

REPORT NUMBER TR-P26001-09-NC

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

**BAYERISCHE MOTOREN WERKE AG
2006 BMW 325i
4-DOOR SEDAN**

NHTSA NUMBER: M60500

**PREPARED BY:
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JANUARY 26, 2006

FINAL REPORT

**PREPARED FOR:
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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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16. Abstract A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2006 BMW 325i 4-Door Sedan at Karco Engineering, LLC on 1/26/06. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity is 56.02 km/h. The ambient temperature at the barrier face at the time of impact is 16.0 degrees Celcius. The vehicle's maximum post-test static crush is 423 mm at the vehicle's centerline. The test vehicle is equipped with a 3-point continuous belt system and second generation supplemental airbags in both front outboard seating 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	406.4	494.2
Max. Chest Accel. (3 msec Clip)		G's	60	52.5	56.6
Left Femur Force		Newtons	10008	-431.3	-2485.5
Right Femur Force		Newtons	10008	-1944.0	-1374.2
17. Key Words 56.3 km/h NCAP Frontal Barrier Impact Test New Car Assessment Program (NCAP) 2006 BMW 325i 4-Door Sedan NHTSA No. M60500				18. Distribution of Statement Copies of this report available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 400 Seventh St., SW, Room 5108 Washington, D.C. 20590	
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SECTION 1

PURPOSE AND SUMMARY OF TEST M60500

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. DTNH22-01-D-02005. 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, "Windshield Zone Intrusion (Partial)", and FMVSS 301 "Fuel System Integrity", 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 2006 BMW 325i 4-Door Sedan at a velocity of 56.02 km/h. The test was performed at Karco Engineering, LLC on January 26, 2006.

Two (2) 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 also placed on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. Also, shoulder belt spool-off was measured for the driver and passenger dummy. The driver (position 1) ATD (Serial No. 35) and the right-front passenger (position 2) ATD (Serial No. 34) were calibrated two tests prior to this test.

One hundred and thirty two (132) channels of data were recorded using an on-board 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 percent windshield retention and there was no intrusion into the protected zone of the windshield during the impact event. There was no stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 423 mm at the vehicle's centerline and both the driver and the 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 and the abdomen had no contact. Both knees contacted the knee bolster.

The passenger's visible contact points were as follows: The passenger ATD's head, chest and abdomen contacted the airbag. Both knees contacted the glove box.

Occupant injury data is contained in table below.

OCCUPANT DATA SUMMARY					
ATD Position	HIC 36	Clip (g)	Chest Defl. (mm)	Left Femur (N)	Right Femur (N)
Driver	406.4	52.5	38.4	-431.3	-1944.0
Passenger	494.2	56.6	25.6	-2485.5	-1374.2

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: 2006 BMW 325i 4-Door Sedan

NHTSA No.: M60500

Test Program: 2006 NHTSA 35mph NCAP

Test Date: 1/26/06

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	lbf/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: 2006 BMW 325i 4-Door Sedan
Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
Test Date: 1/26/06

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/h	56.02
Test Weight	kg	1806
Impact Angle	degrees	0
Average Rebound	mm	883
Maximum Static Crush	mm	423

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door opening	Remained closed and latched, opened w/o tools	Remained closed and latched, opened w/o tools
Rear Door Opening	Remained closed and latched, opened w/o tools	Remained closed and latched, opened w/o tools
Seat Track Shift (mm)	None	None
Seat Back Failure	No	No

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type/ Serial No.	50% Male Hybrid III No. 35	50% Male Hybrid III No. 34
Head Contact	Airbag	Airbag
Chest Contact	Airbag	Airbag
Abdomen Contact	None	Airbag
Left Knee Contact	Knee Bolster	Glove Box
Right Knee Contact	Knee Bolster	Glove Box

MOVIE COVERAGE

Cameras	Standard	Additional
High Speed	14	
Real Time	1	1
Total	15	1

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: 2006 BMW 325i 4-Door Sedan

NHTSA No.: M60500

Test Program: 2006 NHTSA 35mph NCAP

Test Date: 1/26/06

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M60500
Make	BMW
Model	325i
Body Style	4-Door Sedan
Vin No.	WBAVB13506PT09915
Color	White
Delivery Date	1/16/2006
Odometer (Miles)	105.0
Dealer	Alexander Imports
Transmission	6-Speed Automatic
Final Drive	Rear
Type/No. Cyl.	Inline 6
Engine Disp. (L)	3.0
Engine Placement	Longitudinal
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 Airbag	Yes
Driver Head Airbag	No
Driver Curtain Airbag	Yes
Pass. Airbag	Yes
Pass. Side Airbag	Yes
Pass. Head Airbag	No
Pass. Curtain Airbag	Yes
Pre-Tensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes
Air. Cond.	Yes
AM/FM Cassette	Yes
Tilt Steering	Yes
Automatic Door Locks	Yes
Power Windows	Yes
Power Seats	No
Other	None

Does Owners Manual provide instructions to turn off automatic door locks.

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Bayerische Motoren Werke AG
Date of Manufacture	Nov-05

GVWR (kg)	2000
GAWR Front (kg)	940
GAWR Rear (kg)	1100

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

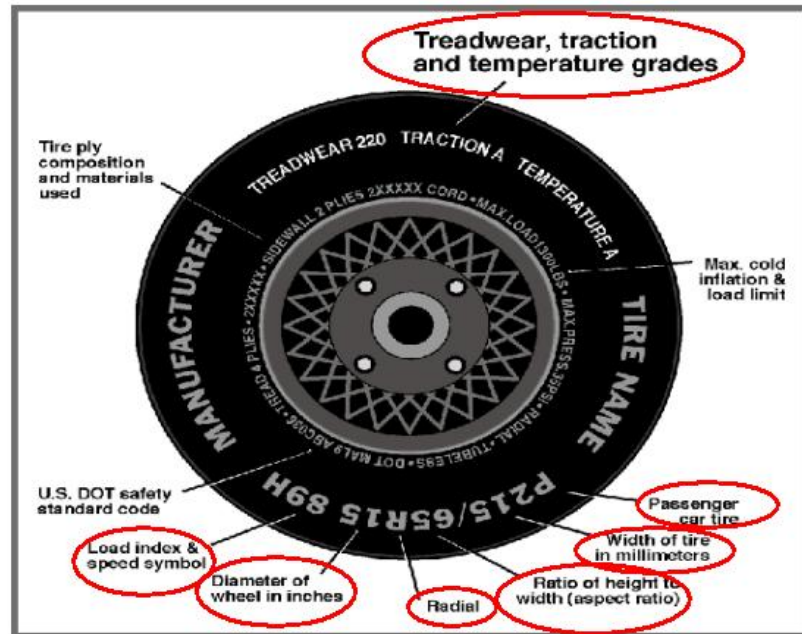
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket		
Number of Occupants	2	3		5
Capacity Weight (VCW) (kg)				480
Cargo Weight (RCLW) (kg)				136

DATA SHEET NO. 2...(CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06

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)	350	350
Cold Pressure (kpa)	200	240
Recommended Tire Size	P205/55R16	P205/55R16
Tire Size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	Bridgestone	Bridgestone
Treadwear	300	300
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 rayon	2 rayon
Tire Plies Body	2 steel + 2 rayon + 1 nylon	2 steel + 2 rayon + 1 nylon
Load Index/Speed Symbol	91H	91H
Tire Material	Rayon + Steel + Nylon	Rayon + Steel + Nylon
DOT Safety Code Right	EJ8K CNK 4205	EJ8K CNK 4205
DOT Safety Code Left	EJ8K CNK 4205	EJ8K CNK 4205

DATA SHEET NO. 2...(CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	373	375	748	395	494	889
Right	kg	400	377	777	417	500	917
Ratio	%	50.7	49.3	100	45.0	55.0	100
Totals	kg	773	752	1525	812	994	1806

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1525
Weight of 2 P572 ATD's	kg	152
Rated Cargo/Luggage Wt. (RCLW)	kg	136
Calculated Vehicle Target Wt. (TVTW)	kg	1813

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	685	681	677	680	1364
As Tested	mm	665	665	640	639	1523

Vehicle Wheel Base (mm) 2767

Weight of Ballast Secured in cargo area (kg) 64

Weight of Items Removed (kg) 17

Vehicle Components Removed Rear center arm rest, rear truck carpet

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

FUEL SYSTEM DATA

Fuel System Capacity From Owners Manual (L) 60.94

Actual Test Volume with entire fuel System Filled (L) 56.73

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 ignition switch "On" & engine "OFF" Yes

Fuel System Particulars: Electric fuel pump. Activated when electrical system is activated
Fuel pump will run for 3 seconds when ignition is in "on" position.

DATA SHEET NO. 3
POST-TEST IMPACT DATA

Test Vehicle: 2006 BMW 325i 4-Door Sedan

NHTSA No.: M60500

Test Program: 2006 NHTSA 35mph NCAP

Test Date: 1/26/06

SPEED TRAP DATA

Measured Parameter	Units	Requirement	Value
Trap No.1 Velocity (Primary)	km/h	55.51 to 57.12	56.02
Trap No.2 Velocity (Redun.)	km/h	55.51 to 57.12	56.13

VEHICLE STATIC CRUSH

Measured Parameter	Units	Pre-Test	Post-Test	Difference
Left Side	mm	4302	4016	-286
Center	mm	4506	4083	-423
Right Side	mm	4301	4083	-218

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	880
Center	mm	890
Right Side	mm	880
Average	mm	883

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

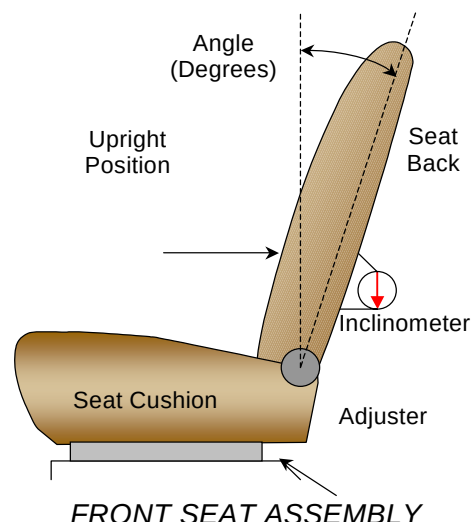
NHTSA No.: M60500
 Test Date: 1/26/06

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 of the seat back using a digital inclinometer.

SEAT BACK ANGLES

	Deg.
Driver w/seated Dummy	25.0
Passenger w/seated Dummy	25.0

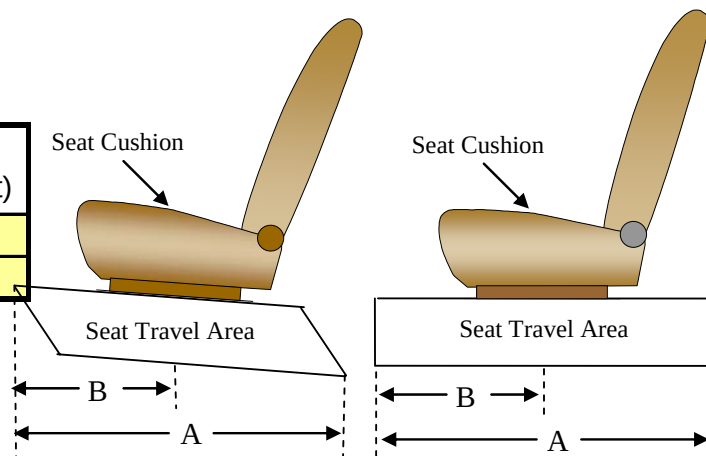


SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position to rearmost position, irrespective of vertical seat height in those positions. The seat was set at the longitudinal mid position with the vertical adjustment at the lowest position obtainable for the driver and passenger.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel (Detent)	Placed in Position (Detent)
Driver Seat	57	35
Passenger Seat	57	35



SEAT BELT UPPER ANCHORAGE

Position number one (1) is the uppermost position.

SEAT BELT UPPER ANCHORAGE

	Total # of Positions	Placed in Position #
Driver Seat	*	*
Passenger Seat	*	*

* Seat belt anchorage was fixed

DATA SHEET NO. 4...(CONTINUED)
TEST VEHICLE INFORMATION

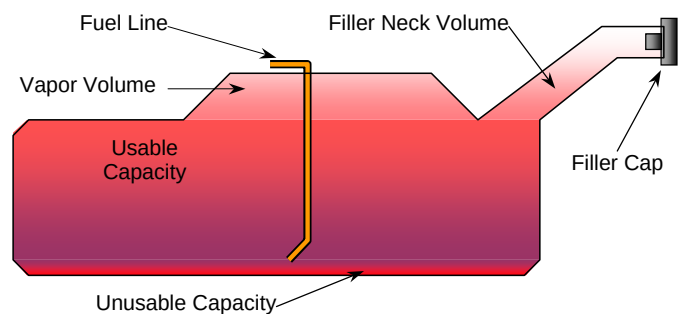
Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	60.94
Usable Capacity of "Optional" Tank	
Usable Capacity used for FMVSS 301	56.06 to 57.27
Actual Amount of Solvent used	56.73

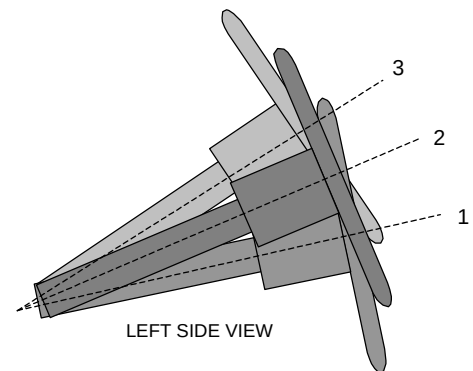
The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the right rear fender. The standard fuel tank occupies the area under the rear seat.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. 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 (mm)
Lowermost position No. 1	17.8	0
Geometric center position No. 2	19.7	17.5
Uppermost position No. 3	22.0	35

DATA SHEET NO. 5
DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2006 BMW 325i 4-Door Sedan
Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
Test Date: 1/26/06

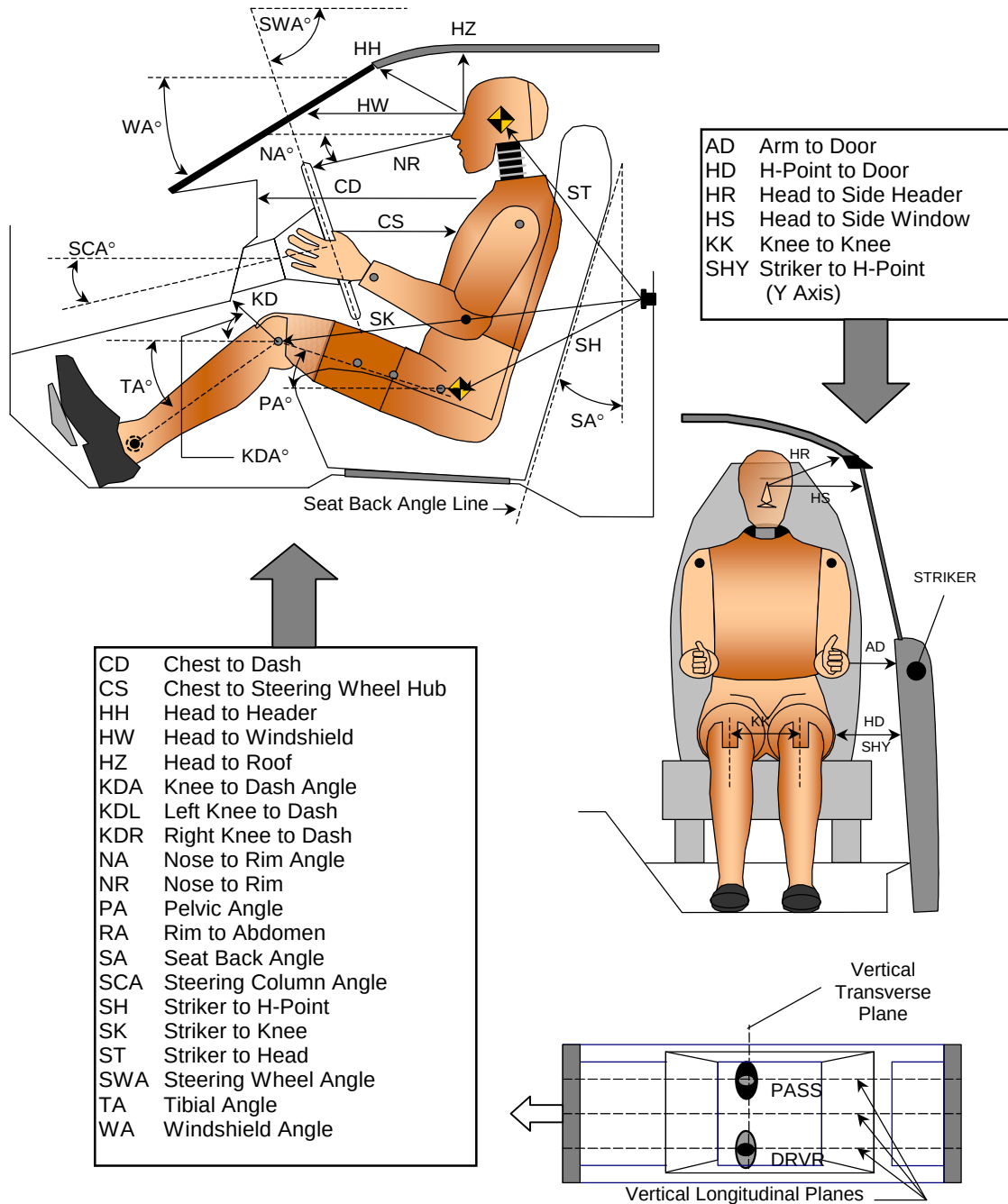
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (deg)	Length (mm)	Angle (deg)
WA	Windshield Angle		28.8		
SWA	Steering Wheel Angle		70.3		
SCA	Steering Column Angle		19.7		
SA	Seat Back Angle		25.0		25.0
HZ	Head to Roof (Z)	246	90.0	185	90.0
HH	Head to Header	355		315	
HW	Head to Windshield	640		575	
HR	Head to Side Header (Y)	250		220	
NR	Nose to Rim	400	1.2		
CD	Chest to Dash	580		390	
CS	Chest to Steering Hub	320			
RA	Rim to Abdomen	240			
KDL	Left Knee to Dash	340	0.7	250	
KDR	Right Knee to Dash	225		280	4.0
PA	Pelvic Angle		25.0		24.6
TA	Tibia Angle		35.9		34.1
KK	Knee to Knee (Y)	300		270	
SK	Striker to Knee	572	15.4	590	13.3
ST	Striker to Head	397	86.0	400	82.5
SH	Striker to H-Point	274	61.0	310	56.0
SHY	Striker to H-Point (Y)	240		242	
HS	Head to Side Window	380		360	
HD	H-Point to Door (Y)	170		150	
AD	Arm to Door (Y)	100		110	

DATA SHEET NO. 5...(CONTINUED) **DUMMY POSITIONING IN VEHICLE**

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06

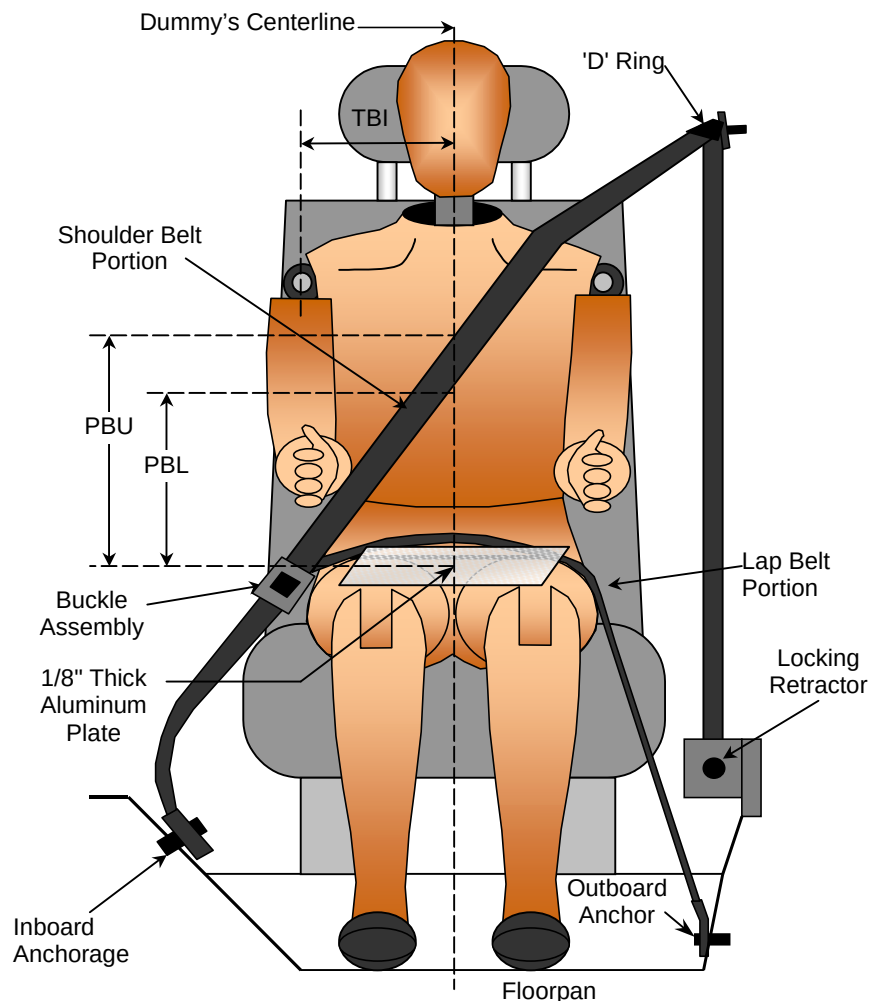


DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS

DATA SHEET NO. 6 **SEAT BELT POSITIONING DATA**

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06



SEAT BELT POSITIONING MEASUREMENTS

Measured Parameter	Units	Driver	Passenger
TBI - Dummy C/L to Lap/Shoulder Belt Intersect	mm	180	180
PBU - Top Surface of reference to belt upper edge	mm	300	245
PBL - Top Surface of reference to belt lower edge	mm	200	164
Lap Belt Tension	Newtons	10	10
Shoulder Belt Tension	N/A	Retractor	Retractor

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

Test Vehicle: 2006 BMW 325i 4-Door Sedan

NHTSA No.: M60500

Test Program: 2006 NHTSA 35mph NCAP

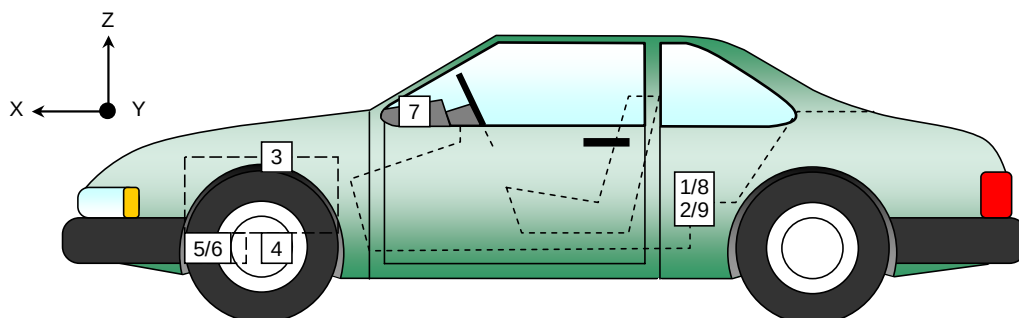
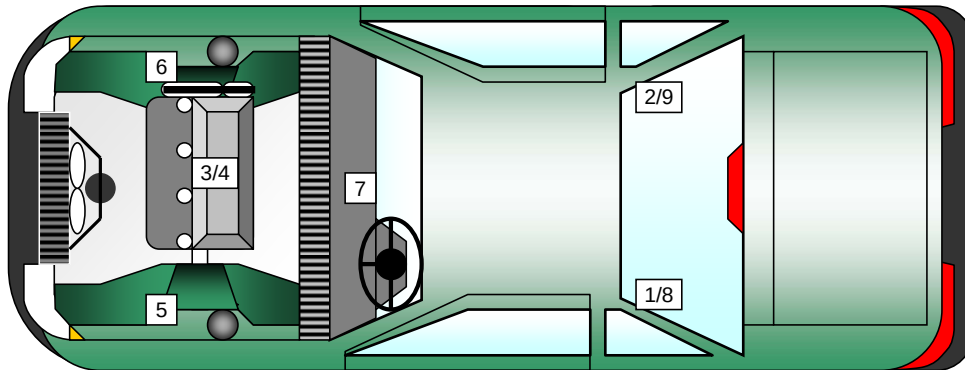
Test Date: 1/26/06

VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member	1854	-714	405
2	Right Rear X-Member	1854	714	405
3	Engine Top	3923	-148	1019
4	Engine Bottom	3455	-175	110
5	Left Brake Caliper	3555	-587	265
6	Right Brake Caliper	3555	587	265
7	Instrument Panel			
8	Left Rear X-Member (Z-Axis)	1854	-714	405
9	Right Rear X-Member (Z-Axis)	1854	714	405

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

1.) Not installed



DATA SHEET NO. 8
SEAT BELT ASSESSMENT TEST DATA

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
Retractor Reel to "D" ring	mm	740	740
Shoulder Belt length as measured on ATD	mm	840	660
Lap Belt length as measured on ATD	mm	550	550
Remainder of belt on reel	mm	1040	950
Total belt length for continuous webbing systems	mm	3170	2900

SHOULDER BELT SPOOL-OFF DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm	360	470
As determined electronically	mm	639	*

* Channel failed at 68.0 msec

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: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06

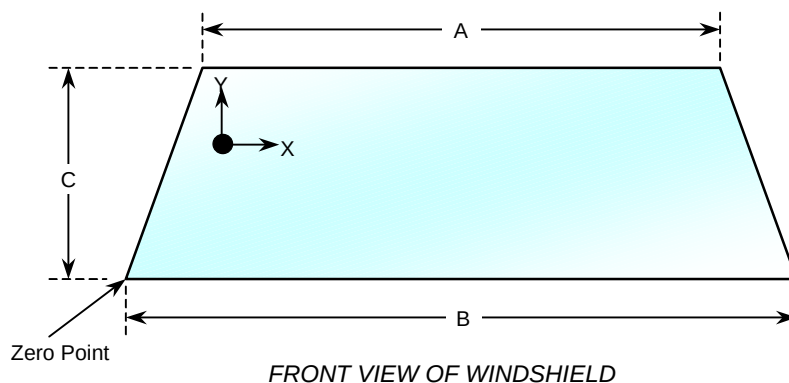
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with a rubber type adhesive. No molding covers the windshield periphery at any point.

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: 21.1 °C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test(mm)	Post-Test(mm)	% of Retention
Left Side	2028	2028	100
Right Side	2028	2028	100
Total	4056	4056	100



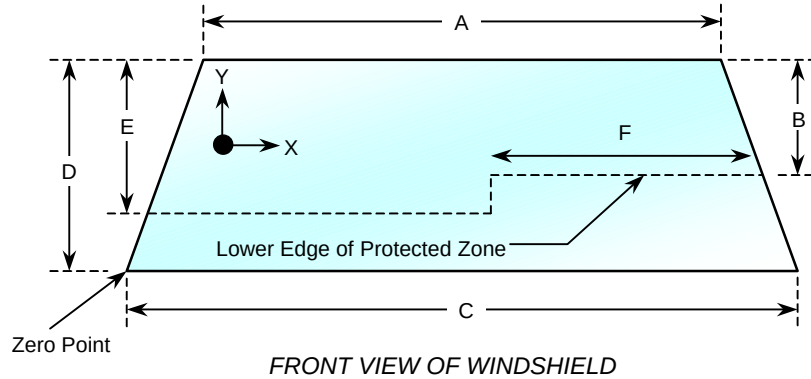
WINDSHIELD DIMENSIONS

Item	Units	Segment Length	Molding Width
A	mm	1175	19
B	mm	1500	0
C-Left	mm	690	20
C-Right	mm	690	20

DATA SHEET NO. 10
WINDSHIELD ZONE INTRUSION FMVSS 219 DATA (PARTIAL)

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06



**WINDSHIELD AND
PROTECTED ZONE**

Item	Units	Value
A	mm	1175
B	mm	282
C	mm	1500
D	mm	690
E	mm	435
F	mm	530

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: 2006 BMW 325i 4-Door Sedan NHTSA No.: M60500
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/26/06

Test Time: 12:43 PM Temperature: 16.0 Deg. C.

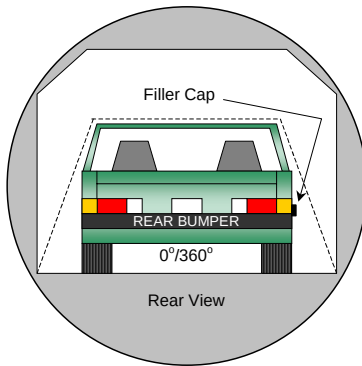
STODDARD SOLVENT SPILLAGE MEASUREMENTS

- A. From impact until vehicle motion ceases: 0.0 oz.
(Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0.0 oz.
(Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0.0 oz.
(Maximum Allowable = 1 oz./minute)
- D. Spillage Location Details: No leakage occurred

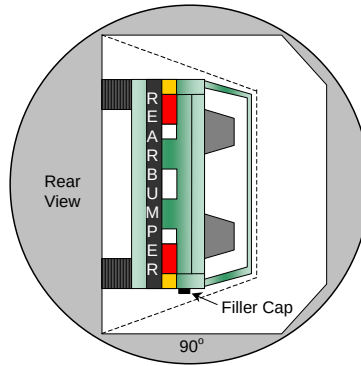
DATA SHEET NO. 12
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2006 BMW 325i 4-Door Sedan
Test Program: 2006 NHTSA 35mph NCAP

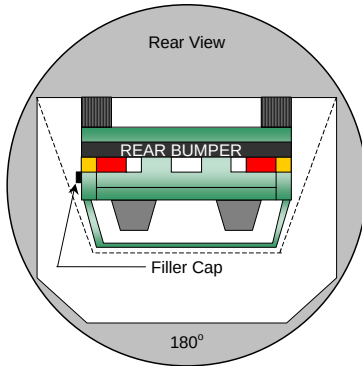
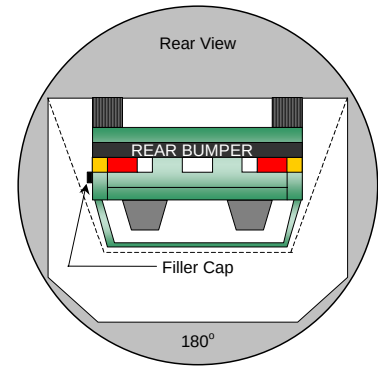
NHTSA No.: M60500
Test Date: 1/26/06



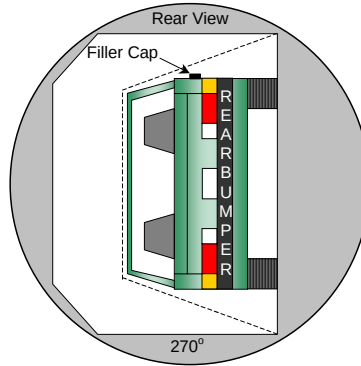
0° to 90°



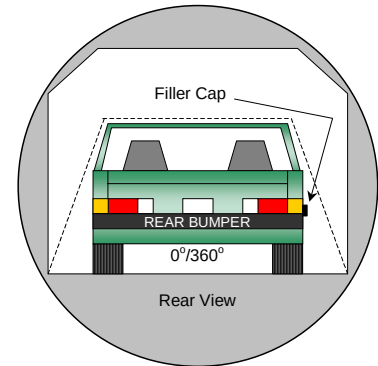
90° to 180°



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: 2006 BMW 325i 4-Door Sedan

NHTSA No.: M60500

Test Program: 2006 NHTSA 35mph NCAP

Test Date: 1/26/06

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	80	300	380
90° to 180°	79	300	379
180° to 270°	78	300	378
270° to 360°	79	300	379

FMVSS 301 SPILLAGE TABLE REQUIREMENT (oz.)

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	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	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: 2006 BMW 325i 4-Door Sedan
Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
Test Date: 1/26/06

VEHICLE MEASUREMENT TABLE

No.	Measurement Description	Units	Pre-Test	Post-Test	Diff.
1	Total length of vehicle at centerline	mm	4506	4083	-423
2	RSOV to front of engine	mm	4046	3816	-230
3	RSOV to firewall centerline	mm	3601	3536	-65
4	RSOV to leading edge of right door	mm	3048	3031	-17
5	RSOV to leading edge of left door	mm	3050	3046	-4
6	RSOV to lower leading edge of right door	mm	3115	3108	-7
7	RSOV to lower leading edge of left door	mm	3122	3120	-2
8	RSOV to upper trailing edge of right door	mm	2035	2015	-20
9	RSOV to upper trailing edge of left door	mm	2035	2030	-5
10	RSOV to lower trailing edge of right door	mm	2075	2061	-14
11	RSOV to lower trailing edge of left door	mm	2077	2076	-1
12	RSOV to bottom of right 'A' pillar	mm	3051	3041	-10
13	RSOV to bottom of left 'A' pillar	mm	3057	3049	-8
14	RSOV to firewall on right side	mm	3621	3550	-71
15	RSOV to firewall on left side	mm	3623	3577	-46
16	RSOV to steering column	mm	2615	2645	30
17	Center of steering column to left 'A' pillar	mm	434	350	-84
18	Center of steering column to headlining	mm	397	440	43
19	RSOV to right side of front bumper	mm	4301	4083	-218
20	RSOV to left side of front bumper	mm	4302	4016	-286
21	Length of engine block	mm	557	557	0
RD	RSOV to right side of dash panel	mm	2841	2806	-35
CD	RSOV to center of dash panel	mm	2750	2737	-13
LD	RSOV to left side of dash panel	mm	2837	2817	-20

DATA SHEET NO. 13...(CONTINUED)
VEHICLE STRUCTURAL MEASUREMENTS

Test Vehicle: 2006 BMW 325i 4-Door Sedan

NHTSA No.: M60500

Test Program: 2006 NHTSA 35mph NCAP

Test Date: 1/26/06

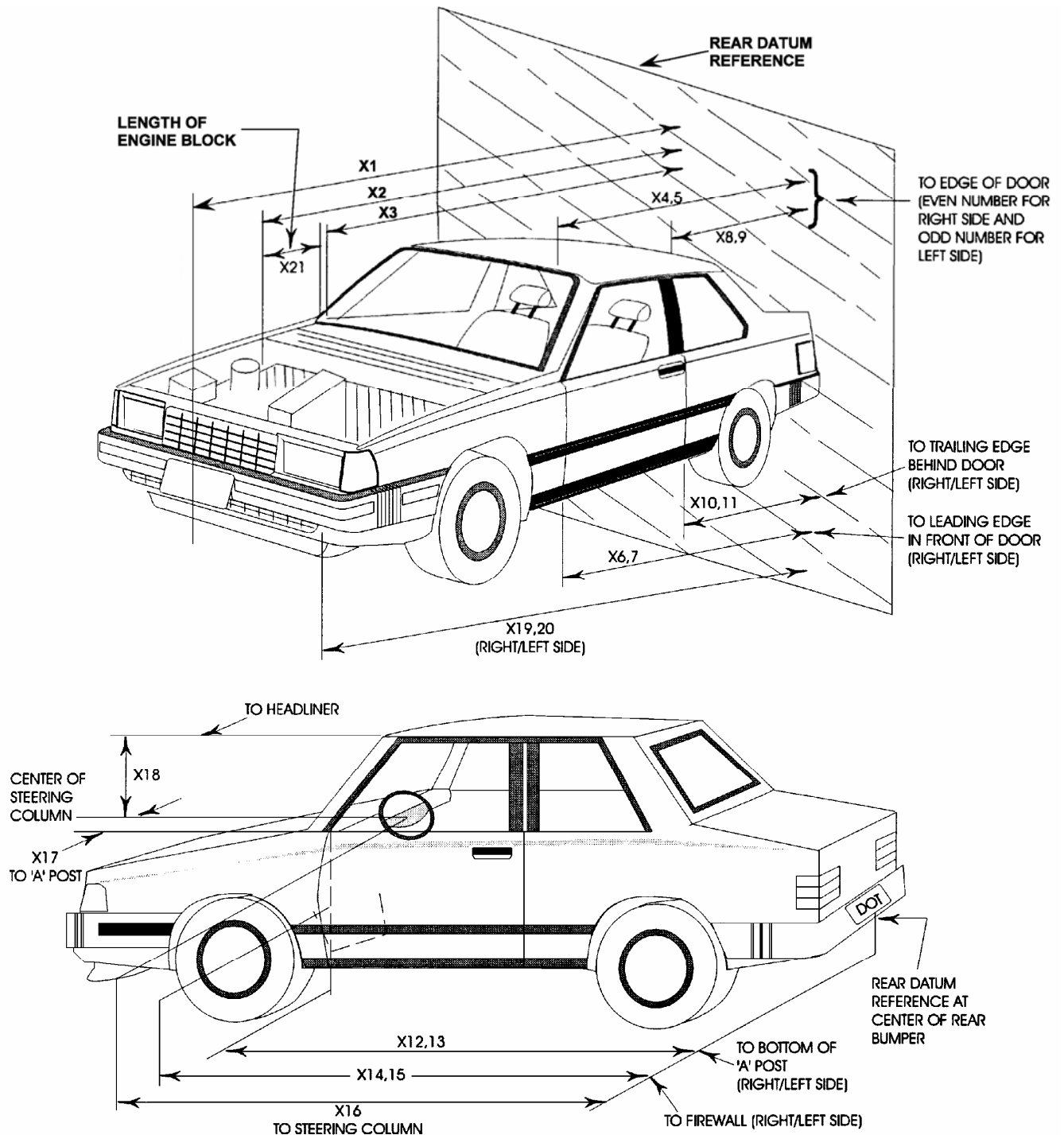
VEHICLE STRUCTURAL MEASUREMENT TABLE

No.	Measurement Description	Units	Pre-Test	Post-Test	Diff.
1	Total length	mm	4506	4083	-423
2	Total width	mm	1780	1774	-6
3	Bumper top height	mm	567	600	33
4	Bumper bottom height	mm	166	215	49
5	Longitudinal member top height	mm	491	560	69
6	Longitudinal member bottom height	mm	313	416	103
7	Distance between longitudinal members	mm	748	746	-2
8	Longitudinal member width	mm	60	60	0
9	Engine top height	mm	828	900	72
10	Engine bottom height	mm	163	214	51
11	Engine and gear box width	mm	695	695	0
12	Front bumper to engine distance	mm	460	265	-195
13	Front shock absorber fixing width	mm	818	858	40
14	Bonnet leading edge height	mm	680	826	146
15	Front shock absorber fixing width	mm	1100	1102	2
16	Front bumper to front axle distance	mm	750	380	-370
17	Front axle to 'A' pillar distance	mm	635	580	-55
18	'A' pillar to 'B' pillar distance	mm	1071	1068	-3
19	'B' pillar to rear axle distance	mm	1072	1069	-3
20	'B' pillar to 'C' pillar distance	mm	955	956	1
21	Roof sill bottom height	mm	1260	1294	34
22	Roof sill top height	mm	1370	1394	24
23	Floor sill bottom height	mm	169	170	1
24	Floor sill top height	mm	391	392	1

DATA SHEET NO. 13...(CONTINUED)
VEHICLE MEASUREMENTS

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06



DATA SHEET NO. 14
CAMERA LOCATIONS

Test Vehicle: 2006 BMW 325i 4-Door Sedan
Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
Test Date: 1/26/06

VEHICLE CAMERA MEASUREMENT TABLE

No.	Camera View	Location (mm)			Angle (deg.)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Real Time Camera (Panning)	-15385	-7882	-1598	0			30
2	Overall Left Side	-1795	-7156	-1167	0	7202	20mm	1000
3	Left Side View	-1533	-7126	-1188	-3	7196	50mm	1000
4	Driver and Interior View	-8696	-12562	-4511	-13	15000	ZOOM	1000
5	Steering Column (Bottom)	-1631	-8234	-2682	-13	8793	35mm	1000
6	Steering Column (Top)	-1663	-8153	-3078	-17	8903	35mm	1000
7	Overall Right Side	-2536	6887	-1184	-2	6961	20mm	1000
8	Right Side View	-2005	6510	-1249	-4	6620	50mm	1000
9	Passenger and Interior View	-5330	9365	-2407	-10	10223	ZOOM	1000
10	Right Side View	-2006	6967	-1463	-6	7124	ZOOM	1000
11	Windshield View	-601	0	-5556	-75		25mm	1000
12	Driver Front View	378	-286	-2438	-35		25mm	1000
13	Passenger Front View	375	413	-2439	-35		25mm	1000
14	Pit View of Engine	-832	0	1495	90		12mm	1000
15	Pit View of Fuel Tank	-2987	0	1495	90		10mm	1000
16	Real Time Camera	-2167	6988	-1463	-1	7143		30

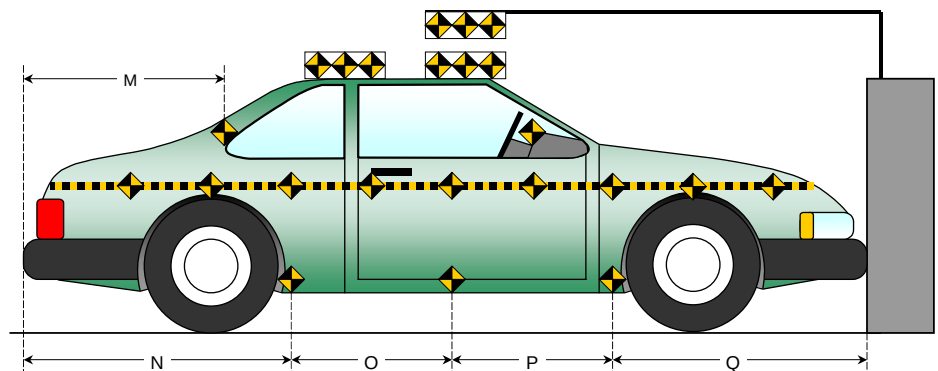
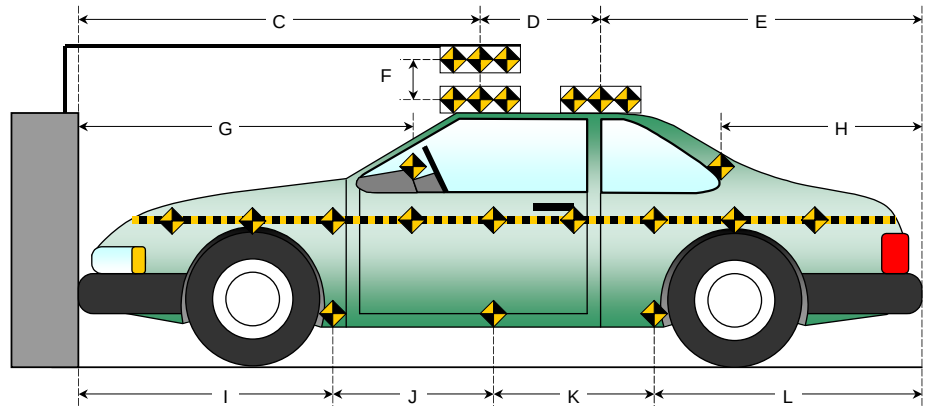
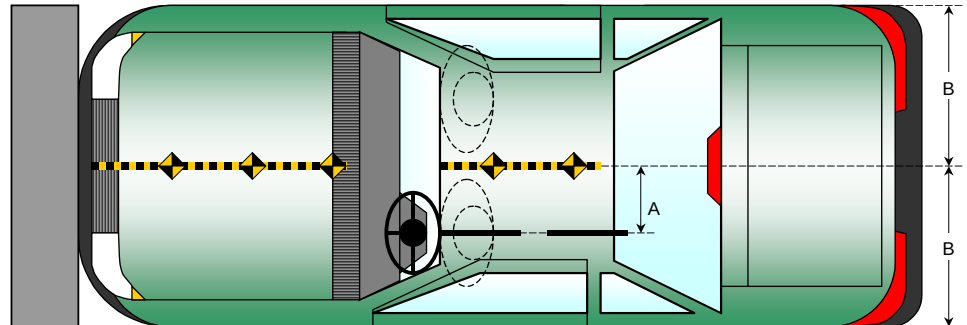
All measurements are relative to point of impact.

DATA SHEET NO. 15
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06

All Dimensions in (mm)	
Item	Value
A	*
B	1780
C	*
D	*
E	*
F	*
G	1745
H	538
I	1186
J	952
K	952
L	1431
M	538
N	1431
O	952
P	952
Q	1186



* Targets are not installed due to sunroof and curtain airbags

DATA SHEET NO. 16
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

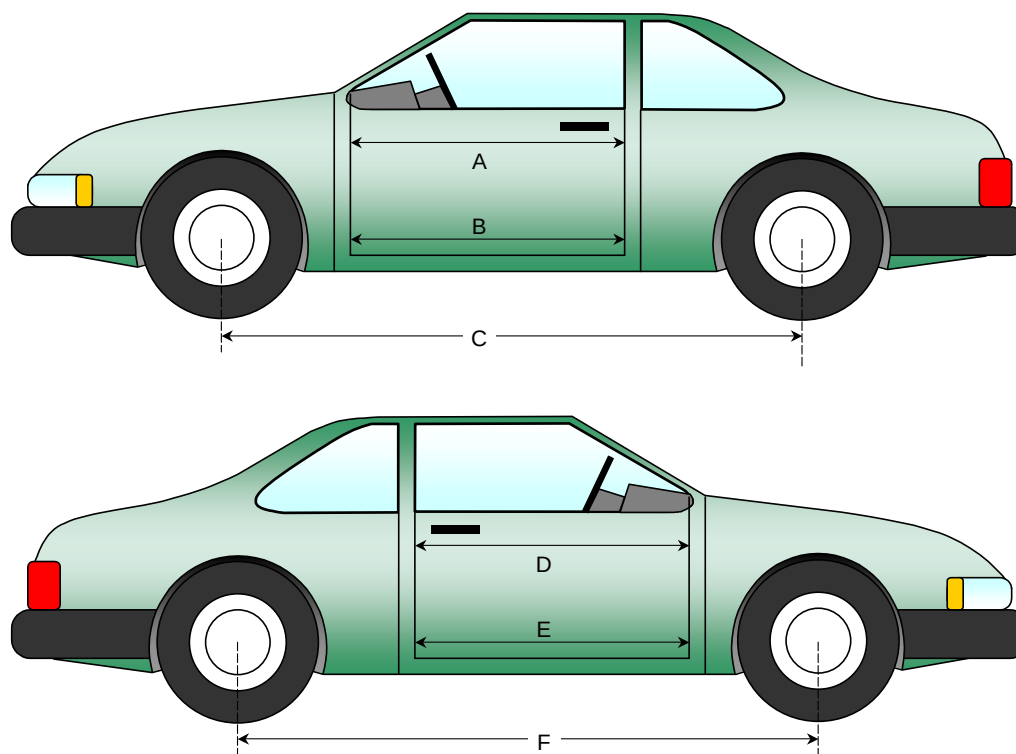
NHTSA No.: M60500
 Test Date: 1/26/06

DOOR OPENING WIDTH TABLE

Item	Description	Units	Pre-Test	Post-Test	Diff.
A	Left Side Upper	mm	926	926	0
B	Left Side Lower	mm	858	861	3
D	Right Side Upper	mm	923	931	8
E	Right Side Lower	mm	861	860	-1

WHEELBASE MEASUREMENT TABLE

Item	Description	Units	Pre-Test	Post-Test	Diff.
C	Left Side Wheel Base	mm	2767	2700	-67
F	Right Side Wheel Base	mm	2767	2675	-92



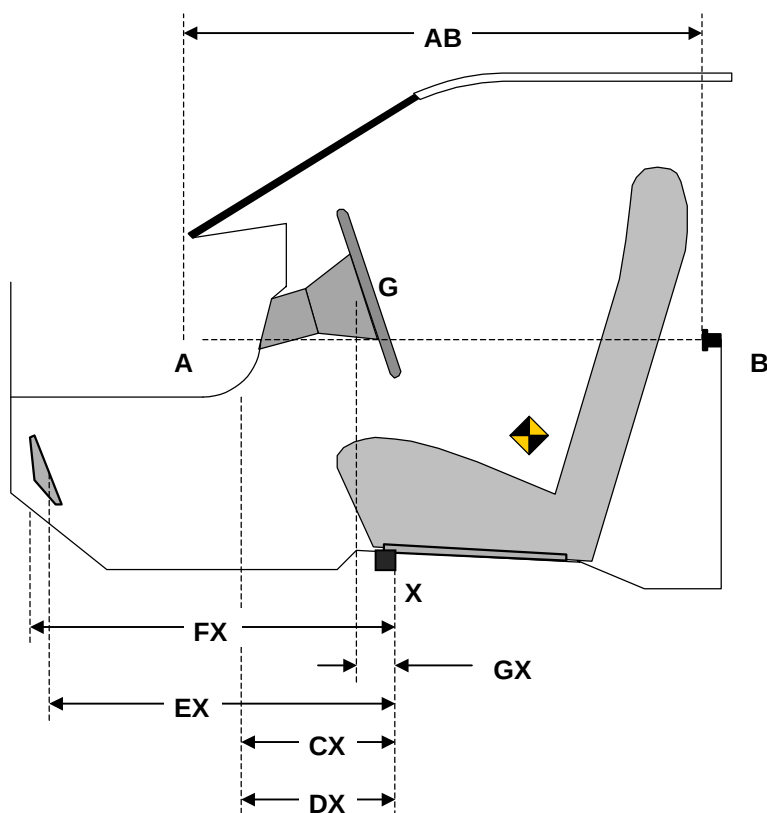
DATA SHEET NO. 16...(CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06

DRIVER COMPARTMENT INTRUSION TABLE

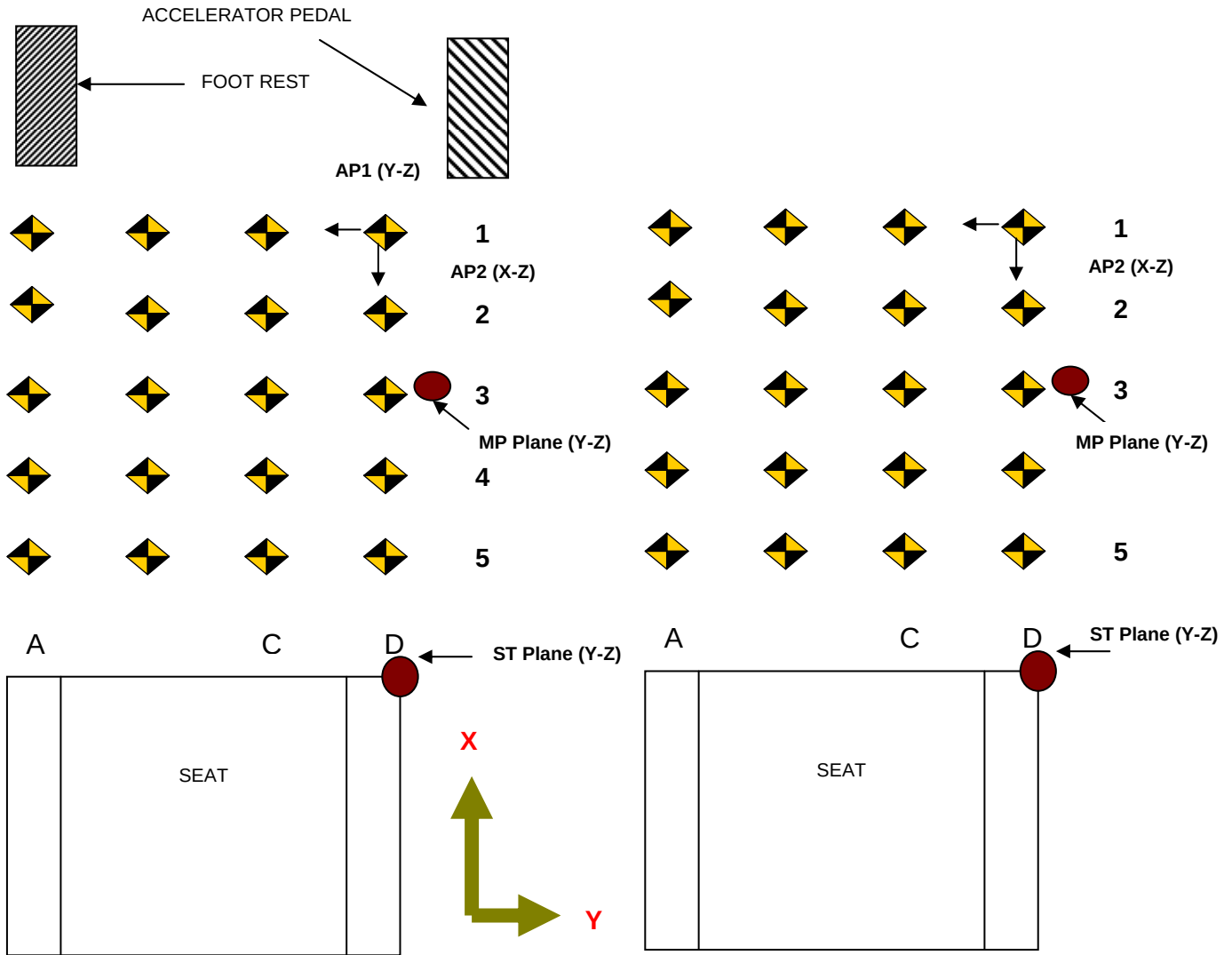
Item	Description	Units	Pre-Test	Post-Test	Diff.
AB	Door Opening (Inside window jam)	mm	926	926	0
CX	Left Knee Bolster to X	mm	255	237	-18
DX	Right Knee Bolster to X	mm	240	255	15
EX	Brake Pedal to X	mm	561	585	24
FX	Foot Rest to X	mm	543	635	92
GX	Center of Steering Wheel Hub to X	mm	70	71	1



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

Test Vehicle: 2006 BMW 325i 4-Door Sedan
Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
Test Date: 1/26/06



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: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06

All measurements in mm

DRIVER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	670	722	717	707	798	854	862	860	128	132	145	153
2	614	651	647	639	746	793	794	791	132	142	147	152
3	557	556	555	545	695	698	707	693	138	142	152	148
4	458	454	452	443	595	599	601	603	137	145	149	160
5	361	357	346	342	497	501	498	497	136	144	152	155

DRIVER FLOOR PAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	483	599	711	802	395	516	622	718	-88	-83	-89	-84
2	478	593	698	799	401	520	618	726	-77	-73	-80	-73
3	478	582	694	790	402	521	623	724	-76	-61	-71	-66
4	464	581	685	788	402	516	622	724	-62	-65	-63	-64
5	460	574	678	784	405	519	622	728	-55	-55	-56	-56

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-657	-475	-470	-474	-674	-499	-490	-499	-17	-24	-20	-25
2	-585	-414	-410	-407	-598	-433	-426	-424	-13	-19	-16	-17
3	-511	-381	-380	-394	-523	-391	-392	-401	-12	-10	-12	-7
4	-362	-369	-367	-373	-372	-374	-375	-380	-10	-5	-8	-7
5	-367	-360	-363	-362	-377	-361	-366	-365	-10	-1	-3	-3

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

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06

All measurements in mm

PASSENGER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	788	812	803	770	810	863	863	842	22	51	60	72
2	732	737	729	723	774	806	805	801	42	69	76	78
3	645	640	634	634	718	713	702	708	73	73	68	74
4	550	545	538	529	622	619	607	607	72	74	69	78
5	446	442	437	431	516	515	510	509	70	73	73	78

PASSENGER FLOOR PAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-660	-570	-469	-373	-589	-506	-407	-307	71	64	62	66
2	-671	-568	-466	-354	-590	-511	-406	-277	81	57	60	77
3	-673	-564	-463	-362	-597	-506	-403	-296	76	58	60	66
4	-676	-566	-456	-359	-604	-503	-397	-299	72	63	59	60
5	-670	-563	-458	-357	-597	-502	-397	-293	73	61	61	64

PASSENGER FLOOR PAN Z-AXIS

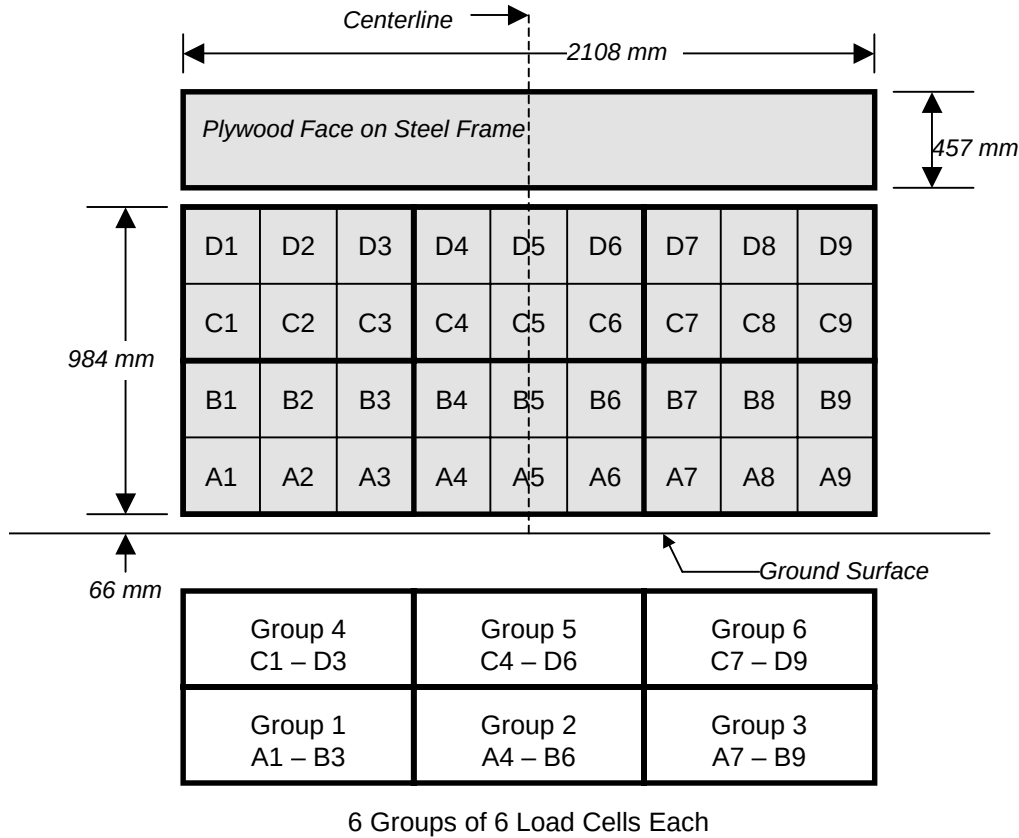
	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-497	-477	-481	-496	-527	-502	-505	-512	-30	-25	-24	-16
2	-439	-409	-419	-413	-452	-422	-433	-426	-13	-13	-14	-13
3	-397	-379	-380	-374	-414	-387	-392	-394	-17	-8	-12	-20
4	-387	-368	-368	-362	-404	-371	-381	-365	-17	-3	-13	-3
5	-381	-364	-364	-362	-394	-363	-369	-356	-13	1	-5	6

DATA SHEET NO. 17
FIXED BARRIER LOAD CELL LOCATIONS

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
 Test Date: 1/26/06

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



ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2006 BMW 325i 4-Door Sedan
Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
Test Date: 1/26/06

VEHICLE INFORMATION

VIN: WBAVB13506PT09915
Vehicle Size Category: 4-Door

Wheel base (mm): 2767
Test Weight (kg): 1806

ACCELEROMETER DATA

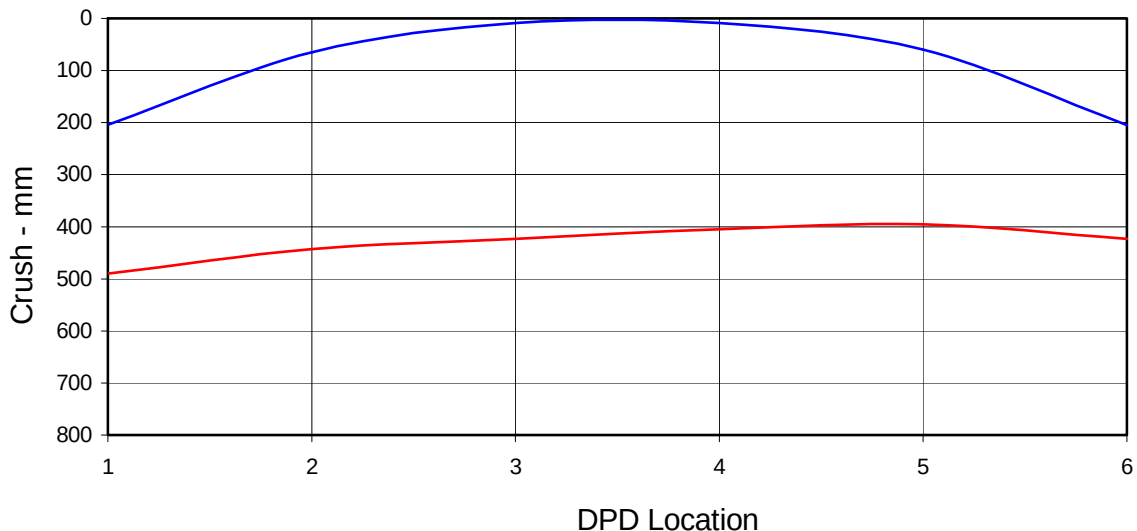
Accelerometer Location: Left rear cross member
Cal. Procedure/Interval: 6 months / drop test
Integration Algorithm: NHTSA Standard
Impact Velocity (km/h): 56.02
Velocity Change (km/h): 63.8

Linearity: Good
Time of Separation (msec): 58.3

CRUSH PROFILE

Collision Deformation Classification: 12FDEW6 Midpoint of Damage: Vehicle Centerline
Damage Region Length (mm): 1517 Impact Mode: Full Frontal

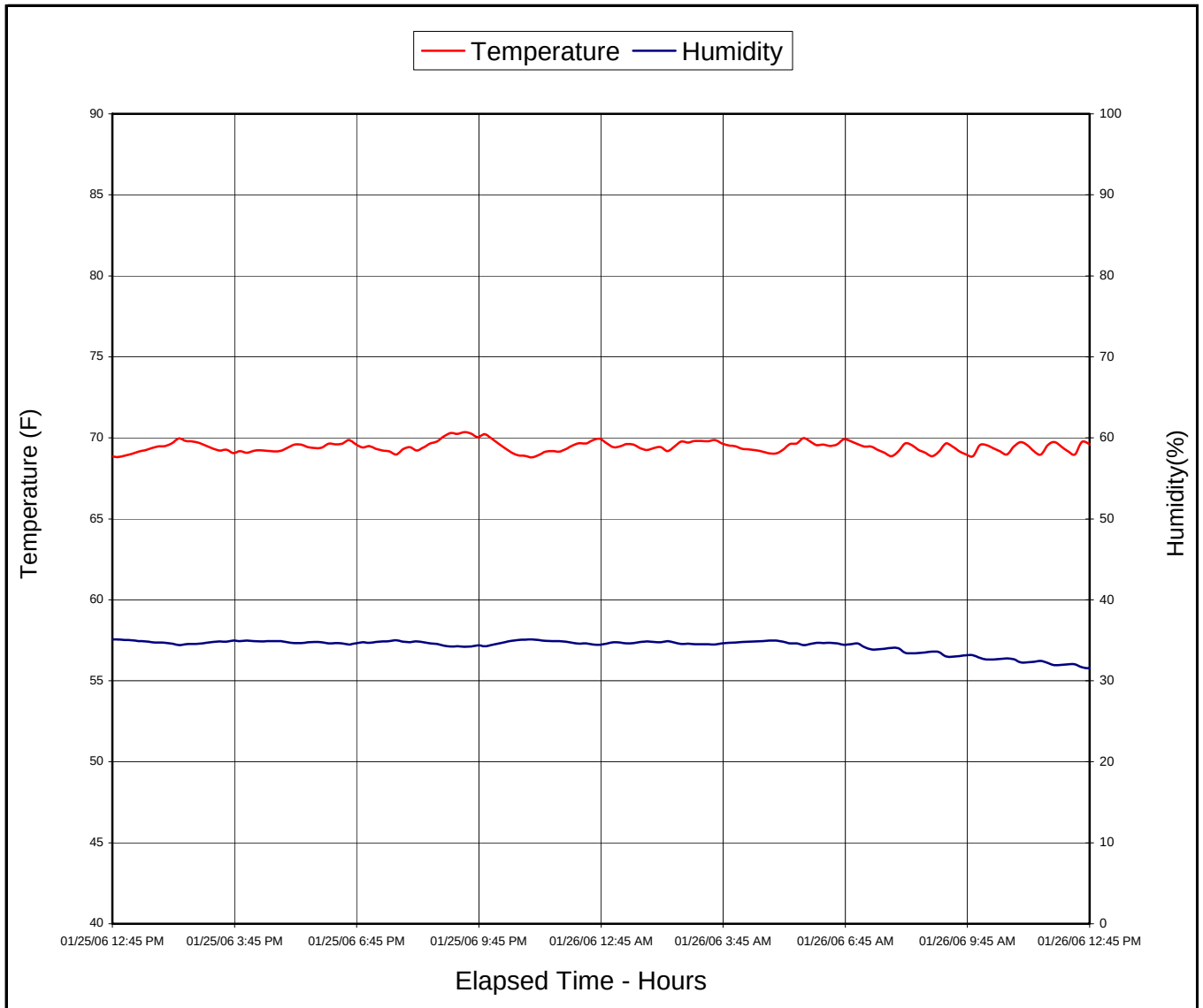
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	204	490	-286
C2	Crush zone 2 on left side	mm	65	443	-378
C3	Crush zone 3 on left side	mm	9	423	-414
C4	Crush zone 4 on right side	mm	9	405	-396
C5	Crush zone 5 on right side	mm	60	395	-335
C6	Crush zone 6 at right side	mm	205	423	-218



DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2006 BMW 325i 4-Door Sedan
Test Program: 2006 NHTSA 35mph NCAP

NHTSA No.: M60500
Test Date: 1/26/06



APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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A-26	Pre-Test Mid Underbody	A-26
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A-33	Post-Test Driver Dummy (Through Window)	A-33
A-34	Pre-Test Driver Dummy (Door Open)	A-34
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A-38	Pre-Test Driver Side Knee Bolster	A-38
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A-47	Post-Test Passenger Dummy Front (Through Window)	A-47
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A-49	Post-Test Passenger Dummy (Door Open)	A-49
A-50	Pre-Test Passenger Dummy Feet	A-50
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A-56	Post-Test Passenger Dummy Head	A-56
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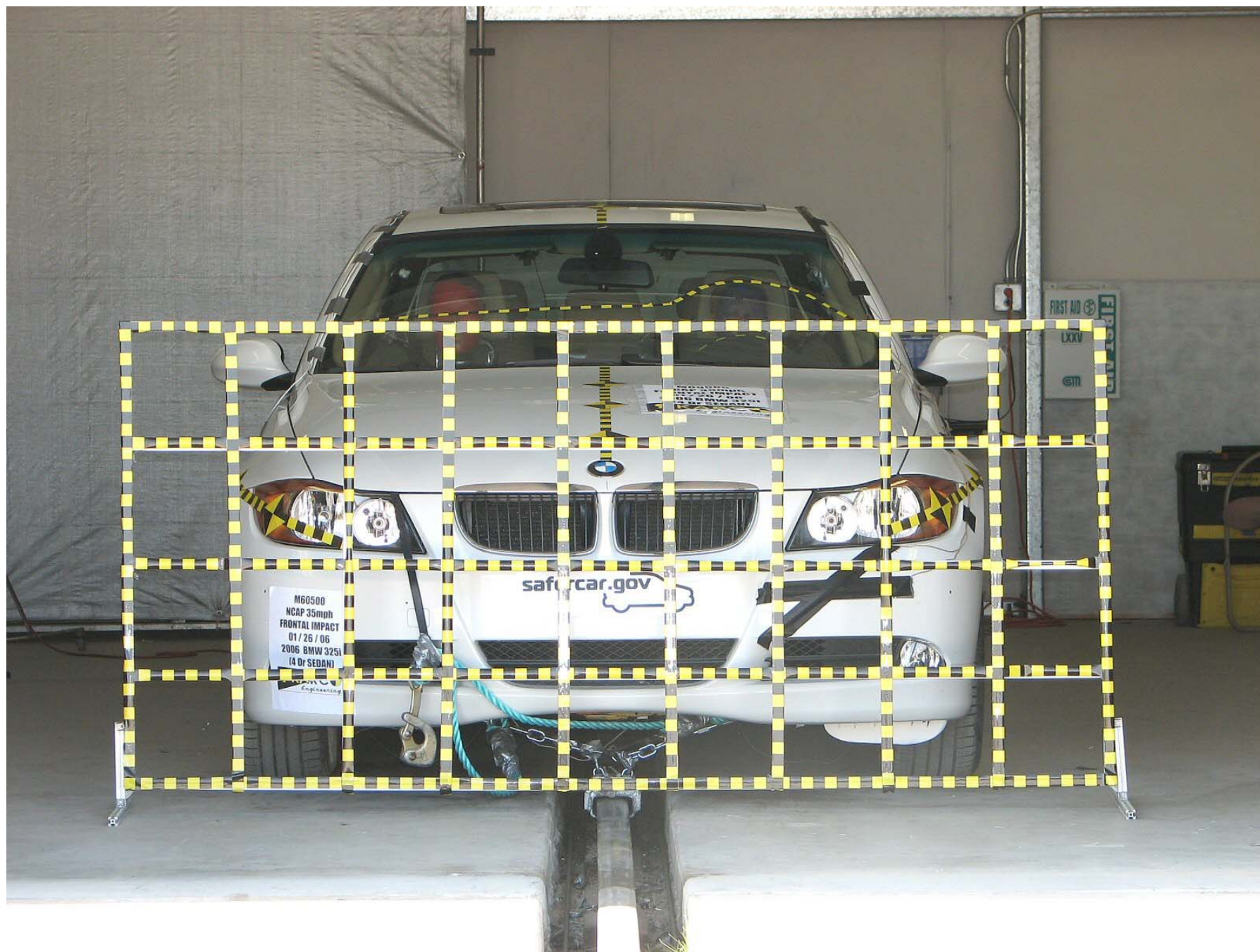


Figure A-1: Load Cell Location

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325iA

VEHICLE TYPE: PASSENGER CAR

BAYERISCHE MOTOREN WERKE AG 11/05

GVWR 4409 lbs 2000 kg

GAWR FRONT 2072 lbs 940 kg REAR 2425 lbs 1100 kg

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

WBAVB13506PT09915



MADE IN
GERMANY

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 480 kg or 1058 lbs.

ORIGINAL TIRE SIZE	COLD TIRE INFLATION PRESSURE			
205/55 R 16	FRONT	200 kPa,	29	PSI
205/55 R 16	REAR	240 kPa,	35	PSI
COMPACT SPARE TIRE	COLD TIRE INFLATION PRESSURE			
		kPa	PSI	

SEE OWNER'S
MANUAL FOR
ADDITIONAL
INFORMATION

6773356



Figure A-3: Tire Placard



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



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

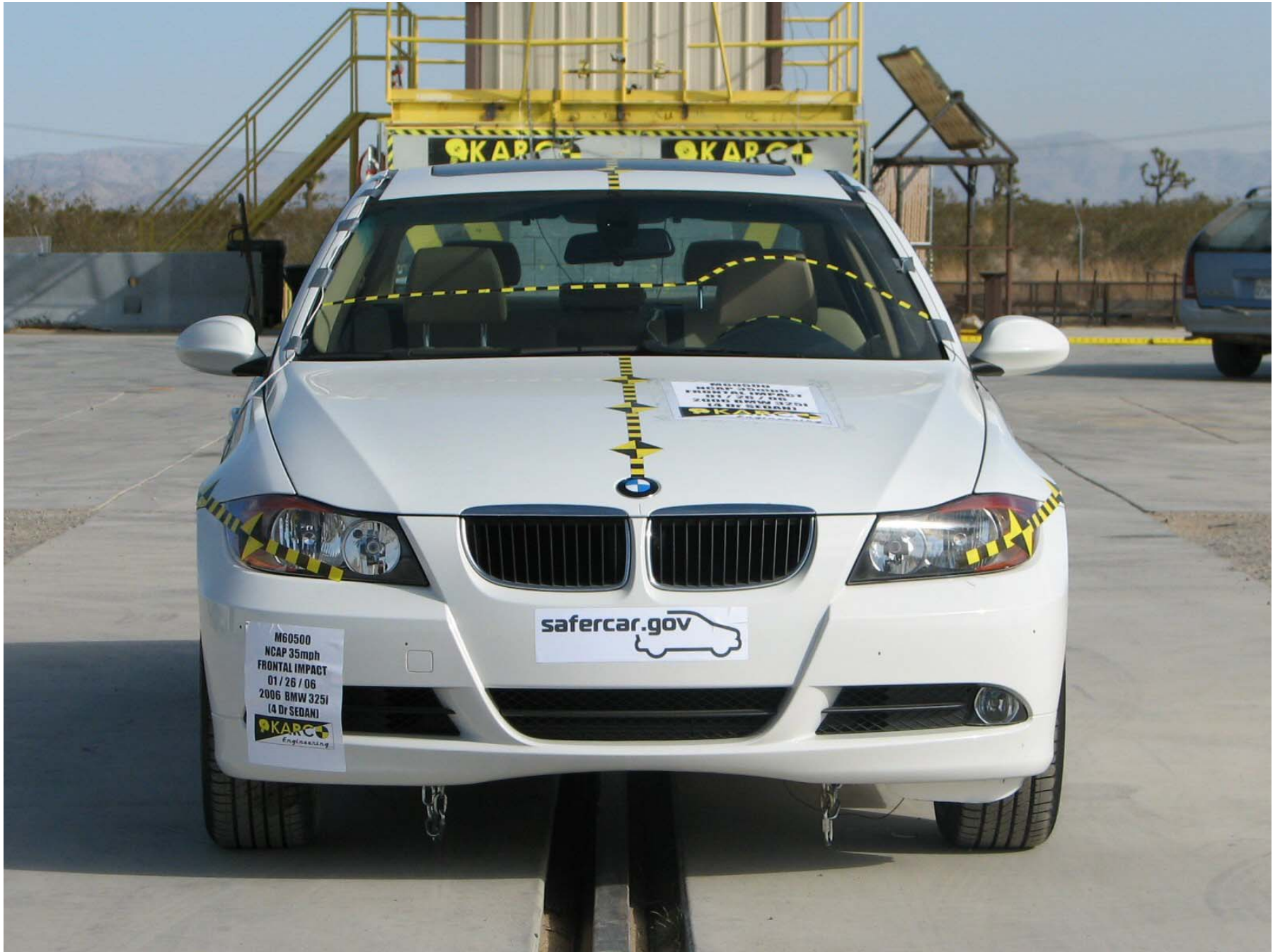


Figure A-6: Pre-Test Front View

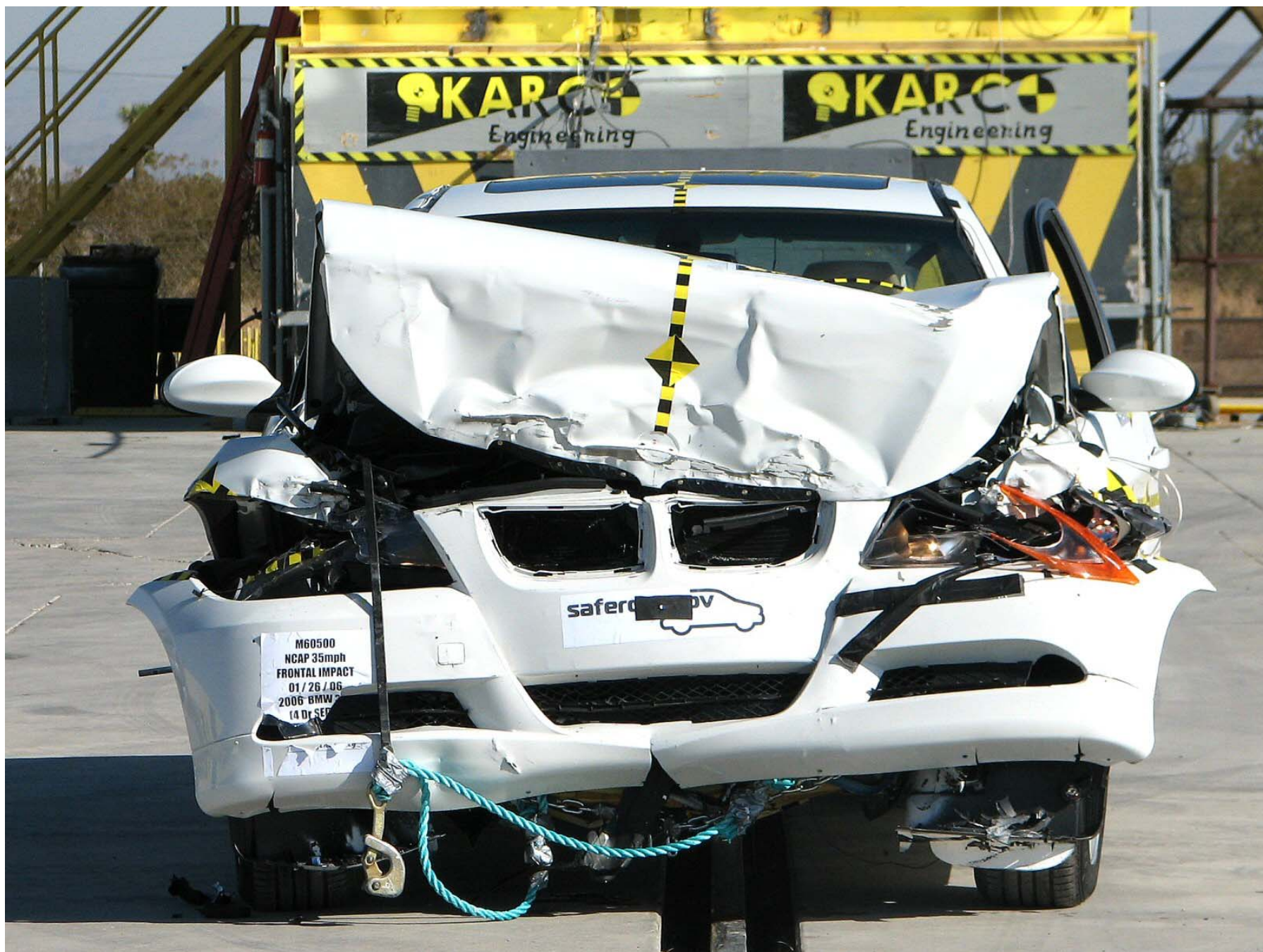


Figure A-7: Post-Test Front View (Vehicle Moved)



Figure A-8: Pre-Test Left Side View



Figure A-9: Post-Test Left Side View



Figure A-10: Pre-Test Right Side View



Figure A-11: Post-Test Right Side View



Figure A-12: Pre-Test Right Front 3/4 View



Figure A-13: Post-Test Right Front ¾ View (Vehicle Moved)



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



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



Figure A-16: Post-Test Left Side $\frac{3}{4}$ View of Doors After Impact



Figure A-17: Post-Test Right Side $\frac{3}{4}$ View of Doors After Impact

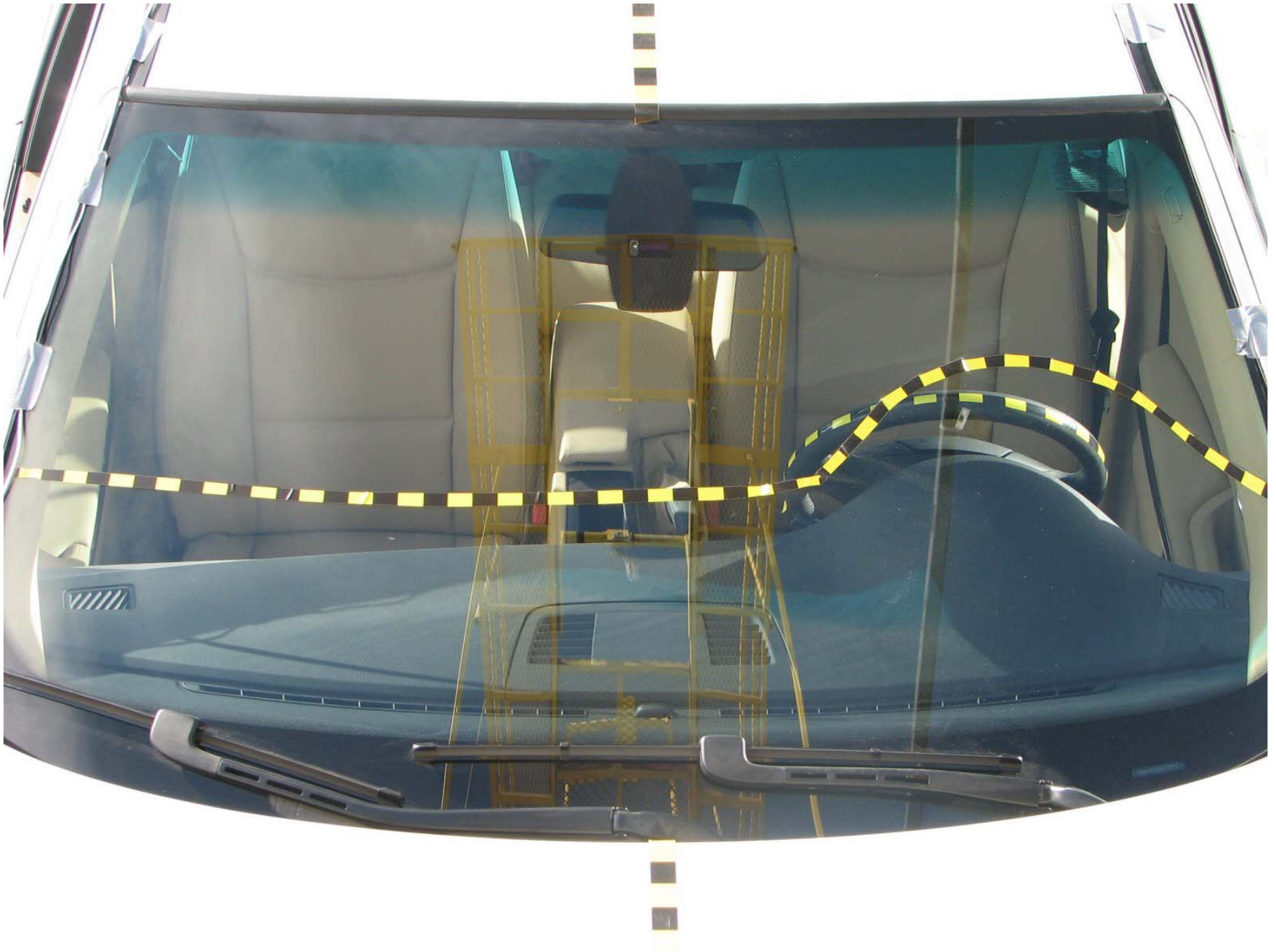


Figure A-18: Pre-Test Windshield



Figure A-19: Post-Test Windshield



Figure A-20: Pre-Test Engine Compartment



Figure A-21: Post-Test Engine Compartment (Vehicle Moved)

2006 BMW 325i
M60500
STODDARD SOLVENT ADDED
14.97 GALLONS
(56.7 LITERS)
KARCO
Engineering, LLC



Figure A-22: Pre-Test Fuel Cap

2006 BMW 325i
M60500
STODDARD SOLVENT ADDED
14.97 GALLONS
(56.7 LITERS)

KARCO
Engineering LLC



Figure A-23: Post-Test Fuel Cap

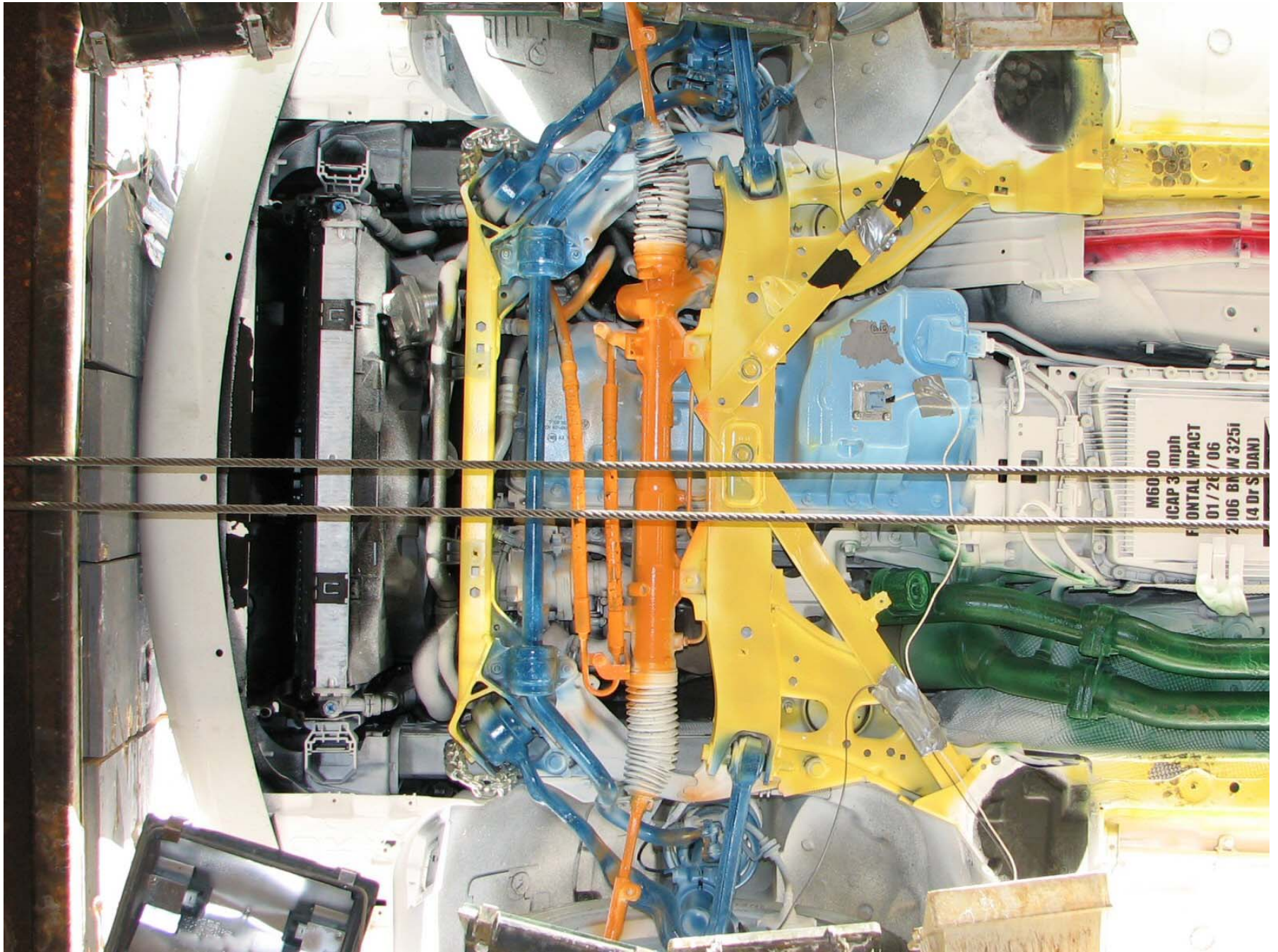


Figure A-24: Pre-Test Front Underbody



Figure A-25: Post-Test Front Underbody

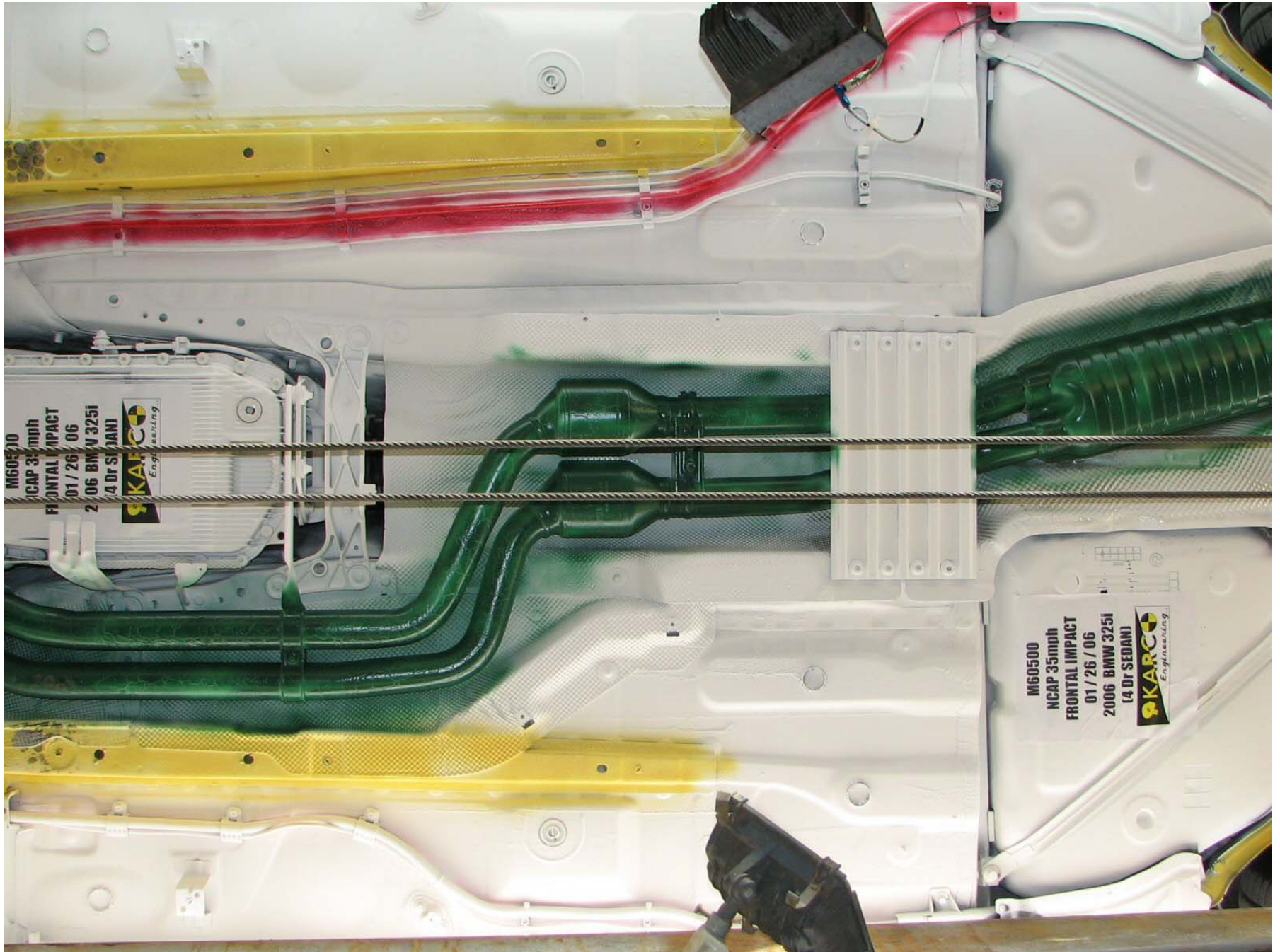


Figure A-26: Pre-Test Mid Underbody

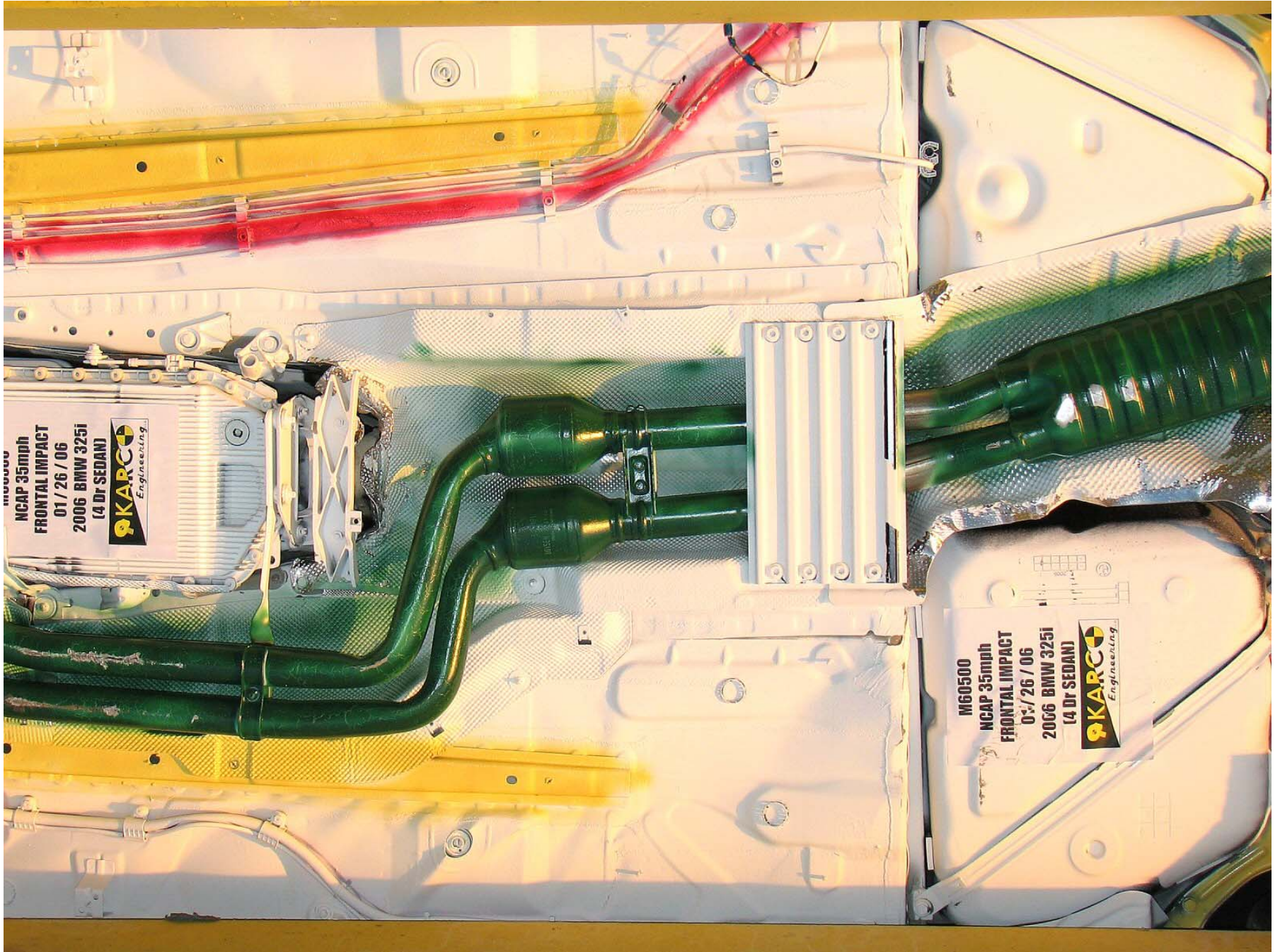


Figure A-27: Post-Test Mid Underbody

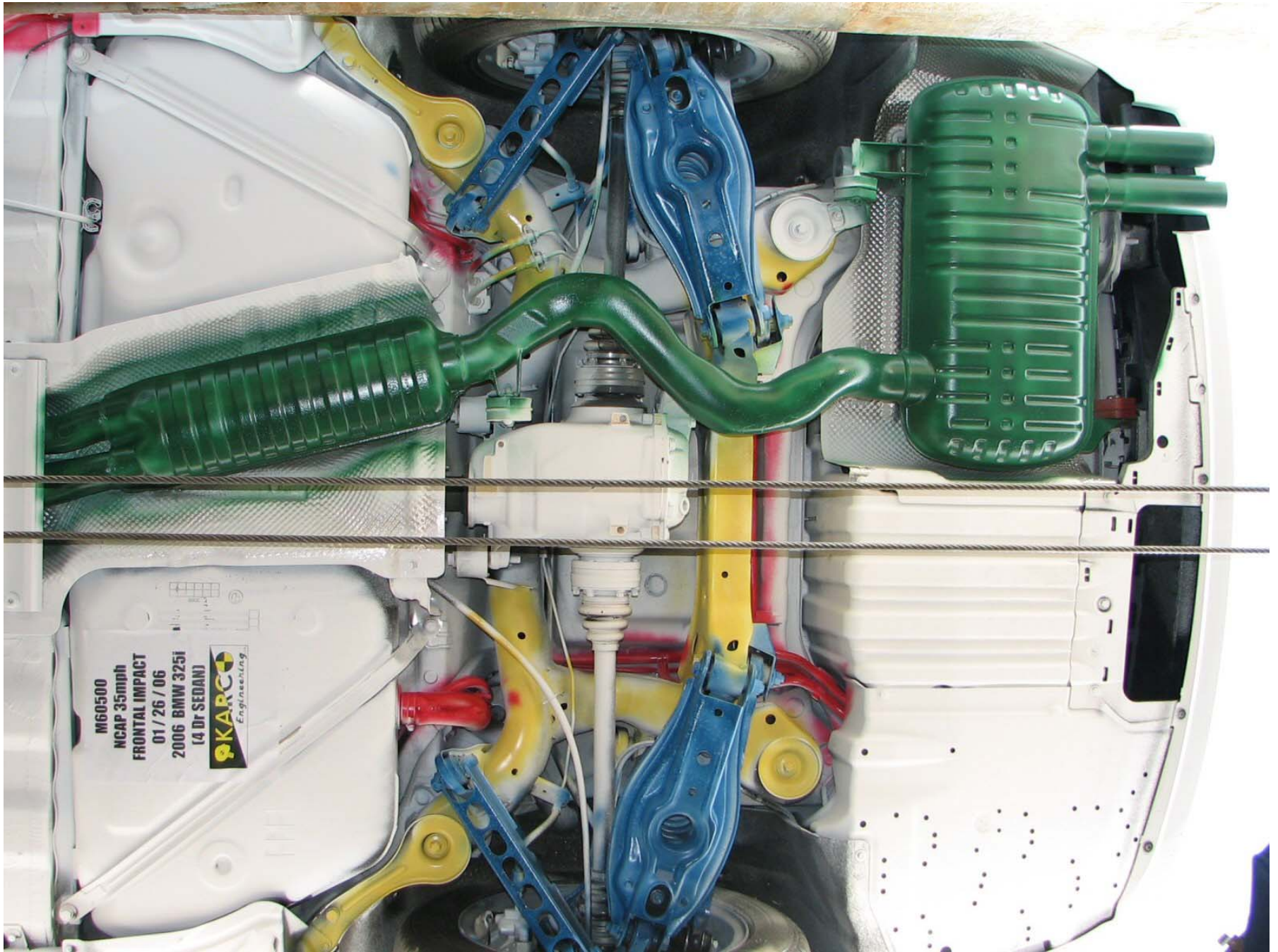


Figure A-28: Pre-Test Rear Underbody

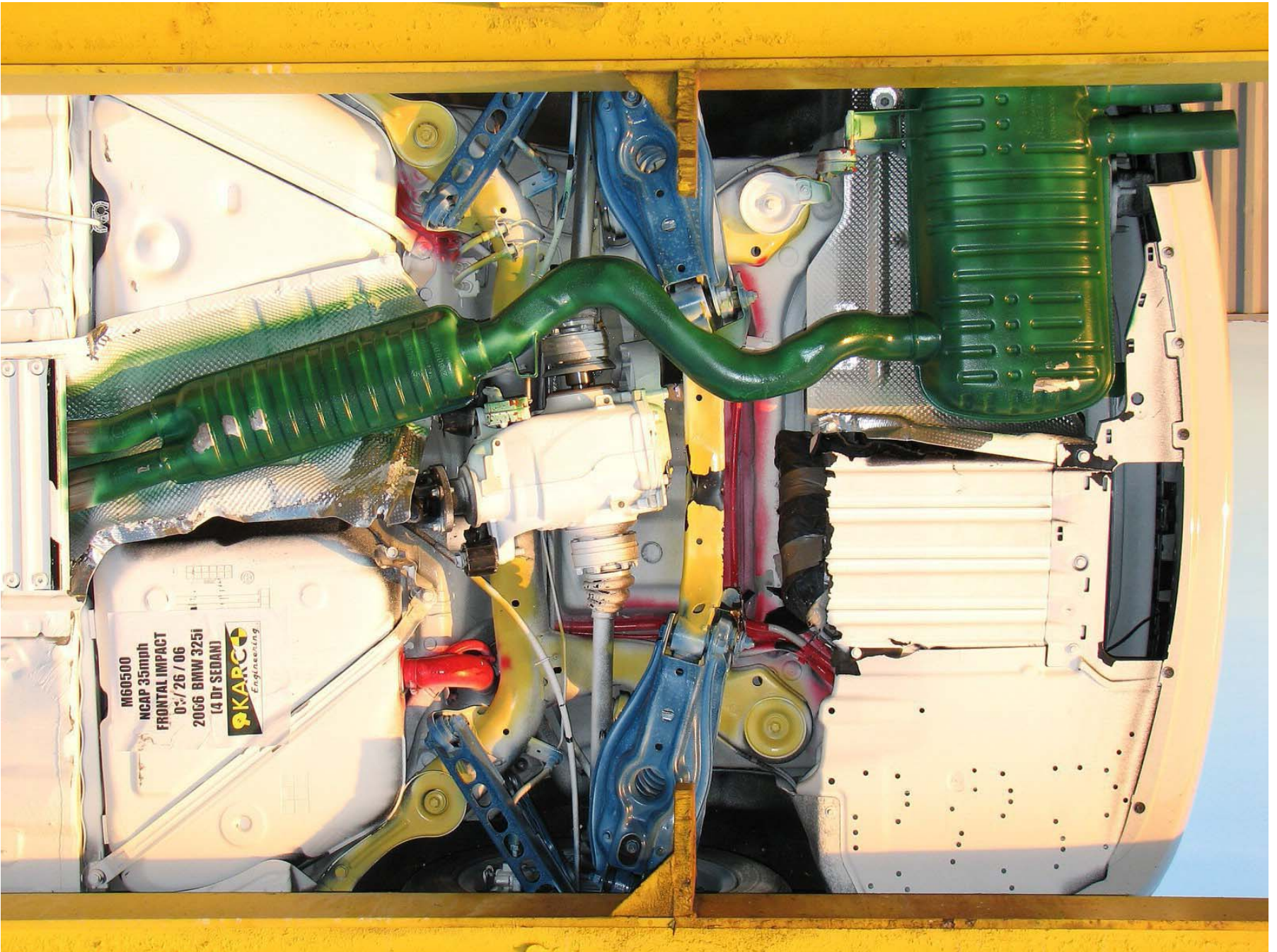


Figure A-29: Post-Test Rear Underbody



Figure A-30: Pre-Test Driver Dummy Front View (Head Position)



Figure A-31: Post-Test Driver Dummy Front View (Head Position)



Figure A-32: Pre-Test Driver Dummy (Through Window)



Figure A-33: Post-Test Driver Dummy (Through Window)



Figure A-34: Pre-Test Driver Dummy (Door Open)



Figure A-35: Post-Test Driver Dummy (Door Open)

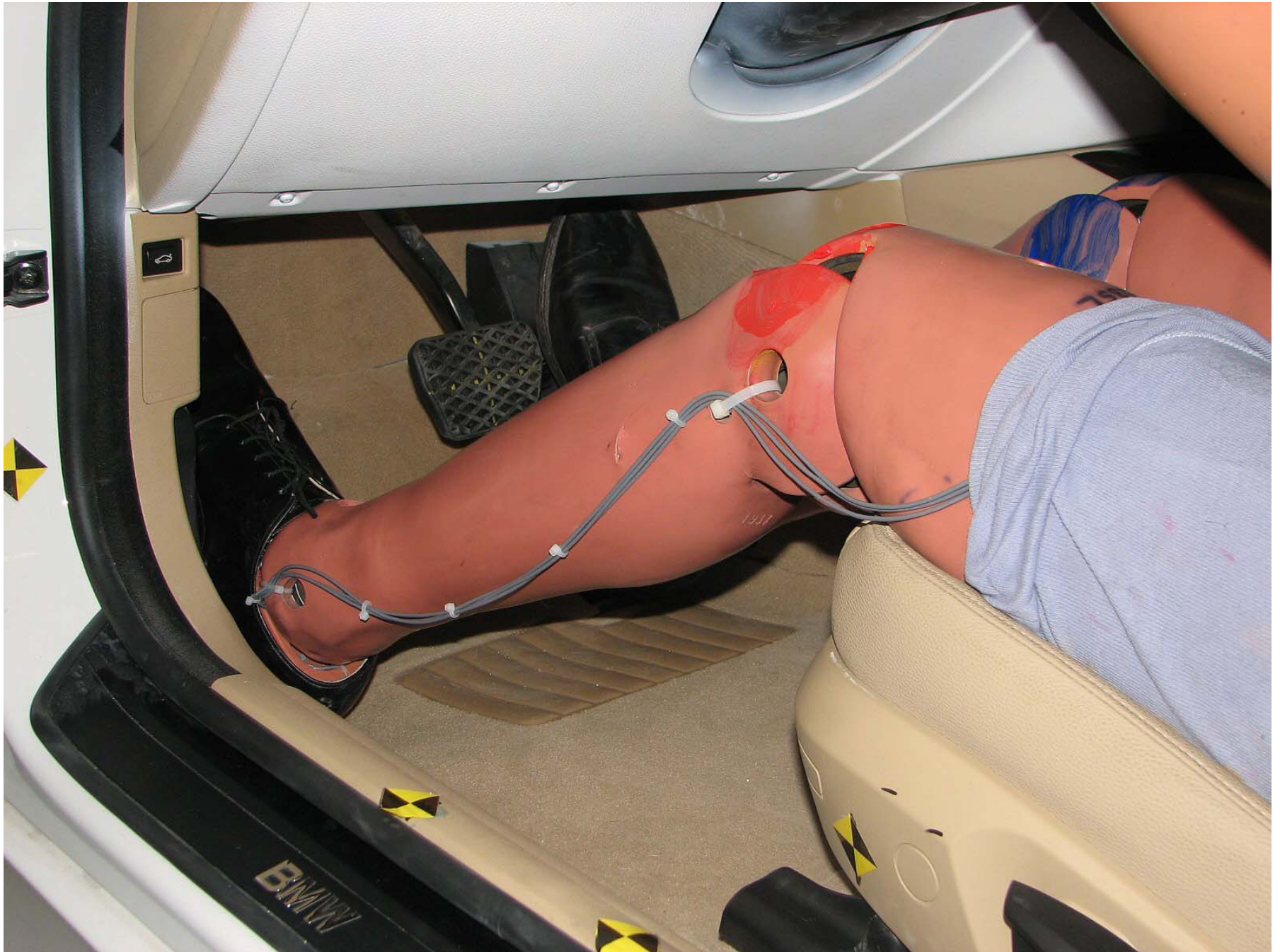


Figure A-36: Pre-Test Driver Dummy Feet



Figure A-37: Post-Test Driver Dummy Feet



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



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



Figure A-40: Pre-Test Driver Side Floor Pan



Figure A-41: Post-Test Driver Side Floor Pan



Figure A-42: Post-Test Driver Dummy Head



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



Figure A-44: Pre-Test Passenger Dummy Front View (Head Position)



Figure A-45: Post-Test Passenger Dummy Front View (Head Position)



Figure A-46: Pre-Test Passenger Dummy (Through Window)



Figure A-47: Post-Test Passenger Dummy (Through Window)



Figure A-48: Pre-Test Passenger Dummy (Door Open)



Figure A-49: Post-Test Passenger Dummy (Door Open)



Figure A-50: Pre-Test Passenger Dummy Feet



Figure A-51: Post-Test Passenger Dummy Feet



Figure A-52: Pre-Test Passenger Side Glove Box



Figure A-53: Post-Test Passenger Side Glove Box



Figure A-54: Pre-Test Passenger Side Floor Pan



Figure A-55: Post-Test Passenger Side Floor Pan



Figure A-56: Post-Test Passenger Dummy Head



Figure A-57: Post-Test Passenger Dummy Airbag Contact

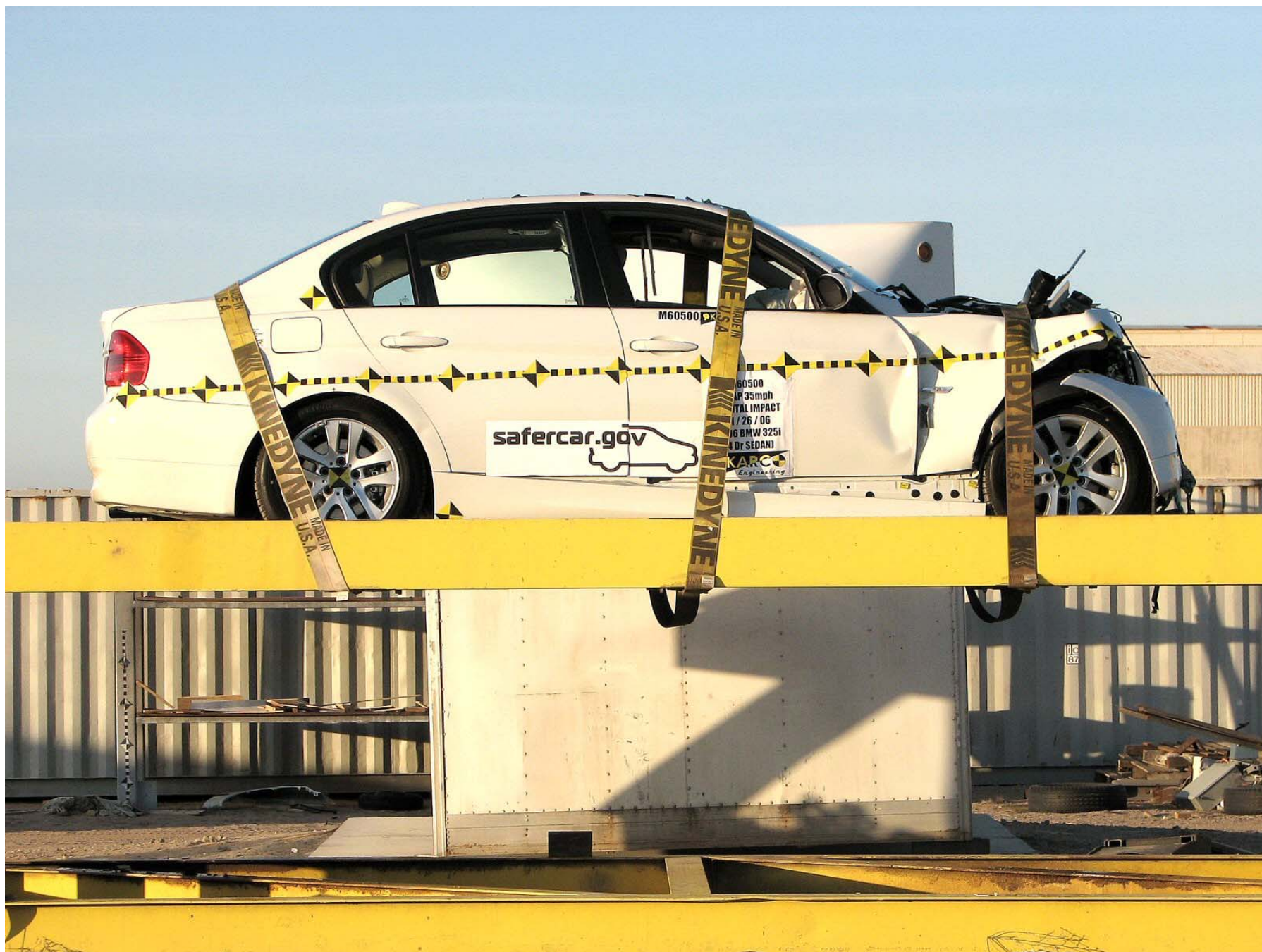


Figure A-58: Vehicle on Rollover Device (0°)



Figure A-59: Vehicle on Rollover Device (90°)



Figure A-60: Vehicle on Rollover Device (180°)

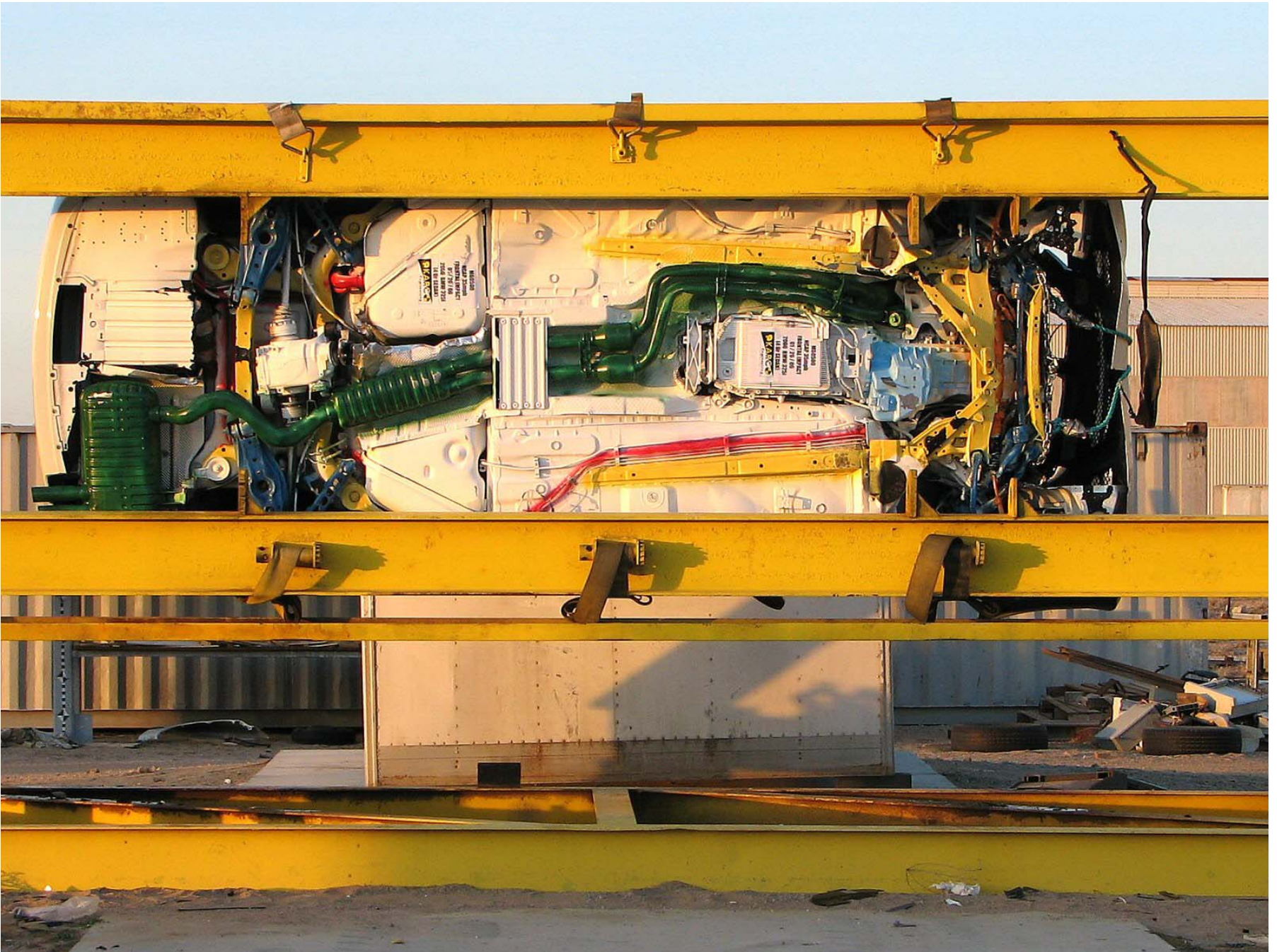


Figure A-61: Vehicle on Rollover Device (270°)



Figure A-62: Vehicle Impact

APPENDIX B

DATA PLOTS

LIST OF DATA PLOTS

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

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)

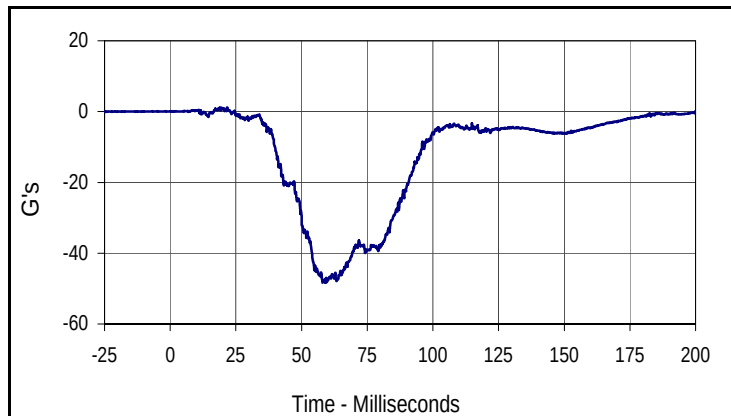
Passenger Chest Redundant Y
Passenger Chest Redundant Z
Passenger Chest Resultant Redundant
Passenger Chest Redundant X Velocity
Passenger Chest Redundant X Displacement
Passenger Chest Displacement
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Pelvis Resultant
Passenger Pelvis X 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)

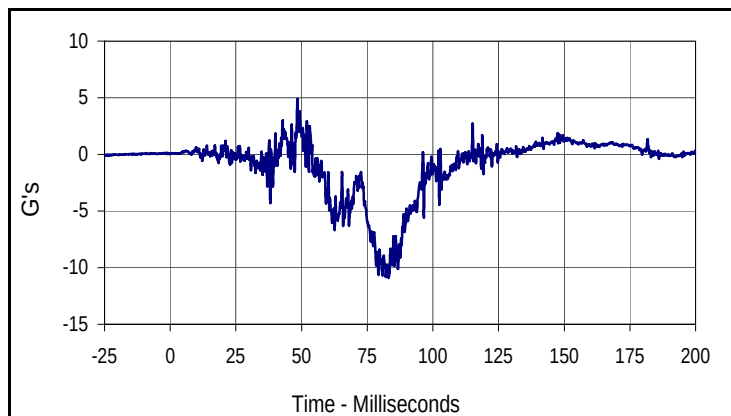
Vehicle Left Rear X Displacement
Vehicle Right Rear X
Vehicle Right Rear X Velocity
Vehicle Right Rear X Displacement
Vehicle Engine Top
Vehicle Engine Top Velocity
Vehicle Engine Top Displacement
Vehicle Engine Bottom
Vehicle Engine Bottom Velocity
Vehicle Engine Bottom Displacement
Vehicle Left Brake 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: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

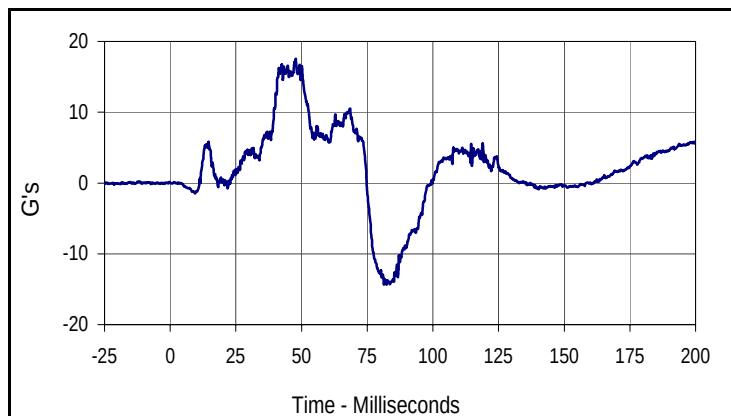
Test Date: 1/26/06
 NHTSA No.: M60500



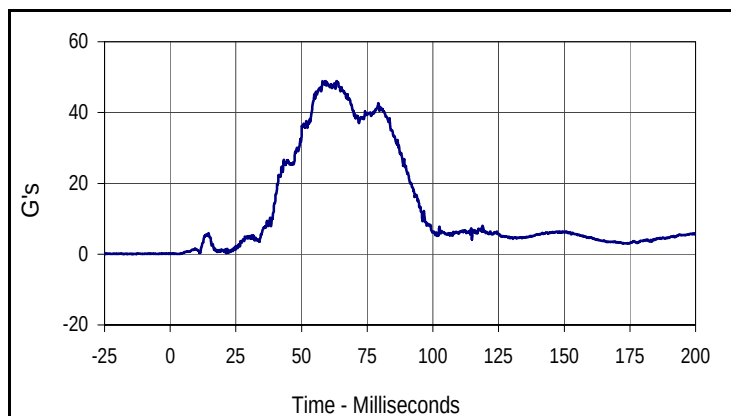
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Driver Head Primary X			
CURNO	Type	SAE Class	Units
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Max	Time	Min	Time
1.2	21.7	-48.4	59.1



Curve Description			
Driver Head Primary Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.9	48.4	-10.9	83.2



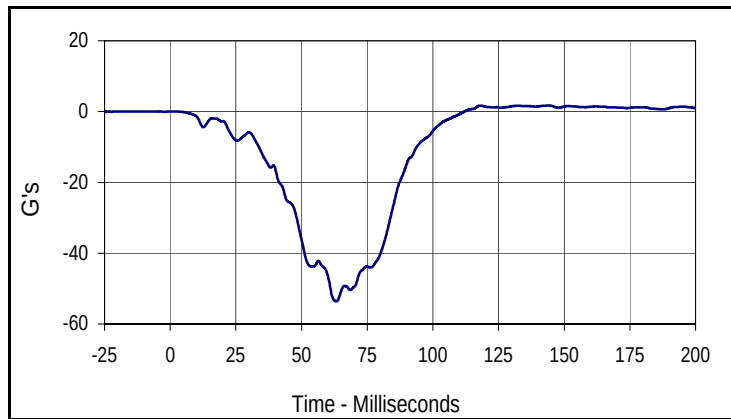
Curve Description			
Driver Head Primary Z			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
17.6	47.8	-14.3	82.3



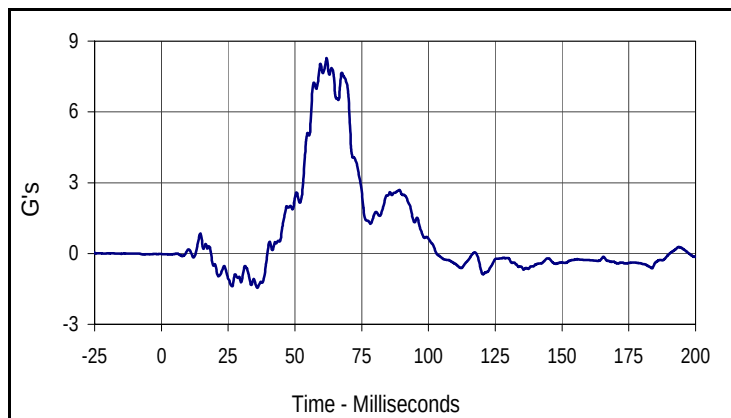
Curve Description			
Driver Head Resultant Primary			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
48.9	59.1	0.1	2.8

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

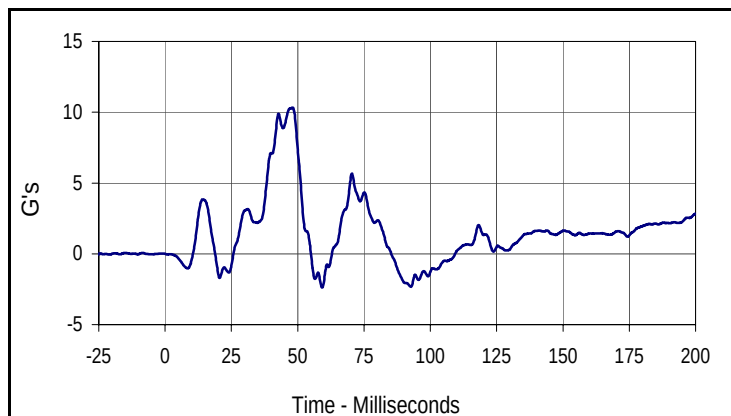
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 NHTSA No.: M60500



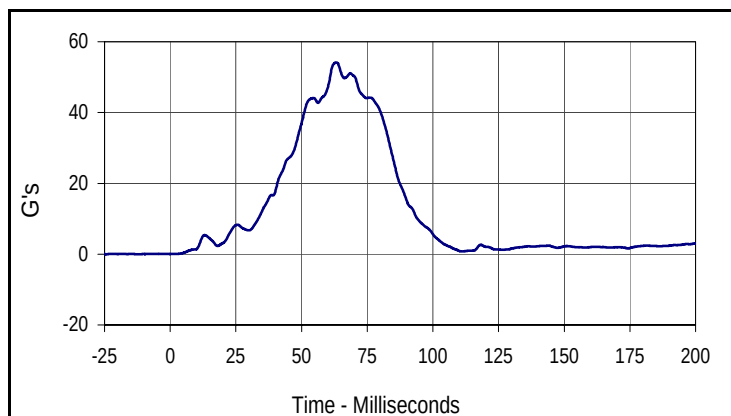
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Driver Chest Primary X			
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Max	Time	Min	Time
1.7	144.1	-53.6	63.2



Curve Description			
Driver Chest Primary Y			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
8.3	61.9	-1.4	35.9



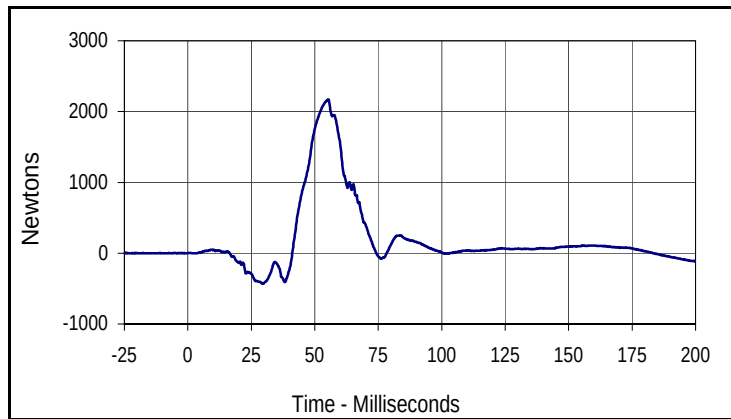
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Driver Chest Primary Z			
CURNO	Type	SAE Class	Units
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Max	Time	Min	Time
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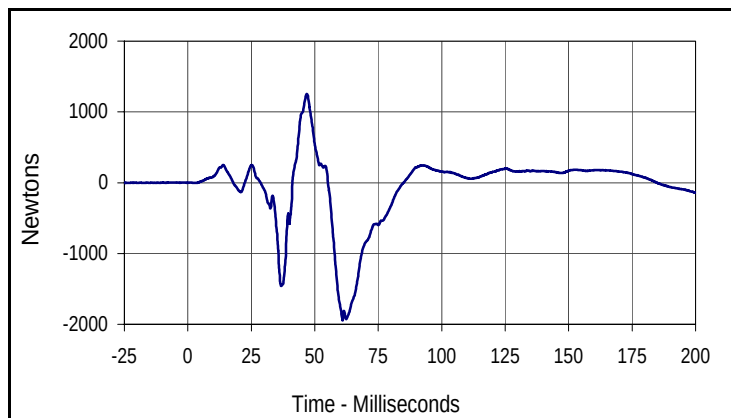
Curve Description			
Driver Chest Resultant Primary			
CURNO	Type	SAE Class	Units
004	RES	180	G's
Max	Time	Min	Time
54.1	63.3	0.0	0.0

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

Test Date: 1/26/06
 NHTSA No.: M60500



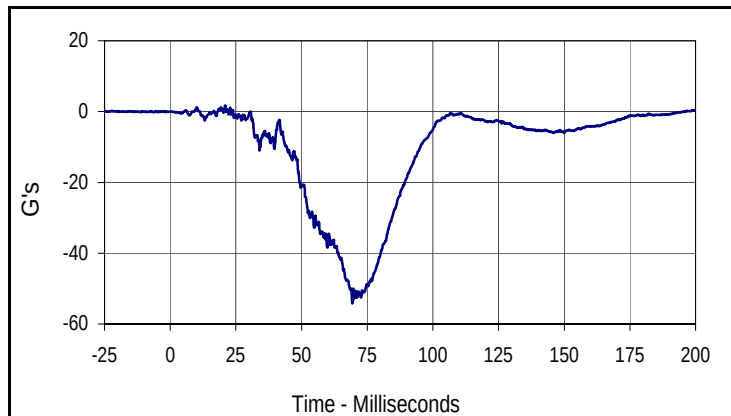
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Driver Left Femur Force Z			
CURNO	Type	SAE Class	Units
007	FIL	600	Newtons
Max	Time	Min	Time
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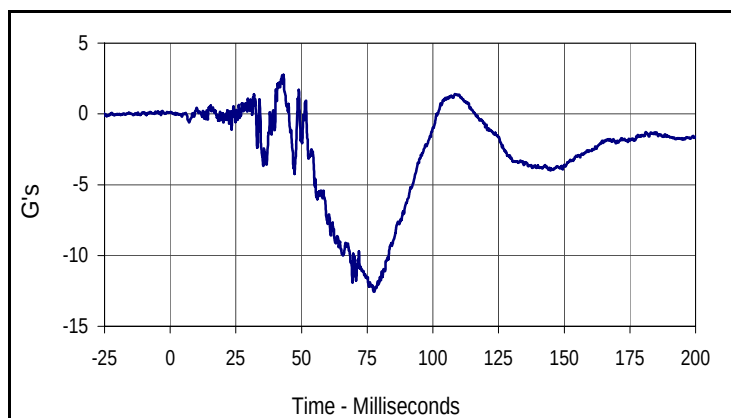
Curve Description			
Driver Right Femur Force Z			
CURNO	Type	SAE Class	Units
008	FIL	600	Newtons
Max	Time	Min	Time
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Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

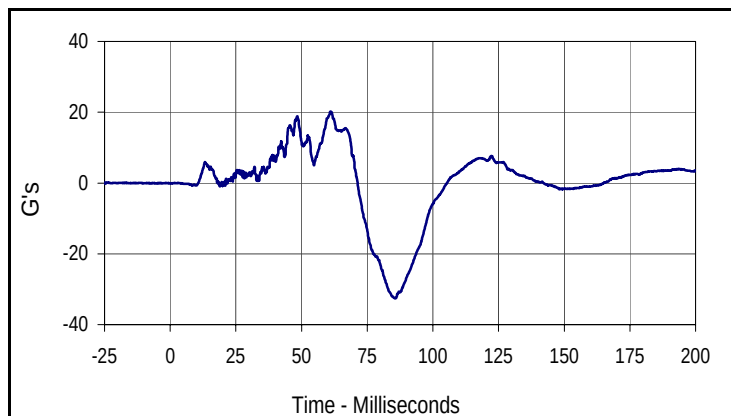
Test Date: 1/26/06
 NHTSA No.: M60500



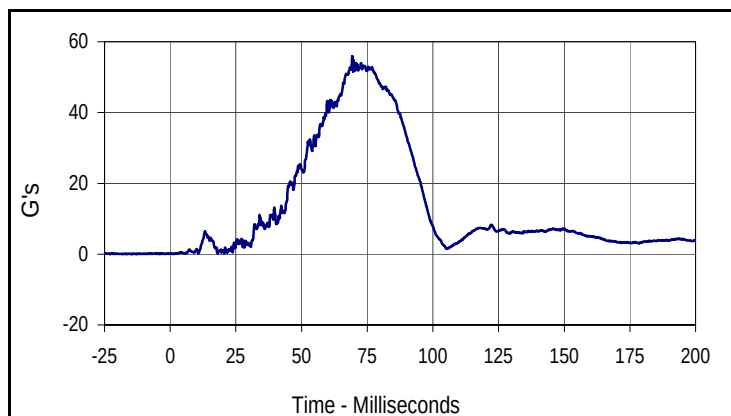
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1.7	20.9	-54.1	69.3



Curve Description			
Passenger Head Primary Y			
CURNO	Type	SAE Class	Units
010	FIL	1000	G's
Max	Time	Min	Time
2.8	43.1	-12.6	77.5



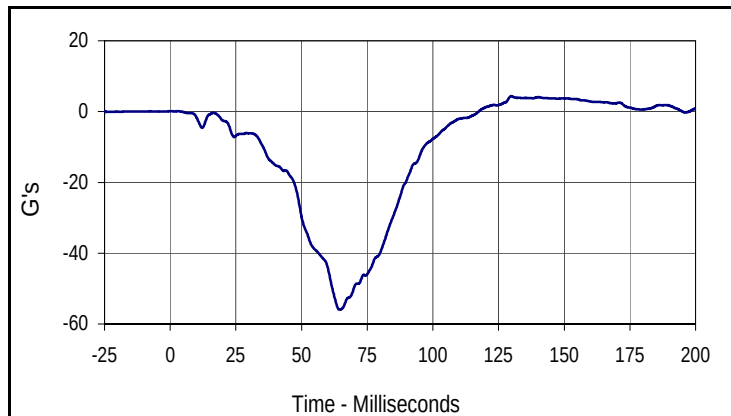
Curve Description			
Passenger Head Primary Z			
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011	FIL	1000	G's
Max	Time	Min	Time
20.2	61.0	-32.6	85.6



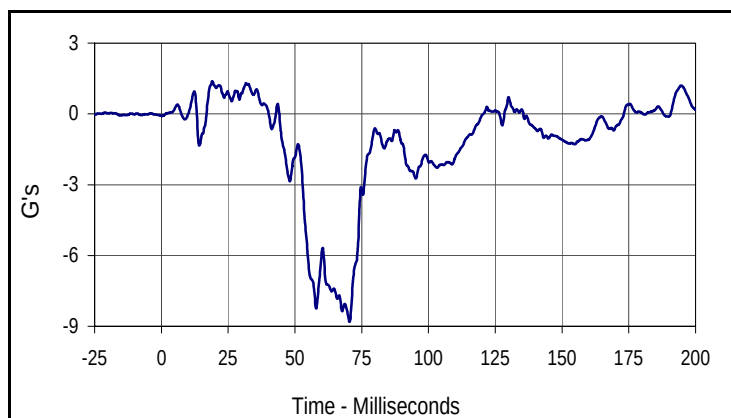
Curve Description			
Passenger Head Resultant Primary			
CURNO	Type	SAE Class	Units
009	RES	1000	G's
Max	Time	Min	Time
55.9	69.3	0.0	1.0

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

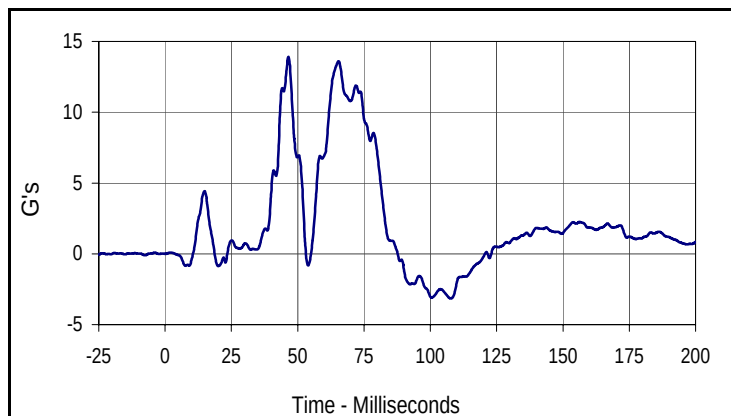
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 NHTSA No.: M60500



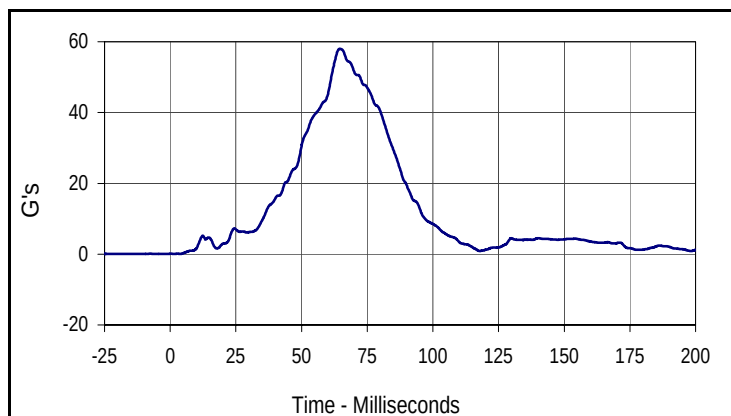
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Passenger Chest Primary X			
CURNO	Type	SAE Class	Units
012	FIL	180	G's
Max	Time	Min	Time
4.4	129.8	-55.9	64.5



Curve Description			
Passenger Chest Primary Y			
CURNO	Type	SAE Class	Units
013	FIL	180	G's
Max	Time	Min	Time
1.4	19.1	-8.8	70.4



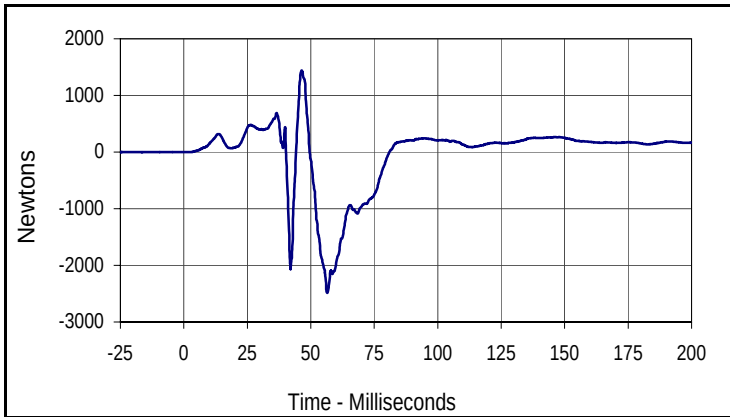
Curve Description			
Passenger Chest Primary Z			
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014	FIL	180	G's
Max	Time	Min	Time
13.9	46.5	-3.1	107.7



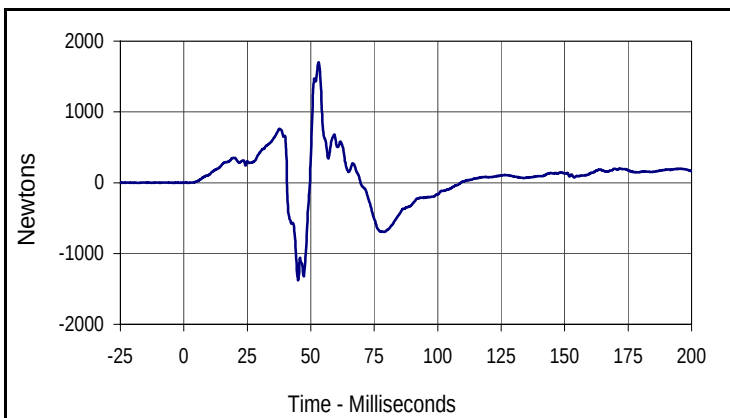
Curve Description			
Passenger Chest Resultant Primary			
CURNO	Type	SAE Class	Units
012	RES	180	G's
Max	Time	Min	Time
58.0	64.6	0.1	3.9

Test Vehicle: 2006 BMW 325i 4-Door Sedan
 Test Program: 2006 NHTSA 35mph NCAP

Test Date: 1/26/06
 NHTSA No.: M60500



Curve Description			
Passenger Left Femur Force Z			
CURNO	Type	SAE Class	Units
015	FIL	600	Newtons
Max	Time	Min	Time
1439.4	46.4	-2485.5	56.5



Curve Description			
Passenger Right Femur Force Z			
CURNO	Type	SAE Class	Units
016	FIL	600	Newtons
Max	Time	Min	Time
1700.9	53.1	-1374.2	45.0

APPENDIX C

DUMMY CALIBRATION DATA

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

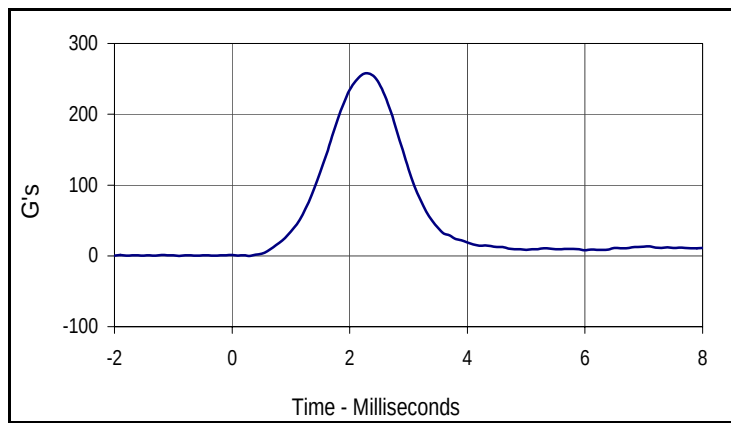
Test Date: 1/19/06

ATD Serial No.: 034

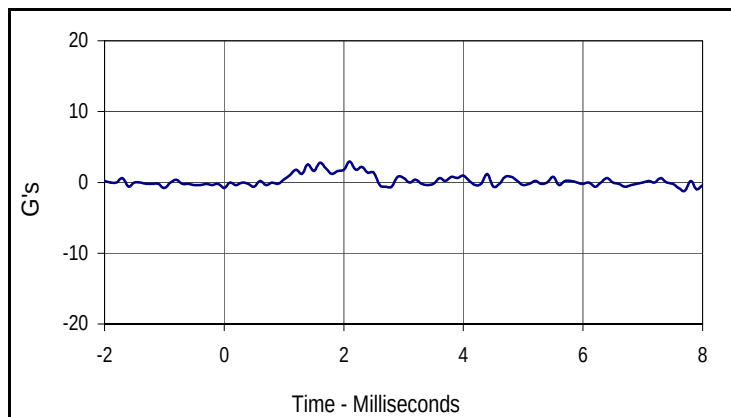
Test I.D.: HD01A



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	258.0	Pass
Peak Lateral Acceleration	G's	≤15.0	3.0	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
258.0	2.3	0.1	-0.9



Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.0	2.1	-0.8	-1.0

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

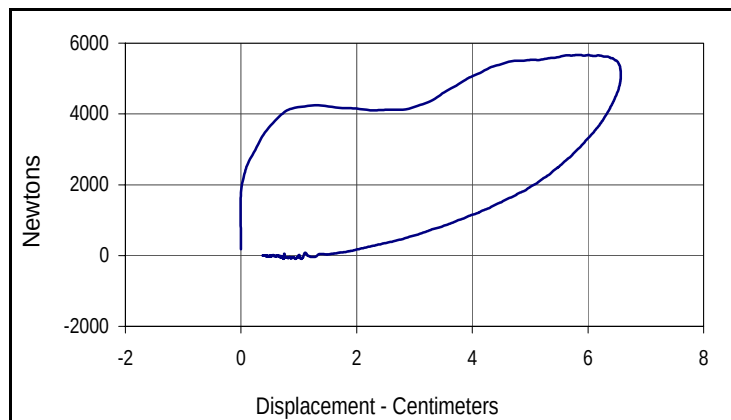
Test Date: 1/19/06

ATD Serial No.: 034

Test I.D.: CH01A



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	5670	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.57	Pass
Internal Hysteresis	%	69 to 85	75.1	Pass
Overall Test Results				Pass



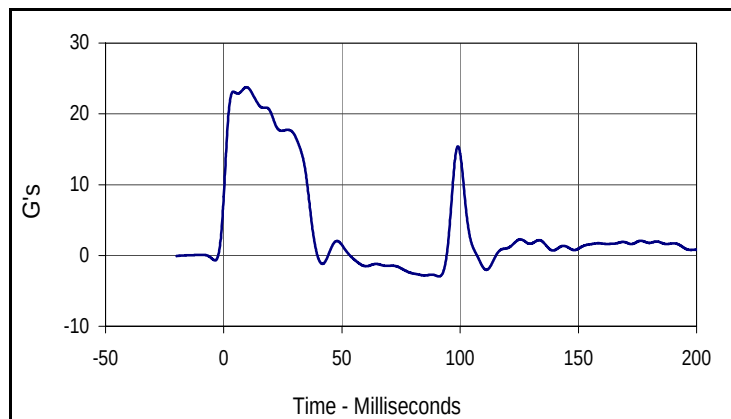
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
001	FIL	180	75.1
Peak Probe Force		Peak Chest Deflection	
5670		6.57	

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
 ATD Serial No.: 034

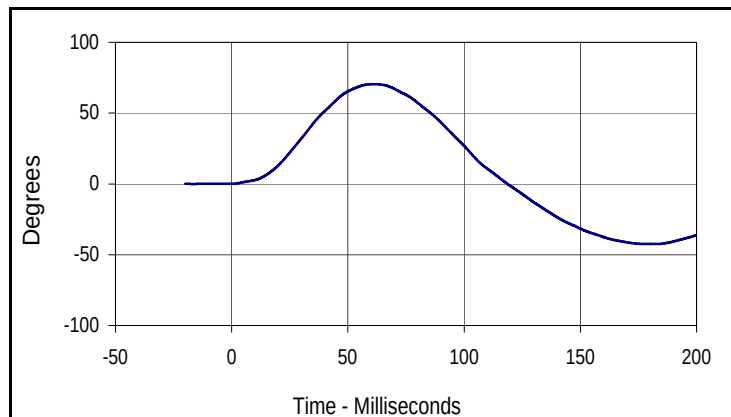
Test Date: 1/19/06
 Test I.D.: NF01A



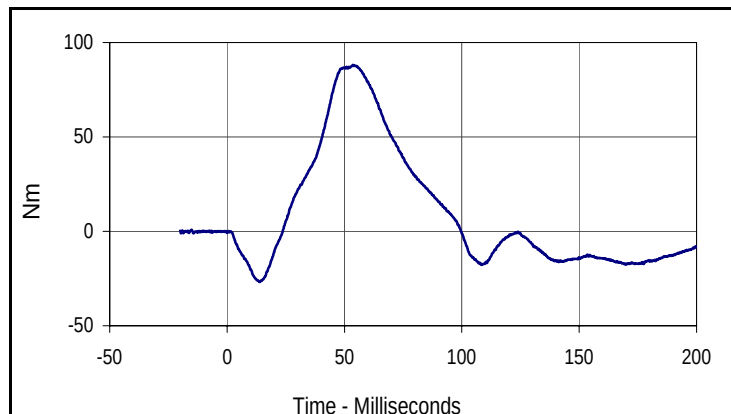
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.98	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.8	Pass
	20 Msec.	G's	17.6 to 22.6	20.1	Pass
	30 Msec.	G's	12.5 to 18.5	17.0	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	17.0	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	37.1	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	70.4	Pass
	Time	Msec.	57.0 to 64.0	60.9	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	118.6	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	88.1	Pass
	Time	Msec.	47.0 to 58.0	53.6	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	99.8	Pass
Overall Test Results				Pass	



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
23.8	9.6	-3.0	91.0



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
70.4	60.9	-42.4	181.8



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
88.1	53.6	-26.8	13.8

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

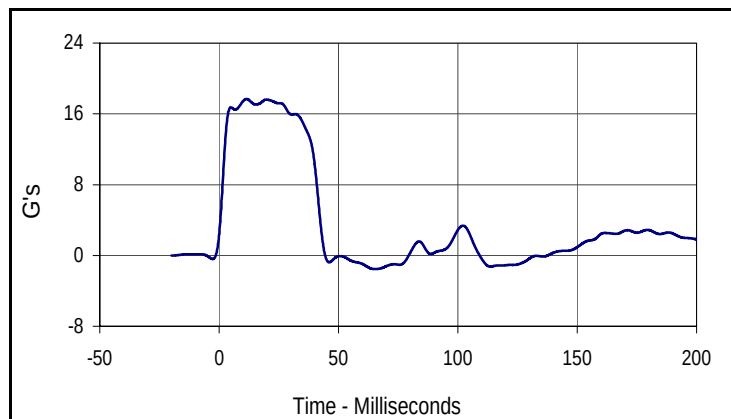
Test Date: 1/19/06

ATD Serial No.: 034

Test I.D.: NE01A



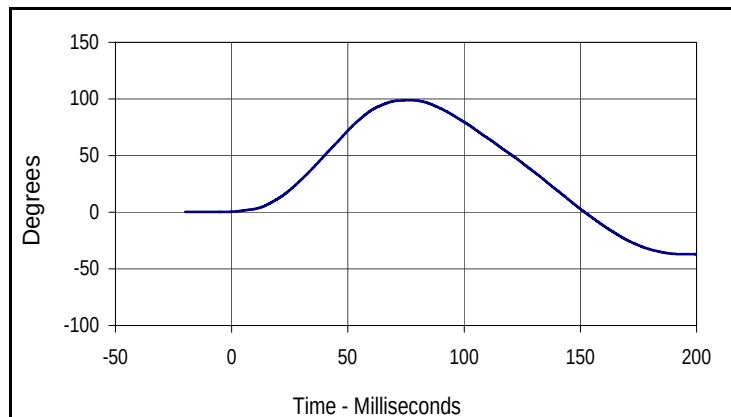
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.00	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	17.4	Pass
	20 Msec.	G's	14.0 to 19.0	17.6	Pass
	30 Msec.	G's	11.0 to 16.0	15.9	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	16.0	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	42.0	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	98.8	Pass
	Time	Msec.	72.0 to 82.0	76.8	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	151.9	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-72.1	Pass
	Time	Msec.	65.0 to 79.0	68.1	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	137.8	Pass
Overall Test Results				Pass	



Curve Description

Pendulum Deceleration

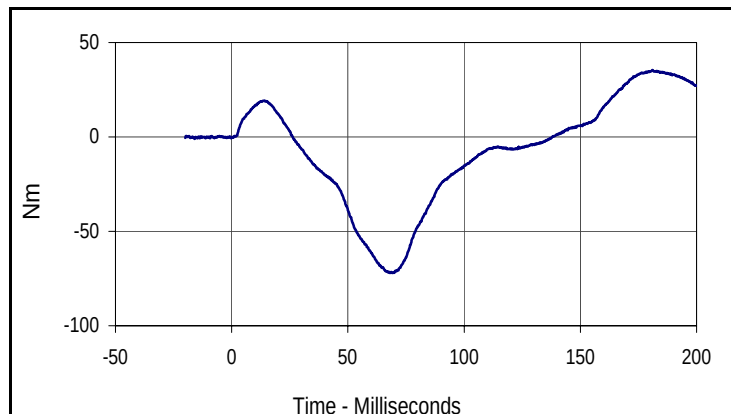
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
17.7	11.5	-1.5	65.2



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
98.8	76.8	-37.1	196.4



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
35.5	181.0	-72.1	68.1

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

Test Date: 1/19/06

ATD Serial No.: 034

Test I.D.: LK01A , RK01A

**Left Knee**

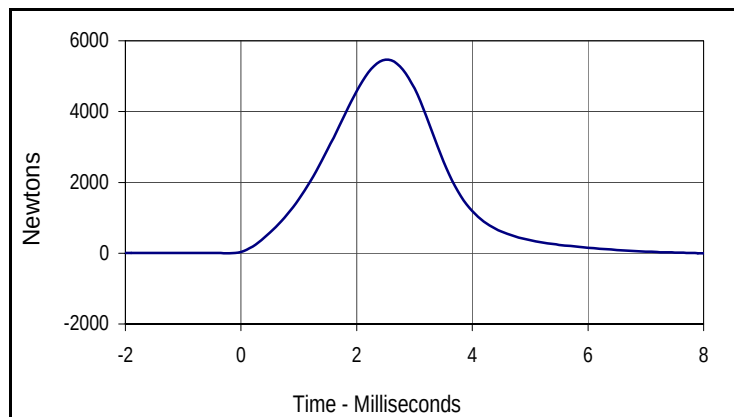
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5499	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5465	Pass
Overall Test Results				Pass

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

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5498.8	2.5	-9.1	8.1

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

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5465.2	2.5	-195.5	9.7

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 1/19/06

ATD Serial No.: 034

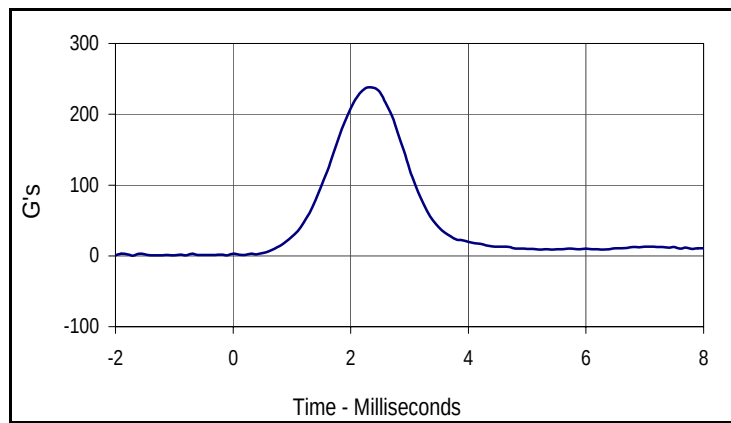
Test I.D.: N/A



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	86	Pass
D - "H" point from seat back	mm	135 to 140	139	Pass
E - Shoulder pivot from back	mm	84 to 94	86	Pass
F - Thigh clearance	mm	140 to 155	148	Pass
G - Elbow back to wrist pivot	mm	290 to 305	295	Pass
H - Skull cap to back line	mm	41 to 46	45	Pass
I - Shoulder to elbow length	mm	330 to 345	335	Pass
J - Elbow rest height	mm	190 to 211	198	Pass
K - Buttock to knee length	mm	579 to 604	600	Pass
L - Popliteal length	mm	429 to 455	450	Pass
M - Knee pivot height	mm	485 to 500	490	Pass
N - Buttock popliteal length	mm	452 to 477	470	Pass
O - Chest depth	mm	213 to 229	215	Pass
P - Foot length	mm	251 to 267	265	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	985	Pass
Z - Waist circumference	mm	836 to 866	850	Pass
AA - Location for chest circumference	mm	429 to 434	431	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
Overall Test Results				Pass

Test Program: Hybrid III 50th Percentile Male Head Drop TestTest Date: 1/19/06ATD Serial No.: 035Test I.D.: HD01B

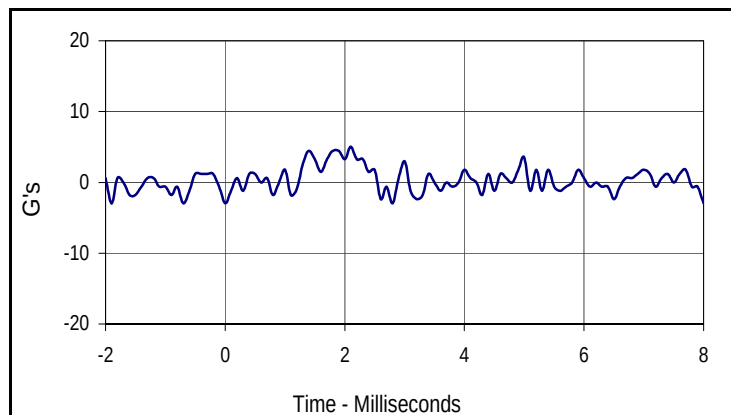
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	237.9	Pass
Peak Lateral Acceleration	G's	≤15.0	5.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results			Pass	



Curve Description

Head Resultant

CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
237.9	2.3	0.4	-1.7



Curve Description

Head Y

CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.0	2.1	-2.9	-1.9

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

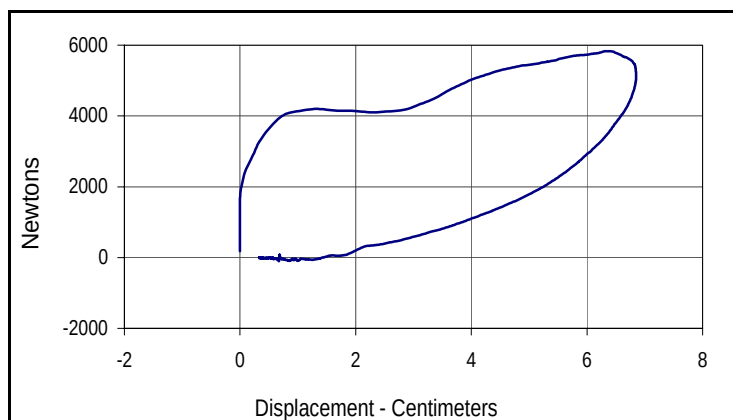
Test Date: 1/19/06

ATD Serial No.: 035

Test I.D.: CH01A



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	6.70	Pass
Peak Probe Force	Newtons	5159 to 5893	5829	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.85	Pass
Internal Hysteresis	%	69 to 85	74.5	Pass
Overall Test Results				Pass



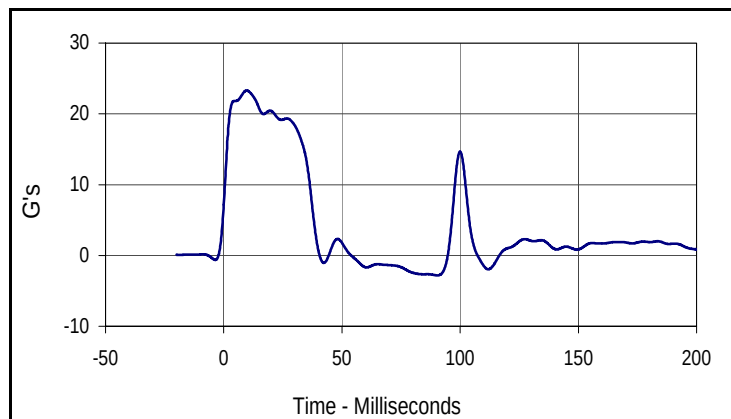
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
001	FIL	180	74.5
Peak Probe Force		Peak Chest Deflection	
5829		6.85	

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

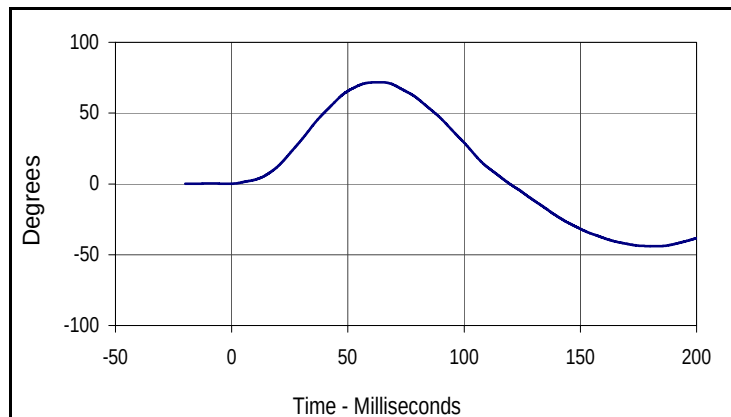
Test Date: 1/19/06
 Test I.D.: NF01B



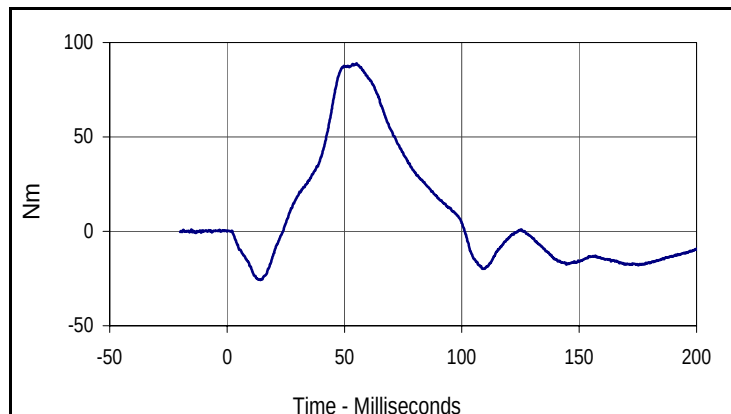
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.11	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.3	Pass
	20 Msec.	G's	17.6 to 22.6	20.4	Pass
	30 Msec.	G's	12.5 to 18.5	18.4	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	18.4	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	38.1	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	71.8	Pass
	Time	Msec.	57.0 to 64.0	63.7	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	119.6	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	89.0	Pass
	Time	Msec.	47.0 to 58.0	55.1	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	101.3	Pass
Overall Test Results				Pass	



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
23.3	9.7	-2.8	90.4



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
71.8	63.7	-44.0	183.4



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
89.0	55.1	-25.8	14.1

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

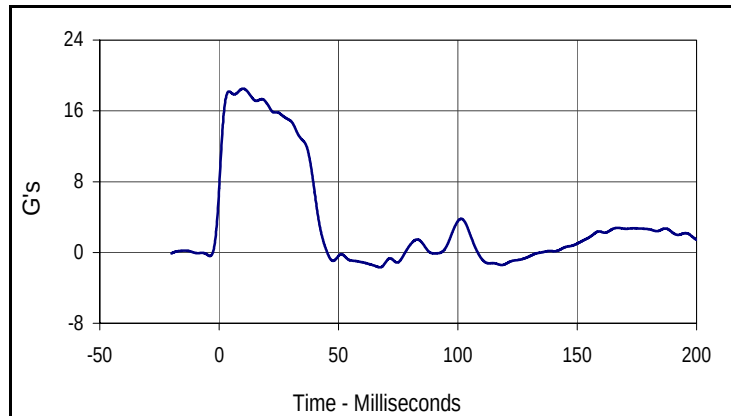
Test Date: 1/19/06

ATD Serial No.: 035

Test I.D.: NE01B



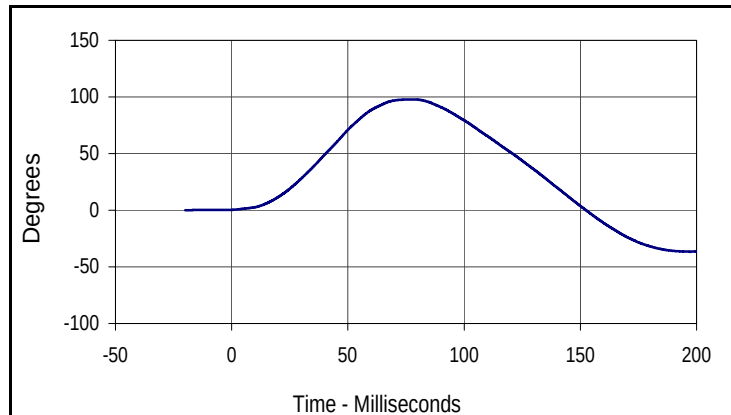
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.11	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	18.5	Pass
	20 Msec.	G's	14.0 to 19.0	16.9	Pass
	30 Msec.	G's	11.0 to 16.0	14.9	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	14.9	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	41.0	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	97.9	Pass
	Time	Msec.	72.0 to 82.0	78.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	152.5	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-68.3	Pass
	Time	Msec.	65.0 to 79.0	68.0	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	139.2	Pass
Overall Test Results				Pass	



Curve Description

Pendulum Deceleration

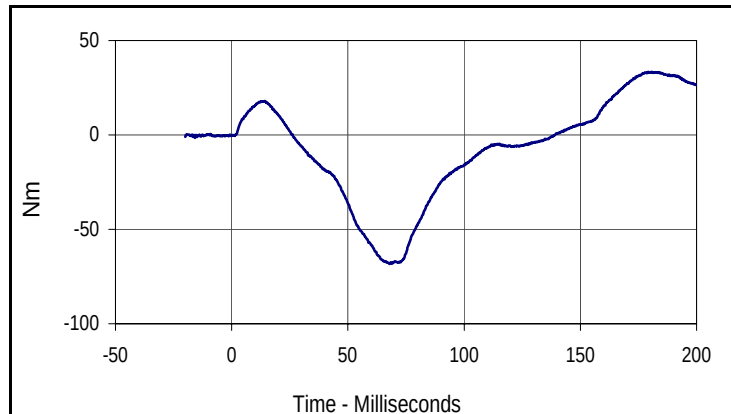
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
18.5	10.0	-1.7	67.4



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
97.9	78.0	-36.6	197.1



Curve Description

Moment About Occipital Condyle

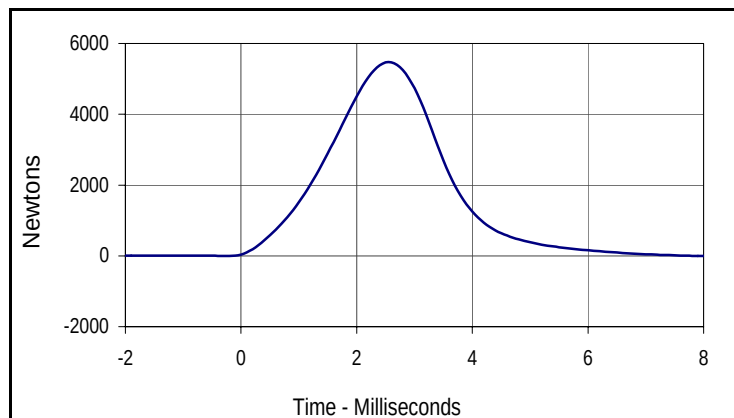
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
33.5	180.7	-68.3	68.0

Test Program: Hybrid III 50th Percentile Male Knee Impact TestTest Date: 1/19/06ATD Serial No.: 034Test I.D.: LK01B , RK01B**Left Knee**

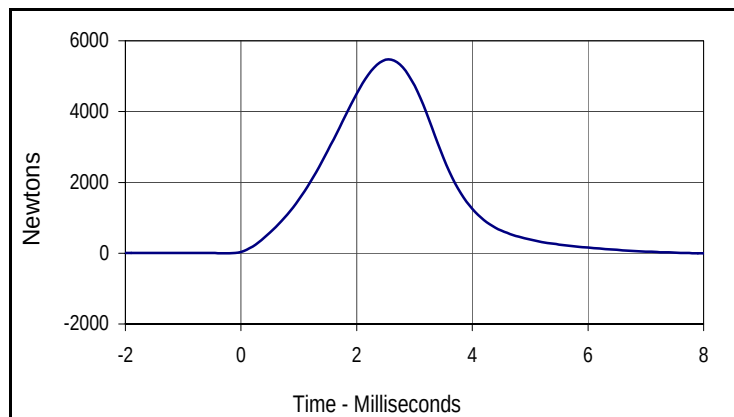
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5468	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5468	Pass
Overall Test Results				Pass

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

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5467.6	2.6	-6.9	9.9

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

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5467.6	2.6	-6.9	9.9

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 1/19/06

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	885	Pass
B - Shoulder pivot height	mm	505 to 521	515	Pass
C - "H" point height	mm	84 to 89	85	Pass
D - "H" point from seat back	mm	135 to 140	139	Pass
E - Shoulder pivot from back	mm	84 to 94	86	Pass
F - Thigh clearance	mm	140 to 155	145	Pass
G - Elbow back to wrist pivot	mm	290 to 305	300	Pass
H - Skull cap to back line	mm	41 to 46	45	Pass
I - Shoulder to elbow length	mm	330 to 345	335	Pass
J - Elbow rest height	mm	190 to 211	210	Pass
K - Buttock to knee length	mm	579 to 604	600	Pass
L - Popliteal length	mm	429 to 455	451	Pass
M - Knee pivot height	mm	485 to 500	490	Pass
N - Buttock popliteal length	mm	452 to 477	475	Pass
O - Chest depth	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	255	Pass
V - Shoulder breadth	mm	422 to 437	430	Pass
W - Foot breadth	mm	91 to 107	105	Pass
Y - Chest circumference	mm	970 to 1001	985	Pass
Z - Waist circumference	mm	836 to 866	860	Pass
AA - Location for chest circumference	mm	429 to 434	430	Pass
BB - Location for waist circumference	mm	226 to 231	229	Pass
Overall Test Results				Pass