REPORT NUMBER: NCAP-MGA-2002-008

NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST

2002 FORD RANGER 4 X 2
NHTSA NUMBER: M20202

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

Test Date: June 11, 2002

Report Date: June 18, 2002

FINAL REPORT

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

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Date of Acceptance

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COTR, NCAP Frontal Impact Program

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Date of Acceptance

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16. Abstract

A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2002 Ford Ranger 4x2 at MGA Research Corporation on June 11, 2002. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The impact velocity was 56.6 km/h. The ambient temperature at the barrier face at the time of impact was 21.1 degrees Celsius. The vehicle's maximum post test static crush is 567 mm located to the left of the vehicle 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	532	624
Max. Thorax Accel. (3msec Clip)	G's	60	52	45
Left Femur force	Newtons	10009	4273**	2938**
Right Femur force	Newtons	10009	6468**	3868**

Note: HIC and CLIP from redundant channels due to a data anomaly on the primary channels
** - Questionable Data

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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.6 kph 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 2002 Ford Ranger 4x2 at a velocity of 56.6 kph. The test was performed at MGA Research Corporation on June 11, 2002. 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 nine accelerometer array head, chest and pelvis triaxial accelerometers, chest displacement potentiometer, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 066) and right-front passenger (position 2) ATD (Serial No. 065) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 113 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 567 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's head, chest, and abdomen contacted the airbag. The driver's head contacted the headrest. The driver's knees contacted the knee 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)	Belt Spool (mm)	Belt Stretch (mm/m)
Driver	532	52	36**	4273**	6468**	127	N/A
Passenger	624	45	25**	2938**	3868**	197	N/A

Note: HIC and CLIP from redundant channels due to a data anomaly on the primary Channels

** Questionable Data

There was an anomaly in the test data that spanned from 0 msec. to 15 msec. The channels affected are listed below.

DRIVER HEAD PRIMARY X,Y,Z
DRIVER NECK LOAD CELL
DRIVER CHEST PRIMARY X,Y,Z
DRIVER CHEST DISPLACEMENT
DRIVER PELVIS X,Y,Z
DRIVER LEFT AND RIGHT FEMUR
PASSENGER HEAD PRIMARY X,Y,Z
PASSENGER CHEST PRIMARY X,Y,Z
PASSENGER CHEST DISPLACEMENT
PASSENGER PELVIS X,Y,Z
PASSENGER LEFT AND RIGHT FEMUR

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

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: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/hr	56.6
Test Weight	kg	1706.4
Average Rebound	mm	512
Maximum Static Crush	mm	567
Impact Angle	degrees	0

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door Opening	Door remained closed & latched; Door opened without tools.	Door remained closed & latched; Door opened without tools.
Rear Door Opening		
Seat Track Shift (mm)	0	0
Seat Back Failure	None	None

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type / Serial No.	HIII / 066	HIII / 065
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

16mm MOVIE COVERAGE

High Speed	16
Real Time	1
Total	17

Driver ATD Sensors	48
Passenger ATD Sensors	48
Belt Assessment Sensors	2
Vehicle Structure Accelerometers	9
Rigid Barrier Load Cells	6
Total	113

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

TEST VEHICLE INFORMATION

Manufacturer	Ford
Model	Ranger
Body Style	4x2
NHTSA No.	M20202
VIN	1FTYR10D72PA40040
Color	Red
Delivery Date	12/20/01
Odometer Reading (mile)	28
Dealer	Kune's Country Ford
Transmission	Automatic
Final Drive	Rear
Number of Cylinders	4
Engine Displacement (L)	2.3
Engine Placement	longitudinal

TEST VEHICLE OPTIONS

Driver Airbag	Yes
Passenger Airbag	Yes
Force Limiter	Yes
Pretensioner	Yes
Power Windows	No
Power Steering	Yes
Power Door Locks	No
Tilt Wheel	No
Air Conditioning	Yes
Power Brakes	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	No
Anti-lock Brakes	Yes
AM/FM	Yes
Anti-theft System	No
Cruise Control	No

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.
Date of Manufacture	11/01

GVWR (kg)	1968
GAWR Front (kg)	952
GAWR Rear (kg)	1156

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	207	207
Cold Pressure (kPa)	207	207
Recommended Tire Size	P225/70R15	P225/70R15
Tire Size on Vehicle	P225/70R15	P225/70R15
Tire Manufacturer	Firestone	Firestone

Measured Parameter	Front	Rear	Third	Total
Type of Seat	Split Bench			
Number Of Occupants	3			3
Capacity Wt. (VCW) (kg)				340
Cargo Wt. (RCLW) (kg)				136

DATA SHEET NO. 2...(continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	429.1	296.7		472.2	395.5	
Right	kg	404.2	290.8		447.7	391.0	
Ratio	%	58.7	41.3		53.9	46.1	
Totals	kg	833.3	587.5	1420.8	919.9	786.5	1706.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1420.8
Weight of 2 P572E ATDs	kg	156.0
Rated Cargo/Luggage Weight (RCLW)	kg	136.0
Calculated Vehicle Target Weight (TVTW)	kg	1712.8

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	783	795	846	853	1170
As Tested	mm	777	785	797	806	1304
Post Test	mm	760	790	804	789	

Vehicle Wheelbase (mm): 2830

Weight of Ballast secured in cargo area (kg): 28.5

Vehicle Components Removed: Rear window, jack and tools

Ballast weight does not include cameras, instrumentation, and brake abort system.

FUEL SYSTEM DATA

Fuel System Capacity From Owner's Manual (L): 62.5

Usable Capacity Figure Furnished by COTR (L): 62.5

Actual Test Volume (L): 58.7

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"?: no

DATA SHEET NO. 3

POST IMPACT DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	55.5 – 57.1	56.6
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	56.5
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	4698	4184	514
Center	mm	4761	4203	558
Right Side	mm	4691	4190	501

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	515
Center	mm	535
Right Side	mm	485
Average	mm	512

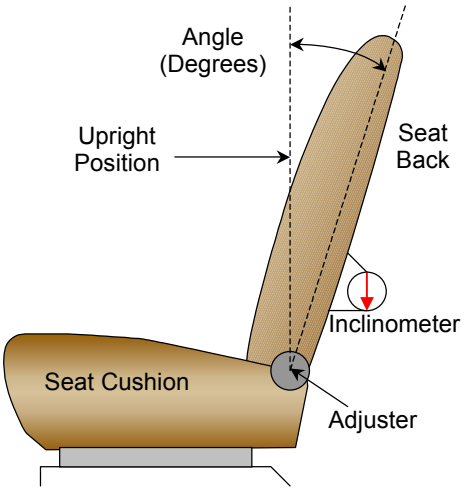
DATA SHEET NO. 4

TEST VEHICLE INFORMATION

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows: The seat back angle is measured relative to the rocker sill. Remove the seat back panel and position the inclinometer as shown in the drawing 13 inches above the back pivot point on the rear outboard seat frame. Avoid taking measurement on reinforcement plates.



FRONT SEAT ASSEMBLY

Driver seat back angle: 21.5 degrees
Passenger seat back angle: 21.6 degrees

SEAT FORE/AFT POSITIONS

The driver seat and passenger seats are manually operated. The total travel is 23 seat positions for each seat. The fore/aft position is set at the middle position for both driver and passenger.

Driver seat fore/aft total travel: 23 positions
Passenger seat fore/aft total travel: 23 positions
Driver seat fore/aft position: 12 positions
Passenger seat fore/aft position: 12 positions

SEAT BELT UPPER ANCHORAGE

The D ring is set at the second notch of 4, with the bottom as #1.

DATA SHEET NO. 4...(continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

FUEL TANK CAPACITY DATA

The "Usable Capacity" of the standard equipment fuel tank is: 62.5 liters

The "Usable Capacity" of any optional equipment fuel tank is: n/a liters

The "Usable Capacity" used for certification to FMVSS 301 requirements: 57.5 – 58.7 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 58.7 liters

The test vehicle is equipped with an electric fuel pump. The fuel filler door is located on the left rear fender.

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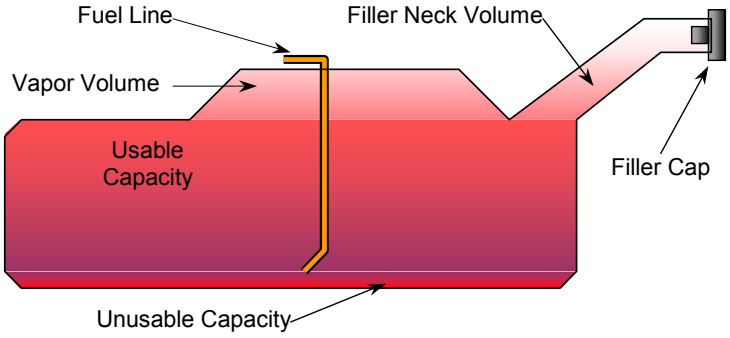
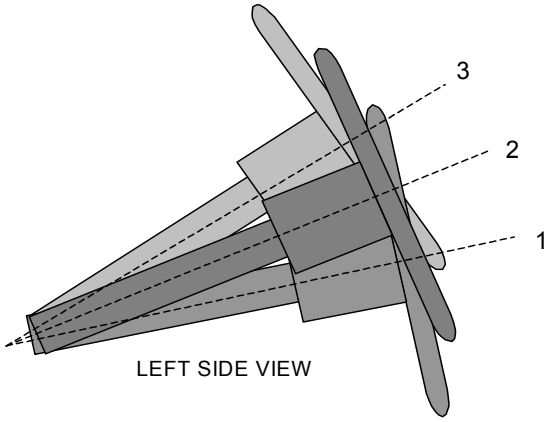


VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

The steering column is non adjustable.



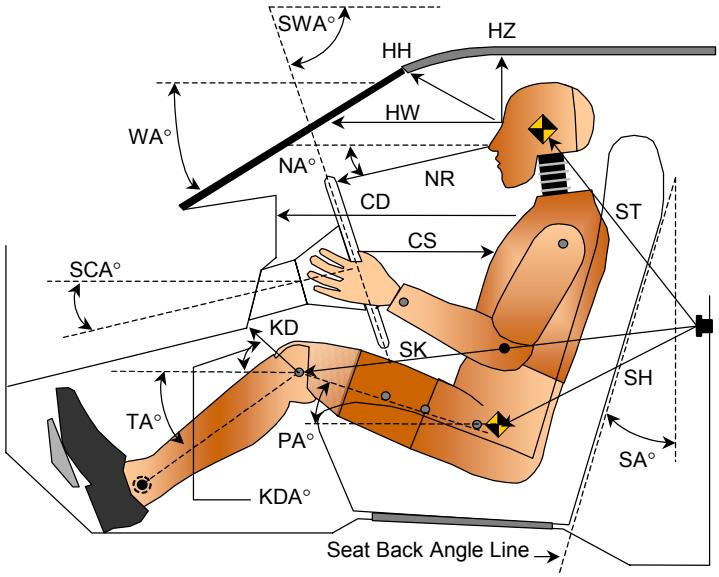
STEERING COLUMN ASSEMBLY

DATA SHEET NO. 5

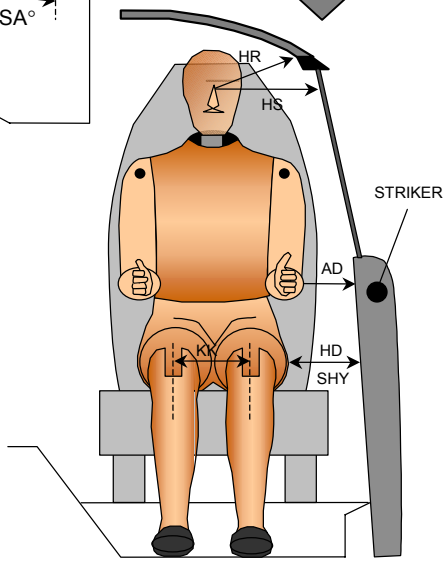
DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

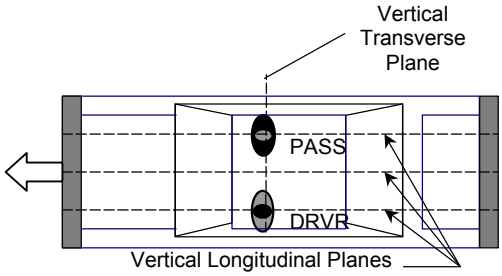
DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS



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. 5...(continued)

DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

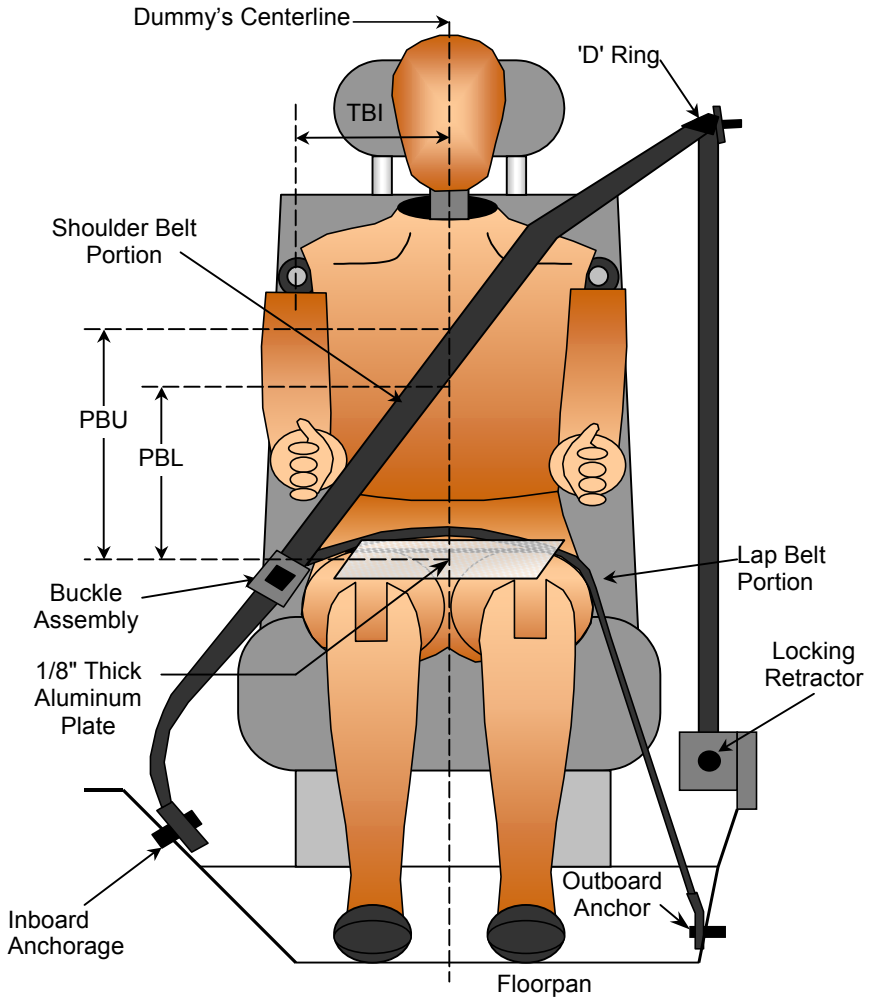
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		41.2		
SWA	Steering Wheel Angle		67.5		
SCA	Steering Column Angle		22.0		
SA	Seat Back Angle		21.5		21.3
HZ	Head to Roof (Z)	188	90	196	90
HH	Head to Header	423	10.9	414	15.6
HW	Head to Windshield	549	0	541	0
HR	Head to Side Header (Y)	229		232	
NR	Nose to Rim	344	19.2		
CD	Chest to Dash	494		586	
CS	Chest to Steering Hub	284	3.1		
RA	Rim to Abdomen	154	0		
KDL	Left Knee to Dash	165	0	163	
KDR	Right Knee to Dash	172		191	0
PA	Pelvic Angle		23.0		24.9
TA	Tibia Angle		44.9		45.5
KK	Knee to Knee (Y)	285		209	
SK	Striker to Knee	701	0	699	0
ST	Striker to Head	586	69.2	560	67.8
SH	Striker to H-Point	318	109.2	328	112.2
SHY	Striker to H-Point (Y)	226		211	
HS	Head to Side Window	323		307	
HD	H-Point to Door (Y)	138		138	
AD	Arm to Door (Y)	75		77	
AA	Ankle to Ankle	300		208	

DATA SHEET NO. 6

SEAT BELT POSITIONING DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy centerline to shoulder bolt	mm	171	171
PBU - Top surface of reference to belt upper edge	mm	340	329
PBL - To surface of reference to belt lower edge	mm	255	235

DATA SHEET NO. 7

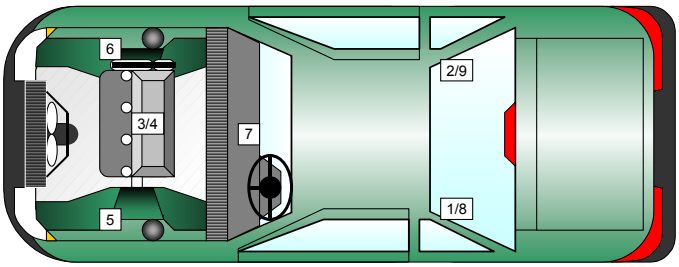
VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

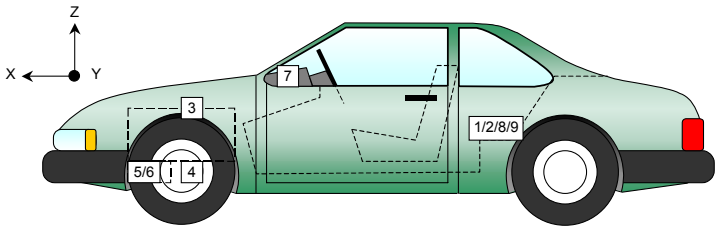
Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

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	2096	-655	480	G's	3.2	103	40.4	58
2	Right Rear X-Member X	2096	655	480	G's	3.2	161	41.4	59.3
3	Engine Top X	3992	75	971	G's	13.1	64	59.0	47
4	Engine Bottom X	3641	-82	350	G's	8.8	100	65.0	46
5	Left Brake Caliper X	3796	-600	285	G's	54.8	67	67.8	55
6	Right Brake Caliper X	3796	600	285	G's	33.0	65	60.5	55
7	Instrument Panel X	3118	0	1232	G's	11.6	37	87.7	27
8	Left Rear X-Member Z	2096	-655	480	G's	13.9	102	10.2	32
9	Right Rear X-Member Z	2096	655	480	G's	*	*	*	*

Reference Points: X - From Rear Surface of Vehicle (+ forward)
Y - Vehicle Centerline (+ to right)
Z - Ground Plane (+ up) * no valid data collected





DATA SHEET NO. 8

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG*	X	G's	2.0	200	50.5	74	1.3	20	58.1	78
Head CG*	Y	G's	3.9	40	11.7	80	8.5	44	14.7	91
Head CG*	Z	G's	21.0	78	7.9	155	35.9	84	8.2	124
Head CG Resultant*	N/A	G's	54.7	76			66.6	79		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG*	X	G's	8.7	164	49.3	81	4.8	176	39.3	86
Chest CG*	Y	G's	2.7	90	5.4	39	5.2	92	1.7	24
Chest CG*	Z	G's	20.9	79	9.3	149	22.9	87	10.3	127
Chest CG Resultant*	N/A	G's	52.7	80			45.6	86		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur*	Z	Newtons	146	112	4273	42	206	26	2938	77
Right Femur*	Z	Newtons	287	32	6468	38	122	21	3868	46

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	3348	61			5594	63		
Shoulder Belt Force	N/A	Newtons								

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	537*	46.7	60.0	96.0	642*	50.5	63.5	98.9

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T^1	T^2	CLIP	T^1	T^2
Chest CG Primary	51.2*	78.9	81.9	45.0*	84.3	87.2

* Questionable Data

DATA SHEET NO. 8...(continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis*	X	G's	6.5	160	72.3	38	7.2	141	48.0	56
Pelvis*	Y	G's	5.8	107	16.6	38	13.2	76	6.3	103
Pelvis*	Z	G's	6.6	78	11.8	38	2.9	176	13.6	60

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver*				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	39	198	360	151	436	87	401	59
Neck Force	Y	Newtons	237	96	18	37	227	72	91	38
Neck Force	Z	Newtons	2489	76	361	158	1541	68	404	125
Neck Moment	X	N•m	5.5	120	24.5	95	11.9	158	20.4	89
Neck Moment	Y	N•m	38.0	169	28.1	53	51.0	86	26.6	65
Neck Moment	Z	N•m	7.9	100	4.0	182	31.3	96	16.4	153

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	10.4	94	60.4	47	14.6	91	63.6	29
Left Foot Aft	Z	G's	11.0	51	40.5	35	18.2	45	48.0	37
Left Foot Fore	Z	G's	22.2	51	86.1	57	33.3	60	50.5	50
Right Foot Aft	X	G's	13.1	80	93.2	39	20.0	83	68.2	33
Right Foot Aft	Z	G's	9.9	63	77.5	42	12.0	60	54.0	35
Right Foot Fore	Z	G's	69.6	64	96.8	38	29.4	45	74.9	36

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	24.8	103	12.1	56	12.3	93	9.4	67
Left Lower Moment	Y	N•m	29.9	73	9.7	23	20.9	41	36.8	52
Left Lower Force	Z	Newton	109	153	2779	34	272	70	2468	36
Left Upper Moment	X	N•m	31.7	167	31.7	45	38.4	93	33.5	66
Left Upper Moment	Y	N•m	25.3	153	63.7	37	25.1	160	86.3	61
Left Upper Force	Z	Newton	168	155	2202	62	200	160	1989	36
Right Lower Moment	X	N•m	3.9	43	41.4	65	30.1	47	11.6	31
Right Lower Moment	Y	N•m	45.7	84	65.7	40	36.8	47	31.4	62
Right Lower Force	Z	Newton	155	159	4165	44	108	162	2753	34
Right Upper Moment	X	N•m	44.5	44	31.8	65	29.8	92	21.9	45
Right Upper Moment	Y	N•m	33.6	156	181.0	44	20.6	47	89.4	34
Right Upper Force	Z	Newton	130	167	3471	44	145	161	2198	33

* Questionable Data

DATA SHEET NO. 8...(continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	mm			35.5	80			25.2	78

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	4.5	200	50.3	74	2.2	21	56.7	78
Head CG	Y	G's	2.9	39	9.9	79	7.1	45	16.1	94
Head CG	Z	G's	21.8	59	7.9	158	35.6	84	7.9	123
Head CG	N/A	G's	54.8	76			65.4	79		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	8.7	163	50.0	81	4.7	176	39.5	86
Chest CG	Y	G's	3.1	90	5.1	48	5.7	92	1.2	137
Chest CG	Z	G's	21.1	79	9.3	151	23.0	87	10.3	128
Chest CG	N/A	G's	53.5	80			45.8	86		

REDUNDANT 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 Redundant	532	46.5	59.6	95.6	624	49.8	63.5	99.2

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T^1	T^2	CLIP	T^1	T^2
Chest CG Redundant	51.9	78.9	81.9	45.1	84.4	87.4

DATA SHEET NO. 9

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

SEAT BELT PLACEMENT MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy centerline to shoulder bolt	mm	171	171
PBU - Top surface of reference to belt upper edge	mm	340	329
PBL - Top surface of reference to belt lower edge	mm	255	235

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Retractor reel to "D" ring	mm	370	370
Shoulder belt length as measured on ATD	mm	830	806
Lap belt length as measured on ATD	mm	790	765
Remainder of belt on reel	mm	990	1163
Total belt length for continuous webbing systems	mm	2980	3104

SHOULDER BELT SPOOL-OUT DATA

Measurement Description	Units	Driver	Passenger
As determined by film analysis	mm	127	197

BELT STRETCH DATA

Measurement Description	Units	Driver	Passenger
As determined electronically	mm/m	Not recorded	Not recorded

DATA SHEET NO. 10

SUMMARY OF FMVSS 212 DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

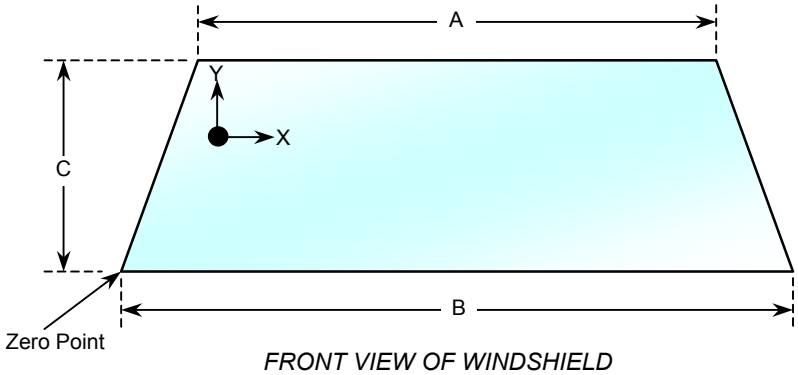
Windshield Mounting Details:
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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: 21.1°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	1937	1937	100
Right Side	1937	1937	100
Total	3874	3874	100



FRONT VIEW OF WINDSHIELD

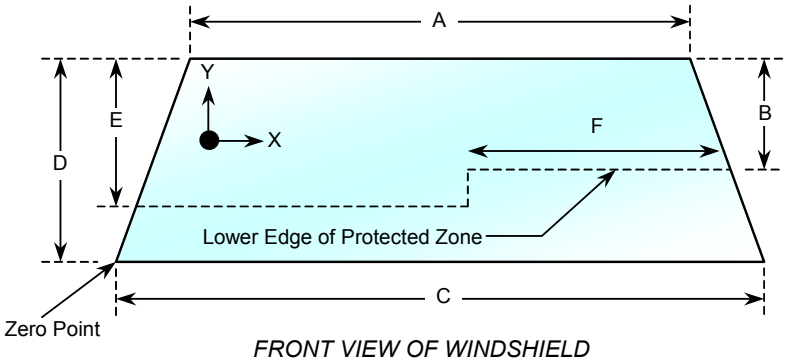
WINDSHIELD DIMENSIONS

Item	Units	Segment Length	Molding Width
A	mm	1224	19
B	mm	1500	20
C	mm	575	19

DATA SHEET NO. 11

WINDSHIELD ZONE INTRUSION FMVSS 219 (Partial) DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1224
B	mm	300
C	mm	1500
D	mm	575
E	mm	370
F	mm	578

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. 12

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

Temperature at Time of Impact: 21.1° C Test Time: 12:12 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)

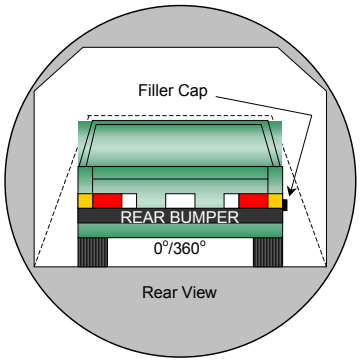
D. Spillage : None

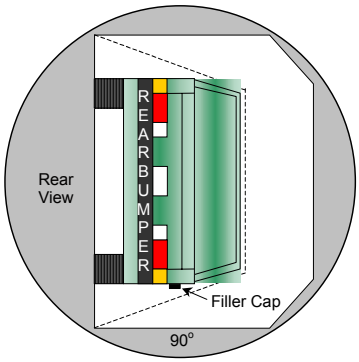
DATA SHEET NO. 13

FMVSS 301 STATIC ROLLOVER DATA

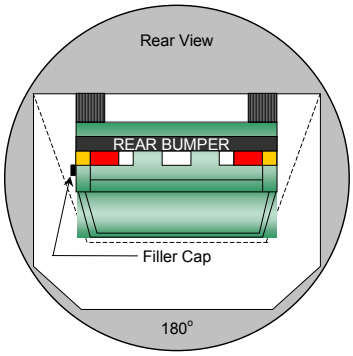
Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

Test Time 12:12 pm

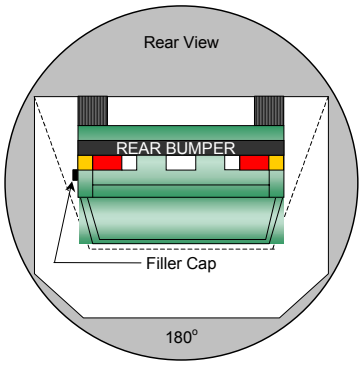




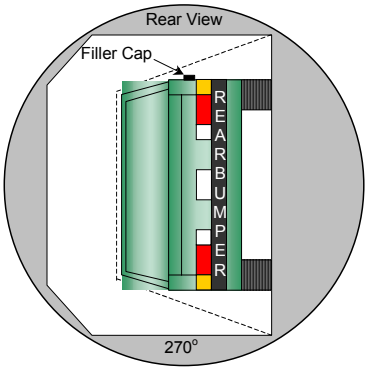
0° to 90°

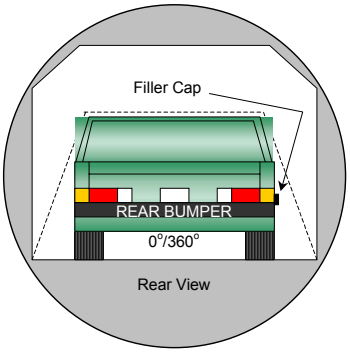


90° to 180°



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°	169	300	0
90° to 180°	156	300	0
180° to 270°	136	300	0
270° to 360°	165	300	0

DATA SHEET NO. 14

VEHICLE MEASUREMENTS

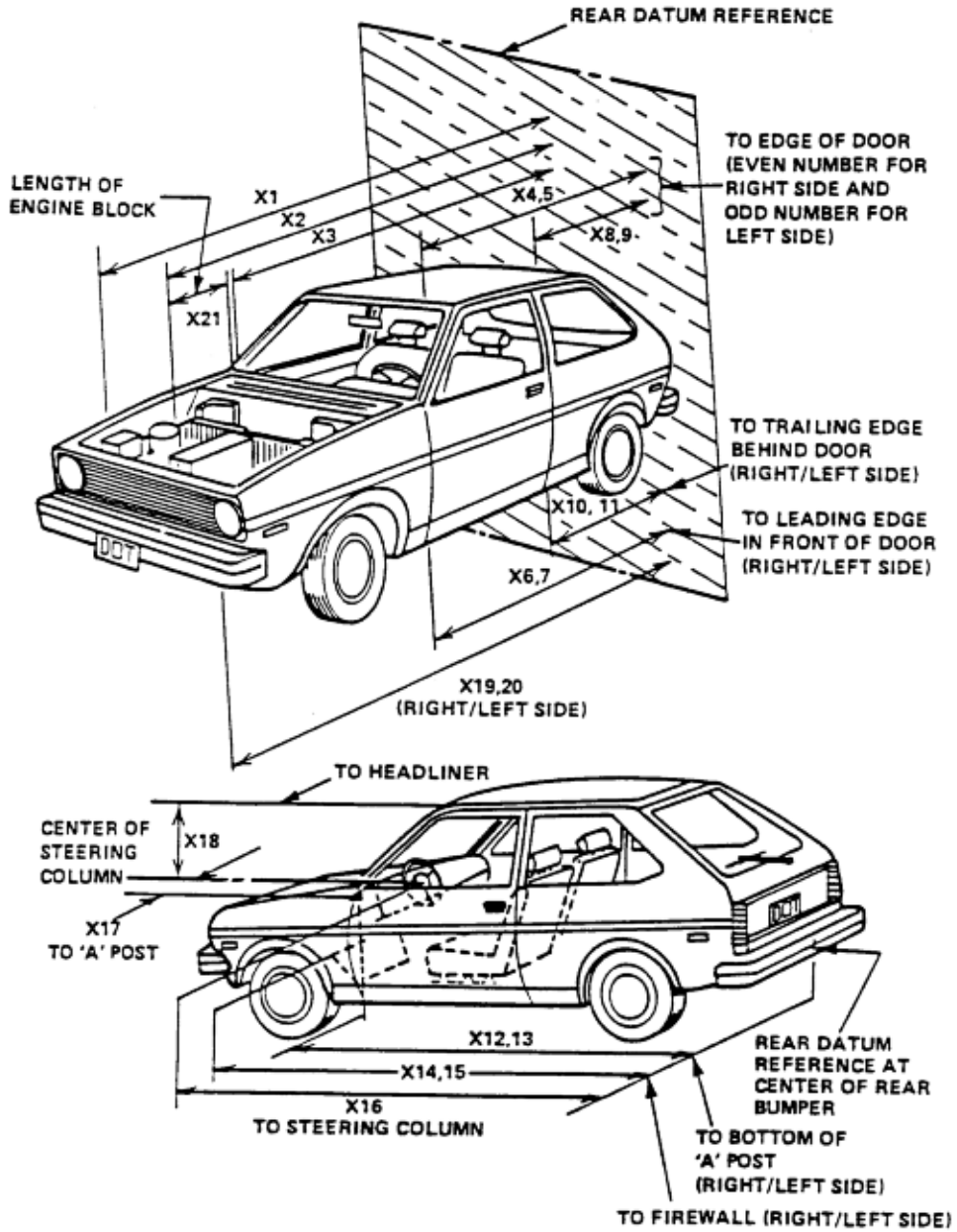
Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	4761	4203	558
2	RSOV to front of engine	mm	4029	3943	86
3	RSOV to firewall centerline	mm	3610	3552	58
4	RSOV to leading edge of right door	mm	3341	3358	-17
5	RSOV to leading edge of left door	mm	3347	3344	3
6	RSOV to lower leading edge of right door	mm	3257	3273	-16
7	RSOV to lower leading edge of left door	mm	3264	3265	-1
8	RSOV to upper leading edge of right door	mm	2209	2227	-18
9	RSOV to upper leading edge of left door	mm	2216	2213	3
10	RSOV to lower trailing edge of right door	mm	2204	2214	-10
11	RSOV to lower trailing edge of left door	mm	2207	2210	-3
12	RSOV to bottom of right 'A' pillar	mm	3241	3261	-20
13	RSOV to bottom of left 'A' pillar	mm	3256	3260	-4
14	RSOV to firewall on right side	mm	3565	3583	18
15	RSOV to firewall on left side	mm	3571	3563	8
16	RSOV to steering column	mm	2871	2923	-52
17	Center of steering column to left 'A' pillar	mm	380	367	13
18	Center of steering column to headlining	mm	380	347	33
19	RSOV to right side of front bumper	mm	4691	4190	501
20	RSOV to left side of front bumper	mm	4698	4184	514
21	Length of engine block	mm	480	480	0
RD	RSOV to right side of dash panel	mm	3064	3100	-36
CD	RSOV to center of dash panel	mm	3094	3108	-14
LD	RSOV to left side of dash panel	mm	3076	3063	13

DATA SHEET NO. 14...(continued)

VEHICLE MEASUREMENTS

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02



DATA SHEET NO. 15

CAMERA LOCATIONS

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

No.	Camera View	Location (mm) *			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View				18	32
2	Left Front View	1000	-7530	1445	25	1005
3	Steering Column Top	2000	-8150	1560	25	1005
4	Steering Column Bottom	1990	-8000	1045	25	625
5	Driver Close-up	1440	-8560	1510	50	813
6	Driver Angle	4600	-5020	2060	50	877
7	Onboard Driver				13	1005
8	Onboard Passenger				13	1005
9	Right Overall	2300	7300	1690	13	909
10	Right Passenger Half	1000	7650	1640	13	952
11	Right Close-up	1600	9430	1510	25	1010
12	Right Angle	5000	5800	2140	50	741
13	Windshield	700	0	2650	13	995
14	Top Driver	-90	-430	1745	13	*
15	Top Passenger	-90	460	1745	13	1026
16	Pit Front	1150	0	-5000	13	1000
17	Pit Rear	3050	0	-5000	13	948

*COORDINATES: * no timing marks

+X = film plane rearward of barrier

+Y = film plane to right of monorail centerline

+Z = film plane to above ground level

ORIGIN: For X it is the Impact Point.

For Y it is the rail.

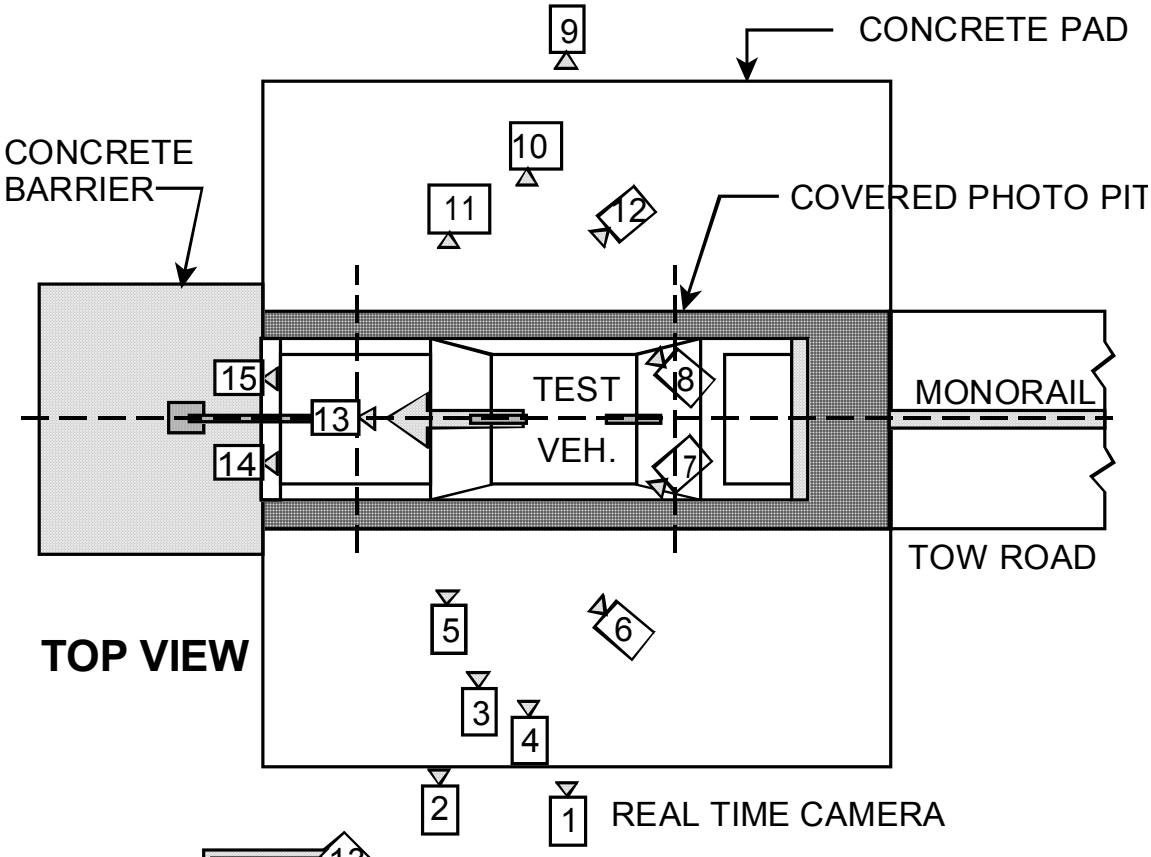
For Z it is the Floor.

DATA SHEET NO. 15...(continued)

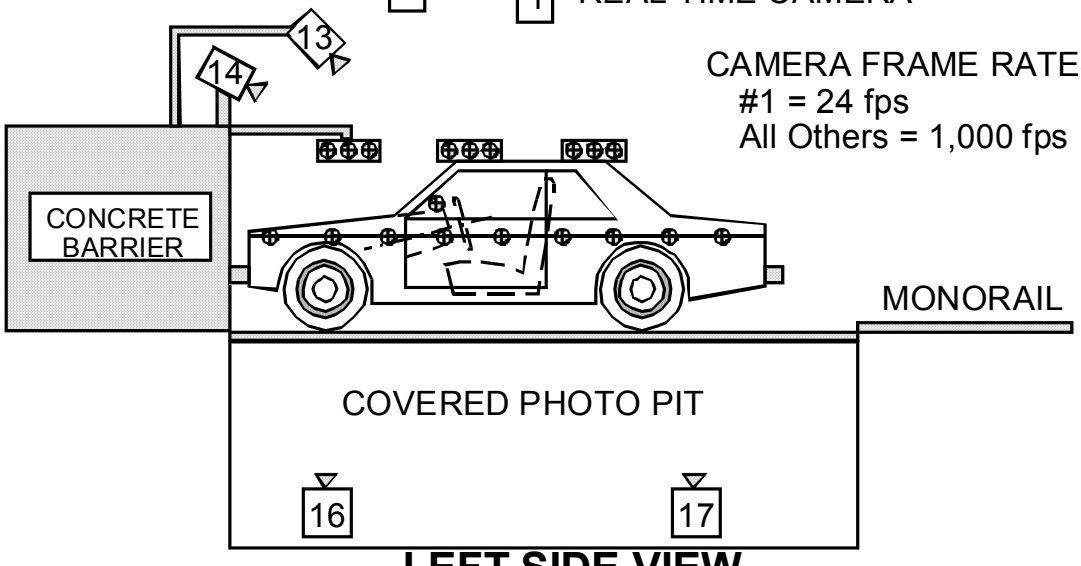
CAMERA LOCATIONS

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

CAMERA POSITIONS FOR FRONTAL IMPACTS



TOP VIEW



CAMERA FRAME RATES:
#1 = 24 fps
All Others = 1,000 fps

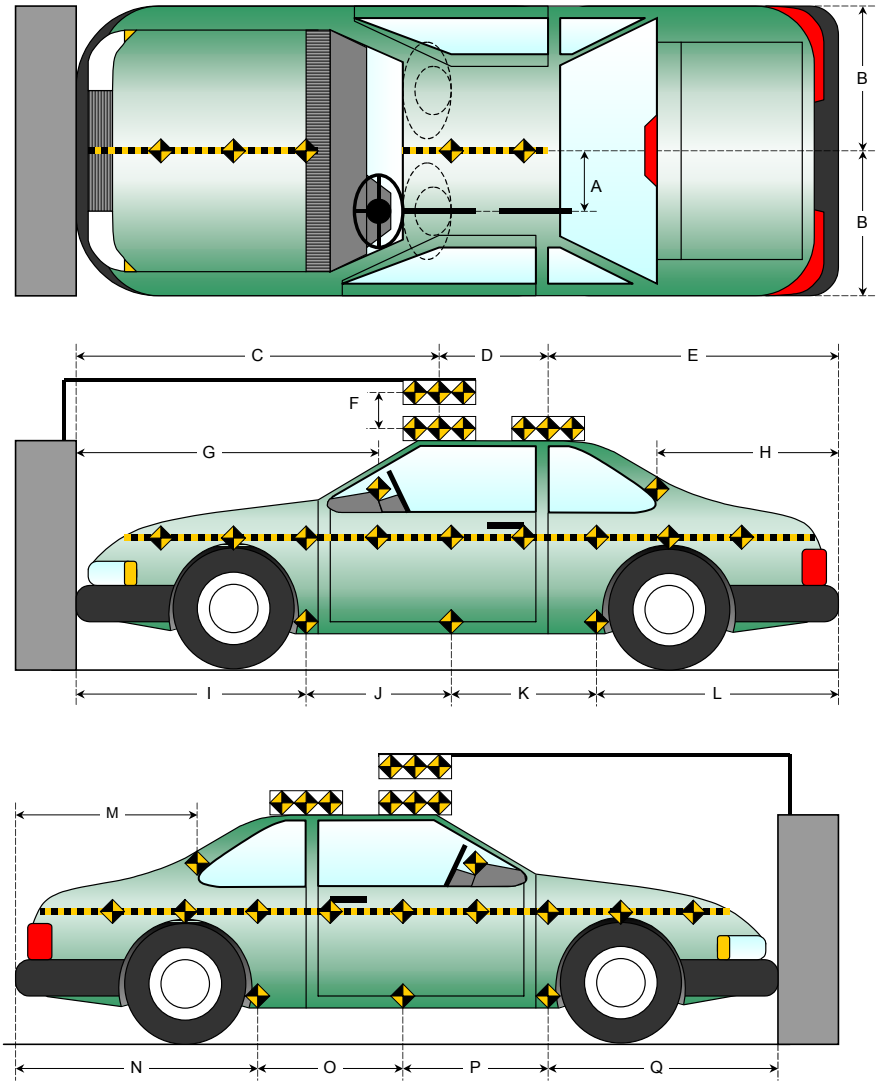
LEFT SIDE VIEW

DATA SHEET NO. 16

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

Item	Value
A	370
B	880
C	2026
D	380
E	2390
F	172
G	1655
H	2213
I	1450
J	872
K	879
L	1595
M	2212
N	1596
O	881
P	872
Q	1447



DATA SHEET NO. 17

VEHICLE INTRUSION MEASUREMENTS

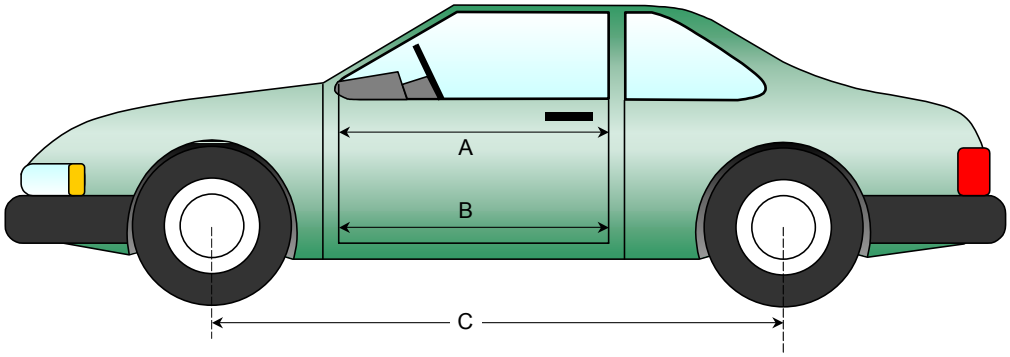
Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

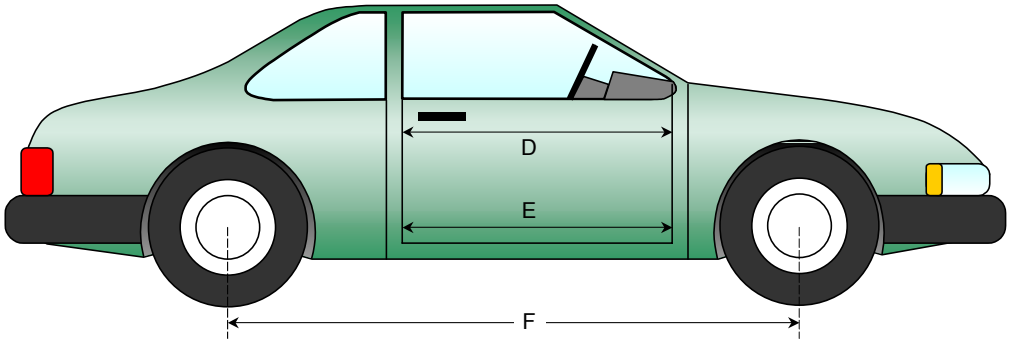
DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1040	1022	18
B	Left Side Lower	mm	1047	1024	23
D	Right Side Upper	mm	1031	1026	5
E	Right Side Lower	mm	1037	1027	10

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2834	2770	64
F	Right Side Wheelbase	mm	2830	2793	37





DATA SHEET NO. 17...(continued)

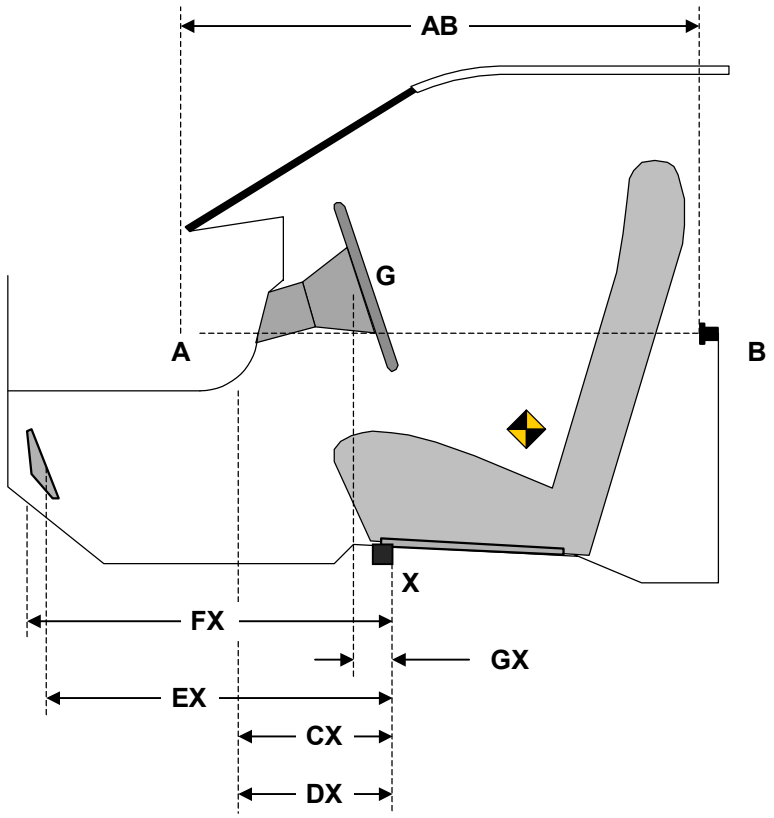
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	758	758	0
CX	Left Knee Bolster to X	mm	287	296	-9
DX	Right Knee Bolster to X	mm	292	274	18
EX	Brake Pedal to X	mm	537	503	34
FX	Foot Rest to X	mm	577	555	22
GX	Center of Steering Column Wheel Hub to X	mm	31	40	-9

X = Left Front Seat Front Outboard Anchor Bolt Head



DRIVER COMPARTMENT

DATA SHEET NO. 17...(continued)

VEHICLE INTRUSION MEASUREMENTS

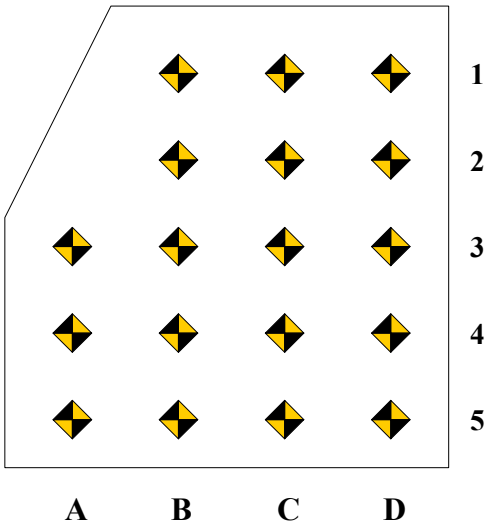
Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

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		675	675	680		678	635	605		-3	40	75
2		578	579	580		561	548	538		17	31	42
3	481	479	479	475	459	461	454	449	22	18	25	26
4	379	379	379	378	378	370	364	354	1	9	15	24
5	279	279	280	280	278	273	264	255	1	6	16	25

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		28	30	29		46	52	65		-18	-22	-36
2		-35	-34	-24		-34	-22	-16		-1	-12	-8
3	-59	-58	-54	-61	-50	-71	-71	-63	-9	13	17	2
4	-69	-69	-65	-74	-73	-85	-83	-74	4	16	18	0
5	-71	-66	-71	-64	-75	-82	-83	-72	4	16	12	8

DATA SHEET NO. 17...(continued)

VEHICLE INTRUSION MEASUREMENTS

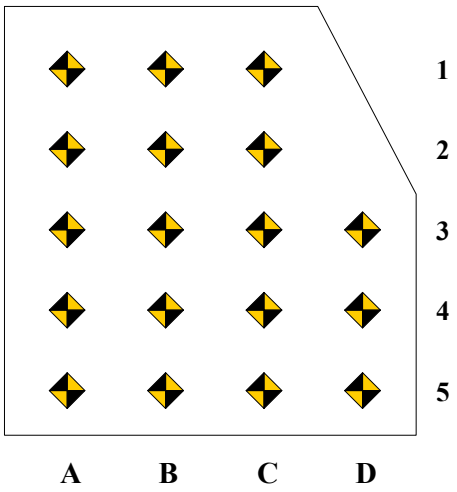
Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

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	621	628	626	625	606	618	620	622	15	10	6	3
2	567	573	569	565	541	557	556	560	26	16	13	5
3	505	508	507	505	501	503	501	498	4	5	6	7
4	405	405	407	402	400	411	404	409	5	-6	3	-7
5	305	305	305	310	307	306	304	309	-2	-1	1	1

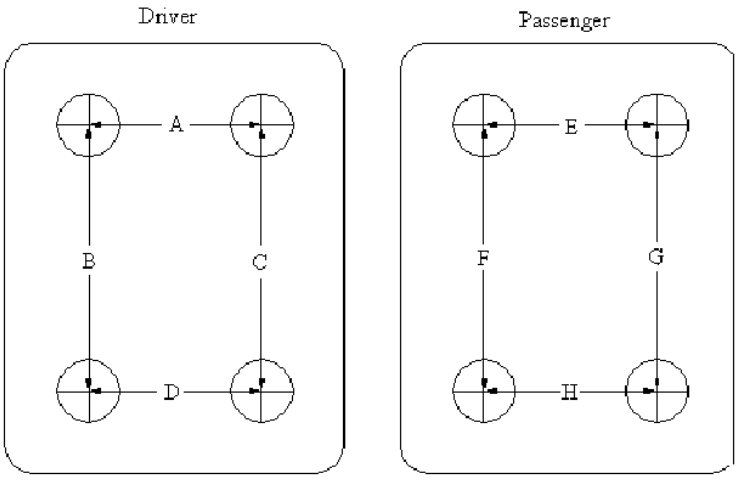
PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	60	59	60	62	90	93	80	78	-30	-34	-20	-16
2	5	0	2	3	34	30	25	29	-29	-30	-23	-26
3	-44	-51	-49	-48	-38	-42	-39	-27	-6	-9	-10	-21
4	-67	-67	-68	-70	-63	-69	-66	-66	-4	2	-2	-4
5	-76	-69	-68	-75	-69	-68	-69	-66	-7	-1	1	-9

DATA SHEET NO. 17...(continued)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02



UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	373	373	0
B	247	247	0
C	264	264	0
D	376	376	0
E			
F			
G	244	242	2
H			

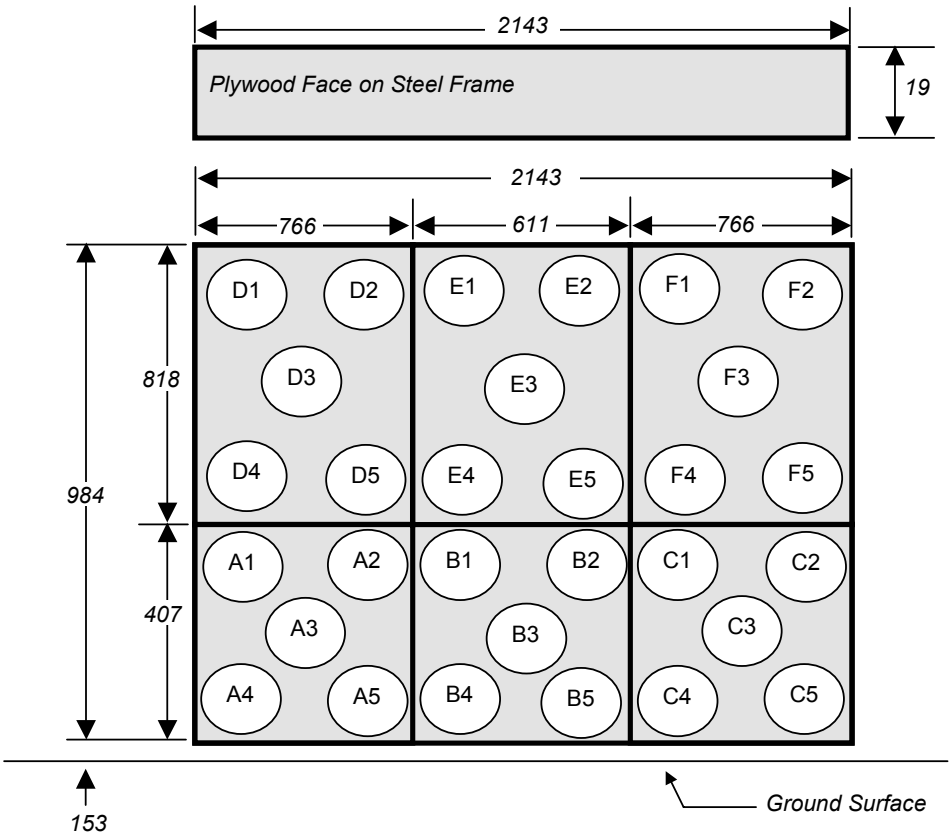
DATA SHEET NO. 18

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

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 crossmember displacement.

DATA SHEET NO. 19

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02

VEHICLE INFORMATION

VIN: 1FTYR10D72PA40040 Wheelbase (mm) : 2830
Vehicle Size Category: Truck Test Weight (kg) : 1706.4

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 13
Cal. Procedure/Interval: MGA procedure / 6 month
Integration Algorithm: Trapezoidal Linearity: > 99%
Impact Velocity (km/h): 56.6
Velocity Change (km/h): 62.0 Time of Separation (msec): 177

CRUSH PROFILE

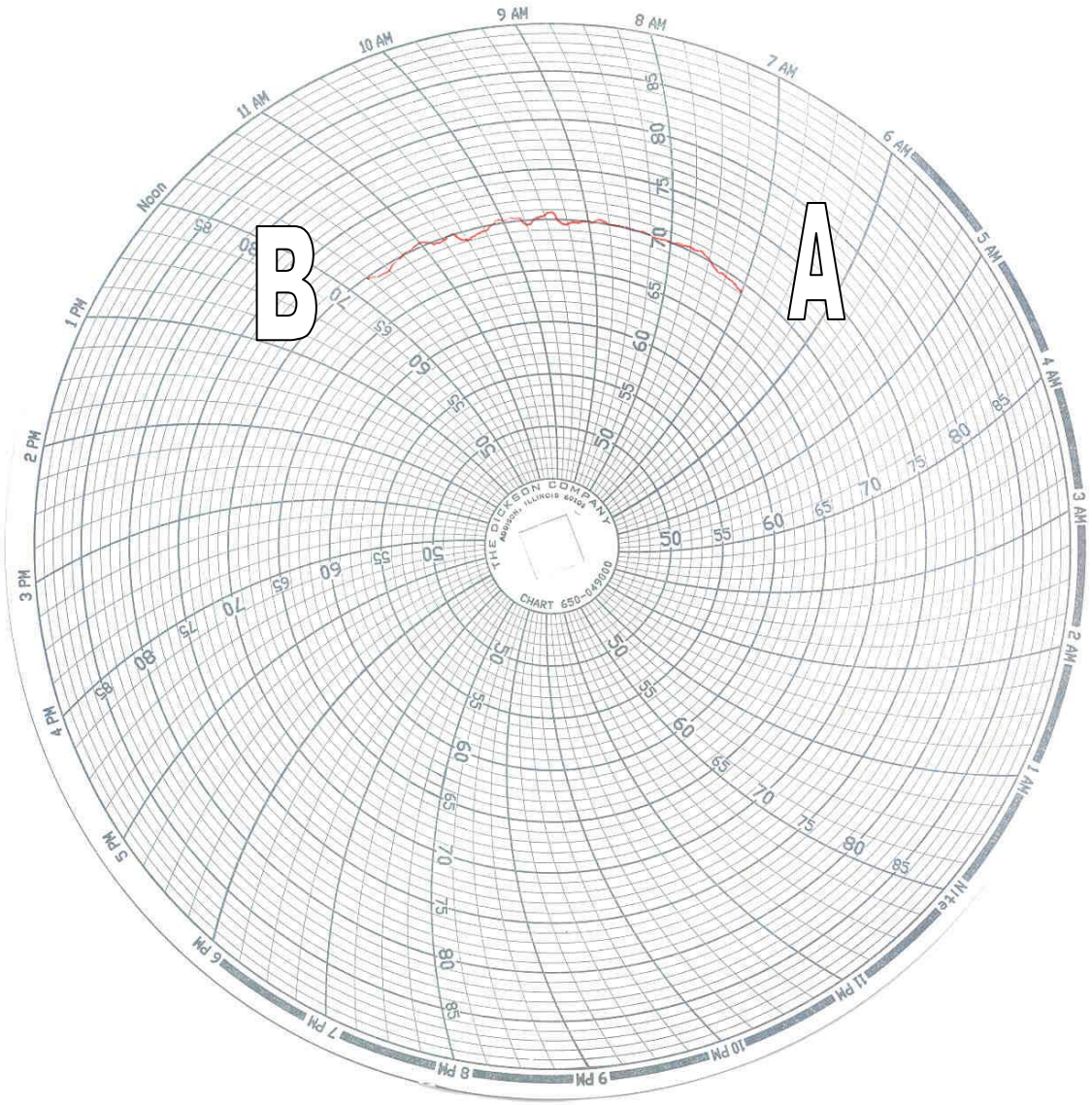
Collision Deformation Classification: Frontal Midpoint of Damage: CL
Damage Region Length (mm): 1760 Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4698	4184	514
C2	Crush zone 2 at left side	mm	4748	4224	524
C3	Crush zone 3 at left side	mm	4755	4188	567
C4	Crush zone 4 at right side	mm	4756	4206	550
C5	Crush zone 5 at right side	mm	4745	4242	503
C6	Crush zone 6 at right side	mm	4691	4190	501

DATA SHEET NO. 20

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2002/Ford/Ranger/4x2 NHTSA No.: M20202
Test Program: NCAP Test Date: 6/11/02



A = Dummies installed in vehicle at 7:30 a.m.

B = Test conducted at 12:12 p.m.

APPENDIX A

PHOTOGRAPHS

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Pre-Test Front View of Test Vehicle

Post-Test Front View of Test Vehicle

Pre-Test Rear View of Test Vehicle

Post-Test Rear View of Test Vehicle

Pre-Test Left Side View of Test Vehicle

Post-Test Left Side View of Test Vehicle

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

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

Pre-Test Right Side View of Test Vehicle

Post-Test Right Side View of Test Vehicle

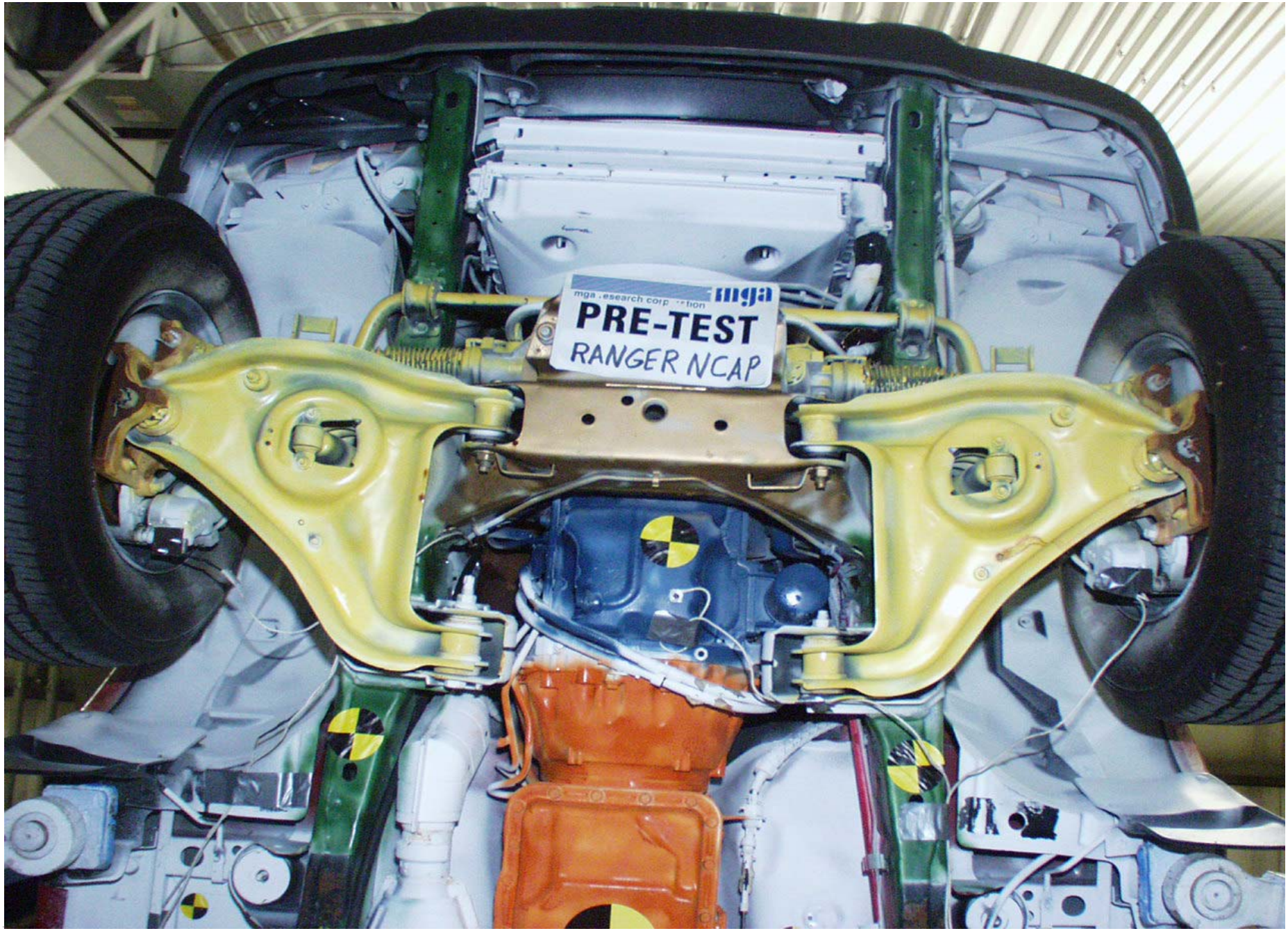
Pre-Test Right Front Three-Quarter View of Test Vehicle

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

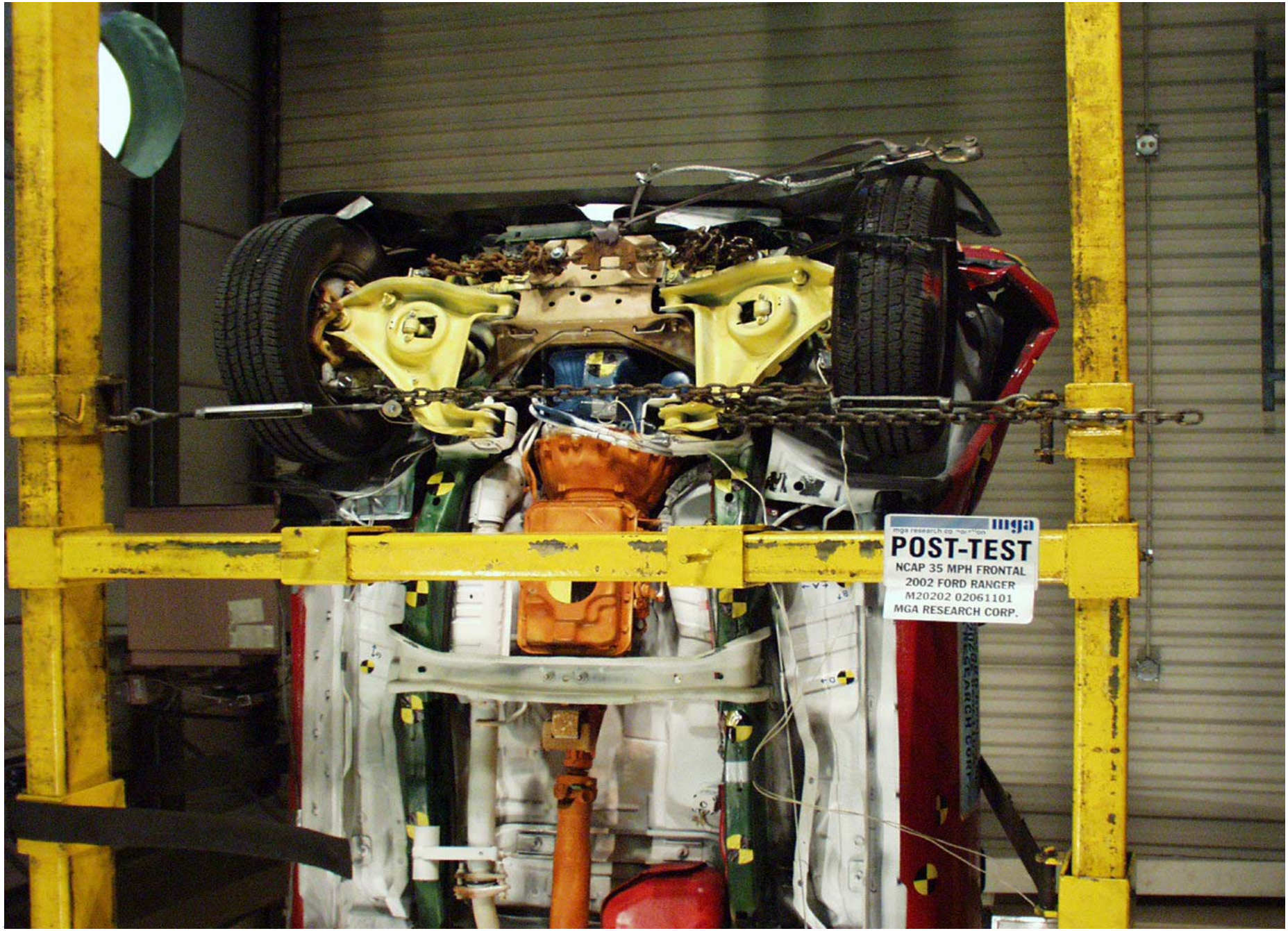
Pre-Test Fuel Filler Cap View

Pre-Test Engine Compartment View

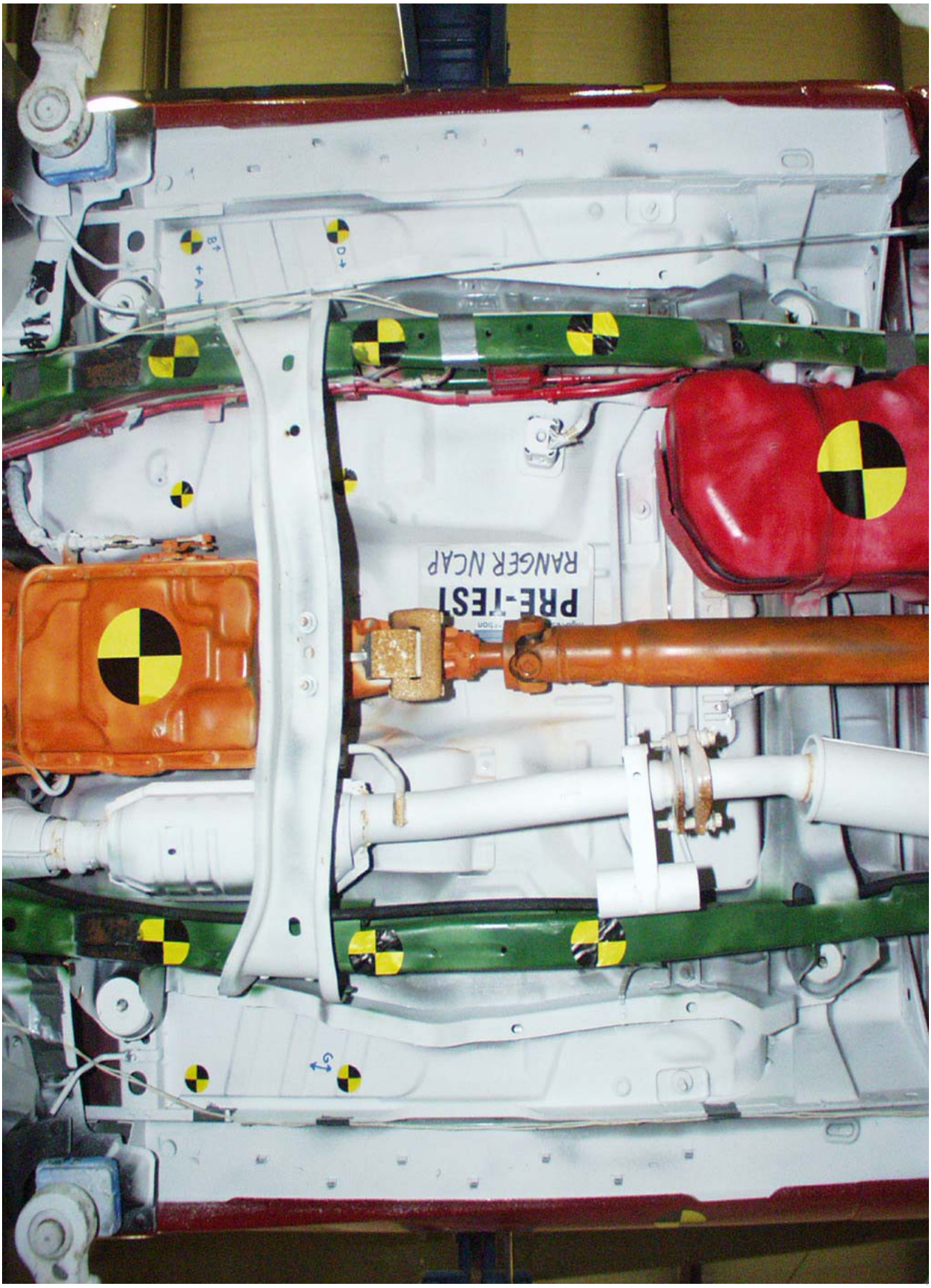
Post-Test Engine Compartment View



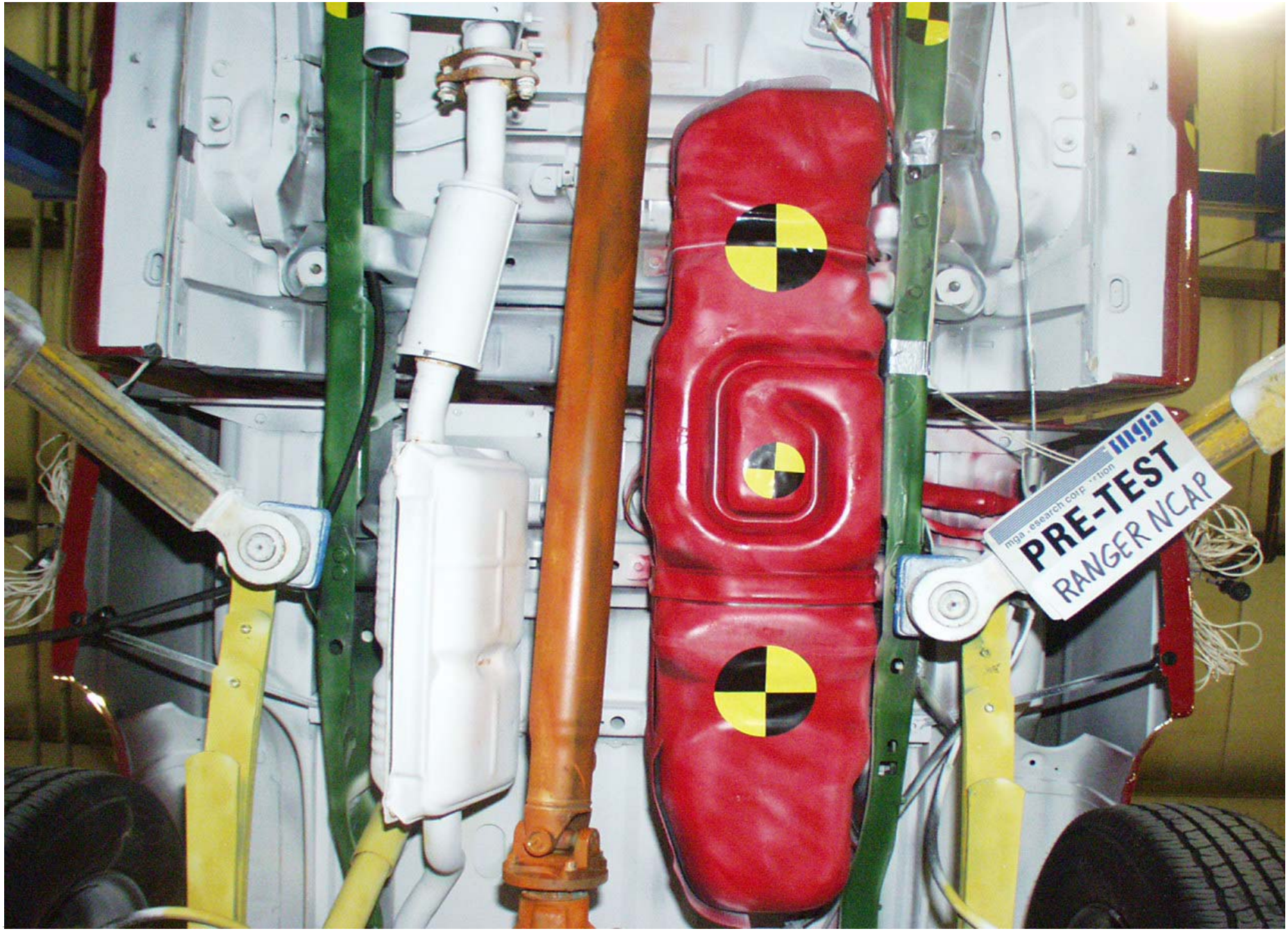
Pre-Test Front Underbody View



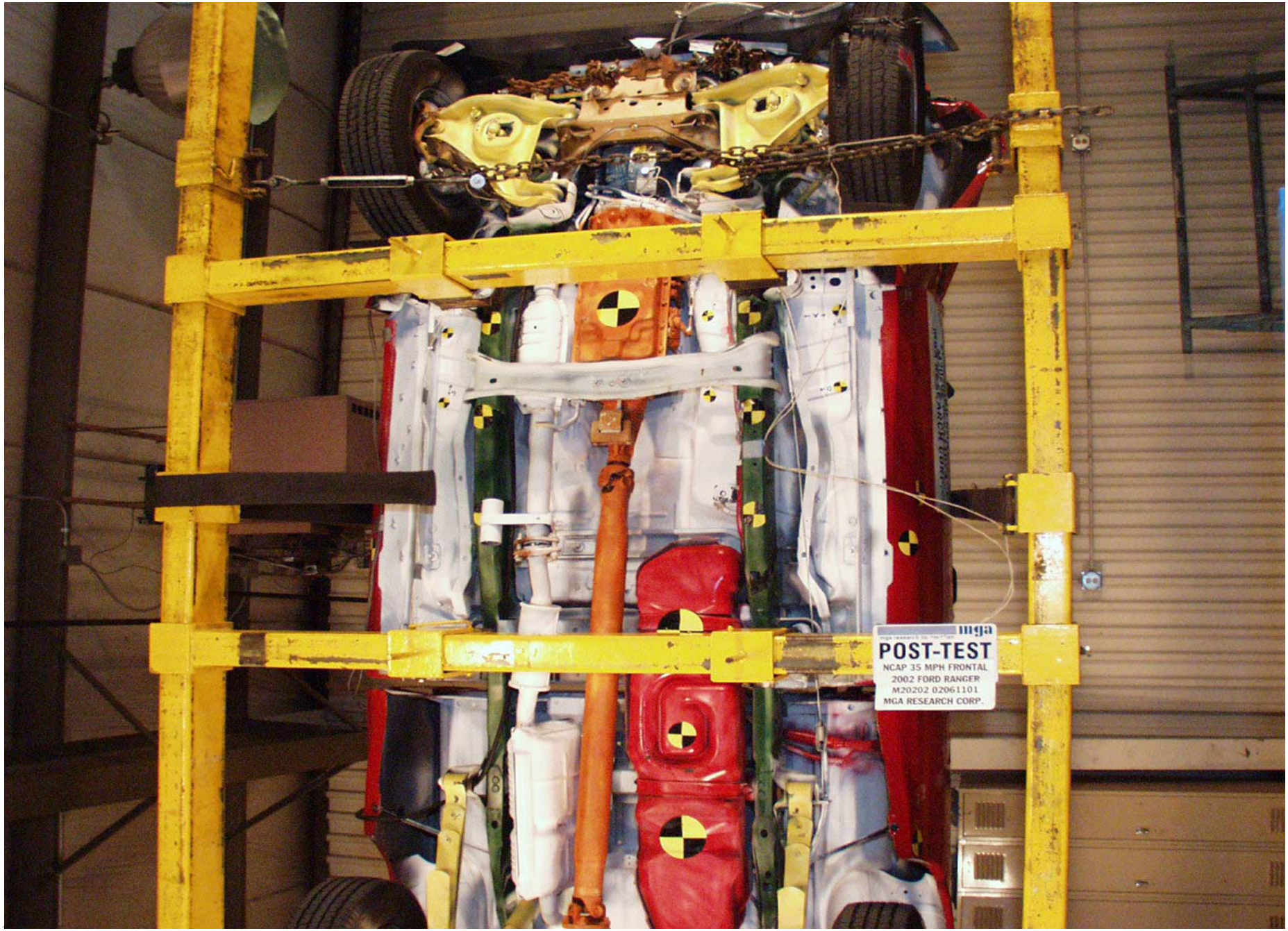
Post-Test Front Underbody View



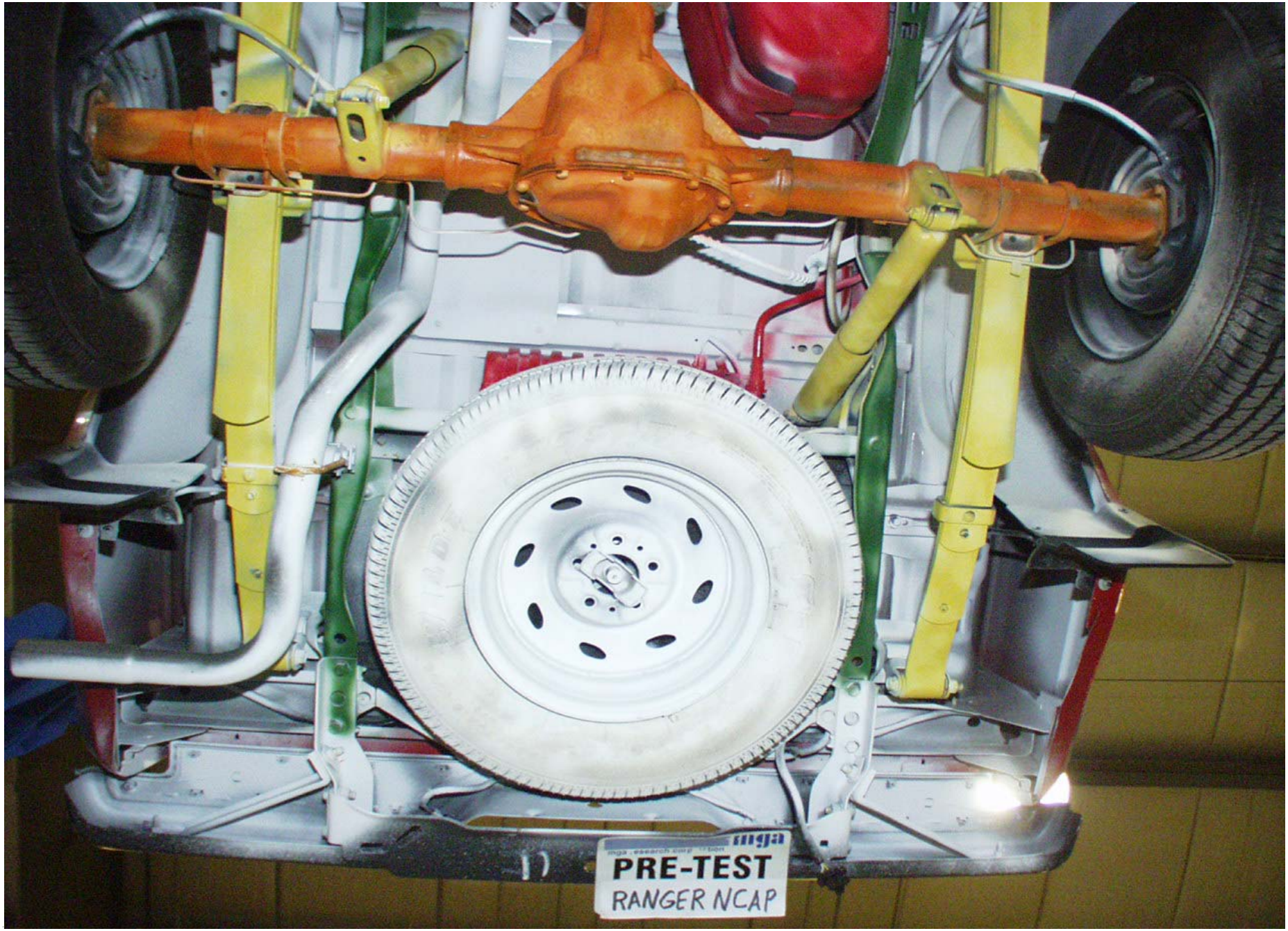
Pre-Test Front Mid Underbody



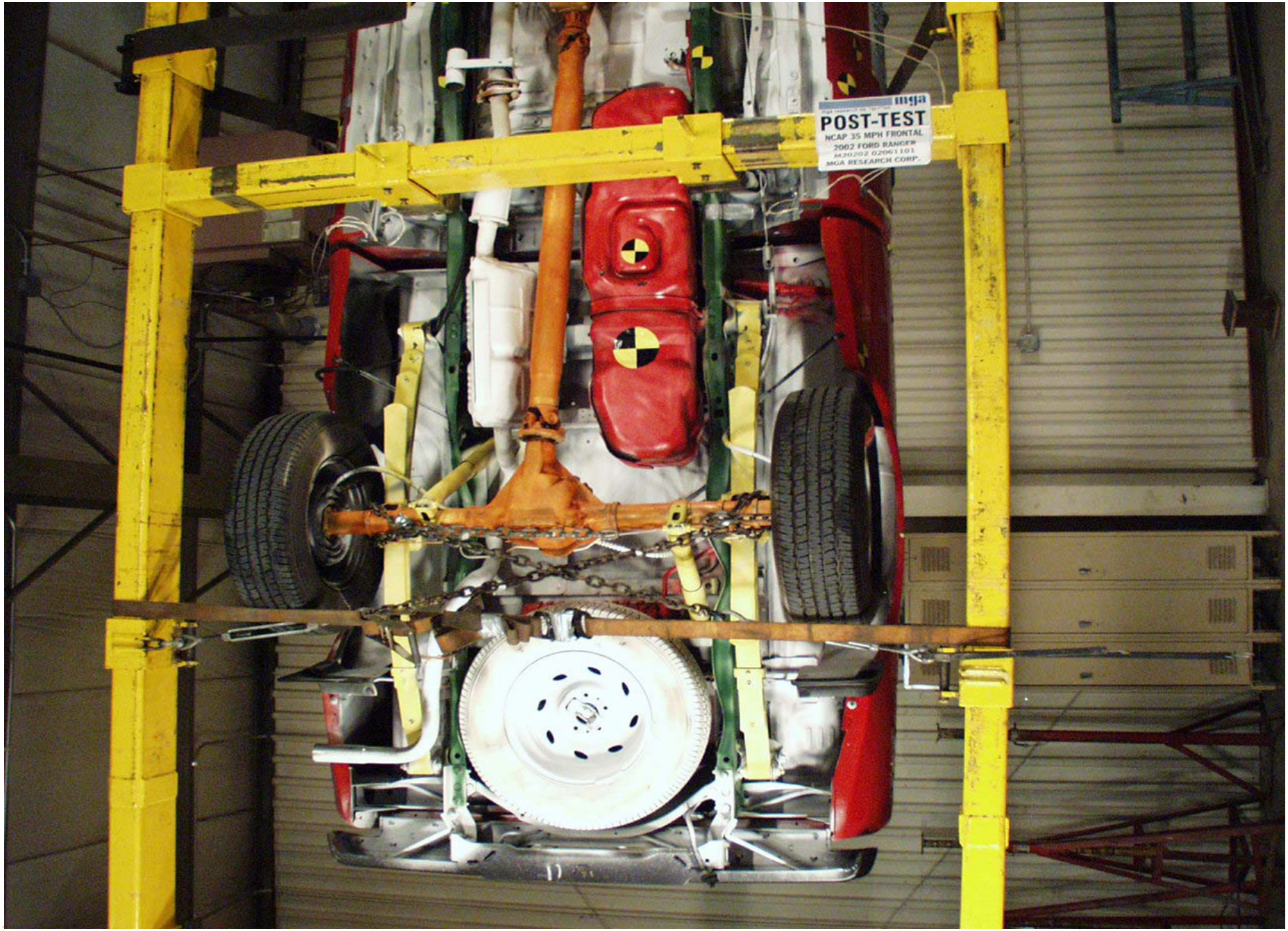
Pre-Test Rear Mid Underbody



Post-Test Mid Underbody



Pre-Test Rear Underbody View



Post-Test Rear Underbody View

Pre-Test Windshield View

Post-Test Windshield View

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 Seat Position View

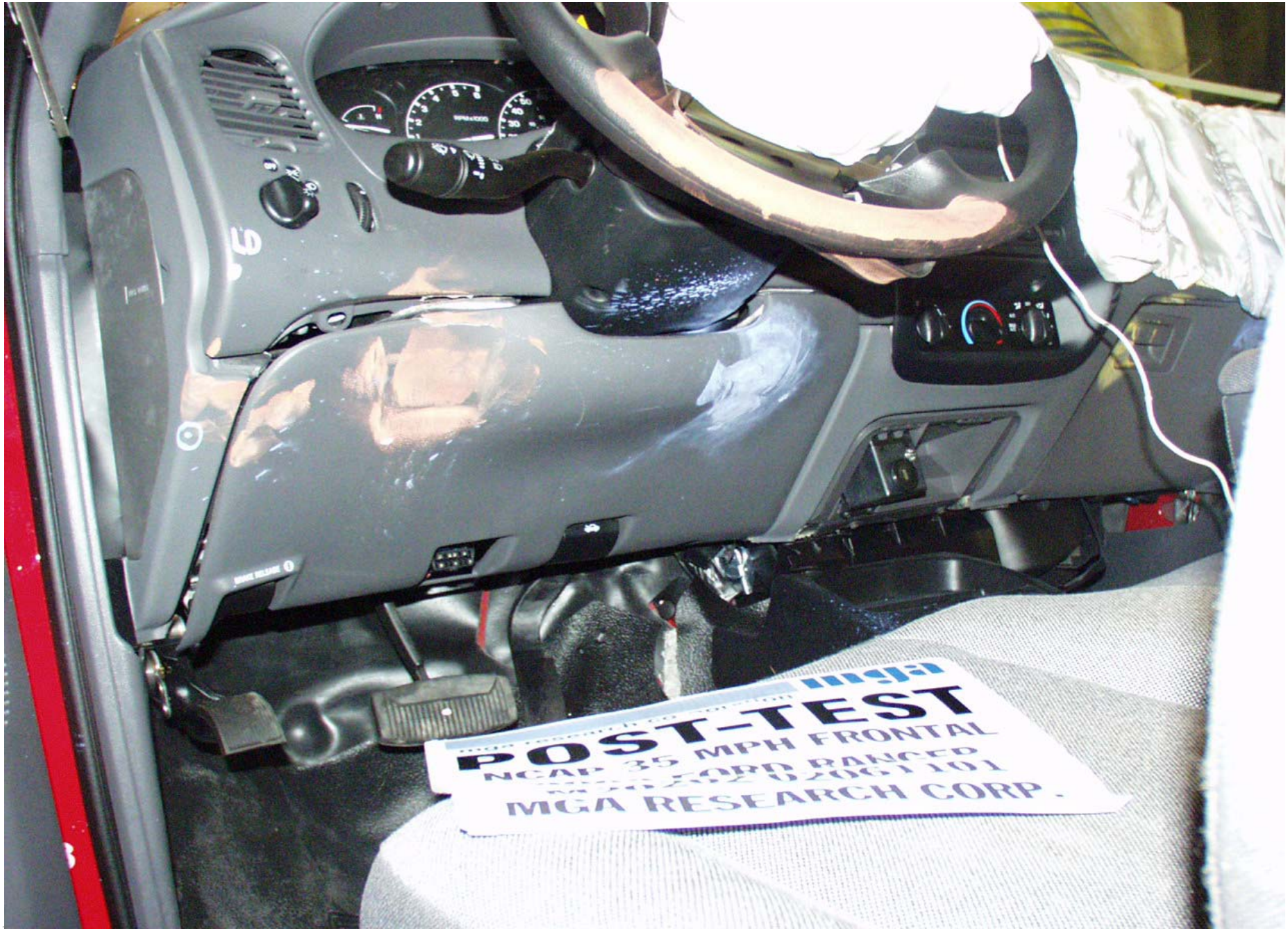
Post-Test Driver Seat Position View

Pre-Test Driver Dummy Knee Position

Post-Test Driver Dummy Knee Position

Post-Test Driver Airbag Contact

Post-Test Driver Head Contact (headrest)



Post-Test Driver Knee Contact View

Pre-Test Driver Windshield View

Post-Test Driver Windshield View

Pre-Test Passenger Dummy Position Right Side View

Post-Test Passenger Dummy Position Right Side View

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

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

Pre-Test Passenger Seat Position View

Post-Test Passenger Seat Position View

Pre-Test Passenger Dummy Knee Position

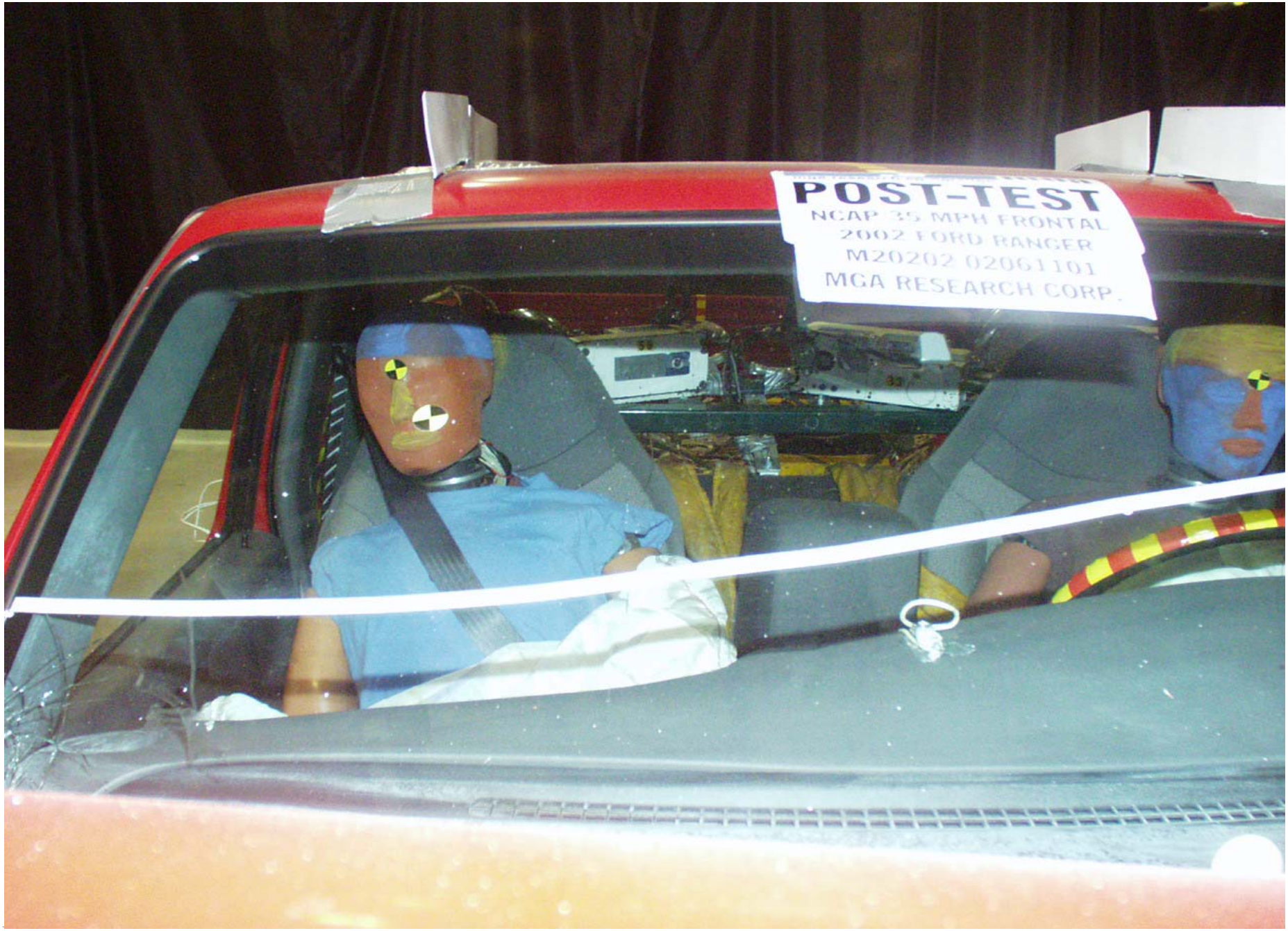
Post-Test Passenger Dummy Knee Position

Post-Test Passenger Airbag Contact

Post-Test Passenger Head Contact (headrest)

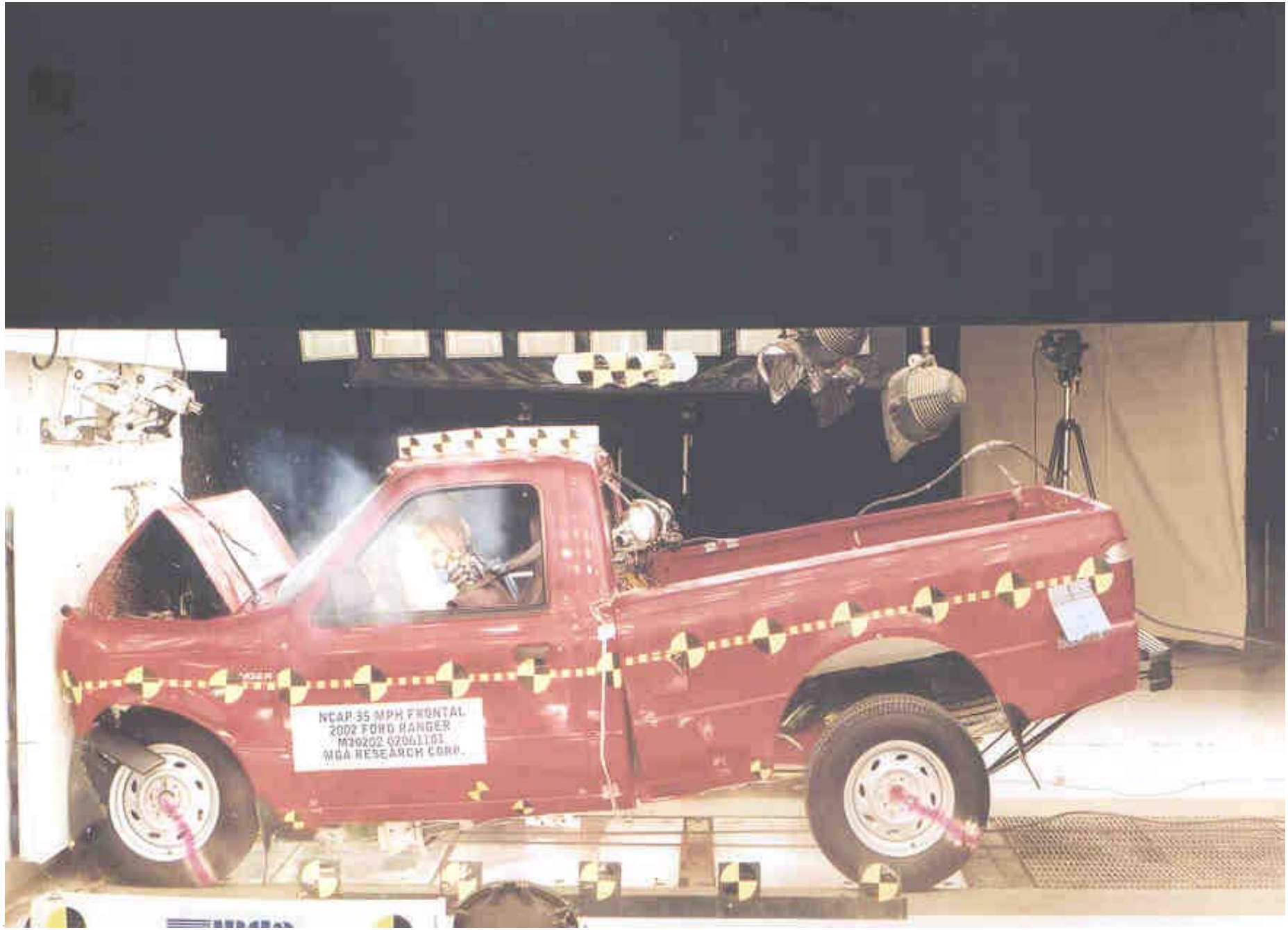
Post-Test Passenger Knee Contact View

Pre-Test Passenger Windshield View



Post-Test Passenger Windshield View

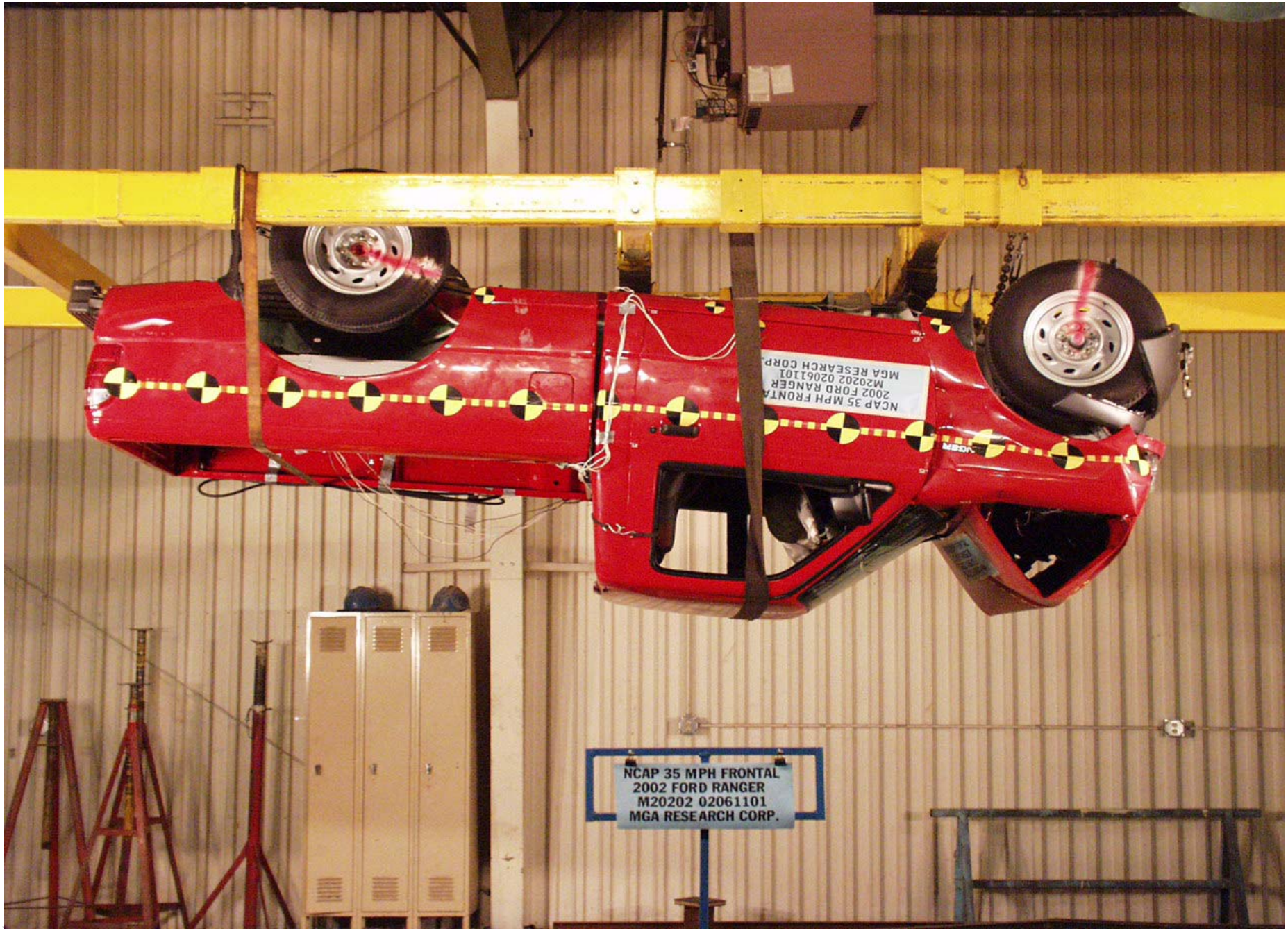
Vehicle Certification Label and Tire Placard



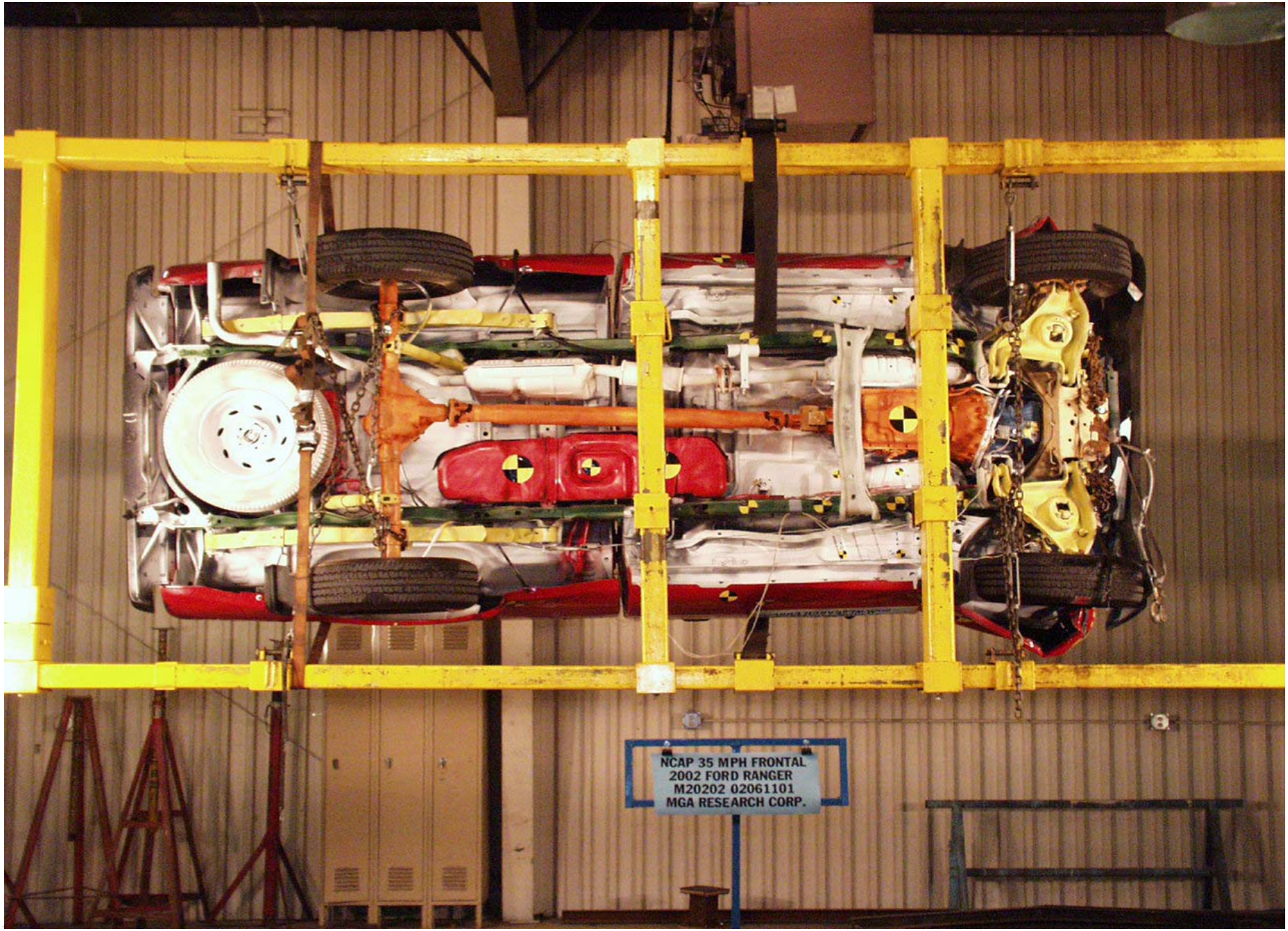
Vehicle Impact


NCAP 35 MPH FRONTAL
2002 FORD RANGER
M20202 02061101
MGA RESEARCH CORP.

Rollover 90°



Rollover 180°



Rollover 270°

Rollover 360°

Pre-Test Left Side Door Latched

Pre-Test Right Side Door Latched

APPENDIX B

DUMMY AND VEHICLE RESPONSE DATA TRACES

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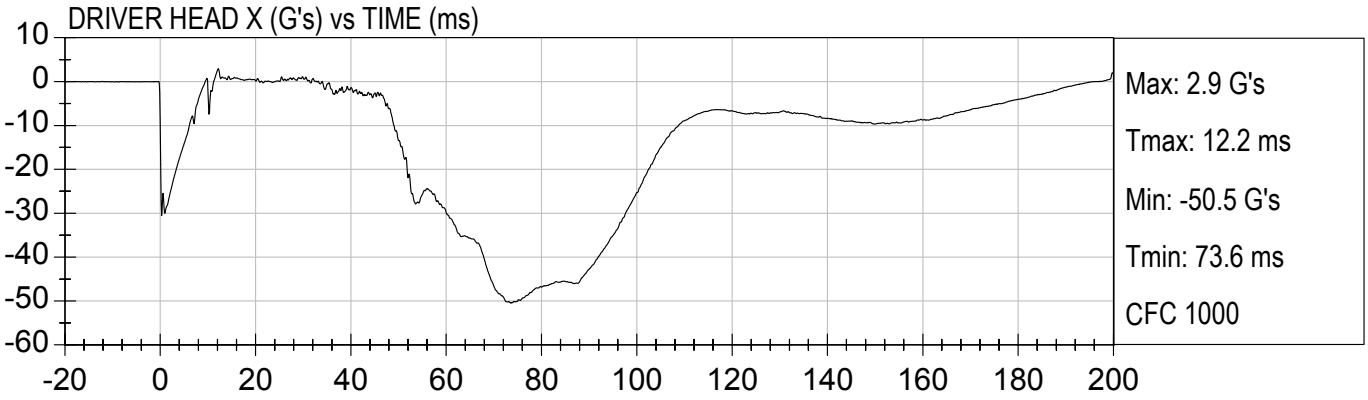
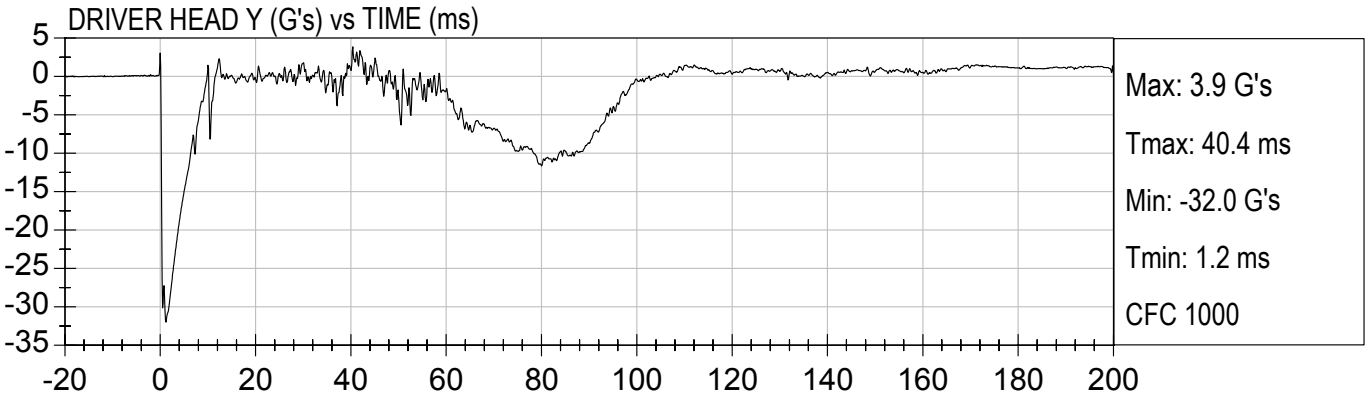
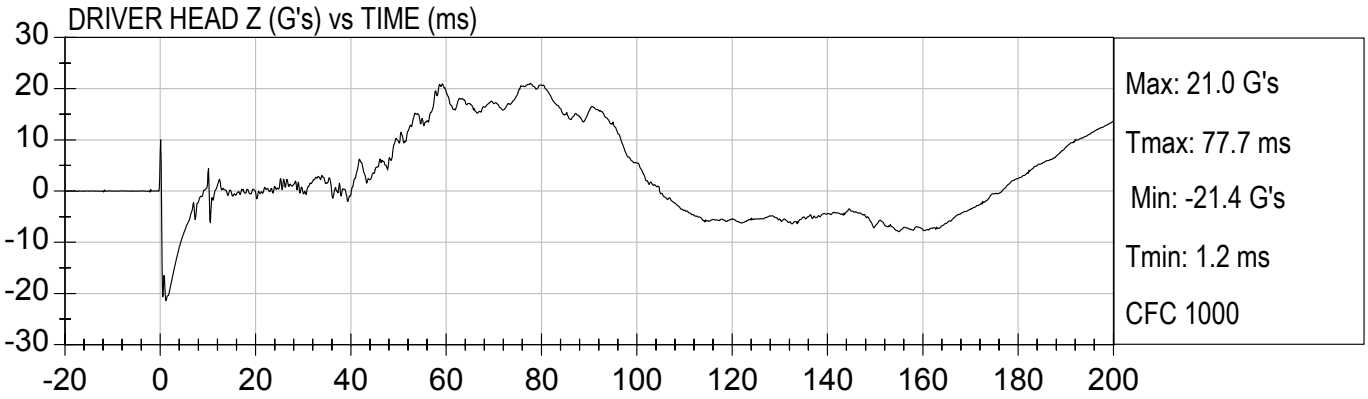
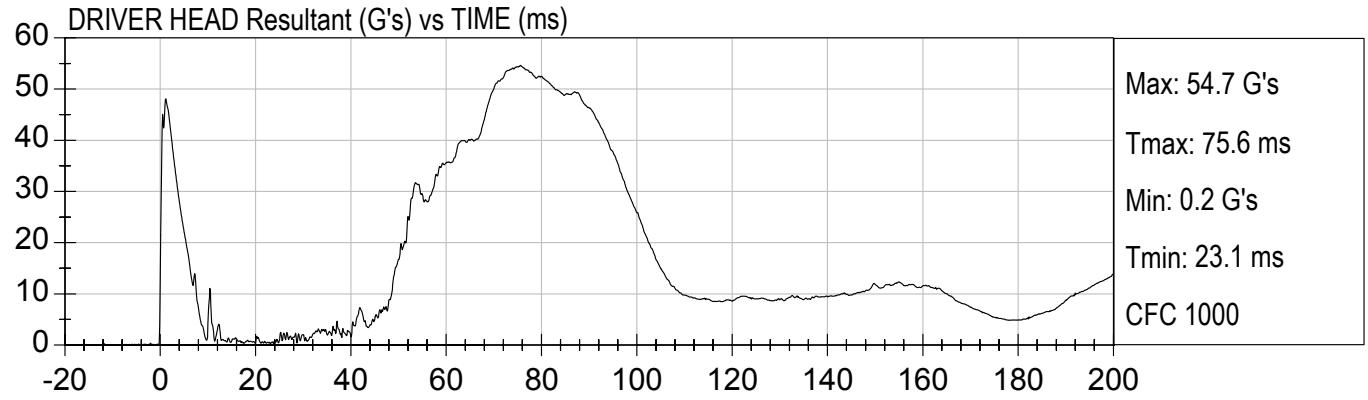
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

Test Date: 9/4/2002
Speed: 35.2 mph (56.6 km/h)



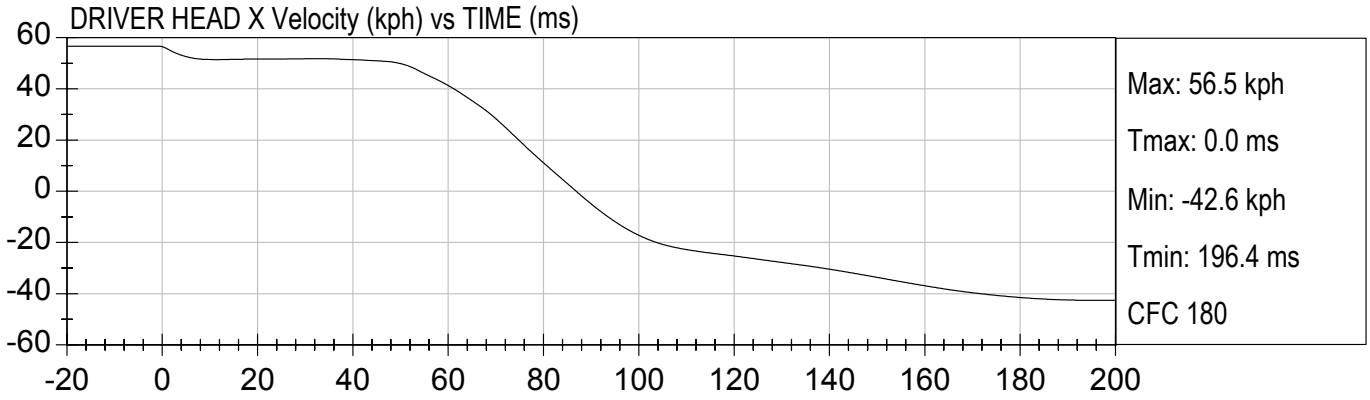


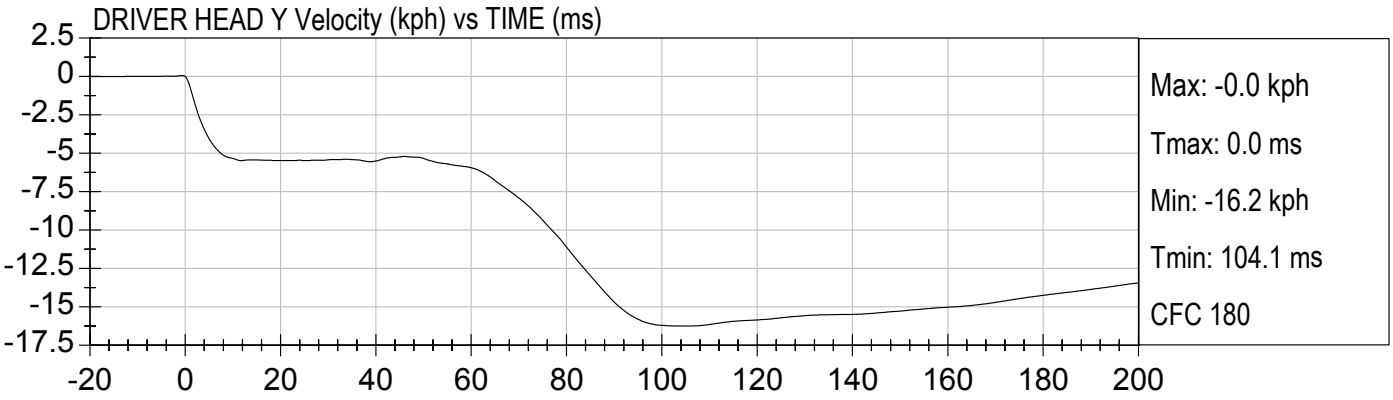


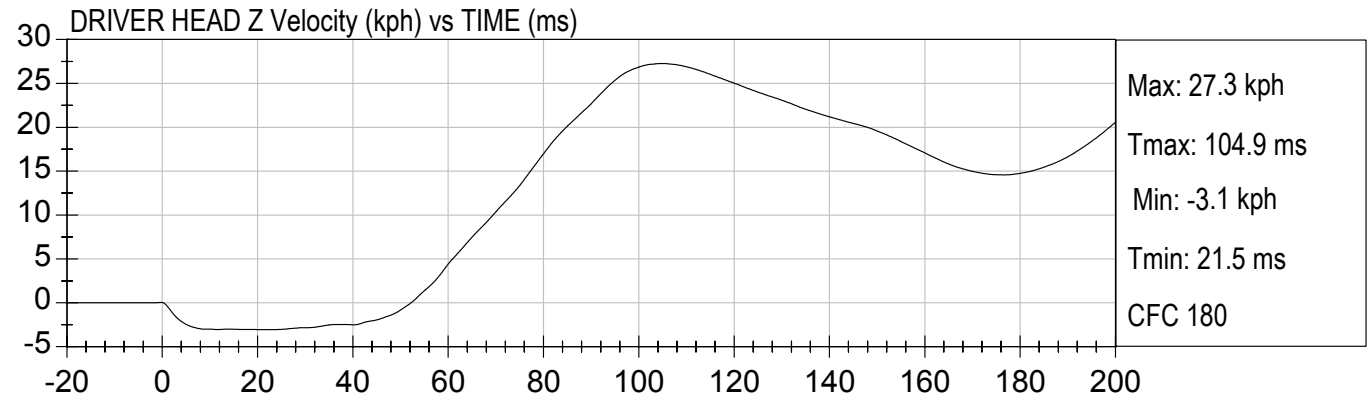


35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

Test Date: 9/4/2002
Speed: 35.2 mph (56.6 km/h)

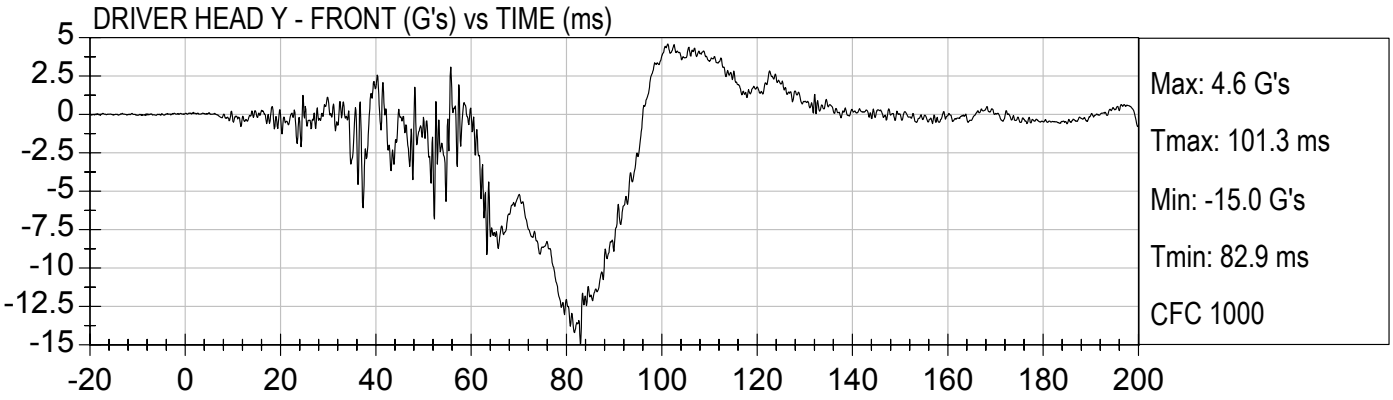


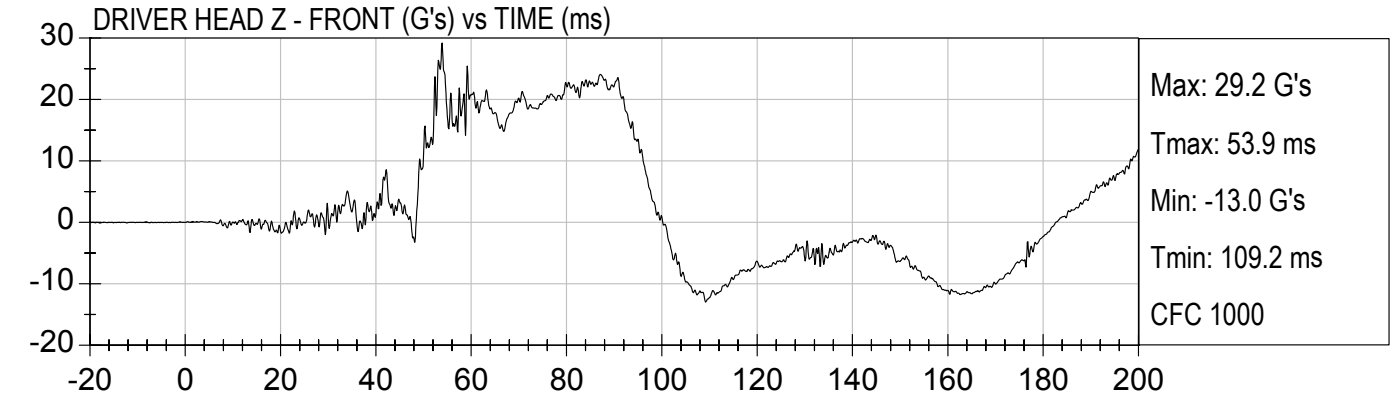




35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

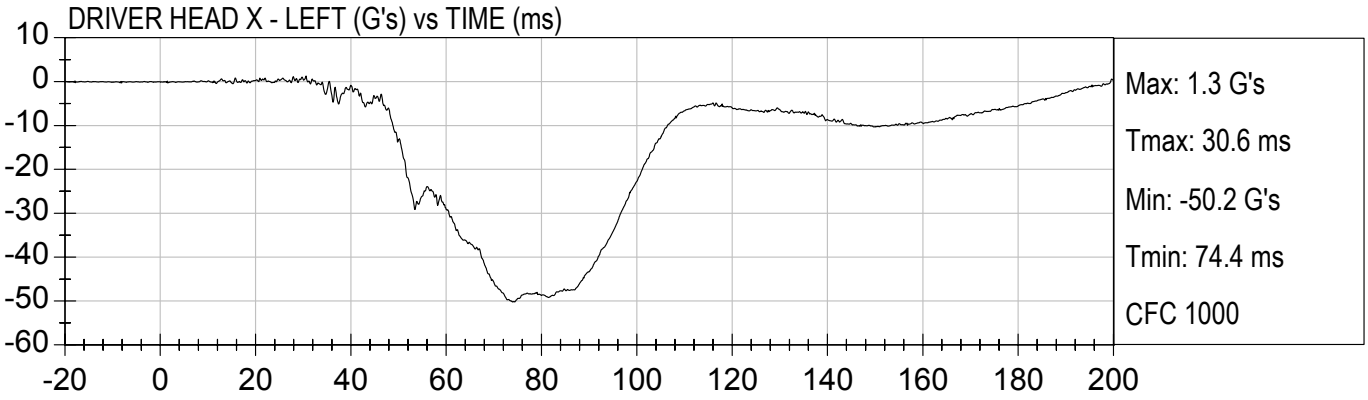
Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

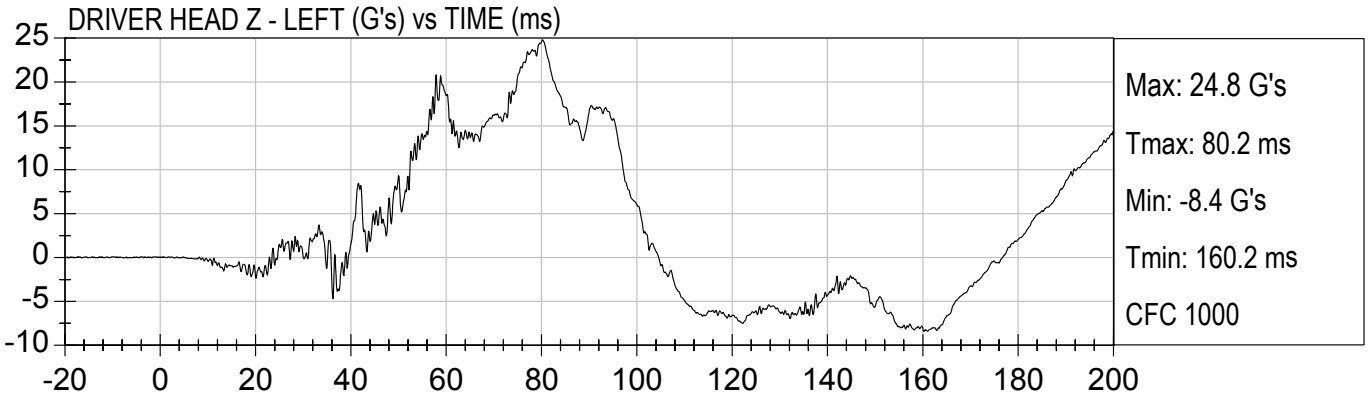


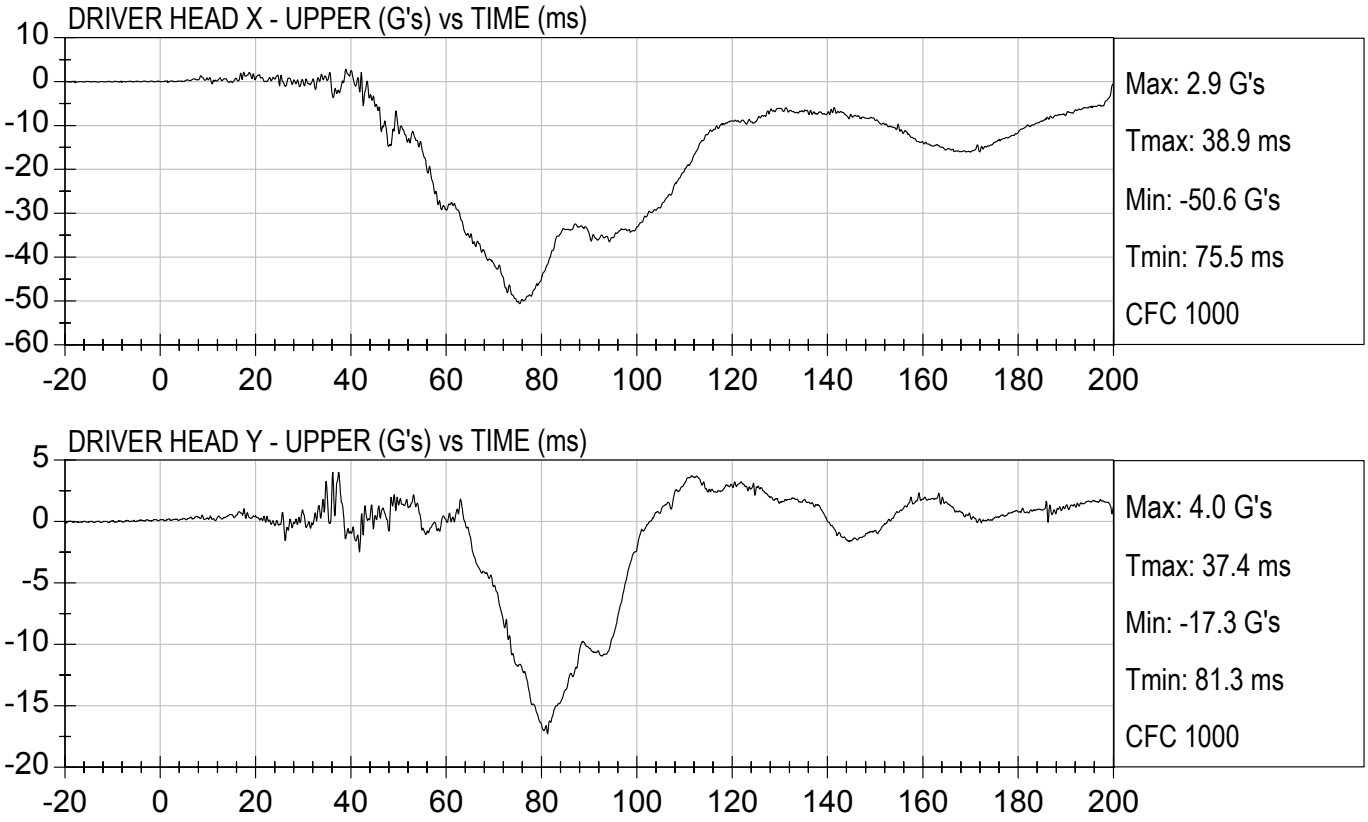


35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)



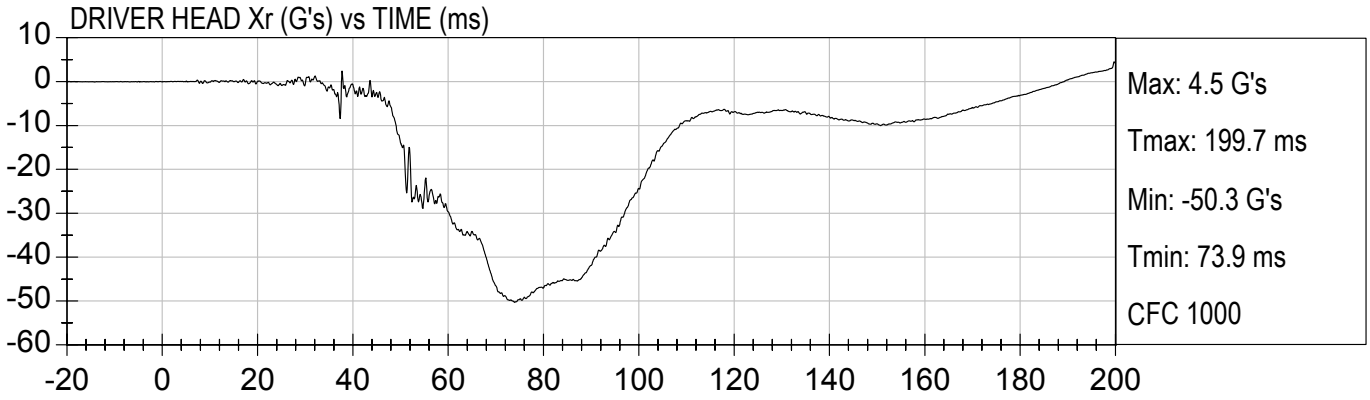


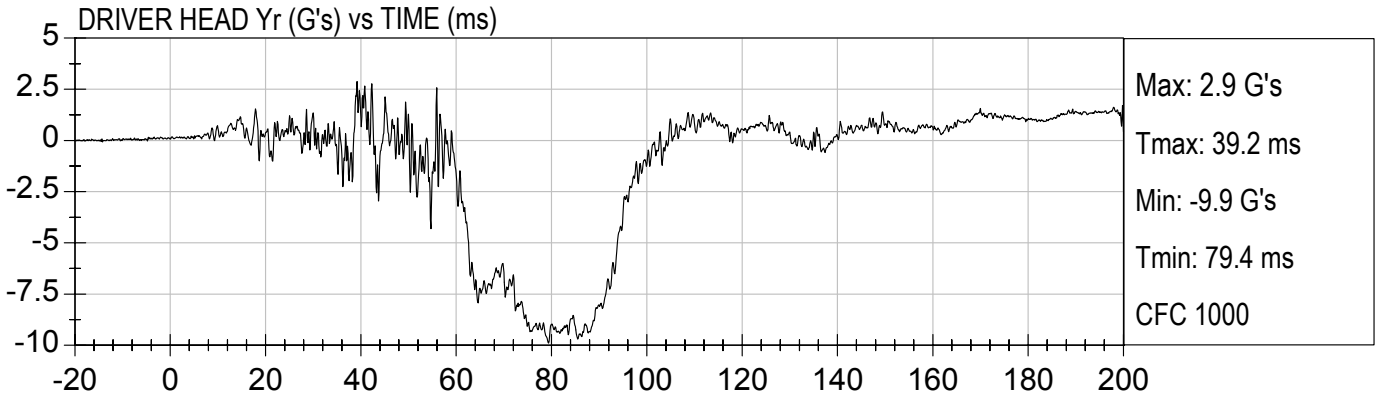

DRIVER HEAD X - UPPER (G's) vs TIME (ms)
10
0
-10
-20
-30
-40
-50
-60
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 2.9 G's
Tmax: 38.9 ms
Min: -50.6 G's
Tmin: 75.5 ms
CFC 1000

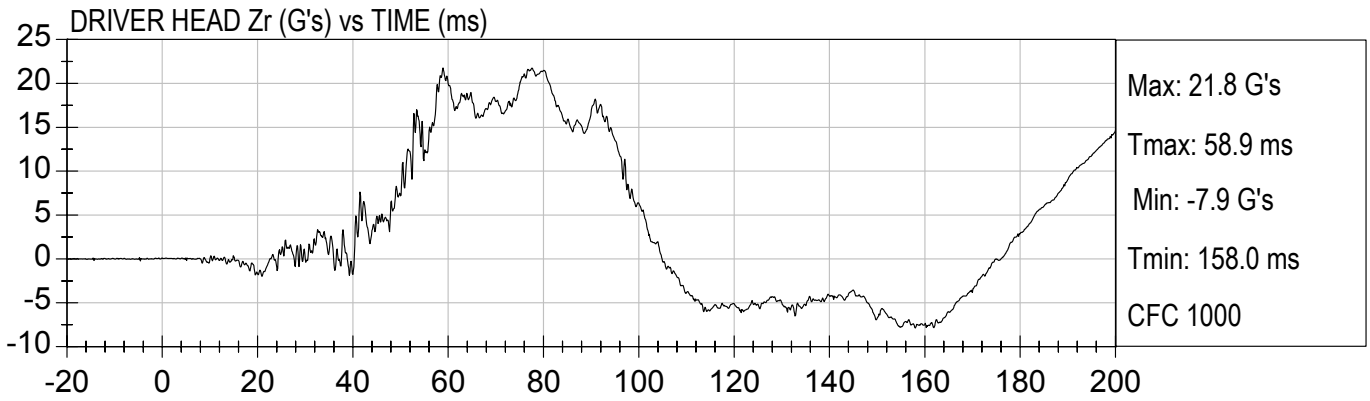
DRIVER HEAD Y - UPPER (G's) vs TIME (ms)
5
0
-5
-10
-15
-20
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 4.0 G's
Tmax: 37.4 ms
Min: -17.3 G's
Tmin: 81.3 ms
CFC 1000

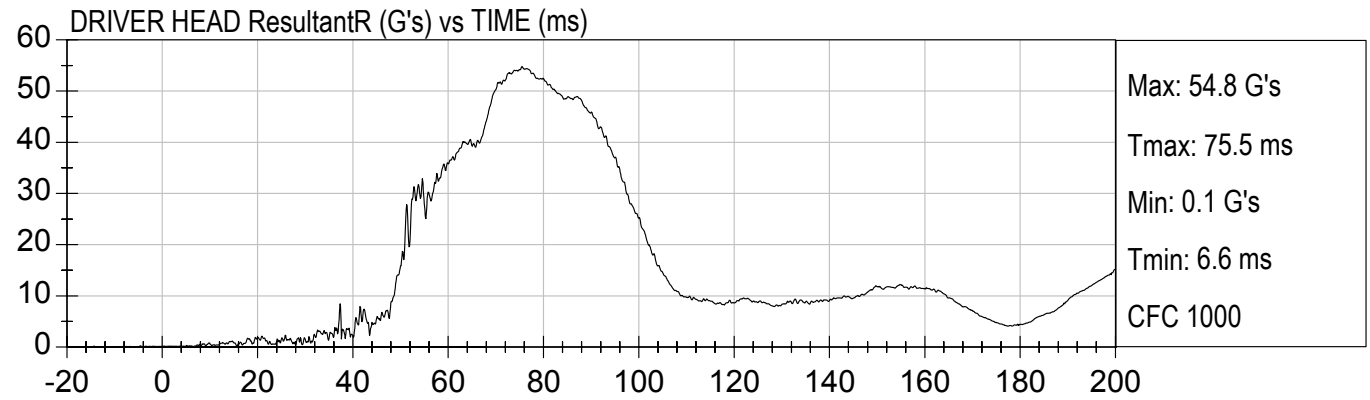
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

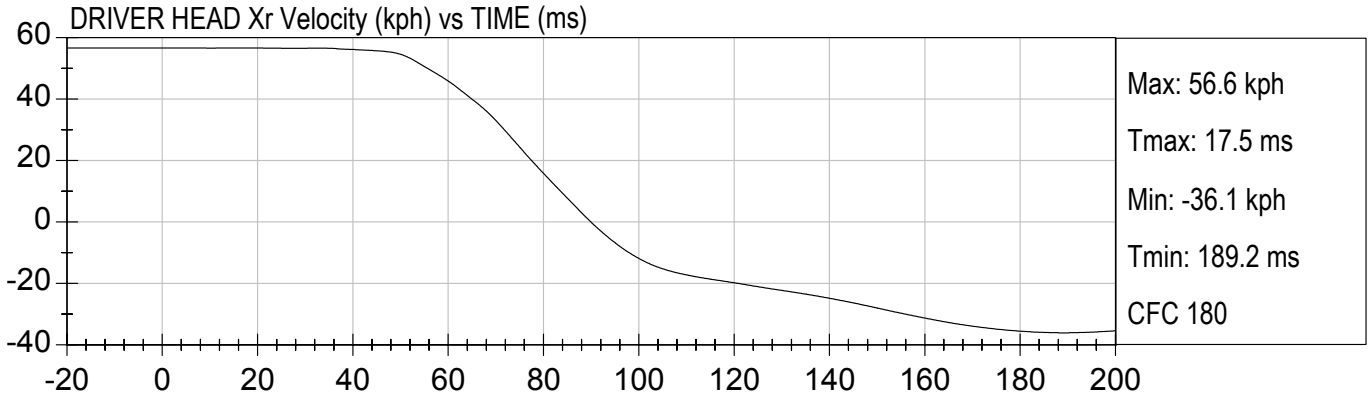
Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

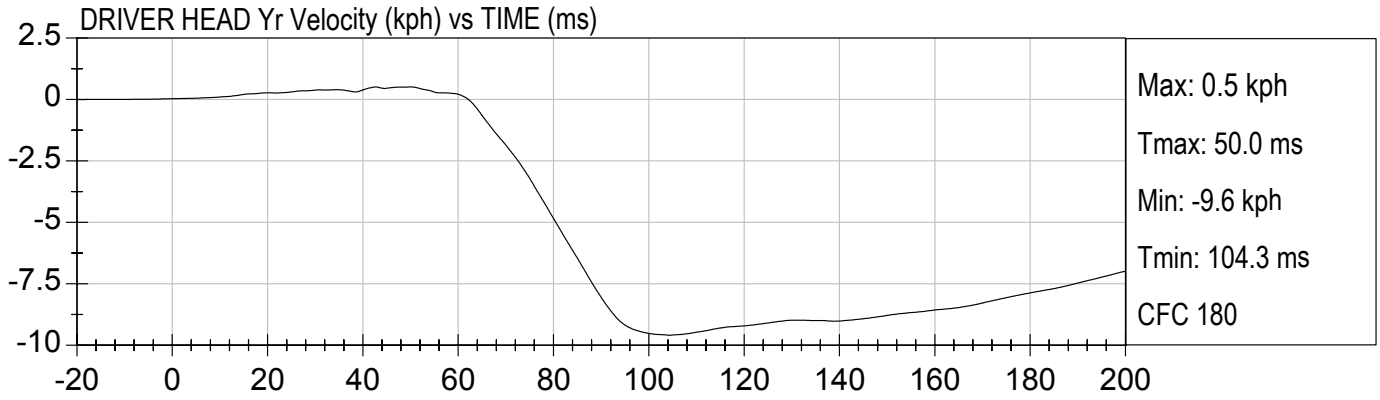


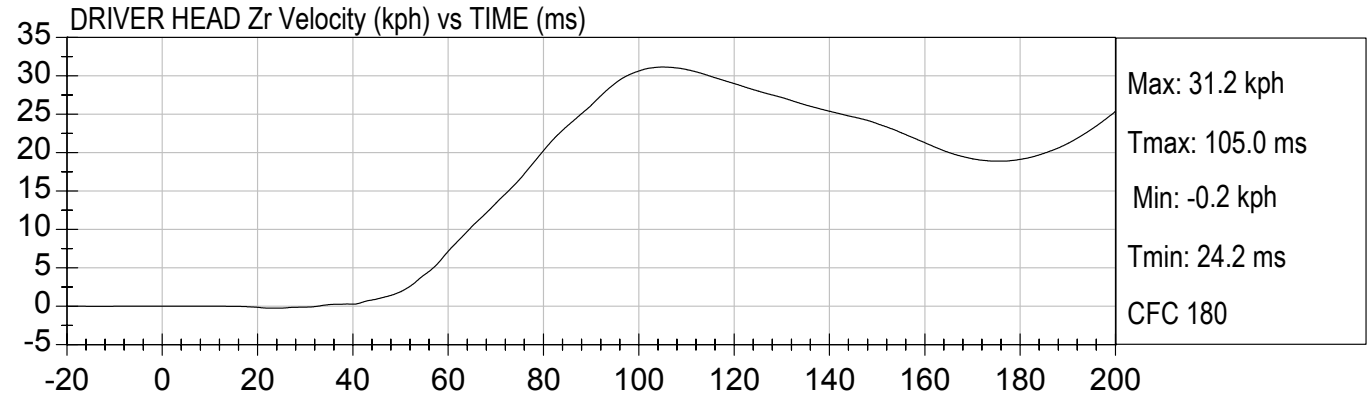






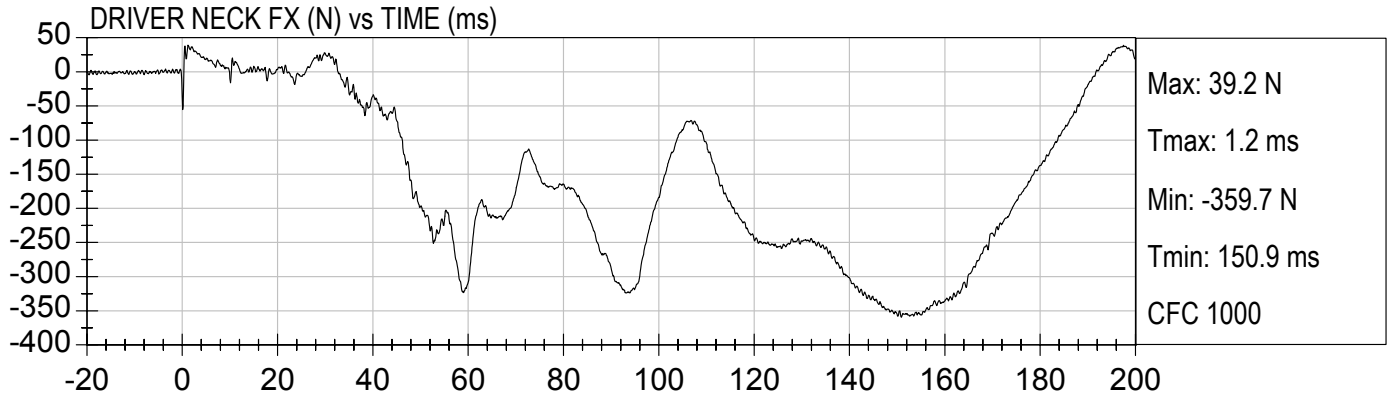

DRIVER HEAD Xr Velocity (kph) vs TIME (ms)
60
40
20
0
-20
-40
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 56.6 kph
Tmax: 17.5 ms
Min: -36.1 kph
Tmin: 189.2 ms
CFC 180

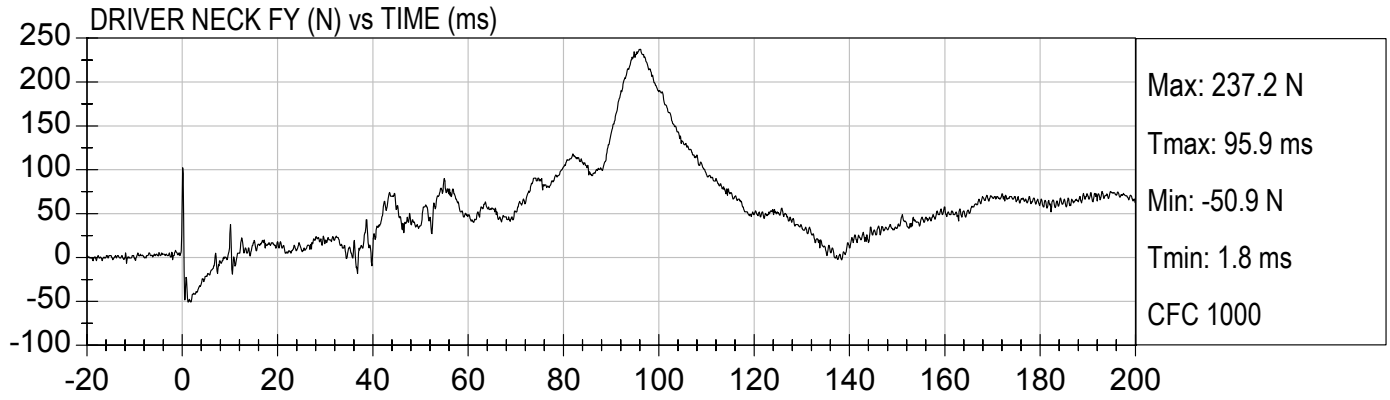

DRIVER HEAD Yr Velocity (kph) vs TIME (ms)
2.5
0
-2.5
-5
-7.5
-10
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 0.5 kph
Tmax: 50.0 ms
Min: -9.6 kph
Tmin: 104.3 ms
CFC 180

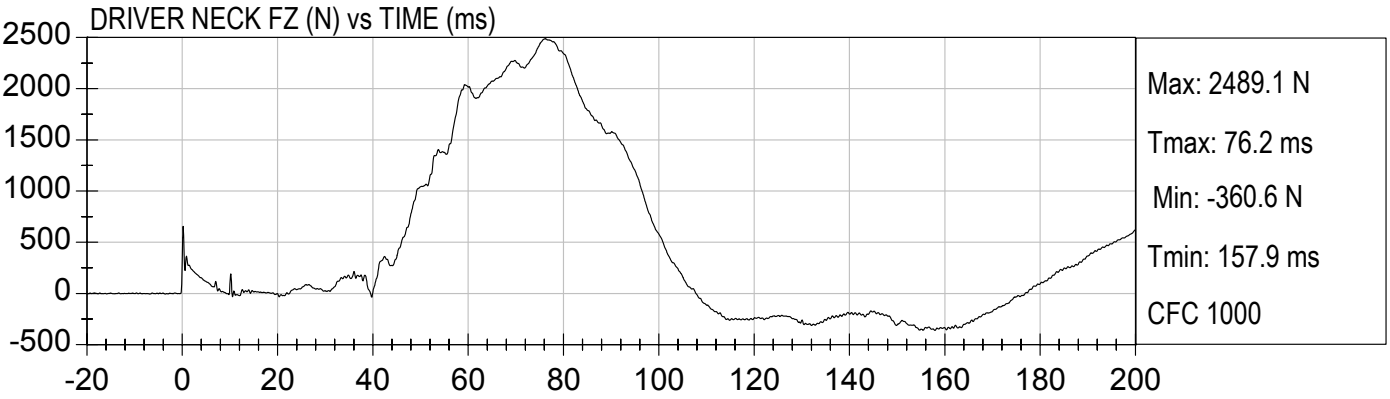

DRIVER HEAD Zr Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 31.2 kph
Tmax: 105.0 ms
Min: -0.2 kph
Tmin: 24.2 ms
CFC 180

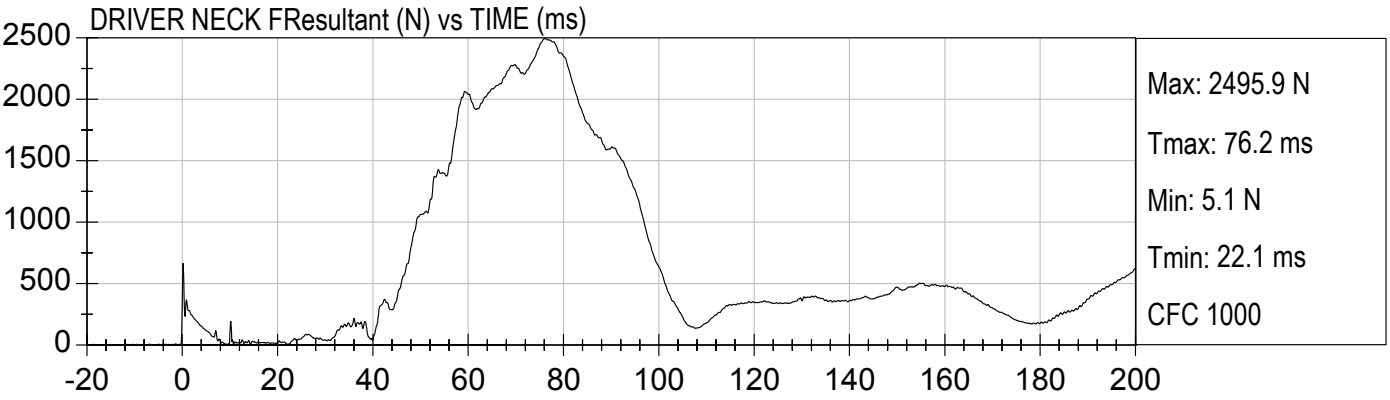
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

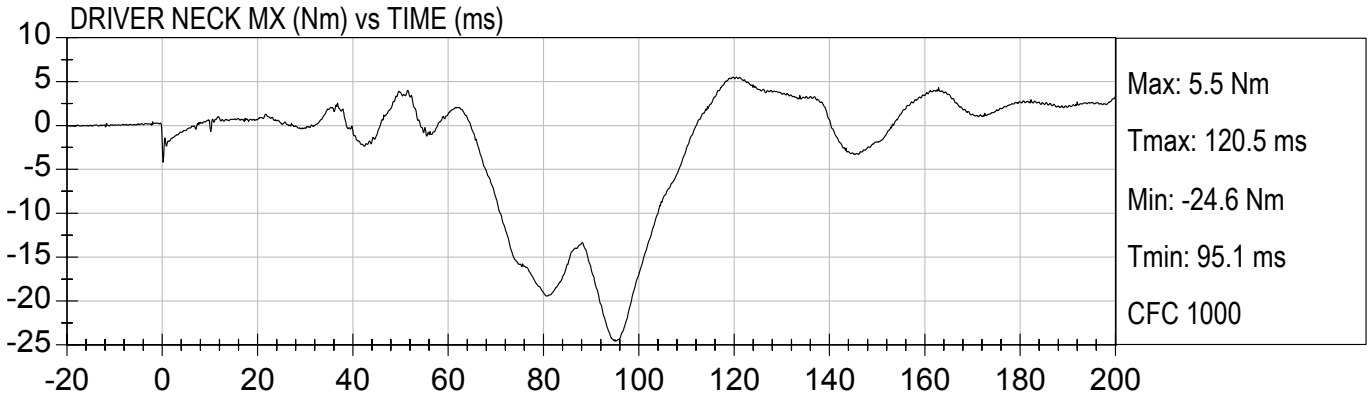
Test Date: 9/4/2002
Speed: 35.2 mph (56.6 km/h)

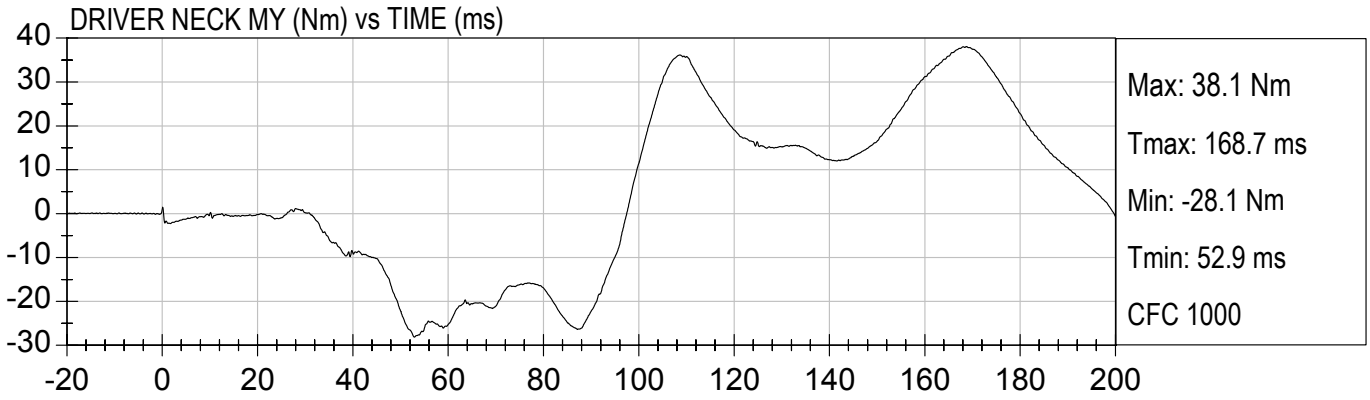


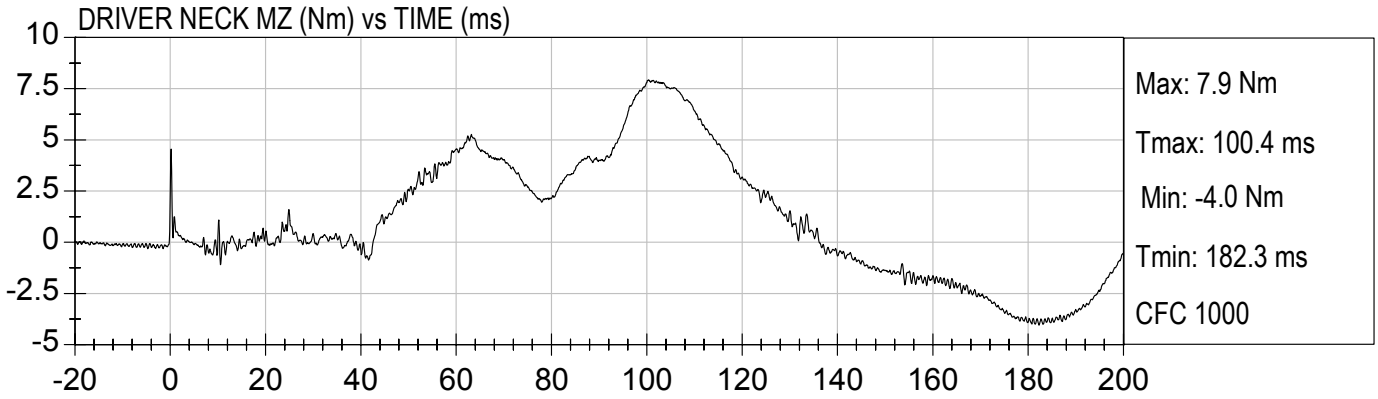






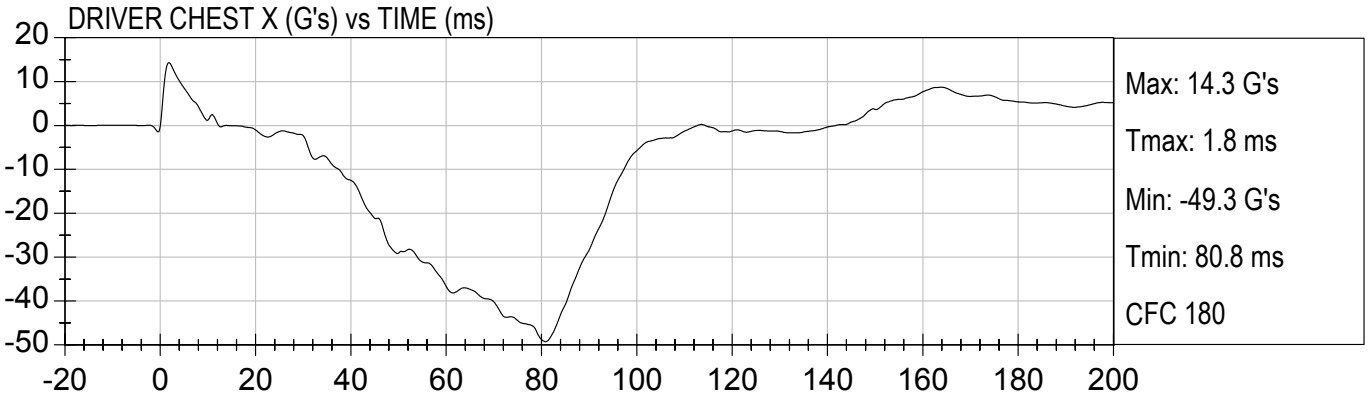

DRIVER NECK MX (Nm) vs TIME (ms)
10
5
0
-5
-10
-15
-20
-25
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 5.5 Nm
Tmax: 120.5 ms
Min: -24.6 Nm
Tmin: 95.1 ms
CFC 1000

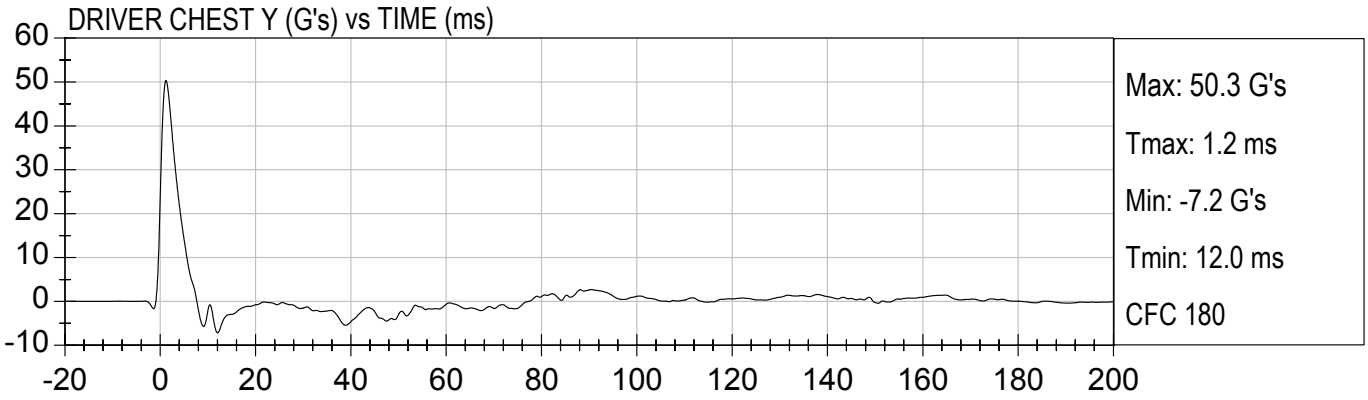

DRIVER NECK MY (Nm) vs TIME (ms)
40
30
20
10
0
-10
-20
-30
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 38.1 Nm
Tmax: 168.7 ms
Min: -28.1 Nm
Tmin: 52.9 ms
CFC 1000

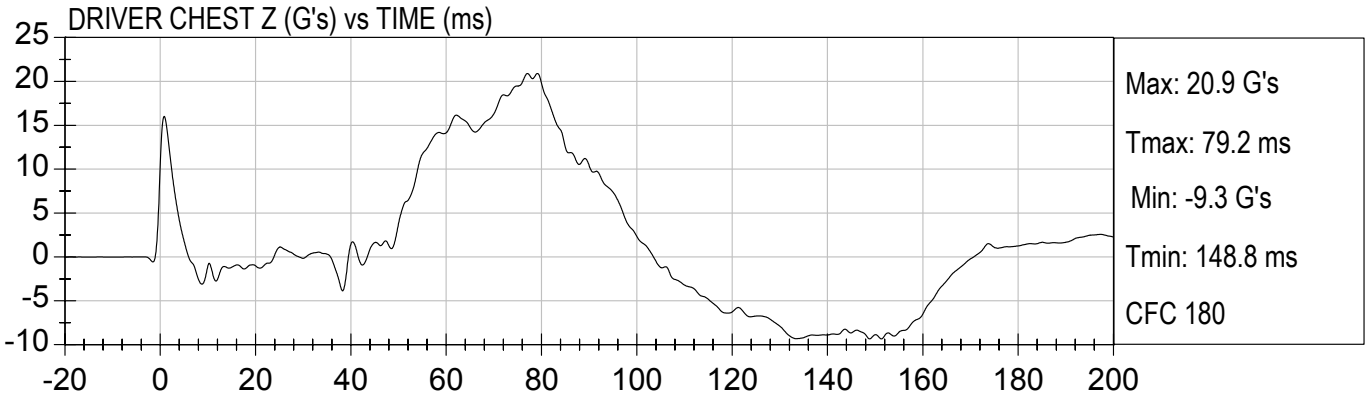

DRIVER NECK MZ (Nm) vs TIME (ms)
10
7.5
5
2.5
0
-2.5
-5
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 7.9 Nm
Tmax: 100.4 ms
Min: -4.0 Nm
Tmin: 182.3 ms
CFC 1000

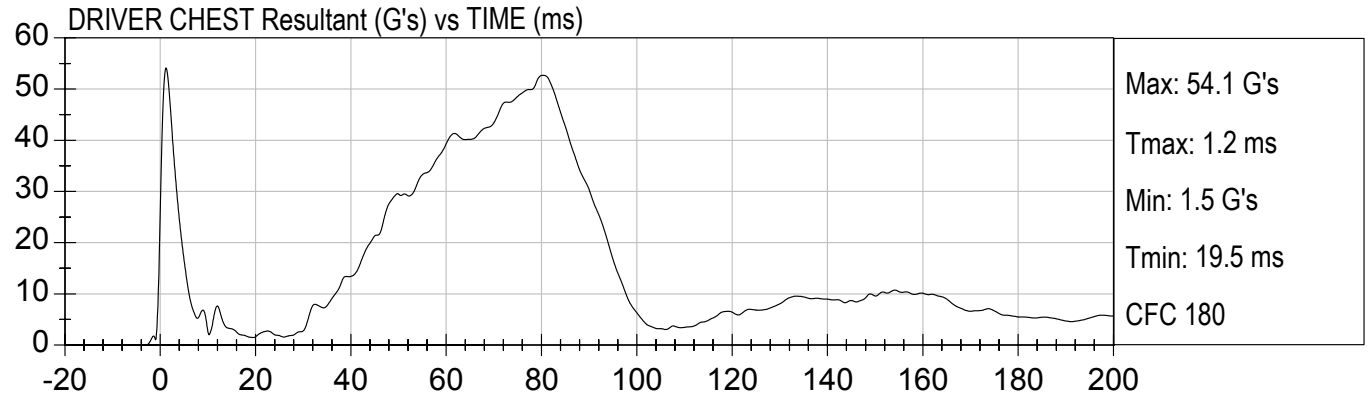
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

Test Date: 9/4/2002
Speed: 35.2 mph (56.6 km/h)



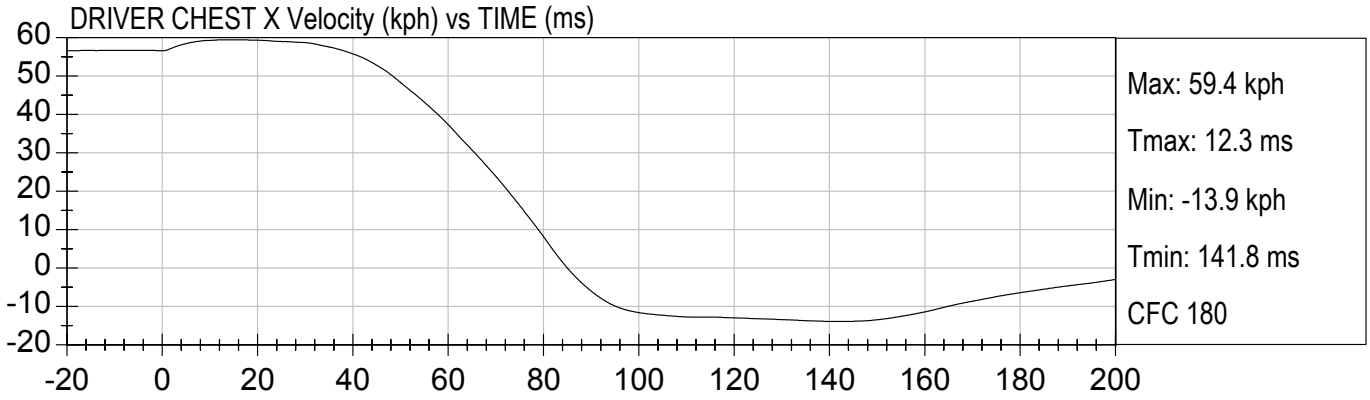


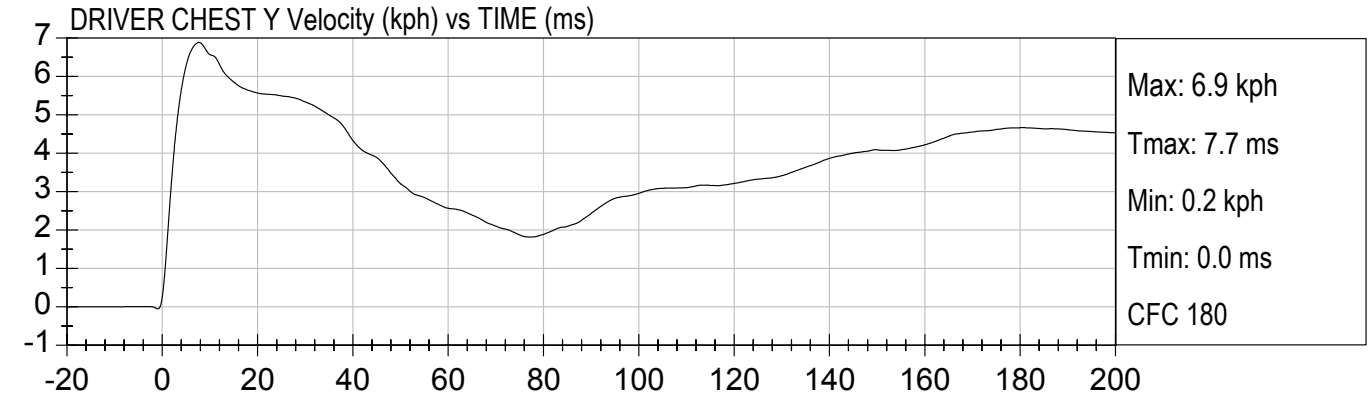


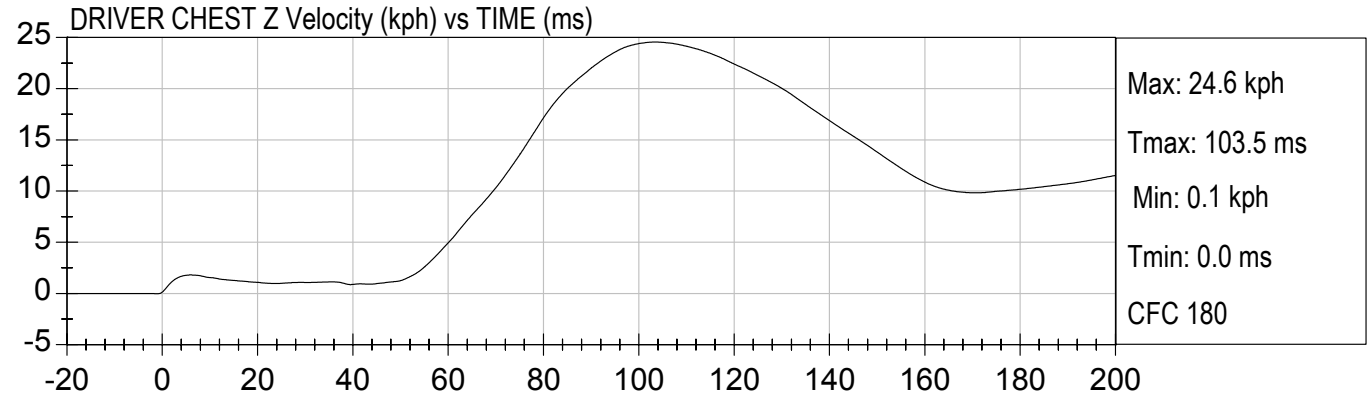


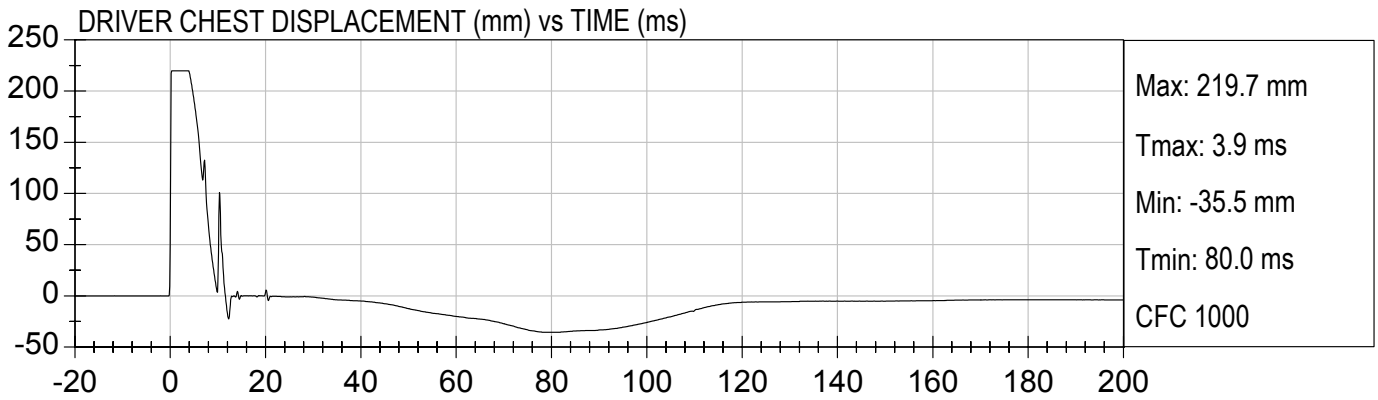
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

Test Date: 9/4/2002
Speed: 35.2 mph (56.6 km/h)



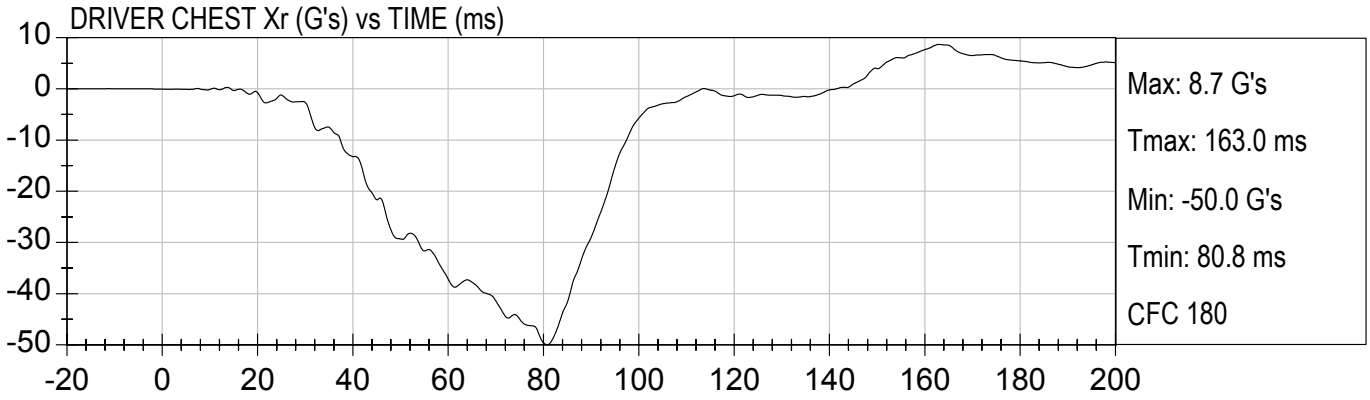


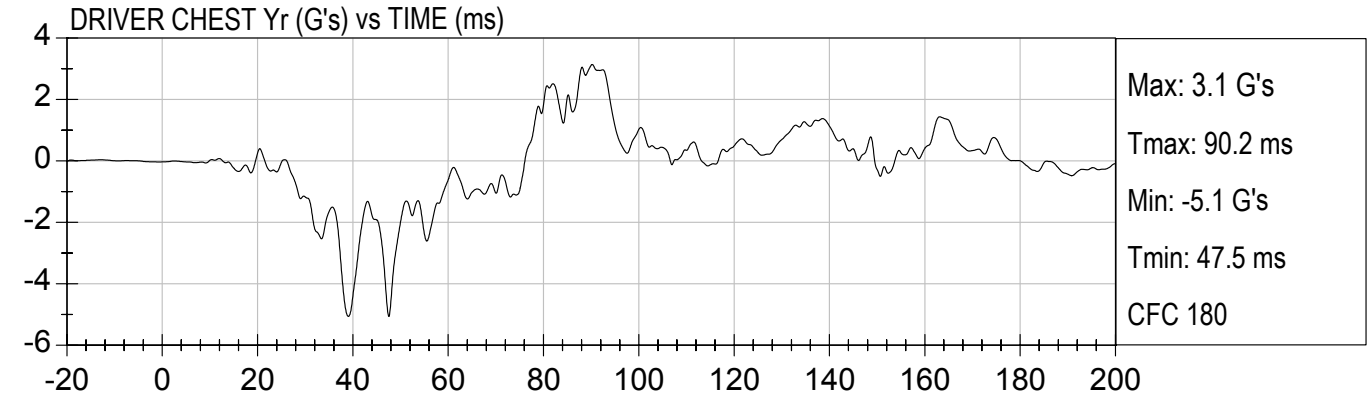


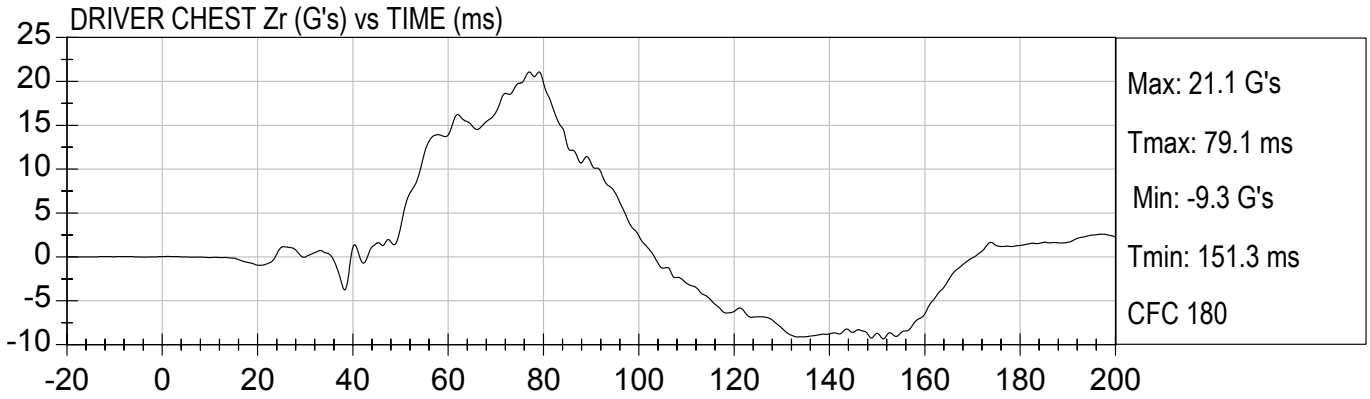


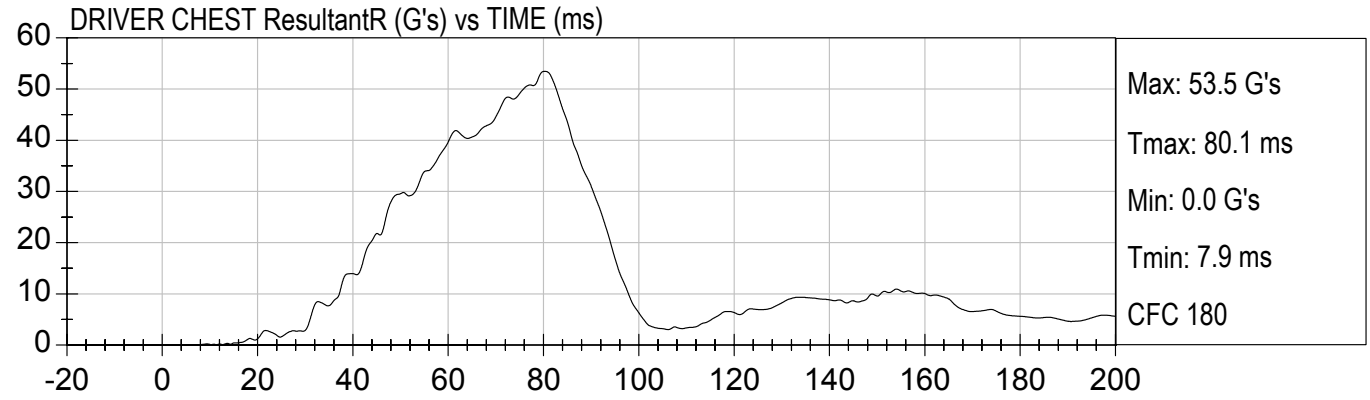
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

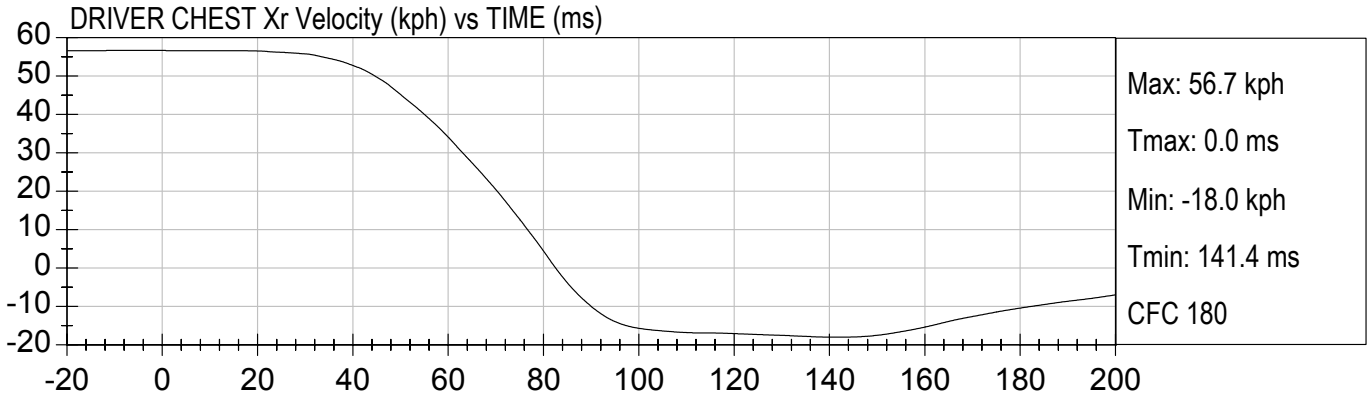
Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

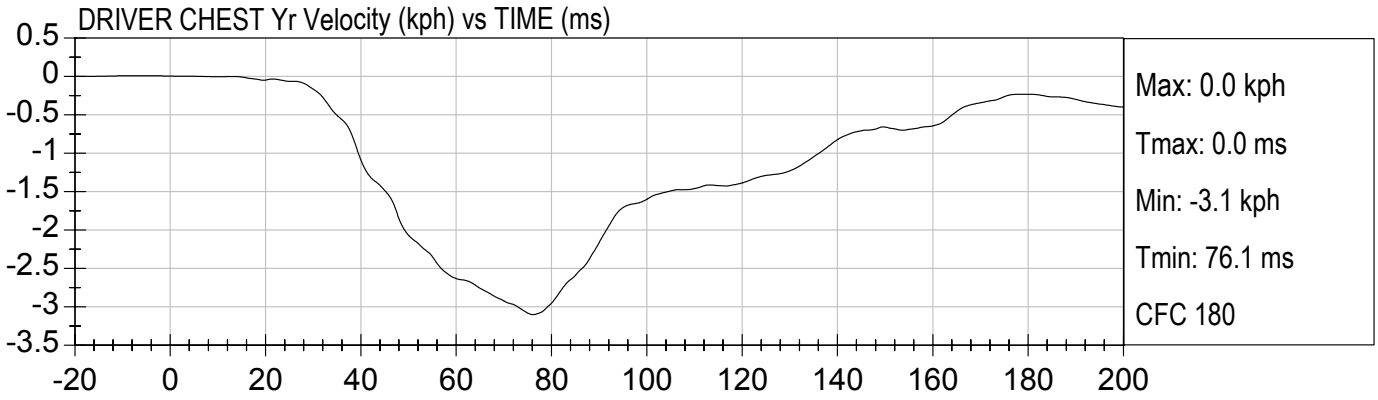


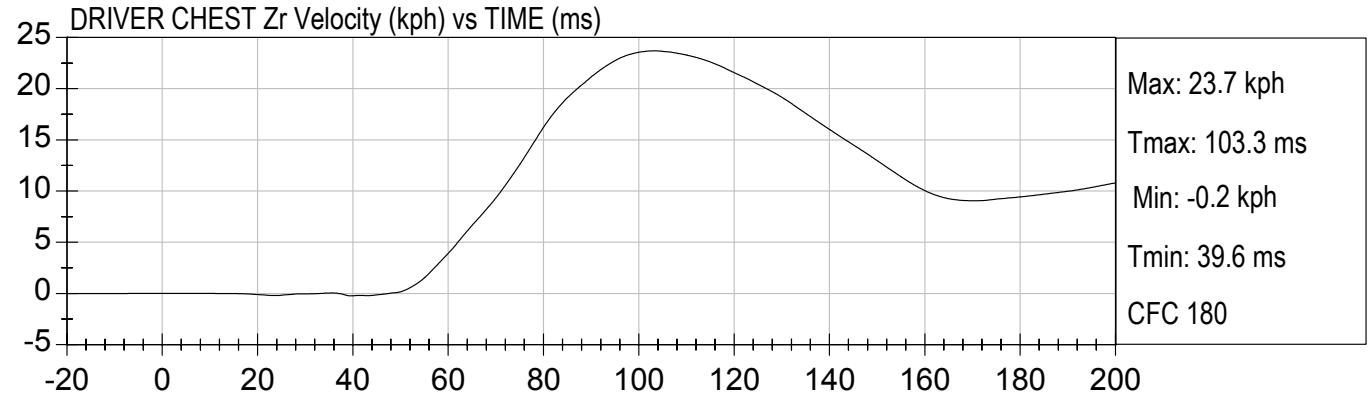






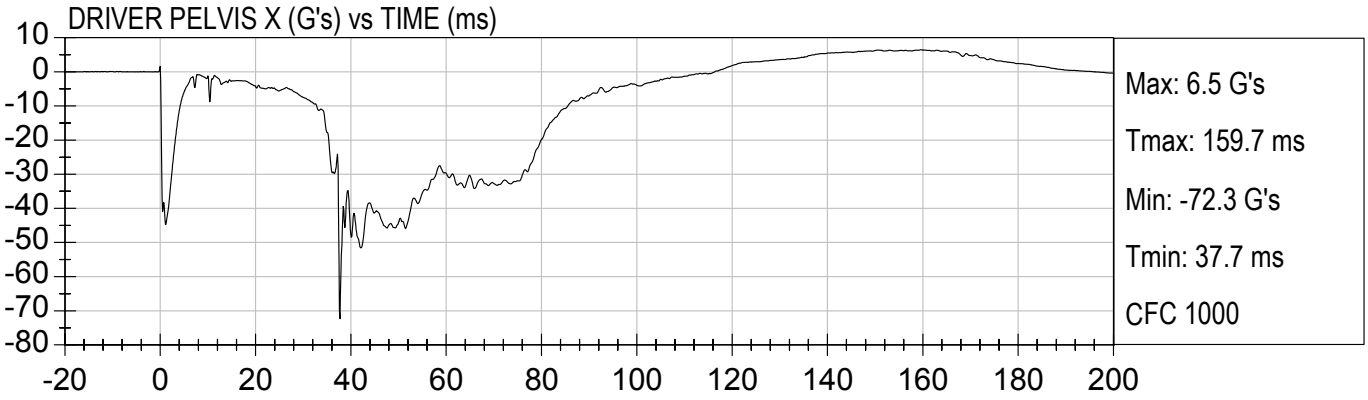

DRIVER CHEST Xr Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 56.7 kph
Tmax: 0.0 ms
Min: -18.0 kph
Tmin: 141.4 ms
CFC 180

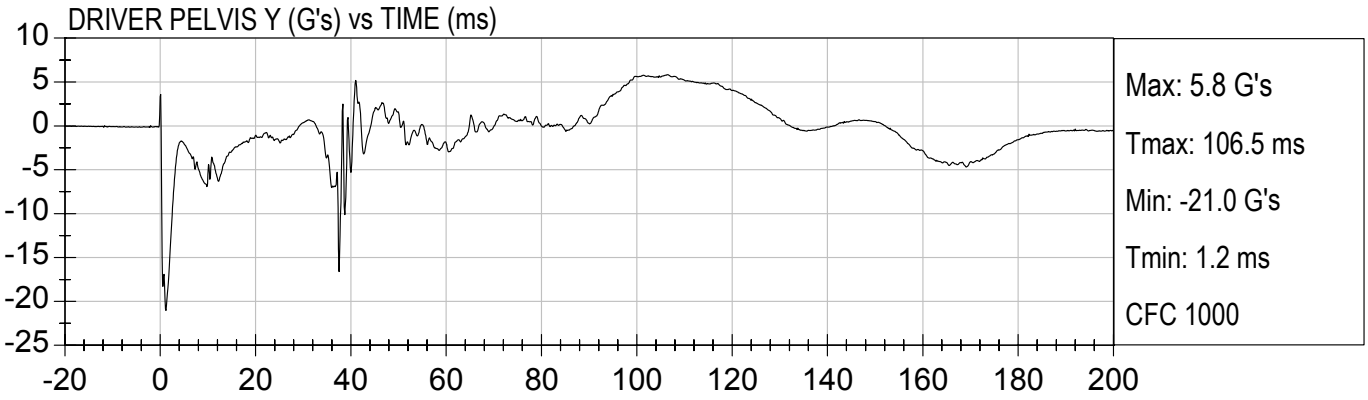

DRIVER CHEST Yr Velocity (kph) vs TIME (ms)
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 0.0 kph
Tmax: 0.0 ms
Min: -3.1 kph
Tmin: 76.1 ms
CFC 180

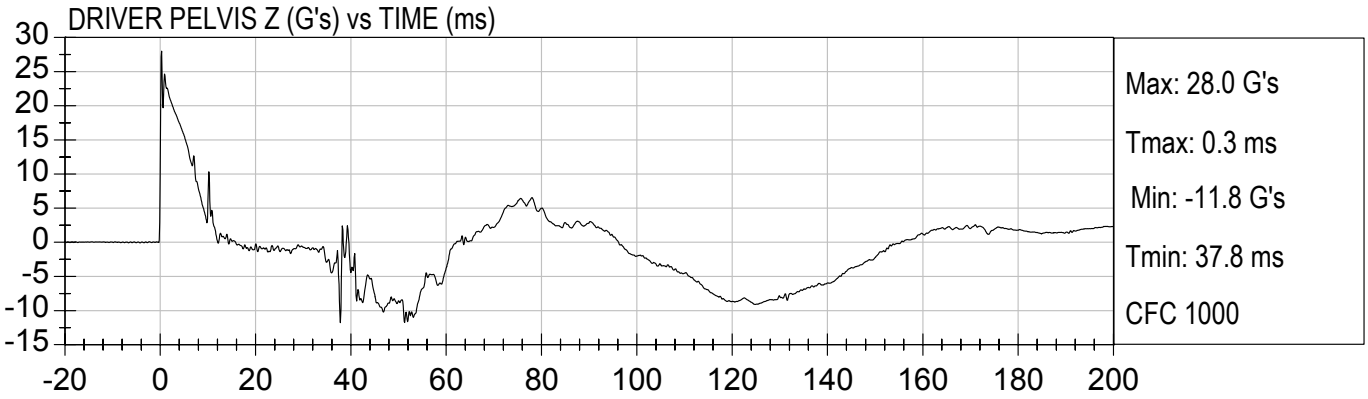

DRIVER CHEST Zr Velocity (kph) vs TIME (ms)
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 23.7 kph
Tmax: 103.3 ms
Min: -0.2 kph
Tmin: 39.6 ms
CFC 180

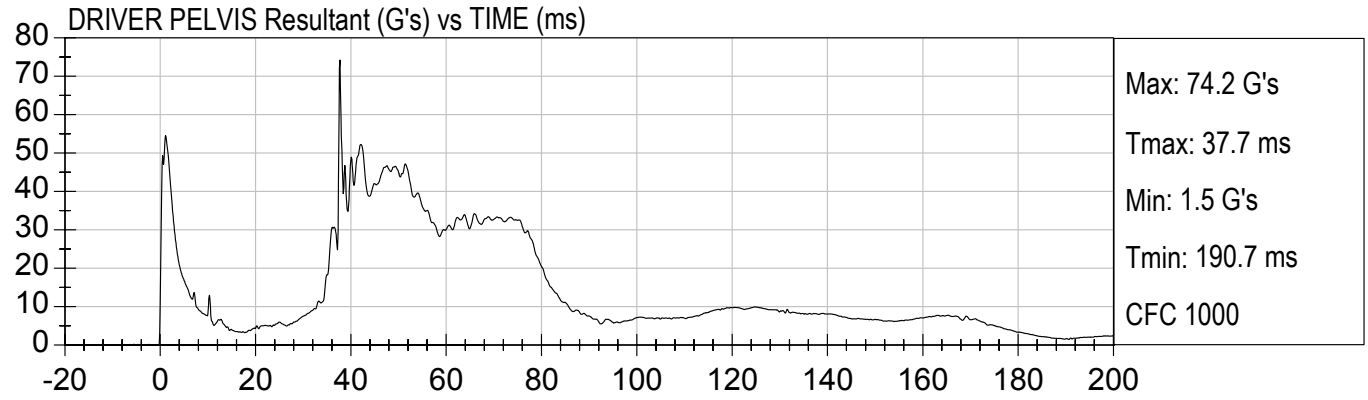
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

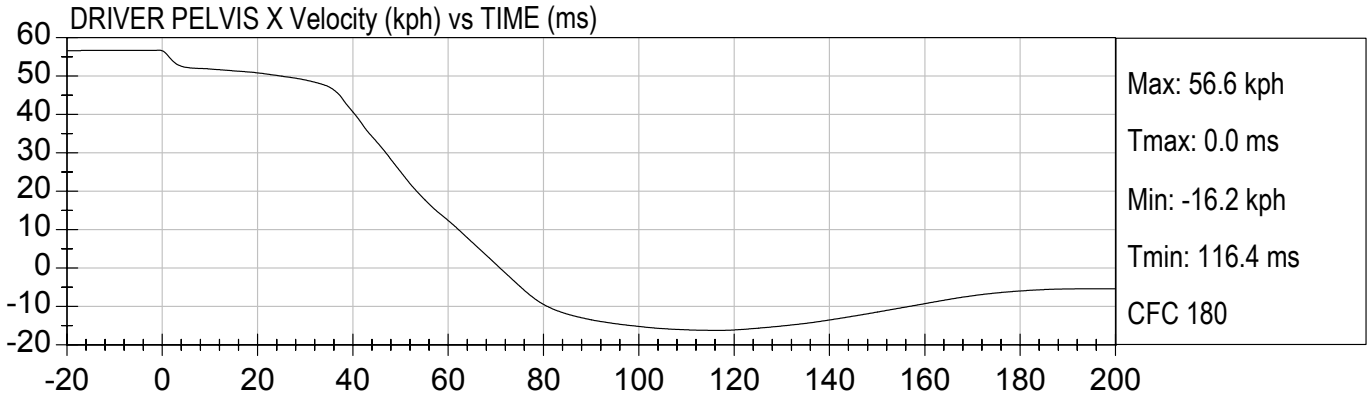
Test Date: 9/4/2002
Speed: 35.2 mph (56.6 km/h)

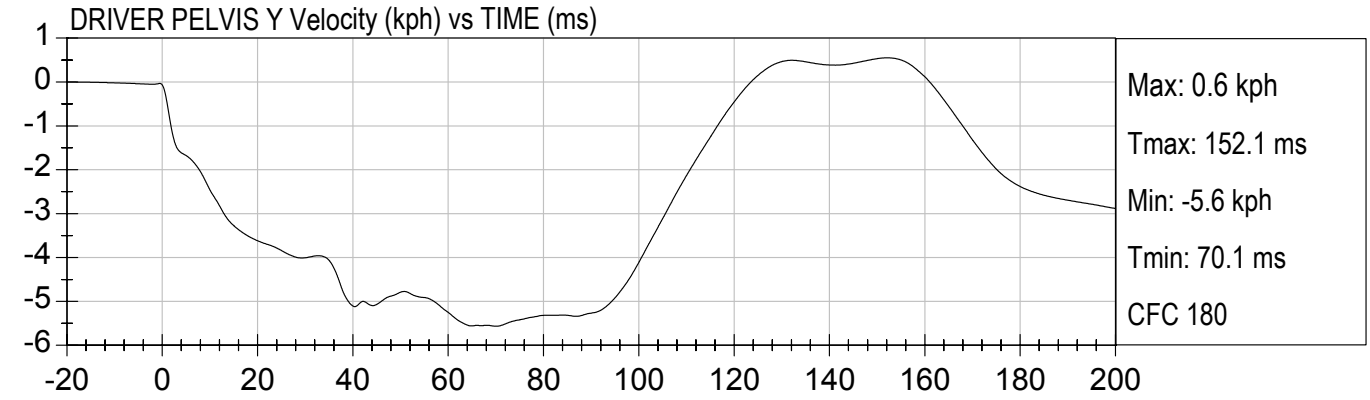


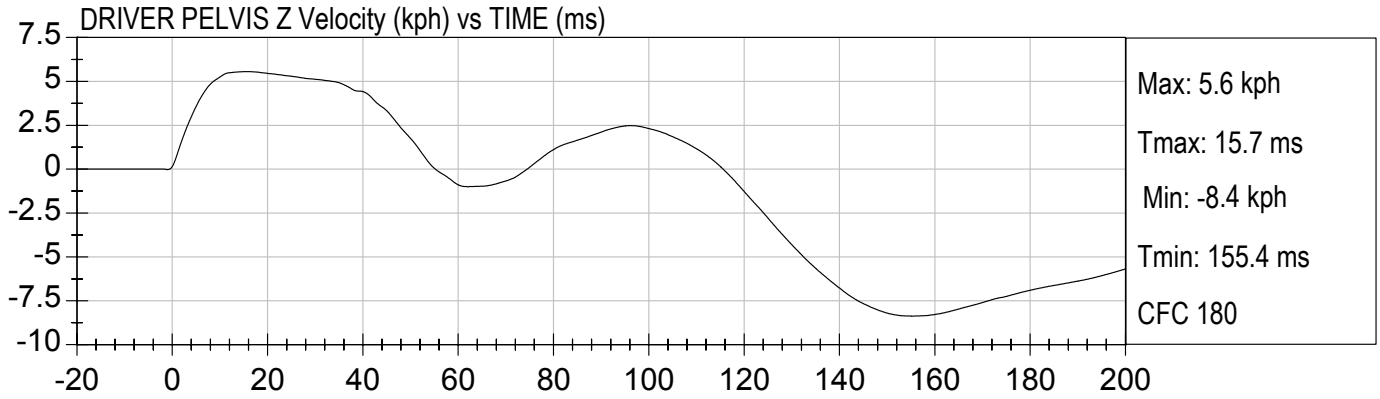


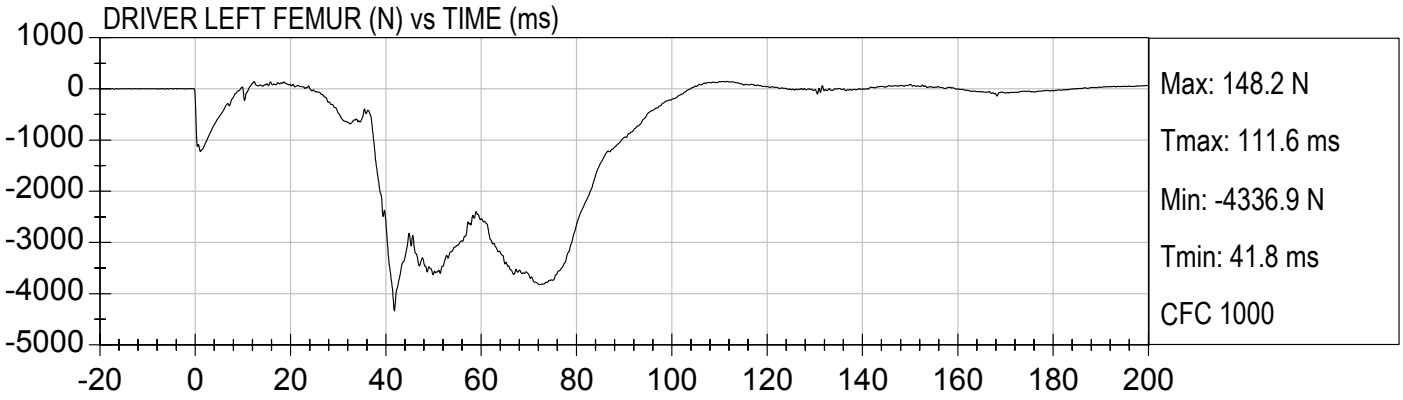


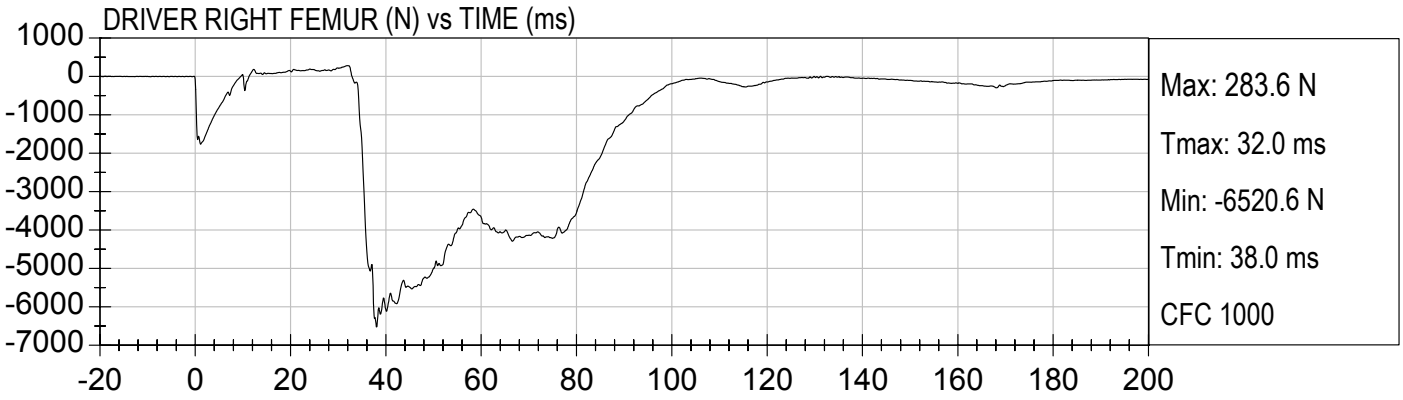



DRIVER PELVIS X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 56.6 kph
Tmax: 0.0 ms
Min: -16.2 kph
Tmin: 116.4 ms
CFC 180


DRIVER PELVIS Y Velocity (kph) vs TIME (ms)
1
0
-1
-2
-3
-4
-5
-6
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 0.6 kph
Tmax: 152.1 ms
Min: -5.6 kph
Tmin: 70.1 ms
CFC 180

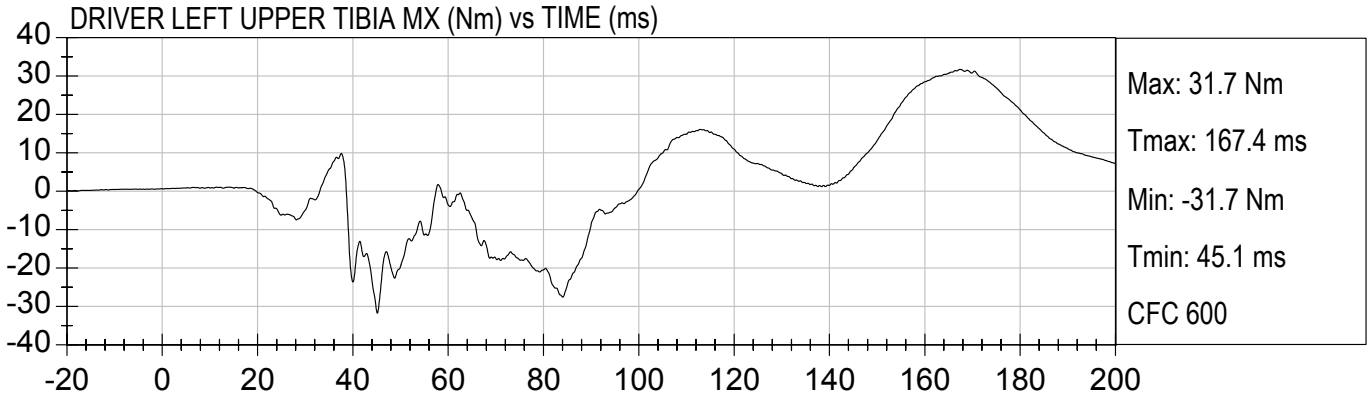

DRIVER PELVIS Z Velocity (kph) vs TIME (ms)
7.5
5
2.5
0
-2.5
-5
-7.5
-10
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 5.6 kph
Tmax: 15.7 ms
Min: -8.4 kph
Tmin: 155.4 ms
CFC 180

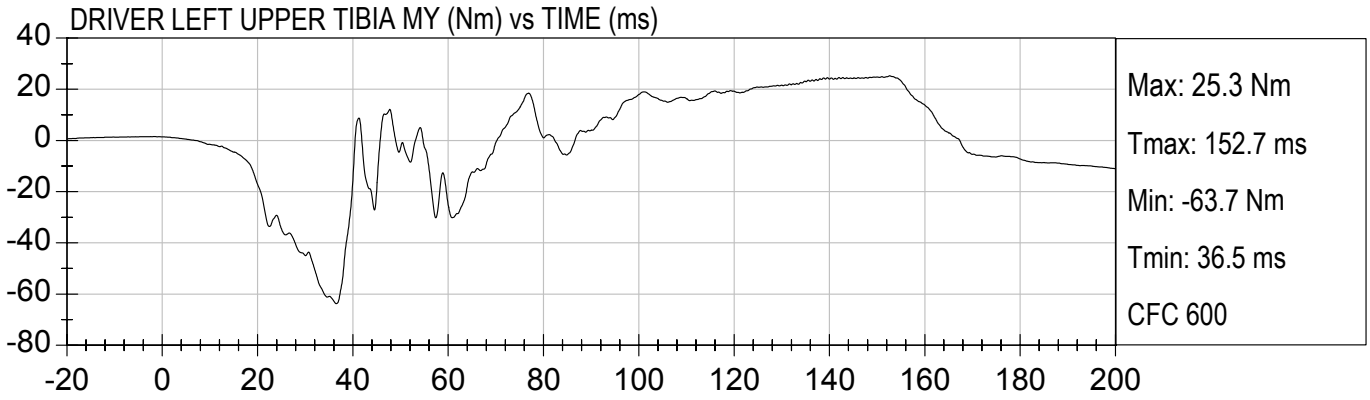

DRIVER LEFT FEMUR (N) vs TIME (ms)
1000
0
-1000
-2000
-3000
-4000
-5000
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 148.2 N
Tmax: 111.6 ms
Min: -4336.9 N
Tmin: 41.8 ms
CFC 1000

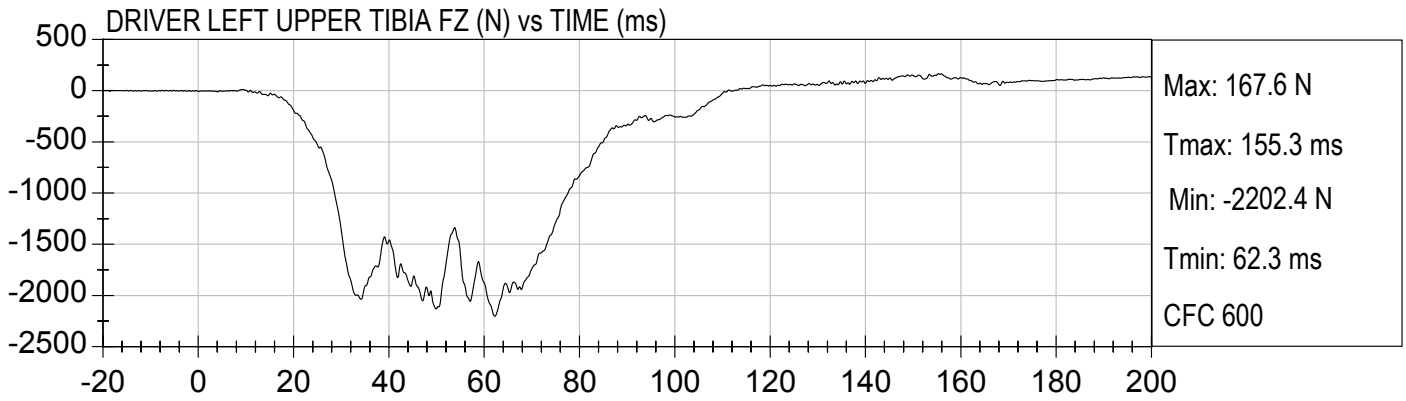

DRIVER RIGHT FEMUR (N) vs TIME (ms)
1000
0
-1000
-2000
-3000
-4000
-5000
-6000
-7000
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 283.6 N
Tmax: 32.0 ms
Min: -6520.6 N
Tmin: 38.0 ms
CFC 1000

35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

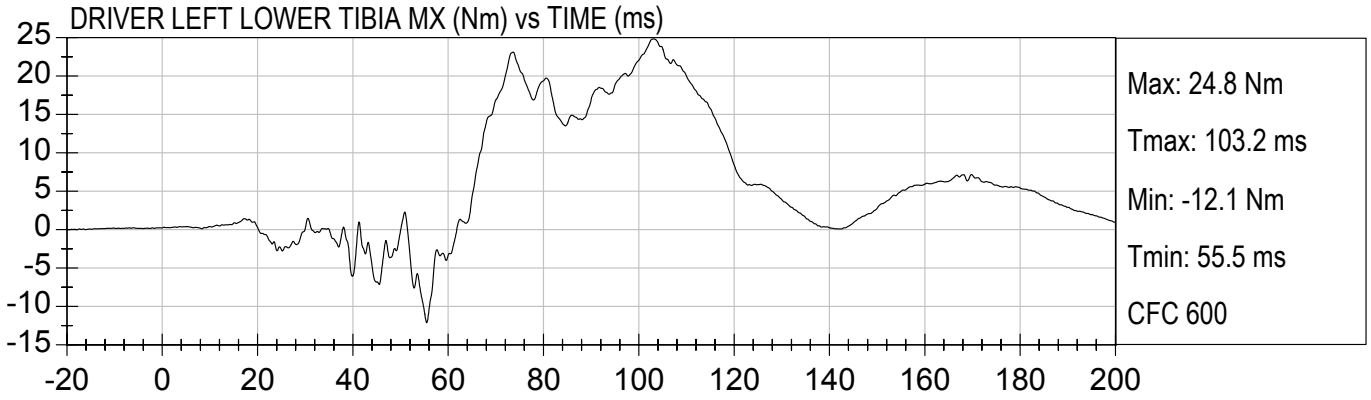


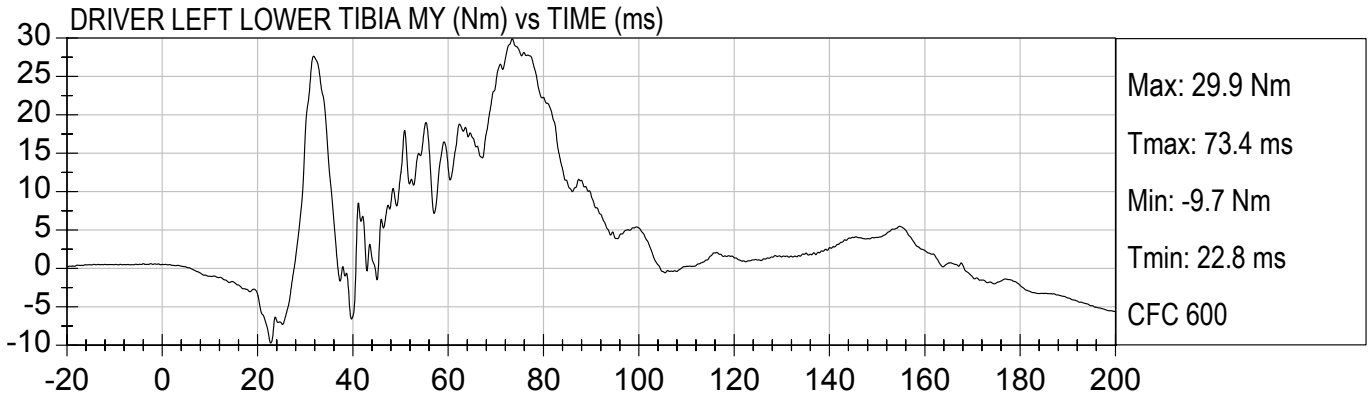


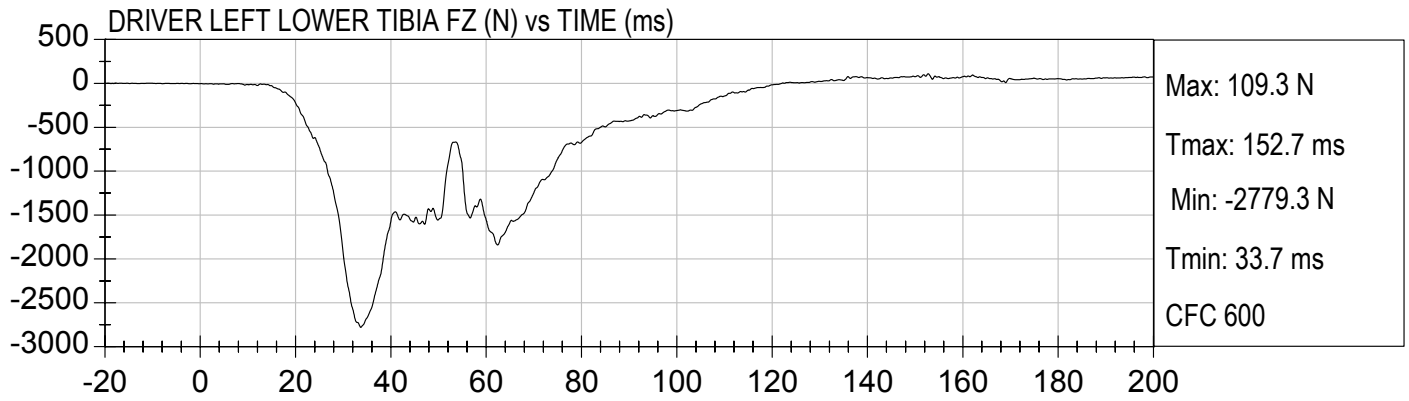


35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

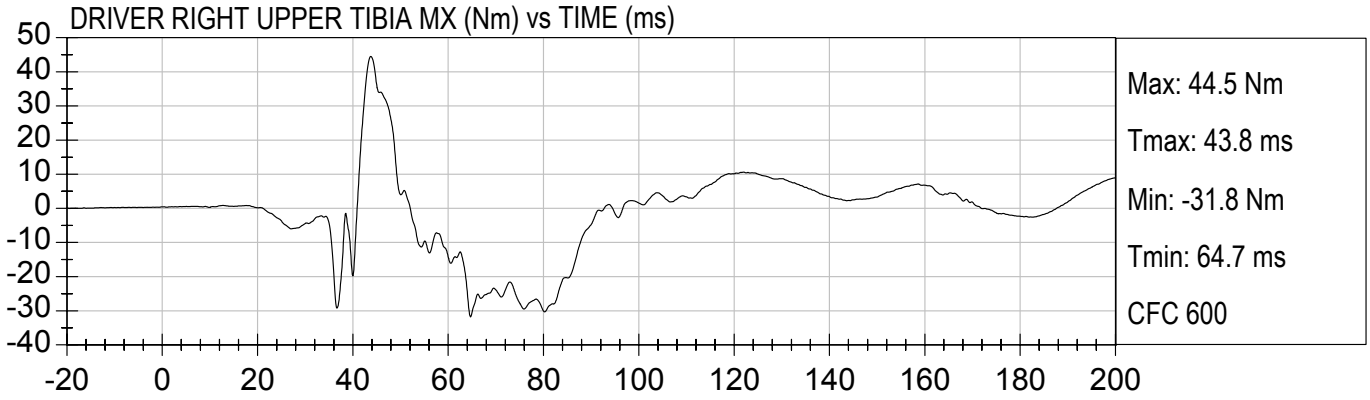


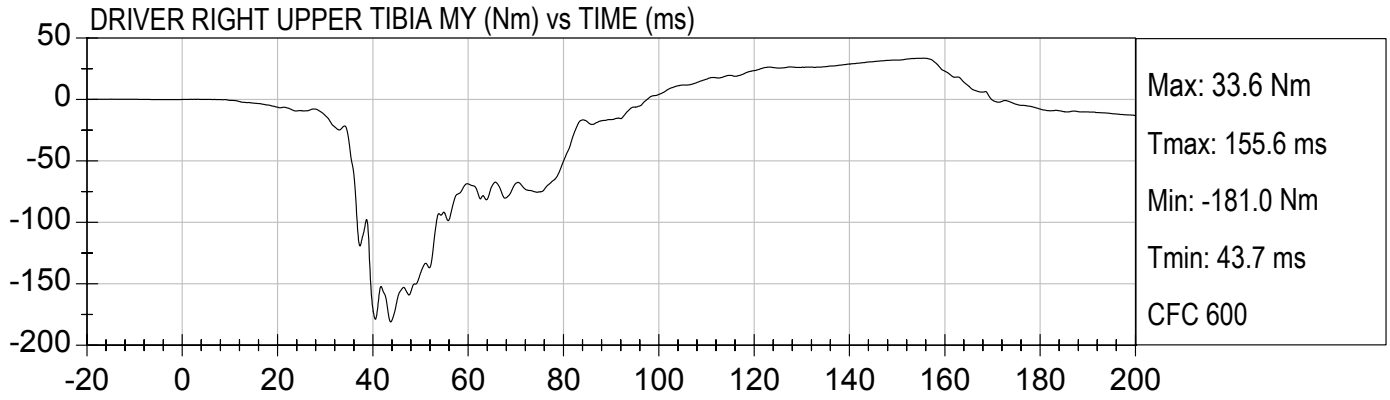


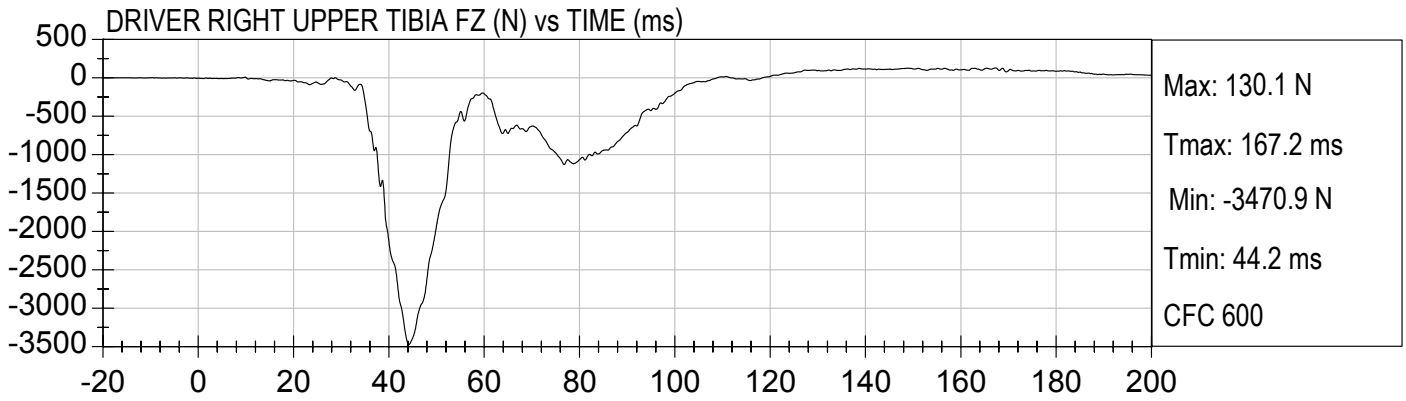


35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

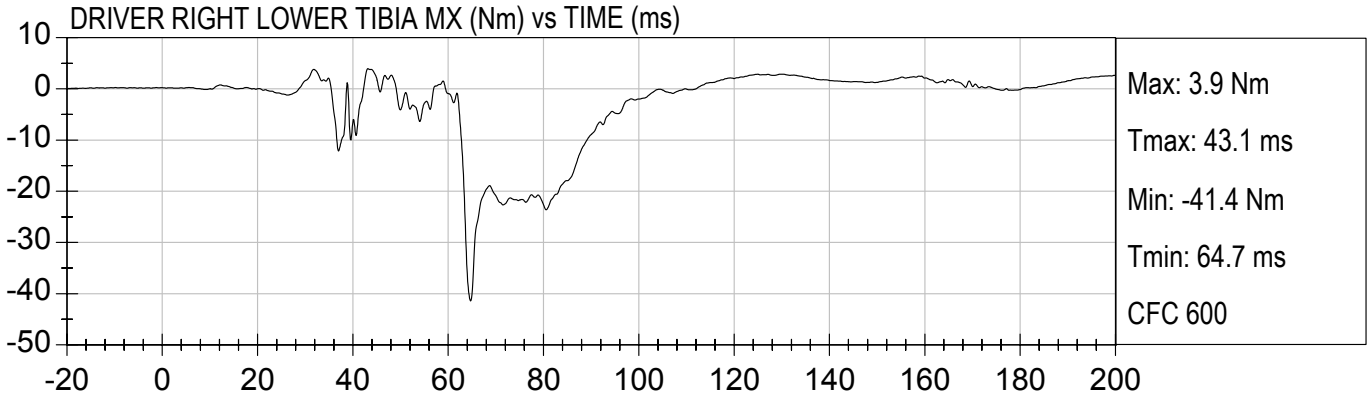


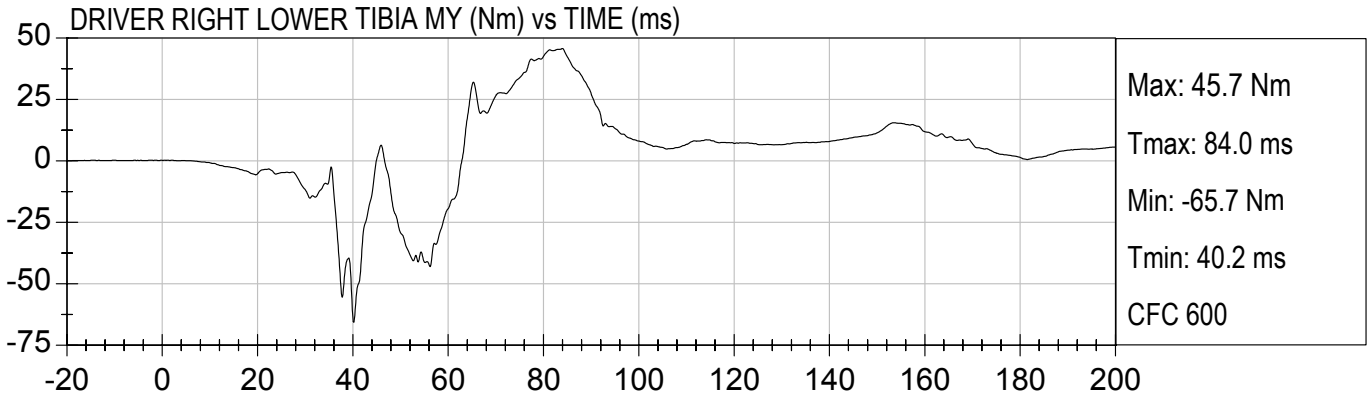


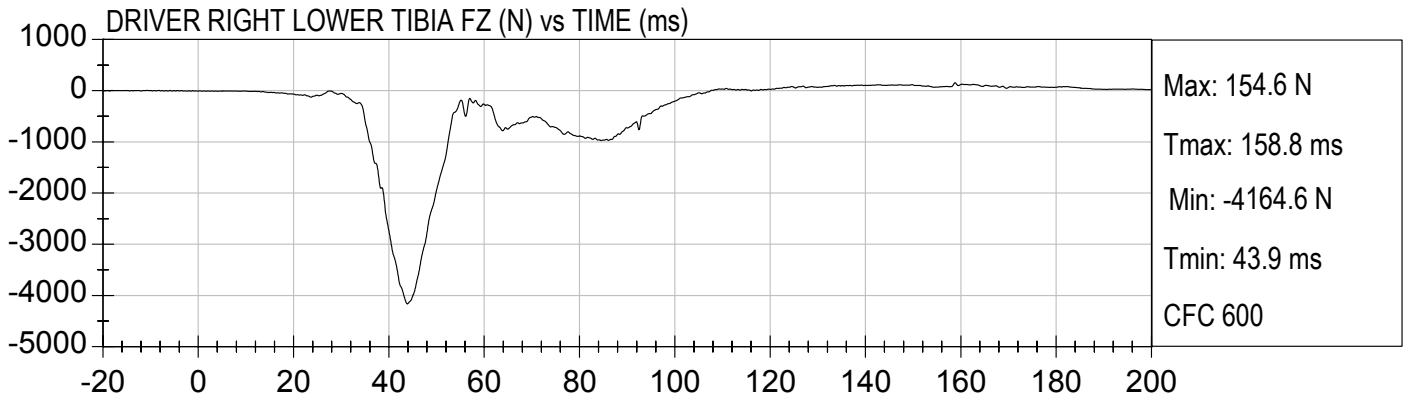


35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

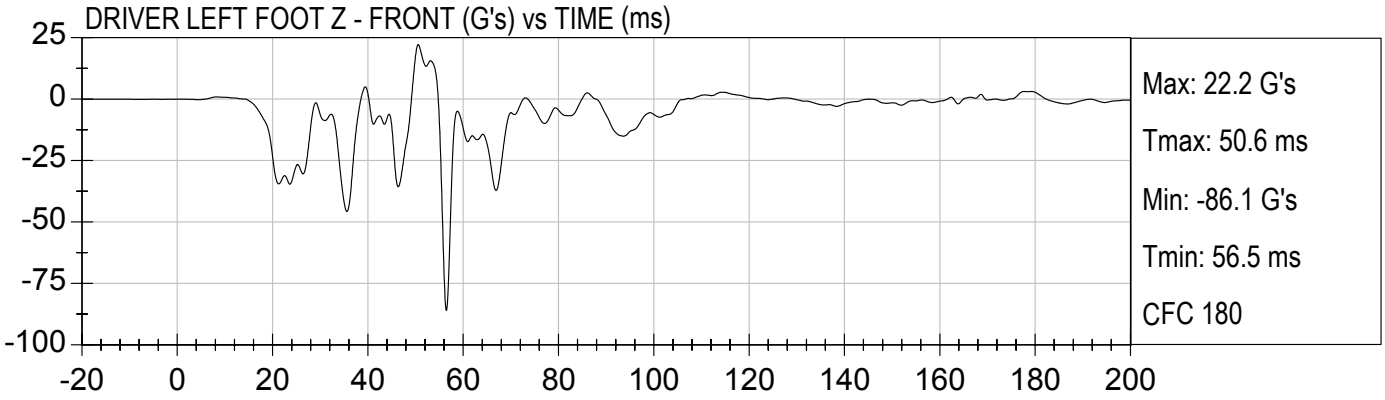


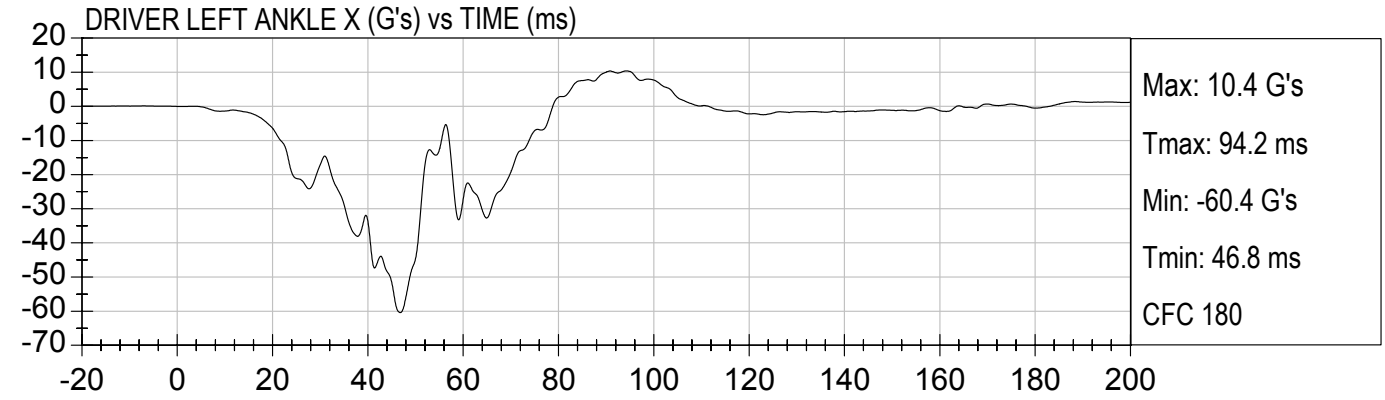


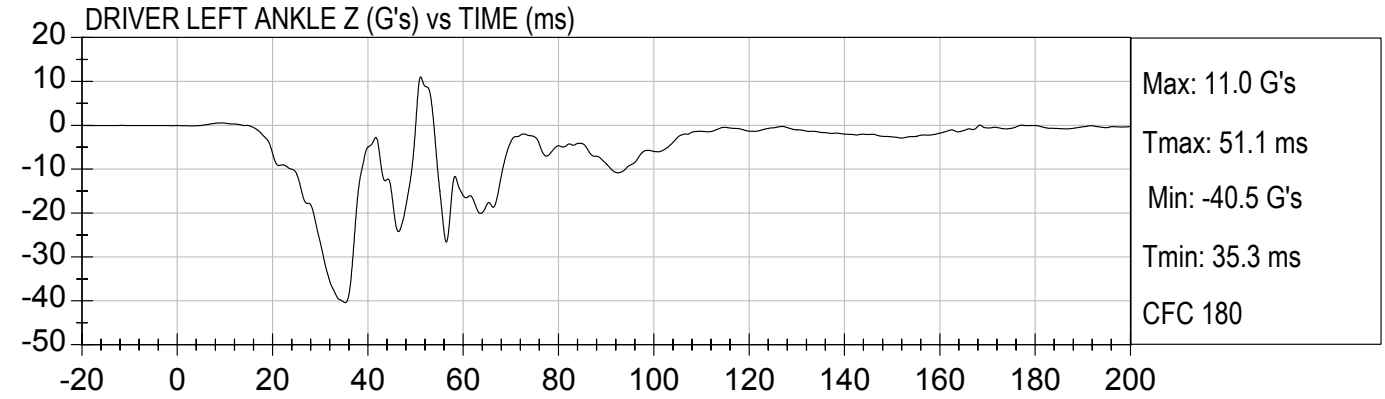


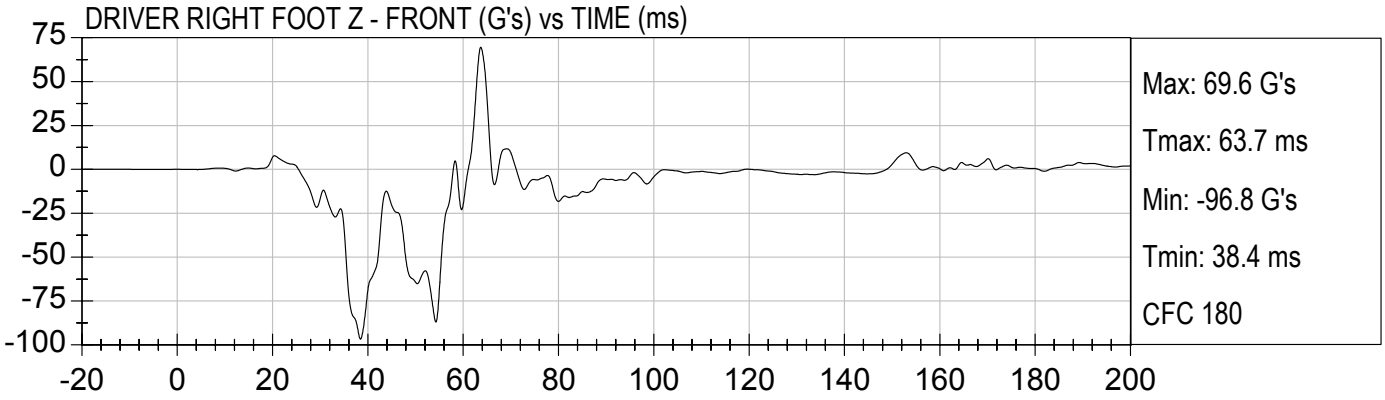
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

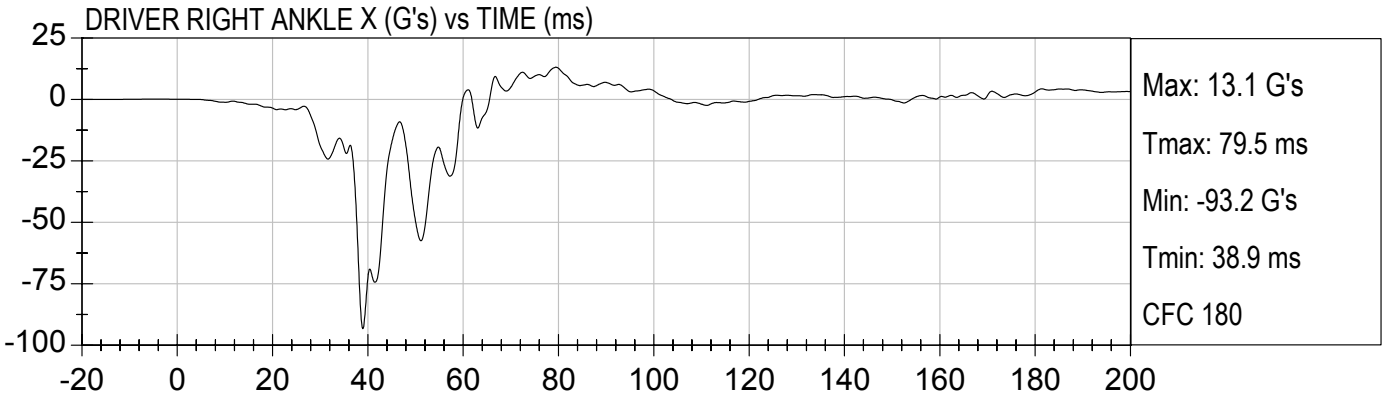
Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

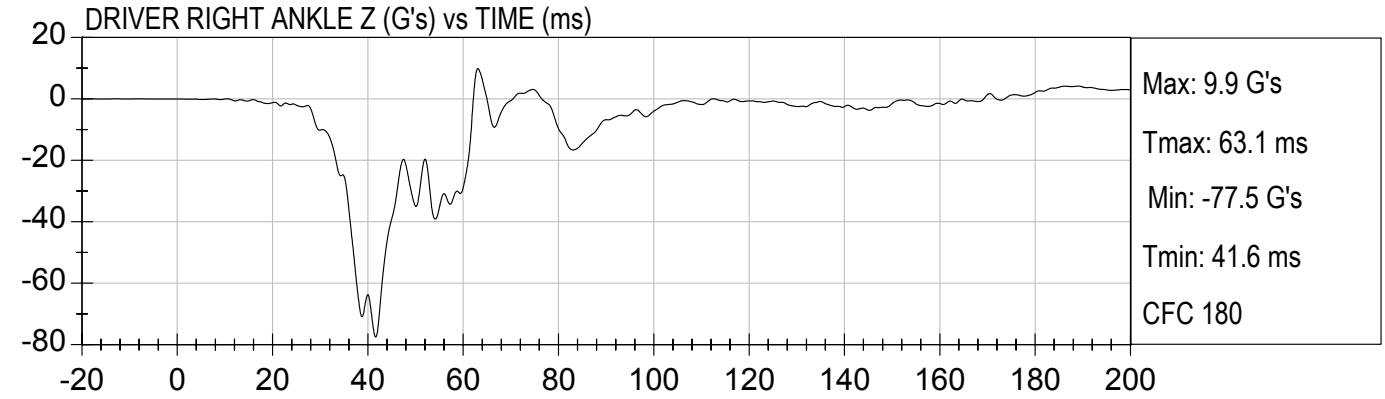


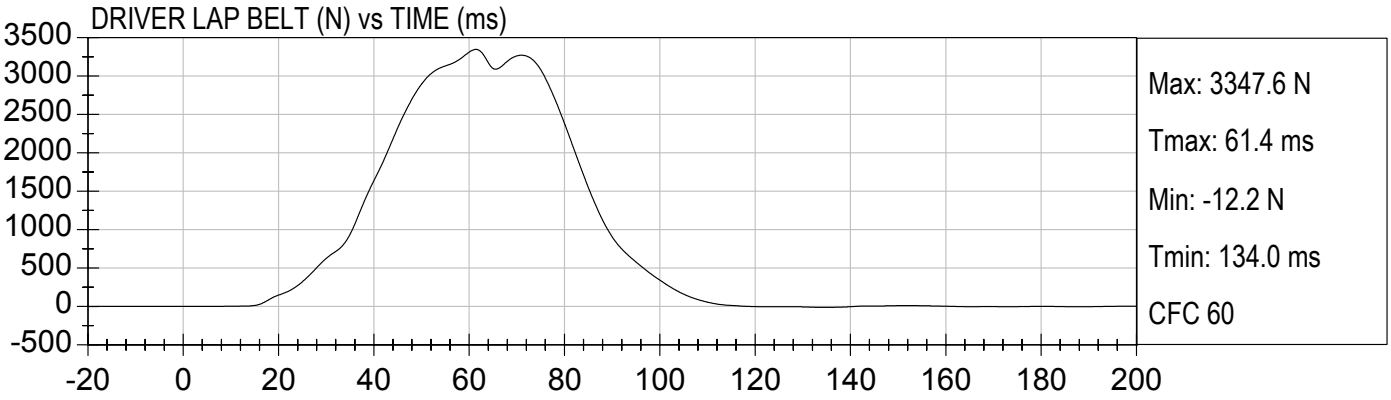





DRIVER RIGHT FOOT Z - FRONT (G's) vs TIME (ms)
75
50
25
0
-25
-50
-75
-100
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 69.6 G's
Tmax: 63.7 ms
Min: -96.8 G's
Tmin: 38.4 ms
CFC 180

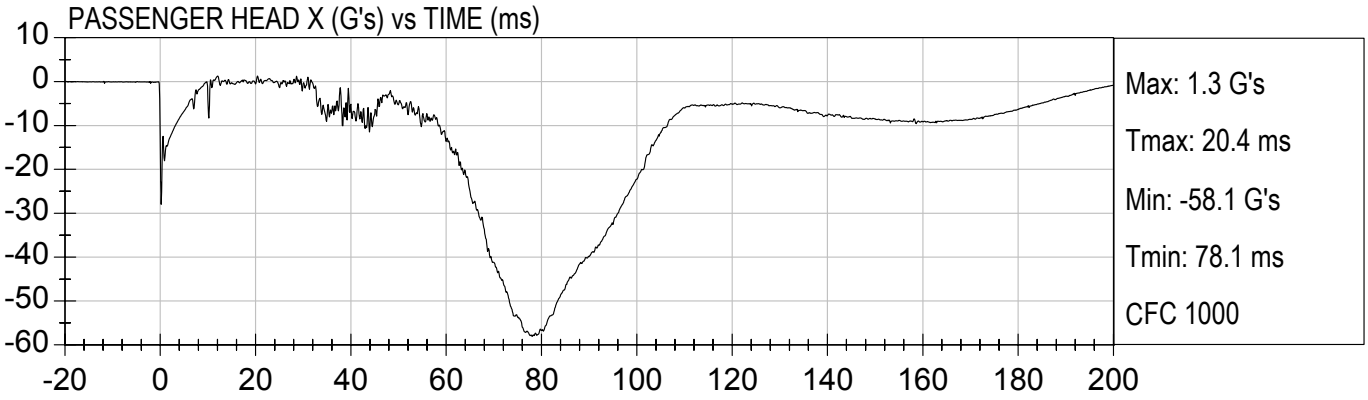

DRIVER RIGHT ANKLE X (G's) vs TIME (ms)
25
0
-25
-50
-75
-100
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 13.1 G's
Tmax: 79.5 ms
Min: -93.2 G's
Tmin: 38.9 ms
CFC 180

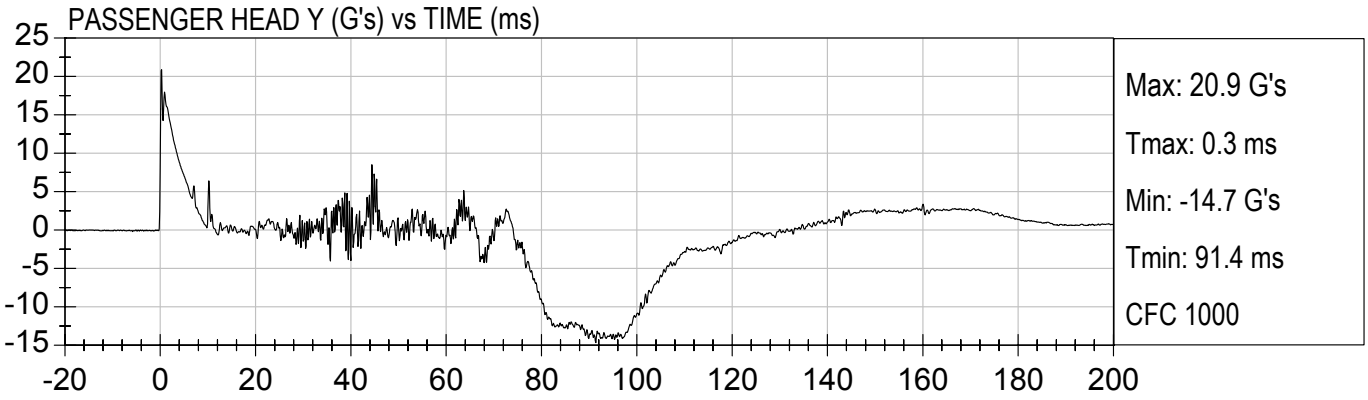

DRIVER RIGHT ANKLE Z (G's) vs TIME (ms)
20
0
-20
-40
-60
-80
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 9.9 G's
Tmax: 63.1 ms
Min: -77.5 G's
Tmin: 41.6 ms
CFC 180

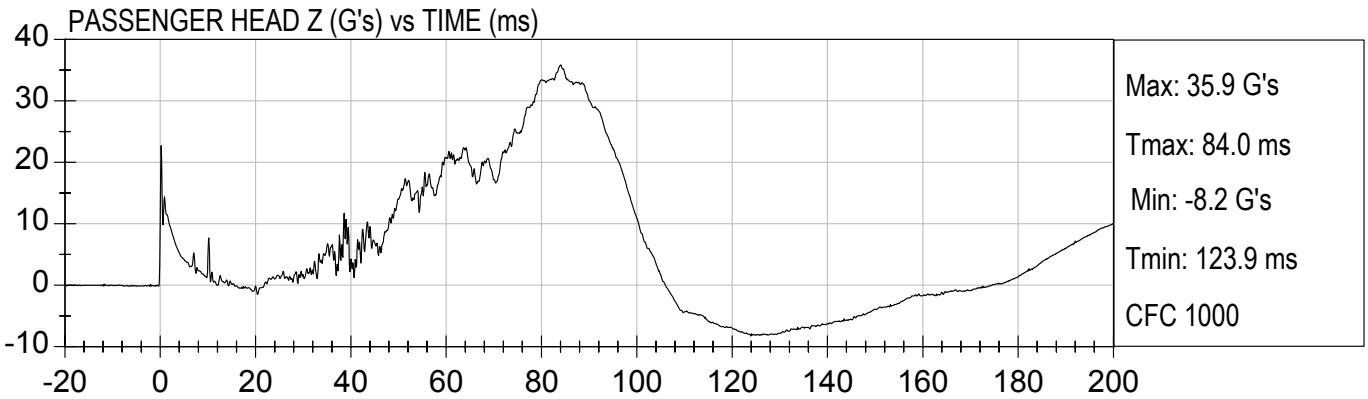

DRIVER LAP BELT (N) vs TIME (ms)
3500
3000
2500
2000
1500
1000
500
0
-500
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 3347.6 N
Tmax: 61.4 ms
Min: -12.2 N
Tmin: 134.0 ms
CFC 60

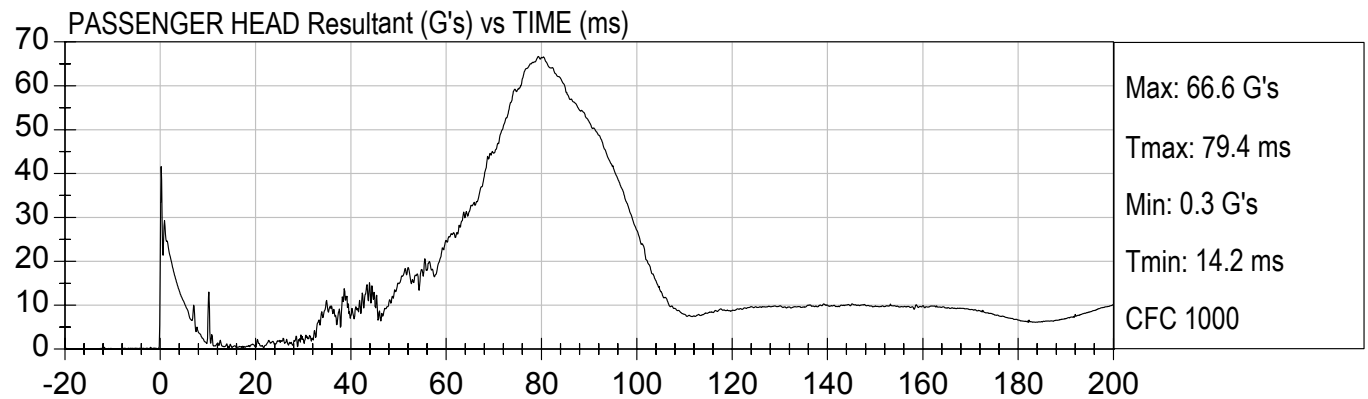
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

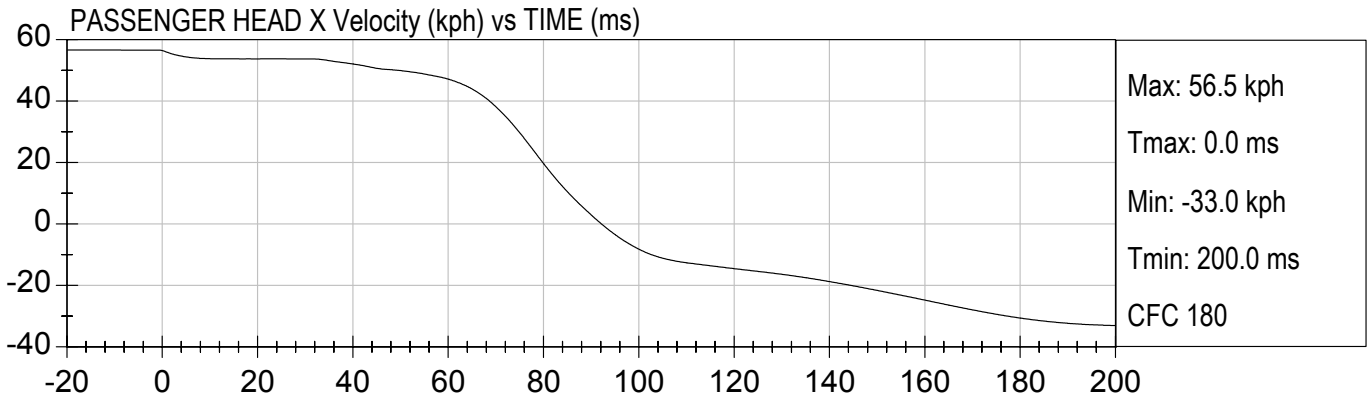
Test Date: 9/4/2002
Speed: 35.2 mph (56.6 km/h)

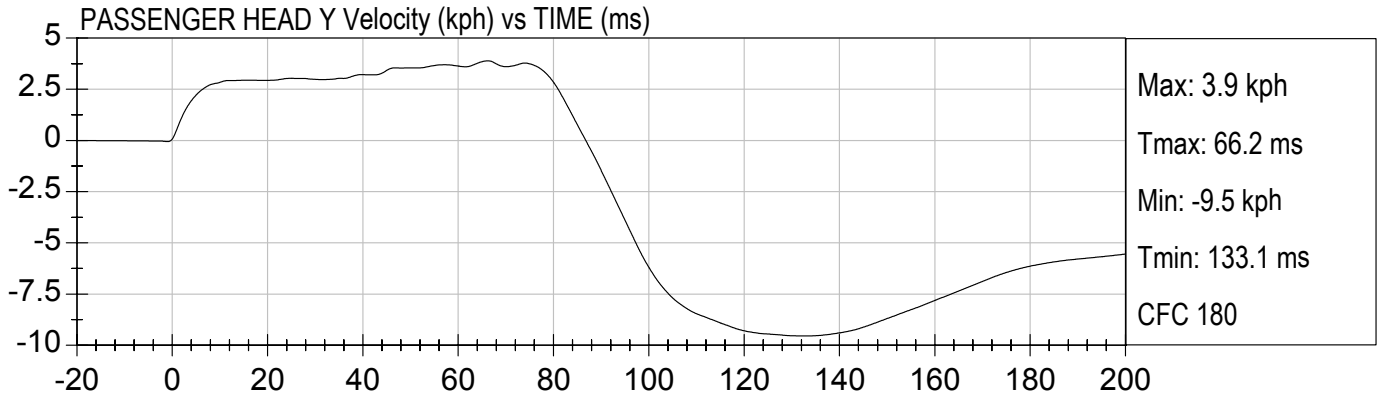


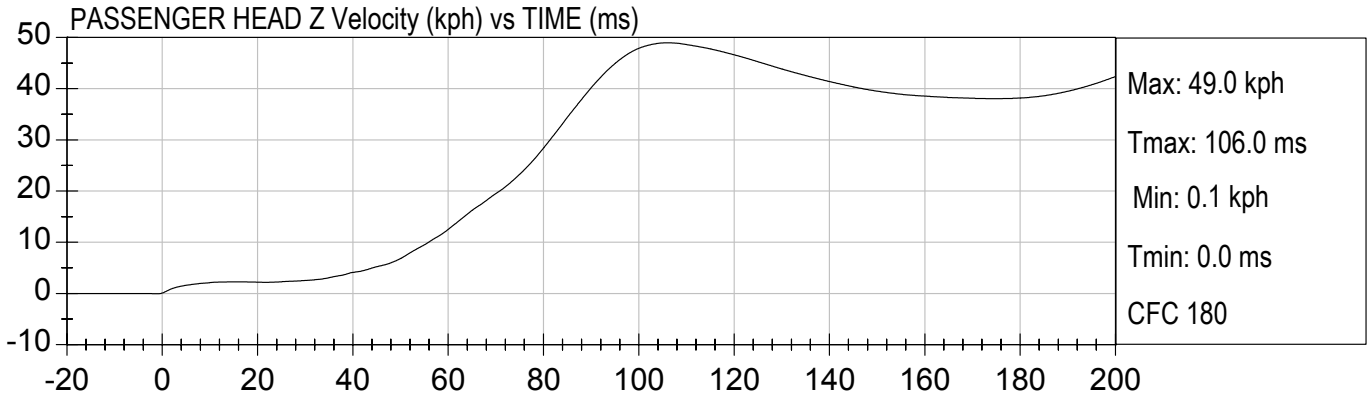


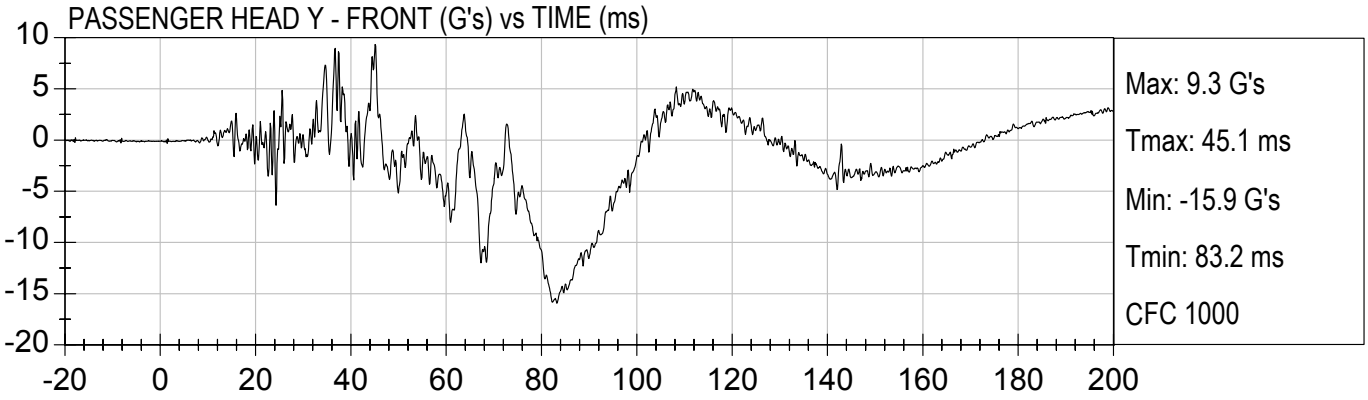


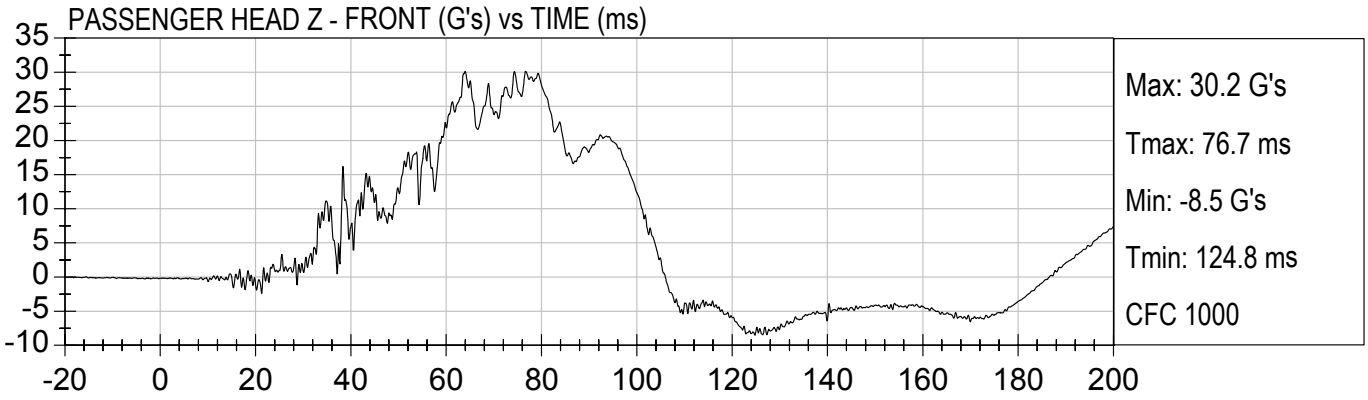


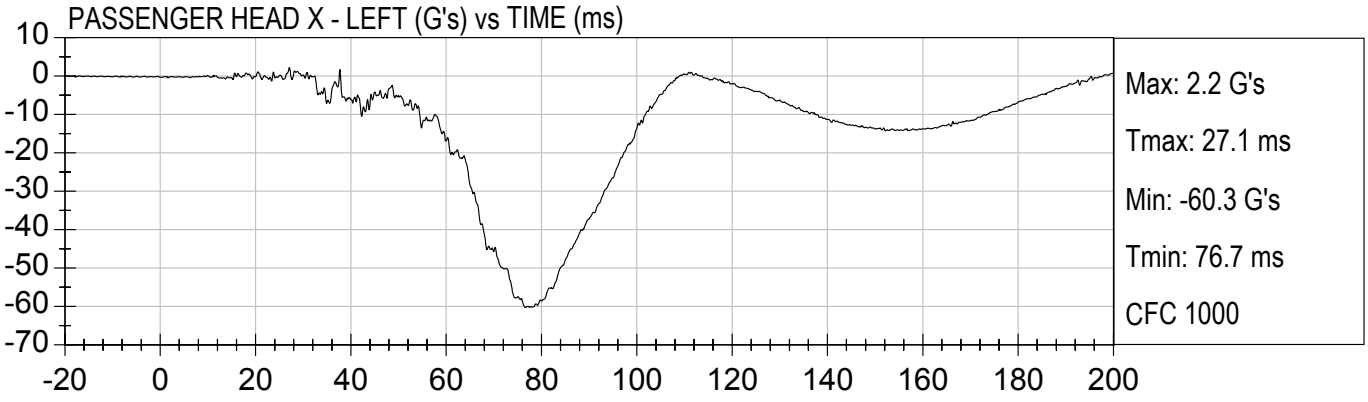

PASSENGER HEAD X Velocity (kph) vs TIME (ms)
60
40
20
0
-20
-40
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 56.5 kph
Tmax: 0.0 ms
Min: -33.0 kph
Tmin: 200.0 ms
CFC 180

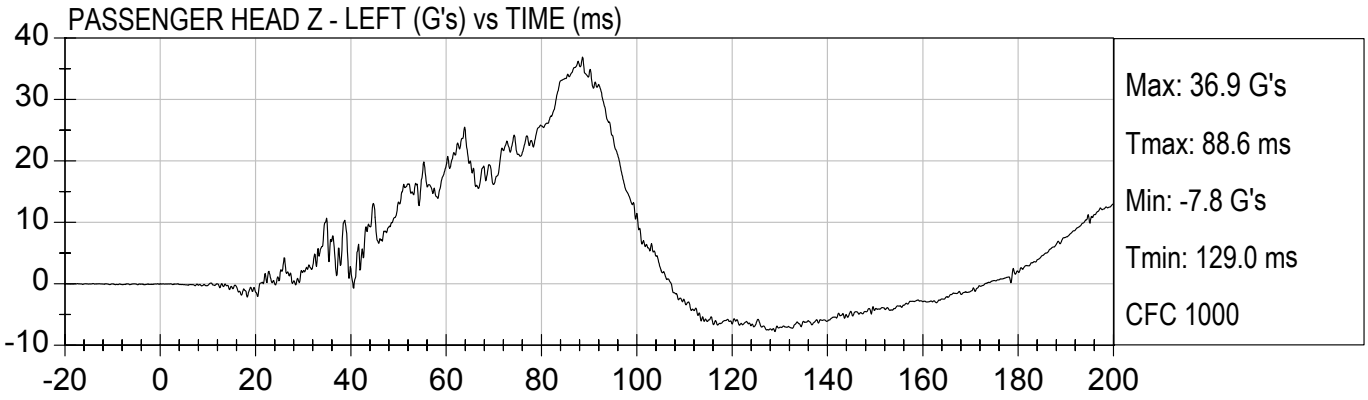

PASSENGER HEAD Y Velocity (kph) vs TIME (ms)
5
2.5
0
-2.5
-5
-7.5
-10
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 3.9 kph
Tmax: 66.2 ms
Min: -9.5 kph
Tmin: 133.1 ms
CFC 180


PASSENGER HEAD Z Velocity (kph) vs TIME (ms)
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 49.0 kph
Tmax: 106.0 ms
Min: 0.1 kph
Tmin: 0.0 ms
CFC 180


PASSENGER HEAD Y - FRONT (G's) vs TIME (ms)
10
5
0
-5
-10
-15
-20
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 9.3 G's
Tmax: 45.1 ms
Min: -15.9 G's
Tmin: 83.2 ms
CFC 1000

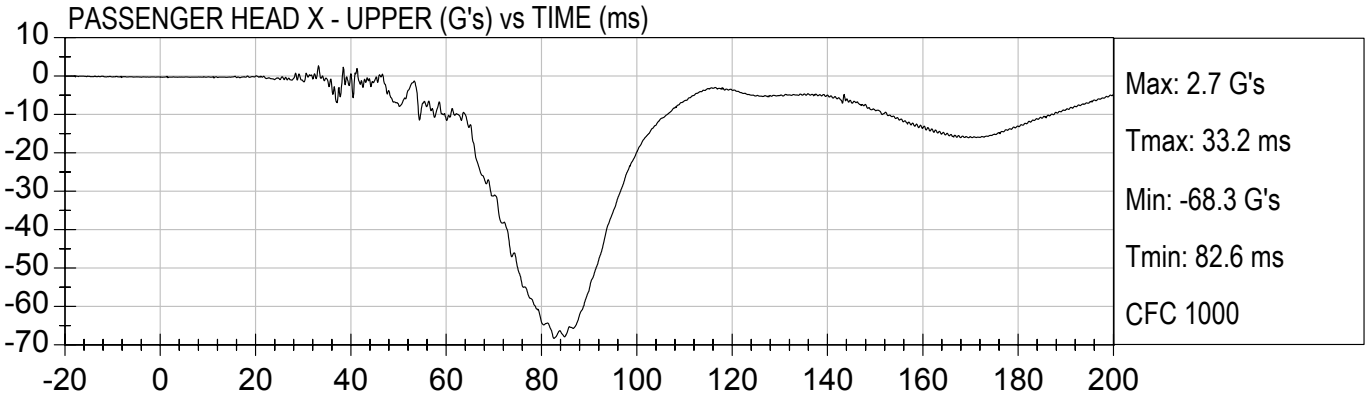

PASSENGER HEAD Z - FRONT (G's) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 30.2 G's
Tmax: 76.7 ms
Min: -8.5 G's
Tmin: 124.8 ms
CFC 1000

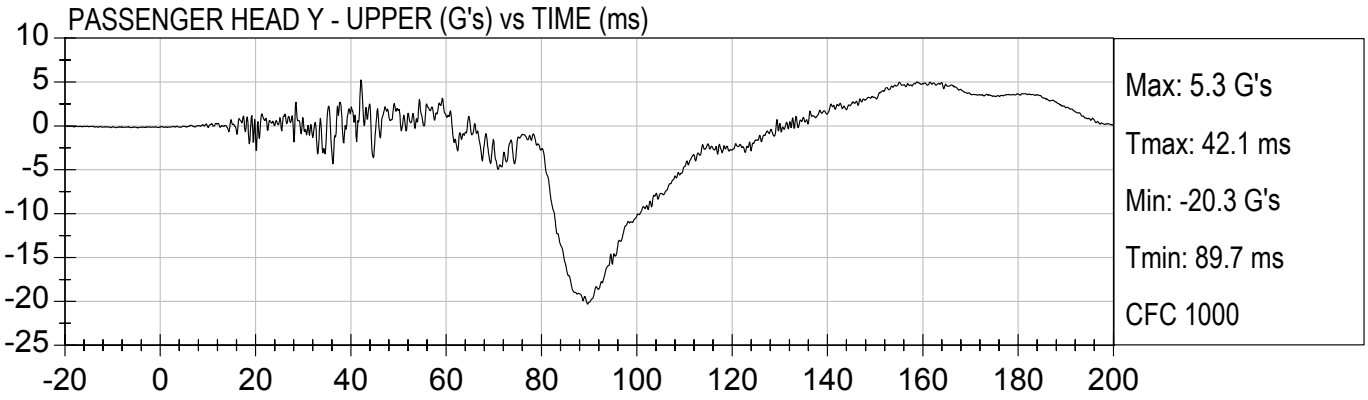

PASSENGER HEAD X - LEFT (G's) vs TIME (ms)
10
0
-10
-20
-30
-40
-50
-60
-70
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 2.2 G's
Tmax: 27.1 ms
Min: -60.3 G's
Tmin: 76.7 ms
CFC 1000

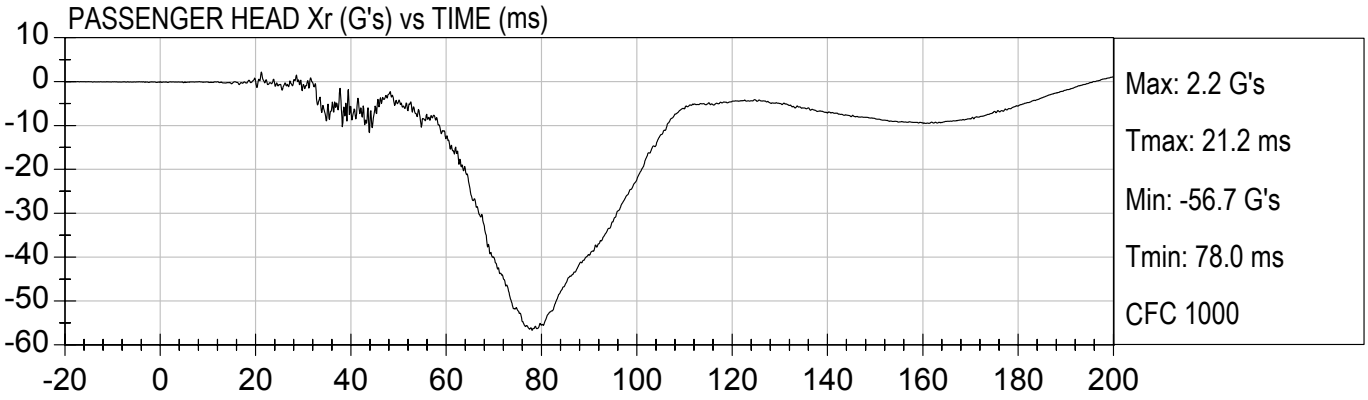

PASSENGER HEAD Z - LEFT (G's) vs TIME (ms)
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 36.9 G's
Tmax: 88.6 ms
Min: -7.8 G's
Tmin: 129.0 ms
CFC 1000

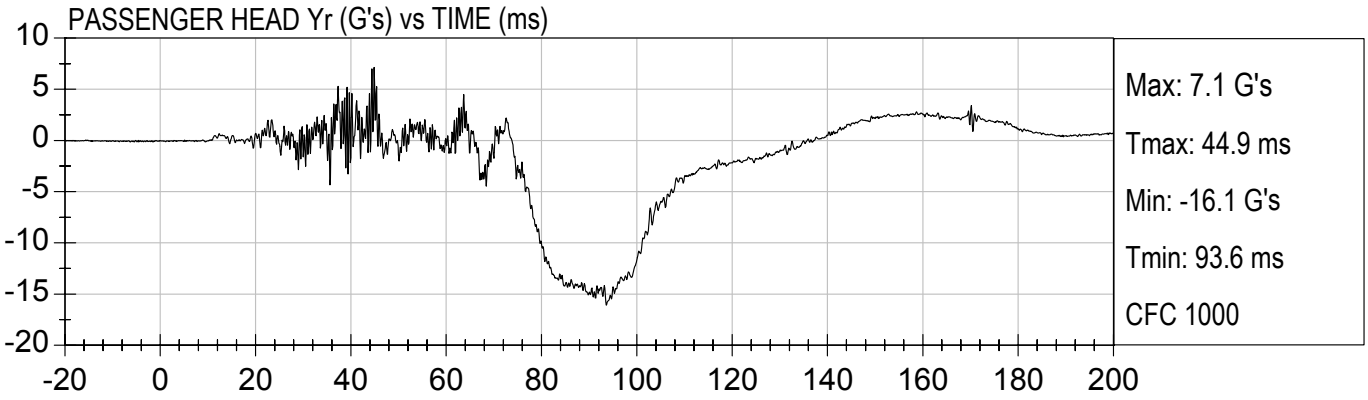
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

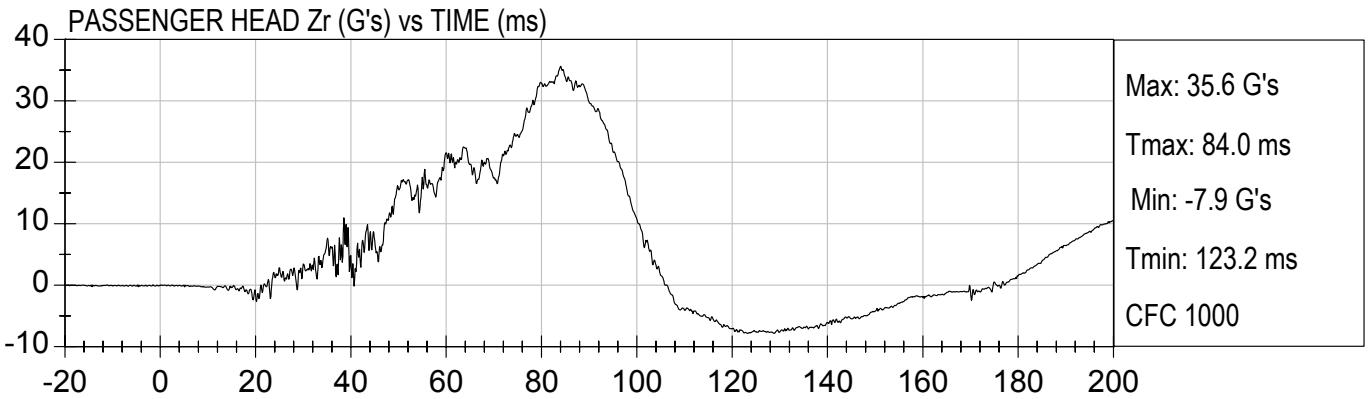
Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

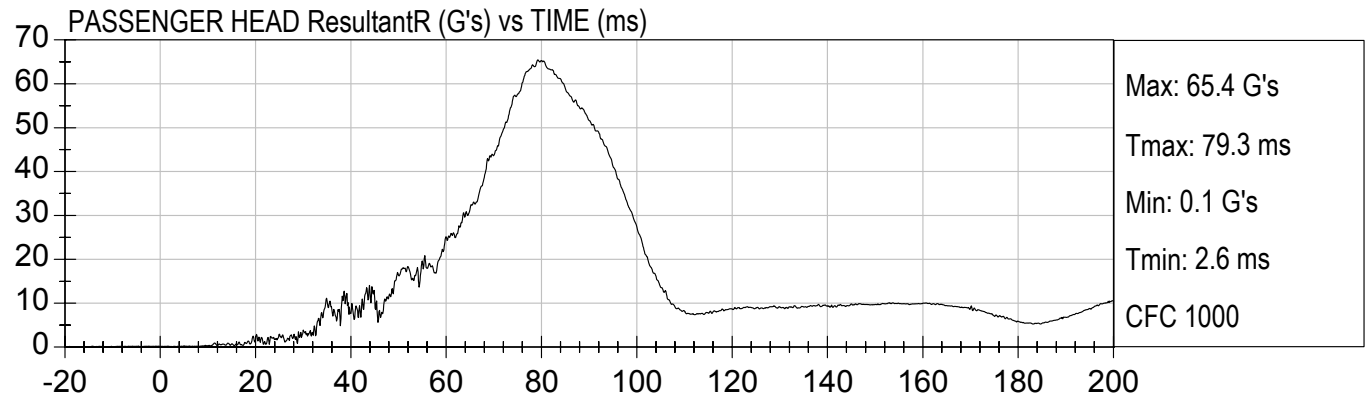


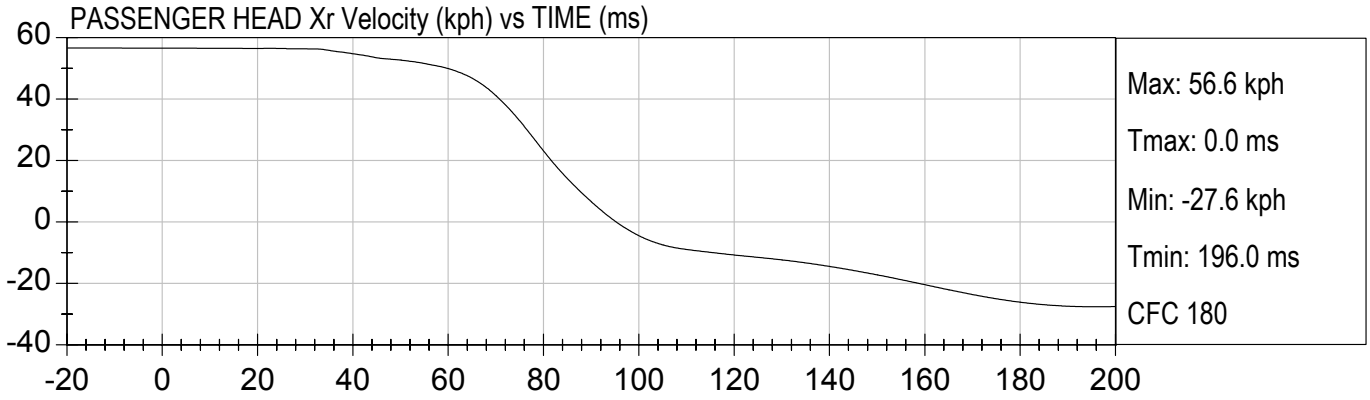


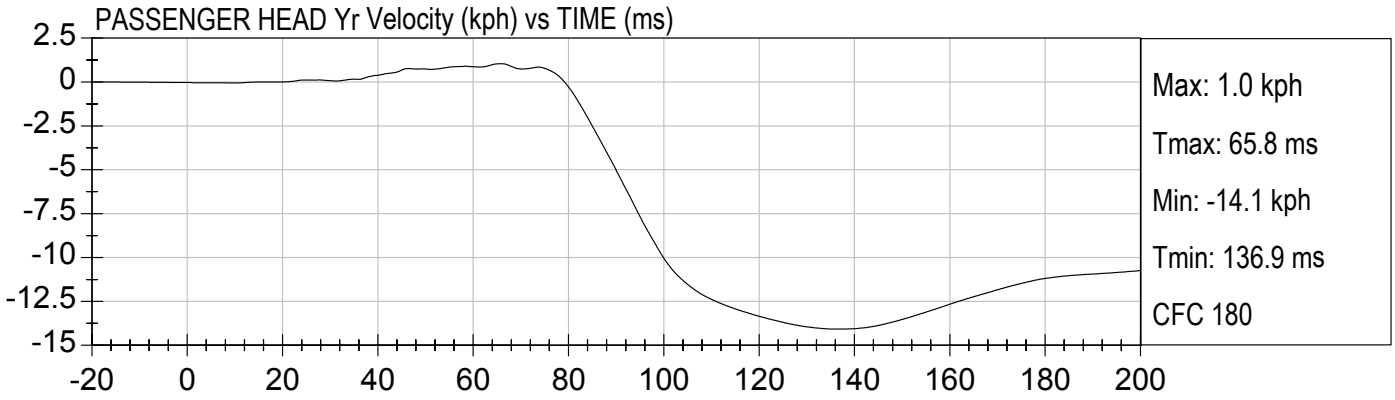

PASSENGER HEAD Xr (G's) vs TIME (ms)
10
0
-10
-20
-30
-40
-50
-60
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 2.2 G's
Tmax: 21.2 ms
Min: -56.7 G's
Tmin: 78.0 ms
CFC 1000

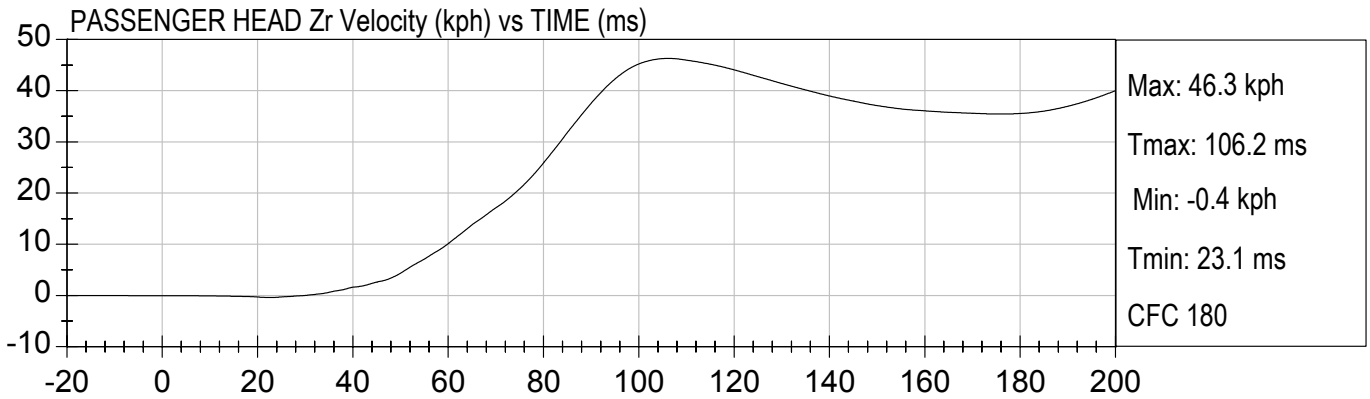

PASSENGER HEAD Yr (G's) vs TIME (ms)
10
5
0
-5
-10
-15
-20
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 7.1 G's
Tmax: 44.9 ms
Min: -16.1 G's
Tmin: 93.6 ms
CFC 1000


PASSENGER HEAD Zr (G's) vs TIME (ms)
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 35.6 G's
Tmax: 84.0 ms
Min: -7.9 G's
Tmin: 123.2 ms
CFC 1000


PASSENGER HEAD ResultantR (G's) vs TIME (ms)
70
60
50
40
30
20
10
0
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 65.4 G's
Tmax: 79.3 ms
Min: 0.1 G's
Tmin: 2.6 ms
CFC 1000

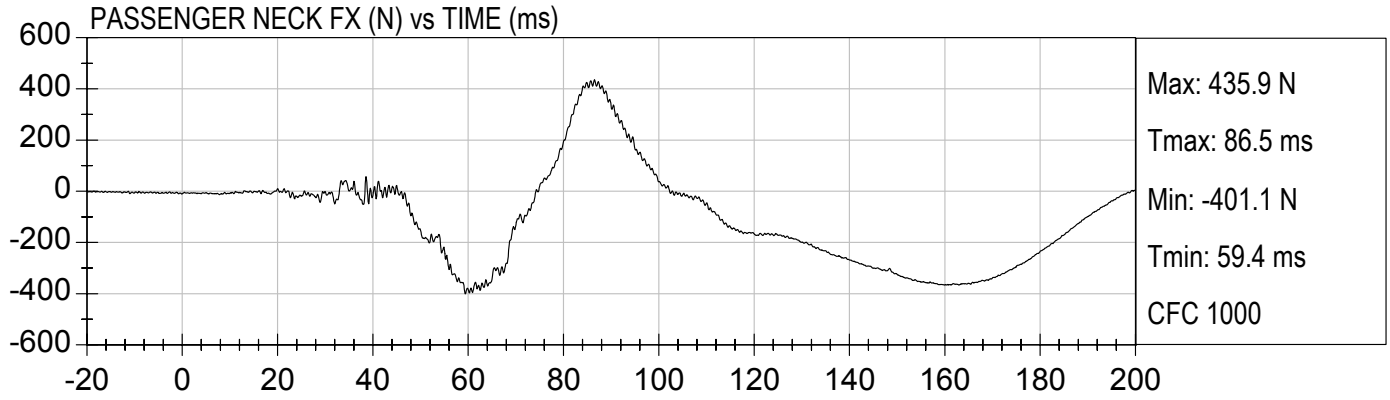

PASSENGER HEAD Xr Velocity (kph) vs TIME (ms)
60
40
20
0
-20
-40
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 56.6 kph
Tmax: 0.0 ms
Min: -27.6 kph
Tmin: 196.0 ms
CFC 180

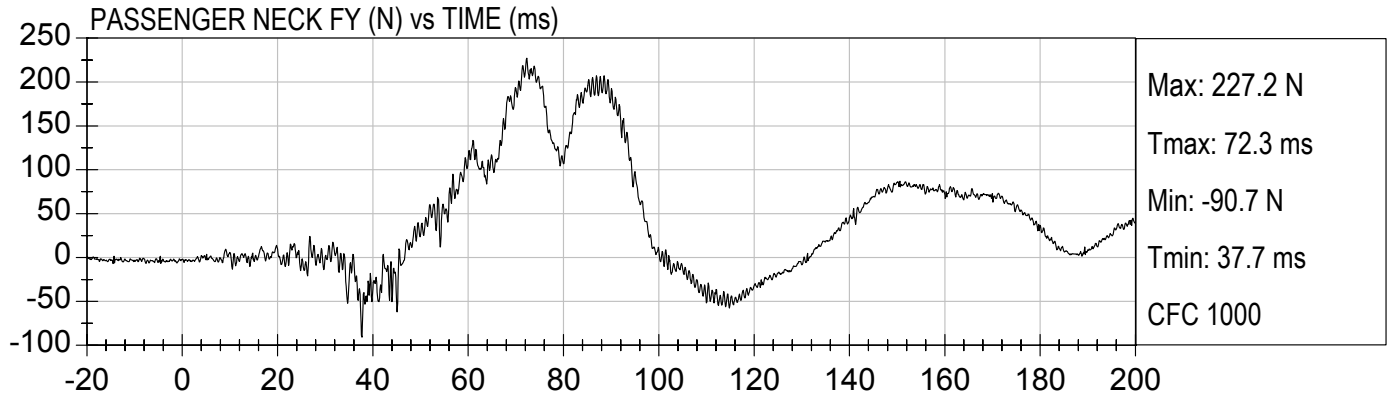

PASSENGER HEAD Yr Velocity (kph) vs TIME (ms)
2.5
0
-2.5
-5
-7.5
-10
-12.5
-15
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 1.0 kph
Tmax: 65.8 ms
Min: -14.1 kph
Tmin: 136.9 ms
CFC 180

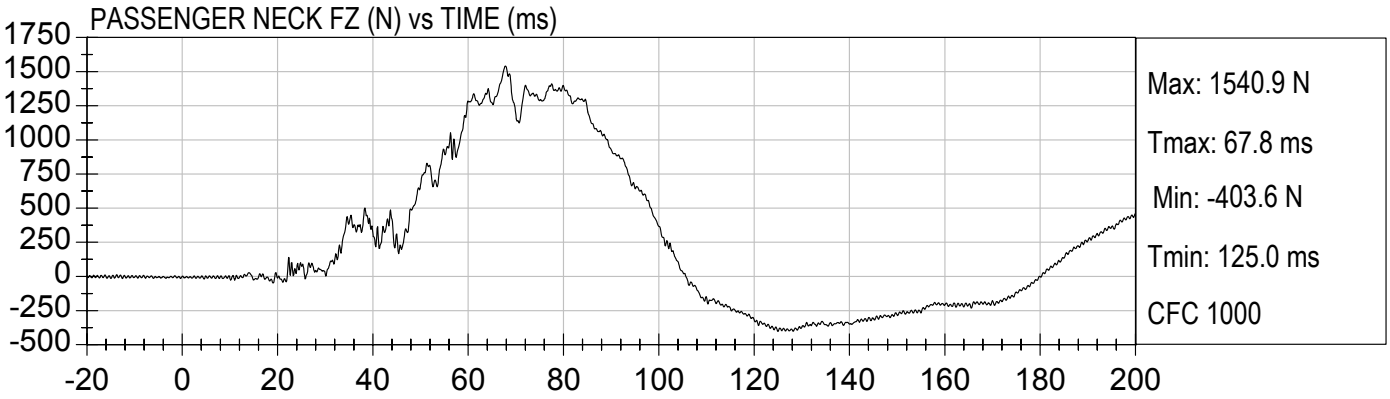

PASSENGER HEAD Zr Velocity (kph) vs TIME (ms)
50
40
30
20
10
0
-10
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 46.3 kph
Tmax: 106.2 ms
Min: -0.4 kph
Tmin: 23.1 ms
CFC 180

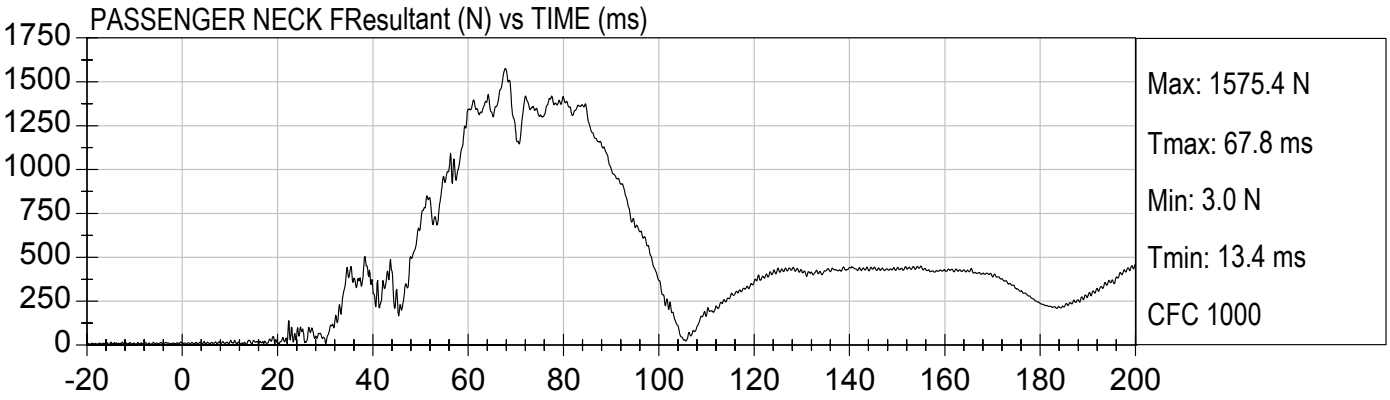
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)



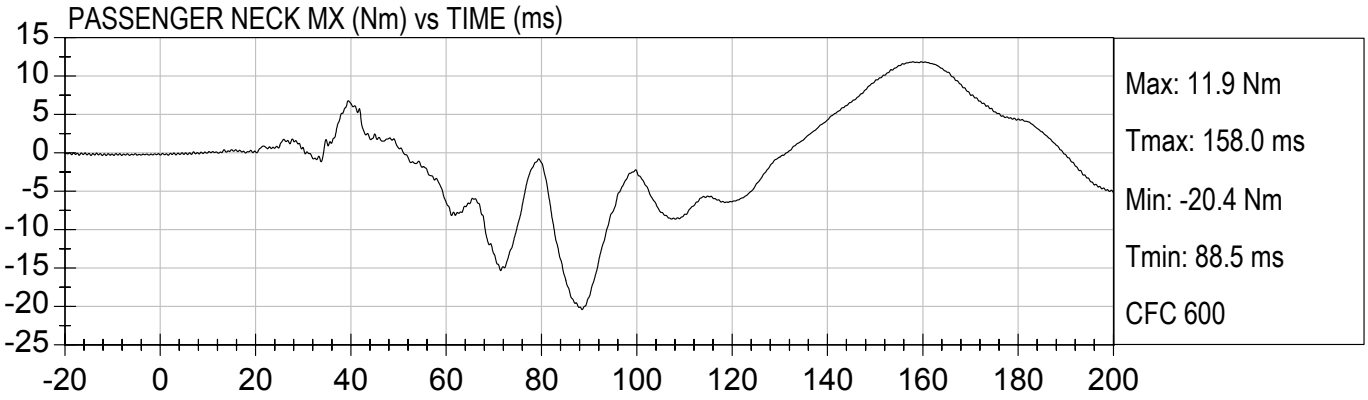


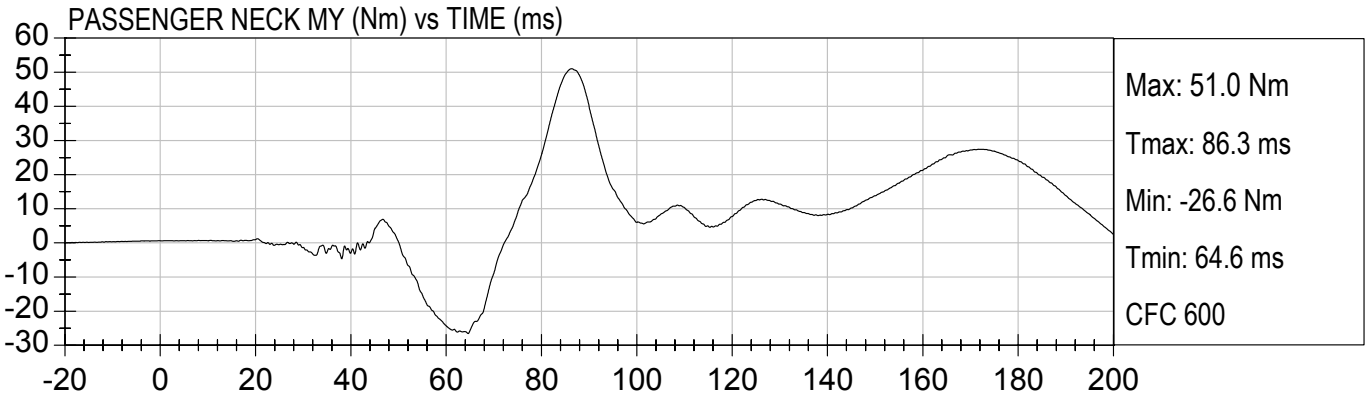


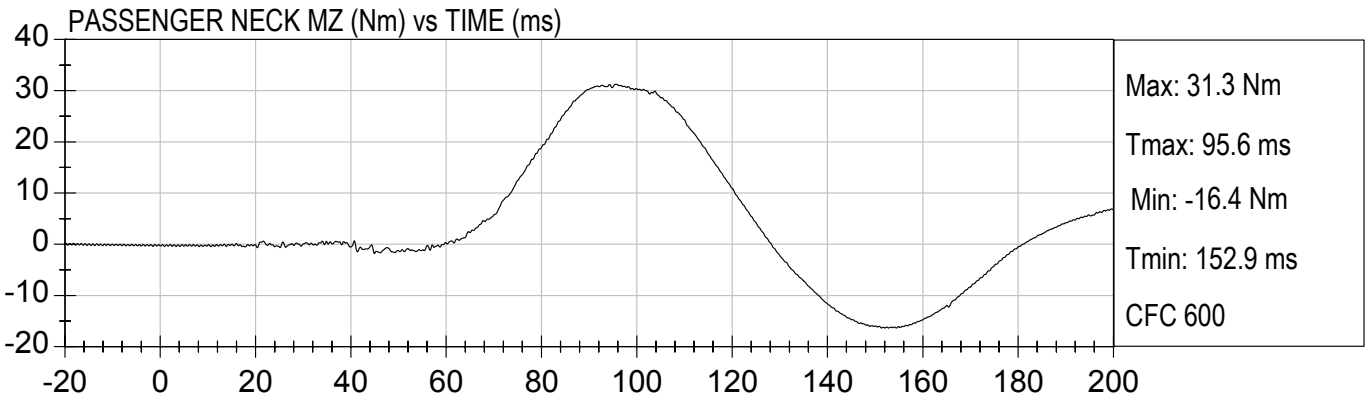


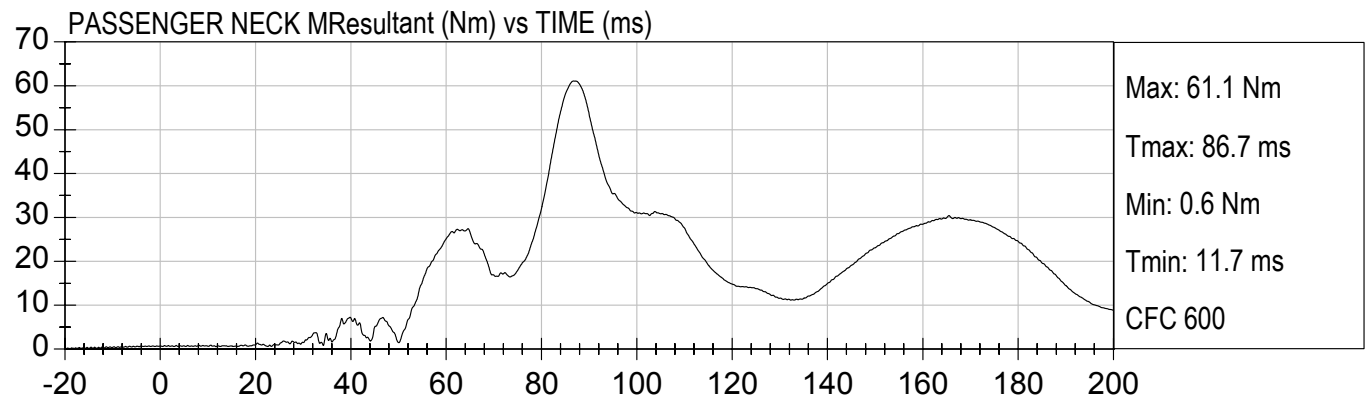
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

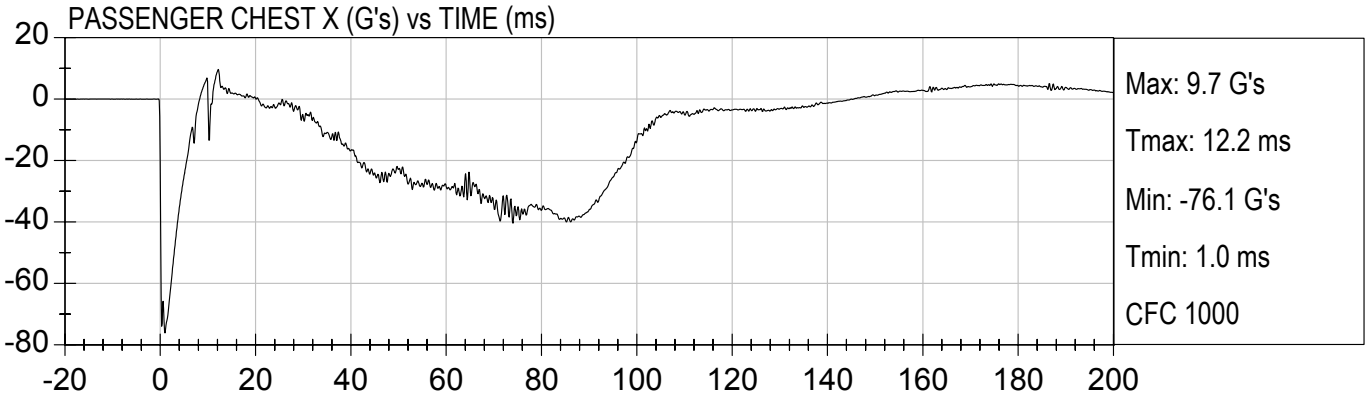
Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

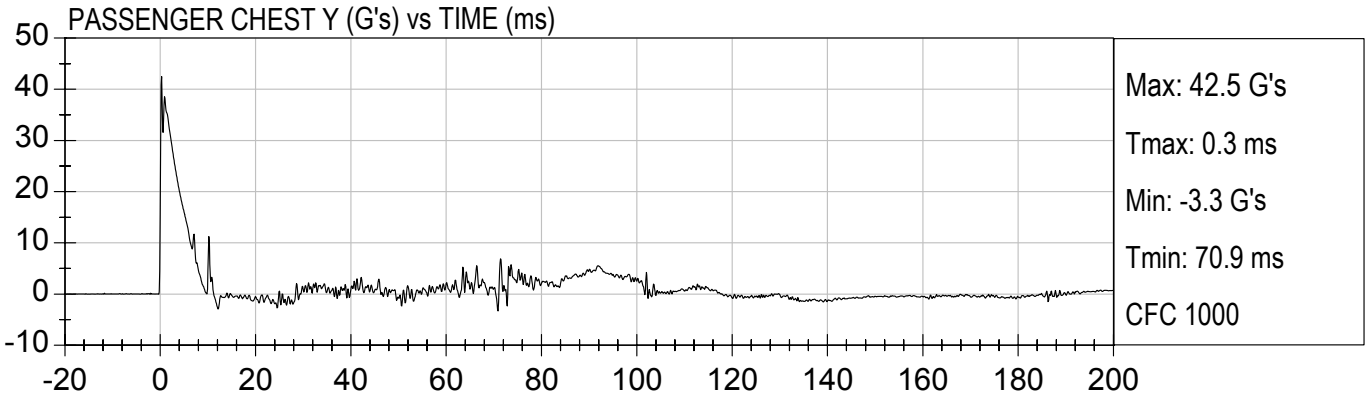


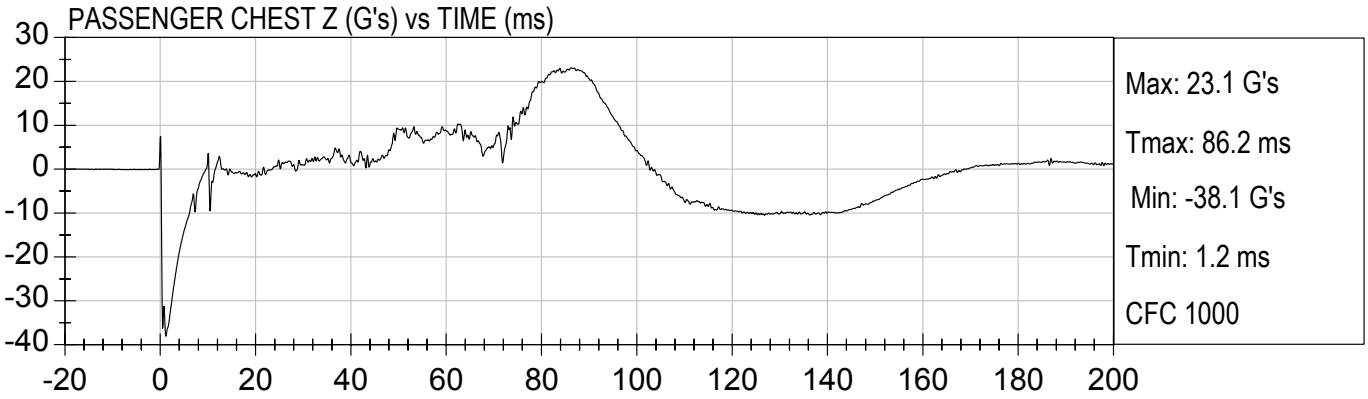






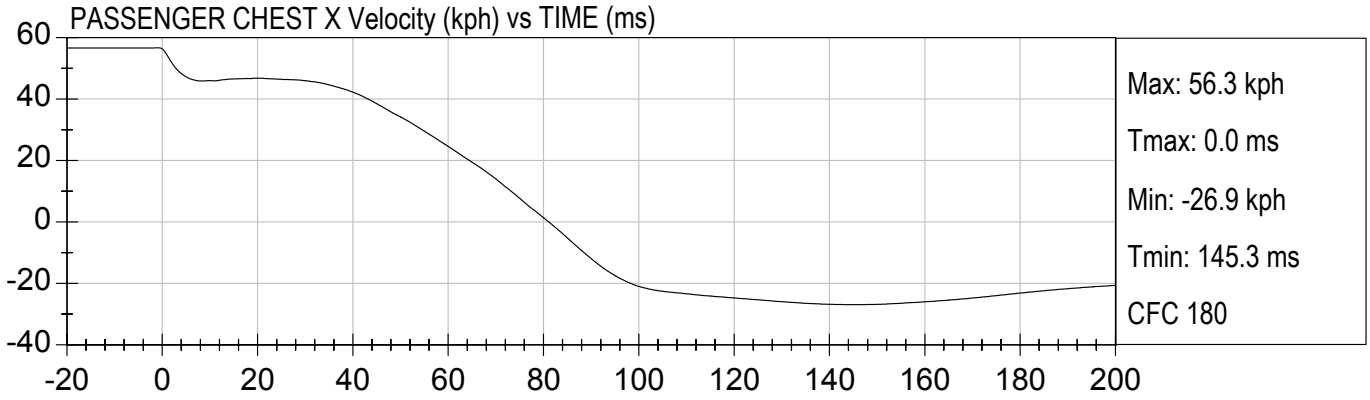

PASSENGER CHEST X (G's) vs TIME (ms)
20
0
-20
-40
-60
-80
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 9.7 G's
Tmax: 12.2 ms
Min: -76.1 G's
Tmin: 1.0 ms
CFC 1000

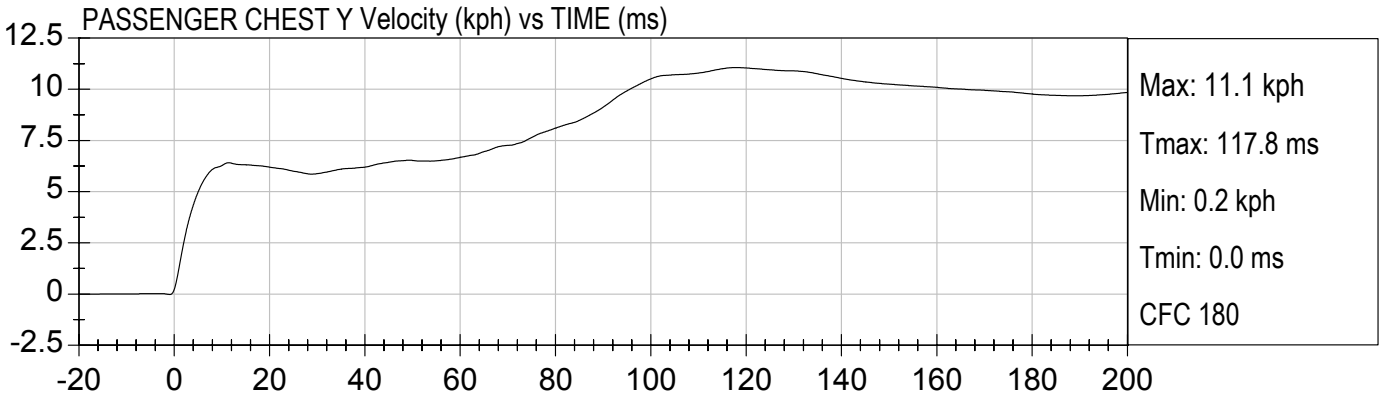

PASSENGER CHEST Y (G's) vs TIME (ms)
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 42.5 G's
Tmax: 0.3 ms
Min: -3.3 G's
Tmin: 70.9 ms
CFC 1000

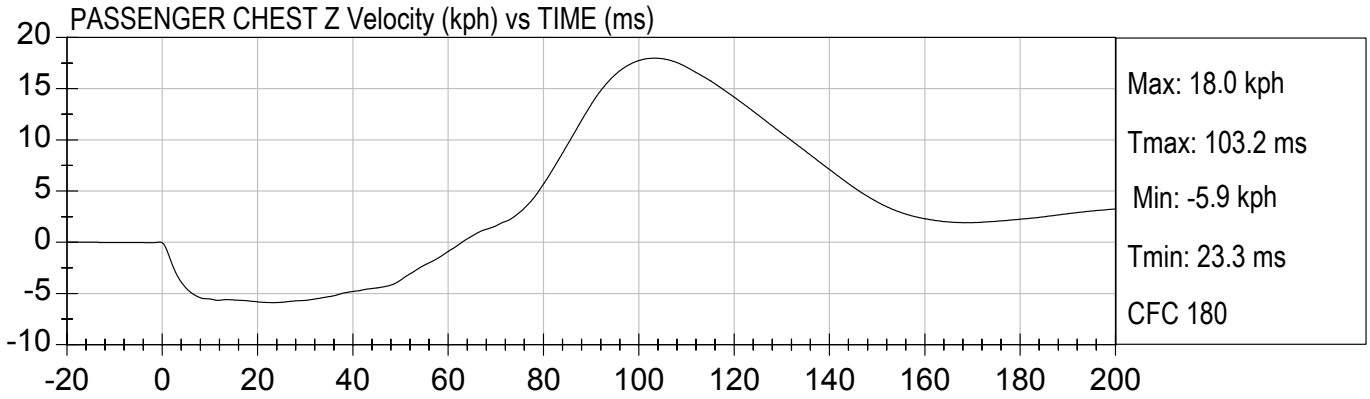

PASSENGER CHEST Z (G's) vs TIME (ms)
30
20
10
0
-10
-20
-30
-40
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 23.1 G's
Tmax: 86.2 ms
Min: -38.1 G's
Tmin: 1.2 ms
CFC 1000

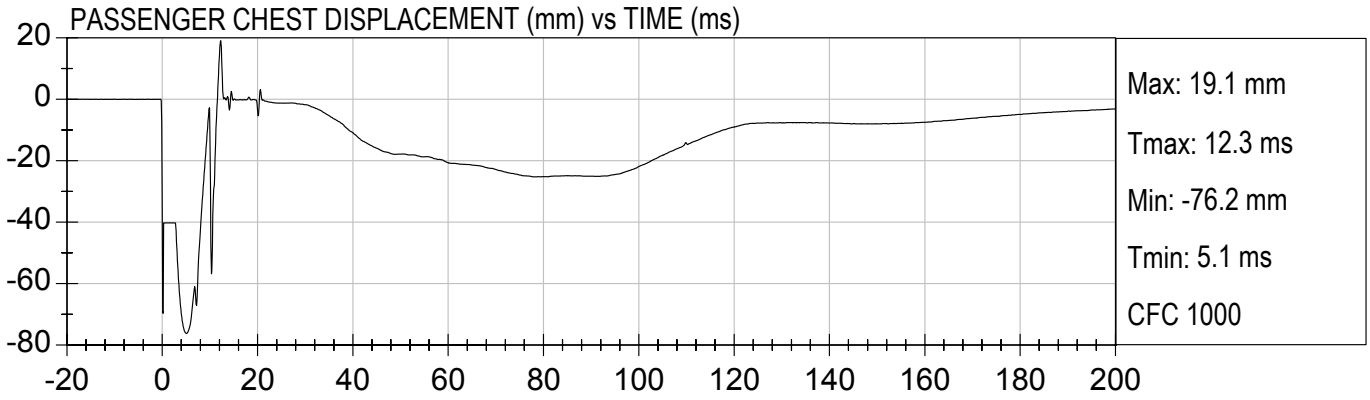
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

Test Date: 9/4/2002
Speed: 35.2 mph (56.6 km/h)



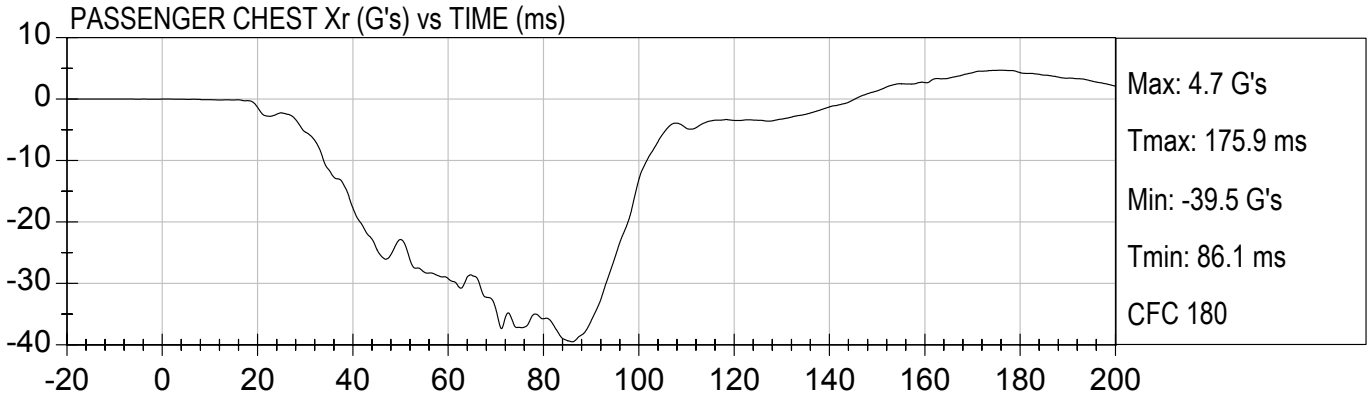


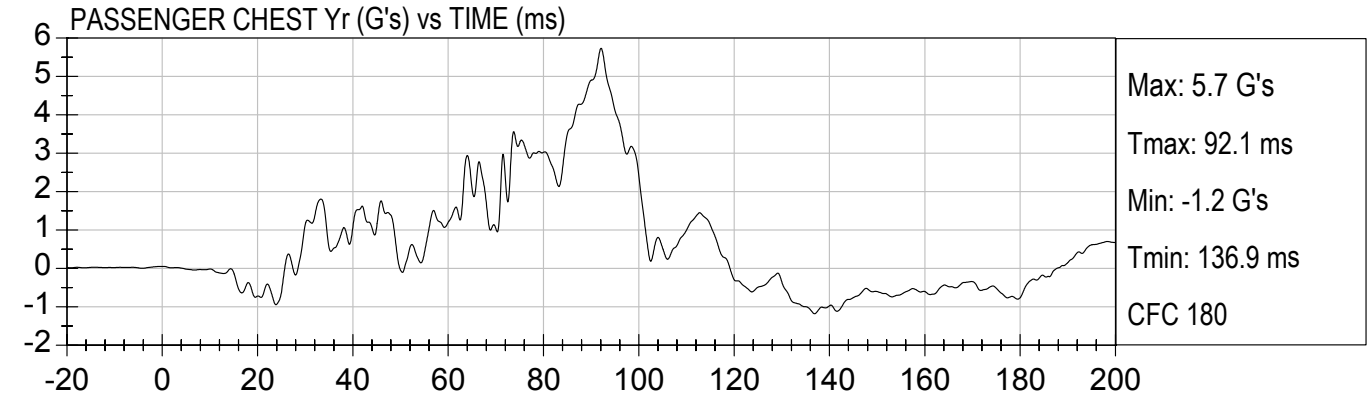


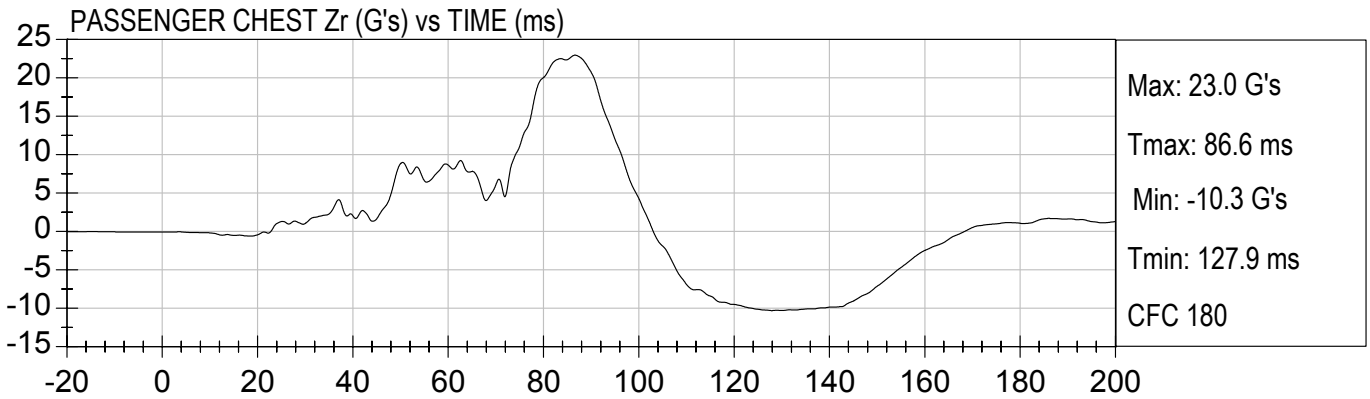


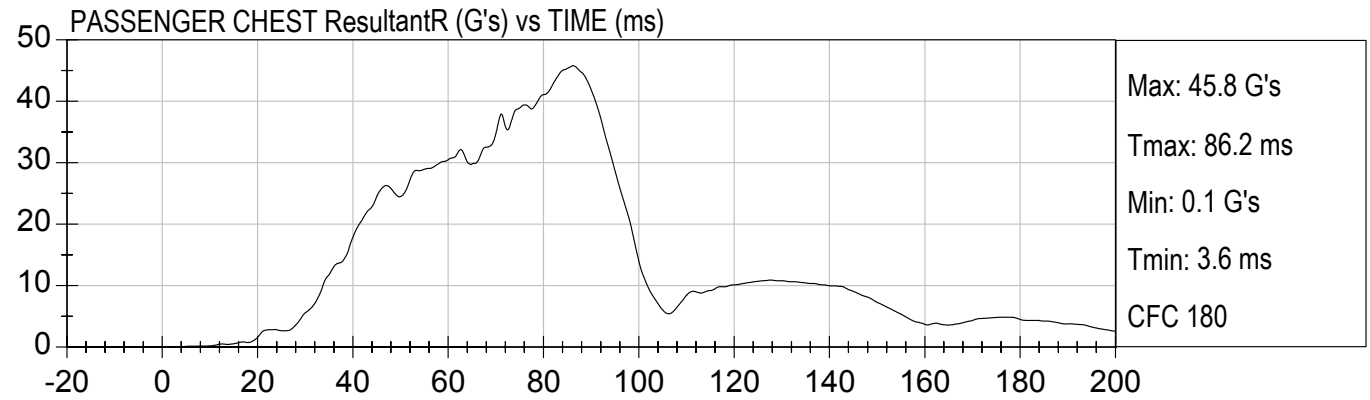
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

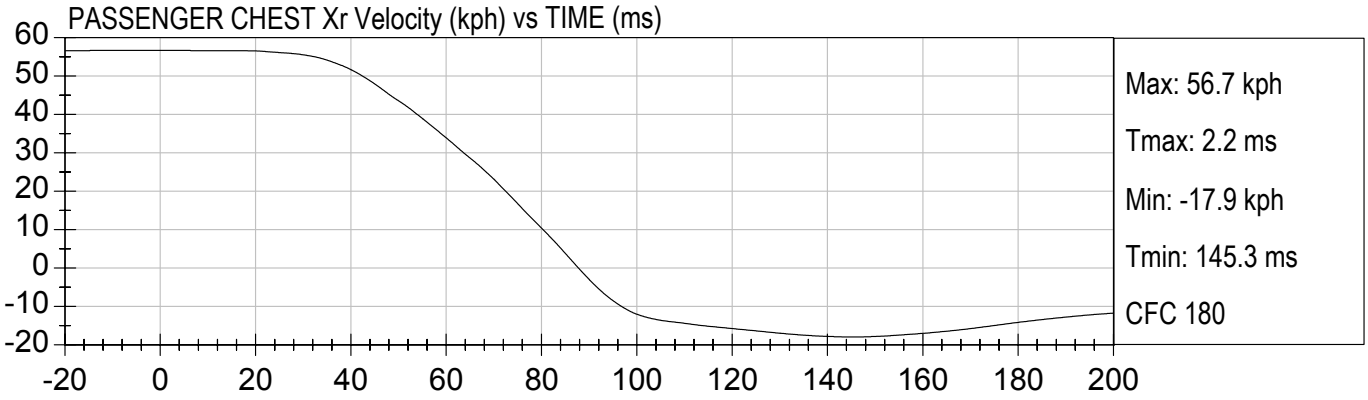
Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

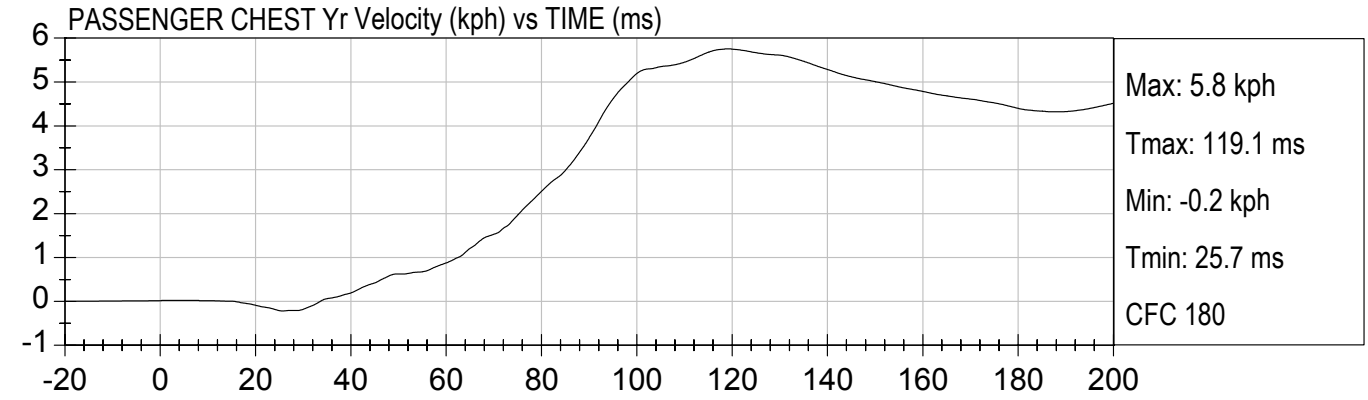


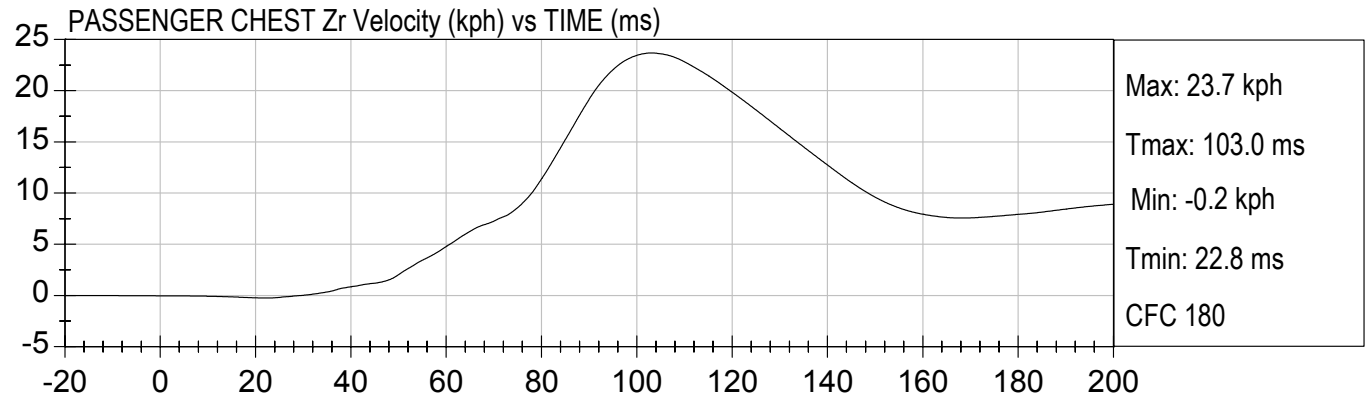






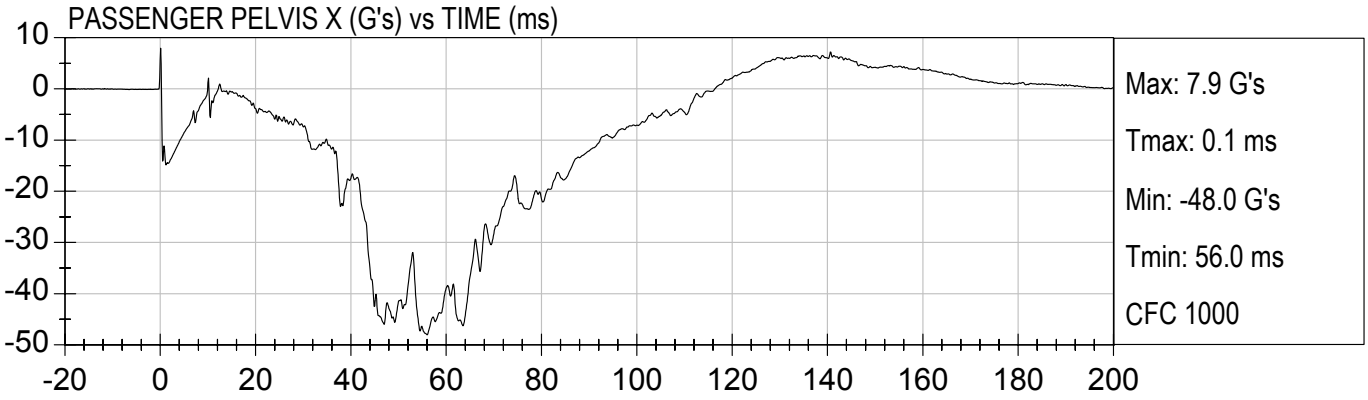

PASSENGER CHEST Xr Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 56.7 kph
Tmax: 2.2 ms
Min: -17.9 kph
Tmin: 145.3 ms
CFC 180

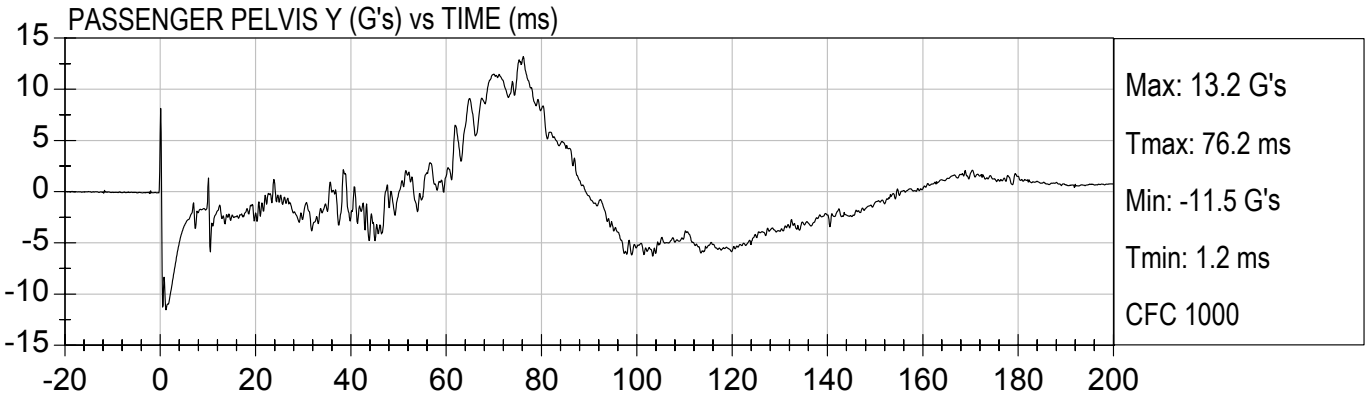

PASSENGER CHEST Yr Velocity (kph) vs TIME (ms)
6
5
4
3
2
1
0
-1
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 5.8 kph
Tmax: 119.1 ms
Min: -0.2 kph
Tmin: 25.7 ms
CFC 180

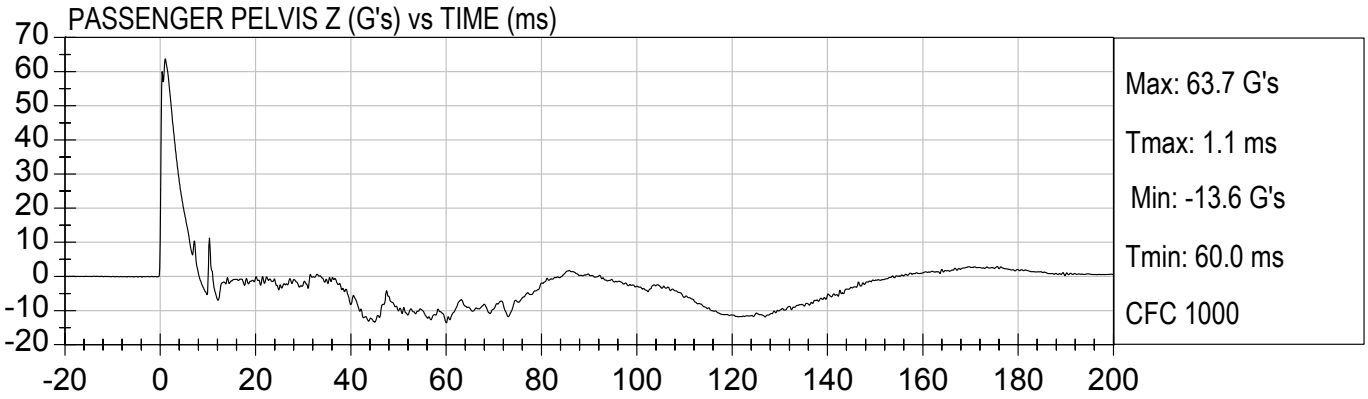

PASSENGER CHEST Zr Velocity (kph) vs TIME (ms)
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 23.7 kph
Tmax: 103.0 ms
Min: -0.2 kph
Tmin: 22.8 ms
CFC 180

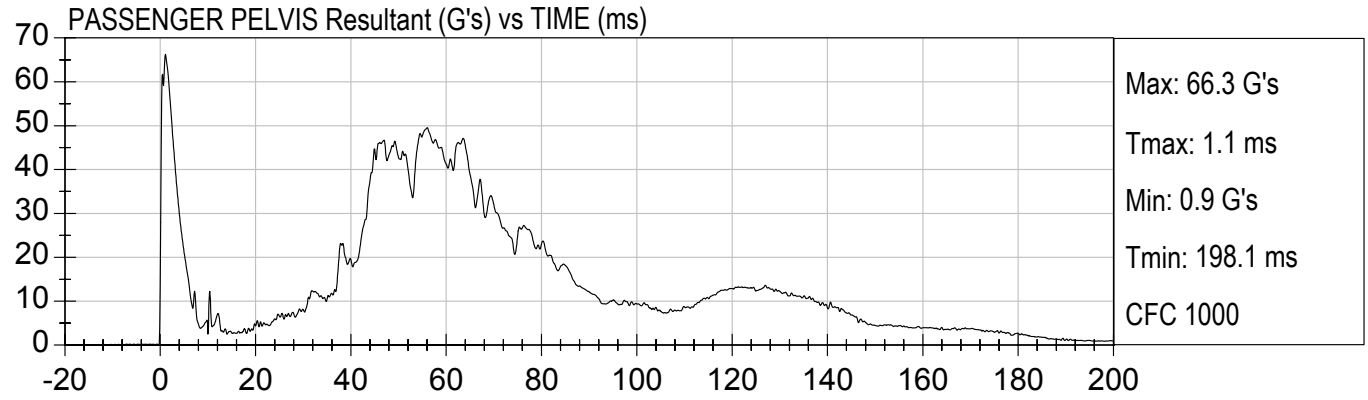
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

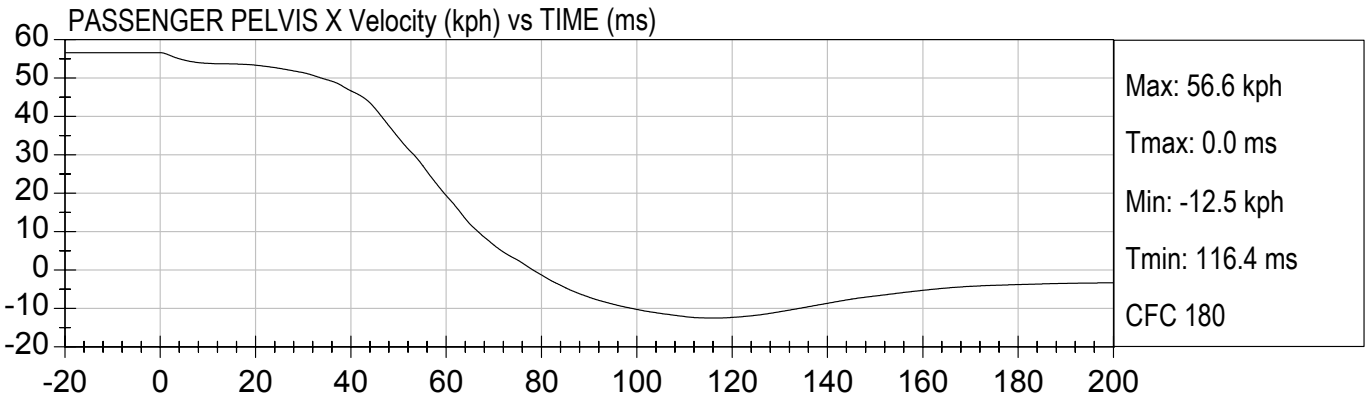
Test Date: 9/4/2002
Speed: 35.2 mph (56.6 km/h)

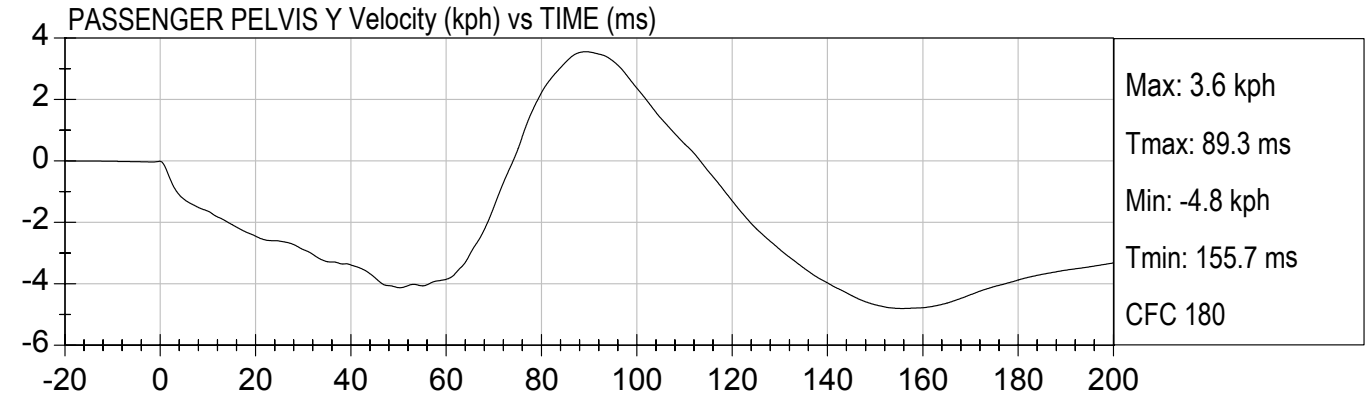


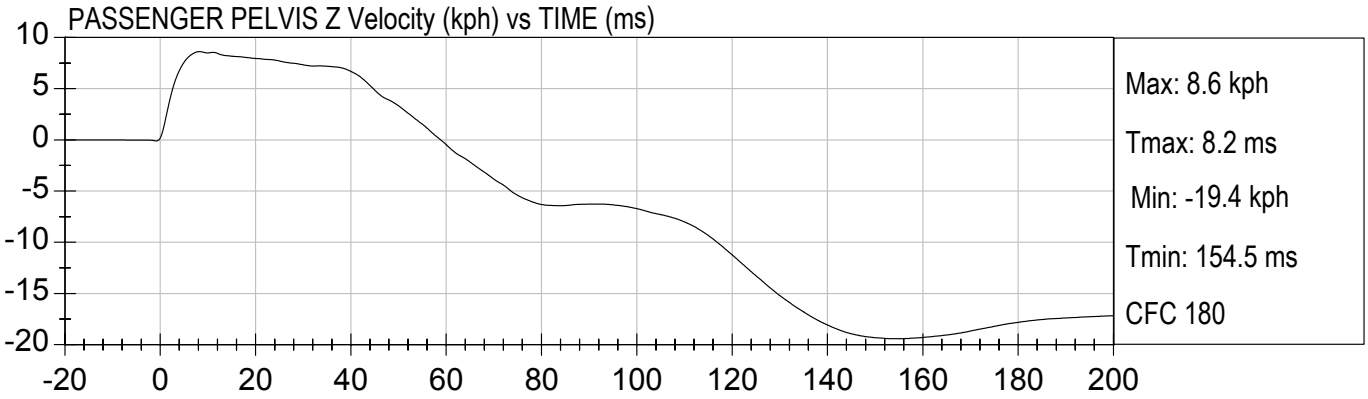


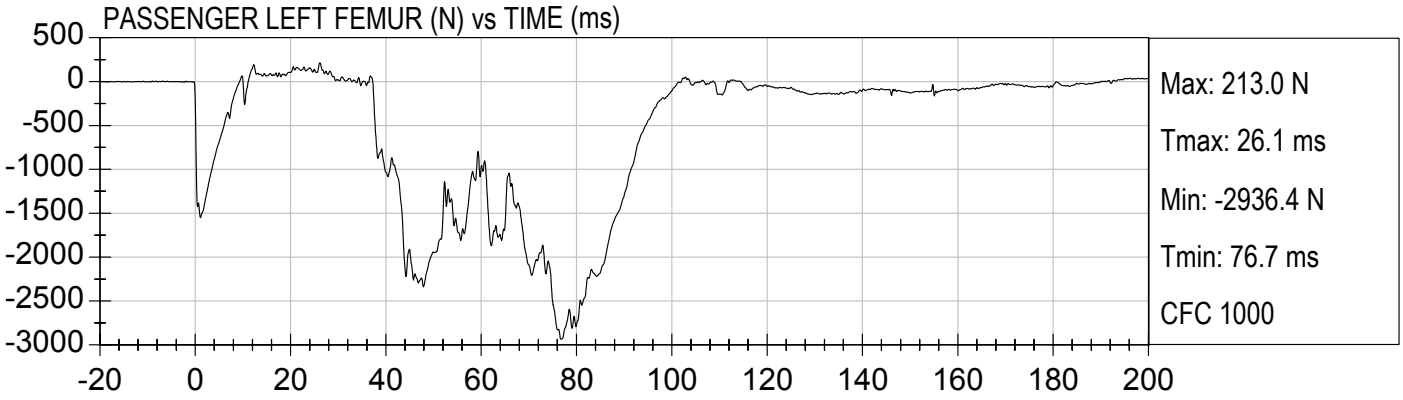


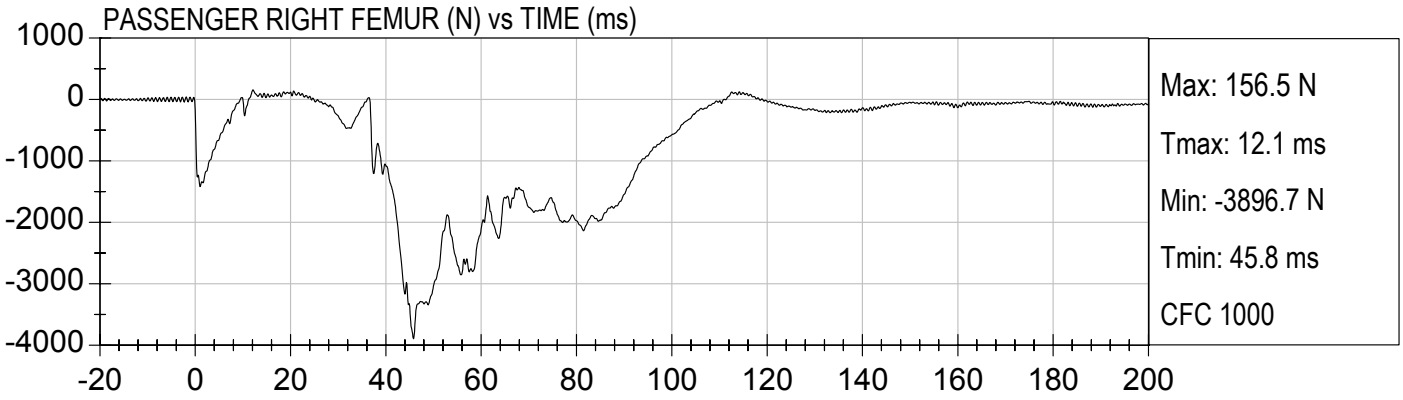


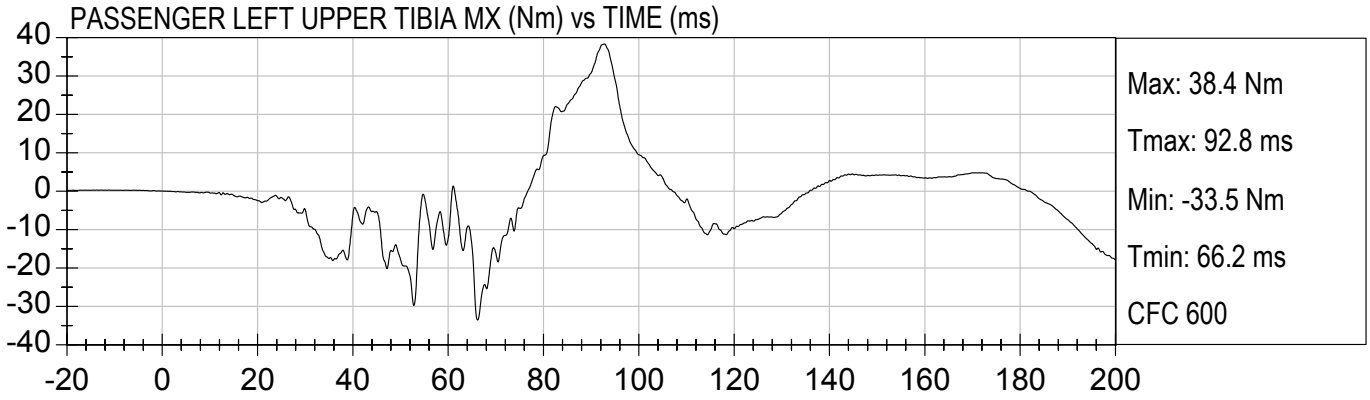

PASSENGER PELVIS X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 56.6 kph
Tmax: 0.0 ms
Min: -12.5 kph
Tmin: 116.4 ms
CFC 180

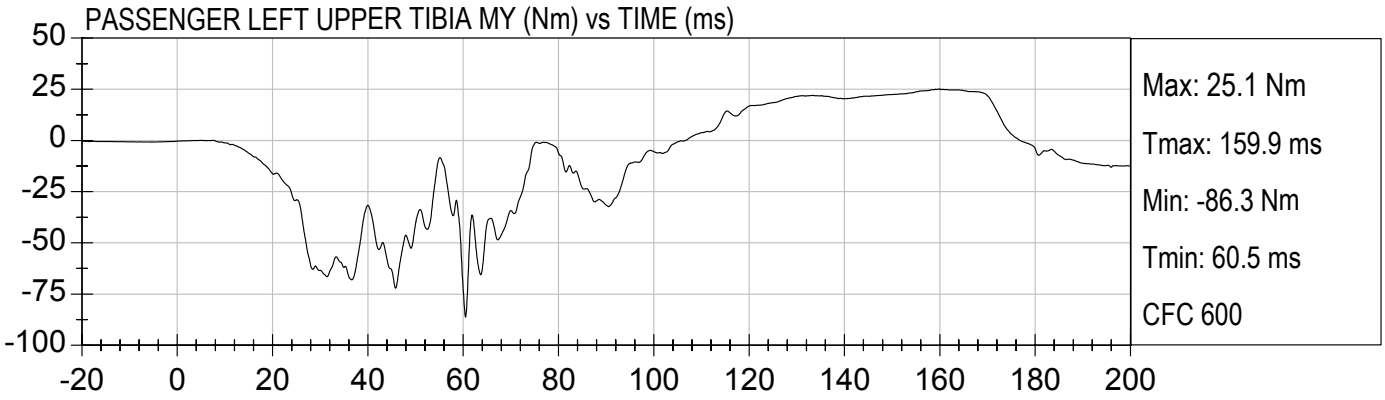

PASSENGER PELVIS Y Velocity (kph) vs TIME (ms)
4
2
0
-2
-4
-6
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 3.6 kph
Tmax: 89.3 ms
Min: -4.8 kph
Tmin: 155.7 ms
CFC 180

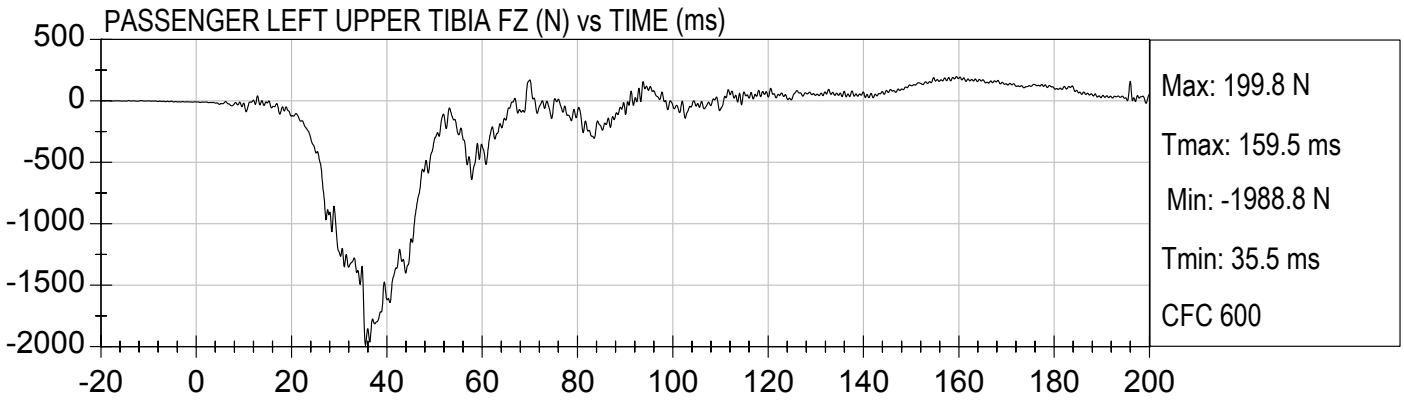

PASSENGER PELVIS Z Velocity (kph) vs TIME (ms)
10
5
0
-5
-10
-15
-20
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 8.6 kph
Tmax: 8.2 ms
Min: -19.4 kph
Tmin: 154.5 ms
CFC 180

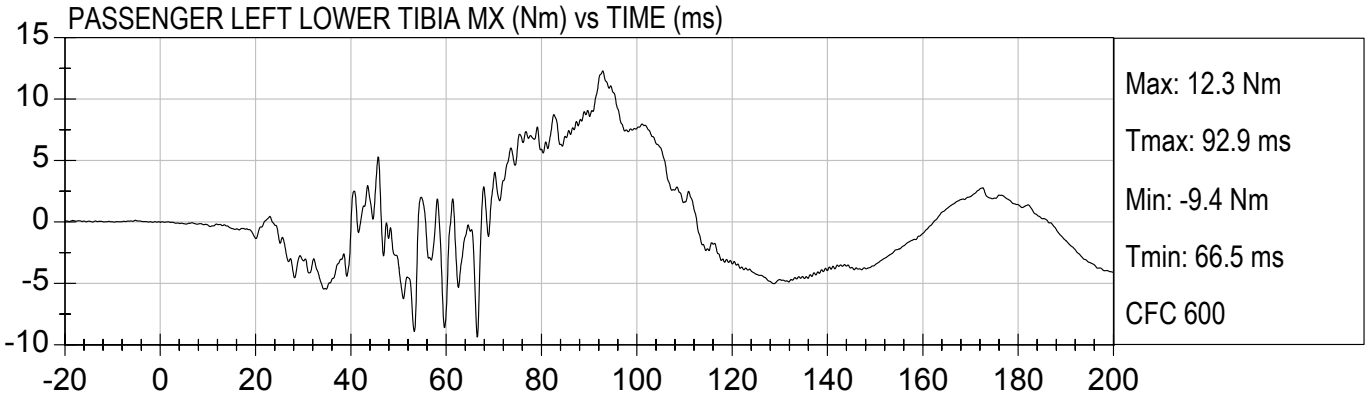

PASSENGER LEFT FEMUR (N) vs TIME (ms)
500
0
-500
-1000
-1500
-2000
-2500
-3000
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 213.0 N
Tmax: 26.1 ms
Min: -2936.4 N
Tmin: 76.7 ms
CFC 1000

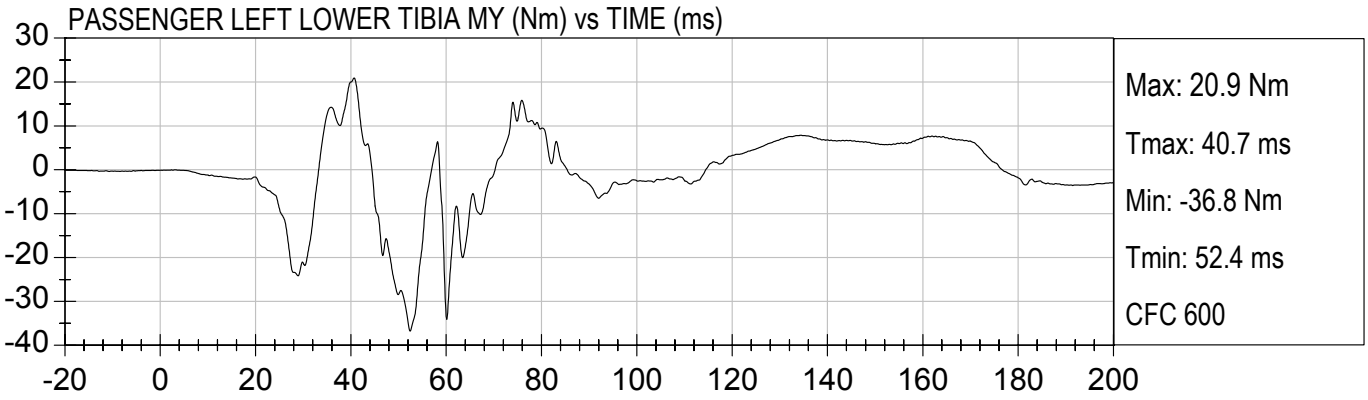

PASSENGER RIGHT FEMUR (N) vs TIME (ms)
1000
0
-1000
-2000
-3000
-4000
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 156.5 N
Tmax: 12.1 ms
Min: -3896.7 N
Tmin: 45.8 ms
CFC 1000

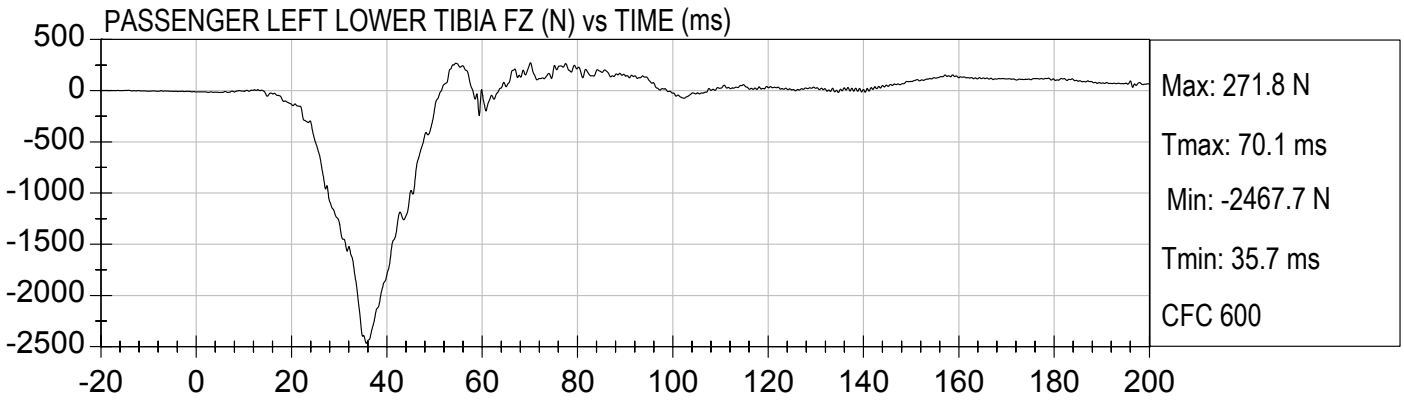

PASSENGER LEFT UPPER TIBIA MX (Nm) vs TIME (ms)
40
30
20
10
0
-10
-20
-30
-40
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 38.4 Nm
Tmax: 92.8 ms
Min: -33.5 Nm
Tmin: 66.2 ms
CFC 600

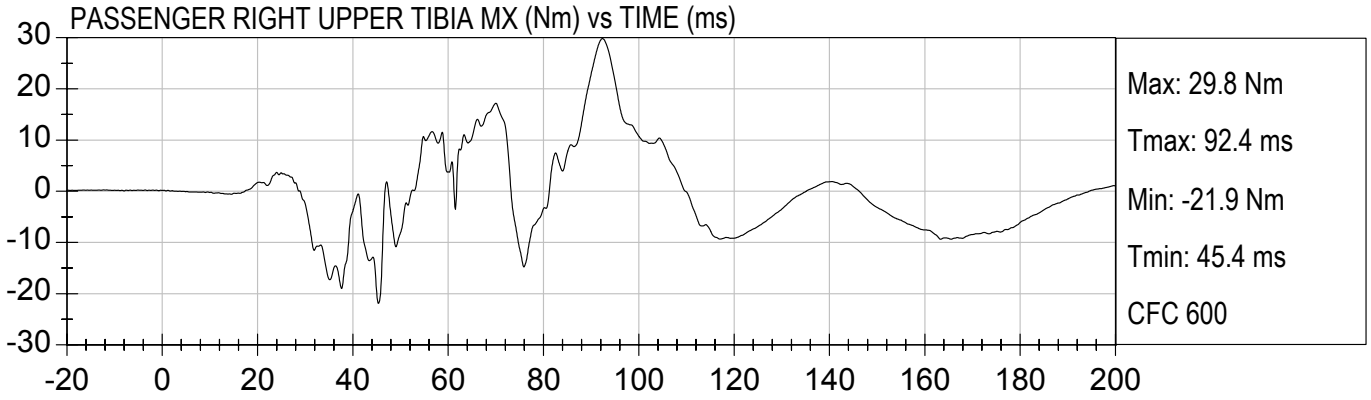

PASSENGER LEFT UPPER TIBIA MY (Nm) vs TIME (ms)
50
25
0
-25
-50
-75
-100
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 25.1 Nm
Tmax: 159.9 ms
Min: -86.3 Nm
Tmin: 60.5 ms
CFC 600

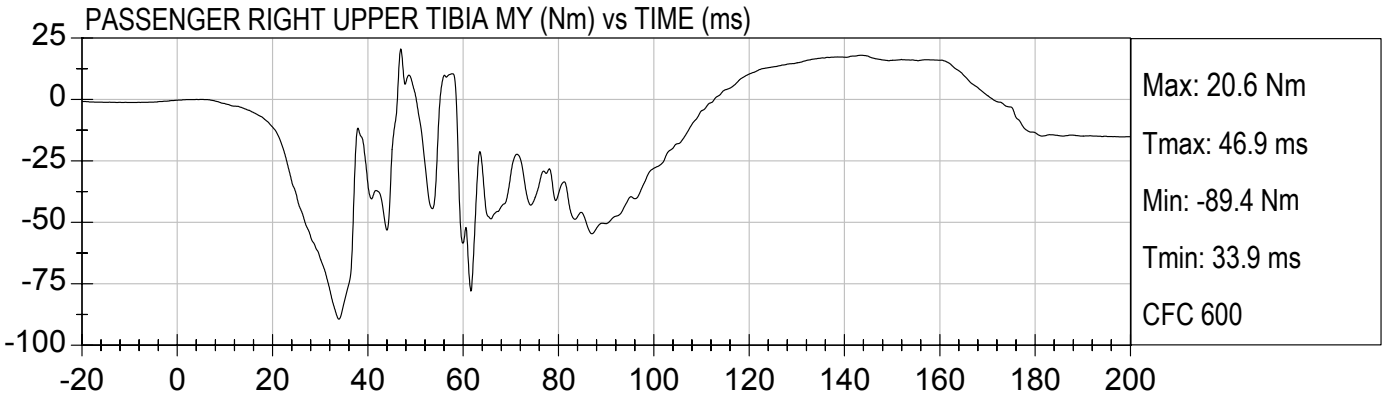

PASSENGER LEFT UPPER TIBIA FZ (N) vs TIME (ms)
500
0
-500
-1000
-1500
-2000
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 199.8 N
Tmax: 159.5 ms
Min: -1988.8 N
Tmin: 35.5 ms
CFC 600

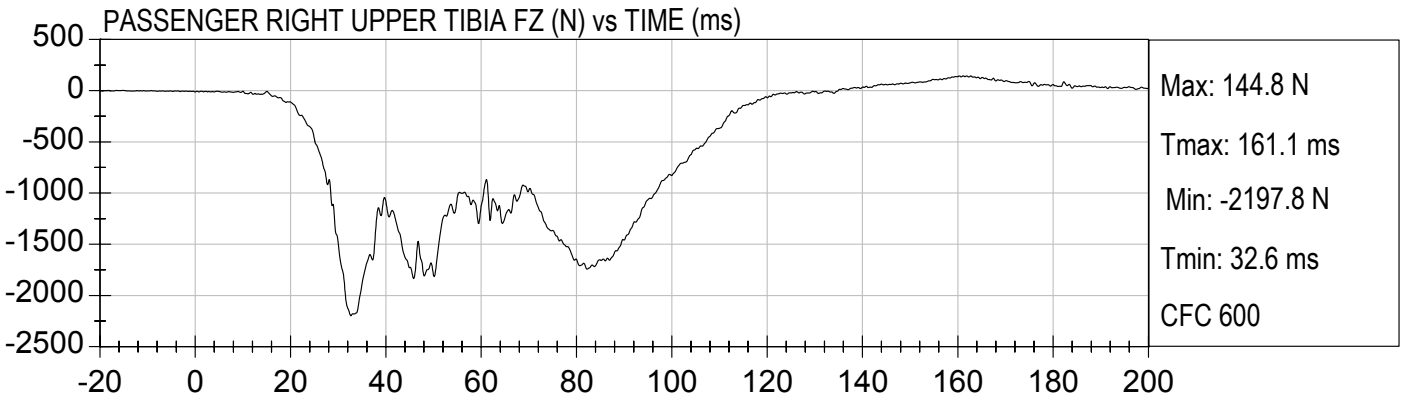

PASSENGER LEFT LOWER TIBIA MX (Nm) vs TIME (ms)
15
10
5
0
-5
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 12.3 Nm
Tmax: 92.9 ms
Min: -9.4 Nm
Tmin: 66.5 ms
CFC 600

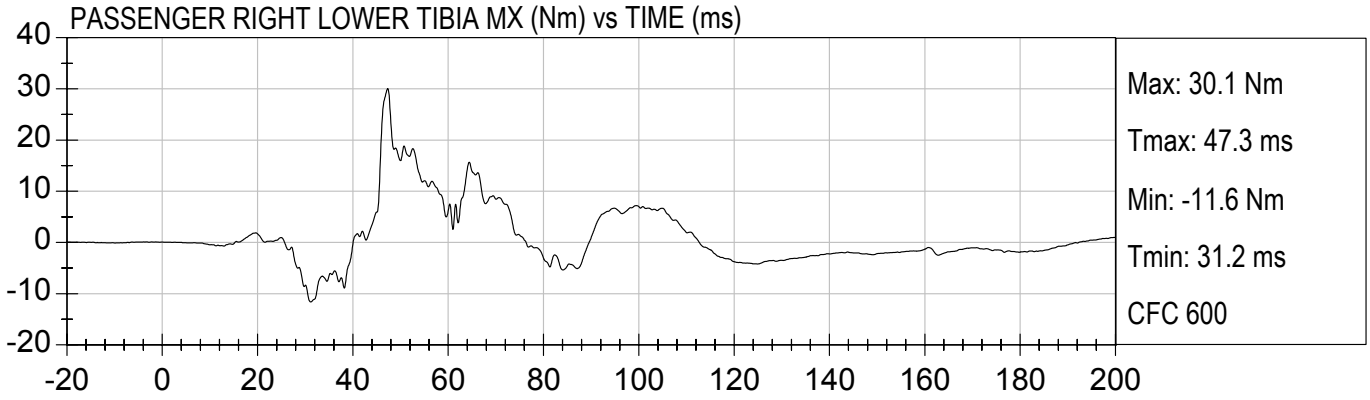

PASSENGER LEFT LOWER TIBIA MY (Nm) vs TIME (ms)
30
20
10
0
-10
-20
-30
-40
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 20.9 Nm
Tmax: 40.7 ms
Min: -36.8 Nm
Tmin: 52.4 ms
CFC 600

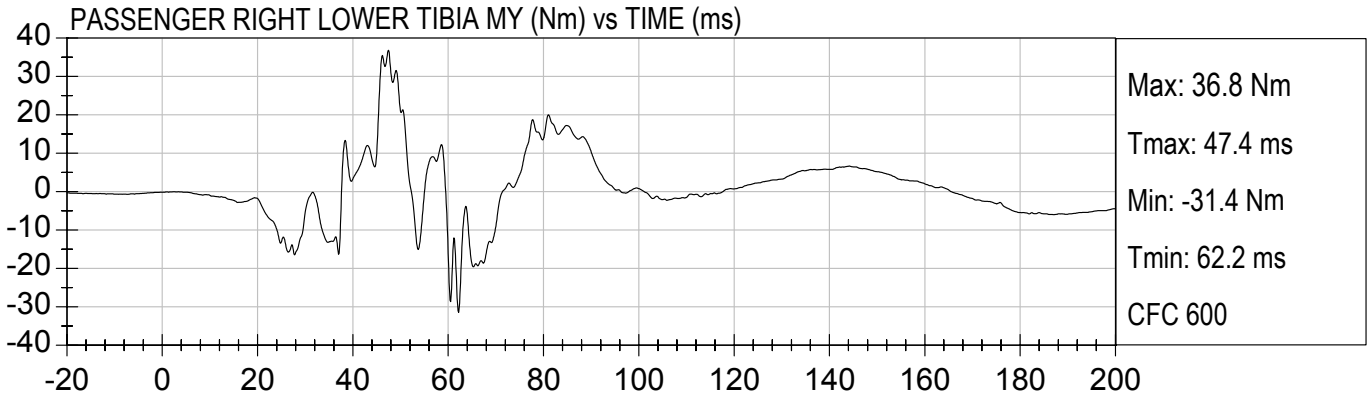

PASSENGER LEFT LOWER TIBIA FZ (N) vs TIME (ms)
500
0
-500
-1000
-1500
-2000
-2500
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 271.8 N
Tmax: 70.1 ms
Min: -2467.7 N
Tmin: 35.7 ms
CFC 600

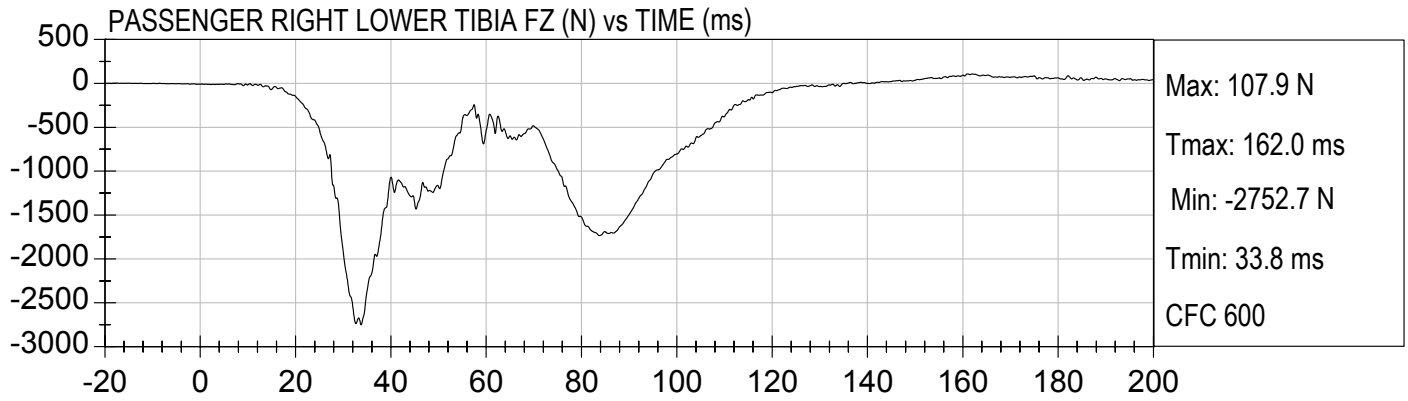

PASSENGER RIGHT UPPER TIBIA MX (Nm) vs TIME (ms)
30
20
10
0
-10
-20
-30
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 29.8 Nm
Tmax: 92.4 ms
Min: -21.9 Nm
Tmin: 45.4 ms
CFC 600

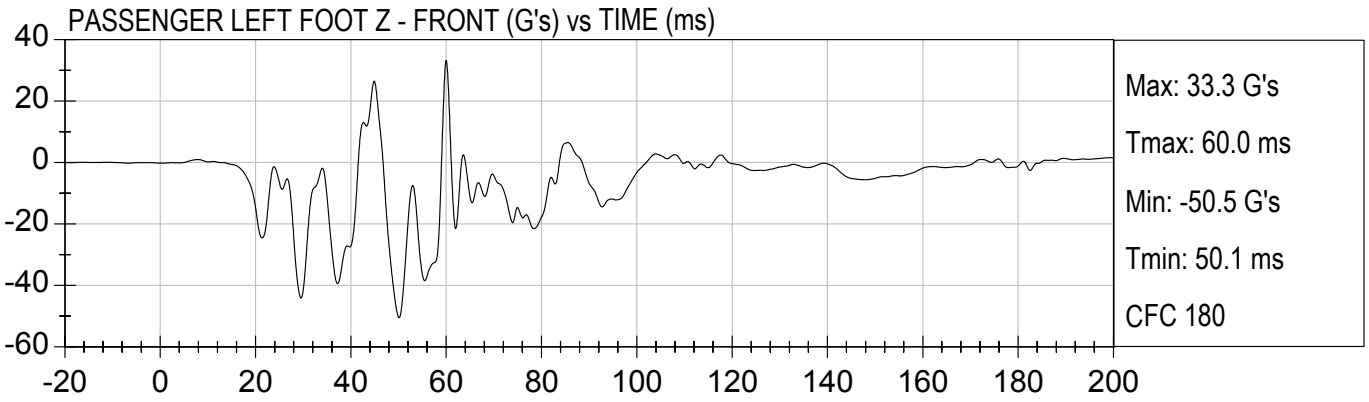

PASSENGER RIGHT UPPER TIBIA MY (Nm) vs TIME (ms)
25
0
-25
-50
-75
-100
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 20.6 Nm
Tmax: 46.9 ms
Min: -89.4 Nm
Tmin: 33.9 ms
CFC 600

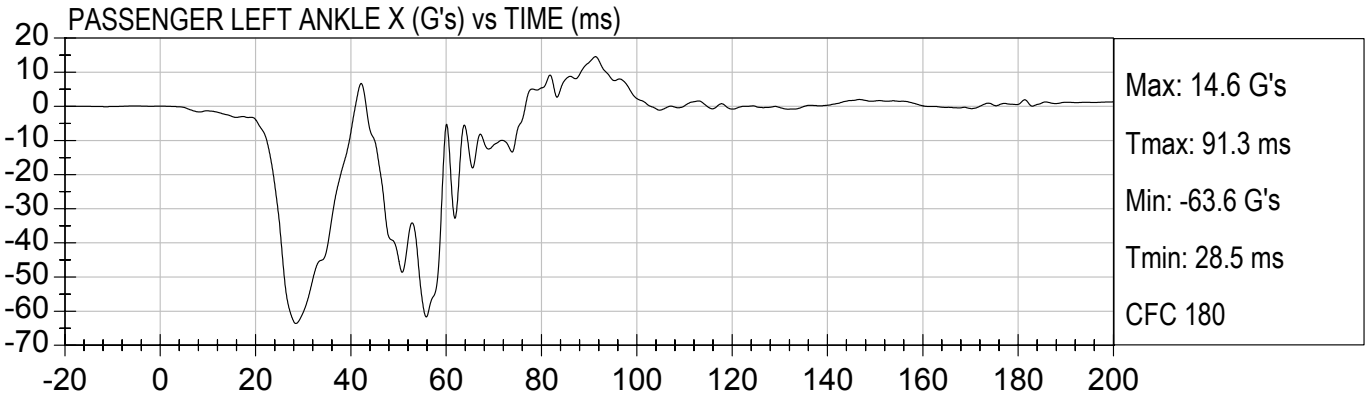

PASSENGER RIGHT UPPER TIBIA FZ (N) vs TIME (ms)
500
0
-500
-1000
-1500
-2000
-2500
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 144.8 N
Tmax: 161.1 ms
Min: -2197.8 N
Tmin: 32.6 ms
CFC 600

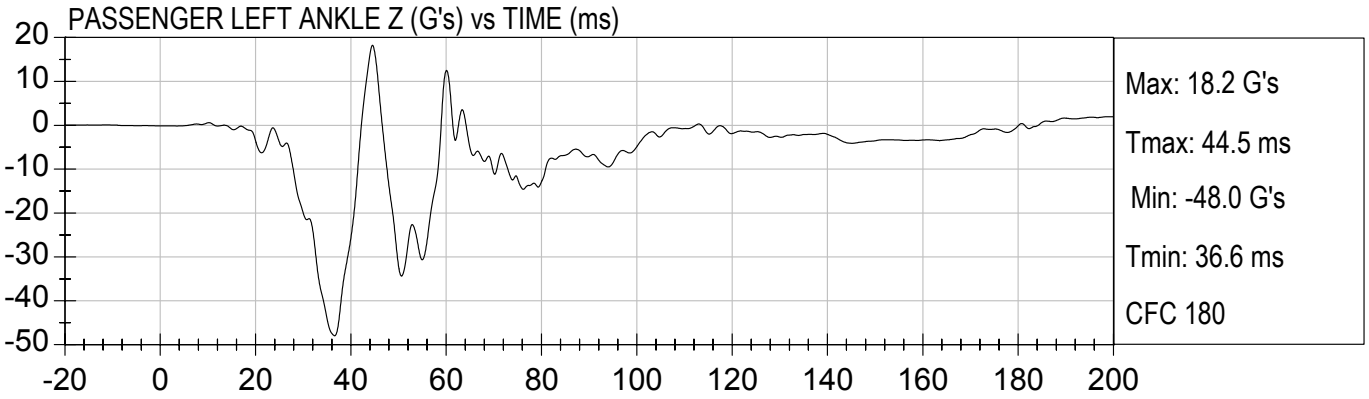

PASSENGER RIGHT LOWER TIBIA MX (Nm) vs TIME (ms)
40
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 30.1 Nm
Tmax: 47.3 ms
Min: -11.6 Nm
Tmin: 31.2 ms
CFC 600

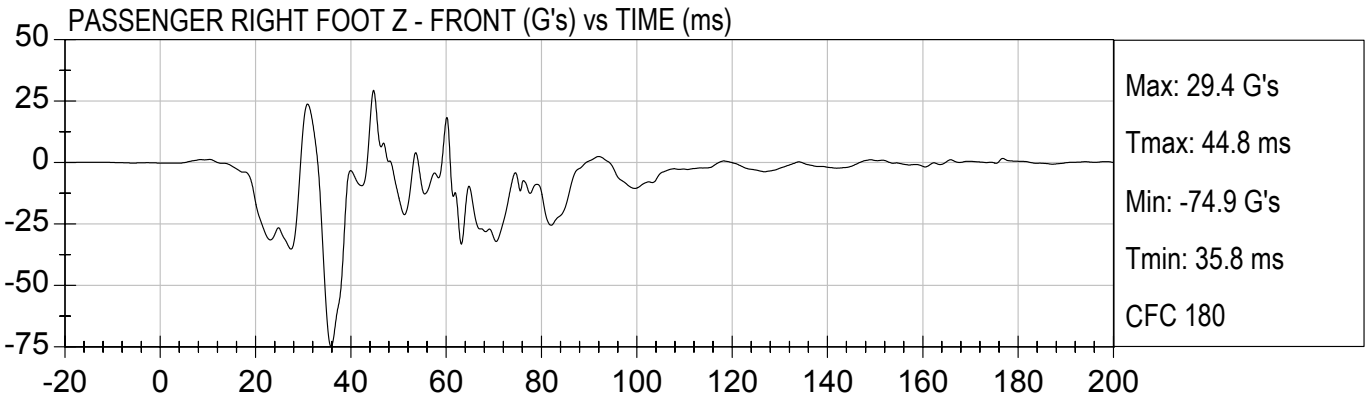

PASSENGER RIGHT LOWER TIBIA MY (Nm) vs TIME (ms)
40
30
20
10
0
-10
-20
-30
-40
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 36.8 Nm
Tmax: 47.4 ms
Min: -31.4 Nm
Tmin: 62.2 ms
CFC 600

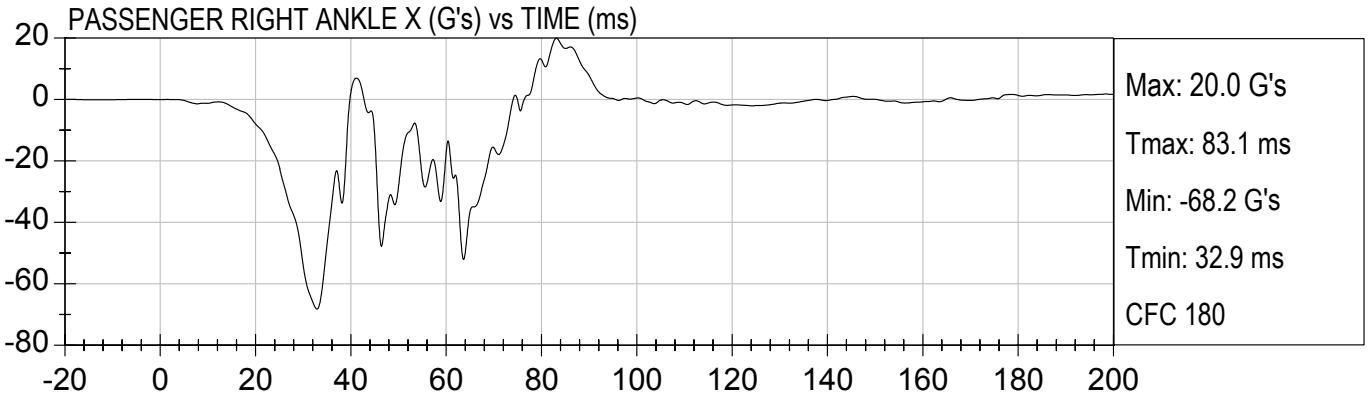

PASSENGER RIGHT LOWER TIBIA FZ (N) vs TIME (ms)
500
0
-500
-1000
-1500
-2000
-2500
-3000
-20 0 20 40 60 80 100 120 140 160 180 200
Max: 107.9 N
Tmax: 162.0 ms
Min: -2752.7 N
Tmin: 33.8 ms
CFC 600

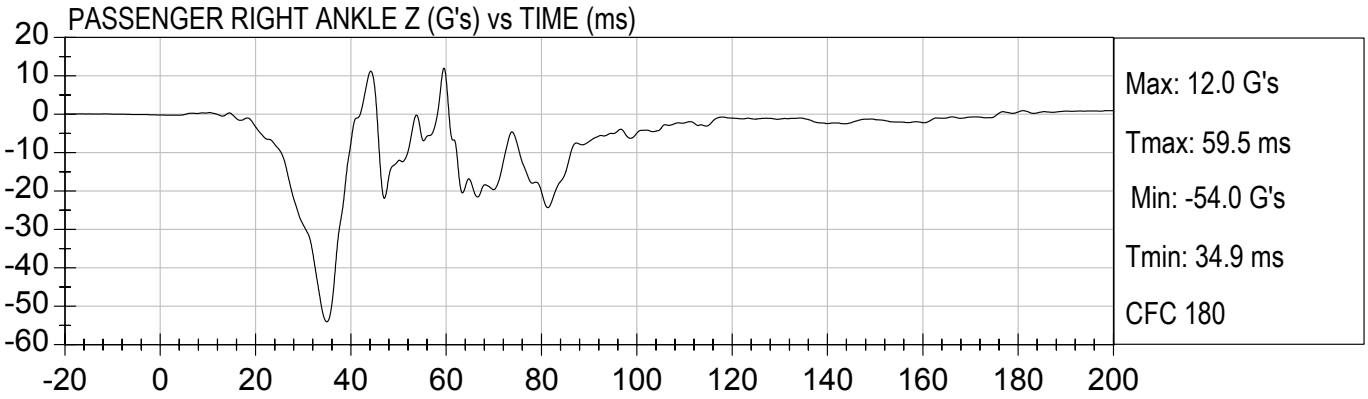

PASSENGER LEFT FOOT Z - FRONT (G's) vs TIME (ms)
40
20
0
-20
-40
-60
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 33.3 G's
Tmax: 60.0 ms
Min: -50.5 G's
Tmin: 50.1 ms
CFC 180

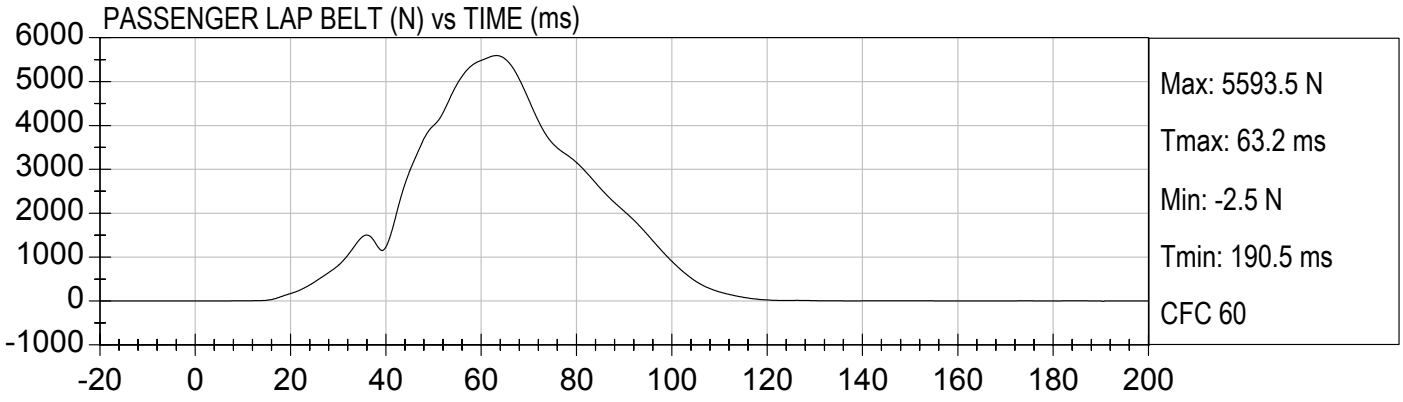

PASSENGER LEFT ANKLE X (G's) vs TIME (ms)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 14.6 G's
Tmax: 91.3 ms
Min: -63.6 G's
Tmin: 28.5 ms
CFC 180

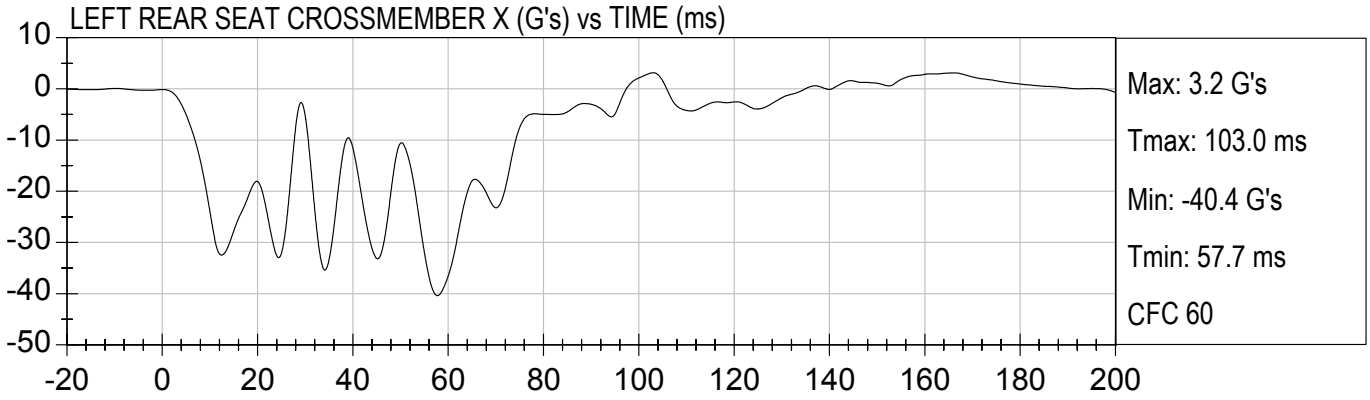

PASSENGER LEFT ANKLE Z (G's) vs TIME (ms)
20
10
0
-10
-20
-30
-40
-50
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 18.2 G's
Tmax: 44.5 ms
Min: -48.0 G's
Tmin: 36.6 ms
CFC 180

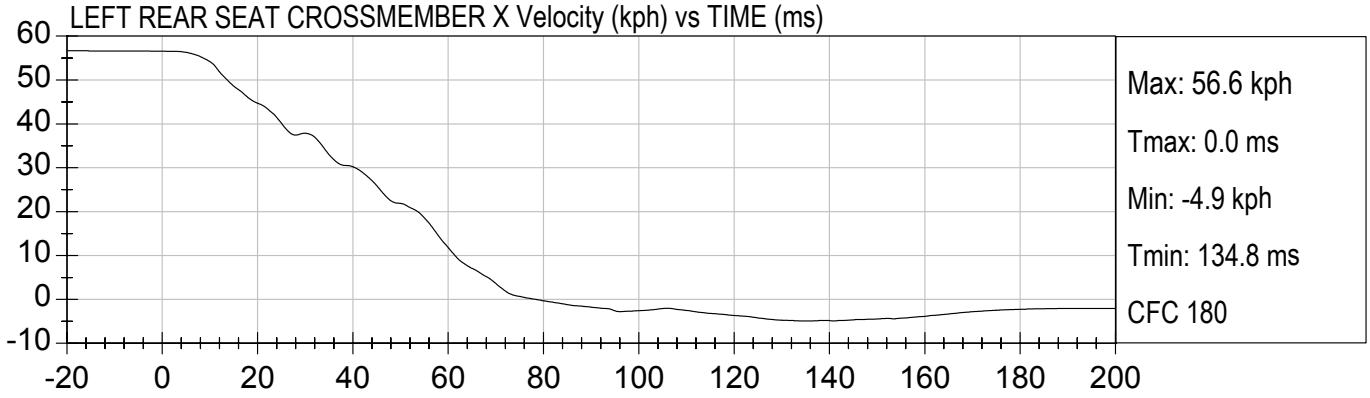

PASSENGER RIGHT FOOT Z - FRONT (G's) vs TIME (ms)
50
25
0
-25
-50
-75
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 29.4 G's
Tmax: 44.8 ms
Min: -74.9 G's
Tmin: 35.8 ms
CFC 180

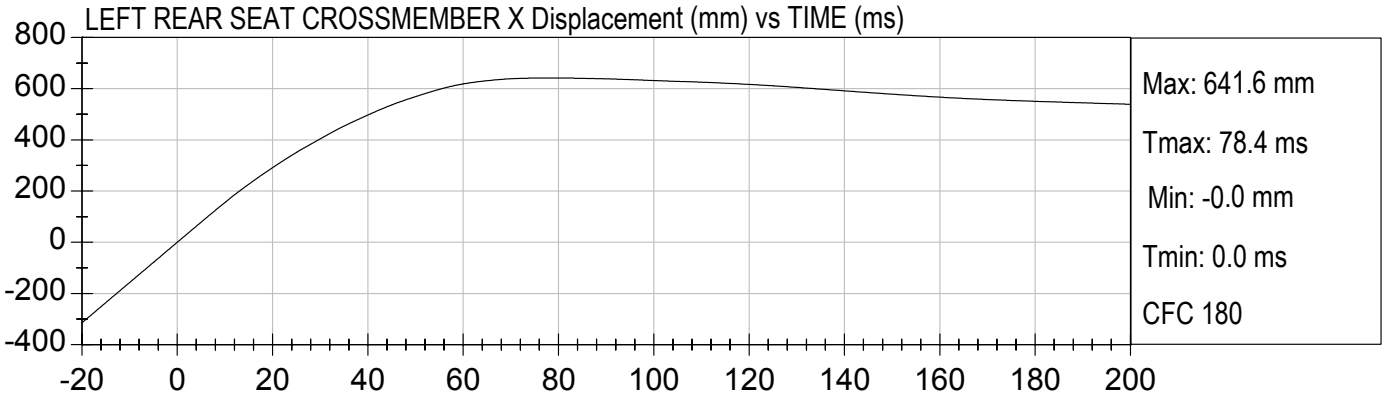

PASSENGER RIGHT ANKLE X (G's) vs TIME (ms)
20
0
-20
-40
-60
-80
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 20.0 G's
Tmax: 83.1 ms
Min: -68.2 G's
Tmin: 32.9 ms
CFC 180

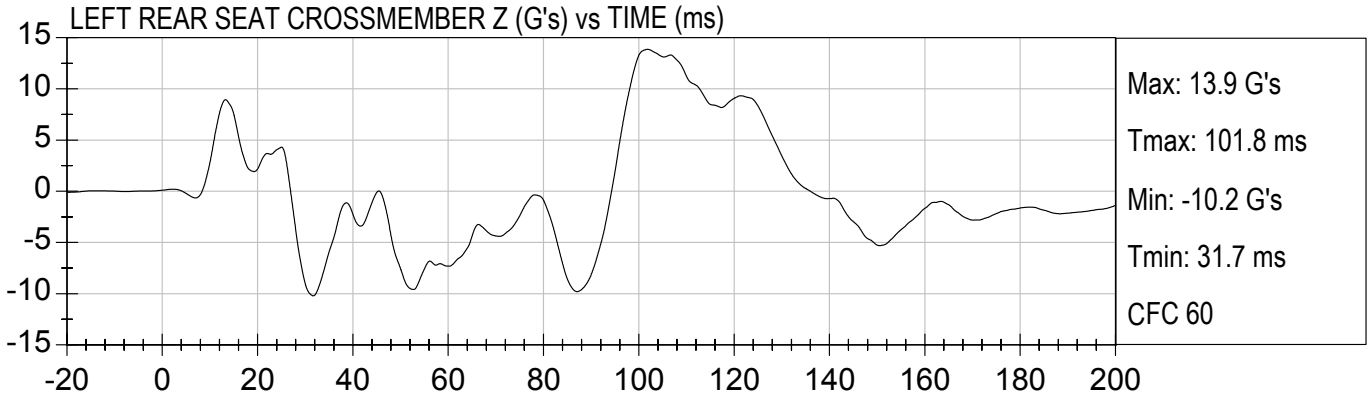

PASSENGER RIGHT ANKLE Z (G's) vs TIME (ms)
20
10
0
-10
-20
-30
-40
-50
-60
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 12.0 G's
Tmax: 59.5 ms
Min: -54.0 G's
Tmin: 34.9 ms
CFC 180

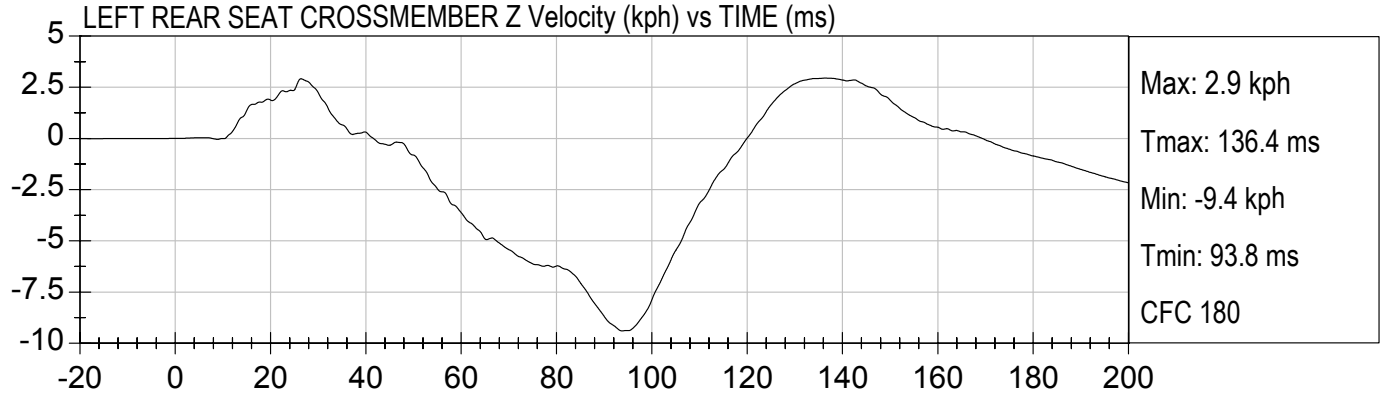

PASSENGER LAP BELT (N) vs TIME (ms)
6000
5000
4000
3000
2000
1000
0
-1000
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 5593.5 N
Tmax: 63.2 ms
Min: -2.5 N
Tmin: 190.5 ms
CFC 60

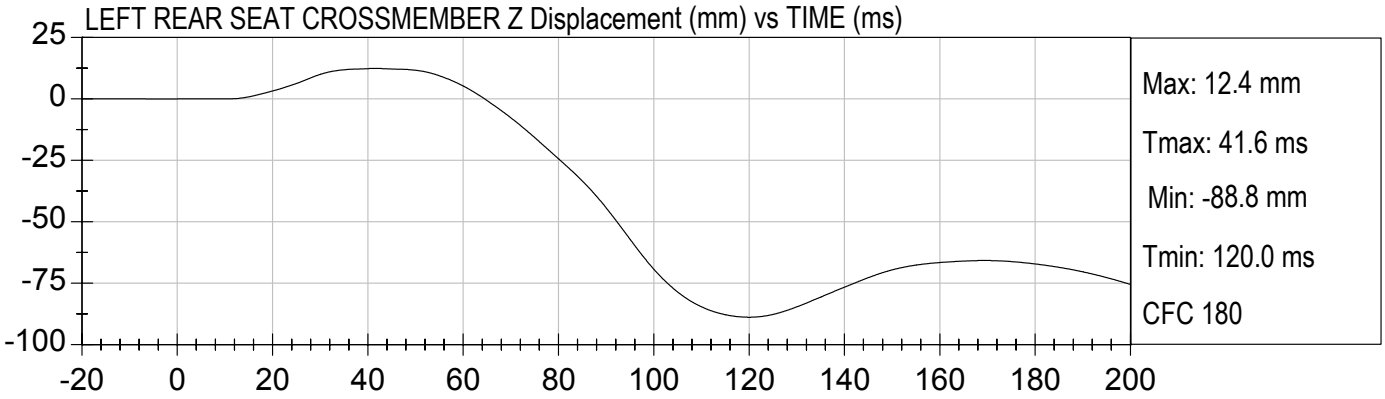

LEFT REAR SEAT CROSSMEMBER X (G's) vs TIME (ms)
10
0
-10
-20
-30
-40
-50
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 3.2 G's
Tmax: 103.0 ms
Min: -40.4 G's
Tmin: 57.7 ms
CFC 60

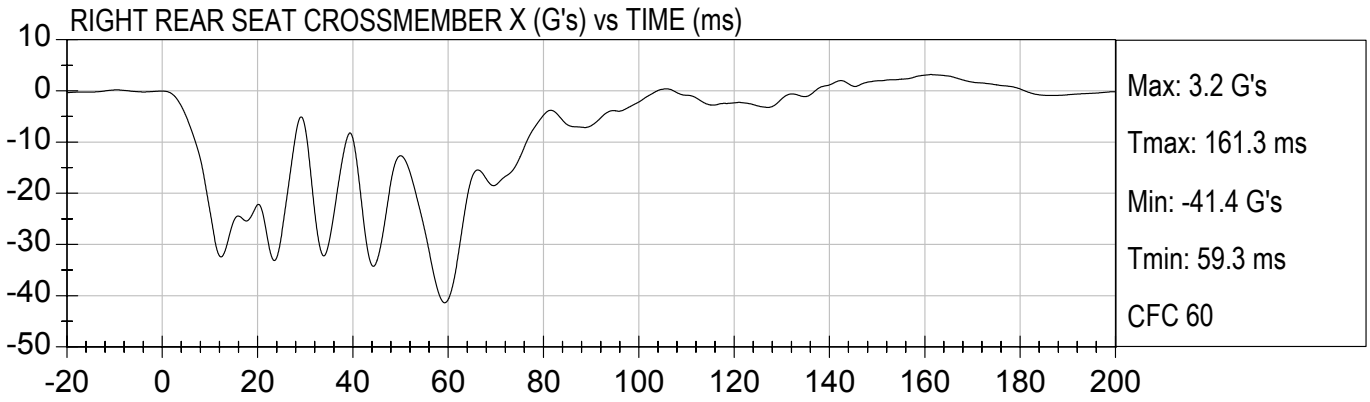

LEFT REAR SEAT CROSSMEMBER X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 56.6 kph
Tmax: 0.0 ms
Min: -4.9 kph
Tmin: 134.8 ms
CFC 180

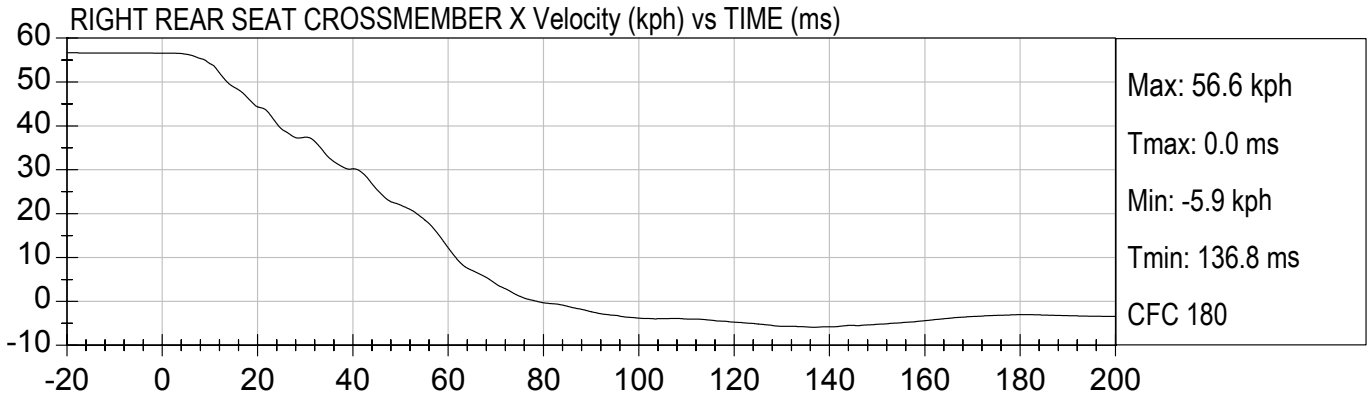

LEFT REAR SEAT CROSSMEMBER X Displacement (mm) vs TIME (ms)
800
600
400
200
0
-200
-400
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 641.6 mm
Tmax: 78.4 ms
Min: -0.0 mm
Tmin: 0.0 ms
CFC 180

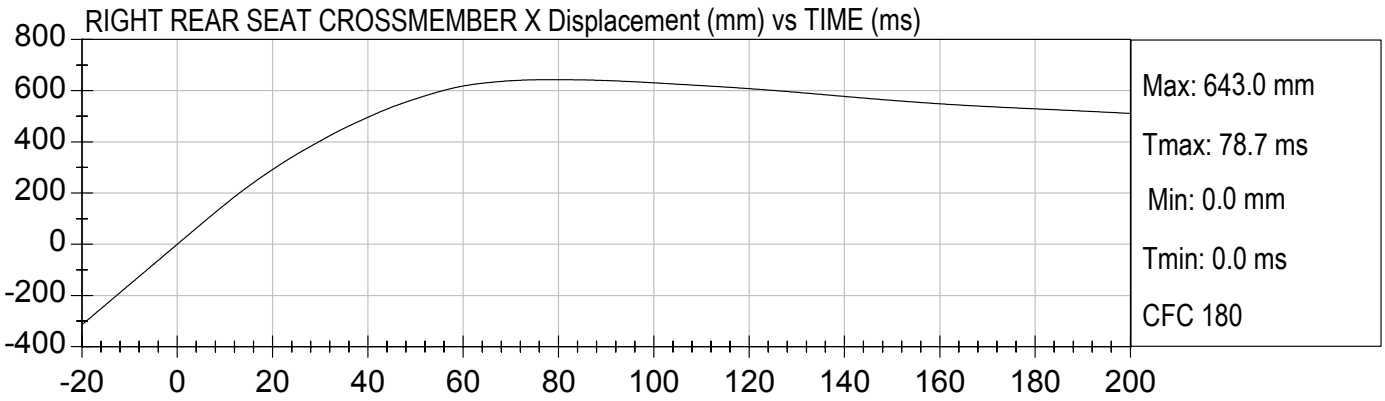

LEFT REAR SEAT CROSSMEMBER Z (G's) vs TIME (ms)
15
10
5
0
-5
-10
-15
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 13.9 G's
Tmax: 101.8 ms
Min: -10.2 G's
Tmin: 31.7 ms
CFC 60

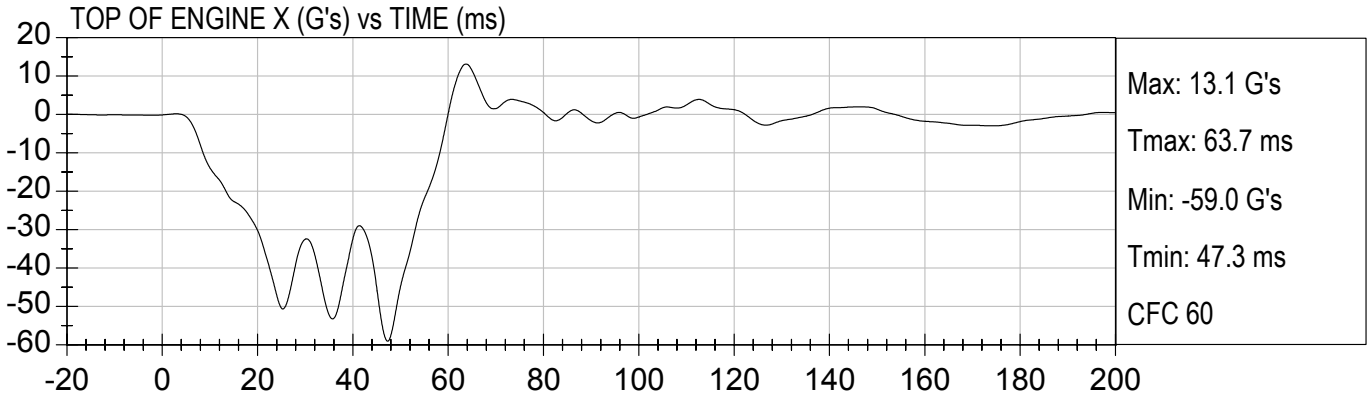

LEFT REAR SEAT CROSSMEMBER Z Velocity (kph) vs TIME (ms)
5
2.5
0
-2.5
-5
-7.5
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 2.9 kph
Tmax: 136.4 ms
Min: -9.4 kph
Tmin: 93.8 ms
CFC 180

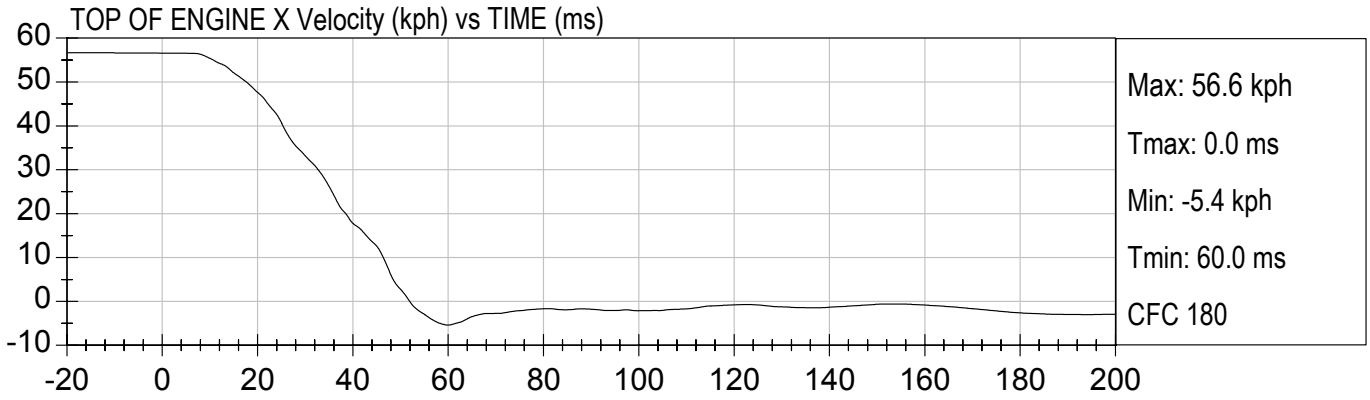

LEFT REAR SEAT CROSSMEMBER Z Displacement (mm) vs TIME (ms)
25
0
-25
-50
-75
-100
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 12.4 mm
Tmax: 41.6 ms
Min: -88.8 mm
Tmin: 120.0 ms
CFC 180

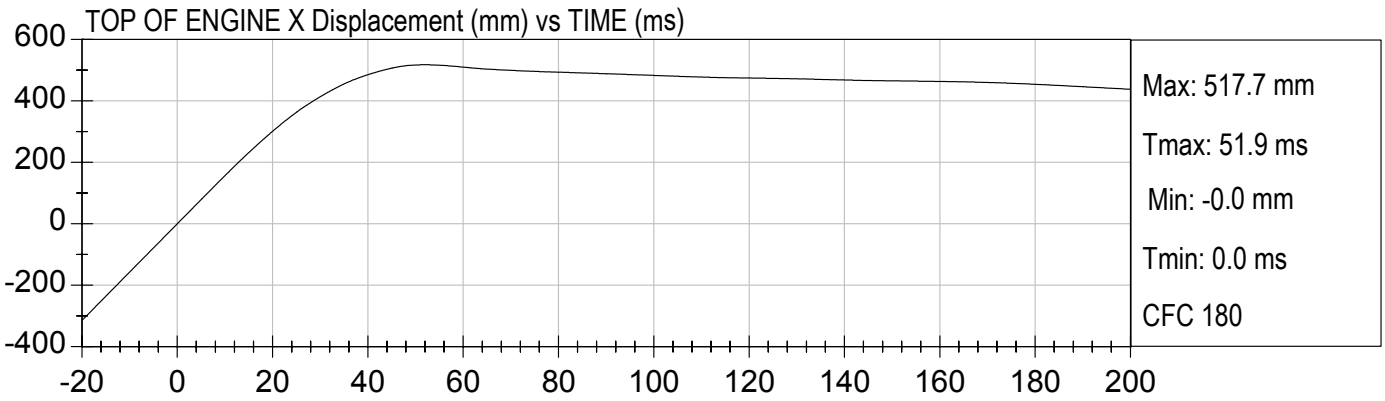

RIGHT REAR SEAT CROSSMEMBER X (G's) vs TIME (ms)
10
0
-10
-20
-30
-40
-50
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 3.2 G's
Tmax: 161.3 ms
Min: -41.4 G's
Tmin: 59.3 ms
CFC 60

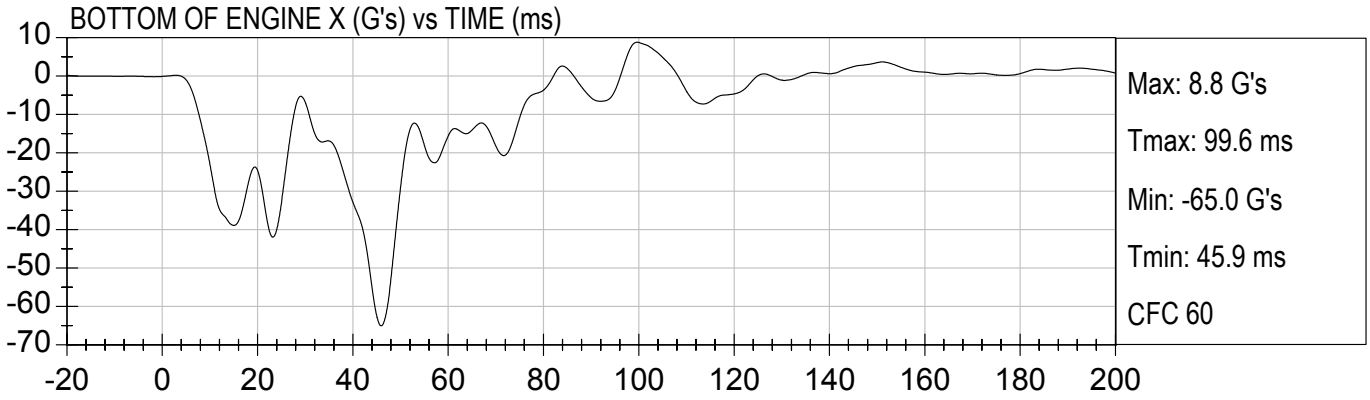

RIGHT REAR SEAT CROSSMEMBER X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 56.6 kph
Tmax: 0.0 ms
Min: -5.9 kph
Tmin: 136.8 ms
CFC 180

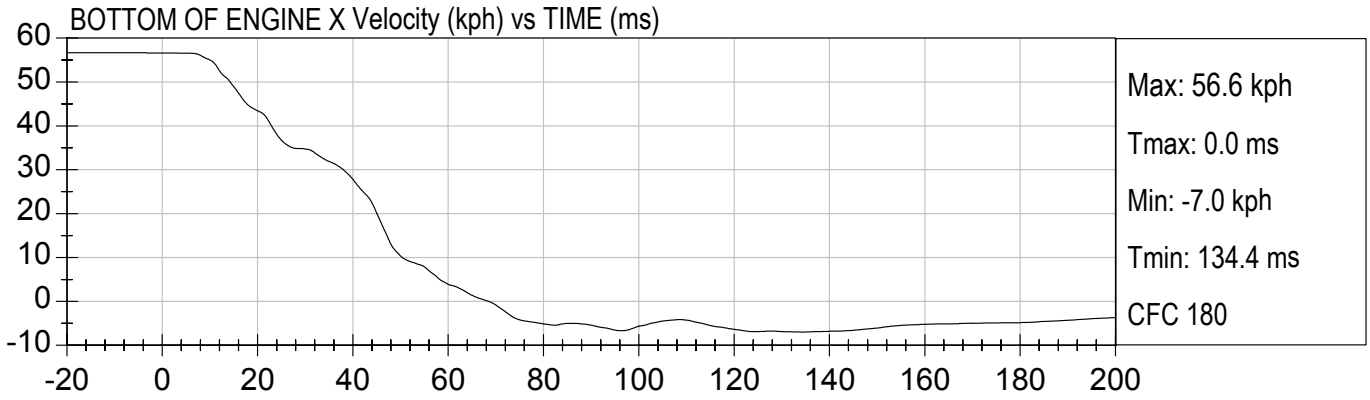

RIGHT REAR SEAT CROSSMEMBER X Displacement (mm) vs TIME (ms)
800
600
400
200
0
-200
-400
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 643.0 mm
Tmax: 78.7 ms
Min: 0.0 mm
Tmin: 0.0 ms
CFC 180

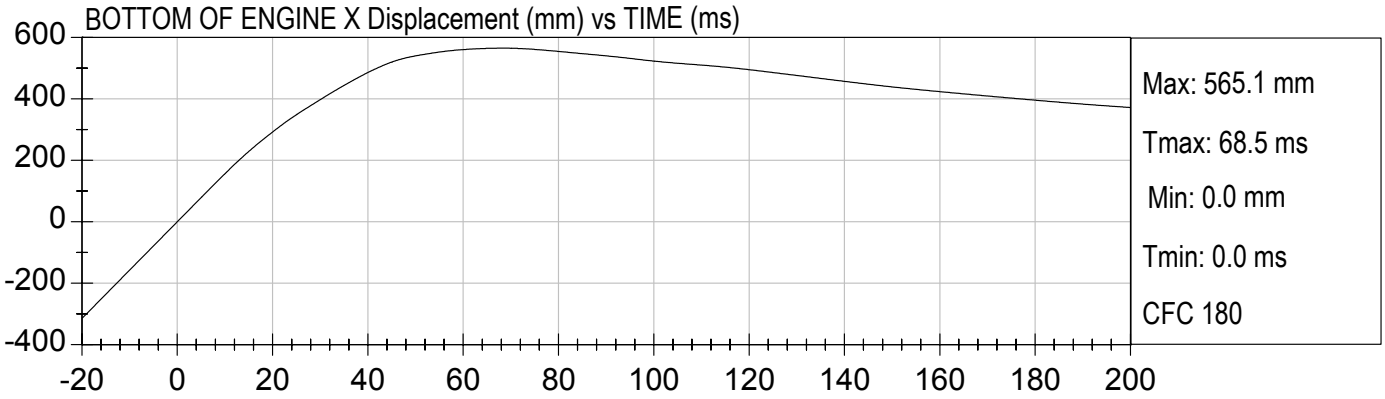

TOP OF ENGINE X (G's) vs TIME (ms)
20
10
0
-10
-20
-30
-40
-50
-60
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 13.1 G's
Tmax: 63.7 ms
Min: -59.0 G's
Tmin: 47.3 ms
CFC 60

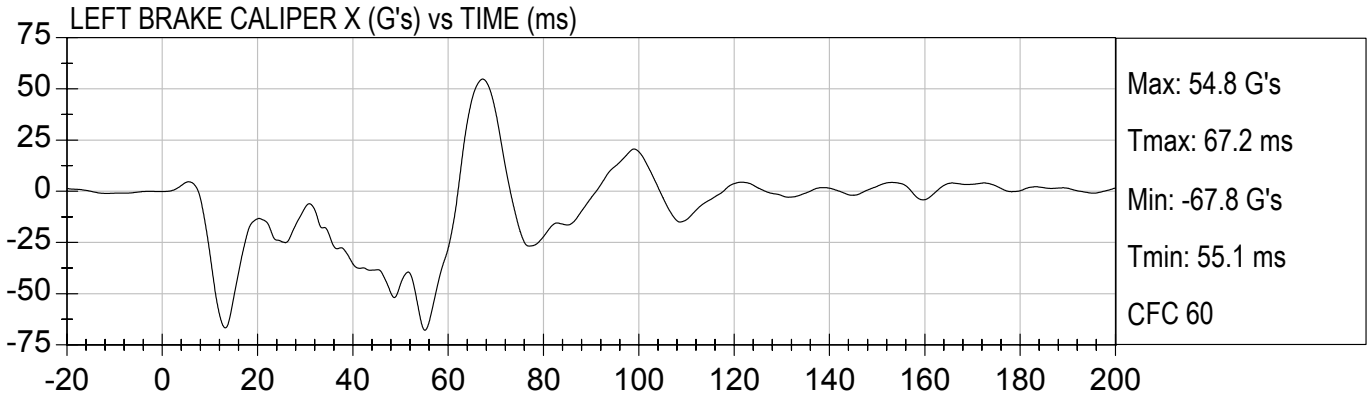

TOP OF ENGINE X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 56.6 kph
Tmax: 0.0 ms
Min: -5.4 kph
Tmin: 60.0 ms
CFC 180

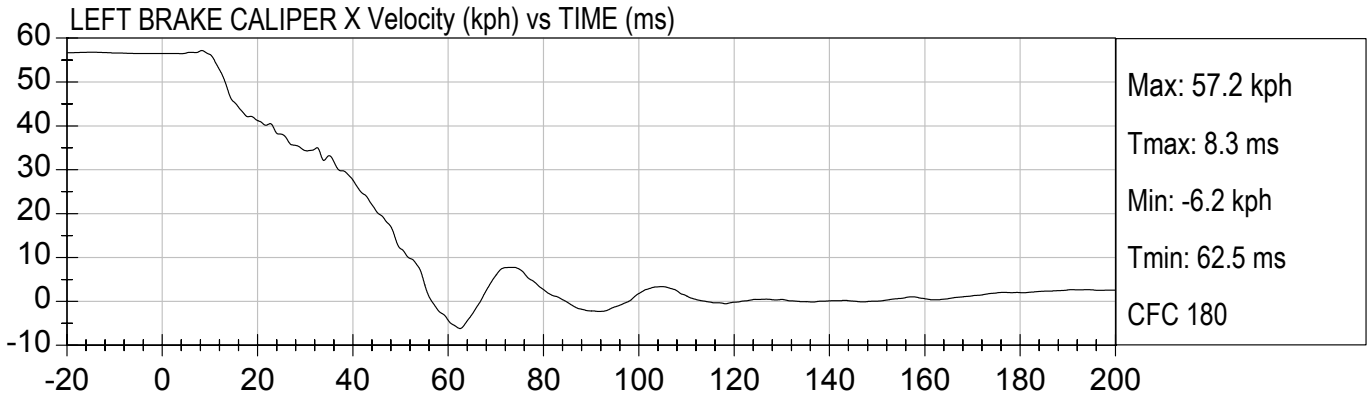

TOP OF ENGINE X Displacement (mm) vs TIME (ms)
600
400
200
0
-200
-400
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 517.7 mm
Tmax: 51.9 ms
Min: -0.0 mm
Tmin: 0.0 ms
CFC 180

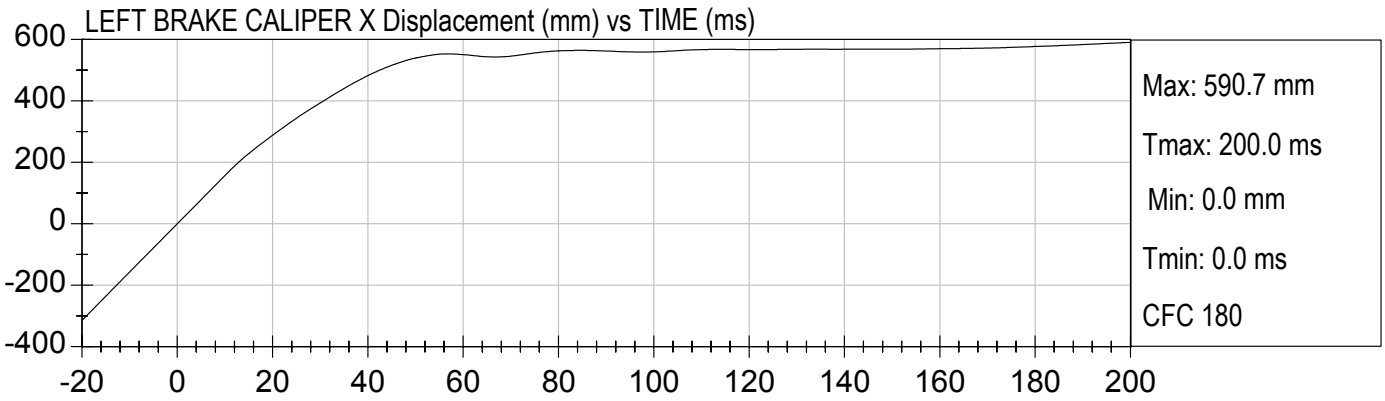

BOTTOM OF ENGINE X (G's) vs TIME (ms)
10
0
-10
-20
-30
-40
-50
-60
-70
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 8.8 G's
Tmax: 99.6 ms
Min: -65.0 G's
Tmin: 45.9 ms
CFC 60

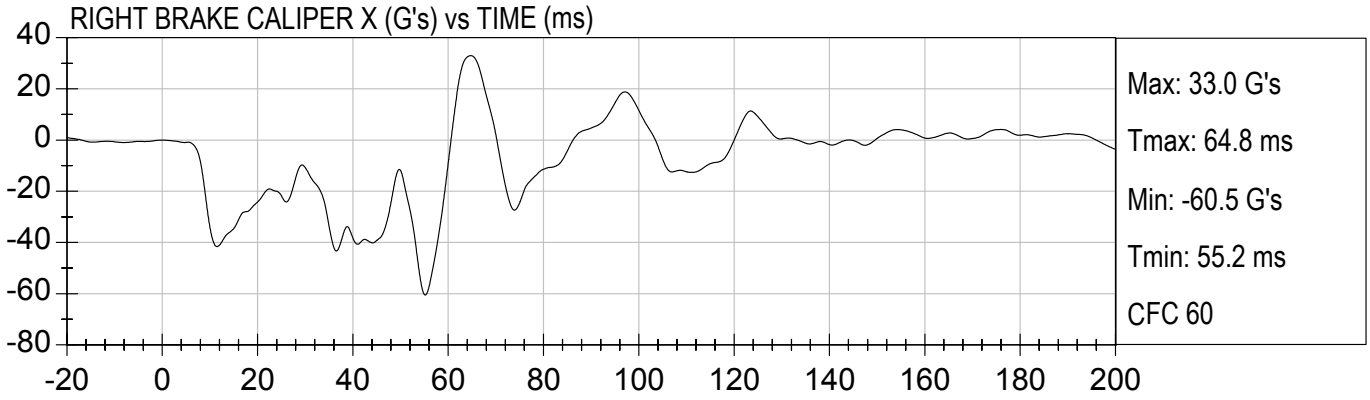

BOTTOM OF ENGINE X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 56.6 kph
Tmax: 0.0 ms
Min: -7.0 kph
Tmin: 134.4 ms
CFC 180

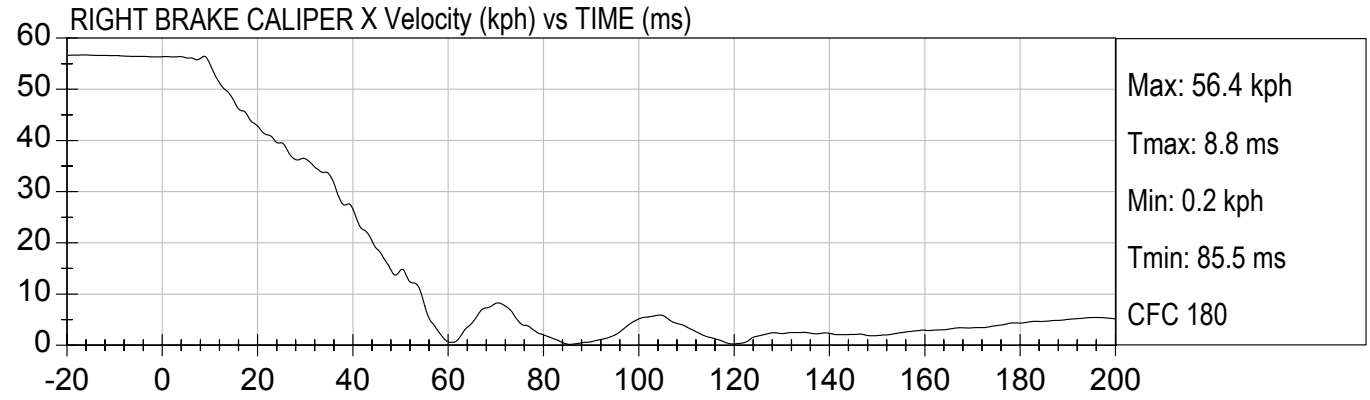

BOTTOM OF ENGINE X Displacement (mm) vs TIME (ms)
600
400
200
0
-200
-400
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 565.1 mm
Tmax: 68.5 ms
Min: 0.0 mm
Tmin: 0.0 ms
CFC 180

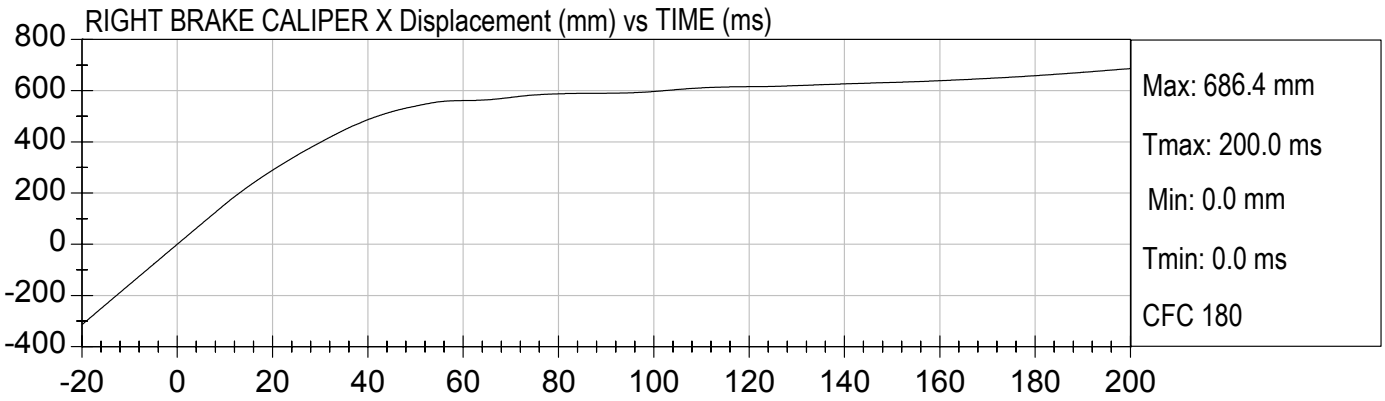

LEFT BRAKE CALIPER X (G's) vs TIME (ms)
75
50
25
0
-25
-50
-75
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 54.8 G's
Tmax: 67.2 ms
Min: -67.8 G's
Tmin: 55.1 ms
CFC 60

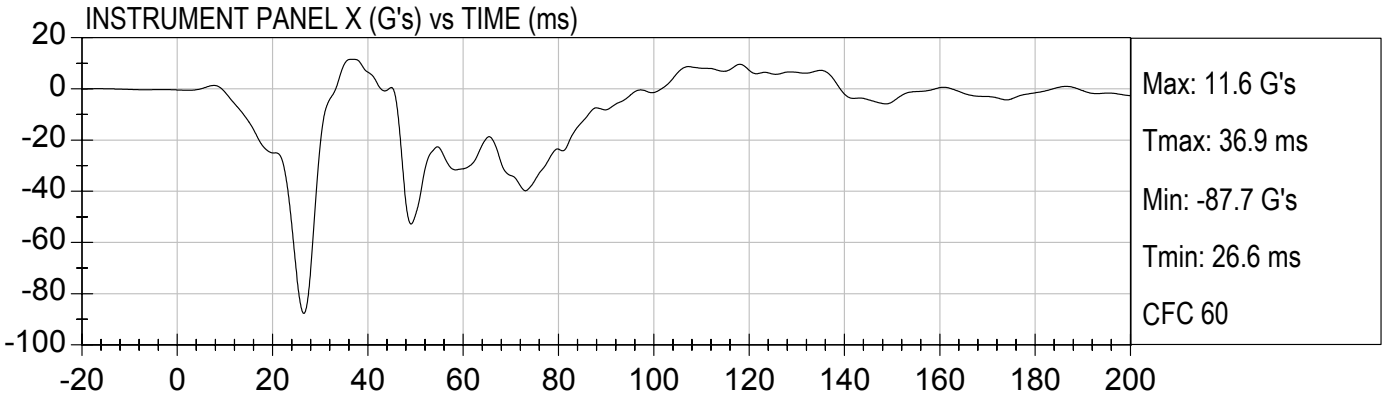

LEFT BRAKE CALIPER X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 57.2 kph
Tmax: 8.3 ms
Min: -6.2 kph
Tmin: 62.5 ms
CFC 180

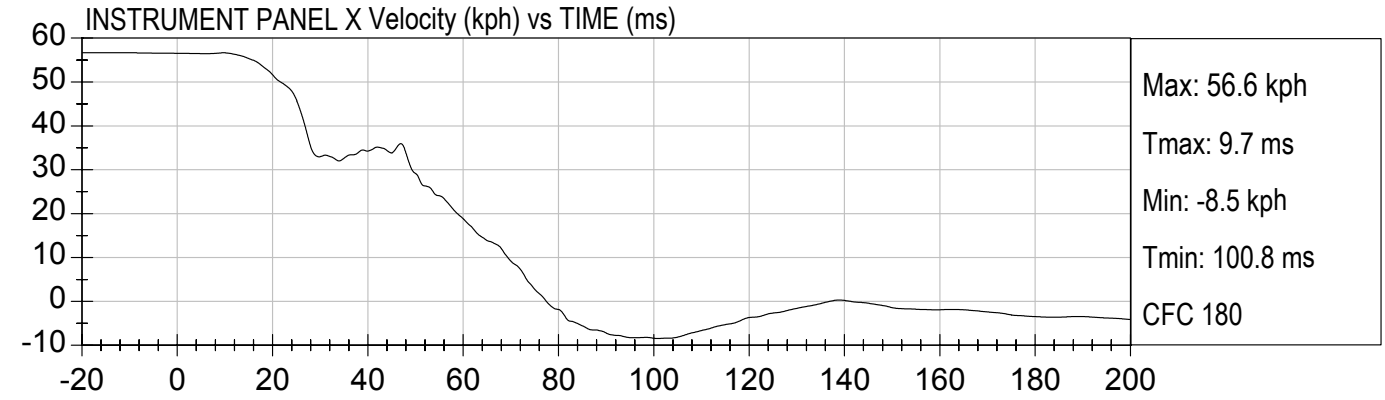

LEFT BRAKE CALIPER X Displacement (mm) vs TIME (ms)
600
400
200
0
-200
-400
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 590.7 mm
Tmax: 200.0 ms
Min: 0.0 mm
Tmin: 0.0 ms
CFC 180

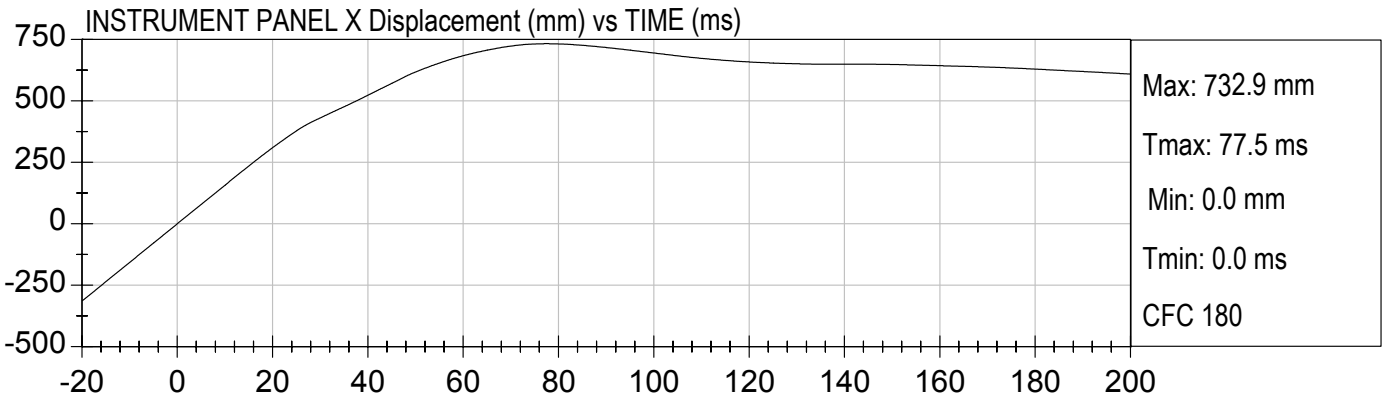

RIGHT BRAKE CALIPER X (G's) vs TIME (ms)
40
20
0
-20
-40
-60
-80
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 33.0 G's
Tmax: 64.8 ms
Min: -60.5 G's
Tmin: 55.2 ms
CFC 60


RIGHT BRAKE CALIPER X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 56.4 kph
Tmax: 8.8 ms
Min: 0.2 kph
Tmin: 85.5 ms
CFC 180


RIGHT BRAKE CALIPER 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
Max: 686.4 mm
Tmax: 200.0 ms
Min: 0.0 mm
Tmin: 0.0 ms
CFC 180

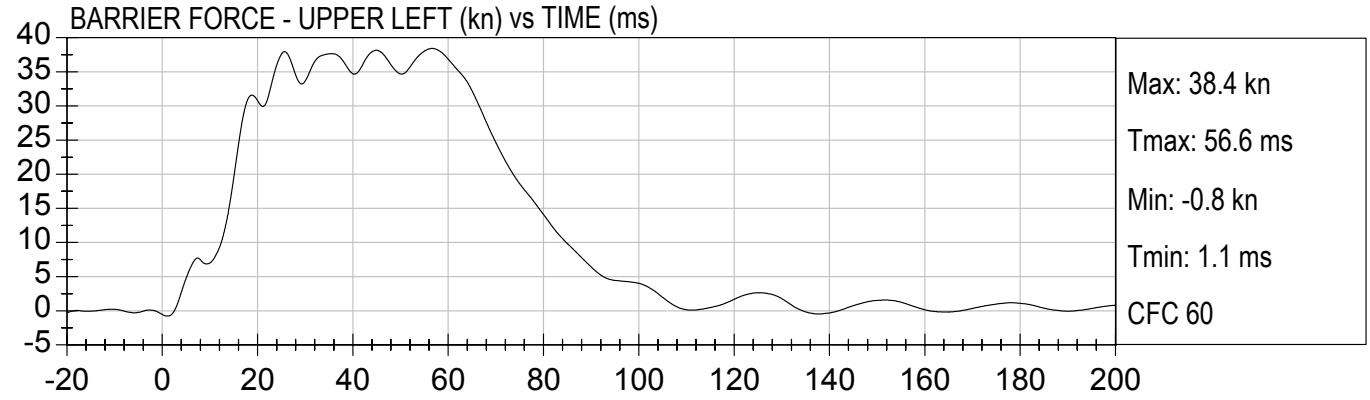

INSTRUMENT PANEL X (G's) vs TIME (ms)
20
0
-20
-40
-60
-80
-100
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 11.6 G's
Tmax: 36.9 ms
Min: -87.7 G's
Tmin: 26.6 ms
CFC 60

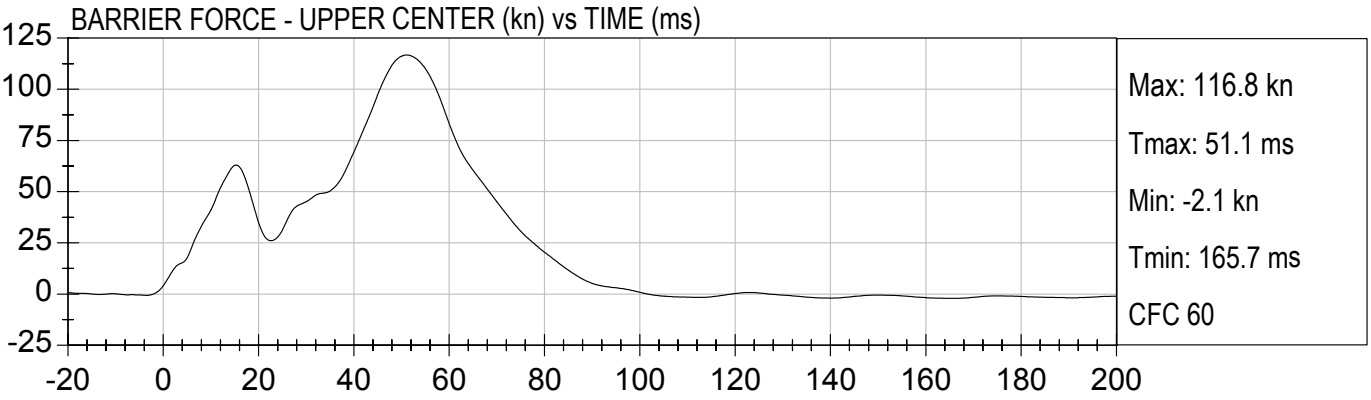

INSTRUMENT PANEL X Velocity (kph) vs TIME (ms)
60
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 56.6 kph
Tmax: 9.7 ms
Min: -8.5 kph
Tmin: 100.8 ms
CFC 180

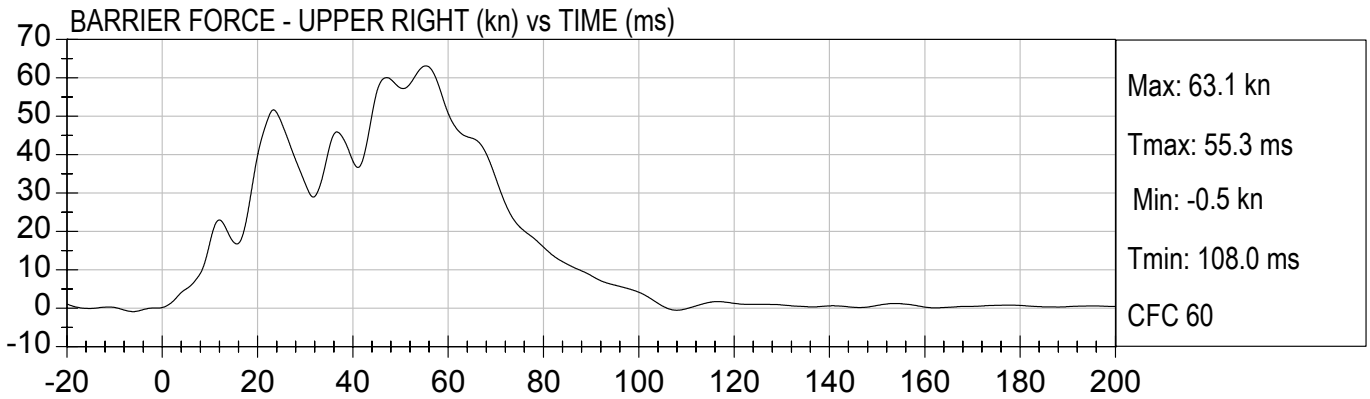

INSTRUMENT PANEL X Displacement (mm) vs TIME (ms)
750
500
250
0
-250
-500
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 732.9 mm
Tmax: 77.5 ms
Min: 0.0 mm
Tmin: 0.0 ms
CFC 180

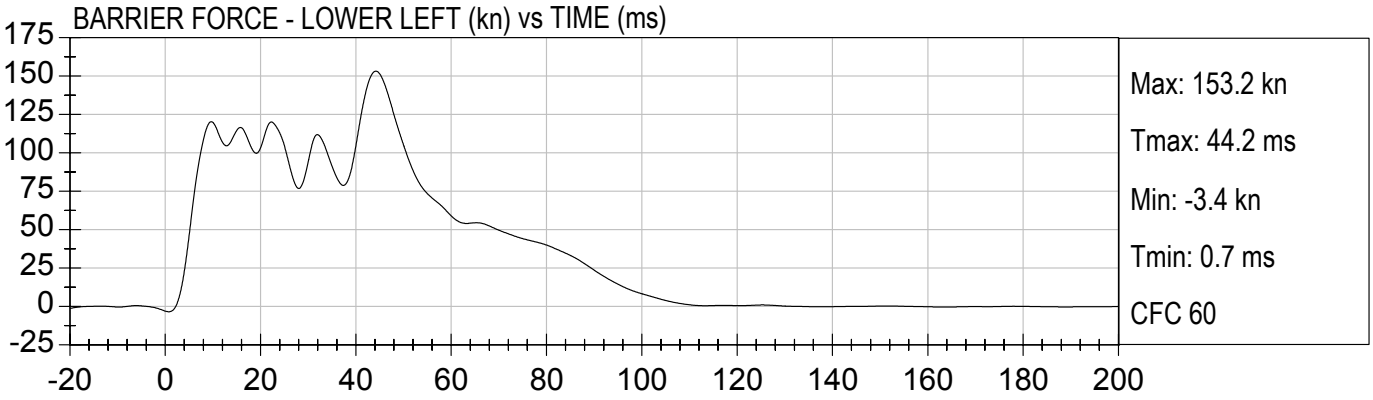
35MPH FRONTAL NCAP IMPACT
2002 FORD RANGER 4X2

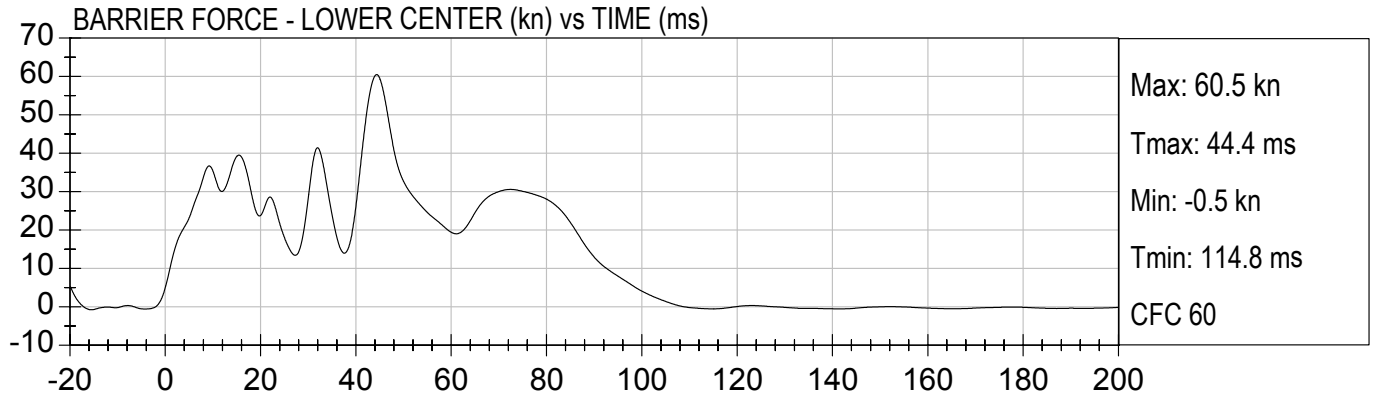
Test Date: 06/11/02
Speed: 35.2 mph (56.6 km/h)

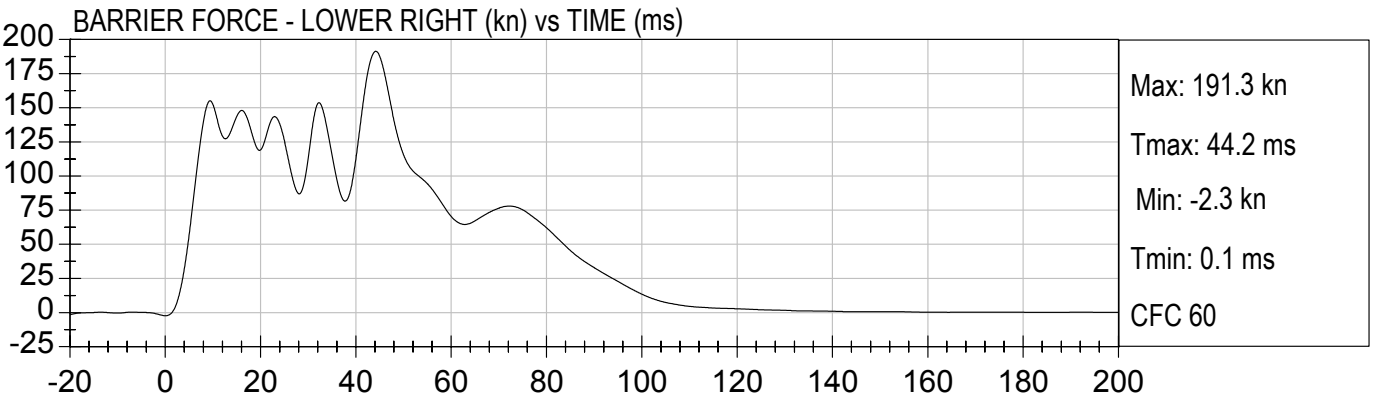


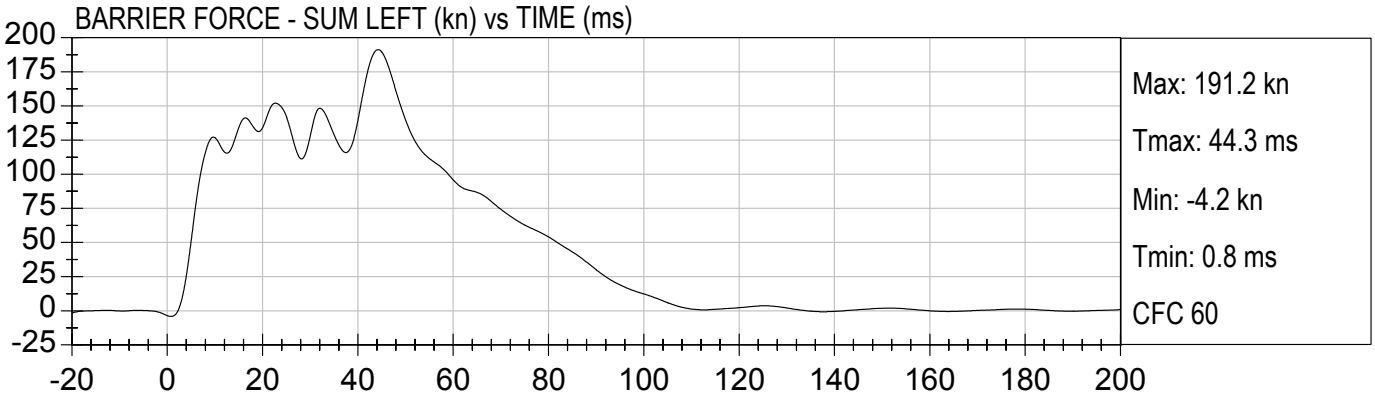


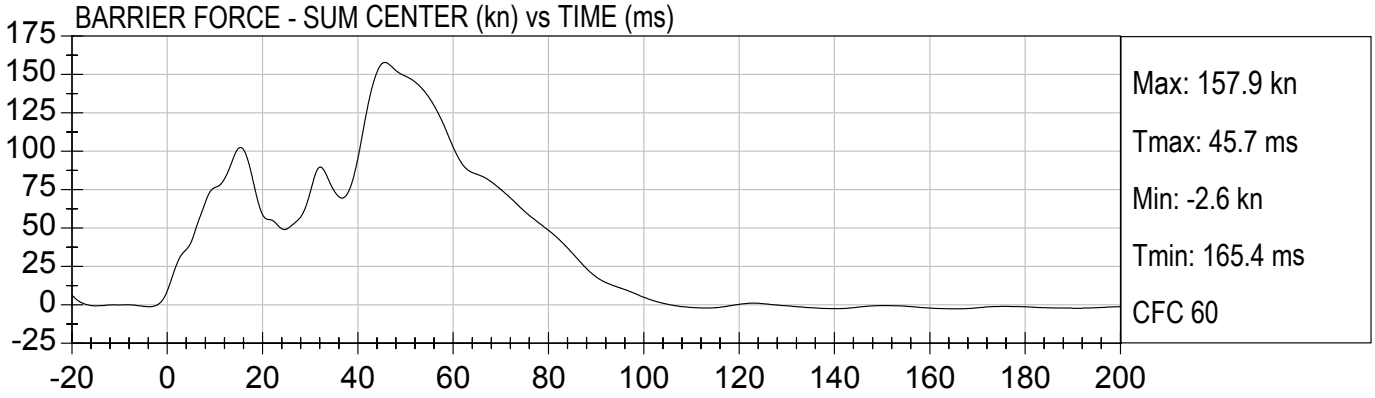


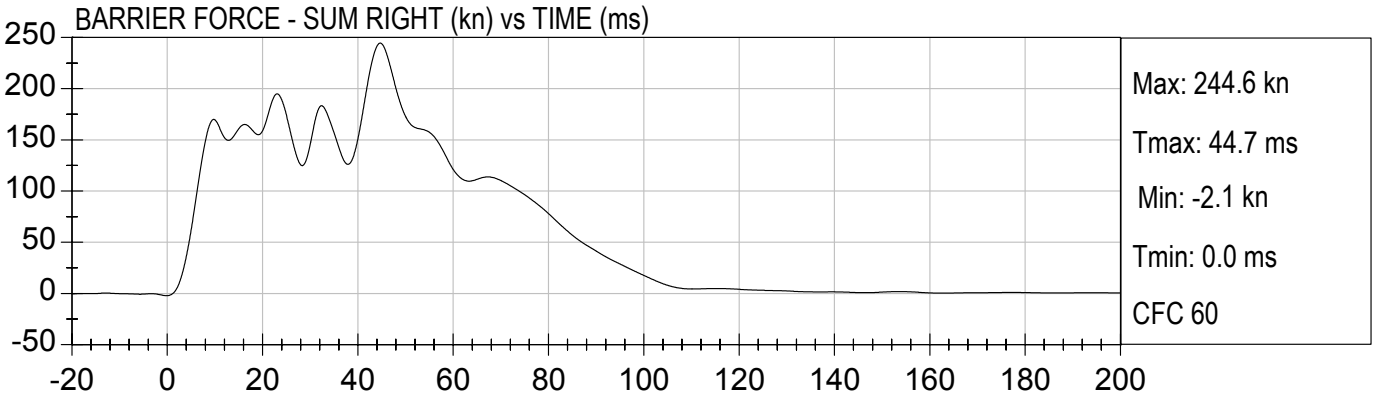

BARRIER FORCE - LOWER LEFT (kn) vs TIME (ms)
175
150
125
100
75
50
25
0
-25
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 153.2 kn
Tmax: 44.2 ms
Min: -3.4 kn
Tmin: 0.7 ms
CFC 60

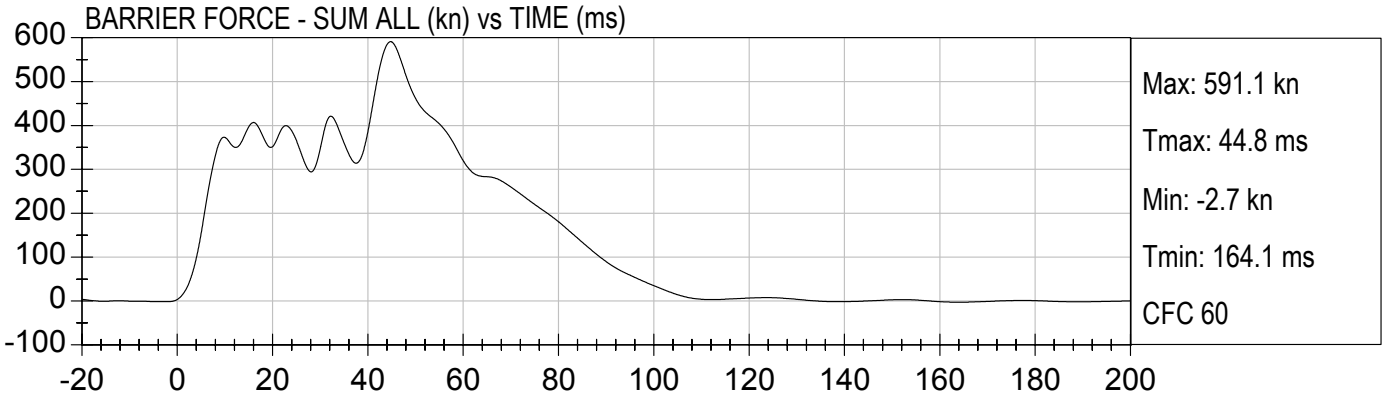

BARRIER FORCE - LOWER CENTER (kn) vs TIME (ms)
70
60
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 60.5 kn
Tmax: 44.4 ms
Min: -0.5 kn
Tmin: 114.8 ms
CFC 60

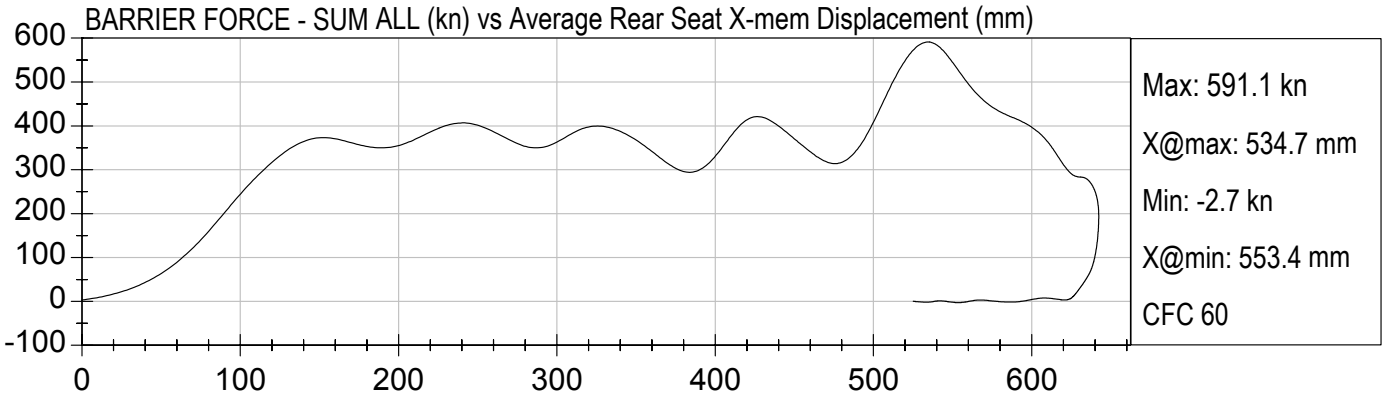

BARRIER FORCE - LOWER RIGHT (kn) vs TIME (ms)
200
175
150
125
100
75
50
25
0
-25
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 191.3 kn
Tmax: 44.2 ms
Min: -2.3 kn
Tmin: 0.1 ms
CFC 60


BARRIER FORCE - SUM LEFT (kn) vs TIME (ms)
200
175
150
125
100
75
50
25
0
-25
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 191.2 kn
Tmax: 44.3 ms
Min: -4.2 kn
Tmin: 0.8 ms
CFC 60


BARRIER FORCE - SUM CENTER (kn) vs TIME (ms)
175
150
125
100
75
50
25
0
-25
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 157.9 kn
Tmax: 45.7 ms
Min: -2.6 kn
Tmin: 165.4 ms
CFC 60


BARRIER FORCE - SUM RIGHT (kn) vs TIME (ms)
250
200
150
100
50
0
-50
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 244.6 kn
Tmax: 44.7 ms
Min: -2.1 kn
Tmin: 0.0 ms
CFC 60


BARRIER FORCE - SUM ALL (kn) vs TIME (ms)
600
500
400
300
200
100
0
-100
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 591.1 kn
Tmax: 44.8 ms
Min: -2.7 kn
Tmin: 164.1 ms
CFC 60


BARRIER FORCE - SUM ALL (kn) vs Average Rear Seat X-mem Displacement (mm)
600
500
400
300
200
100
0
-100
0
100
200
300
400
500
600
Max: 591.1 kn
X@max: 534.7 mm
Min: -2.7 kn
X@min: 553.4 mm
CFC 60

APPENDIX C

DUMMY CALIBRATION DATA TRACES AND TABLES

Hybrid III Calibration Data Sheet

50th Percentile Male

Head Drop Calibration

ATD Serial No: 066 **Test I.D:** D02471

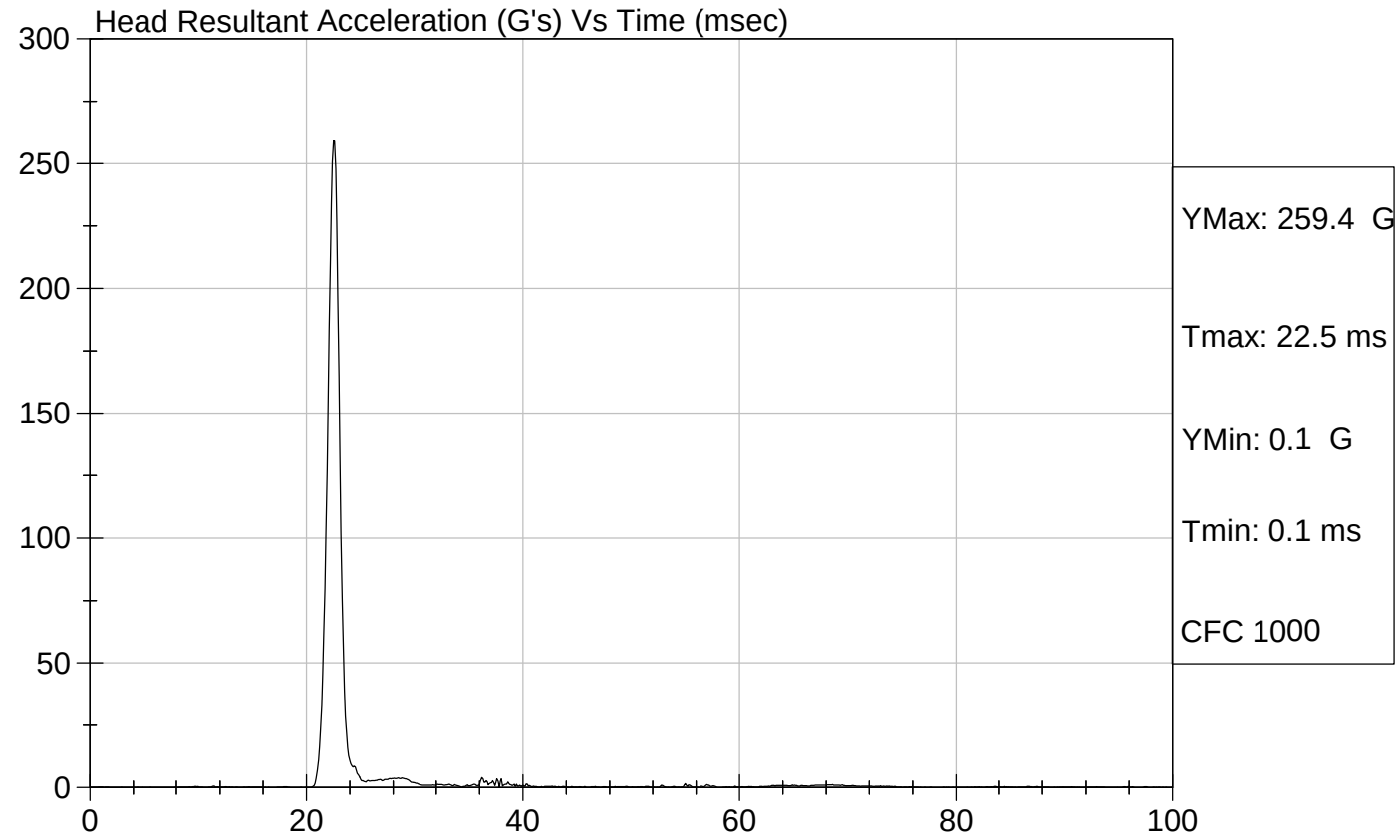
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	259.4	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-13.3	Pass
Is Acceleration Unimodal?	Yes/No	< 10% Peak	Yes	Pass
		Overall Test Results		Pass

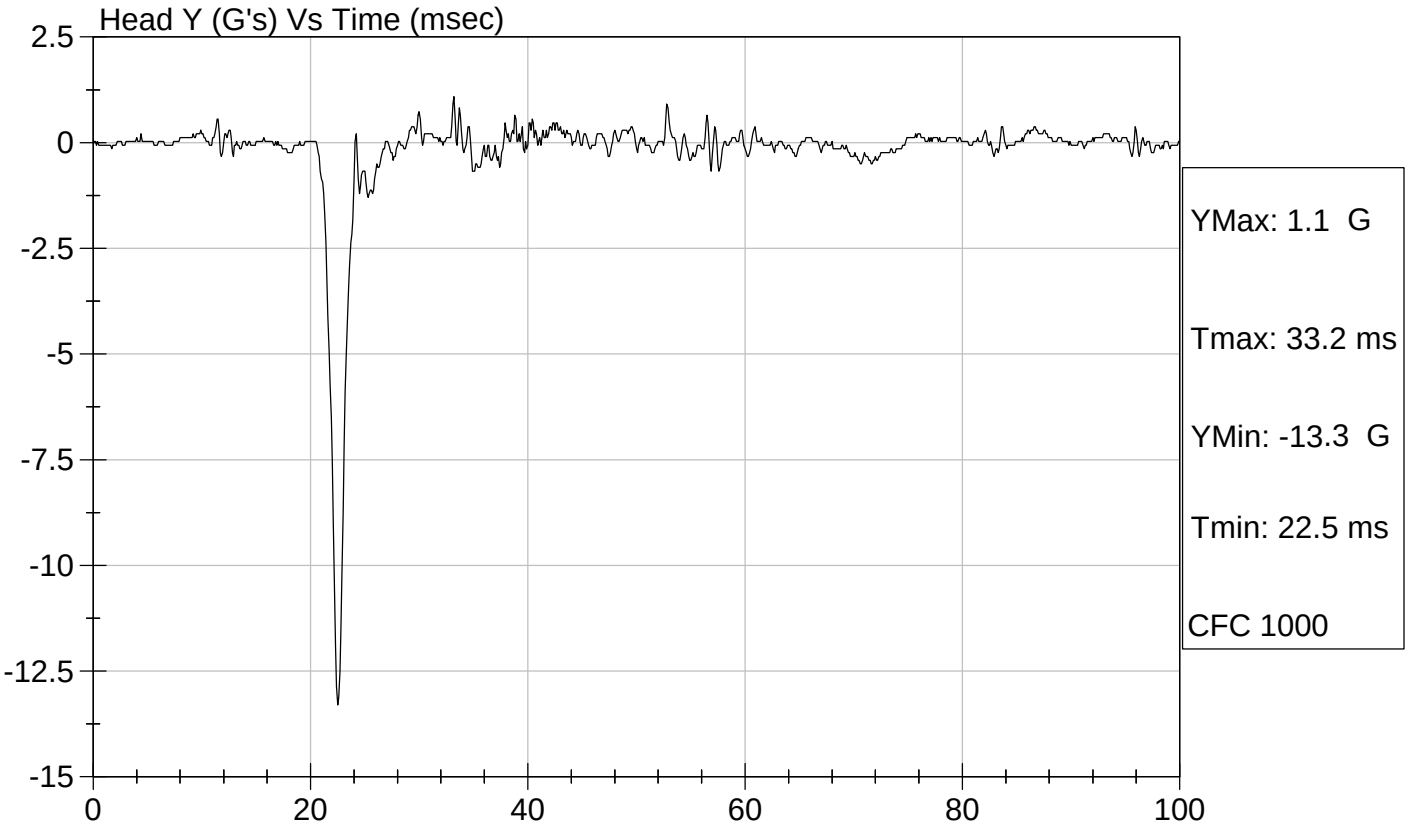
Laboratory Technician

3/21/02
Test Date

Approved By

	Test Description: Head Drop	Test Date: 3/21/02
	Component: D02471	Speed: 0 ft/s, 0.00 m/s





Hybrid III Calibration Data Sheet

50th Percentile Male

Neck Flexion Test

ATD Serial No: 066 **Test I.D:** D02472

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.00	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	23.15	Pass
	20 msec	G's	17.60 to 22.60	20.18	Pass
	30 msec	G's	12.50 to 18.50	15.38	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	15.4	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	36.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	73.5	Pass
	Time	msec	57.0 to 64.0	57.2	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	114.5	Pass
Moment About Occipital Condyle	Maximum	N m	84.1 to 108.5	98.0	Pass
	Time	msec	47.0 to 58.0	50.5	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	99.3	Pass
			Overall Test Results		Pass

Laboratory Technician

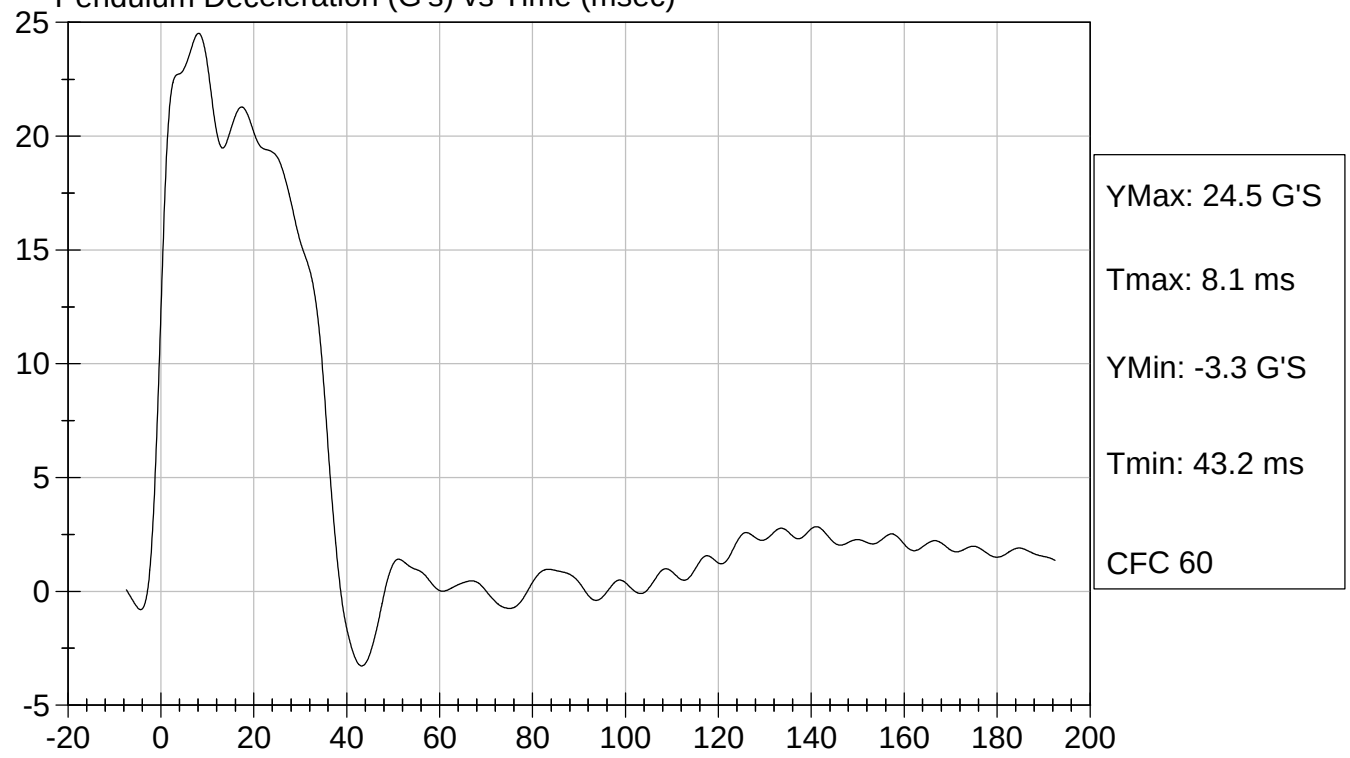
3/21/02
Test Date

Approved By

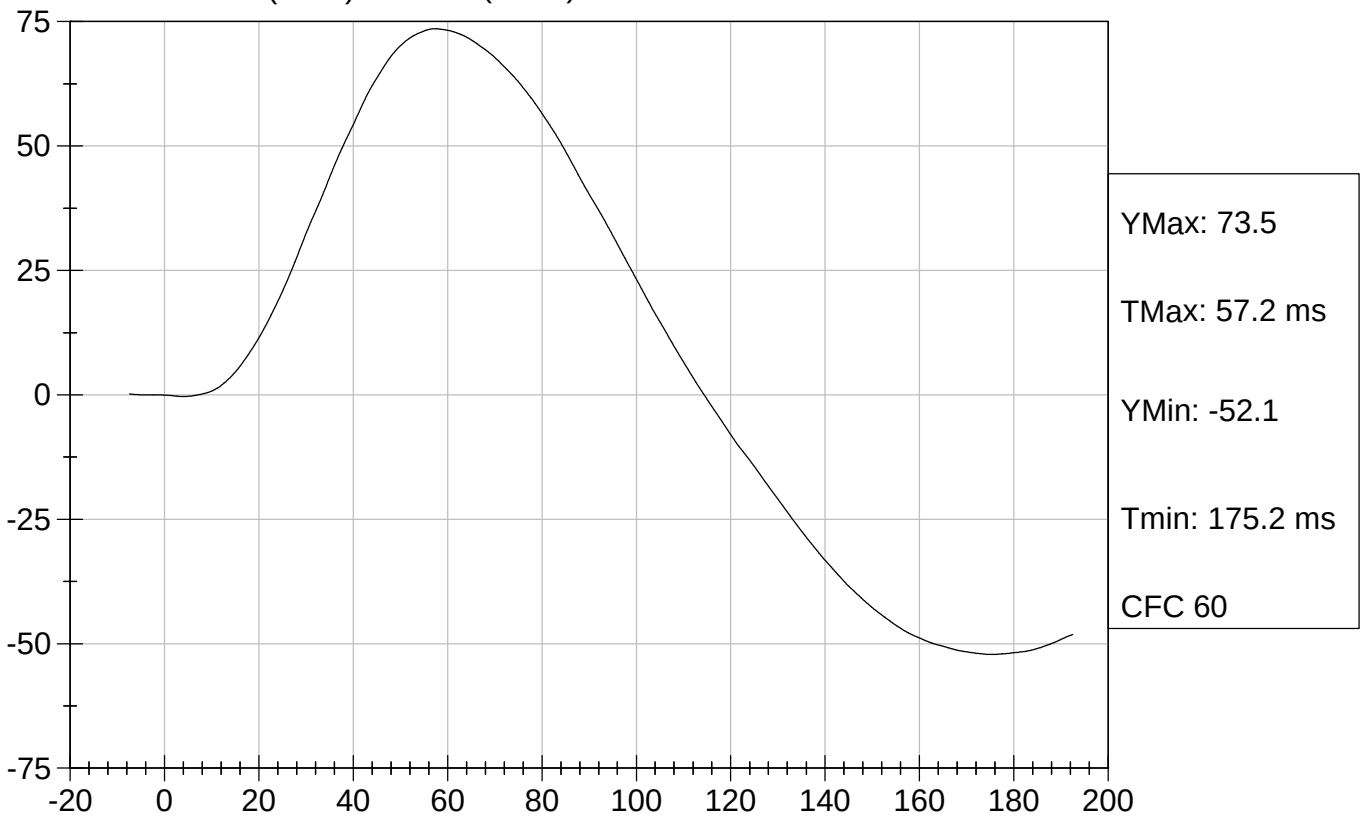
Test Desc: Neck Flexion
Component ID: D02472

Test Date: 3/21/02
Speed: 22.96 ft/sec, 7.00 m/sec

Pendulum Deceleration (G's) vs Time (msec)

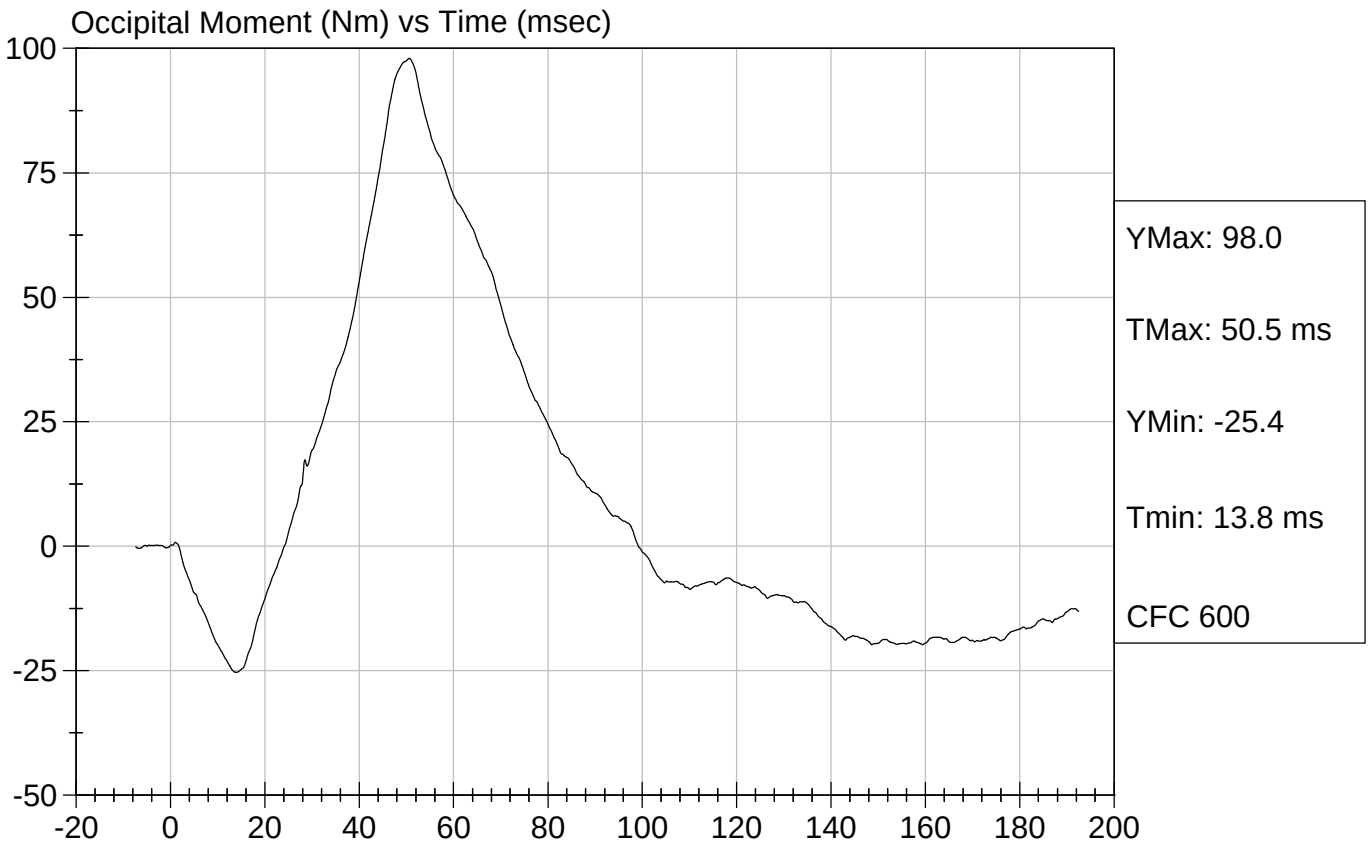


Neck Rotation (DEG) vs Time (msec)



Test Desc: Neck Flexion
Component ID: D02472

Test Date: 3/21/02
Speed: 22.96 ft/sec, 7.00 m/sec



Hybrid III Calibration Data Sheet

50th Percentile Male

Neck Extension Test

ATD Serial No: 066 **Test I.D:** D02473

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.06	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	19.27	Pass
	20 msec	G's	14.00 to 19.00	16.01	Pass
	30 msec	G's	11.00 to 16.00	13.06	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	13.5	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	38.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	96.6	Pass
	Time	msec	72.0 to 82.0	76.5	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	154.2	Pass
Moment About Occipital Condyle	Minimum	N m	-52.9 to -79.9	-64.5	Pass
	Time	msec	65.0 to 79.0	70.2	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	141.8	Pass
			Overall Test Results		Pass

Laboratory Technician

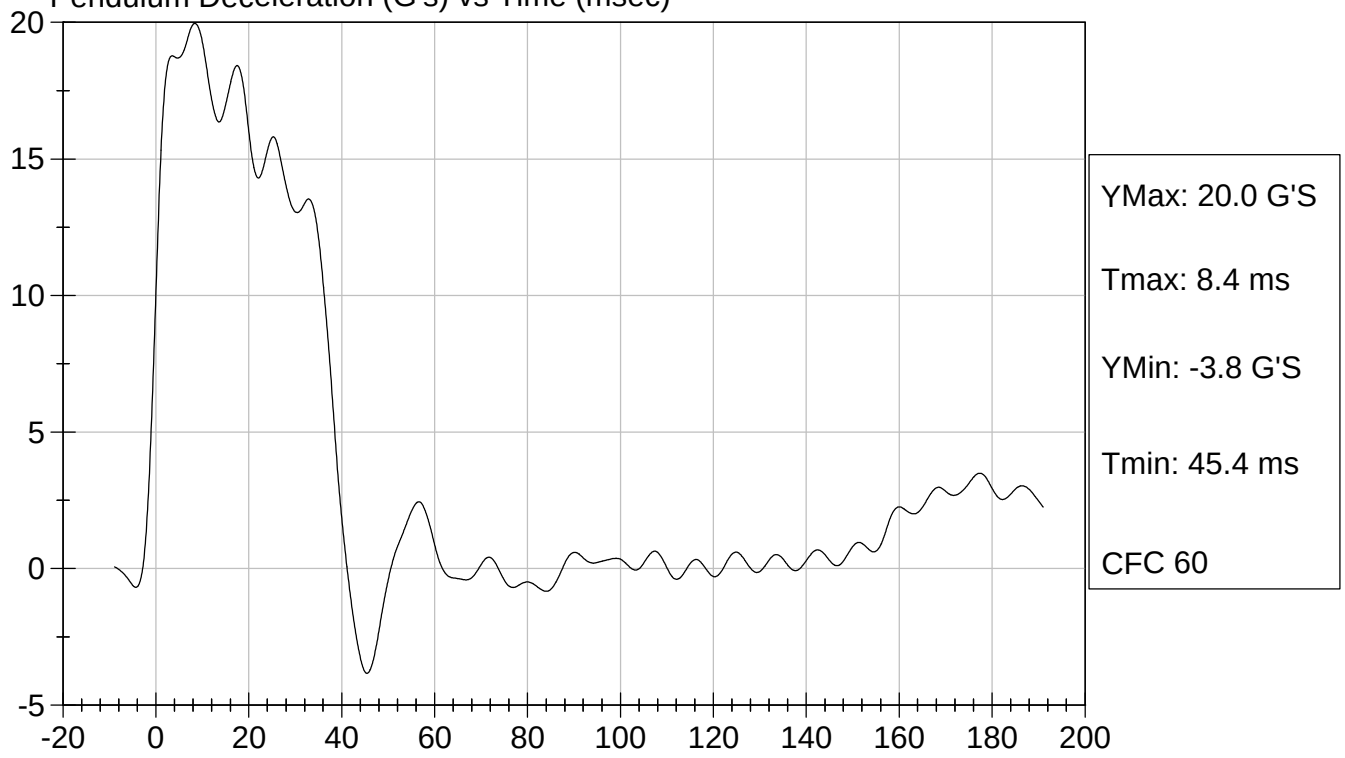
3/21/02
Test Date

Approved By

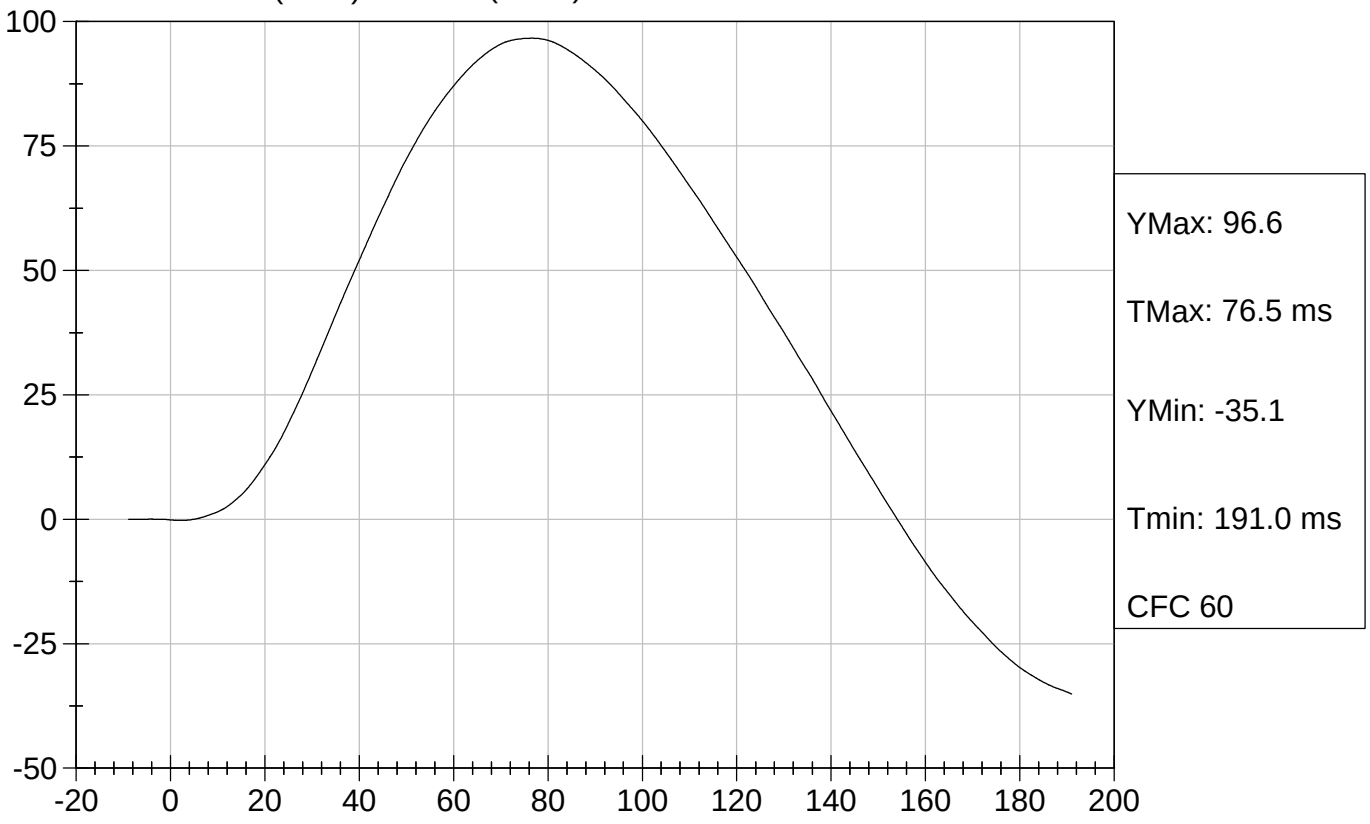
Test Desc: Neck Extension
Component ID: D02473

Test Date: 3/21/02
Speed: 19.88 ft/sec, 6.06 m/sec

Pendulum Deceleration (G's) vs Time (msec)

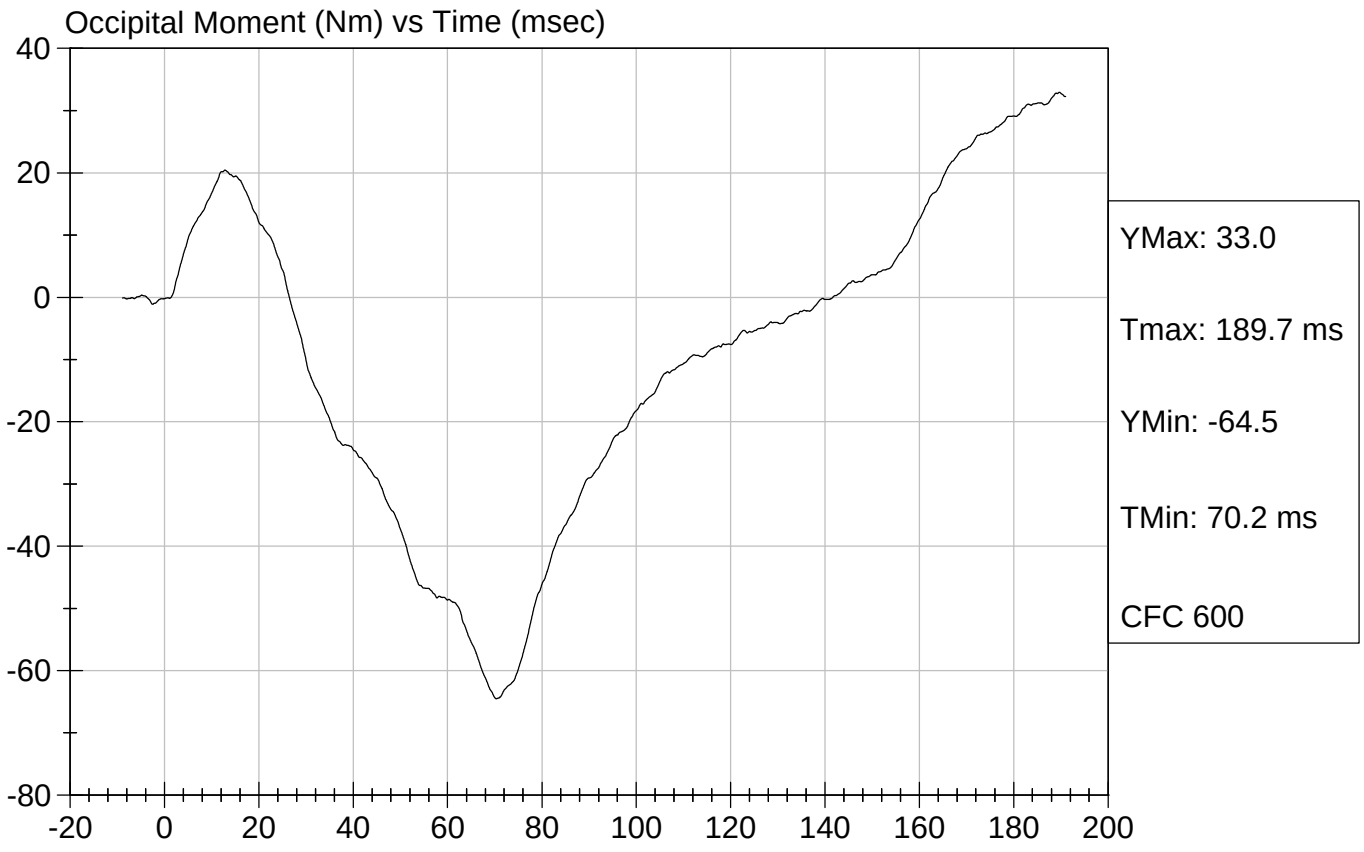


Neck Rotation (DEG) vs Time (msec)



Test Desc: Neck Extension
Component ID: D02473

Test Date: 3/21/02
Speed: 19.88 ft/sec, 6.06 m/sec



Hybrid III Calibration Data Sheet

50th Percentile Male

Thorax Impact Test

ATD Serial No: 066 **Test I.D:** D02484

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	6.58 to 6.82	6.69	Pass
Peak Probe Force	Newtons	5159 to 5893	5,715	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.64	Pass
Internal Hysteresis	%	69 to 85	73	Pass
		Overall Test Results		Pass

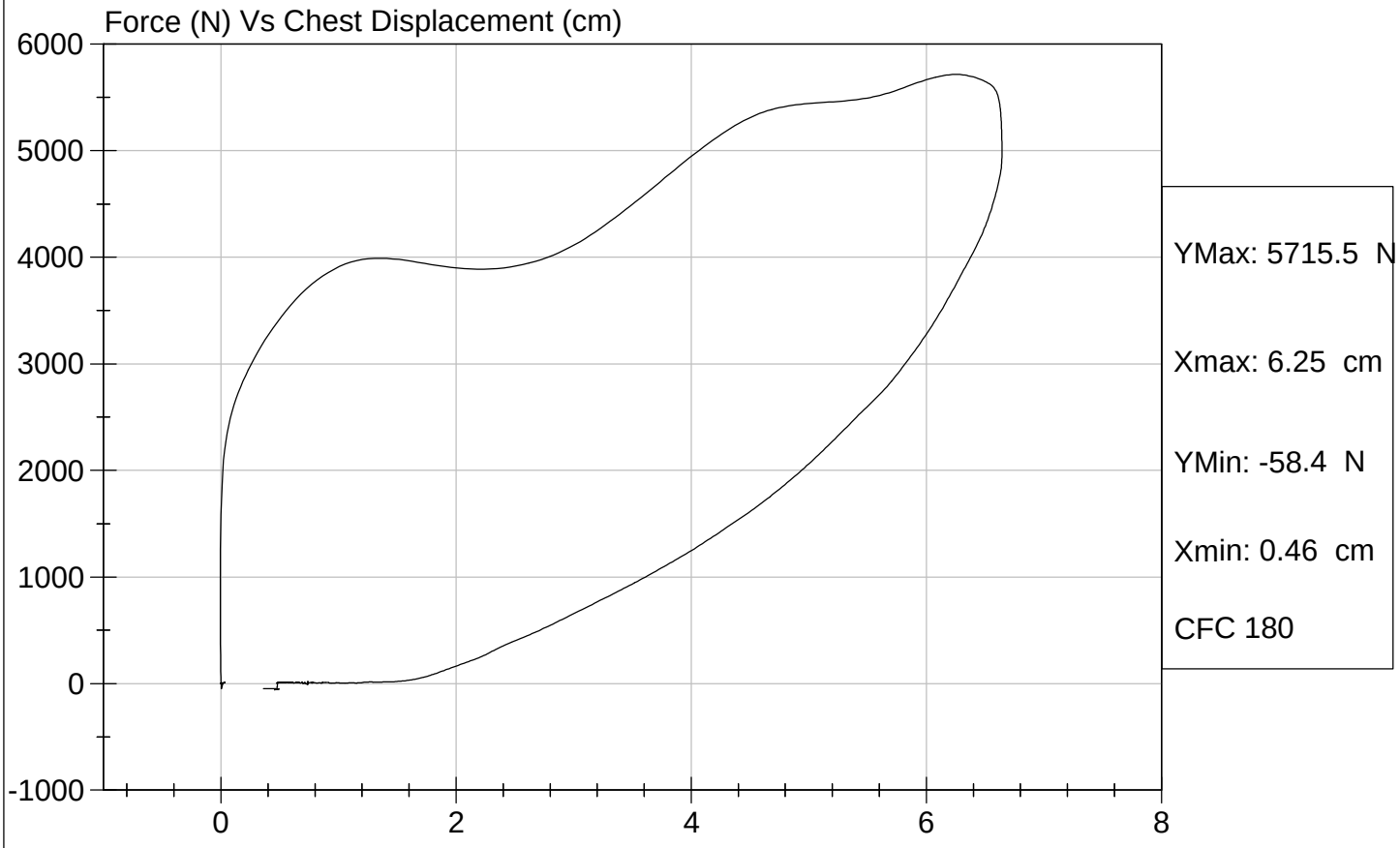
Laboratory Technician

3/20/02
Test Date

Approved By

Test Description: Thorax Impact | Test Date: 3/20/02

Component: D02484 | Speed: 21.95 ft/sec, 6.69 m/sec



Hybrid III Calibration Data Sheet

50th Percentile Male

Right Knee Impact Test

ATD Serial No: 066 **Test I.D:** D02475

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5,192	Pass
		Overall Test Results		Pass

Laboratory Technician

3/21/02
Test Date

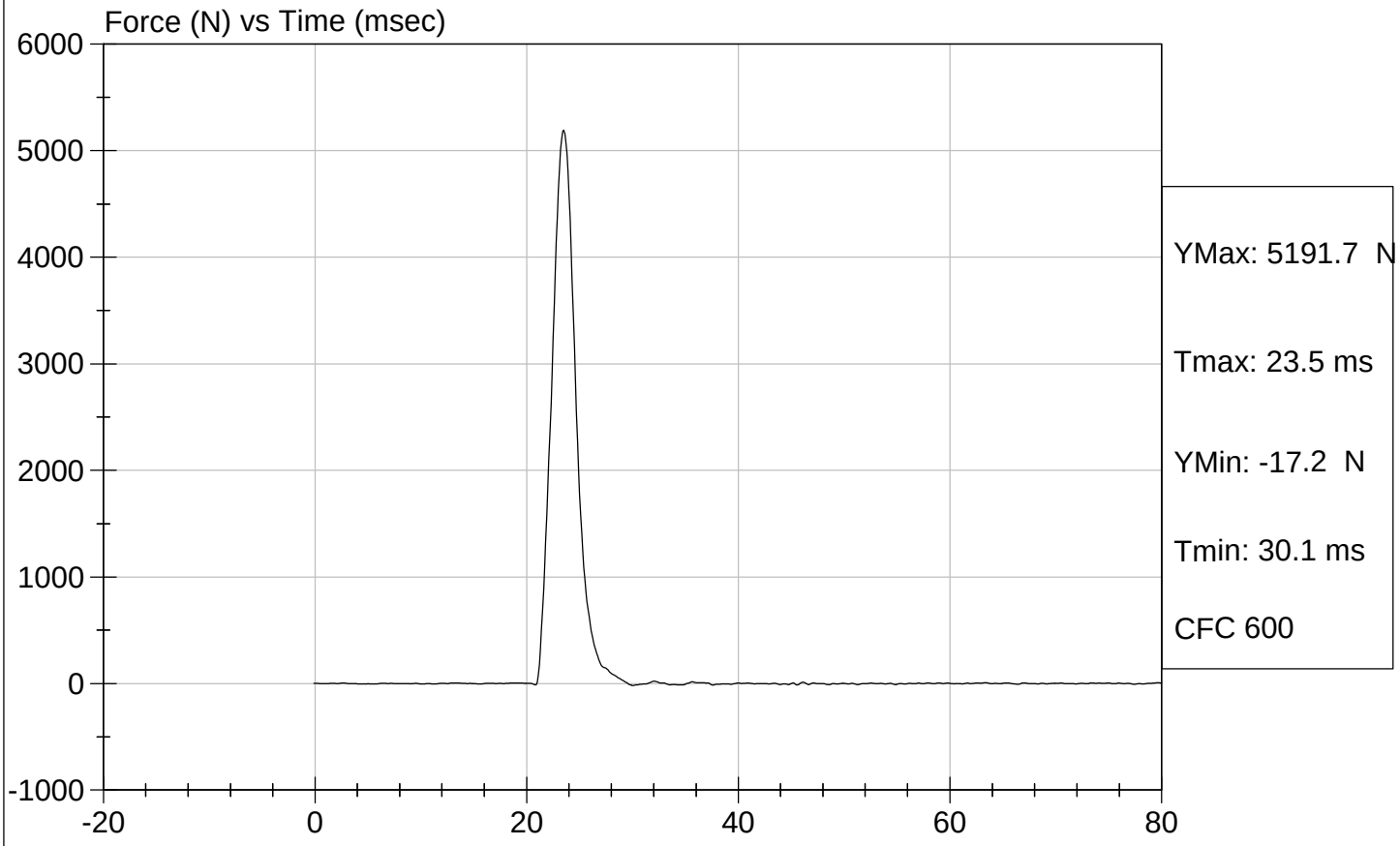
Approved By

Test Description: Right Knee

Test Date: 3/21/02

Component: D02475

Speed: 6.87 ft/sec, 2.09 m/sec



Hybrid III Calibration Data Sheet

50th Percentile Male

Left Knee Impact Test

ATD Serial No: 066 **Test I.D:** D02476

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	4,851	Pass
		Overall Test Results		Pass

Laboratory Technician

3/21/02
Test Date

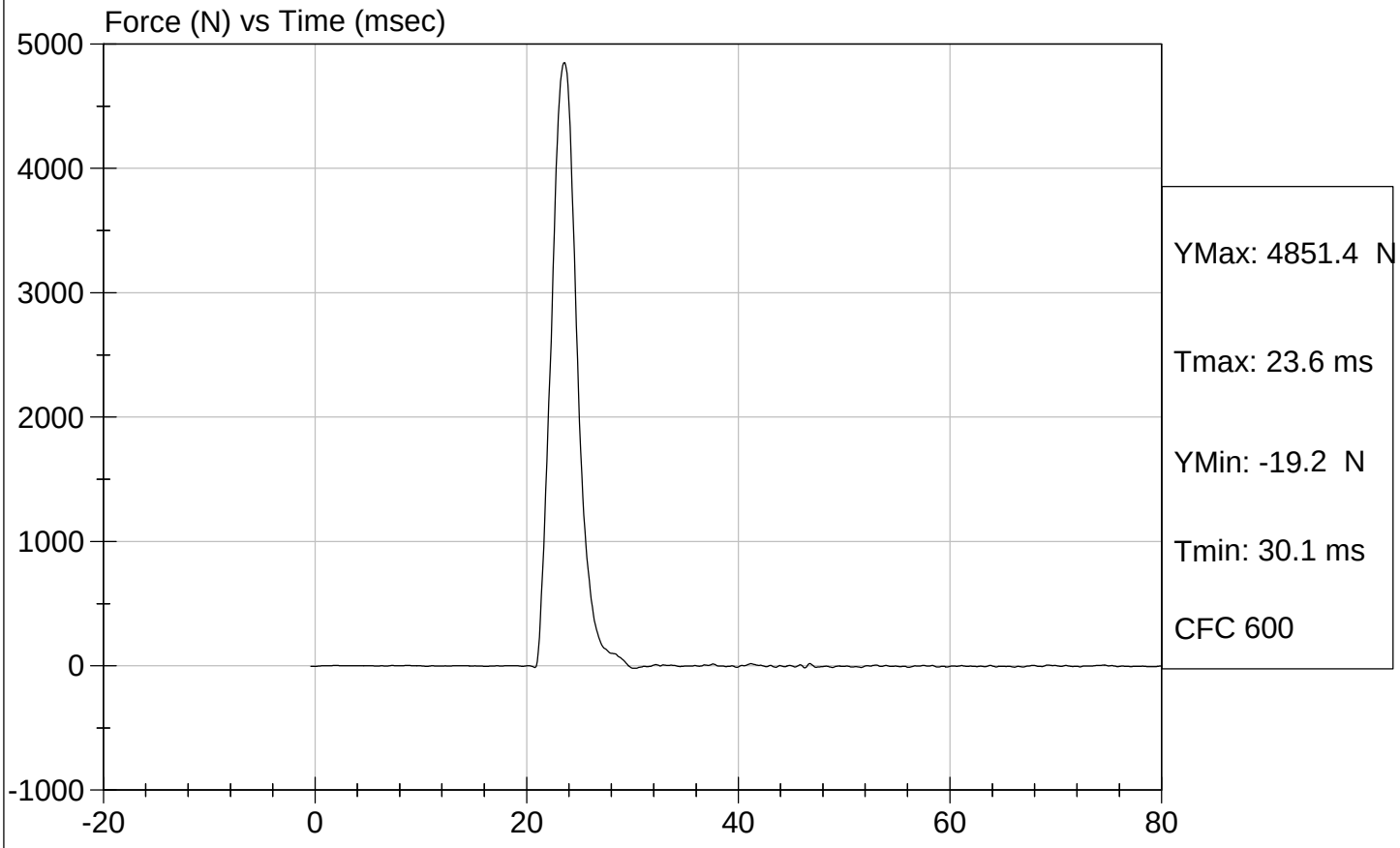
Approved By

Test Description: Left Knee

Test Date: 3/21/02

Component: D02476

Speed: 6.89 ft/sec, 2.10 m/sec



Hybrid III Calibration Data Sheet

50th Percentile Male

Hip-Femur Flexion Test

ATD Serial No: 066 **Test I.D:** D02479/0

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.7	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	19	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	79.9	71.8	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	45	44	Pass
		Overall Test Results			Pass

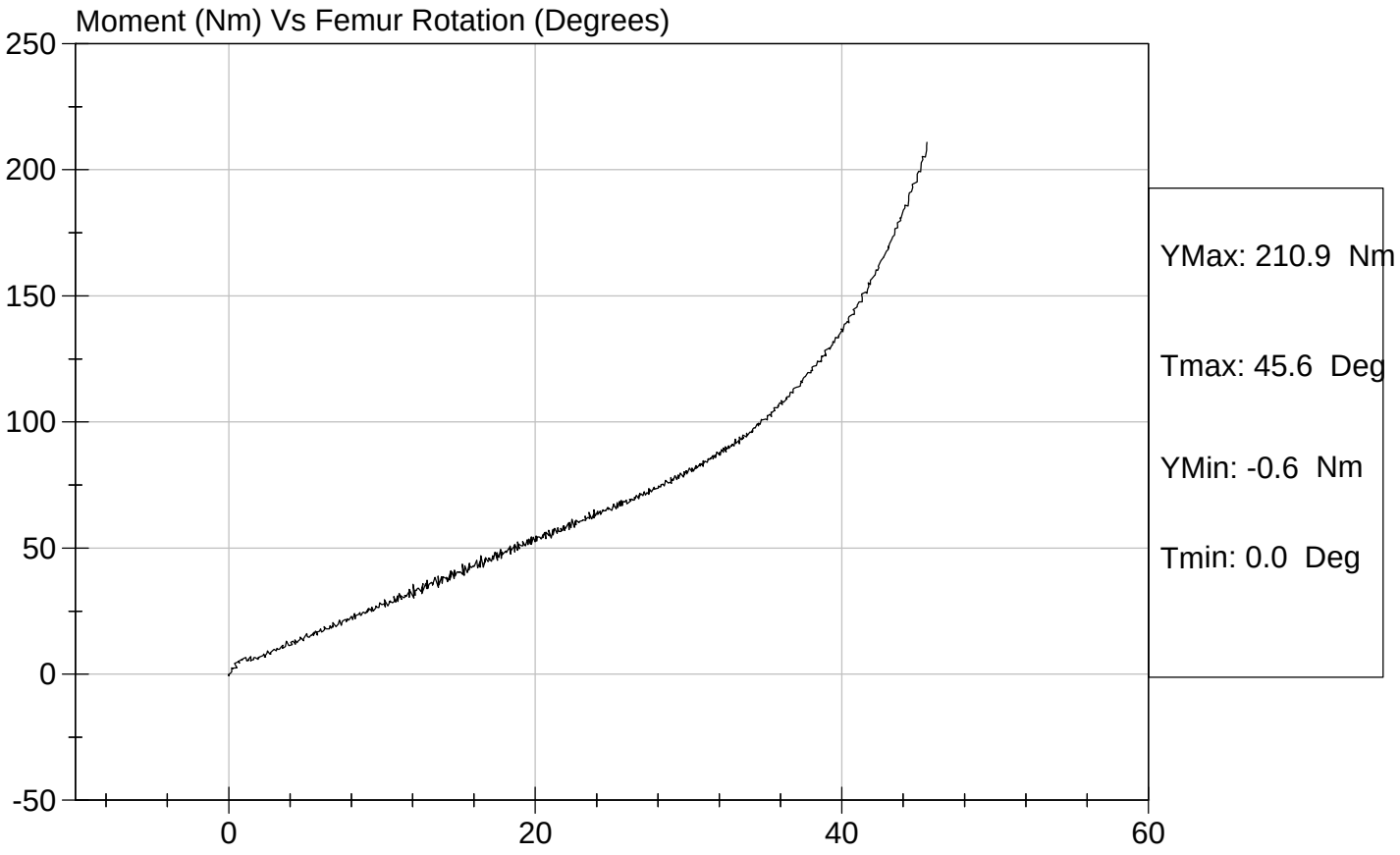
Laboratory Technician

3/21/02
Test Date

Approved By

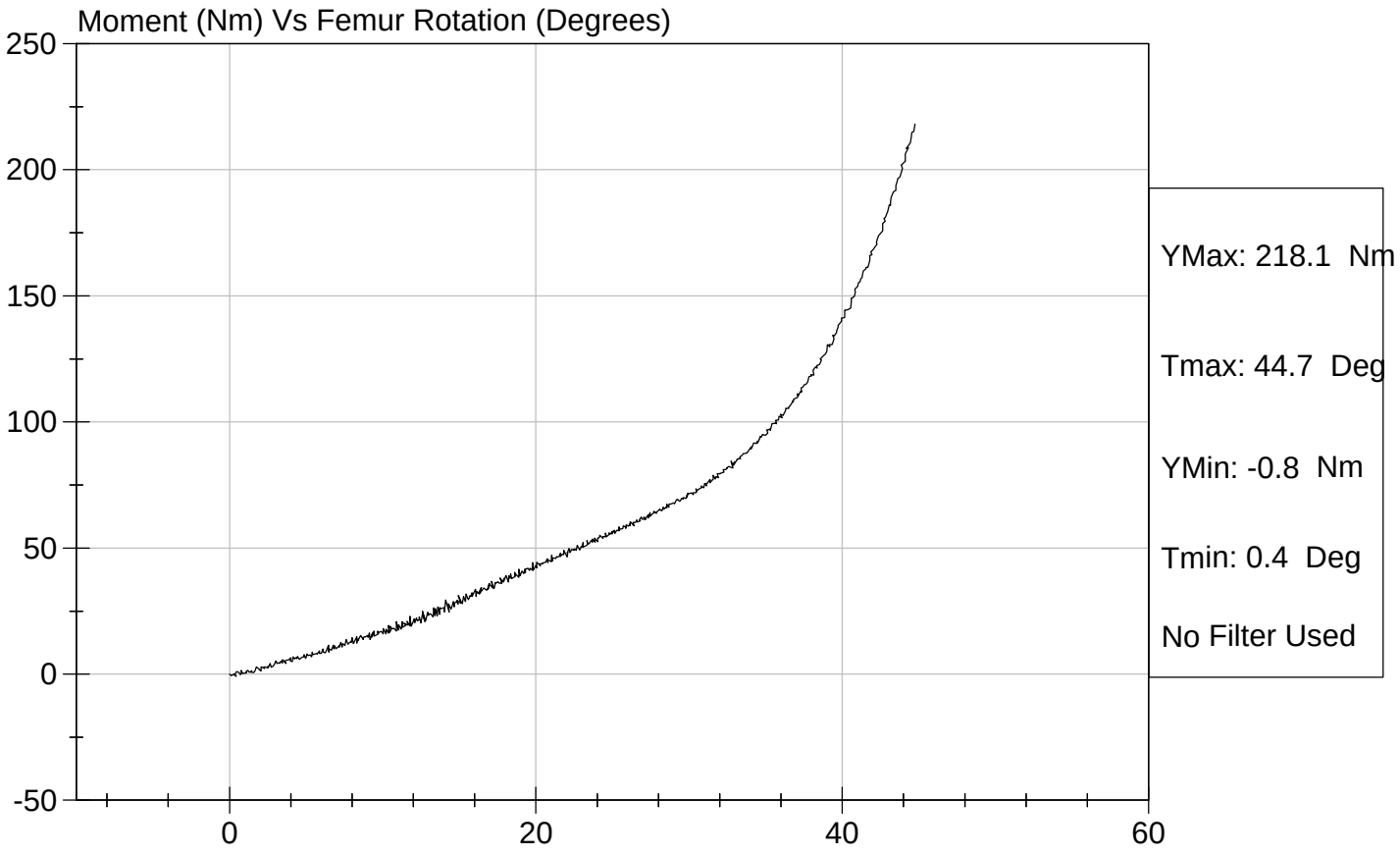
Test Description: Hip Femur Flexion | Test Date: 3/21/02

Component: D02479 | Speed: 0.0 ft/sec, 0.0 m/sec



Test Description: Hip Femur Flexion | Test Date: 3/21/02

Component: D02470 | Speed: 0 ft/sec, 0.00 m/sec



Hybrid III Calibration Data Sheet

50th Percentile Male

Head Drop Calibration

ATD Serial No: 065 **Test I.D:** D02461

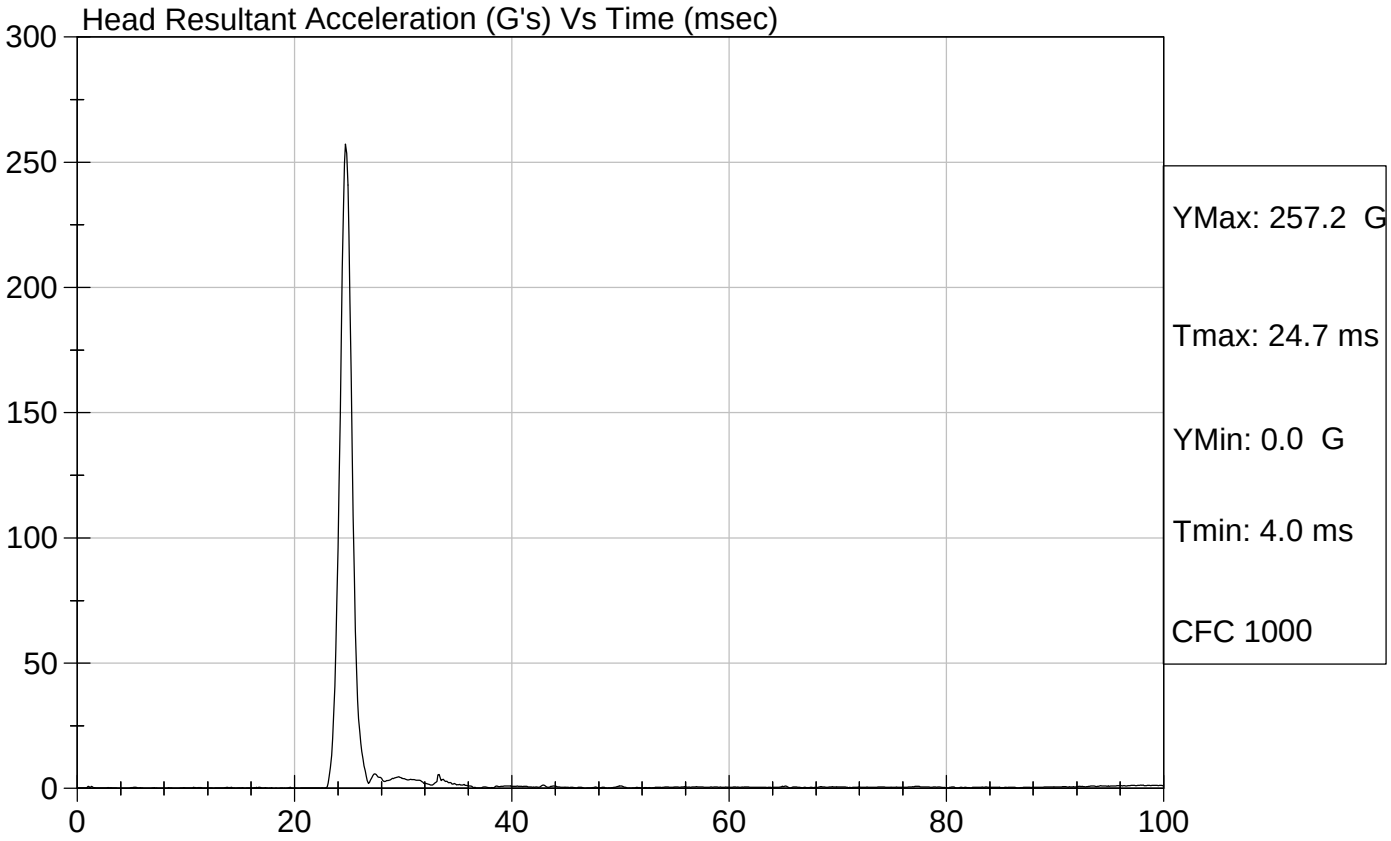
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	257.2	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-3.6	Pass
Is Acceleration Unimodal?	Yes/No	< 10% Peak	Yes	Pass
		Overall Test Results		Pass

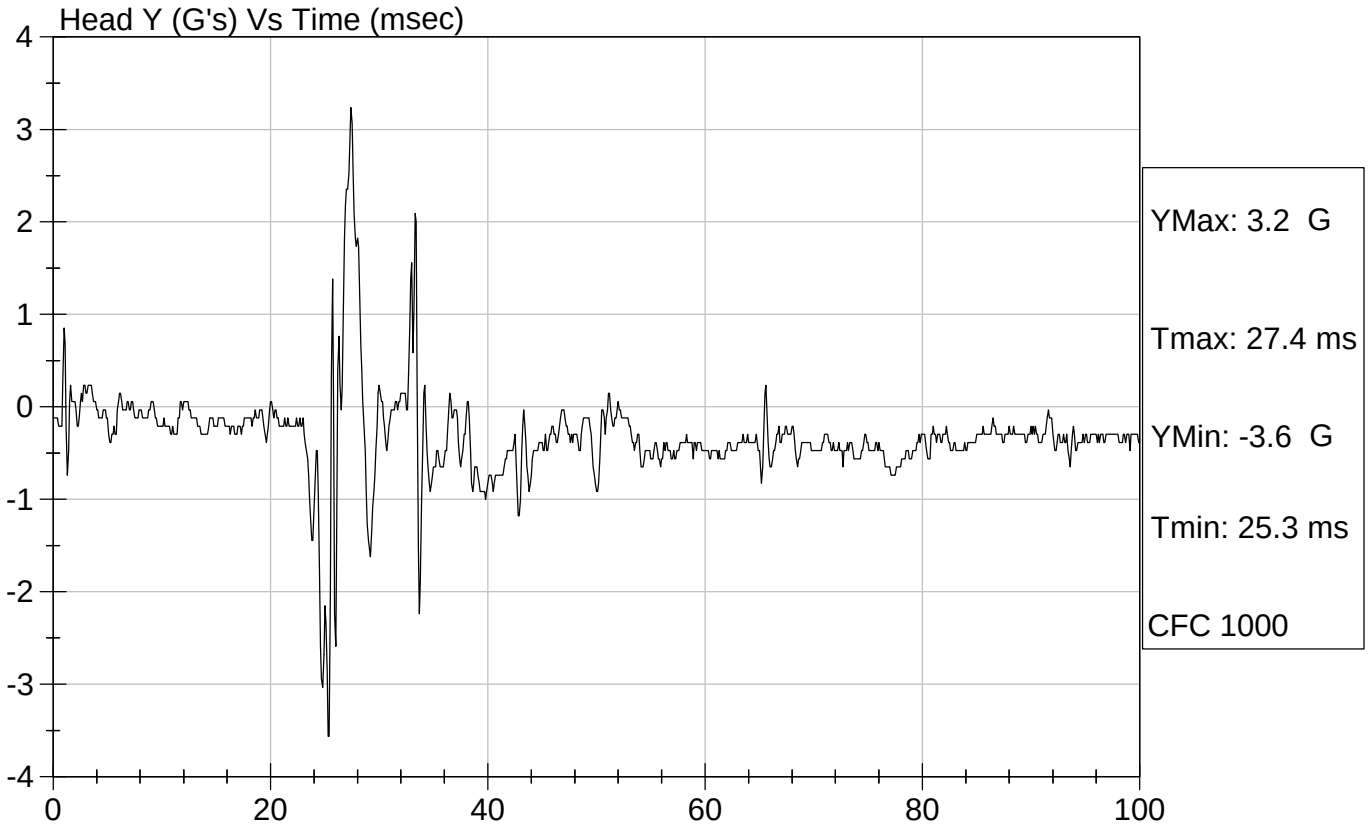
Laboratory Technician

3/21/02
Test Date

Approved By

	Test Description: Head Drop	Test Date: 3/21/02
	Component: D02461	Speed: 0 ft/s, 0.00 m/s





Hybrid III Calibration Data Sheet

50th Percentile Male

Neck Flexion Test

ATD Serial No: 065 **Test I.D:** D02462

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.00	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	23.73	Pass
	20 msec	G's	17.60 to 22.60	20.10	Pass
	30 msec	G's	12.50 to 18.50	15.19	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	15.2	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	37	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	71.3	Pass
	Time	msec	57.0 to 64.0	58.2	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	113.9	Pass
Moment About Occipital Condyle	Maximum	N m	84.1 to 108.5	91.2	Pass
	Time	msec	47.0 to 58.0	50.5	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	103.1	Pass
			Overall Test Results		Pass

Laboratory Technician

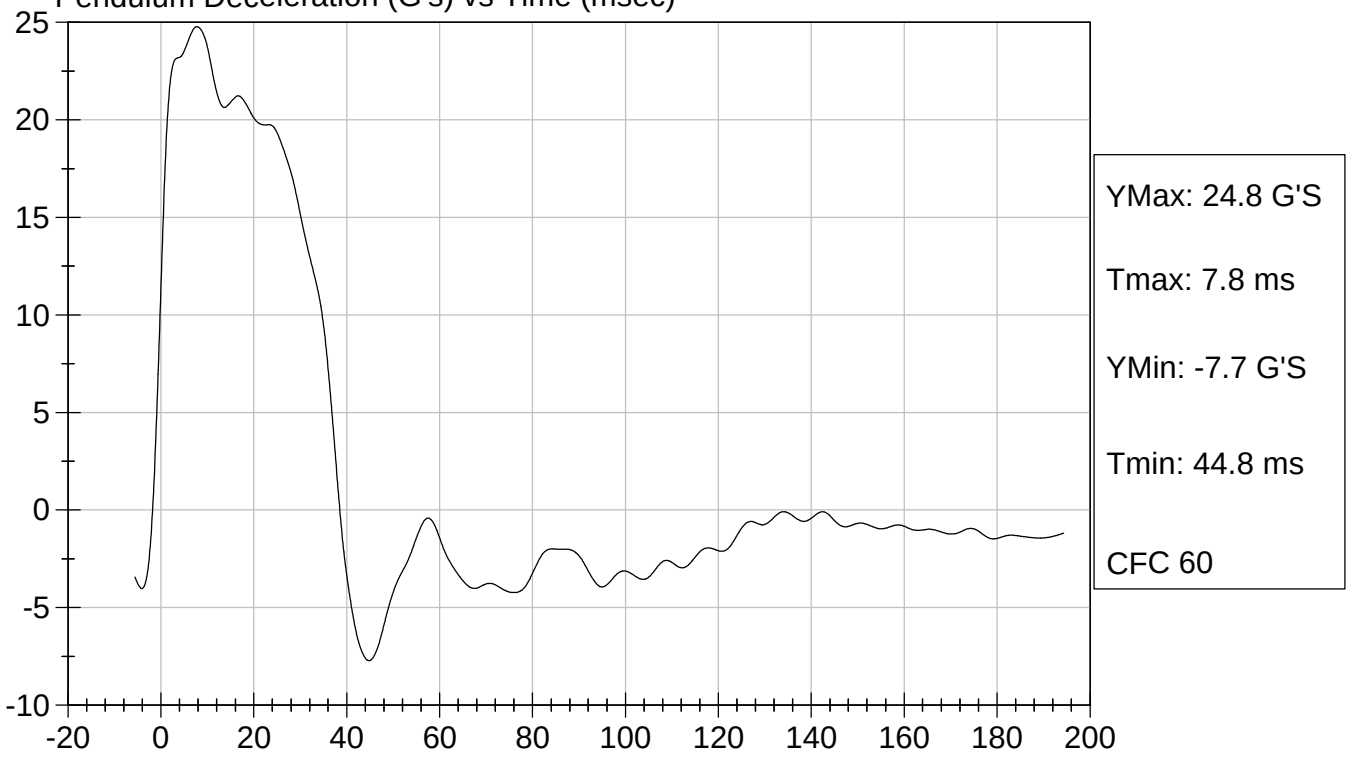
3/21/02
Test Date

Approved By

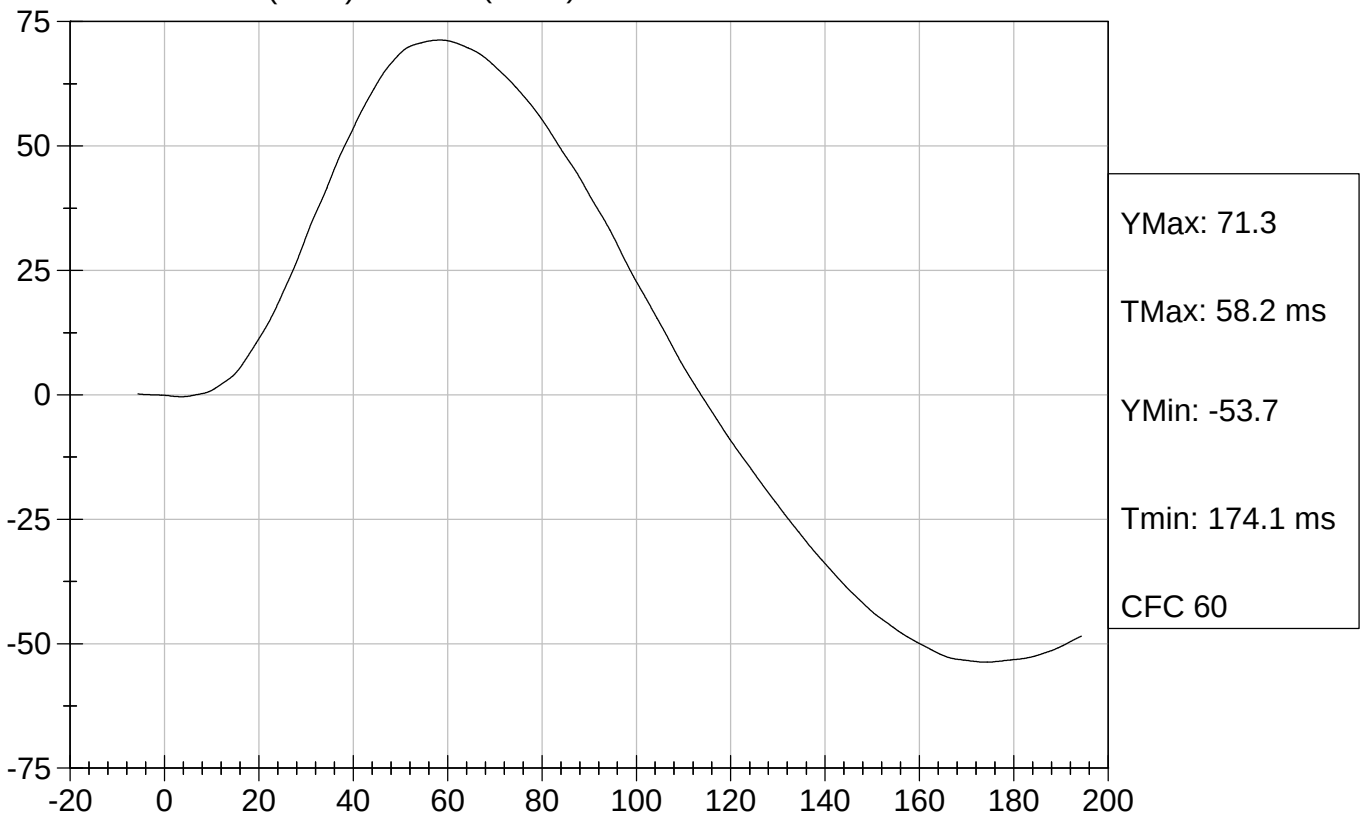
Test Desc: Neck Flexion
Component ID: D02462

Test Date: 3/21/02
Speed: 22.98 ft/sec, 7.00 m/sec

Pendulum Deceleration (G's) vs Time (msec)

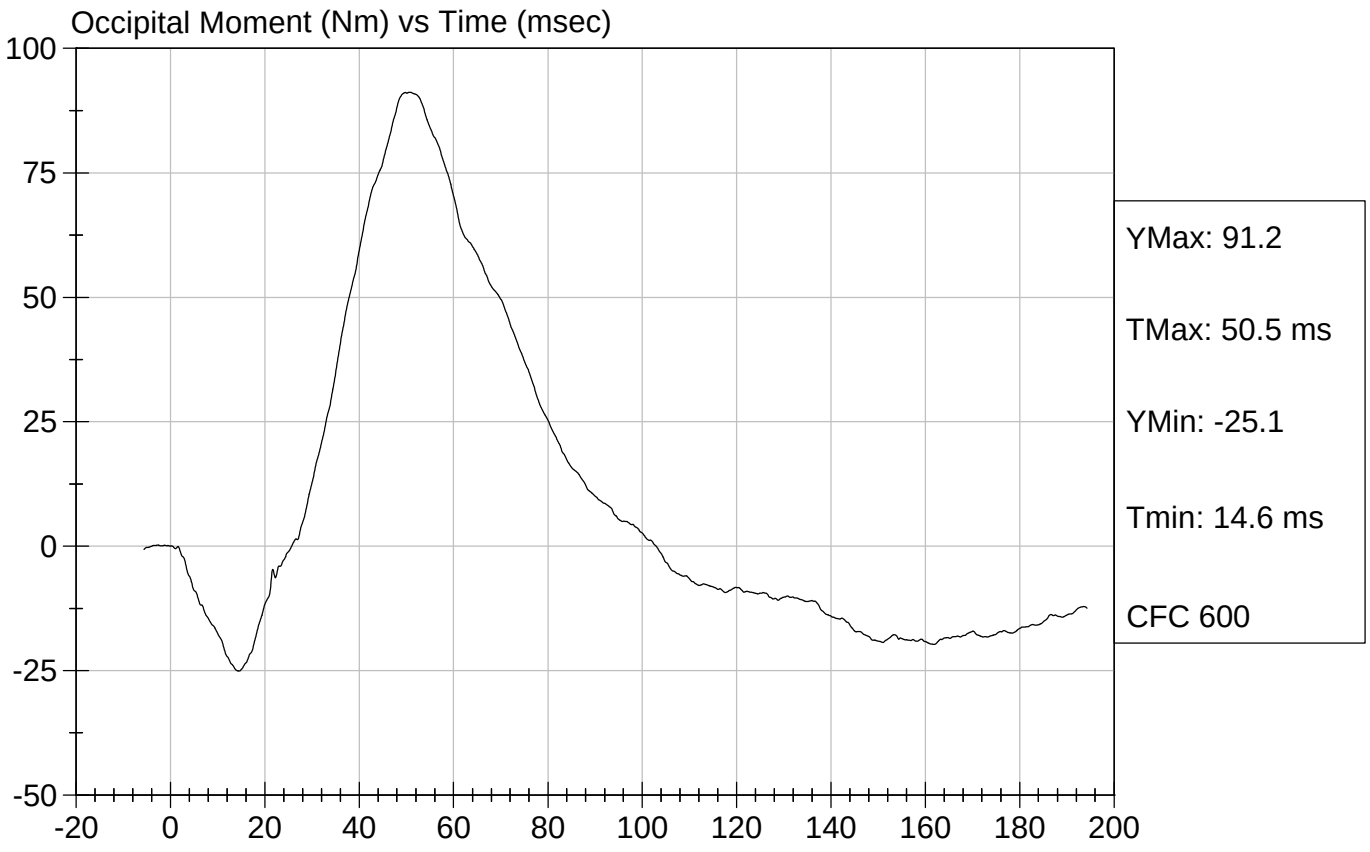


Neck Rotation (DEG) vs Time (msec)



Test Desc: Neck Flexion
Component ID: D02462

Test Date: 3/21/02
Speed: 22.98 ft/sec, 7.00 m/sec



Hybrid III Calibration Data Sheet

50th Percentile Male

Neck Extension Test

ATD Serial No: 065 **Test I.D:** D02463

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.10	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	18.19	Pass
	20 msec	G's	14.00 to 19.00	16.28	Pass
	30 msec	G's	11.00 to 16.00	12.22	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	12.3	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	42.8	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	98.6	Pass
	Time	msec	72.0 to 82.0	77.0	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	158.7	Pass
Moment About Occipital Condyle	Minimum	N m	-52.9 to -79.9	-57.7	Pass
	Time	msec	65.0 to 79.0	73.9	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	144.6	Pass
			Overall Test Results		Pass

Laboratory Technician

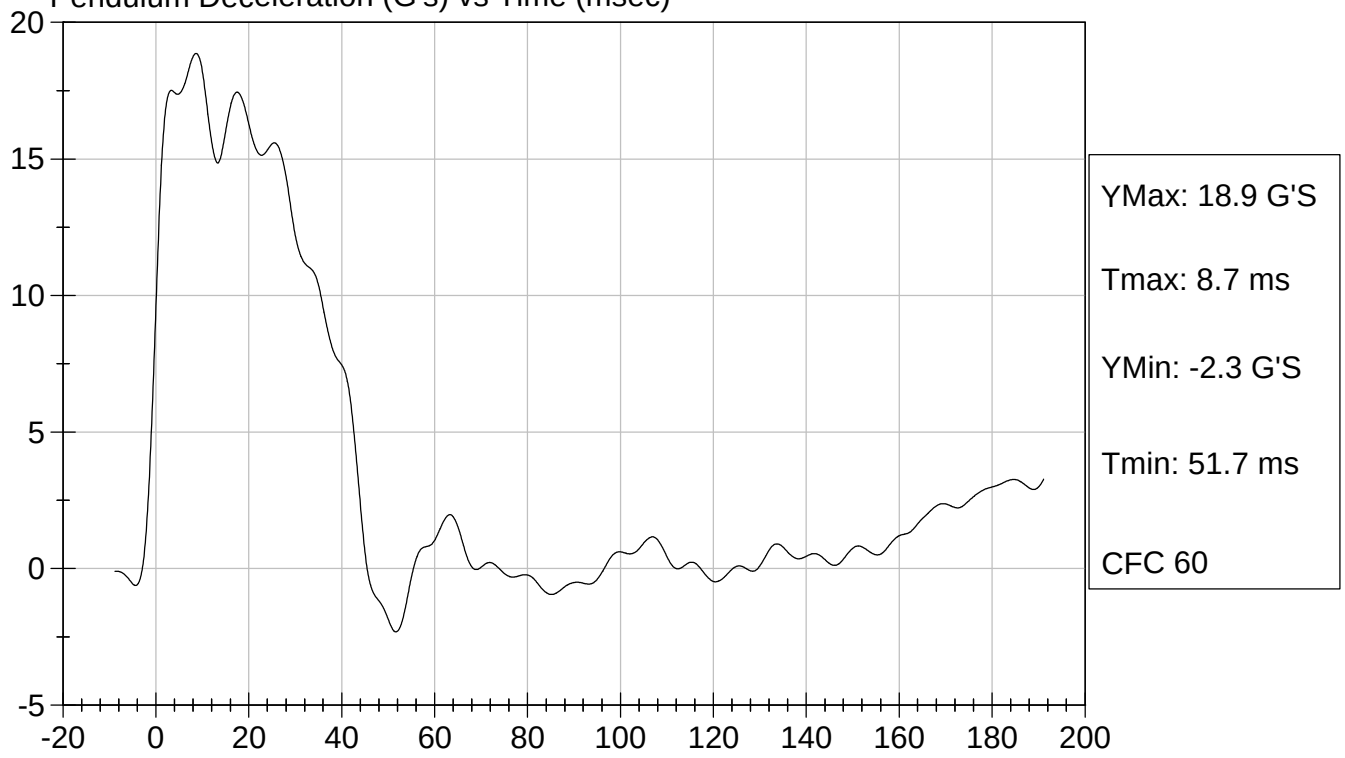
3/21/02
Test Date

Approved By

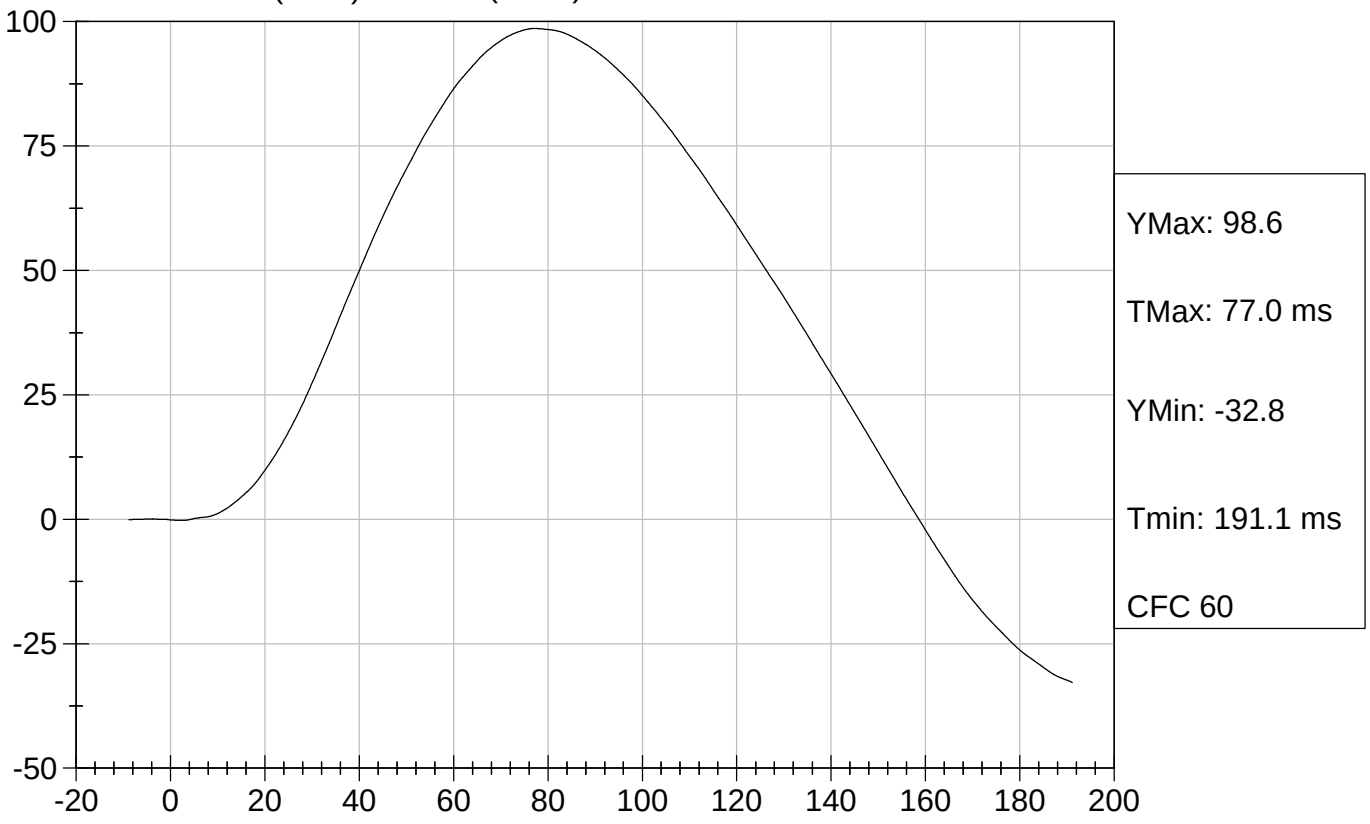
Test Desc: Neck Extension
Component ID: D02463

Test Date: 3/21/02
Speed: 20.01 ft/sec, 6.10 m/sec

Pendulum Deceleration (G's) vs Time (msec)

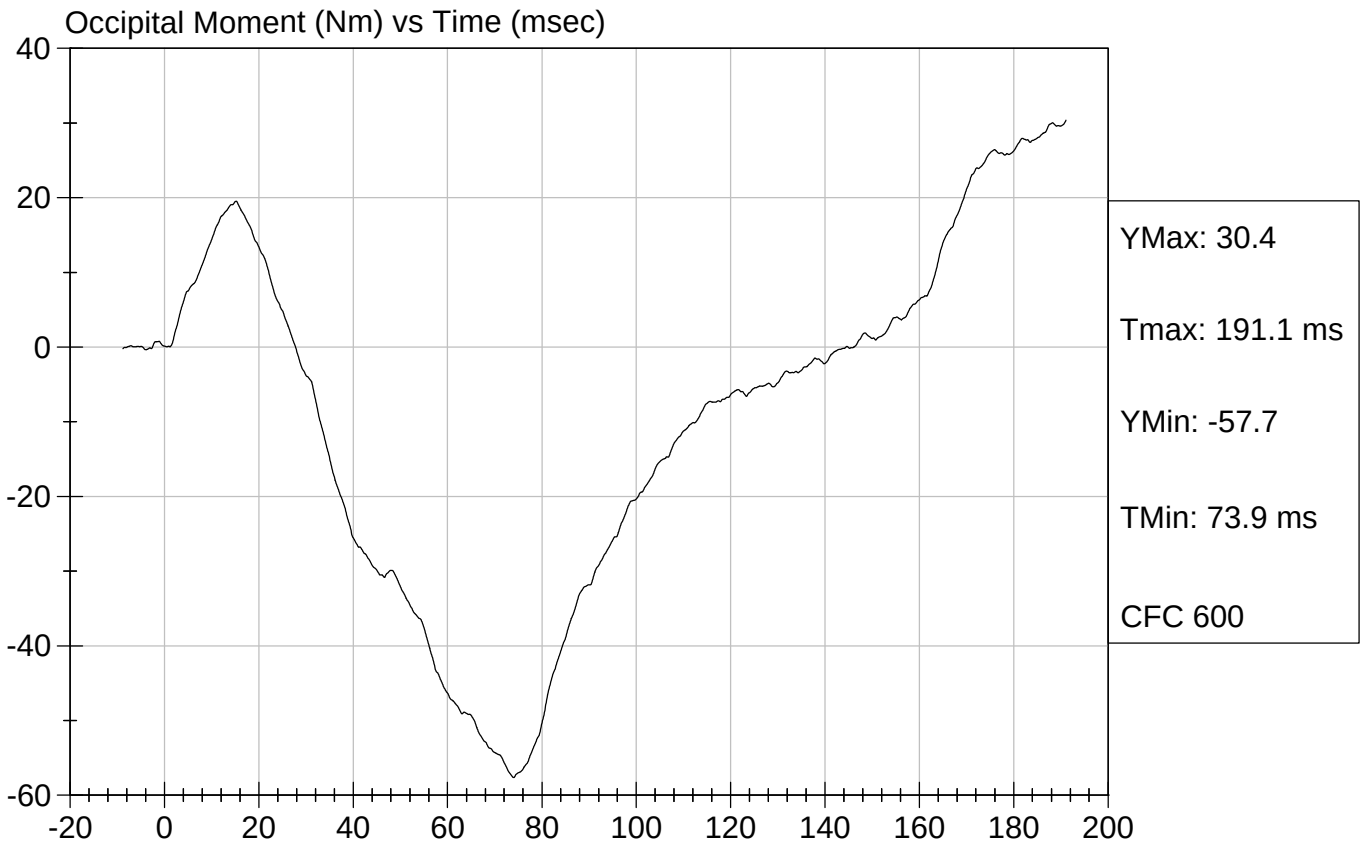


Neck Rotation (DEG) vs Time (msec)



Test Desc: Neck Extension
Component ID: D02463

Test Date: 3/21/02
Speed: 20.01 ft/sec, 6.10 m/sec



Hybrid III Calibration Data Sheet

50th Percentile Male

Thorax Impact Test

ATD Serial No: 065 **Test I.D:** D02464

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	Newtons	5159 to 5893	5,706	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.84	Pass
Internal Hysteresis	%	69 to 85	70	Pass
		Overall Test Results		Pass

Laboratory Technician

3/20/02
Test Date

Approved By

Test Description: Thorax Impact | Test Date: 3/20/02

Component: D02464 | Speed: 21.91 ft/sec, 6.68 m/sec

Hybrid III Calibration Data Sheet

50th Percentile Male

Right Knee Impact Test

ATD Serial No: 065 **Test I.D:** D02465

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5,402	Pass
		Overall Test Results		Pass

Laboratory Technician

3/21/02
Test Date

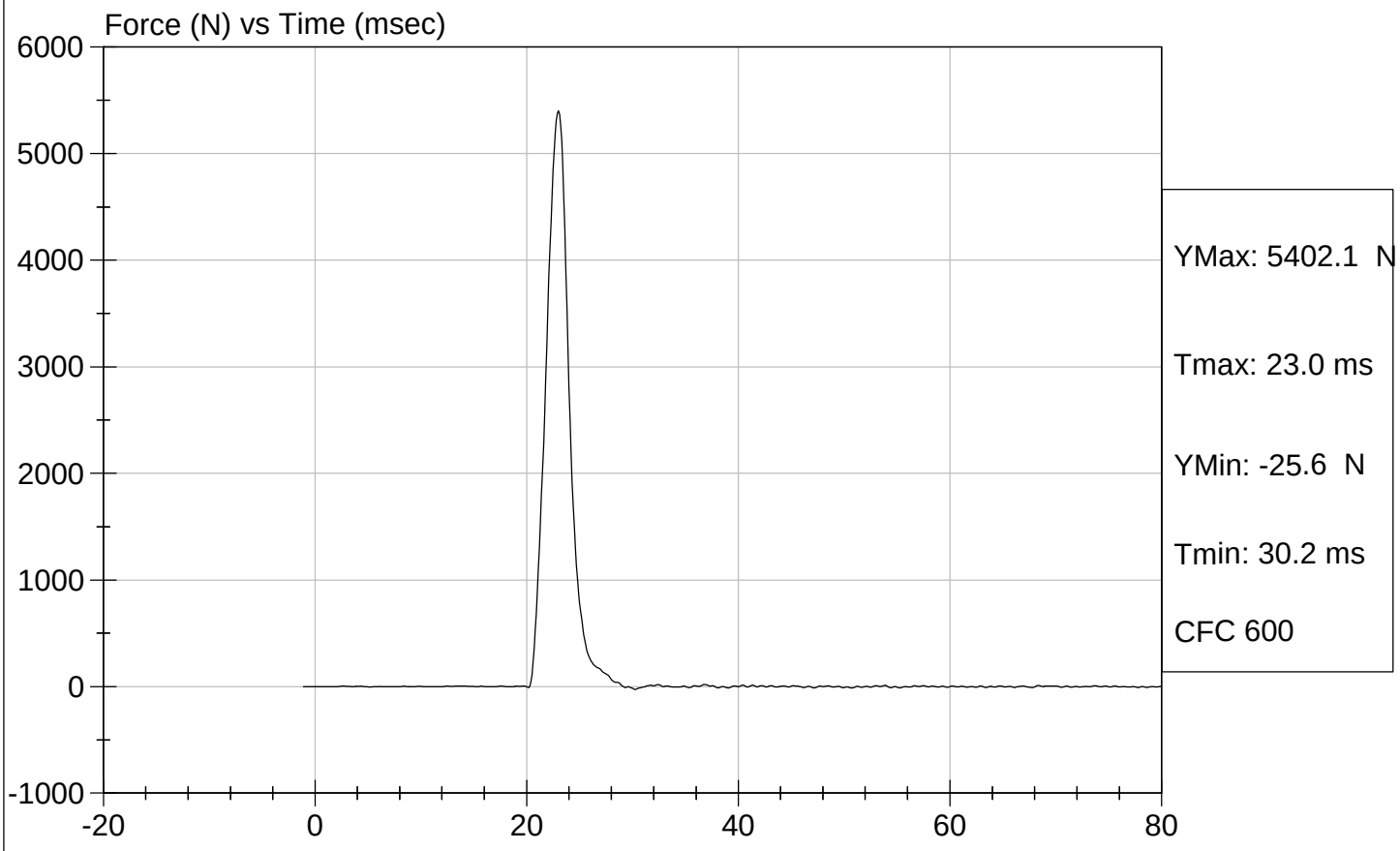
Approved By

Test Description: Right Knee

Test Date: 3/21/02

Component: D02465

Speed: 6.91 ft/sec, 2.11 m/sec



Hybrid III Calibration Data Sheet

50th Percentile Male

Left Knee Impact Test

ATD Serial No: 065 **Test I.D:** D02466

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5,507	Pass
		Overall Test Results		Pass

Laboratory Technician

3/21/02
Test Date

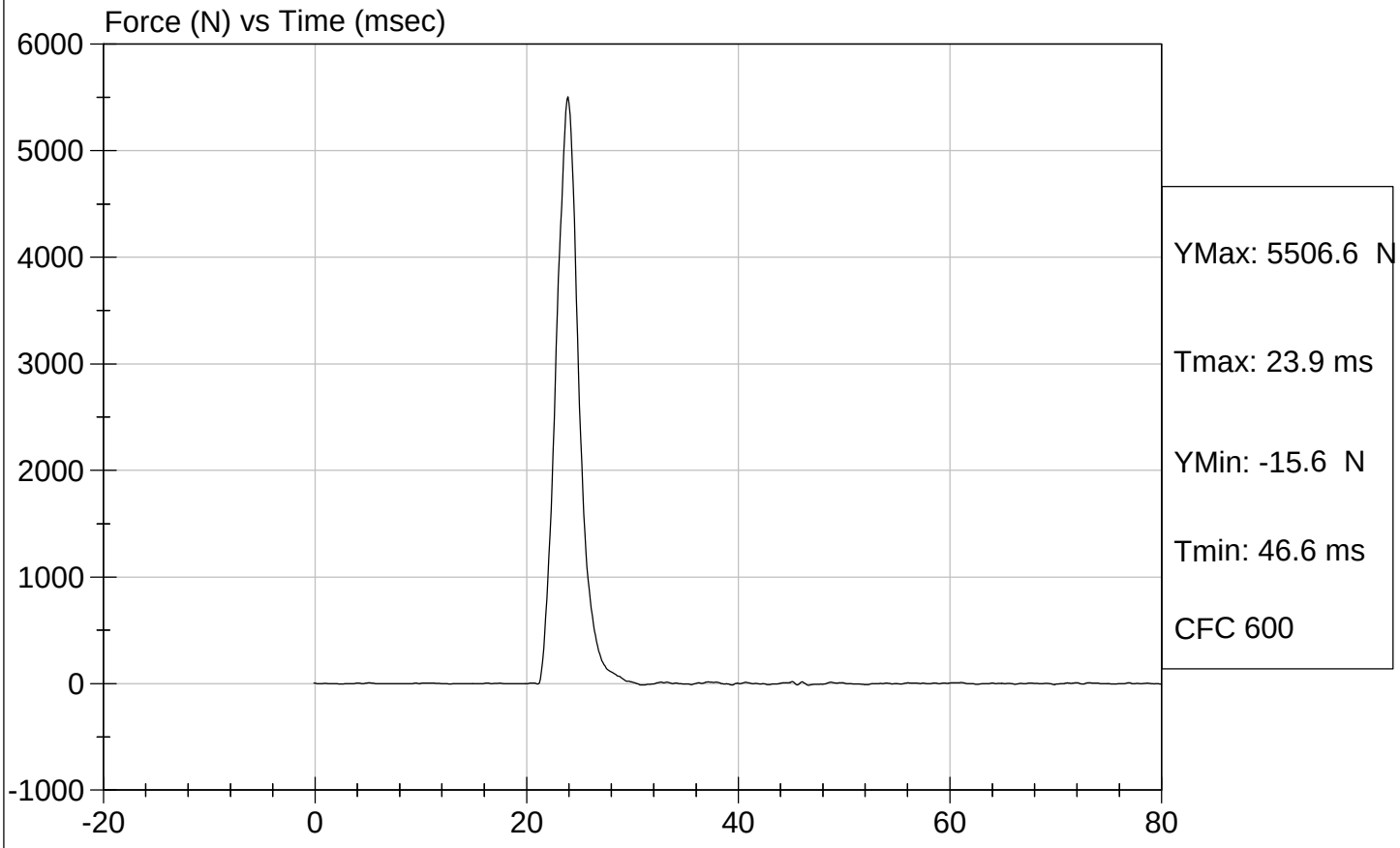
Approved By

Test Description: Left Knee

Test Date: 3/21/02

Component: D02466

Speed: 6.92 ft/sec, 2.11 m/sec



Hybrid III Calibration Data Sheet

50th Percentile Male

Hip-Femur Flexion Test

ATD Serial No: 065 **Test I.D:** D02469/0

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.7	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	19	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	79.9	74.1	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	45	44	Pass
		Overall Test Results			Pass

Laboratory Technician

3/21/02
Test Date

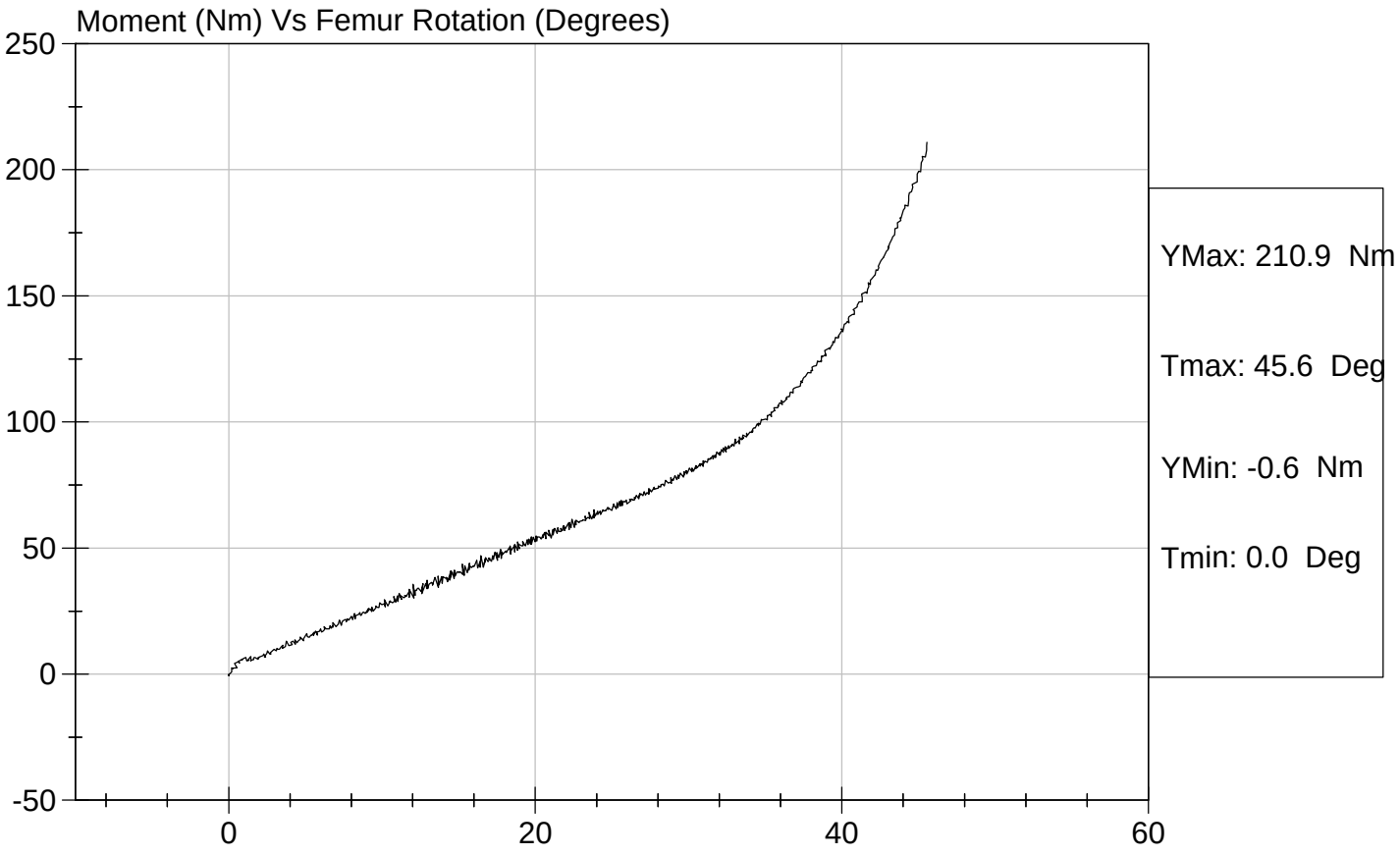
Approved By

Test Description: Hip Femur Flexion

Test Date: 3/21/02

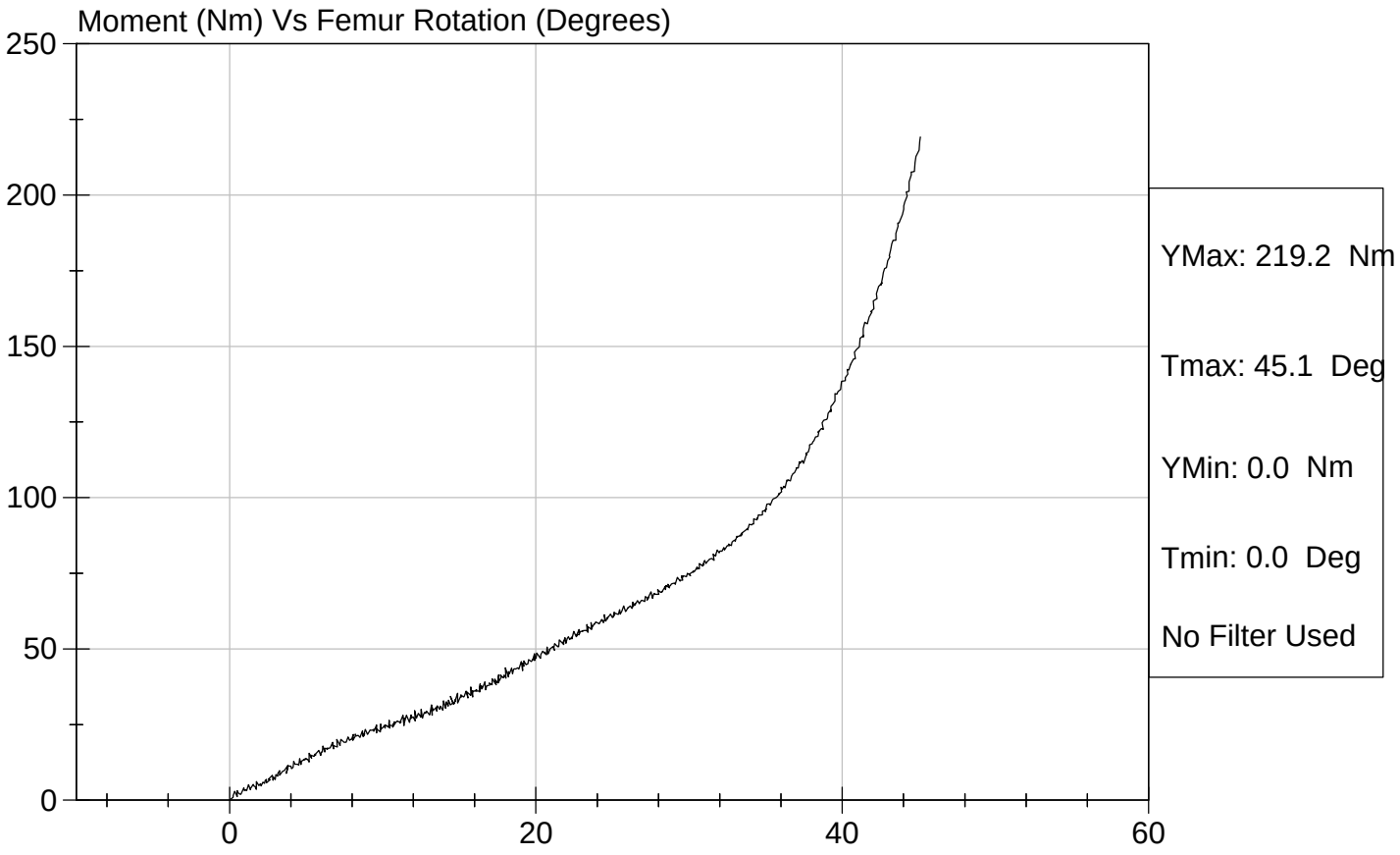
Component: D02469

Speed: 0 ft/sec, 0.00 m/sec



Test Description: Hip Femur Flexion | Test Date: 3/21/02

Component: D02460 | Speed: 0 ft/sec, 0.00 m/sec



APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

INSTRUMENTS FOR DRIVER DUMMY NO. 066

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	4/25/02
Head Y	ACC61	Endevco	4/25/02
Head Z	ACCW9	Endevco	4/25/02
Head Y – Front	APYY3	Endevco	4/25/02
Head Z – Front	J23774	Endevco	4/25/02
Head X – Left	J20382	Endevco	4/25/02
Head Z – Left	J28988	Endevco	4/25/02
Head X – Upper	J22036	Endevco	4/25/02
Head Y – Upper	J20569	Endevco	4/25/02
Head X Redundant	J19884	Endevco	4/25/02
Head Y Redundant	J21988	Endevco	4/25/02
Head Z Redundant	J28986	Endevco	4/25/02
Neck Load Cell	443	Denton	1/24/02
Chest X	ACCY1	Endevco	4/25/02
Chest Y	ACCC8	Endevco	4/25/02
Chest Z	ACCT7	Endevco	4/25/02
Chest Deflection Gauge	066	Servo	6/3/02
Chest X Redundant	J13541	Endevco	4/25/02
Chest Y Redundant	J20093	Endevco	4/25/02
Chest Z Redundant	J19440	Endevco	4/25/02
Pelvis X	J13530	Endevco	4/25/02
Pelvis Y	J13535	Endevco	4/25/02
Pelvis Z	AP2E1	Endevco	4/25/02
Left Femur Load Cell	262	Denton	4/30/02
Right Femur Load Cell	261	Denton	4/30/02
Left Upper Tibia Load Cell	109	Denton	4/26/02
Left Lower Tibia Load Cell	138	Denton	4/29/02
Right Upper Tibia Load Cell	106	Denton	4/26/02
Right Lower Tibia Load Cell	135	Denton	4/29/02

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Foot Z – Front	AHWK8	Endevco	4/25/02
Left Ankle X	AH0D1	Endevco	4/25/02
Left Ankle Z	AH0M0	Endevco	4/25/02
Right Foot Z – Front	J21612	Endevco	5/10/02
Right Ankle X	J22034	Endevco	5/10/02
Right Ankle Z	J21724	Endevco	5/10/02
Lap Belt Load Cell	192	Denton	5/22/02

INSTRUMENTS FOR PASSENGER DUMMY NO. 065

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	4/25/02
Head Y	J13941	Endevco	4/25/02
Head Z	AAMW5	Endevco	4/25/02
Head Y – Front	J20165	Endevco	4/25/02
Head Z – Front	J28708	Endevco	4/25/02
Head X – Left	J27513	Endevco	4/25/02
Head Z – Left	J23946	Endevco	4/25/02
Head X – Upper	J20580	Endevco	4/25/02
Head Y - Upper	J23914	Endevco	4/25/02
Head X Redundant	J18724	Endevco	4/25/02
Head Y Redundant	J14235	Endevco	4/25/02
Head Z Redundant	AJ5R0	Endevco	4/25/02
Neck Load Cell	442	Denton	3/15/02
Chest X	ACC78	Endevco	4/25/02
Chest Y	ACCE6	Endevco	4/25/02
Chest Z	ACCY3	Endevco	4/25/02
Chest Deflection Gauge	065	Servo	6/3/02
Chest X Redundant	J19927	Endevco	4/25/02
Chest Y Redundant	J14674	Endevco	4/25/02
Chest Z Redundant	J18736	Endevco	4/25/02
Pelvis X	AJ9N4	Endevco	4/25/02
Pelvis Y	ALFL9	Endevco	4/25/02
Pelvis Z	AJ808	Endevco	4/25/02
Left Femur Load Cell	256	Denton	4/30/02
Right Femur Load Cell	259	Denton	4/30/02
Left Upper Tibia Load Cell	105	Denton	4/26/02
Left Lower Tibia Load Cell	133	Denton	4/29/02
Right Upper Tibia Load Cell	103	Denton	4/26/02

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Right Lower Tibia Load Cell	134	Denton	4/29/02
Left Foot Z – Front	AJ9F3	Endevco	5/10/02
Left Ankle X	J13942	Endevco	5/10/02
Left Ankle Z	AJ9D4	Endevco	5/10/02
Right Foot Z – Front	AJ9J7	Endevco	5/10/02
Right Ankle X	AJ819	Endevco	5/10/02
Right Ankle Z	AJ7A2	Endevco	5/10/02
Lap Belt Load Cell	196	Denton	5/22/02

INSTRUMENTS FOR VEHICLE AND LABORATORY

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	F18-G07	Entran	3/6/02
Left Rear Seat Crossmember Z	H14-N13	Entran	1/15/02
Right Rear Seat Crossmember X	I12-F01	Entran	5/29/02
Right Rear Seat Crossmember Z	I25-F02	Entran	1/15/02
Top of Engine X	D11-F16	Entran	5/29/02
Bottom of Engine X	I12-F16	Entran	5/29/02
Left Brake Caliper X	I12-F10	Entran	5/29/02
Right Brake Caliper X	F11-G09	Entran	5/29/02
Instrument Panel X	I12-F05	Entran	5/29/02

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

APPENDIX E

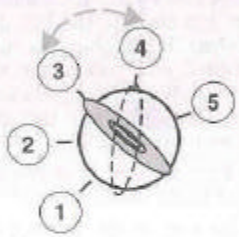
VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT INSTRUCTIONS

Programming spare keys

A maximum of eight keys can be coded to your vehicle. Only SecuriLock® keys can be used. To program a **coded key** yourself, you will need two previously programmed **coded keys** (keys that already operate your vehicle's engine) and the new unprogrammed key(s) readily accessible for timely implementation of each step in the procedure.

If two previously programmed coded keys are not available, you must bring your vehicle to your dealership to have the spare coded key(s) programmed.

Please read and understand the entire procedure before you begin.



1. Insert the first previously programmed **coded key** into the ignition and turn the ignition from 3 (OFF) to 4 (ON) (maintain ignition in 4 (ON) for at least one second).
2. Turn ignition to 3 (OFF) then 2 (LOCK) and remove the first **coded key** from the ignition.
3. Within ten seconds of removing the first **coded key,** insert the second previously programmed **coded key** into the ignition and turn the ignition from 3 (OFF) to 4 (ON) (maintain ignition in 4 (ON) for at least one second but no more than ten seconds).
4. Turn the ignition to 3 (OFF) then 2 (LOCK) and remove the second **coded key** from the ignition.
5. Within 20 seconds of removing the second **coded key,** insert the new unprogrammed key (new key/valet key) into the ignition and turn the ignition from 3 (OFF) to 4 (ON) (maintain ignition in 4 (ON) for at least one second). This step will program your new key to a coded key.
6. To program additional new unprogrammed key(s), repeat this procedure from step 1.

If successful, the new coded key(s) will start the vehicle's engine and the theft indicator will illuminate for three seconds and then go out.

If not successful, the new coded key(s) will not start the vehicle's engine and the theft indicator will flash on and off and you may repeat steps 1 through 6. If failure repeats, bring your vehicle to your dealership to have the new spare key(s) programmed.

SEATING

Adjusting the front manual seat

> ⚠ Never adjust the driver's seat or seatback when the vehicle is moving.

> ⚠ Do not pile cargo higher than the seatbacks to reduce the risk of injuring people in a collision or sudden stop.

> ⚠ Always drive and ride with your seatback upright and the lap belt snug and low across the hips.

> ⚠ Reclining the seatback can reduce the effectiveness of the seat's safety belt in the event of a collision.

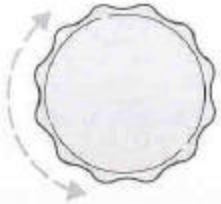
Lift handle to move seat forward or backward.

Pull lever up to adjust seatback.

Using the manual lumbar support (if equipped)

Turn the lumbar support control clockwise to increase firmness.

Turn the lumbar support control counterclockwise to increase softness.



REAR SEATS

Center facing jump seat (2 door SuperCab) (if equipped)

To open, pull inboard and down on the seat handle.

To stow the seat, pull seat bottom back to the fully upright position.

⚠ Do not install a child seat in a center facing jump seat.

Center facing jump seat (4 door SuperCab) (if equipped)

To open, pull seat assembly down, then raise seatback.

To stow the seat, fold seat back down and raise seat assembly to the fully upright position.

⚠ Do not install a child seat in a center facing jump seat.

SAFETY RESTRAINTS

Safety restraints precautions

⚠ Always drive and ride with your seatback upright and the lap belt snug and low across the hips.

⚠ To reduce the risk of injury, make sure children sit where they can be properly restrained.

⚠ Never let a passenger hold a child on his or her lap while the vehicle is moving. The passenger cannot protect the child from injury in a collision.

⚠ All occupants of the vehicle, including the driver, should always properly wear their safety belts, even when an air bag (SRS) is provided.

⚠ It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, people riding in these areas are more likely to be seriously injured or killed. Do not allow people to ride in any area of your vehicle that is not equipped with seats and safety belts. Be sure everyone in your vehicle is in a seat and using a safety belt properly.

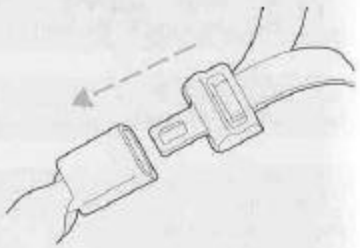
In a rollover crash, an unbelted person is significantly more likely to die than a person wearing a safety belt.

Each seating position in your vehicle has a specific safety belt assembly which is made up of one buckle and one tongue that are designed to be used as a pair. 1) Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. 2) Never swing the safety belt around your neck over the inside shoulder. 3) Never use a single belt for more than one person.

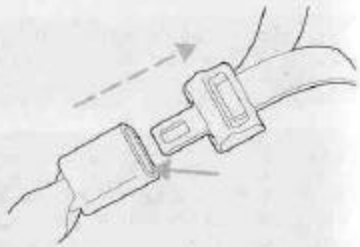
On four-door SuperCab vehicles, do not open the rear door when the rear seat belt is still buckled.

Combination lap and shoulder belts

1. Insert the belt tongue into the proper buckle (the buckle closest to the direction the tongue is coming from) until you hear a snap and feel it latch. Make sure the tongue is securely fastened in the buckle.



2. To unfasten, push the release button and remove the tongue from the buckle.



The front outboard safety restraints in the vehicle are combination lap and shoulder belts. The front passenger outboard safety belt has two types of locking modes described below:

Energy Management Feature

- This vehicle has a seat belt system with an energy management feature at the front outboard seating positions to help further reduce the risk of injury in the event of a head-on collision.
- This seat belt system has a retractor assembly that is designed to pay out webbing in a controlled manner. This feature is designed to help reduce the belt force acting on the occupant's chest.

Vehicle sensitive mode

The vehicle sensitive mode is the normal retractor mode, allowing free shoulder belt length adjustment to your movements and locking in response to vehicle movement. For example, if the driver brakes suddenly or turns a corner sharply, or the vehicle receives an impact of approximately 8 km/h (5 mph) or more, the combination safety belts will lock to help reduce forward movement of the driver and passengers.

Automatic locking mode

In this mode, the shoulder belt is automatically pre-locked. The belt will still retract to remove any slack in the shoulder belt.

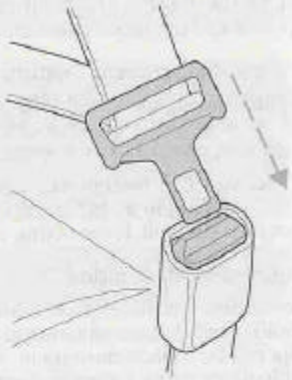
The automatic locking mode is not available on the driver safety belt.

When to use the automatic locking mode

- **Any time** a child safety seat is installed in a passenger front seat. Refer to *Safety Restraints for Children*, *Safety Seats for Children*, or *Passenger air bag On/Off switch* later in this chapter.

How to use the automatic locking mode

- Buckle the combination lap and shoulder belt.



- Grasp the shoulder portion and pull downward until the entire belt is extracted.

- Allow the belt to retract. As the belt retracts, you will hear a clicking sound. This indicates the safety belt is now in the automatic locking mode.

How to disengage the automatic locking mode

Disconnect the combination lap/shoulder belt and allow it to retract completely to disengage the automatic locking mode and activate the vehicle sensitive (emergency) locking mode.

After any vehicle collision, the seat belt system at all outboard seating positions (except driver, which has no "automatic locking retractor" feature) must be checked by a qualified technician to verify that the "automatic locking retractor" feature for child seats is still functioning properly. In addition, all seat belts should be checked for proper function.

BELT AND RETRACTOR ASSEMBLY MUST BE REPLACED if the seat belt assembly "automatic locking retractor" feature or any other seat belt function is not operating properly when checked according to the procedures in Workshop Manual.

Failure to replace the Belt and Retractor assembly could increase the risk of injury in collisions.

Safety belt pretensioner (if equipped)

Your vehicle is equipped with safety belt pretensioners at the driver and front outboard passenger seating positions.

The safety belt pretensioners are designed to activate during certain frontal or near-frontal collisions with sufficient longitudinal deceleration. A safety belt pretensioner is a device which tightens the webbing of the lap and shoulder belts in such a way that they fit more snugly against the body.

The driver and front outboard passenger safety belt system (including retractors, buckle assembly, pretensioner assembly with seat and height adjusters) must be replaced if the vehicle is involved in a collision that results in the activation of the safety belt pretensioners. Refer to the *Safety belt maintenance* section in this chapter.

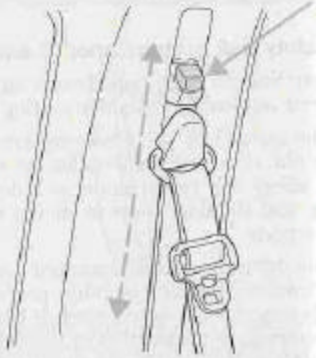
Failure to replace the safety belt assembly under the above conditions could result in severe personal injuries in the event of a collision.

Front safety belt height adjustment

Your vehicle has safety belt height adjustments for the driver and front passenger. Adjust the height of the shoulder belt so the belt rests across the middle of your shoulder.

- Regular Cab and 4–door Super Cab

- 2–door SuperCab



To lower the shoulder belt height, push the button and slide the height adjuster down. To raise the height of the shoulder belt, slide the height adjuster up. Pull down on the height adjuster to make sure it is locked in place.

⚠ Position the shoulder belt height adjusters so that the belt rests across the middle of your shoulder. Failure to adjust the safety belt properly could reduce the effectiveness of the seat belt and increase the risk of injury in a collision.

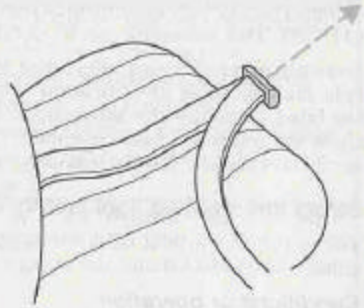
Lap belts

Adjusting the front center seat lap belt (if equipped)

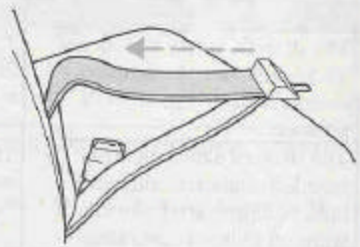
The lap belt does not adjust automatically.

⚠ The lap belt should fit snugly and as low as possible around the hips, not across the waist.

Insert the tongue into the correct buckle (the buckle closest to the direction the tongue is coming from). To lengthen the belt, turn the tongue at a right angle to the belt and pull across your lap until it reaches the buckle. To tighten the belt, pull the loose end of the belt through the tongue until it fits snugly across the hips.



Shorten and fasten the belt when not in use.



Adjusting the rear center facing jump seat lap belt (if equipped)

The lap belt will adjust automatically. To fasten, grasp the tongue, and with a continuous motion, pull out enough webbing to buckle the tongue into the correct buckle. If you did not pull out enough webbing to reach the buckle, allow the tongue to retract fully before trying to pull it out again.

⚠ The lap belt should fit snugly and as low as possible around the hips, not across the waist.

If you need to lengthen the belt, unfasten it and repeat the procedure above.

To unfasten the belt, push in the release button prior to opening the rear door.

Safety belt extension assembly

If the safety belt is too short when fully extended, there is a 20 cm (8 inch) safety belt extension assembly that can be added (part number 611C22). This assembly can be obtained from your dealer at no cost.

Use only extensions manufactured by the same supplier as the safety belt. Manufacturer identification is located at the end of the webbing on the label. Also, use the safety belt extension only if the safety belt is too short for you when fully extended. Do not use extensions to change the fit of the shoulder belt across the torso.

Safety belt warning light and indicator chime

The seat belt warning light illuminates in the instrument cluster and a chime sounds to remind the occupants to fasten their safety belts.

Conditions of operation

If...	Then...
The driver's safety belt is not buckled before the ignition switch is turned to the ON position...	The safety belt warning light illuminates 1-2 minutes and the warning chime sounds 4-8 seconds.
The driver's safety belt is buckled while the indicator light is illuminated and the warning chime is sounding...	The safety belt warning light and warning chime turn off.
The driver's safety belt is buckled before the ignition switch is turned to the ON position...	The safety belt warning light and indicator chime remain off.

BeltMinder

The BeltMinder feature is a supplemental warning to the safety belt warning function. This feature provides additional reminders to the driver that the driver's safety belt is unbuckled by intermittently sounding a chime and illuminating the safety belt warning lamp in the instrument cluster.

If...	Then...
The driver's safety belt is not buckled before the vehicle has reached at least 5 km/h (3 mph) and 1-2 minutes have elapsed since the ignition switch has been turned to ON...	The BeltMinder feature is activated - the safety belt warning light illuminates and the warning chime sounds for 6 seconds every 30 seconds, repeating for approximately 5 minutes or until safety belt is buckled.
The driver's safety belt is buckled while the safety belt indicator light is illuminated and the safety belt warning chime is sounding...	The BeltMinder feature will not activate.
The driver's safety belt is buckled before the ignition switch is turned to the ON position...	The BeltMinder feature will not activate.

The purpose of the BeltMinder is to remind occasional wearers to wear safety belts all of the time.

The following are reasons most often given for not wearing safety belts: (All statistics based on U.S. data)

Reasons given...	Consider...
"Crashes are rare events"	**36 700 crashes occur every day.** The more we drive, the more we are exposed to "rare" events, even for good drivers. *1 in 4 of us will be seriously injured in a crash during our lifetime.*
"I'm not going far"	**3 of 4** fatal crashes occur within **25** miles of home.
"Belts are uncomfortable"	We design our safety belts to enhance comfort. If you are uncomfortable - try different positions for the safety belt upper anchorage and seatback which should be as upright as possible; this can improve comfort.
"I was in a hurry"	**Prime time for an accident.** BeltMinder reminds us to take a few seconds to buckle up.
"Seat belts don't work"	**Safety belts,** when used properly, **reduce risk of death** to front seat occupants by **45% in cars,** and by **60% in light trucks.**
"Traffic is light"	**Nearly 1 of 2 deaths occur in single-vehicle crashes,** many when no other vehicles are around.
"Belts wrinkle my clothes"	Possibly, but a serious crash can do much more than wrinkle your clothes, particularly if you are unbelted.
"The people I'm with don't wear belts"	Set the example, teen deaths occur 4 times more often in vehicles with TWO or MORE people. Children and younger brothers/sisters imitate behavior they see.

Reasons given...	Consider...
"I have an air bag"	Air bags offer greater protection when used with safety belts. Frontal airbags are not designed to inflate in rear and side crashes or rollovers.
"I'd rather be thrown clear"	Not a good idea. **People** who are **ejected are 40 times more likely to DIE.** Safety belts help prevent ejection, WE CAN'T "PICK OUR CRASH".

⚠ Do not sit on top of a buckled safety belt to avoid the Belt Minder chime. Sitting on the safety belt will increase the risk of injury in an accident. To disable (one-time) or deactivate the Belt Minder feature please follow the directions stated below.

One time disable

Any time the safety belt is buckled and then unbuckled during an ignition ON cycle, BeltMinder will be disabled for that ignition cycle only.

Deactivating/activating the BeltMinder feature

Read steps 1 - 9 thoroughly before proceeding with the deactivation/activation programming procedure.

The BeltMinder feature can be deactivated/activated by performing the following procedure:

Before following the procedure, make sure that:

- The parking brake is set.
- The gearshift is in P (Park) (automatic transmission) or the neutral position (manual transmission).
- The ignition switch is in the OFF position.
- All vehicle doors are closed.
- The driver's safety belt is unbuckled.
- The parklamps/headlamps are in OFF position (If vehicle is equipped with Autolamps, this will not affect the procedure).

To reduce the risk of injury, do not deactivate/activate the Belt Minder feature while driving the vehicle.

1. Turn the ignition switch to the RUN (or ON) position. (DO NOT START THE ENGINE.)
2. Wait until the safety belt warning light turns off. (Approximately 1–2 minutes.)
   - Steps 3–5 must be completed within 60 seconds or the procedure will have to be repeated.
3. Buckle then unbuckle the safety belt three times, ending with the safety belt unbuckled. This can be done before or during BeltMinder warning activation.
4. Turn on the parklamps/headlamps, turn off the parklamps/headlamps.
5. Buckle then unbuckle the safety belt three times, ending with the safety belt unbuckled.
   - After step 5 the safety belt warning light will be turned on for three seconds.
6. Within seven seconds of the safety belt warning light turning off, buckle then unbuckle the safety belt.
   - This will disable BeltMinder if it is currently enabled, or enable BeltMinder if it is currently disabled.
7. Confirmation of disabling BeltMinder is provided by the safety belt warning light flashing four times per second for three seconds.
8. Confirmation of enabling BeltMinder is provided by:
   - The safety belt warning light flashing four times per second for three seconds.
   - Followed by three seconds with the safety belt warning light off.
   - Once again, the safety belt warning light will flash four times per second for three seconds.
9. After receiving confirmation, the deactivation/activation procedure is complete.

Safety belt maintenance

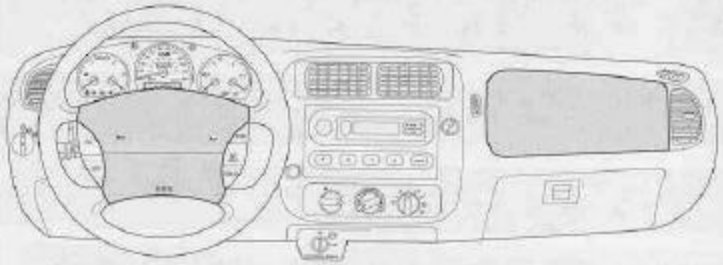
Inspect the safety belt systems periodically to make sure they work properly and are not damaged. Inspect the safety belts to make sure

there are no nicks, tears or cuts. Replace if necessary. All safety belt assemblies, including retractors, buckles, front seat belt buckle assemblies, buckle support assemblies (slide bar-if equipped), shoulder belt height adjusters (if equipped), shoulder belt guide on seatback (if equipped), child safety seat tether bracket assemblies (if equipped), LATCH child seat tether anchors and lower anchors (if equipped), and attaching hardware, should be inspected after a collision. Ford Motor Company recommends that all safety belt assemblies used in vehicles involved in a collision be replaced. However, if the collision was minor and a qualified technician finds that the belts do not show damage and continue to operate properly, they do not need to be replaced. Safety belt assemblies not in use during a collision should also be inspected and replaced if either damage or improper operation is noted.

Failure to inspect and if necessary replace the safety belt assembly under the above conditions could result in severe personal injuries in the event of a collision.

Refer to *Cleaning and maintaining the safety belts* in the *Cleaning* chapter.

AIR BAG SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

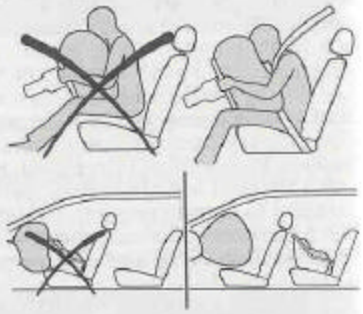


Your vehicle is equipped with a crash sensing and diagnostic module which records information about the air bag and sensor systems. In the event of a collision this module may save information related to the collision including information about the air bag system and impact severity. This information will assist Ford Motor Company in the servicing vehicle and helping to better understand real world collisions and further improve the safety of future vehicles.

Important supplemental restraint system (SRS) precautions

The supplemental restraint system is designed to work with the safety belt to help protect the driver and right front passenger from certain upper body injuries.

Air bags DO NOT inflate slowly or gently and the risk of injury from a deploying air bag is greatest close to the trim covering the air bag module.



⚠ All occupants of the vehicle, including the driver, should always properly wear their safety belts, even when an air bag (SRS) is provided.

⚠ National Highway Traffic Safety Administration (NHTSA) recommends a minimum distance of at least 25 cm (10 inches) between an occupant's chest and the driver air bag module.

⚠ Never place your arm over the air bag module as a deploying air bag can result in serious arm fractures or other injuries.

⚠ Never place a rear facing infant seat in the front seat unless the passenger air bag is turned off.

Steps you can take to properly position yourself away from the airbag:

- Move your seat to the rear as far as you can while still reaching the pedals comfortably.
- Recline the seat slightly (one or two degrees) from the upright position.

⚠ Do not put anything on or over the air bag module. Placing objects on or over the air bag inflation area may cause those objects to be propelled by the air bag into your face and torso causing serious injury.

⚠ Do not attempt to service, repair, or modify the Air Bag Supplemental Restraint System or its fuses. See your Ford or Lincoln Mercury dealer.

⚠ The front passenger air bag is not designed to offer protection to occupants in the center front seating position.

⚠ Modifications to the front end of the vehicle, including frame, bumper, front end body structure and tow hooks may affect the performance of the air bag sensors increasing the risk of injury. Do not modify the front end of the vehicle.

⚠ Additional equipment may affect the performance of the air bag sensors increasing the risk of injury. Please refer to the Body Builders Layout Book for instructions about the appropriate installation of additional equipment.

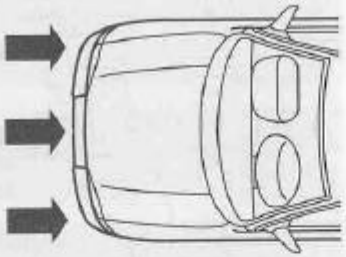
Children and air bags

For additional important safety information, read all information on safety restraints in this guide.

Children must always be properly restrained. Failure to follow these instructions may increase the risk of injury in a collision.

⚠ An infant in a rear-facing seat faces a high risk of serious or fatal injuries from a deploying passenger air bag. Rear facing infant seats should NEVER be placed in the front seats, unless the passenger air bag is turned off. See *Passenger air bag ON/OFF switch.*

How does the air bag supplemental restraint system work?



The air bag SRS is designed to activate when the vehicle sustains sufficient longitudinal deceleration.

The fact that the air bags did not inflate in a collision does not mean that something is wrong with the system. Rather, it means the forces were not of the type sufficient to cause activation. Air bags are designed to inflate in frontal and near-frontal collisions, not rollover, side-impact, or rear-impacts.

The air bags inflate and deflate rapidly upon activation. After air bag deployment, it is normal to notice a smoke-like, powdery residue or smell the burnt propellant. This may consist of cornstarch, talcum powder (to lubricate the bag) or sodium compounds (e.g., baking soda) that result from the combustion process that inflates the air bag. Small amounts of sodium hydroxide may be present which may irritate the skin and eyes, but none of the residue is toxic.

While the system is designed to help reduce serious injuries, it may also cause minor abrasions, swelling or temporary hearing loss. Because air bags must inflate rapidly and with considerable force, there is the risk of death or serious injuries such as fractures, facial and eye injuries or internal injuries, particularly to occupants who are not properly restrained or are otherwise out of position at the time of air bag deployment. Thus, it is extremely important that occupants be properly restrained as far away from the air bag module as possible while maintaining vehicle control.

⚠ Several air bag system components get hot after inflation. Do not touch them after inflation.

⚠ If the air bag has deployed, **the air bag will not function again and must be replaced immediately.** If the air bag is not replaced, the unrepaired area will increase the risk of injury in a collision.

The SRS consists of:

- driver and passenger air bag modules (which include the inflators and air bags),
- one or more impact and safing sensors, passenger air bag deactivation switch and diagnostic monitor (RCM)
- a readiness light and tone,
- and the electrical wiring which connects the components.

The RCM (restraints control module) monitors its own internal circuits and the supplemental air bag electrical system warning (including the passenger air bag deactivation switch, the impact sensors, the system wiring, the air bag system readiness light, the air bag back up power and the air bag ignitors).

Determining if the system is operational

The SRS uses readiness lights in the instrument cluster and the passenger air bag deactivate switch or a tone to indicate the condition of the system. Refer to the *Air bag readiness* section in the *Instrument cluster* chapter or *Passenger air bag on/off switch* section in this chapter. Routine maintenance of the air bag is not required.

A difficulty with the system is indicated by one or more of the following:

- The readiness lights will either flash or stay lit.
- The readiness lights will not illuminate immediately after ignition is turned on.
- A series of five beeps will be heard. The tone pattern will repeat periodically until the problem and/or light are repaired.

If any of these things happen, even intermittently, have the SRS serviced at your dealership or by a qualified technician immediately. Unless serviced, the system may not function properly in the event of a collision.

Disposal of air bags and air bag equipped vehicles (including pretensioners)

For disposal of air bags or air bag equipped vehicles, see your local dealership or qualified technician. Air bags MUST BE disposed of by qualified personnel.

Passenger air bag ON/OFF switch

⚠ An air bag ON/OFF switch has been installed in this vehicle. Before driving, *always* look at the face of the switch to be sure the switch is in the proper position in accordance with these instructions and warnings. Failure to put the switch in a proper position can increase the risk of serious injury or death in a collision.

Turning the passenger air bag off

1. Insert the ignition key, turn the switch to OFF position and hold in OFF position while removing the key.
2. When the ignition is turned to the ON position the OFF light illuminates briefly, momentarily shuts off and then turns back on. This indicates that the passenger air bag is deactivated.

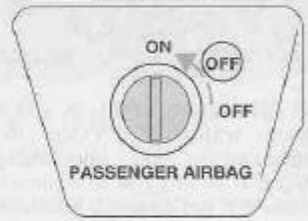
⚠ If the light fails to illuminate when the passenger air bag switch is in the OFF position and the ignition switch is in ON, have the passenger air bag switch serviced at your Ford or Lincoln-Mercury dealer immediately.

⚠ In order to avoid inadvertent activation of the switch, always remove the ignition key from the passenger air bag ON/OFF switch.

Turning the passenger air bag back on

The passenger air bag remains OFF until you turn it back ON.

1. Insert the ignition key and turn the switch to ON.
2. The OFF light will briefly illuminate when the ignition is turned to ON. This indicates that the passenger air bag is operational.



⚠ If the OFF light is illuminated when the passenger air bag ON/OFF switch is in the ON position and the ignition switch is ON, have the passenger air bag ON/OFF switch serviced at your Ford or Lincoln-Mercury dealer immediately.

The passenger side air bag should always be ON (the air bag OFF light should *not* be illuminated) unless the passenger is a person who meets the requirements stated either in Category 1, 2 or 3 of the NHTSA/Transport Canada deactivation criteria which follows.

⚠ The safety belts for the driver and right front passenger seating positions have been specifically designed to function together with the air bags in certain types of crashes. When you turn OFF your air bag, you not only lose the protection of the air bag, you also may reduce the effectiveness of your safety belt system, which was designed to work with the air bag. If you are not a person who meets the requirements stated in the NHTSA/Transport Canada deactivation criteria turning OFF the air bag can increase the risk of serious injury or death in a collision.

⚠ Always use safety belts and child restraints properly. If a child in a rear facing infant seat must be transported in front, the passenger air bag *must* be turned OFF. This is because the back of the infant seat is too close to the inflating air bag and the risk of a fatal injury to the infant when the air bag inflates is substantial.

The vast majority of drivers and passengers are much safer with an air bag than without. To do their job and reduce the risk of life threatening injuries, air bags must open with great force, and this force can pose a potentially deadly risk in some situations, particularly when a front seat occupant is not properly buckled up. The most effective way to reduce the risk of unnecessary air bag injuries without reducing the overall safety of the vehicle is to make sure all occupants are properly restrained in the vehicle, especially in the front seat. This provides the protection of safety belts and permits the air bags to provide the additional protection they were designed to provide. If you choose to deactivate your air bag, you are losing the very significant risk reducing benefits of the air bag and you are also reducing the effectiveness of the safety belts, because safety belts in modern vehicles are designed to work as a safety system with the air bags.

Read all air bag Warning labels in the vehicle as well as the other important air bag instructions and Warnings in this Owner's Guide.

NHTSA deactivation criteria (excluding Canada)

1. **Infant.** An infant (less than 1 year old) must ride in the front seat because:

- the vehicle has no rear seat;
- the vehicle has a rear seat too small to accommodate a rear-facing infant seat; or
- the infant has a medical condition which, according to the infant's physician, makes it necessary for the infant to ride in the front so that the driver can constantly monitor the child's condition.

2. **Child age 1 to 12.** A child age 1 to 12 must ride in the front seat because:

- the vehicle has no rear seat;
- although children ages 1 to 12 ride in the rear seat(s) whenever possible, children ages 1 to 12 sometimes must ride in the front because no space is available in the rear seat(s) of the vehicle; or
- the child has a medical condition which, according to the child's physician, makes it necessary for the child to ride in the front seat so that the driver can constantly monitor the child's condition.

3. **Medical condition.** A passenger has a medical condition which, according to his or her physician:

- causes the passenger air bag to pose a special risk for the passenger; and
- makes the potential harm from the passenger air bag in a crash greater than the potential harm from turning OFF the air bag and allowing the passenger, even if belted, to hit the dashboard or windshield in a crash.

⚠ This vehicle has special energy management safety belts for the driver and/or right front passenger. These particular belts are specifically designed to work with air bags to help reduce the risk of injury in a collision. The energy management safety belt is designed to give or release additional belt webbing in some accidents to reduce concentration of force on an occupant's chest and reduce the risk of certain bone fractures and injuries to underlying organs. In a crash, if the air bag is turned OFF, this energy management safety belt might permit the person wearing the belt to move forward enough to incur a serious or fatal injury. The more severe the crash, and the heavier the occupant, the greater the risk. Be sure the air bag is turned ON for any person who does not qualify under the NHTSA deactivation criteria.