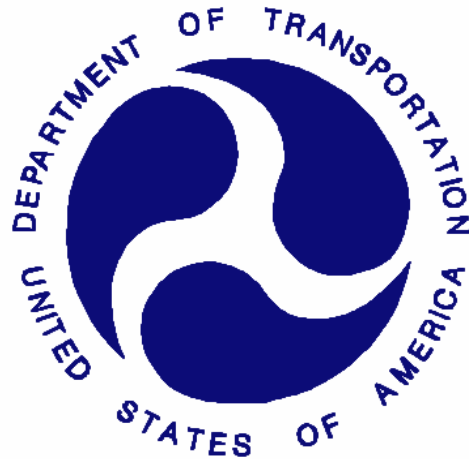


REPORT NUMBER: 301-MGA-2007-002

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

**NISSAN MOTOR CO., LTD.
2006 NISSAN PATHFINDER LE 4X2
NHTSA NUMBER: C65200**

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



Test Date: April 10, 2007

Final Report Date: May 8, 2007

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW, ROOM 6111
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-06-C-00030.

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Prepared by: Joe Fleck
Joe Fleck, Project Engineer

Date: 4/13/07

Reviewed by: David Winkelbauer
David Winkelbauer, Facility Director

Date: 4/13/07

FINAL REPORT ACCEPTED BY:

Edward Echan
COTR

5/8/07
Date of Acceptance

Technical Report Documentation Page

1. Report No. 301-MGA-2007-002		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Final Report for Fuel System Integrity Test of a 2006 Nissan Pathfinder LE 4x2 NHTSA No.: C65200				5. Report Date May 8, 2007	
				6. Performing Organization Code MGA	
7. Author(s) Joe Fleck, Project Engineer				8. Performing Organization Report No. 301-MGA-2007-002	
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 400 Seventh Street, SW, Room 6111 Washington, D.C. 20590				13. Type of Report and Period Covered Final Report 4/10/07 to 5/08/07	
				14. Sponsoring Agency Code NVS-220	
15. Supplementary Notes					
16. Abstract A rear impact was conducted on a 2006 Nissan Pathfinder LE 4x2 at MGA Research Corporation on April 10, 2007. This test was conducted to obtain data indicant of FMVSS 301R. The impact velocity was 79.2 km/h. The ambient temperature at the time of impact was 12 degrees Celsius.					
17. Key Words Fuel System Integrity Test 2006 Nissan Pathfinder LE 4x2 NHTSA No: C65200				18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin., Technical Ref. Division, Room 5108 (NPO-230) 400 Seventh Street, S.W. Washington, D.C. 20590	
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 50	22. Price

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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 2006 Nissan Pathfinder LE 4x2 was impacted by a Moving Deformable Barrier (MDB) at a velocity of 79.2 km/h. The test was performed at MGA Research Corporation on April 10, 2007. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and three high-speed cameras were used to document the impact event. In addition, real-time video was taken of the gas cap closing and static rollover.

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

Two ballast Part 572B, 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.

**SECTION 2
DATA SHEETS**

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

Test Vehicle: 2006 Nissan Pathfinder LE 4x2 NHTSA No.: C65200
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 4/10/2007

TEST VEHICLE INFORMATION

Manufacturer	Nissan
Model	Pathfinder
Body Style	LE
Major Options	Navigation Package
NHTSA No.	C65200
VIN	5N1AR18U06C655172
Color	Silver Lightnin
Delivery Date	1/8/2007
Odometer Reading (mile)	366
Dealer	Jim Bass Nissan, Inc.
Transmission	Automatic Overdrive
Final Drive	Rear
Number of Cylinders	6
Engine Displacement (L)	4.0
Engine Placement	Longitudinal

DATA FROM VEHICLE'S CERTIFICATION LABEL

Manufactured By	Nissan Motor Co., Ltd.
Date of Manufacture	04/06

GVWR (kg)	2631
GAWR Front (kg)	1259
GAWR Rear (kg)	1588

VEHICLE CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	Bench	
Number of Occupants	2	3	2	7
Capacity Wt. (VCW) (kg)				507
Number of Occupants x 68 kg.				476
Cargo Wt. (RCLW) (kg)				31

DATA SHEET NO. 1 (continued)
TEST VEHICLE SPECIFICATIONS

Test Vehicle: 2006 Nissan Pathfinder LE 4x2 NHTSA No.: C65200
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 4/10/2007

DATA FROM VEHICLE'S TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P265/65R17	P265/65R17
Recommended Load Range	110	110
Tire Size on Vehicle	P265/65R17	P265/65R17
Tire Manufacturer	General	General
Location of Placard of Vehicle	Driver Door, B-Post	
Type of Spare Tire (full size/space saver)	Full Size	

DATA SHEET NO. 2

PRE-TEST DATA

Test Vehicle: 2006 Nissan Pathfinder LE 4x2
 Test Program: FMVSS 301 Fuel System Integrity

NHTSA No.: C65200
 Test Date: 4/10/2007

WEIGHT OF TEST VEHICLE

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	507.6	537.9		543.0	590.6	
Right	kg	520.7	533.0		553.4	585.6	
Ratio	%	49.0	51.0		48.2	51.8	
Totals	kg	1028.3	1070.9	2099.2	1096.4	1176.2	2272.6

CALCULATION OF TARGET TEST WEIGHT (TTW)

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2099.2
Rated Cargo/Luggage Weight (RCLW)	kg	31
Weight of 2 P572B ATDs	kg	148
Calculated Vehicle Target Weight (TVTW)	kg	2278.2

Vehicle Wheelbase	2851 mm
Weight of Ballast secured in cargo area	29 kg
Method of Securing Ballast	On rearmost seat with ratchet straps
Vehicle Components Removed for Weight Reduction	None

VEHICLE ATTITUDES

	Units	LF	RF	LR	RR
As Delivered	mm	852	857	862	869
As Tested	mm	844	845	858	867

DATA SHEET NO. 2 (continued)

PRE-TEST DATA

Test Vehicle: 2006 Nissan Pathfinder LE 4x2 NHTSA No.: C65200
Test Program: FMVSS 301 Fuel System Integrity Test Date: 4/10/2007

FUEL SYSTEM DATA

	Units: Liters
Usable Capacity of "Standard Tank" (Owner's Manual)	80.0
Usable Capacity Figure Furnished by COTR	80.0
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	73.6 to 75.2
Actual Test Volume (entire fuel system filled)	74.6

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: 2006 Nissan Pathfinder LE 4x2 NHTSA No.: C65200
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 4/10/2007

MOVING BARRIER'S TEST WEIGHT

	Units	Front	Rear	Total
Left	kg	400.1	282.6	
Right	kg	370.2	311.0	
Ratio	%	56.5	43.5	
Totals	kg	770.3	593.6	1363.9

Tires (Mfr, line, size)	Yukohoma
Tire Pressure (kPa)	207
Brake Abort System (Yes/No)?	Yes
Date of Last Calibration	11/29/2006

DATA SHEET NO. 4

POST-TEST DATA

Test Vehicle: 2006 Nissan Pathfinder LE 4x2 NHTSA No.: C65200
Test Program: FMVSS 301 Fuel System Integrity Test Date: 4/10/2007

IMPACT VELOCITY

	Units: km/h
Required Impact Velocity	80.0
Actual Impact Velocity (Trap No. 1)	79.2
Actual Impact Velocity (Trap No. 2)	79.2
Average Impact Speed	79.2

Temperature at Time of Impact (°C)	12
Test Time	2:28 pm

WELDING ROD IMPACT POINT

	Units: mm
Vertical distance from target center (+ above target / - below target)	2 mm above
Horizontal distance from target center (+ to the right / - to the left)	18 mm to the right

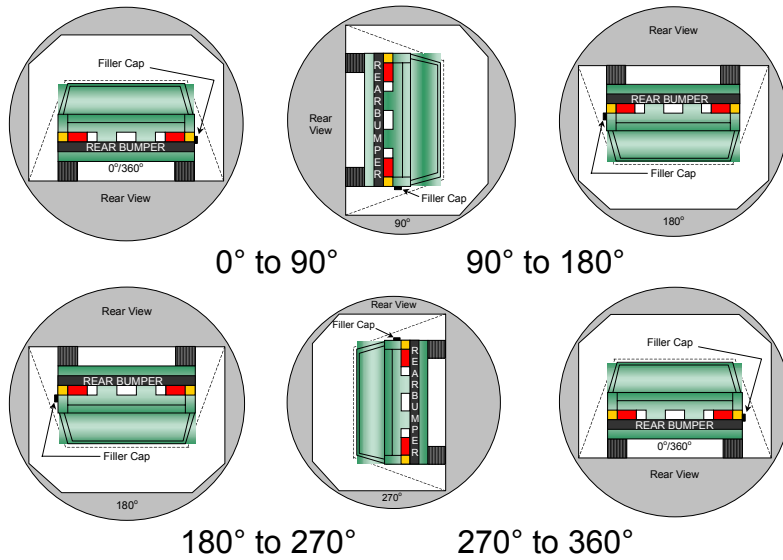
DATA SHEET NO. 5
STATIC ROLLOVER TEST DATA

Test Vehicle: 2006 Nissan Pathfinder LE 4x2 NHTSA No.: C65200
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 4/10/2007

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: 2006 Nissan Pathfinder LE 4x2 NHTSA No.: C65200
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 4/10/2007

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

0° TO 90° 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	

90° TO 180° Rotation Time (sec) = 118 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) = 117 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) = 118 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

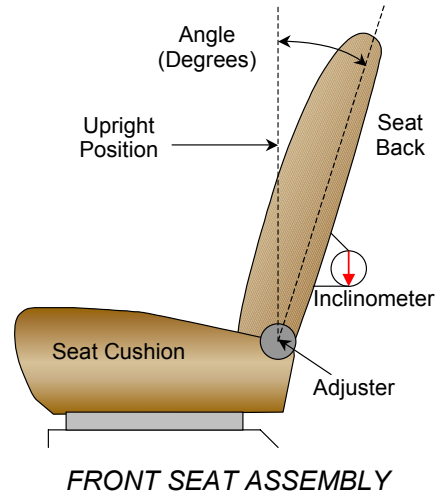
Test Vehicle: 2006 Nissan Pathfinder LE 4x2
Test Program: FMVSS 301 Fuel System Integrity

NHTSA No.: C65200
Test Date: 4/10/2007

NORMAL DESIGN RIDING POSITION

For both driver and passenger seat backs:
Use the door sill as the reference for measuring the seat back angle.

Driver Seat Back Angle	21°
Passenger Seat Back Angle	21°



SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	240 mm	120 mm
Passenger Seat	240 mm	120 mm

D-RING ADJUSTMENT

The driver and passenger D-rings were placed in the uppermost position.

STEERING COLUMN ADJUSTMENT

The steering column was placed in the mid position.

APPENDIX A
PHOTOGRAPHS

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MFD BY NISSAN MOTOR CO., LTD.

DATE 04/06

GVWR 5800 LB

GAWR FR. 2775 LB

WITH P265/65R17 TIRES

17X7.5 RIMS AT 35 PSI

COLD SINGLE

GAWR RR. 3500 LB

WITH P265/65R17 TIRES

17X7.5 RIMS AT 35 PSI

COLD SINGLE

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE. SEE OWNERS MANUAL FOR ADDITIONAL INFORMATION.

5N1AR18U06C655172

TYPE: MPV 321

MODEL: JCKULVN-EUA 0Z000

COLOR TRIM TRANS

K12 | K | RE5R05A

AXLE ENGINE

RC31 | VQ40DE 3954CC



A-1.

Vehicle's Certification Label

A-2.



TIRE AND LOADING INFORMATION PNEU ET INFORMATION DE CHARGEMENT

SEATING CAPACITY NOMBRE DE PLACES	TOTAL TOTAL	7	FRONT AVANT	2	REAR ARRIÈRE	5
--------------------------------------	----------------	---	----------------	---	-----------------	---

THE COMBINED WEIGHT OF OCCUPANTS AND CARGO SHOULD NEVER EXCEED 1118 lbs OR 507 kg
 LE POIDS COMBINÉ D'OCCUPANTS ET DE CARGAISON NE DEVRAIT JAMAIS EXCÉDER 1118 lbs OU 507 kg

TIRE PNEU	ORIGINAL TIRE SIZE TAILLE DU PNEU D'ORIGINE	COLD TIRE PRESSURE PRESSION DE GONFLAGE À FROIDS
FRONT AVANT	P265/65R17	240 kPa (35 psi)
REAR ARRIÈRE	P265/65R17	240 kPa (35 psi)
SPARE TIRE ROUE DE SECOURS	P265/65R17	240 kPa (35 psi)

**SEE OWNER'S MANUAL
FOR ADDITIONAL
INFORMATION.
POUR D'AUTRES
DÉTAILS, SE REPORTER
AU MANUEL DU
CONDUCTEUR.**

655172 321

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 Right Side View of Vehicle

A-8.



Post-Test Right Side View of Vehicle

A-9.



Pre-Test Rear View of Vehicle

A-10.



Post-Test Rear View of Vehicle

A-11.



Pre-Test ¾ Frontal View From Right Side of Vehicle

A-12.



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



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

A-14.



Post-Test ¾ Rear View From Left Side of Vehicle

A-15.

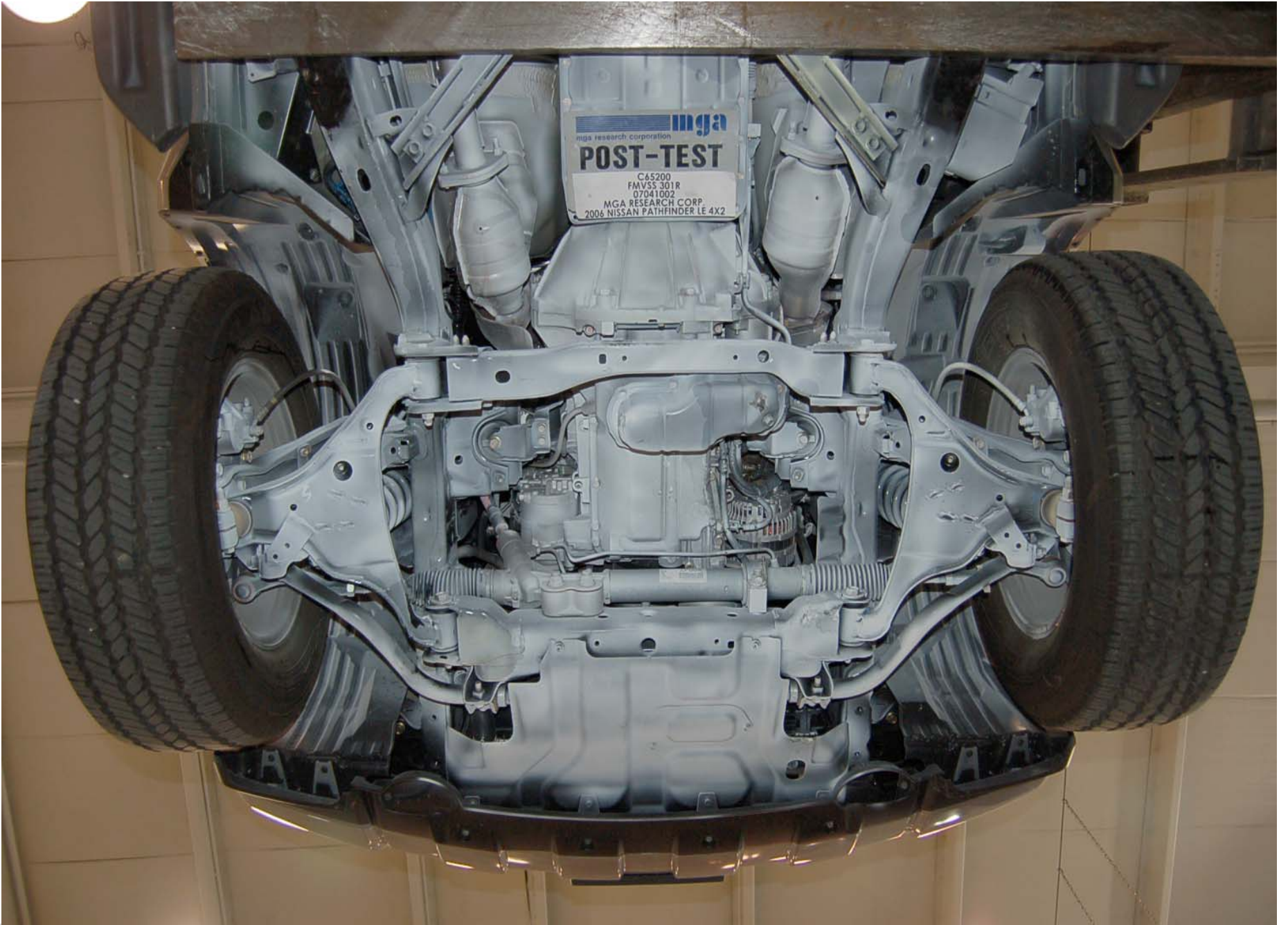


Post-Test Impact Point



A-16.

Pre-Test Underbody View 1



A-17.

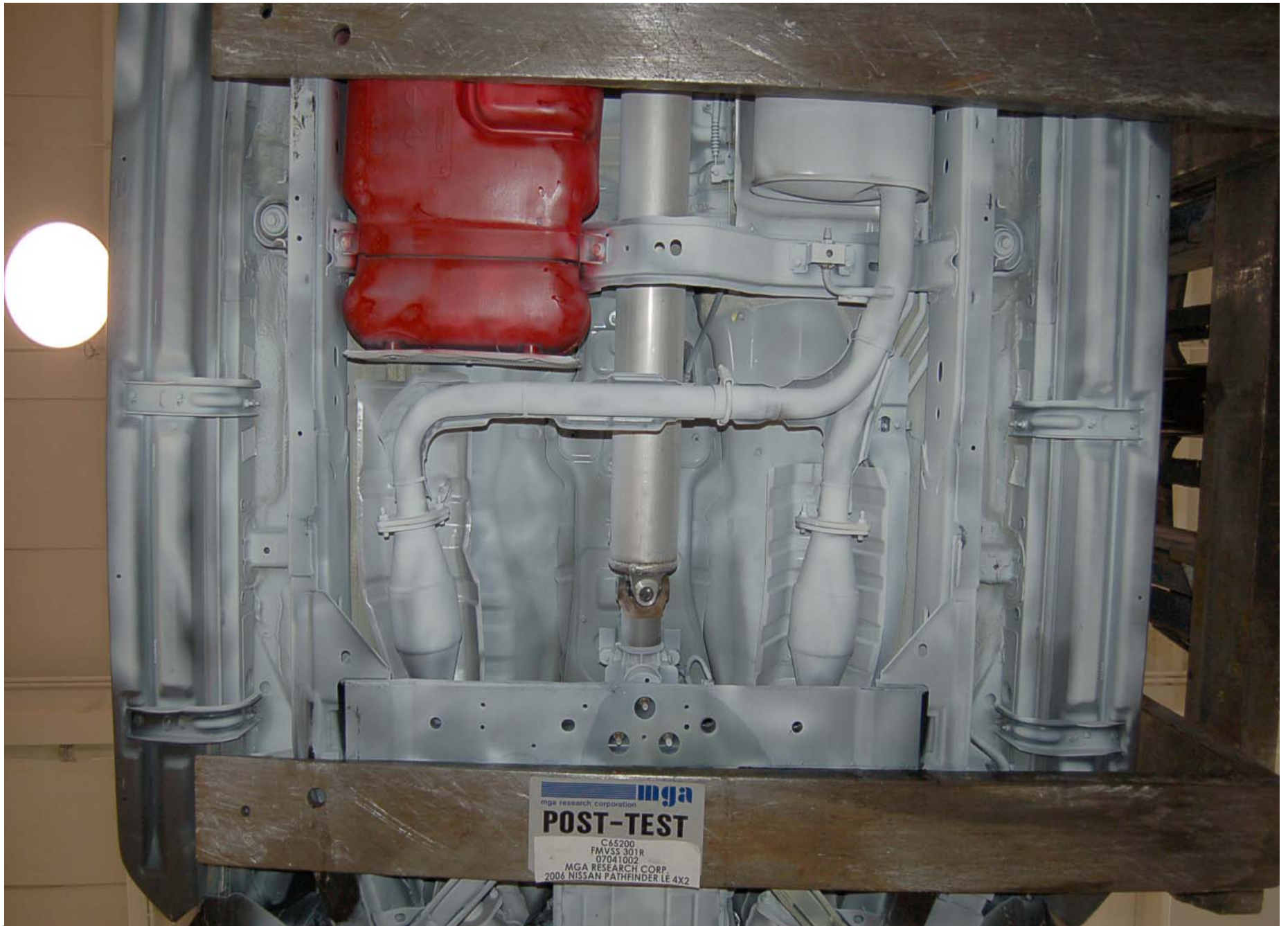
Post-Test Underbody View 1

A-18.



Pre-Test Underbody View 2

A-19.



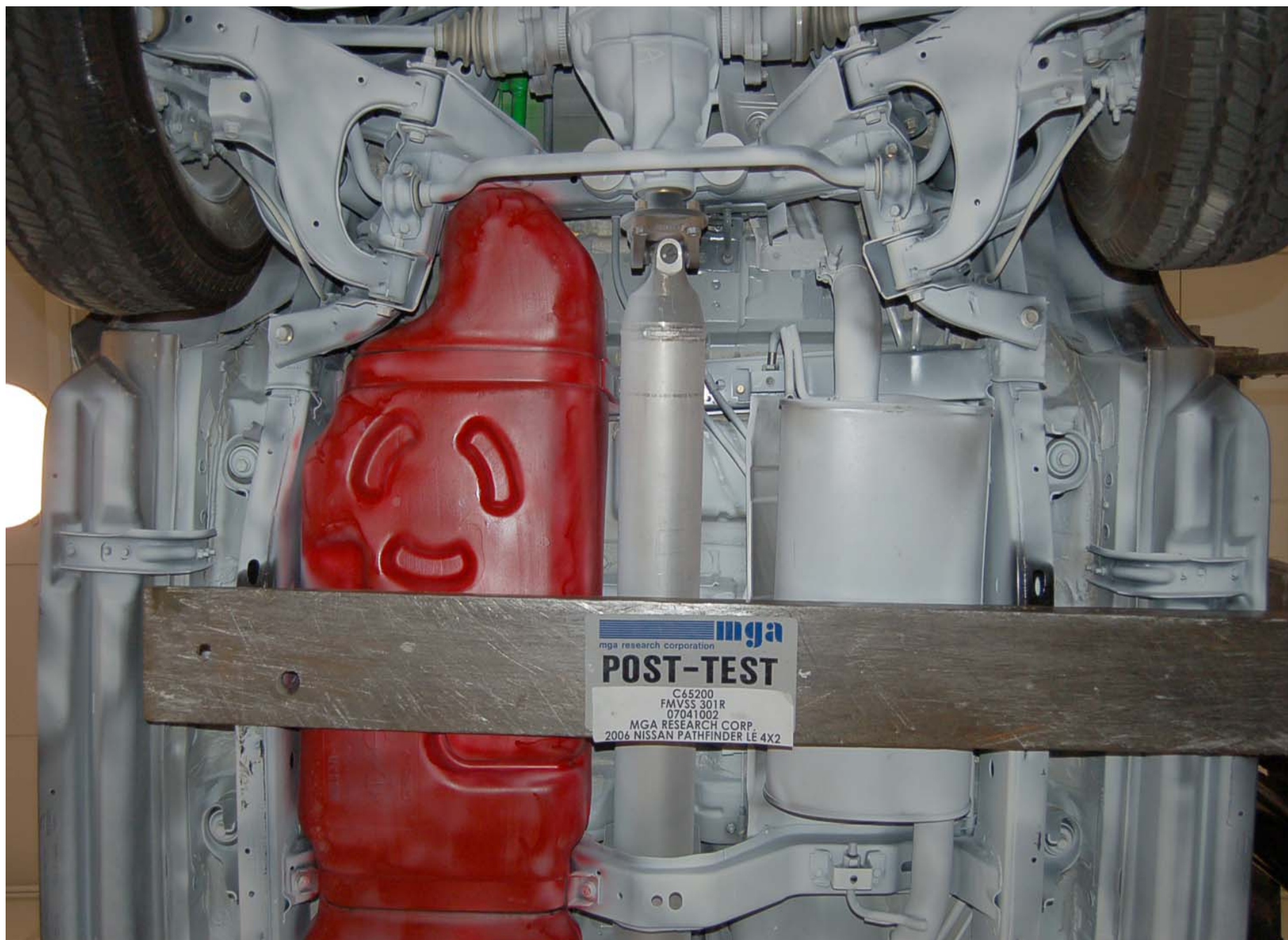
Post-Test Underbody View 2

A-20.

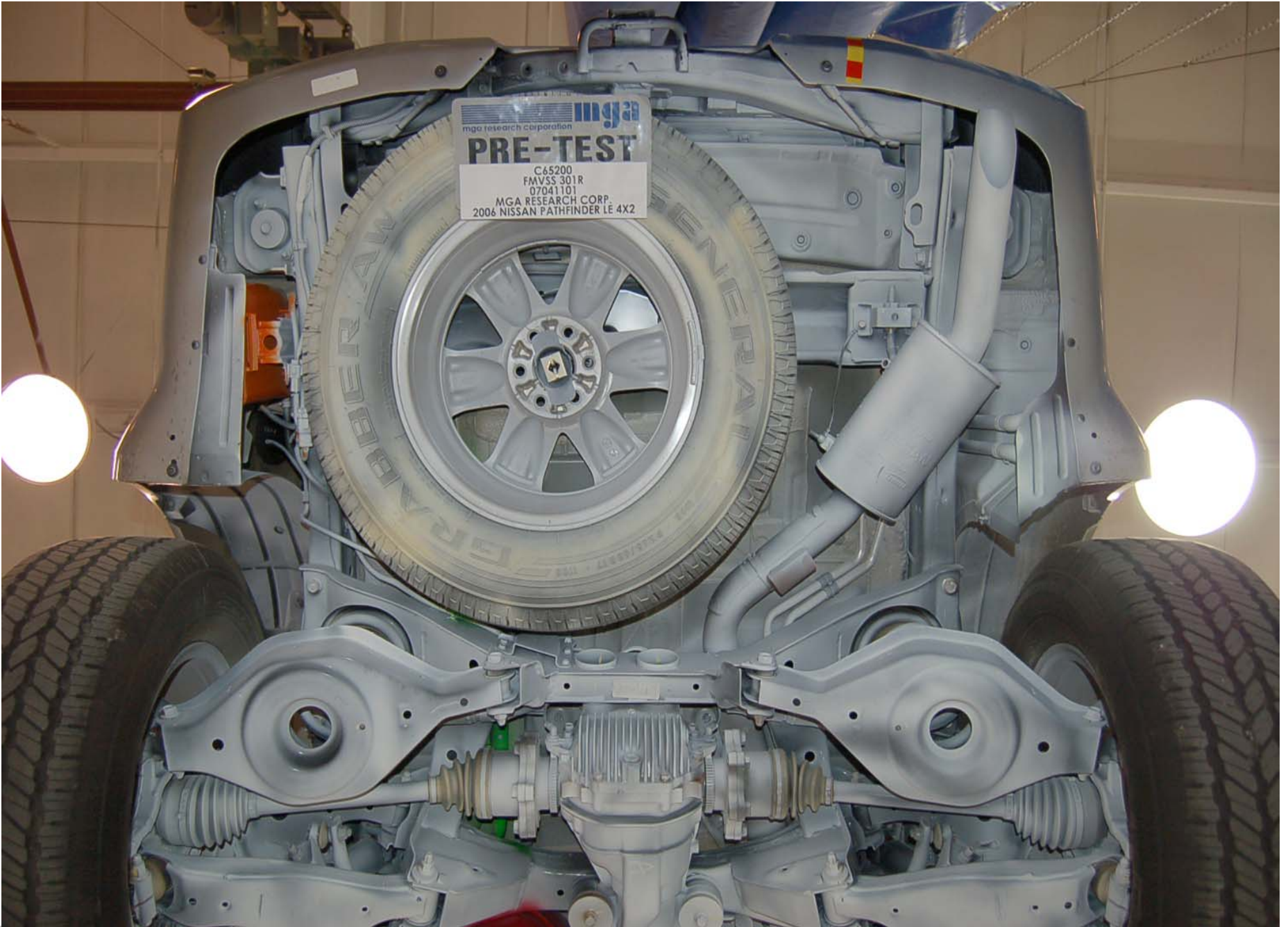


Pre-Test Underbody View 3

A-21.



Post-Test Underbody View 3



A-22.

Pre-Test Underbody View 4



Post-Test Underbody View 4



A-24.

Pre-Test Front View of MDB

A-25.



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

A-26.



Post-Test ¾ Right Side View of MDB



A-27.

Pre-Test 3/4 Left Side View of MDB



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



Post-Test Top View of MDB

A-30.



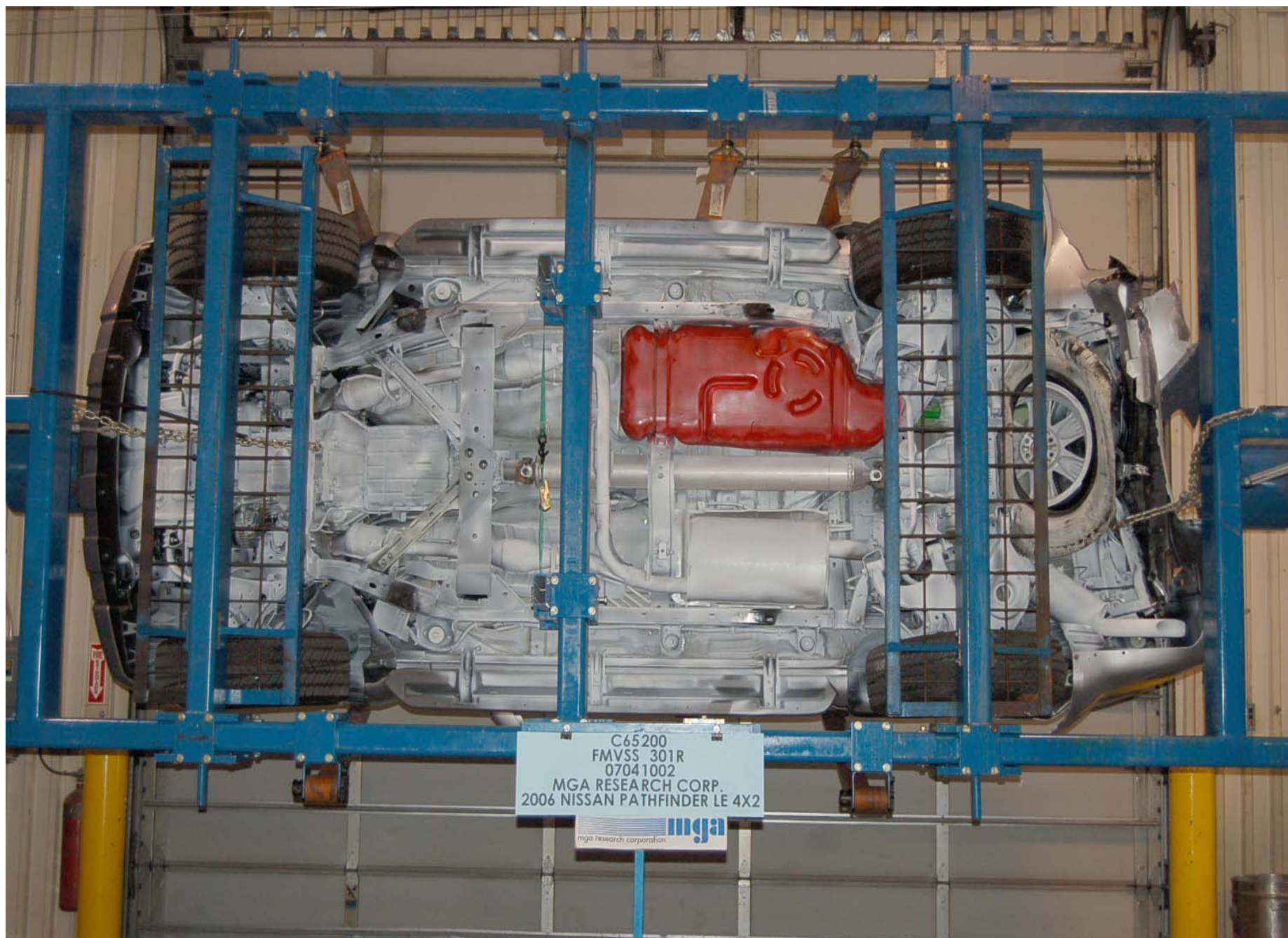
Static Rollover at 90 Degrees

A-31.



Static Rollover at 180 Degrees

A-32.



Static Rollover at 270 Degrees

A-33.



Static Rollover at 360 Degrees