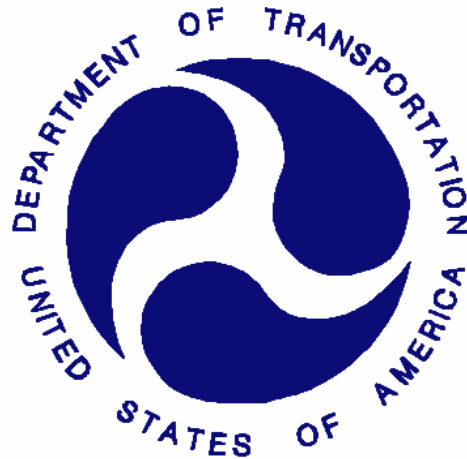


REPORT NUMBER: 301-MGA-2011-006

**SAFETY COMPLIANCE TESTING FOR FMVSS 301R
FUEL SYSTEM INTEGRITY – REAR IMPACT**

**CHRYSLER GROUP LLC
2010 DODGE CHARGER
NHTSA NUMBER: CA0307**

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



Test Date: June 20, 2011

Final Report Date: June 23, 2011

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
1200 NEW JERSEY AVENUE, S.E., NVS-220
WASHINGTON, D.C. 20590**

Technical Report Documentation Page

1. Report No. 301-MGA-2011-006		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Final Report for Fuel System Integrity Test of a 2010 Dodge Charger NHTSA No.: CA0307				5. Report Date June 23, 2011	
				6. Performing Organization Code MGA	
7. Author(s) Joe Fleck, Project Engineer				8. Performing Organization Report No. 301-MGA-2011-006	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105				10. Work Unit No.	
				11. Contract or Grant No. DTNH22-06-C-00030	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement, Office of Vehicle Safety Compliance 1200 New Jersey Avenue, S.E., NVS-220 Washington, D.C. 20590				13. Type of Report and Period Covered Final Report June 20, 2011 – June 29, 2011	
				14. Sponsoring Agency Code NVS-220	
15. Supplementary Notes					
16. Abstract A rear impact was conducted on a 2010 Dodge Charger at MGA Research Corporation on June 20, 2011. This test was conducted to obtain data indicant of FMVSS 301R. The impact velocity was 80.0 km/h. The ambient temperature at the time of impact was 24 degrees Celsius.					
17. Key Words Fuel System Integrity Test 2010 Dodge Charger NHTSA No: CA0307				18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin., Technical Ref. Division, 1200 New Jersey Avenue, SE Washington, D.C. 20590	
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This rear impact test is sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-06-C-00030. The purpose of this test is to reduce deaths and injuries occurring from fires that result from fuel spillage during and after motor vehicle crashes and resulting from ingestion of fuels during siphoning.

SUMMARY

A 2010 Dodge Charger was impacted by a Moving Deformable Barrier (MDB) at a velocity of 80.0 km/h. The test was performed at MGA Research Corporation on June 20, 2011. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and five high-speed cameras were used to document the impact event.

- Left Rear Half 1000 fps
- Right Rear Half 1000 fps
- Left Overall 1000 fps
- Overhead Overall 1000 fps
- Right Overall 1000 fps
- Real Time Pan 30 fps

Two ballast 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.

There was no Stoddard Solvent leakage after the event or during any phase of the static rollover.

The vehicle appeared to comply with all the requirements of FMVSS No. 301 "Fuel System Integrity."

**SECTION 2
DATA SHEETS**

**DATA SHEET NO. 1
TEST VEHICLE SPECIFICATIONS**

Test Vehicle: 2010 Dodge Charger NHTSA No.: CA0307
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 6/20/2011

TEST VEHICLE INFORMATION

Manufacturer	Chrysler Group LLC
Model	Charger
Body Style	Passenger Car
Major Options	None
NHTSA No.	CA0307
VIN	2B3CA4CT7AH303251
Color	Bright White
Delivery Date	6/13/11
Odometer Reading (mile)	860
Dealer	Allen Samuels
Transmission	Automatic
Final Drive	Rear Wheel Drive
Number of Cylinders	8
Engine Displacement (L)	5.7
Engine Placement	Longitudinal

DATA FROM VEHICLE'S CERTIFICATION LABEL

Manufactured By	Chrysler LLC
Date of Manufacture	09/10

GVWR (kg)	2495
GAWR Front (kg)	1293
GAWR Rear (kg)	1293

VEHICLE CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				576
Number of Occupants x 68 kg.				340
Cargo Wt. (RCLW) (kg)				236

DATA SHEET NO. 1 (continued)
TEST VEHICLE SPECIFICATIONS

Test Vehicle: 2010 Dodge Charger NHTSA No.: CA0307
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 6/20/2011

DATA FROM VEHICLE'S TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	242	242
Recommended Tire Size	P225/60R18	P225/60R18
Recommended Load Range	99V	99V
Tire Size on Vehicle	P225/60R18	P225/60R18
Tire Manufacturer	Continental	Continental
Location of Placard of Vehicle	Lower B-Pillar	
Type of Spare Tire (full size/space saver)	Full Size	

DATA SHEET NO. 2

PRE-TEST DATA

Test Vehicle: 2010 Dodge Charger NHTSA No.: CA0307
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 6/20/2011

WEIGHT OF TEST VEHICLE

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	492.2	431.4		553.8	561.1	
Right	kg	501.2	445.0		559.7	572.0	
Ratio	%	53.1	46.9		49.6	50.4	
Totals	kg	993.4	876.4	1869.8	1113.5	1133.1	2246.6

CALCULATION OF TARGET TEST WEIGHT (TTW)

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1869.8
Rated Cargo/Luggage Weight (RCLW)	kg	236
Weight of 2 P572E ATDs	kg	148
Calculated Vehicle Target Weight (TVTW)	kg	2253.8

Vehicle Wheelbase	3055 mm
Vehicle Width	1895 mm
Weight of Ballast Secured Rear Seat	274 kg
Method of Securing Ballast	Ratchet Straps
Vehicle Components Removed for Weight Reduction	None

VEHICLE ATTITUDES

	Units	LF	RF	LR	RR
As Delivered	mm	800	797	802	804
As Tested	mm	778	772	770	771

DATA SHEET NO. 2 (continued)

PRE-TEST DATA

Test Vehicle: 2010 Dodge Charger NHTSA No.: CA0307
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 6/20/2011

FUEL SYSTEM DATA

	Units: Liters
Usable Capacity of "Standard Tank" (Owner's Manual)	71.9
Usable Capacity Figure Furnished by COTR	71.9
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	66.2 to 67.6
Actual Test Volume (entire fuel system filled)	66.9

Test Fluid Type	Stoddard Solvent
Test Fluid Kinematic Viscosity (centistokes)	2.1 cSt @ 20° C
Test Fluid Color	Purple
Type of Vehicle Fuel Pump	Electrical
Activate Electric Fuel Pump Operation with Ignition Switch ON, but Engine OFF	Yes

Comments (noticeable attributes of fuel system components, capacity, etc.)	None
--	------

DATA SHEET NO. 3
MOVING BARRIER DATA

Test Vehicle: 2010 Dodge Charger NHTSA No.: CA0307
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 6/20/2011

MOVING BARRIER'S TEST WEIGHT

	Units	Front	Rear	Total
Left	kg	374.2	308.8	
Right	kg	389.5	291.2	
Ratio	%	56.0	44.0	
Totals	kg	763.7	600.0	1363.7

Tires (Mfr, line, size)	Kumho
Tire Pressure (kPa)	207
Brake Abort System (Yes/No)?	Yes
Date of Last Calibration	8/6/2008

DATA SHEET NO. 4

POST-TEST DATA

Test Vehicle: 2010 Dodge Charger NHTSA No.: CA0307
Test Program: FMVSS 301 Fuel System Integrity Test Date: 6/20/2011

IMPACT VELOCITY

	Units: km/h
Required Impact Velocity	80.0
Actual Impact Velocity (Trap No. 1)	80.0
Actual Impact Velocity (Trap No. 2)	80.0
Average Impact Speed	80.0

Temperature at Time of Impact (°C)	24
Test Time	9:36 am

WELDING ROD IMPACT POINT

	Units: mm
Vertical distance from target center (+ above target / - below target)	6 up
Horizontal distance from target center (+ to the right / - to the left)	15 right

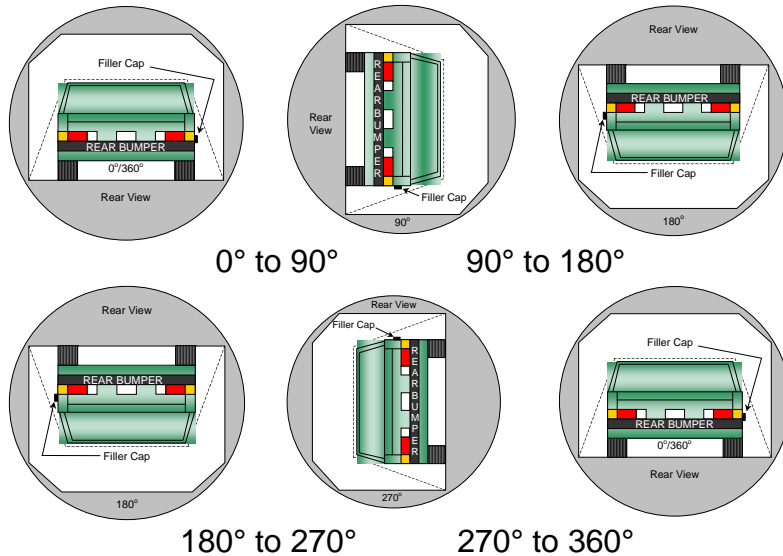
DATA SHEET NO. 5
STATIC ROLLOVER TEST DATA

Test Vehicle: 2010 Dodge Charger NHTSA No.: CA0307
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 6/20/2011

STODDARD SOLVENT SPILLAGE MEASUREMENT

- A. From impact until vehicle motion ceases: 0 g
 (Maximum Allowable = 28 grams)
- B. For the 5 minute period after motion ceases: 0 g
 (Maximum Allowable = 28 grams)
- C. For the following 25 minutes: 0 g
 (Maximum Allowable = 28 grams/minute)
- D. Spillage: None

FMVSS 301 STATIC ROLLOVER DATA



1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.

2. The position hold time at each position is 300 seconds (minimum).

3. Details of Stoddard Solvent spillage locations: **Not Applicable**

DATA SHEET NO. 5 (continued)
STATIC ROLLOVER TEST DATA

Test Vehicle: 2010 Dodge Charger NHTSA No.: CA0307
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 6/20/2011

STODDARD SOLVENT SPILLAGE MEASUREMENT
Hold Time = 5 minutes at all intervals

0° TO 90° Rotation Time (sec) = 122 sec

Test Phase	Spillage (g)	Spillage Details
First 5 minutes from onset of rotation	0	
Sixth minute from onset of rotation	0	
Seventh minute from onset of rotation	0	
Eight minute if required	N/A	

90° TO 180° Rotation Time (sec) = 116 sec

Test Phase	Spillage (g)	Spillage Details
First 5 minutes from onset of rotation	0	
Sixth minute from onset of rotation	0	
Seventh minute from onset of rotation	0	
Eight minute if required	N/A	

180° TO 270° Rotation Time (sec) = 110 sec

Test Phase	Spillage (g)	Spillage Details
First 5 minutes from onset of rotation	0	
Sixth minute from onset of rotation	0	
Seventh minute from onset of rotation	0	
Eight minute if required	N/A	

270° TO 360° Rotation Time (sec) = 119 sec

Test Phase	Spillage (g)	Spillage Details
First 5 minutes from onset of rotation	0	
Sixth minute from onset of rotation	0	
Seventh minute from onset of rotation	0	
Eight minute if required	N/A	

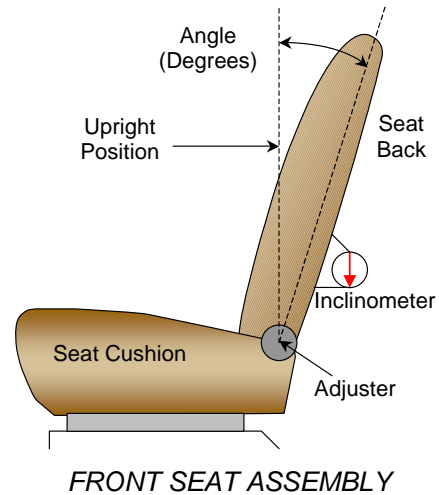
FORM 1
TEST VEHICLE INFORMATION

Test Vehicle: 2010 Dodge Charger
Test Program: FMVSS 301 Fuel System Integrity

NHTSA No.: CA0307
Test Date: 6/20/2011

NORMAL DESIGN RIDING POSITION

With the seat in the mid fore-aft seat track position the angle of the driver's seat back when it is in the nominal riding position is set on head rest post at 14 degrees.



Driver Seat Back Angle	14.3° at headrest post
Passenger Seat Back Angle	13.8° at headrest post

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	260 mm	130 mm
Passenger Seat	210 mm	105 mm

D-RING ADJUSTMENT

The driver and passenger D-rings were full up.

STEERING COLUMN ADJUSTMENT

The steering column was placed in the mid position.

APPENDIX A
PHOTOGRAPHS

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A-1.



MFD BY **CHRYSLER GROUP LLC**

DATE OF MFR: 9-10

GVWR: 02495 KG

GAWR: 01293 KG

GAWR: 01293 KG

05500 LB

FRONT: 02850 LB

REAR: 02850 LB



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

VIN: 2B3CA4CT7AH303251

TYPE: PASSENGER CAR

MDH: 092722 027AB

PAINT: PW7

TRIM: CBDU

VEHICLE MADE IN CANADA

4658843

Vehicle's Certification Label

A-2.



TIRE AND LOADING INFORMATION

SEATING CAPACITY – TOTAL 5 FRONT 2 REAR 3

THE COMBINED WEIGHT OF OCCUPANTS AND CARGO SHOULD NEVER EXCEED
576 KG OR 1270 LB

TIRE	FRONT	REAR	SPARE
ORIGINAL TIRE SIZE	P225/60R18	P225/60R18	P225/60R18
COLD TIRE INFLATION PRESSURE	242 kPa / 35 PSI	242 kPa / 35 PSI	242 kPa / 35 PSI

SEE OWNERS MANUAL FOR ADDITIONAL INFORMATION



AH303251

Vehicle's Tire Placard



A-3.

Pre-Test Front View of Vehicle

A-4.



Post-Test Front View of Vehicle

A-5.



Pre-Test Left Side View of Vehicle



Post-Test Left Side View of Vehicle



Pre-Test Left Rear Close-up View of Vehicle



A-8.

Post-Test Left Rear Close-up View of Vehicle

A-9.



Pre-Test Right Side View of Vehicle

A-10.



Post-Test Right Side View of Vehicle

A-11.



Pre-Test Right Rear Close-up View of Vehicle

A-12.



Post-Test Right Rear Close-up View of Vehicle



Pre-Test Rear View of Vehicle



A-14.

Post-Test Rear View of Vehicle

A-15.



Pre-Test ¾ Frontal View From Right Side of Vehicle

A-16.



Post-Test ¾ Frontal View From Right Side of Vehicle



Pre-Test ¾ Rear View From Right Side of Vehicle



Post-Test ¾ Rear View From Right Side of Vehicle

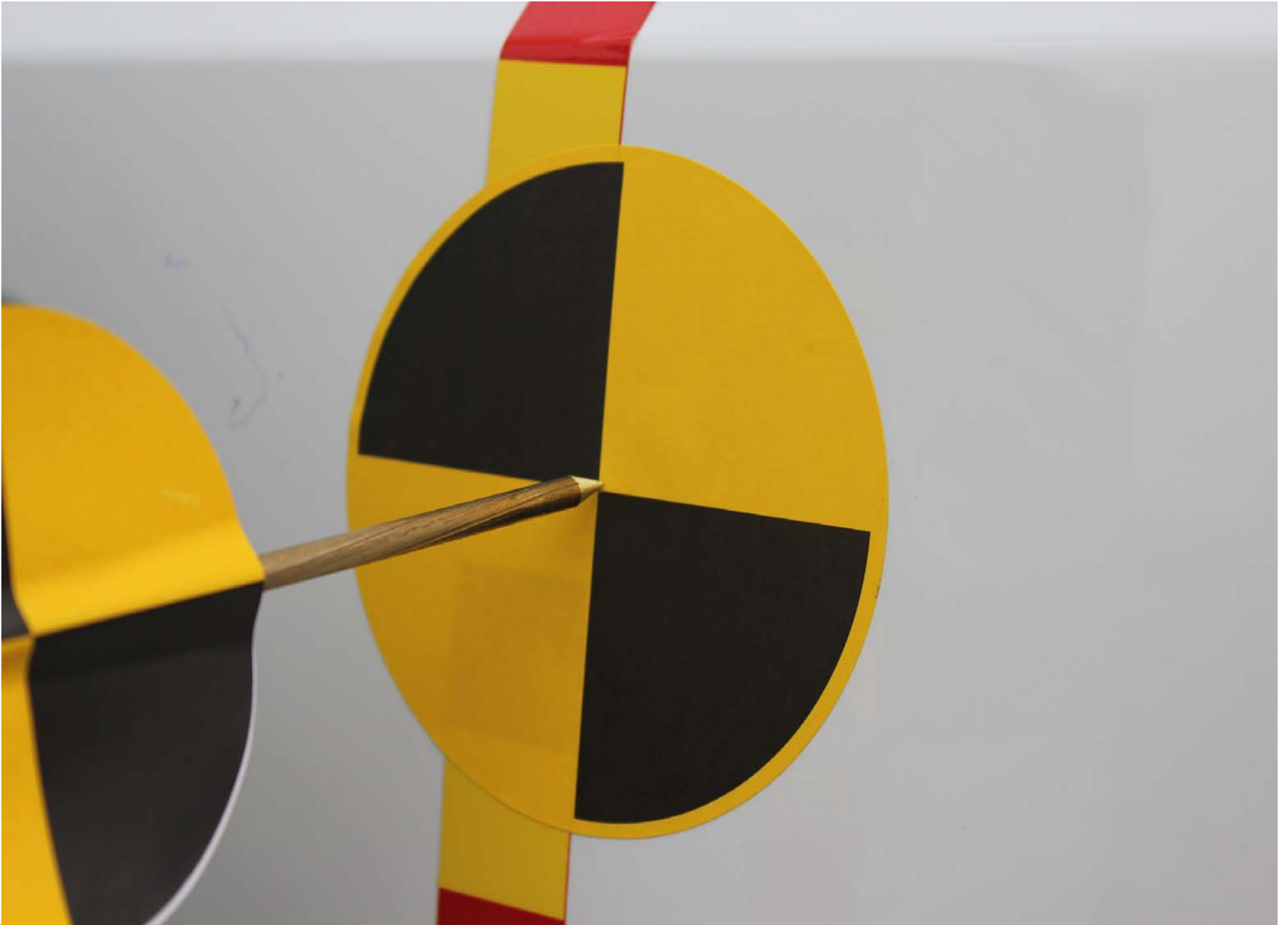


Pre-Test ¾ Rear View From Left Side of Vehicle



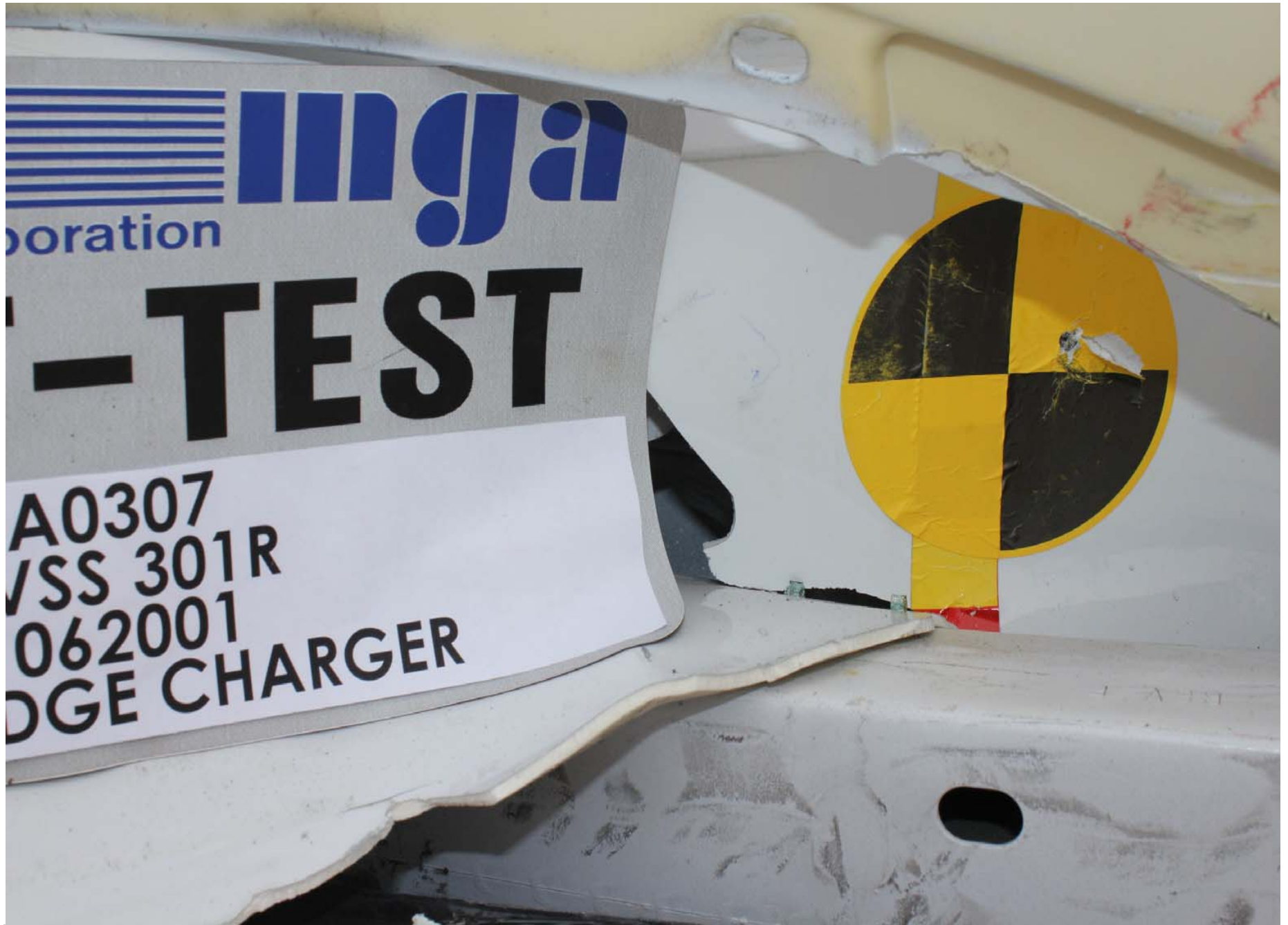
Post-Test ¾ Rear View From Left Side of Vehicle

A-21.

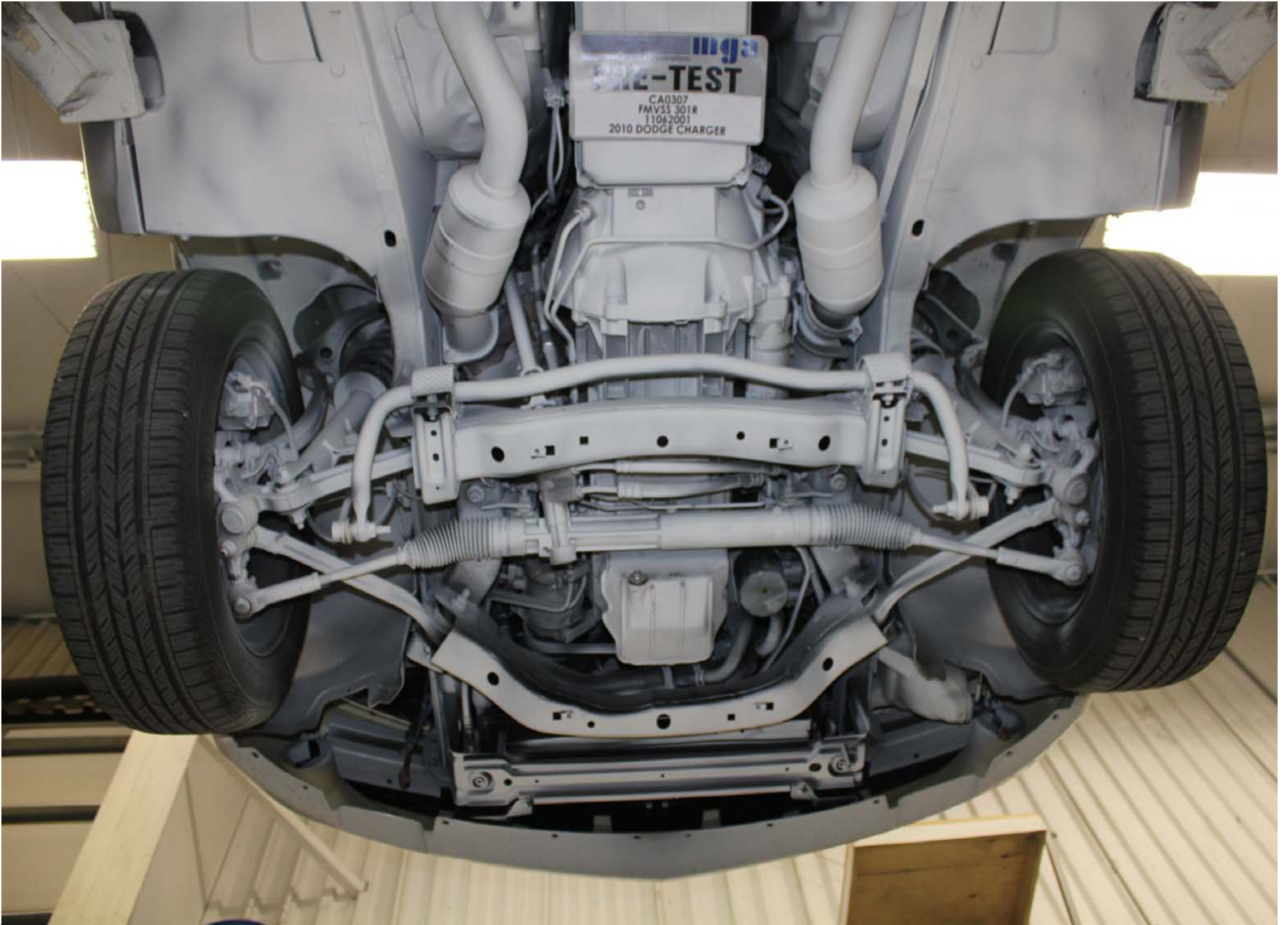


Pre-Test Impact Point

A-22.

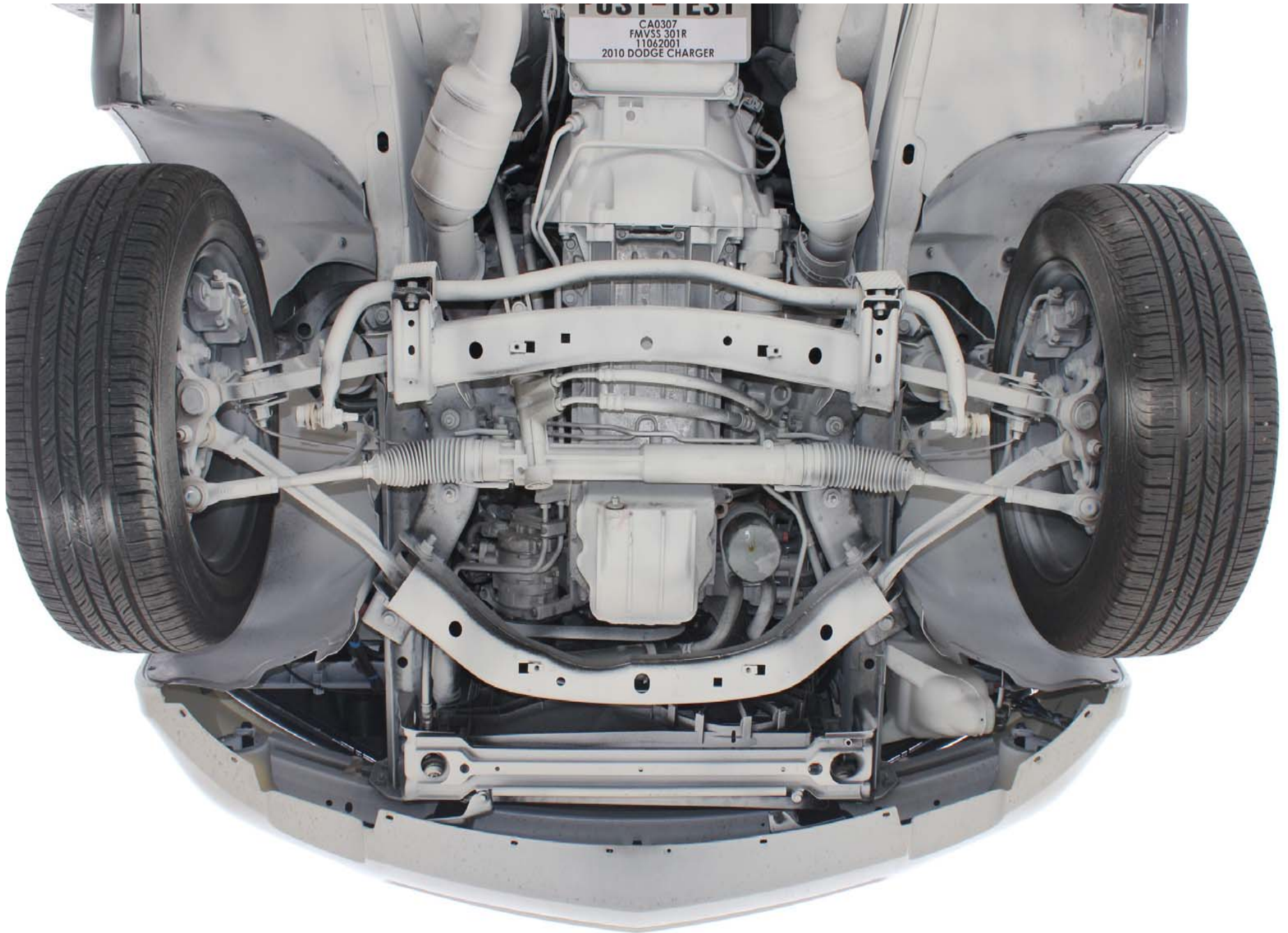


Post-Test Impact Point



A-23.

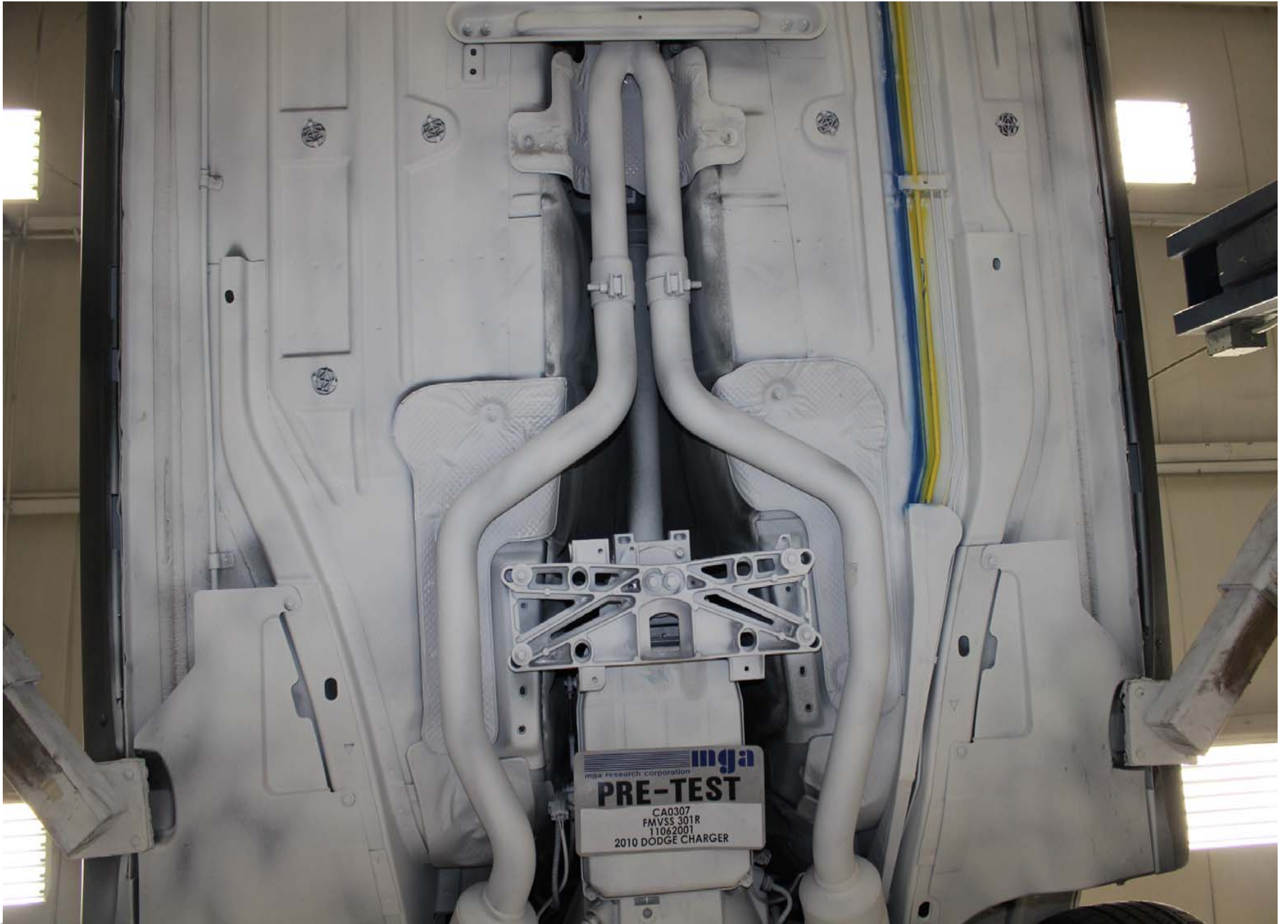
Pre-Test Underbody View 1



A-24.

Post-Test Underbody View 1

A-25.

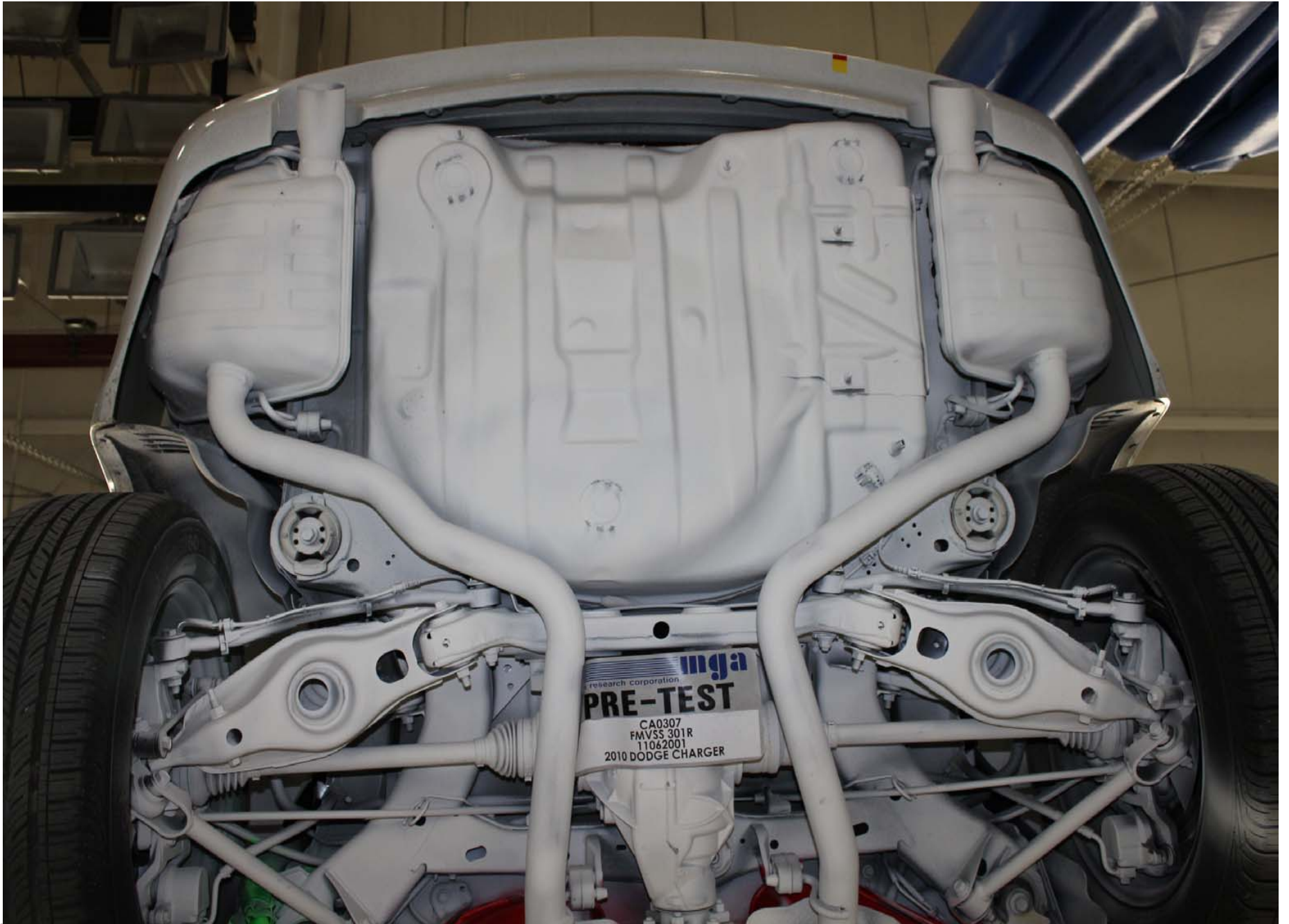


Pre-Test Underbody View 2



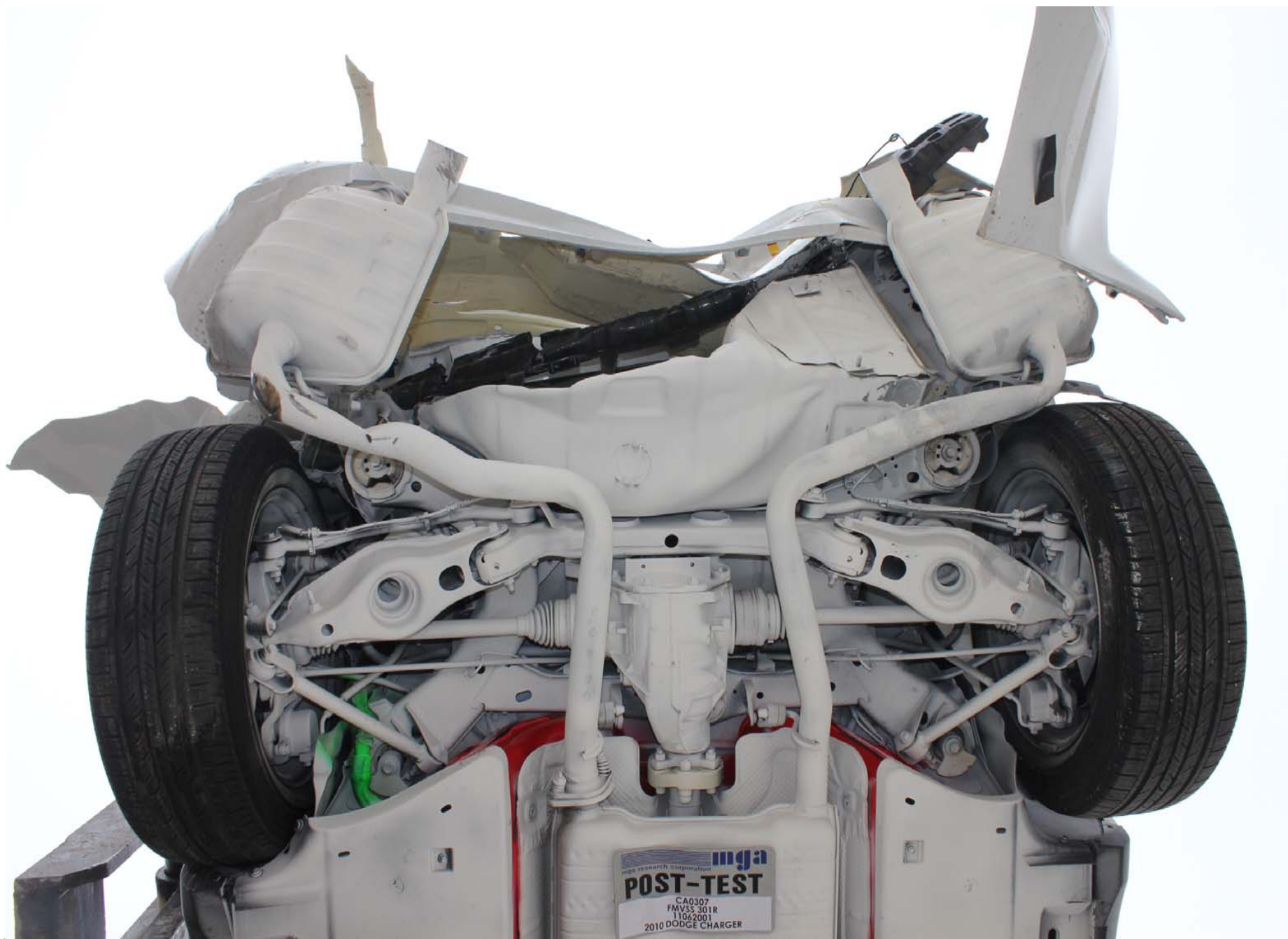
Post-Test Underbody View 2

A-27.



Pre-Test Underbody View 3

A-28.



Post-Test Underbody View 3

A-29.



Pre-Test Front View of MDB

A-30.



Post-Test Front View of MDB

A-31.



Pre-Test $\frac{3}{4}$ Right Side View of MDB

A-32.



Post-Test ¾ Right Side View of MDB

A-33.



Pre-Test ¾ Left Side View of MDB

A-34.



Post-Test $\frac{3}{4}$ Left Side View of MDB

A-35.



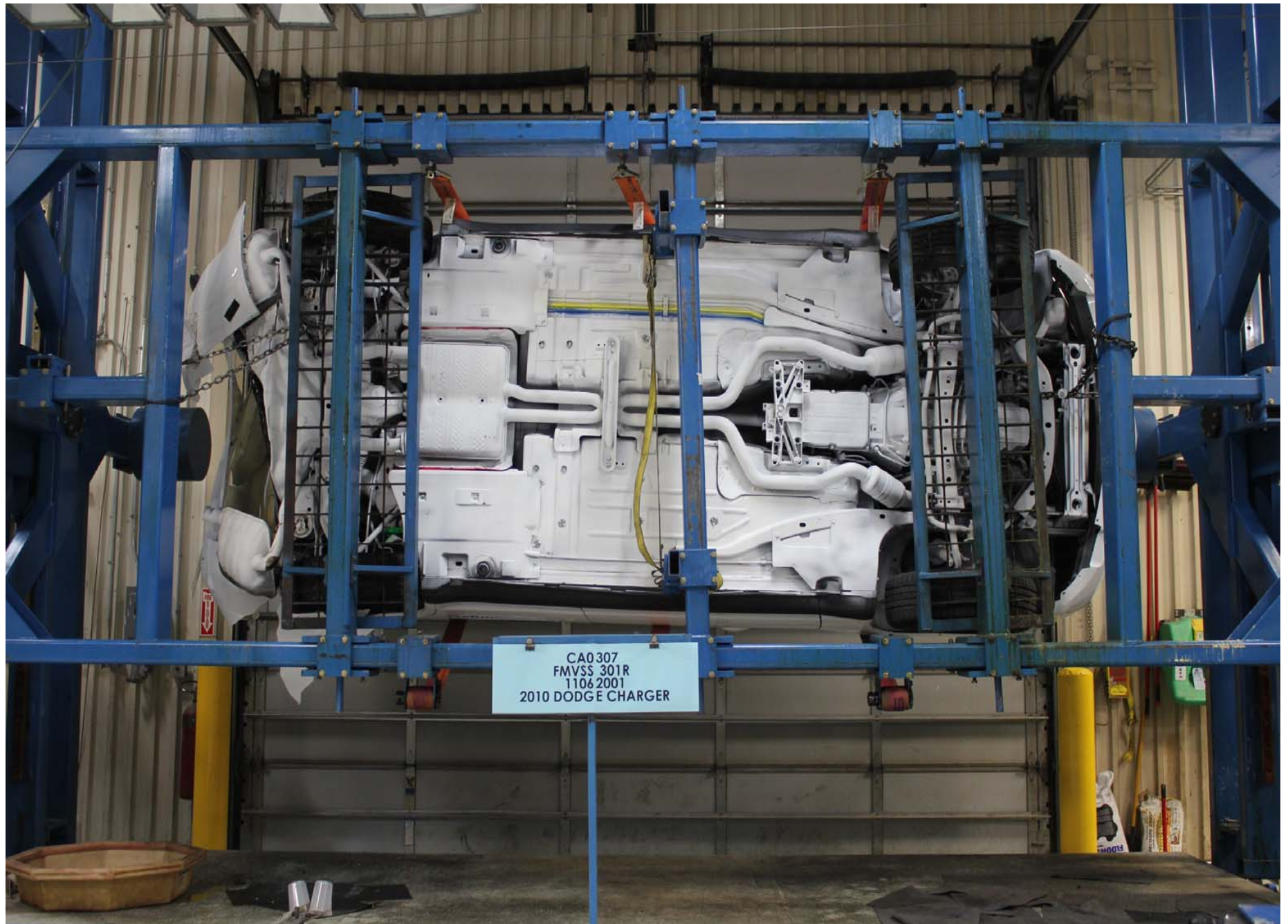
Pre-Test Top View of MDB

A-36.



Post-Test Top View of MDB

A-37.



Static Rollover at 90 Degrees

A-38.



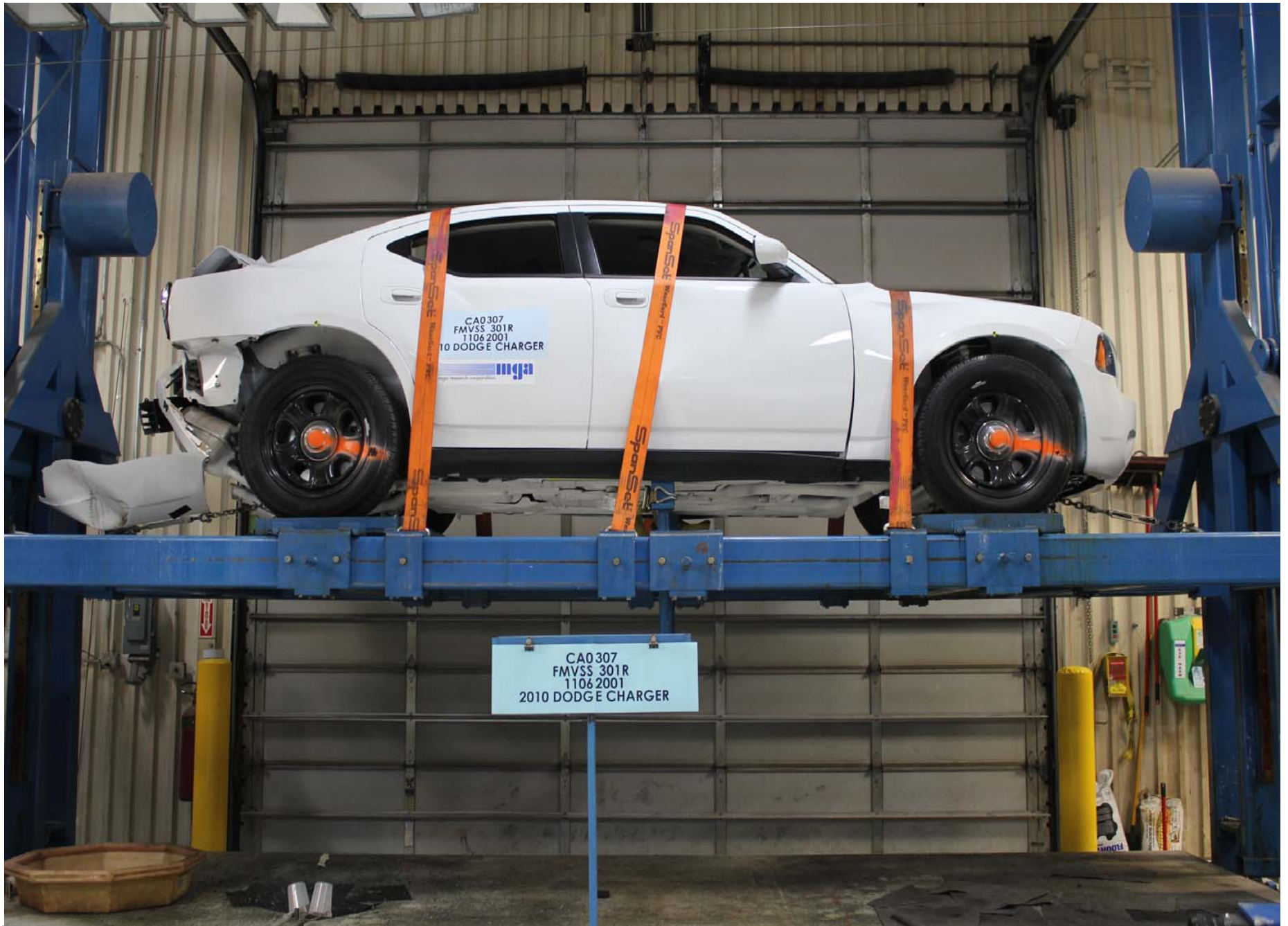
Static Rollover at 180 Degrees



A-39.

Static Rollover at 270 Degrees

A-40.



Static Rollover at 360 Degrees