REPORT NUMBER: TR-P35007-02-NC

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

CHRYSLER GROUP LLC
2015 DODGE CHALLENGER SXT
2-DOOR COUPE

NHTSA NUMBER: M20150302TWG2

PREPARED BY:
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MARCH 30, 2015

FINAL REPORT

PREPARED FOR:
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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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Date of Acceptance

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SECTION 1
PURPOSE AND SUMMARY OF TEST

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 (OOP) side airbag test was conducted in accordance with the Technical Working Group Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags.

SUMMARY

The effects of a roof mounted curtain airbag and a seat mounted torso/pelvis airbag deployment in a 2015 Dodge Challenger SXT 2-Door Coupe with an out-of-position 6-year old dummy were evaluated. The test was performed at KARCO Engineering, LLC. on March 18, 2015. Pre- and post-test photographs of the vehicle and dummy can be found in Appendix A.

Three (3) high-speed digital cameras and one (1) real time camera were used to document the deployment of the airbags. 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 forward according to the dummy placement instructions (3.3.3.5) 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 dummy response data traces. Appendix C contains the instrumentation data channel assignments. Appendix D contains ATD calibration sheets.

Orientation of the 6-year old dummy was with the dummy facing forward. The seat is set full rearward and full down. The dummy is placed on the outboard edge of the foam block with the upper spine aligning with the deployment trajectory of the airbag. The dummy's head is placed between the seat bolster and pillar or side trim and the legs crossing the heel points. The pelvis is slid forward for spine alignment and outboard to contact the door panel. The outboard arm is placed on the armrest. This orientation complies with section 3.3.3.5 of the Technical Working Group (TWG) recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags.

The passenger side door remained closed during the test, and was operable after the airbag deployed.

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

The occupant data is summarized below:

Measurement Description	Passenger ATD (SID-IIs)	
	IARV	Result
Head Injury Criteria (HIC15)	723	1.8
T^1		7.9
T^2		22.9
Avg G		6.7
Upper Neck		
Nij	1	0.36
Intercepts		
F_T (N)	2800	231.1
F_C (N)	2800	-9.2
M_F (Nm)	93	12.4
M_E (Nm)	37	-11.1
Tension (N)	1490	246.1
Compression (N)	1820	-151.8
Ntf		0.10
Nte		0.36
Ncf		0.12
Nce		0.34

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2015 Dodge Challenger SXT 2-Door Coupe NHTSA No.: M20150302TWG2

Test Program: TWG 3.3.3.5 Test Date: 03/18/15

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	^oF	^oC	=(Tf -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: 2015 Dodge Challenger SXT 2-Door Coupe NHTSA No.: M20150302TWG2

Test Program: TWG 3.3.3.5 Test Date: 03/18/15

TEST DUMMY INFORMATION

Description	Passenger Seat
Dummy Type / Serial No.	6-Year Old / 186
Head Contact	Curtain Airbag
Chest Contact	No
Abdomen Contact	Torso/Pelvis Airbag
Pelvis Contact	Torso/Pelvis Airbag
Left Knee Contact	No
Right Knee Contact	No

VIDEO COVERAGE

Description	Quantity
High Speed Digital	3
Real Time	1
Total	4

DATA CHANNELS

Description	Quantity
SID-IIs	15
Belt Assessment Sensors	0
Vehicle Structure Accelerometers	0
Total	15

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Dodge Challenger SXT 2-Door Coupe NHTSA No.: M20150302TWG2

Test Program: TWG 3.3.3.5 Test Date: 03/18/15

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20150302TWG2
Model Year	2015
Make	Dodge
Model	Challenger SXT
Body Style	2-Door Coupe
VIN	2C3CDZAG6FH704472
Body Color	Billet Silver Metallic
Odometer Reading (km / mi)	129 / 80
Engine Displacement (L)	3.6
Type / No. of Cylinders	V6
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	Rear
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	No
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensione	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	Yes

Does Owner's Manual provide instructions to turn off automatic door locks? No

DATA FROM CERTIFICATION LABEL

Manufactured By	Chrysler Group LLC
Date of Manufacture	Aug-14
Vehicle Type	Passenger Car

GVWR (kg)	2246
GAWR Front (kg)	1275
GAWR Rear (kg)	1275

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity	2	3		5
Capacity Weight (VCW) (kg)				392.0

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/ Lever	w/ Knob
Front Seat	Yes					Yes	
Rear or Second Row Seat		Yes			Yes		
Third Row Seat							

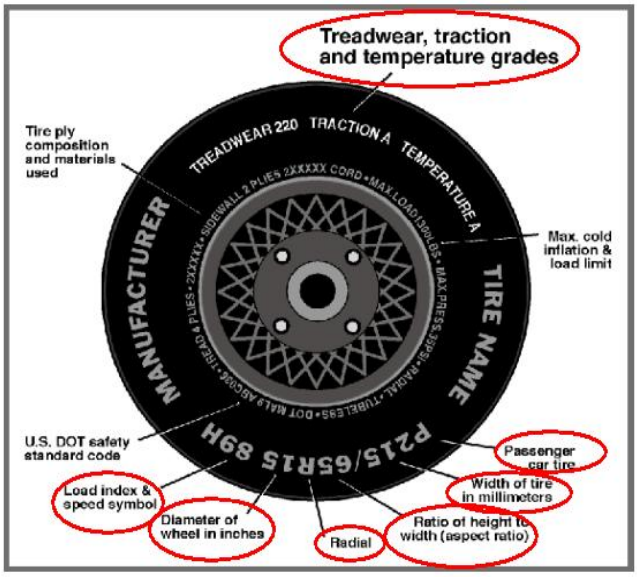
*Vehicle underwent New Car Assessment Program Side Impact Testing on November 18, 2014.

DATA SHEET NO. 2 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Dodge Challenger SXT 2-Door Coupe NHTSA No.: M20150302TWG2

Test Program: TWG 3.3.3.5 Test Date: 03/18/15



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	350	350
Cold Pressure (kPa)	220	220
Recommended Tire Size	P235/55R18	P235/55R18
Tire Size on Vehicle	P235/55R18	P235/55R18
Tire Manufacturer	Michelin	Michelin
Tire Model	Primacy MXM4	Primacy MXM4
Treadware	500	500
Traction Grade	AA	AA
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 1 Polyamide, 2 Steel	2 Polyester, 1 Polyamide, 2 Steel
Load Index/Speed Symbol	100V	100V
Tire Material	Polyester, Polyamide, Steel	Polyester, Polyamide, Steel
DOT Safety Code Left	B93J 0J4X 2914	B93J 0J4X 3014
DOT Safety Code Right	B93J 0J4X 3014	B93J 0J4X 3014

DATA SHEET NO. 3

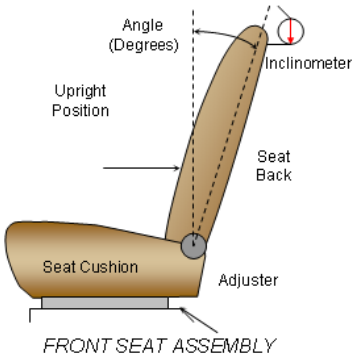
SEAT ADJUSTMENTS

Test Vehicle: 2015 Dodge Challenger SXT 2-Door Coupe NHTSA No.: M20150302TWG2

Test Program: TWG 3.3.3.5 Test Date: 03/18/15

SEAT BACK ANGLE

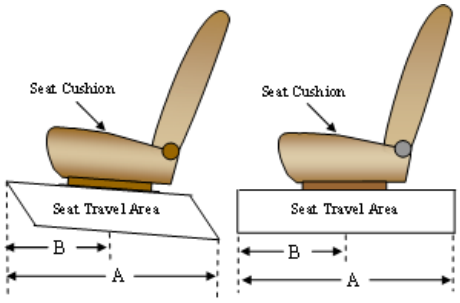
The passenger seat back is positioned per section 3.3.3.5 of the TWG recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags. Seat back angle is measured at the headrest post.



Seating Position	Degrees	Detent
Passenger Seat	14.9	7

SEAT FORE / AFT POSITIONING

The passenger seat track travel is set per section 3.3.3.5 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 zero (0)



Seating Position	Total Fore-Aft Travel		Placed in Position	
	mm	Detents	mm	Detents
Passenger Seat	210	22 (0-21)	210	21

SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the uppermost position. Position “H” is the uppermost position, followed by position “M1”. Position “L” is the lowermost position.

Seating Position	Total No. of Positions	Placed in Position
Passenger Seat	Fixed	Fixed

*

DATA SHEET NO. 4

DUMMY POSITIONING AND AIRBAG DIMENSIONS

Test Vehicle: 2015 Dodge Challenger SXT 2-Door Coupe NHTSA No.: M20150302TWG2

Test Program: TWG 3.3.3.5 Test Date: 03/18/15

DUMMY POSITIONING

Code	Measurement Description	Passenger	
		Length (mm)	Angle (°)
SA	Seat Back Angle		14.9
AN	Top of Airbag Module to Head/Neck Junction	92	90.0
HD	Head CG to Door Panel/ Window	85	0.0
HSC	Head to Seat Back Centerline	256	0.0
HB	Head to B-Pillar (first contact)	170	0.0
HZ	Head to Roof (Z)	202	90.0
HHD	Head to Header (measured from back of head)	579	21.9
ND	Nose to Dash (measured from back of head)	891	17.9
NS	Nose to Seat Back	213	0.0
NR	Nose to Header (measured from back of head)	579	21.9
CD	Chest to Dash (measured from back)	602	2.4
CS	Chest to Seat Back	237	0.0
RACL	Right Arm to Seat Back Centerline	359	0.0
LACL	Left Arm to Seat Back Centerline	115	0.0
RA	Right Arm to Door Panel	12	0.0
LA	Left Arm to Door Panel	274	0.0
KK	Knee to Knee	107	0.0
TT	Toe to Toe	136	0.0
KSCR	Right Knee to Seat Cushion Centerline	108	0.0
KSCL	Left Knee to Seat Cushion Centerline	5	0.0
	Head Level (X Direction)		15.9
	Head Level (Y Direction)		0.9

AIRBAG DIMENSIONS

Code	Measurement Description	Airbag
		Length (mm)
AMW	Curtain Airbag Module Diameter	40
AML	Curtain Airbag Module Length	260
ABW	Curtain Airbag Width	1800
ABL	Curtain Airbag Length	480
AMW	Torso/Pelvis Airbag Module Diameter	30
AML	Torso/Pelvis Airbag Module Length	223
ABW	Torso/Pelvis Airbag Width	235
ABL	Torso/Pelvis Airbag Length	600

DATA SHEET NO. 5

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2015 Dodge Challenger SXT 2-Door Coupe NHTSA No.: M20150302TWG2

Test Program: TWG 3.3.3.5 Test Date: 03/18/15

HEAD PEAK ACCELERATIONS

Location	Axis	Units	Pass. 6 YO			
			Max	Time	Min	Time
Head CG	X	G's	9.1	14.0	-7.7	12.4
Head CG	Y	G's	15.1	12.4	-3.8	13.1
Head CG	Z	G's	17.3	12.8	-5.5	7.2
Head CG Resultant	N/A	G's	22.4	12.4		

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Pass. 6 YO			
			Max	Time	Min	Time
Neck Force	X	Newtons	231.1	15.8	-9.2	94.7
Neck Force	Y	Newtons	77.0	5.6	-123.0	12.9
Neck Force	Z	Newtons	246.1	28.7	-151.8	7.6
Neck Force Resultant	N/A	Newtons	263.8	12.9		
Neck Moment	X	Nm	7.5	13.0	-5.0	34.1
Neck Moment	Y	Nm	12.4	13.2	-11.1	49.2
Neck Moment	Z	Nm	2.0	14.6	-3.9	115.0
Neck Moment Resultant	N/A	Nm	14.6	13.1		

LOWER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Pass. 6 YO			
			Max	Time	Min	Time
Neck Force	X	Newtons	131.5	4.3	-184.0	8.3
Neck Force	Y	Newtons	108.5	8.5	-166.1	4.9
Neck Force	Z	Newtons	154.8	29.9	-202.1	7.0
Neck Force Resultant	N/A	Newtons	261.7	8.4		
Neck Moment	X	Nm	9.2	4.9	-14.1	28.8
Neck Moment	Y	Nm	2.3	6.9	-25.3	18.7
Neck Moment	Z	Nm	15.5	4.9	-5.8	17.3
Neck Moment Resultant	N/A	Nm	27.5	18.6		

HEAD INJURY CRITERIA (HIC 15)

Location	Pass. 6 YO			
	HIC15	T^1	T^2	Avg G
Head CG	1.8	7.9	22.9	6.7

UPPER NECK NIJ VALUES

Location	Pass. 6 YO			
	Ntf	Nte	Ncf	Nce
Upper Neck	0.10	0.36	0.12	0.34

DATA SHEET NO. 6

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2015 Dodge Challenger SXT 2-Door Coupe NHTSA No.: M20150302TWG2

Test Program: TWG 3.3.3.5 Test Date: 03/18/15

CAMERA LOCATIONS

No.	Camera View	Location (mm)			Angle (Deg.)	Lens (mm)	Speed (fps)
		X	Y	Z			
1	High Speed Side View	211	-3700	-953	0.0	35	1000
2	High Speed 3/4 View	2520	-1675	-1695	14.2	35	1000
3	High Speed Front View	2515	-320	-1583	13.6	50	1000
4	Real Time	211	-3700	-1089	0.0		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 Left Front ¾ View of NCAP Side MDB Impact Test

FIGURE 4. Post-Test Left Side View of NCAP Side MDB Impact Test

FIGURE 5. Post-Test Left Rear ¾ View of NCAP Side MDB Impact Test

FIGURE 6. Post-Test Right Side View of NCAP Side MDB 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. Pre-Test Dummy Position, Close-Up Front View

FIGURE 14. Post-Test Dummy Position, Close-Up Front View

FIGURE 15. Pre-Test Dummy Position, Close-Up Rear View

FIGURE 16. Post-Test Dummy Position, Close-Up Rear View

FIGURE 17. Post-Test Airbags, Left Side View

FIGURE 18. Post-Test Airbags, Left Front ¾ View

APPENDIX B
DUMMY RESPONSE DATA TRACES

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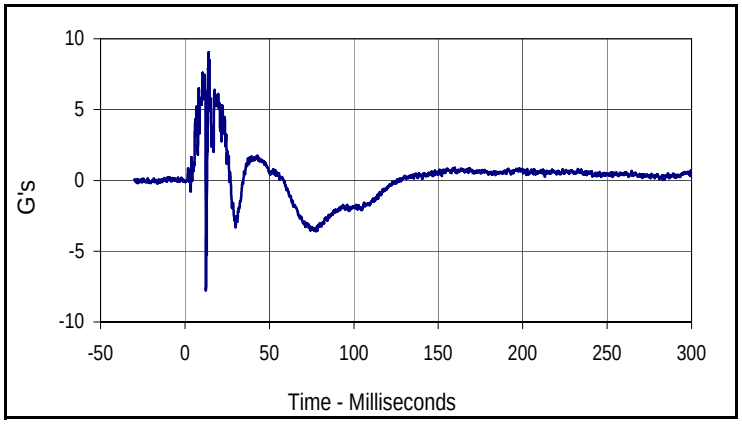
Test Vehicle: 2015 Dodge Challenger SXT 2-Door Coupe

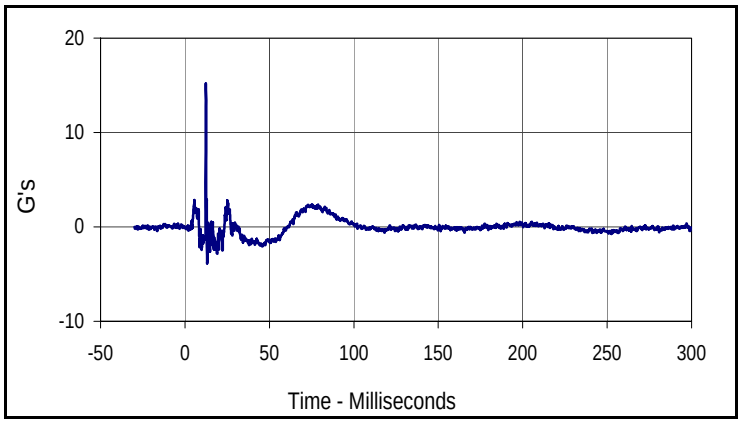
Test Program: TWG 3.3.3.5

Test Date: 3/18/15

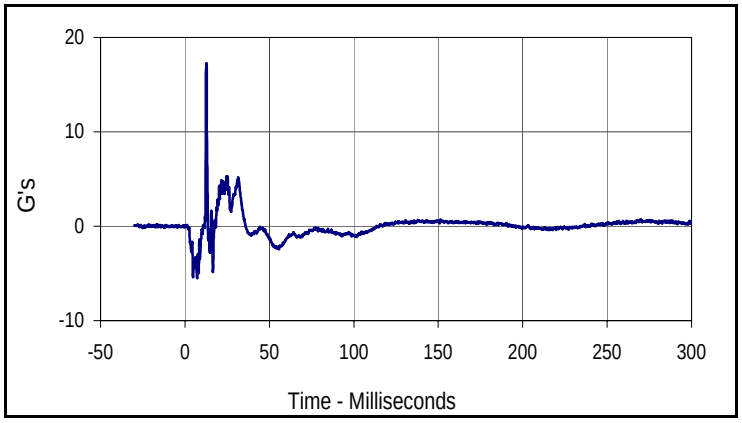
NHTSA No.: M20150302TWG2



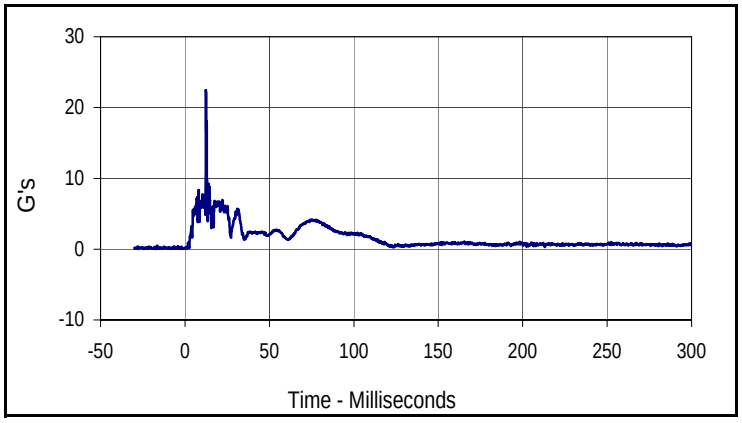
Curve Description			
6 Yr. Old Head X			
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
9.1	14.0	-7.7	12.4



Curve Description			
6 Yr. Old Head Y			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
15.1	12.4	-3.8	13.1

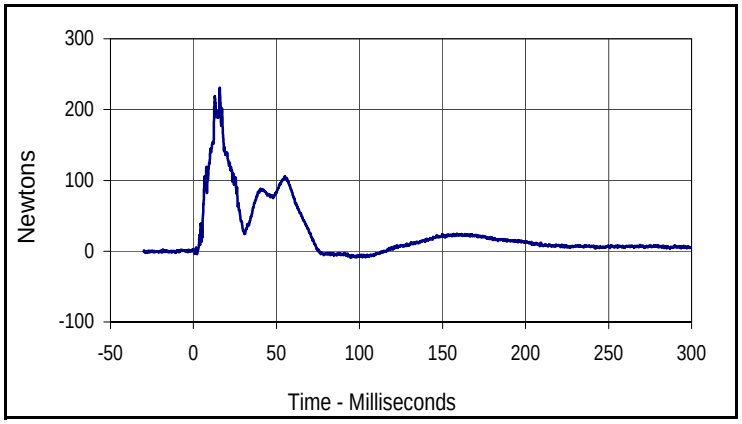


Curve Description			
6 Yr. Old Head Z			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
17.3	12.8	-5.5	7.2

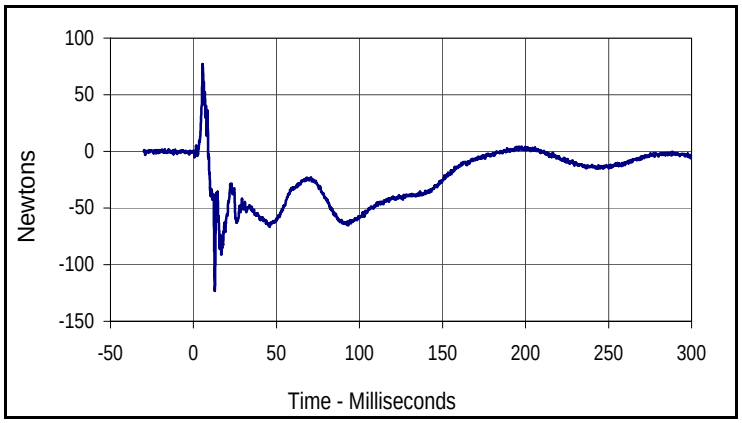


Curve Description			
6 Yr. Old Head Resultant			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
22.4	12.4	0.1	1.4

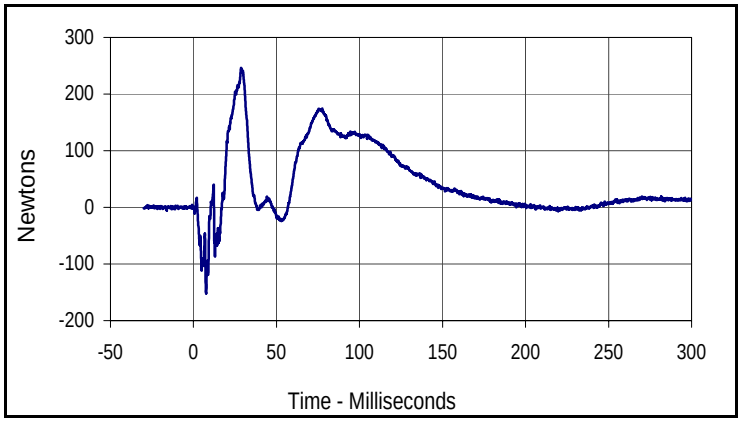
Test Vehicle:	2015 Dodge Challenger SXT 2-Door Coupe	Test Date:	3/18/15
Test Program:	TWG 3.3.3.5	NHTSA No.:	M20150302TWG2



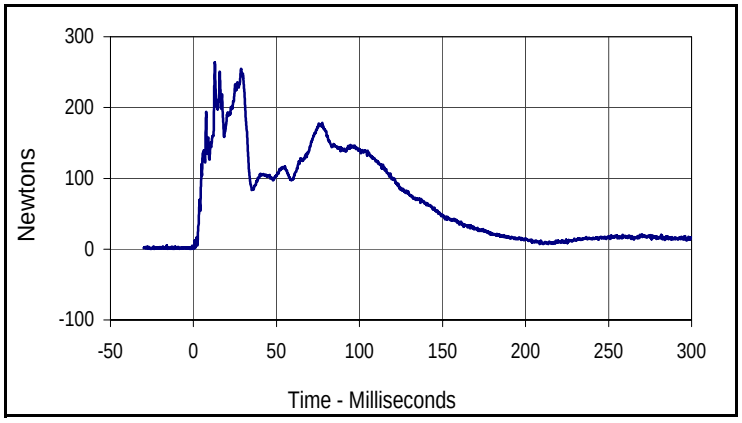
Curve Description			
6 Yr. Old Upper Neck Force X			
Plot No.	Type	SAE Class	Units
005	FIL	1000	Newtons
Max	Time	Min	Time
231.1	15.8	-9.2	94.7



Curve Description			
6 Yr. Old Upper Neck Force Y			
Plot No.	Type	SAE Class	Units
006	FIL	1000	Newtons
Max	Time	Min	Time
77.0	5.6	-123.0	12.9



Curve Description			
6 Yr. Old Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
007	FIL	1000	Newtons
Max	Time	Min	Time
246.1	28.7	-151.8	7.6



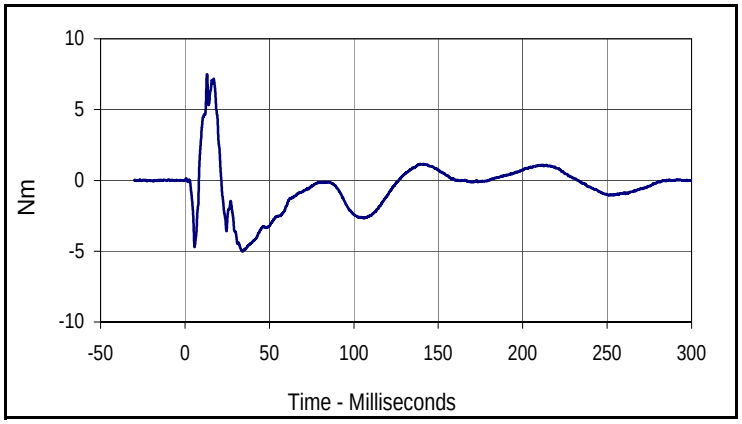
Curve Description			
6 Yr. Old Upper Neck Force Resultant			
Plot No.	Type	SAE Class	Units
008	RES	1000	Newtons
Max	Time	Min	Time
263.8	12.9	0.5	0.2

Test Vehicle: 2015 Dodge Challenger SXT 2-Door Coupe

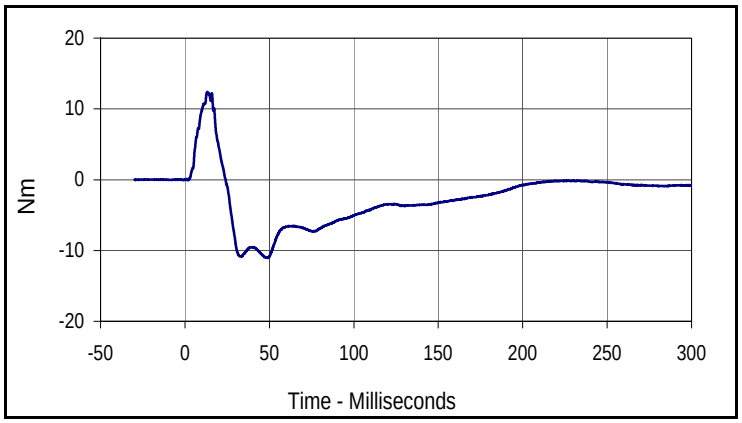
Test Program: TWG 3.3.3.5

Test Date: 3/18/15

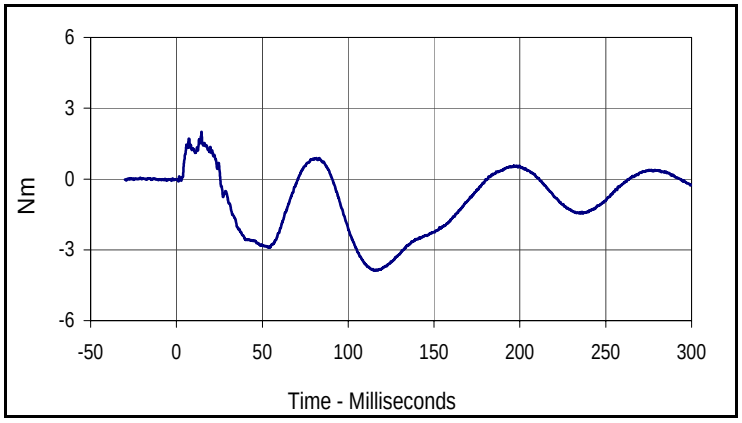
NHTSA No.: M20150302TWG2



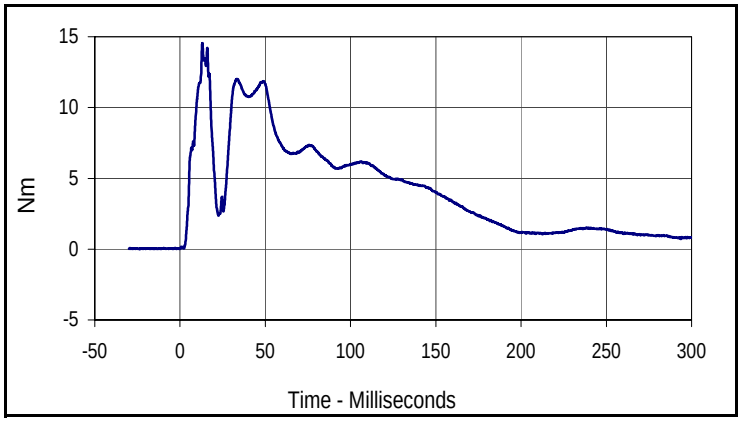
Curve Description			
6 Yr. Old Upper Neck Moment X			
Plot No.	Type	SAE Class	Units
009	FIL	600	Nm
Max	Time	Min	Time
7.5	13.0	-5.0	34.1



Curve Description			
6 Yr. Old Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
010	FIL	600	Nm
Max	Time	Min	Time
12.4	13.2	-11.1	49.2



Curve Description			
6 Yr. Old Upper Neck Moment Z			
Plot No.	Type	SAE Class	Units
011	FIL	600	Nm
Max	Time	Min	Time
2.0	14.6	-3.9	115.0



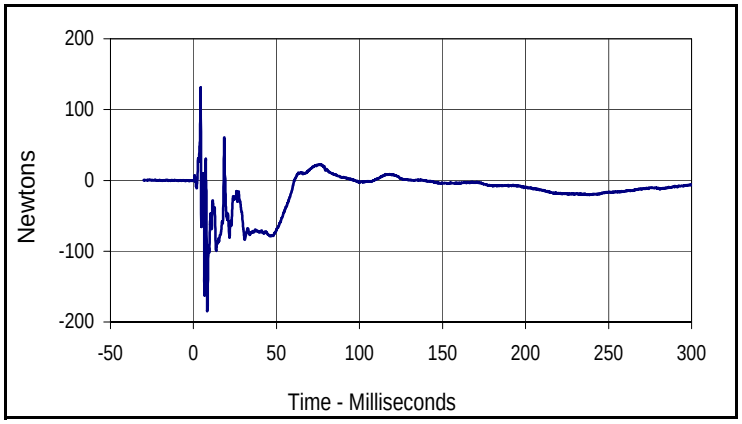
Curve Description			
6 Yr. Old Upper Neck Moment Resultant			
Plot No.	Type	SAE Class	Units
012	RES	600	Nm
Max	Time	Min	Time
14.6	13.1	0.0	0.2

Test Vehicle: 2015 Dodge Challenger SXT 2-Door Coupe

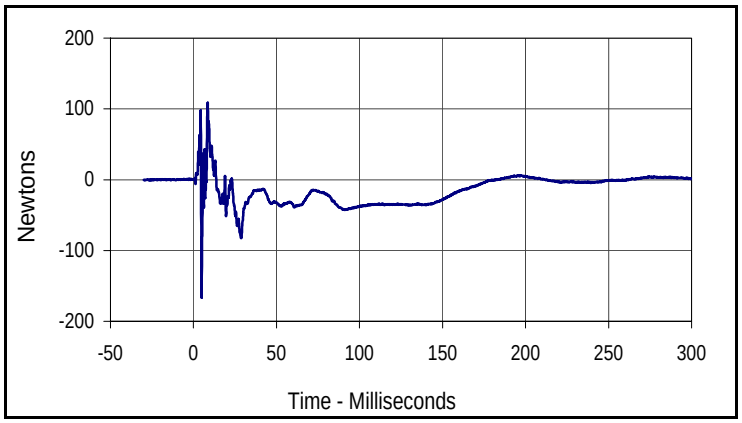
Test Program: TWG 3.3.3.5

Test Date: 3/18/15

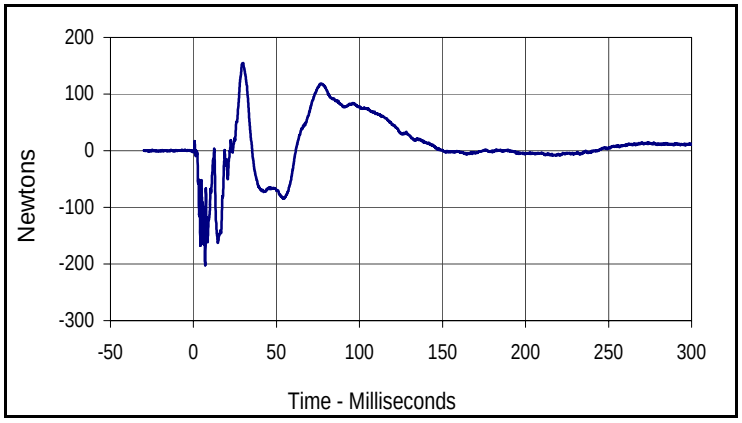
NHTSA No.: M20150302TWG2



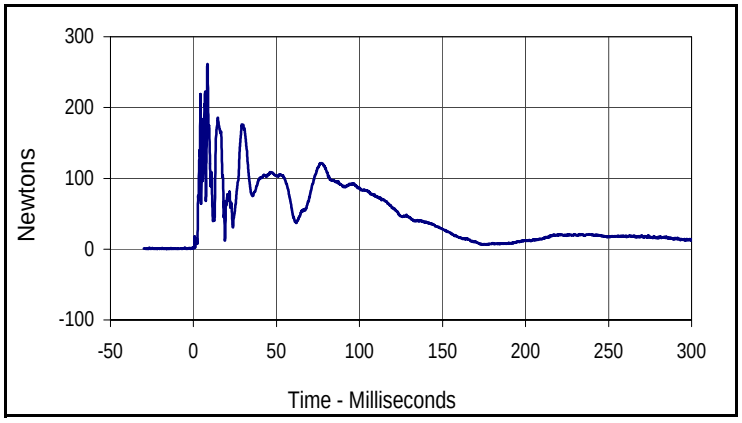
Curve Description			
6 Yr. Old Lower Neck Force X			
Plot No.	Type	SAE Class	Units
013	FIL	1000	Newtons
Max	Time	Min	Time
131.5	4.3	-184.0	8.3



Curve Description			
6 Yr. Old Lower Neck Force Y			
Plot No.	Type	SAE Class	Units
014	FIL	1000	Newtons
Max	Time	Min	Time
108.5	8.5	-166.1	4.9



Curve Description			
6 Yr. Old Lower Neck Force Z			
Plot No.	Type	SAE Class	Units
015	FIL	1000	Newtons
Max	Time	Min	Time
154.8	29.9	-202.1	7.0



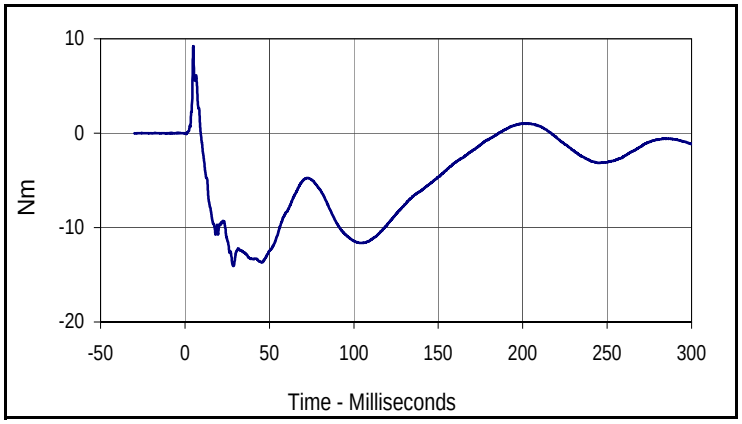
Curve Description			
6 Yr. Old Lower Neck Force Resultant			
Plot No.	Type	SAE Class	Units
016	RES	1000	Newtons
Max	Time	Min	Time
261.7	8.4	1.5	0.4

Test Vehicle: 2015 Dodge Challenger SXT 2-Door Coupe

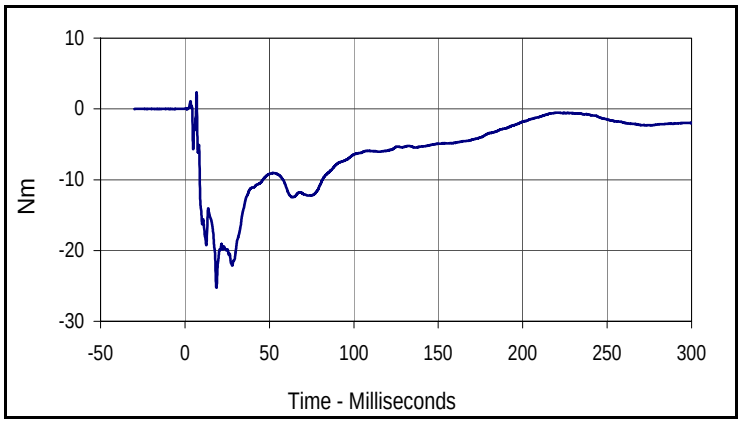
Test Program: TWG 3.3.3.5

Test Date: 3/18/15

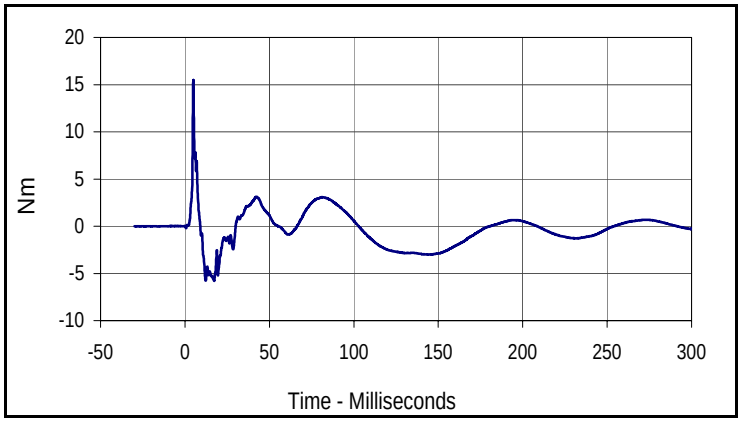
NHTSA No.: M20150302TWG2



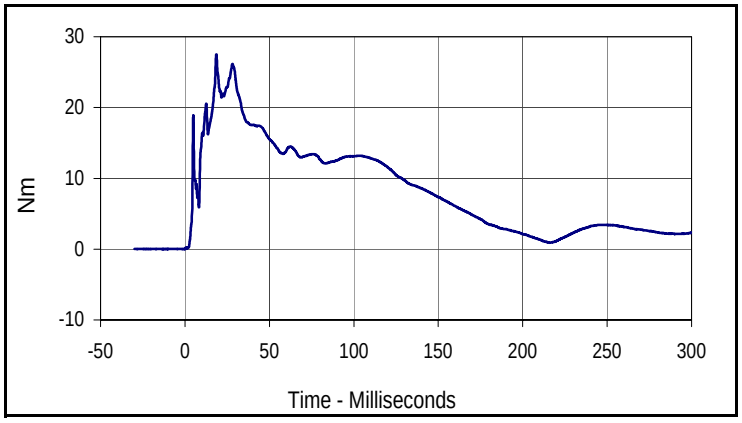
Curve Description			
6 Yr. Old Lower Neck Moment X			
Plot No.	Type	SAE Class	Units
017	FIL	600	Nm
Max	Time	Min	Time
9.2	4.9	-14.1	28.8



Curve Description			
6 Yr. Old Lower Neck Moment Y			
Plot No.	Type	SAE Class	Units
018	FIL	600	Nm
Max	Time	Min	Time
2.3	6.9	-25.3	18.7



Curve Description			
6 Yr. Old Lower Neck Moment Z			
Plot No.	Type	SAE Class	Units
019	FIL	600	Nm
Max	Time	Min	Time
15.5	4.9	-5.8	17.3



Curve Description			
6 Yr. Old Lower Neck Moment Resultant			
Plot No.	Type	SAE Class	Units
020	RES	600	Nm
Max	Time	Min	Time
27.5	18.6	0.0	0.2

APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

TWG 3.3.3.5
Instrumentation Data Channel Assignments
A.T.D. Serial Number 186
3/18/15
2015 Dodge Challenger SXT 2-Door Coupe

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	2185	Load cell, six axis neck	R. A. Denton	1716A	N
5	UPPER NECK FORCE	Y	2185	Load cell, six axis neck	R. A. Denton	1716A	N
6	UPPER NECK FORCE	Z	2185	Load cell, six axis neck	R. A. Denton	1716A	N
7	UPPER NECK MOMENT	X	2185	Load cell, six axis neck	R. A. Denton	1716A	Nm
8	UPPER NECK MOMENT	Y	2185	Load cell, six axis neck	R. A. Denton	1716A	Nm
9	UPPER NECK MOMENT	Z	2185	Load cell, six axis neck	R. A. Denton	1716A	Nm
10	LOWER NECK FORCE	X	180	Load cell, six axis neck	R. A. Denton	2430	N
11	LOWER NECK FORCE	Y	180	Load cell, six axis neck	R. A. Denton	2430	N
12	LOWER NECK FORCE	Z	180	Load cell, six axis neck	R. A. Denton	2430	N
13	LOWER NECK MOMENT	X	180	Load cell, six axis neck	R. A. Denton	2430	Nm
14	LOWER NECK MOMENT	Y	180	Load cell, six axis neck	R. A. Denton	2430	Nm
15	LOWER NECK MOMENT	Z	180	Load cell, six axis neck	R. A. Denton	2430	Nm

APPENDIX D

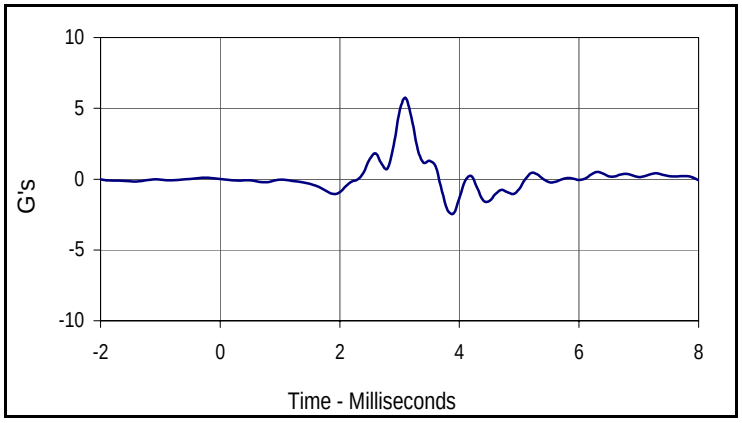
PRE-TEST AND POST-TEST HYBRID III CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

Test Program:	Hybrid III 6 Yr Old Head Drop Test	Test Date:	3/13/15
ATD Serial No.:	186	Test I.D.:	186HD032

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Peak Resultant Acceleration	G's	245.0 to 300.0	272.8	Pass
Peak Lateral Acceleration	G's	≤15.0	5.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass

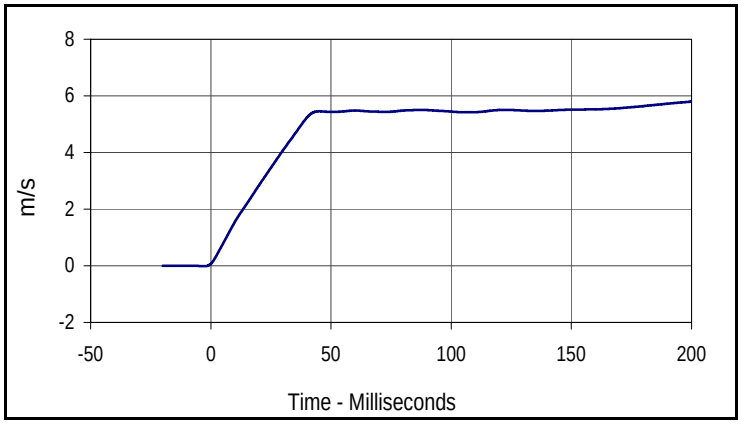
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
272.8	2.1	0.0	-1.0



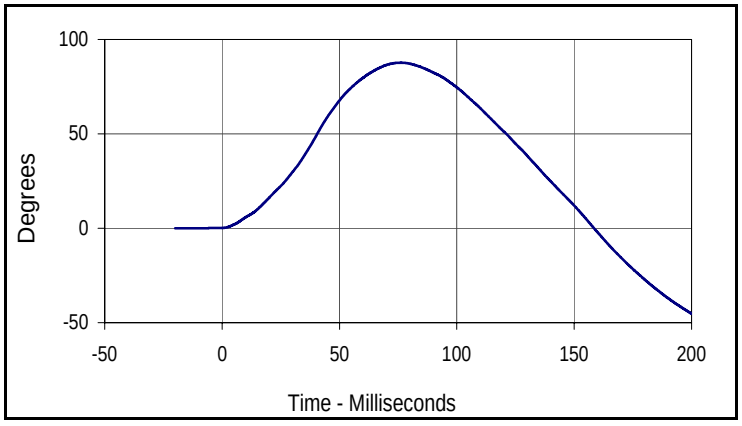
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.8	3.1	-2.4	3.9

Test Program:	Hybrid III 6 Yr Old Neck Flexion Test	Test Date:	3/13/15
ATD Serial No.:	186	Test I.D.:	186NF032

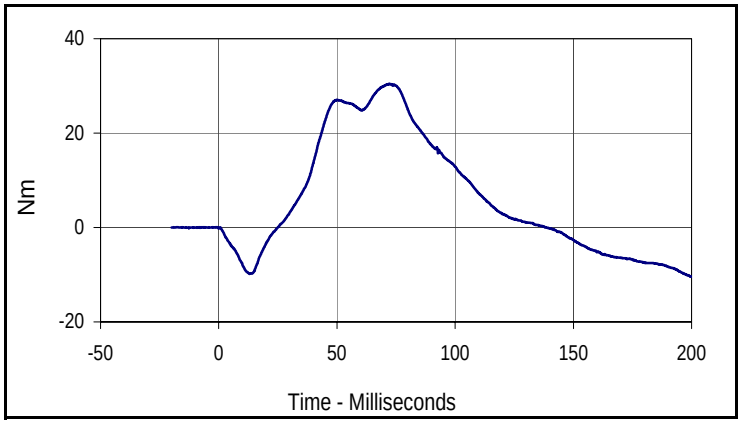
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	33	Pass
Pendulum Velocity		m/s	4.83 to 5.07	4.84	Pass
Pendulum Deceleration	10 Msec.	m/s	1.2 to 1.6	1.5	Pass
	20 Msec.	m/s	2.4 to 3.4	2.8	Pass
	30 Msec.	m/s	3.8 to 5.0	4.1	Pass
"D" Plane Rotation	Max	Degrees	74.0 to 92.0	87.7	Pass
Peak Moment in Rotation	Max	Nm	27.0 to 33.0	30.4	Pass
Positive Moment Decay, Time To 5 Nm		Msec.	103.0 to 123.0	114.7	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	200.0	0.0	-2.8



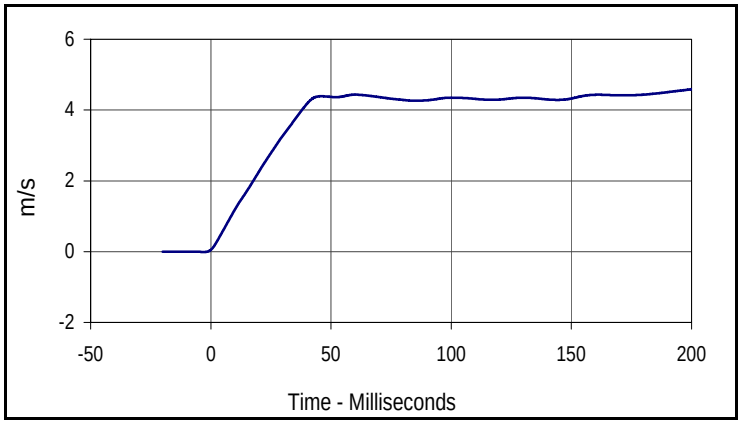
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
87.7	76.2	-45.2	200.0



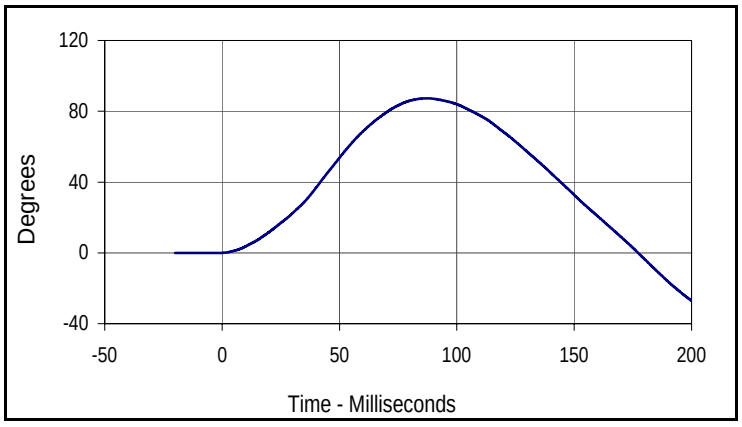
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
30.4	71.9	-10.5	199.9

Test Program:	Hybrid III 6 Yr Old Neck Extension Test	Test Date:	3/13/15
ATD Serial No.:	186	Test I.D.:	186NE032

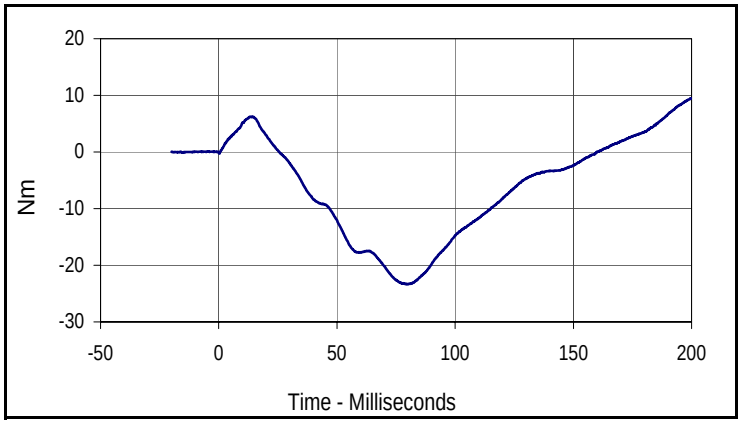
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	33	Pass
Pendulum Velocity		m/s	4.18 to 4.42	4.31	Pass
Pendulum Deceleration	10 Msec.	m/s	1.0 to 1.4	1.2	Pass
	20 Msec.	m/s	2.2 to 3.0	2.3	Pass
	30 Msec.	m/s	3.2 to 4.2	3.3	Pass
"D" Plane Rotation	Max	Degrees	85.0 to 103.0	87.3	Pass
Peak Moment in Rotation	Max	Nm	-24.0 to -19.0	-23.4	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
4.6	200.0	0.0	-2.8



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
87.3	87.1	-27.1	200.0

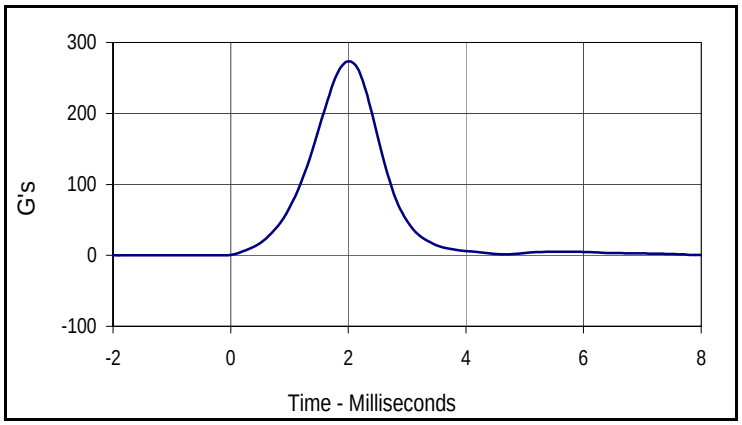


Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
9.4	199.9	-23.4	79.8

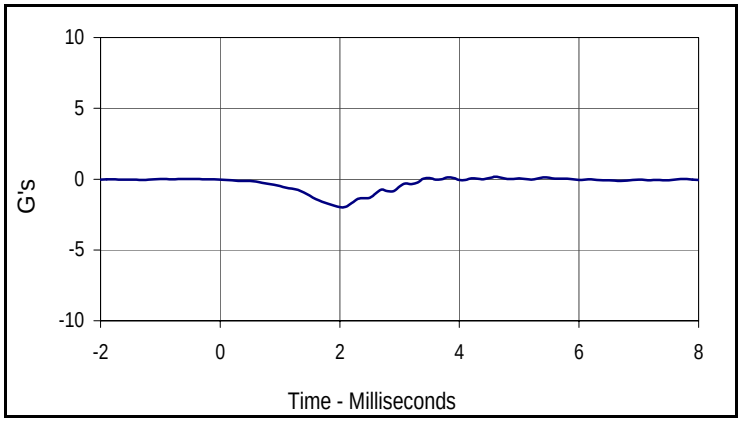
APPENDIX D
POST-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	Hybrid III 6 Yr Old Head Drop Test	Test Date:	3/20/15
ATD Serial No.:	186	Test I.D.:	186HD033

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Peak Resultant Acceleration	G's	245.0 to 300.0	273.4	Pass
Peak Lateral Acceleration	G's	≤15.0	2.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass



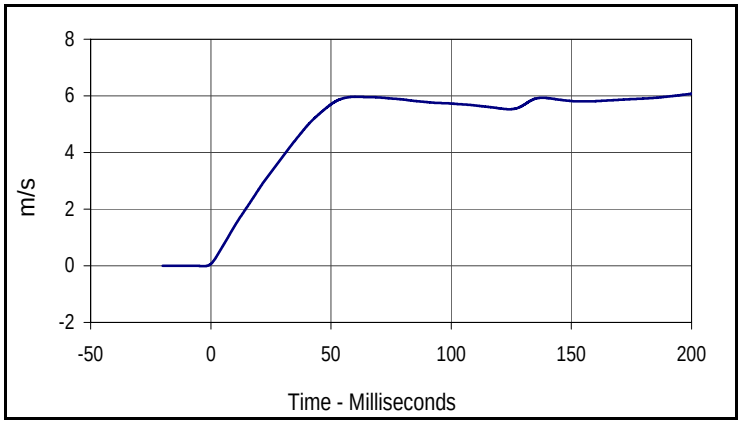
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
273.4	2.0	0.0	-0.5



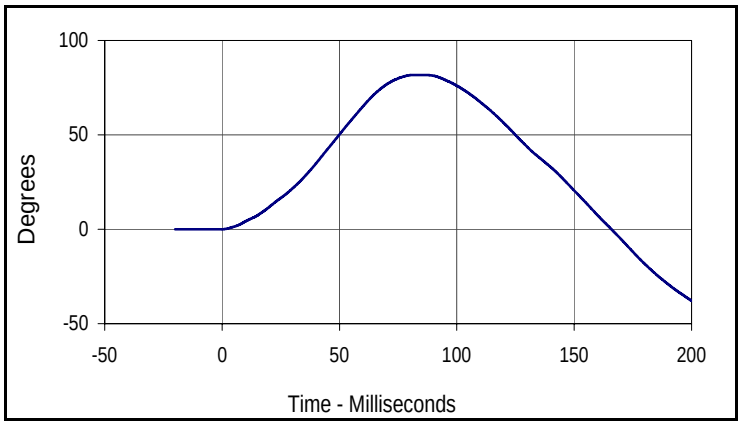
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.2	4.6	-2.0	2.0

Test Program:	Hybrid III 6 Yr Old Neck Flexion Test	Test Date:	3/20/15
ATD Serial No.:	186	Test I.D.:	186NF033

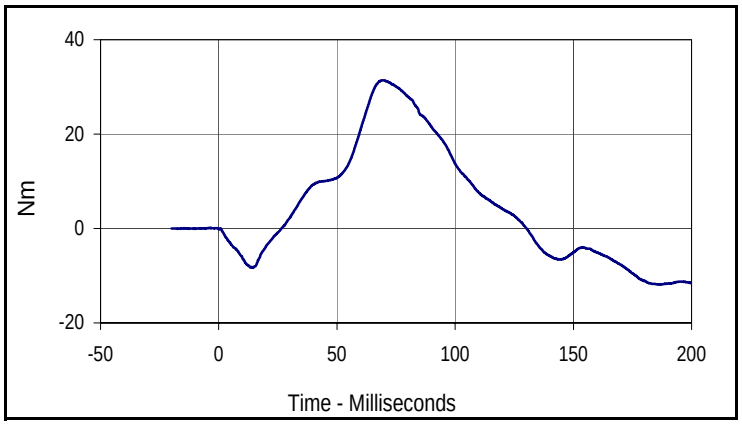
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	32	Pass
Pendulum Velocity		m/s	4.83 to 5.07	4.85	Pass
Pendulum Deceleration	10 Msec.	m/s	1.2 to 1.6	1.4	Pass
	20 Msec.	m/s	2.4 to 3.4	2.7	Pass
	30 Msec.	m/s	3.8 to 5.0	3.9	Pass
"D" Plane Rotation	Max	Degrees	74.0 to 92.0	81.8	Pass
Peak Moment in Rotation	Max	Nm	27.0 to 33.0	31.4	Pass
Positive Moment Decay, Time To 5 Nm		Msec.	103.0 to 123.0	117.4	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.1	200.0	0.0	-2.8



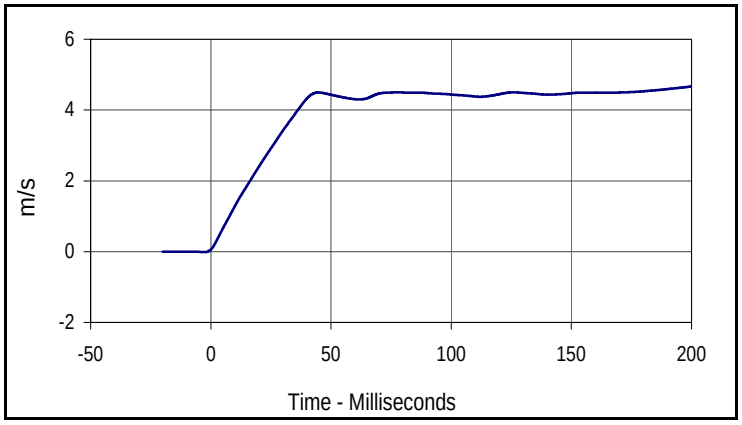
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
81.8	82.0	-37.9	200.0



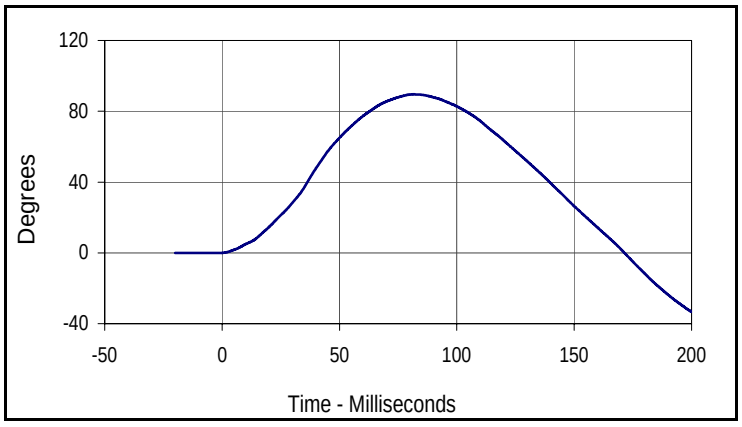
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
31.4	69.8	-11.9	185.9

Test Program:	Hybrid III 6 Yr Old Neck Extension Test	Test Date:	3/20/15
ATD Serial No.:	186	Test I.D.:	186NE033

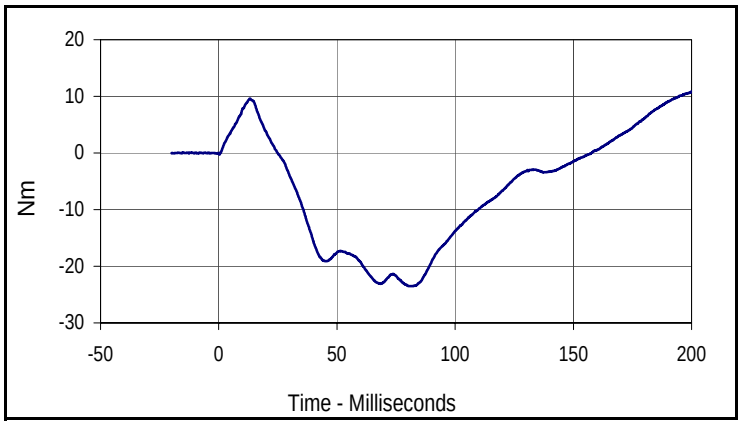
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	33	Pass
Pendulum Velocity		m/s	4.18 to 4.42	4.27	Pass
Pendulum Deceleration	10 Msec.	m/s	1.0 to 1.4	1.3	Pass
	20 Msec.	m/s	2.2 to 3.0	2.4	Pass
	30 Msec.	m/s	3.2 to 4.2	3.4	Pass
"D" Plane Rotation	Max	Degrees	85.0 to 103.0	89.5	Pass
Peak Moment in Rotation	Max	Nm	-24.0 to -19.0	-23.5	Pass
Positive Moment Decay, Time To -5 Nm		Msec.	123.0 to 147.0	124.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
4.7	200.0	0.0	-2.8



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
89.5	81.7	-33.3	200.0



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
10.8	200.0	-23.5	80.5