REPORT NUMBER: NCAP-MGA-2005-011

NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST

DaimlerChrysler Corporation
2005 Jeep Grand Cherokee
NHTSA NUMBER: M50307

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

Test Date: January 31, 2005

Report Date: March 21, 2005

FINAL REPORT

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

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-01-D-12005.

Prepared by: _____ Date: 03/21/05
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Reviewed by: _____ Date: 03/21/05
David Winkelbauer, Facility Director

FINAL REPORT ACCEPTED BY:

_____
Manager, New Car Assessment Program

_____
Date of Acceptance

_____
COTR, NCAP Frontal Impact Program

_____
Date of Acceptance

Technical Report Documentation Page

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16. Abstract

A 35.0 mph (56.3 km/h) frontal barrier impact was conducted on a 2005 Jeep Grand Cherokee at MGA Research Corporation on January 31, 2005. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The impact velocity was 56.8 km/h. The ambient temperature at the barrier face at the time of impact was 21 degrees celsius. The vehicle's maximum post test static crush is 603 mm located left of the vehicle's centerline. The test vehicle is equipped with a 3-point continuous belt system and an airbag in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows:

Measurement Description	Units	Threshold	Driver ATD	Pass. ATD
Head Injury Criteria (HIC)	N/A	1000	381	387
Max. Thorax Accel. (3msec Clip)	G's	60	32	34
Left Femur Force	Newton	10009	-4738	-3676
Right Femur Force	Newton	10009	-3980	-1997

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PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-01-D-12005. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact in excess of the current 48.3 kph requirements.

SUMMARY

A load cell barrier consisting of 30 load cells was impacted by a 2005 Jeep Grand Cherokee at a velocity of 56.8 kph. The test was performed at MGA Research Corporation on January 31, 2005. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and sixteen high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometer, upper neck transducers, right/left femur load cells, and lower leg instrumentation. The driver (position 1) ATD (Serial No. 065) and right-front passenger (position 2) ATD (Serial No. 066) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 153 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard Solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 603 mm and both the driver and passenger side doors remained closed and latched during the impact event and were operable after the impact.

The driver’s head, chest, and abdomen contacted the airbag. The driver’s head also contacted the headrest. The driver’s knees contacted the bolster. The passenger’s head, chest and abdomen contacted the airbag. The passenger's head contacted the headrest. The passenger’s knees contacted the glove box.

The occupant data is summarized below:

ATD position	HIC	Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver	380.6	31.9	-31.0	-4738	-3980
Passenger	386.9	33.7	-25.4	-3676	-1997

TEST NOTES

None

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

CONVERSION FACTORS USED IN THIS REPORT*

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

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

DATA SHEET NO. 1
CRASH TEST SUMMARY

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/hr	56.8
Test Weight	kg	2321.0
Average Rebound	mm	2487
Maximum Static Crush	mm	603
Impact Angle	degrees	0

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Doors were unlocked	Doors were unlocked
Front Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Rear Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Seat Track Shift (mm)	0	0
Seat Back Failure	None	None
Glazing Damage	None	

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type / Serial No.	HIII 50th / 065	HIII 50th / 066
Head Contact	Airbag, Headrest	Airbag, Headrest
Chest Contact	Airbag	Airbag
Abdomen Contact	Airbag	Airbag
Left Knee Contact	Knee Bolster	Glove Box
Right Knee Contact	Knee Bolster	Glove Box

DIGITAL MOVIE COVERAGE

High Speed	16
Real Time	1
Total	17

Driver ATD Sensors	46
Passenger ATD Sensors	42
Belt Assessment Sensors	4
Vehicle Structure Accelerometers	9
Rigid Barrier Load Cells	30
Total	101

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Jeep Grand Cherokee
Test Program: 35mph Frontal Impact

NHTSA No.: M50307
Test Date: 01/31/05

TEST VEHICLE INFORMATION

Manufacturer	DaimlerChrysler
Model	Jeep Grand Cherokee
Body Style	SUV
NHTSA No.	M50307
VIN	1J4GR48K05C509667
Color	Red
Delivery Date	12/07/04
Odometer Reading (mile)	153
Dealer	Albion Motors
Transmission	Automatic
Final Drive	4 wheel
Number of Cylinders	6
Engine Displacement (L)	3.7
Engine Placement	Longitudinal
Automatic Door Lock (ADL)	Yes
Owner's Manual Details Instructions on Disabling ADLs	Yes

TEST VEHICLE OPTIONS

Driver Airbag	Yes
Passenger Airbag	Yes
Force Limiter	Yes
Pretensioner	Yes
Power Windows	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Power Brakes	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	Yes
Anti-lock Brakes	Yes
AM/FM/CD	Yes
Anti-theft System	Yes
Cruise Control	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	DaimlerChrysler Corporation
Date of Manufacture	10/04

GVWR (kg)	2677
GAWR Front (kg)	1339
GAWR Rear (kg)	1452

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	228	228
Recommended Tire Size	P245/65R17	P245/65R17
Tire Size on Vehicle	P245/65R17	P245/65R17
Tire Manufacturer	Goodyear	Goodyear

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				498
Cargo Wt. (RCLW) (kg)				136.1

DATA SHEET NO. 2... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	552.9	496.2		597.8	595.1	
Right	kg	528.4	460.4		577.9	550.2	
Ratio	%	53.1	46.9		50.7	49.3	
Totals	kg	1081.3	956.6	2037.9	1175.7	1145.3	2321.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2037.9
Weight of 2 P572E ATDs	kg	156.0
Rated Cargo/Luggage Weight (RCLW)	kg	136.1
Calculated Vehicle Target Weight (TVTW)	kg	2330.0

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	834	831	843	854	1305
As Tested	mm	814	819	813	824	1372
Post Test	mm	840	838	808	803	

Vehicle Wheelbase (mm): 2780

Weight of Ballast secured in cargo area (kg): 0.0

Vehicle Components Removed: Rear interior, spare tire, jack and wrench

Ballast weight does not include instrumentation and data acquisition system.

FUEL SYSTEM DATA

Fuel System Capacity From Owner's Manual (L): 77.6

Usable Capacity Figure Furnished by COTR (L): 77.6

Actual Test Volume (L): 72.9

Test Fluid Type: Stoddard Solvent; Specific Gravity: 0.77

Is Vehicle Fuel Pump Electric or Mechanical? Electric

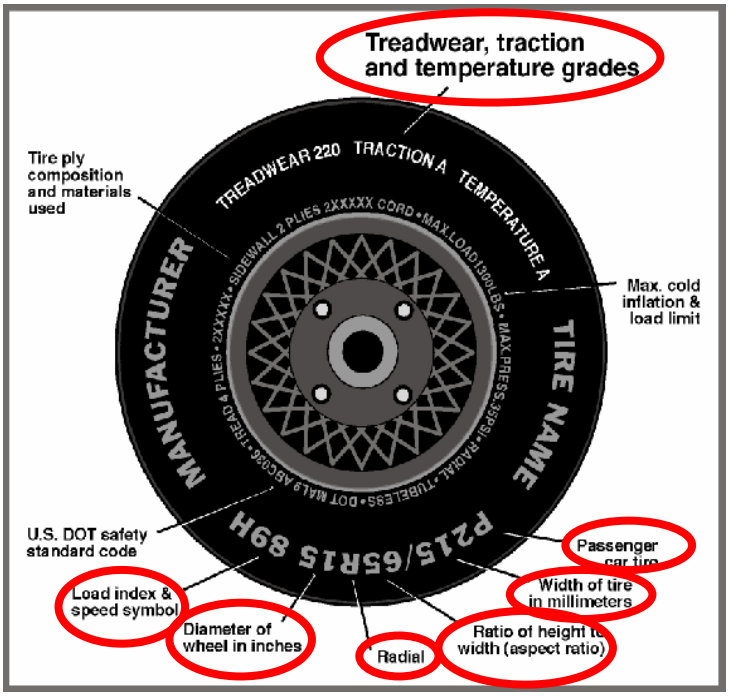
If electric, does pump operate with ignition switch "ON" & engine "OFF"? Yes

DATA SHEET NO. 3

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

Vehicle Year	2005	Vehicle Make	Jeep
VIN	1J4GR48K05C509667	Vehicle Model	Grand Cherokee



	Front	Rear
Tire Manufacturer	Goodyear	Goodyear
Tire Name	Wrangler SR-A	Wrangler SR-A
Tire Type	Passenger	Passenger
Tire Width (mm)	245	245
Ratio of Height to Width (aspect ratio)	65	65
Radial	Yes	Yes
Wheel Diameter	17	17
Load Index & Speed Symbol	105S	105S
Treadwear	360	360
Traction Grade	A	A
Temperature Grade	B	B

DATA SHEET NO. 4

POST IMPACT DATA

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	55.5 – 57.1	56.8
Trap No. 1 Entry Distance	mm	<1524	1300
Trap No. 1 Exit Distance	mm	<1524	300
Trap No. 2 Velocity (Redundant)	km/h	55.5 – 57.1	56.8
Trap No. 2 Entry Distance	mm	<1524	1425
Trap No. 2 Exit Distance	mm	<1524	425

VEHICLE STATIC CRUSH

Measured Parameter	Units	Pre-Test	Post-Test	Difference
Left Side	mm	4632	4165	467
Center	mm	4712	4166	546
Right Side	mm	4630	4178	452

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	2470
Center	mm	2510
Right Side	mm	2480
Average	mm	2487

DATA SHEET NO. 5

TEST VEHICLE INFORMATION

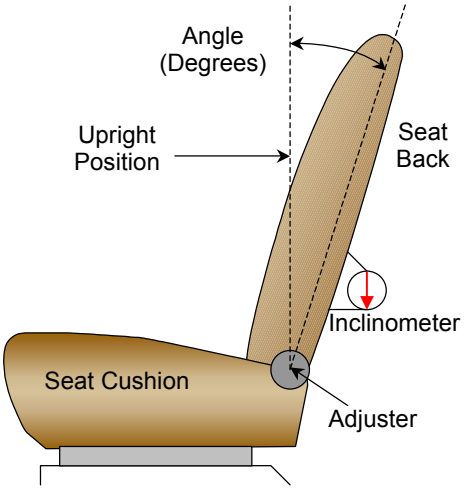
Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows: Measure 14 degrees when inclinometer is positioned across head rest support posts.

Driver seat back angle: 13.5° on Headrest post

Passenger seat back angle: 14.1° on Headrest post



FRONT SEAT ASSEMBLY

SEAT FORE/AFT POSITIONS

The driver seat is power adjustable and the passenger seat is manually adjustable.

Driver seat fore/aft total travel: 292 mm
Passenger seat fore/aft total travel: 292 mm (manual w/ notches)
Driver seat fore/aft position: 146 mm
Passenger seat fore/aft position: 146 mm

DATA SHEET NO. 5... (continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

FUEL TANK CAPACITY DATA

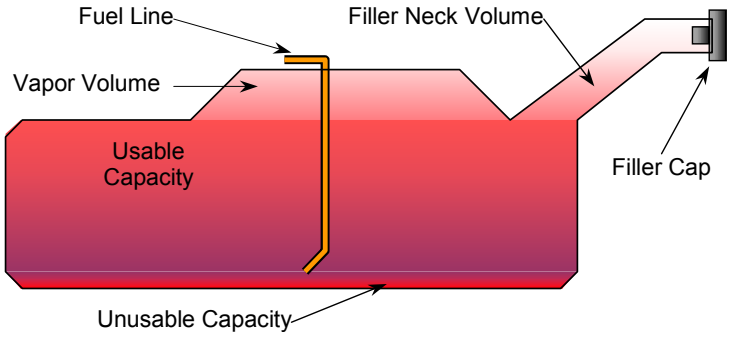
The "Usable Capacity" of the standard equipment fuel tank is: 77.6 liters

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

The "Usable Capacity" used for certification to FMVSS 301 requirements: 77.6 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 72.9 liters

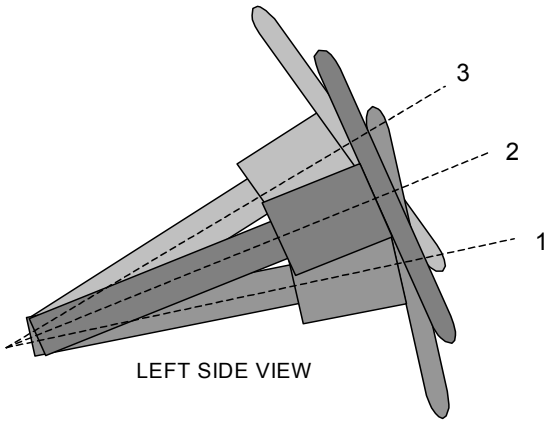
The fuel door is located on the left hand side of the vehicle.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Adjustable steering controls are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. Measure steering wheel angle at highest and lowest point of column travel and bisect the difference.



STEERING COLUMN ASSEMBLY

Lowermost. Position 1: 18.8°

Geometric Center, Position 2: 22.1°

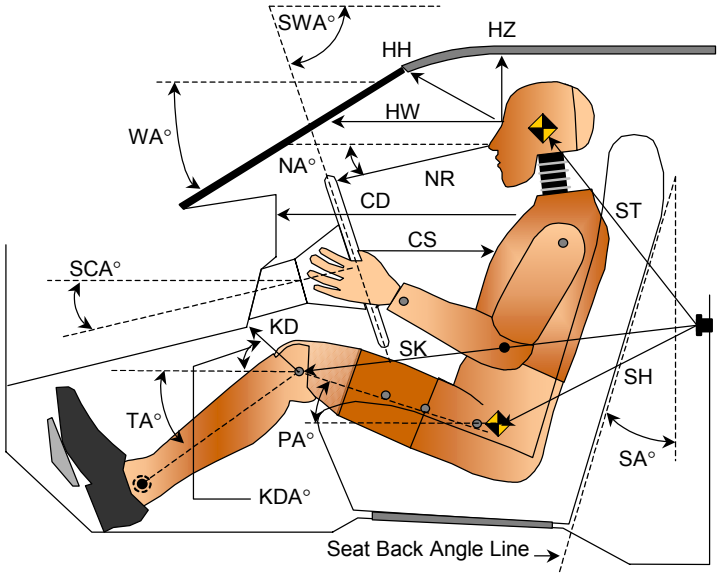
Uppermost, Position 3: 25.4°

DATA SHEET NO. 6

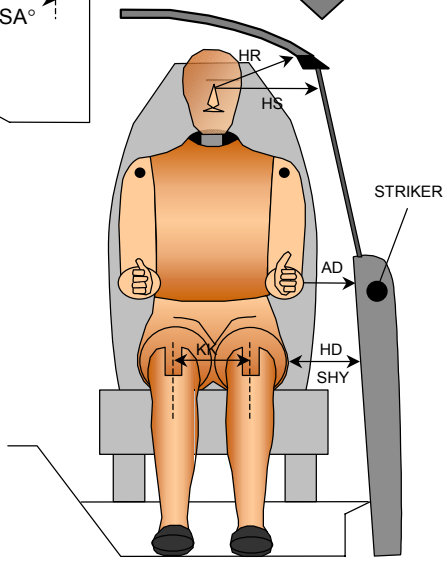
DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

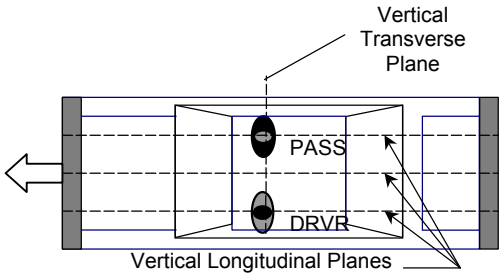
DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS



AD	Arm to Door
HD	H-Point to Door
HR	Head to Side Header
HS	Head to Side Window
KK	Knee to Knee
SHY	Striker to H-Point (Y Axis)



CD	Chest to Dash
CS	Chest to Steering Wheel Hub
HH	Head to Header
HW	Head to Windshield
HZ	Head to Roof
KDA	Knee to Dash Angle
KDL	Left Knee to Dash
KDR	Right Knee to Dash
NA	Nose to Rim Angle
NR	Nose to Rim
PA	Pelvic Angle
RA	Rim to Abdomen
SA	Seat Back Angle
SCA	Steering Column Angle
SH	Striker to H-Point
SK	Striker to Knee
ST	Striker to Head
SWA	Steering Wheel Angle
TA	Tibial Angle
WA	Windshield Angle



DATA SHEET NO. 6... (continued)

DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

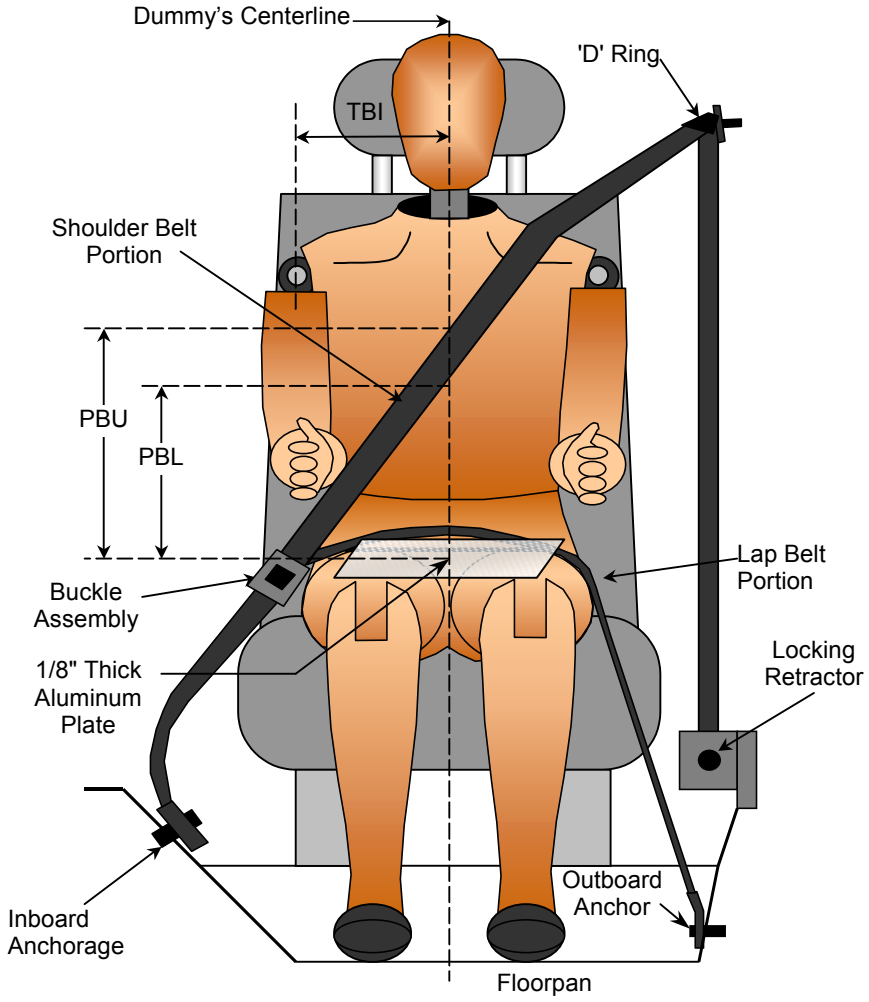
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		33.0		
SWA	Steering Wheel Angle		67.3		
SCA	Steering Column Angle		22.1		
SA	Seat Back Angle (headrest post)		13.5		14.1
HZ	Head to Roof (Z)	196	90.0	184	90.0
HH	Head to Header	452	11.6	477	10.5
HW	Head to Windshield	638	0.0	643	0.0
HR	Head to Side Header (Y)	187		175	
NR	Nose to Rim	417	13.0		
CD	Chest to Dash	586		578	
CS	Chest to Steering Hub	346	15.7		
RA	Rim to Abdomen	196	0.0		
KDL	Left Knee to Dash	163	32.5	170	
KDR	Right Knee to Dash	153		177	33.5
PA	Pelvic Angle		24.8		24.0
TA	Tibia Angle		46.8		46.5
KK	Knee to Knee (Y)	309		258	
SK	Striker to Knee	558	88.7	535	87.8
ST	Striker to Head	586	2.0	600	1.4
SH	Striker to H-Point	162	108.3	145	107.2
SHY	Striker to H-Point (Y)	224		220	
HS	Head to Side Window	337		324	
HD	H-Point to Door (Y)	134		102	
AD	Arm to Door (Y)	90		81	
AA	Ankle to Ankle	289		172	

DATA SHEET NO. 7

SEAT BELT POSITIONING DATA

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy centerline to shoulder bolt	mm	170	170
PBU - Top surface of reference to belt upper edge	mm	316	336
PBL - To surface of reference to belt lower edge	mm	234	259

DATA SHEET NO. 8

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

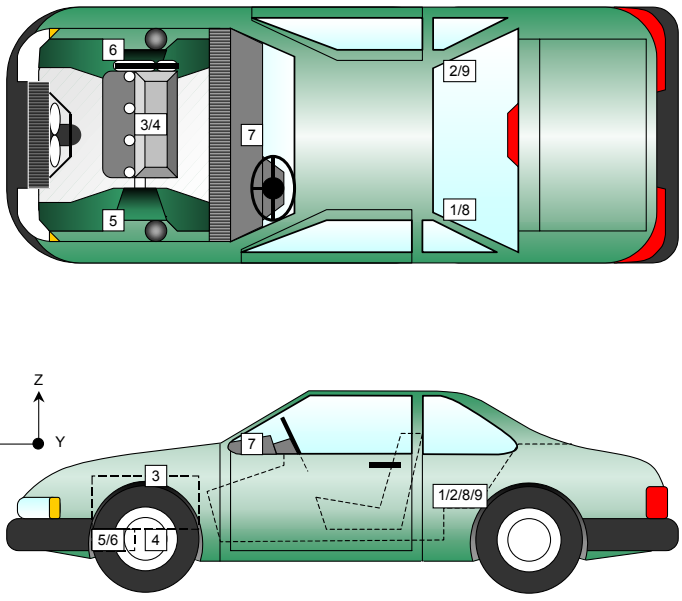
Test Vehicle: 2005 Jeep Grand Cherokee
Test Program: 35mph Frontal Impact

NHTSA No.: M50307
Test Date: 01/31/05

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)			Peak Values				
		X	Y	Z	Units	Max	Time	Min	Time
1	Left Rear X-Member X	1738	-585	580	G's	4.0	12	-55.4	8
2	Right Rear X-Member X	1743	580	590	G's	8.1	14	-54.4	8
3	Engine Top X	3762	0	1010	G's	17.7	75	-64.3	44
4	Engine Bottom X	3608	0	337	G's	9.3	70	-55.3	50
5	Left Brake Caliper X	3712	-690	275	G's	55.8	69	-84.4	52
6	Right Brake Caliper X	3712	690	273	G's	54.7	70	-72.0	51
7	Instrument Panel X	3154	0	1230	G's	10.1	28	-44.8	16
8	Left Rear X-Member Z	1738	-585	585	G's	19.3	7	-18.5	20
9	Right Rear X-Member Z	1743	580	595	G's	24.4	7	-11.8	11

Reference Points: X - Rear Surface of Vehicle (+ forward)
Y - Vehicle Centerline (+ to right)
Z - Ground Plane (+ up)



DATA SHEET NO. 9

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2005 Jeep Grand Cherokee
Test Program: 35mph Frontal Impact
NHTSA No.: M50307
Test Date: 01/31/05

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	2.7	287	-42.4	77	2.9	259	-43.3	92
Head CG	Y	G's	2.6	135	-5.2	92	4.0	39	-12.2	96
Head CG	Z	G's	20.5	73	-1.8	115	26.2	77	-0.6	12
Head CG Resultant	N/A	G's	46.8	77			47.8	91		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	1.6	155	-32.2	85	0.9	157	-34.9	69
Chest CG	Y	G's	1.1	114	-7.9	40	4.8	47	-3.8	82
Chest CG	Z	G's	6.9	34	-5.3	108	9.3	81	-3.3	123
Chest CG Resultant	N/A	G's	32.6	85			35.0	69		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	381	22	-4738	47	910	36	-3676	56
Right Femur	Z	Newtons	559	27	-3980	53	1190	40	-1997	56

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	4834	46			6711	51		
Shoulder Belt Force	N/A	Newtons	5045	51			5348	45		

HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg. G's	T^1	T^2	HIC	Avg. G's	T^1	T^2
Head CG Primary	380.6	40.7	63.8	99.8	386.9	41.0	69.2	105.2

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T^1	T^2	CLIP	T^1	T^2
Chest CG Primary	31.9	82.5	85.5	33.7	67.0	70.0

DATA SHEET NO. 9... (continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2005 Jeep Grand Cherokee
Test Program: 35mph Frontal Impact

NHTSA No.: M50307
Test Date: 01/31/05

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	1.9	107	-58.4	47	7.8	152	-58.5	56
Pelvis	Y	G's	10.5	94	-13.1	45	5.5	55	-6.6	87
Pelvis	Z	G's	2.7	14	-21.8	51	7.5	244	-26.9	71

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	439	83	-362	114	523	88	-451	152
Neck Force	Y	Newtons	189	87	-191	27	97	53	-152	96
Neck Force	Z	Newtons	1362	73	-102	12	1123	74	-211	107
Neck Moment	X	N•m	8.7	142	-13.2	83	28.8	96	-6.4	137
Neck Moment	Y	N•m	40.7	84	-20.5	66	35.9	87	-17.8	119
Neck Moment	Z	N•m	9.7	87	-4.3	49	16.9	108	-11.0	161

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	6.6	96	-53.6	41	20.7	82	-51.0	49
Left Foot Aft	Z	G's	5.0	136	-41.1	40	1.9	143	-70.0	54
Left Foot Fore	Z	G's	11.8	136	-45.8	39	46.9	49	-74.7	56
Right Foot Aft	X	G's	21.4	84	-53.1	32	21.0	60	-125.8	53
Right Foot Aft	Z	G's	3.5	154	-38.9	65	1.7	134	-58.3	57
Right Foot Fore	Z	G's	20.7	61	-64.1	32	15.7	55	-79.8	46

* No valid data collected

UPPER AND LOWER TIBIA PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Lower Moment	X	N•m	18.5	41	-33.1	93	10.4	53	-8.3	81
Left Lower Moment	Y	N•m	32.3	49	-59.9	36	20.6	41	-46.0	82
Left Lower Force	Z	Newtons	95	156	-1994	44	172	28	-3663	55
Left Upper Moment	X	N•m	5.5	169	-8.2	32	8.6	76	-37.6	53
Left Upper Moment	Y	N•m	12.2	36	-15.0	94	43.4	83	-16.3	55
Left Upper Force	Z	Newtons	81	117	-2121	68	318	31	-3201	56
Right Lower Moment	X	N•m	6.3	193	-50.3	70	60.6	56	-8.4	93
Right Lower Moment	Y	N•m	21.7	33	-29.9	42	17.9	45	-60.0	58
Right Lower Force	Z	Newtons	121	17	-2444	61	345	40	-3294	55
Right Upper Moment	X	N•m	24.2	53	-15.7	151	18.4	99	-57.3	56
Right Upper Moment	Y	N•m	25.2	108	-68.4	46	98.7	49	-9.0	158
Right Upper Force	Z	Newtons	181	108	-2074	56	538	39	-3431	55

DATA SHEET NO. 9... (continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2005 Jeep Grand Cherokee
Test Program: 35mph Frontal Impact

NHTSA No.: M50307
Test Date: 01/31/05

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest	X	mm			-31.0	87			-25.4	84

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	2.9	251	-43.1	76	3.3	258	-42.9	92
Head CG	Y	G's	2.5	135	-4.9	93	4.0	34	-12.4	96
Head CG	Z	G's	22.2	73	-1.8	113	25.6	77	-0.7	11
Head CG Resultant	N/A	G's	48.3	73			46.9	92		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	1.7	161	-34.0	48	1.0	181	-34.0	69
Chest CG	Y	G's	0.8	106	-6.1	52	6.4	46	-3.5	66
Chest CG	Z	G's	6.9	36	-5.3	110	9.4	81	-3.4	123
Chest CG Resultant	N/A	G's	34.3	48			34.1	69		

REDUNDANT HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg.	T^1	T^2	HIC	Avg.	T^1	T^2
Head CG Primary Redundant	399.1	41.5	63.9	99.9	361.1	39.9	69.3	105.3

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T^1	T^2	CLIP	T^1	T^2
Chest CG Primary Redundant	32.2	46.0	49.0	33.2	67.0	70.0

DATA SHEET NO. 10

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

Test Vehicle: 2005 Jeep Grand Cherokee
Test Program: 35mph Frontal Impact

NHTSA No.: M50307
Test Date: 01/31/05

SEAT BELT PLACEMENT MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy centerline to shoulder bolt	mm	170	170
PBU - Top surface of reference to belt upper edge	mm	316	336
PBL - Top surface of reference to belt lower edge	mm	234	259

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Retractor reel to "D" ring	mm	434	434
Shoulder belt length as measured on ATD	mm	759	736
Lap belt length as measured on ATD	mm	588	569
Remainder of belt on reel	mm	754	796
Total belt length for continuous webbing systems	mm	2535	2535

SHOULDER BELT SPOOL-OUT DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm	Not recorded	
As determined electronically	mm	Not recorded	

DATA SHEET NO. 11

SUMMARY OF FMVSS 212 DATA

Test Vehicle: 2005 Jeep Grand Cherokee
Test Program: 35mph Frontal Impact

NHTSA No.: M50307
Test Date: 01/31/05

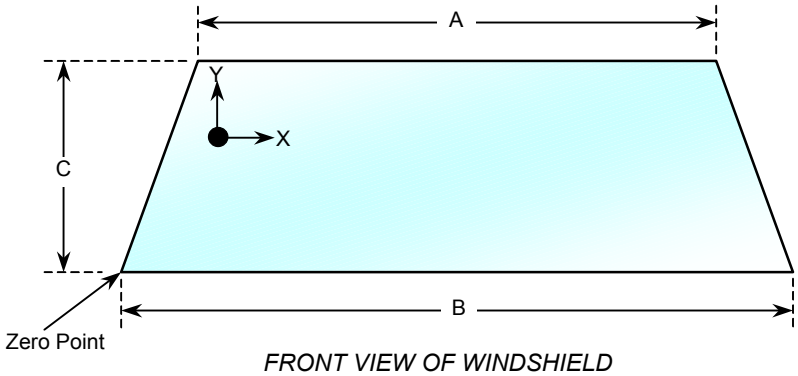
Windshield Mounting Details:
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

The standard requires that the post-test retention measurement be a minimum of 75 percent of the pretest total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles, which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21 °C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2145	2145	100
Right Side	2145	2145	100
Total	4290	4290	100



FRONT VIEW OF WINDSHIELD

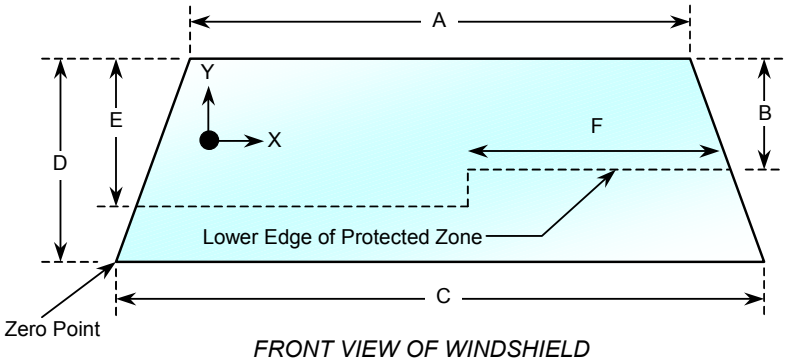
WINDSHIELD DIMENSIONS

Item	Units	Segment Length	Molding Width
A	mm	1330	15
B	mm	1570	N/A
C	mm	695	25

DATA SHEET NO. 12

WINDSHIELD ZONE INTRUSION FMVSS 219 (Partial) DATA

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1330
B	mm	492
C	mm	1570
D	mm	695
E	mm	450
F	mm	492

AREA OF PROTECTED ZONE FAILURES - NONE

A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield. **None**

X	Y

B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component. **None**

X	Y

DATA SHEET NO. 13

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

Temperature at Time of Impact: 21° C Test Time: 12:03 pm

Stoddard Solvent Spillage Measurements

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

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

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

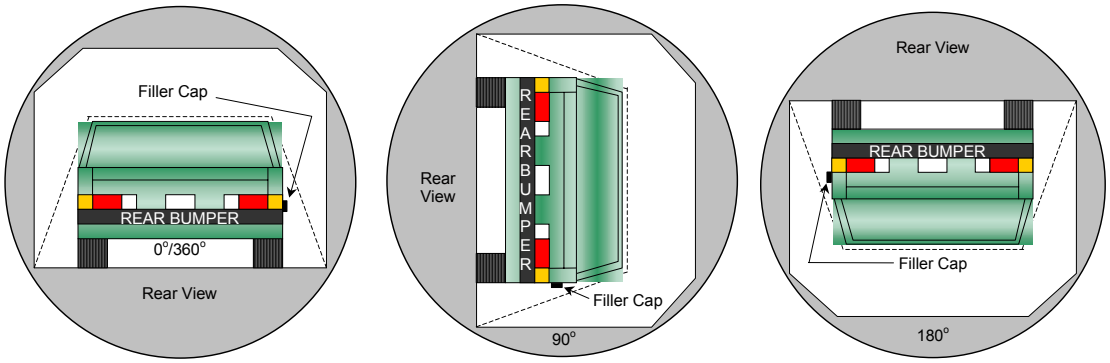
D. Spillage: None

DATA SHEET NO. 14

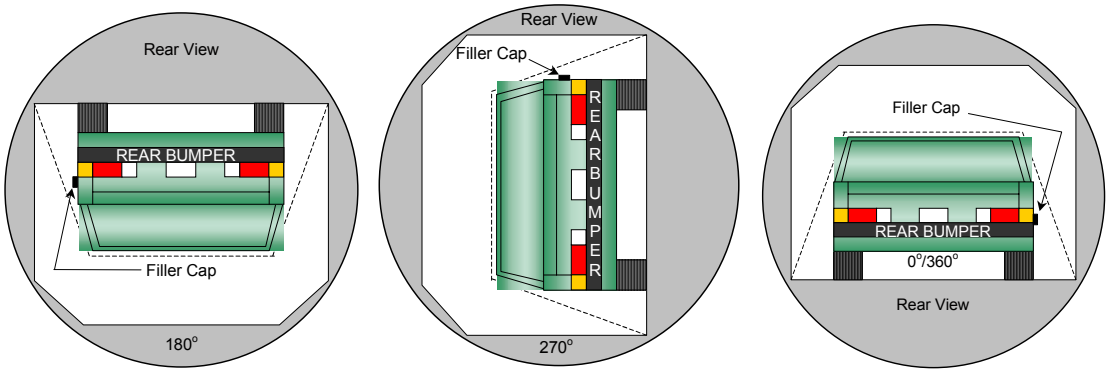
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

Test Time: 3:00 pm



0° to 90° 90° to 180°



180° to 270° 270° to 360°

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

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	164	300	0
90° to 180°	152	300	0
180° to 270°	134	300	0
270° to 360°	160	300	0

DATA SHEET NO. 15

VEHICLE MEASUREMENTS

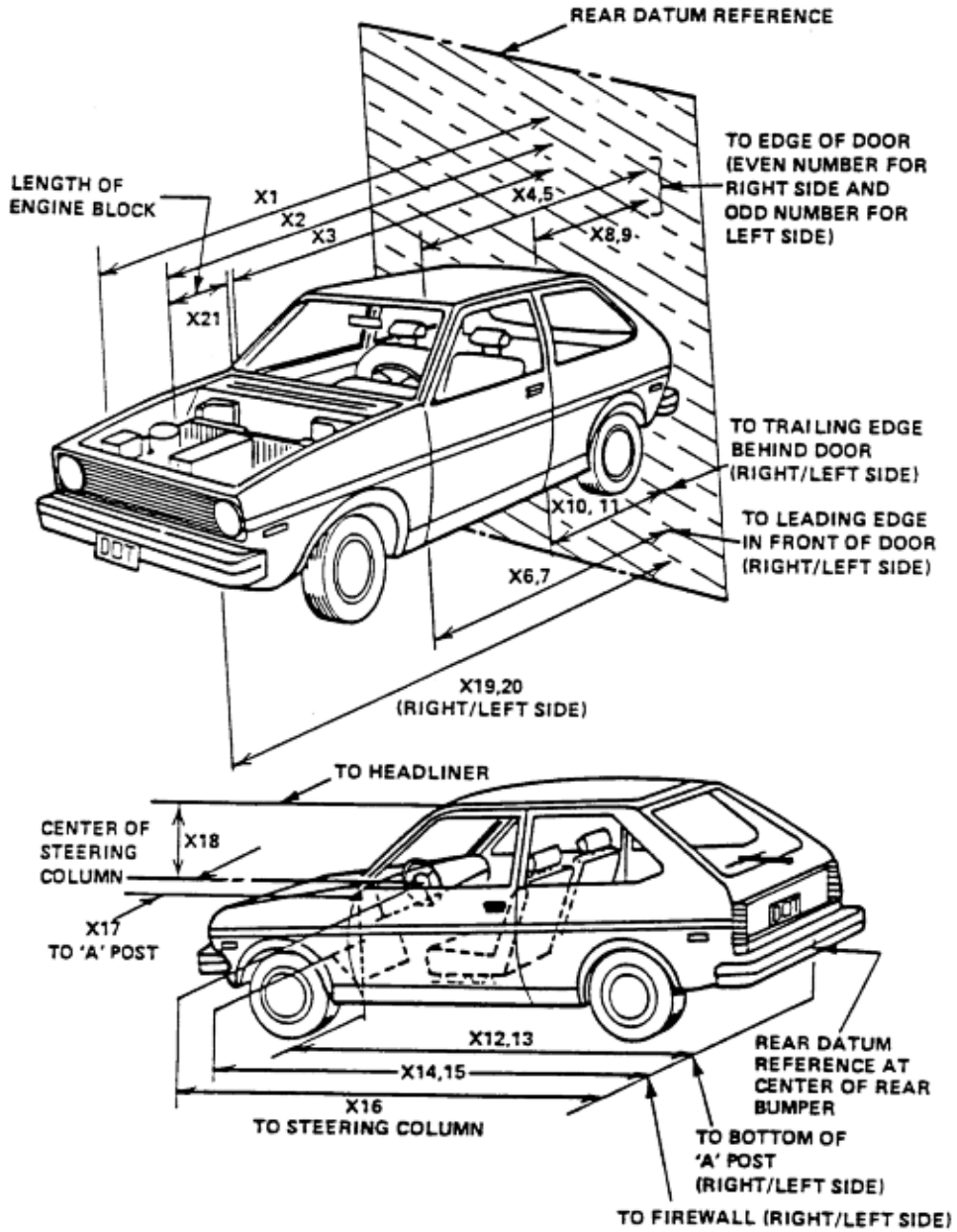
Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	4712	4166	546
2	RSOV to front of engine	mm	3762	3677	85
3	RSOV to firewall centerline	mm	3622	3599	23
4	RSOV to leading edge of right door	mm	3239	3237	2
5	RSOV to leading edge of left door	mm	3243	3230	13
6	RSOV to lower leading edge of right door	mm	3230	3230	0
7	RSOV to lower leading edge of left door	mm	3234	3238	-4
8	RSOV to upper trailing edge of right door	mm	2139	2137	2
9	RSOV to upper trailing edge of left door	mm	2145	2145	0
10	RSOV to lower trailing edge of right door	mm	2143	2143	0
11	RSOV to lower trailing edge of left door	mm	2144	2144	0
12	RSOV to bottom of right 'A' pillar	mm	3238	3236	2
13	RSOV to bottom of left 'A' pillar	mm	3235	3237	-2
14	RSOV to firewall on right side	mm	3403	3394	9
15	RSOV to firewall on left side	mm	3405	3385	20
16	RSOV to steering column	mm	2739	2749	-10
17	Center of steering column to left 'A' pillar	mm	385	350	35
18	Center of steering column to headlining	mm	420	390	30
19	RSOV to right side of front bumper	mm	4630	4178	452
20	RSOV to left side of front bumper	mm	4632	4165	467
21	Length of engine block	mm	580	580	0
RD	RSOV to right side of dash panel	mm	3001	2988	3
CD	RSOV to center of dash panel	mm	3024	2986	38
LD	RSOV to left side of dash panel	mm	2997	3008	-11

DATA SHEET NO. 15... (continued)

VEHICLE MEASUREMENTS

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05



DATA SHEET NO. 15... (continued)

VEHICLE MEASUREMENTS

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

Target Vehicle Structural Measurement

	Elements	Pre-Test (mm)
1	Total Length	4712
2	Total Width	1872
3	Bumper Top Height	684
4	Bumper Bottom Height	516
5	Longitudinal Member Top Height	310
6	Distance between Longitudinal Members	895
7	Longitudinal Member Width	135
8	Engine Top Height	1030
9	Engine Bottom Height	335
10	Engine and gearbox width	680
11	Front bumper-engine distance	580
12	Front shock absorber fixing height	840
13	Bonnet leading edge height	970
14	Front shock absorber fixing width	995
15	Front bumper – front axle distance	825
16	Front axle – a pillar distance	542
17	A-pillar – B-pillar distance	1175
18	B-Pillar – rear axle distance	1072
19	B-pillar – C-pillar distance	574
20	Roof sill bottom height	1597
21	Roof sill top height	1675
22	Floor sill bottom height	328
23	Floor sill top height	430

DATA SHEET NO. 16

CAMERA LOCATIONS

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

No.	Camera View	Location (mm) *			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View				13	24
2	Left Front View	1020	-8870	1398	25	1000
3	Steering Column Top	2180	-6693	1570	19	1000
4	Steering Column Bottom	2134	-6693	1040	19	1000
5	Driver Close-up	1710	-9400	1380	50	1000
6	Driver Angle	6550	-5040	2140	50	1000
7	Left Rear				8	500
8	Right Rear				8	500
9	Right Overall	2240	7380	1365	19	1000
10	Right Passenger Half	1165	9480	1465	24	1000
11	Right Close-up	1600	8190	1470	50	1000
12	Right Angle	6560	5000	2220	50	1000
13	Windshield	-290	0	2795	13	1000
14	Driver Front	90	-460	1770	25	1000
15	Passenger Front	95	460	1750	13	1026
16	Pit Front	1110	0	-3150	24	1000
17	Pit Rear	3480	0	-3150	24	1000

*COORDINATES:

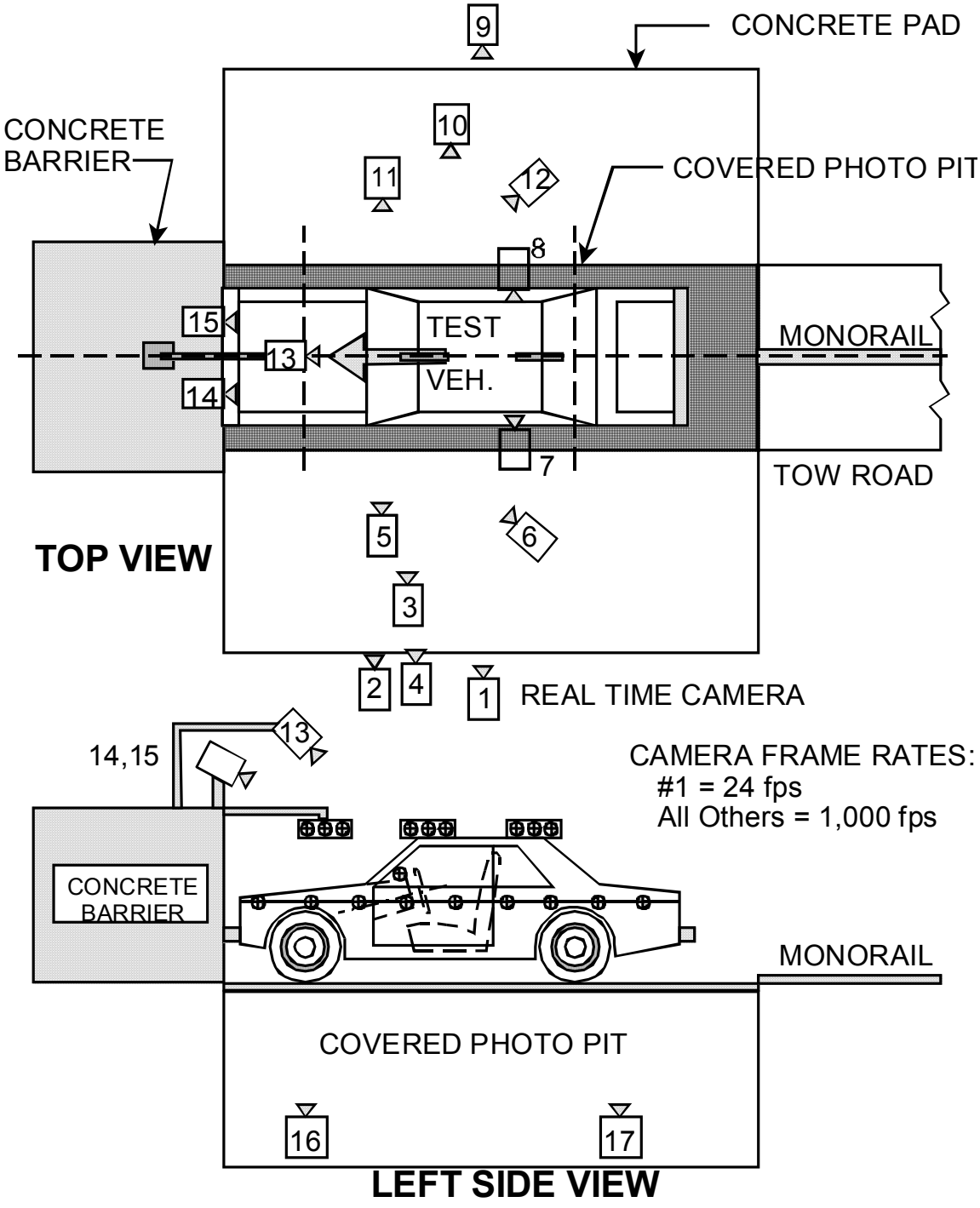
+X = film plane rearward of barrier
+Y = film plane to right of monorail centerline
+Z = film plane above ground level

DATA SHEET NO. 16... (continued)

CAMERA LOCATIONS

Test Vehicle:	2005 Jeep Grand Cherokee	NHTSA No.:	M50307
Test Program:	35mph Frontal Impact	Test Date:	01/31/05

CAMERA POSITIONS FOR FRONTAL IMPACTS

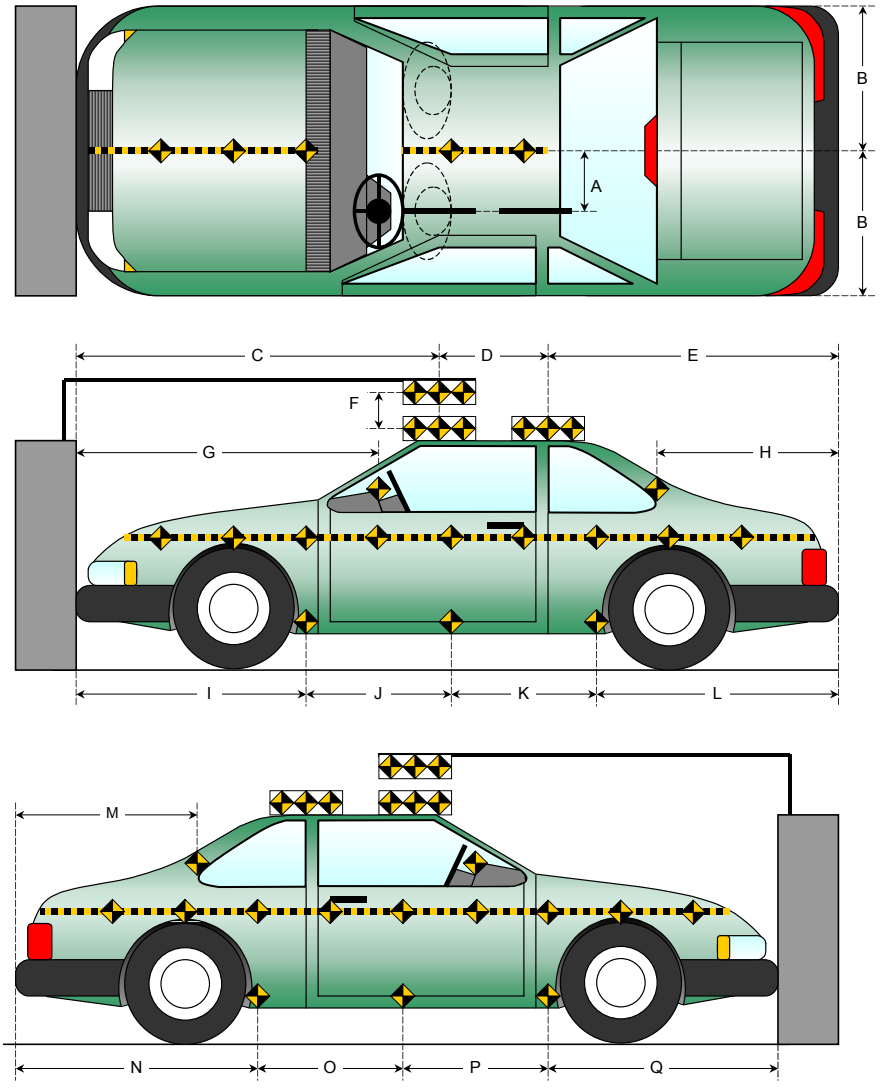


DATA SHEET NO. 17

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

Item	Value
A	402
B	936
C	2464
D	609
E	1639
F	1694
G	
H	1255
I	1396
J	878
K	872
L	1566
M	1261
N	1564
O	882
P	885
Q	1381



DATA SHEET NO. 18

VEHICLE INTRUSION MEASUREMENTS

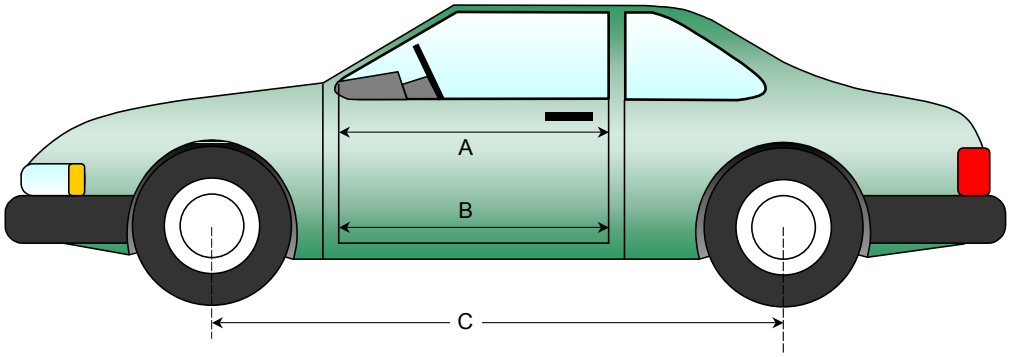
Test Vehicle: 2005 Jeep Grand Cherokee
Test Program: 35mph Frontal Impact
NHTSA No.: M50307
Test Date: 01/31/05

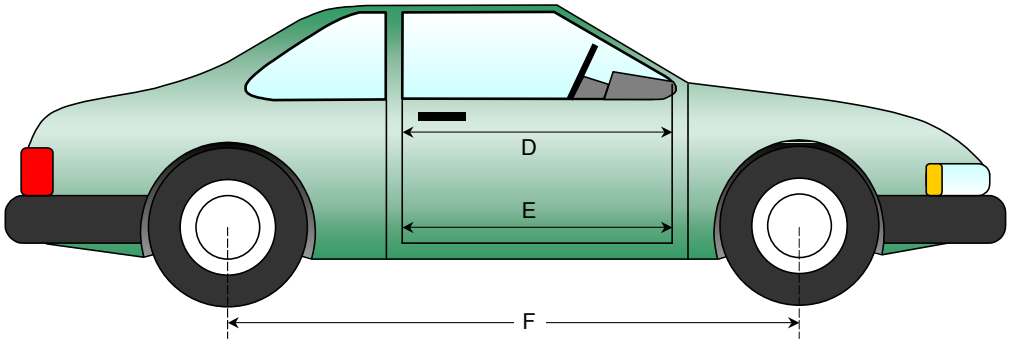
DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1027	1027	0
B	Left Side Lower	mm	934	936	-2
D	Right Side Upper	mm	982	983	-1
E	Right Side Lower	mm	950	948	2

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2780	2778	2
F	Right Side Wheelbase	mm	2780	2795	-15





DATA SHEET NO. 18... (continued)

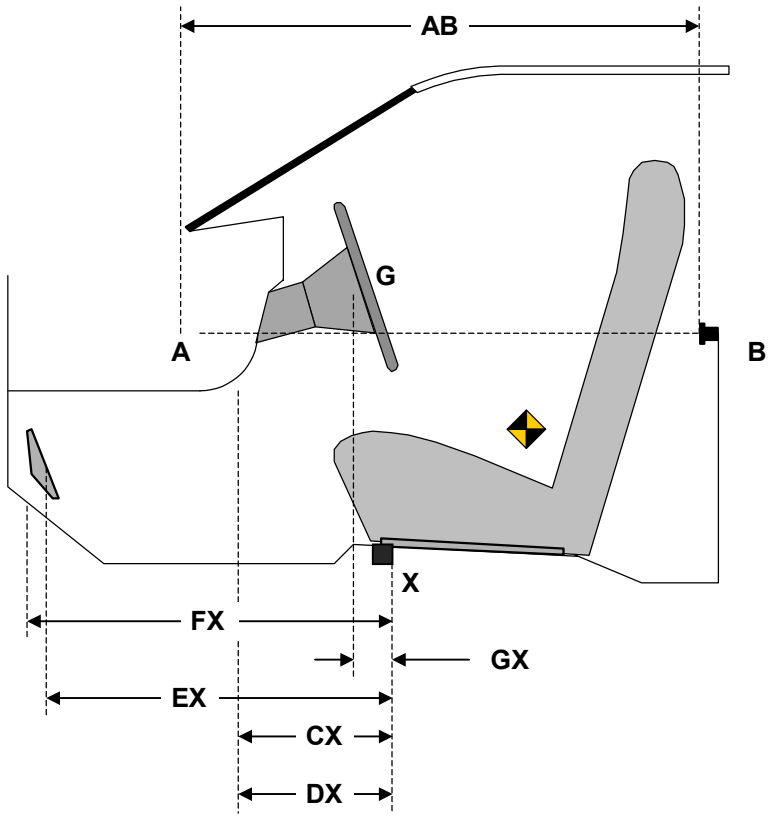
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	1027	1027	0
CX	Left Knee Bolster to X	mm	318	321	-3
DX	Right Knee Bolster to X	mm	314	325	-11
EX	Brake Pedal to X	mm	597	559	38
FX	Foot Rest to X	mm	671	672	-1
GX	Center of Steering Column Wheel Hub to X	mm	101	115	-14

X = Front of Seat Track (stationary)



DRIVER COMPARTMENT

DATA SHEET NO. 18... (continued)

VEHICLE INTRUSION MEASUREMENTS

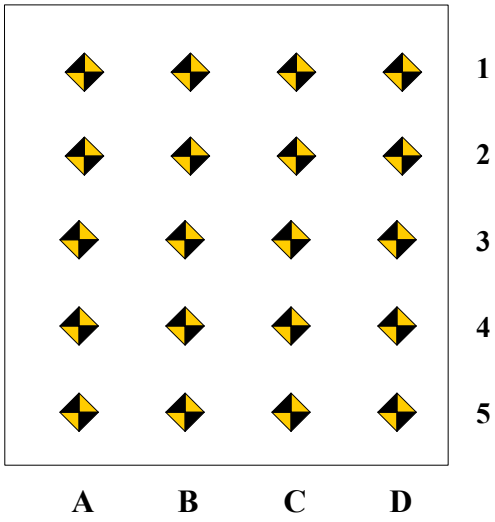
Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

Measurement reference point for X and Z axis is the forward outboard seat mounting bolt.

Columns A through D are evenly spaced.

Rows 1 and 2 are on the toe kick portion of the floor pan. Rows 3, 4, and 5 are located on the most level portion of the floor pan.

Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.



DRIVER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	780	776	775	774	780	771	770	775	0	5	5	-1
2	695	691	685	683	695	690	685	686	0	1	0	-3
3	581	576	571	567	582	578	575	573	-1	-2	-4	-6
4	453	445	445	437	455	446	447	441	-2	-1	-2	-4
5	326	318	320		327	321	324		-1	-3	-4	

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-11	-14	-15	-17	-1	1	0	-2	-10	-15	-15	-15
2	-101	-104	-104	-107	-93	-95	-94	-97	-8	-9	-10	-10
3	-158	-156	-158	-158	-151	-152	-150	-151	-7	-4	-8	-7
4	-161	-158	-159	-158	-157	-154	-154	-154	-4	-4	-5	-4
5	-159	-158	-157		-157	-158	-154		-2	0	-3	

DATA SHEET NO. 18... (continued)

VEHICLE INTRUSION MEASUREMENTS

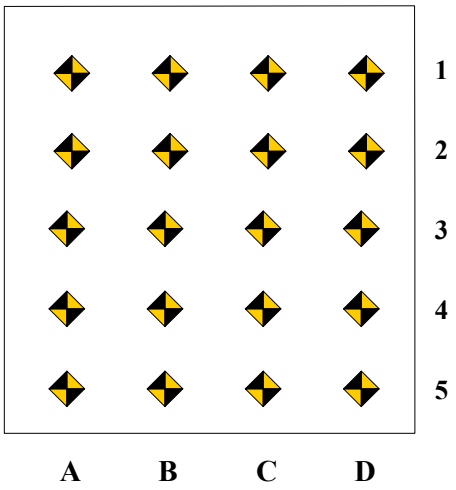
Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

Measurement reference point for X and Z axis is the forward outboard seat mounting bolt.

Columns A through D are evenly spaced.

Rows 1 and 2 are on the toe kick portion of the floor pan. Rows 3, 4, and 5 are located on the most level portion of the floor pan.

Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.



PASSENGER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	732	737	738	743	712	714	716	737	20	23	22	6
2	647	648	648	656	632	636	641	650	15	12	7	6
3	530	534	537	545	518	524	528	540	12	10	9	5
4	408	409	408	413	395	400	401	407	13	9	7	6
5	280	282	282	279	268	272	275	275	12	10	7	4

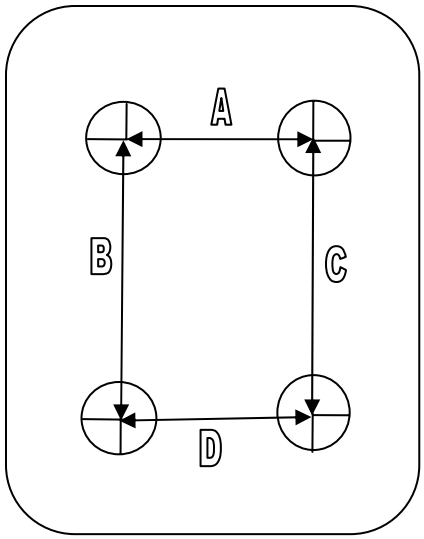
PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	10	9	10	16	19	27	25	22	-9	-18	-15	-6
2	-83	-83	-82	-77	-75	-76	-74	-73	-8	-7	-8	-4
3	-136	-135	-134	-132	-132	-132	-131	-128	-4	-3	-3	-4
4	-136	-133	-136	-135	-134	-132	-134	-132	-2	-1	-2	-3
5	-134	-134	-133	-134	-134	-136	-135	-135	0	2	2	1

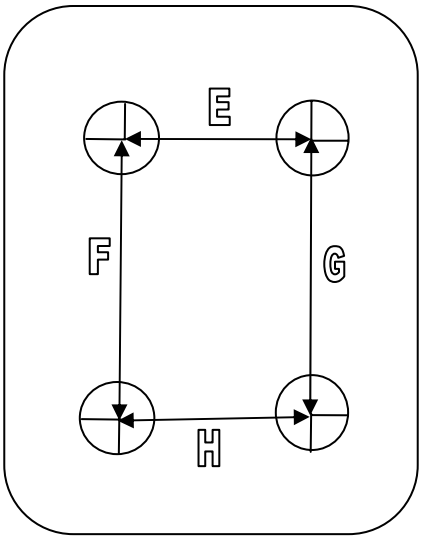
DATA SHEET NO. 18... (continued)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05



Driver



Passenger

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	323	323	0
B	307	307	0
C	332	332	0
D	248	248	0
E	242	242	0
F	358	358	0
G	351	354	-3
H	188	189	-1

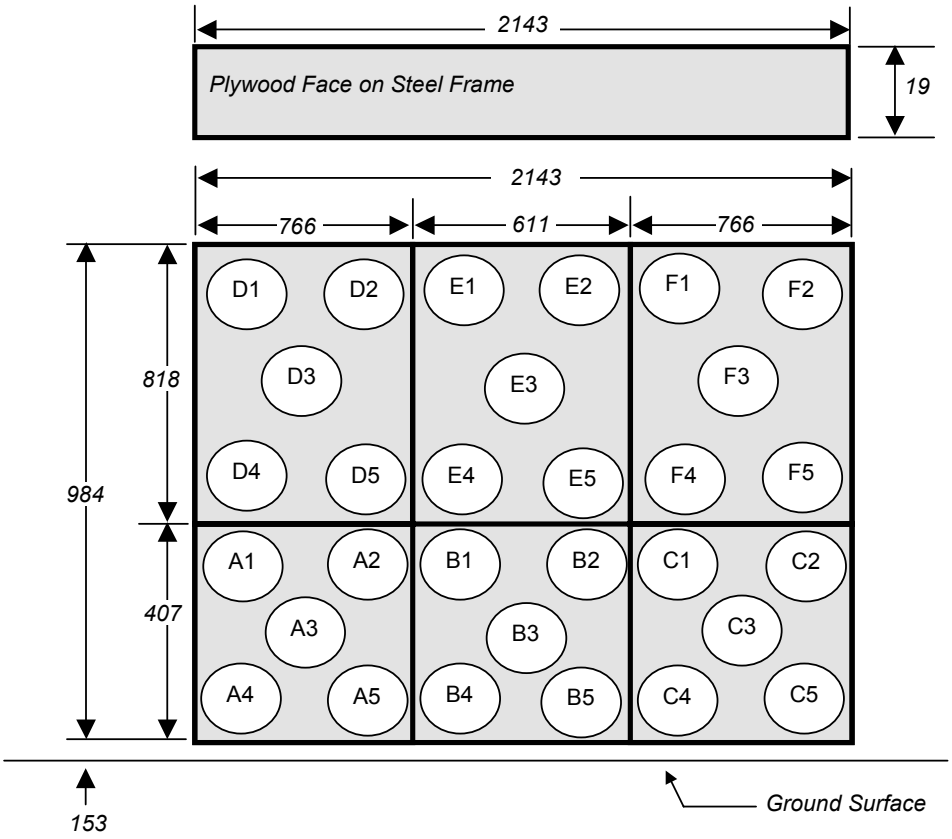
DATA SHEET NO. 19

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

30 Load Cell Rigid Barrier

Load Cell Locations on Fixed Barrier



Group 4 D1-D5	Group 5 E1-E5	Group 6 F1-F5
Group 1 A1-A5	Group 2 B1-B5	Group 3 C1-C5

6 Groups of 5 Load Cells Each

The Data is presented in Appendix B with the following requirements:

1. Sum data from 6 groupings shown above (5 cells/group)
2. Sum of left 2 groupings, center 2 groupings and right 2 groupings.
3. Total or sum of all 30 individual load cells.
4. Total versus average rear seat cross member displacement.

DATA SHEET NO. 20

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2005 Jeep Grand Cherokee NHTSA No.: M50307
Test Program: 35mph Frontal Impact Test Date: 01/31/05

VEHICLE INFORMATION

VIN: 1J4GR48K05C509667 Wheelbase (mm) : 2780
Vehicle Size Category: SUV Test Weight (kg) : 2321.0

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 14
Cal. Procedure/Interval: MGA procedure / 6 month
Integration Algorithm: Trapezoidal Linearity: > 99%
Impact Velocity (km/h): 56.8
Velocity Change (km/h): 65.6 Time of Separation (msec): 114

CRUSH PROFILE

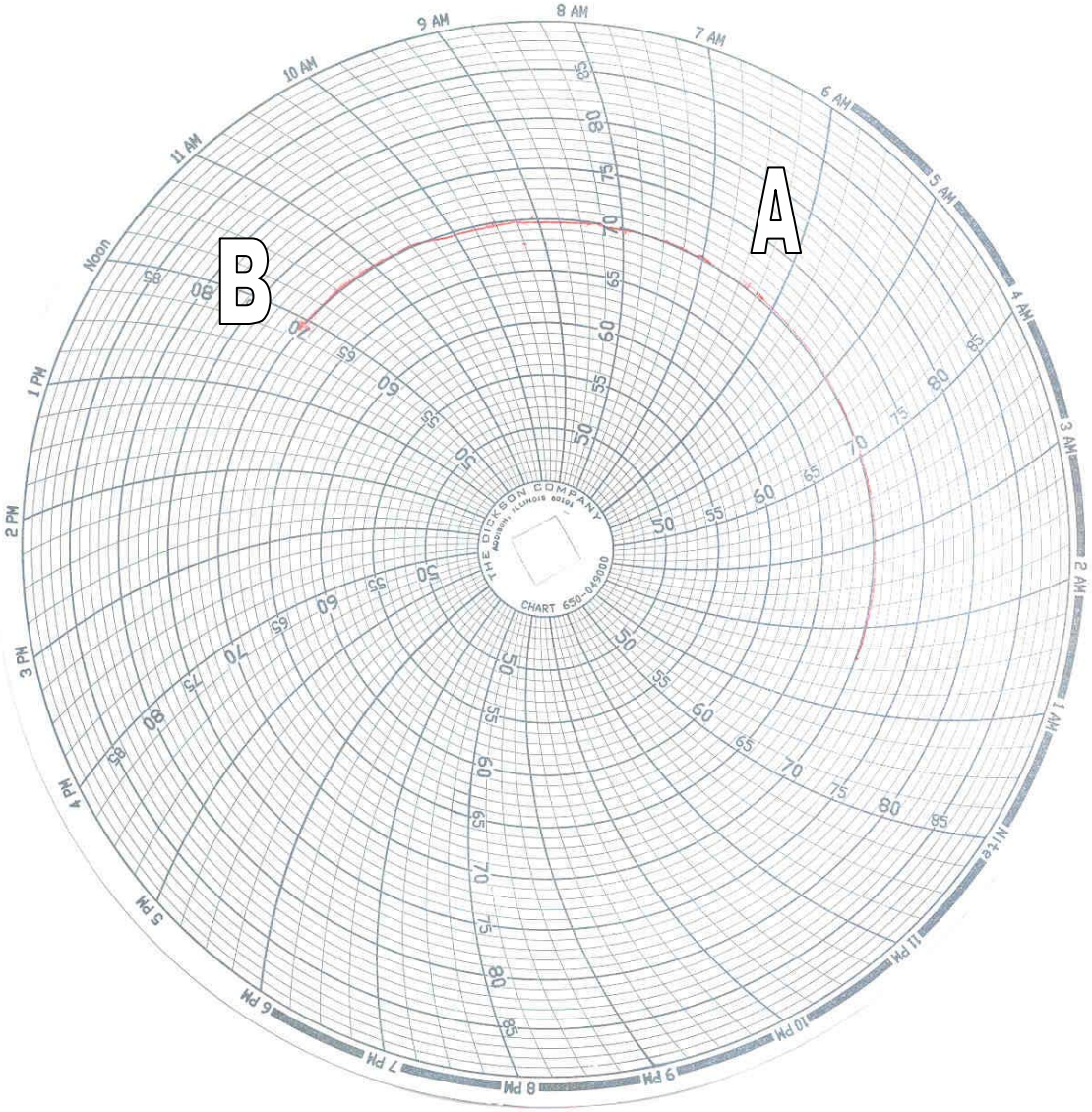
Collision Deformation Classification: Frontal Midpoint of Damage: Centerline
Damage Region Length (mm): 1246 Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4632	4165	467
C2	Crush zone 2 at left side	mm	4714	4111	603
C3	Crush zone 3 at left side	mm	4708	4160	548
C4	Crush zone 4 at right side	mm	4708	4163	545
C5	Crush zone 5 at right side	mm	4712	4120	592
C6	Crush zone 6 at right side	mm	4630	4178	452
L	C1 TO C6	mm	1246	1330	-84

DATA SHEET NO. 21

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle:	2005 Jeep Grand Cherokee	NHTSA No.:	M50307
Test Program:	35mph Frontal Impact	Test Date:	01/31/05



A = Dummies installed in vehicle at 7:00 am

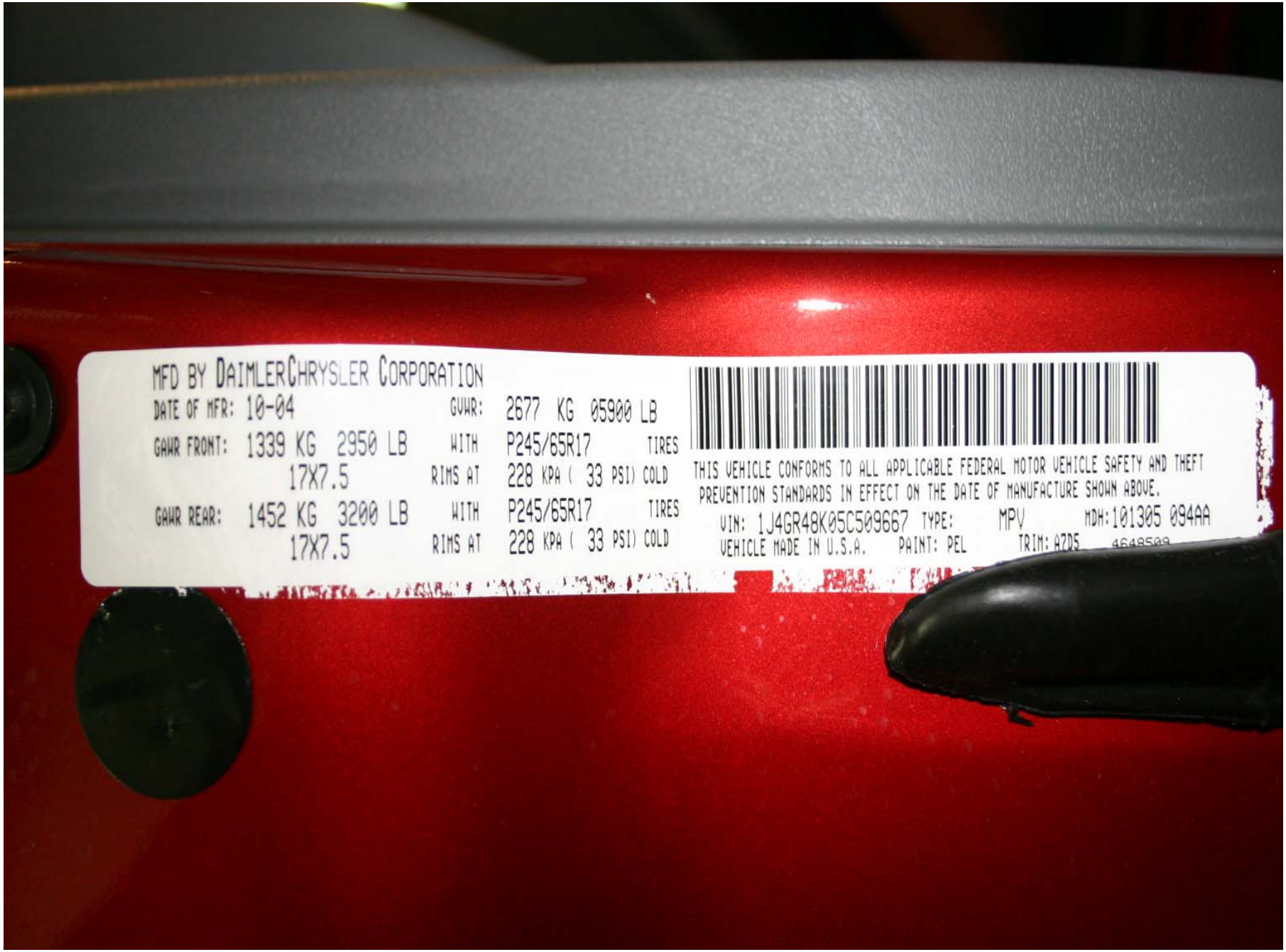
B = Test conducted at 12:03 pm

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Load Cell Location



A-2.

Vehicle Certification Label

Tire Placard

Right Front View of Test Vehicle, as received

Left Rear View of Test Vehicle, as received

Pre-Test Front View of Test Vehicle

Post-Test Front View of Test Vehicle

Pre-Test Left Side View of Test Vehicle

Post-Test Left Side View of Test Vehicle

Pre-Test Right Side View of Test Vehicle

Post-Test Right Side View of Test Vehicle

Pre-Test Right Front Three-Quarter View of Test Vehicle

Post-Test Right Front Three-Quarter View of Test Vehicle

Pre-Test Left Rear Three-Quarter View of Test Vehicle

Post-Test Left Rear Three-Quarter View of Test Vehicle

Pre-Test Left Rear Three-Quarter View of Doors

Post-Test Left Rear Three-Quarter View of Doors

Pre-Test Right Rear Three-Quarter View of Doors

Post-Test Right Rear Three-Quarter View of Doors

Pre-Test Windshield View

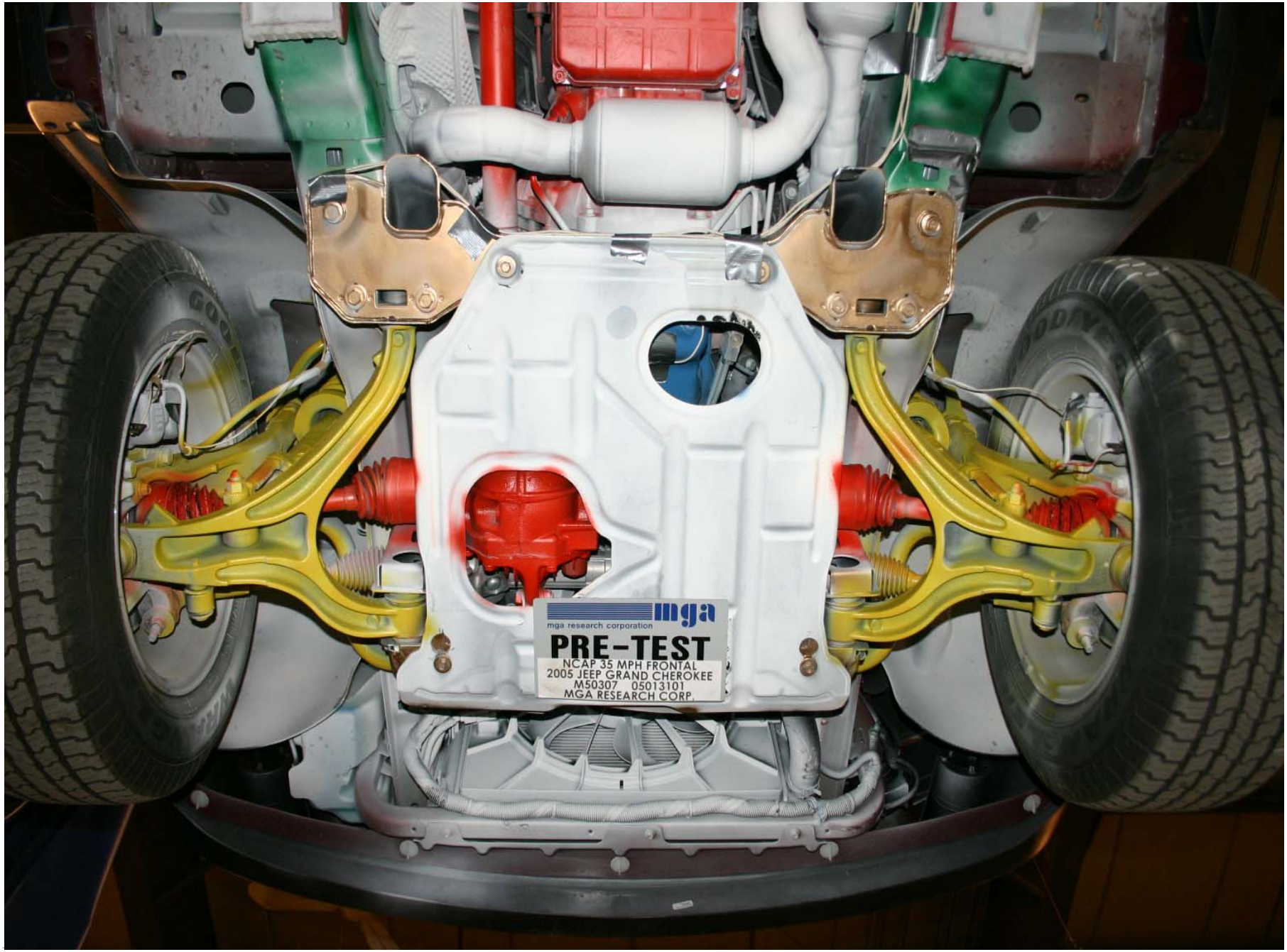
Post-Test Windshield View

Pre-Test Engine Compartment View

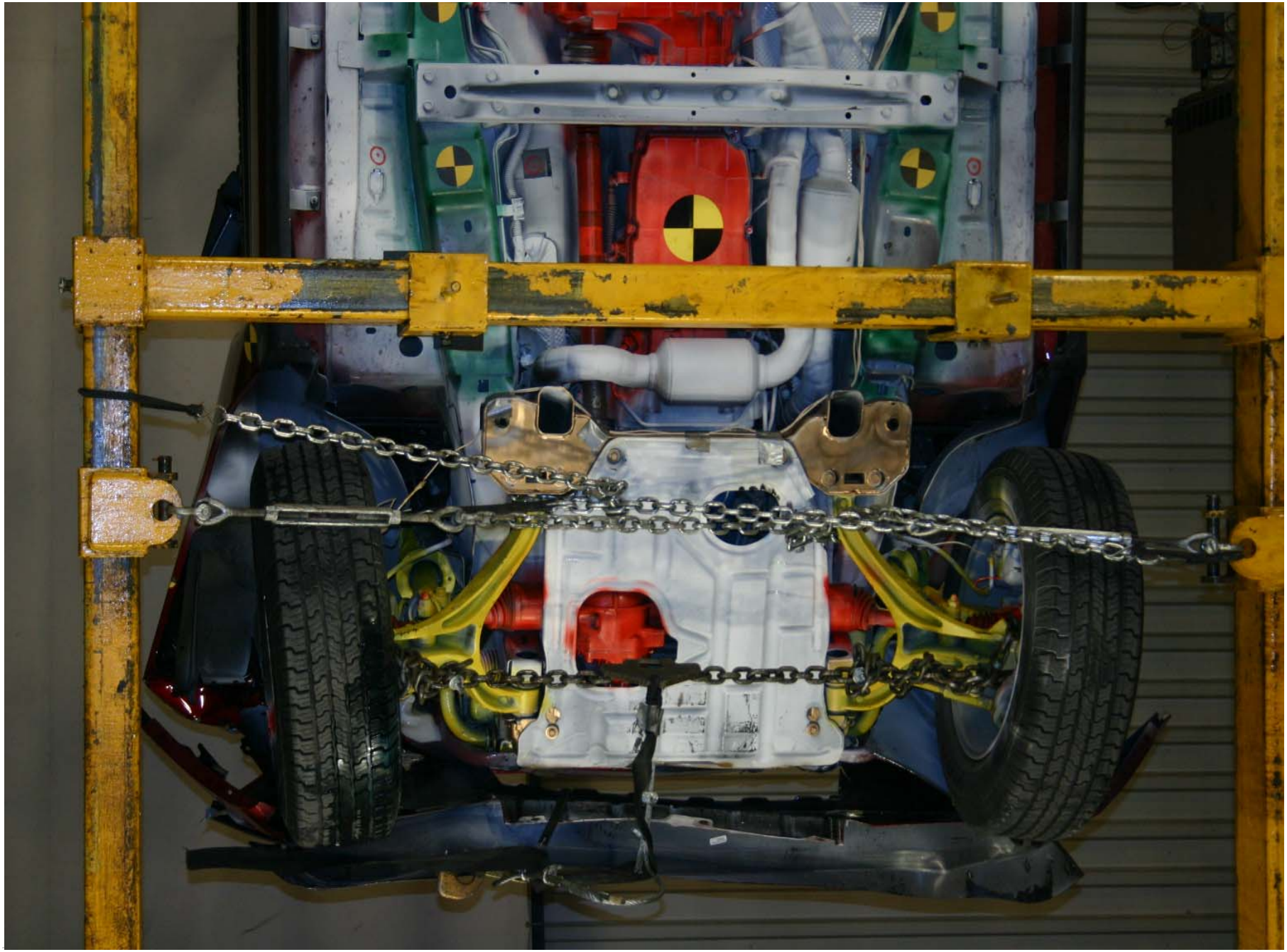
Post-Test Engine Compartment View

Pre-Test Fuel Filler Cap View

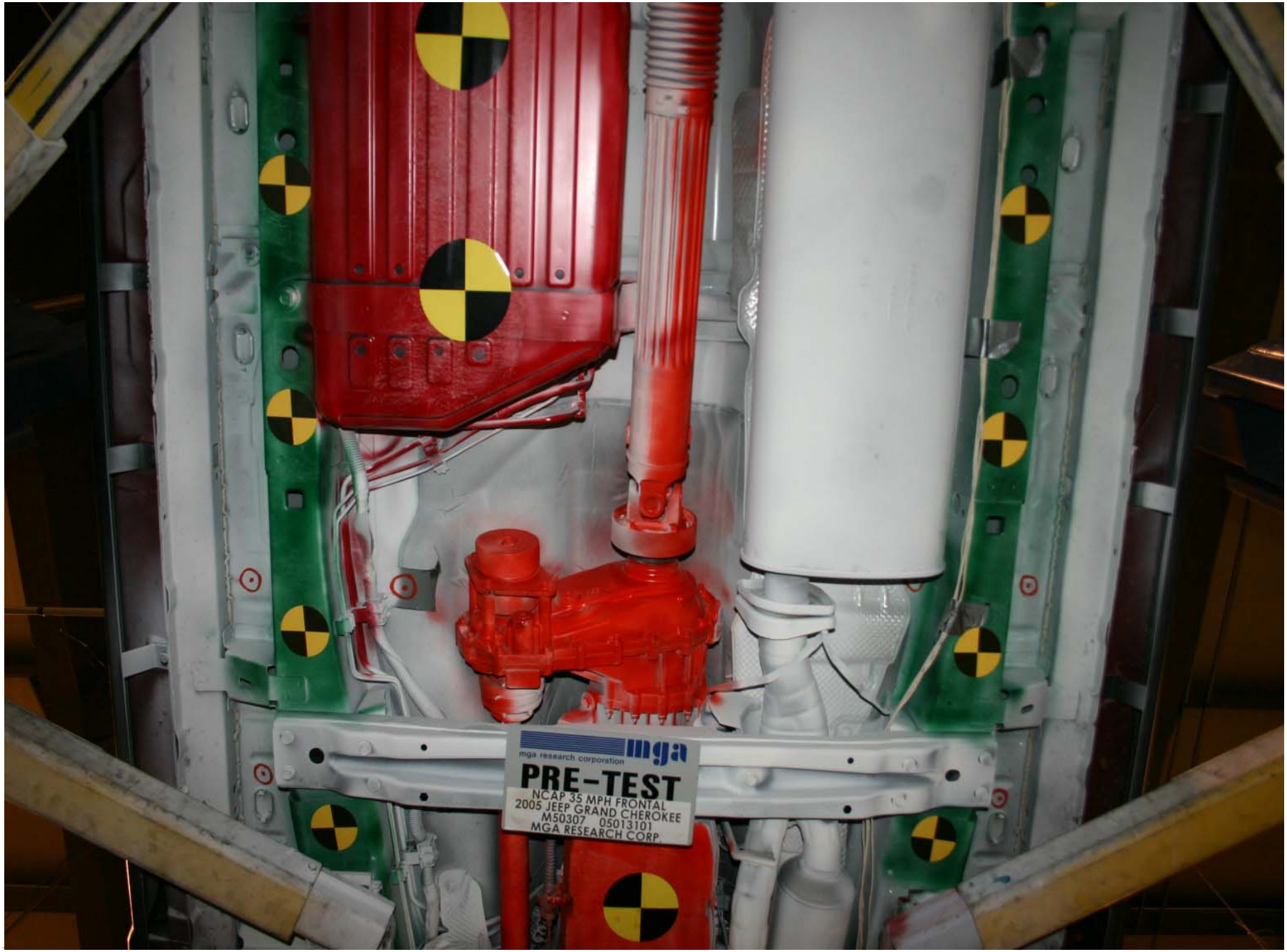
Post-Test Fuel Filler Cap View



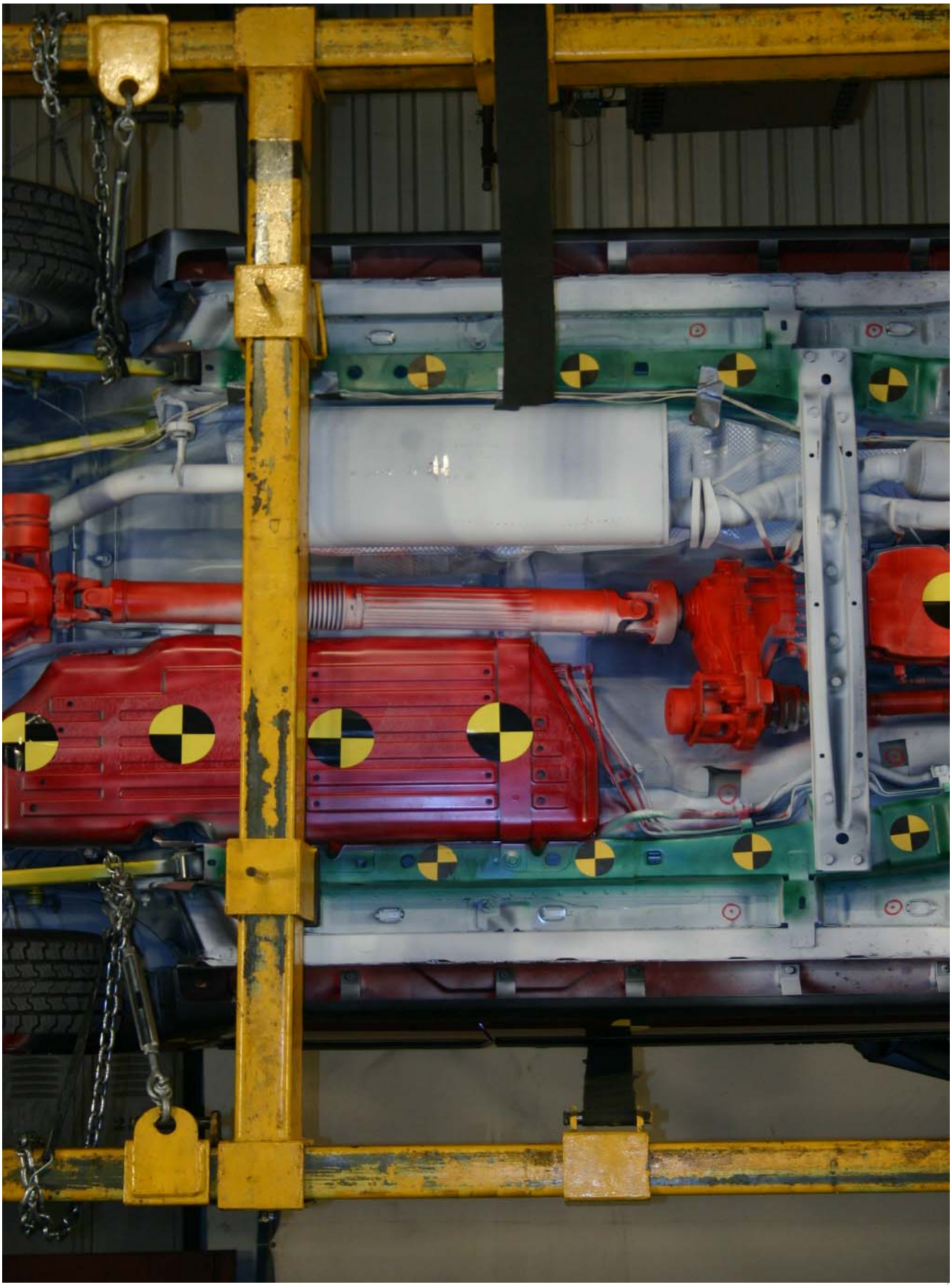
Pre-Test Front Underbody View



Post-Test Front Underbody View



Pre-Test Mid Underbody



Post-Test Mid Underbody

Pre-Test Rear Underbody View

Post-Test Rear Underbody View

Pre-Test Driver Dummy Front View (head position)

Post-Test Driver Dummy Front View (head position)

Pre-Test Driver Dummy Position Left Side View

Post-Test Driver Dummy Position Left Side View

Pre-Test Driver Dummy Position Left Side View (Door Open)

Post-Test Driver Dummy Position Left Side View (Door Open)

Pre-Test Driver Dummy Seat Position

Post-Test Driver Dummy Seat Position

Pre-Test Driver Dummy Feet Position

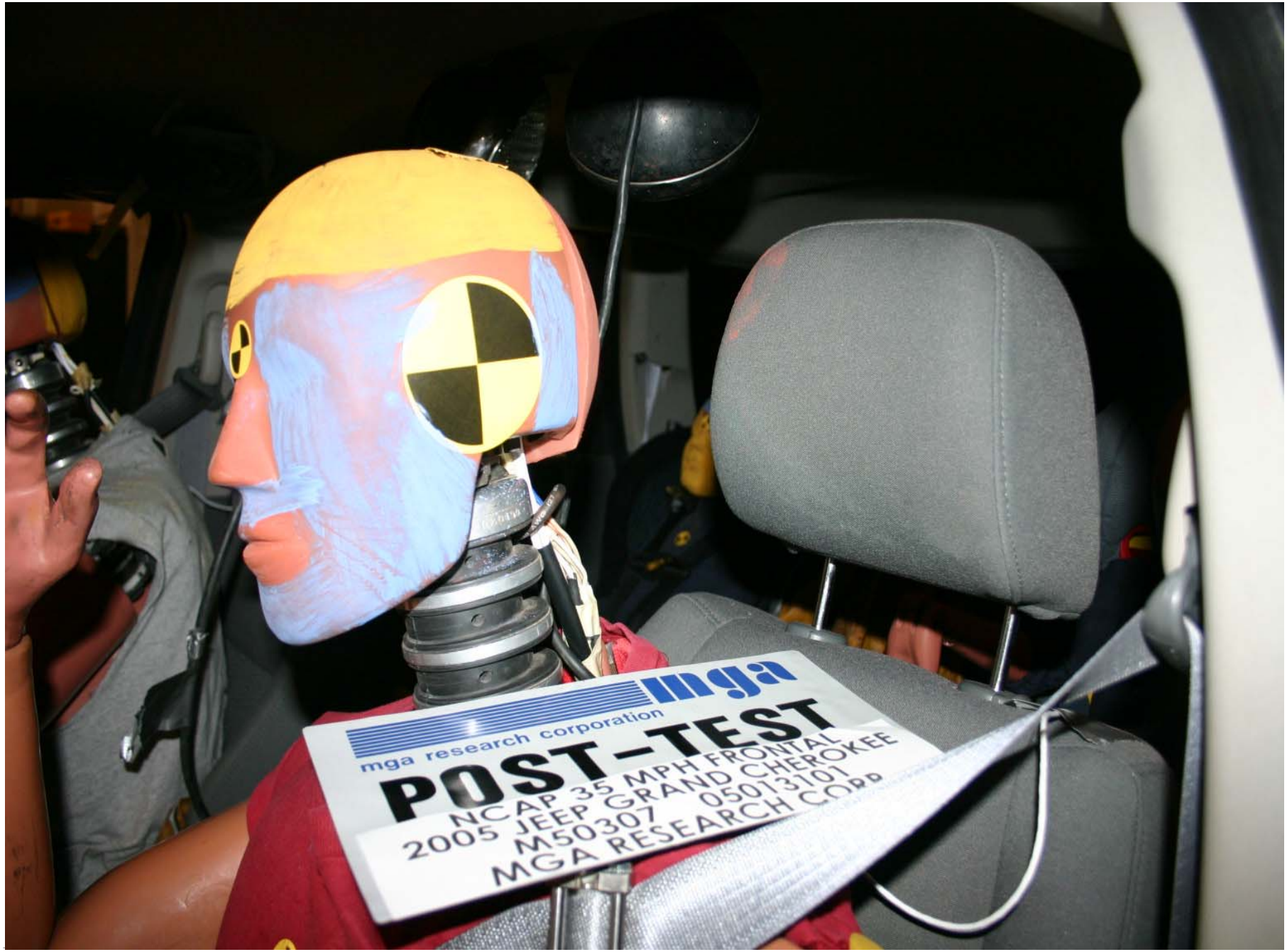
Post-Test Driver Dummy Feet Position

Pre-Test Driver Side Knee Bolster View

Post-Test Driver Side Knee Bolster View

Pre-Test Driver Side Floor Pan View

Post-Test Driver Side Floor Pan View



Post-Test Driver Dummy Head Contact

Post-Test Driver Dummy Knee Contact

Post-Test Driver Dummy Airbag Contact

Pre-Test Passenger Dummy Front View (head position)

Post-Test Passenger Dummy Front View (head position)

Pre-Test Passenger Dummy Position Right Side View

Post-Test Passenger Dummy Position Right Side View

Pre-Test Passenger Dummy Position Right Side View (Door Open)

Post-Test Passenger Dummy Position Right Side View (Door Open)

Pre-Test Passenger Dummy Seat Position

Post-Test Passenger Dummy Seat Position

Pre-Test Passenger Dummy Feet Position

Post-Test Passenger Dummy Feet Position

Pre-Test Passenger Side Knee Bolster View

Post-Test Passenger Side Knee Bolster View

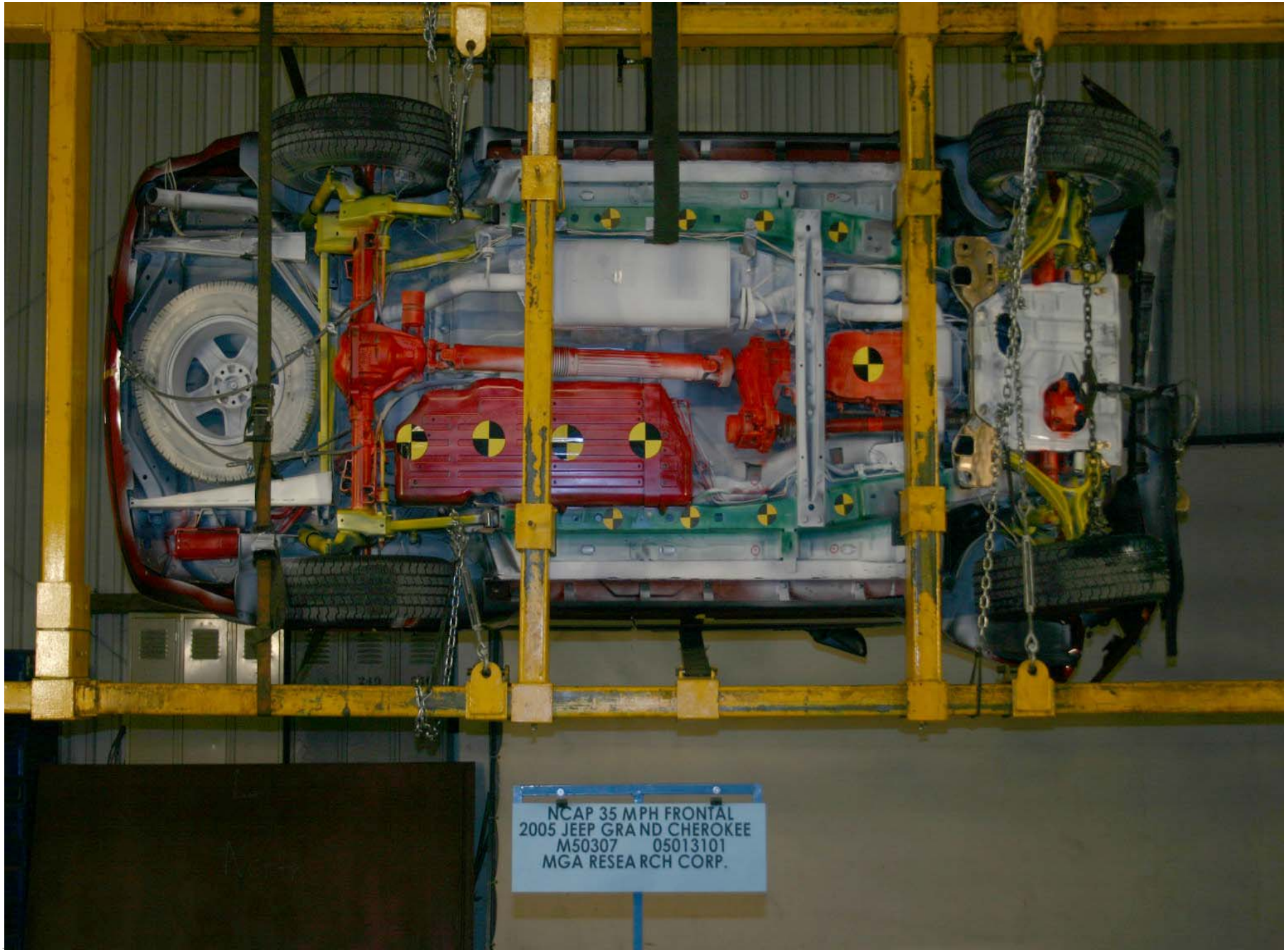
Pre-Test Passenger Side Floor Pan View

Post-Test Passenger Side Floor Pan View

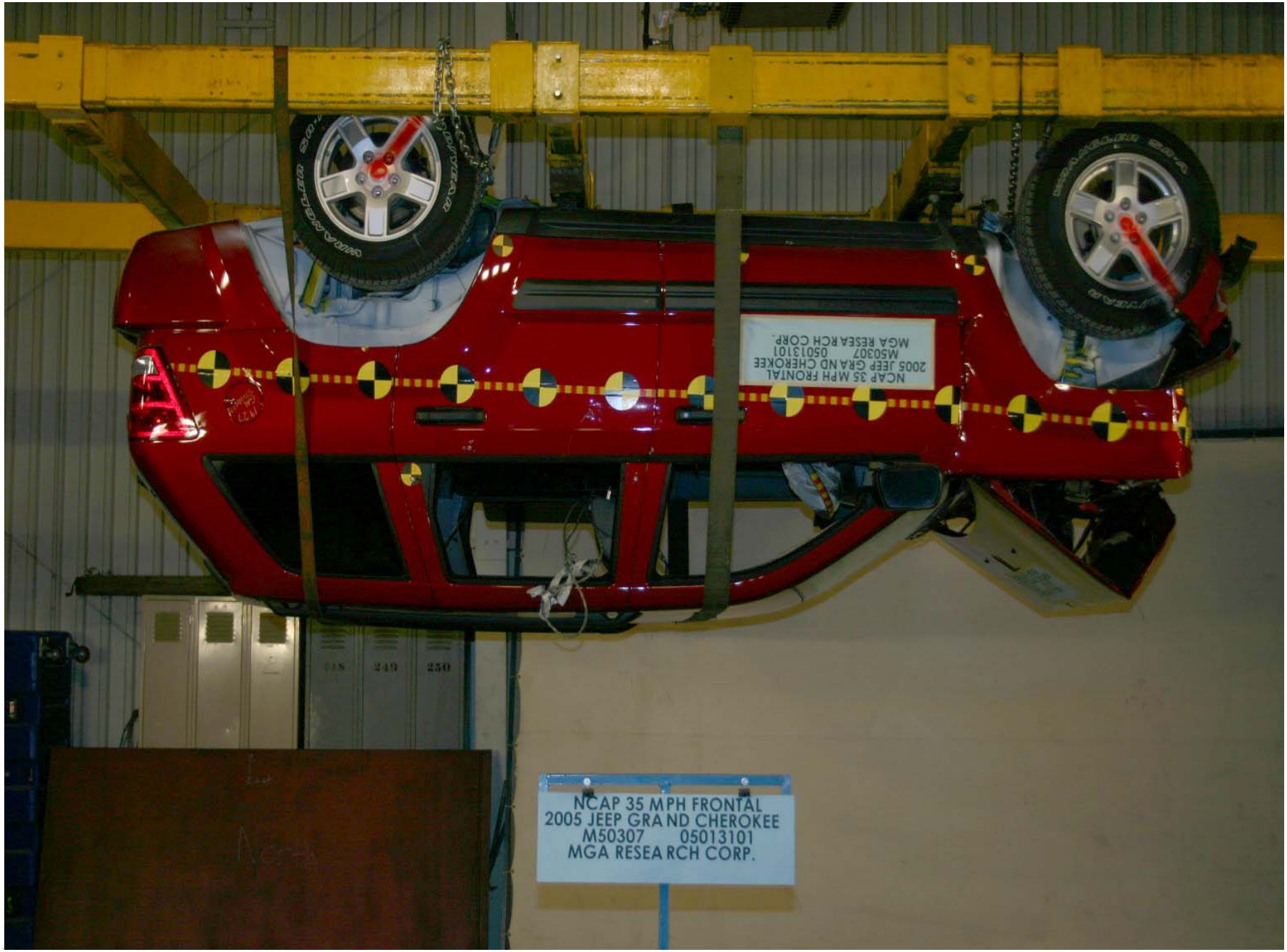
Post-Test Passenger Dummy Head Contact

Post-Test Passenger Dummy Knee Contact

Post-Test Passenger Dummy Airbag Contact



Rollover 90 Degrees



Rollover 180 Degrees

Rollover 270 Degrees

Rollover 360 Degrees

Vehicle Impact

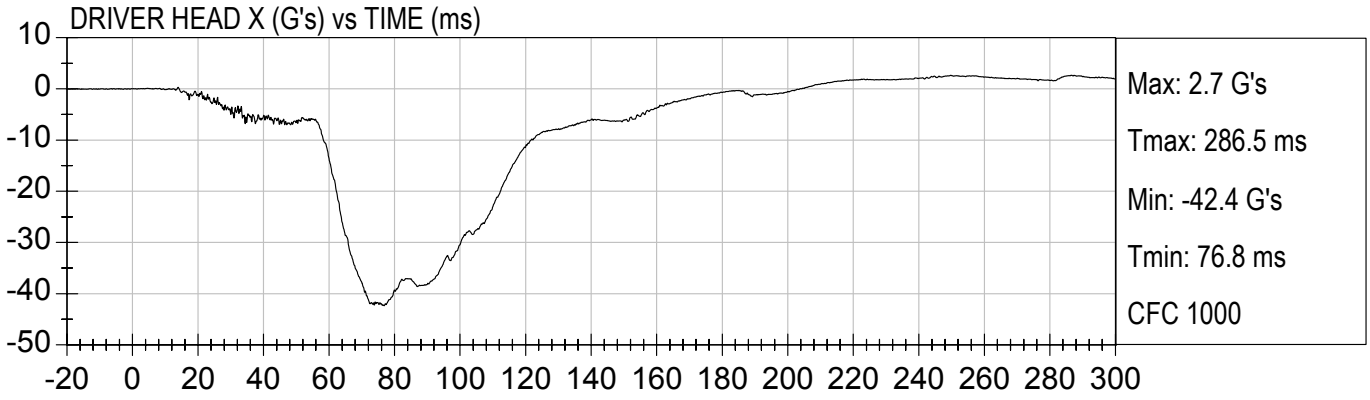
APPENDIX B

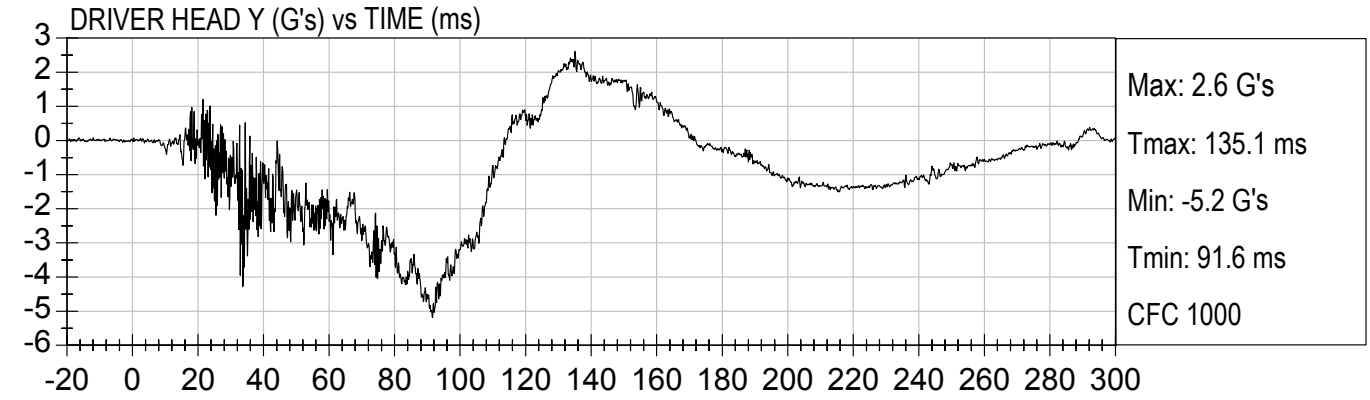
DUMMY AND VEHICLE RESPONSE DATA TRACES

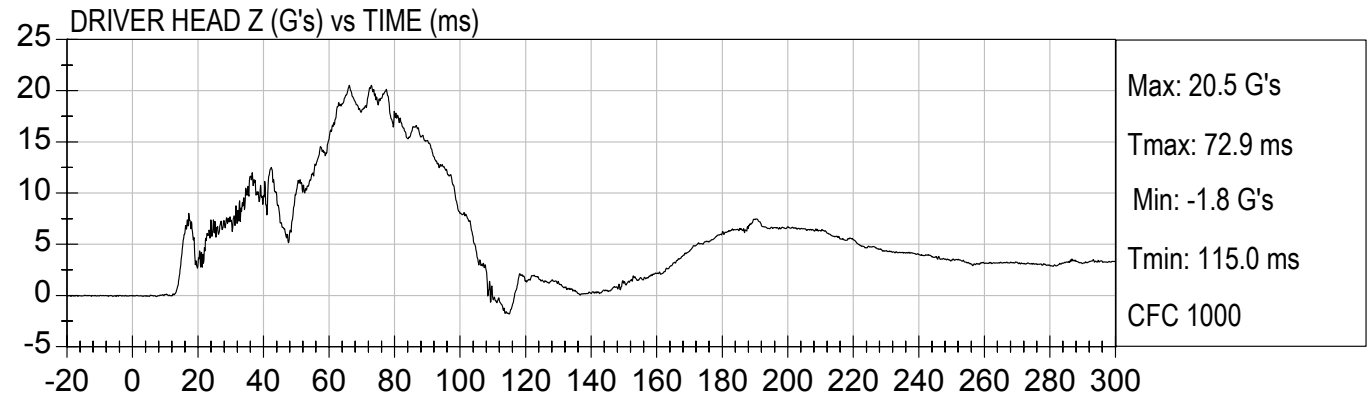
TABLE OF DATA PLOTS

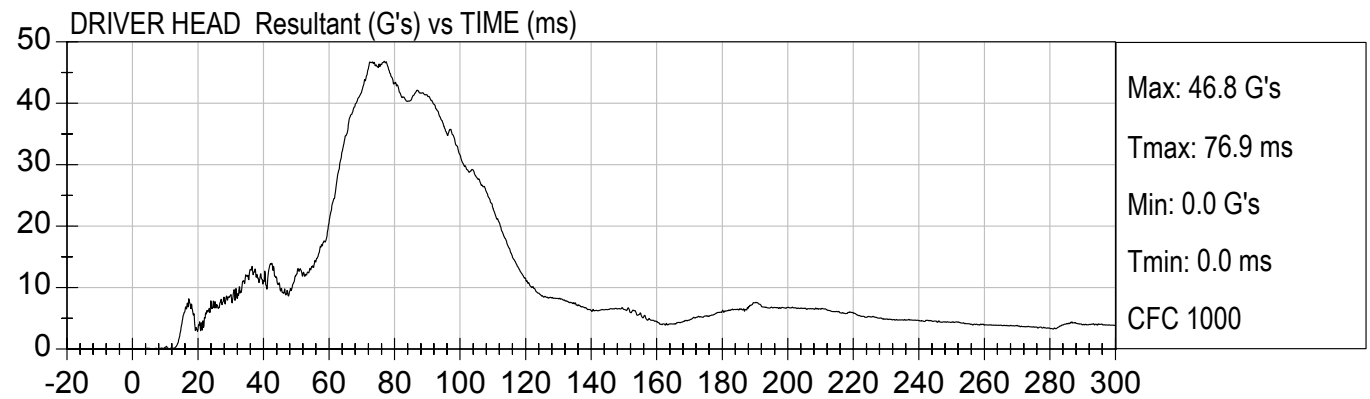
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

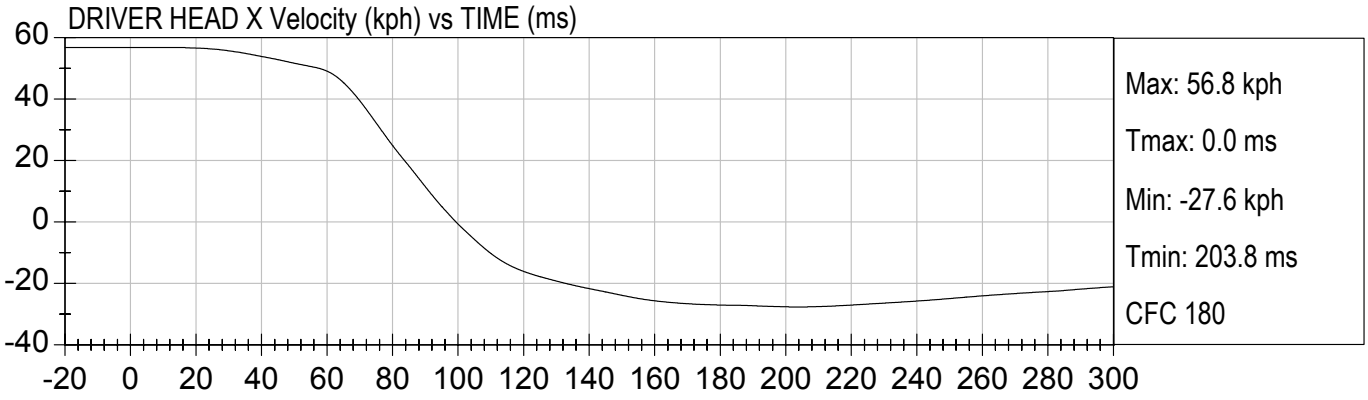
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

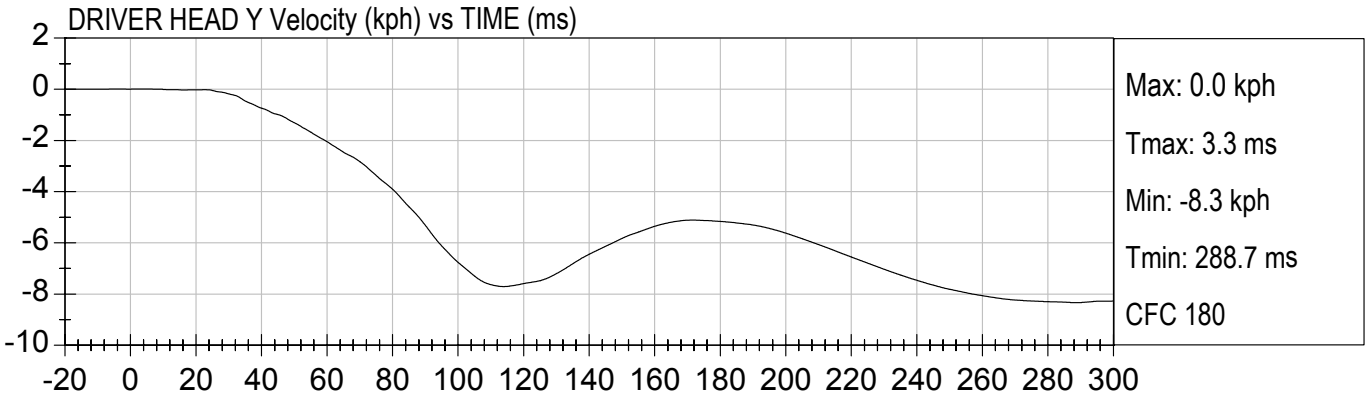


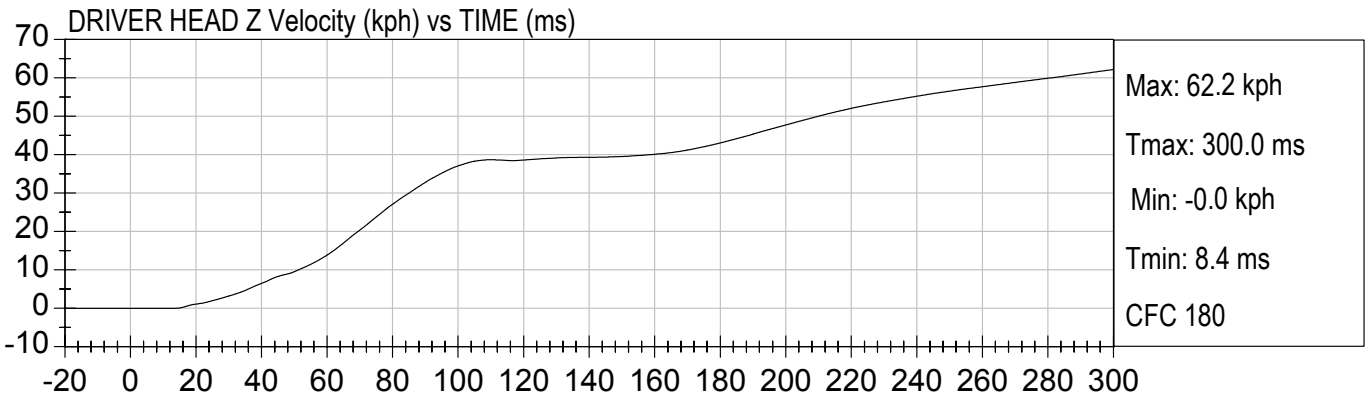






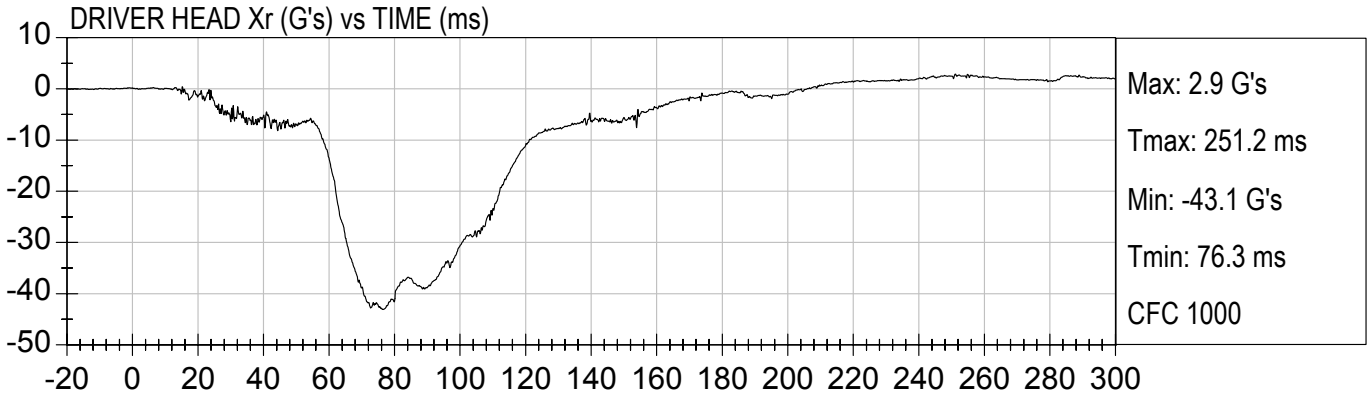

DRIVER HEAD X Velocity (kph) vs TIME (ms)
60
40
20
0
-20
-40
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 56.8 kph
Tmax: 0.0 ms
Min: -27.6 kph
Tmin: 203.8 ms
CFC 180

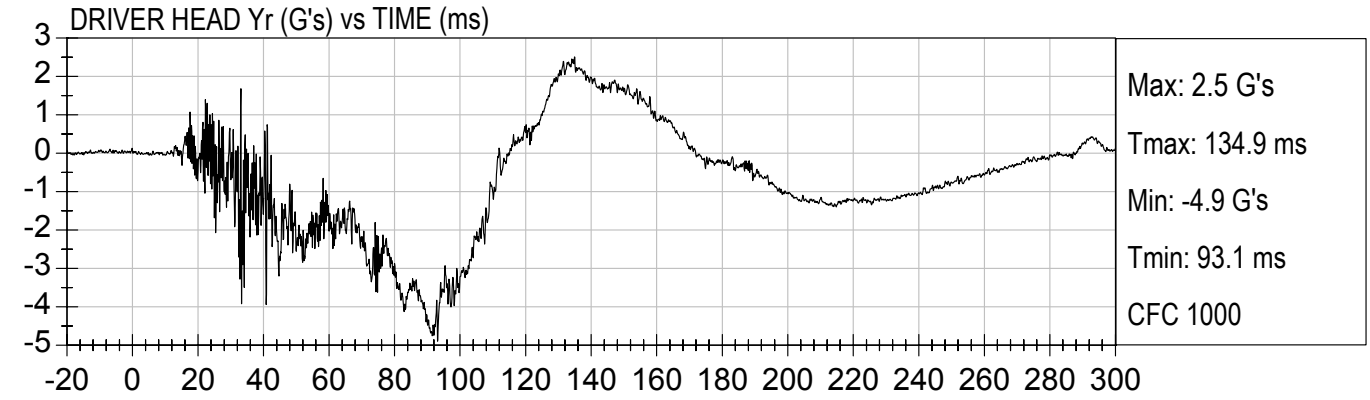

DRIVER HEAD Y Velocity (kph) vs TIME (ms)
2
0
-2
-4
-6
-8
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.0 kph
Tmax: 3.3 ms
Min: -8.3 kph
Tmin: 288.7 ms
CFC 180

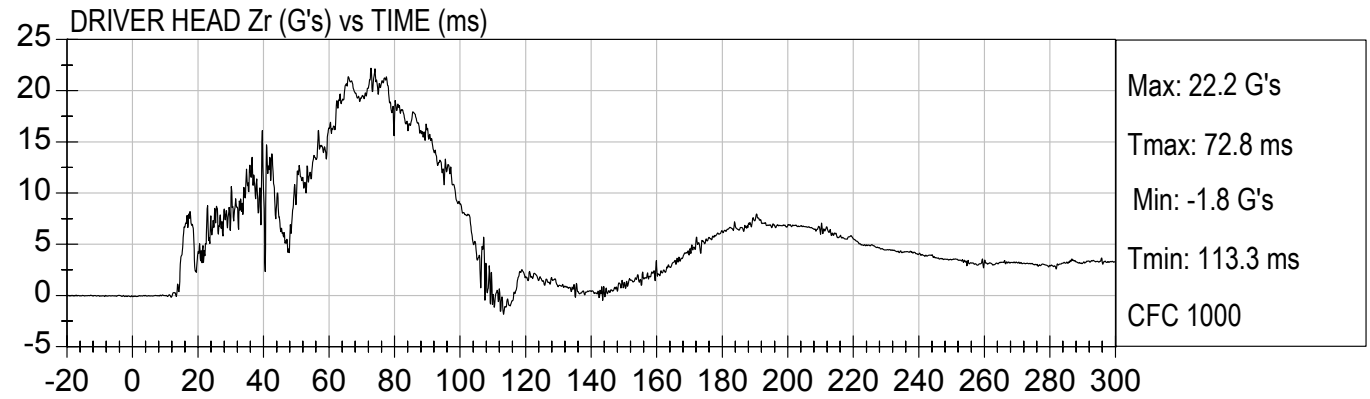

DRIVER HEAD Z Velocity (kph) vs TIME (ms)
70
60
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 62.2 kph
Tmax: 300.0 ms
Min: -0.0 kph
Tmin: 8.4 ms
CFC 180

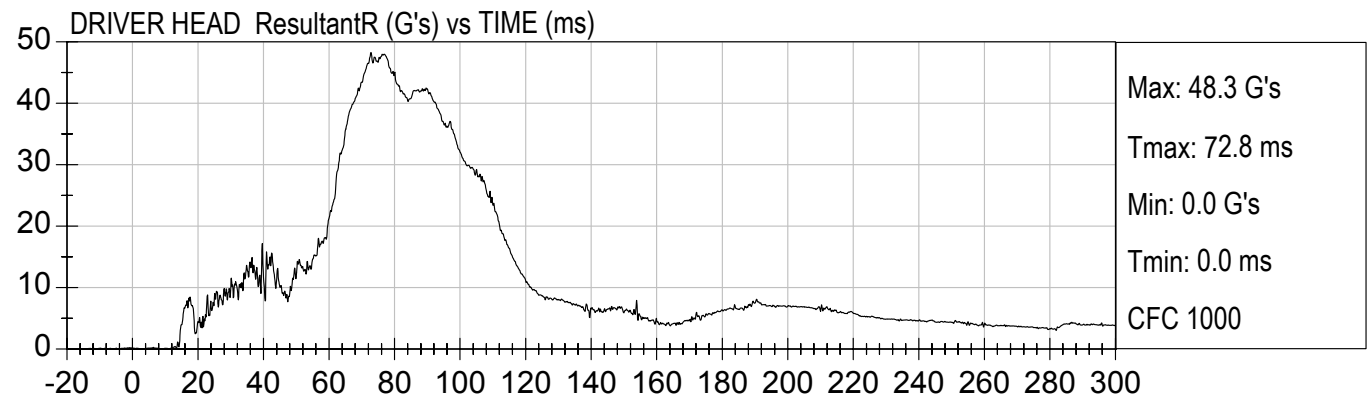
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

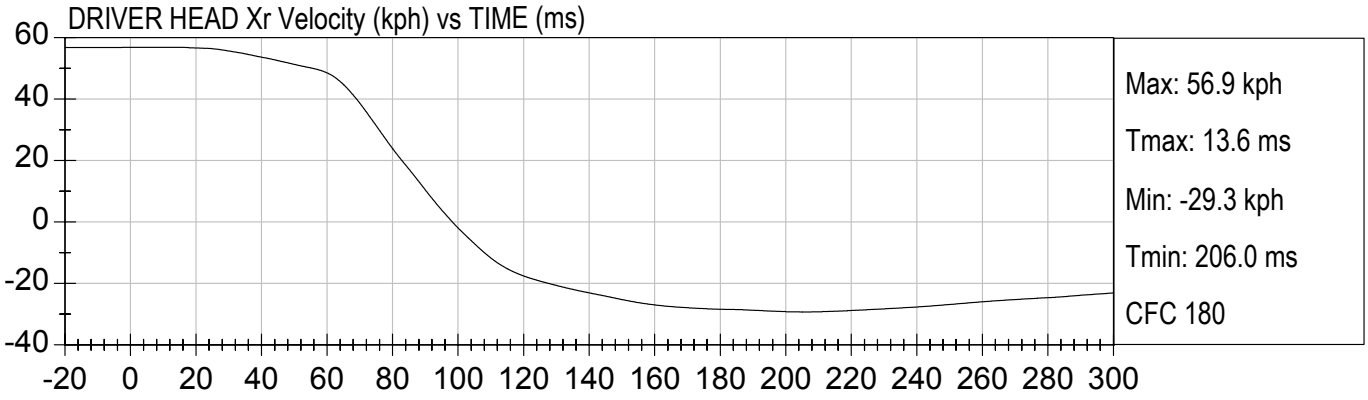
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

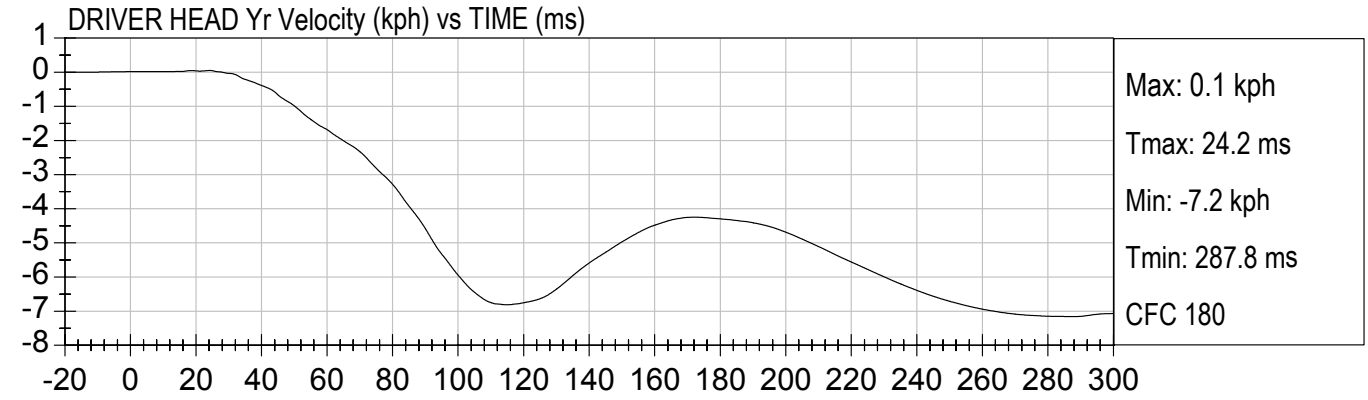


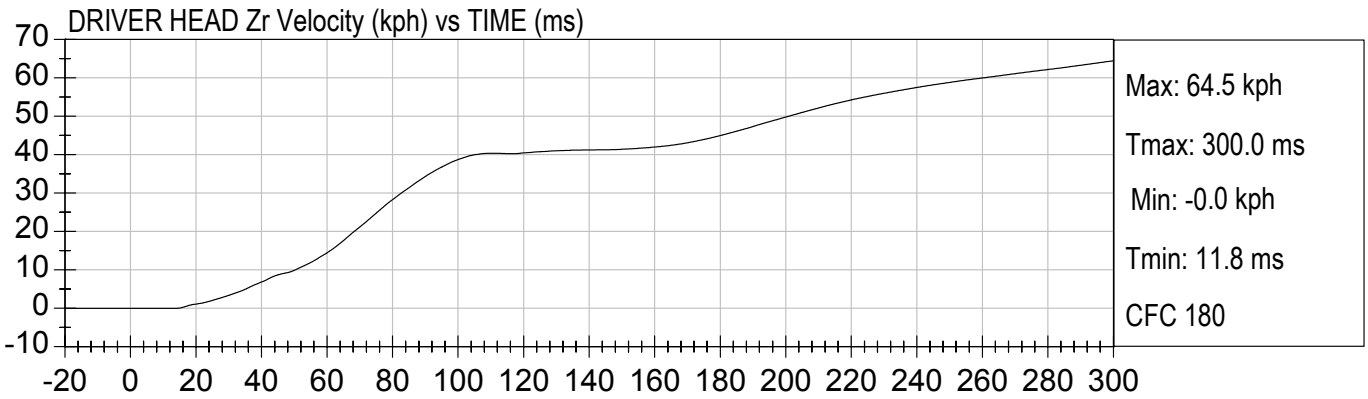






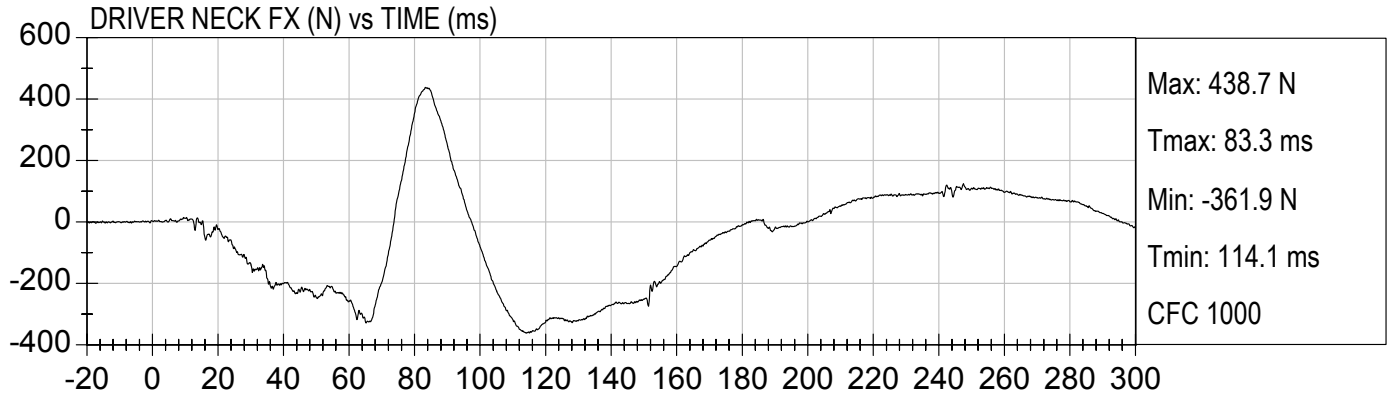

DRIVER HEAD Xr Velocity (kph) vs TIME (ms)
60
40
20
0
-20
-40
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 56.9 kph
Tmax: 13.6 ms
Min: -29.3 kph
Tmin: 206.0 ms
CFC 180

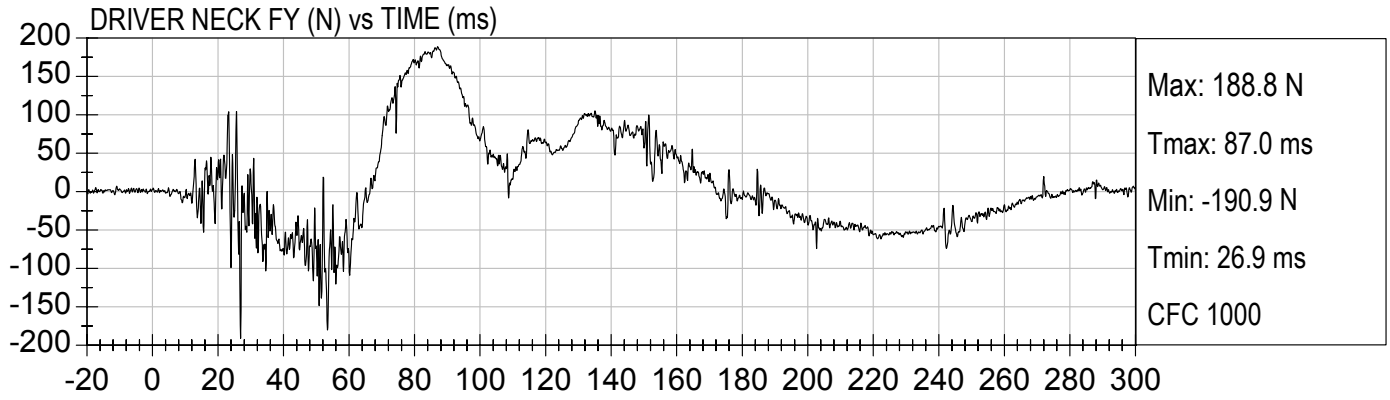

DRIVER HEAD Yr Velocity (kph) vs TIME (ms)
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.1 kph
Tmax: 24.2 ms
Min: -7.2 kph
Tmin: 287.8 ms
CFC 180

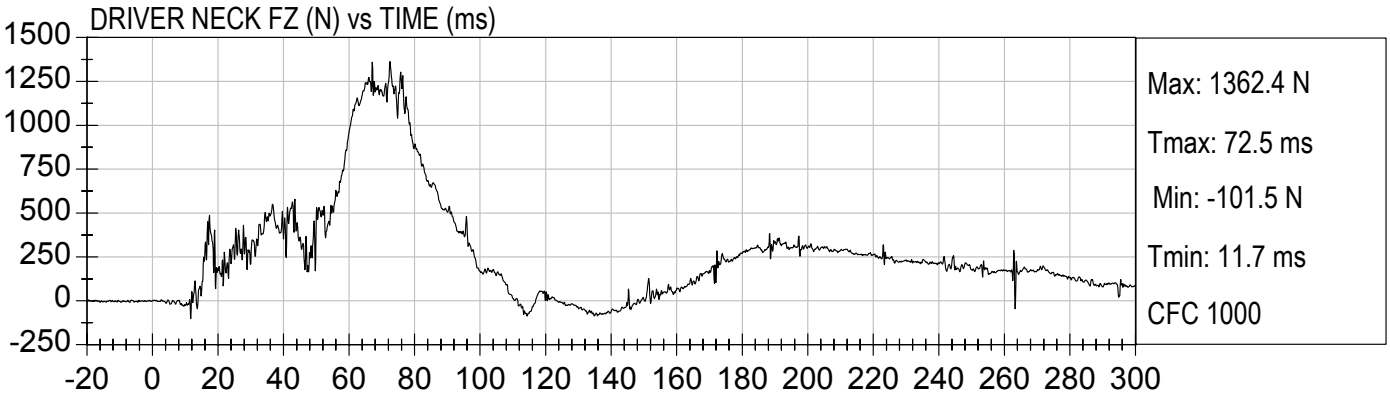

DRIVER HEAD Zr Velocity (kph) vs TIME (ms)
70
60
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 64.5 kph
Tmax: 300.0 ms
Min: -0.0 kph
Tmin: 11.8 ms
CFC 180

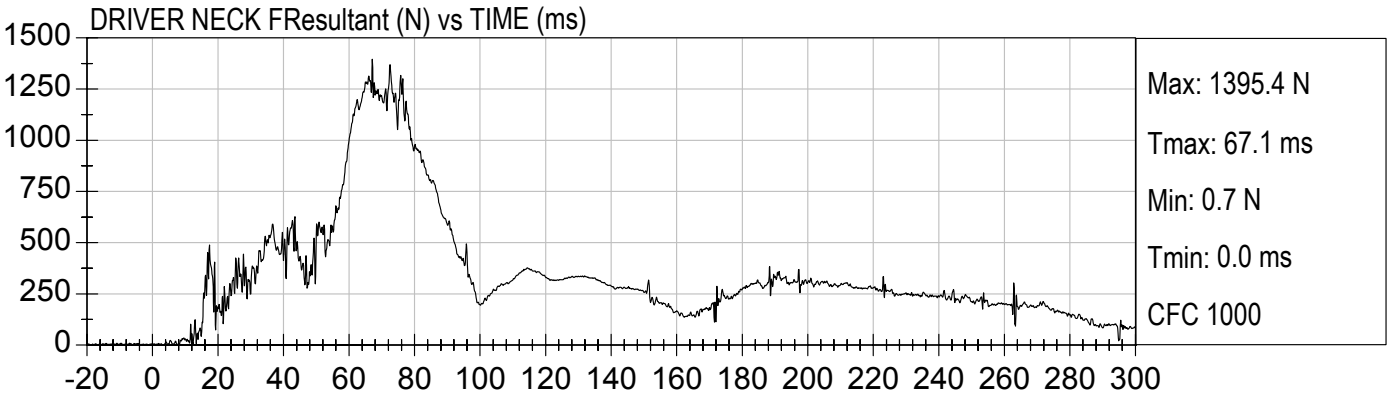
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



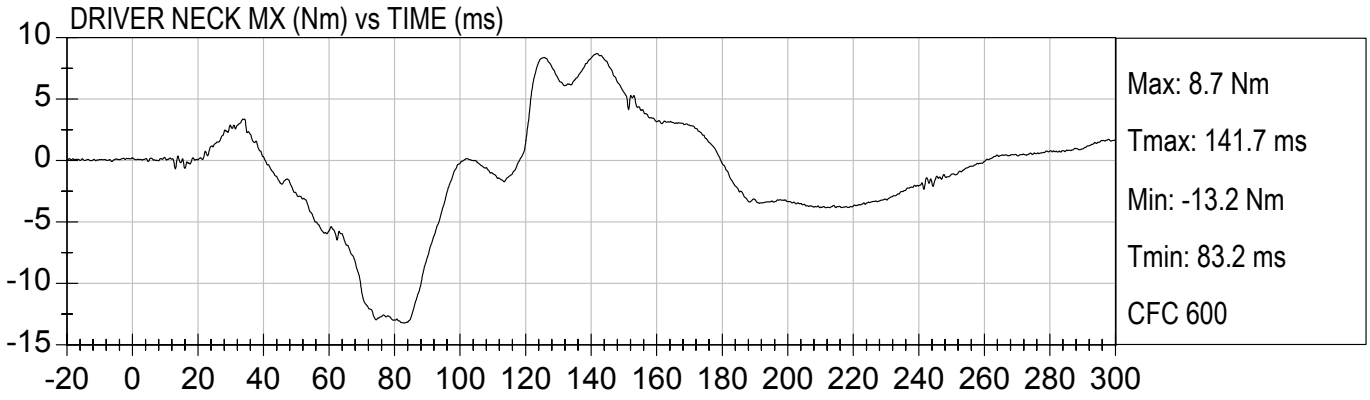


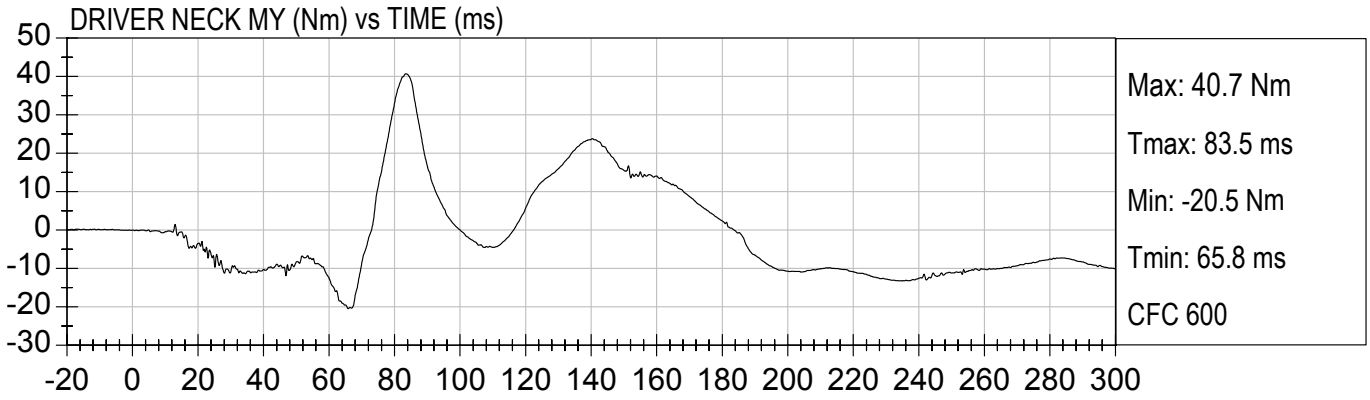


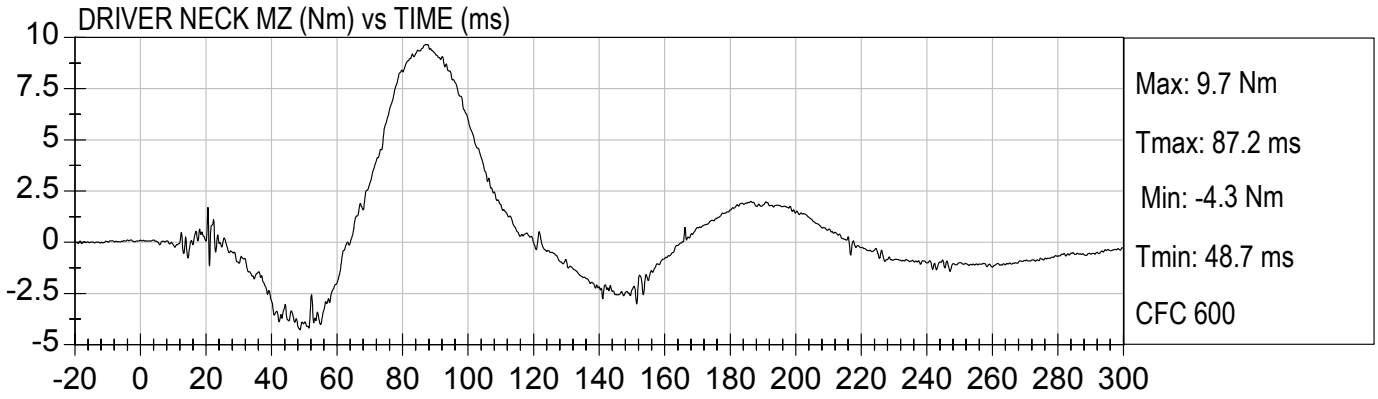


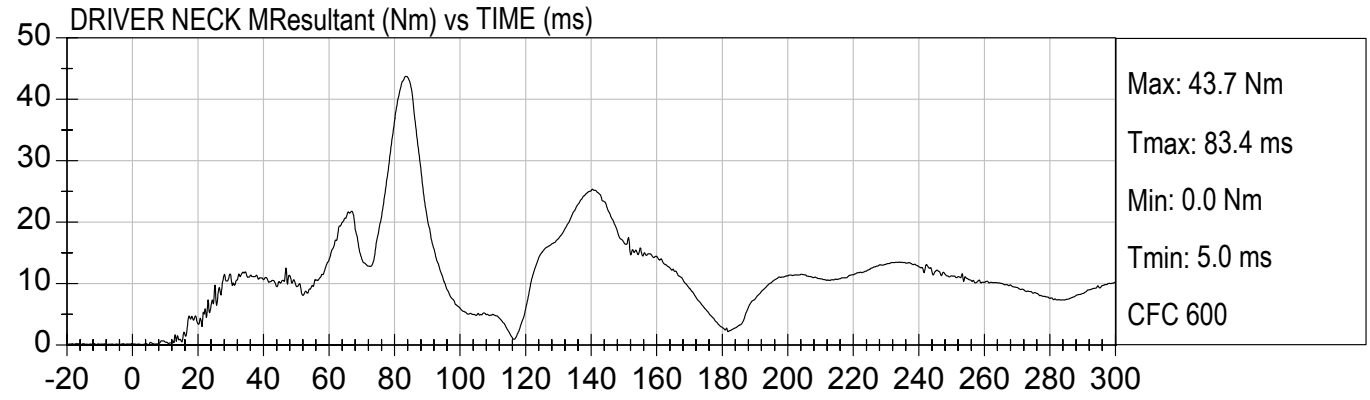
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



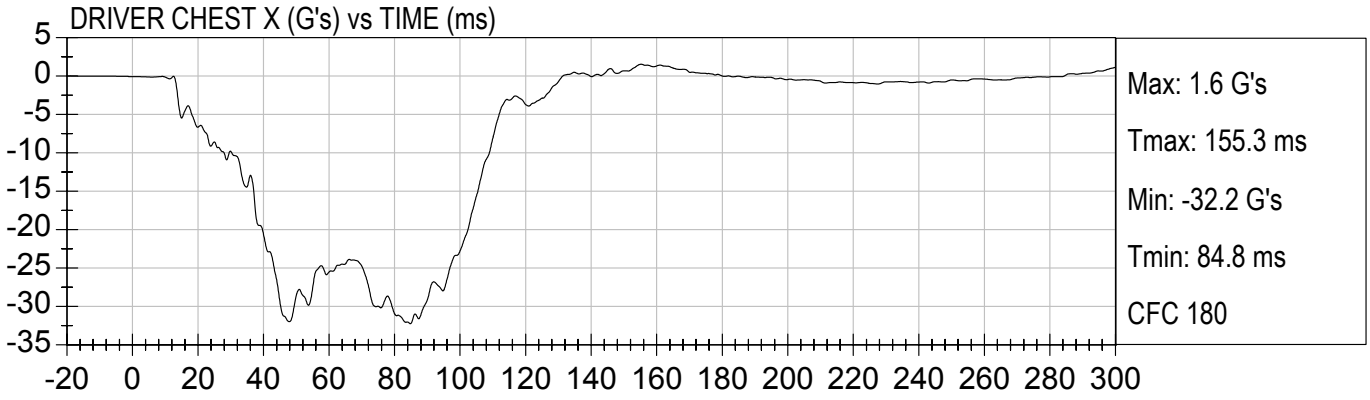


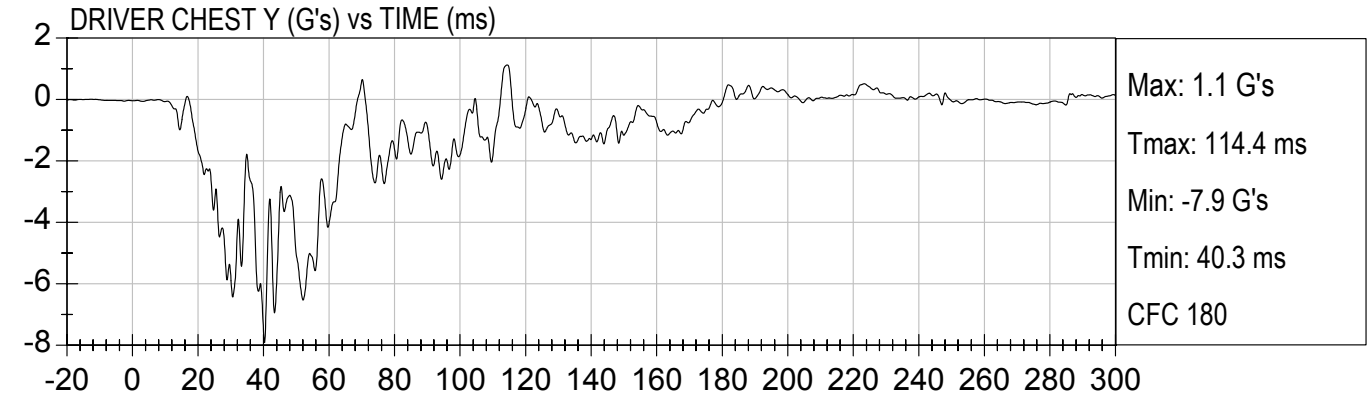


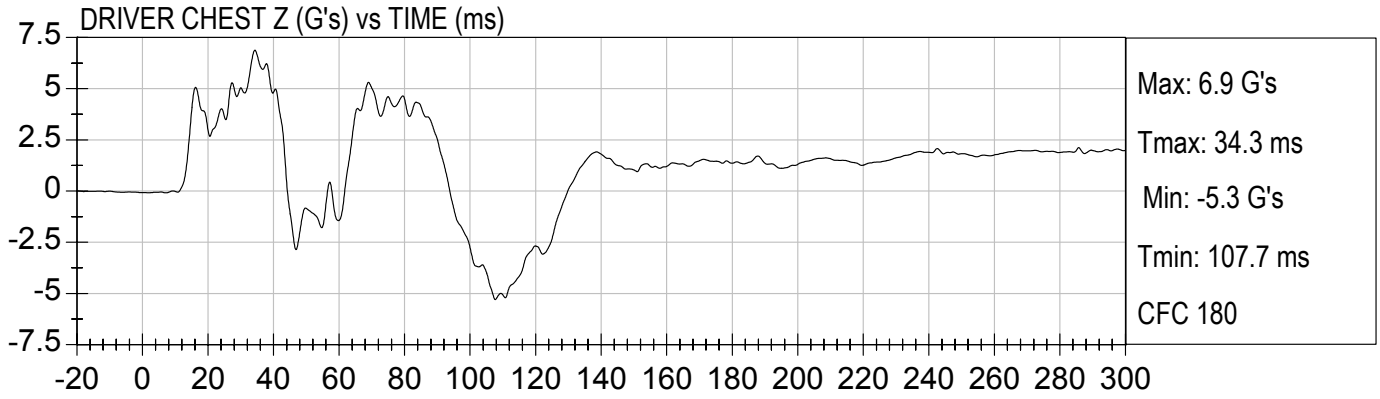


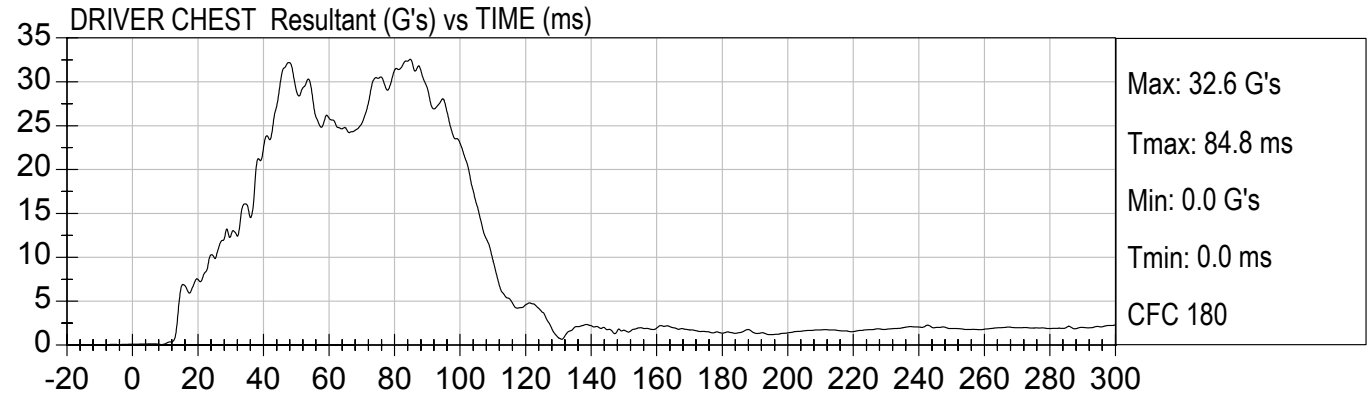
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



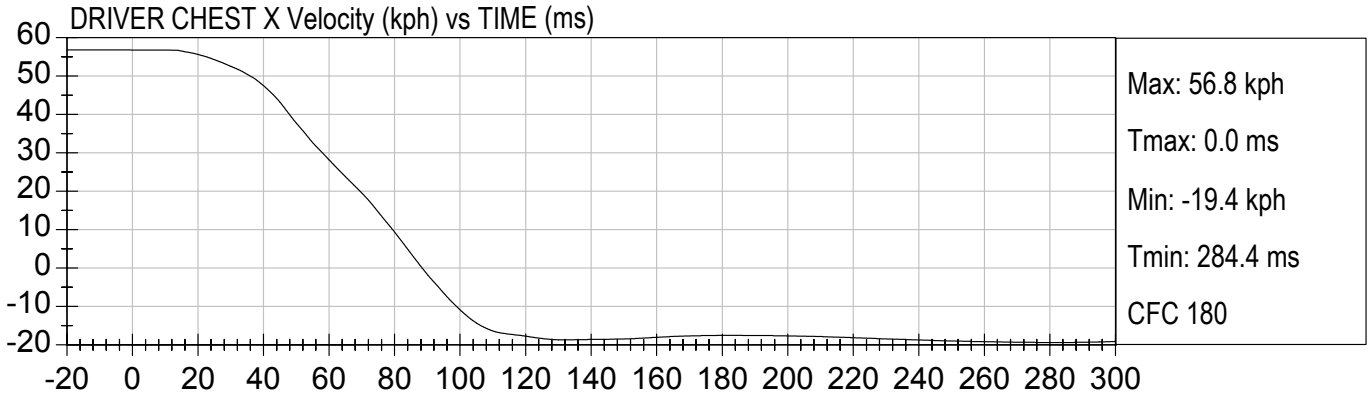


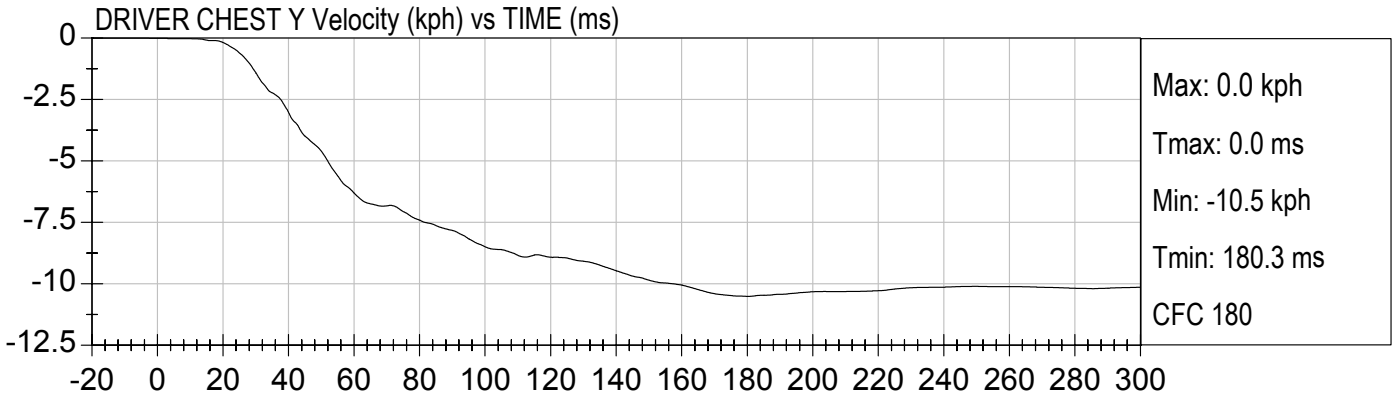


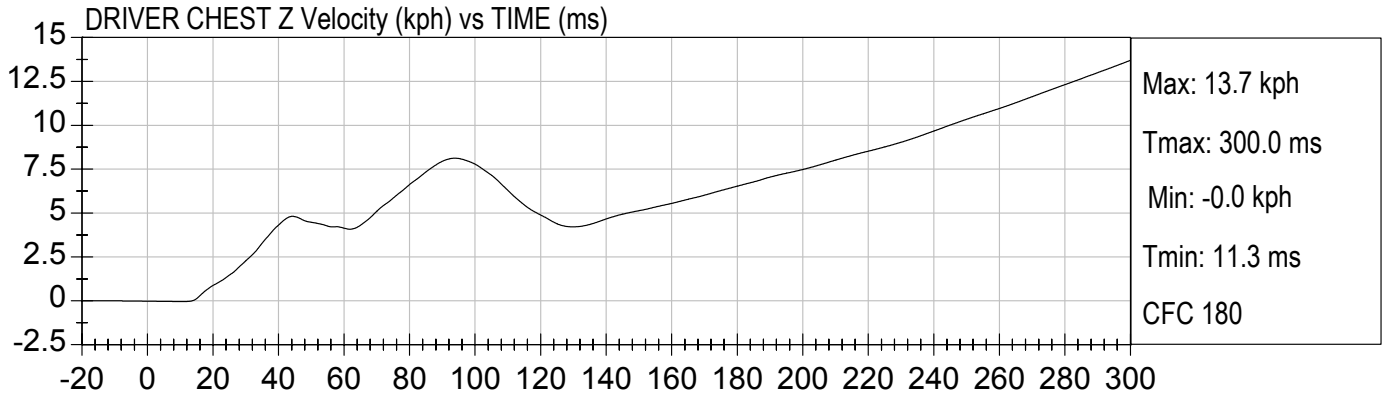


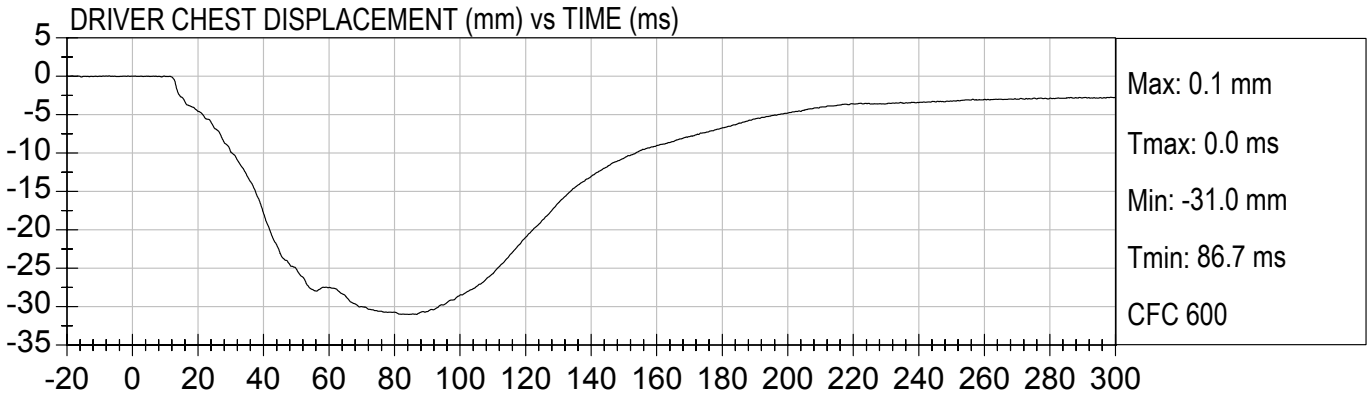
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



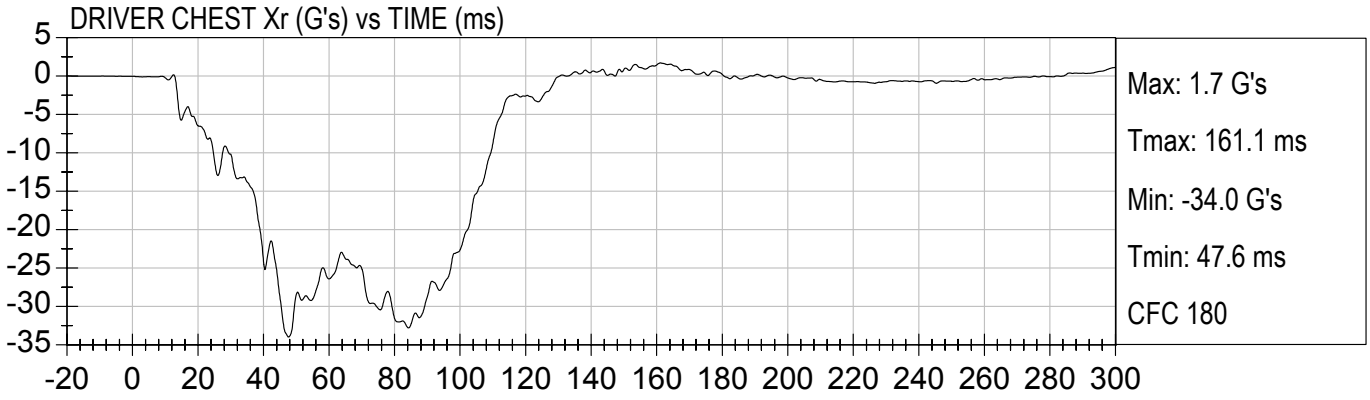


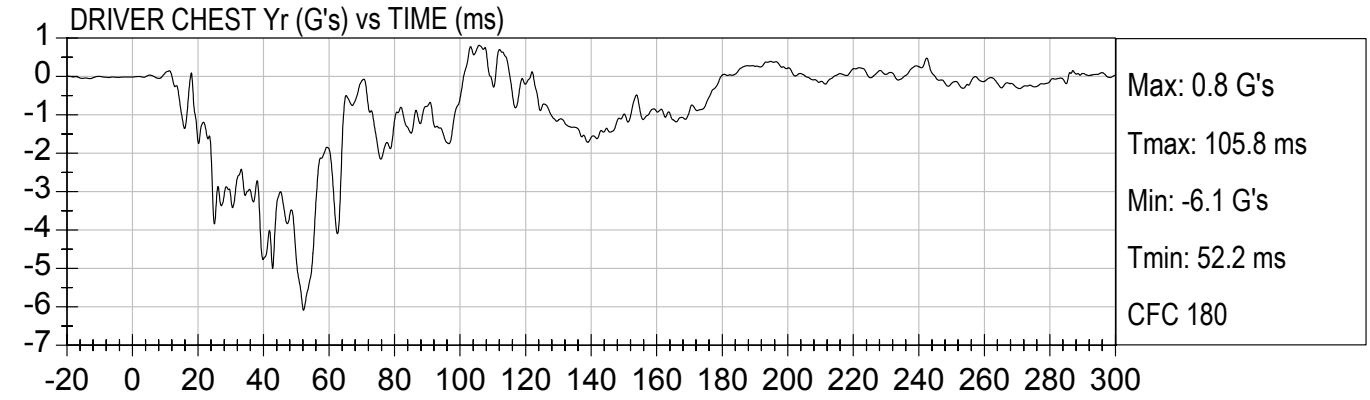


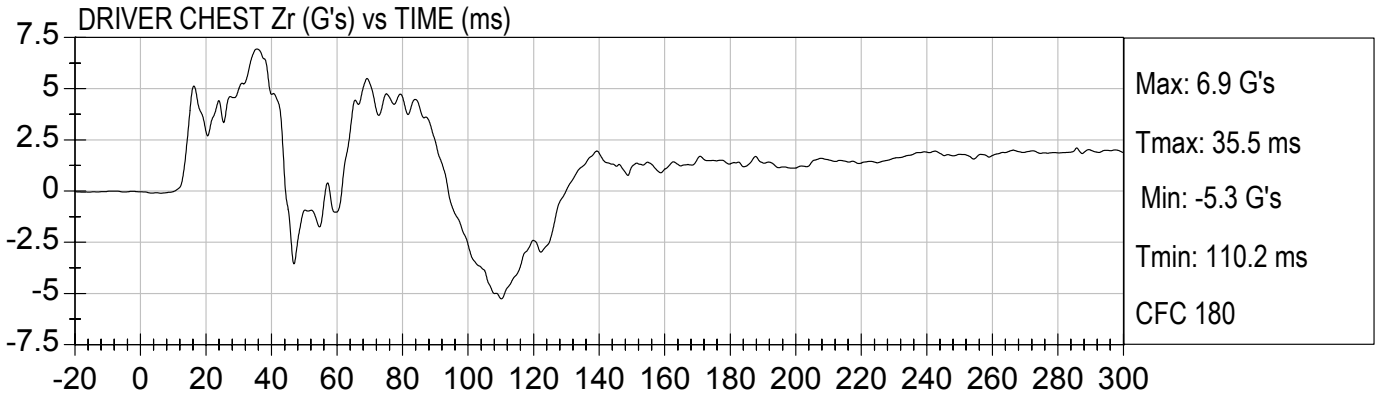


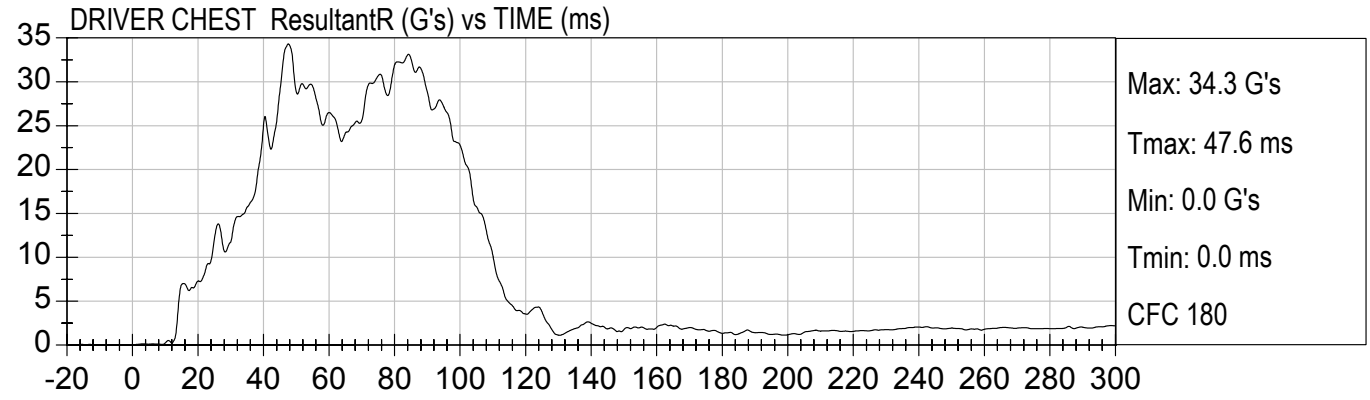
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

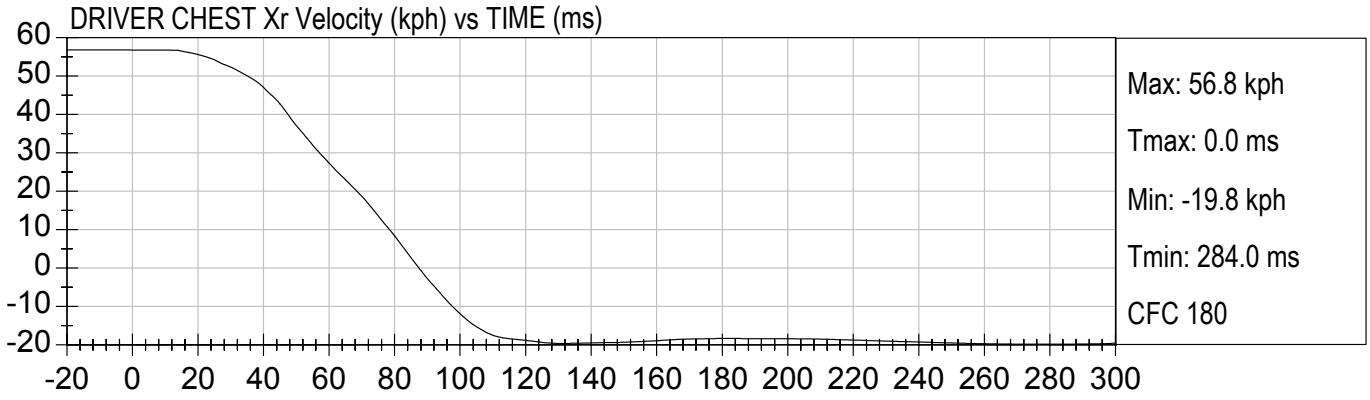
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

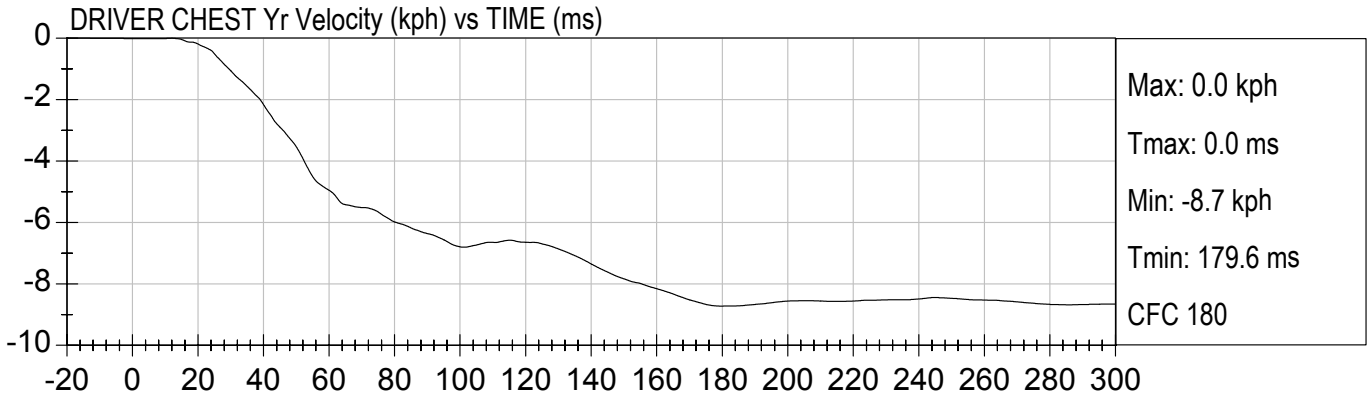


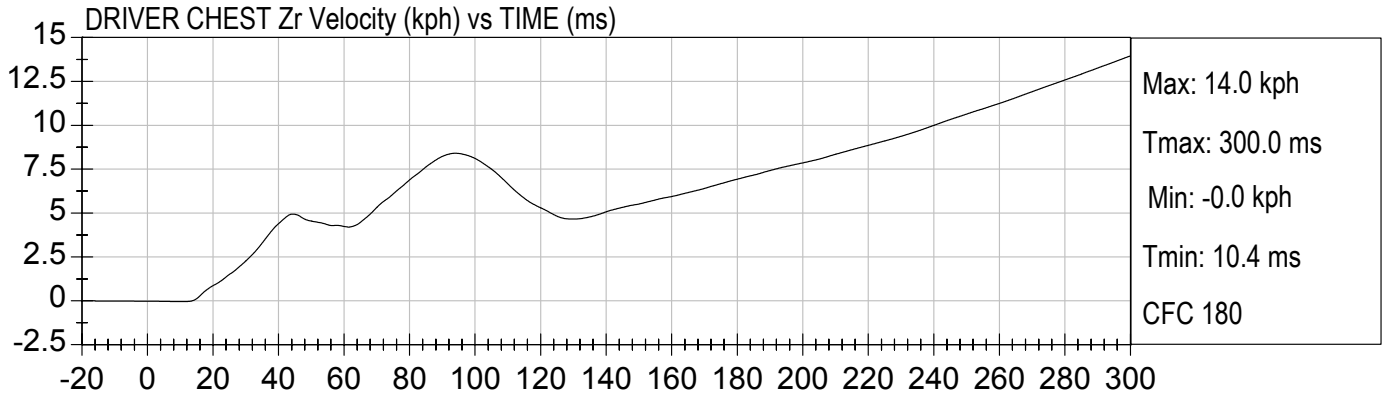






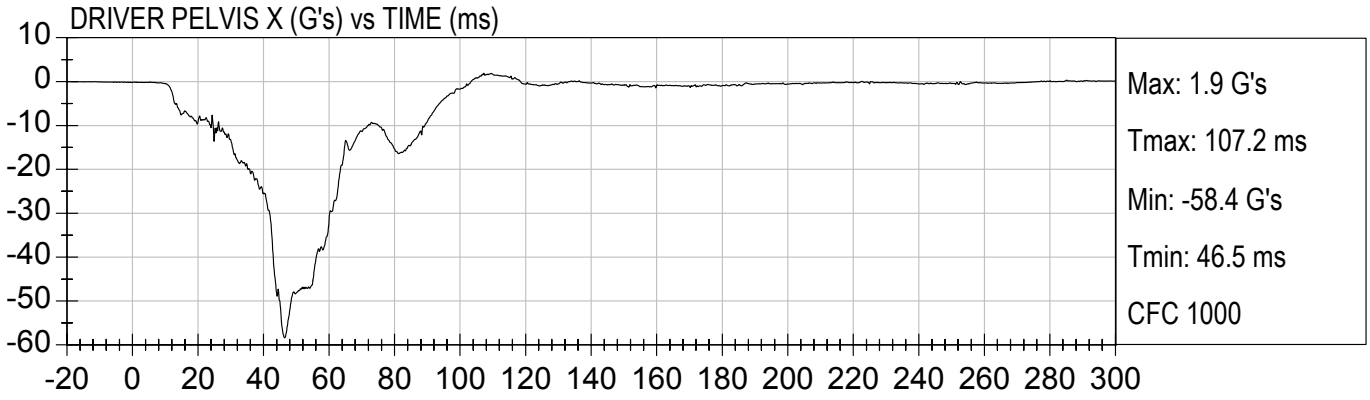

DRIVER CHEST Xr Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 56.8 kph
Tmax: 0.0 ms
Min: -19.8 kph
Tmin: 284.0 ms
CFC 180

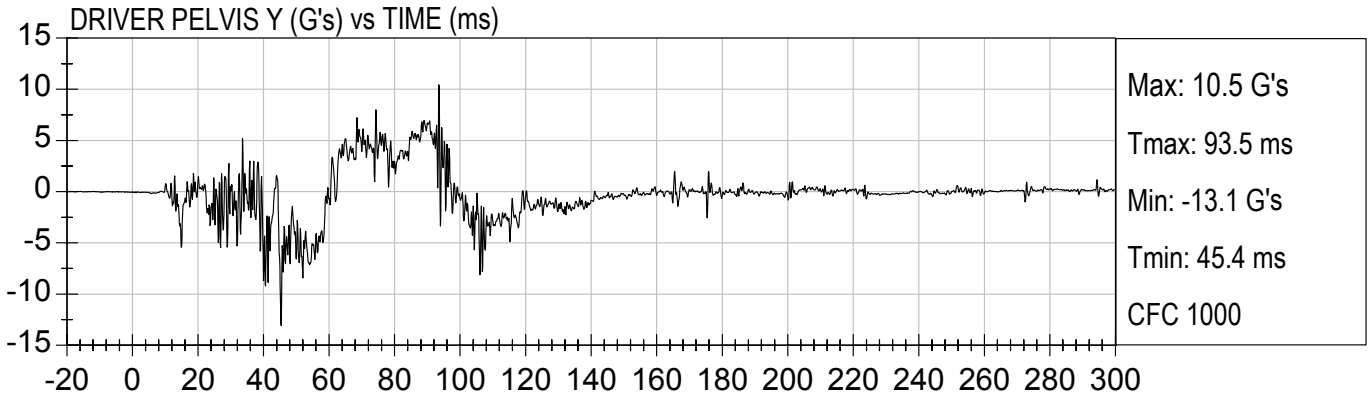

DRIVER CHEST Yr Velocity (kph) vs TIME (ms)
0
-2
-4
-6
-8
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.0 kph
Tmax: 0.0 ms
Min: -8.7 kph
Tmin: 179.6 ms
CFC 180

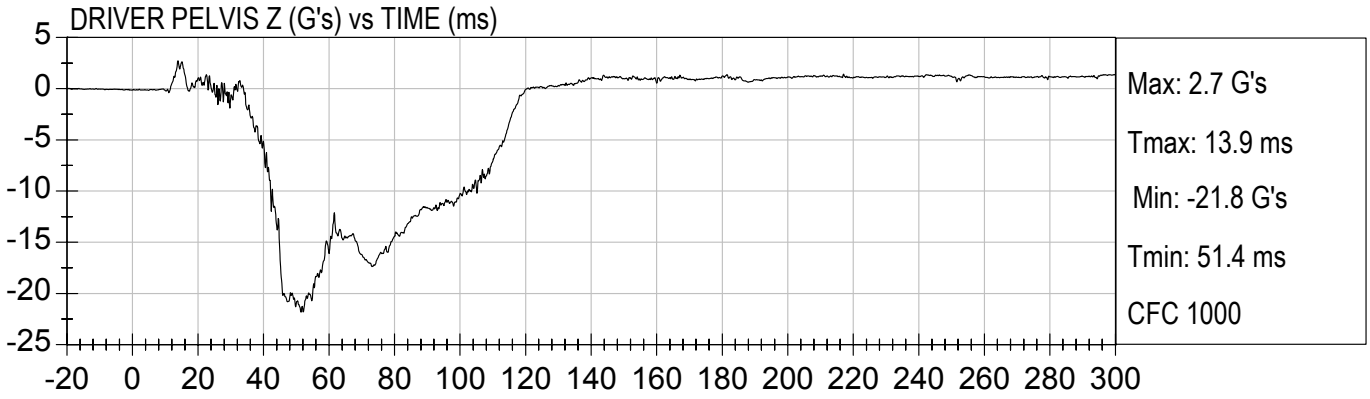

DRIVER CHEST Zr Velocity (kph) vs TIME (ms)
15
12.5
10
7.5
5
2.5
0
-2.5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 14.0 kph
Tmax: 300.0 ms
Min: -0.0 kph
Tmin: 10.4 ms
CFC 180

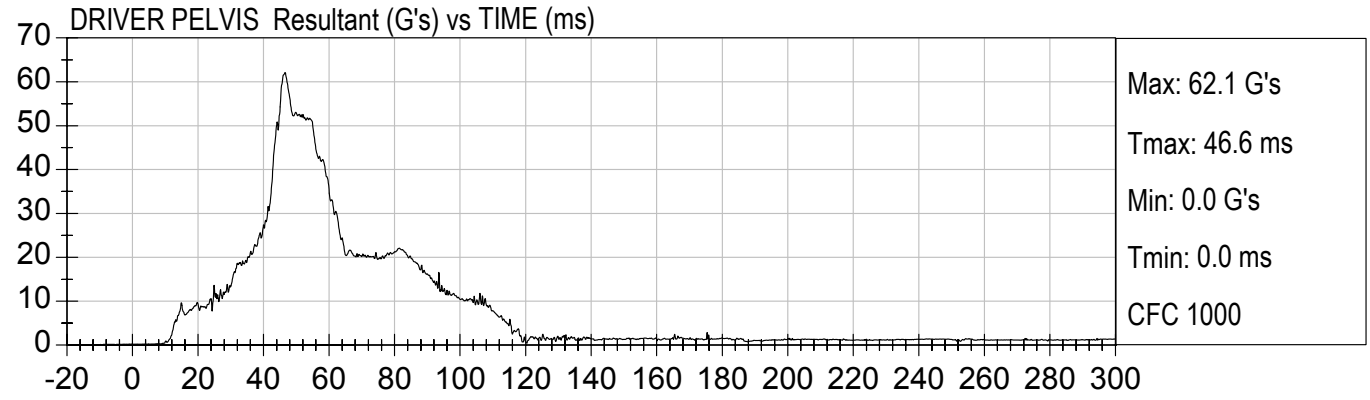
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

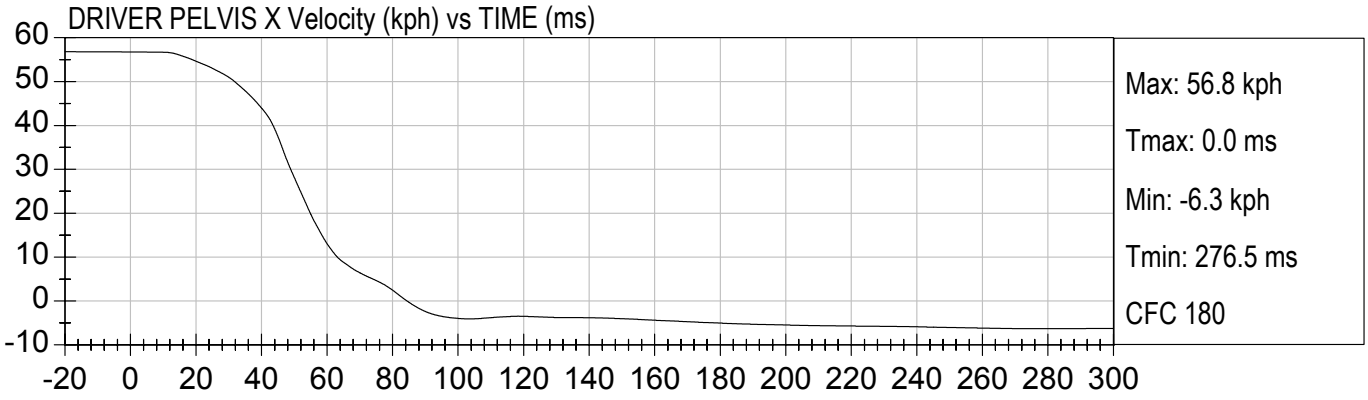
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

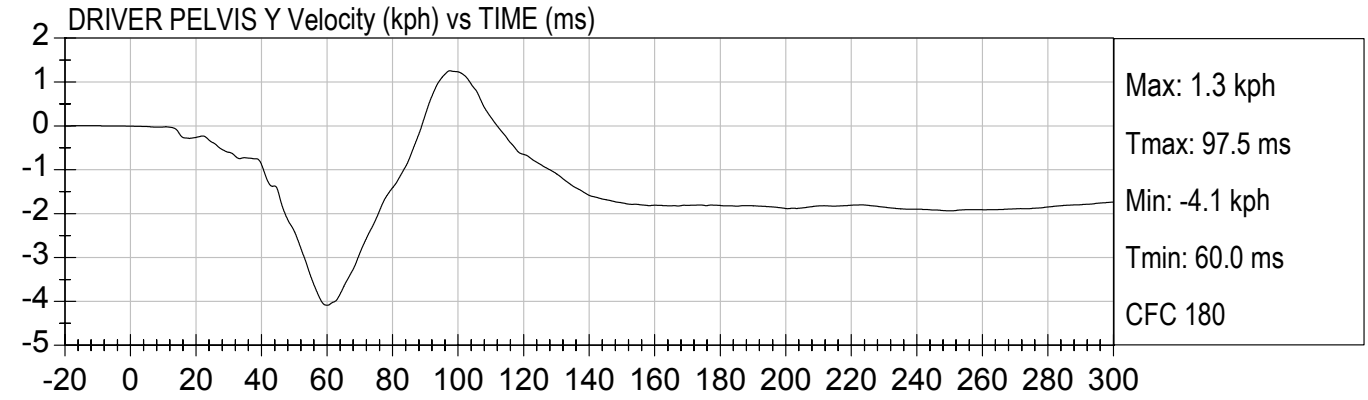


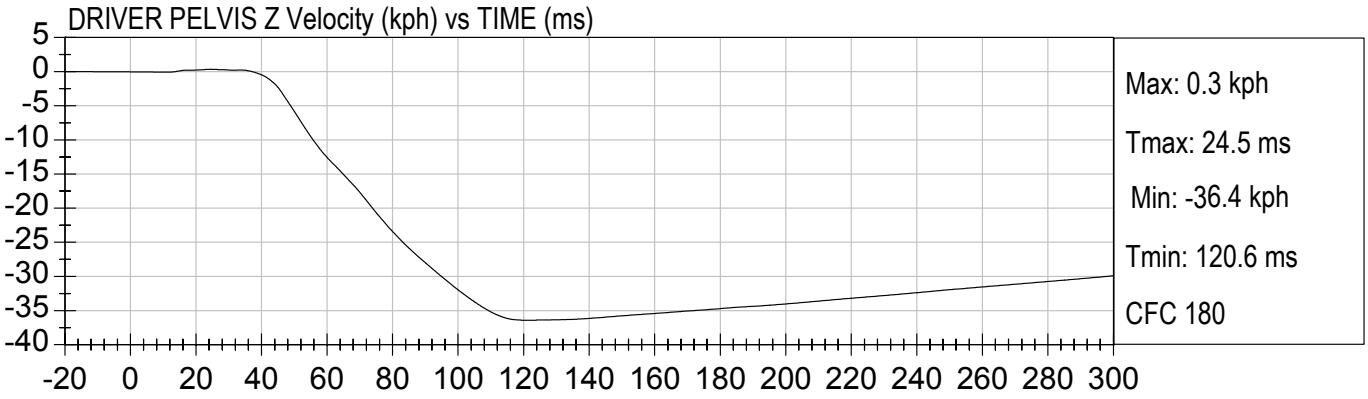






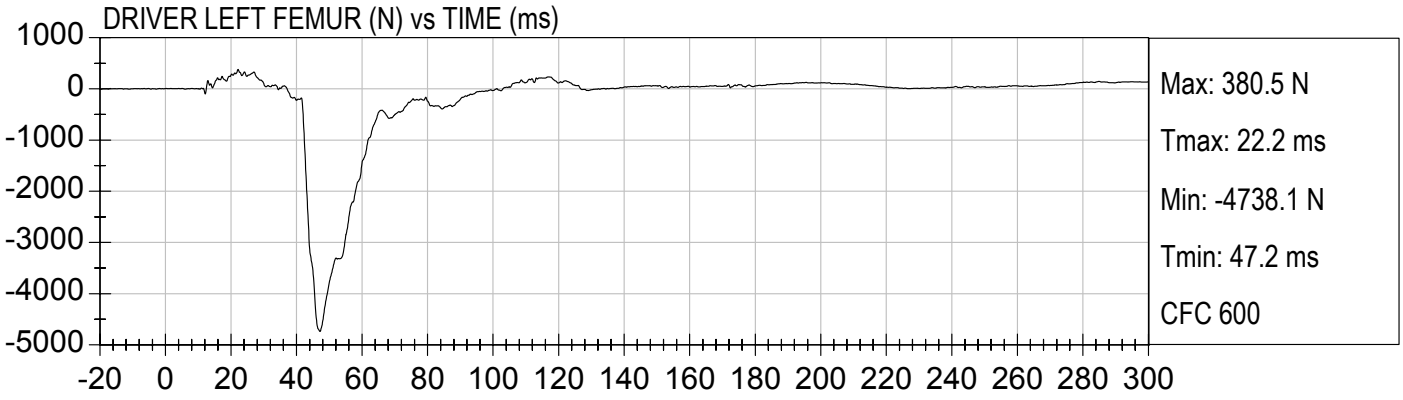

DRIVER PELVIS X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 56.8 kph
Tmax: 0.0 ms
Min: -6.3 kph
Tmin: 276.5 ms
CFC 180

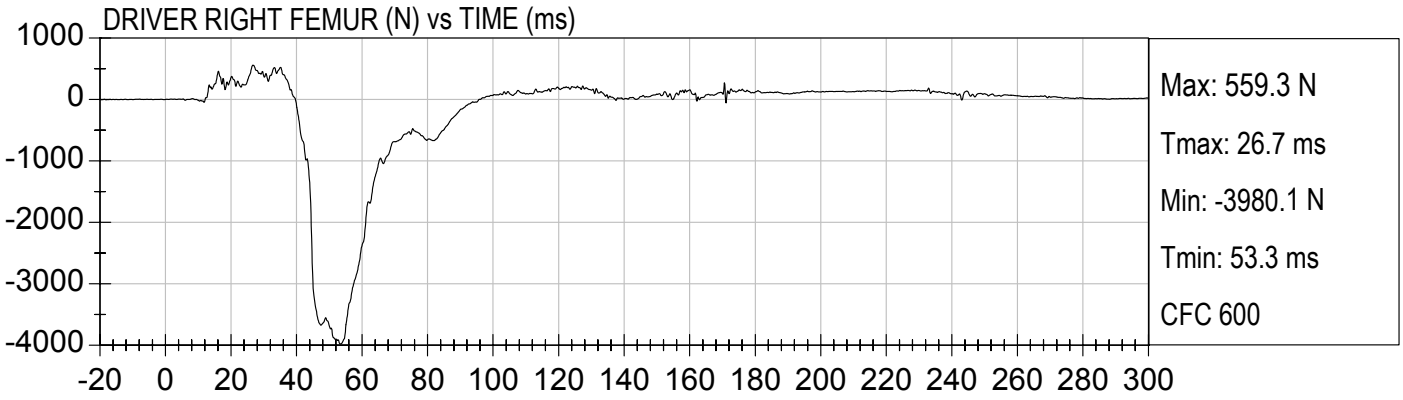

DRIVER PELVIS Y Velocity (kph) vs TIME (ms)
2
1
0
-1
-2
-3
-4
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 1.3 kph
Tmax: 97.5 ms
Min: -4.1 kph
Tmin: 60.0 ms
CFC 180

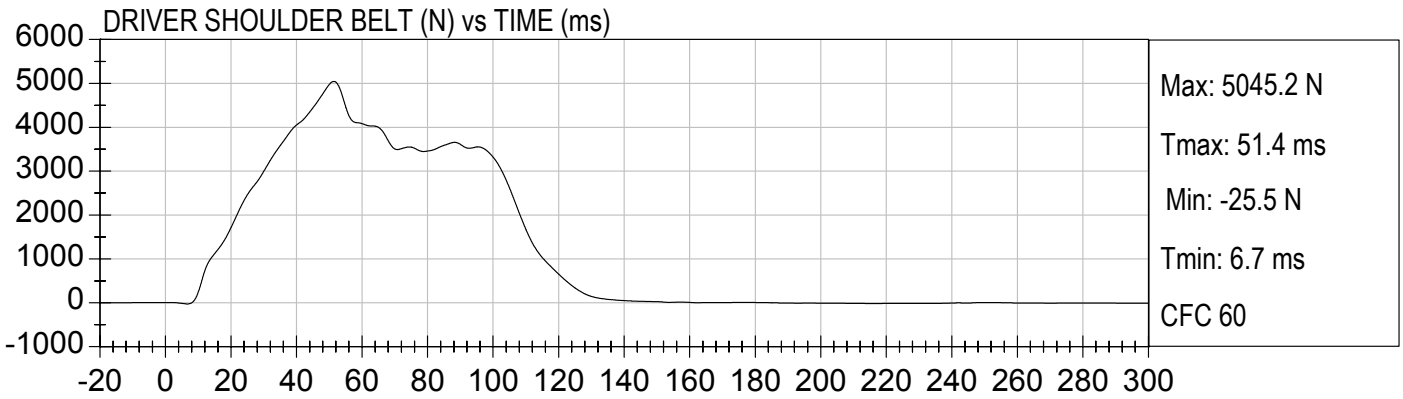

DRIVER PELVIS Z Velocity (kph) vs TIME (ms)
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.3 kph
Tmax: 24.5 ms
Min: -36.4 kph
Tmin: 120.6 ms
CFC 180

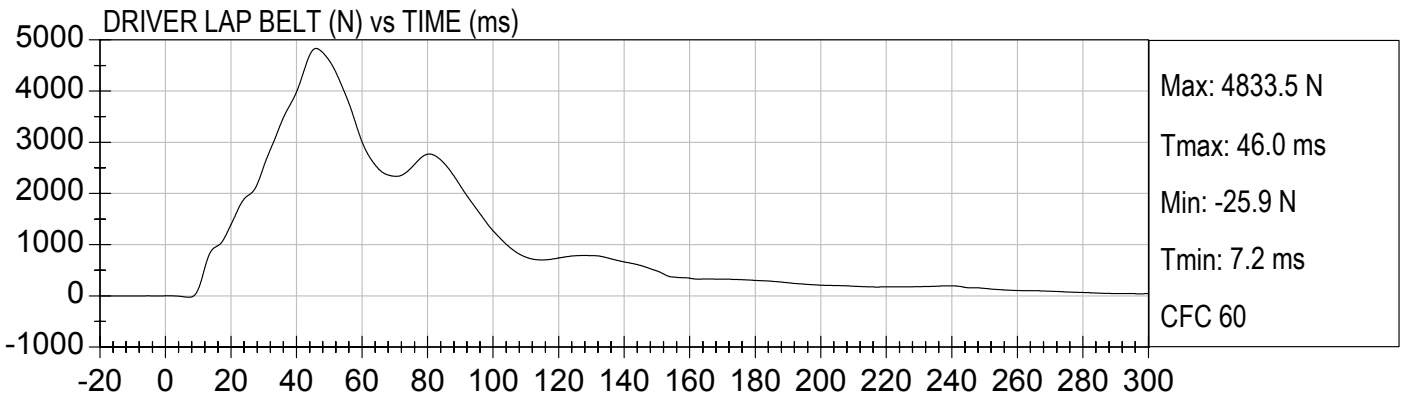
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



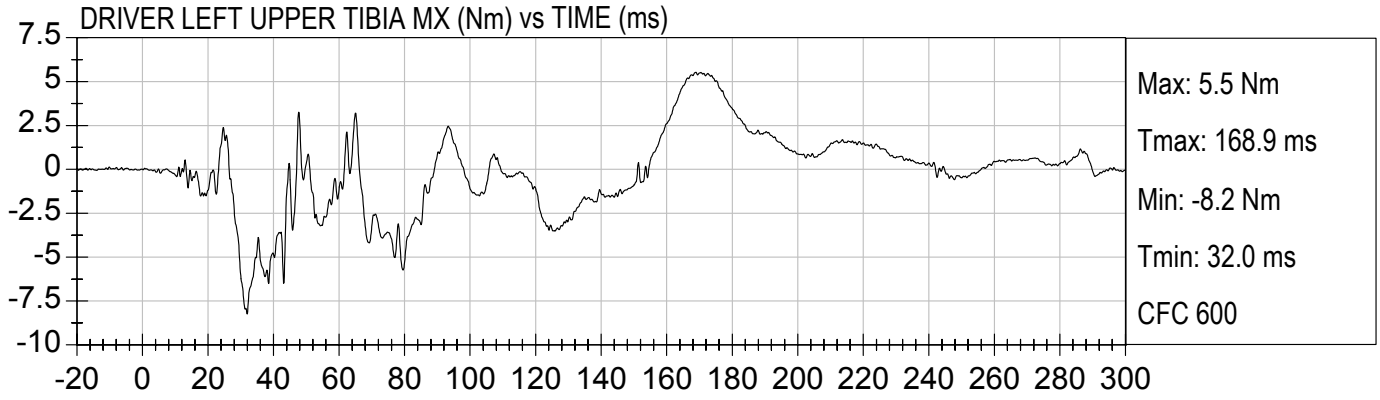


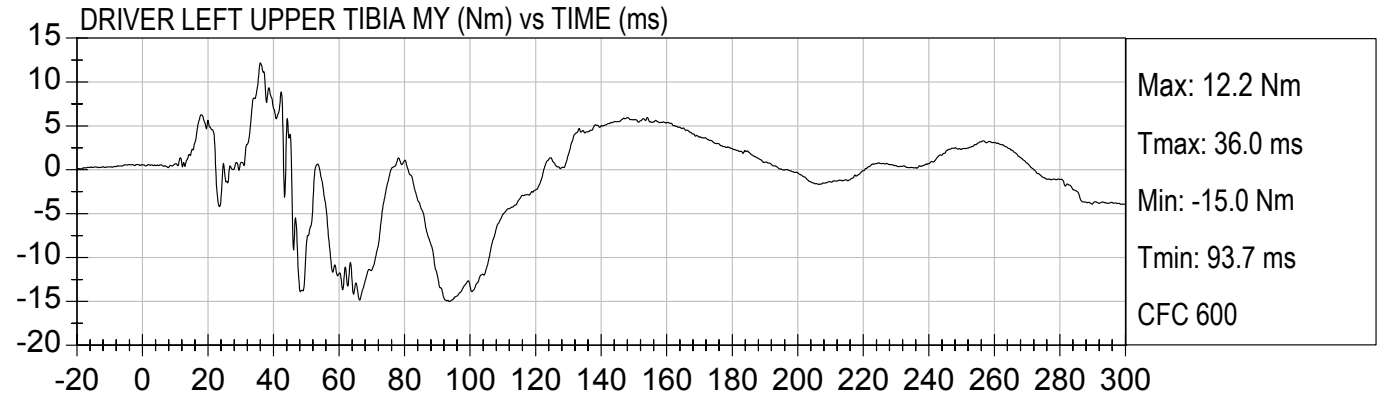


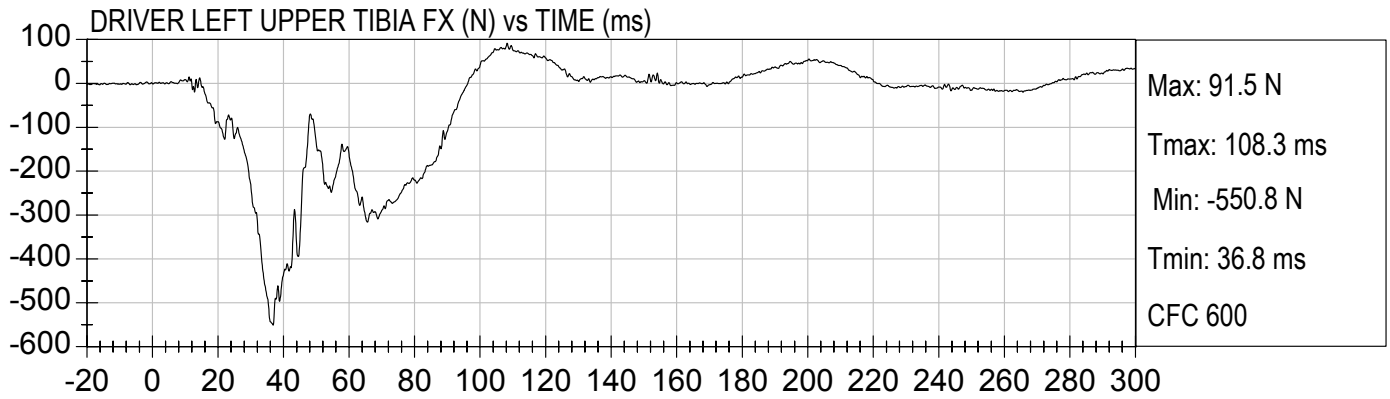


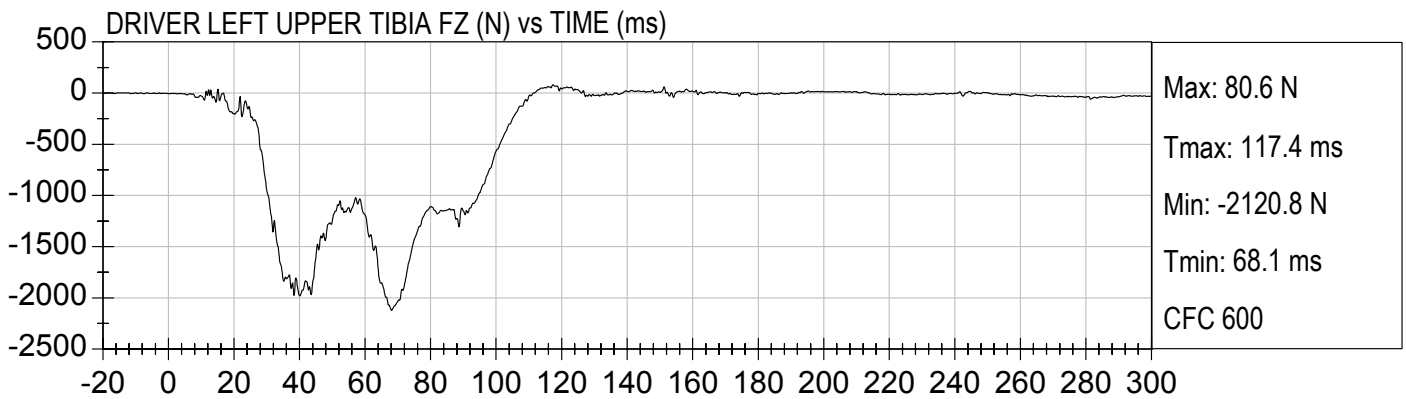
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



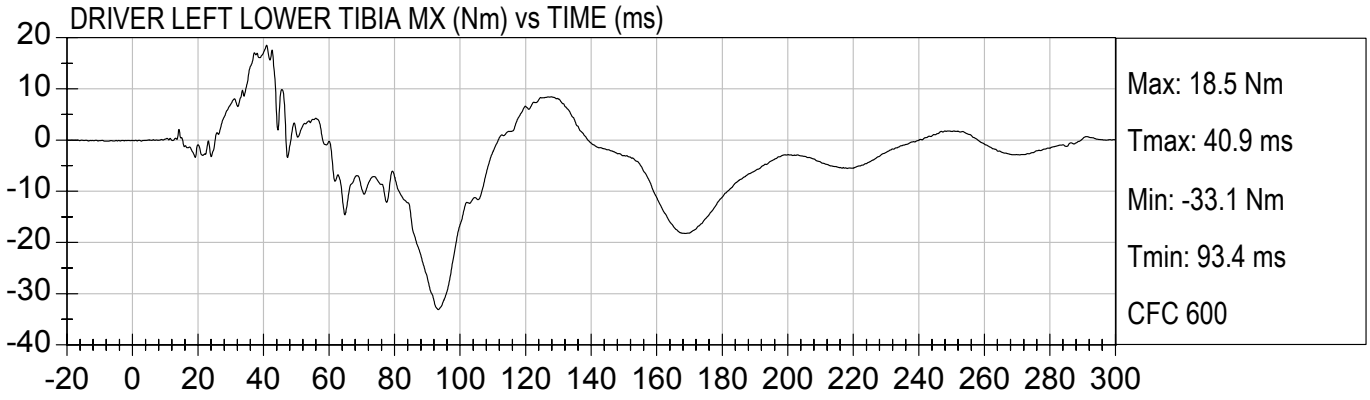


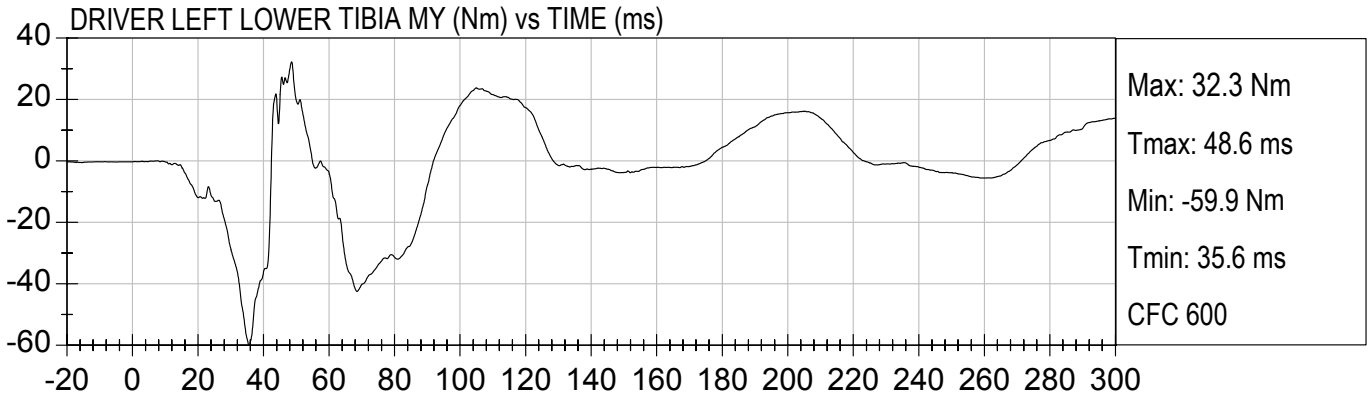


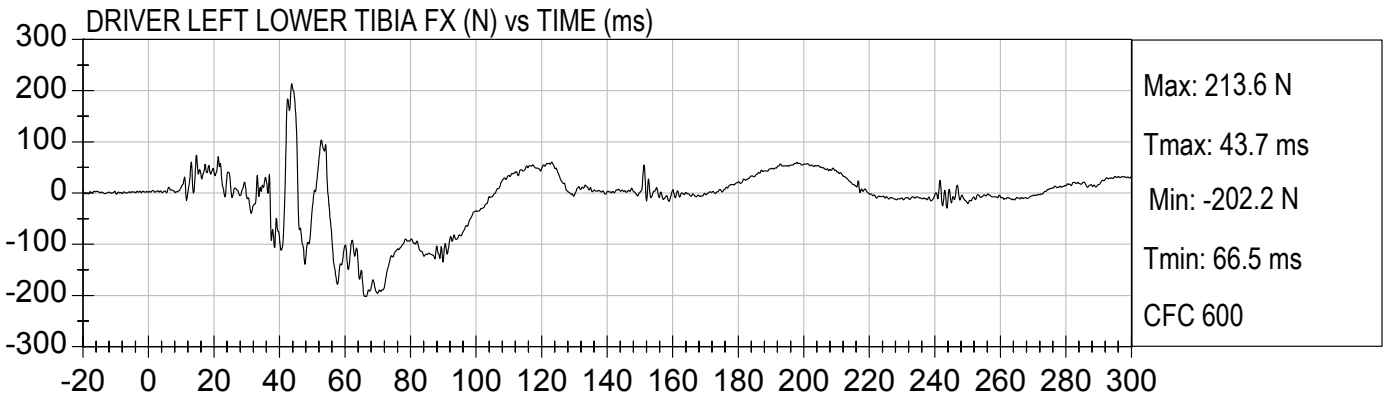


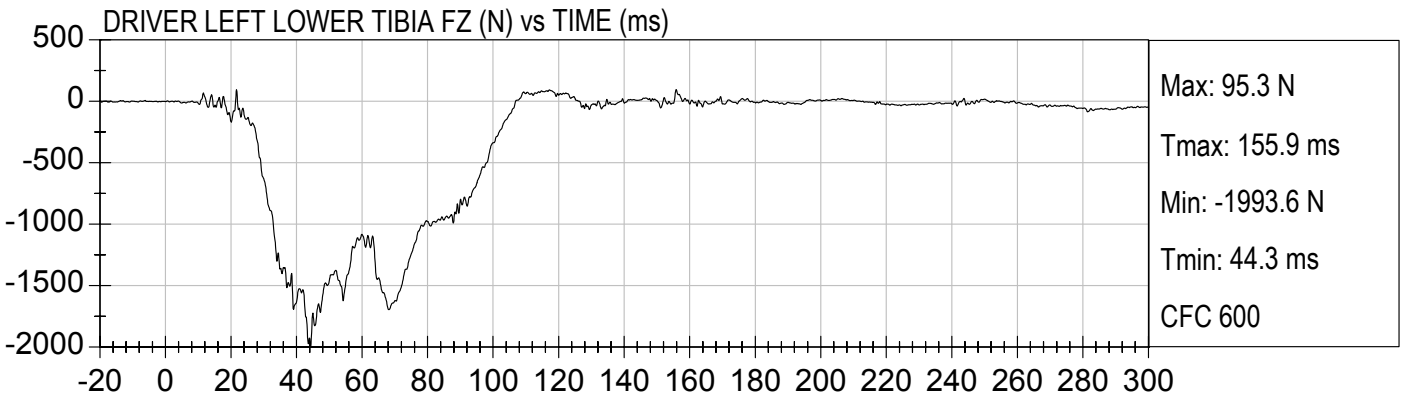
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



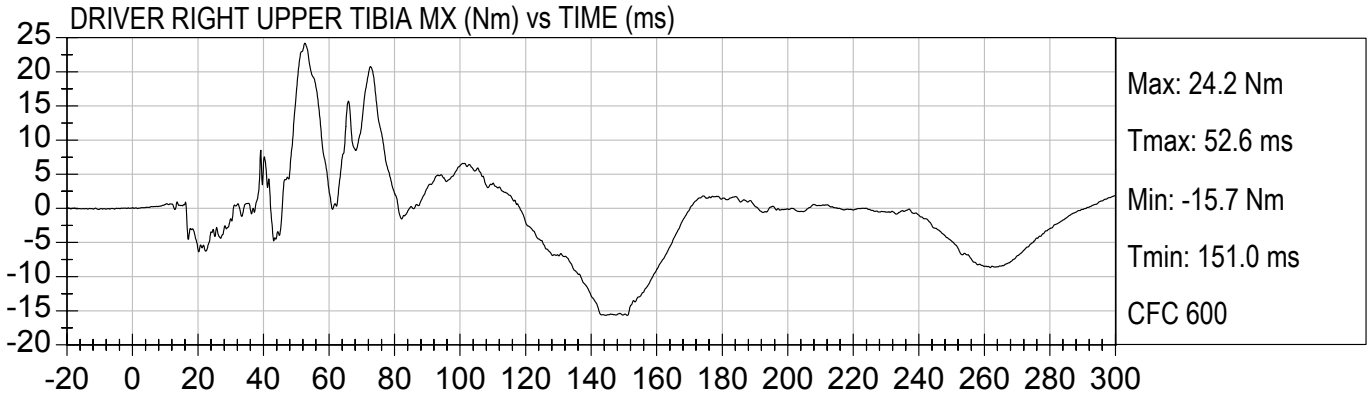


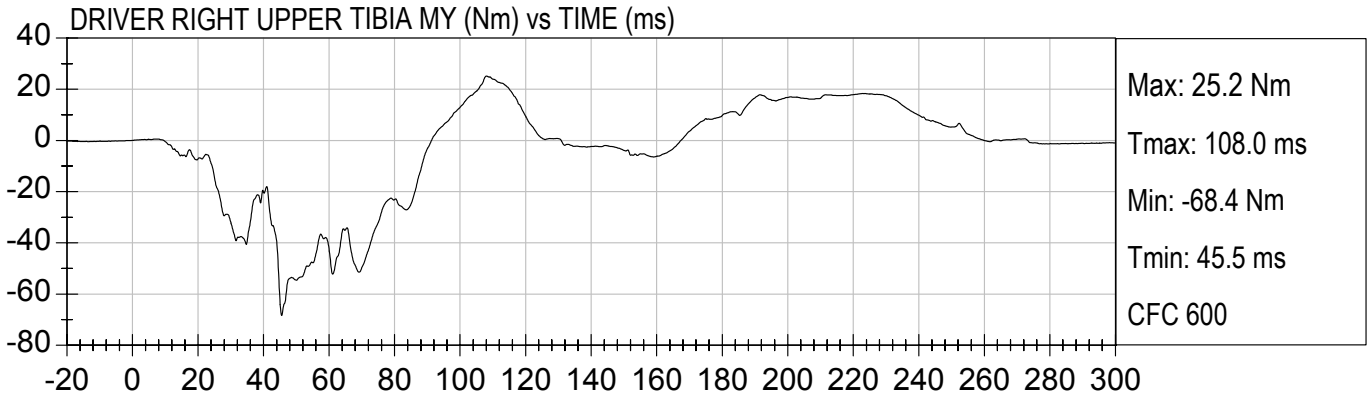


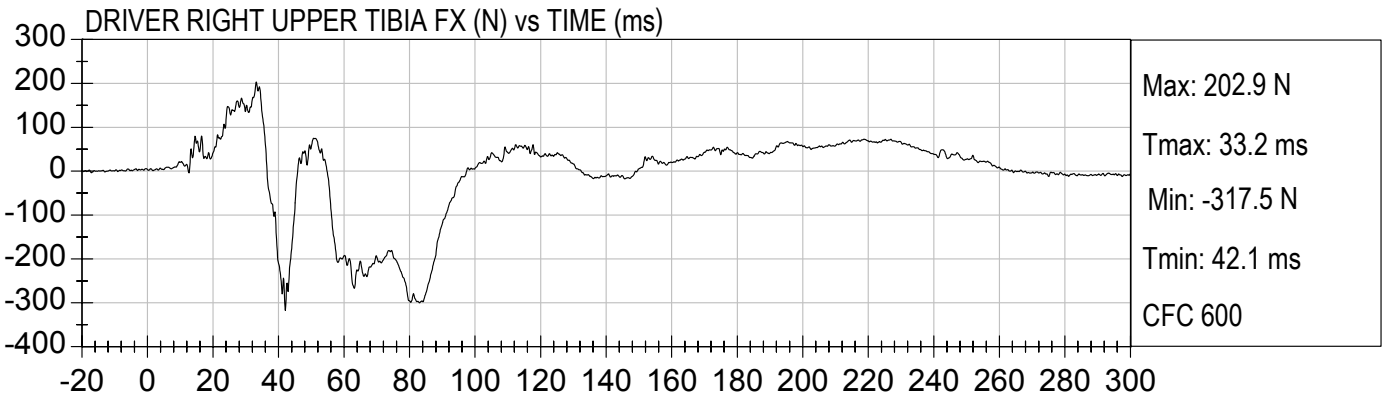


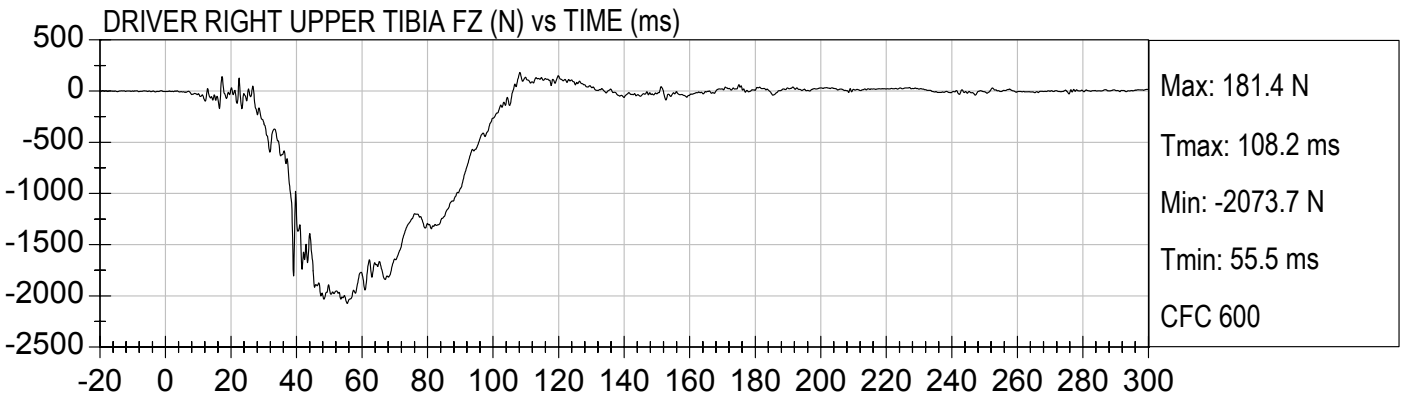
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



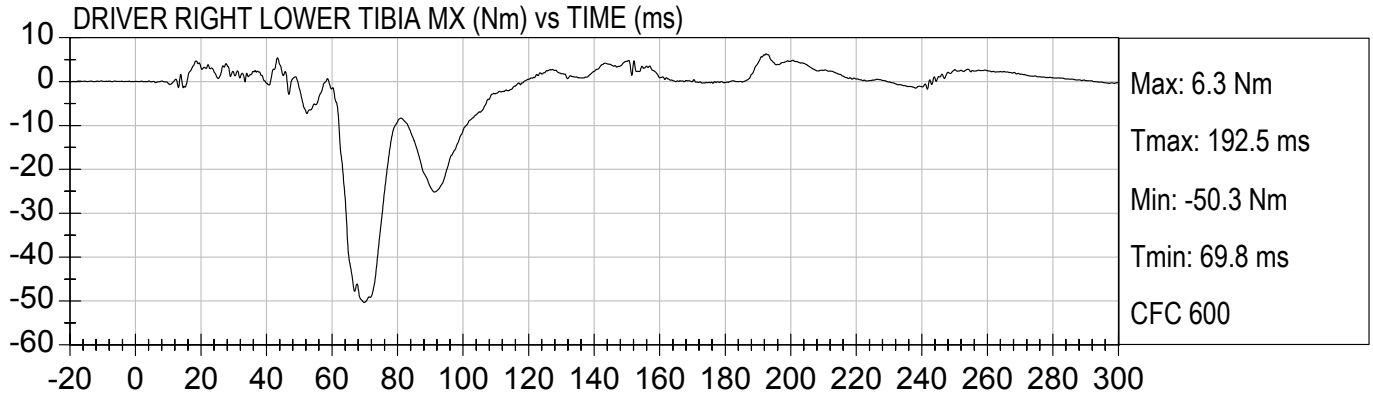


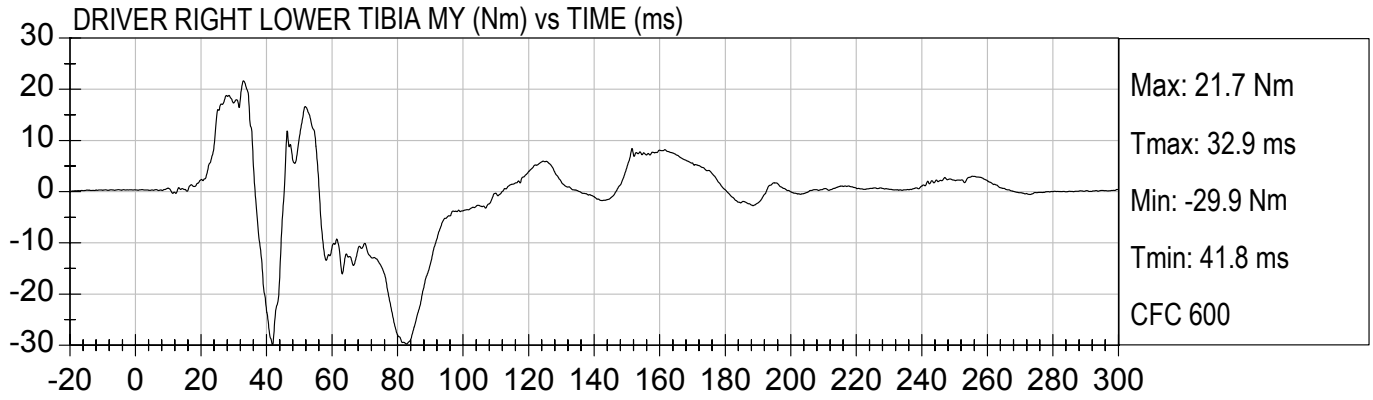


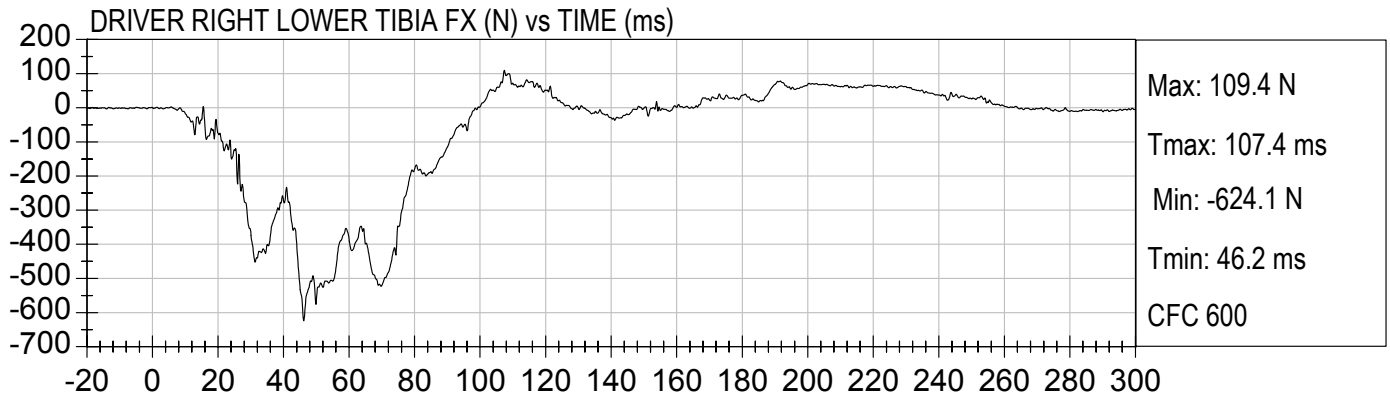


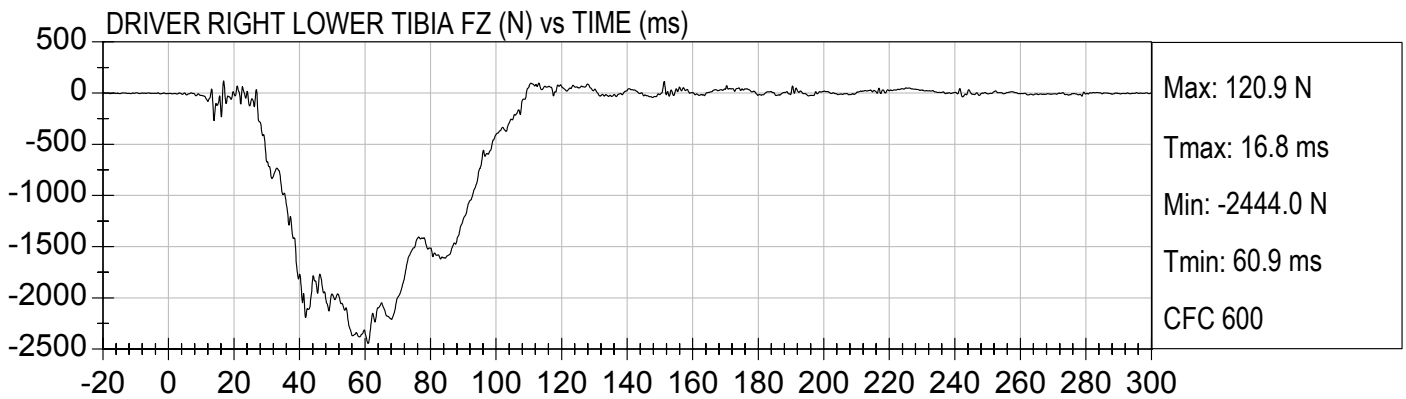
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



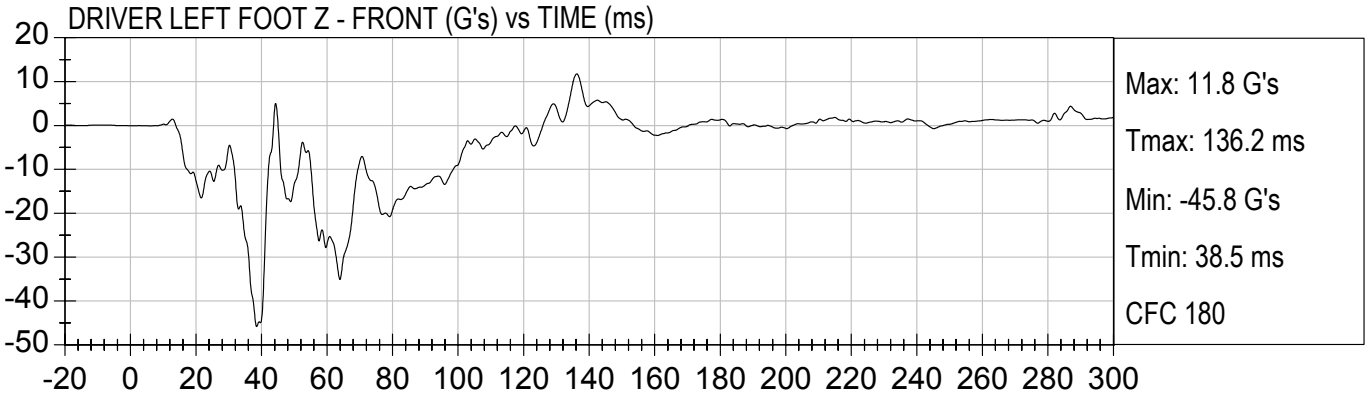


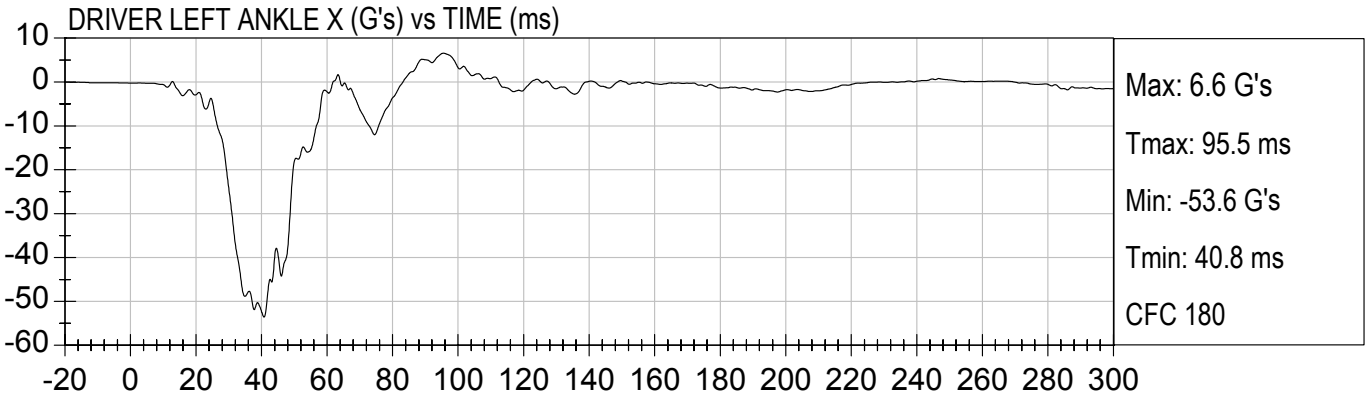


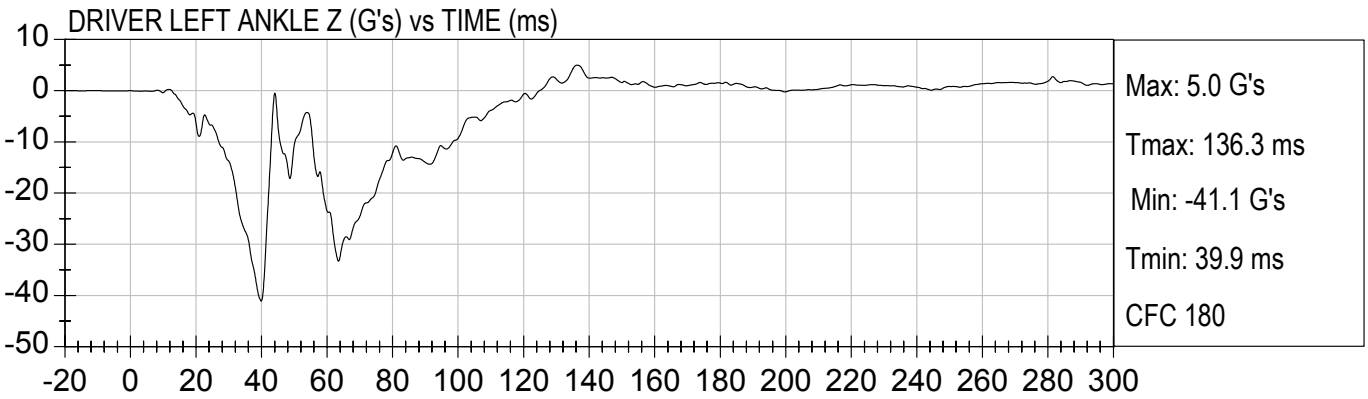


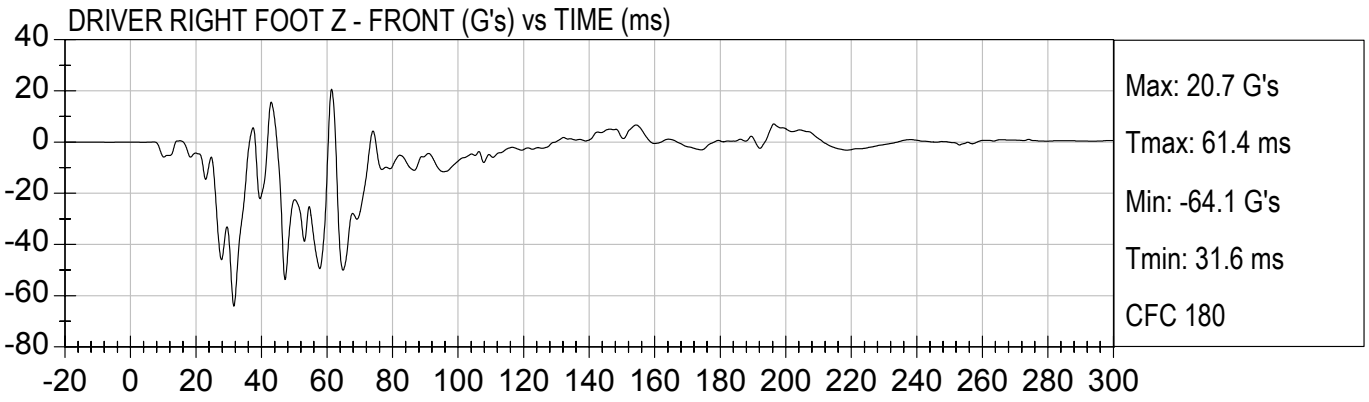
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

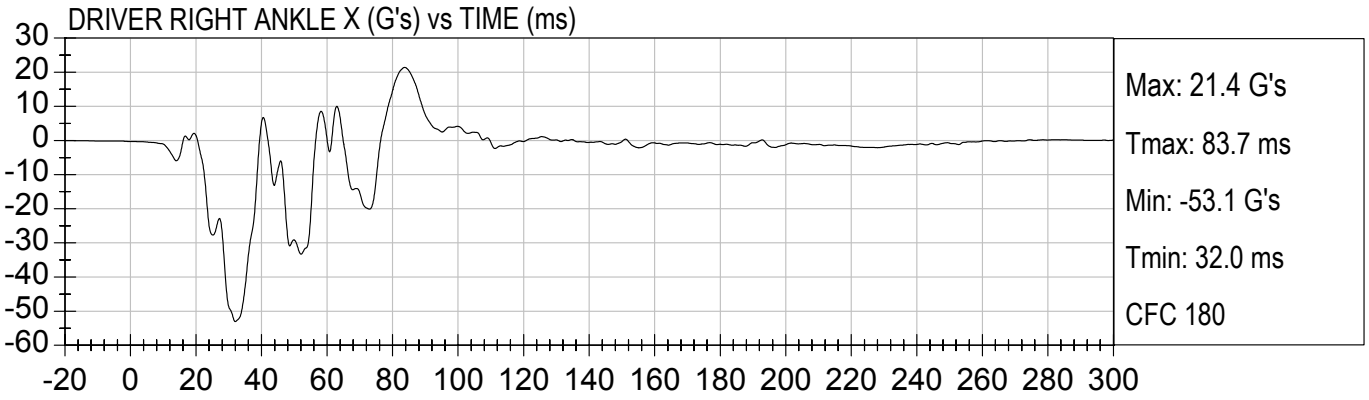
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

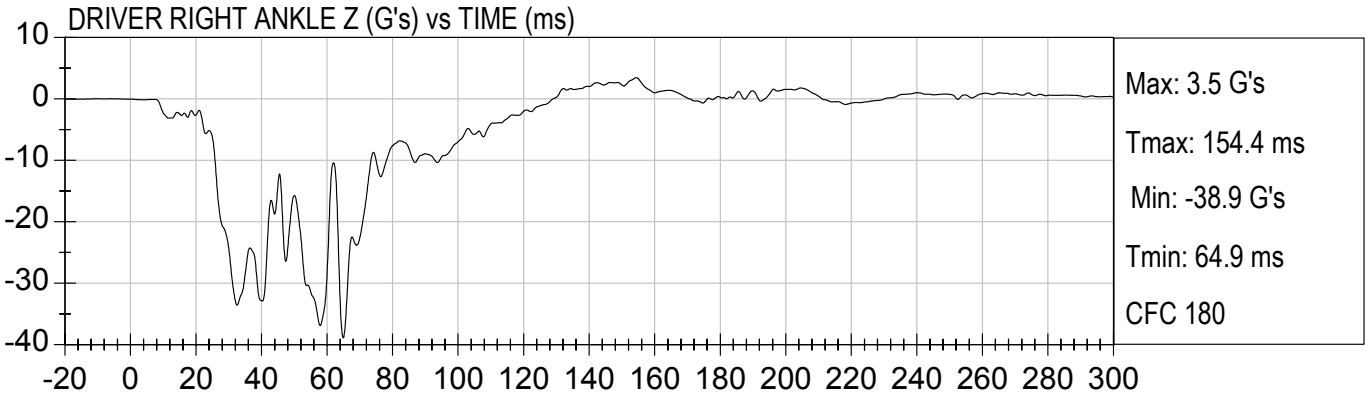






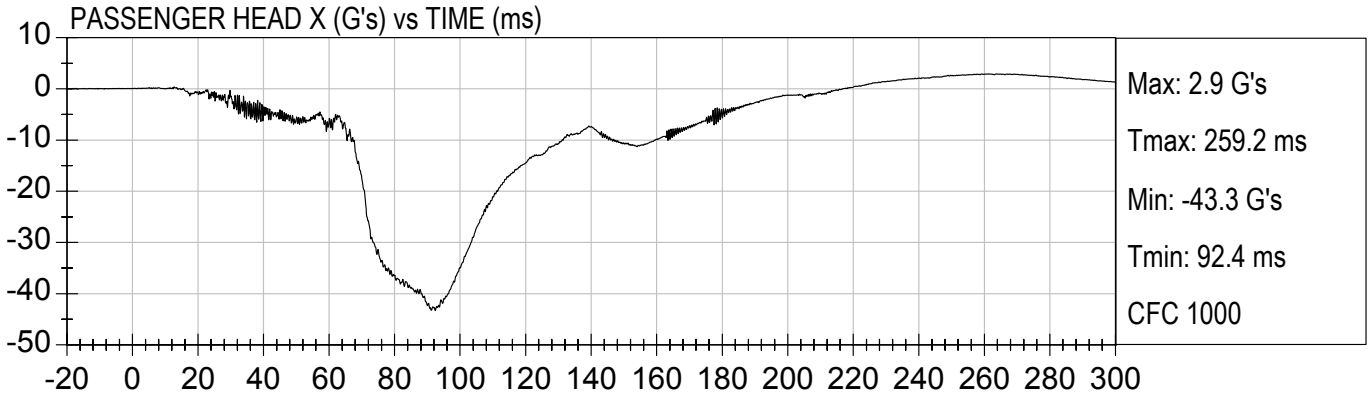

DRIVER RIGHT FOOT Z - FRONT (G's) vs TIME (ms)
40
20
0
-20
-40
-60
-80
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 20.7 G's
Tmax: 61.4 ms
Min: -64.1 G's
Tmin: 31.6 ms
CFC 180

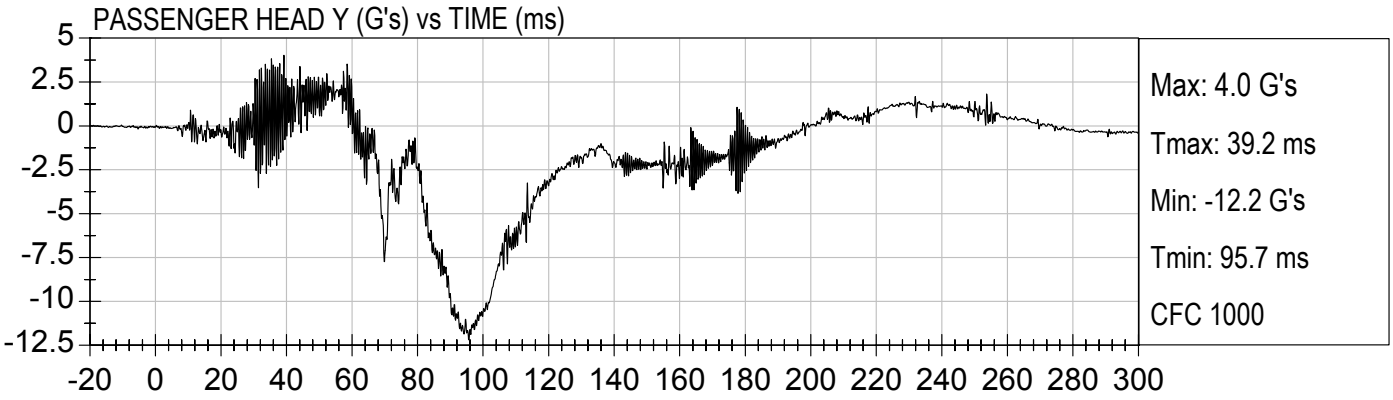

DRIVER RIGHT ANKLE X (G's) vs TIME (ms)
30
20
10
0
-10
-20
-30
-40
-50
-60
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 21.4 G's
Tmax: 83.7 ms
Min: -53.1 G's
Tmin: 32.0 ms
CFC 180

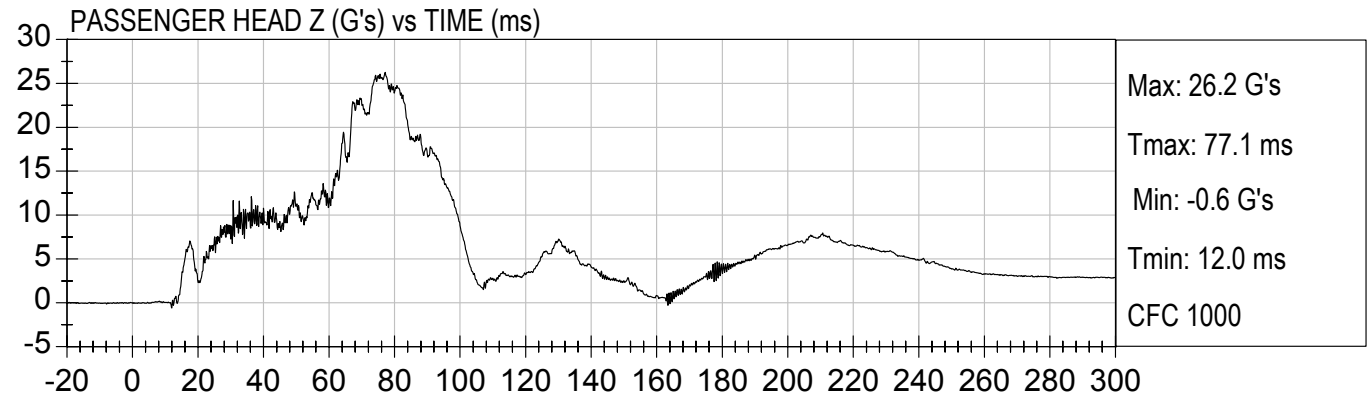

DRIVER RIGHT ANKLE Z (G's) vs TIME (ms)
10
0
-10
-20
-30
-40
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 3.5 G's
Tmax: 154.4 ms
Min: -38.9 G's
Tmin: 64.9 ms
CFC 180

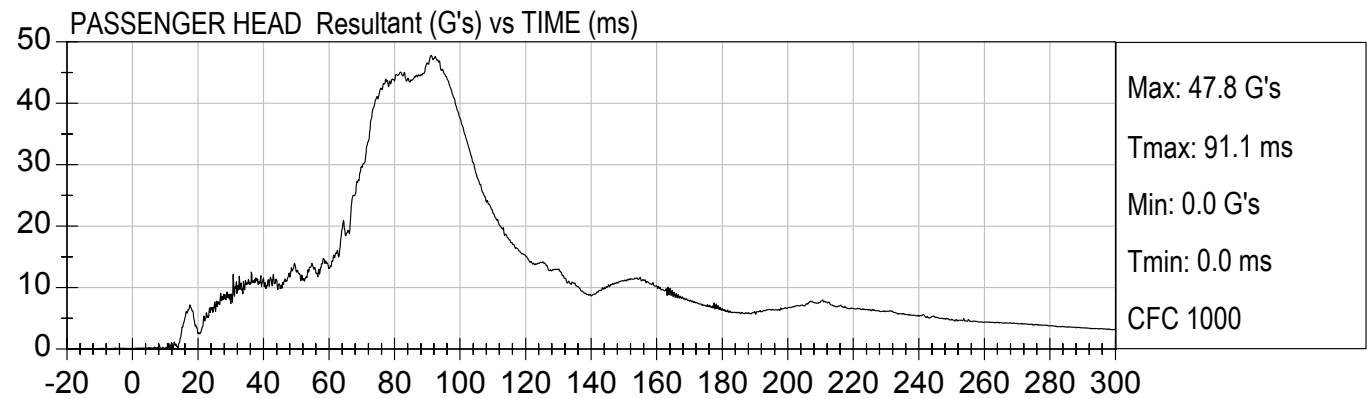
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

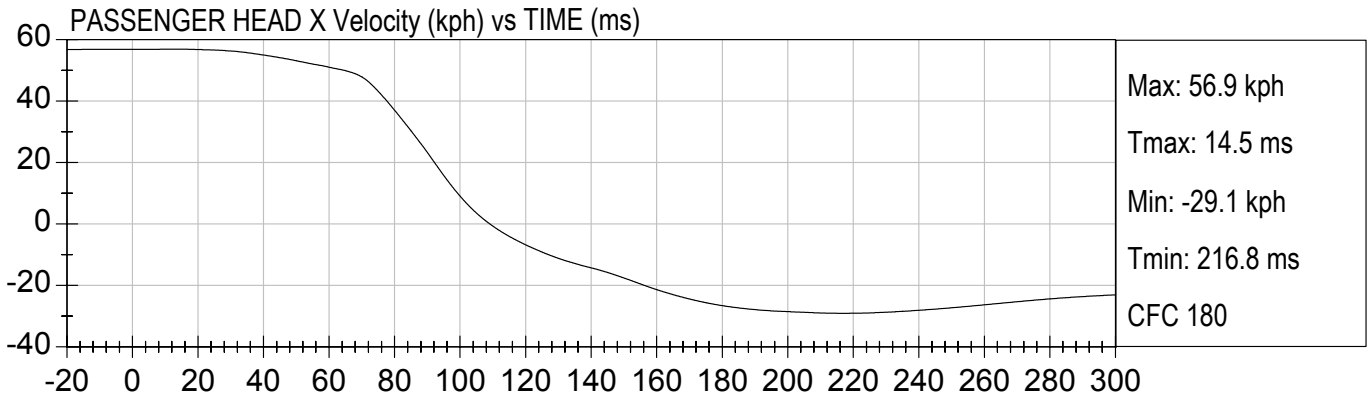
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

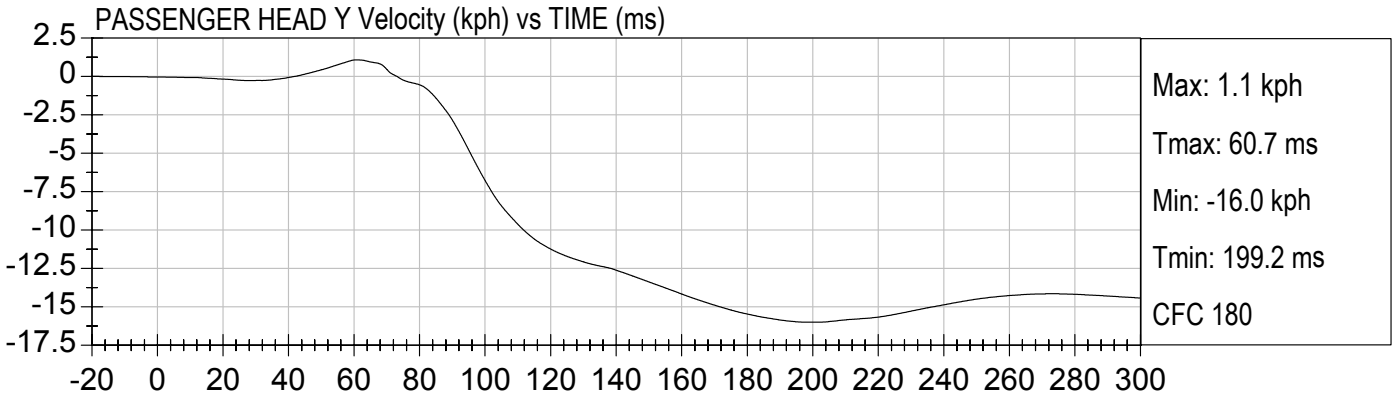


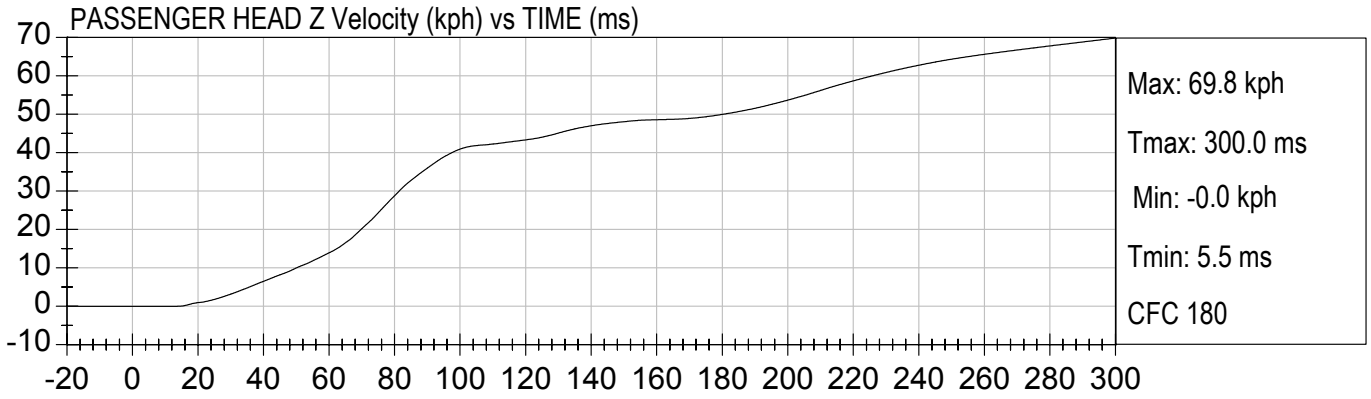






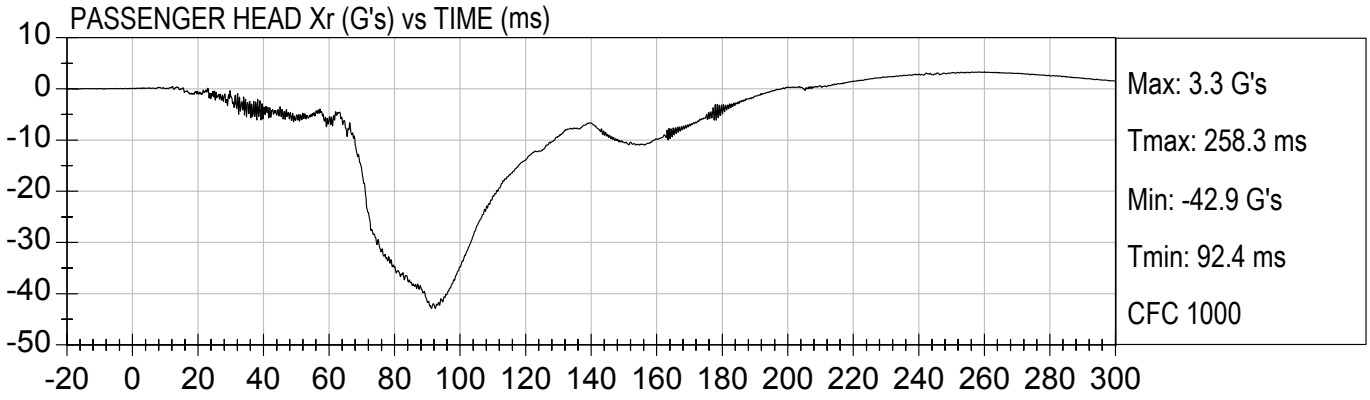

PASSENGER HEAD X Velocity (kph) vs TIME (ms)
60
40
20
0
-20
-40
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 56.9 kph
Tmax: 14.5 ms
Min: -29.1 kph
Tmin: 216.8 ms
CFC 180

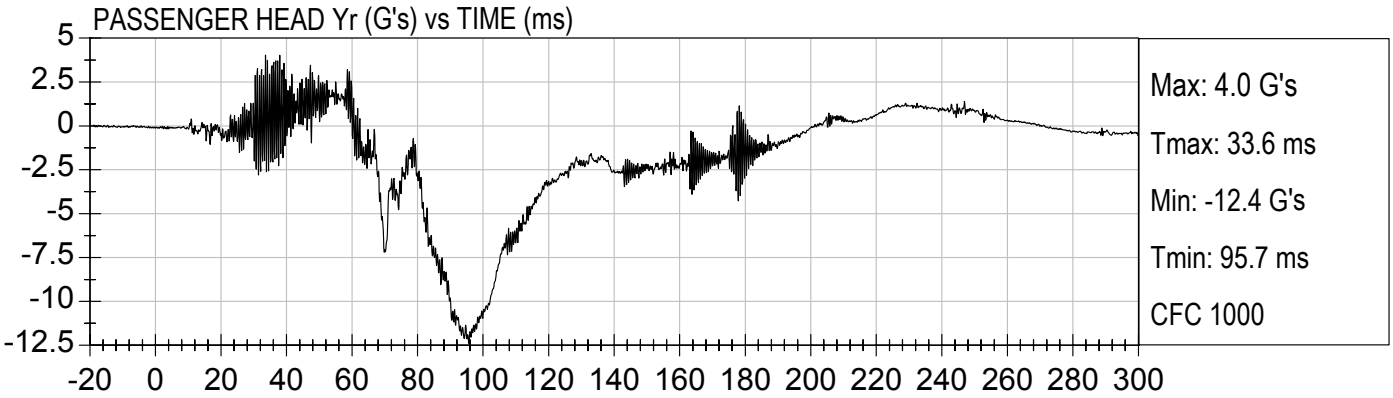

PASSENGER HEAD Y Velocity (kph) vs TIME (ms)
2.5
0
-2.5
-5
-7.5
-10
-12.5
-15
-17.5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 1.1 kph
Tmax: 60.7 ms
Min: -16.0 kph
Tmin: 199.2 ms
CFC 180

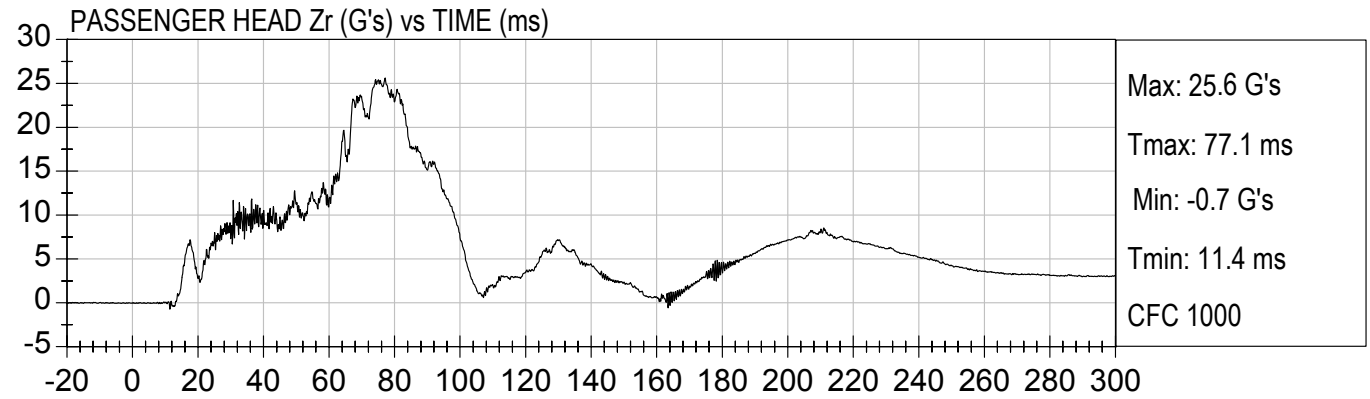

PASSENGER HEAD Z Velocity (kph) vs TIME (ms)
70
60
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 69.8 kph
Tmax: 300.0 ms
Min: -0.0 kph
Tmin: 5.5 ms
CFC 180

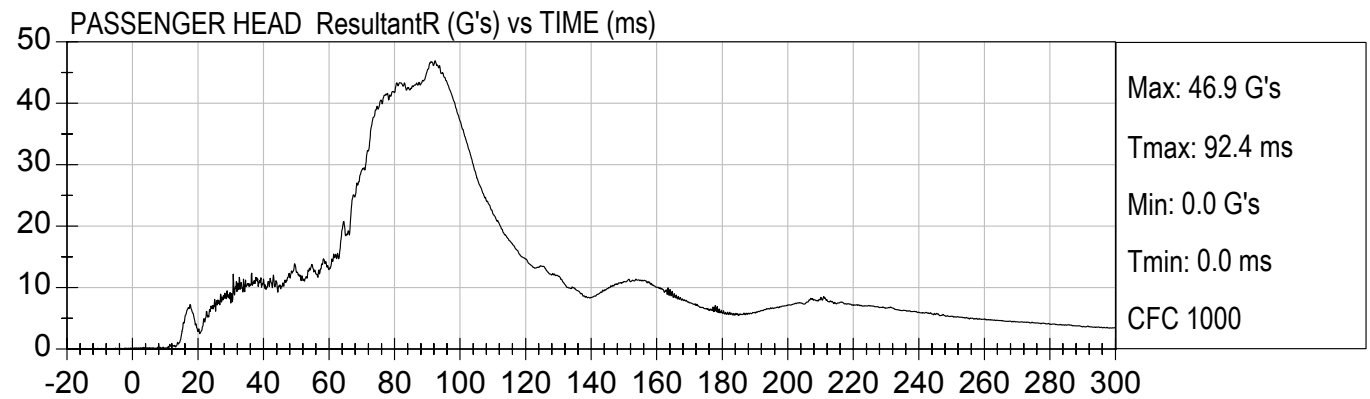
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

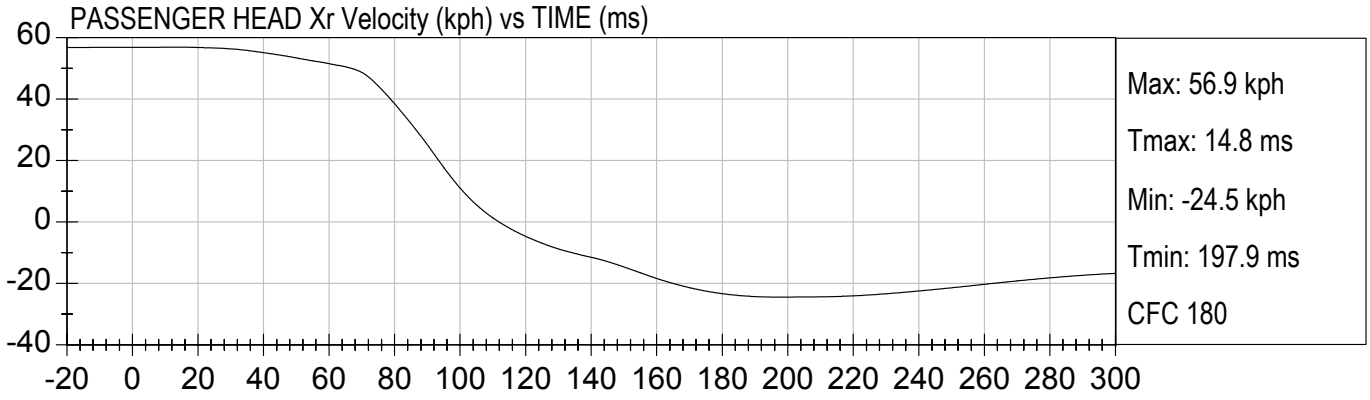
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

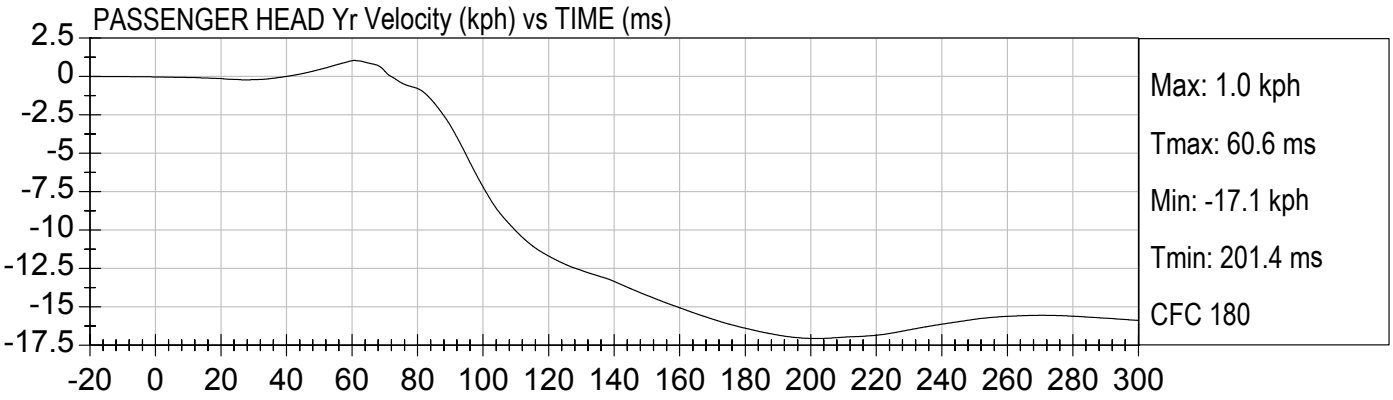


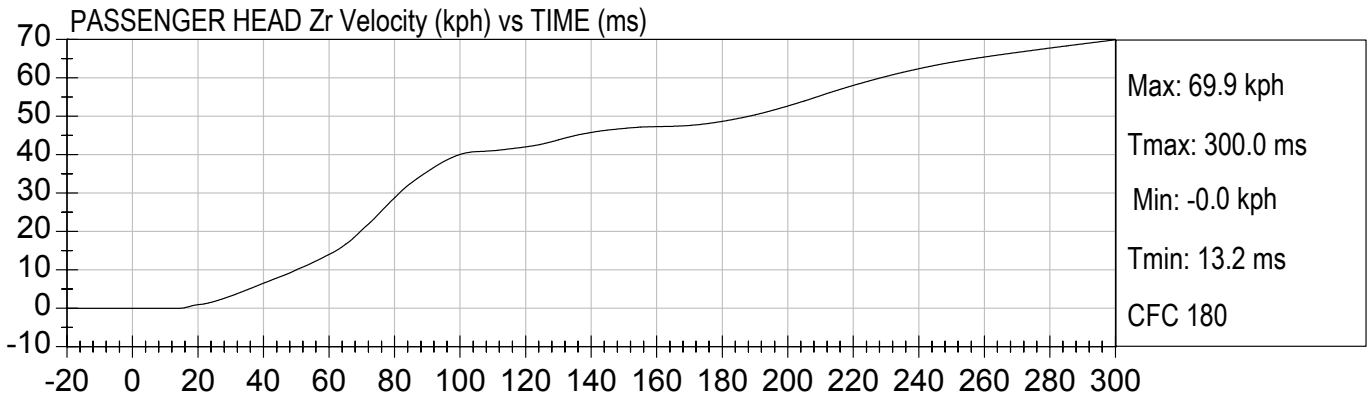






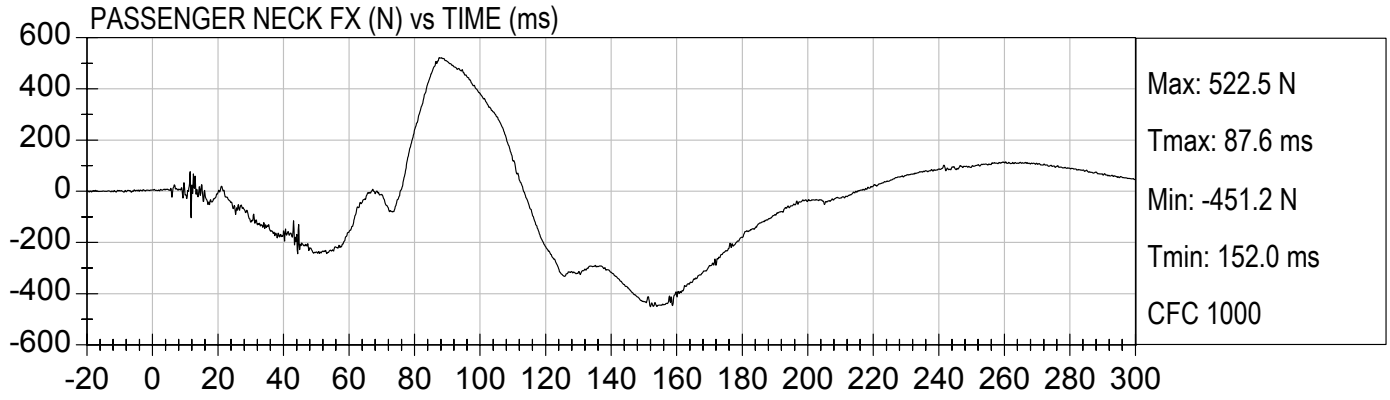

PASSENGER HEAD Xr Velocity (kph) vs TIME (ms)
60
40
20
0
-20
-40
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 56.9 kph
Tmax: 14.8 ms
Min: -24.5 kph
Tmin: 197.9 ms
CFC 180

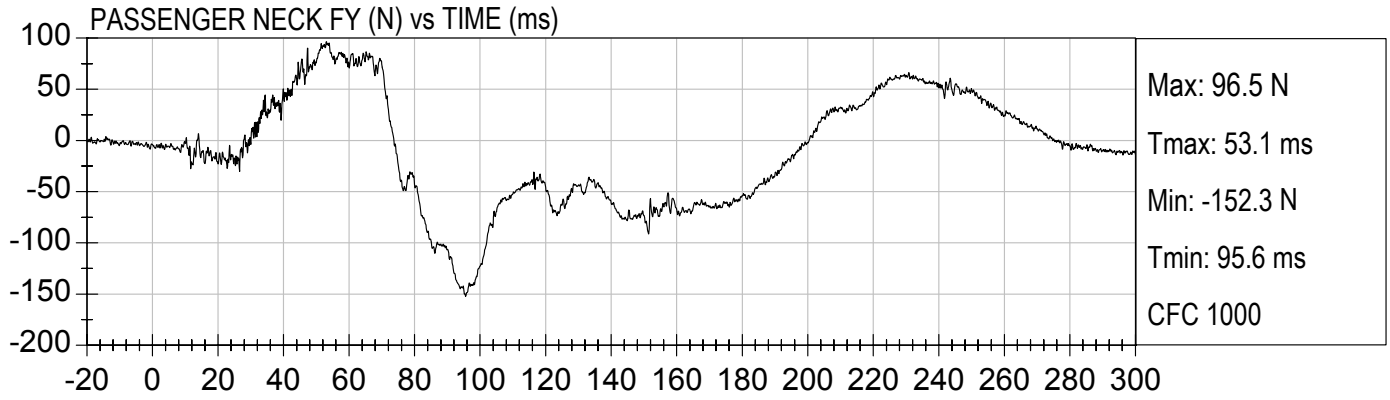

PASSENGER HEAD Yr Velocity (kph) vs TIME (ms)
2.5
0
-2.5
-5
-7.5
-10
-12.5
-15
-17.5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 1.0 kph
Tmax: 60.6 ms
Min: -17.1 kph
Tmin: 201.4 ms
CFC 180

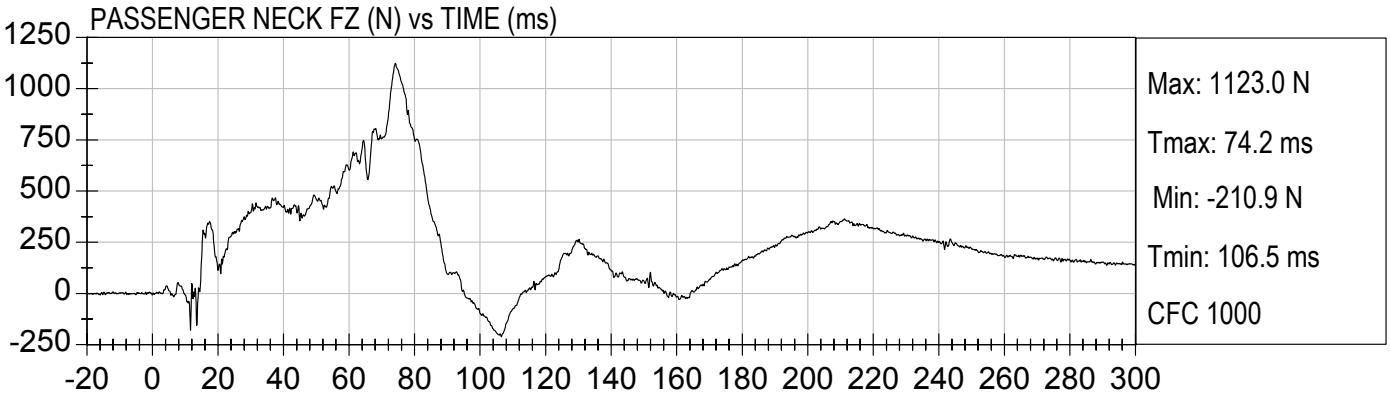

PASSENGER HEAD Zr Velocity (kph) vs TIME (ms)
70
60
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 69.9 kph
Tmax: 300.0 ms
Min: -0.0 kph
Tmin: 13.2 ms
CFC 180

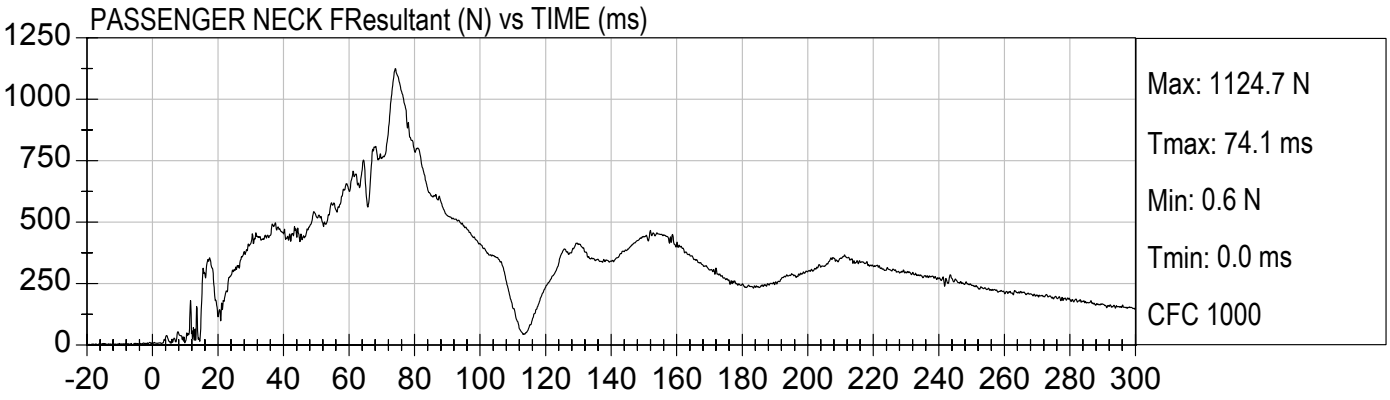
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



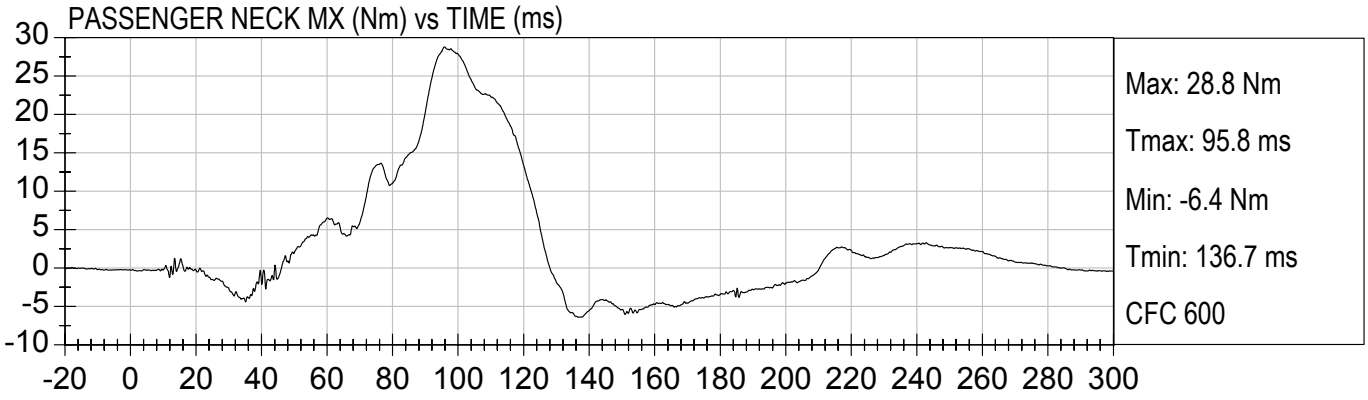


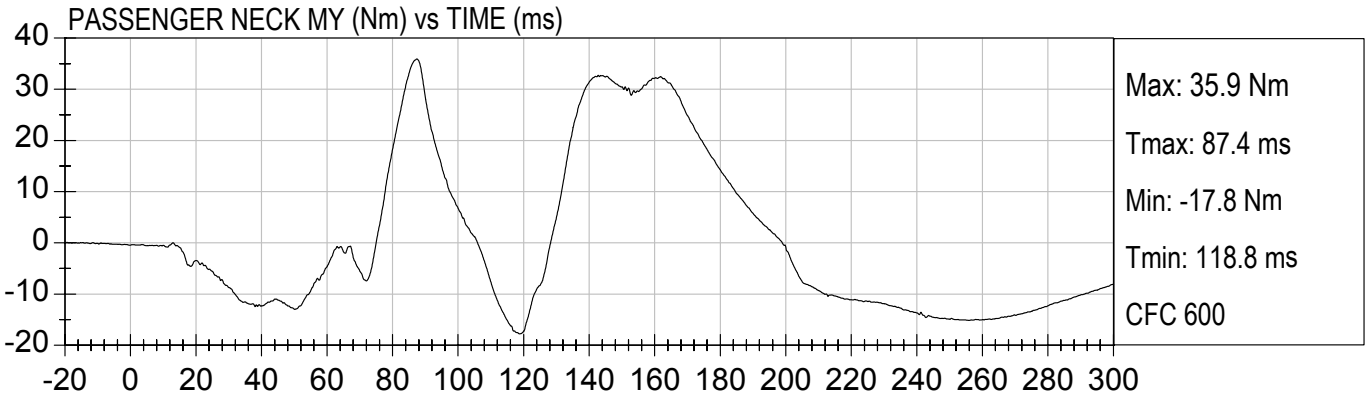


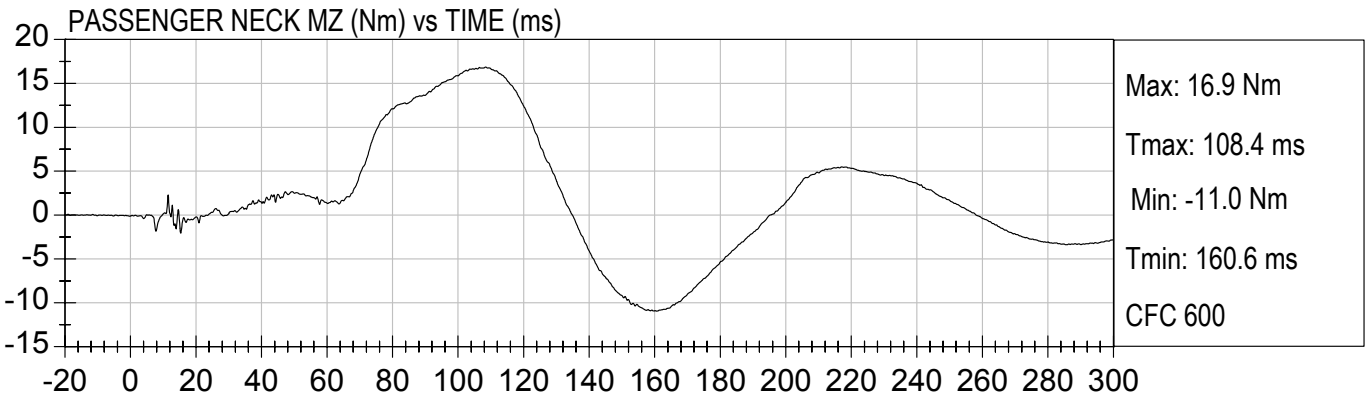


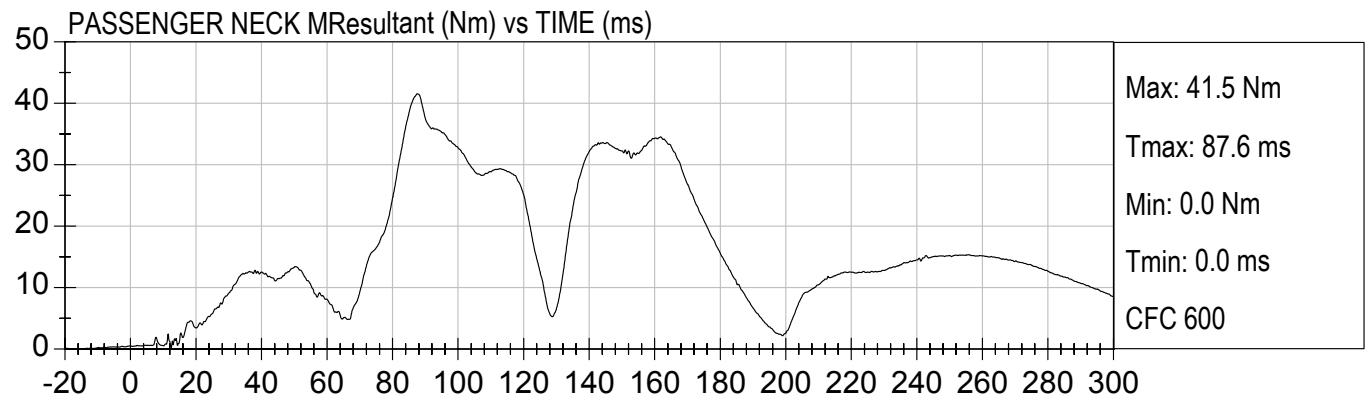
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



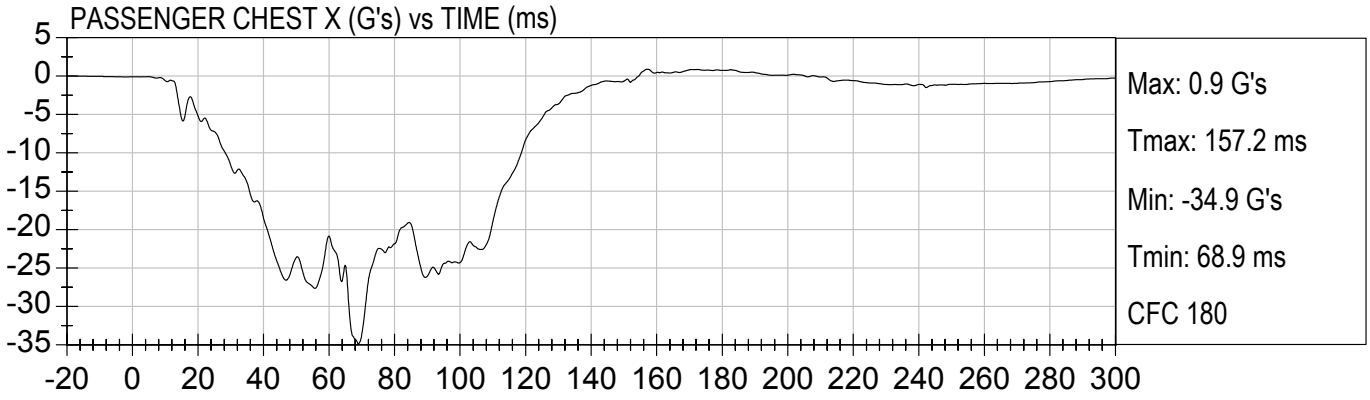


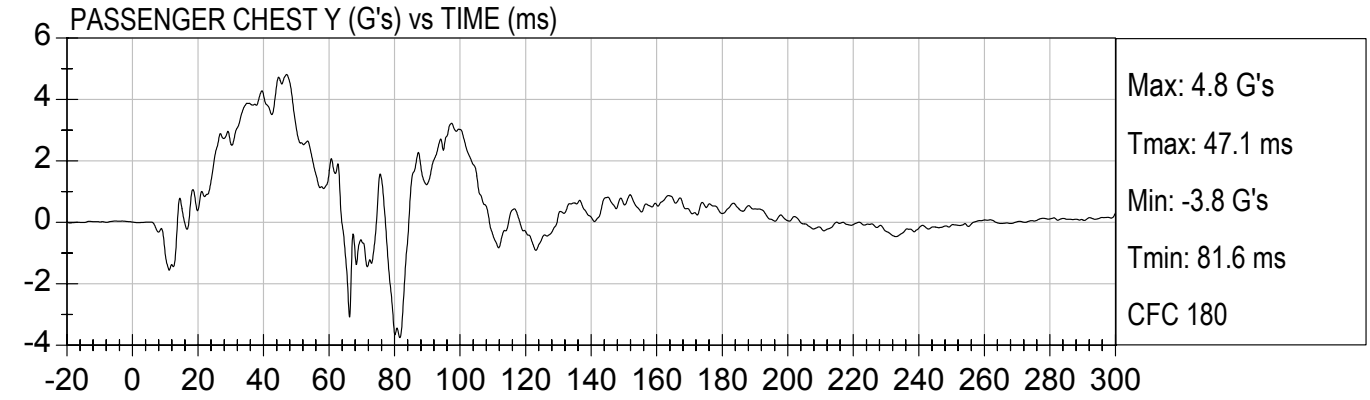


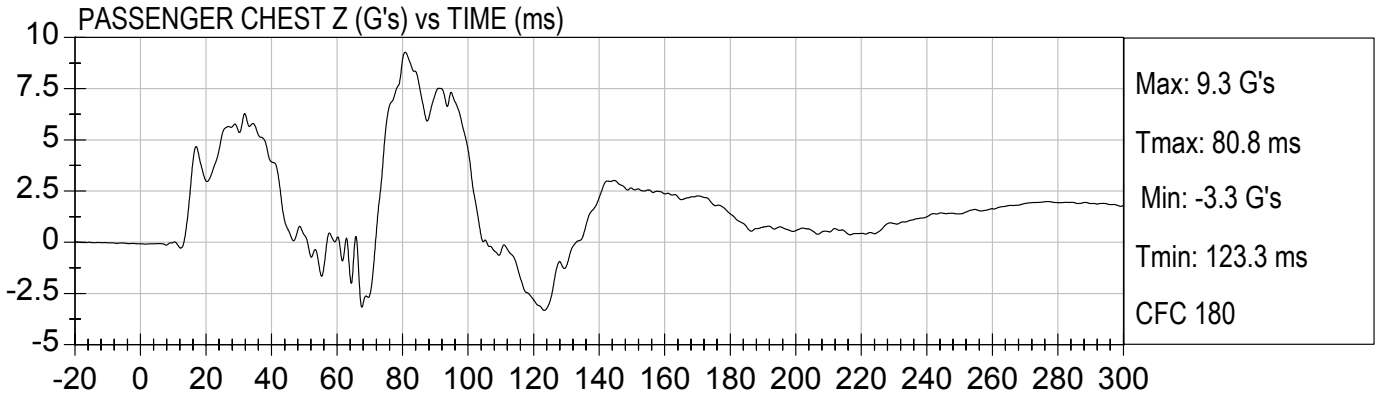


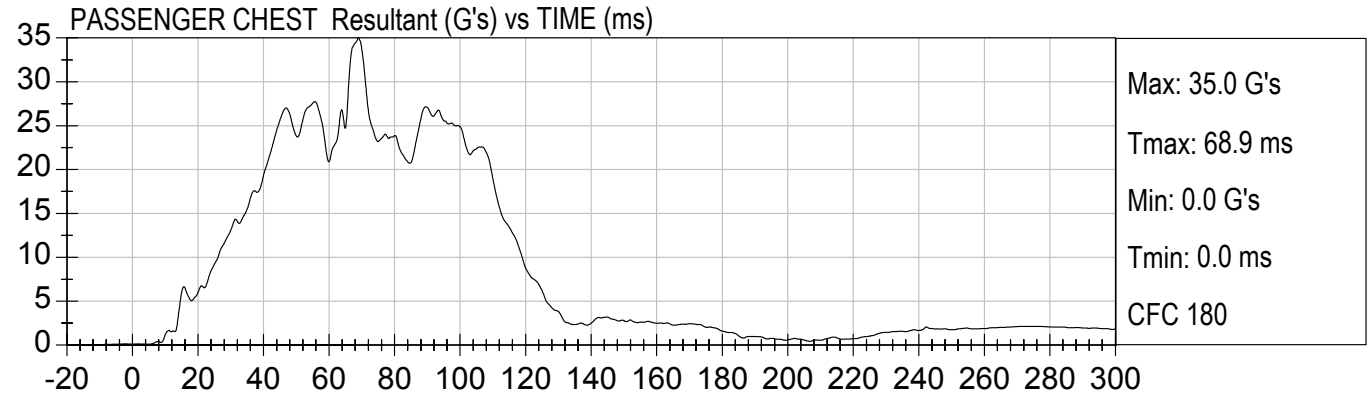
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

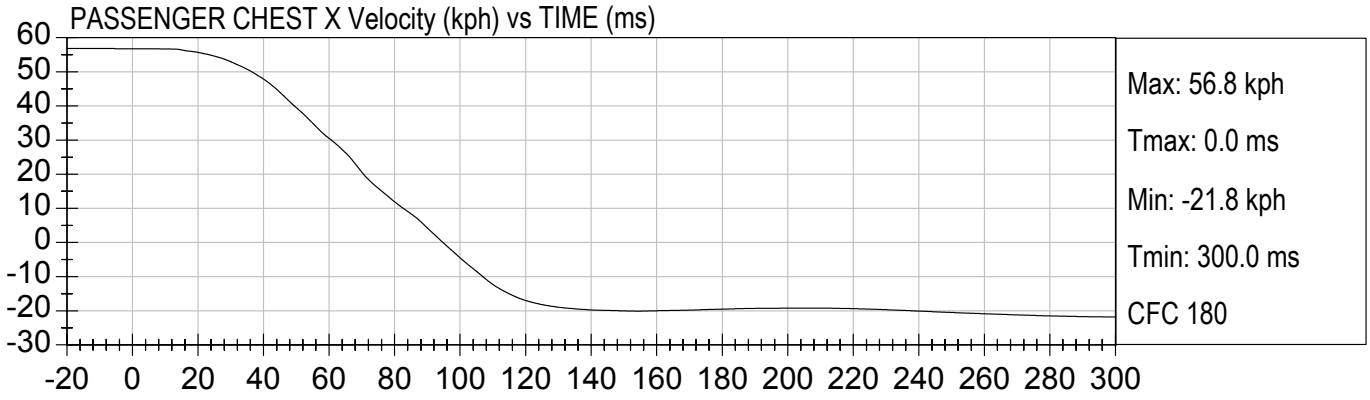
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

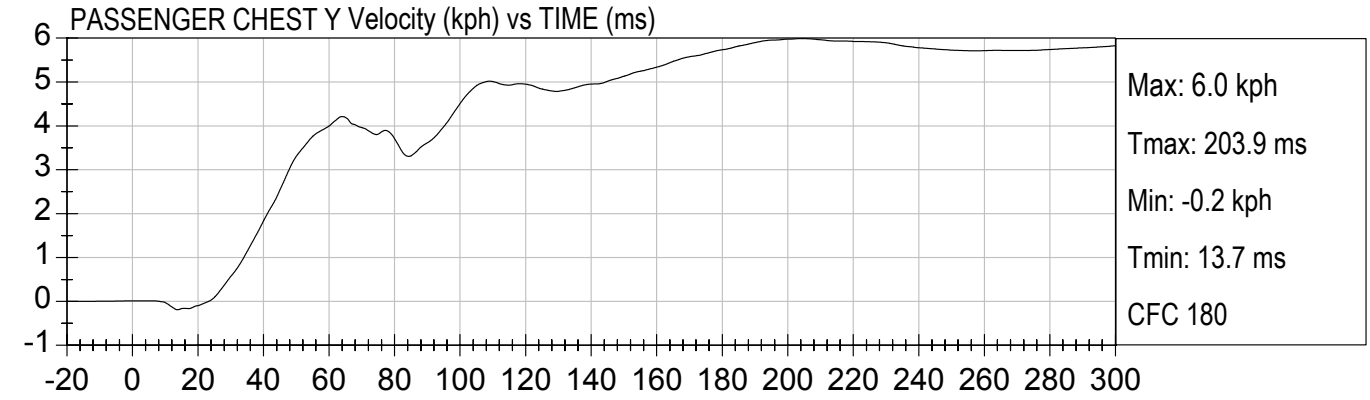


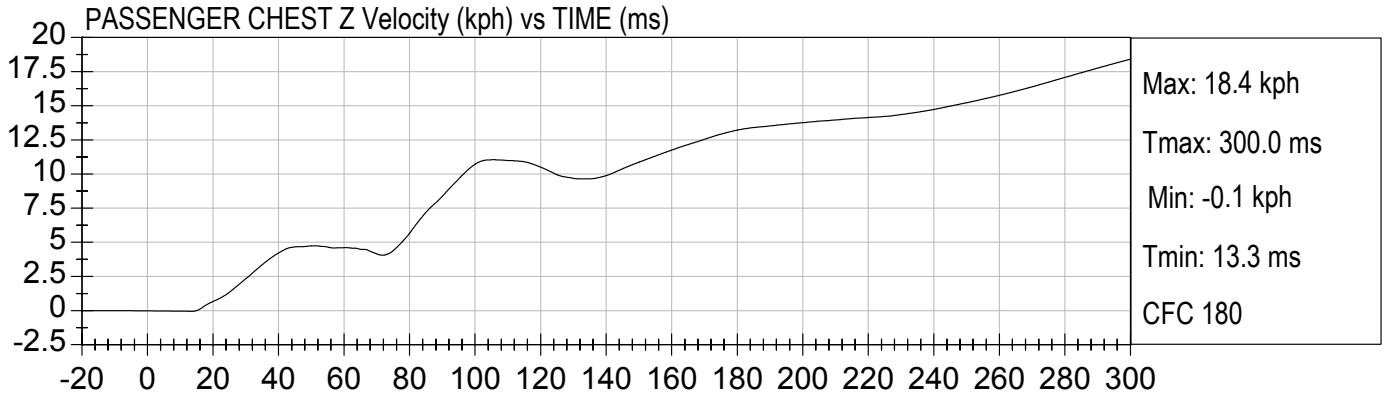


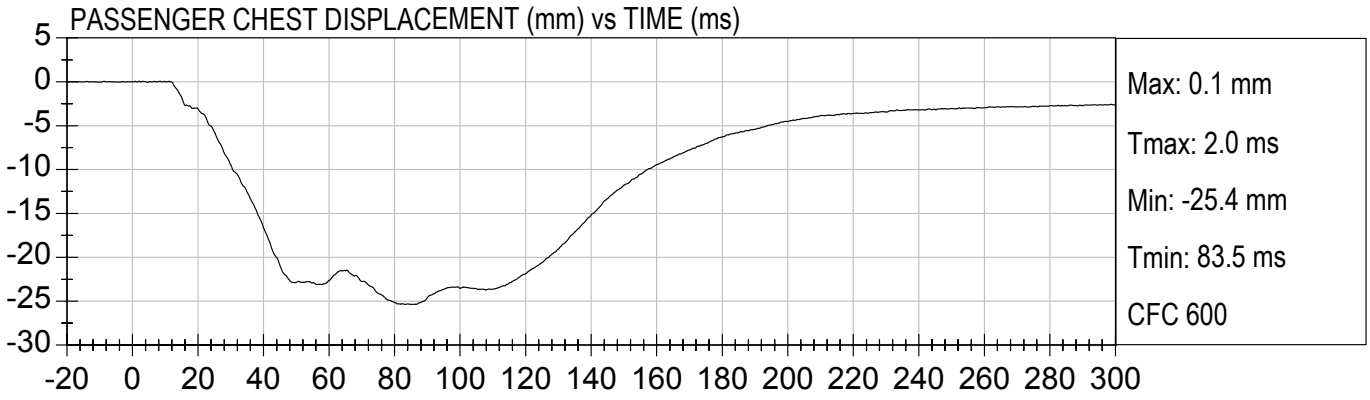





PASSENGER CHEST X Velocity (kph) vs TIME (ms)
Max: 56.8 kph
Tmax: 0.0 ms
Min: -21.8 kph
Tmin: 300.0 ms
CFC 180

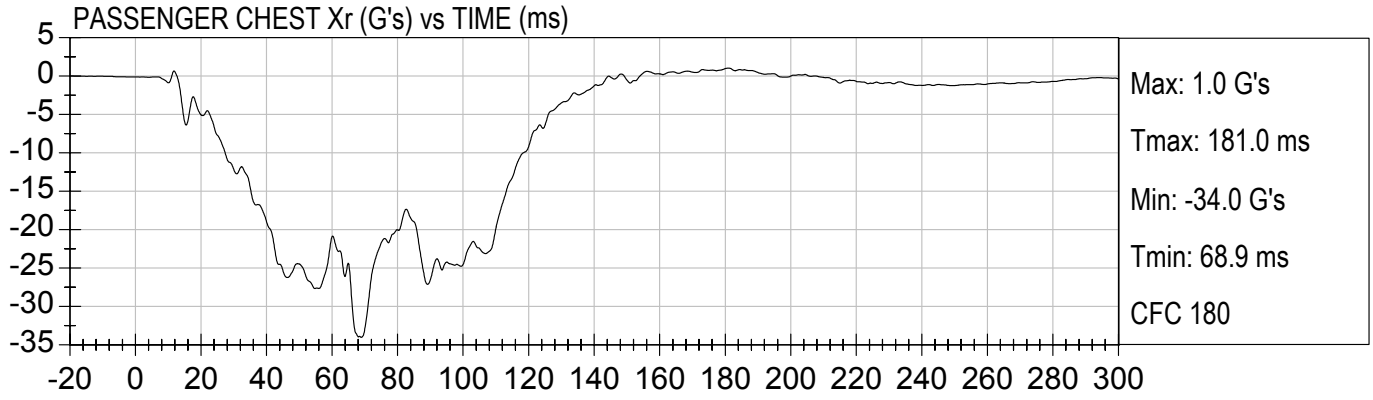

PASSENGER CHEST Y Velocity (kph) vs TIME (ms)
Max: 6.0 kph
Tmax: 203.9 ms
Min: -0.2 kph
Tmin: 13.7 ms
CFC 180

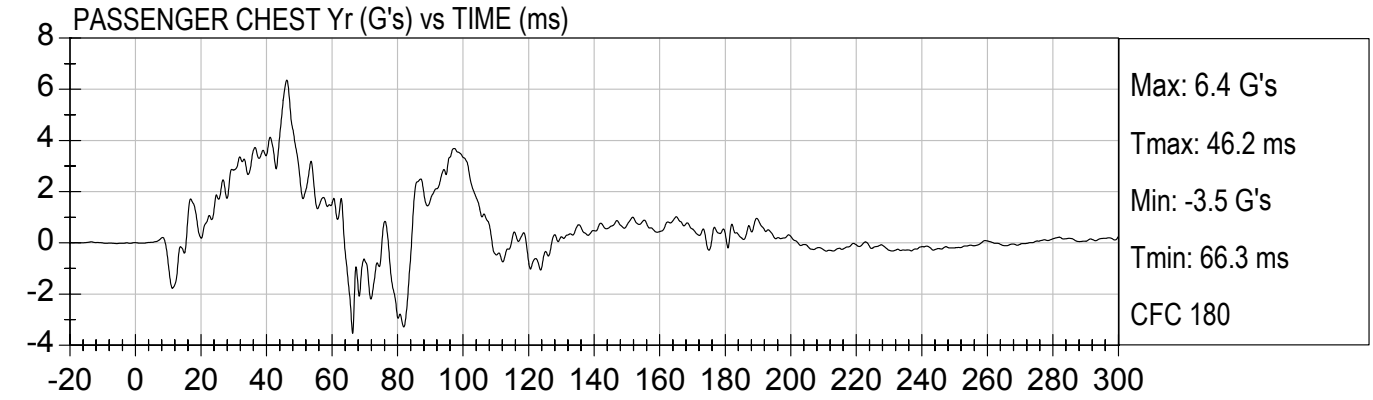

PASSENGER CHEST Z Velocity (kph) vs TIME (ms)
Max: 18.4 kph
Tmax: 300.0 ms
Min: -0.1 kph
Tmin: 13.3 ms
CFC 180

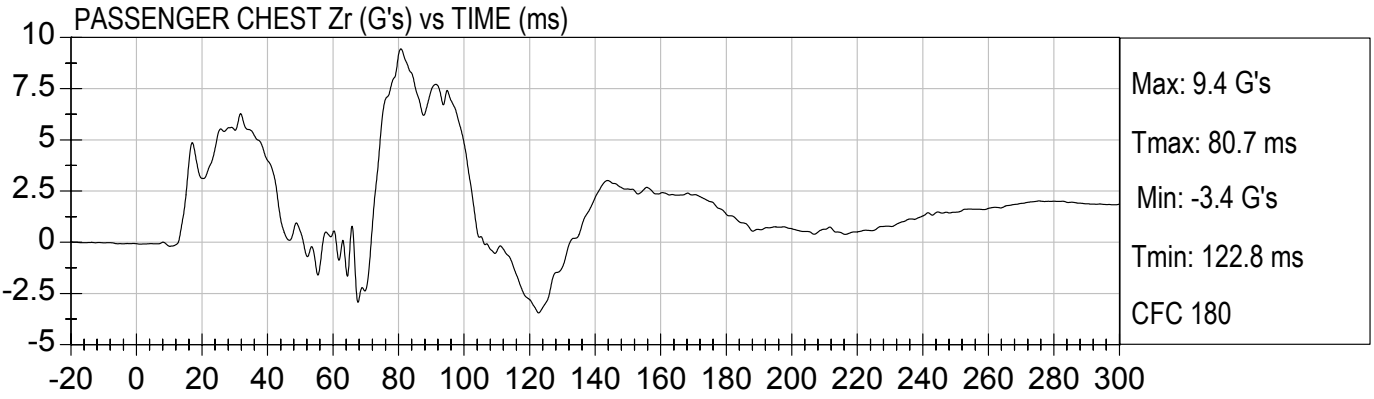

PASSENGER CHEST DISPLACEMENT (mm) vs TIME (ms)
Max: 0.1 mm
Tmax: 2.0 ms
Min: -25.4 mm
Tmin: 83.5 ms
CFC 600

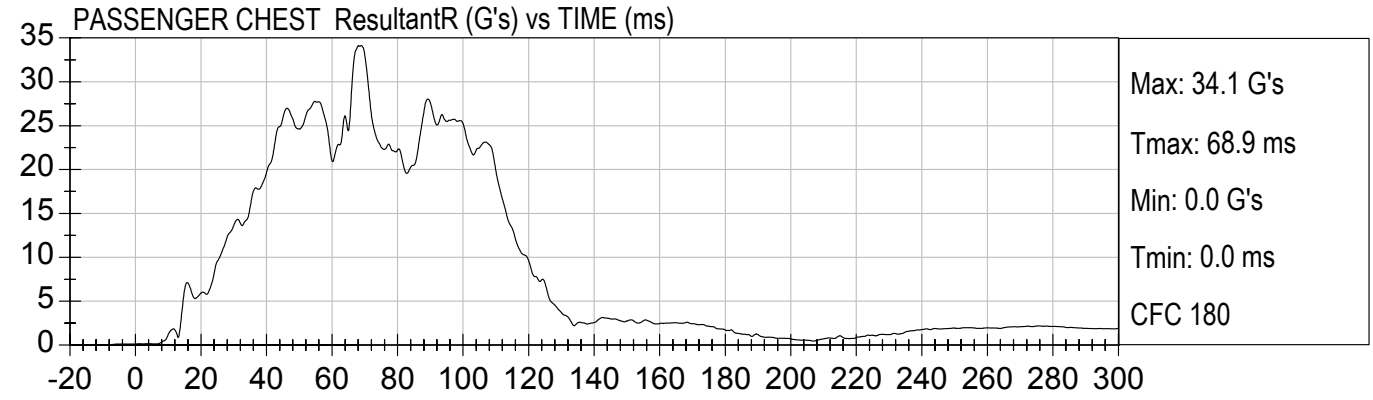
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

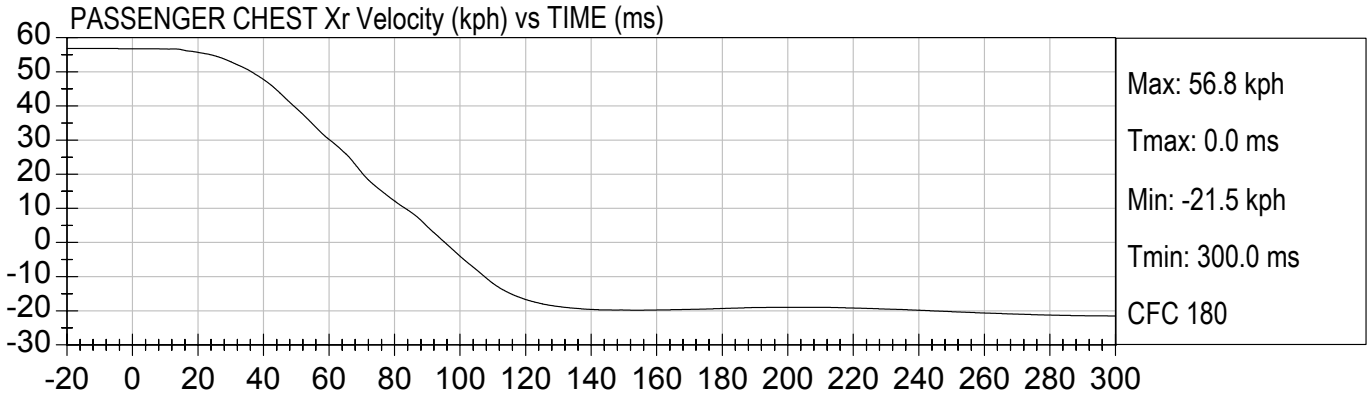
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

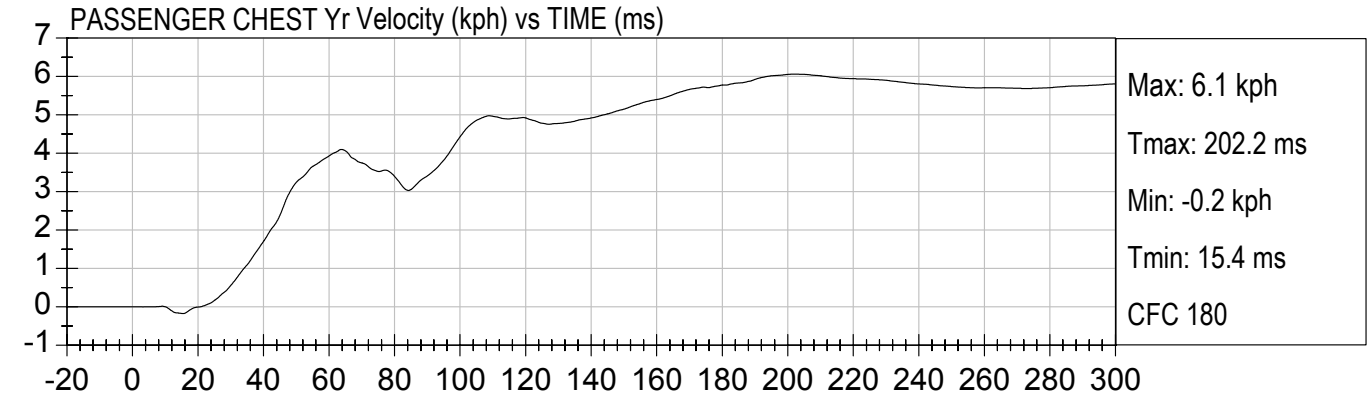


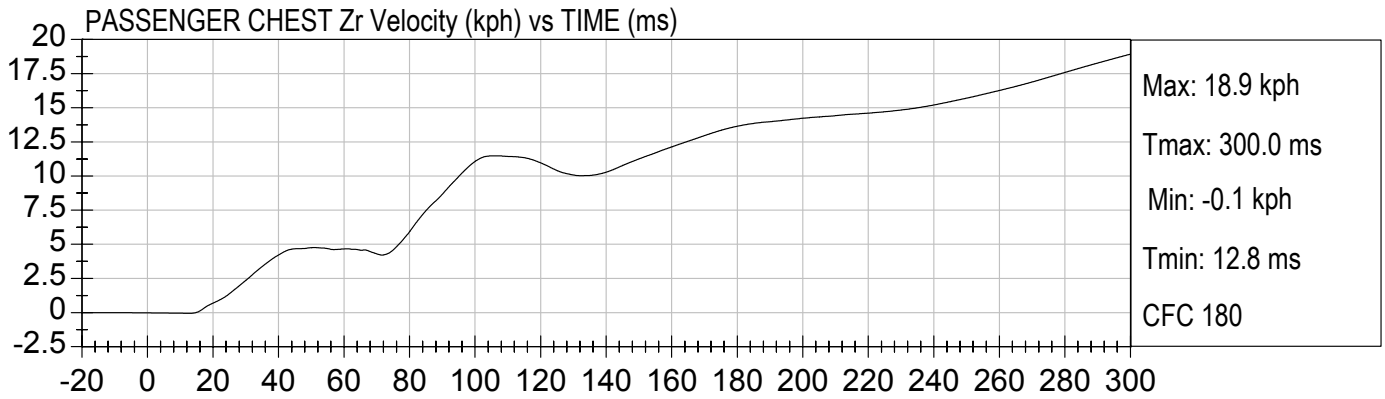






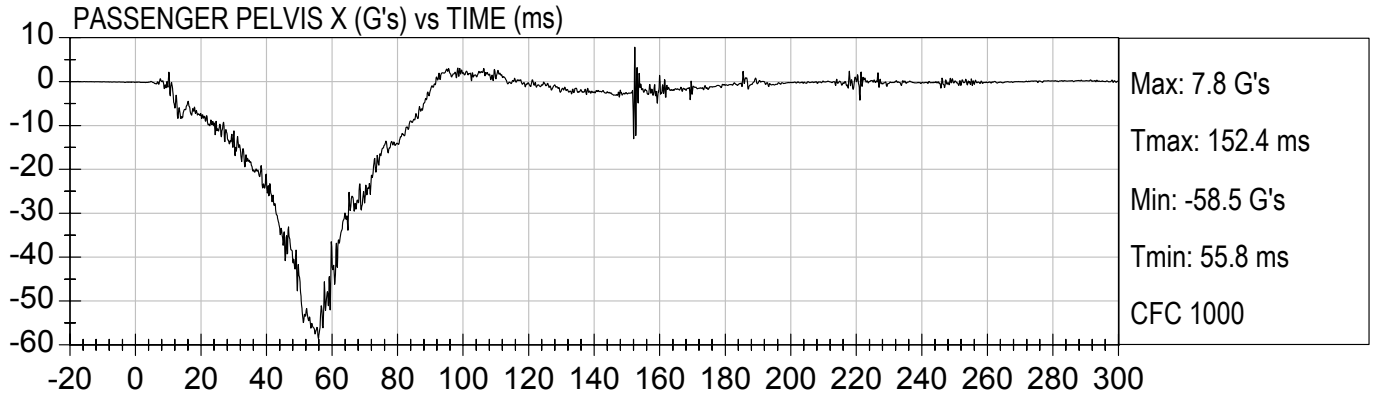

PASSENGER CHEST Xr Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
-30
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 56.8 kph
Tmax: 0.0 ms
Min: -21.5 kph
Tmin: 300.0 ms
CFC 180

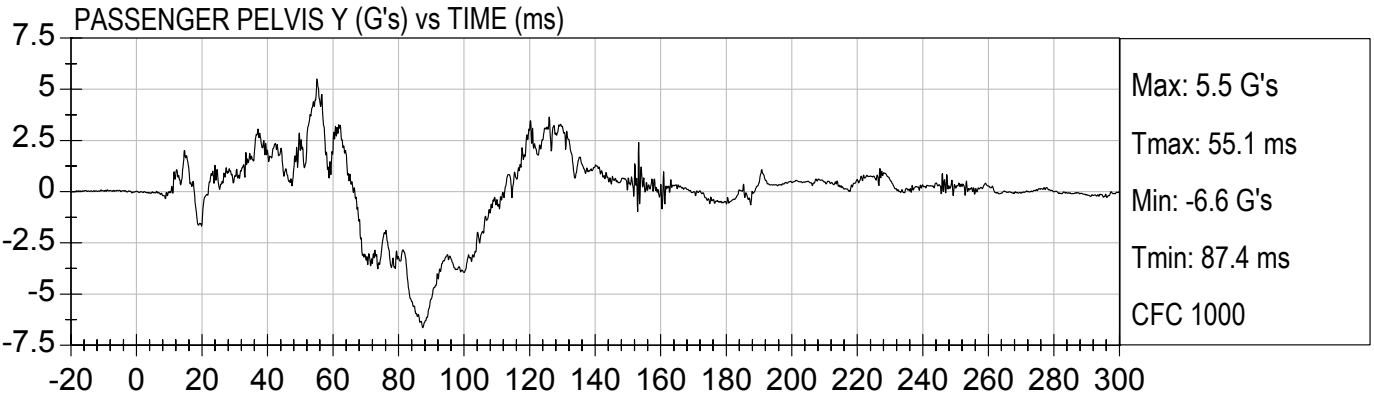

PASSENGER CHEST Yr Velocity (kph) vs TIME (ms)
7
6
5
4
3
2
1
0
-1
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 6.1 kph
Tmax: 202.2 ms
Min: -0.2 kph
Tmin: 15.4 ms
CFC 180

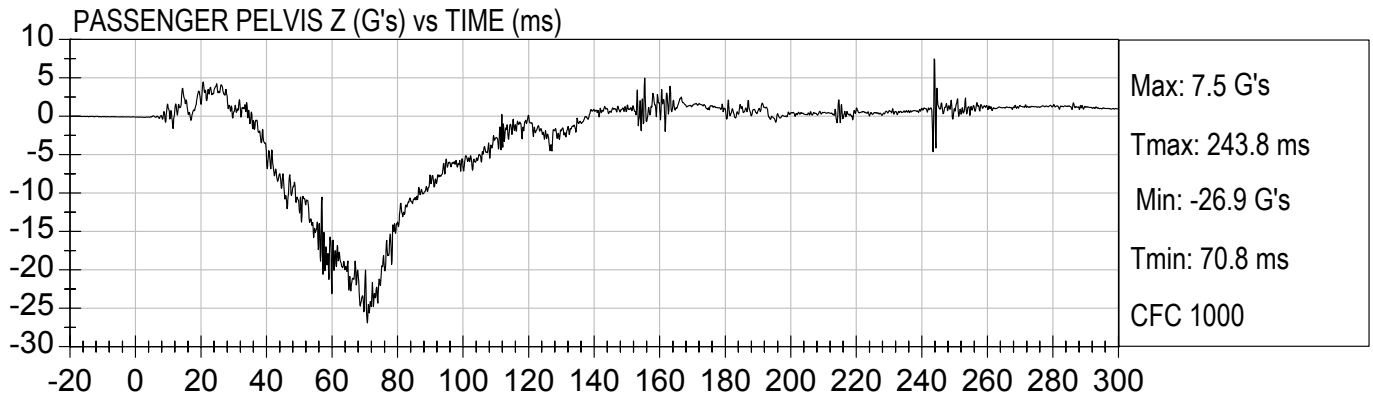

PASSENGER CHEST Zr Velocity (kph) vs TIME (ms)
20
17.5
15
12.5
10
7.5
5
2.5
0
-2.5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 18.9 kph
Tmax: 300.0 ms
Min: -0.1 kph
Tmin: 12.8 ms
CFC 180

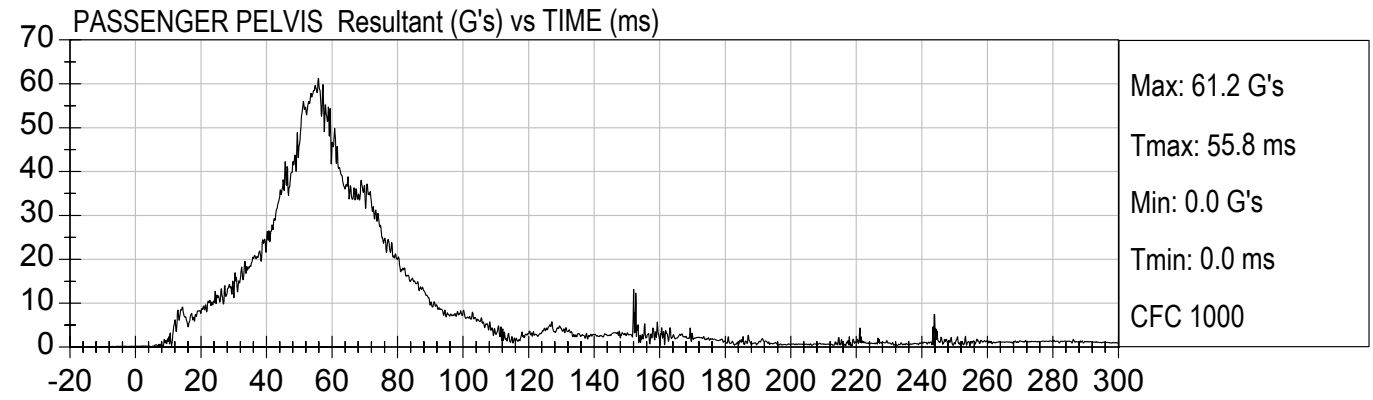
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

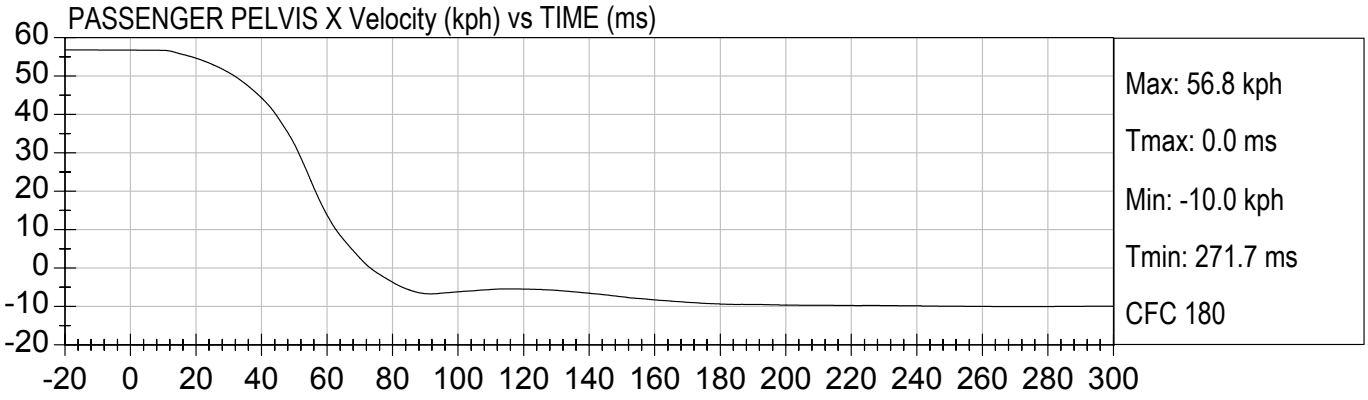
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

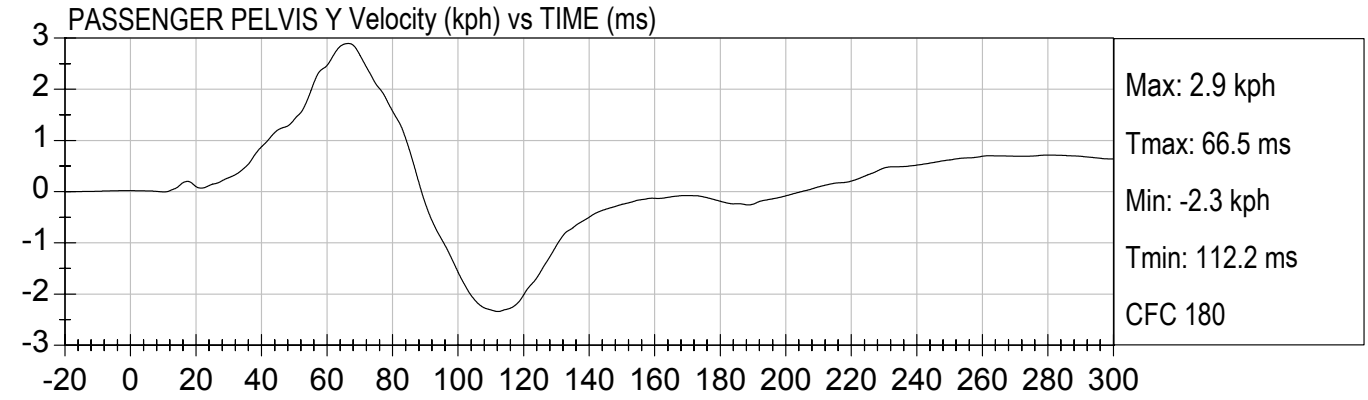


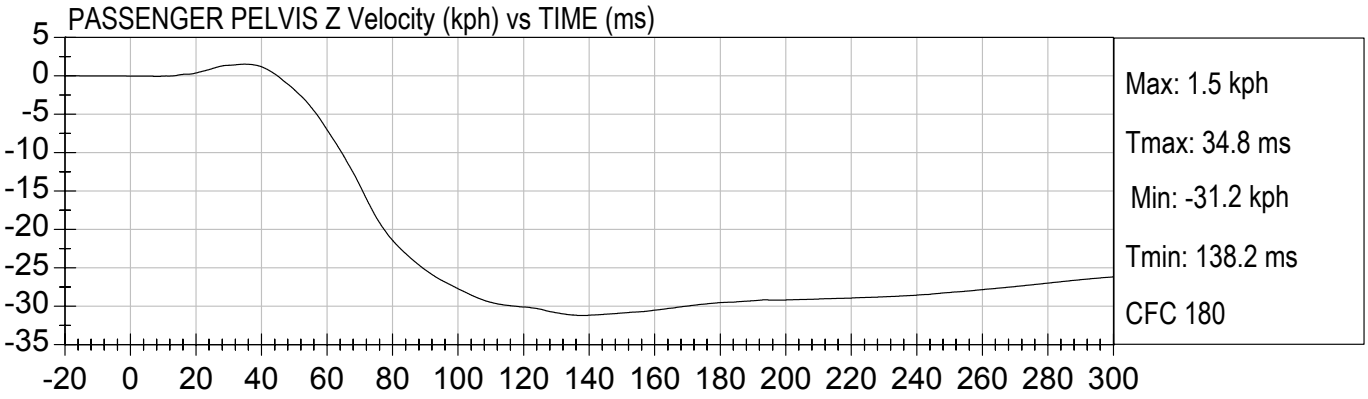






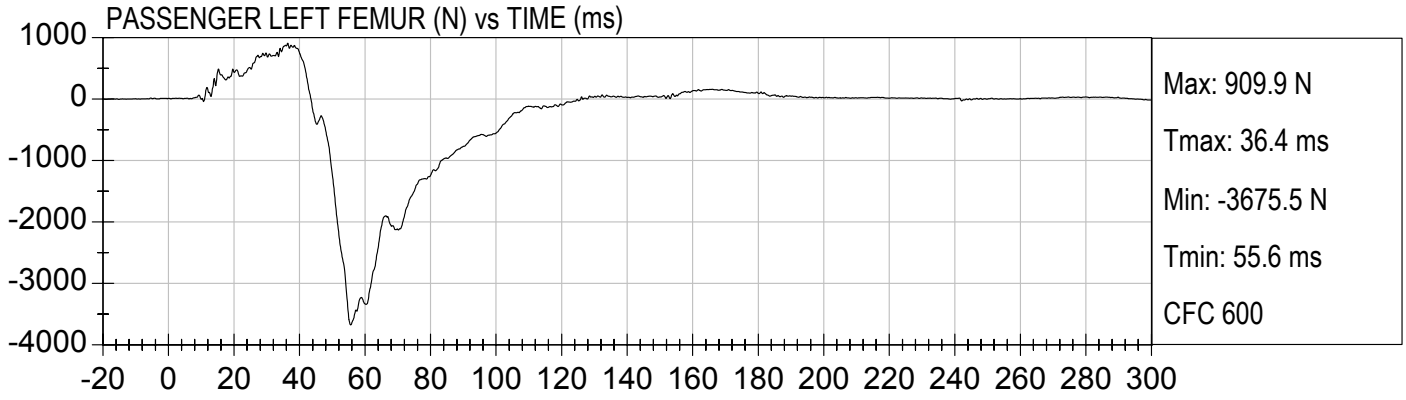

PASSENGER PELVIS X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 56.8 kph
Tmax: 0.0 ms
Min: -10.0 kph
Tmin: 271.7 ms
CFC 180

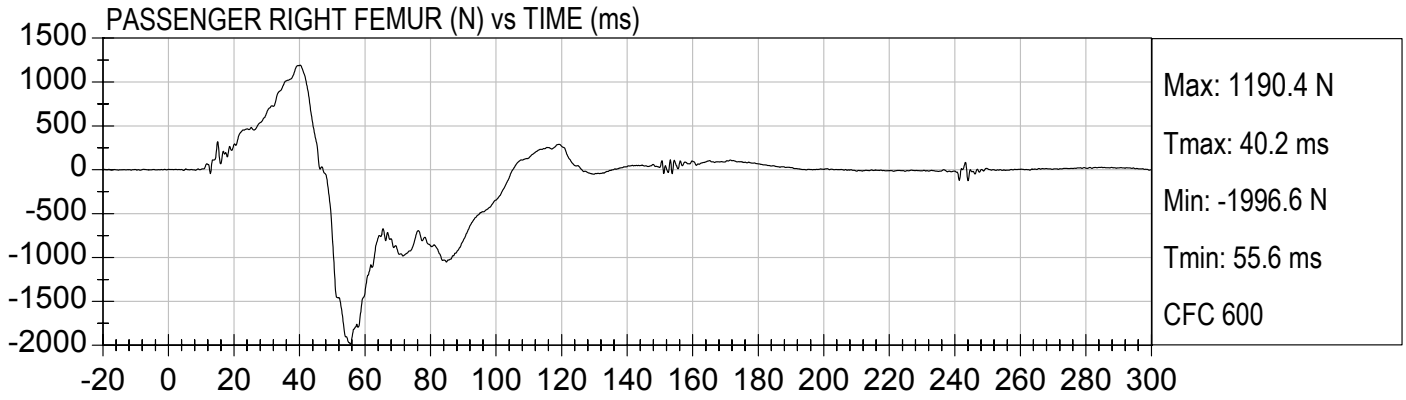

PASSENGER PELVIS Y Velocity (kph) vs TIME (ms)
3
2
1
0
-1
-2
-3
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 2.9 kph
Tmax: 66.5 ms
Min: -2.3 kph
Tmin: 112.2 ms
CFC 180

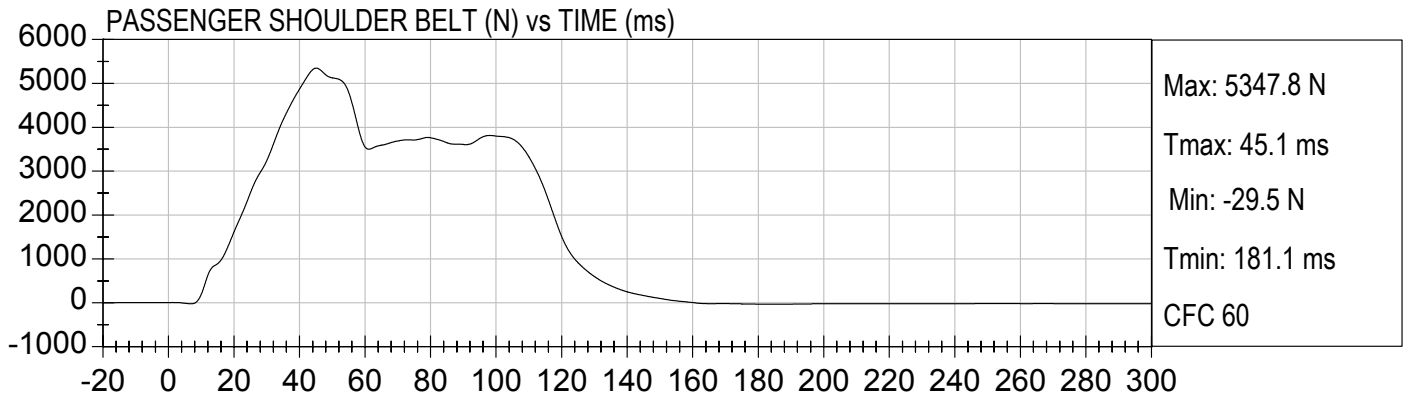

PASSENGER PELVIS Z Velocity (kph) vs TIME (ms)
5
0
-5
-10
-15
-20
-25
-30
-35
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 1.5 kph
Tmax: 34.8 ms
Min: -31.2 kph
Tmin: 138.2 ms
CFC 180

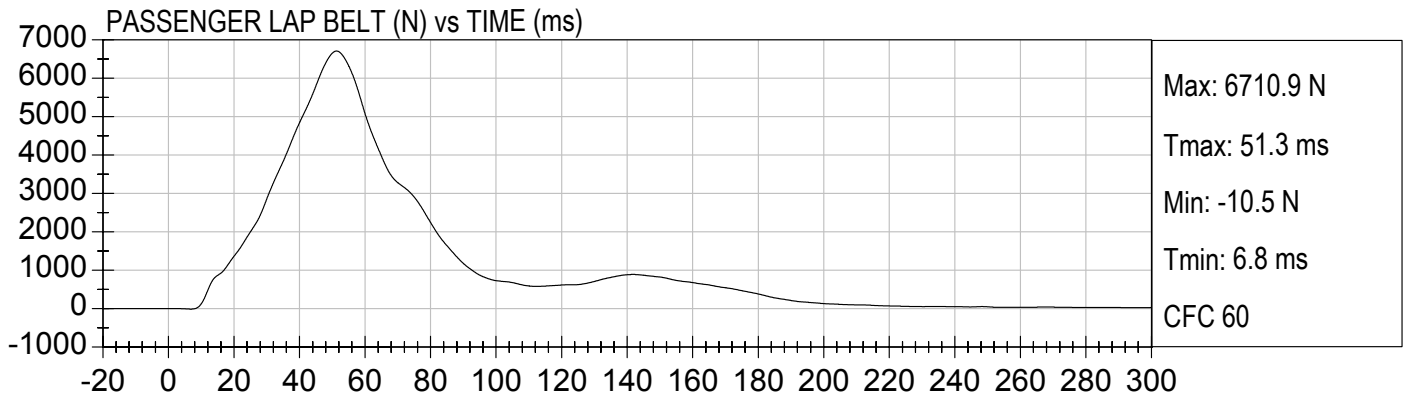
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)



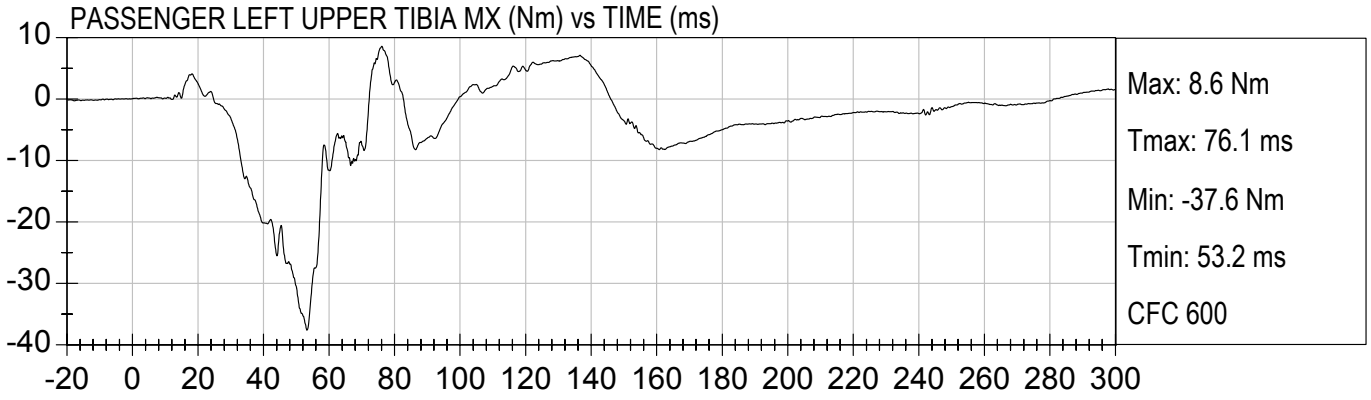


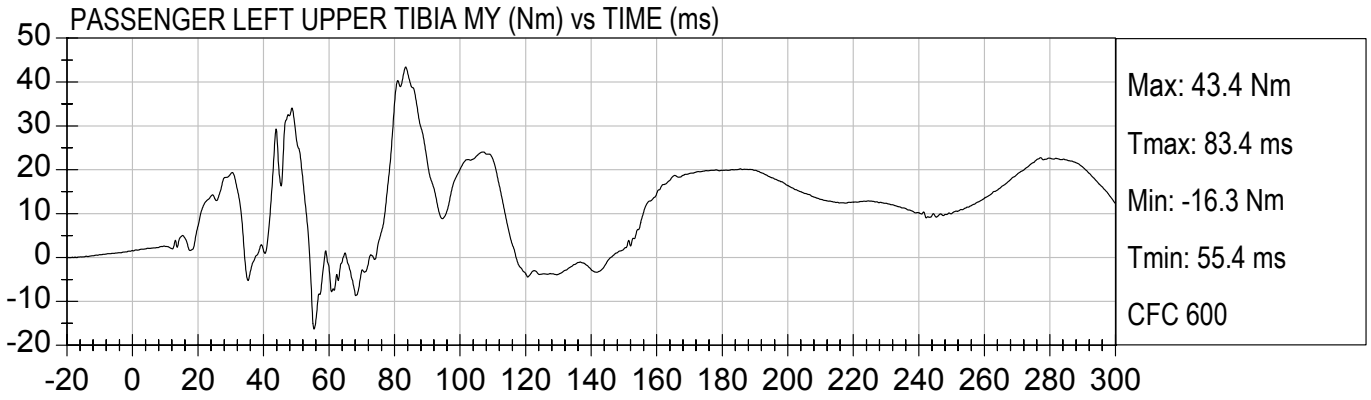


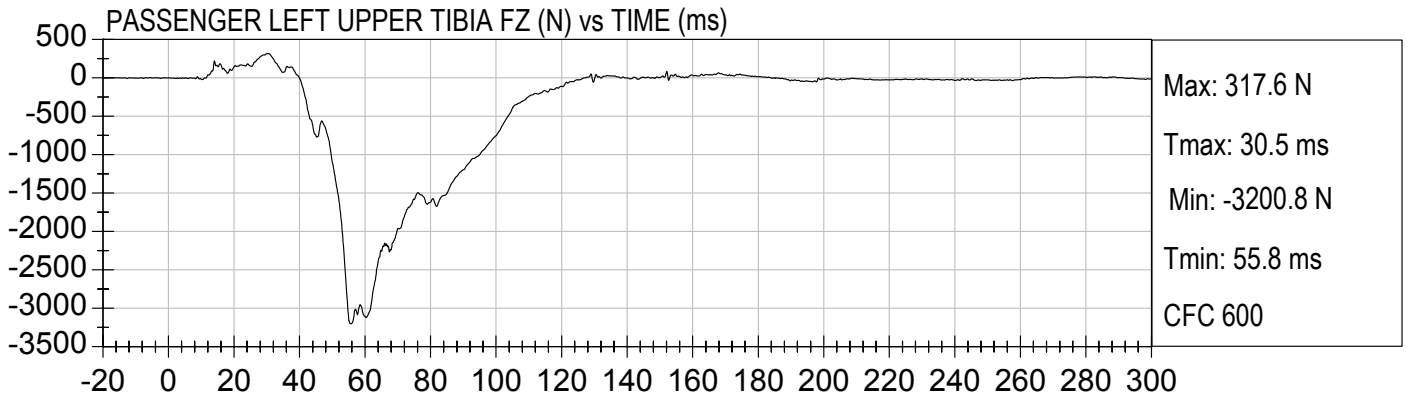


NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

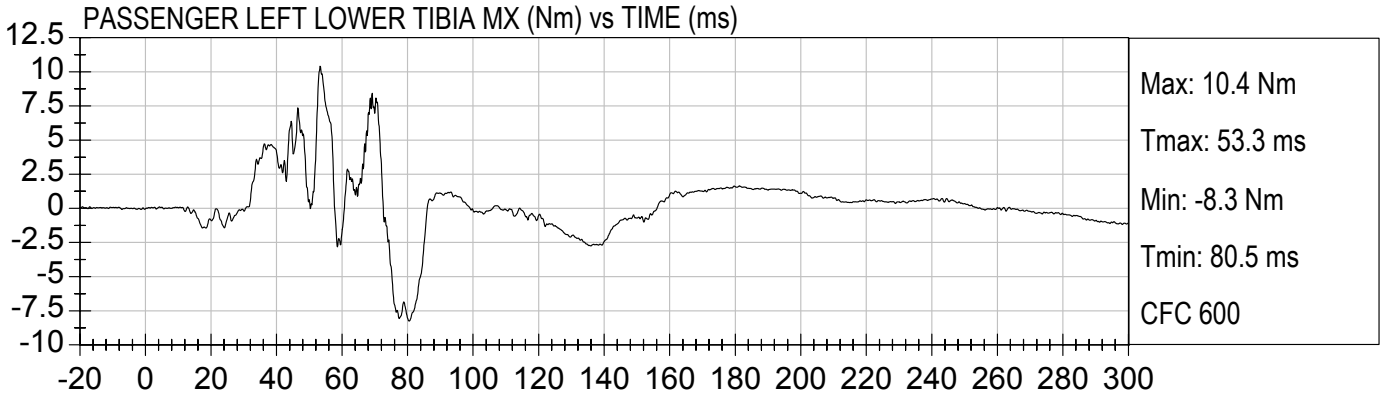


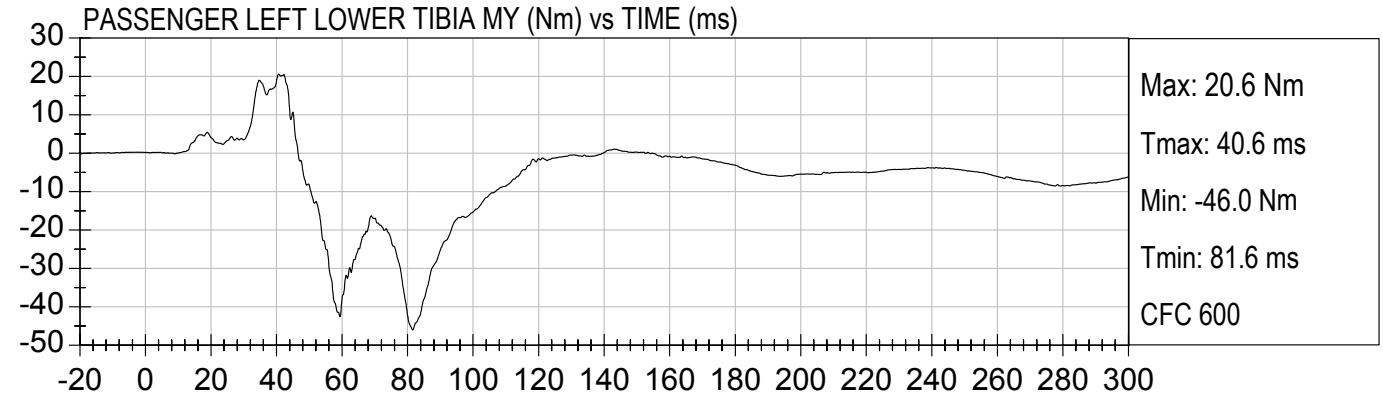


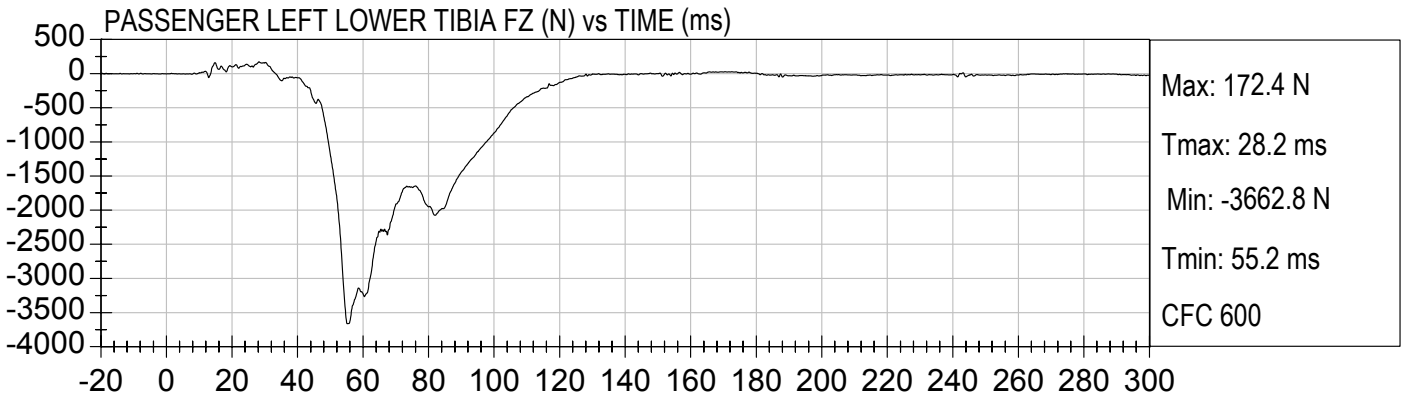


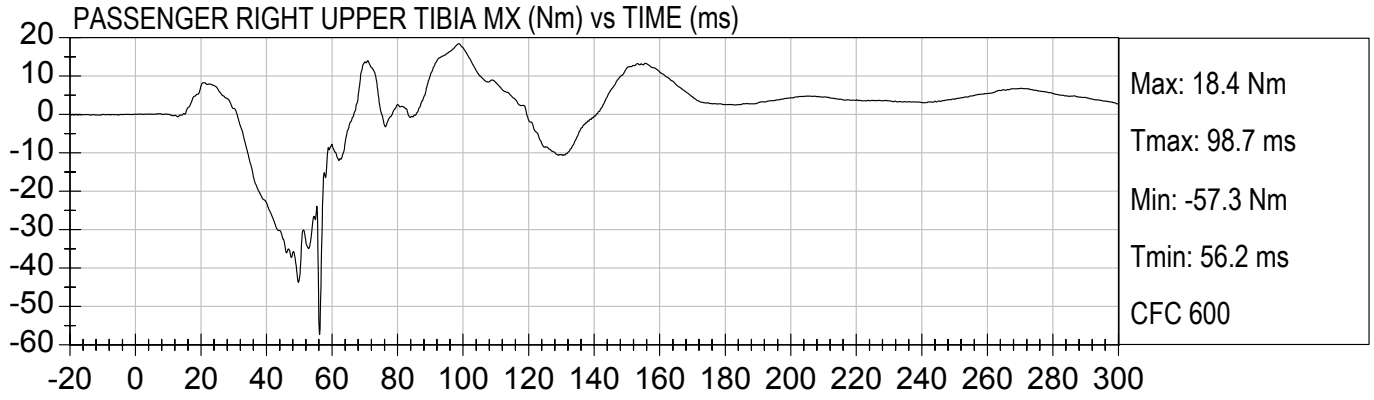
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

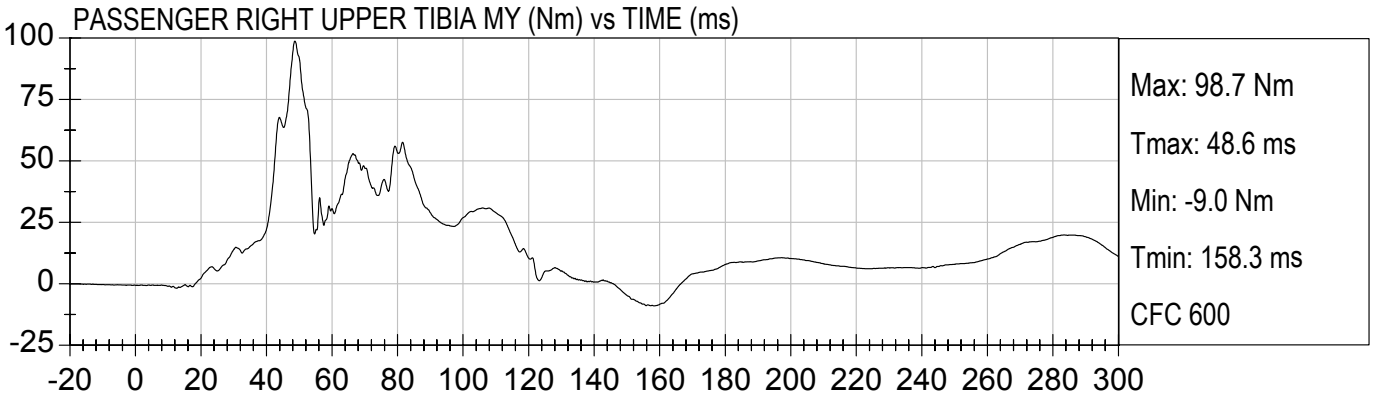
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

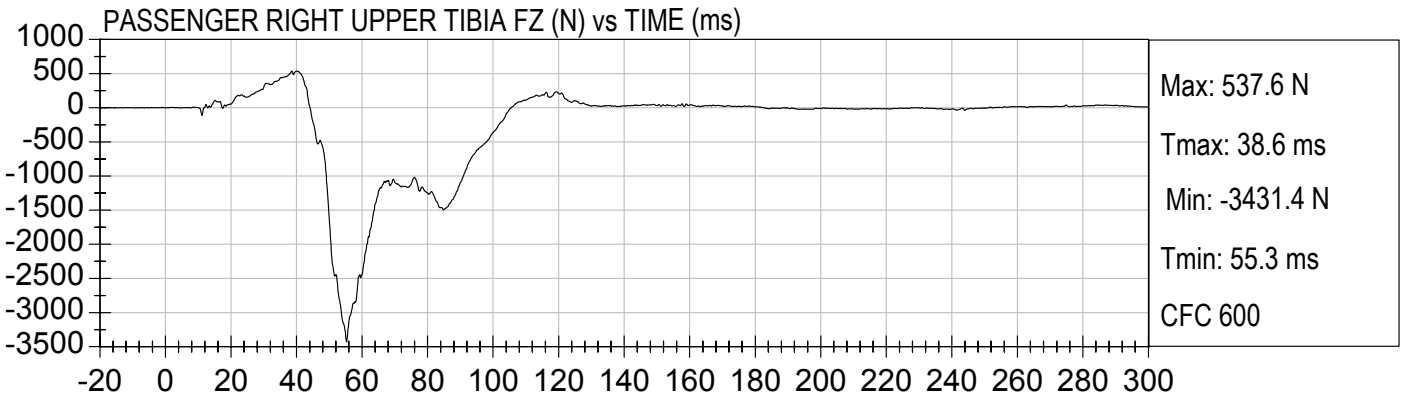


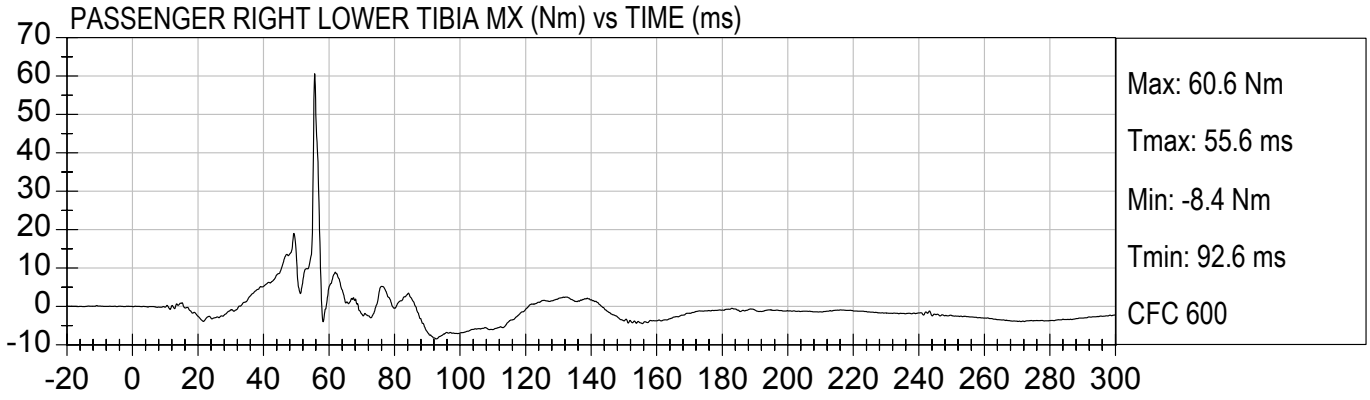


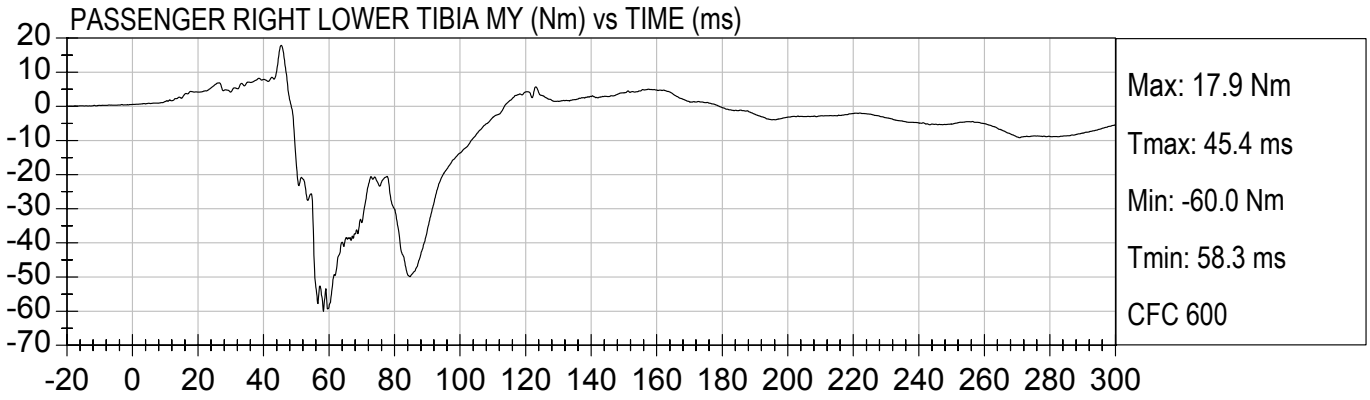


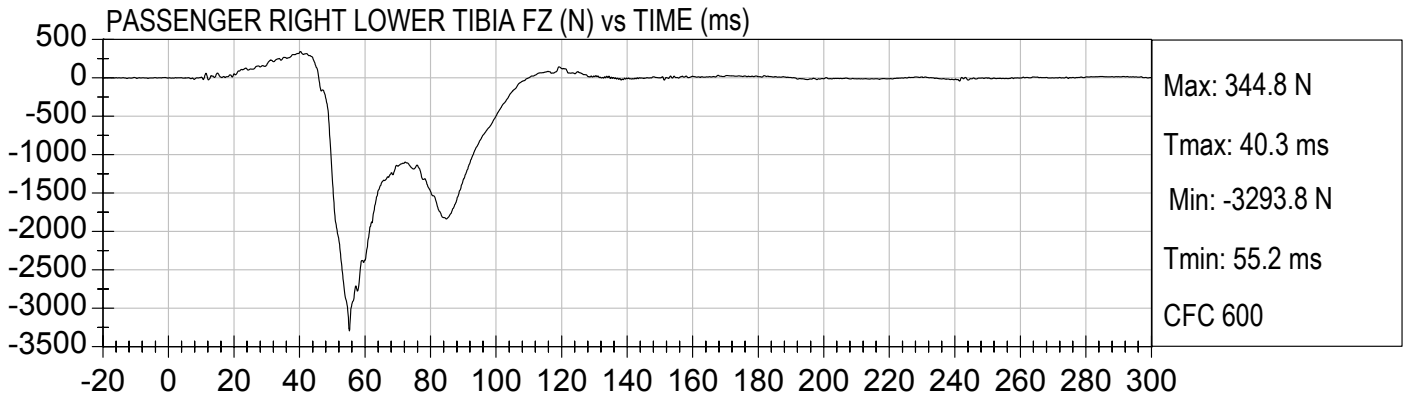

PASSENGER RIGHT UPPER TIBIA MX (Nm) vs TIME (ms)
20
10
0
-10
-20
-30
-40
-50
-60
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 18.4 Nm
Tmax: 98.7 ms
Min: -57.3 Nm
Tmin: 56.2 ms
CFC 600

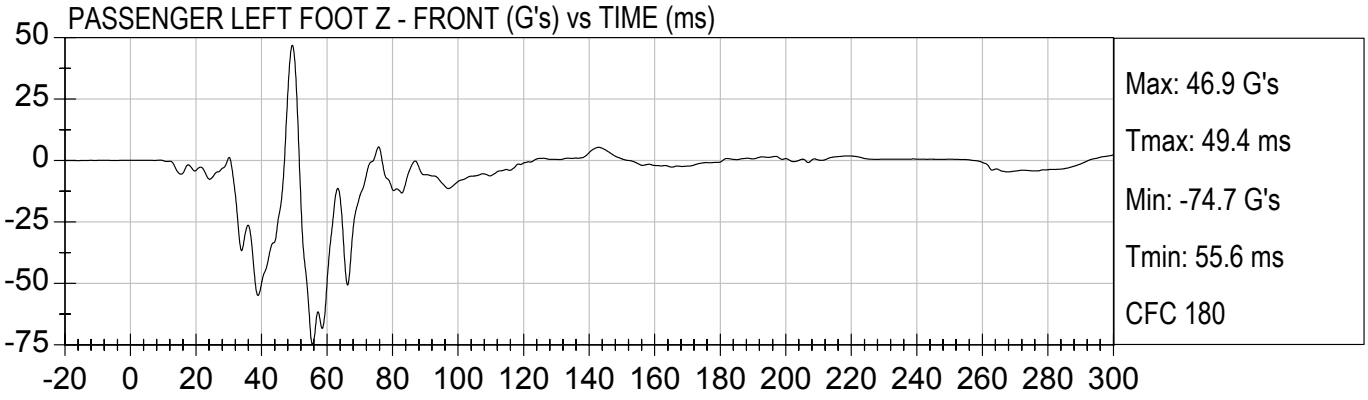

PASSENGER RIGHT UPPER TIBIA MY (Nm) vs TIME (ms)
100
75
50
25
0
-25
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 98.7 Nm
Tmax: 48.6 ms
Min: -9.0 Nm
Tmin: 158.3 ms
CFC 600

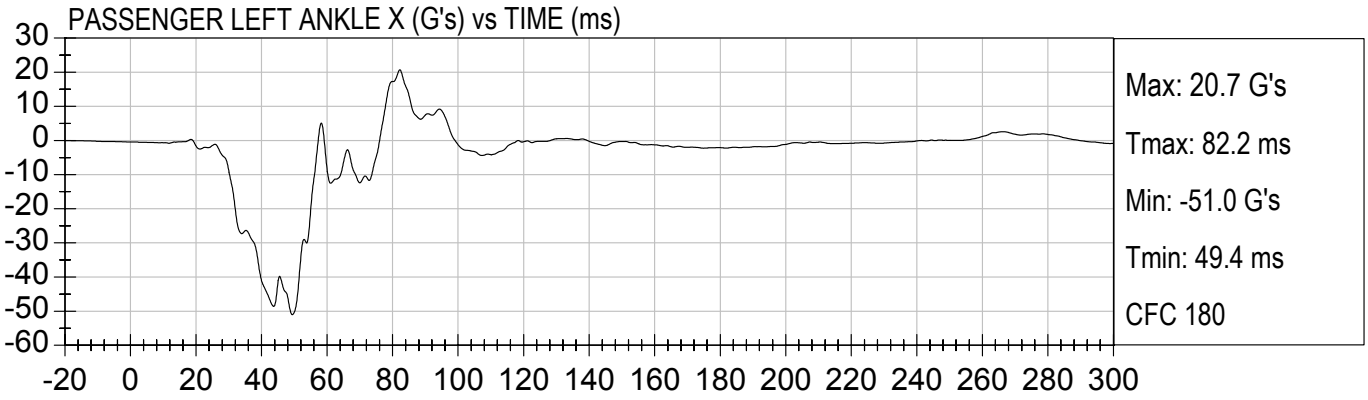

PASSENGER RIGHT UPPER TIBIA FZ (N) vs TIME (ms)
1000
500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 537.6 N
Tmax: 38.6 ms
Min: -3431.4 N
Tmin: 55.3 ms
CFC 600

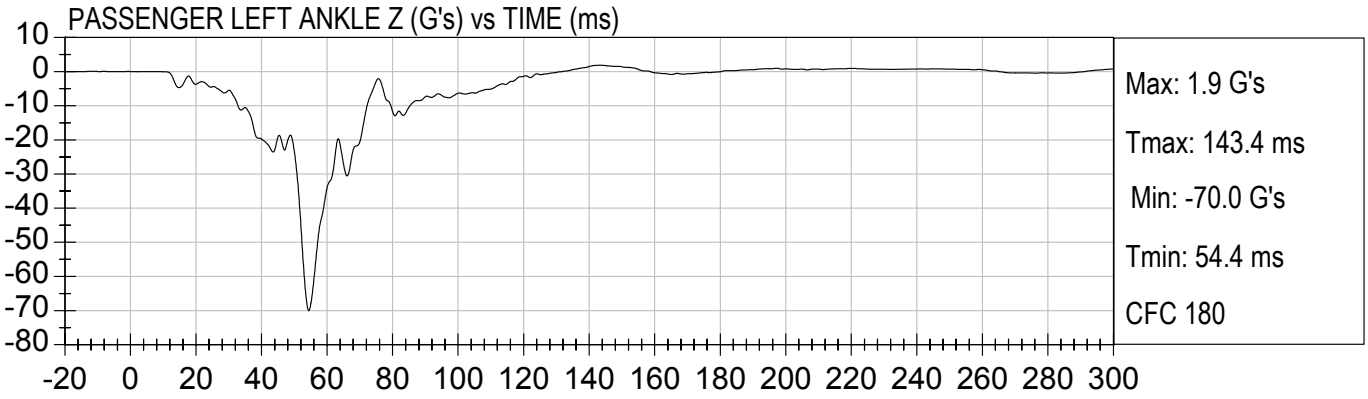

PASSENGER RIGHT LOWER TIBIA MX (Nm) vs TIME (ms)
70
60
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 60.6 Nm
Tmax: 55.6 ms
Min: -8.4 Nm
Tmin: 92.6 ms
CFC 600

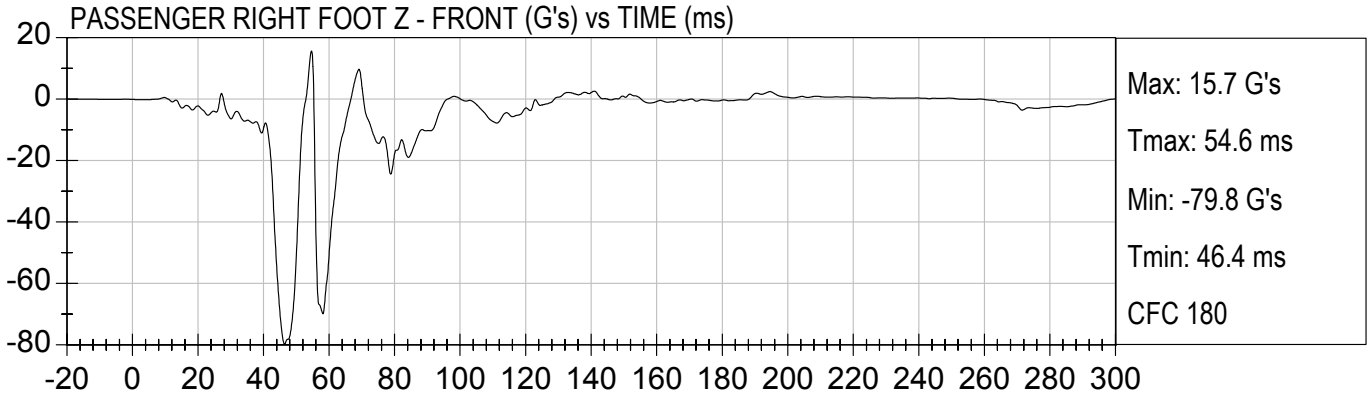

PASSENGER RIGHT LOWER TIBIA MY (Nm) vs TIME (ms)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 17.9 Nm
Tmax: 45.4 ms
Min: -60.0 Nm
Tmin: 58.3 ms
CFC 600

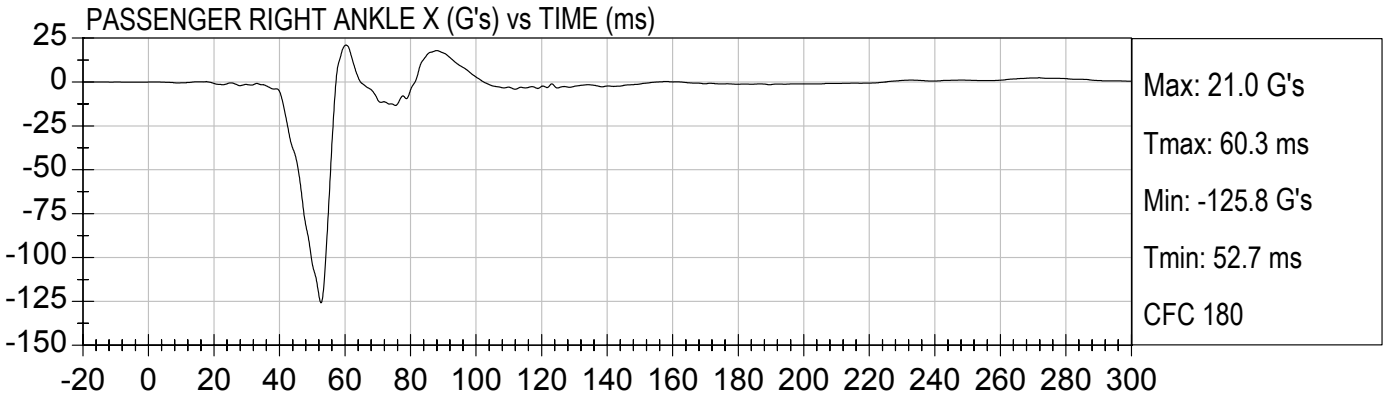

PASSENGER RIGHT LOWER TIBIA FZ (N) vs TIME (ms)
500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 344.8 N
Tmax: 40.3 ms
Min: -3293.8 N
Tmin: 55.2 ms
CFC 600

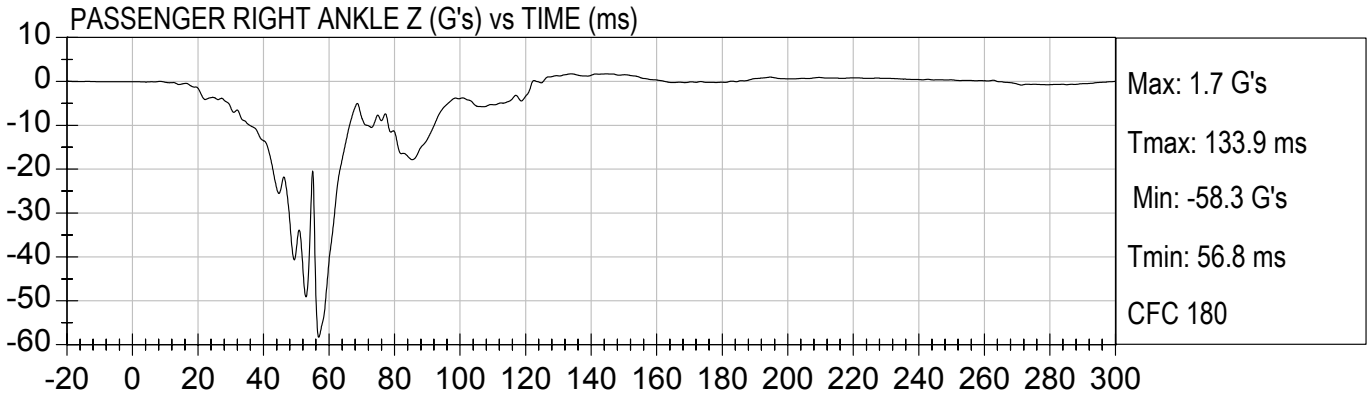

PASSENGER LEFT FOOT Z - FRONT (G's) vs TIME (ms)
50
25
0
-25
-50
-75
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 46.9 G's
Tmax: 49.4 ms
Min: -74.7 G's
Tmin: 55.6 ms
CFC 180

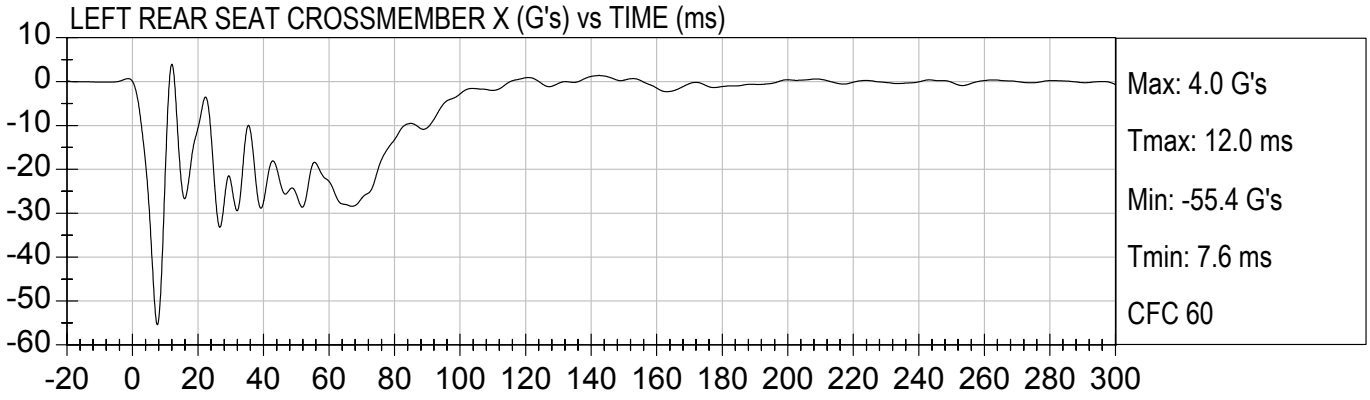

PASSENGER LEFT ANKLE X (G's) vs TIME (ms)
30
20
10
0
-10
-20
-30
-40
-50
-60
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 20.7 G's
Tmax: 82.2 ms
Min: -51.0 G's
Tmin: 49.4 ms
CFC 180

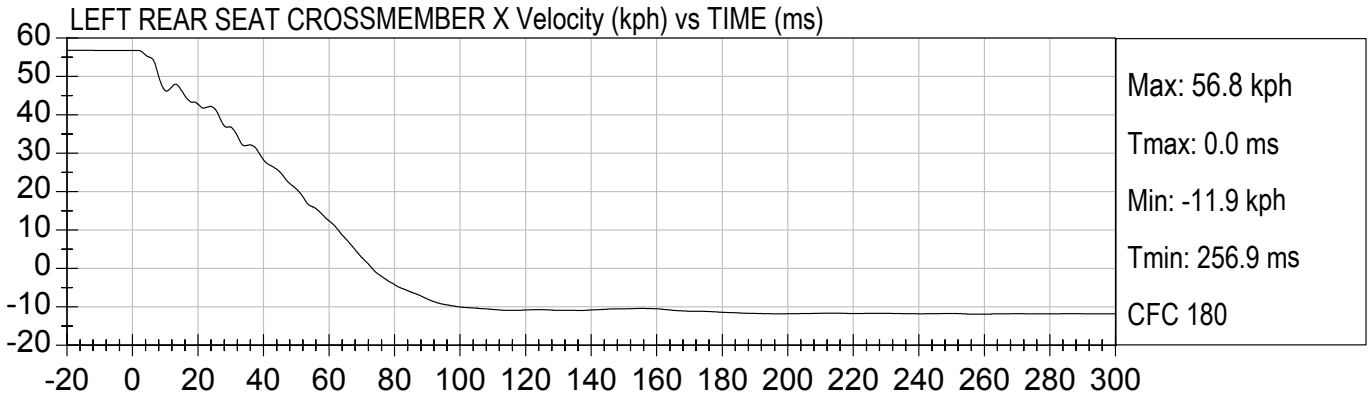

PASSENGER LEFT ANKLE Z (G's) vs TIME (ms)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 1.9 G's
Tmax: 143.4 ms
Min: -70.0 G's
Tmin: 54.4 ms
CFC 180

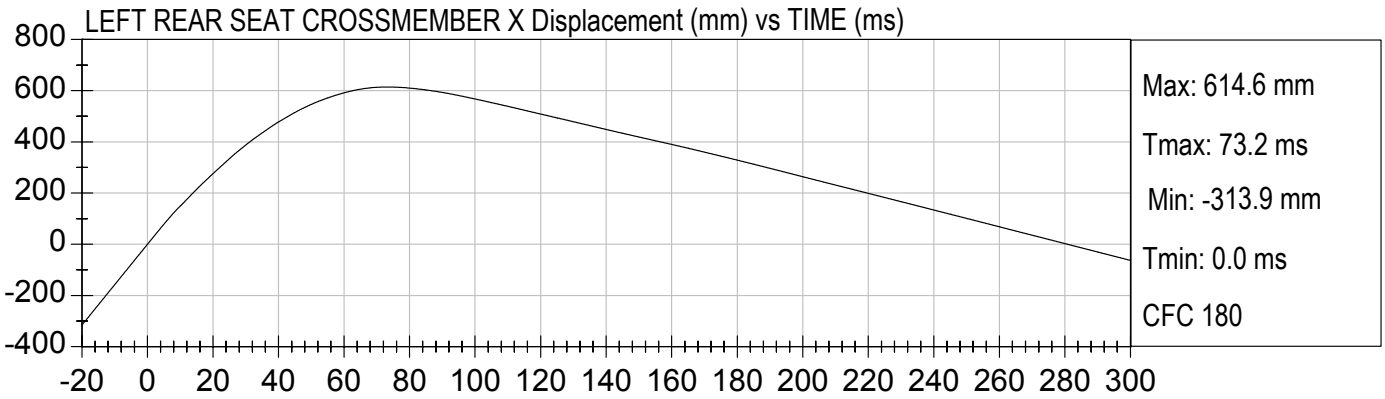

PASSENGER RIGHT FOOT Z - FRONT (G's) vs TIME (ms)
20
0
-20
-40
-60
-80
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 15.7 G's
Tmax: 54.6 ms
Min: -79.8 G's
Tmin: 46.4 ms
CFC 180

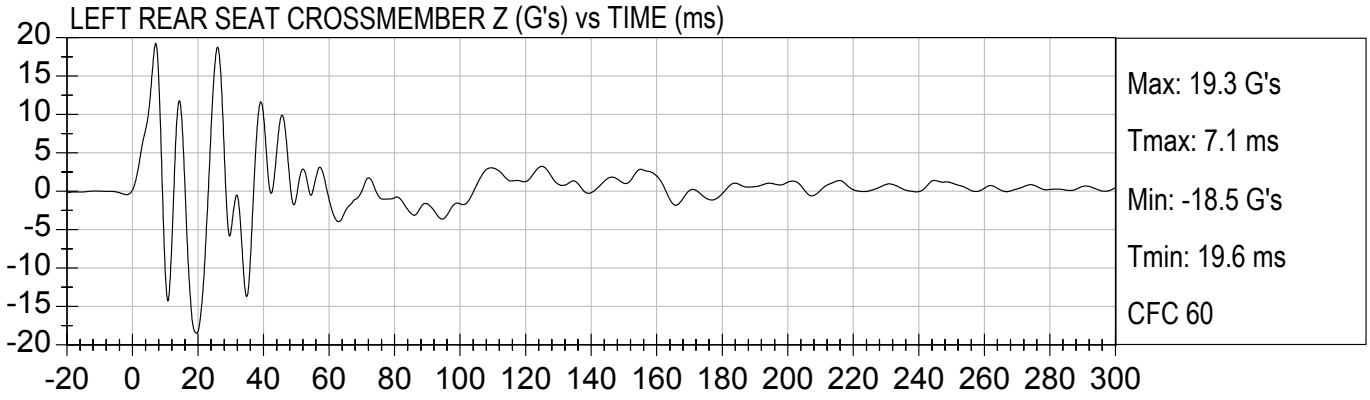

PASSENGER RIGHT ANKLE X (G's) vs TIME (ms)
25
0
-25
-50
-75
-100
-125
-150
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 21.0 G's
Tmax: 60.3 ms
Min: -125.8 G's
Tmin: 52.7 ms
CFC 180

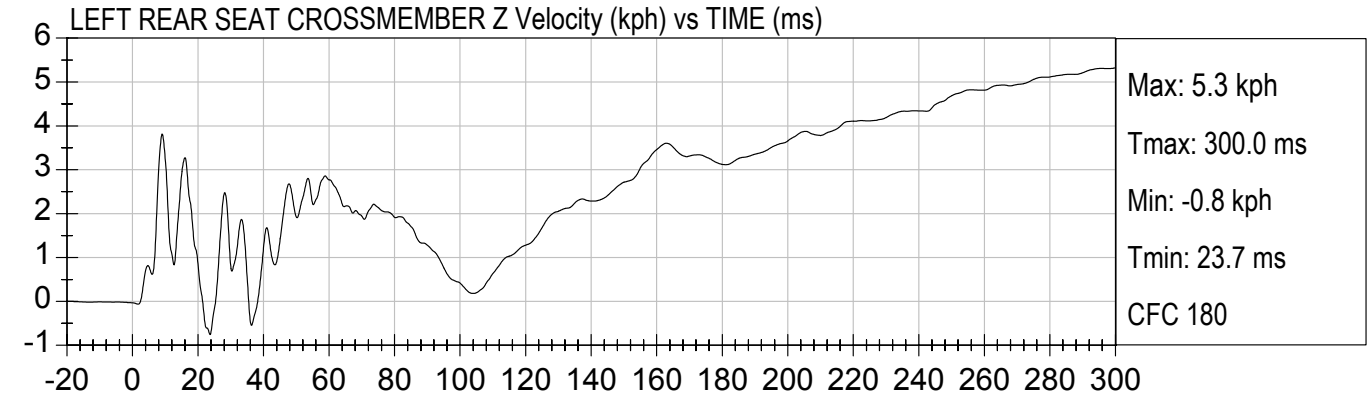

PASSENGER RIGHT ANKLE Z (G's) vs TIME (ms)
10
0
-10
-20
-30
-40
-50
-60
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 1.7 G's
Tmax: 133.9 ms
Min: -58.3 G's
Tmin: 56.8 ms
CFC 180

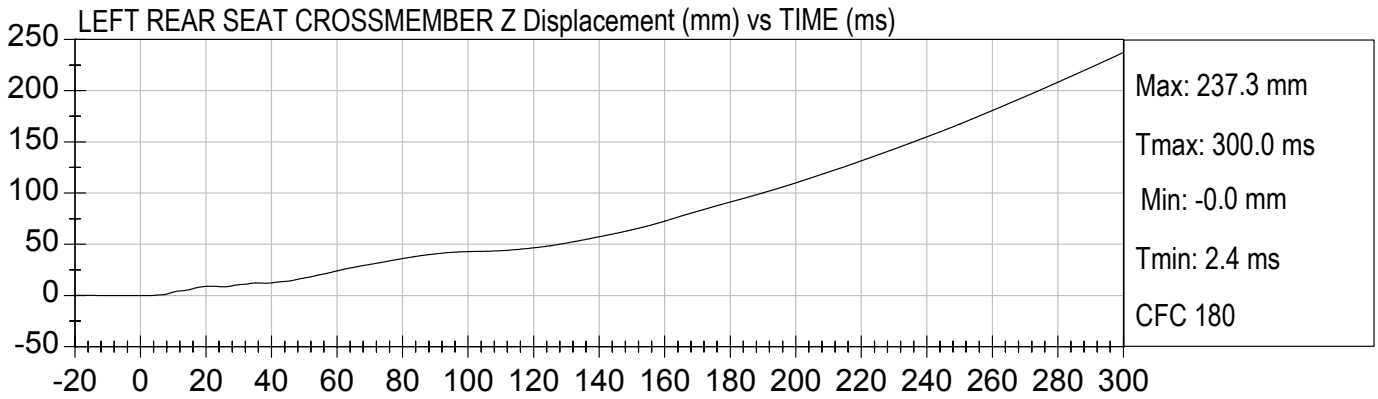

LEFT REAR SEAT CROSSMEMBER X (G's) vs TIME (ms)
10
0
-10
-20
-30
-40
-50
-60
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 4.0 G's
Tmax: 12.0 ms
Min: -55.4 G's
Tmin: 7.6 ms
CFC 60

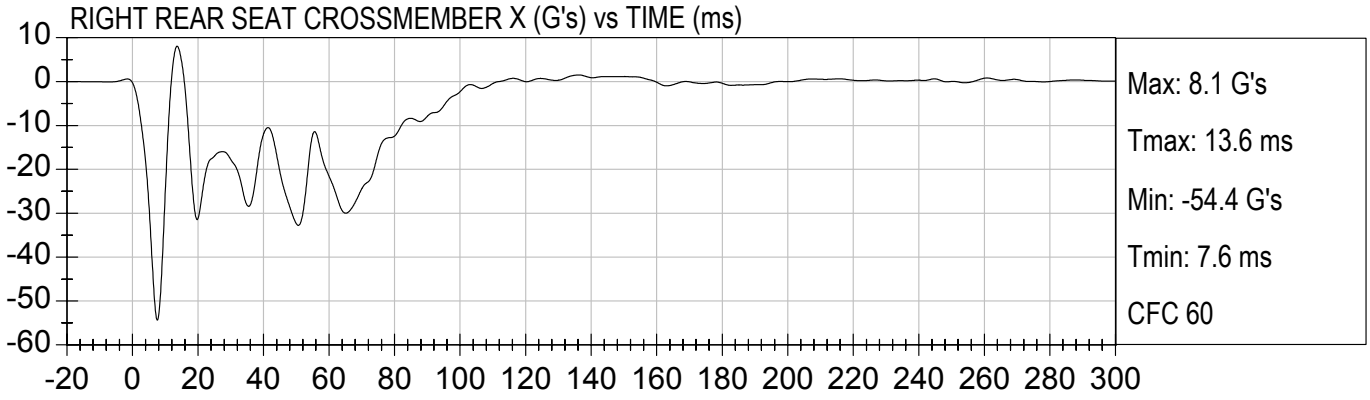

LEFT REAR SEAT CROSSMEMBER X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 56.8 kph
Tmax: 0.0 ms
Min: -11.9 kph
Tmin: 256.9 ms
CFC 180

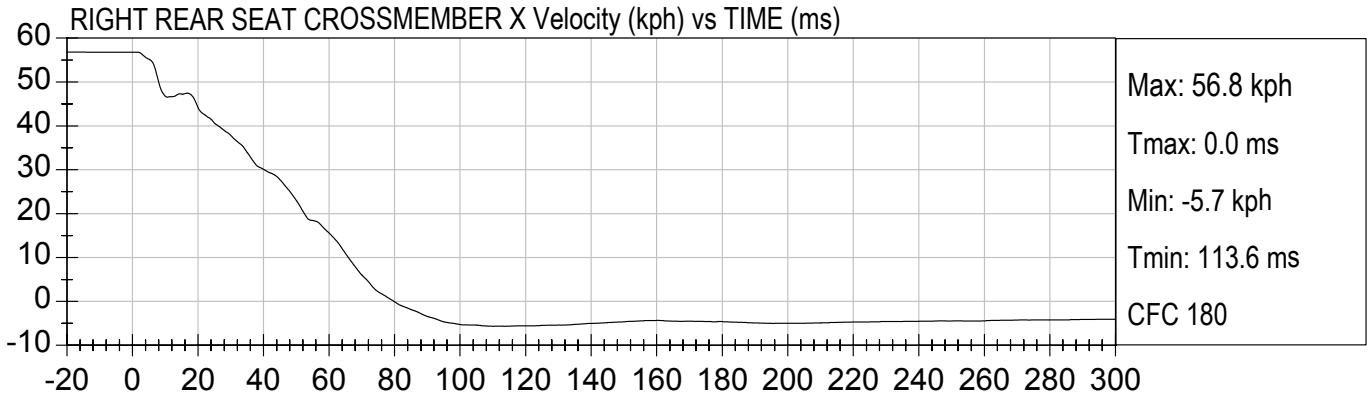

LEFT REAR SEAT CROSSMEMBER X Displacement (mm) vs TIME (ms)
800
600
400
200
0
-200
-400
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 614.6 mm
Tmax: 73.2 ms
Min: -313.9 mm
Tmin: 0.0 ms
CFC 180

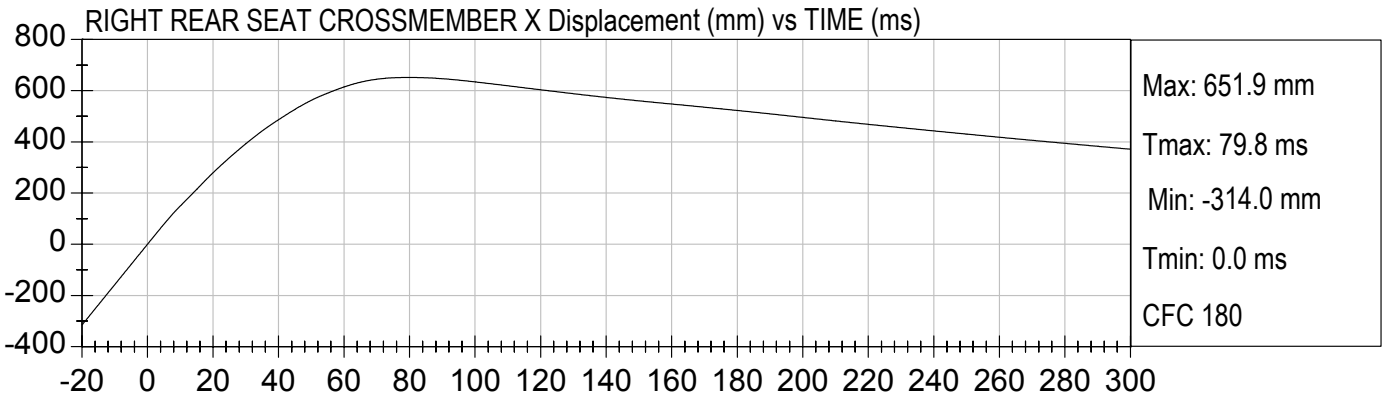

LEFT REAR SEAT CROSSMEMBER Z (G's) vs TIME (ms)
20
15
10
5
0
-5
-10
-15
-20
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 19.3 G's
Tmax: 7.1 ms
Min: -18.5 G's
Tmin: 19.6 ms
CFC 60

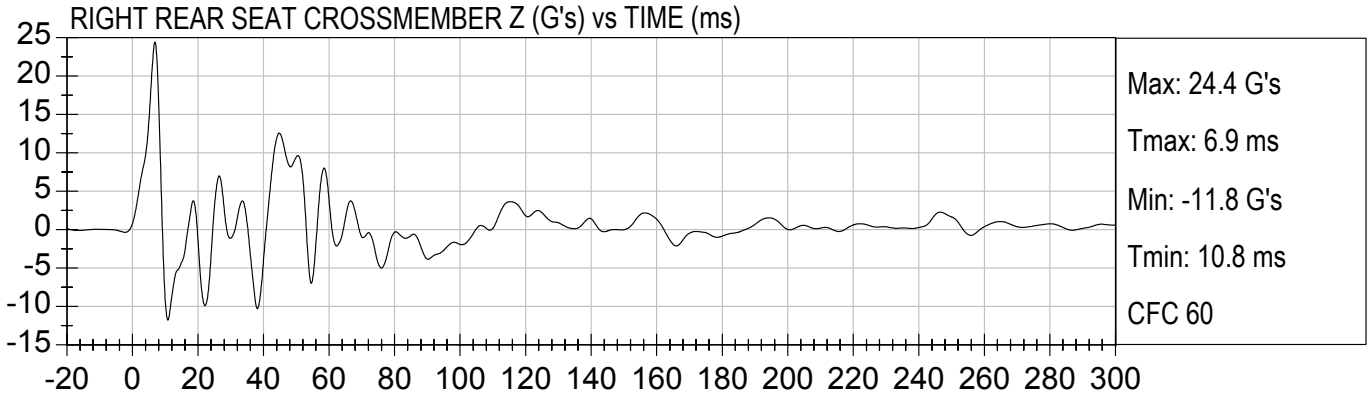

LEFT REAR SEAT CROSSMEMBER Z Velocity (kph) vs TIME (ms)
6
5
4
3
2
1
0
-1
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 5.3 kph
Tmax: 300.0 ms
Min: -0.8 kph
Tmin: 23.7 ms
CFC 180

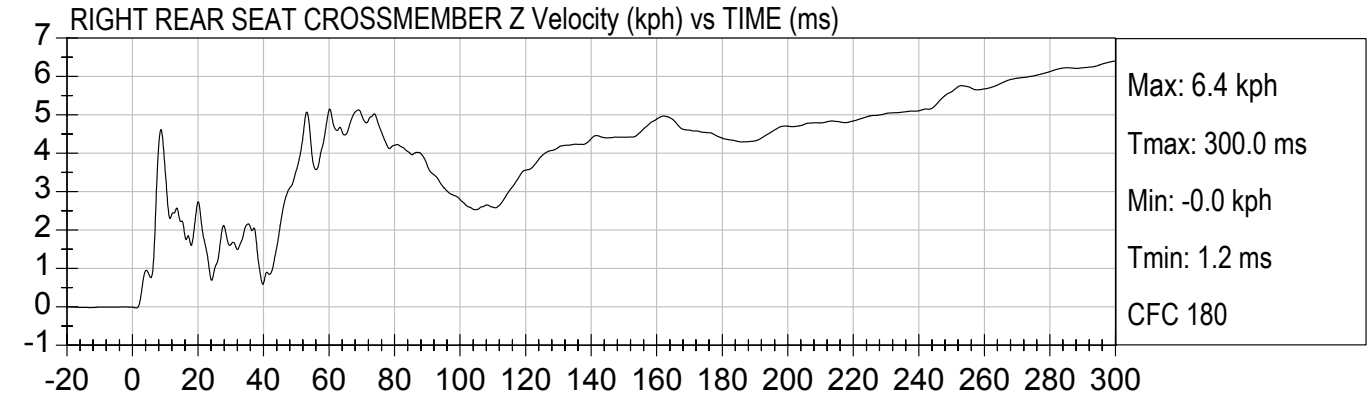

LEFT REAR SEAT CROSSMEMBER Z Displacement (mm) vs TIME (ms)
250
200
150
100
50
0
-50
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 237.3 mm
Tmax: 300.0 ms
Min: -0.0 mm
Tmin: 2.4 ms
CFC 180

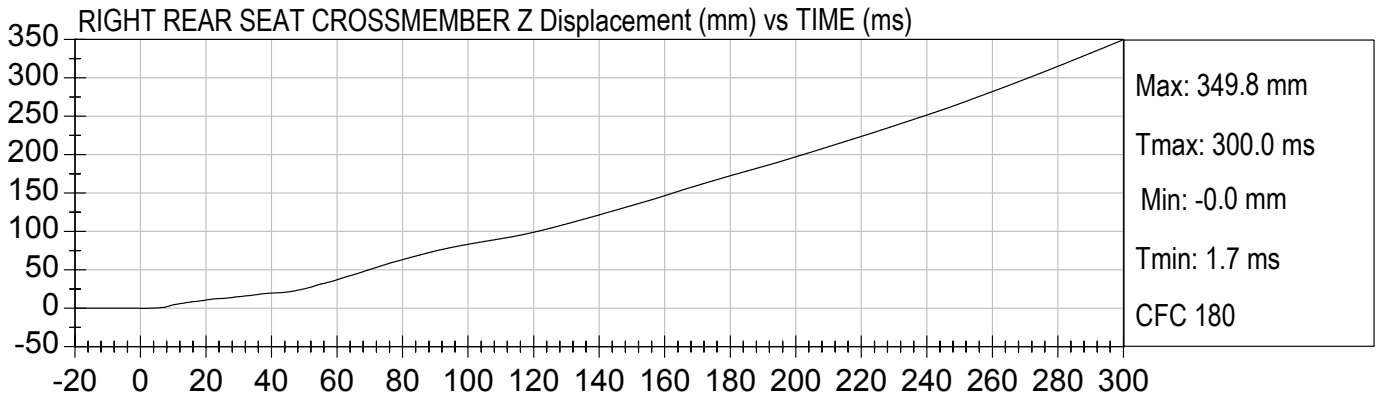

RIGHT REAR SEAT CROSSMEMBER X (G's) vs TIME (ms)
10
0
-10
-20
-30
-40
-50
-60
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 8.1 G's
Tmax: 13.6 ms
Min: -54.4 G's
Tmin: 7.6 ms
CFC 60

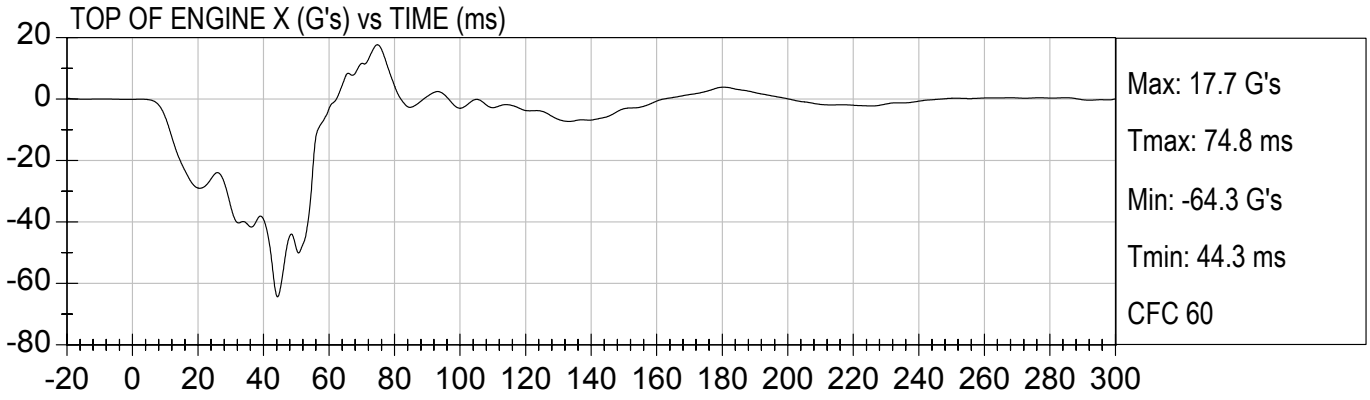

RIGHT REAR SEAT CROSSMEMBER X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 56.8 kph
Tmax: 0.0 ms
Min: -5.7 kph
Tmin: 113.6 ms
CFC 180

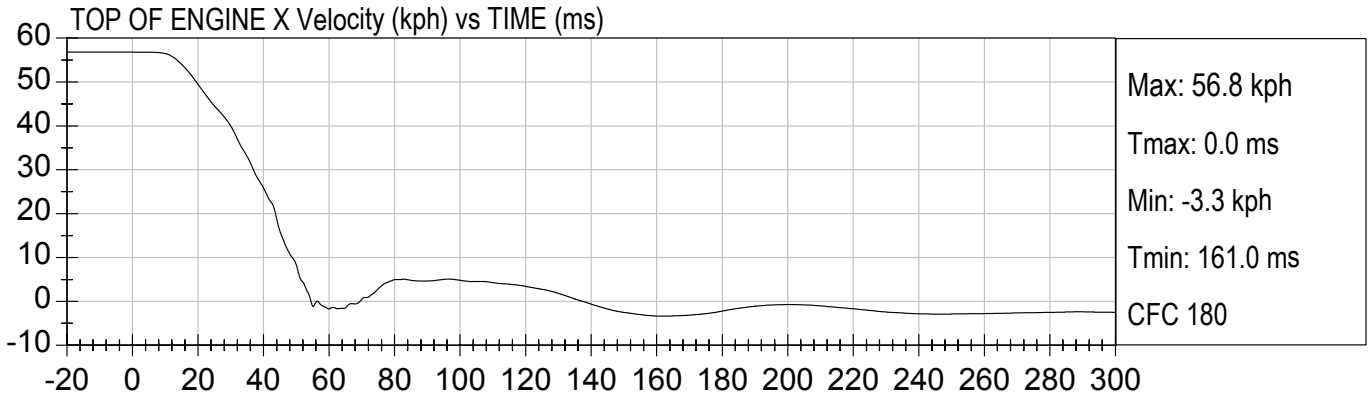

RIGHT REAR SEAT CROSSMEMBER X Displacement (mm) vs TIME (ms)
800
600
400
200
0
-200
-400
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 651.9 mm
Tmax: 79.8 ms
Min: -314.0 mm
Tmin: 0.0 ms
CFC 180

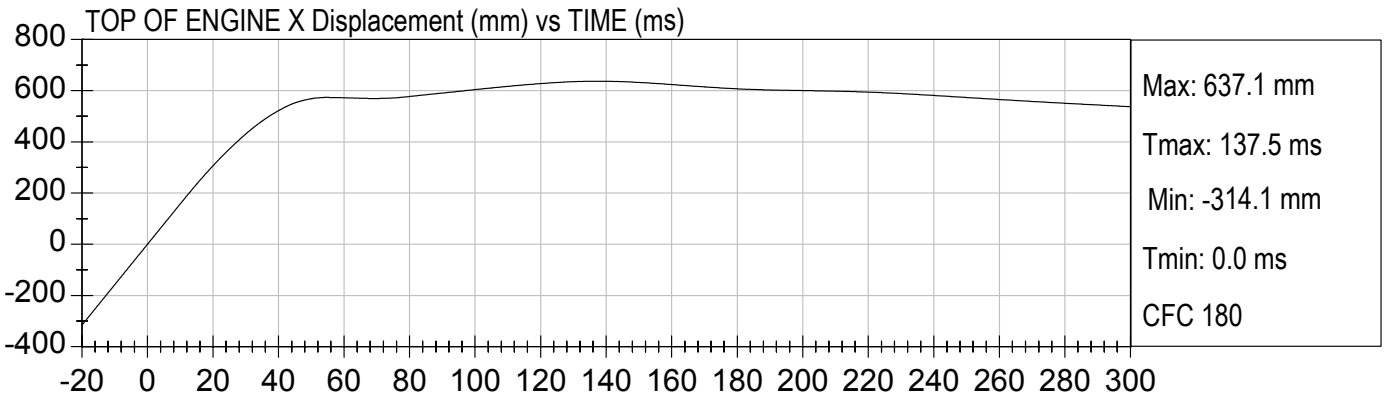

RIGHT REAR SEAT CROSSMEMBER Z (G's) vs TIME (ms)
25
20
15
10
5
0
-5
-10
-15
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 24.4 G's
Tmax: 6.9 ms
Min: -11.8 G's
Tmin: 10.8 ms
CFC 60


RIGHT REAR SEAT CROSSMEMBER Z Velocity (kph) vs TIME (ms)
7
6
5
4
3
2
1
0
-1
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 6.4 kph
Tmax: 300.0 ms
Min: -0.0 kph
Tmin: 1.2 ms
CFC 180


RIGHT REAR SEAT CROSSMEMBER Z Displacement (mm) vs TIME (ms)
350
300
250
200
150
100
50
0
-50
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 349.8 mm
Tmax: 300.0 ms
Min: -0.0 mm
Tmin: 1.7 ms
CFC 180

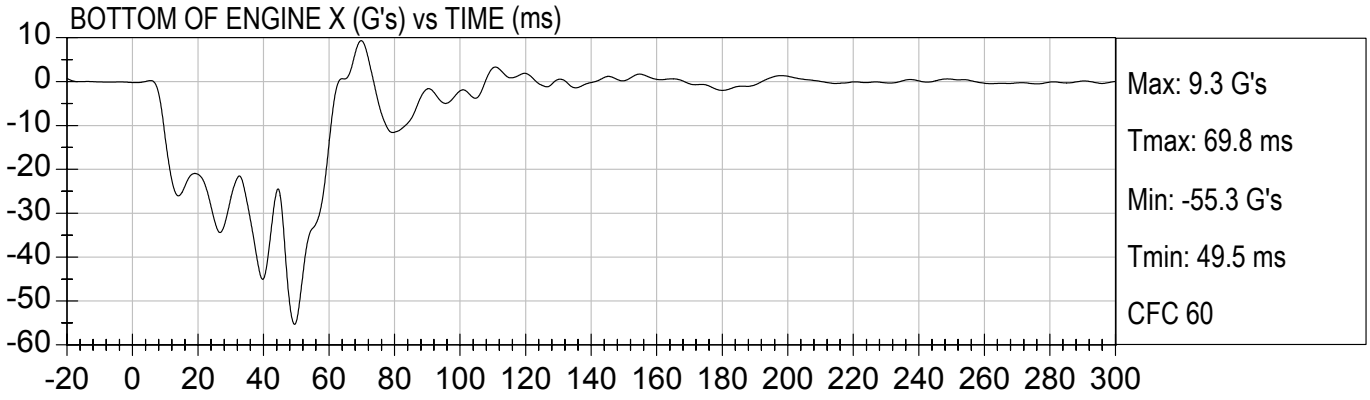

TOP OF ENGINE X (G's) vs TIME (ms)
20
0
-20
-40
-60
-80
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 17.7 G's
Tmax: 74.8 ms
Min: -64.3 G's
Tmin: 44.3 ms
CFC 60

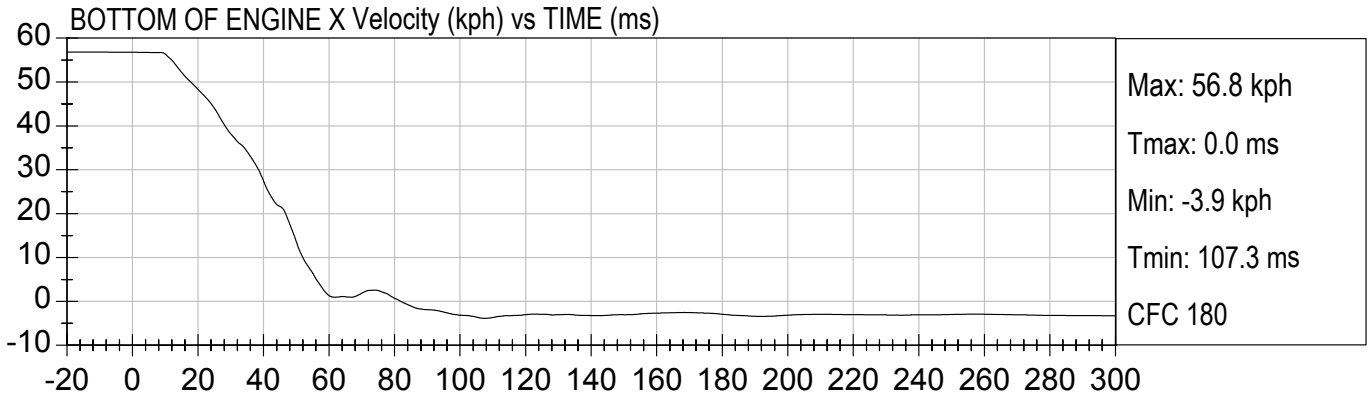

TOP OF ENGINE X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 56.8 kph
Tmax: 0.0 ms
Min: -3.3 kph
Tmin: 161.0 ms
CFC 180

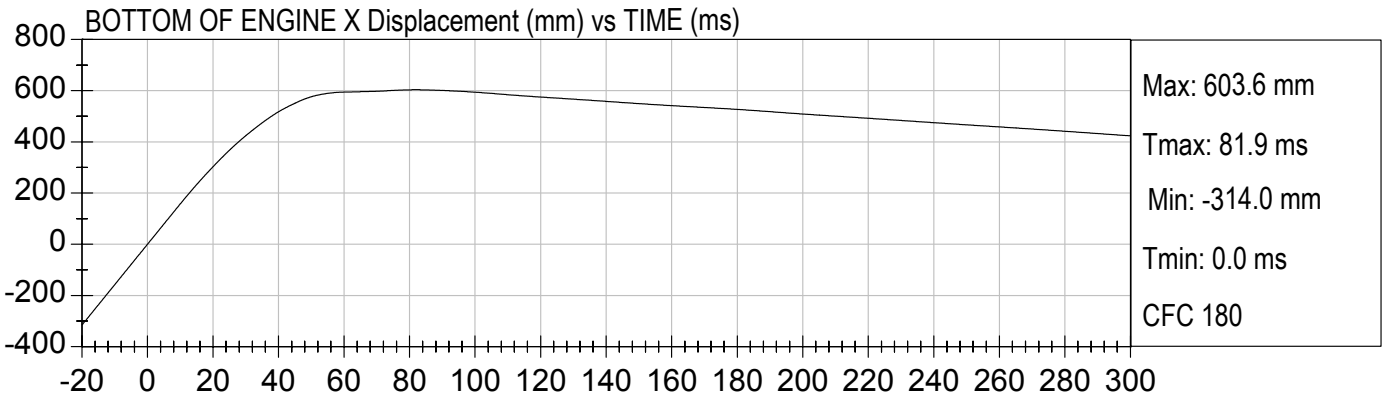

TOP OF ENGINE X Displacement (mm) vs TIME (ms)
800
600
400
200
0
-200
-400
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 637.1 mm
Tmax: 137.5 ms
Min: -314.1 mm
Tmin: 0.0 ms
CFC 180

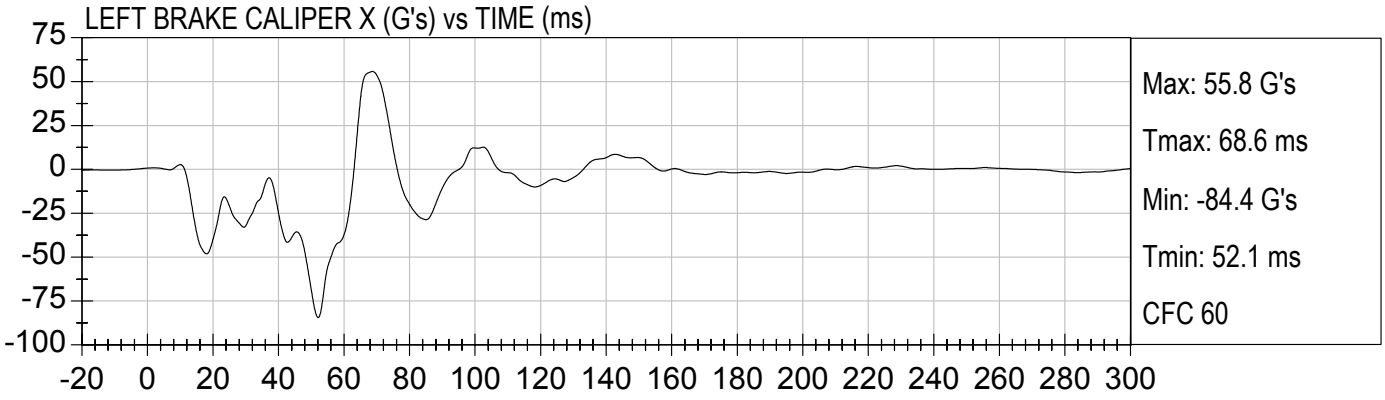
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

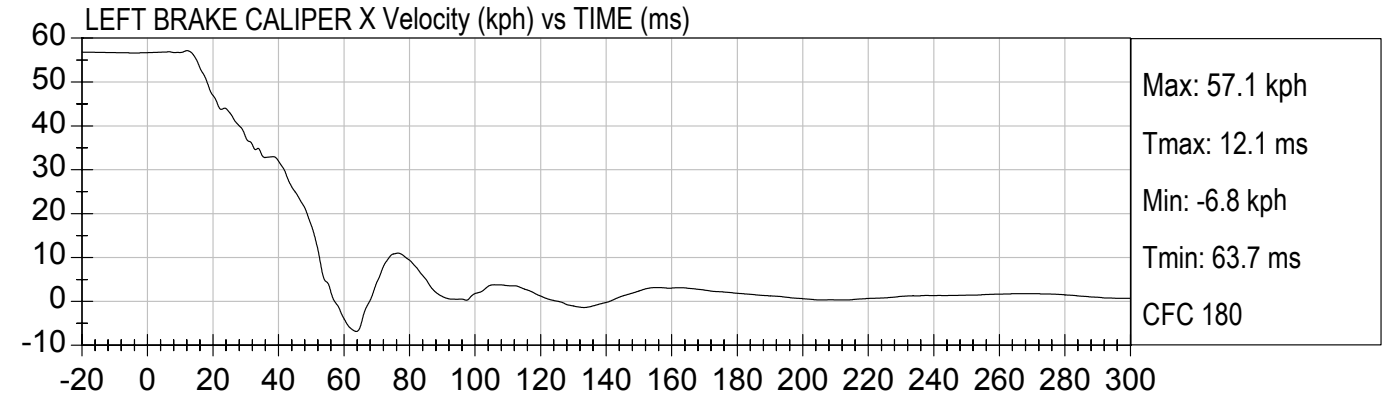
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

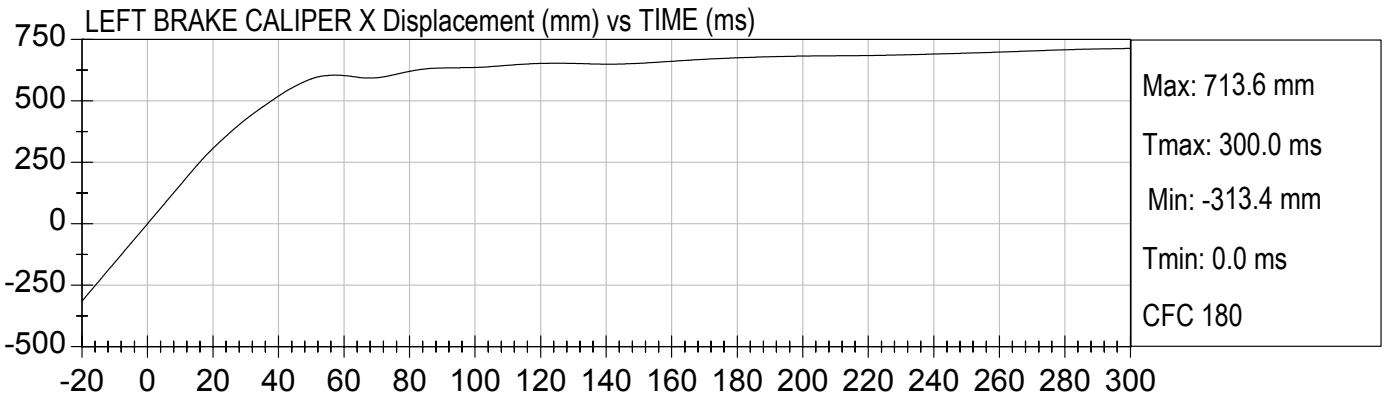






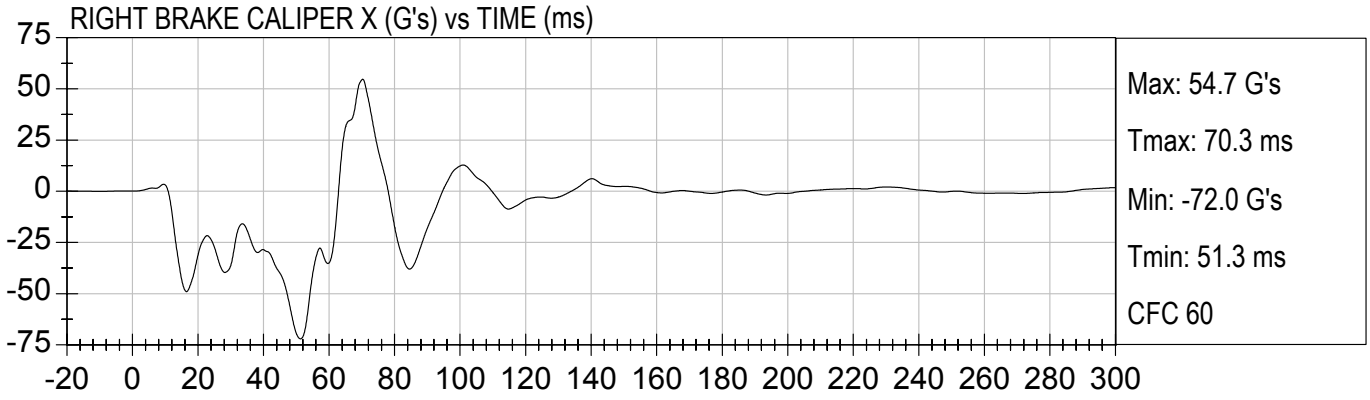

LEFT BRAKE CALIPER X (G's) vs TIME (ms)
75
50
25
0
-25
-50
-75
-100
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 55.8 G's
Tmax: 68.6 ms
Min: -84.4 G's
Tmin: 52.1 ms
CFC 60

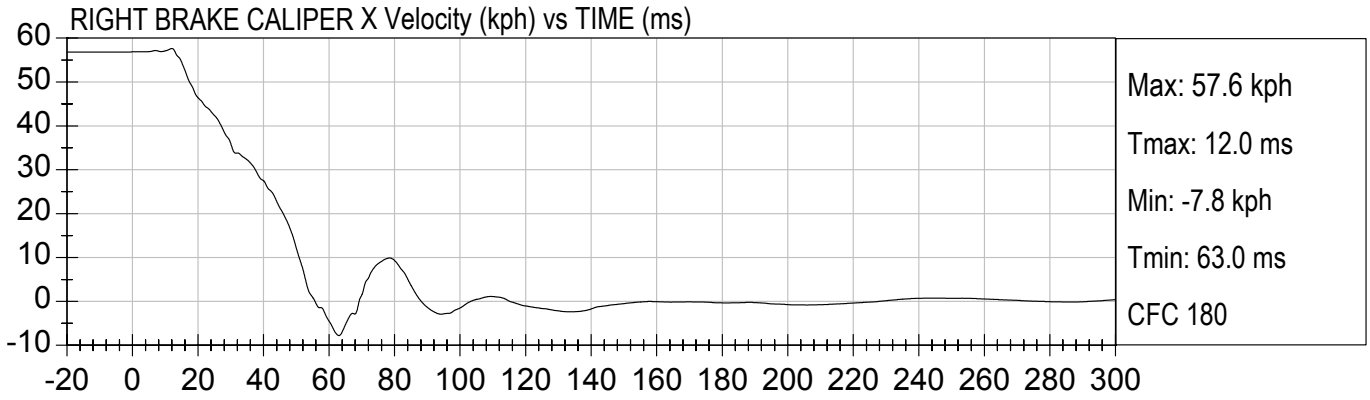

LEFT BRAKE CALIPER X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 57.1 kph
Tmax: 12.1 ms
Min: -6.8 kph
Tmin: 63.7 ms
CFC 180

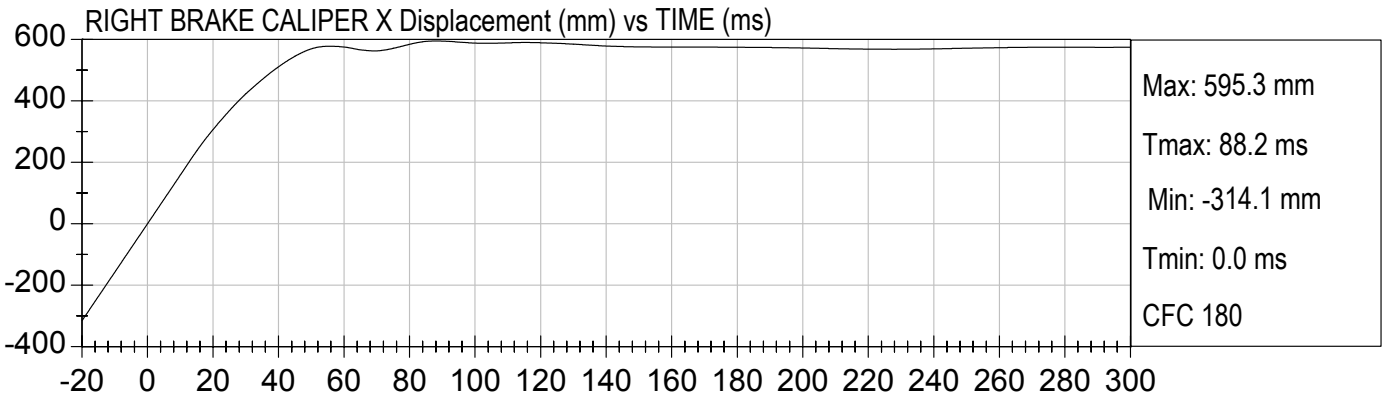

LEFT BRAKE CALIPER X Displacement (mm) vs TIME (ms)
750
500
250
0
-250
-500
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 713.6 mm
Tmax: 300.0 ms
Min: -313.4 mm
Tmin: 0.0 ms
CFC 180

NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

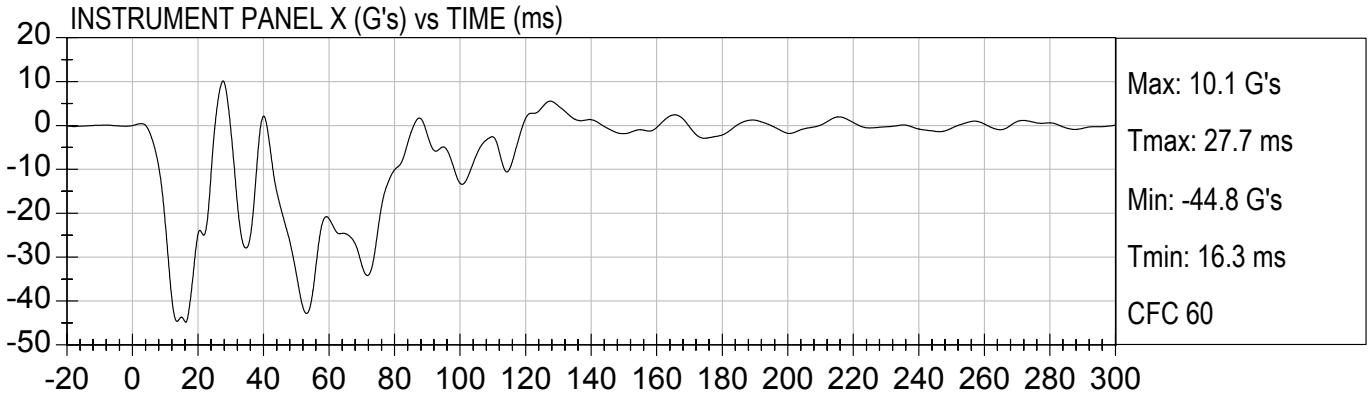


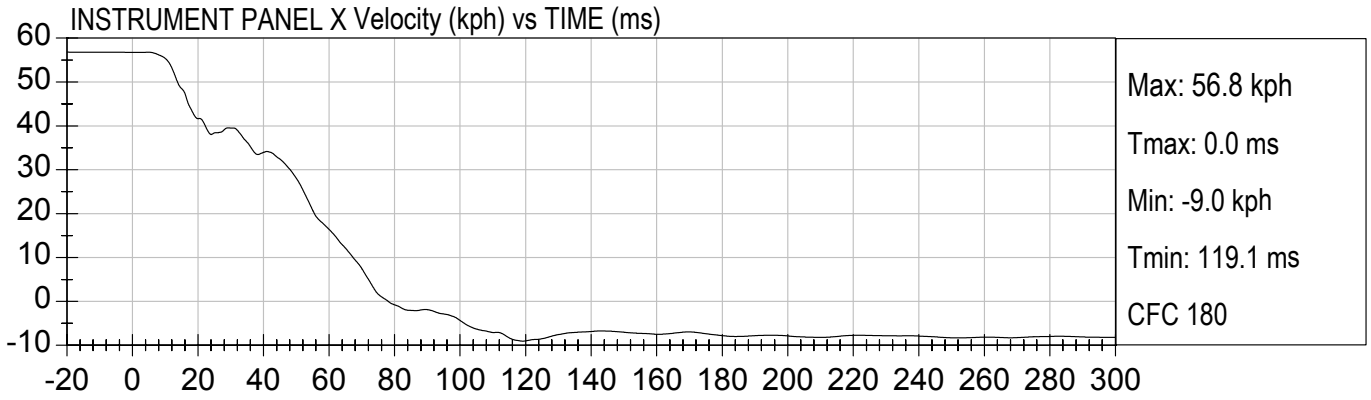


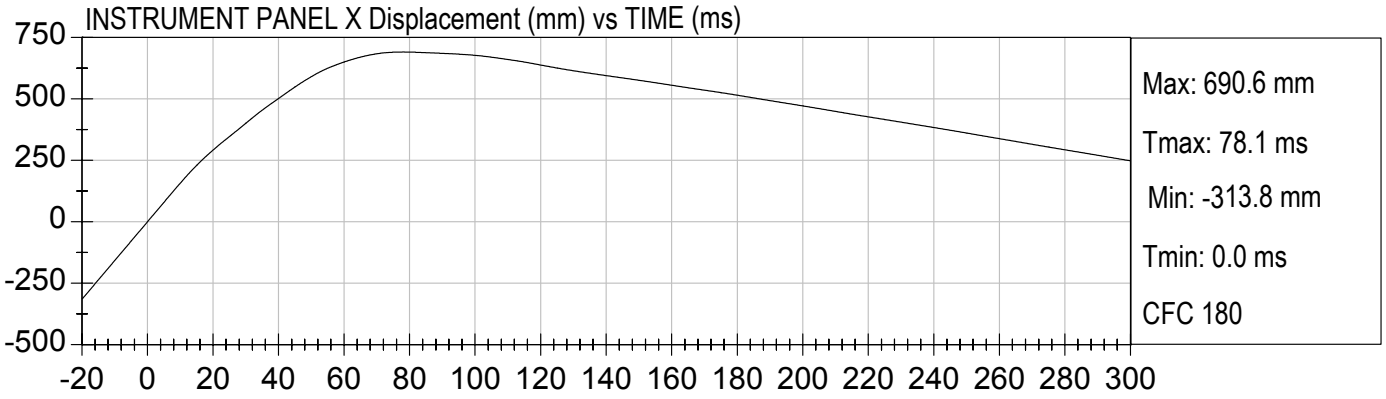


NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

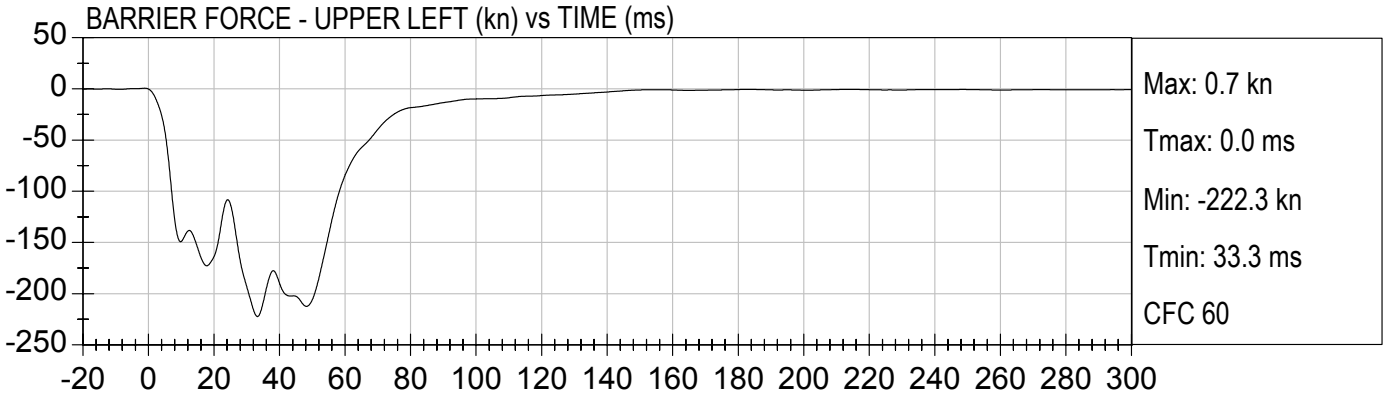


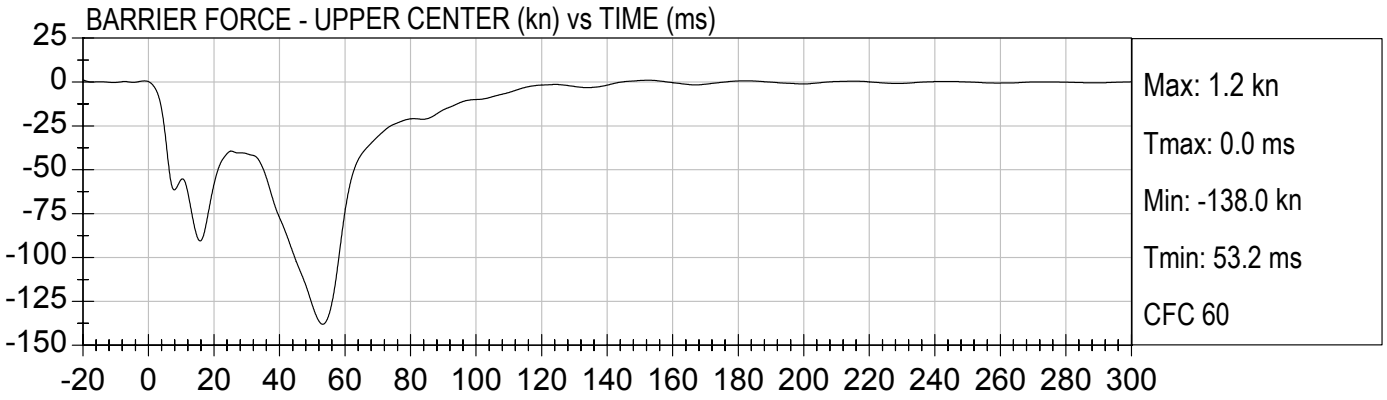


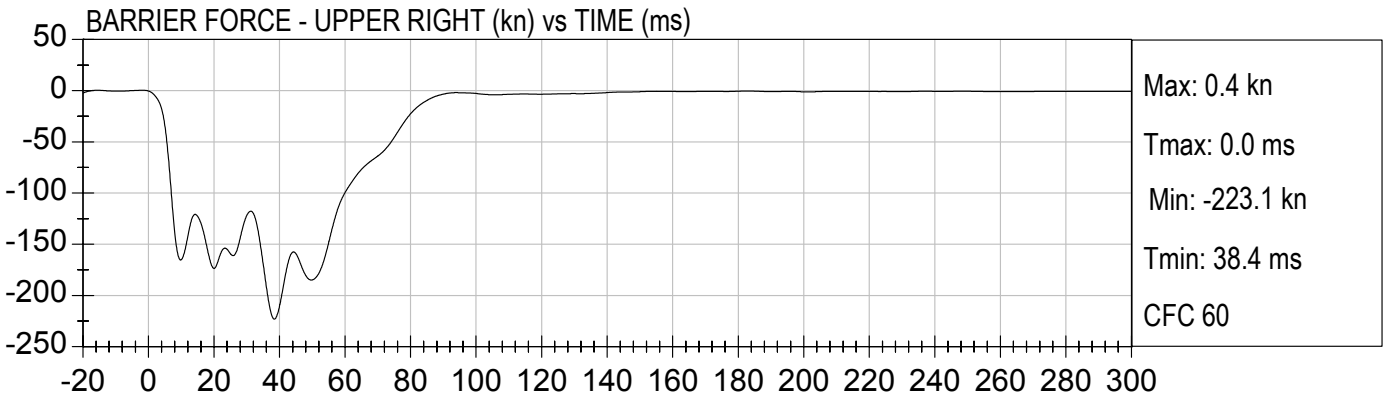


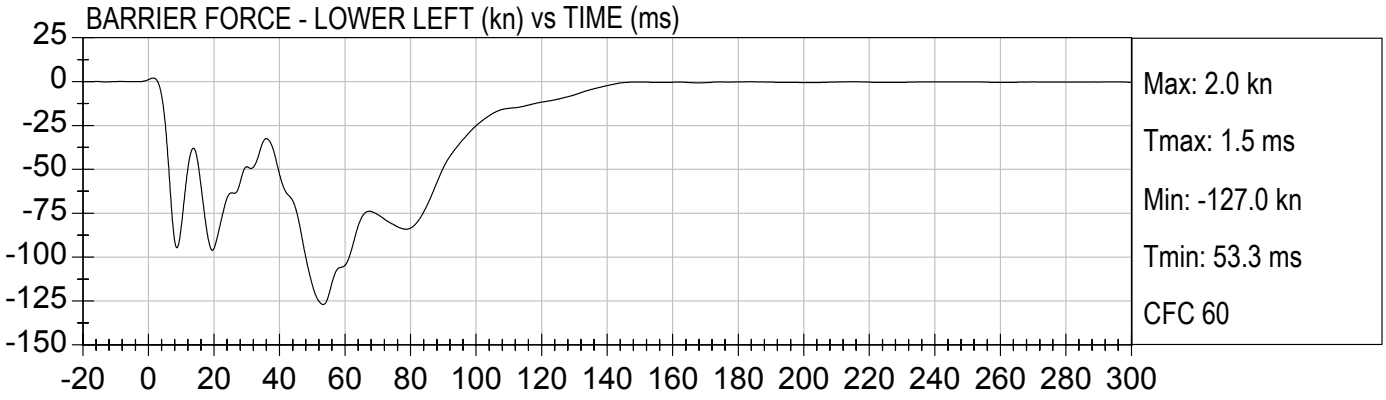
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

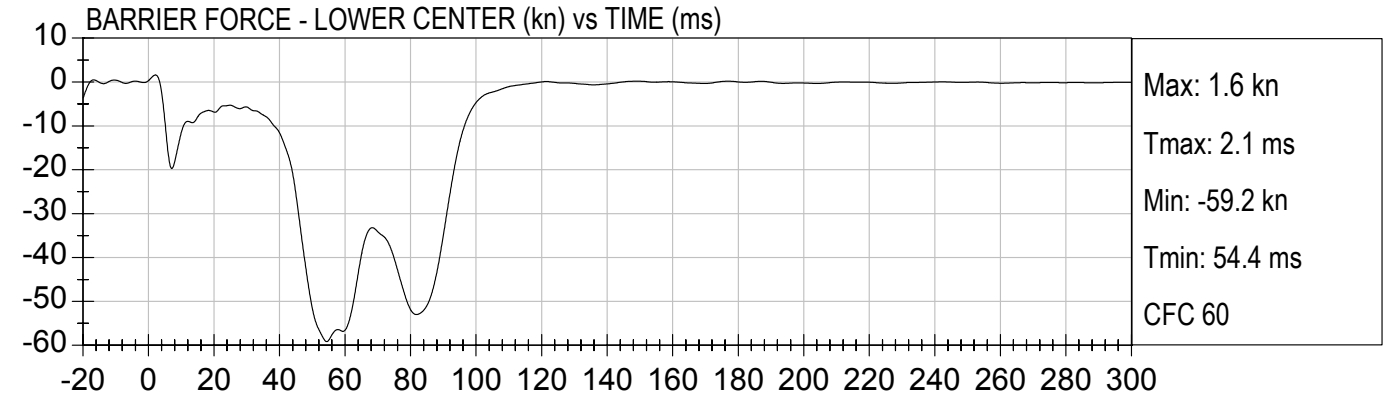
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)

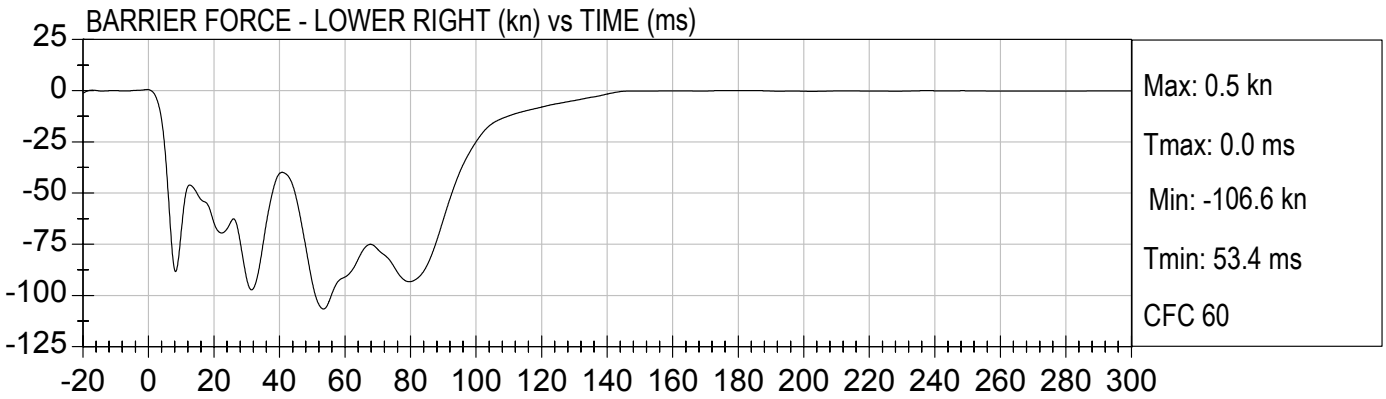






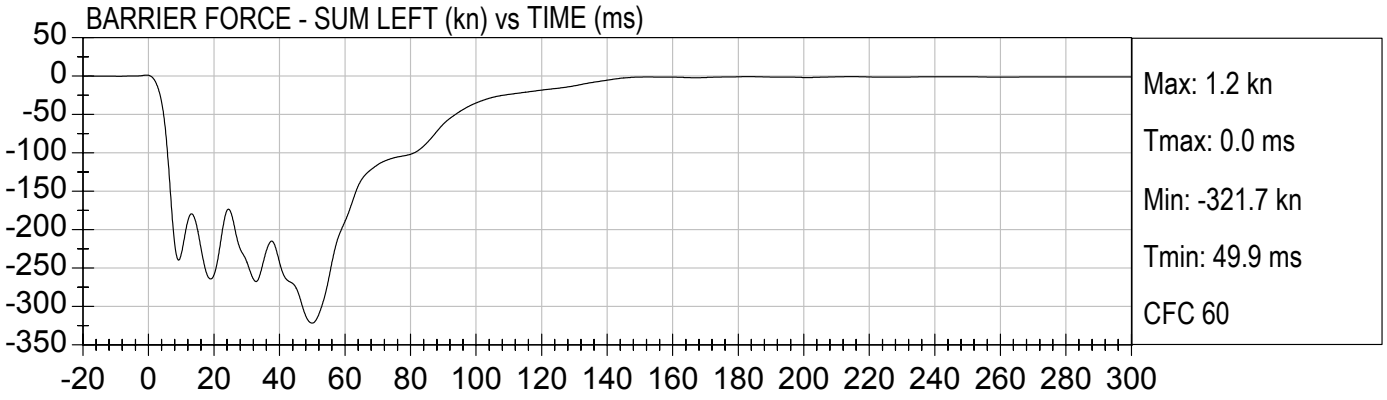

BARRIER FORCE - LOWER LEFT (kn) vs TIME (ms)
25
0
-25
-50
-75
-100
-125
-150
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 2.0 kn
Tmax: 1.5 ms
Min: -127.0 kn
Tmin: 53.3 ms
CFC 60

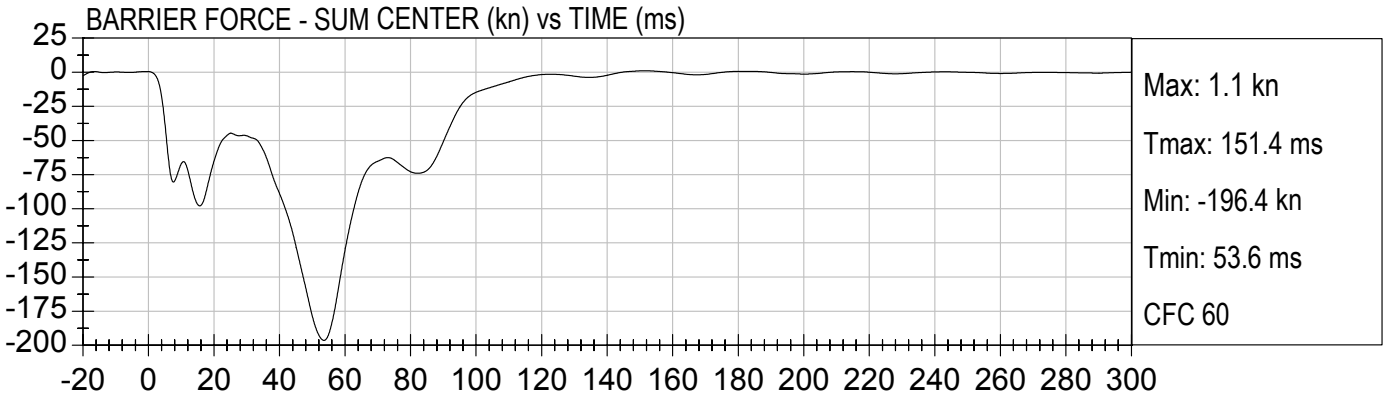

BARRIER FORCE - LOWER CENTER (kn) vs TIME (ms)
10
0
-10
-20
-30
-40
-50
-60
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 1.6 kn
Tmax: 2.1 ms
Min: -59.2 kn
Tmin: 54.4 ms
CFC 60

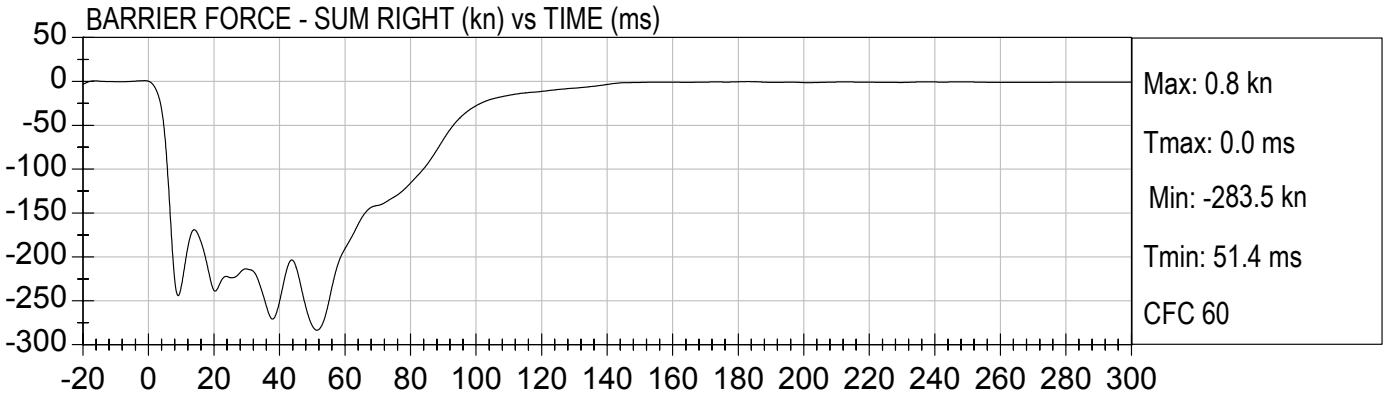

BARRIER FORCE - LOWER RIGHT (kn) vs TIME (ms)
25
0
-25
-50
-75
-100
-125
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 0.5 kn
Tmax: 0.0 ms
Min: -106.6 kn
Tmin: 53.4 ms
CFC 60

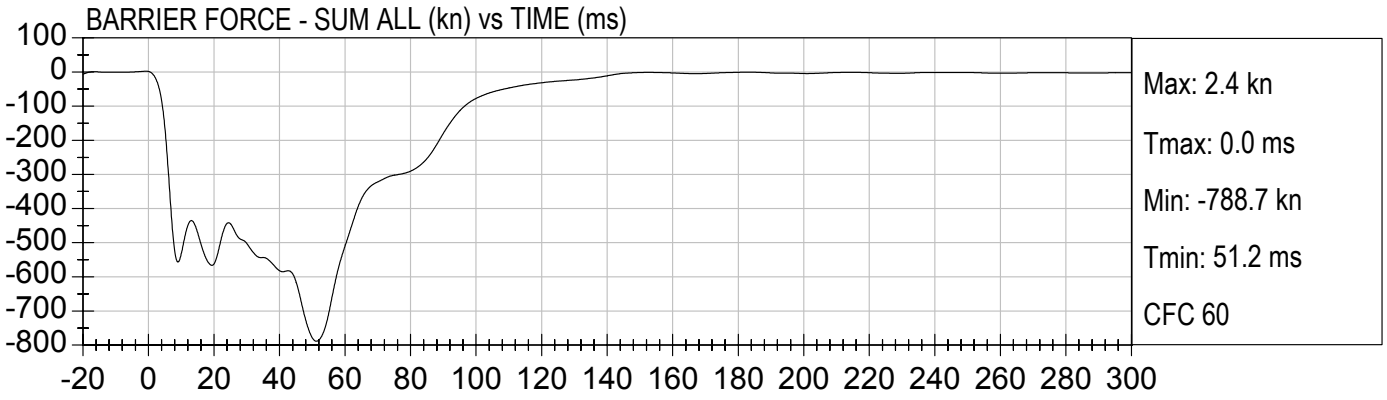
NCAP 35MPH FRONTAL
2005 JEEP CHEROKEE (M50307)

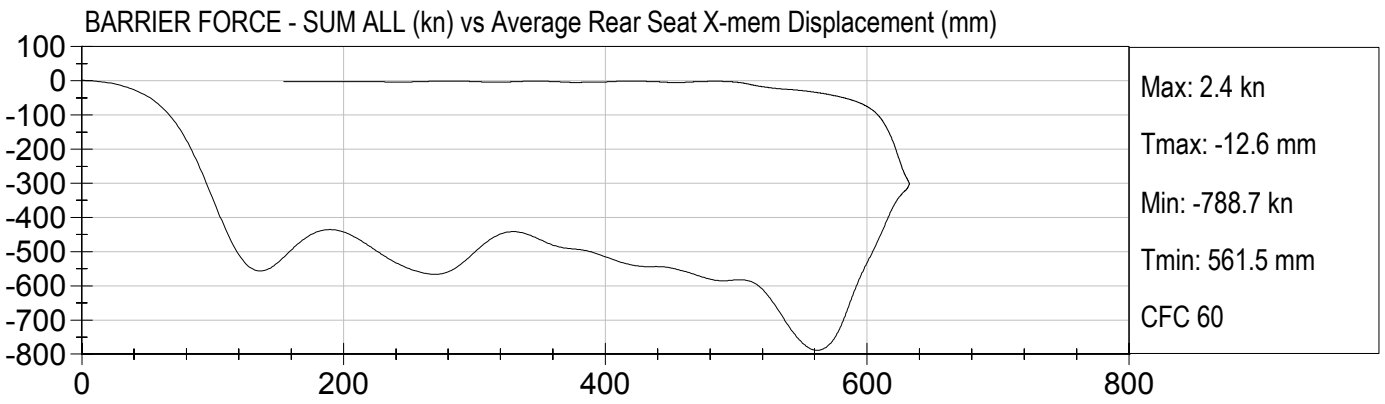
Test Date: 1/31/05
Speed: 35.3 mph (56.8 km/h)










BARRIER FORCE - SUM ALL (kn) vs Average Rear Seat X-mem Displacement (mm)
100
0
-100
-200
-300
-400
-500
-600
-700
-800
0
200
400
600
800
Max: 2.4 kn
Tmax: -12.6 mm
Min: -788.7 kn
Tmin: 561.5 mm
CFC 60

APPENDIX C

DUMMY CALIBRATION DATA TRACES AND TABLES

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test ID:** D05141

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Peak Resultant Acceleration	G's	225 - 275	240	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	14.2	Pass
Unimodal	Yes/No	NA	Yes	Pass
Oscillations	Yes/No	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Joe Fleck

Laboratory Technician

01/20/2005

Test Date

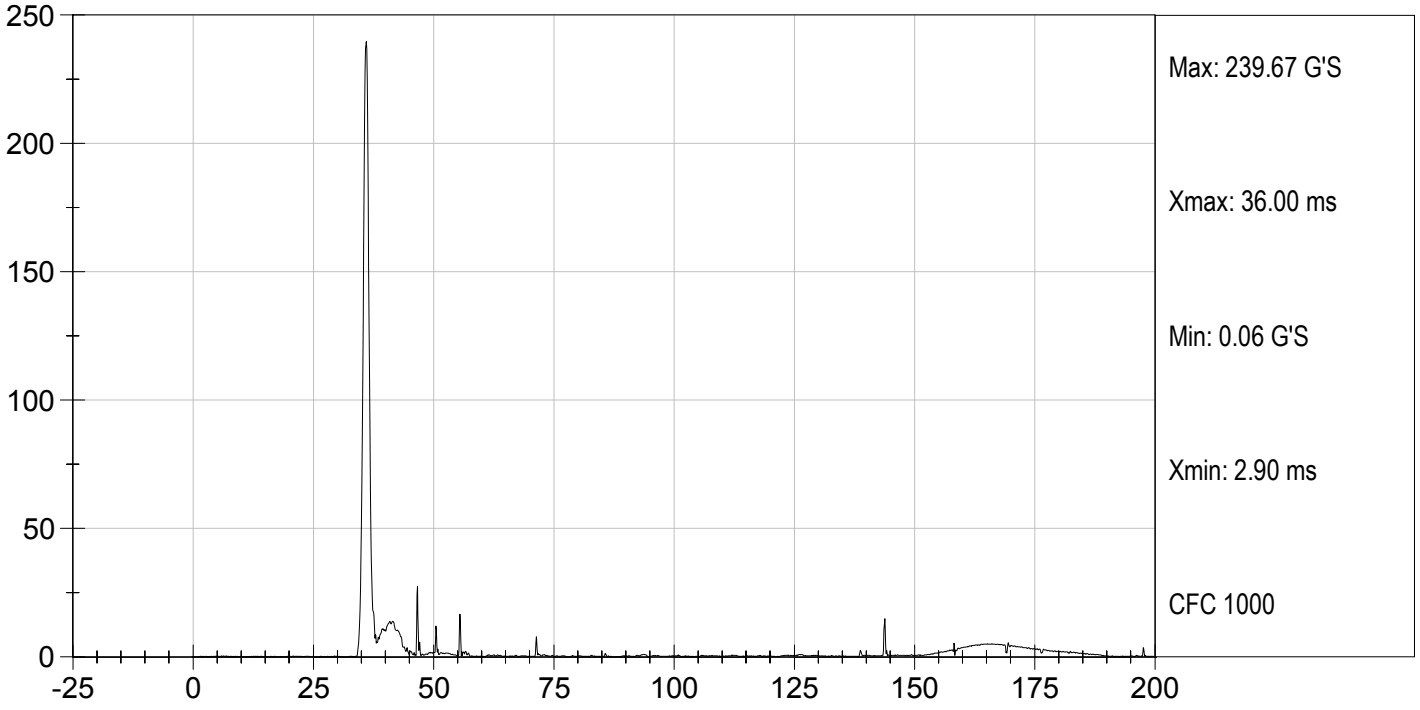
David Winkelbauer

Approved By

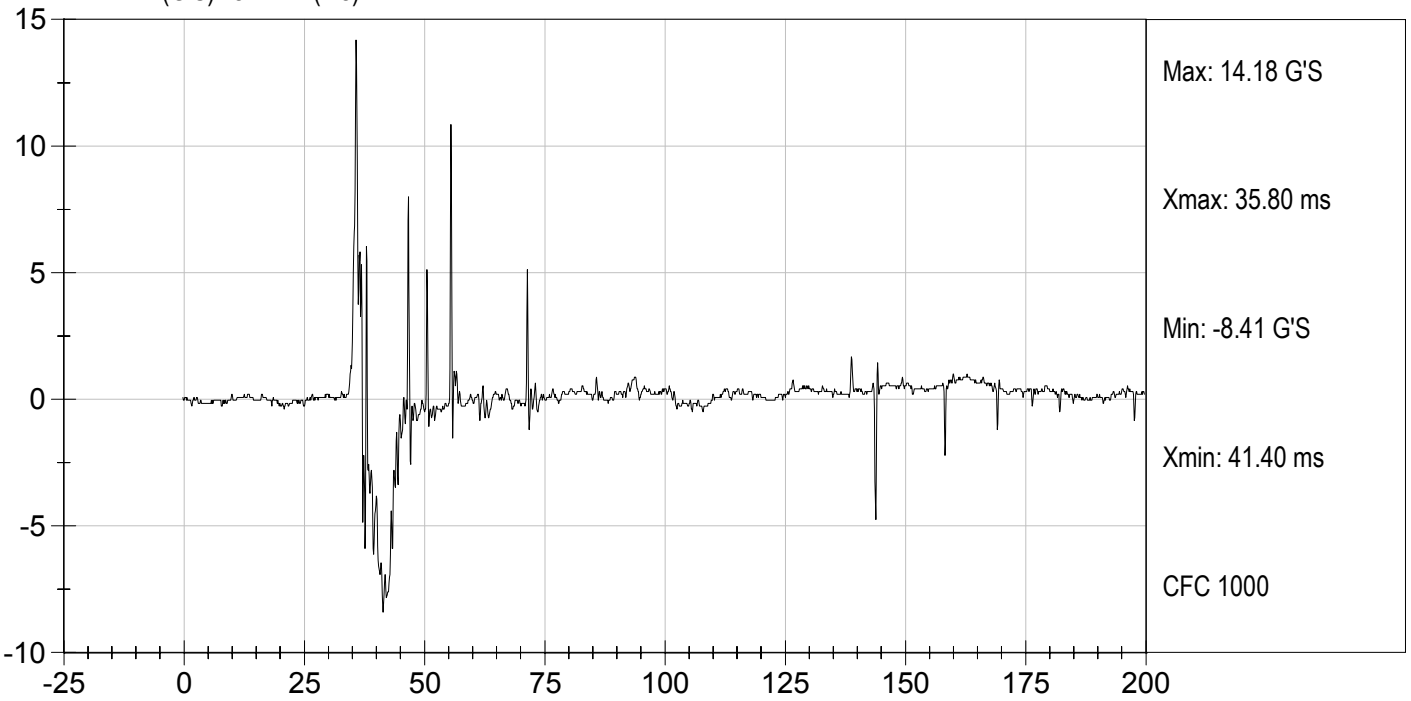
Test Desc: Head Drop
Componet ID: D05141

Test Date: 01/20/2005
Velocity: 0 ft/s, 0.00 m/s

HEAD RESULTANT ACCELERATION (G'S) vs TIME (ms)



HEAD Y (G'S) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D05142

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	25.11	Pass
	20 msec	G's	17.60 to 22.60	20.49	Pass
	30 msec	G's	12.50 to 18.50	15.90	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	15.87	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	36.7	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	73.0	Pass
	Time	msec	57.0 to 64.0	58.5	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	114.4	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	98.1	Pass
	Time	msec	47.0 to 58.0	49.4	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	104.4	Pass
			Overall Test Results		Pass

Joe Fleck

Laboratory Technician

01/20/2005

Test Date

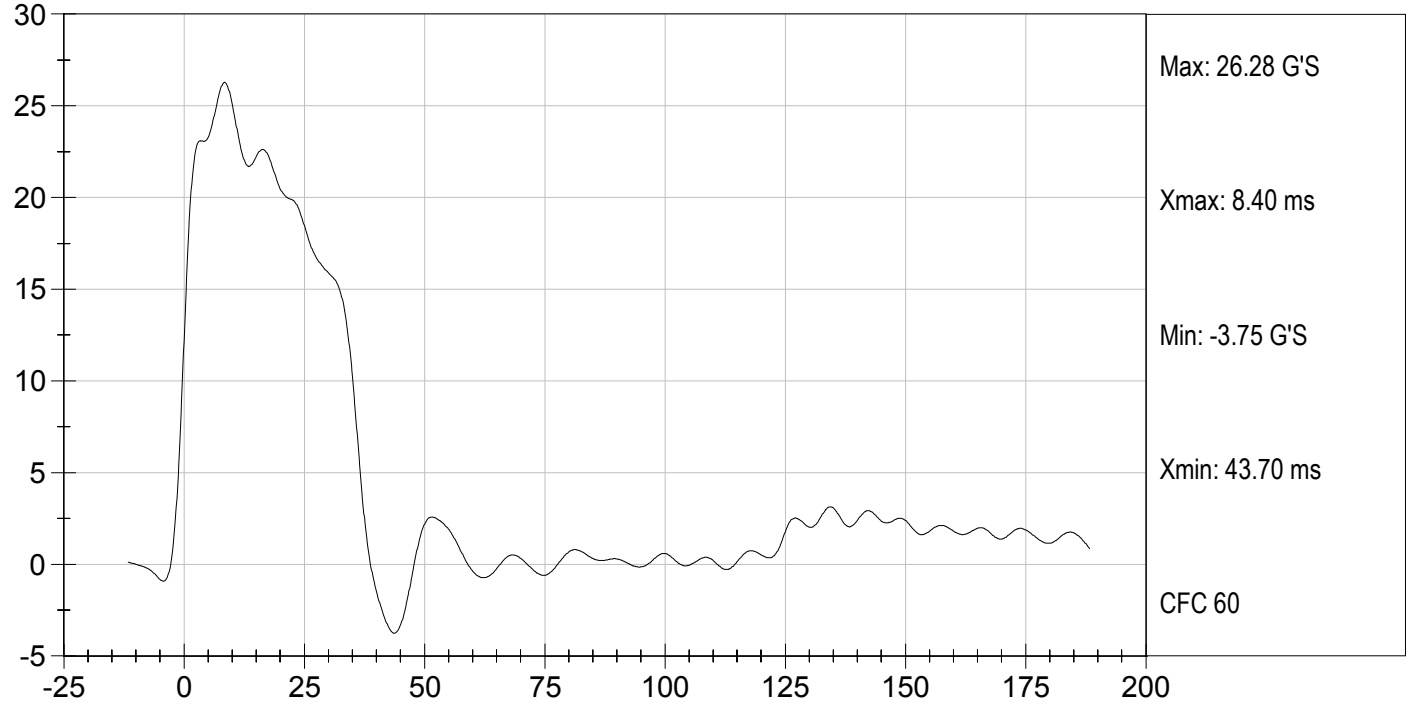
David Winkelbauer

Approved By

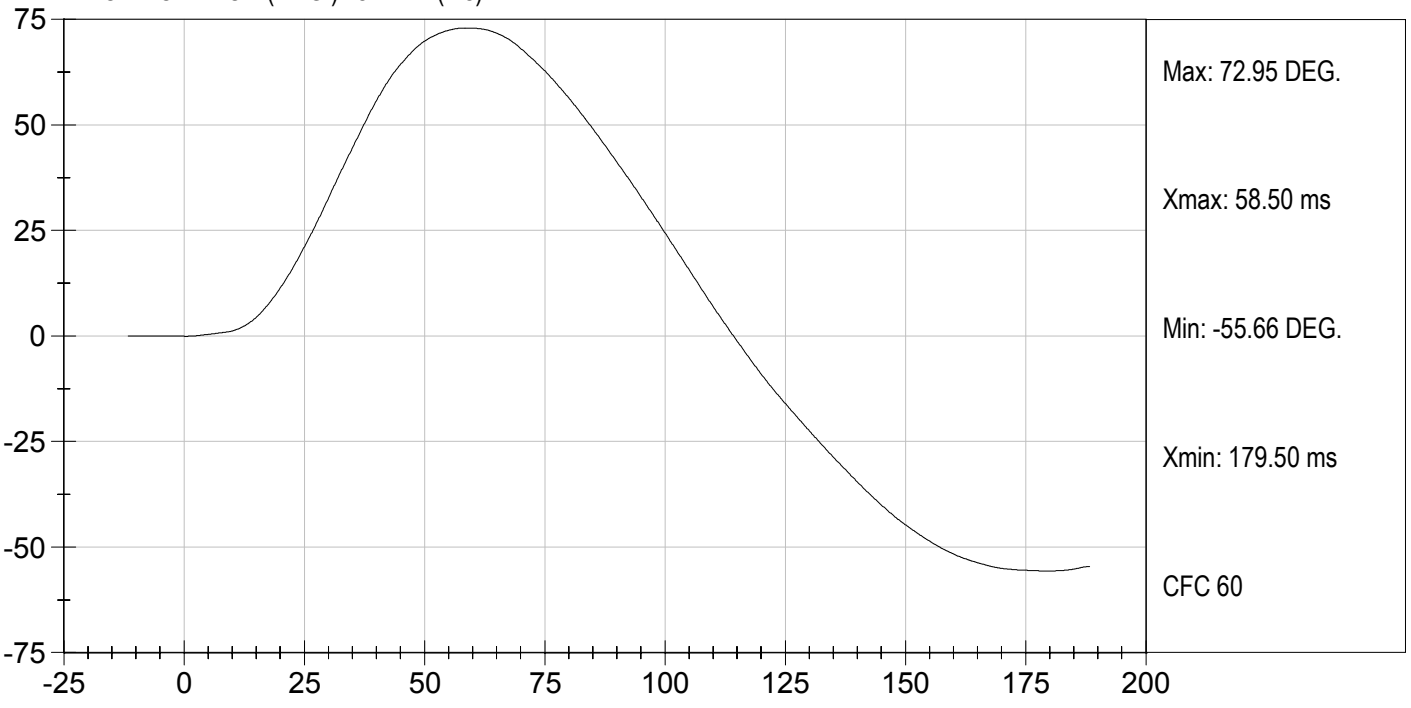
Test Desc: Neck Flexion
Componet ID: D05142

Test Date: 01/20/2005
Velocity: 22.82 ft/s, 6.96 m/s

PENDULUM DECELERATION (G'S) vs TIME (ms)

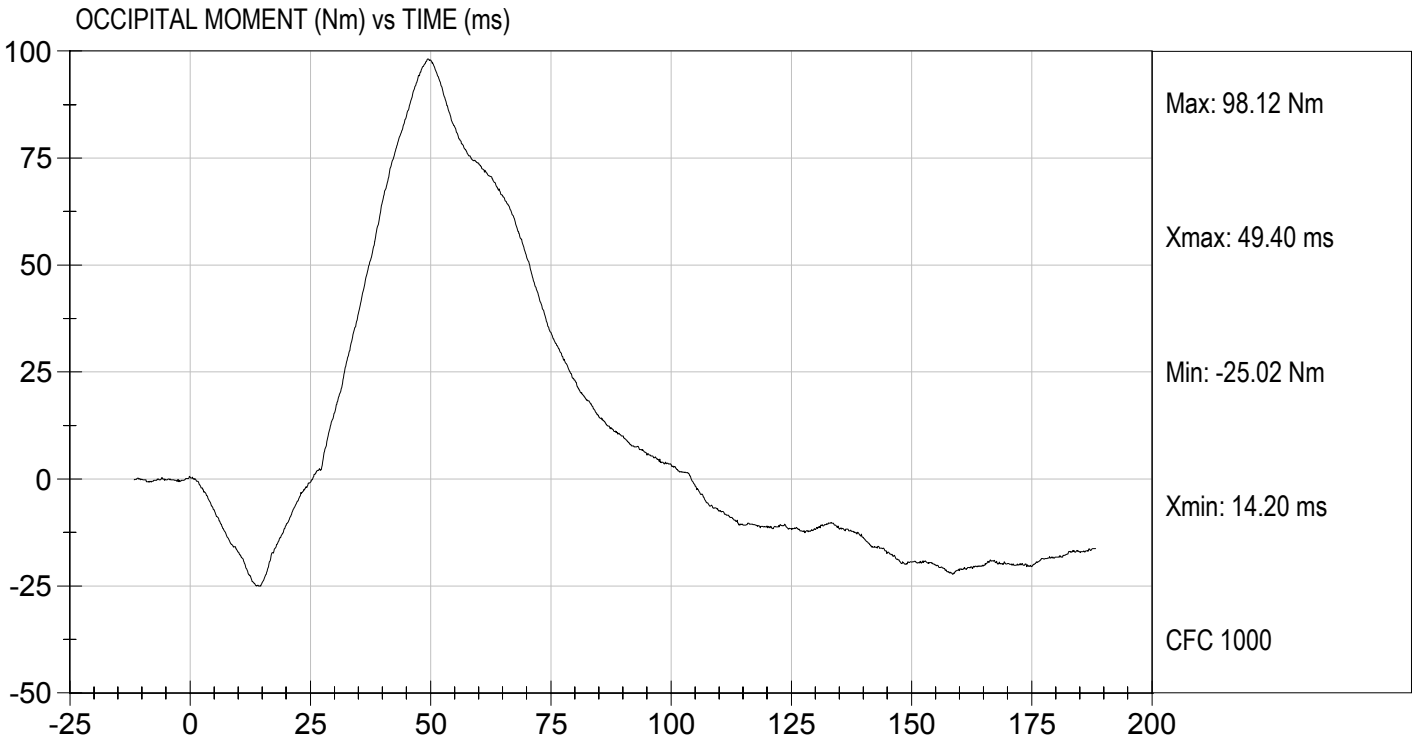


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Flexion
Componet ID: D05142

Test Date: 01/20/2005
Velocity: 22.82 ft/s, 6.96 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D05143

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Velocity		m/s	5.95 to 6.19	5.96	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	19.56	Pass
	20 msec	G's	14.00 to 19.00	16.54	Pass
	30 msec	G's	11.00 to 16.00	12.37	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	13.18	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	40.2	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	99.6	Pass
	Time	msec	72.0 to 82.0	78.1	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	158.2	Pass
Moment About Occipital Condyle	Maximum	N m	-52.9 to -79.9	-67.2	Pass
	Time	msec	65.0 to 79.0	73.0	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	145.5	Pass
			Overall Test Results		Pass

Joe Fleck

Laboratory Technician

01/20/2005

Test Date

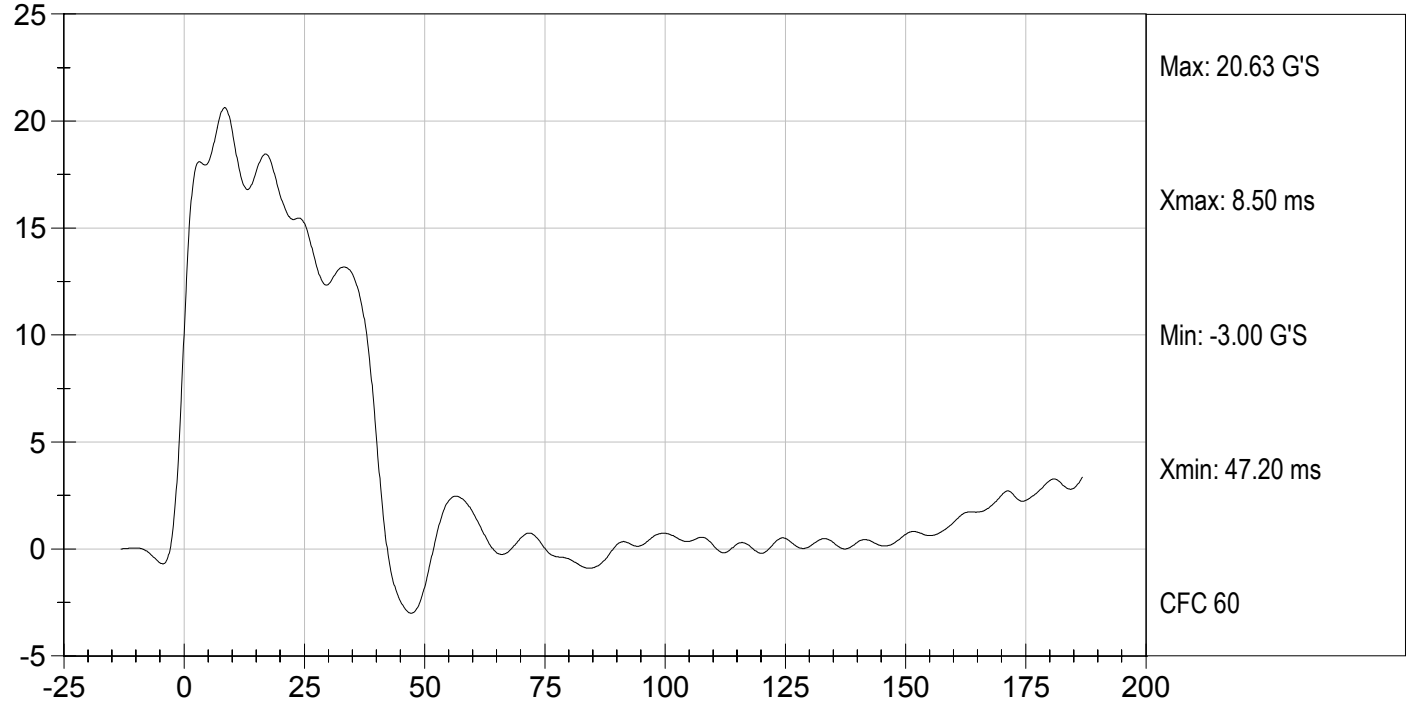
David Winkelbauer

Approved By

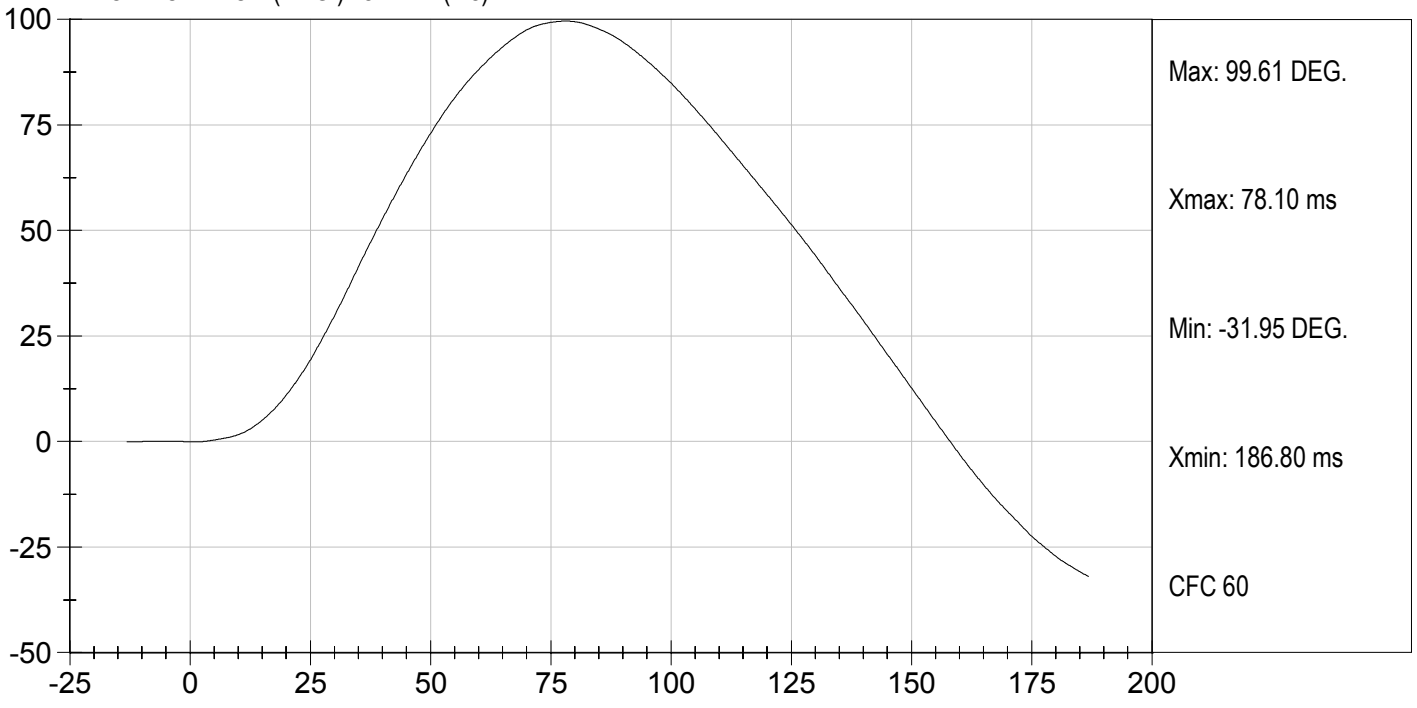
Test Desc: Neck Extension
Componet ID: D05143

Test Date: 01/20/2005
Velocity: 19.56 ft/s, 5.96 m/s

PENDULUM DECELERATION (G'S) vs TIME (ms)

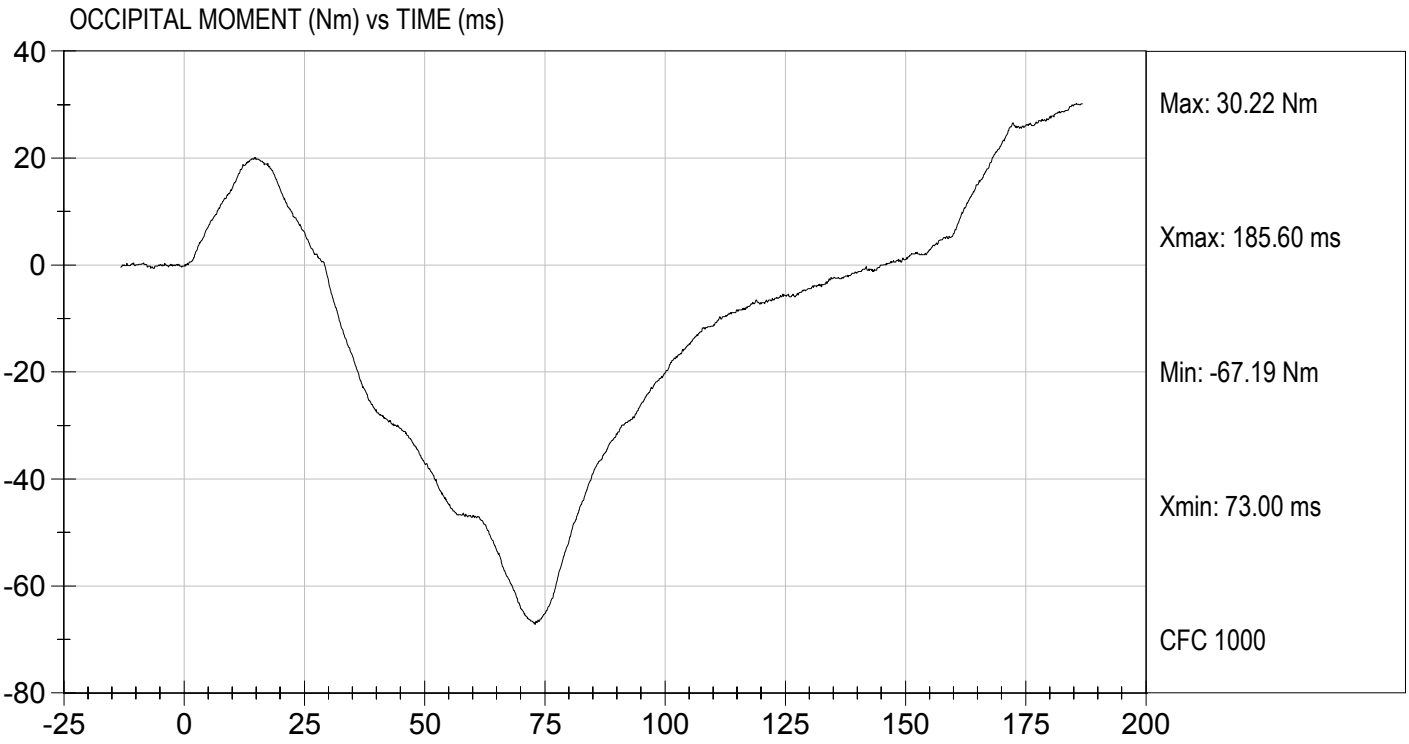


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Extension
Componet ID: D05143

Test Date: 01/20/2005
Velocity: 19.56 ft/s, 5.96 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D05144

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Velocity	m/s	6.58 to 6.82	6.72	Pass
Peak Probe Force	N	5159 to 5893	5,625	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.63	Pass
Internal Hysteresis	%	69 to 85	72	Pass
		Overall Test Results		Pass

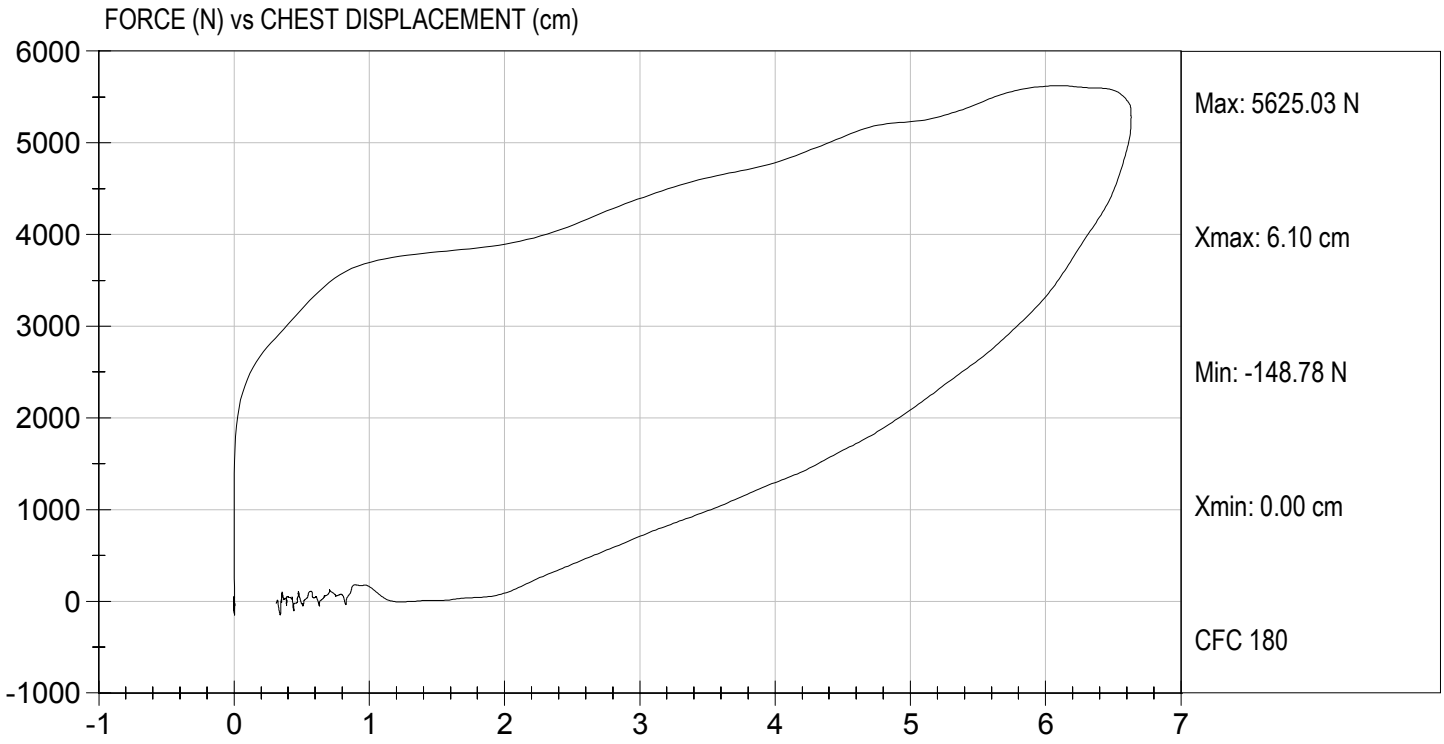
Joe Fleck
Laboratory Technician

01/21/2005
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Componet ID: D05144

Test Date: 01/21/2005
Velocity: 22.05 ft/s, 6.72 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D05145

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	5,073	Pass
		Overall Test Results		Pass

Joe Fleck

Laboratory Technician

01/21/2005

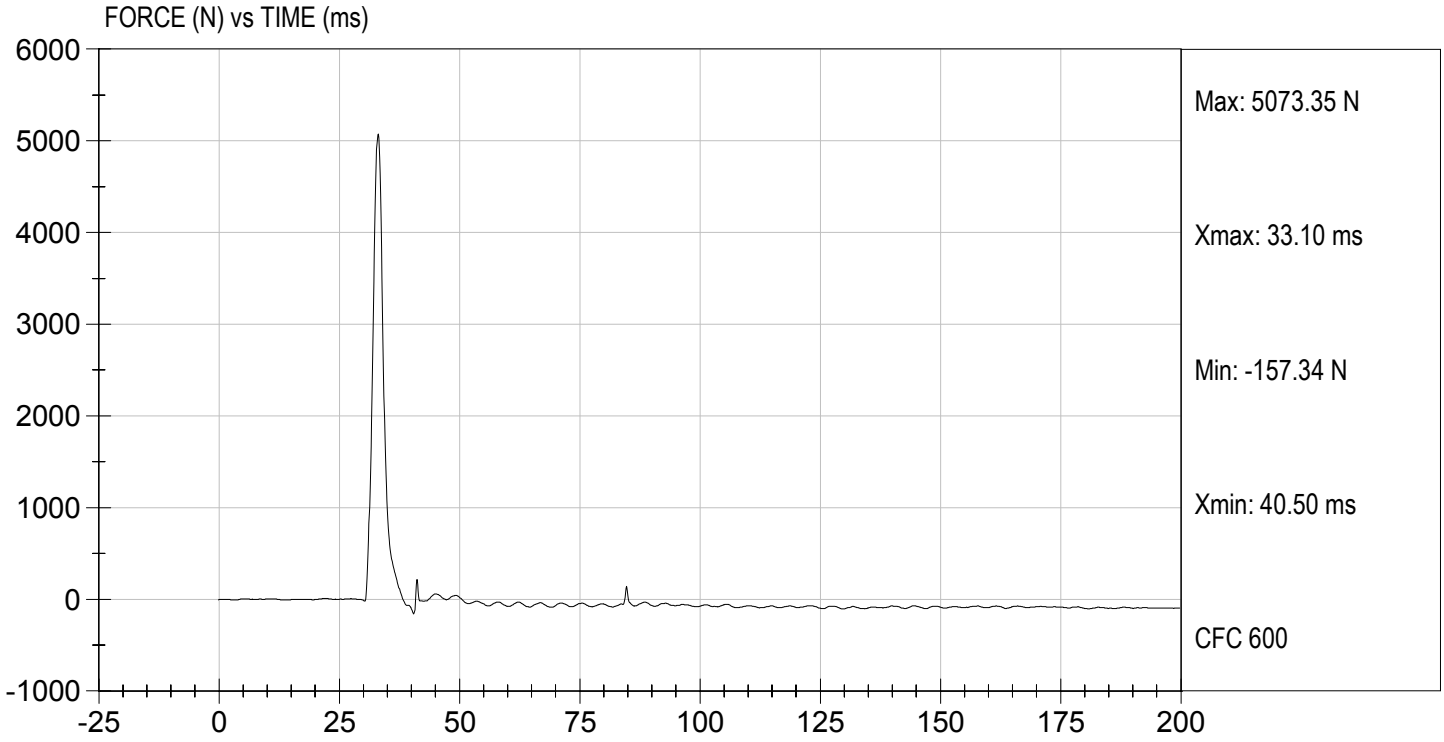
Test Date

David Winkelbauer

Approved By

Test Desc: Right Knee
Componet ID: D05145

Test Date: 01/21/2005
Velocity: 6.83 ft/s, 2.08 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D05146

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	5,403	Pass
		Overall Test Results		Pass

Joe Fleck

Laboratory Technician

01/21/2005

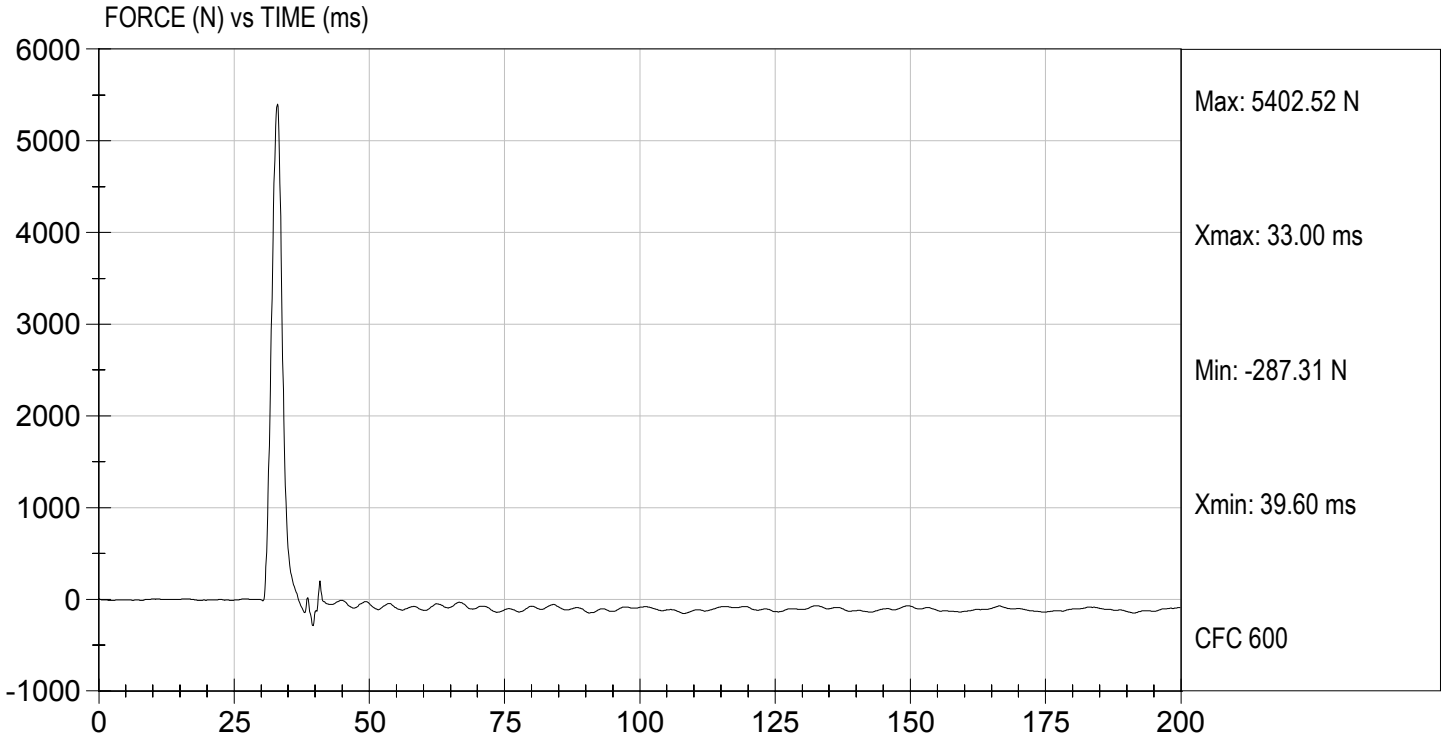
Test Date

David Winkelbauer

Approved By

Test Desc: Left Knee
Componet ID: D05146

Test Date: 01/21/2005
Velocity: 6.82 ft/s, 2.08 m/s



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D05140

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.8	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	18	18	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	73.9	76.7	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	43	42	Pass
		Overall Test Results			Pass

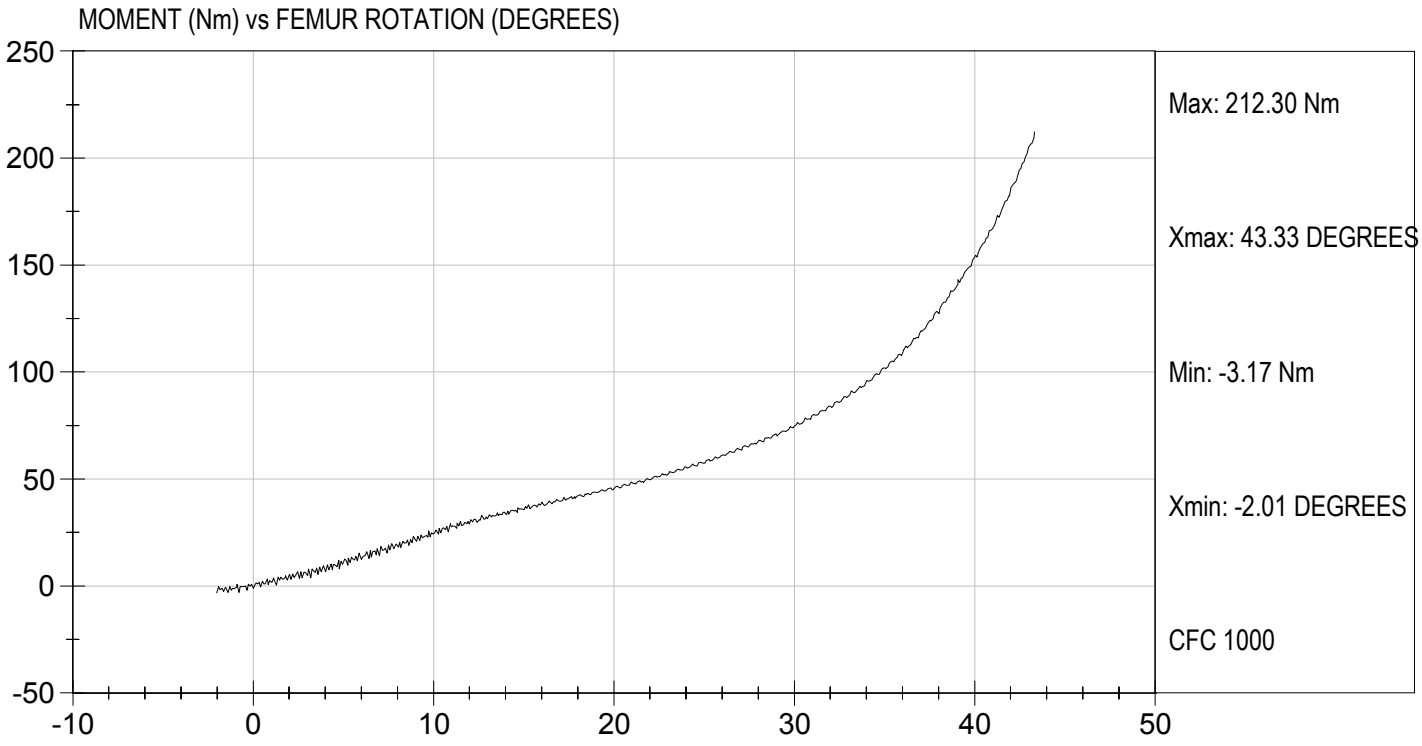
Laboratory Technician

01/21/2005
Test Date

Approved By

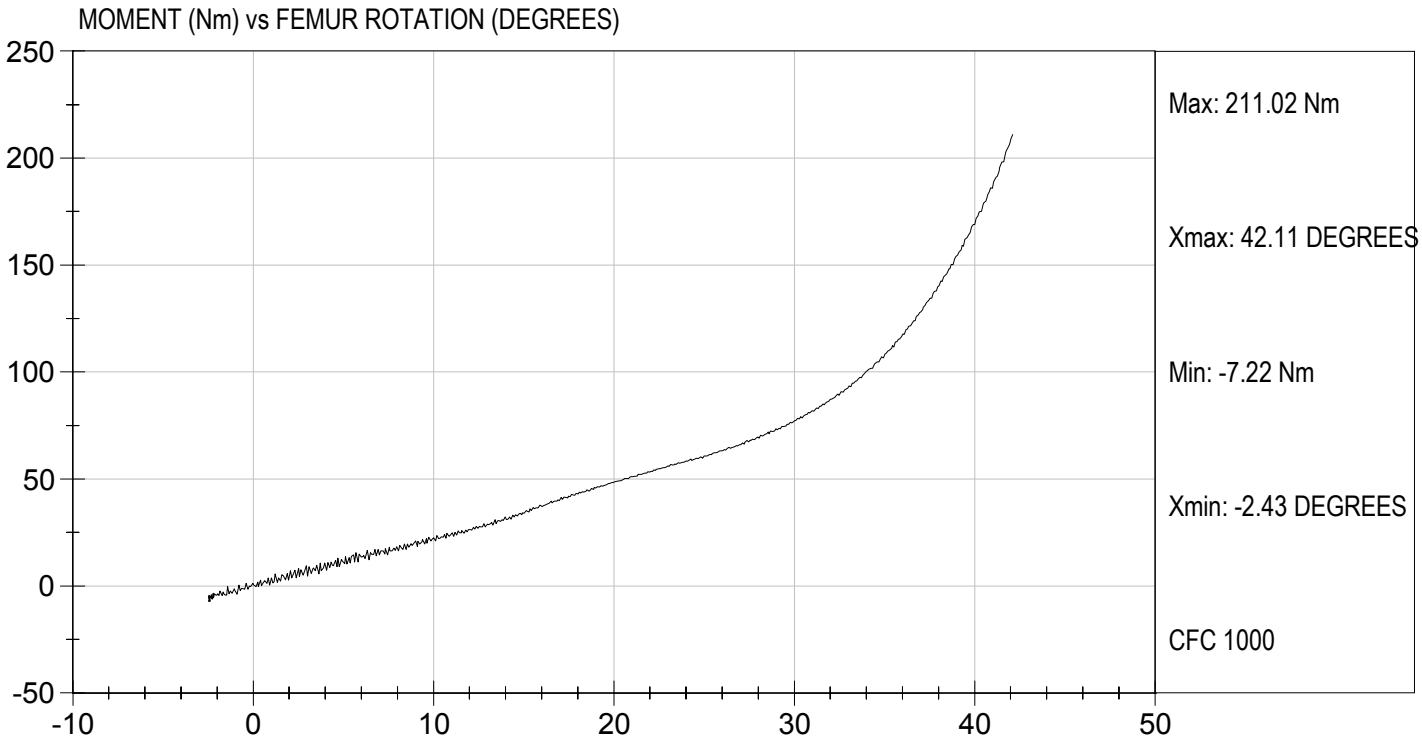
Test Desc: Hip Femur Flexion
Componet ID: D05149

Test Date: 01/21/2005
Velocity: 0 ft/s, 0.00 m/s



Test Desc: Hip Femur Flexion
Componet ID: D05140

Test Date: 01/21/2005
Velocity: 0 ft/s, 0.00 m/s



MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test ID:** D05151

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Peak Resultant Acceleration	G's	225 - 275	251	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-11.0	Pass
Unimodal	Yes/No	NA	Yes	Pass
Oscillations	Yes/No	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Joe Fleck

Laboratory Technician

01/20/2005

Test Date

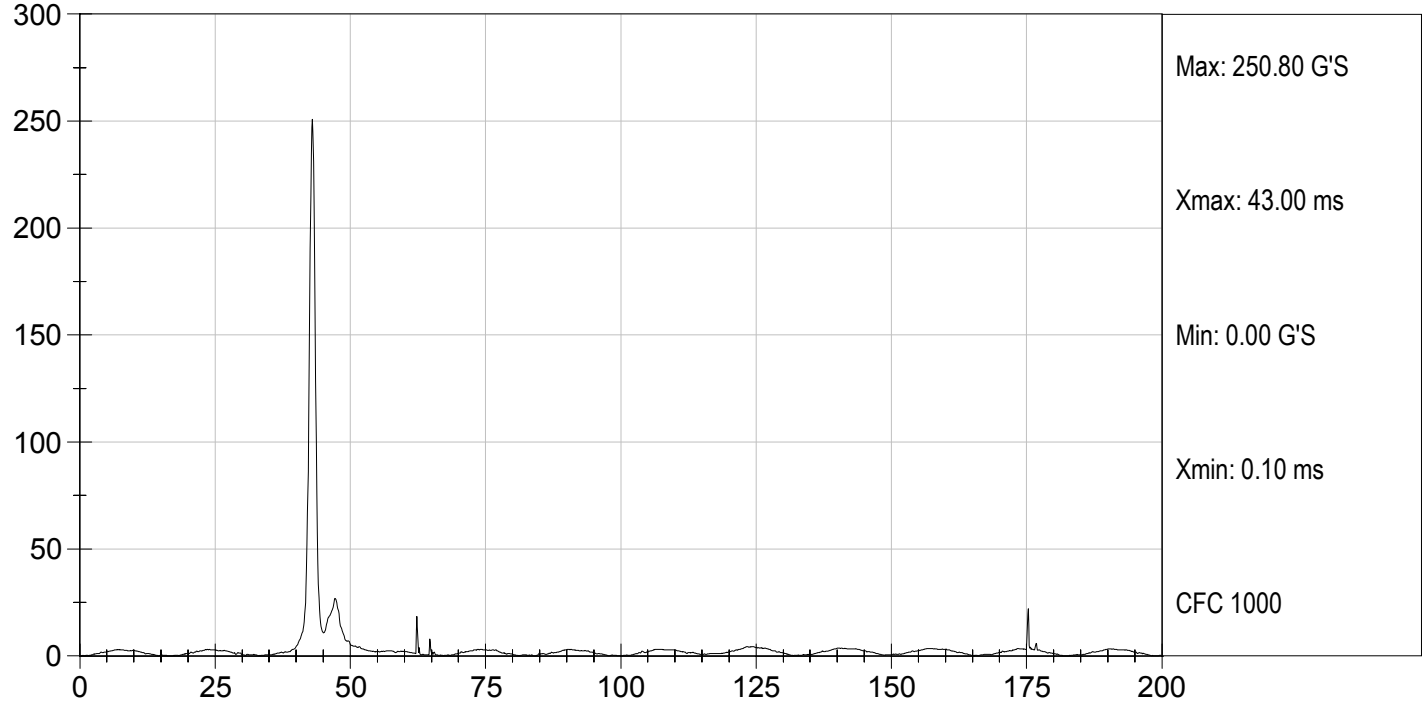
David Winkelbauer

Approved By

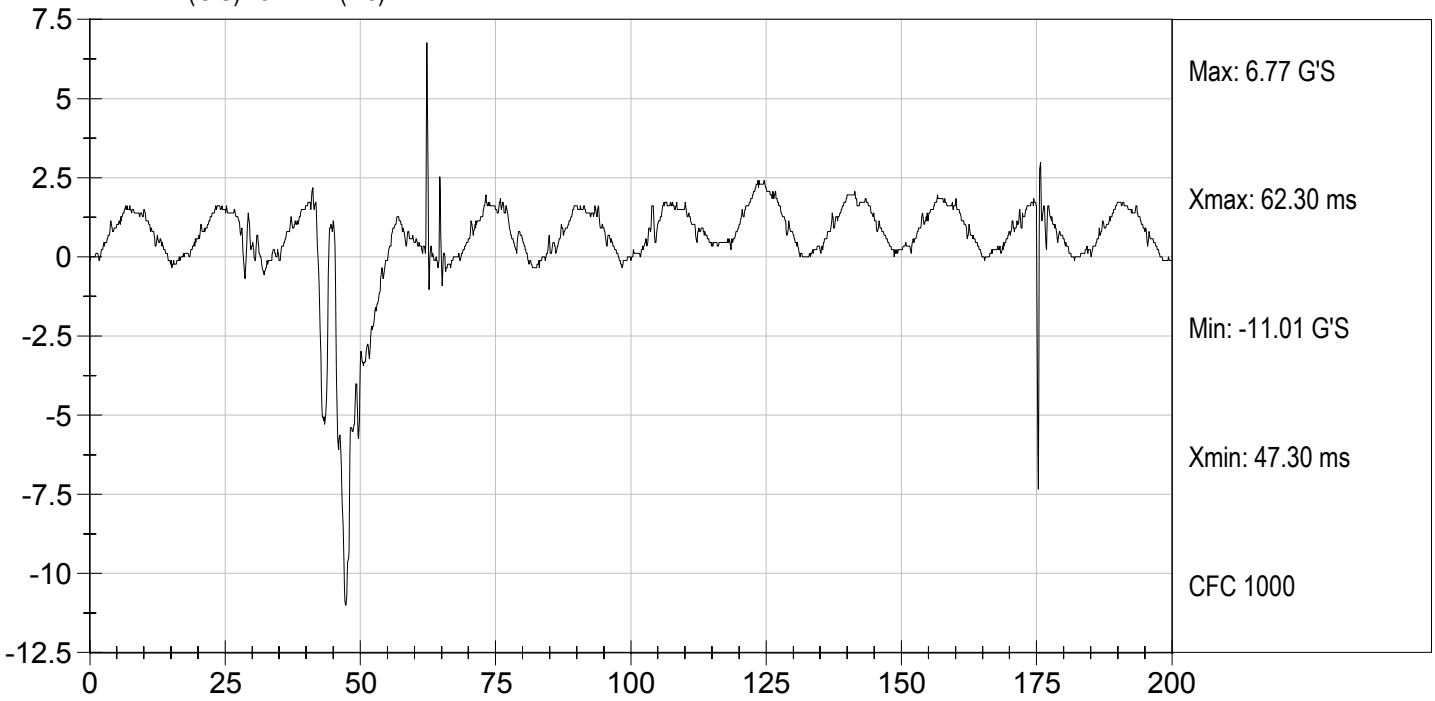
Test Desc: Head Drop
Componet ID: D05151

Test Date: 01/20/2005
Velocity: 0 ft/s, 0.00 m/s

HEAD RESULTANT ACCELERATION (G'S) vs TIME (ms)



HEAD Y (G'S) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D05152

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	21	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.93	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	23.32	Pass
	20 msec	G's	17.60 to 22.60	19.69	Pass
	30 msec	G's	12.50 to 18.50	15.18	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	15.12	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	39.5	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	73.2	Pass
	Time	msec	57.0 to 64.0	60.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	115.5	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	97.1	Pass
	Time	msec	47.0 to 58.0	52.7	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	102.7	Pass
			Overall Test Results		Pass

Joe Fleck

Laboratory Technician

01/20/2005

Test Date

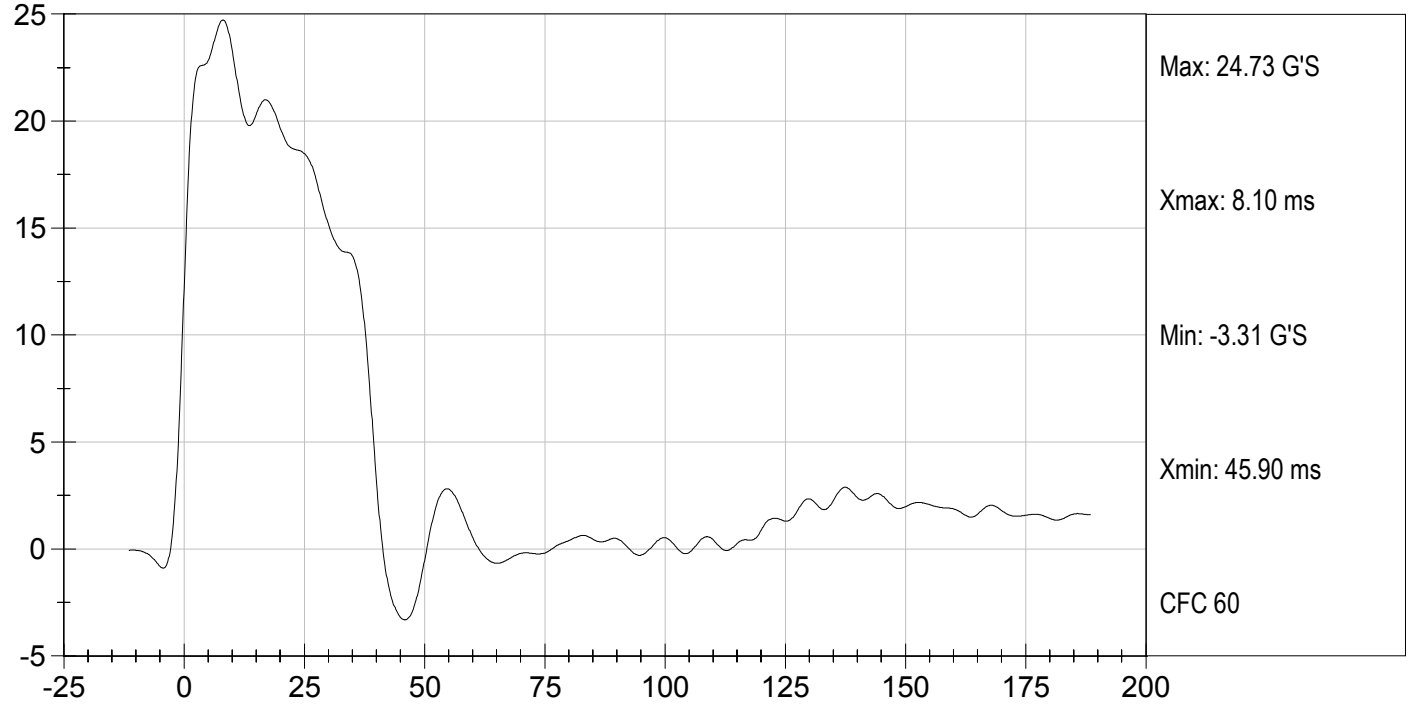
David Winkelbauer

Approved By

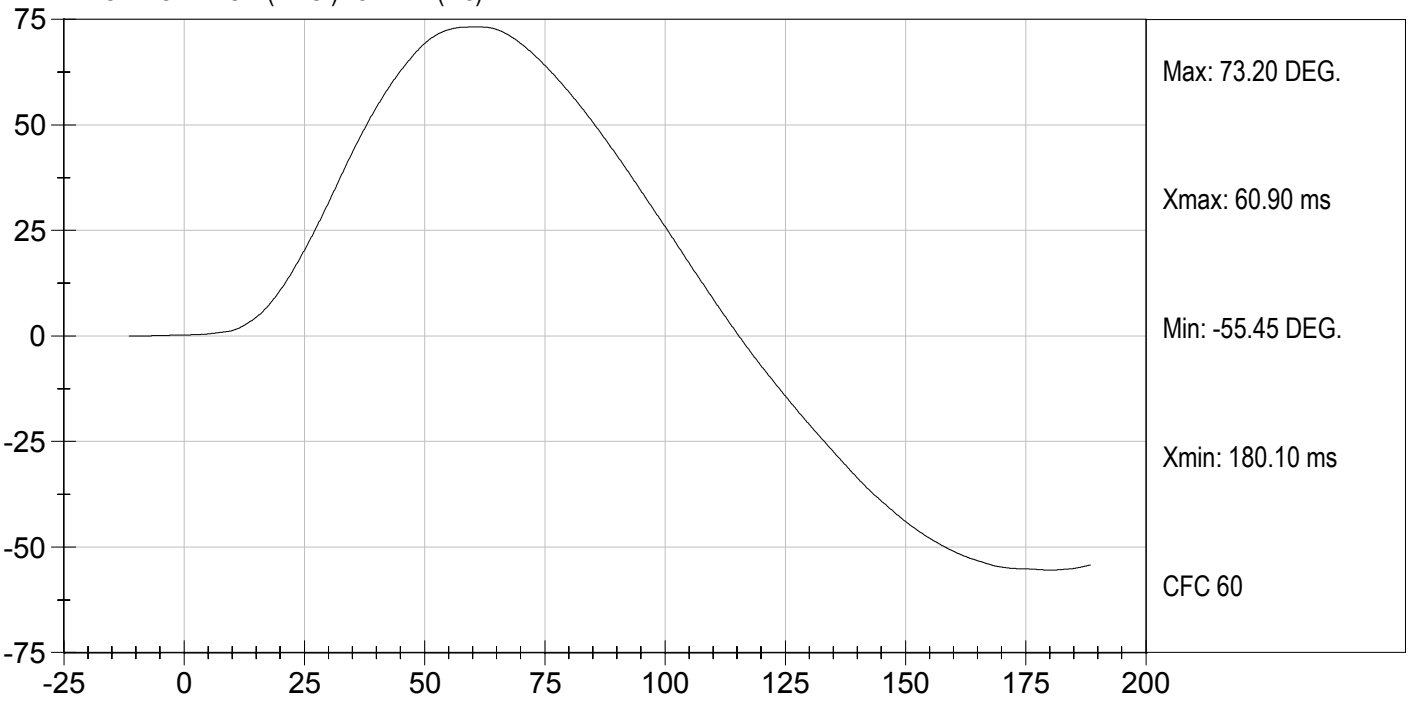
Test Desc: Neck Flexion
Componet ID: D05152

Test Date: 01/20/2005
Velocity: 22.73 ft/s, 6.93 m/s

PENDULUM DECELERATION (G'S) vs TIME (ms)



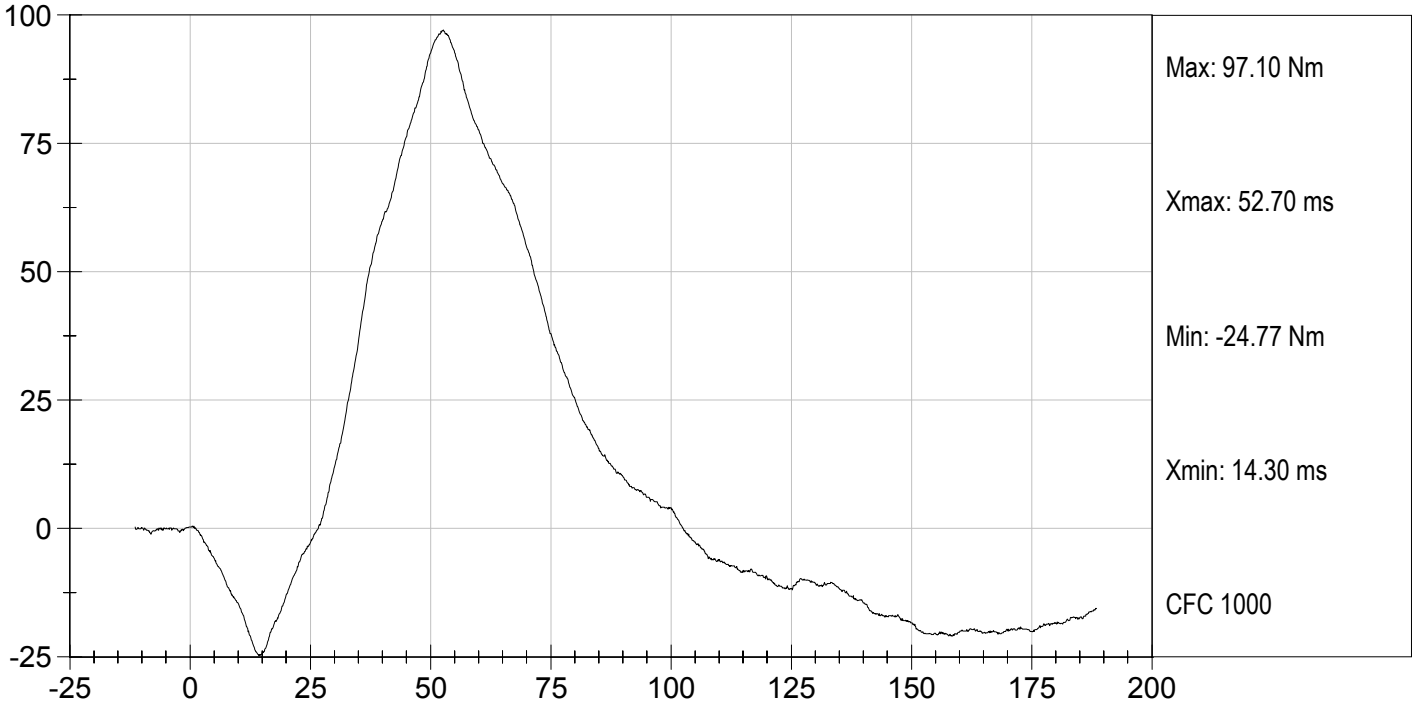
NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Flexion
Componet ID: D05152

Test Date: 01/20/2005
Velocity: 22.73 ft/s, 6.93 m/s

OCCIPITAL MOMENT (Nm) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D05153

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	21	Pass
Pendulum Velocity		m/s	5.95 to 6.19	5.99	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	19.62	Pass
	20 msec	G's	14.00 to 19.00	16.20	Pass
	30 msec	G's	11.00 to 16.00	14.10	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	14.04	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	39.1	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	101.0	Pass
	Time	msec	72.0 to 82.0	78.2	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	157.5	Pass
Moment About Occipital Condyle	Maximum	N m	-52.9 to -79.9	-69.5	Pass
	Time	msec	65.0 to 79.0	72.4	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	147.2	Pass
			Overall Test Results		Pass

Joe Fleck

Laboratory Technician

01/20/2005

Test Date

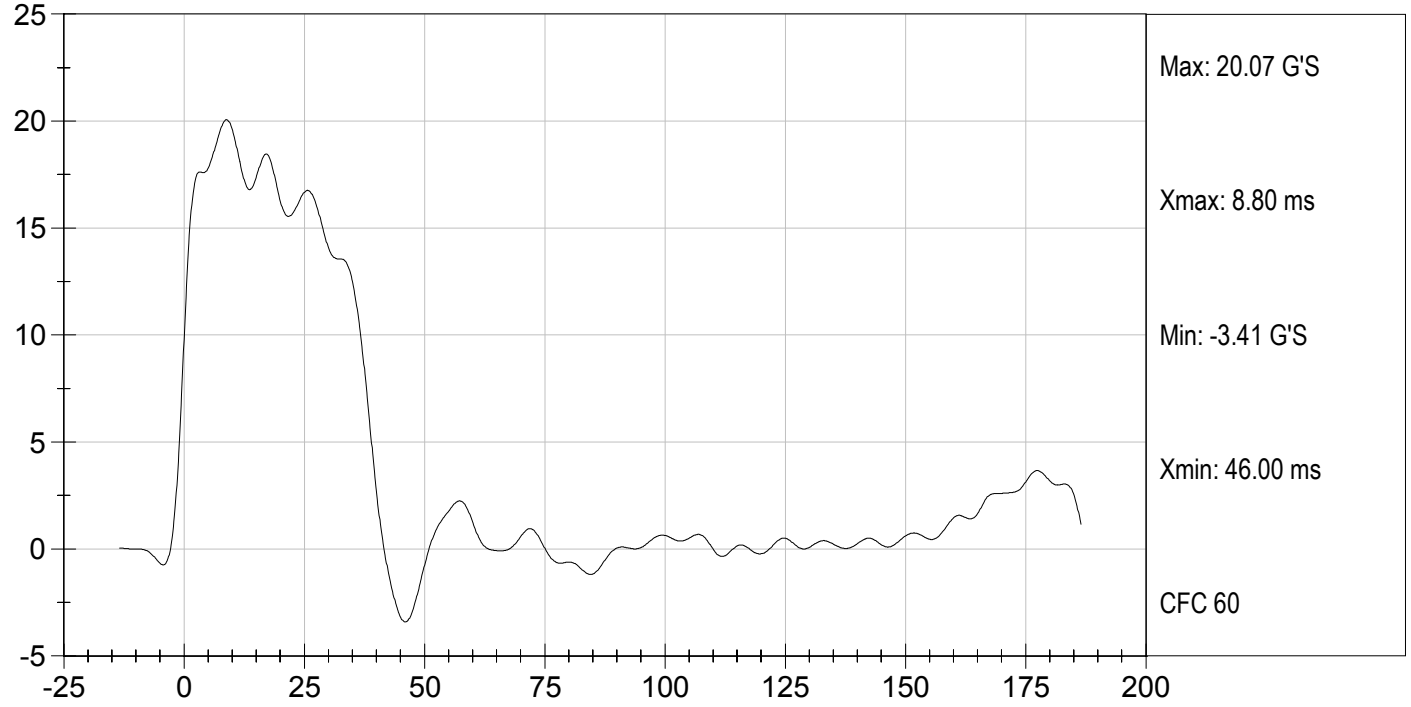
David Winkelbauer

Approved By

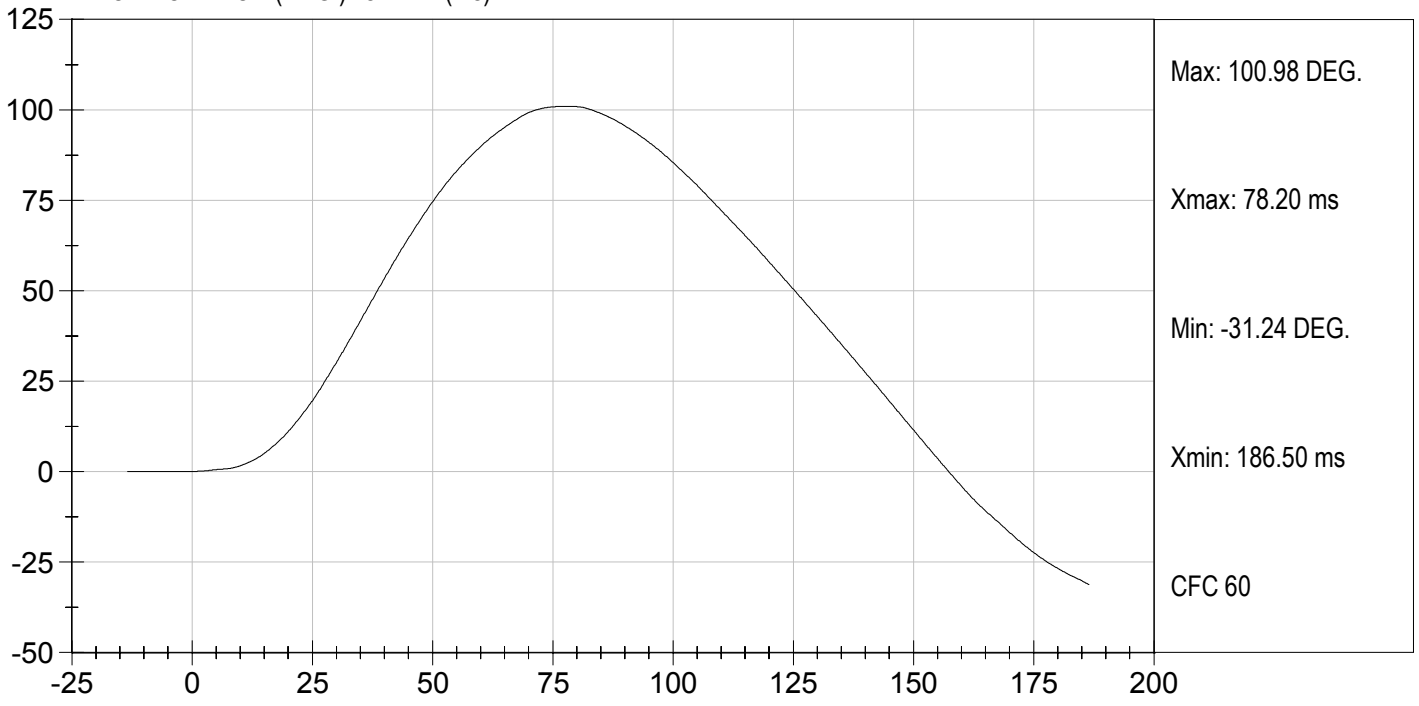
Test Desc: Neck Extension
Componet ID: D05153

Test Date: 01/20/2005
Velocity: 19.64 ft/s, 5.99 m/s

PENDULUM DECELERATION (G'S) vs TIME (ms)

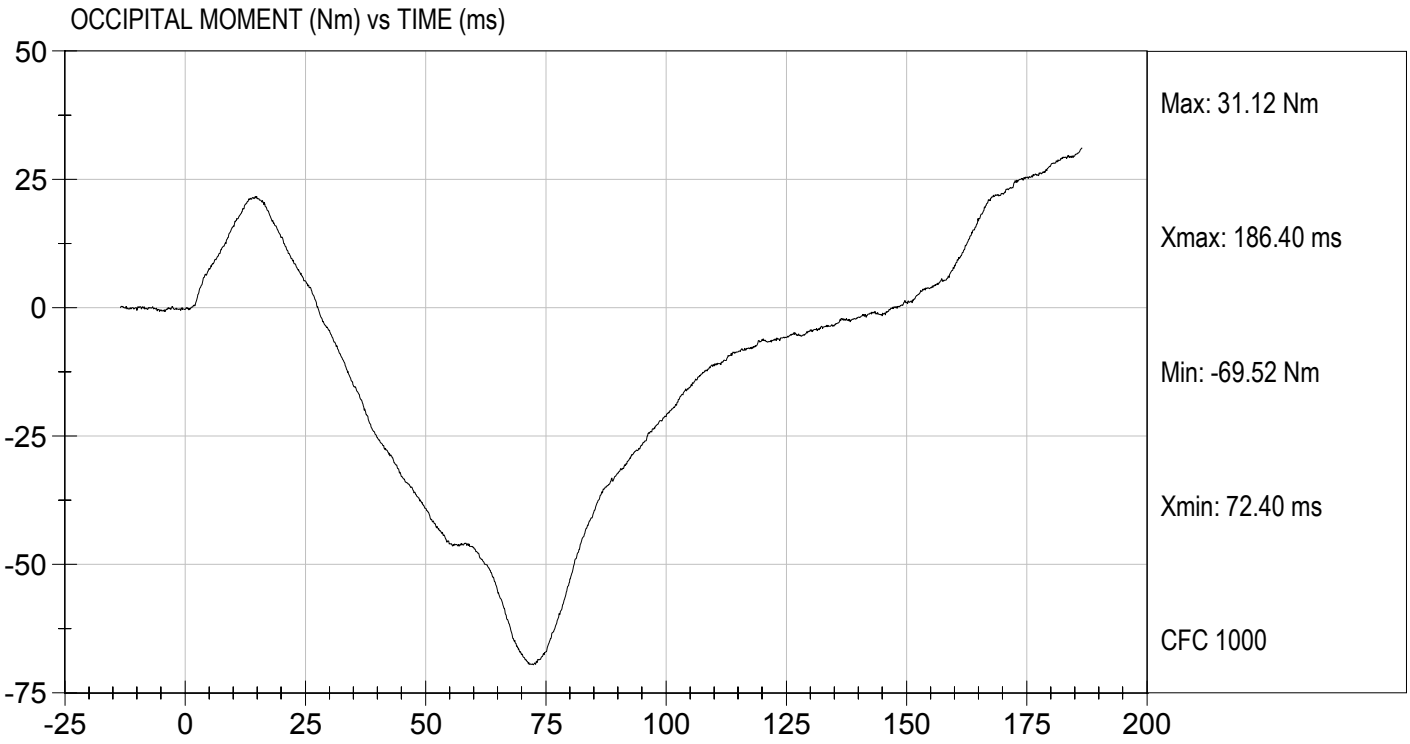


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Extension
Componet ID: D05153

Test Date: 01/20/2005
Velocity: 19.64 ft/s, 5.99 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D05154

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Velocity	m/s	6.58 to 6.82	6.73	Pass
Peak Probe Force	N	5159 to 5893	5,800	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.82	Pass
Internal Hysteresis	%	69 to 85	71	Pass
		Overall Test Results		Pass

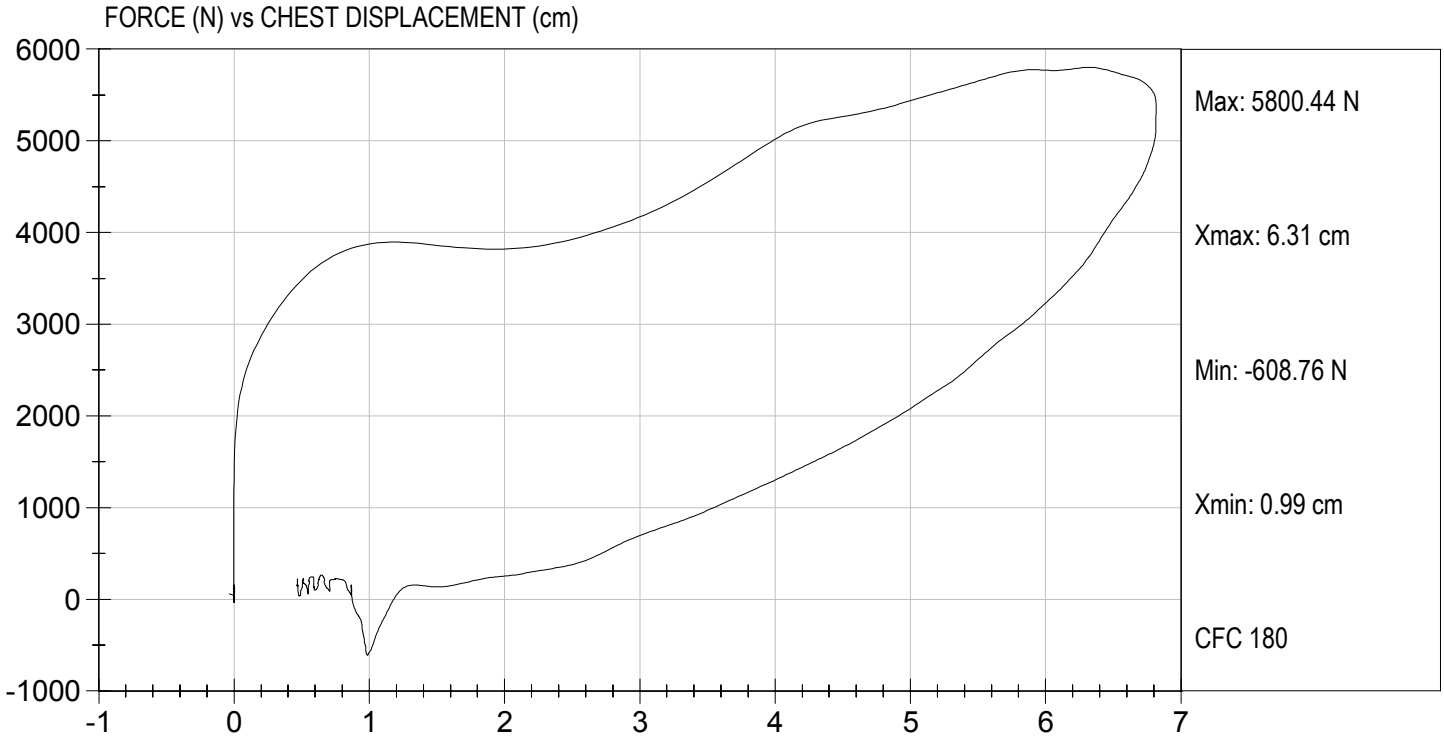
Joe Fleck
Laboratory Technician

01/21/2005
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Componet ID: D05154

Test Date: 01/21/2005
Velocity: 22.07 ft/s, 6.73 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D05155

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5,538	Pass
		Overall Test Results		Pass

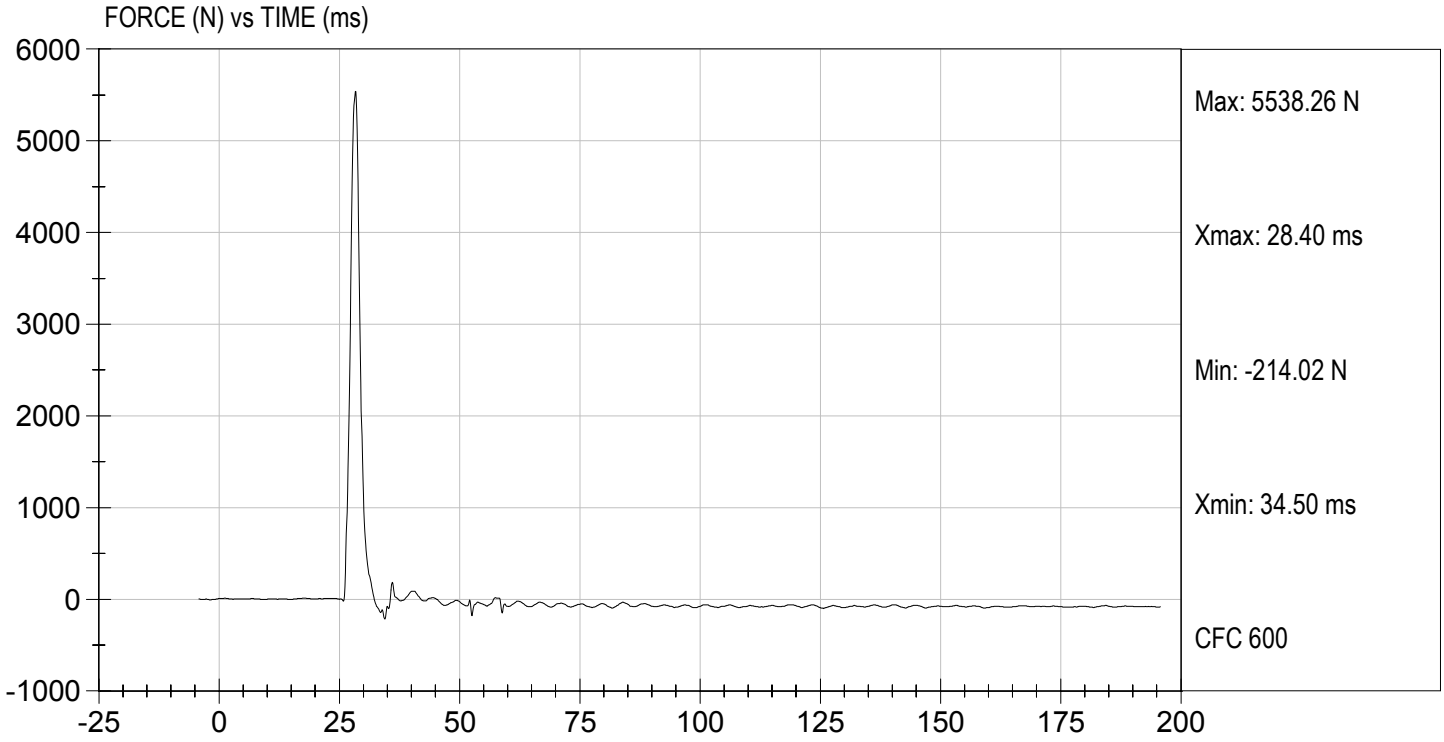
Joe Fleck
Laboratory Technician

01/21/2005
Test Date

David Winkelbauer
Approved By

Test Desc: Right Knee
Componet ID: D05155

Test Date: 01/21/2005
Velocity: 6.91 ft/s, 2.11 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D05156

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	4,905	Pass
		Overall Test Results		Pass

Joe Fleck

Laboratory Technician

01/21/2005

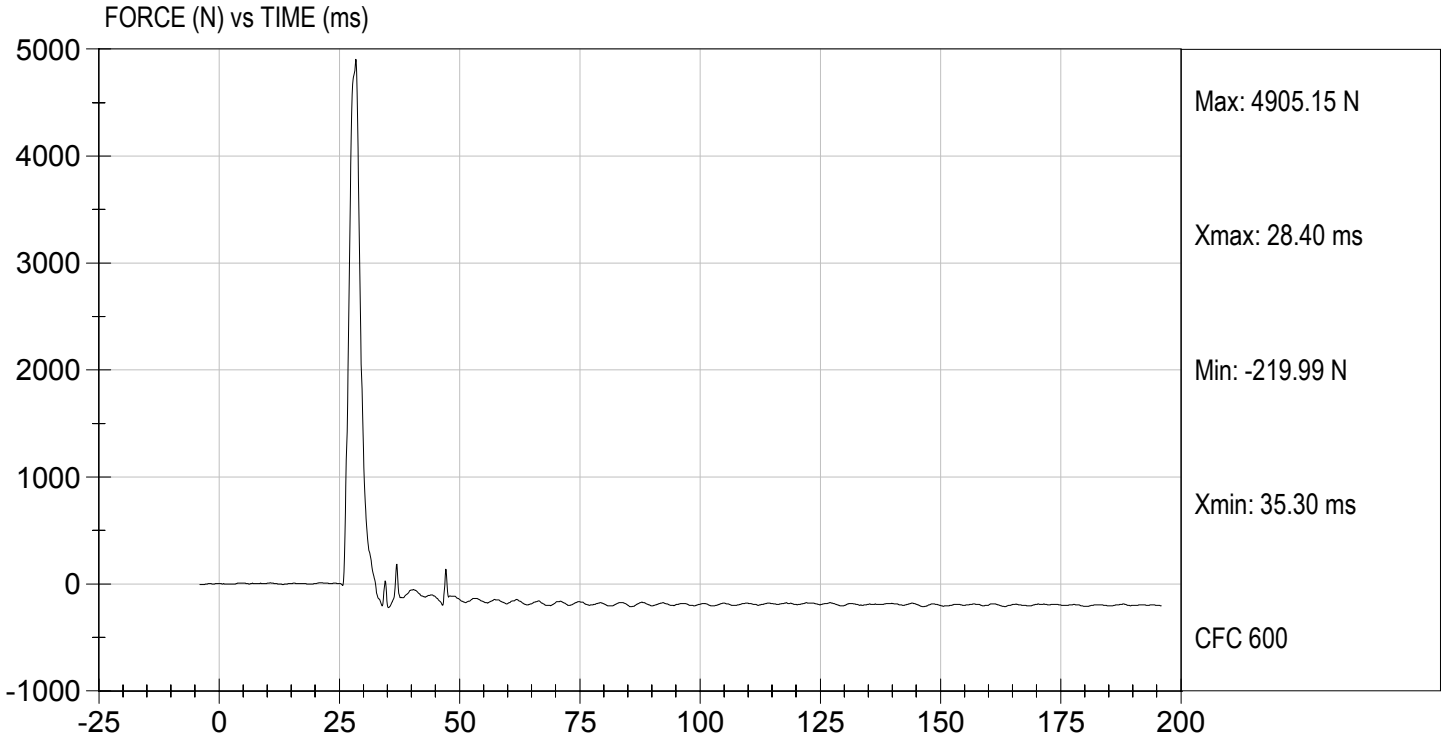
Test Date

David Winkelbauer

Approved By

Test Desc: Left Knee
Componet ID: D05156

Test Date: 01/21/2005
Velocity: 6.93 ft/s, 2.11 m/s



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D05150

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	18	18	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	84.2	76.6	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	43	40	Pass
		Overall Test Results			Pass

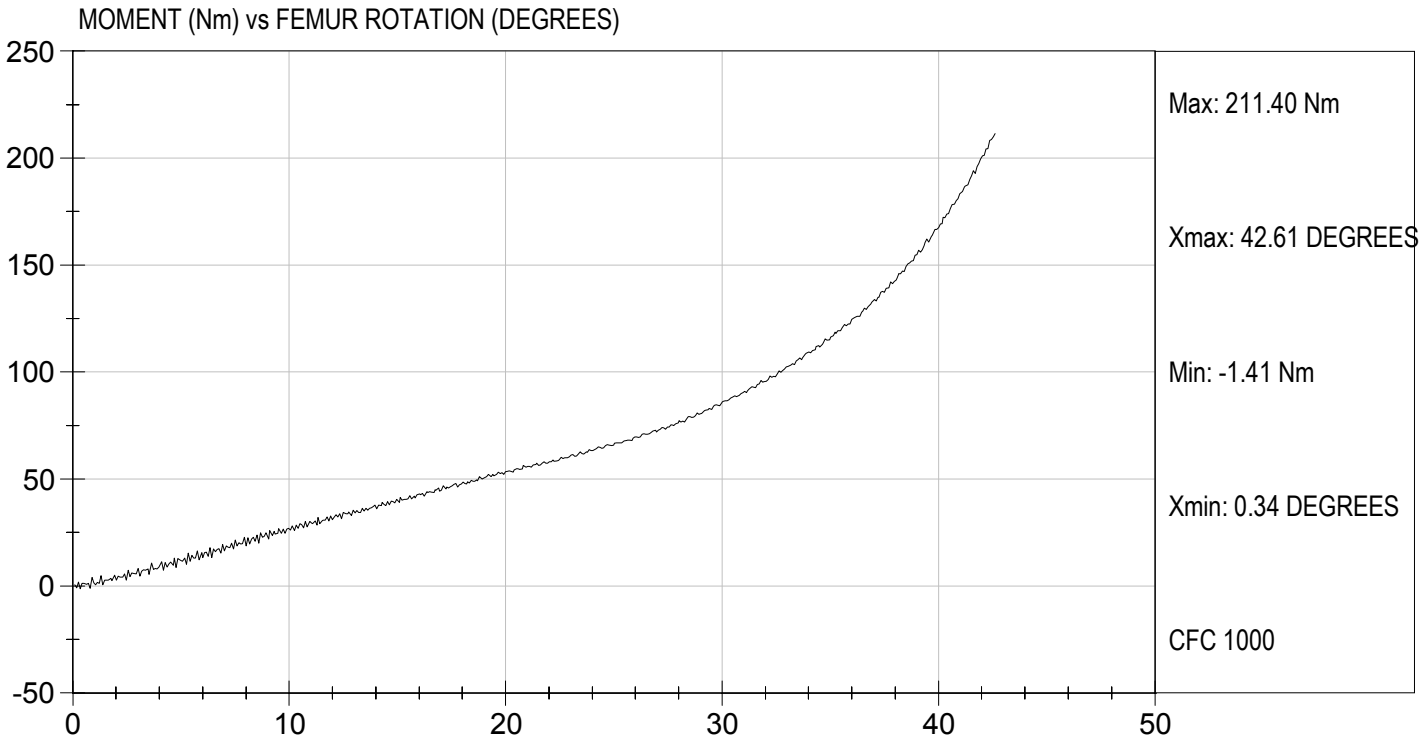
Laboratory Technician

01/21/2005
Test Date

Approved By

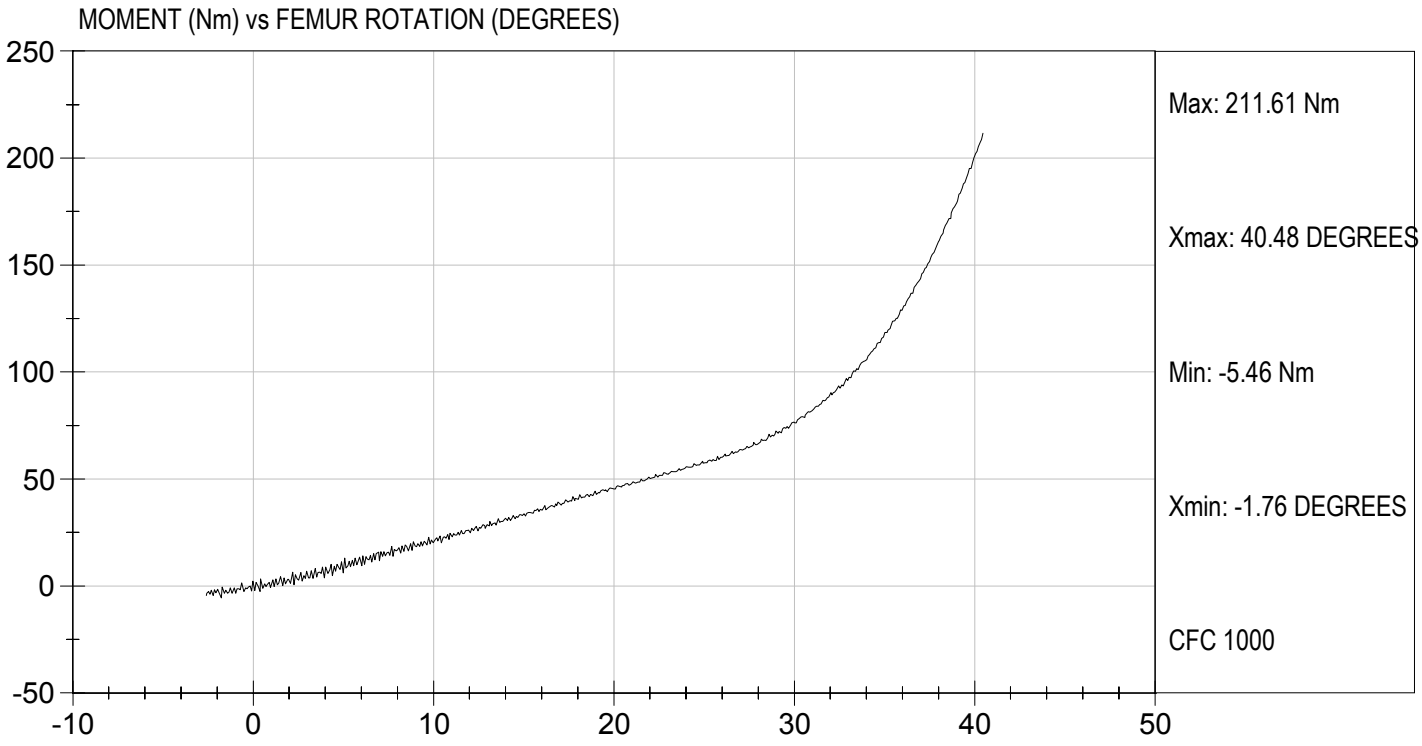
Test Desc: Hip Femur Flexion
Componet ID: D05159

Test Date: 01/21/2005
Velocity: 0 ft/s, 0.00 m/s



Test Desc: Hip Femur Flexion
Componet ID: D05150

Test Date: 01/21/2005
Velocity: 0 ft/s, 0.00 m/s



APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

INSTRUMENTS FOR DRIVER DUMMY NO. 065

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	P27020	Endevco	08/04/04
Head Y	P27025	Endevco	08/04/04
Head Z	P22692	Endevco	08/04/04
Head X Redundant	J10431	Endevco	08/04/04
Head Y Redundant	P26986	Endevco	08/04/04
Head Z Redundant	AN9E3	Endevco	08/04/04
Neck Load Cell	443	Denton	07/20/04
Chest X	AMT78	Endevco	08/04/04
Chest Y	AP1Y8	Endevco	08/04/04
Chest Z	J11361	Endevco	08/04/04
Chest Deflection Gauge	065	Servo	08/03/04
Chest X Redundant	ALFP5	Endevco	08/04/04
Chest Y Redundant	AP138	Endevco	08/04/04
Chest Z Redundant	AJ9Y3	Endevco	08/04/04
Pelvis X	AJ9D8	Endevco	11/12/04
Pelvis Y	AJ4J3	Endevco	11/12/04
Pelvis Z	AF0M3	Endevco	11/12/04
Left Femur Load Cell	262	Denton	07/20/04
Right Femur Load Cell	261	Denton	07/20/04
Left Upper Tibia Load Cell	266	Denton	07/22/04
Left Lower Tibia Load Cell	179	Denton	07/22/04
Right Upper Tibia Load Cell	263	Denton	07/22/04
Right Lower Tibia Load Cell	174	Denton	07/22/04
Left Foot Z – Front	AMTL6	Endevco	09/17/04
Left Ankle X	AMTG3	Endevco	09/17/04
Left Ankle Z	ALC37	Endevco	09/17/04
Right Foot Z – Front	J21970	Endevco	09/17/04
Right Ankle X	J22033	Endevco	09/17/04
Right Ankle Z	J21691	Endevco	09/17/04
Shoulder Belt Load Cell	158	Denton	12/07/04
Lap Belt Load Cell	166	Denton	12/07/04

INSTRUMENTS FOR PASSENGER DUMMY NO. 066

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	A28-H01	Entran	09/17/04
Head Y	J13535	Endevco	10/25/04
Head Z	A28-H02	Entran	09/17/04
Head X Redundant	A27-Z12	Entran	09/17/04
Head Y Redundant	AH097	Endevco	10/25/04
Head Z Redundant	L17-Z14	Entran	09/17/04
Neck Load Cell	442	Denton	07/20/04
Chest X	P22086	Endevco	08/04/04
Chest Y	AJ9D2	Endevco	08/04/04
Chest Z	P24265	Endevco	08/04/04
Chest Deflection Gauge	066	Servo	08/03/04
Chest X Redundant	P22652	Endevco	08/04/04
Chest Y Redundant	AJ417	Endevco	08/04/04
Chest Z Redundant	P22150	Endevco	08/04/04
Pelvis X	J13851	Endevco	08/02/04
Pelvis Y	AJ808	Endevco	08/02/04
Pelvis Z	AH0F0	Endevco	08/02/04
Left Femur Load Cell	259	Denton	07/20/04
Right Femur Load Cell	256	Denton	07/20/04
Left Upper Tibia Load Cell	107	Denton	07/22/04
Left Lower Tibia Load Cell	136	Denton	07/22/04
Right Upper Tibia Load Cell	103	Denton	07/22/04
Right Lower Tibia Load Cell	133	Denton	07/22/04
Left Foot Z – Front	A05-A20	Entran	08/04/04
Left Ankle X	A05-A21	Entran	08/04/04
Left Ankle Z	A07-J01	Entran	08/04/04
Right Foot Z – Front	ANBP7	Endevco	07/23/04
Right Ankle X	L30-Z18	Entran	08/04/04
Right Ankle Z	A12-A11	Entran	08/04/04
Shoulder Belt Load Cell	157	Denton	08/18/04
Lap Belt Load Cell	194	Denton	12/07/04

INSTRUMENTS FOR VEHICLE

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	A08-M10	Entran	09/13/04
Left Rear Seat Crossmember Z	J21-Z01	Entran	12/01/40
Right Rear Seat Crossmember X	J21-Z04	Entran	12/01/04
Right Rear Seat Crossmember Z	J07-M06	Entran	10/29/04
Top of Engine X	K18-D11	Entran	12/03/04
Bottom of Engine X	H20-R10	Entran	09/24/04
Left Brake Caliper X	A08-M02	Entran	09/13/04
Right Brake Caliper X	L17-D01	Entran	09/24/04
Instrument Panel X	A29-F14	Entran	11/02/04