REPORT NUMBER: NCAPSIDE-MGA-2008-012

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST
RESEARCH PROJECT

DAIMLERCHRYSLER CORPORATION
2008 DODGE GRAND CARAVAN SE
NHTSA NUMBER: M80311

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

Test Date: December 21, 2007

Report Date: March 21, 2008

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
1200 NEW JERSEY AVENUE, SE, ROOM W43-410
WASHINGTON, D.C. 20590

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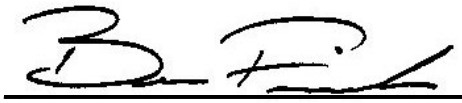
Prepared by:  Date: 3/21/08

Ben Fischer, Project Engineer

Reviewed by:  Date: 3/21/08

David Winkelbauer, Facility Director

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 2008 Dodge Grand Caravan SE 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 December 21, 2007. The impact velocity of the Moving Deformable Barrier (MDB) was 62.3 km/h, and the ambient temperature at the struck side (drivers) of the vehicle was 21°C. The target vehicle's maximum post test static crush was 270 mm at level 2.

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 / Research Project Side Impact ES-2re Dummy Occupant Side Impact Protection		*18. Distribution Statement* Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, 1200 New Jersey Ave, SE Washington, D.C. 20590	
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TABLE OF CONTENTS

SECTION 1

PURPOSE AND TEST PROCEDURE

PURPOSE

This side impact test / research project was conducted as part of the FY' 2008 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 and research data in a 2008 Dodge Grand Caravan SE manufactured by DaimlerChrysler Corporation.

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

A model year 2008 Dodge Grand Caravan SE was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.3 km/h. The specified impact velocity range is from 61.1 to 62.7 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 2213.5 kg and the test weight of the MDB was 1360.8 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on December 21, 2007.

One (1) real-time motion picture camera and fourteen (14) 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 Dummy (ES-2re) can be found in Appendix A. One ES-2re 50th percentile male dummy was placed in the driver designated seating position according to instructions specified in the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002. The ES-2re was instrumented in the following locations:

- Front Abdomen load cell
- Mid Abdomen load cell
- Rear Abdomen load cell
- Pubic Symphysis load cell
- Lower Thoracic Spine (T12) tri-axial accelerometers (X, Y, and Z primary)
- Head CG tri-axial accelerometers (X, Y, and Z axes primary and redundant)
- Upper, Mid, and Lower Rib Displacement Potentiometers

The test vehicle was instrumented with thirty-eight (38) structural accelerometers and the MDB was instrumented with five (5) accelerometers and two (2) contact switches on the bumper to compare left side to right side bumper impact timing. All data channels were recorded with a fully self contained on-board DTS TDAS Pro Data Acquisition System. The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 270 mm at level 2, 1350 mm rearward of the vertical impact point. The driver ES-2re, Serial Nos. 030 was calibrated just prior to this test.

Appendix A contains the still photograph prints. Appendix B contains the ES-2re response data traces. Appendix C contains the dummy calibration data. Appendix D contains the child dummy data.

The driver occupant (ES-2re) data is summarized below:

		Driver
HIC 15 (CFC 1000)	T1 (msec)	60.1
	T2 (msec	75.1
	HIC 15	114
HIC 36 (CFC 1000)	T1 (msec)	58.0
	T2 (msec)	79.2
	HIC 36	122
Thorax (CFC 180)		
Chest Deflection	Upper Rib Deflection	-0.9
	Mid Rib Deflection	-1.2
	Lower Rib Deflection	-3.9
Lower Spine (CFC 180)		
	Lower Spine Resultant	30.7
Abdomen (CFC 600)		
	Front Abdominal Force	127
	Mid Abdominal Force	289
	Rear Abdominal Force	638
	Sum of Abdominal Force	974
Pelvis (CFC 600)		
	Pubic Symphysis Force	2428

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Information	Left Front (Driver)		Left 2nd & 3rd Row Passengers	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Side Torso Airbag	No		No	
Curtain Airbag	Yes	Yes	Yes	Yes

The test data can be found on the NHTSA website at www.nhtsa.dot.gov.

TEST NOTES

There was no valid data collected for:

Mid Rear of LF Door after 35 msec
Left Lower C-Post Y after 120 msec
Left Lower B-Post Y after 10 msec
Left Mid B-Post Y after 20 msec
Left Mid Door Grid 3 after 45 msec
Left Mid Door Grid 5 after 20 msec
Left Mid Door Grid 7
Rear Seat Track Y after 40 msec
LF Door Centerline Y after 10 msec

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007

TEST VEHICLE INFORMATION

Make	Dodge
Model	Grand Caravan SE
Body Style	MPV
NHTSA No.	M80311
VIN	2D8HN44H08R104776
Color	Bright Silver Metallic
Delivery Date	12/12/2007
Odometer Reading (mile)	106
Dealer	Frank Boucher
Transmission	Automatic
Final Drive	Front
Number of Cylinders	6
Engine Displacement (L)	3.3
Engine Placement	Lateral
Automatic Door Locks (ADL)	Yes
Owner's Manual Details Instructions on Disabling ADLs	Yes

TEST VEHICLE OPTIONS

Driver Front Airbag	Yes
Driver Side Curtain Airbag	Yes
Driver Side Torso Airbag	No
Rear Passenger Side Curtain Airbag	Yes
Rear Passenger Side Torso Airbag	No
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Anti-lock Brakes	Yes
Traction Control	No
All Wheel Drive	No
Power Seats	No
Pretensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	DaimlerChrysler Corporation
Date of Manufacture	8-07

GVWR (kg)	2745
GAWR Front (kg)	1339
GAWR Rear (kg)	1407

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket	Split Bench	
Number Of Occupants	2	2	3	7
Capacity Wt. (VCW) (kg)				521
Cargo Wt. (RCLW) (kg)				45

DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	571.1	450.9		620.5	519.8	
Right	kg	544.8	448.1		563.8	509.4	
Ratio	%	55.4	44.6		53.5	46.5	
Totals	kg	1115.9	899.0	2014.9	1184.3	1029.2	2213.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2014.9
Weight of 2 P572M ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	45
Calculated Vehicle Target Weight (TVTW)	kg	2221.4

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

Weight of Ballast in Cargo Area: None

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	778	778	790	790	1374
As Tested	mm	767	771	760	773	1432
Fully Loaded	mm	761	771	759	771	

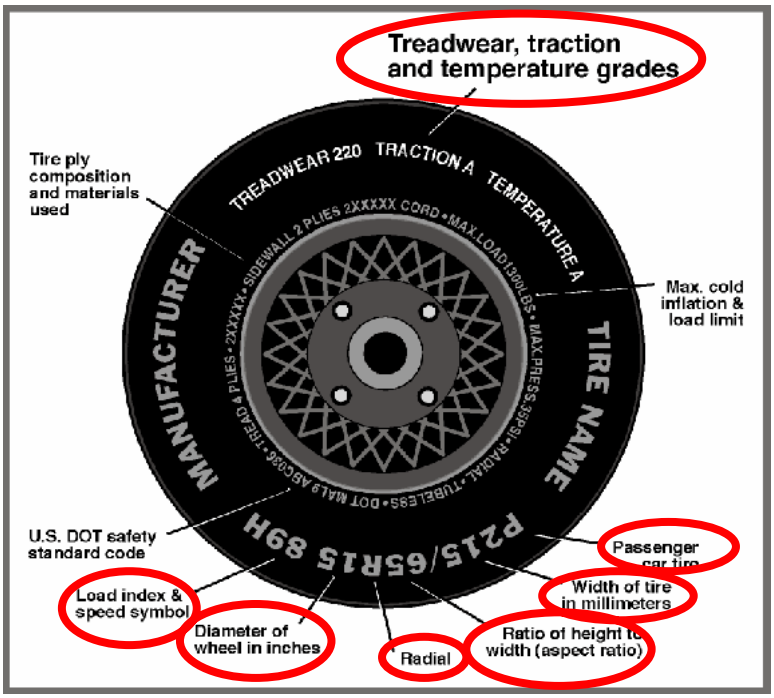
TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	3080
Target Impact Point Aft of Front Axle	mm	508
Actual Impact Point Aft of Front Axle	mm	511

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold / Test Pressure (kPa)	250	250
Recommended Tire Size	P225/65R16	P225/65R16
Tire Size on Vehicle	P225/65R16	P225/65R16
Tire Manufacturer	Yokohama	Yokohama
Tire Name	AVID S33	AVID S33
Tire Type	Passenger	Passenger
Tire Width (mm)	225	225
Ratio of Height to Width (aspect ratio)	65	65
Radial	R	R
Wheel Diameter	16	16
Load Index & Speed Symbol	100S	100S
Treadwear	460	460
Traction Grade	B	B
Temperature Grade	B	B

DATA SHEET NO. 3

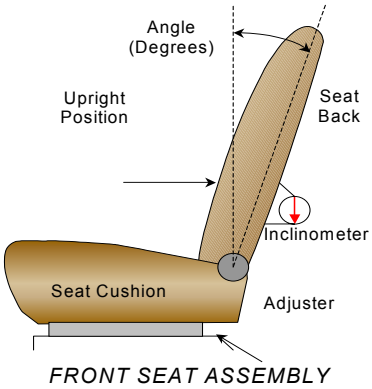
TEST VEHICLE INFORMATION

Test Vehicle:	2008 Dodge Grand Caravan SE	NHTSA No.	M80311
Test Program:	NCAP Side Impact	Test Date:	12/21/2007

NORMAL DESIGN RIDING POSITION

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

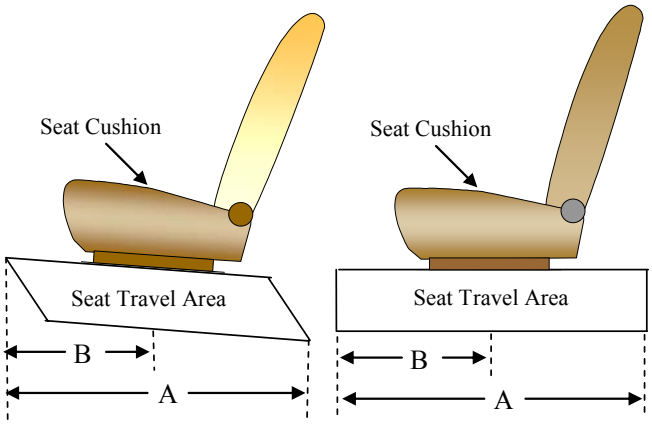
Driver seat back angle: 8.5 degrees at headrest post



SEAT FORE/AFT POSITIONS

	Total Fore/Aft Travel	Placed in position #
Driver Seat	33 detents	16th detent (1st as 0)
Second Row Seats	11 detents	Full forward *
Third Row Seats	Fixed	Fixed

* Placed in this position to achieve clearance for the 3rd row child restraints.



DATA SHEET NO. 3 (CONTINUED)

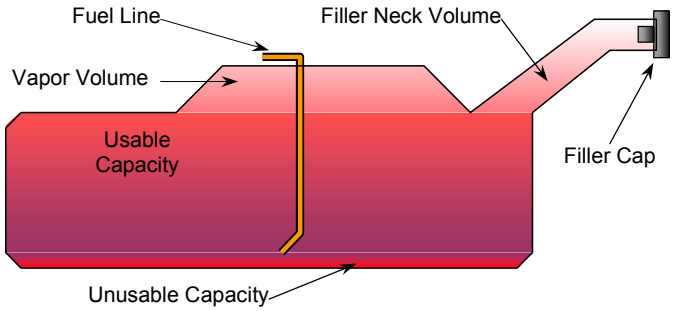
TEST VEHICLE INFORMATION

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	75.7
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	69.6 – 71.2
Actual Amount of Solvent used	0
1/3 of Usable Capacity	25.2

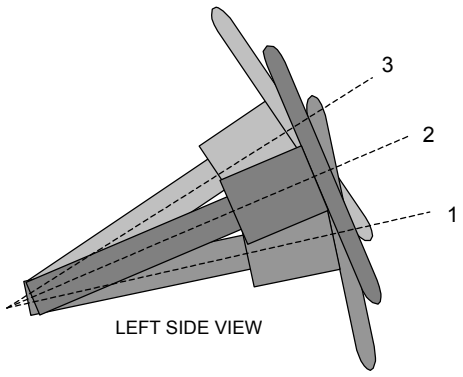
The test vehicle is equipped with an electric fuel pump. For the fuel pump to pump fuel, the engine must be running.



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 moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITION

	Fore/Aft (mm)	Degrees
Lowermost position No. 1		65.0
Geometric center position No. 2		68.0
Uppermost position No. 3		71.0

DATA SHEET NO. 4

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2588
C.G. Location aft of Front Axle	1101

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	473.5	219.5	
Right	kg	308.3	359.5	
Ratio	%	57.5	42.5	
Totals	kg	781.8	579.0	1360.8

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.3
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.3
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.7

POST TEST OBSERVATIONS
MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	3 rearward
Vertical Offset	mm	+/-20	2 up

DATA SHEET NO. 5

POST TEST OBSERVATIONS

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat Driver
Dummy Type / Serial No.	ES-2re / 030
Head Contact	Curtain Airbag, Headliner
Upper Torso Contact	Door Panel
Lower Torso Contact	Door Panel
Left Knee Contact	Door Panel
Right Knee Contact	Left Knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

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

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	None
Window Damage	Left Mid and Left Rear Windows Broke
Other Notable Effects	None

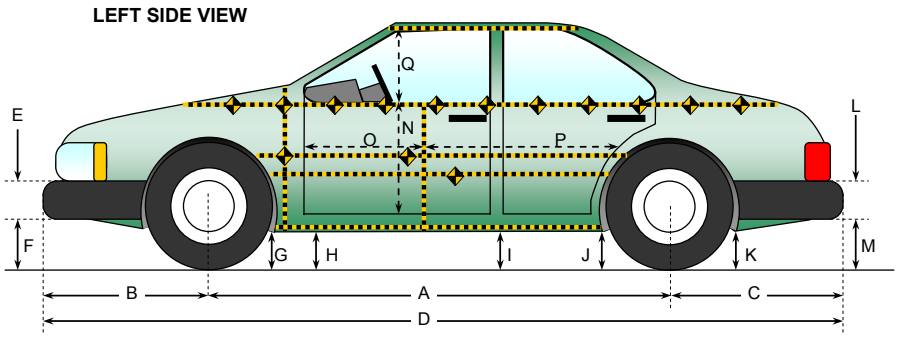
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Information	Left Front (Driver)		Left 2nd & 3rd Row Passengers	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Side Torso Airbag	No		No	
Curtain Airbag	Yes	Yes	Yes	Yes

DATA SHEET NO. 6

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007



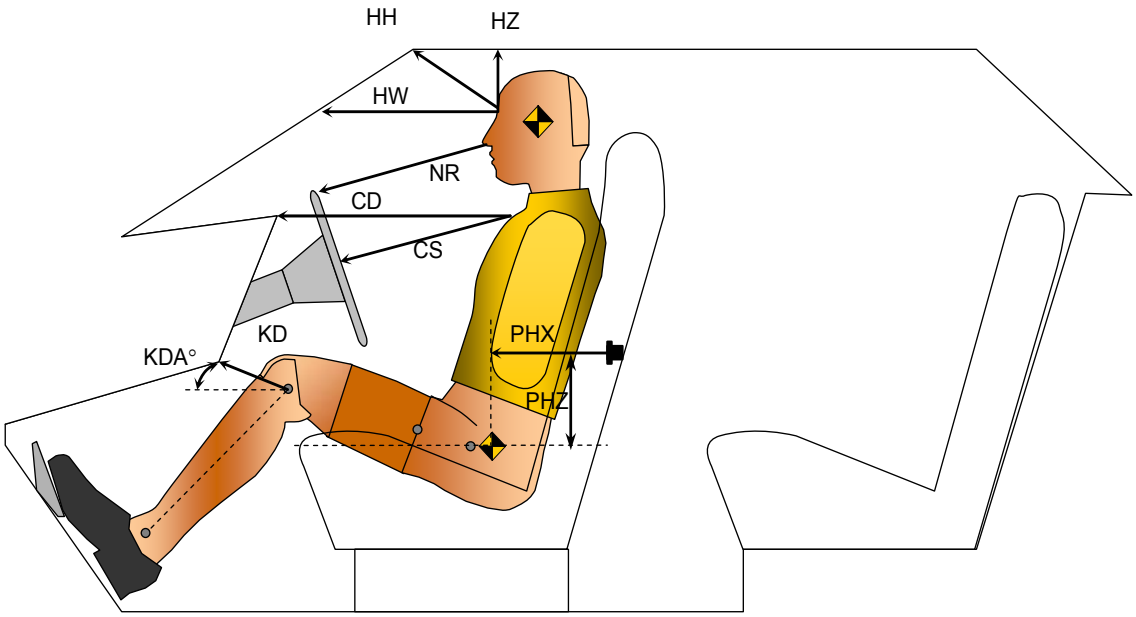
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3080	3082	-2
B	Front Axle to FSOV	1033	1030	3
C	Rear Axle to RSOV	1184	1182	2
D	Total Length at Centerline	5297	5294	3
E	Front Bumper Thickness	164	164	0
F	Front Bumper Bottom to Ground	455	460	-5
G	Sill Height at Front Wheel Well	230	226	4
H	Sill Height at Front Door Leading Edge	232	226	6
I	Sill Height at "B" Pillar	235	227	8
J1	Sill Height at Rear Wheel Well	237	238	-1
J2	Pinch Weld Height at Rear Wheel Well	237	230	7
K	Sill Height Aft of Rear Wheel Well	255	258	-3
L	Rear Bumper Thickness	125	125	0
M	Rear Bumper Bottom to Ground	342	351	-9
N	Sill Height to Window Bottom Sill	798	630	168
O	Front Door Leading Edge to Impact CL	871	774	97
P	Rear Door Trailing Edge to Impact CL	1329	1284	45
Q	Front Window Opening	513	511	2
R	Right Side Length	4219	4228	-9
S	Left Side Length	4219	4212	7
T	Vehicle Width at "B" Post	1959	1742	217

DATA SHEET NO. 7

ES-2re LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007

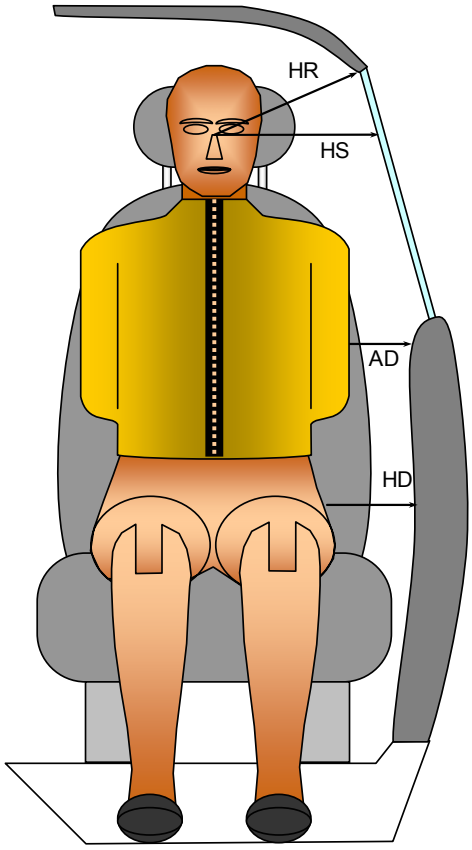


Driver Code	Measurement Description	Driver S/N 030	
		Length(mm)	Angle(°)
HH	Head to Header	284	
HW	Head to Windshield	568	
HZ	Head to Roof	136	
NR	Nose to Rim/Nose to Seatback	388	
CD	Chest to Dash or Seatback	506	
CS	Chest to Steering Wheel	315	
KDL	Left Knee to Dash or Seatback	150	19.9
KDR	Right Knee to Dash or Seatback	139	24.6
PHX	H-Point to Striker (X-Axis)	224	
PHZ	H-Point to Striker (Z-Axis)	11 above striker	

DATA SHEET NO. 8

ES-2re LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007



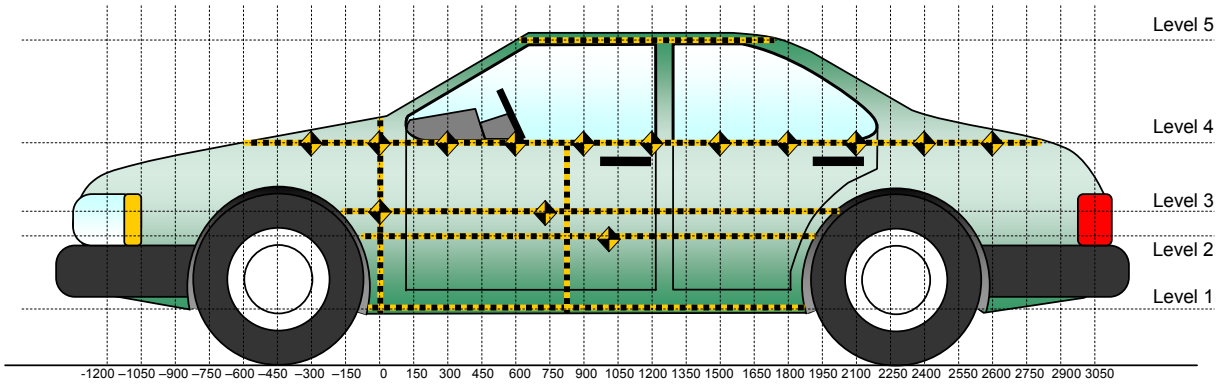
FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver S/N 030
HR	Head to Side Header	mm	239
HS	Head to Side Window	mm	382
AD	Arm to Door	mm	133
HD	H-Point to Door	mm	160

DATA SHEET NO. 9

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007



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	Maximum Exterior Static Crush	Distance From Impact	Height Above Ground
5	Window	22	1050	1643
4	Window Sill	165	1200	1062
3	Mid Door	261	1200	750
2	Occupant H-Point	270	1350	690
1	Sill Top	76	900	305
	Maximum Penetration	270		

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-750				257					257					0	
-600				235					232					-3	
-450		137		217			189		216			52		-1	
-300		139		205			205		201			66		-4	
-150		151	144	194			190	180	190			39	36	-4	
0	188	146	148	184		192	160	164	170		4	14	16	-14	
150	184	139	143	176		216	295	302	196		32	156	159	20	
300	179	135	138	171		226	358	354	210		47	223	216	39	
450	175	131	133	166		229	368	354	224		54	237	221	58	
600	170	128	130	160	363	232	368	354	242	373	62	240	224	82	10
750	166	125	128	158	359	240	362	365	265	370	74	237	237	107	11
900	165	123	125	154	356	241	362	382	278	371	76	239	257	124	15
1050	163	121	125	153	354	213	340	344	294	376	50	219	219	141	22
1200	163	123	125	153	353	206	388	386	318	348	43	265	261	165	-5
1350	166	124	126	154	353	204	394	375	308	327	38	270	249	154	-26
1500	170	126	128	154	353	203	395	380	275	305	33	269	252	121	-48
1650	171	129	131	158	355	207	386	382	245	286	36	257	251	87	-69
1800	176	133	136	161	355	182	354	352	220	268	6	221	216	59	-87
1950	182	137	141	165	357	123	252	261	194	249	-59	115	120	29	-108
2100	187	143	146	170	361	188	166	153	170	232	1	23	7	0	-129
2250		138	131	177	364		151	139	196	375		13	8	19	11
2400		125		181	368		133		198	379		8		17	11
2550				190	375				203	383				13	8
2700				198	383				207	392				9	9
2850				208	395				215	403				7	8
3000				220	419				223	420				3	1
3150				237					235					-2	

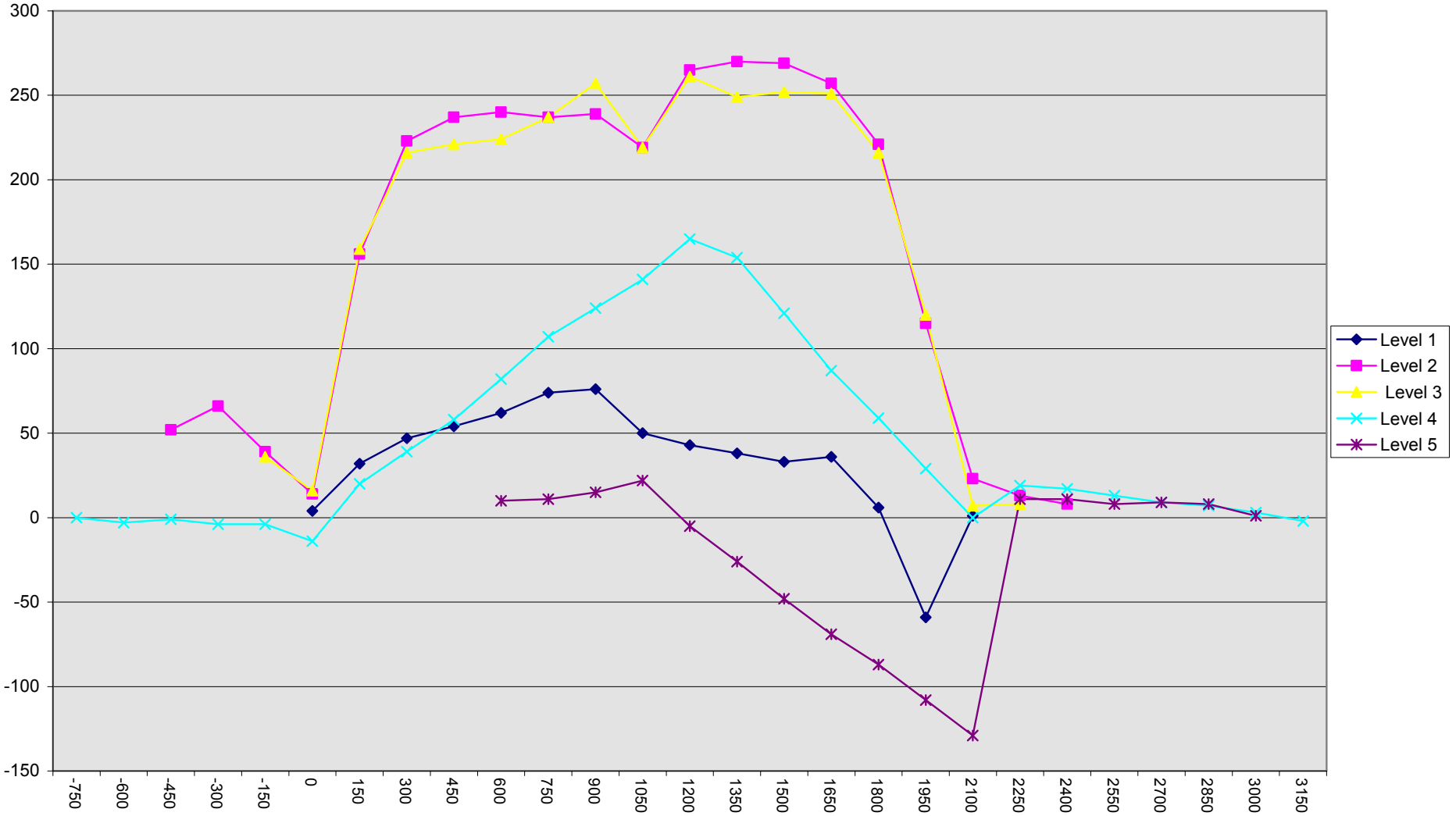
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

DATA SHEET NO. 10... (continued)

VEHICLE EXTERIOR CRUSH PROFILES

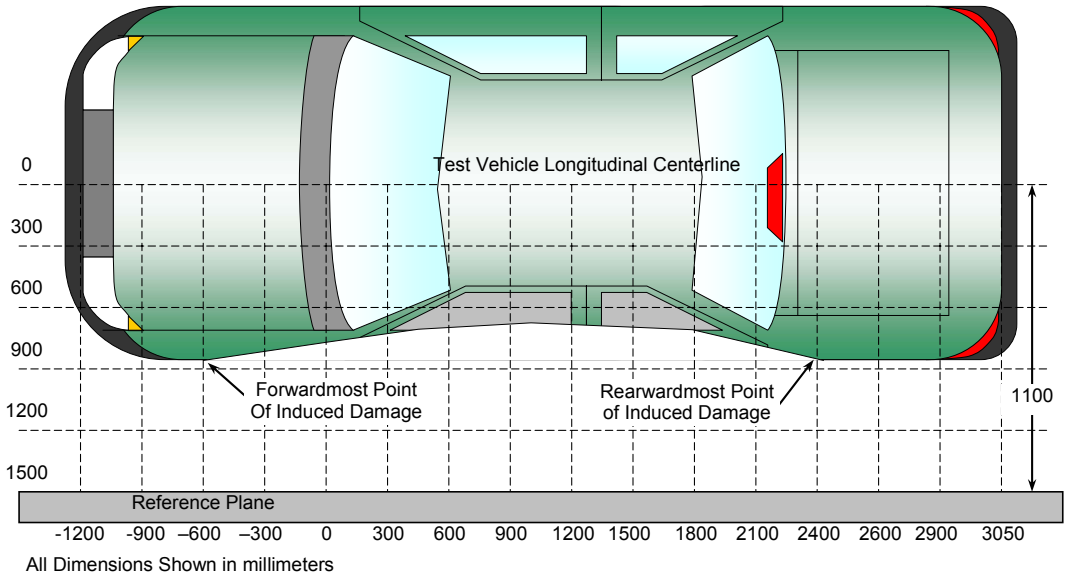
Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007



DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007



TOP VIEW

DAMAGE PROFILE DISTANCES

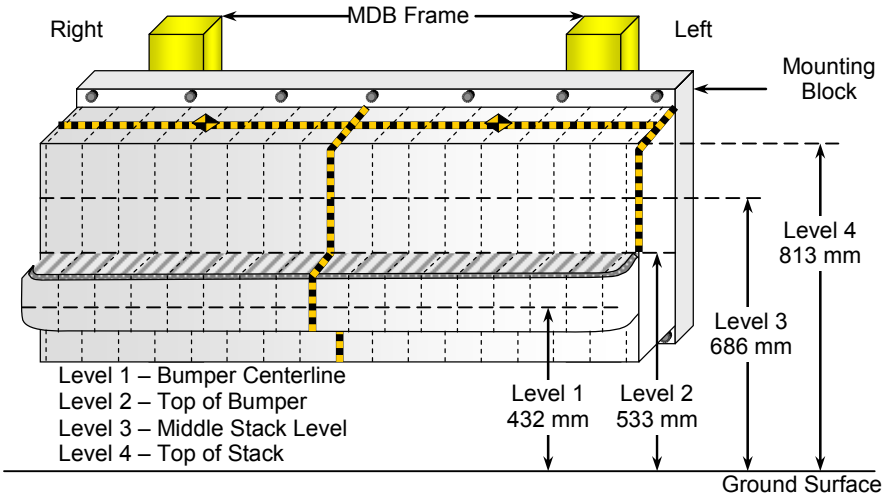
DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	3150	4	237	235	2
2	2370	3	128	135	7
3	1592	3	125	395	270
4	784	2	126	378	252
5	30	2	147	232	85
6	-750	4	257	257	0

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

DATA SHEET NO. 12

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007



DEFORMABLE BARRIER STATIC CRUSH

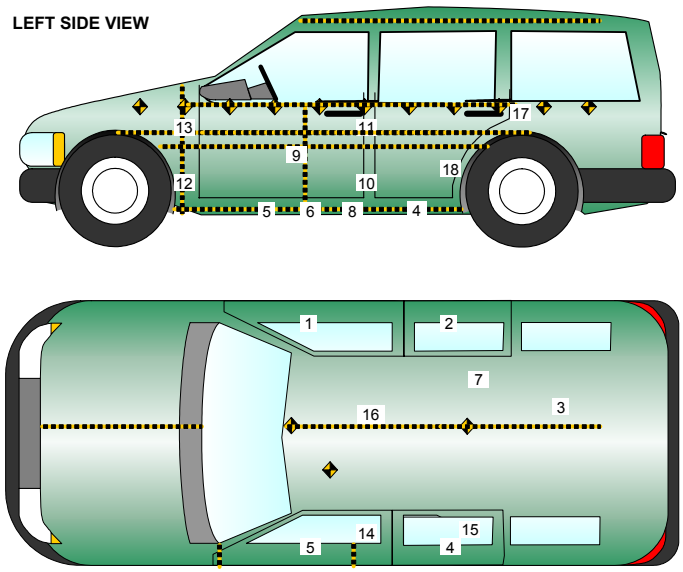
Stack Level	Distance Right of Center								C_L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	165	135	139	143	145	148	156	160	153	141	136	138	136	130	124	118	125
2	75	75	67	68	70	73	75	83	90	90	97	81	70	68	89	97	106
3	61	46	40	34	30	27	44	66	65	46	42	41	40	40	45	56	76
4	123	77	46	28	24	30	46	70	94	63	53	49	55	68	76	86	97

All Dimensions in mm

DATA SHEET NO. 13

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	3109	711	260
2	Right Sill at Rear Seat	2090	710	271
3	Rear Floorpan Above Axle	1138	10	568
4	Left Sill at Rear Door	2134	-710	267
5	Left Sill at Front Door	3140	-711	256
6	Left Front Door Centerline	3150	-883	466
7	Rear Occupant Compartment	2154	-330	310
8	Midrear of LF Door	2903	-879	527
9	LF Door Upper Centerline	3152	-852	685
10	Left Lower B-Post	2592	-809	682
11	Left Mid B-Post	2603	-822	926
12	Left Lower A-Post	3678	-803	624
13	Left Mid A-Post	3655	-889	1031
14	Front Seat Track	2794	-595	616
15	Rear Seat Track	1802	-589	604
16	Vehicle CG	2714	0	210
17	Left Mid C-Post	1591	-827	721
18	Left Lower C-Post	1583	-778	964

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

DATA SHEET NO. 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS

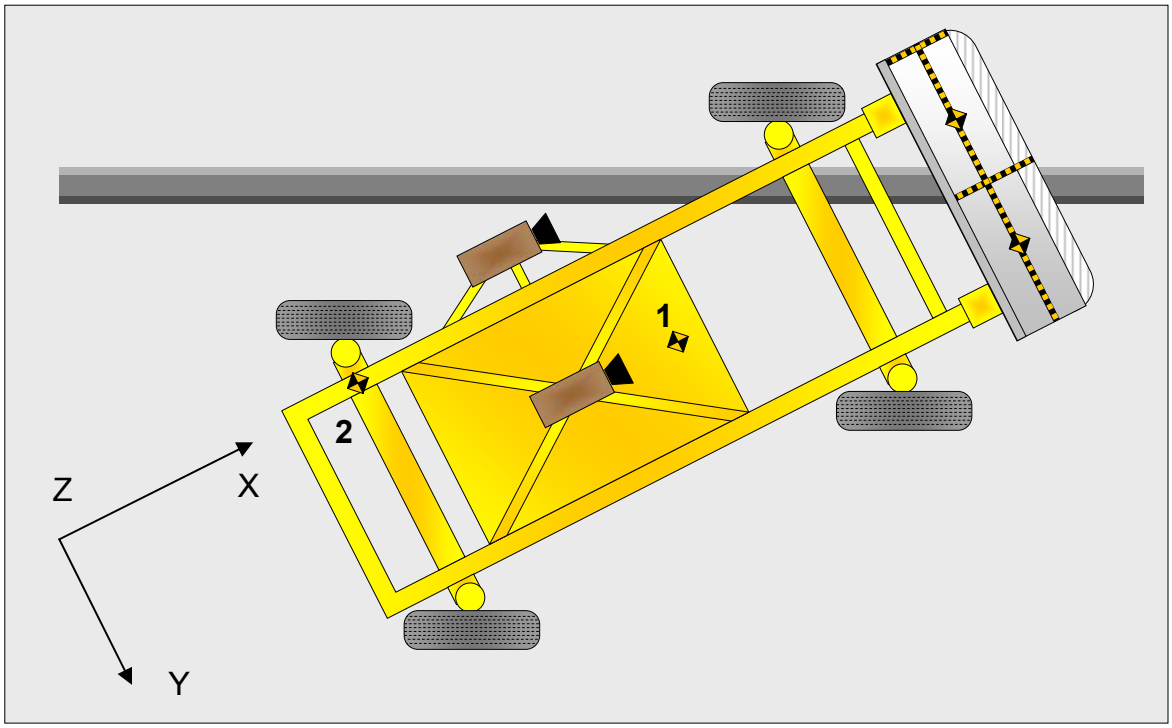
Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Mid Door Grid 1	1793	-852	1118
2	Left Mid Door Grid 2	1999	-863	1122
3	Left Mid Door Grid 3	2200	-863	1114
4	Left Mid Door Grid 4	1789	-859	890
5	Left Mid Door Grid 5	1968	-880	925
6	Left Mid Door Grid 6	2167	-875	888
7	Left Mid Door Grid 7	1760	-868	737
8	Left Mid Door Grid 8	1990	-858	745
9	Left Mid Door Grid 9	2199	-865	751
10	Left Rear Grid 1	1374	-818	973
11	Left Rear Grid 2	1163	-633	751
12	Left Rear Grid 3	1068	-821	981

DATA SHEET NO. 14

MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	MDB CG	-1092	0	-483
2	MDB Rear	-2591	-625	-622

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

DATA SHEET NO. 15

VEHICLE STRUCTURAL MEASUREMENTS

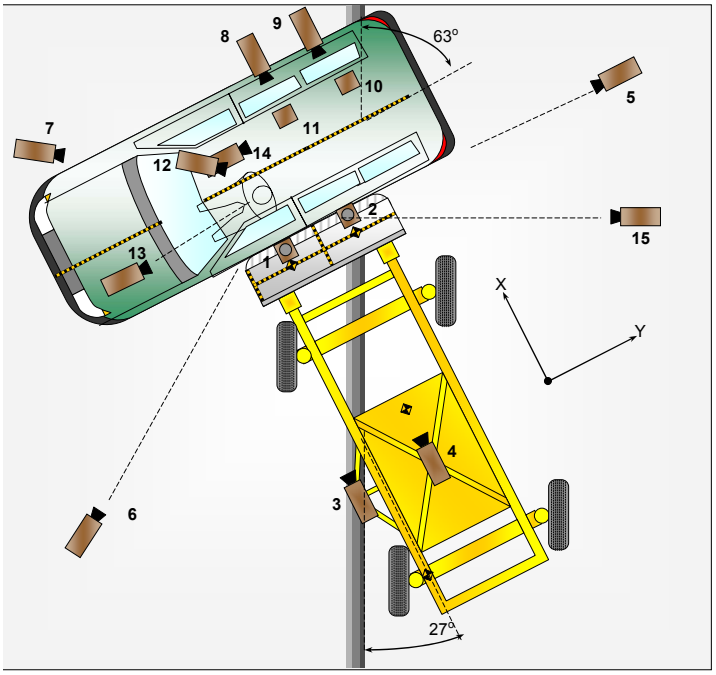
Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007

	Elements	Pre-Test (mm)
1	Total Length	5297
2	Total Width	1959
3	Bumper Top Height	634
4	Bumper Bottom Height	468
5	Longitudinal Member Top Height	605
6	Distance between Longitudinal Members	944
7	Longitudinal Member Width	74
8	Engine Top Height	942
9	Engine Bottom Height	215
10	Engine and gearbox width	890
11	Front bumper-engine distance	562
12	Front shock absorber fixing height	979
13	Bonnet leading edge height	901
14	Front shock absorber fixing width	1319
15	Front bumper – front axle distance	923
16	Front axle – a pillar distance	475
17	A-pillar – B-pillar distance	1080
18	B-Pillar – rear axle distance	1524
19	B-pillar – C-pillar distance	1030
20	Roof sill bottom height	1635
21	Roof sill top height	1687
22	Floor sill bottom height	189
23	Floor sill top height	316

DATA SHEET NO. 16

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2008 Dodge Grand Caravan SE NHTSA No. M80311
Test Program: NCAP Side Impact Test Date: 12/21/2007



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Close-up	100	0	5050	50	1000
2	Overhead Overall	-340	0	5050	14	1000
3	MDB Onboard, Impact Point Close-up				50	1000
4	MDB Onboard, Centerline of Impact				16	1000
5	Right Side, Ground Level, Overall	1050	5040	1250	19	1000
6	Left Side, Ground Level, Overall	932	-5250	1192	24	1000
7	Vehicle Offboard ES-2re, Front	-2130	-5200	1700	35	1000
8	Vehicle Onboard 2nd Row, Side				8	1000
9	Vehicle Onboard 3rd Row, Side				8.5	1000
10	Onboard Overhead 3rd Row				6.5	1000
11	Onboard Overhead 2nd Row				6.5	1000
12	2nd Row, Front Angle				12.5	1000
13	Vehicle Onboard Front ES-2re				12.5	1000
14	Vehicle Onboard Floor, 2nd Row				8	1000
15	Real Time Coverage				13	24

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

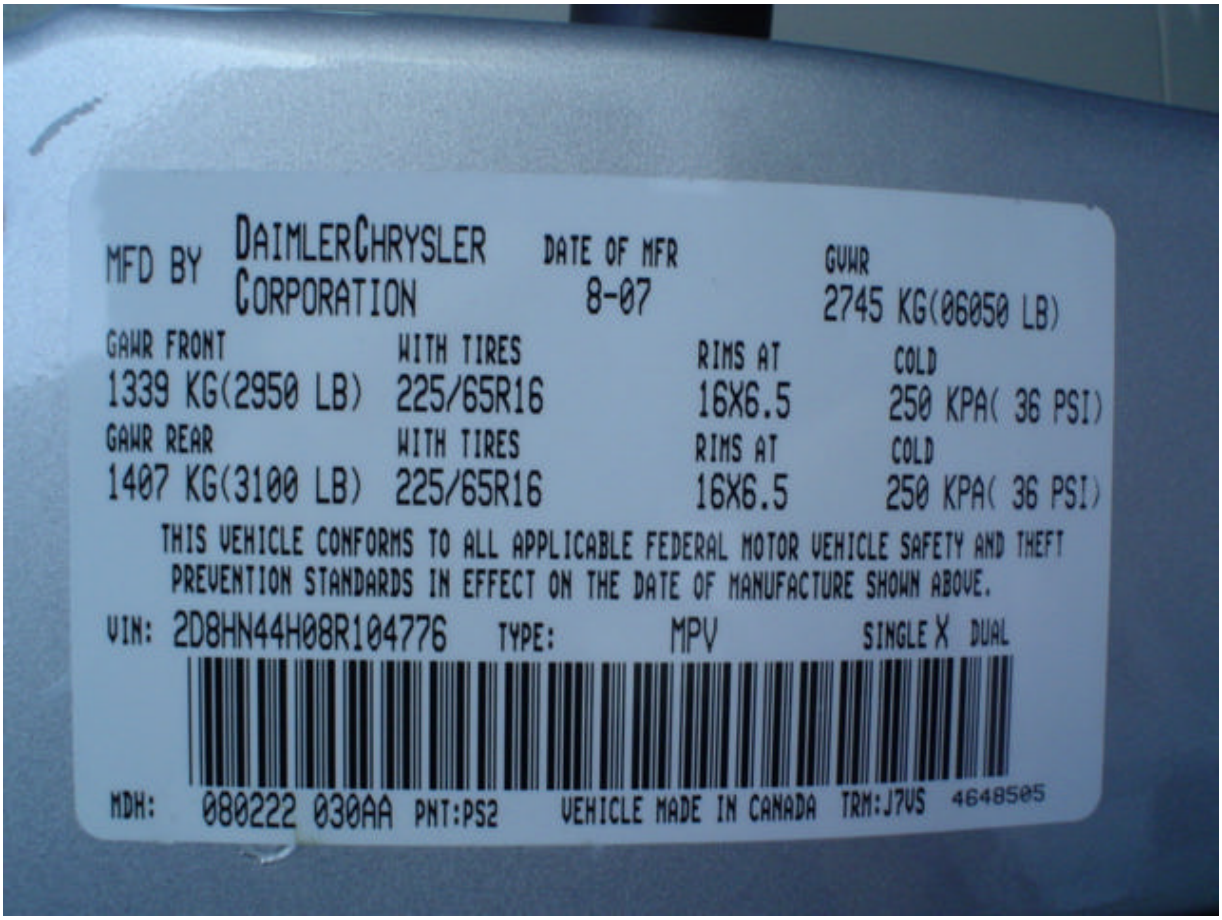
APPENDIX A

PHOTOGRAPHS

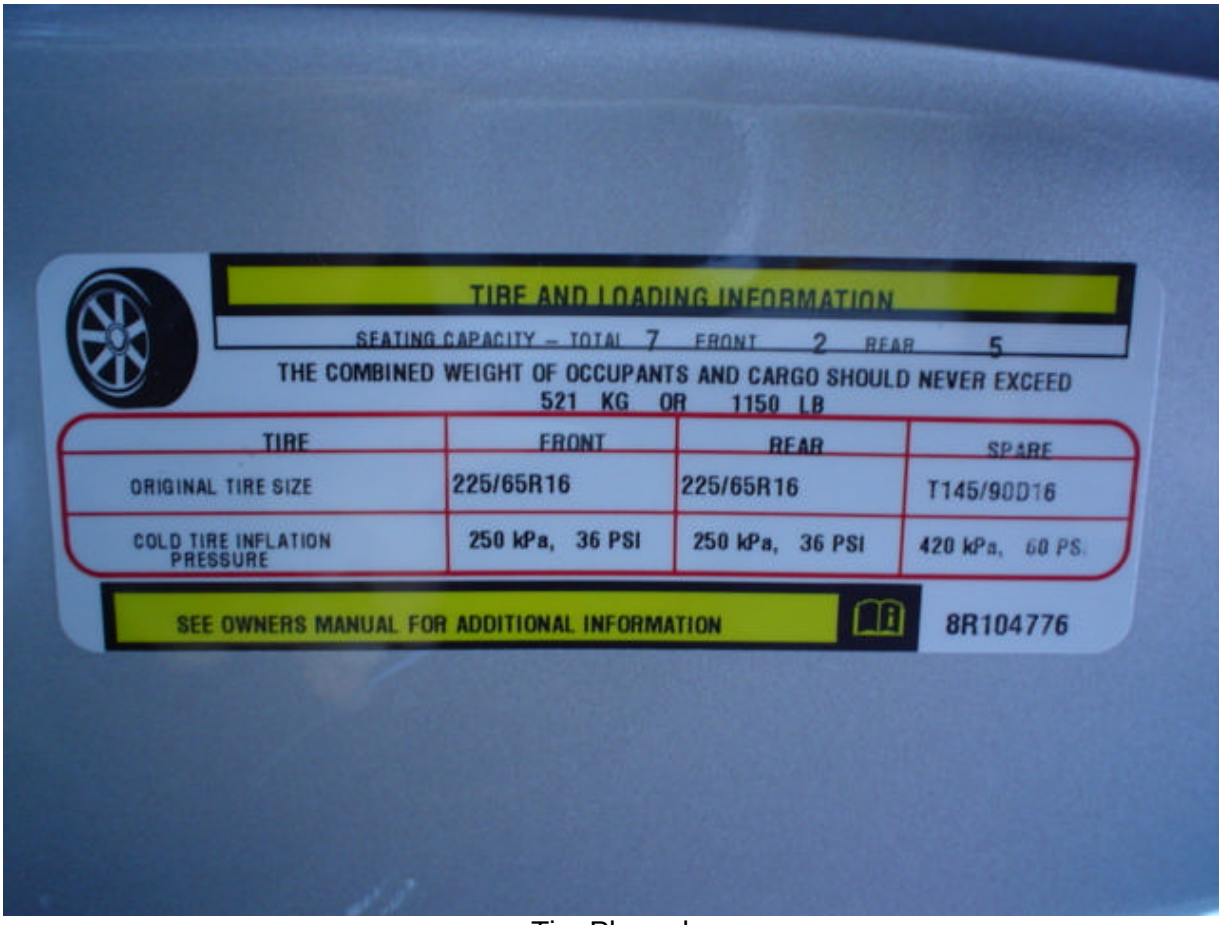
TABLE OF PHOTOGRAPHS

Left Front ¾ View, As Received

Right Rear ¾ View, As Received



Manufacturer's Label



Tire Placard

Pre-Test Front View

Post-Test Front View

Pre-Test Left Front ¾ View

Post-Test Left Front ¾ View

Pre-Test Left Side View

Post-Test Left Side View

Pre-Test Left Rear ¾ View

Post-Test Left Rear ¾ View

Pre-Test Rear View

Post-Test Rear View

Pre-Test Right Rear ¾ View

Post-Test Right Rear ¾ View

Pre-Test Right Side View

Post-Test Right Side View

Pre-Test Right Front ¾ View

Post-Test Right Front ¾ View

Pre-Test Left Impact Point

Post-Test Left Impact Point

Pre-Test Front ¾ View of Left Side Doors


Post-Test Front ¾ View of Left Side Doors

Pre-Test Rear ¾ View of Left Side Doors

Post-Test Rear ¾ View of Left Side Doors

Pre-Test Left Side Impact Close-up

Post-Test Left Side Impact Close-up

Pre-Test Overhead View

Post-Test Overhead View

Pre-Test Overhead Close-up View

Post-Test Overhead Close-up View

Pre-Test Driver Dummy (Door Open)

Pre-Test Driver Dummy Clearance From Door

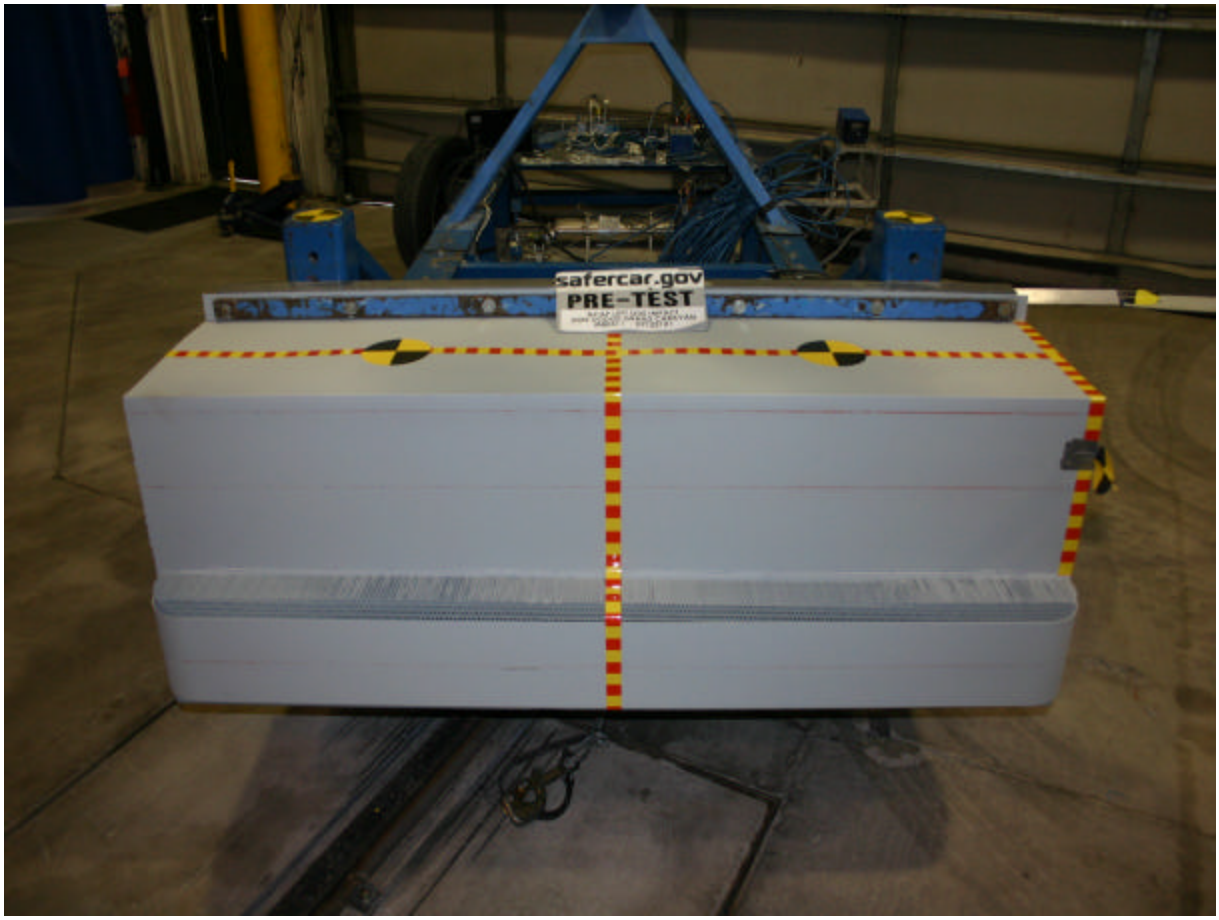

Post-Test Driver Dummy Clearance From Door

Pre-Test Driver Dummy (Through Window)

Post-Test Driver Dummy (Through Window)

Pre-Test Driver Dummy Right Side View

Post-Test Driver Dummy Right Side View



Pre-Test Front View of Deformable Barrier

Pre-Test Top View of Deformable Barrier

Pre-Test Right Side View of Deformable Barrier

Pre-Test Left Side View of Deformable Barrier

Vehicle Impact

Post-Test Driver Dummy Contact

Post-Test Driver Dummy Head Contact

Post-Test Driver Dummy Head Contact

Post-Test Driver Dummy Torso Contact

APPENDIX B

ES-2re RESPONSE DATA TRACES

TABLE OF DATA PLOTS

The following vehicle and MDB response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

Midrear of LF Door Y

LF Door Centerline Y Accel

LF Door Upper Centerline Y

Right Front Sill X

Right Front Sill Y

Right Front Sill Z

Right Rear Sill X

Right Rear Sill Y

Right Rear Sill Z

Floorpan @ Rear Axle X

Floorpan @ Rear Axle Y

Floorpan @ Rear Axle Z

Left Front Sill Y

Left Rear Sill Y

Left Lower C-Post Y

Left Mid C-Post Y

Left Lower B-Post Y

Left Mid B-Post Y

Left Lower A-Post Y

Left Mid A-Post Y

Left Mid Door Grid 1

Left Mid Door Grid 2

Left Mid Door Grid 3

Left Mid Door Grid 4

Left Mid Door Grid 5

Left Mid Door Grid 6

Left Mid Door Grid 7

Left Mid Door Grid 8

Left Mid Door Grid 9

Left Rear Grid 1

Left Rear Grid 2

Left Rear Grid 3

Vehicle CG X

Vehicle CG Y

Vehicle CG Z

Driver Seat Track Y

Rear Seat Track Y

RR Occupant Compartment Y

MDB CG X

MDB CG Y

MDB CG Z

MDB Rear X

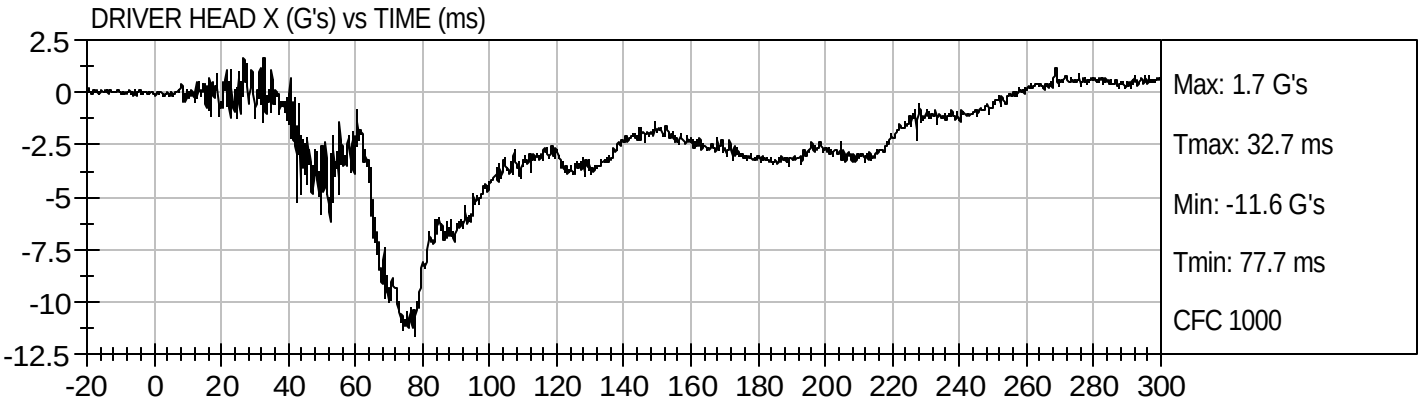
MDB Rear Y

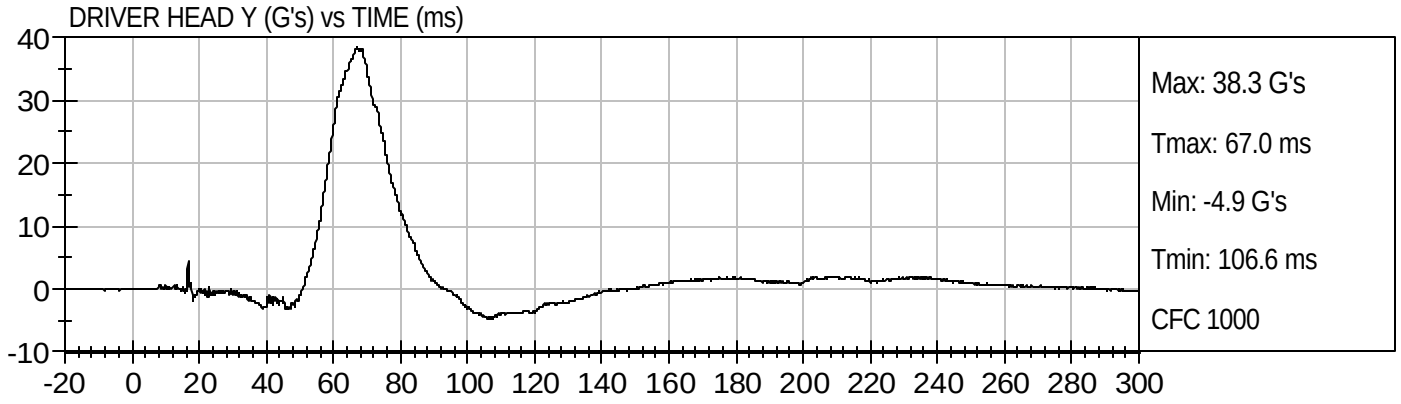
Left MDB Contact

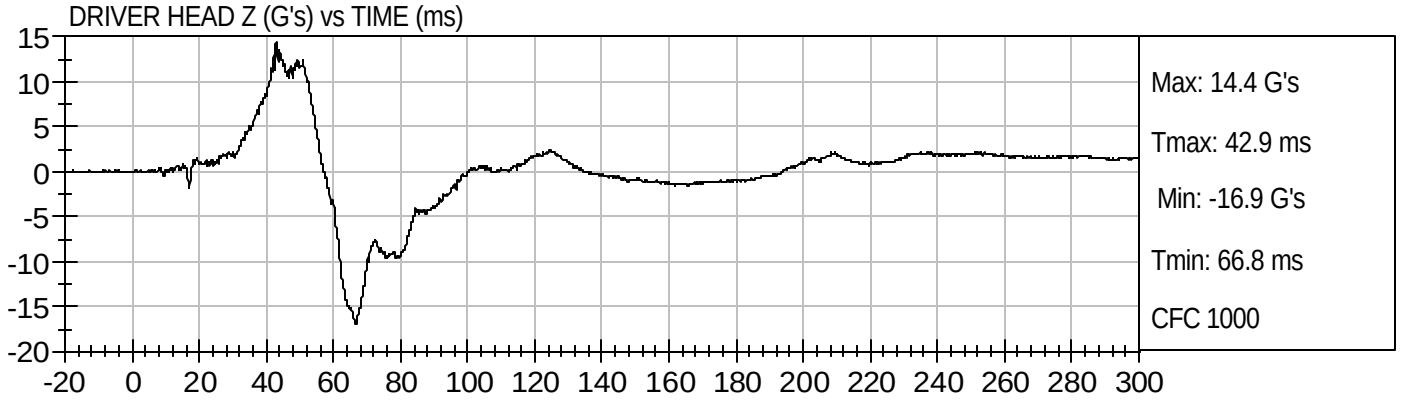
Right MDB Contact

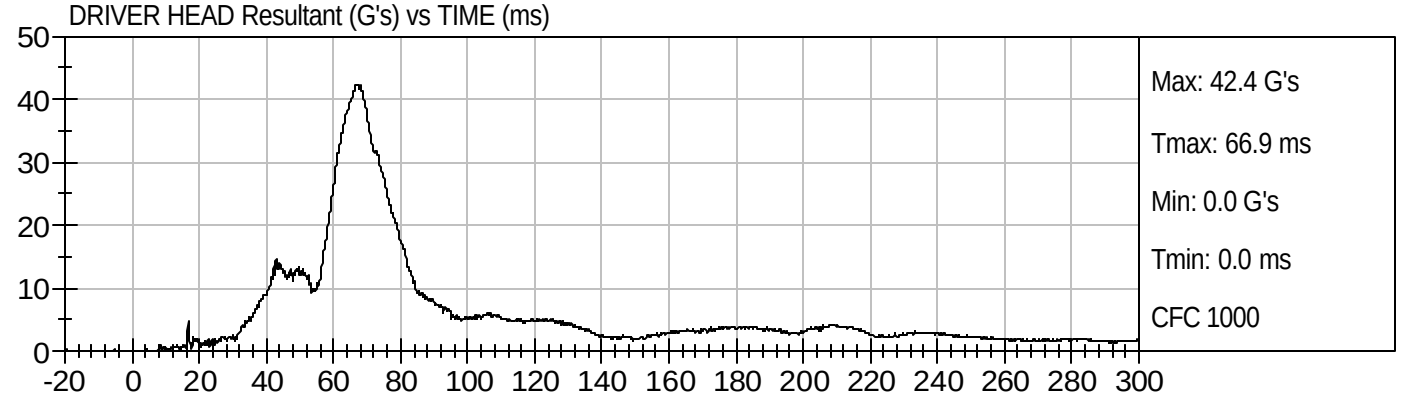
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



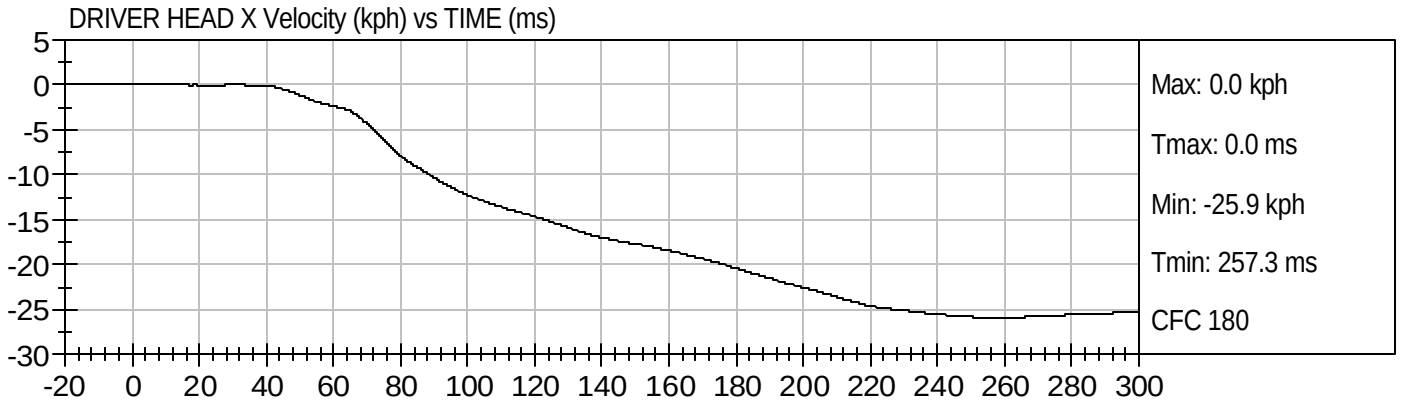


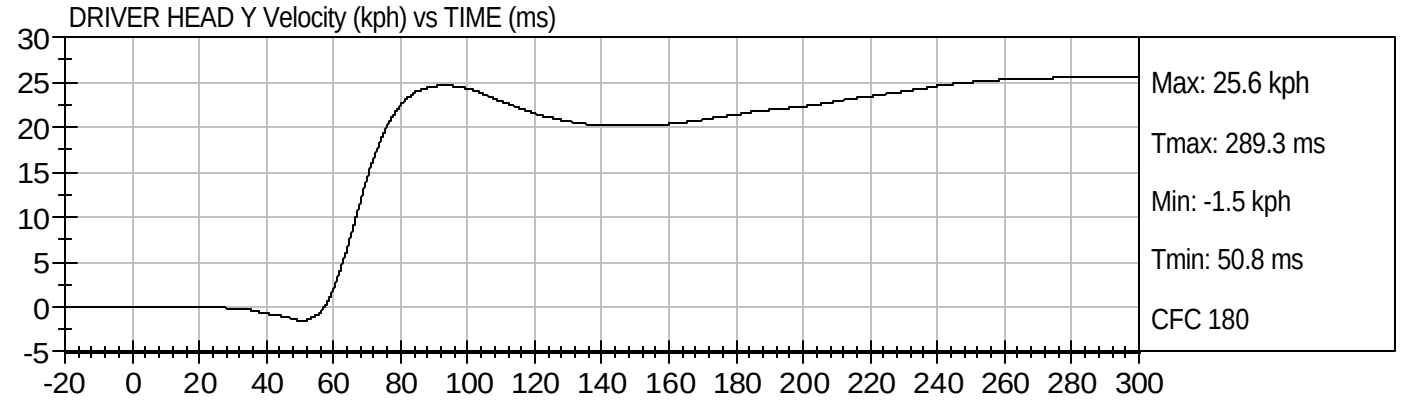


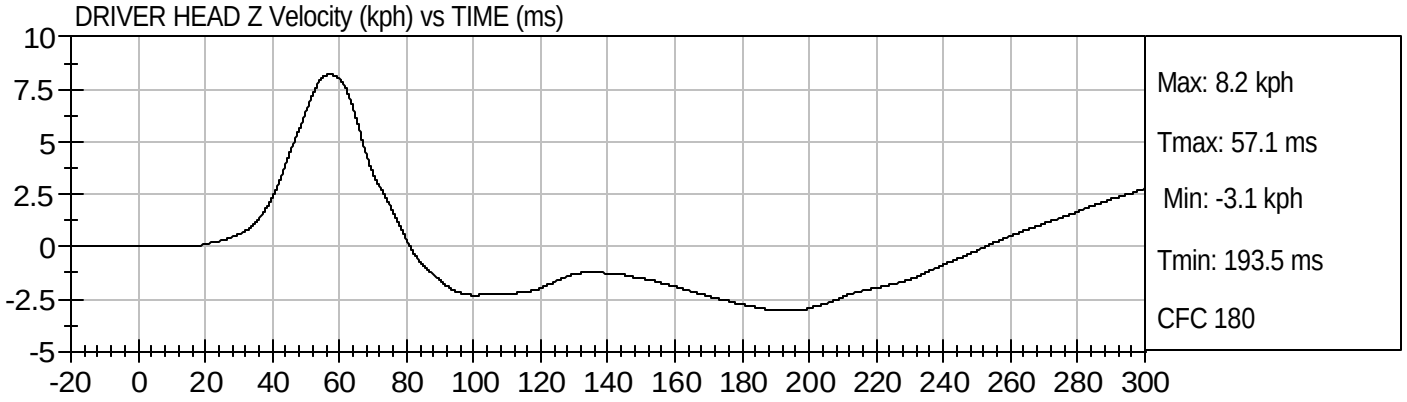


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

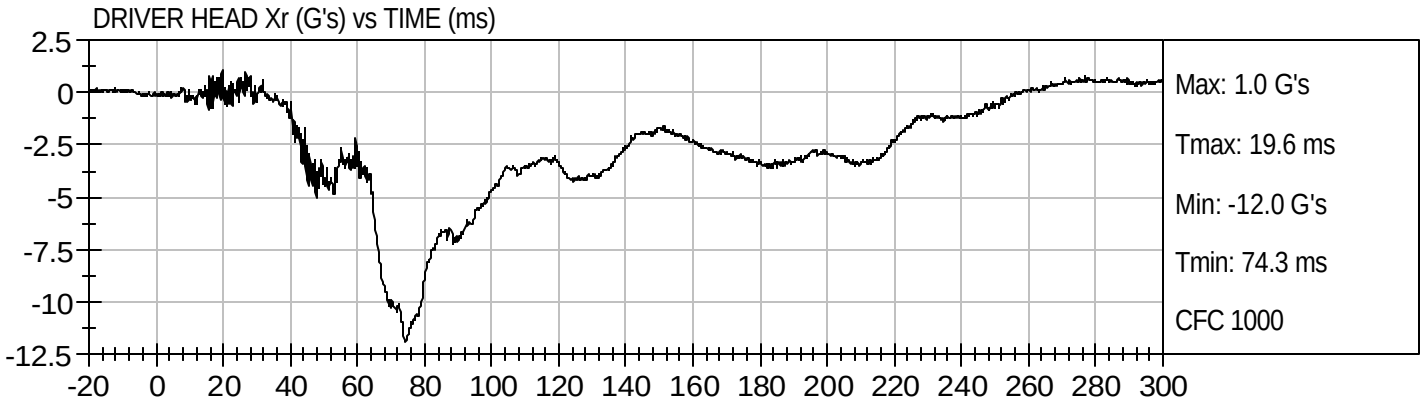


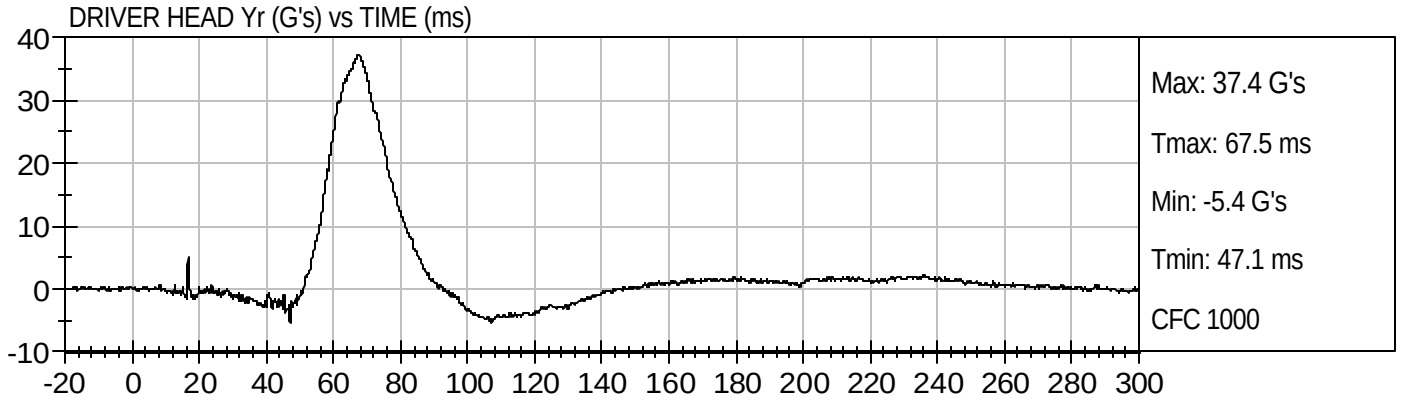


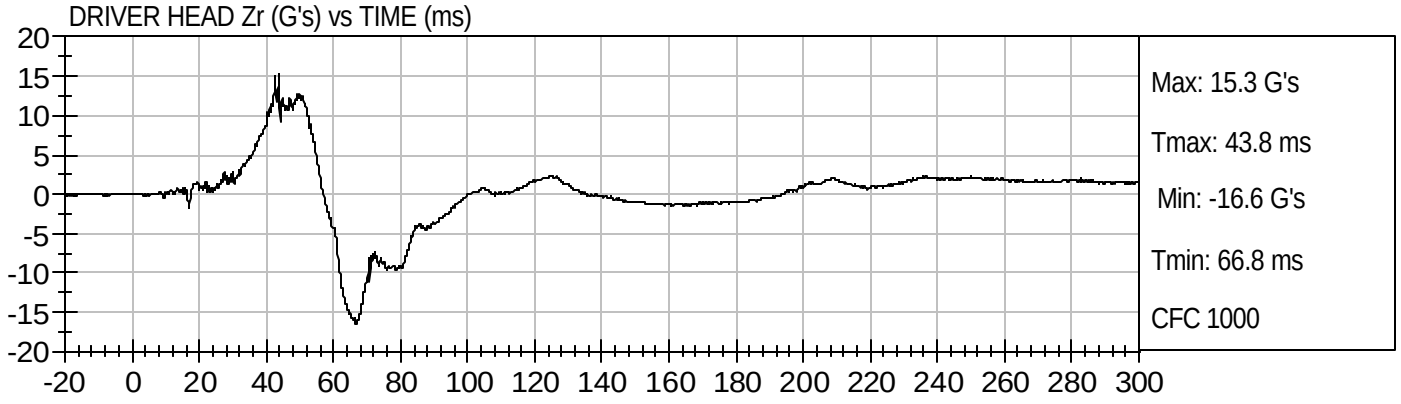


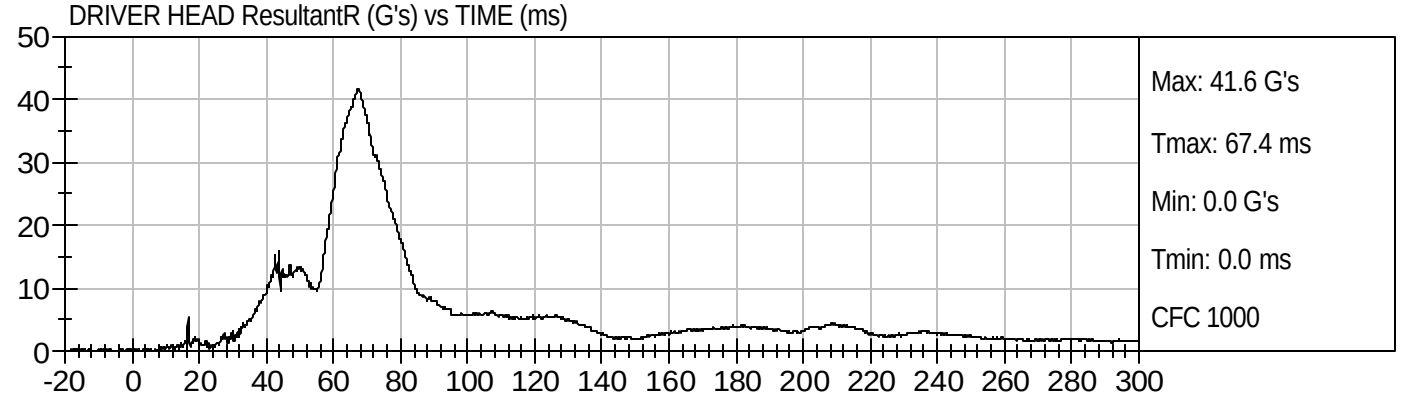
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



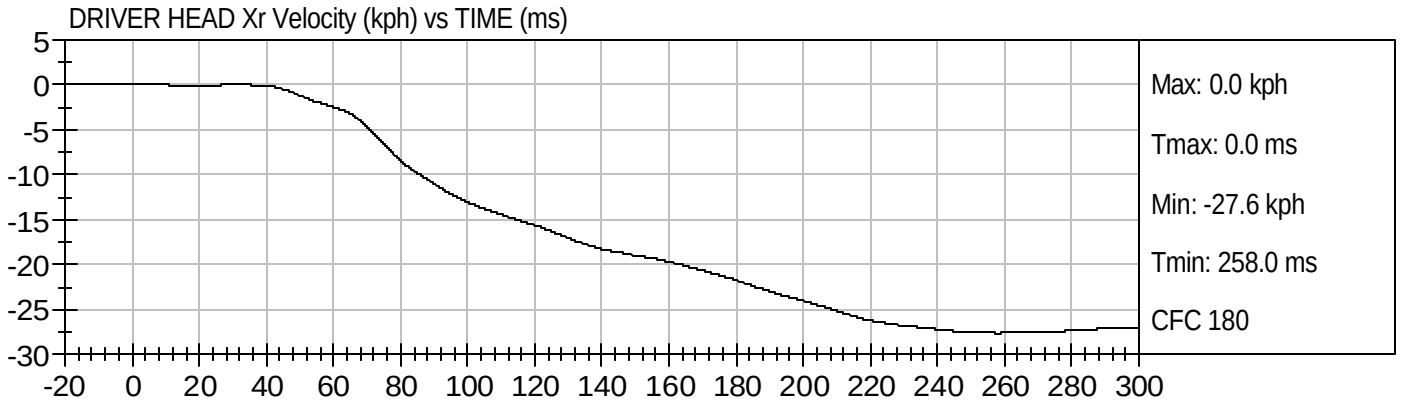


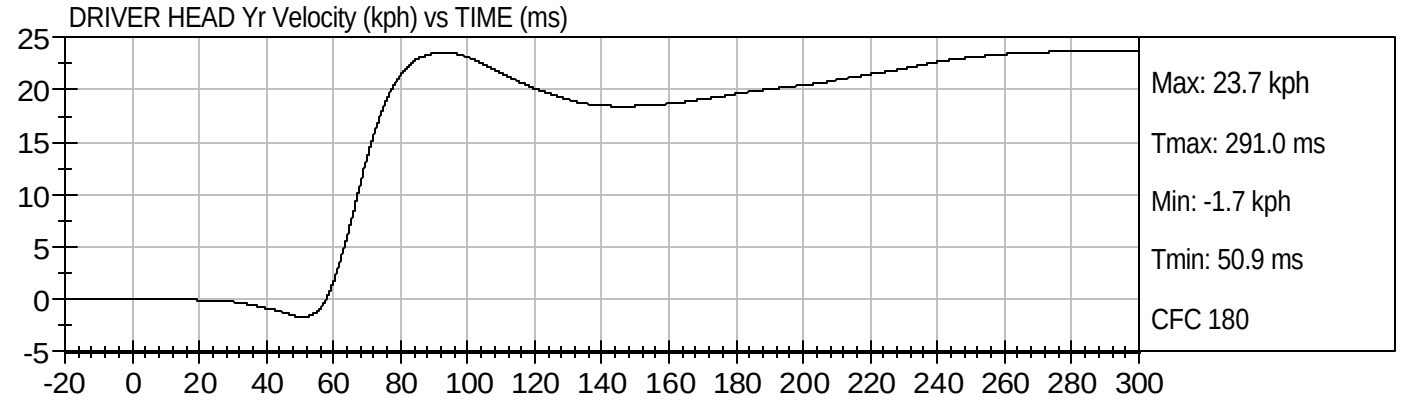


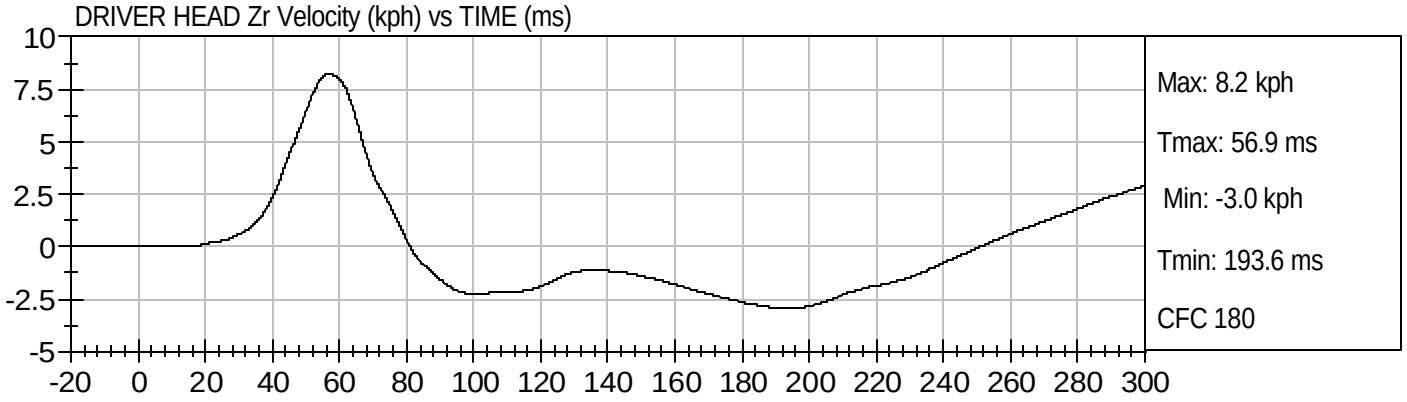


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



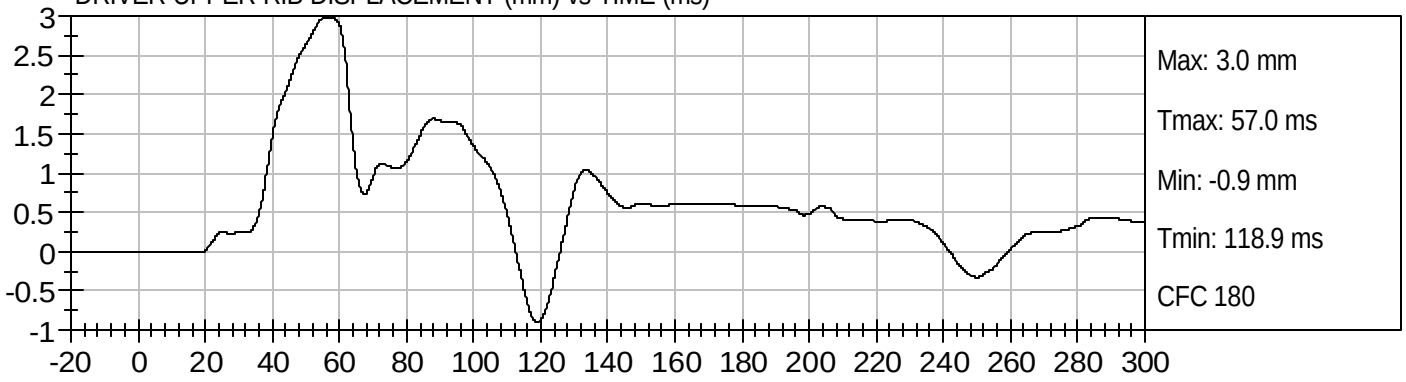




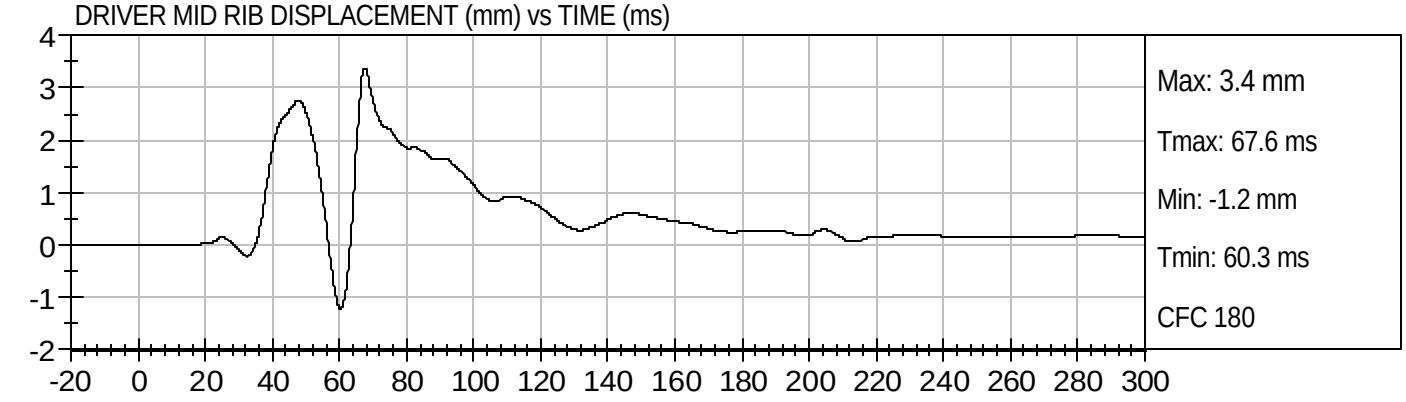
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

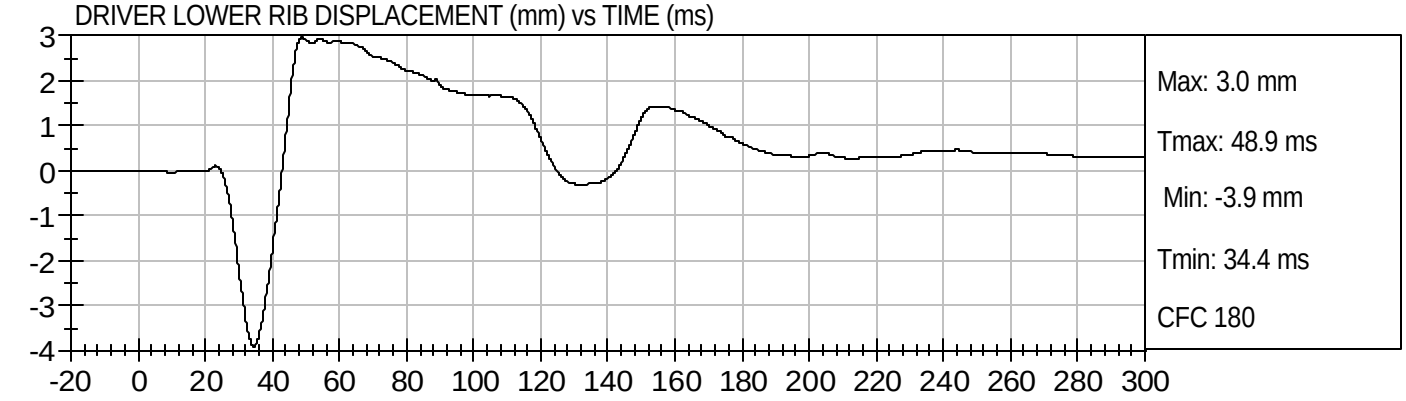
DRIVER UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



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

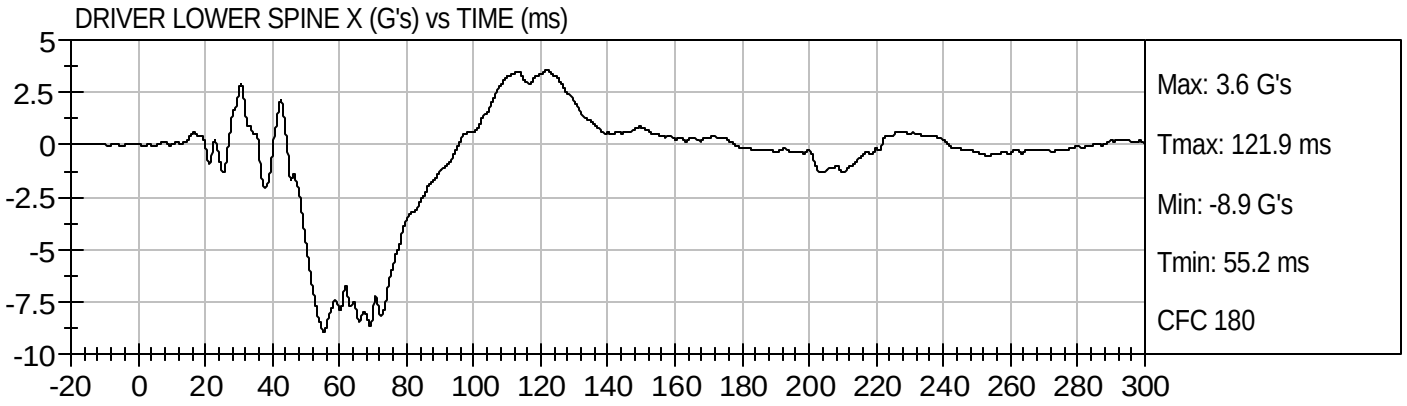


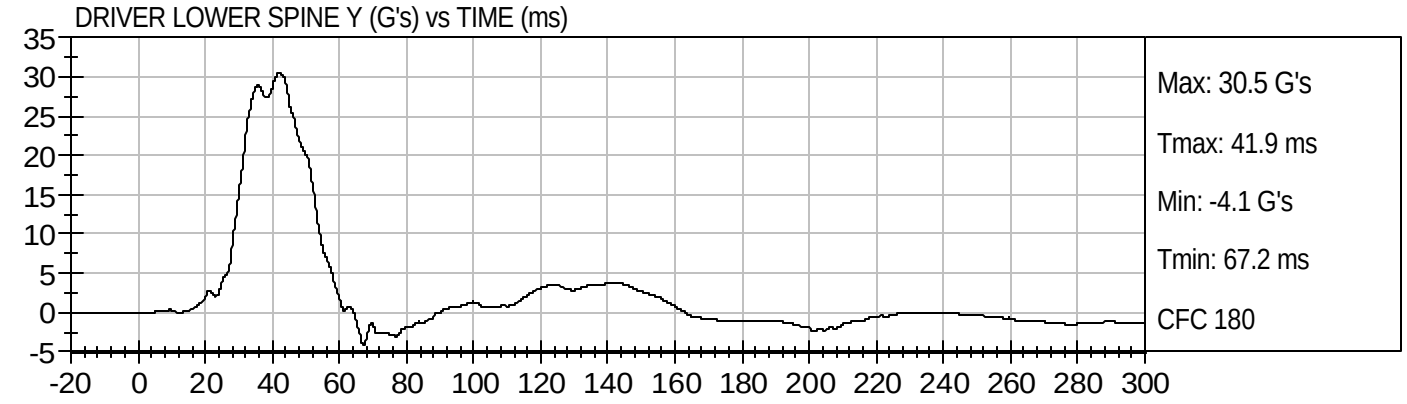
DRIVER LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

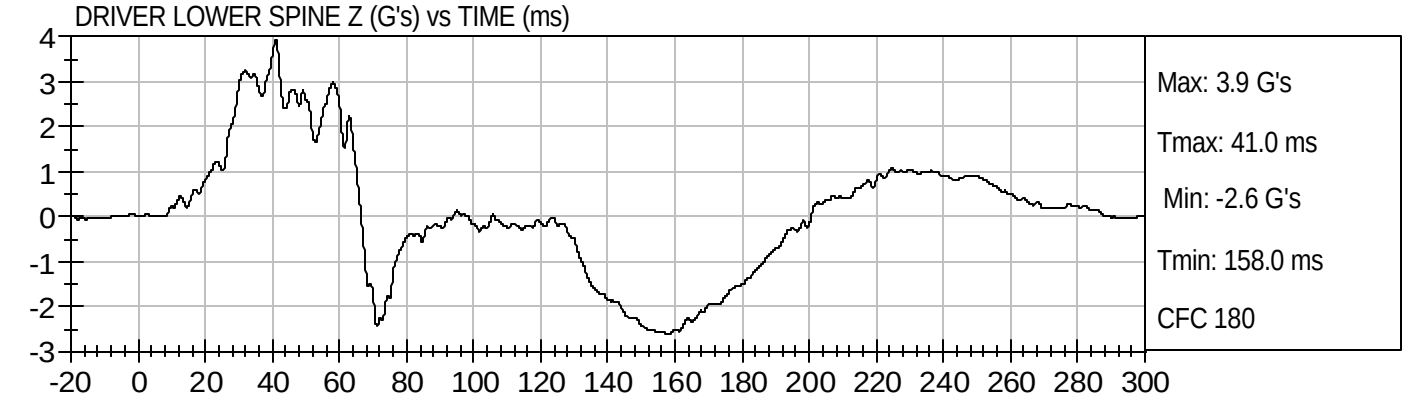


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



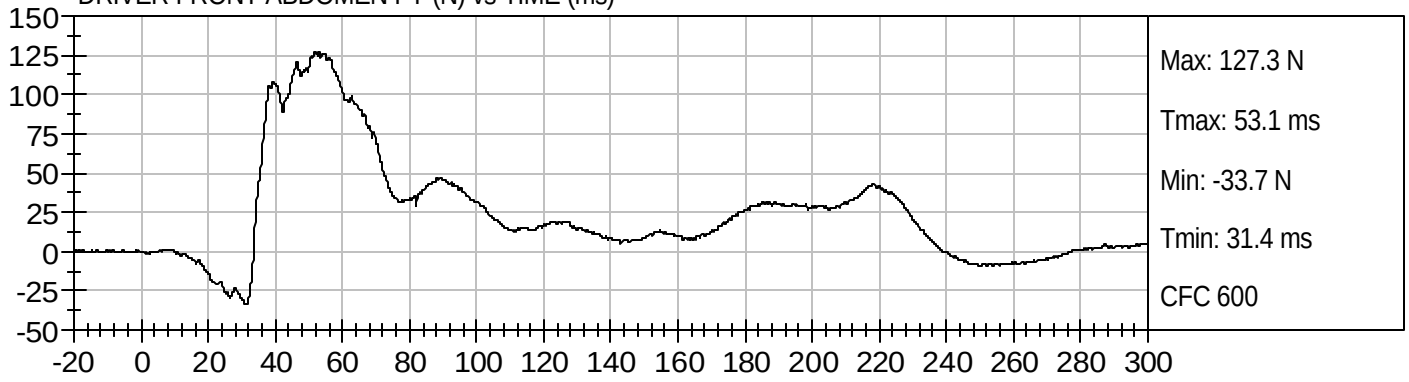




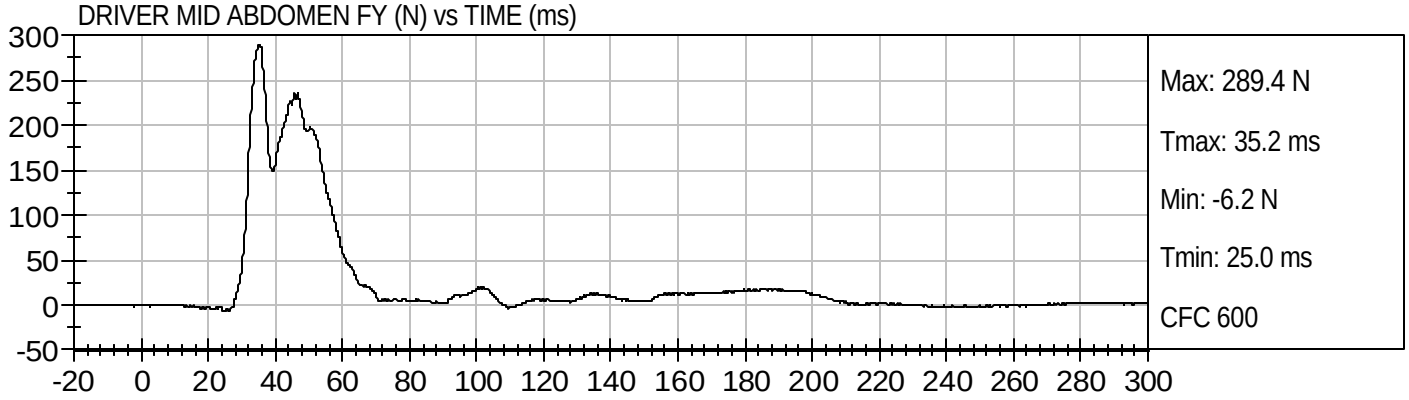
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

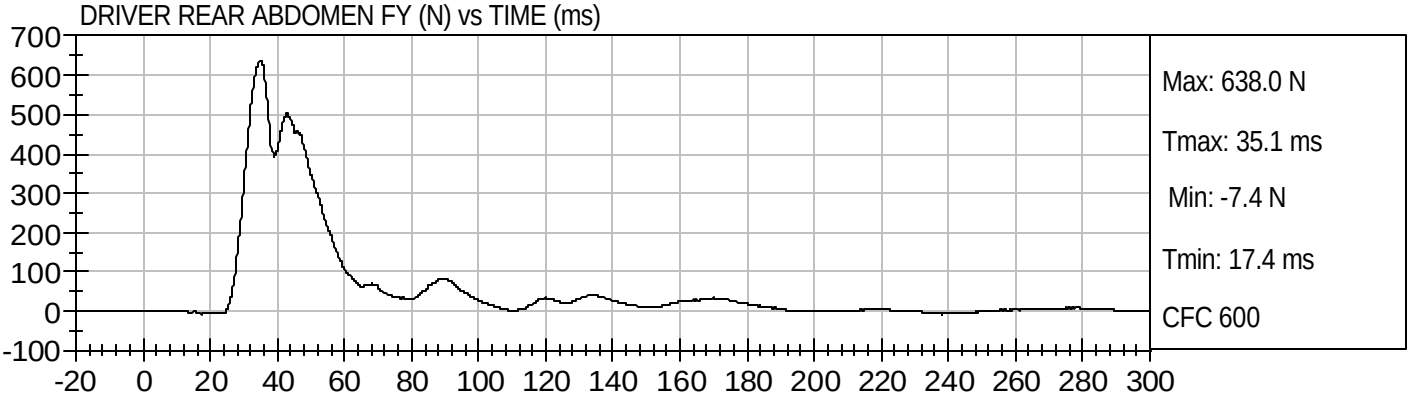
DRIVER FRONT ABDOMEN FY (N) vs TIME (ms)



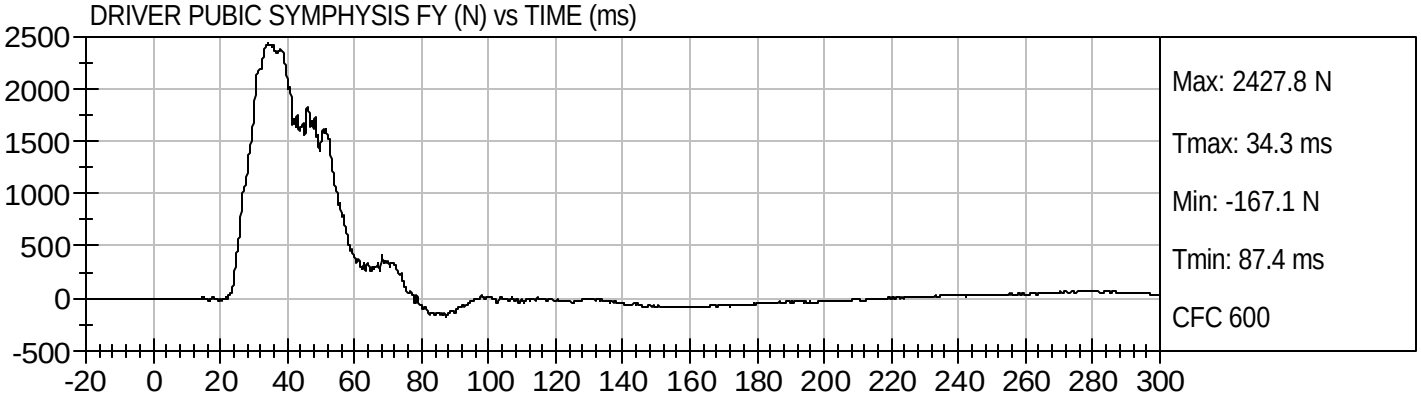
DRIVER MID ABDOMEN FY (N) vs TIME (ms)



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



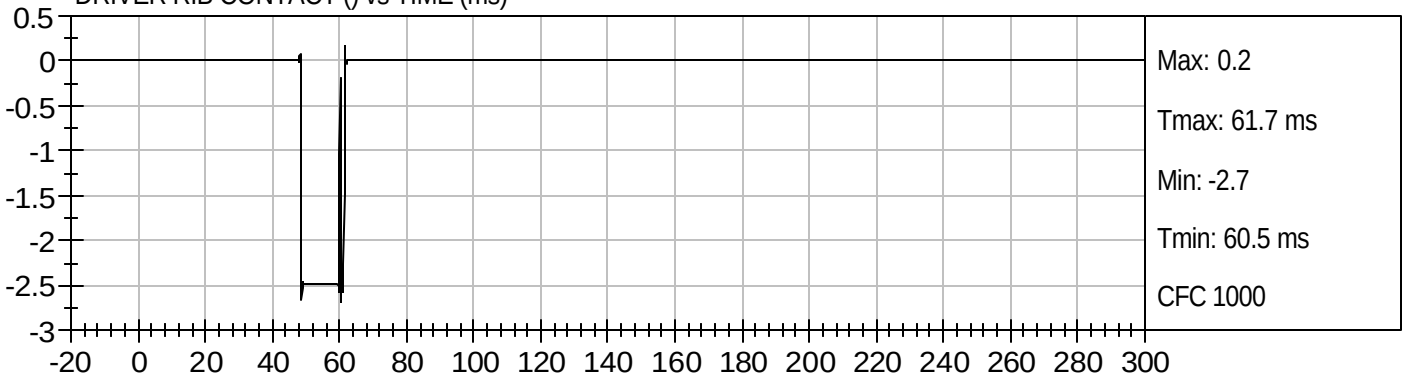
DRIVER PUBIC SYMPHYSIS FY (N) vs TIME (ms)



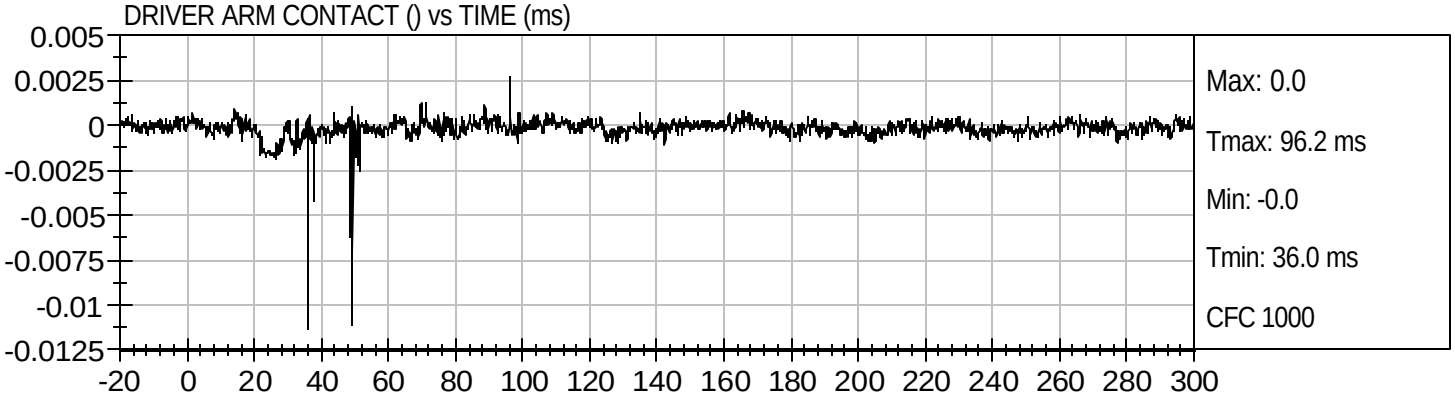
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

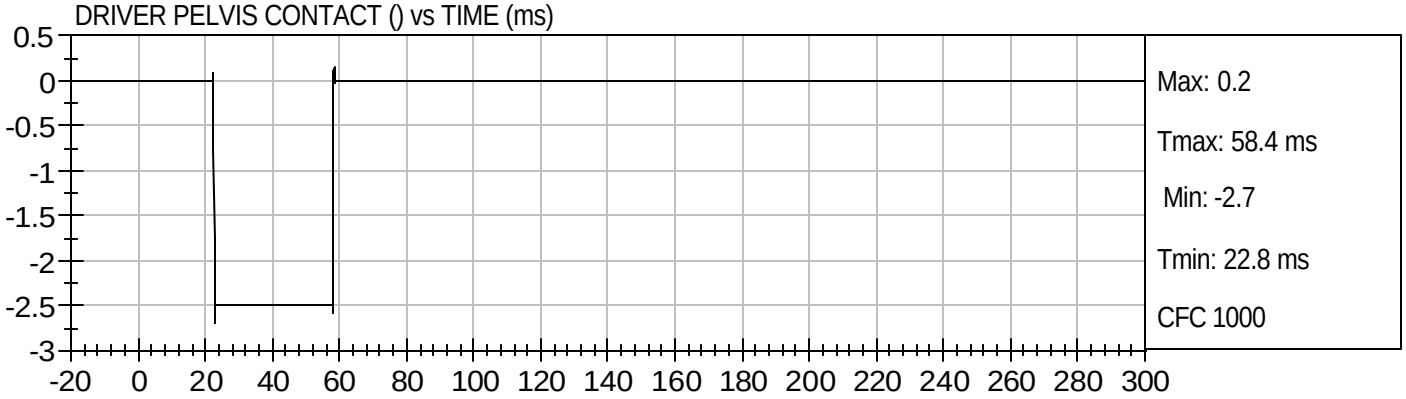
DRIVER RIB CONTACT () vs TIME (ms)



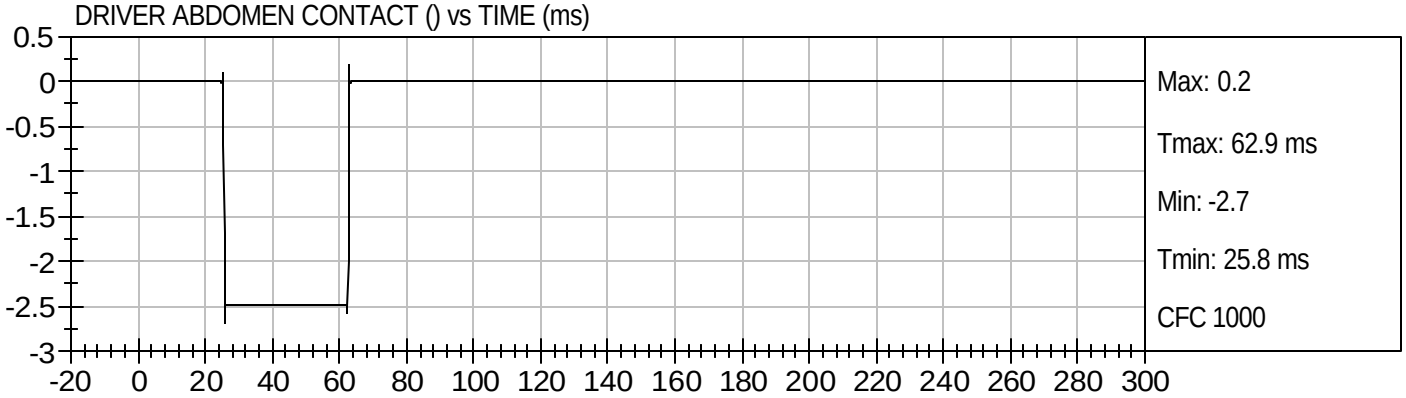
DRIVER ARM CONTACT () vs TIME (ms)



DRIVER PELVIS CONTACT () vs TIME (ms)



DRIVER ABDOMEN CONTACT () vs TIME (ms)



APPENDIX C

DUMMY CALIBRATION DATA

MGA RESEARCH CORPORATION

HEAD DROP TEST

ES-2re DUMMY

ATD Serial No: 030 **Test ID:** D073621

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Peak Resultant Acceleration	G's	125 to 155	141	Pass
Peak Lateral Acceleration	G's	+/- 15	5.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

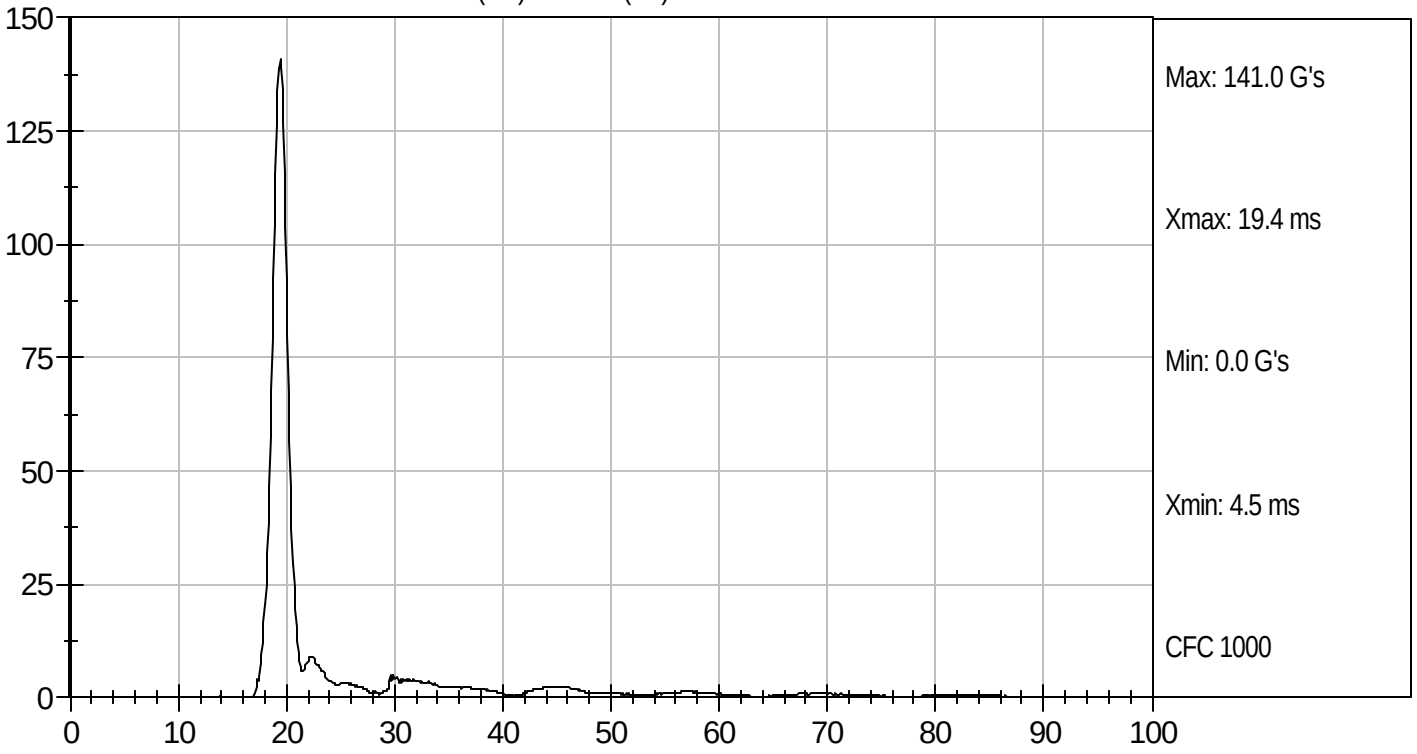
12/19/07
Test Date

David Winkelbauer
Approved By

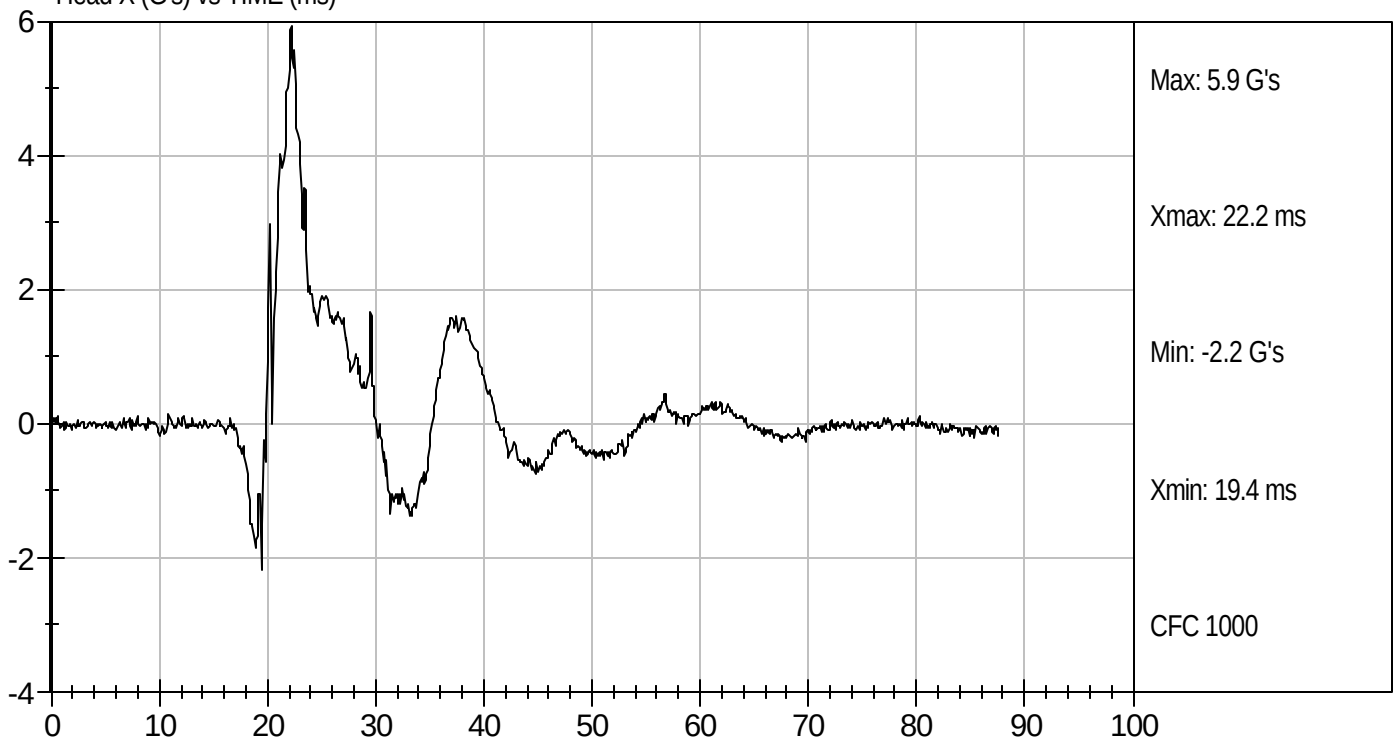
Test Desc: Head Drop
Component ID: D073621

Test Date: 12/19/07
Velocity: 0 ft/s, 0.00 m/s

PEAK RESULTANT ACCELERATION (G's) vs TIME (ms)



Head X (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK PENDULUM TEST

ES-2re DUMMY

ATD Serial No: 030 **Test I.D:** D073622

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.0 to 22.0	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	24	Pass
Pendulum Speed		m/s	3.3 to 3.5	3.5	Pass
Pendulum Deceleration	1 msec	G's	0.00 to -0.05	-0.04	Pass
	3 msec	G's	-0.25 to -0.375	-0.35	Pass
	14 msec	G's	-3.20 to -3.70	-3.23	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	51.4	Pass
Time of Maximum Flexion Angle		msec	54.0 to 66.0	59.9	Pass
Maximum Angle Theta (A)		deg	32.7 to 37.0	33.5	Pass
Time of Maximum Theta (A)		msec	53.0 to 63.0	59.9	Pass
Maximum Angle Theta (B)		deg	28.87 to 31.37	30.30	Pass
Time of Maximum Theta (B)		msec	54.0 to 64.0	54.5	Pass
Head Rotation Decay Time to 0 degree		msec	53 to 88	80	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

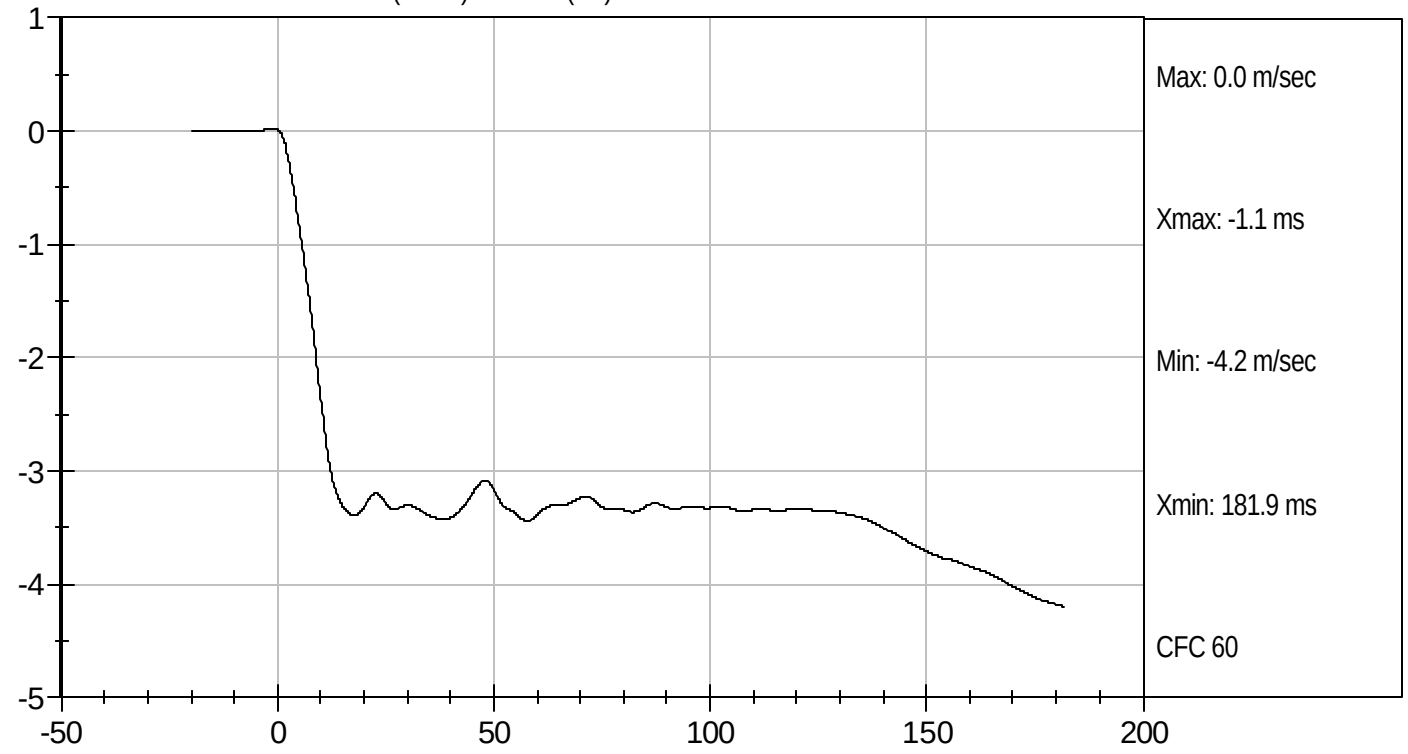
12/19/07
Test Date

David Winkelbauer
Approved By

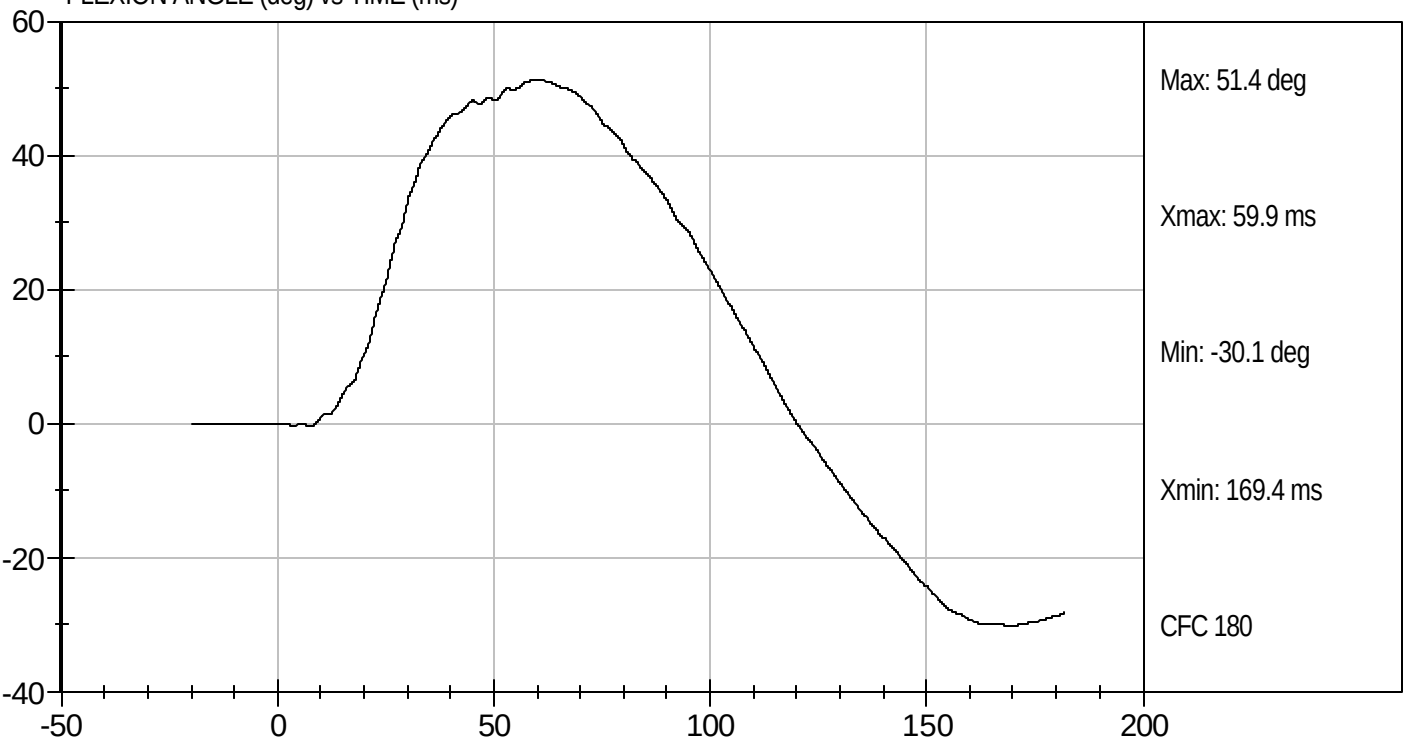
Test Desc: Neck Bending
Component ID: D073622

Test Date: 12/19/07
Velocity: 11.33 ft/s, 3.5 m/s

PENDULUM DECELERATION (m/sec) vs TIME (ms)

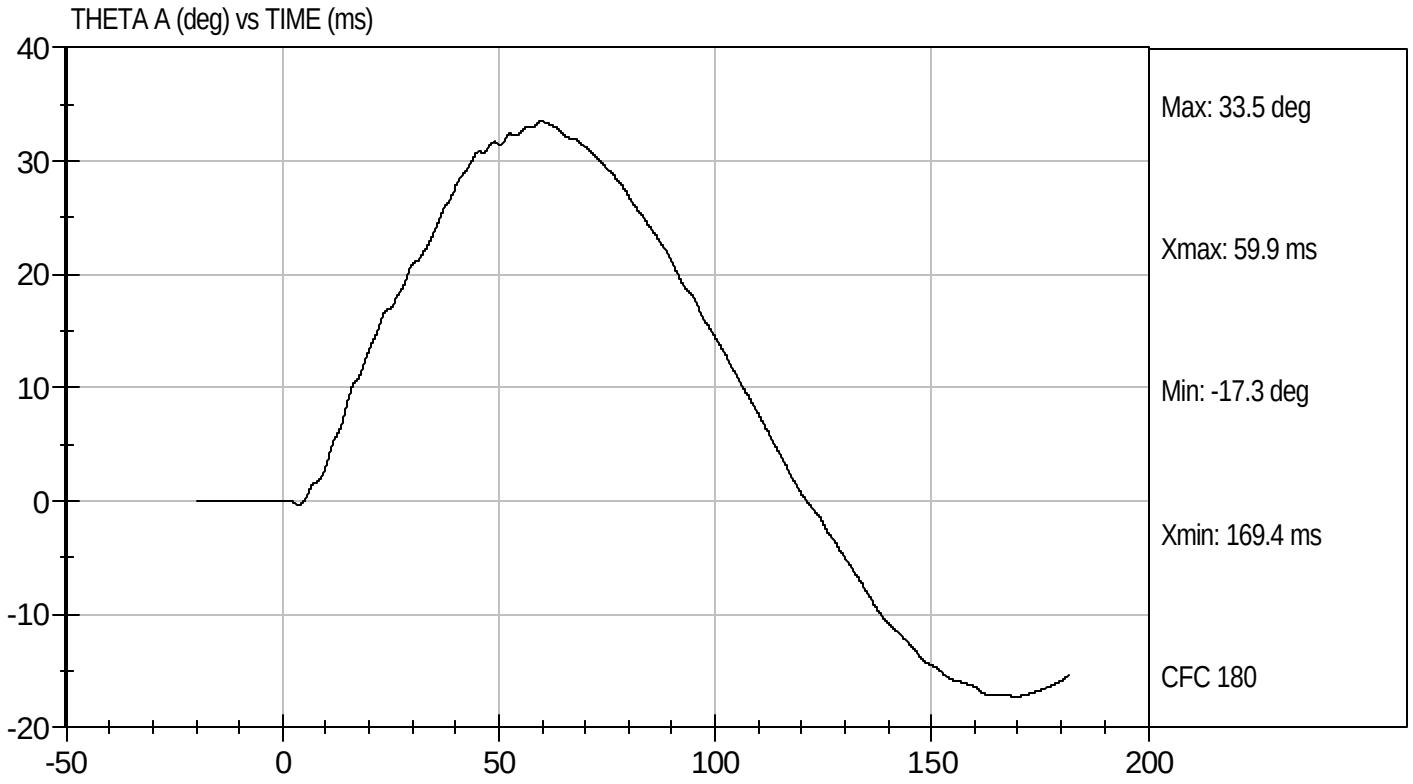


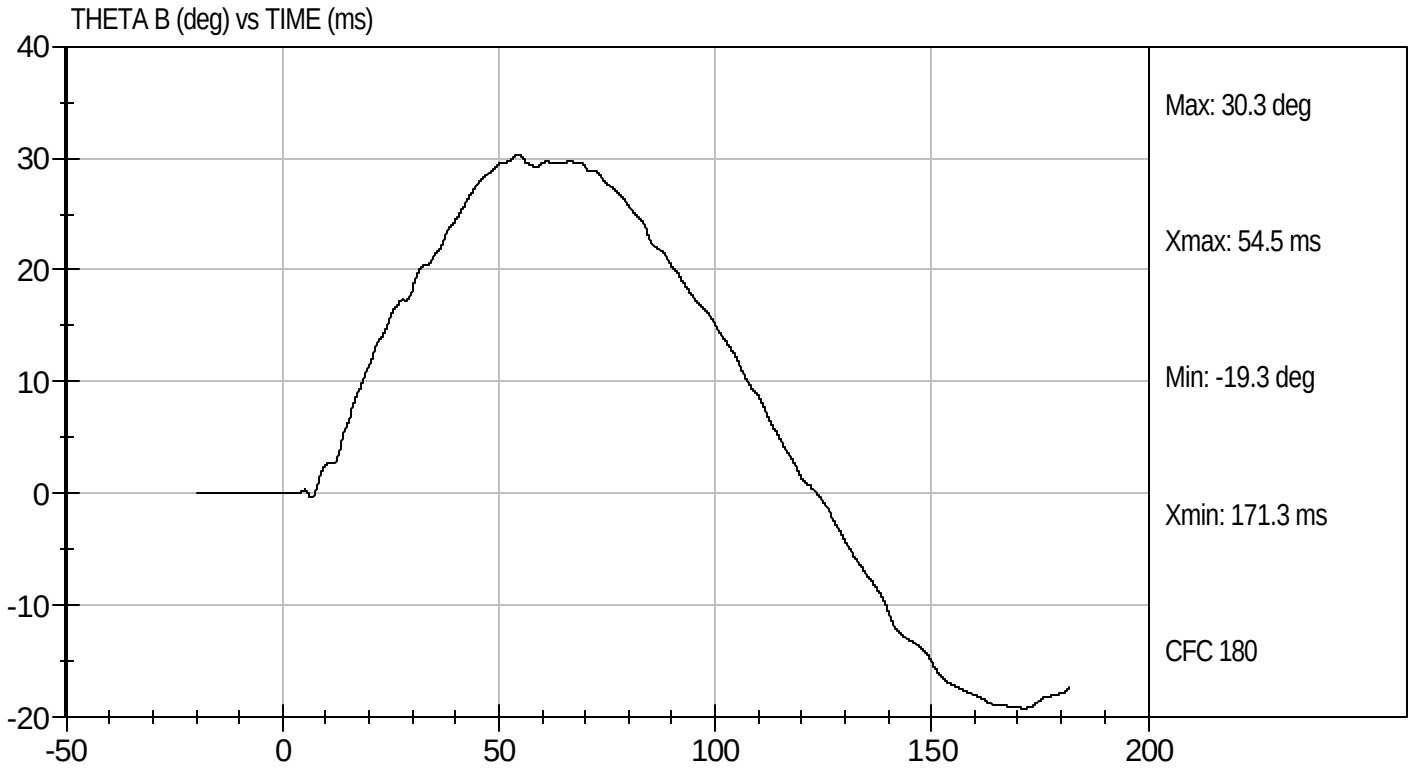
FLEXION ANGLE (deg) vs TIME (ms)



Test Desc: Neck Bending
Component ID: D073622

Test Date: 12/19/07
Velocity: 11.33 ft/s, 3.5 m/s





MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

ES-2re DUMMY

ATD Serial No: 030 **Test I.D:** D073623

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.3	Pass
Peak Shoulder Acceleration	G's	7.5 to 10.5	9.4	Pass
Time of Peak Shoulder Acceleration	msec	NA	17.5	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

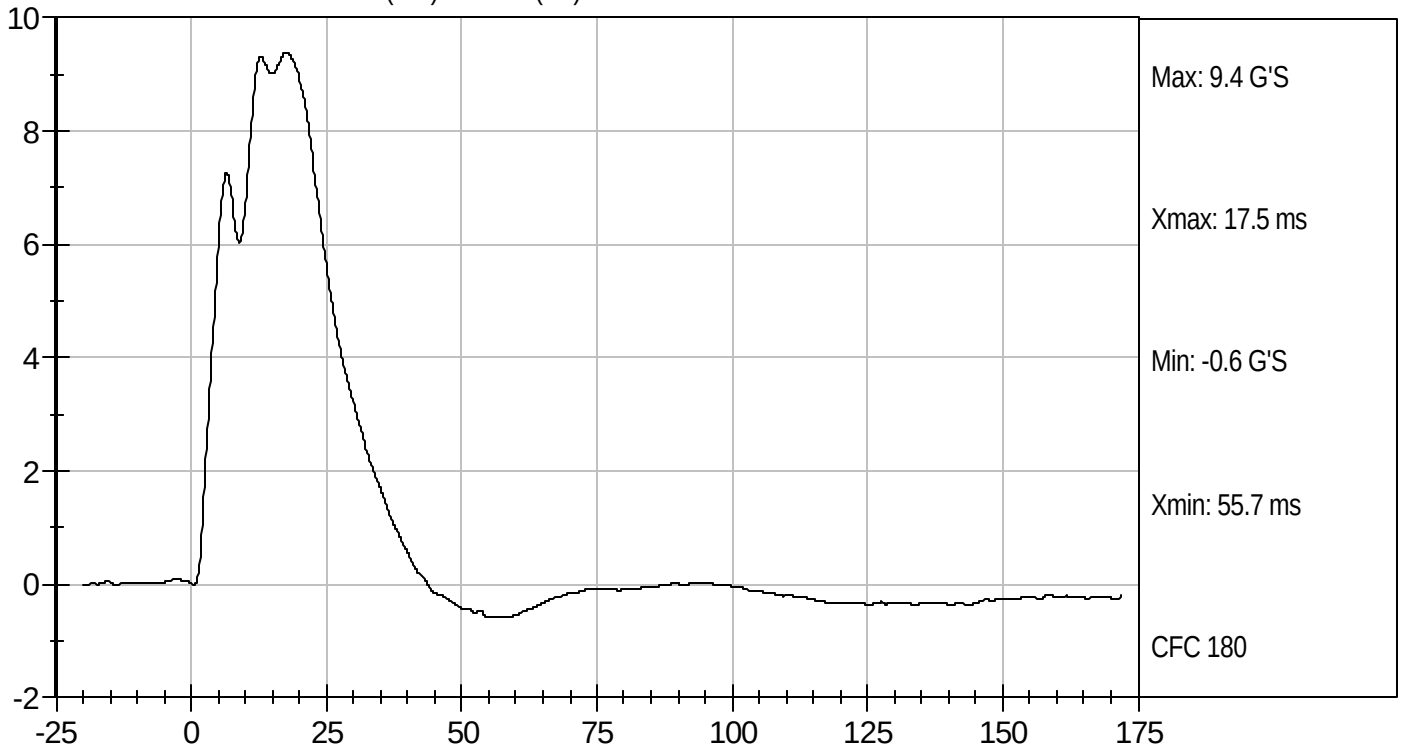
12/20/07
Test Date

David Winkelbauer
Approved By

Test Desc: Shoulder Impact
Component ID: D073623

Test Date: 12/20/07
Velocity: 14.01 ft/s, 4.3 m/s

SHOULDER ACCELERATION (G'S) vs TIME (ms)



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 030 **Test I.D:** D073624

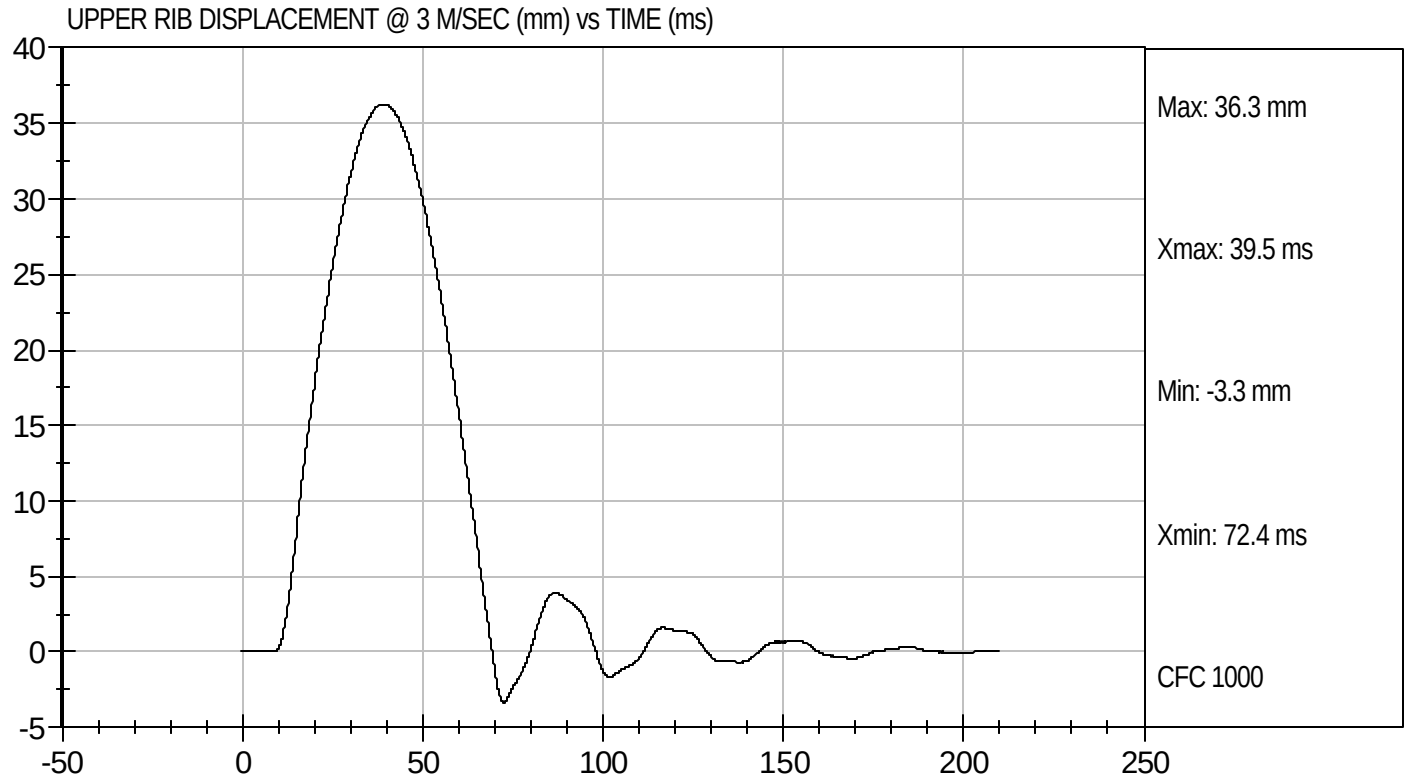
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	36.3	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	47.3	Pass
		Overall Test Results		Pass

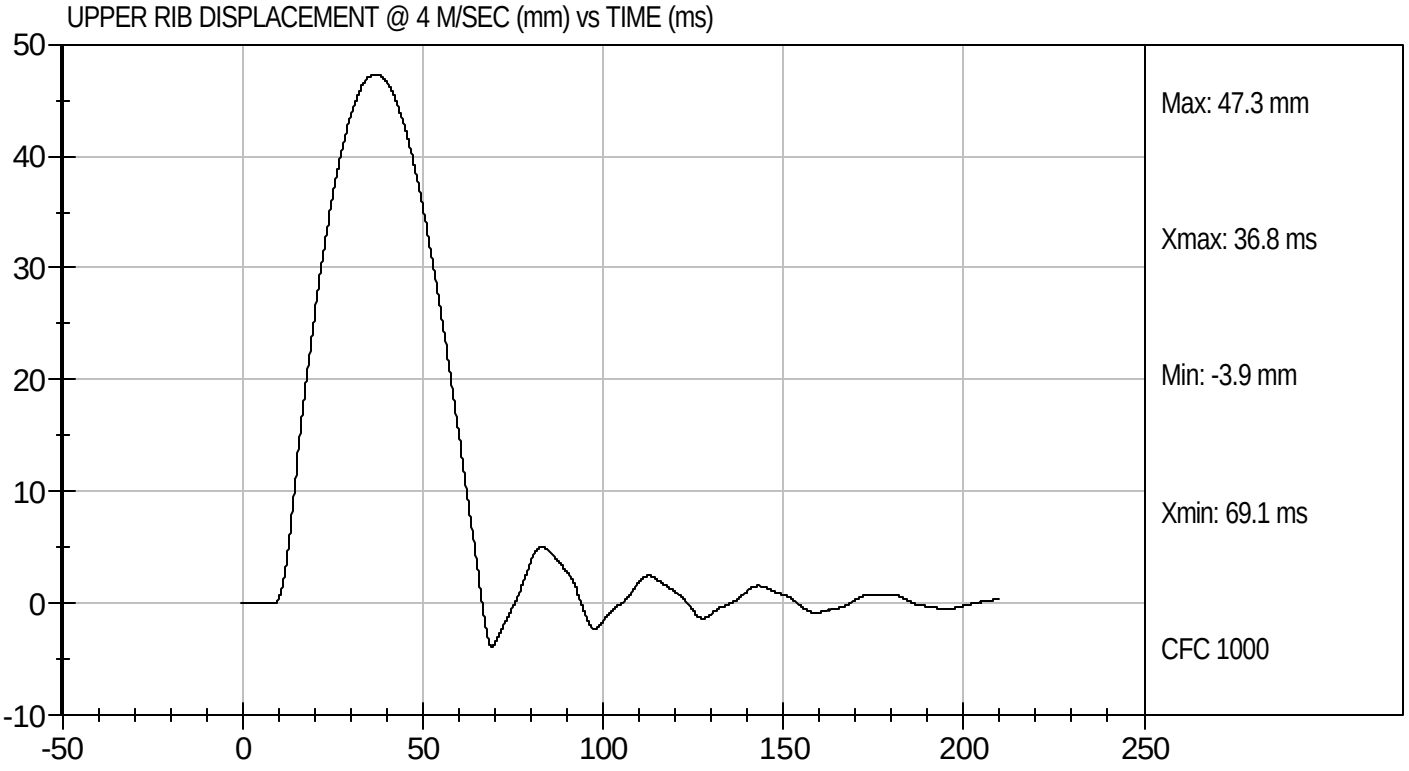
Laboratory Technician

12/19/07
Test Date

David Winkelbauer
Approved By

Test Desc: Rib Impact - Upper
Component ID: D073624
Test Date: 12/19/07





MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

ATD Serial No: 030 **Test I.D:** D073625

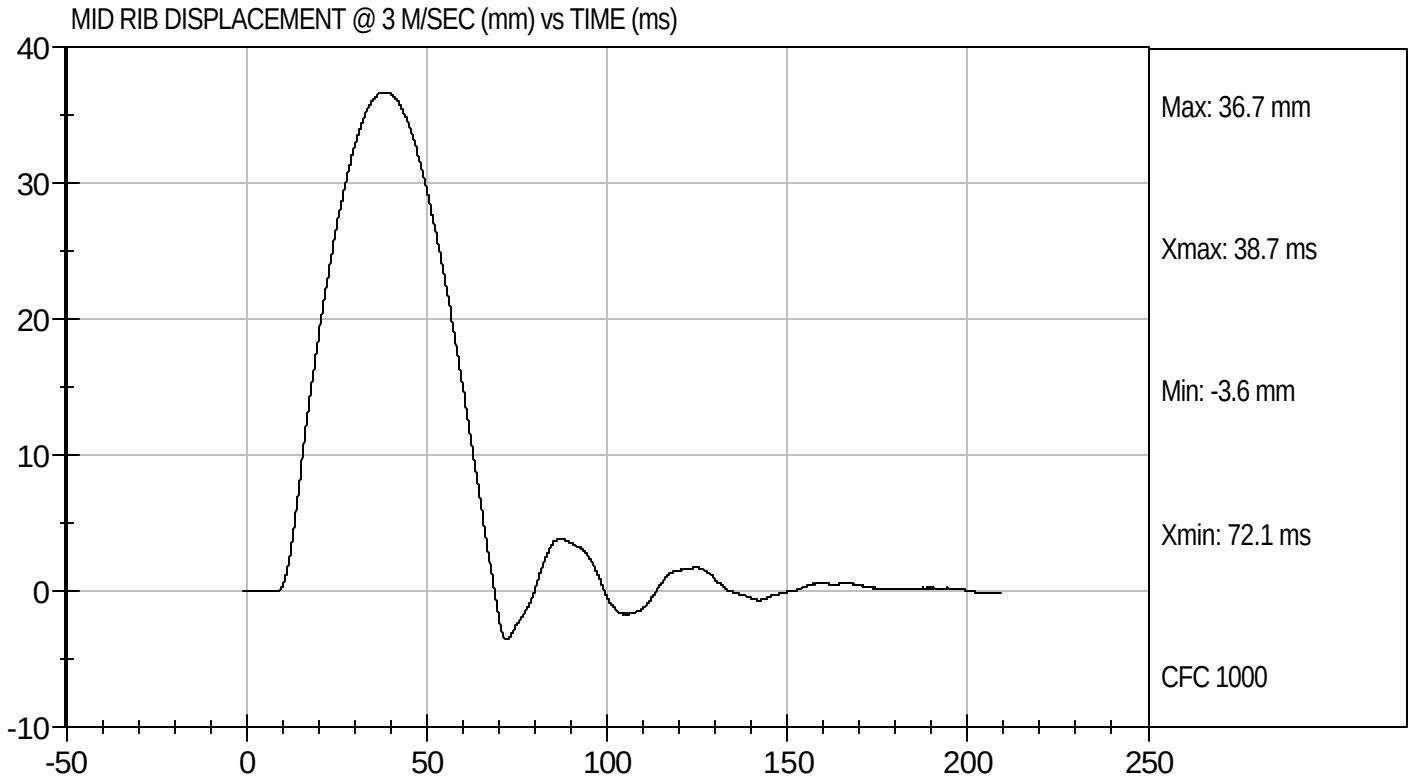
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	36.7	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	49.2	Pass
		Overall Test Results		Pass

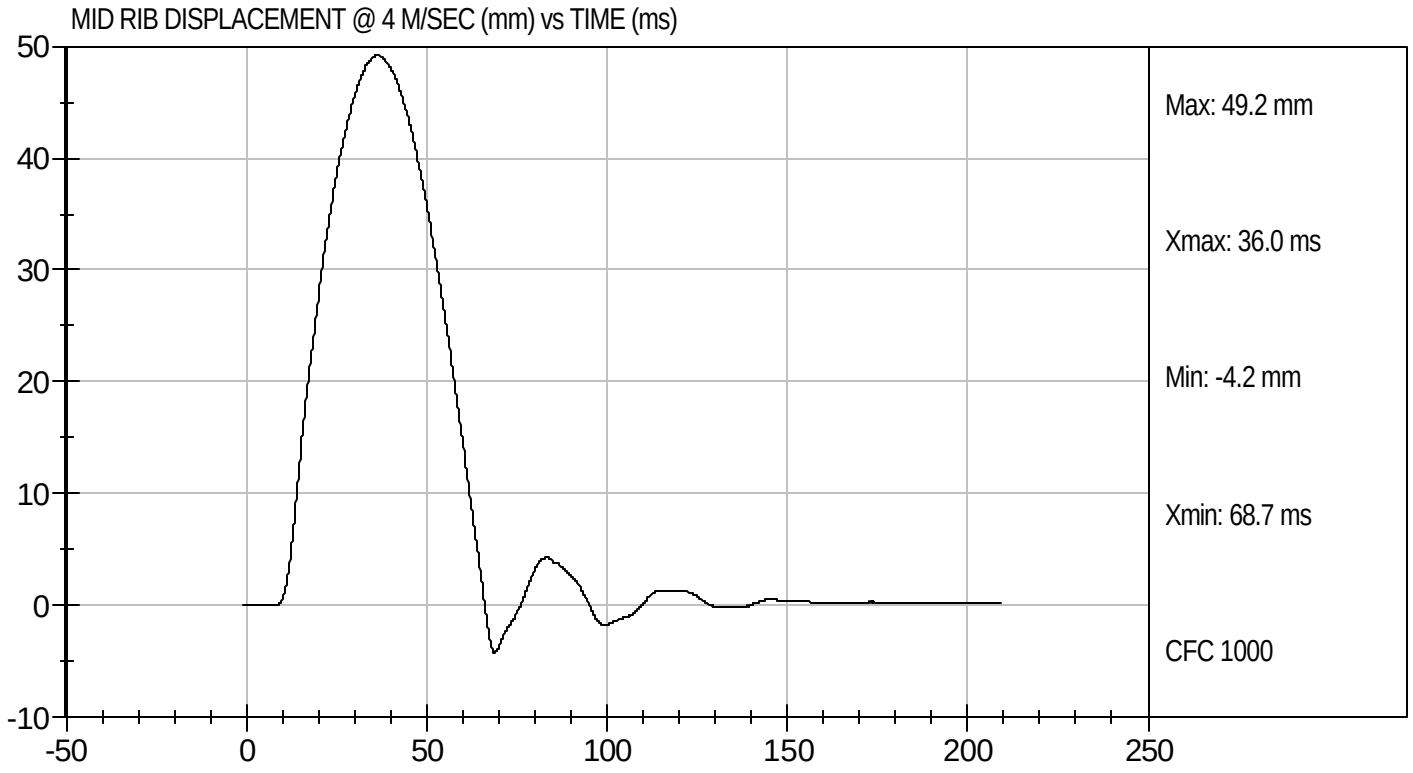
Laboratory Technician

12/19/07
Test Date

David Winkelbauer
Approved By

Test Desc: Rib Impact - Mid
Component ID: D073625
Test Date: 12/19/07





MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 030 **Test I.D:** D073626

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	36.0	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	47.4	Pass
		Overall Test Results		Pass

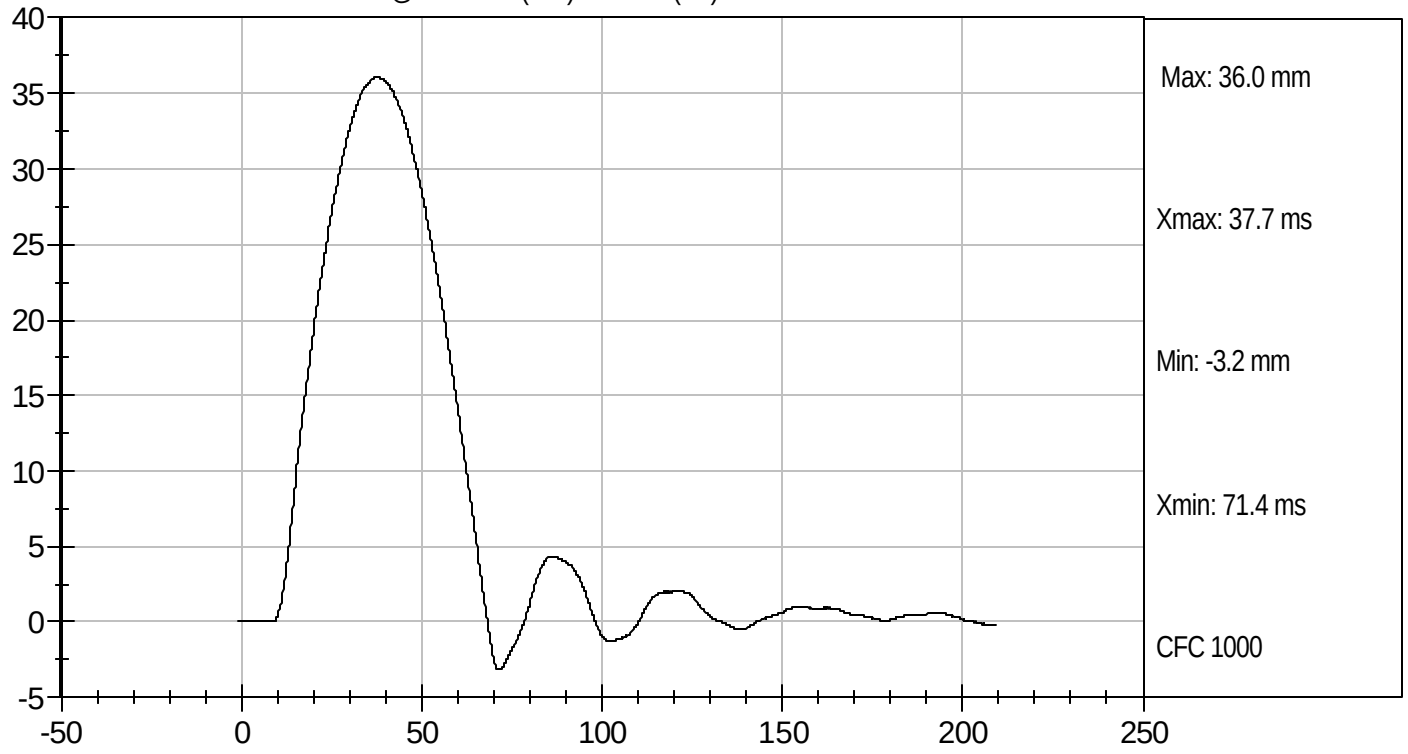
Laboratory Technician

12/19/07
Test Date

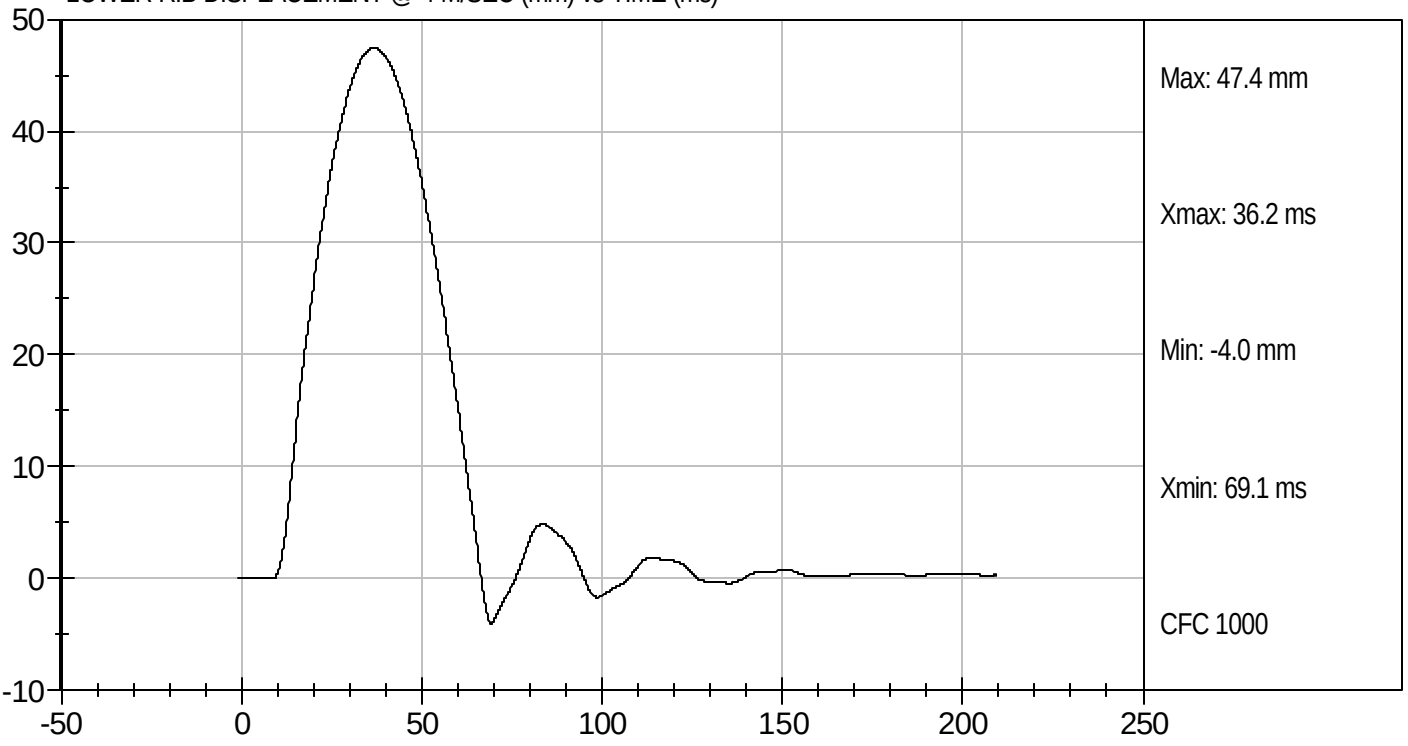
David Winkelbauer
Approved By

Test Desc: Rib Impact - Lower
Component ID: D073626
Test Date: 12/19/07

LOWER RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT @ 4 M/SEC (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: 030 **Test I.D:** D073627

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Speed	m/s	3.90 to 4.10	4.03	Pass
Maximum Impact Force	kN	4.00 to 4.80	4.37	Pass
Time of Maximum Impactor Force	msec	10.60 to 13.00	11.00	Pass
Maximum Total Abdomen Force	kN	2.20 to 2.70	2.52	Pass
Time of Maximum Abdomen Force	msec	10.00 to 12.30	10.20	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

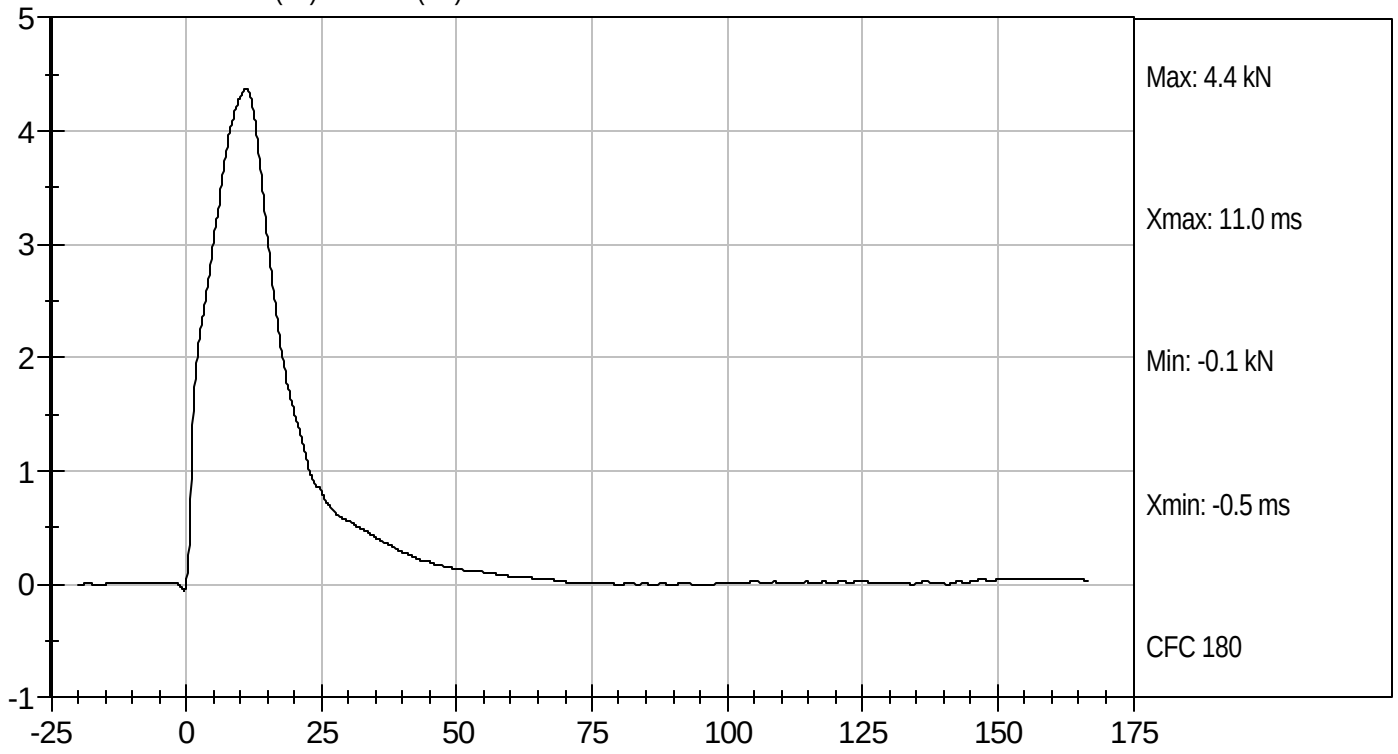
12/20/07
Test Date

David Winkelbauer
Approved By

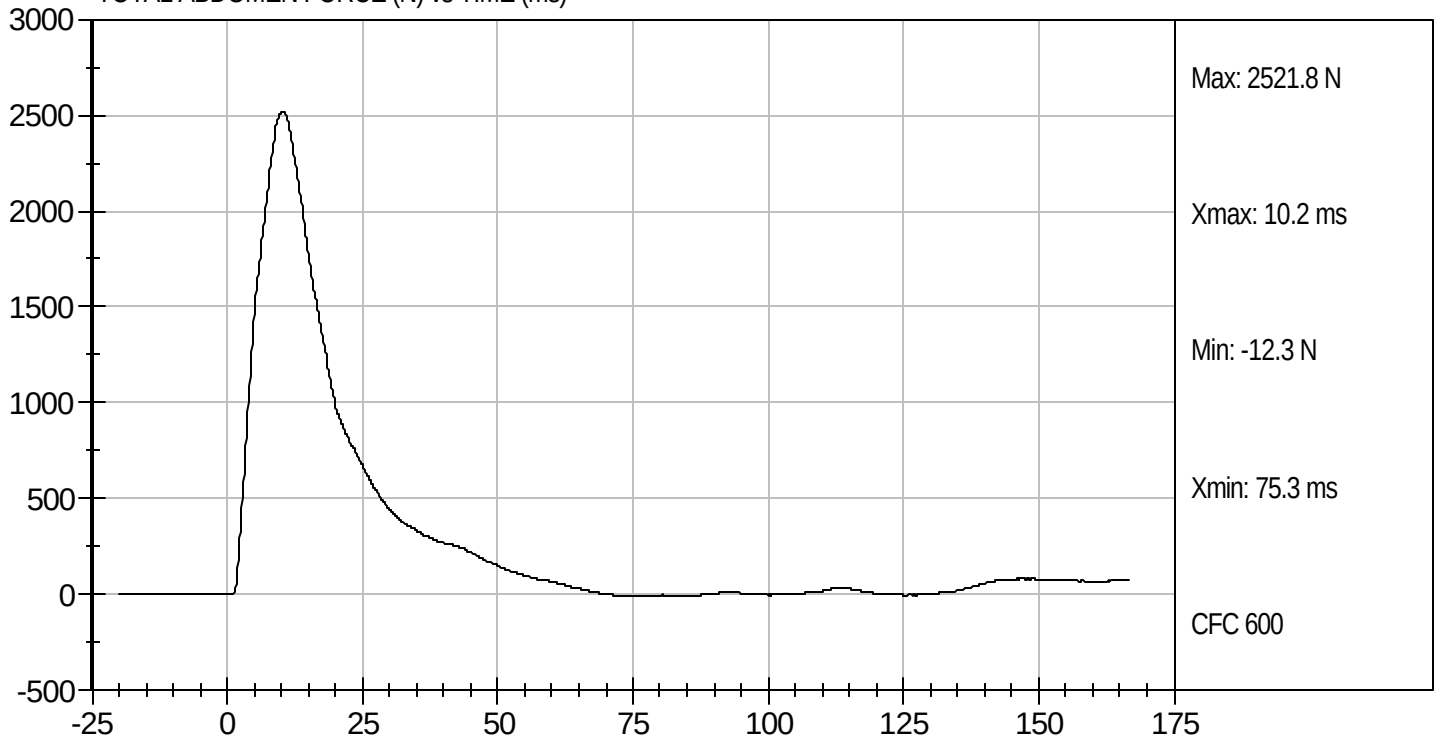
Test Desc: Abdomen Impact
Component ID: D073627

Test Date: 12/20/07
Velocity: 13.22 ft/s, 4.03 m/s

IMPACTOR FORCE (kN) vs TIME (ms)



TOTAL ABDOMEN FORCE (N) vs TIME (ms)



MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

ES-2re DUMMY

ATD Serial No: 030 **Test I.D:** D073628

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	23	Pass
Pendulum Speed		m/sec	5.95 to 6.15	6.14	Pass
Pendulum Deceleration	1 msec	m/sec	-0.05 to 0.00	-0.03	Pass
	3.7 msec	m/sec	-0.425 to -0.24	-0.41	Pass
	27 msec	m/sec	-6.50 to -5.80	-5.84	Pass
	30 msec	m/sec	>= -6.5	-5.88	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	48.6	Pass
Time of Maximum Flexion Angle		msec	39.0 to 53.0	46.0	Pass
Maximum Theta (A)		deg	31.0 to 35.0	32.4	Pass
Time of Maximum Theta (A)		msec	44.0 to 52.0	46.0	Pass
Maximum Theta (B)		deg	27.89 to 30.39	29.87	Pass
Time of Maximum Theta (B)		msec	44.0 to 52.0	45.1	Pass
Headform Rotation Decay to Initial Position		msec	37 to 57	46	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

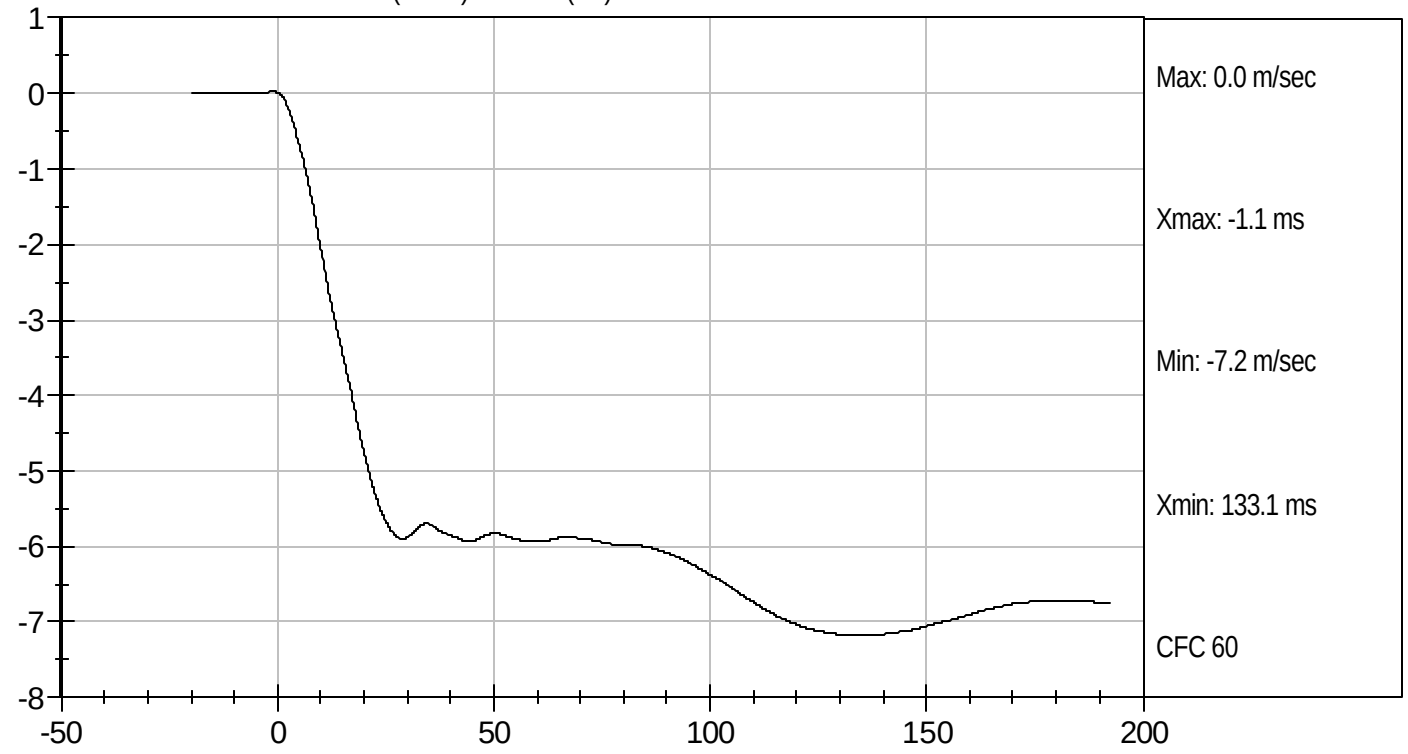
12/19/07
Test Date

David Winkelbauer
Approved By

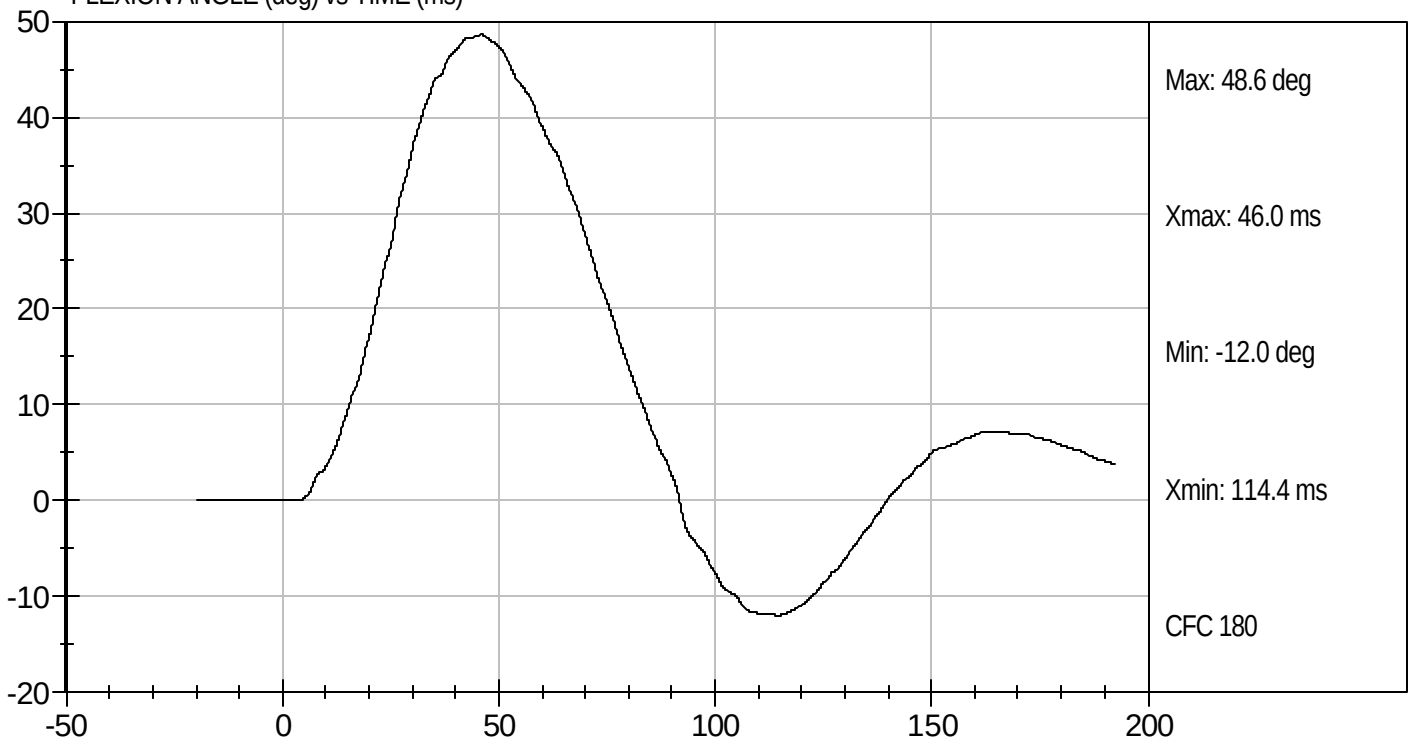
Test Desc: Lumbar Bending
Component ID: D073628

Test Date: 12/19/07
Velocity: 20.15 ft/s, 6.14 m/s

PENDULUM DECELERATION (m/sec) vs TIME (ms)

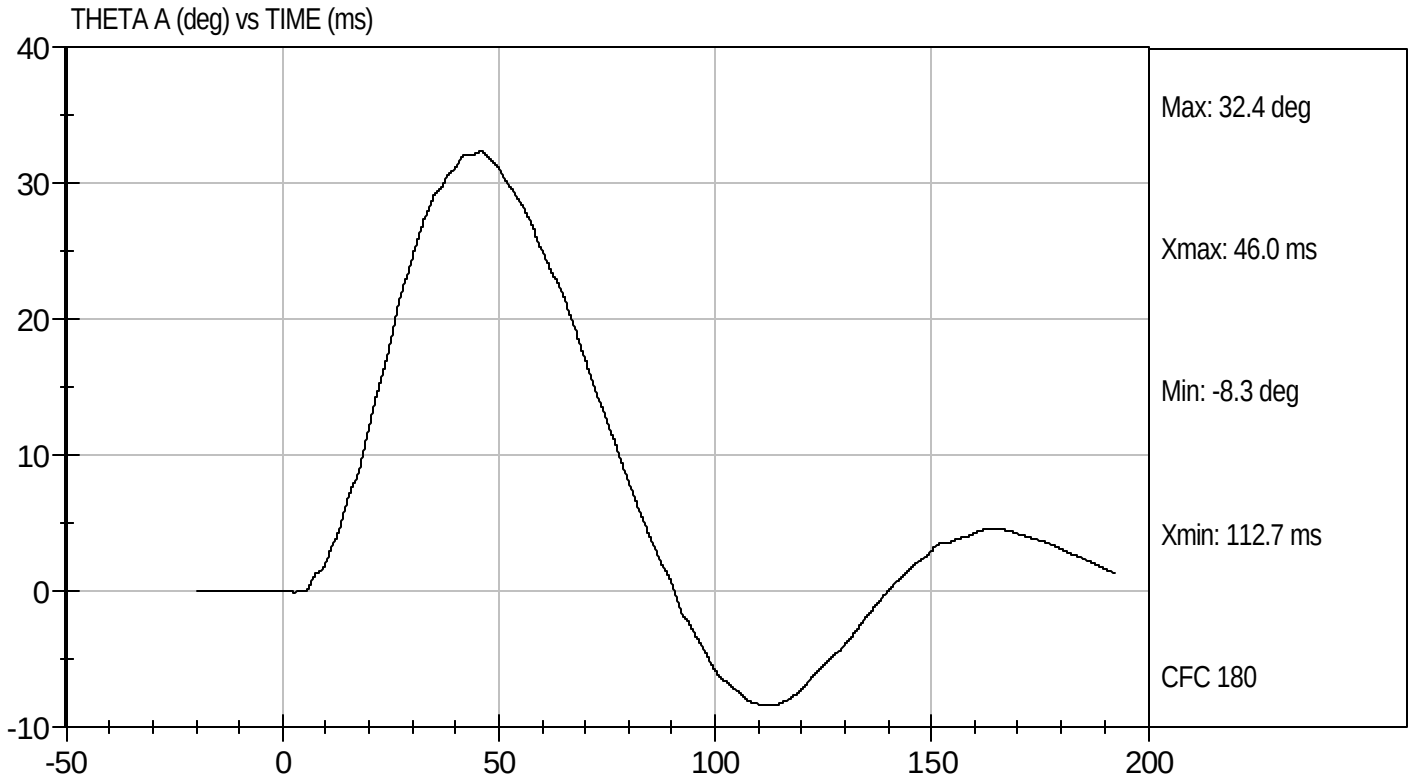


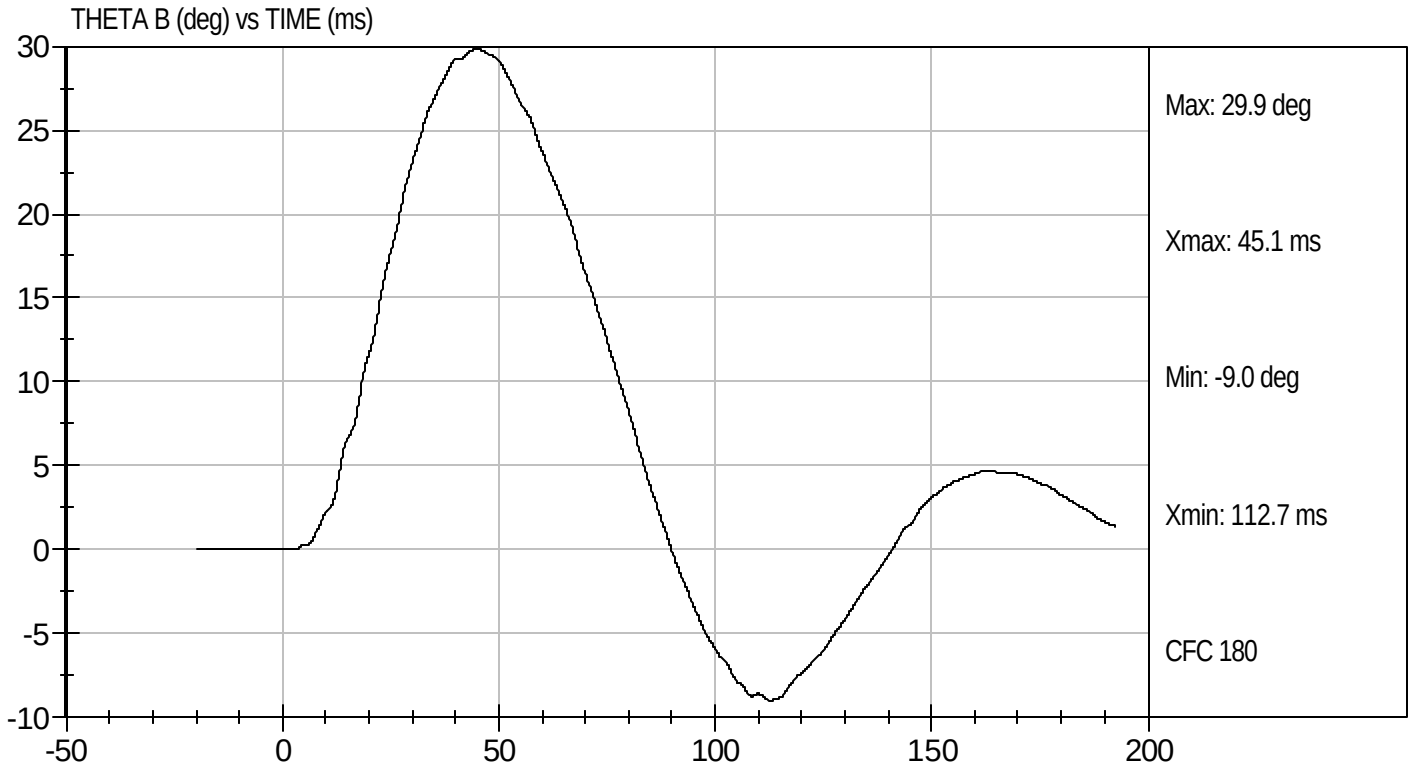
FLEXION ANGLE (deg) vs TIME (ms)



Test Desc: Lumbar Bending
Component ID: D073628

Test Date: 12/19/07
Velocity: 20.15 ft/s, 6.14 m/s





MGA RESEARCH CORPORATION

PELVIS TEST

ES-2re DUMMY

ATD Serial No: 030 **Test I.D:** D073629

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	25	Pass
Probe Speed	m/s	4.20 to 4.40	4.30	Pass
Maximum Impactor Force	kN	4.70 to 5.40	4.91	Pass
Time of Maximum Impactor Force	msec	11.80 to 16.10	12.60	Pass
Maximum Pubic Force	kN	1.23 to 1.59	1.40	Pass
Time of Maximum Pubic Force	msec	12.20 to 17.00	13.60	Pass
		Overall Test Results		Pass

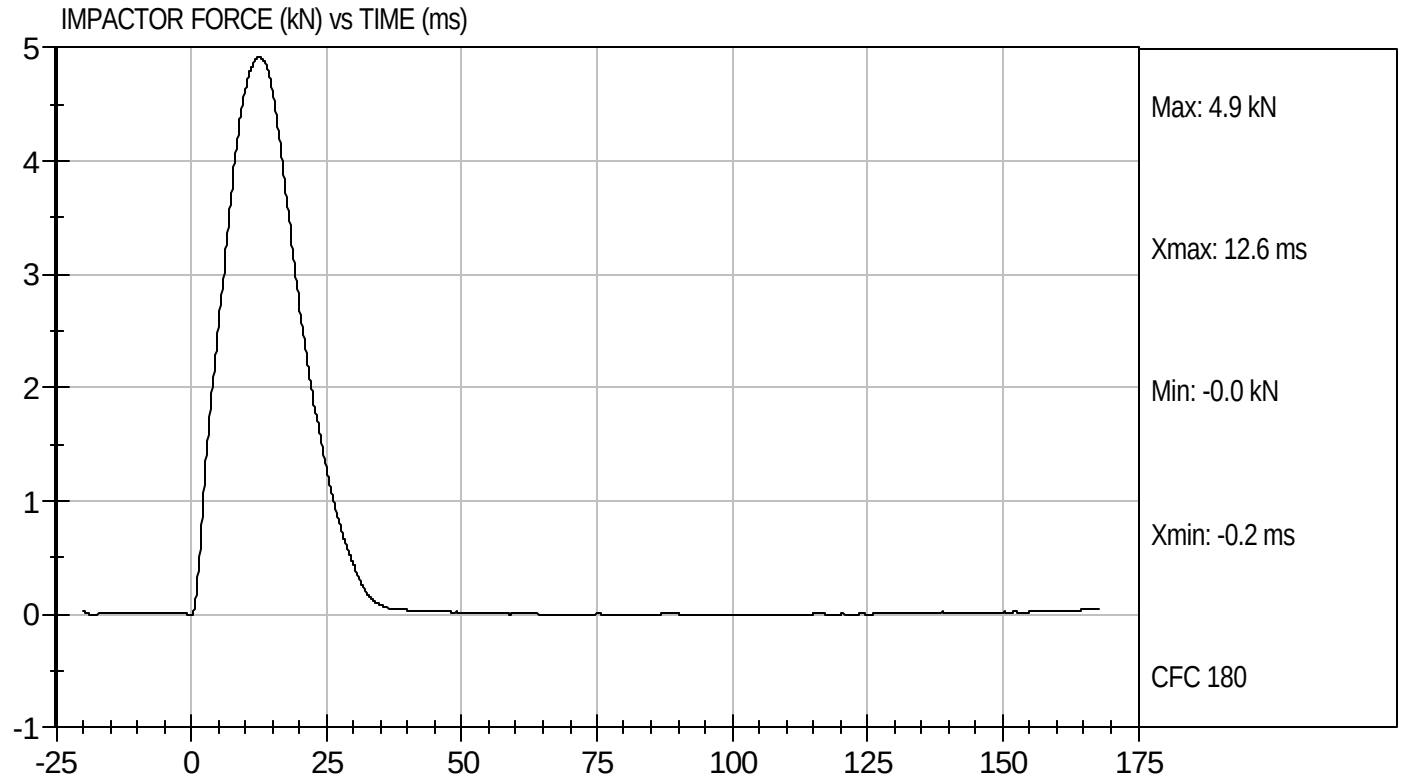
Jessica Hall
Laboratory Technician

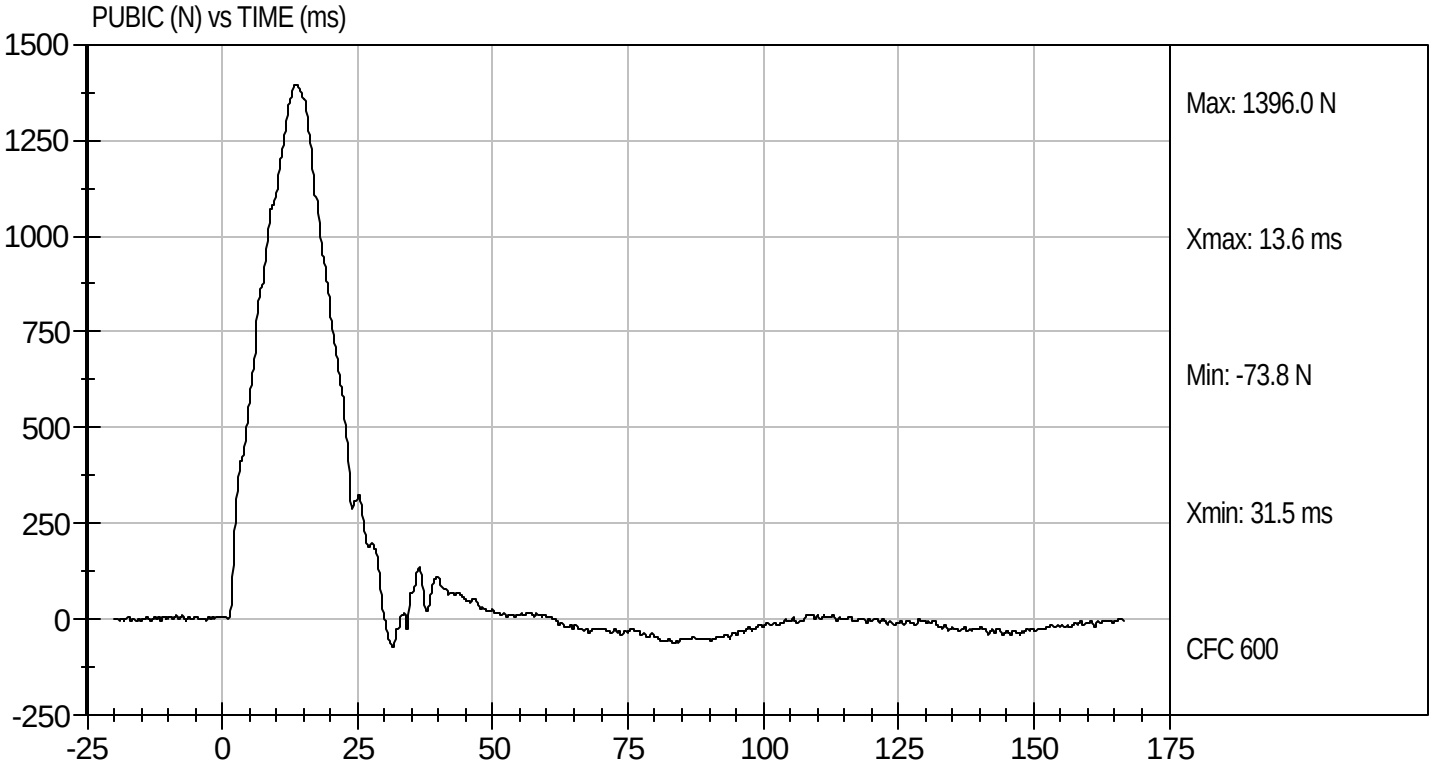
12/19/07
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D073629

Test Date: 12/19/07
Velocity: 14.12 ft/s, 4.30 m/s





MGA RESEARCH CORPORATION

FULL BODY THORAX IMPACT TEST

ES-2re DUMMY

ATD Serial No: 030 **Test I.D:** D073620

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	22	Pass
Probe Speed	m/s	5.40 to 5.60	5.52	Pass
Maximum Impactor Force (after 6 ms)	kN	5.17 to 6.12	5.70	Pass
Upper Rib Displacement	mm	33.2 to 41.3	36.5	Pass
Middle Rib Displacement	mm	37.1 to 45.4	39.3	Pass
Lower Rib Displacement	mm	35.6 to 43.0	39.0	Pass
		Overall Test Results		Pass

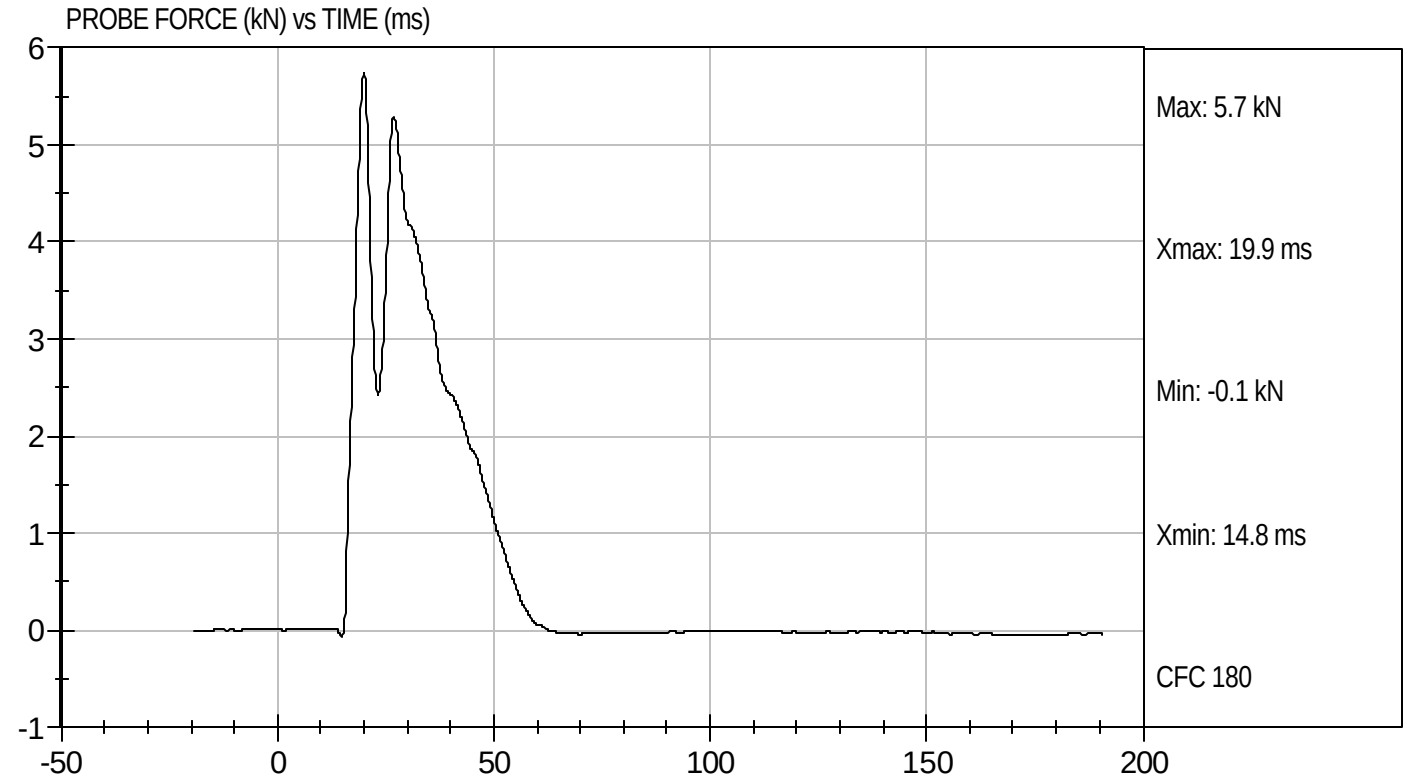
Jessica Hall
Laboratory Technician

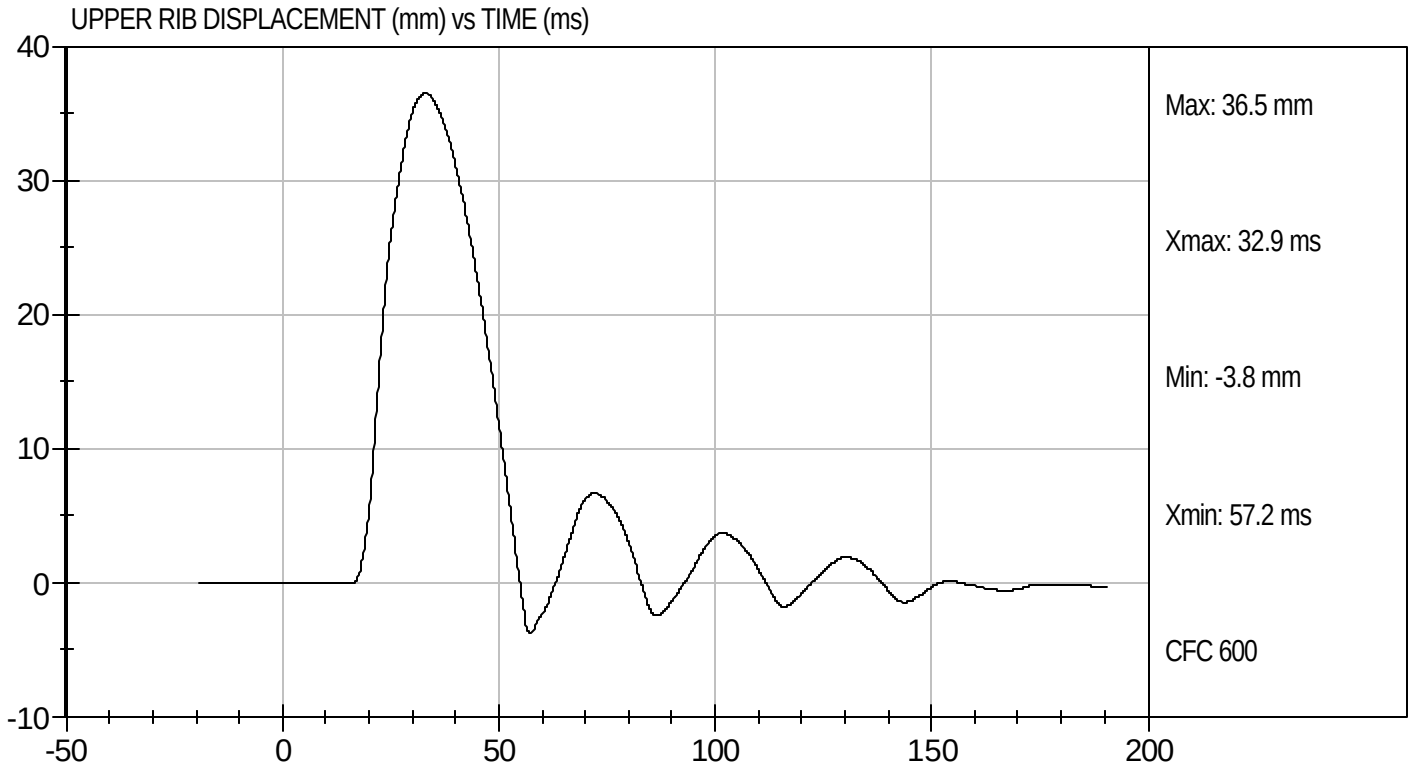
12/20/07
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D073620

Test Date: 12/20/07
Velocity: 18.12 ft/s, 5.52 m/s

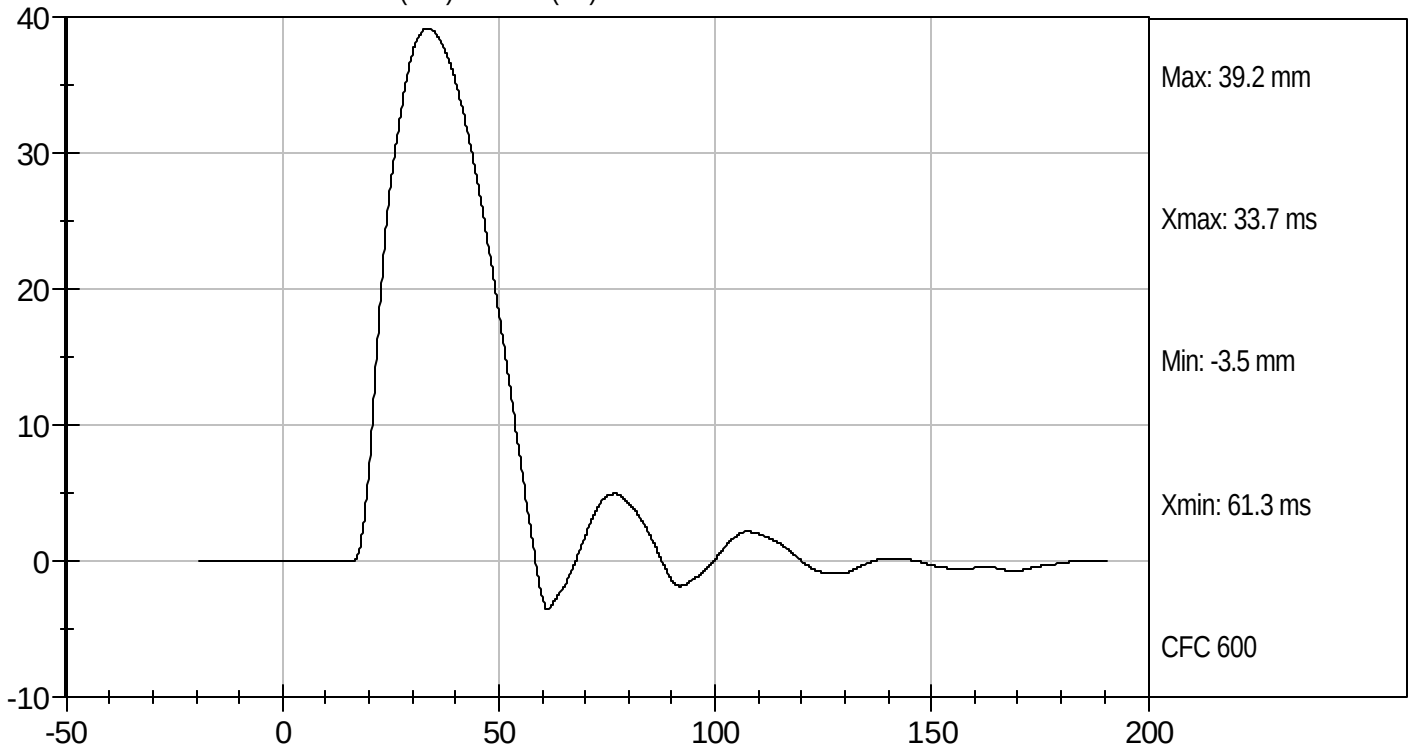




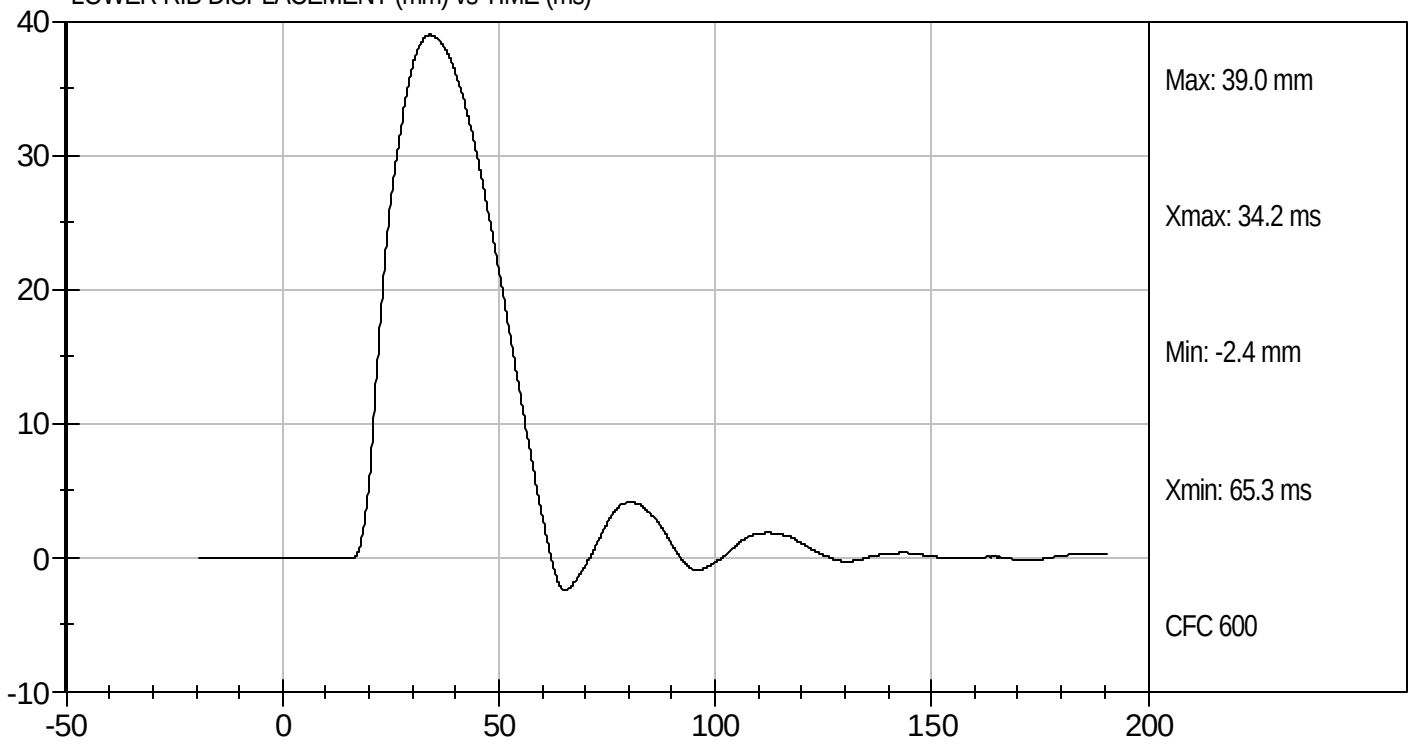
Test Desc: Thorax Impact
Component ID: D073620

Test Date: 12/20/07
Velocity: 18.12 ft/s, 5.52 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



APPENDIX D

CHILD DUMMY DATA

SUMMARY OF TEST

Measurement Description	Units	Threshold	P3 ATD	P4 ATD	P5 ATD	P6 ATD
Head Injury Criteria (HIC36)	N/A	N/A	23	123	66	160
Head Injury Criteria (HIC15)	N/A	390	12	87	43	93
Max. Thorax Accel. (3msec Clip)	G's	50	16	47	17	33

The CRABI child dummies were instrumented with head, chest, and upper six axial neck force and moment sensors. The 3-Year-Old child dummies were instrumented with head, chest, pelvis, and upper six axial neck force and moment sensors.

The following dummies were calibrated previous to this test and the certification information can be found in this Appendix.

2nd Row Right Rear (Position 3) CRABI child dummy (S/N 090)
CRS restrained with vehicle's Type 2 belt system.
Towel was used to achieve recommended orientation to CRS level indicator.
2nd Row Left Rear (Position 4) 3-Year-Old child dummy (S/N 031)
CRS restrained with LATCH system and top tether.
3rd Row Right Rear (Position 5) CRABI child dummy (S/N 093)
CRS restrained with vehicle's Type 2 belt system.
Towel was used to achieve recommended orientation to CRS level indicator.
3rd Row Left Rear (Position 6) 3-Year-Old child dummy (S/N 032)
CRS restrained with LATCH system and top tether.

TEST VEHICLE WEIGHTS

	Units	As Tested (ATW) (Axle)		
		Front	Rear	Total
Left	kg	620.5	519.8	
Right	kg	563.8	509.4	
Ratio	%	53.5	46.5	
Totals	kg	1184.3	1029.2	2213.5

As tested weight of vehicle includes one ES-2re ATD, two CRABIs with CRS, two 3-Year-Olds with CRS, cargo, equipment, and instrumentation.

TEST NOTES

There was no valid data collected for:
RMP Child Seat Y after 180 msec
RRP Child Seat Y after 90 msec

2nd ROW TEST DUMMY INFORMATION

Description	Position 3 CRS	Position 4 CRS
Dummy Type / Serial No.	12 month old CRABI / 090	3-Year Old / 031
Number of Data Channels	12	15
Restraint System	Evenflo Discovery (Rear Facing)	Graco Safe Seat (Forward Facing)

3rd ROW TEST DUMMY INFORMATION

Description	Position 5 CRS	Position 6 CRS
Dummy Type / Serial No.	12 month old CRABI / 093	3-Year Old / 032
Number of Data Channels	12	15
Restraint System	Evenflo Discovery (Rear Facing)	Graco Safe Seat (Forward Facing)

POST TEST SEAT DATA

Location	Seat Movement (mm)	Seat Back Failure
P1 (Left Front)	0	None
P2 (Right Front)		
P3 (2nd Row Right Rear)	0	None
P4 (2nd Row Left Rear)	0	None
P5 (3rd Row Right Rear)	0	None
P6 (3rd Row Left Rear)	0	None

2nd ROW VISIBLE DUMMY CONTACT POINTS

Description	Position 3 CRS	Position 4 CRS
Head Contact	Mid seat back and door panel	Curtain airbag
Upper Torso Contact	None	None
Lower Torso Contact	None	None
Left Foot Contact	Foot to mid seat back	None
Right Foot Contact	Foot to mid seat back	Foot to driver seat back

3rd ROW VISIBLE DUMMY CONTACT POINTS

Description	Position 5 CRS	Position 6 CRS
Head Contact	None	Curtain airbag
Upper Torso Contact	None	None
Lower Torso Contact	None	None
Left Foot Contact	Foot to rear seat back	Foot to mid seat back
Right Foot Contact	Foot to rear seat back	Foot to mid seat back

CHILD DUMMY INJURY CRITERIA VALUES

NHTSA No.	M80311

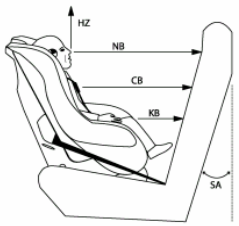
	HEAD INJURY CRITERIA (HIC)		
	HIC	T_1 (msec)	T_2 (msec)
Position 3 – 2nd Row Right Rear	23	62.1	98.1
Position 4 – 2nd Row Left Rear	123	58.1	87.3
Position 5 – 3rd Row Right Rear	66	80.2	116.2
Position 6 – 3rd Row Left Rear	160	61.9	94.2

	CLIP SUMMARY		
	CLIP (g's)	T_1 (msec)	T_2 (msec)
Position 3 – 2nd Row Right Rear	15.9	60.6	65.0
Position 4 – 2nd Row Left Rear	46.6	54.5	57.5
Position 5 – 3rd Row Right Rear	17.0	76.5	79.5
Position 6 – 3rd Row Left Rear	32.7	76.4	79.4

CHILD DUMMY POSITIONING IN VEHICLE

Child Restraint System (Position 3)	Evenflo Discovery (Rear Facing)
NHTSA No.	M80311

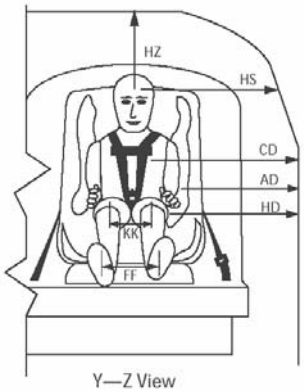
Dummy Measurements for Rear-facing CRS Passengers



X—Z View

HZ	-	Head to Roof
NB	-	Nose to Front of Back Seat
CB	-	Chest to Front of Back Seat
KB	-	Knee to Front of Back Seat
SA	-	Seat Back Angle

X—Z View



Y—Z View

HZ	-	Head to Roof
HS	-	Head to Side Window
CD	-	Chest to Door
AD	-	Arm to Door
HD	-	H-Point to Door
KK	-	Knee to Knee
FF	-	Foot to Foot
NB	-	Nose to Front Seat Back
CB	-	Chest to Front Seat Back
KB	-	Knee to Front Seat Back
TB	-	Toe to Front Seat Back
SA	-	Seat Back Angle

Measurement	Pre-Test (mm)	Post-Test (mm)
	P3 CRS (090)	P3 CRS (090) *
SA (deg)	14.5 on headrest post	
HS	470	508
CD	405	660
AD	288	730
HD	303	752
HZ	443	994
NB	536	525
CB	409	460
KK	101	72
FF	84	15
KB - LEFT	175	294
KB – RIGHT	176	303
TB - LEFT	30	171
TB - RIGHT	28	162

All dimensions in mm (unless noted)
P3 – 2nd Row Right Rear Passenger (Rear Facing)

* Child seat became unattached from its base.
Measurements taken with ATD on floor of vehicle.

CRS PERFORMANCE DATA

Child Restraint System (Position 3)	Evenflo Discovery (Rear Facing)
NHTSA No.	M80311

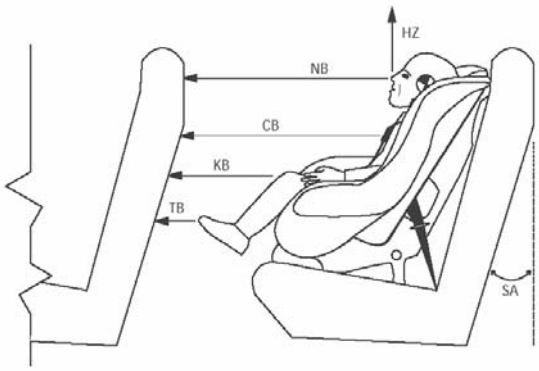
POSITION 3 CRS POST-TEST INSPECTION

Location	Damage	Remarks
Upper Tether Strap		
Upper Tether Buckle		
Upper Tether Hook		
Vehicle Upper Tether Anchor		
Lower Anchor Strap		
Lower Anchor Buckle		
Lower Anchor Hooks		
Vehicle Lower CRS Anchors		
Harness Connections	None	
Cracks on CRS	None	
Fabric Tears on CRS	None	
Vehicle Seat Structure	None	
Vehicle Seat Fabric Tears	None	
Child Dummy	None	CRABI 12 Month Old
Child Restraint System	None	Child seat became unattached from its base

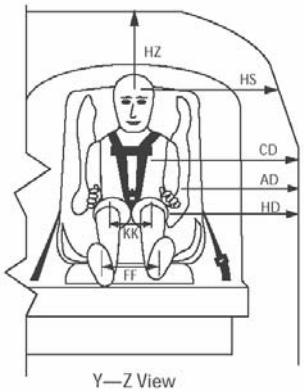
CHILD DUMMY POSITIONING IN VEHICLE

Child Restraint System (Position 4)	Graco Safe Seat (Forward Facing)
NHTSA No.	M80311

Dummy Measurements for CRS Passengers



X—Z View



Y—Z View

X—Z View

HZ	-	Head to Roof
HS	-	Head to Side Window
CD	-	Chest to Door
AD	-	Arm to Door
HD	-	H-Point to Door
KK	-	Knee to Knee
FF	-	Foot to Foot
NB	-	Nose to Front Seat Back
CB	-	Chest to Front Seat Back
KB	-	Knee to Front Seat Back
TB	-	Toe to Front Seat Back
SA	-	Seat Back Angle

Measurement	Pre-Test (mm)	Post-Test (mm)
	P4 CRS (031)	P4 CRS (031)
SA (deg)	22.7 on headrest post	
HS	445	window broke
CD	439	309
AD	280	149
HD	325	210
HZ	297	313
NB	628	632
CB	578	571
KK	127	140
FF	142	181
KB - LEFT	343	303
KB – RIGHT	333	303
TB - LEFT	46	96
TB - RIGHT	47	0
Seat Top to Door	231	100
Seat Bottom to Door	203	82

All dimensions in mm (unless noted)
P4 – 2nd Row Left Rear Passenger (Forward Facing)

CRS PERFORMANCE DATA

Child Restraint System (Position 4)	Graco Safe Seat (Forward Facing)
NHTSA No.	M80311

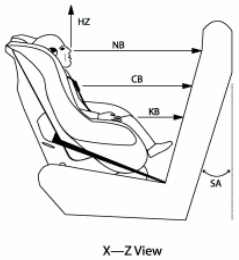
POSITION 3 CRS POST-TEST INSPECTION

Location	Damage	Remarks
Upper Tether Strap	None	
Upper Tether Buckle	None	
Upper Tether Hook	None	
Vehicle Upper Tether Anchor	None	
Lower Anchor Strap	None	
Lower Anchor Buckle	None	
Lower Anchor Hooks	None	
Vehicle Lower CRS Anchors	None	
Harness Connections	None	
Cracks on CRS	None	
Fabric Tears on CRS	None	
Vehicle Seat Structure	None	
Vehicle Seat Fabric Tears	None	
Child Dummy	None	3-Year-Old

CHILD DUMMY POSITIONING IN VEHICLE

Child Restraint System (Position 5)	Evenflo Discovery (Rear Facing)
NHTSA No.	M80311

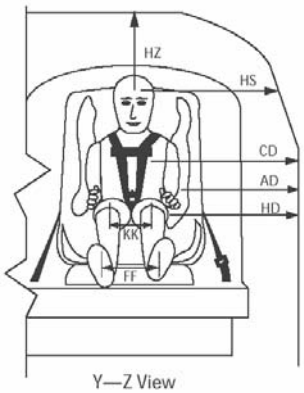
Dummy Measurements for Rear-facing CRS Passengers



X—Z View

HZ	-	Head to Roof
NB	-	Nose to Front of Back Seat
CB	-	Chest to Front of Back Seat
KB	-	Knee to Front of Back Seat
SA	-	Seat Back Angle

X—Z View



Y—Z View

HZ	-	Head to Roof
HS	-	Head to Side Window
CD	-	Chest to Door
AD	-	Arm to Door
HD	-	H-Point to Door
KK	-	Knee to Knee
FF	-	Foot to Foot
NB	-	Nose to Front Seat Back
CB	-	Chest to Front Seat Back
KB	-	Knee to Front Seat Back
TB	-	Toe to Front Seat Back
SA	-	Seat Back Angle

Measurement	Pre-Test (mm)	Post-Test (mm)
	P6 CRS (032)	P6 CRS (032)
SA (deg)	20.7	
HS	466	585
CD	460	508
AD	170	196
HD	196	193
HZ	494	468
NB	519	436
CB	390	372
KK	96	87
FF	100	110
KB - LEFT	155	165
KB – RIGHT	155	169
TB - LEFT	50	25
TB - RIGHT	50	43

All dimensions in mm (unless noted)
P5 – 3rd Row Right Rear Passenger (Rear Facing)

CRS PERFORMANCE DATA

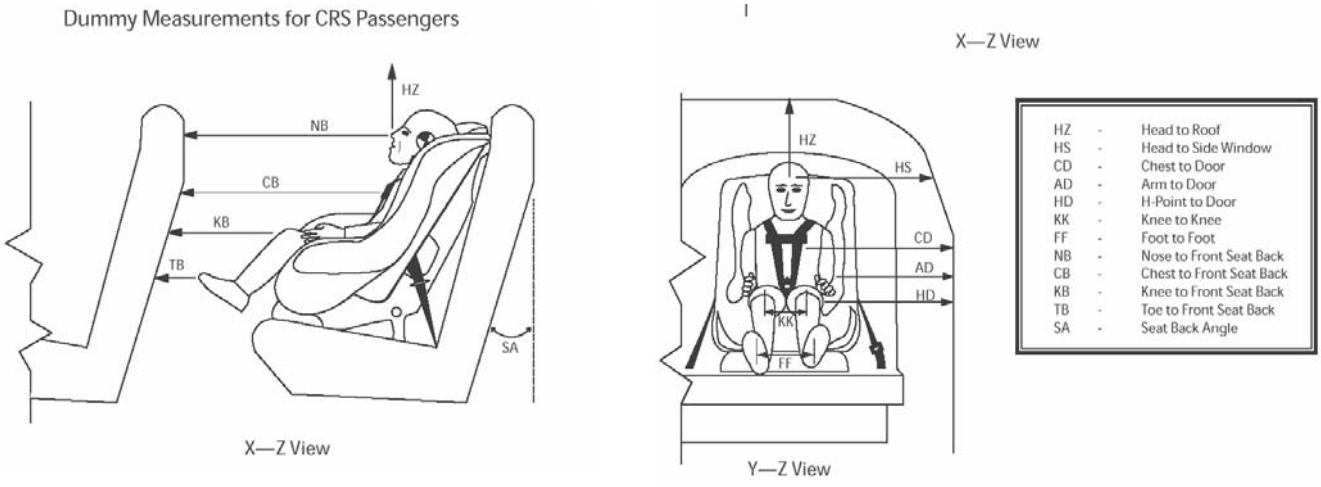
Child Restraint System (Position 5)	Evenflo Discovery (Rear Facing)
NHTSA No.	M80311

POSITION 3 CRS POST-TEST INSPECTION

Location	Damage	Remarks
Upper Tether Strap		
Upper Tether Buckle		
Upper Tether Hook		
Vehicle Upper Tether Anchor		
Lower Anchor Strap		
Lower Anchor Buckle		
Lower Anchor Hooks		
Vehicle Lower CRS Anchors		
Harness Connections	None	
Cracks on CRS	None	
Fabric Tears on CRS	None	
Vehicle Seat Structure	None	
Vehicle Seat Fabric Tears	None	
Child Dummy	None	CRABI 12 Month Old
Child Restraint System		Base Not Used

CHILD DUMMY POSITIONING IN VEHICLE

Child Restraint System (Position 6)	Graco Safe Seat (Forward Facing)
NHTSA No.	M80311



Measurement	Pre-Test (mm)	Post-Test (mm)
	P5 CRS (093)	P5 CRS (093)
SA (deg)	20.7 on headrest post	
HS	497	window broke
CD	463	window broke
AD	302	271
HD	336	31
HZ	257	245
NB	579	583
CB	483	490
KK	129	221
FF	143	395
KB - LEFT	232	201
KB – RIGHT	233	230
TB - LEFT	0	0
TB - RIGHT	0	0

All dimensions in mm (unless noted)
P6 – 3rd Row Left Rear Passenger (Forward Facing)

CRS PERFORMANCE DATA

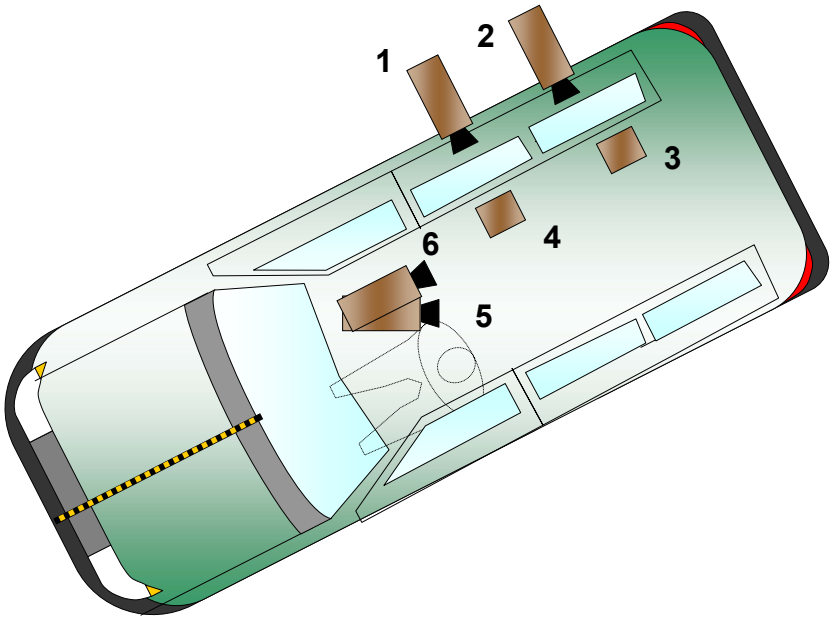
Child Restraint System (Position 6)	Graco Safe Seat (Forward Facing)
NHTSA No.	M80311

POSITION 6 CRS POST-TEST INSPECTION

Location	Damage	Remarks
Upper Tether Strap	None	
Upper Tether Buckle	None	
Upper Tether Hook	None	
Vehicle Upper Tether Anchor	None	
Lower Anchor Strap	None	
Lower Anchor Buckle	None	
Lower Anchor Hooks	None	
Vehicle Lower CRS Anchors	None	
Harness Connections	None	
Cracks on CRS	None	
Fabric Tears on CRS	None	
Vehicle Seat Structure	None	
Vehicle Seat Fabric Tears	None	
Child Dummy	None	3-Year-Old

CRS CAMERA DATA

NHTSA No.	M80311



No.	Camera View	Location (mm) *			Angle (deg)	Lens (mm)	Speed (fps)
		X	Y	Z			
1	Vehicle Onboard 2nd Row, Side					8	1000
2	Vehicle Onboard 3rd Row, Side					8.5	1000
3	Onboard Overhead 3rd Row					6.5	1000
4	Onboard Overhead 2nd Row					6.5	1000
5	2nd Row, Front Angle					12.5	1000
6	Vehicle Onboard Floor, 2nd Row					8	1000

*COORDINATES:

+X = film plane rearward of barrier

+Y = film plane to right of monorail centerline

+Z = film plane above ground level

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Pre-Test Position 3 Left Side View

Pre-Test Position 3 Right Side View

Post-Test Position 3 Right Side View

Post-Test Position 3 Head and Feet Contact

Post-Test Front View of Position 4 CRS

Post-Test Rear View of Position 4 CRS

Post-Test Left Side View of Position 4 CRS

Post-Test Right Side View of Position 4 CRS

Pre-Test Position 4 Left Side View

Post-Test Position 4 Left Side View

Pre-Test Position 4 Right Side View

Post-Test Position 4 Right Side View

Post-Test Position 4 Head Contact

Post-Test Position 4 Feet Contact

Post-Test Front View of Position 5 CRS

Post-Test Rear View of Position 5 CRS

Post-Test Left Side View of Position 5 CRS

Post-Test Right Side View of Position 5 CRS

Pre-Test Position 5 Left ¾ Front View

Pre-Test Position 5 Right Side View

Post-Test Position 5 Right Side View

Post-Test Position 5 Head Contact

Post-Test Front View of Position 6 CRS

Post-Test Rear View of Position 6 CRS

Post-Test Left Side View of Position 6 CRS

Post-Test Right Side View of Position 6 CRS

Pre-Test Position 6 Left Side View

Post-Test Position 6 Left Side View

Pre-Test Position 6 Right Side View

Post-Test Position 6 Right Side View

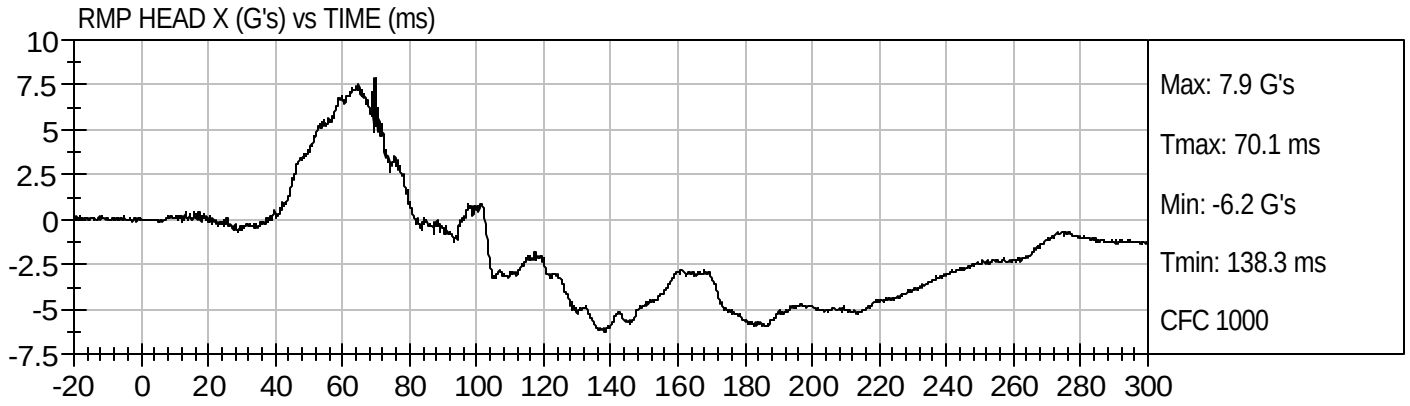
Post-Test Position 6 Head Contact

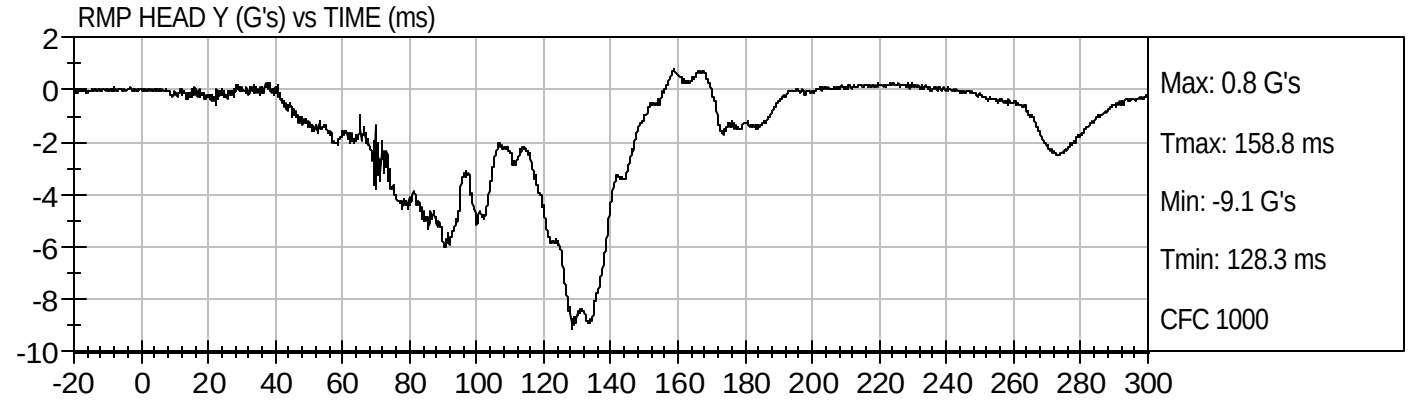
CHILD DUMMY RESPONSE DATA TRACES

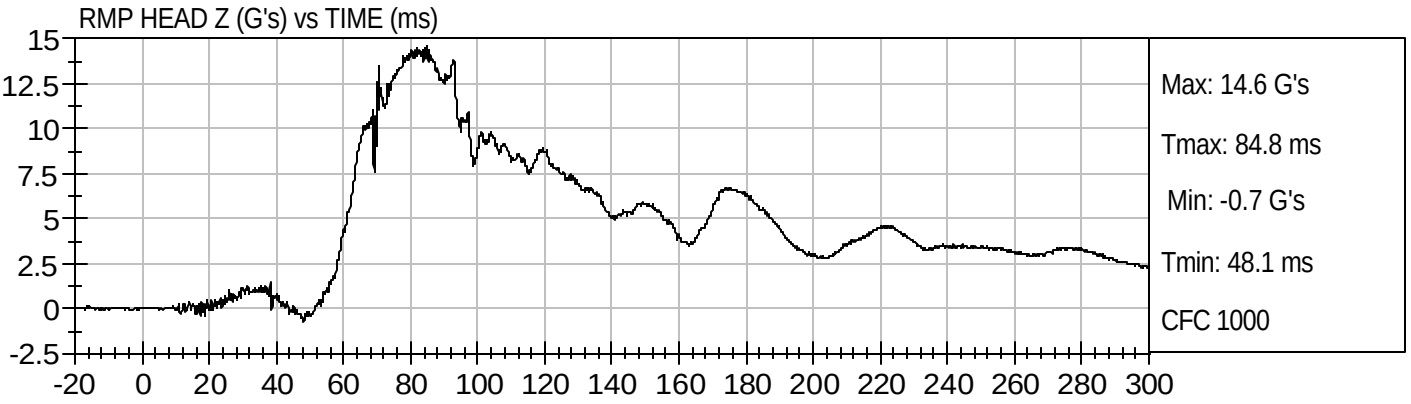
TABLE OF DATA PLOTS

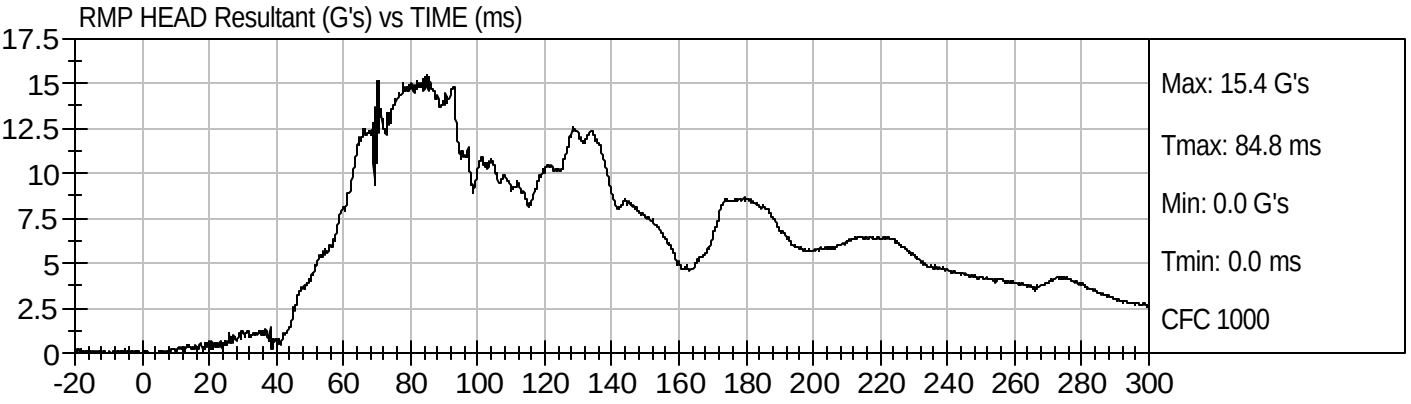
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



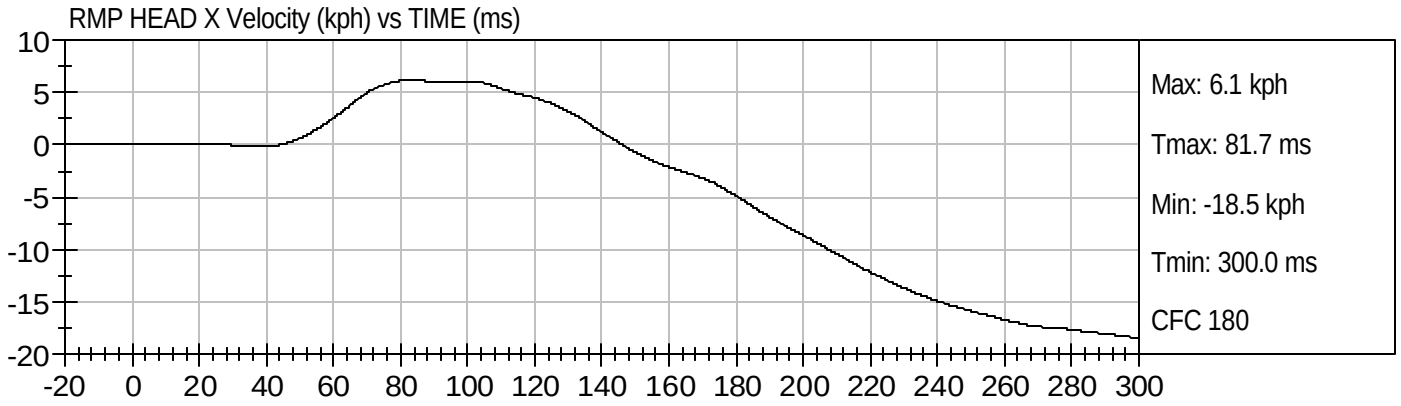


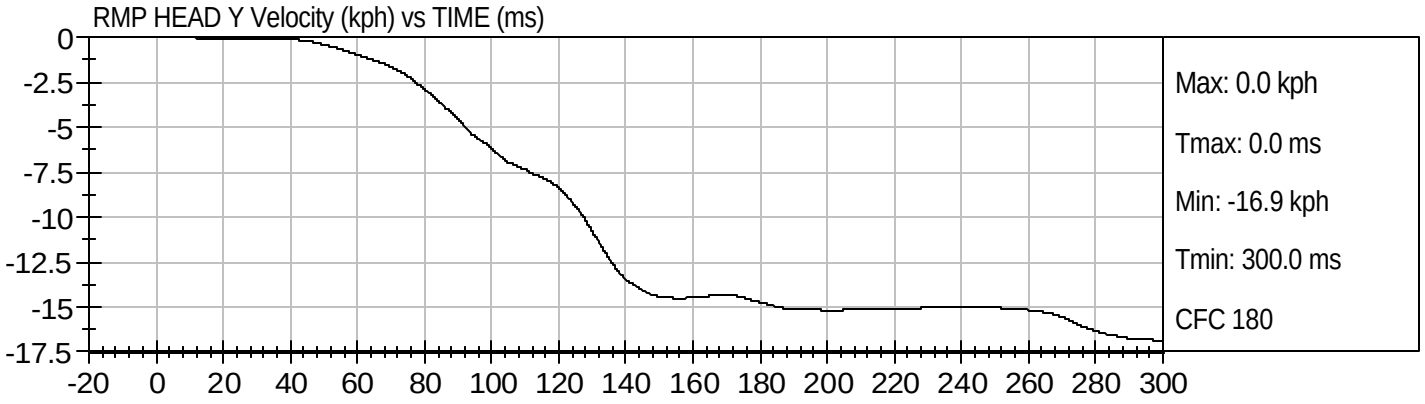


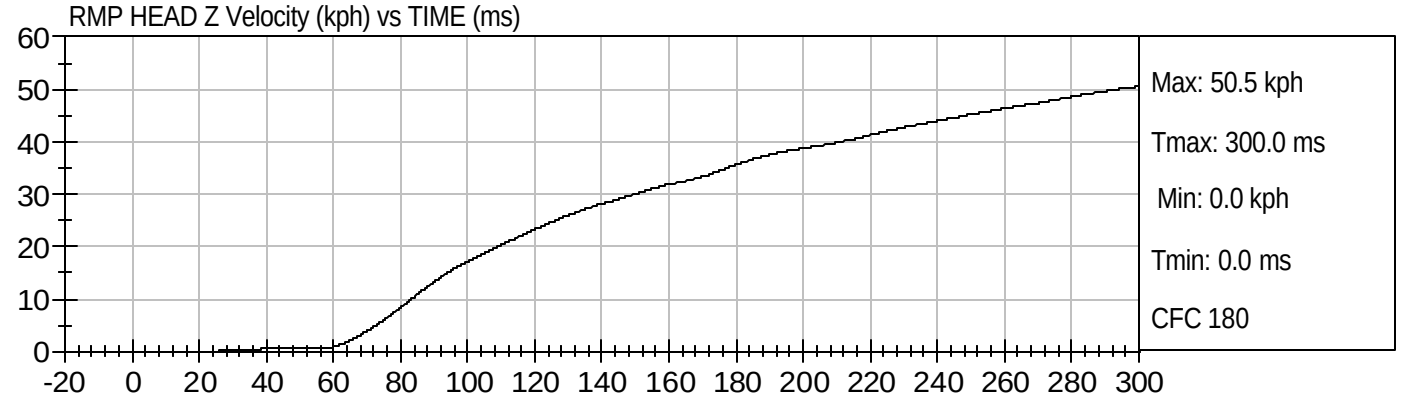


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

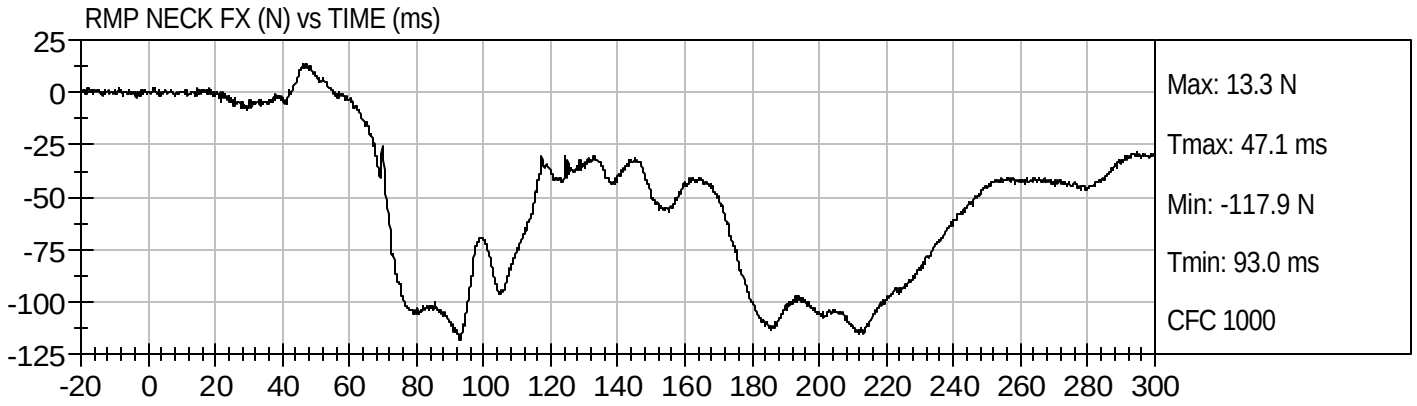


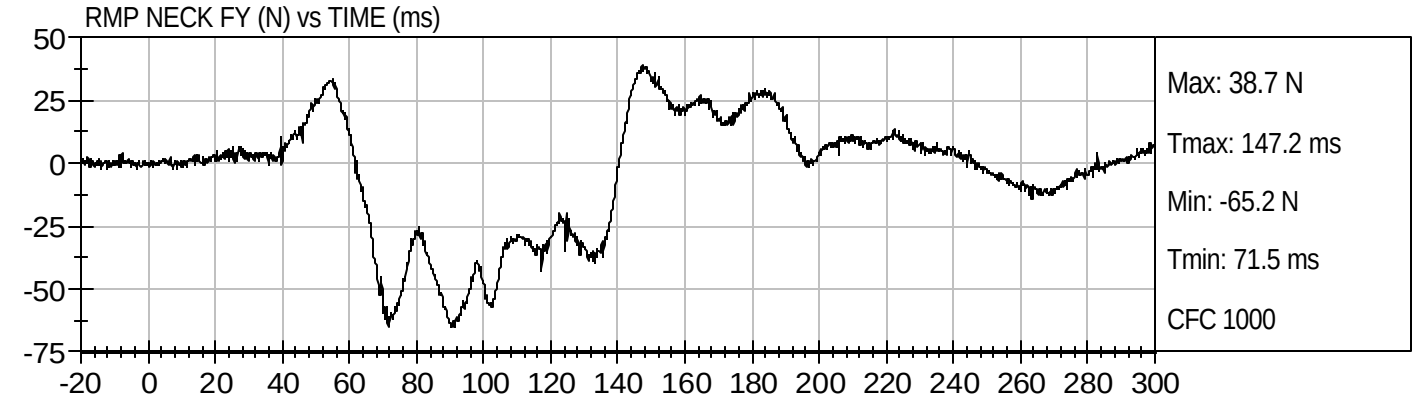


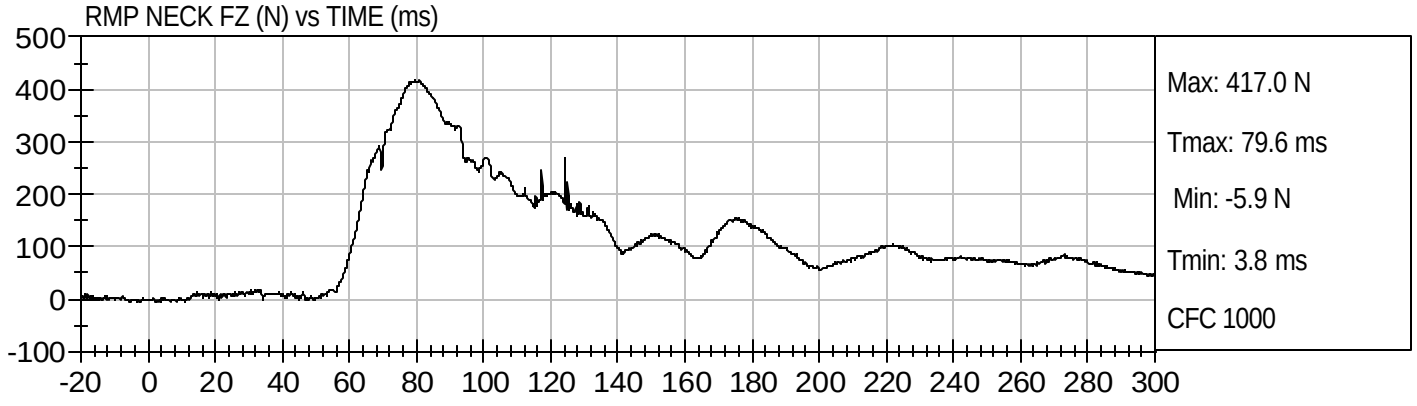


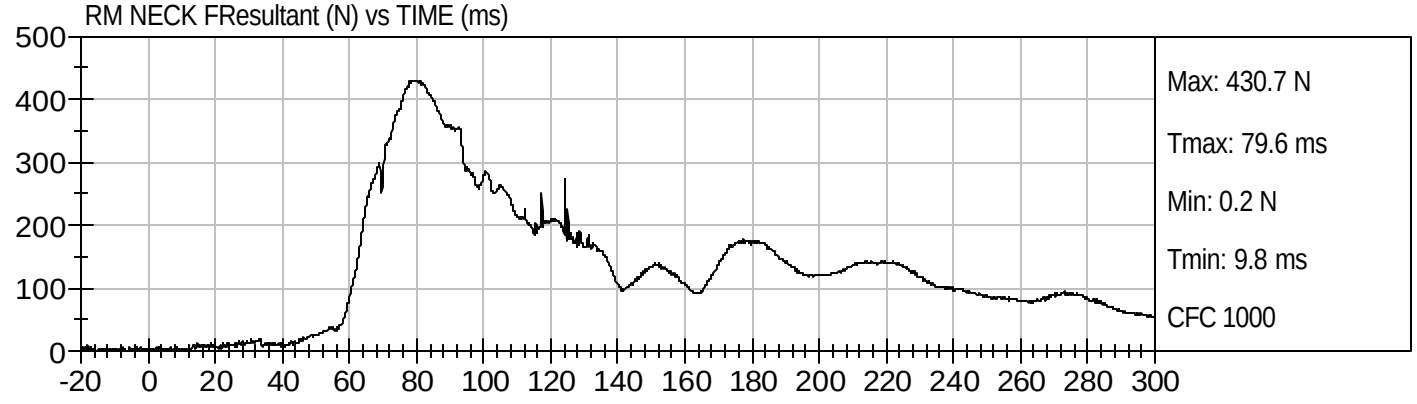
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



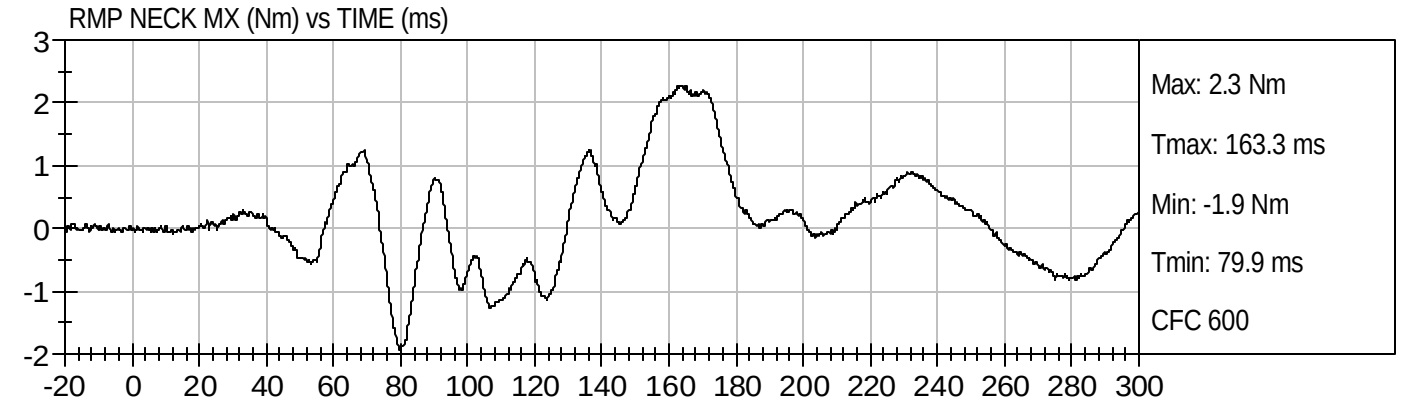


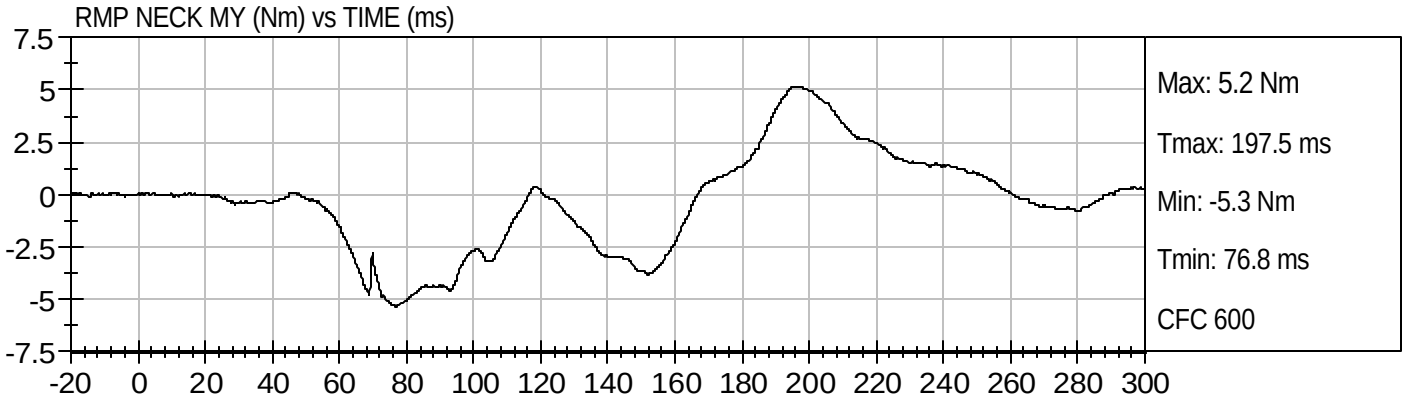


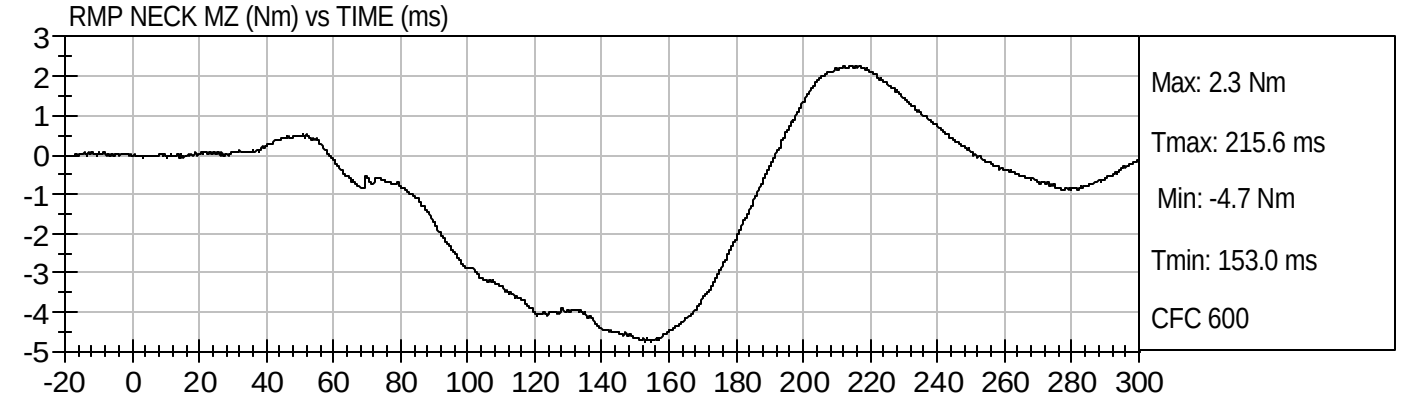


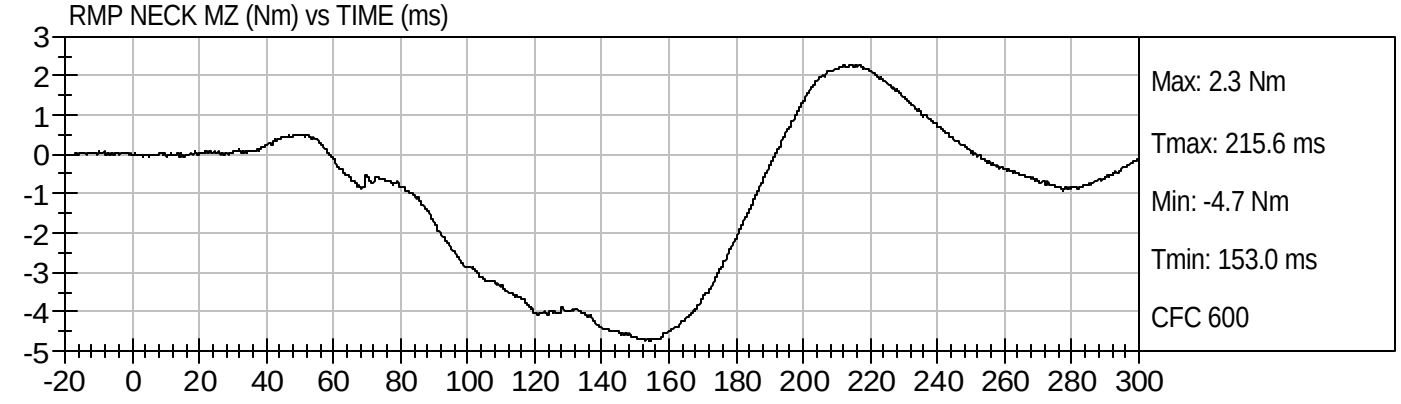
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)





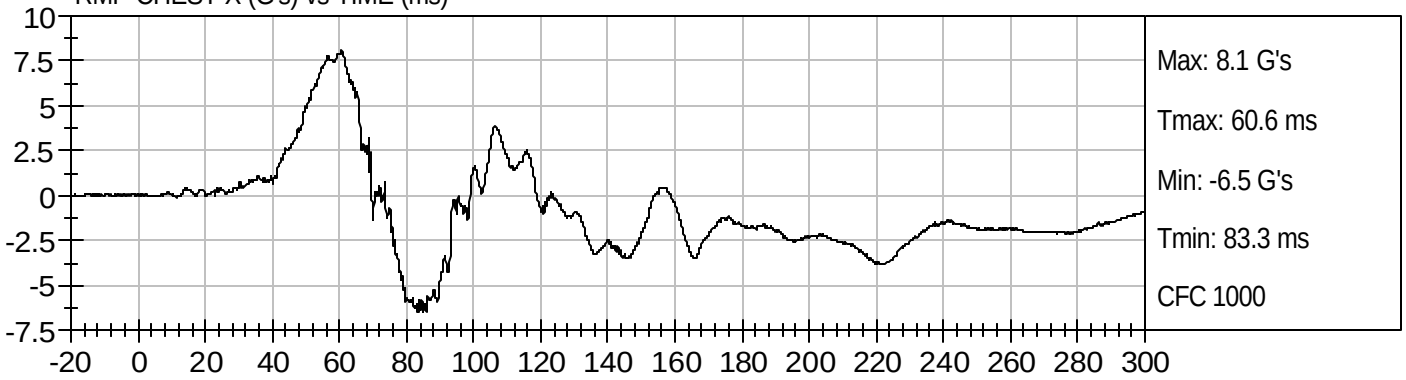




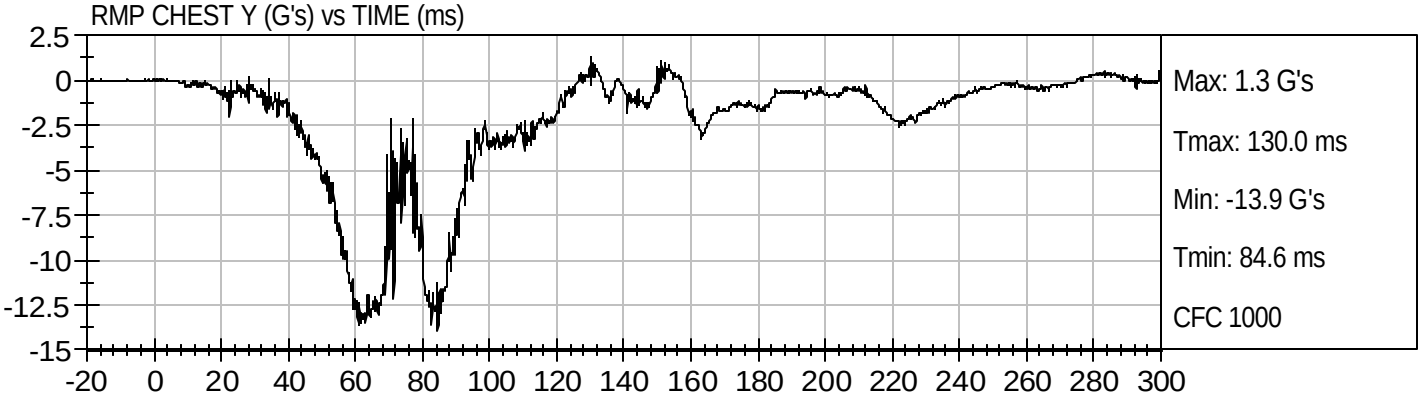
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

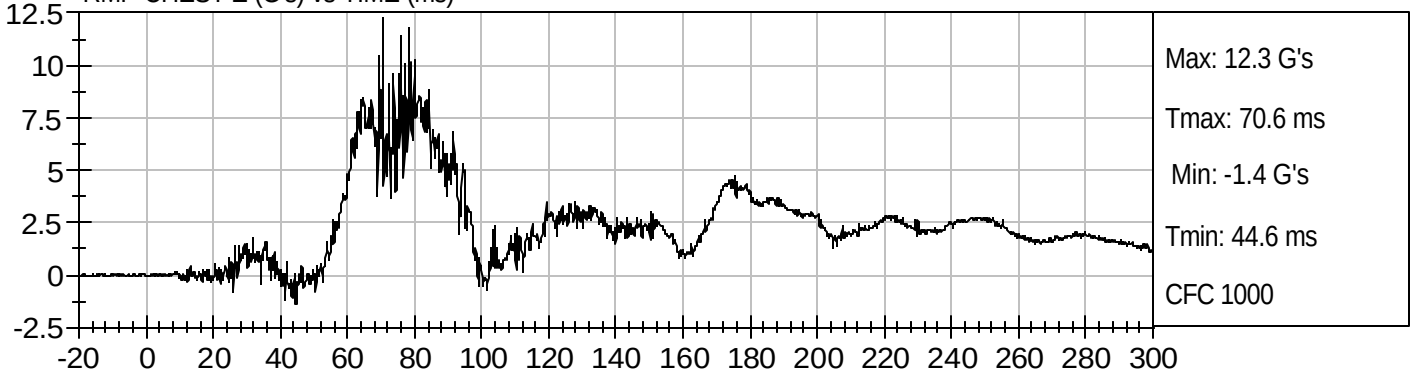
RMP CHEST X (G's) vs TIME (ms)



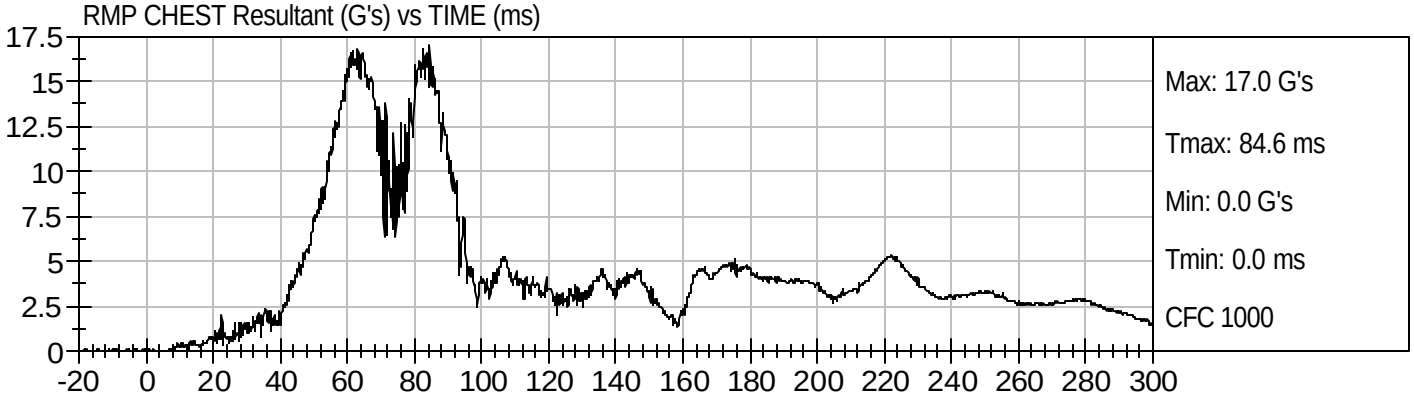
RMP CHEST Y (G's) vs TIME (ms)



RMP CHEST Z (G's) vs TIME (ms)

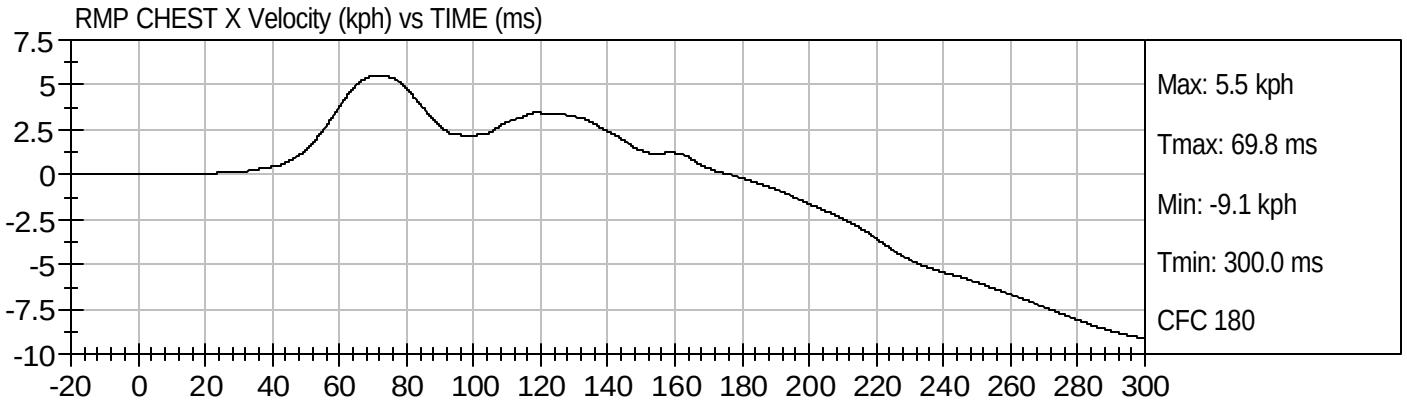


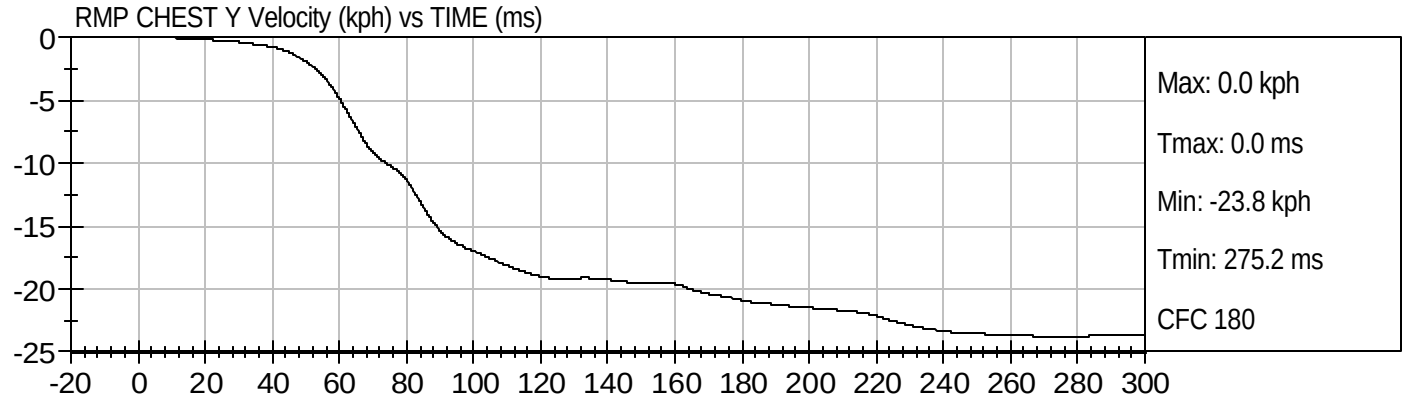
RMP CHEST Resultant (G's) vs TIME (ms)

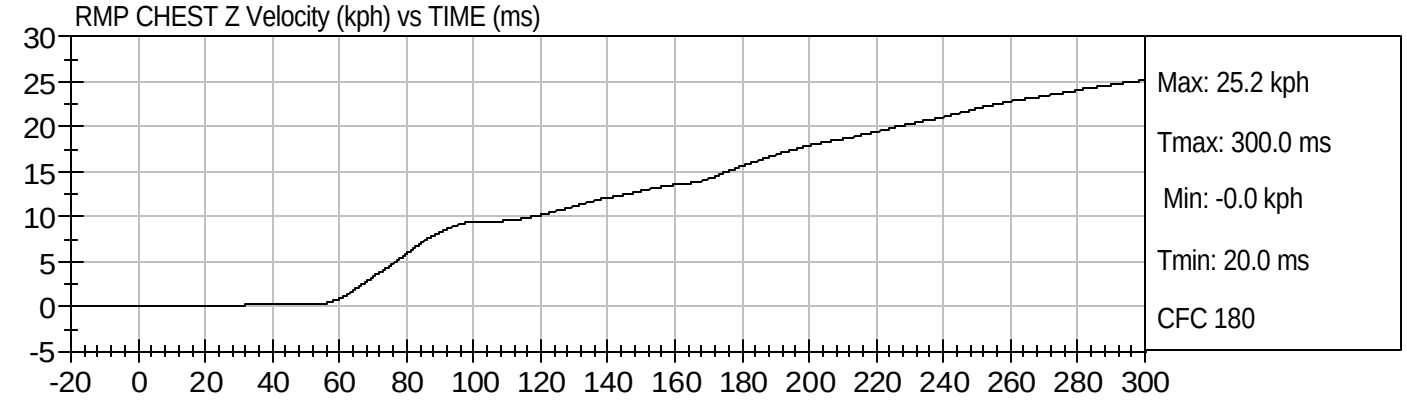


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

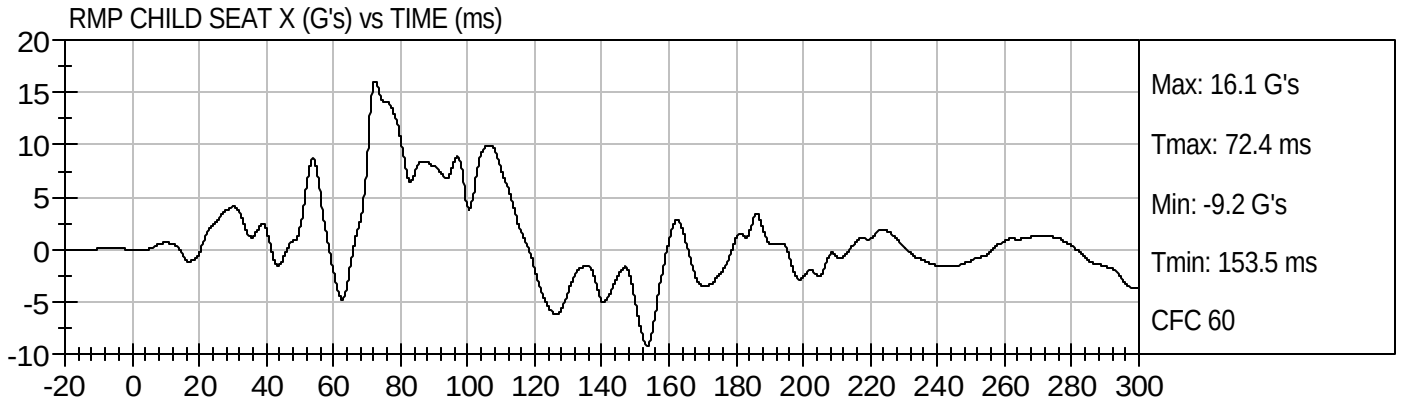


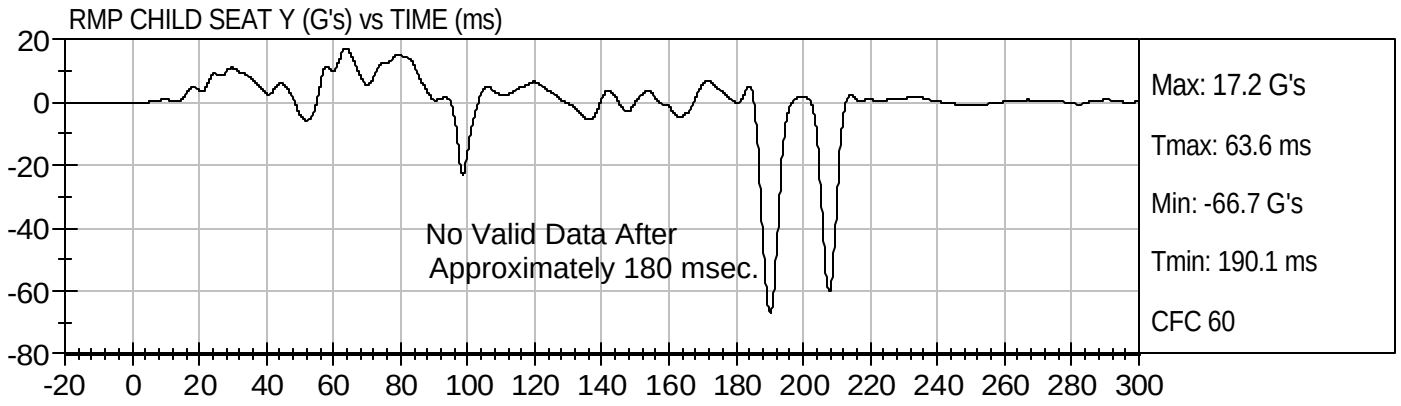


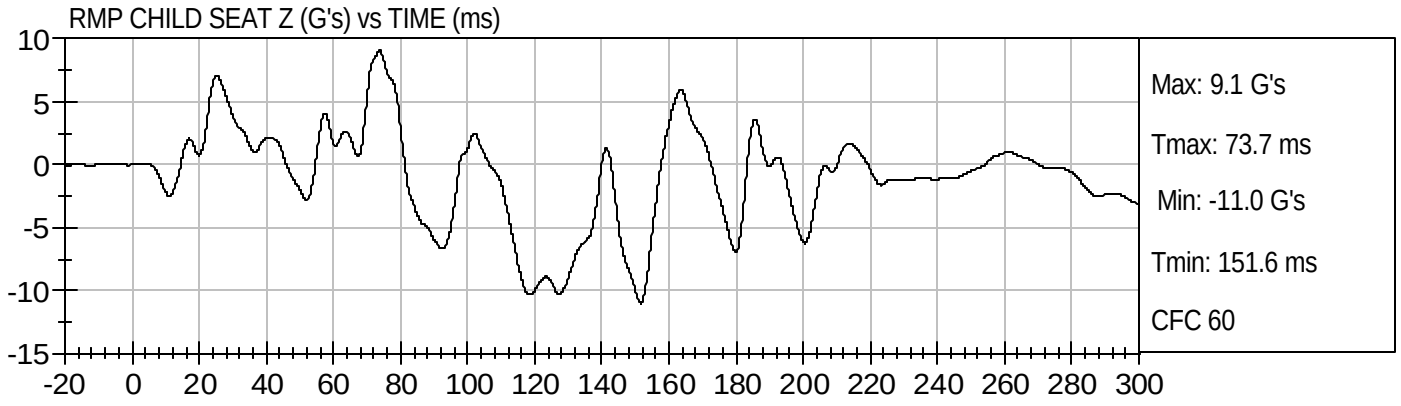


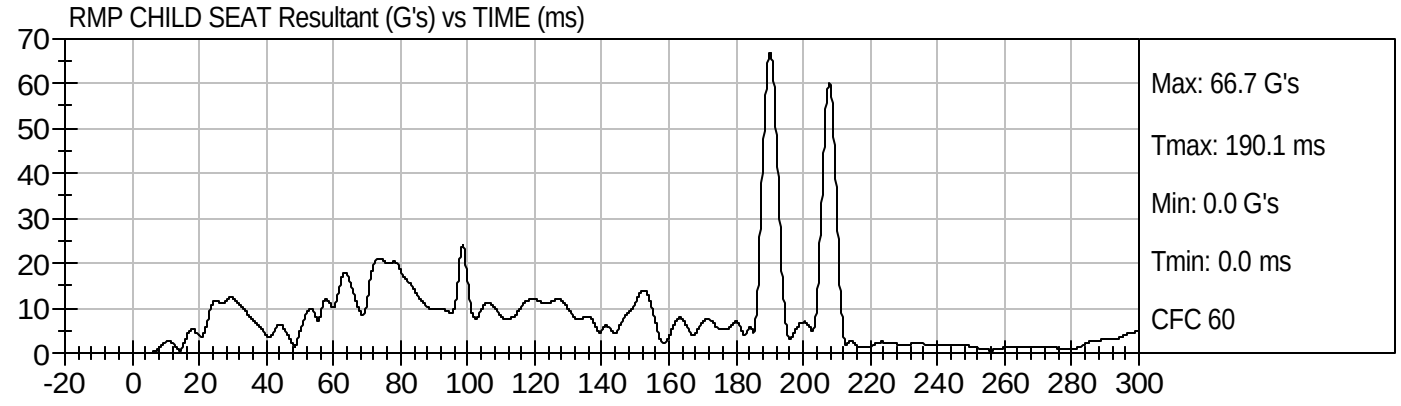
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



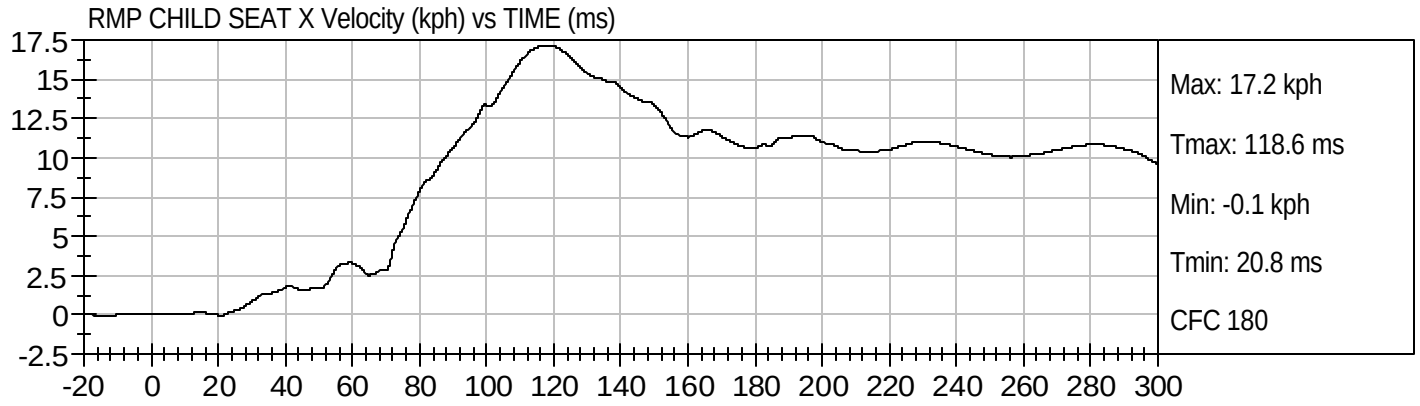


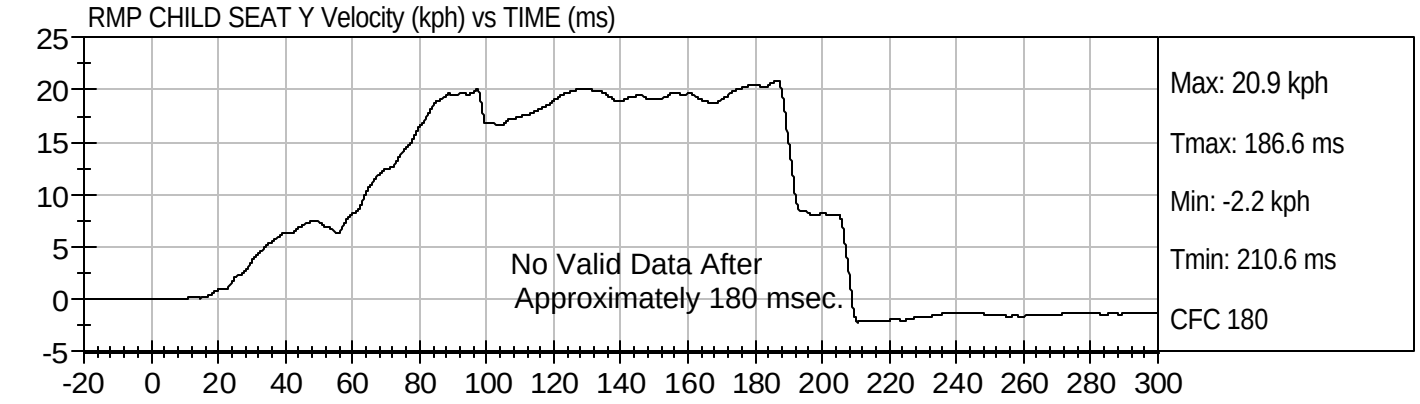


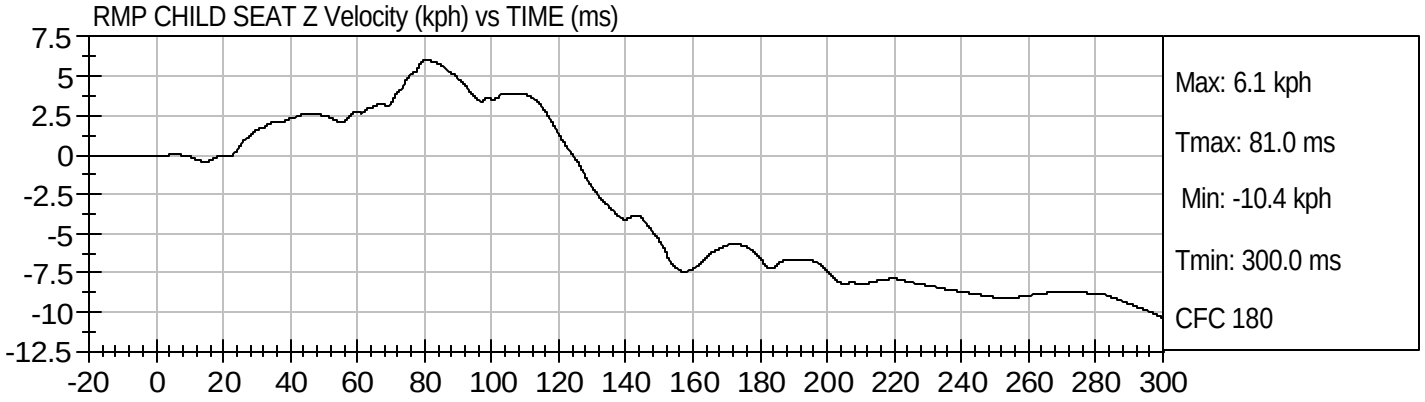


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

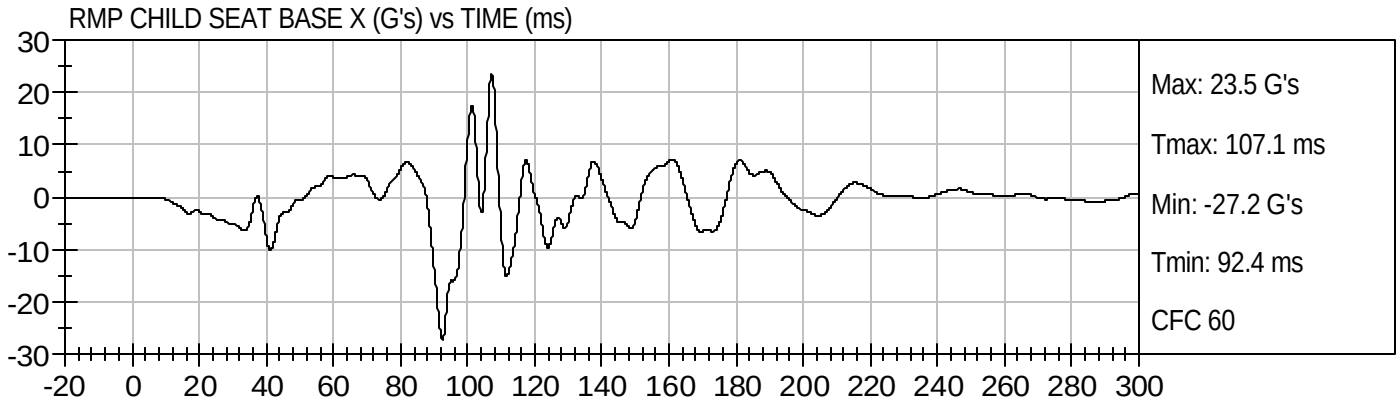


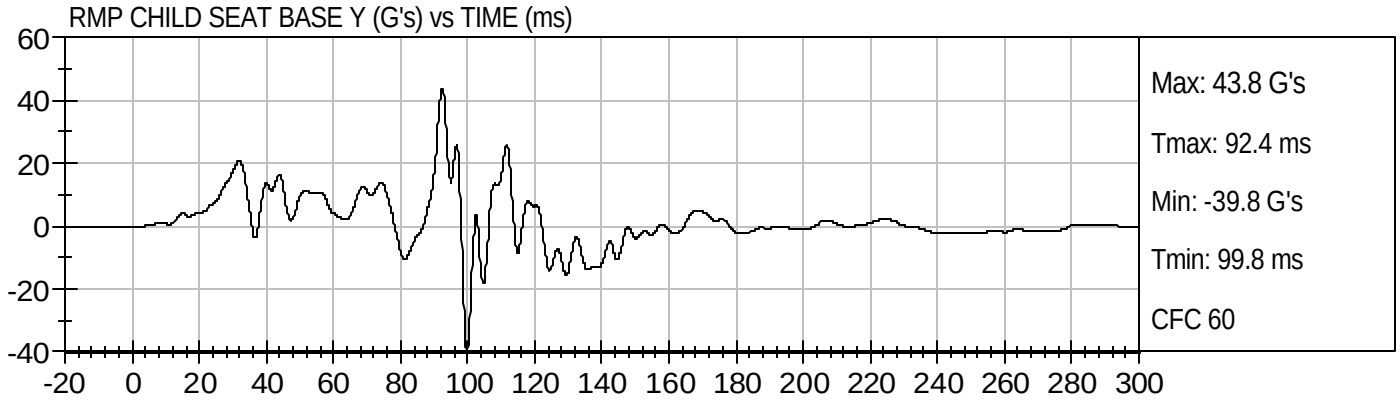


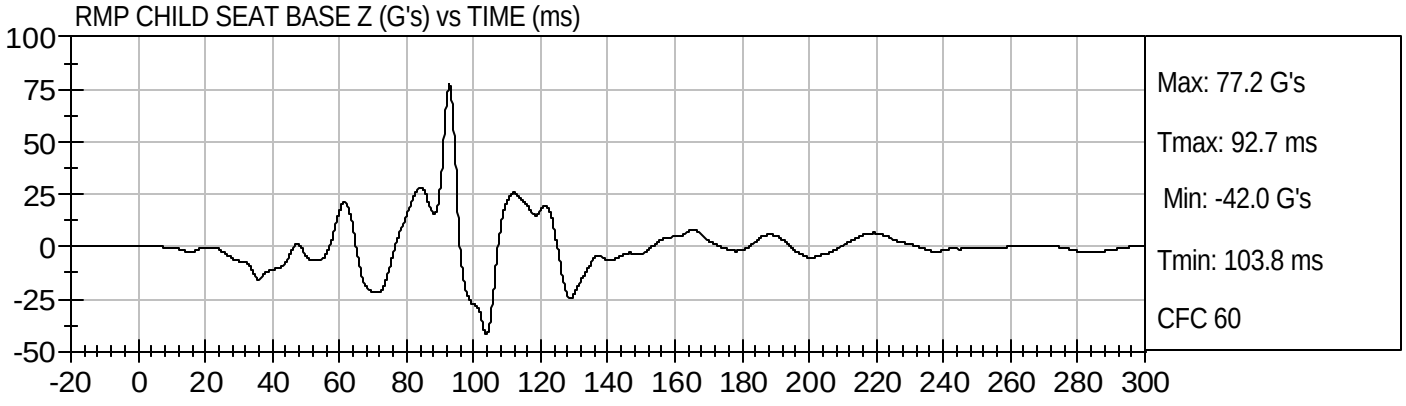


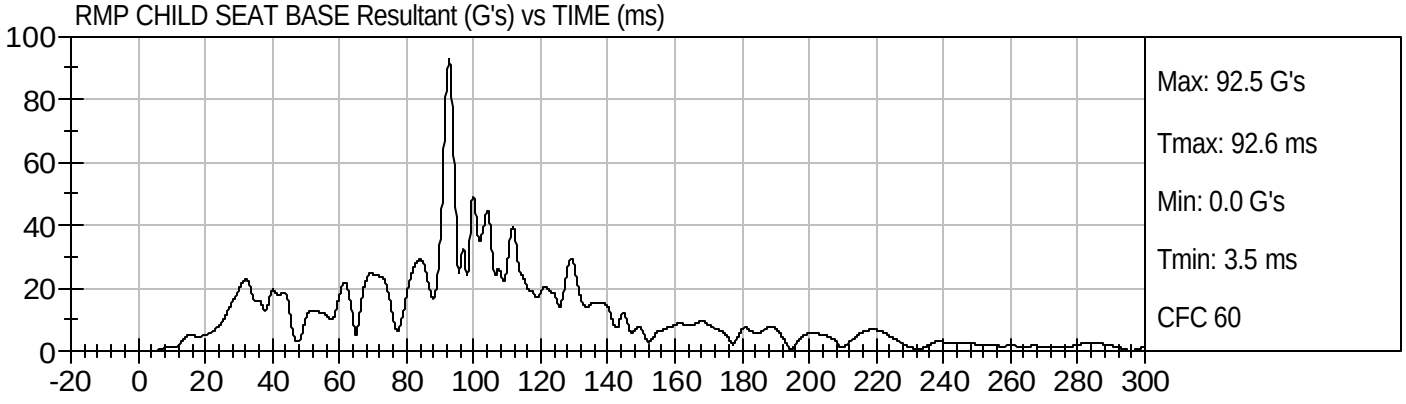
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



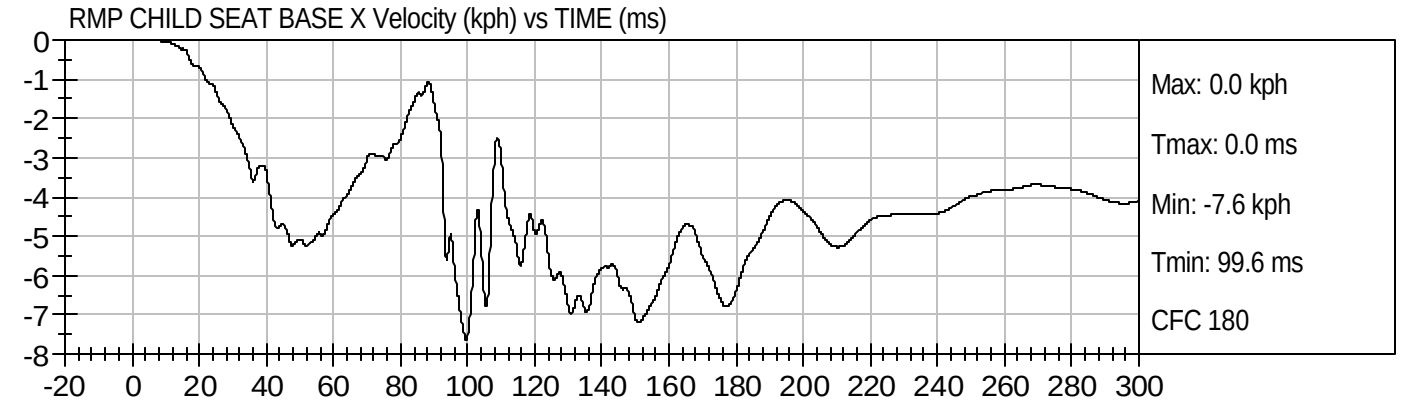


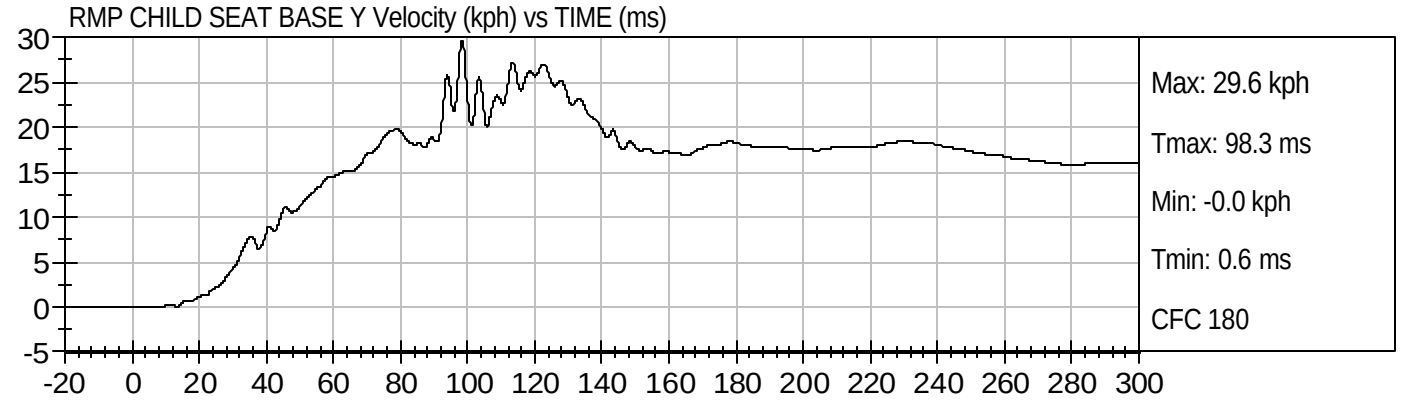


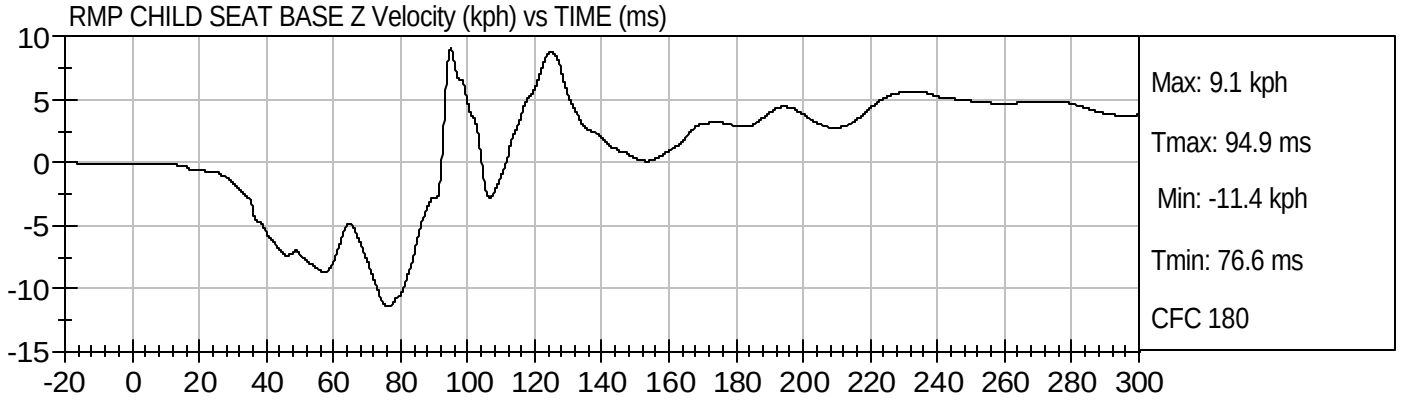


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



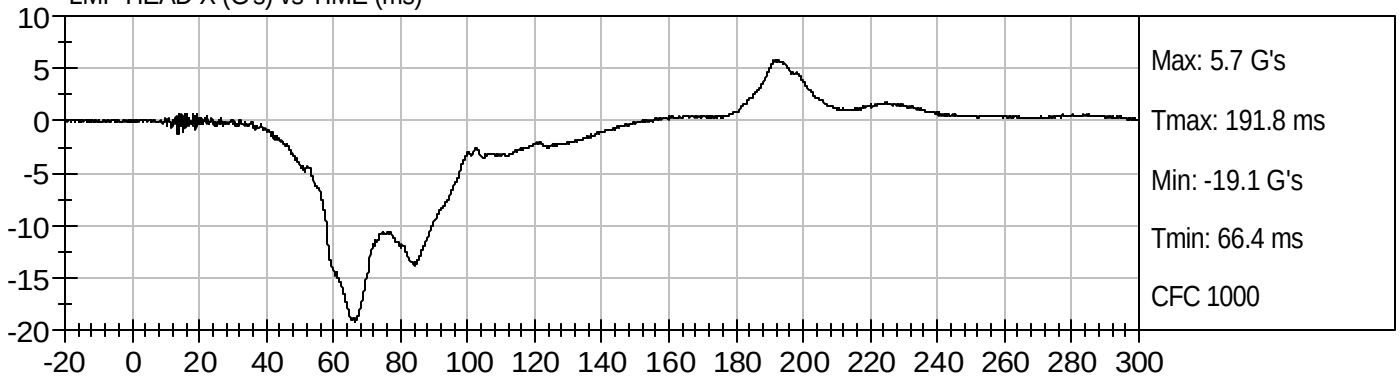




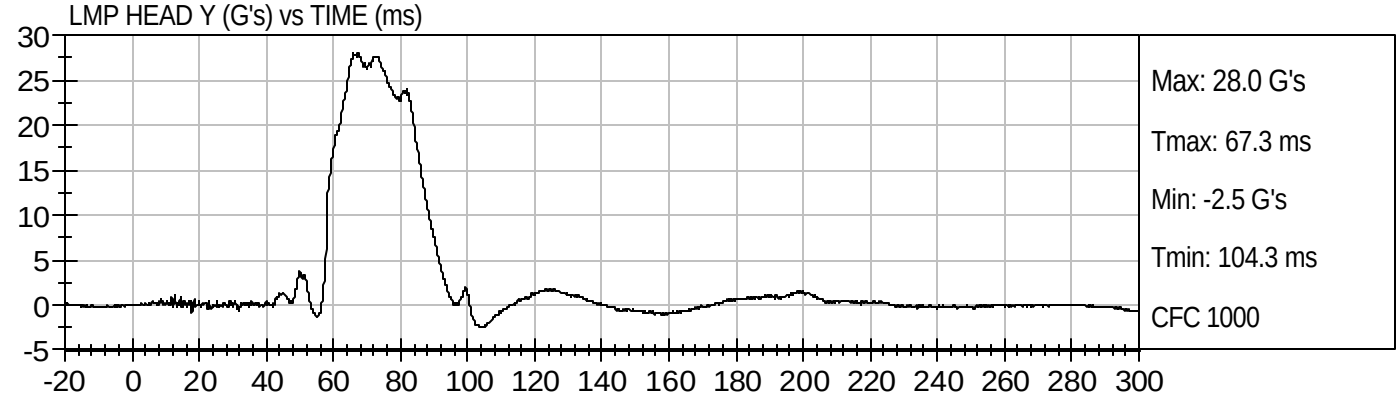
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

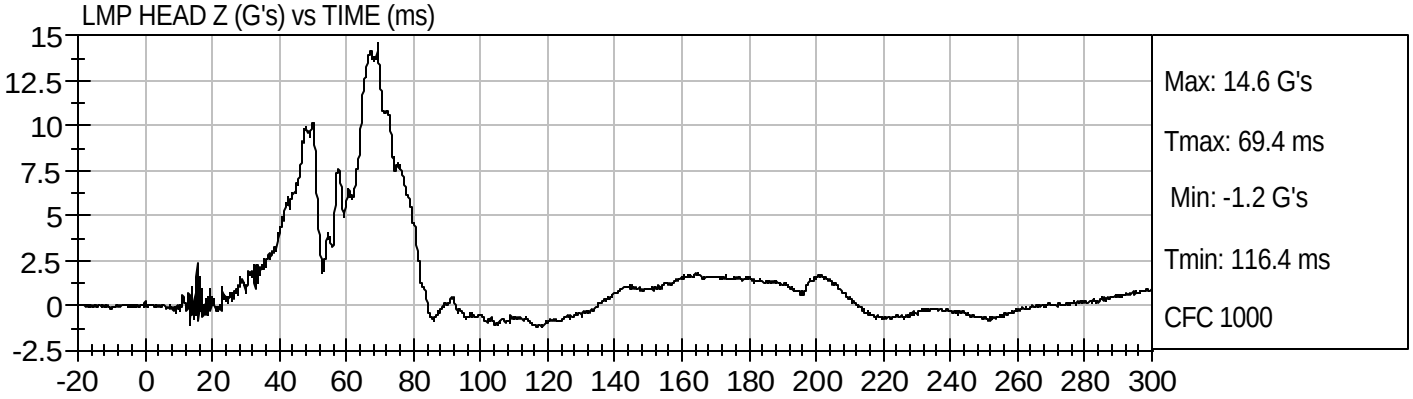
LMP HEAD X (G's) vs TIME (ms)



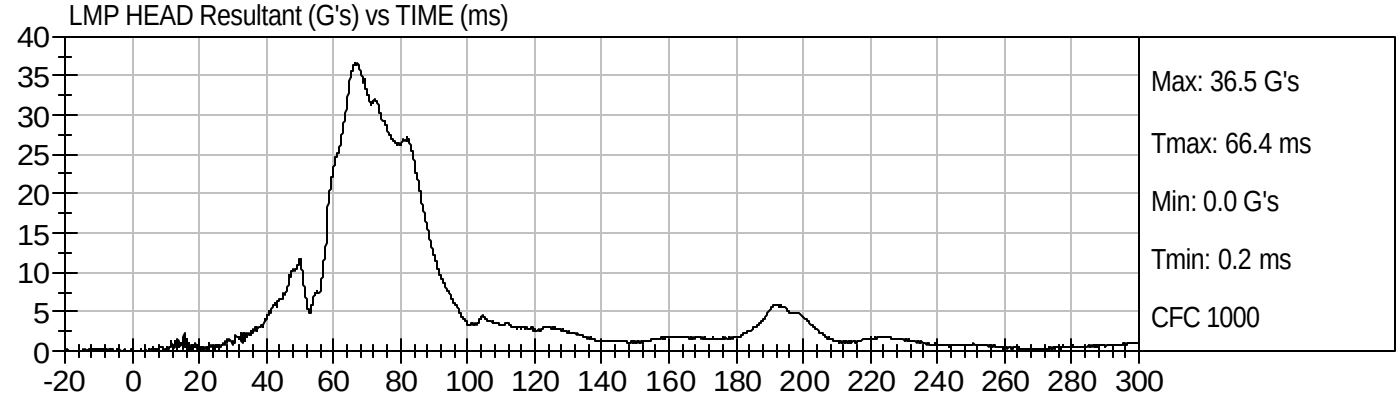
LMP HEAD Y (G's) vs TIME (ms)



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

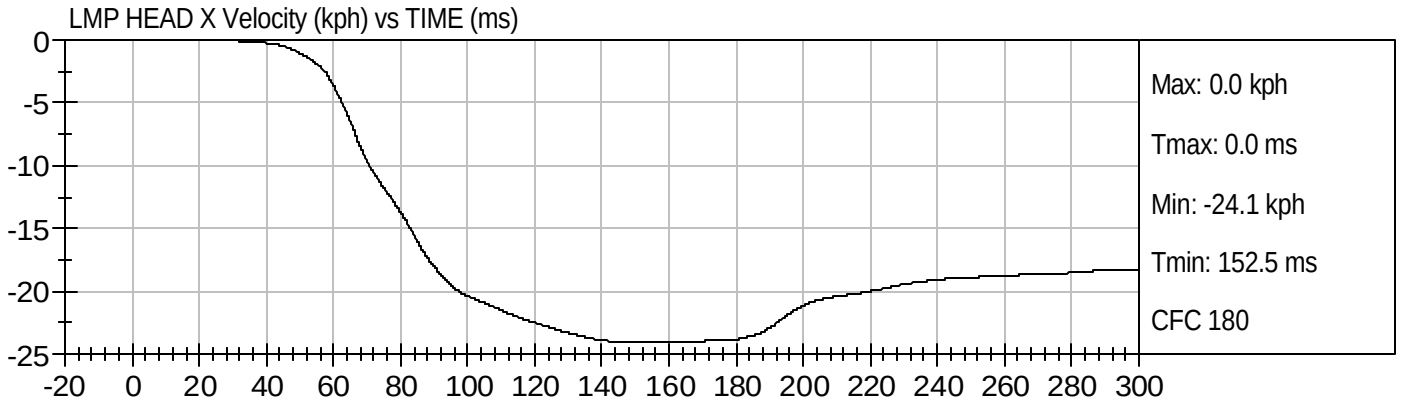


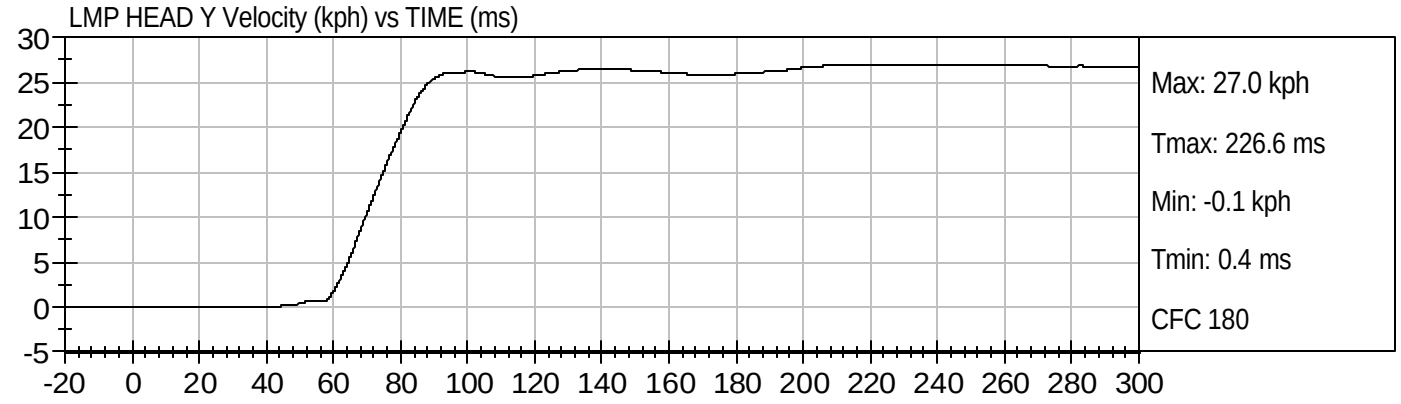
LMP HEAD Resultant (G's) vs TIME (ms)

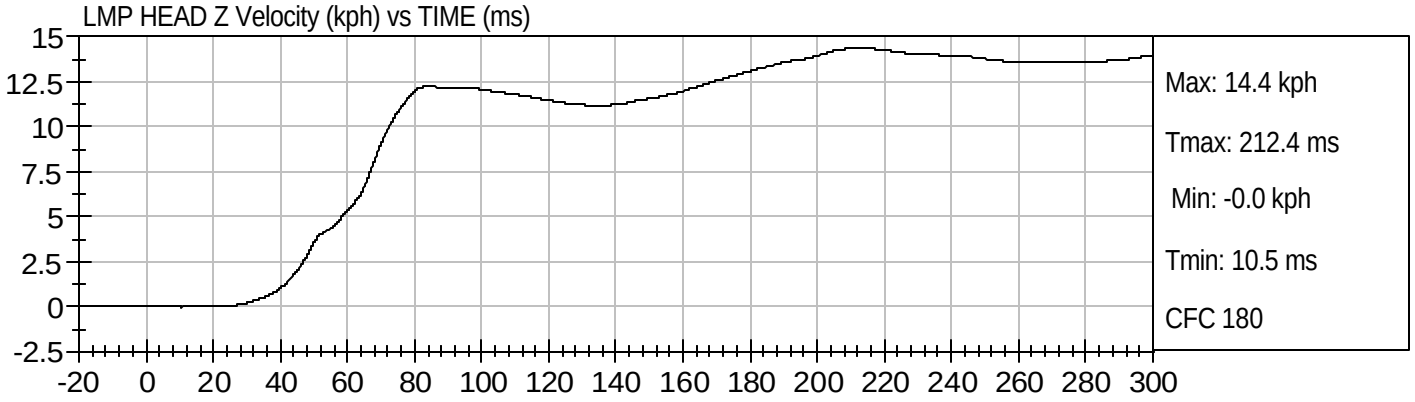


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

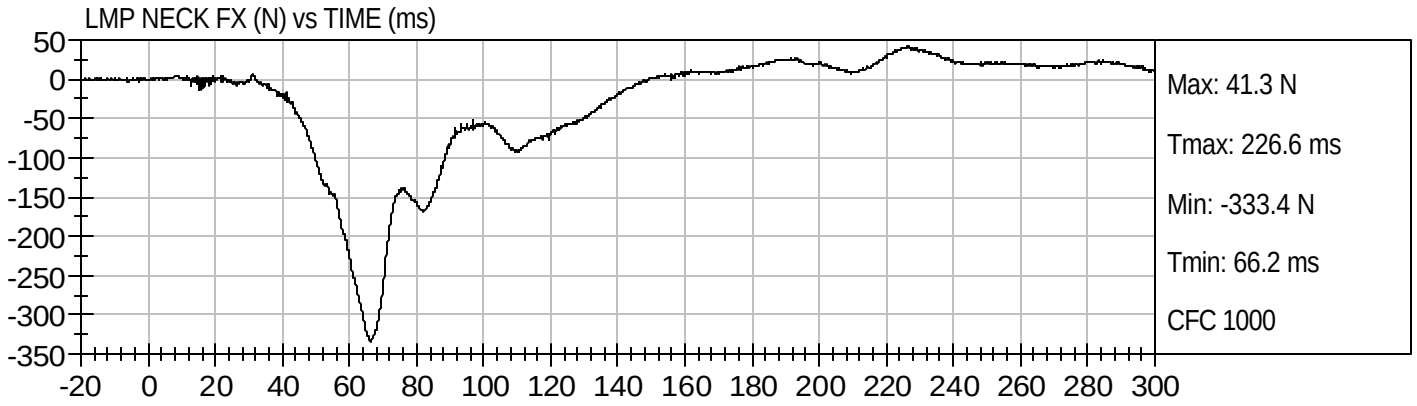


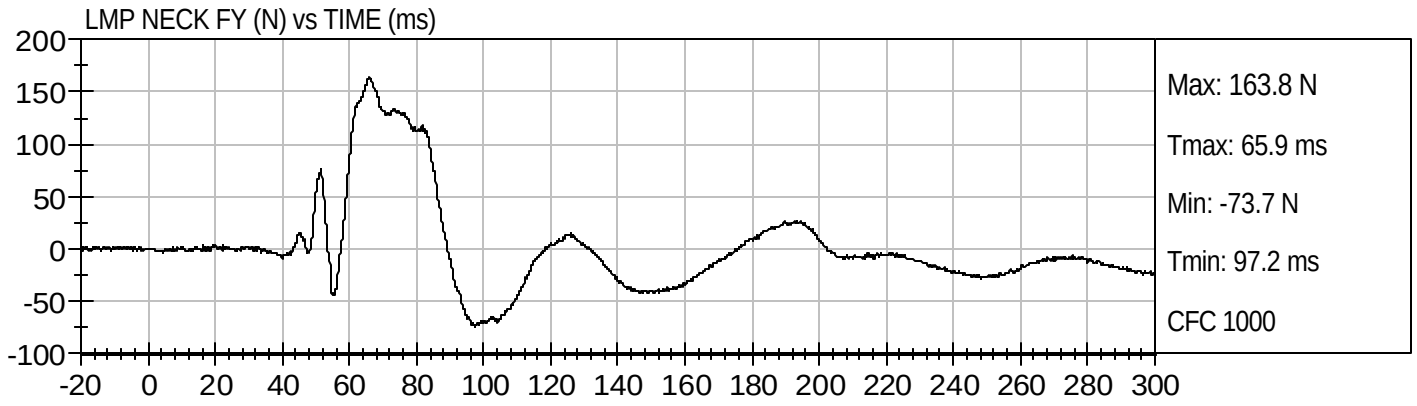


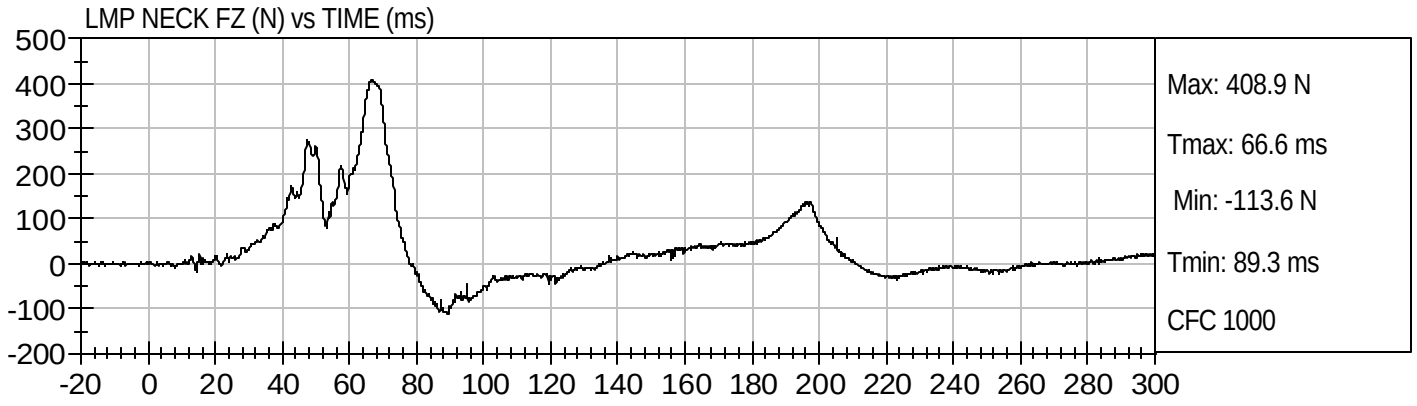


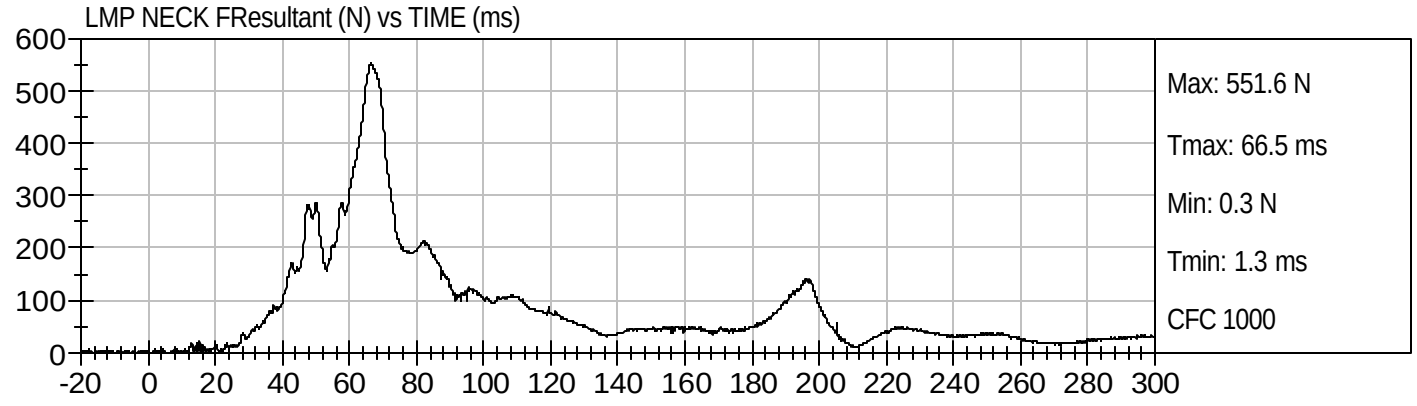
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



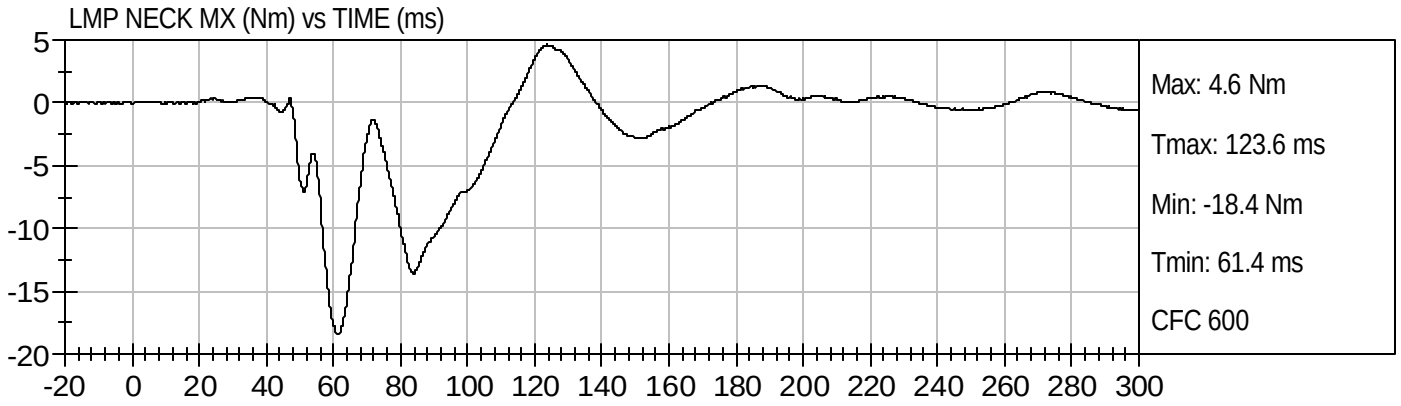


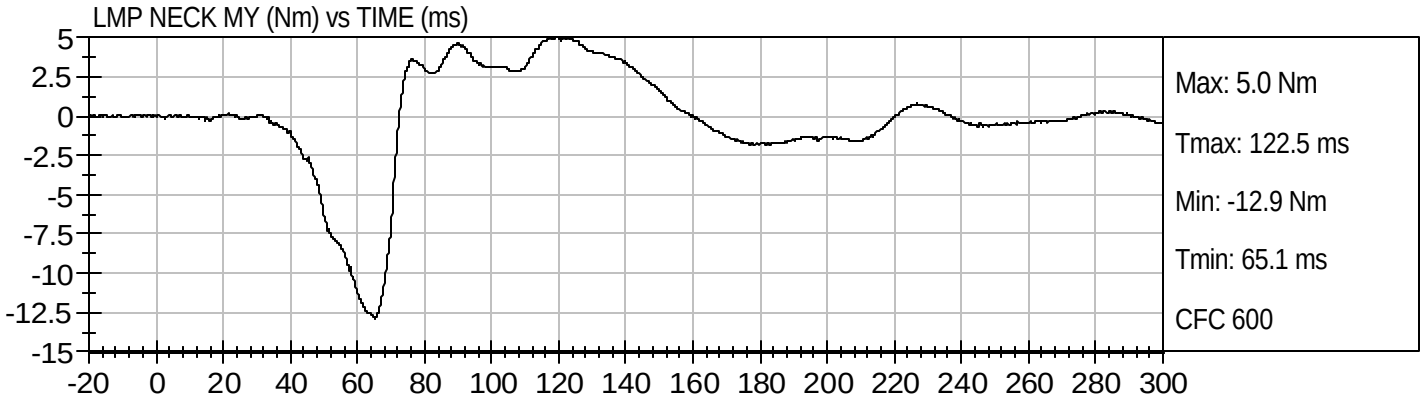


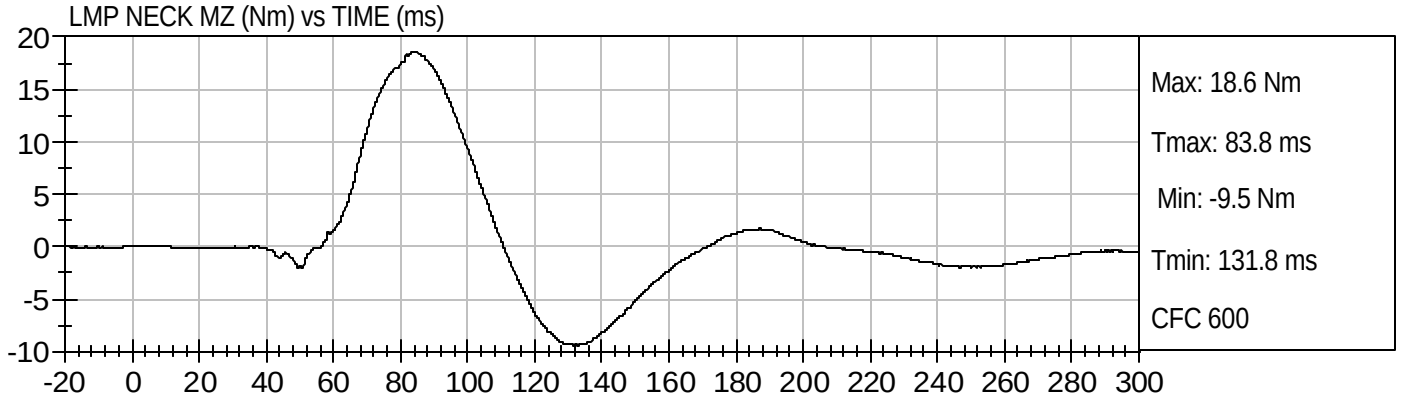


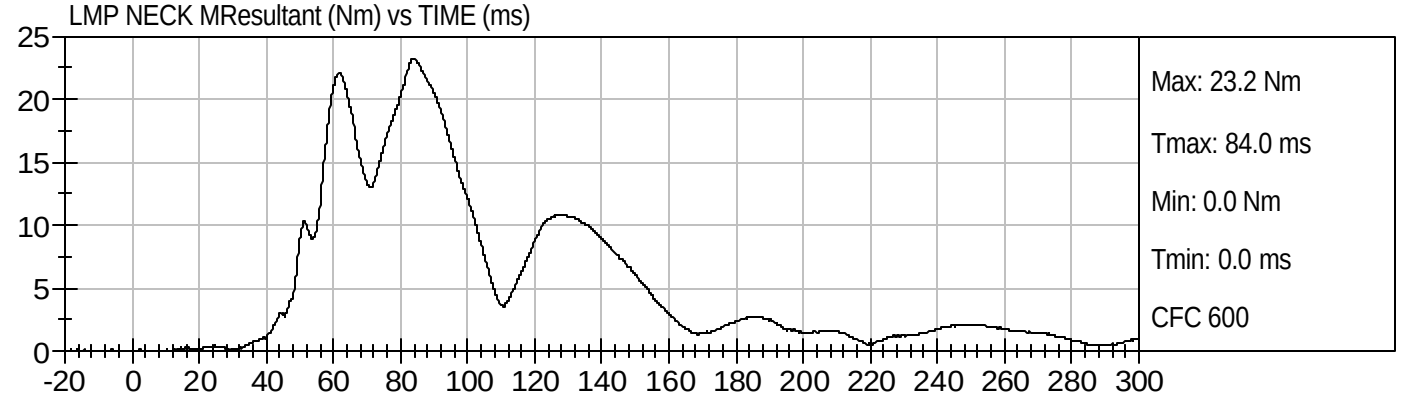
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



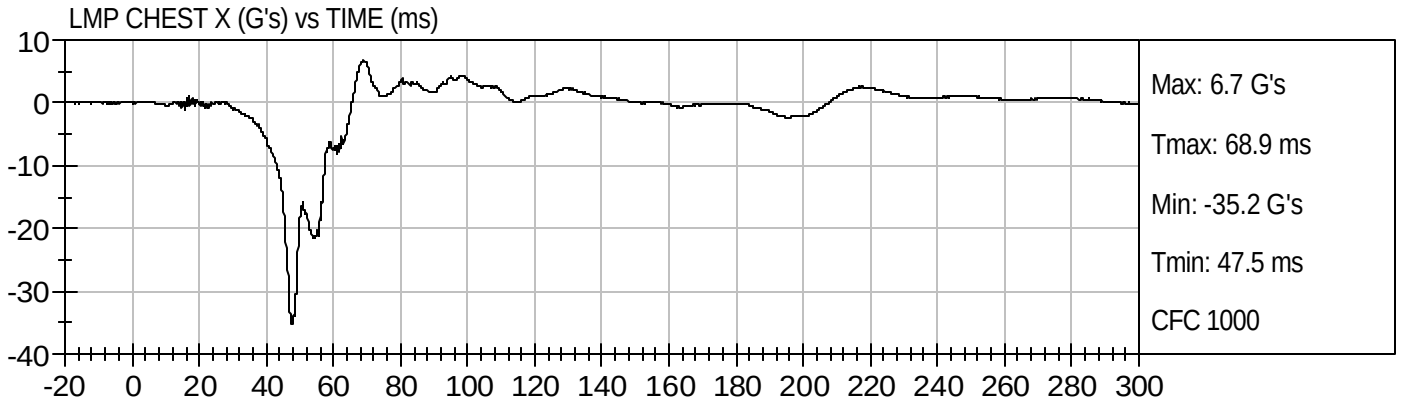


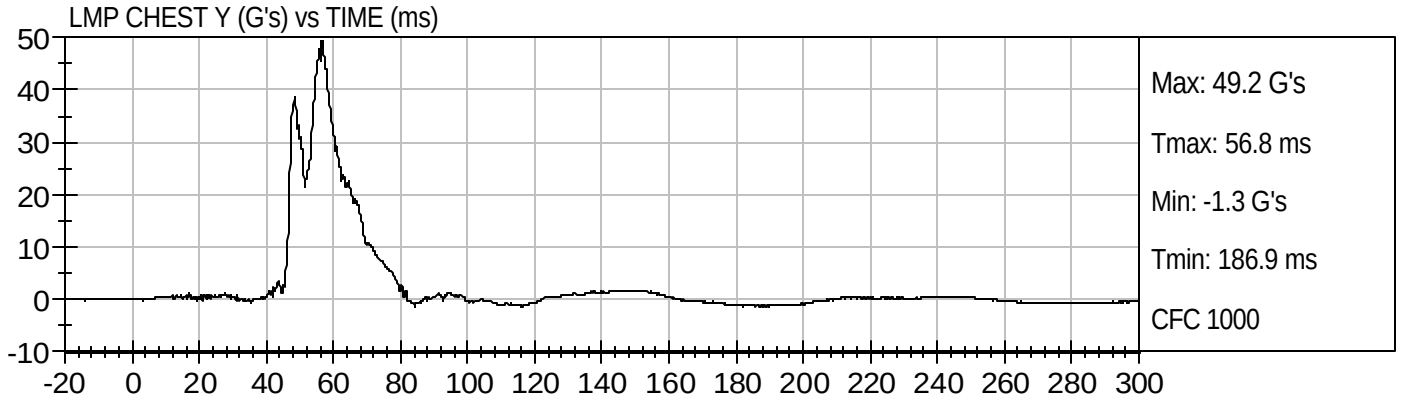


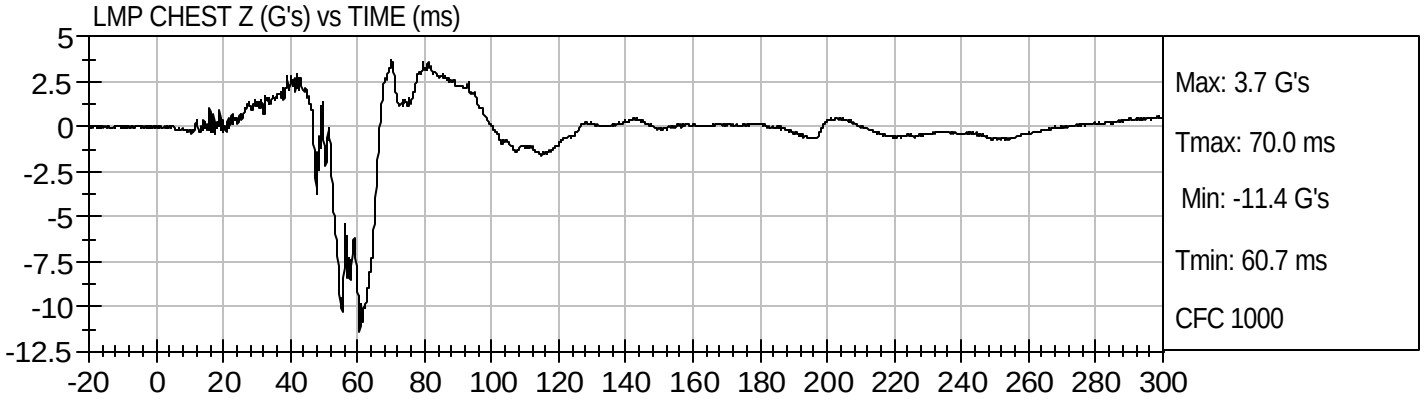


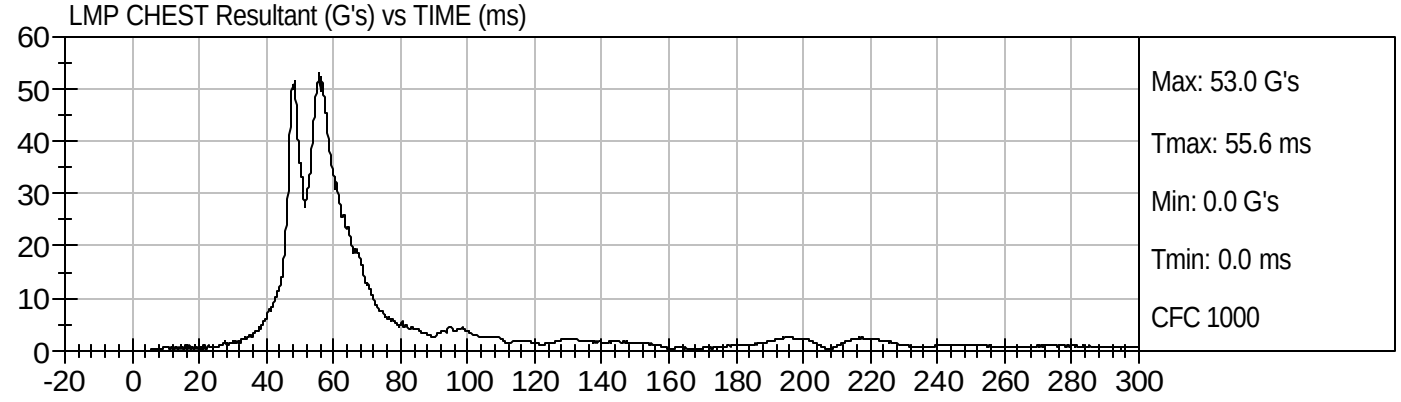
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



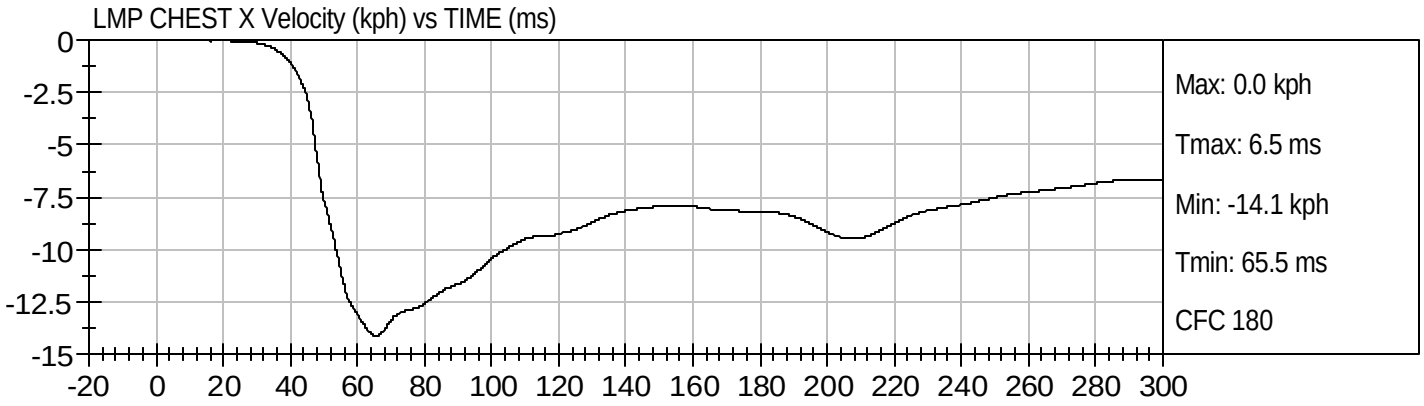


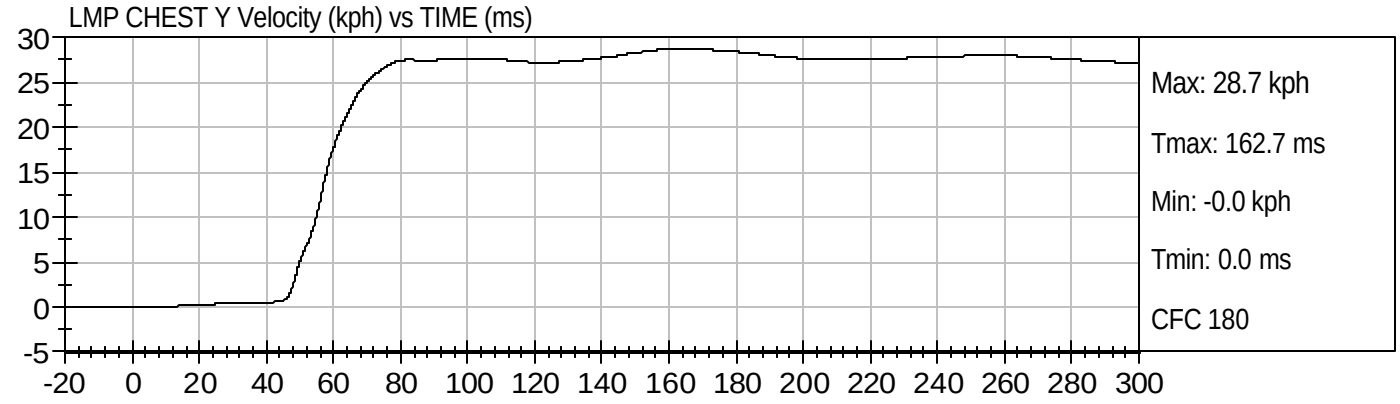


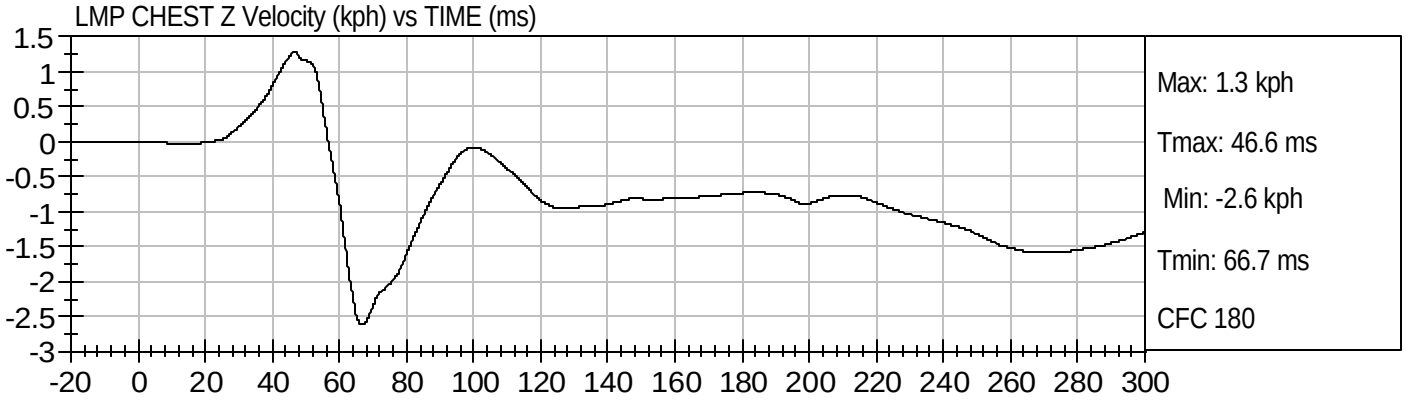


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

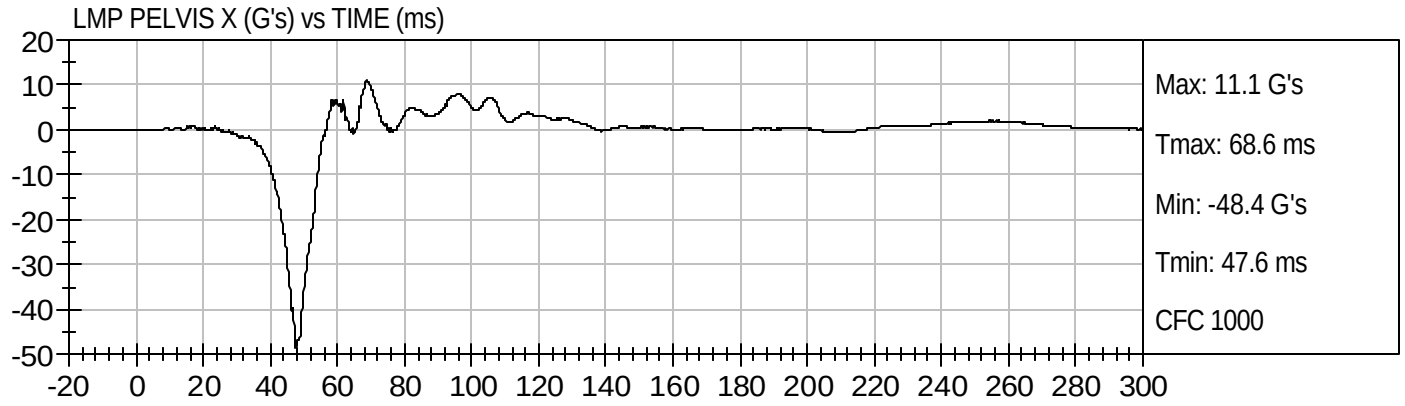


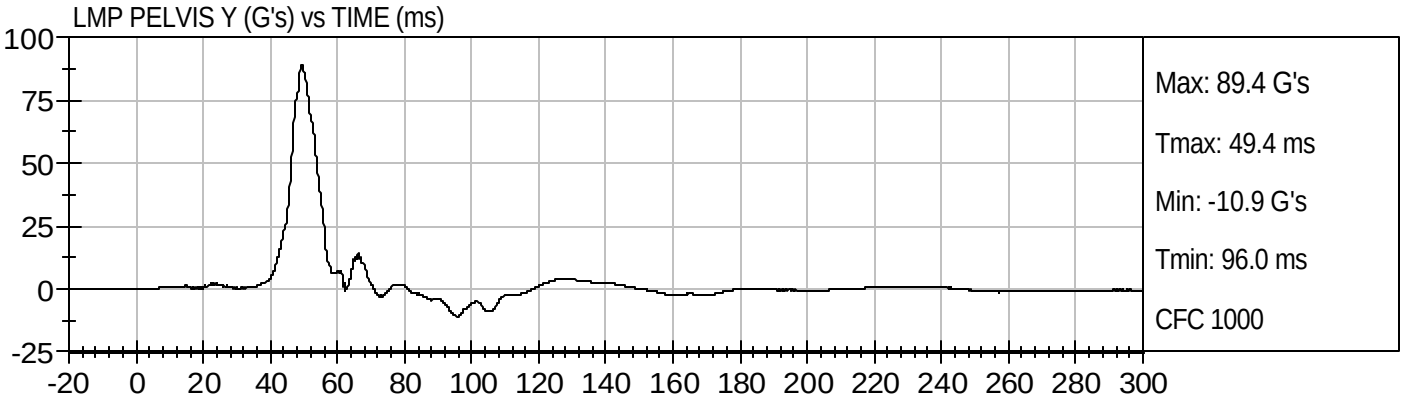


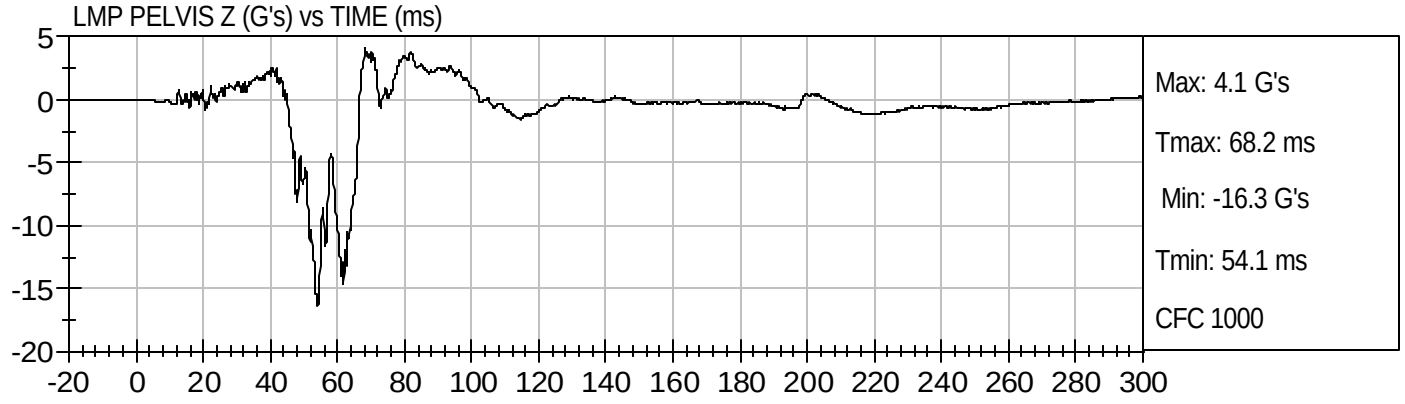


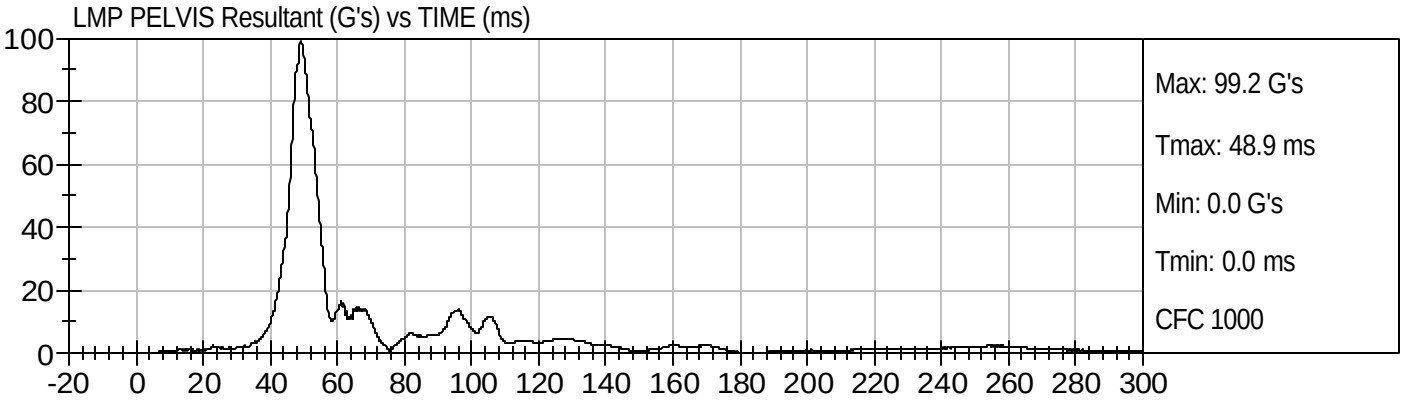
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



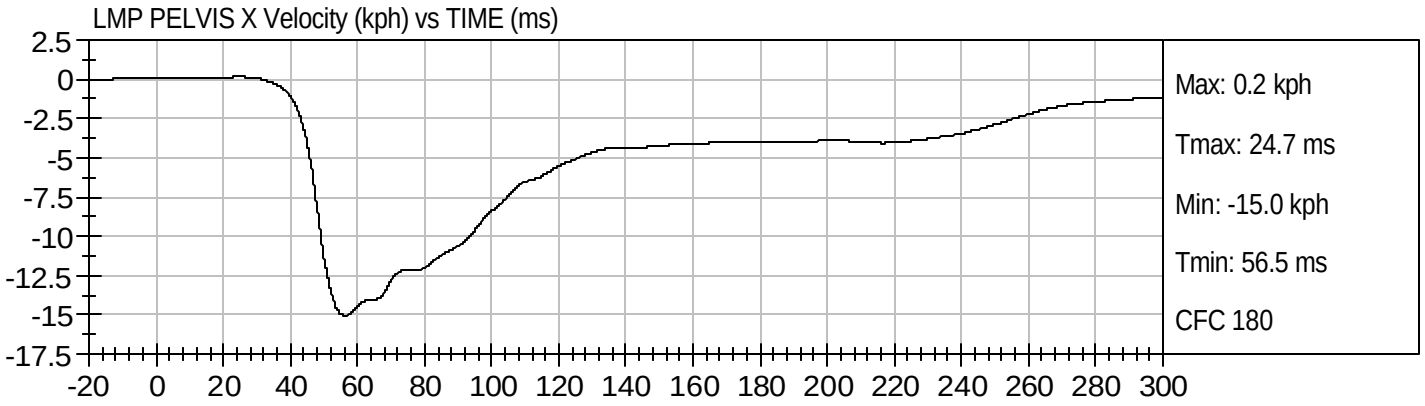


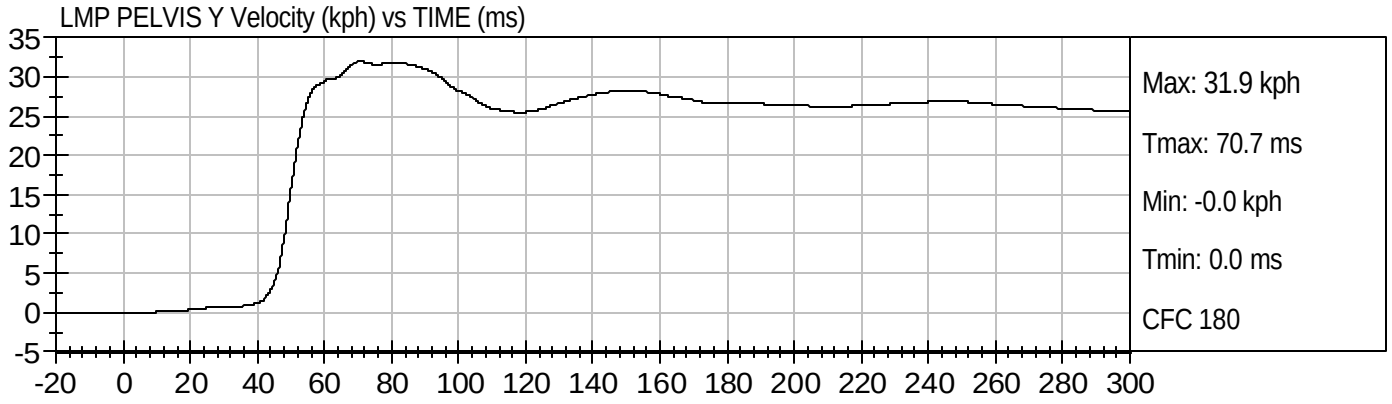


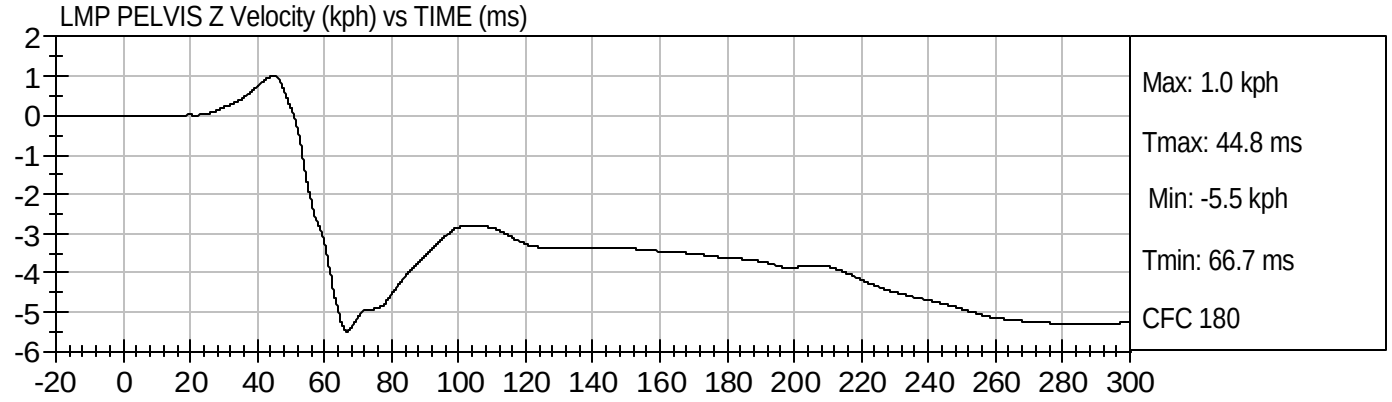


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

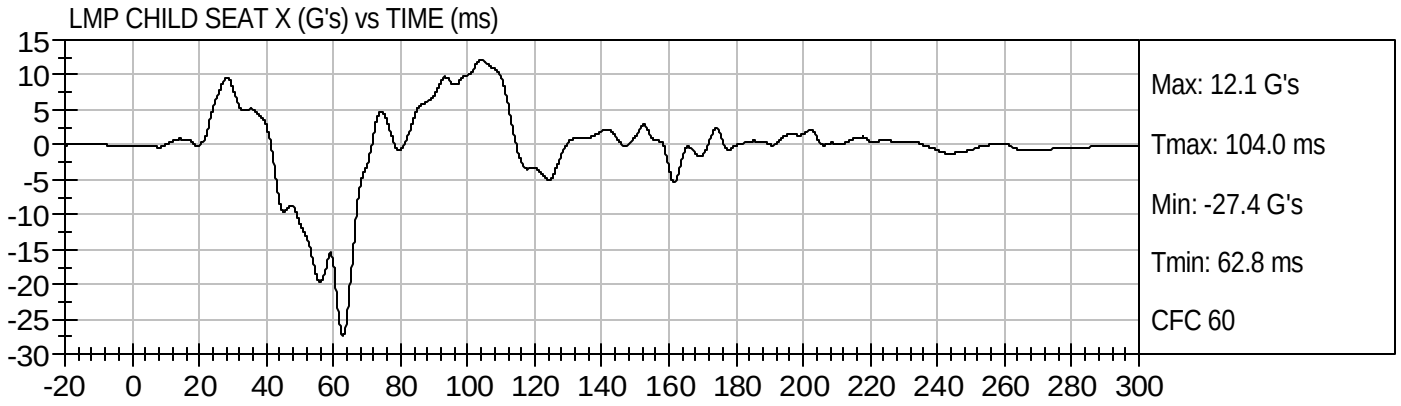


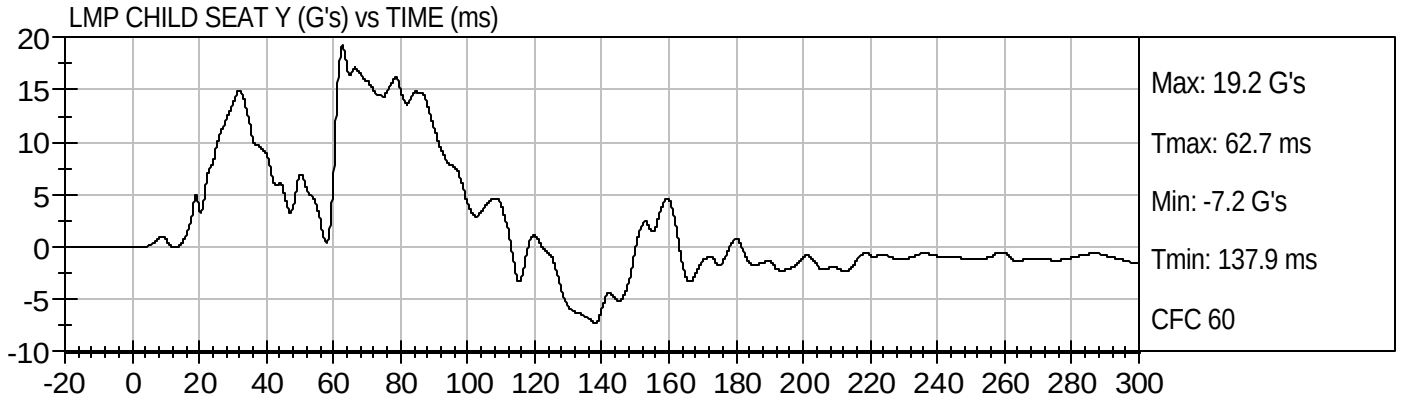


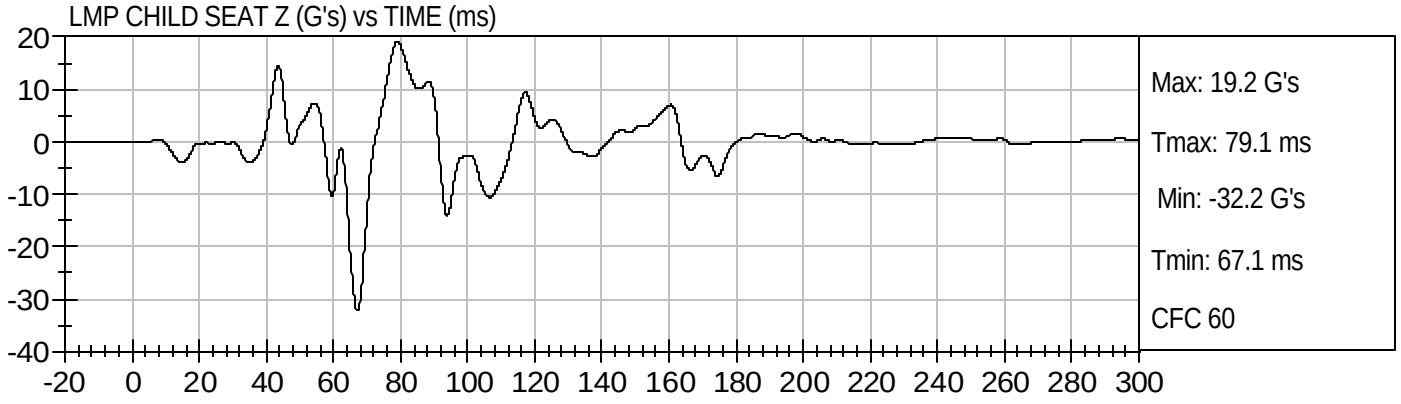


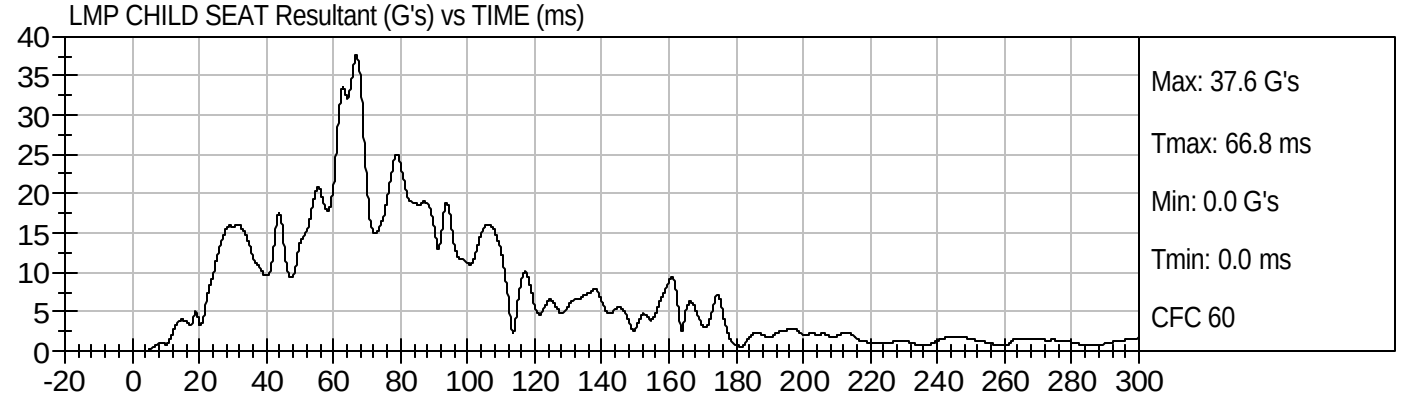
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



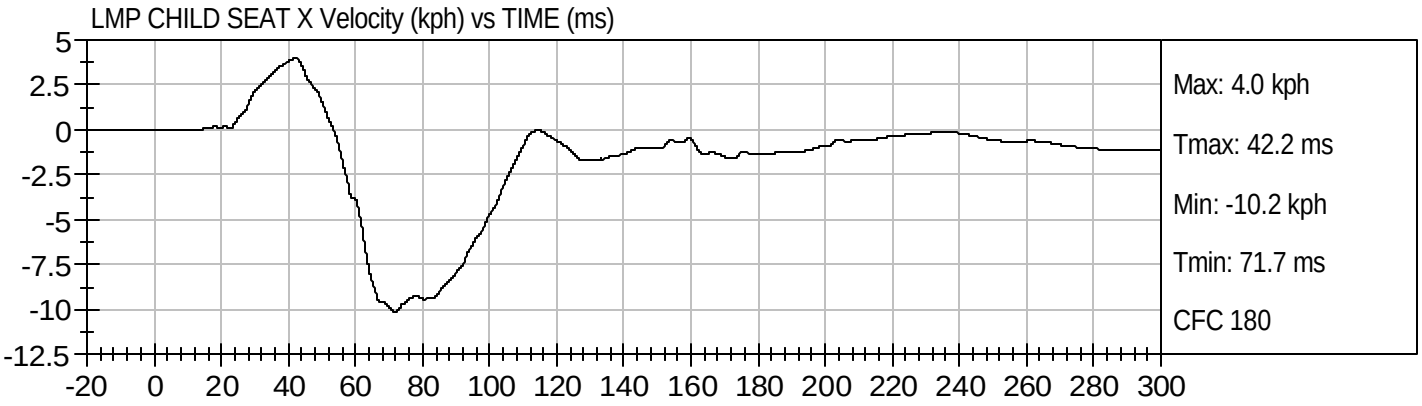


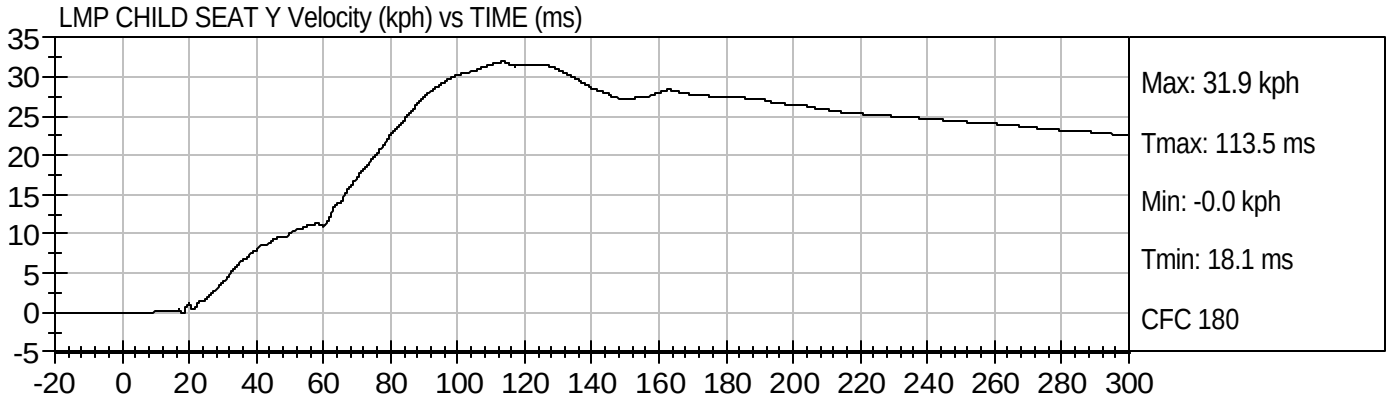


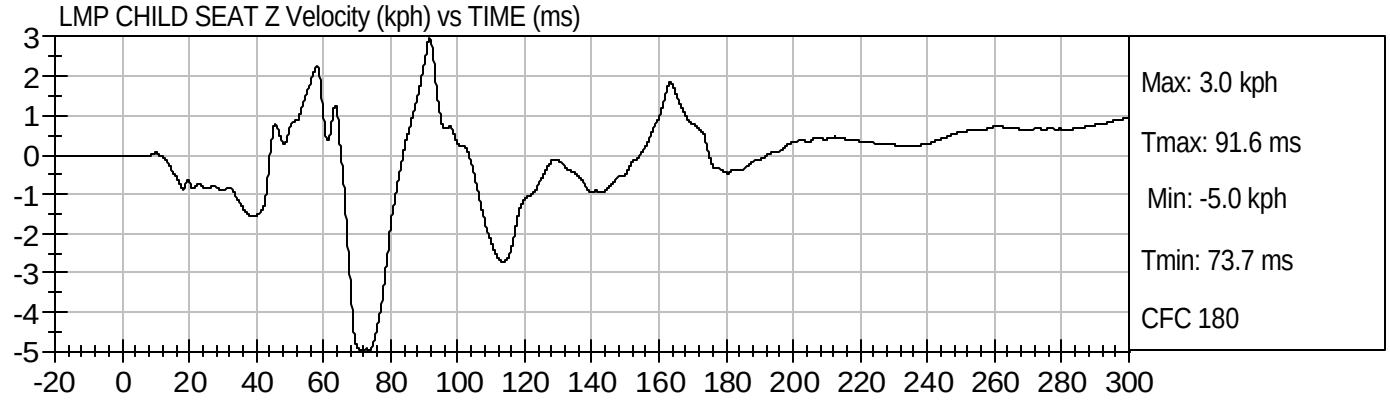


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

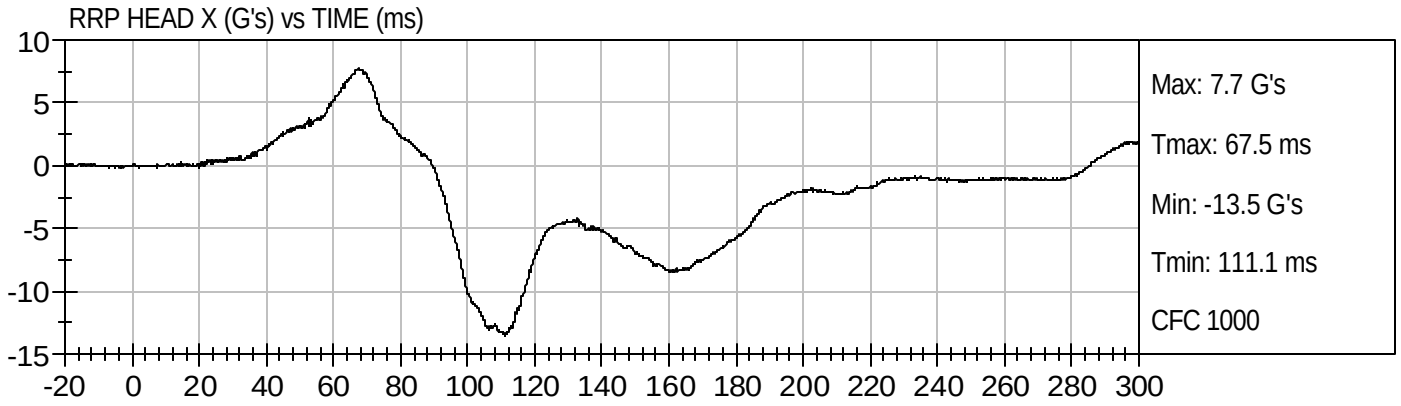


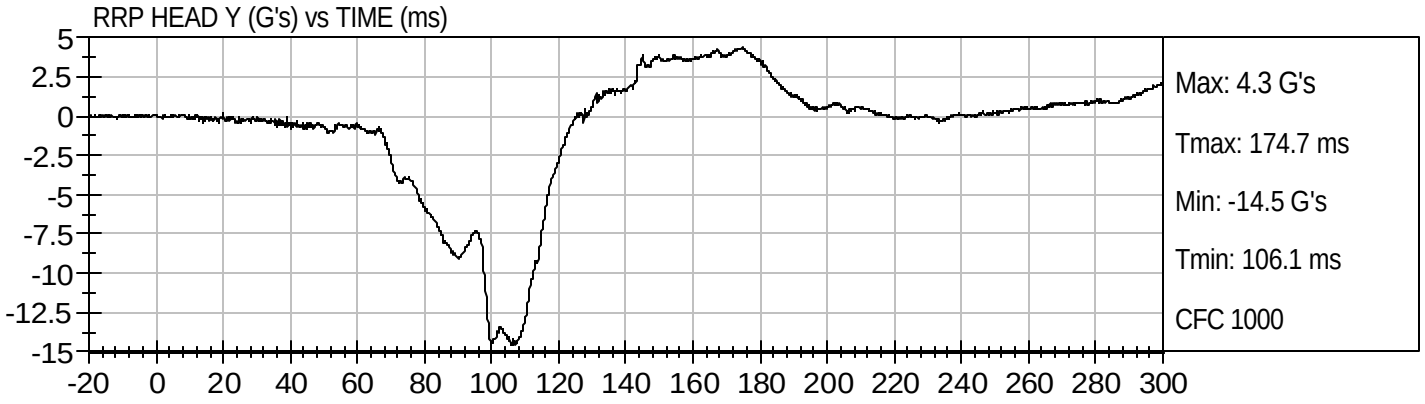


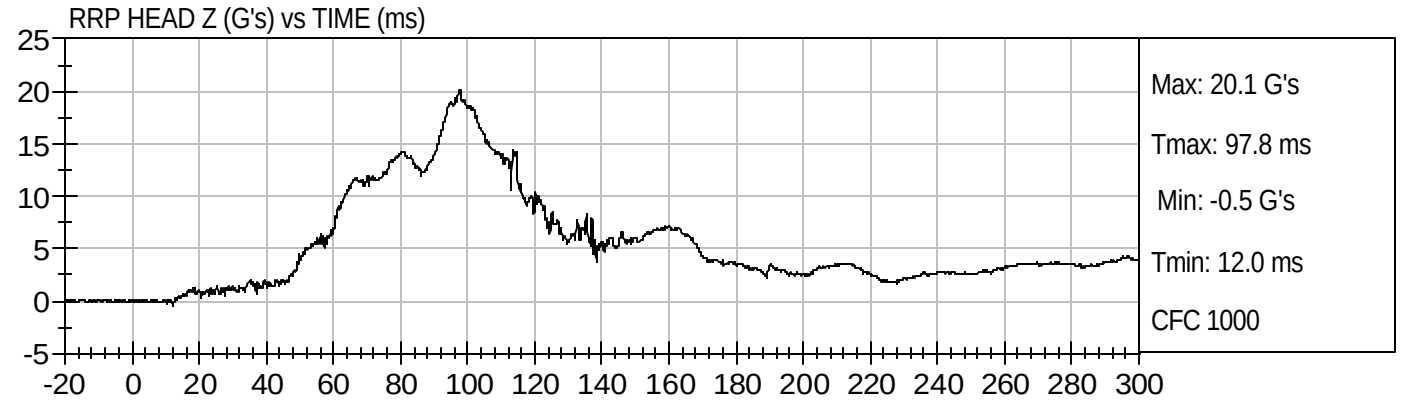


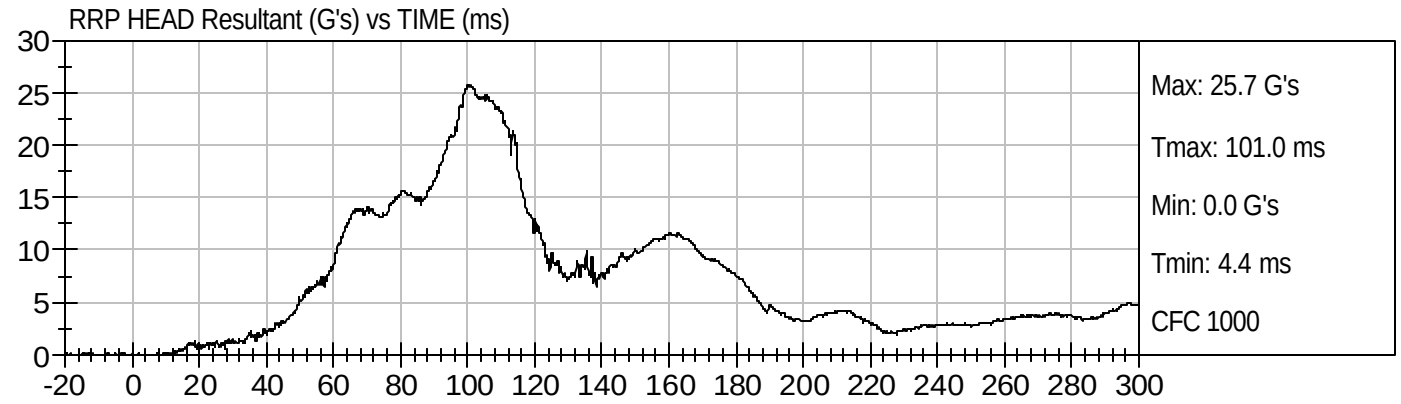
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



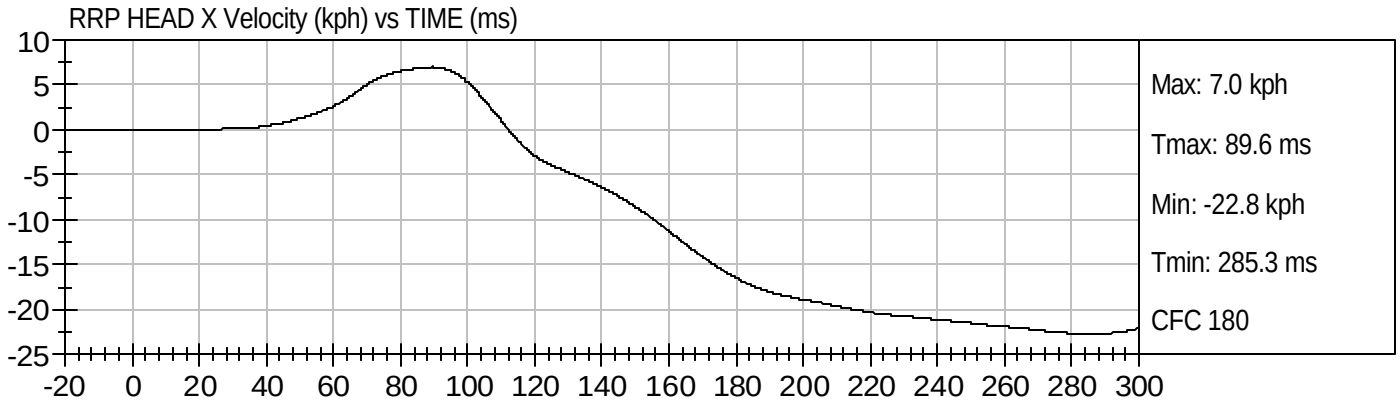


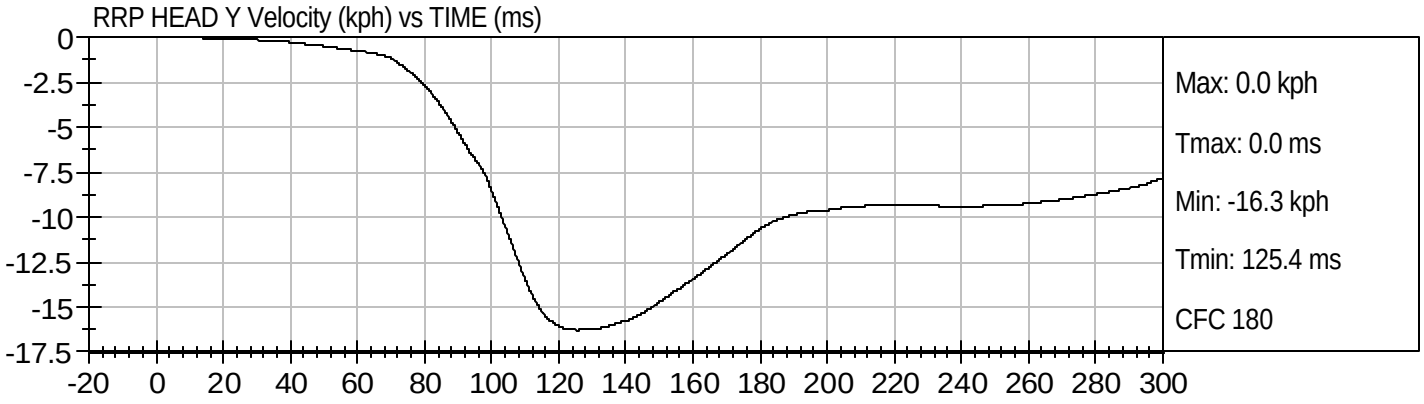


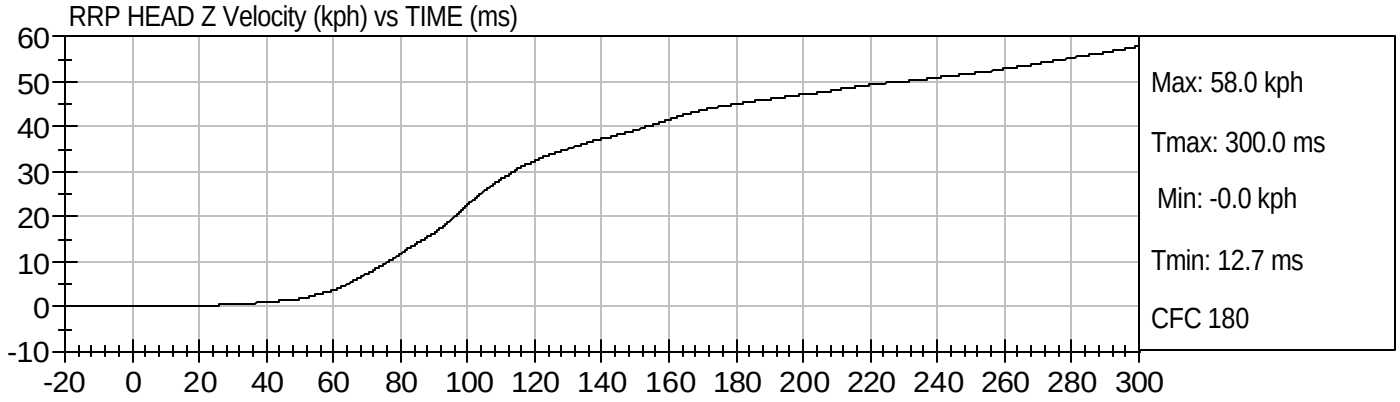


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

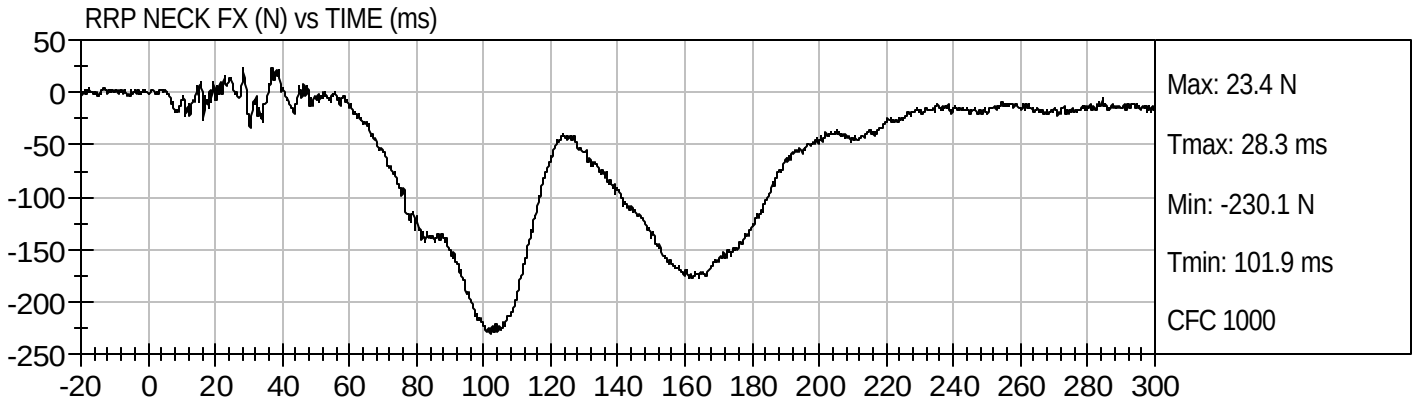


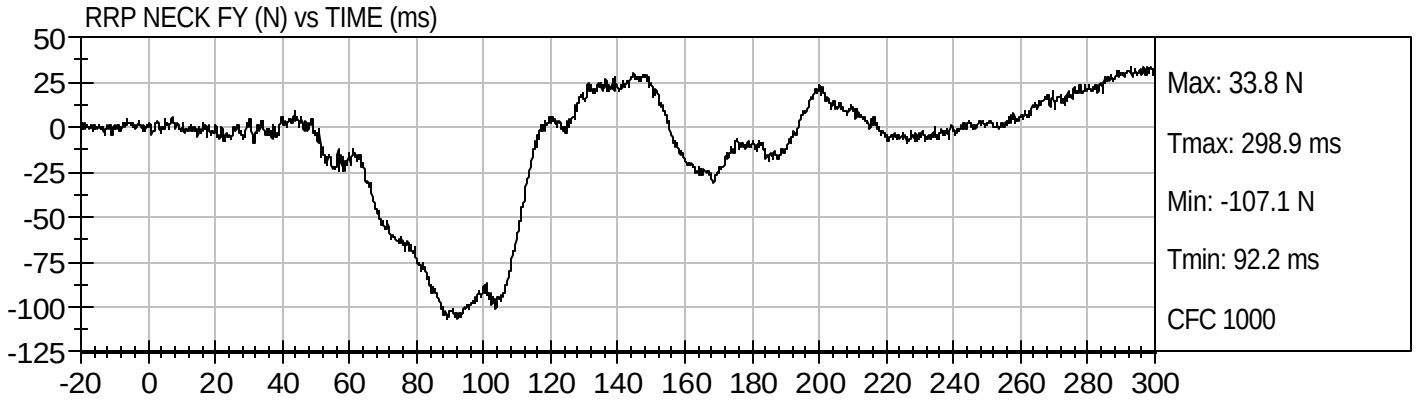


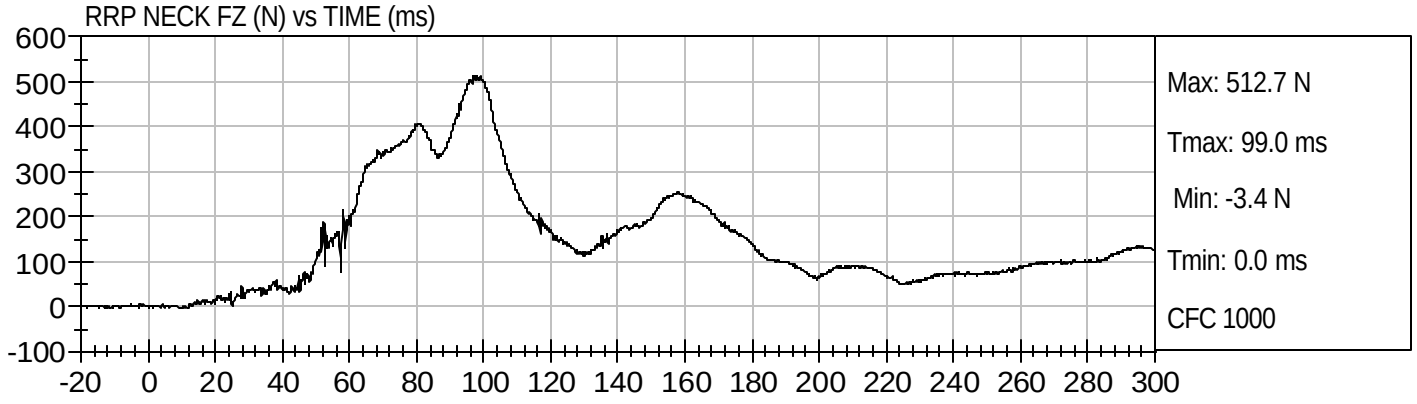


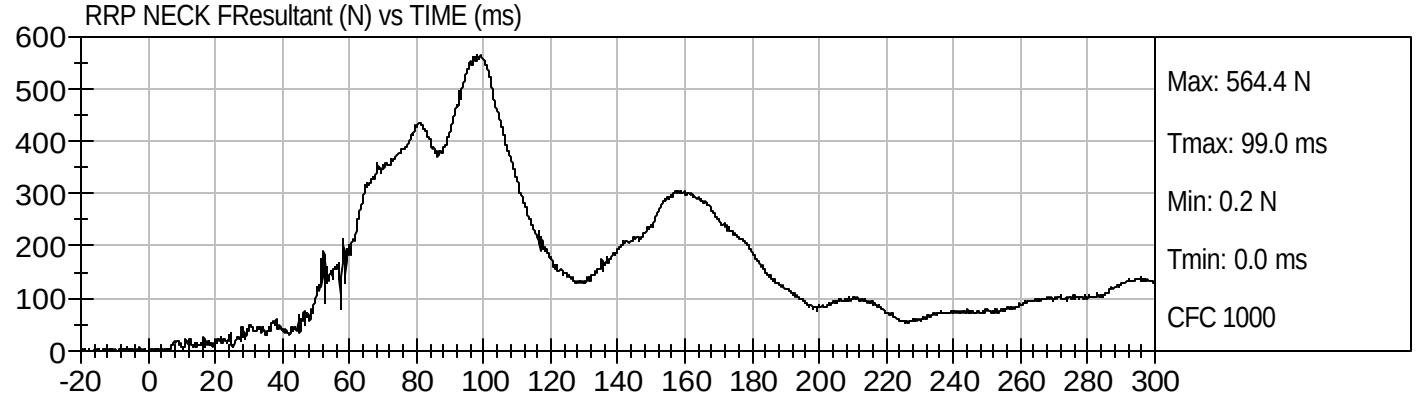
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



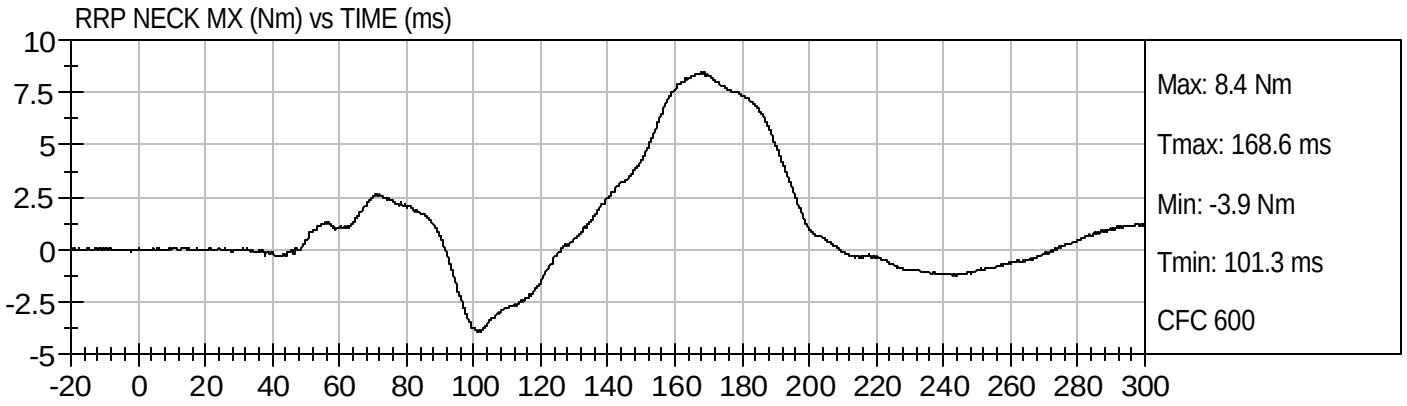


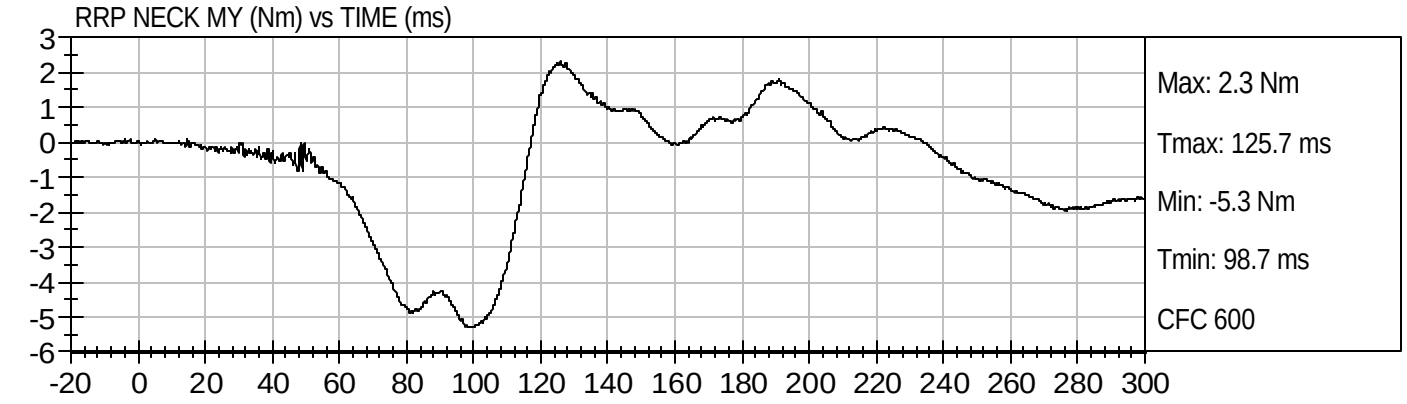


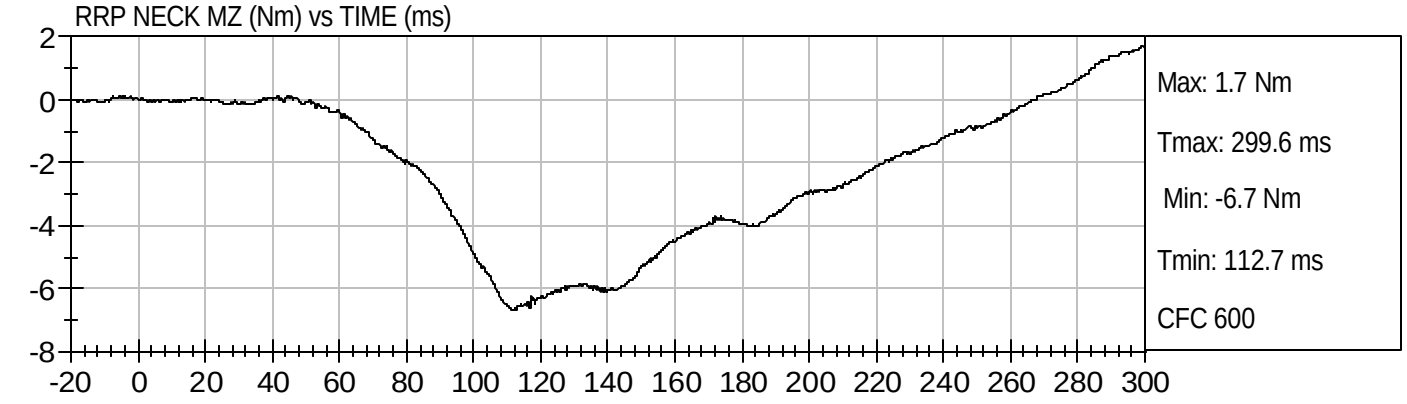


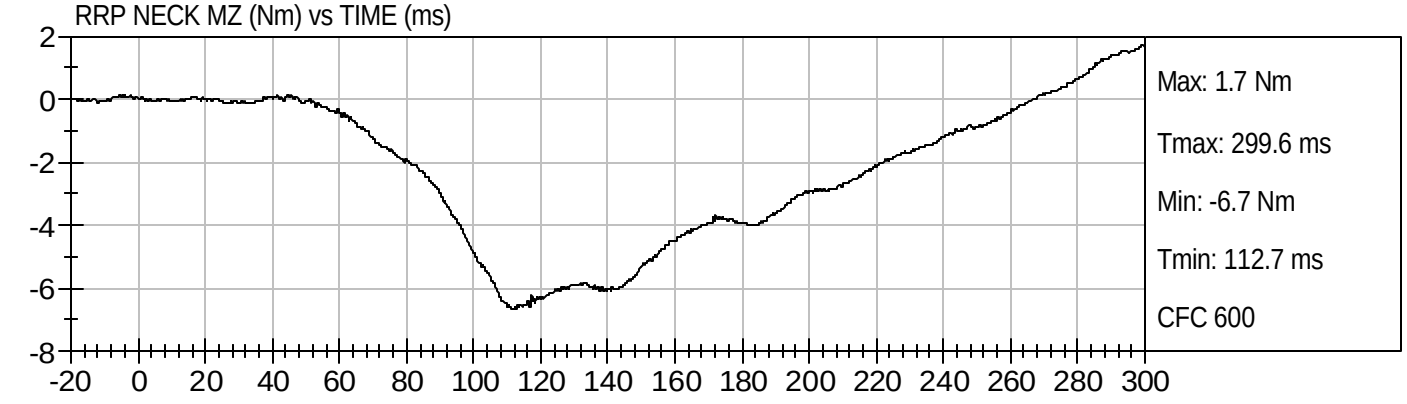
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



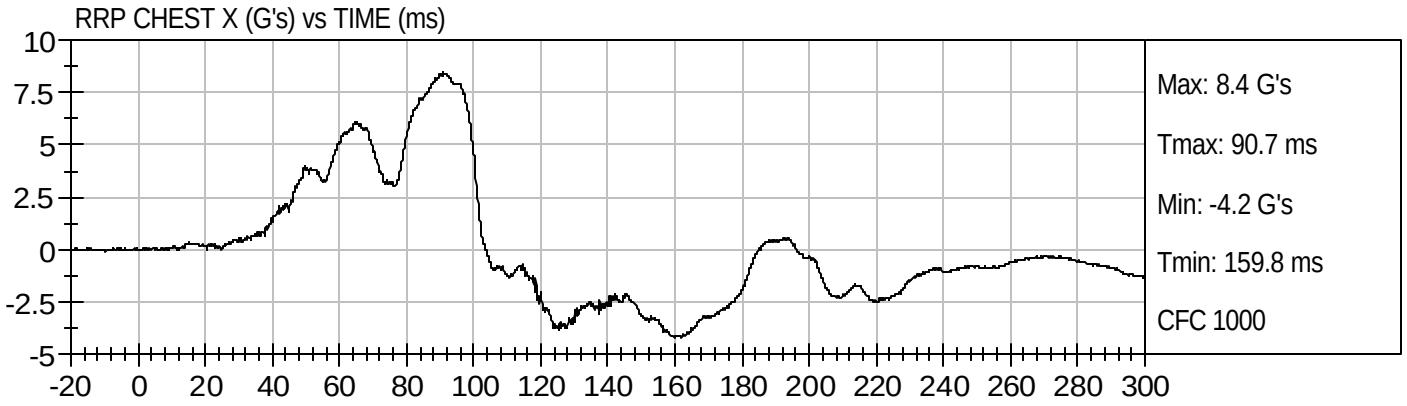


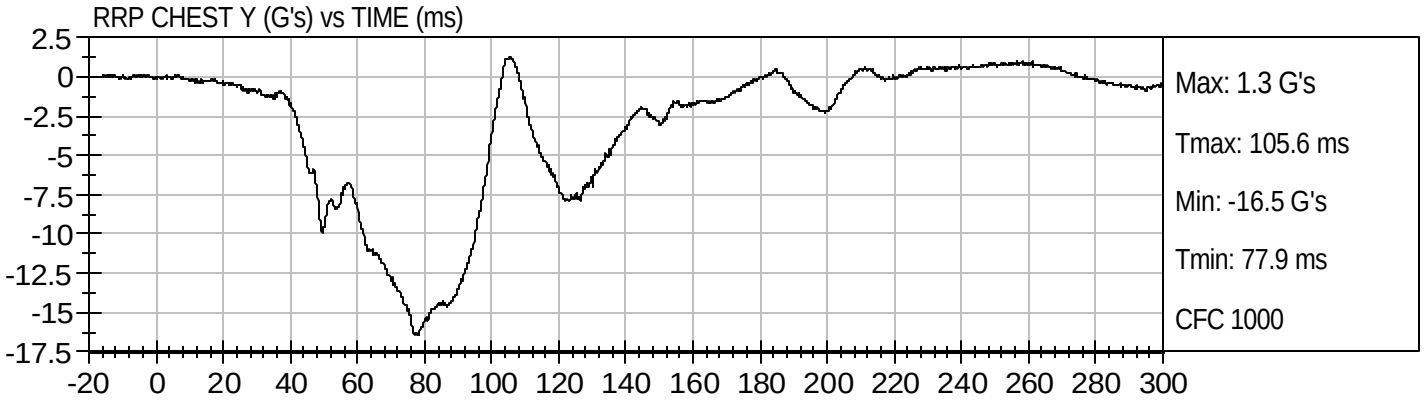


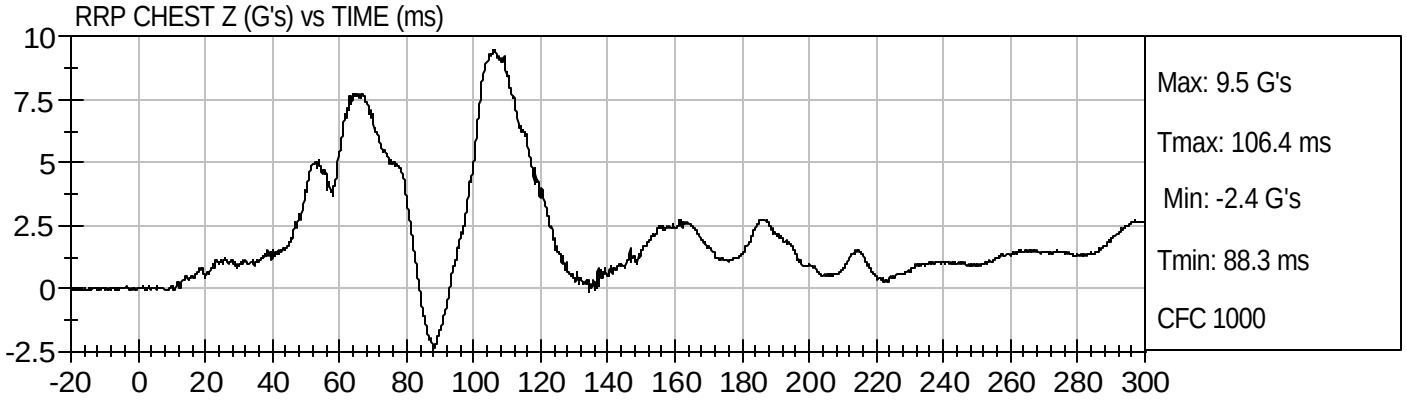


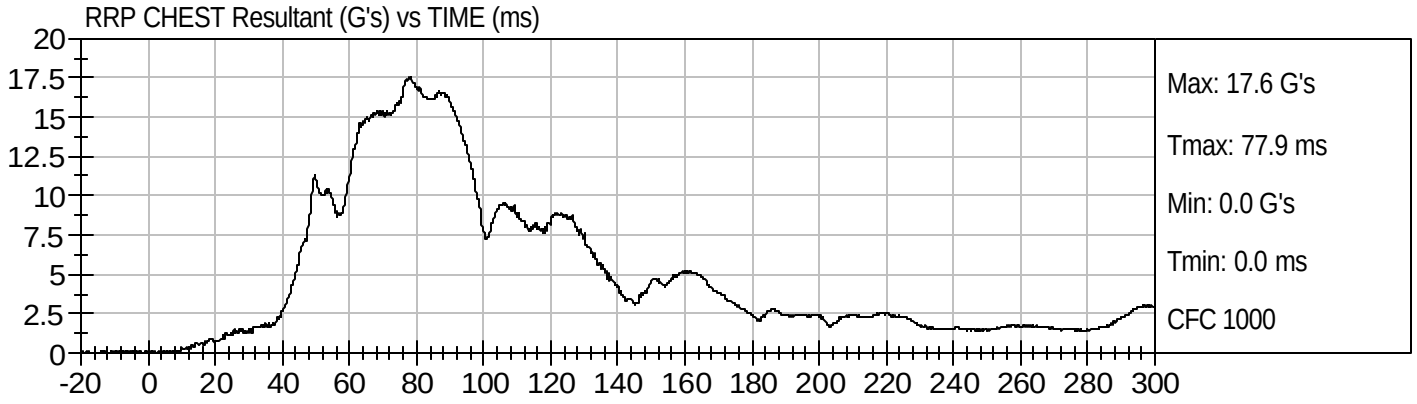
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

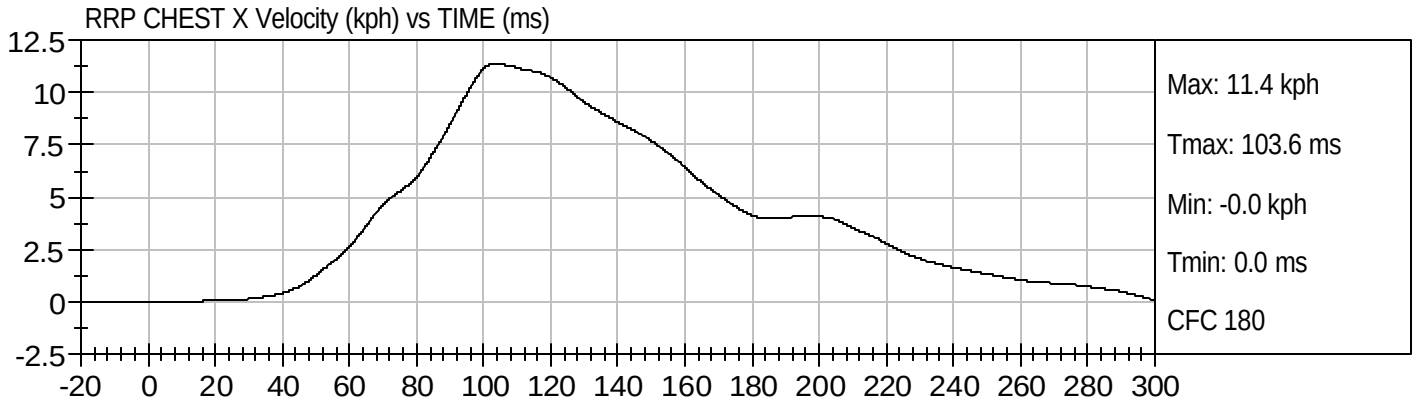
Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

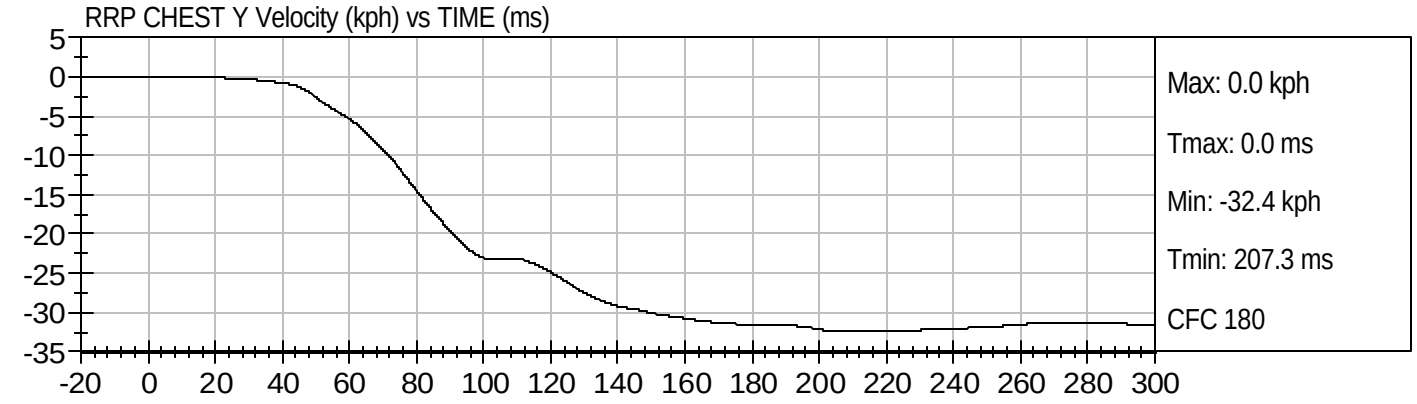


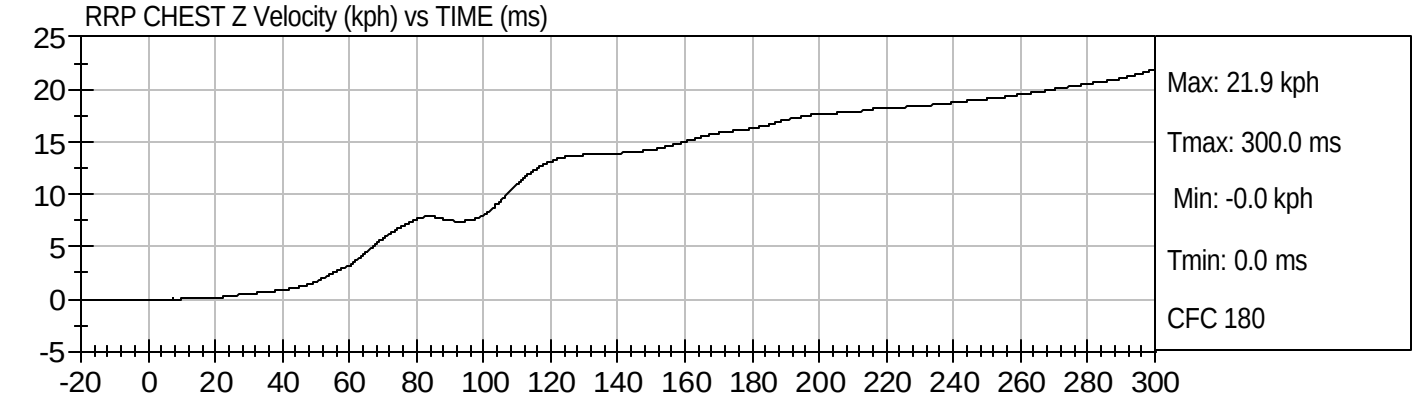






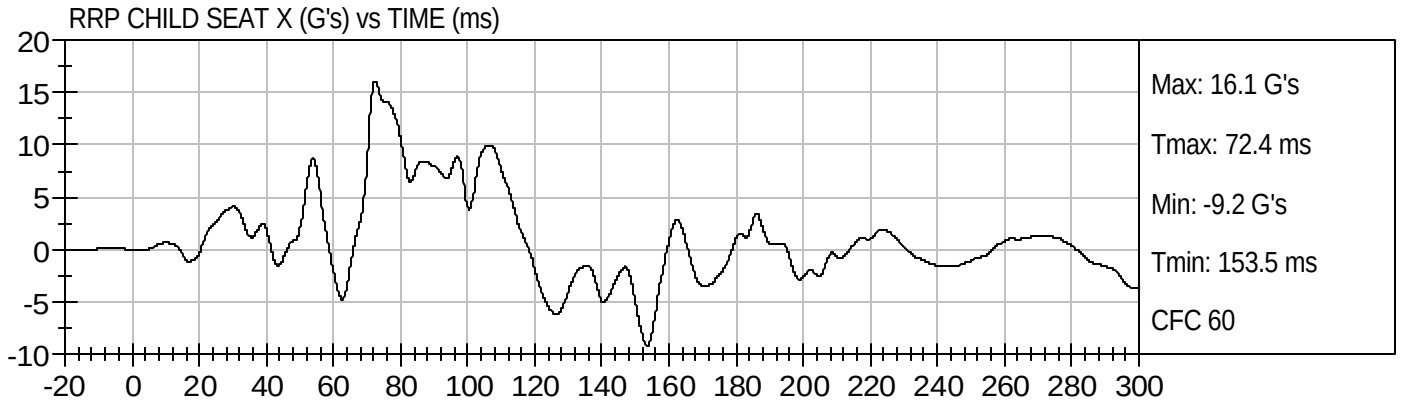

RRP CHEST X Velocity (kph) vs TIME (ms)
12.5
10
7.5
5
2.5
0
-2.5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 11.4 kph
Tmax: 103.6 ms
Min: -0.0 kph
Tmin: 0.0 ms
CFC 180

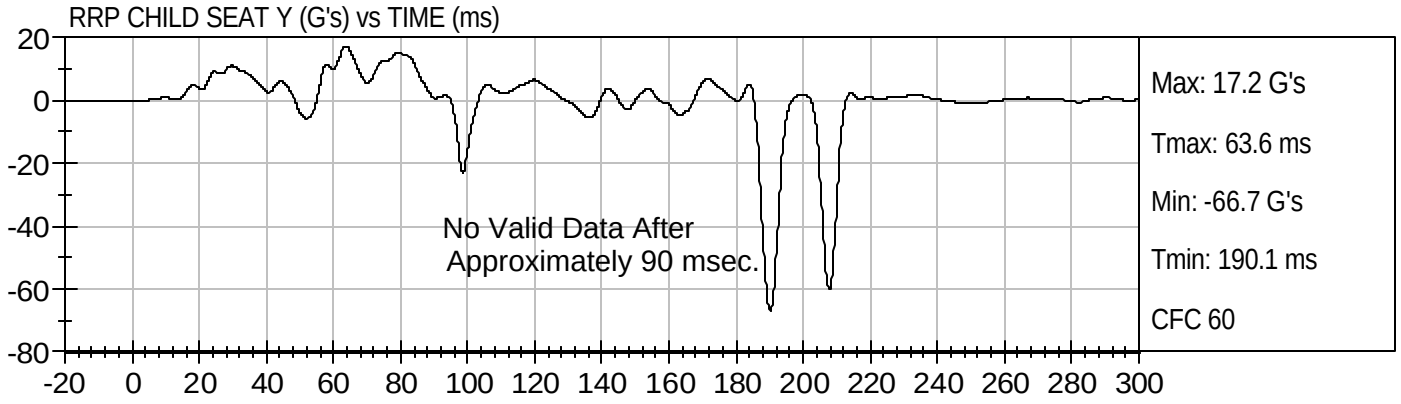

RRP CHEST Y Velocity (kph) vs TIME (ms)
5
0
-5
-10
-15
-20
-25
-30
-35
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.0 kph
Tmax: 0.0 ms
Min: -32.4 kph
Tmin: 207.3 ms
CFC 180

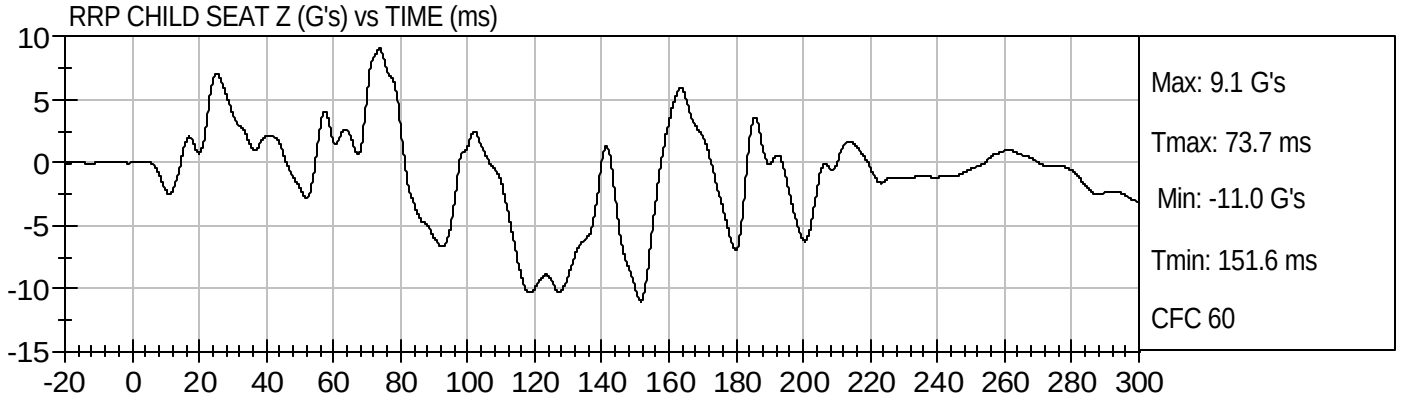

RRP CHEST Z Velocity (kph) vs TIME (ms)
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 21.9 kph
Tmax: 300.0 ms
Min: -0.0 kph
Tmin: 0.0 ms
CFC 180

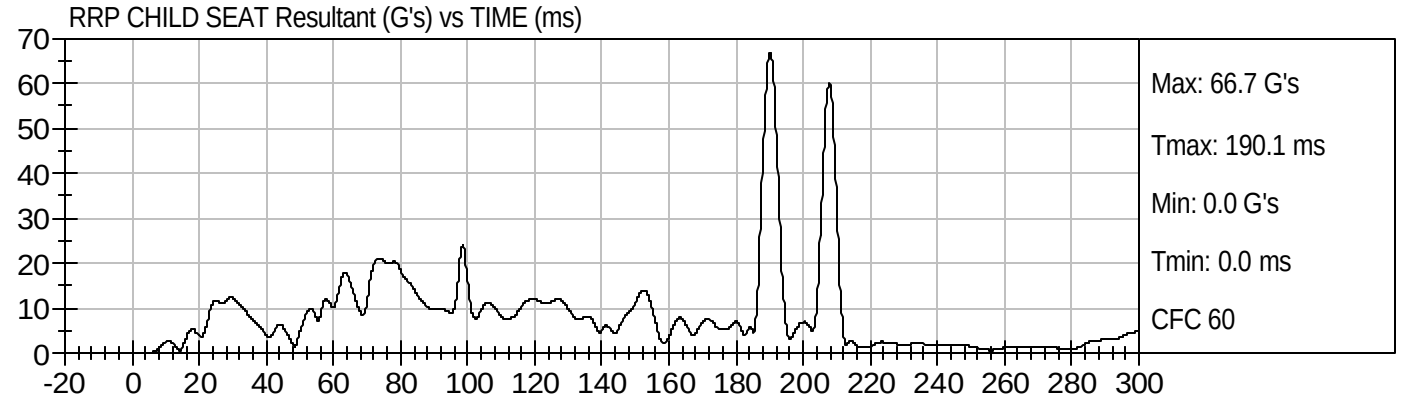
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



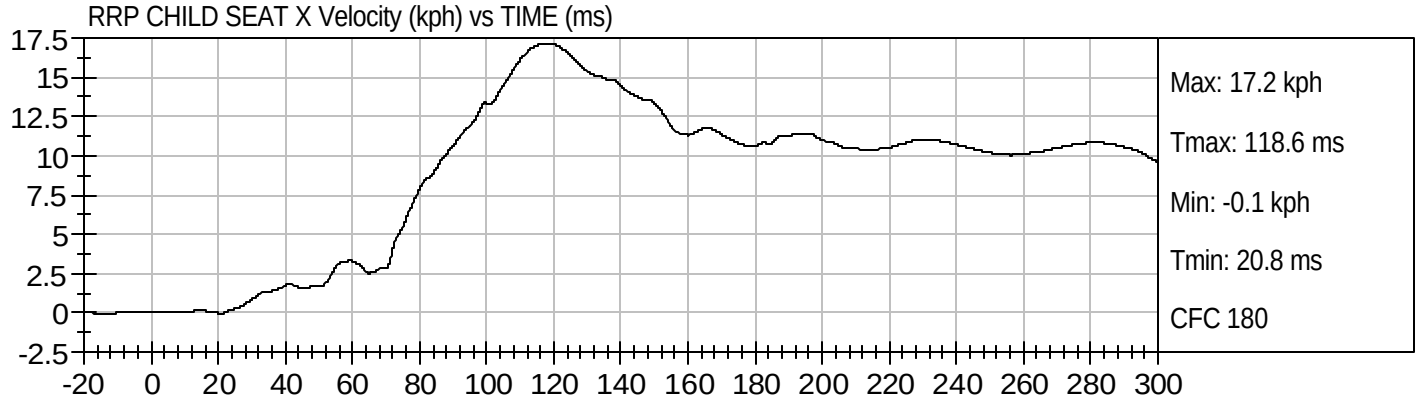


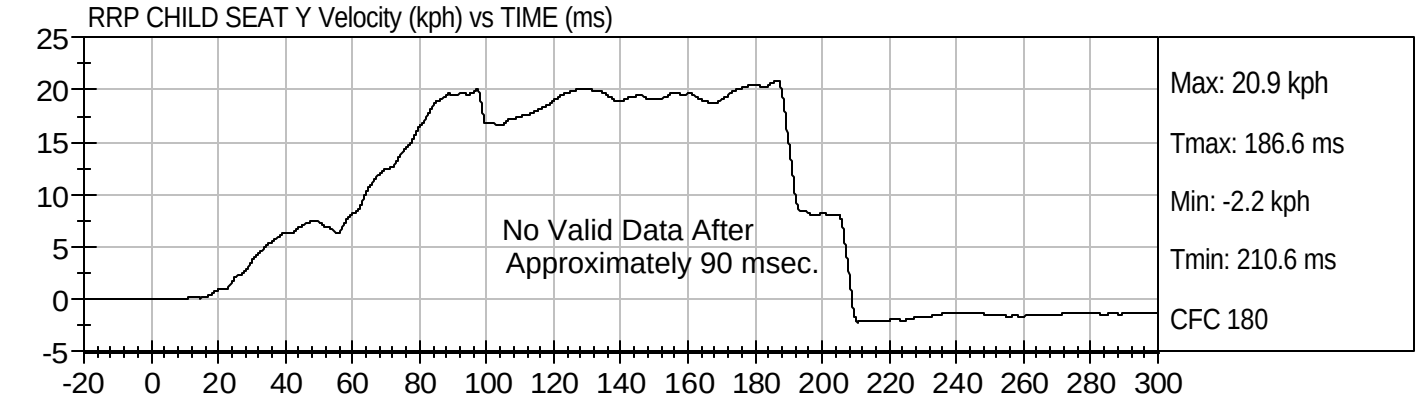


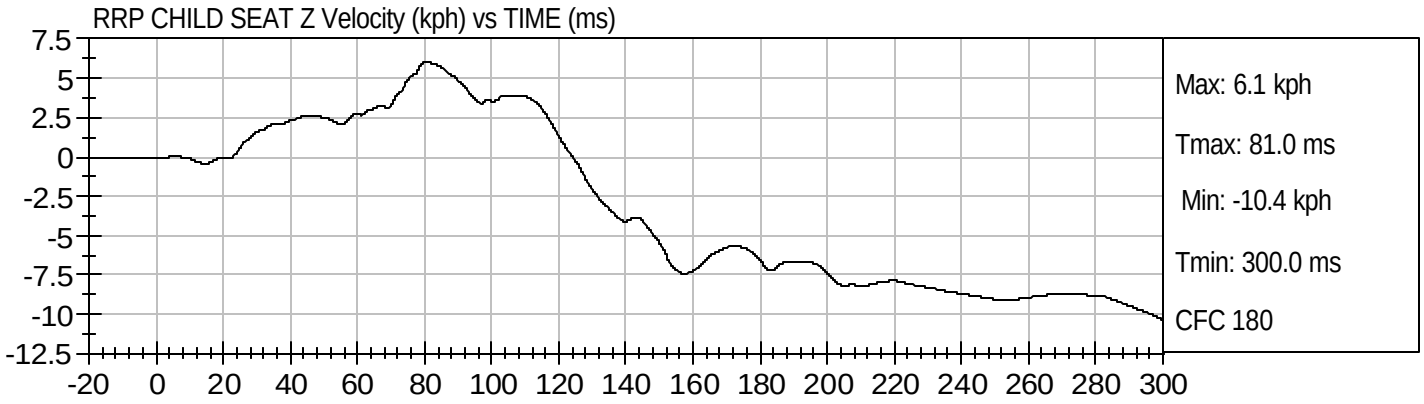


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



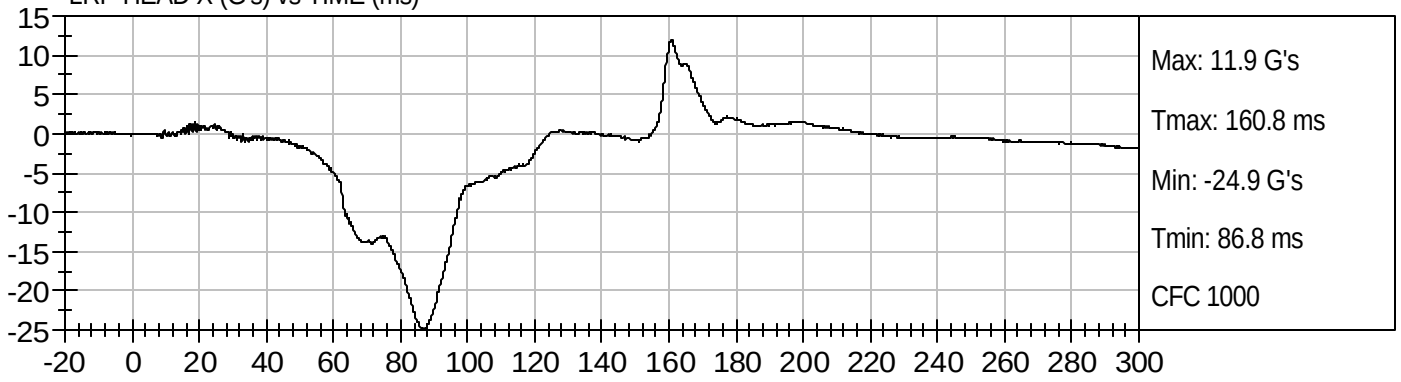




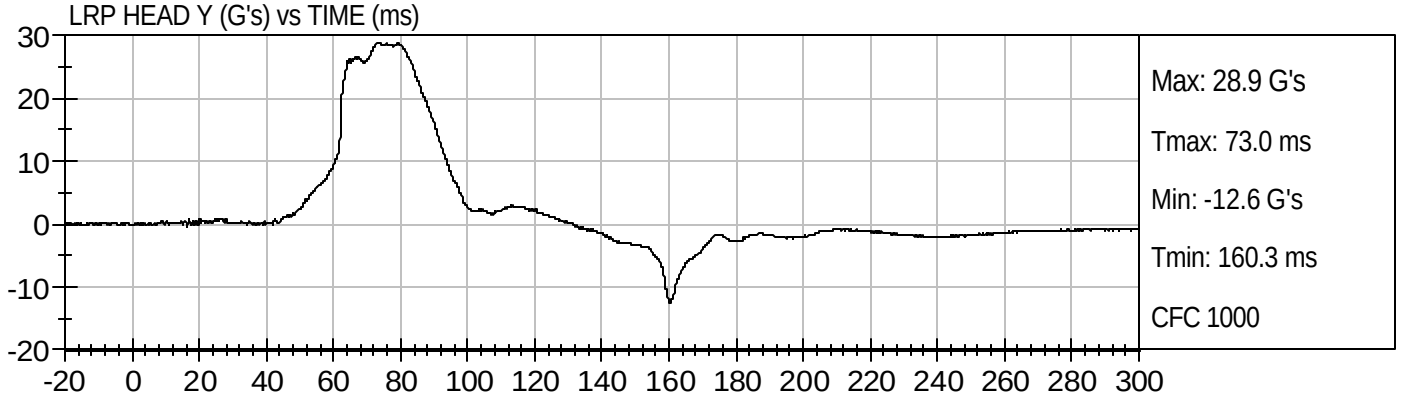
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

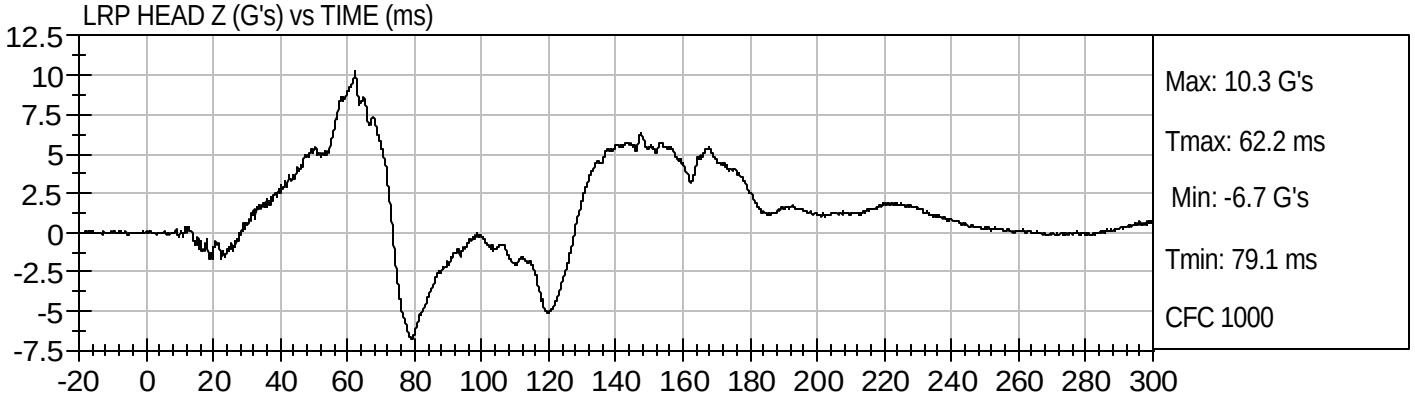
LRP HEAD X (G's) vs TIME (ms)



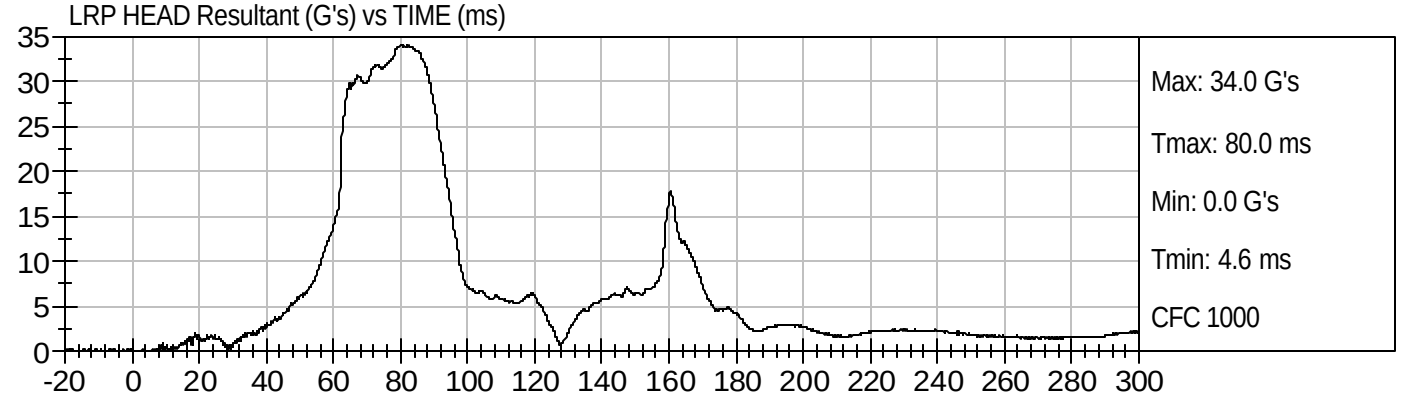
LRP HEAD Y (G's) vs TIME (ms)



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

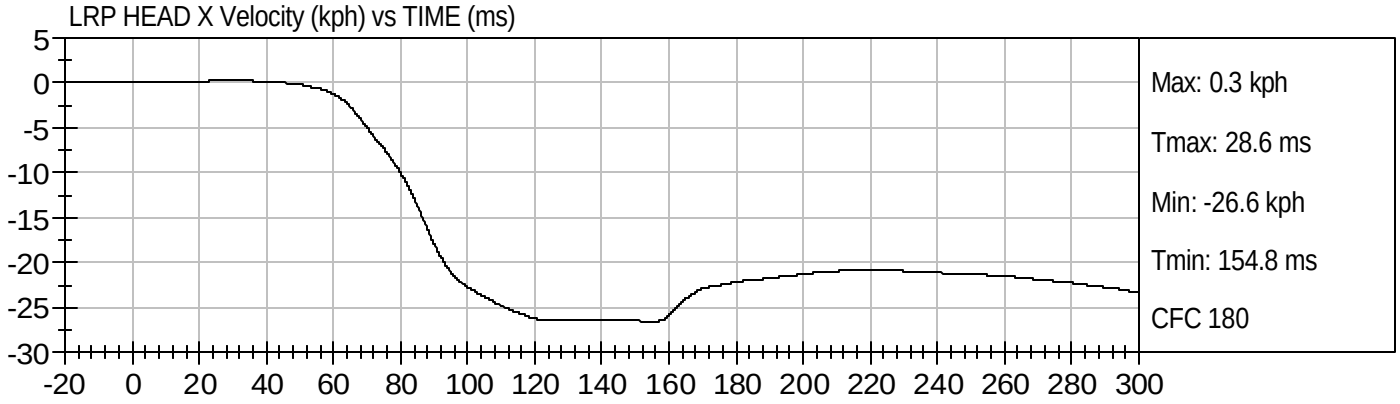


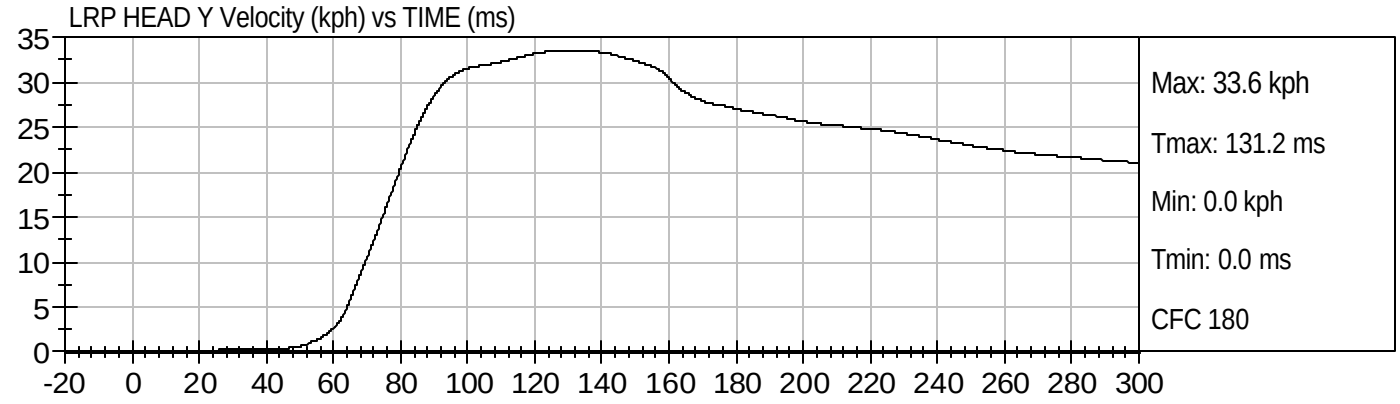
LRP HEAD Resultant (G's) vs TIME (ms)

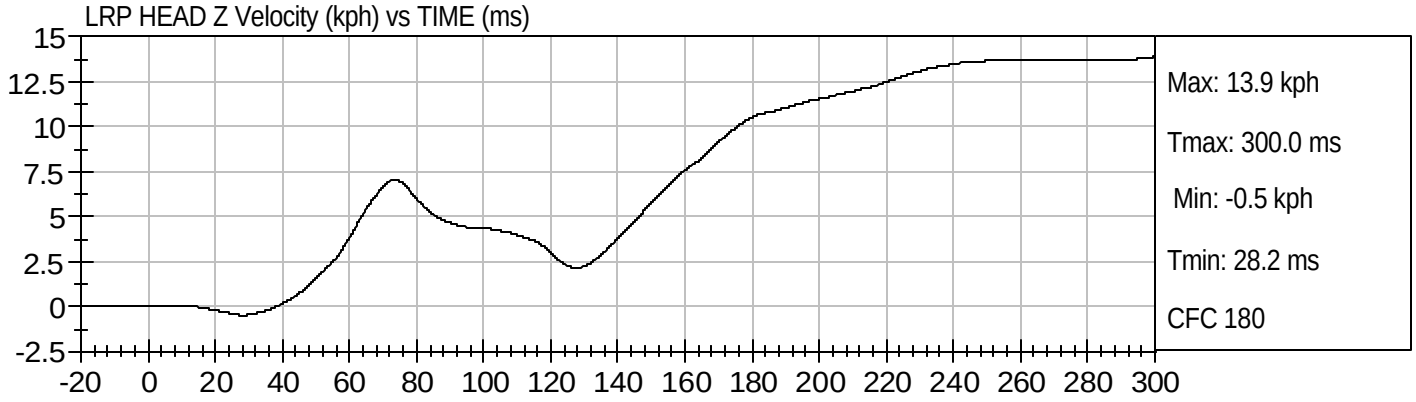


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

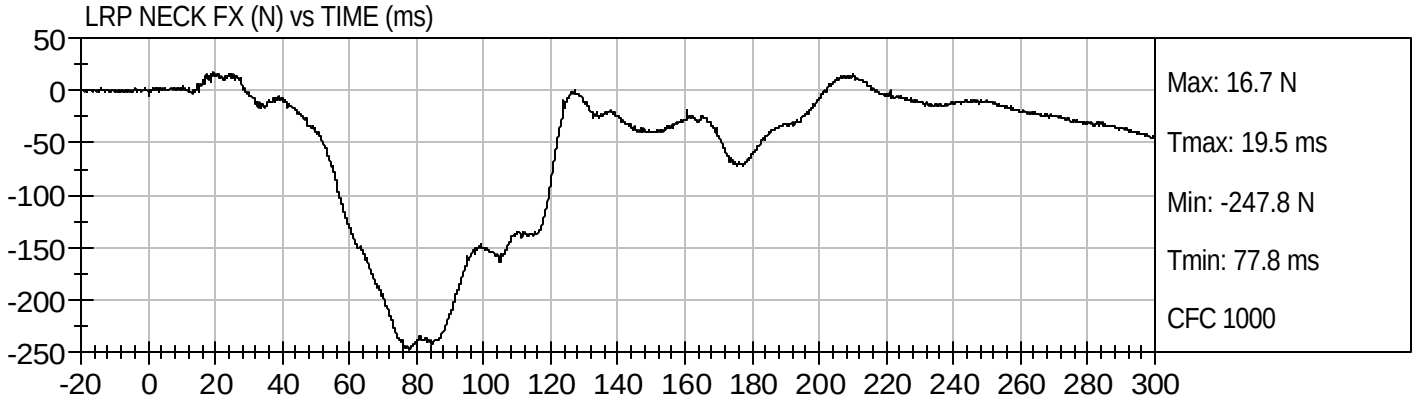


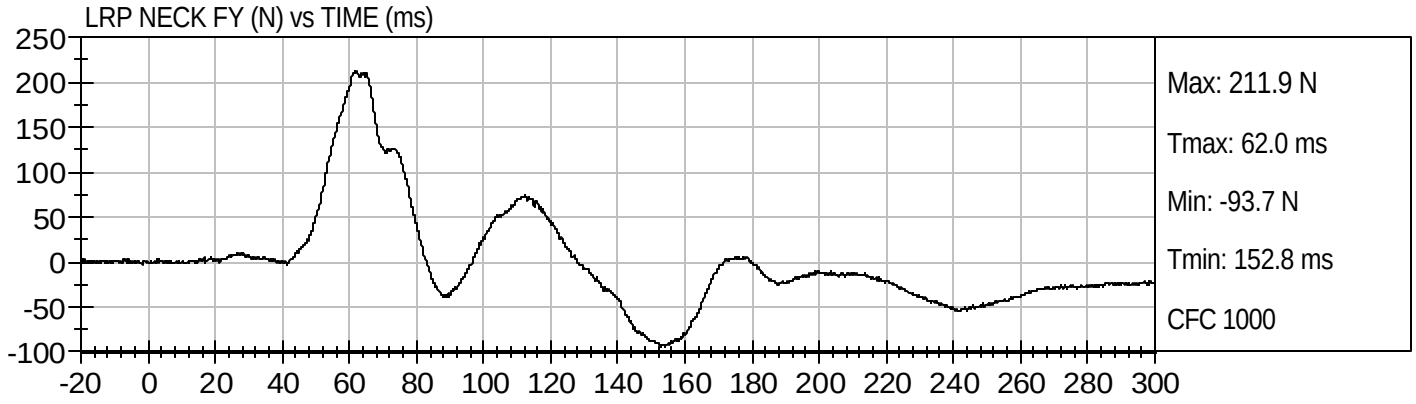


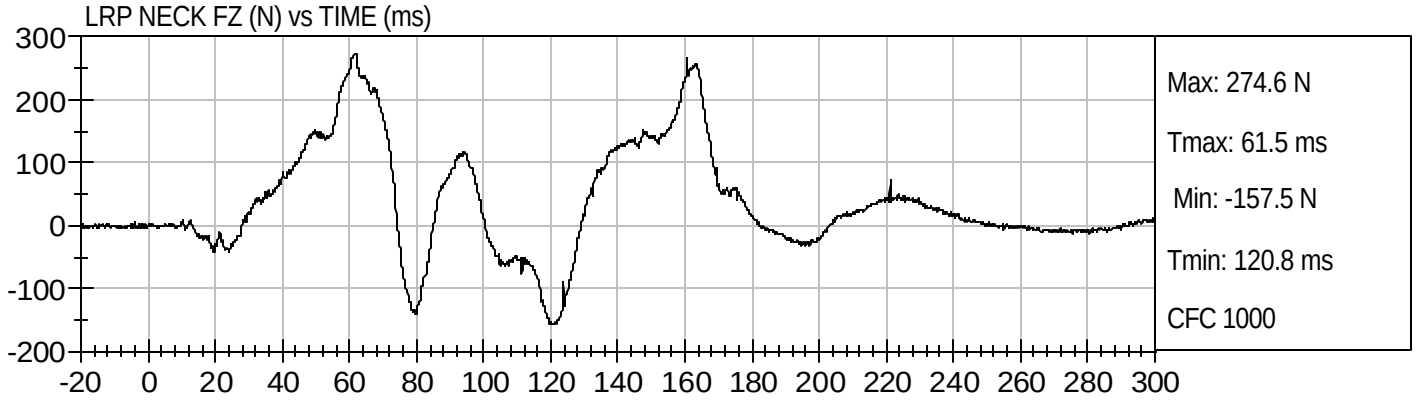


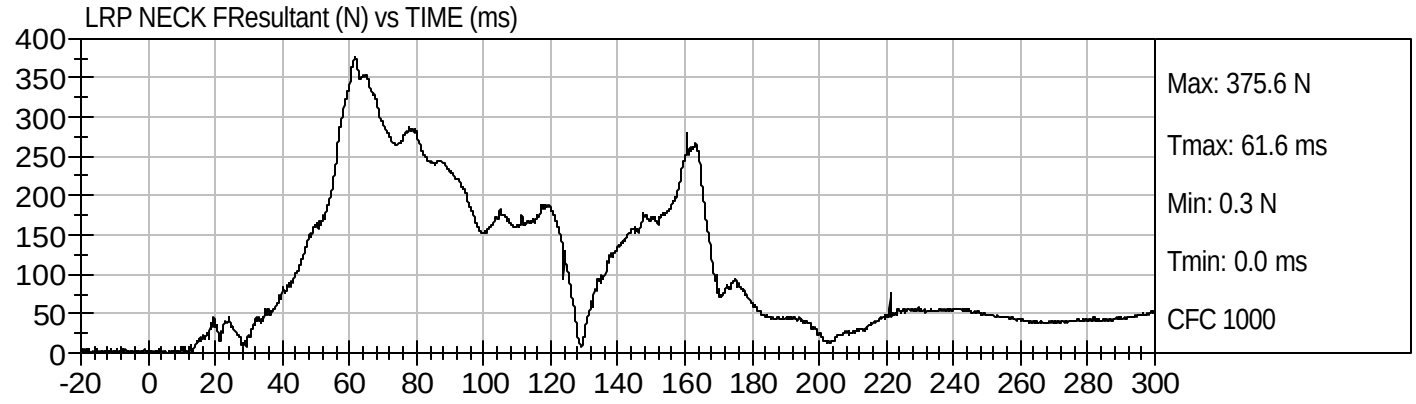
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



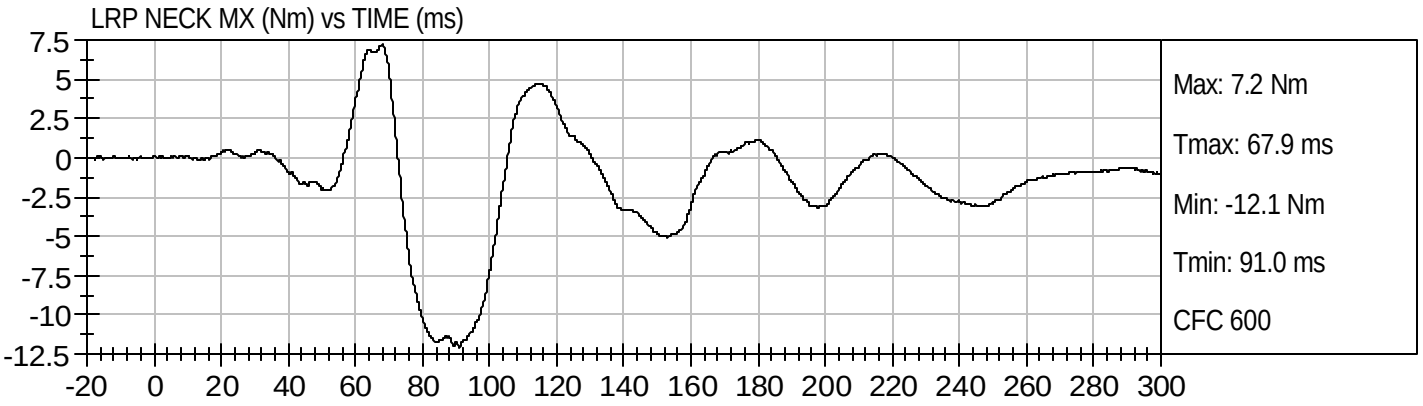


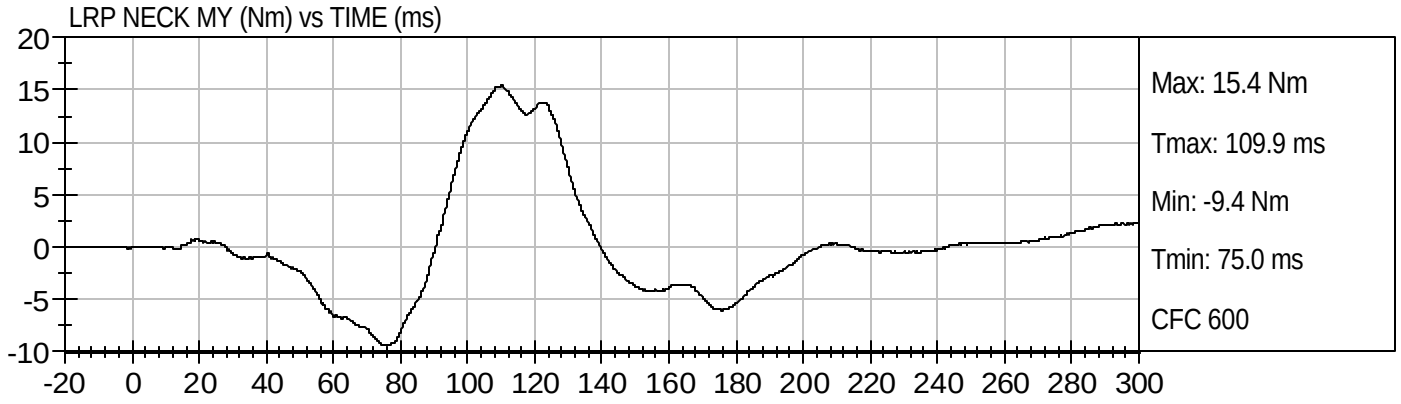


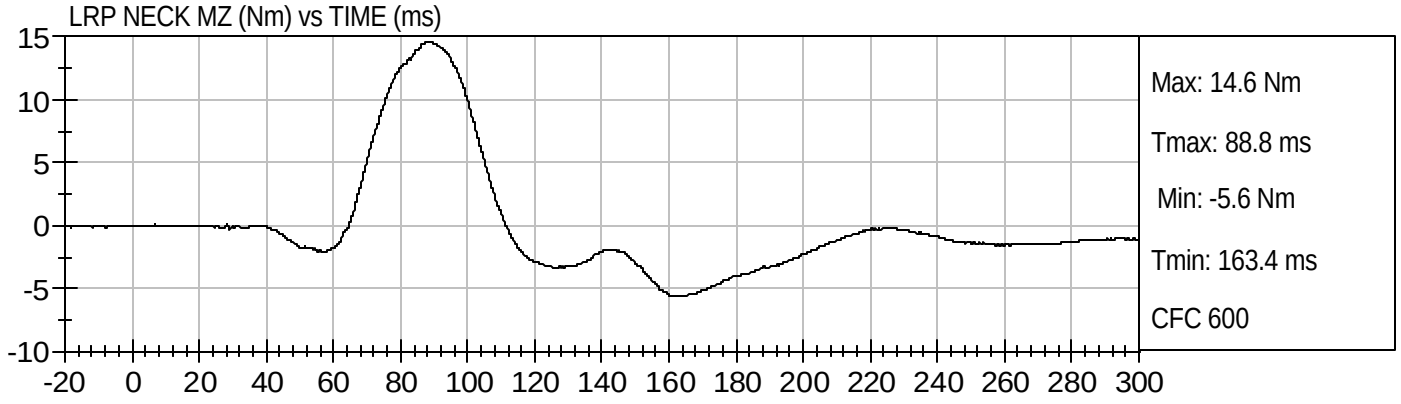


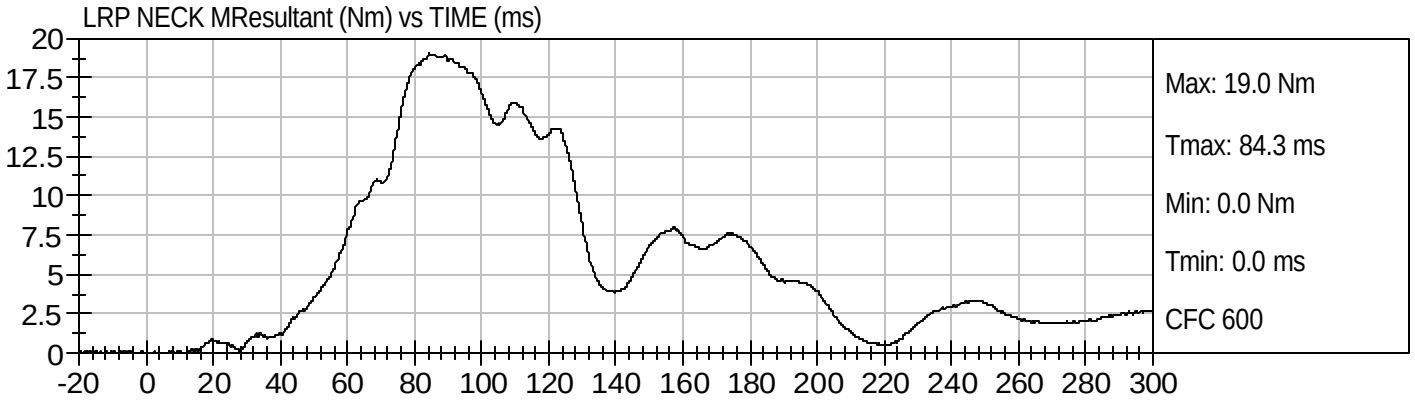
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)





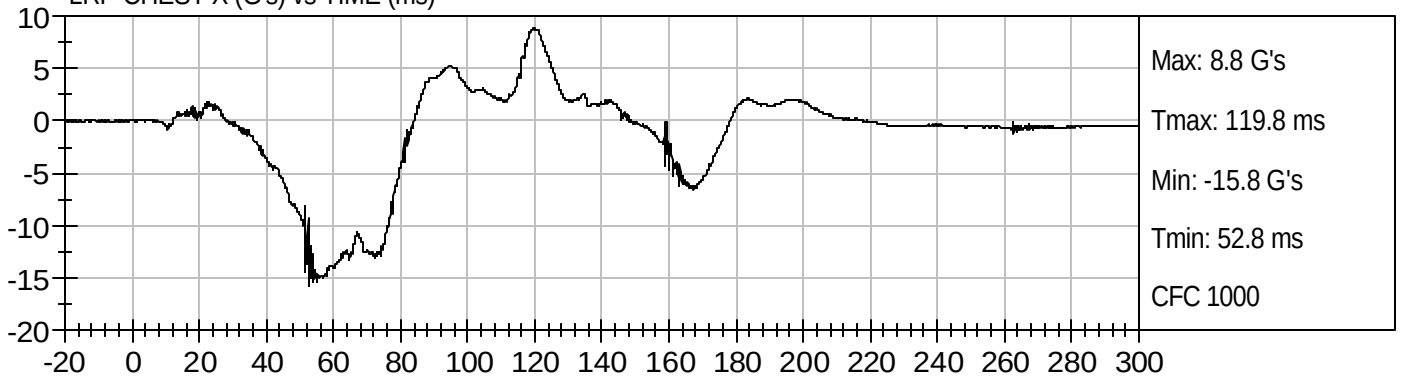




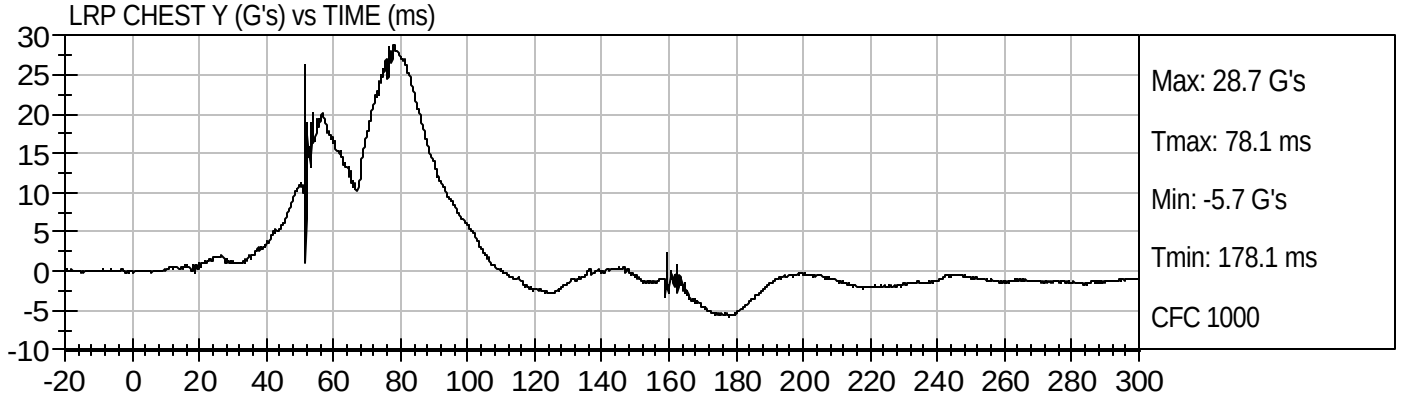
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

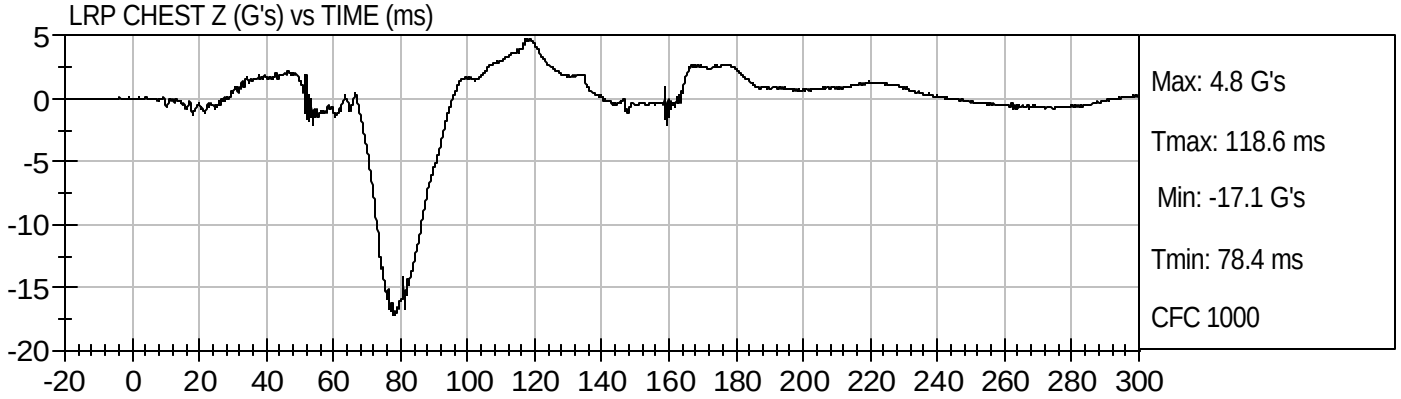
LRP CHEST X (G's) vs TIME (ms)



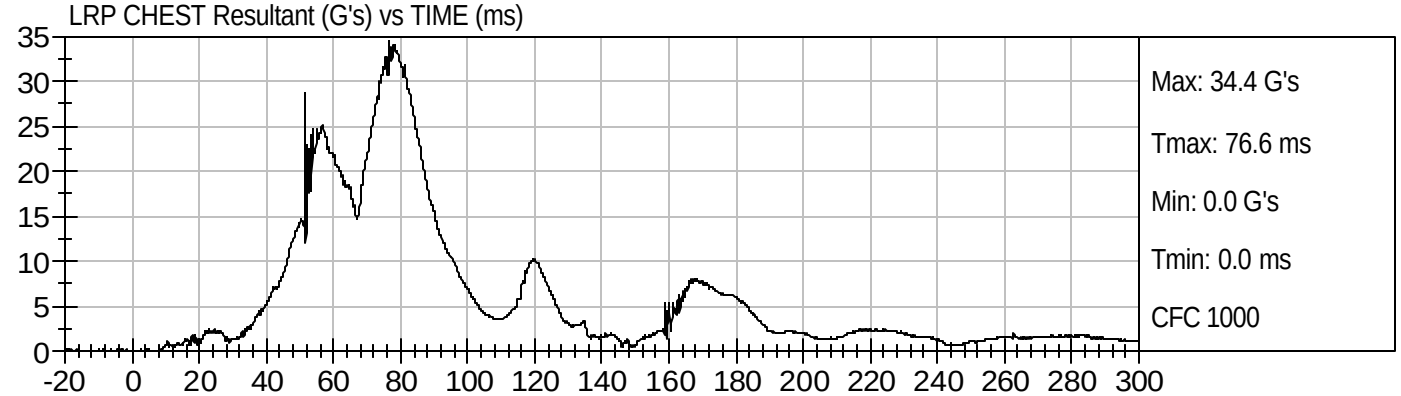
LRP CHEST Y (G's) vs TIME (ms)



LRP CHEST Z (G's) vs TIME (ms)

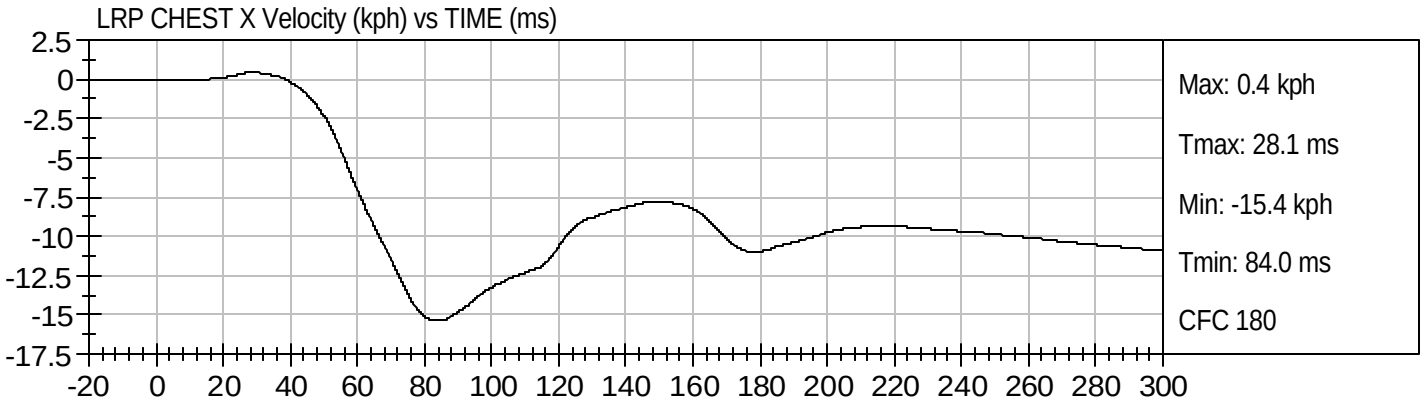


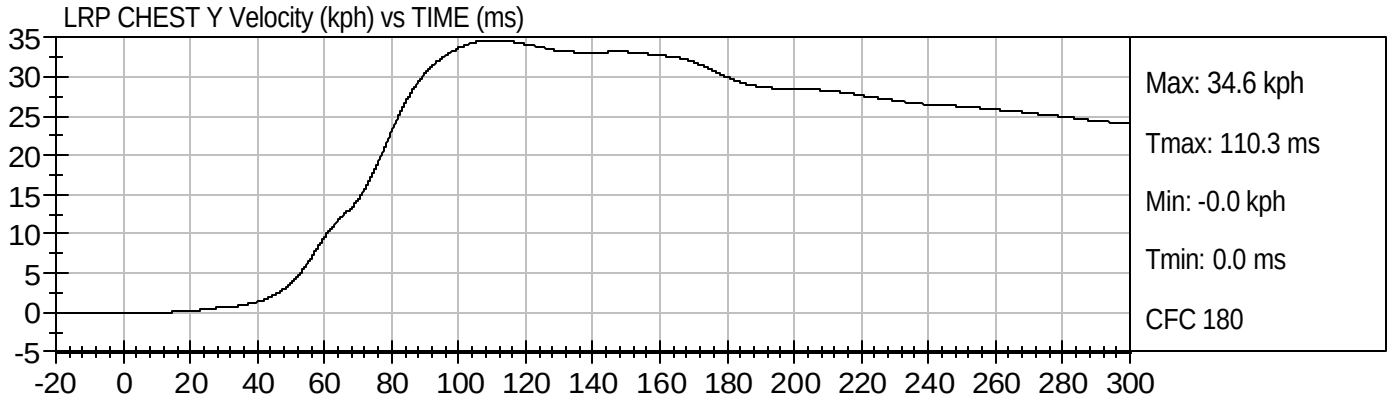
LRP CHEST Resultant (G's) vs TIME (ms)

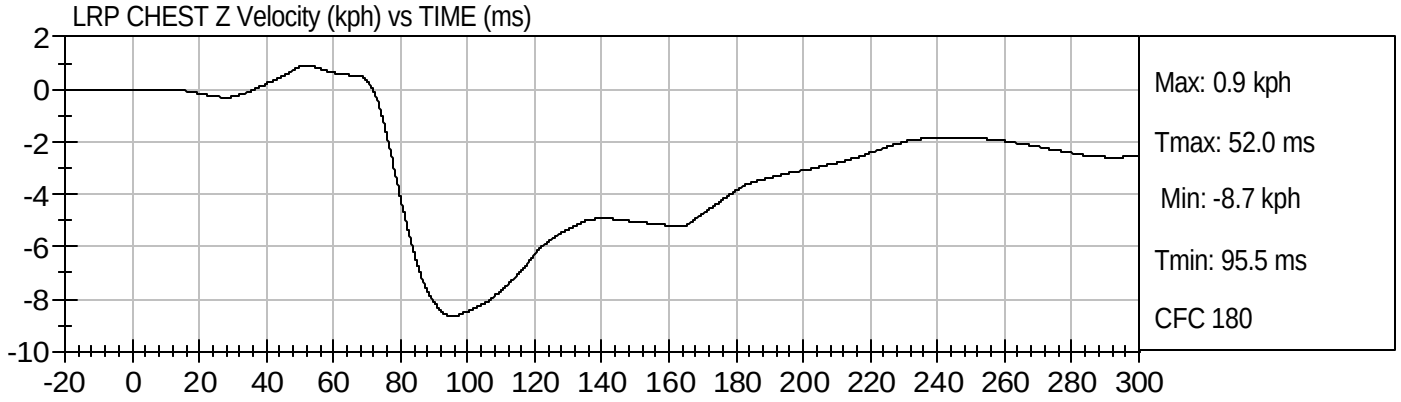


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

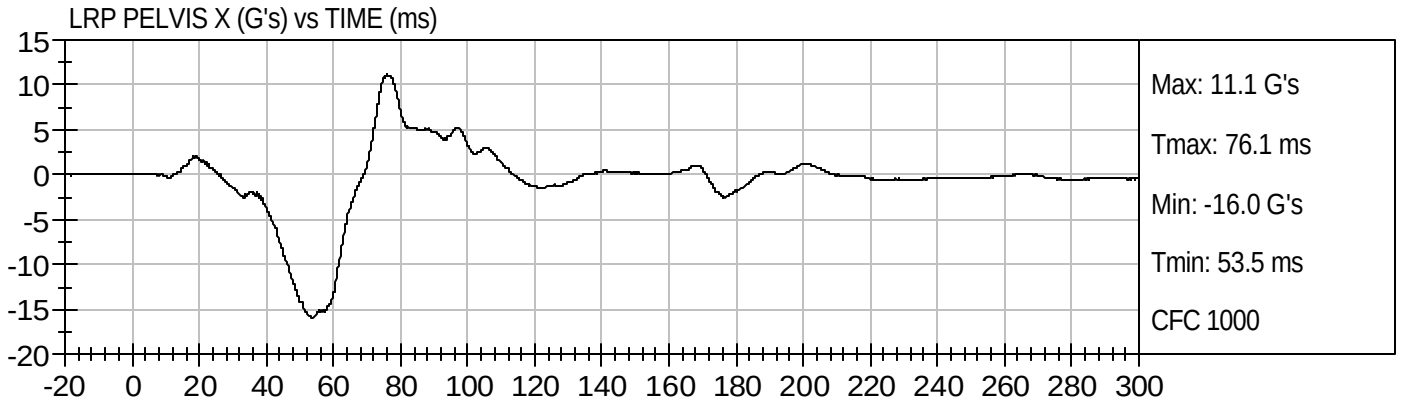


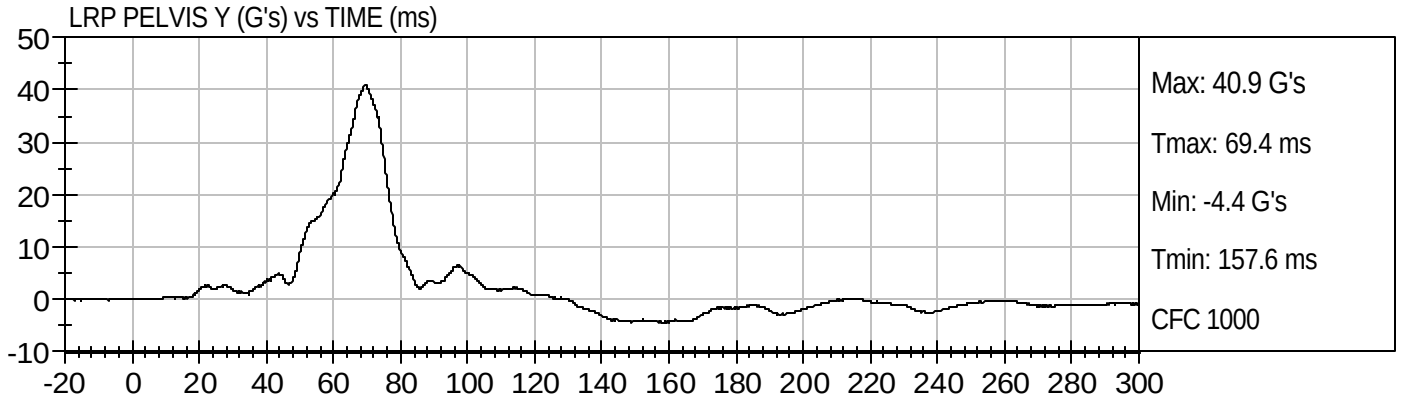


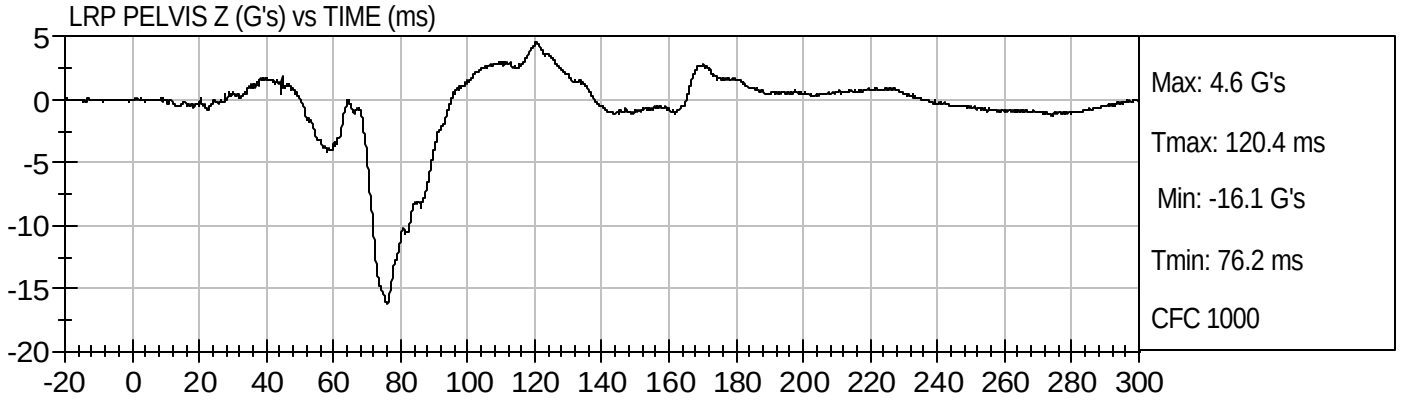


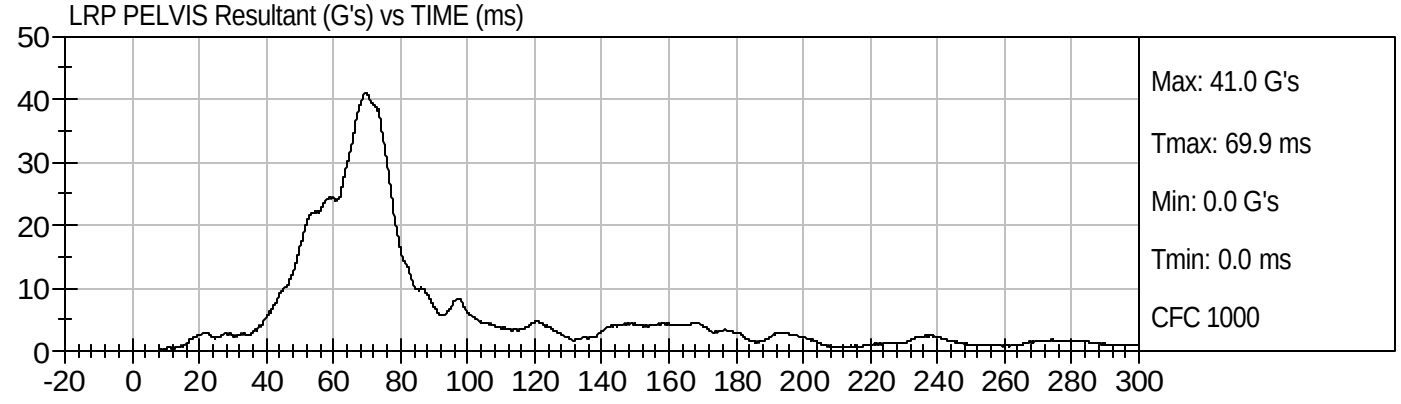
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



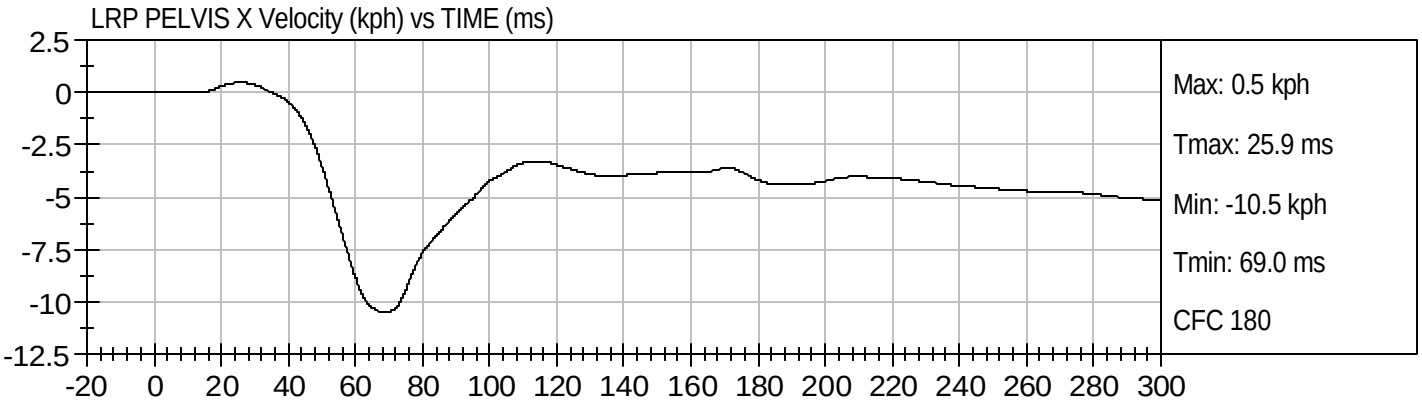


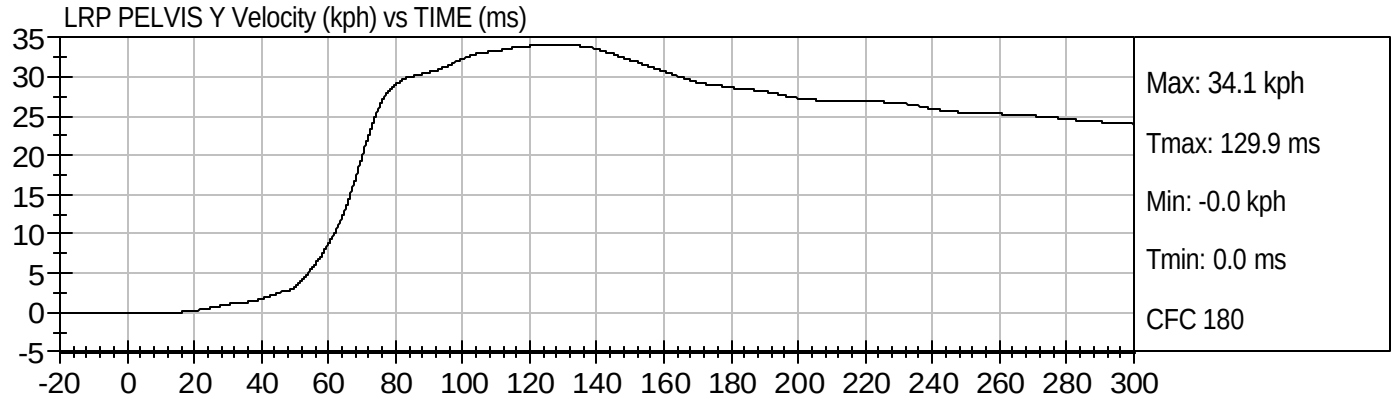


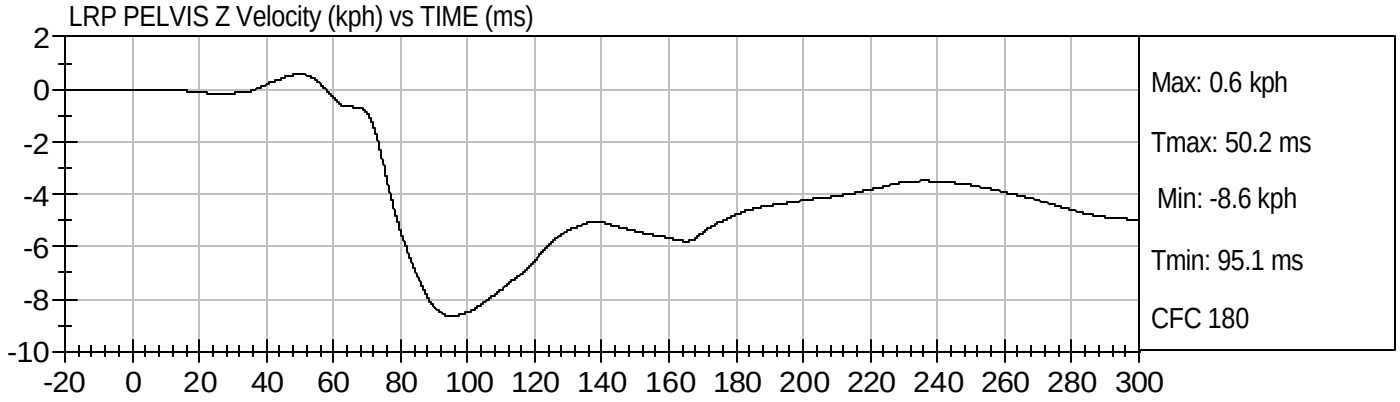


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)

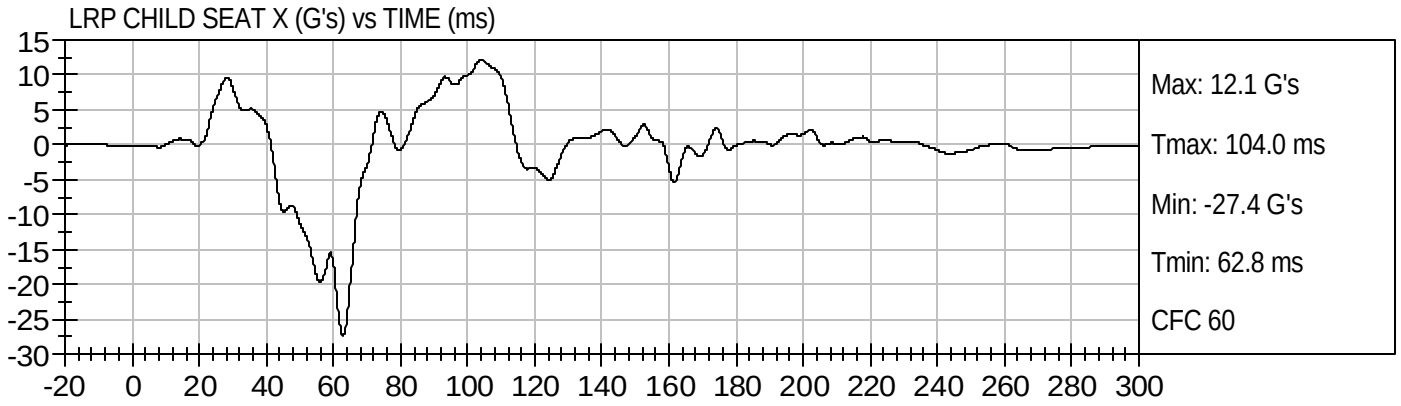


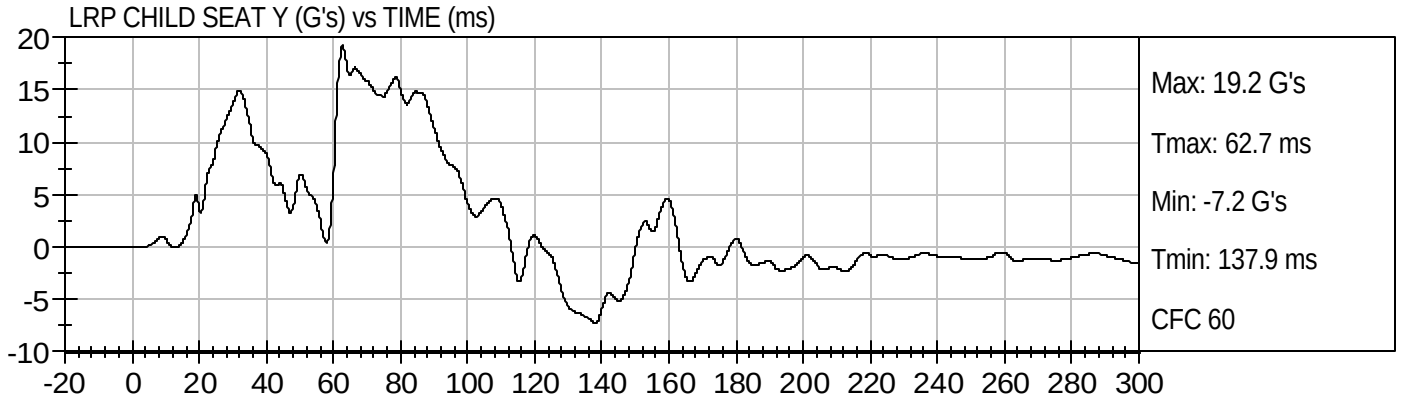


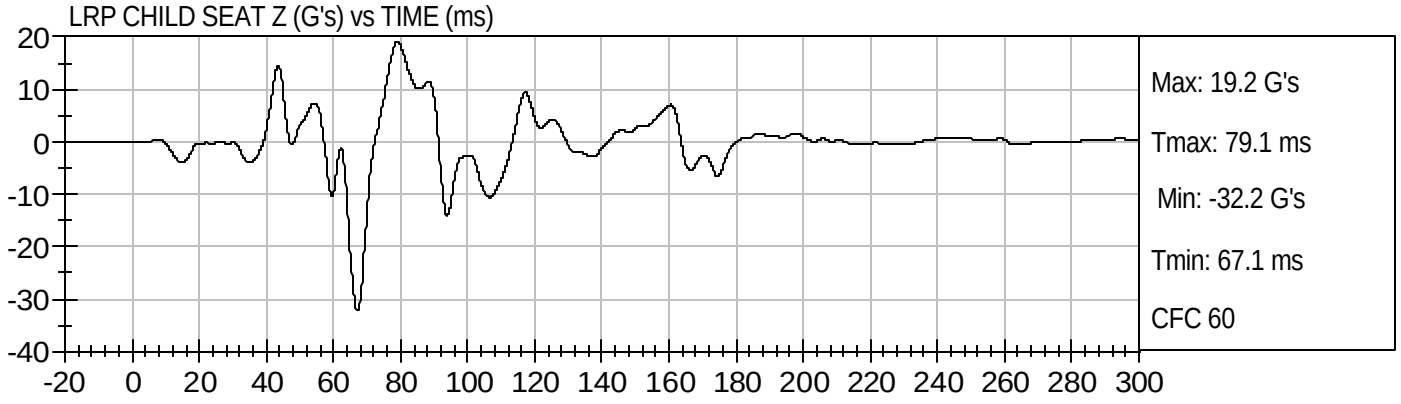


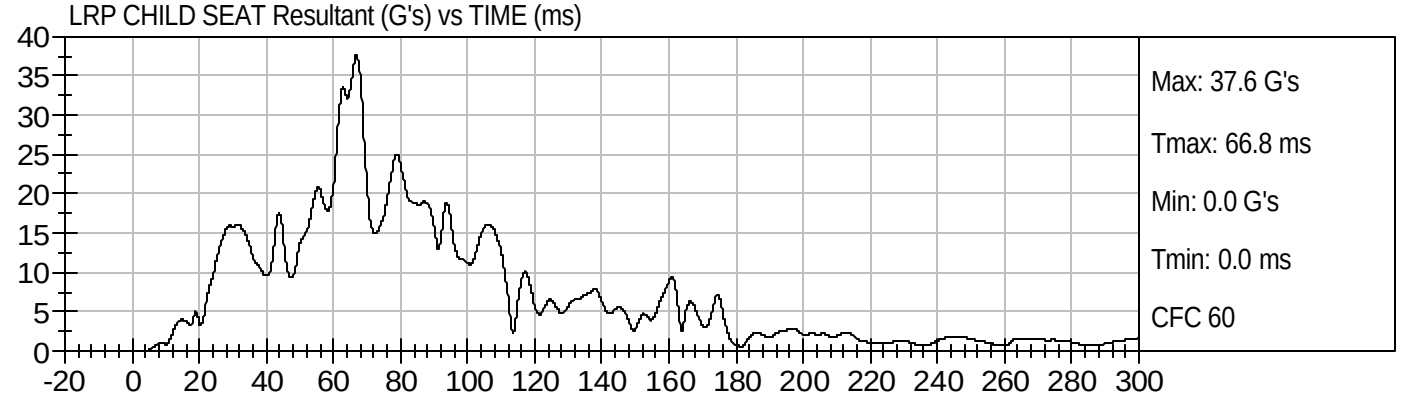
NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)



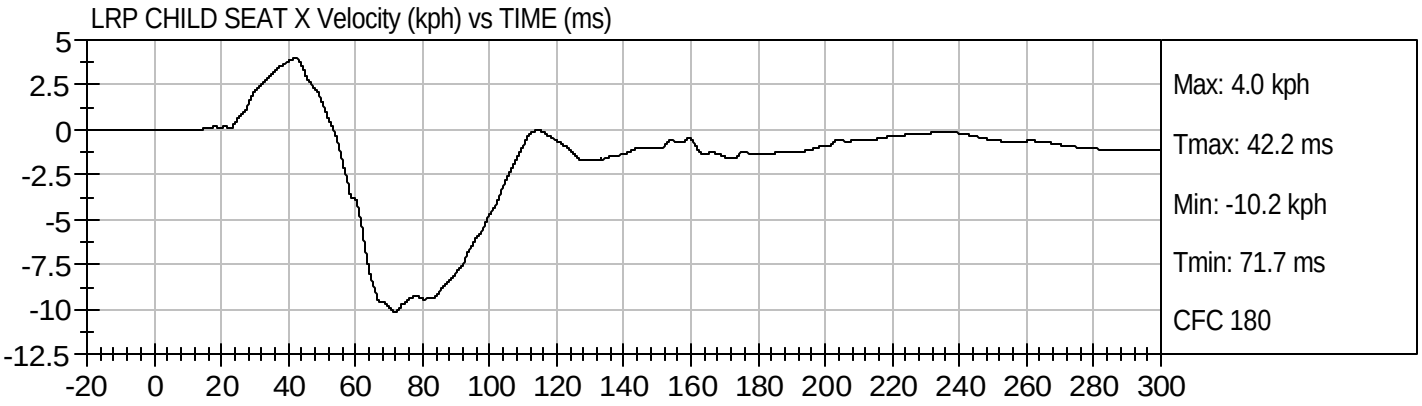


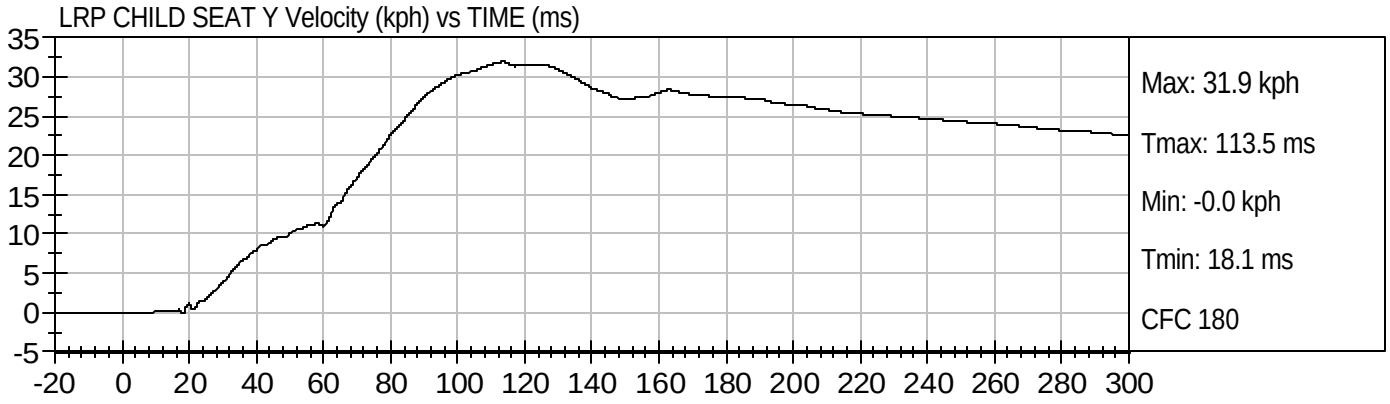


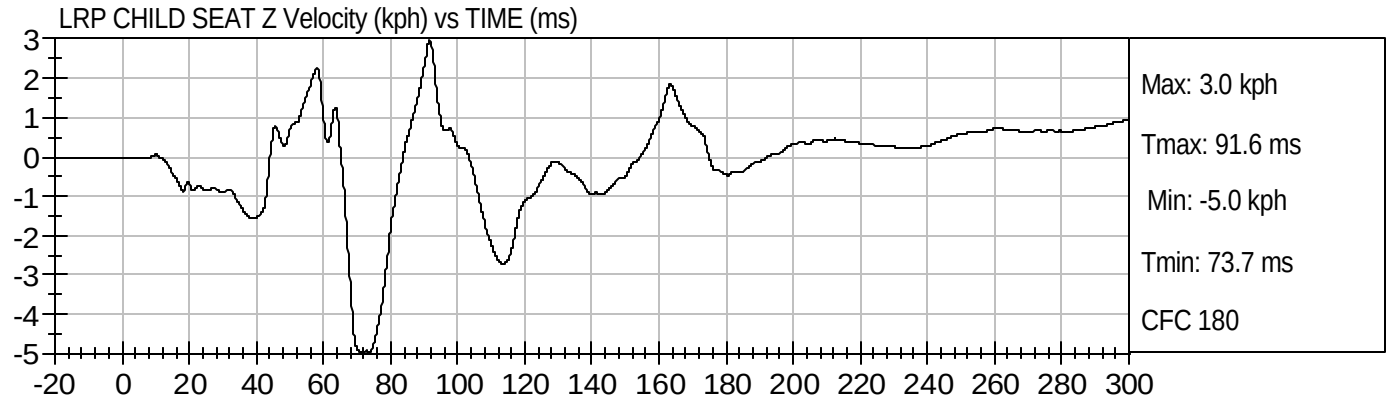


NCAP LEFT SIDE - RESEARCH
2008 DODGE GRAND CARAVAN

Test Date: 12/21/2007
Speed: 38.7 mph (62.3 km/h)







CHILD DUMMY CALIBRATION INFORMATION

MGA RESEARCH CORPORATION

FRONT HEAD DROP TEST

CRABI 12 MONTH

ATD Serial No: 090 **Test ID:** D073551

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Peak Resultant Acceleration	G's	100 to 120	112	Pass
Peak Lateral Acceleration	G's	+/- 15	5	Pass
Unimodal	N/A	within 17% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

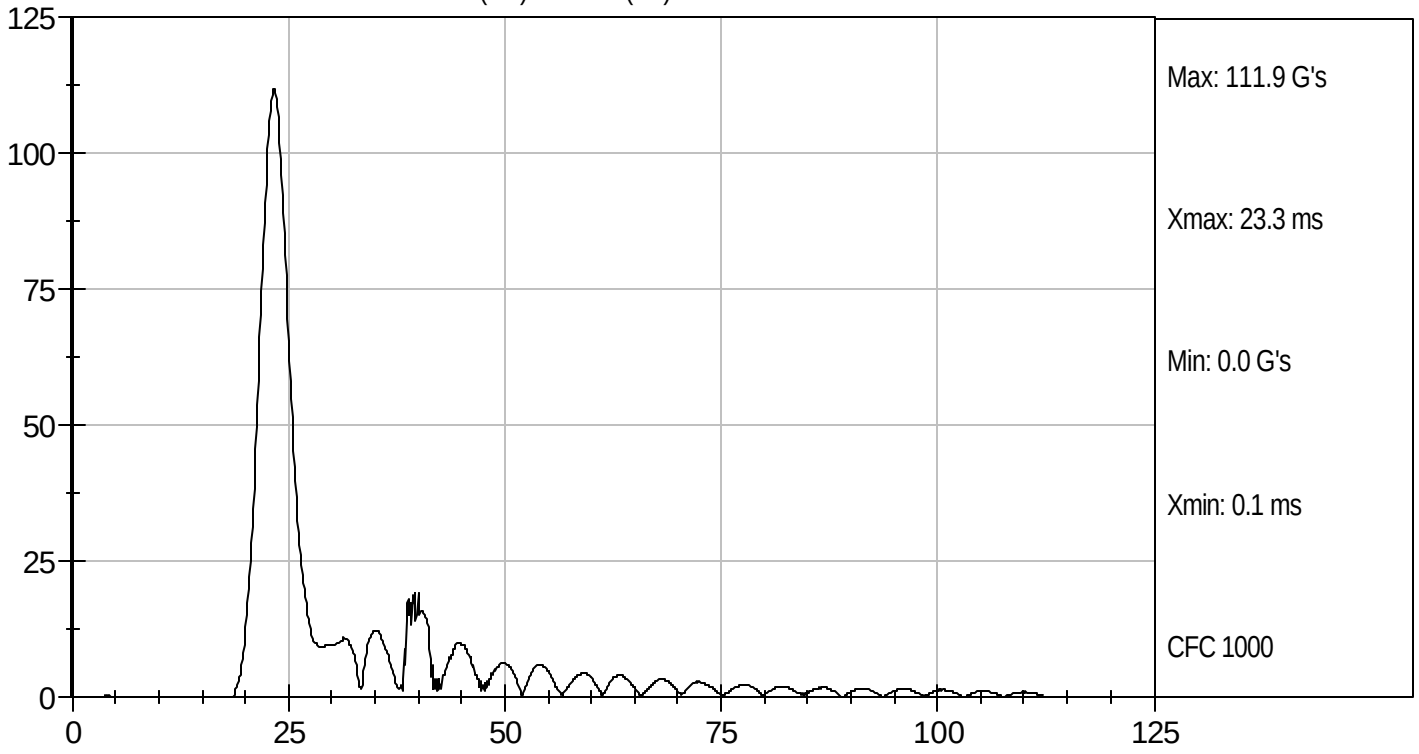
12/12/07
Test Date

David Winkelbauer
Approved By

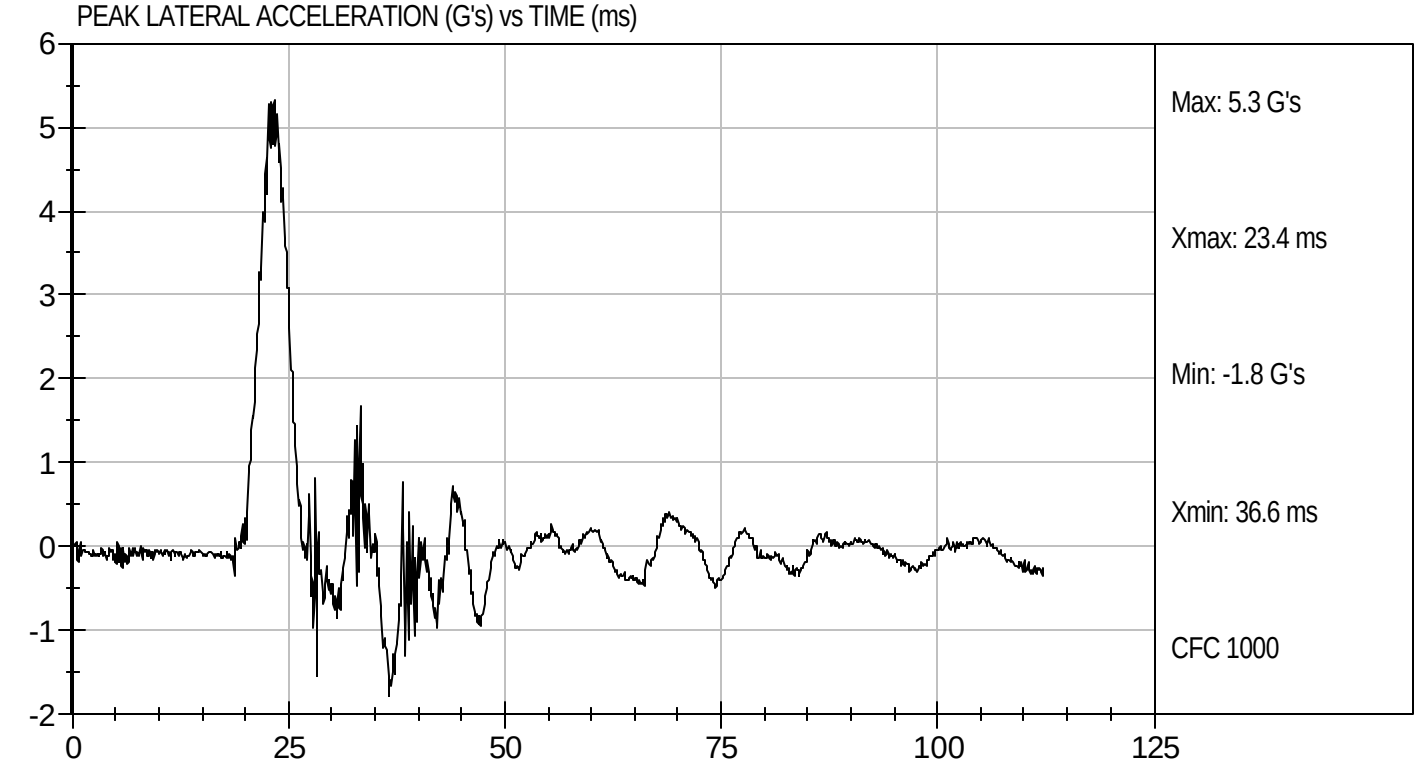
Test Desc: Head Drop
Component ID: D073551

Test Date: 12/12/07
Velocity: 0 ft/s, 0 m/s

PEAK RESULTANT ACCELERATION (G's) vs TIME (ms)



PEAK LATERAL ACCELERATION (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

CRABI 12 MONTH

ATD Serial No: 090 **Test I.D:** D073552

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	20.9	Pass
Humidity		%	10 to 70	27	Pass
Impact Velocity		m/s	5.1 to 5.3	5.2	Pass
Pendulum Deceleration	10 msec	m/s	1.6 to 2.3	1.9	Pass
	20 msec	m/s	3.4 to 4.2	3.6	Pass
	25 msec	m/s	4.3 to 5.2	4.4	Pass
D Plane Rotation		deg	75.0 to 86.0	80.4	Pass
Moment About Occipital Condyle		Nm	36.0 to 45.0	37.3	Pass
Positive Moment - Time Curve Decay to 5 Nm		msec	60 to 80	75	Pass
			Overall Test Results		Pass

Laboratory Technician

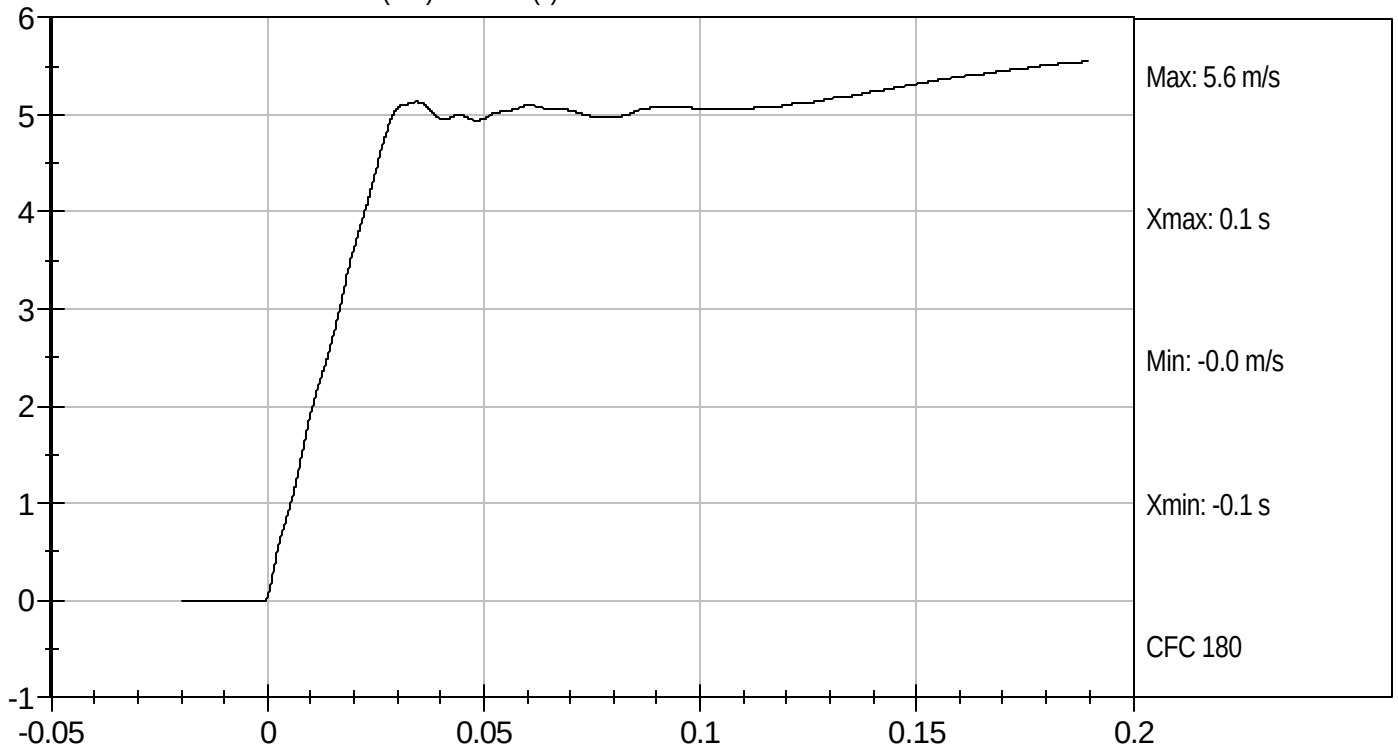
12/12/07
Test Date

Approved By

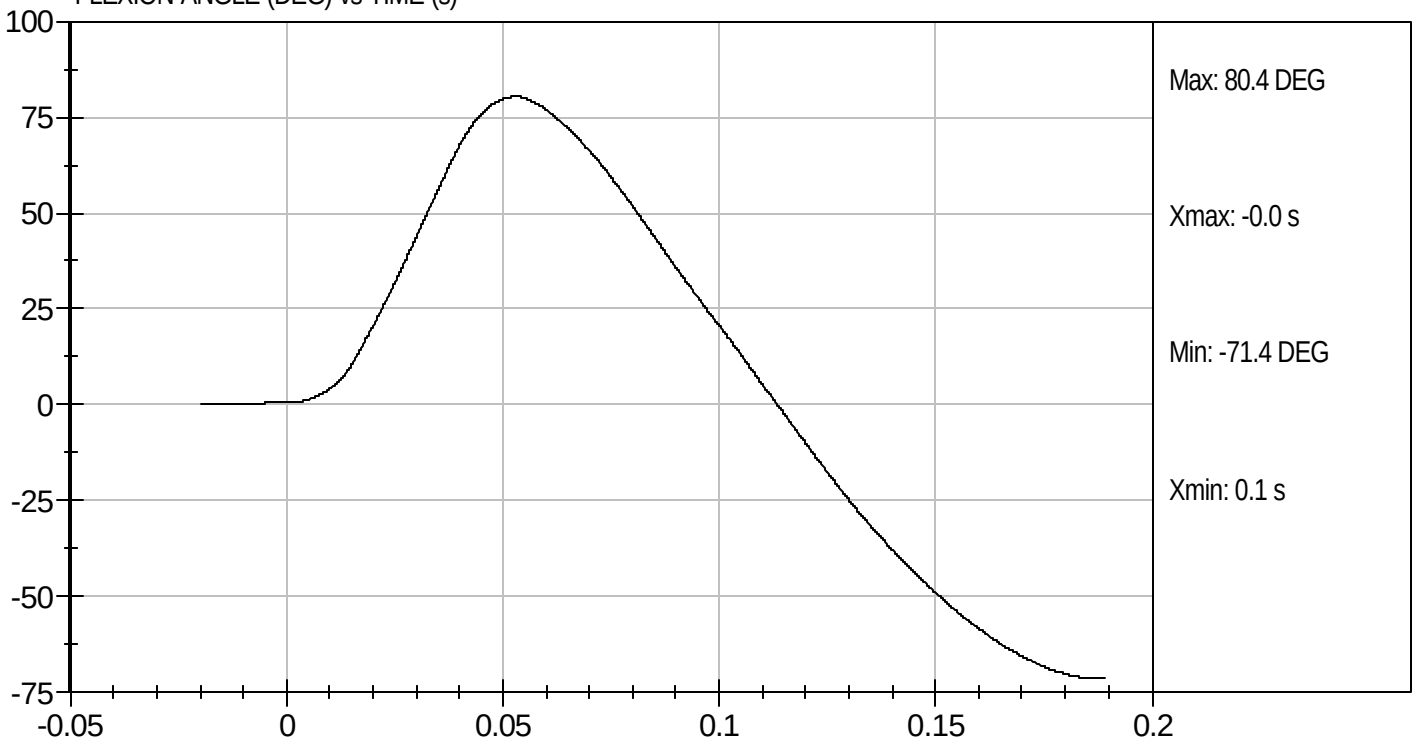
Test Desc: Neck Flexion
Component ID: D073552

Test Date: 12/12/07
Velocity: 17.00 ft/s, 5.2 m/s

PENDULUM DECELERATION (m/s) vs TIME (s)

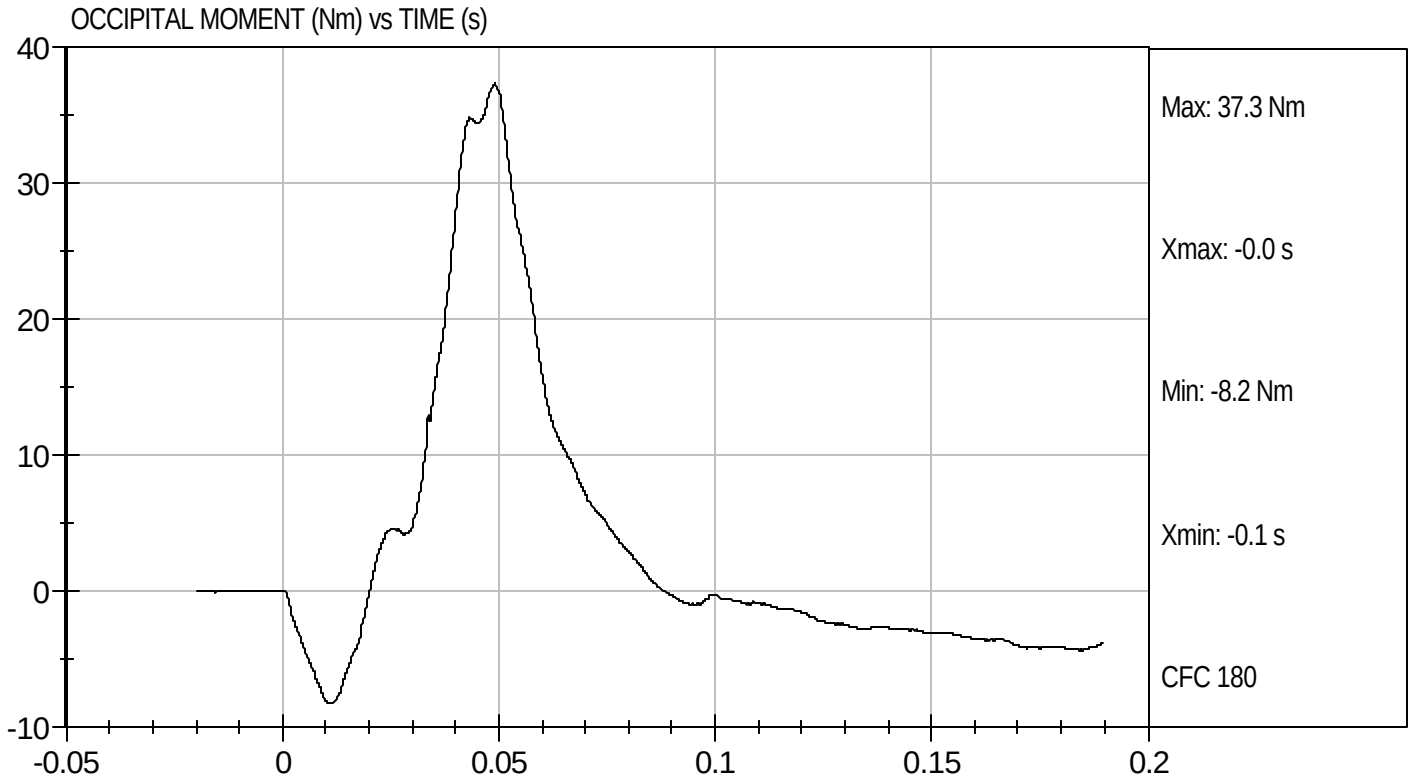


FLEXION ANGLE (DEG) vs TIME (s)



Test Desc: Neck Flexion
Component ID: D073552

Test Date: 12/12/07
Velocity: 17.00 ft/s, 5.2 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

CRABI 12 MONTH

ATD Serial No: 090 **Test I.D:** D073553

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.2	Pass
Humidity		%	10 to 70	25	Pass
Pendulum Speed		m/s	2.4 to 2.6	2.6	Pass
Pendulum Deceleration	6 msec	m/s	0.8 to 1.2	0.9	Pass
	10 msec	m/s	1.5 to 2.1	1.9	Pass
	14 msec	m/s	2.2 to 2.9	2.6	Pass
D Plane Rotation		deg	80.0 to 92.0	81.7	Pass
Moment About Occipital Condyle		Nm	-23.0 to -12.0	-13.2	Pass
Negative Moment - Time Curve Decay to -5 Nm		msec	76 to 90	86	Pass
			Overall Test Results		Pass

Laboratory Technician

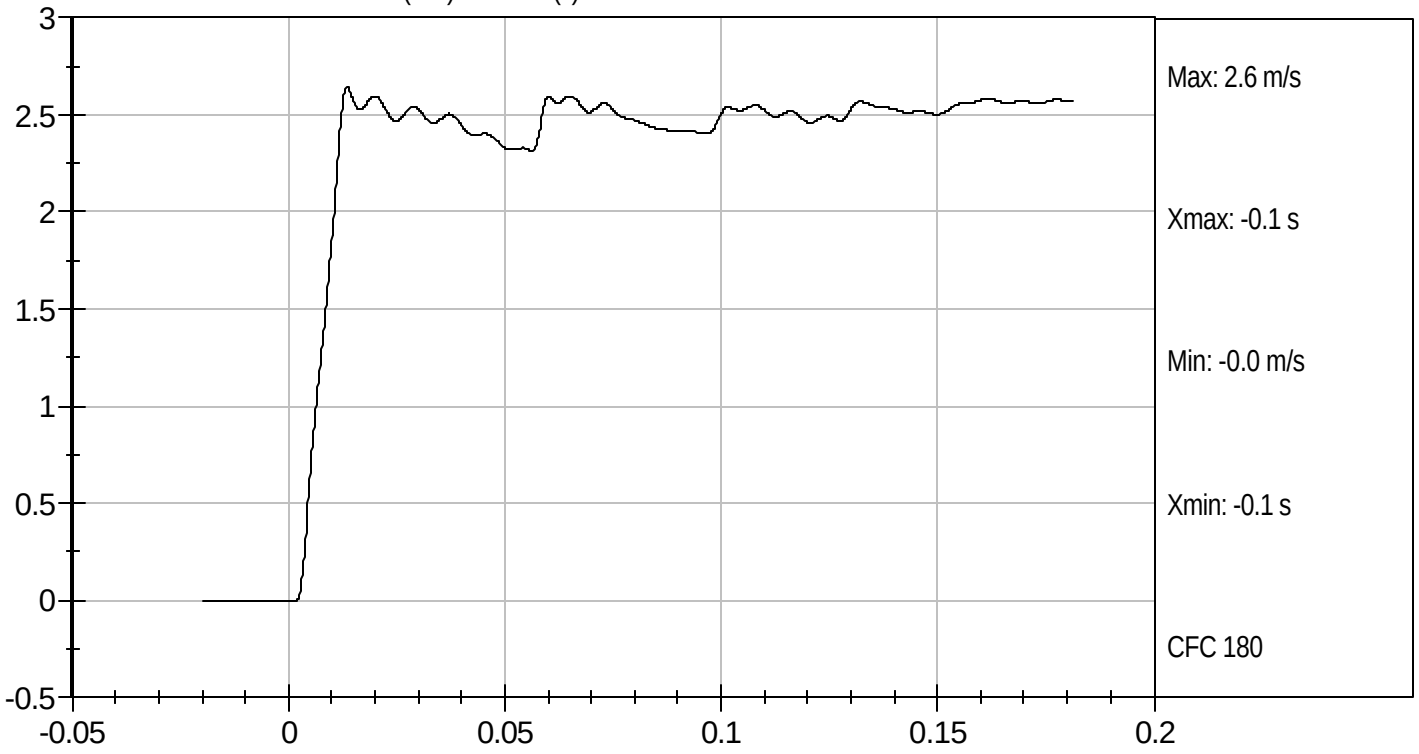
12/12/07
Test Date

David Winkelbauer
Approved By

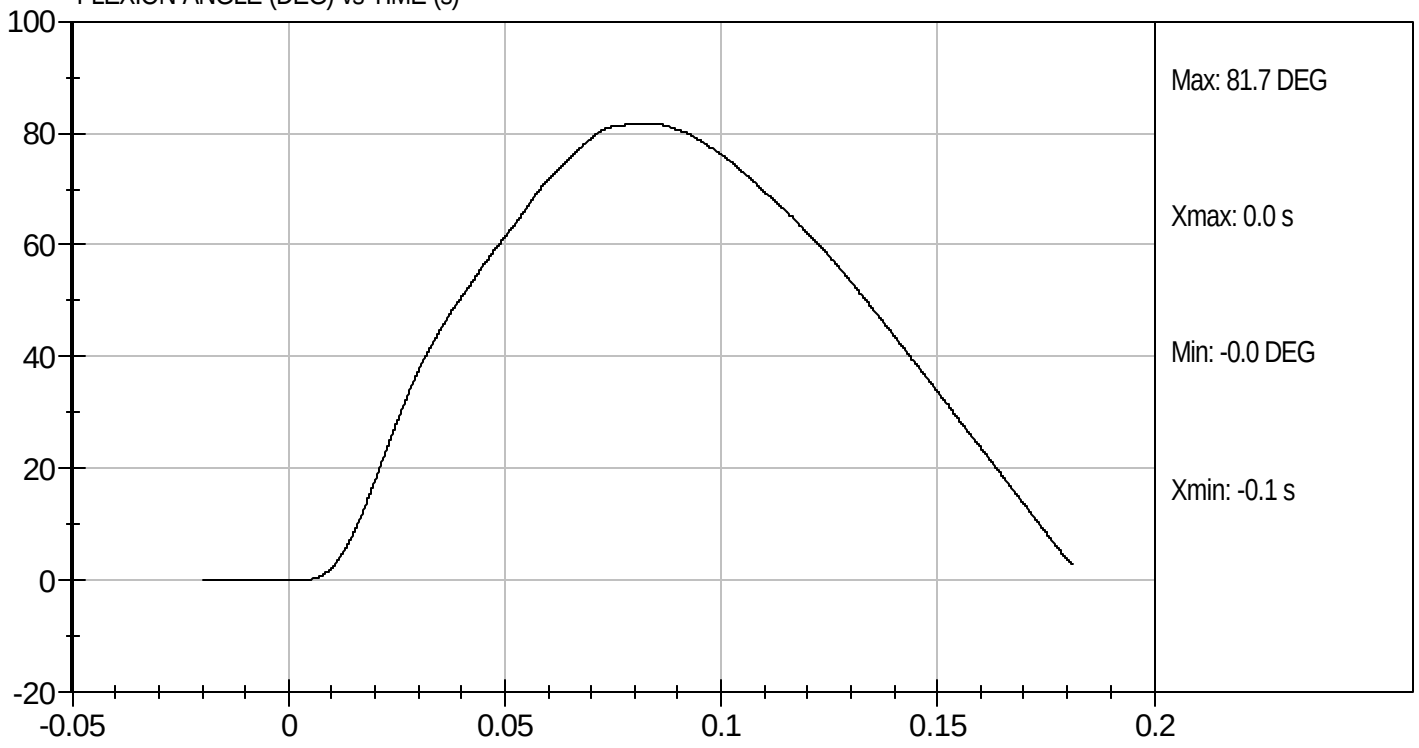
Test Desc: Neck Extension
Component ID: D073553

Test Date: 12/12/07
Velocity: 8.41 ft/s, 2.6 m/s

PENDULUM DECELERATION (m/s) vs TIME (s)

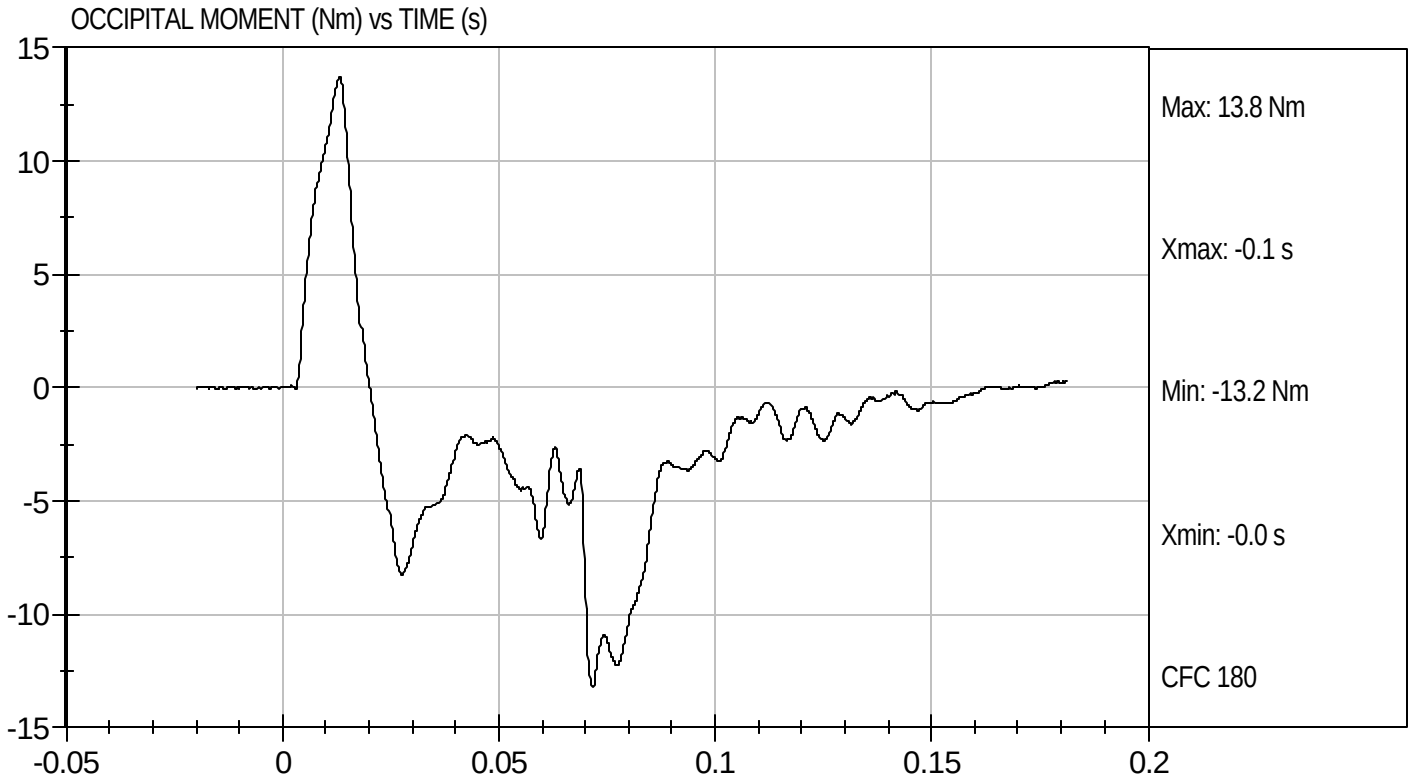


FLEXION ANGLE (DEG) vs TIME (s)



Test Desc: Neck Extension
Component ID: D073553

Test Date: 12/12/07
Velocity: 8.41 ft/s, 2.6 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

CRABI 12 MONTH

ATD Serial No: 090 **Test I.D:** D073554

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Probe Speed	m/sec	4.9 to 5.1	5.08	Pass
Probe Force	kN	1.51 to 1.80	1.59	Pass
		Overall Test Results		Pass

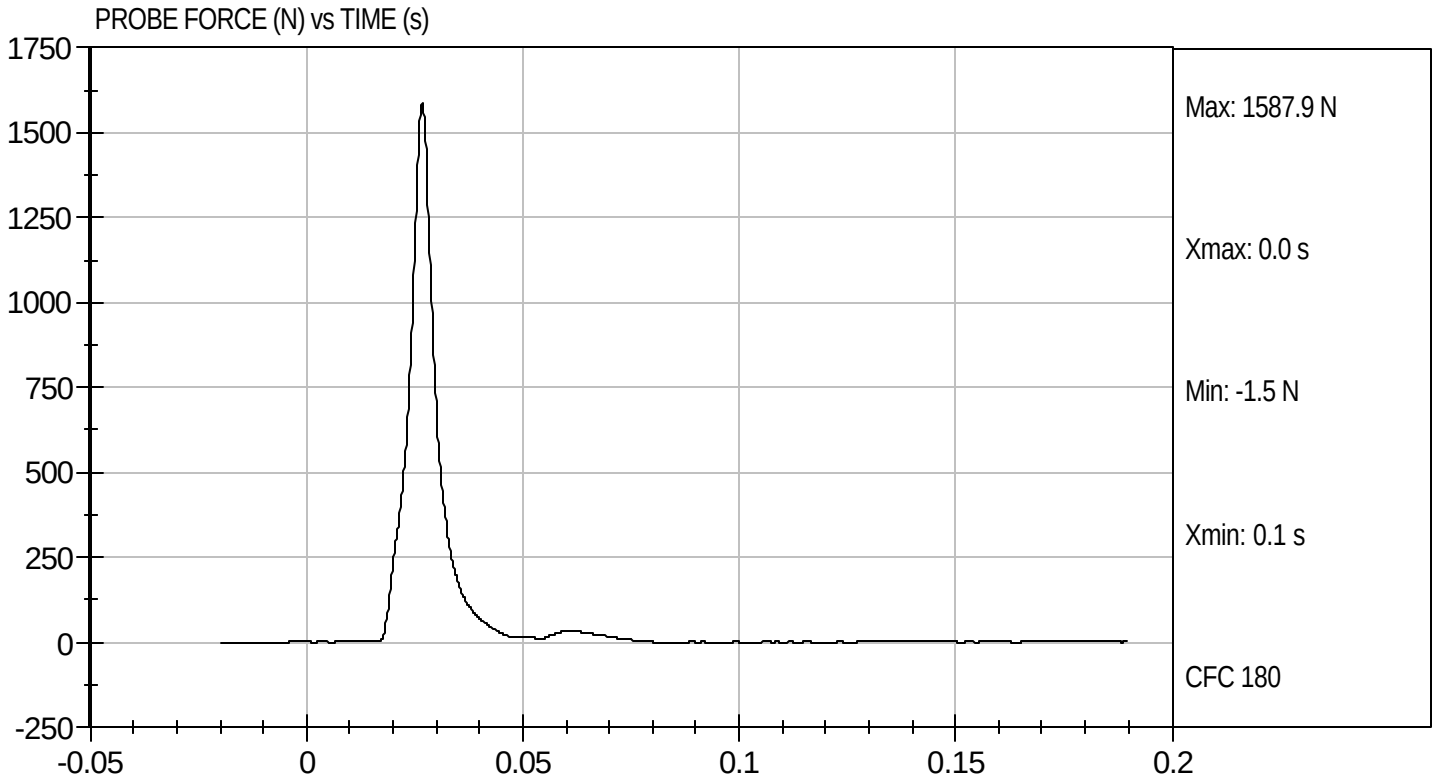
Jessica Gall
Laboratory Technician

12/12/07
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D073554

Test Date: 12/12/07
Velocity: 16.67 ft/s, 5.08 m/s



MGA RESEARCH CORPORATION

REAR HEAD DROP TEST

CRABI 12 MONTH

ATD Serial No: 090 **Test ID:** D073555

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Peak Resultant Acceleration	G's	55 to 71	66	Pass
Peak Lateral Acceleration	G's	+/- 15	-4	Pass
Unimodal	N/A	within 17% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

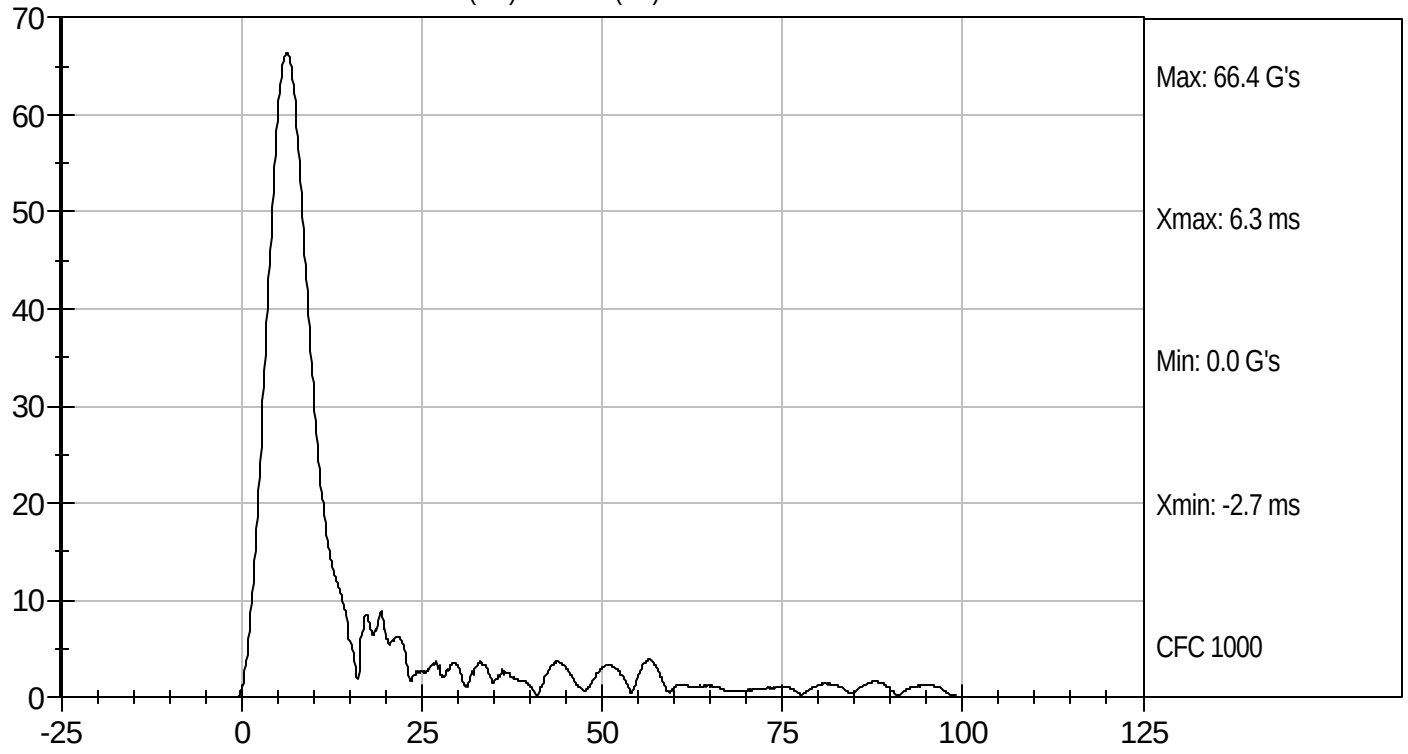
12/12/07
Test Date

David Winkelbauer
Approved By

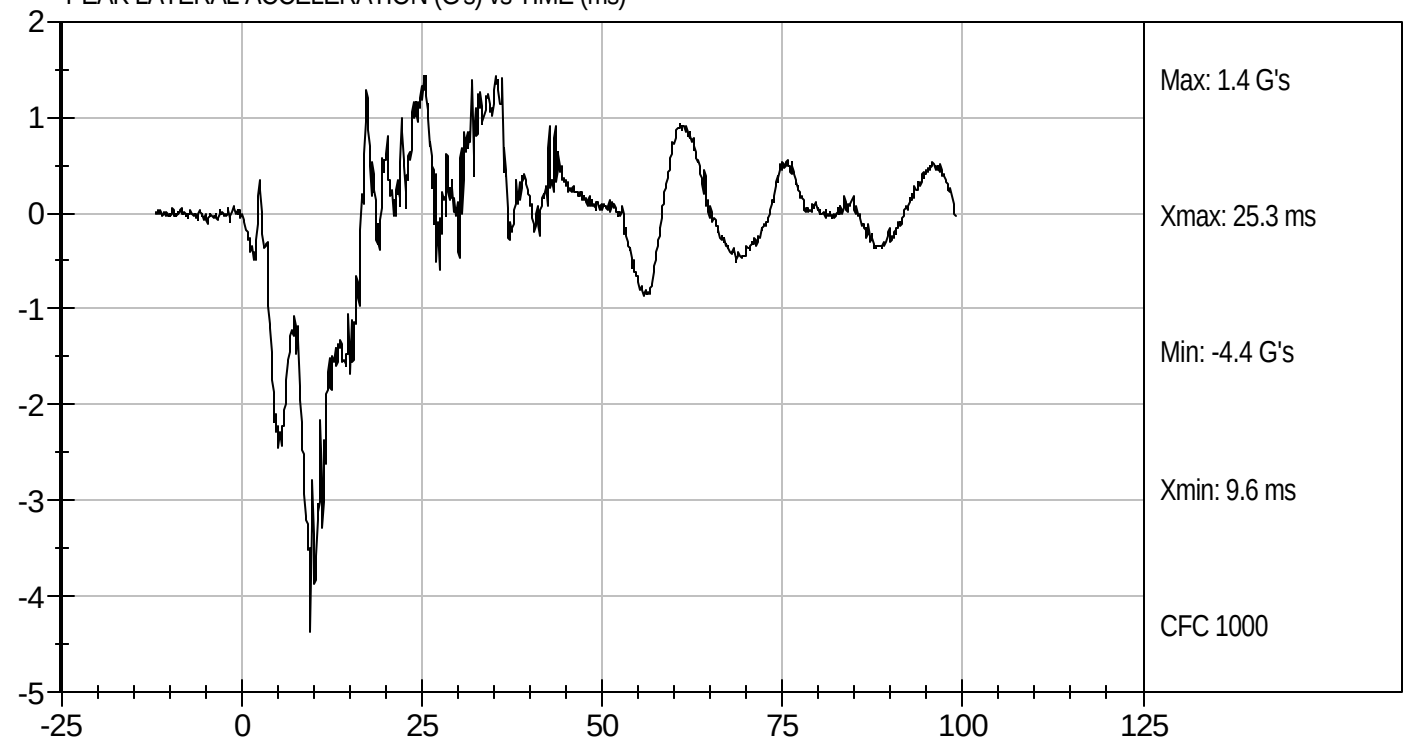
Test Desc: Head Drop
Component ID: D073555

Test Date: 12/12/07
Velocity: 0 ft/s, 0 m/s

PEAK RESULTANT ACCELERATION (G's) vs TIME (ms)



PEAK LATERAL ACCELERATION (G's) vs TIME (ms)



Hybrid III Calibration Data Sheet

3 Year Old

Head Drop Calibration

ATD Serial No: 031 **Test I.D:** D073581

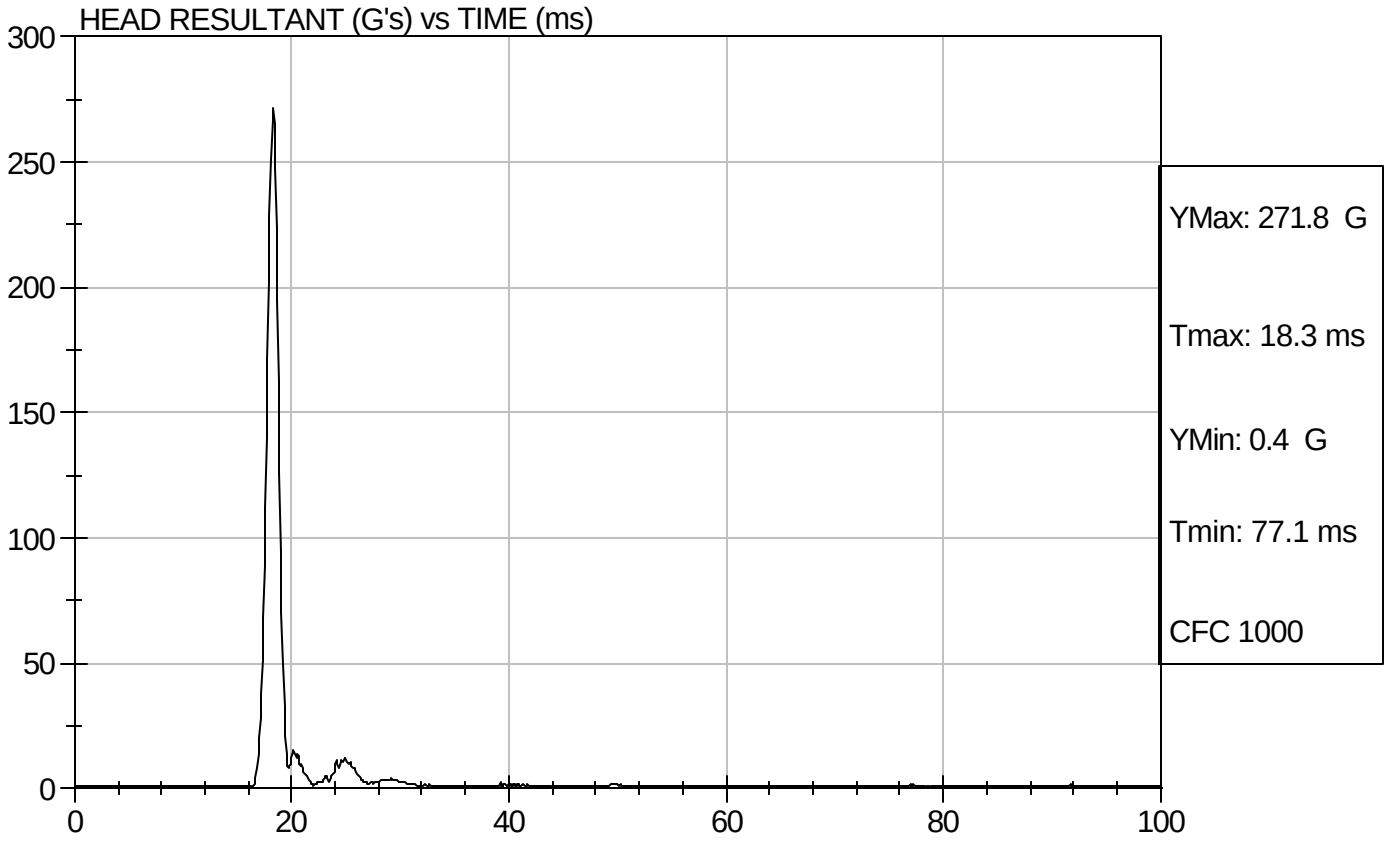
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Peak Resultant Acceleration	G's	250.0 to 280.0	271.8	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-6.9	Pass
Is Acceleration Unimodal?	N/A	< 10% Peak	Yes	Pass
		Overall Test Results		Pass

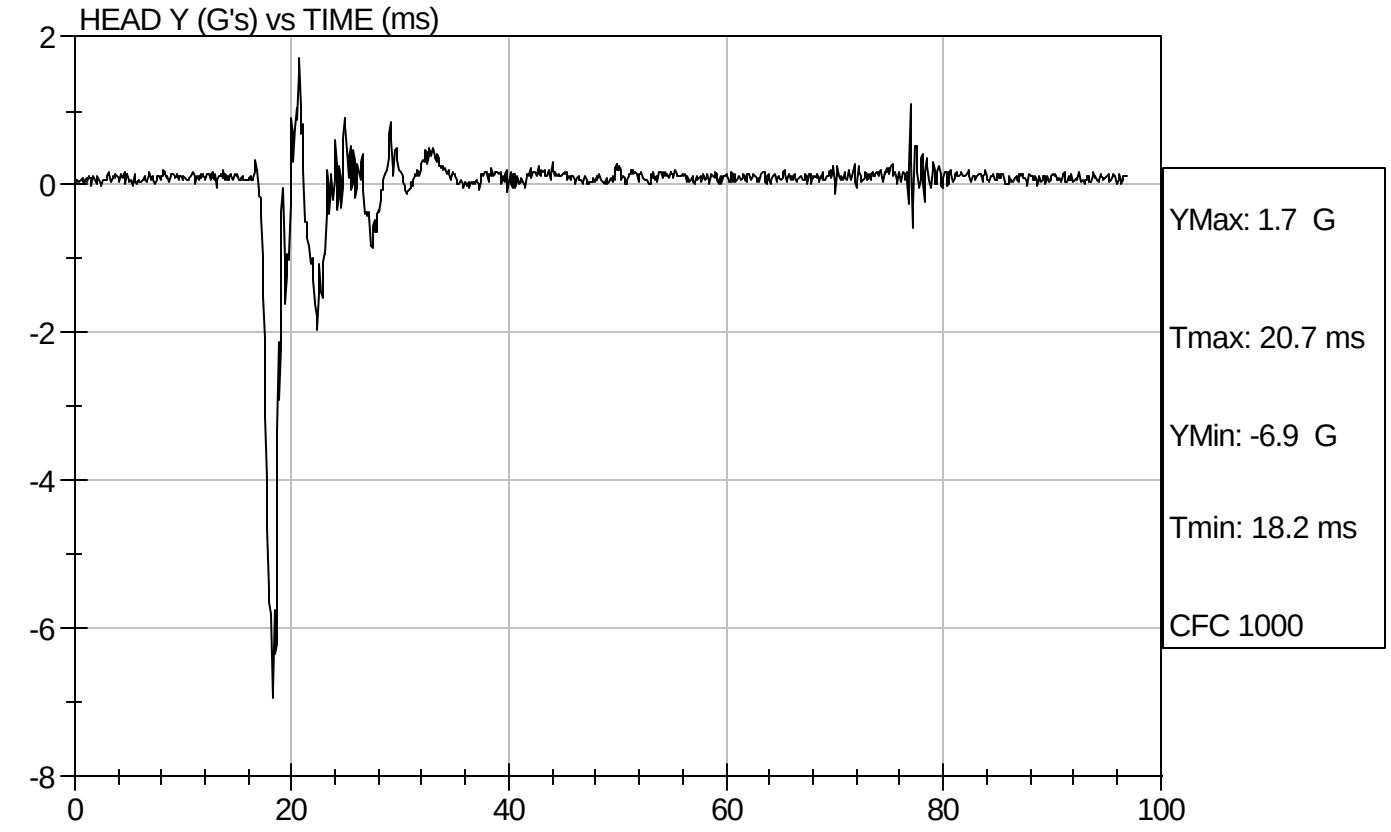
Jessica Gall
Laboratory Technician

12/13/07
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 12/13/07
	Component: D073581	Speed: 0 ft/s, 0.00 m/s





Hybrid III Calibration Data Sheet

3 Year Old

Neck Flexion Test

ATD Serial No: 031 **Test I.D:** D073582

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.6	Pass
Laboratory Relative Humidity		%	10 to 70	18	Pass
Pendulum Speed		m/s	5.4 to 5.6	5.5	Pass
Pendulum Deceleration	10 msec	m/s	2.0 - 2.7	2.2	Pass
	15 msec	m/s	3.0 - 4.0	3.3	Pass
	20 msec	m/s	4.0 - 5.1	4.6	Pass
D Plane Rotation		deg	70 - 82	81	Pass
Peak Moment within Deflection Corridor		Nm	42.0 - 53.0	43.8	Pass
Positive Moment - Time Curve Decay to 10 Nm		msec	60.0 - 80.0	70.1	Pass
			Overall Test Results		Pass

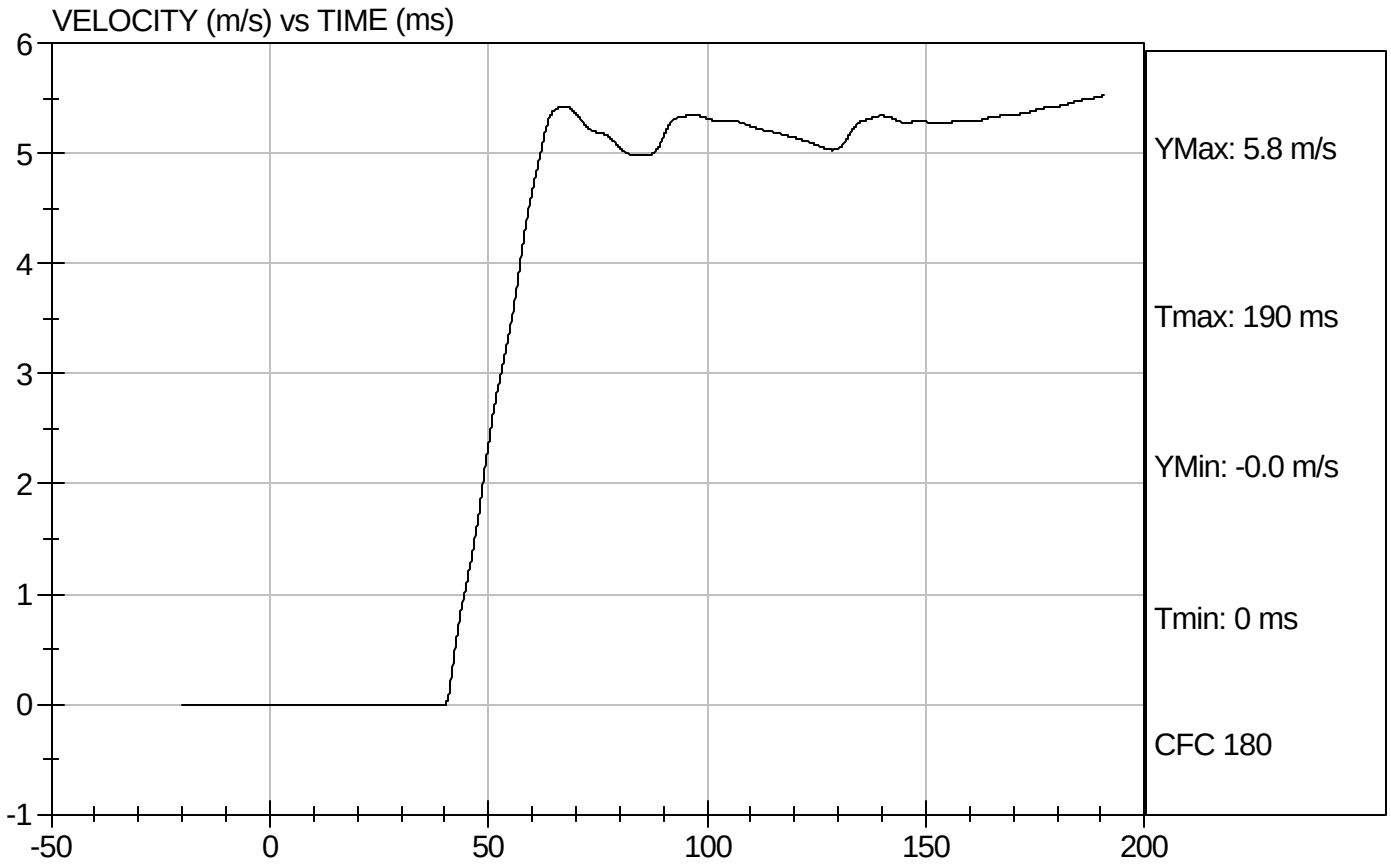
Jessica Gall
Laboratory Technician

12/17/07
Test Date

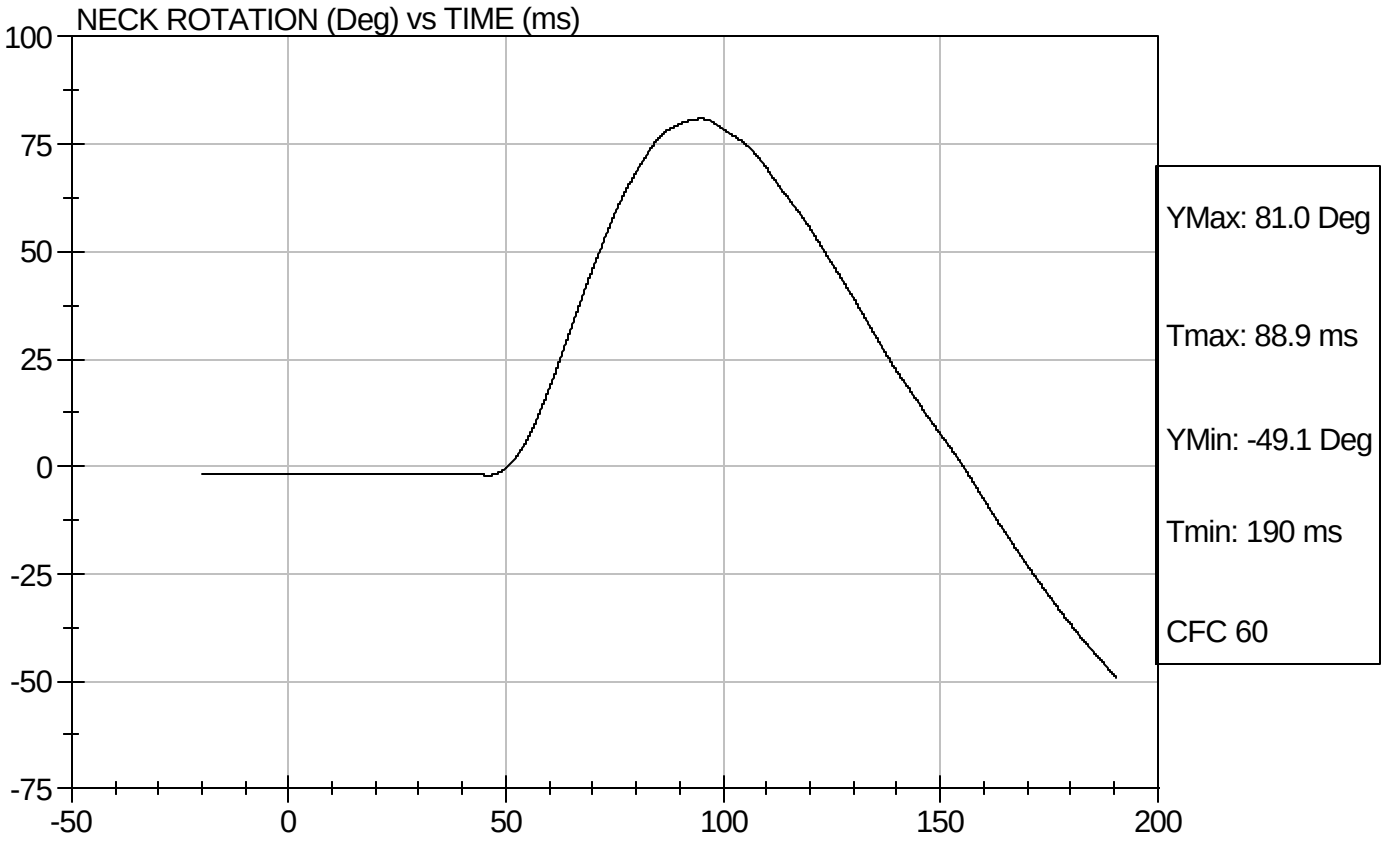
David Winkelbauer
Approved By

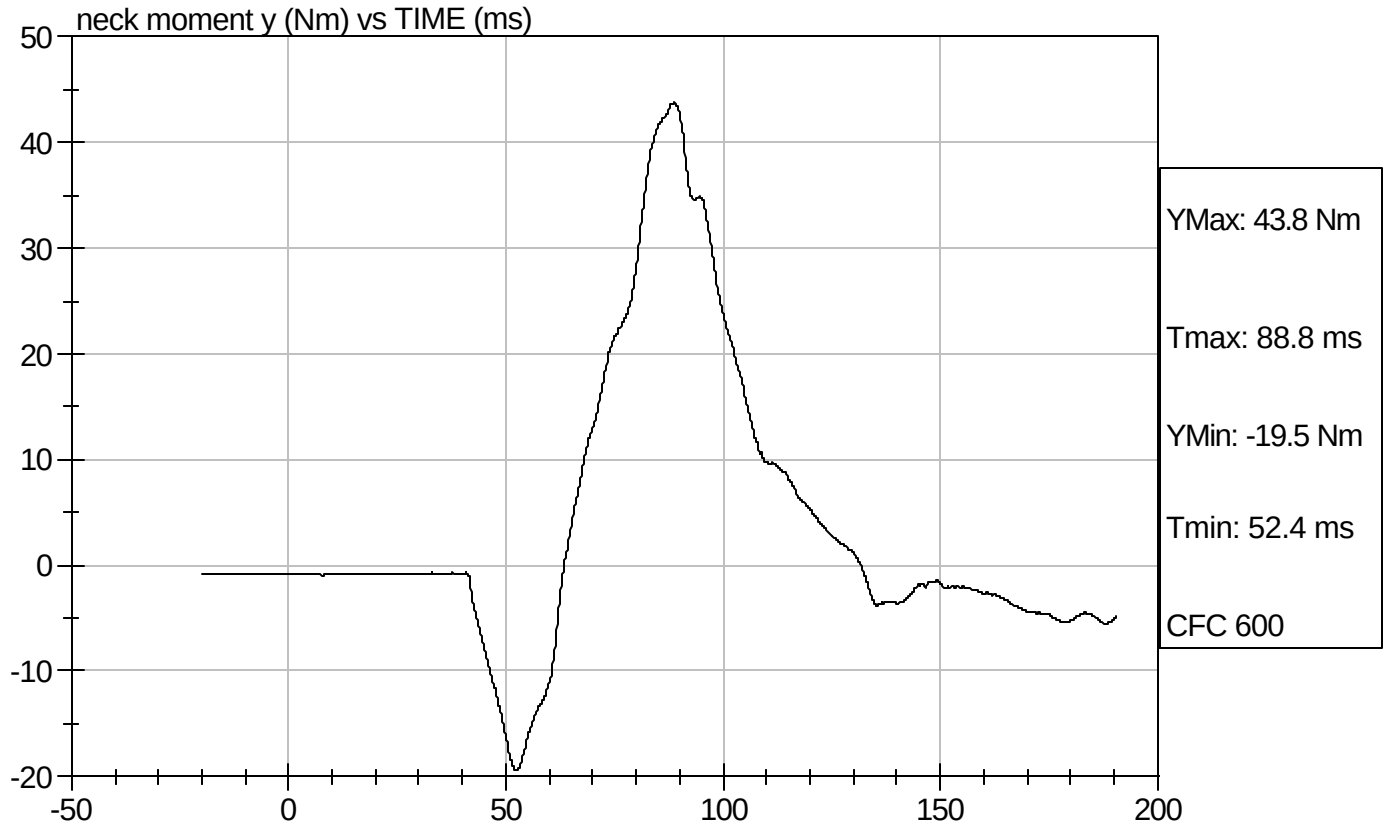
Test Description: Neck Flexion | Test Date: 12/17/07

Component: D073582 | Speed: 18.11 ft/sec, 5.52 m/sec



	Test Description: Neck Flexion	Test Date: 12/17/07
	Component: D073582	Speed: 18.11 ft/s, 5.52 m/s





Hybrid III Calibration Data Sheet

3 Year Old

Neck Extension Test

ATD Serial No: 031 **Test I.D:** D073583

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	19	Pass
Pendulum Speed		m/s	3.55 to 3.75	3.73	Pass
Pendulum Deceleration	6 msec	m/s	1.0 - 1.4	1.1	Pass
	10 msec	m/s	1.9 - 2.5	2.1	Pass
	14 msec	m/s	2.8 - 3.5	3.1	Pass
D Plane Rotation		deg	83 - 93	86	Pass
Peak Moment within Deflection Corridor		Nm	-53.3 - -43.7	-47.9	Pass
Negative Moment - Time Curve Decay to -10 Nm		msec	60.0 - 80.0	71.1	Pass
			Overall Test Results		Pass

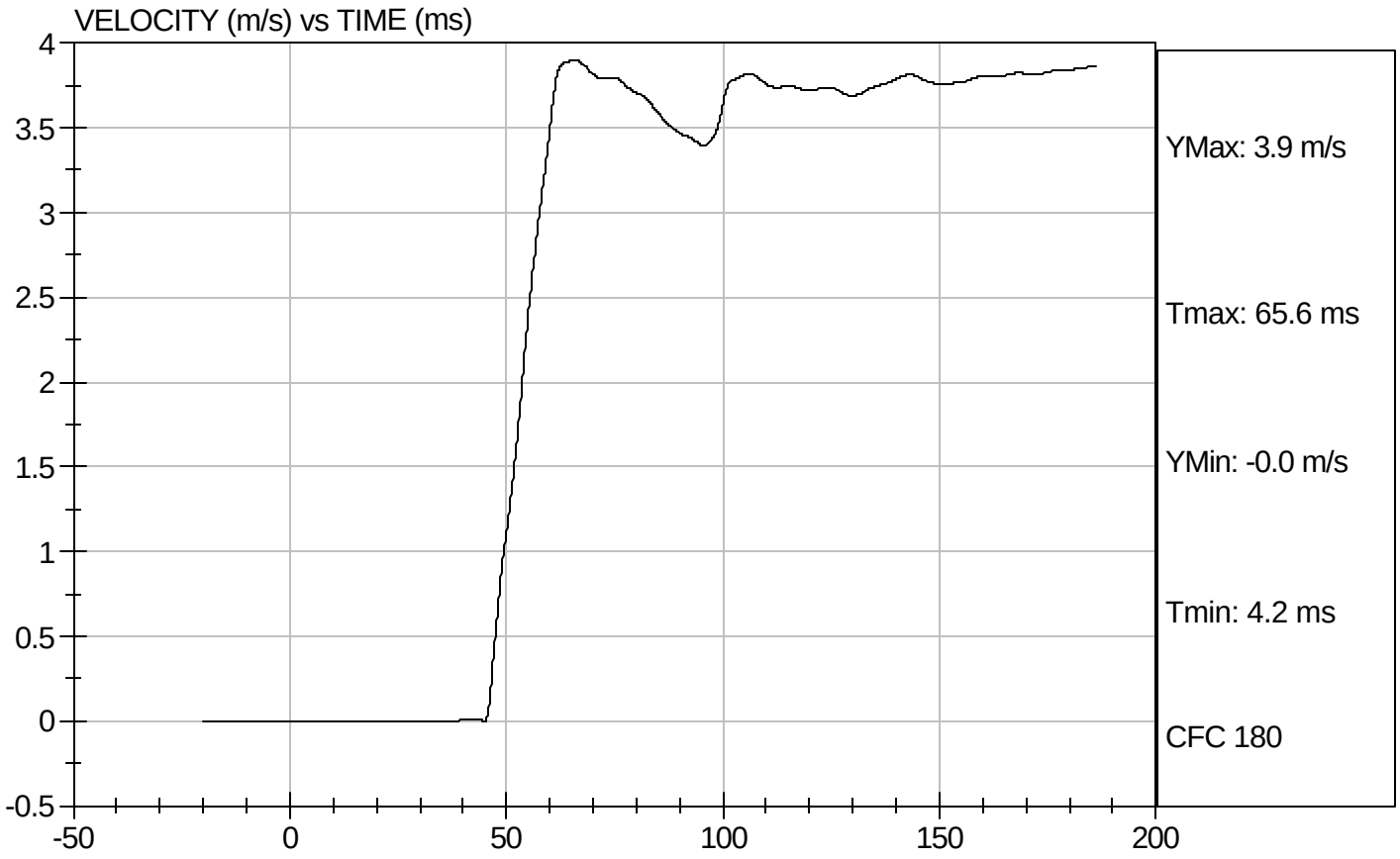
Jessica Gall
Laboratory Technician

12/18/07
Test Date

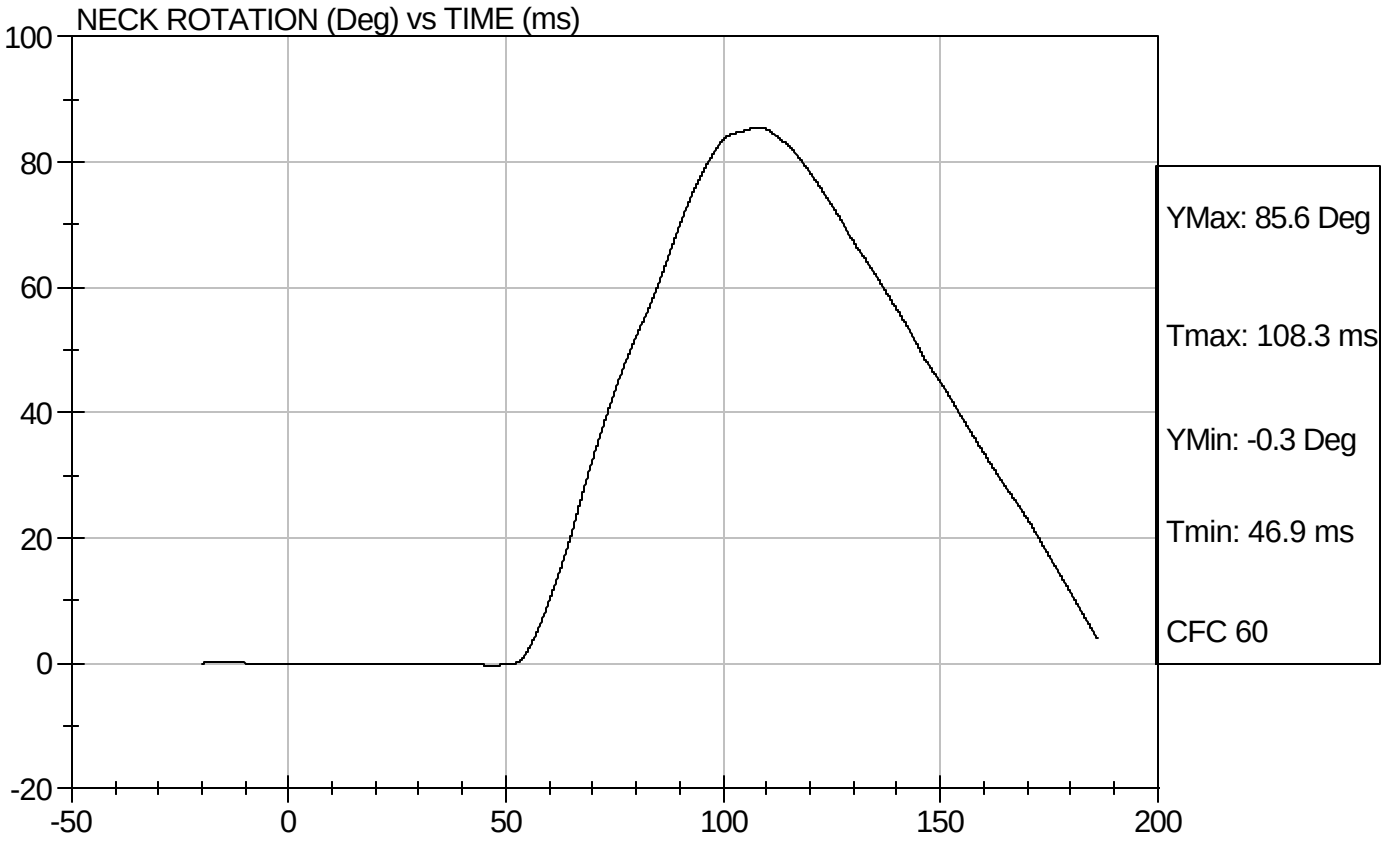
David Winkelbauer
Approved By

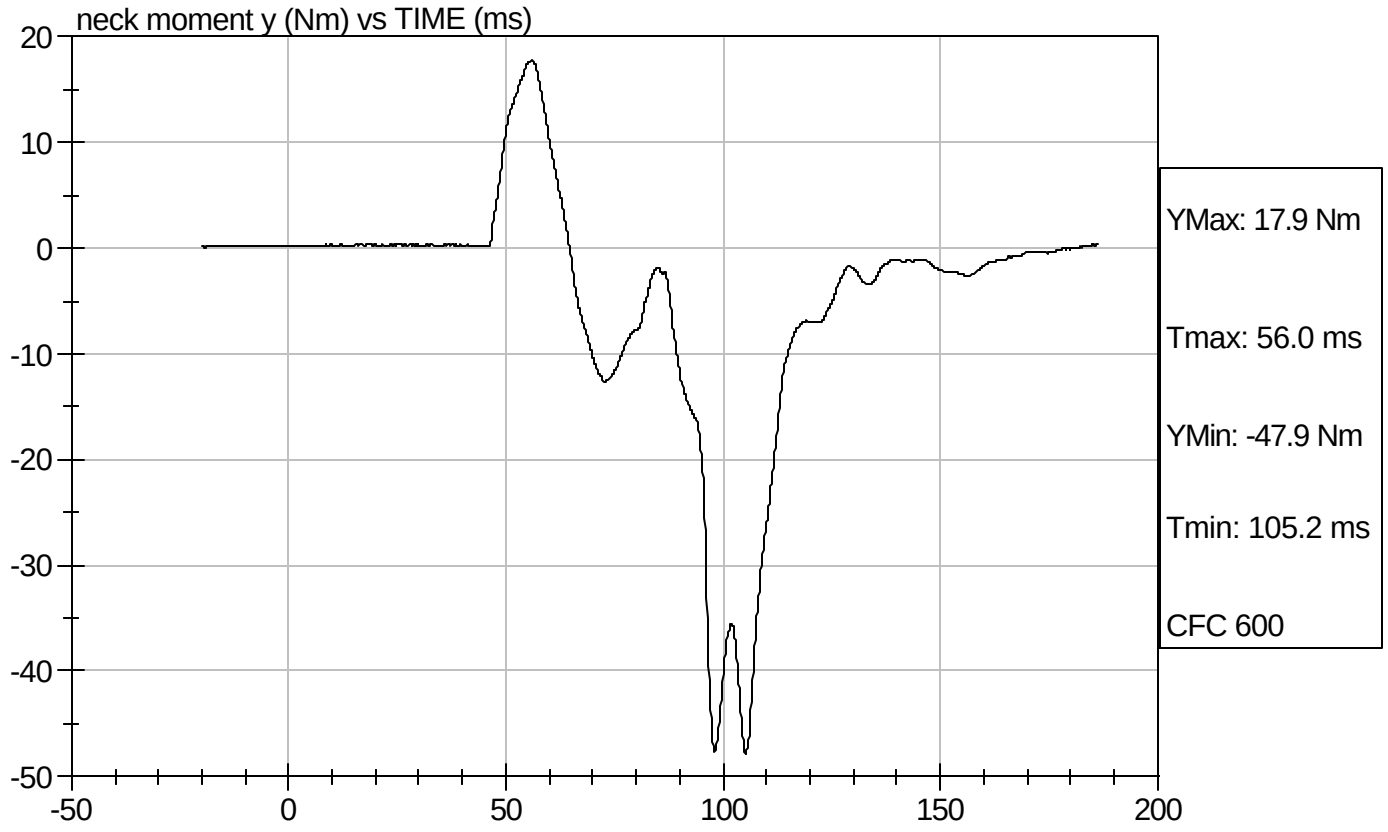
Test Description: Neck Extension Test Date: 12/18/07

Component: D073583 Speed: 12.25 ft/sec, 3.73 m/sec



	Test Description: Neck Extension	Test Date: 12/18/07
	Component: D073583	Speed: 12.25 ft/s, 3.73 m/s





Hybrid III Calibration Data Sheet

3 Year Old

Thorax Impact Test

ATD Serial No: 031 **Test I.D:** D073584

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Probe Velocity	m/s	5.9 to 6.1	6.0	Pass
Peak Deflection	mm	32 - 38	34	Pass
Peak Resistive Force w/in Deflection Corridor	kN	0.68 - 0.81	0.80	Pass
Internal Hysteresis	%	65 to 85	68	Pass
Max Force 12.5 mm - 32 mm Deflection	kN	Max 0.86	0.81	Pass
		Overall Test Results		Pass

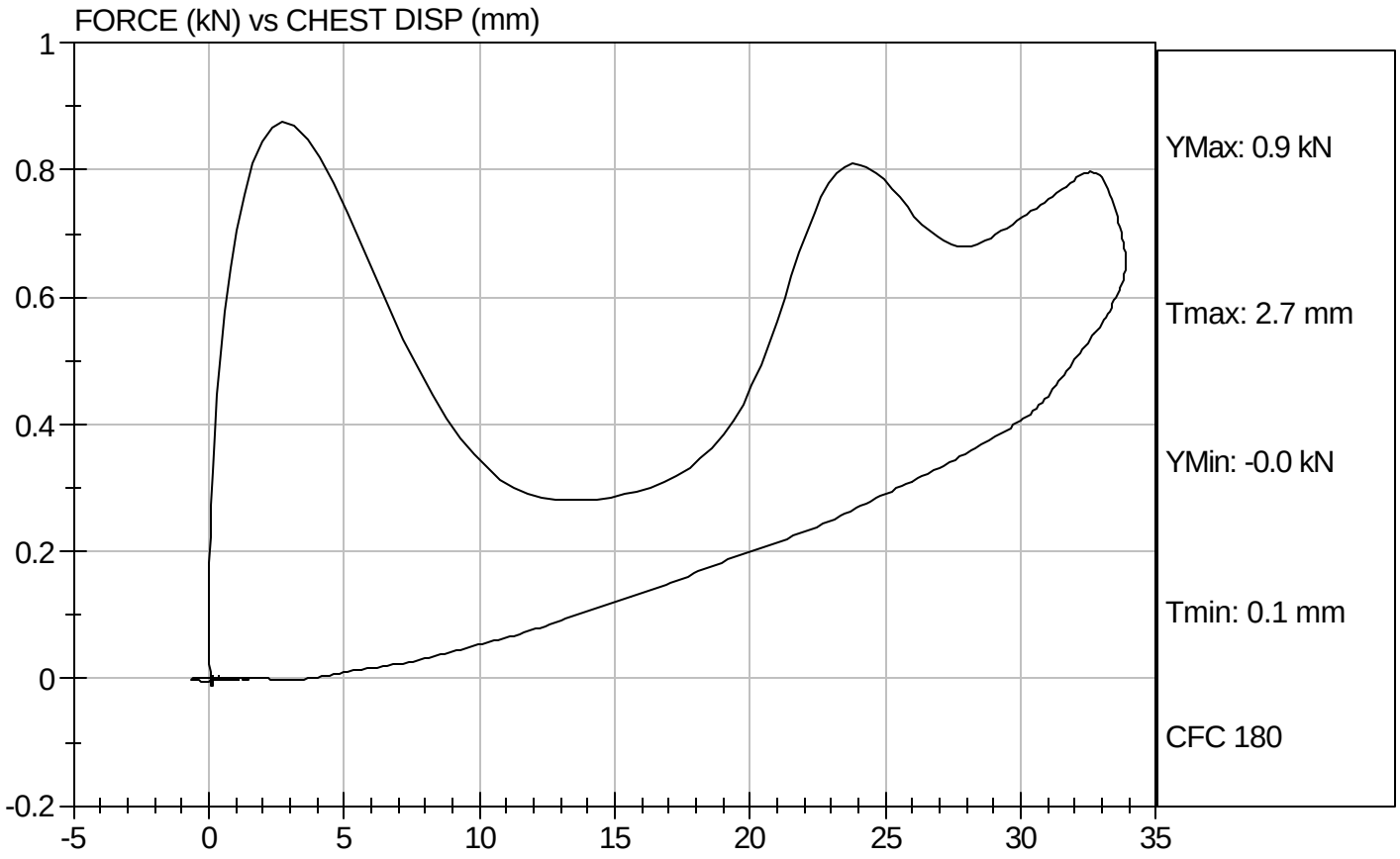
Jessica Gall
Laboratory Technician

12/18/07
Test Date

David Winkelbauer
Approved By

Test Description: Thorax Impact | Test Date: 12/18/07

Component: D073584 | Speed: 19.6 ft/sec, 5.97 m/sec



Hybrid III Calibration Data Sheet

3 Year Old

Torso Lumbar Flexion

ATD Serial No: 031 **Test I.D:** D073587

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Force At 45 deg.	N	130 - 180	177	Pass
Initial Angle	deg	0 - 15	12	Pass
Return Angle	deg	0 - 10	5	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

12/13/07
Test Date

David Winkelbauer
Approved By

MGA RESEARCH CORPORATION

FRONT HEAD DROP TEST

CRABI 12 MONTH

ATD Serial No: 093 **Test ID:** D073561

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Peak Resultant Acceleration	G's	100 to 120	106	Pass
Peak Lateral Acceleration	G's	+/- 15	-2	Pass
Unimodal	N/A	within 17% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

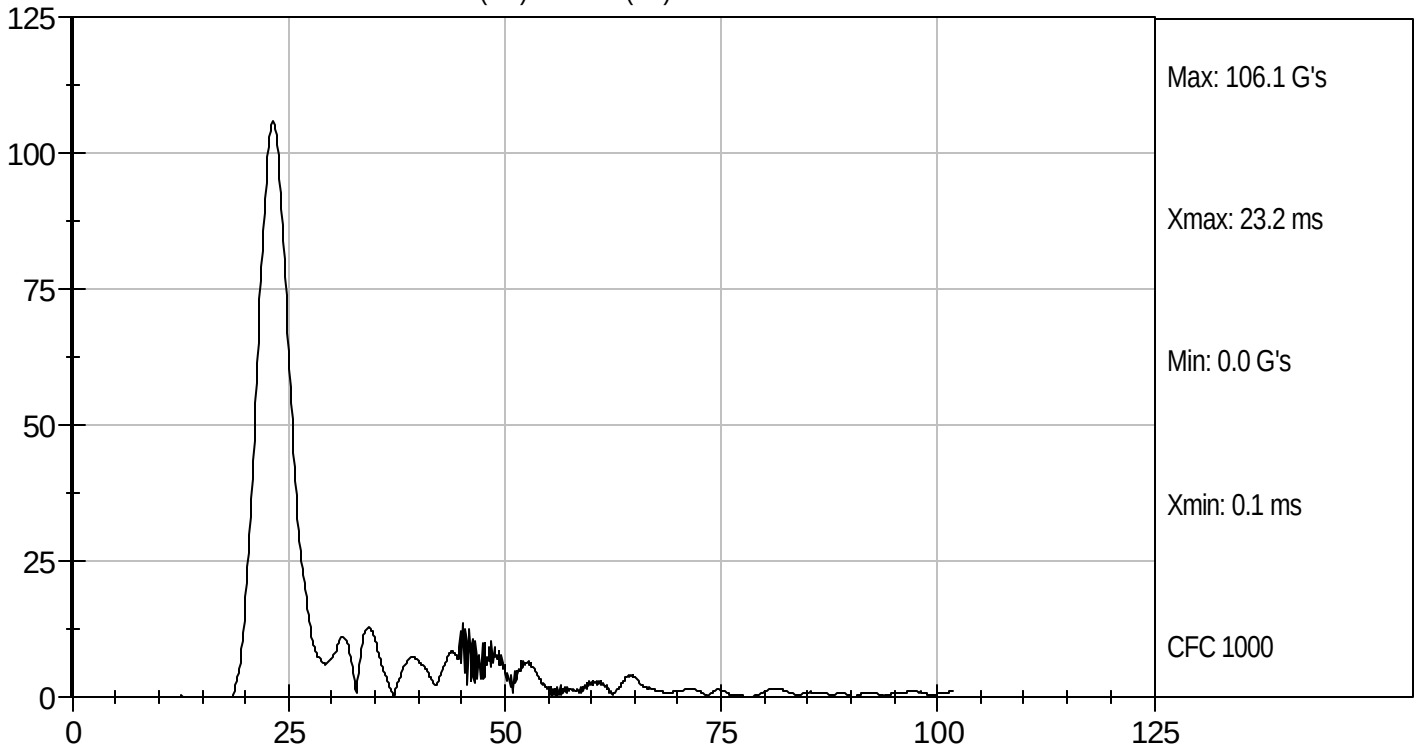
12/12/07
Test Date

David Winkelbauer
Approved By

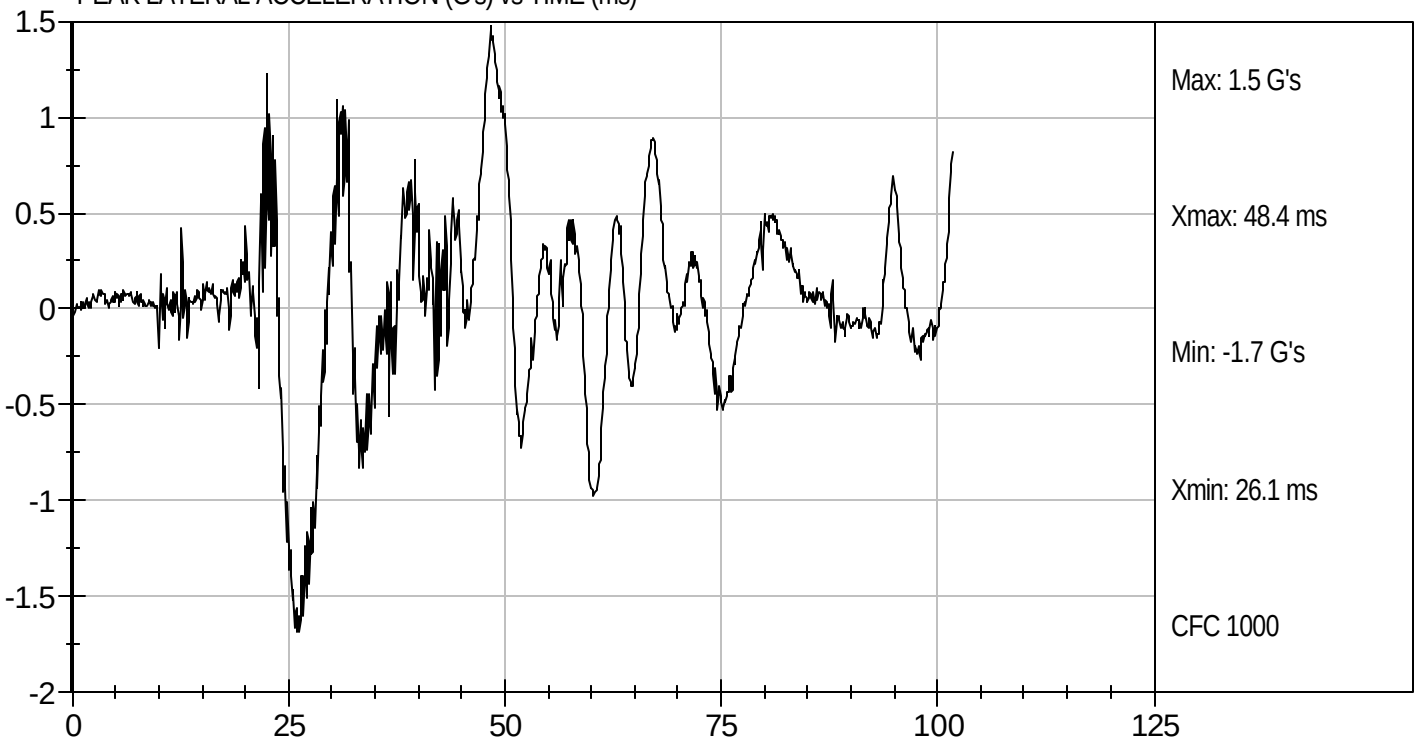
Test Desc: Head Drop
Component ID: D073561

Test Date: 12/12/07
Velocity: 0 ft/s, 0 m/s

PEAK RESULTANT ACCELERATION (G's) vs TIME (ms)



PEAK LATERAL ACCELERATION (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

CRABI 12 MONTH

ATD Serial No: 093 **Test I.D:** D073562

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	20.7	Pass
Humidity		%	10 to 70	25	Pass
Impact Velocity		m/s	5.1 to 5.3	5.3	Pass
Pendulum Deceleration	10 msec	m/s	1.6 to 2.3	2.1	Pass
	20 msec	m/s	3.4 to 4.2	3.8	Pass
	25 msec	m/s	4.3 to 5.2	4.5	Pass
D Plane Rotation		deg	75.0 to 86.0	80.6	Pass
Moment About Occipital Condyle		Nm	36.0 to 45.0	43.3	Pass
Positive Moment - Time Curve Decay to 5 Nm		msec	60 to 80	69	Pass
			Overall Test Results		Pass

Laboratory Technician

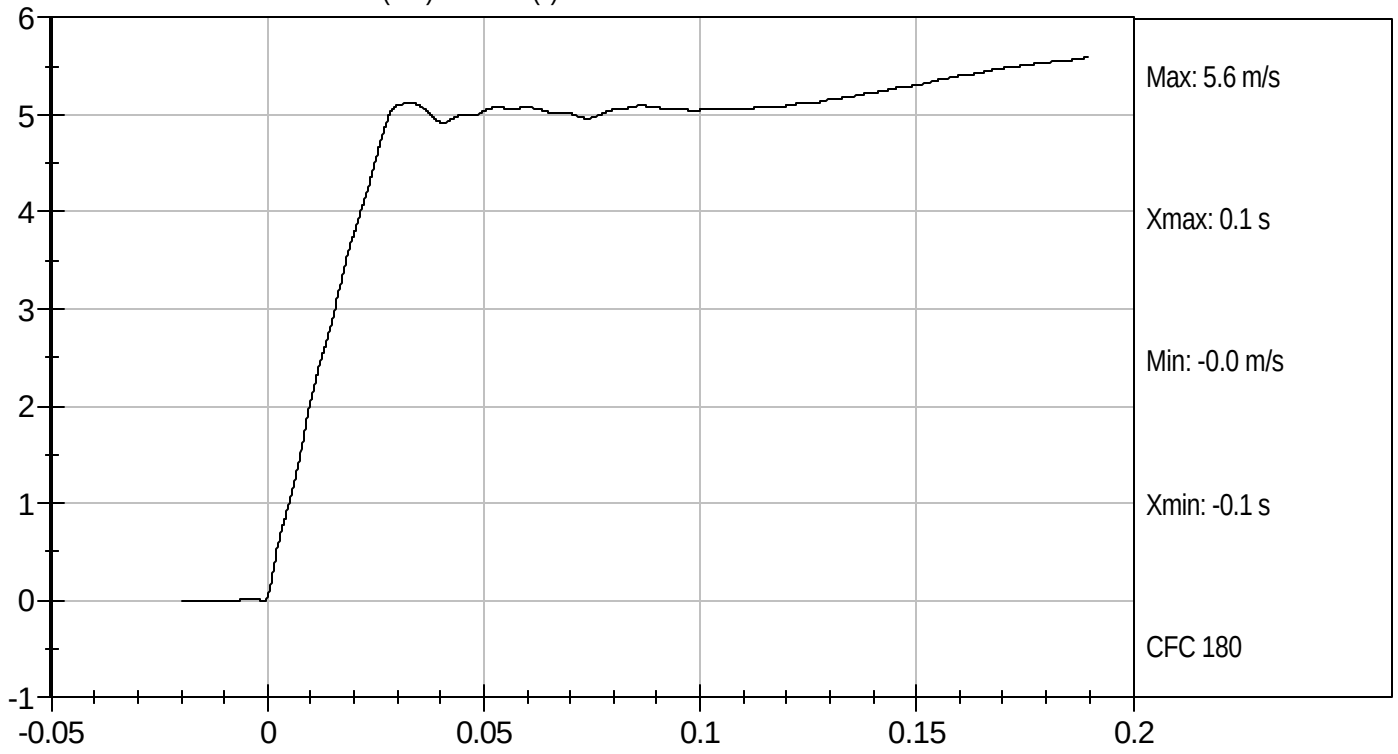
12/12/07
Test Date

David Winkelbauer
Approved By

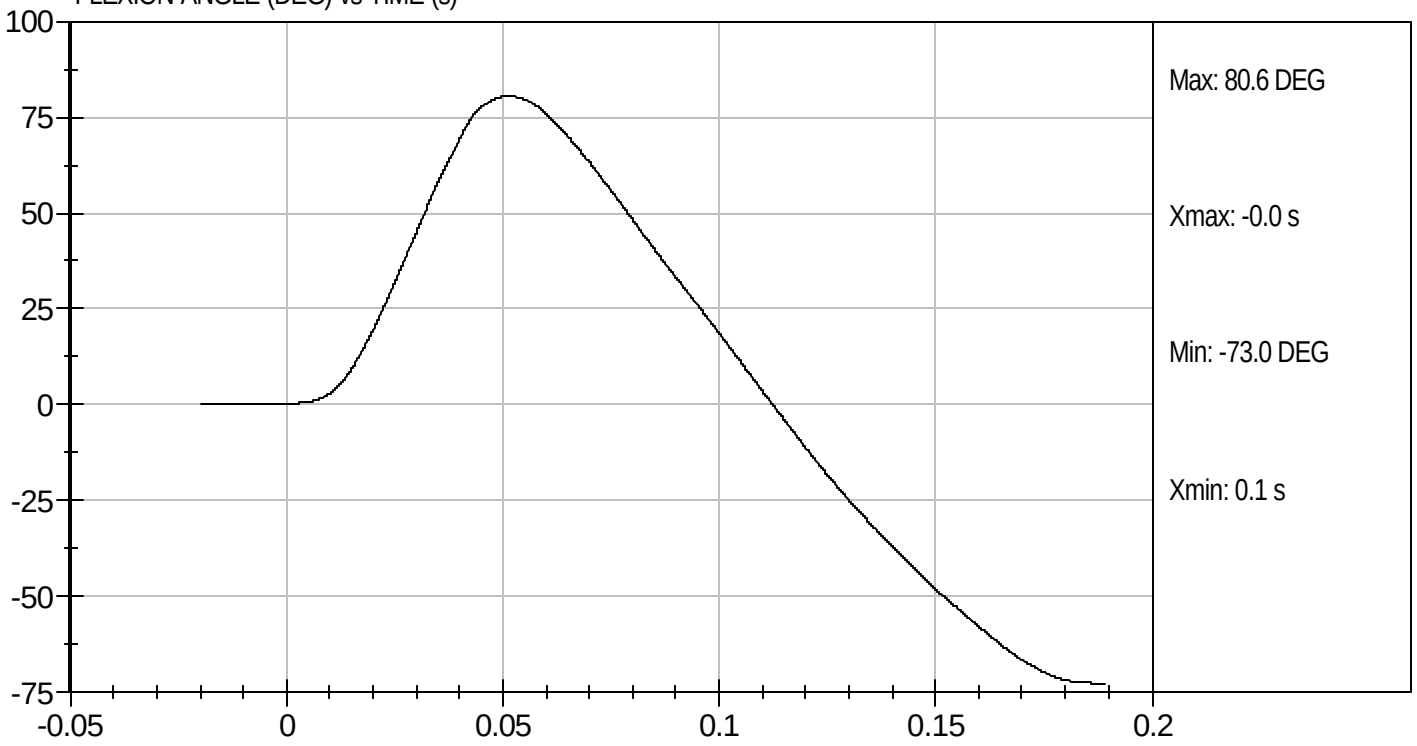
Test Desc: Neck Flexion
Component ID: D073562

Test Date: 12/12/07
Velocity: 17.36 ft/s, 5.3 m/s

PENDULUM DECELERATION (m/s) vs TIME (s)

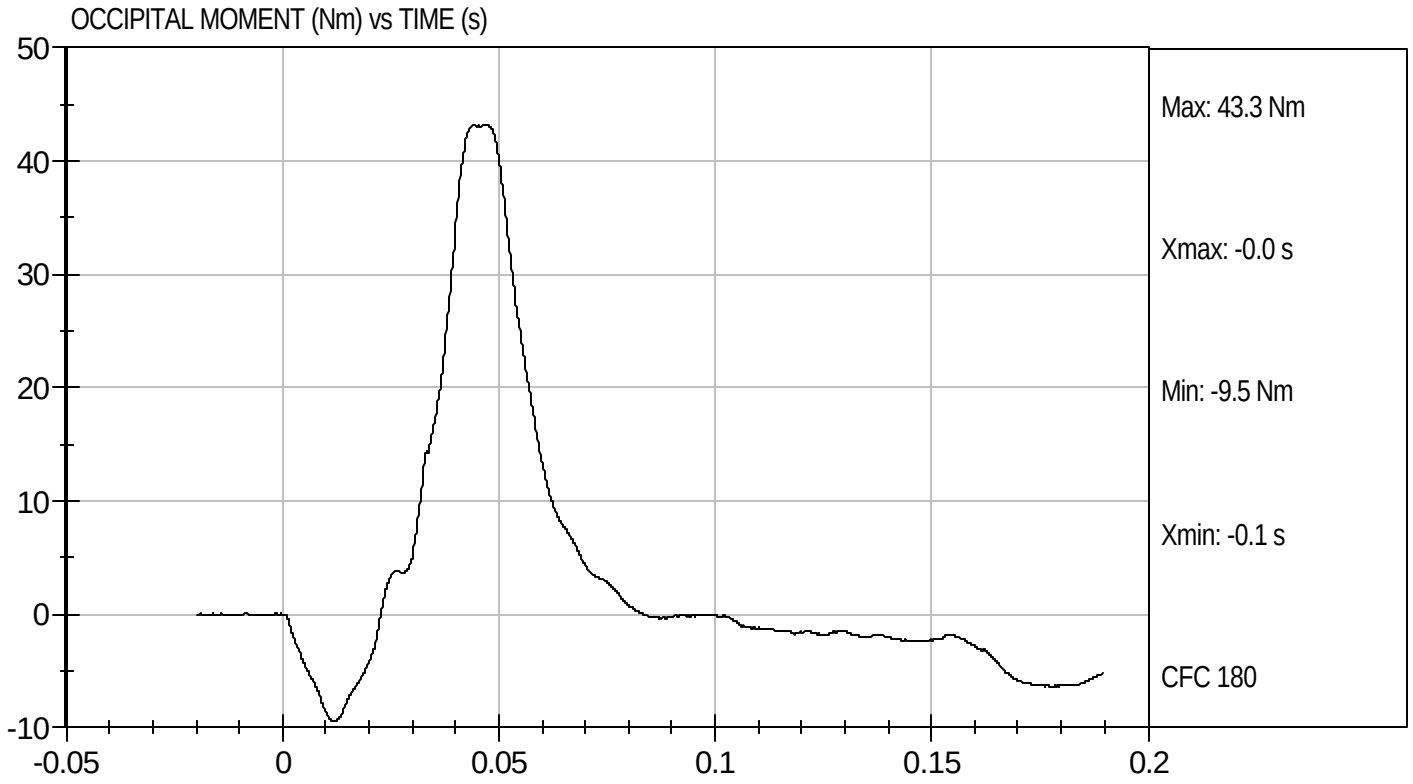


FLEXION ANGLE (DEG) vs TIME (s)



Test Desc: Neck Flexion
Component ID: D073562

Test Date: 12/12/07
Velocity: 17.36 ft/s, 5.3 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

CRABI 12 MONTH

ATD Serial No: 093 **Test I.D:** D073563

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	20.8	Pass
Humidity		%	10 to 70	25	Pass
Pendulum Speed		m/s	2.4 to 2.6	2.6	Pass
Pendulum Deceleration	6 msec	m/s	0.8 to 1.2	0.9	Pass
	10 msec	m/s	1.5 to 2.1	1.9	Pass
	14 msec	m/s	2.2 to 2.9	2.6	Pass
D Plane Rotation		deg	80.0 to 92.0	80.6	Pass
Moment About Occipital Condyle		Nm	-23.0 to -12.0	-19.0	Pass
Negative Moment - Time Curve Decay to -5 Nm		msec	76 to 90	85	Pass
			Overall Test Results		Pass

Laboratory Technician

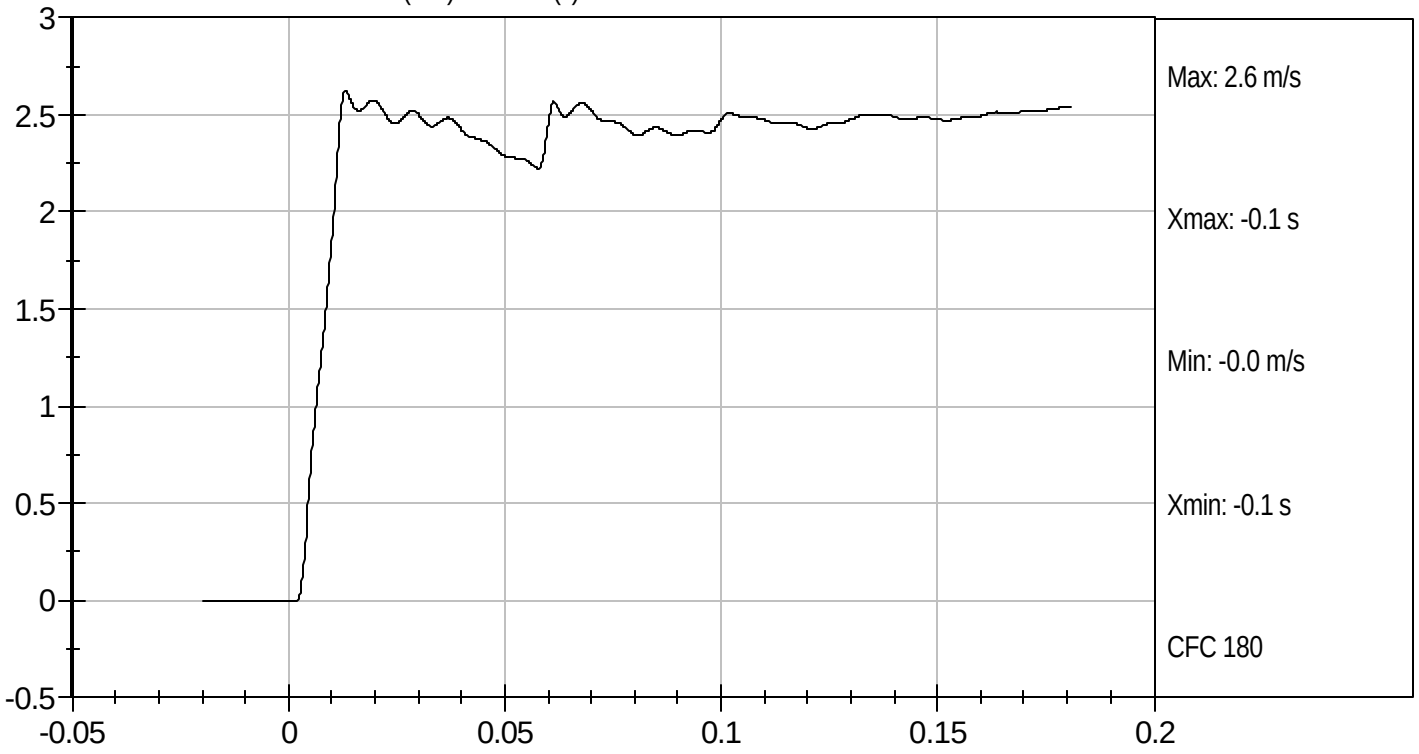
12/12/07
Test Date

David Winkelbauer
Approved By

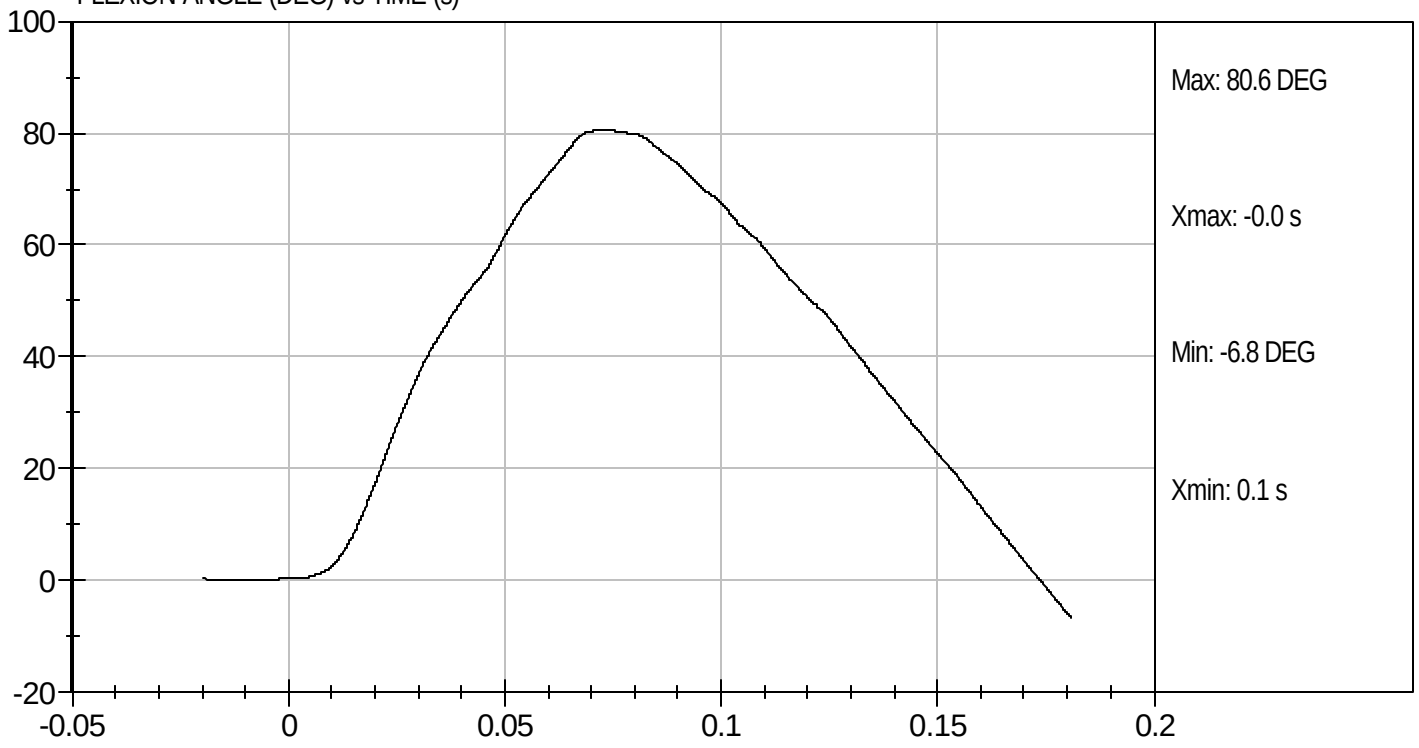
Test Desc: Neck Extension
Component ID: D073563

Test Date: 12/12/07
Velocity: 8.41 ft/s, 2.6 m/s

PENDULUM DECELERATION (m/s) vs TIME (s)

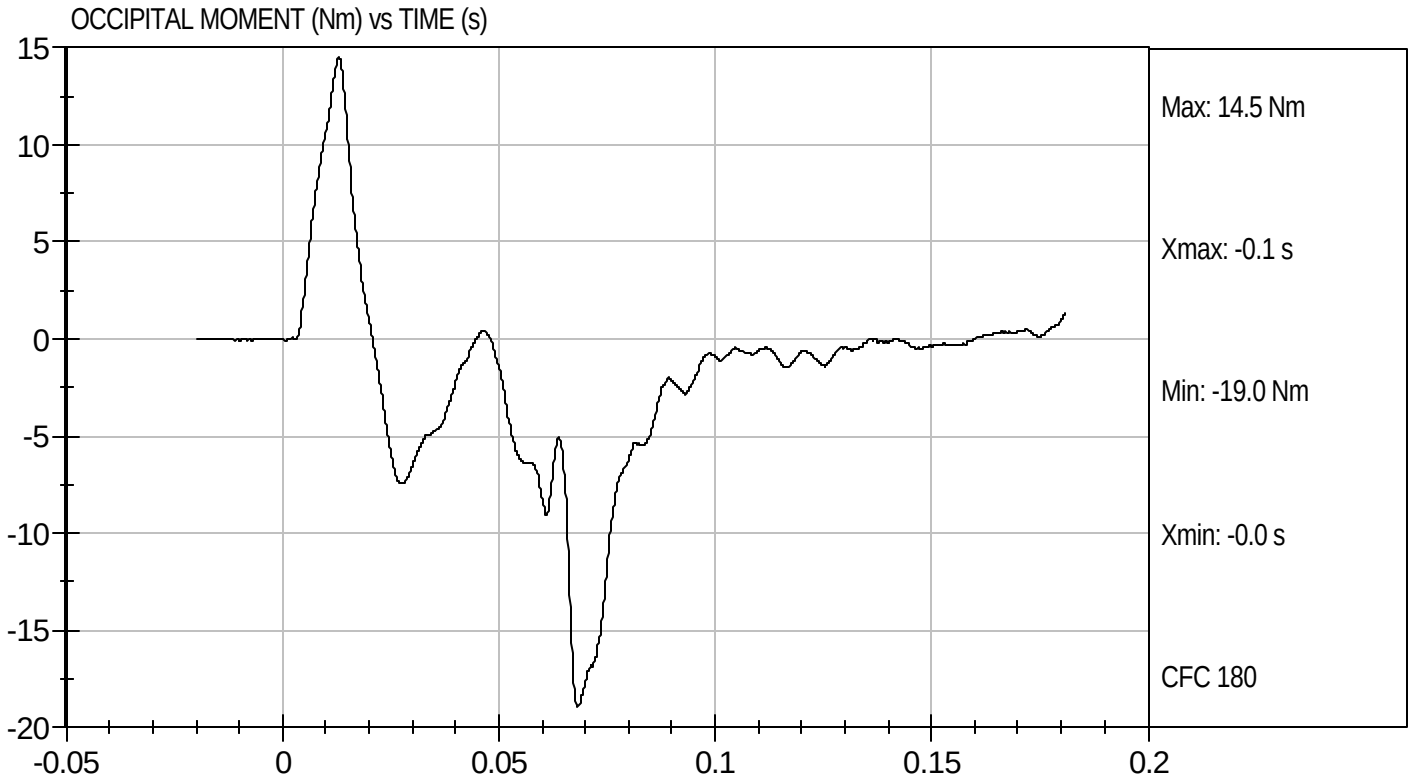


FLEXION ANGLE (DEG) vs TIME (s)



Test Desc: Neck Extension
Component ID: D073563

Test Date: 12/12/07
Velocity: 8.41 ft/s, 2.6 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

CRABI 12 MONTH

ATD Serial No: 093 **Test I.D:** D073564

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Probe Speed	m/sec	4.9 to 5.1	5.08	Pass
Probe Force	kN	1.51 to 1.80	1.54	Pass
		Overall Test Results		Pass

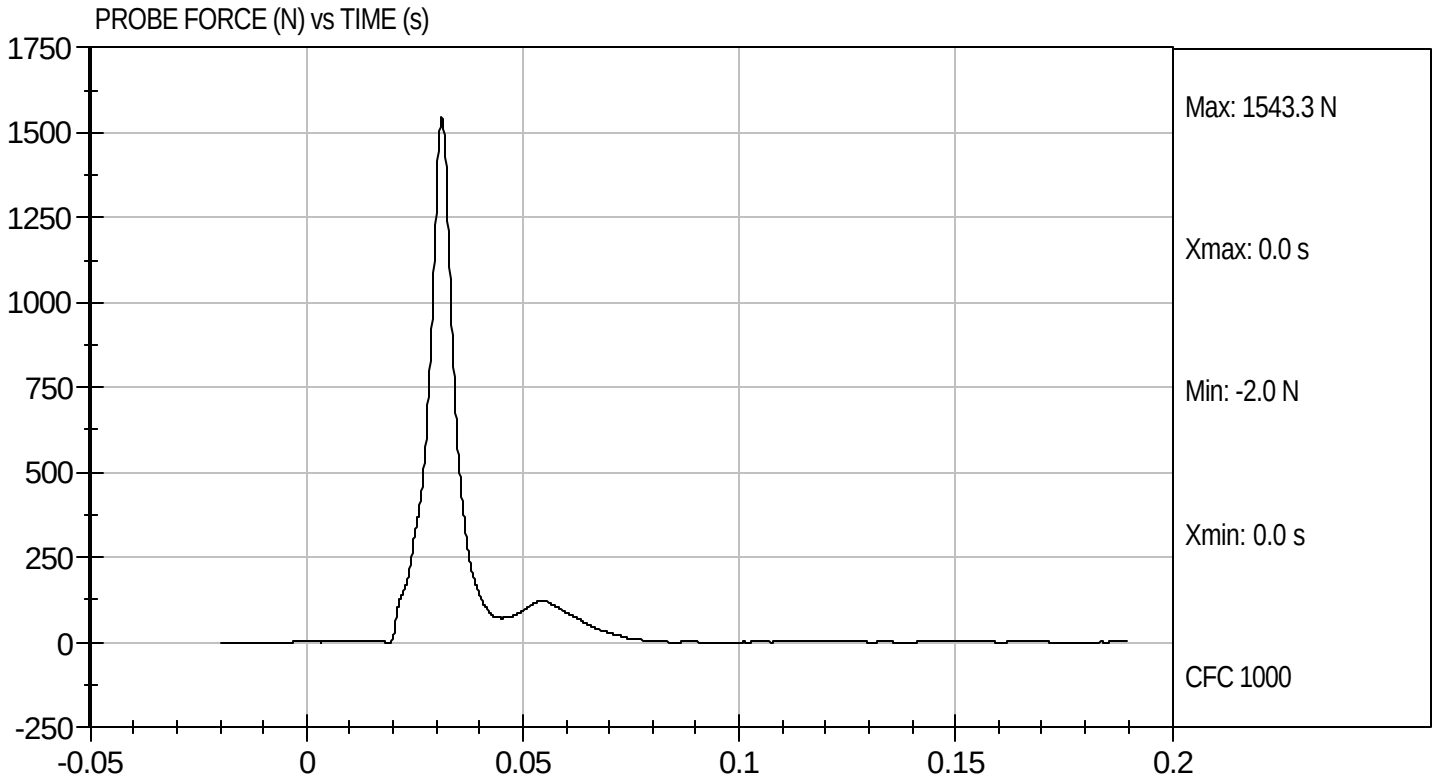
Jessica Gall
Laboratory Technician

12/12/07
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D073564

Test Date: 12/12/07
Velocity: 16.67 ft/s, 5.08 m/s



MGA RESEARCH CORPORATION

REAR HEAD DROP TEST

CRABI 12 MONTH

ATD Serial No: 093 **Test ID:** D073565

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Peak Resultant Acceleration	G's	55 to 71	64	Pass
Peak Lateral Acceleration	G's	+/- 15	-2	Pass
Unimodal	N/A	within 17% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

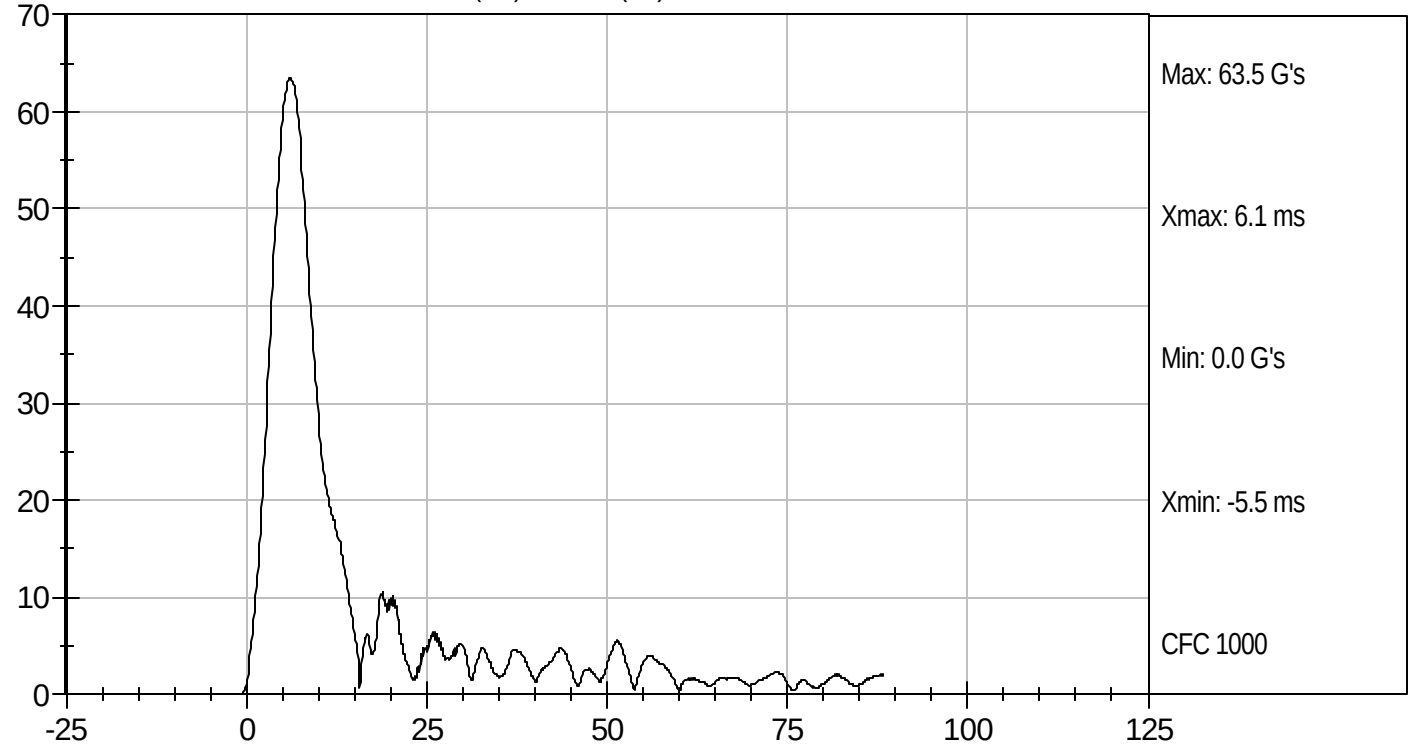
12/12/07
Test Date

David Winkelbauer
Approved By

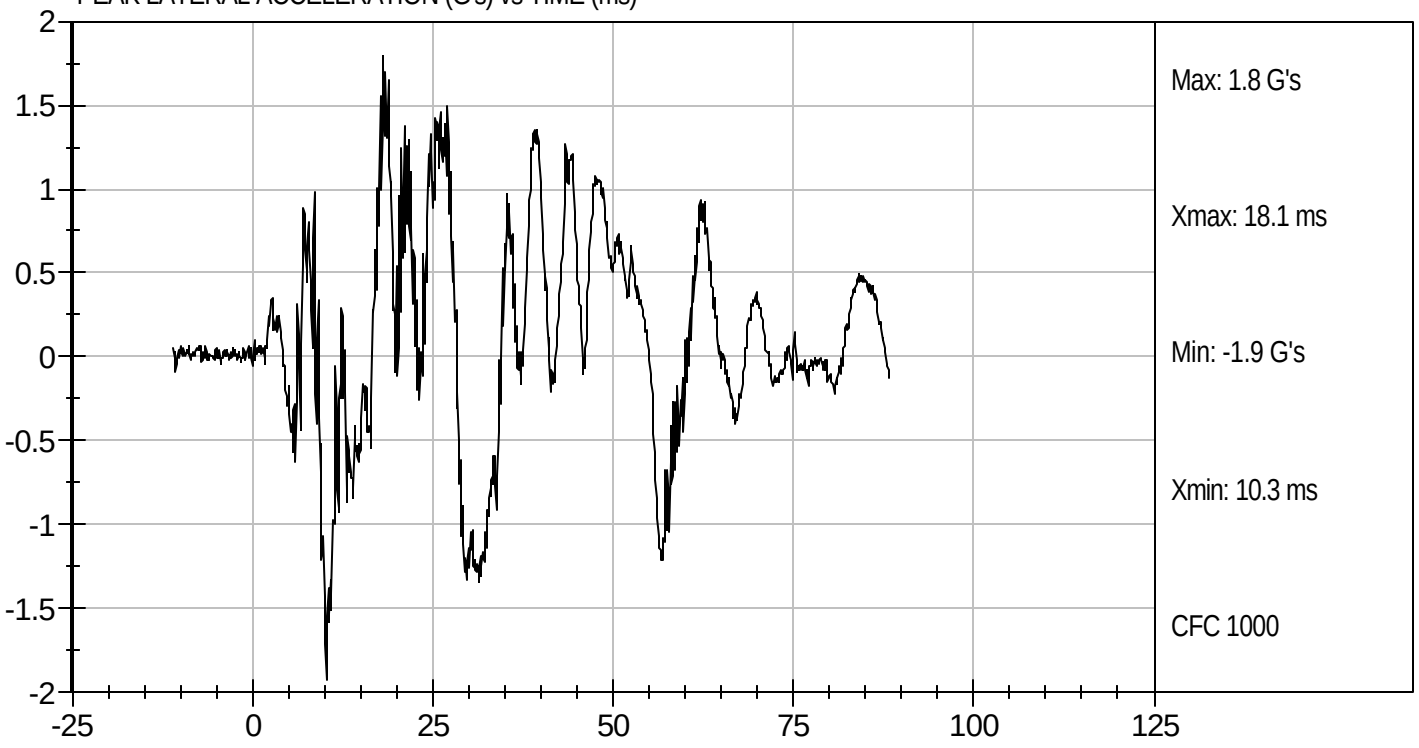
Test Desc: Head Drop
Component ID: D073565

Test Date: 12/12/07
Velocity: 0 ft/s, 0 m/s

PEAK RESULTANT ACCELERATION (G's) vs TIME (ms)



PEAK LATERAL ACCELERATION (G's) vs TIME (ms)



Hybrid III Calibration Data Sheet

3 Year Old

Head Drop Calibration

ATD Serial No: 032 **Test I.D:** D073591

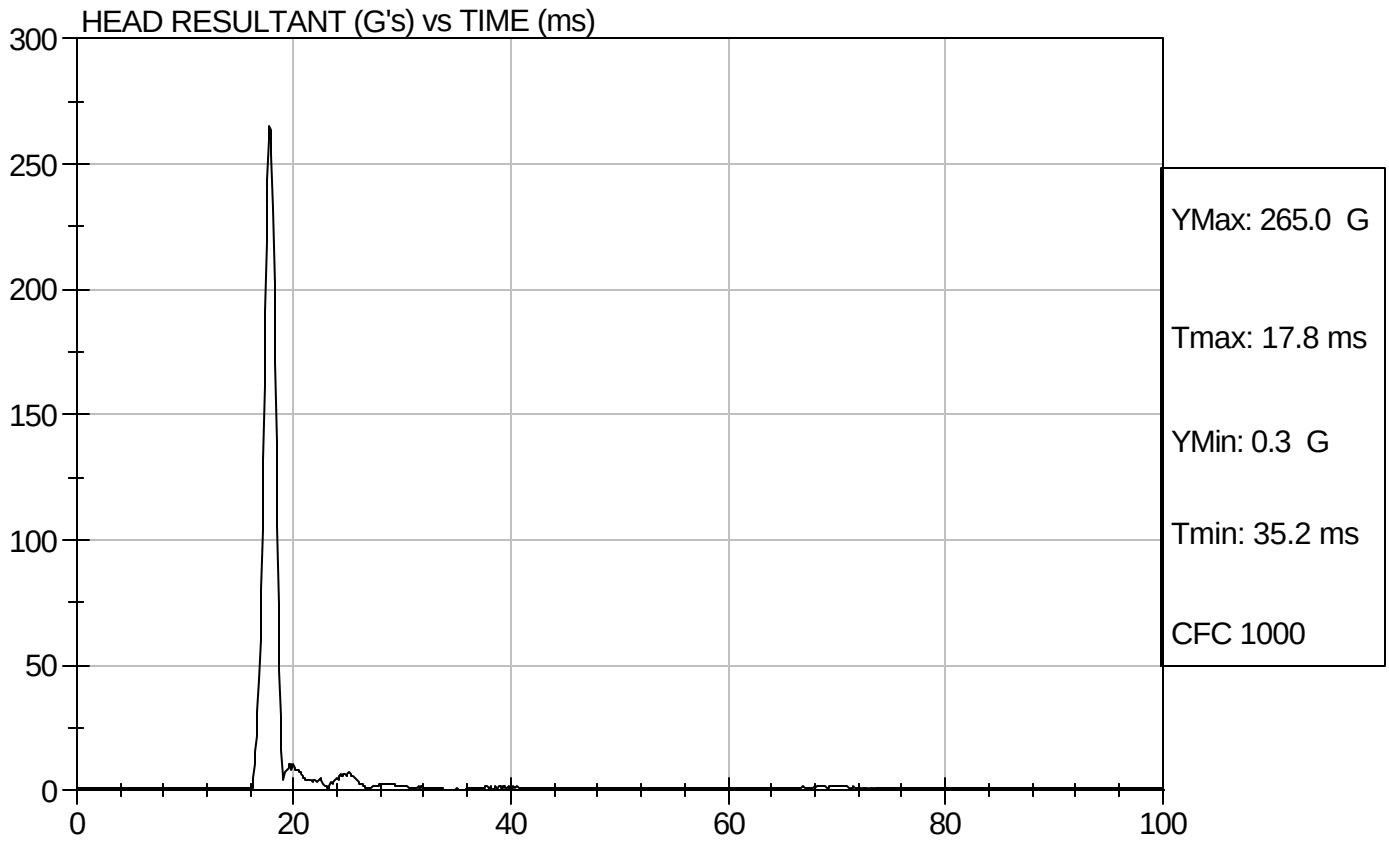
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Peak Resultant Acceleration	G's	250.0 to 280.0	265.0	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	9.6	Pass
Is Acceleration Unimodal?	N/A	< 10% Peak	Yes	Pass
		Overall Test Results		Pass

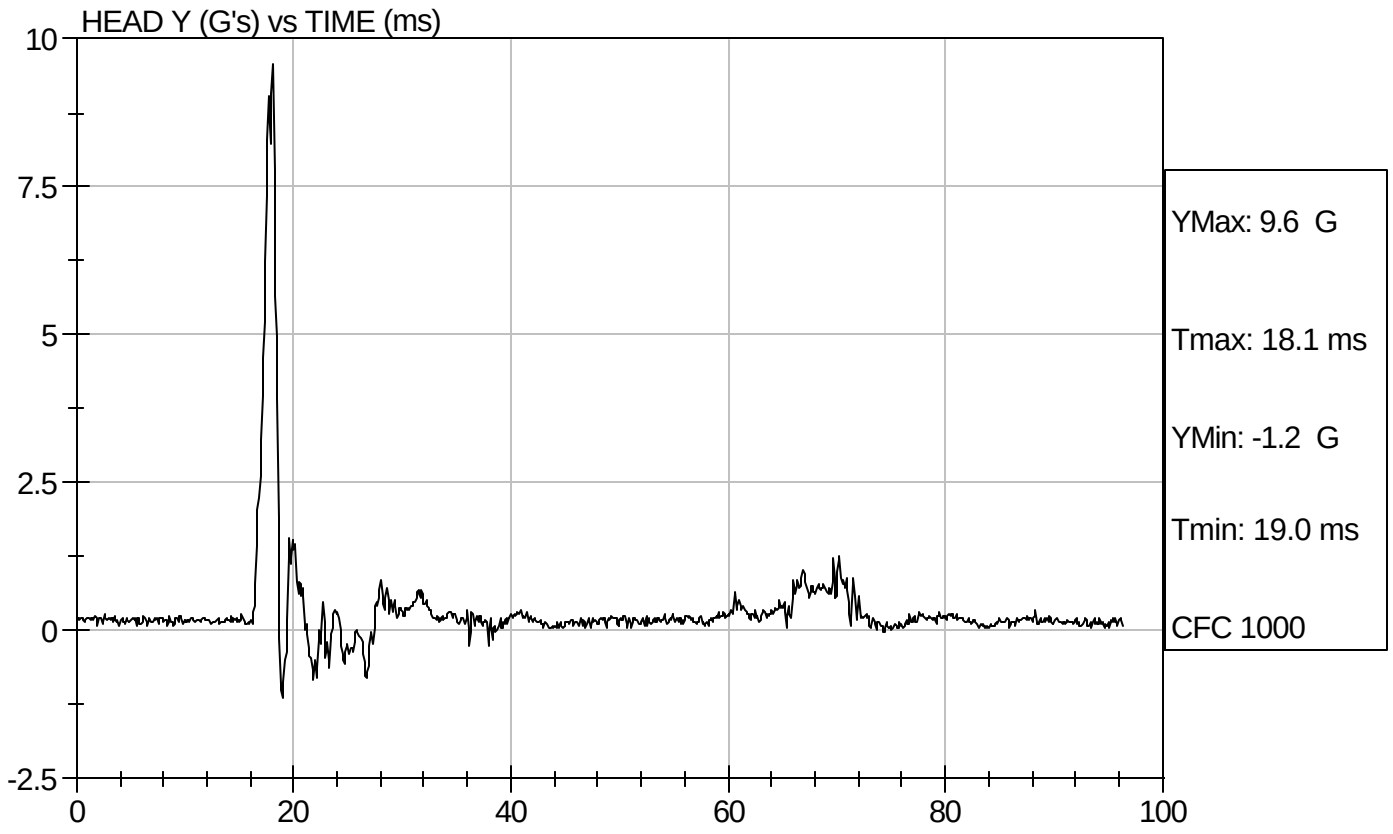
Jessica Gall
Laboratory Technician

12/13/07
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 12/13/07
	Component: D073591	Speed: 0 ft/s, 0.00 m/s





Hybrid III Calibration Data Sheet

3 Year Old

Neck Flexion Test

ATD Serial No: 032 **Test I.D:** D073592

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.6	Pass
Laboratory Relative Humidity		%	10 to 70	18	Pass
Pendulum Speed		m/s	5.4 to 5.6	5.52	Pass
Pendulum Deceleration	10 msec	m/s	2.0 - 2.7	2.7	Pass
	15 msec	m/s	3.0 - 4.0	3.8	Pass
	20 msec	m/s	4.0 - 5.1	5.1	Pass
D Plane Rotation		deg	70 - 82	74	Pass
Peak Moment within Deflection Corridor		Nm	42.0 - 53.0	42.6	Pass
Positive Moment - Time Curve Decay to 10 Nm		msec	60.0 - 80.0	68.2	Pass
			Overall Test Results		Pass

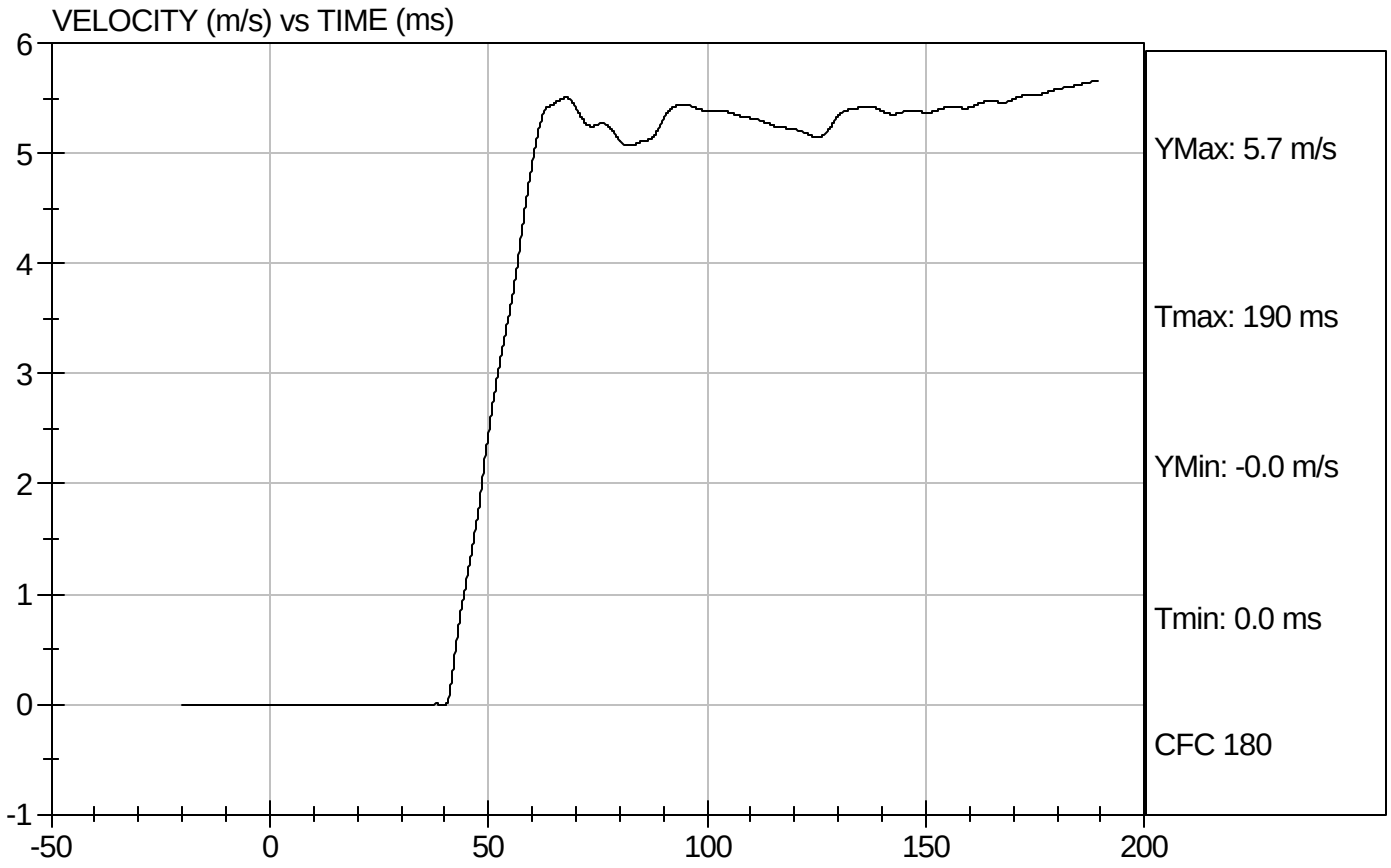
Jessica Gall
Laboratory Technician

12/17/07
Test Date

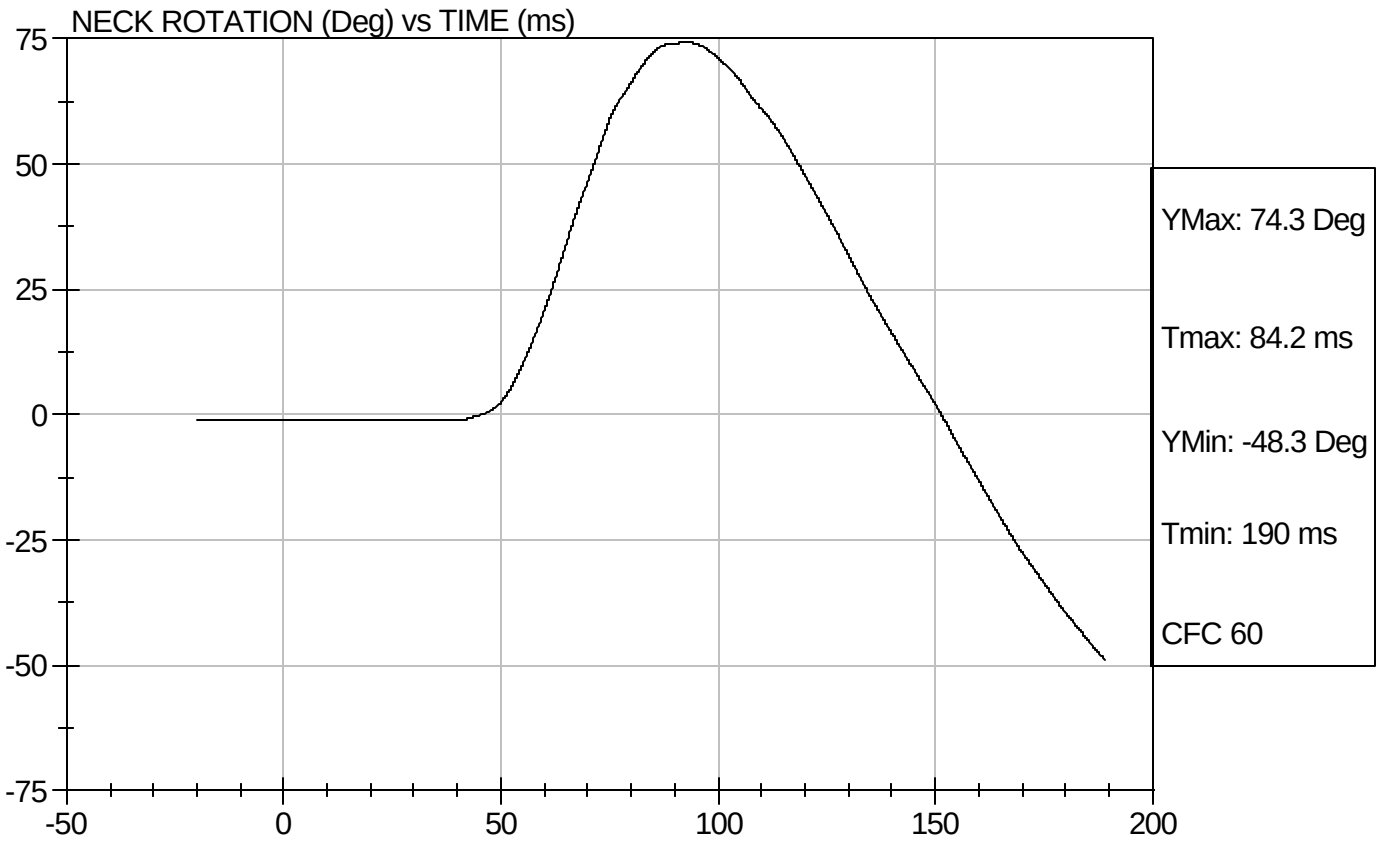
David Winkelbauer
Approved By

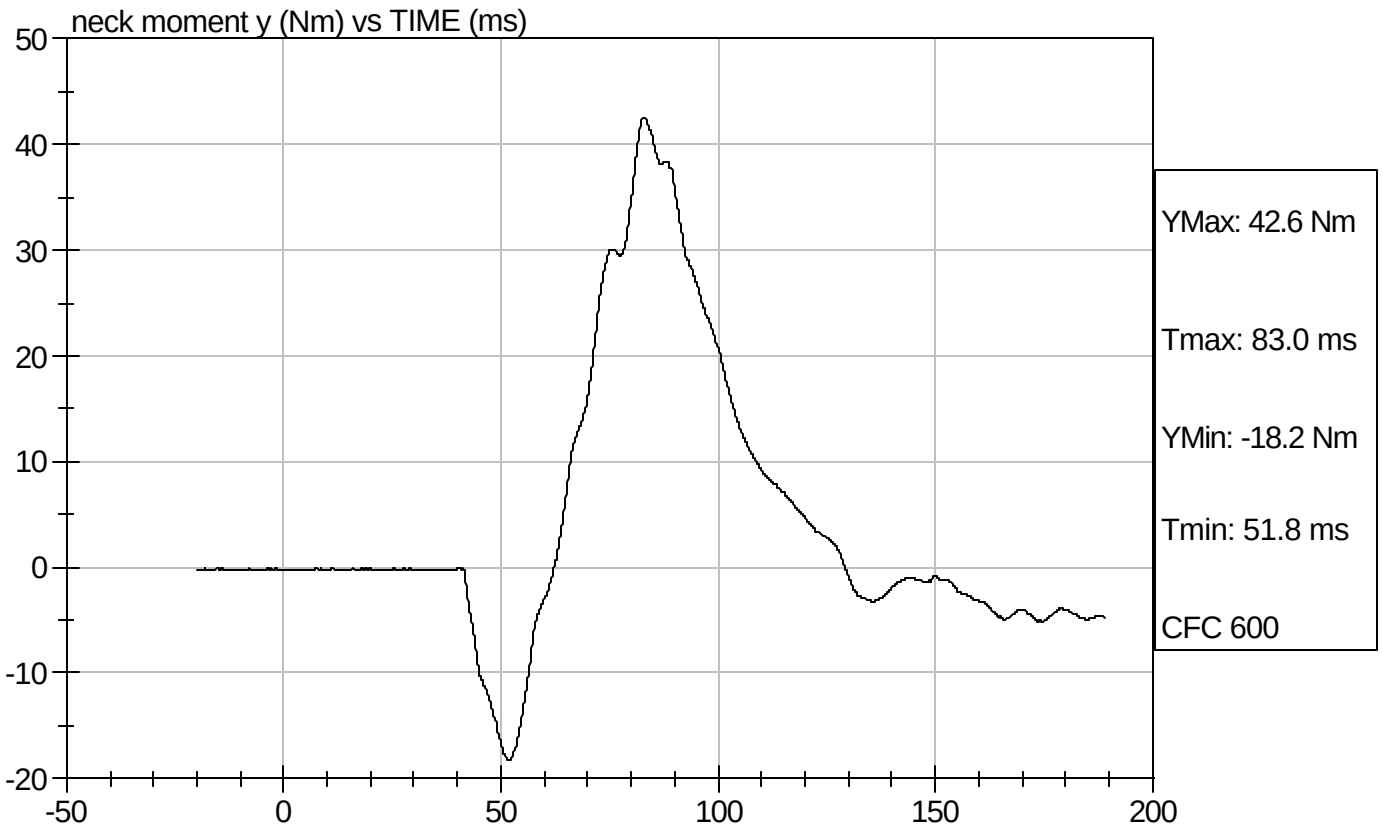
Test Description: Neck Flexion | Test Date: 12/17/07

Component: D073592 | Speed: 18.11 ft/sec, 5.52 m/sec



	Test Description: Neck Flexion	Test Date: 12/17/07
	Component: D073592	Speed: 18.11 ft/s, 5.52 m/s





Hybrid III Calibration Data Sheet

3 Year Old

Neck Extension Test

ATD Serial No: 032 **Test I.D:** D073593

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity		%	10 to 70	19	Pass
Pendulum Speed		m/s	3.55 to 3.75	3.73	Pass
Pendulum Deceleration	6 msec	m/s	1.0 - 1.4	1.1	Pass
	10 msec	m/s	1.9 - 2.5	2.1	Pass
	14 msec	m/s	2.8 - 3.5	3.2	Pass
D Plane Rotation		deg	83 - 93	86	Pass
Peak Moment within Deflection Corridor		Nm	-53.3 - -43.7	-49.2	Pass
Negative Moment - Time Curve Decay to -10 Nm		msec	60.0 - 80.0	66.2	Pass
			Overall Test Results		Pass

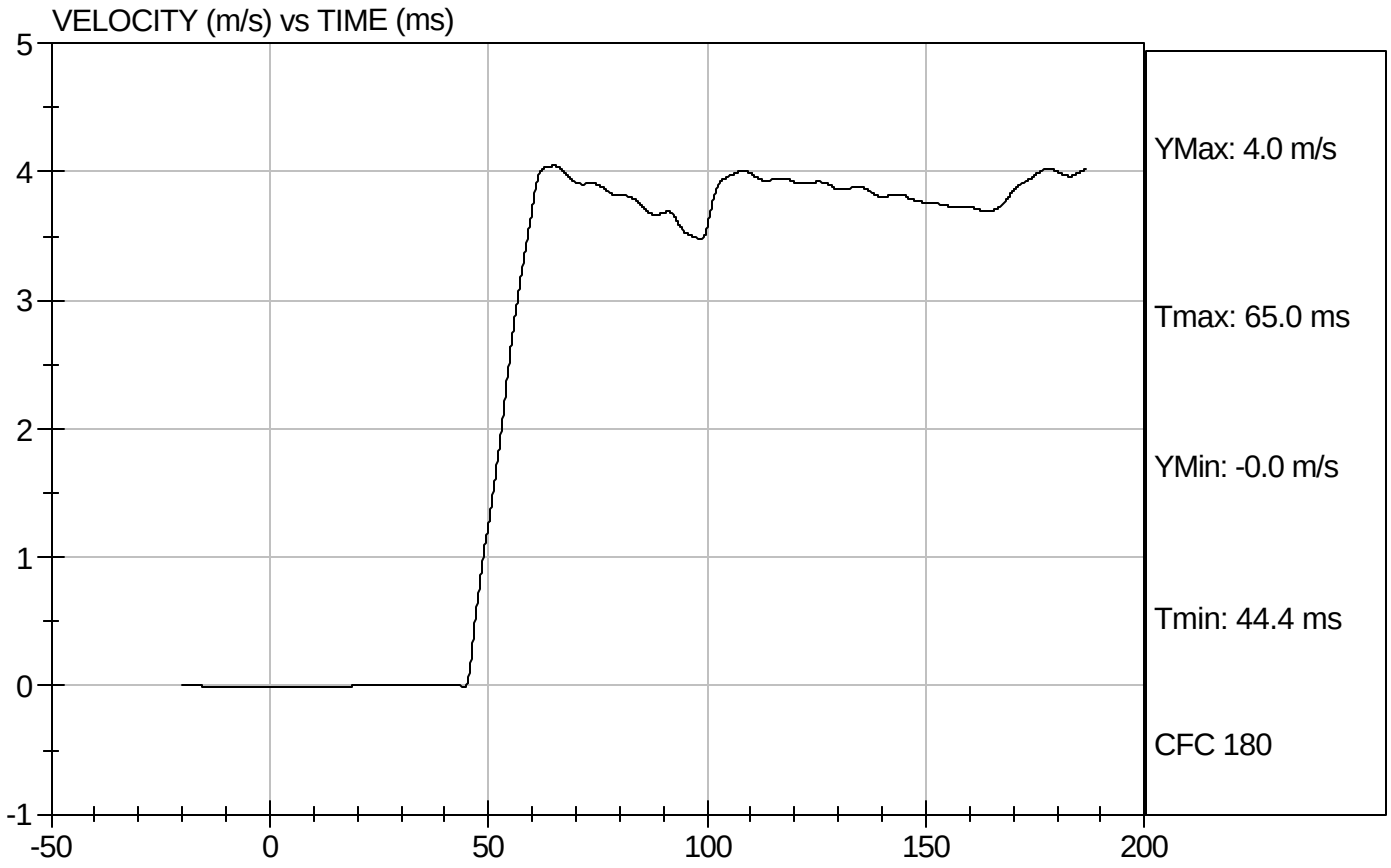
Jessica Gall
Laboratory Technician

12/18/07
Test Date

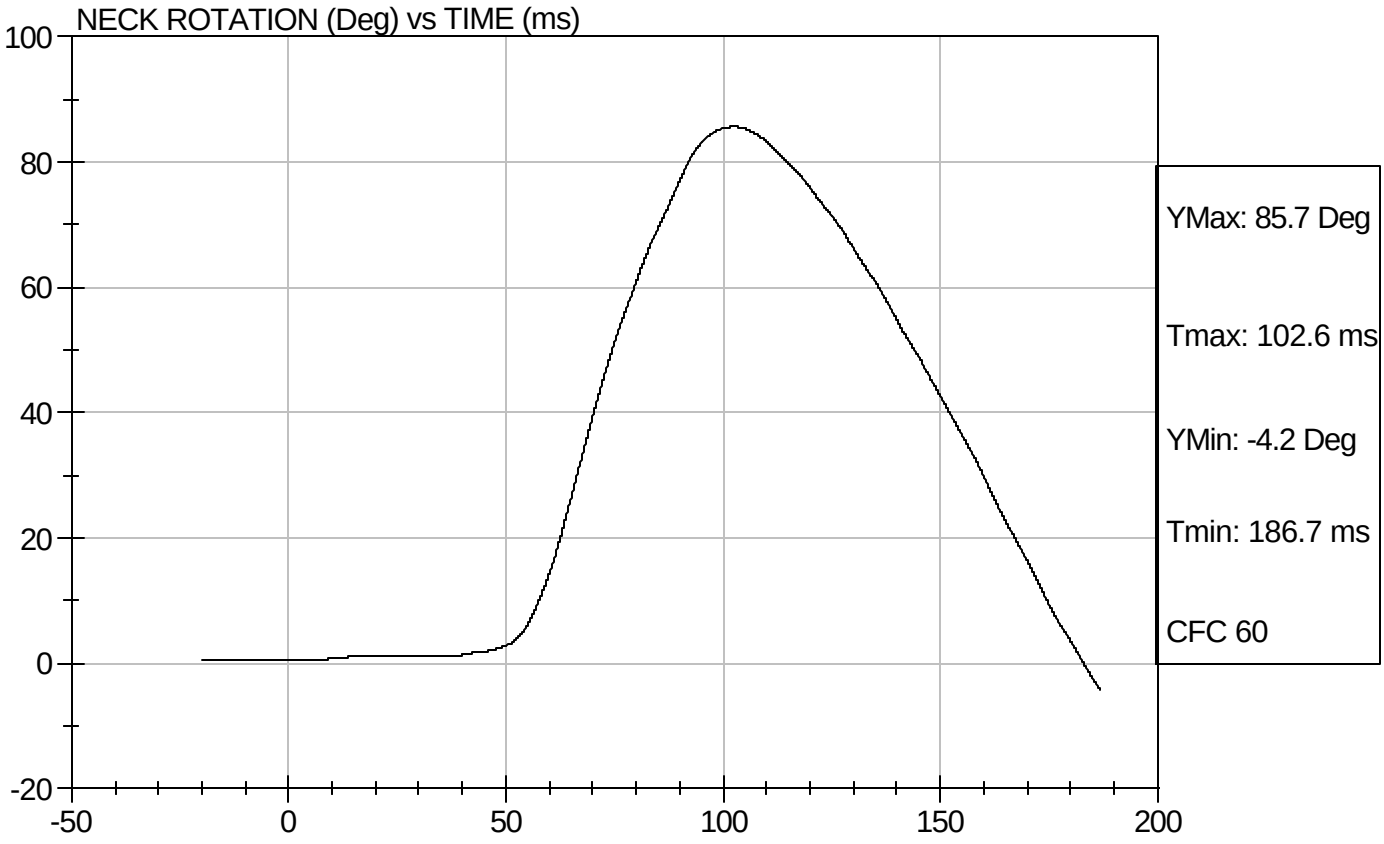
David Winkelbauer
Approved By

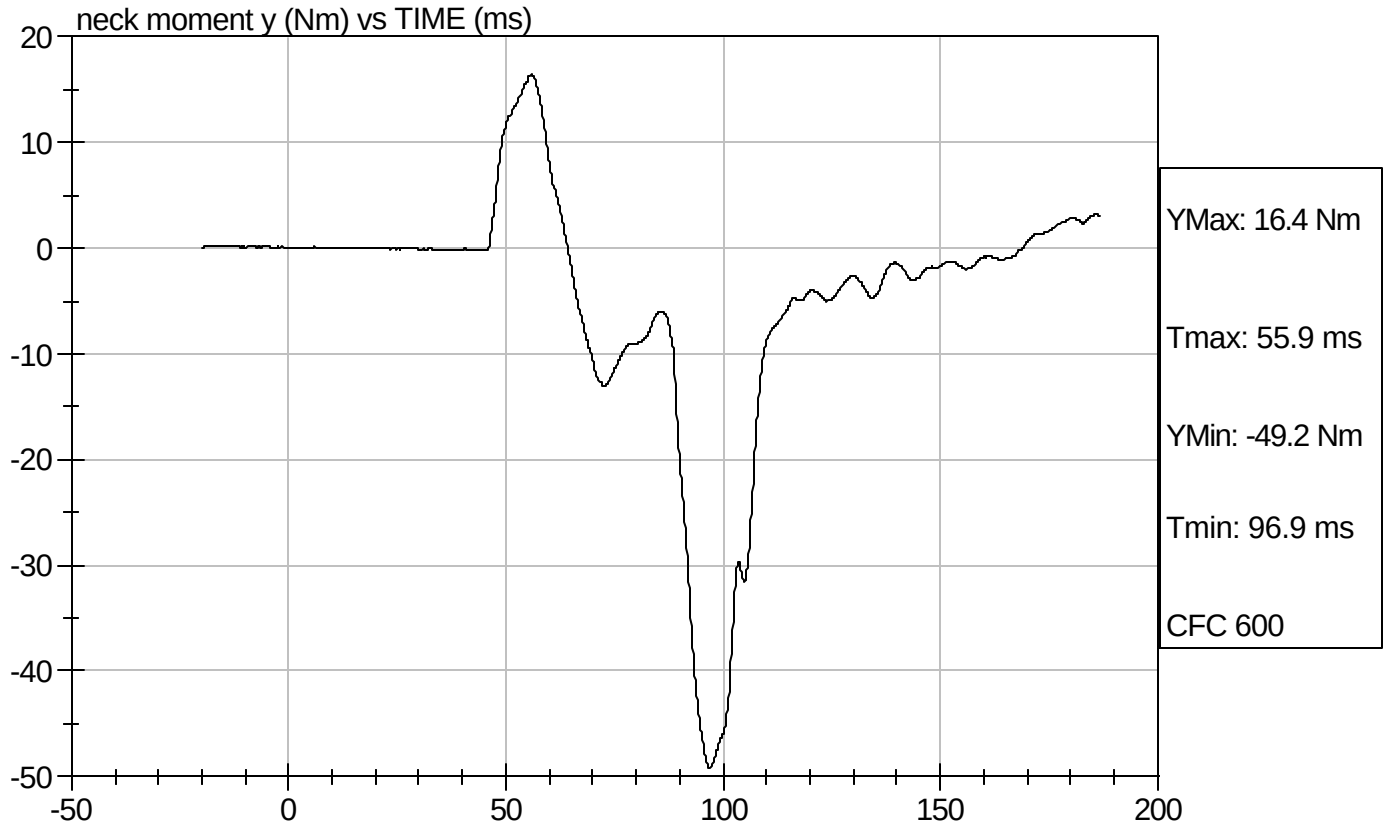
Test Description: Neck Extension Test Date: 12/18/07

Component: D073593 Speed: 12.24 ft/sec, 3.73 m/sec



	Test Description: Neck Extension	Test Date: 12/18/07
	Component: D073593	Speed: 12.24 ft/s, 3.73 m/s





Hybrid III Calibration Data Sheet

3 Year Old

Thorax Impact Test

ATD Serial No: 032 **Test I.D:** D073594

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Probe Velocity	m/s	5.9 to 6.1	6.0	Pass
Peak Deflection	mm	32 - 38	35	Pass
Peak Resistive Force w/in Deflection Corridor	kN	0.68 - 0.81	0.71	Pass
Internal Hysteresis	%	65 to 85	69	Pass
Max Force 12.5 mm - 32 mm Deflection	kN	Max 0.86	0.76	Pass
		Overall Test Results		Pass

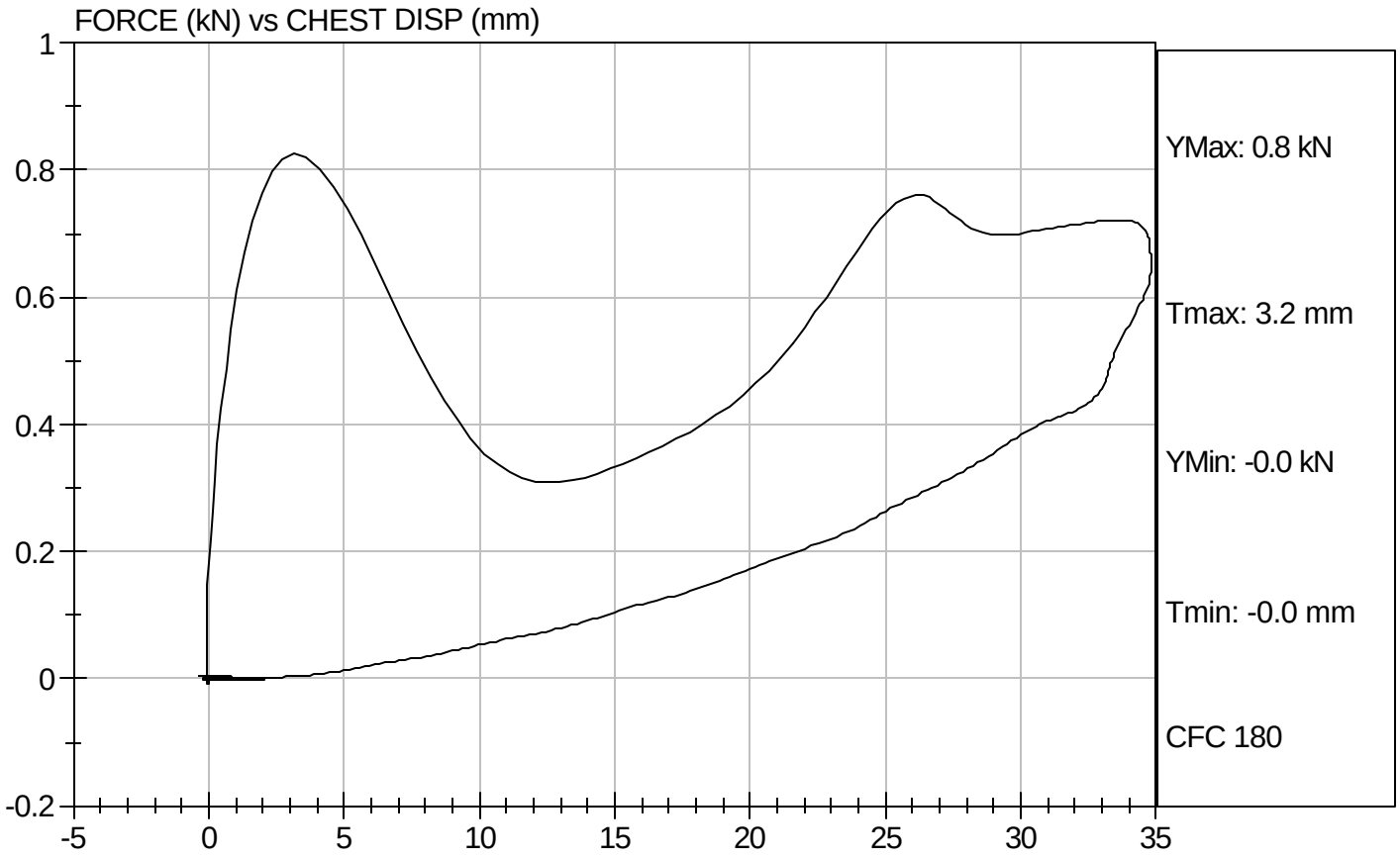
Jessica Gall
Laboratory Technician

12/18/07
Test Date

David Winkelbauer
Approved By

Test Description: Thorax Impact | Test Date: 12/18/07

Component: D073594 | Speed: 19.6 ft/sec, 5.97 m/sec



Hybrid III Calibration Data Sheet

3 Year Old

Torso Lumbar Flexion

ATD Serial No: 032 **Test I.D:** D073597

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Force At 45 deg.	N	130 - 180	167	Pass
Initial Angle	deg	0 - 15	2	Pass
Return Angle	deg	0 - 10	2	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

12/13/07
Test Date

David Winkelbauer
Approved By