

**REPORT NUMBER: 301-MGA-2009-010**

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

**GENERAL MOTORS CORPORATION  
2008 CHEVROLET EXPRESS 2500 WORK VAN  
NHTSA NUMBER: C80114**

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



**Test Date: July 8, 2009**

**Final Report Date: July 29, 2009**

**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**

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16. Abstract A rear impact was conducted on a 2008 Chevrolet Express 2500 Work Van at MGA Research Corporation on July 8, 2009. This test was conducted to obtain data indicant of FMVSS 301R. The impact velocity was 79.5 km/h. The ambient temperature at the time of impact was 18.3 degrees Celsius.					
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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 2008 Chevrolet Express 2500 Work Van was impacted by a Moving Deformable Barrier (MDB) at a velocity of 79.5 km/h. The test was performed at MGA Research Corporation on July 8, 2009. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

- Left Rear Half 1000 fps
- Right Rear Half 1000 fps
- Overhead Overall 1000 fps
- Left Overall 1000 fps
- Real Time Pan 24 fps

Two ballast Part 572E, 50<sup>th</sup> 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: 2008 Chevrolet Express 2500 Work Van      NHTSA No.: C80114  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 7/8/2009

**TEST VEHICLE INFORMATION**

Manufacturer	General Motors Corporation
Model	Chevrolet
Body Style	Truck
Major Options	None
NHTSA No.	C80114
VIN	1GCGG25C781117413
Color	Summit White
Delivery Date	3/23/2009
Odometer Reading (mile)	644
Dealer	The Bobb Chevrolet Company
Transmission	Automatic
Final Drive	Rear Wheel Drive
Number of Cylinders	8
Engine Displacement (L)	4.8
Engine Placement	Longitudinal

**DATA FROM VEHICLE'S CERTIFICATION LABEL**

Manufactured By	General Motors Corporation
Date of Manufacture	08/07

GVWR (kg)	3901
GAWR Front (kg)	1860
GAWR Rear (kg)	2431

**VEHICLE CAPACITY DATA**

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket			
Number of Occupants	2			2
Capacity Wt. (VCW) (kg)				1420
Number of Occupants x 68 kg.				136
Cargo Wt. (RCLW) (kg)				1284

**DATA SHEET NO. 1 (continued)**  
**TEST VEHICLE SPECIFICATIONS**

Test Vehicle: 2008 Chevrolet Express 2500 Work Van      NHTSA No.: C80114  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 7/8/2009

**DATA FROM VEHICLE'S TIRE PLACARD**

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	550	550
Cold Pressure (kPa)	340	550
Recommended Tire Size	LT245/75R16	LT245/75R16
Recommended Load Range	116S	116S
Tire Size on Vehicle	LT 245/75R16	LT 245/75R16
Tire Manufacturer	Bridgestone	Bridgestone
Location of Placard of Vehicle	Lower B-Post	
Type of Spare Tire (full size/space saver)	Full Size	

**DATA SHEET NO. 2**

**PRE-TEST DATA**

Test Vehicle: 2008 Chevrolet Express 2500 Work Van      NHTSA No.: C80114  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 7/8/2009

**WEIGHT OF TEST VEHICLE**

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	694.9	538.9		750.3	611.5	
Right	kg	692.6	540.7		777.0	605.6	
Ratio	%	56.2	43.8		55.7	44.3	
Totals	kg	1387.5	1079.6	2467.1	1527.3	1217.1	2744.4

**CALCULATION OF TARGET TEST WEIGHT (TTW)**

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2467.1
Rated Cargo/Luggage Weight (RCLW)	kg	136
Weight of 2 P572E ATDs	kg	148
Calculated Vehicle Target Weight (TVTW)	kg	2751.1

Vehicle Wheelbase	3440 mm
Vehicle Width	2012 mm
Weight of Ballast Secured in Centerline in Front of Rear Axle	129.3 kg
Method of Securing Ballast	Bolts
Vehicle Components Removed for Weight Reduction	None

**VEHICLE ATTITUDES**

	Units	LF	RF	LR	RR
As Delivered	mm	886	887	956	970
As Tested	mm	875	875	953	955

**DATA SHEET NO. 2 (continued)**

**PRE-TEST DATA**

Test Vehicle: 2008 Chevrolet Express 2500 Work Van      NHTSA No.: C80114  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 7/8/2009

**FUEL SYSTEM DATA**

	Units: Liters
Usable Capacity of "Standard Tank" (Owner's Manual)	118
Usable Capacity Figure Furnished by COTR	118
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	108.5 to 111.0
Actual Test Volume (entire fuel system filled)	109.8

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: 2008 Chevrolet Express 2500 Work Van      NHTSA No.: C80114  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 7/8/2009

**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)	Yokohama
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: 2008 Chevrolet Express 2500 Work Van

NHTSA No.: C80114

Test Program: FMVSS 301 Fuel System Integrity

Test Date: 7/8/2009

**IMPACT VELOCITY**

	Units: km/h
Required Impact Velocity	80.0
Actual Impact Velocity (Trap No. 1)	79.5
Actual Impact Velocity (Trap No. 2)	79.5
Average Impact Speed	79.5

Temperature at Time of Impact (°C)	18.3
Test Time	2:39 pm

**WELDING ROD IMPACT POINT**

	Units: mm
Vertical distance from target center (+ above target / - below target)	5 mm down
Horizontal distance from target center (+ to the right / - to the left)	12 mm right

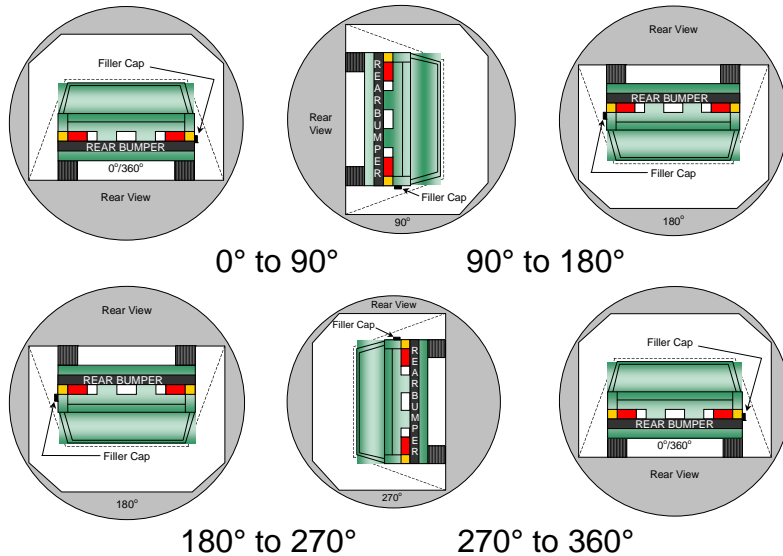
**DATA SHEET NO. 5**  
**STATIC ROLLOVER TEST DATA**

Test Vehicle: 2008 Chevrolet Express 2500 Work Van      NHTSA No.: C80114  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 7/8/2009

**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: 2008 Chevrolet Express 2500 Work Van      NHTSA No.: C80114  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 7/8/2009

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

**0° TO 90° Rotation Time (sec) = 161 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) = 155 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) = 136 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) = 148 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**

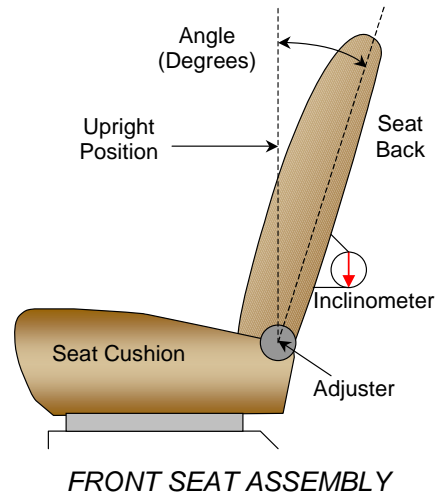
Test Vehicle: 2008 Chevrolet Express 2500 Work Van  
Test Program: FMVSS 301 Fuel System Integrity

NHTSA No.: C80114  
Test Date: 7/8/2009

**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 at 20 degrees, front passenger is set at 20 degrees.

Driver Seat Back Angle	20°
Passenger Seat Back Angle	20°



**SEAT FORE/AFT POSITIONING**

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	220 mm	110 mm
Passenger Seat	220 mm	110 mm

**D-RING ADJUSTMENT**

The driver and passenger D-rings were placed in the 2<sup>nd</sup> position top as 0.

**STEERING COLUMN ADJUSTMENT**

The steering column was placed in the mid position.

**APPENDIX A**  
**PHOTOGRAPHS**

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A-1.

**GM** MFD BY GENERAL MOTORS CORP. 08/07


GVWR	GAWR FRT	GAWR RR
3901KG(8600LB)	1860KG(4100LB)	2431KG(5360LB)

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

**1GCGG25C781117413** TYPE: TRUCK

MODEL: G23405

GBCM	TIRE SIZE	RIM	COLD TIRE PRESSURE
FRT	LT245/75R16E	16X6.5J	340KPA(50PSI)
RR	LT245/75R16E	16X6.5J	550KPA(80PSI)
SPA	LT245/75R16E	16X6.5J	550KPA(80PSI)

SEE OWNER'S MANUAL  FOR MORE INFORMATION.

Vehicle's Certification Label



# TIRE AND LOADING INFORMATION

SEATING CAPACITY | TOTAL 2 | FRONT 2 | REAR 0

The combined weight of occupants and cargo should never exceed 1420 kg or 3129 lbs.

TIRE	ORIGINAL SIZE	COLD TIRE PRESSURE	SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION
FRONT	LT245/75R16E	340 kPa, 50 PSI	
REAR	LT245/75R16E	550 kPa, 80 PSI	
SPARE	LT245/75R16E	550 kPa, 80 PSI	

1GCGG25C781117413

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

A-6.



Post-Test Left Side View of Vehicle

A-7.



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



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



Post-Test  $\frac{3}{4}$  Frontal View From Right Side of Vehicle

A-17.



Pre-Test ¾ Rear View From Right Side of Vehicle



Post-Test  $\frac{3}{4}$  Rear View From Right Side of Vehicle



Pre-Test  $\frac{3}{4}$  Rear View From Left Side of Vehicle



Post-Test ¾ Rear View From Left Side of Vehicle

A-21.

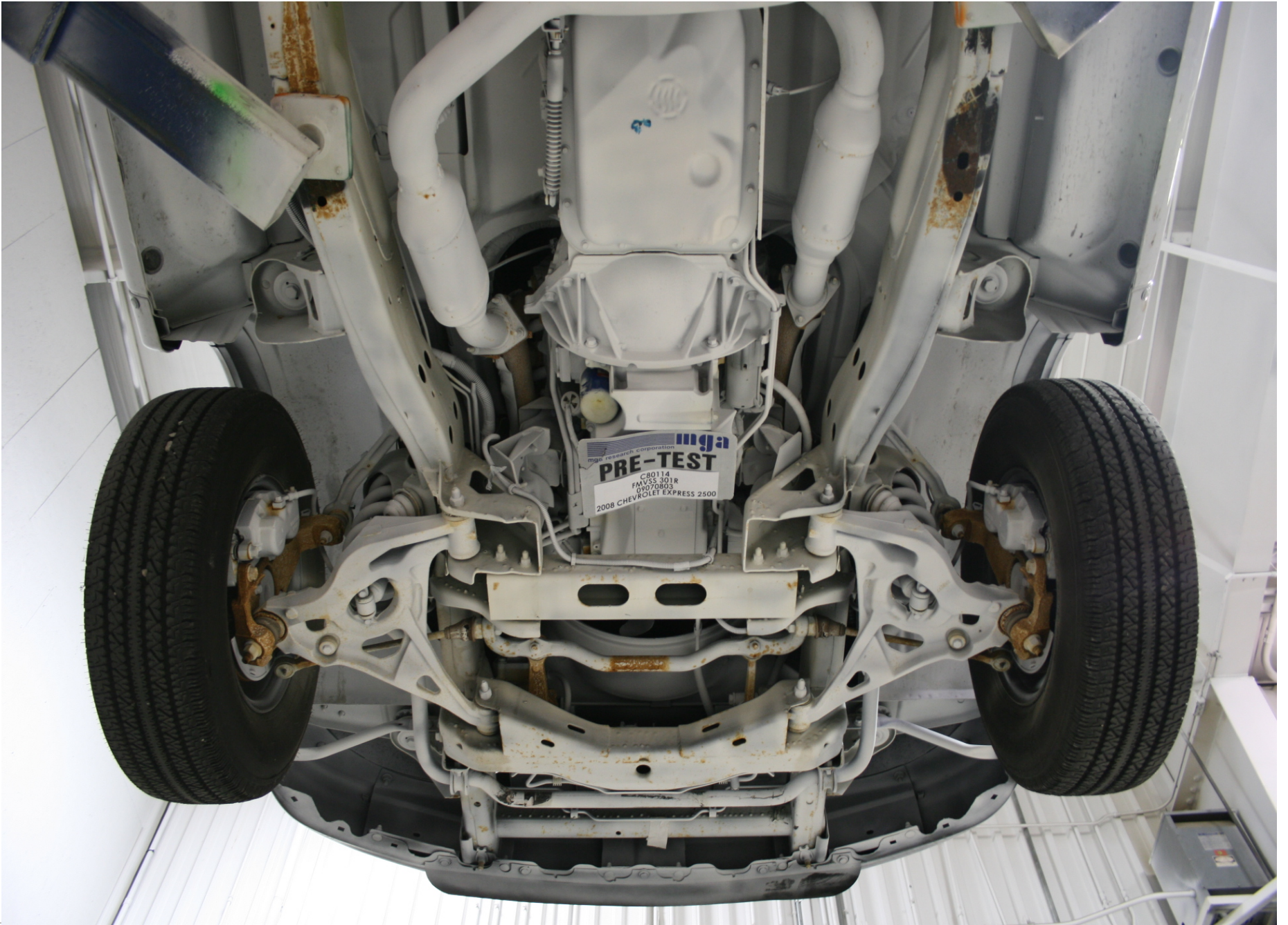


Pre-Test Impact Point



A-22.

Post-Test Impact Point



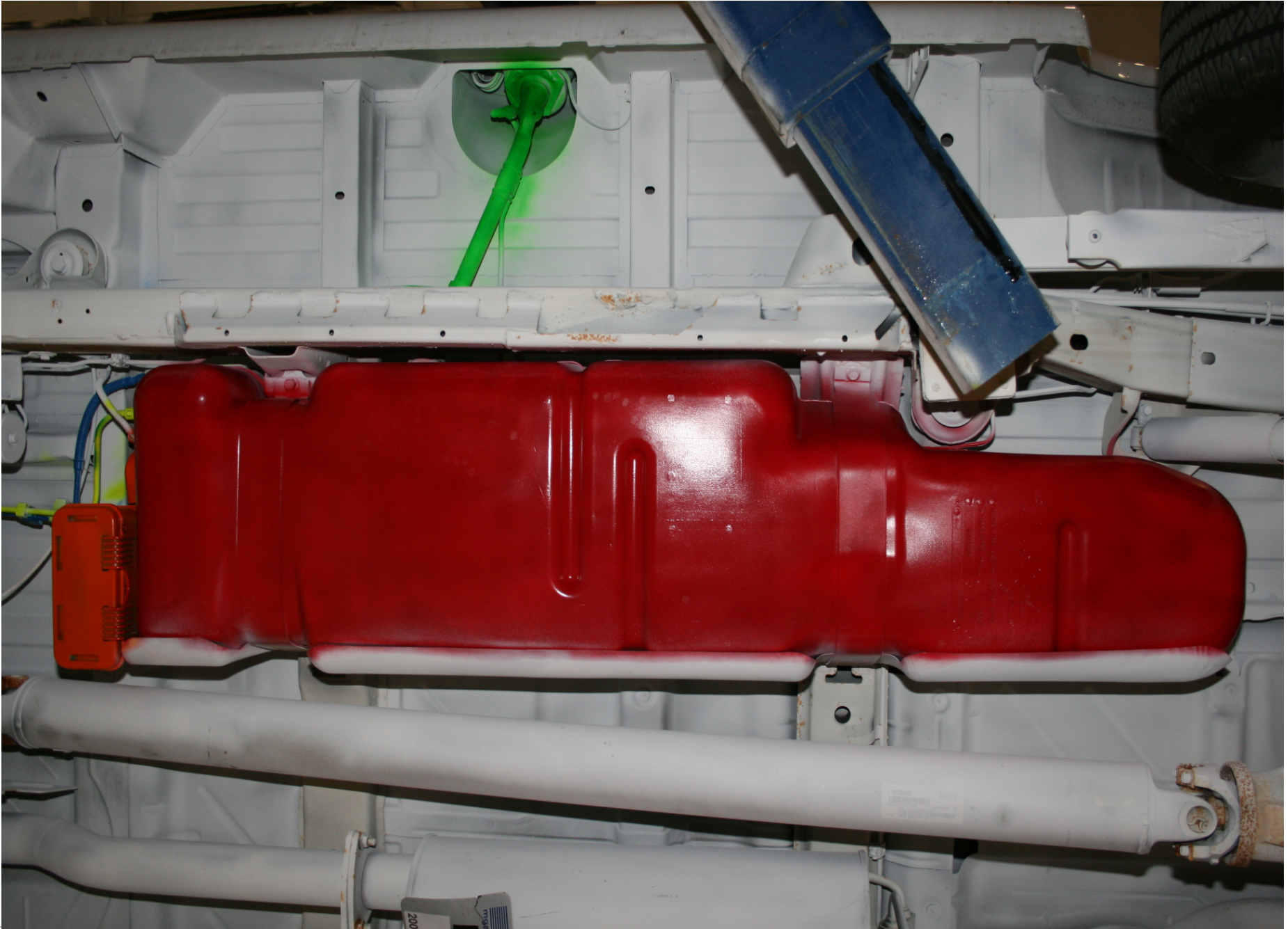
A-23.

Pre-Test Underbody View 1



A-24.

Post-Test Underbody View 1



A-25.

Pre-Test Underbody View 2

A-26.



Post-Test Underbody View 2



A-27.

Pre-Test Underbody View 3



A-28.

Post-Test Underbody View 3

A-29.



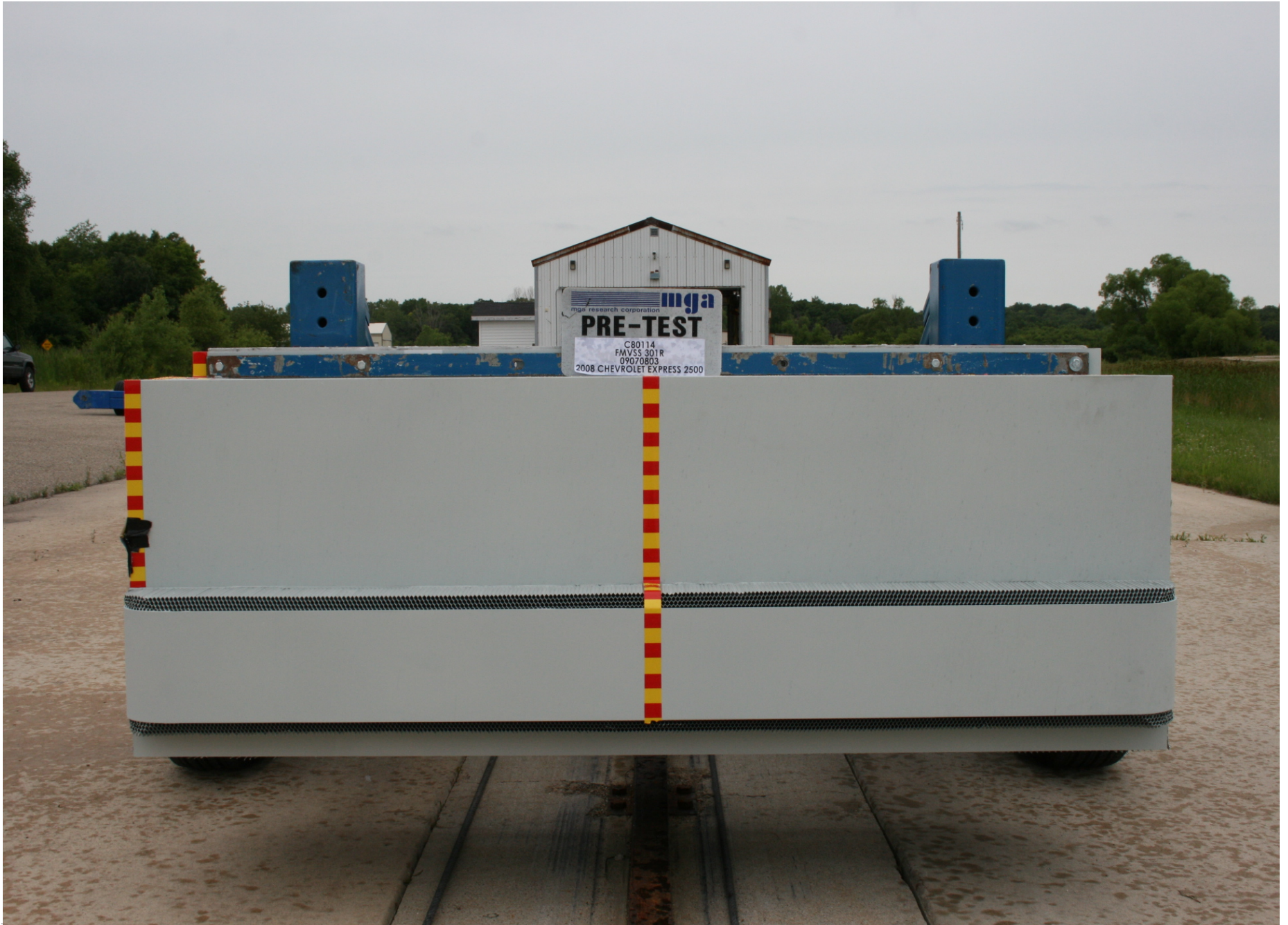
Pre-Test Underbody View 4



A-30.

Post-Test Underbody View 4

A-31.



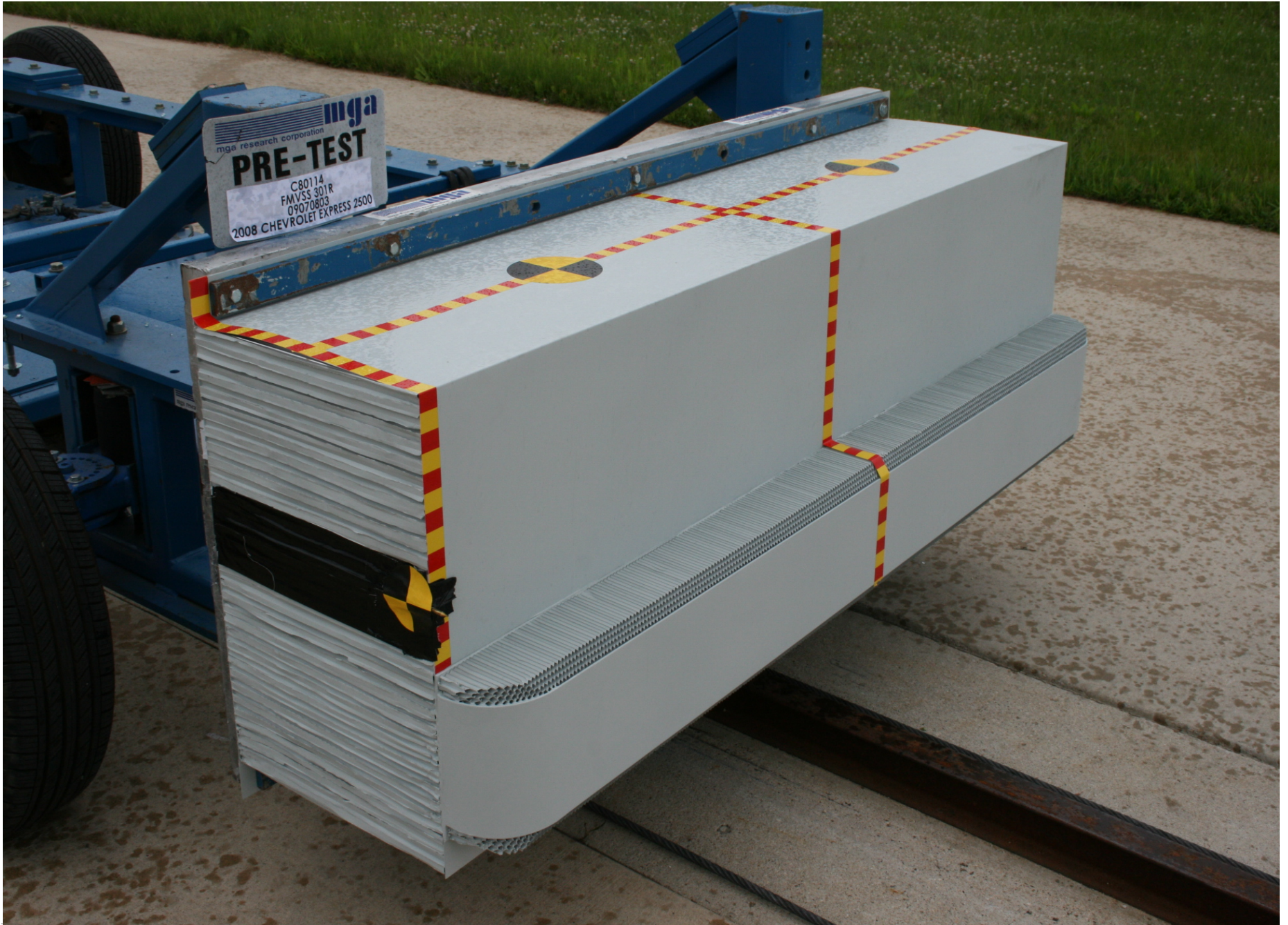
Pre-Test Front View of MDB

A-32.



Post-Test Front View of MDB

A-33.



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

A-34.



Post-Test ¾ Right Side View of MDB

A-35.



Pre-Test ¾ Left Side View of MDB



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

A-37.



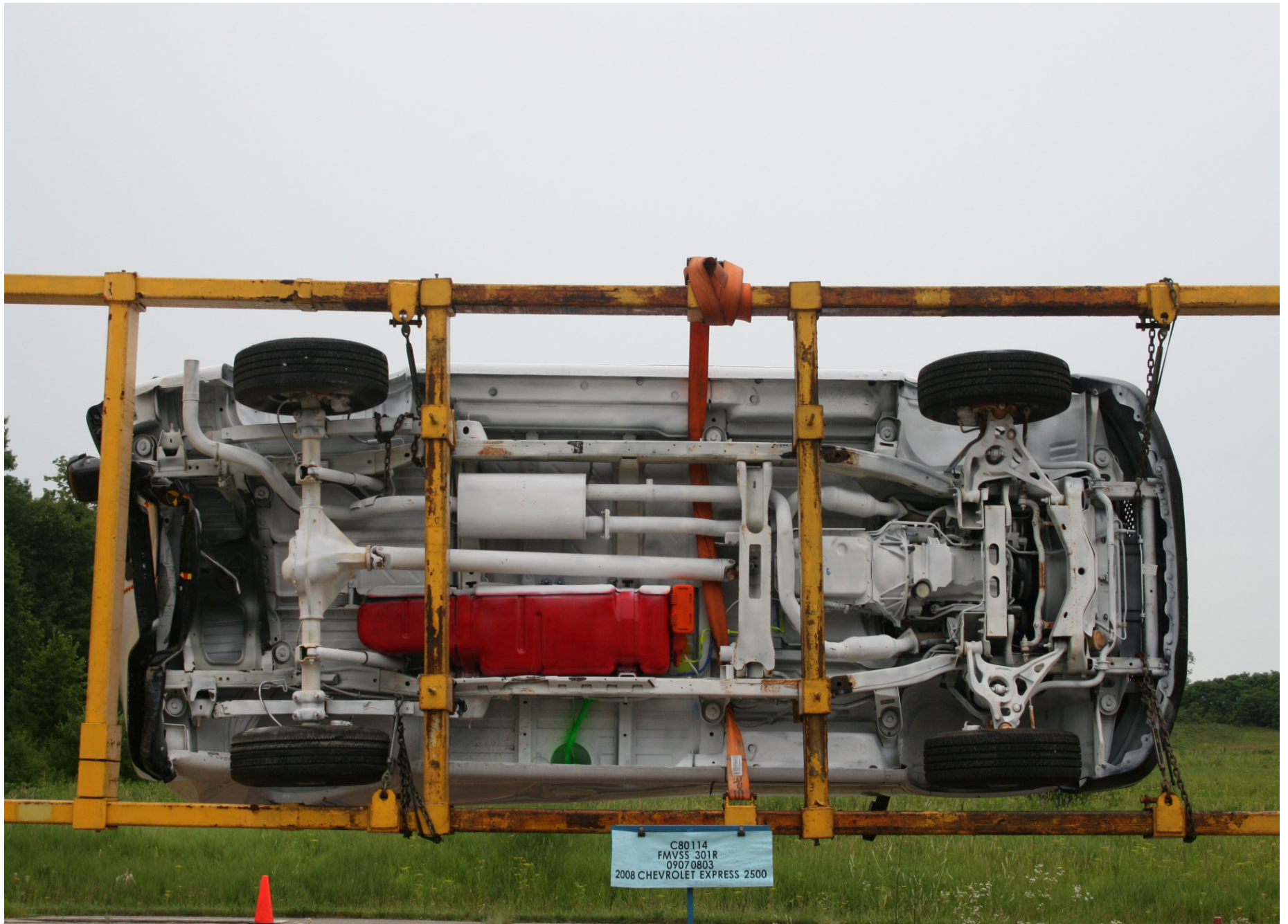
Pre-Test Top View of MDB

A-38.



Post-Test Top View of MDB

A-39.



Static Rollover at 90 Degrees

A-40.



Static Rollover at 180 Degrees

A-41.



Static Rollover at 270 Degrees

A-42.



Static Rollover at 360 Degrees