

REPORT NUMBER: TR-P35007-07-NC

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

**FORD MOTOR CO.
2015 FORD EDGE SEL AWD
5-DOOR MPV**

NHTSA NUMBER: M20150206TWG2

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JULY 1, 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 Ford Edge SEL AWD 5-Door MPV with an out-of-position SID-IIs dummy were evaluated. The test was performed at KARCO Engineering, LLC. on June 17, 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 SID-IIs anthropomorphic test device (ATD) was placed in the right front passenger seating position facing inboard according to the dummy placement instructions (3.3.5.3) in the July 2003 Revision of the Technical Working Group's 'Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags'.

The SID-IIs ATD was instrumented with head tri-axial accelerometers, 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 SID-IIs dummy was with the dummy facing toward the center of the vehicle with its arm against the seatback. The seat is adjusted to its highest position and the seat track is adjusted forward to minimize the vertical distance between the dummy's head and the roof-rail module and to maximize the cushion to head interaction. The dummy's pelvis is slid outboard until the dummy's back contacts the door trim panel or armrest and the CG of the head is centered in the deployment trajectory of the airbag. This orientation complies with section 3.3.5.3 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 SID-IIs dummy's visible contact points were as follows: The ATD's head contacted the curtain airbag. The ATD's abdomen, pelvis and left arm contacted the torso/pelvis airbag.

The occupant data is summarized below:

Measurement Description	Passenger ATD (SID-IIs)	
	IARV	Result
Head Injury Criteria (HIC15)	779	14.7
T^1		12.9
T^2		27.9
Avg G		15.7
Upper Neck		
Nij	1	0.40
Intercepts		
F_T (N)	3880	20.2
F_C (N)	3880	-285.0
M_F (Nm)	155	4.3
M_E (Nm)	61	-22.1
Tension (N)	2070	51.7
Compression (N)	2520	-822.9
Ntf		0.04
Nte		0.02
Ncf		0.21
Nce		0.40

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2015 Ford Edge SEL AWD 5-Door MPV NHTSA No.: M20150206TWG2

Test Program: TWG 3.3.5.3 Test Date: 06/17/15

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	°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: 2015 Ford Edge SEL AWD 5-Door MPV NHTSA No.: M20150206TWG2
Test Program: TWG 3.3.5.3 Test Date: 06/17/15

TEST DUMMY INFORMATION

Description	Passenger Seat
Dummy Type / Serial No.	SID-IIs / 308
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 Ford Edge SEL AWD 5-Door MPV NHTSA No.: M20150206TWG2
 Test Program: TWG 3.3.5.3 Test Date: 06/17/15

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20150206TWG2
Model Year	2015
Make	Ford
Model	Edge SEL AWD
Body Style	5-Door MPV
VIN	2FMTK4J92FBB10997
Body Color	Ingot Silver Metallic
Odometer Reading (km / mi)	130 / 81
Engine Displacement (L)	2.0
Type / No. of Cylinders	Inline 4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	AWD
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

Traction Control System	Yes
Power Steering	Yes
Power Window Auto-Reverse	Yes
Driver Frontal 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	Yes
Front Pass. Frontal Airbag	Yes
Front Pass. Curtain Airbag	Yes
Front Pass. Head/Torso Airbag	No
Front Pass. Torso Airbag	No
Front Pass. Torso/Pelvis Airbag	Yes
Front Pass. Pelvis Airbag	No
Front Pass. Knee Airbag	No
Driver Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Front Pass. Seat Belt Pretensioner	Yes
Front Pass. Load Limiter	Yes
Front Passenger Active Glove Box	Yes

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.
Date of Manufacture	Mar-15

GVWR (kg)	2513
GAWR Front (kg)	1325
GAWR Rear (kg)	1207

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Bucket	Bench		
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				430.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				89.8	A-B

*Vehicle underwent New Car Assessment Program Frontal Impact Testing on April 20, 2015.

DATA SHEET NO. 2 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Ford Edge SEL AWD 5-Door MPV NHTSA No.: M20150206TWG2
 Test Program: TWG 3.3.5.3 Test Date: 06/17/15



VEHICLE TIRE INFORMATION

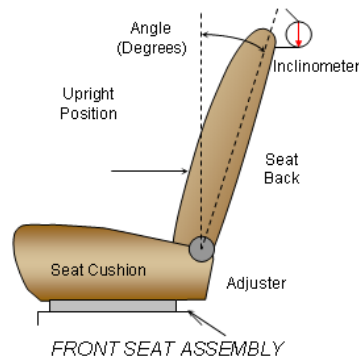
Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P245/60R18	P245/60R18
Tire Size on Vehicle	P245/60R18	P245/60R18
Tire Manufacturer	Michelin	Michelin
Tire Model	Latitude	Latitude
Treadwear	440	440
Traction	A	A
Temperature Grades	A	A
Tire 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	104H	104H
Tire Material	Polyester, Polyamide, Steel	Polyester, Polyamide, Steel
DOT Safety Code Left	B94A 00AX 5014	B94A 00AX 5014
DOT Safety Code Right	B94A 00AX 5014	B94A 00AX 5014

DATA SHEET NO. 3
SEAT ADJUSTMENTS

Test Vehicle: 2015 Ford Edge SEL AWD 5-Door MPV NHTSA No.: M20150206TWG2
 Test Program: TWG 3.3.5.3 Test Date: 06/17/15

SEAT BACK ANGLE

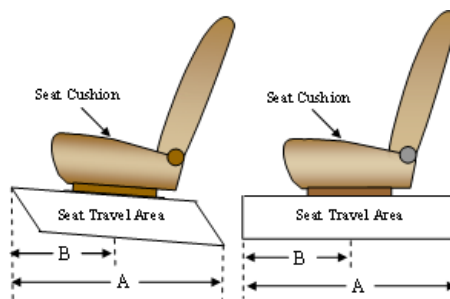
The passenger seat back is positioned per section 3.3.5.3 of the TWG recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags. Seat back angle is measured at the headrest post.



Seating Position	Degrees
Passenger Seat	2.5

SEAT FORE / AFT POSITIONING

The passenger seat track travel is set per section 3.3.5.3 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	241	36 (0-35)	120	17 (0-17)

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	4	H *

DATA SHEET NO. 4

DUMMY POSITIONING AND AIRBAG DIMENSIONS

Test Vehicle: 2015 Ford Edge SEL AWD 5-Door MPV NHTSA No.: M20150206TWG2
 Test Program: TWG 3.3.5.3 Test Date: 06/17/15

DUMMY POSITIONING

Code	Measurement Description	Passenger	
		Length (mm)	Angle (°)
SA	Seat Back Angle		2.5
AN	Top of Airbag Module to Head/Neck Junction	245	90.0
HD	Head CG to Door Panel/ Window	185	0.0
HSC	Head to Seat Back Centerline	247	0.0
HB	Head to B-Pillar (first contact)	206	0.0
HZ	Head to Roof (Z)	221	90.0
HH	Head to Header (measured from back of head)	349	28.3
ND	Nose to Dash (measured from back of head)	636	28.6
NS	Nose to Seat Back	275	0.0
NR	Nose to Header (measured from back of head)	349	28.3
CD	Chest to Dash (measured from back)	524	6.4
CS	Chest to Seat Back	248	0.0
RACL	Right Arm to Seat Back Centerline	N/A	N/A
LACL	Left Arm to Seat Back Centerline	279	0.0
RA	Right Arm to Door Panel	N/A	N/A
LA	Left Arm to Door Panel	88	0.0
KK	Knee to Knee	165	0.0
TT	Toe to Toe	168	0.0
KSCR	Right Knee to Seat Cushion Centerline	194	0.0
KSCL	Left Knee to Seat Cushion Centerline	199	0.0
	Head Level (X Direction)		6.2
	Head Level (Y Direction)		13.3

AIRBAG DIMENSIONS

Code	Measurement Description	Airbag
		Length (mm)
AMW	Curtain Airbag Module Diameter	30
AML	Curtain Airbag Module Length	325
ABW	Curtain Airbag Width	525
ABL	Curtain Airbag Length	1740
AMW	Torso/Pelvis Airbag Module Diameter	25
AML	Torso/Pelvis Airbag Module Length	135
ABW	Torso/Pelvis Airbag Width	600
ABL	Torso/Pelvis Airbag Length	275

DATA SHEET NO. 5

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2015 Ford Edge SEL AWD 5-Door MPV NHTSA No.: M20150206TWG2
 Test Program: TWG 3.3.5.3 Test Date: 06/17/15

HEAD PEAK ACCELERATIONS

Location	Axis	Units	SID-II			
			Max	Time	Min	Time
Head CG	X	G's	2.7	264.0	-22.1	13.5
Head CG	Y	G's	25.8	13.7	-6.6	40.8
Head CG	Z	G's	34.4	13.5	-14.5	17.9
Head CG Resultant	N/A	G's	44.9	13.5		

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	SID-II			
			Max	Time	Min	Time
Neck Force	X	Newtons	20.2	0.0	-285.0	27.0
Neck Force	Y	Newtons	314.5	37.6	-71.2	130.9
Neck Force	Z	Newtons	51.7	163.0	-822.9	16.0
Neck Force Resultant	N/A	Newtons	869.3	24.5		
Neck Moment	X	Nm	5.5	68.1	-6.8	35.8
Neck Moment	Y	Nm	4.3	139.7	-22.1	46.5
Neck Moment	Z	Nm	2.2	141.5	-3.1	89.3
Neck Moment Resultant	N/A	Nm	22.2	46.5		

LOWER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	SID-II			
			Max	Time	Min	Time
Neck Force	X	Newtons	39.9	19.7	-223.0	47.5
Neck Force	Y	Newtons	200.6	34.2	-64.5	140.4
Neck Force	Z	Newtons	66.4	166.7	-843.6	16.5
Neck Force Resultant	N/A	Newtons	846.8	16.5		
Neck Moment	X	Nm	38.7	36.9	-15.5	130.4
Neck Moment	Y	Nm	53.9	25.4	-4.4	0.0
Neck Moment	Z	Nm	10.4	34.1	-4.5	95.0
Neck Moment Resultant	N/A	Nm	58.6	25.6		

HEAD INJURY CRITERIA (HIC 15)

Location	SID-II			
	HIC15	T ¹	T ²	Avg G
Head CG	14.7	12.9	27.9	15.7

UPPER NECK NIJ VALUES

Location	SID-II			
	Ntf	Nte	Ncf	Nce
Upper Neck	0.04	0.02	0.21	0.40

DATA SHEET NO. 6

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2015 Ford Edge SEL AWD 5-Door MPV NHTSA No.: M20150206TWG2

Test Program: TWG 3.3.5.3 Test Date: 06/17/15

CAMERA LOCATIONS

No.	Camera View	Location (mm)			Angle (Deg.)	Lens (mm)	Speed (fps)
		X	Y	Z			
1	High Speed Side View	180	-3380	-995	-10.5	35	1000
2	High Speed 3/4 View	1720	-1430	-1570	-9.2	35	1000
3	High Speed Front View	1800	-120	-1595	-0.7	35	1000
4	Real Time	180	-3380	-1150	-0.7		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 Right Front 3/4 View of NCAP Frontal Impact Test



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



FIGURE 10. Post-Test Dummy Position, $\frac{3}{4}$ 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

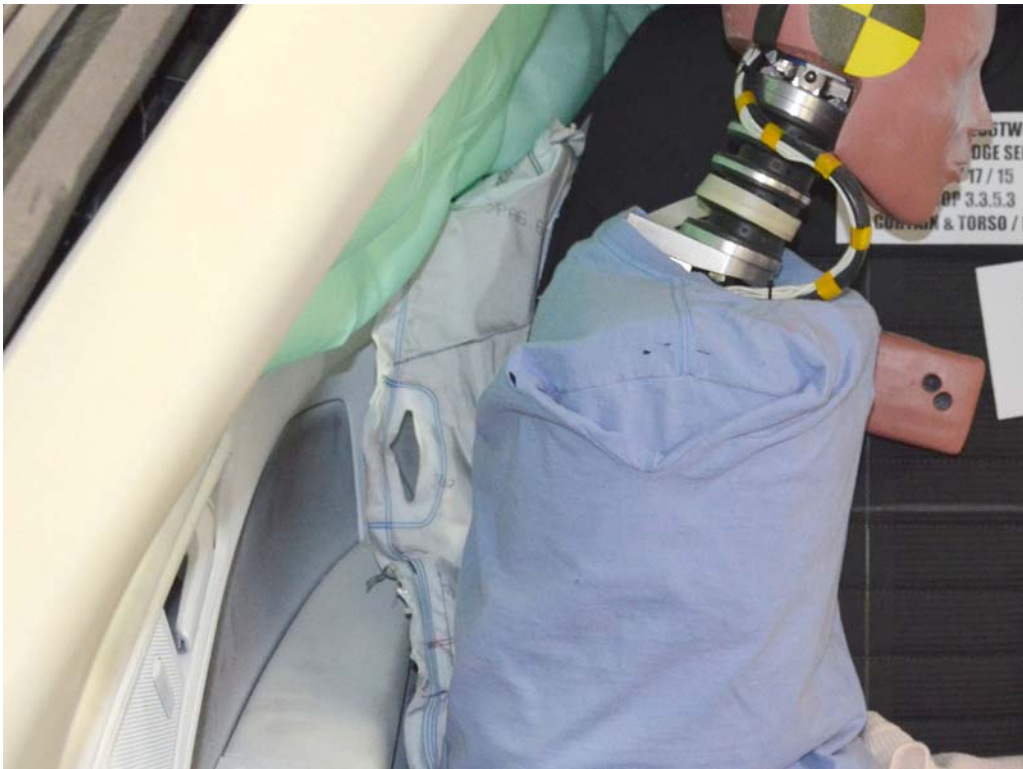


FIGURE 14. Post-Test Dummy Position, Close-Up Front View



FIGURE 15. Post-Test Airbags, Left Side View



FIGURE 16. Post-Test Airbags, Left Front ¾ View

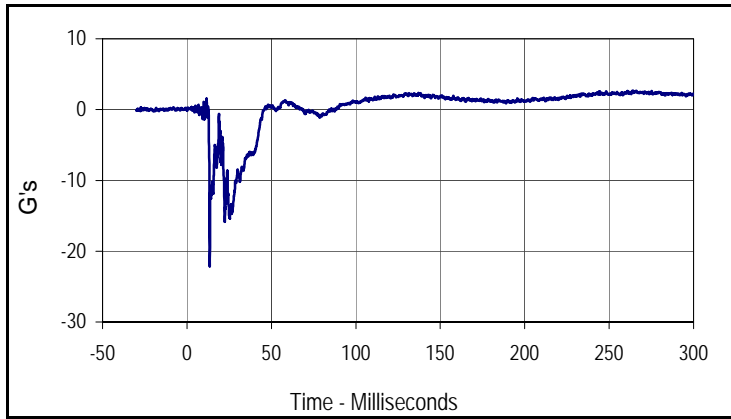
APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

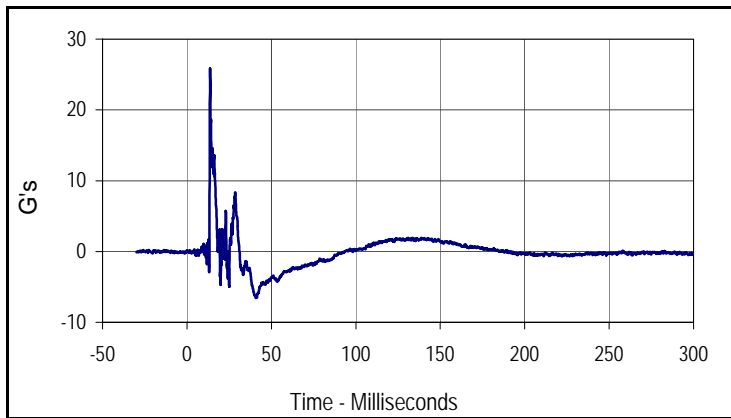
<u>Plot</u>		<u>Page</u>
1	SID-IIs Head X	B-1
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Test Vehicle: 2015 Ford Edge SEL AWD 5-Door MVP
 Test Program: TWG 3.3.5.3

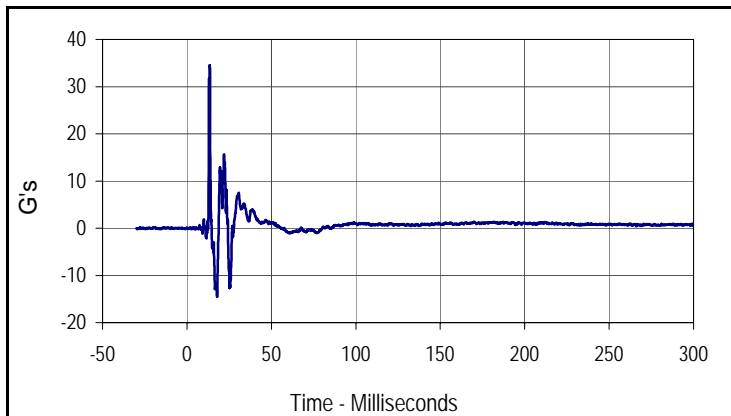
Test Date: 6/17/15
 NHTSA No.: M20150206TWG2



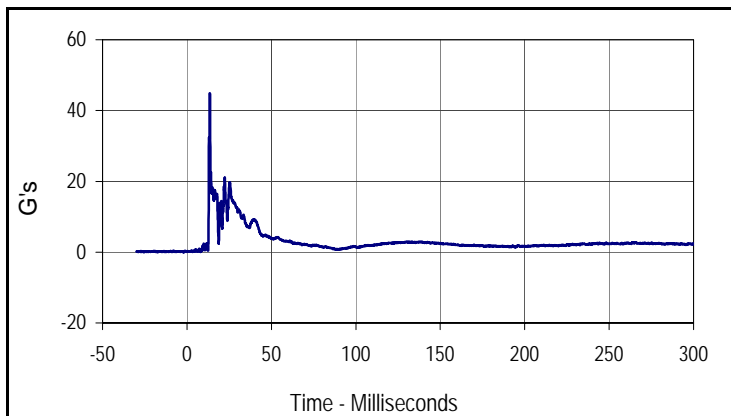
Curve Description			
SID-IIs Head X			
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
2.7	264.0	-22.1	13.5



Curve Description			
SID-IIs Head Y			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
25.8	13.7	-6.6	40.8



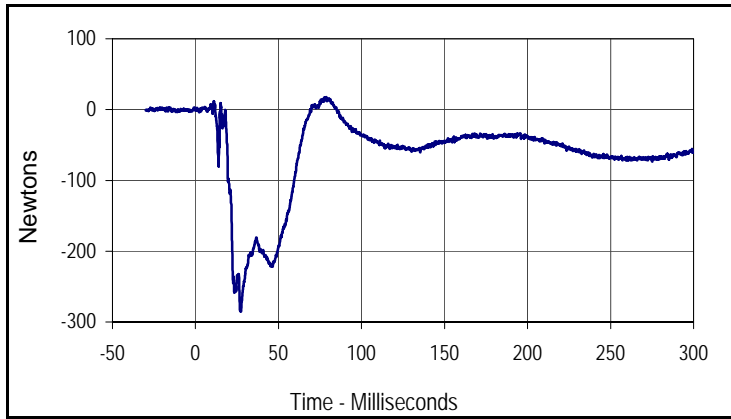
Curve Description			
SID-IIs Head Z			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
34.4	13.5	-14.5	17.9



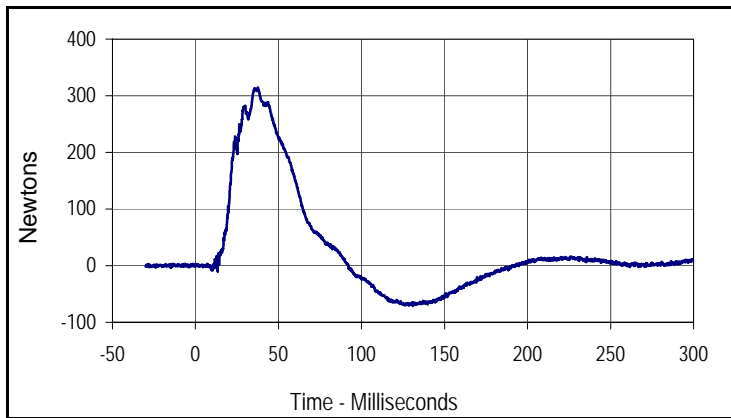
Curve Description			
SID-IIs Head Resultant			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
44.9	13.5	0.0	0.0

Test Vehicle: 2015 Ford Edge SEL AWD 5-Door MVP
 Test Program: TWG 3.3.5.3

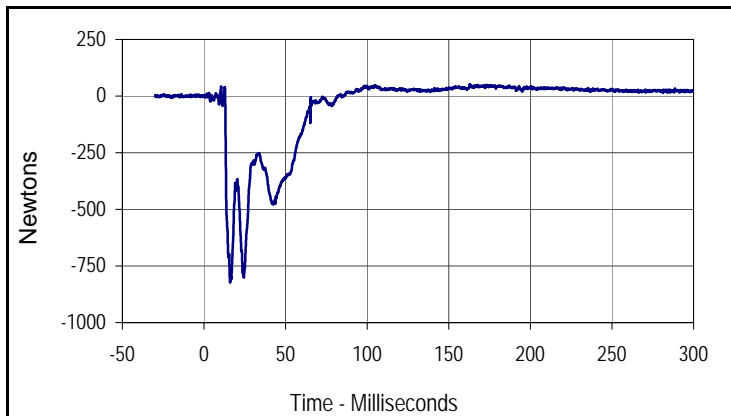
Test Date: 6/17/15
 NHTSA No.: M20150206TWG2



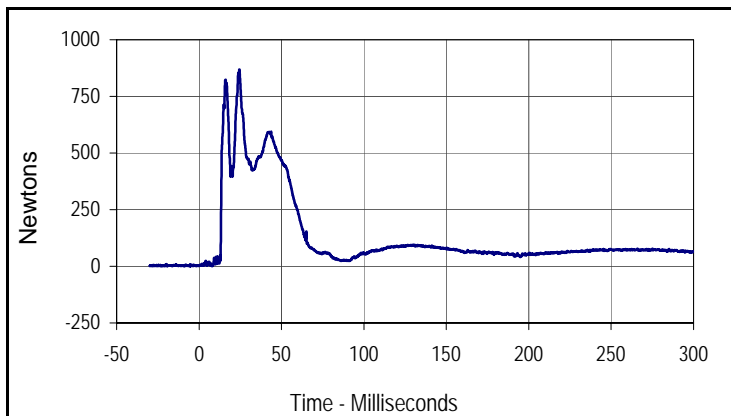
Curve Description			
SID-IIs Upper Neck Force X			
Plot No.	Type	SAE Class	Units
005	FIL	1000	Newtons
Max	Time	Min	Time
20.2	0.0	-285.0	27.0



Curve Description			
SID-IIs Upper Neck Force Y			
Plot No.	Type	SAE Class	Units
006	FIL	1000	Newtons
Max	Time	Min	Time
314.5	37.6	-71.2	130.9



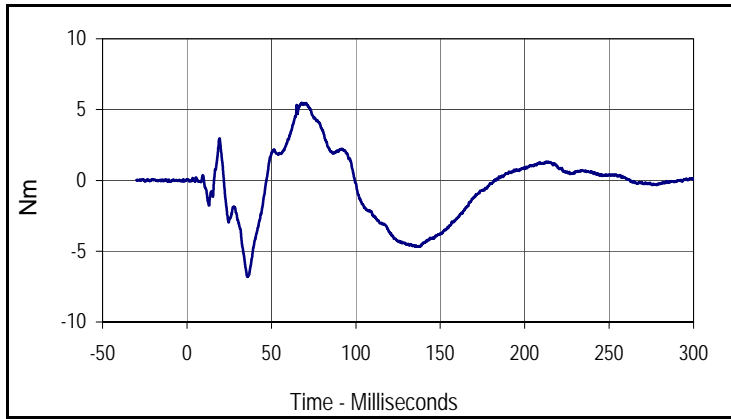
Curve Description			
SID-IIs Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
007	FIL	1000	Newtons
Max	Time	Min	Time
51.7	163.0	-822.9	16.0



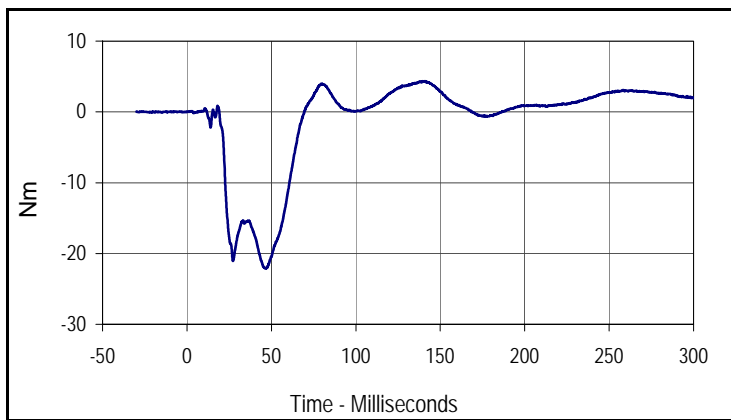
Curve Description			
SID-IIs Upper Neck Force Resultant			
Plot No.	Type	SAE Class	Units
008	RES	1000	Newtons
Max	Time	Min	Time
869.3	24.5	0.6	0.0

Test Vehicle: 2015 Ford Edge SEL AWD 5-Door MVP
 Test Program: TWG 3.3.5.3

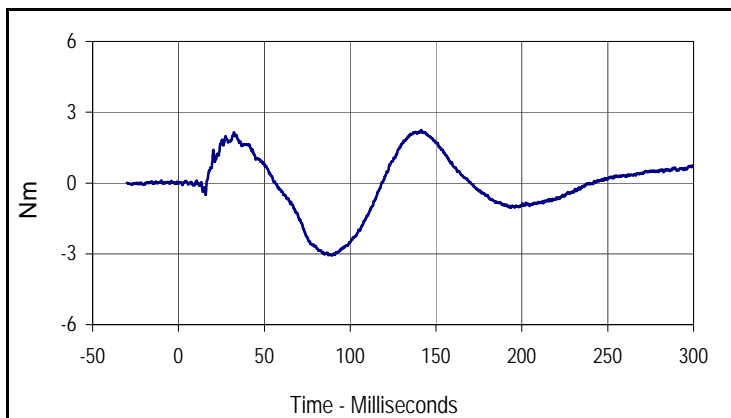
Test Date: 6/17/15
 NHTSA No.: M20150206TWG2



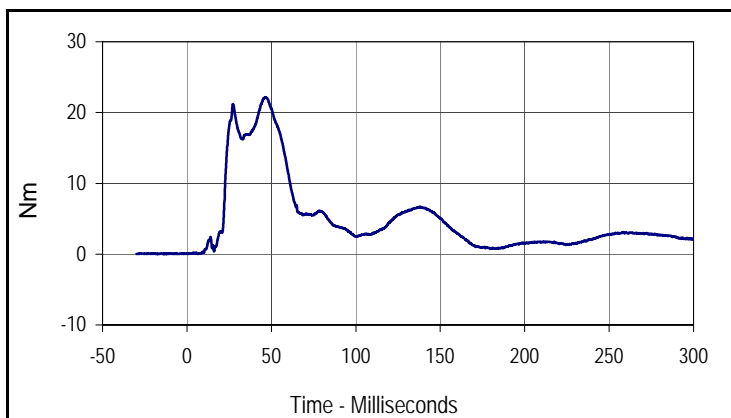
Curve Description			
SID-IIs Upper Neck Moment X			
Plot No.	Type	SAE Class	Units
009	FIL	600	Nm
Max	Time	Min	Time
5.5	68.1	-6.8	35.8



Curve Description			
SID-IIs Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
010	FIL	600	Nm
Max	Time	Min	Time
4.3	139.7	-22.1	46.5



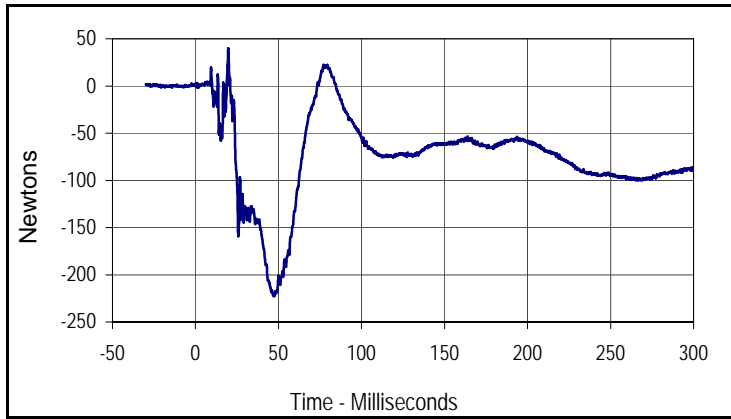
Curve Description			
SID-IIs Upper Neck Moment Z			
Plot No.	Type	SAE Class	Units
011	FIL	600	Nm
Max	Time	Min	Time
2.2	141.5	-3.1	89.3



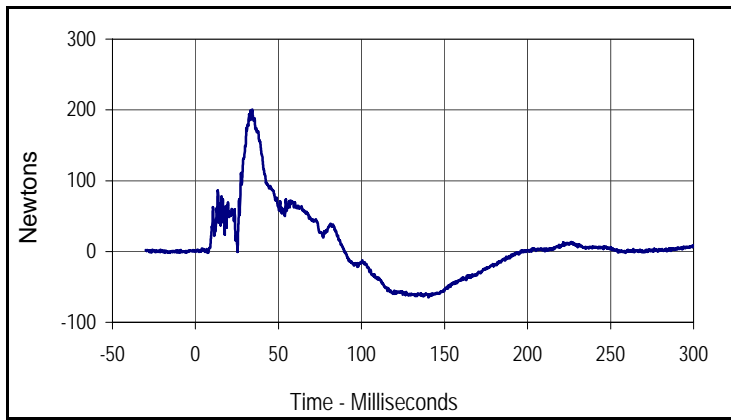
Curve Description			
SID-IIs Upper Neck Moment Resultant			
Plot No.	Type	SAE Class	Units
012	RES	600	Nm
Max	Time	Min	Time
22.2	46.5	0.0	1.3

Test Vehicle: 2015 Ford Edge SEL AWD 5-Door MVP
 Test Program: TWG 3.3.5.3

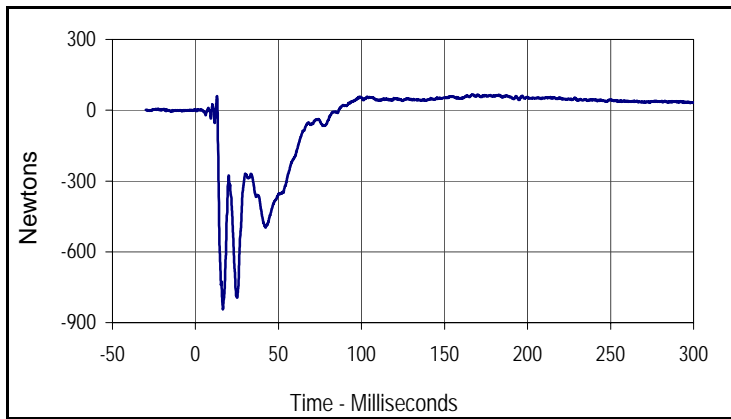
Test Date: 6/17/15
 NHTSA No.: M20150206TWG2



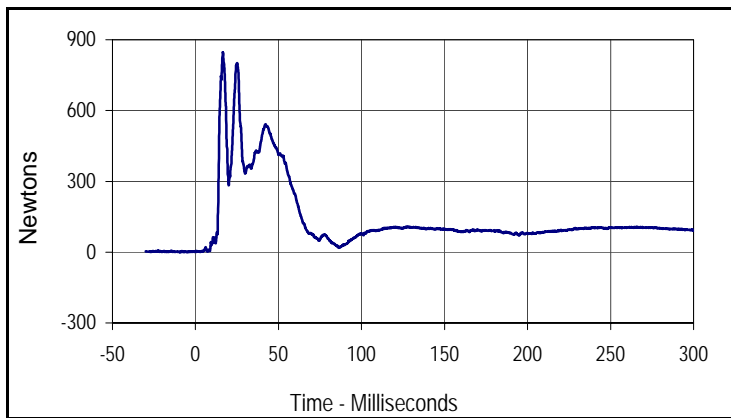
Curve Description			
SID-IIs Lower Neck Force X			
Plot No.	Type	SAE Class	Units
013	FIL	1000	Newtons
Max	Time	Min	Time
39.9	19.7	-223.0	47.5



Curve Description			
SID-IIs Lower Neck Force Y			
Plot No.	Type	SAE Class	Units
014	FIL	1000	Newtons
Max	Time	Min	Time
200.6	34.2	-64.5	140.4



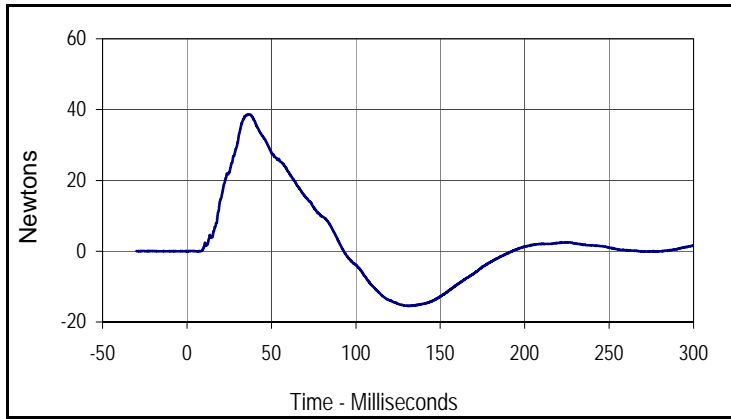
Curve Description			
SID-IIs Lower Neck Force Z			
Plot No.	Type	SAE Class	Units
015	FIL	1000	Newtons
Max	Time	Min	Time
66.4	166.7	-843.6	16.5



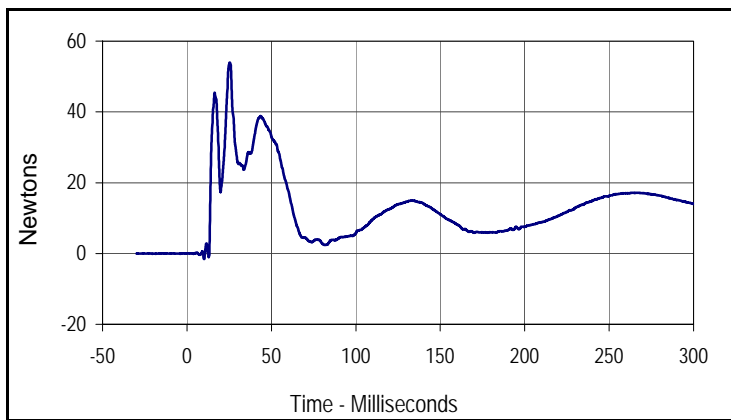
Curve Description			
SID-IIs Lower Neck Force Resultant			
Plot No.	Type	SAE Class	Units
016	RES	1000	Newtons
Max	Time	Min	Time
846.8	16.5	0.6	2.9

Test Vehicle: 2015 Ford Edge SEL AWD 5-Door MVP
 Test Program: TWG 3.3.5.3

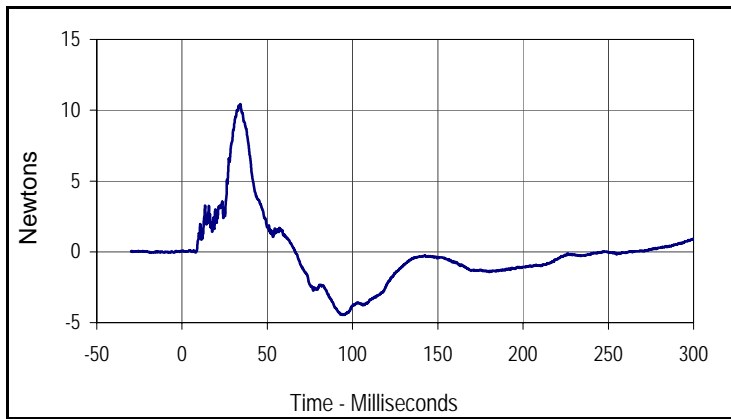
Test Date: 6/17/15
 NHTSA No.: M20150206TWG2



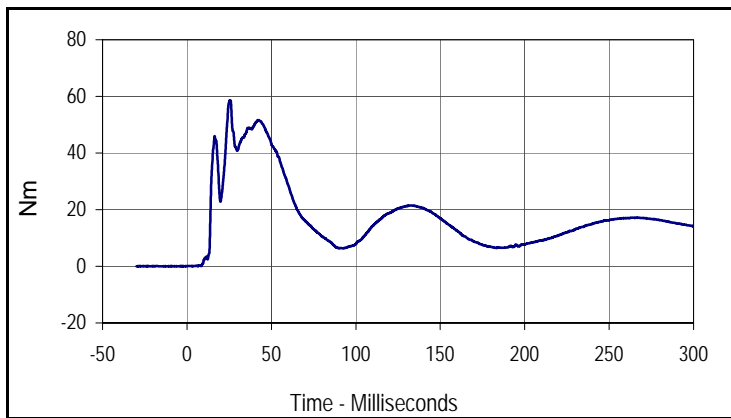
Curve Description			
SID-IIs Lower Neck Moment X			
Plot No.	Type	SAE Class	Units
017	FIL	600	Newtons
Max	Time	Min	Time
38.7	36.9	-15.5	130.4



Curve Description			
SID-IIs Lower Neck Moment Y			
Plot No.	Type	SAE Class	Units
018	FIL	600	Newtons
Max	Time	Min	Time
53.9	25.4	-4.4	0.0



Curve Description			
SID-IIs Lower Neck Moment Z			
Plot No.	Type	SAE Class	Units
019	FIL	600	Newtons
Max	Time	Min	Time
10.4	34.1	-4.5	95.0



Curve Description			
SID-IIs Lower Neck Moment Resultant			
Plot No.	Type	SAE Class	Units
020	RES	600	Nm
Max	Time	Min	Time
58.6	25.6	0.0	6.6

APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

TWG 3.3.5.3
Instrumentation Data Channel Assignments
A.T.D. Serial Number 308
6/17/15
2015 Ford Edge SEL AWD 5-Door MVP

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
1	HEAD	X	P50099	Accel.,full bridge	Endevco	7264C-2K	G
2	HEAD	Y	P52013	Accel.,full bridge	Endevco	7264C-2K	G
3	HEAD	Z	P64127	Accel.,full bridge	Endevco	7264C-2K	G
4	UPPER NECK FORCE	X	1643	Load cell, six axis neck	FTSS	IF-205	N
5	UPPER NECK FORCE	Y	1643	Load cell, six axis neck	FTSS	IF-205	N
6	UPPER NECK FORCE	Z	1643	Load cell, six axis neck	FTSS	IF-205	N
7	UPPER NECK MOMENT	X	1643	Load cell, six axis neck	FTSS	IF-205	Nm
8	UPPER NECK MOMENT	Y	1643	Load cell, six axis neck	FTSS	IF-205	Nm
9	UPPER NECK MOMENT	Z	1643	Load cell, six axis neck	FTSS	IF-205	Nm
10	LOWER NECK FORCE	X	DR8678	Load cell, six axis neck	FTSS	IF-269	N
11	LOWER NECK FORCE	Y	DR8678	Load cell, six axis neck	FTSS	IF-269	N
12	LOWER NECK FORCE	Z	DR8678	Load cell, six axis neck	FTSS	IF-269	N
13	LOWER NECK MOMENT	X	DR8678	Load cell, six axis neck	FTSS	IF-269	Nm
14	LOWER NECK MOMENT	Y	DR8678	Load cell, six axis neck	FTSS	IF-269	Nm
15	LOWER NECK MOMENT	Z	DR8678	Load cell, six axis neck	FTSS	IF-269	Nm

APPENDIX D
PRE-TEST AND POST-TEST ATD CONFIGURATION AND PERFORMANCE VERIFICATION
DATA

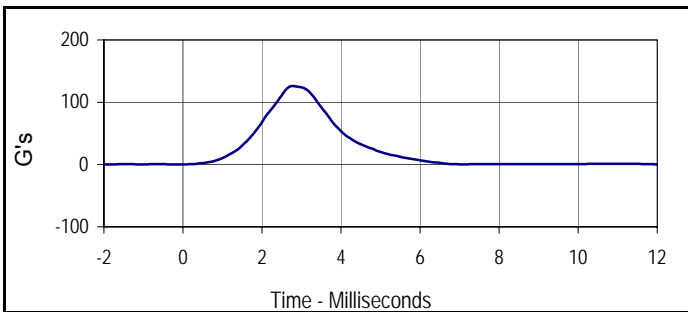
APPENDIX D
PRE-TEST / ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: SID IIs Head Drop Test
 ATD Serial No.: 308

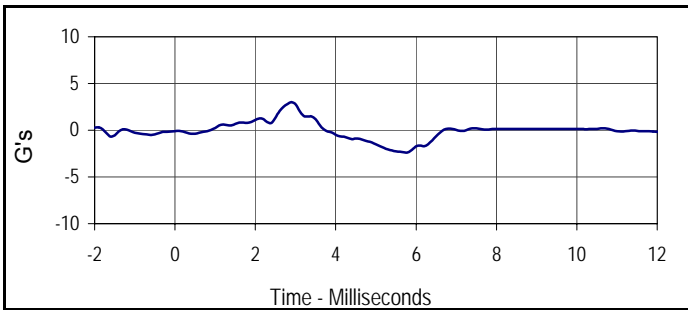
Test Date: 6/10/15
 Test I.D.: 308HD003



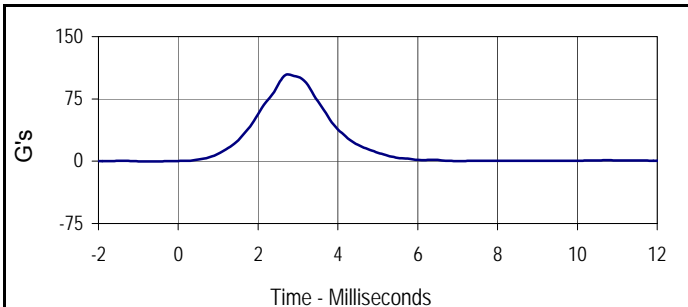
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	261	Pass
Temperature During Soak	Max	18.9 to 25.6	21.3	Pass
	Min		21.2	Pass
Humidity During Soak	Max	10.0 to 70.0	29.2	Pass
	Min		19.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.0	Pass
Peak Head Resultant Acceleration	G's	115 to 137	125.9	Pass
Peak Head X Acceleration	G's	<15	3.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	1.1	Pass
Overall Test Results				Pass



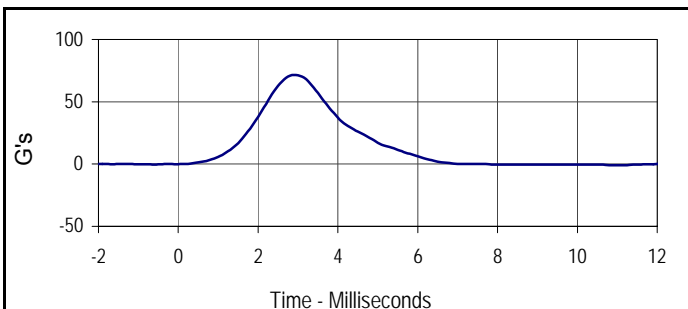
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
125.9	2.8	0.1	-1.8



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.0	2.9	-2.4	5.8



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
104.1	2.7	-0.2	-0.5



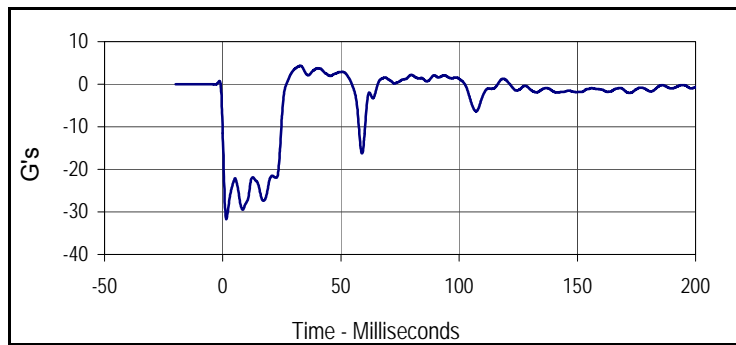
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
71.4	2.9	-1.1	11.0

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 308

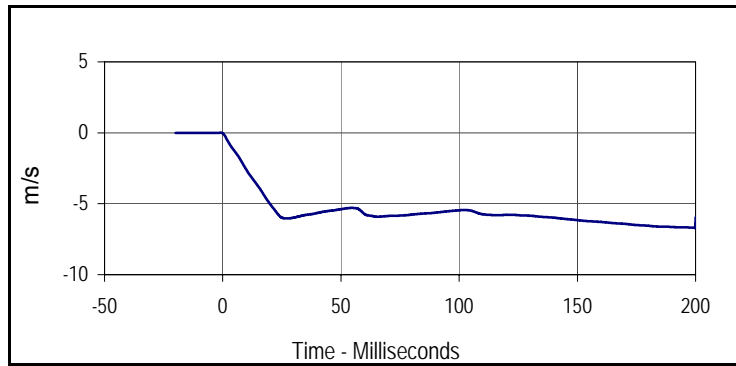
Test Date: 6/10/15
 Test I.D.: 308NB003



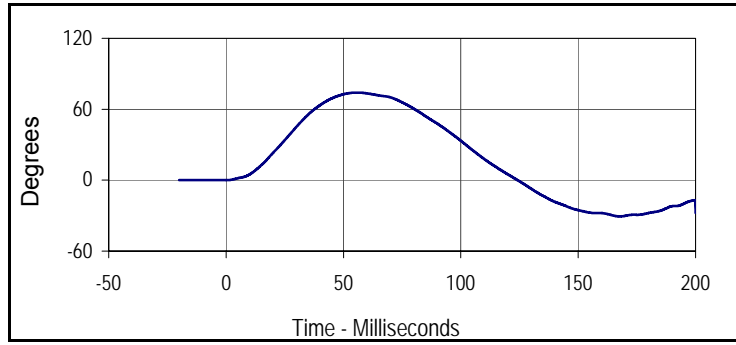
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	326	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.3	Pass	
	Min		21.2	Pass	
Humidity During Soak	Max	10.0 to 70.0	29.2	Pass	
	Min		19.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.2	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	29.2	Pass	
Pendulum Velocity	m/s	5.51 to 5.63	5.53	Pass	
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.61	Pass
	15 msec	m/s	-3.30 to -4.10	-3.77	Pass
	20 msec	m/s	-4.40 to -5.40	-5.02	Pass
	25 msec	m/s	-5.40 to -6.10	-5.99	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.04	Pass
D-Plane Rotation	Max	Degrees	71 to 81	74.1	Pass
	Time	msec	50 to 70	55.8	Pass
Peak Occipital Condyle Moment	Nm	-36 to -44	-43.9	Pass	
Decaying Moment Time to Cross 0 Nm	msec	102 to 126	105.8	Pass	
Overall Test Results			Pass	Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
4.4	0.0	-31.7	0.0



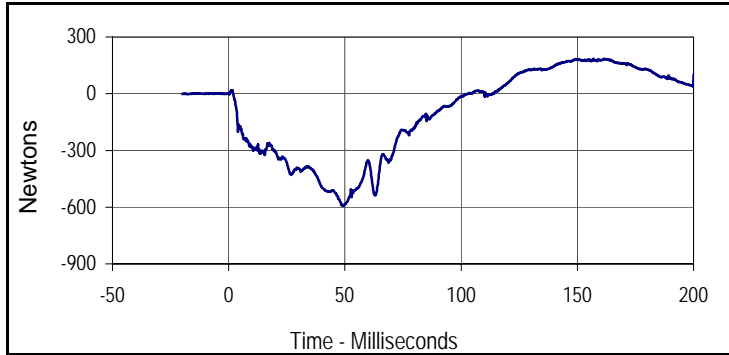
Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.9	-6.7	199.9



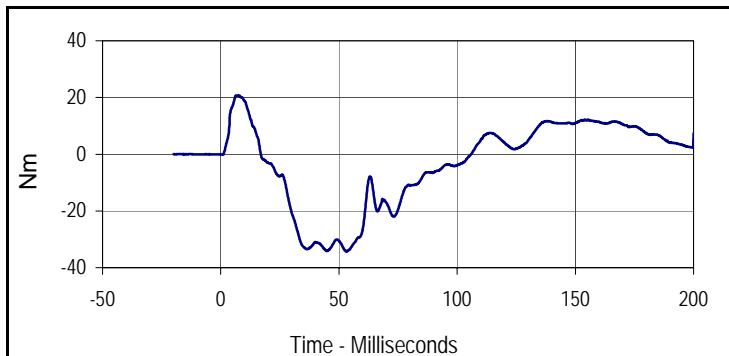
Curve Description			
D-Plane Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
74.1	55.8	-30.7	167.7

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 308

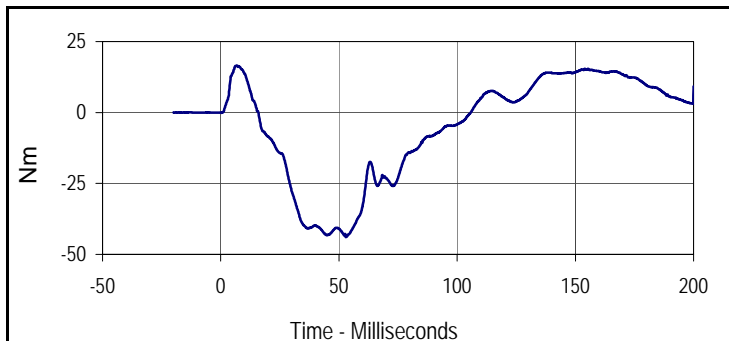
Test Date: 6/10/15
 Test I.D.: 308NB003



Curve Description			
Neck Force Y			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
184.9	156.9	-593.2	49.1



Curve Description			
Neck Moment X			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
20.8	6.8	-34.4	53.1



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
006	FIL	600	Nm
Max	Time	Min	Time
16.5	7.0	-43.9	53.0