

REPORT NUMBER TR-P33007-11-NC

**SIDE AIRBAG OCCUPANT RISK PROGRAM
OCCUPANT OUT-OF-POSITION TESTS**

**TOYOTA MOTOR CORPORATION
2013 TOYOTA PRIUS C
5-DOOR HATCHBACK**

NHTSA NUMBER: MD5109TWG2

**PREPARED BY:
KARCO ENGINEERING, LLC.
9270 HOLLY ROAD
ADELANTO, CA 92301**

MAY 8, 2013

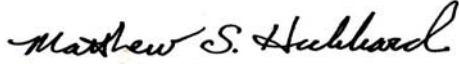
FINAL REPORT

PREPARED FOR:

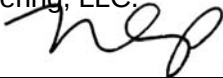
**ALPHA TECHNOLOGY ASSOCIATE, INC.
2810 OLD LEE HWY, SUITE 120
FAIRFAX, VA 22031**

This final test report was prepared for the U.S. Department of Transportation, Alpha Technology Associate, Inc., in response to Contract Number DTNH22-12-D-00259.

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Prepared By: 
Mr. Matthew S. Hubbard, Test Engineer
KARCO Engineering, LLC.

Reviewed By: 
Mr. Steven D. Matsusaka, Engineering Department Supervisor
KARCO Engineering, LLC.


Mr. Michael L. Dunlap, Director of Operations
KARCO Engineering, LLC.

Approved By: 
Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC.

Approval Date: May 8, 2013

FINAL REPORT ACCEPTED BY:

Engineer, Alpha Technology Associate, Inc.

Date of Acceptance

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SECTION 1

PURPOSE AND SUMMARY OF TEST MD5109TWG2

1.1 PURPOSE

This occupant out-of-position static side airbag deployment test is part of the Technical Working Group Occupant Injury Risk from Deploying Side Airbags Testing Program sponsored by Alpha Technology Associate, Inc. under Contract No. DTNH22-12-D-00259. The purpose of this test was to obtain occupant injury data for a side airbag deployment.

The occupant out-of-position side airbag test was conducted in accordance with the Technical Working Group Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags.

1.2 SUMMARY

The effects of a roof mounted curtain airbag and a torso/pelvis airbag deployment in a 2013 Toyota Prius C 5-door hatchback with an out-of-position 6 year old dummy were evaluated. The test was performed at KARCO Engineering, LLC. on April 24, 2013. Pre- and post-test photographs of the vehicle and dummy can be found in Appendix A.

Three high-speed digital cameras and one real time camera were used to document the airbag deployment. Camera locations and other pertinent camera information can be found on Data Sheet No.1 and Data Sheet No.6.

A 6 year old anthropomorphic test device (ATD) was placed in the right front passenger seating position facing inboard according to the dummy placement instructions (3.3.5.1) in the July 2003 Revision of the Technical Working Group's 'Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags'.

The 6 year old ATD was instrumented with head tri-axial accelerometers, and upper and lower neck force transducers.

Fifteen (15) channels of data were recorded using an on-board data acquisition system. Appendix B contains the dummy response data traces. Appendix C contains the instrumentation data channel assignments. Appendix D contains the ATD calibration sheets.

The front passenger side door remained closed during the deployment and was operable after the test.

The 6 year old dummy's visible contact points were as follows: The curtain airbag contacted the ATD's head and the torso/pelvis airbag contacted the ATD's back and pelvis.

OUT OF POSITION OCCUPANT DATA SUMMARY

ATD Position	HIC ₁₅
Passenger	29.5

Orientation of the 6 year old dummy was in the inboard facing position leaning back against the door panel. The dummy's upper spine was aligned with the deploying trajectory of the airbag. This orientation complies with section 3.3.5.1 of the Technical Working Group (TWG) recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags.

SECTION 2

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback NHTSA No.: MD5109TWG2
Test Program: TWG 3.3.5.1 Test Date: 04/24/13

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.574
Pressure	Tire Pressures	lbf/in ²	kPa	6.895
Temperature	General Use	°F	°C	$=(t_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf-ft	N•m	1.355

DATA SHEET NO. 1

TEST SUMMARY

Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback NHTSA No.: MD5109TWG2

Test Program: TWG 3.3.5.1 Test Date: 04/24/13

TEST DUMMY INFORMATION

Description	Passenger Seat Inboard Facing
Dummy Type / Serial No.	6 year old / 186
Head Contact	Yes
Chest Contact	No
Abdomen Contact	No
Pelvis	Yes
Left Knee Contact	No
Right Knee Contact	No

VIDEO COVERAGE

High Speed Digital	3
Real Time	1
Total	4

DATA CHANNELS

6 year old ATD Sensors	15
Belt Assessment Sensors	0
Vehicle Structure Accelerometers	0
Total	15

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback NHTSA No.: MD5109TWG2
 Test Program: TWG 3.3.5.1 Test Date: 04/24/13

TEST VEHICLE INFORMATION

Make	Toyota
Model	Prius C
Body Style	5-Door Hatchback
NHTSA No.	MD5109TWG2
VIN	JTDKDTB33D1528623
Color	Classic Silver Metallic
Delivery Date	February 13, 2013
Odometer (km./mi.)	50 / 31
Dealer	Toyota of Walnut Creek
Transmission	Automatic
Final Drive	Front
Type/Number Cylinders	Inline-4
Engine Displacement (L)	1.5L
Engine Placement	Transverse

TEST VEHICLE OPTIONS

Driver Front Airbag	Yes
Driver Side Airbag	Yes
Driver Side Curtain Airbag	Yes
Pass. Front Airbag	Yes
Pass. Side Airbag	Yes
Pass. Curtain Airbag	Yes
Power Brakes	Yes
Power Steering	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	Yes
Anti-lock Brakes	Yes
Tilt Steering Wheel	Yes
Power Windows	Yes
Power Seats	No

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Corporation	GVWR (kg)	1576
Date of Manufacture	December-12	GAWR Front (kg)	830
		GAWR Rear (kg)	830

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommend Tire Size	P175/65 R15	P175/65 R15
Tire Size on Vehicle	P175/65 R15	P175/65 R15
Tire Manufacturer	Goodyear	Goodyear

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				376

* Vehicle underwent New Car Assessment Program Frontal Impact Testing on February 21, 2013.

DATA SHEET NO. 3

TEST VEHICLE INFORMATION

Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback NHTSA No.: MD5109TWG2

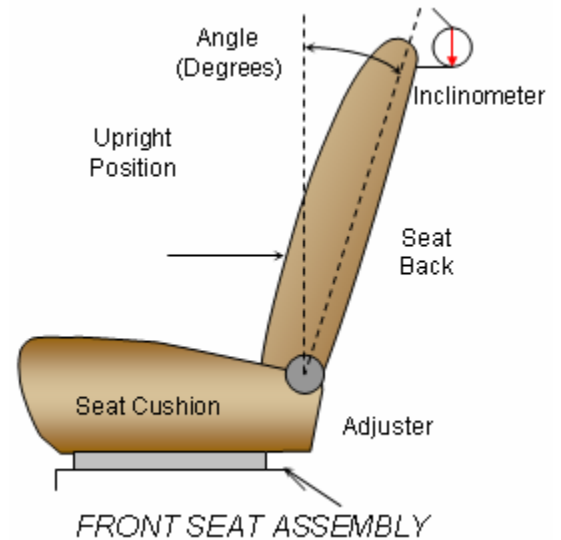
Test Program: TWG 3.3.5.1 Test Date: 04/24/13

NOMINAL DESIGN RIDING POSITION

The passenger seat back is positioned per section 3.3.5.1 of the TWG recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags. Seat back angle is measured at the headrest post.

SEAT BACK ANGLES

Position	Deg.
Passenger w/ Dummy	79.3



SEAT FORE/AFT POSITIONS

The passenger seat track travel is set per section 3.3.5.1 of the TWG recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags. The first or forward most position is counted as number zero (0).

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Passenger Seat	240 mm (25 detents)	60 mm (6th detent)

DATA SHEET NO. 4

DUMMY POSITIONING INFORMATION

Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback NHTSA No.: MD5109TWG2

Test Program: TWG 3.3.5.1 Test Date: 04/24/13

TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Hybrid III 6 YO	
		Length (mm)	Angle (°)
SA	Seat Back Angle		79.3
AMW	Side Airbag Module Diameter (Torso / Curtain)	30 / 30	
ABW	Side Airbag Width (Torso / Curtain)	580 / 445	
AML	Side Airbag Module Length (Torso / Curtain)	145 / 170	
ABL	Side Airbag Length (Torso / Curtain)	310 / 1620	
AN	Top of Airbag Module to Head/Neck Junction	259	
HD	Head CG to Door Panel/ Window	176	
HSC	Head to Seat Back Centerline	290	
HB	Head to B-Pillar (first contact)	273	
HZ	Head to Roof (Z)	254	
HHD	Head to Header	296	51.2
ND	Nose to Dash	487	21.8
NS	Nose to Seat Back	274	
NR	Nose to Header	298	51.3
CD	Chest to Dash	431	0.0
CS	Chest to Seat Back	247	
RACL	Right Arm to Seat Back Centerline	297	
LACL	Left Arm to Seat Back Centerline	284	
RA	Right Arm to Door Panel	85	
LA	Left Arm to Door Panel	88	
KK	Knee to Knee	141	
TT	Toe to Toe	87	
KSCR	Right Knee to Seat Cushion Centerline	77	
KSCL	Left Knee to Seat Cushion Centerline	72	
	Head Level (X Direction)		10.4
	Head Level (Y Direction)		3.6

DATA SHEET NO. 5

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback NHTSA No.: MD5109TWG2
 Test Program: TWG 3.3.5.1 Test Date: 04/24/13

HEAD PEAK ACCELERATIONS

Location	Axis	Units	Pass. 6 YO			
			Max	Time	Min	Time
Head CG	X	G's	41.3	55.5	-31.1	9.6
Head CG	Y	G's	14.8	9.7	-11.9	11.0
Head CG	Z	G's	54.8	9.6	-11.0	9.8
Head CG Resultant	N/A	G's	64.3	9.6		

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Pass. 6 YO			
			Max	Time	Min	Time
Neck Force	X	Newtons	104.4	18.4	-104.1	9.3
Neck Force	Y	Newtons	127.0	73.2	-51.5	15.1
Neck Force	Z	Newtons	39.0	4.2	-547.9	12.9
Neck Force Resultant	N/A	Newtons	548.4	12.9		
Neck Moment	X	Nm	11.1	65.8	-6.9	22.2
Neck Moment	Y	Nm	15.6	20.4	-6.1	9.2
Neck Moment	Z	Nm	6.0	61.5	-4.8	26.8
Neck Moment Resultant	N/A	Nm	17.3	20.6		

LOWER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Pass. 6 YO			
			Max	Time	Min	Time
Neck Force	X	Newtons	113.6	60.9	-259.3	7.6
Neck Force	Y	Newtons	333.4	4.6	-91.7	5.9
Neck Force	Z	Newtons	30.6	201.2	-681.8	11.7
Neck Force Resultant	N/A	Newtons	684.4	11.7		
Neck Moment	X	Nm	26.2	73.7	-3.7	218.4
Neck Moment	Y	Nm	32.3	11.1	-4.5	55.0
Neck Moment	Z	Nm	9.1	4.7	-5.4	13.8
Neck Moment Resultant	N/A	Nm	32.6	11.1		

HEAD INJURY CRITERIA (HIC 15)

Location	Pass. 6 YO			
	HIC15	T ¹	T ²	Avg G
Head CG	29.5	54.1	61.2	27.9

UPPER NECK NIJ VALUES

Location	Pass. 6 YO			
	Ntf	Nte	Ncf	Nce
Upper Neck	0.02	0.05	0.26	0.24

DATA SHEET NO. 6**CAMERA LOCATIONS**Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback NHTSA No.: MD5109TWG2Test Program: TWG 3.3.5.1 Test Date: 04/24/13

No.	Camera View	Location (mm)			Angle (Deg.)	Lens (mm)	Speed (fps)
		X	Y	Z			
1	High Speed Front View	1640	-260	-1315	-9.5	35	1000
2	High Speed 3/4 View	1500	-1150	-1275	-6.4	35	1000
3	High Speed Side View	75	-2715	-825	-0.9	24	1000
4	Real Time	-10	-2715	-825	0.0	N/A	30

Coordinates: +X = forward of vehicle relative to dummy's head CG
+Y = right of vehicle relative to dummy's head CG
+Z = into ground

APPENDIX A

PHOTOGRAPHS

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FIGURE 1. Right Front ¾ View, As Received



FIGURE 2. Vehicle Certification Label



FIGURE 3. Post-Test Front View of NCAP Frontal Impact Test



FIGURE 4. Post-Test Right Front ¼ View of NCAP Frontal Impact Test



FIGURE 5. Post-Test Left Front $\frac{3}{4}$ View of NCAP Frontal Impact Test



FIGURE 6. Post-Test Right Side View of NCAP Frontal Impact Test



FIGURE 7. Pre-Test Dummy Position, Left Side View



FIGURE 8. Post-Test Dummy Position, Left Side View



FIGURE 9. Pre-Test Dummy Position, ¾ View



FIGURE 10. Post-Test Dummy Position, ¾ View



FIGURE 11. Pre-Test Dummy Position, Front View



FIGURE 12. Post-Test Dummy Position, Front View



FIGURE 13. Post-Test Airbags, Left Side View



FIGURE 14. Post-Test Airbags, Left Front $\frac{3}{4}$ View

APPENDIX B

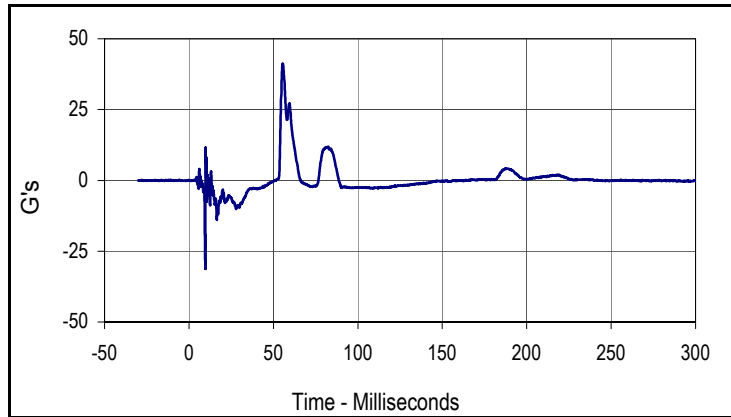
DATA PLOTS

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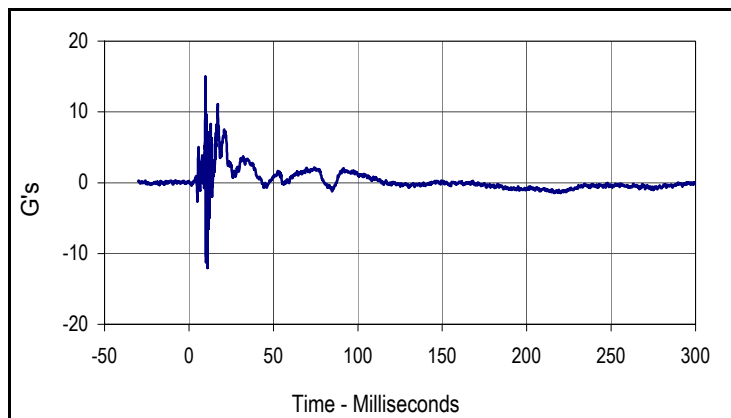
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1	Pass. (6 Yr. Old) Head X	B-1
2	Pass. (6 Yr. Old) Head Y	B-1
3	Pass. (6 Yr. Old) Head Z	B-1
4	Pass. (6 Yr. Old) Head Resultant	B-1
5	Pass. (6 Yr. Old) Upper Neck Force X	B-2
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14	Pass. (6 Yr. Old) Lower Neck Force Y	B-4
15	Pass. (6 Yr. Old) Lower Neck Force Z	B-4
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18	Pass. (6 Yr. Old) Lower Neck Moment Y	B-5
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20	Pass. (6 Yr. Old) Lower Neck Moment Resultant	B-5

Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback
 Test Program: TWG 3.3.5.1

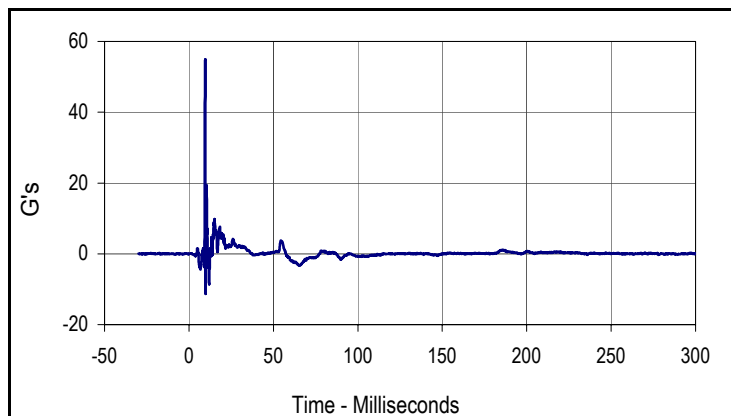
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 NHTSA No.: MD5109TWG2



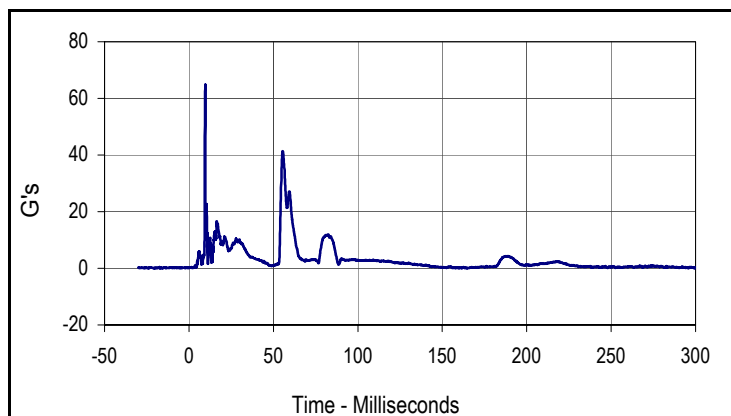
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Curve Description			
6 Yr. Old Head Y			
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Max	Time	Min	Time
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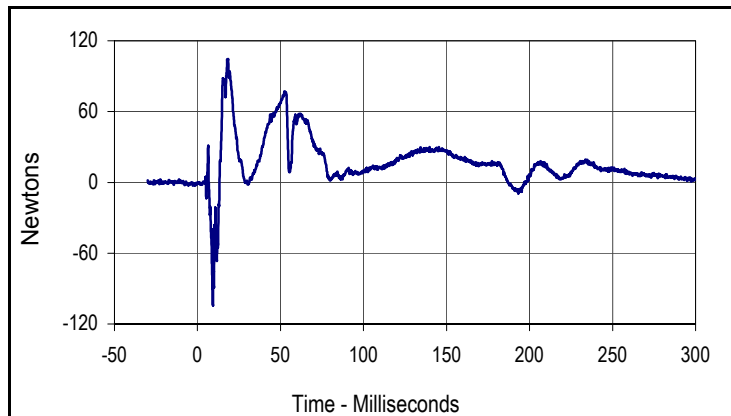
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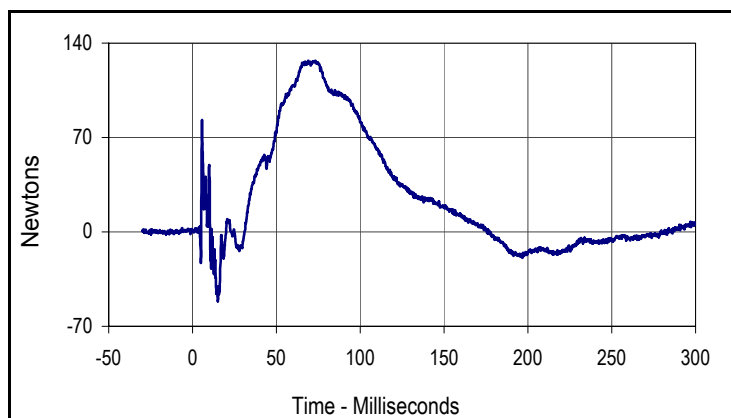
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Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback
 Test Program: TWG 3.3.5.1

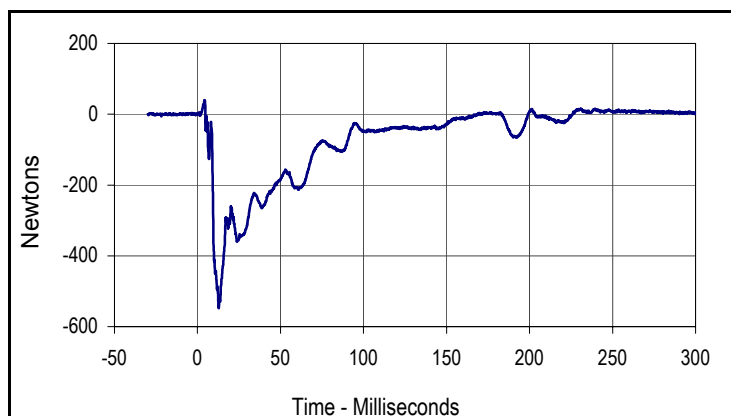
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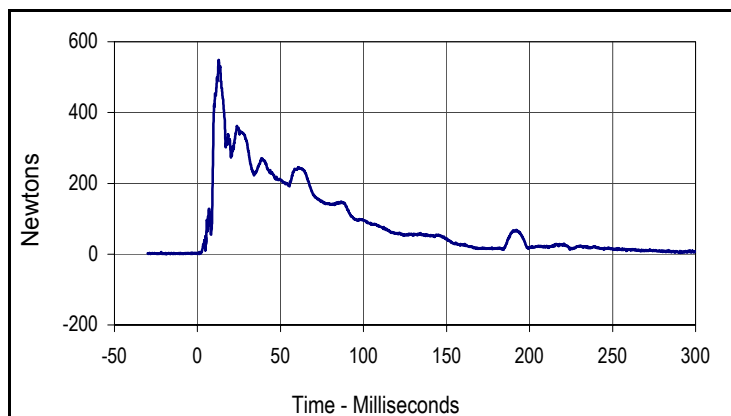
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Plot No.	Type	SAE Class	Units
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Curve Description			
6 Yr. Old Upper Neck Force Y			
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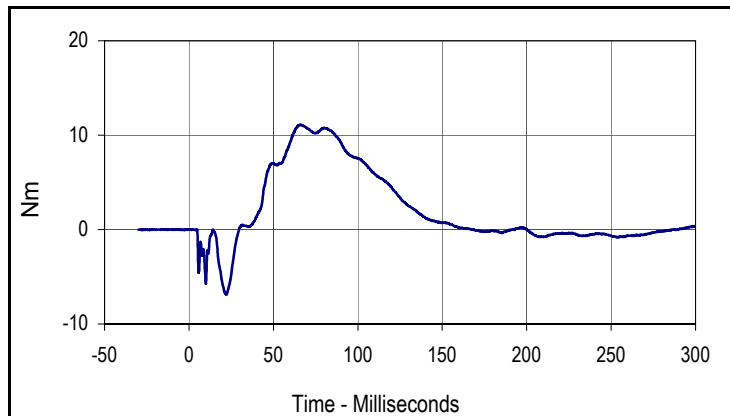
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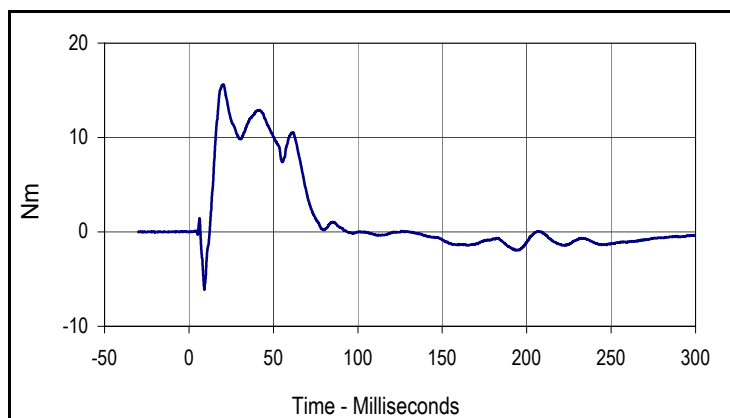
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6 Yr. Old Upper Neck Force Resultant			
Plot No.	Type	SAE Class	Units
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Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback
 Test Program: TWG 3.3.5.1

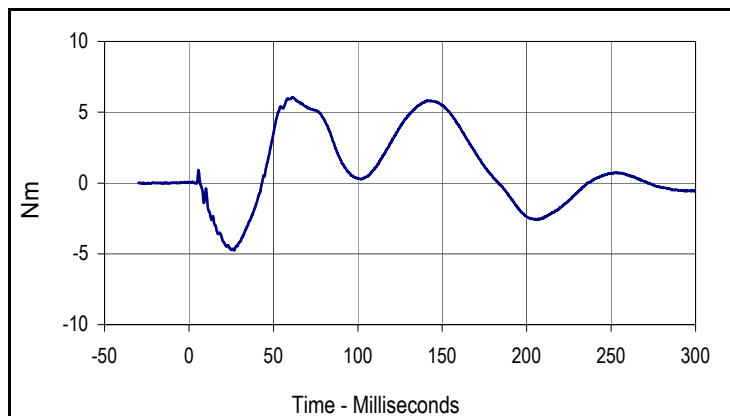
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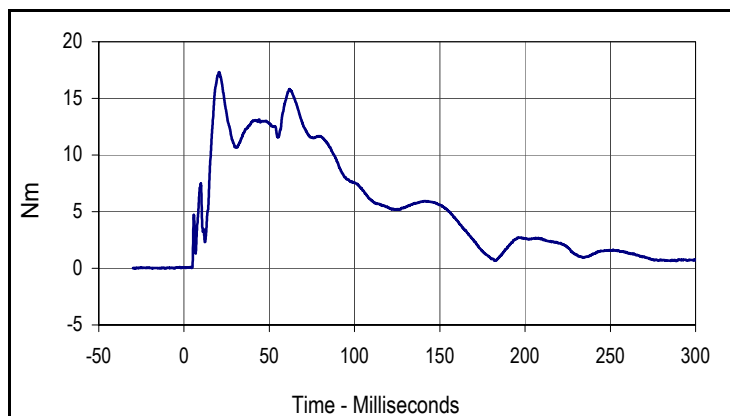
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Max	Time	Min	Time
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Curve Description			
6 Yr. Old Upper Neck Moment Y			
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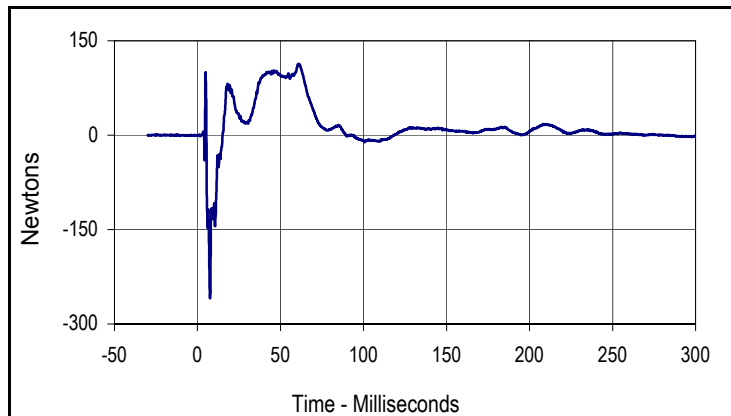
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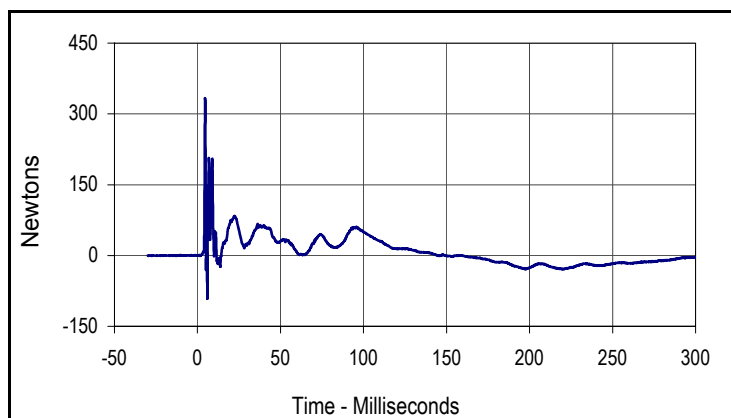
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6 Yr. Old Upper Neck Moment Resultant			
Plot No.	Type	SAE Class	Units
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17.3	20.6	0.0	1.1

Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback
 Test Program: TWG 3.3.5.1

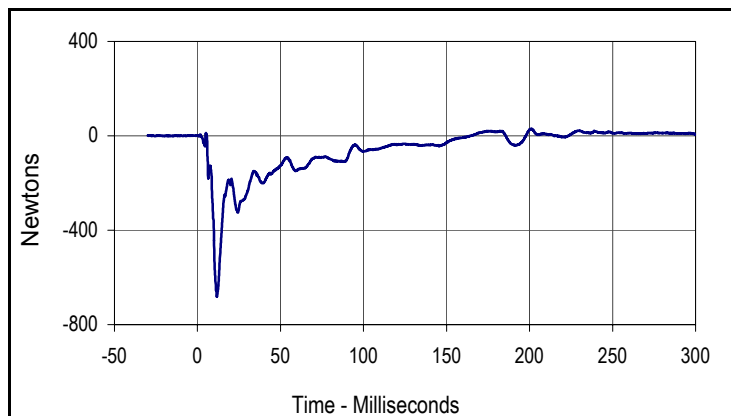
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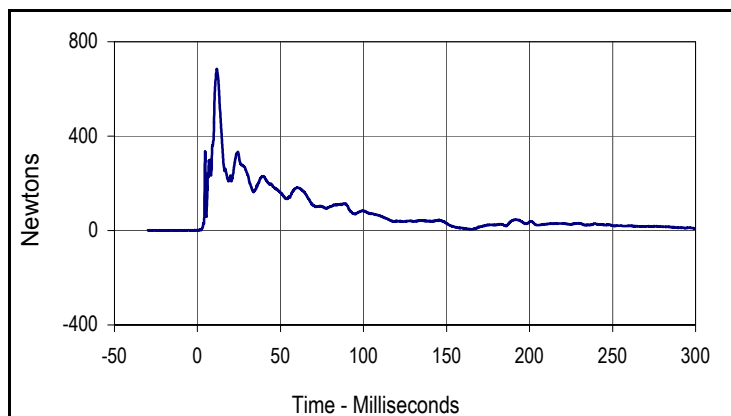
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Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
113.6	60.9	-259.3	7.6



Curve Description			
6 Yr. Old Lower Neck Force Y			
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Max	Time	Min	Time
333.4	4.6	-91.7	5.9



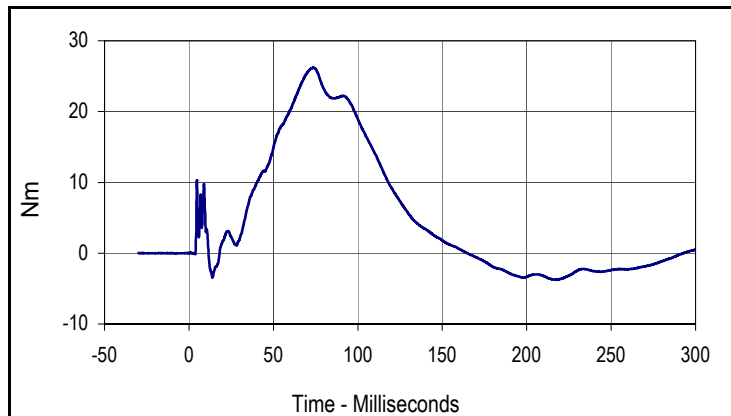
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Max	Time	Min	Time
30.6	201.2	-681.8	11.7



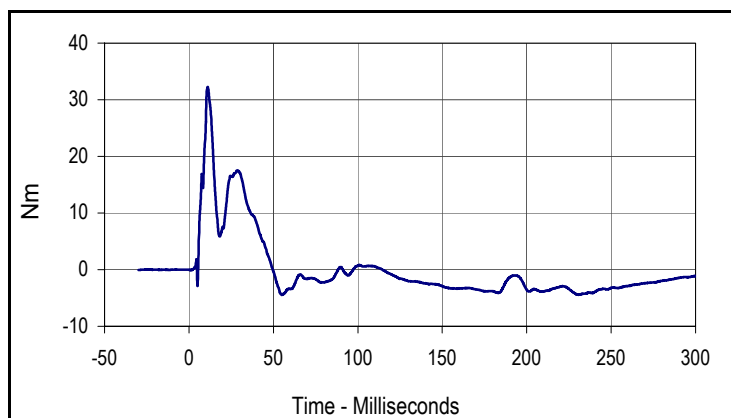
Curve Description			
6 Yr. Old Lower Neck Force Resultant			
Plot No.	Type	SAE Class	Units
016	RES	1000	Newtons
Max	Time	Min	Time
684.4	11.7	0.7	0.7

Test Vehicle: 2013 Toyota Prius C 5-Door Hatchback
 Test Program: TWG 3.3.5.1

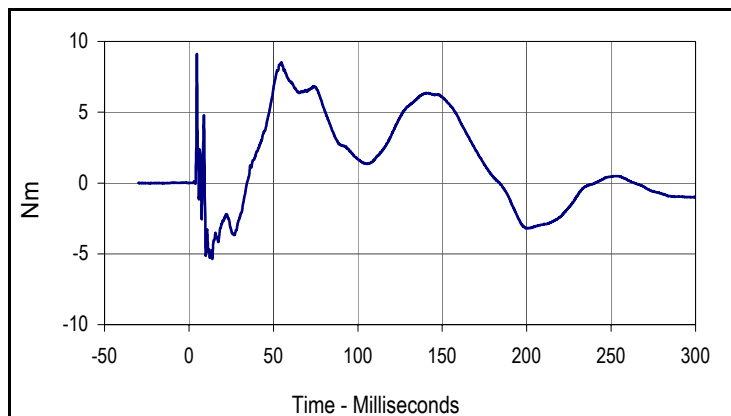
Test Date: 4/24/13
 NHTSA No.: MD5109TWG2



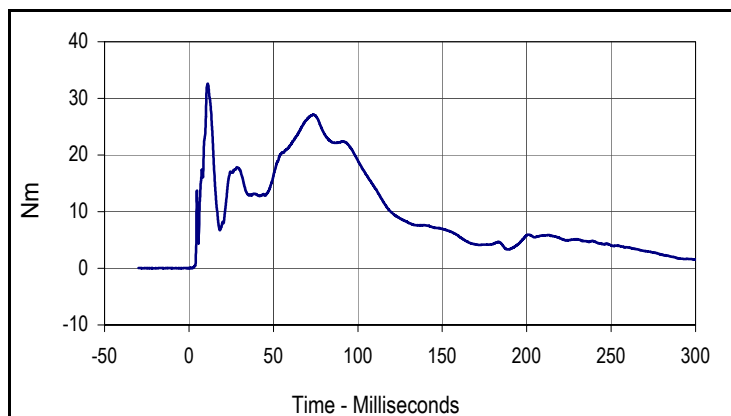
Curve Description			
6 Yr. Old Lower Neck Moment X			
Plot No.	Type	SAE Class	Units
017	FIL	600	Nm
Max	Time	Min	Time
26.2	73.7	-3.7	218.4



Curve Description			
6 Yr. Old Lower Neck Moment Y			
Plot No.	Type	SAE Class	Units
018	FIL	600	Nm
Max	Time	Min	Time
32.3	11.1	-4.5	55.0



Curve Description			
6 Yr. Old Lower Neck Moment Z			
Plot No.	Type	SAE Class	Units
019	FIL	600	Nm
Max	Time	Min	Time
9.1	4.7	-5.4	13.8



Curve Description			
6 Yr. Old Lower Neck Moment Resultant			
Plot No.	Type	SAE Class	Units
020	RES	600	Nm
Max	Time	Min	Time
32.6	11.1	0.0	0.9

APPENDIX C

INSTRUMENTATION DATA CHANNEL ASSIGNMENTS

TWG 3.3.5.1
Instrumentation Data Channel Assignments
A.T.D. Serial Number 186
4/24/13

2013 Toyota Prius C 5-Door Hatchback

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
1	HEAD	X	J34330	Accel.,full bridge	Endevco	7264-2000	G
2	HEAD	Y	P15334	Accel.,full bridge	Endevco	7264C-2000	G
3	HEAD	Z	ACCW9	Accel.,full bridge	Endevco	7264-2000	G
4	UPPER NECK FORCE	X	1646	Load cell, six axis neck	R. A. Denton	1716A	N
5	UPPER NECK FORCE	Y	1646	Load cell, six axis neck	R. A. Denton	1716A	N
6	UPPER NECK FORCE	Z	1646	Load cell, six axis neck	R. A. Denton	1716A	N
7	UPPER NECK MOMENT	X	1646	Load cell, six axis neck	R. A. Denton	1716A	Nm
8	UPPER NECK MOMENT	Y	1646	Load cell, six axis neck	R. A. Denton	1716A	Nm
9	UPPER NECK MOMENT	Z	1646	Load cell, six axis neck	R. A. Denton	1716A	Nm
10	LOWER NECK FORCE	X	139	Load cell, six axis neck	R. A. Denton	2430	N
11	LOWER NECK FORCE	Y	139	Load cell, six axis neck	R. A. Denton	2430	N
12	LOWER NECK FORCE	Z	139	Load cell, six axis neck	R. A. Denton	2430	N
13	LOWER NECK MOMENT	X	139	Load cell, six axis neck	R. A. Denton	2430	Nm
14	LOWER NECK MOMENT	Y	139	Load cell, six axis neck	R. A. Denton	2430	Nm
15	LOWER NECK MOMENT	Z	139	Load cell, six axis neck	R. A. Denton	2430	Nm

APPENDIX D

PRE-TEST AND POST-TEST HYBRID III CONFIGURATION AND PERFORMANCE VERIFICATION DATA

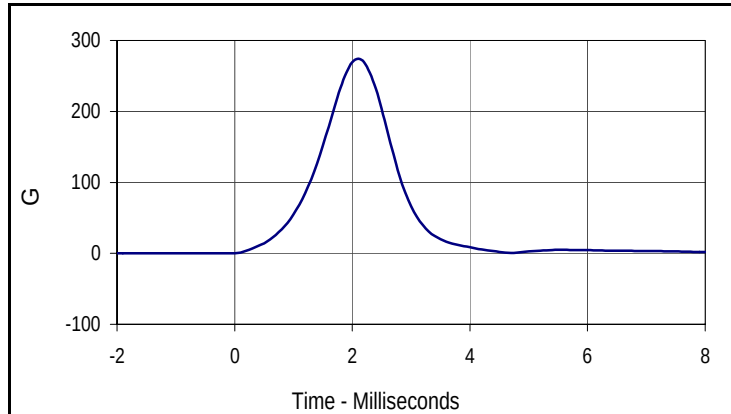
APPENDIX D
PRE-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: Hybrid III 6 Yr Old Head Drop Test
 ATD Serial No.: 186

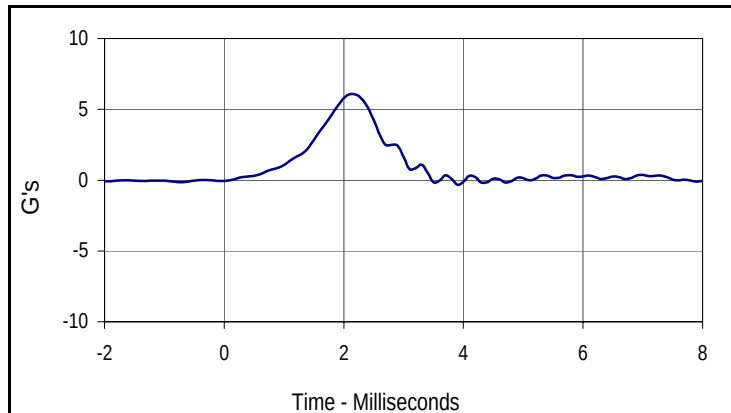
Test Date: 4/17/13
 Test I.D.: 186HD026



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Peak Resultant Acceleration	G's	245.0 to 300.0	274.5	Pass
Peak Lateral Acceleration	G's	≤15.0	6.1	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
Max	Time	Min	Time
274.5	2.1	0.0	-1.6



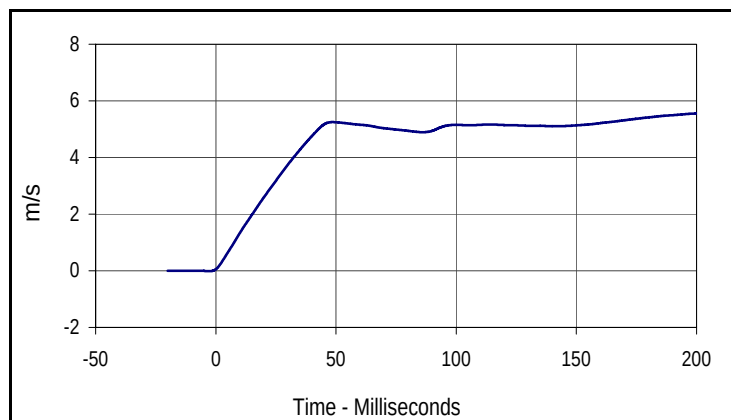
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
6.1	2.1	-0.3	3.9

Test Program: Hybrid III 6 Yr Old Neck Flexion Test
 ATD Serial No.: 186

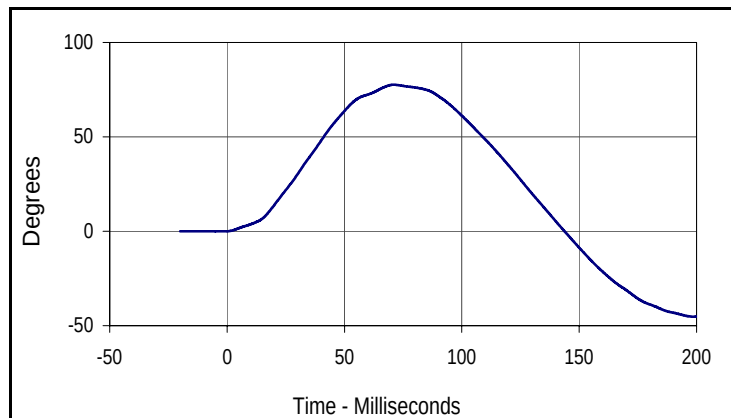
Test Date: 4/17/13
 Test I.D.: 186NF026



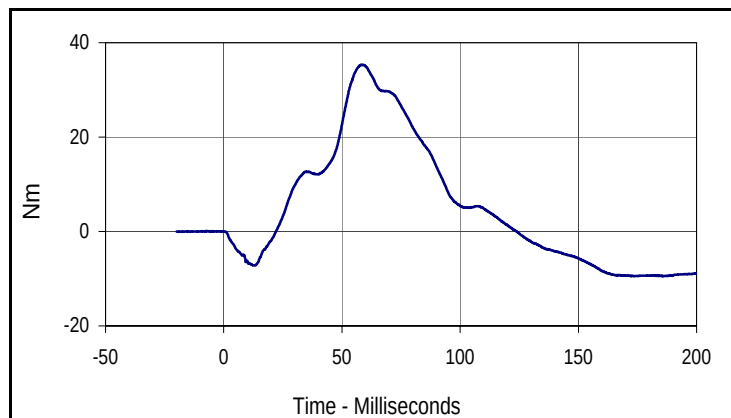
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	4.83 to 5.07	5.03	Pass
Pendulum Deceleration	10 Msec.	m/s	1.2 to 1.6	1.3	Pass
	20 Msec.	m/s	2.4 to 3.4	2.6	Pass
	30 Msec.	m/s	3.8 to 5.0	3.8	Pass
"D" Plane Rotation	Max	Degrees	74.0 to 92.0	77.6	Pass
Peak Moment in Rotation	Max	Nm	27.0 to 33.0	32.4	Pass
Positive Moment Decay, Time To 5 Nm		Msec.	103.0 to 123.0	109.8	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
5.6	200.0	0.0	-2.7



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
77.6	71.0	-45.3	200.0



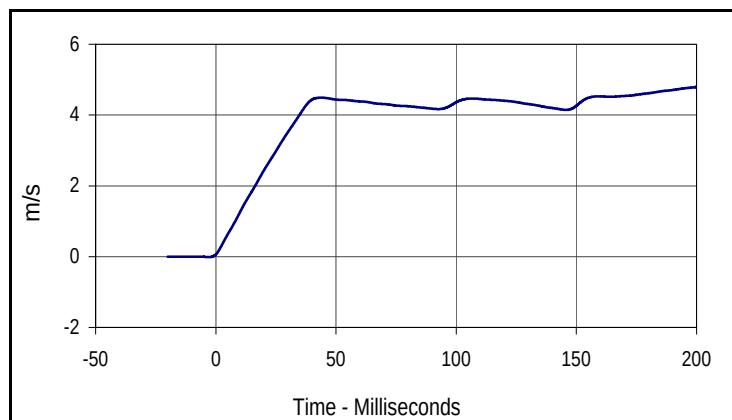
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
35.3	58.1	-9.5	185.8

Test Program: Hybrid III 6 Yr Old Neck Extension Test
 ATD Serial No.: 186

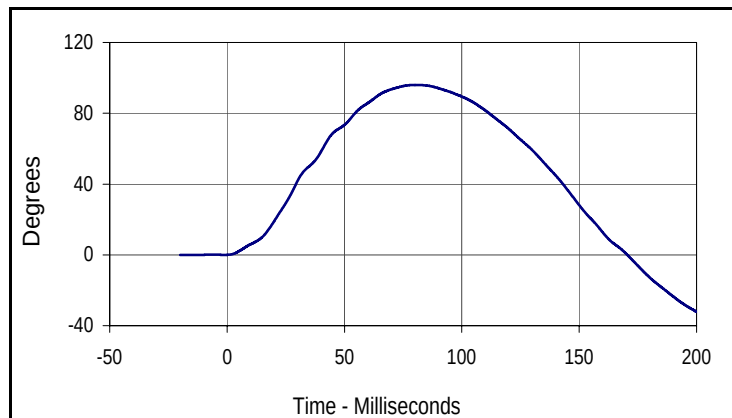
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 Test I.D.: 186NE026



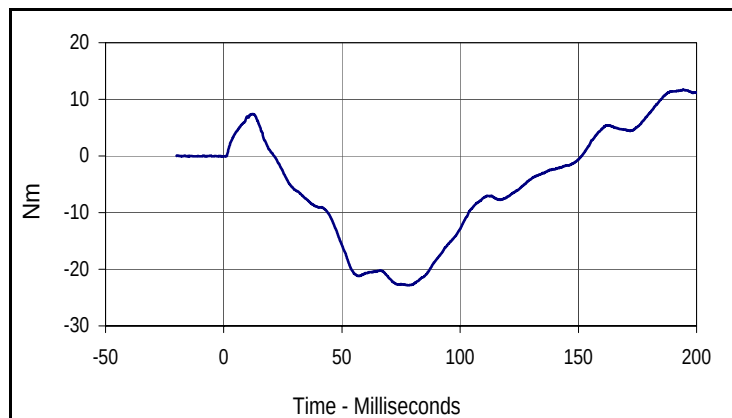
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	4.18 to 4.42	4.31	Pass
Pendulum Deceleration	10 Msec.	m/s	1.0 to 1.4	1.2	Pass
	20 Msec.	m/s	2.2 to 3.0	2.4	Pass
	30 Msec.	m/s	3.2 to 4.2	3.5	Pass
"D" Plane Rotation	Max	Degrees	85.0 to 103.0	96.0	Pass
Peak Moment in Rotation	Max	Nm	-24.0 to -19.0	-22.8	Pass
Positive Moment Decay, Time To -5 Nm		Msec.	123.0 to 147.0	127.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
4.8	200.0	0.0	-2.8



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
96.0	80.6	-32.2	200.0



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
11.7	194.4	-22.8	78.2

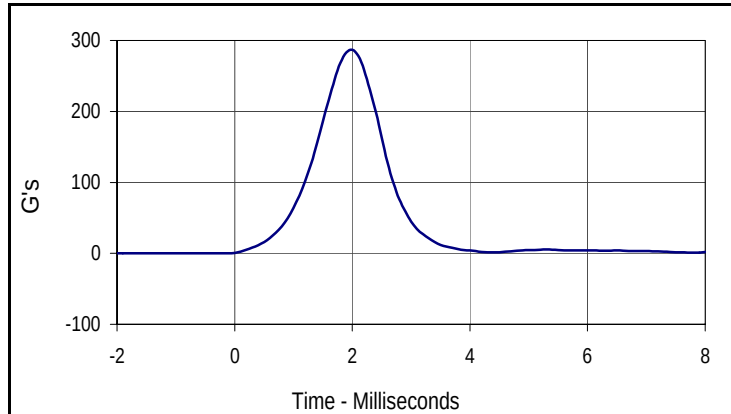
APPENDIX D
POST-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: Hybrid III 6 Yr Old Head Drop Test
 ATD Serial No.: 186

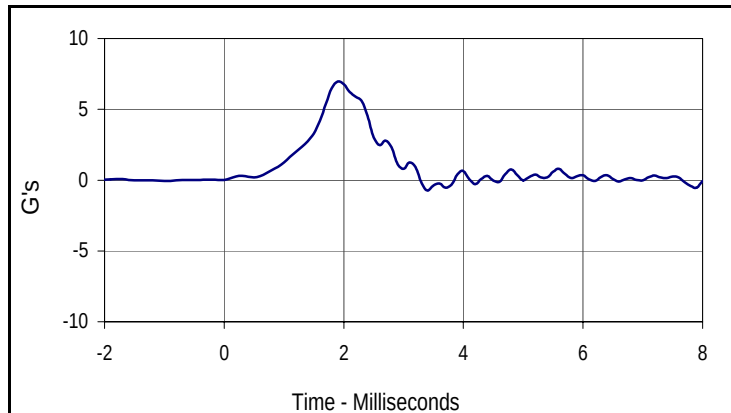
Test Date: 4/26/13
 Test I.D.: 186HD027



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Peak Resultant Acceleration	G's	245.0 to 300.0	286.9	Pass
Peak Lateral Acceleration	G's	≤15.0	7.0	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
286.9	2.0	0.0	-1.5



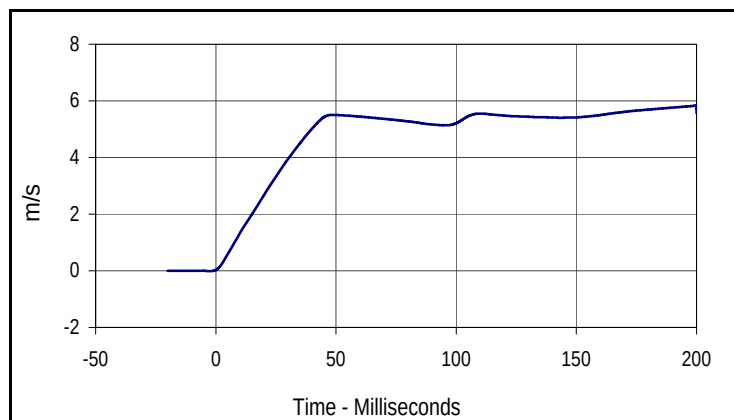
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
7.0	1.9	-0.7	3.4

Test Program: Hybrid III 6 Yr Old Neck Flexion Test
 ATD Serial No.: 186

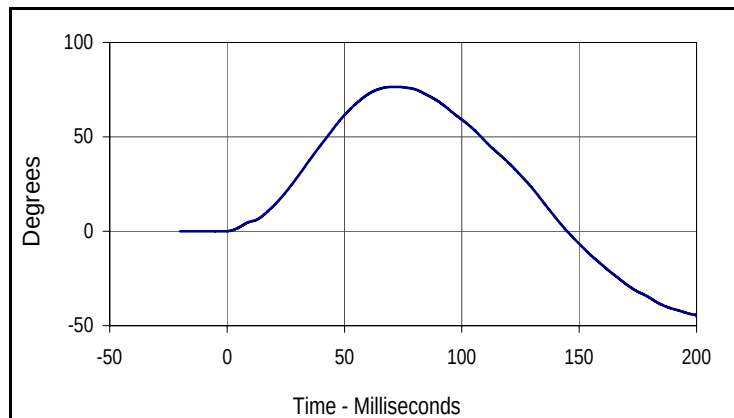
Test Date: 4/26/13
 Test I.D.: 186NF027



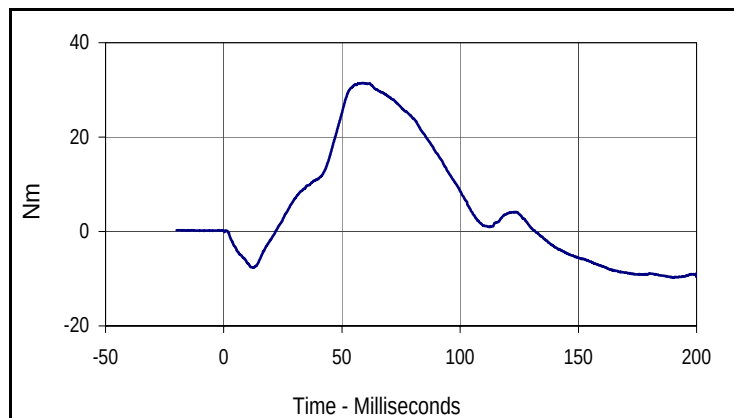
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	4.83 to 5.07	5.03	Pass
Pendulum Deceleration	10 Msec.	m/s	1.2 to 1.6	1.3	Pass
	20 Msec.	m/s	2.4 to 3.4	2.7	Pass
	30 Msec.	m/s	3.8 to 5.0	3.9	Pass
"D" Plane Rotation	Max	Degrees	74.0 to 92.0	76.5	Pass
Peak Moment in Rotation	Max	Nm	27.0 to 33.0	31.1	Pass
Positive Moment Decay, Time To 5 Nm		Msec.	103.0 to 123.0	104.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
5.8	199.9	0.0	-2.3



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
76.5	71.9	-45.3	200.0



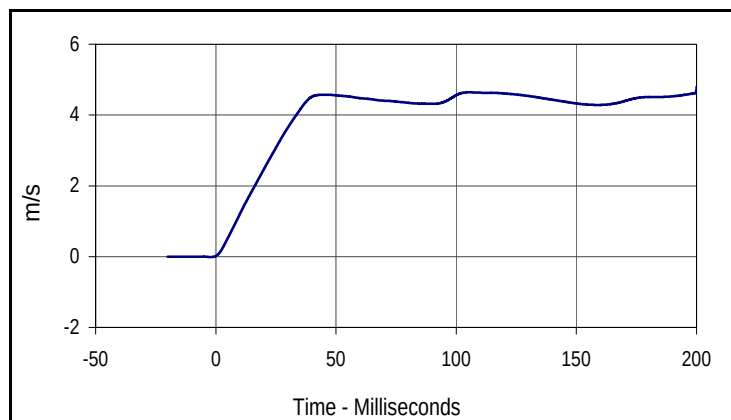
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
31.4	58.7	-9.7	190.2

Test Program: Hybrid III 6 Yr Old Neck Extension Test
 ATD Serial No.: 186

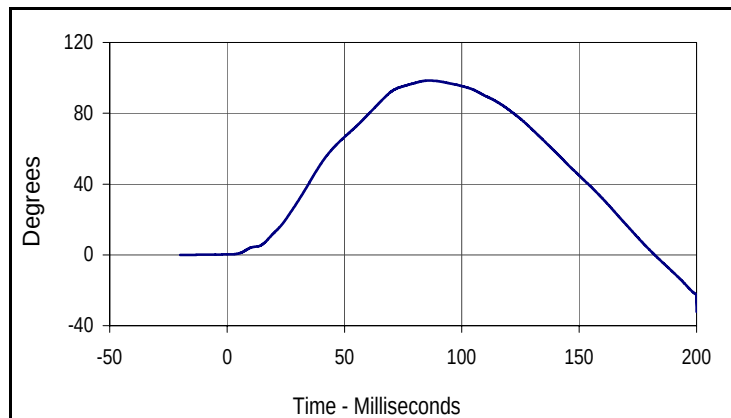
Test Date: 4/26/13
 Test I.D.: 186NE027



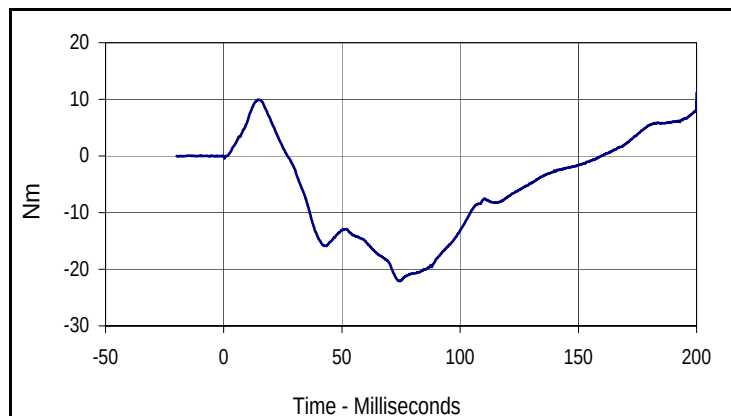
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Pendulum Velocity		m/s	4.18 to 4.42	4.41	Pass
Pendulum Deceleration	10 Msec.	m/s	1.0 to 1.4	1.2	Pass
	20 Msec.	m/s	2.2 to 3.0	2.5	Pass
	30 Msec.	m/s	3.2 to 4.2	3.6	Pass
"D" Plane Rotation	Max	Degrees	85.0 to 103.0	98.5	Pass
Peak Moment in Rotation	Max	Nm	-24.0 to -19.0	-22.1	Pass
Positive Moment Decay, Time To -5 Nm		Msec.	123.0 to 147.0	127.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
4.8	200.0	0.0	-2.0



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
98.5	86.0	-32.2	200.0



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
11.2	200.0	-22.1	74.5