REPORT NUMBER: NCAP-MGA-2008-003

NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST

FORD MOTOR COMPANY
2008 FORD MUSTANG CONVERTIBLE
NHTSA NUMBER: M80207

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

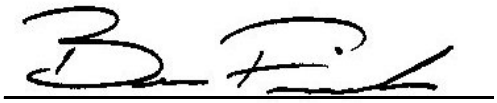
Test Date: September 13, 2007

Final Report Date: October 17, 2007

FINAL REPORT

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

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-06-D-00028.

Prepared by:  Date: 10/17/07

Ben Fischer, Project Engineer

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Technical Report Documentation Page

1. Report No. NCAP-MGA-2008-003	*2. Government Accession No.*	*3. Recipient's Catalog No.*	
4. Title and Subtitle Final Report of New Car Assessment Program Testing of a 2008 Ford Mustang Convertible NHTSA No.: M80207		*5. Report Date* October 17, 2007 *6. Performing Organization Code* MGA	
7. Author(s) Ben Fischer, Project Engineer		*8. Performing Organization Report No.* NCAP-MGA-2008-003	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-06-D-00028	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Rulemaking, Office of Crashworthiness Standards 1200 New Jersey Ave, SE, Room W43-410, NVS-111 Washington, D.C. 20590		*13. Type of Report and Period Covered* Final Report 9/13/2007 to 10/17/2007 *14. Sponsoring Agency Code* NVS-111	
15. Supplementary Notes			

16. Abstract

A frontal barrier impact was conducted on a 2008 Ford Mustang Convertible at MGA Research Corporation on September 13, 2007. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The impact velocity was 56.3 km/h. The ambient temperature at the barrier face at the time of impact was 21 degrees Celsius. The vehicle's maximum post test static crush is 441 mm located at the vehicle's centerline. The test vehicle is equipped with a 3-point continuous belt system and an airbag in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows:

Measurement Description	Units	Threshold	Driver ATD	Pass. ATD
Head Injury Criteria (HIC)	N/A	1000	461	493
Max. Thorax Accel. (3ms Clip)	G's	60	37	42
Left Femur Force	Newton	10009	-1641	-2575
Right Femur Force	Newton	10009	-1763	-1483

17. Key Words 56.3 km/h NCAP Frontal Barrier Impact Test New Car Assessment Program (NCAP) 2008 Ford Mustang Convertible NHTSA No: M80207		*18. Distribution Statement* Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, 1200 New Jersey Ave, SE Washington, D.C. 20590	
19. Security Classif. (of this report) Unclassified	*20. Security Classif. (of this page)* Unclassified	*21. No. of Pages* 174	22. Price

Form DOT F1700.7 (8-72)

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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 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 DTNH22-06-D-00028. 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 was impacted by a 2008 Ford Mustang Convertible at a velocity of 56.3 kph. The test was performed at MGA Research Corporation on September 13, 2007. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

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

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

The 102 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy head, chest, and femur 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 441 mm and both the driver and passenger side doors remained closed and latched during the impact event and were operable after the impact.

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

The occupant data is summarized below:

ATD position	HIC	T^1	T^2	Clip (g)	T^1	T^2	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver	461	52.3	84.4	37	75.5	78.5	-31	-1641	-1763
Passenger	493	58.7	94.7	42	71.5	74.5	-26	-2575	-1483

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

TEST NOTES

There was no valid data collected for:
Passenger Left Ankle X
Bottom of Engine X after 20 msec.

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1

CRASH TEST SUMMARY

Test Vehicle: 2008 Ford Mustang Convertible
Test Program: 35mph Frontal Impact
NHTSA No.: M80207
Test Date: 9/13/2007

DOOR OPENING AND SEAT TRACK INFORMATION

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

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1405
Center	mm	1354
Right Side	mm	1482
Average	mm	1414

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	1037	1034
Lap belt length as measured on ATD	mm	926	873
Remainder of belt on reel	mm	811	813
Total belt length for continuous webbing systems	mm	2774	2720

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Ford Mustang Convertible
Test Program: 35mph Frontal Impact
NHTSA No.: M80207
Test Date: 9/13/2007

TEST VEHICLE INFORMATION

Manufacturer	Ford
Model	Mustang
Body Style	Convertible
NHTSA No.	M80207
VIN	1ZVHT84N785101174
Color	Vista Blue
Delivery Date	8/17/2007
Odometer Reading (mile)	214
Dealer	Gordie Boucher
Transmission	Automatic
Final Drive	Rear
Number of Cylinders	6
Engine Displacement (L)	4.0
Engine Placement	Longitudinal
Automatic Door Lock (ADL)	Yes
Owners Manual Details Instructions on Disabling ADLs	Yes
Bucket Seats	Yes

TEST VEHICLE OPTIONS

Front Airbag	Yes
Driver Side Curtain Airbag	No
Driver Side Torso Airbag	Yes
Rear Passenger Side Curtain Airbag	No
Rear Passenger Side Torso Airbag	No
Force Limiter	Yes
Pretensioner	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Anti-lock Brakes	No
Traction Control	No
All Wheel Drive	No
Power Seats	No

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Company
Date of Manufacture	06/07

GVWR (kg)	2037
GAWR Front (kg)	971
GAWR Rear (kg)	1066

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket		
Number of Occupants	2	2		4
Capacity Wt. (VCW) (kg)				301
Cargo Wt. (RCLW) (kg)				29

DATA SHEET NO. 2... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Ford Mustang Convertible
Test Program: 35mph Frontal Impact
NHTSA No.: M80207
Test Date: 9/13/2007

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	425.9	371.5		458.1	429.1	
Right	kg	425.0	380.6		455.0	440.0	
Ratio	%	53.1	46.9		51.2	48.8	
Totals	kg	850.9	752.1	1603.0	913.1	869.1	1782.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1603.0
Weight of 2 P572E ATDs	kg	156.0
Rated Cargo/Luggage Weight (RCLW)	kg	29
Calculated Vehicle Target Weight (TVTW)	kg	1788.0

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	732	725	746	739	1275
As Tested	mm	721	718	713	712	1325
Post Test	mm	750	798	679	734	

Vehicle Wheelbase (mm): 2718

Weight of Ballast secured in cargo area (kg): 0

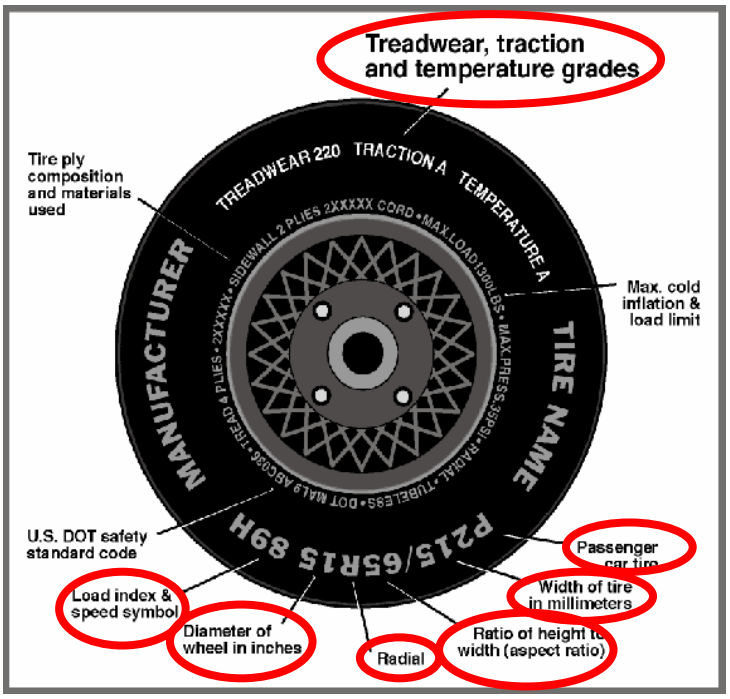
Vehicle Components Removed: Spare, jack, carpet in trunk, tail lights, mirrors, antenna, tools

Ballast weight does not include instrumentation and data acquisition system.

DATA SHEET NO. 3

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P215/65R16	P215/65R16
Tire Size on Vehicle	P215/65R16	P215/65R16
Tire Manufacturer	BF Goodrich	BF Goodrich
Tire Name	Traction T/A	Traction T/A
Tire Type	Passenger	Passenger
Tire Width (mm)	215	215
Ratio of Height to Width (aspect ratio)	65	65
Radial	R	R
Wheel Diameter	16	16
Load Index & Speed Symbol	96T	96T
Treadwear	620	620
Traction Grade	A	A
Temperature Grade	B	B

DATA SHEET NO. 4

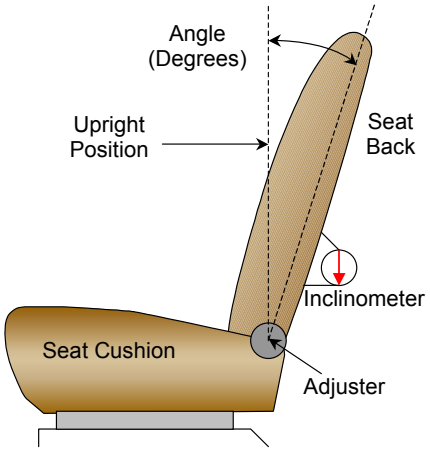
TEST VEHICLE INFORMATION

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows: 330 mm radius from the seat pivot to the backside of the seat back frame. This corresponds to a head restraint post angle of 13.0 degrees.

Driver seat back angle: 13.9 degrees
Passenger seat back angle: 13.8 degrees



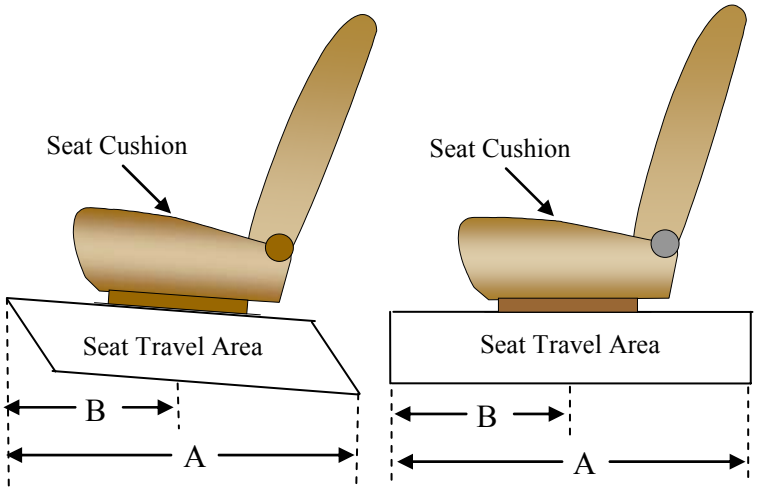
FRONT SEAT ASSEMBLY

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	25 detents	14th detent (1st as 1)
Passenger Seat	25 detents	13th detent (1st as 1)

ADJUSTABLE D-RING POSITION

The driver and passenger D-rings are fixed.



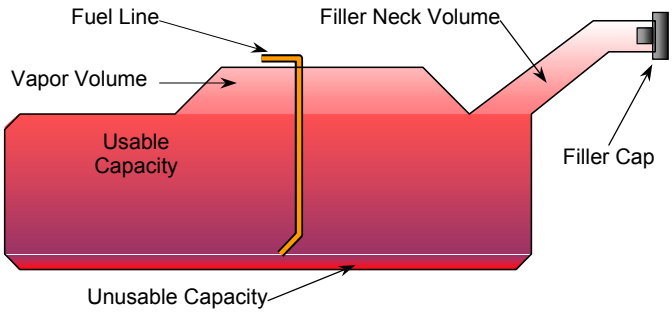
DATA SHEET NO. 4…(CONTINUED)
TEST VEHICLE INFORMATION

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	61.7
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	56.7 – 58.0
Actual Amount of Solvent used	56.8
1/3 of Usable Capacity	20.6

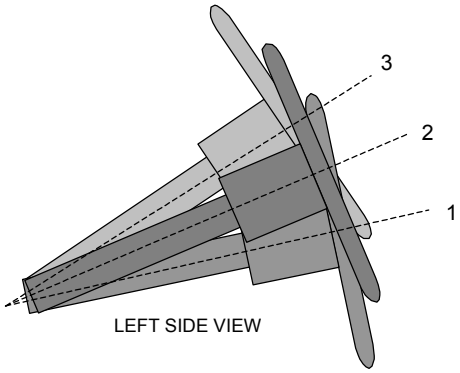
The test vehicle is equipped with an electric fuel pump. The electric fuel pump operates for a prescribed amount of time to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 2 seconds following ignition actuation, the fuel pump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



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

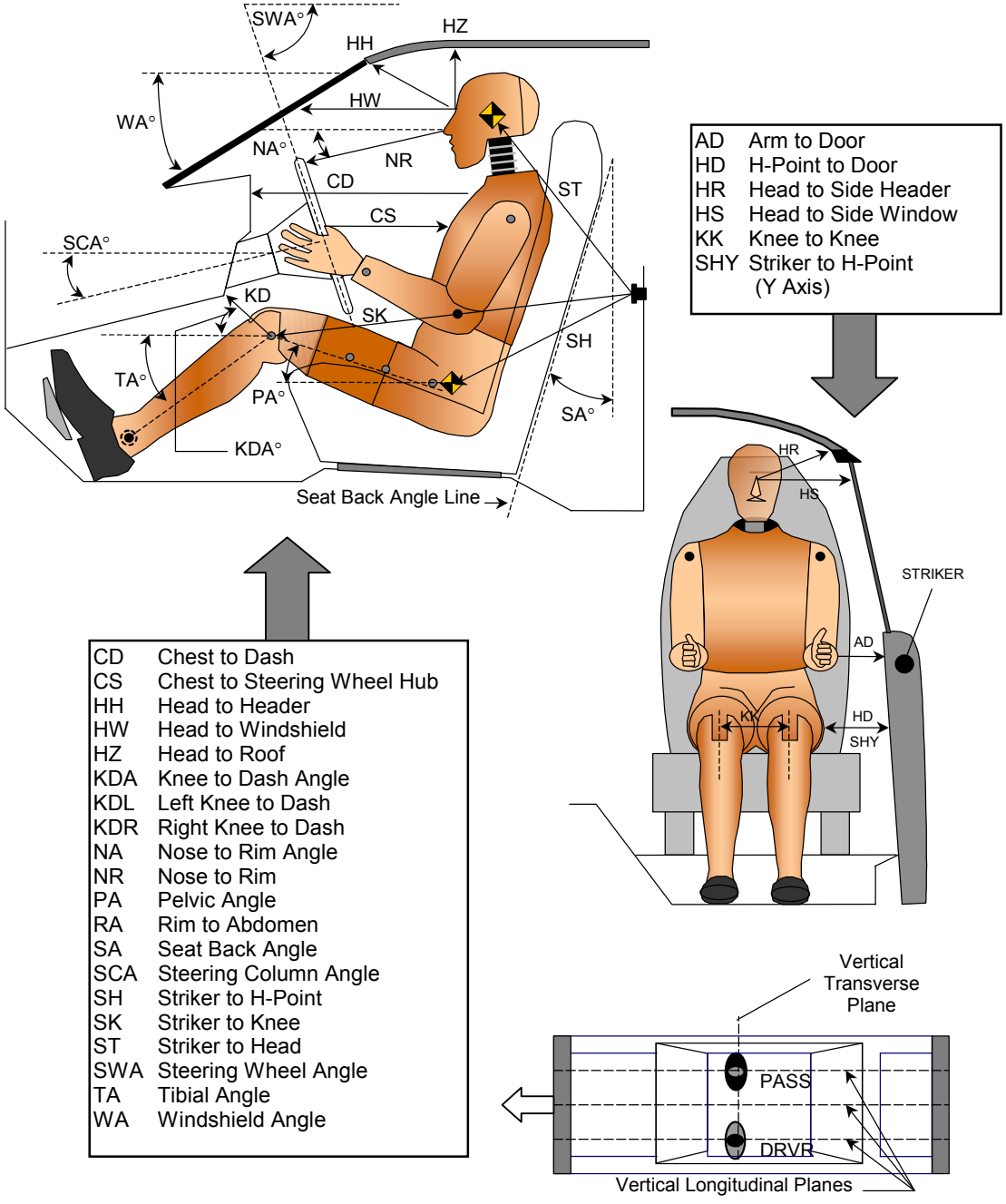
	Fore/Aft Position (mm)	Degrees
Lowermost position No. 1		66.8
Geometric center position No. 2		68.8
Uppermost position No. 3		70.8

DATA SHEET NO. 5

DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS



DATA SHEET NO. 5... (CONTINUED)

DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

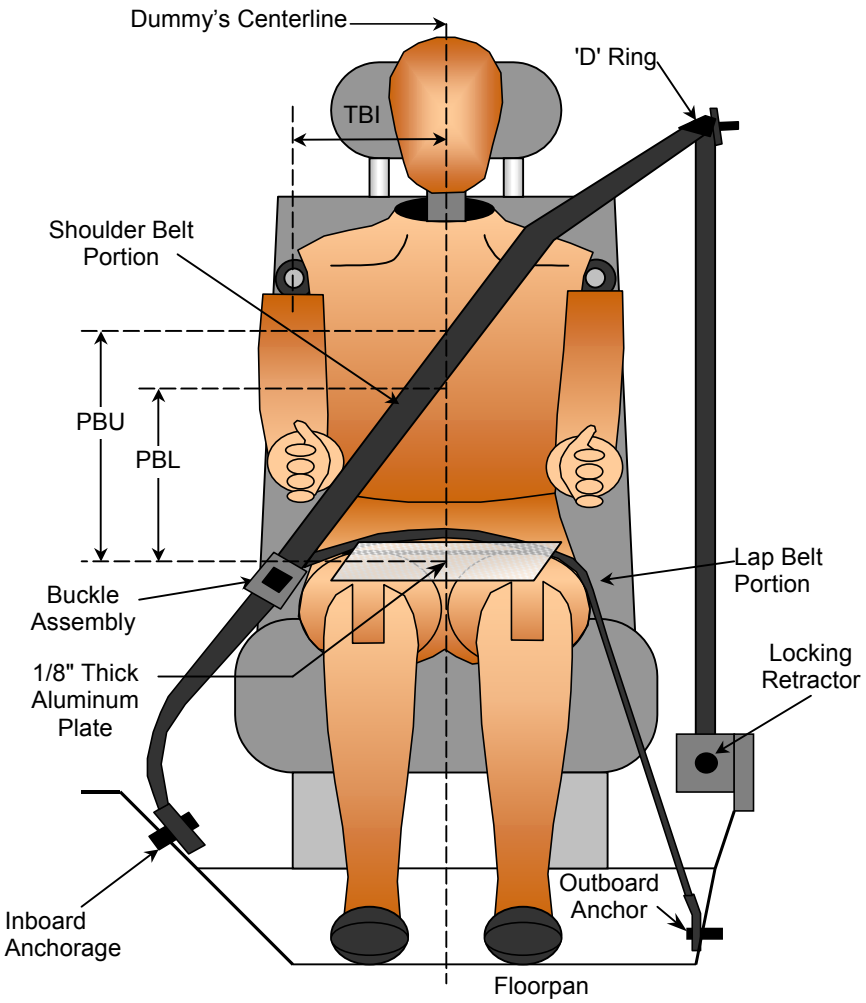
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		28.7		
SWA	Steering Wheel Angle		68.8		
SCA	Steering Column Angle		21.6		
SA	Seat Back Angle (on headrest post)		13.9		13.8
HZ	Head to Roof (Z)	207	90	198	90
HH	Head to Header	308	23.2	327	19.2
HW	Head to Windshield	564	0	566	0
HR	Head to Side Header (Y)	228		221	
NR	Nose to Rim	367	8.3		
CD	Chest to Dash	506		476	
CS	Chest to Steering Hub	292	0		
RA	Rim to Abdomen	174	0		
KDL	Left Knee to Dash	132	40.1	129	
KDR	Right Knee to Dash	119		134	35.3
PA	Pelvic Angle		24.1		22.8
TA	Tibia Angle		37.5		35.5
KK	Knee to Knee (Y)	298		272	
SK	Striker to Knee	842	94.2	875	95.0
ST	Striker to Head	533	40.8	546	37.6
SH	Striker to H-Point	527	116.2	505	113.9
SHY	Striker to H-Point (Y)	253		268	
HS	Head to Side Window	336		321	
HD	H-Point to Door (Y)	154		123	
AD	Arm to Door (Y)	122		116	
AA	Ankle to Ankle	300		240	

DATA SHEET NO. 6

SEAT BELT POSITIONING DATA

Test Vehicle: 2008 Ford Mustang Convertible
Test Program: 35mph Frontal Impact
NHTSA No.: M80207
Test Date: 9/13/2007



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	325	325
PBL - To surface of reference to belt lower edge	mm	245	245

DATA SHEET NO. 7

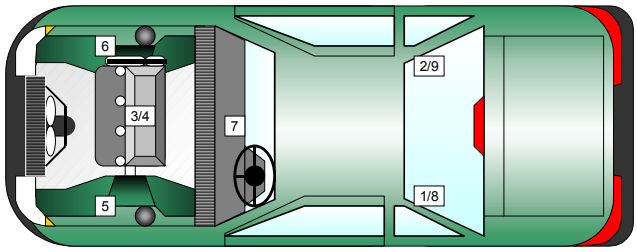
VEHICLE ACCELEROMETER LOCATIONS

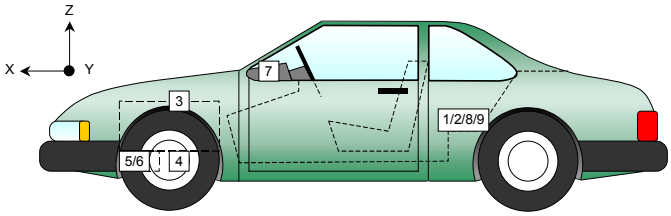
Test Vehicle: 2008 Ford Mustang Convertible
Test Program: 35mph Frontal Impact
NHTSA No.: M80207
Test Date: 9/13/2007

VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member X	1793	-312	421
2	Right Rear X-Member X	1789	315	415
3	Engine Top X	3764	0	973
4	Engine Bottom X	3535	20	261
5	Left Brake Caliper X	3679	-695	244
6	Right Brake Caliper X	3679	695	244
7	Instrument Panel X			
8	Left Rear X-Member Z	1793	-312	421
9	Right Rear X-Member Z	1789	315	415

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





DATA SHEET NO. 8

SUMMARY OF FMVSS 212 AND FMVSS 219 (Partial) DATA

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

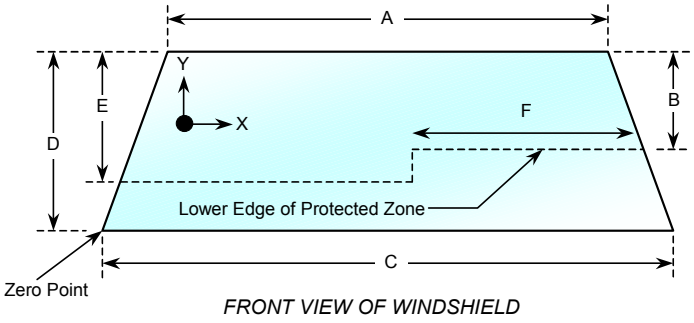
Windshield Mounting Details:
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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

Temperature of windshield molding during test: 21°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2116	2116	100
Right Side	2116	2116	100
Total	4232	4232	100



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1235
B	mm	319
C	mm	1549
D	mm	724
E	mm	333
F	mm	604

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. 9

SUMMARY OF FMVSS 301 DATA

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21° C Test Time: 10:07 am

Stoddard Solvent Spillage Measurements

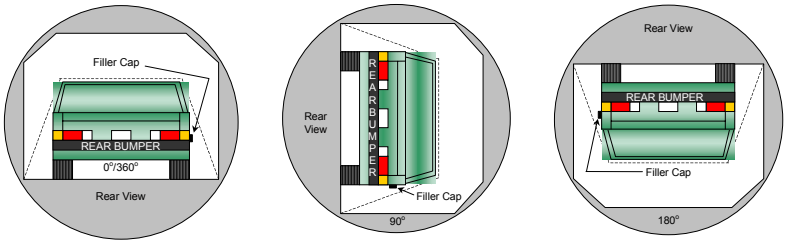
A. From impact until vehicle motion ceases: 0 oz.
(Maximum Allowable = 1 ounce)

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

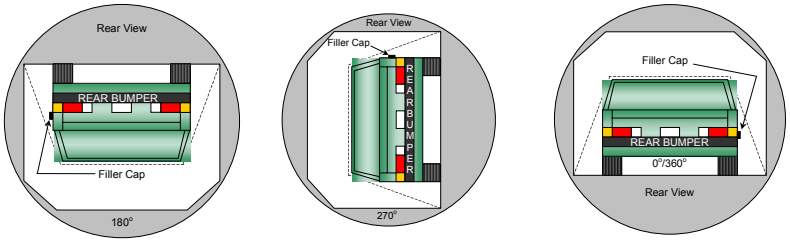
C. For the following 25 minutes: 0 oz.
(Maximum Allowable = 1 oz. /minute)

D. Spillage: None

FMVSS 301 STATIC ROLLOVER DATA



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°	118	300	0
90° to 180°	104	300	0
180° to 270°	109	300	0
270° to 360°	117	300	0

DATA SHEET NO. 10

VEHICLE MEASUREMENTS

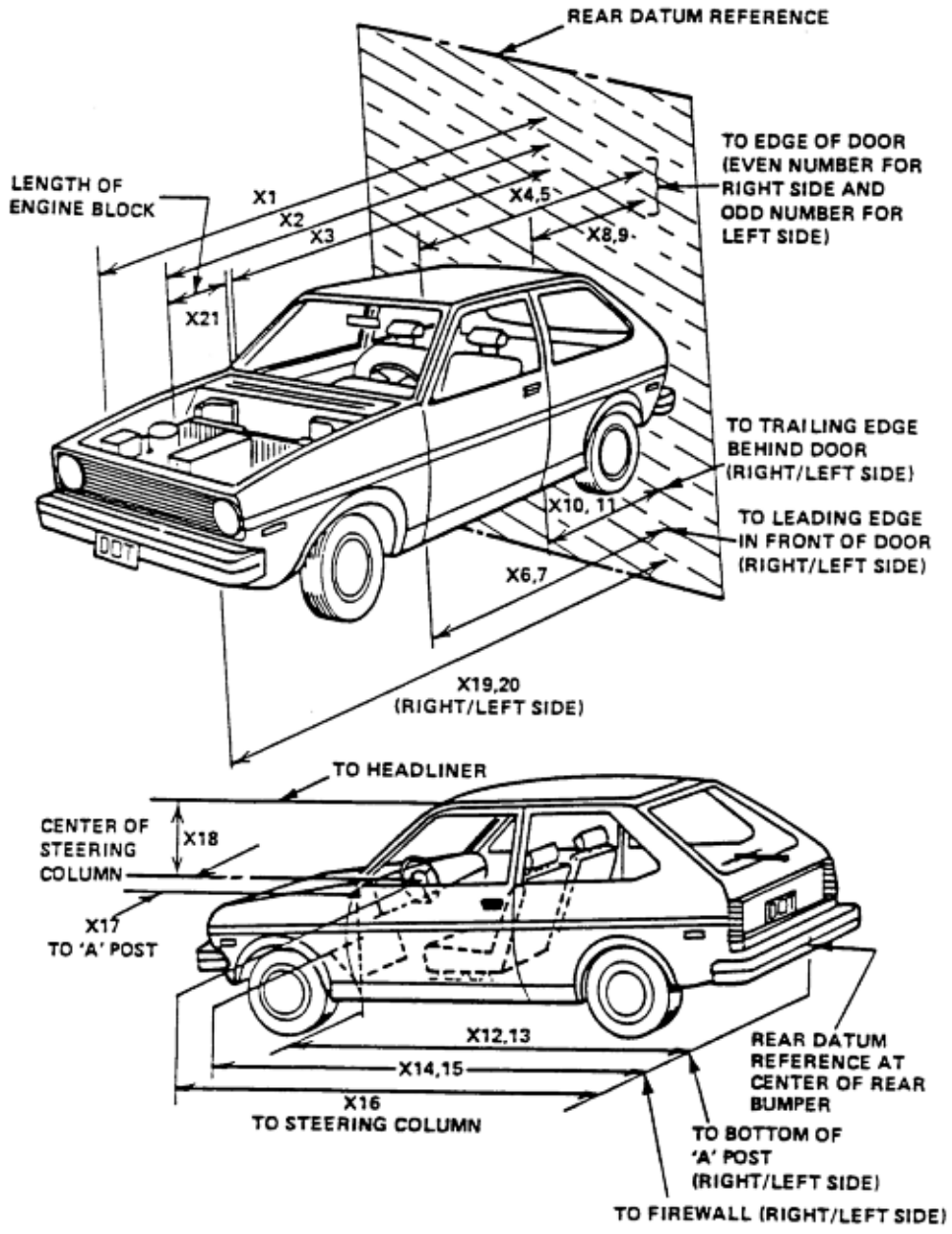
Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	4727	4286	441
2	RSOV to front of engine	mm	3995	3802	193
3	RSOV to firewall centerline	mm	3439	3433	6
4	RSOV to leading edge of right door	mm	3014	3009	5
5	RSOV to leading edge of left door	mm	3012	3019	-7
6	RSOV to lower leading edge of right door	mm	2984	2984	0
7	RSOV to lower leading edge of left door	mm	2987	2992	-5
8	RSOV to upper leading edge of right door	mm	1734	1719	15
9	RSOV to upper leading edge of left door	mm	1722	1733	-11
10	RSOV to lower trailing edge of right door	mm	1871	1869	2
11	RSOV to lower trailing edge of left door	mm	1866	1879	-13
12	RSOV to bottom of right 'A' pillar	mm	2935	2939	-4
13	RSOV to bottom of left 'A' pillar	mm	2946	2951	-5
14	RSOV to firewall on right side	mm	3342	3302	40
15	RSOV to firewall on left side	mm	3353	3338	15
16	RSOV to steering column	mm	2656	2612	44
17	Center of steering column to left 'A' pillar	mm	359	348	11
18	Center of steering column to headlining	mm	400	402	-2
19	RSOV to right side of front bumper	mm	4610	4219	391
20	RSOV to left side of front bumper	mm	4611	4259	352
21	Length of engine block	mm	362	362	0
RD	RSOV to right side of dash panel	mm	2826	2823	3
CD	RSOV to center of dash panel	mm	2819	2792	27
LD	RSOV to left side of dash panel	mm	2817	2820	-3

DATA SHEET NO. 10... (continued)

VEHICLE MEASUREMENTS

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007



DATA SHEET NO. 10... (continued)

VEHICLE MEASUREMENTS

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

Target Vehicle Structural Measurement

	Elements	Pre-Test (mm)
1	Total Length	4727
2	Total Width	1822
3	Bumper Top Height	521
4	Bumper Bottom Height	416
5	Longitudinal Member Top Height	510
6	Distance between Longitudinal Members	969
7	Longitudinal Member Width	88
8	Engine Top Height	935
9	Engine Bottom Height	230
10	Engine and gearbox width	362
11	Front bumper-engine distance	527
12	Front shock absorber fixing height	908
13	Bonnet leading edge height	784
14	Front shock absorber fixing width	1095
15	Front bumper – front axle distance	928
16	Front axle – a pillar distance	725
17	A-pillar – B-pillar distance	1235
18	B-Pillar – rear axle distance	765
19	B-pillar – C-pillar distance	---
20	Roof sill bottom height	1210
21	Roof sill top height	1320
22	Floor sill bottom height	154
23	Floor sill top height	325

DATA SHEET NO. 11

CAMERA LOCATIONS

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

No.	Camera View	Location (mm) *			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View				13	24
2	Left Driver Half	1440	-4750	1210	24	1000
3	Steering Column Top	1180	-5030	1200	25	1000
4	Steering Column Bottom	1185	-5035	1180	25	1000
5	Driver Close-up	1450	-5830	1250	35	1000
6	Driver Angle	7020	-5400	2120	50	1000
7	On board Driver Side					
8	On board Passenger Side					
9	Right Overall	2200	7120	1280	24	1000
10	Right Passenger Half	1350	5280	1100	24	1000
11	Right Close-up	1520	6100	1460	35	1000
12	Right Angle	6980	5200	2200	50	1000
13	Windshield	-285	0	2860	12.5	1000
14	Top Driver	-135	-470	2180	24	1000
15	Top Passenger	-110	420	2180	24	1000
16	Pit Front	1205	0	-3150	24	1000
17	Pit Rear	3200	0	-3150	24	1000

*COORDINATES:

+X = forward of impact plane
+Y = right of monorail centerline
+Z = above ground level

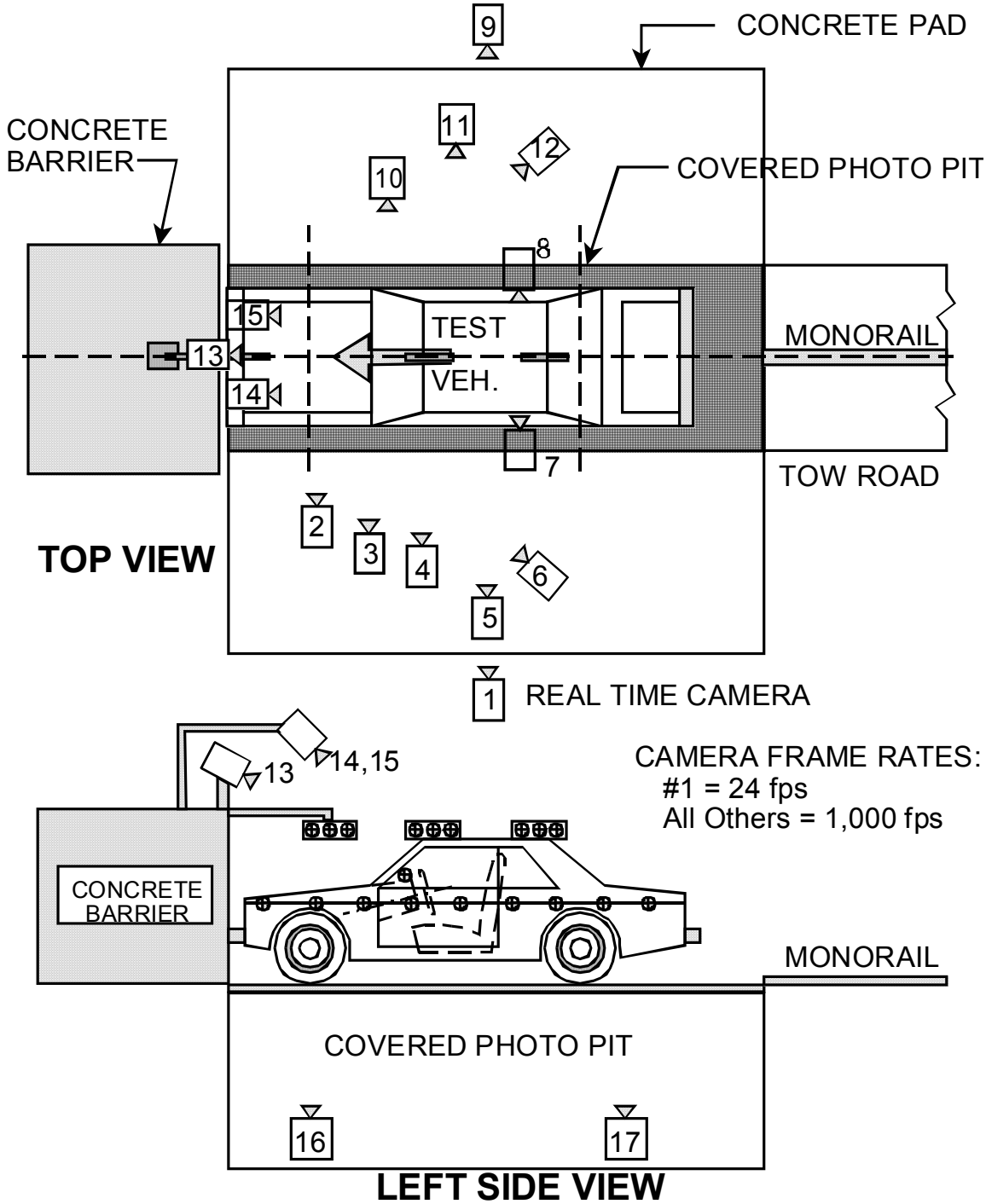
Cameras 7 & 8 were not used for this test.

DATA SHEET NO. 11... (continued)

CAMERA LOCATIONS

Test Vehicle:	2008 Ford Mustang Convertible	NHTSA No.:	M80207
Test Program:	35mph Frontal Impact	Test Date:	9/13/2007

CAMERA POSITIONS FOR FRONTAL IMPACTS



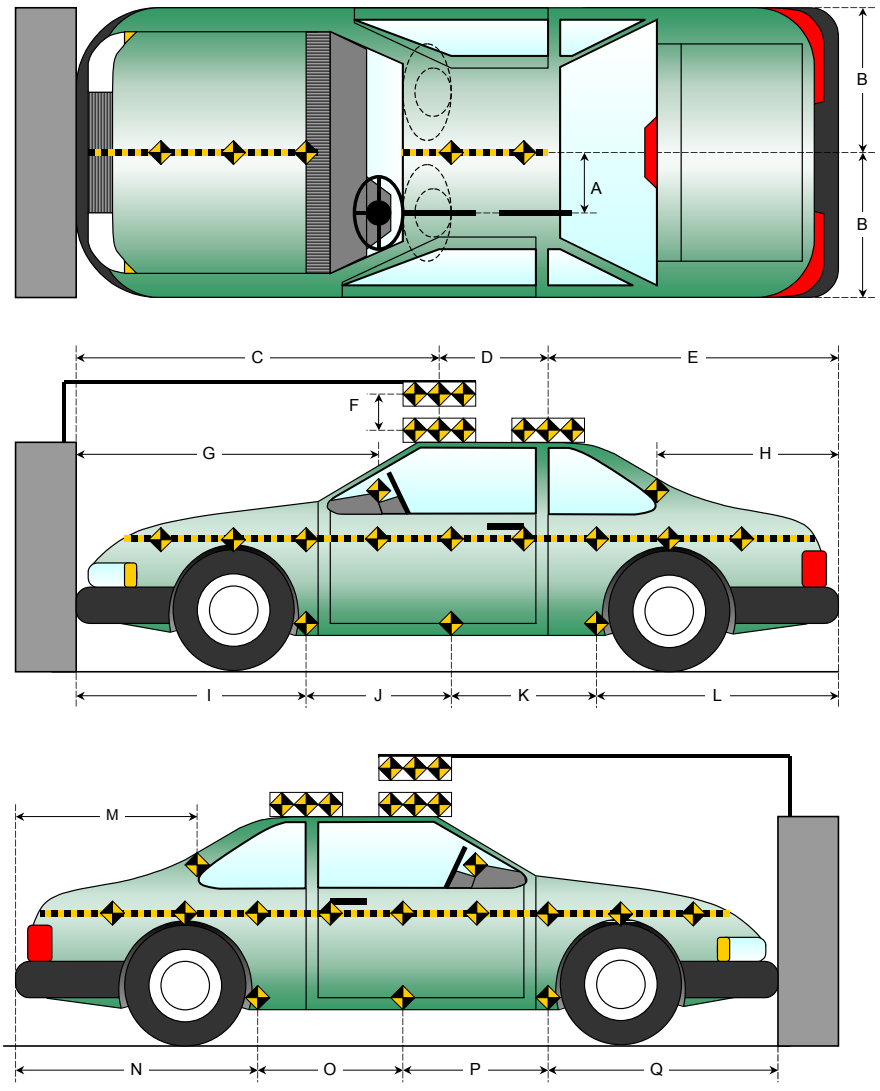
DATA SHEET NO. 12

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2008 Ford Mustang Convertible
Test Program: 35mph Frontal Impact

NHTSA No.: M80207
Test Date: 9/13/2007

Item	Value
A	
B	911
C	
D	
E	
F	
G	
H	
I	1400
J	896
K	898
L	1533
M	
N	1547
O	894
P	891
Q	1395



DATA SHEET NO. 13

VEHICLE INTRUSION MEASUREMENTS

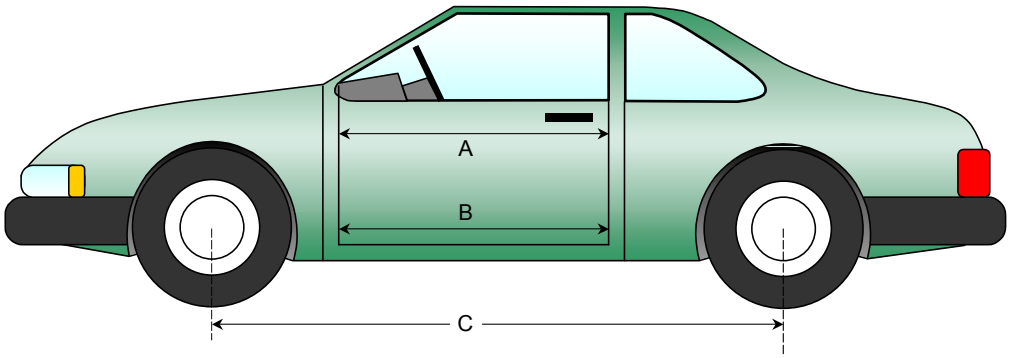
Test Vehicle: 2008 Ford Mustang Convertible
Test Program: 35mph Frontal Impact
NHTSA No.: M80207
Test Date: 9/13/2007

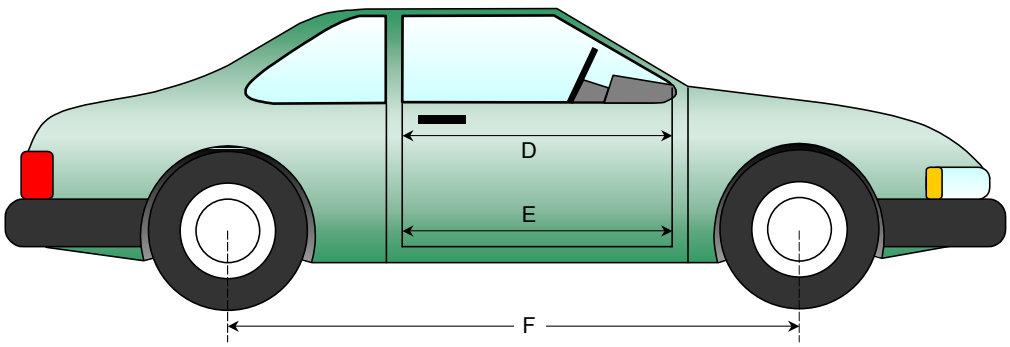
DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1203	1200	3
B	Left Side Lower	mm	1021	1022	-1
D	Right Side Upper	mm	1204	1191	13
E	Right Side Lower	mm	1022	1021	1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2718	2629	89
F	Right Side Wheelbase	mm	2717	2622	95





DATA SHEET NO. 13... (continued)

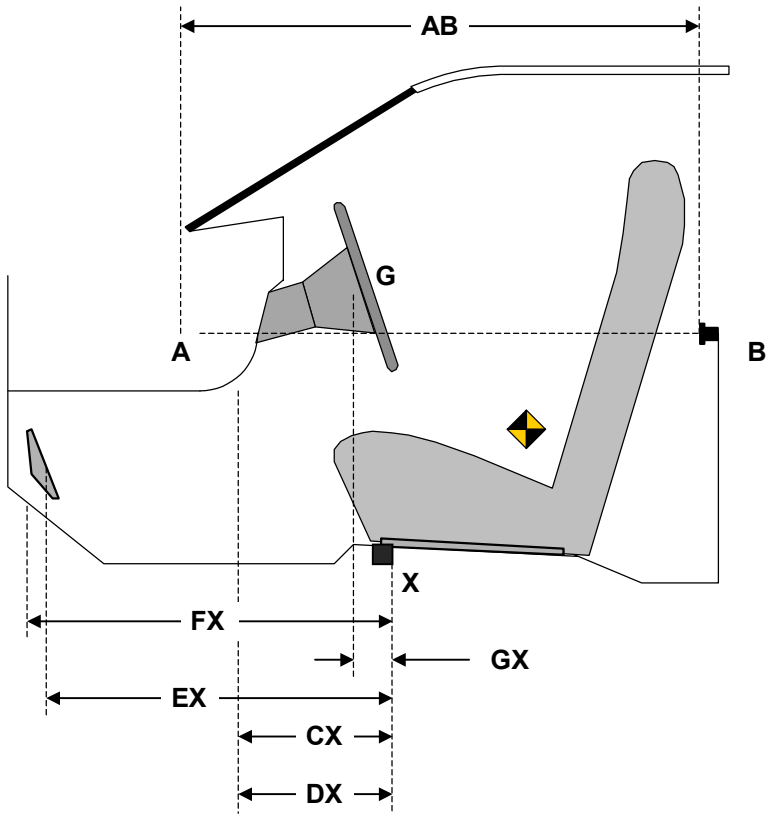
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	1016	1019	-3
CX	Left Knee Bolster to X	mm	262	257	5
DX	Right Knee Bolster to X	mm	252	239	13
EX	Brake Pedal to X	mm	585	530	52
FX	Foot Rest to X	mm	618	582	36
GX	Center of Steering Column Wheel Hub to X	mm	45	26	19

X = Front of Seat Track (stationary)

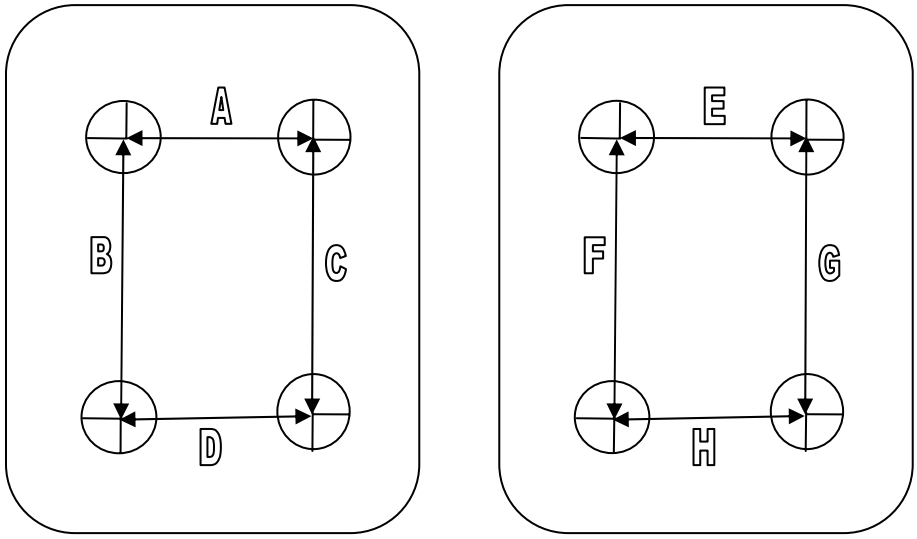


DRIVER COMPARTMENT

DATA SHEET NO. 13... (continued)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007



Driver Passenger

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	318	314	4
B	310	310	0
C	290	290	0
D	318	318	0
E	318	316	2
F	313	313	0
G	312	310	2
H	300	298	2

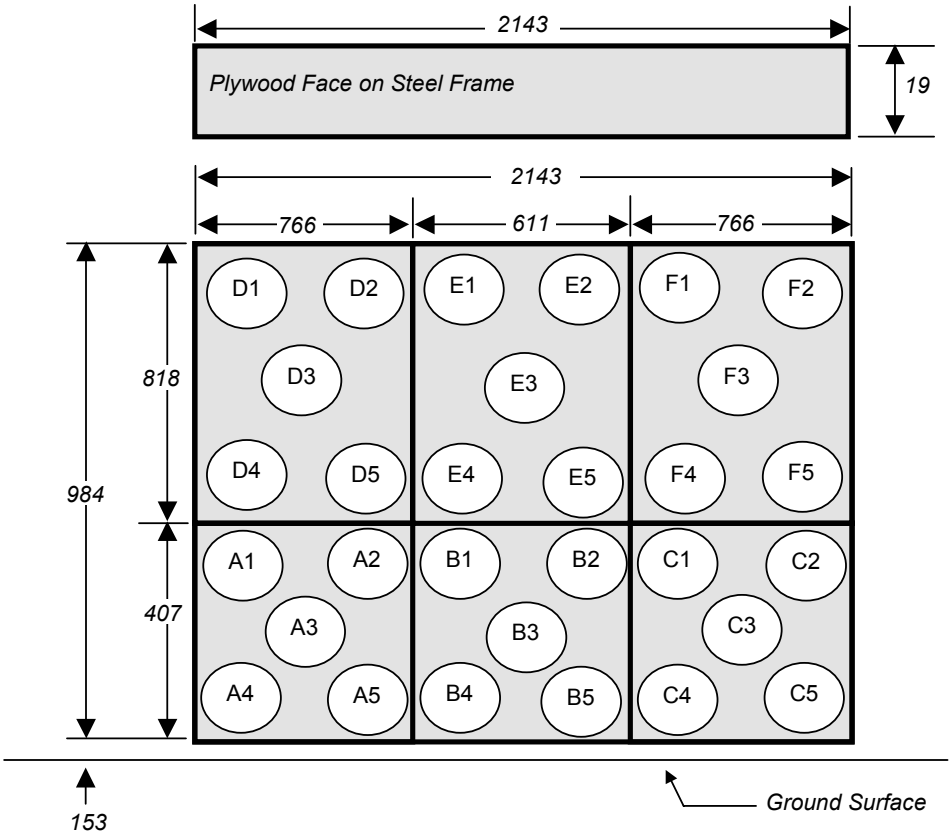
DATA SHEET NO. 14

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

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

DATA SHEET NO. 15

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2008 Ford Mustang Convertible NHTSA No.: M80207
Test Program: 35mph Frontal Impact Test Date: 9/13/2007

VEHICLE INFORMATION

VIN: 1ZVHT84N785101174 Wheelbase (mm) : 2718
Vehicle Size Category: Convertible Test Weight (kg) : 1782.2

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 12
Cal. Procedure/Interval: MGA procedure / 6 month
Integration Algorithm: Trapezoidal Linearity: > 99%
Impact Velocity (km/h): 56.3
Velocity Change (km/h): 64.4 Time of Separation (msec): 192

CRUSH PROFILE

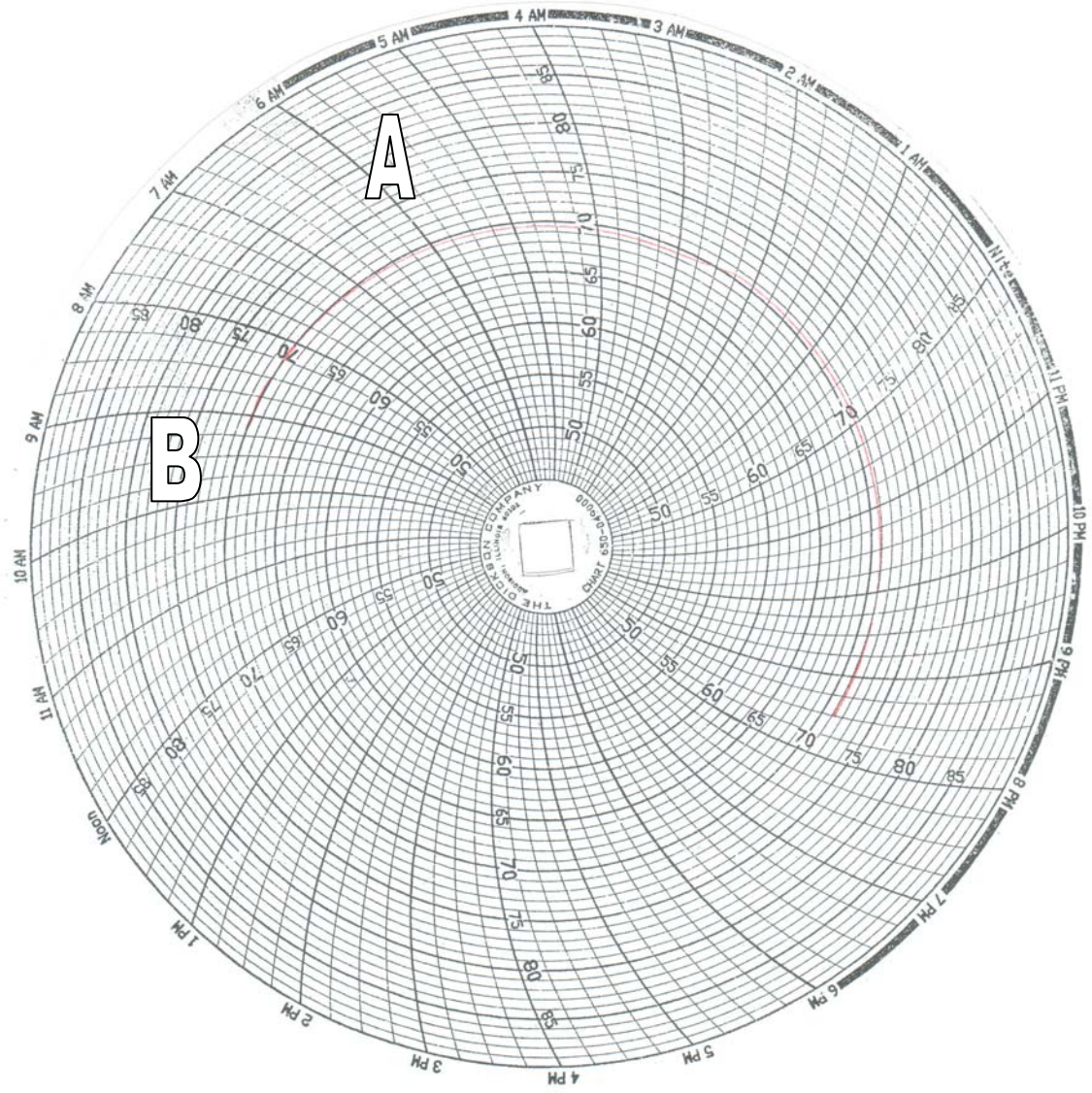
Collision Deformation Classification: Frontal Midpoint of Damage: Centerline
Damage Region Length (mm): 1260 Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	Mm	4610	4259	351
C2	Crush zone 2 at left side	mm	4668	4271	397
C3	Crush zone 3 at left side	mm	4703	4277	426
C4	Crush zone 4 at right side	mm	4704	4272	432
C5	Crush zone 5 at right side	mm	4673	4252	421
C6	Crush zone 6 at right side	mm	4611	4219	392
L	C1 TO C6	mm	1145	1142	3

DATA SHEET NO. 16

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle:	2008 Ford Mustang Convertible	NHTSA No.:	M80207
Test Program:	35mph Frontal Impact	Test Date:	9/13/2007



A = Dummies installed in vehicle at 6:00 am

B = Test conducted at 10:07 pm

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Load Cell Location

Manufacturer's Label

Tire Placard

Left Front ¾ View, As Received

Right Rear ¾ View, As Received

Pre-Test Front View

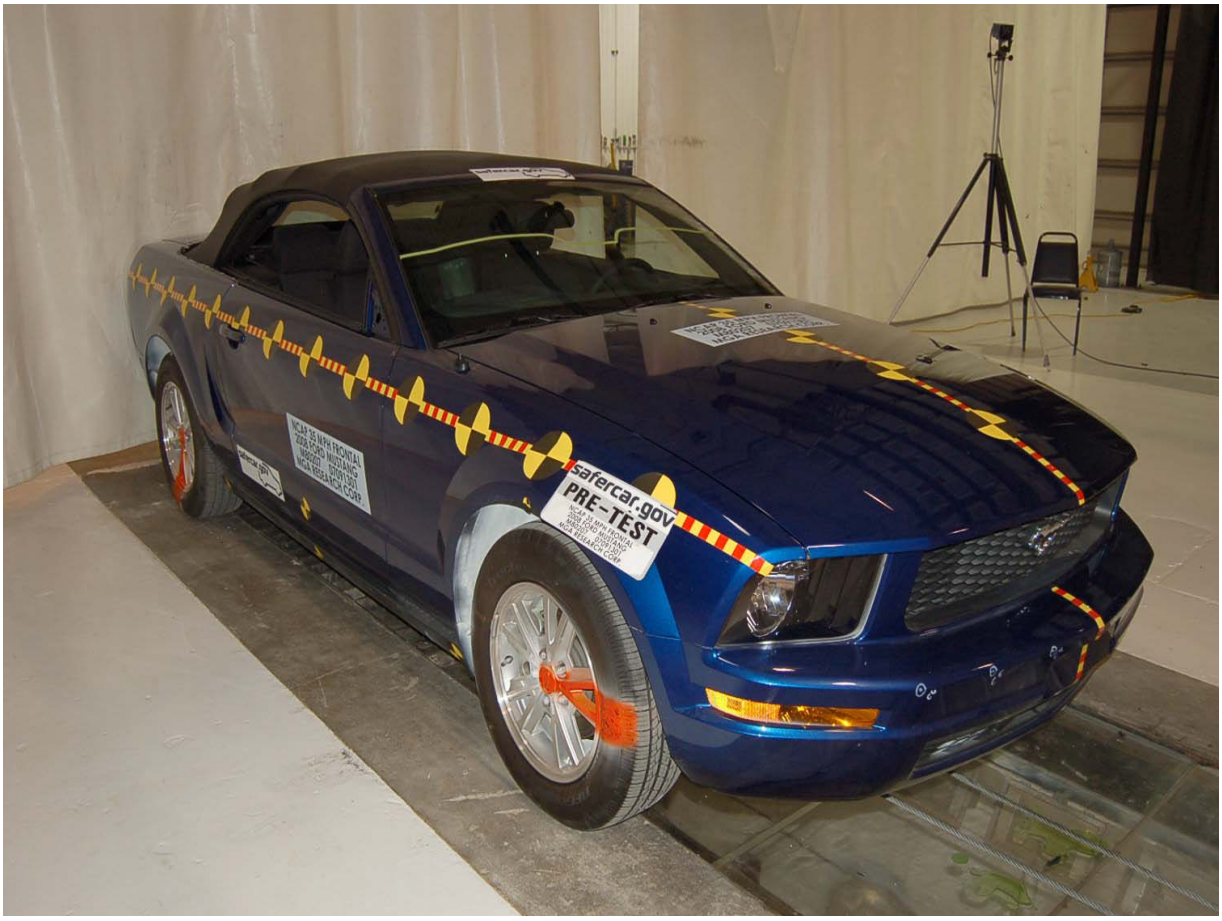
Post-Test Front View

Pre-Test Left Side View

Post-Test Left Side View

Pre-Test Right Side View

Post-Test Right Side View



Pre-Test Right Front ¾ View

Post-Test Right Front ¾ View

Pre-Test Left Rear ¾ View

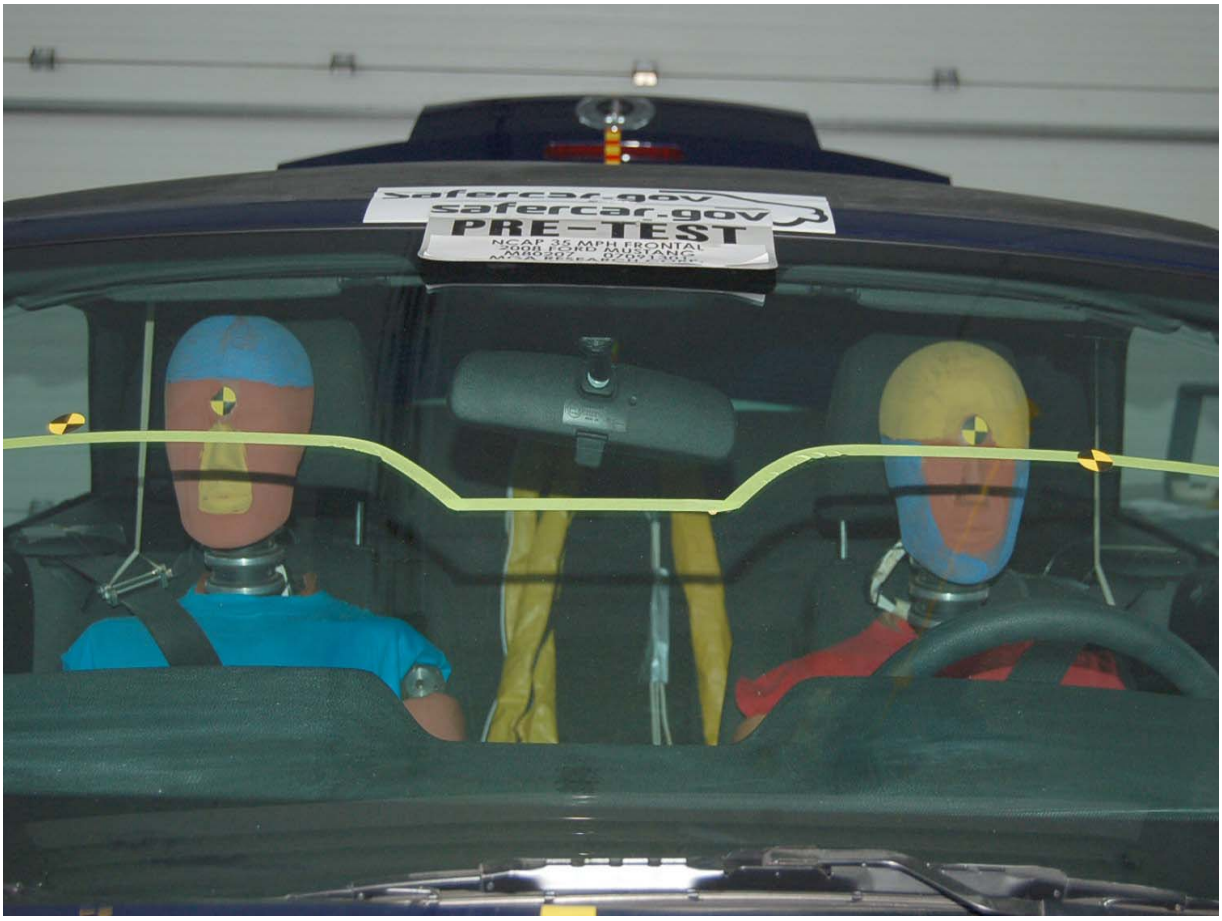
Post-Test Left Rear ¾ View

Pre-Test Left Side ¾ View of Doors

Post-Test Left Side ¾ View of Doors After Impact

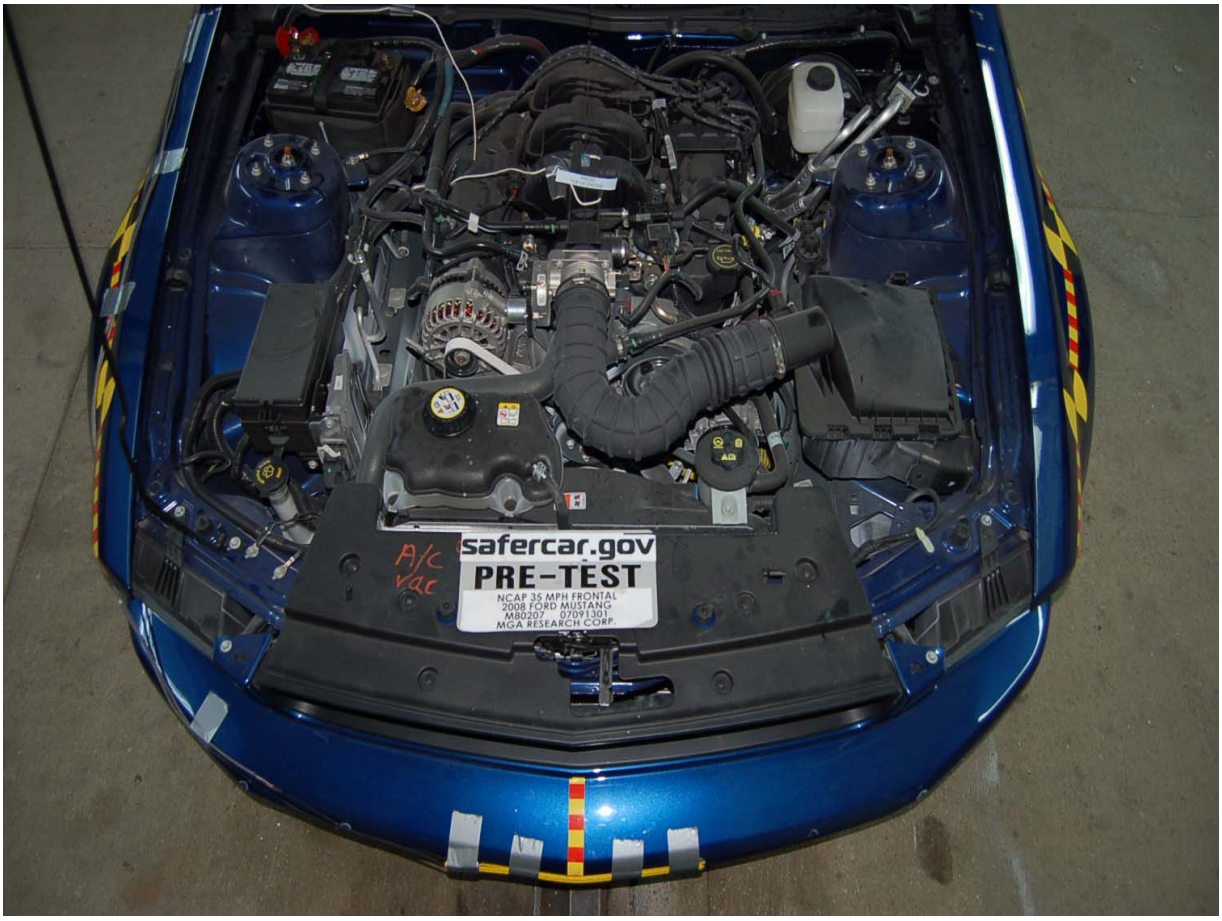
Pre-Test Right Side ¾ View of Doors

Post-Test Right Side ¾ View of Doors After Impact

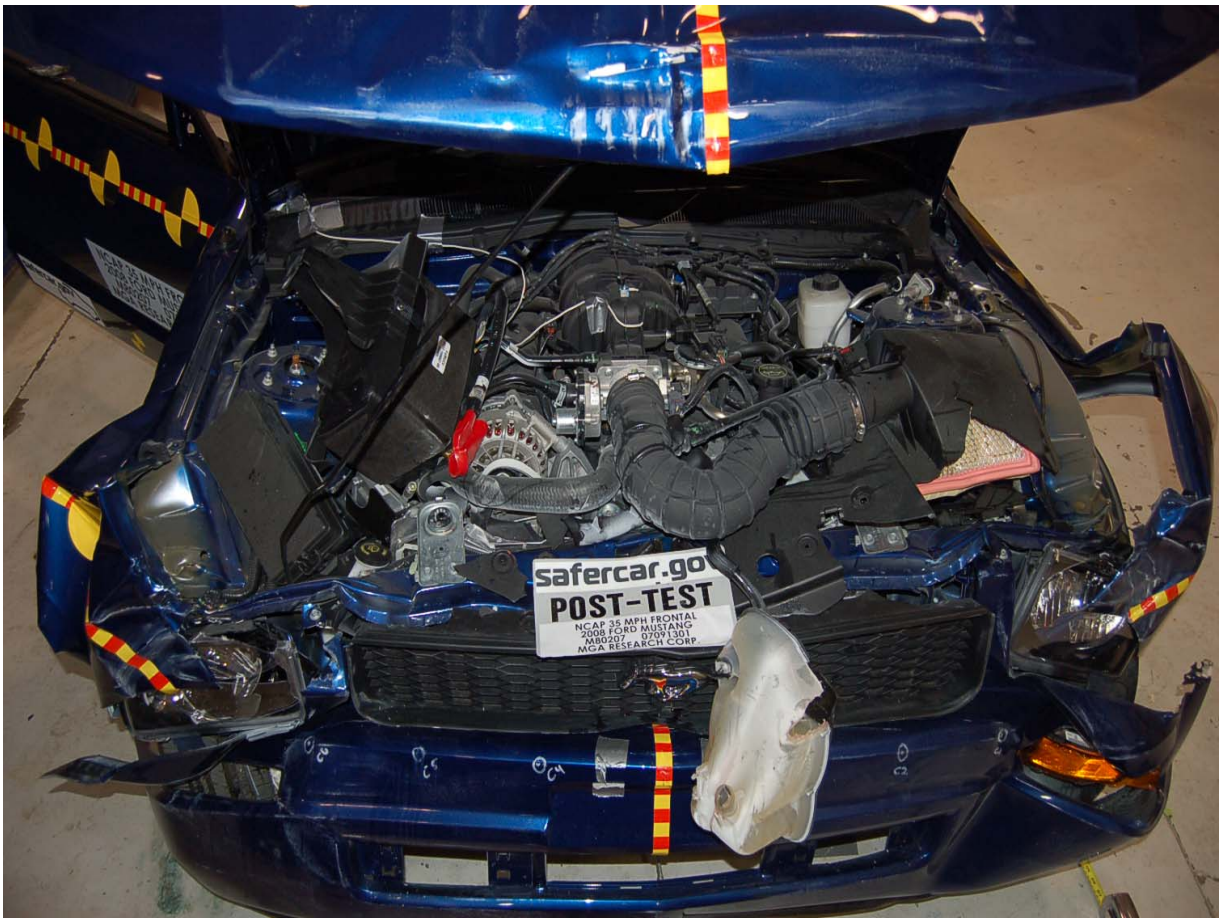


Pre-Test Windshield View

Post-Test Windshield View



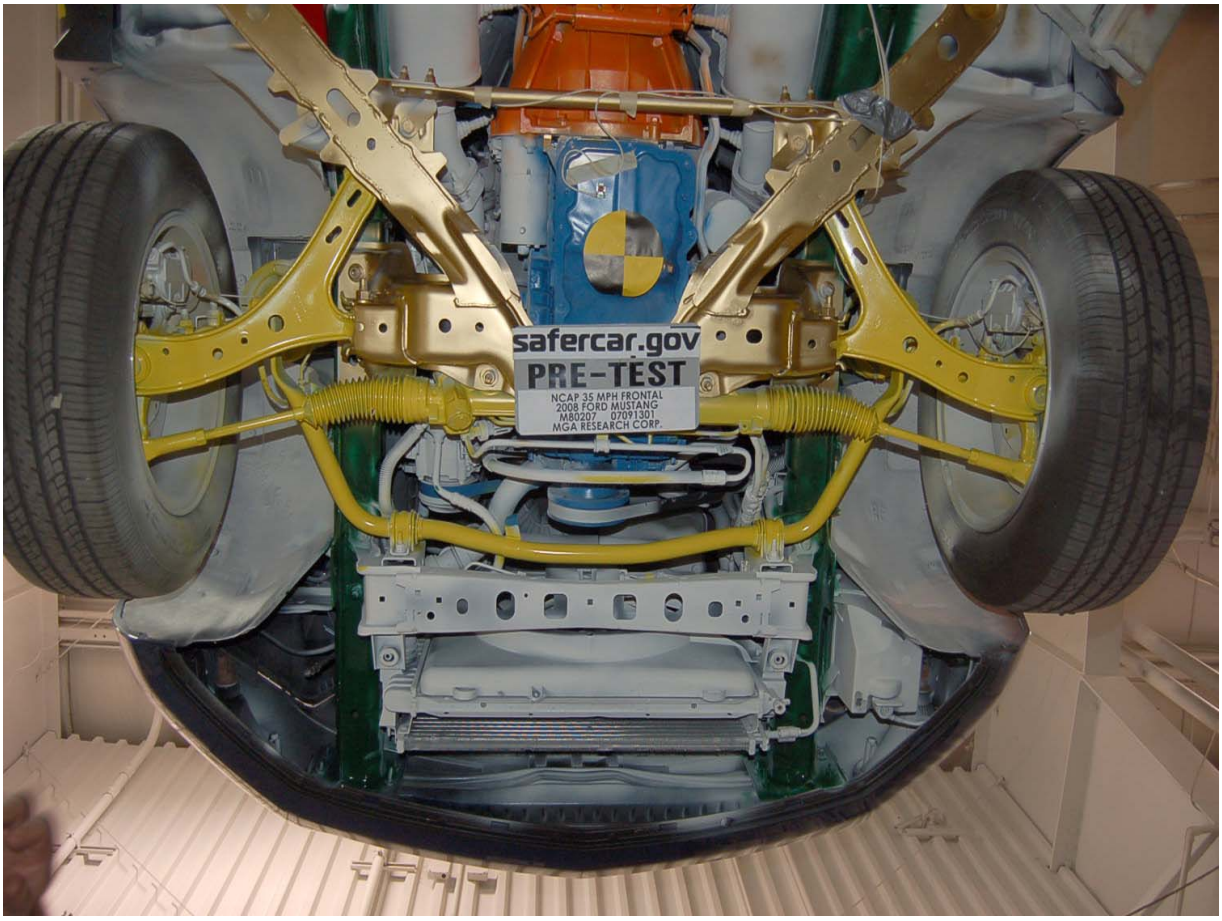
Pre-Test Engine Compartment View



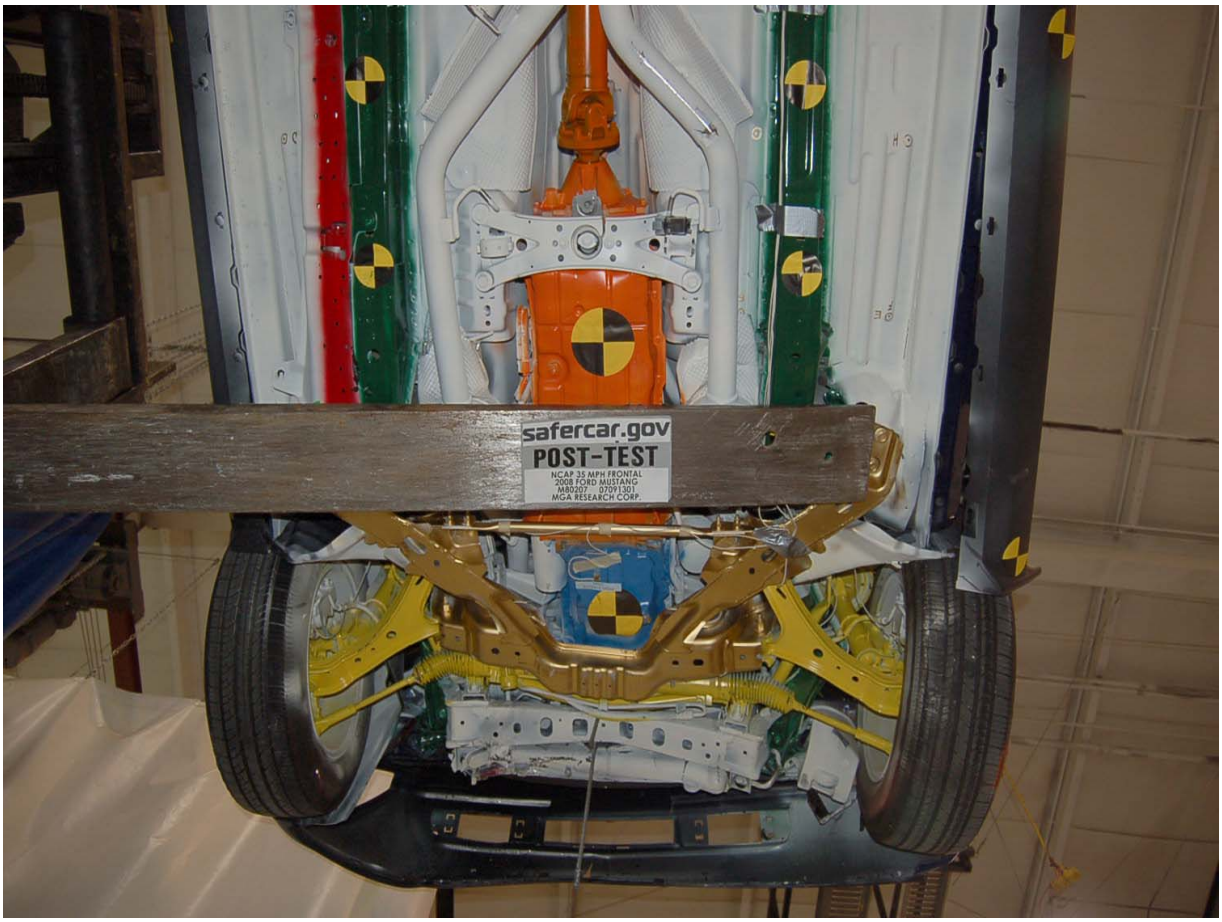
Post-Test Engine Compartment View

Pre-Test Fuel Cap View

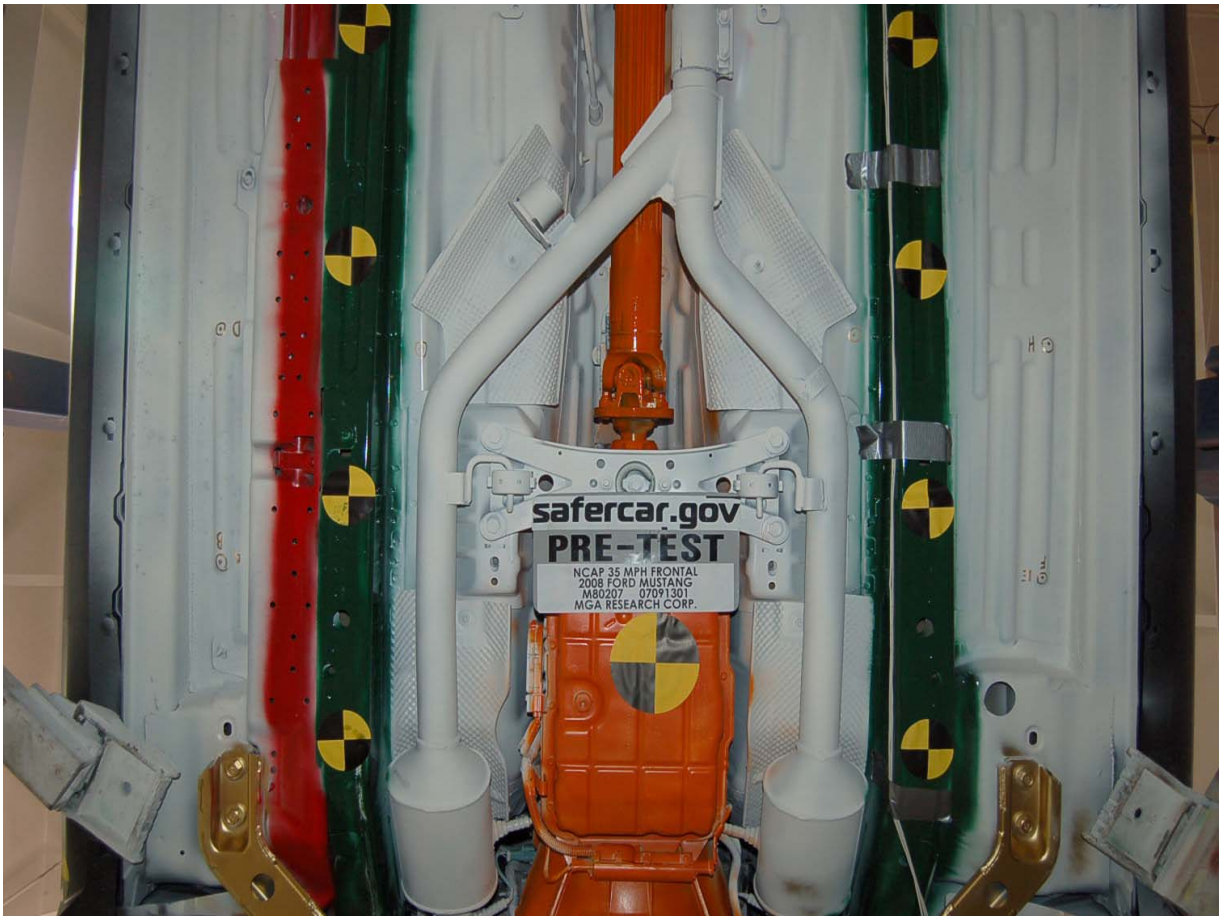
Post-Test Fuel Cap View



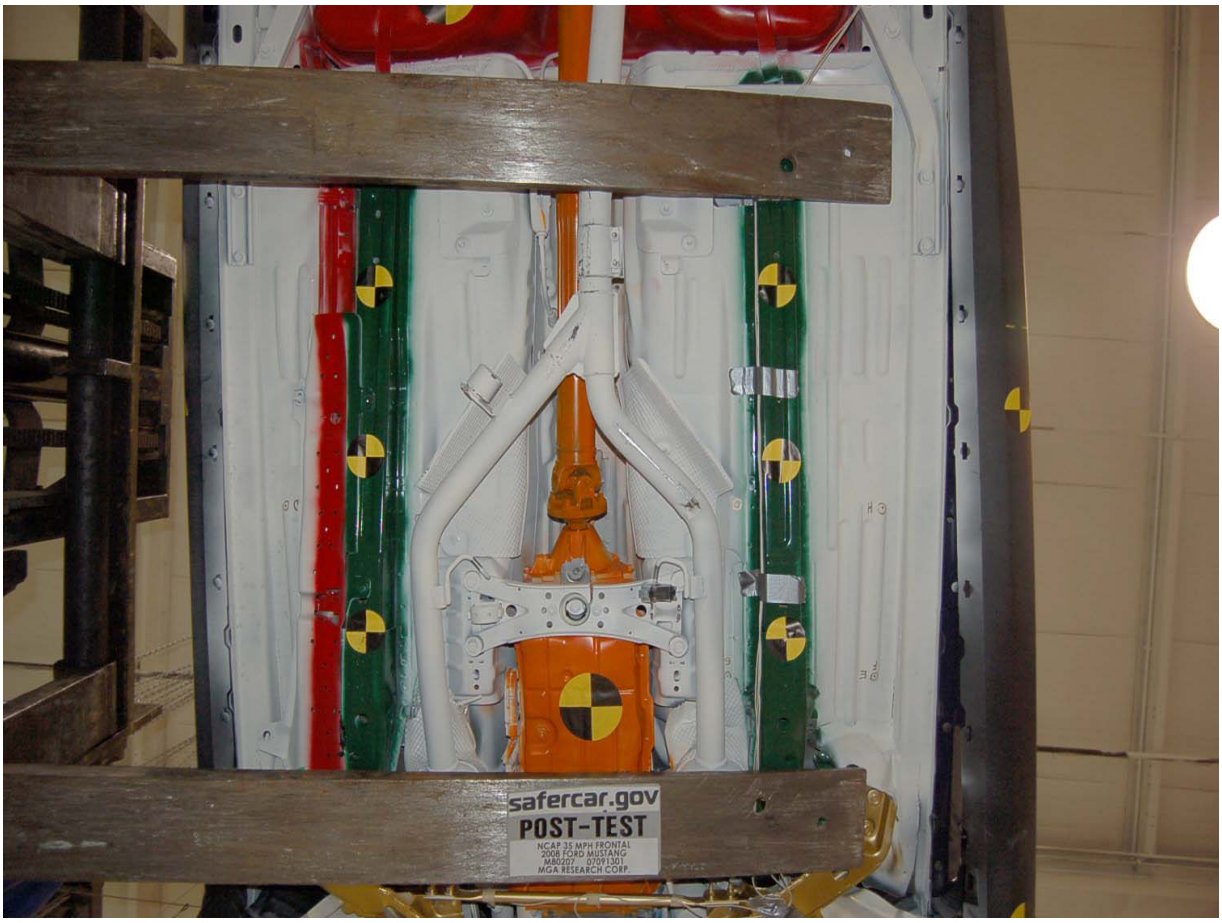
Pre-Test Front Underbody View



Post-Test Front Underbody View

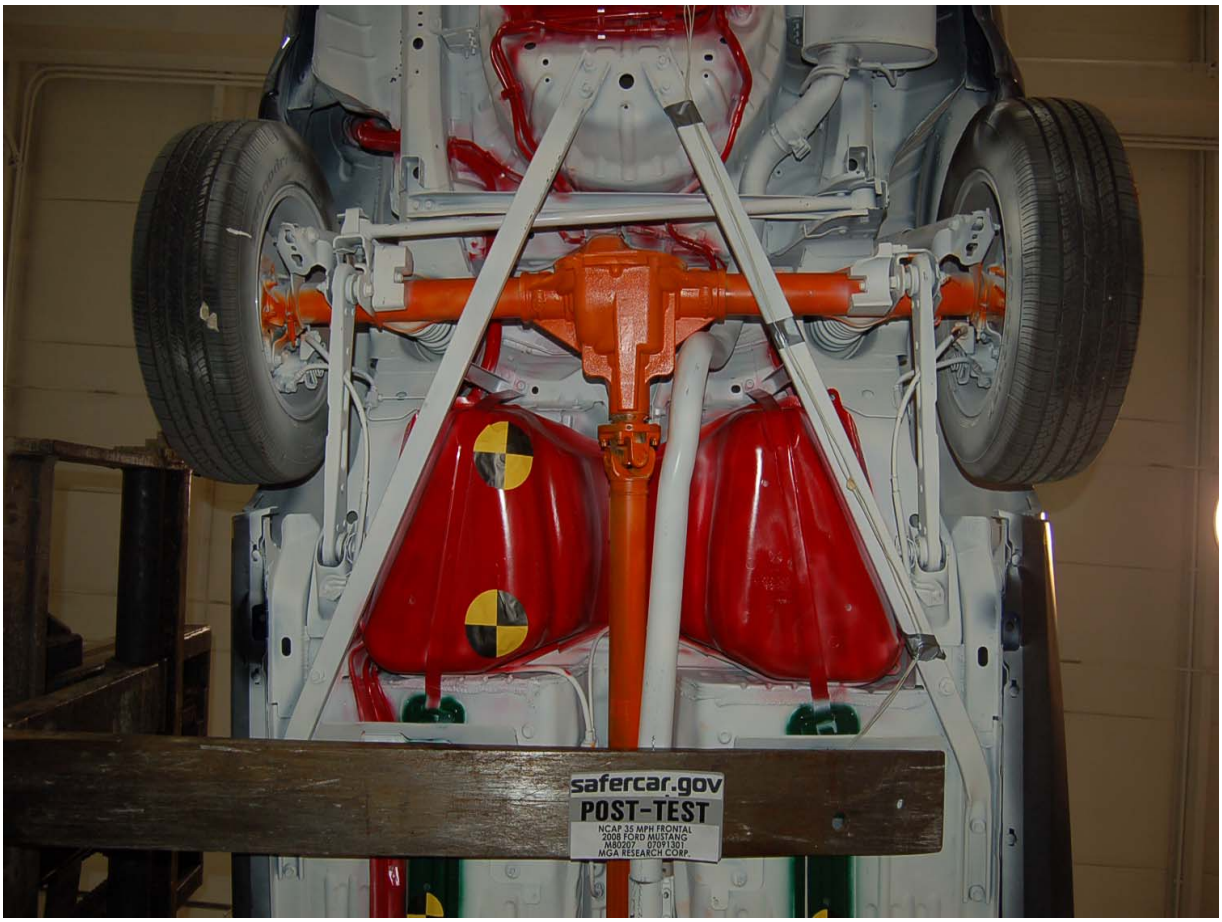


Pre-Test Mid Front Underbody View

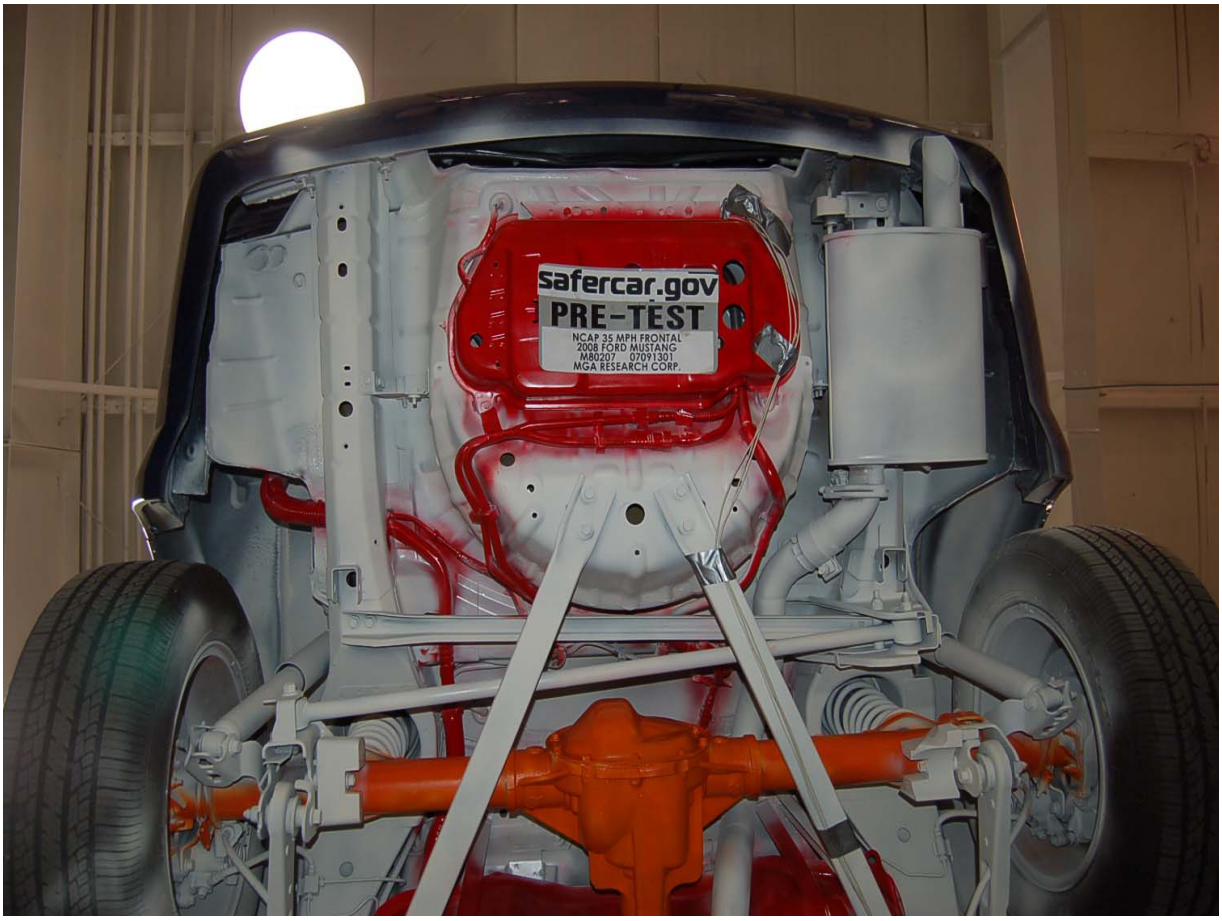


Post-Test Mid Front Underbody View

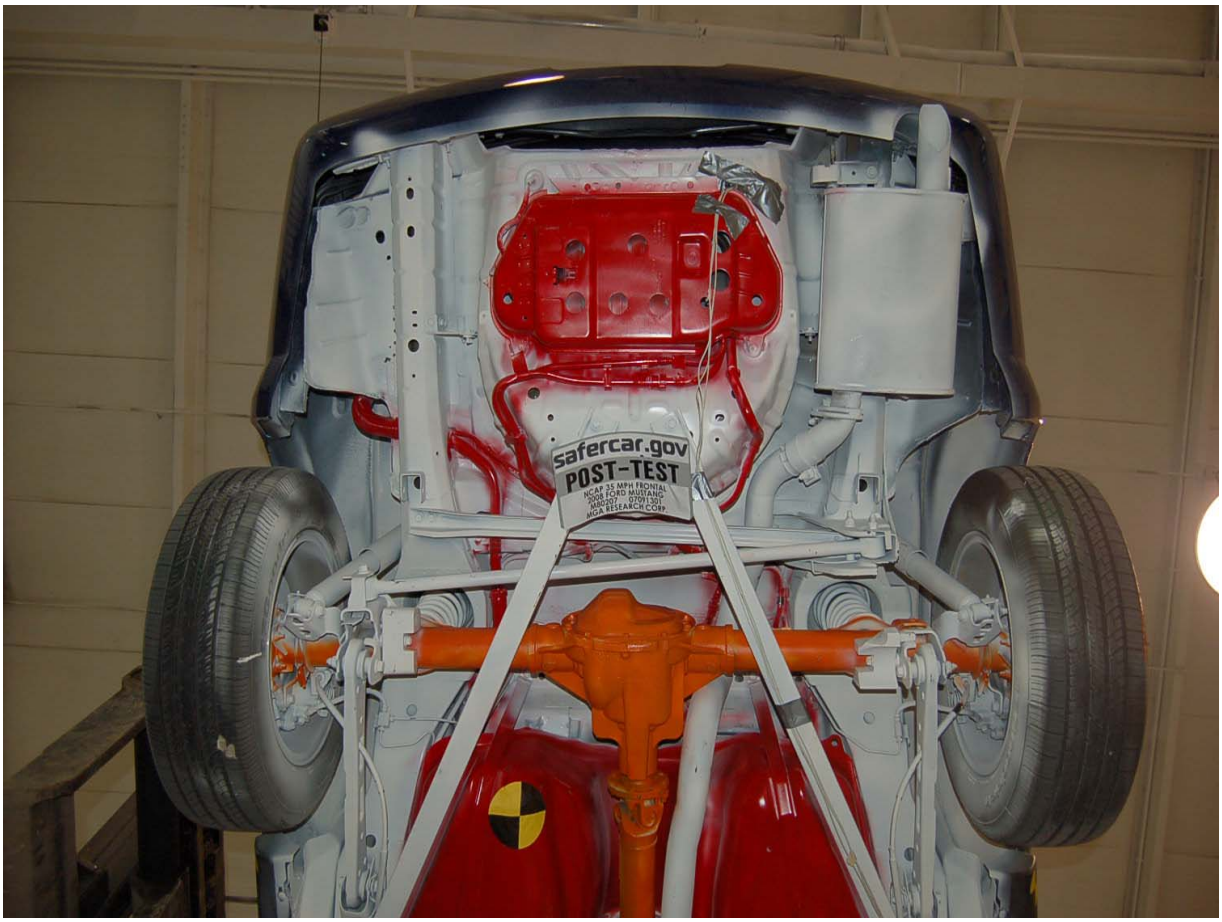
Pre-Test Mid Rear Underbody View



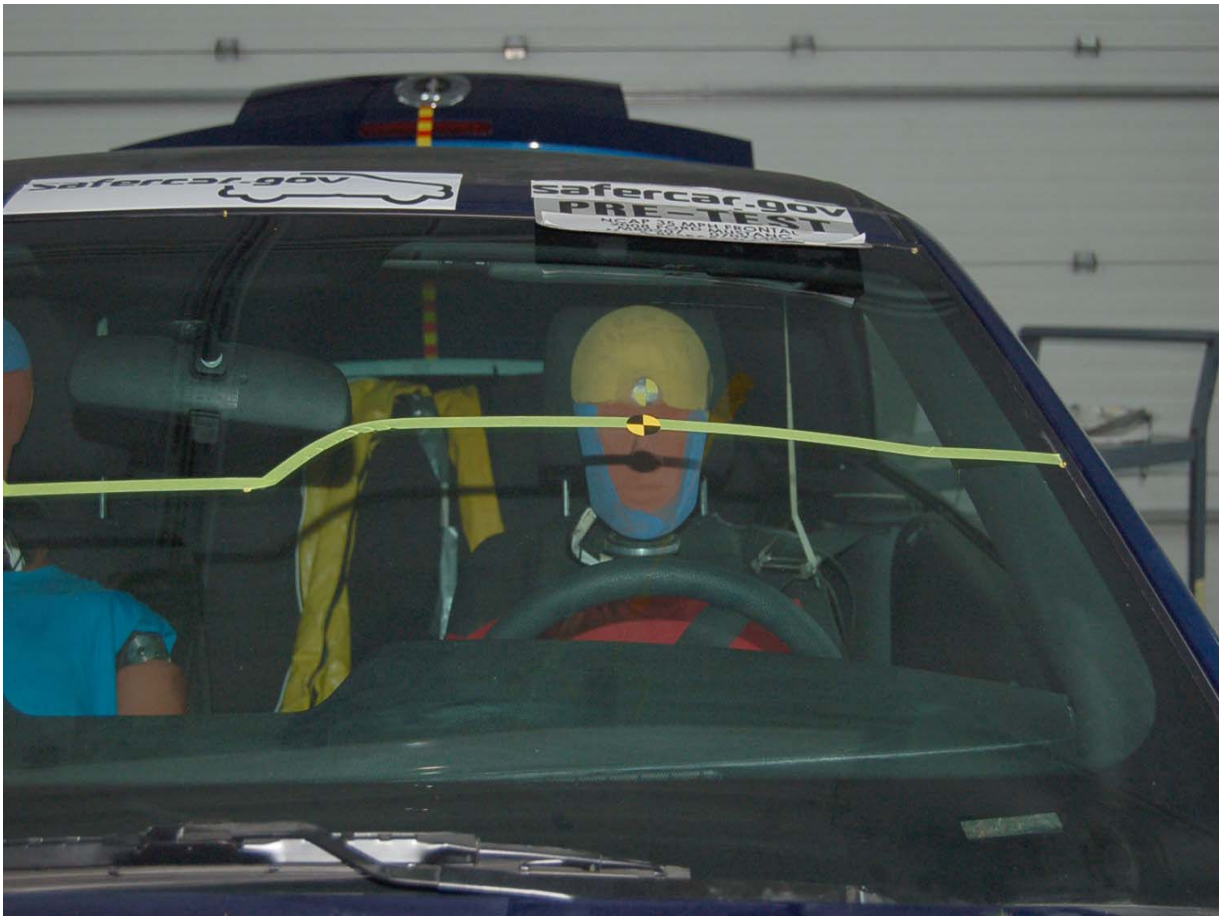
Post-Test Mid Rear Underbody View



Pre-Test Rear Underbody View



Post-Test Rear Underbody View



Pre-Test Driver Dummy Front View (Head Position)

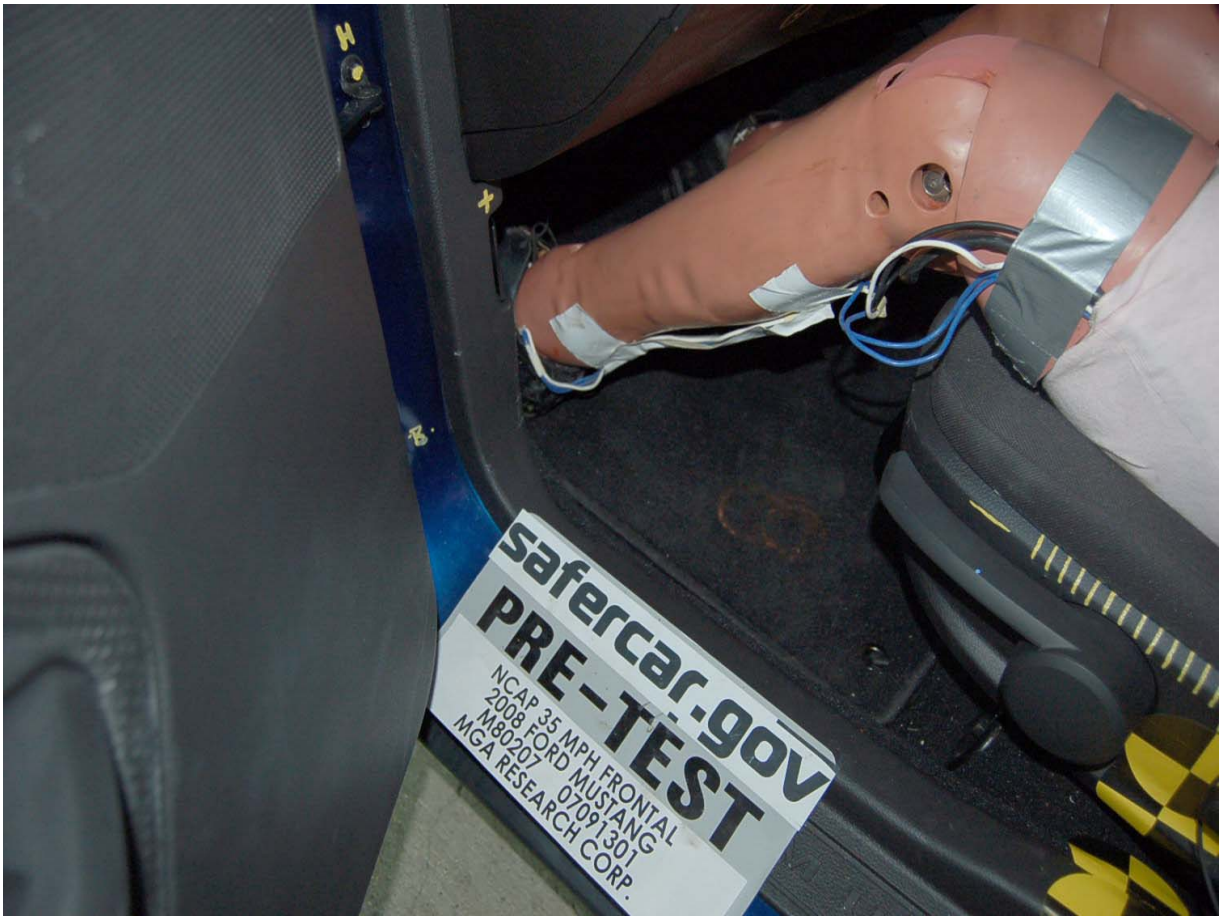
Post-Test Driver Dummy Front View (Head Position)

Pre-Test Driver Dummy (Through Window)

Post-Test Driver Dummy (Through Window)

Pre-Test Driver Dummy (Door Open)

Post-Test Driver Dummy (Door Open)



Pre-Test Driver Dummy Feet

Post-Test Driver Dummy Feet

Pre-Test Driver Side Knee Bolster

Post-Test Driver Side Knee Bolster

Pre-Test Driver Side Floor Pan

Post-Test Driver Side Floor Pan

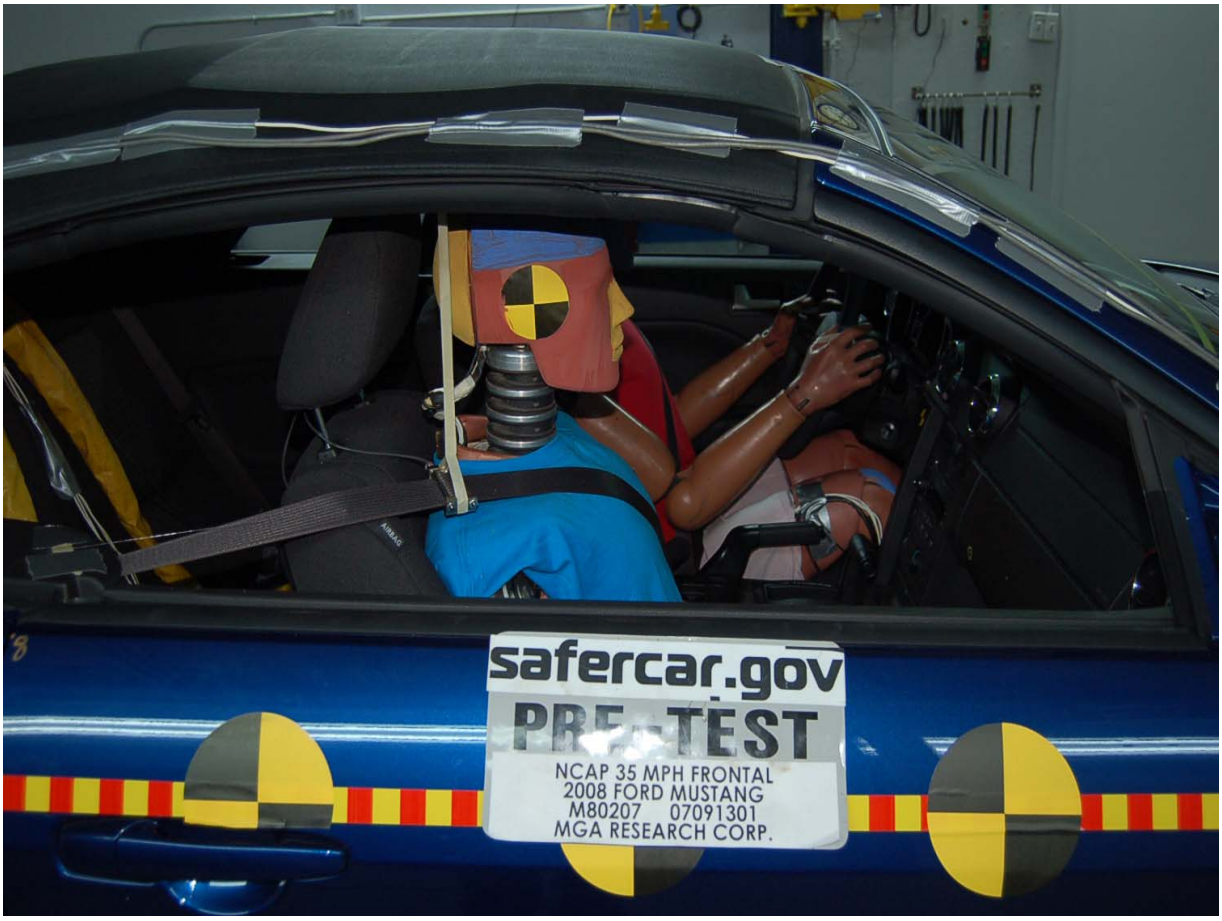
Post-Test Driver Dummy Head Contact (headrest)

Post-Test Driver Dummy Knee Contact

Post-Test Driver Dummy Airbag Contact

Pre-Test Passenger Dummy Front View (Head Position)

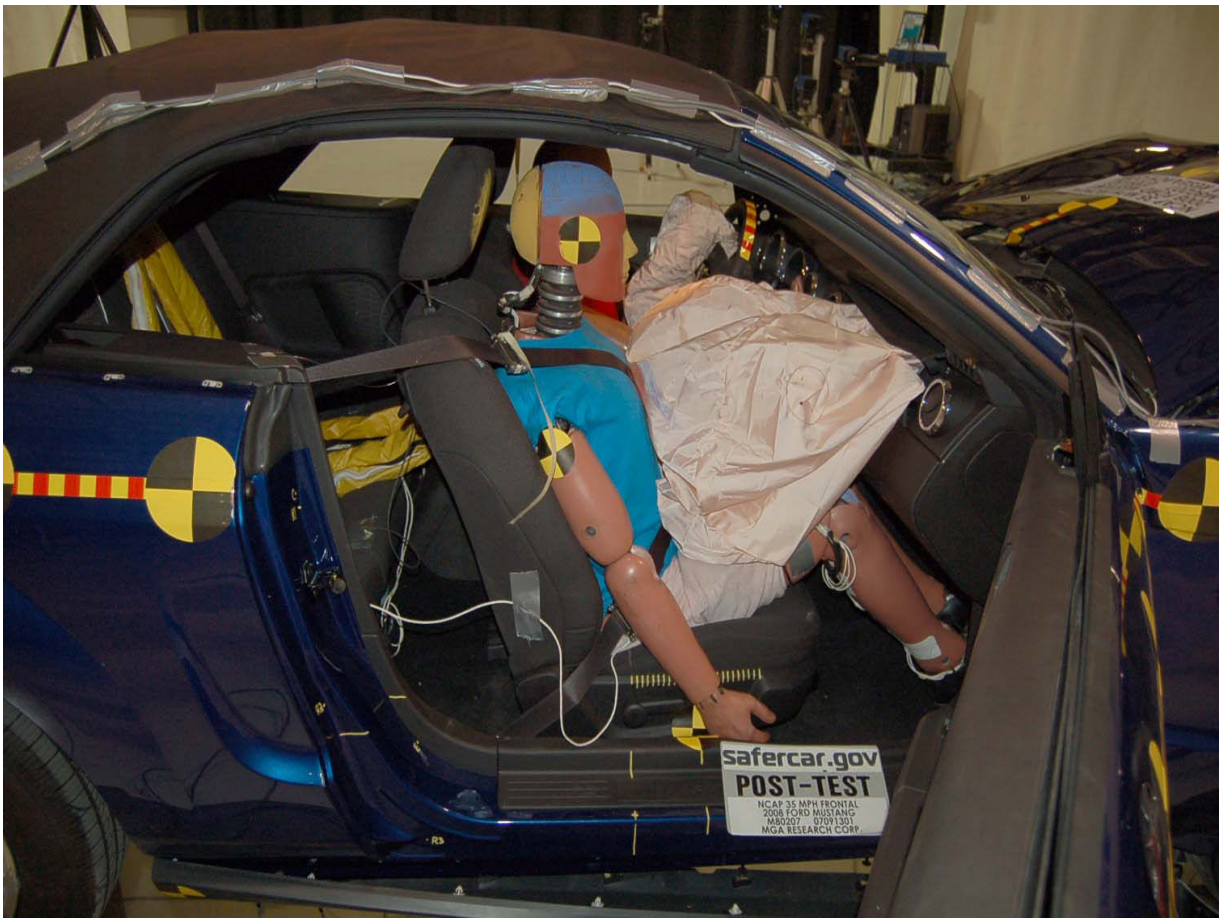
Post-Test Passenger Dummy Front View (Head Position)



Pre-Test Passenger Dummy (Through Window)

Post-Test Passenger Dummy (Through Window)

Pre-Test Passenger Dummy (Door Open)



Post-Test Passenger Dummy (Door Open)

Pre-Test Passenger Dummy Feet

Post-Test Passenger Dummy Feet

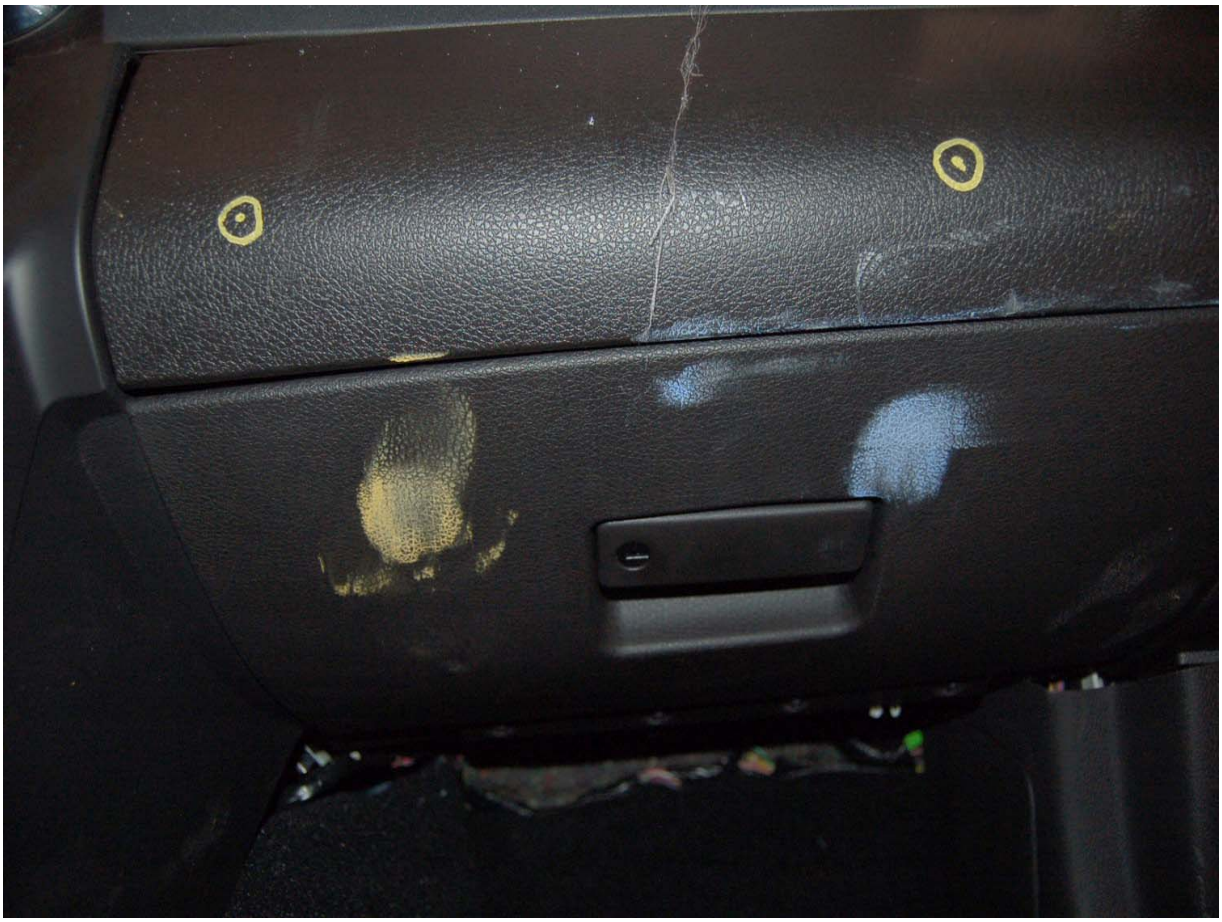
Pre-Test Passenger Side Glove Box

Post-Test Passenger Side Glove Box

Pre-Test Passenger Side Floor Pan

Post-Test Passenger Side Floor Pan

Post-Test Passenger Dummy Head Contact (headrest)



Post-Test Passenger Dummy Knee Contact

Post-Test Passenger Dummy Airbag Contact

Rollover 90 Degrees

Rollover 180 Degrees

Rollover 270 Degrees

Rollover 360 Degrees

Vehicle Impact

APPENDIX B

DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

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

Driver Head X Redundant

Driver Head Y Redundant

Driver Head Z Redundant

Driver Upper Neck Force X

Driver Upper Neck Force Y

Driver Upper Neck Force Z

Driver Upper Neck Moment X

Driver Upper Neck Moment Y

Driver Upper Neck Moment Z

Driver Chest X Redundant

Driver Chest Y Redundant

Driver Chest Z Redundant

Driver Chest Displacement

Driver Pelvis X

Driver Pelvis Y

Driver Pelvis Z

Driver Shoulder Belt Force

Driver Lap Belt Force

Driver Left Upper Tibia Moment X

Driver Left Upper Tibia Moment Y

Driver Left Upper Tibia Force Z

Driver Left Lower Tibia Moment X

Driver Left Lower Tibia Moment Y

Driver Left Lower Tibia Force Z

Driver Right Upper Tibia Moment X

Driver Right Upper Tibia Moment Y

Driver Right Upper Tibia Force Z

Driver Right Lower Tibia Moment X

Driver Right Lower Tibia Moment Y

Driver Right Lower Tibia Force Z

Driver Left Foot Fore Z

Driver Left Foot Aft X

Driver Left Foot Aft Z

Driver Right Foot Fore Z

Driver Right Foot Aft X

Driver Right Foot Aft Z

Passenger Head X Redundant

Passenger Head Y Redundant

Passenger Head Z Redundant

Passenger Upper Neck Force X

Passenger Upper Neck Force Y

Passenger Upper Neck Force Z

Passenger Upper Neck Moment X

Passenger Upper Neck Moment Y

Passenger Upper Neck Moment Z

Passenger Chest X Redundant

Passenger Chest Y Redundant

Passenger Chest Z Redundant

Passenger Chest Displacement

Passenger Pelvis X

Passenger Pelvis Y

Passenger Pelvis Z

Passenger Shoulder Belt Force

Passenger Lap Belt Force

Passenger Left Upper Tibia Moment X

Passenger Left Upper Tibia Moment Y

Passenger Left Upper Tibia Force Z

Passenger Left Lower Tibia Moment X

Passenger Left Lower Tibia Moment Y

Passenger Left Lower Tibia Force Z

Passenger Right Upper Tibia Moment X

Passenger Right Upper Tibia Moment Y

Passenger Right Upper Tibia Force Z

Passenger Right Lower Tibia Moment X

Passenger Right Lower Tibia Moment Y

Passenger Right Lower Tibia Force Z

Passenger Left Foot Fore Z

Passenger Left Foot Aft X

Passenger Left Foot Aft Z

Passenger Right Foot Fore Z

Passenger Right Foot Aft X

Passenger Right Foot Aft Z

Left Rear Seat Crossmember X

Left Rear Seat Crossmember Z

Right Rear Seat Crossmember X

Right Rear Seat Crossmember Z

Vehicle Engine Top X

Vehicle Engine Bottom X

Vehicle Left Brake Caliper X

Vehicle Right Brake Caliper X

Barrier Force – Upper Left

Barrier Force – Upper Center

Barrier Force – Upper Right

Barrier Force – Lower Left

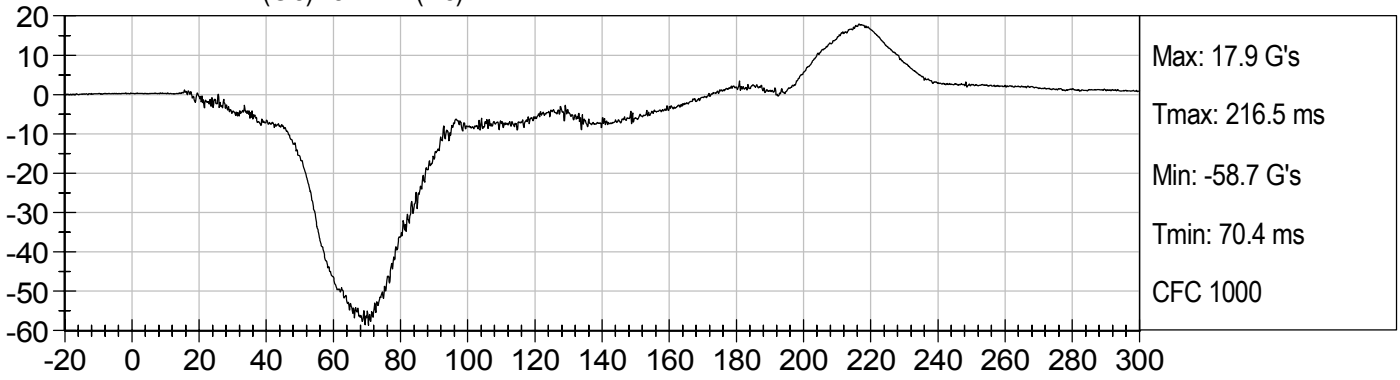
Barrier Force – Lower Center

Barrier Force – Lower Right

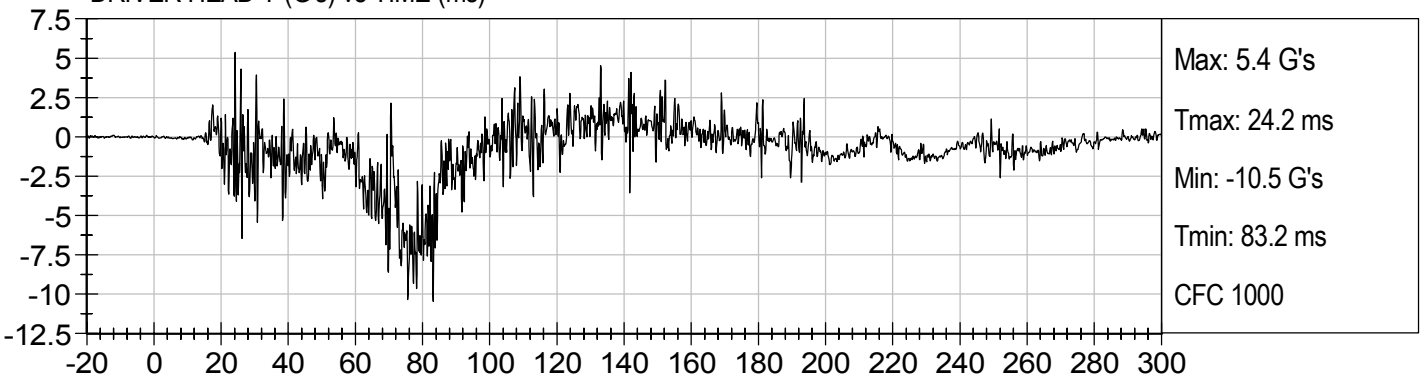
35 MPH NCAP FRONTAL
2008 FORD MUSTANG CONVERTIBLE M80207

Test Date: 09/13/2007
Speed: 35.0 mph (56.3 km/h)

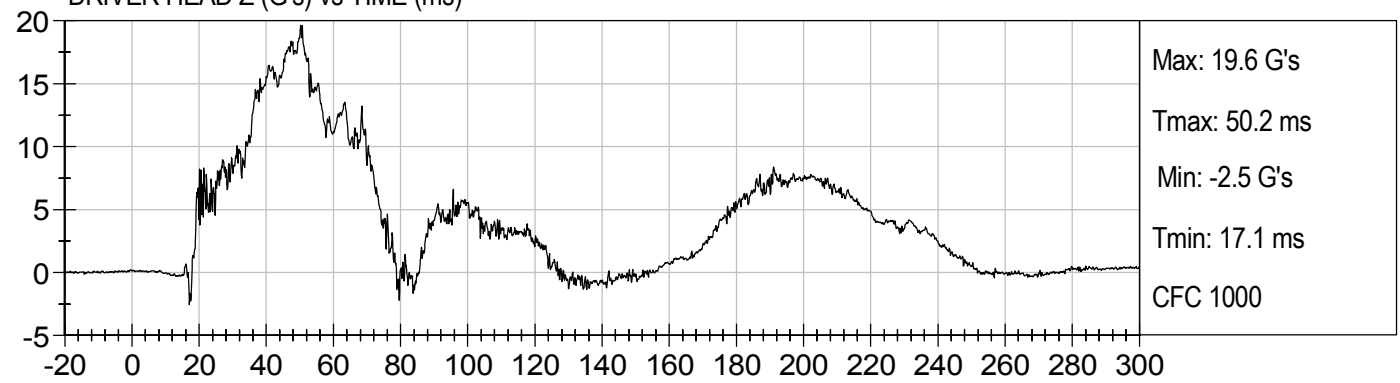
DRIVER HEAD X (G's) vs TIME (ms)



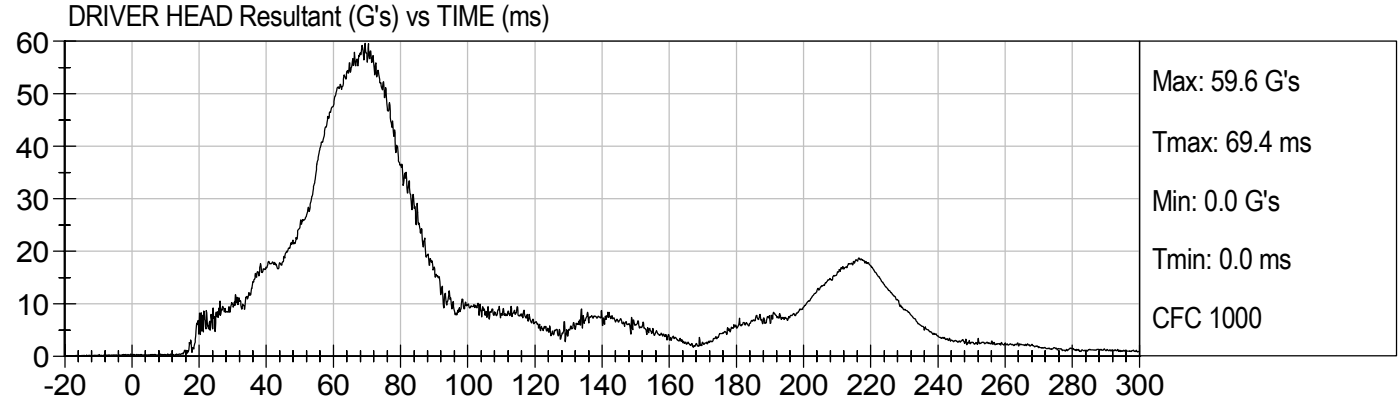
DRIVER HEAD Y (G's) vs TIME (ms)



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



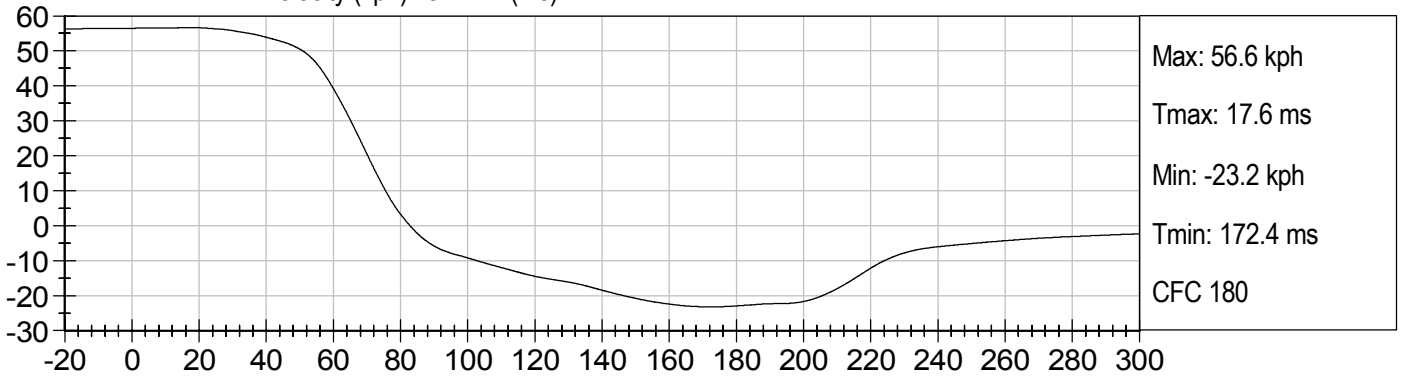
DRIVER HEAD Resultant (G's) vs TIME (ms)



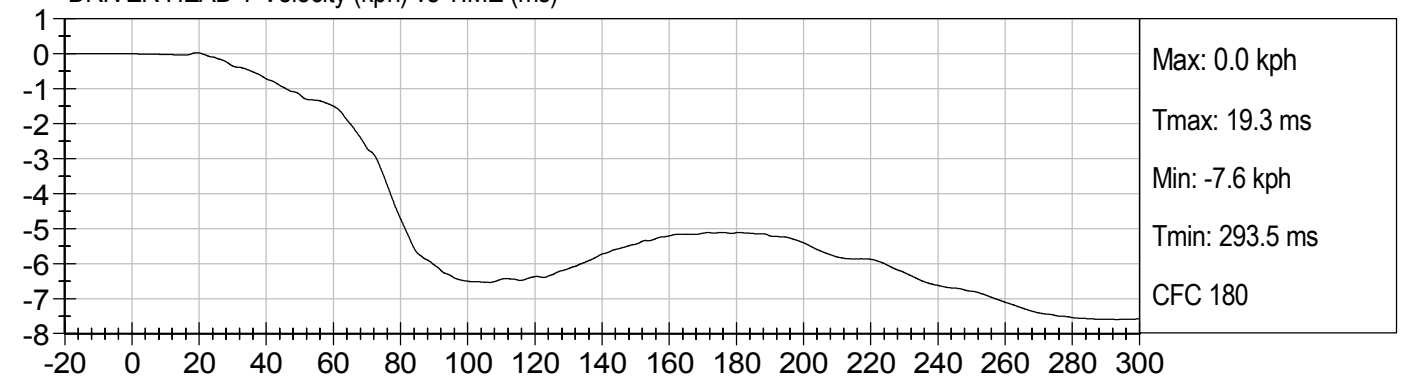
35 MPH NCAP FRONTAL
2008 FORD MUSTANG CONVERTIBLE M80207

Test Date: 09/13/2007
Speed: 35.0 mph (56.3 km/h)

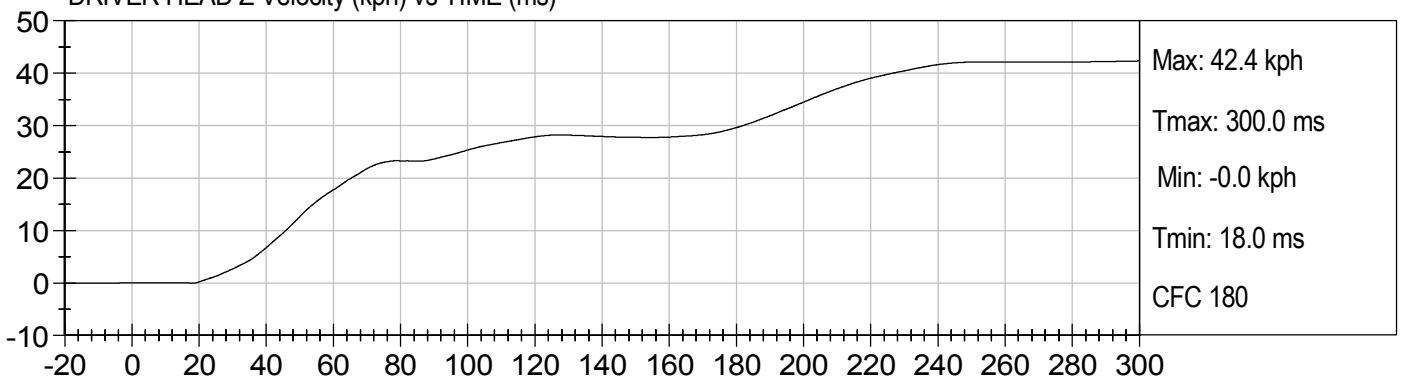
DRIVER HEAD X Velocity (kph) vs TIME (ms)



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



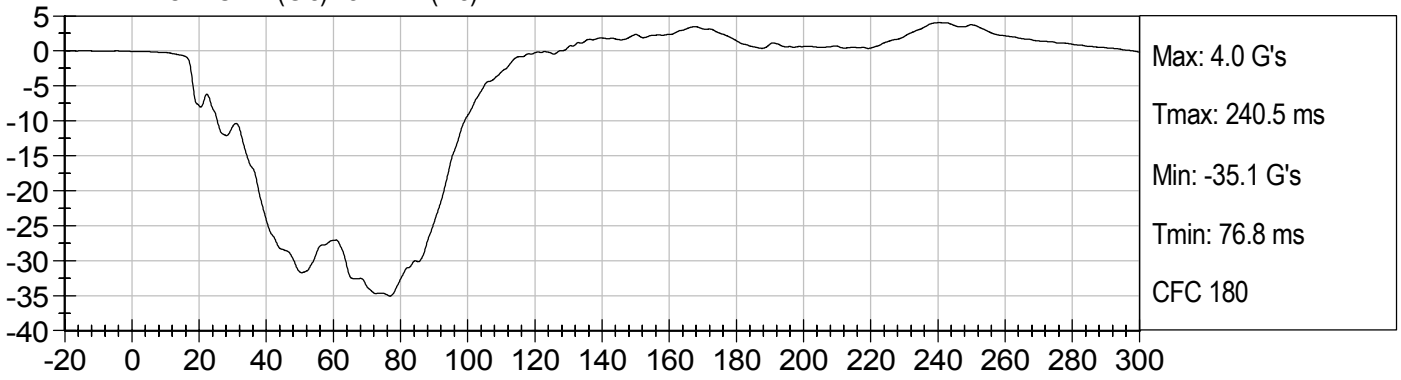
DRIVER HEAD Z Velocity (kph) vs TIME (ms)



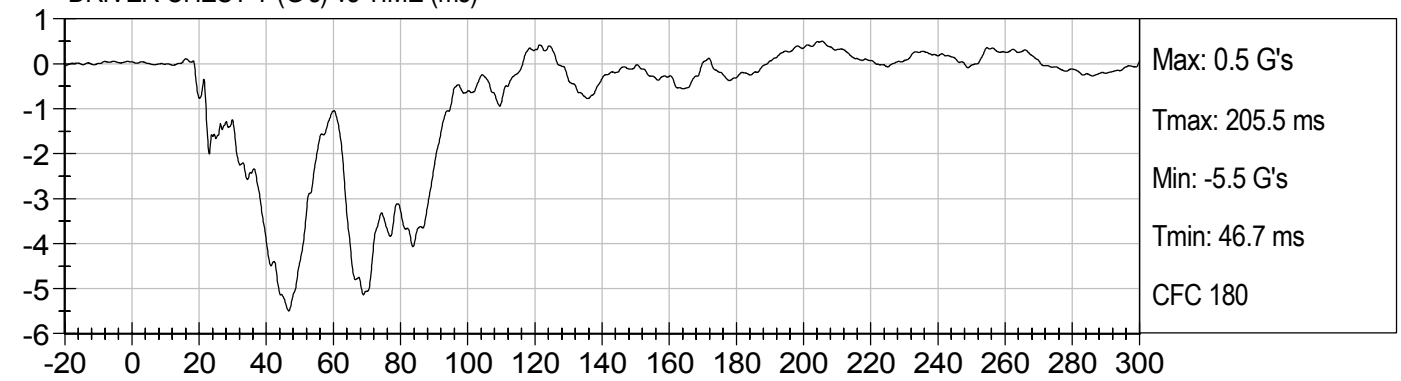
35 MPH NCAP FRONTAL
2008 FORD MUSTANG CONVERTIBLE M80207

Test Date: 09/13/2007
Speed: 35.0 mph (56.3 km/h)

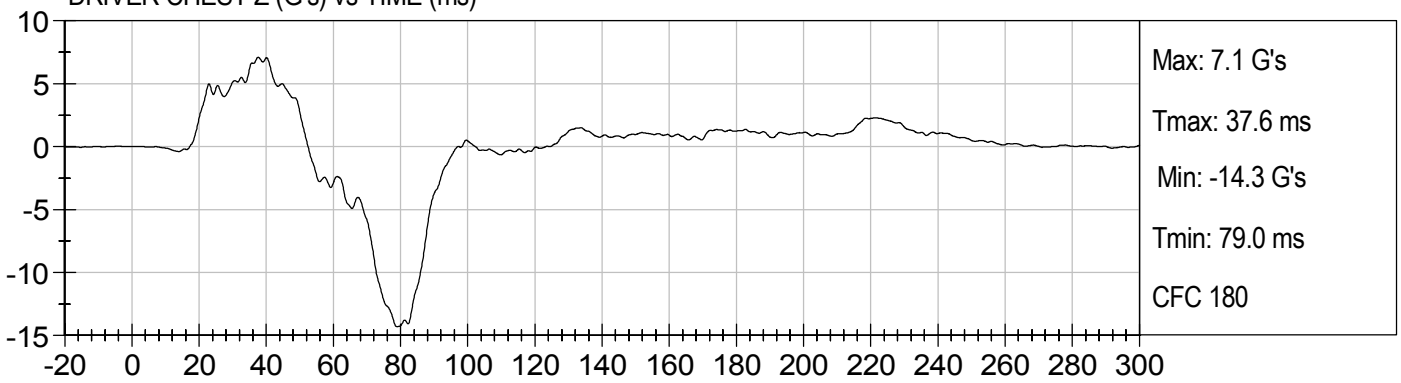
DRIVER CHEST X (G's) vs TIME (ms)



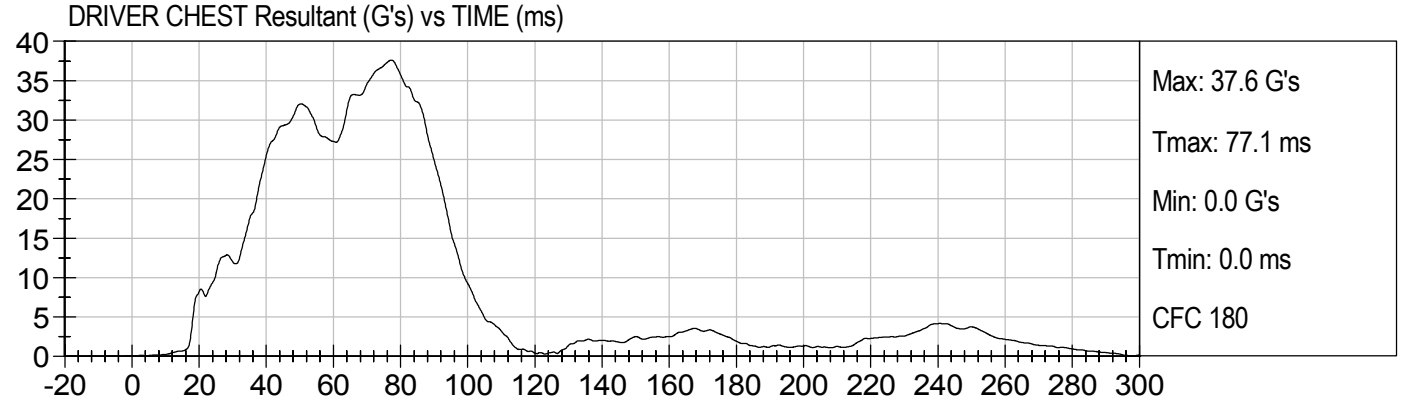
DRIVER CHEST Y (G's) vs TIME (ms)



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

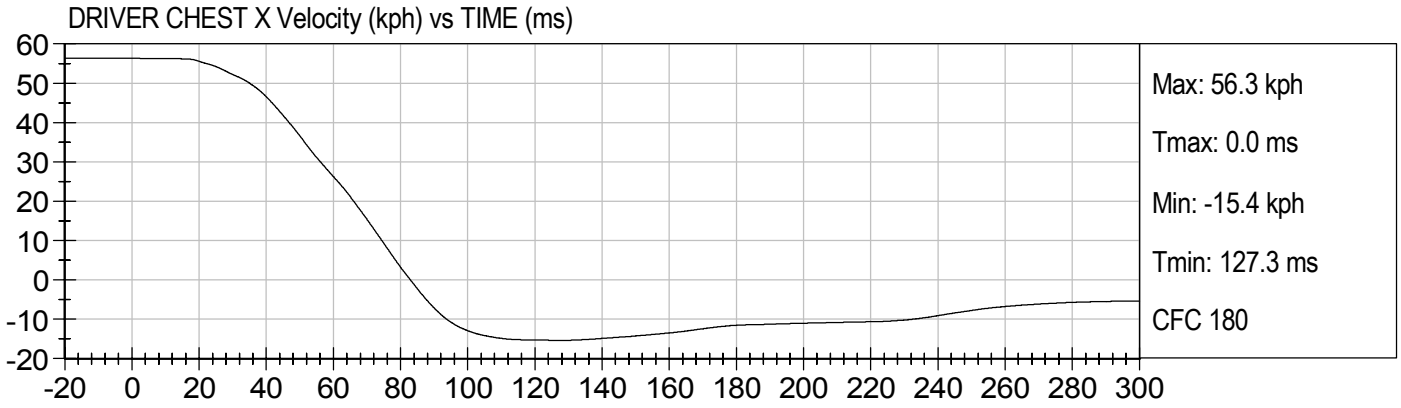


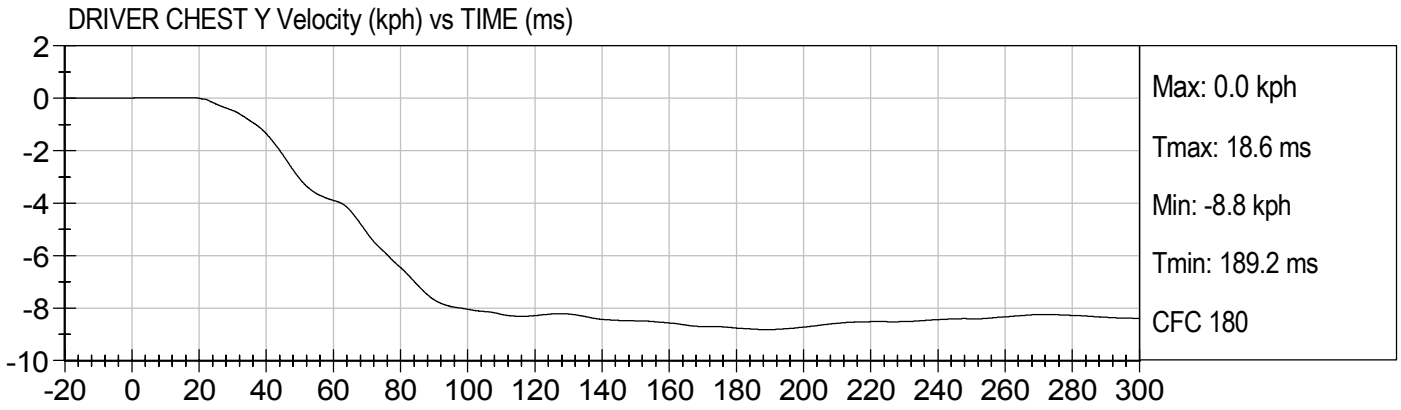
DRIVER CHEST Resultant (G's) vs TIME (ms)

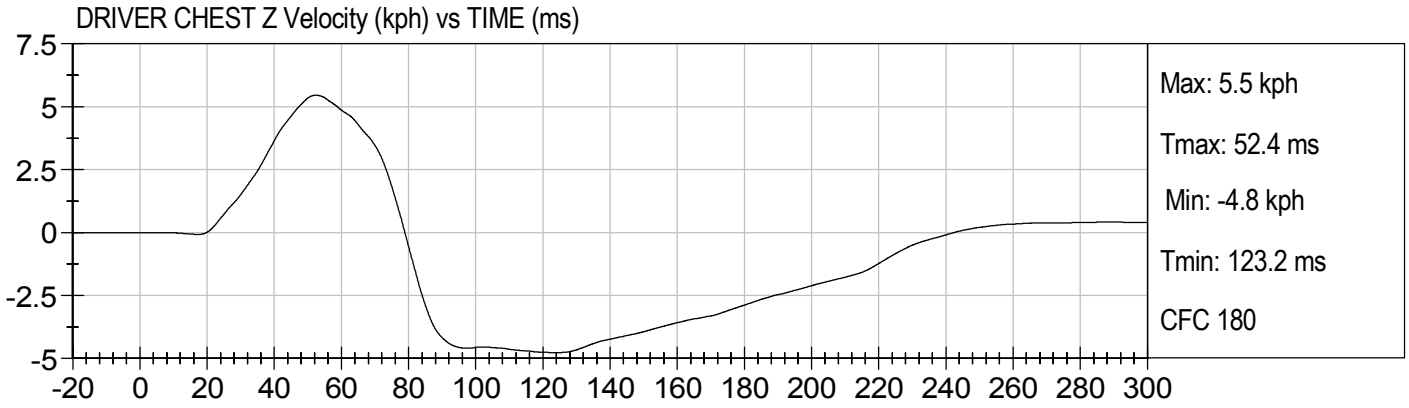


35 MPH NCAP FRONTAL
2008 FORD MUSTANG CONVERTIBLE M80207

Test Date: 09/13/2007
Speed: 35.0 mph (56.3 km/h)



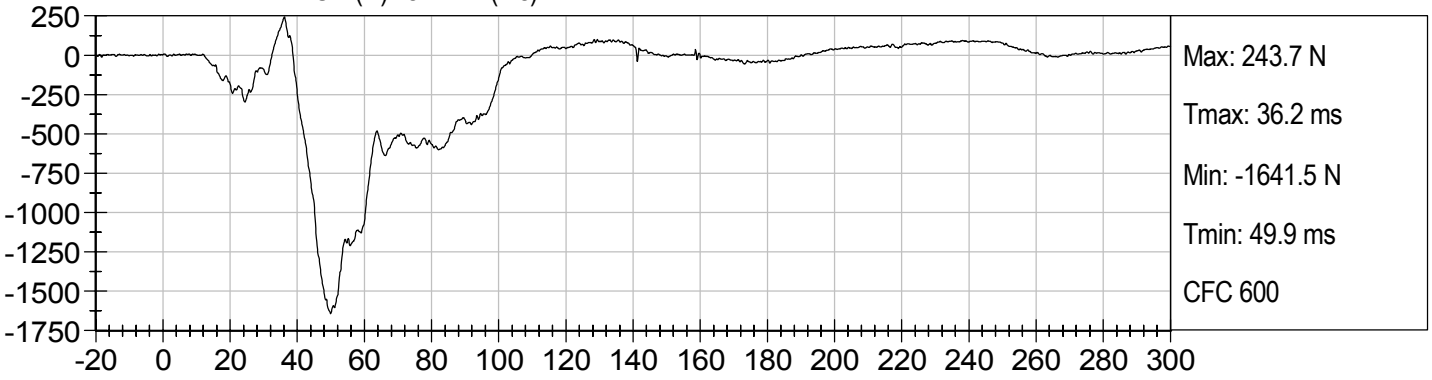




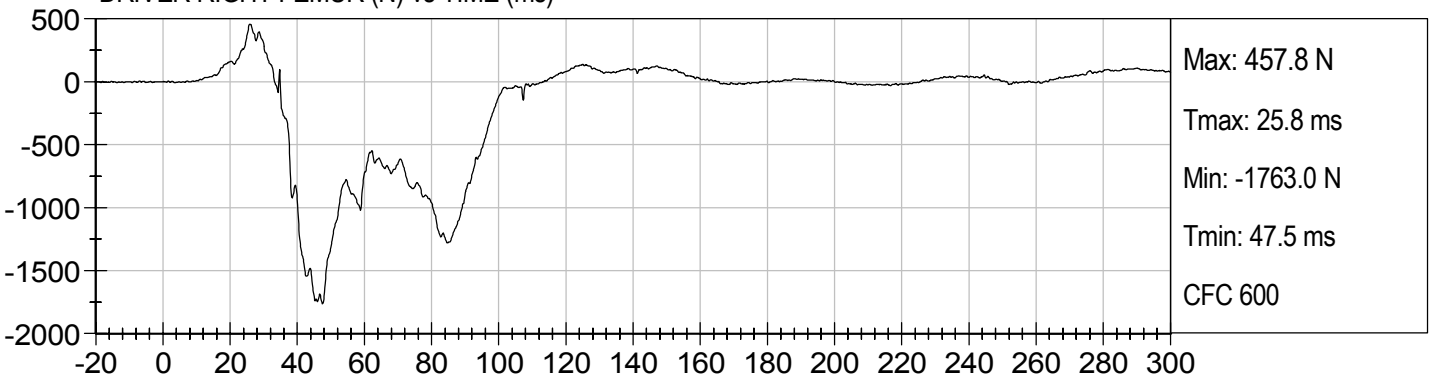
35 MPH NCAP FRONTAL
2008 FORD MUSTANG CONVERTIBLE M80207

Test Date: 09/13/2007
Speed: 35.0 mph (56.3 km/h)

DRIVER LEFT FEMUR (N) vs TIME (ms)



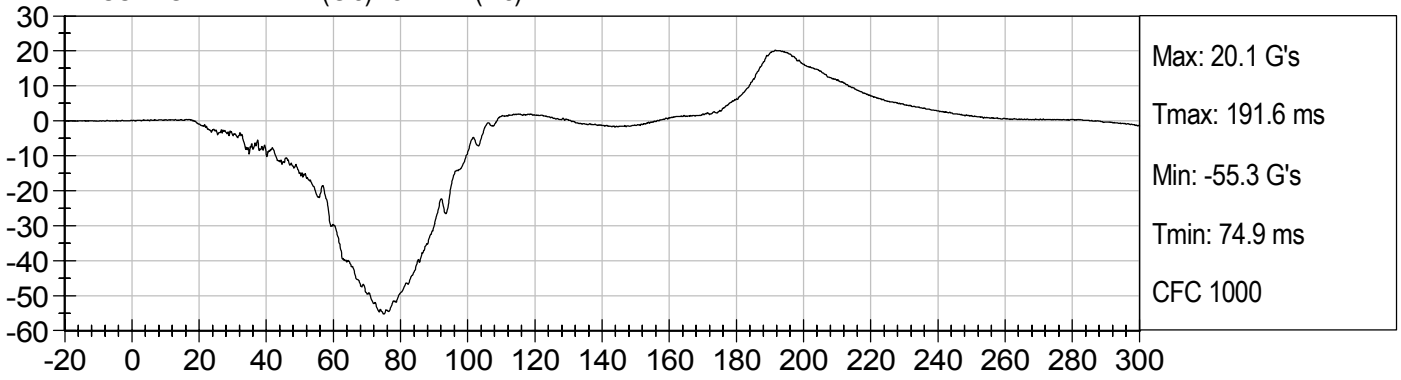
DRIVER RIGHT FEMUR (N) vs TIME (ms)



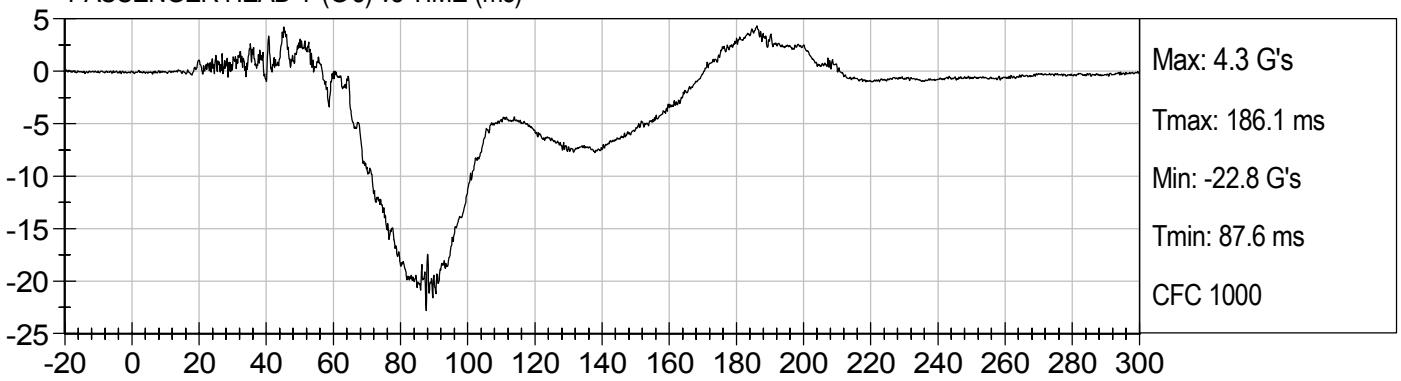
35 MPH NCAP FRONTAL
2008 FORD MUSTANG CONVERTIBLE M80207

Test Date: 09/13/2007
Speed: 35.0 mph (56.3 km/h)

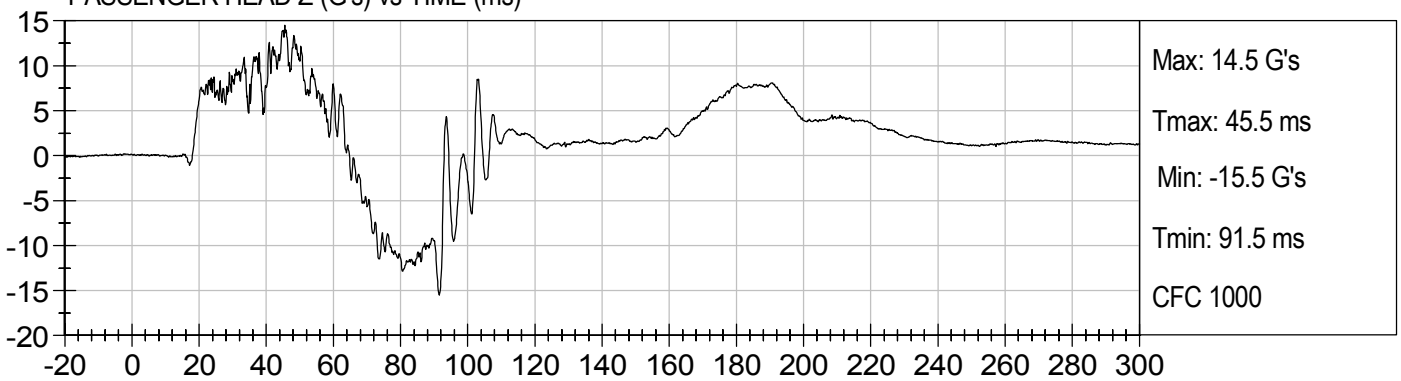
PASSENGER HEAD X (G's) vs TIME (ms)



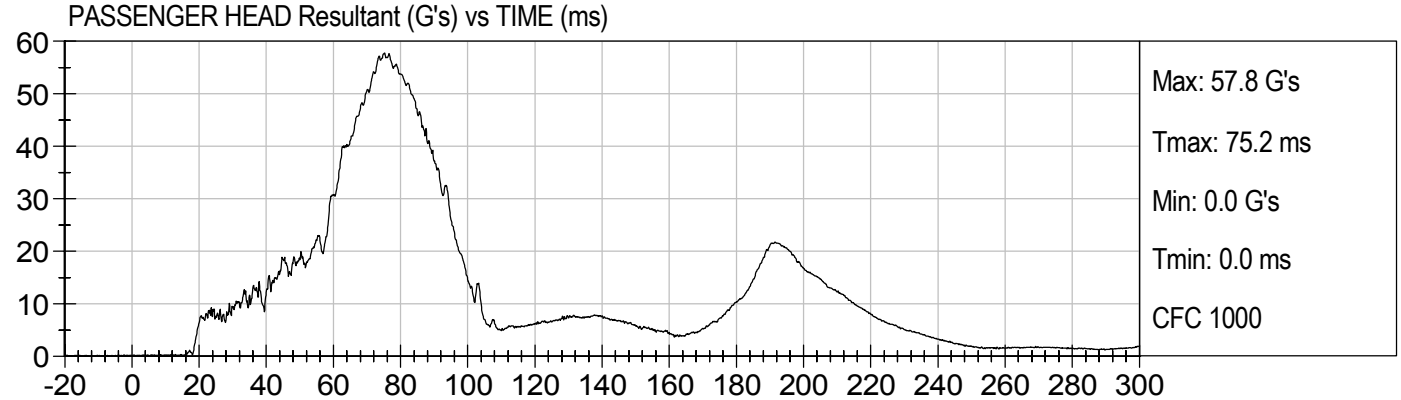
PASSENGER HEAD Y (G's) vs TIME (ms)



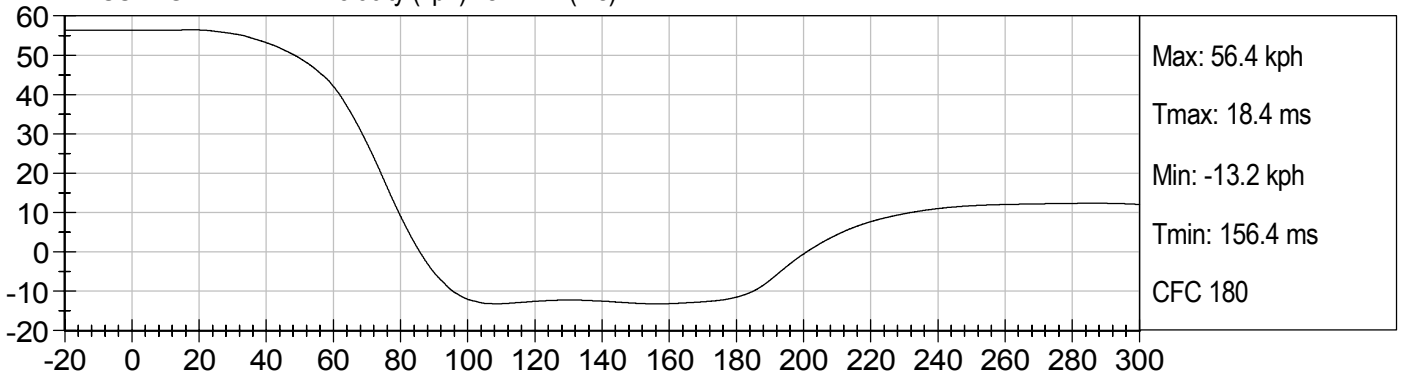
PASSENGER HEAD Z (G's) vs TIME (ms)



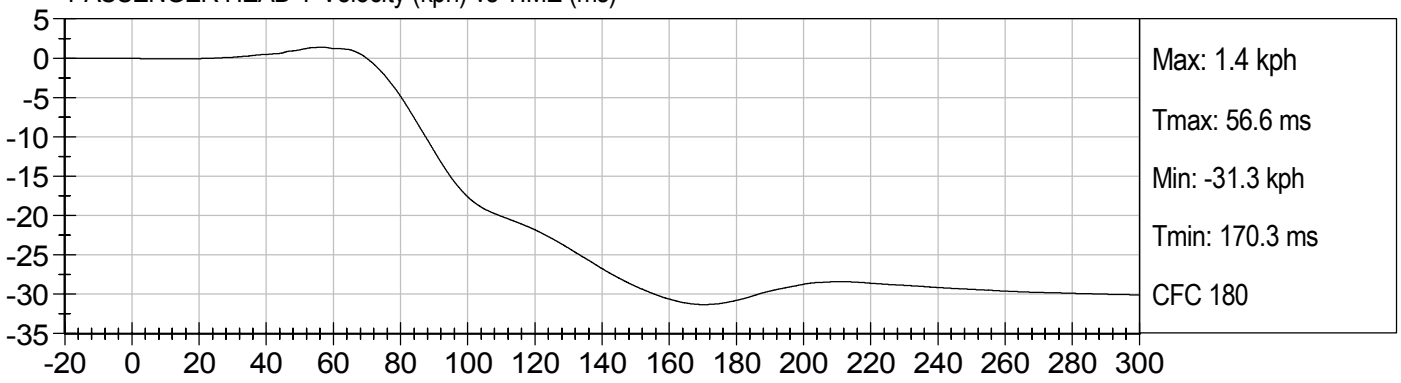
PASSENGER HEAD Resultant (G's) vs TIME (ms)



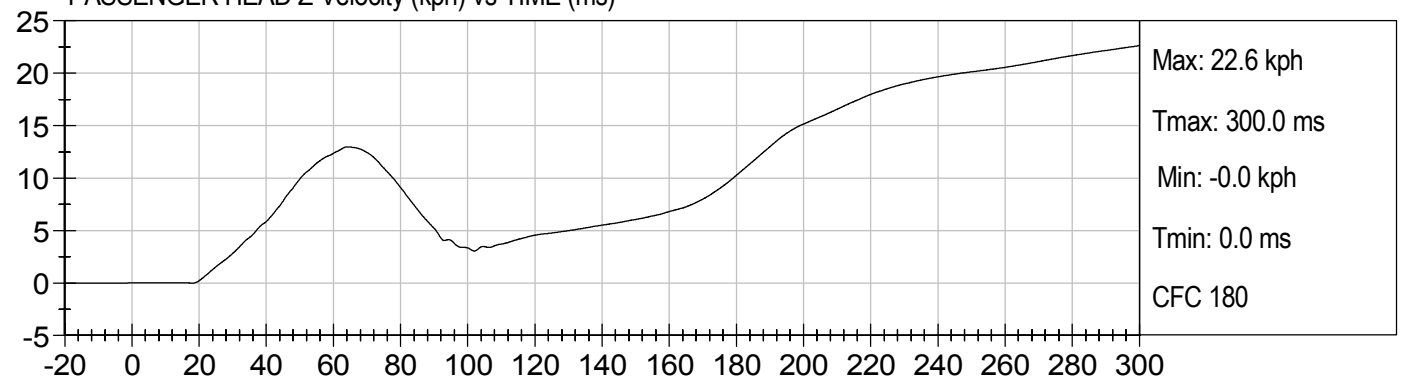
PASSENGER HEAD X Velocity (kph) vs TIME (ms)



PASSENGER HEAD Y Velocity (kph) vs TIME (ms)



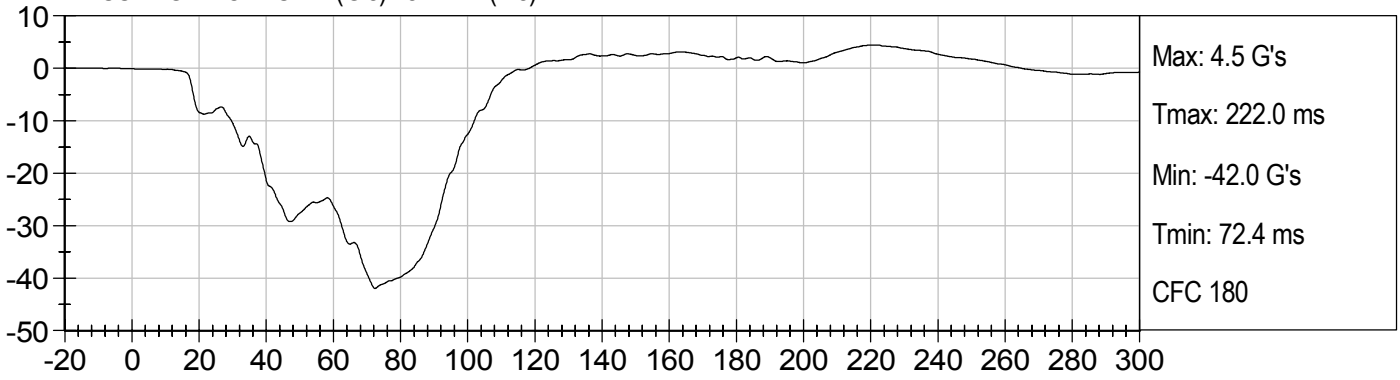
PASSENGER HEAD Z Velocity (kph) vs TIME (ms)



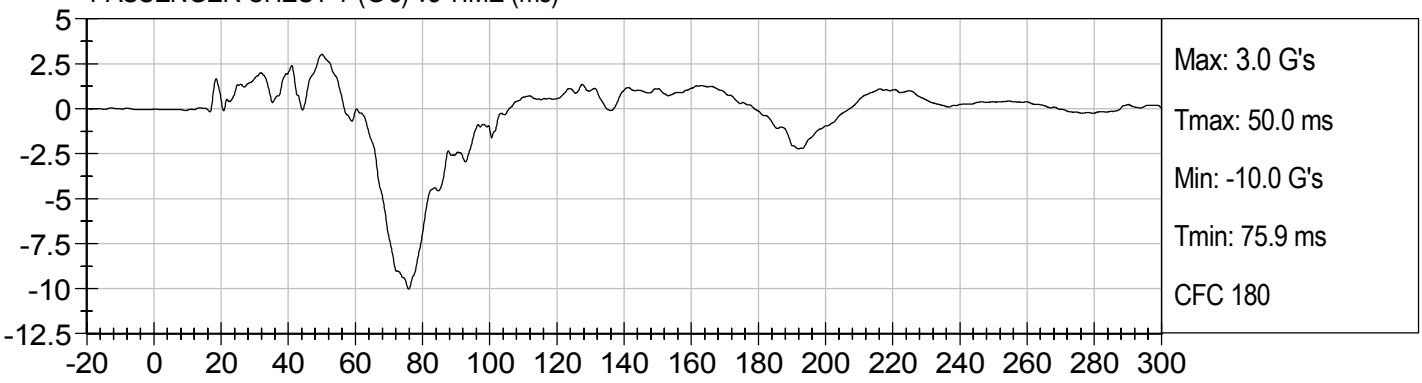
35 MPH NCAP FRONTAL
2008 FORD MUSTANG CONVERTIBLE M80207

Test Date: 09/13/2007
Speed: 35.0 mph (56.3 km/h)

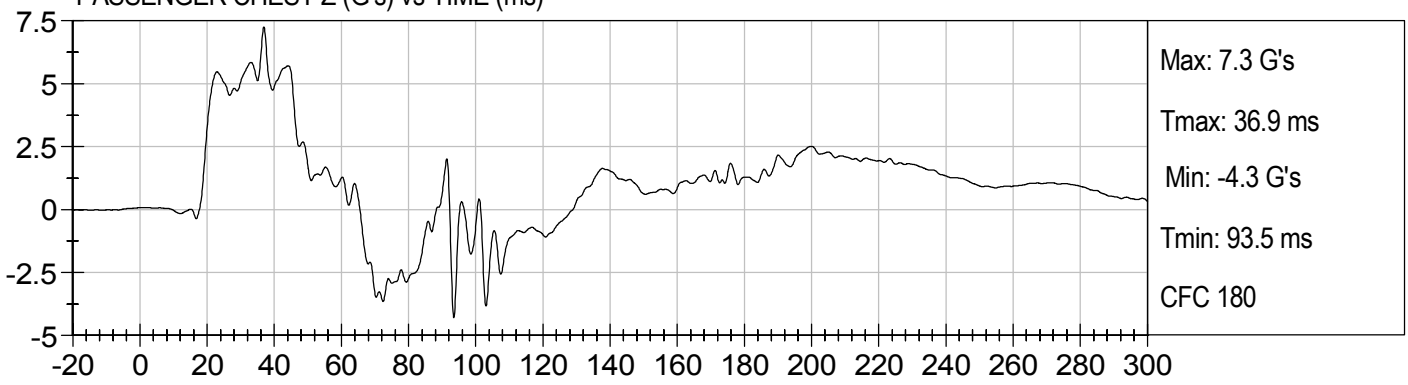
PASSENGER CHEST X (G's) vs TIME (ms)



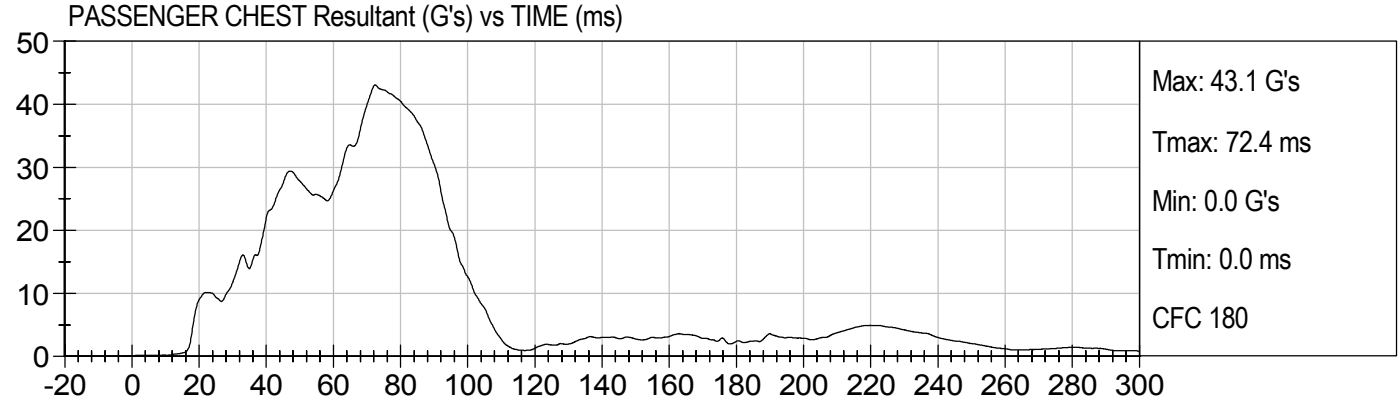
PASSENGER CHEST Y (G's) vs TIME (ms)



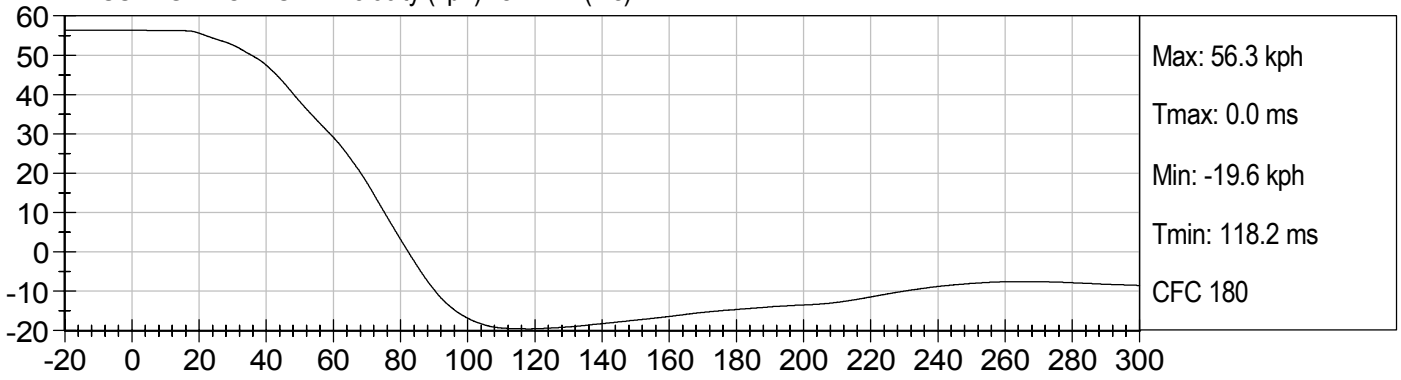
PASSENGER CHEST Z (G's) vs TIME (ms)



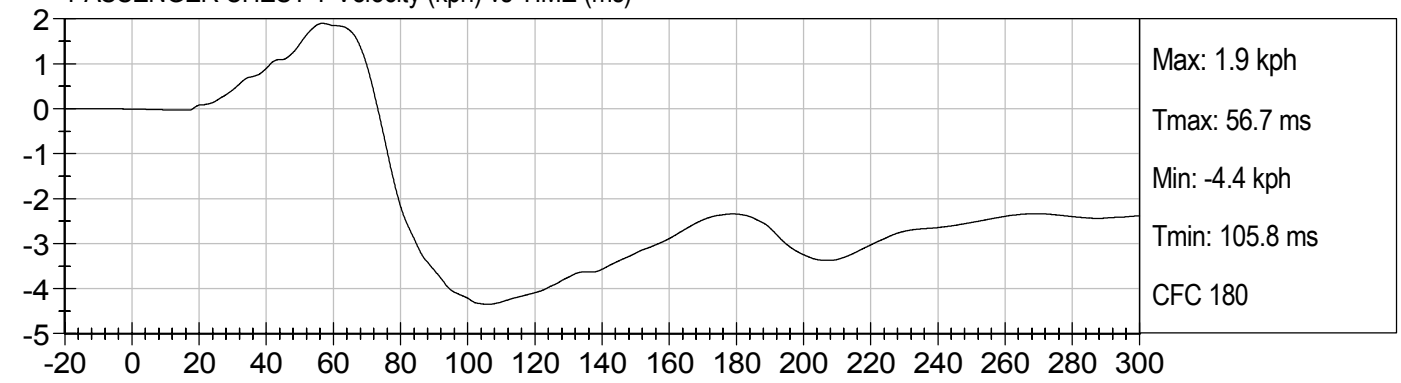
PASSENGER CHEST Resultant (G's) vs TIME (ms)



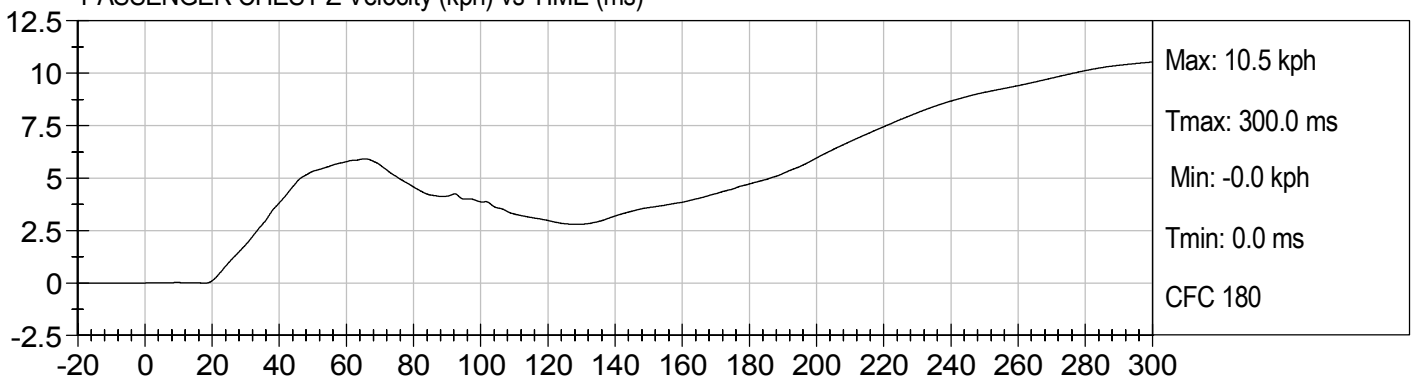
PASSENGER CHEST X Velocity (kph) vs TIME (ms)



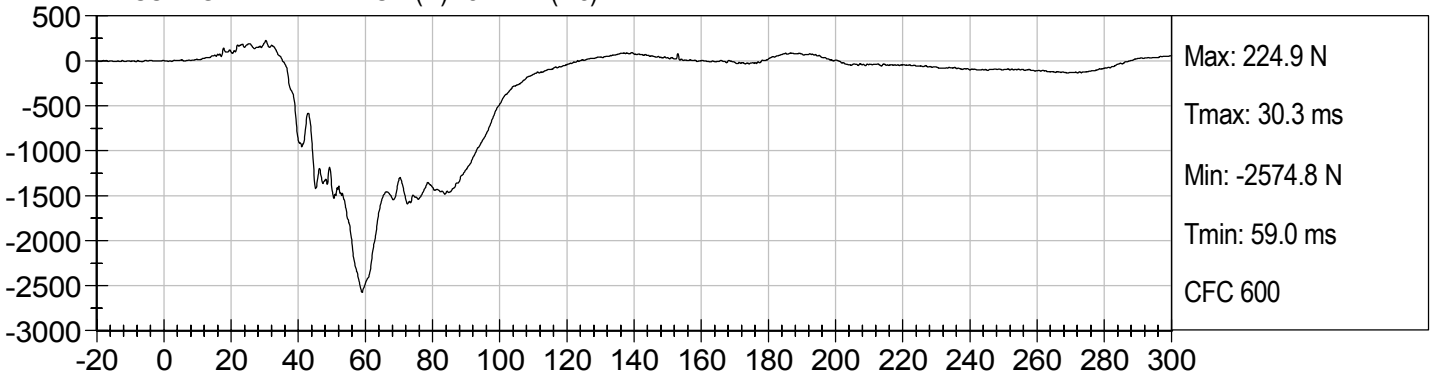
PASSENGER CHEST Y Velocity (kph) vs TIME (ms)



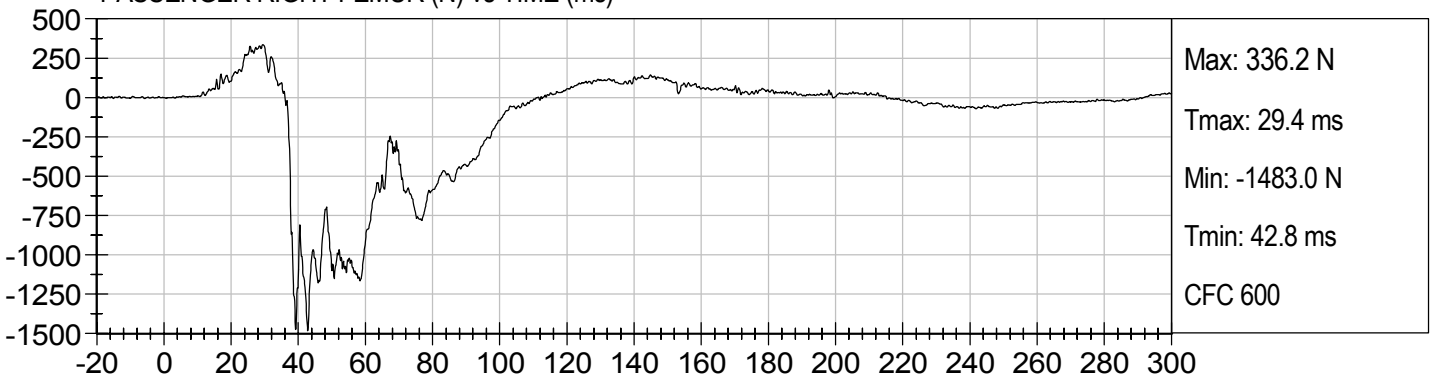
PASSENGER CHEST Z Velocity (kph) vs TIME (ms)



PASSENGER LEFT FEMUR (N) vs TIME (ms)



PASSENGER RIGHT FEMUR (N) vs TIME (ms)



APPENDIX C

DUMMY CALIBRATION DATA

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test ID:** D072841

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Peak Resultant Acceleration	G's	225 - 275	227	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-2.8	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician

9/11/07

Test Date

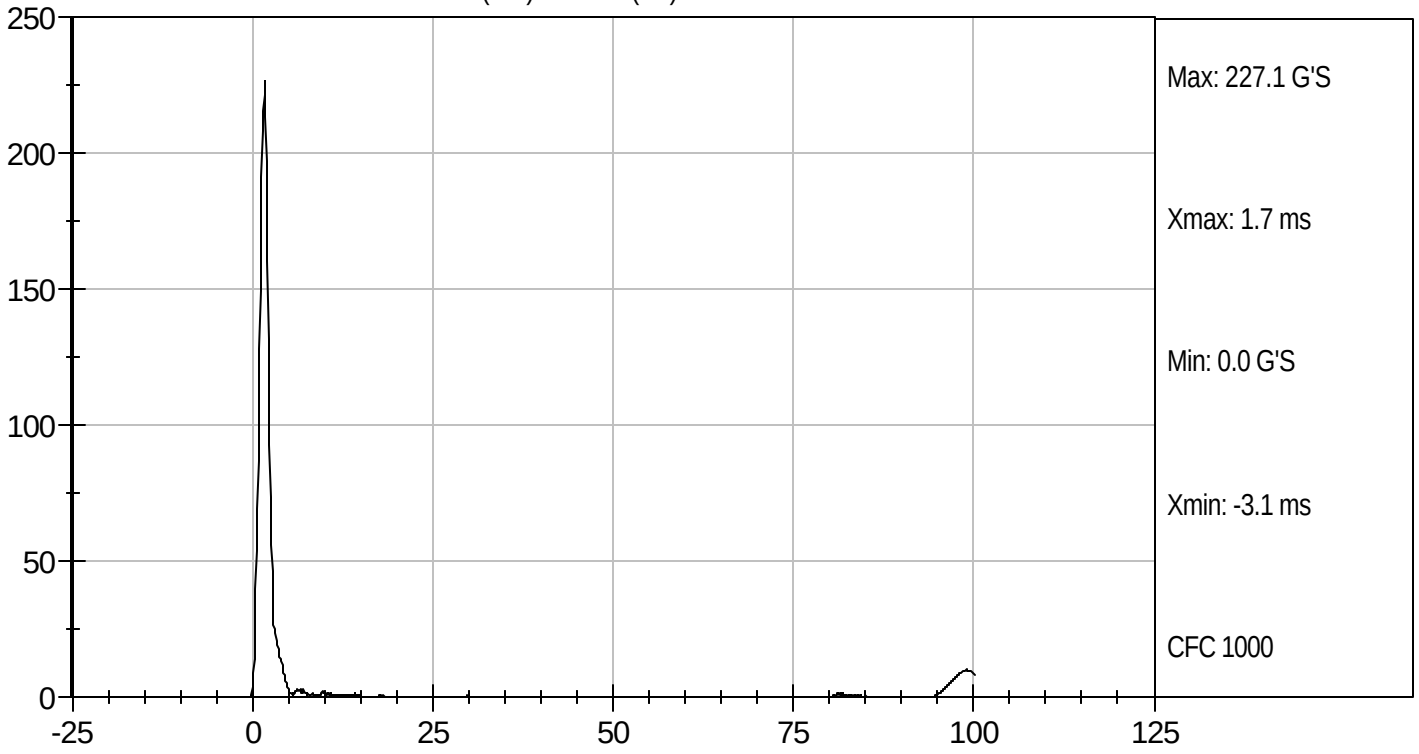
David Winkelbauer

Approved By

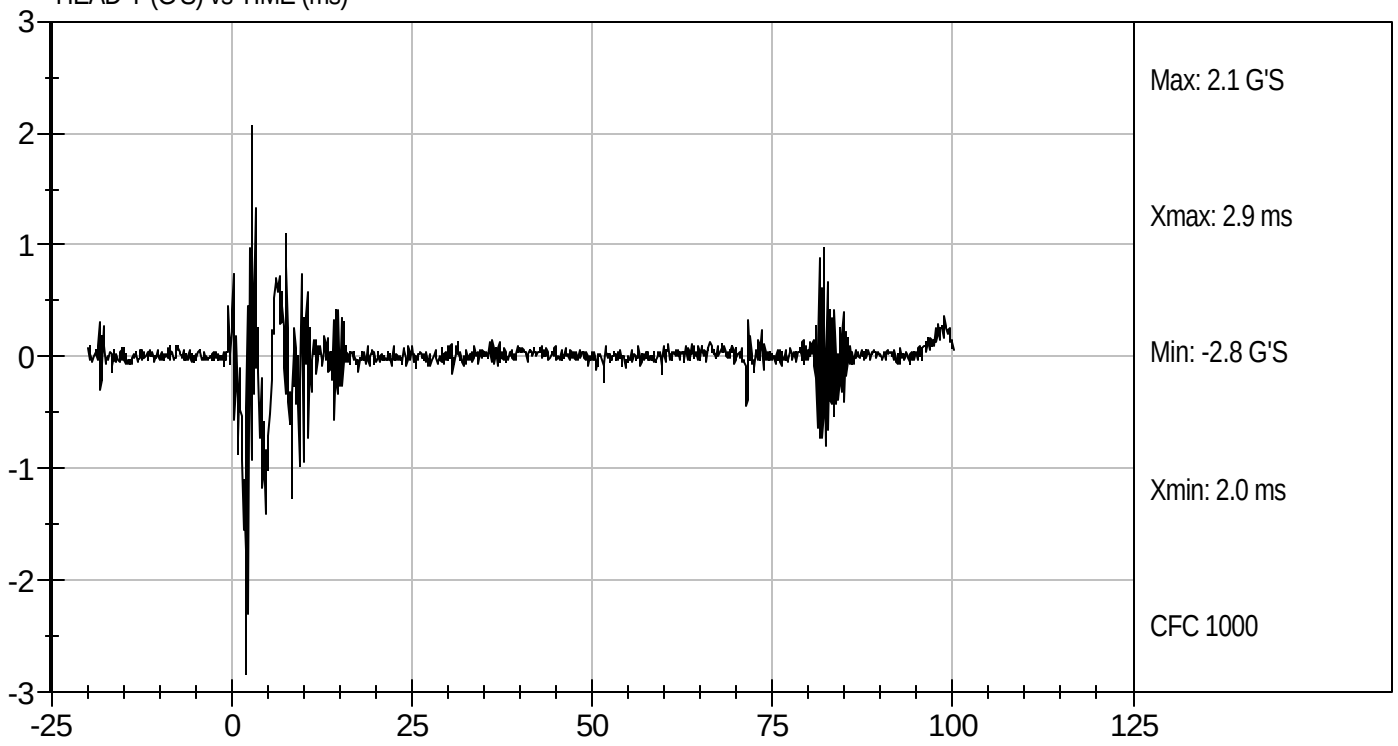
Test Desc: Head Drop
Component ID: D072841

Test Date: 9/11/07
Velocity: 0 ft/s, 0.00 m/s

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



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



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D072842

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity		%	10 to 70	36	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	24.38	Pass
	20 msec	G's	17.60 to 22.60	18.49	Pass
	30 msec	G's	12.50 to 18.50	14.46	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	14.42	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	35.2	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	68.2	Pass
	Time	msec	57.0 to 64.0	63.5	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	113.1	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	92.9	Pass
	Time	msec	47.0 to 58.0	47.8	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	101.3	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

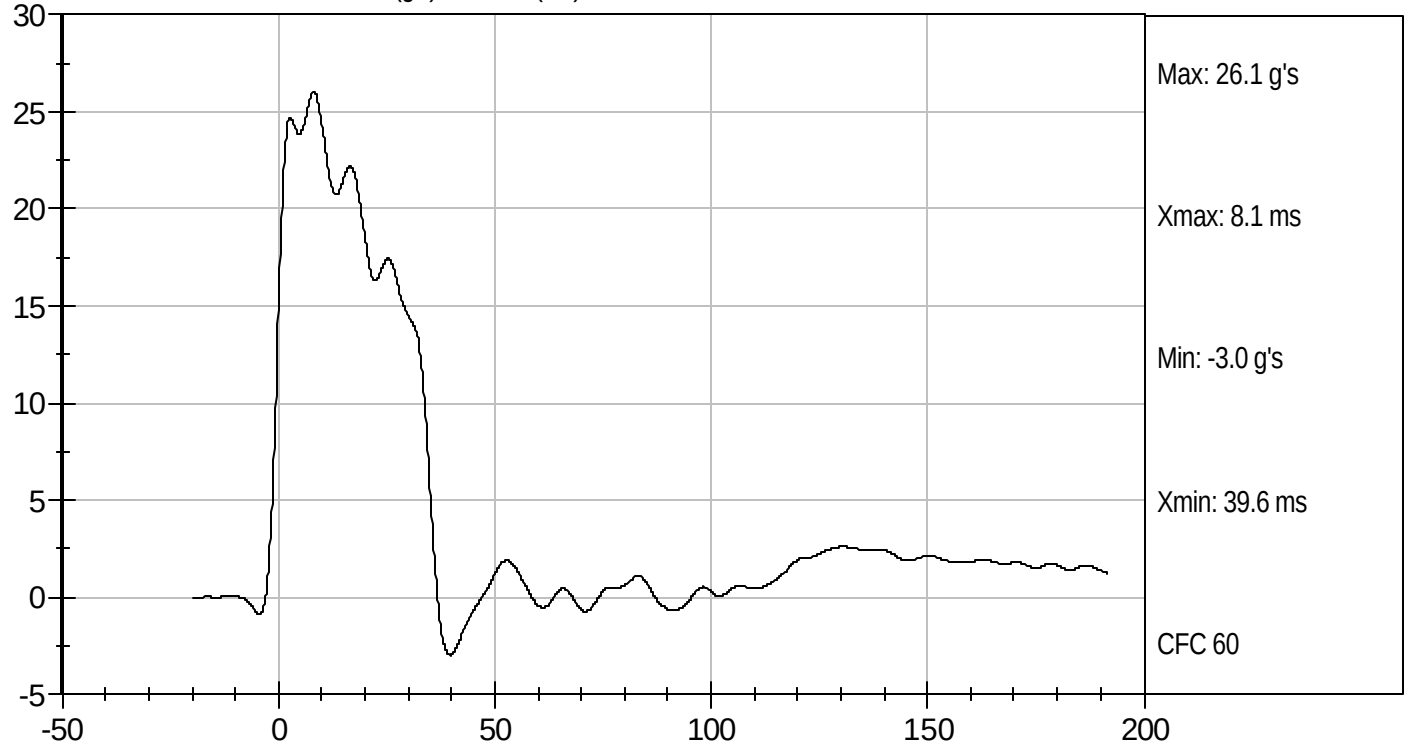
9/11/07
Test Date

David Winkelbauer
Approved By

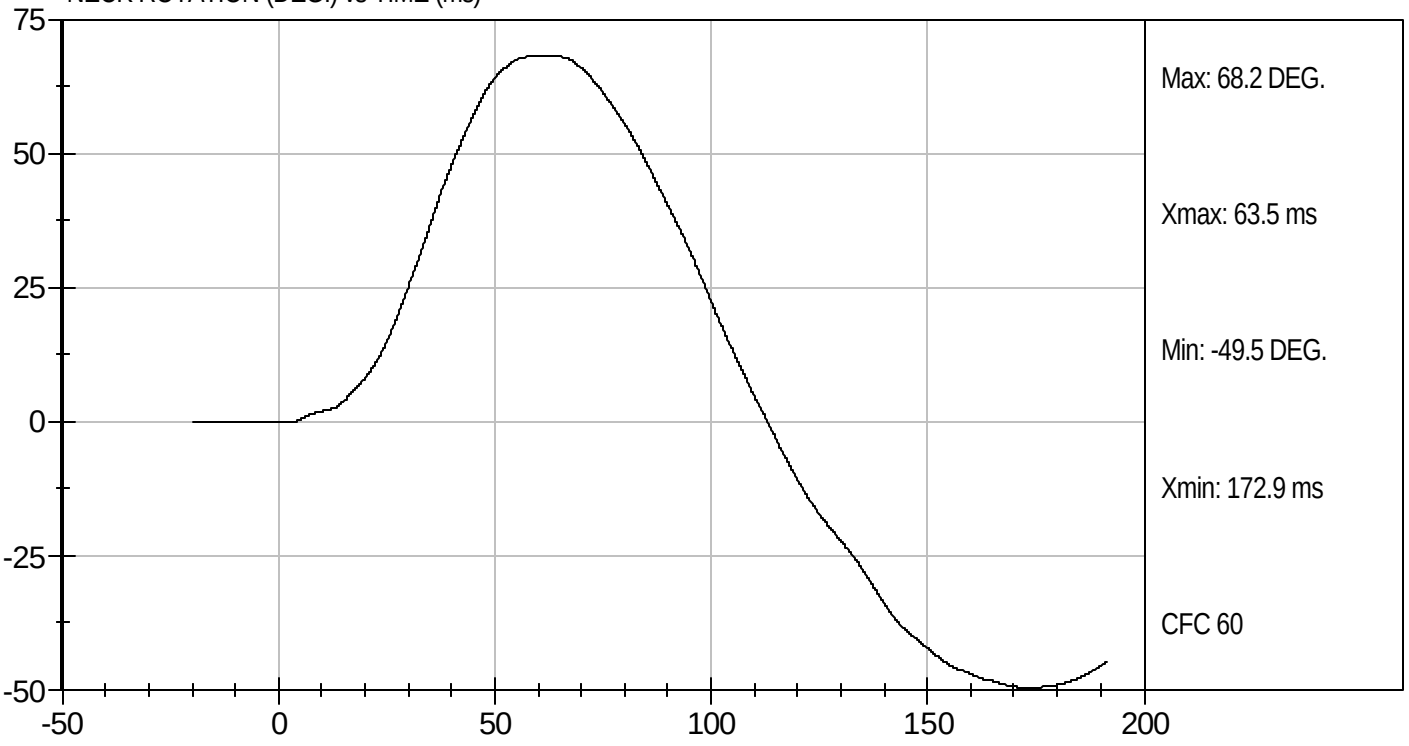
Test Desc: Neck Flexion
Component ID: D072842

Test Date: 9/11/07
Velocity: 23.15 ft/s, 7.06 m/s

PENDULUM DECELERATION (g's) vs TIME (ms)

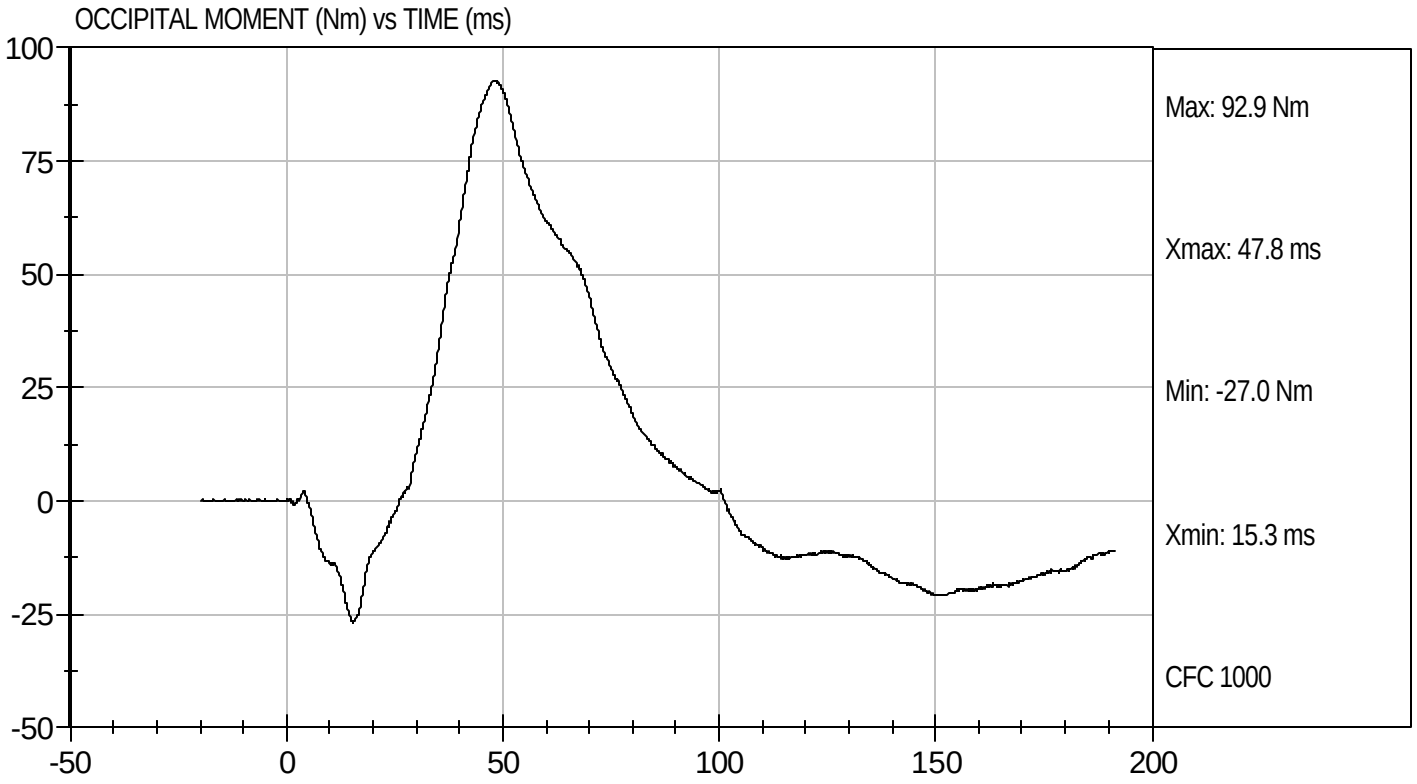


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Flexion
Component ID: D072842

Test Date: 9/11/07
Velocity: 23.15 ft/s, 7.06 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D072843

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity		%	10 to 70	36	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.04	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	18.79	Pass
	20 msec	G's	14.00 to 19.00	16.07	Pass
	30 msec	G's	11.00 to 16.00	13.16	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	13.13	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	38.1	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	94.5	Pass
	Time	msec	72.0 to 82.0	73.3	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	152.3	Pass
Moment About Occipital Condyle	Maximum	N m	-52.9 to -79.9	-59.9	Pass
	Time	msec	65.0 to 79.0	69.4	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	139.5	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

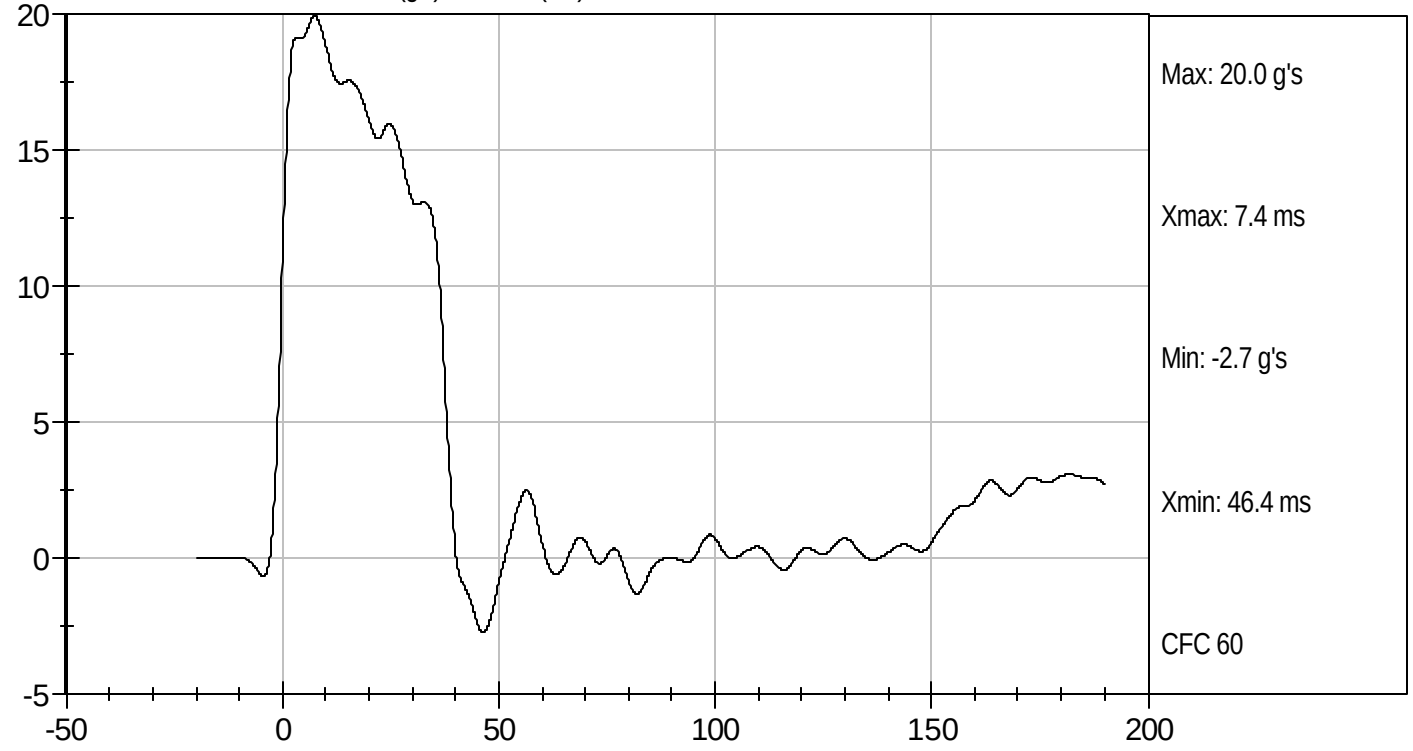
9/11/07
Test Date

David Winkelbauer
Approved By

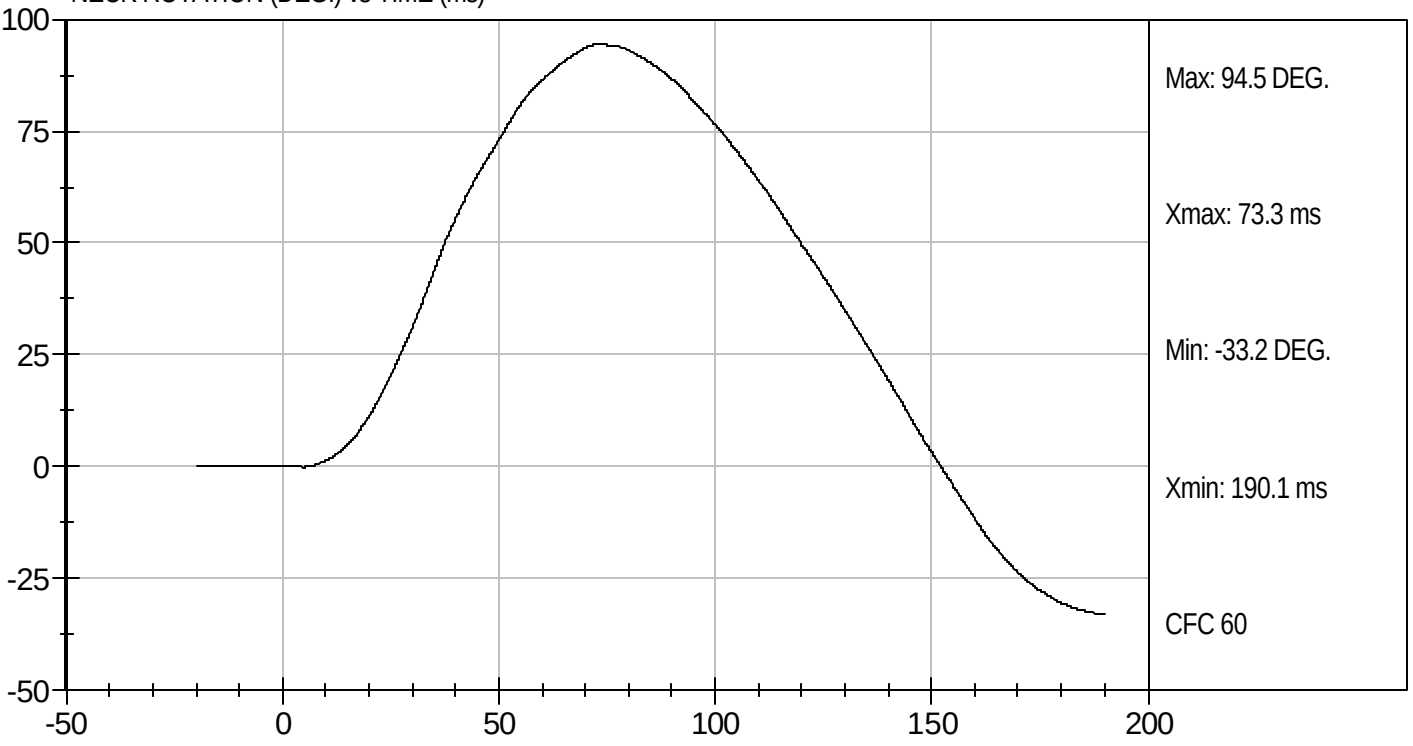
Test Desc: Neck Extension
Component ID: D072843

Test Date: 9/11/07
Velocity: 19.83 ft/s, 6.04 m/s

PENDULUM DECELERATION (g's) vs TIME (ms)

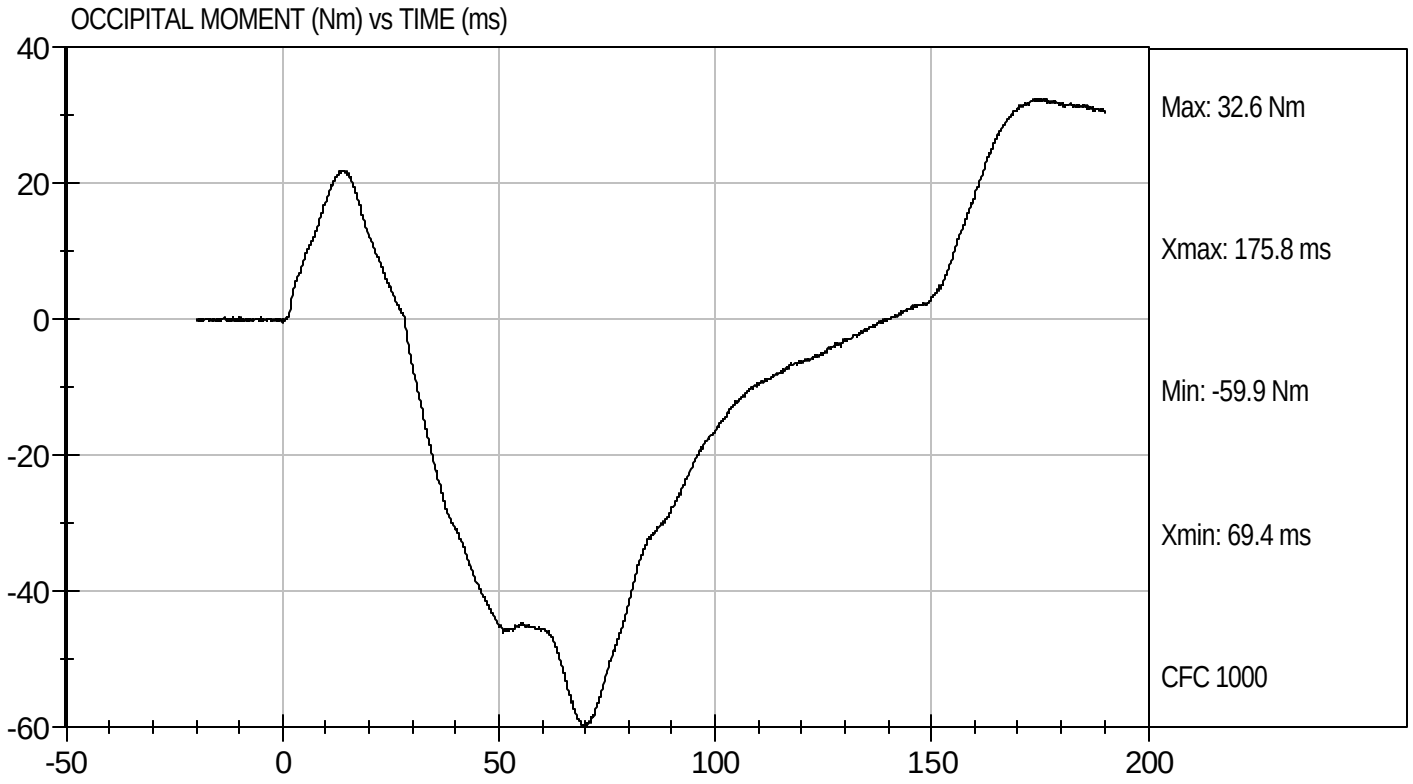


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Extension
Component ID: D072843

Test Date: 9/11/07
Velocity: 19.83 ft/s, 6.04 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D072844

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	34	Pass
Probe Velocity	m/s	6.58 to 6.82	6.77	Pass
Peak Probe Force	N	5159 to 5893	5,400	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.55	Pass
Internal Hysteresis	%	69 to 85	73	Pass
		Overall Test Results		Pass

Laboratory Technician

9/11/07

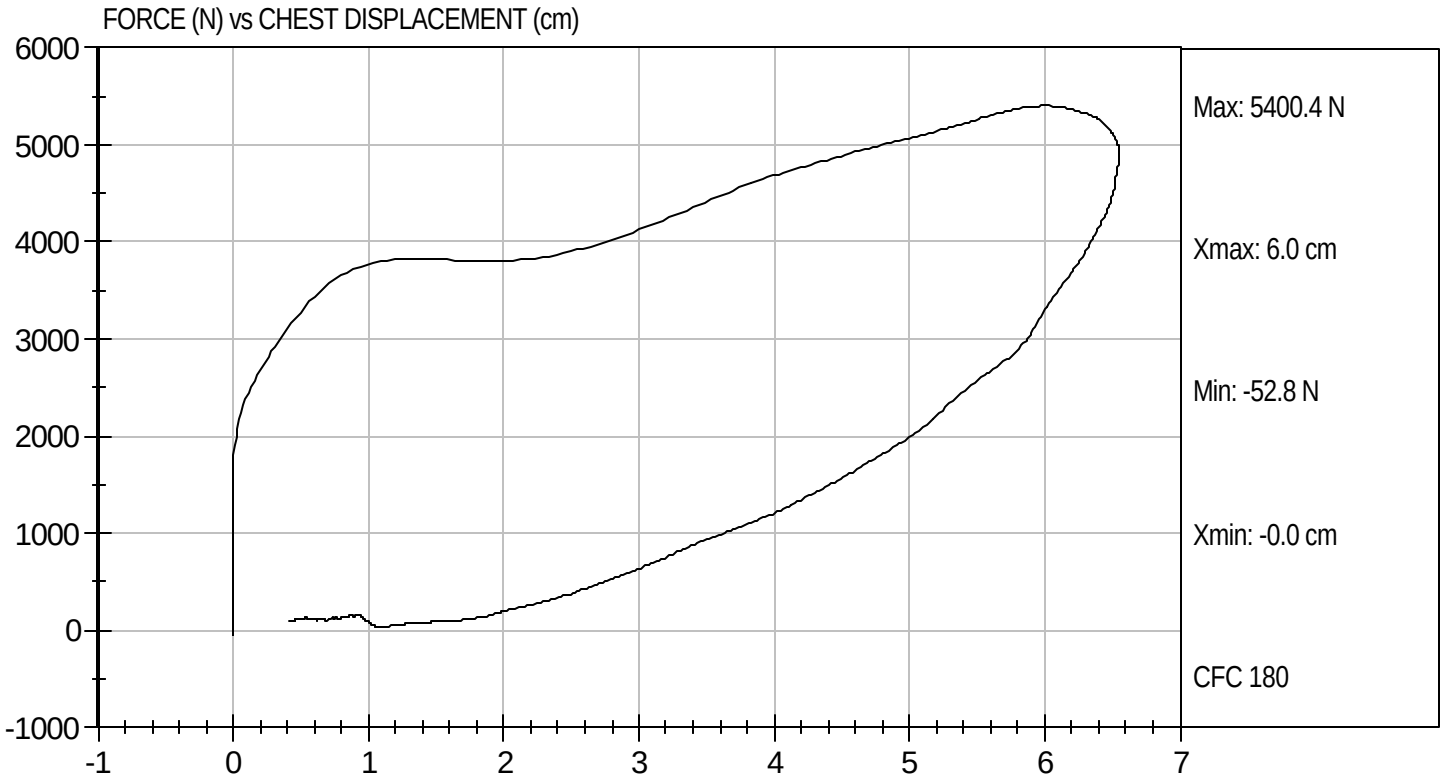
Test Date

David Winkelbauer

Approved By

Test Desc: Thorax Impact
Component ID: D072844

Test Date: 9/11/07
Velocity: 22.222 ft/s, 6.77 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D072845

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	37	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	5,686	Pass
		Overall Test Results		Pass

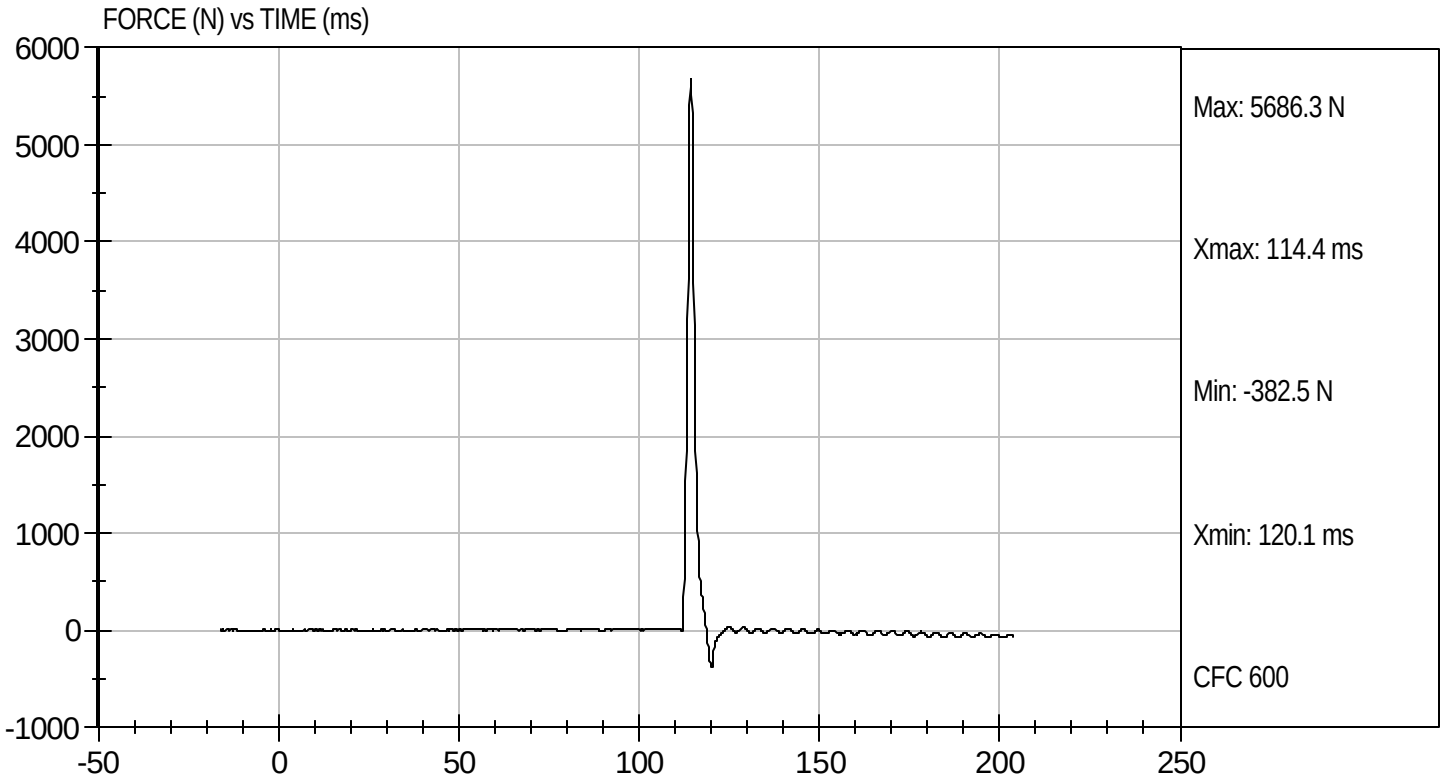
Jessica Gall
Laboratory Technician

9/11/07
Test Date

David Winkelbauer
Approved By

Test Desc: Right Knee
Component ID: D072845

Test Date: 9/11/07
Velocity: 6.83 ft/s, 2.08 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D072846

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5,608	Pass
		Overall Test Results		Pass

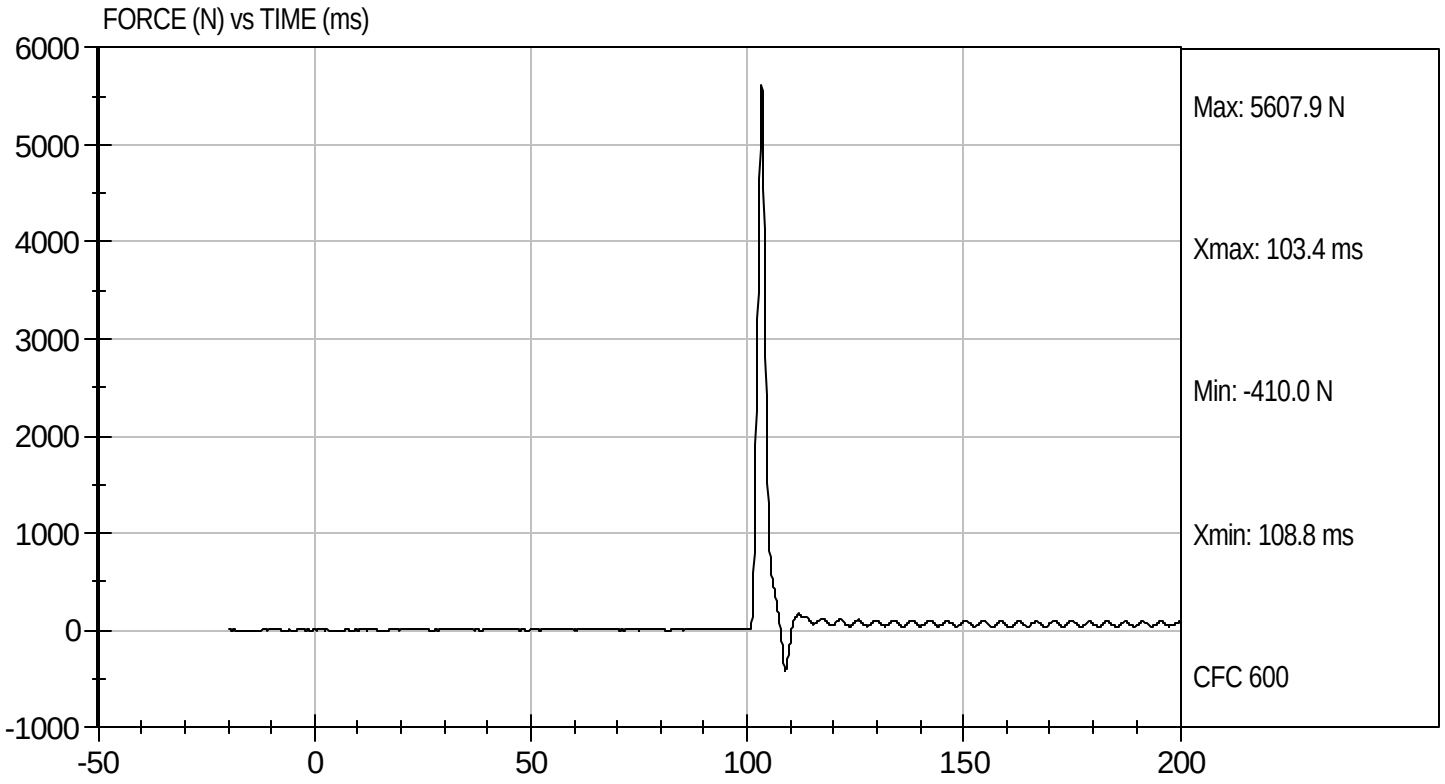
Jessica Gall
Laboratory Technician

9/11/07
Test Date

David Winkelbauer
Approved By

Test Desc: Left Knee
Component ID: D072846

Test Date: 9/11/07
Velocity: 6.89 ft/s, 2.10 m/s



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065 **Test I.D:** D072840

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	20.8	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	43	43	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	65.5	59.3	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	42	42	Pass
		Overall Test Results			Pass

Laboratory Technician

9/11/07

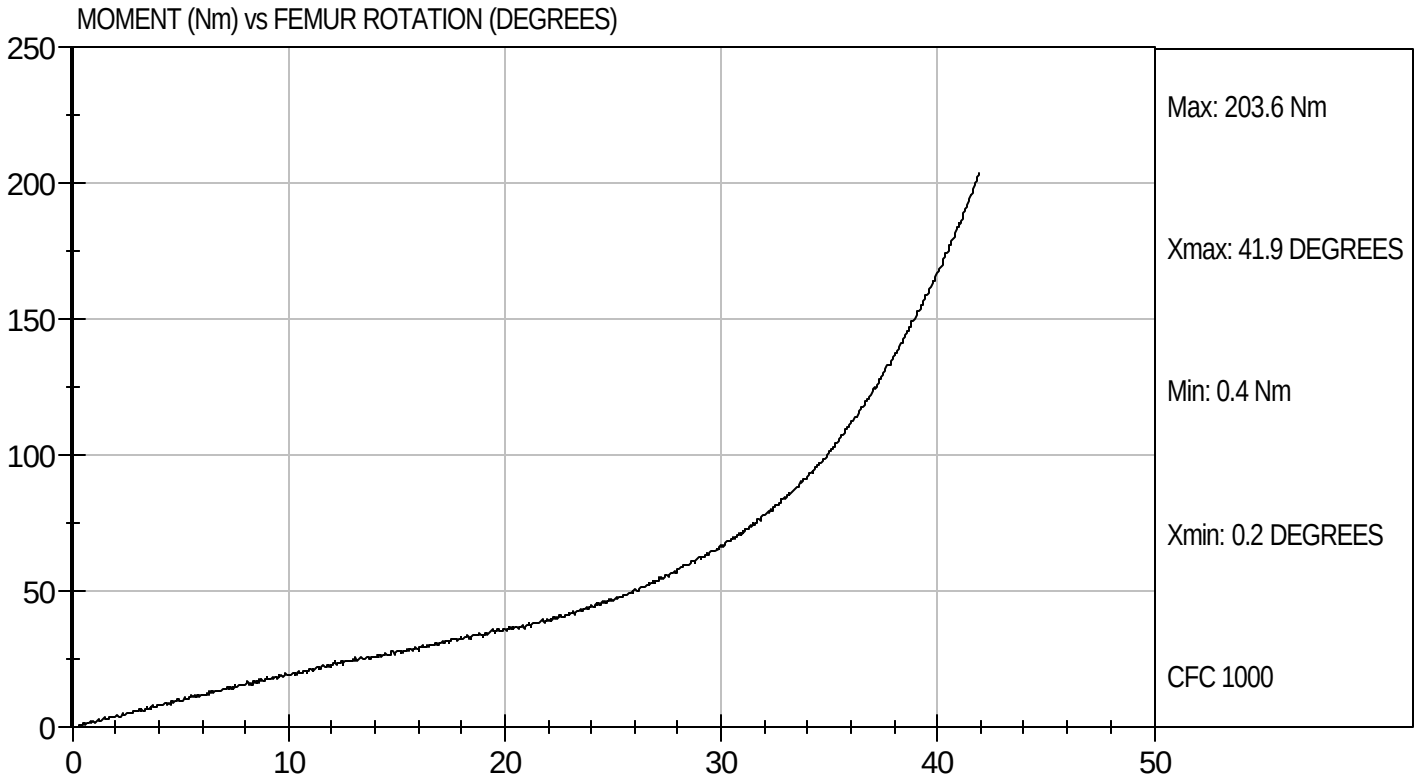
Test Date

David Winkelbauer

Approved By

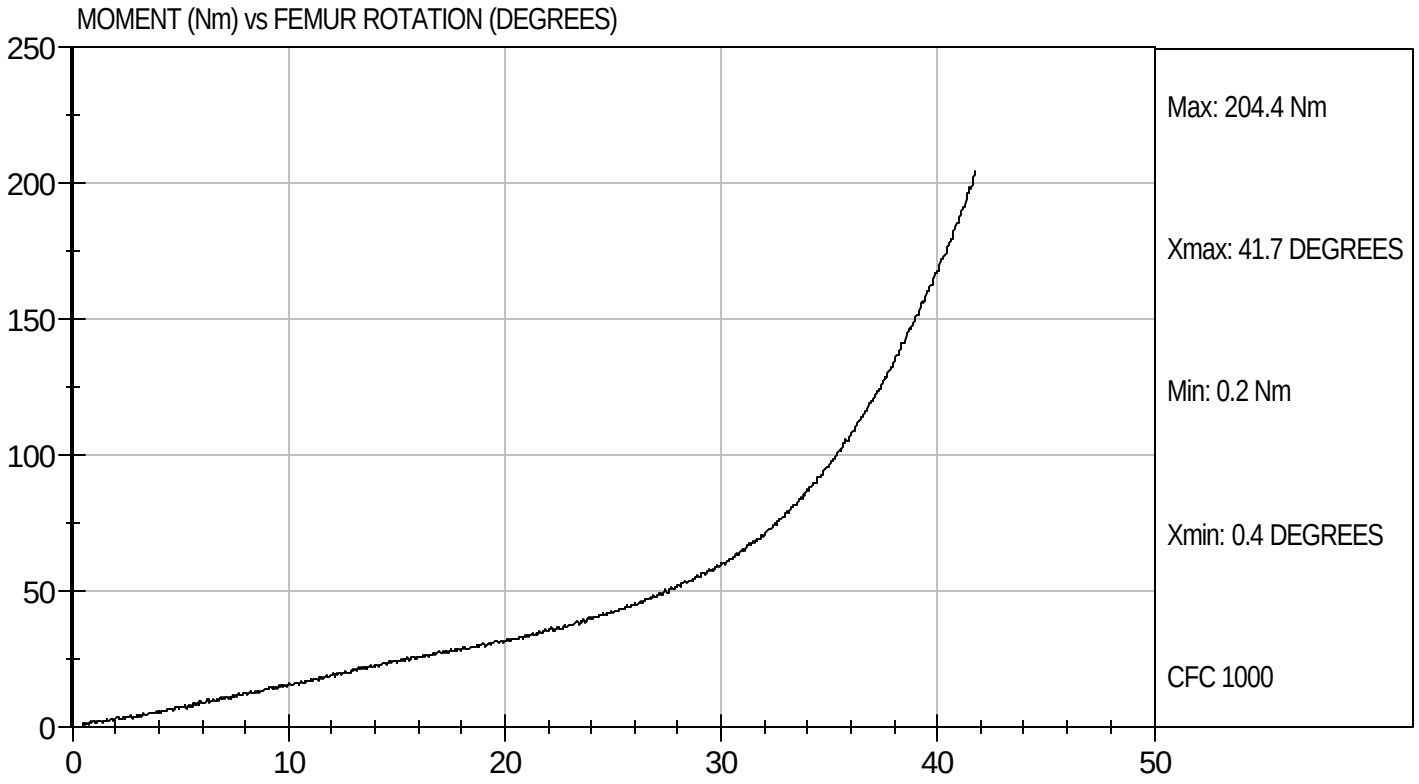
Test Desc: Hip Femur Flexion
Component ID: D072849

Test Date: 9/11/07
Velocity: 0 ft/s, 0.00 m/s



Test Desc: Hip Femur Flexion
Component ID: D072840

Test Date: 9/11/07
Velocity: 0 ft/s, 0.00 m/s



MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test ID:** D072851

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Peak Resultant Acceleration	G's	225 - 275	267	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	9.0	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician

9/11/07

Test Date

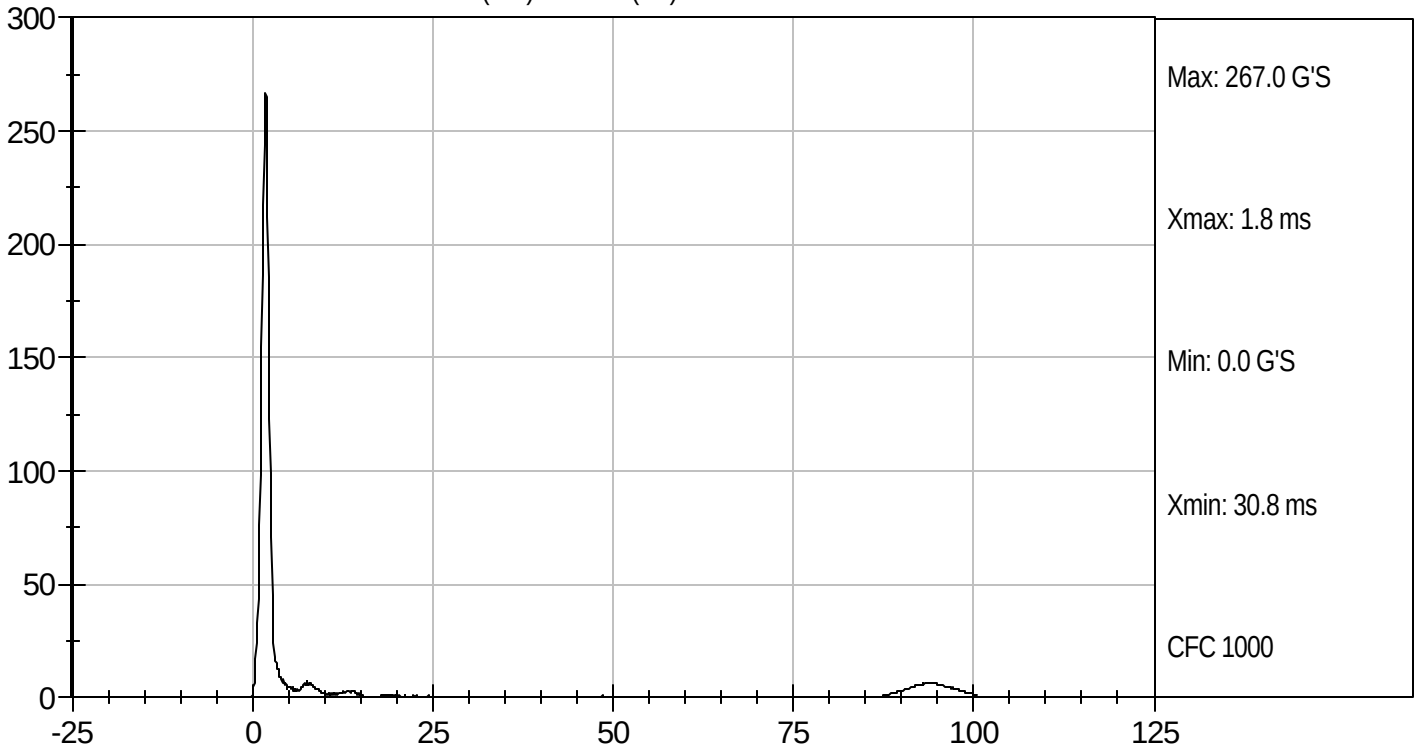
David Winkelbauer

Approved By

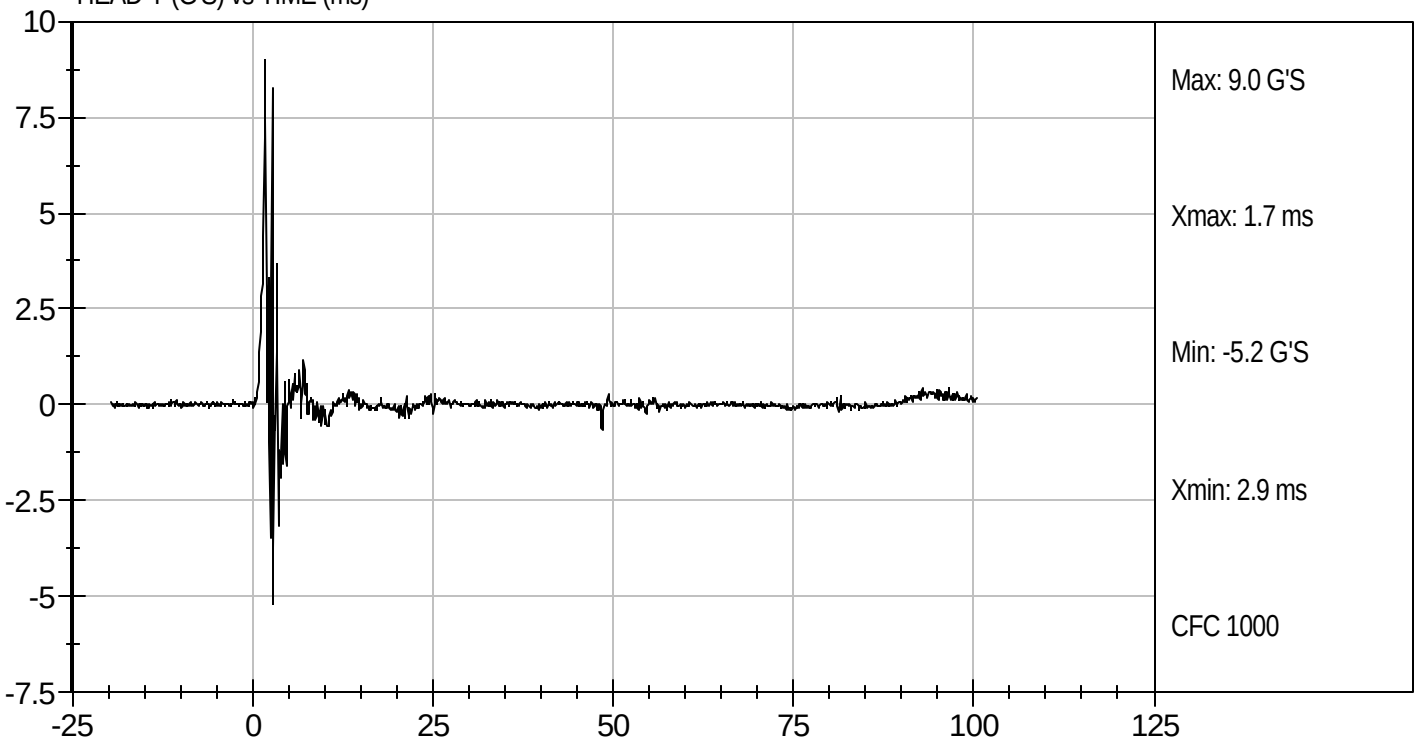
Test Desc: Head Drop
Component ID: D072851

Test Date: 9/11/07
Velocity: 0 ft/s, 0.00 m/s

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



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



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D072852

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity		%	10 to 70	36	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	24.18	Pass
	20 msec	G's	17.60 to 22.60	19.53	Pass
	30 msec	G's	12.50 to 18.50	14.71	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	14.63	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	35.0	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	69.4	Pass
	Time	msec	57.0 to 64.0	57.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	114.8	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	93.5	Pass
	Time	msec	47.0 to 58.0	47.3	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	100.8	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

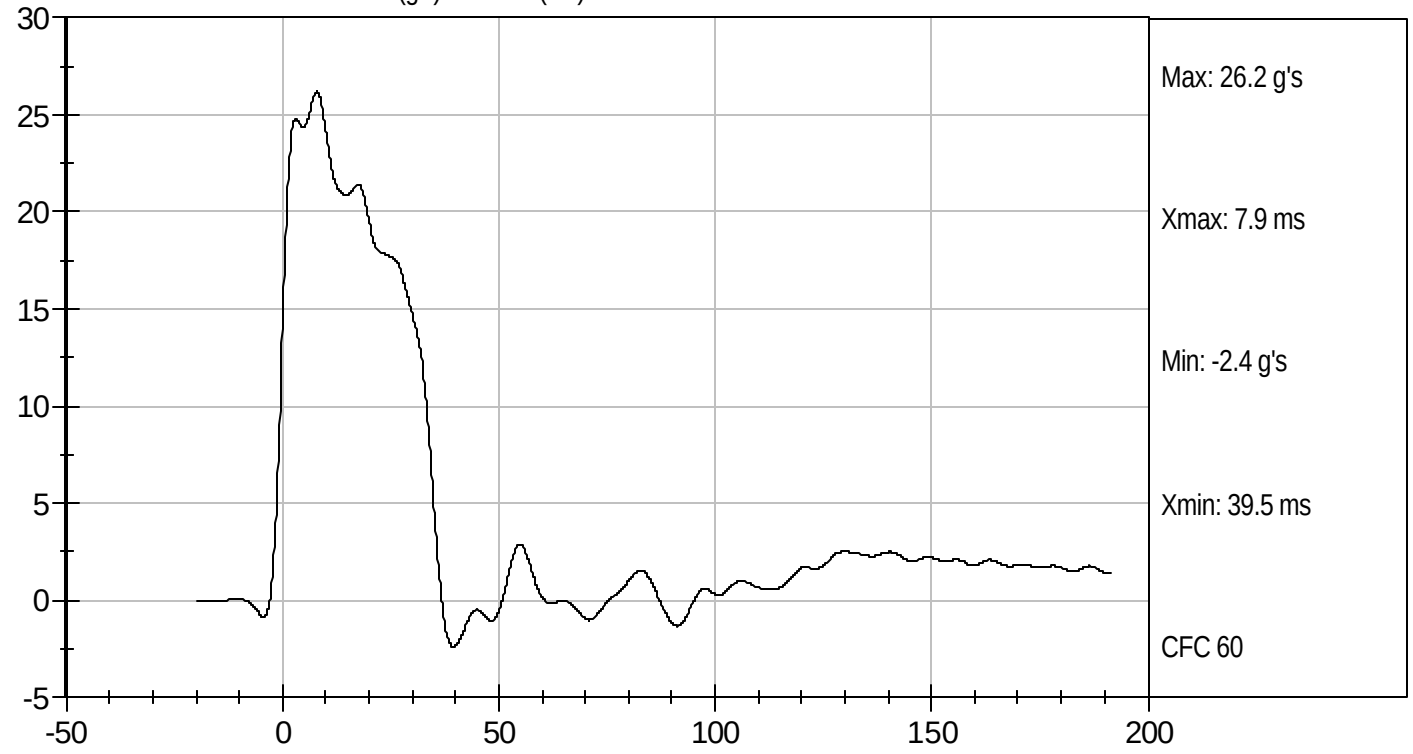
9/11/07
Test Date

David Winkelbauer
Approved By

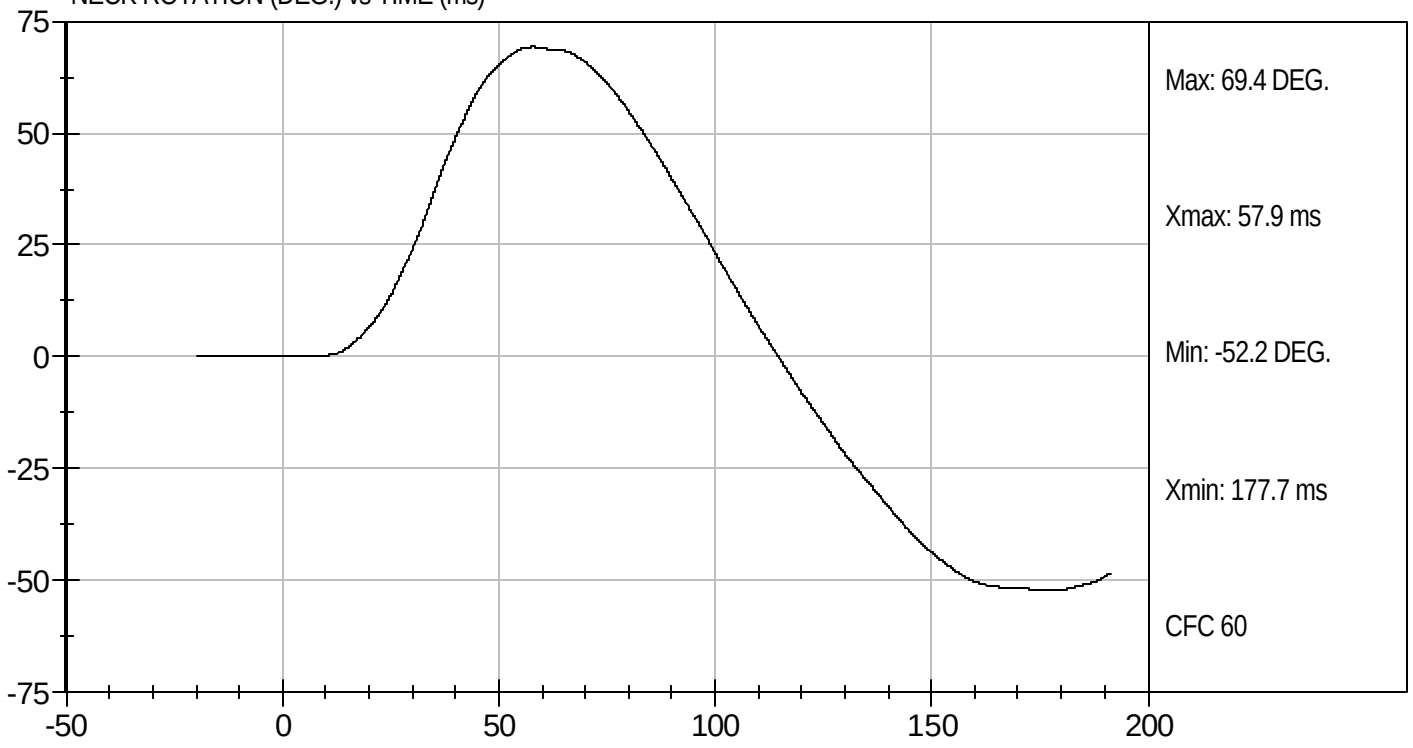
Test Desc: Neck Flexion
Component ID: D072852

Test Date: 9/11/07
Velocity: 23.15 ft/s, 7.06 m/s

PENDULUM DECELERATION (g's) vs TIME (ms)

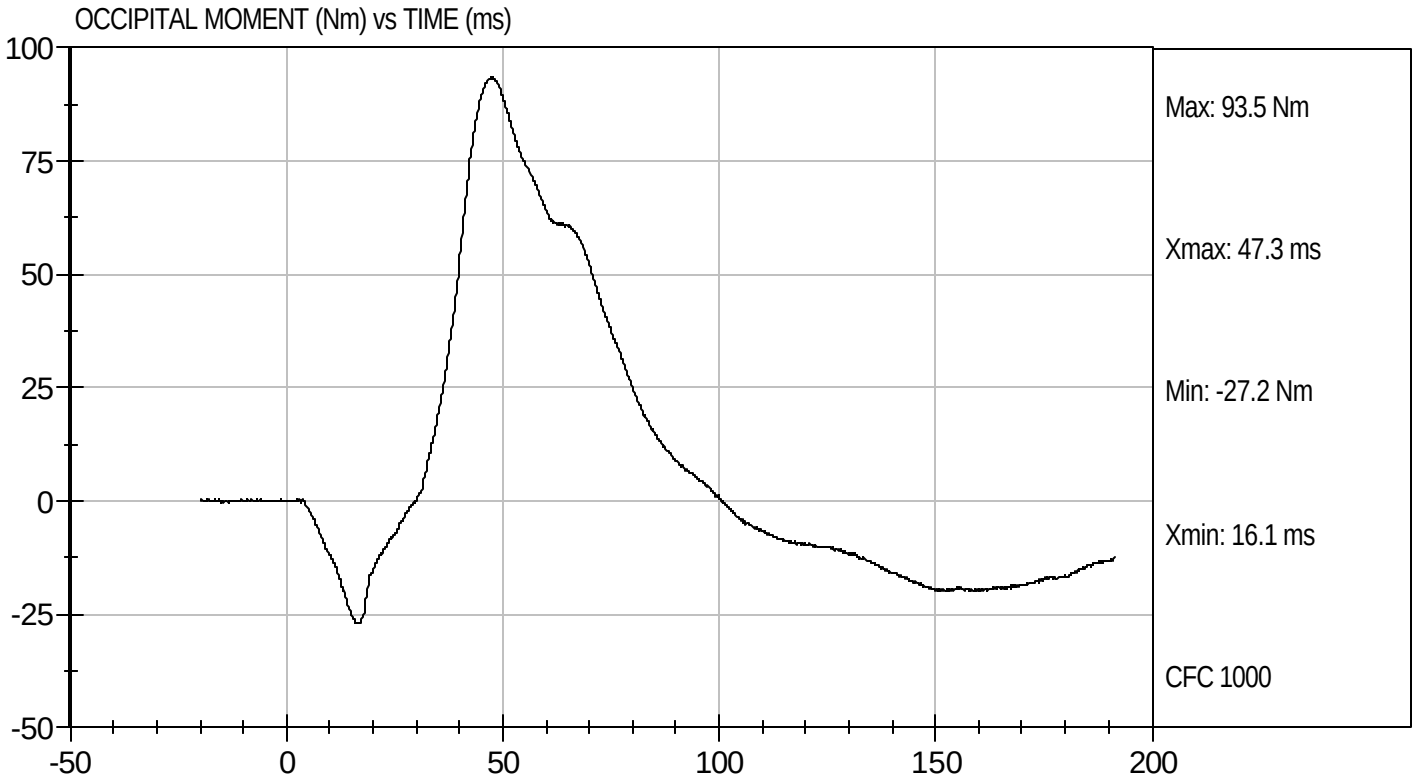


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Flexion
Component ID: D072852

Test Date: 9/11/07
Velocity: 23.15 ft/s, 7.06 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D072853

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity		%	10 to 70	36	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	19.84	Pass
	20 msec	G's	14.00 to 19.00	17.65	Pass
	30 msec	G's	11.00 to 16.00	13.24	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	13.15	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	38.2	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	98.0	Pass
	Time	msec	72.0 to 82.0	74.7	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	153.0	Pass
Moment About Occipital Condyle	Maximum	N m	-52.9 to -79.9	-62.6	Pass
	Time	msec	65.0 to 79.0	69.8	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	141.2	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

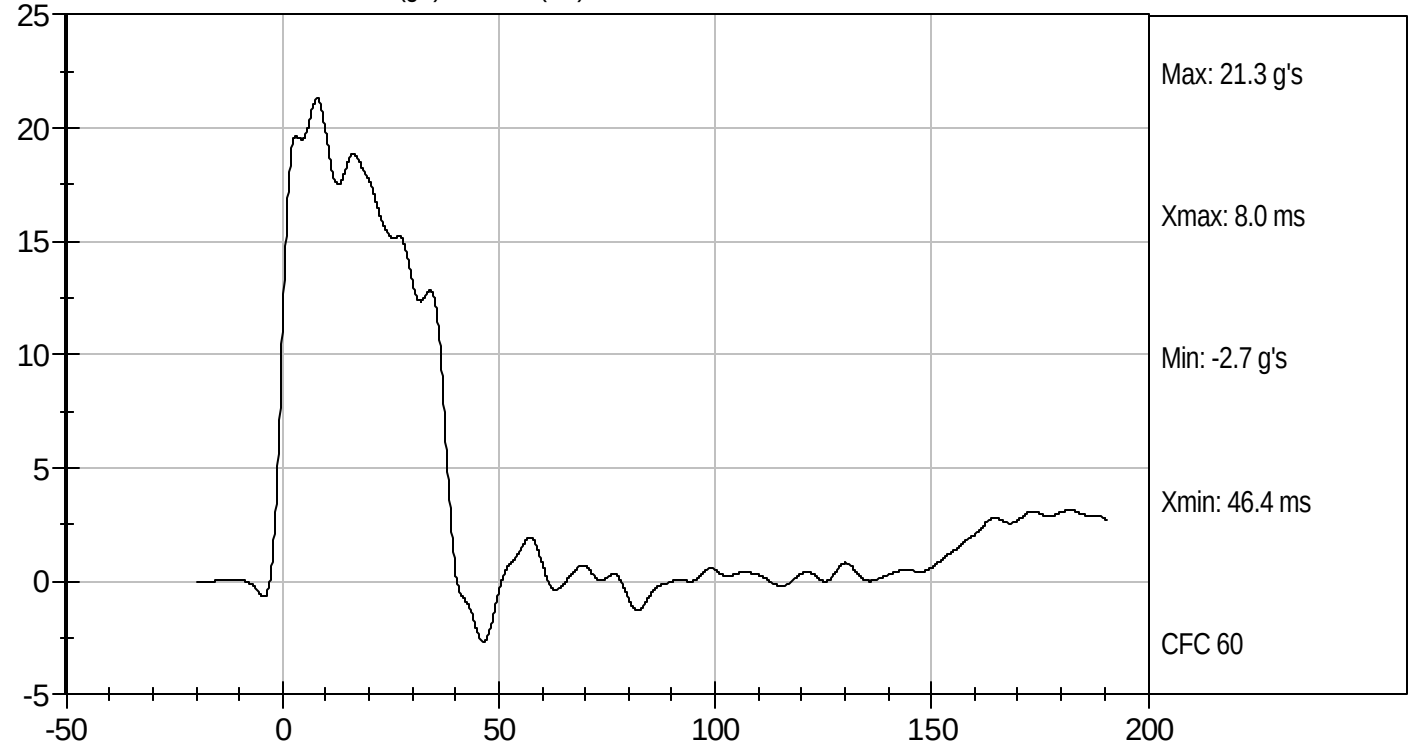
9/11/07
Test Date

David Winkelbauer
Approved By

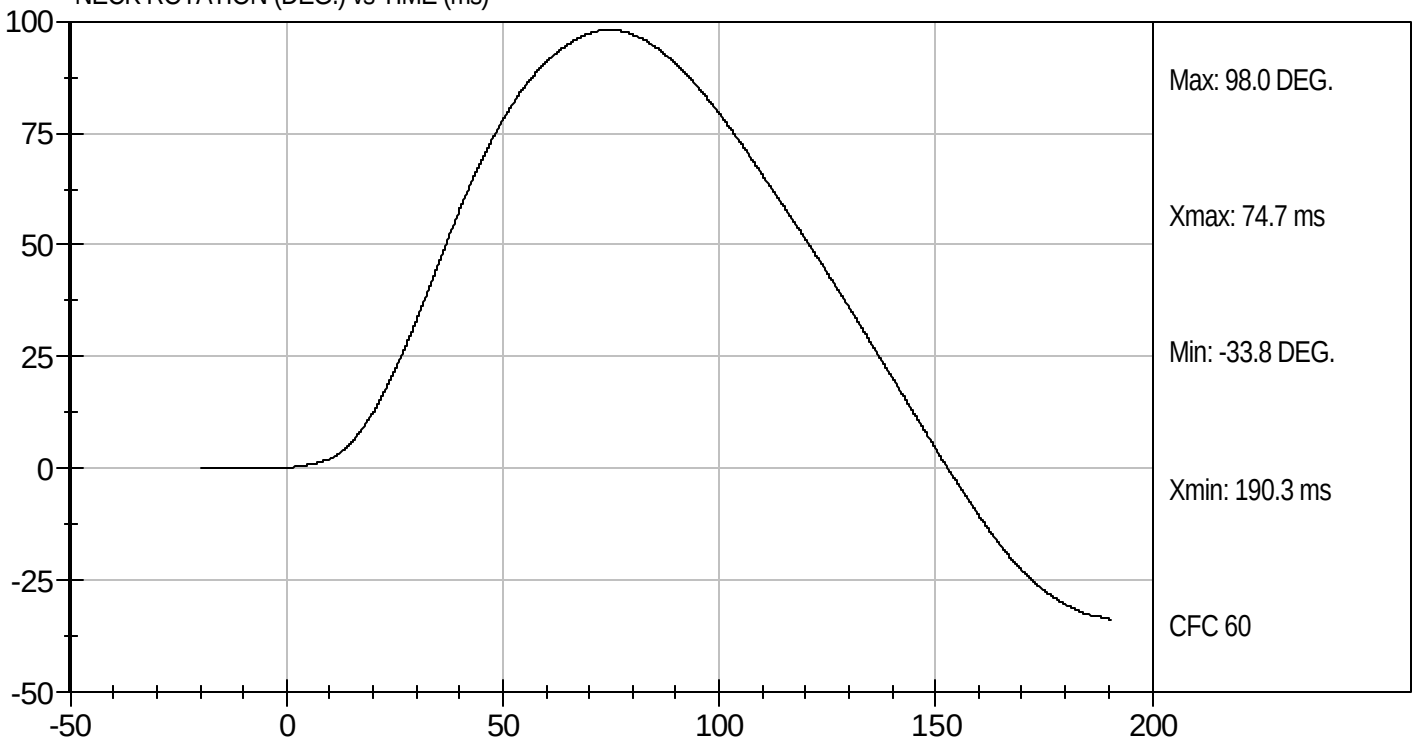
Test Desc: Neck Extension
Component ID: D072853

Test Date: 9/11/07
Velocity: 20.08 ft/s, 6.12 m/s

PENDULUM DECELERATION (g's) vs TIME (ms)

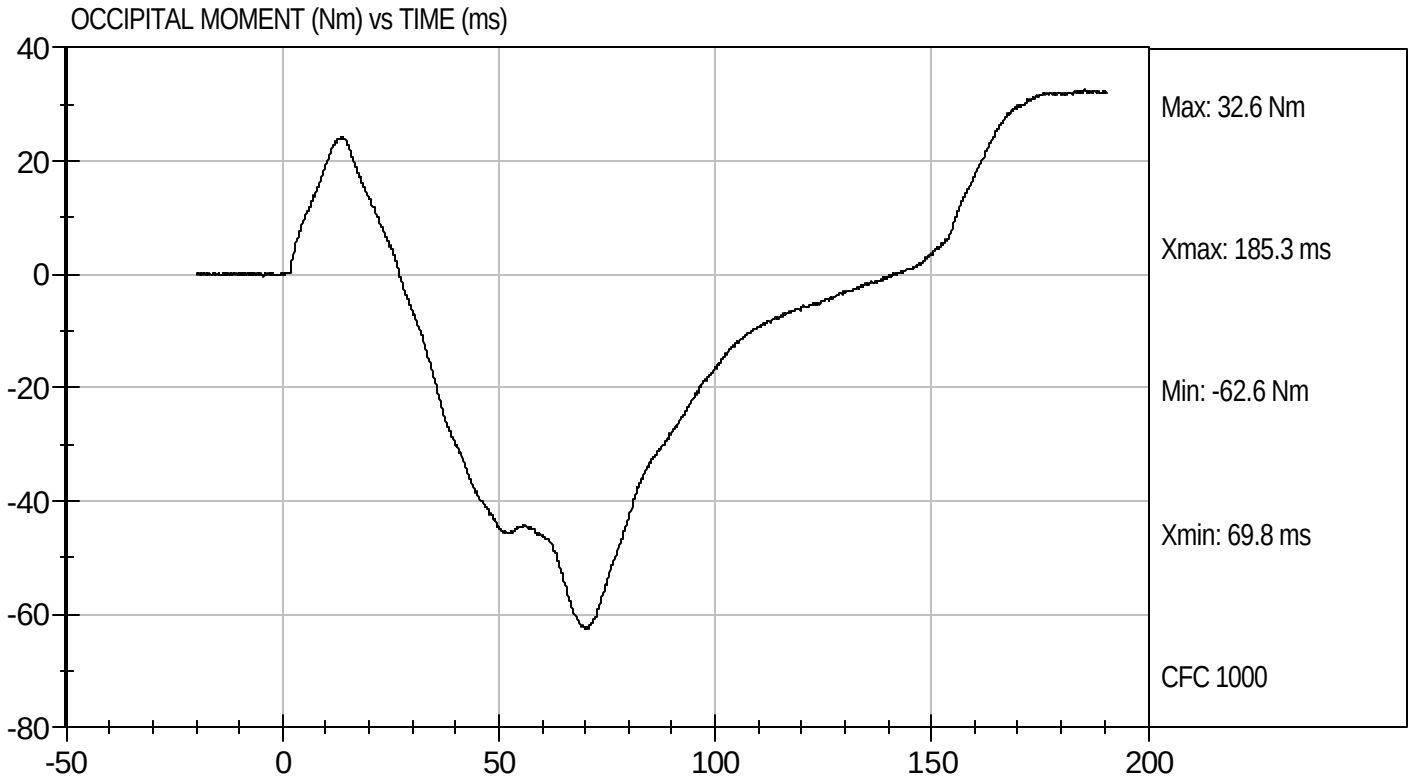


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Extension
Component ID: D072853

Test Date: 9/11/07
Velocity: 20.08 ft/s, 6.12 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D072854

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	34	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5,306	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.48	Pass
Internal Hysteresis	%	69 to 85	71	Pass
		Overall Test Results		Pass

Laboratory Technician

9/11/07

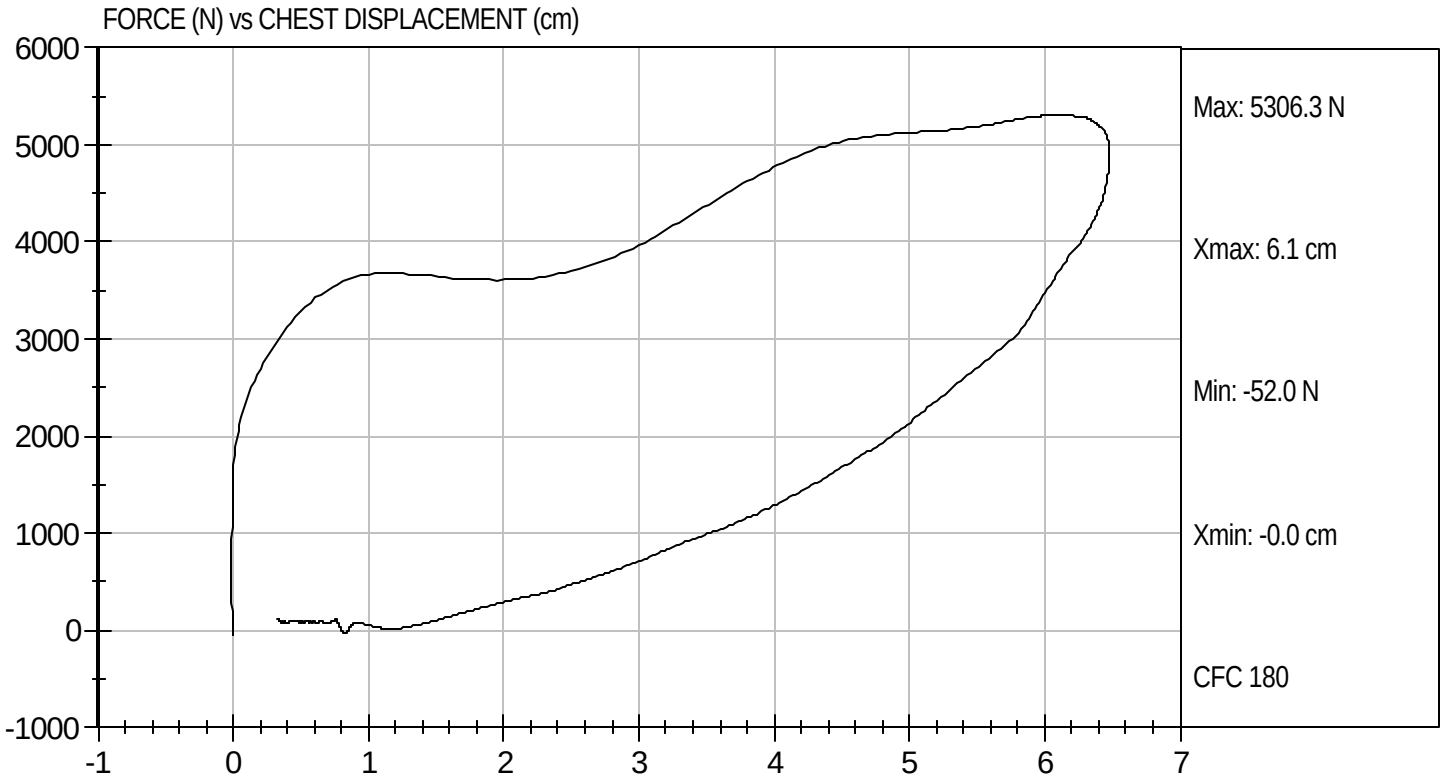
Test Date

David Winkelbauer

Approved By

Test Desc: Thorax Impact
Component ID: D072854

Test Date: 9/11/07
Velocity: 21.929 ft/s, 6.68 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D072855

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5,536	Pass
		Overall Test Results		Pass

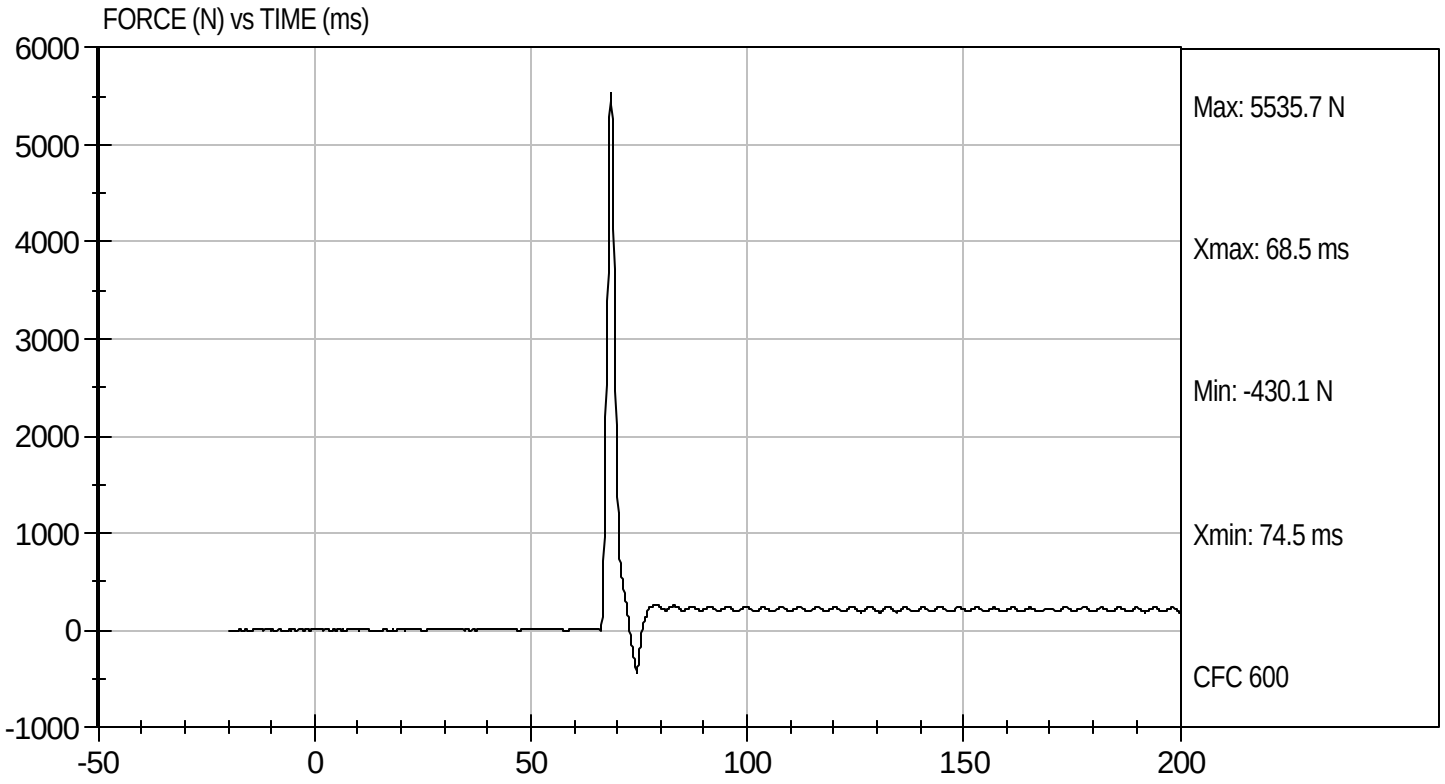
Jessica Gall
Laboratory Technician

9/11/07
Test Date

David Winkelbauer
Approved By

Test Desc: Right Knee
Component ID: D072855

Test Date: 9/11/07
Velocity: 6.92 ft/s, 2.11 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D072856

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	4,920	Pass
		Overall Test Results		Pass

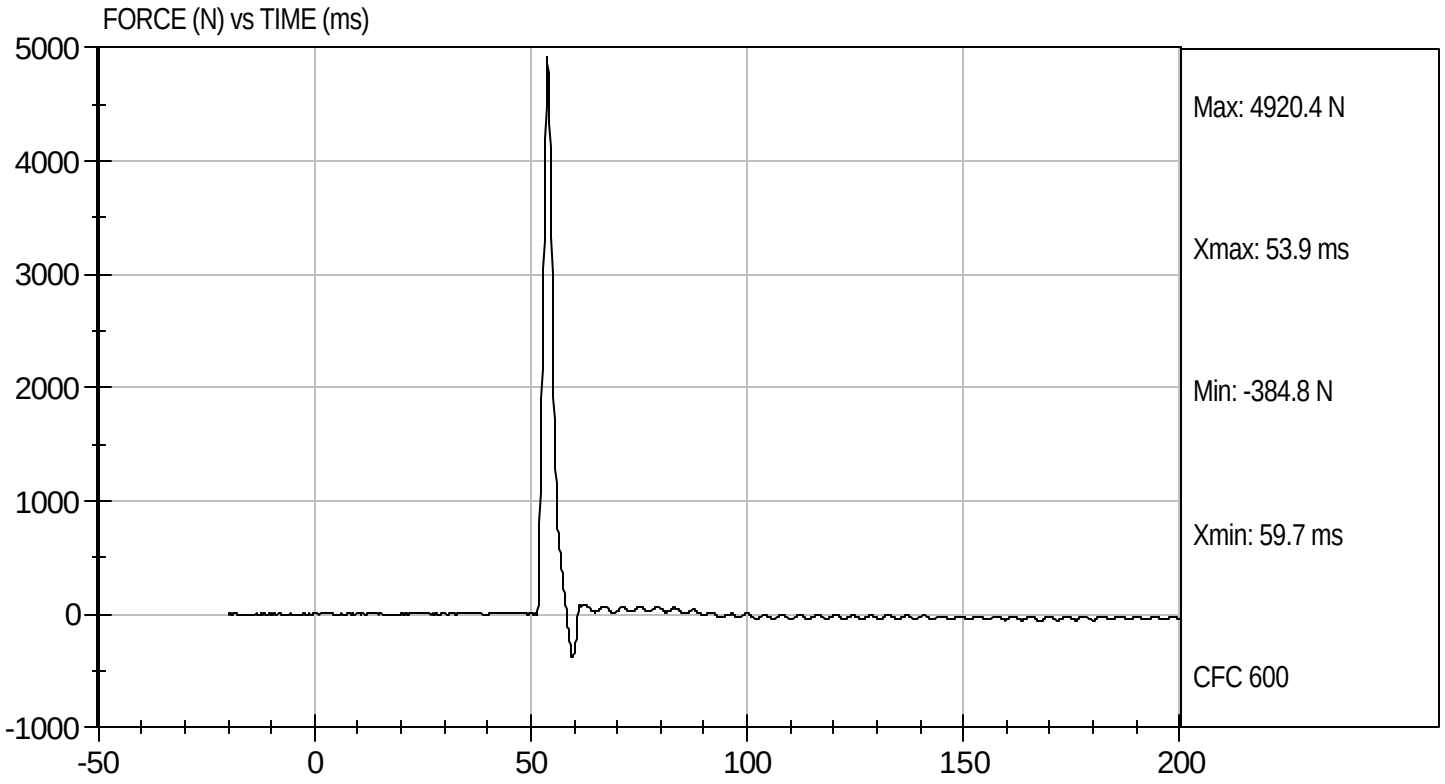
Jessica Gall
Laboratory Technician

9/11/07
Test Date

David Winkelbauer
Approved By

Test Desc: Left Knee
Component ID: D072856

Test Date: 9/11/07
Velocity: 6.92 ft/s, 2.11 m/s



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066 **Test I.D:** D072850

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	20.9	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	40	40	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	65.6	61.6	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	41	40	Pass
		Overall Test Results			Pass

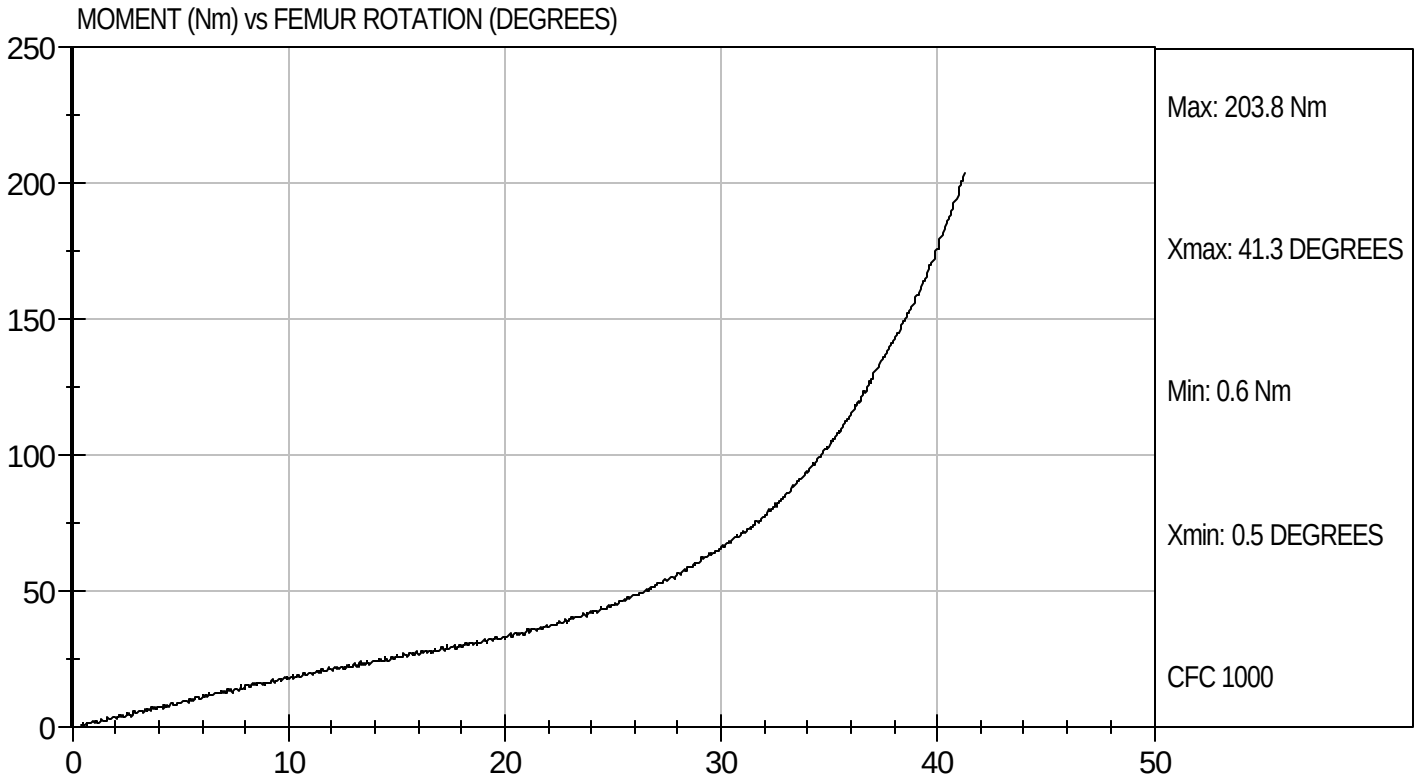
Laboratory Technician

09/11/07
Test Date

David Winkelbauer
Approved By

Test Desc: Hip Femur Flexion
Component ID: D072859

Test Date: 9/11/07
Velocity: 0 ft/s, 0.00 m/s



Test Desc: Hip Femur Flexion
Component ID: D072850

Test Date: 09/11/07
Velocity: 0 ft/s, 0.00 m/s