

REPORT NUMBER TR-P29001-10-NC

**NEW CAR ASSESMENT PROGRAM
FRONTAL BARRIER IMPACT TEST**

**TOYOTA MOTOR CORPORATION
2010 LEXUS HS 250H
4-DOOR SEDAN**

NHTSA NUMBER: MA5119

**Prepared By:
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OCTOBER 24, 2009

FINAL REPORT

**PREPARED FOR:
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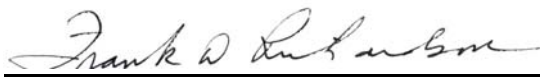
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16. Abstract A 35 mph (56.3 km/h) frontal barrier impact test was conducted on the subject 2010 Lexus HS 250h 4-Door Sedan at KARCO Engineering, LLC, in Adelanto, CA, on October 24, 2009. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, 305, and footwell intrusion performance. The impact velocity was 56.44 km/h. The ambient temperature at the barrier at the time of the crash was 28.3 degrees Celsius. The vehicle's maximum post static crush was 453 mm at DPD 4, to the right of the vehicle's centerline. The test vehicle was equipped with a 3-point continuous belt system and a second generation airbag at both front outboard positions. With respect to FMVSS 208 'Occupant Crash Protection', the occupant injury criteria summary is as follows:					
Measurement Description		Units	Threshold	Driver ATD	Passenger ATD
Head Injury Criteria (HIC)		N/A	1000	360.5	307.1
Max. Chest Accel. (3 msec. Chest Clip)		G's	60	42.1	39.4
Left Femur Force		Newtons	10008	-2590.6	-2036.5
Right Femur Force		Newtons	10008	-2985.4	-1741.1
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SECTION 1
PURPOSE AND SUMMARY OF TEST MA5119

1.1 PURPOSE

This 35 mph (56.3 km/h) frontal barrier impact test is part of the New Car Assessment Program (NCAP) sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-06-D-00027. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph (48.3 km/h) requirements.

The 35 mph (56.3 km/h) frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated July 2005. Data was obtained indicant of FMVSS 208 "Occupant Crash Protection", FMVSS 212 "Windshield Retention", FMVSS 219 (partial) "Windshield Zone Intrusion", FMVSS 301 "Fuel System Integrity", and FMVSS 305 "Electric Powered Vehicles: Electrolyte Spillage and Shock Protection" performance. Procedures for receiving, inspection, testing and reporting of test results are described in the test procedures and are not repeated in this report.

1.2 SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2010 Lexus HS 250h 4-Door Sedan at a velocity of 56.44 km/h. The test was performed at KARCO Engineering, LLC on October 24, 2009.

Three (3) real-time and fourteen (14) 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 number 14 (page number 24) of 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 (primary and redundant), chest (primary and redundant) and pelvis triaxial accelerometers, chest displacement potentiometers, six-axis upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were placed on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. Shoulder belt spool-off was measured for the driver and passenger dummies. The driver (position 1) ATD (Serial No.034) and the right-front passenger (position 2) ATD (Serial No. 035) were calibrated prior to this test.

One hundred and thirty-two (132) channels of data were recorded using a TDAS data acquisition system. Appendix A contains Pre and Post-Test Photographs, Appendix B contains the Dummy Response data traces, and Appendix C contains the Dummy Calibration data.

There was 100% windshield retention and no intrusion into the protected zone of the windshield during impact. There was no Stoddard solvent leakage after the event, or during any phase of the static rollover. There was also no electrolyte leakage or propulsion battery shorting to chassis after the event or at any phase of the static rollover.

The maximum static crush of the vehicle was 453 mm at DPD 4, to the right of the vehicle's centerline. Both the driver and passenger side doors remained closed and latched 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 knees contacted the Knee airbag.

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 knees contacted the Knee airbag.

Occupant injury data is contained in table below.

OCCUPANT DATA SUMMARY

ATD Position	HIC 36	3 msec Chest Clip	Chest Defl. (mm)	Left Femur (N)	Right Femur (N)
Driver	360.5	42.1	-22.3	-2590.6	-2985.4
Passenger	307.1	39.4	-21.5	-2036.5	-1741.1

Additional data plots for this test are available in the research and development section of the NHTSA website. The website can be found at: www.NHTSA.Dot.Gov

SECTION 2

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan NHTSA No.: MA5119
Test Program: NHTSA 35mph NCAP Test Date: 10/24/09

CONVERSION FACTORS USED IN THIS REPORT*

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

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

DATA SHEET NO. 1
CRASH TEST SUMMARY

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan
 Test Program: NHTSA 35mph NCAP

NHTSA No.: MA5119
 Test Date: 10/24/09

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/h	56.44
Test Weight	kg	1859
Impact Angle	degrees	0
Average Rebound	mm	1855
Maximum Static Crush	mm	453

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door Opening	Remained closed and latched, opened without tools	Remained closed and latched, opened without tools
Rear Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Seat Track Shift (mm)	14 mm	3 mm
Seatback Failure	No	No

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type/Serial No.	50% Male Hybrid III No.034	50% Male Hybrid III No. 035
Head Contact	Airbag, headrest	Airbag, headrest
Chest Contact	Airbag	Airbag
Abdomen Contact	None	None
Left Knee Contact	Knee Airbag	Knee Airbag
Right Knee Contact	Knee Airbag	Knee Airbag

MOVIE COVERAGE

Cameras	Standard	Additional
High Speed	16	0
Real Time	1	2
Total	17	2

DATA CHANNELS

Driver ATD Sensors	40
Passenger ATD Sensors	40
Belt Assessment Sensors	8
Vehicle Structure Accelerometers	8
Rigid Barrier Load Cells	36
Total	132

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: <u>2010 Lexus HS 250h 4-Door Sedan</u>	NHTSA No.: <u>MA5119</u>
Test Program: <u>NHTSA 35mph NCAP</u>	Test Date: <u>10/24/09</u>

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MA5119
Make	Lexus
Model	HS 250h
Body Style	4-Door Sedan
VIN No.	JTHBB1BA1A2002357
Color	Black Sapphire
Delivery Date	10/08/09
Odometer (Miles)	52.0
Dealer	Lexus of Las Vegas
Transmission	CVT
Final Drive	Front
Type/No. of Cylinders	Inline 4
Engine Displ. (L)	2.4
Engine Placement	Transverse
Roof Rack	No
Sunroof/T-top	Yes
Tinted Glass	Yes
Traction Control	Yes
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	Yes
Pass. Front Airbag	Yes
Pass. Side Torso Airbag	Yes
Pass. Head Airbag	No
Pass. Curtain Airbag	Yes
Pass. Knee Airbag	Yes
Pre-Tensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes
Air Conditioning	Yes
AM/FM CD	Yes
Tilt Steering	Yes
Automatic Door Locks	Yes
Power Windows	Yes
Power Seats	Yes
Other	Bluetooth

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

Yes

DATA FROM MANUFACTURER'S LABEL

Manufactured By	Toyota Motor Corporation
Date of Manufacture	Jul-09

GVWR (kg)	2124
GAWR Front (kg)	1160
GAWR Rear (kg)	1000

VEHICLE SEATING CAPACITY AND WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number of Occupants	2	3		5
Capacity Weight (VCW) (kg)				375
Cargo Weight (RCLW) (kg)				35

DATA SHEET NO. 2...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

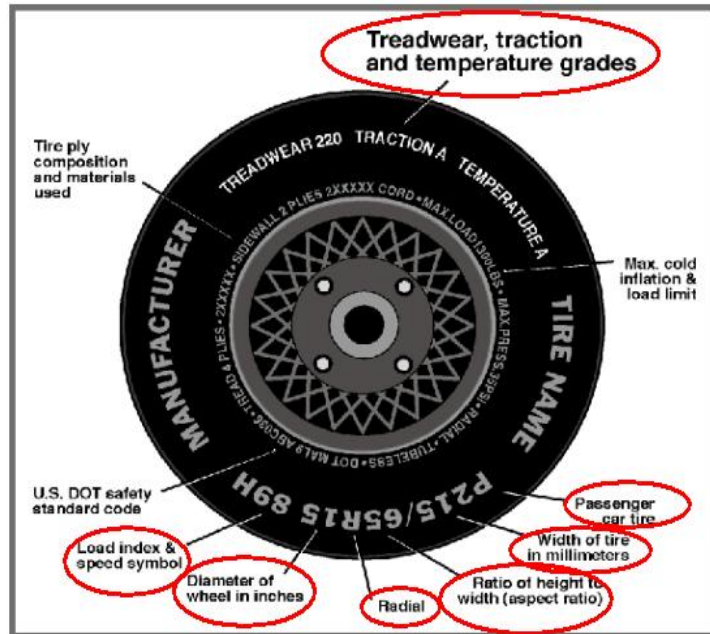
Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09

Collect year, make, model, VIN, items circled in red, and tire manufacturer and tire name.



TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Tire Pressure (kPa)	230	230
Recommended Tire Size	P215/55R17	P215/55R17
Tire Size on Vehicle	P215/55R17	P215/55R17
Tire Manufacturer	Michelin	Michelin
Treadwear	440	440
Traction	A	A
Temperature Grades	A	A
Tire Plies - Sidewall	2 Polyester	2 Polyester
Tire Plies - Body	2 Polyester, 1 Polyamide, 2 Steel	2 Polyester, 1 Polyamide, 2 Steel
Load Index/Speed Symbol	93V	93V
Tire Material	Polyester, Polyamide, Steel	Polyester, Polyamide, Steel
DOT Safety Code Right	B93F MK6X 0709	B93F MK6X 0709
DOT Safety Code Left	B93F MK6X 0709	B93F MK6X 0709

DATA SHEET NO. 2...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan NHTSA No.: MA5119
 Test Program: NHTSA 35mph NCAP Test Date: 10/24/09

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	475.0	337.5	812.5	564.0	407.0	971.0
Right	kg	522.0	324.5	846.5	501.0	387.0	888.0
Ratio	%	60.1	39.9	100.0	57.3	42.7	100.0
Totals	kg	997.0	662.0	1659.0	1065.0	794.0	1859.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1659
Weight of 2 P572 ATD's	kg	170
Rated Cargo/Luggage Weight (RCLW)	kg	35
Calculated Target Vehicle Test Weight (TVTW)	kg	1864

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	716	726	716	723	1077
As Tested	mm	689	699	690	703	1152

Vehicle Wheel Base (mm) 2699
 Weight of Ballast Secured in Cargo Area (kg) 0
 Weight of Items Removed (kg) 32
 Vehicle Components Removed: Spare tire, tools and jack, rear bumper assembly, taillights, rear door panels, rear center console

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

FUEL SYSTEM DATA

Fuel System Capacity from Owner's Manual (L) 55.00
 Actual Test Volume with Entire Fuel System Filled (L) 51.14
 Test Fluid Type Stoddard Solvent
 Kinematic Viscosity as per ASTM Standard D484-71 Red
 Is Vehicle Fuel Pump Electric or Mechanical? Electric
 If electric, does pump operate with the ignition switch "ON" & engine "OFF"? No
 Fuel System Particulars The fuel pump will operate when the engine is running.

DATA SHEET NO. 3
POST-TEST IMPACT DATA

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan
 Test Program: NHTSA 35mph NCAP

NHTSA No.: MA5119
 Test Date: 10/24/09

SPEED TRAP DATA

Measured Paramater	Units	Requirement	Value
Trap No. 1 Velocity	km/h	55.1 to 57.12	56.44
Trap No. 2 Velocity	km/h	55.1 to 57.12	56.38

VEHICLE STATIC CRUSH

Measured Parameter	Units	Pre-Test	Post-Test	Difference
Left Side	mm	4002	3821	181
Center	mm	4700	4351	349
Right Side	mm	4008	3779	229

VEHICLE REBOUND FROM BARRIER

Measured Paramater	Units	Value
Left Side	mm	1905
Center	mm	1790
Right Side	mm	1870
Average	mm	1855

DATA SHEET NO. 4

TEST VEHICLE INFORMATION

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan
Test Program: NHTSA 35mph NCAP

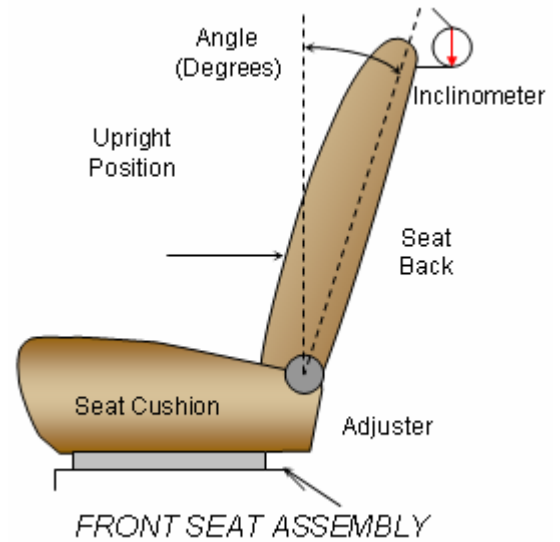
NHTSA No.: MA5119
Test Date: 10/24/09

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs are positioned to the manufacturer's designated angle. The procedure is as follows: Seat back angle was measured at the headrest, using a digital inclinometer.

SEAT BACK ANGLES

Position	Degrees
Driver w/ Seated Dummy	1.0 @ headrest
Passenger w/ Seated Dummy	1.0 @ headrest

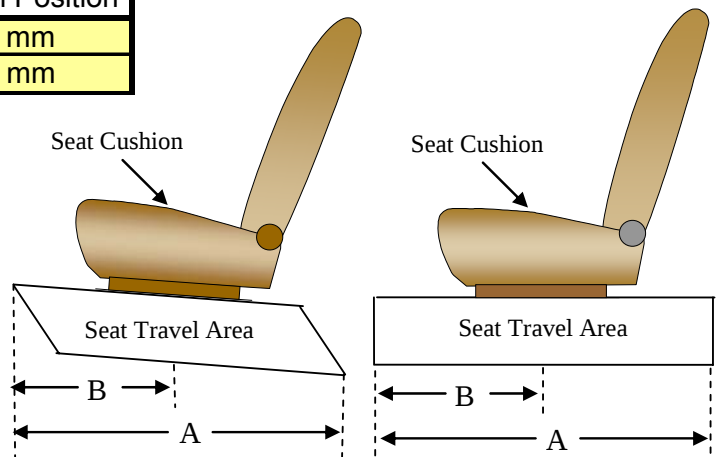


SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position to rearmost position. The seat was set at the longitudinal mid position. There were vertical adjustments on the driver seat that was equipped with the vehicle. There were no adjustments on the passenger seat. The driver seat was placed in the lowermost position.

SEAT FORE/AFT POSITIONING

Position	Total Fore/Aft Travel	Placed in Position
Driver Seat	290 mm	145 mm
Passenger Seat	290 mm	145 mm



SEAT BELT ANCHORAGE

Position number one (1) is the uppermost position.

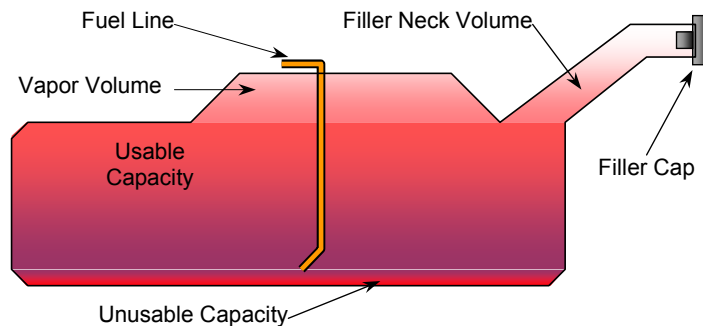
SEAT BELT ANCHORAGE POSITIONING

	Total Number of Positions	Placed in Position
Driver Seat	4	1
Passenger Seat	4	1

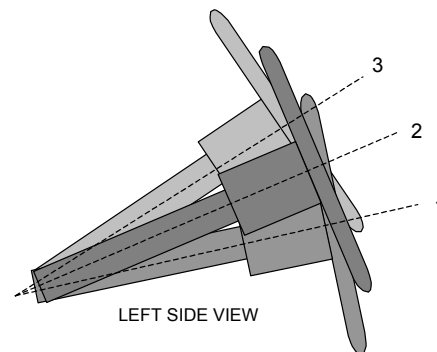
DATA SHEET NO. 4...(CONTINUED)**TEST VEHICLE INFORMATION**Test Vehicle: 2010 Lexus HS 250h 4-Door SedanNHTSA No.: MA5119Test Program: NHTSA 35mph NCAPTest Date: 10/24/09**FUEL TANK CAPACITY**

	Liters
Usable Capacity of Standard Tank	55.00
Usable Capacity of Optional Tank	
Usable Capacity Used for FMVSS 301	50.6 to 51.7
Actual Amount of Solvent Used	51.14

The test vehicle is equipped with an electric fuel pump. The fuel pump will operate when the engine is running. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear passenger 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. 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**

	Degrees	Fore/Aft Position
Lowermost - Position No. 1	21.6	81
Geometric Center - Position No. 2	23.7	99
Uppermost - Position No. 3	25.7	116

DATA SHEET NO. 5

DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09

TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield angle		22.1		
SWA	Steering wheel angle		66.4		
SCA	Steering column angle		23.6		
SA	Seat Back angle		1.0		1.0
HZ	Head to roof (Z)	189	90.0	171	90.0
HH	Head to header	396	23.1	388	22.4
HW	Head to windshield	769	0.0	742	0.0
HR	Head to side header (Y)	282		271	
NR	Nose to rim	396	12.1		
CD	Chest to dash	505	11.4	544	13.7
CS	Chest to steering hub	311	10.6		
RA	Rim to abdomen	194			
KDL	Left knee to dash	169	17.2	158	
KDR	Right knee to dash	117		157	29.1
PA	Pelvic angle		22.0		21.4
TA	Tibia Angle		51.8		51.8
KK	Knee to knee	339		268	
SK	Striker to outboard knee	617	10.4	604	3.9
ST	Striker to head	447	76.9	453	74.1
SH	Striker to H-Point	327	44.3	321	40.4
SHY	Striker to H-Point (Y)	235		229	
HS	Head to side window	332		331	
HD	H-Point to door	140		142	
AD	Arm to door	138		42	

DATA SHEET NO. 5...(CONTINUED)

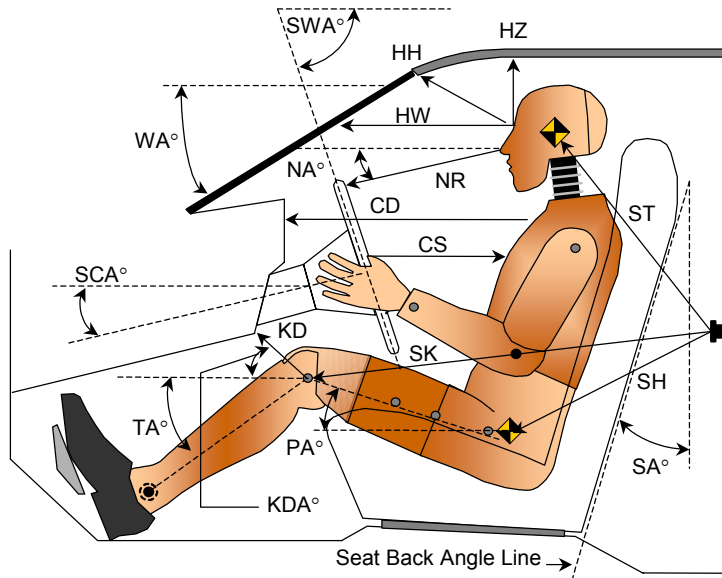
DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

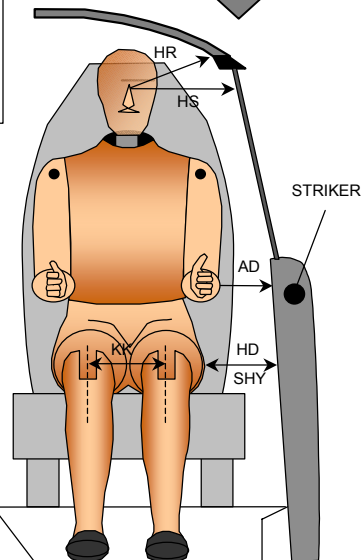
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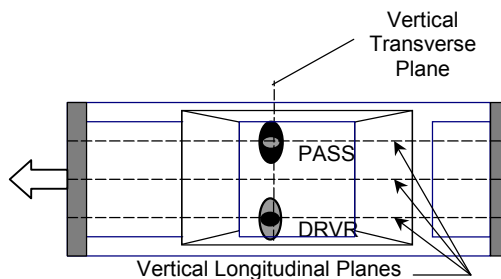
Test Date: 10/24/09



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



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



DATA SHEET NO. 6

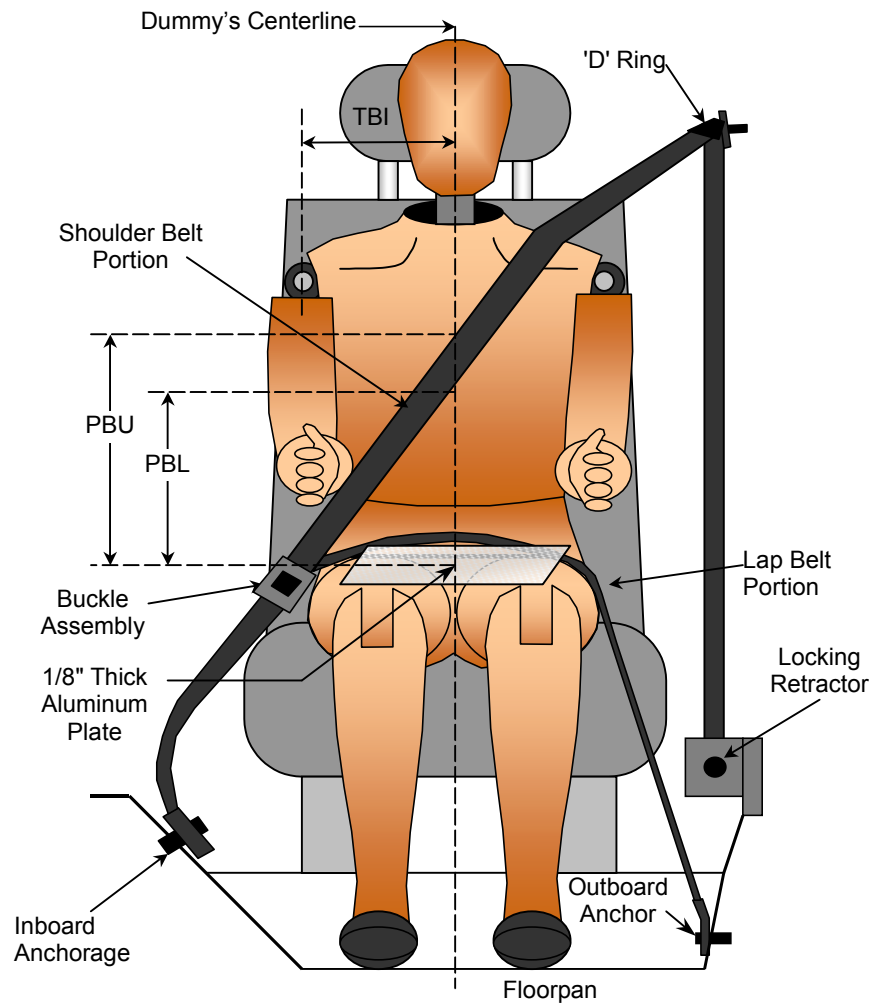
SEAT BELT POSITIONING DATA

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09



SEAT BELT POSITIONING MEASUREMENTS

Measured Parameter	Units	Driver	Passenger
TBI - Dummy C/L to Lap/Shoulder Belt Intersect	mm	244	242
PBU - Top Surface of Reference to Belt Upper Edge	mm	359	341
PBL - Top Surface of Reference to Belt Lower Edge	mm	274	255
Lap Belt Tension	Newtons	10	10
Shoulder Belt Tension	N/A	Retractor	Retractor

DATA SHEET NO. 7**VEHICLE ACCELEROMETER LOCATIONS**Test Vehicle: 2010 Lexus HS 250h 4-Door SedanNHTSA No.: MA5119Test Program: NHTSA 35mph NCAPTest Date: 10/24/09**VEHICLE ACCELEROMETER PRE-TEST LOCATIONS**

No.	Accelerometer Location	Measurement (mm)		
		X	Y	Z
1	Left Rear X-Member	-2820	-660	360
2	Right Rear X-Member	-2820	660	360
3	Engine Top	-840	30	820
4	Engine Bottom	-710	260	170
5	Left Brake Caliper	-830	-730	270
6	Right Brake Caliper	-830	730	270
7	Instrument Panel			
8	Left Rear X-Member (Z-Axis)	-2820	-660	360
9	Right Rear X-Member (Z-Axis)	-2820	660	360

Reference Planes: X=From Rear Surface of Vehicle, Y=Vehicle Centerline, Z=Ground Plane

1.) Instrument Panel no longer used by NHTSA.

2.) Instrumentation not installed

DATA SHEET NO. 8**SEAT BELT ASSESSMENT TEST DATA**Test Vehicle: 2010 Lexus HS 250h 4-Door SedanNHTSA No.: MA5119Test Program: NHTSA 35mph NCAPTest Date: 10/24/09**SEAT BELT POSITIONING MEASUREMENTS**

Measurement Description	Units	Driver	Passenger
Retractor Reel to D-Ring	mm	685	985
Shoulder Belt Length as Measured on ATD	mm	884	912
Lap Belt Length as Measured on ATD	mm	930	945
Remainder of Belt on Reel	mm	790	776
Total Belt Length for Continuous Webbing Systems	mm	3289	3618

SHOULDER BELT SPOOL-OFF DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm	99	144
As determined electronically	mm	137.4	200.7

BELT STRETCH DATA

Measurement Description	Units	Driver	Passenger
Electronically between belt load cell and D-Ring	mm/cm	*	*
Mechanically	mm/cm		

*Not used with shoulder belt pre-tensioner systems

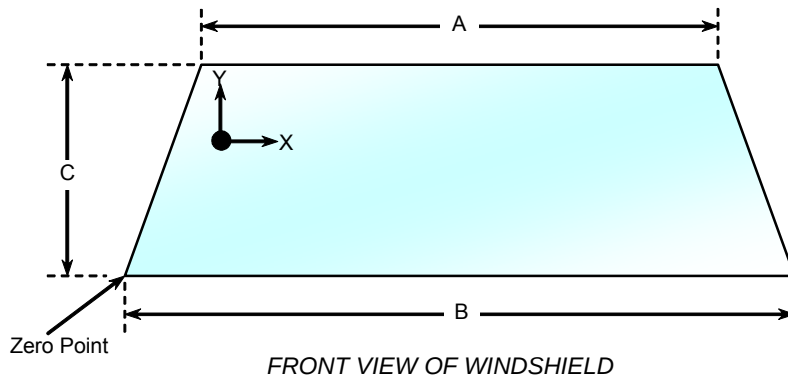
DATA SHEET NO. 9**SUMMARY OF FMVSS 212 DATA**Test Vehicle: 2010 Lexus HS 250h 4-Door SedanNHTSA No.: MA5119Test Program: NHTSA 35mph NCAPTest Date: 10/24/09

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

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 that are equipped with occupant passive restraints.

Temperature of windshield molding during test: 28.3 °C**WINDSHIELD PERIPHERY MEASUREMENTS**

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2110	2110	100.0
Right Side	2110	2110	100.0
Total	4220	4220	100.0

**WINDSHIELD DIMENSIONS**

Item	Units	Segment Length	Molding Width
A	mm	1110	0
B	mm	1340	10
C-Left	mm	885	20
C-Right	mm	885	20

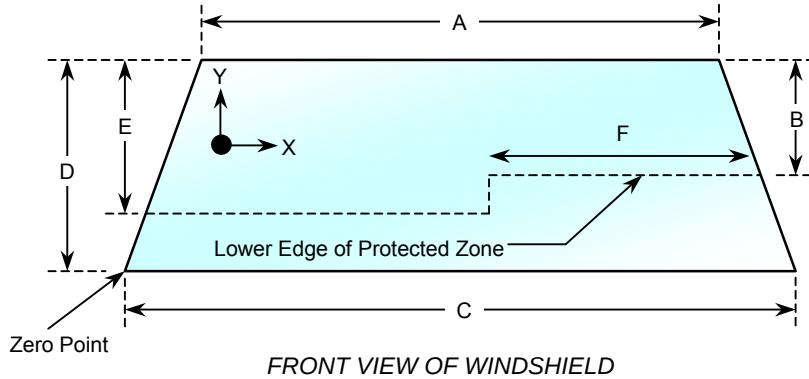
DATA SHEET NO. 10

WINDSHIELD ZONE INTRUSION FMVSS 219 DATA (PARTIAL)

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan
 Test Program: NHTSA 35mph NCAP

NHTSA No.: MA5119
 Test Date: 10/24/09

WINDSHIELD AND PROTECTED ZONE



Item	Units	Value
A	mm	1110
B	mm	597
C	mm	1340
D	mm	885
E	mm	600
F	mm	540

AREA OF PROTECTED ZONE FAILURES

- A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 in. 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. 11

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan NHTSA No.: MA5119
Test Program: NHTSA 35mph NCAP Test Date: 10/24/09

Test Time: 12:32 PM Temperature: 28.3 ° C

STODDARD SOLVENT SPILLAGE MEASUREMENTS

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

DATA SHEET NO. 12

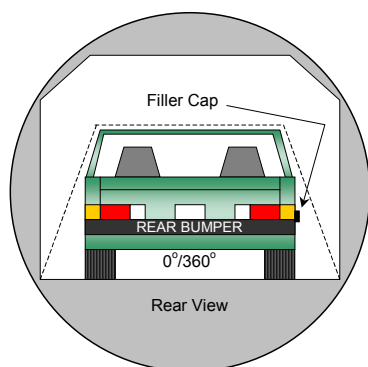
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

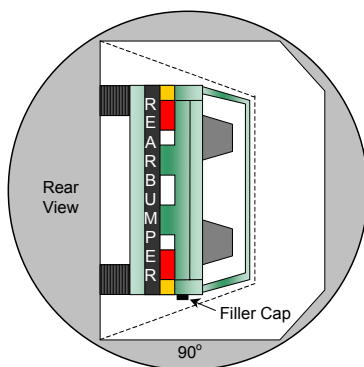
NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

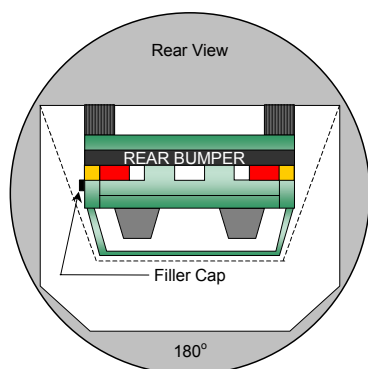
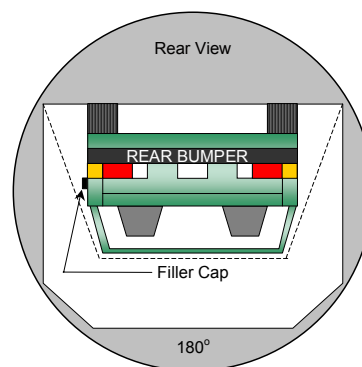
Test Date: 10/24/09



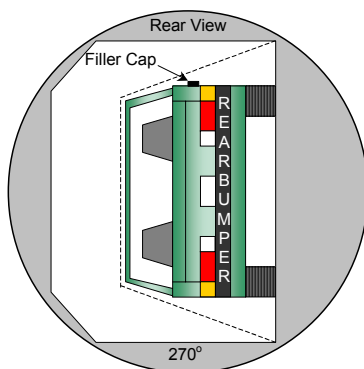
0° to 90°



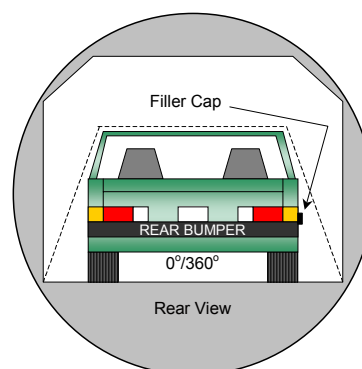
90° to 180°



180° to 270°



270° to 360°



1. The specified fixture rollover rate for each 90° of rotation is 60 to 120 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. No solvent leakage occurred during rollover.

DATA SHEET NO. 12...(CONTINUED)

FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	87	300	387
90° to 180°	85	303	388
180° to 270°	87	391	478
270° to 360°	81	337	418

FMVSS 301 SPILLAGE TABLE REQUIREMENT

First 5 Minutes	5.0
Sixth Minute	1.0
Seventh Minute	1.0
Eighth Minute	1.0

ACTUAL TEST VEHICLE SOLVENT SPILLAGE TABLE (OZ)

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0			
90° to 180°	0	0		
180° to 270°	0	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. 13
VEHICLE MEASUREMENTS

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09

VEHICLE MEASUREMENT TABLE

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Length of test vehicle at centerline	mm	4700	4351	-349
2	RSOV to front of engine	mm	3955	3391	-564
3	RSOV to firewall centerline	mm	3565	3560	-5
4	RSOV to upper leading edge of right door	mm	3289	3285	-4
5	RSOV to upper leading edge of left door	mm	3283	3277	-6
6	RSOV to lower leading edge of right door	mm	3228	3220	-8
7	RSOV to lower leading edge of left door	mm	3220	3207	-13
8	RSOV to upper trailing edge of right door	mm	2174	2182	8
9	RSOV to upper trailing edge of left door	mm	2170	2170	0
10	RSOV to lower trailing edge of right door	mm	2169	2163	-6
11	RSOV to lower trailing edge of left door	mm	2162	2148	-14
12	RSOV to bottom of right A-pillar	mm	3125	3140	15
13	RSOV to bottom of left A-pillar	mm	3128	3122	-6
14	RSOV to firewall on right side	mm	3600	3560	-40
15	RSOV to firewall on left side	mm	3560	3530	-30
16	RSOV to steering column hub	mm	2780	2845	65
17	Center of steering column to left A-pillar, Y	mm	420	435	15
18	Center of steering column to headlining, Z	mm	440	470	30
19	RSOV to right side of front bumper	mm	4008	3779	-229
20	RSOV to left side of front bumper	mm	4002	3821	-181
21	Length of engine block	mm	860	860	0
RD	RSOV to right side of dash panel	mm	2985	2990	5
CD	RSOV to center of dash panel	mm	2995	3010	15
LD	RSOV to left side of dash panel	mm	2964	2976	12

DATA SHEET NO. 13...(CONTINUED)

VEHICLE STRUCTURAL MEASUREMENTS

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09

VEHICLE STRUCTURAL MEASUREMENT TABLE

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length	mm	4700	4351	-349
2	Total width	mm	1765	1767	2
3	Front bumper top height	mm	568	613	45
4	Front bumper bottom height	mm	216	260	44
5	Longitudinal member top height	mm	530	550	20
6	Longitudinal member bottom height	mm	430	450	20
7	Distance between longitudinal members	mm	1030	1047	17
8	Longitudinal member width	mm	70	82	12
9	Engine top height	mm	800	820	20
10	Engine bottom height	mm	163	211	48
11	Engine and gearbox width	mm	425	425	0
12	Front bumper-engine distance	mm	745	545	-200
13	Front shock absorber height	mm	860	887	27
14	Front hood leading edge height	mm	760	810	50
15	Distance between front shock absorbers	mm	1145	1150	5
16	Front bumper-front axle distance	mm	990	630	-360
17	Front axle to A-pillar distance	mm	430	400	-30
18	A Pillar to B Pillar distance	mm	948	885	-63
19	B Pillar to rear axle distance	mm	1178	1165	-13
20	B Pillar to C Pillar distance	mm	988	986	-2
21	Roof sill bottom height	mm	1336	1345	9
22	Roof sill top height	mm	1446	1460	14
23	Floor sill bottom height	mm	176	190	14
24	Floor sill top height	mm	320	335	15

DATA SHEET NO. 13...(CONTINUED)

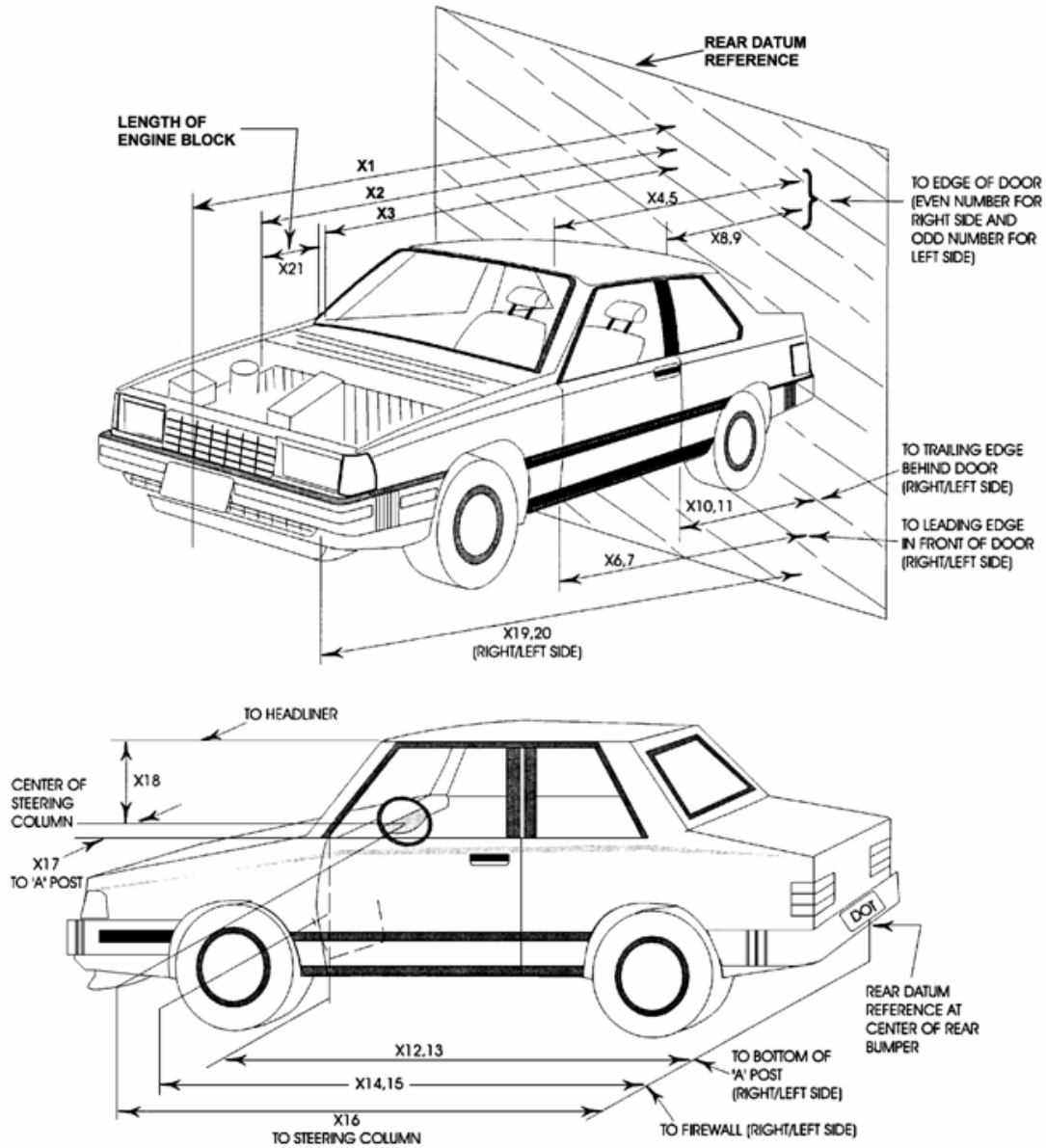
VEHICLE MEASUREMENTS

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09



DATA SHEET NO. 14**CAMERA LOCATIONS**Test Vehicle: 2010 Lexus HS 250h 4-Door SedanNHTSA No.: MA5119Test Program: NHTSA 35mph NCAPTest Date: 10/24/09**VEHICLE CAMERA MEASUREMENT TABLE**

No.	Camera View	Location			Angle (deg)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Real Time Camera (Panning)	-11412	-8150	-1484	0			30
2	Overall Left Side	-2590	-7950	-1371	0	8105	20	1000
3	Closeup Left Side	-1701	-6197	-1701	0	7844	50	1000
4	Driver and Interior View	-6696	-5987	-1071	-17	15570	ZOOM	1000
5	Steering Column (Bottom)	-1972	-8184	-2879	-13	9453	35	1000
6	Steering Column (Top)	-1966	-8141	-3258	-13	9549	35	1000
7	Overall Right Side	-2336	7569	-1168	0	7409	20	1000
8	Closeup Right Side	-1600	6121	-1651	0	7079	50	1000
9	Passenger and Interior View	-5136	9516	-2460	-10	10211	ZOOM	1000
10	Right Side View	-1582	7995	-1713	-6	7134	ZOOM	1000
11	Windshield View	-354	0	-5749	-90		24	1000
12	Driver Front View	363	-543	-2548	-34		25	1000
13	Passenger Front View	381	445	-2548	-34		25	1000
14	Pit View of Engine	-756	0	1495	90		12	1000
15	Pit View of Fuel Tank	-3398	0	1495	90		8	1000
16	Driver Side Dummy On-Board	-2875	-275	1360	-5	1045	12	1000
17	Passenger Side Dummy On-Board	-2875	275	1360	-5	1030	12	1000
18	Real Time Driver	-1926	-8089	-1704	-1	-1704	-1	30
19	Real Time Passenger	-1433	8047	-1704	-1	-1704	-1	30

All measurements are made relative to the point of impact.

DATA SHEET NO. 15

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

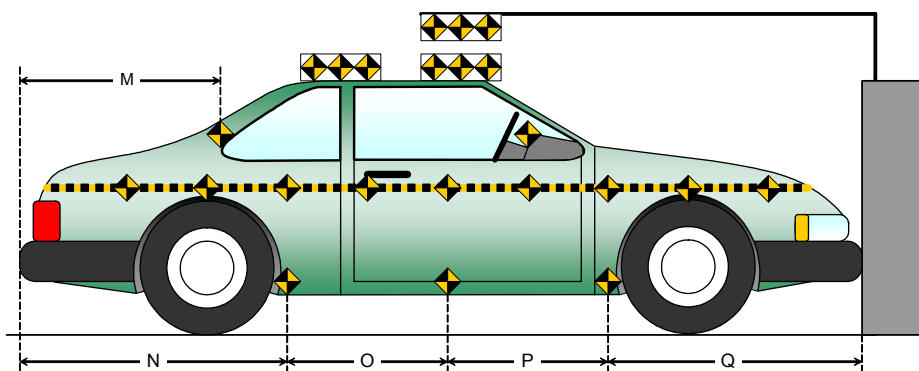
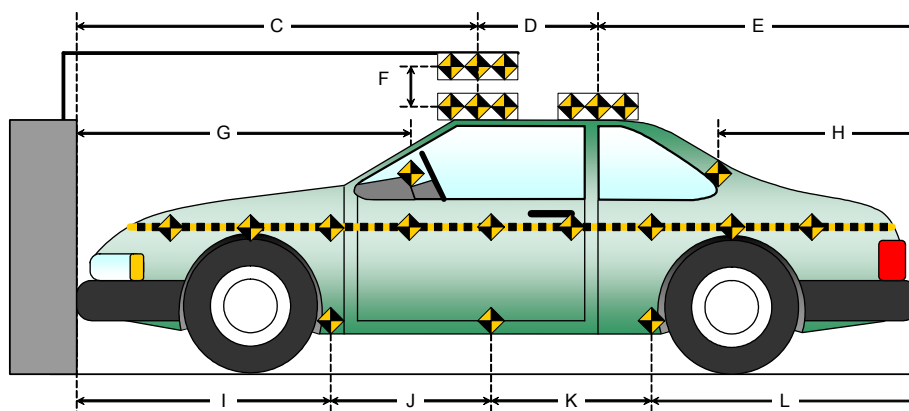
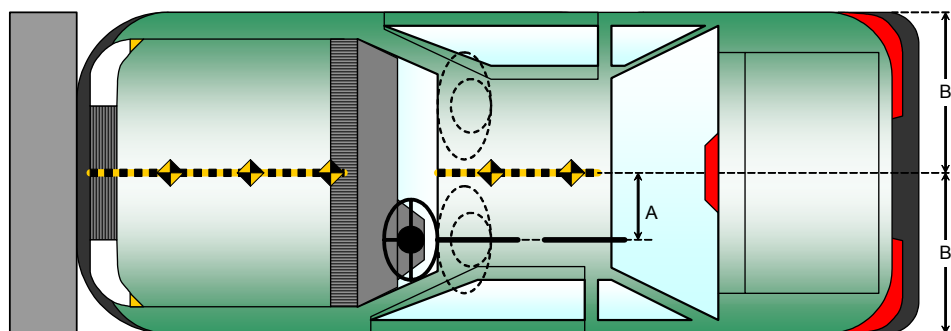
Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09

All Dimensions in Millimeters (mm)	
Item	Value
A	
B	883
C	
D	
E	
F	
G	1730
H	1437
I	1428
J	912
K	912
L	1084
M	1091
N	1445
O	911
P	911
Q	1425



DATA SHEET NO. 16

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

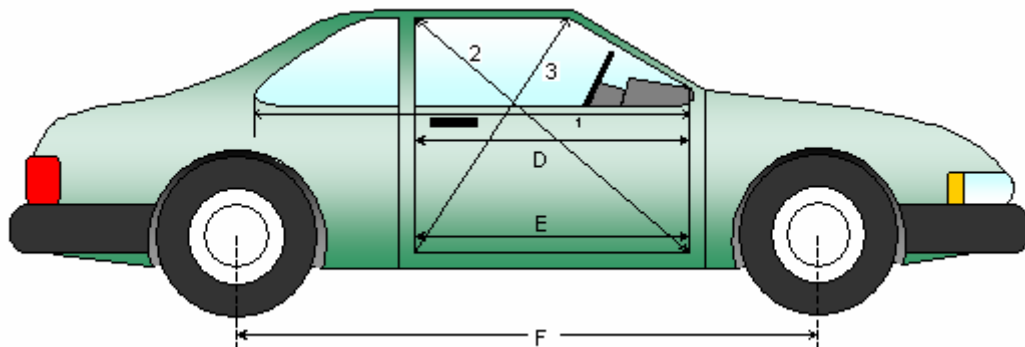
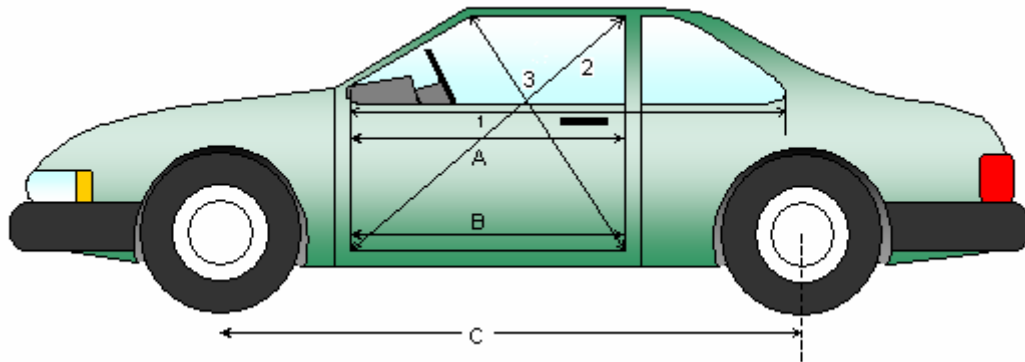
Test Date: 10/24/09

DOOR OPENING WIDTH TABLE

Item	Description	Units	Pre-Test	Post-Test	Difference
1L	Left Side	mm	948	936	12
2L	Left Side (Diagonally)	mm	1448	1448	0
3L	Left Side (Diagonally)	mm	1055	1054	1
1R	Right Side	mm	920	913	7
2R	Right Side (Diagonally)	mm	1448	1453	-5
3R	Right Side (Diagonally)	mm	1053	1050	3

WHEELBASE MEASUREMENT TABLE

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2699	2613	86
F	Right Side Wheelbase	mm	2699	2631	68



DATA SHEET NO. 16...(CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

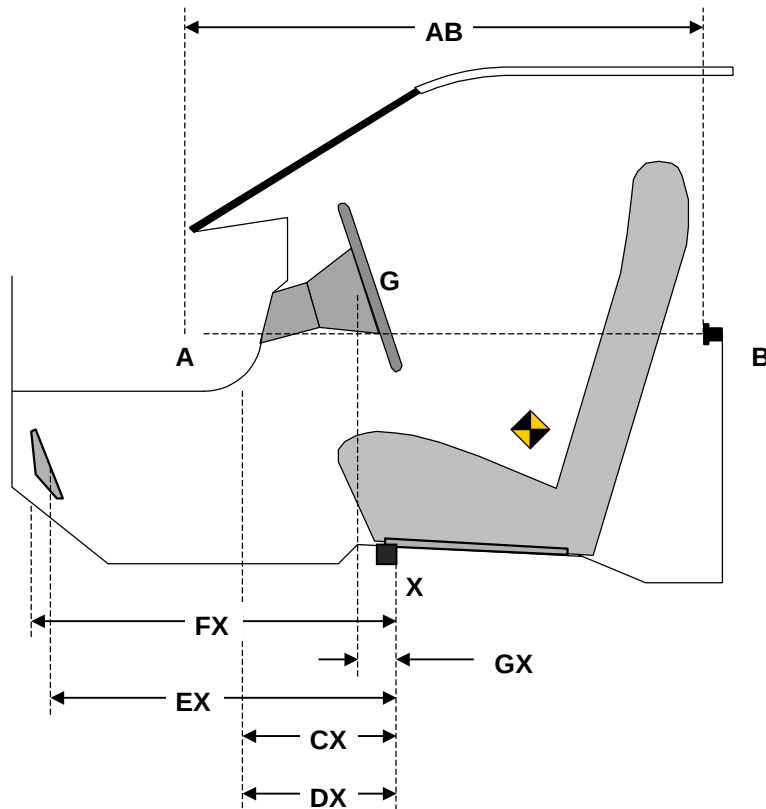
NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09

DRIVER COMPARTMENT INTRUSION TABLE

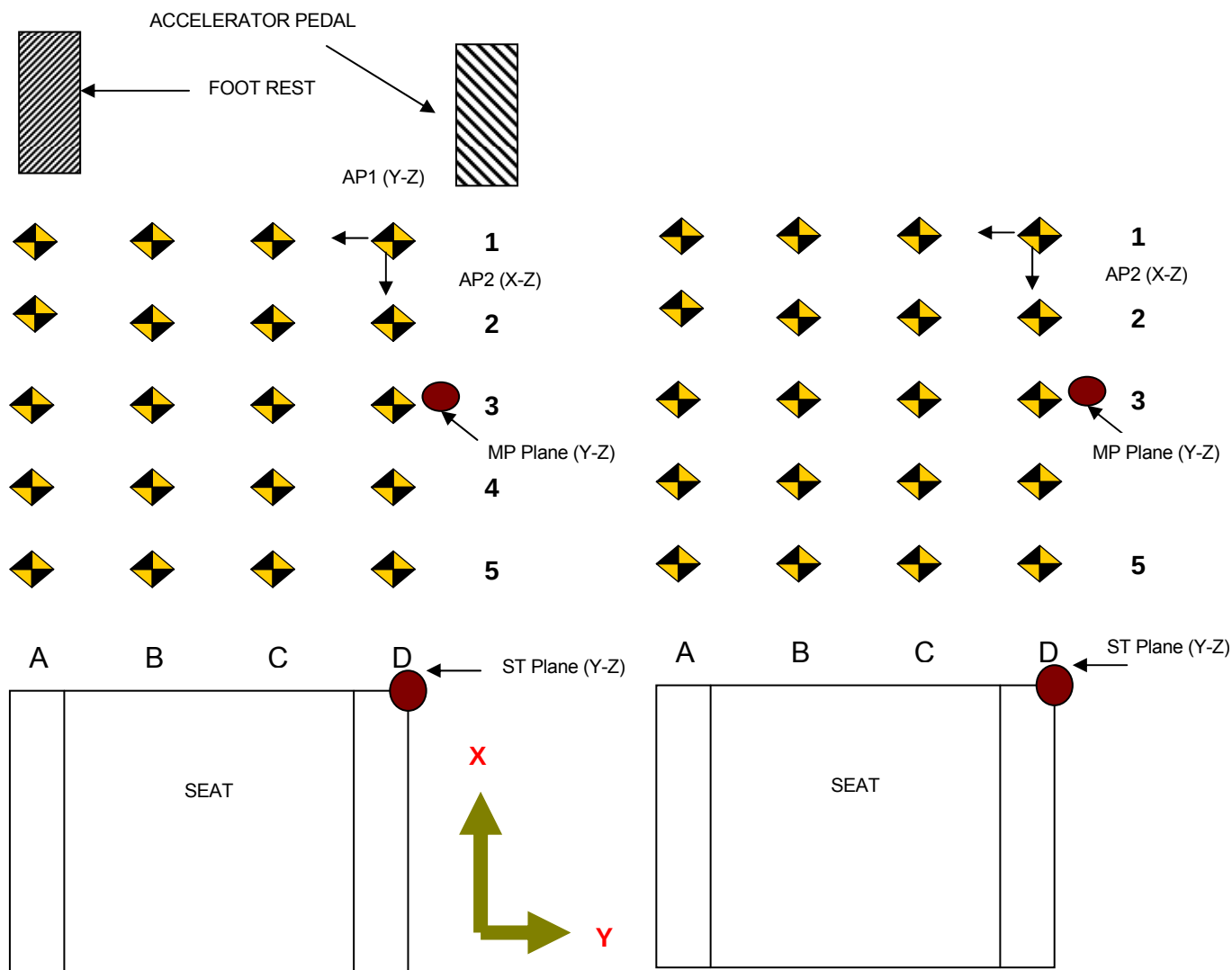
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Windowdown Jam)	mm	888	885	3
CX	Left Knee Bolster to X	mm	307	280	27
DX	Right Knee Bolster to X	mm	324	273	51
EX	Brake Pedal to X	mm	555	465	90
FX	Foot Rest to X	mm	545	573	-28
GX	Center of Steering Wheel Hub to X	mm	62	100	-38



DATA SHEET NO. 16...(CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan
 Test Program: NHTSA 35mph NCAP

NHTSA No.: MA5119
 Test Date: 10/24/09



- AP1:** Y-Z Plane passing through D1
- AP2:** X-Z Plane passing through D1
- AP3:** X-Y plane passing through D1
- MP:** Y-Z plane, halfway between the ST plane and AP1 plane
- CF Plane:** X-Z plane passes through center of footrest.
- BP Plane:** X-Z plane passes through center of brake pedal
- TP Plane:** Y-Z plane, intersection of BP Plane and the intersection of the toe pan and floorboard
- Column A:** intersection of vehicle and CF plane
- Column D:** Intersection of vehicle and AP2 plane
- Row 1:** intersection of the vehicle and the AP3 Plane
- Row 3:** intersection of the vehicle and TP plane
- Row 5:** intersection of the vehicle and MP plane
- Row 2:** evenly spaced between row 1 and 3
- Row 4:** evenly spaced between row 3 and 5

DATA SHEET NO. 16...(CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09

All measurements in mm

DRIVER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-615	-636	-649	-652	-600	-599	-588	-625	-15	-37	-61	-27
2	-591	-576	-585	-588	-580	-557	-562	-576	-11	-19	-23	-12
3	-526	-508	-520	-524	-521	-498	-509	-515	-5	-10	-11	-9
4	-409	-402	-402	-398	-403	-396	-395	-390	-6	-6	-7	-8
5	-295	-294	-289	-285	-290	-288	-283	-280	-5	-6	-6	-5

DRIVER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	53	147	251	410	56	152	263	414	-3	-5	-12	-4
2	-49	148	255	409	-53	153	263	414	4	-5	-8	-5
3	51	147	257	405	54	151	261	407	-3	-4	-4	-2
4	52	147	258	397	53	148	259	398	-1	-1	-1	-1
5	52	148	247	396	50	148	247	393	2	0	0	3

DRIVER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-69	-58	-46	-48	-79	-81	-55	-56	10	23	9	8
2	-7	-10	2	4	2	-18	-6	15	-9	8	8	-11
3	60	31	51	52	58	34	55	66	2	-3	-4	-14
4	90	57	75	73	88	65	86	87	2	-8	-11	-14
5	87	57	69	72	88	64	80	86	-1	-7	-11	-14

DATA SHEET NO. 16...(CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09

All measurements in mm

PASSENGER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	675	674	663	658	637	614	617	643	38	60	46	15
2	608	611	602	560	600	595	580	611	8	16	22	11
3	425	549	543	445	545	542	531	555	3	7	12	5
4	317	431	433	329	421	425	430	441	4	6	3	4
5	317	317	322	329	313	312	318	325	4	5	4	4

PASSENGER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	378	233	140	48	374	245	142	52	4	-12	-2	-4
2	379	238	136	37	379	239	138	40	0	-1	-2	-3
3	377	238	136	30	376	235	136	32	1	3	0	-2
4	380	238	134	28	379	235	133	26	1	3	1	2
5	387	239	127	27	386	236	127	26	1	3	0	1

PASSENGER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	41	38	53	71	48	48	67	75	-7	-10	-14	-4
2	-19	-11	4	-10	-32	-17	0	-13	13	6	4	3
3	-65	-58	-33	-56	-80	-74	-51	-62	15	16	18	6
4	-86	-81	-62	-93	-101	-101	-83	-101	15	20	21	8
5	-86	-74	-62	-89	-99	-91	-80	-98	13	17	18	9

DATA SHEET NO. 17

FIXED BARRIER LOAD CELL LOCATIONS

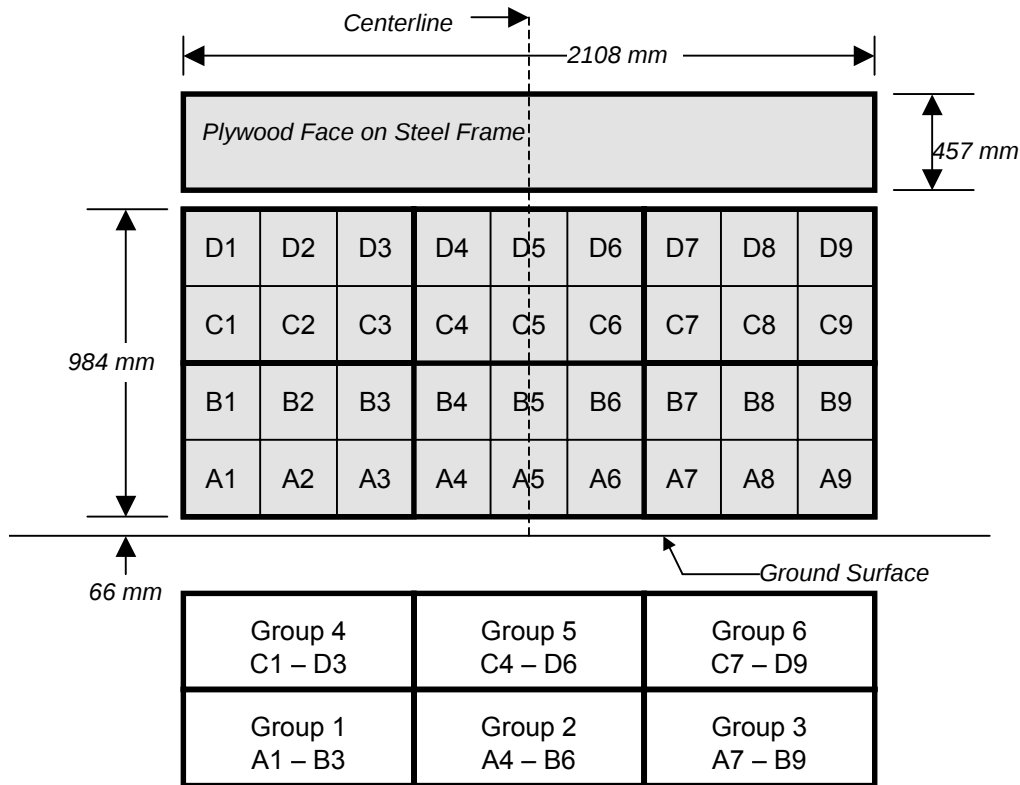
Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09

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



6 Groups of 6 Load Cells Each

DATA SHEET NO. 18

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan NHTSA No.: MA5119
 Test Program: NHTSA 35mph NCAP Test Date: 10/24/09

VEHICLE INFORMATION

VIN: JTHBB1BA1A2002357 Wheelbase (mm): 2699
 Vehicle Size Category: 4-Door Sedan Test Weight (kg): 1859

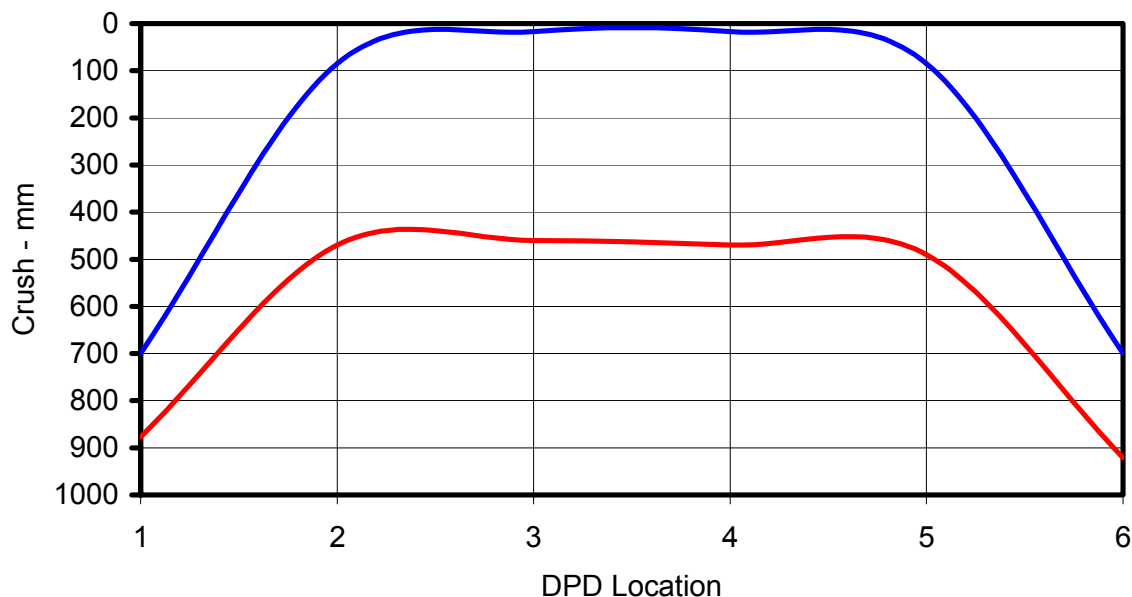
ACCELEROMETER DATA

Accelerometer Location: Left rear cross member
 Cal. Procedure/Interval: 6 months/drop test
 Integration Algorithm: NHTSA Standard Linearity: Good
 Impact Velocity (km/h): 56.44
 Velocity Change (km/h): 67.6 Time of Separation (msec): 66.2

CRUSH PROFILE

Collision Deformation Classification: 12FCEW2 Midpoint of Damage: Vehicle Centerline
 Damage Region Length: 1765 Impact Mode: Full frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side of vehicle	mm	700	877	-177
C2	Crush zone 2 on left side of vehicle	mm	85	470	-385
C3	Crush zone 3 on left side of vehicle	mm	17	460	-443
C4	Crush zone 4 on right side of vehicle	mm	17	470	-453
C5	Crush zone 5 on right side of vehicle	mm	85	490	-405
C6	Crush zone 6 at right side of vehicle	mm	700	921	-221



DATA SHEET NO. 19**FMVSS 305 ELECTRIC VEHICLE PROPULSION SYSTEM DATA**

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan NHTSA No.: MA5119
Test Program: NHTSA 35mph NCAP Test Date: 10/24/09

ELECTRIC VEHICLE PROPULSION SYSTEM DATA

Type of Electric Vehicle	Gas-Electric Hybrid
Propulsion Battery Type	Ni-MH
Nominal Voltage	244.8 V
Physical Location of Automatic Propulsion Battery Disconnect	Inside battery pack
Auxilliary Battery Type	Lead-Acid Battery

PROPULSION BATTERY SYSTEM DATA

Electrolyte Fluid Type	KOH
Electrolyte Fluid Specific Gravity	1.269
Electrolyte Fluid Kinematic Viscosity	1.906 CST
Electrolyte Fluid Color	Clear
Propulsion Battery Coolant Type, Color, Specific Gravity	n/a
Location of Battery Modules	Outside Passenger Compartment

DATA SHEET NO. 20

FMVSS 305 POST-IMPACT DATA

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan NHTSA No.: MA5119
 Test Program: NHTSA 35mph NCAP Test Date: 10/24/09

ELECTROLYTE SPILLAGE MEASUREMENTS

- A. From impact until 30 minutes later: 0.0 L
 (Maximum Allowable = 5.0 L total)
- B. Spillage Details: No leakage occurred

MEASUREMENT DESCRIPTIONS

Code	Units	Description
V_b	V	Propulsion Battery Voltage
V_1	V	Propulsion Battery Negative to Chassis
V_2	V	Propulsion Battery Positive to Chassis
R_o	Ω	Resistance of Grounding Circuit
V_1'	V	Propulsion Battery Negative to Chassis with R_o installed
V_2'	V	Propulsion Battery Positive to Chassis with R_o installed
R_{i1}	Ω	Electrical Isolation Value of Propulsion Battery Negative to Chassis Ground
R_{i2}	Ω	Electrical Isolation Value of Propulsion Battery Positive to Chassis Ground
R_i	Ω	Electrical Isolation Value of Propulsion Battery - The Minimum of R_{i1} and R_{i2}
R_i/V_b	Ω/v	Electrical Isolation per Volt of Propulsion Battery

ELECTRICAL ISOLATION DATA

Code	Units	Threshold	Pre-Test	Post-Test
V_b	V		271.3	268.7
V_1	V		13.2	23.0
V_2	V		32.0	35.0
R_o	Ω		19,500	19,500
V_1'	V		1.0	1.4
V_2'	V		2.4	2.2
R_{i1}	Ω		814,627	758,683
R_{i2}	Ω		339,706	481,777
R_i	Ω		339,706	481,777
R_i/V_b	Ω/V	500	1,388	1,968

DATA SHEET NO. 21

FMVSS 305 STATIC ROLLOVER DATA

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09

STATIC ROLLOVER ELECTRICAL ISOLATION DATA

Code	Units	Threshold	Rollover Position			
			90°	180°	270°	360°
V_b	V		266.0	266.5	269.2	270.8
V_1	V		15.0	14.3	13.7	13.3
V_2	V		37.4	34.8	35.6	33.8
R_o	Ω		19,500	19,500	19,500	19,500
V_1'	V		0.7	0.6	0.6	0.5
V_2'	V		2.9	2.9	2.6	2.4
R_{i1}	Ω		1,391,594	1,528,796	1,532,079	1,767,844
R_{i2}	Ω		325,024	302,642	342,746	355,514
R_i	Ω		325,024	302,642	342,746	355,514
R_i/V_b	Ω/V	500	1,328	1,236	1,400	1,452

FMVSS 305 Requirements: Maximum allowable propulsion battery electrolyte spillage is 5.0 L.

FMVSS 305 ELECTROLYTE SPILLAGE REQUIREMENT

Maximum Allowable Spillage	5.0L throughout impact test and static rollover
----------------------------	---

FMVSS 305 ELECTROLYTE COLLECTED

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

ELECTROLYTE 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. 22

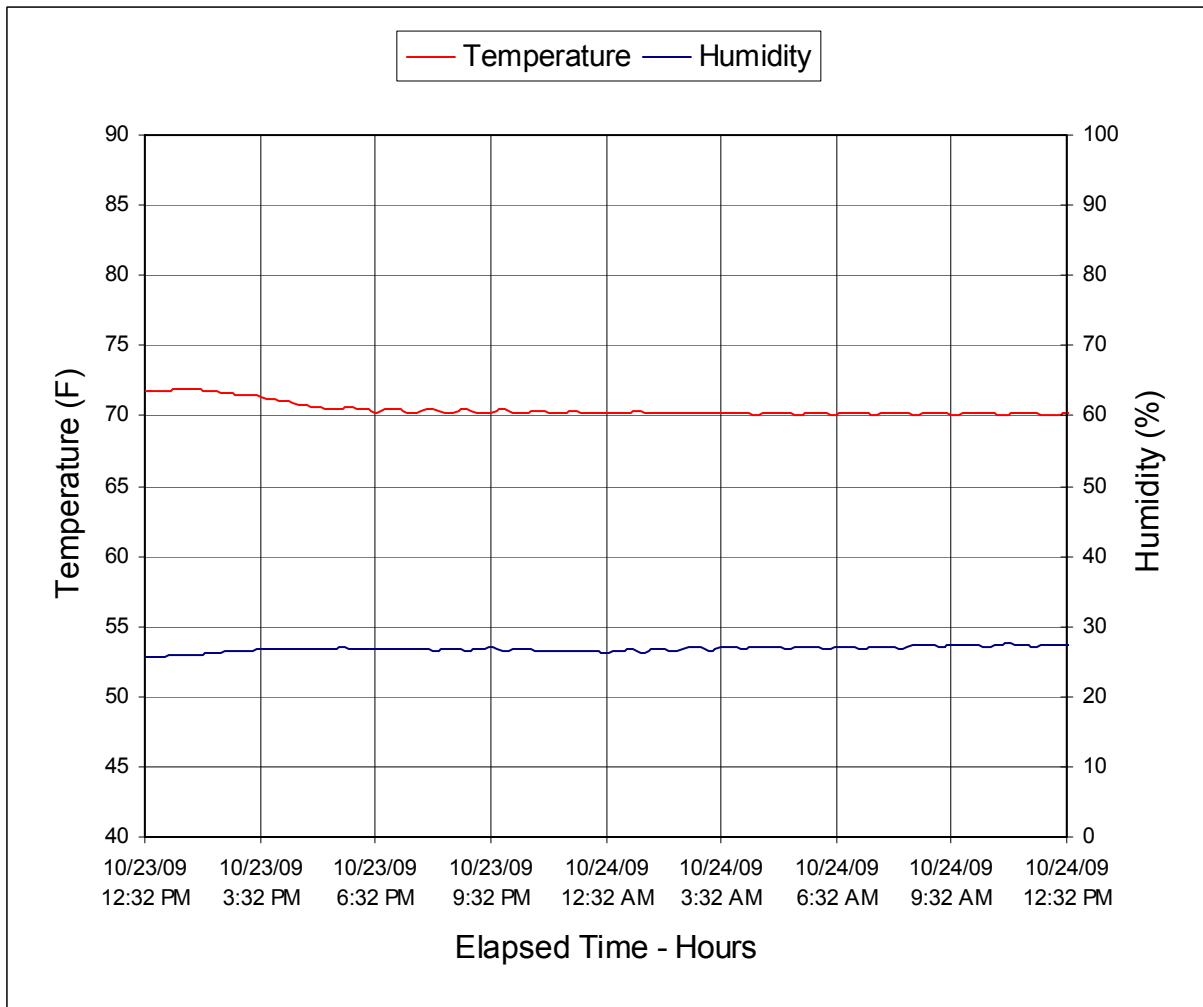
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan

NHTSA No.: MA5119

Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09



APPENDIX A
PHOTOGRAPHS

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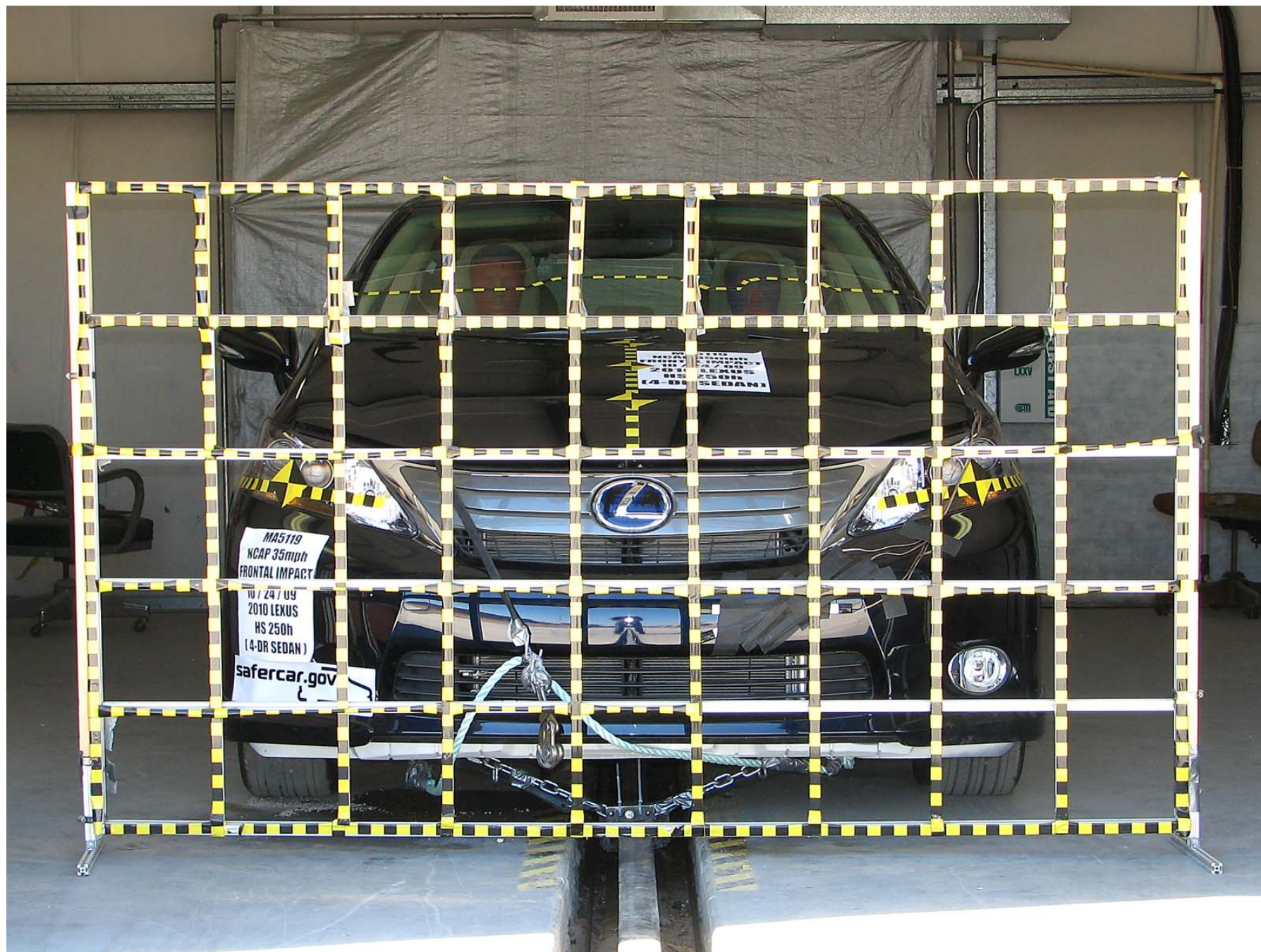


Figure A-1: Load Cell Location

MFD. BY: TOYOTA MOTOR CORPORATION 07/09
GVWR 4685LB GAWR FR 2560LB RR 2205LB
THIS VEHICLE CONFORMS TO ALL APPLICABLE
FEDERAL MOTOR VEHICLE SAFETY, BUMPER, AND
THEFT PREVENTION STANDARDS IN EFFECT ON
THE DATE OF MANUFACTURE SHOWN ABOVE.
JTHBB1BA1A2002357 PASS. CAR



C/TR: 8U0/LB05 ANF10L-AEXVBA
A/TM: -01A/P311 MADE IN JAPAN

091 A

Figure A-2: Manufacturer's Label



TIRE AND LOADING INFORMATION

SEATING CAPACITY : TOTAL 5
FRONT 2 : REAR 3

The combined weight of occupants and cargo should never exceed 375 kg or 825 lbs.

TIRE	SIZE	COLD TIRE PRESSURE
FRONT	P215/55R17	230kPa, 33PSI
REAR	P215/55R17	230kPa, 33PSI
SPARE	T145/70D17	420kPa, 60PSI

SEE OWNER'S
MANUAL FOR
ADDITIONAL
INFORMATION.

RENSEIGNEMENTS SUR LES PNEUS ET LE CHARGEMENT

NOMBRE DE PLACES : TOTAL 5
AVANT 2 : ARRIÈRE 3

Le poids total des occupants et du chargement ne doit jamais dépasser 375 kg ou 825 lb.

PNEU	DIMENSIONS	PRESSION DES PNEUS À FROID
AVANT	P215/55R17	230kPa, 33PSI
ARRIÈRE	P215/55R17	230kPa, 33PSI
DE SECOURS	T145/70D17	420kPa, 60PSI

VOIR LE MANUEL
DE L'USAGER
POUR PLUS DE
RENSEIGNEMENTS.

EH 75060

Figure A-3: Tire Placard

BATTERY LOCATION

This vehicle has two types of battery:

- ① Nickel-Metal Hydride Battery (Traction Battery)
- ② Lead Acid Battery (Auxiliary Battery for accessories, lights, etc.)

EMPLACEMENT DES BATTERIES

Ce véhicule est équipé de deux types de batteries:

- ① Batterie à l'hydruure de nickel metallique (Batterie de traction)
- ② Batterie à acide et plomb (Batterie auxiliaire pour les feux, les accessoires, etc.)

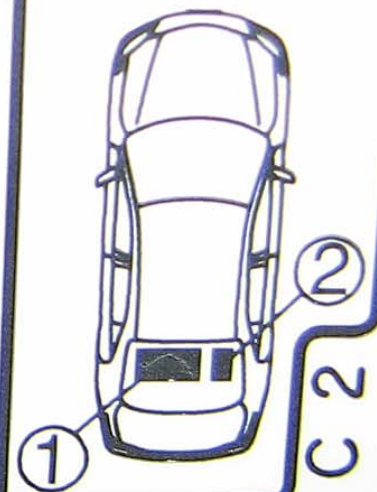


Figure A-4: Hybrid System Label

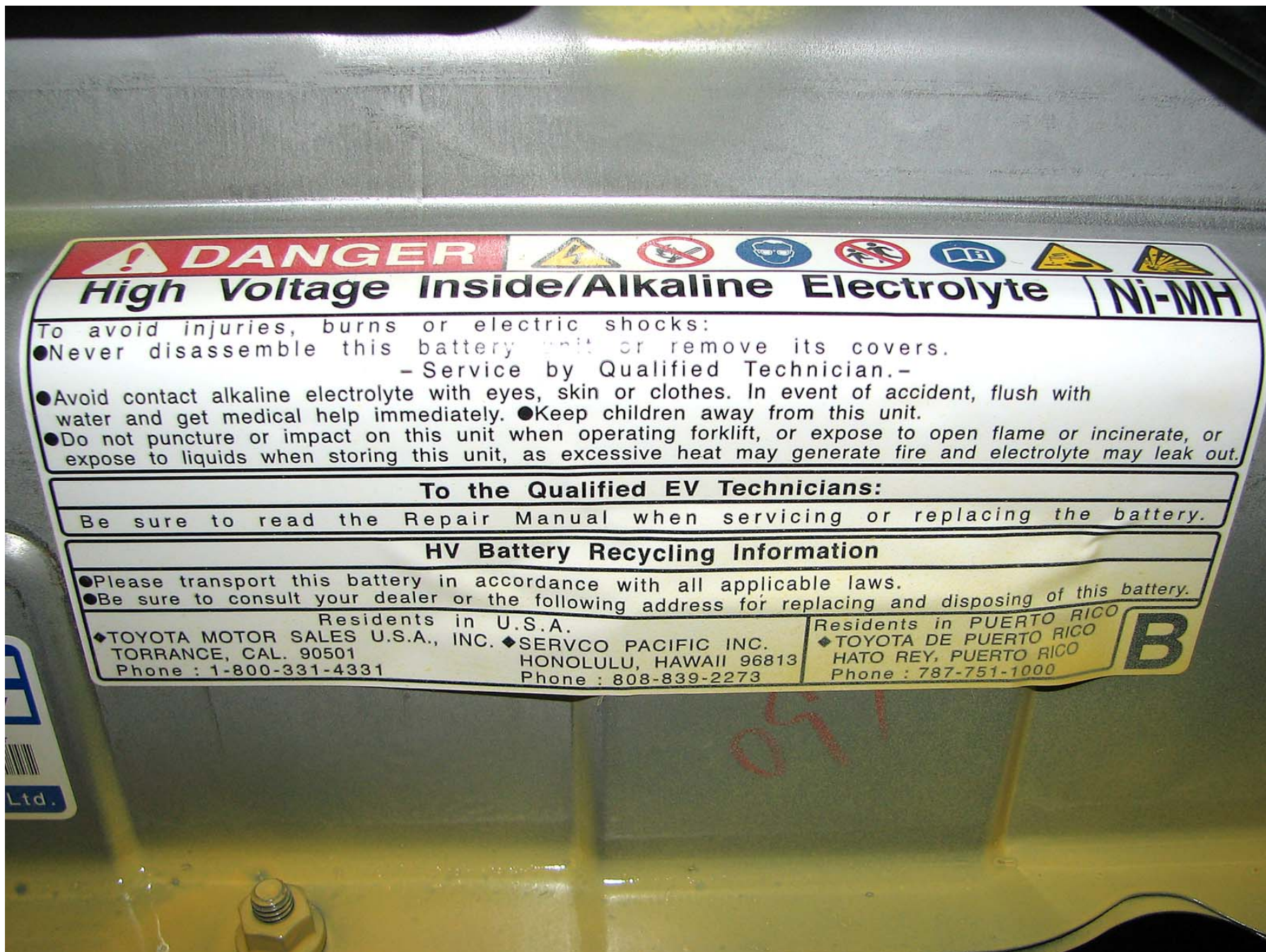
DO NOT touch this service plug.
Use the designated fuse only.
Service by Qualified Technician only.
NE PAS toucher ce bouchon
d'entretien. Utiliser seulement
des fusible désignés. Confier
l'entretien à un technicien
qualifié seulement.

⚠ WARNING AVERTISSEMENT

**HIGH VOLTAGE INSIDE
HAUTE TENSION À L'INTÉRIEUR**



Figure A-5: Hybrid System Label



! DANGER       

High Voltage Inside/Alkaline Electrolyte **Ni-MH**

To avoid injuries, burns or electric shocks:

- Never disassemble this battery unit or remove its covers.
- Service by Qualified Technician.-
- Avoid contact alkaline electrolyte with eyes, skin or clothes. In event of accident, flush with water and get medical help immediately. ● Keep children away from this unit.
- Do not puncture or impact on this unit when operating forklift, or expose to open flame or incinerate, or expose to liquids when storing this unit, as excessive heat may generate fire and electrolyte may leak out.

To the Qualified EV Technicians:

Be sure to read the Repair Manual when servicing or replacing the battery.

HV Battery Recycling Information

● Please transport this battery in accordance with all applicable laws.
● Be sure to consult your dealer or the following address for replacing and disposing of this battery.

Residents in U.S.A.		Residents in PUERTO RICO
◆ TOYOTA MOTOR SALES U.S.A., INC.	◆ SERVCO PACIFIC INC.	◆ TOYOTA DE PUERTO RICO
TORRANCE, CAL. 90501	HONOLULU, HAWAII 96813	HATO REY, PUERTO RICO
Phone : 1-800-331-4331	Phone : 808-839-2273	Phone : 787-751-1000

B

Figure A-6: Hybrid System Label

G9280-75010

BATTERY ASSY, HV



2345P275010097280094



Panasonic EV Energy Co., Ltd.

Figure A-7: Hybrid System Label

LEXUS

VEHICLE EMISSION CONTROL INFORMATION

TOYOTA

TOYOTA MOTOR CORPORATION

Conforms to regulations
2010MY HEV

TEST GROUP : ATYXV02.4CC4
EVAP FAMILY : ATYXR0130P12

U. S. EPA : T2B3

LDV OBD : CA II Fuel : Gasoline

California : SULEV II

PC OBD : CA II Fuel : Gasoline

No adjustments needed.

SFI, A/FS, WU-TWC, HO2S, TWC

NONE OF THE PERFORMANCE WARRANTY TESTS
OF 40 CFR PART 85, SUBPART W, IS TO BE PERFORMED.

28740

2AZ-FXE

BU

INVERTE

Figure A-8: Hybrid System Label



Figure A-9: Right Front $\frac{3}{4}$ View, As Received



Figure A-10: Left Rear $\frac{3}{4}$ View, as Received



Figure A-11: Pre-Test Front View

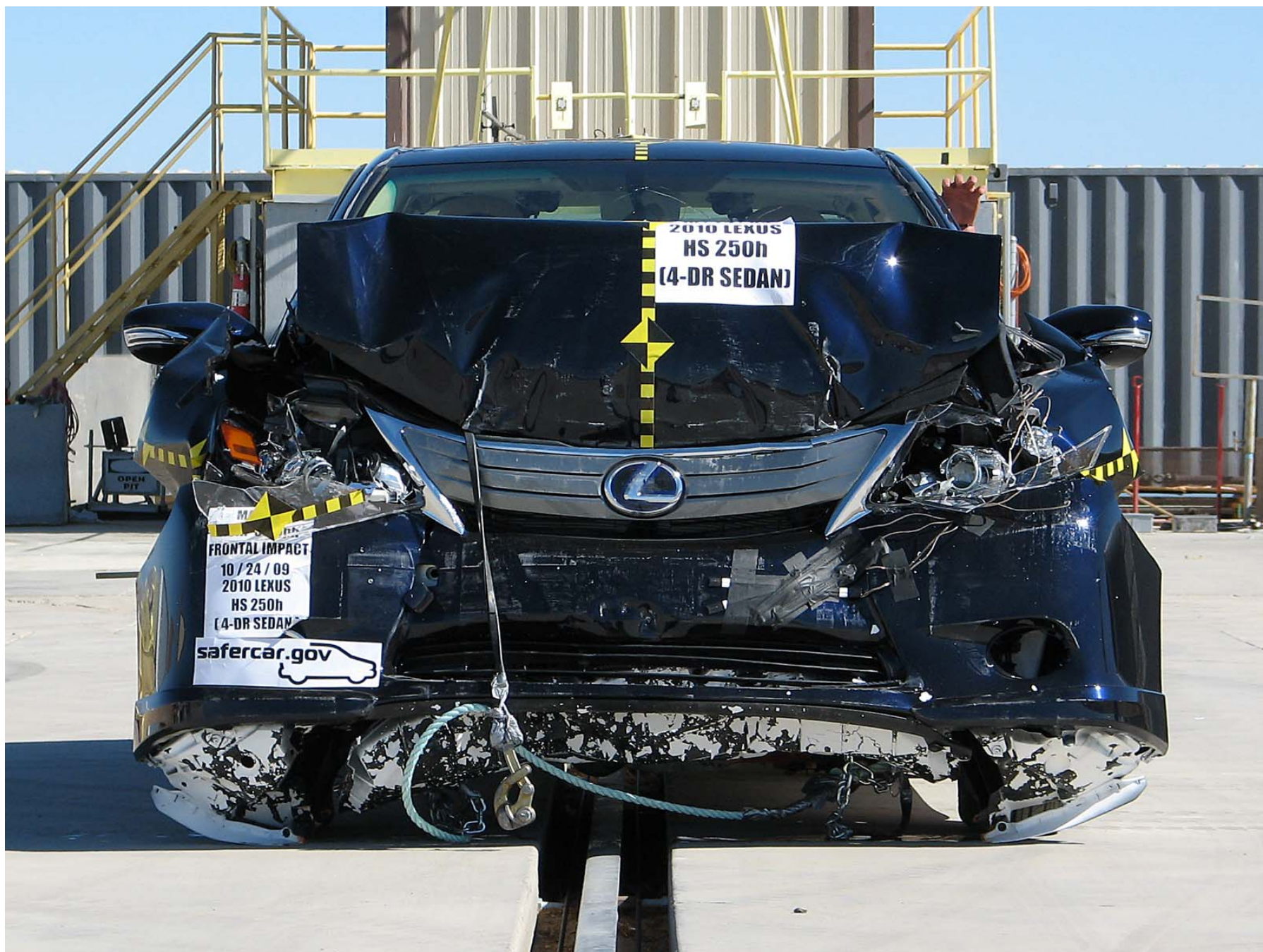


Figure A-12: Post-Test Front View (Vehicle Moved)



Figure A-13: Pre-Test Left Side View



Figure A-14: Post-Test Left Side View



Figure A-15: Pre-Test Right Side View



Figure A-16: Post-Test Right Side View



Figure A-17: Pre-Test Right Front $\frac{3}{4}$ View



Figure A-18: Post-Test Right Front $\frac{3}{4}$ View (Vehicle Moved)



Figure A-19: Pre-Test Left Rear $\frac{3}{4}$ View



Figure A-20: Post-Test Left Rear $\frac{3}{4}$ View



Figure A-21: Post-Test Left Side ¾ View of Doors After Impact



Figure A-22: Post-Test Right Side $\frac{3}{4}$ View of Doors After Impact

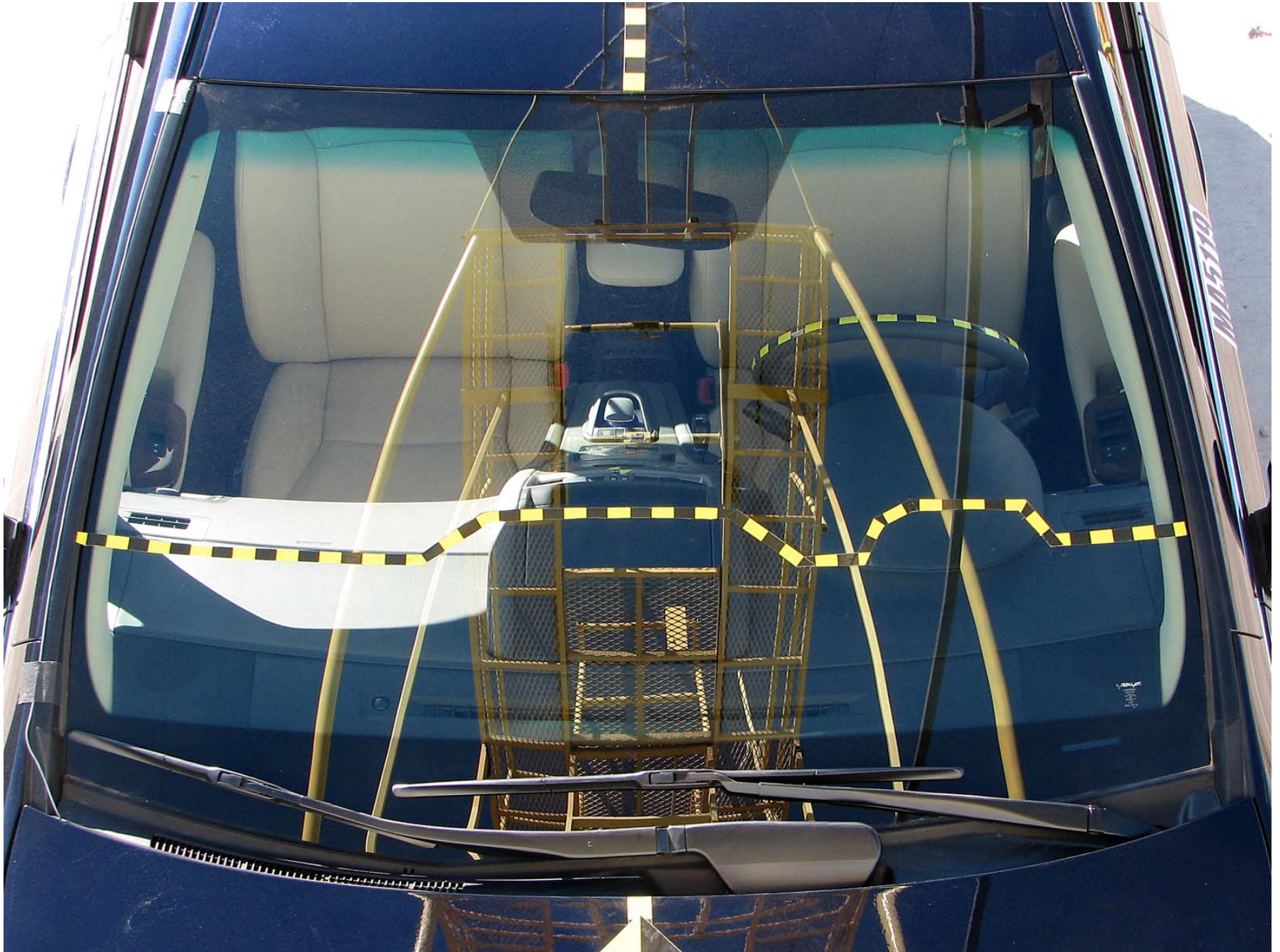


Figure A-23: Pre-Test Windshield



Figure A-24: Post-Test Windshield



Figure A-25: Pre-Test Engine Compartment



Figure A-26: Post-Test Engine Compartment (Vehicle Moved)



Figure A-27: Pre-Test Fuel Cap



Figure A-28: Post-Test Fuel Cap

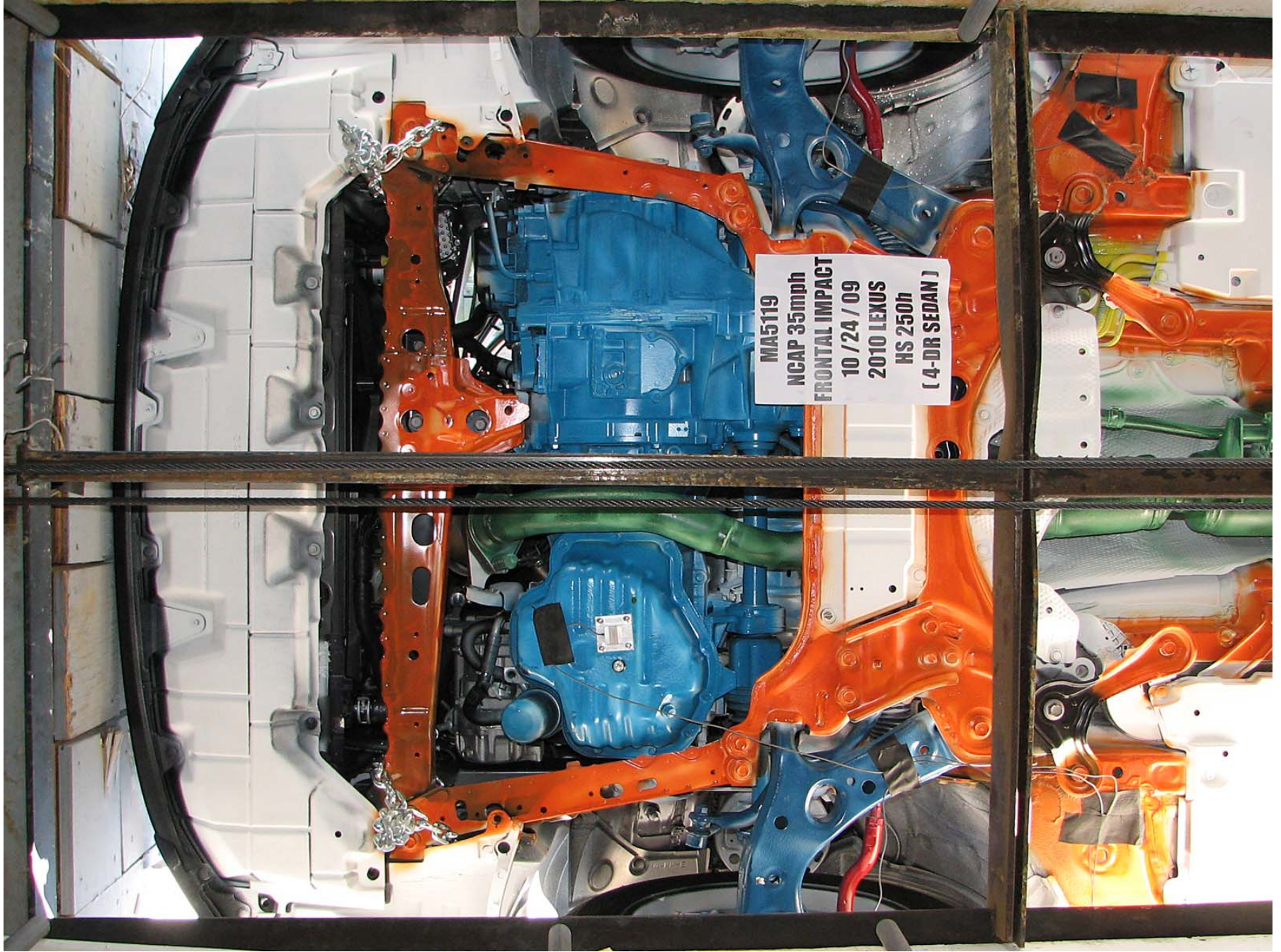


Figure A-29: Pre-Test Front Underbody

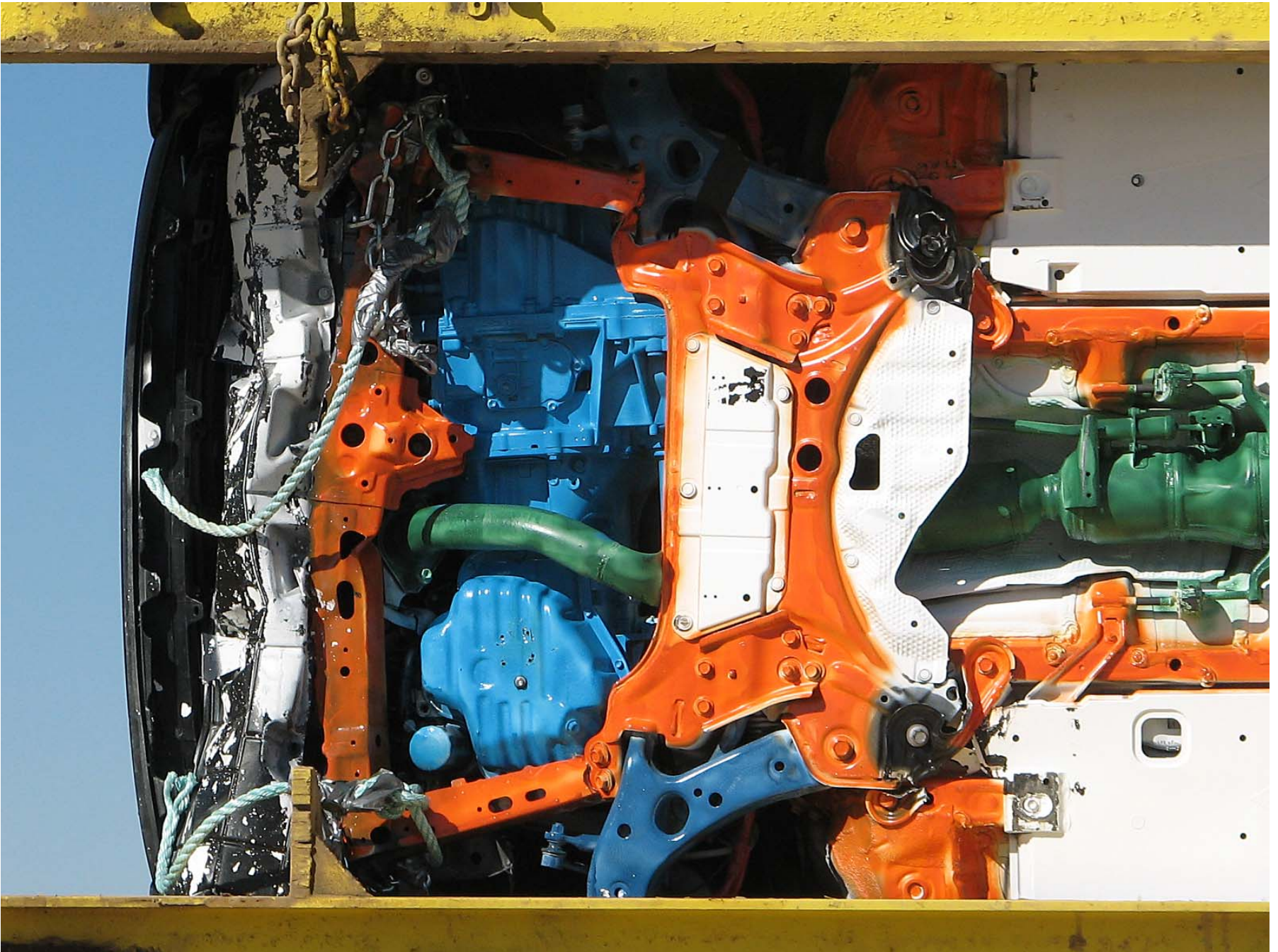


Figure A-30: Post-Test Front Underbody

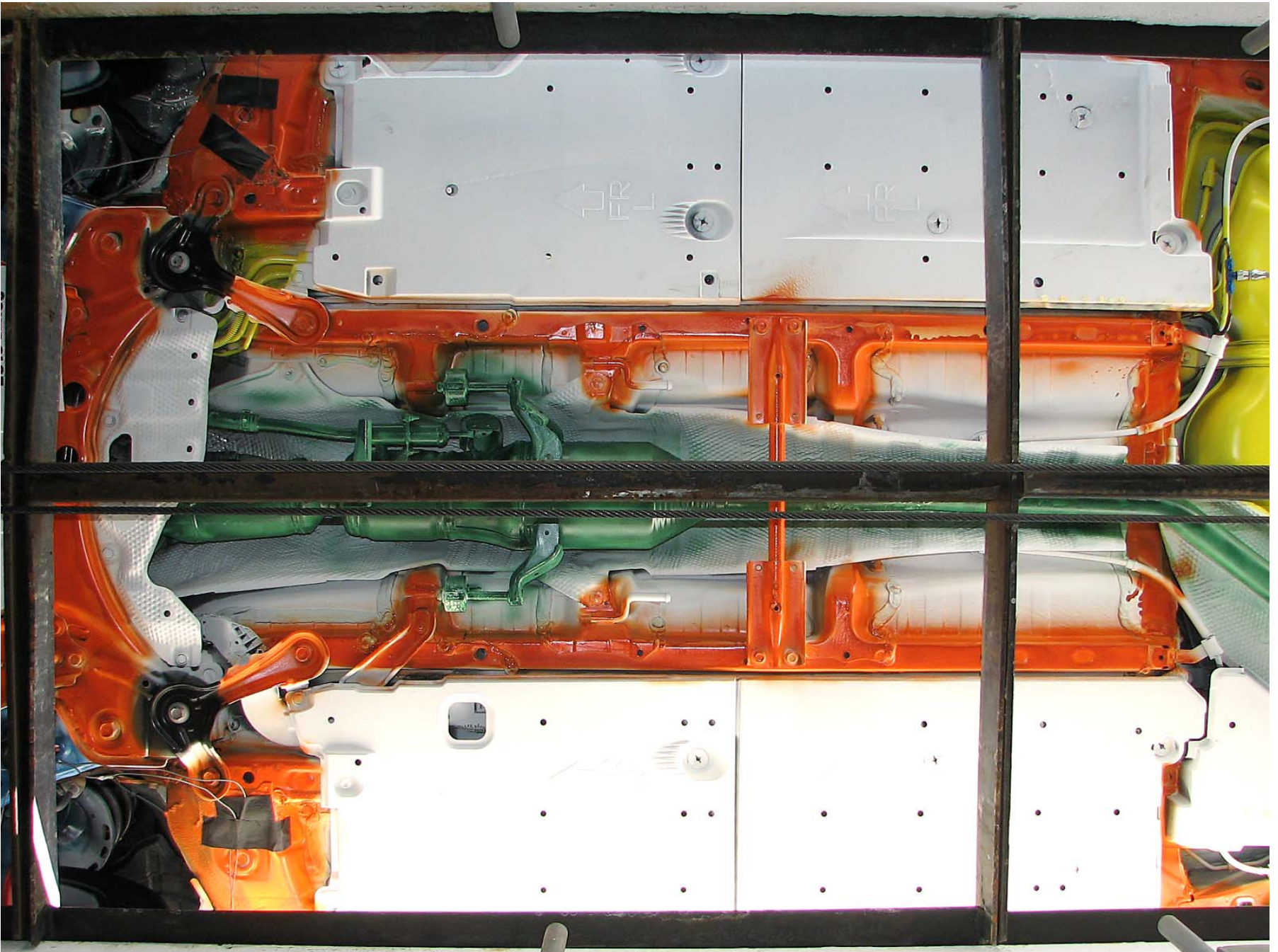


Figure A-31: Pre-Test Mid Underbody

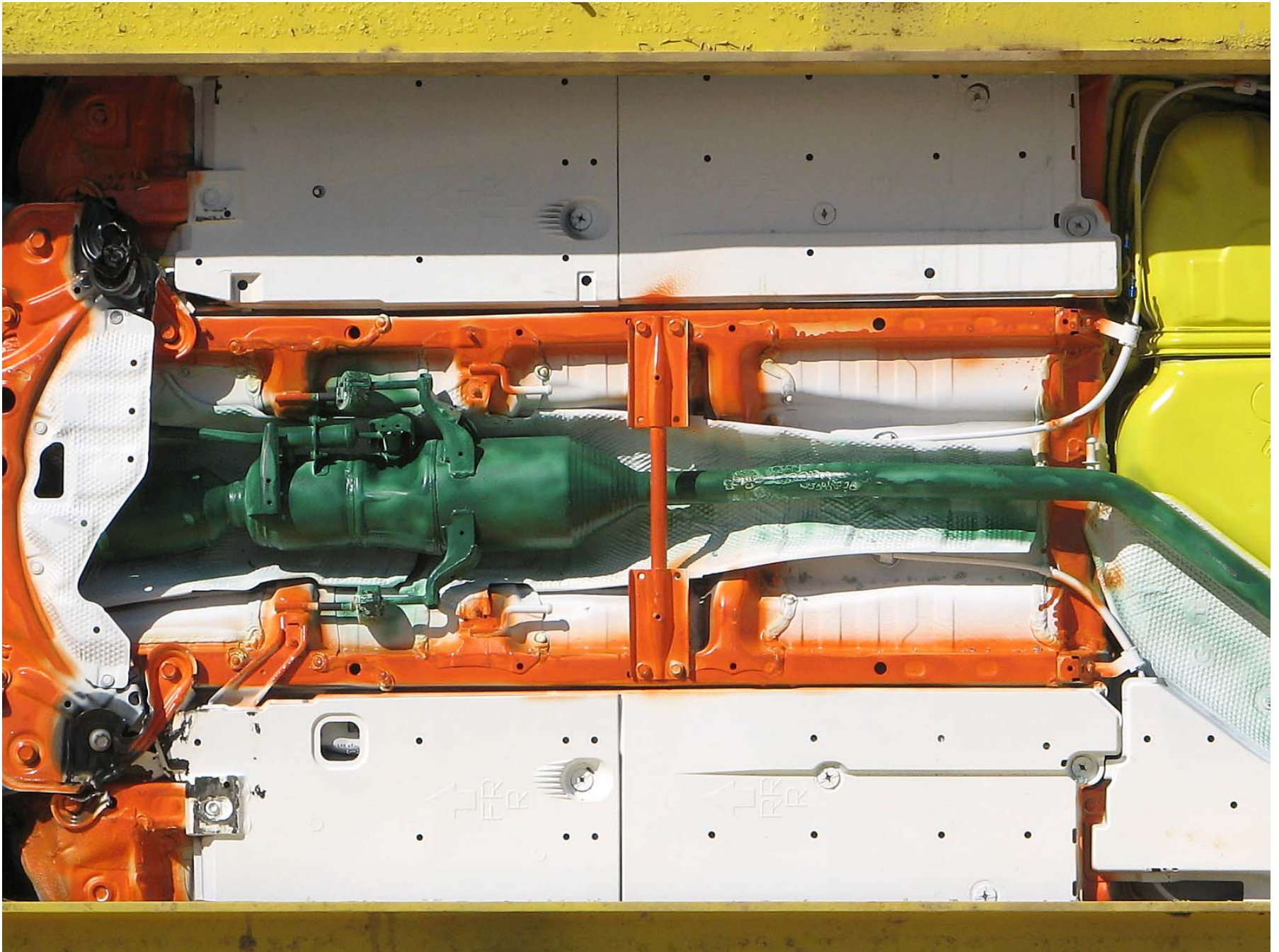


Figure A-32: Post-Test Mid Underbody

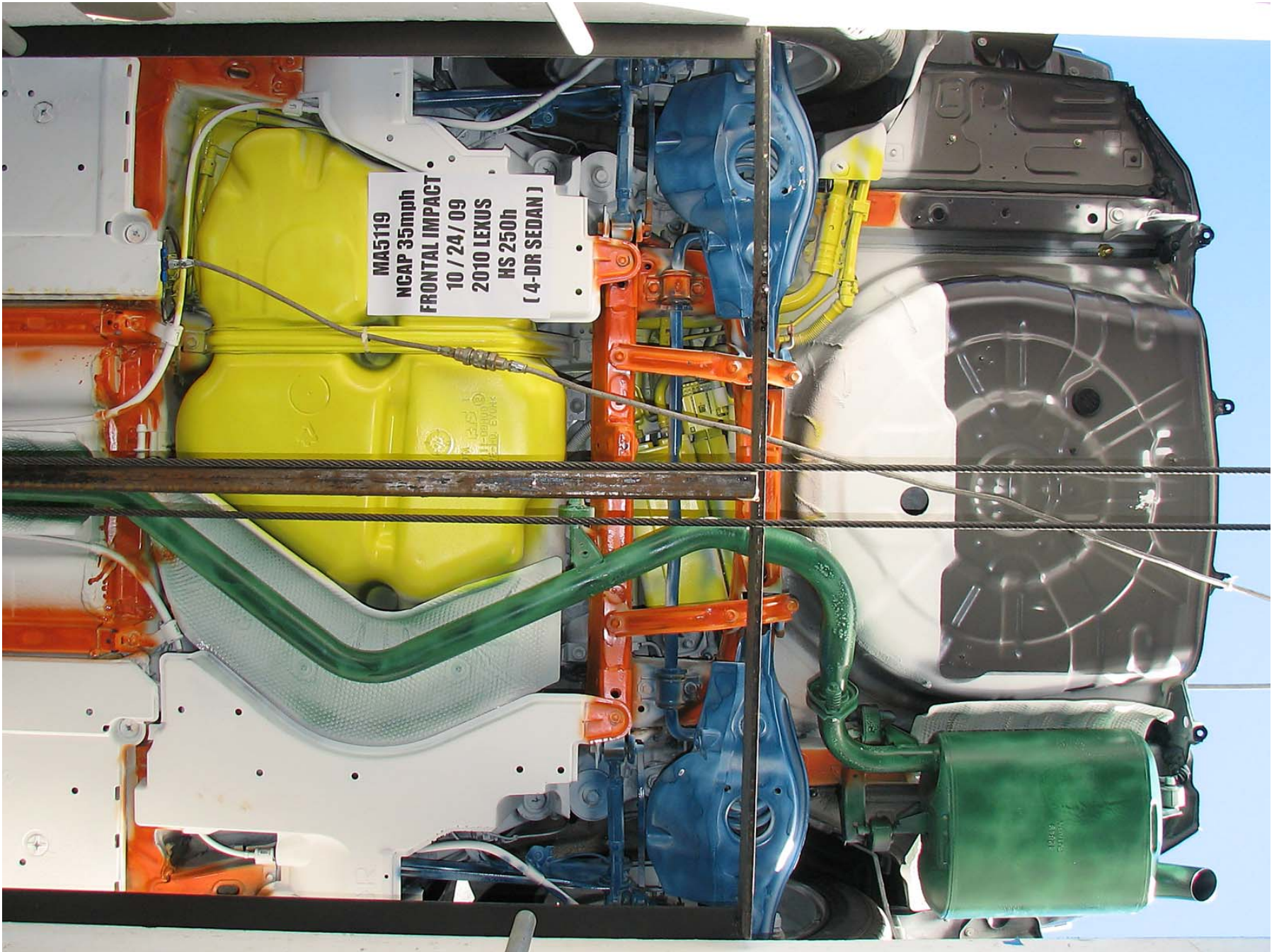


Figure A-33: Pre-Test Rear Underbody

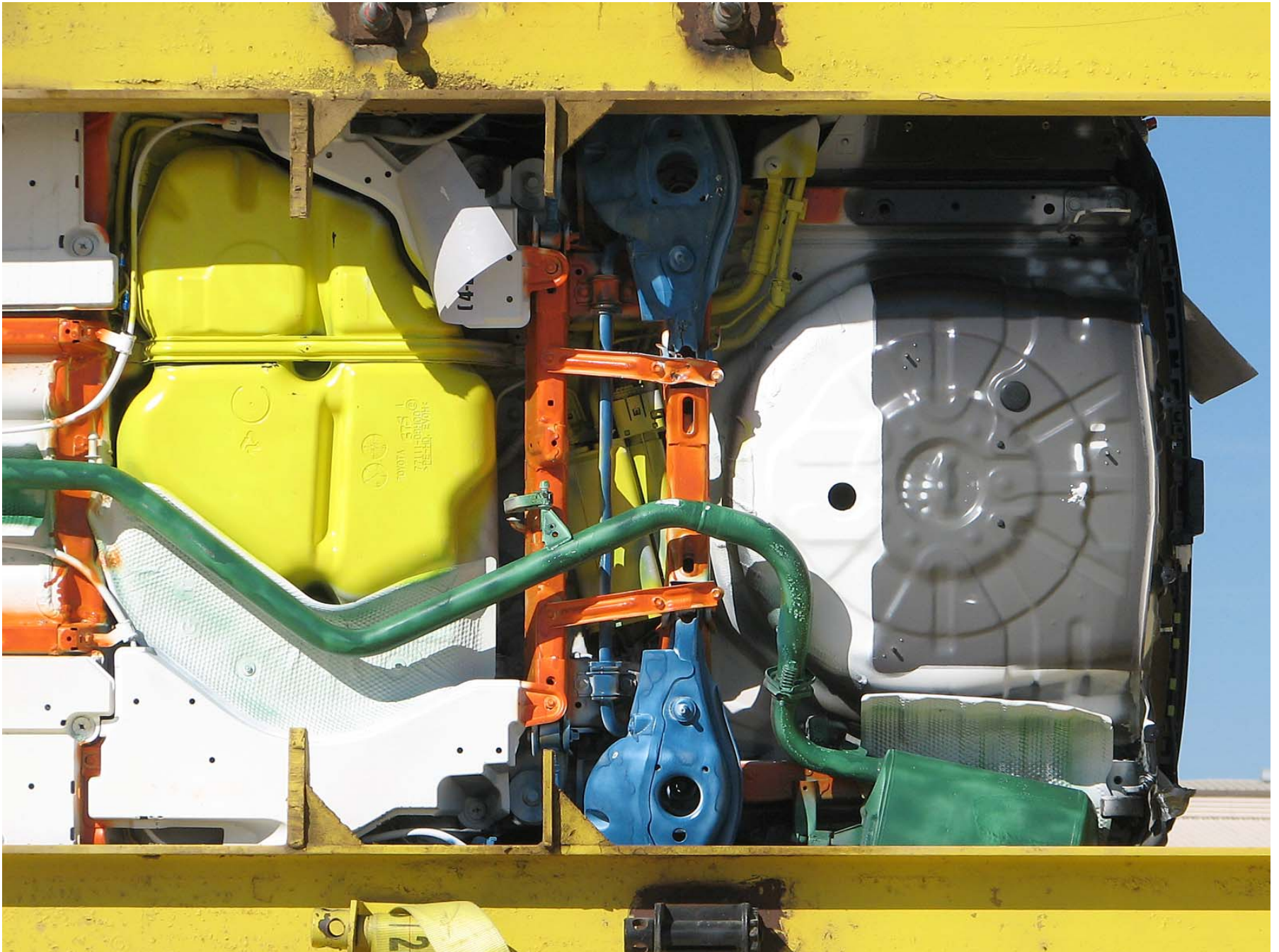


Figure A-34: Post-Test Rear Underbody



Figure A-35: Pre-Test Driver Dummy Front View (Head Position)



Figure A-36: Post-Test Driver Dummy Front View (Head Position)



Figure A-37: Pre-Test Driver Dummy (Through Window)



Figure A-38: Post-Test Driver Dummy (Through Window)



Figure A-39: Pre-Test Driver Dummy (Door Open)



Figure A-40: Post-Test Driver Dummy (Door Open)



Figure A-41: Pre-Test Driver Dummy Feet



Figure A-42: Post-Test Driver Dummy Feet



Figure A-43: Pre-Test Driver Side Knee Bolster



Figure A-44: Post-Test Driver Side Knee Bolster

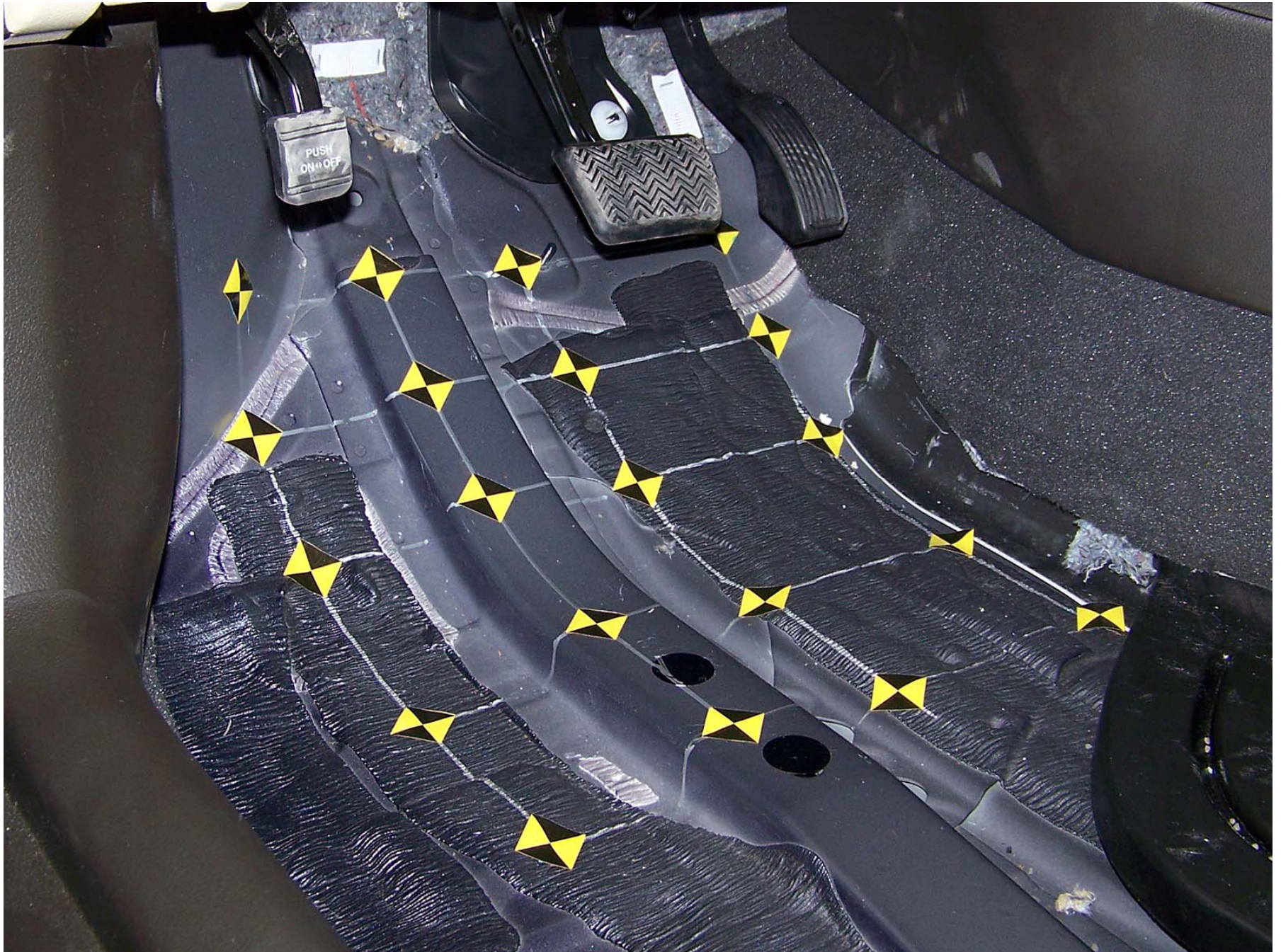


Figure A-45: Pre-Test Driver Side Floor Pan



Figure A-46: Post-Test Driver Side Floor Pan



Figure A-47: Post-Test Driver Dummy Head



Figure A-48: Post-Test Driver Dummy Airbag Contact



Figure A-49: Pre-Test Passenger Dummy Front View (Head Position)



Figure A-50: Post-Test Passenger Dummy Front View (Head Position)



Figure A-51: Pre-Test Passenger Dummy (Through Window)



Figure A-52: Post-Test Passenger Dummy (Through Window)



Figure A-53: Pre-Test Passenger Dummy (Door Open)



Figure A-54: Post-Test Passenger Dummy (Door Open)



Figure A-55: Pre-Test Passenger Dummy Feet



Figure A-56: Post-Test Passenger Dummy Feet



Figure A-57: Pre-Test Passenger Side Glove Box



Figure A-58: Post-Test Passenger Side Glove Box

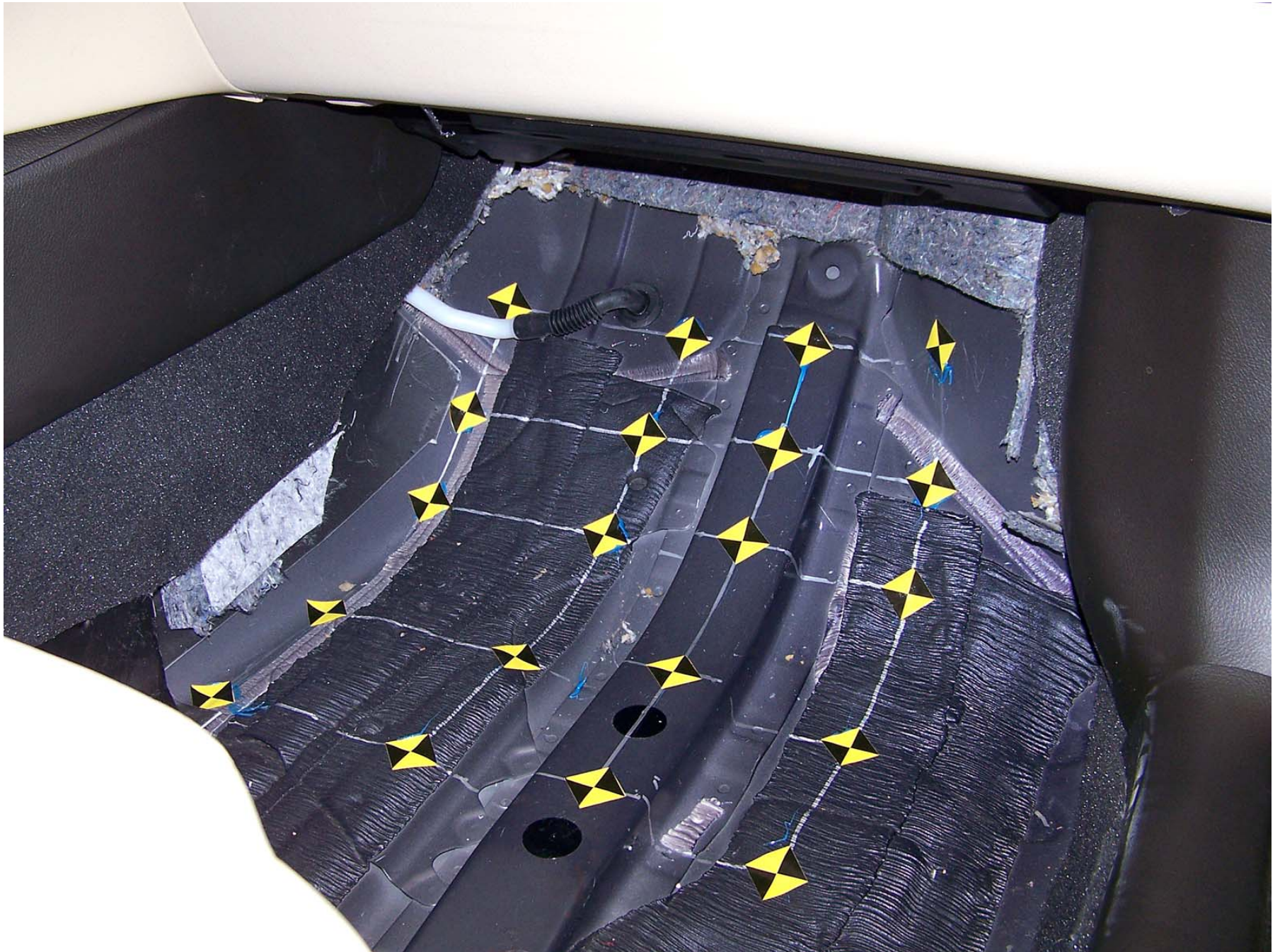


Figure A-59: Pre-Test Passenger Side Floor Pan



Figure A-60: Post-Test Passenger Side Floor Pan



Figure A-61: Post-Test Passenger Dummy Head



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

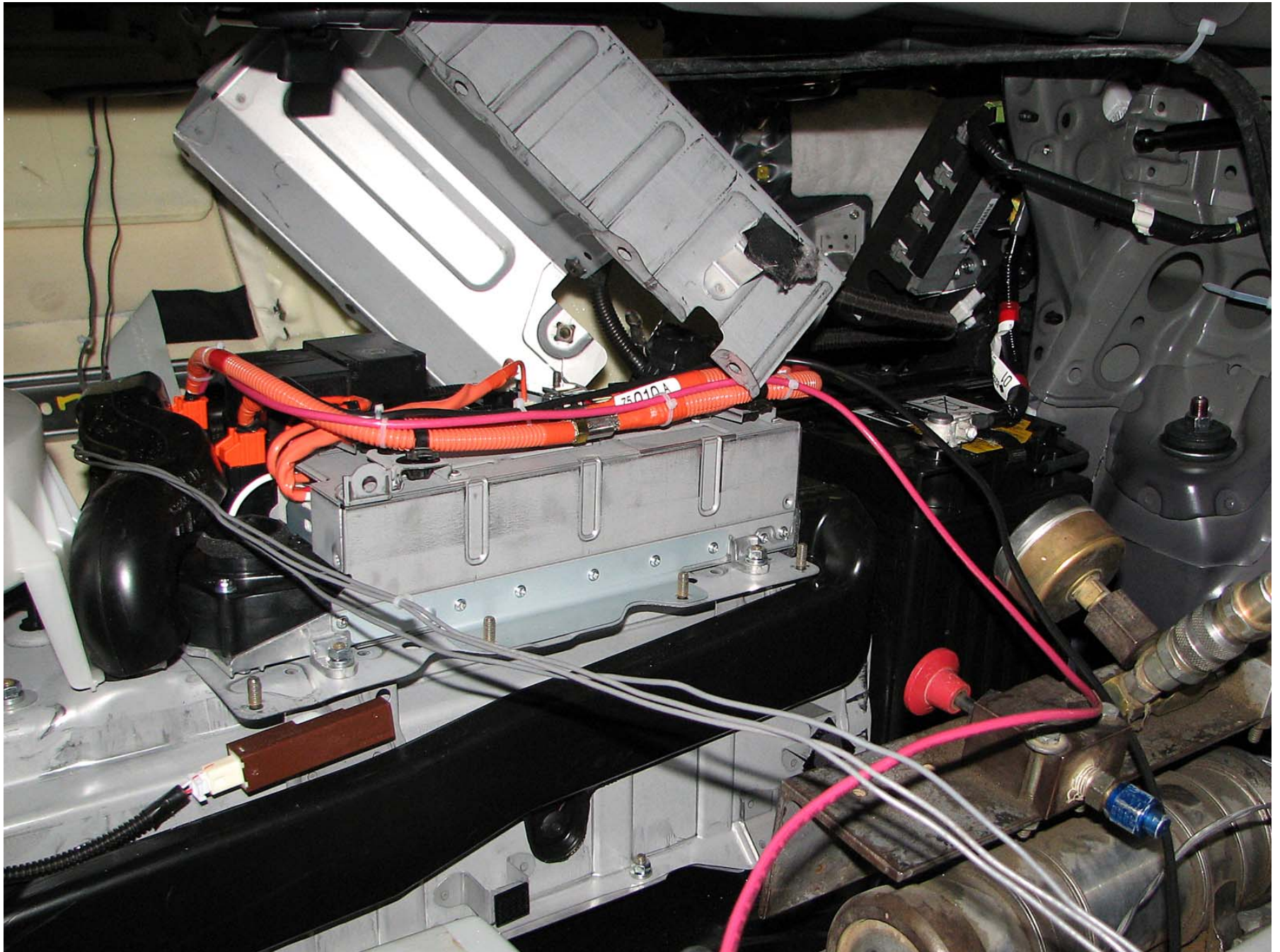


Figure A-63: Pre-Test View of Battery Compartment

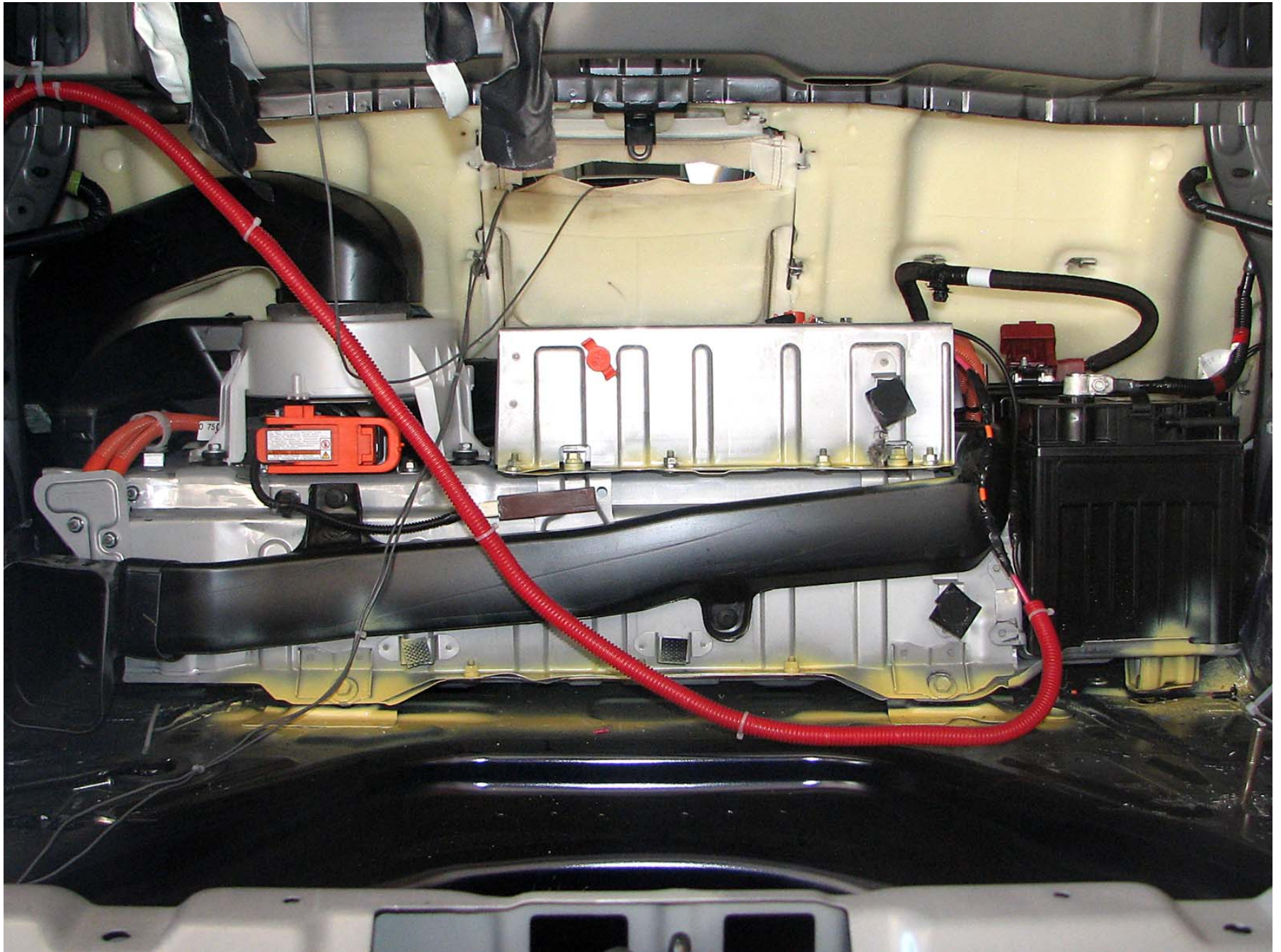


Figure A-64: Post-Test View of Battery Compartment

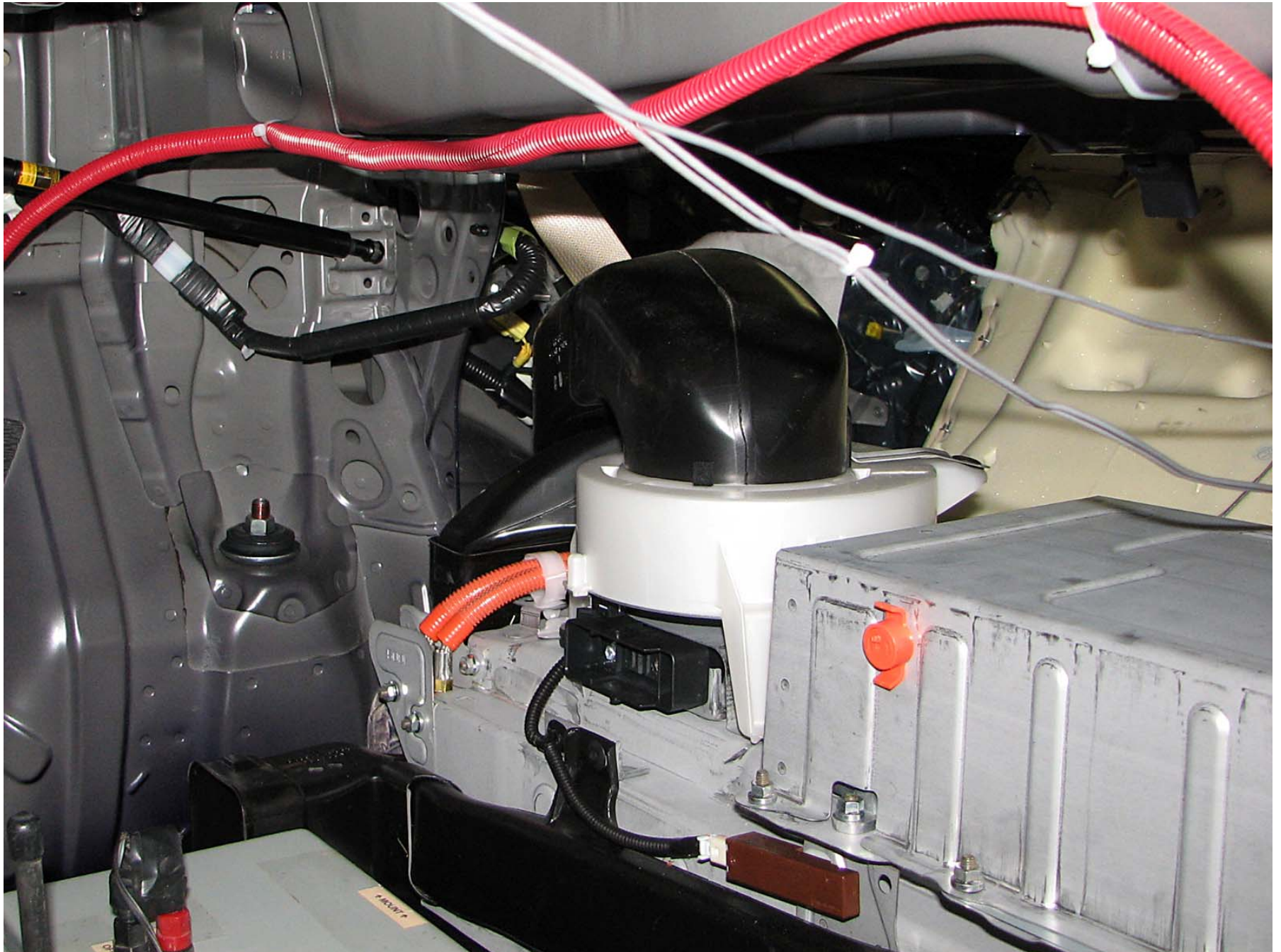


Figure A-65: Pre-Test View of Battery Compartment

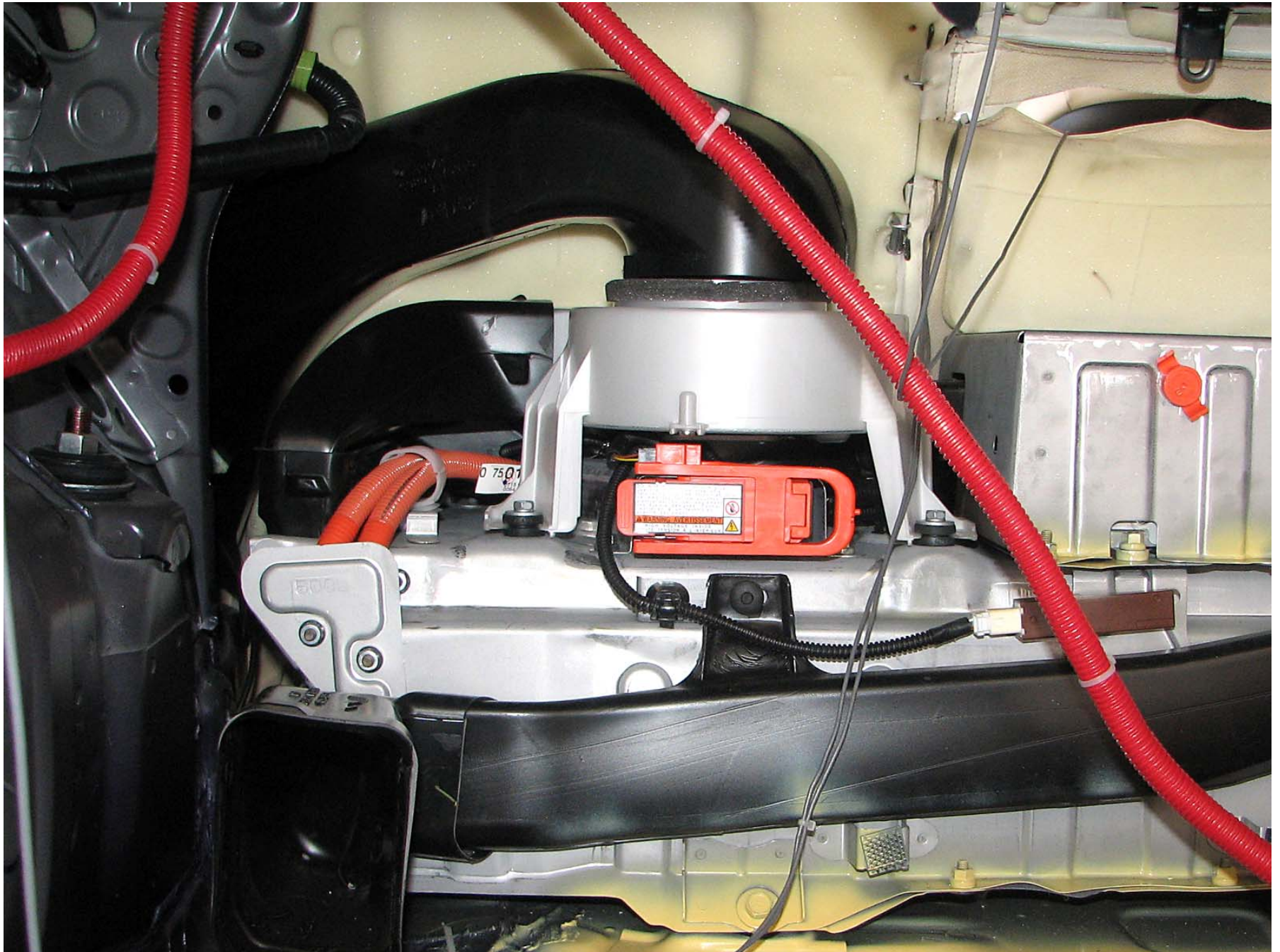


Figure A-66: Post-Test View of Battery Compartment



Figure A-67: Pre-Test View of Battery Compartment

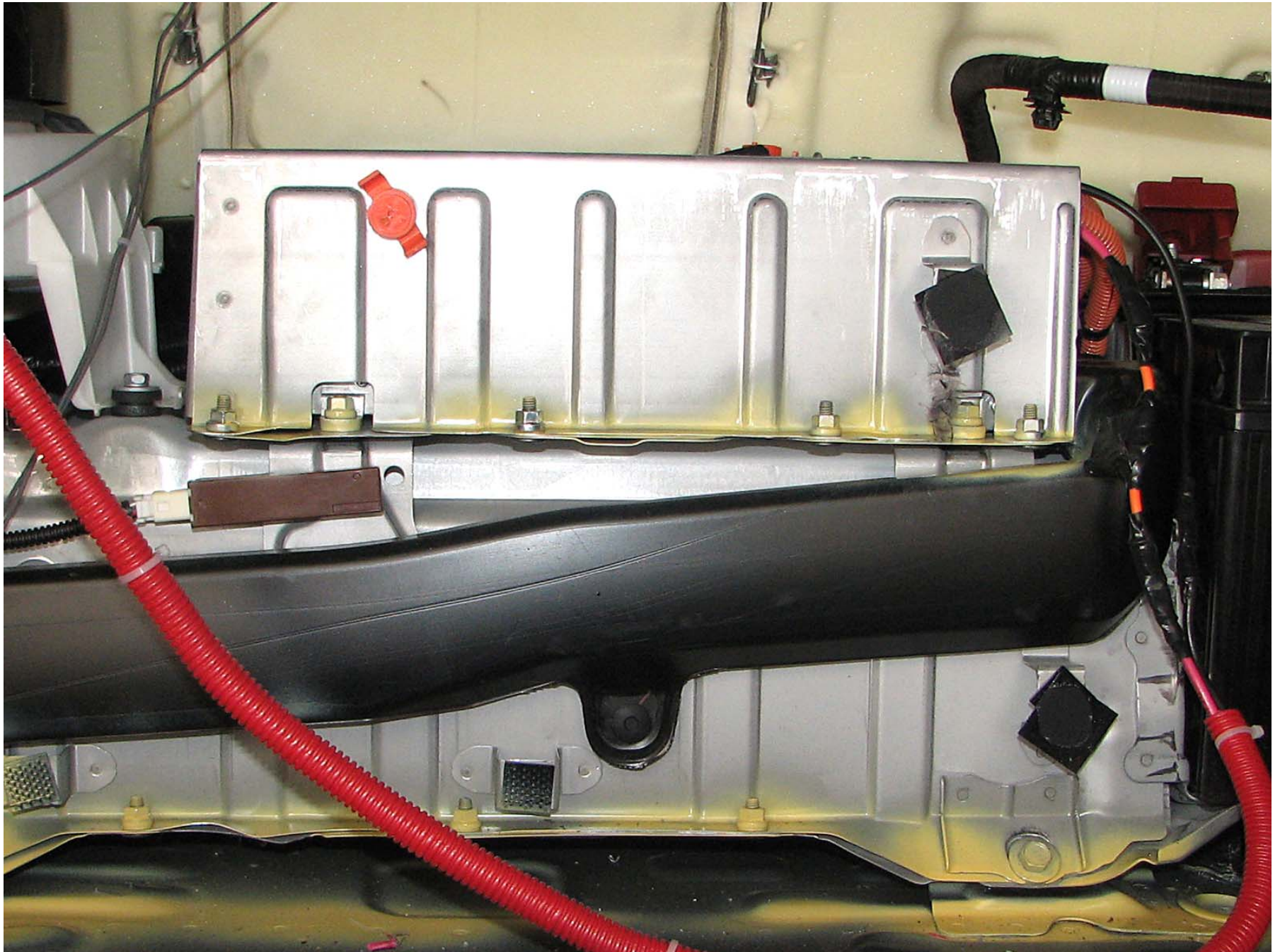


Figure A-68: Post-Test View of Battery Compartment



Figure A-69: Pre-Test View of Battery Compartment



Figure A-70: Post-Test View of Battery Compartment



Figure A-71: Vehicle on Rollover Device (0°)



Figure A-72: Vehicle on Rollover Device (90°)



Figure A-73: Vehicle on Rollover Device (180°)

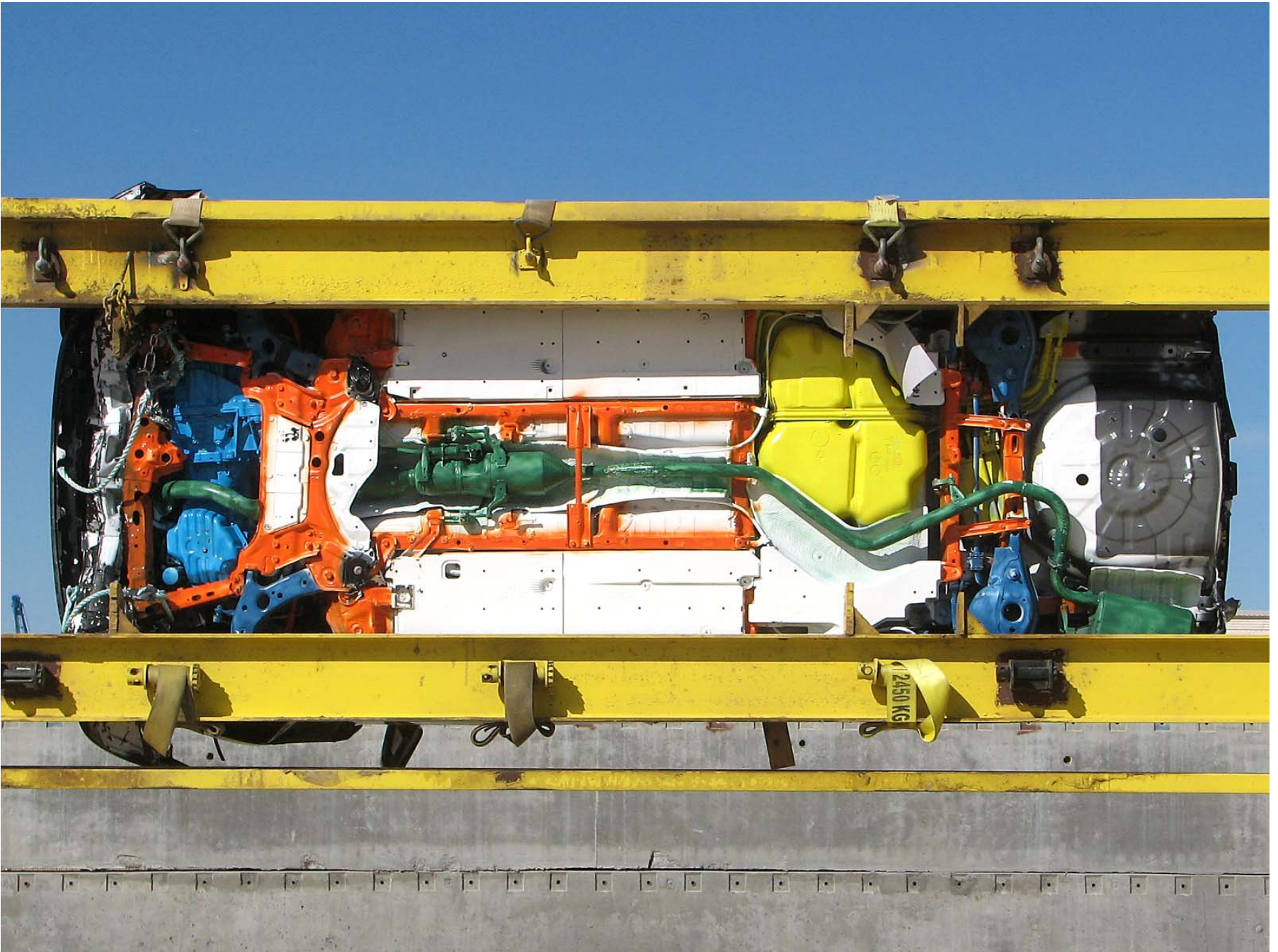


Figure A-74: Vehicle on Rollover Device (270°)



Figure A-75: Vehicle on Rollover Device (360°)

07/19/09
07/19/10
Kelsey

TIMER 1



08/17/09
08/05/10
Kelsey

TIMER 2



Figure A-76: Timers



Figure A-77: Vehicle Impact

APPENDIX B
DATA PLOTS

LIST OF DATA PLOTS

Data Plot		Page
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	Driver Head Primary Y	B-1
	Driver Head Primary Z	B-1
	Driver Head Resultant Primary	B-1
B-2	Driver Chest Primary X	B-2
	Driver Chest Primary Y	B-2
	Driver Chest Primary Z	B-2
	Driver Chest Resultant Primary	B-2
B-3	Driver Left Femur Force Z	B-3
	Driver Right Femur Force Z	B-3
B-4	Passenger Head Primary X	B-4
	Passenger Head Primary Y	B-4
	Passenger Head Primary Z	B-4
	Passenger Head Resultant Primary	B-4
B-5	Passenger Chest Primary X	B-5
	Passenger Chest Primary Y	B-5
	Passenger Chest Primary Z	B-5
	Passenger Chest Resultant Primary	B-5
B-6	Passenger Left Femur Force Z	B-6
	Passenger Right Femur Force Z	B-6

LIST OF DATA PLOTS...(CONTINUED)

The following additional data plots for this test can be obtained from the research and development section of the NHTSA website. The website can be found at www.NHTSA.dot.gov.

- Driver Head Primary X Velocity
- Driver Head Primary X Displacement
- Driver Head Redundant X
- Driver Head Redundant Y
- Driver Head Redundant Z
- Driver Head Resultant Redundant
- Driver Head Redundant X Velocity
- Driver Head Redundant X Displacement
- Driver Upper Neck Force X
- Driver Upper Neck Force Y
- Driver Upper Neck Force Z
- Driver Upper Neck Force Resultant
- Driver Upper Neck Moment X
- Driver Upper Neck Moment Y
- Driver Upper Neck Moment Z
- Driver Upper Neck Moment Resultant
- Driver Chest Primary X Velocity
- Driver Chest Primary X Displacement
- Driver Chest Redundant X
- Driver Chest Redundant Y
- Driver Chest Redundant Z
- Driver Chest Resultant Redundant
- Driver Chest Redundant X Velocity
- Driver Chest Redundant X Displacement
- Driver Chest Displacement
- Driver Pelvis X
- Driver Pelvis Y
- Driver Pelvis Z
- Driver Pelvis Resultant
- Driver Pelvis X Velocity
- Driver Pelvis X Displacement
- Driver Left Upper Tibia Moment X
- Driver Left Upper Tibia Moment Y
- Driver Right Upper Tibia Moment X

LIST OF DATA PLOTS...(CONTINUED)

Driver Right Upper Tibia Moment Y
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver Left Foot Aft X
Driver Left Foot Aft Z
Driver Left Foot Fore Z
Driver Right Foot Aft X
Driver Right Foot Aft Z
Driver Right Foot Fore Z
Driver Lap Belt Force
Driver Shoulder Belt Force
Driver Shoulder Belt Pullout
Driver Shoulder Belt Elongation
Passenger Head Primary X Velocity
Passenger Head Primary X Displacement
Passenger Head Redundant X
Passenger Head Redundant Y
Passenger Head Redundant Z
Passenger Head Resultant Redundant
Passenger Head Redundant X Velocity
Passenger Head Redundant X Displacement
Passenger Upper Neck Force X
Passenger Upper Neck Force Y
Passenger Upper Neck Force Z
Passenger Upper Neck Force Resultant
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Y
Passenger Upper Neck Moment Z
Passenger Upper Neck Moment Resultant
Passenger Chest Primary X Velocity
Passenger Chest Primary X Displacement
Passenger Chest Redundant X

LIST OF DATA PLOTS...(CONTINUED)

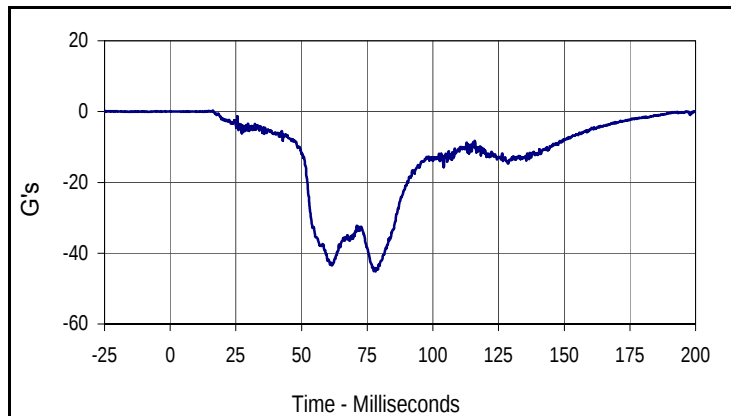
Passenger Chest Redundant Y
Passenger Chest Redundant Z
Passenger Chest Resultant Redundant
Passenger Chest Redundant X Velocity
Passenger Chest Redundant X Displacement
Passenger Chest Displacement
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Pelvis Resultant
Passenger Pelvis X Velocity
Passenger Pelvis X Displacement
Passenger Left Femur Force
Passenger Right Femur Force
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Left Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Passenger Right Foot Fore Z
Passenger Lap Belt Force
Passenger Shoulder Belt Force
Passenger Shoulder Belt Pullout
Passenger Shoulder Belt Elongation
Vehicle Left Rear X
Vehicle Left Rear X Velocity

LIST OF DATA PLOTS...(CONTINUED)

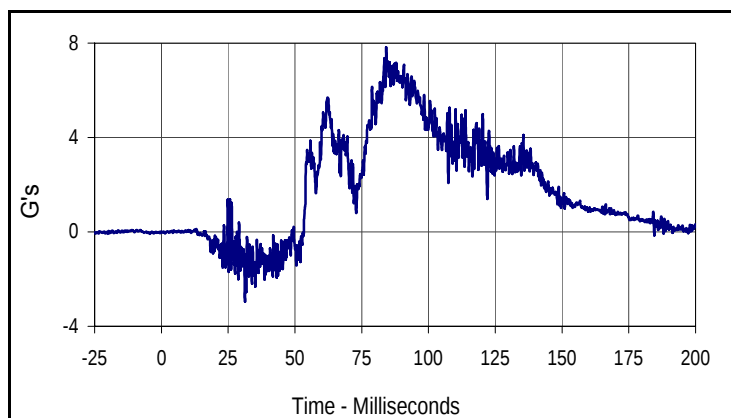
Vehicle Left Rear X Displacement
Vehicle Right Rear X
Vehicle Right Rear X Velocity
Vehicle Right Rear X Displacement
Vehicle Engine Top
Vehicle Engine Top Velocity
Vehicle Engine Top Displacement
Vehicle Engine Bottom
Vehicle Engine Bottom Velocity
Vehicle Engine Bottom Displacement
Vehicle Left Brake Caliper
Vehicle Left Brake Caliper Velocity
Vehicle Left Brake Caliper Displacement
Vehicle Right Brake Caliper
Vehicle Right Brake Caliper Velocity
Vehicle Right Brake Caliper Displacement
Vehicle Instrument Panel
Vehicle Instrument Panel Velocity
Vehicle Instrument Panel Displacement
Vehicle Left Rear Z
Vehicle Left Rear Z Velocity
Vehicle Left Rear Z Displacement
Vehicle Right Rear Z
Vehicle Right Rear Z Velocity
Vehicle Right Rear Z Displacement

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan
 Test Program: NHTSA 35mph NCAP

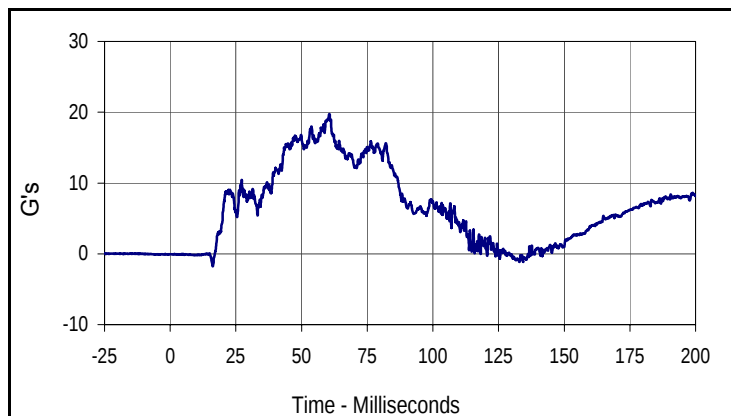
Test Date: 10/24/09
 NHTSA No.: MA5119



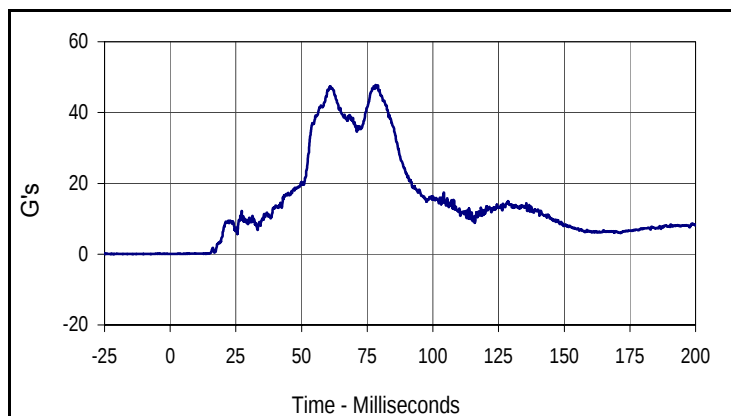
Curve Description			
Driver Head Primary X			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
0.3	16.2	-45.1	78.2



Curve Description			
Driver Head Primary Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
7.8	84.2	-3.0	31.3



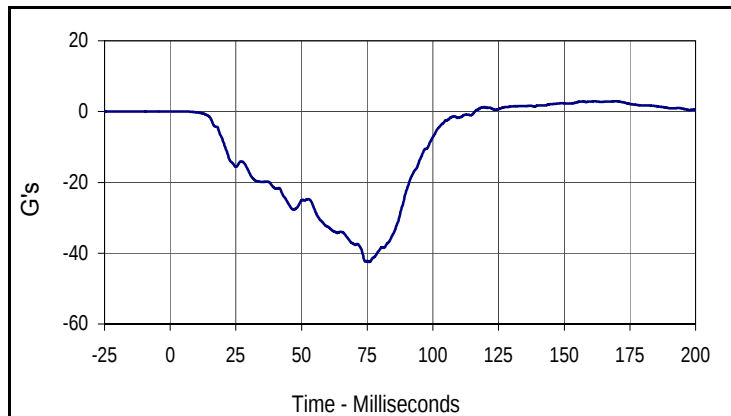
Curve Description			
Driver Head Primary Z			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
19.7	60.6	-1.8	16.2



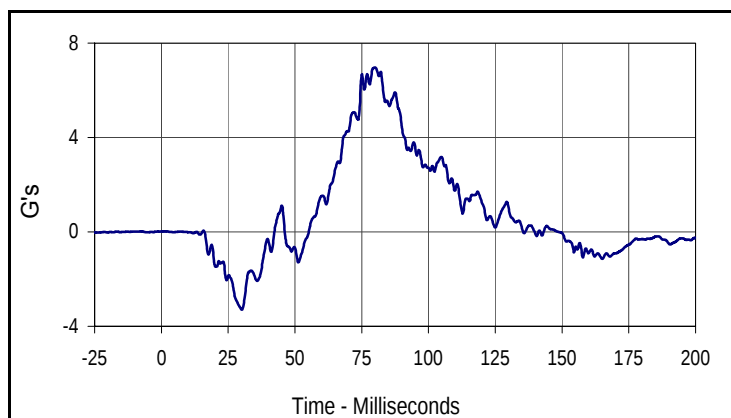
Curve Description			
Driver Head Resultant Primary			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
47.8	78.2	0.0	13.4

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan
 Test Program: NHTSA 35mph NCAP

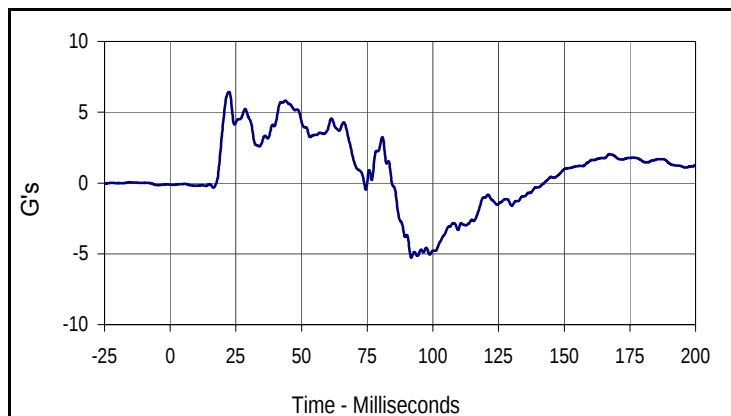
Test Date: 10/24/09
 NHTSA No.: MA5119



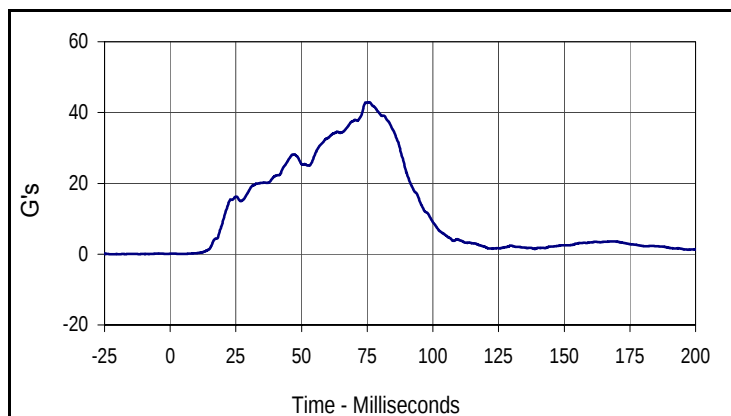
Curve Description			
Driver Chest Primary X			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
2.9	161.6	-42.5	75.9



Curve Description			
Driver Chest Primary Y			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
7.0	80.0	-3.3	30.1



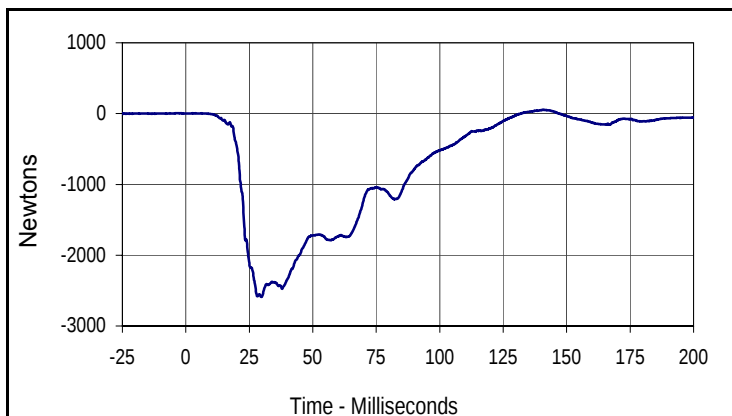
Curve Description			
Driver Chest Primary Z			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
6.4	22.4	-5.3	91.8



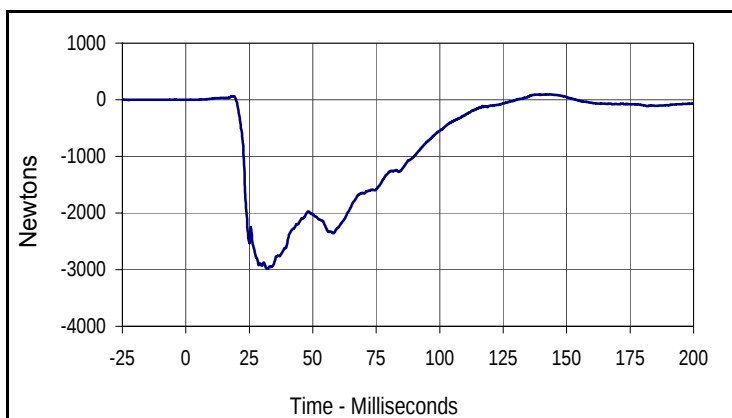
Curve Description			
Driver Chest Resultant Primary			
CURNO	Type	SAE Class	Units
004	RES	180	G's
Max	Time	Min	Time
42.9	75.8	0.1	5.7

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan
 Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09
 NHTSA No.: MA5119



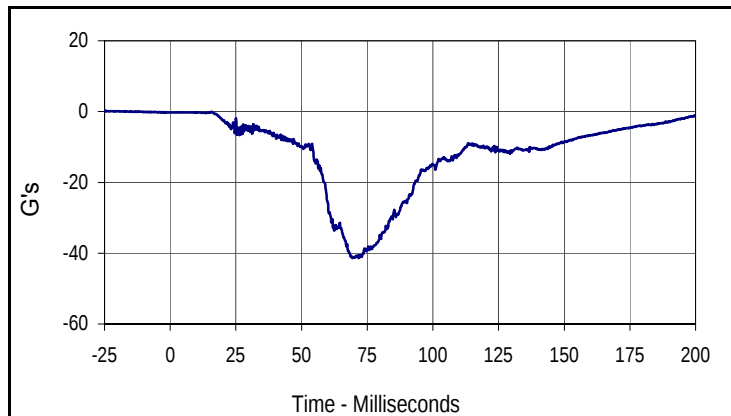
Curve Description			
Driver Left Femur Force Z			
CURNO	Type	SAE Class	Units
007	FIL	600	Newtons
Max	Time	Min	Time
53.8	140.9	-2590.6	29.7



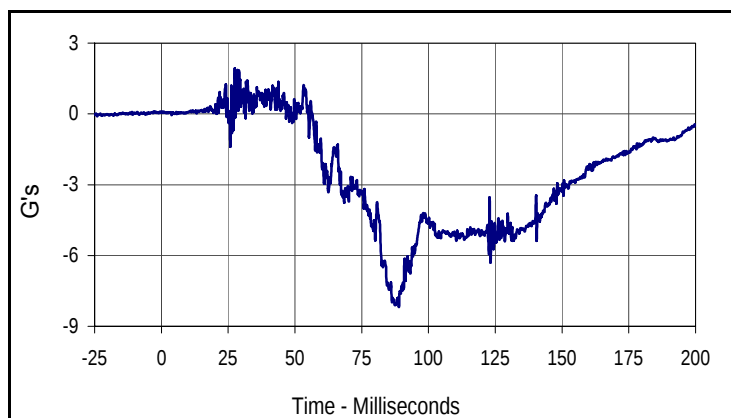
Curve Description			
Driver Right Femur Force Z			
CURNO	Type	SAE Class	Units
008	FIL	600	Newtons
Max	Time	Min	Time
96.2	142.1	-2985.4	32.2

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan
 Test Program: NHTSA 35mph NCAP

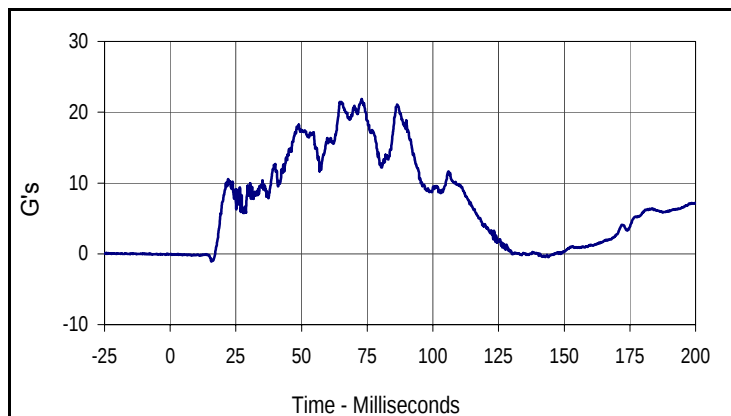
Test Date: 10/24/09
 NHTSA No.: MA5119



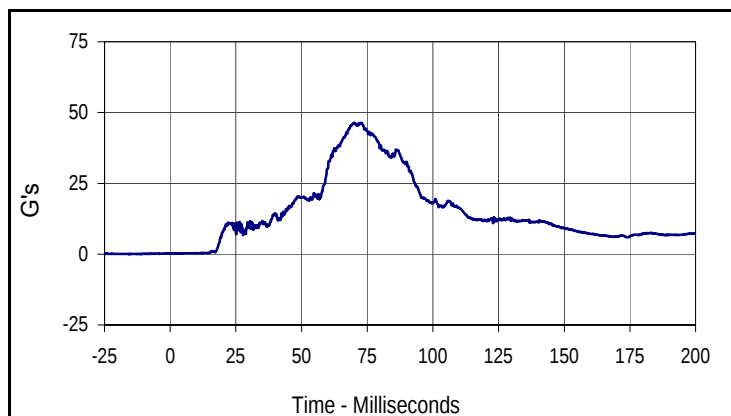
Curve Description			
Passenger Head Primary X			
CURNO	Type	SAE Class	Units
009	FIL	1000	G's
Max	Time	Min	Time
-0.1	15.8	-41.4	69.3



Curve Description			
Passenger Head Primary Y			
CURNO	Type	SAE Class	Units
010	FIL	1000	G's
Max	Time	Min	Time
1.9	27.5	-8.2	88.9



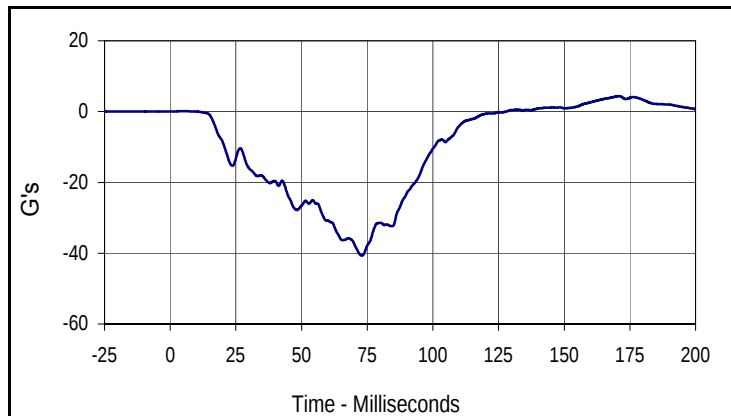
Curve Description			
Passenger Head Primary Z			
CURNO	Type	SAE Class	Units
011	FIL	1000	G's
Max	Time	Min	Time
21.8	72.9	-1.1	15.7



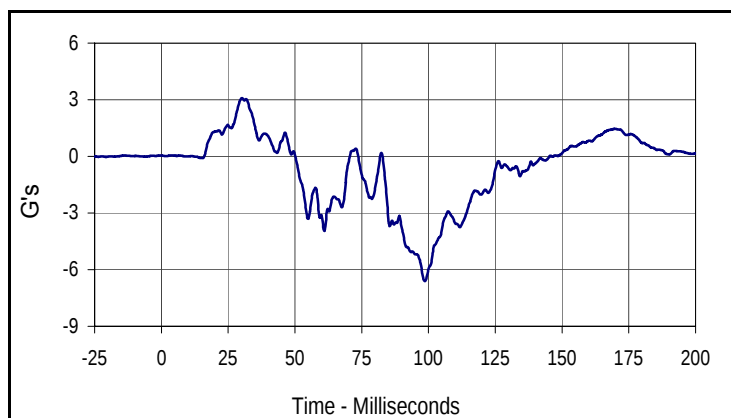
Curve Description			
Passenger Head Resultant Primary			
CURNO	Type	SAE Class	Units
009	RES	1000	G's
Max	Time	Min	Time
46.5	72.9	0.2	3.1

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan
 Test Program: NHTSA 35mph NCAP

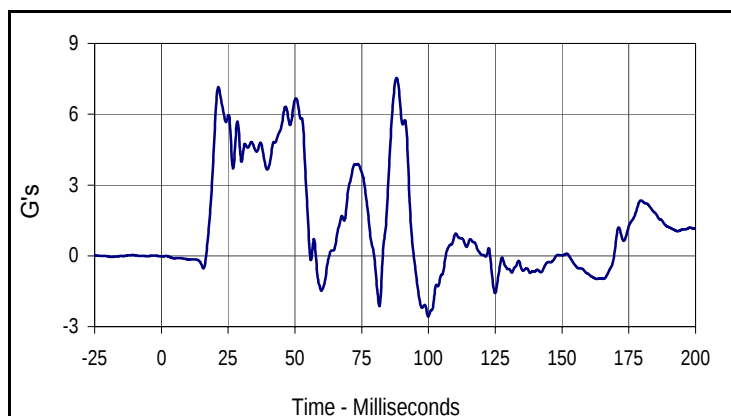
Test Date: 10/24/09
 NHTSA No.: MA5119



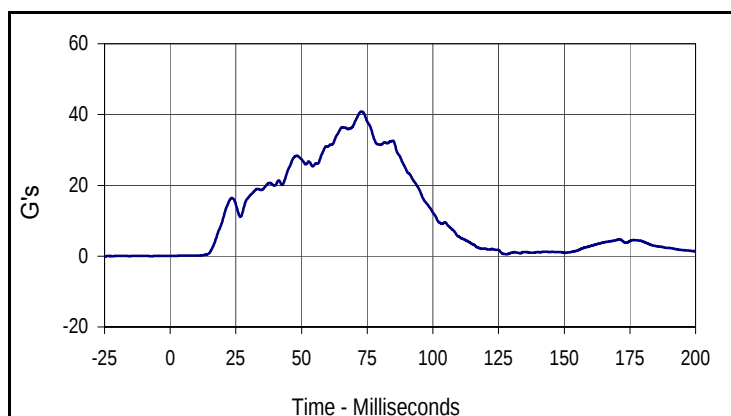
Curve Description			
Passenger Chest Primary X			
CURNO	Type	SAE Class	Units
012	FIL	180	G's
Max	Time	Min	Time
4.4	170.8	-40.7	72.9



Curve Description			
Passenger Chest Primary Y			
CURNO	Type	SAE Class	Units
013	FIL	180	G's
Max	Time	Min	Time
3.1	30.1	-6.6	98.6



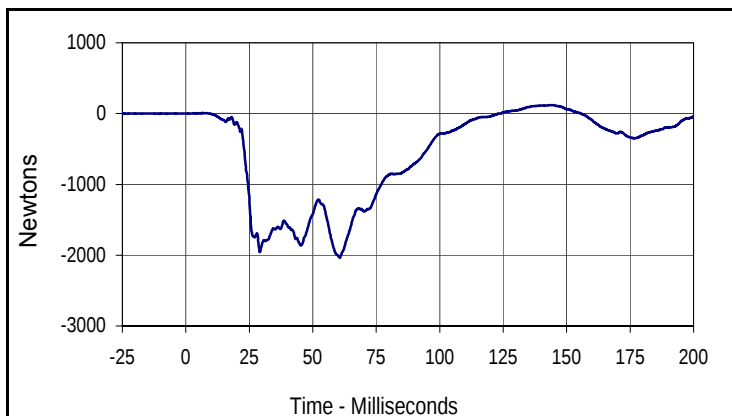
Curve Description			
Passenger Chest Primary Z			
CURNO	Type	SAE Class	Units
014	FIL	180	G's
Max	Time	Min	Time
7.5	88.0	-2.6	99.9



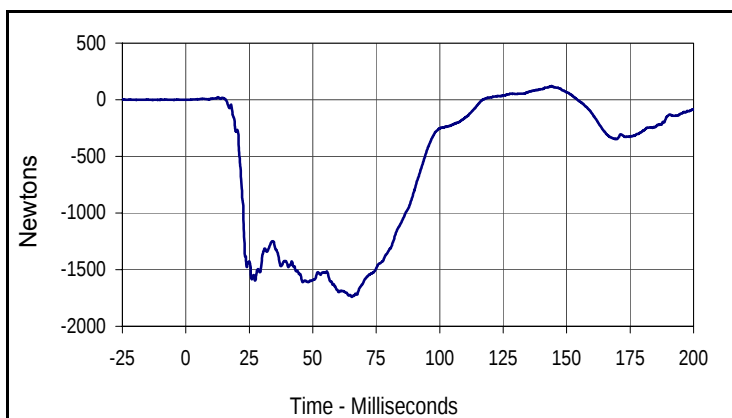
Curve Description			
Passenger Chest Resultant Primary			
CURNO	Type	SAE Class	Units
012	RES	180	G's
Max	Time	Min	Time
40.8	72.9	0.1	1.8

Test Vehicle: 2010 Lexus HS 250h 4-Door Sedan
 Test Program: NHTSA 35mph NCAP

Test Date: 10/24/09
 NHTSA No.: MA5119



Curve Description			
Passenger Left Femur Force Z			
CURNO	Type	SAE Class	Units
015	FIL	600	Newtons
Max	Time	Min	Time
120.3	144.1	-2036.5	60.7



Curve Description			
Passenger Right Femur Force Z			
CURNO	Type	SAE Class	Units
016	FIL	600	Newtons
Max	Time	Min	Time
120.2	144.0	-1741.1	65.4

APPENDIX C
DUMMY CALIBRATION DATA

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

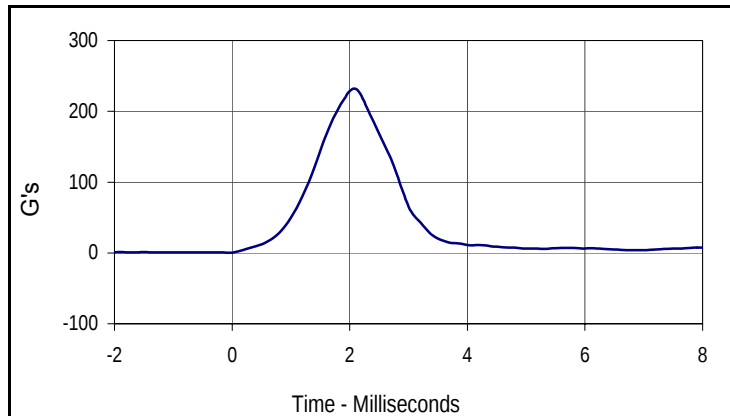
Test Date: 10/8/09

ATD Serial No.: 034

Test I.D.: HD34A



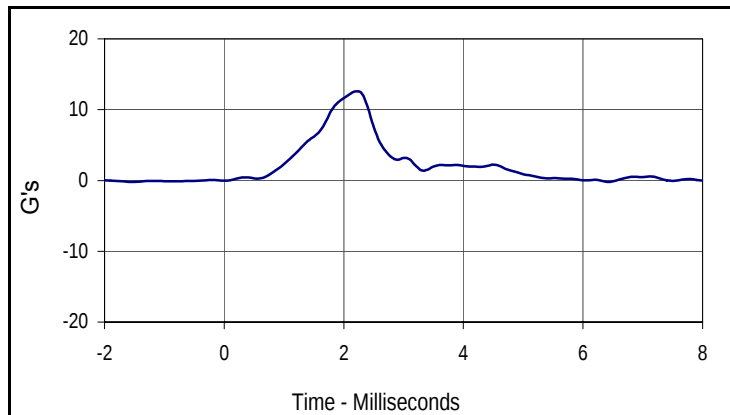
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	231.7	Pass
Peak Lateral Acceleration	G's	≤15.0	12.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results			Pass	



Curve Description

Head Resultant

CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
231.7	2.1	0.4	-0.1



Curve Description

Head Y

CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
12.6	2.2	-0.2	-1.5

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

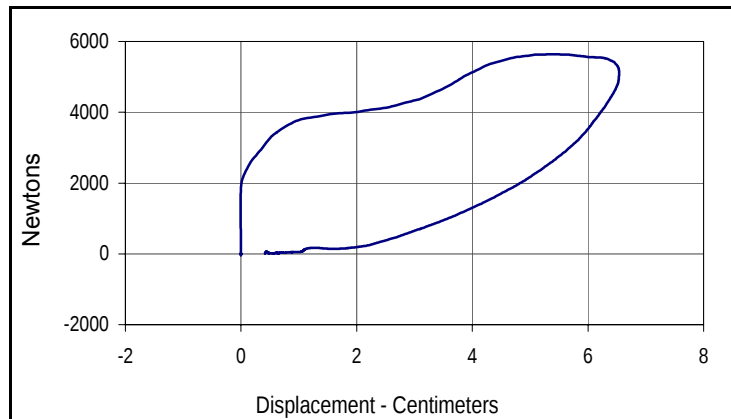
Test Date: 10/15/09

ATD Serial No.: 034

Test I.D.: CH10C



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	6.62	Pass
Peak Probe Force	Newtons	5159 to 5893	5641	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.54	Pass
Internal Hysteresis	%	69 to 85	72.4	Pass
Overall Test Results			Pass	



Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
001	FIL	180	72.4
Peak Probe Force		Peak Chest Deflection	
5641		6.54	

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

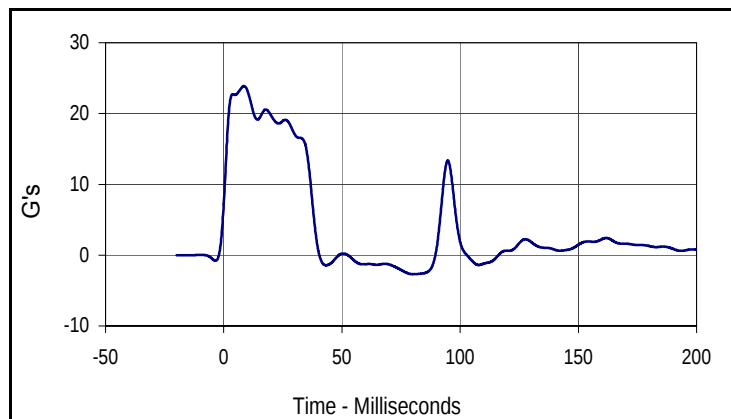
Test Date: 10/7/09

ATD Serial No.: 034

Test I.D.: NF10B



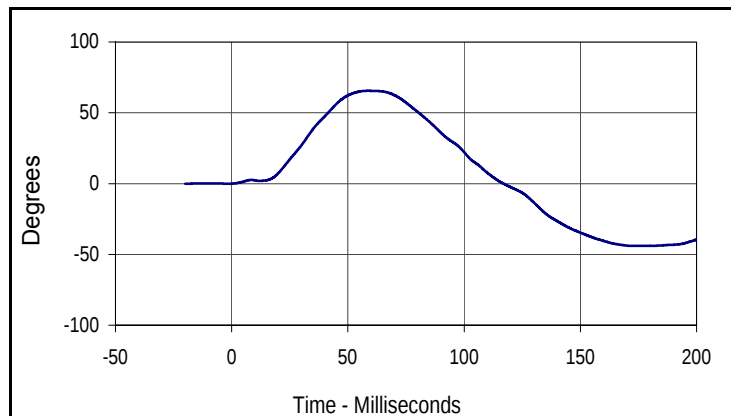
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.89	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.2	Pass
	20 Msec.	G's	17.6 to 22.6	19.7	Pass
	30 Msec.	G's	12.5 to 18.5	17.1	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	17.1	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	38.3	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	65.5	Pass
	Time	Msec.	57.0 to 64.0	58.8	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	116.9	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	85.4	Pass
	Time	Msec.	47.0 to 58.0	52.1	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	98.2	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

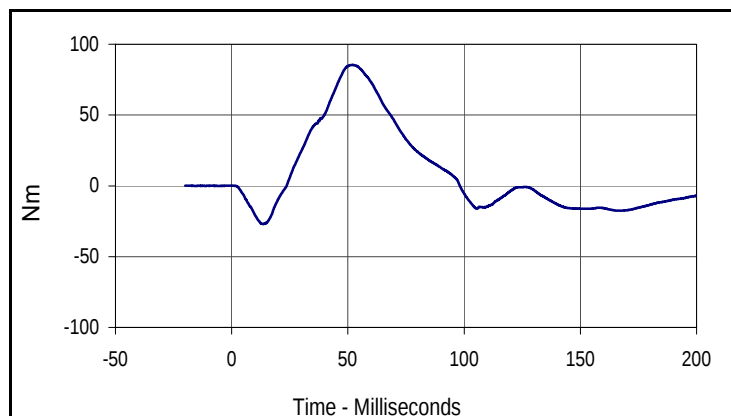
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
23.9	8.5	-2.7	80.1



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
65.5	58.8	-44.1	175.2



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
85.4	52.1	-26.9	13.7

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

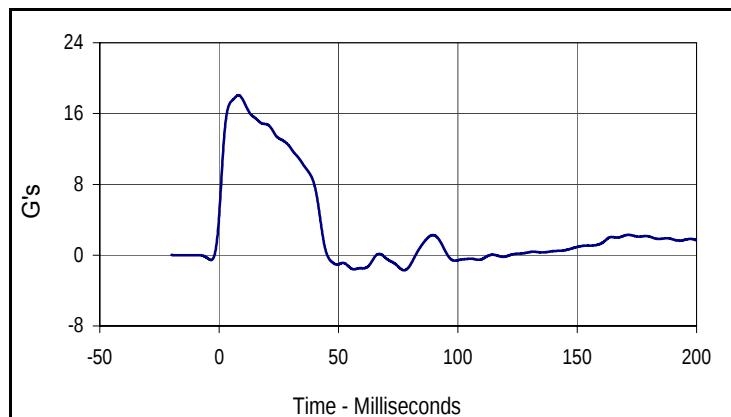
Test Date: 10/9/09

ATD Serial No.: 034

Test I.D.: NE034A



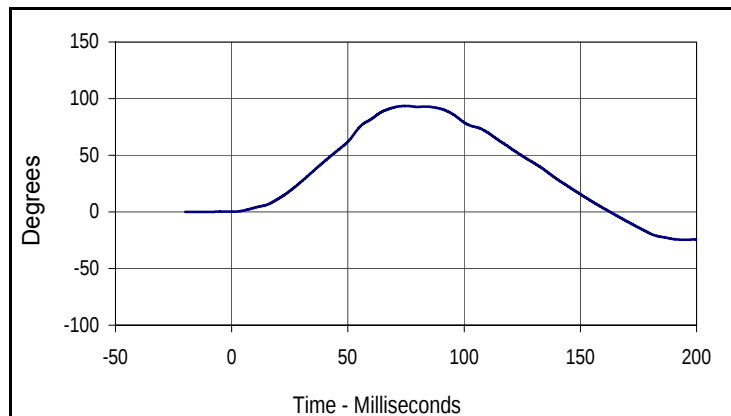
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.09	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	17.5	Pass
	20 Msec.	G's	14.0 to 19.0	14.8	Pass
	30 Msec.	G's	11.0 to 16.0	12.1	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	12.1	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	41.9	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	93.5	Pass
	Time	Msec.	72.0 to 82.0	75.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	162.8	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-69.5	Pass
	Time	Msec.	65.0 to 79.0	68.3	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	133.1	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

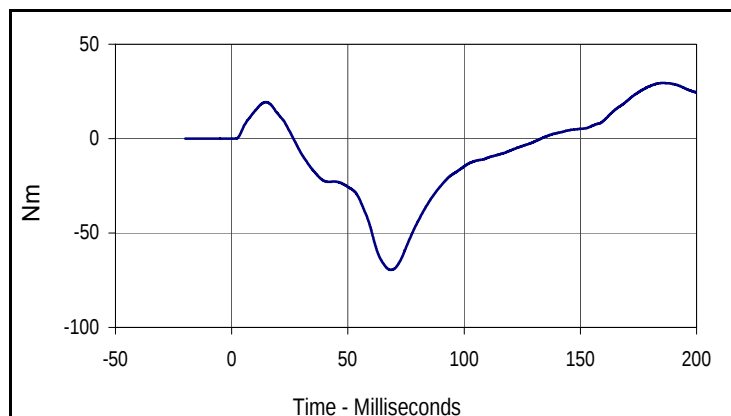
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
18.1	8.1	-1.7	77.5



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
93.5	75.0	-24.5	194.6



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
29.5	185.8	-69.5	68.3

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

Test Date: 10/15/09

ATD Serial No.: 034

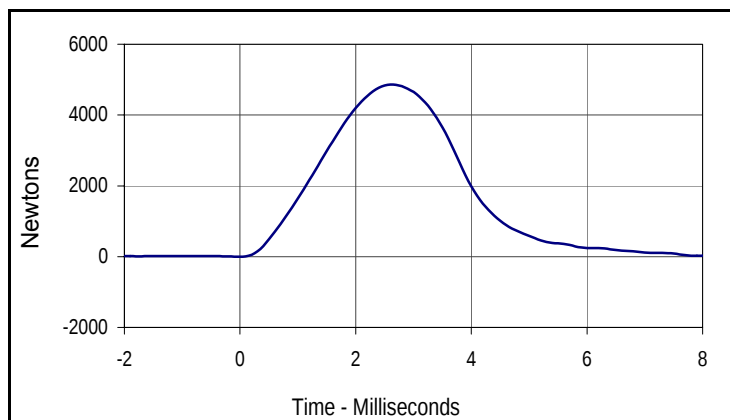
Test I.D.: LK06B , RK06B

**Left Knee**

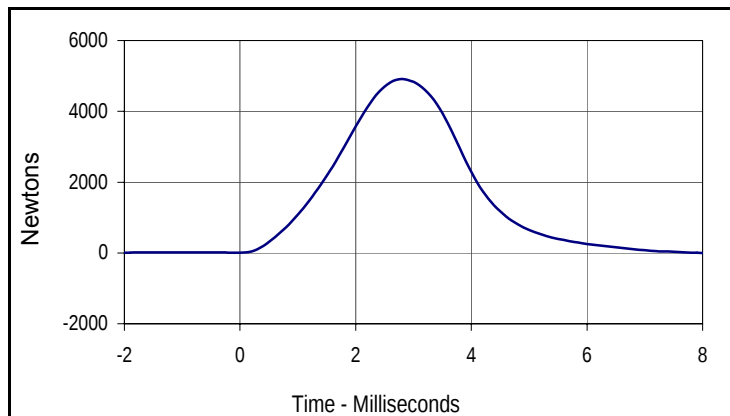
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	4859	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	4911	Pass
Overall Test Results				Pass

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

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4859.4	2.6	-52.9	9.6

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

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
4911.1	2.8	-13.2	8.7

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 10/15/09

ATD Serial No.: 034

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	885	Pass
B - Shoulder pivot height	mm	505 to 521	510	Pass
C - "H" point height	mm	84 to 89	85	Pass
D - "H" point from seat back	mm	135 to 140	135	Pass
E - Shoulder pivot from back	mm	84 to 94	89	Pass
F - Thigh clearance	mm	140 to 155	146	Pass
G - Elbow back to wrist pivot	mm	290 to 305	300	Pass
H - Skull cap to back line	mm	41 to 46	43	Pass
I - Shoulder to elbow length	mm	330 to 345	331	Pass
J - Elbow rest height	mm	190 to 211	209	Pass
K - Buttock to knee length	mm	579 to 604	592	Pass
L - Popliteal length	mm	429 to 455	442	Pass
M - Knee pivot height	mm	485 to 500	492	Pass
N - Buttock popliteal length	mm	452 to 477	475	Pass
O - Chest depth	mm	213 to 229	216	Pass
P - Foot length	mm	251 to 267	255	Pass
V - Shoulder breadth	mm	422 to 437	425	Pass
W - Foot breadth	mm	91 to 107	105	Pass
Y - Chest circumference	mm	970 to 1001	990	Pass
Z - Waist circumference	mm	836 to 866	855	Pass
AA - Location for chest circumference	mm	429 to 434	429	Pass
BB - Location for waist circumference	mm	226 to 231	229	Pass
Overall Test Results				Pass

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

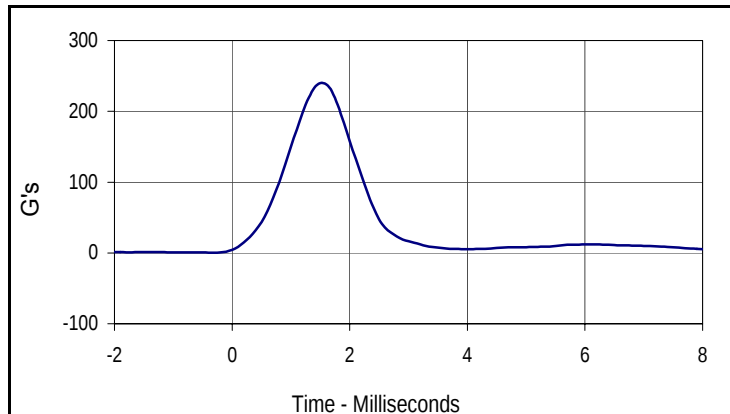
Test Date: 10/8/09

ATD Serial No.: 035

Test I.D.: HD35B



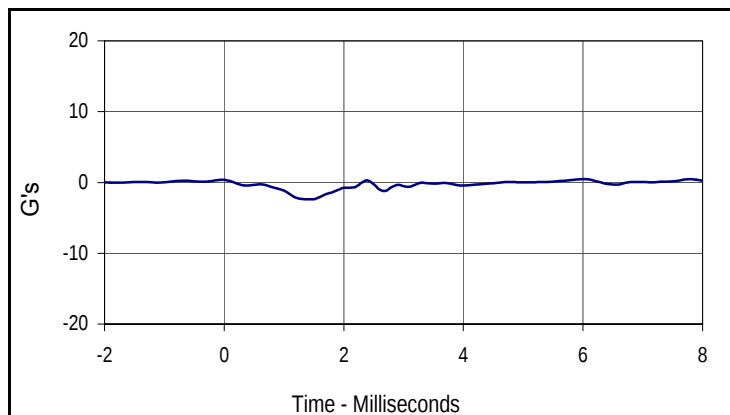
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	239.9	Pass
Peak Lateral Acceleration	G's	≤15.0	2.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description

Head Resultant

CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
239.9	1.5	0.2	-0.3



Curve Description

Head Y

CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.5	6.0	-2.4	1.4

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

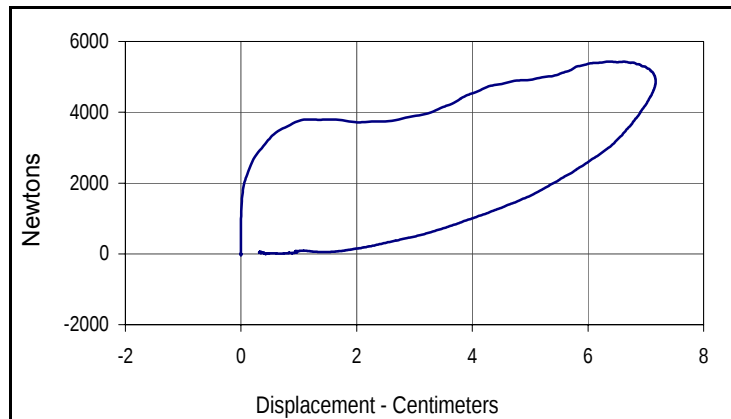
Test Date: 10/15/09

ATD Serial No.: 035

Test I.D.: CH10A



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	6.64	Pass
Peak Probe Force	Newtons	5159 to 5893	5429	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	7.17	Pass
Internal Hysteresis	%	69 to 85	72.3	Pass
Overall Test Results			Pass	



Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
001	FIL	180	72.3
Peak Probe Force		Peak Chest Deflection	
5429		7.17	

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

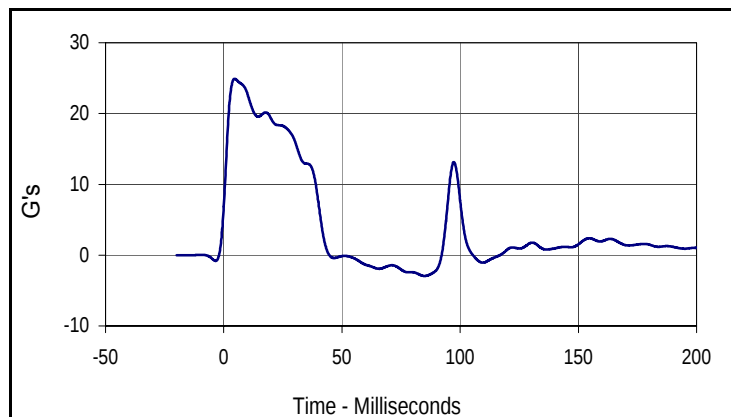
Test Date: 10/13/09

ATD Serial No.: 035

Test I.D.: NF10C



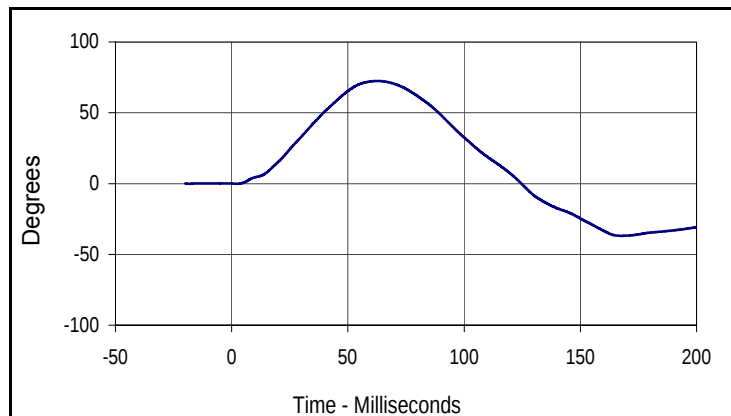
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.89	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	22.8	Pass
	20 Msec.	G's	17.6 to 22.6	19.3	Pass
	30 Msec.	G's	12.5 to 18.5	16.2	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	16.2	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	41.1	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	72.5	Pass
	Time	Msec.	57.0 to 64.0	62.7	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	124.7	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	89.0	Pass
	Time	Msec.	47.0 to 58.0	53.9	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	98.4	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

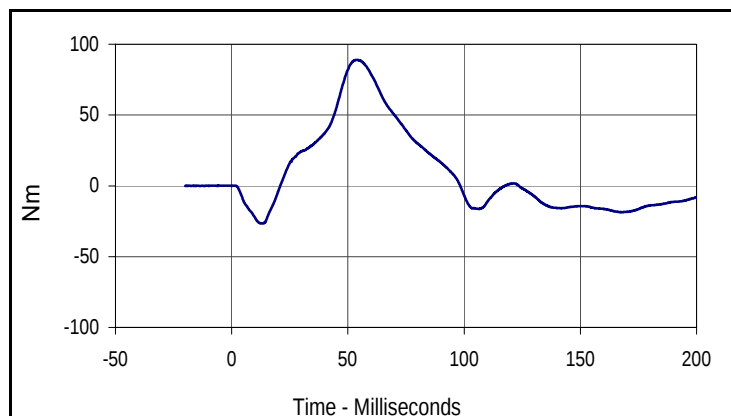
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
24.9	4.6	-2.9	84.9



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
72.5	62.7	-36.9	167.6



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
89.0	53.9	-26.7	13.3

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

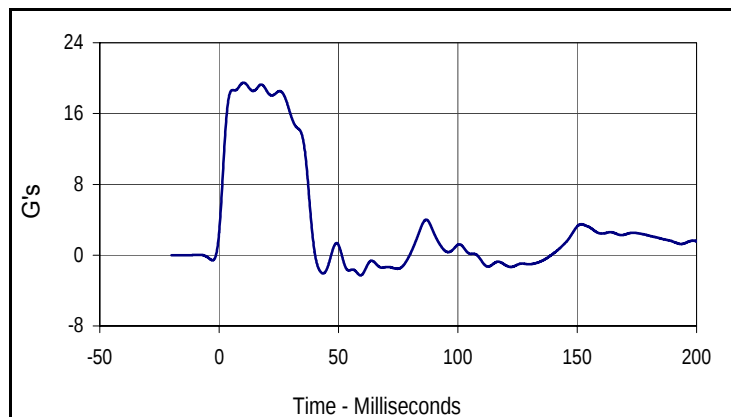
Test Date: 10/13/09

ATD Serial No.: 035

Test I.D.: NE10C



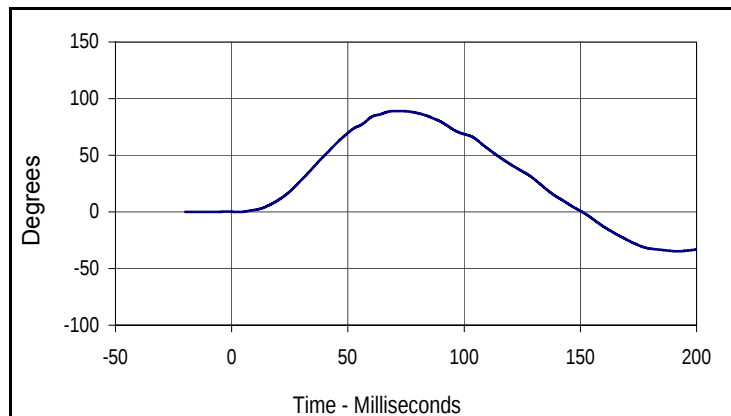
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.09	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	19.5	Pass
	20 Msec.	G's	14.0 to 19.0	18.5	Pass
	30 Msec.	G's	11.0 to 16.0	15.8	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	15.8	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	38.2	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	89.1	Pass
	Time	Msec.	72.0 to 82.0	73.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	150.8	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-74.6	Pass
	Time	Msec.	65.0 to 79.0	66.7	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	134.9	Pass
			Overall Test Results		Pass



Curve Description

Pendulum Deceleration

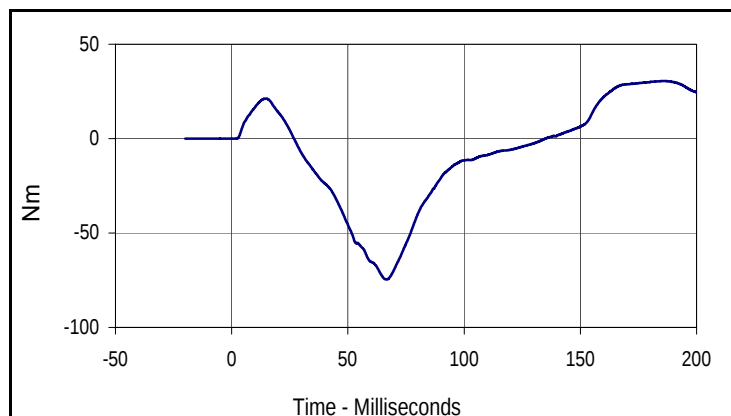
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
19.5	10.3	-2.3	59.2



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
89.1	73.0	-34.8	191.8



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
30.5	186.5	-74.6	66.7

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

Test Date: 10/15/09

ATD Serial No.: 035

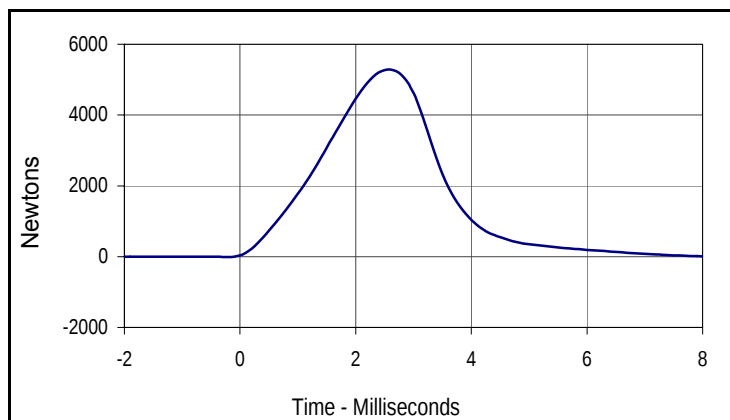
Test I.D.: LK10B , RK10B

**Left Knee**

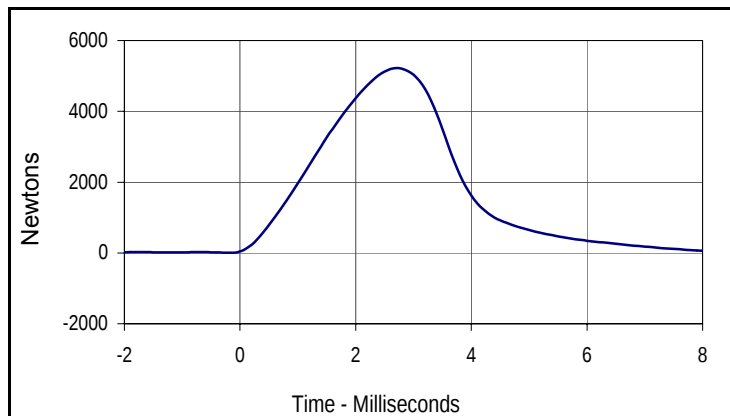
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5284	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5223	Pass
Overall Test Results				Pass

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

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5284.0	2.6	-14.2	-0.2

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

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5223.3	2.7	-2.6	9.8

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 10/15/09

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	884	Pass
B - Shoulder pivot height	mm	505 to 521	507	Pass
C - "H" point height	mm	84 to 89	86	Pass
D - "H" point from seat back	mm	135 to 140	137	Pass
E - Shoulder pivot from back	mm	84 to 94	86	Pass
F - Thigh clearance	mm	140 to 155	151	Pass
G - Elbow back to wrist pivot	mm	290 to 305	302	Pass
H - Skull cap to back line	mm	41 to 46	44	Pass
I - Shoulder to elbow length	mm	330 to 345	331	Pass
J - Elbow rest height	mm	190 to 211	204	Pass
K - Buttock to knee length	mm	579 to 604	591	Pass
L - Popliteal length	mm	429 to 455	443	Pass
M - Knee pivot height	mm	485 to 500	492	Pass
N - Buttock popliteal length	mm	452 to 477	472	Pass
O - Chest depth	mm	213 to 229	216	Pass
P - Foot length	mm	251 to 267	254	Pass
V - Shoulder breadth	mm	422 to 437	429	Pass
W - Foot breadth	mm	91 to 107	105	Pass
Y - Chest circumference	mm	970 to 1001	999	Pass
Z - Waist circumference	mm	836 to 866	854	Pass
AA - Location for chest circumference	mm	429 to 434	430	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
Overall Test Results				Pass

Test Program: Dummy Damage Checklist
 ATD Serial No.: 034

Test Date: 10/15/09
 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:
