data Sheet

Side Impact Dummy

External Measurements

ATD Serial No: 271 **Test I.D:** D03187

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	905	Pass
RH - Rib Height	mm	501 - 521	502	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	239	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	526	Pass
SW - Knee Pivot to Floor	mm	490 - 505	497	Pass
HW - Hip Width	mm	356 - 391	371	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

11/12/2003
Test Date

Shefalika Jgarwal
Approved By

SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 271 **Test I.D:** D031871

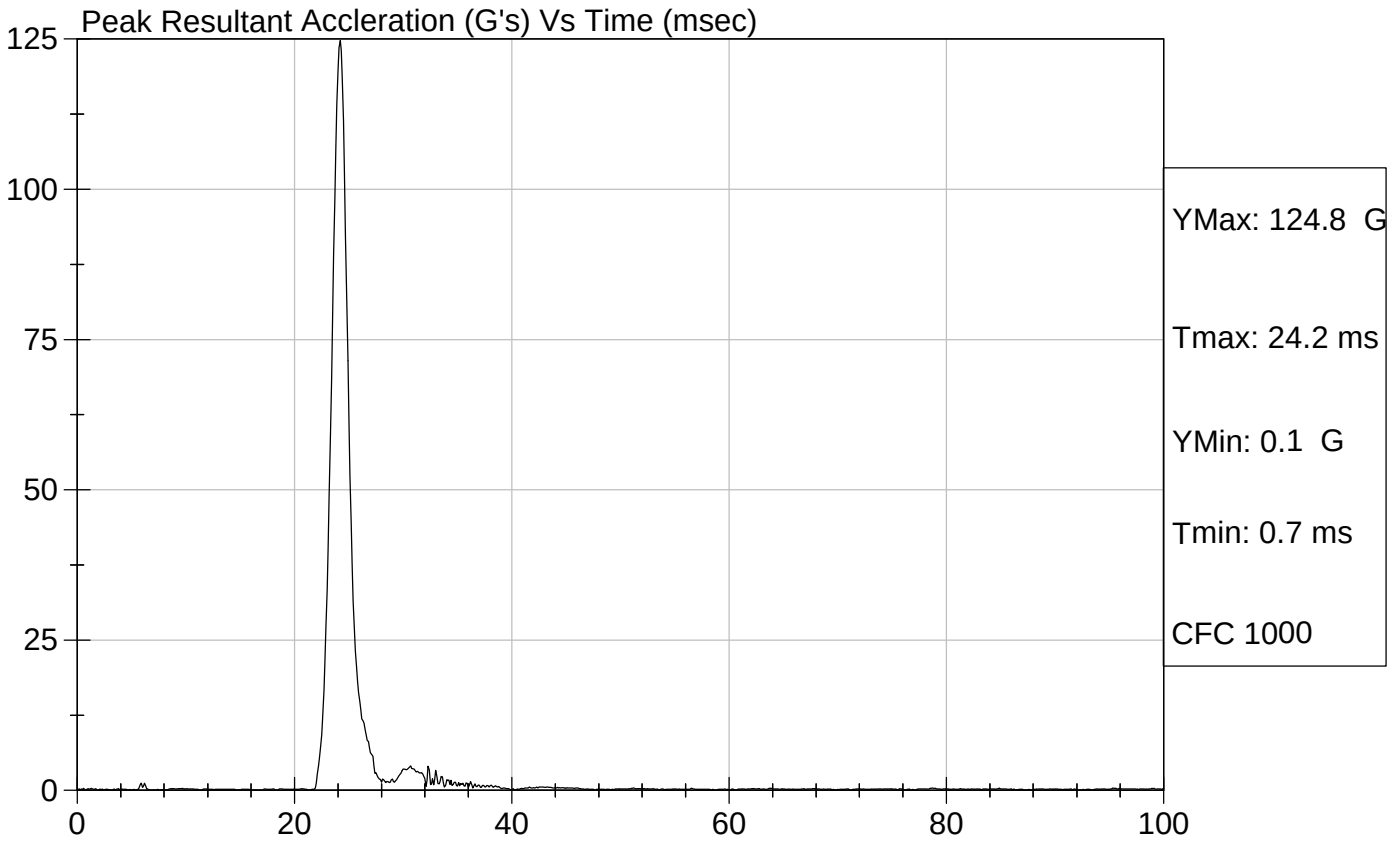
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Peak Resultant Acceleration	G's	120 to 150	125	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-7	Pass
		Overall Test Results		Pass

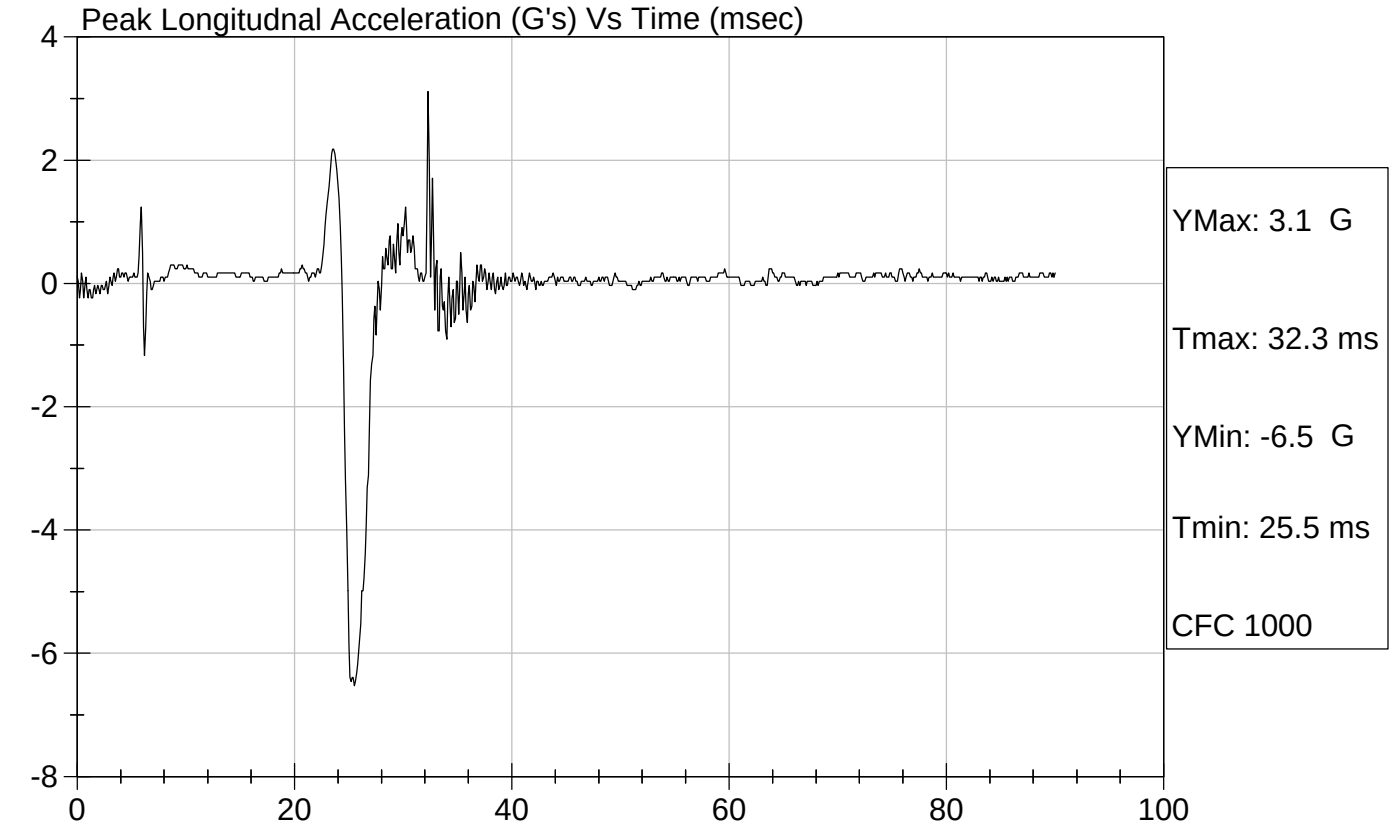
Jessica Gall
Laboratory Technician

11/18/2003
Test Date

Mukta Agarwal
Approved By

	Test Description: Head Drop	Test Date: 11/18/2003
	Component: D031871	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:** D031872

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Upper Rib	G's	37 - 46	45	Pass
Lower Rib	G's	37 - 46	43	Pass
Lower Spine	G's	15 - 22	19	Pass
		Overall Test Results		Pass

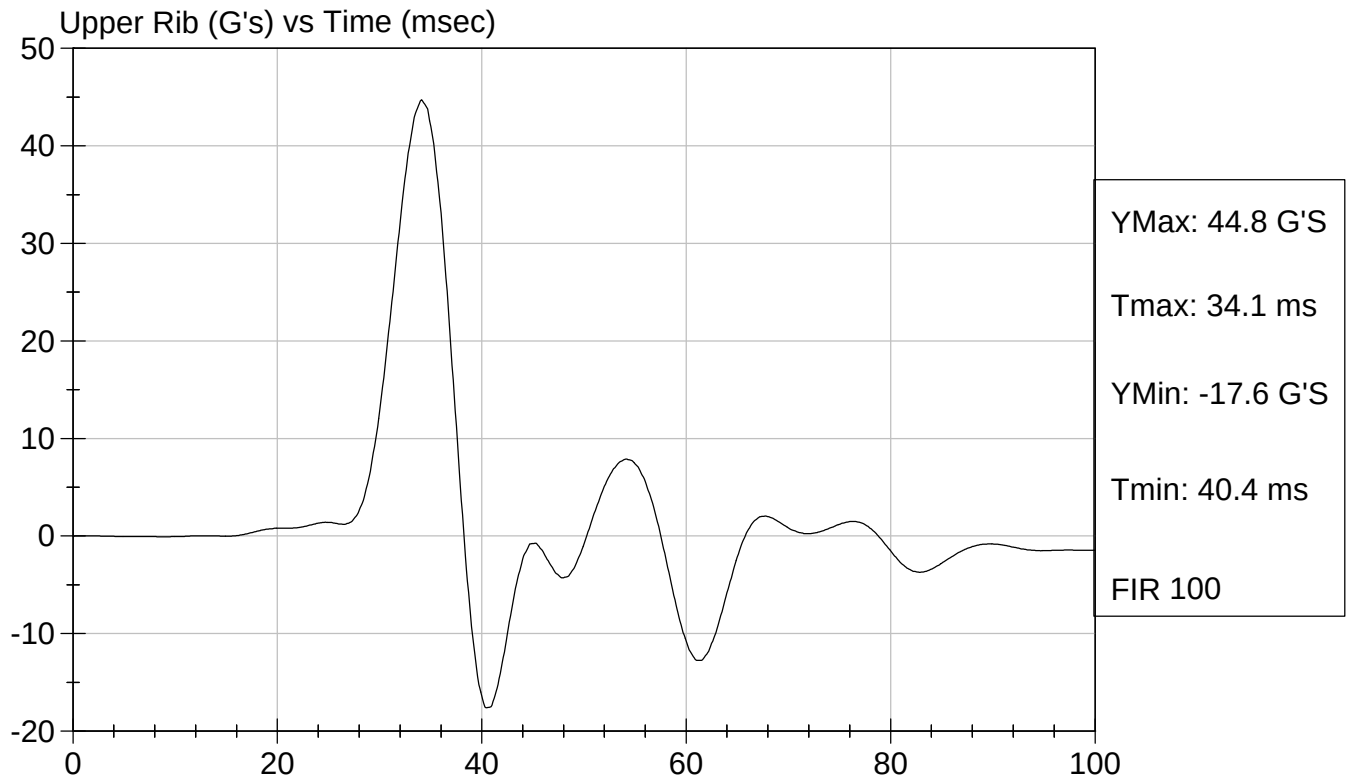
Jessica Gall
Laboratory Technician

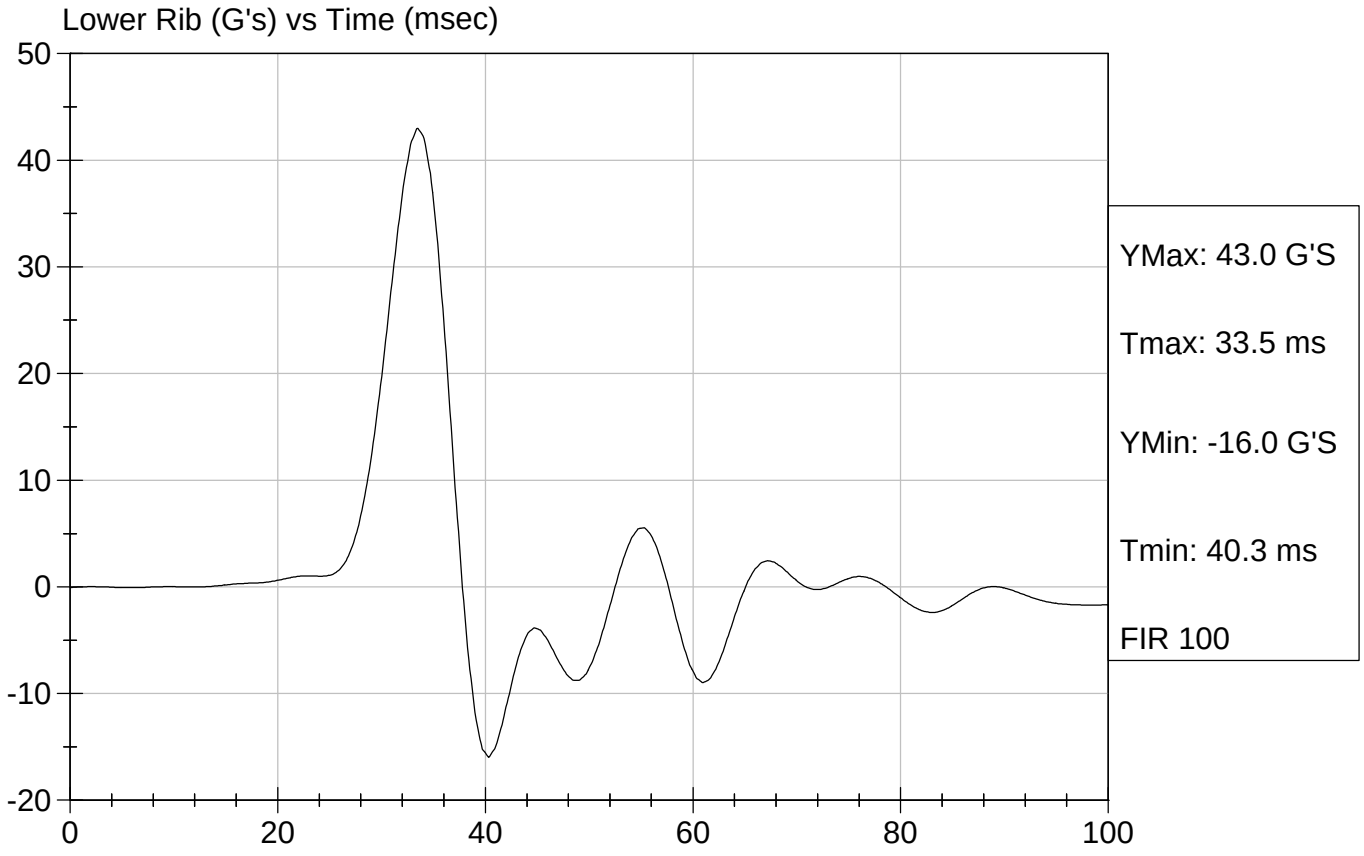
11/20/2003
Test Date

Shefalika Jgarwal
Approved By

Test Desc: Thorax Impact
Component ID: D031872

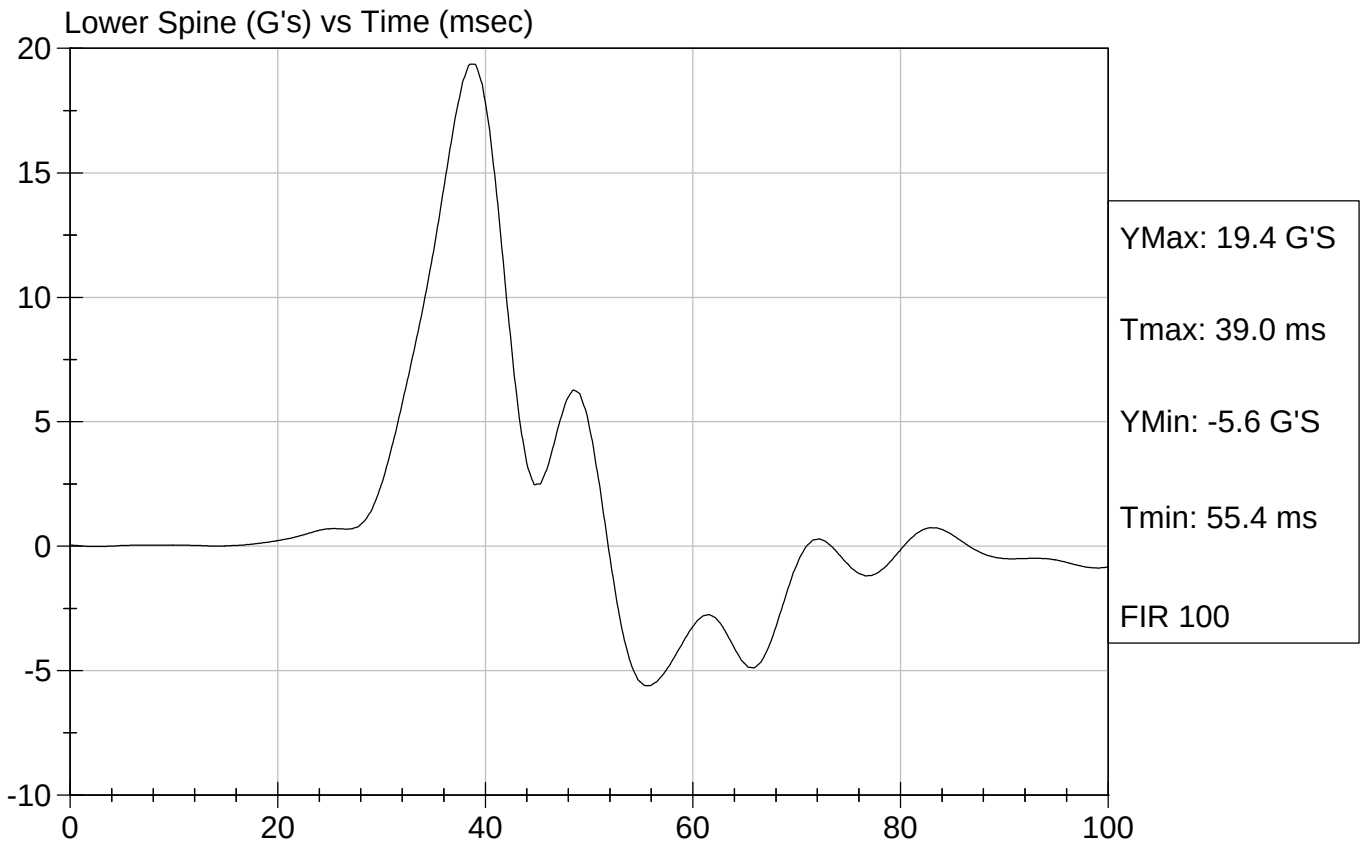
Test Date: 11/20/2003
Speed: 14.12 ft/sec, 4.30 m/sec





Test Desc: Thorax Impact
Component ID: D031872

Test Date: 11/20/2003
Speed: 14.12 ft/sec, 4.30 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 271 **Test I.D:** D031873

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	44	Pass
		Overall Test Results		Pass

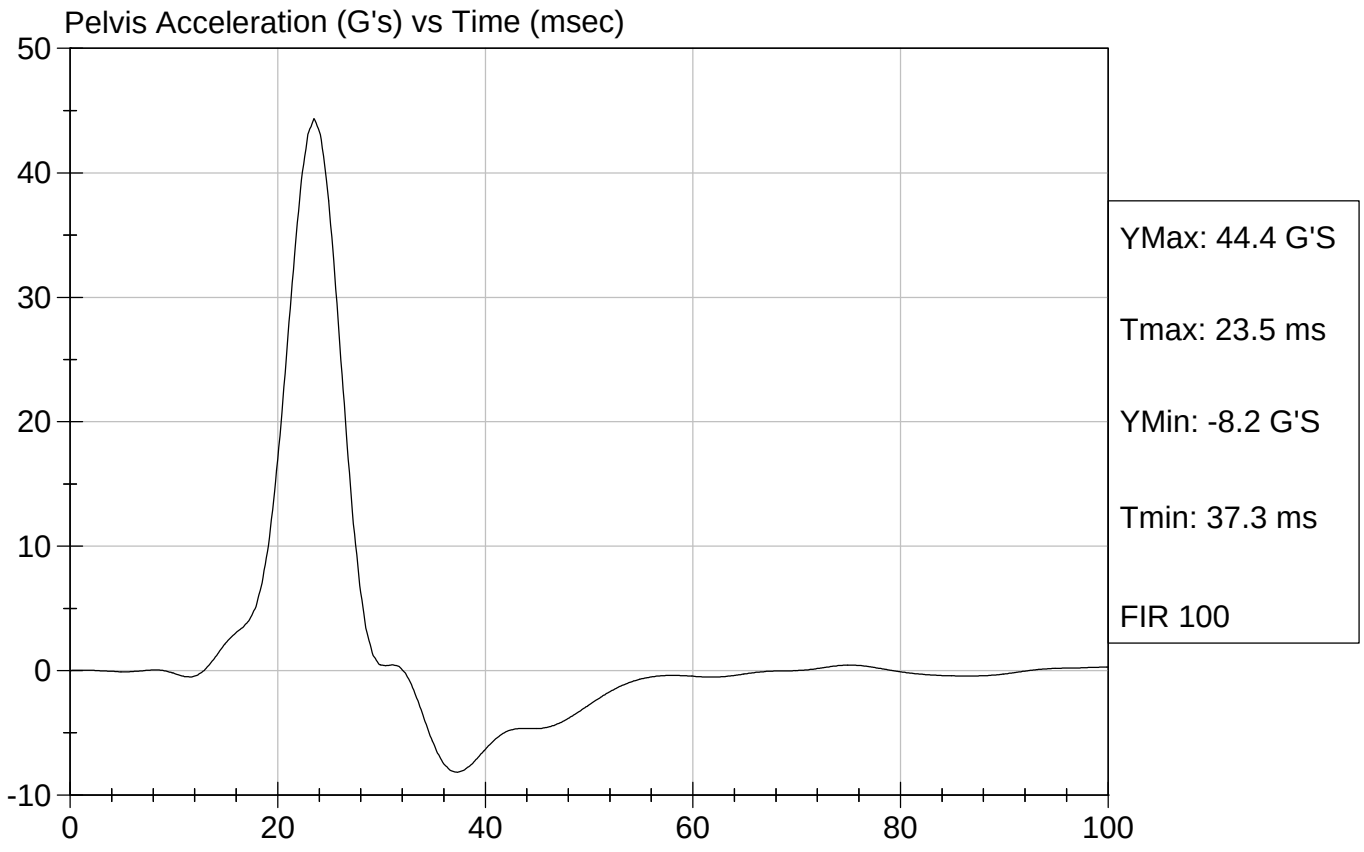
Jessica Gall
Laboratory Technician

11/20/2003
Test Date

Shefalika Jgarwal
Approved By

Test Desc: Pelvis Impact
Component ID: D031873

Test Date: 11/20/2003
Speed: 14.12 ft/sec, 4.30 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271 **Test I.D:** D031874

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Force At 12.7 mm	N	104 -162	142	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	372	Pass
		Overall Test Results		Pass

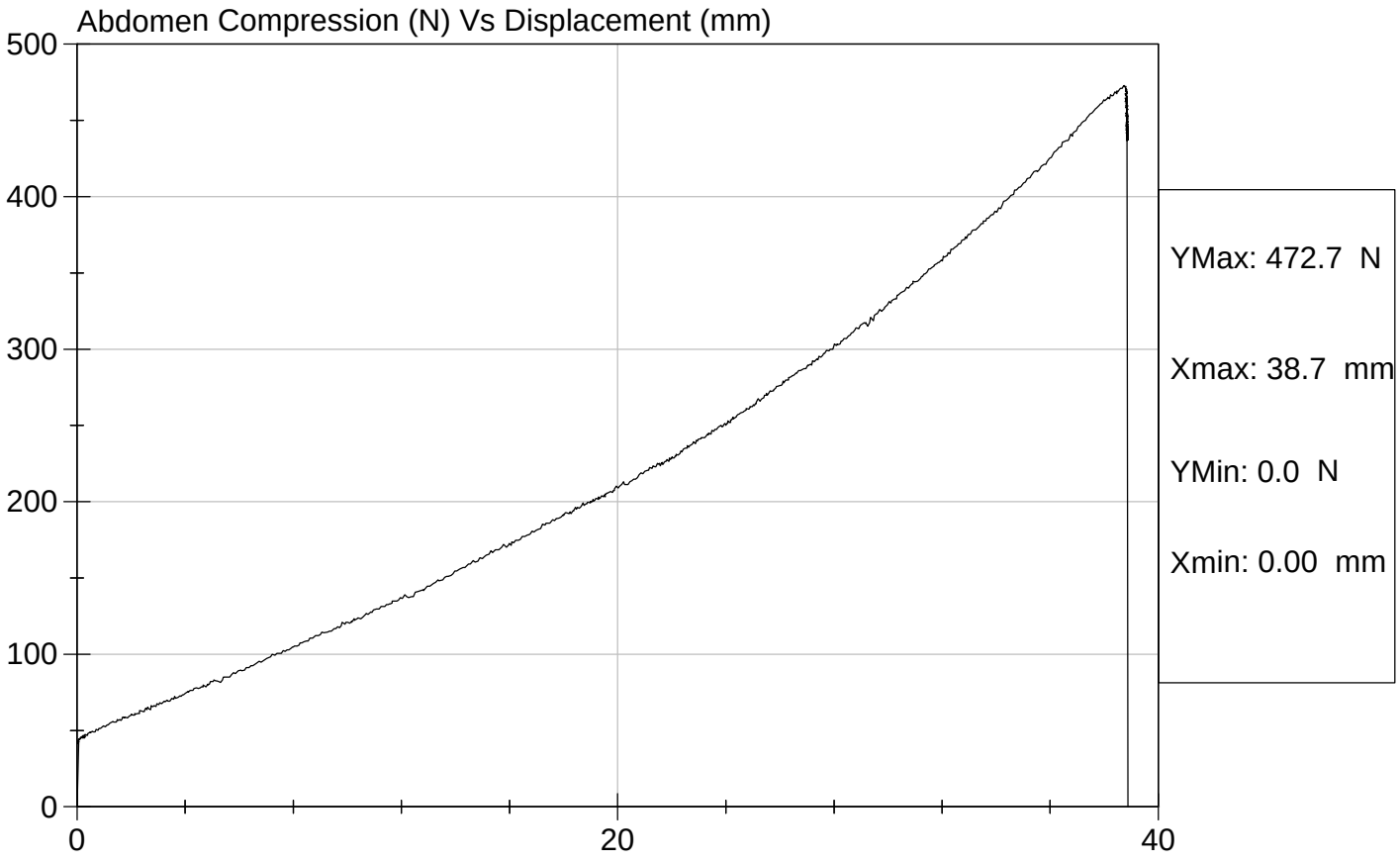
Jessica Gall
Laboratory Technician

11/19/2003
Test Date

Shefalika Jgarwal
Approved By

Test Description: Abdomen Compression Test Date: 11/19/2003

Component: D031874 Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 271 **Test I.D:** D031875

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	125.4	Pass
Force At 30 deg	N	151.2 - 204.6	177.6	Pass
Force At 40 deg	N	204.6 - 258.0	229.9	Pass
Return Angle	Deg	12 Maximum	5	Pass
		Overall Test Results		Pass

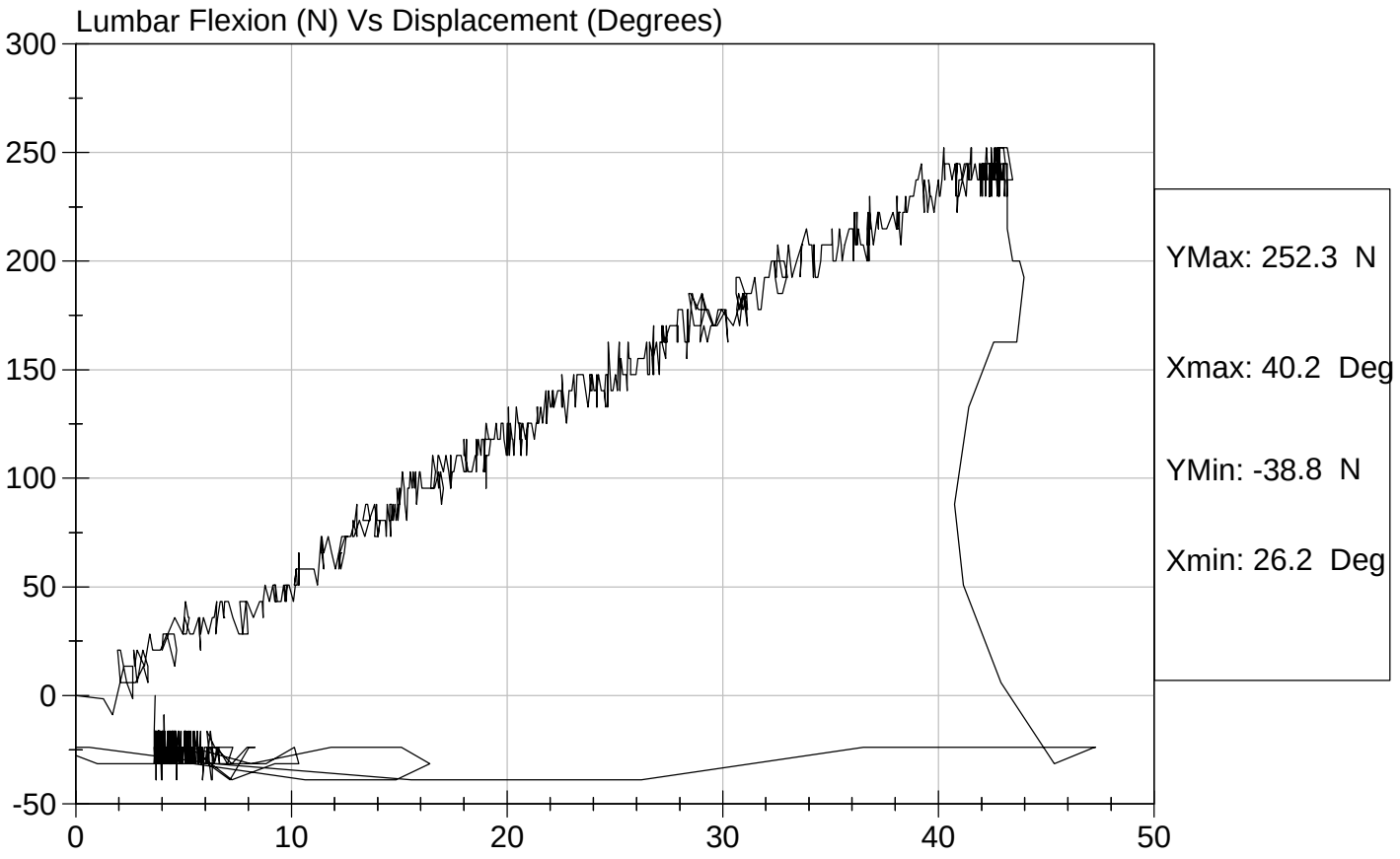
Jessica Gall
Laboratory Technician

11/19/2003
Test Date

Shefalika Jgarwal
Approved By

Test Description: Lumbar Flexion | Test Date: 11/19/2003

Component: D031875 | Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet
Side Impact Dummy (SID)
Neck Pendulum Test

ATD Serial No: 271 **Test I.D:** D031879

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	28	Pass
Impact Velocity		m/s	6.89 to 7.13	7.03	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.39	Pass
	20 msec	m/s	4.12 to 5.10	4.73	Pass
	30 msec	m/s	5.73 to 7.01	6.54	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.01	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	75	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	55	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	9	Pass

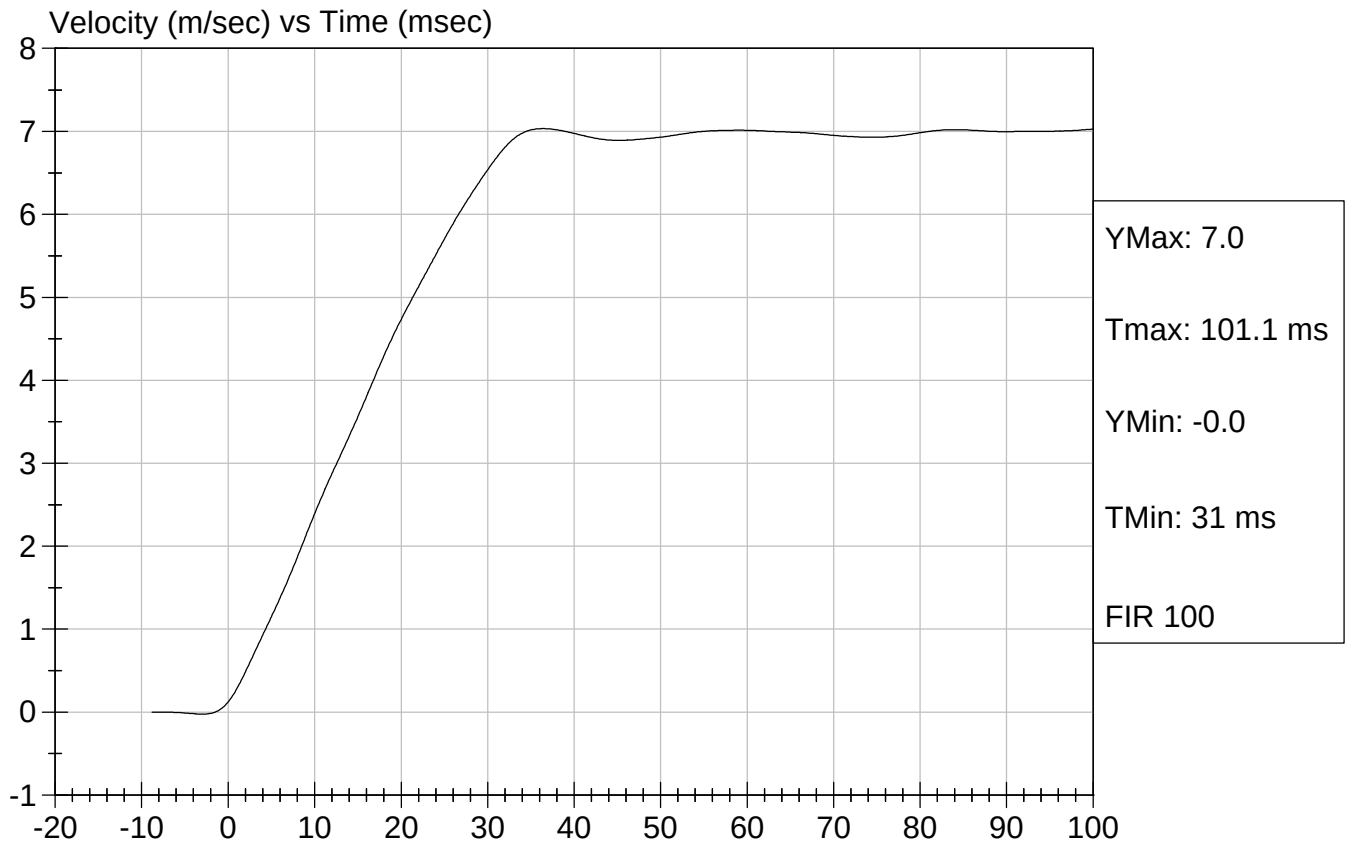
Jessica Gall
Laboratory Technician

11/19/2003
Test Date

Shefalika Jgarwal
Approved By

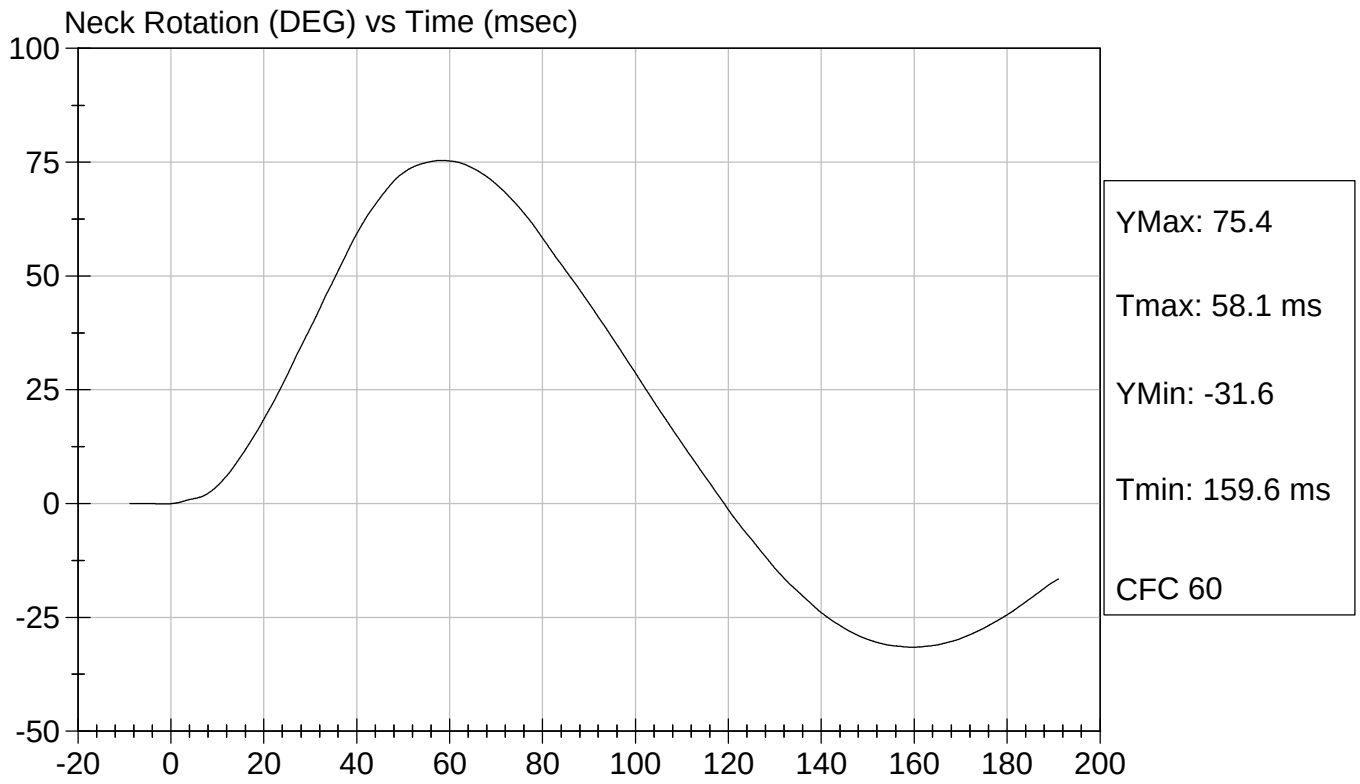
Test Desc: Neck Bending
Component ID: D031879

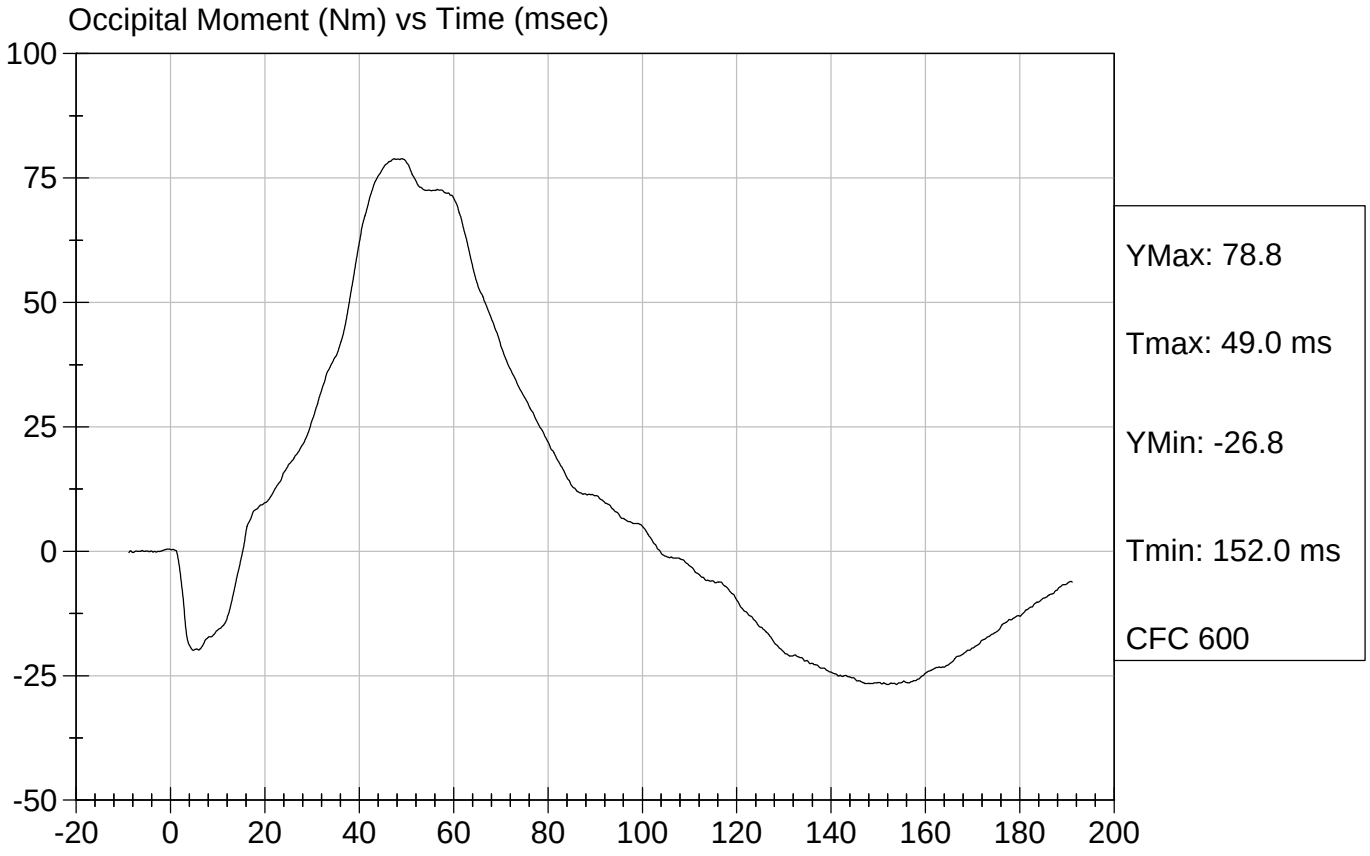
Test Date: 11/19/2003
Speed: 23.05 ft/sec, 7.03 m/sec



Test Desc: Neck Bending
Component ID: D031879

Test Date: 11/19/2003
Speed: 23.05 ft/sec, 7.03 m/sec





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 Gall
Laboratory Technician

11/20/2003
Test Date

Shefalika Agarwal
Approved By

CERTIFICATION DATA

Dummy Serial Number: 904

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.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.

SID Calibration Data Sheet

Side Impact Dummy

External Measurements

ATD Serial No: 904 **Test I.D:** D03188

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	903	Pass
RH - Rib Height	mm	501 - 521	509	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	240	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	525	Pass
SW - Knee Pivot to Floor	mm	490 - 505	500	Pass
HW - Hip Width	mm	356 - 391	368	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

11/12/2003
Test Date

Shefalika Jgarwal
Approved By

SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 904 **Test I.D:** D031881

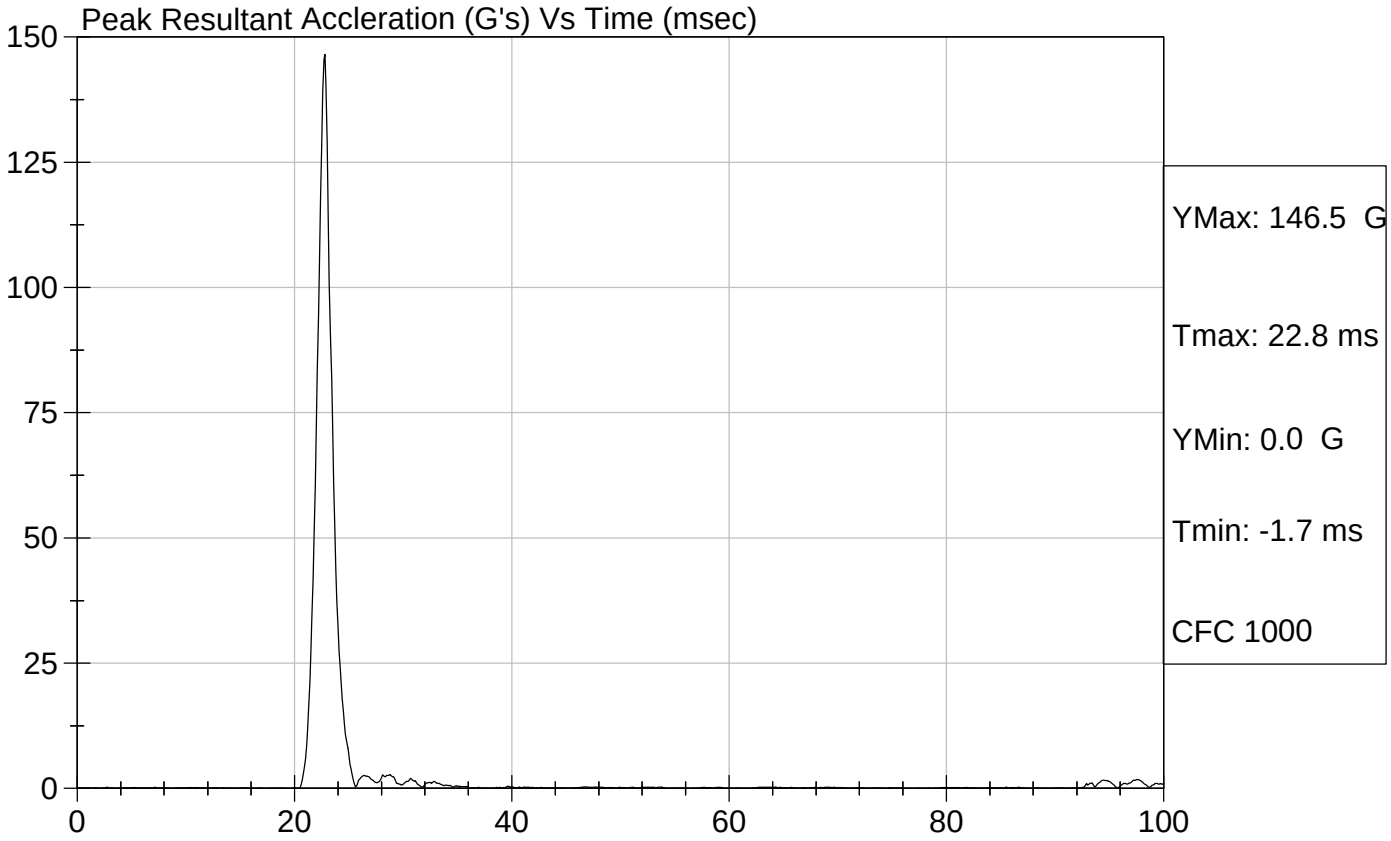
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Peak Resultant Acceleration	G's	120 to 150	147	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-5	Pass
		Overall Test Results		Pass

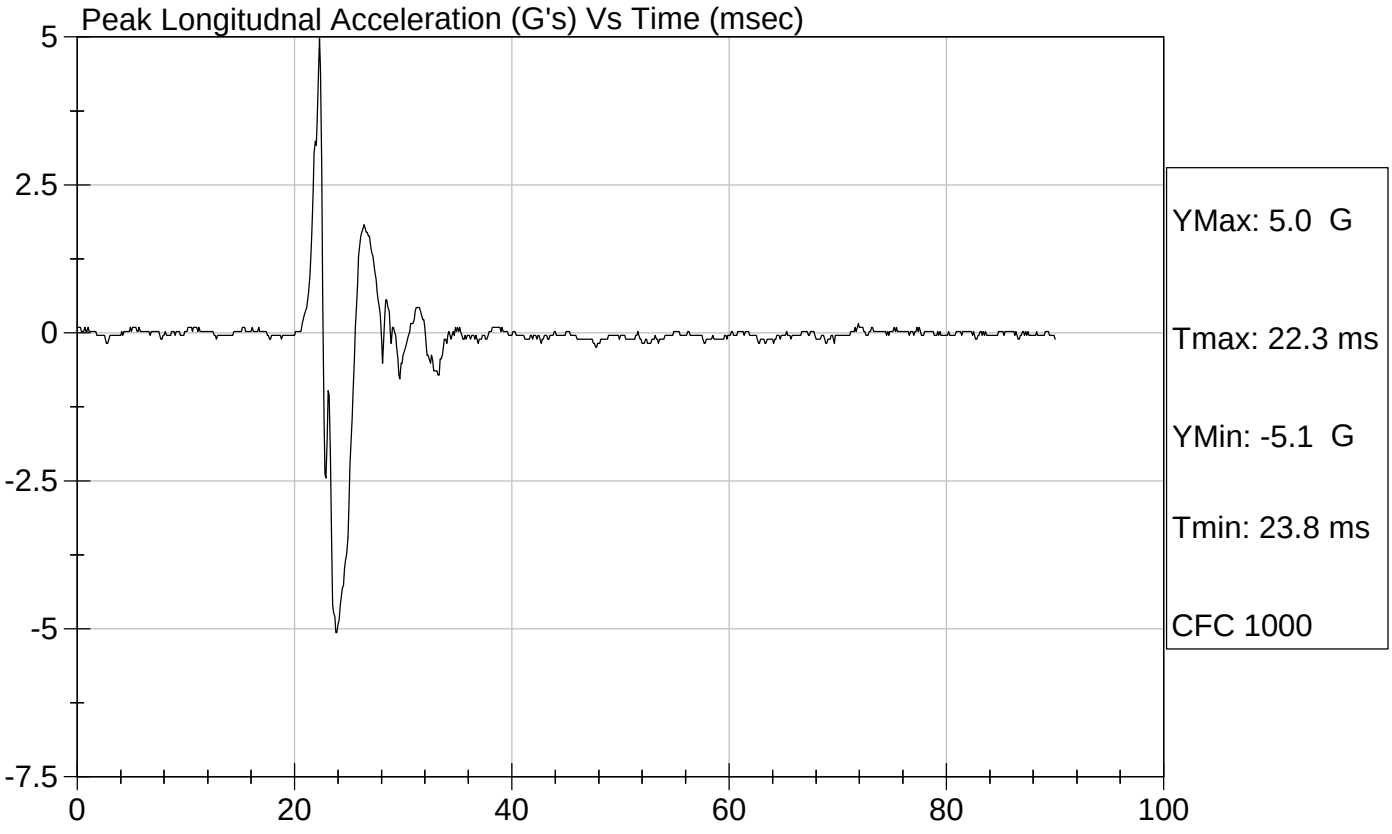
Jessica Gall
Laboratory Technician

11/18/2003
Test Date

Shefalika Jgarwal
Approved By

	Test Description: Head Drop	Test Date: 11/18/2003
	Component: D031881	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:** D031882

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Probe Velocity	m/s	4.27 - 4.33	4.29	Pass
Upper Rib	G's	37 - 46	40	Pass
Lower Rib	G's	37 - 46	41	Pass
Lower Spine	G's	15 - 22	20	Pass
		Overall Test Results		Pass

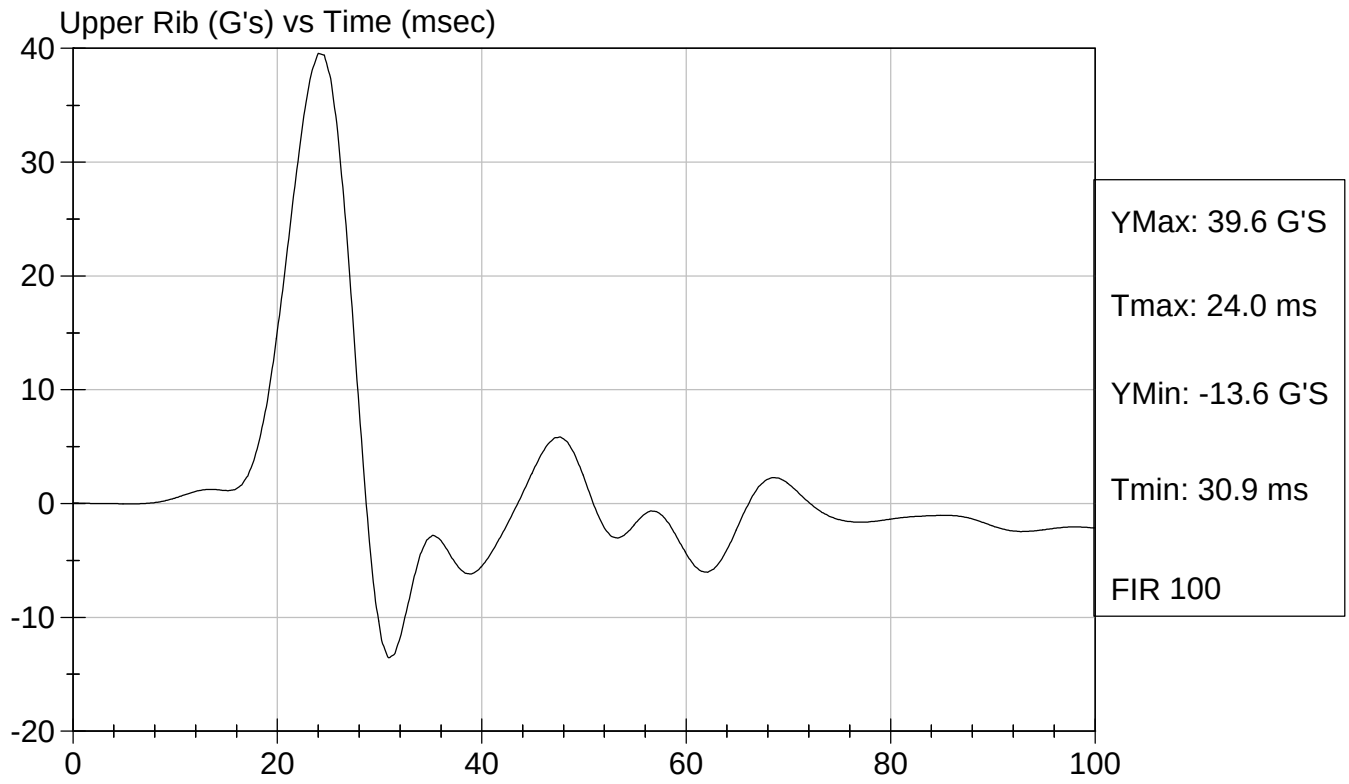
Jessica Gall
Laboratory Technician

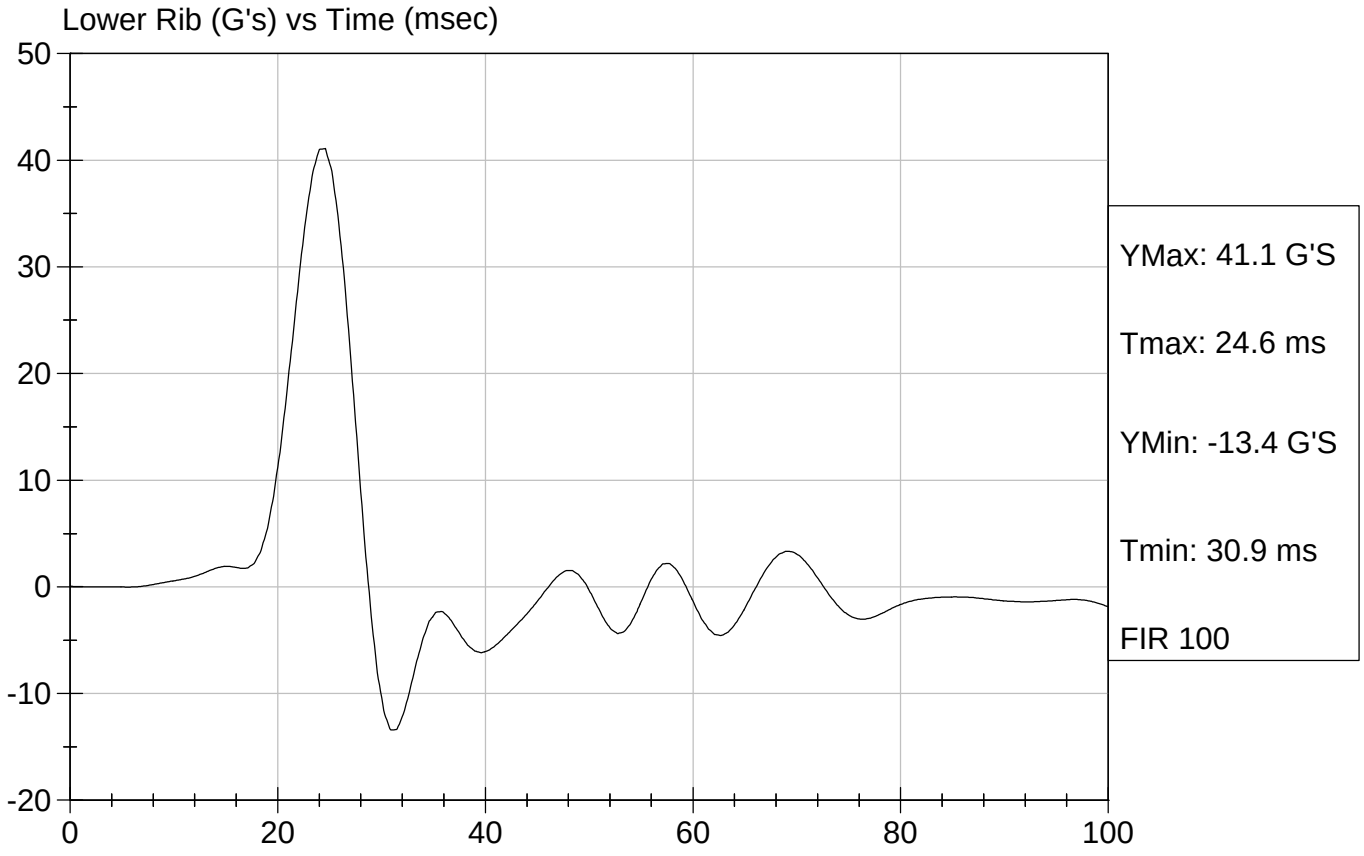
11/20/2003
Test Date

Shefalika Jgarwal
Approved By

Test Desc: Thorax Impact
Component ID: D031882

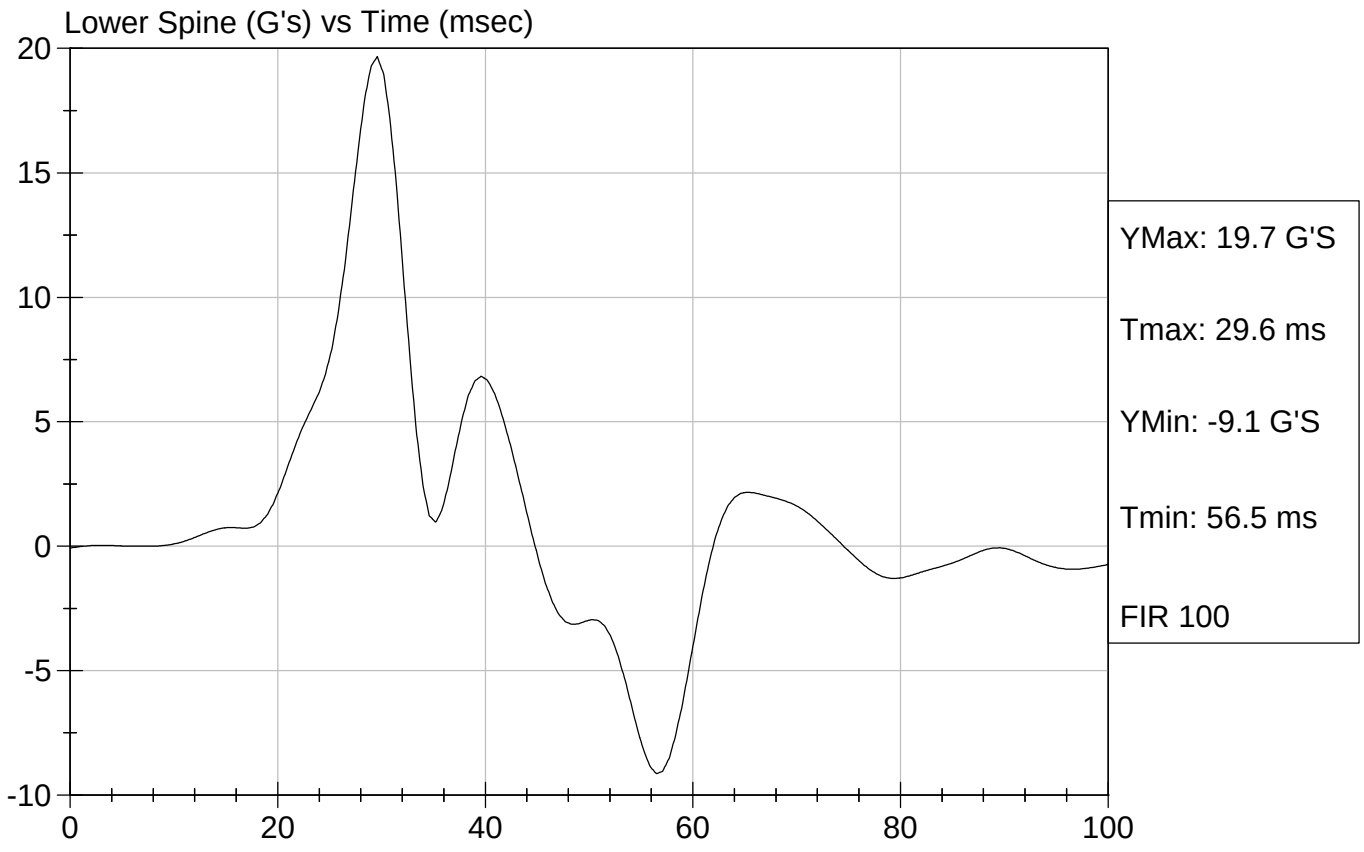
Test Date: 11/20/2003
Speed: 14.08 ft/sec, 4.29 m/sec





Test Desc: Thorax Impact
Component ID: D031882

Test Date: 11/20/2003
Speed: 14.08 ft/sec, 4.29 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 904 **Test I.D:** D031883

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Probe Velocity	m/s	4.27 - 4.33	4.32	Pass
Pelvis Acceleration	G's	40 - 60	44	Pass
		Overall Test Results		Pass

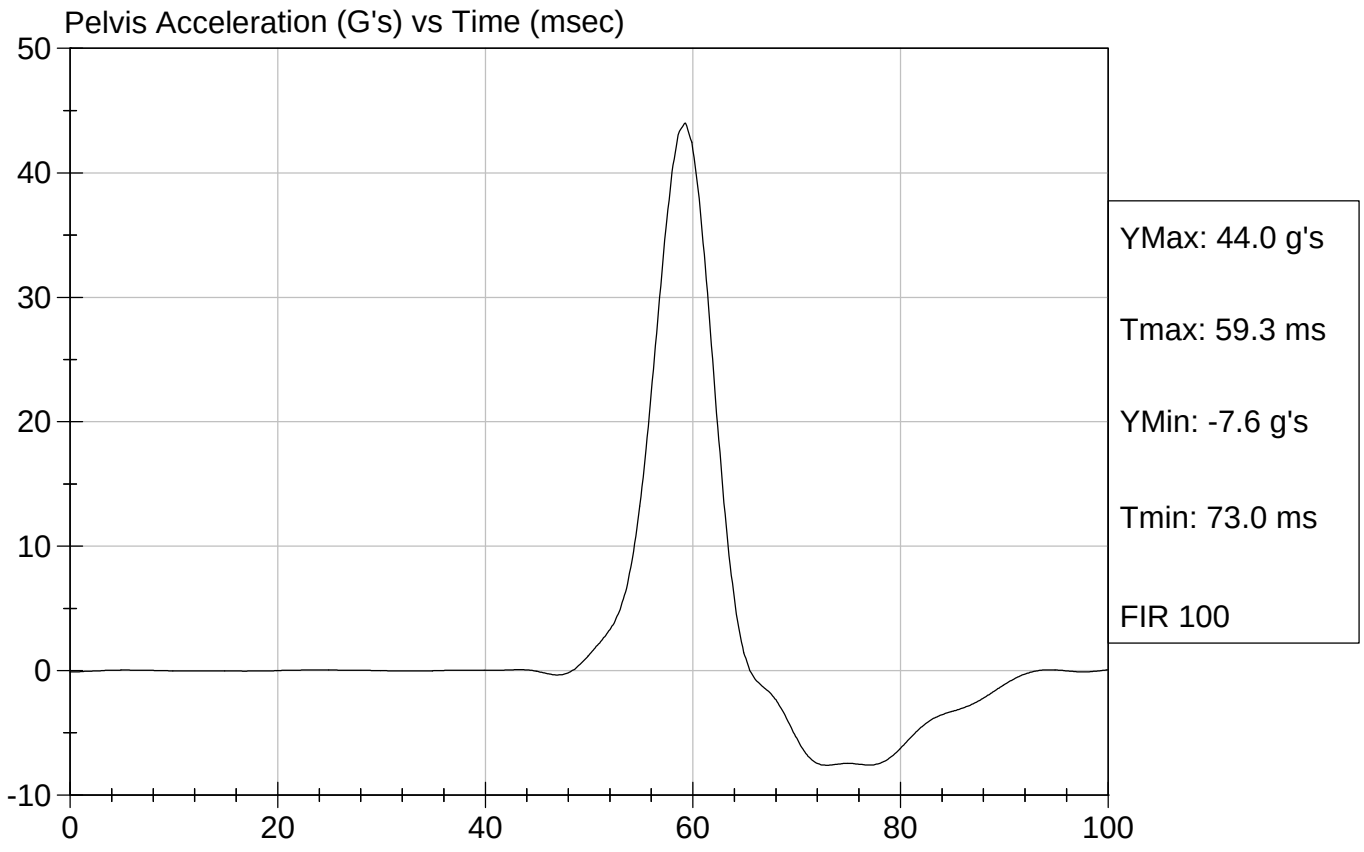
Jessica Gall
Laboratory Technician

11/19/2003
Test Date

Mustafa Agarwal
Approved By

Test Desc: Pelvis Impact
Component ID: D031883

Test Date: 11/19/2003
Speed: 14.16 ft/sec, 4.32 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 904 **Test I.D:** D031884

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Force At 12.7 mm	N	104 -162	139	Pass
Force At 19 mm	N	163 - 222	194	Pass
Force At 25.4 mm	N	222 - 280	257	Pass
Force At 33 mm	N	325 - 391	355	Pass
		Overall Test Results		Pass

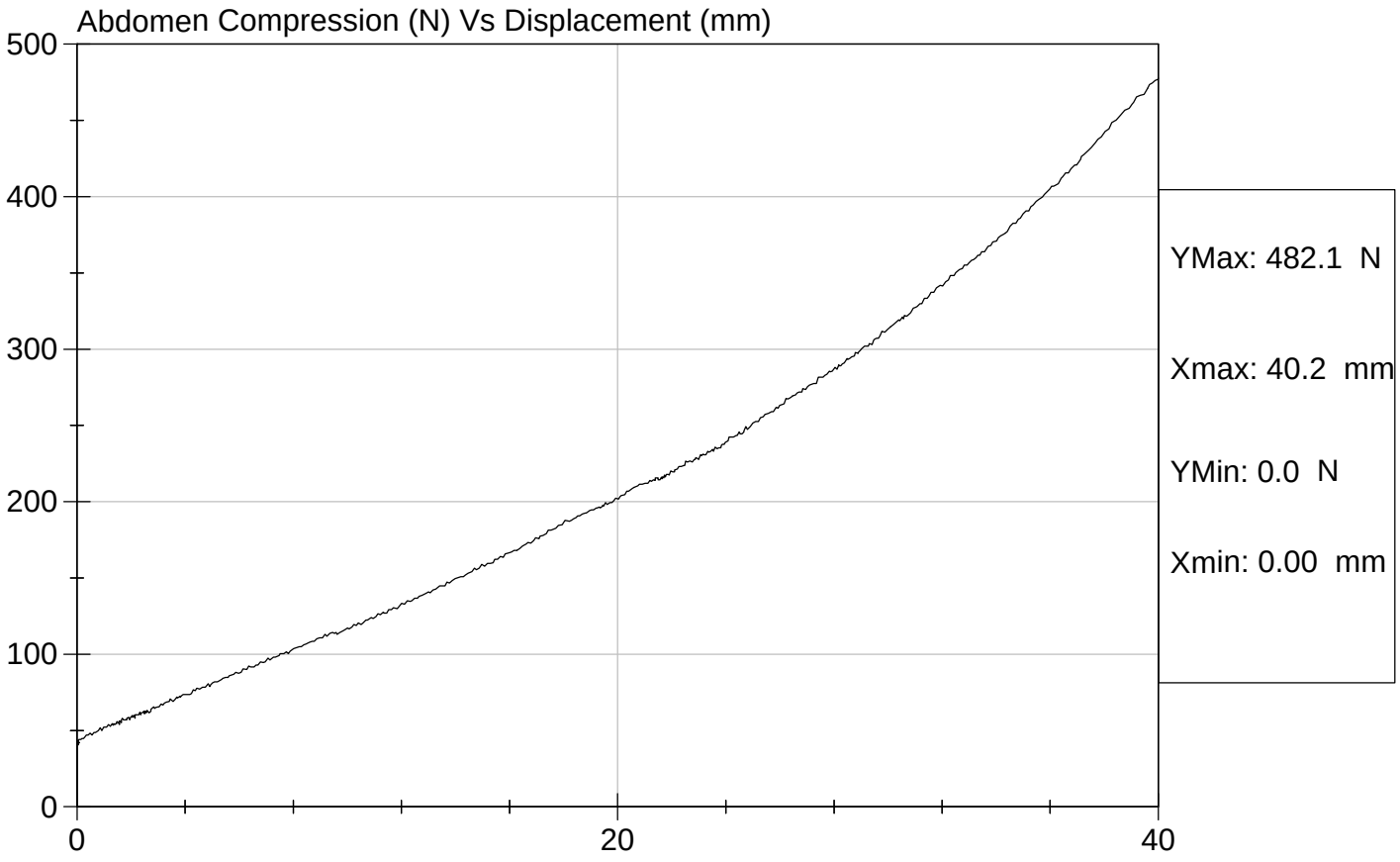
Jessica Gall
Laboratory Technician

11/19/2003
Test Date

Shefalika Jgarwal
Approved By

Test Description: Abdomen Compression Test Date: 11/19/2003

Component: D031884 Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 904 **Test I.D:** D031885

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	133.6	Pass
Force At 30 deg	N	151.2 - 204.6	185.9	Pass
Force At 40 deg	N	204.6 - 258.0	245.6	Pass
Return Angle	Deg	12 Maximum	5	Pass
		Overall Test Results		Pass

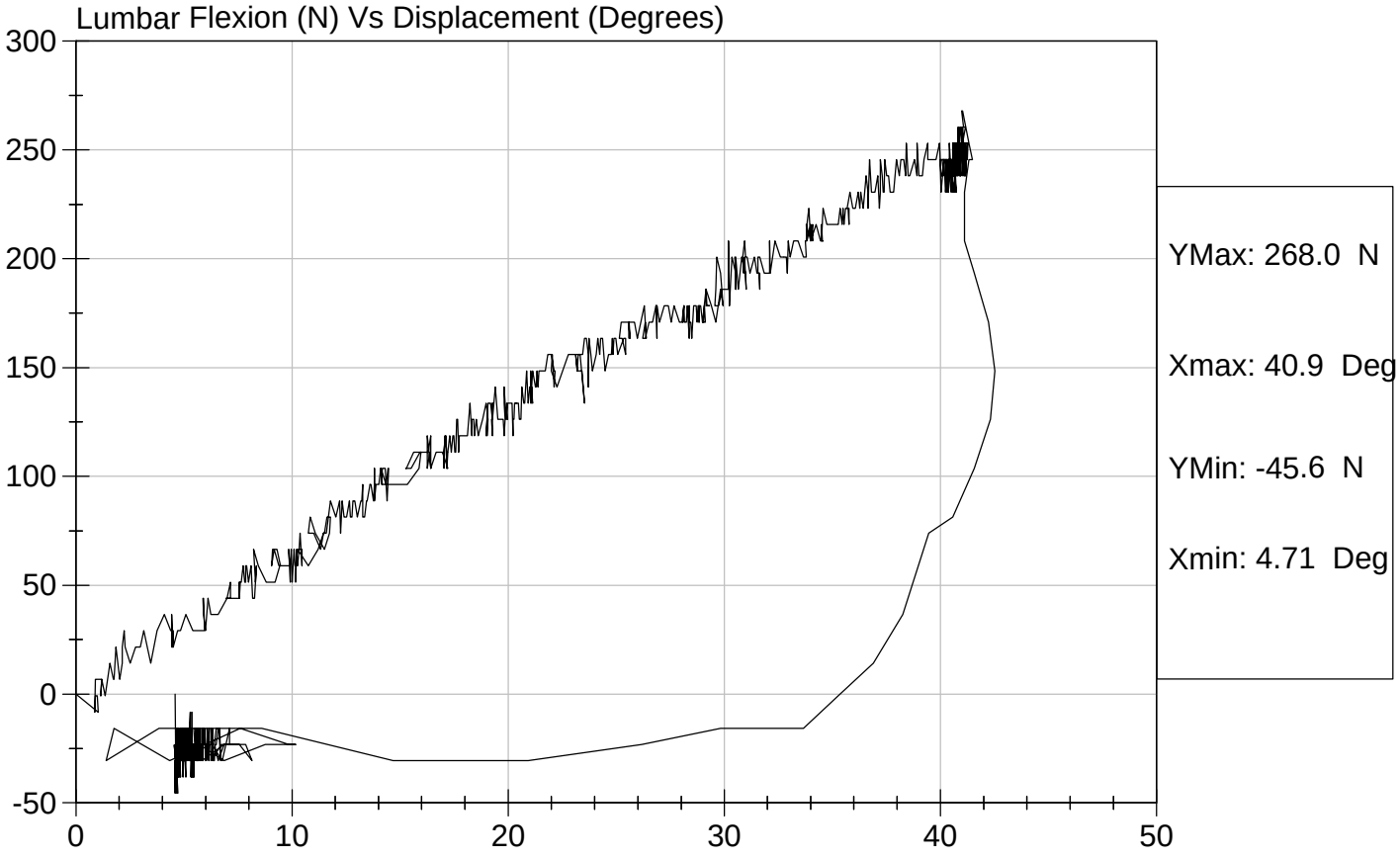
Jessica Gall
Laboratory Technician

11/19/2003
Test Date

Mustafa Agarwal
Approved By

Test Description: Lumbar Flexion | Test Date: 11/19/2003

Component: D031885 | 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:** D031889

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	28	Pass
Impact Velocity		m/s	6.89 to 7.13	7.10	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.21	Pass
	20 msec	m/s	4.12 to 5.10	4.45	Pass
	30 msec	m/s	5.73 to 7.01	6.28	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.02	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	70	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	80	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	55	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	10	Pass

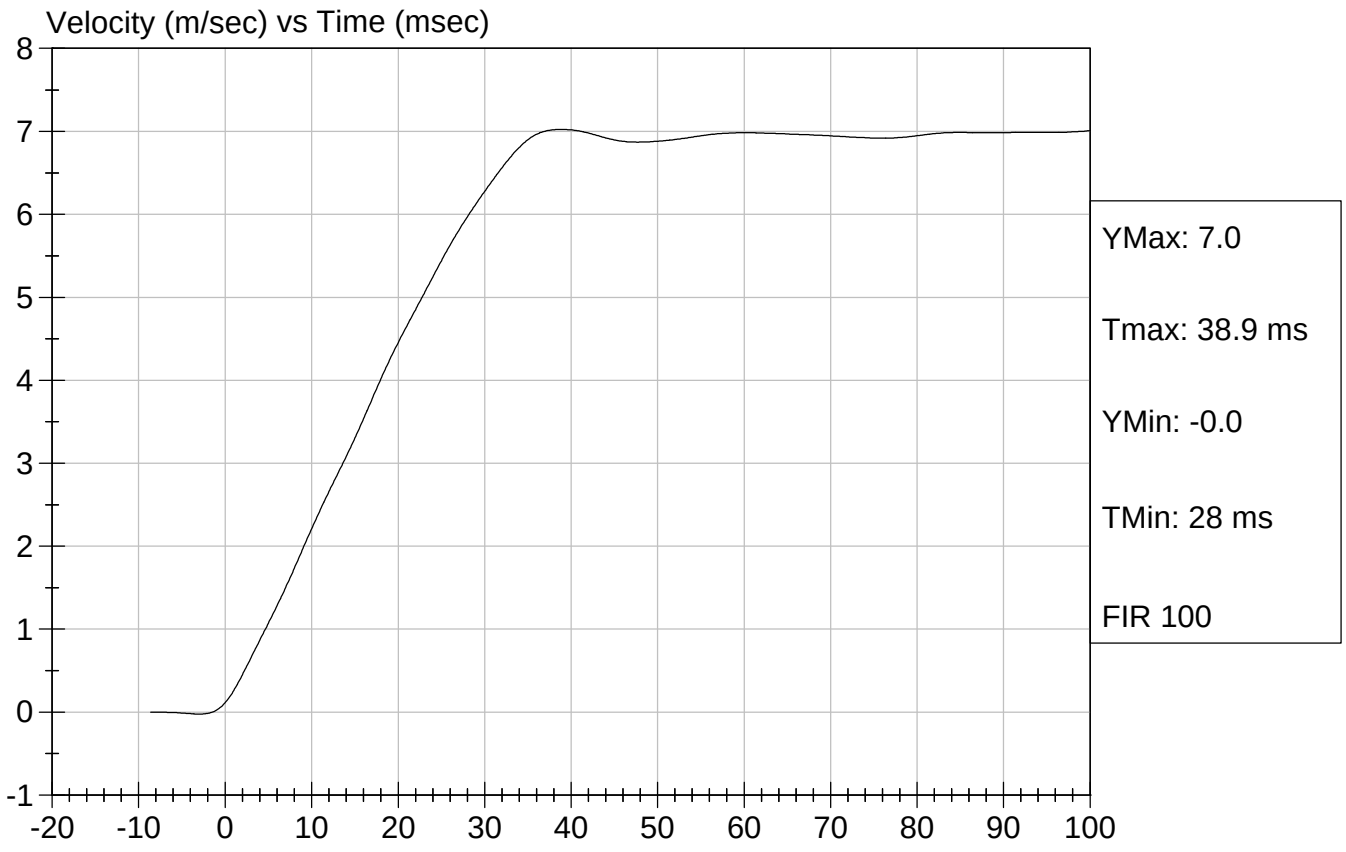
Jessica Gall
Laboratory Technician

11/19/2003
Test Date

Shefalika Jgarwal
Approved By

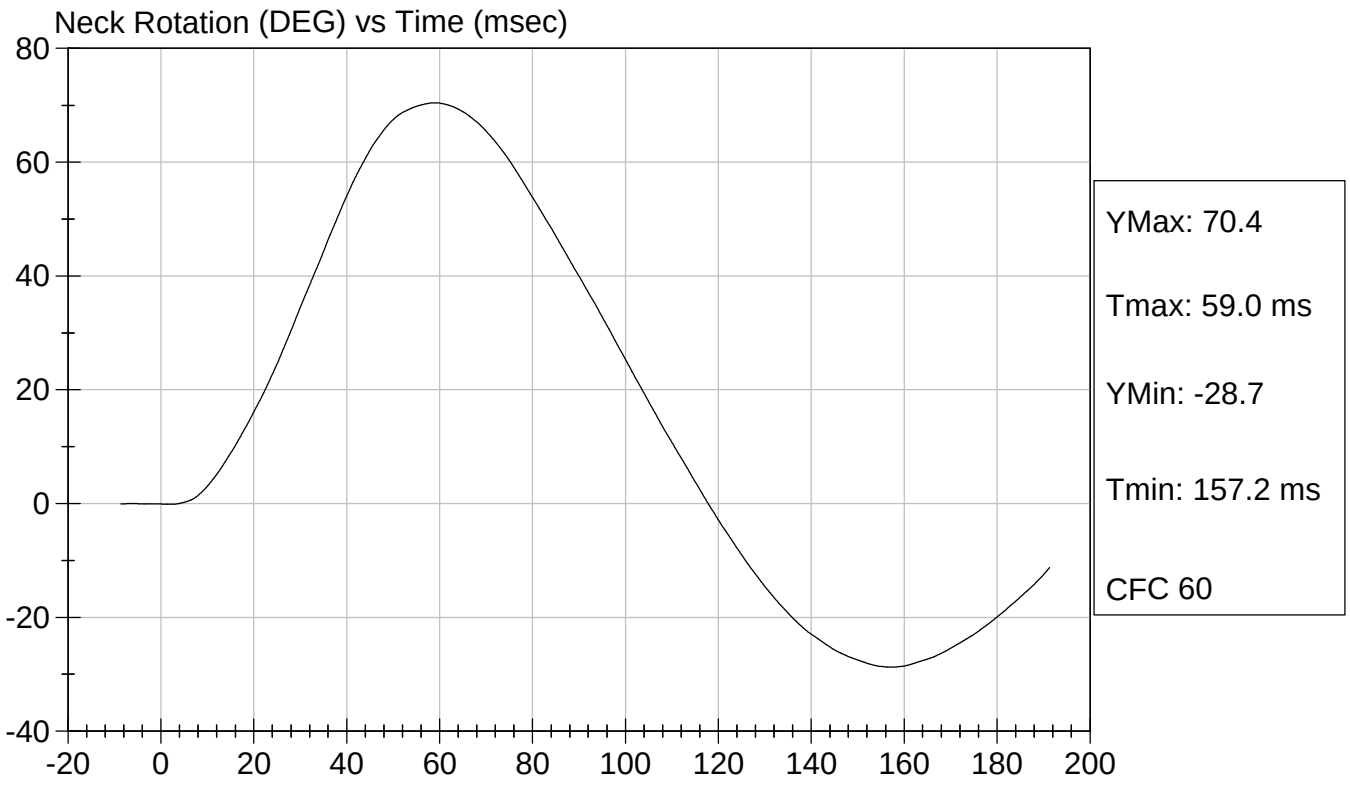
Test Desc: Neck Bending
Component ID: D031889

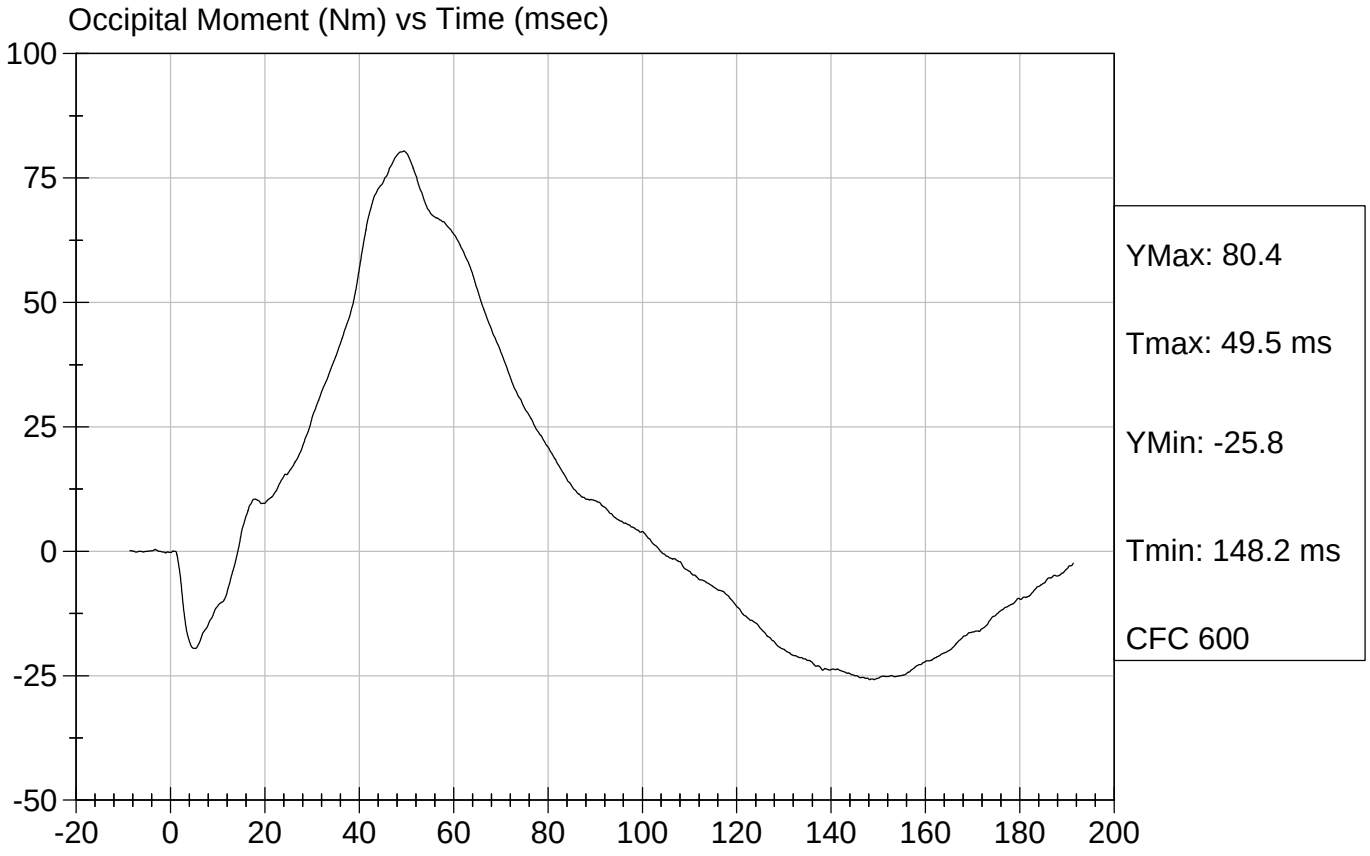
Test Date: 11/19/2003
Speed: 23.3 ft/sec, 7.10 m/sec



Test Desc: Neck Bending
Component ID: D031889

Test Date: 11/19/2003
Speed: 23.3 ft/sec, 7.10 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 Hall
Laboratory Technician

11/20/2003
Test Date

Shefalika Agarwal
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	5/23/03
Lower Rib Y	AN8M6	Endevco	11/10/03
Lower Spine Y	AGP28	Endevco	11/10/03
Pelvis Y	AJ420	Endevco	11/10/03
Upper Rib Redundant Y	AHW95	Endevco	5/23/03
Lower Rib Redundant Y	AN8P9	Endevco	11/10/03
Lower Spine Redundant Y	AJ9A7	Endevco	11/10/03
Pelvis Redundant Y	AMTA3	Endevco	11/10/03
Head X	AMP82	Endevco	11/10/03
Head Y	J11625	Endevco	11/10/03
Head Z	J10730	Endevco	11/10/03
Head Redundant X	J18843	Endevco	11/10/03
Head Redundant Y	J18953	Endevco	11/10/03
Head Redundant Z	J11014	Endevco	11/10/03
Neck Load Cell	376	Denton	8/14/03

	INSTRUMENTS FOR PASSENGER DUMMY NO. 904		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	J12450	Endevco	11/9/03
Lower Rib Y	J10420	Endevco	11/9/03
Lower Spine Y	AJ9F3	Endevco	11/9/03
Pelvis Y	AJ4K2	Endevco	11/9/03
Upper Rib Redundant Y	J12461	Endevco	11/9/03
Lower Rib Redundant Y	AJ820	Endevco	11/9/03
Lower Spine Redundant Y	AJ621	Endevco	11/9/03
Pelvis Redundant Y	J11047	Endevco	11/9/03
Head X	J13650	Endevco	11/10/03
Head Y	AKAA6	Endevco	11/10/03
Head Z	ALBA7	Endevco	11/10/03
Head Redundant X	J14007	Endevco	11/10/03
Head Redundant Y	J13424	Endevco	11/10/03
Head Redundant Z	AP2C4	Endevco	11/10/03
Neck Load Cell	253	Denton	10/17/03

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Front Door Centerline Y	G10-F11	Entran	10/17/03
Midrear of Left Rear Door Y	G10-F01	Entran	10/17/03
Left Front Door Upper Centerline Y	G10-F02	Entran	10/17/03
Midrear of Left Rear Door Y	K16-X08	Entran	9/11/03
Left Rear Door Upper Centerline Y	C12-M11	Entran	10/9/03
Left Rear Seat Track Y	H01-N27	Entran	10/8/03
Left Mid A-Post Y	G10-F13	Entran	10/17/03
Left Lower A-Post Y	G10-F10	Entran	10/17/03
Left Mid B-Post Y	G10-F07	Entran	10/17/03
Left Lower B-Post Y	G10-F12	Entran	10/17/03
Floorpan @ Rear Axle X	H21-J04	Entran	10/9/03
Floorpan @ Rear Axle Y	H20-R03	Entran	10/9/03
Floorpan @ Rear Axle Z	H21-J08	Entran	10/9/03
Driver Seat Track Y	A08-M05	Entran	9/11/03
Right Front Sill X	C12-M10	Entran	10/9/03
Right Front Sill Y	A27-R16	Entran	10/9/03
Right Front Sill Z	A27-R17	Entran	10/9/03
Right Rear Sill X	L23-A02	Entran	10/9/03
Right Rear Sill Y	A27-R14	Entran	10/9/03
Right Rear Sill Z	G03-N02	Entran	10/9/03
Left Front Sill Y	K21-N20	Entran	10/8/03
Left Rear Sill Y	A08-M03	Entran	10/8/03
Right Rear Occupant Compartment Y	H01-N18	Entran	6/2/03
Vehicle CG X	G10-F09	Entran	10/17/03
Vehicle CG Y	G10-F04	Entran	10/17/03
Vehicle CG Z	G10-F06	Entran	10/17/03

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