

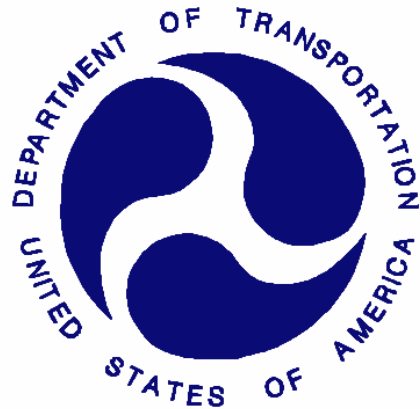
REPORT NUMBER: TWG-KAR-17-005

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

**MAZDA MOTOR CORPORATION
2017 MAZDA CX-5 TOURING AWD 5-DOOR MPV**

NHTSA NUMBER: M20175400TWG2

**PREPARED BY:
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AUGUST 11, 2017

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 DTNH22-13-D-00311L.

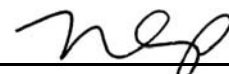
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TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. TWG-KAR-17-005	2. Government Accession No.	3. Recipient's Catalog No.																									
4. Title and Subtitle Final Report of New Car Assessment Program Side Airbag Out-of-Position Testing of 2017 Mazda CX-5 Touring AWD 5-Door MPV NHTSA No. M20175400TWG2		5. Report Date August 11, 2017																									
		6. Performing Organization Code KAR																									
7. Authors Mr. Robert S. Ramos, Project Engineer, KARCO Mr. Frank Richardson, Program Manager, KARCO		8. Performing Organization Report No. TR-P37253-01-NC																									
		10. Work Unit No.																									
9. Performing Organization Name and Address KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA 92301		11. Contract or Grant No. DTNH22-13-D-00311L																									
		13. Type of Report and Period Covered Final Test Report, July 28 - August 11, 2017																									
12. Sponsoring Agency Name and Address United States Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave., SE, Room W43-410 Washington, DC 20590		14. Sponsoring Agency Code NRM-110																									
		15. Supplementary Notes																									
16. Abstract A side airbag out of position test was conducted on the subject 2017 Mazda CX-5 Touring AWD 5-door MPV in accordance with the specifications of the Office of Crashworthiness Standards SAB OOP NCAP Laboratory Test Procedure for the generation of consumer information on vehicle side airbag protection. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on July 28, 2017. The curtain and torso/pelvis side airbags were deployed and responses were measured on a Hybrid III 6-year old child dummy. Three high speed cameras recorded the event. The ambient temperature at the time of airbag deployment was 21.2°C <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th colspan="4" style="text-align: center;">Section 3.3.3.5 - HIII 6-Year Old Child Dummy - P2</th> </tr> <tr> <th style="width: 30%;">Measurement Description</th> <th style="width: 10%;">Units</th> <th style="width: 30%;">IARV</th> <th style="width: 30%;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>723</td> <td>26.3</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.63</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>1490</td> <td>45.8</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>1820</td> <td>-1407.8</td> </tr> </tbody> </table>				Section 3.3.3.5 - HIII 6-Year Old Child Dummy - P2				Measurement Description	Units	IARV	Result	Head Injury Criteria (HIC ₁₅)	N/A	723	26.3	Nij	N/A	1	0.63	Neck Tension	N	1490	45.8	Neck Compression	N	1820	-1407.8
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17. Key Words New Car Assessment Program (NCAP) Side Airbag Out-of-position Technical Working Group (TWG)		18. Distribution Statement Copies of this report are available from the following: National Highway Traffic Safety Administration Technical Information Services 1200 New Jersey Ave, SE Washington, DC 20590 Email: tis@nhtsa.dot.gov FAX: 202-493-2833																									
		19. Security Classification of this report UNCLASSIFIED																									
20. Security Classification of this page UNCLASSIFIED		21. No. of Pages 38	22. Price																								

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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. DTNH22-13-D-00311L. 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 2017 Mazda CX-5 Touring AWD 5-door MPV with an out-of-position 6-year old dummy were evaluated. The test was performed at KARCO Engineering, LLC. on July 28, 2017. 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.

The airbags were deployed and fifteen (15) channels of data were recorded using a 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 at the 16th detent (160 mm) from the full forward position and adjusted vertically to its highest position. The seat was not tested in the lowest and rearmost position in order to maximize the interaction and contact between the dummy and airbag. 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 and airbag and the seat back. The ATD's torso contacted the curtain and torso/pelvis airbags and the seat back.

The occupant data is summarized below:

Measurement Description	Passenger ATD (HIII 6YO)	
	IARV	Result
Head Injury Criteria (HIC ₁₅)	723	26.3
T ¹		10.2
T ²		25.2
Average g		19.8
Upper Neck		
Nij	1	0.63
Tension (N)	1490	45.8
Compression (N)	1820	-1407.8

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2017 Mazda CX-5 Touring AWD 5-Door MPV NHTSA No.: M20175400TWG2
Test Program: TWG 3.3.3.5 Test Date: 07/28/17

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	lb/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: 2017 Mazda CX-5 Touring AWD 5-Door MPV NHTSA No.: M20175400TWG2
Test Program: TWG 3.3.3.5 Test Date: 07/28/17

TEST DUMMY INFORMATION

Description	Passenger Seat
Dummy Type / Serial No.	III 6YO / 186
Head Contact	Curtain Airbag, Seat Back
Chest Contact	Curtain & Torso/Pelvis Airbag, Seat Back
Abdomen Contact	None
Pelvis Contact	None
Left Knee Contact	None
Right Knee Contact	None

VIDEO COVERAGE

Description	Quantity
High Speed Digital	3
Real Time	1
Total	4

DATA CHANNELS

Description	Quantity
Head CG Accelerometers	3
Upper Neck Load Cell	6
Lower Neck Load Cell	6
Total	15

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2017 Mazda CX-5 Touring AWD 5-Door MPV NHTSA No.: M20175400TWG2
 Test Program: TWG 3.3.3.5 Test Date: 07/28/17

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20175400TWG2
Model Year	2017
Make	Mazda
Model	CX-5 Touring AWD
Body Style	5-Door MPV
VIN	JM3KFBCL6H0107940
Body Color	Machine Gray Metallic
Odometer Reading (km / mi)	35 / 22
Engine Displacement (L)	2.5
Type / No. of Cylinders	4 Cylinder
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	AWD
Roof Rack	No
Sunroof / T-Top	Yes
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 Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	No

Does Owner's Manual provide instructions to turn off automatic door locks?

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Mazda Motor Corporation
Date of Manufacture	Mar-17
Vehicle Type	MPV

GVWR (kg)	2106
GAWR Front (kg)	1075
GAWR Rear (kg)	1034

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

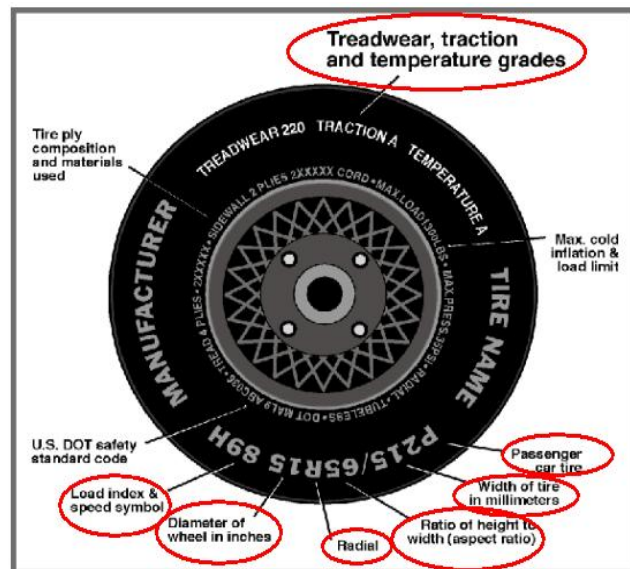
Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Bench			
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				385.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				44.8	A-B

*Vehicle underwent New Car Assessment Program Frontal Impact Testing on May 12, 2017.

DATA SHEET NO. 2 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2017 Mazda CX-5 Touring AWD 5-Door MPV NHTSA No.: M20175400TWG2
 Test Program: TWG 3.3.3.5 Test Date: 07/28/17



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	300	300
Cold Pressure (kPa)	230	230
Recommended Tire Size	P225/65R17	P225/65R17
Tire Size on Vehicle	P225/65R17	P225/65R17
Tire Manufacturer	Yokohama	Yokohama
Tire Model	Geolander G91	Geolander G91
Treadware	280	280
Traction Grade	B	B
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	100H	100H
Tire Material	Polyester, Steel, Polyamide	Polyester, Steel, Polyamide
DOT Safety Code Left	FDF5 PC5 0717	FDF5 PC5 0717
DOT Safety Code Right	FDF5 PC5 0717	FDF5 PC5 0717

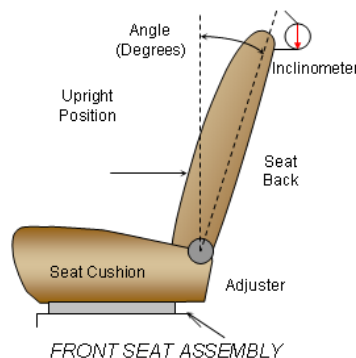
DATA SHEET NO. 3

SEAT ADJUSTMENTS

Test Vehicle: 2017 Mazda CX-5 Touring AWD 5-Door MPV NHTSA No.: M20175400TWG2
 Test Program: TWG 3.3.3.5 Test Date: 07/28/17

SEAT BACK ANGLE

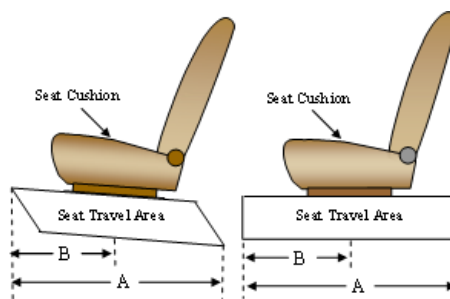
The passenger seat back is positioned per section 3.3.3.5 of the TWG recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags. Seat back angle is measured at the headrest post.



Seating Position	Degrees
Passenger Seat	9.3

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	260	26	160	16

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" and "M2". Position "L" is the lowermost position.

Seating Position	Total No. of Positions	Placed in Position
Passenger Seat	4	H

SEAT HEIGHT POSITIONING

The passenger seat height is set to the position described in section 3.3.3.5 of the TWG recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags. For this test the passenger seat was adjusted to its highest position to minimize the vertical distance between the dummy's head and the roof-rail module and to maximize the cushion to head interaction.

DATA SHEET NO. 4

DUMMY POSITIONING AND AIRBAG DIMENSIONS

Test Vehicle: 2017 Mazda CX-5 Touring AWD 5-Door MPV NHTSA No.: M20175400TWG2
 Test Program: TWG 3.3.3.5 Test Date: 07/28/17

DUMMY POSITIONING

Code	Measurement Description	Passenger	
		Length (mm)	Angle (°)
SA	Seat Back Angle		9.3
AN	Top of Airbag Module to Head/Neck Junction	256	90.0
HD	Head CG to Door Panel/ Window	177	0.0
HSC	Head to Seat Back Centerline	170	0.0
HB	Head to B-Pillar (first contact)	232	0.0
HZ	Head to Roof (Z)	192	90.0
HHD	Head to Header (measured from back of head)	320	34.5
ND	Nose to Dash	564	29.0
NS	Nose to Seat Back	230	0.0
NR	Nose to Header	327	35.4
CD	Chest to Dash	451	20.3
CS	Chest to Seat Back	255	0.0
RACL	Right Arm to Seat Back	356	0.0
LACL	Left Arm to Seat Back	95	0.0
RA	Right Arm to Door Panel	0	0.0
LA	Left Arm to Door Panel	263	0.0
KK	Knee to Knee	118	0.0
TT	Toe to Toe	140	0.0
KSCR	Right Knee to Seat Cushion Centerline	130	0.0
KSCL	Left Knee to Seat Cushion Centerline	35	0.0
	Head Level (X Direction)		2.1
	Head Level (Y Direction)		4.2

AIRBAG DIMENSIONS

Code	Measurement Description	Airbag
		Length (mm)
AMW	Curtain Airbag Module Diameter	30
AML	Curtain Airbag Module Length	300
ABL	Curtain Airbag Length	1900
ABW	Curtain Airbag Width	500
AMW	Torso/Pelvis Airbag Module Diameter	25
AML	Torso/Pelvis Airbag Module Length	150
ABW	Torso/Pelvis Airbag Length	700
ABL	Torso/Pelvis Airbag Width	300

DATA SHEET NO. 5

DUMMY INJURY CRITERIA AND PERFORMANCE DATA

Test Vehicle: 2017 Mazda CX-5 Touring AWD 5-Door MPV NHTSA No.: M20175400TWG2

Test Program: TWG 3.3.3.5 Test Date: 07/28/17

HEAD PEAK ACCELERATIONS

Location	Axis	Units	6 Yr. Old			
			Max	Time	Min	Time
Head CG	X	g	22.7	12.3	-38.0	10.9
Head CG	Y	g	19.4	11.7	-21.1	20.7
Head CG	Z	g	71.4	10.7	-14.6	7.2
Head CG Resultant	N/A	g	77.3	10.8		

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	6 Yr. Old			
			Max	Time	Min	Time
Neck Force	X	N	337.5	36.2	-140.3	10.8
Neck Force	Y	N	335.1	36.1	-128.8	80.4
Neck Force	Z	N	45.8	76.0	-1407.8	22.2
Neck Force Resultant	N/A	N	1439.4	22.2		
Neck Moment	X	Nm	7.5	11.0	-32.0	36.7
Neck Moment	Y	Nm	24.8	38.3	-6.4	146.5
Neck Moment	Z	Nm	7.2	107.4	-8.0	53.4
Neck Moment Resultant	N/A	Nm	39.8	37.8		

LOWER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	6 Yr. Old			
			Max	Time	Min	Time
Neck Force	X	N	173.7	5.2	-159.3	5.7
Neck Force	Y	N	295.4	37.2	-116.2	76.4
Neck Force	Z	N	78.4	10.5	-1265.3	18.3
Neck Force Resultant	N/A	N	1284.0	18.3		
Neck Moment	X	Nm	15.2	36.9	-27.3	82.2
Neck Moment	Y	Nm	38.7	18.0	-8.5	10.6
Neck Moment	Z	Nm	11.0	20.0	-3.0	165.7
Neck Moment Resultant	N/A	Nm	42.2	18.1		

HEAD INJURY CRITERIA (HIC 15)

Location	6 Yr. Old			
	HIC15	T ¹	T ²	Avg g
Head CG	26.3	10.2	25.2	19.8

UPPER NECK NIJ VALUES

Location	6 Yr. Old			
	Ntf	Nte	Ncf	Nce
Upper Neck	0.11	0.01	0.63	0.24

DATA SHEET NO. 6**HIGH SPEED CAMERA LOCATIONS AND DATA**Test Vehicle: 2017 Mazda CX-5 Touring AWD 5-Door MPV NHTSA No.: M20175400TWG2Test Program: TWG 3.3.3.5 Test Date: 07/28/17**CAMERA LOCATIONS**

No.	Camera View	Location (mm)			Angle (Deg.)	Lens (mm)	Speed (fps)
		X	Y	Z			
1	High Speed Front View	2370	-710	-1550	2.5	35	1000
2	High Speed 3/4 View	2170	-1720	-1550	1.7	35	1000
3	High Speed Left Side View	-200	-2650	-1170	2.0	20	1000
4	Real Time	-200	-2650	-1280	2.0	20	60

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
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FIGURE 1. Right Front ¾ View, As Received



FIGURE 2. Vehicle Certification Label



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

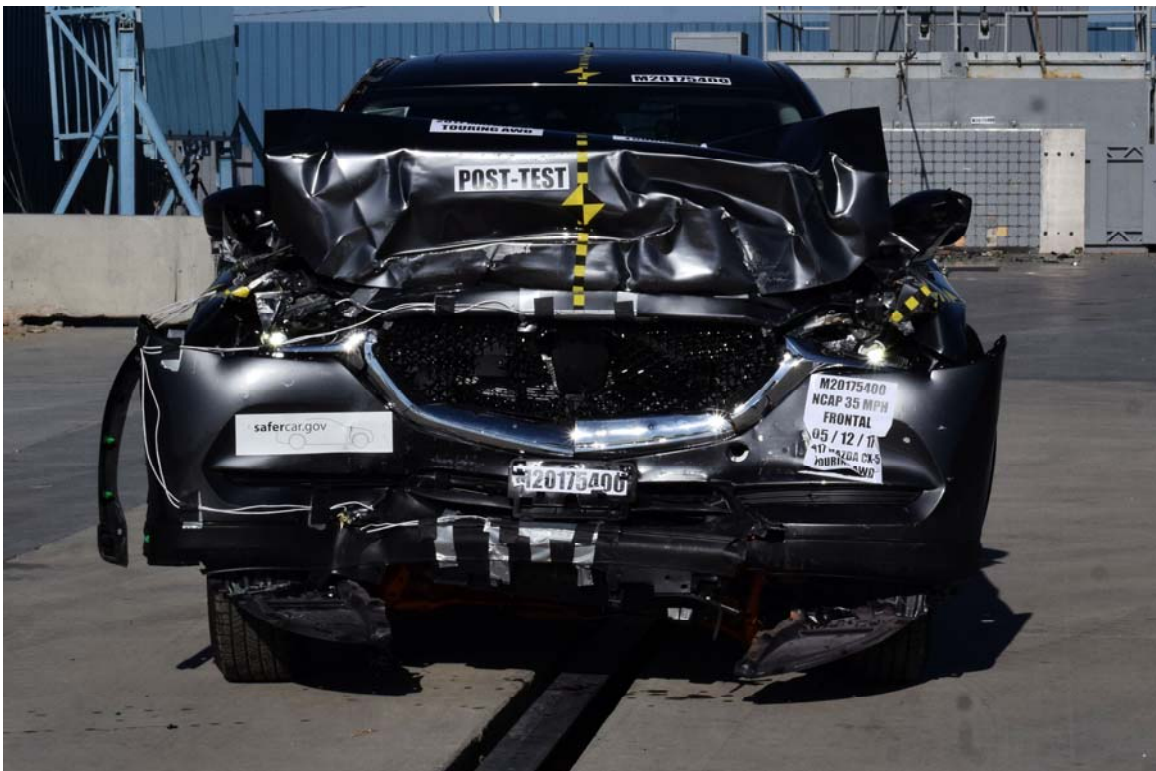


FIGURE 4. Post-Test Front View of NCAP Frontal Impact Test



FIGURE 5. Post-Test Right Front 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 View



FIGURE 8. Post-Test Dummy Position, Left View



FIGURE 9. Pre-Test Dummy Position, 3/4 View



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

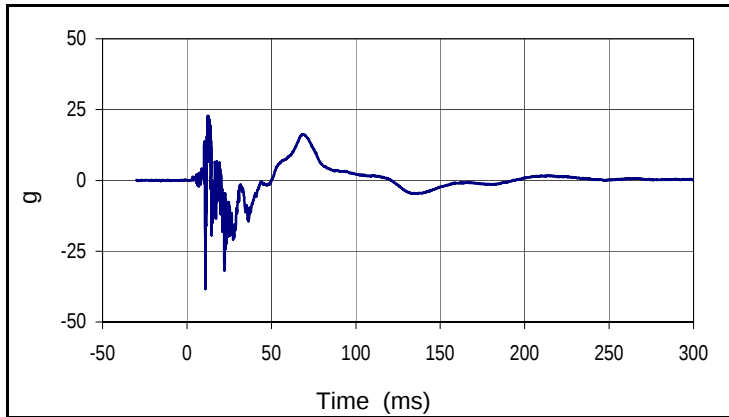
APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

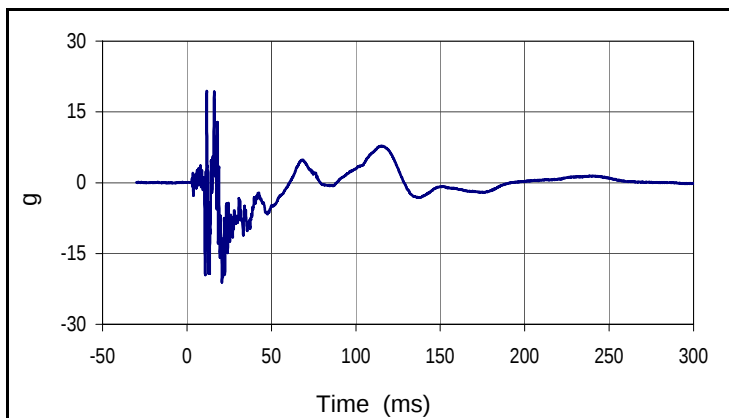
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10	6 Yr. Old Upper Neck Moment Y	B-3
11	6 Yr. Old Upper Neck Moment Z	B-3
12	6 Yr. Old Upper Neck Moment Resultant	B-3
13	6 Yr. Old Lower Neck Force X	B-4
14	6 Yr. Old Lower Neck Force Y	B-4
15	6 Yr. Old Lower Neck Force Z	B-4
16	6 Yr. Old Lower Neck Force Resultant	B-4
17	6 Yr. Old Lower Neck Moment X	B-5
18	6 Yr. Old Lower Neck Moment Y	B-5
19	6 Yr. Old Lower Neck Moment Z	B-5
20	6 Yr. Old Lower Neck Moment Resultant	B-5

Test Vehicle: 2017 Mazda CX-5 5-Door MPV
 Test Program: TWG 3.3.3.5

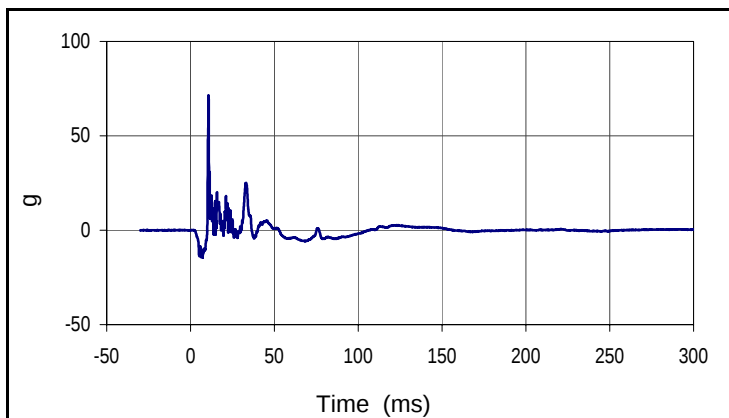
Test Date: 7/28/17
 NHTSA No.: M20175400TWG2



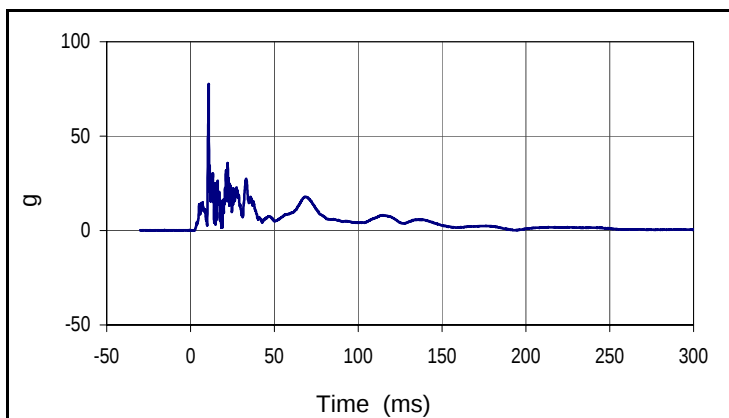
Curve Description			
6 Yr. Old Head Acceleration X Primary			
Plot No.		SAE Class	Units
001		1000	g
Max	Time	Min	Time
22.7	12.3	-38.0	10.9



Curve Description			
6 Yr. Old Head Acceleration Y Primary			
Plot No.		SAE Class	Units
002		1000	g
Max	Time	Min	Time
19.4	11.7	-21.1	20.7



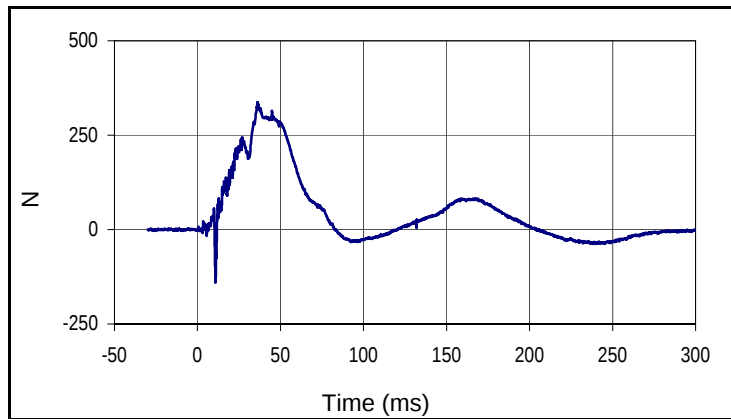
Curve Description			
6 Yr. Old Head Acceleration Z Primary			
Plot No.		SAE Class	Units
003		1000	g
Max	Time	Min	Time
71.4	10.7	-14.6	7.2



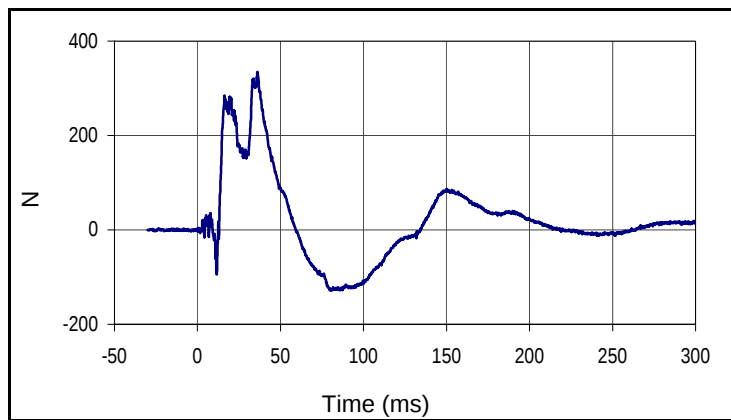
Curve Description			
6 Yr. Old Head Acceleration Primary Resultant			
Plot No.		SAE Class	Units
004		1000	g
Max	Time	Min	Time
77.3	10.8	0.0	0.1

Test Vehicle: 2017 Mazda CX-5 5-Door MPV
 Test Program: TWG 3.3.3.5

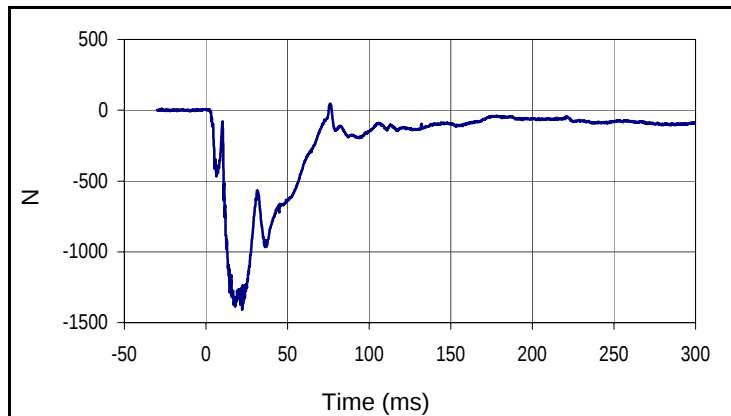
Test Date: 7/28/17
 NHTSA No.: M20175400TWG2



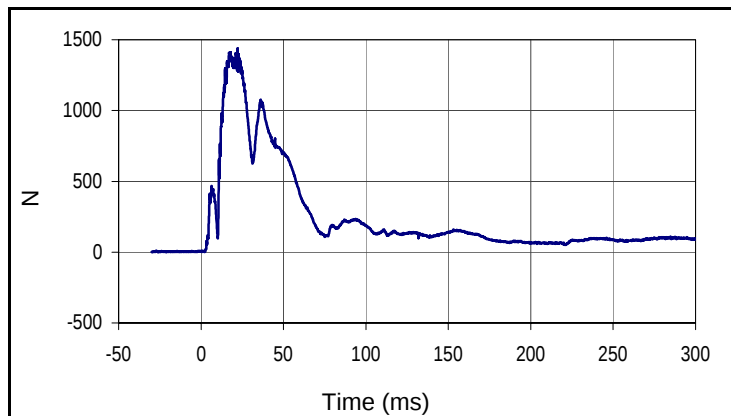
Curve Description			
6 Yr. Old Upper Neck Force X			
Plot No.		SAE Class	Units
005		1000	N
Max	Time	Min	Time
337.5	36.2	-140.3	10.8



Curve Description			
6 Yr. Old Upper Neck Force Y			
Plot No.		SAE Class	Units
006		1000	N
Max	Time	Min	Time
335.1	36.1	-128.8	80.4



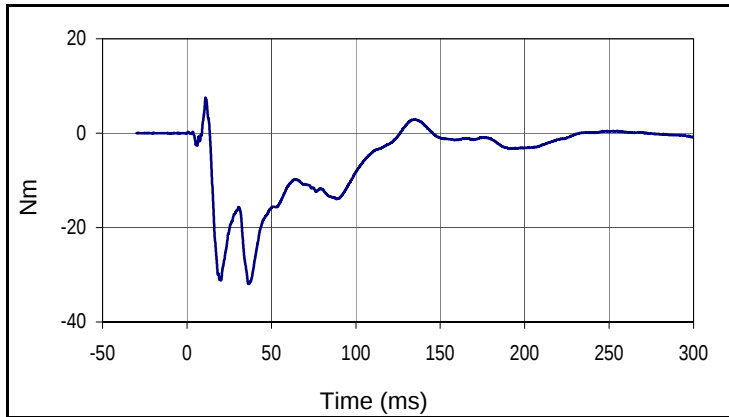
Curve Description			
6 Yr. Old Upper Neck Force Z			
Plot No.		SAE Class	Units
007		1000	N
Max	Time	Min	Time
45.8	76.0	-1407.8	22.2



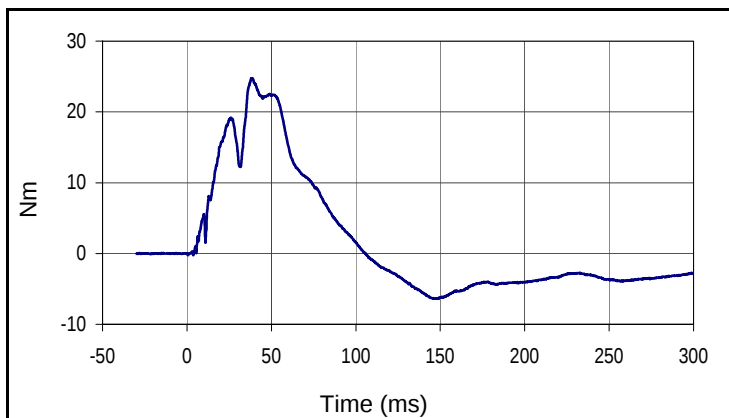
Curve Description			
6 Yr. Old Upper Neck Force Resultant			
Plot No.		SAE Class	Units
008		1000	N
Max	Time	Min	Time
1439.4	22.2	1.4	2.3

Test Vehicle: 2017 Mazda CX-5 5-Door MPV
 Test Program: TWG 3.3.3.5

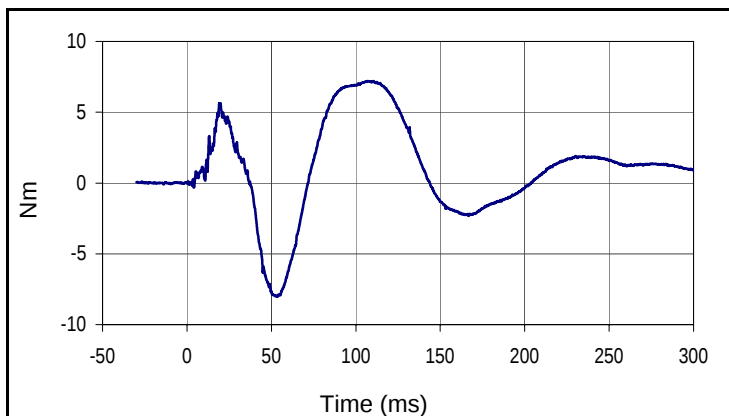
Test Date: 7/28/17
 NHTSA No.: M20175400TWG2



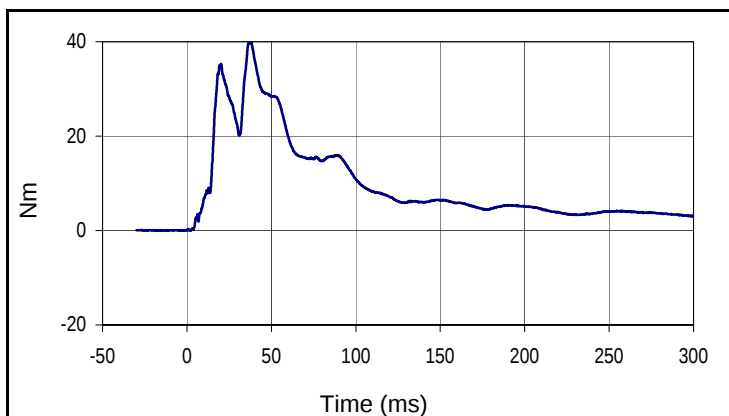
Curve Description			
6 Yr. Old Upper Neck Moment X			
Plot No.		SAE Class	Units
009		600	Nm
Max	Time	Min	Time
7.5	11.0	-32.0	36.7



Curve Description			
6 Yr. Old Upper Neck Moment Y			
Plot No.		SAE Class	Units
010		600	Nm
Max	Time	Min	Time
24.8	38.3	-6.4	146.5



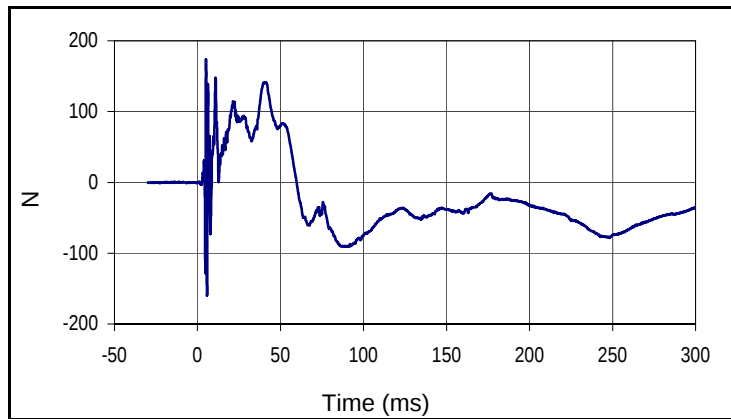
Curve Description			
6 Yr. Old Upper Neck Moment Z			
Plot No.		SAE Class	Units
011		600	Nm
Max	Time	Min	Time
7.2	107.4	-8.0	53.4



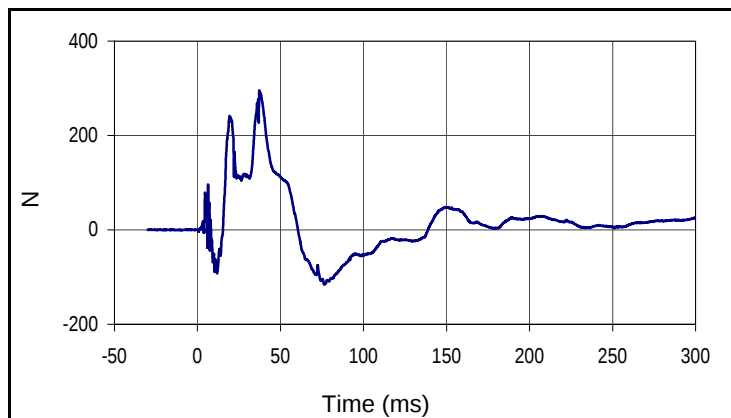
Curve Description			
6 Yr. Old Upper Neck Moment Resultant			
Plot No.		SAE Class	Units
012		600	Nm
Max	Time	Min	Time
39.8	37.8	0.0	2.2

Test Vehicle: 2017 Mazda CX-5 5-Door MPV
 Test Program: TWG 3.3.3.5

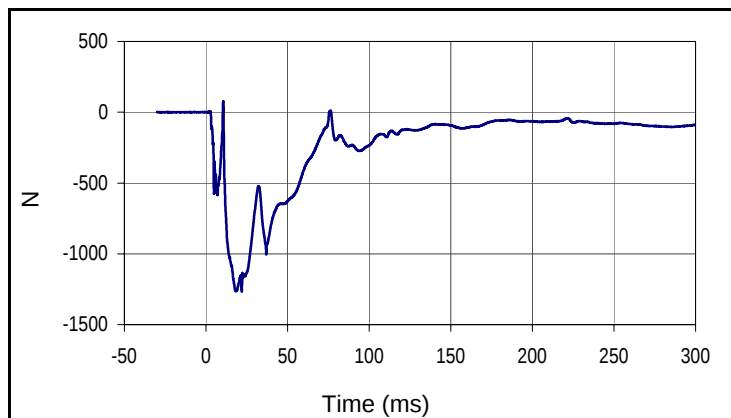
Test Date: 7/28/17
 NHTSA No.: M20175400TWG2



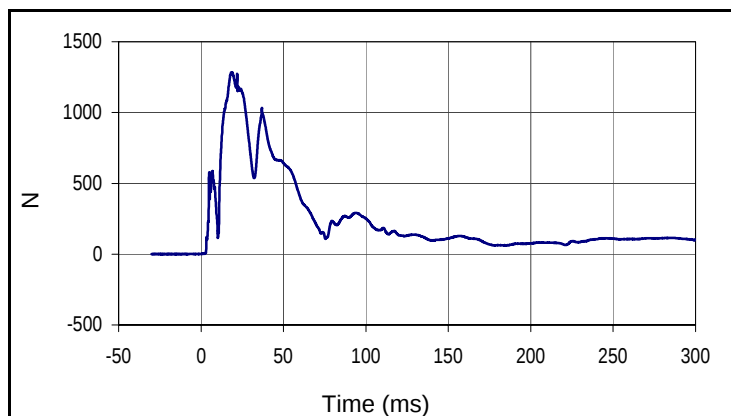
Curve Description			
6 Yr. Old Lower Neck Force X			
Plot No.		SAE Class	Units
013		1000	N
Max	Time	Min	Time
173.7	5.2	-159.3	5.7



Curve Description			
6 Yr. Old Lower Neck Force Y			
Plot No.		SAE Class	Units
014		1000	N
Max	Time	Min	Time
295.4	37.2	-116.2	76.4



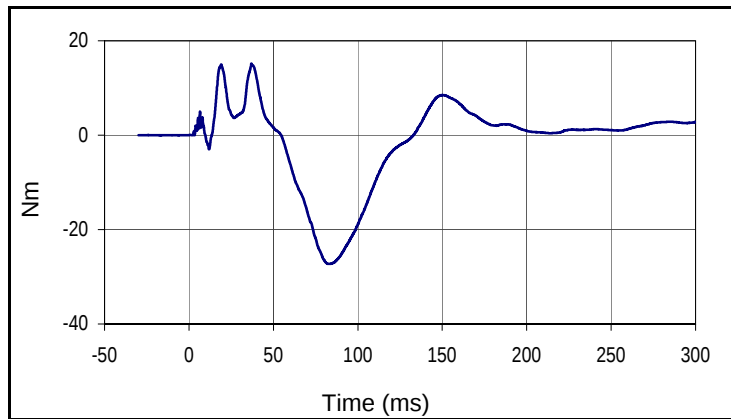
Curve Description			
6 Yr. Old Lower Neck Force Z			
Plot No.		SAE Class	Units
015		1000	N
Max	Time	Min	Time
78.4	10.5	-1265.3	18.3



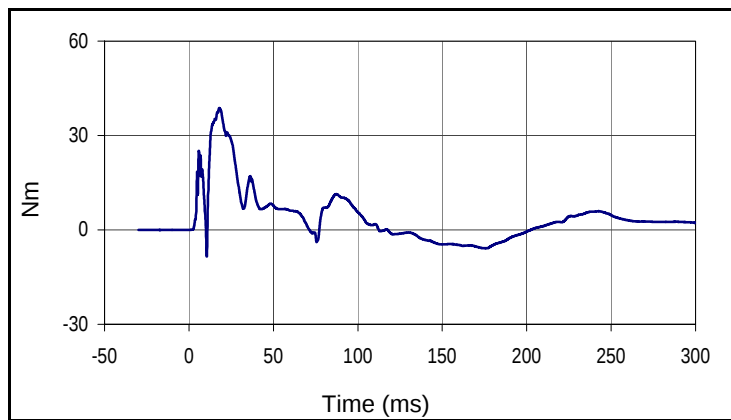
Curve Description			
6 Yr. Old Lower Neck Force Resultant			
Plot No.		SAE Class	Units
016		1000	N
Max	Time	Min	Time
1284.0	18.3	0.1	0.3

Test Vehicle: 2017 Mazda CX-5 5-Door MPV
 Test Program: TWG 3.3.3.5

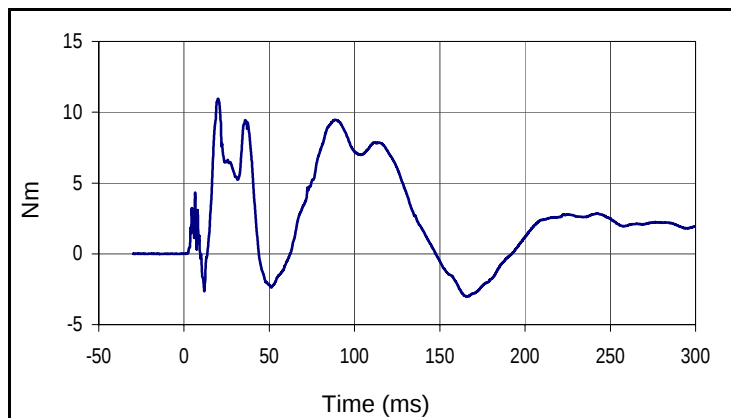
Test Date: 7/28/17
 NHTSA No.: M20175400TWG2



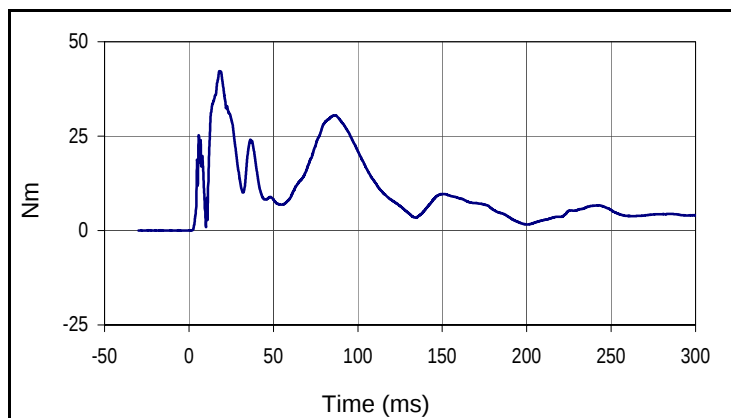
Curve Description			
6 Yr. Old Lower Neck Moment X			
Plot No.		SAE Class	Units
017		600	Nm
Max	Time	Min	Time
15.2	36.9	-27.3	82.2



Curve Description			
6 Yr. Old Lower Neck Moment Y			
Plot No.		SAE Class	Units
018		600	Nm
Max	Time	Min	Time
38.7	18.0	-8.5	10.6



Curve Description			
6 Yr. Old Lower Neck Moment Z			
Plot No.		SAE Class	Units
019		600	Nm
Max	Time	Min	Time
11.0	20.0	-3.0	165.7



Curve Description			
6 Yr. Old Lower Neck Moment Resultant			
Plot No.		SAE Class	Units
020		600	Nm
Max	Time	Min	Time
42.2	18.1	0.0	0.0

APPENDIX C
INSTRUMENTATION DATA CHANNEL ASSIGNMENTS

TWG 3.3.3.5

Instrumentation Data Channel Assignments

A.T.D. Serial Number 186

7/28/17

2017 Mazda CX-5 5-Door MPV

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	7264-2000	g
3	HEAD	Z	ACCW9	Accel.,full bridge	Endevco	7264-2000	g
4	UPPER NECK FORCE	X	452	Load cell, six axis neck	R. A. Denton	1716A	N
5	UPPER NECK FORCE	Y	452	Load cell, six axis neck	R. A. Denton	1716A	N
6	UPPER NECK FORCE	Z	452	Load cell, six axis neck	R. A. Denton	1716A	N
7	UPPER NECK MOMENT	X	452	Load cell, six axis neck	R. A. Denton	1716A	Nm
8	UPPER NECK MOMENT	Y	452	Load cell, six axis neck	R. A. Denton	1716A	Nm
9	UPPER NECK MOMENT	Z	452	Load cell, six axis neck	R. A. Denton	1716A	Nm
10	LOWER NECK FORCE	X	146	Load cell, six axis neck	R. A. Denton	2430	N
11	LOWER NECK FORCE	Y	146	Load cell, six axis neck	R. A. Denton	2430	N
12	LOWER NECK FORCE	Z	146	Load cell, six axis neck	R. A. Denton	2430	N
13	LOWER NECK MOMENT	X	146	Load cell, six axis neck	R. A. Denton	2430	Nm
14	LOWER NECK MOMENT	Y	146	Load cell, six axis neck	R. A. Denton	2430	Nm
15	LOWER NECK MOMENT	Z	146	Load cell, six axis neck	R. A. Denton	2430	Nm

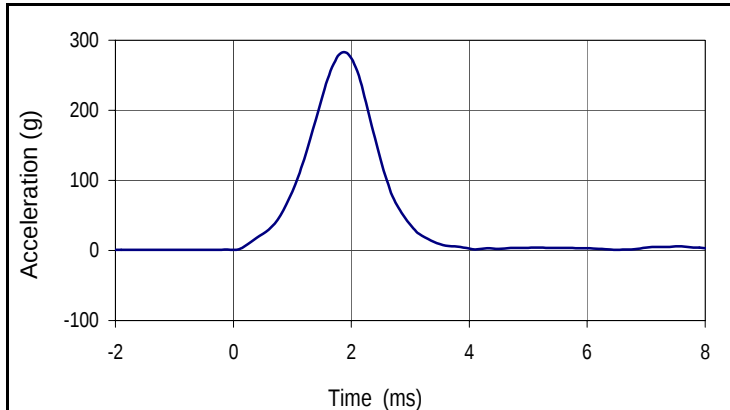
APPENDIX D
PRE-TEST ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

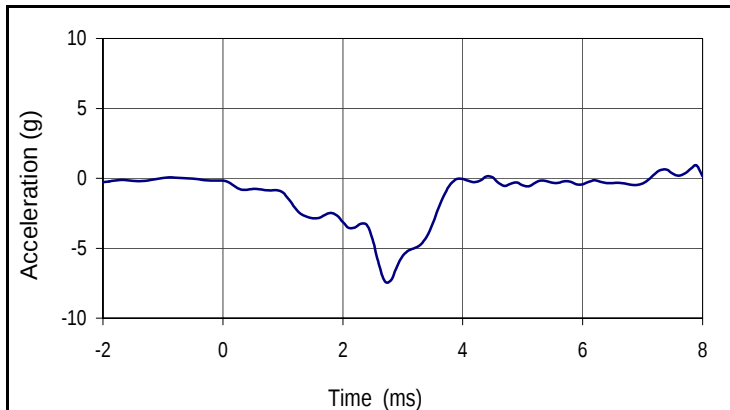
Test Date: 5/26/17
 Test I.D.: 6YR186HD52617



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	245.0 to 300.0	282.6	Pass
Peak Lateral Acceleration	g	≤15.0	7.4	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
282.6	1.9	0.8	0.0



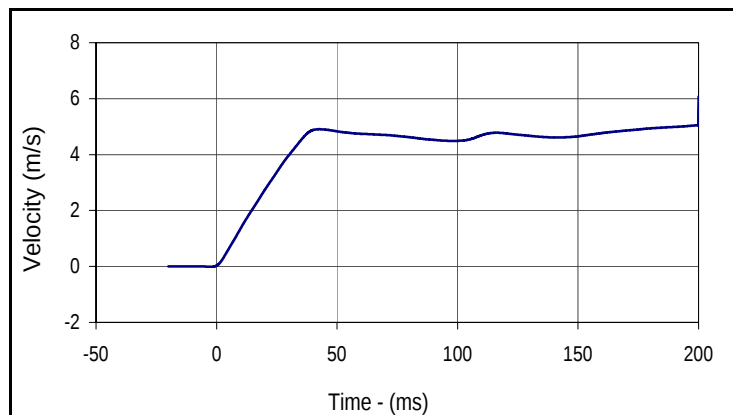
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	g
Max	Time	Min	Time
0.1	4.4	-7.4	2.7

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

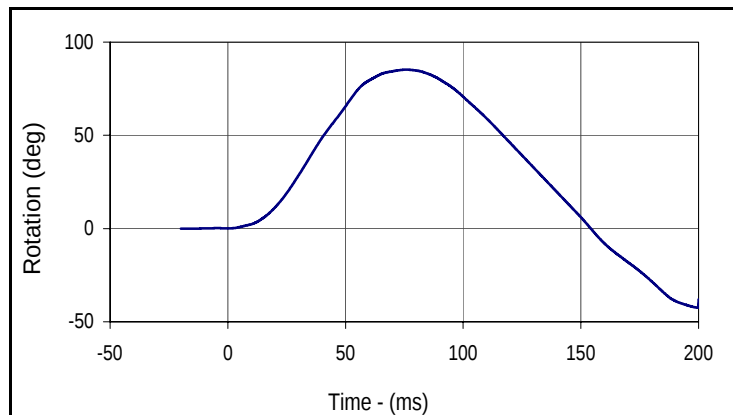
Test Date: 5/26/17
 Test I.D.: 6YR186NF52617



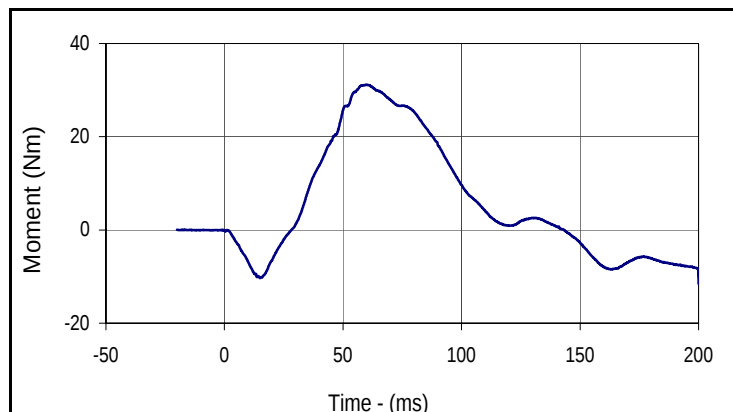
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	33	Pass
Pendulum Velocity		m/s	4.83 to 5.07	4.86	Pass
Pendulum Deceleration	10 Msec.	m/s	1.2 to 1.6	1.4	Pass
	20 Msec.	m/s	2.4 to 3.4	2.7	Pass
	30 Msec.	m/s	3.8 to 5.0	4.0	Pass
"D" Plane Rotation	Max	deg	74.0 to 92.0	85.2	Pass
Peak Moment in Rotation	Max	Nm	27.0 to 33.0	31.2	Pass
Positive Moment Decay, Time To 5 Nm		ms	103.0 to 123.0	108.4	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	-2.2



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	deg
Max	Time	Min	Time
85.2	75.7	-42.5	199.9



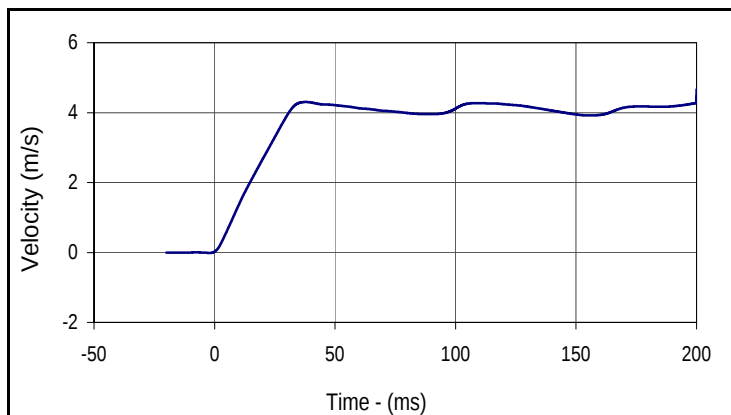
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
31.2	59.8	-11.6	200.0

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

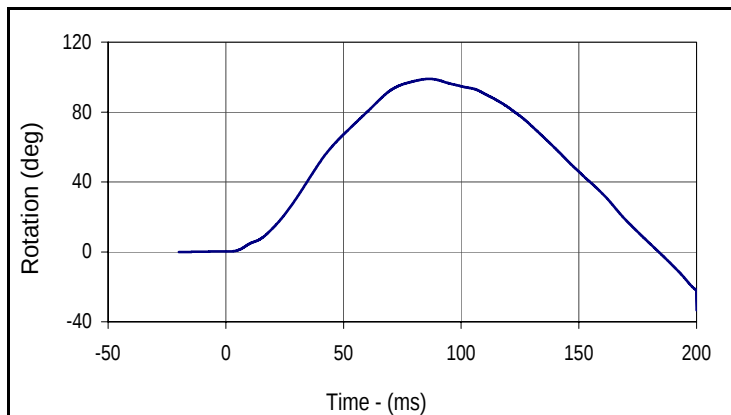
Test Date: 5/26/17
 Test I.D.: 6YR186NE52617



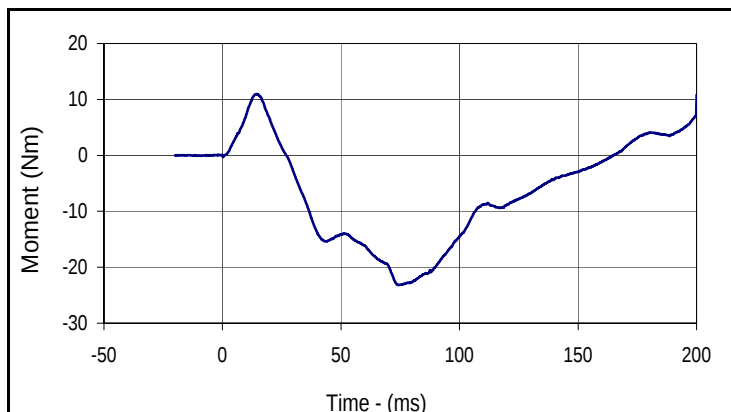
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	32	Pass
Pendulum Velocity		m/s	4.18 to 4.42	4.32	Pass
Pendulum Deceleration	10 Msec.	m/s	1.0 to 1.4	1.4	Pass
	20 Msec.	m/s	2.2 to 3.0	2.7	Pass
	30 Msec.	m/s	3.2 to 4.2	3.9	Pass
"D" Plane Rotation	Max	deg	85.0 to 103.0	99.0	Pass
Peak Moment in Rotation	Max	Nm	-24.0 to -19.0	-23.2	Pass
Positive Moment Decay, Time To -5 Nm		ms	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
4.7	200.0	0.0	-2.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	deg
Max	Time	Min	Time
99.0	86.4	-33.3	200.0



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
11.0	14.6	-23.2	74.3