REPORT NUMBER TR-P26001-07-NC

NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST

TOYOTA MOTOR CORPORATION
2006 LEXUS ES330
4-DOOR SEDAN

NHTSA NUMBER: M65101

PREPARED BY:
KARCO ENGINEERING, LLC
9270 HOLLY ROAD
ADELANTO, CALIFORNIA 92301

JANUARY 20, 2006

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NVS-111
400 SEVENTH STREET, SW, ROOM 5311
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 DTNH22-01-D-02005.

Prepared by: _____ Date: January 20, 2006
Mr. Elie W. Helou, Project Engineer
KARCO Engineering, LLC

Reviewed by: _____ Date: January 20, 2006
Mr. Michael L. Dunlap, T&E Manager
KARCO Engineering, LLC

Approved by: _____ Date: January 20, 2006
Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC

FINAL REPORT ACCEPTED BY:

_____
Manager, New Car Assessment Program

_____
Date of Acceptance

_____
COTR, NCAP Frontal Impact Program

_____
Date of Acceptance

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipients Catalog No.
TR-P26001-07-NC		

4. Title and Subtitle
Final Report of New Car Assessment Program Testing of a
2006 Lexus ES330 4-Door Sedan
NHTSA No. M65101

5. Report Date
January 20, 2006

6. Performing Organization Code
KAR

7. Authors
Mr. Elie Helou, Project Engineer, Karco
Mr. Frank Richardson, Program Manager, Karco

8. Performing Organization Report No.
TR-P26001-07-NC

9. Performing Organization Name and Address
Karco Engineering, LLC
9270 Holly Rd.
Adelanto, CA, 92301

10. Work Unit No.

11. Contract or Grant No.
DTNH22-01-D-02005

12. Sponsoring Agency Name and Address
U. S. Department of Transportation
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
Mail Code NPS-111
400 Seventh Street, SW, Room 5311
Washington, D.C 20590

13. Type of Report and Period Covered
Final Test Report
Option Year 5

14. Sponsoring Agency Code
DOT/NHTSA/NRM/OCS

15. Supplementary Notes

16. Abstract

A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2006 Lexus ES330 4-Door Sedan at Karco Engineering, LLC on 1/20/06. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity is 56.43 km/h. The ambient temperature at the barrier face at the time of impact is 12.0 degrees Celcius. The vehicle's maximum post-test static crush is 525 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	374.3	561.9
Max. Chest Accel. (3 msec Clip)	G's	60	42.9	40.9
Left Femur Force	Newtons	10008	-3055.1	-2867.7
Right Femur Force	Newtons	10008	-4442.9	-1777.3

17. Key Words
56.3 km/h NCAP Frontal Barrier Impact Test
New Car Assessment Program (NCAP)
2006 Lexus ES330 4-Door Sedan
NHTSA No. M65101

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

19. Security Classification (this report)	20. Security Classification (this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	127	

Form DOT F1700.7 (8-72)

TABLE OF CONTENTS

SECTION 1
PURPOSE AND SUMMARY OF TEST M65101

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 2006. 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 Lexus ES330 4-Door Sedan at a velocity of 56.43 km/h. The test was performed at Karco Engineering, LLC on January 20, 2006.

Three (3) real-time and fourteen (14) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet number 14 (page number 24) of this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head (primary and redundant), chest (primary and redundant) and pelvis triaxial accelerometers, chest displacement potentiometers, six-axis upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were 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 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 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 525 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 contacted the airbag and the abdomen had no contact. 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	374.3	42.9	-32.0	-3055.1	-4442.9
Passenger	561.9	40.9	-20.3	-2867.7	-1777.3

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

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

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	^oF	^oC	=(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 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/h	56.43
Test Weight	kg	1825
Impact Angle	degrees	0
Average Rebound	mm	1500
Maximum Static Crush	mm	525

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	None
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	2
Total	15	2

DATA CHANNELS

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

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101

Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M65101	Anti-Lock Brakes	Yes
Make	Lexus	All Wheel Drive	No
Model	ES330	Power Steering	Yes
Body Style	4-Door Sedan	Driver Front Airbag	Yes
Vin No.	JTHBA30G665149818	Driver Side Airbag	Yes
Color	White	Driver Head Airbag	No
Delivery Date	1/3/2006	Driver Curtain Airbag	Yes
Odometer (Miles)	92.0	Pass. Airbag	Yes
Dealer	Crown Lexus	Pass. Side Airbag	Yes
Transmission	5-Speed Automatic	Pass. Head Airbag	No
Final Drive	Front	Pass. Curtain Airbag	Yes
Type/No. Cyl.	V6	Pre-Tensioners	Yes
Engine Disp. (L)	3.3	Load Limiters	Yes
Engine Placement	Transverse	Bucket Seats	Yes
Roof Rack	No	Air. Cond.	Yes
Sunroof/T-Top	Yes	AM/FM Cassette	Yes
Tinted Glass	Yes	Tilt Steering	Yes
Traction Control	No	Automatic Door Locks	Yes
Power Brakes	Yes	Power Windows	Yes
Front Disc	Yes	Power Seats	Yes
Rear Disc	Yes	Other	None

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Corporation	GVWR (kg)	2059
Date of Manufacture	Sep-05	GAWR Front (kg)	1211
		GAWR Rear (kg)	1034

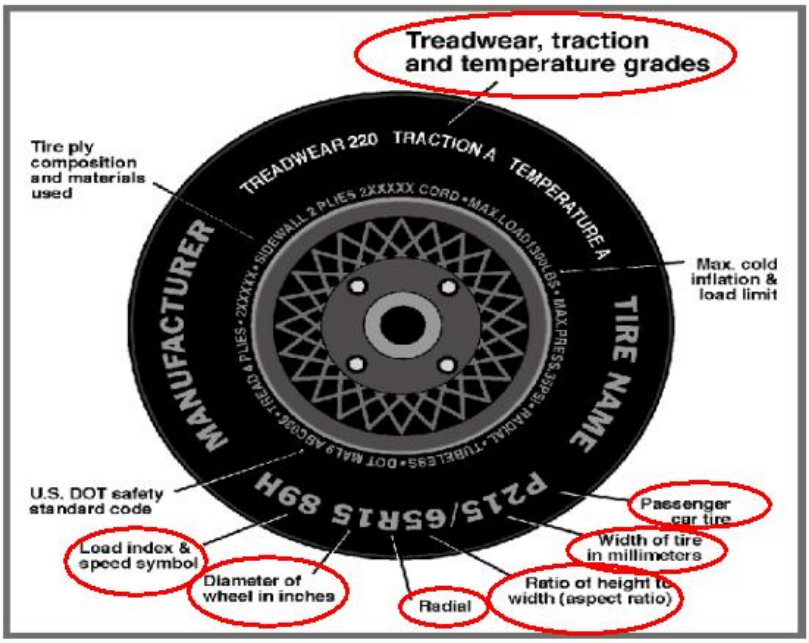
VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket		
Number of Occupants	2	3		5
Capacity Weight (VCW) (kg)				410
Cargo Weight (RCLW) (kg)				68

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

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

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)	300	300
Cold Pressure (kpa)	210	210
Recommended Tire Size	P215/55R17	P215/55R17
Tire Size on Vehicle	P215/55R17	P215/55R17
Tire Manufacturer	TOYO	TOYO
Treadwear	2210	2210
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester + 2 Steel + 1Nylon	2 Polyester + 2 Steel + 1Nylon
Load Index/Speed Symbol	93V	93V
Tire Material	Polyester + Steel + Nylon	Polyester + Steel + Nylon
DOT Safety Code Right	CXLM ALK 3205	CXLM ALK 3205
DOT Safety Code Left	CXLM ALK 3205	CXLM ALK 3205

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

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101

Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	483	325	807	518	411	929
Right	kg	492	309	801	511	385	895
Ratio	%	60.6	39.4	100	56.4	43.6	100
Totals	kg	974	634	1608	1029	796	1825

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1608
Weight of 2 P572 ATD's	kg	152
Rated Cargo/Luggage Wt. (RCLW)	kg	68
Calculated Vehicle Target Wt. (TVTW)	kg	1828

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	715	715	715	720	1072
As Tested	mm	697	704	676	684	1186

Vehicle Wheel Base (mm): 2720

Weight of Ballast Secured in cargo area (kg): 73

Weight of Items Removed (kg): 16

Vehicle Components Removed: Floor mats, Rear carpet in cargo area

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

FUEL SYSTEM DATA

Fuel System Capacity From Owners Manual (L): 70.02

Actual Test Volume with entire fuel System Filled (L): 65.10

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 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

SPEED TRAP DATA

Measured Parameter	Units	Requirement	Value
Trap No.1 Velocity (Primary)	km/h	55.51 to 57.12	56.43
Trap No.2 Velocity (Redun.)	km/h	55.51 to 57.12	56.54

VEHICLE STATIC CRUSH

Measured Parameter	Units	Pre-Test	Post-Test	Difference
Left Side	mm	4657	4274	-383
Center	mm	4845	4320	-525
Right Side	mm	4651	4266	-385

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1500
Center	mm	1445
Right Side	mm	1554
Average	mm	1500

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

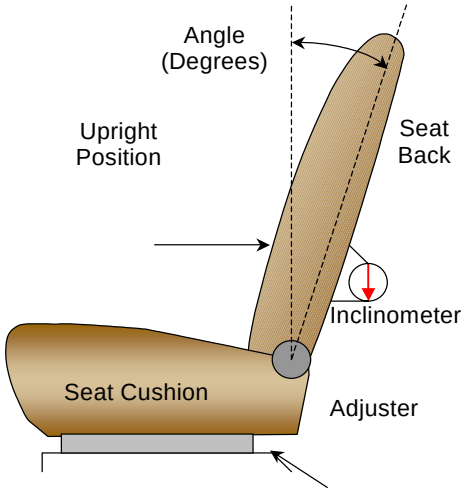
Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

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	3.0 @ headrest
Passenger w/seated Dummy	3.0 @ headrest



FRONT SEAT ASSEMBLY

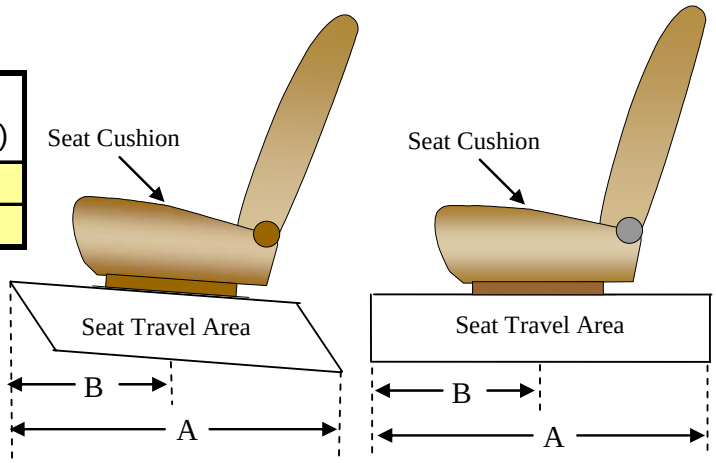
SEAT FORE/AFT POSITIONS

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	262 mm	131 mm
Passenger Seat	262 mm	131 mm

.



SEAT BELT UPPER ANCHORAGE

Position number one (1) is the uppermost position.

SEAT BELT UPPER ANCHORAGE

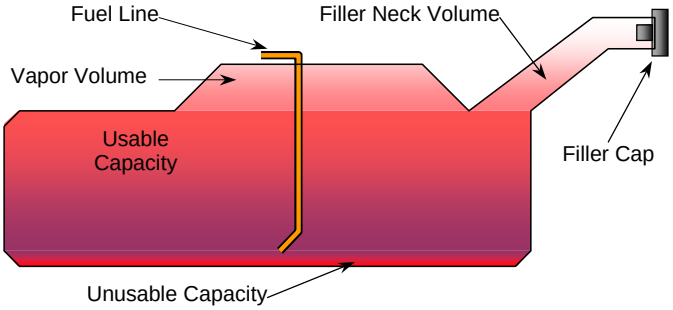
	Total # of Positions	Placed in Position #
Driver Seat	5	1
Passenger Seat	5	1

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	70.02
Usable Capacity of "Optional" Tank	
Usable Capacity used for FMVSS 301	64.42 to 65.82
Actual Amount of Solvent used	65.10

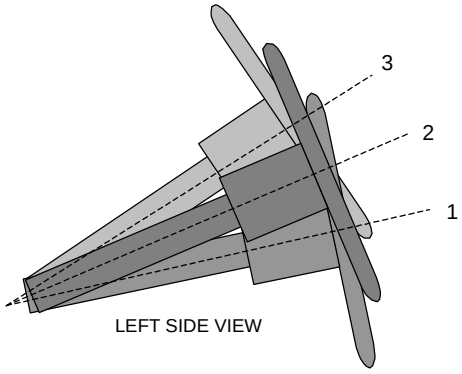
The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the “ON” position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies 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 positon No. 1	12.8	
Geometric center position No. 2	22.6	
Uppermost position No. 3	29.3	

DATA SHEET NO. 5
DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

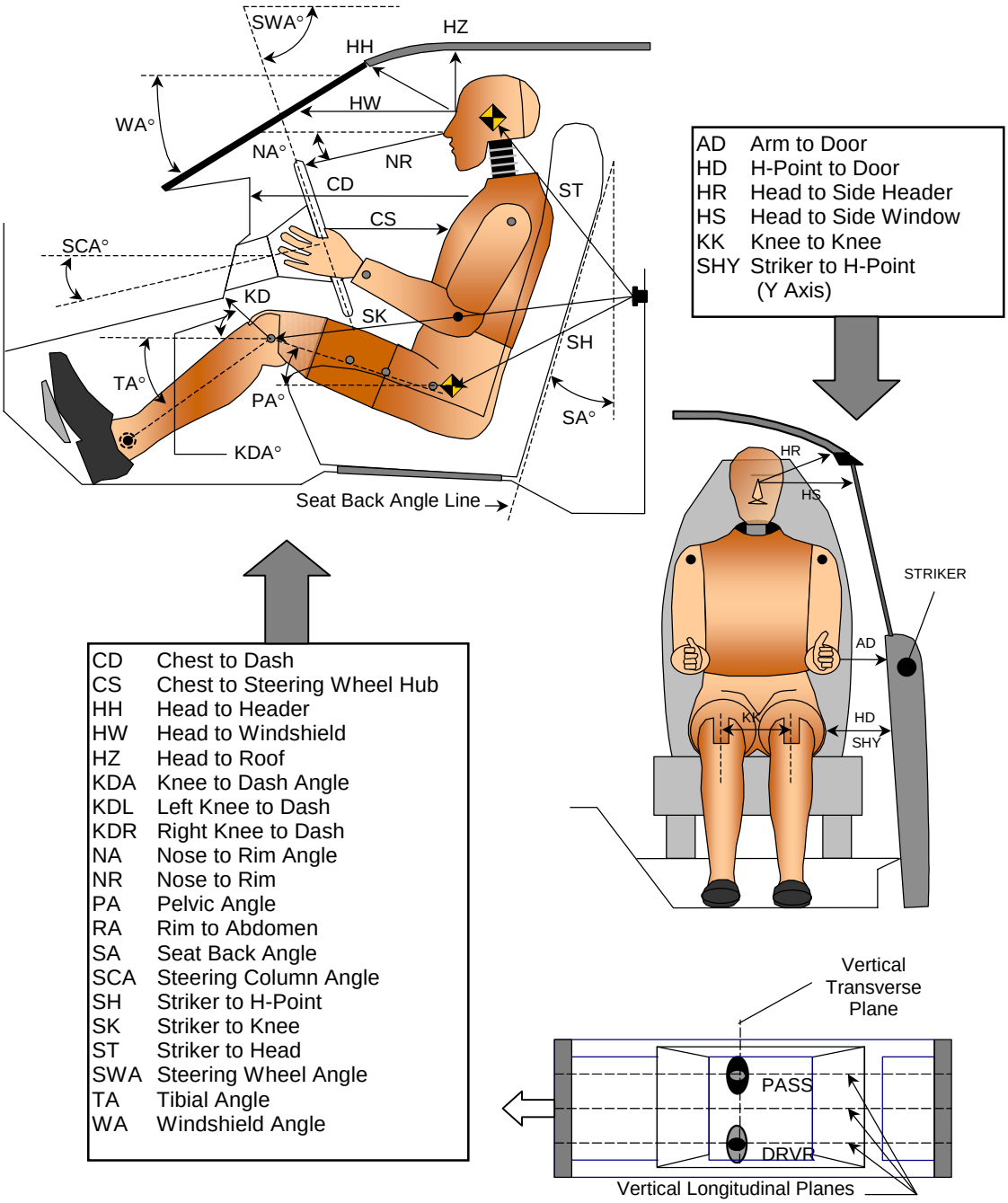
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (deg)	Length (mm)	Angle (deg)
WA	Windshield Angle		23.9		
SWA	Steering Wheel Angle		67.4		
SCA	Steering Column Angle		22.6		
SA	Seat Back Angle		3.0 @ headrest		3.0 @ headrest
HZ	Head to Roof (Z)	150	90.0	140	90.0
HH	Head to Header	190		300	
HW	Head to Windshield	580		640	
HR	Head to Side Header (Y)	235		236	
NR	Nose to Rim	353	10.2		
CD	Chest to Dash	490		530	
CS	Chest to Steering Hub	290			
RA	Rim to Abdomen	180			
KDL	Left Knee to Dash	185	3.2	150	
KDR	Right Knee to Dash	145		140	16.3
PA	Pelvic Angle		24.5		24.0
TA	Tibia Angle		47.8		40.0
KK	Knee to Knee (Y)	326		250	
SK	Striker to Knee	662	11.7	665	7.9
ST	Striker to Head	460	72.0	460	73.0
SH	Striker to H-Point	330	45.8	330	54.0
SHY	Striker to H-Point (Y)	250		270	
HS	Head to Side Window	235		312	
HD	H-Point to Door (Y)	120		130	
AD	Arm to Door (Y)	100		40	

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

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101

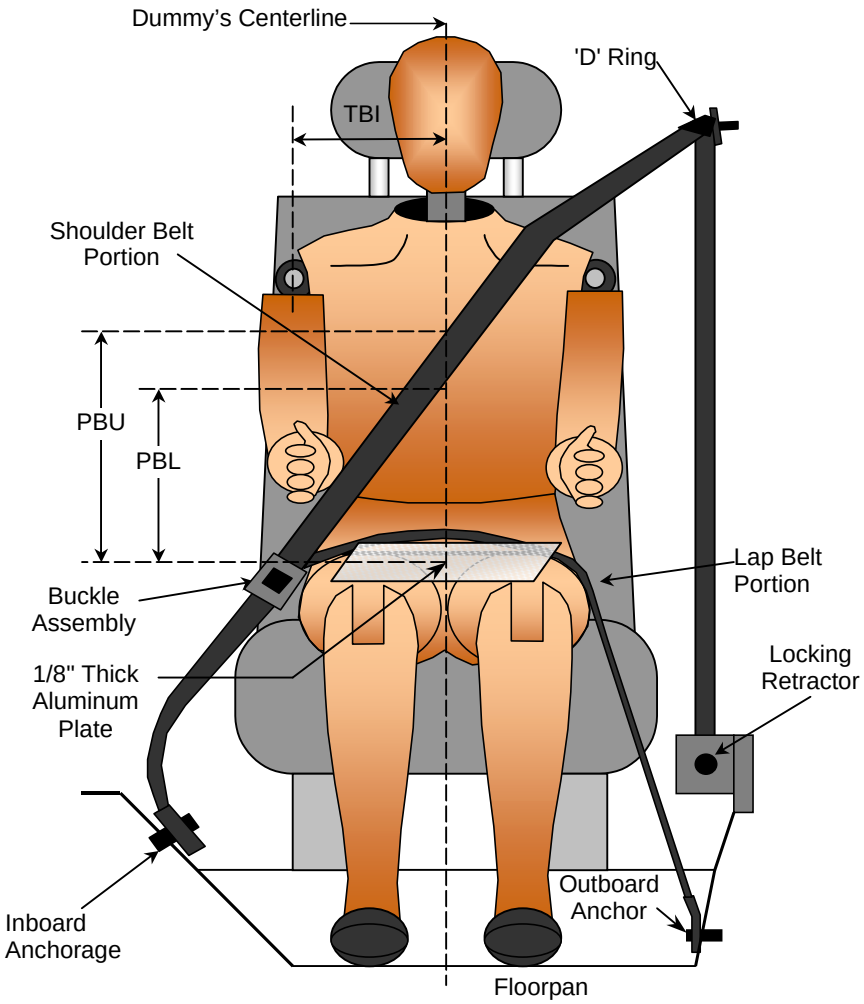
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06



DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS

DATA SHEET NO. 6
SEAT BELT POSITIONING DATA

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06



SEAT BELT POSITIONING MEASUREMENTS

Measured Parameter	Units	Driver	Passenger
TBI - Dummy C/L to Lap/Shoulder Belt Intersect	mm	230	240
PBU - Top Surface of reference to belt upper edge	mm	317	320
PBL - Top Surface of reference to belt lower edge	mm	250	250
Lap Belt Tension	Newtons	10	10
Shoulder Belt Tension	N/A	Retractor	Retractor

DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATION

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101

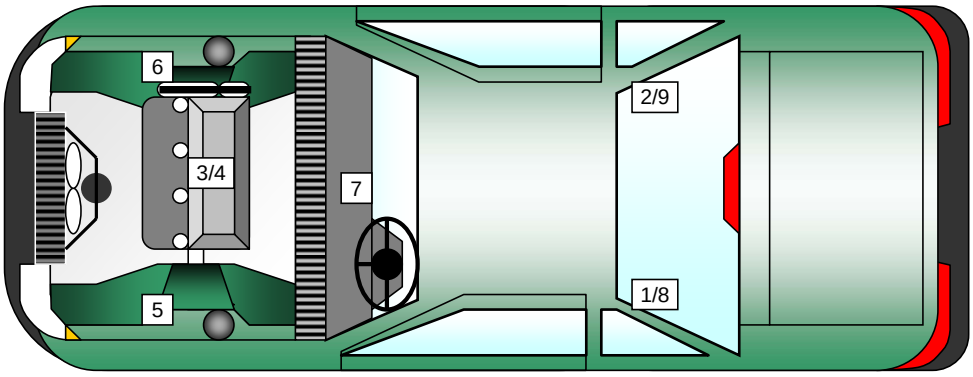
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

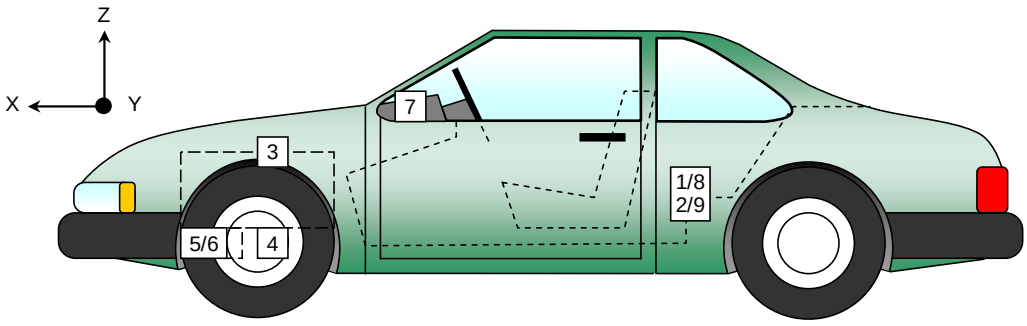
VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member	2005	-714	375
2	Right Rear X-Member	2005	714	375
3	Engine Top	4185	-167	866
4	Engine Bottom	4132	256	150
5	Left Brake Caliper	4010	-680	310
6	Right Brake Caliper	4010	680	310
7	Instrument Panel			[1]
8	Left Rear X-Member (Z-Axis)	2005	-714	375
9	Right Rear X-Member (Z-Axis)	2005	714	375

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 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

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	900	945
Lap Belt length as measured on ATD	mm	800	940
Remainder of belt on reel	mm	900	955
Total belt length for continuous webbing systems	mm	3340	3580

SHOULDER BELT SPOOL-OFF DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm	30	116
As determined electronically	mm	114	*

* Channel failed, no data

BELT STRETCH DATA

Measuerment 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 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

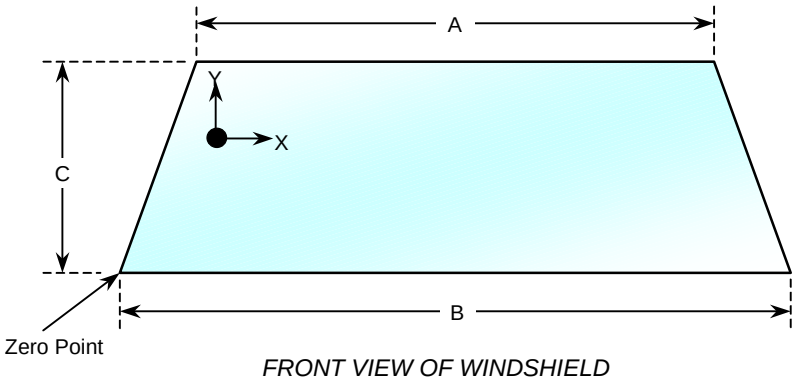
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with a rubber type adhesive. No molding covers the windshield periphery at any point.

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.

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test(mm)	Post-Test(mm)	% of Retention
Left Side	2183	2183	100
Right Side	2183	2183	100
Total	4366	4366	100

Temperature of windshield molding during test: 21.1 °C



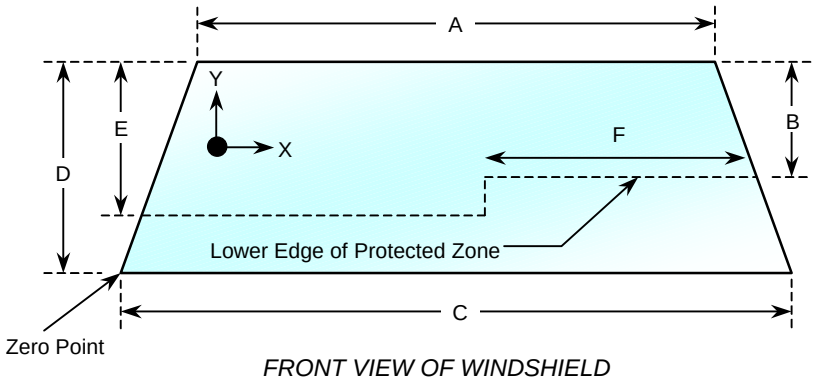
FRONT VIEW OF WINDSHIELD

WINDSHIELD DIMENSIONS

Item	Units	Segment Length	Molding Width
A	mm	1195	8
B	mm	1510	8
C-Left	mm	830	8
C-Right	mm	830	8

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

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06



FRONT VIEW OF WINDSHIELD

WINDSHIELD AND PROTECTED ZONE

Item	Units	Value
A	mm	1195
B	mm	490
C	mm	1510
D	mm	830
E	mm	550
F	mm	625

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 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

Test Time: 12:13 PM Temperature: 12.0 Deg. C.

STODDARD SOLVENT SPILLAGE MEASUREMENTS

A. From impact until vehicle motion ceases: 0.0 oz.
(Maximum Allowable = 1 ounce)

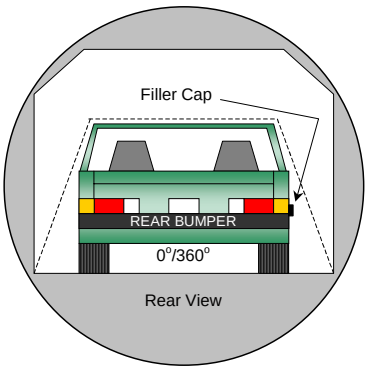
B. For the 5 minute period after motion ceases: 0.0 oz.
(Maximum Allowable = 5 ounces)

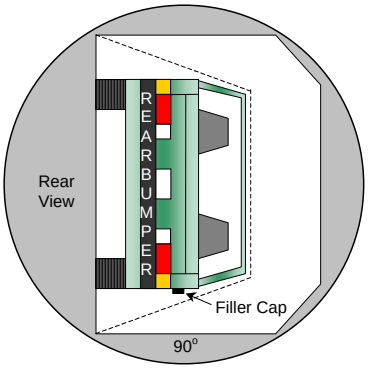
C. For the following 25 minutes: 0.0 oz.
(Maximum Allowable = 1 oz./minute)

D. Spillage Location Details: No leakage occurred

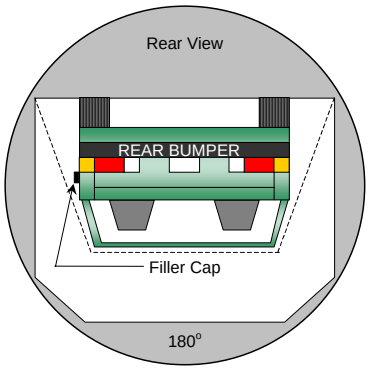
DATA SHEET NO. 12
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

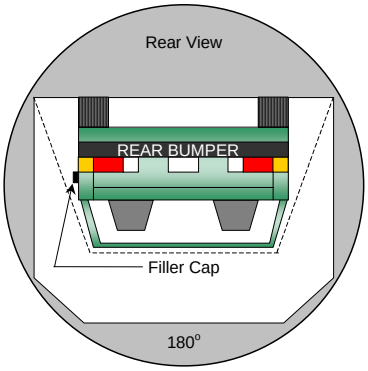




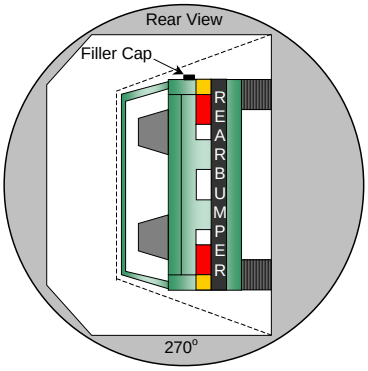
0° to 90°

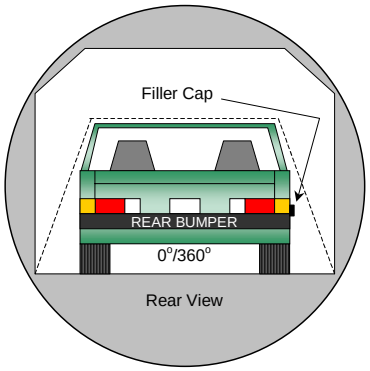


90° to 180°



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 Lexus ES330 4-Door Sedan NHTSA No.: M65101

Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	84	300	384
90° to 180°	80	300	380
180° to 270°	79	300	379
270° to 360°	77	300	377

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 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

VEHICLE MEASUREMENT TABLE

No.	Measurement Description	Units	Pre-Test	Post-Test	Diff.
1	Total length of vehicle at centerline	mm	4845	4320	-525
2	RSOV to front of engine	mm	4250	4010	-240
3	RSOV to firewall centerline	mm	3681	3580	-101
4	RSOV to leading edge of right door	mm	3375	3383	8
5	RSOV to leading edge of left door	mm	3381	3380	-1
6	RSOV to lower leading edge of right door	mm	3354	3360	6
7	RSOV to lower leading edge of left door	mm	3355	3353	-2
8	RSOV to upper trailing edge of right door	mm	2250	2266	16
9	RSOV to upper trailing edge of left door	mm	2255	2255	0
10	RSOV to lower trailing edge of right door	mm	2246	2254	8
11	RSOV to lower trailing edge of left door	mm	2248	2245	-3
12	RSOV to bottom of right 'A' pillar	mm	3307	3316	9
13	RSOV to bottom of left 'A' pillar	mm	3322	3311	-11
14	RSOV to firewall on right side	mm	3941	3849	-92
15	RSOV to firewall on left side	mm	3938	3867	-71
16	RSOV to steering column	mm	2874	2845	-29
17	Center of steering column to left 'A' pillar	mm	400	401	1
18	Center of steering column to headlining	mm	430	445	15
19	RSOV to right side of front bumper	mm	4651	4266	-385
20	RSOV to left side of front bumper	mm	4657	4274	-383
21	Length of engine block	mm	580	580	0
RD	RSOV to right side of dash panel	mm	3091	3097	6
CD	RSOV to center of dash panel	mm	3068	3041	-27
LD	RSOV to left side of dash panel	mm	3094	3089	-5

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

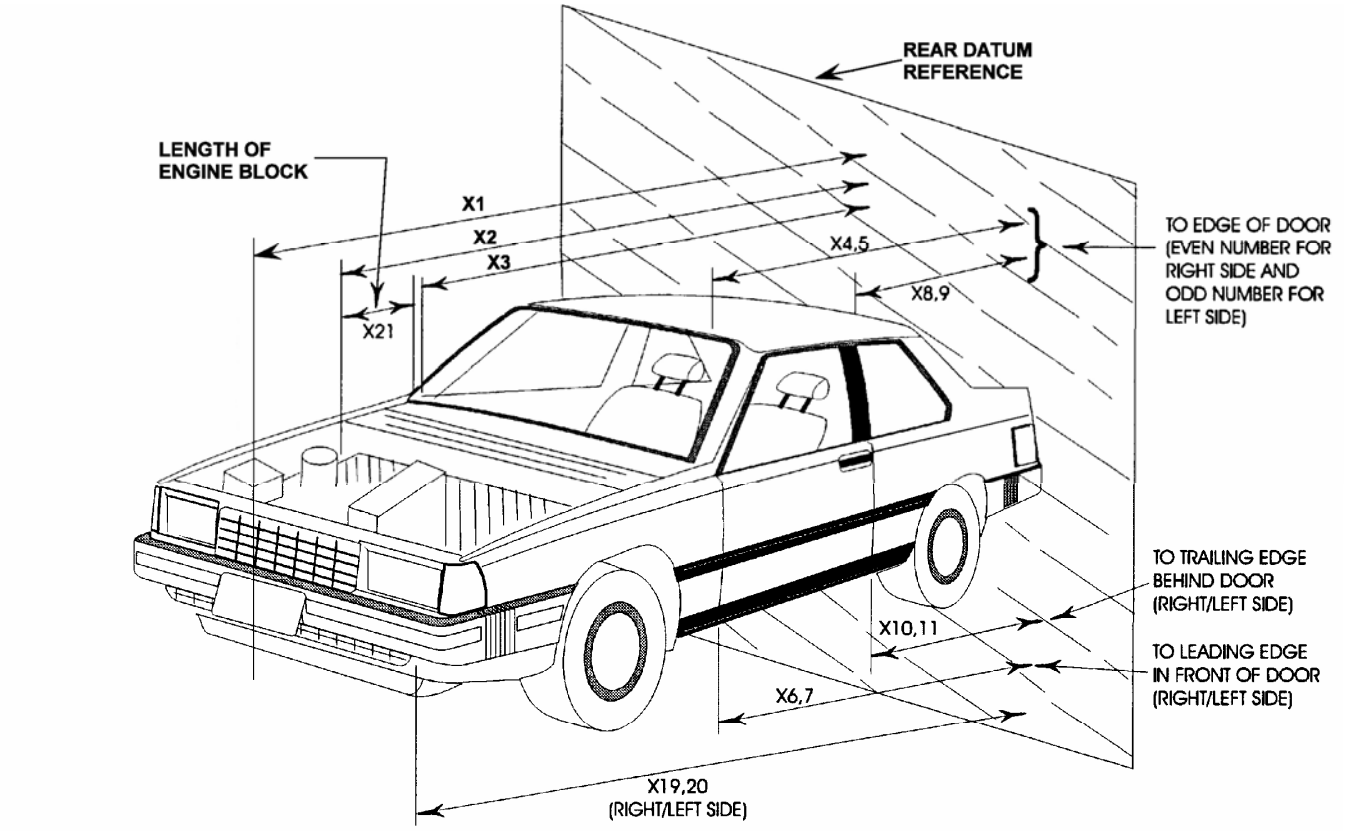
Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

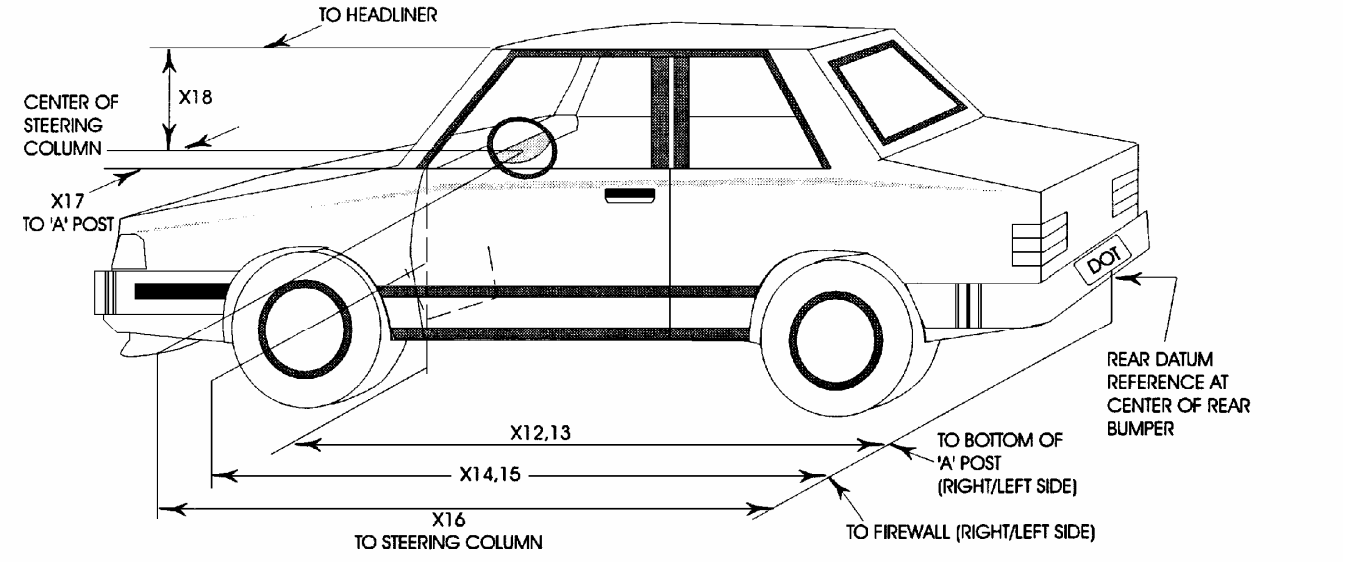
VEHICLE STRUCTURAL MEASUREMENT TABLE

No.	Measurement Description	Units	Pre-Test	Post-Test	Diff.
1	Total length	mm	4845	4320	-525
2	Total width	mm	1793	1793	0
3	Bumper top height	mm	574	538	-36
4	Bumper bottom height	mm	180	288	108
5	Longitudinal member top height	mm	584	599	15
6	Longitudinal member bottom height	mm	464	479	15
7	Distance between longitudinal members	mm	905	891	-14
8	Longitudunal member width	mm	90	89	-1
9	Engine top height	mm	875	655	-220
10	Engine bottom height	mm	199	199	0
11	Engine and gear box width	mm	825	825	0
12	Front bumper to engine distance	mm	595	303	-292
13	Front shock absorber fixing width	mm	920	997	77
14	Bonnet leading edge height	mm	765	791	26
15	Front shock absorber fixing width	mm	1197	1113	-84
16	Front bumper to front axle distance	mm	998	463	-535
17	Front axle to 'A' pillar distance	mm	480	435	-45
18	'A' pillar to 'B' pillar distance	mm	1124	1124	0
19	'B' pillar to rear axle distance	mm	1103	1108	5
20	'B' pillar to 'C' pillar distance	mm	643	643	0
21	Roof sill bottom height	mm	1413	1322	-91
22	Roof sill top height	mm	1320	1406	86
23	Floor sill bottom height	mm	205	185	-20
24	Floor sill top height	mm	360	339	-21

DATA SHEET NO. 13…(CONTINUED)
VEHICLE MEASUREMENTS

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06





DATA SHEET NO. 14
CAMERA LOCATIONS

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

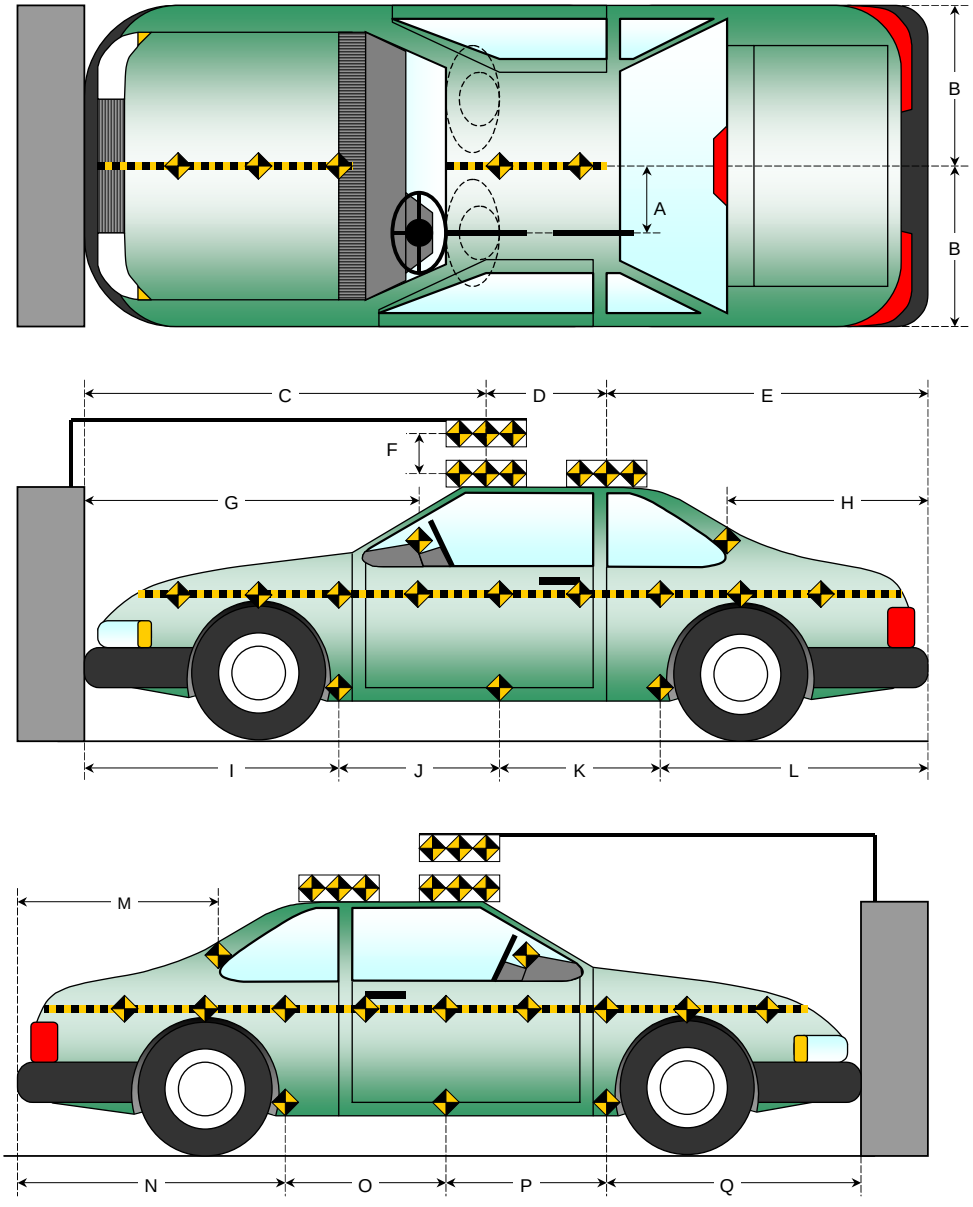
VEHICLE CAMERA MEASUREMENT TABLE

No.	Camera View	Location (mm)			Angle (deg.)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Real Time Camera (Panning)	-15316	-7910	-1584	0			30
2	Overall Left Side	-1795	-7189	-1128	0	7495	20mm	1000
3	Left Side View	-1533	-7126	-1188	-3	7385	50mm	1000
4	Driver and Interior View	-8696	-12562	-4511	-13	15930	ZOOM	1000
5	Steering Column (Bottom)	-1631	-8234	-2682	-13	8812	35mm	1000
6	Steering Column (Top)	-1663	-8153	-3078	-17	8872	35mm	1000
7	Overall Right Side	-2536	6867	-1066	-2	7398	20mm	1000
8	Right Side View	-2005	6510	-1249	-4	6925	50mm	1000
9	Passenger and Interior View	-5330	9365	-2407	-10	11041	ZOOM	1000
10	Right Side View	-2006	6967	-1463	-6	7396	25mm	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	-3211	0	1495	90		10mm	1000
16	Real Time Camera	-1585	-8255	-1767	-1	8590		30
17	Real Time Camera	-2167	6988	-1463	-1	7461		30

DATA SHEET NO. 15
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

All Dimensions in (mm)	
Item	Value
A	*
B	1793
C	*
D	*
E	*
F	*
G	1770
H	1210
I	1444
J	923
K	923
L	1569
M	1209
N	1569
O	923
P	923
Q	1444



* Targets are not installed due to sunroof and curtain airbags.

DATA SHEET NO. 16
VEHICLE INTRUSION MEASUREMENTS

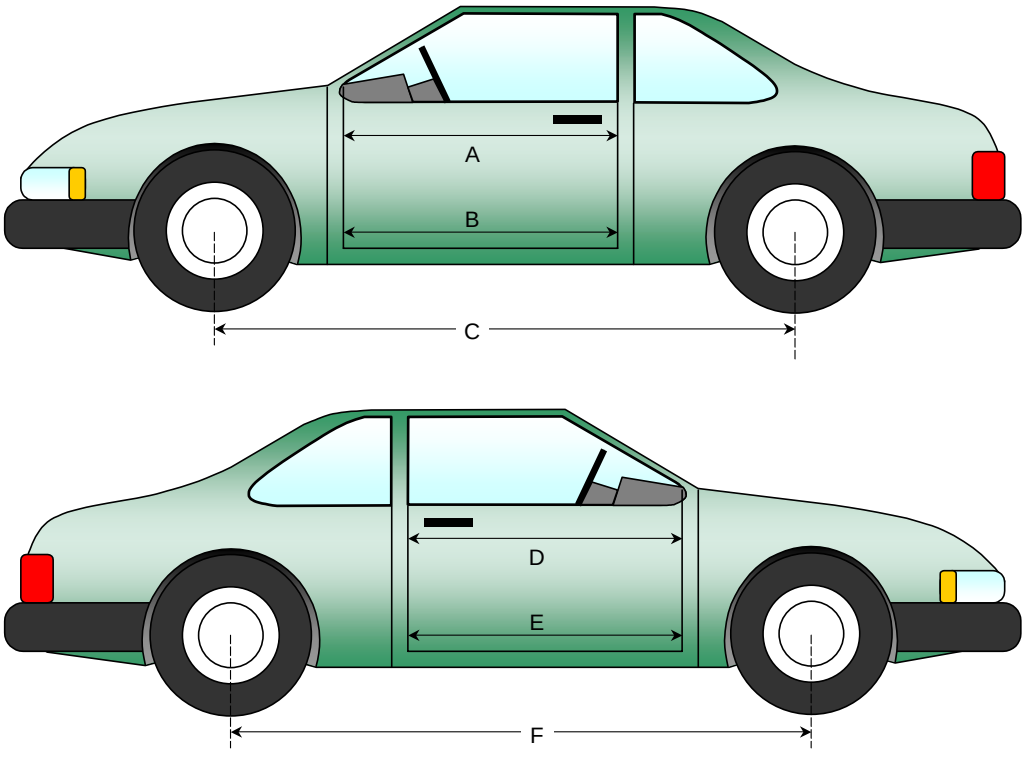
Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

DOOR OPENING WIDTH TABLE

Item	Description	Units	Pre-Test	Post-Test	Diff.
A	Left Side Upper	mm	1066	1065	-1
B	Left Side Lower	mm	884	889	5
D	Right Side Upper	mm	1063	1065	2
E	Right Side Lower	mm	857	856	-1

WHEELBASE MEASUREMENT TABLE

Item	Description	Units	Pre-Test	Post-Test	Diff.
C	Left Side Wheel Base	mm	2720	2666	-54
F	Right Side Wheel Base	mm	2720	2675	-45

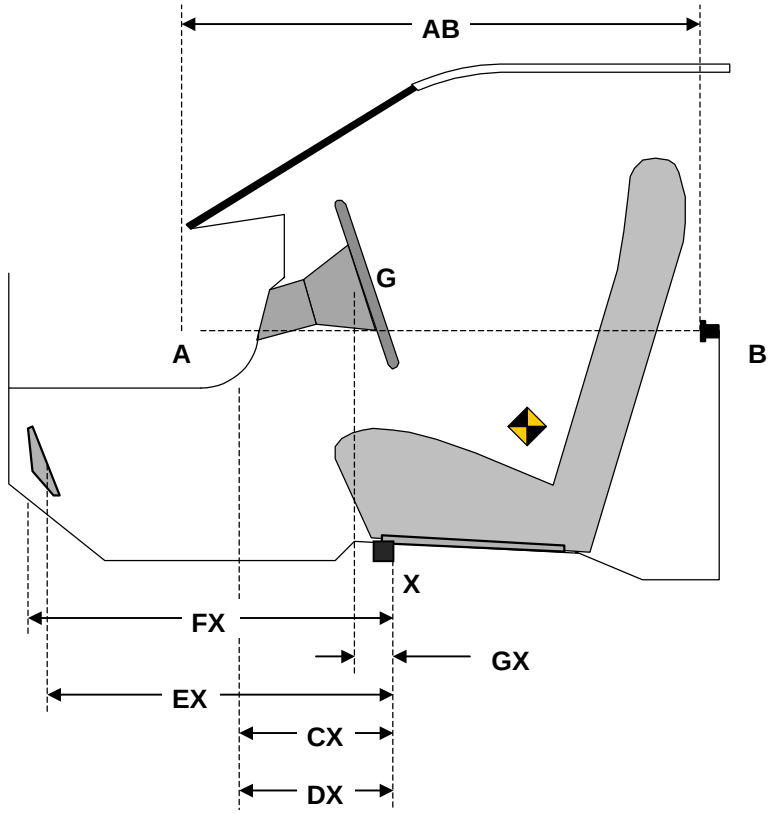


DATA SHEET NO. 16…(CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

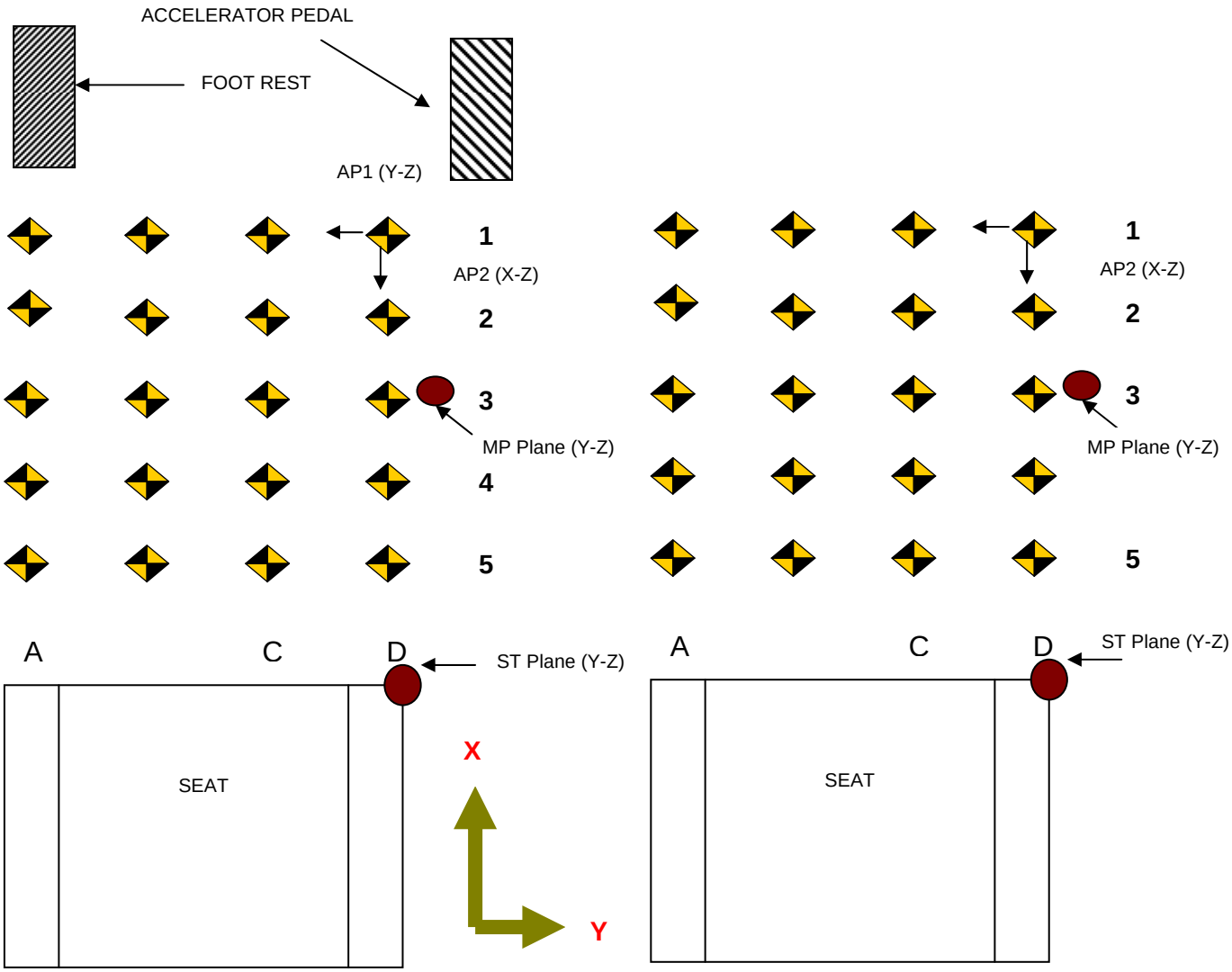
DRIVER COMPARTMENT INTRUSION TABLE

Item	Description	Units	Pre-Test	Post-Test	Diff.
AB	Door Opening (Inside window jam)	mm	1066	1065	-1
CX	Left Knee Bolster to X	mm	340	215	-125
DX	Right Knee Bolster to X	mm	330	320	-10
EX	Brake Pedal to X	mm	609	584	-25
FX	Foot Rest to X	mm	598	615	17
GX	Center of Steering Wheel Hub to X	mm	85	124	39



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

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06



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 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

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	-653	-728	-720	-708	-639	-695	-705	-689	14	33	15	19
2	-613	-657	-652	-643	-606	-645	-651	-645	7	12	1	-2
3	-570	-587	-583	-575	-568	-590	-585	-576	2	-3	-2	-1
4	-487	-481	-475	-468	-493	-492	-483	-468	-6	-11	-8	0
5	-371	-365	-359	-352	-374	-376	-377	-375	-3	-11	-18	-23

DRIVER FLOOR PAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-11	-144	-279	-416	-51	-188	-320	-458	-40	-44	-41	-42
2	-10	-138	-281	-413	-52	-189	-330	-454	-42	-51	-49	-41
3	-8	-139	-277	-411	-50	-187	-324	-456	-42	-48	-47	-45
4	-7	-138	-273	-404	-56	-182	-322	-446	-49	-44	-49	-42
5	-1	-139	-272	-408	-50	-188	-321	-452	-49	-49	-49	-44

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	139	78	71	84	145	104	86	90	6	26	15	6
2	74	24	18	12	77	42	24	8	3	18	6	-4
3	7	-30	-32	-36	5	-26	-28	-37	-2	4	4	-1
4	-65	-65	-69	-72	-67	-74	-78	-63	-2	-9	-9	9
5	-79	-65	-72	-90	-77	-75	-83	-83	2	-10	-11	7

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

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

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	-707	-716	-714	-669	-693	-703	-707	-667	14	13	7	2
2	-645	-644	-644	-648	-647	-649	-649	-663	-2	-5	-5	-15
3	-574	-571	-571	-574	-578	-579	-591	-600	-4	-8	-20	-26
4	-464	-466	-468	-468	-466	-479	-492	-495	-2	-13	-24	-27
5	-362	-358	-359	-364	-383	-382	-385	-393	-21	-24	-26	-29

PASSENGER FLOOR PAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	371	240	104	-14	432	300	169	46	61	60	65	60
2	374	241	105	-25	436	298	165	35	62	57	60	60
3	379	244	109	-19	435	298	166	39	56	54	57	58
4	390	246	114	-16	441	294	169	41	51	48	55	57
5	397	251	121	-13	446	303	171	38	49	52	50	51

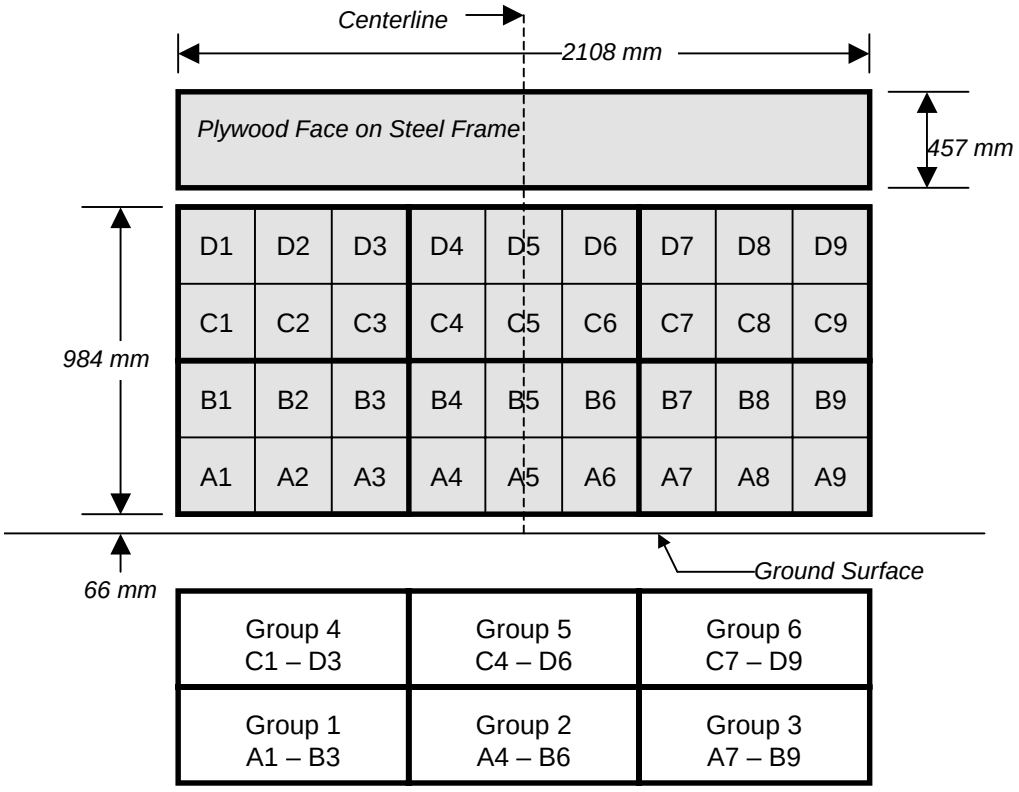
PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	63	64	66	111	77	91	98	138	14	27	32	27
2	9	9	11	10	17	26	37	38	8	17	26	28
3	-42	-40	-39	-39	-34	-33	-23	-27	8	7	16	12
4	-63	-66	-64	-69	-45	-71	-58	-57	18	-5	6	12
5	-79	-76	-65	-82	-61	-81	-67	-68	18	-5	-2	14

DATA SHEET NO. 17
FIXED BARRIER LOAD CELL LOCATIONS

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

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



6 Groups of 6 Load Cells Each

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101
Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06

VEHICLE INFORMATION

VIN: JTHBA30G665149818 Wheel base (mm): 2720
Vehicle Size Category: 4-Door Test Weight (kg): 1825

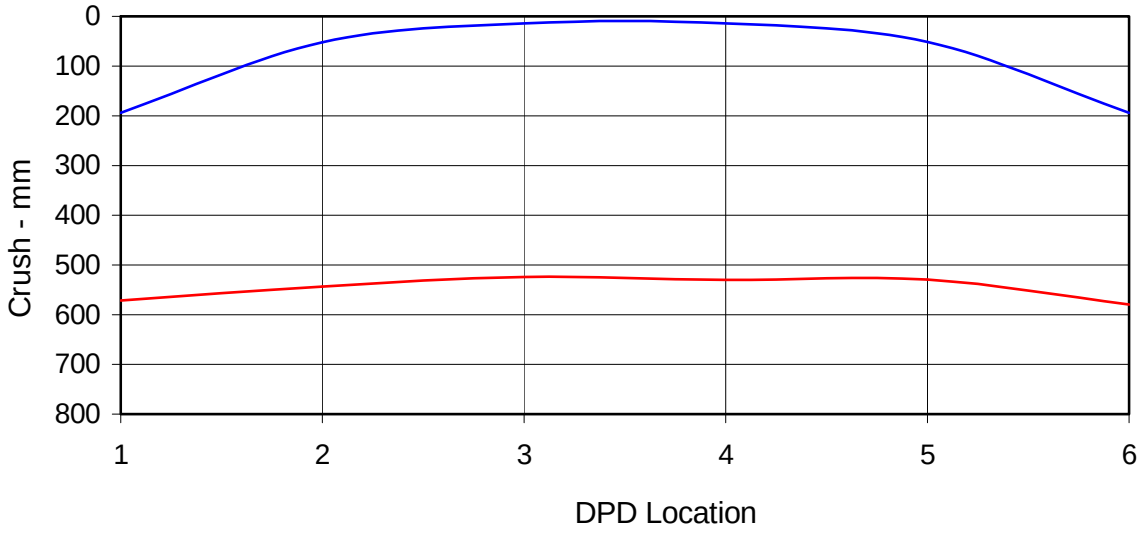
ACCELEROMETER DATA

Accelerometer Location: Left rear cross member
Cal. Procedure/Interval: 6 months / drop test
Integration Algorithm: NHTSA Standard Linearity: Good
Impact Velocity (km/h): 56.43
Velocity Change (km/h): 63.9 Time of Separation (msec): 72.3

CRUSH PROFILE

Collision Deformation Classification: 12FDEW6 Midpoint of Damage: Vehicle Centerline
Damage Region Length (mm): 1495 Impact Mode: Full Frontal

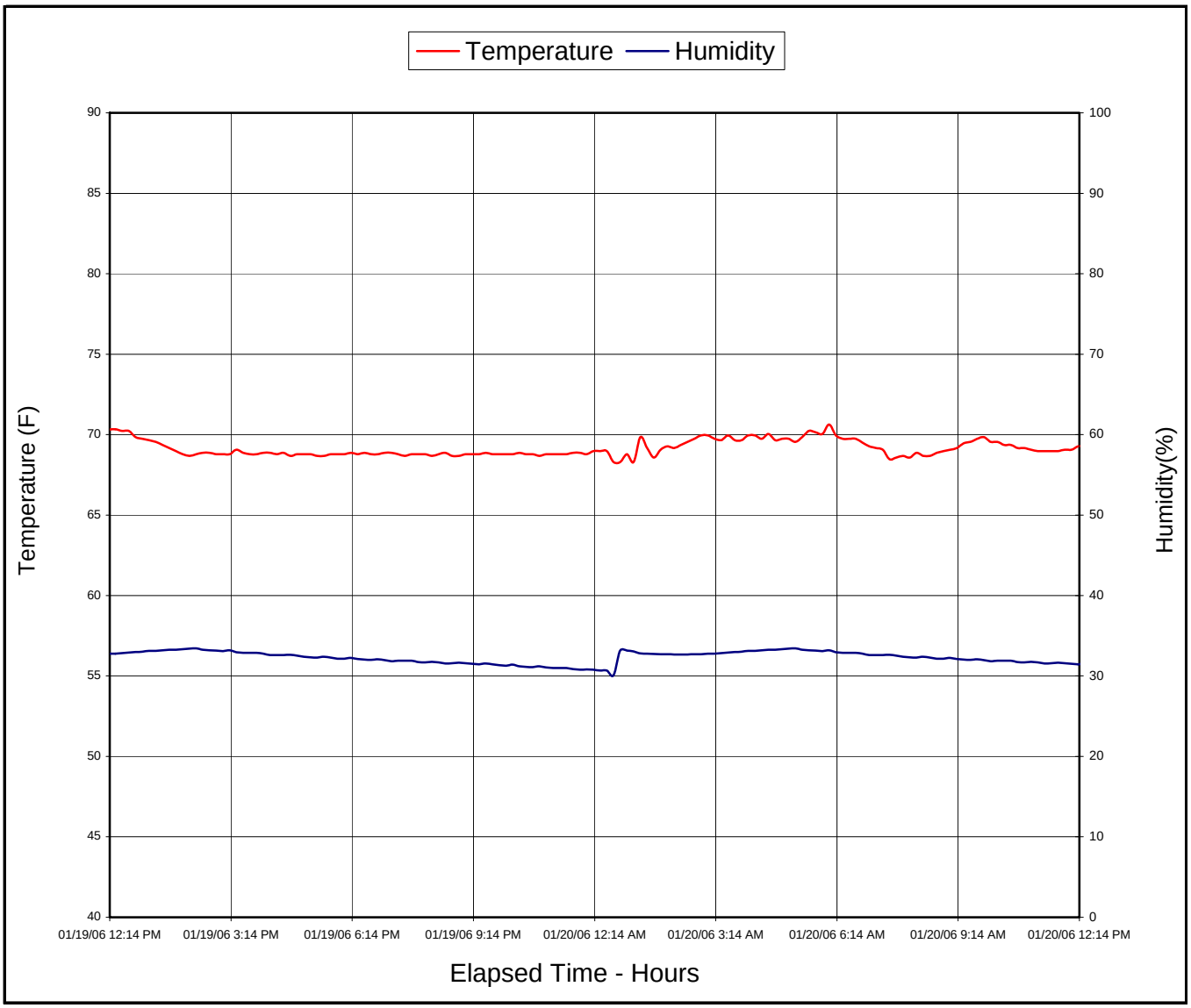
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	194	571	-377
C2	Crush zone 2 on left side	mm	52	543	-491
C3	Crush zone 3 on left side	mm	14	524	-510
C4	Crush zone 4 on right side	mm	14	530	-516
C5	Crush zone 5 on right side	mm	51	529	-478
C6	Crush zone 6 at right side	mm	194	579	-385



DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2006 Lexus ES330 4-Door Sedan NHTSA No.: M65101

Test Program: 2006 NHTSA 35mph NCAP Test Date: 1/20/06



APPENDIX A

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

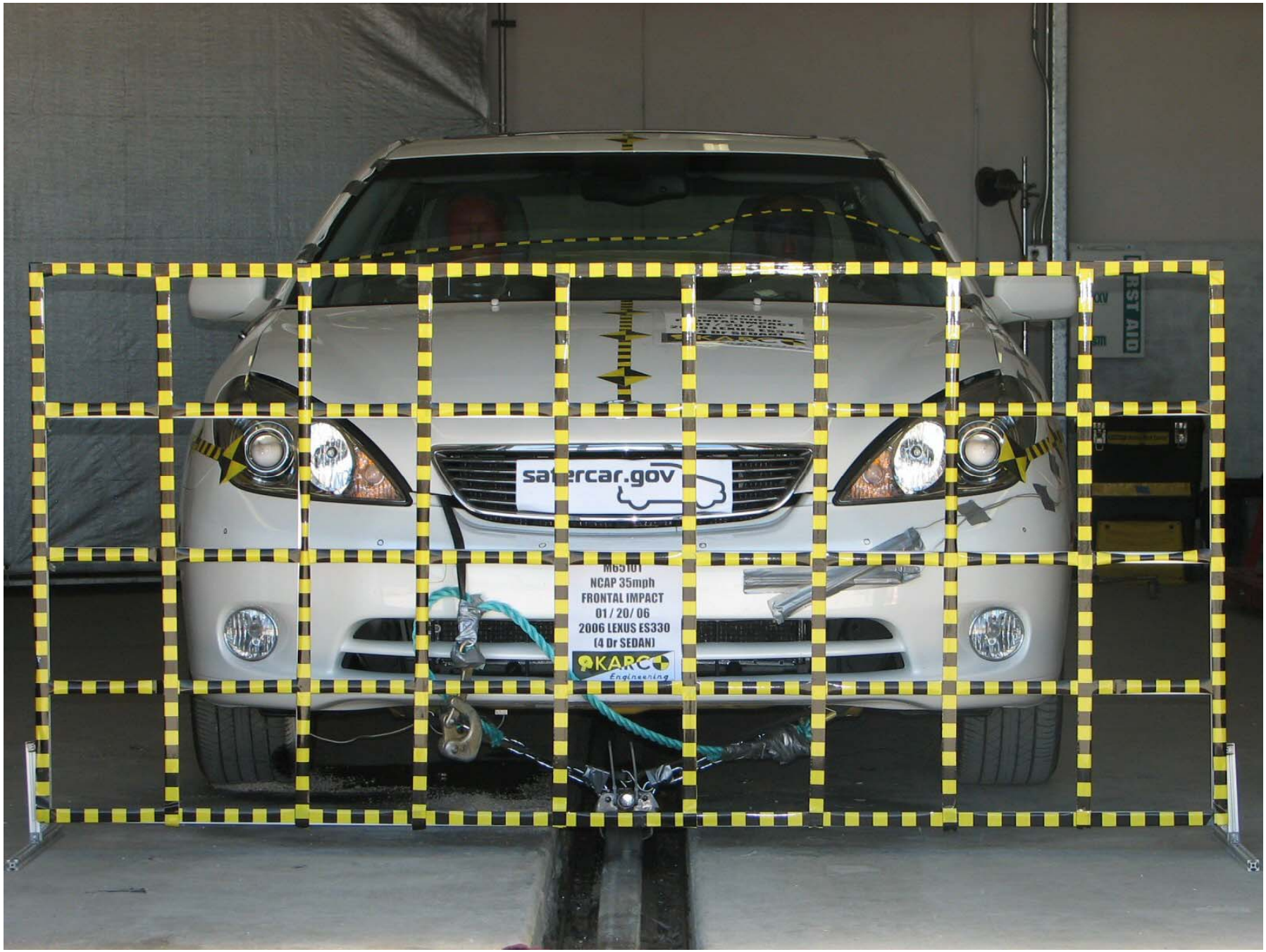


Figure A-1: Load Cell Location

Figure A-2: Manufacturer's Label

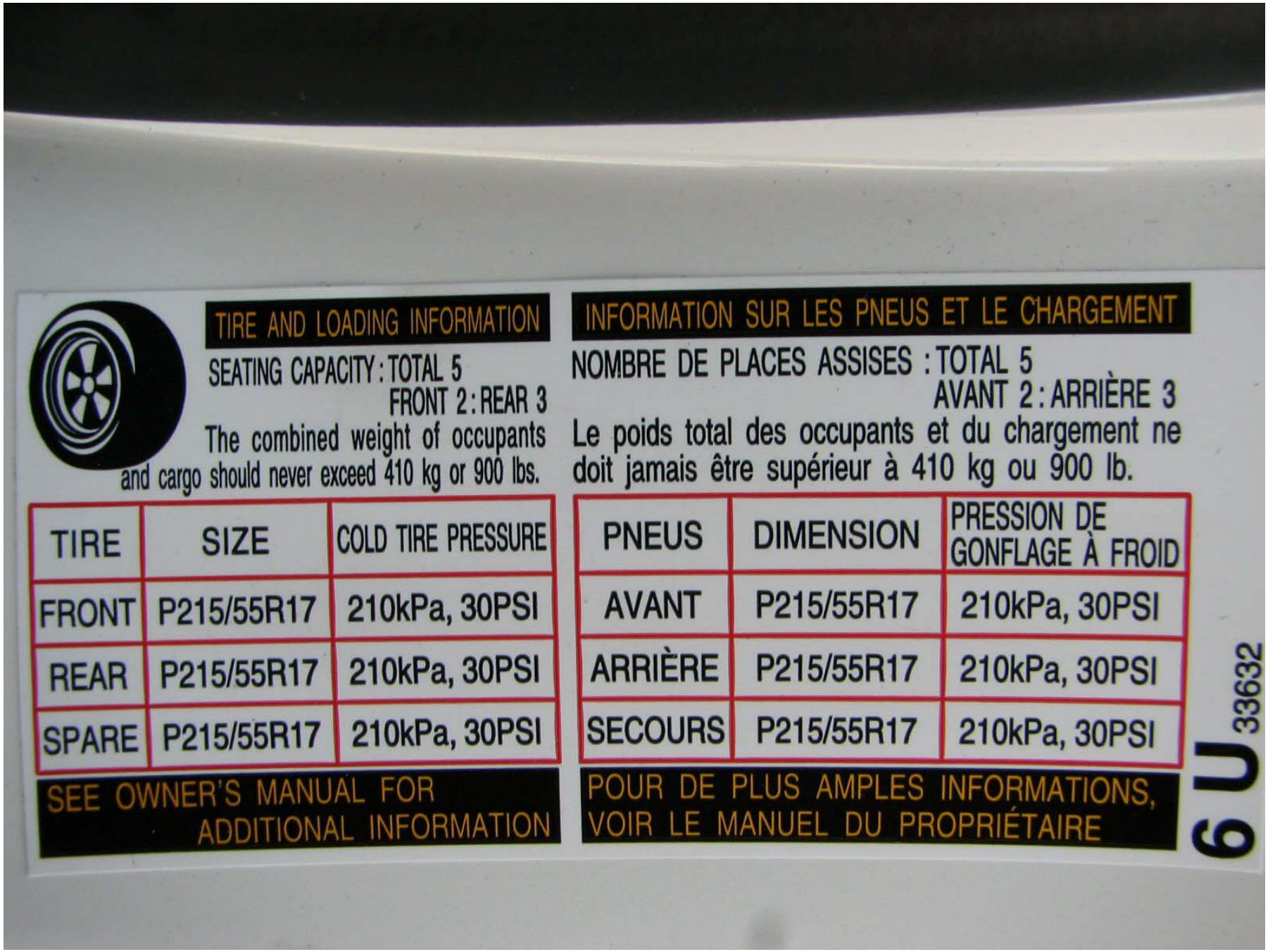


Figure A-3: Tire Placard

Figure A-4: Right Front ¾ View, As Received

Figure A-5: Left Rear ¾ View, as Received

Figure A-6: Pre-Test Front View

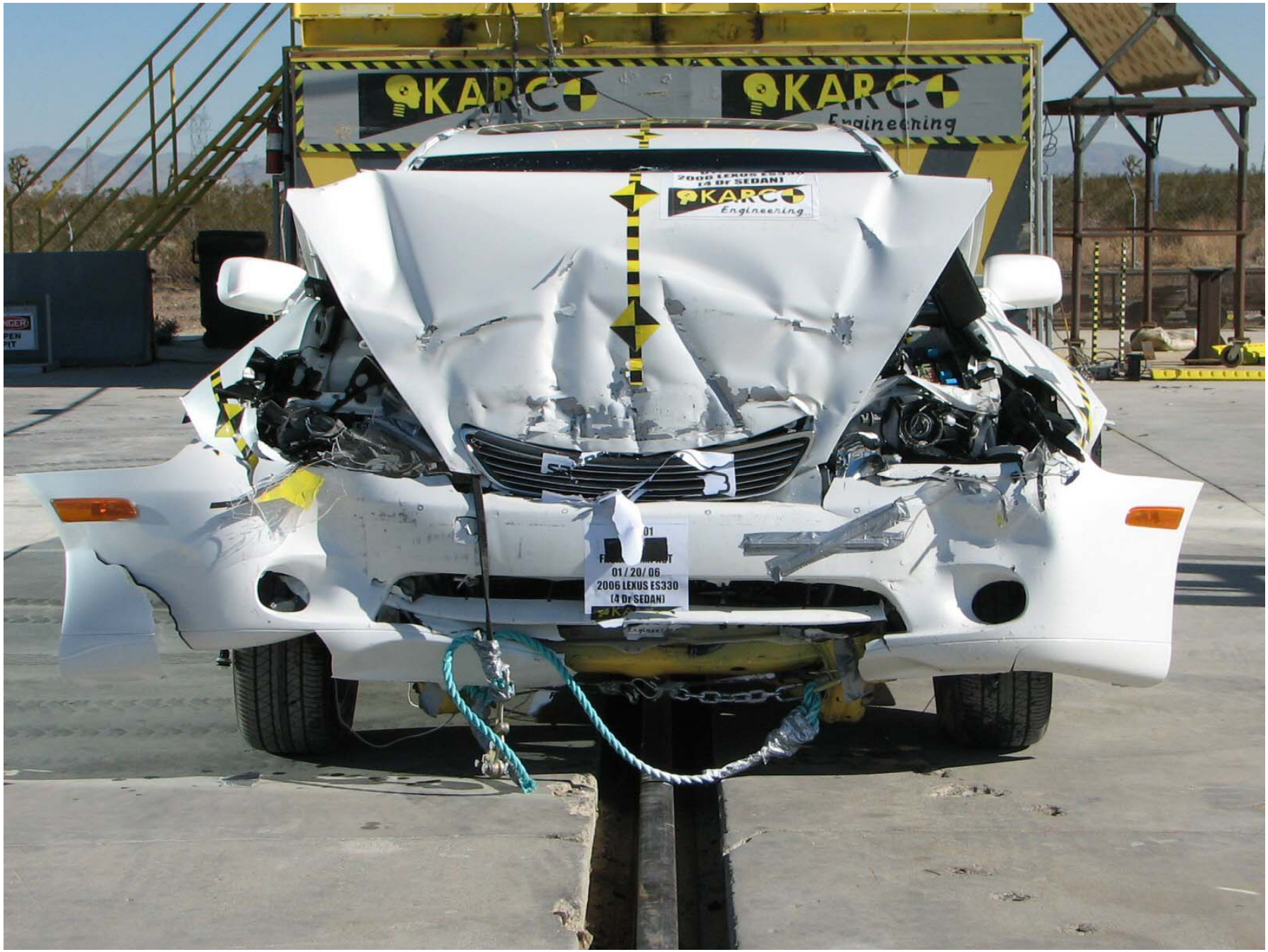


Figure A-7: Post-Test Front View (Vehicle Moved)

Figure A-8: Pre-Test Left Side View

Figure A-9: Post-Test Left Side View

Figure A-10: Pre-Test Right Side View

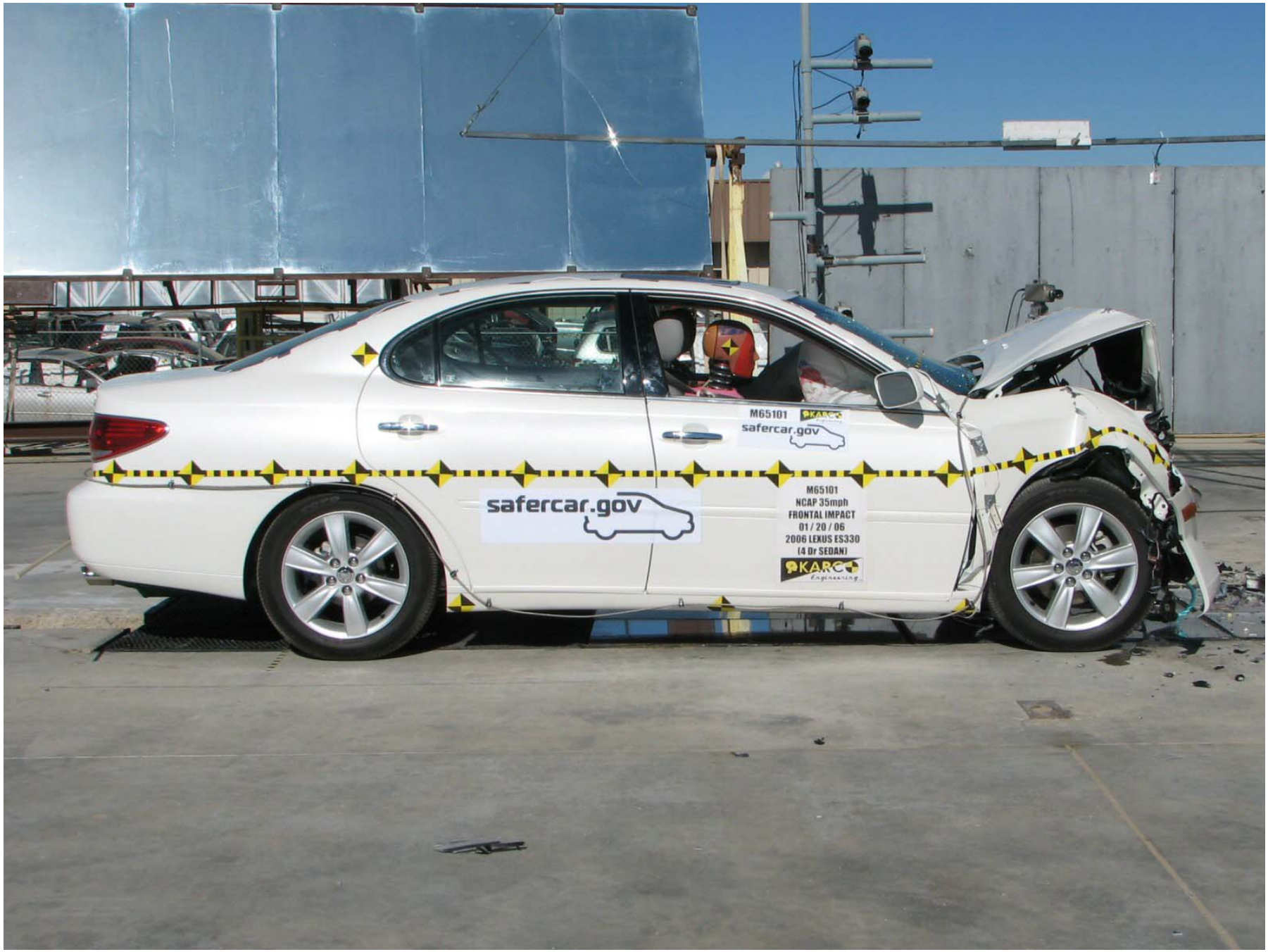


Figure A-11: Post-Test Right Side View

Figure A-12: Pre-Test Right Front ¾ View

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

Figure A-14: Pre-Test Left Rear ¾ View

Figure A-15: Post-Test Left Rear ¾ View

Figure A-16: Post-Test Left Side ¾ View of Doors After Impact

Figure A-17: Post-Test Right Side ¾ View of Doors After Impact

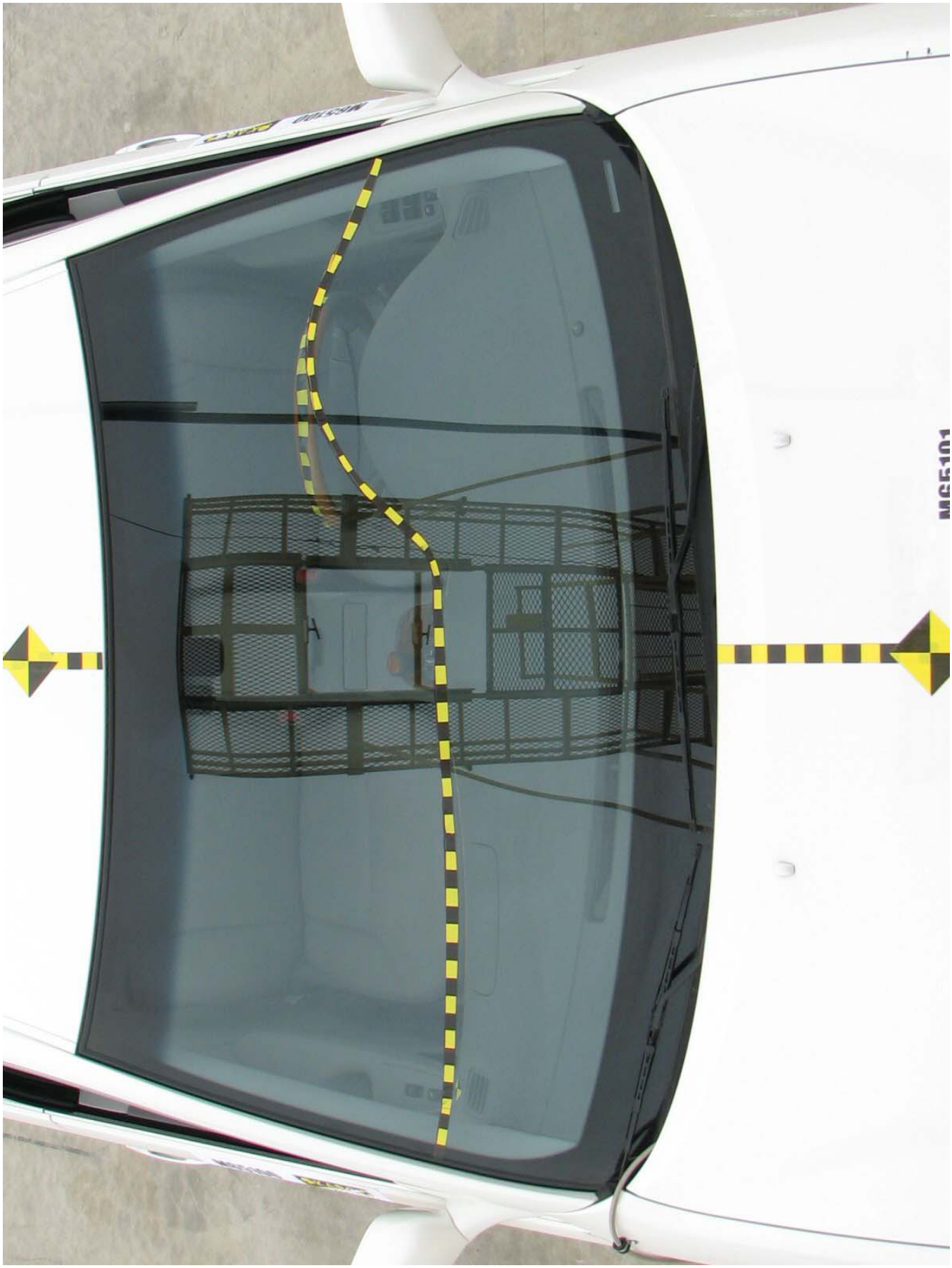


Figure A-18: Pre-Test Windshield

Figure A-19: Post-Test Windshield

Figure A-20: Pre-Test Engine Compartment

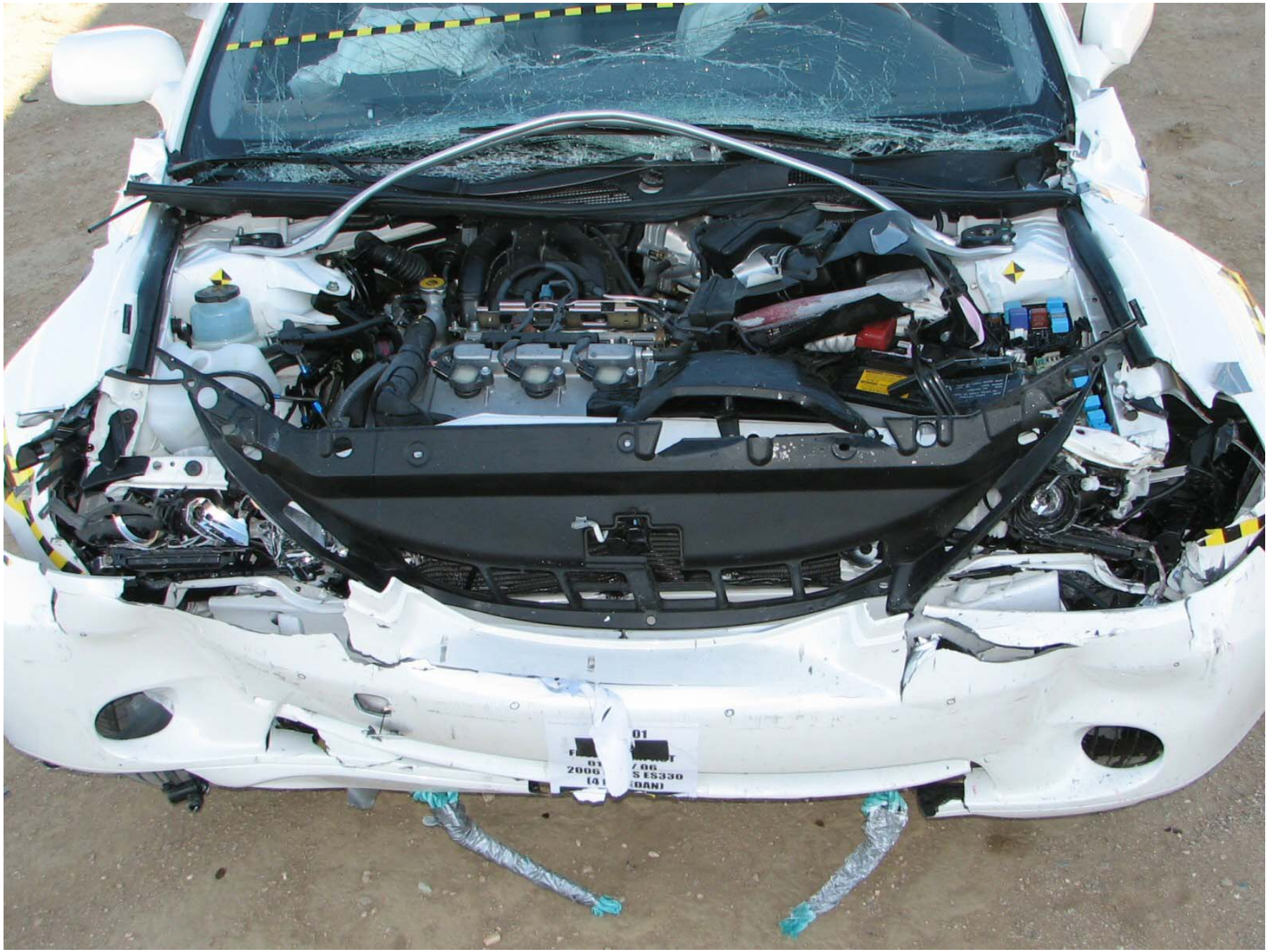


Figure A-21: Post-Test Engine Compartment (Vehicle Moved)

Figure A-22: Pre-Test Fuel Cap

Figure A-23: Post-Test Fuel Cap

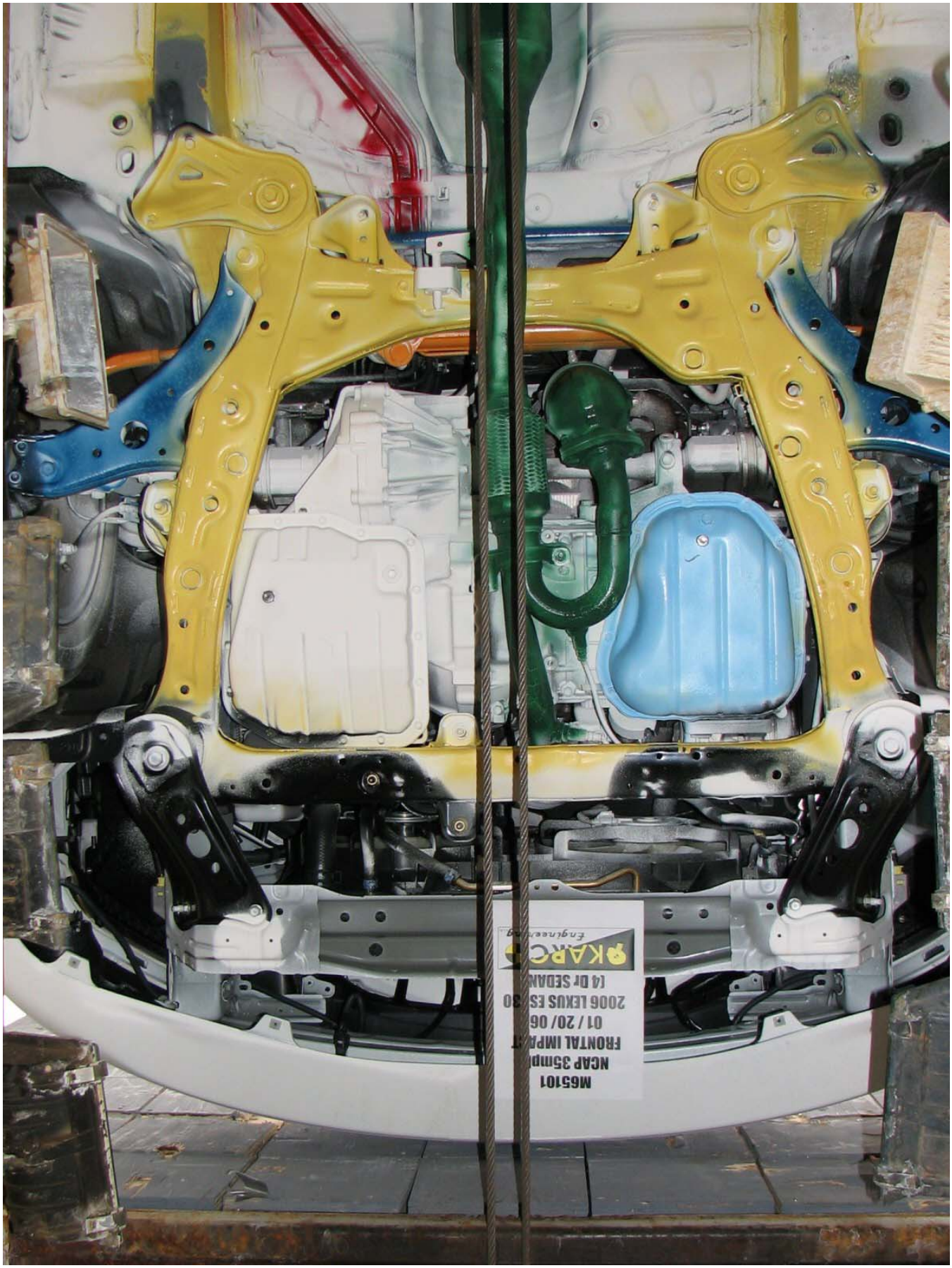


Figure A-24: Pre-Test Front Underbody

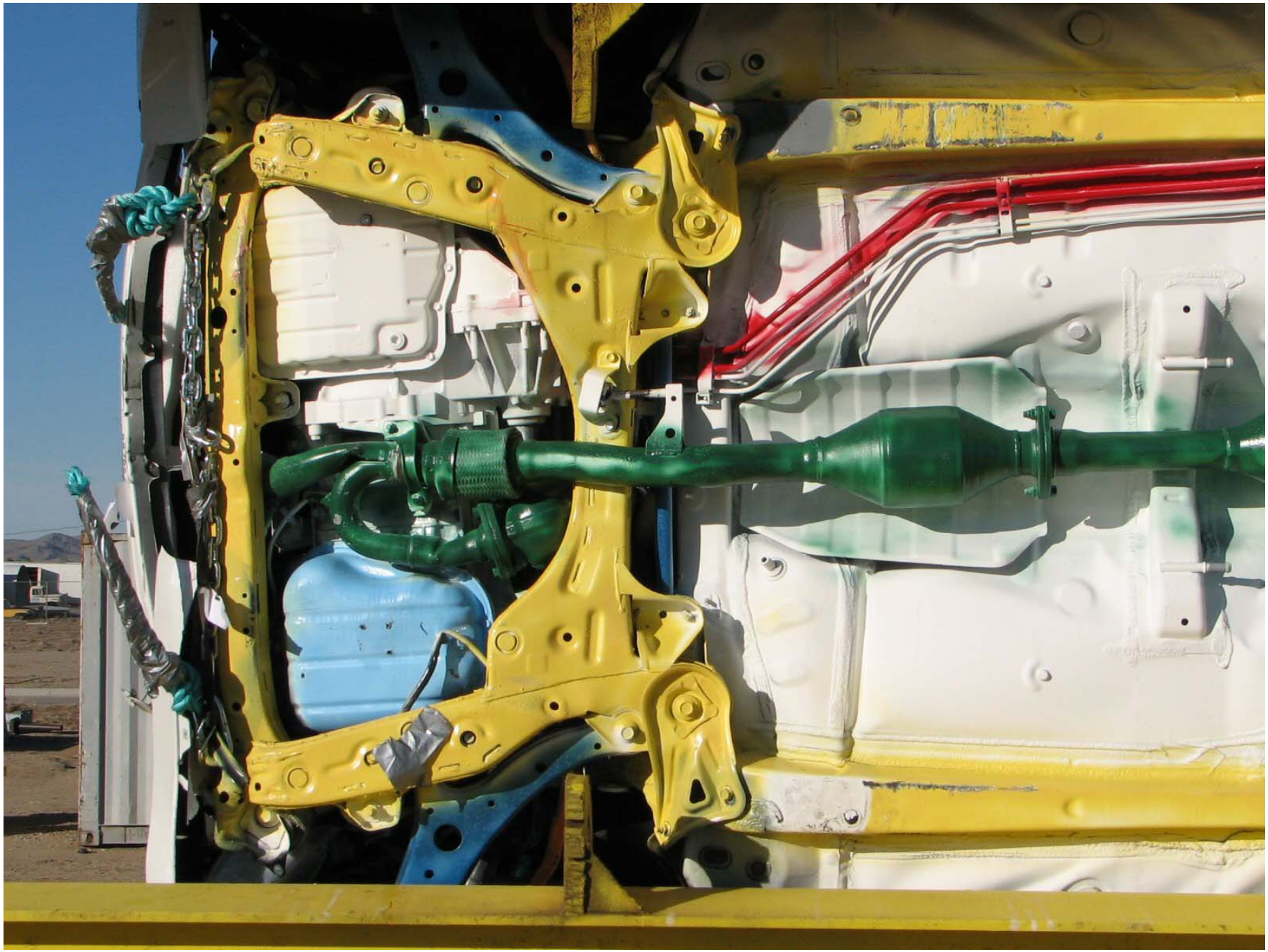


Figure A-25: Post-Test Front Underbody

Figure A-26: Pre-Test Mid Underbody

Figure A-27: Post-Test Mid Underbody

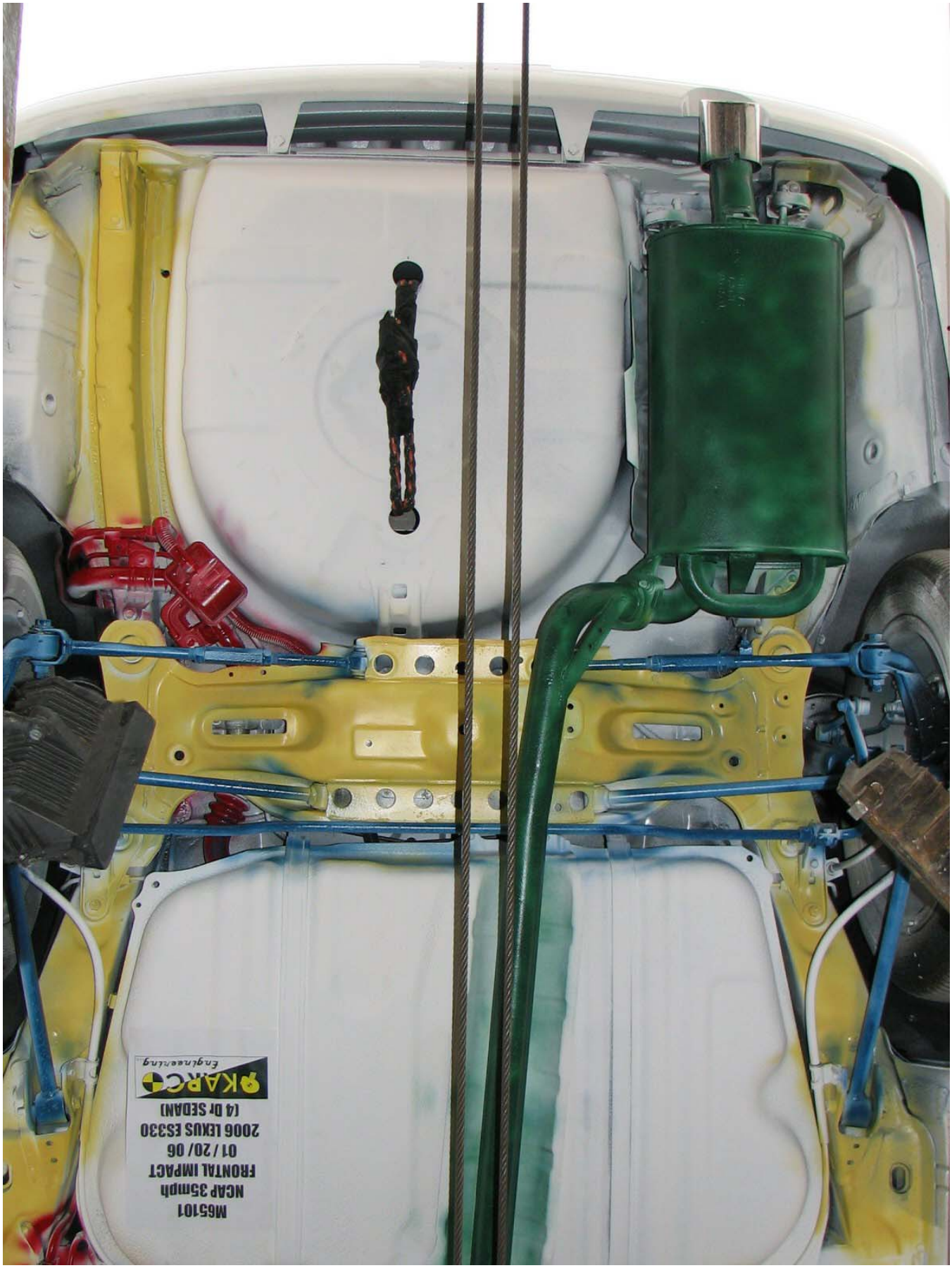


Figure A-28: Pre-Test Rear Underbody

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

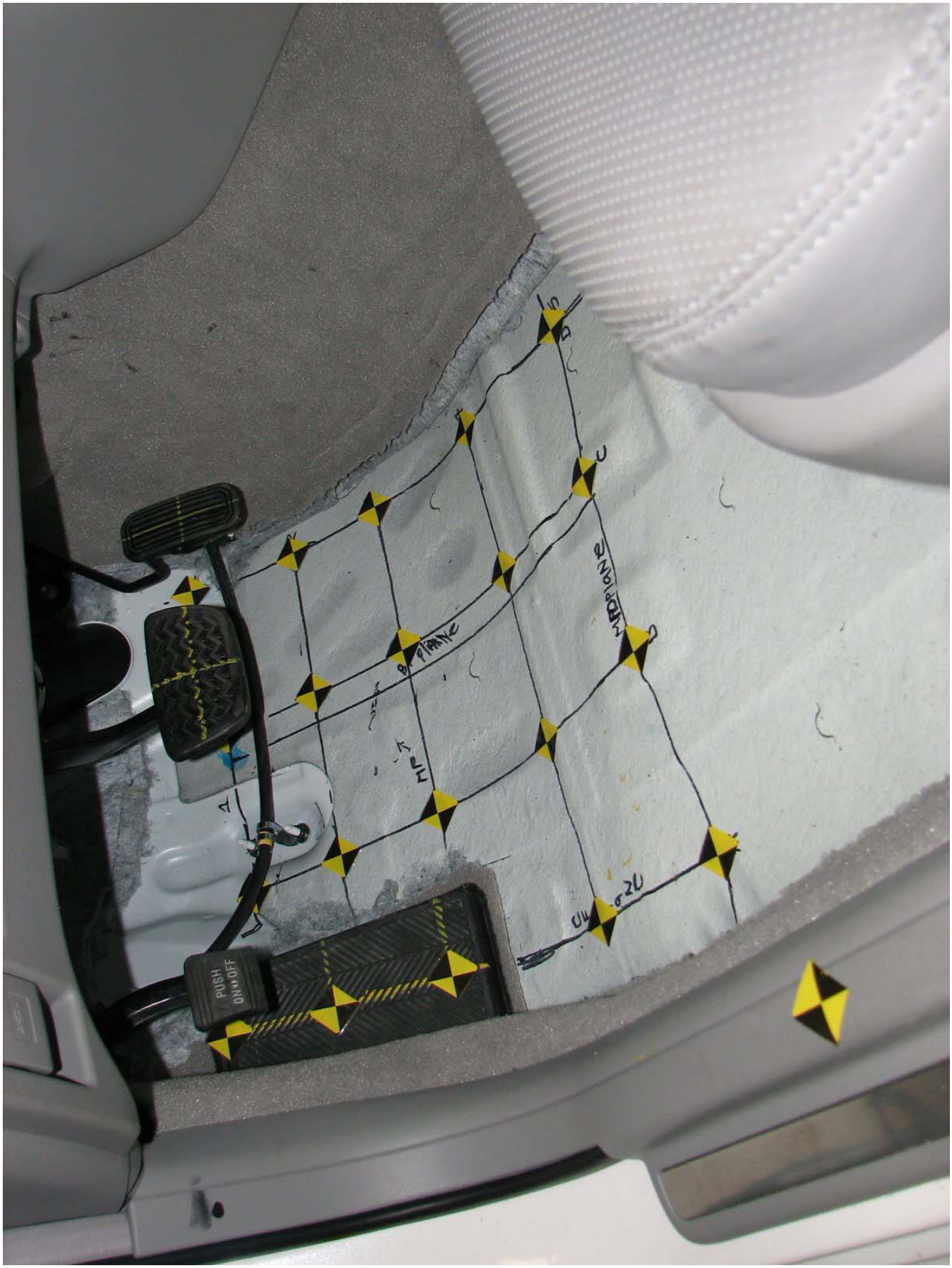


Figure A-40: Pre-Test Driver Side Floor Pan

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

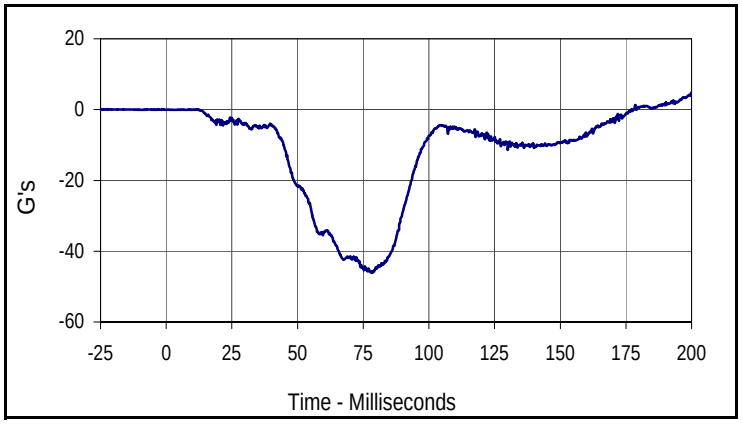
LIST OF DATA PLOTS

LIST OF DATA PLOTS…(CONTINUED)

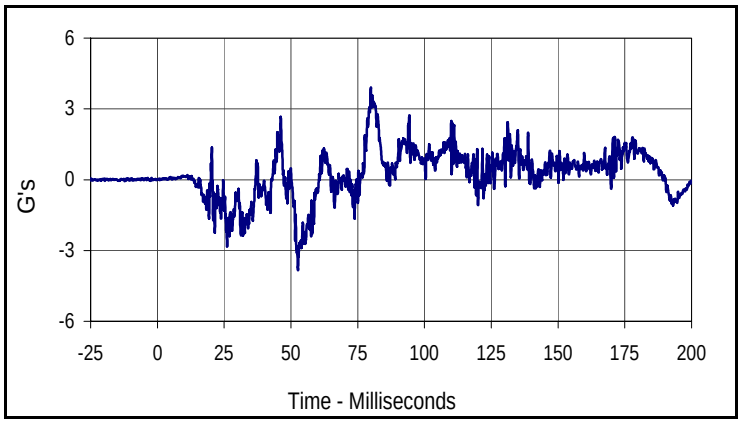
The following additional data plots for this test can be obtained from the research and development section of the NHTSA website. The website can be found at www.NHTSA.dot.gov.

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

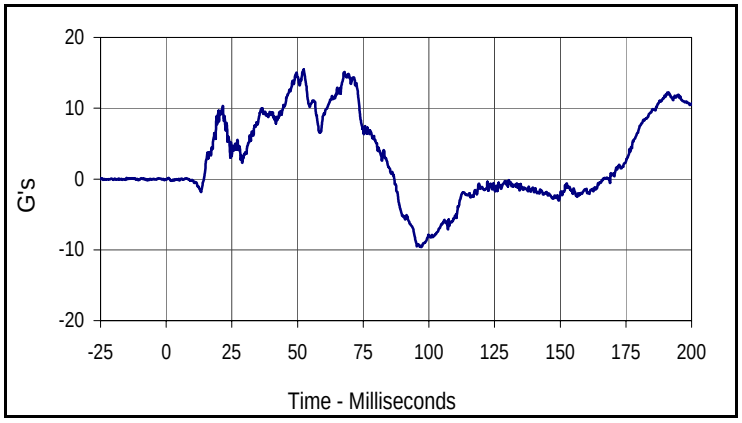
Test Vehicle:	2006 Lexus ES330 4-Door Sedan	Test Date:	1/20/06
Test Program:	2006 NHTSA 35mph NCAP	NHTSA No.:	M65101



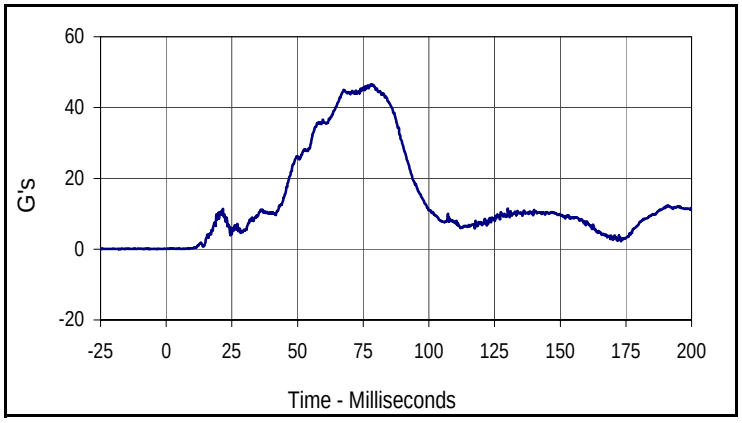
Curve Description			
Driver Head Primary X			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
4.8	200.0	-46.1	78.4



Curve Description			
Driver Head Primary Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.9	79.9	-3.8	52.6

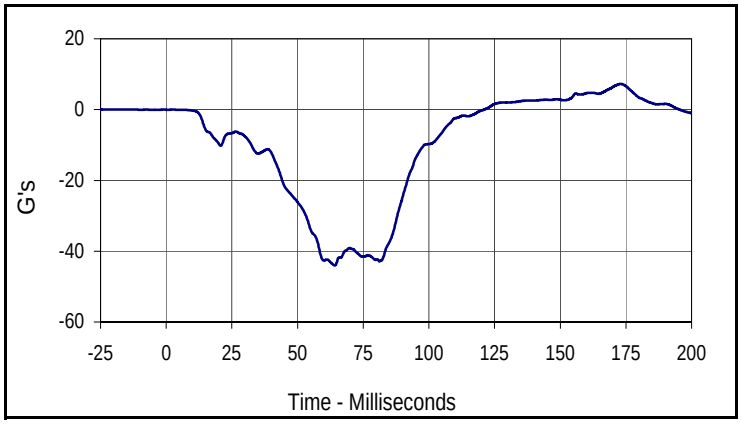


Curve Description			
Driver Head Primary Z			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
15.5	52.3	-9.6	97.1

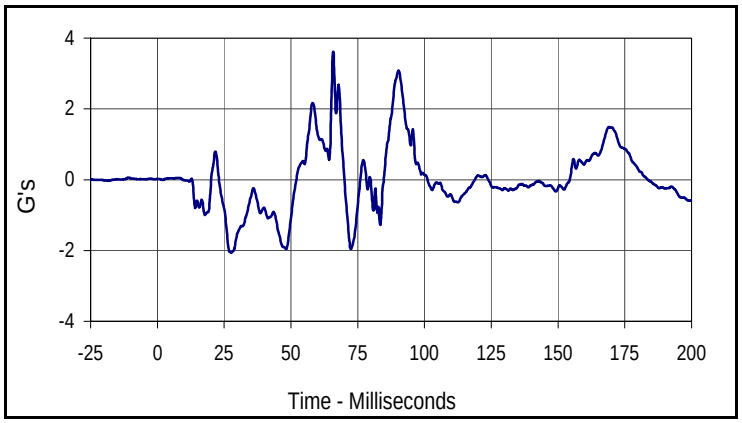


Curve Description			
Driver Head Resultant Primary			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
46.5	78.4	0.0	0.4

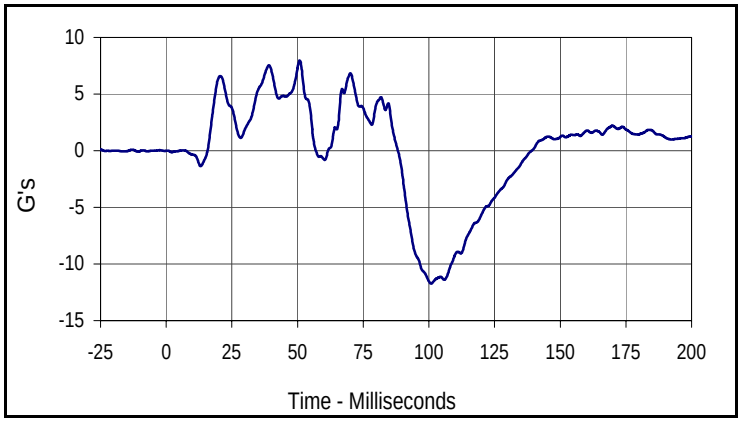
Test Vehicle:	2006 Lexus ES330 4-Door Sedan	Test Date:	1/20/06
Test Program:	2006 NHTSA 35mph NCAP	NHTSA No.:	M65101



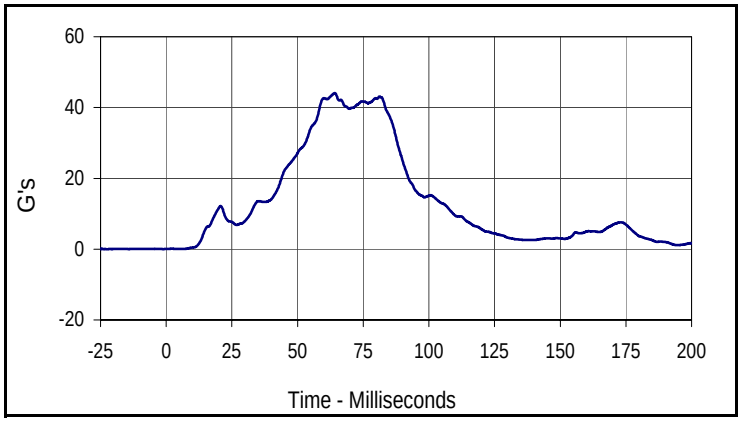
Curve Description			
Driver Chest Primary X			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
7.3	172.9	-44.0	64.2



Curve Description			
Driver Chest Primary Y			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
3.6	65.8	-2.1	27.7

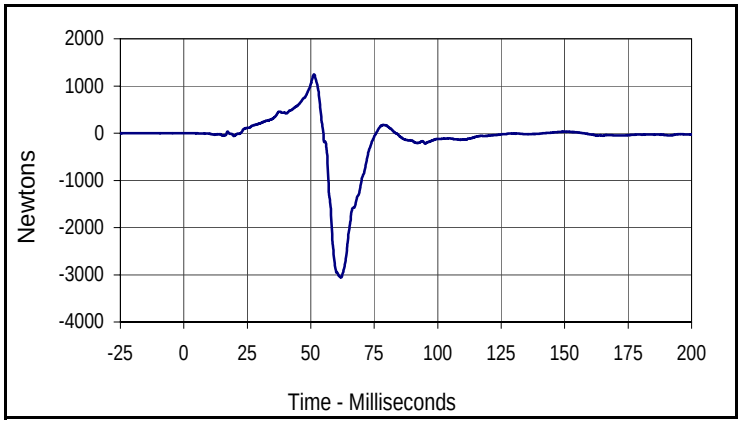


Curve Description			
Driver Chest Primary Z			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
8.0	50.8	-11.7	100.8

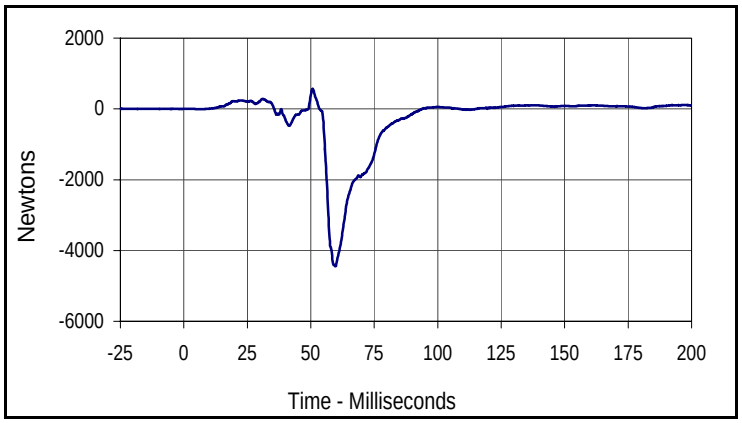


Curve Description			
Driver Chest Resultant Primary			
CURNO	Type	SAE Class	Units
004	RES	180	G's
Max	Time	Min	Time
44.1	64.2	0.0	0.0

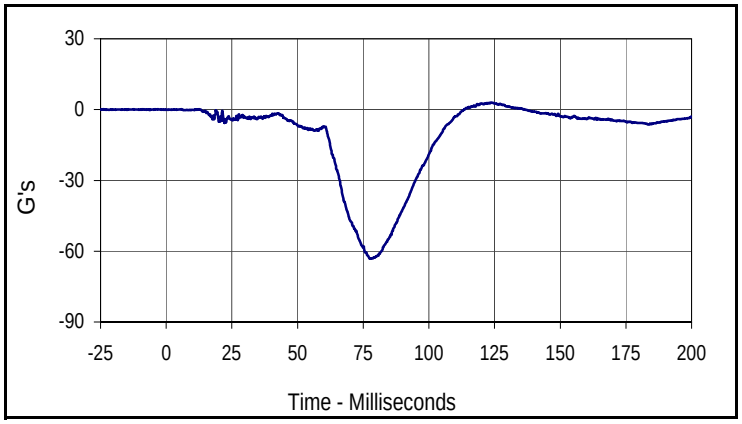
Test Vehicle:	2006 Lexus ES330 4-Door Sedan	Test Date:	1/20/06
Test Program:	2006 NHTSA 35mph NCAP	NHTSA No.:	M65101



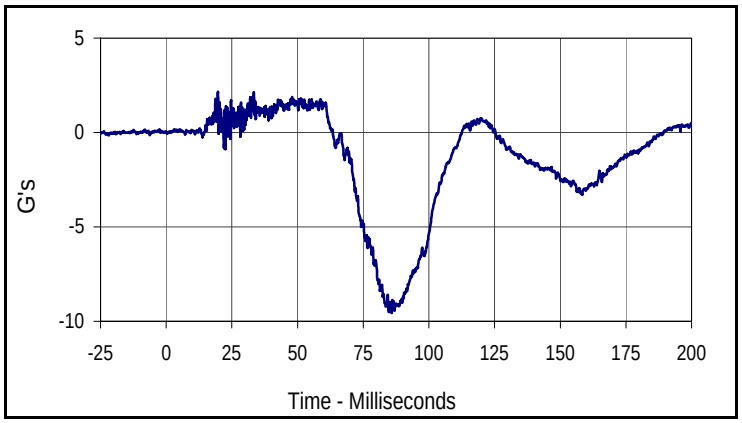
Curve Description			
Driver Left Femur Force Z			
CURNO	Type	SAE Class	Units
007	FIL	600	Newtons
Max	Time	Min	Time
1246.2	51.3	-3055.1	62.0



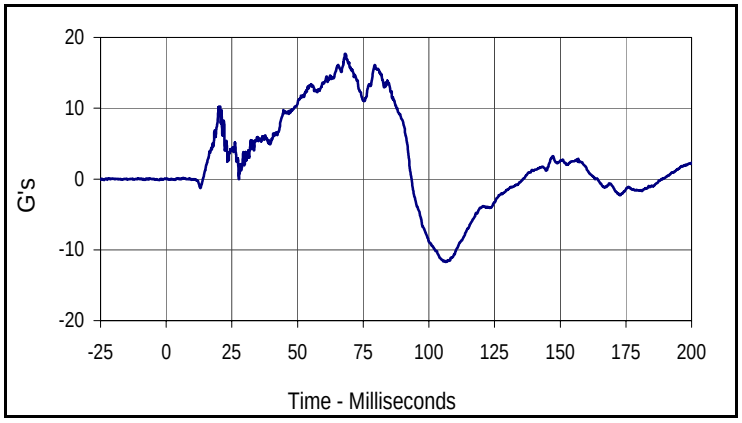
Curve Description			
Driver Right Femur Force Z			
CURNO	Type	SAE Class	Units
008	FIL	600	Newtons
Max	Time	Min	Time
569.1	50.7	-4442.9	59.7



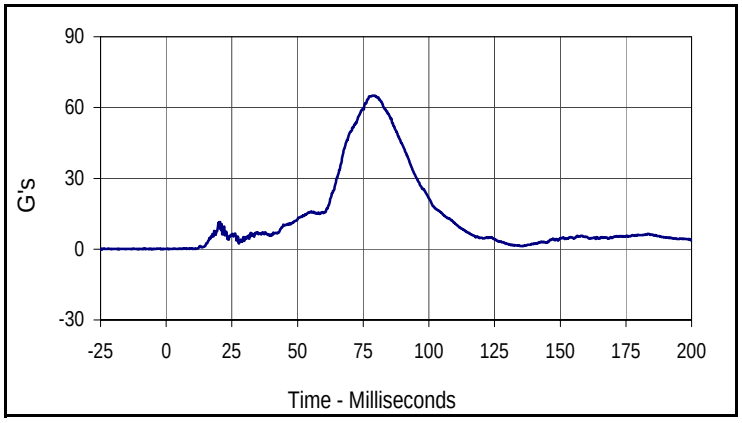
Curve Description			
Passenger Head Primary X			
CURNO	Type	SAE Class	Units
009	FIL	1000	G's
Max	Time	Min	Time
3.1	123.7	-63.2	77.7



Curve Description			
Passenger Head Primary Y			
CURNO	Type	SAE Class	Units
010	FIL	1000	G's
Max	Time	Min	Time
2.1	19.7	-9.6	85.8

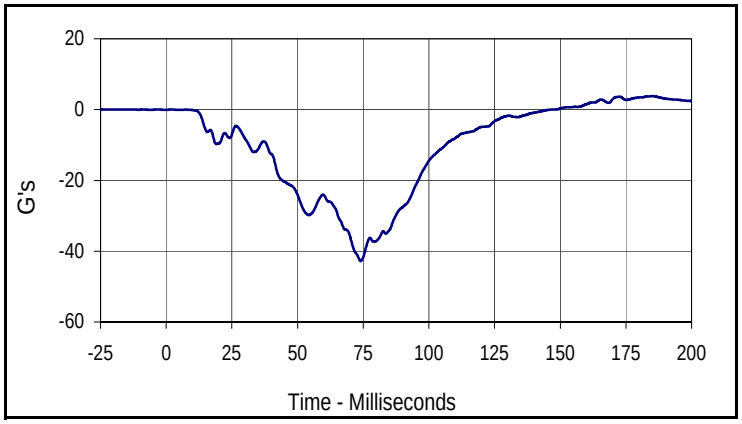


Curve Description			
Passenger Head Primary Z			
CURNO	Type	SAE Class	Units
011	FIL	1000	G's
Max	Time	Min	Time
17.7	68.2	-11.7	106.4

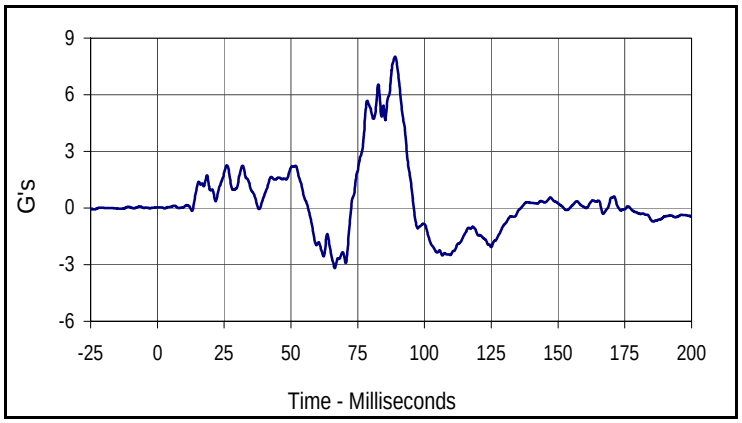


Curve Description			
Passenger Head Resultant Primary			
CURNO	Type	SAE Class	Units
009	RES	1000	G's
Max	Time	Min	Time
65.1	78.6	0.0	1.1

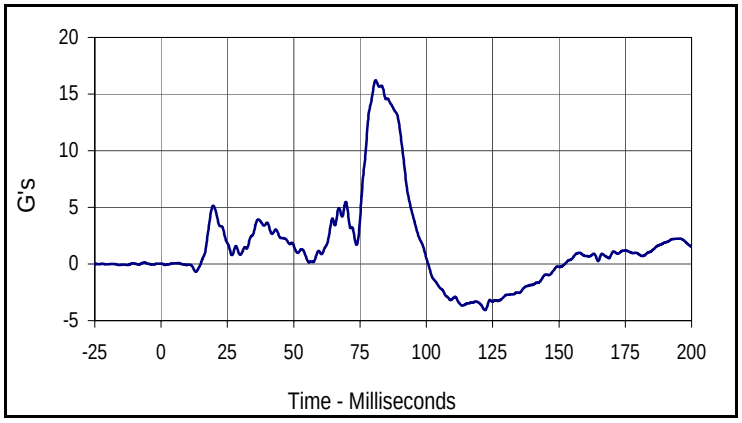
Test Vehicle:	2006 Lexus ES330 4-Door Sedan	Test Date:	1/20/06
Test Program:	2006 NHTSA 35mph NCAP	NHTSA No.:	M65101



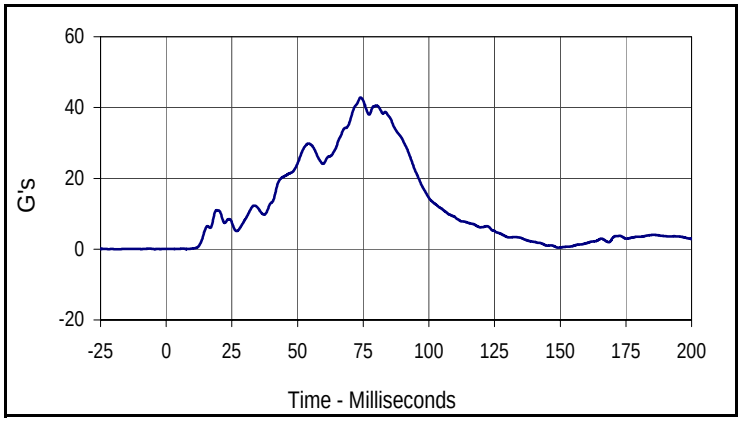
Curve Description			
Passenger Chest Primary X			
CURNO	Type	SAE Class	Units
012	FIL	180	G's
Max	Time	Min	Time
3.8	185.1	-42.8	74.0



Curve Description			
Passenger Chest Primary Y			
CURNO	Type	SAE Class	Units
013	FIL	180	G's
Max	Time	Min	Time
8.0	89.0	-3.2	66.4

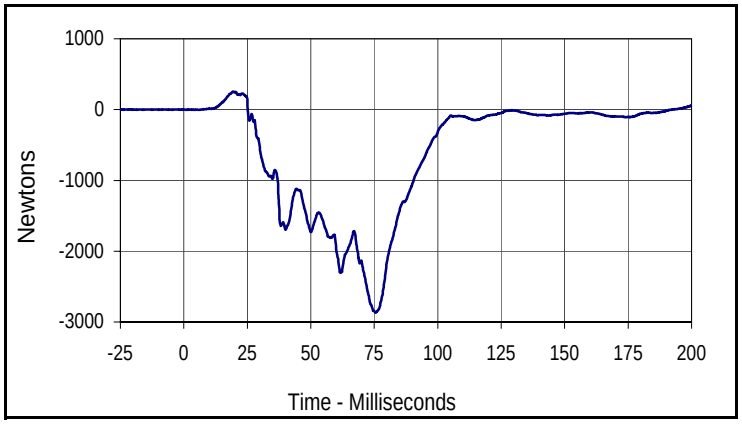


Curve Description			
Passenger Chest Primary Z			
CURNO	Type	SAE Class	Units
014	FIL	180	G's
Max	Time	Min	Time
16.2	80.9	-4.1	122.1

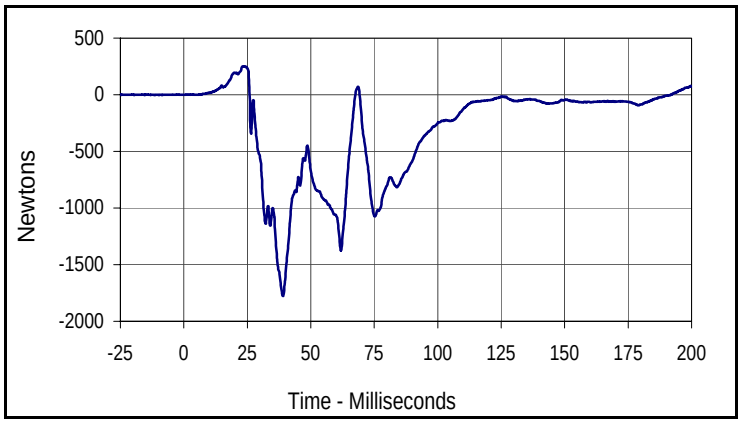


Curve Description			
Passenger Chest Resultant Primary			
CURNO	Type	SAE Class	Units
012	RES	180	G's
Max	Time	Min	Time
42.8	74.0	0.0	7.6

Test Vehicle:	2006 Lexus ES330 4-Door Sedan	Test Date:	1/20/06
Test Program:	2006 NHTSA 35mph NCAP	NHTSA No.:	M65101



Curve Description			
Passenger Left Femur Force Z			
CURNO	Type	SAE Class	Units
015	FIL	600	Newtons
Max	Time	Min	Time
254.8	19.4	-2867.7	75.4



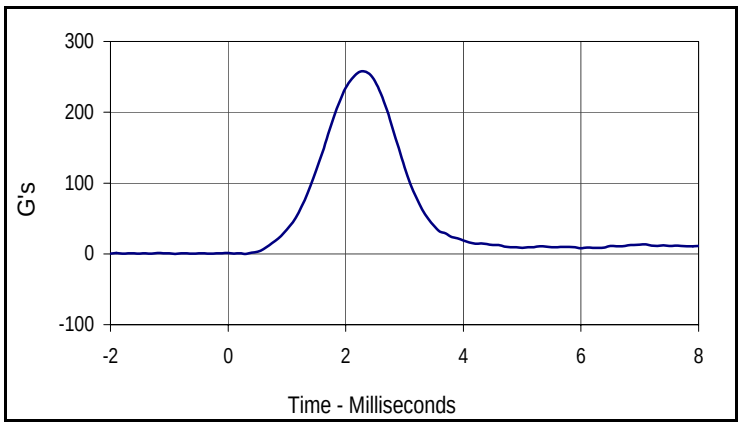
Curve Description			
Passenger Right Femur Force Z			
CURNO	Type	SAE Class	Units
016	FIL	600	Newtons
Max	Time	Min	Time
251.0	24.1	-1777.3	39.0

APPENDIX C

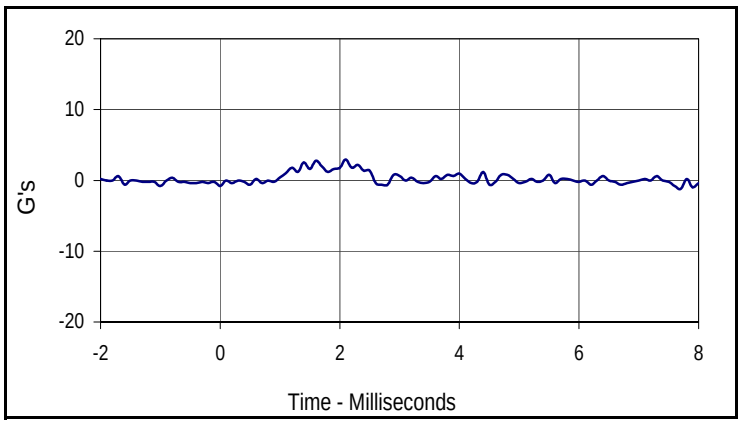
DUMMY CALIBRATION DATA

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



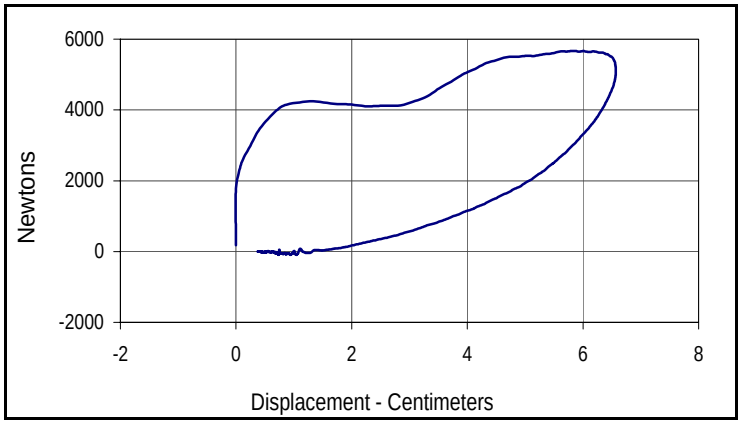
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
258.0	2.3	0.1	-0.9



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

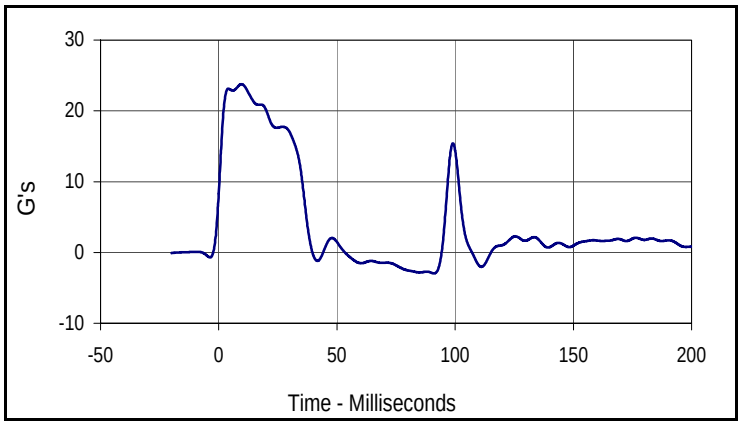
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.64	Pass
Peak Probe Force	Newtons	5159 to 5893	5670	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.57	Pass
Internal Hysterysis	%	69 to 85	75.1	Pass
		Overall Test Results		Pass



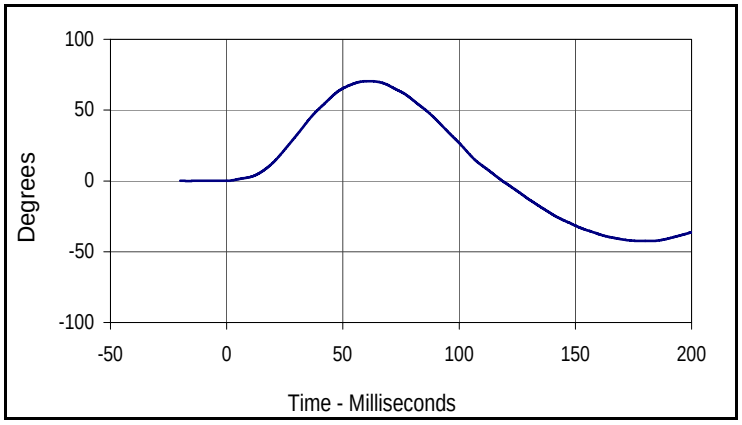
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysterysis
001	FIL	180	75.1
Peak Probe Force		Peak Chest Deflection	
5670		6.57	

Test Program:	Hybrid III 50th Percentile Male Neck Flexion Test	Test Date:	1/19/06
ATD Serial No.:	034	Test I.D.:	NF01A

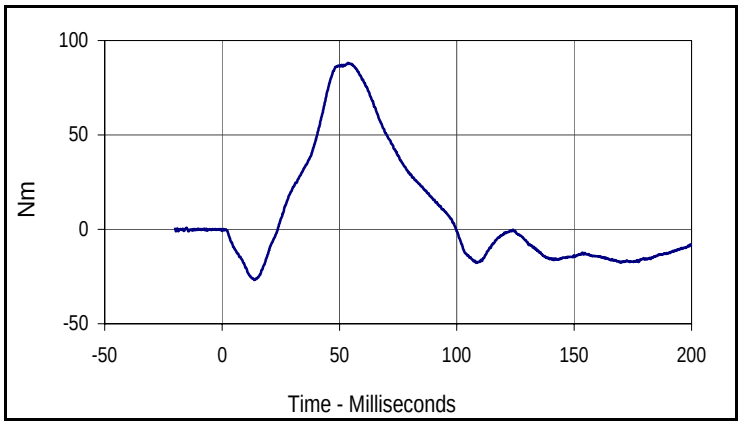
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.98	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.8	Pass
	20 Msec.	G's	17.6 to 22.6	20.1	Pass
	30 Msec.	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



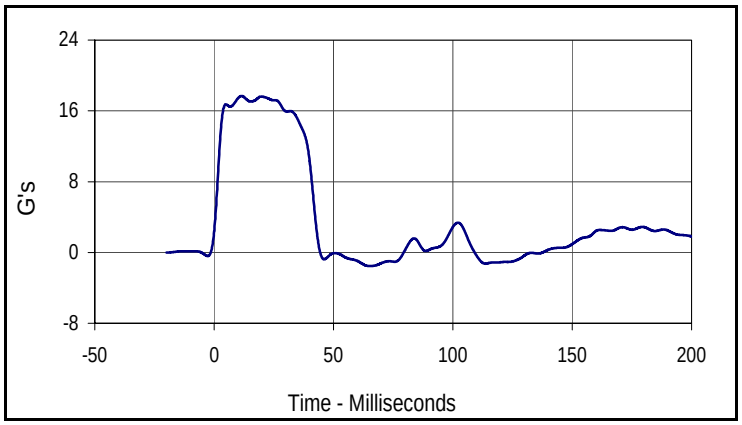
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
70.4	60.9	-42.4	181.8



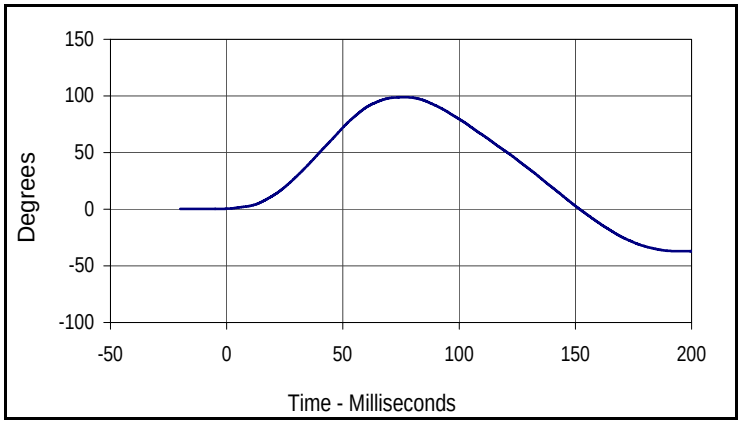
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
88.1	53.6	-26.8	13.8

Test Program:	Hybrid III 50th Percentile Male Neck Extension Test	Test Date:	1/19/06
ATD Serial No.:	034	Test I.D.:	NE01A

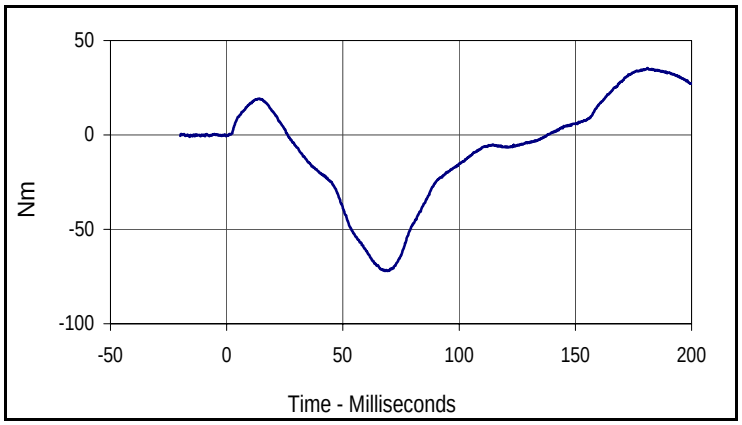
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.00	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	17.4	Pass
	20 Msec.	G's	14.0 to 19.0	17.6	Pass
	30 Msec.	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

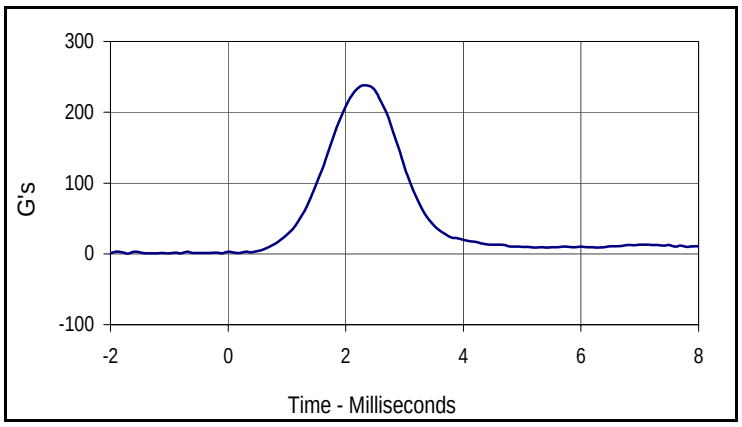
Curve Description			
Right Knee Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5465.2	2.5	-195.5	9.7

Test Program:	Hybrid III 50th Percentile Male External Measurements	Test Date:	1/19/06
ATD Serial No.:	034	Test I.D.:	N/A

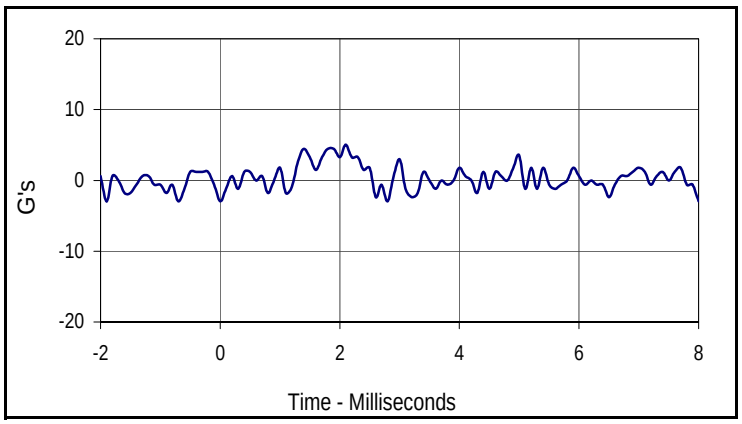
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	879 to 889	885	Pass
B - Shoulder pivot height	mm	505 to 521	510	Pass
C - "H" point height	mm	84 to 89	86	Pass
D - "H" point 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 - Poplipteal length	mm	429 to 455	450	Pass
M - Knee pivot height	mm	485 to 500	490	Pass
N - Buttock poplipteal 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 Test	Test Date:	1/19/06
ATD Serial No.:	035	Test 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



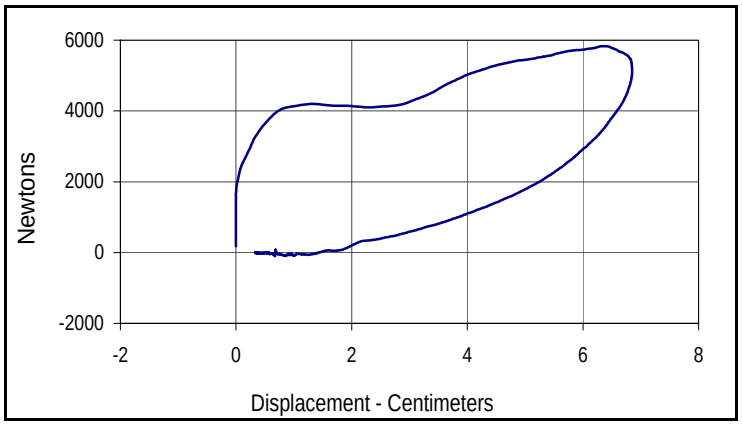
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
237.9	2.3	0.4	-1.7



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

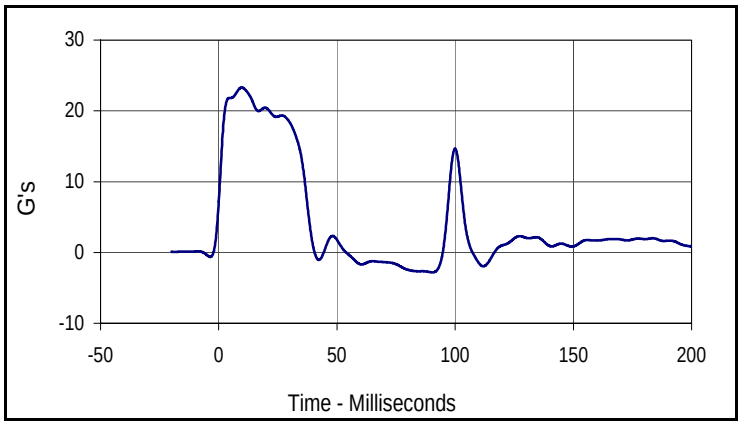
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.70	Pass
Peak Probe Force	Newtons	5159 to 5893	5829	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.85	Pass
Internal Hysterysis	%	69 to 85	74.5	Pass
		Overall Test Results		Pass



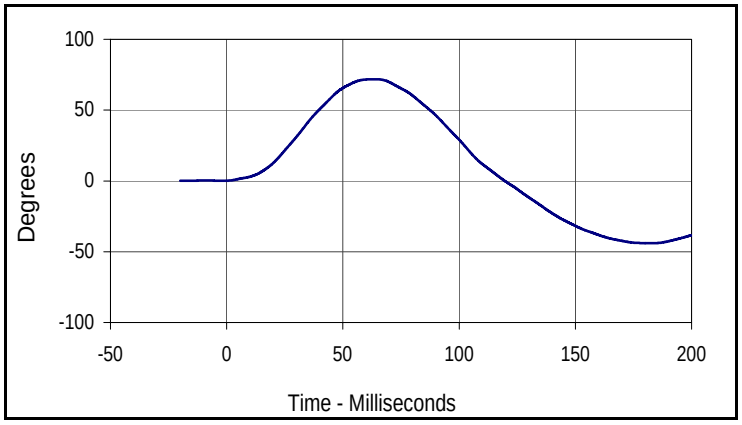
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysterysis
001	FIL	180	74.5
Peak Probe Force		Peak Chest Deflection	
5829		6.85	

Test Program:	Hybrid III 50th Percentile Male Neck Flexion Test	Test Date:	1/19/06
ATD Serial No.:	035	Test I.D.:	NF01B

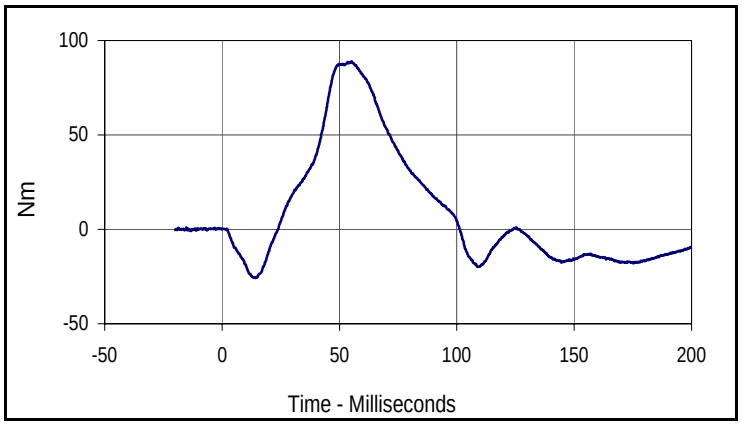
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.11	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.3	Pass
	20 Msec.	G's	17.6 to 22.6	20.4	Pass
	30 Msec.	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



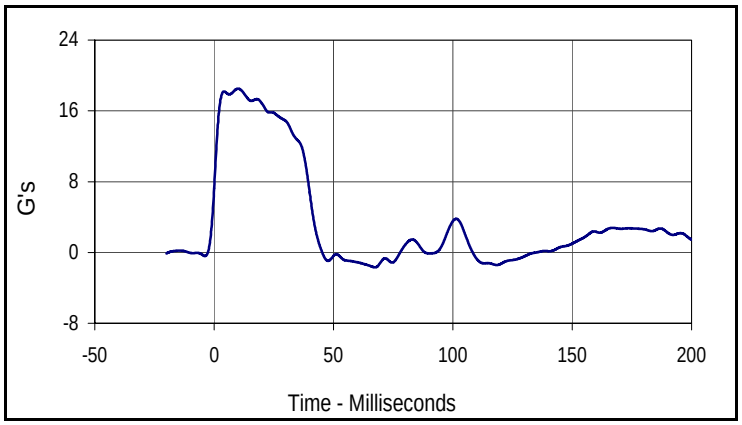
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
71.8	63.7	-44.0	183.4



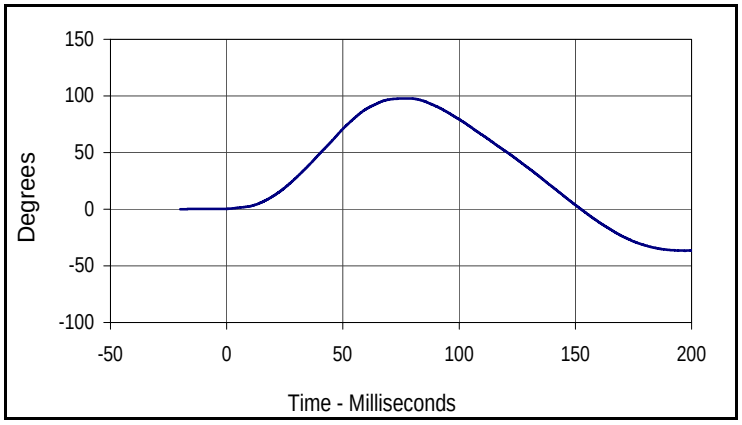
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
89.0	55.1	-25.8	14.1

Test Program:	Hybrid III 50th Percentile Male Neck Extension Test	Test Date:	1/19/06
ATD Serial No.:	035	Test I.D.:	NE01B

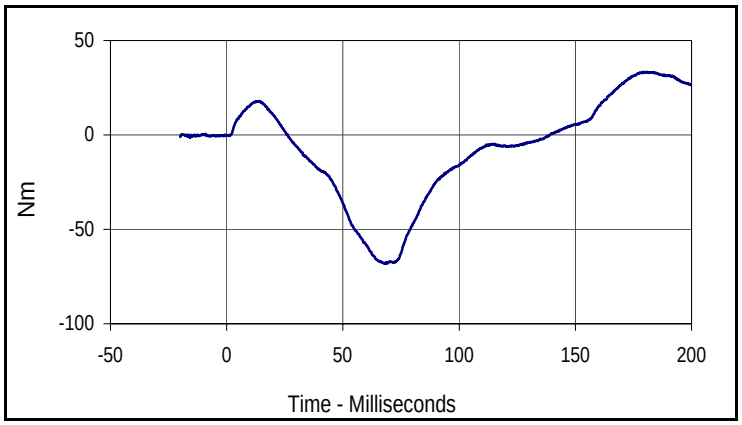
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.11	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	18.5	Pass
	20 Msec.	G's	14.0 to 19.0	16.9	Pass
	30 Msec.	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 Test	Test Date:	1/19/06
ATD Serial No.:	034	Test 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 - Poplipteal length	mm	429 to 455	451	Pass
M - Knee pivot height	mm	485 to 500	490	Pass
N - Buttock poplipteal 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