

REPORT NUMBER: TR-P29001-06-NC

VALIDATION FRONTAL BARRIER IMPACT TEST

MAZDA MOTOR CORPORATION

2010 MAZDA3 I SPORT

4-DOOR SEDAN

NHTSA NUMBER: MA5401

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301



MAY 7, 2009

FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF CRASHWORTHINESS STANDARDS

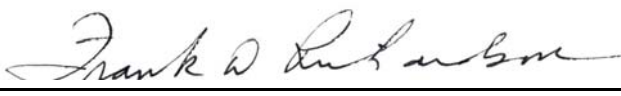
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FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

TECHNICAL REPORT DOCUMENTATION PAGE

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16. Abstract A 56.3 km/h Validation Frontal Impact Test was conducted on a 2010 Mazda3 I Sport 4-Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301 and foot well intrusion performance. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on May 7, 2009. The impact velocity of the vehicle was 56.36 km/h and the ambient temperature at the barrier face at the time of impact was 31.7 deg. C. The target vehicle's maximum post-test maximum crush was 340 mm at the vehicle centerline. The test vehicle's performance is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700.0</td> <td>186.6</td> <td>700.0</td> <td>283.1</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>-63</td> <td>-16</td> <td>-52</td> <td>-23</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.21</td> <td>1</td> <td>0.46</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>792.8</td> <td>2620</td> <td>835.2</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>-4000</td> <td>-58.2</td> <td>-2520</td> <td>-232.6</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>-10008</td> <td>-217.3</td> <td>-6805</td> <td>-2537.0</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>-10008</td> <td>-739.4</td> <td>-6805</td> <td>-3049.2</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700.0	186.6	700.0	283.1	Maximum Chest Compression	mm	-63	-16	-52	-23	Nij	N/A	1	0.21	1	0.46	Neck Tension	N	4170	792.8	2620	835.2	Neck Compression	N	-4000	-58.2	-2520	-232.6	Left Femur Force	N	-10008	-217.3	-6805	-2537.0	Right Femur Force	N	-10008	-739.4	-6805	-3049.2
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program, sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-06-D-00027. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure, dated April 2009.

SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2010 Mazda3 I Sport 4-Door Sedan at a velocity of 56.36 km/h. The test was performed at KARCO Engineering, LLC, on May 7, 2009. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One Part 572E 50th percentile male anthropomorphic test device (ATD) was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck force transducers, right / left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure the dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 035) and the right-front passenger (position 2) ATD (Serial No. 635) were calibrated prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The one-hundred thirty-two (132) 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% 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 test vehicle was 340 mm located at the vehicle centerline. Both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver ATD's head and chest contacted the airbag. The head also contacted the headrest. Both the left and right knees contacted the knee bolster. The left knee also contacted the steering column.

The passenger's visible contact points were as follows: The passenger ATD's head and chest contacted the airbag. The head also contacted the headrest. Both the left and right knees contacted the glovebox.

The occupant data is summarized below:

ATD Position	HIC ₁₅	T ¹	T ²	Chest Disp. (mm)	Nij	Neck Tension (N)	Neck Comp. (N)	Left Femur (N)	Right Femur (N)
Driver (50th)	186.6	73.2	88.2	-15.7	0.21	792.8	-58.2	-217.3	-739.4
Passenger (5th)	283.1	58.9	73.9	-22.8	0.46	835.2	-232.6	-2537.0	-3049.2

SECTION 2
DATA SHEETS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	$=(t_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
 Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MA5401
Model Year	2010
Make	Mazda
Model	3 I Sport
Body Style	4-Door Sedan
VIN	JM1BL1SG3A1131600
Body Color	Black
Delivery Date	4/27/2009
Odometer Reading (km / mi)	209 / 130
Dealer	Hi-Desert Kia
Transmission	5-Speed Automatic
Final Drive	Front
Type / No. of Cylinders	Inline 4
Engine Displacement (L)	2.0
Engine Placement	Transverse
Roof Rack	No
Sunroof / T-Top	No
Tinted Glass	Yes
Traction Control	No
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

Anti-Lock Brakes	Yes
All Wheel Drive	No
Power Steering	Yes
Driver Front Airbag	Yes
Driver Side Torso Airbag	Yes
Driver Side Head Airbag	No
Driver Curtain Airbag	Yes
Driver Knee Airbag	No
Pass. Front Airbag	Yes
Pass. Side Torso Airbag	Yes
Pass. Side Head Airbag	No
Pass. Curtain Airbag	Yes
Pass. Combo Airbag	No
Pre-Tensioners	Yes
Load Limiters	Yes
Air Conditioning	Yes
AM / FM CD	Yes
Tilt Steering	Yes
Automatic Door Locks	No
Power Windows	Yes
Power Seats	No
Other	Tire Pressure Monitoring System

Does Owner's Manual provide instructions to turn off automatic door locks?

N/A

DATA FROM CERTIFICATION LABEL

Manufactured By	Mazda Motor Corporation
Date of Manufacture	Feb-09

GVWR (kg)	1800
GAWR Front (kg)	967
GAWR Rear (kg)	833

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				385.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				44.8	A-B

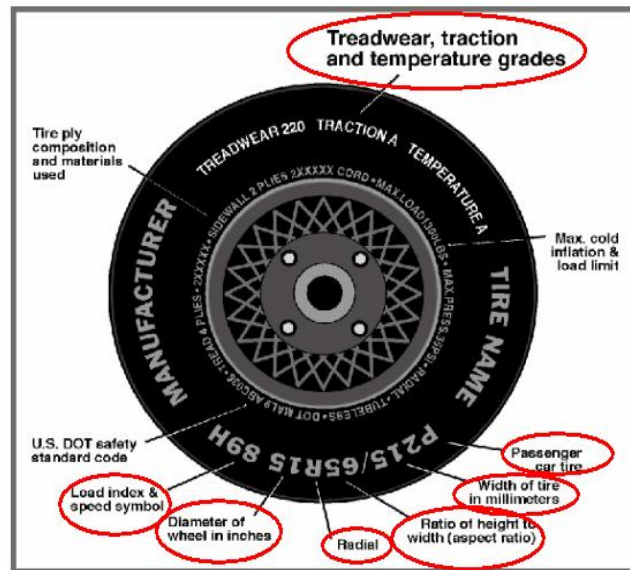
VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
					Fixed	Adjustable	
	Bucket	Bench	Split Bench	Contoured		w/ Lever	w/ Knob
Front Seat	Yes					Yes	
Rear or Second Row Seat		Yes			Yes		
Third Row Seat							

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
 Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P205/55R16	P205/55R16
Tire Size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Turanza EL 400	Turanza EL 400
Treadwear	300	440
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 Steel, 1 Nylon
Load Index / Speed Symbol	89H	89H
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Right	H48K DHE 0209	H48K DHE 0209
DOT Safety Code Left	H48K DHE 0209	H48K DHE 0209

DATA SHEET NO. 1 ... (CONTINUED)**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
 Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	398.0	263.5		430.5	333.5	
Right	kg	411.5	254.0		425.0	317.0	
Ratio	%	61.0%	39.0%	100.0%	56.8%	43.2%	100.0%
Total	kg	809.5	517.5	1327.0	855.5	650.5	1506.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1327.0	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	142.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	44.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1513.8	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	695	699	706	706	1030
As Tested	mm	681	680	670	676	1140
Fully Loaded	mm	679	680	670	669	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2640
Total Vehicle Length at Left Side	mm	3822
Total Vehicle Length at Centerline	mm	4575
Total Vehicle Length at Right Side	mm	3814
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	23.5
Amount of Stoddard Solvent in Fuel Tank	L	51.04

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Rear Windows (6.0 kg), Spare Tire (9.5 kg), Rear Bumper Cover (3.5 kg), Spare Tire Tools (2.5 kg), Rear Carpeting (2.0 kg)

DATA SHEET NO. 1 ... (CONTINUED)**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length	4575	4235	-340
2	Total Width	1750	1751	1
3	Bumper Top Height	640	550	-90
4	Bumper Bottom Height	216	155	-61
5	Longitudinal Member Top Height	530	545	15
6	Longitudinal Member Bottom Height	430	410	-20
7	Distance Between Longitudinal Members	890	950	60
8	Longitudinal Member Width	50	60	10
9	Engine Top Height	775	705	-70
10	Engine Bottom Height	193	138	-55
11	Engine and Gearbox Width	495	495	0
12	Front Bumper to Engine Distance	698	615	-83
13	Front Shock Absorber Fixing Height	855	860	5
14	Bonnet Leading Edge Height	760	640	-120
15	Front Shock Absorber Fixing Width	1140	1125	-15
16	Front Bumper to Front Axle Distance	943	605	-338
17	Front Axle to A-Pillar Distance	448	440	-8
18	A-Pillar to B-Pillar Distance	1000	1000	0
19	B-Pillar to Rear Axle Distance	1090	1105	15
20	B-Pillar to C-Pillar Distance	740	740	0
21	Roof Sill Bottom Height	1301	1334	33
22	Roof Sill Top Height	1415	1440	25
23	Floor Sill Bottom Height	191	212	21
24	Floor Sill Top Height	308	340	32

DATA SHEET NO. 2

SEAT ADJUSTMENT, SEAT BELTS, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan

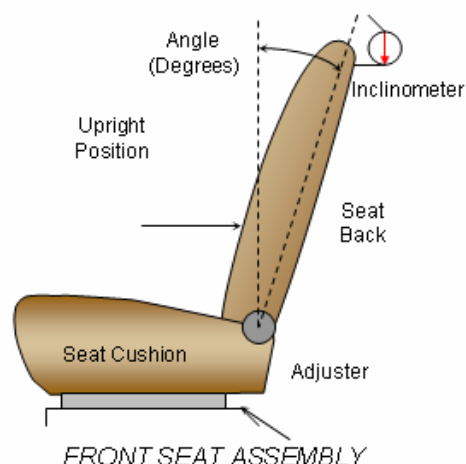
NHTSA No.: MA5401

Test Program: 56 km/h Frontal Validation Testing

Test Date: 05/07/09

NOMINAL DESIGN RIDING POSITION

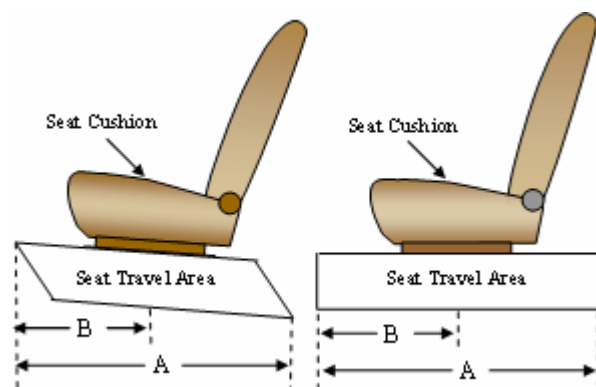
The procedure for the driver is as follows: the seat back is set to the manufacturer's designated angle; seat back angle is measured at the headrest post using a digital inclinometer. The procedure for the passenger is as follows: the seat back is set to position the transverse instrumentation platform of the dummy's head at $0^\circ \pm 0.5^\circ$; seat back angle is measured at the headrest post using a digital inclinometer.



Seating Position	Degrees
Driver Seat Back Angle	15.3
Passenger Seat Back Angle	10.6

SEAT FORE / AFT POSITIONS

The total seat travel is measured from the forward most possible position to the rearmost possible position. The driver's seat is set to the mid travel longitudinal position with the seat in the full down height position. The passenger's seat is positioned at the farthest point forward without the dummy contacting any interior surface.



Seating Position	Total Fore-Aft Travel	Placed in Position	Cushion Range	Placed In Position
Driver Seat	260 mm	130 mm	-5.1° to -0.4°	-5.1°
Passenger Seat	260 mm	0 mm	Fixed	Fixed

SEAT BELT UPPER ANCHORAGE

Position zero (0) is the uppermost position.

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	4	1
Passenger Seat	4	4

DATA SHEET NO. 2 ... (CONTINUED)

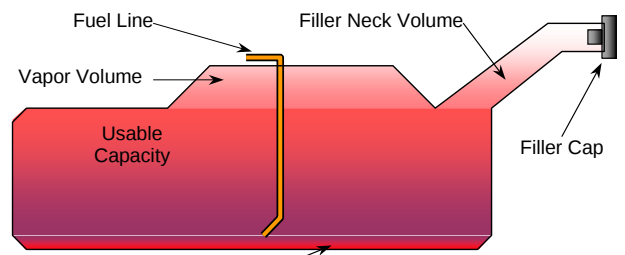
SEAT ADJUSTMENT, SEAT BELTS, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	54.89
Usable Capacity of "Optional Tank"	
92 - 94% of Usable Capacity	50.50 to 51.6
Actual Amount of Stoddard Solvent Used	51.04
1/3 of Usable Capacity	18.30

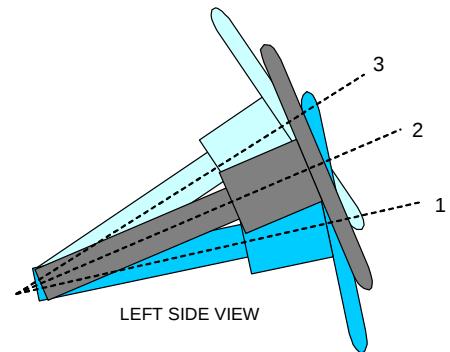
The test vehicle is equipped with an electric fuel pump. The fuel pump operates when the starter or engine is activated. The fuel filler door is located on the right rear fender. The standard fuel tank occupies the area under the rear seat.



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. A digital inclinometer is used to measure a plate which is placed across the rim of the steering wheel.



STEERING COLUMN ASSEMBLY

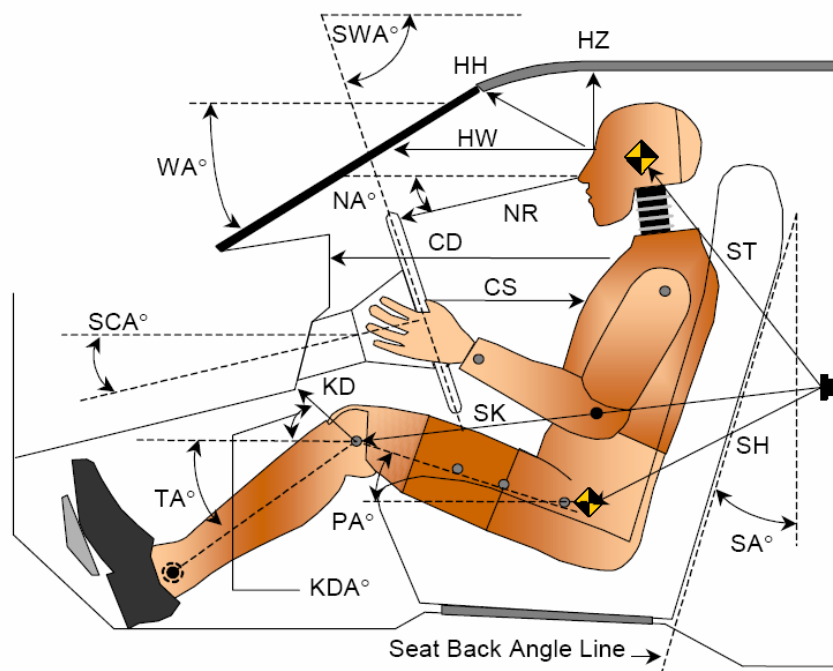
STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	18.9	107
Geometric Center Position, No. 2	21.9	135
Uppermost Position, No. 3	24.9	162
Telescoping Steering Wheel Travel		55
Test Position	21.9	162

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2010 Mazda3 I Sport 4-Door Sedan	NHTSA No.:	MA5401
Test Program:	56 km/h Frontal Validation Testing	Test Date:	05/07/09

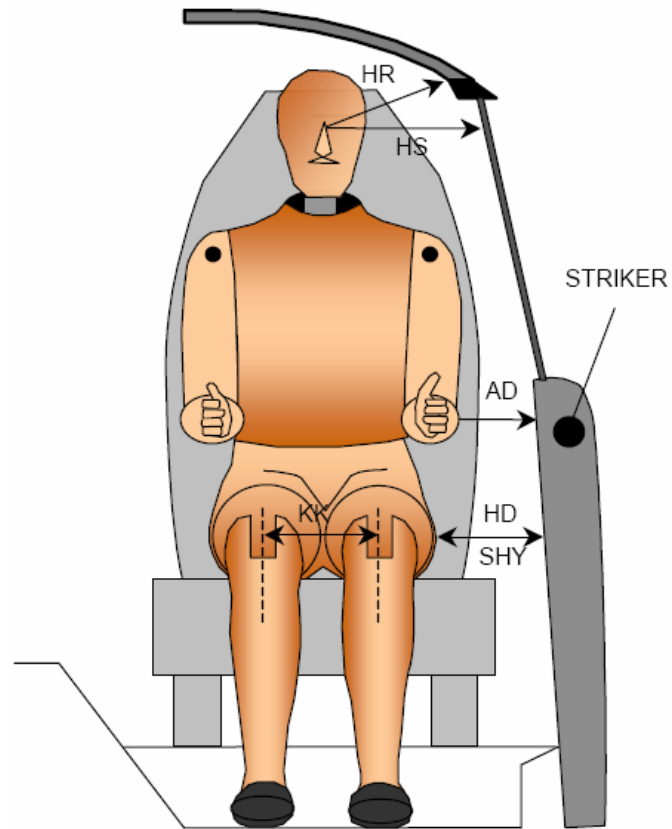


Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		23.0		
SWA°	Steering Wheel Angle		24.5		
SCA°	Steering Column Angle		65.5		
SA°	Seat Back Angle (On Headrest Post)		15.3		10.6
HZ	Head to Roof	217	90.0	216	90.0
HH	Head to Header	376	27.8	294	53.0
HW	Head to Windshield	699	0.0	723	0.0
HR	Head to Side Header	250		283	
NR	Nose to Rim	410	6.9	441	35.8
CD	Chest to Dash	566		359	
CS	Chest to Steering Hub	327	3.5		
RA	Rim to Abdomen	221	0.0		
KDL	Left Knee to Dash	188	39.9	70	21.0
KDR	Right Knee to Dash	135	36.7	109	35.0
PA°	Pelvic Angle		24.8		21.3
TA°	Tibia Angle		44.0		45.7
SK	Striker to Knee	598	3.0	735	7.2
ST	Striker to Head	485	80.2	472	62.6
SH	Striker to H-Point	270	42.8	405	9.0

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09



Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	136	92
HD	H-Point to Door	158	205
HR	Head to Side Header	250	283
HS	Head to Side Window	325	364
KK	Knee to Knee	285	161
SHY	Striker to H-Point (Y-Direction)	250	270
AA	Ankle to Ankle	315	190

DATA SHEET NO. 5

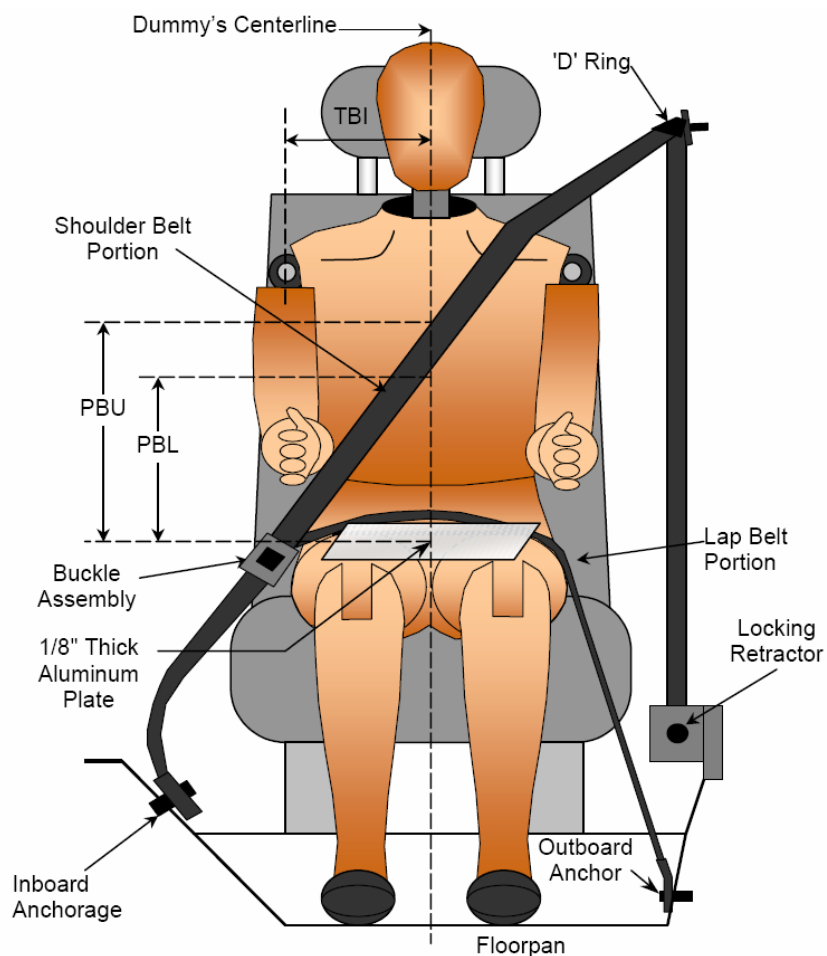
SEAT BELT POSITIONING DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan

NHTSA No.: MA5401

Test Program: 56 km/h Frontal Validation Testing

Test Date: 05/07/09



SEAT BELT POSITIONING MEASUREMENTS

Code	Measurement Description	Units	Driver	Passenger
PBU	Top Surface of Aluminum Plate to Belt Upper Edge	mm	331	271
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	263	199

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	884	947
Lap Belt Length as Measured on ATD	mm	771	557
Remainder of Belt on Reel	mm	955	912
Total Belt Length for Continuous Webbing Systems	mm	2610	2416

DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
 Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

No.	Description	Location			Angle (°)	Film Plane to Head Target	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Real-Time Camera	11412	-8150	-1484				30
2	Overall Left Side	-2590	-7950	-1371	0	9881	24	1000
3	Left Side A-Pillar	-1701	-6197	-1701	0	7921	85	1000
4	Left Side B-Pillar	-6696	-5987	-1071	-17	11281	ZOOM	1000
5	Steering Column Upper	-1966	-8141	-3258	-13	9887	35	1000
6	Steering Column Lower	-1972	-8184	-2879	-13	9870	35	1000
7	Driver's Seat Belt	-3100	-235	-1320			12	1000
8	Overall Right Side	-2336	7569	-1168	0	9417	24	1000
9	Right Side A-Pillar	-1600	6121	-1651	0	7789	70	1000
10	Passenger IP View	-5136	9516	-2460	0	7795	ZOOM	1000
11	Right Side B-Pillar	-5136	9516	-2460	-10	12626	ZOOM	1000
12	Passenger's Seat Belt	-3100	235	-1370			12	1000
13	Overhead Passenger View	381	445	-2548	-34		12	1000
14	Overhead Driver View	363	-543	-2548	-34		12	1000
15	Overhead Windshield View	354	0	-5749	-90		24	1000
16	Pit View of Engine Compartment	-756	0	1495	90		12	1000
17	Pit View of Fuel Tank	-3398	0	1495	90		8	1000

Reference Points: X – Front Surface of Vehicle (+ Forward)
 Y – Vehicle Centerline (+ Passenger Side)
 Z – Ground Plane (+ Down)

DATA SHEET NO. 7**VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

No.	Description	Location		
		X	Y	Z
1	Left Rear Cross Member X	1780	-690	-340
2	Right Rear Cross Member X	1780	690	-340
3	Engine Top X	3840	160	-745
4	Engine Bottom X	3870	140	-160
5	Left Brake Caliper X	3720	725	-230
6	Right Brake Caliper X	3720	725	-230
7	Left Rear Cross Member Z	1780	-690	-340
8	Right Rear Cross Member Z	1780	690	-340

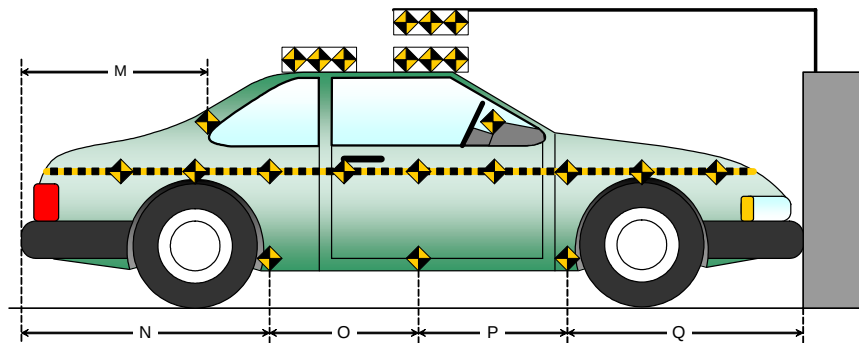
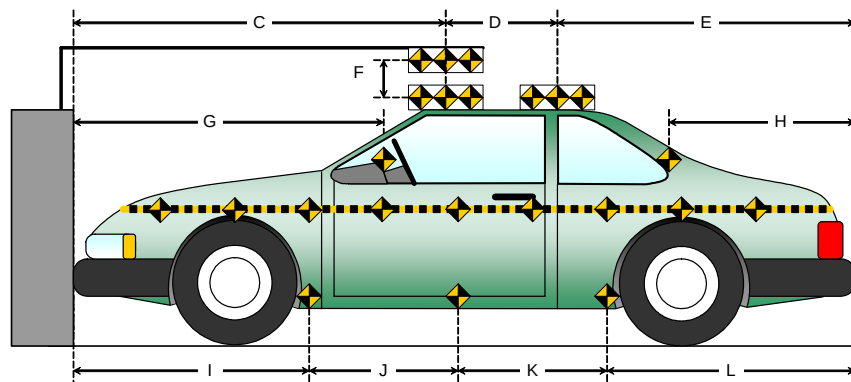
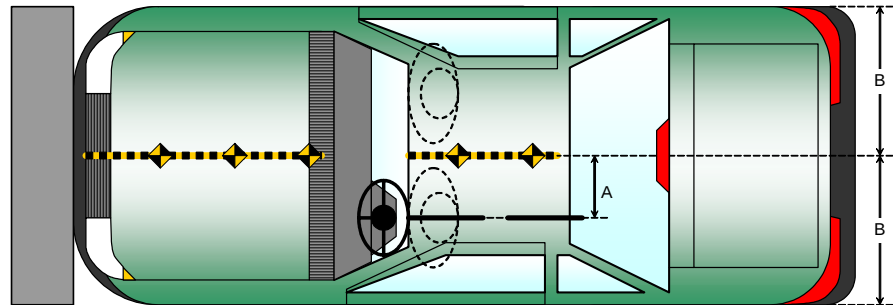
Reference Points: X – Rear Surface of Vehicle (+ Forward)
Y – Vehicle Centerline (+ Passenger Side)
Z – Ground Plane (+ Down)

DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
 Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

Item	Value
A	370
B	875
C	2223
D	610
E	1737
F	370
G	1720
H	1007
I	1390
J	872
K	872
L	1430
M	1007
N	1430
O	869
P	869
Q	1398



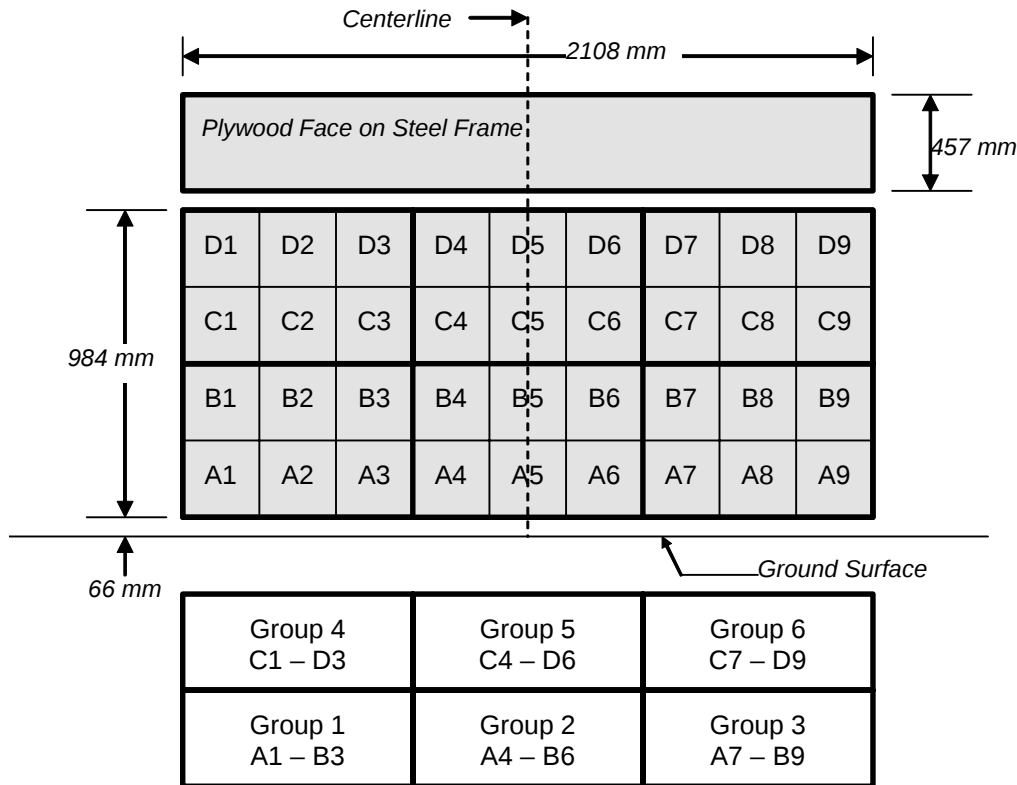
All measurements in millimeters.

DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
 Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

36 Load Cell Rigid Barrier (NHTSA Standard) Load Cell Locations on Fixed Barrier



6 Groups of 6 Load Cells Each

DATA SHEET NO. 10**TEST VEHICLE CAMERA AND INSTRUMENTATION SUMMARY**

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

INSTRUMENTATION

Driver Dummy Accelerometers	40
Passenger Dummy Accelerometers	40
Vehicle Structure Accelerometers	8
Load Cell Barrier	36
Belt Load and Pullout Sensors	8
Total	132

CAMERA COVERAGE

High-Speed Vehicle On-Board	2
High-Speed Offboard	14
Real Time	3
Total	19

DATA SHEET NO. 11
POST-TEST OBSERVATIONS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	P572E 50th Percentile Male ATD / 035	P572O 5th Percentile Female ATD / 635
Head Contact	Airbag, Headrest	Airbag, Headrest
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Steering Column	Glovebox
Right Knee Contact	Bolster	Glovebox

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked / Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Rear Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Seat Track Shift (mm)	10 mm	8 mm
Seat Back Failure	None	None
Glazing Damage	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Cracked
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1314
Center	mm	1256
Right Side	mm	1339
Average	mm	1303

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Knee Airbag	No		No	
Side Torso Airbag	Yes	No	Yes	No
Combination Head/Torso Airbag	No		No	
Side Head Curtain/Tube Airbag	Yes	No	Yes	No
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	

DATA SHEET NO. 12

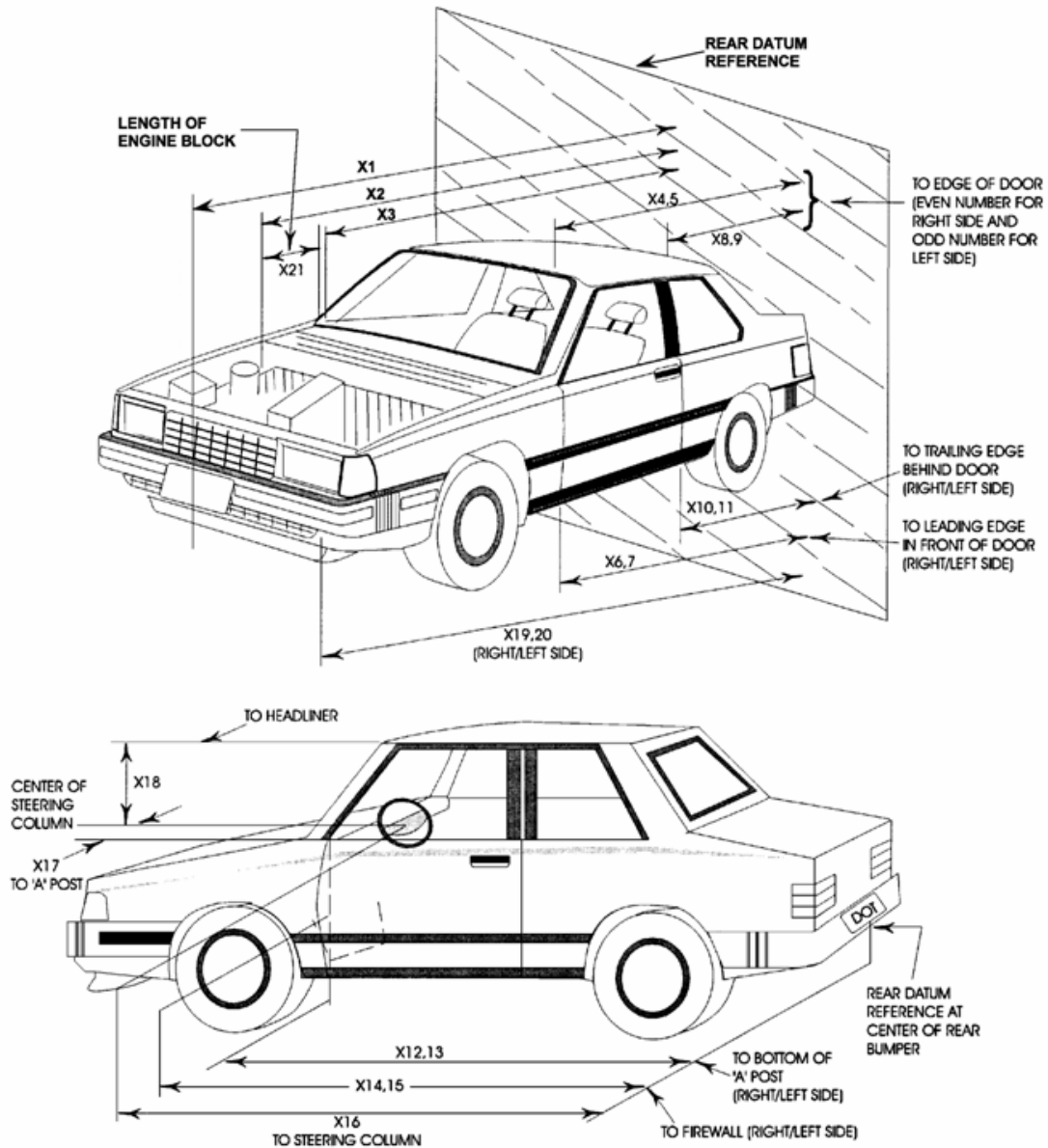
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan

NHTSA No.: MA5401

Test Program: 56 km/h Frontal Validation Testing

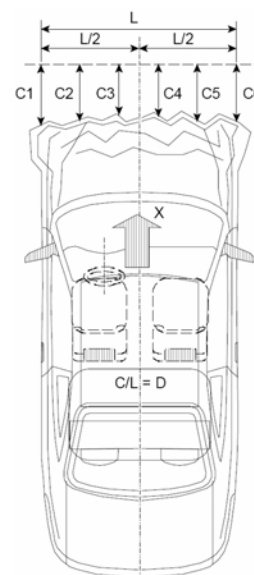
Test Date: 05/07/09



DATA SHEET NO. 12 ... (CONTINUED)**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4575	4235	-340
2	Rear Surface of Vehicle to Front of Engine	3885	3595	-290
3	RSOV to Firewall	3555	3545	-10
4	RSOV to Upper Leading Edge of Right Door	3141	3151	10
5	RSOV to Upper Leading Edge of Left Door	3145	3159	14
6	RSOV to Lower Leading Edge of Right Door	3128	3130	2
7	RSOV to Lower Leading Edge of Left Door	3135	3140	5
8	RSOV to Upper Trailing Edge of Right Door	2013	2025	12
9	RSOV to Upper Trailing Edge of Left Door	2017	2030	13
10	RSOV to Lower Trailing Edge of Right Door	2073	2070	-3
11	RSOV to Lower Trailing Edge of Left Door	2076	2078	2
12	RSOV to Bottom of A-Pillar of Right Side	3106	3108	2
13	RSOV to Bottom of A-Pillar Left Side	3106	3113	7
14	RSOV to Firewall, Right Side	3502	3496	-6
15	RSOV to Firewall, Left Side	3505	3495	-10
16	RSOV to Steering Column	2715	2120	-595
17	Center of Steering Column to A-Pillar	415	415	0
18	Center of Steering Column to Headliner	415	390	-25
19	RSOV to Right Side of Front Bumper	3814	3650	-164
20	RSOV to Left Side of Front Bumper	3822	3771	-51
21	Length of Engine Block	626	626	0
RD	RSOV to Right Side of Dash Panel	2885	2880	-5
CD	RSOV to Center of Dash Panel	2855	2845	-10
LD	RSOV to Left Side of Dash Panel	2875	2880	5

DATA SHEET NO. 13**ACCIDENT INVESTIGATION DATA**Test Vehicle: 2010 Mazda3 I Sport 4-Door SedanNHTSA No.: MA5401Test Program: 56 km/h Frontal Validation TestingTest Date: 05/07/09**VEHICLE INFORMATION**VIN: JM1BL1SG3A1131600Wheelbase (mm): 3640Vehicle Size Category: 4-Door SedanTest Weight (kg): 1506.0**ACCELEROMETER DATA**Accelerometer Locations: DTNFCal. Procedure/Interval: Drop Test / 6 monthsIntegration Algorithm: NHTSA StandardImpact Velocity (km/h): 56.36Velocity Change (km/h): 67Time of Separation (msec): 71.4Linearity: Good**CRUSH PROFILE**Collision Deformation Classification: 12FCEW2Midpoint of Damage: Vehicle CenterlineDamage Region Length (mm): 1768Impact Mode: Full Frontal

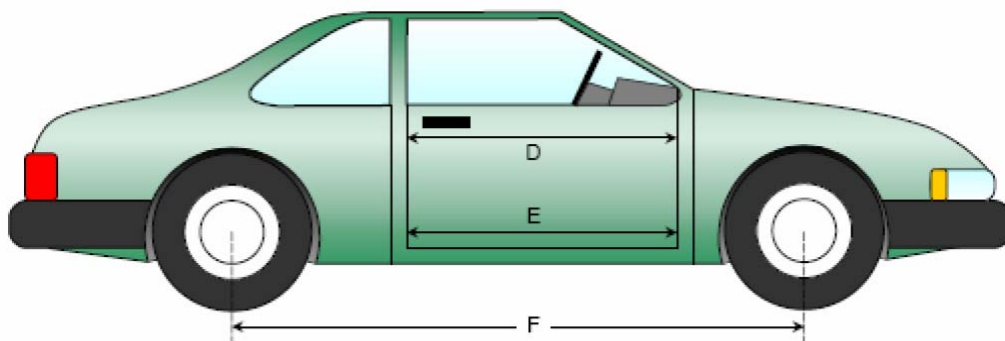
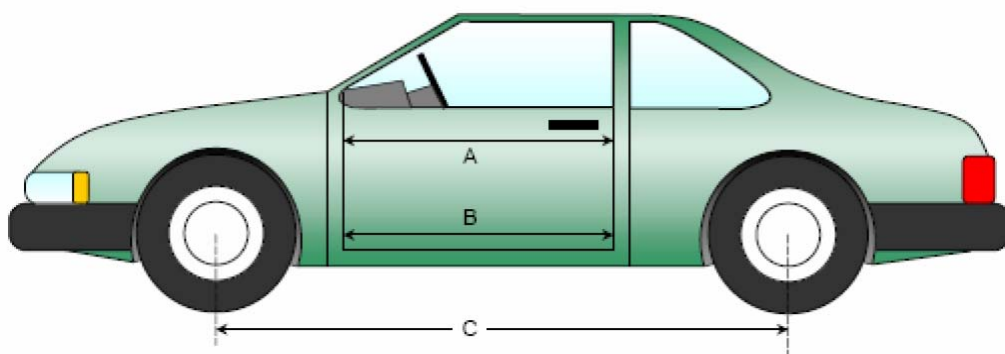
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	760	804	-44
C2	Crush Zone 2 at Left Side	mm	160	387	-227
C3	Crush Zone 3 at Left Side	mm	40	345	-305
C4	Crush Zone 4 at Right Side	mm	40	365	-325
C5	Crush Zone 5 at Right Side	mm	160	445	-285
C6	Crush Zone 6 at Right Side	mm	760	925	-165
L	C1 to C6	mm	1768		

DATA SHEET NO. 14**VEHICLE INTRUSION MEASUREMENTS**Test Vehicle: 2010 Mazda3 I Sport 4-Door SedanNHTSA No.: MA5401Test Program: 56 km/h Frontal Validation TestingTest Date: 05/07/09**DOOR OPENING WIDTH**

A	Left Side Upper	mm	990	988	-2
B	Left Side Lower	mm	835	829	-6
D	Right Side Upper	mm	1000	1008	8
E	Right Side Lower	mm	755	764	9

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2640	2603	-37
F	Right Side Wheelbase	mm	2640	2548	-92



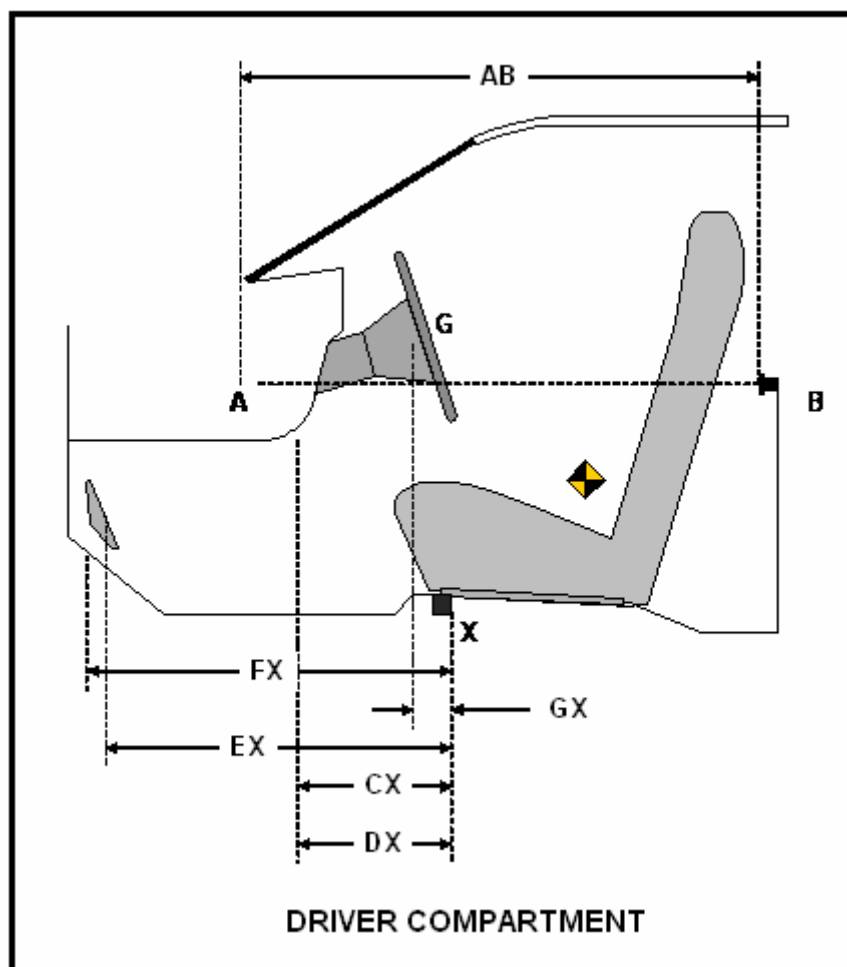
DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
 Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	1000	1000	0
CX	Left Knee Bolster to X	mm	260	235	-25
DX	Right Knee Bolster to X	mm	220	205	-15
EX	Brake Pedal to X	mm	510	485	-25
FX	Foot Rest to X	mm	525	600	75
GX	Center of Steering Wheel Hub to X	mm	45	70	25

X = Front of Seat Track (Stationary)



DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
 Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

DRIVER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-643	-683	-663	-655	-626	-655	-627	-615	17	28	36	40
2	-568	-588	-579	-575	-564	-567	-553	-545	4	21	26	30
3	-508	-499	-492	-483	-500	-485	-475	-464	8	14	17	19
4	-437	-429	-422	-414	-431	-420	-409	-397	6	9	13	17
5	-365	-358	-355	-348	-358	-348	-340	-332	7	10	15	16

DRIVER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	37	152	277	419	54	171	297	435	17	19	20	16
2	-34	147	277	412	-36	159	289	423	-2	12	12	11
3	29	146	273	406	35	153	278	411	6	7	5	5
4	25	144	268	402	30	150	273	406	5	6	5	4
5	25	141	263	395	30	144	264	397	5	3	1	2

DRIVER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-72	-20	-22	-15	-77	-21	-17	-5	-5	-1	5	10
2	-8	36	38	48	-12	45	53	70	-4	9	15	22
3	97	95	102	98	106	113	129	137	9	18	27	39
4	103	102	103	100	108	115	125	130	5	13	22	30
5	106	102	102	99	110	115	121	128	4	13	19	29

All measurements in millimeters

DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
 Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

PASSENGER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	715	703	706	656	637	643	662	636	-78	-60	-44	-20
2	622	610	600	581	565	555	574	566	-57	-55	-26	-15
3	526	518	511	508	478	483	484	497	-48	-35	-27	-11
4	461	456	447	434	416	423	427	426	-45	-33	-20	-8
5	381	376	370	361	337	344	352	355	-44	-32	-18	-6

PASSENGER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	346	209	90	-13	413	276	166	58	67	67	76	71
2	352	211	91	-15	410	270	153	40	58	59	62	55
3	357	217	94	-27	402	266	143	23	45	49	49	50
4	360	223	99	-19	401	265	143	25	41	42	44	44
5	361	228	103	-12	394	263	137	23	33	35	34	35

PASSENGER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	44	43	33	60	33	33	27	54	-11	-10	-6	-6
2	-32	-31	-33	-17	-61	-50	-55	-24	-29	-19	-22	-7
3	-95	-98	-92	-91	-138	-136	-117	-106	-43	-38	-25	-15
4	-99	-103	-98	-98	-142	-133	-121	-112	-43	-30	-23	-14
5	-98	-99	-99	-100	-138	-126	-121	-114	-40	-27	-22	-14

All measurements in millimeters

DATA SHEET NO. 15

SUMMARY OF FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401

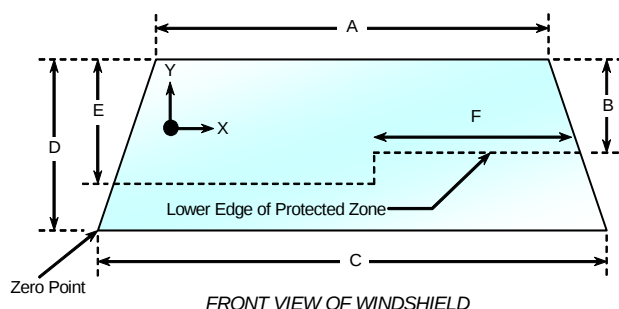
Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

Windshield Mounting Details: Windshield glass is secured to the vehicle frame with rubber cement type adhesive and plastic molding.

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

Temperature of windshield molding during test: 31.7° C

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2218	2218	100%
Right Side	2218	2218	100%
Total	4436	4436	100%



Item	Units	Value
A	mm	1180
B	mm	487
C	mm	1415
D	mm	920
E	mm	558
F	mm	495

AREAS OF PROTECTED ZONE FAILURES

- 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.

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.

X	Y

DATA SHEET NO. 16

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09

FMVSS 301 FUEL SYSTEM INTEGRITY DATA

Temperature at Time of Impact: 31.7° Test Time: 2:19 PM

Stoddard Solvent Spillage Measurements

- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)
- B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)
- C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)
- D. Spillage: No spillage occurred

DATA SHEET NO. 17

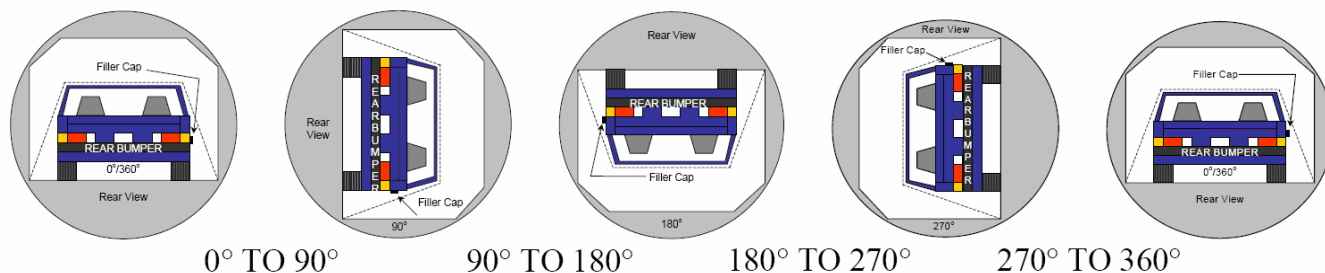
FMVSS 301 STATIC ROLLOVER

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan

NHTSA No.: MA5401

Test Program: 56 km/h Frontal Validation Testing

Test Date: 05/07/09



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: No spillage occurred

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	86	300	386
90° To 180°	87	300	387
180° To 270°	86	300	386
270° To 360°	76	300	376

FMVSS 301 SPILLAGE TABLE

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° To 90°	0	0		
90° To 180°	0	0		
180° To 270°	0	0		
270° To 360°	0	0		

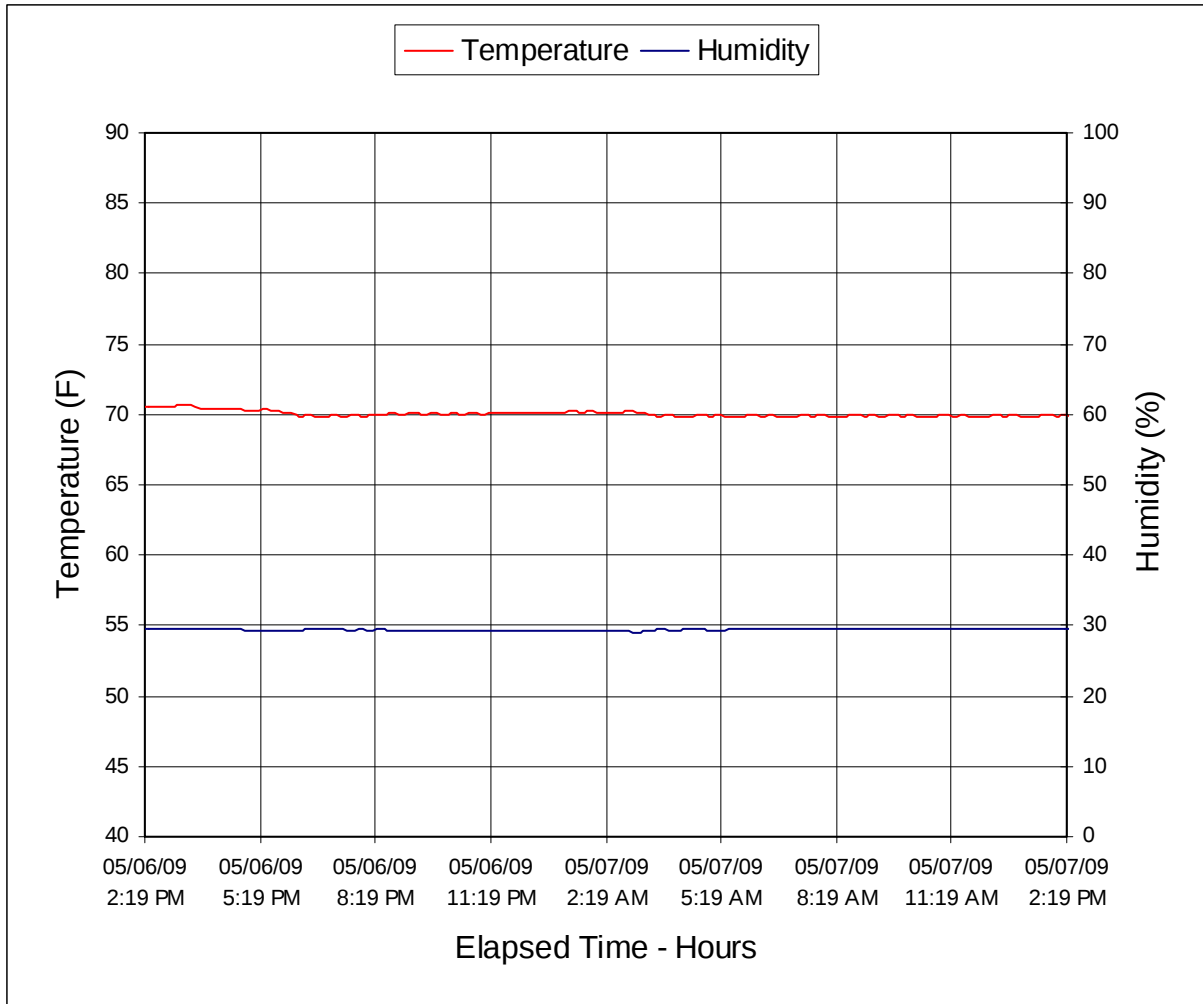
SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° To 90°	None
90° To 180°	None
180° To 270°	None
270° To 360°	None

DATA SHEET NO. 18

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5401
Test Program: 56 km/h Frontal Validation Testing Test Date: 05/07/09



APPENDIX A
PHOTOGRAPHS

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68	Vehicle at 180° on Static Rollover Device	A-68
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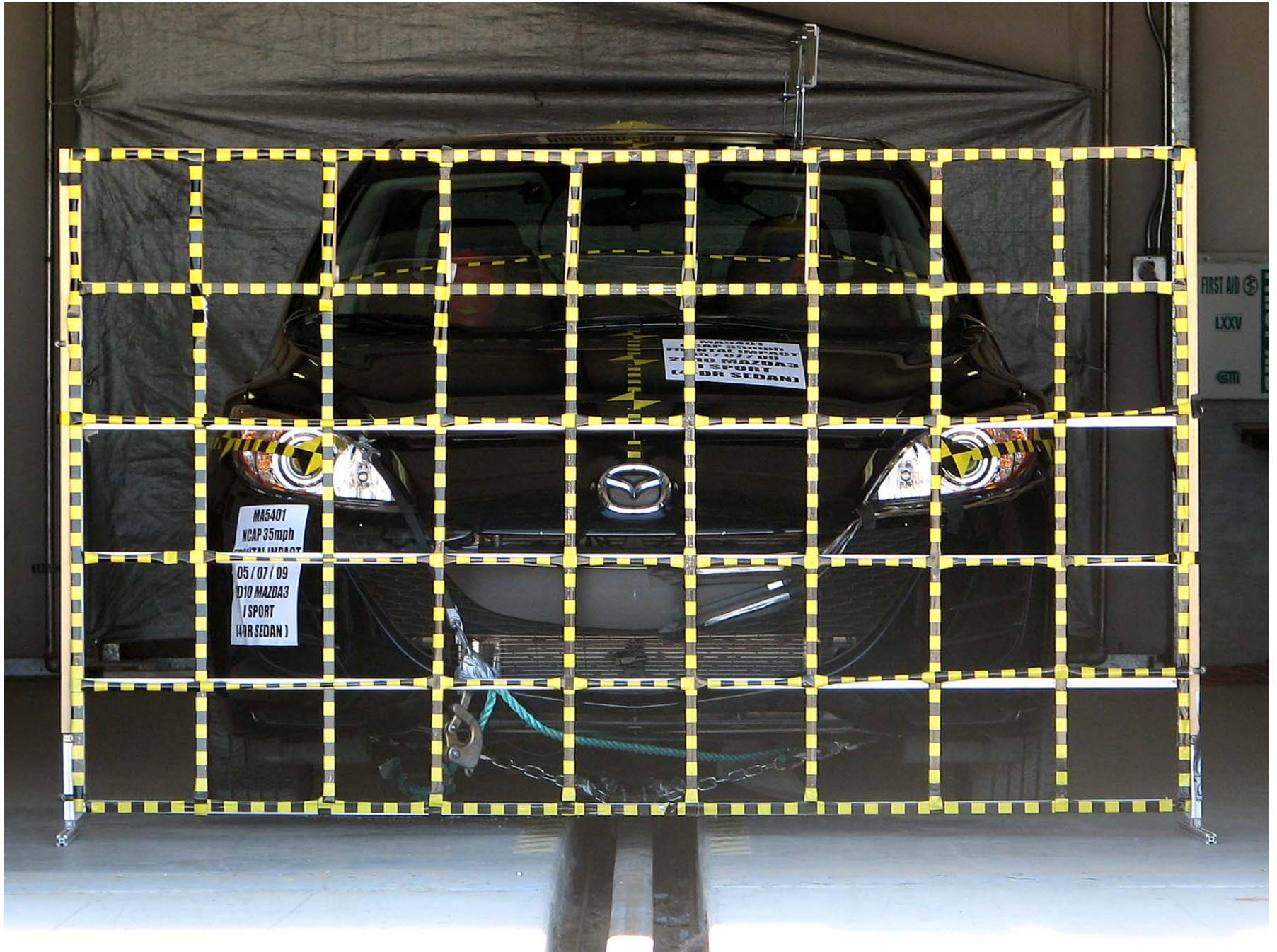


Figure A-1: Load Cell Location

MFD. BY MAZDA MOTOR CORPORATION

DATE	GVWR/PNBV	GAWR/PNBE FRT	GAWR/PNBE RR
02/09	3968 LB	2132 LB	1836 LB
	1800 KG	967 KG	833 KG

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY
/ BUMPER, AND THEFT PREVENTION
STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

JM1BL1SG3A1131600

TYPE: PASSENGER



BODY COLOR CODE; 16W

MADE IN JAPAN

Figure A-2: Manufacturer's Label



TIRE AND LOADING INFORMATION RENSEIGNEMENTS SUR LES PNEUS ET LE CHARGEMENT

SEATING CAPACITY | TOTAL 5 | FRONT 2 | REAR 3
NOMBRE DE PLACES | TOTAL 5 | AVANT 2 | ARRIÈRE 3

The combined weight of occupants and cargo should never exceed 385kg or 850lbs.*
Le poids total des occupants et du chargement ne doit jamais dépasser 385kg ou 850 lb.*

TIRE PNEU	SIZE DIMENSIONS	COLD TIRE PRESSURE PRESSION DES PNEUS À FROID
FRONT AVANT	P205/55R16	240KPA, 35PSI
REAR ARRIÈRE	P205/55R16	240KPA, 35PSI
SPARE DE SECOURS	T115/70D15	420KPA, 60PSI

SEE OWNER'S MANUAL
FOR ADDITIONAL
INFORMATION

VOIR LE MANUEL DE
L'USAGER POUR PLUS
DE RENSEIGNEMENTS

(BBM4A)

Figure A-3: Tire Placard



Figure A-4: Right Front $\frac{3}{4}$ View, As Received



Figure A-5: Left Rear $\frac{3}{4}$ View, As Received



Figure A-6: Pre-Test Front View of Test Vehicle

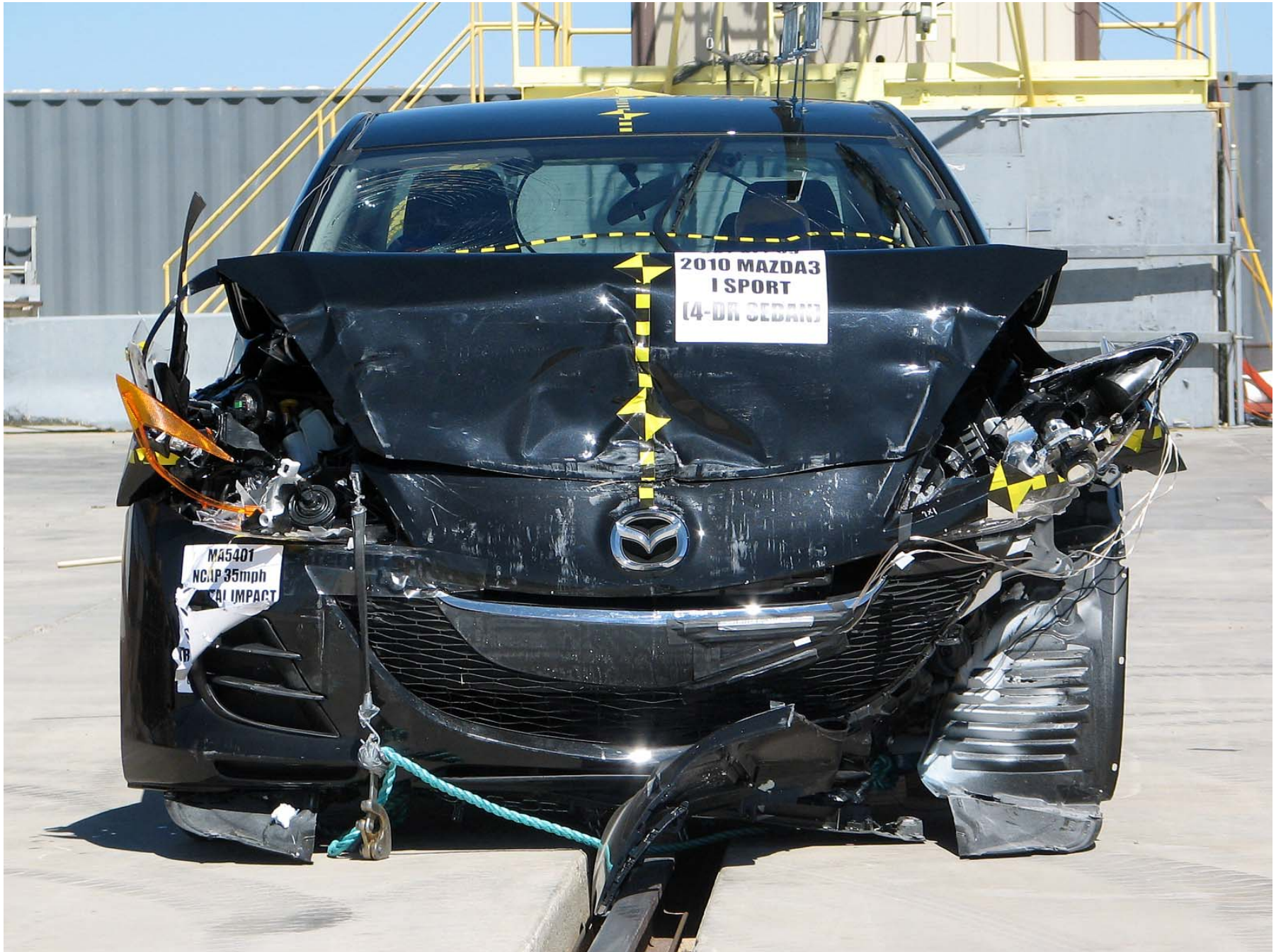


Figure A-7: Post-Test Front View of Test Vehicle



Figure A-8: Pre-Test Left View of Test Vehicle



Figure A-9: Post-Test Left View of Test Vehicle



Figure A-10: Pre-Test Right View of Test Vehicle



Figure A-11: Post-Test Right View of Test Vehicle



Figure A-12: Pre-Test Right Front $\frac{3}{4}$ View of Test Vehicle



Figure A-13: Post-Test Right Front $\frac{3}{4}$ View of Test Vehicle



Figure A-14: Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-15: Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle

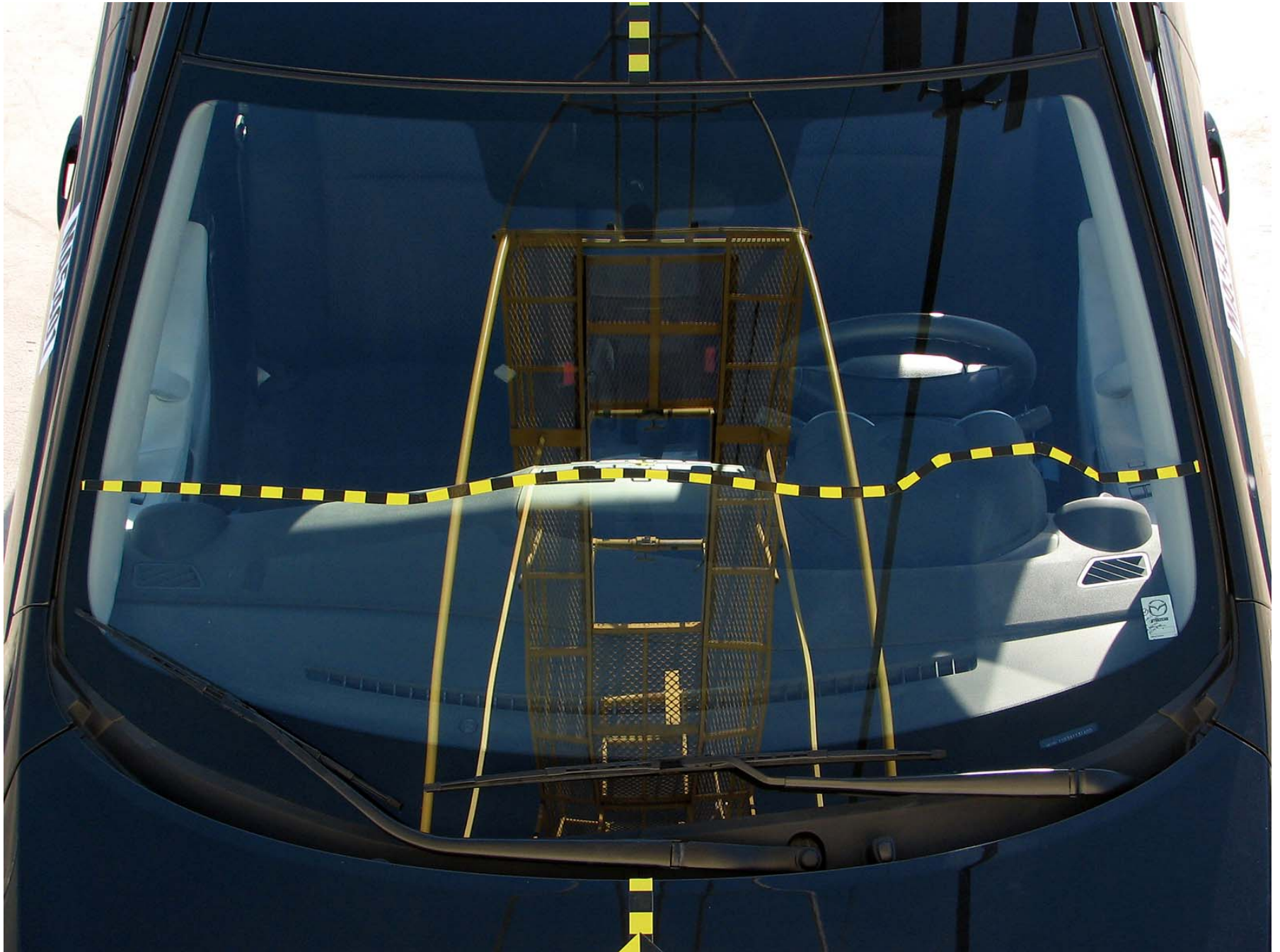


Figure A-16: Pre-Test Windshield View



Figure A-17: Post-Test Windshield View



Figure A-18: Pre-Test Engine Compartment View

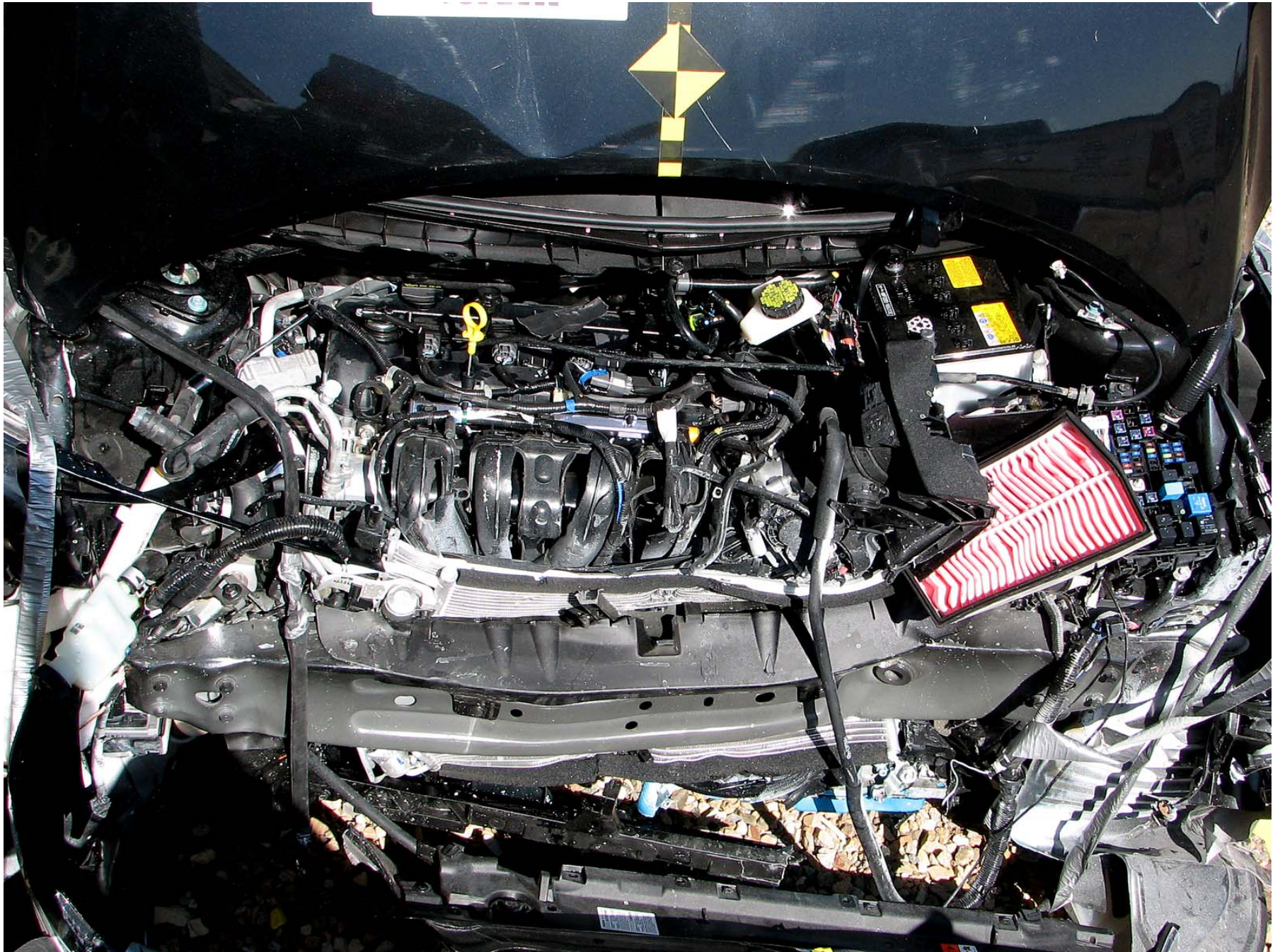


Figure A-19: Post-Test Engine Compartment View

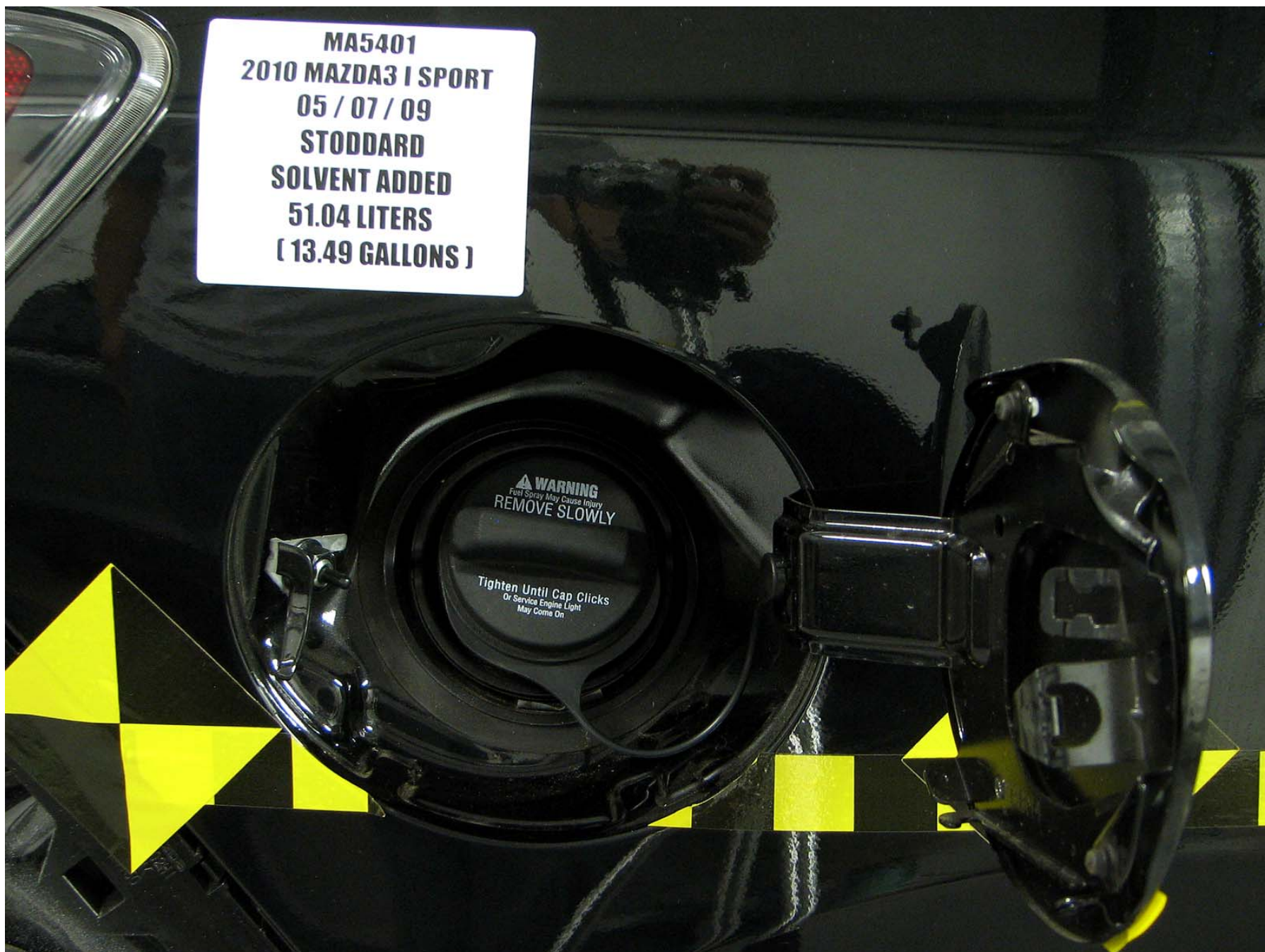


Figure A-20: Pre-Test Fuel Filler Cap View

MA5401
2010 MAZDA3 I SPORT
05 / 07 / 09
STODDARD
SOLVENT ADDED
51.04 LITERS
(13.49 GALLONS)



Figure A-21: Post-Test Fuel Filler Cap View

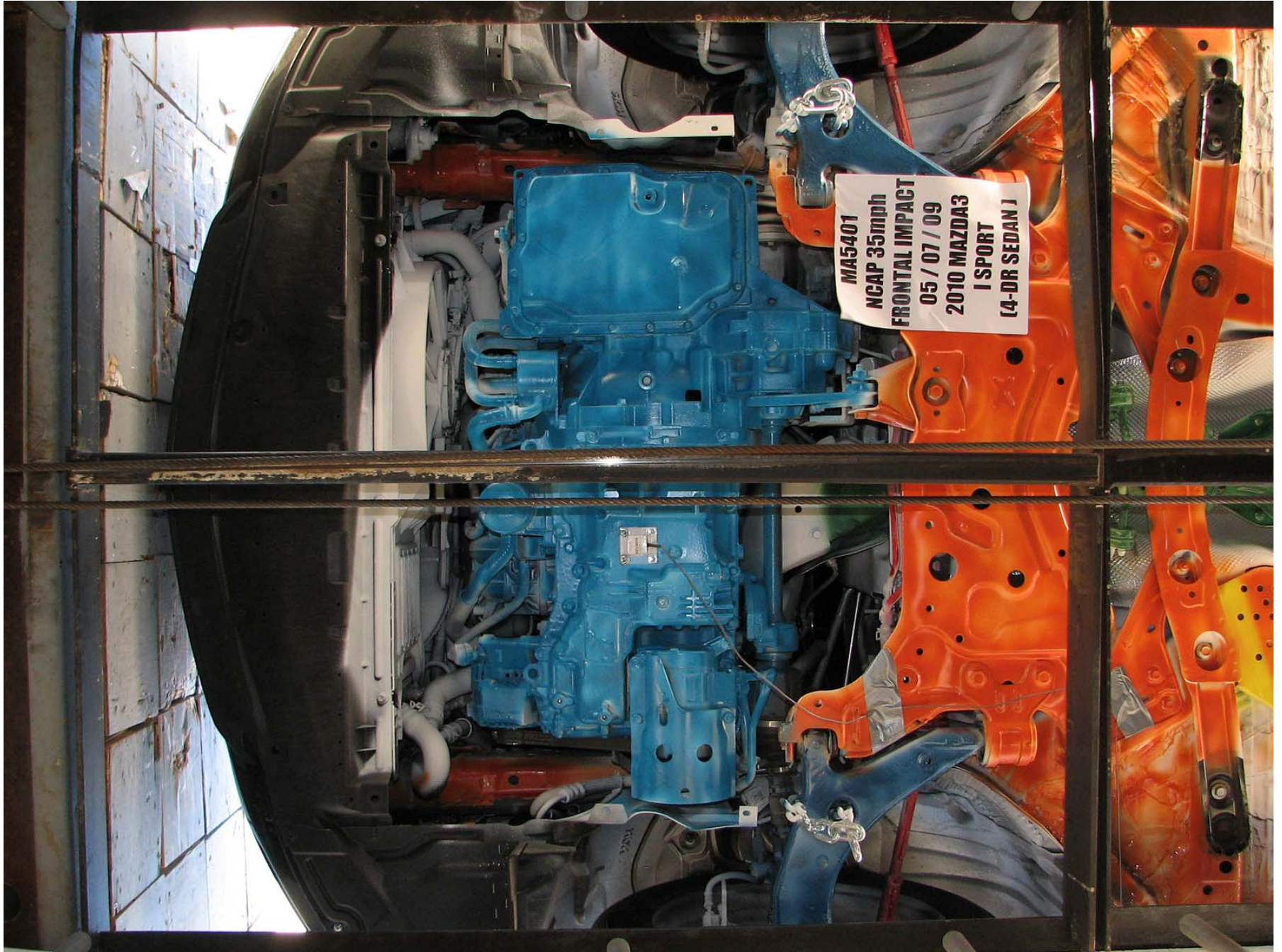


Figure A-22: Pre-Test Front Underbody View

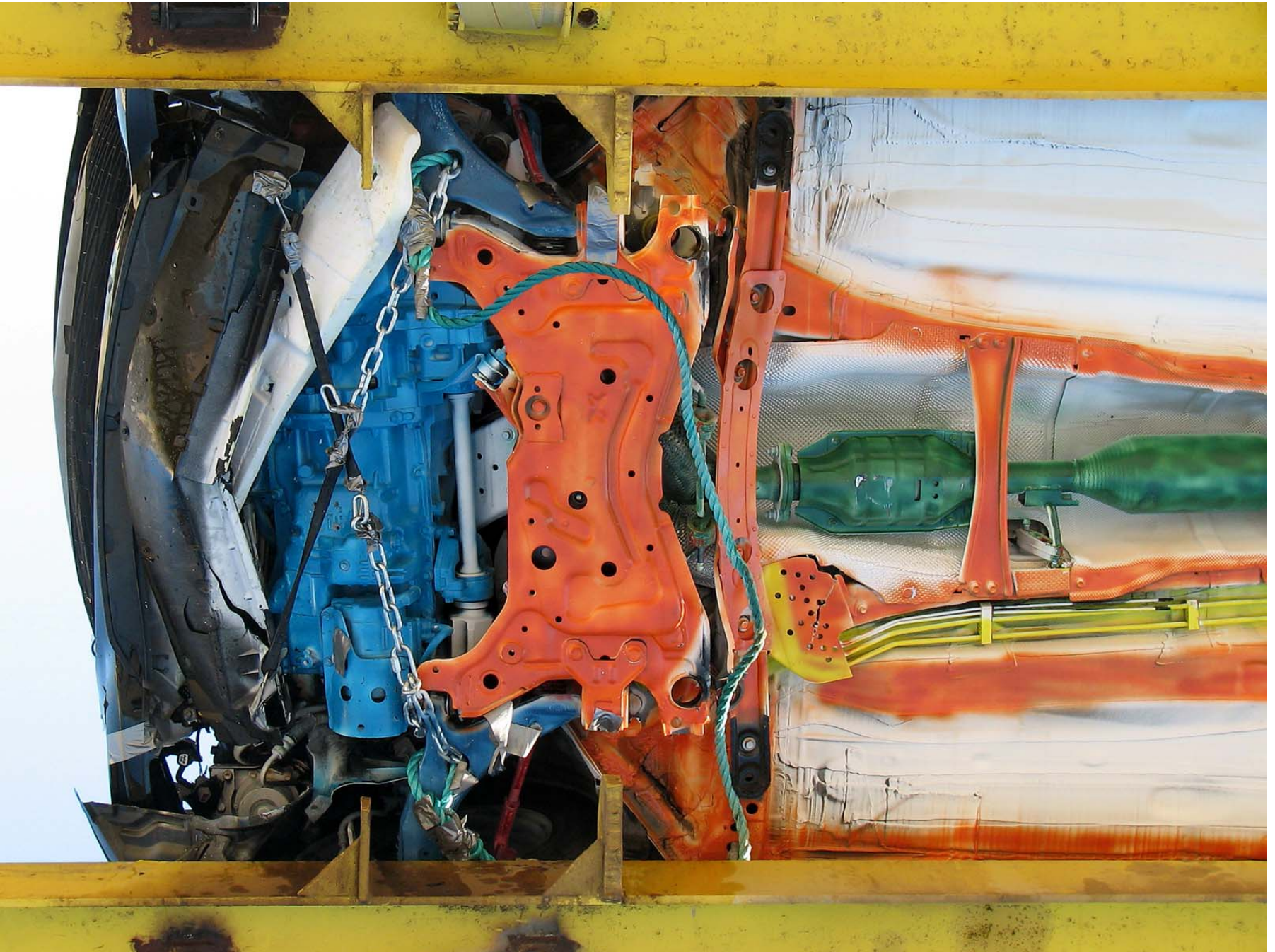


Figure A-23: Post-Test Front Underbody View

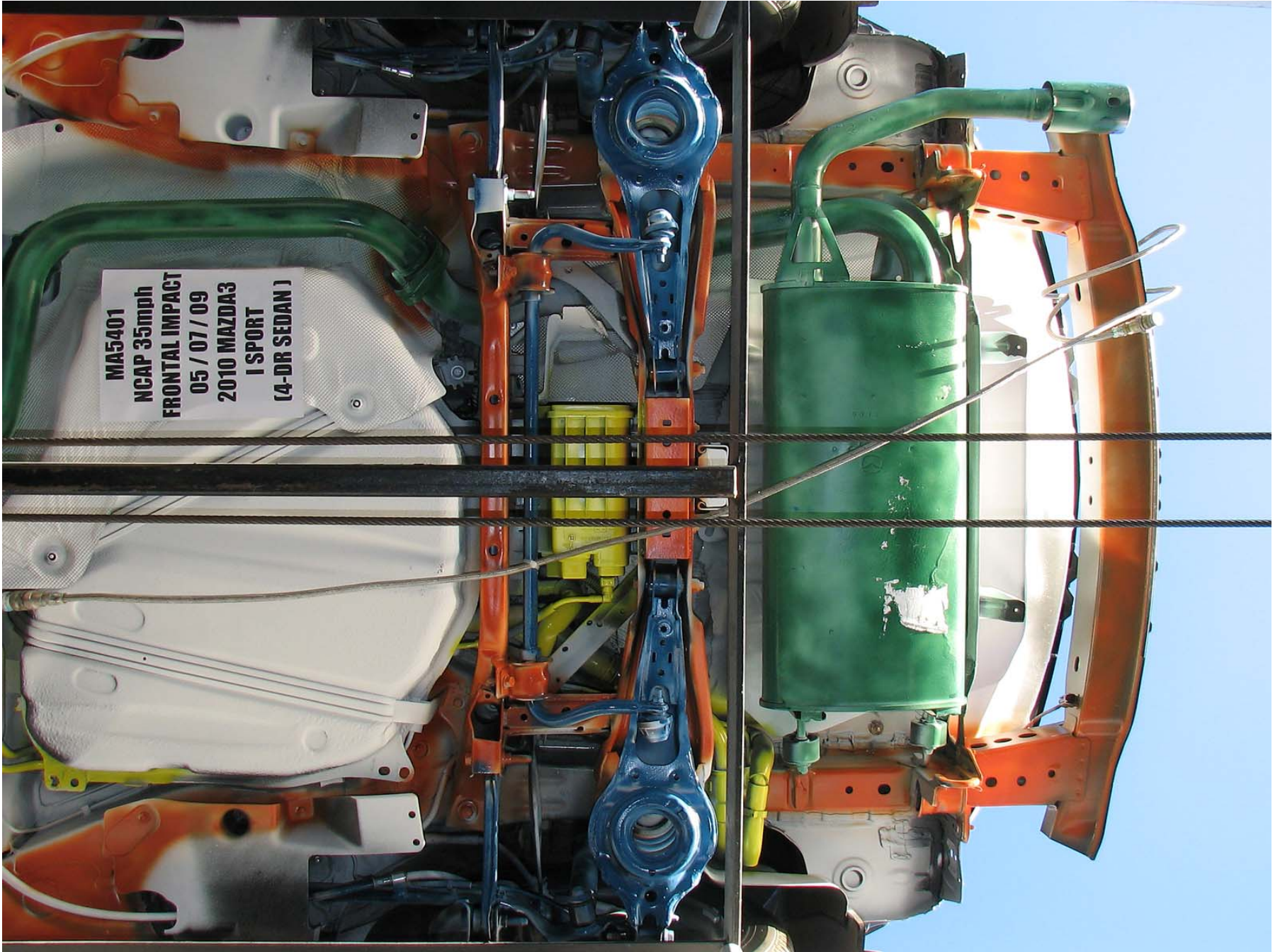


Figure A-24: Pre-Test Rear Underbody View

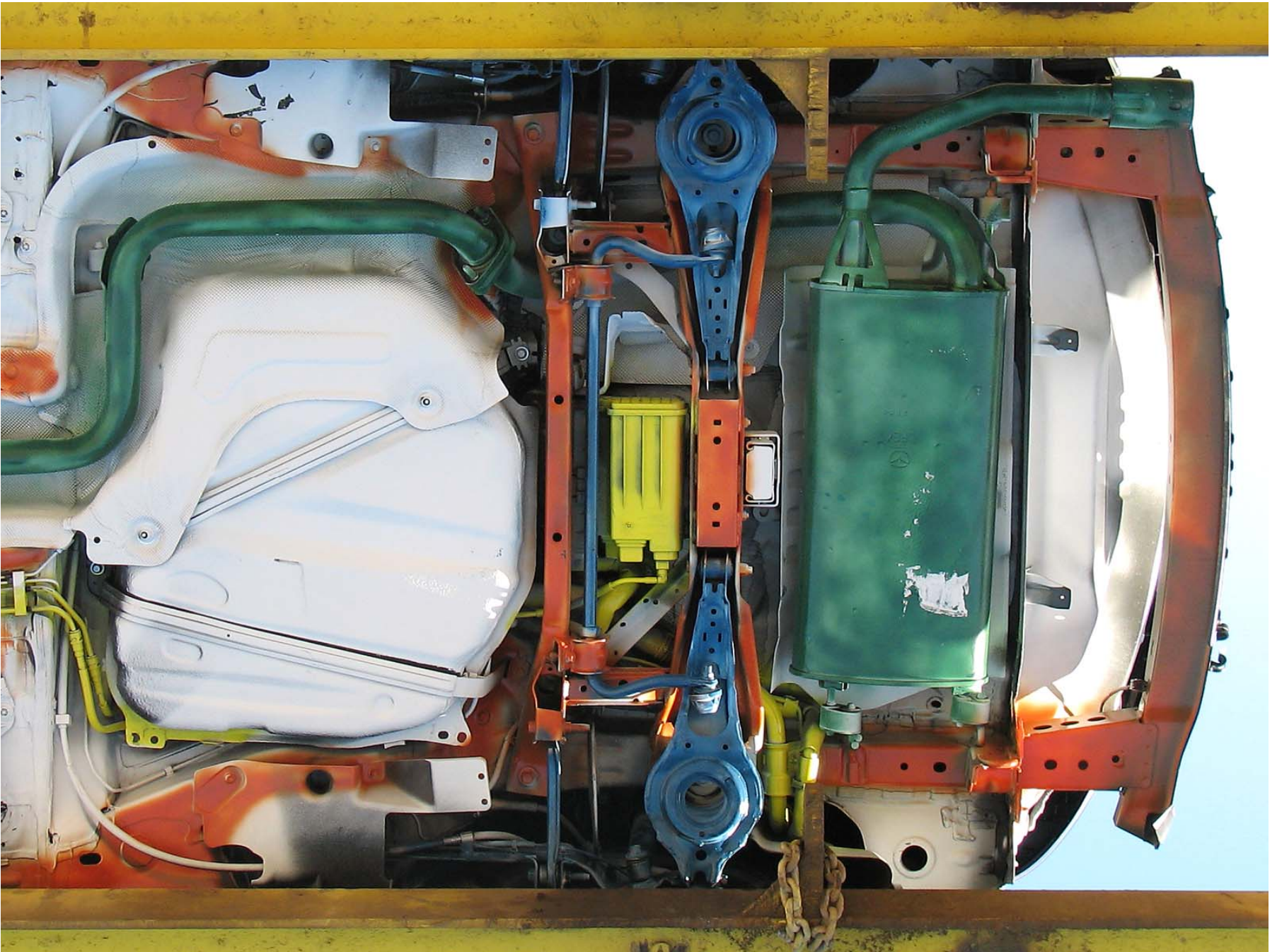


Figure A-25: Post-Test Rear Underbody View



Figure A-26: Pre-Test Dummy Cable Routing



Figure A-27: Post-Test Dummy Cable Routing



Figure A-28: Pre-Test Driver Dummy Front View



Figure A-29: Post-Test Driver Dummy Front View



Figure A-30: Pre-Test Driver Dummy Window View



Figure A-31: Post-Test Driver Dummy Window View



Figure A-32: Pre-Test Driver Dummy and Vehicle Interior View



Figure A-33: Post-Test Driver Dummy and Vehicle Interior View

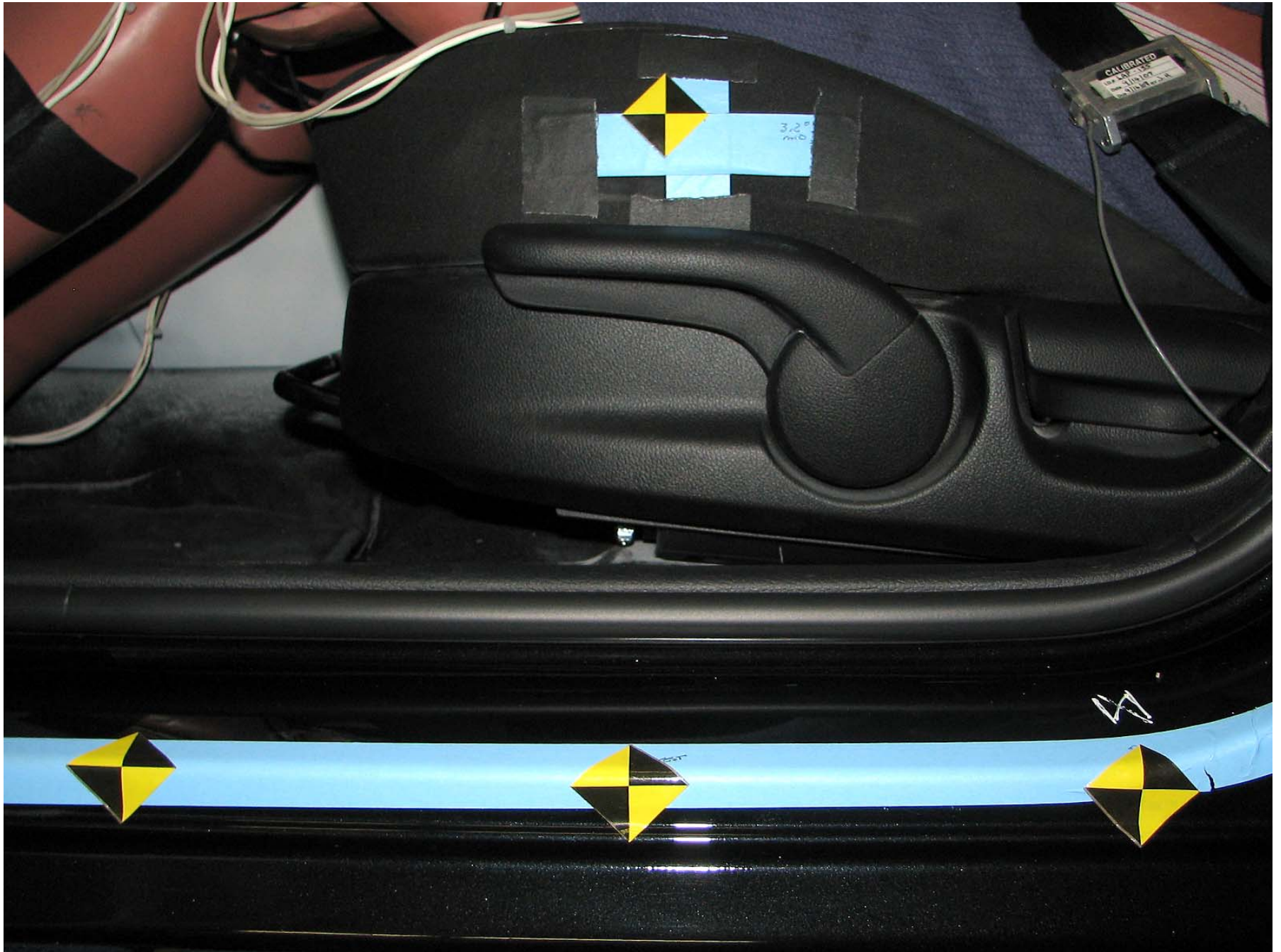


Figure A-34: Pre-Test Driver's Seat Fore-Aft Markings

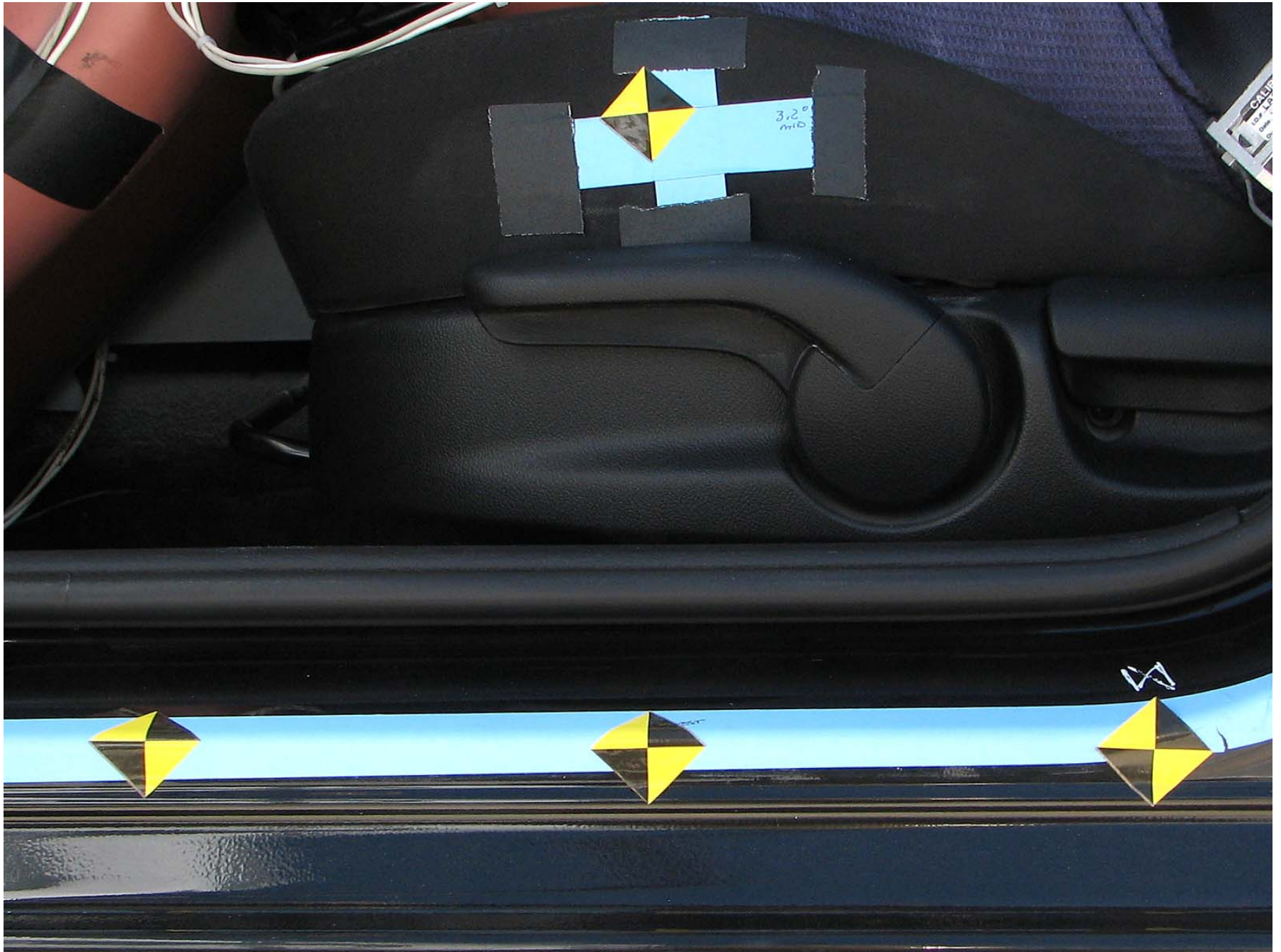


Figure A-35: Post-Test Driver's Seat Fore-Aft Markings

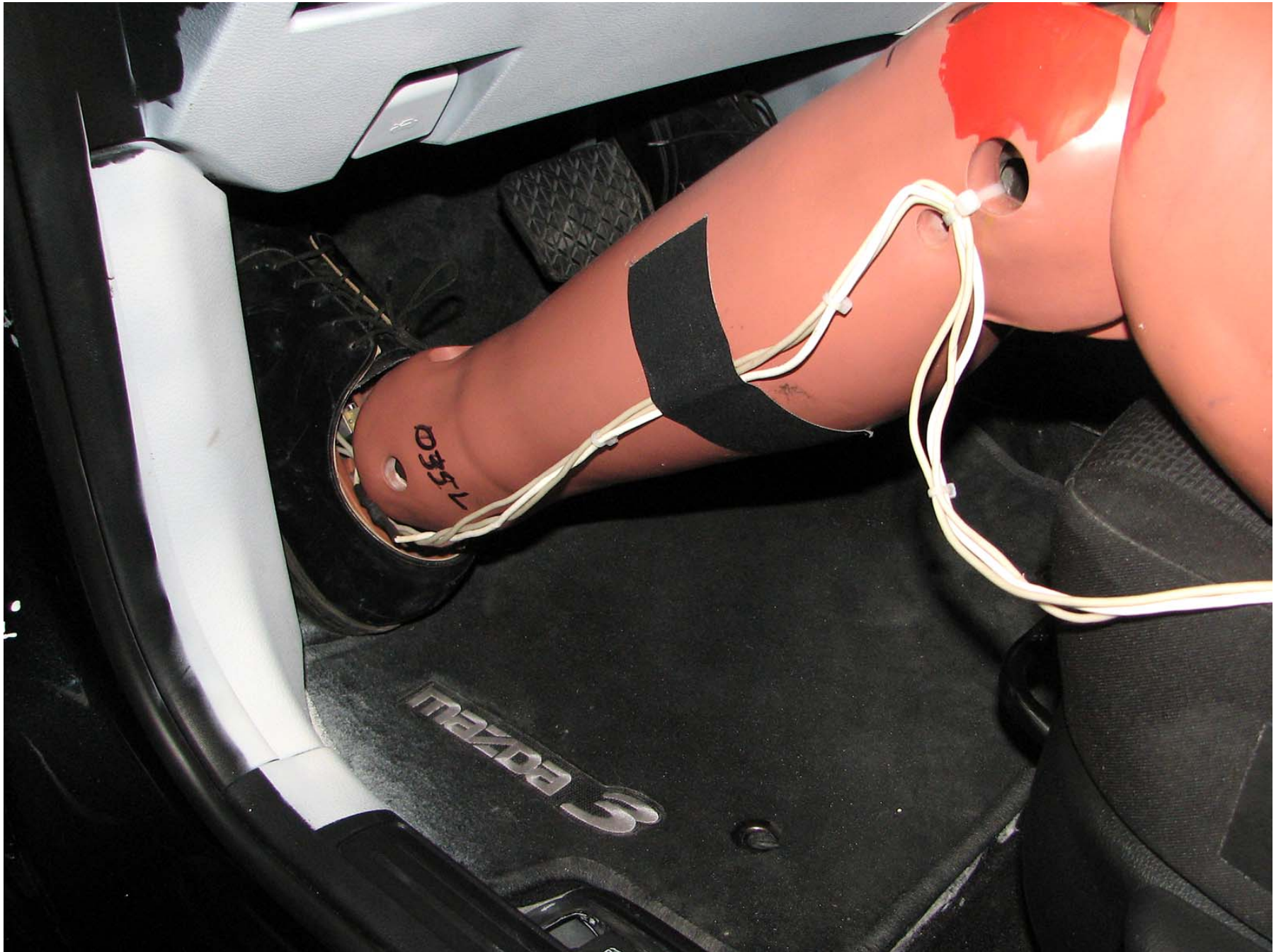


Figure A-36: Pre-Test Driver Dummy Feet

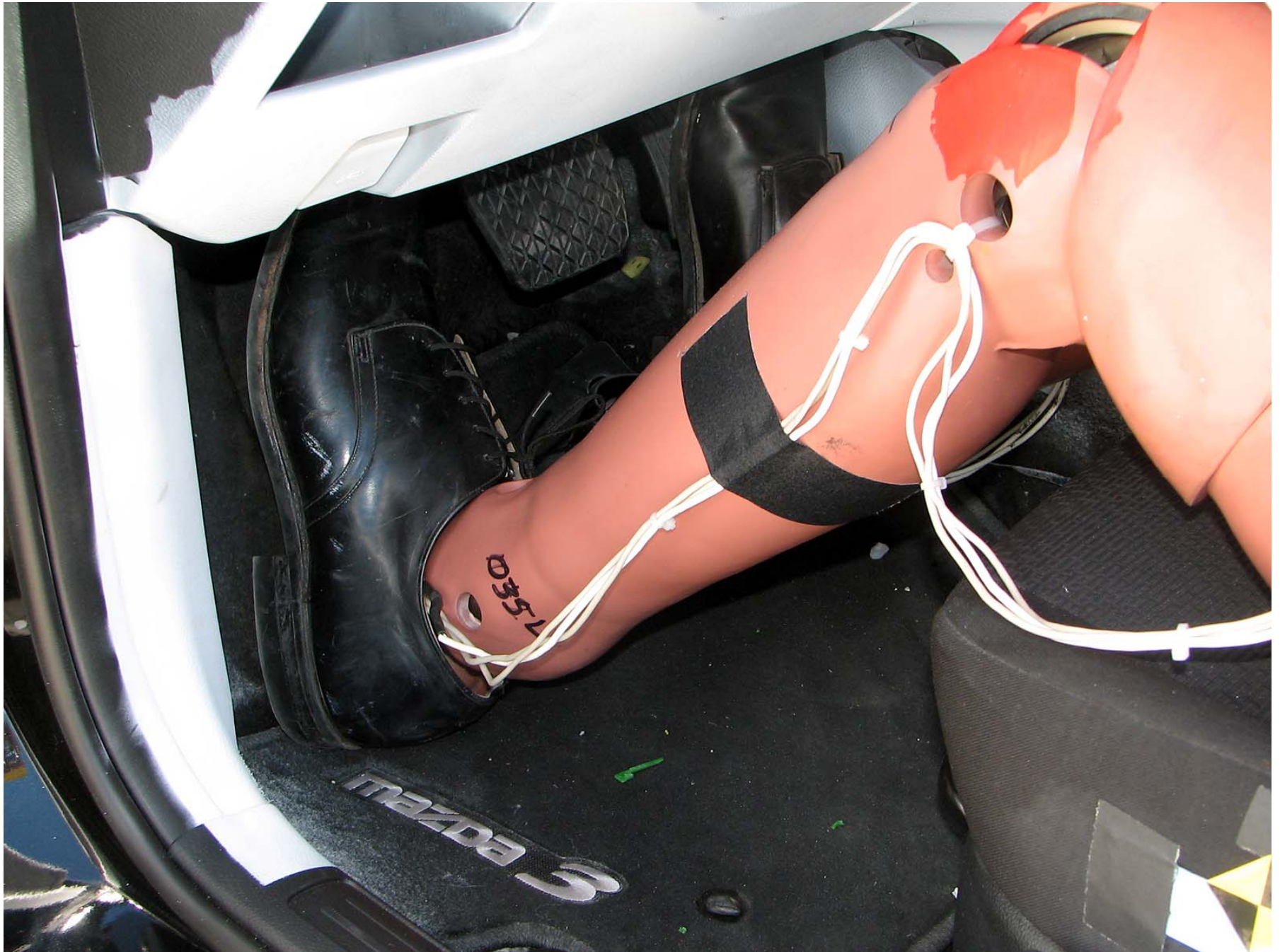


Figure A-37: Post-Test Driver Dummy Feet



Figure A-38: Pre-Test Driver's Side Knee Bolster



Figure A-39: Post-Test Driver's Side Knee Bolster



Figure A-40: Pre-Test Driver's Side Floorpan



Figure A-41: Post-Test Driver's Side Floorpan



Figure A-42: Post-Test Driver Dummy Head



Figure A-43: Post-Test Driver Dummy Contact with Airbag



Figure A-44: Post-Test Driver Dummy Contact with Headrest



Figure A-45: Pre-Test View of the Steering Column Shear Capsule



Figure A-46: Post-Test View of the Steering Column Shear Capsule



Figure A-47: Pre-Test Passenger Dummy Front View



Figure A-48: Post-Test Passenger Dummy Front View



Figure A-49: Pre-Test Passenger Dummy Window View



Figure A-50: Post-Test Passenger Dummy Window View



Figure A-51: Pre-Test Passenger Dummy and Vehicle Interior



Figure A-52: Post-Test Passenger Dummy and Vehicle Interior

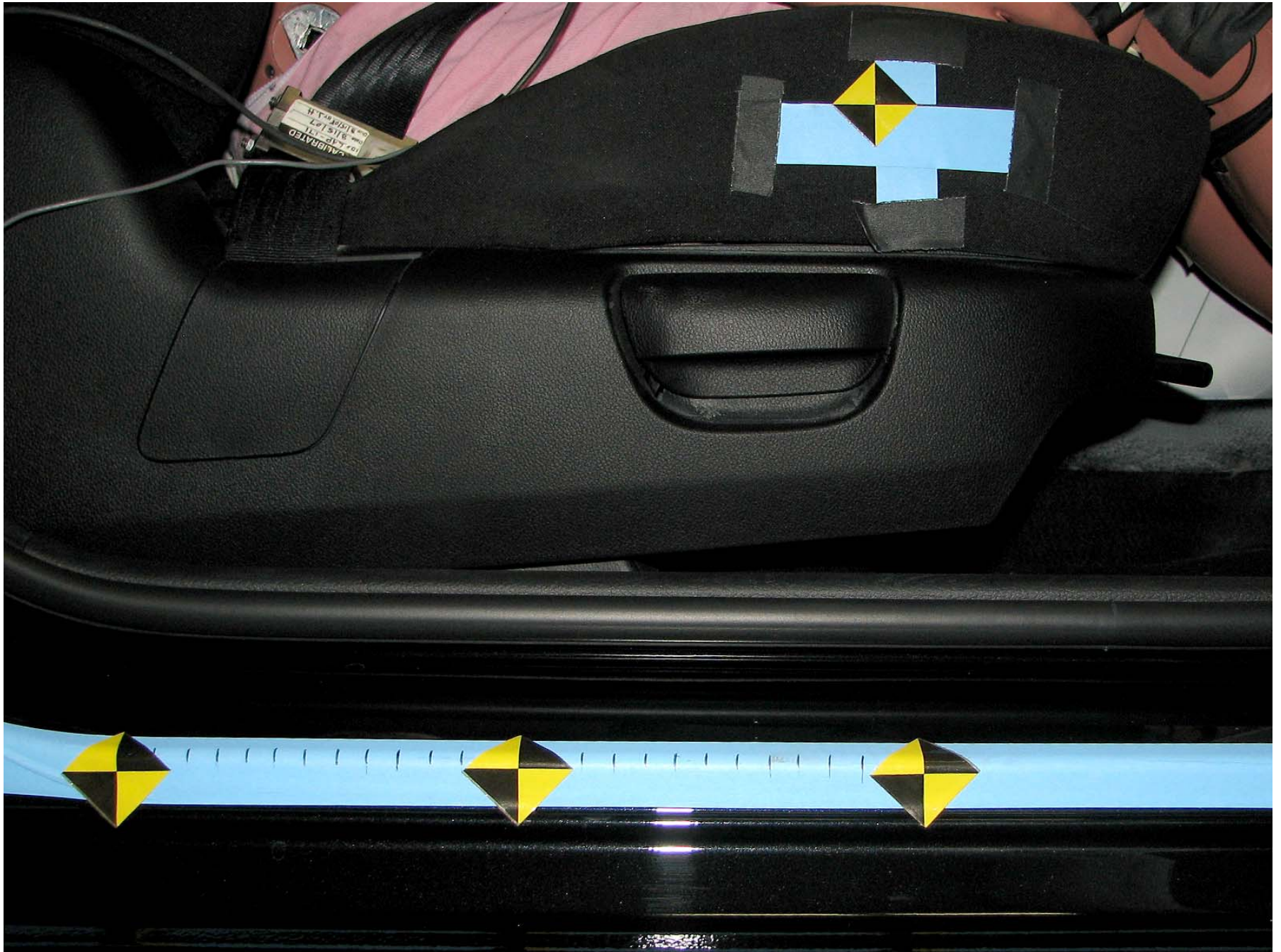


Figure A-53: Pre-Test Passenger's Seat Fore-Aft Markings

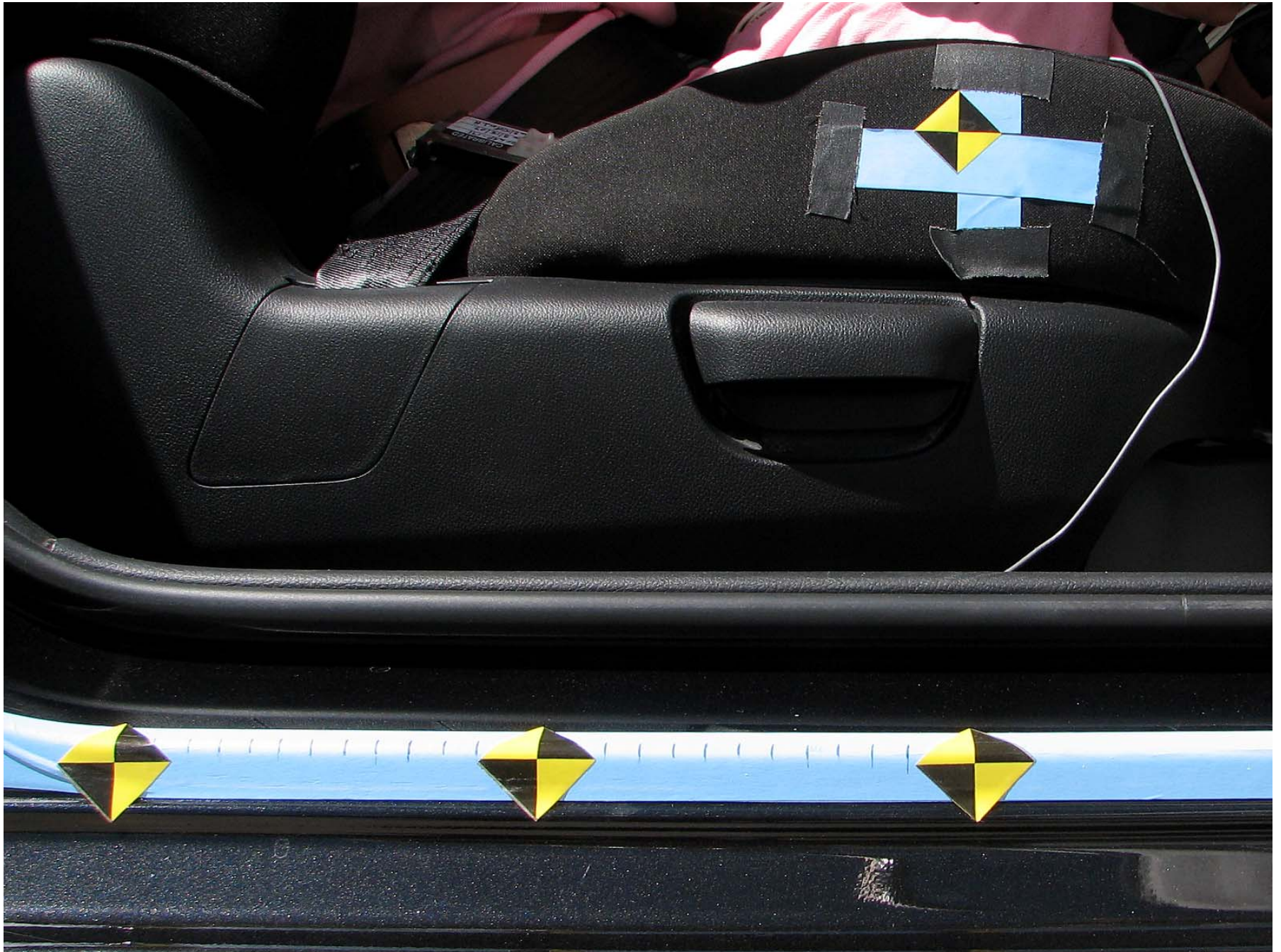


Figure A-54: Post-Test Passenger's Seat Fore-Aft Markings



Figure A-55: Pre-Test Passenger Dummy Feet



Figure A-56: Post-Test Passenger Dummy Feet



Figure A-57: Pre-Test Passenger's Side Knee Bolster



Figure A-58: Post-Test Passenger's Side Knee Bolster

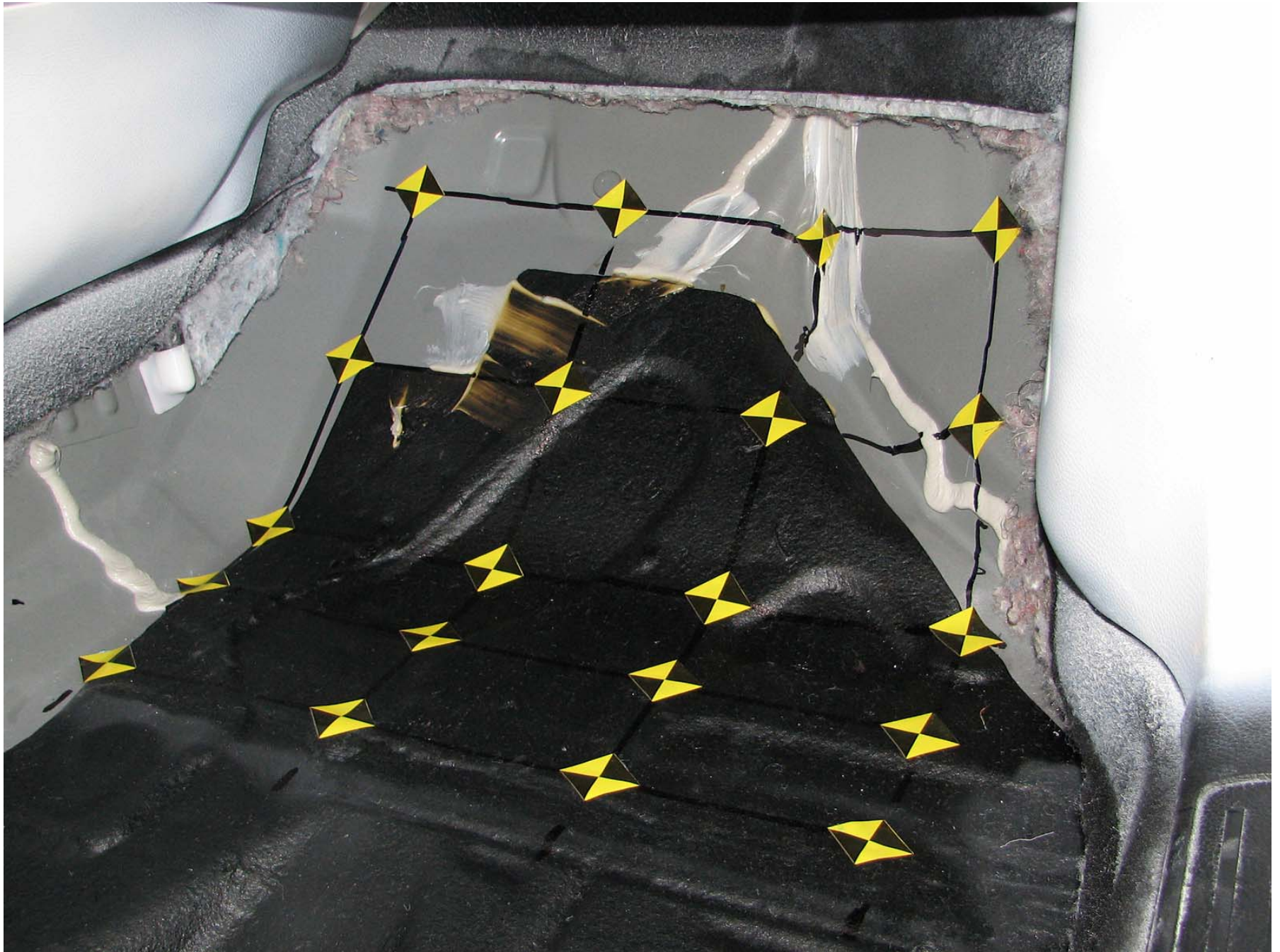


Figure A-59: Pre-Test Passenger's Side Floorpan



Figure A-60: Post-Test Passenger's Side Floorpan



Figure A-61: Post-Test Passenger Dummy Head



Figure A-62: Post-Test Passenger Dummy Contact with Airbag



Figure A-63: Post-Test Passenger Dummy Contact With Headrest



Figure A-64: Pre-Test Ballast Installed in Vehicle



Figure A-65: Post-Test Speed Trap Readout

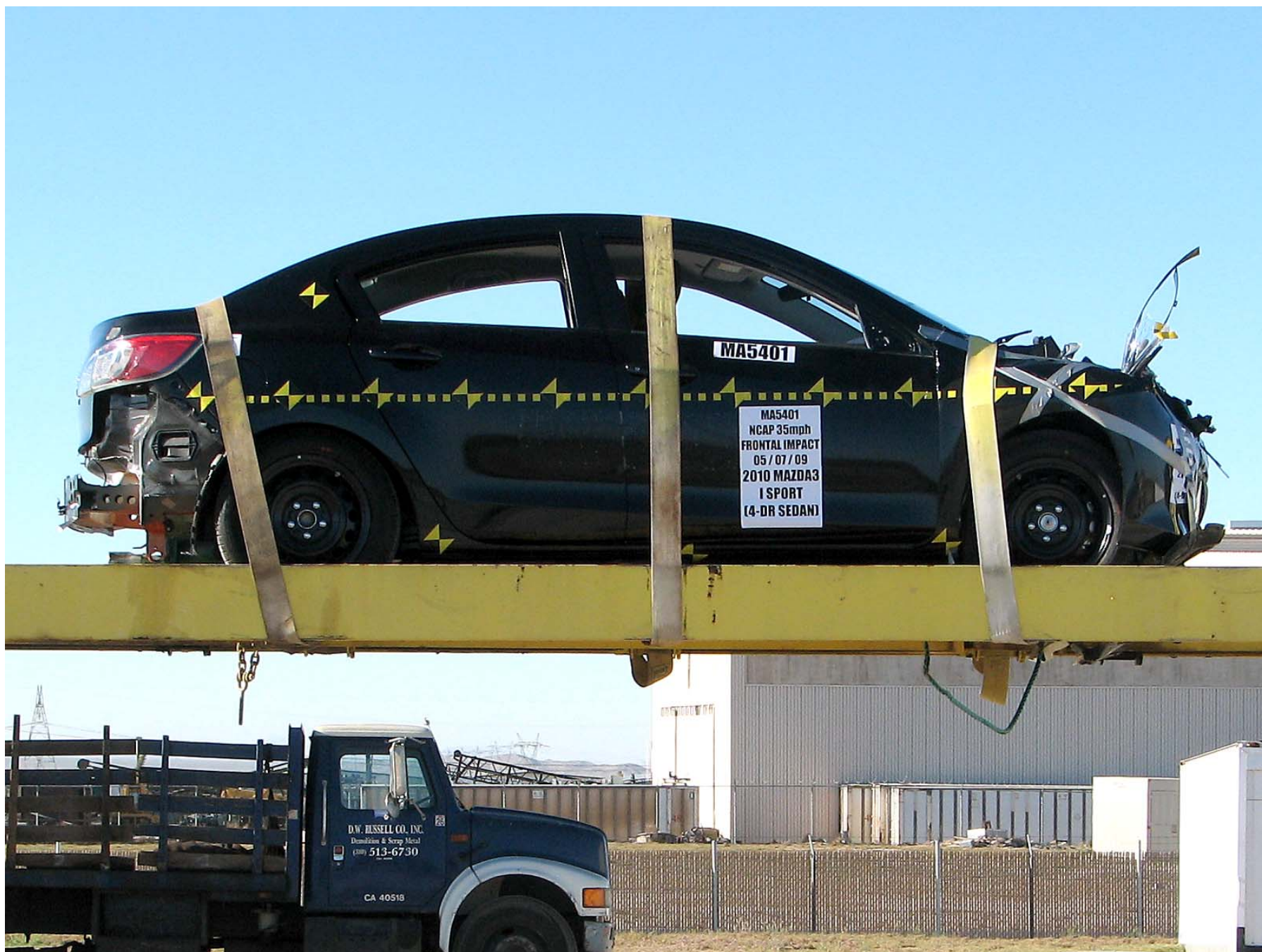


Figure A-66: Vehicle at 0° on Static Rollover Device



Figure A-67: Vehicle at 90° on Static Rollover Device



Figure A-68: Vehicle at 180° on Static Rollover Device



Figure A-69: Vehicle at 270° on Static Rollover Device



Figure A-70: Vehicle at 360° on Static Rollover Device



Figure A-71: Impact Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

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3	Driver Head Z Acceleration vs. Time Primary	B-1
4	Driver Head Resultant Acceleration vs. Time Primary	B-1
5	Driver Chest X Deflection vs. Time	B-2
6	Driver Chest X Acceleration vs. Time Primary	B-3
7	Driver Chest Y Acceleration vs. Time Primary	B-3
8	Driver Chest Z Acceleration vs. Time Primary	B-3
9	Driver Chest Resultant Acceleration vs. Time Primary	B-3
10	Driver Upper Neck Force X vs. Time Primary	B-4
11	Driver Upper Neck Force Z vs. Time Primary	B-4
12	Driver Upper Neck Moment Y vs. Time Primary	B-4
13	Driver Nij vs. Time Primary	B-4
14	Driver Left Femur Force vs. Time	B-5
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18	Passenger Head Z Acceleration vs. Time Primary	B-6
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22	Passenger Chest Y Acceleration vs. Time Primary	B-8
23	Passenger Chest Z Acceleration vs. Time Primary	B-8
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25	Passenger Upper Neck Force X vs. Time Primary	B-9
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27	Passenger Upper Neck Moment Y vs. Time Primary	B-9
28	Passenger Nij vs. Time Primary	B-9
29	Passenger Left Femur Force vs. Time	B-10
30	Passenger Right Femur Force vs. Time	B-10

The following additional 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 Acceleration Redundant
Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant
Driver Pelvis X
Driver Pelvis Y
Driver Pelvis Z
Driver Shoulder Belt Force
Driver Lap Belt Force
Driver Shoulder Belt Pullout
Driver Shoulder Belt Elongation
Driver Left Upper Tibia Moment X
Driver Left Upper Tibia Moment Y
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 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 Y Acceleration Redundant
Passenger Head Z Acceleration Redundant

Passenger Upper Neck Force Y
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Z
Passenger Chest X Acceleration Redundant
Passenger Chest Y Acceleration Redundant
Passenger Chest Z Acceleration Redundant
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Shoulder Belt Force
Passenger Lap Belt Force
Passenger Shoulder Belt Pullout
Passenger Shoulder Belt Pullout
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
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 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 Sill X
Left Rear Sill Z
Right Rear Sill X
Right Rear Sill Z
Vehicle Engine Top X
Vehicle Engine Bottom X
Vehicle Left Brake Caliper X
Vehicle Right Brake Caliper X

Load Cell Barrier A1 – A9

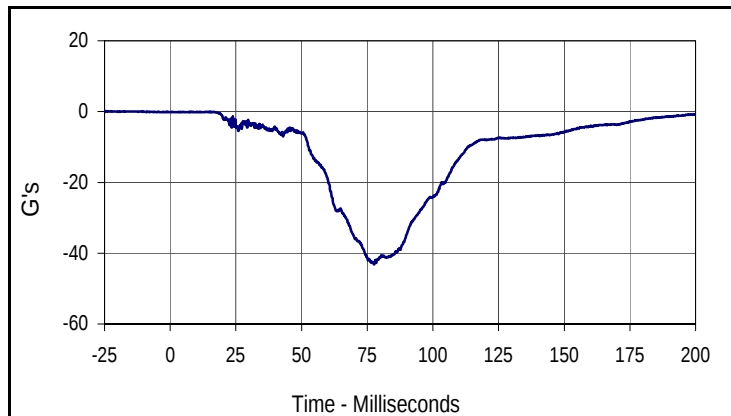
Load Cell Barrier B1 – B9

Load Cell Barrier C1 – C9

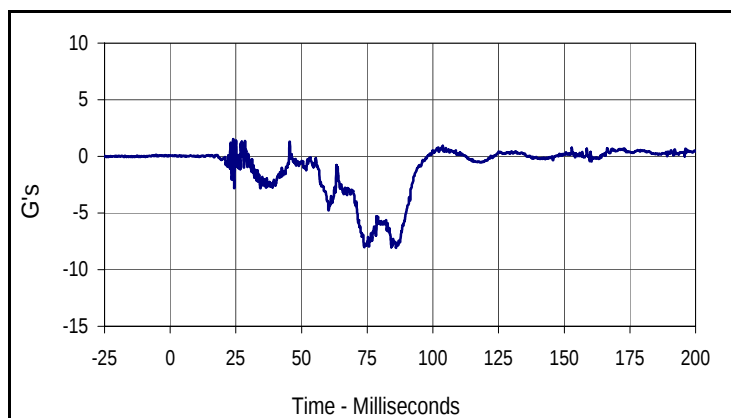
Load Cell Barrier D1 – D9

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 Test Program: 56 km/h Frontal Validation Testing

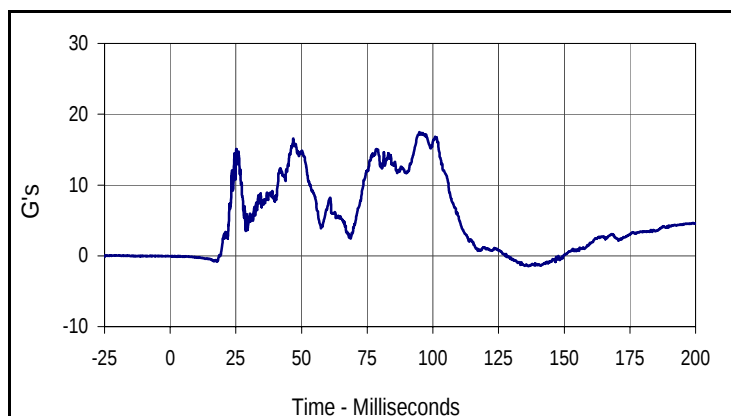
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 NHTSA No.: MA5401



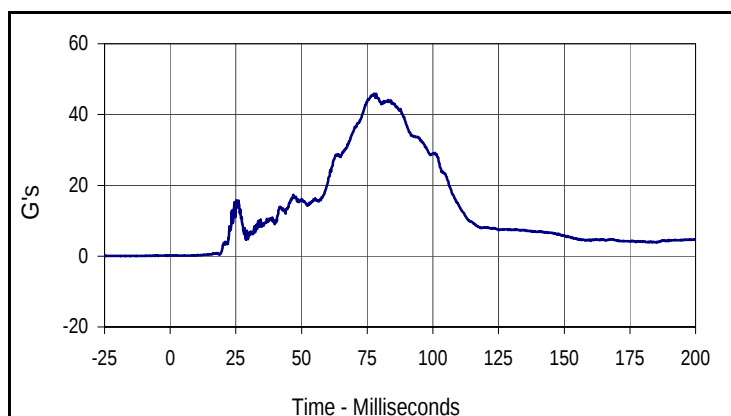
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CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
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Curve Description			
Driver Head Primary Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
1.5	24.0	-8.1	86.0



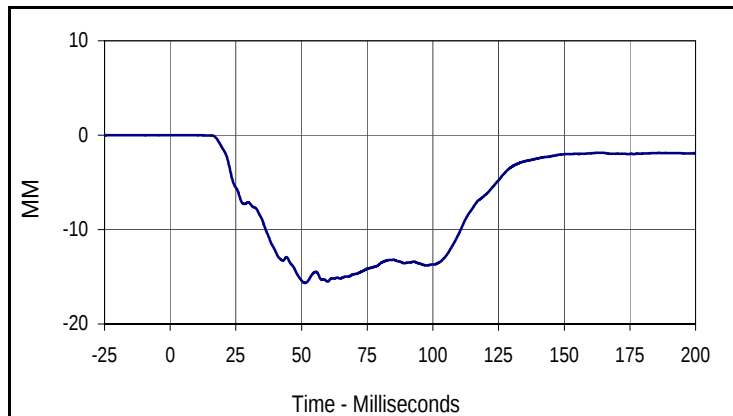
Curve Description			
Driver Head Primary Z			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
17.5	94.9	-1.5	136.3



Curve Description			
Driver Head Resultant Primary			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
45.9	77.6	0.1	0.8

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: 56 km/h Frontal Validation Testing

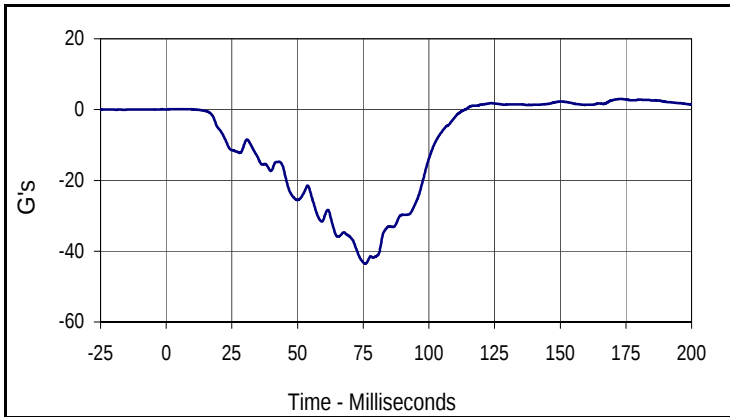
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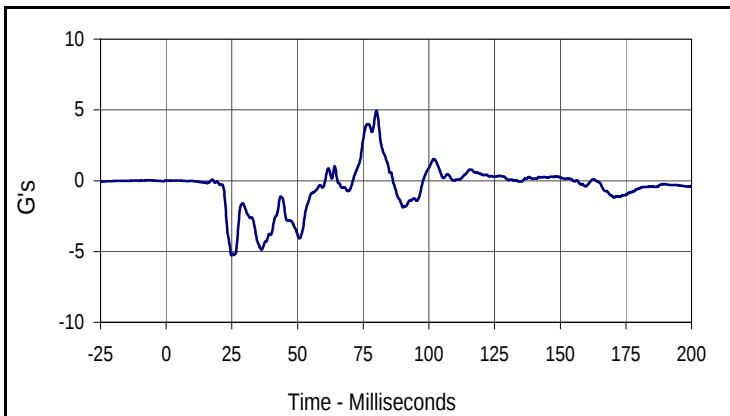
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Driver Chest Deflection			
CURNO	Type	SAE Class	Units
019	FIL	180	MM
Max	Time	Min	Time
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Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: 56 km/h Frontal Validation Testing

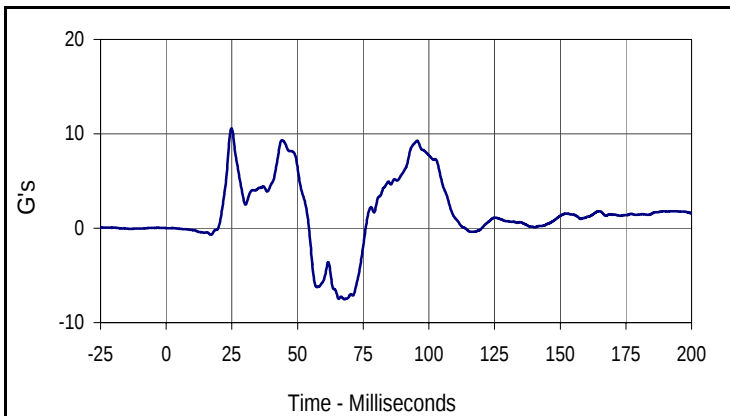
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 NHTSA No.: MA5401



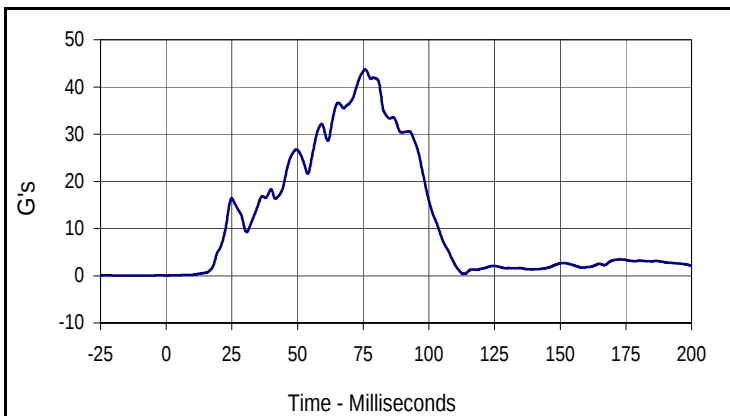
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Driver Chest Primary X			
CURNO	Type	SAE Class	Units
013	FIL	180	G's
Max	Time	Min	Time
3.0	172.9	-43.5	75.7



Curve Description			
Driver Chest Primary Y			
CURNO	Type	SAE Class	Units
014	FIL	180	G's
Max	Time	Min	Time
4.9	80.1	-5.3	24.8



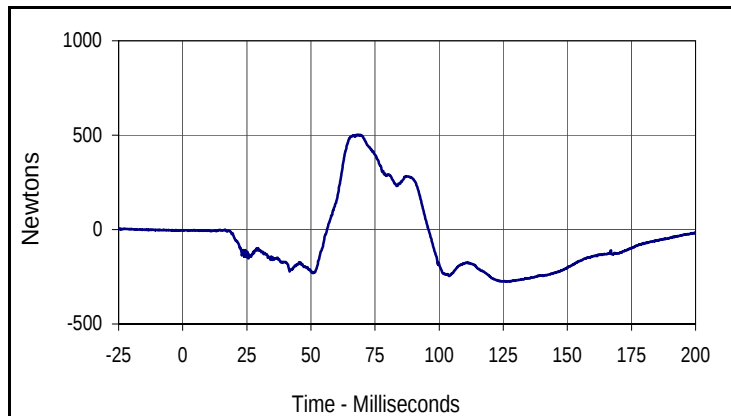
Curve Description			
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Max	Time	Min	Time
10.6	24.9	-7.5	67.9



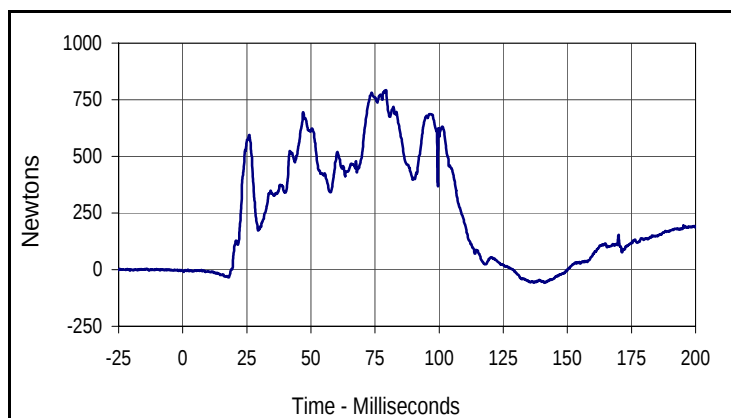
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Driver Chest Resultant Primary			
CURNO	Type	SAE Class	Units
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Max	Time	Min	Time
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Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: 56 km/h Frontal Validation Testing

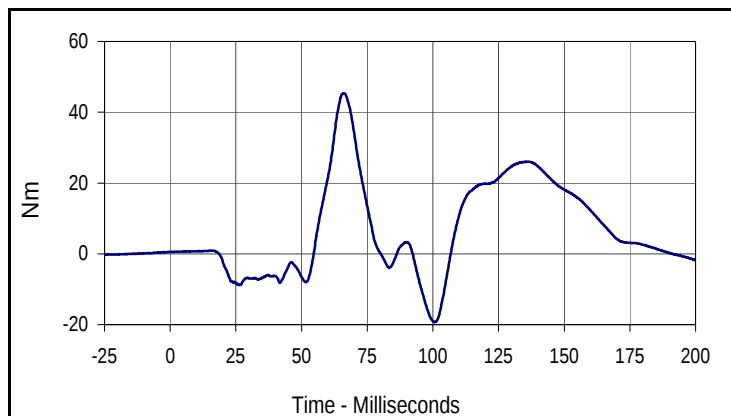
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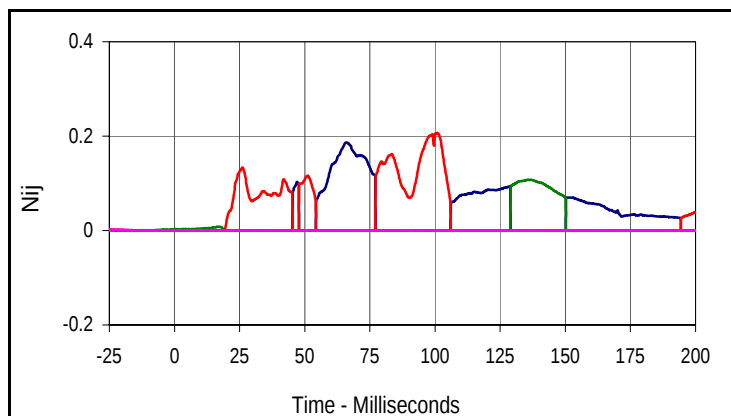
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503.0	68.3	-276.2	126.5



Curve Description			
Driver Upper Neck Force Z			
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009	FIL	1000	Newtons
Max	Time	Min	Time
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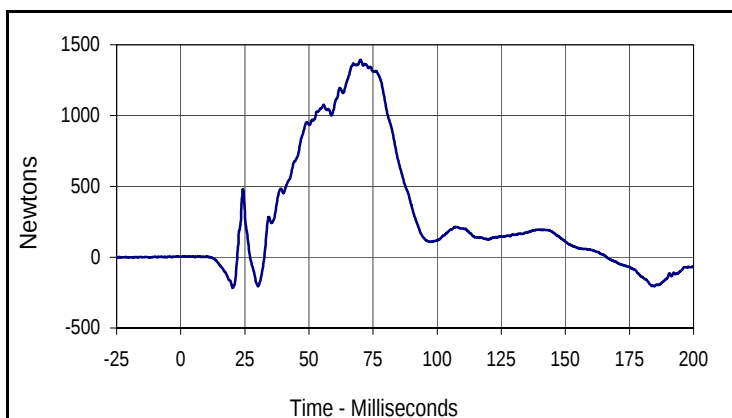
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Driver Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
011	FIL	600	Nm
Max	Time	Min	Time
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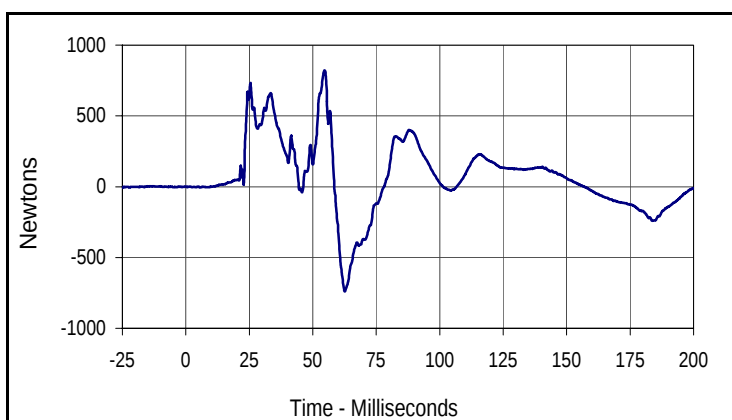
Curve Description			
Driver Nij			
Units	Type	Max	Time
Ntf	FIL	0.19	66.1
Units	Type	Max	Time
Nte	FIL	0.21	100.9
Units	Type	Max	Time
Ncf	FIL	0.11	136.8
Units	Type	Max	Time
Nce	FIL	0.00	-26.0

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: 56 km/h Frontal Validation Testing

Test Date: 5/7/09
 NHTSA No.: MA5401



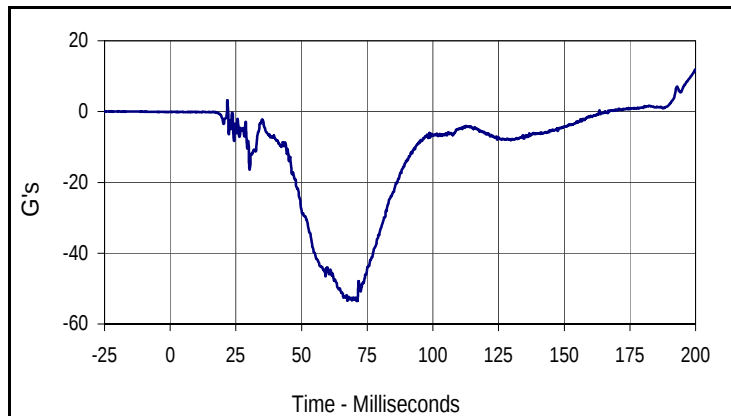
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Driver Left Femur Force Z			
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Max	Time	Min	Time
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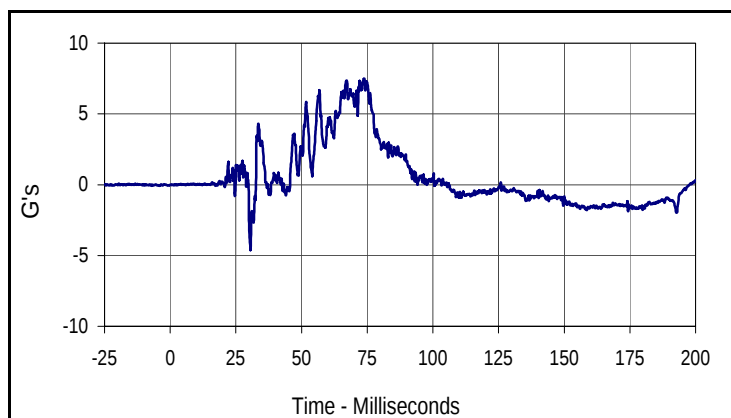
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Driver Right Femur Force Z			
CURNO	Type	SAE Class	Units
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Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: 56 km/h Frontal Validation Testing

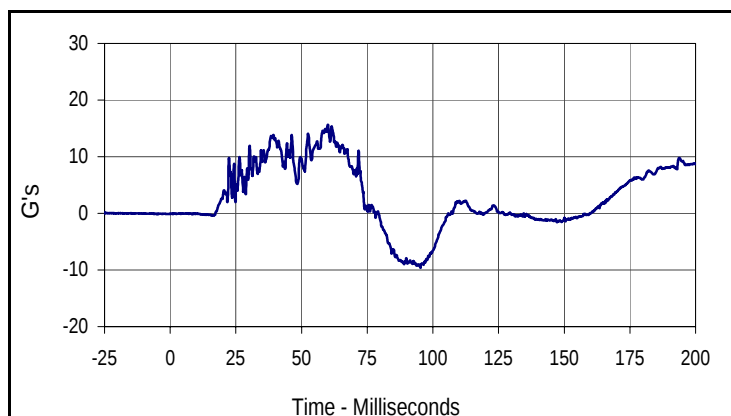
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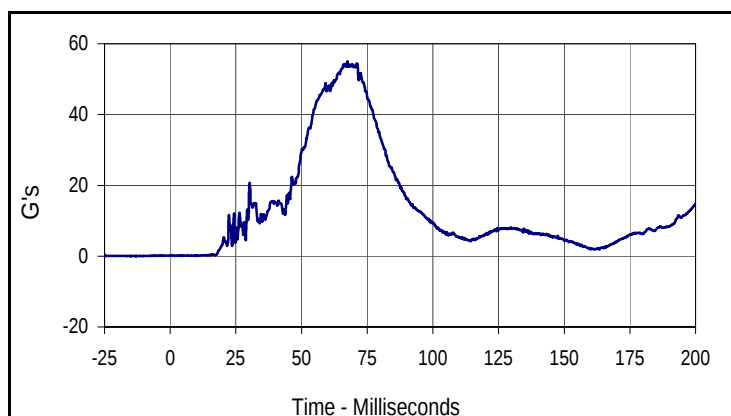
Curve Description			
Passenger Head Primary X			
CURNO	Type	SAE Class	Units
045	FIL	1000	G's
Max	Time	Min	Time
11.9	200.0	-53.5	71.3



Curve Description			
Passenger Head Primary Y			
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046	FIL	1000	G's
Max	Time	Min	Time
7.5	73.9	-4.6	30.6



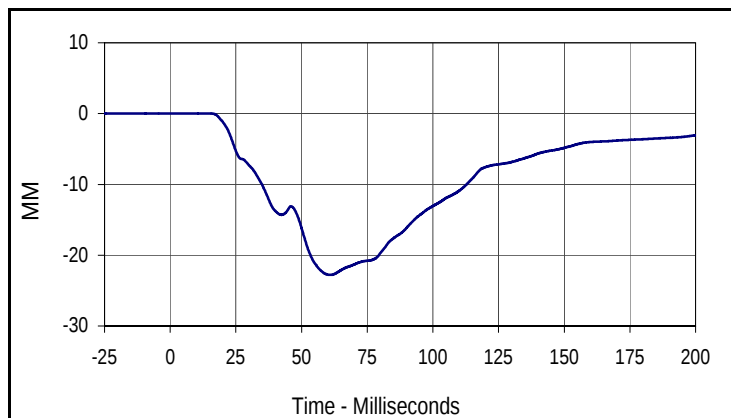
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CURNO	Type	SAE Class	Units
047	FIL	1000	G's
Max	Time	Min	Time
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Curve Description			
Passenger Head Resultant Primary			
CURNO	Type	SAE Class	Units
045	RES	1000	G's
Max	Time	Min	Time
54.9	67.5	0.1	1.6

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: 56 km/h Frontal Validation Testing

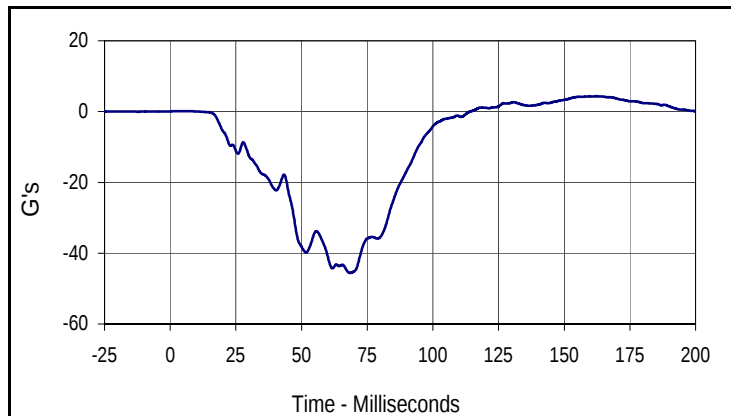
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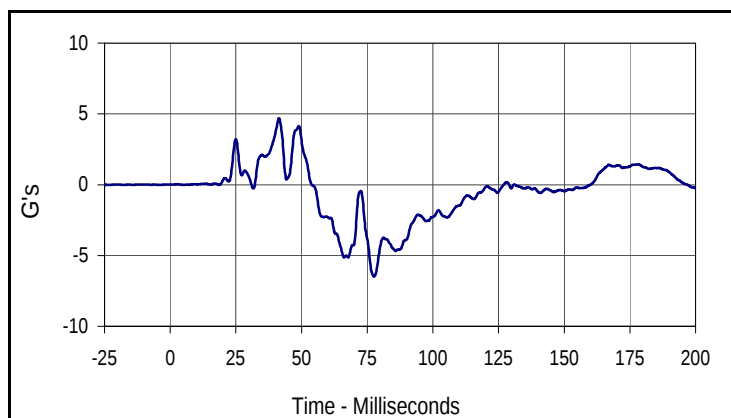
Curve Description			
Passenger Chest Deflection			
CURNO	Type	SAE Class	Units
063	FIL	180	MM
Max	Time	Min	Time
0.0	5.4	-22.8	60.9

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: 56 km/h Frontal Validation Testing

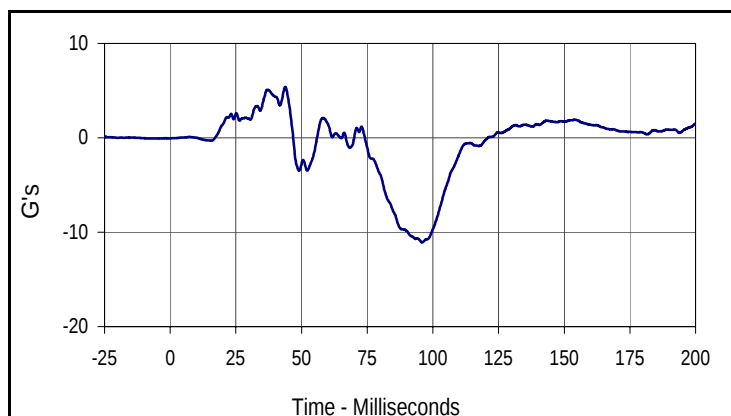
Test Date: 5/7/09
 NHTSA No.: MA5401



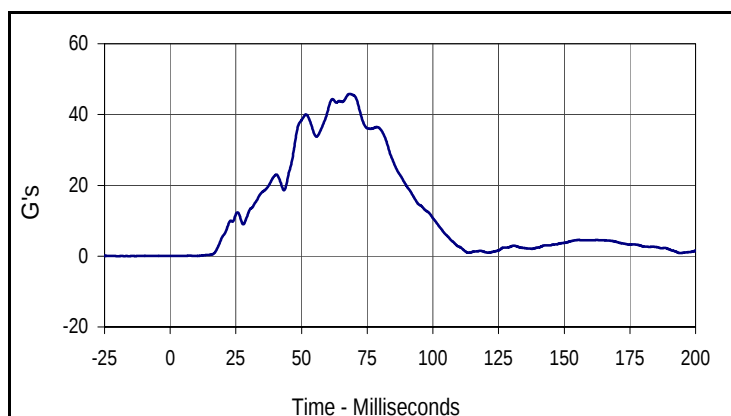
Curve Description			
Passenger Chest Primary X			
CURNO	Type	SAE Class	Units
057	FIL	180	G's
Max	Time	Min	Time
4.3	162.3	-45.6	68.5



Curve Description			
Passenger Chest Primary Y			
CURNO	Type	SAE Class	Units
058	FIL	180	G's
Max	Time	Min	Time
4.7	41.4	-6.5	77.6



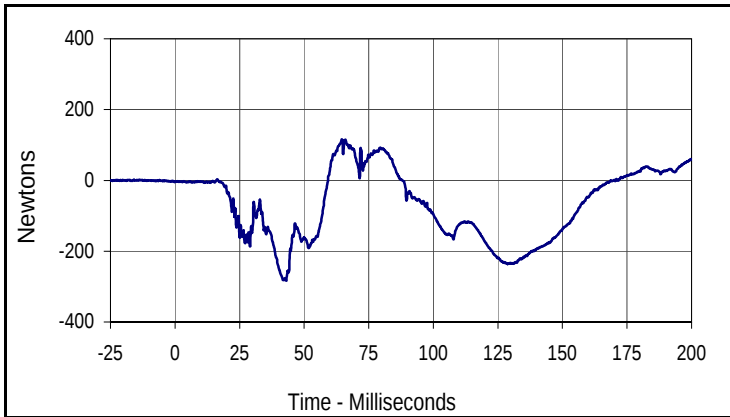
Curve Description			
Passenger Chest Primary Z			
CURNO	Type	SAE Class	Units
059	FIL	180	G's
Max	Time	Min	Time
5.4	43.8	-11.1	95.9



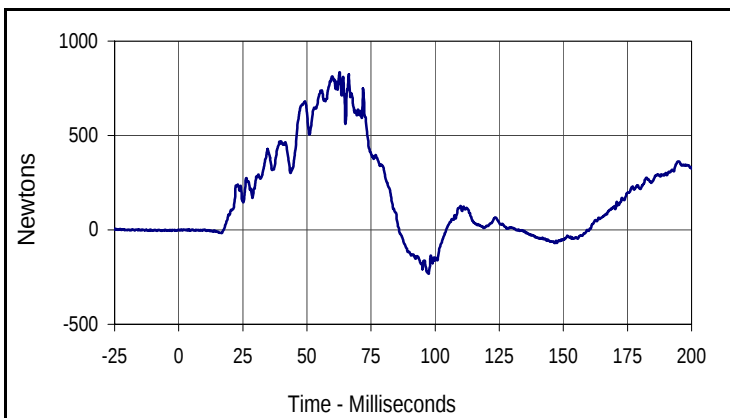
Curve Description			
Passenger Chest Resultant Primary			
CURNO	Type	SAE Class	Units
057	RES	180	G's
Max	Time	Min	Time
45.8	68.3	0.0	10.4

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: 56 km/h Frontal Validation Testing

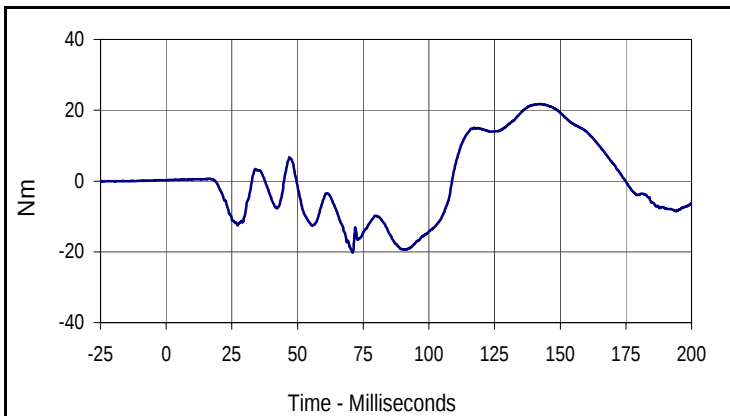
Test Date: 5/7/09
 NHTSA No.: MA5401



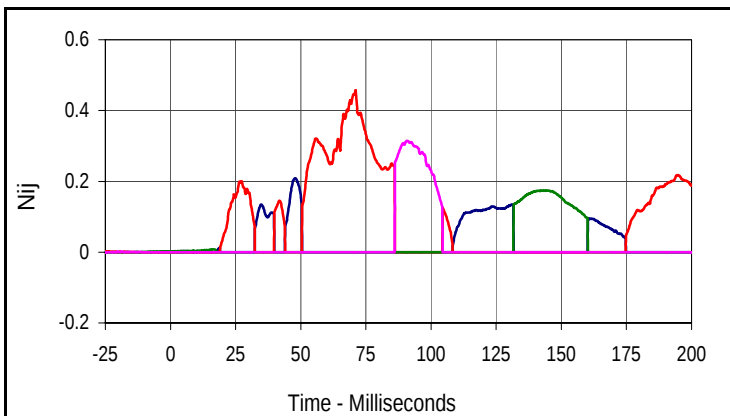
Curve Description			
Passenger Upper Neck Force X			
CURNO	Type	SAE Class	Units
051	FIL	1000	Newtons
Max	Time	Min	Time
115.9	64.6	-283.7	43.0



Curve Description			
Passenger Upper Neck Force Z			
CURNO	Type	SAE Class	Units
053	FIL	1000	Newtons
Max	Time	Min	Time
835.2	62.7	-232.6	97.4



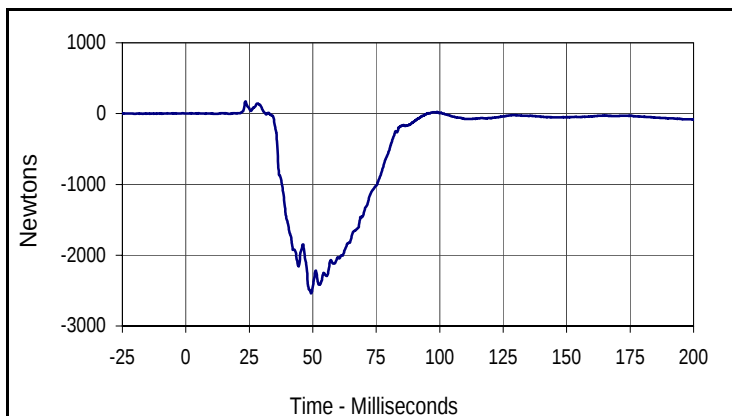
Curve Description			
Passenger Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
055	FIL	600	Nm
Max	Time	Min	Time
21.8	142.4	-20.2	71.0



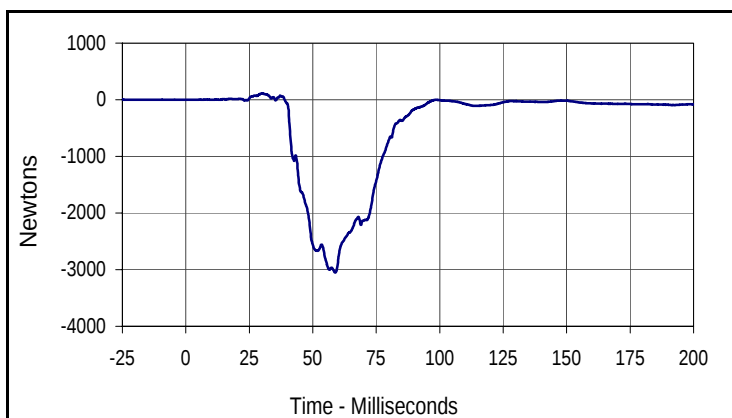
Curve Description			
Passenger Nij			
Units	Type	Max	Time
Ntf	FIL	0.21	47.8
Units	Type	Max	Time
Nte	FIL	0.46	71.0
Units	Type	Max	Time
Ncf	FIL	0.17	143.6
Units	Type	Max	Time
Nce	FIL	0.31	90.8

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: 56 km/h Frontal Validation Testing

Test Date: 5/7/09
 NHTSA No.: MA5401



Curve Description			
Passenger Left Femur Force Z			
CURNO	Type	SAE Class	Units
067	FIL	600	Newtons
Max	Time	Min	Time
172.3	23.5	-2537.0	49.4



Curve Description			
Passenger Right Femur Force Z			
CURNO	Type	SAE Class	Units
068	FIL	600	Newtons
Max	Time	Min	Time
112.1	30.1	-3049.2	58.8

APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

Test Program: Hybrid III 50th Percentile Male Head Drop Test

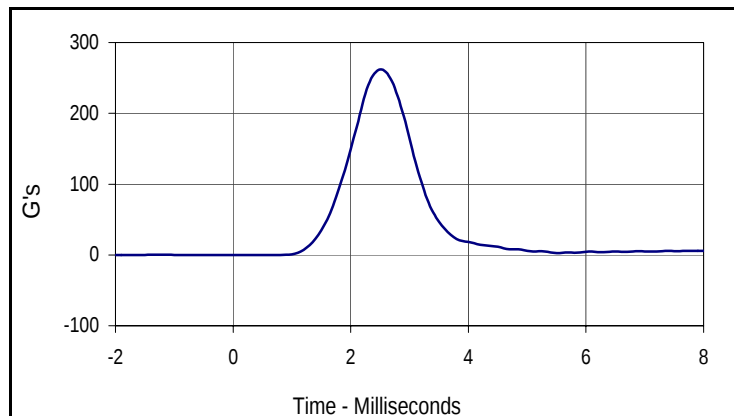
Test Date: 4/17/09

ATD Serial No.: 035

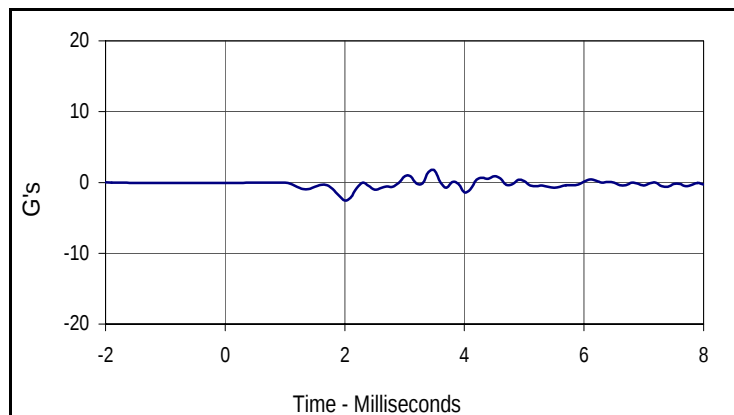
Test I.D.: HD34B



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	262.1	Pass
Peak Lateral Acceleration	G's	≤15.0	2.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
262.1	2.5	0.0	-2.0



Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
1.7	3.5	-2.6	2.0

Test Program: Hybrid III 50th Percentile Male Thorax Impact Test

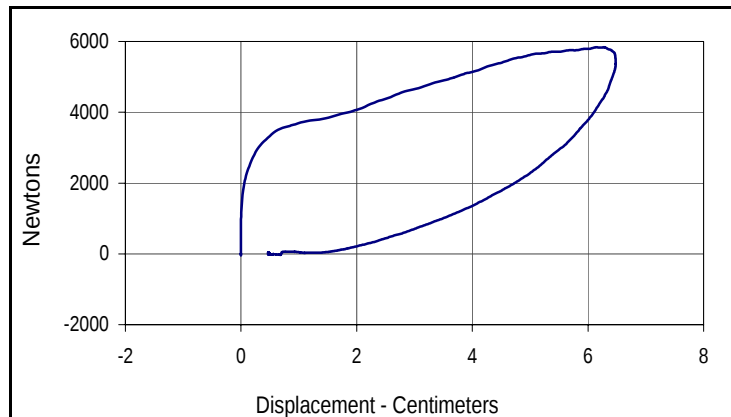
Test Date: 4/17/09

ATD Serial No.: 035

Test I.D.: CH35E



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.77	Pass
Peak Probe Force	Newtons	5159 to 5893	5834	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.48	Pass
Internal Hysteresis	%	69 to 85	72.0	Pass
Overall Test Results			Pass	



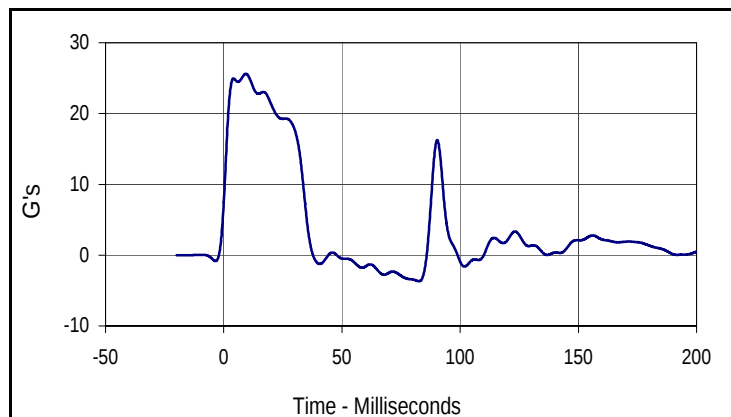
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
001	FIL	180	72.0
Peak Probe Force		Peak Chest Deflection	
5834		6.48	

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
 ATD Serial No.: 035

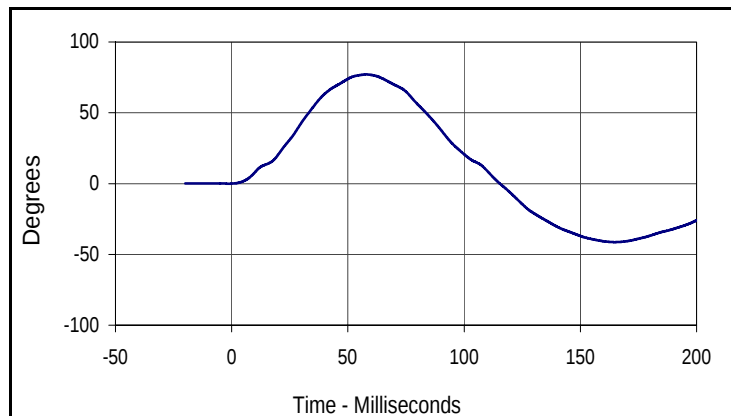
Test Date: 4/17/09
 Test I.D.: NF35G



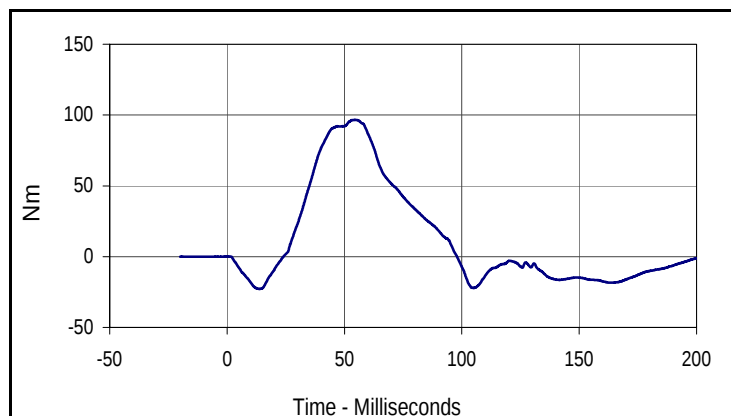
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.03	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	25.5	Pass
	20 Msec.	G's	17.6 to 22.6	21.4	Pass
	30 Msec.	G's	12.5 to 18.5	17.7	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	17.7	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	35.2	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	77.1	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	115.4	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	96.7	Pass
	Time	Msec.	47.0 to 58.0	54.5	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	98.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
25.6	9.3	-3.7	82.6



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
77.1	57.9	-41.4	164.8



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
96.7	54.5	-23.0	13.8

Test Program: Hybrid III 50th Percentile Male Neck Extension Test

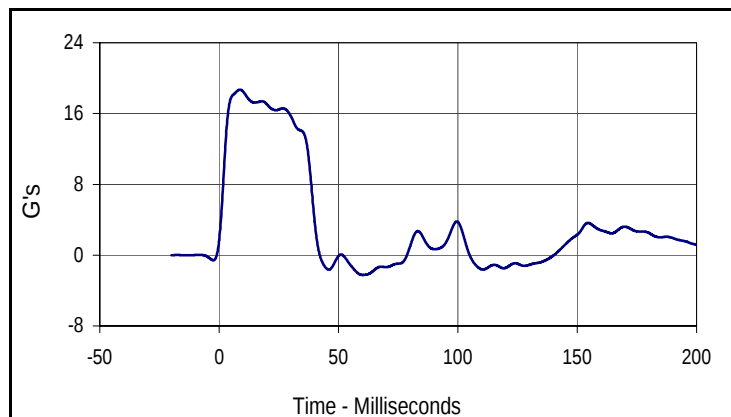
Test Date: 4/17/09

ATD Serial No.: 035

Test I.D.: NE35C



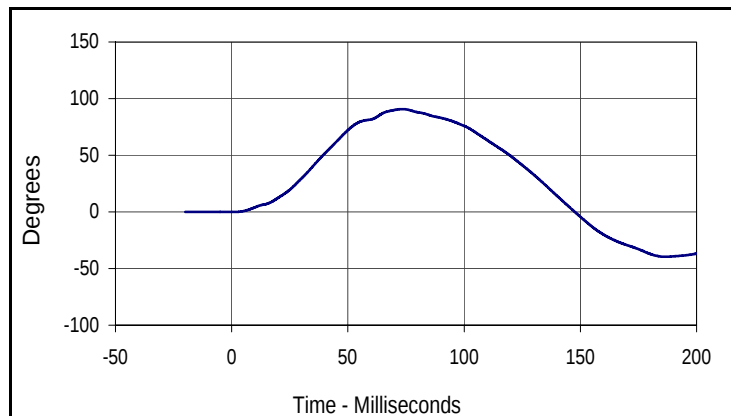
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.10	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	18.5	Pass
	20 Msec.	G's	14.0 to 19.0	17.1	Pass
	30 Msec.	G's	11.0 to 16.0	15.7	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	15.7	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	39.6	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	90.7	Pass
	Time	Msec.	72.0 to 82.0	73.5	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	147.6	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-67.6	Pass
	Time	Msec.	65.0 to 79.0	69.9	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	140.7	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

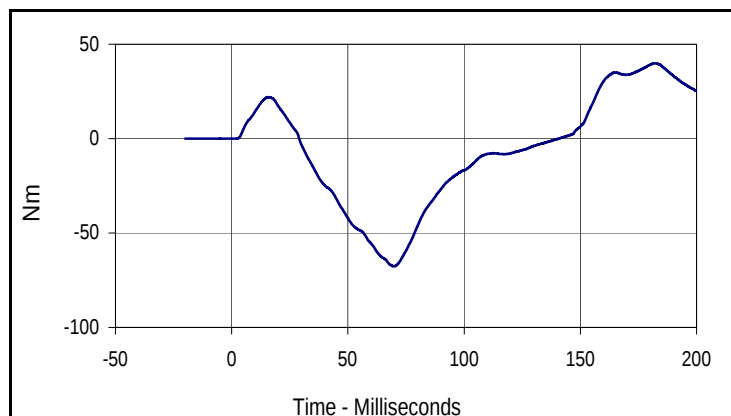
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
18.7	8.7	-2.2	60.2



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
90.7	73.5	-39.7	186.5



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
39.9	181.7	-67.6	69.9

Test Program: Hybrid III 50th Percentile Male Knee Impact Test

Test Date: 4/17/09

ATD Serial No.: 035

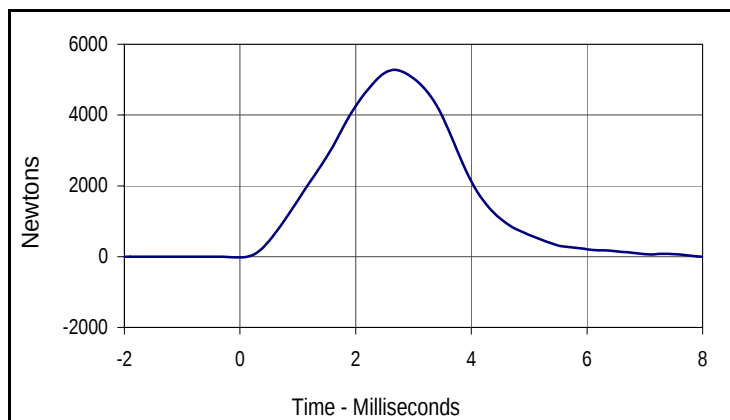
Test I.D.: LK35D , RK35D

**Left Knee**

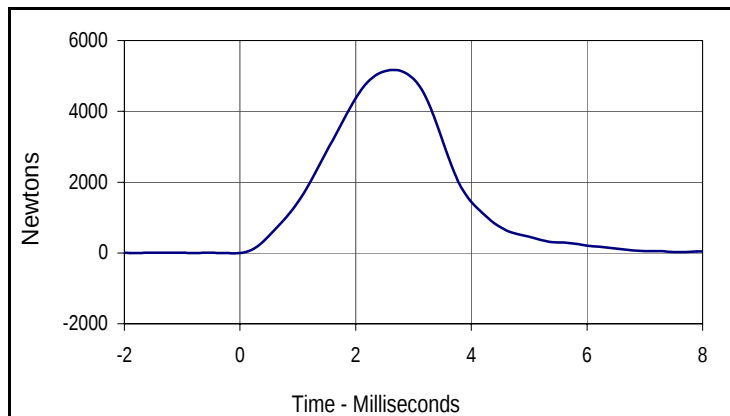
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5273	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5166	Pass
Overall Test Results				Pass

**Curve Description****Left Knee Probe Force**

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5272.9	2.7	-64.5	9.0

**Curve Description****Right Knee Probe Force**

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5165.5	2.6	-20.1	10.0

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 4/17/09

ATD Serial No.: 035

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	879 to 889	887	Pass
B - Shoulder pivot height	mm	505 to 521	512	Pass
C - "H" point height	mm	84 to 89	87	Pass
D - "H" point from seat back	mm	135 to 140	137	Pass
E - Shoulder pivot from back	mm	84 to 94	87	Pass
F - Thigh clearance	mm	140 to 155	152	Pass
G - Elbow back to wrist pivot	mm	290 to 305	302	Pass
H - Skull cap to back line	mm	41 to 46	43	Pass
I - Shoulder to elbow length	mm	330 to 345	337	Pass
J - Elbow rest height	mm	190 to 211	205	Pass
K - Buttock to knee length	mm	579 to 604	596	Pass
L - Popliteal length	mm	429 to 455	449	Pass
M - Knee pivot height	mm	485 to 500	485	Pass
N - Buttock popliteal length	mm	452 to 477	477	Pass
O - Chest depth	mm	213 to 229	213	Pass
P - Foot length	mm	251 to 267	253	Pass
V - Shoulder breadth	mm	422 to 437	427	Pass
W - Foot breadth	mm	91 to 107	105	Pass
Y - Chest circumference	mm	970 to 1001	991	Pass
Z - Waist circumference	mm	836 to 866	853	Pass
AA - Location for chest circumference	mm	429 to 434	429	Pass
BB - Location for waist circumference	mm	226 to 231	227	Pass
Overall Test Results				Pass

Test Program: Hybrid III 5th Percentile Female Head Drop TestTest Date: 4/20/09ATD Serial No.: 635Test I.D.: H635B

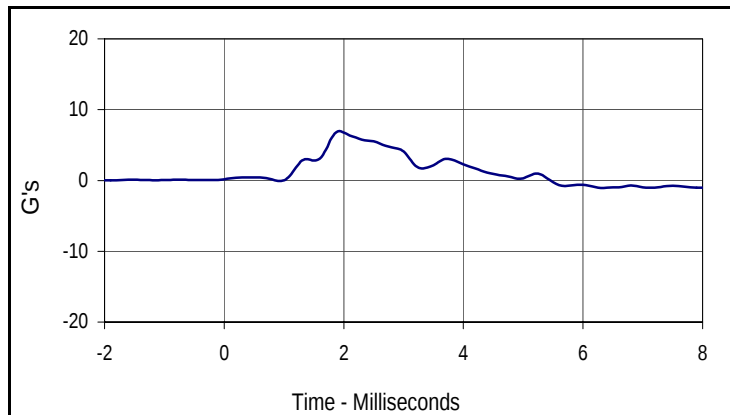
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	250.0 to 300.0	275.5	Pass
Peak Lateral Acceleration	G's	≤15.0	6.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description

Head Resultant

CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
275.5	1.9	0.6	-1.6



Curve Description

Head Y

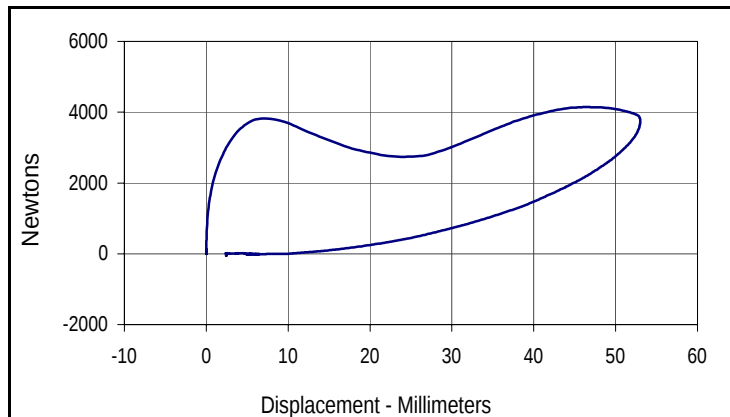
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
6.9	1.9	-0.8	5.7

Test Program: Hybrid III 5th Percentile Female Thorax Impact Test
 ATD Serial No.: 635

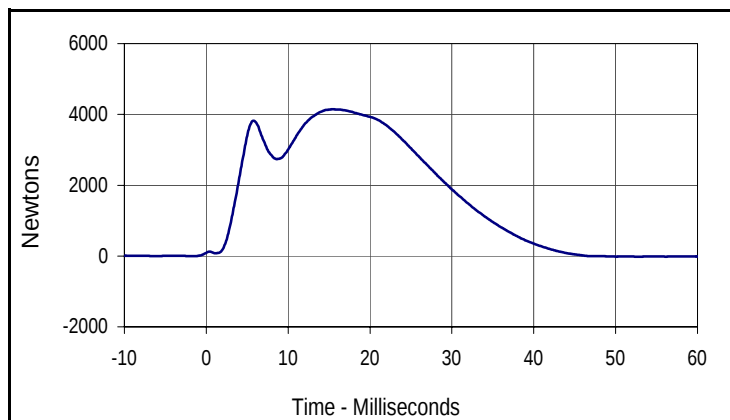
Test Date: 4/20/09
 Test I.D.: CH635E



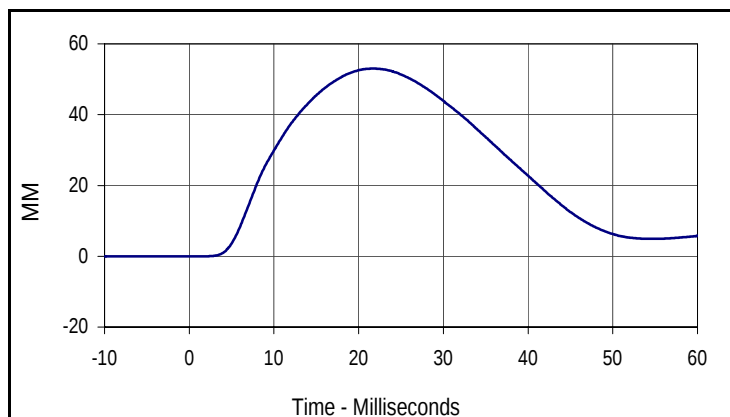
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.59 to 6.83	6.68	Pass
Peak Chest Deflection	MM	50.0 to 58.0	53.0	Pass
Peak Force Between 50 and 58 MM	Newtons	3900 to 4400	4146	Pass
Peak Force Between 18 and 50 MM	Newtons	≤4600	4080	Pass
Internal Hysteresis	%	69 to 85	74.4	Pass
Overall Test Results			Pass	



Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
003	FIL	180	74.4
Peak Probe Force		Peak Chest Displ.	
4145.6		53.0	



Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4145.6	15.4	-52.9	187.8



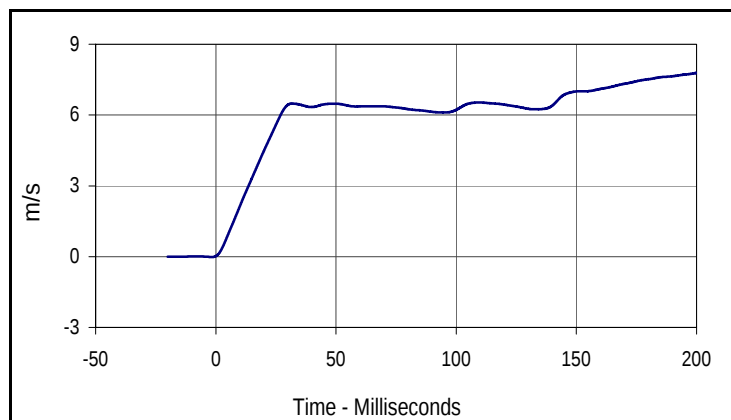
Curve Description			
Chest Deflection			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
53.0	21.7	0.0	-10.0

Test Program: Hybrid III 5th Percentile Female Neck Flexion Test
 ATD Serial No.: 635

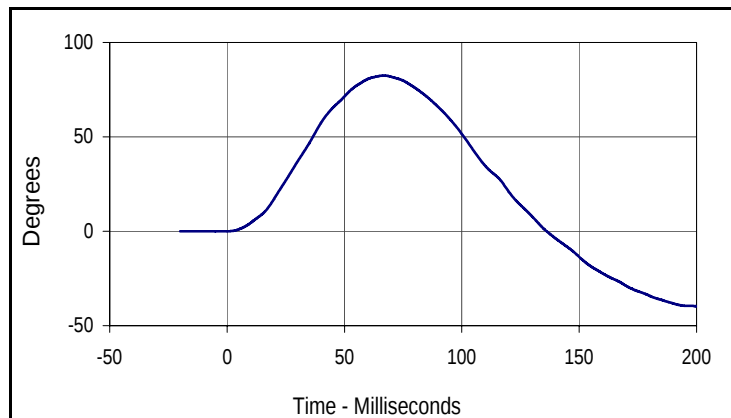
Test Date: 4/20/09
 Test I.D.: F635A



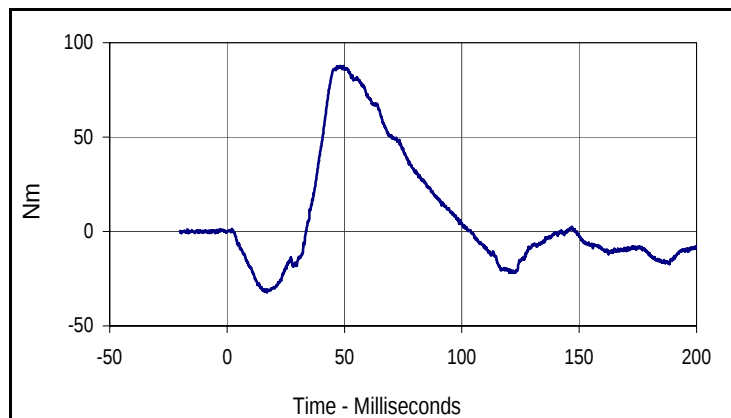
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.09	Pass
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.1	Pass
	20 Msec.	m/s	4.0 to 5.0	4.5	Pass
	30 Msec.	m/s	5.8 to 7.0	6.4	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	82.5	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	81.7	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	93.6	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
7.8	200.0	0.0	-1.7



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
82.5	66.8	-39.6	200.0



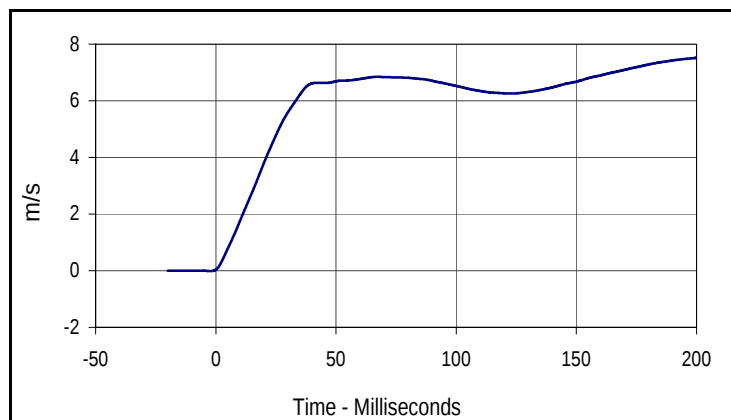
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
87.7	48.0	-32.4	16.9

Test Program: Hybrid III 5th Percentile Female Neck Extension Test
 ATD Serial No.: 635

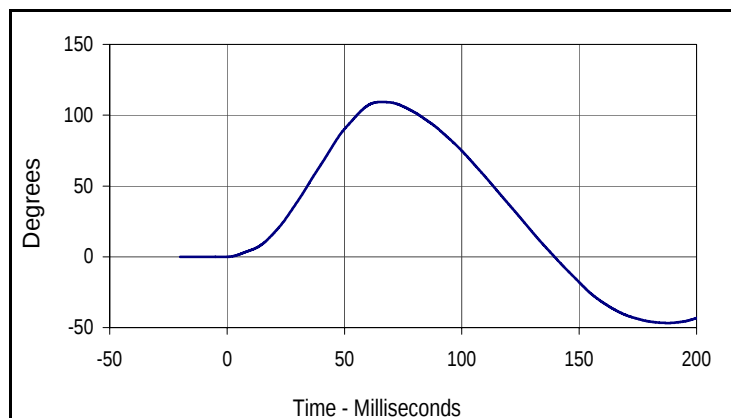
Test Date: 4/20/09
 Test I.D.: E635A



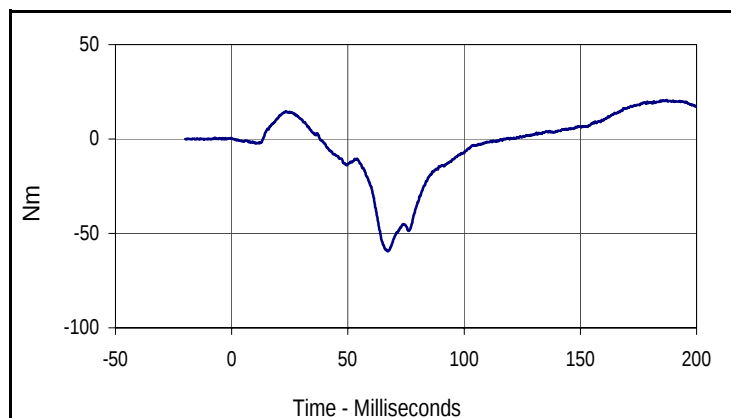
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.05	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.7	Pass
	20 Msec.	m/s	3.1 to 3.9	3.8	Pass
	30 Msec.	m/s	4.6 to 5.6	5.6	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	109.3	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-56.5	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	96.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
7.5	200.0	0.0	-2.2



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
109.3	65.3	-46.8	187.8



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
20.7	187.1	-59.4	67.1

Test Program: Hybrid III 5th Percentile Female Knee Impact Test

Test Date: 4/20/09

ATD Serial No.: 635

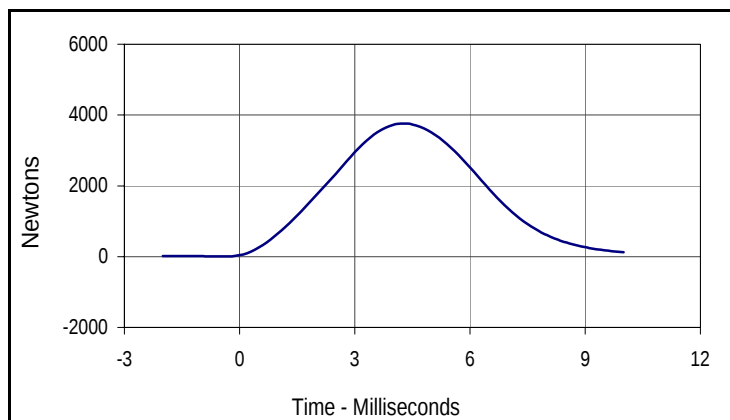
Test I.D.: LK635B , R635A

**Left Knee**

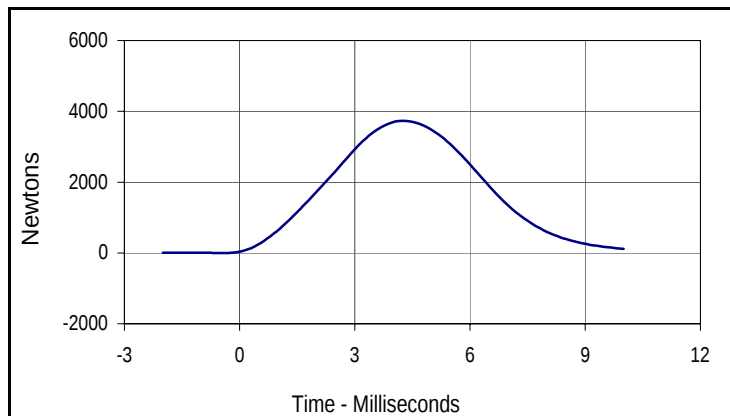
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	3450 to 4060	3762	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	3450 to 4060	3734	Pass
Overall Test Results				Pass

**Curve Description****Left Knee Probe Force**

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3762.1	4.3	3.4	-0.4

**Curve Description****Right Knee Probe Force**

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
3734.1	4.3	-2.5	-0.4

Test Program: Hybrid III 5th Percentile Female External Measurements

Test Date: 4/20/09

ATD Serial No.: 635

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	774.7 to 800.1	775	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	443	Pass
C - "H" point height (Reference)	mm	81.3 to 86.3	85	Pass
D - "H" point from seat back (Ref.)	mm	144.8 to 149.8	146	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	82	Pass
F - Thigh clearance	mm	119.4 to 134.6	130	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	251	Pass
H - Head to back line	mm	40.7 to 45.7	43	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	289	Pass
J - Elbow rest height	mm	182.8 to 203.2	199	Pass
K - Buttock to knee length	mm	520.7 to 546.1	545	Pass
L - Popliteal height	mm	355.6 to 376.0	364	Pass
M - Knee pivot height	mm	393.7 to 419.1	413	Pass
N - Buttock popliteal length	mm	414.0 to 439.4	420	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	186	Pass
P - Foot length	mm	218.5 to 233.7	231	Pass
R - Buttock to knee pivot length	mm	457.2 to 482.6	473	Pass
S - Head breadth	mm	137.1 to 147.3	143	Pass
T - Head depth	mm	177.8 to 188.0	181	Pass
U - Hip breadth	mm	299.7 to 314.9	310	Pass
V - Shoulder breadth	mm	350.5 to 365.7	363	Pass
W - Foot breadth	mm	78.8 to 94.0	89	Pass
X - Head circumference	mm	528.3 to 548.7	541	Pass
Y - Chest circumference with jacket	mm	850.8 to 881.3	875	Pass
Z - Waist circumference	mm	759.5 to 789.9	770	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	302	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	166	Pass
Overall Test Results				Pass

Test Program: Dummy Damage Checklist
 ATD Serial No.: 035

Test Date: 4/17/09
 Test I.D.: N/A



GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:

Test Program: Dummy Damage Checklist
 ATD Serial No.: 635

Test Date: 4/20/09
 Test I.D.: N/A



GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:
