REPORT NUMBER: CAL-06-16

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

TOYOTA MOTOR CORPORATION
2006 TOYOTA RAV4
MPV

NHTSA NUMBER: M65105

CALSPAN TEST NUMBER: 8642-NCAP-75

CALSPAN CORPORATION
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February 23, 2006

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
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15. Supplementary Notes

16. Abstract

A frontal load cell barrier test of a 2006 Toyota RAV4 MPV was performed at Calspan Corporation's crash test facility in Buffalo, New York, on February 23, 2006.

The impact velocity was 56.81 kph and the temperature at the barrier face was 21.3°C. The maximum post-test vehicle crush was 467 mm. The test vehicle was equipped with 3-point restraint systems, knee bolsters, and airbags at both the driver and right outboard passenger seating positions.

With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements. The occupant injury criteria summary is as follows:

Measurement Description	**Units**	**Threshold**	**Driver (142)**	**Passenger (150)**
Head Injury Criteria (HIC - 36 ms)	-	1000	393.4	511.1
Maximum Thorax Acceleration (3 ms Clip)	g's	60 g's	41.2	47.0
Chest Displacement	mm	-76 mm	-29.5	-33.6
Left Femur Force	Newtons	-10000 N	-4187.1	-1175.2
Right Femur Force	Newtons	-10000 N	-5097.9	-2880.6

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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.81 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-01-D-32005. 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 48.3 kph requirements.

The 56.81 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

1.2 TEST PROCEDURE

This 56.81 kph 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 December 1999. 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.

One real-time camera and 14 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in 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 nine accelerometer array heads, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also installed on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 142) and the right-front passenger (position 2) ATD (Serial No.150) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The vehicle, occupant, camera and measurement data are presented in Section 2. Appendix A contains the still photograph prints. The 140 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Appendix C contains the dummy calibration data and Appendix D contains the transducer calibration dates.

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 36 load cells was impacted by a 2006 Toyota RAV4 MPV at a velocity of 56.81 kph. The test was performed at Calspan on February 23, 2006. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The occupant data is summarized below.

ATD	HIC	T_1	T_2	Clip (g)	T_1	T_2	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver	393.4	55.3	91.3	41.2	71.8	74.8	-29.5	-4187.1	-5097.9
Passenger	511.1	51.8	87.4	47.0	55.7	58.7	-33.6	-1175.2	-2880.6

The test data can be found on the NHTSA website at www.nhtsa.dot.gov

TEST NOTES	
Data Channel	Anomalies
V1P1 Right Upper Tibia Mx	Channel Failed
V1P2 Left Upper Tibia Mx	Channel Opened
V1P2 Left Upper Tibia My	Wire Cut at 80 ms
V1P2 Left Foot Fore Az	Questionable Data
V1 Engine Bottom #4x	Wire Cut at 164 ms
V1 Left Caliper #7x	Invalid after 32 ms

SECTION 2
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: M65105 Test Mode: 56.3 kph Frontal Barrier
Test Date: February 23, 2006 Time: 13:36 Temperature: 21.3 °C
Vehicle Make/Model/Body Style: 2006 Toyota RAV4 MPV
Vehicle Test Weight: 1778.0 kg Impact Velocity: 56.81 kph (55.5 – 57.1 kph)
Vehicle/Barrier Impact Angle: 0 ° Max Static Crush: 467 mm

ATD INFORMATION AND VISIBLE CONTACT POINTS

	DRIVER	PASSENGER
ATD Type:	Part 572E	Part 572E
Restraint System:	3-point belt with shoulder pretensioner and force limiter, airbag, knee bolster and head restraint	3-point belt with shoulder pretensioner and force limiter, airbag, knee bolster and head restraint
Head Contact:	Face to center of airbag; Back of head to sun visor and head restraint	Face to upper center of airbag; Top of head to side header
Abdomen Contact:	None	None
Chest Contact:	Airbag	Airbag
Left Knee Contact:	Knee bolster left of steering column	Knee bolster above left edge of glove compartment door
Right Knee Contact:	Knee bolster right of steering column	Knee bolster above center of glove compartment door

DOOR OPENING, SEAT TRACK AND GLAZING INFORMATION

Description	Driver Side	Passenger Side
Door Lock Status	Unlocked	Unlocked
Front Door Opening	Closed, latched and operable without tools	Closed, latched and operable without tools
Rear Door Opening	Closed, latched and operable without tools	Closed, latched and operable without tools
Hatch/Other Door Opening	Closed, latched and operable without tools	
Front Seat Track Shift (mm)	0	0
Front Seat Back Failure	None	None
Glazing Damage	None	

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Left Side (mm)	Center (mm)	Right Side (mm)	Average (mm)
Value	553	510	535	533

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	900	948
Lap belt length as measured on ATD	mm	805	848
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems	mm	1705	1796

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2006 Toyota RAV4 MPV

NHTSA No. : M65105 ; VIN: JTMBD31V165005759 ; Color: Red

Engine Data: 4 cylinders; - CID; 2.4 Liters; - cc

Placement: - Longitudinal or In-Line; X Transverse or Lateral

Transmission Data: 4 speeds; - Manual; X Automatic; X Overdrive

Final Drive: - Rear Wheel Drive; - Front Wheel Drive; X Four Wheel Drive

AUTOMATIC DOOR LOCKS:

Is test vehicle equipped with Automatic Door Locks (ADLs)? - Yes; X No;

Does vehicle owner's manual describe how to deactivate ADLs? - Yes; - No; X N/A

DEALER AND DELIVERY INFORMATION:

Date Received: 01/30/2006 ; Odometer Reading 74 km

Selling Dealer: West Herr Toyota

Dealer Address: 4141 Southwestern Blvd., Orchard Park, NY 14127

TEST VEHICLE OPTIONS:

X AC; X Power Steering; X Power Brakes; X Power Locks; X Power Seats

X ABS; X Tilt Wheel; X Stability Control X Traction Control - Anti-Theft

SAFETY BELT FEATURES:

Driver: X Pretensioner (Shoulder); X Load Limiter; X Adjustable Anchorage

Passenger: X Pretensioner (Shoulder); X Load Limiter; X Adjustable Anchorage

AIRBAG FEATURES:

Position	Frontal	Knee Bolster	Side Torso	Side Head/Torso Combination	Side Curtain
Driver:	Yes	No	Yes	No	Yes
Passenger:	Yes	No	Yes	No	Yes
Rear Passenger:	No	No	No	No	No

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Toyota Motor Corporation

Date of Manufacture 12/05

GVWR: 2055 kg; GAWR: 1145 kg FRONT; 1135 kg REAR

VEHICLE CAPACITY DATA:

Type of Front Seats: - Bench; X Bucket; - Split Bench

Number of Occupants: 2 Front; 3 Rear; 5 Total

Vehicle Capacity Weight (VCW) = 375 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 34.8 kg

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

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	470.5	434.0	56.6	904.5
Rear =	348.0	344.5	43.4	692.5
			Total Delivered Weight (UDW) =	1597.0

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW) =	1597.0	kg
Rated Cargo/Luggage Weight (RCLW) =	34.8	kg
Weight of 2 p.572 Dummies @ 76 each =	152	kg
TARGET TEST WEIGHT =	1783.8	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 29.0 KG OF CARGO WEIGHT:

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	507.5	472.5	55.1	980.0
Rear =	406.5	391.5	44.9	798.0
			Total Vehicle Test Weight (ATW) =	1778.0

Weight of Ballast Secured in Vehicle Trunk Area[1] = 0 kg

Vehicle Components Removed for Weight Reduction: Spare tire and rear seat head restraints.

VEHICLE ATTITUDE (all dimension in millimeters):

	Left Front	Right Front	Left Rear	Right Rear	CG[2]
AS DELIVERED:	823	828	841	845	0.0
FULLY LOADED:	813	813	822	827	-
AS TESTED:	814	814	822	827	0.0

Vehicle's Wheel Base: 2661 mm

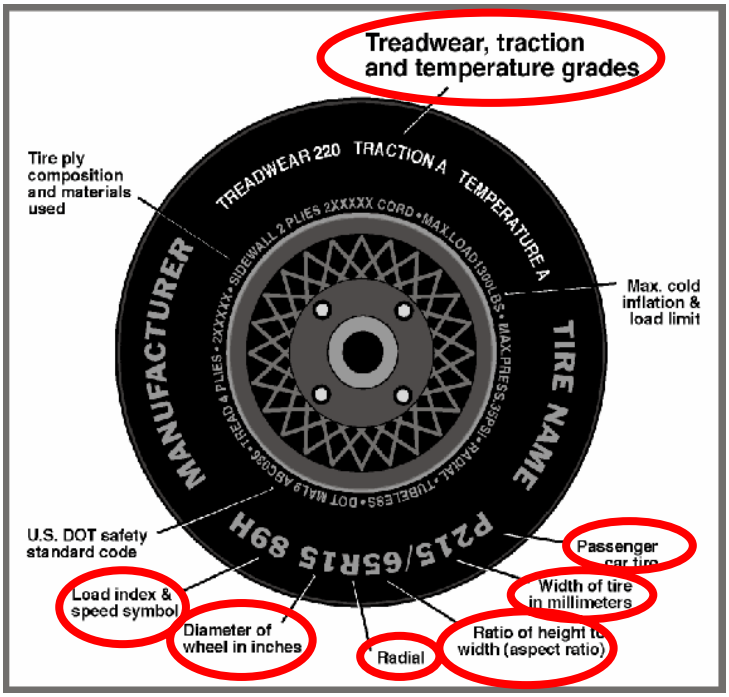
[1]Ballast weight does not include the weight of instrumentation, on-board cameras and data acquisition system

[2]Rearward of the front axle centerline.

DATA SHEET NO. 3
TEST VEHICLE TIRE INFORMATION

Vehicle Year/Make/Model/Body Style: 2006 Toyota RAV4 MPV

NHTSA Test No.: M65105 Test Date: February 23, 2006



Measured Parameter	Front	Rear
Maximum Tire Pressure (from sidewall - kPa)	275	275
Cold Pressure (from tire placard - kPa)*	220	220
Recommended Tire Size (from tire placard)	225/65R17 101H	225/65R17 101H
Tire size on Vehicle	225/65R17	225/65R17
Tire Manufacturer	Yokohama	Yokohama
Tire Name	Geolander	Geolander
Tire Type	P	P
Tire Width (mm)	225	225
Ratio of Height to Width (aspect ratio)	65	65
Radial	R	R
Wheel Diameter	17	17
Load Index & Speed Symbol	101H	101H
Treadwear	280	280
Traction Grade	B	B
Temperature Grade	A	A

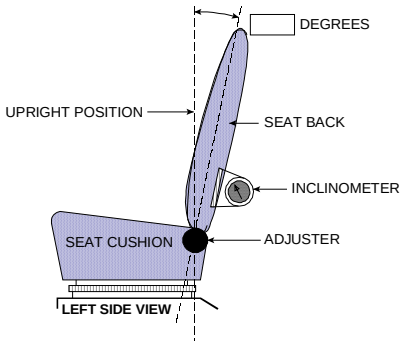
*Tire pressure used for test

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2006 Vehicle Model: Toyota RAV4 Body Style : MPV

1. NOMINAL DESIGN RIDING POSITION:
for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.



FRONT SEAT ASSEMBLY

Seat back angle for driver's seat: 12.0

Measurement instructions: This was a power adjustable seat back. The seat back was placed 12 degrees rearward from its most upright position.

Seat back angle for passenger's seat: 14.0

Measurement instructions: The seat back was placed 12 degrees rearward from its most upright position. This position corresponds to detent 7 where the most upright locking position is defined as detent 0.

2. SEAT FORE AND AFT POSITIONING:

Positioning of the driver's seat: The absolute fore/aft seat travel is 282 mm. The seat cushion was placed full down at the middle of its absolute fore/aft travel (141 mm rearward of its forward most position).

Positioning of the passenger's seat: The absolute fore/aft seat travel is 240 mm. The seat cushion was placed at the middle of its absolute fore/aft travel (detent 8, where the forward most detent is defined as 0).

3. FUEL TANK CAPACITY DATA:

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 25.3 liters

B. "Usable Capacity" of the optional equipment fuel tank is - liters

C. "Usable Capacity" of the vehicle(s) used for certification testing to requirements of FMVSS 301 = 23.3 to 23.8 liters

3.2 Actual Amount of Stoddard solvent added to vehicle for test = 23.4 liters

3.3 One-Third of Useable Capacity = 8.4 liters

3.4 Is vehicle equipped with electric fuel pump? Yes- X ; No- -

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

The fuel pump operates briefly when the ignition is turned to the “ON” position and the engine is not started

The fuel pump operates continuously when the engine is started.

4. STEERING COLUMN ADJUSTMENTS:

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions: The steering column was positioned at the middle of its tilt and middle of its telescope range (1.65 degrees down from full up, 20 mm out from full in).

5. SEAT BELT UPPER ANCHORAGE:

Nominal design riding position: The upper anchorage was placed in detent 0 where the upper most detent is defined as detent 0 (full up).

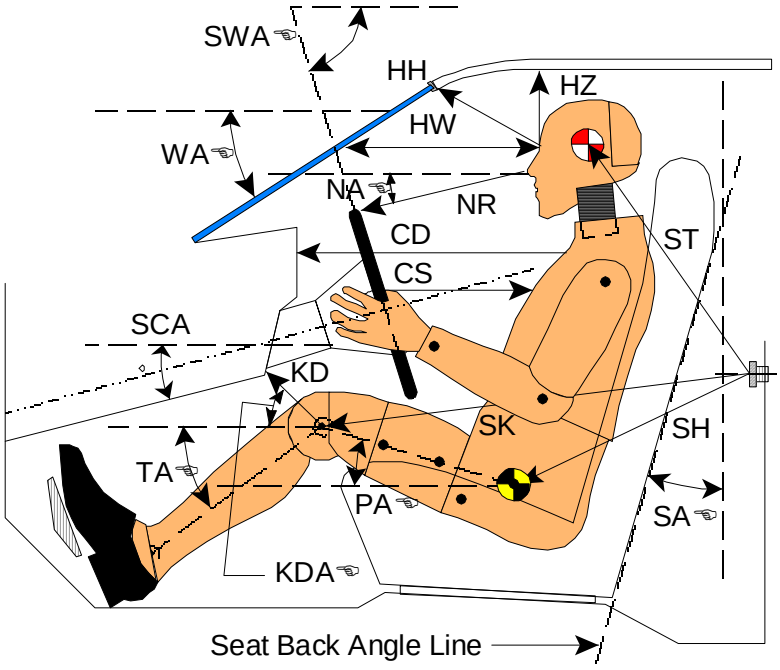
6. AUTOMATIC DOOR LOCKS: Is test vehicle equipped with ADLs? - Yes; X No;

Does vehicle owner's manual describe how to deactivate ADLs? - Yes; - No; X N/A

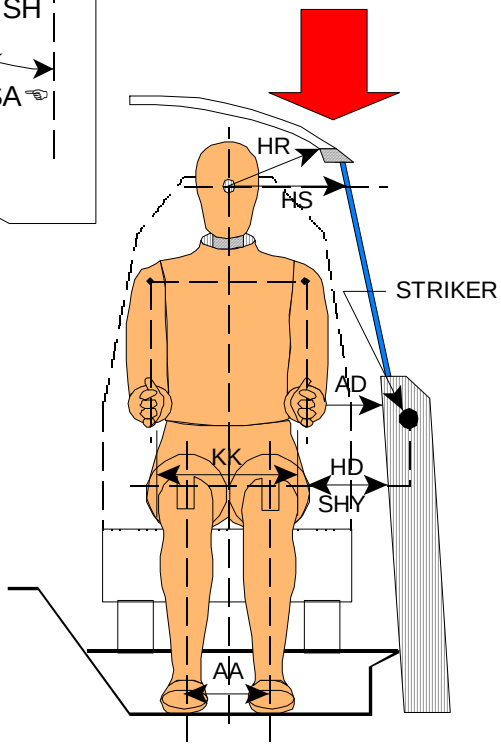
Comments: None

DATA SHEET NO. 5
FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE

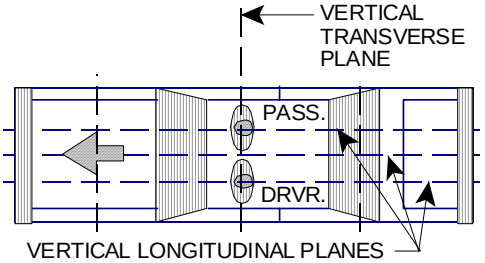
DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



AD - Arm to Door
HD - H-Point to Door
HR - Head to Side Header
HS - Head to Side Window
KK - Knee to Knee
AA - Ankle to Ankle
SHY- Striker to H-Point (Y Direction)



CD - Chest to Dash
CS - Steering Wheel to Chest
HH - Head to Header
HW - Head to Windshield
HZ - Head to Roof
KDA - Knee to Dash Angle
KDL- Left Knee to Dash
KDR - Right Knee to Dash
NA - Nose to Rim Angle
NR - Nose to Rim
PA - Pelvic Angle
RA - Rim to Abdomen
SA - Seat Back Angle
SCA - Steering Column Angle
SH - Striker to H-Point
SK - Striker to Knee
ST - Striker to Head
SWA- Steering Wheel Angle
TA - Tibial Angle
WA - Windshield Angle



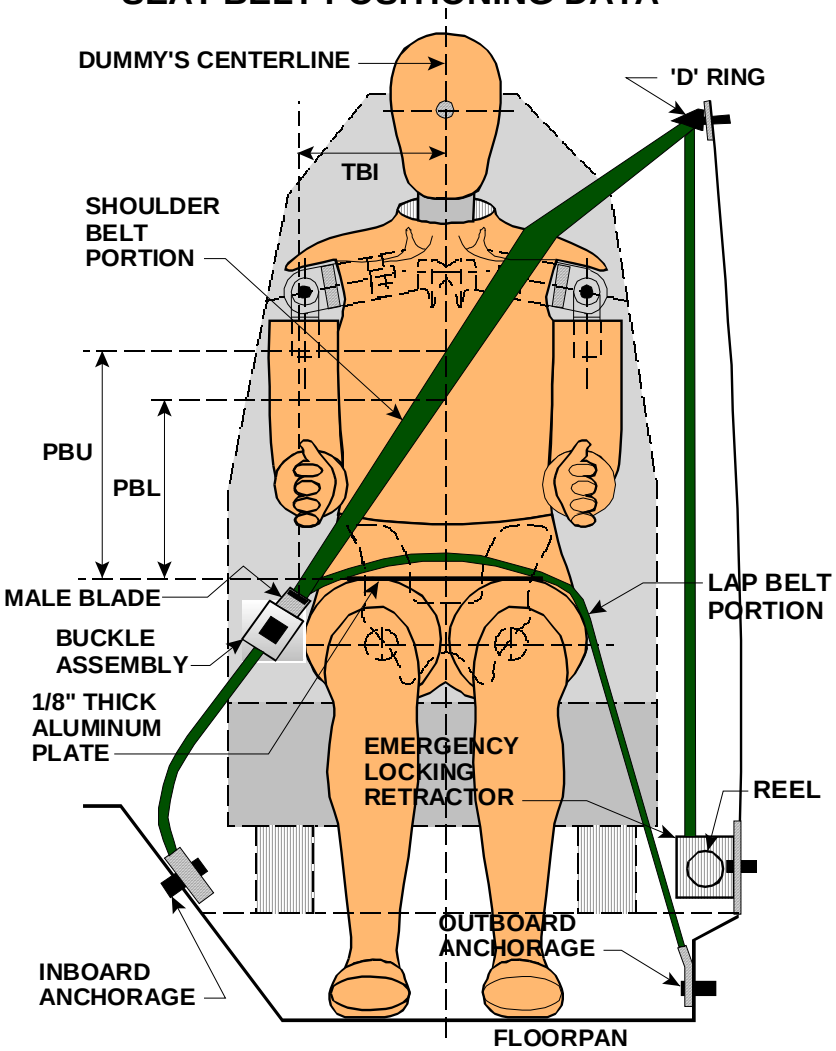
DATA SHEET NO. 5
FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #142)			PASS. (Serial #150)		
WA^O	32.7 deg.			N/A		
SWA^O	62.7 deg.			N/A		
SCA^O	27.3 deg.			N/A		
SA^O	12 deg. (3.0 deg. on head restraint post)			12 deg. (5.8 deg. on head restraint post)		
HZ	240			215		
HH	369			365		
HW	660			615		
HR	240			230		
NR	423	Angle	15 deg.	N/A		
CD	524			550		
CS	294			N/A		
RA	181			N/A		
KDL	135	Angle (KDA)	31 deg.	103		
KDR	89			125	Angle (KDA)	28 deg.
PA^O	22.3 deg.			23.6 deg.		
TA^O	53.6 deg.			47.1 deg.		
KK	410			320		
AA	360			228		
ST	461	Angle	11 deg.	471	Angle	11 deg.
SK	636	Angle	100 deg.	620	Angle	99 deg.
SH	324	Angle	129 deg.	304	Angle	139 deg.
SHY	250			252		
HS	350			345		
HD	164			165		
AD	129			131		

Dimensions in millimeters

DATA SHEET NO. 6
SEAT BELT POSITIONING DATA

SEAT BELT POSITIONING DATA

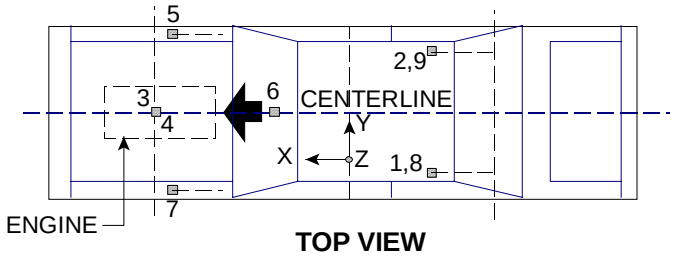


FRONT VIEW OF DUMMY

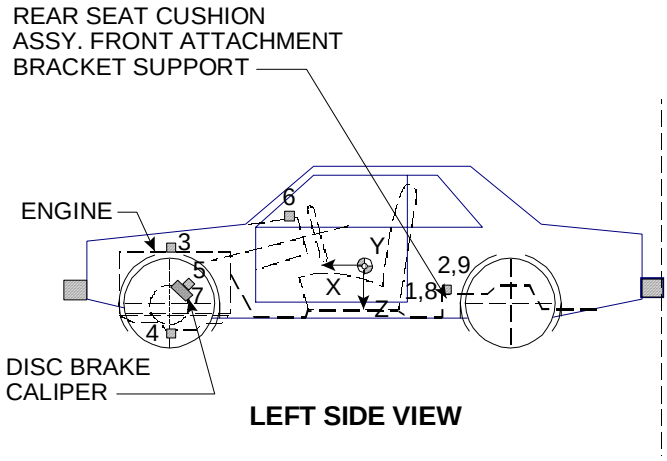
	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	375	368
PBL-- Top surface of alum. plate to belt lower edge	295	282
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATIONS

VEHICLE ACCELEROMETER LOCATIONS



TOP VIEW



LEFT SIDE VIEW

		PRE-TEST LENGTH (mm)		
No.	LOCATION	X	Y	Z
1	Left Rear Seat Cross Member X	1875	-708	-429
2	Right Rear Seat Cross Member X	1875	708	-429
3	Top of Engine Block	4011	347	-817
4	Bottom of Engine	3903	248	-222
5	Disc Brake Caliper @ Right Side	3710	710	-470
6	Instrument Panel**	-	-	-
7	Disc Brake Caliper @Left Side	3710	-713	-470
8	Left Rear Seat Cross Member Z	1875	-708	-429
9	Right Rear Seat Cross Member Z	1875	708	-429

X – From rear surface of vehicle (+ forward)
Y – From vehicle centerline (+ right)
Z – From ground plane (+ up)
** Accelerometer was not requested by the COTR

DATA SHEET NO.8
SUMMARY OF FMVSS 212 and FMVSS 219 (Partial) DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place and covered with a 18 mm molding.

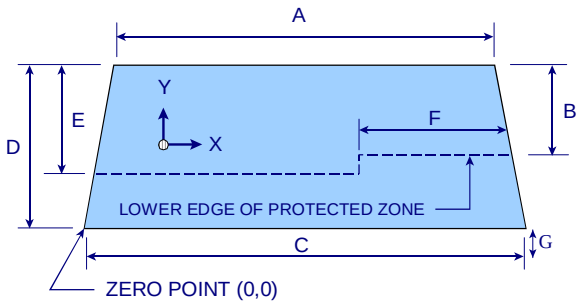
FMVSS 212 REQUIREMENTS:

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants,

Temperature of windshield molding during test: 21.3ºC.

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		% OF RETENTION
	PRE-TEST (mm)	POST-TEST (mm)	
RIGHT SIDE	2005.5	2005.5	100.0%
LEFT SIDE	2005.5	2005.5	100.0%
TOTAL	4011	4011	100.0%



FRONT VIEW OF WINDSHIELD

DIMENSIONS (mm)	
A	1170
B	572
C	1405
D	718
E	491
F	455
G	18

FAILURE DETAILS: None

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

	COORDINATES	
	X	Y
1.	-	-
2.	-	-
3.	-	-
4.	-	-

DATA SHEET NO. 9
SUMMARY OF FMVSS NO. 301 DATA

NHTSA TEST No.: M65105 TEST DATE: February 23, 2006

VEHICLE MAKE/MODEL: 2006 Toyota RAV4 MPV

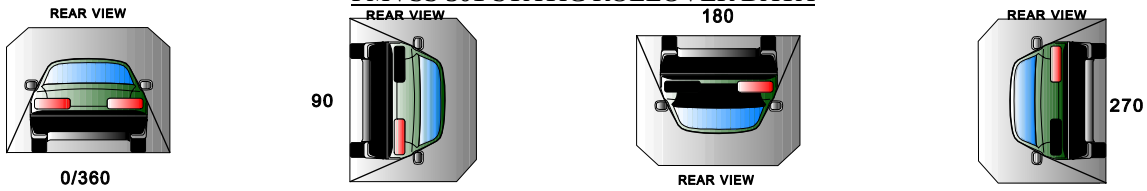
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

FUEL SPILLAGE MEASUREMENT:

Time Interval	Amount	Maximum Allowable Spillage
Impact Until Motion Ceases		**28 g**
First Five Minutes Following Impact		**142 g**
Next 25 Minutes		**28 g / 1 minute**

SOLVENT SPILLAGE DETAILS: None

FMVSS 301 STATIC ROLLOVER DATA



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Stage	Rotation Time (spec. 1 -3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
0º - 90º	1	minutes	10	seconds	5	minutes	6	minutes	10	seconds	7	minutes
90º - 180º	1	minutes	3	seconds	5	minutes	6	minutes	3	seconds	7	minutes
180º-270º	1	minutes	4	seconds	5	minutes	6	minutes	4	seconds	7	minutes
270º-360º	1	minutes	6	seconds	5	minutes	6	minutes	6	seconds	7	minutes

II. FMVSS 301 REQUIREMENTS: (Maximum allowable solvent spillage):

First 5 minutes from onset of rotation	6th min.	7th min.	8th min. (if required)
142 g	28 g	28 g	28 g

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

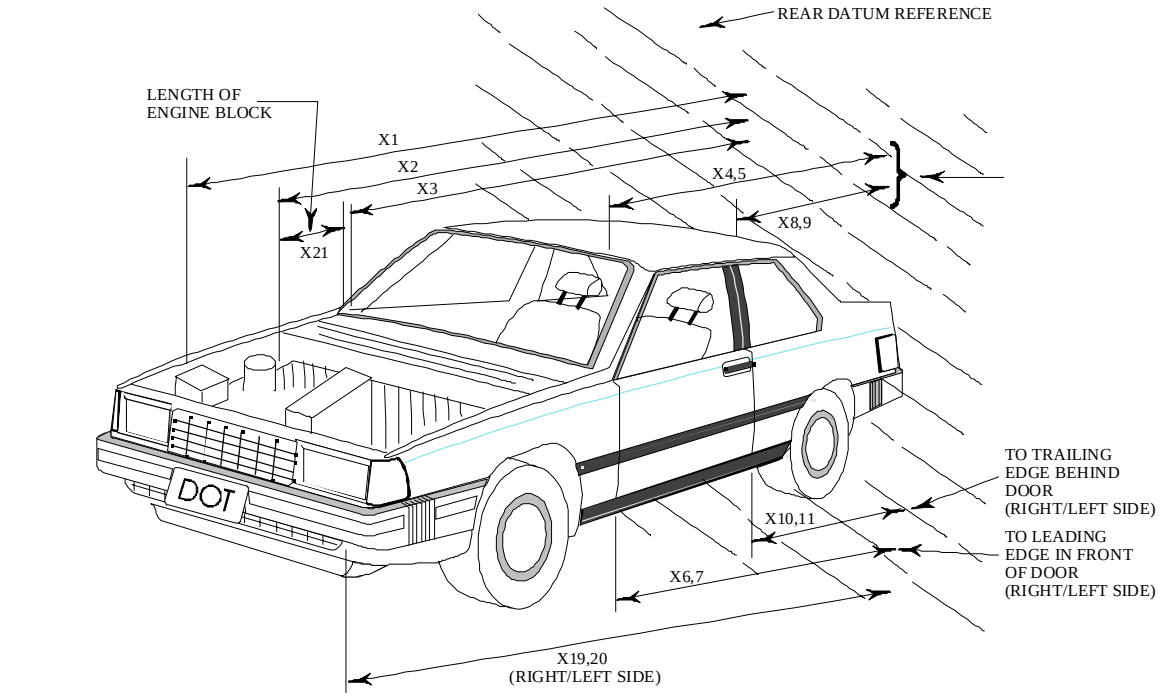
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0º - 90º	0	0	0	N/A
90º - 180º	0	0	0	N/A
180º-270º	0	0	0	N/A
270º-360º	0	0	0	N/A

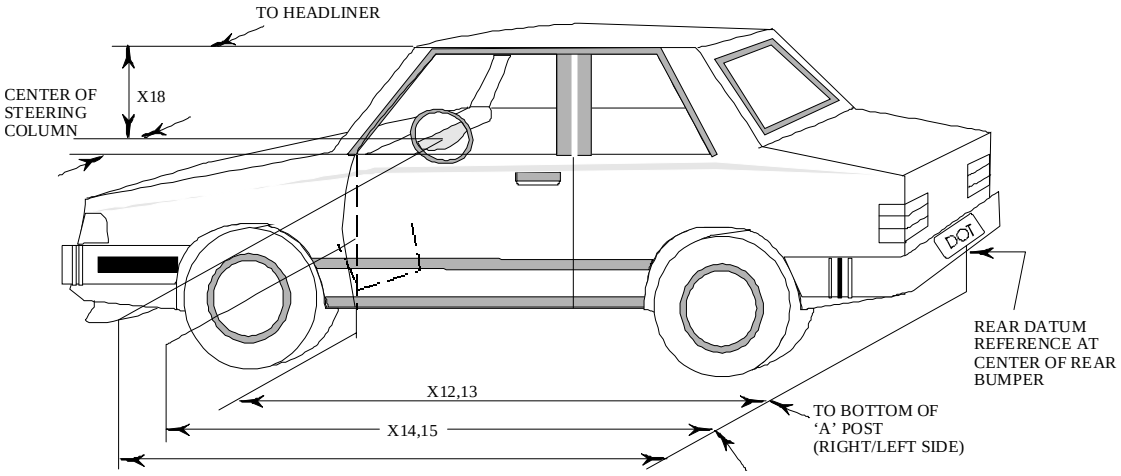
Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

Rollover Stage	Spillage Location
0º - 90º	None
90º - 180º	None
180º-270º	None
270º-360º	None

DATA SHEET NO. 10
TEST VEHICLE MEASUREMENTS





DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

NHTSA TEST No.: M65105 TEST DATE: February 23, 2006

VEHICLE MAKE/MODEL: 2006 Toyota RAV4 MPV

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4601	4168	433
X2	Rear Surface of Vehicle to Front of Engine	4073	3865	208
X3	Rear Surface of Vehicle to Firewall	3627	3621	6
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3212	3214	-2
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3213	3214	-1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3220	3222	-2
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3228	3232	-4
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2185	2186	-1
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2187	2187	0
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2185	2189	-4
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2186	2190	-4
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3304	3305	-1
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3304	3306	-2
X14	Rear Surface of Vehicle to Firewall, Right Side	3614	3594	20
X15	Rear Surface of Vehicle to Firewall, Left Side	3630	3601	29
X16	Rear Surface of Vehicle to Steering Column	2827	2884	-57
X17	Center of Steering Column to "A" Post	303	335	-32
X18	Center of Steering Column to Headliner	467	500	-33
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4577	4118	459
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4580	4113	467
X21	Length of Engine Block	330	330	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	3021	3027	-6
CD	Rear Surface of Vehicle to Center of Dash Panel	3067	3078	-11
LD	Rear Surface of Vehicle to Left Side of Dash Panel	3022	3021	1

All Dimensions in mm

DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

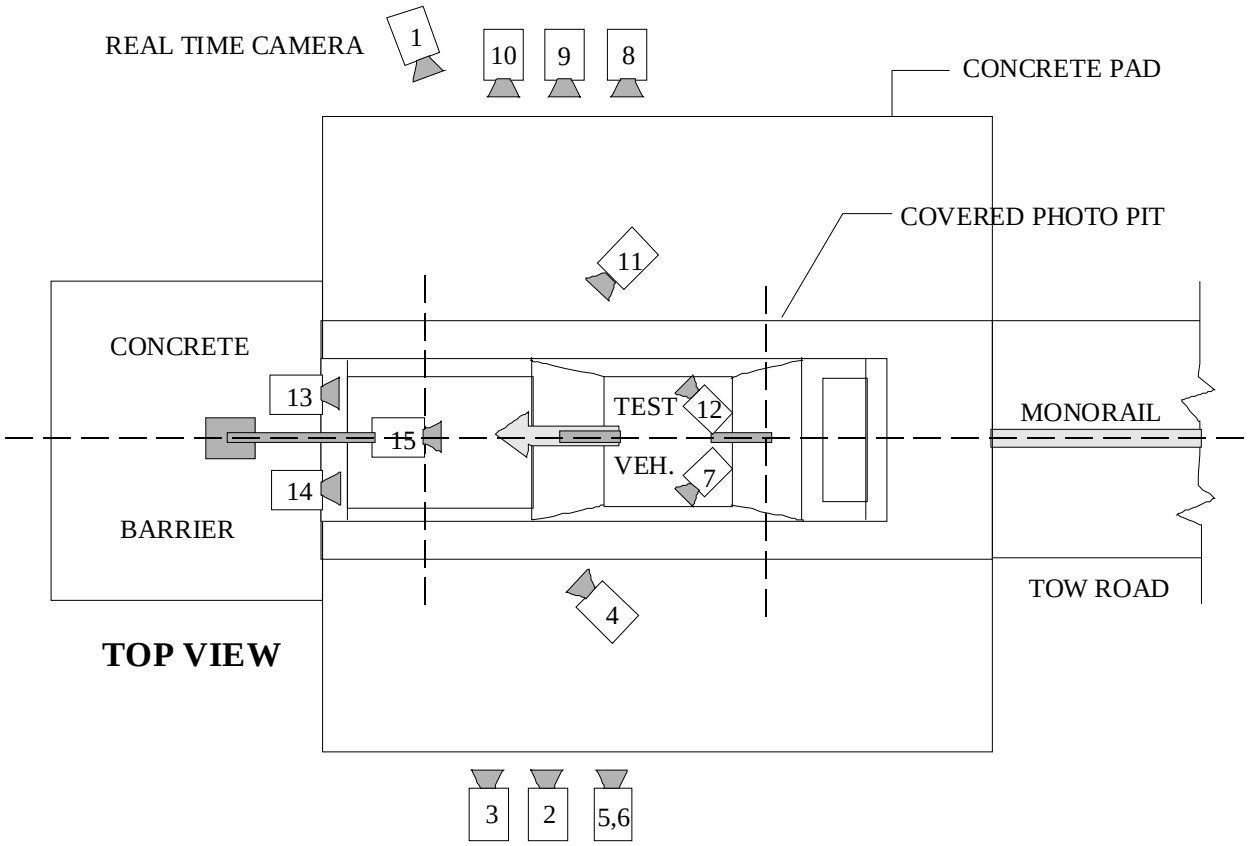
NHTSA TEST No.: M65105 TEST DATE: February 23, 2006

VEHICLE MAKE/MODEL: 2006 Toyota RAV4 MPV

TARGET VEHICLE STRUCTURAL MEASUREMENTS

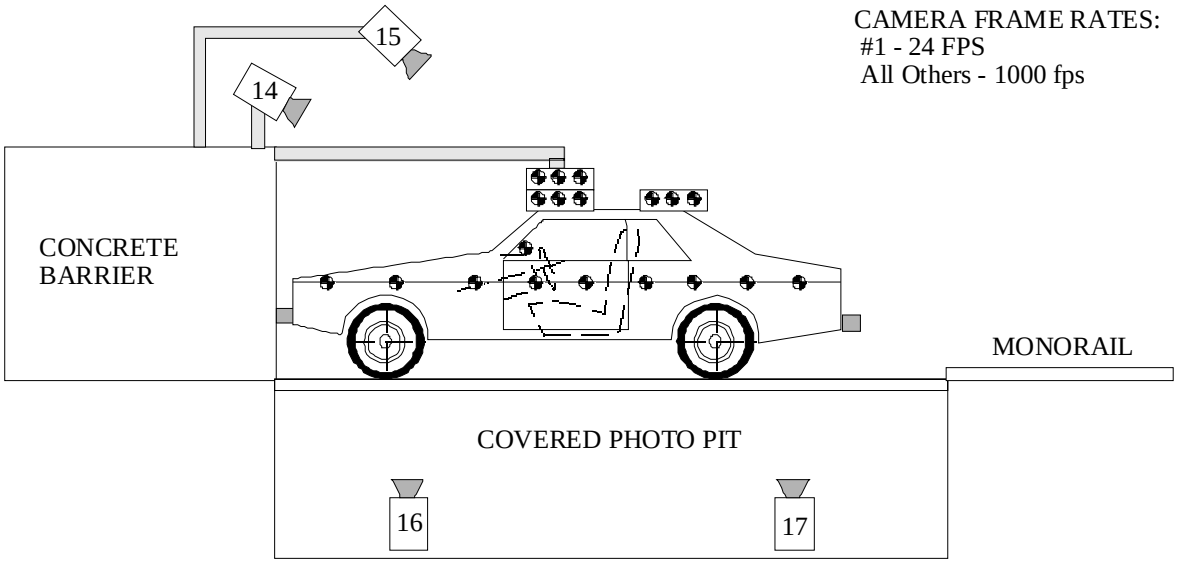
	Elements	Pre-Test (mm)
1	Total length	4601
2	Total Width	1785
3	Bumper Top Height	602
4	Bumper Bottom Height	494
5	Longitudinal Member Top Height	603
6	Distance Between Longitudinal Members	982
7	Longitudinal Member Width	66
8	Engine top height	900
9	Engine bottom height	227
10	Engine and gearbox width	754
11	Front bumper-engine distance	528
12	Front shock absorber fixing height	958
13	Bonnet leading edge height	900
14	Front shock absorber fixing width	1192
15	Front bumper – front axle distance	852
16	Front axle – a pillar distance	509
17	A-pillar – B pillar distance	1027
18	B-pillar – rear axle distance	1108
19	B-pillar – C Pillar distance	658
20	Roof sill bottom height	1547
21	Roof sill top height	1635
22	Floor sill bottom height	309
23	Floor sill top height	446

DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS



TOP VIEW

CAMERA FRAME RATES:
#1 - 24 FPS
All Others - 1000 fps



LEFT SIDE VIEW

DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS (cont.)

NHTSA Test No.: M65105 Vehicle: 2006 Toyota RAV4 MPV

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)* X	Y	Z	ANGLE (deg)**	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	30
2	Overall Left Side	6975	1711	1093	-4.2	6616	28	1000
3	Left Side View	9389	1065	1085	-2.0	9030	50	1000
4	Driver and Interior View	7154	2712	2040	-10.0	-	35	500
5	Steering Column (Bottom)	7085	1471	1172	-2.5	6726	25	1000
6	Steering Column (Top)	7085	1471	1790	-8.2	6726	28-70	1000
7	Left CRS Lateral View	-	-	-	-	-	-	-
8	Overall Right Side	7260	1965	1160	-2.5	7542	28	500
9	Right Side View	9314	1530	1220	-2.4	9596	50	1000
10	Right Passenger View	6510	1935	1410	-3.6	6792	35	1000
11	Passenger and Interior View	7191	2725	2020	-7.2	-	35	500
12	Right CRS Lateral View	-	-	-	-	-	-	-
13	Passenger Front View	620	-92	1987	-33.9	-	13	500
14	Driver Front View	620	-92	1987	-33.6	-	13	500
15	Windshield View	0	-530	3374	-51.5	-	20	500
16	Pit View of Engine	0	800	-3048	90	-	13	500
17	Pit View of Fuel Tank	0	2000	-3048	90	-	13	500

*X = film plane to monorail centerline ** = referenced to horizontal plane

Y = film plane to impact location N.T. indicates No Timing

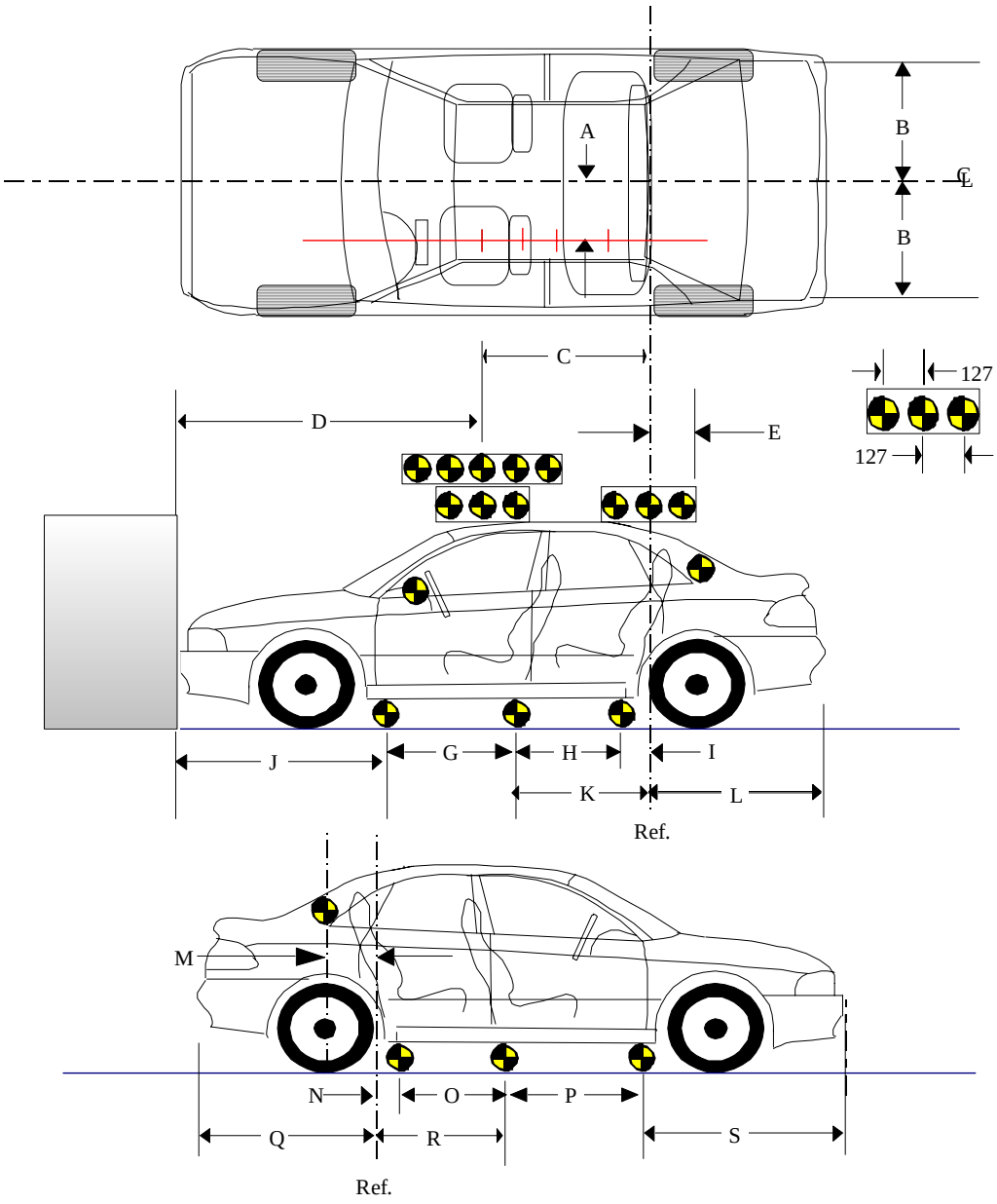
Z = film plane to ground

DATA SHEET NO. 12
VEHICLE REFERENCE PHOTO TARGET LOCATIONS

NHTSA Test No.: M65105 Vehicle: 2006 Toyota RAV4 MPV

(Dimensions in millimeters)

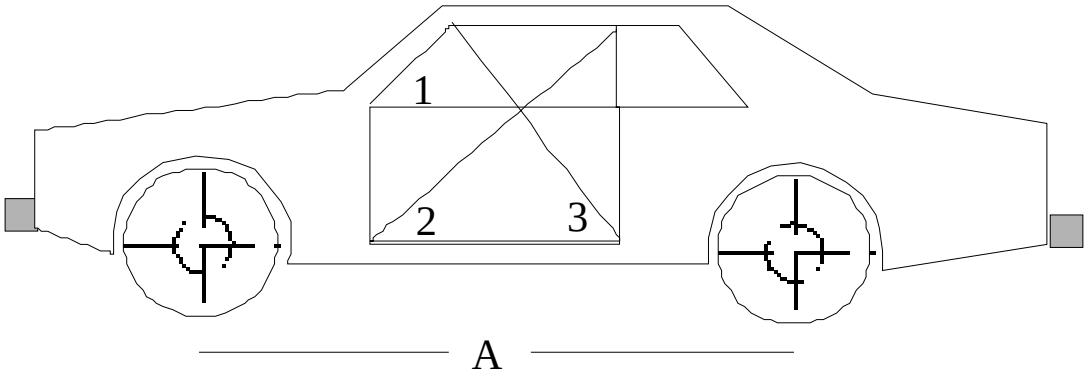
A	358
B	641
C	1222
D	1923
E	363
F	1525
G	844
H	844
I	116
J	1345
K	960
L	1452
M	358
N	109
O	839
P	857
Q	1451
R	948
S	1345



DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

NHTSA Test No.: M65105 Vehicle: 2006 Toyota RAV4 MPV

DOOR OPENING WIDTH AND WHEELBASE MEASUREMENTS



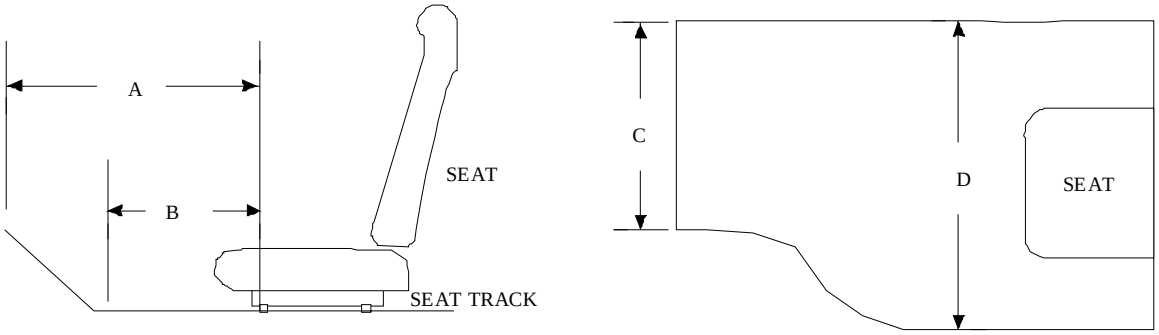
UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	979	1474	1072	978	1473	1071
AFTER TEST	980	1467	1080	978	1468	1078
DIFFERENCE	-1	7	-8	0	5	-7

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2661	2661
AFTER TEST	2620	2664
DIFFERENCE	41	-3

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont)

NHTSA Test No.: M65105 Vehicle: 2006 Toyota RAV4 MPV

STATIC FOOTWELL DEFORMATION



DRIVER

Measurement	Pre-Test	Post-Test	Difference
A	716	659	57
B	528	529	-1
C	522	519	3
D	459	460	-1

PASSENGER

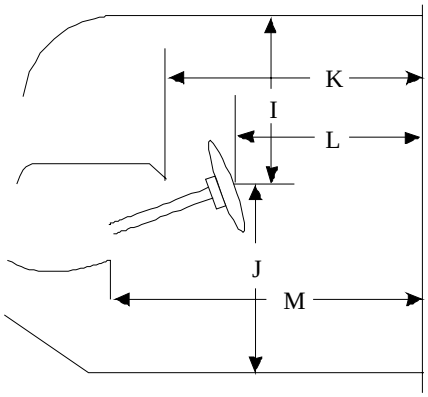
Measurement	Pre-Test	Post-Test	Difference
A	738	732	6
B	533	536	-3
C	516	516	0
D	457	457	0

Units = mm

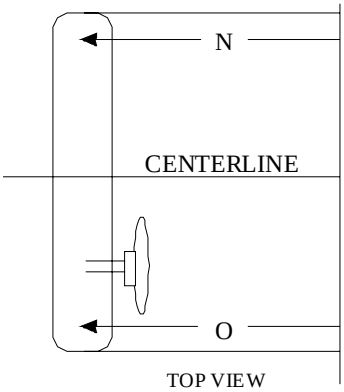
DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: M65105 Vehicle: 2006 Toyota RAV4 MPV

STATIC PASSENGER COMPARTMENT INTRUSION

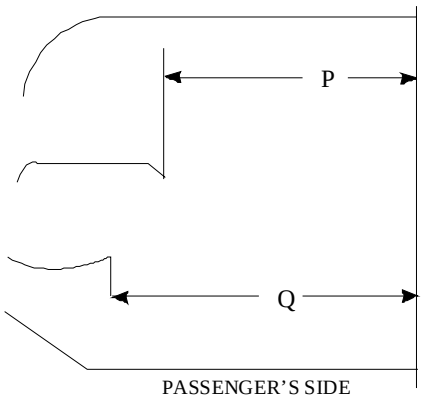


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



PASSENGER'S SIDE

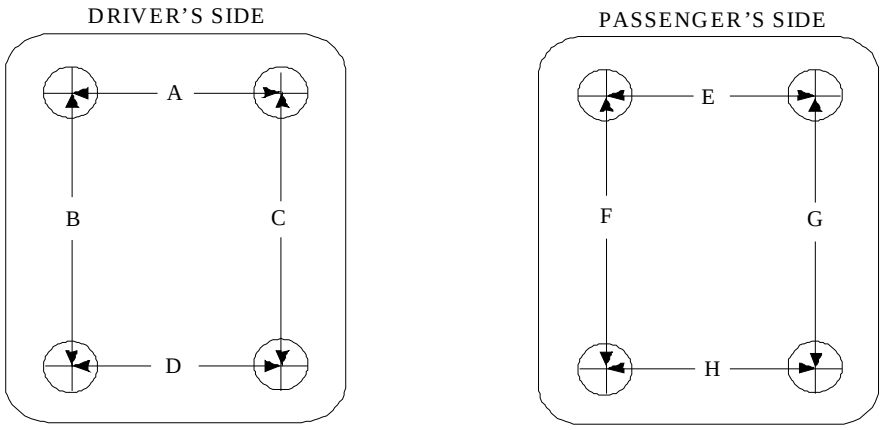
Measurement	Pre-Test	Post-Test	Difference
I	467	500	-33
J	666	636	30
K	779	786	-7
L	579	636	-57
M	850	856	-6
N	774	780	-6
O	774	773	1
P = K (PASS.)	890	893	-3
Q = M (PASS.)	799	797	2

Units = mm

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: M65105 Vehicle: 2006 Toyota RAV4 MPV

FLOORBOARD DEFORMATION



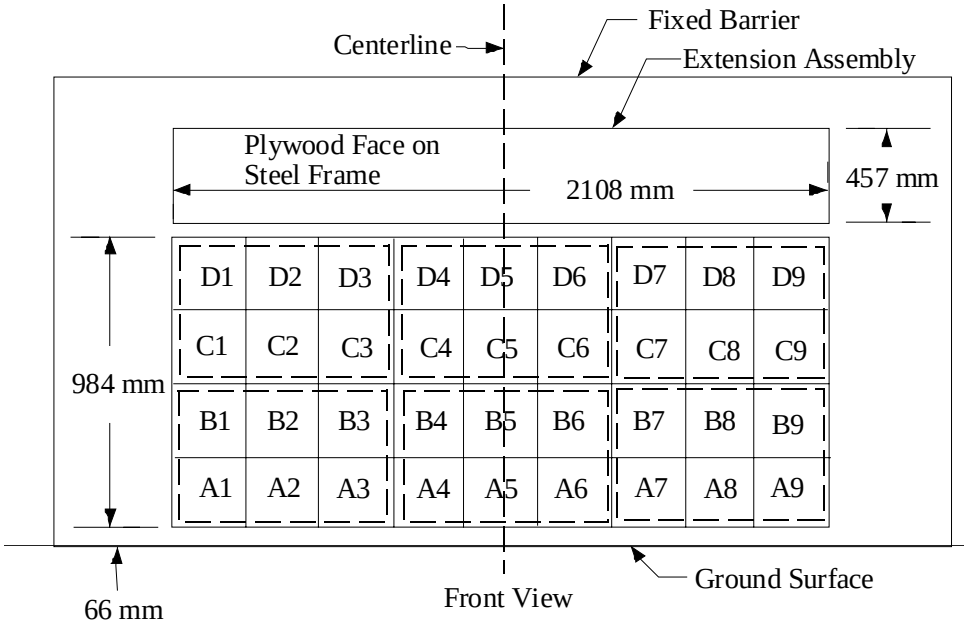
TOP VIEW THROUGH FLOOR PAN

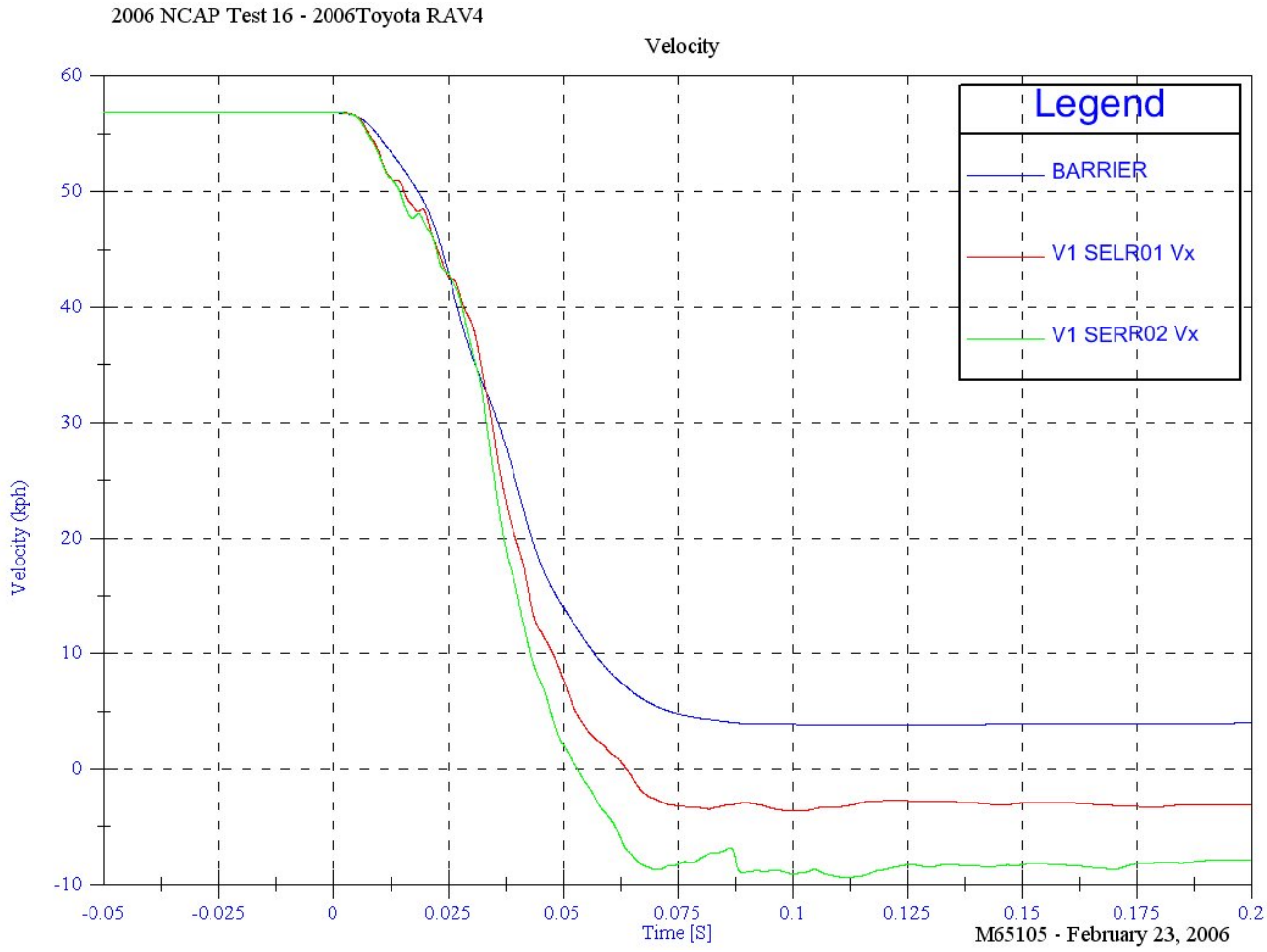
Measurement	Pre-Test	Post-Test	Difference
A	522	519	3
B	468	467	1
C	424	423	1
D	459	460	-1
E	516	516	0
F	363	366	-3
G	355	352	3
H	457	457	0

Units = mm

DATA SHEET NO.14
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells
4 Rows
9 Columns





DATA SHEET NO. 15
ACCIDENT INVESTIGATION DIVISION DATA

FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Toyota RAV4 MPV

NHTSA Test No.: M65105 VIN: JTMBD31V165005759

Model Year: 2006 Build Date: 12/05 Test Date: February 23, 2006

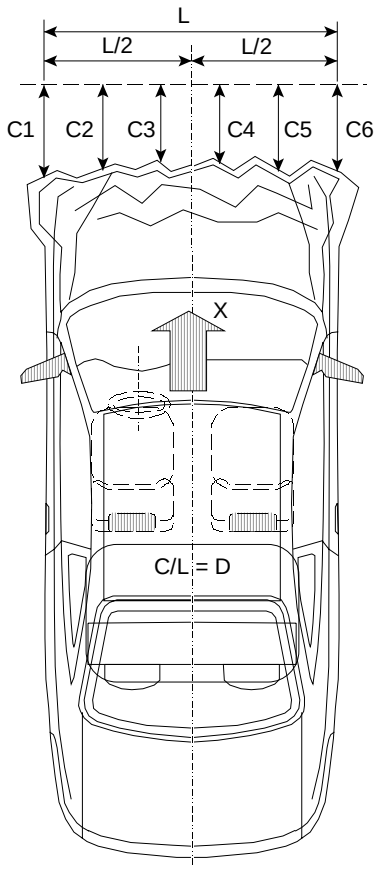
Vehicle Size Category: MPV Test Weight: 1778.0 kg

Vehicle Wheelbase: 2661 mm; Front Overhang: 852 mm; Overall Width: 1815 mm

Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4384	4133	251
C2 =	4577	4119	458
C3 =	4599	4160	439
C4 =	4599	4165	434
C5 =	4576	4126	450
C6 =	4384	4152	232



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

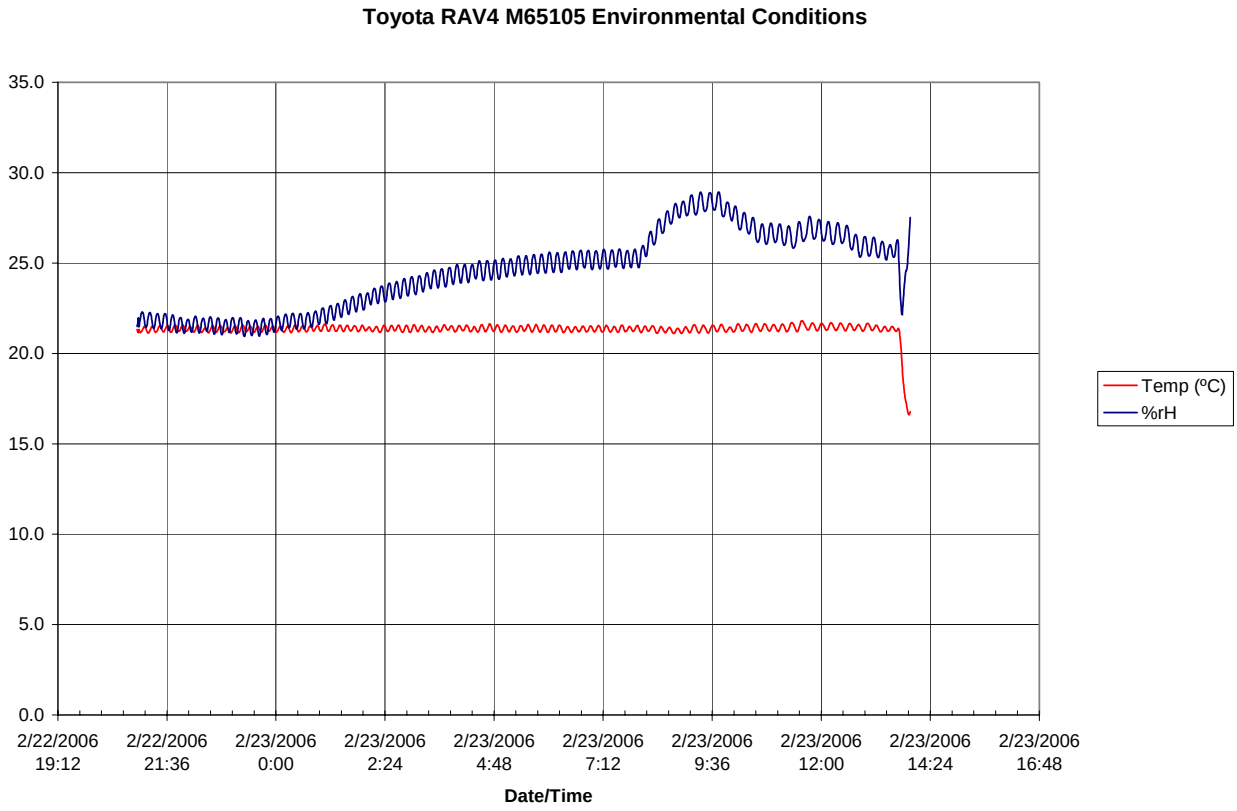
Length of Damaged Region: L1= 1549 mm

L2= 774.5 mm

L5= 309.8 mm

DATA SHEET NO.16
VEHICLE AND DUMMY TEMPERATURE STABILIZATION CHART

NHTSA Test No.: M65105 Vehicle: 2006 Toyota RAV4 MPV



APPENDIX A

PHOTOGRAPHS

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Figure A-1: Load Cell Locations

Figure A-2: Vehicle Certification Placard

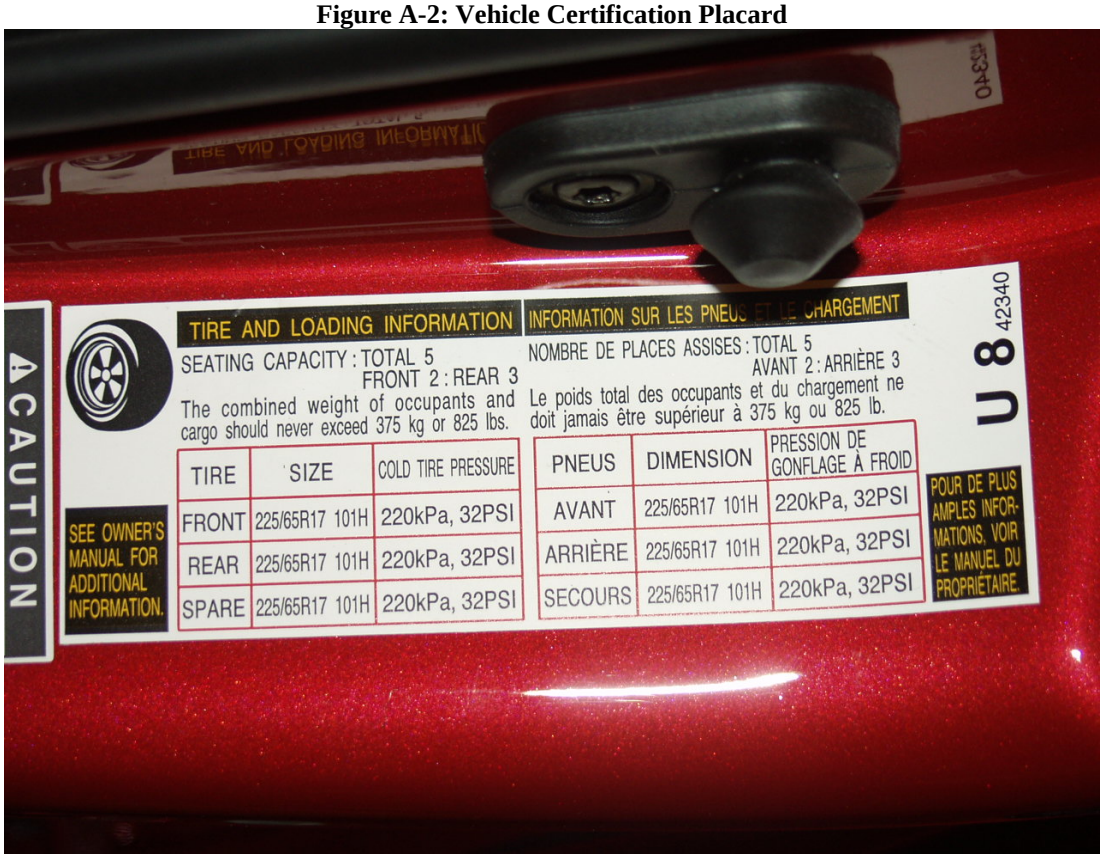


Figure A-3: Vehicle Tire Placard

Figure A-4: Right Front, As Received

Figure A-5: Left Rear, As Received

Figure A-6: Pre-Test Front View

Figure A-7: Post-Test Front View

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 Three-Quarter View

Figure A-13: Post-Test Right Front Three-Quarter View

Figure A-14: Pre-Test Left Rear Three-Quarter View

Figure A-15: Post-Test Left Rear Three-Quarter View

Figure A-16: Left Rear Three-Quarter View of Doors After Impact

Figure A-17: Right Rear Three-Quarter View of Doors After Impact

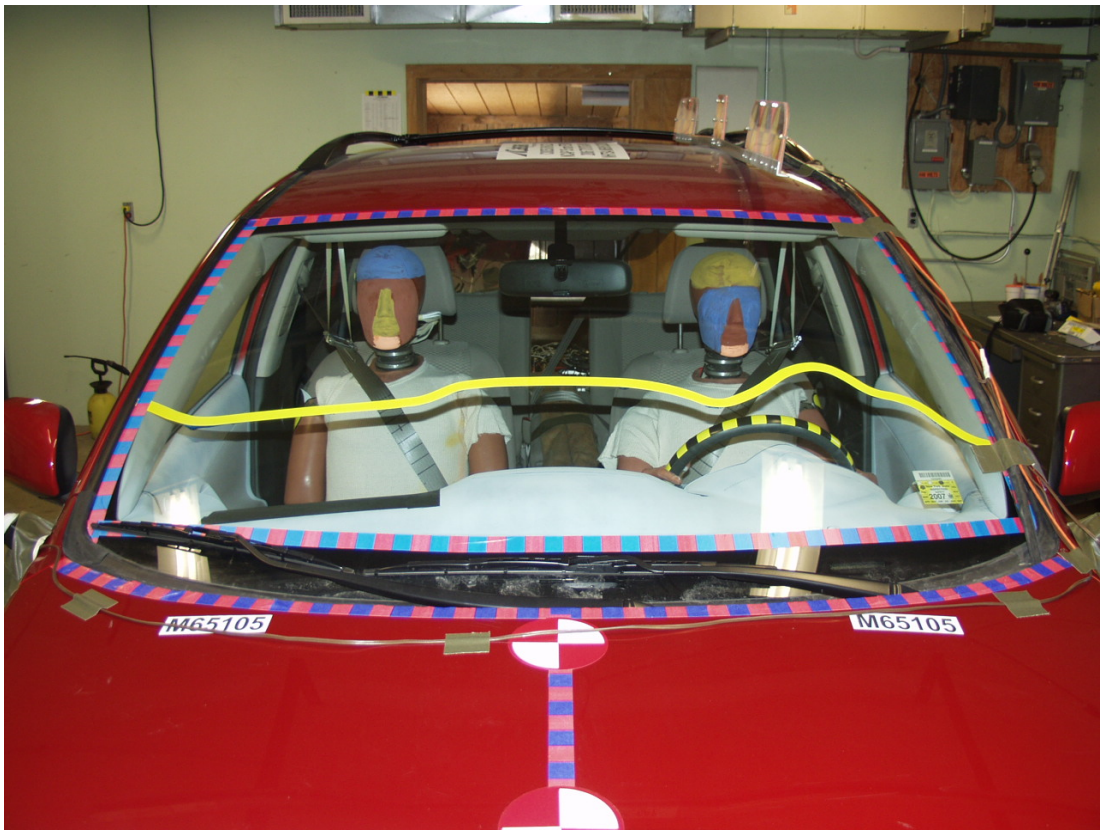


Figure A-18: Pre-Test Windshield View

Figure A-19: Post-Test Windshield View

Figure A-20: Pre-Test Engine Compartment View

Figure A-21: Post-Test Engine Compartment View

Figure A-22: Pre-Test Fuel Cap View

Figure A-23: Post-Test Fuel Cap View

Figure A-24: Pre-Test Front Underbody View

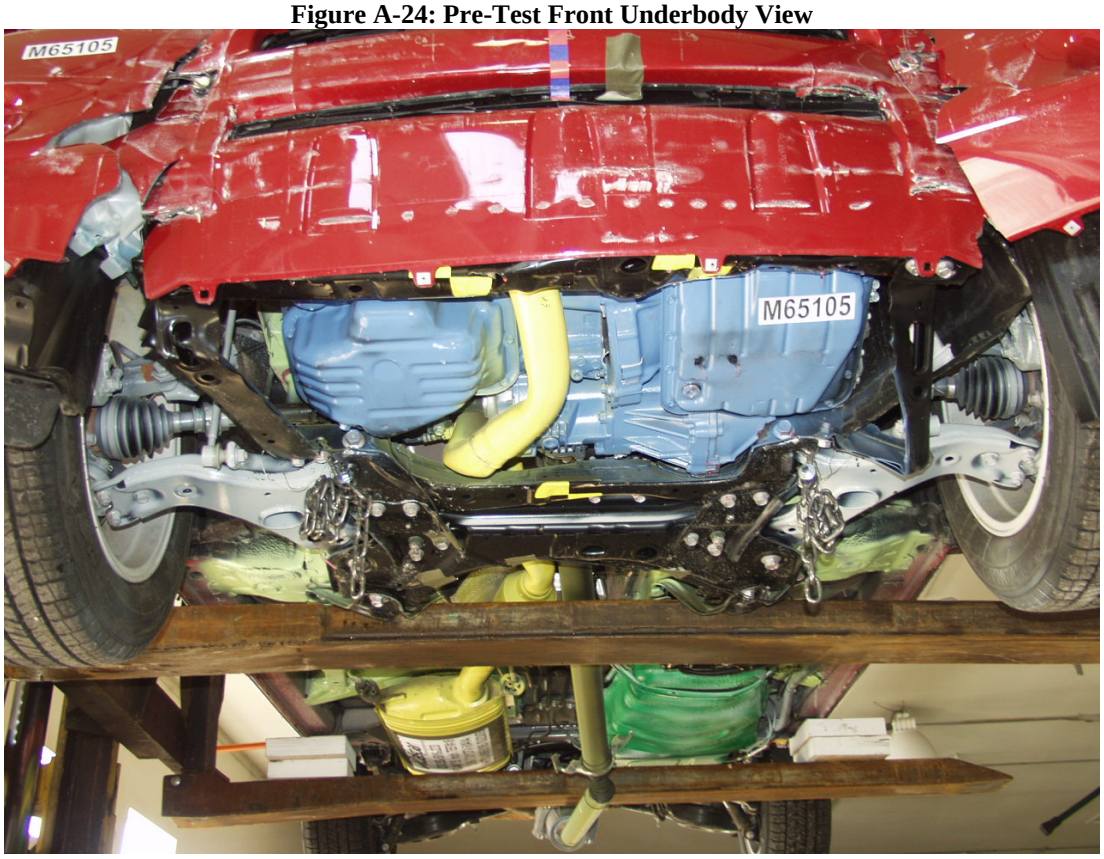


Figure A-25: Post-Test Front Underbody View

Figure A-26: Pre-Test Mid Underbody View

Figure A-27: Post-Test Mid Underbody View

Figure A-28: Pre-Test Rear Underbody View

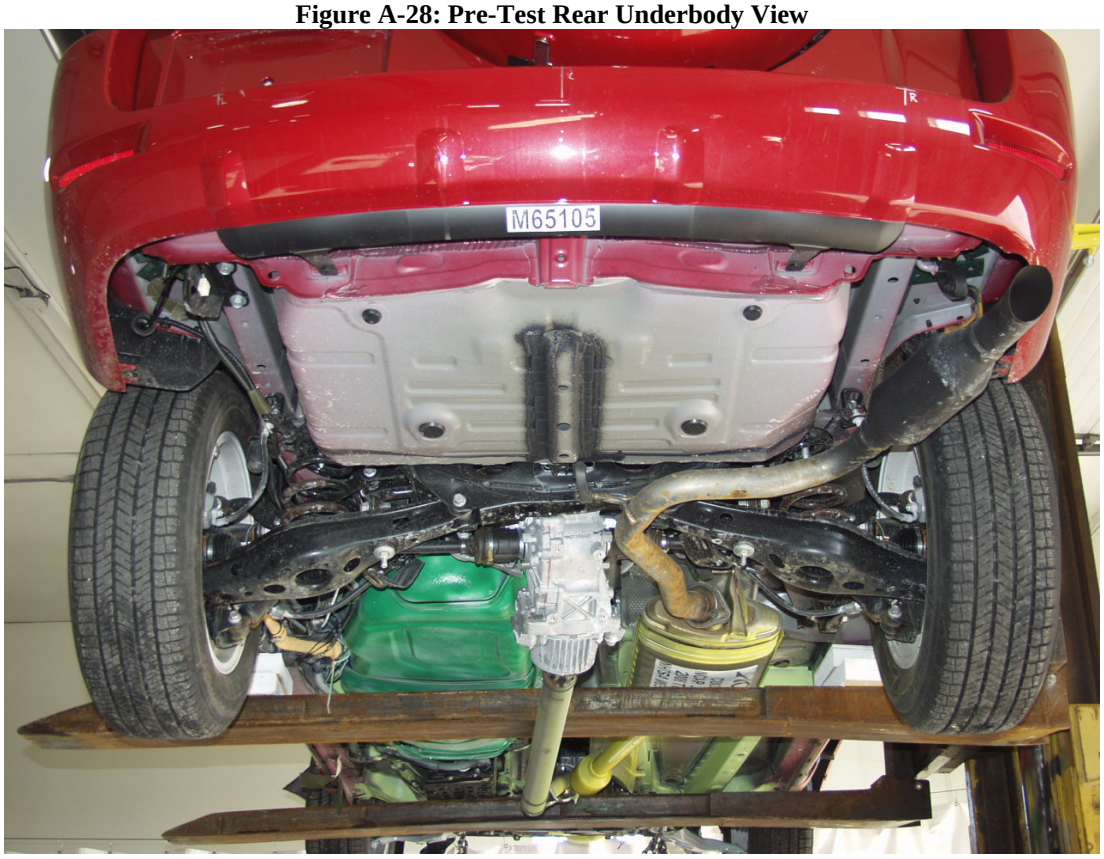


Figure A-29: Post-Test Rear Underbody View

Figure A-30: Pre-Test Driver Head Location

Figure A-31: Post-Test Driver Head Location

Figure A-32: Pre-Test Driver Position View

Figure A-33: Post-Test Driver Position View

Figure A-34: Pre-Test Driver and Interior View

Figure A-35: Post-Test Driver and Interior View

Figure A-36: Pre-Test Driver Feet View

Figure A-37: Post-Test Driver Feet View

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

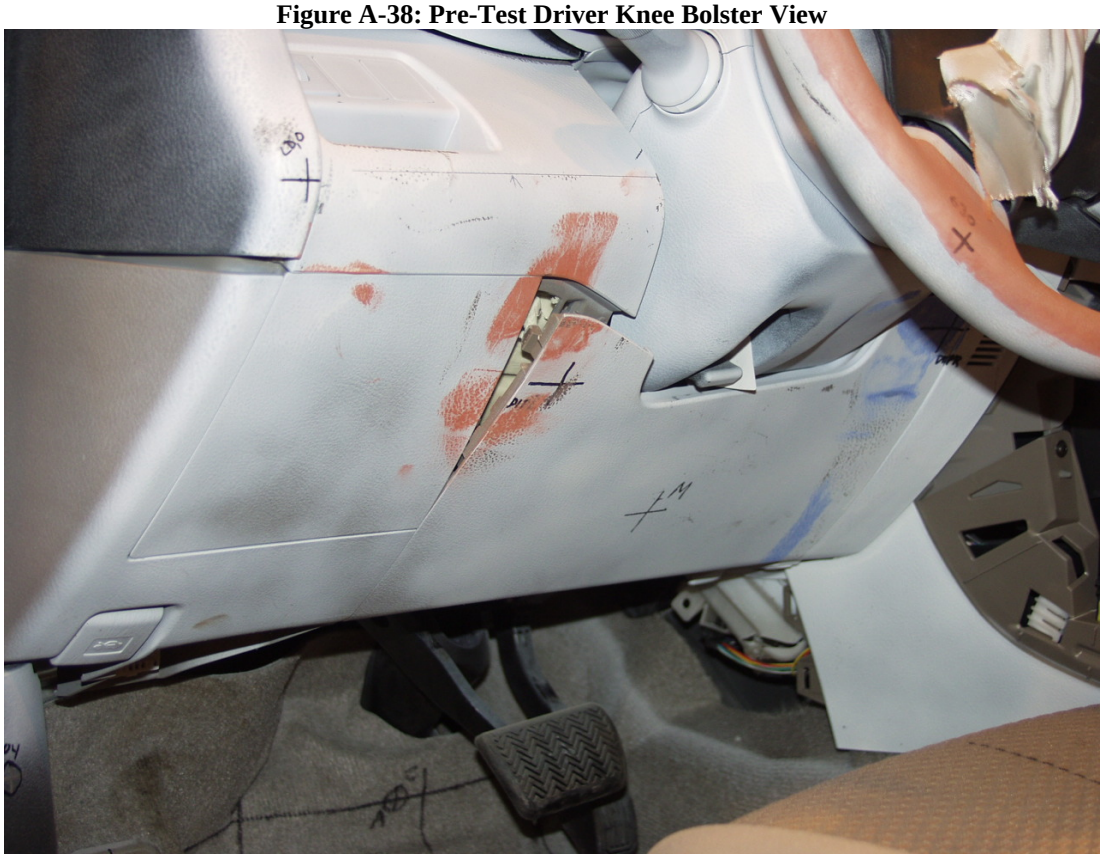


Figure A-39: Post-Test Driver Knee Bolster View

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

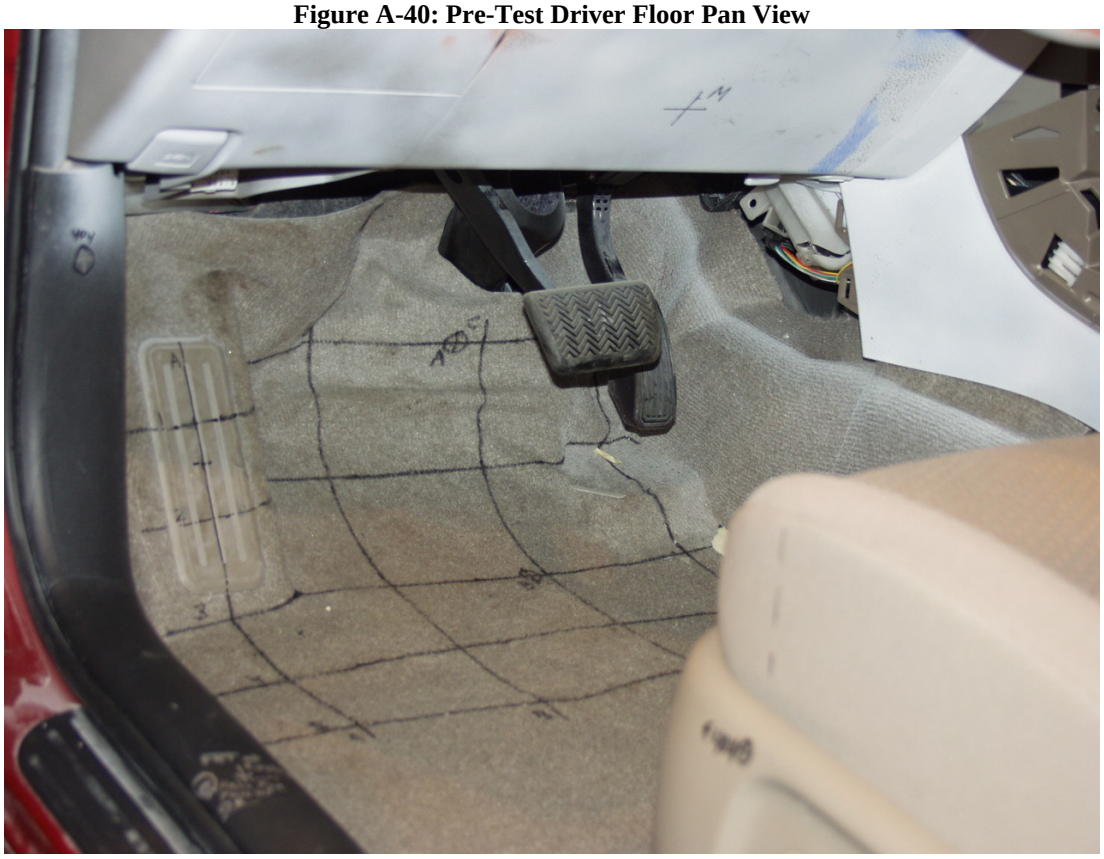


Figure A-41: Post-Test Driver Floor Pan View

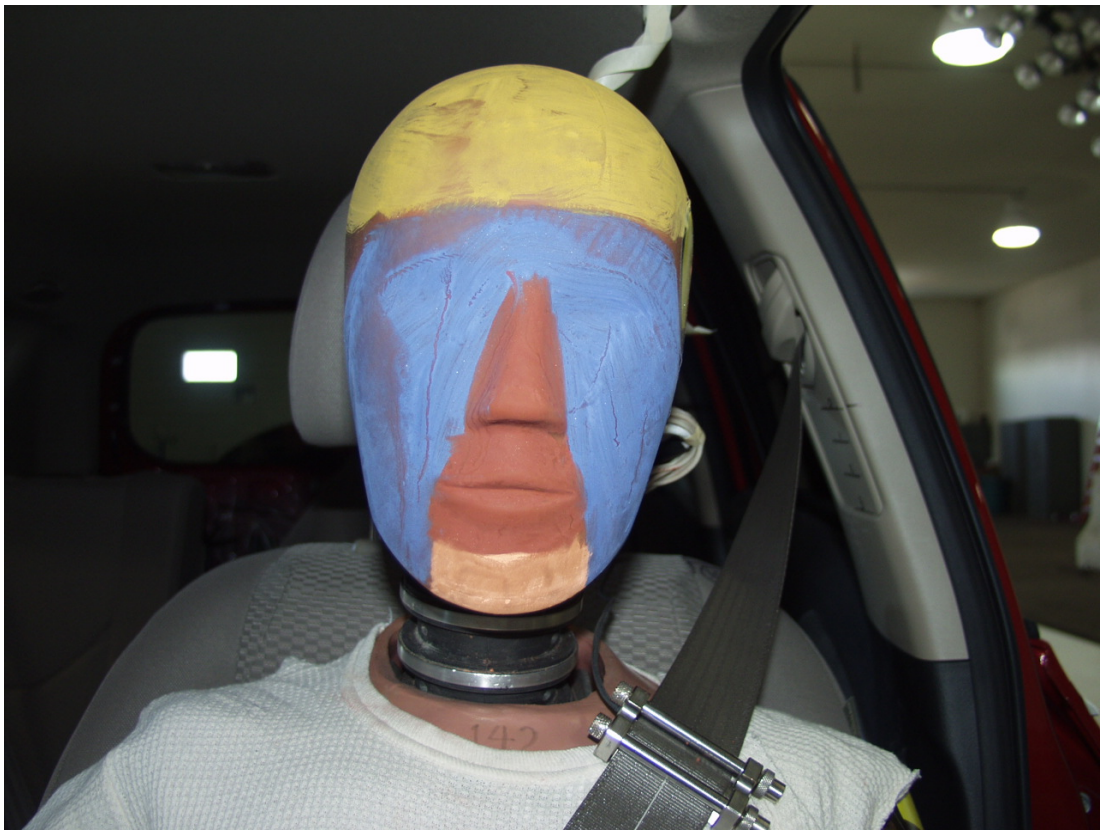


Figure A-42: Post-Test Driver Head View

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

Figure A-44: Pre-Test Passenger Head Location

Figure A-45: Post-Test Passenger Head Location

Figure A-46: Pre-Test Passenger Position View

Figure A-47: Post-Test Passenger Position View

Figure A-48: Pre-Test Passenger and Interior View

Figure A-49: Post-Test Passenger and Interior View

Figure A-50: Pre-Test Passenger Feet View

Figure A-51: Post-Test Passenger Feet View

Figure A-52: Pre-Test Passenger Knee Bolster View

Figure A-53: Post-Test Passenger Knee Bolster View

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

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

Figure A-56: Post-Test Passenger Head View

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

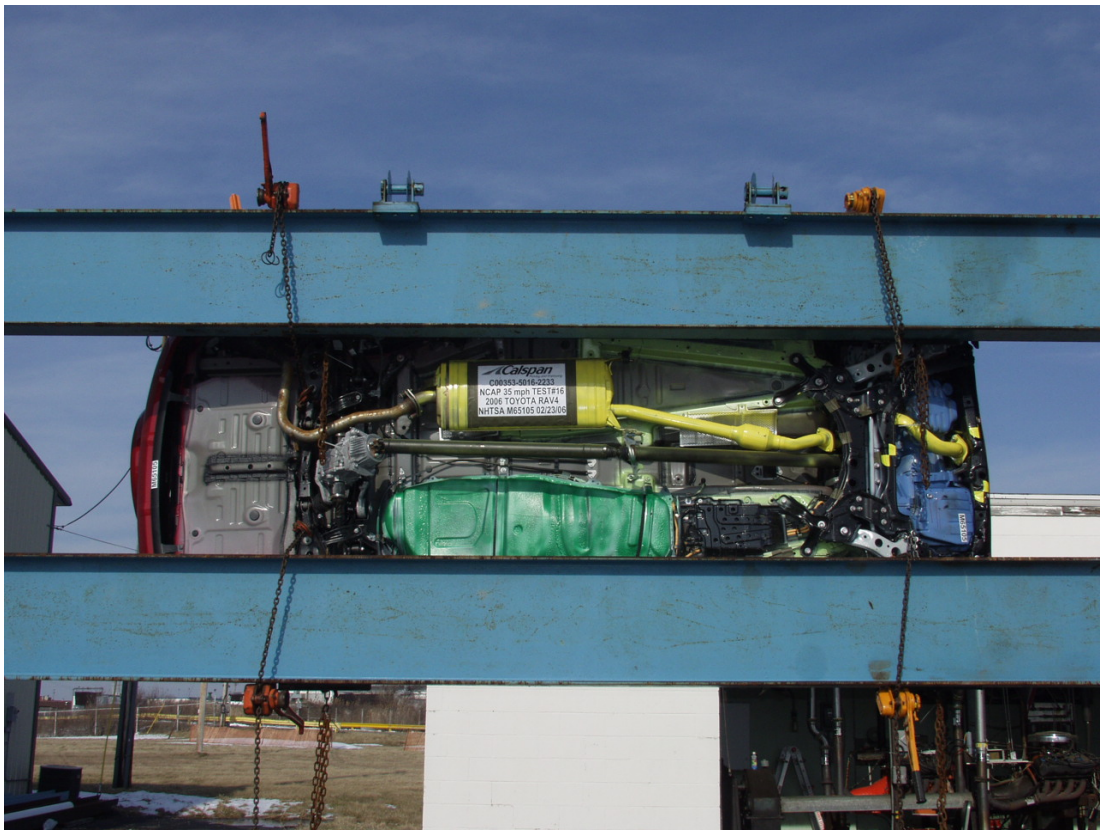


Figure A-58: Rollover View - 90°

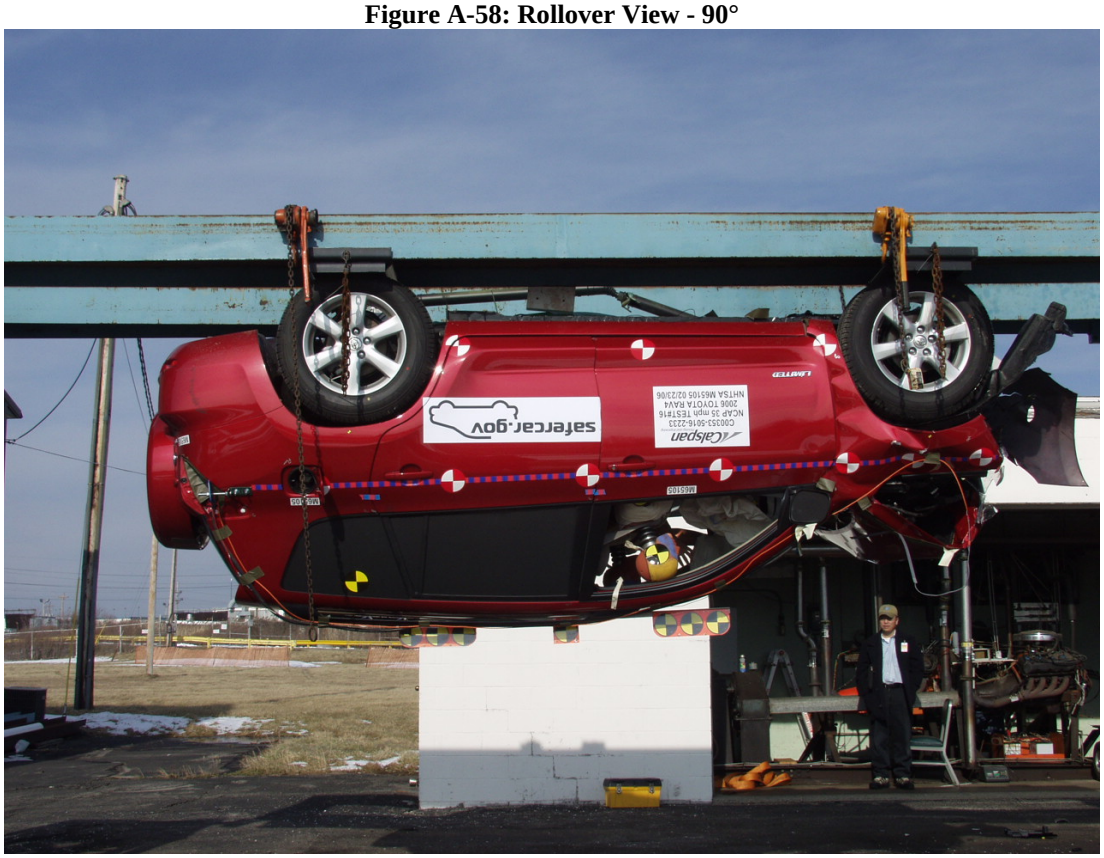


Figure A-59: Rollover View - 180°

Figure A-60: Rollover View - 270°

Figure A-61: Rollover View - 360°

Figure A-62: Impact View

APPENDIX B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

Hybrid III Dummy Sign Conventions
Load Cells and Special Transducers

Transducer	**SAE Sign Convention (positive unless noted)**
Upper Neck Load Cell	Fx Head rearward Fy Head left Fz Neck in tension Mx Left ear to left shoulder My Chin to chest (flexion) Mz Chin to left shoulder (look left)
Chest Displacement Potentiometer	Compression is negative
Pelvic Load Cell (Lower Lumbar)	Fx Chest rearward Fy Chest left Fz Spine in tension
Femur Load Cell	Compression is negative
Upper Tibia Load Cell (right and left leg)	Mx Support tibia at ends, load left side center My Support tibia at ends, load front (shin) center
Lower Tibia Load Cell (right and left leg)	Fz Tibia in tension Mx Support tibia at ends, load left side center My Support tibia at ends, load front (shin) center

DATA CHANNEL FILTER CLASS SUMMARY

NHTSA TEST NO.: M65105

DATA TYPE	**SAE FILTER CLASS (Hz)**
Dummy Head Accelerations	1000
Dummy Chest Accelerations	180
Dummy Chest Displacements	600
Dummy Femur Forces	600
Dummy Belt Loads	60
Dummy Belt Displacements	180
Dummy Neck Forces	1000
Dummy Neck Moments	600
Vehicle Accelerations	60
Vehicle Velocity Integrations	180
Vehicle Displacement Integrations	180
Load Cell Barrier Forces	60

Table of Data Plots

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
1	V1P1 Head CG x [g, CFC_1000]	B-8
2	V1P1 Head CG y [g, CFC_1000]	B-8
3	V1P1 Head CG z [g, CFC_1000]	B-8
4	V1P1 Head CG Resultant [g, CFC_1000]	B-8
5	V1P1 Chest x [g, CFC_180]	B-9
6	V1P1 Chest y [g, CFC_180]	B-9
7	V1P1 Chest z [g, CFC_180]	B-9
8	V1P1 Chest Resultant [g, CFC_180]	B-9
9	V1P1 Chest Compression x [mm, CFC_600]	B-10
10	V1P1 Left Femur z [N, CFC_600]	B-11
11	V1P1 Right Femur z [N, CFC_600]	B-11
12	V1P2 Head CG x [g, CFC_1000]	B-12
13	V1P2 Head CG y [g, CFC_1000]	B-12
14	V1P2 Head CG z [g, CFC_1000]	B-12
15	V1P2 Head CG Resultant [g, CFC_1000]	B-12
16	V1P2 Chest x [g, CFC_180]	B-13
17	V1P2 Chest y [g, CFC_180]	B-13
18	V1P2 Chest z [g, CFC_180]	B-13
19	V1P2 Chest Resultant [g, CFC_180]	B-13
20	V1P2 Chest Compression x [mm, CFC_600]	B-14
21	V1P2 Left Femur z [N, CFC_600]	B-15
22	V1P2 Right Femur z [N, CFC_600]	B-15

The following dummy, vehicle and load cell response data can be found in the research and development section of the NHTSA website at: www.nhtsa.dot.gov

V1P1 Head 9 Array X Arm Ay	V1 Driver Lap Belt F
V1P1 Head 9 Array X Arm Az	V1 Driver Torso Belt F
V1P1 Head 9 Array Y Arm Ax	V1 RFP Lap Belt F
V1P1 Head 9 Array Y Arm Az	V1 RFP Torso Belt F
V1P1 Head 9 Array Z Arm Ax	V1 Left Rear #1 Ax
V1P1 Head 9 Array Z Arm Ay	V1 Right Rear #2 Ax
V1P1 Head CG Ax	V1 Engine Top #3 Ax
V1P1 Head CG Ay	V1 Engine Bottom #4 Ax
V1P1 Head CG Az	V1 Right Caliper #5 Ax
V1P1 Head CG Red Ax	V1 Left Caliper #7 Ax
V1P1 Head CG Red Ay	V1 Left Rear #8 Az
V1P1 Head CG Red Az	V1 Right Rear #9 Az
V1P1 Upper Neck Fx	
V1P1 Upper Neck Fy	
V1P1 Upper Neck Fz	
V1P1 Upper Neck Mx	
V1P1 Upper Neck My	
V1P1 Upper Neck Mz	
V1P1 Chest Ax	
V1P1 Chest Ay	
V1P1 Chest Az	
V1P1 Chest Red Ax	
V1P1 Chest Red Ay	
V1P1 Chest Red Az	
V1P1 Chest Compression	
V1P1 Pelvic Ax	
V1P1 Pelvic Ay	
V1P1 Pelvic Az	
V1P1 Left Femur Fz	
V1P1 Right Femur Fz	
V1P1 Left Upper Tibia Mx	
V1P1 Left Upper Tibia My	
V1P1 Left Lower Tibia Fz	
V1P1 Left Lower Tibia Mx	
V1P1 Left Lower Tibia My	
V1P1 Right Upper Tibia Fz	
V1P1 Right Upper Tibia Mx	
V1P1 Right Upper Tibia My	
V1P1 Right Lower Tibia Mx	
V1P1 Right Lower Tibia My	
V1P1 Left Foot Aft Ax	
V1P1 Left Foot Aft Az	
V1P1 Left Foot Fore Az	
V1P1 Right Foot Aft Ax	
V1P1 Right Foot Aft Az	
V1P1 Right Foot Fore z	
V1P2 Head 9 Array X Arm Ay	

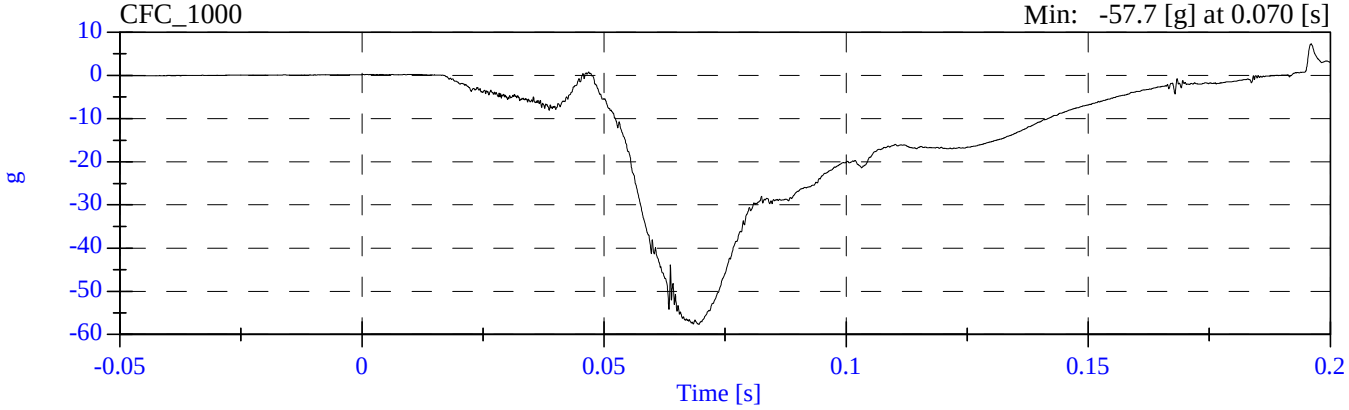
V1P2 Head 9 Array X Arm Az	
V1P2 Head 9 Array Y Arm Ax	
V1P2 Head 9 Array Y Arm Az	
V1P2 Head 9 Array Z Arm Ax	
V1P2 Head 9 Array Z Arm Ay	
V1P2 Head CG Ax	
V1P2 Head CG Ay	
V1P2 Head CG Az	
V1P2 Head CG Red Ax	
V1P2 Head CG Red Ay	
V1P2 Head CG Red Az	
V1P2 Upper Neck Fx	
V1P2 Upper Neck Fy	
V1P2 Upper Neck Fz	
V1P2 Upper Neck Mx	
V1P2 Upper Neck My	
V1P2 Upper Neck Mz	
V1P2 Chest Ax	
V1P2 Chest Ay	
V1P2 Chest Az	
V1P2 Chest Red Ax	
V1P2 Chest Red Ay	
V1P2 Chest Red Az	
V1P2 Chest Compression	
V1P2 Pelvic Ax	
V1P2 Pelvic Ay	
V1P2 Pelvic Az	
V1P2 Left Femur Fz	
V1P2 Right Femur Fz	
V1P2 Left Upper Tibia Fz	
V1P2 Left Upper Tibia Mx	
V1P2 Left Upper Tibia My	
V1P2 Left Lower Tibia Mx	
V1P2 Left Lower Tibia My	
V1P2 Right Upper Tibia Mx	
V1P2 Right Upper Tibia My	
V1P2 Right Lower Tibia Fz	
V1P2 Right Lower Tibia Mx	
V1P2 Right Lower Tibia My	
V1P2 Left Foot Aft Ax	
V1P2 Left Foot Aft Az	
V1P2 Left Foot Fore Az	
V1P2 Right Foot Aft Ax	
V1P2 Right Foot Aft Az	
V1P2 Right Foot Fore Az	
Barrier Load Cell A1 Fx	
Barrier Load Cell A2 Fx	
Barrier Load Cell A3 Fx	
Barrier Load Cell A4 Fx	

Barrier Load Cell A5 Fx	
Barrier Load Cell A6 Fx	
Barrier Load Cell A7 Fx	
Barrier Load Cell A8 Fx	
Barrier Load Cell A9 Fx	
Barrier Load Cell B1 Fx	
Barrier Load Cell B2 Fx	
Barrier Load Cell B3 Fx	
Barrier Load Cell B4 Fx	
Barrier Load Cell B5 Fx	
Barrier Load Cell B6 Fx	
Barrier Load Cell B7 Fx	
Barrier Load Cell B8 Fx	
Barrier Load Cell B9 Fx	
Barrier Load Cell C1 Fx	
Barrier Load Cell C2 Fx	
Barrier Load Cell C3 Fx	
Barrier Load Cell C4 Fx	
Barrier Load Cell C5 Fx	
Barrier Load Cell C6 Fx	
Barrier Load Cell C7 Fx	
Barrier Load Cell C8 Fx	
Barrier Load Cell C9 Fx	
Barrier Load Cell D1 Fx	
Barrier Load Cell D2 Fx	
Barrier Load Cell D3 Fx	
Barrier Load Cell D4 Fx	
Barrier Load Cell D5 Fx	
Barrier Load Cell D6 Fx	
Barrier Load Cell D7 Fx	
Barrier Load Cell D8 Fx	
Barrier Load Cell D9 Fx	

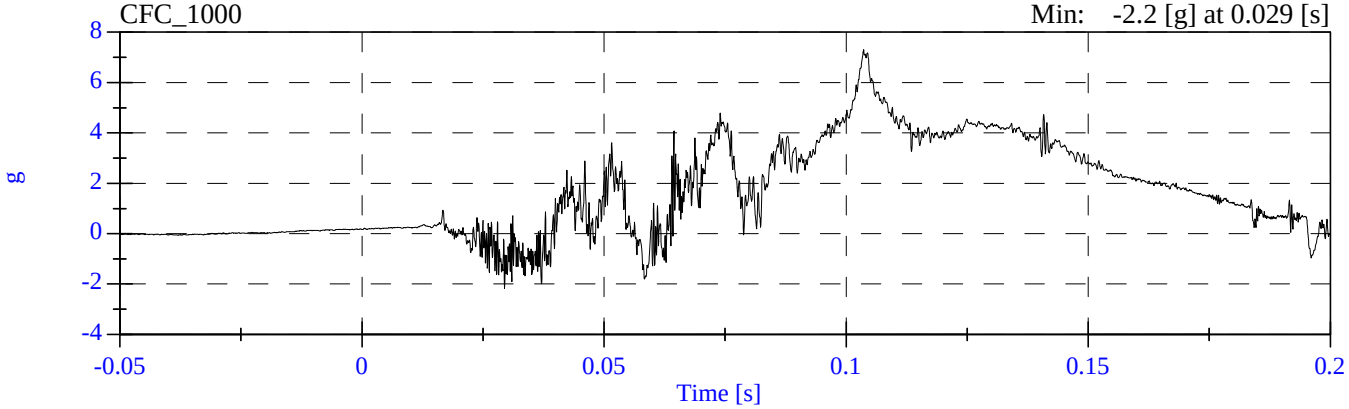
TEST NOTES	
Data Channel	Anomalies
V1P1 Right Upper Tibia Mx	Channel Failed
V1P2 Left Upper Tibia Mx	Channel Opened
V1P2 Left Upper Tibia My	Wire Cut at 80 ms
V1P2 Left Foot Fore Az	Questionable Data
V1 Engine Bottom #4x	Wire Cut at 164 ms
V1 Left Caliper #7x	Invalid after 32 ms

2006 NCAP Test 16 - 2006Toyota RAV4
M65105 - February 23, 2006

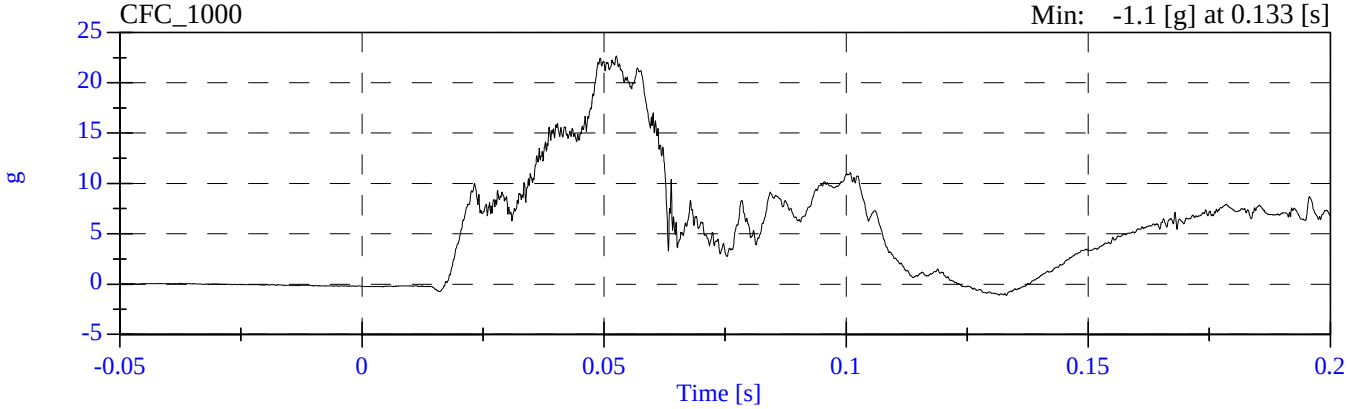
V1P1 Head CG x
CFC_1000
Max: 7.3 [g] at 0.196 [s]
Min: -57.7 [g] at 0.070 [s]



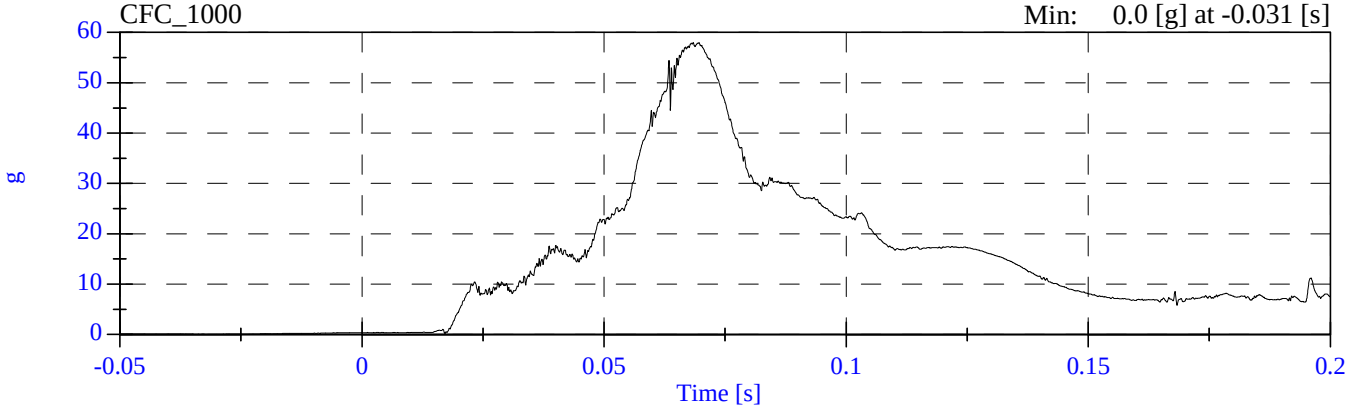
V1P1 Head CG y
CFC_1000
Max: 7.3 [g] at 0.104 [s]
Min: -2.2 [g] at 0.029 [s]



V1P1 Head CG z
CFC_1000
Max: 22.7 [g] at 0.053 [s]
Min: -1.1 [g] at 0.133 [s]

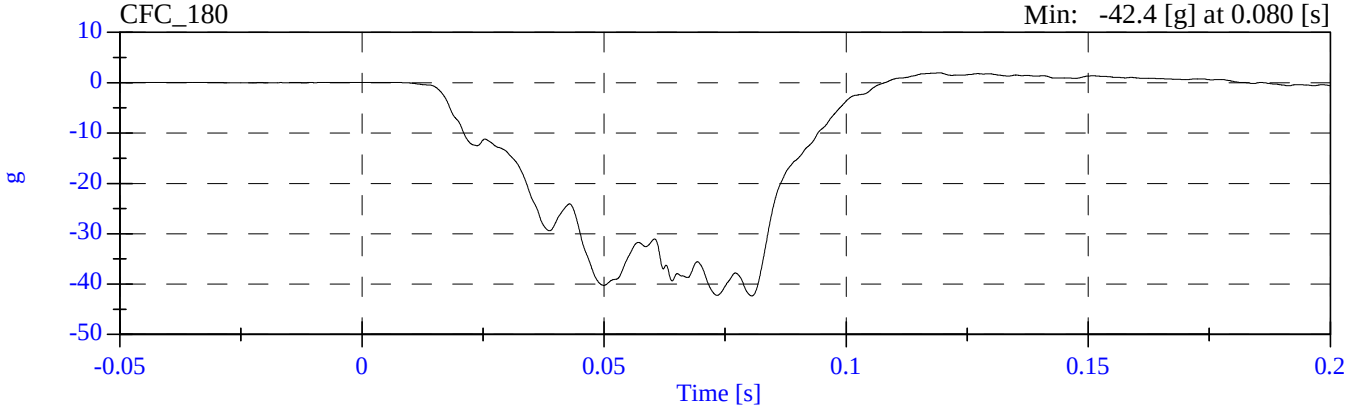


V1P1 Head CG Resultant
CFC_1000
Max: 58.0 [g] at 0.068 [s]
Min: 0.0 [g] at -0.031 [s]

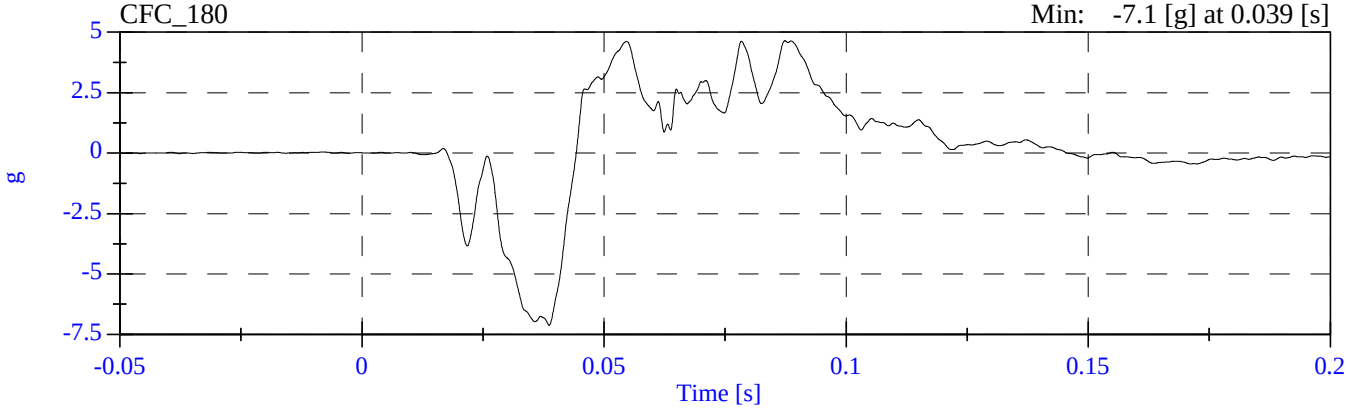


2006 NCAP Test 16 - 2006Toyota RAV4
M65105 - February 23, 2006

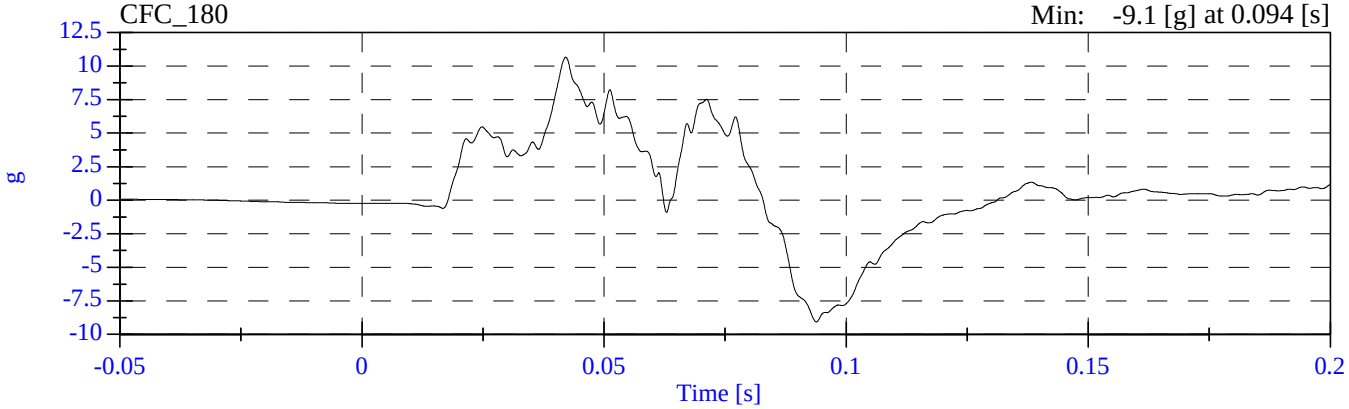
V1P1 Chest x
CFC_180
Max: 2.0 [g] at 0.119 [s]
Min: -42.4 [g] at 0.080 [s]



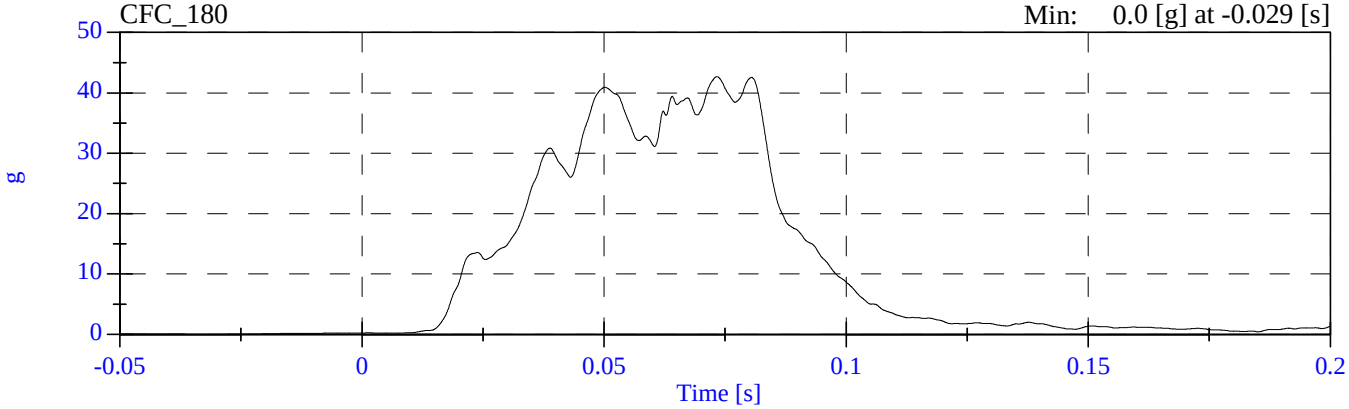
V1P1 Chest y
CFC_180
Max: 4.7 [g] at 0.087 [s]
Min: -7.1 [g] at 0.039 [s]



V1P1 Chest z
CFC_180
Max: 10.7 [g] at 0.042 [s]
Min: -9.1 [g] at 0.094 [s]



V1P1 Chest Resultant
CFC_180
Max: 42.7 [g] at 0.073 [s]
Min: 0.0 [g] at -0.029 [s]



2006 NCAP Test 16 - 2006Toyota RAV4
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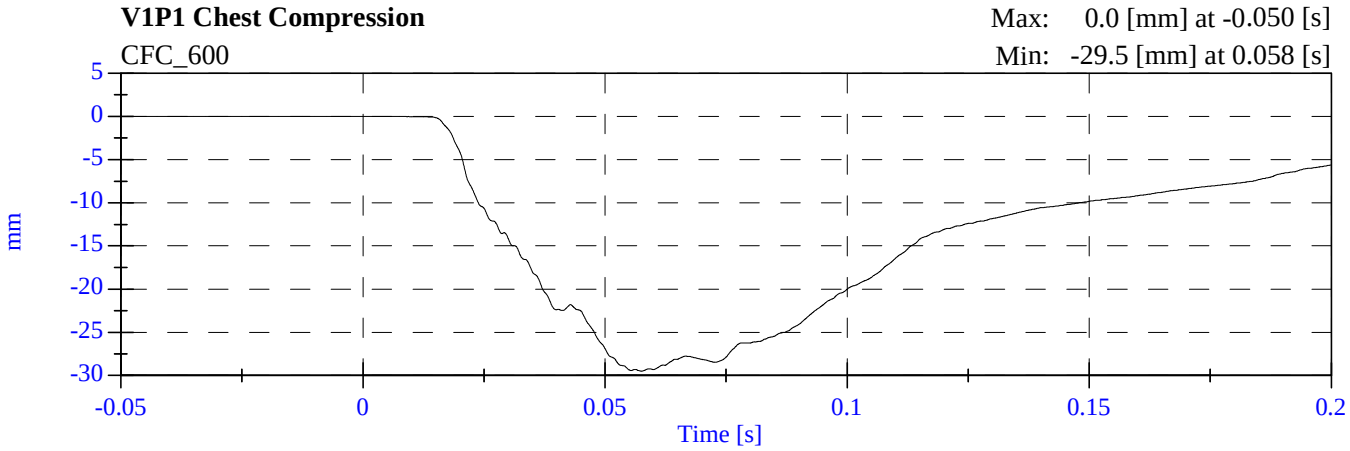
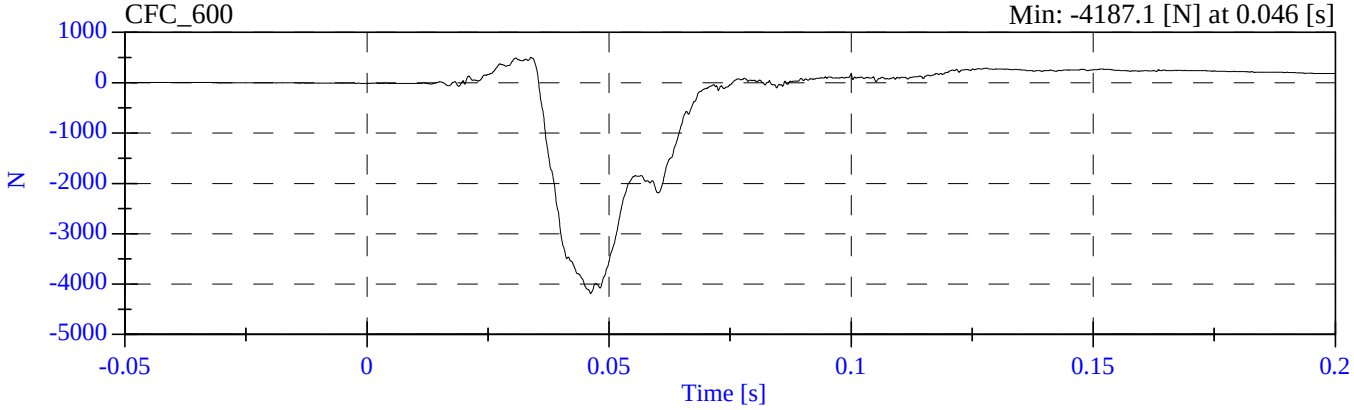
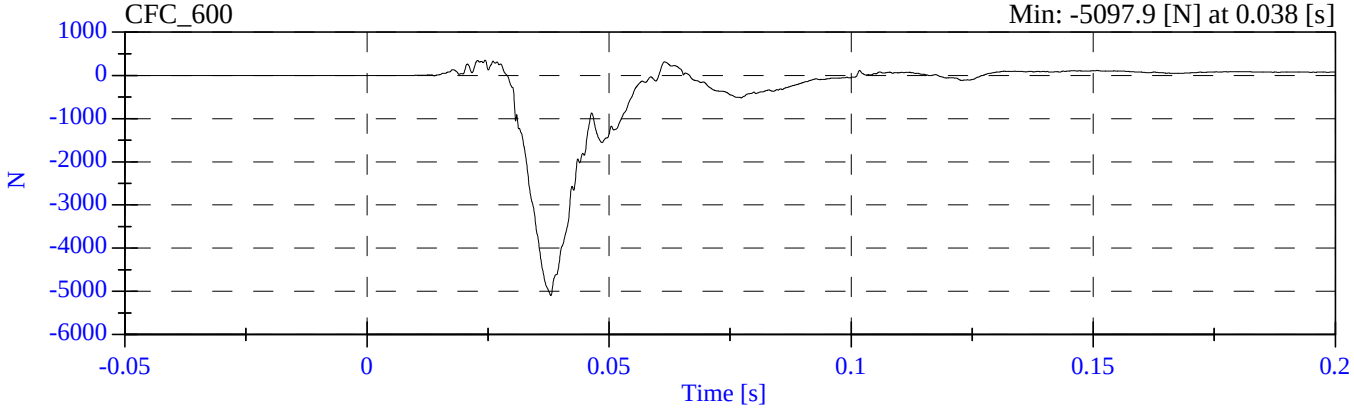


2006 NCAP Test 16 - 2006Toyota RAV4
M65105 - February 23, 2006

V1P1 Left Femur
CFC_600
Max: 503.5 [N] at 0.034 [s]
Min: -4187.1 [N] at 0.046 [s]

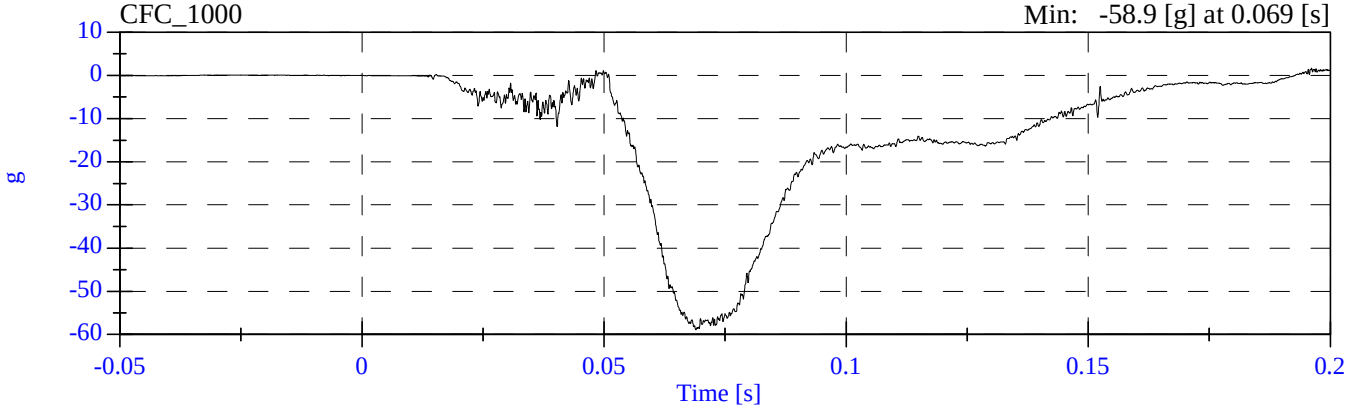


V1P1 Right Femur
CFC_600
Max: 352.8 [N] at 0.024 [s]
Min: -5097.9 [N] at 0.038 [s]

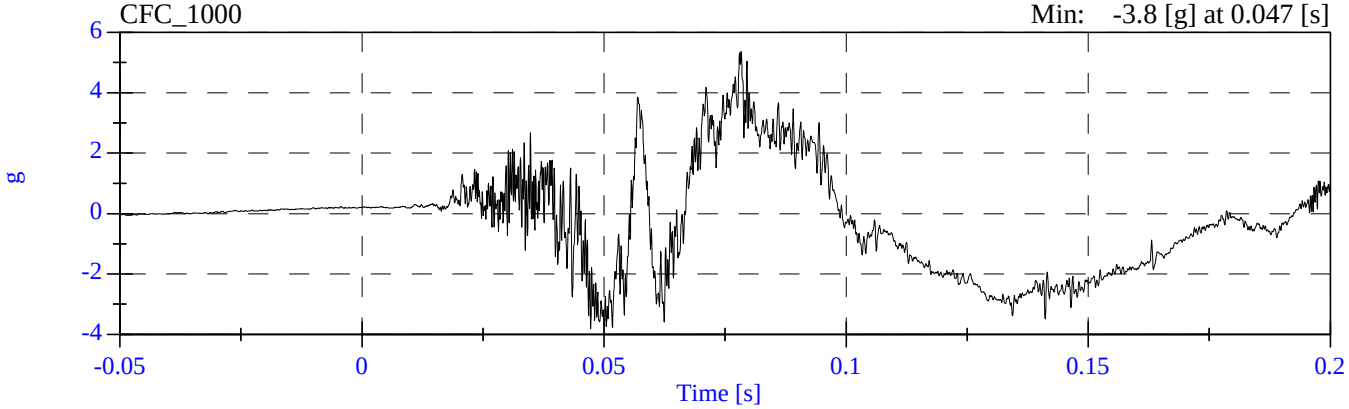


2006 NCAP Test 16 - 2006Toyota RAV4
M65105 - February 23, 2006

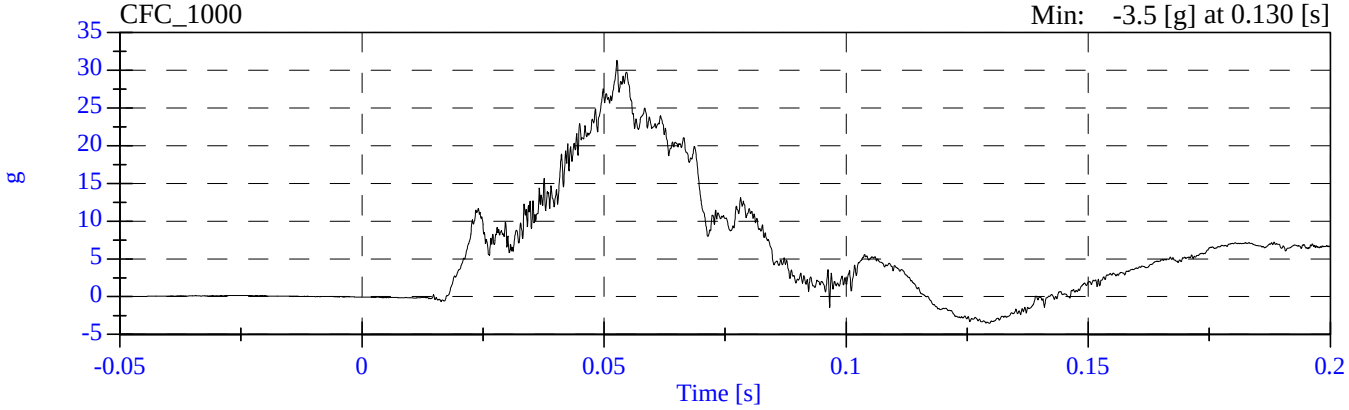
V1P2 Head CG x
CFC_1000
Max: 1.7 [g] at 0.196 [s]
Min: -58.9 [g] at 0.069 [s]



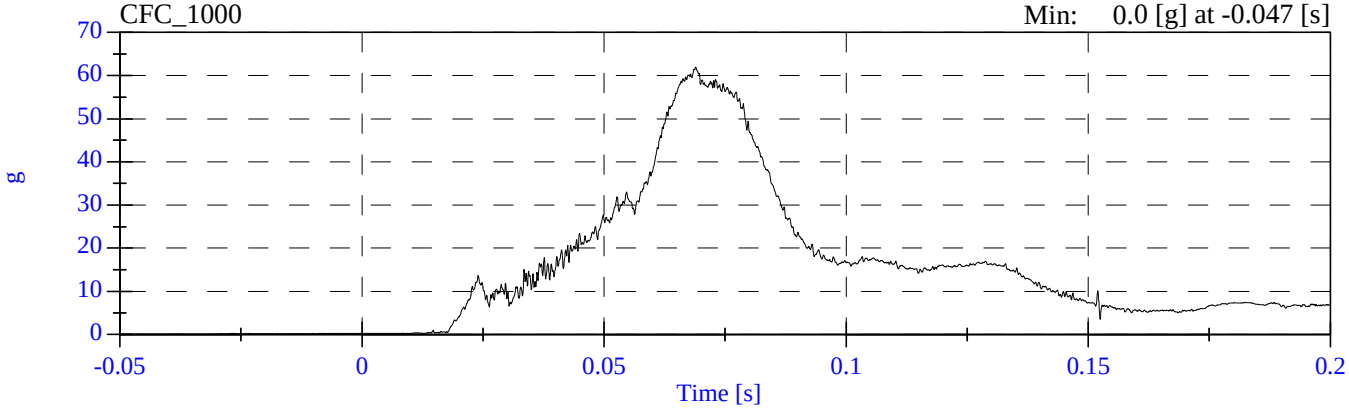
V1P2 Head CG y
CFC_1000
Max: 5.4 [g] at 0.078 [s]
Min: -3.8 [g] at 0.047 [s]



V1P2 Head CG z
CFC_1000
Max: 31.3 [g] at 0.053 [s]
Min: -3.5 [g] at 0.130 [s]

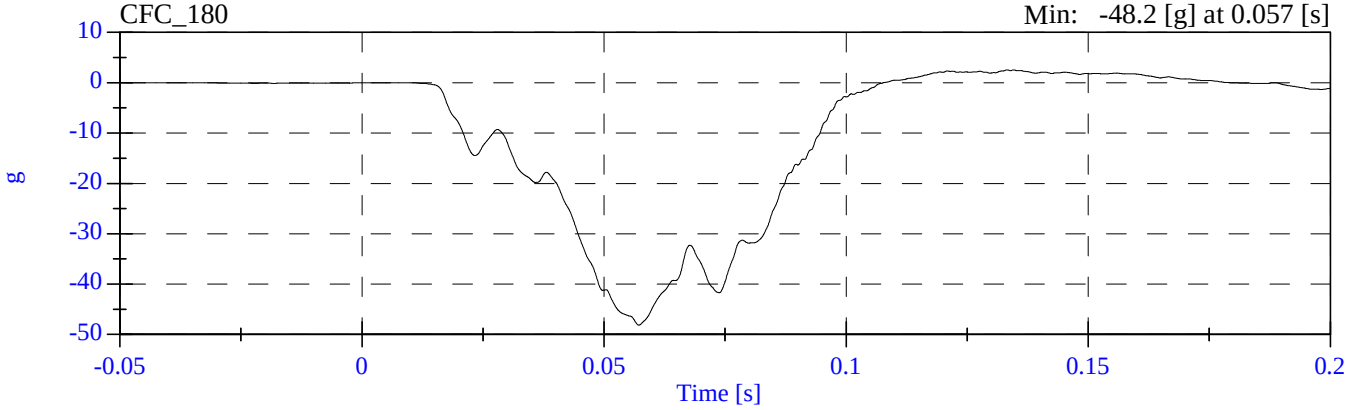


V1P2 Head CG Resultant
CFC_1000
Max: 62.0 [g] at 0.069 [s]
Min: 0.0 [g] at -0.047 [s]

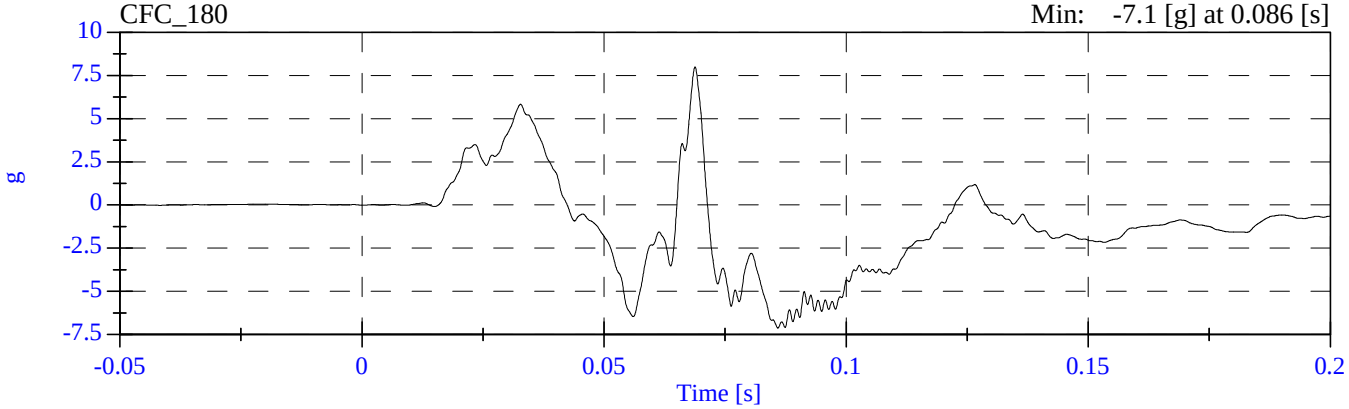


2006 NCAP Test 16 - 2006Toyota RAV4
M65105 - February 23, 2006

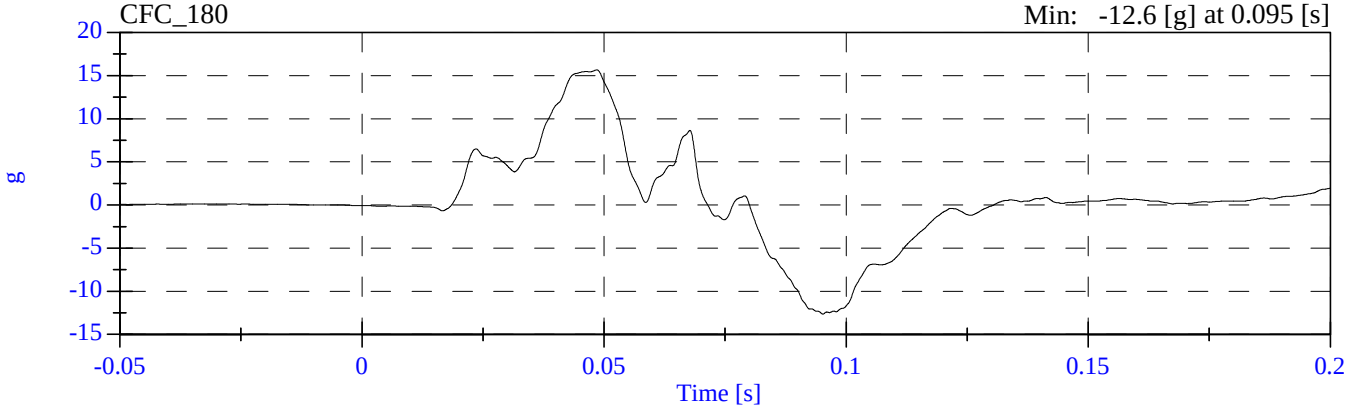
V1P2 Chest x
CFC_180
Max: 2.5 [g] at 0.133 [s]
Min: -48.2 [g] at 0.057 [s]



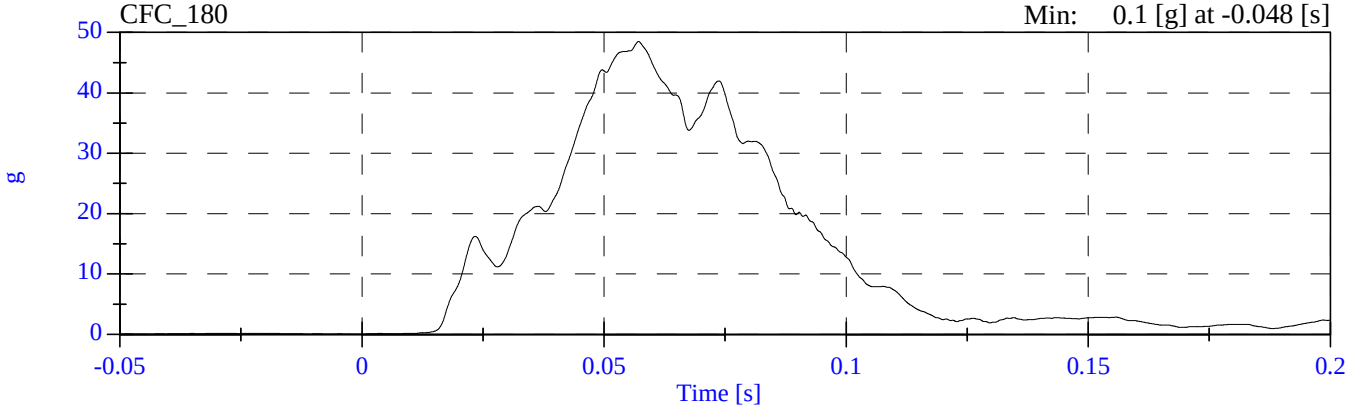
V1P2 Chest y
CFC_180
Max: 8.0 [g] at 0.069 [s]
Min: -7.1 [g] at 0.086 [s]



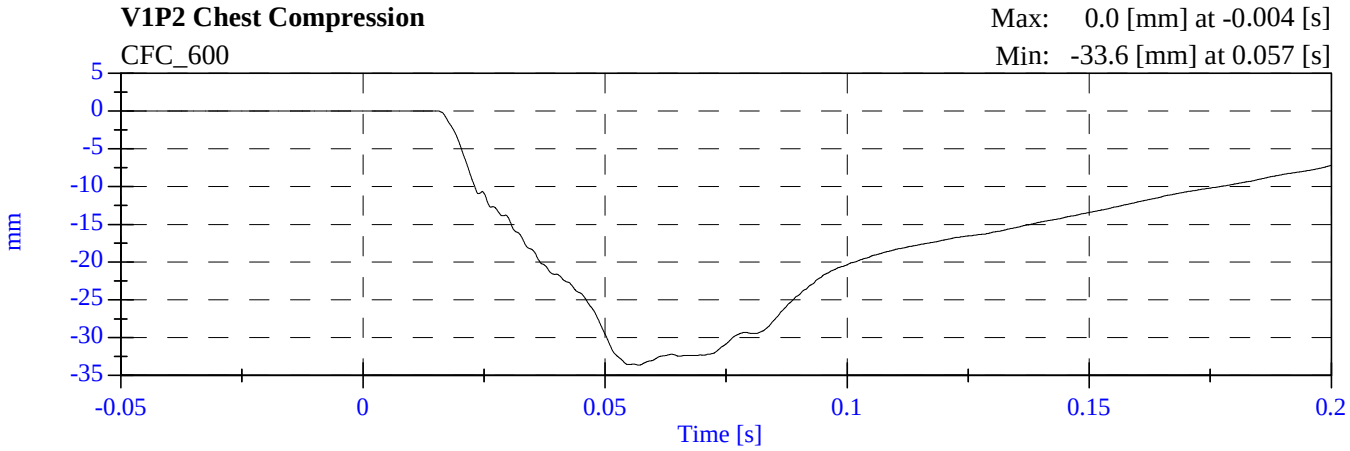
V1P2 Chest z
CFC_180
Max: 15.7 [g] at 0.048 [s]
Min: -12.6 [g] at 0.095 [s]



V1P2 Chest Resultant
CFC_180
Max: 48.5 [g] at 0.057 [s]
Min: 0.1 [g] at -0.048 [s]



2006 NCAP Test 16 - 2006Toyota RAV4
M65105 - February 23, 2006



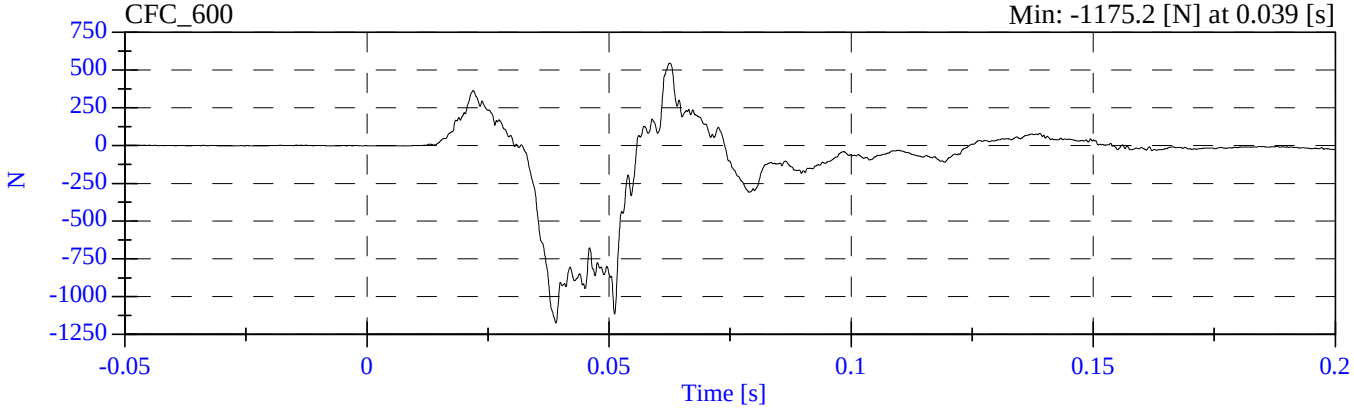
2006 NCAP Test 16 - 2006Toyota RAV4
M65105 - February 23, 2006

V1P2 Left Femur

CFC_600

Max: 544.4 [N] at 0.062 [s]

Min: -1175.2 [N] at 0.039 [s]

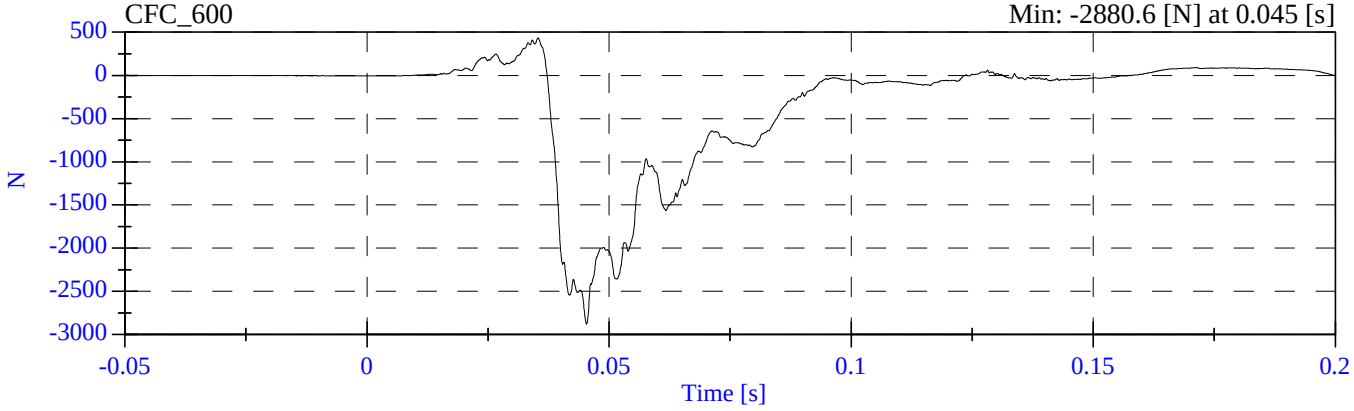


V1P2 Right Femur

CFC_600

Max: 433.9 [N] at 0.035 [s]

Min: -2880.6 [N] at 0.045 [s]



APPENDIX C

PART 572B/E DUMMY CONFIGURATION
AND PERFORMANCE VERIFICATION DATA SHEETS

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of Calspan. A summary of the test results, and Part 572 specifications are included in this Appendix.

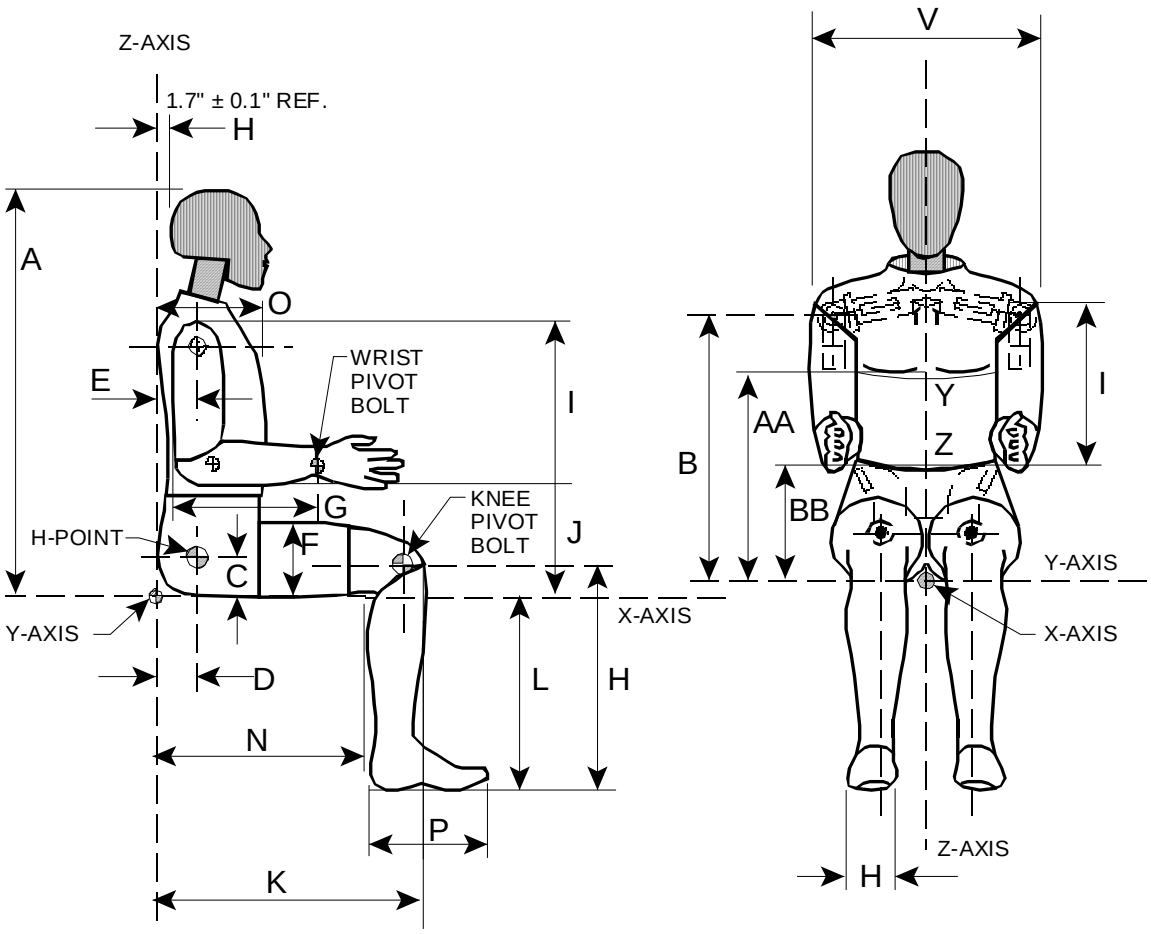
Dummy serial numbers and certification dates are:

Position No./Location	Serial No.	Completion Date
#1/Driver	142	02/17/2006
#2/Right Front Passenger	150	02/17/2006

Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Indicant Testing Final Report No. 6525-V-1.

EXTERNAL DIMENSIONS SPECIFICATIONS



NOTE: Figure is referenced to the erect seated position. The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude. (REF: S572.31(A)(6))

PART 572E
HEAD DROP TEST

Dummy Serial Number	142
Sequential Test Number	1
Date	02/14/2006
Workfile	142H 02-14-06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	36.0
Peak Resultant Acceleration	225-275 G's	249.53
Peak Lateral Acceleration	15 G's Max	5.24
Is Acceleration Curve Unimodal?	YES	Yes

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	142	
Sequential Test Number	1	
Date	02/15/2006	6 Axis Neck Transducer
Workfile	142NF 02-15-06	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.1
Relative Humidity		10% - 70%	28.0
Impact Velocity		6.89 – 7.13 m/s	6.94
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	23.13
	20 ms	17.60 - 22.60 G's	22.04
	30 ms	12.50 - 18.50 G's	17.85
Max Pendulum G's Above 30 ms		29 G's Max	17.85
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	38.60
D Plane Rotation	Max	64 - 78 Deg	68.03
	Time	57 - 64 ms	58.00
Moment About Occipital	Max	88.13 – 108.47 N-m	100.52
Condyle	Time	47 - 58 ms	49.90
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	117.40
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	98.30

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	142	
Sequential Test Number	1	
Date	02/15/2006	6 Axis Neck Transducer
Workfile	142NE 02-15-06	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.1
Relative Humidity		10% - 70%	28.0
Impact Velocity		5.94 – 6.19 m/s	6.07
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	19.95
	20 ms	14.00 - 19.00 G's	18.83
	30 ms	11.00 - 16.00 G's	14.98
Max Pendulum G's Above 30 ms		22 G's Max	15.02
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	38.28
D Plane Rotation	Max	81 - 106 Deg	93.08
	Time	72 - 82 ms	72.38
Moment About Occipital Condyle	Max	-79.99 - -52.88 N-m	-71.71
	Time	65 - 79 ms	67.98
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	153.38
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	131.88

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number	142
Sequential Test Number	1
Date	02/17/2006
Workfile	142T 02-17-06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	20.6 – 22.2 Deg C	21.1
Relative Humidity	10% - 70%	33.0
Pendulum Velocity	6.58 – 6.83 m/s	6.61
Maximum Deflection	63.50 – 72.64 mm	64.8
Maximum Resistive Force	5159.9 – 5893.9 N	5570.9
Internal Hysteresis	69 - 85 %	75.31

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number	142
Sequential Test Number	1
Date	02/17/2006
Workfile	142LF 02-17-06; 142RF 02-17-06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	33.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	5041.5
RIGHT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	33.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	5080.5

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 142
Sequential Test Number 1
Date 02/17/2006

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.1
Relative Humidity			33.0
Location for Chest Circumference	AA	16.9 -17.1 in	17.1
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Total Sitting Height	A	34.6 - 35.0 in	35.0
Shoulder Pivot Height	B	19.9 - 20.5 in	20.4
H-Point Height	C	3.3 - 3.5 in	3.5
H-Point from Backline	D	5.3 - 5.5 in	5.3
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.7
Thigh Clearance	F	5.5 - 6.1 in	6.0
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.5
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.5
Elbow Rest Height	J	7.5 - 8.3 in	8.2
Buttock Knee Length	K	22.8 - 23.8 in	23.5
Popliteal Height	L	16.9 - 17.9 in	17.8
Knee Pivot Height	M	19.1 - 19.7 in	19.2
Buttock Popliteal Length	N	17.8 - 18.8 in	18.6
Chest Depth	O	8.4 - 9.0 in	9.0
Foot Length	P	9.9 - 10.5 in	10.3
Shoulder Breadth	V	16.6 - 17.2 in	16.9
Foot Breadth	W	3.6 - 4.2 in	4.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	38.9
Waist Circumference	Z	32.9 - 34.1 in	33.1

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
HEAD DROP TEST

Dummy Serial Number	150
Sequential Test Number	1
Date	02/14/2006
Workfile	150H 02-14-06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	36.0
Peak Resultant Acceleration	225-275 G's	273.84
Peak Lateral Acceleration	15 G's Max	6.19
Is Acceleration Curve Unimodal?	YES	Yes

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	150	
Sequential Test Number	1	
Date	02/16/2006	6 Axis Neck Transducer
Workfile	150NF1 02-16-06	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.1
Relative Humidity		10% - 70%	34.0
Impact Velocity		6.89 – 7.13 m/s	6.93
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	22.83
	20 ms	17.60 - 22.60 G's	22.41
	30 ms	12.50 - 18.50 G's	18.10
Max Pendulum G's Above 30 ms		29 G's Max	18.10
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	39.90
D Plane Rotation	Max	64 - 78 Deg	69.16
	Time	57 - 64 ms	60.20
Moment About Occipital	Max	88.13 – 108.47 N-m	93.79
Condyle	Time	47 - 58 ms	52.50
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	118.80
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	99.70

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	150	
Sequential Test Number	1	
Date	02/16/2006	6 Axis Neck Transducer
Workfile	150NE2 02-15-06	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.1
Relative Humidity		10% - 70%	28.0
Impact Velocity		5.94 – 6.19 m/s	6.02
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.58
	20 ms	14.00 - 19.00 G's	18.22
	30 ms	11.00 - 16.00 G's	15.81
Max Pendulum G's Above 30 ms		22 G's Max	15.81
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	38.80
D Plane Rotation	Max	81 - 106 Deg	93.59
	Time	72 - 82 ms	73.80
Moment About Occipital	Max	-79.99 - -52.88 N-m	-73.94
Condyle	Time	65 - 79 ms	71.20
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	156.30
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	133.00

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number	150
Sequential Test Number	1
Date	02/17/2006
Workfile	150T 02-17-06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	20.6 – 22.2 Deg C	21.1
Relative Humidity	10% - 70%	33.0
Pendulum Velocity	6.58 – 6.83 m/s	6.67
Maximum Deflection	63.50 – 72.64 mm	65.5
Maximum Resistive Force	5159.9 – 5893.9 N	5544.3
Internal Hysteresis	69 - 85 %	74.55

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number	150
Sequential Test Number	1
Date	02/17/2006
Workfile	150LF 02-17-06; 150RF 02-17-06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	33.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	5249
RIGHT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	33.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	4971

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 150
Sequential Test Number 1
Date 02/17/2006

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.1
Relative Humidity			33.0
Location for Chest Circumference	AA	16.9 -17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Total Sitting Height	A	34.6 - 35.0 in	34.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.0
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.5
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.6
Thigh Clearance	F	5.5 - 6.1 in	6.0
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.5
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
Elbow Rest Height	J	7.5 - 8.3 in	8.2
Buttock Knee Length	K	22.8 - 23.8 in	23.5
Popliteal Height	L	16.9 - 17.9 in	17.8
Knee Pivot Height	M	19.1 - 19.7 in	19.5
Buttock Popliteal Length	N	17.8 - 18.8 in	18.5
Chest Depth	O	8.4 - 9.0 in	9.0
Foot Length	P	9.9 - 10.5 in	10.2
Shoulder Breadth	V	16.6 - 17.2 in	16.9
Foot Breadth	W	3.6 - 4.2 in	4.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.1
Waist Circumference	Z	32.9 - 34.1 in	34.0

Remarks:

Laboratory Technician: B. Swiecicki

APPENDIX D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 142)		Manufacturer	Serial #	Calibration	
				Last	Next
Head 9 Array	X Arm Y	ENDEVCO	AC-J35933	31-Jan-06	1-Aug-06
	X Arm Z	ENDEVCO	AC-J36038	31-Jan-06	1-Aug-06
	Y Arm X	ENDEVCO	AC-J36605	31-Jan-06	1-Aug-06
	Y Arm Z	ENDEVCO	AC-J21907	31-Jan-06	1-Aug-06
	Z Arm X	ENDEVCO	AC-J19843	31-Jan-06	1-Aug-06
	Z Arm Y	ENDEVCO	AC-AJ507	31-Jan-06	1-Aug-06
Head	X	ENDEVCO	AC-J14189	31-Jan-06	1-Aug-06
	Y	ENDEVCO	AC-J20125	31-Jan-06	1-Aug-06
	Z	ENDEVCO	AC-J36744	31-Jan-06	1-Aug-06
Head	X (R)	ENDEVCO	AC-J21989	31-Jan-06	1-Aug-06
	Y (R)	ENDEVCO	AC-J35921	31-Jan-06	1-Aug-06
	Z (R)	ENDEVCO	AC-ACCY2	31-Jan-06	1-Aug-06
Neck Load Cell	X	DENTON	LC-297FX	13-Jul-05	11-Jan-06
	Y	DENTON	LC-297FY	13-Jul-05	11-Jan-06
	Z	DENTON	LC-297FZ	13-Jul-05	11-Jan-06
Neck Moment	X	DENTON	LC-297MX	13-Jul-05	11-Jan-06
	Y	DENTON	LC-297MY	13-Jul-05	11-Jan-06
	Z	DENTON	LC-297MZ	13-Jul-05	11-Jan-06
Chest	X	ENDEVCO	AC-AC9F9	31-Jan-06	1-Aug-06
	Y	ENDEVCO	AC-P16194	31-Jan-06	1-Aug-06
	Z	ENDEVCO	AC-J14688	31-Jan-06	1-Aug-06
Chest	X (R)	ENDEVCO	AC-AAK48	31-Jan-06	1-Aug-06
	Y (R)	ENDEVCO	AC-AAKB1	31-Jan-06	1-Aug-06
	Z (R)	ENDEVCO	AC-J27517	31-Jan-06	1-Aug-06
Chest Deflection	X	SERVO	DS-142	28-Jun-05	27-Dec-05
Pelvic	X	ENDEVCO	AC-AJ5R0	31-Jan-06	1-Aug-06
	Y	ENDEVCO	AC-J22036	31-Jan-06	1-Aug-06
	Z	ENDEVCO	AC-J17649	31-Jan-06	1-Aug-06

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 142)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	DENTON	LC-729	20-Mar-05	18-Sep-05
Right Femur Load Cell	Fz	GSE	LC-631	16-Mar-05	14-Sep-05
Left Upper Tibia	Mx	DENTON	LC-266MX	24-Jun-05	23-Dec-05
	My	DENTON	LC-266MY	24-Jun-05	23-Dec-05
Left Lower Tibia	Fz	DENTON	LC-179FZ	22-Jun-05	21-Dec-05
	Mx	DENTON	LC-179MX	22-Jun-05	21-Dec-05
	My	DENTON	LC-179MY	22-Jun-05	21-Dec-05
Right Upper Tibia	Mx	DENTON	LC-265MX	28-Jun-05	27-Dec-05
	My	DENTON	LC-265MY	28-Jun-05	27-Dec-05
Right Lower Tibia	Fz	DENTON	LC-178FZ	28-Jun-05	27-Dec-05
	Mx	DENTON	LC-178MX	28-Jun-05	27-Dec-05
	My	DENTON	LC-178MY	28-Jun-05	27-Dec-05
Left Foot Rear	X	ENTRAN	AC-02I02I05-F06	1-Feb-06	2-Aug-06
	Z	ENTRAN	AC-01G18-F14	1-Feb-06	2-Aug-06
Left Foot Front	Z	ENTRAN	AC-99H30-Z13	1-Feb-06	2-Aug-06
Right Foot Rear	X	ENTRAN	AC-02I20I16-A13	1-Feb-06	2-Aug-06
	Z	ENTRAN	AC-03D03D16-F01	1-Feb-06	2-Aug-06
Right Foot Front	Z	ENTRAN	AC-00L20-A15	31-Jan-06	1-Aug-06
Lap Belt Load Cell		FIRST TECHNOLOGY	LC-159	1-Oct-05	1-Apr-06
Shoulder Belt Load Cell		FIRST TECHNOLOGY	LC-168	1-Oct-05	1-Apr-06

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 150)		Manufacturer	Serial #	Calibration	
				Last	Next
Head 9 Array	X Arm Y	ENDEVCO	AC-J27470	30-Jan-06	31-Jul-06
	X Arm Z	ENDEVCO	AC-J36741	30-Jan-06	31-Jul-06
	Y Arm X	ENDEVCO	AC-J20027	27-Jan-06	28-Jul-06
	Y Arm Z	ENDEVCO	AC-J21988	30-Jan-06	31-Jul-06
	Z Arm X	ENDEVCO	AC-AAKC6	27-Jan-06	28-Jul-06
	Z Arm Y	ENDEVCO	AC-AAKD0	30-Jan-06	31-Jul-06
Head	X	ENDEVCO	AC-J20061	30-Jan-06	31-Jul-06
	Y	ENDEVCO	AC-AJ4F8	30-Jan-06	31-Jul-06
	Z	ENDEVCO	AC-AHRW5	30-Jan-06	31-Jul-06
Head	X (R)	ENDEVCO	AC-AJ7Y4	30-Jan-06	31-Jul-06
	Y (R)	ENDEVCO	AC-AJ454	30-Jan-06	31-Jul-06
	Z (R)	ENDEVCO	AC-J19563	30-Jan-06	31-Jul-06
Neck Load Cell	X	DENTON	LC-157FX	14-Jul-05	12-Jan-06
	Y	DENTON	LC-157FY	14-Jul-05	12-Jan-06
	Z	DENTON	LC-157FZ	14-Jul-05	12-Jan-06
Neck Moment	X	DENTON	LC-157MX	14-Jul-05	12-Jan-06
	Y	DENTON	LC-157MY	14-Jul-05	12-Jan-06
	Z	DENTON	LC-157MZ	14-Jul-05	12-Jan-06
Chest	X	ENDEVCO	AC-J20580	30-Jan-06	31-Jul-06
	Y	ENDEVCO	AC-J20018	30-Jan-06	31-Jul-06
	Z	ENDEVCO	AC-J20569	30-Jan-06	31-Jul-06
Chest	X (R)	ENDEVCO	AC-J21963	30-Jan-06	31-Jul-06
	Y (R)	ENDEVCO	AC-P16755	30-Jan-06	31-Jul-06
	Z (R)	ENDEVCO	AC-J14667	30-Jan-06	31-Jul-06
Chest Deflection	X	SERVO	DS-150	23-Jun-05	22-Dec-05
Pelvic	X	ENDEVCO	AC-J34378	27-Jan-06	28-Jul-06
	Y	ENDEVCO	AC-J23757	27-Jan-06	28-Jul-06
	Z	ENDEVCO	AC-J27513	27-Jan-06	28-Jul-06

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

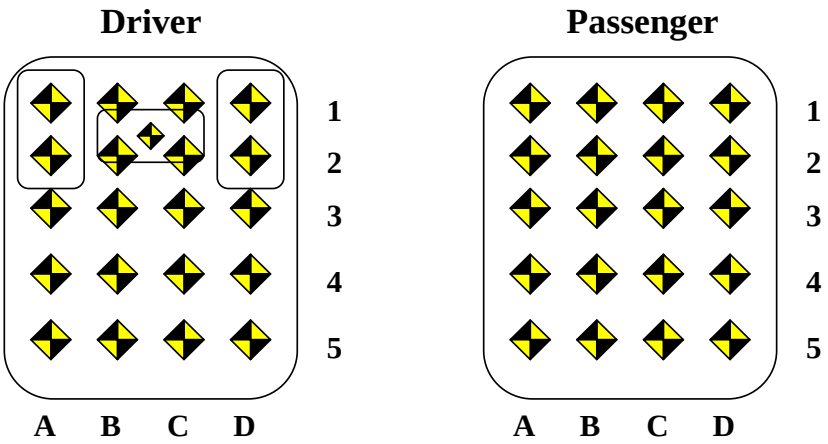
PASSENGER DUMMY (S/N 150)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	DENTON	LC-261	2-Jul-05	31-Dec-05
Right Femur Load Cell	Fz	DENTON	LC-264	2-Jul-05	31-Dec-05
Left Upper Tibia	Mx	DENTON	LC-263MX	29-Jun-05	28-Dec-05
	My	DENTON	LC-263MY	29-Jun-05	28-Dec-05
Left Lower Tibia	Fz	DENTON	LC-174FZ	28-Jun-05	27-Dec-05
	Mx	DENTON	LC-174MX	28-Jun-05	27-Dec-05
	My	DENTON	LC-174MY	28-Jun-05	27-Dec-05
Right Upper Tibia	Mx	DENTON	LC-268MX	27-Jun-05	26-Dec-05
	My	DENTON	LC-268MY	27-Jun-05	26-Dec-05
Right Lower Tibia	Fz	DENTON	LC-196FZ	27-Jun-05	26-Dec-05
	Mx	DENTON	LC-196MX	27-Jun-05	26-Dec-05
	My	DENTON	LC-196MY	27-Jun-05	26-Dec-05
Left Foot Rear	X	ENDEVCO	AC-J19223	30-Jan-06	31-Jul-06
	Z	ENDEVCO	AC-J20083	30-Jan-06	31-Jul-06
Left Foot Front	Z	ENTRAN	AC-04J04J07-M02	30-Jan-06	31-Jul-06
Right Foot Rear	X	ENDEVCO	AC-J35747	30-Jan-06	31-Jul-06
	Z	ENDEVCO	AC-J27496	30-Jan-06	31-Jul-06
Right Foot Front	Z	ENDEVCO	AC-J36723	30-Jan-06	31-Jul-06
Lap Belt Load Cell		FIRST TECHNOLOGY	LC-173	1-Oct-05	1-Apr-06
Shoulder Belt Load Cell		FIRST TECHNOLOGY	LC-178	1-Oct-05	1-Apr-06

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ICS	AC-FGP19	17-Oct-05	17-Apr-06
Right Rear Seat Crossmember X	GS SENSORS	AC-9440-046	17-Oct-05	17-Apr-06
Top of Engine	GS SENSORS	AC-9440-024	3-Feb-06	4-Aug-06
Bottom of Engine	ICS	AC-FGP26	17-Oct-05	17-Apr-06
Right Disc Brake Caliper	GS SENSORS	AC-9440-045	17-Oct-05	17-Apr-06
Instrument Panel	-	-	-	-
Left Disc Brake Caliper	GS SENSORS	AC-9440-029	8-Feb-06	9-Aug-06
Left Seat Rear Crossmember Z	ICS	AC-FGP29	17-Oct-05	17-Apr-06
Right Seat Rear Crossmember Z	GS SENSORS	AC-9440-023	17-Oct-05	17-Apr-06

APPENDIX E

VEHICLE INTERIOR INTRUSION MEASUREMENTS

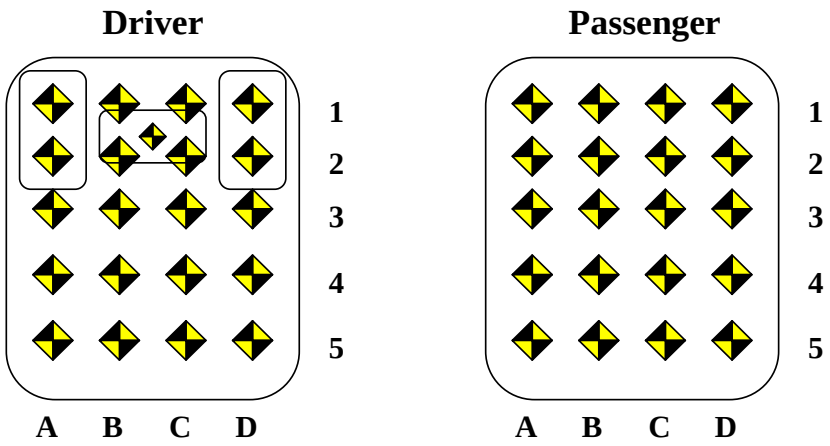


Driver Side Intrusion Measurements

Intrusion Location	PRE-TEST (mm)			POST-TEST (mm)			CHANGE (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	3304	-574	-488	3303	-566	-501	1	-8	13
B1	3426	-448	-488	3399	-428	-516	27	-20	28
C1	3428	-319	-488	3368	-304	-524	60	-15	36
D1	3431	-189	-488	3385	-187	-514	46	-2	26
A2	3265	-574	-438	3265	-567	-449	0	-7	11
B2	3340	-447	-422	3339	-437	-434	1	-10	12
C2	3342	-316	-423	3335	-306	-430	7	-10	7
D2	3365	-189	-420	3356	-180	-432	9	-9	12
A3	3223	-574	-385	3223	-567	-396	0	-7	11
B3	3241	-445	-385	3240	-436	-393	1	-9	8
C3	3239	-313	-384	3238	-305	-387	1	-8	3
D3	3240	-184	-383	3236	-178	-388	4	-6	5
A4	3144	-574	-382	3144	-567	-392	0	-7	10
B4	3151	-444	-383	3151	-438	-390	0	-6	7
C4	3152	-313	-380	3150	-306	-384	2	-7	4
D4	3152	-184	-381	3148	-177	-384	4	-7	3
A5	3061	-572	-386	3065	-567	-400	-4	-5	14
B5	3061	-441	-386	3062	-436	-391	-1	-5	5
C5	3060	-313	-389	3060	-307	-395	0	-6	6
D5	3062	-183	-384	3059	-179	-391	3	-4	7
BP	3286	-335	-549	3218	-312	-590	68	-23	41
G	3043	-504	-842	3040	-501	-846	3	-3	4
H	3008	-205	-841	3032	-201	-866	-24	-4	25
L	2827	-368	-1061	2884	-340	-1040	-57	-28	-21
AB	2712	-589	-456	2711	-587	-463	1	-2	7

BP=Brake Pedal, G=Left side of bolster, H=Right side of bolster, L=Steering wheel center;
AB = Front outboard seat anchor bolt

PASSENGER SIDE INTRUSION MEASUREMENTS



Passenger Side Intrusion Measurements

Intrusion Location	PRE-TEST (mm)			POST-TEST (mm)			CHANGE (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	3417	187	-492	3412	174	-505	5	13	13
B1	3450	315	-492	3423	302	-517	27	13	25
C1	3433	448	-494	3419	429	-527	14	19	33
D1	3338	579	-495	3335	564	-509	3	15	14
A2	3345	187	-456	3340	173	-464	5	14	8
B2	3349	318	-460	3345	304	-471	4	14	11
C2	3350	447	-461	3353	433	-475	-3	14	14
D2	3330	577	-460	3332	562	-471	-2	15	11
A3	3245	187	-423	3242	175	-429	3	12	6
B3	3245	317	-425	3244	305	-434	1	12	9
C3	3245	447	-427	3247	436	-437	-2	11	10
D3	3246	578	-423	3249	565	-435	-3	13	12
A4	3157	188	-396	3156	180	-399	1	8	3
B4	3157	317	-398	3157	306	-403	0	11	5
C4	3158	447	-399	3160	437	-406	-2	10	7
D4	3160	577	-398	3164	566	-406	-4	11	8
A5	3066	189	-394	3065	180	-394	1	9	0
B5	3067	318	-395	3069	311	-399	-2	7	4
C5	3068	447	-397	3071	438	-399	-3	9	2
D5	3069	576	-399	3072	568	-403	-3	8	4
R	3006	210	-845	3042	203	-878	-36	7	33
S	3036	507	-851	3039	509	-871	-3	-2	20
AB	2712	583	-455	2709	580	-458	3	3	3

R=Left side of bolster, S=Right side of bolster, L=Steering wheel center;
AB = Front outboard seat anchor bolt