



REPORT NUMBER: TWG-MGA-2018-006

**SIDE AIRBAG OUT-OF-POSITION INJURY
TECHNICAL WORKING GROUP**

**TOYOTA MOTOR CORPORATION
2018 Toyota Camry LE 4-Door Sedan
NHTSA No.: M20185102TWG3**

Test Date: September 27, 2018

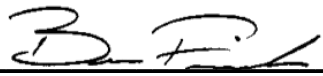
Final Report Date: May 16, 2019

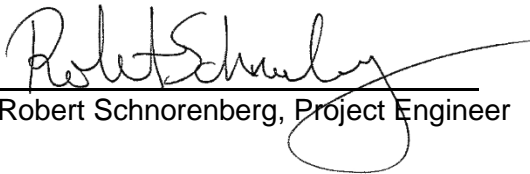
FINAL REPORT

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Approval Date: May 16, 2019

FINAL REPORT ACCEPTANCE BY:

Date: _____

The results presented in this report relate only to the specified test items.

TECHNICAL REPORT DOCUMENTATION PAGE

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15. Supplementary Notes																	
16. Abstract A Side Airbag Out-of-Position Injury evaluation was conducted on the subject 2018 Toyota Camry LE 4-Door Sedan in accordance with the specifications of the Side Airbag Out-of-Position Injury Technical Working Group Laboratory Test Procedure for the generation of consumer information. The test was conducted at MGA Research Corporation in Burlington, Wisconsin on September 27, 2018.																	
Injury Summary (3-Year-Old Out-Of-Position)																	
<table border="1" style="width: 100%; border-collapse: collapse; margin: 0 auto;"> <thead> <tr> <th style="width: 12.5%;">HIC15</th> <th style="width: 17.5%;">Maximum Chest Displacement (mm)</th> <th style="width: 17.5%;">Maximum Chest Displacement Rate m/s</th> <th style="width: 12.5%;">Nij (NTF)</th> <th style="width: 12.5%;">Nij (NTE)</th> <th style="width: 12.5%;">Nij (NCF)</th> <th style="width: 12.5%;">Nij (NCE)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">36.050</td> <td style="text-align: center;">-1.0</td> <td style="text-align: center;">-0.4</td> <td style="text-align: center;">0.19</td> <td style="text-align: center;">0.69</td> <td style="text-align: center;">0.12</td> <td style="text-align: center;">0.69</td> </tr> </tbody> </table>				HIC15	Maximum Chest Displacement (mm)	Maximum Chest Displacement Rate m/s	Nij (NTF)	Nij (NTE)	Nij (NCF)	Nij (NCE)	36.050	-1.0	-0.4	0.19	0.69	0.12	0.69
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17. Key Words Side Airbag Out-of-Position Technical Working Group OOP TWG HIII 3YO		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833															
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SECTION 1 PURPOSE AND SUMMARY OF TEST

PURPOSE

The purpose of this test was to obtain data in a static out-of-position side air bag deployment. These data constitute part of the general consumer information collected by Alpha Technology Associate, Inc.

SUMMARY

The effects of both a curtain and torso airbag deployment in a 2018 Toyota Camry LE 4-Door Sedan with an out-of-position Hybrid III 3-Year-Old child dummy were evaluated. The curtain and seat airbags were fired remotely. The test was performed by MGA Research Corporation on September 27, 2018. Pre- and post-test photographs of the vehicle and dummy can be found in Appendix A.

Two high-speed cameras (1000 fps) were used to document the side airbag deployment event. The following camera locations were used:

- Left Side Through Removed Left Rear Passenger Door
- Left Side ¾ View Through Windshield

One Hybrid III 3-Year-Old child dummy (Serial Number 082) was placed in the right rear passenger seat situated in the rear-facing position along the outboard edge of the seat per Section 3.3.3.2 according to dummy placement instructions specified in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags as prepared by the Side Airbag Out-of-Position Injury Technical Working Group (TWG).

The dummy was instrumented with the following instrumentation:

- Head Accelerometers
- Upper Neck Load Cell
- Lower Neck Load Cell
- Chest Accelerometers
- Upper Spine Accelerometers
- Lower Spine Accelerometers
- Upper Sternum Accelerometers
- Lower Sternum Accelerometers
- Chest Potentiometer

The 27 channels of data were recorded using an off board data acquisition system. Appendix B contains the dummy data traces.

The Hybrid III 3-Year-Old child dummy's visible contact points were as follows:

- Side curtain airbag to back of head and shoulder
- Side torso/pelvis airbag to left side of torso

The Hybrid III 3-Year-Old child dummy was placed in the right rear passenger seat along the outboard edge of the seat cushion, kneeling and facing rearward. The vertical centerline of the dummy's sternum was aligned as close as possible with the leading edge of the seatback bolster. The sternum contacted with seat. The dummy's head was placed in between the seat bolster and pillar/side trim to maximize contact between the sternum and seatback. The head remained in its neutral orientation. The outboard leg was positioned at the outboard edge of the seat cushion and parallel to the seat centerline and remained on the cushion. The outboard knee and lower leg was slid toward the seatback/seat cushion junction until the top edge of the upper rib was aligned horizontally with the top edge of the airbag module. The inboard leg was aligned parallel to the centerline of the seat cushion. The inboard knee and lower leg was slid toward the seat bight until a line drawn through both shoulder bolts was perpendicular to the vehicle centerline. The inboard arm was rotated towards the seatback until the thumb contacts the seatback. The outboard arm and hand was rotated to hang down as close to vertical as possible.

The dummy's skullcap seam was taped with 4mm electrical tape to prevent the airbag from getting caught in the seam. The dummy's head skin was cleaned with alcohol and dusted with baby powder to achieve acceptable frictional characteristics.

This orientation complies with Section 3.3.3.2 of the TWG Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags as defined by Lund, et al and the Technical Working Group First Revision dated July, 2003.

**SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS**

**DATA SHEET NO. 1
TEST SUMMARY**

	Test Data	Description
Seating Position	P3	Right Rear Seating Position
Test	3.3.3.2*	Rear-Facing Child Dummy
Curtain Airbag	Roof-Rail Mounted	Side Curtain Airbag
Torso Airbag	Seat Mounted	Side Torso Airbag
ATD Type/Serial No.	Hybrid III 3-Year-Old / 082	Child Dummy

*Procedure as defined by Lund, et al and the Technical Working Group dated July, 2003

Number of Data Channels	27
Number of Airbag Channels	4
Number of High-Speed Video	2

Visible Dummy Contact Points	
Head Contact	Side curtain airbag to back of head
Left Shoulder Contact	None
Left Torso Contact	Side torso airbag to torso
Left Pelvis Contact	None

DATA SHEET NO. 2

TEST VEHICLE INFORMATION

Please note that this vehicle had previously been tested in an
NCAP Side Impact on October 20, 2017.

TEST VEHICLE INFORMATION

Manufacturer	Toyota
Model	Camry LE
Body Style	4-Door Sedan
NHTSA No.	M20185102
VIN	JTNB11HK1J3018603
Color	Brownstone
Delivery Date	9/21/2017
Odometer Reading	50 miles
Dealer	Toyota of Brookfield
Transmission	Automatic
Final Drive	FWD
Number of Cylinders	4
Engine Displacement	2.5 L
Engine Placement	Lateral
Automatic Door Lock (ADL)	Yes
Owner's Manual Details Instructions on Disabling ADLs	Yes
Bucket Seats	Yes

TEST VEHICLE OPTIONS

Driver Front Airbag	Yes
Driver Side Curtain Airbag	Yes
Driver Side Torso Airbag	No
Driver Side Torso/Pelvis Airbag	Yes
Rear Pass. Side Curtain Airbag	Yes
Rear Pass. Side Torso Airbag	No
Rear Pass. Side Torso/Pelvis Airbag	Yes
Force Limiter	Yes
Pretensioner	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Anti-lock Brakes	Yes
Traction Control	Yes
All-Wheel Drive	No
Power Seats	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	TOYOTA MOTOR CORPORATION
Date of Manufacture	07/17

GVWR (kg)	2030
GAWR Front (kg)	1129
GAWR Rear (kg)	1080

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Contoured Bench		
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				420
Cargo Wt. (RCLW) (kg)				80

DATA SHEET NO. 3
DUMMY POSITIONING IN VEHICLE

Measurement		Value
Seat Position (from forward-most)		Fixed
Seat Height Position		Fixed
Placed in Position No. 2		-
Seat Back Angle (at outboard headrest post)	SA (°)	-
Top of Curtain Airbag Module to Head/Neck Junction	AN (mm)	325
Top of Seat Airbag Module to Head/Neck Junction	AN (mm)	185
Head CG to Window	HD (mm)	120
Head to Seat Back Centerline	HSC (mm)	170
ATD Back to Seatback	CD (mm)	-
Chest to Seatback	CS (mm)	90
Right Arm to Seat Back Centerline	RACL (mm)	50
Left Arm to Seat Back Centerline	LACL (mm)	320
Right Arm to Door Panel	RA (mm)	320
Left Arm to Door Panel	LA (mm)	0
Knee to Knee	KK (mm)	88
Toe to Toe	TT (mm)	74
Right Knee to Seat Cushion Centerline	KSCR (mm)	76
Left Knee to Seat Cushion Centerline	KSCL (mm)	175
Right Toe to Seat Cushion Centerline	TSCR (mm)	84
Left Toe to Seat Cushion Centerline	TSCL (mm)	150
Nose to Dash	ND (mm)	-
Nose to Seatback	NS (mm)	0
Top of Head to Headliner	HH (mm)	95

DATA SHEET NO. 4
DUMMY INJURY CRITERIA VALUES

NHTSA No. M20185102TWG3

DESCRIPTION	UNIT	Position No. 3			
		MAXIMUM	TIME (ms)	MINIMUM	TIME (ms)
Head X	g	40.7	14.2	-32.9	44.8
Head Y	g	17.2	13.9	-17.1	17.6
Head Z	g	21.1	14.6	-5.0	16.8
Head Resultant	g	44.3	14.2		
Upper Neck Fx	N	170.1	7.2	-320.0	17.7
Upper Neck Fy	N	108.2	21.0	-113.6	14.7
Upper Neck Fz	N	492.5	21.2	-382.4	16.0
Upper Neck F Resultant	N	547.7	21.3		
Upper Neck Mx	Nm	11.2	67.8	-10.8	10.2
Upper Neck My	Nm	8.9	7.1	-15.9	17.7
Upper Neck Mz	Nm	6.6	97.4	-7.9	21.1
Upper Neck M Resultant	Nm	16.4	17.7		
Lower Neck Fx	N	171.1	6.4	-351.6	19.8
Lower Neck Fy	N	51.8	176.0	-186.7	15.5
Lower Neck Fz	N	588.8	21.1	-311.0	16.3
Lower Neck F Resultant	N	664.6	21.1		
Lower Neck Mx	Nm	18.2	173.7	-10.6	16.5
Lower Neck My	Nm	20.5	34.9	-8.5	6.5
Lower Neck Mz	Nm	7.9	109.8	-8.4	13.5
Lower Neck M Resultant	Nm	20.9	33.2		
Chest X	g	7.7	29.6	-24.6	5.6
Chest Y	g	22.8	5.9	-2.3	178.6
Chest Z	g	9.0	15.3	-7.7	21.0
Chest Resultant	g	33.4	5.8		

DATA SHEET NO. 4 (continued)
DUMMY INJURY CRITERIA VALUES

NHTSA No. M20185102TWG3

DESCRIPTION	UNIT	Position No. 3			
		MAXIMUM	TIME (ms)	MINIMUM	TIME (ms)
Upper Spine X	g	9.9	29.5	-16.7	8.7
Upper Spine Y	g	23.2	9.0	-5.8	6.4
Upper Spine Z	g	10.4	14.9	-8.9	19.2
Upper Spine Resultant	g	28.6	8.9		
Lower Spine X	g	33.1	5.4	-7.6	30.1
Lower Spine Y	g	26.0	5.8	-2.5	30.7
Lower Spine Z	g	11.2	5.7	-10.2	21.0
Lower Spine Resultant	g	42.1	5.5		
Upper Sternum X	g	258.9	4.8	-190.6	6.6
Lower Sternum X	g	209.2	4.6	-292.7	5.0
Chest Displacement	mm	3.1	21.9	-1.0	5.5
Chest Displacement Rate	m/s	0.5	16.6	-0.4	25.2

DATA SHEET NO. 4 (continued)
DUMMY INJURY CRITERIA VALUES

NHTSA No. M20185102TWG3

Head Injury Summary (Hybrid III 3-Year-Old Child Out-Of-Position)

ATD position	HEAD INJURY CRITERIA (HIC)					
	HIC15			HIC36		
	HIC	T ¹ (msec)	T ² (msec)	HIC	T ¹ (msec)	T ² (msec)
No. 082 Right Front	36.050	39.9	49.8	47.485	13.6	49.6

Neck Injury Summary (Hybrid III 3-Year-Old Child Out-Of-Position)

	Nij	Time (msec)	Z Force (N) (CFC 600)	X Force (N) (CFC 600)	Y Moment (N-m) (CFC 600)
Ntf	0.19	7.3	119.8	165.0	8.8
Nte	0.69	20.1	446.2	-264.1	-12.9
Ncf	0.12	5.1	-93.6	99.1	5.0
Nce	0.69	16.3	-360.5	-261.7	14.0
Peak Tension (CFC1000)		492.5 N	Peak Compression (CFC 1000)		-382.4 N

Critical Values

Nij Intercepts				Peak Limits	
Tension (CVt)	2120 N	Extension (mCVe)	27 N-m	Tension	1130 N
Compression (CVc)	2120 N	Flexion (mCVf)	68 N-m	Compression	1380 N

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PHOTOGRAPHS**

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Photo No. 001 - Right Three-Quarter Front View of Vehicle, As Received



Photo No. 002 - Vehicle Certification Placard



Photo No. 003 - Pre-Test Vehicle Left Side View



Photo No. 004 - Post-Test Vehicle Left Side View

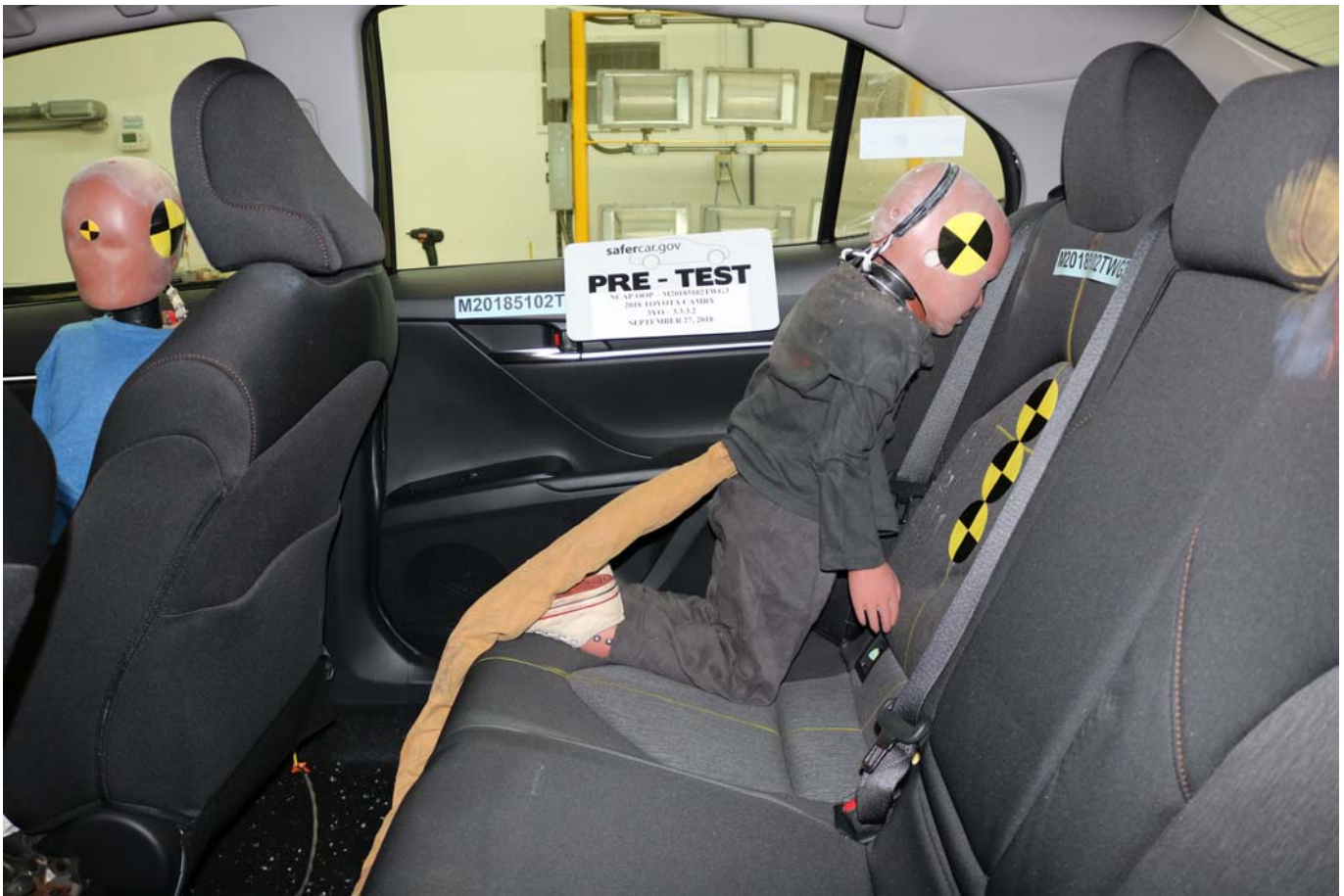


Photo No. 005 - Pre-Test 3-Year-Old Child Dummy Left Side View



Photo No. 006 - Post-Test 3-Year-Old Child Dummy Left Side View



Photo No. 007 - Pre-Test 3-Year-Old Child Dummy Left Side Close-Up View

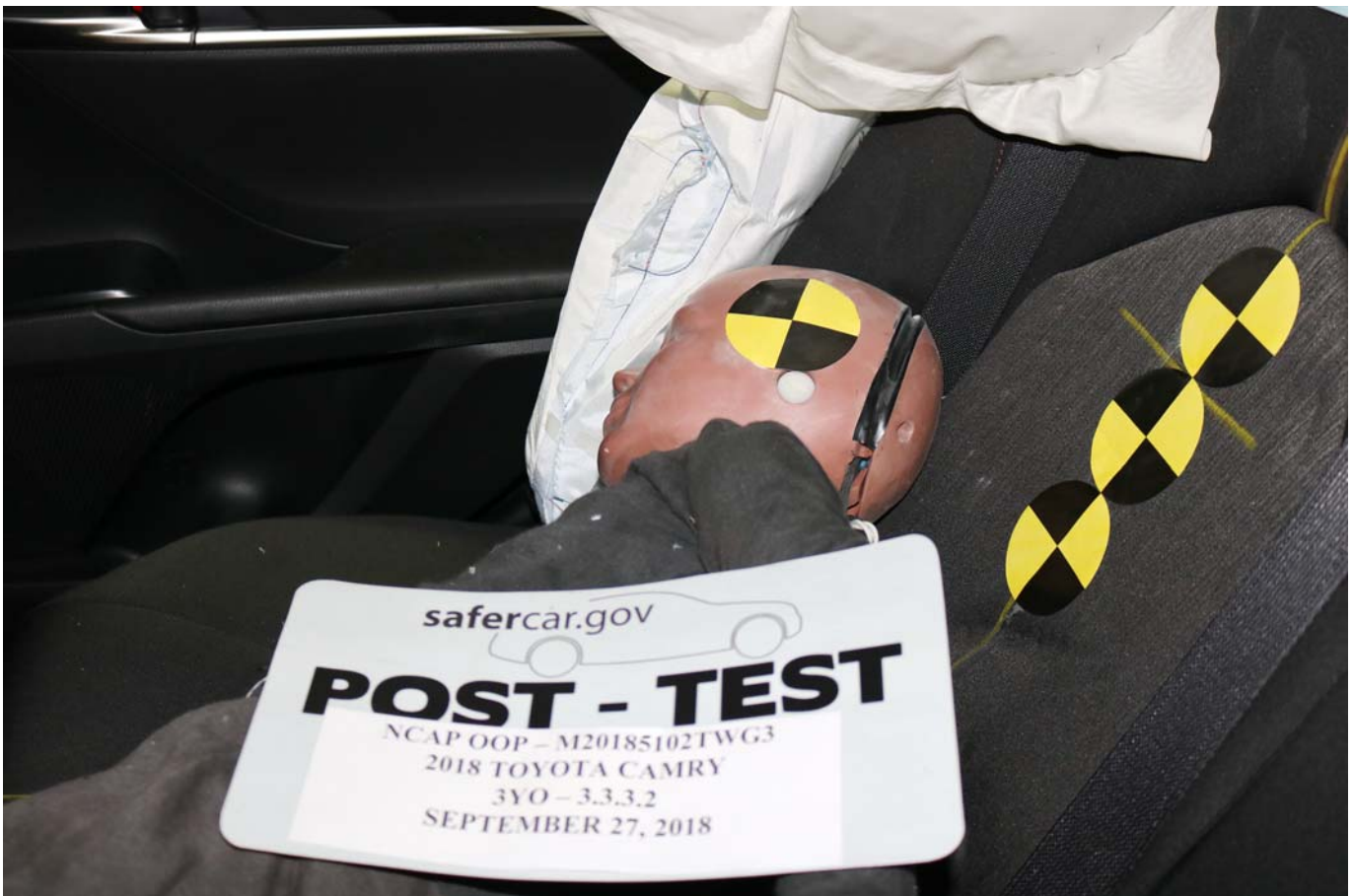


Photo No. 008 - Post-Test 3-Year-Old Child Dummy Left Side Close-Up View



Photo No. 009 - Pre-Test 3-Year-Old Child Dummy Left Three-Quarter Front View



Photo No. 010 - Post-Test 3-Year-Old Child Dummy Left Three-Quarter Front View



Photo No. 011 - Pre-Test 3-Year-Old Child Dummy Left Three-Quarter Front Close-Up View



Photo No. 012 - Post-Test 3-Year-Old Child Dummy Left Three-Quarter Front Close-Up View

PHOTOGRAPH NOT AVAILABLE

Photo No. 013 - Pre-Test 3-Year-Old Child Dummy Front View

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Photo No. 014 - Post-Test 3-Year-Old Child Dummy Front View

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Photo No. 015 - Pre-Test 3-Year-Old Child Dummy Front Close-Up View

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Photo No. 016 - Post-Test 3-Year-Old Child Dummy Front Close-Up View



Photo No. 017 - Pre-Test 3-Year-Old Child Dummy Right Three-Quarter Front View



Photo No. 018 - Post-Test 3-Year-Old Child Dummy Right Three-Quarter Front View



Photo No. 019 - Pre-Test 3-Year-Old Child Dummy Right Side View



Photo No. 020 - Post-Test 3-Year-Old Child Dummy Right Side View



Photo No. 021 - Post-Test 3-Year-Old Child Dummy Right Side View (Door Open)



Photo No. 022 - Post-Test Curtain Airbag Left Side View



Photo No. 023 - Post-Test Curtain Airbag Left Three-Quarter Front View

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Photo No. 024 - Post-Test Curtain Airbag Front View



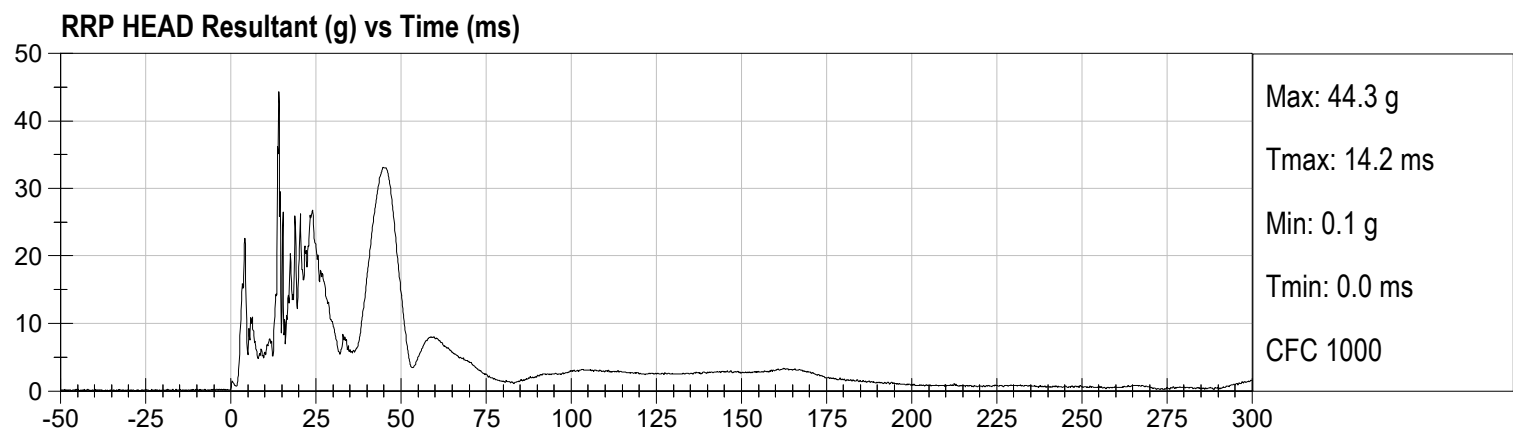
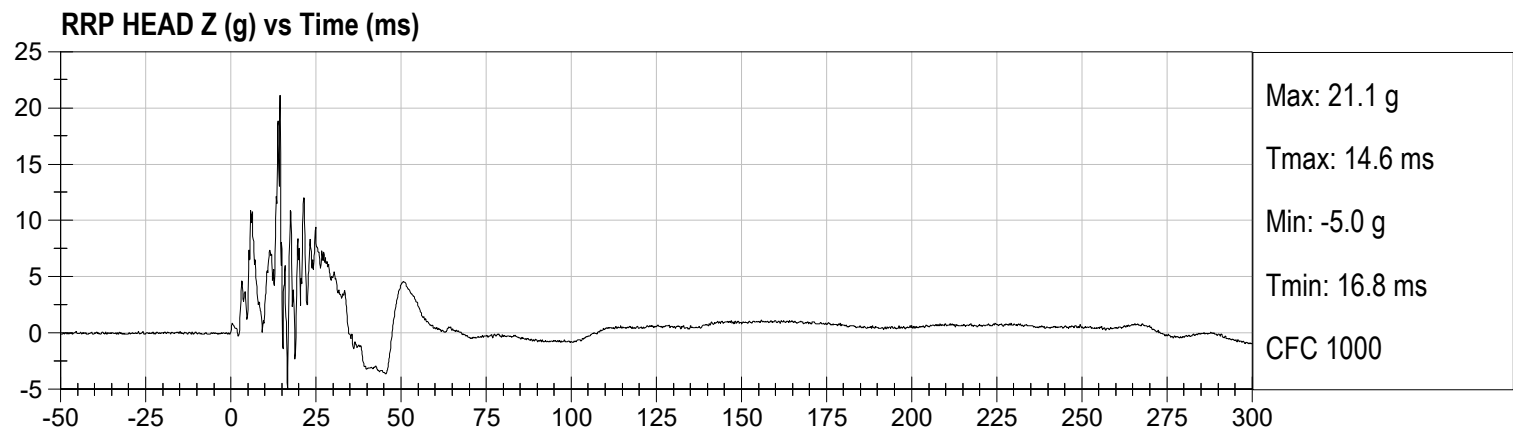
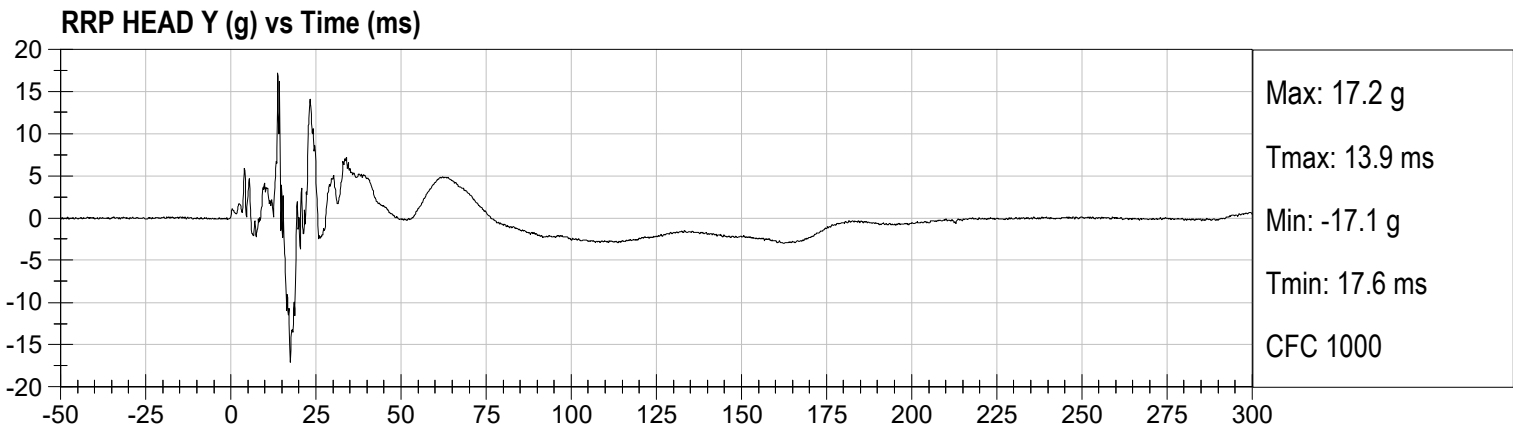
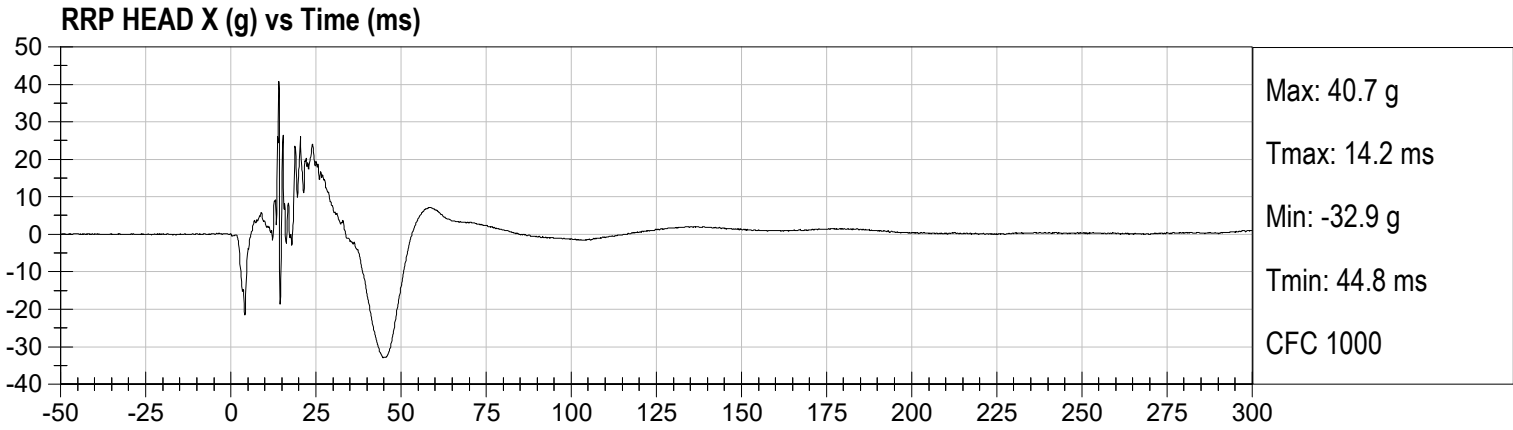
Photo No. 025 - Post-Test Curtain Airbag Right Side View (Door Open)

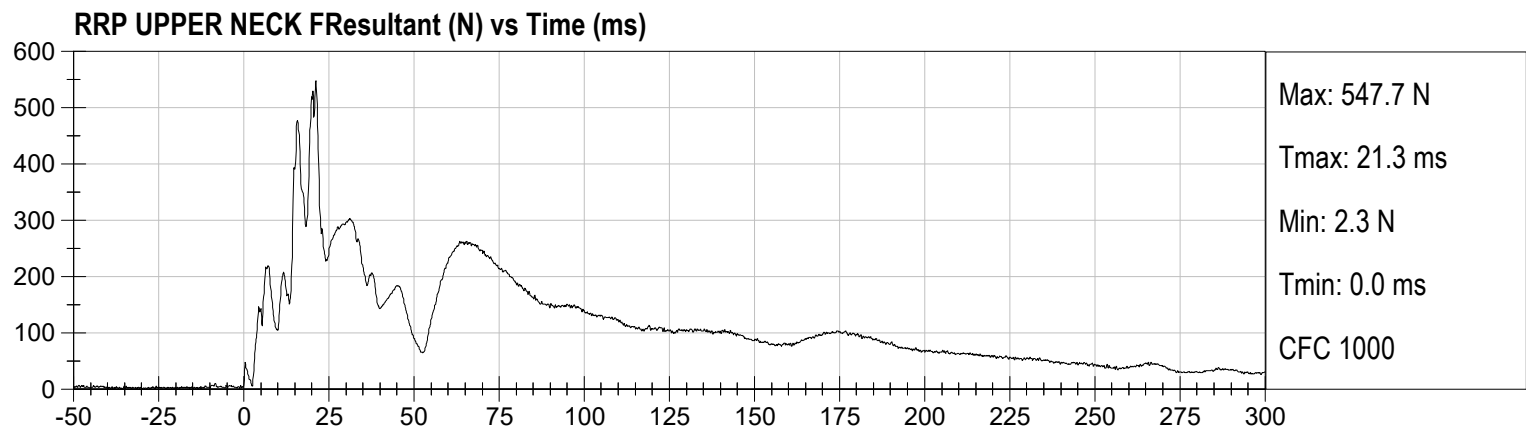
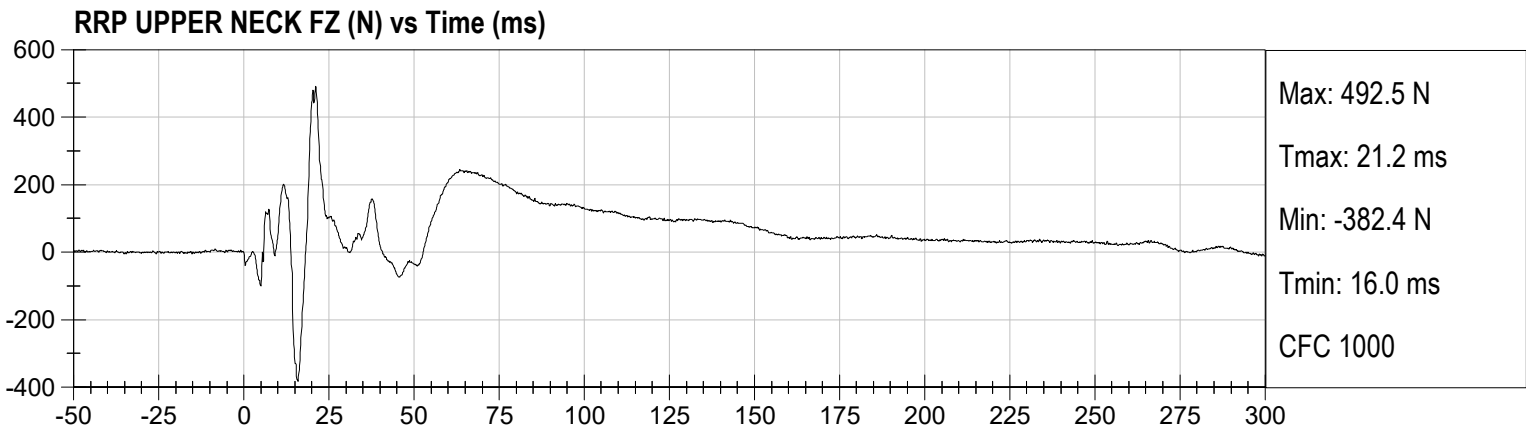
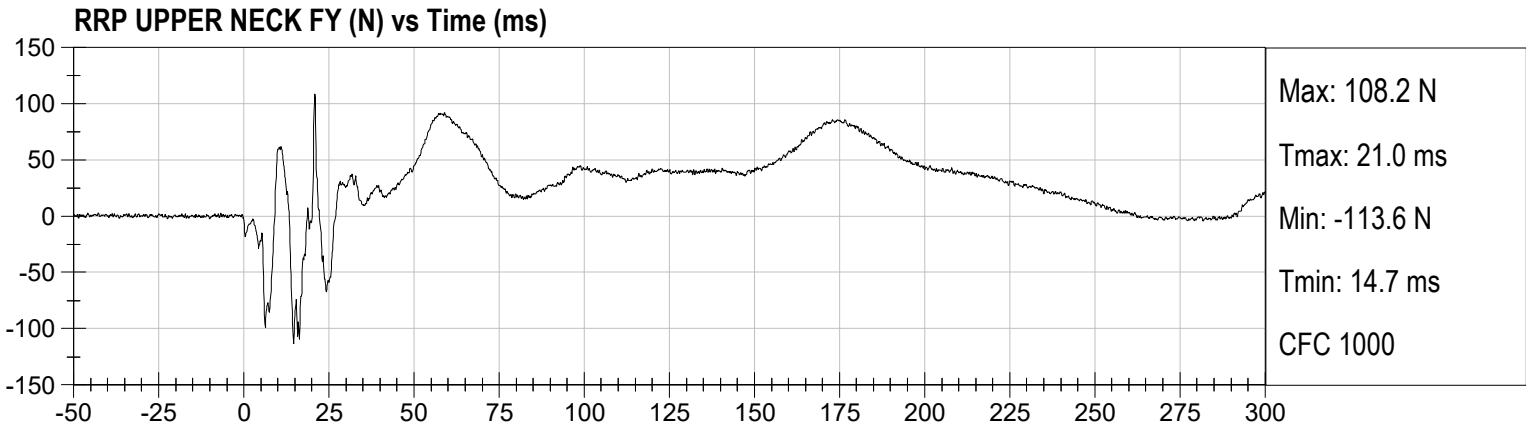
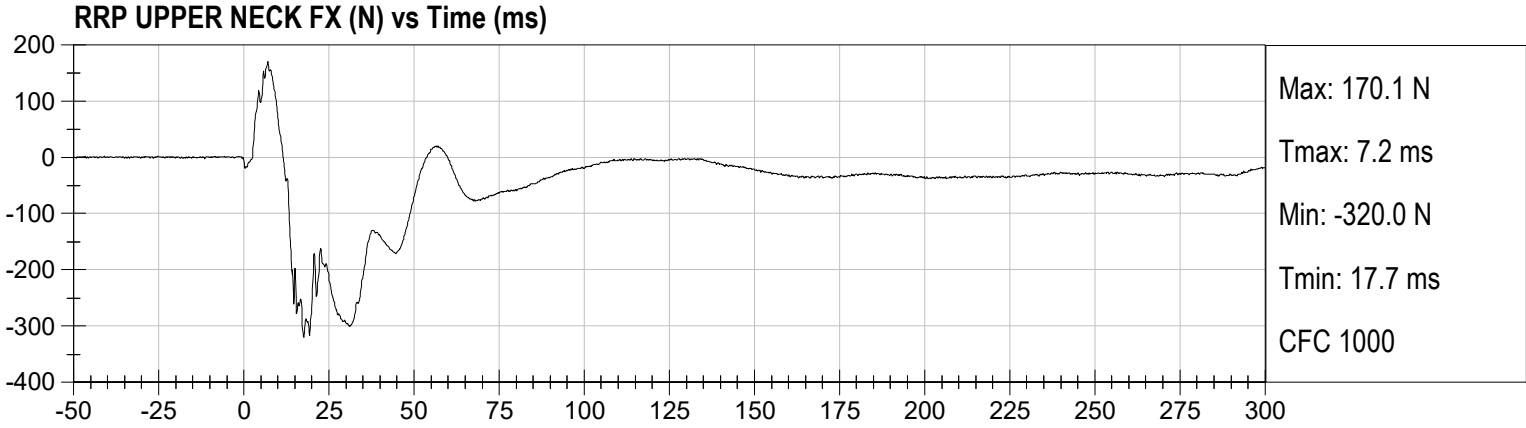
APPENDIX B
DUMMY RESPONSE DATA TRACES

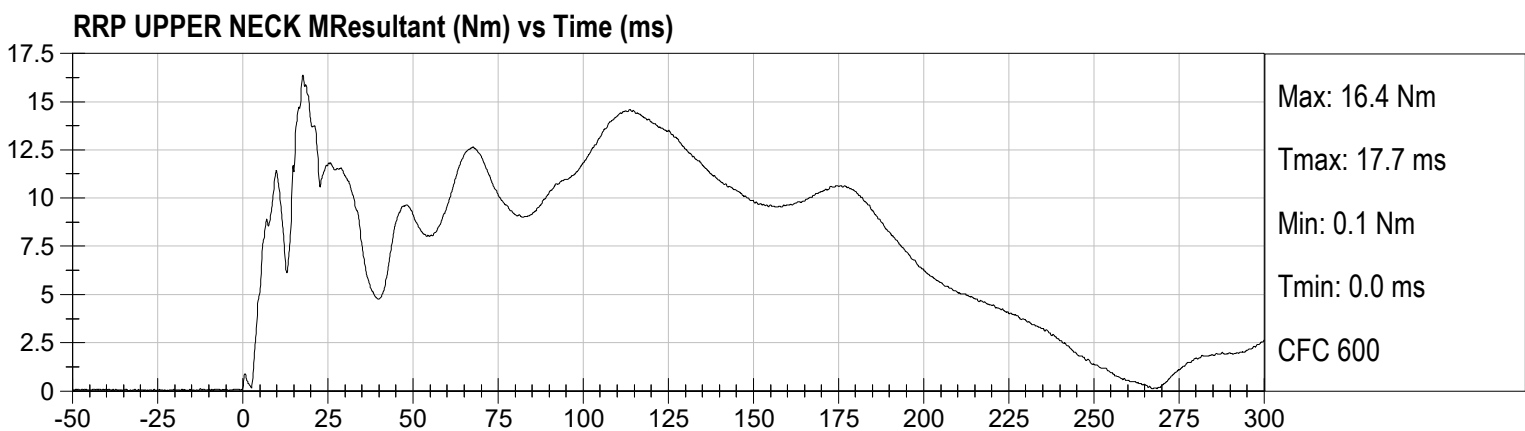
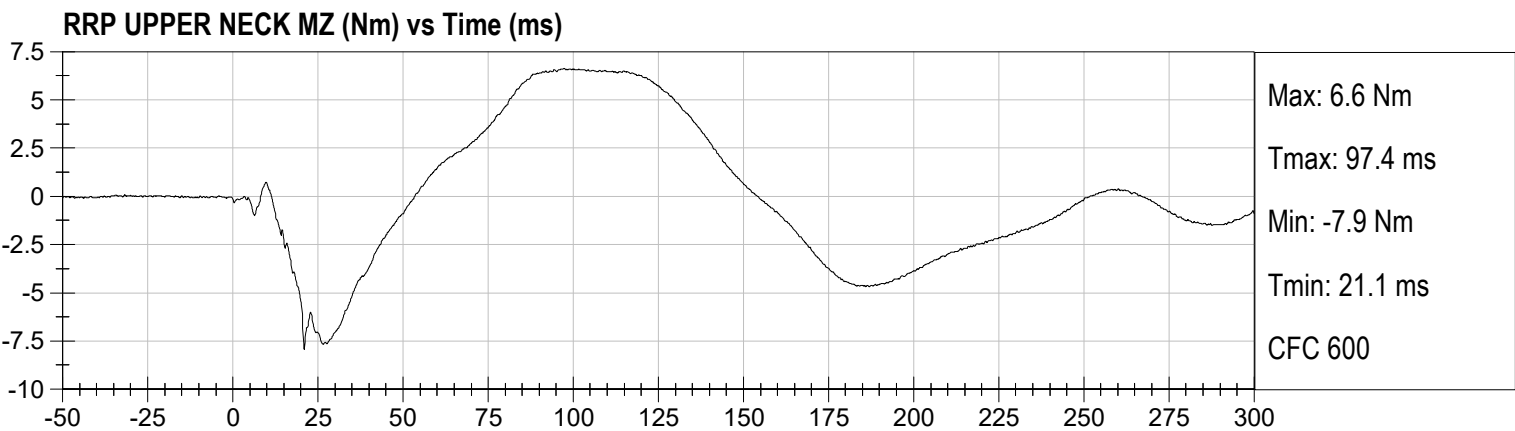
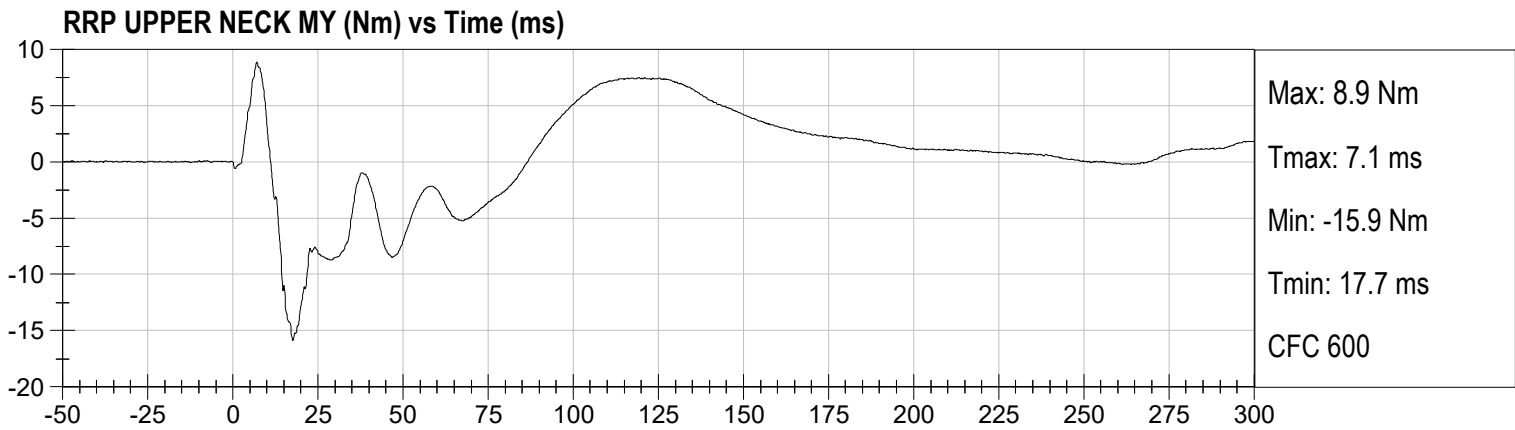
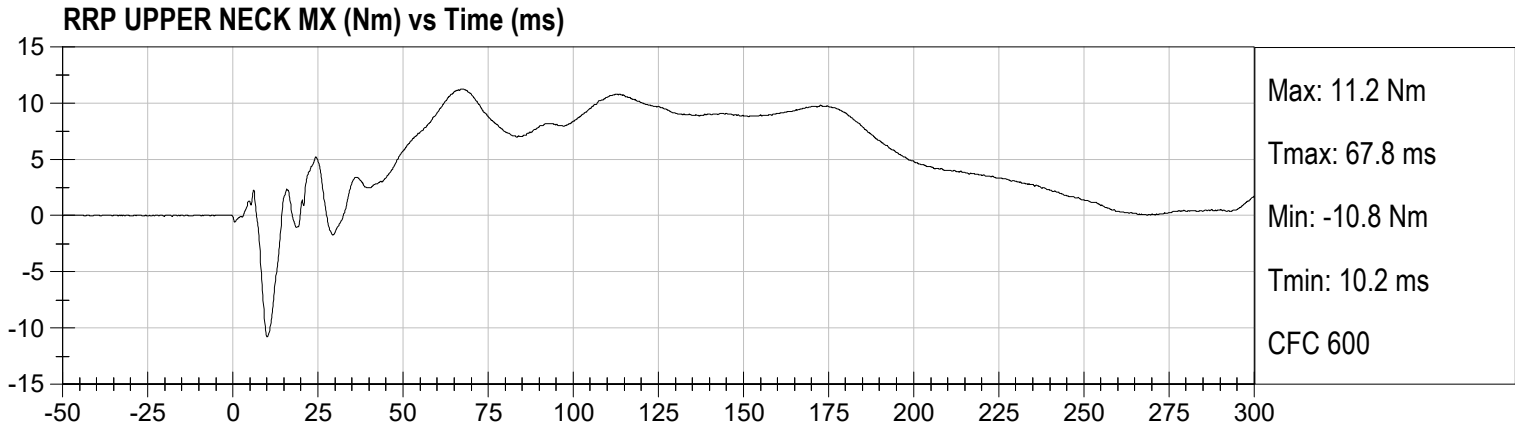
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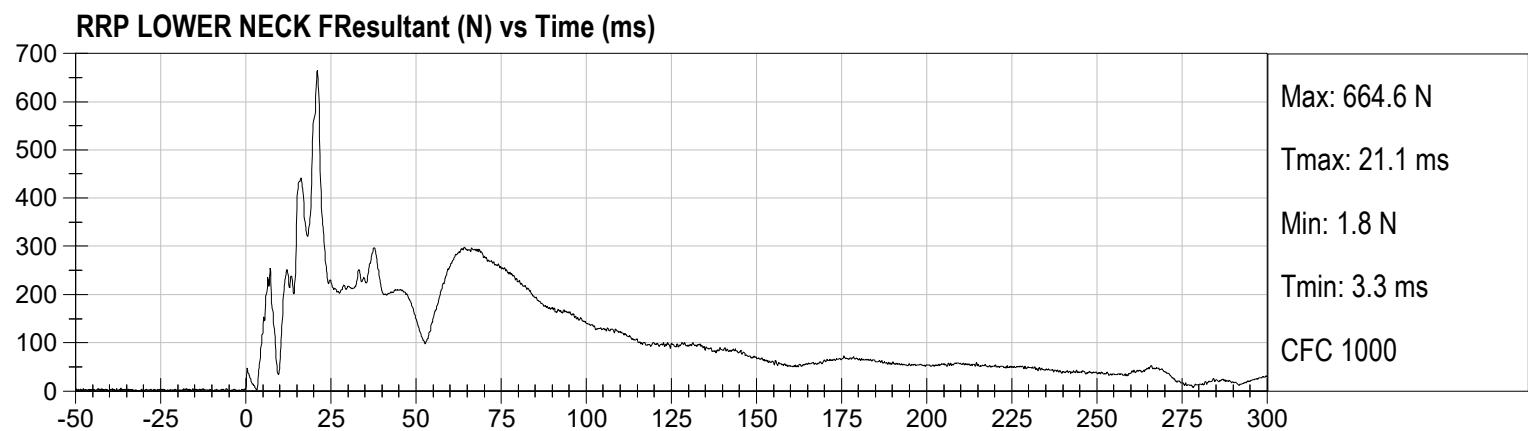
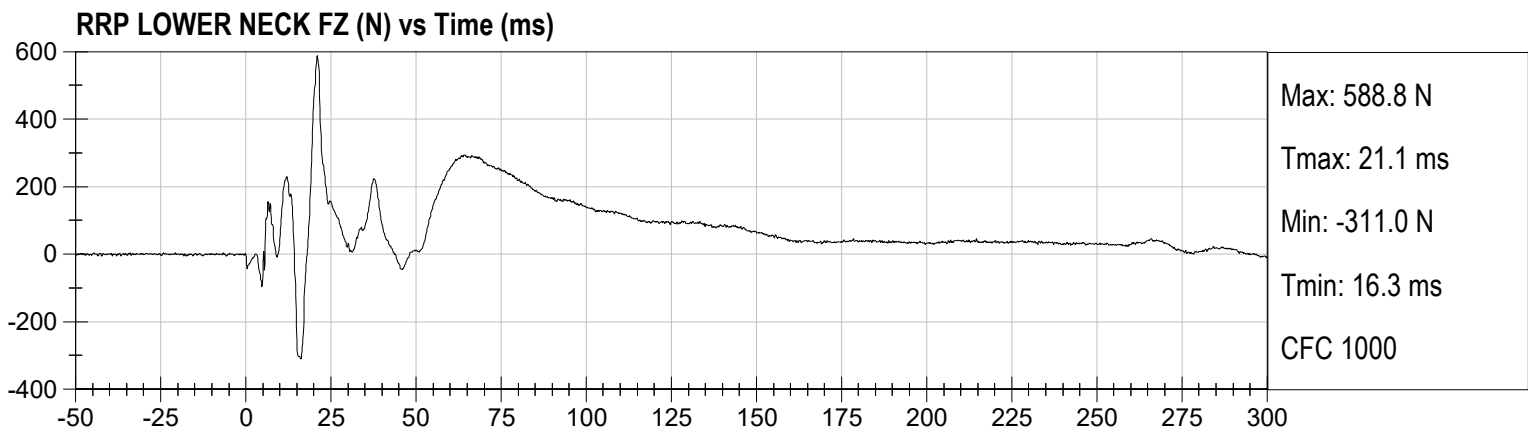
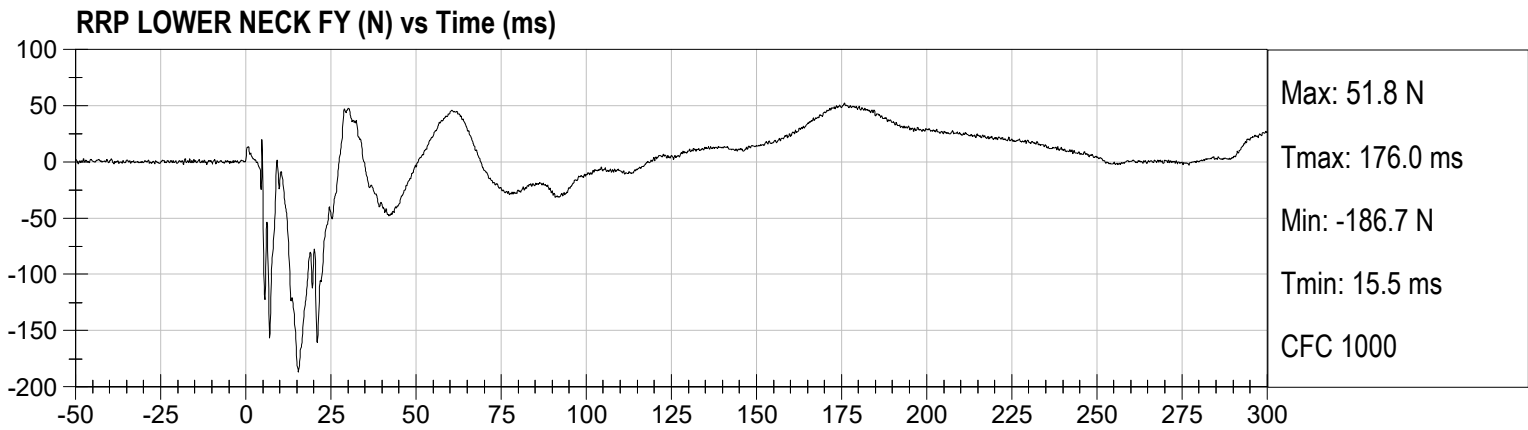
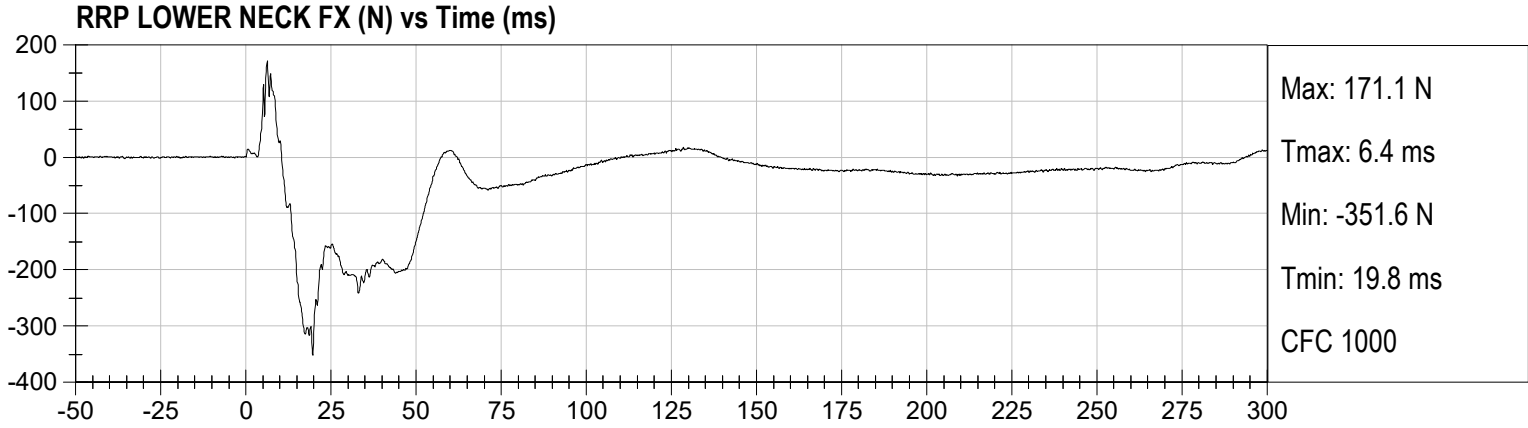
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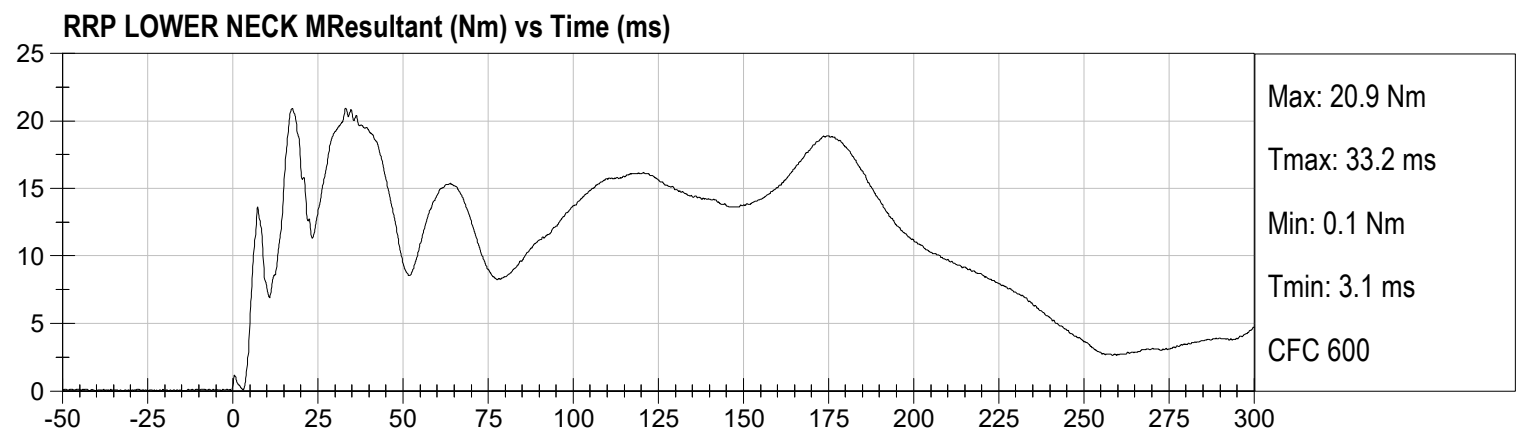
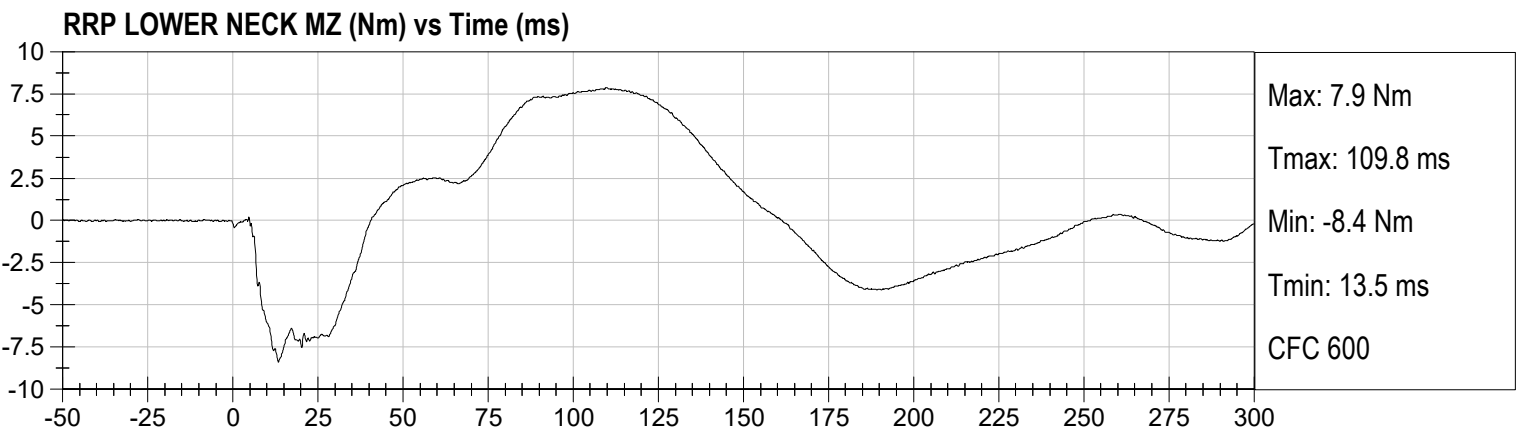
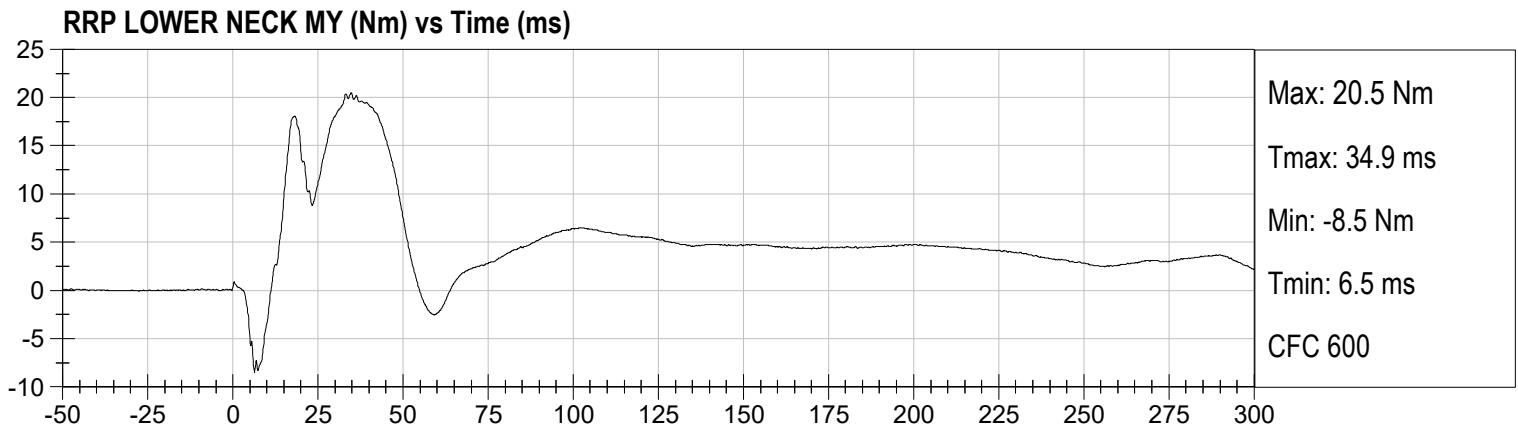
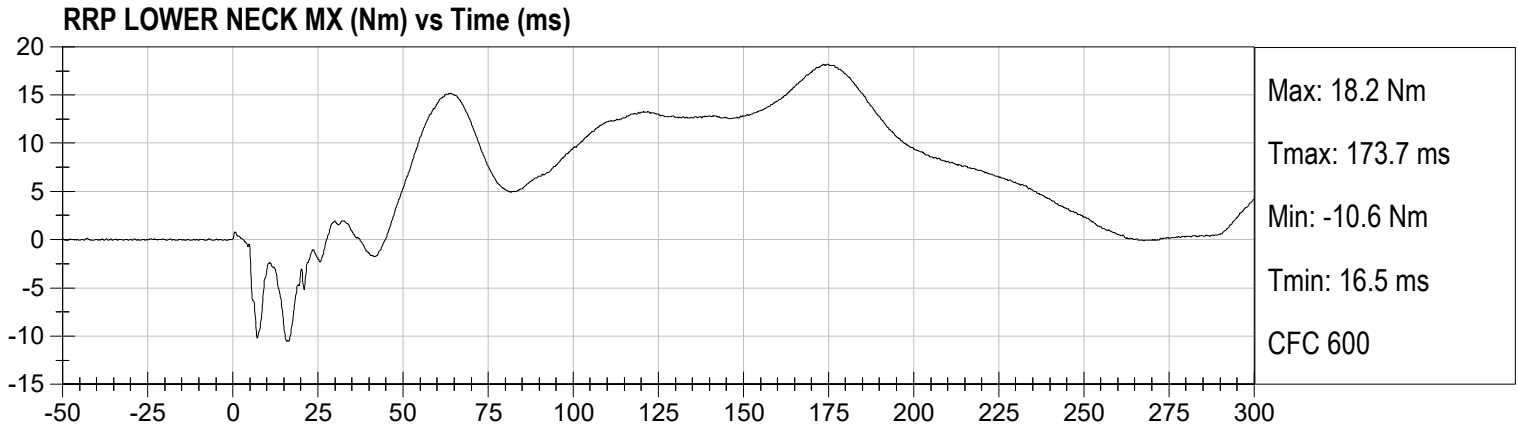
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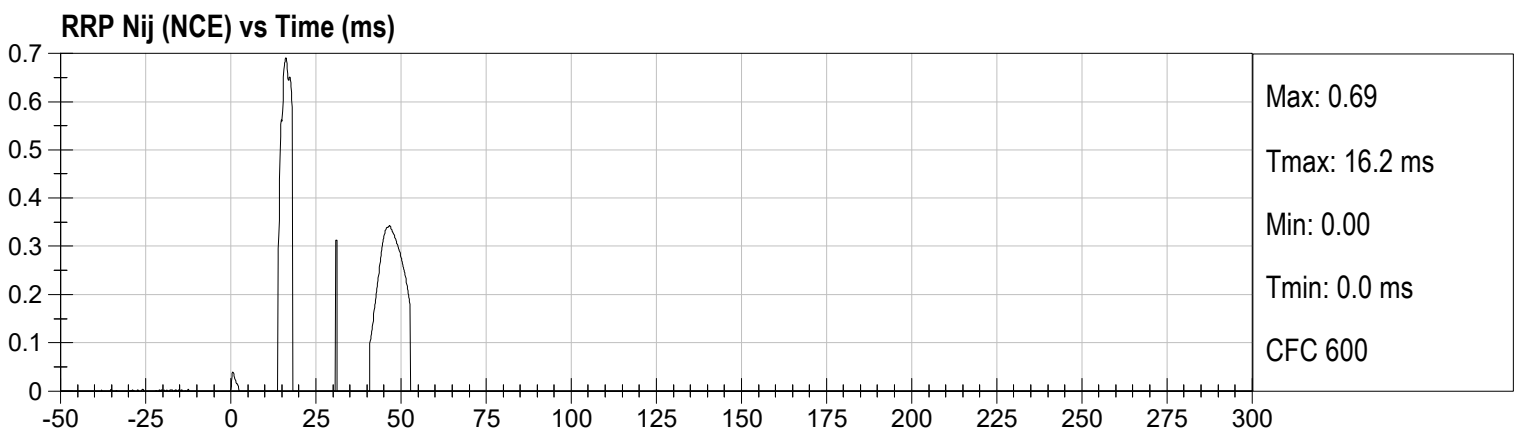
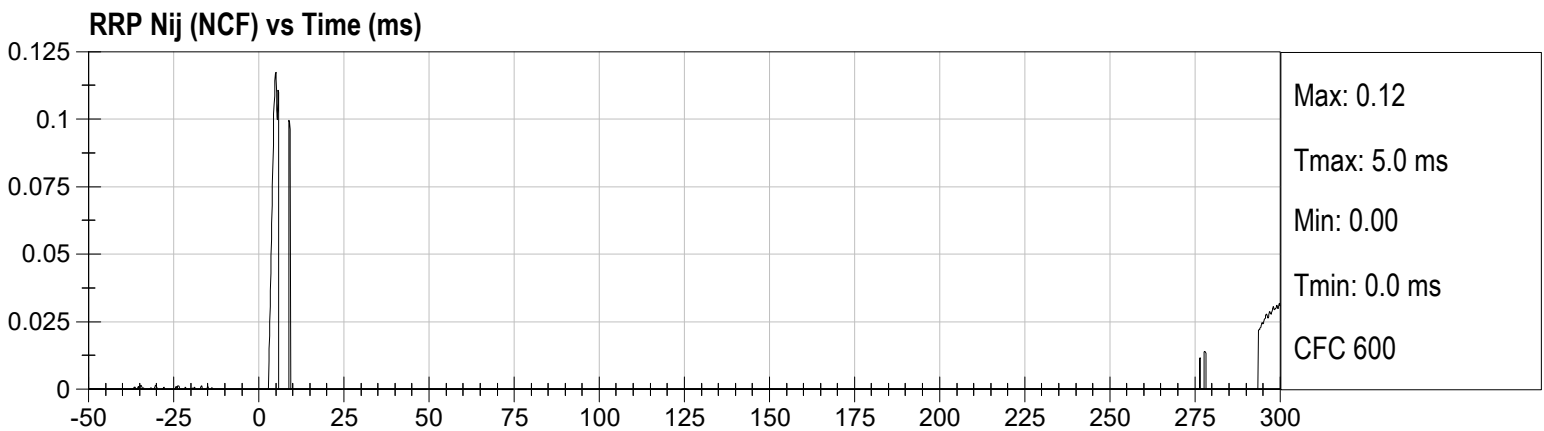
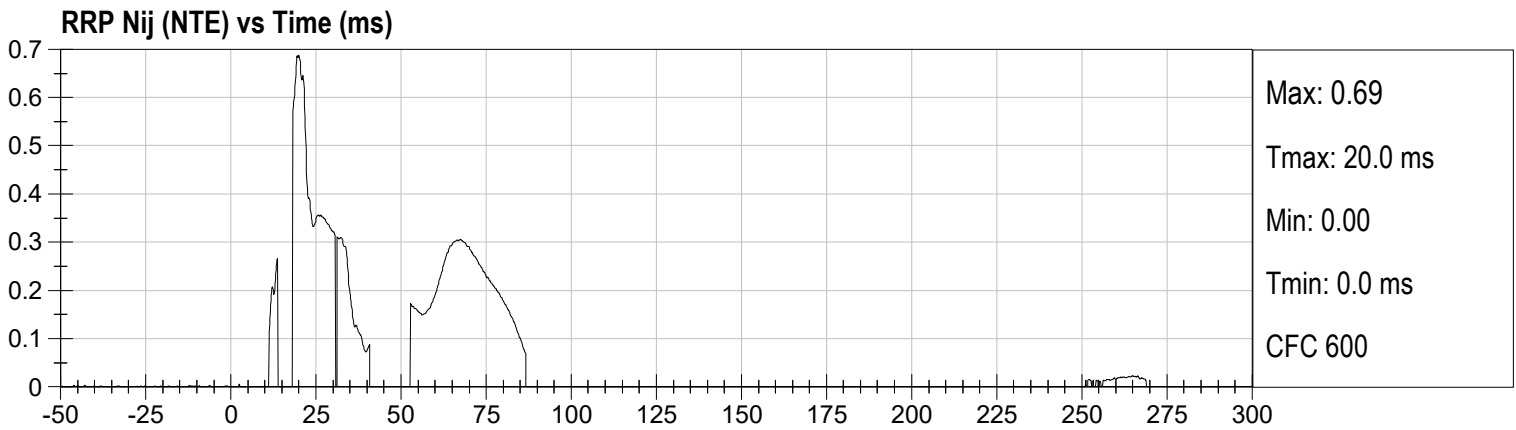
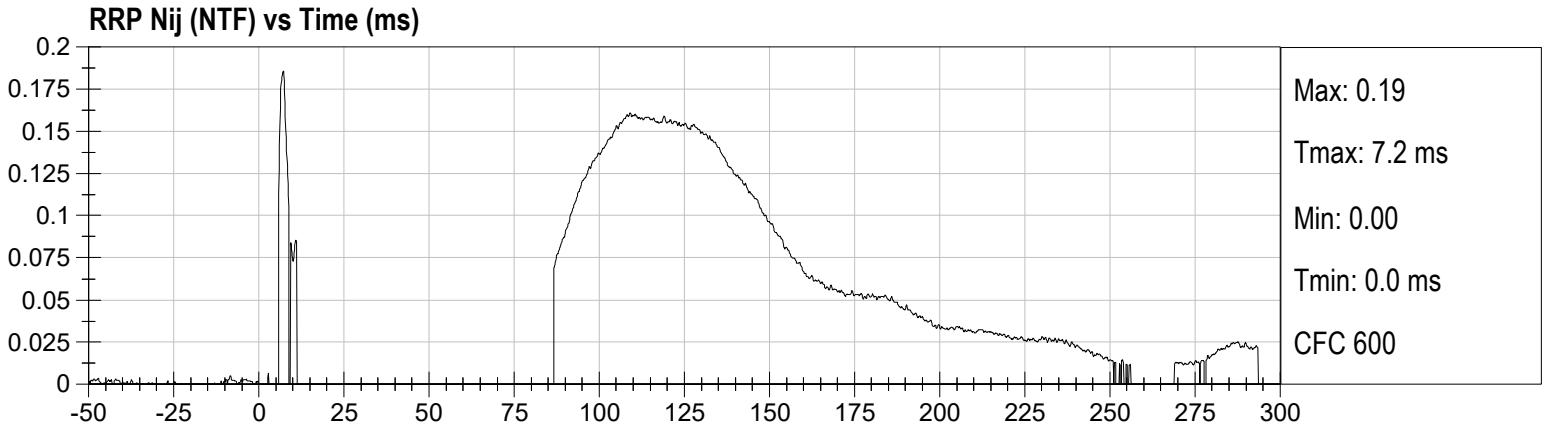


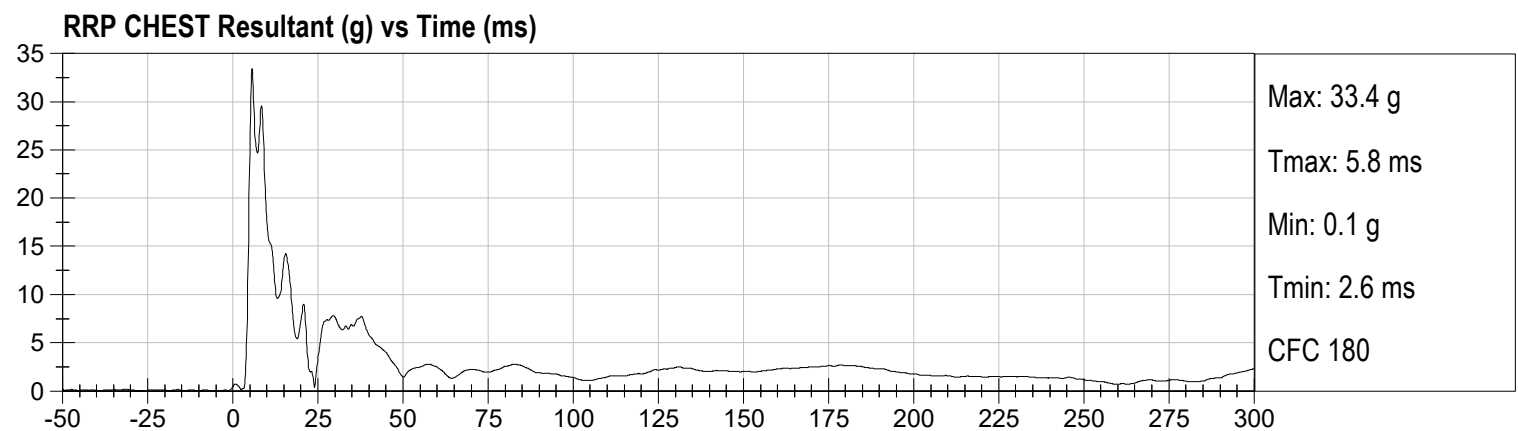
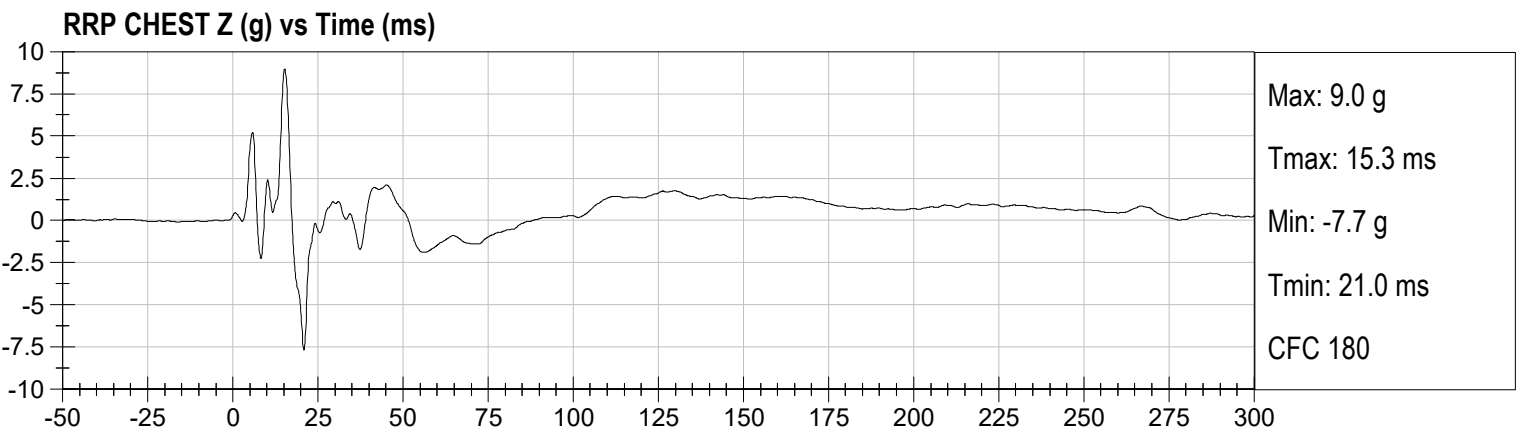
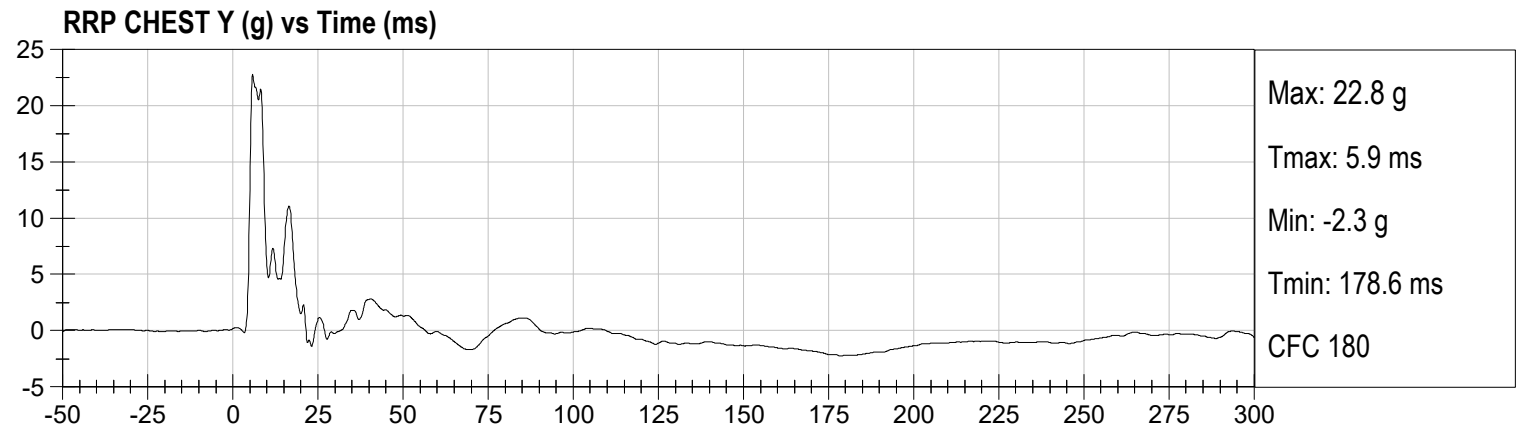
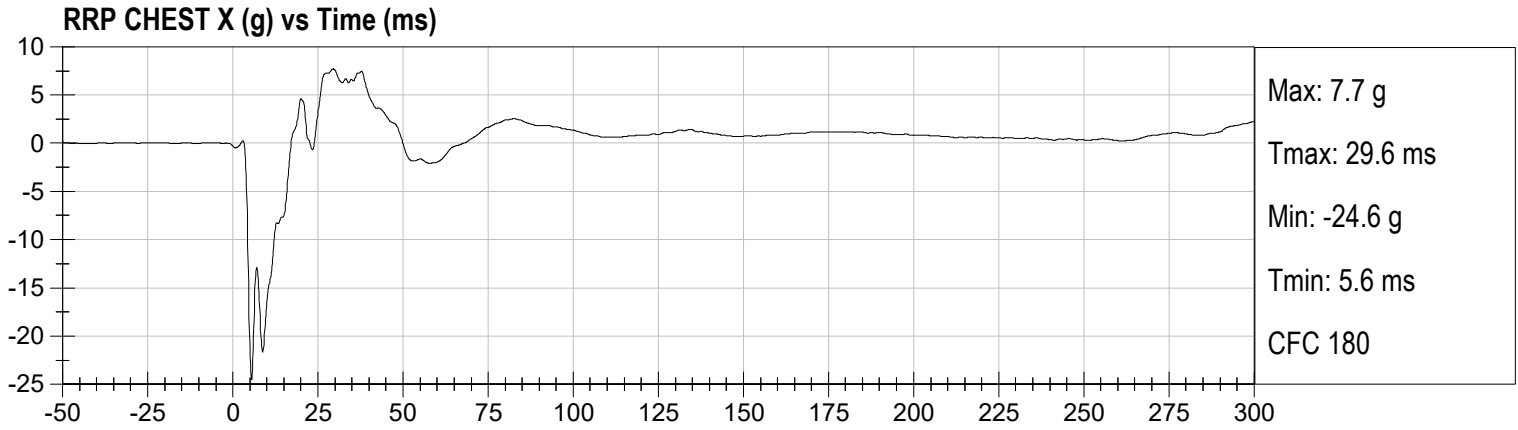


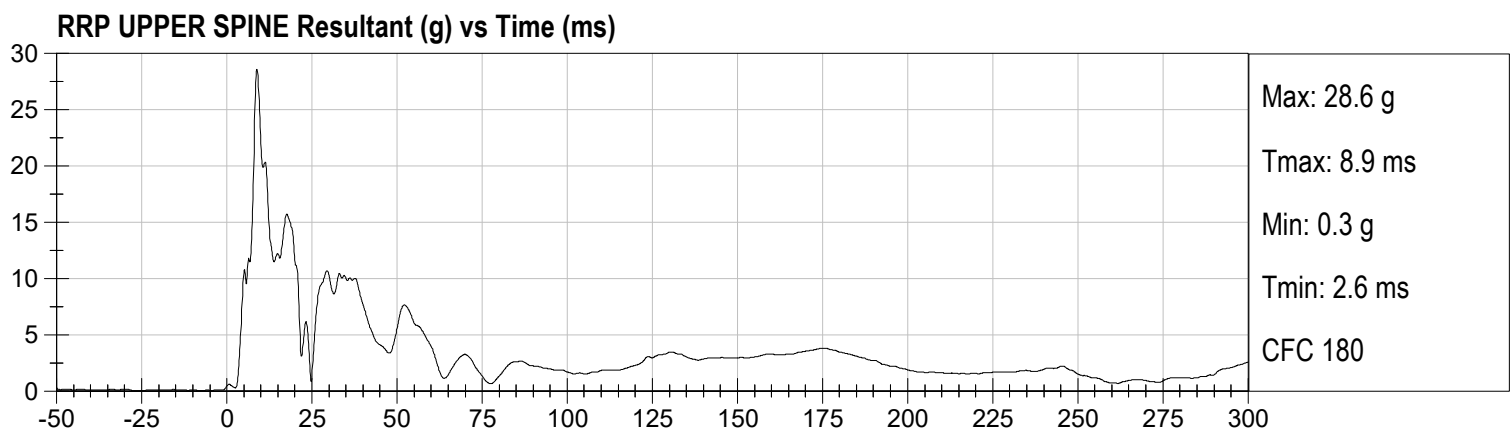
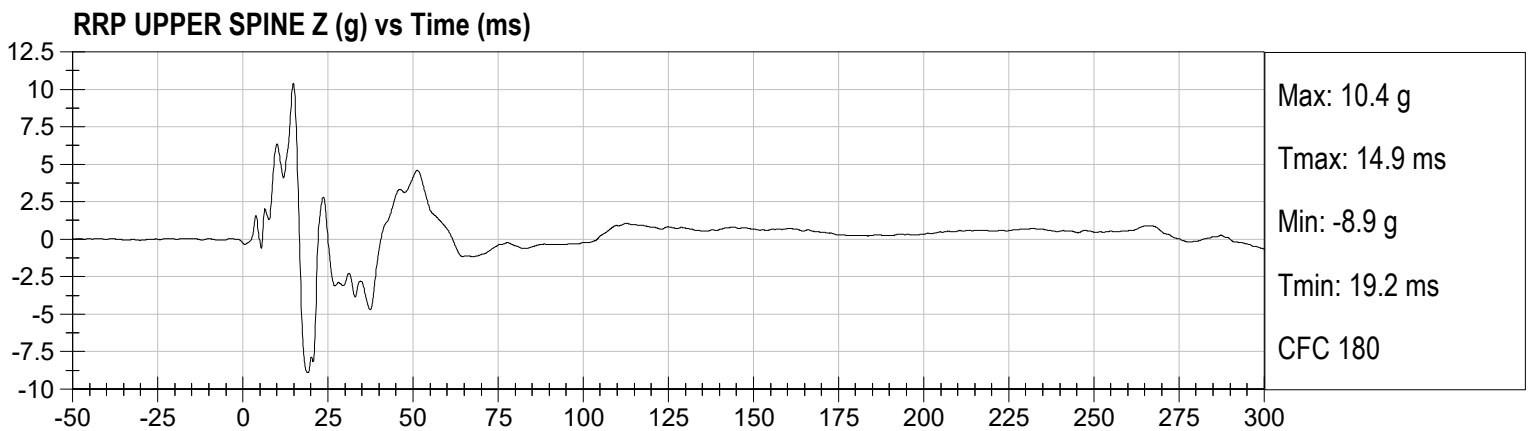
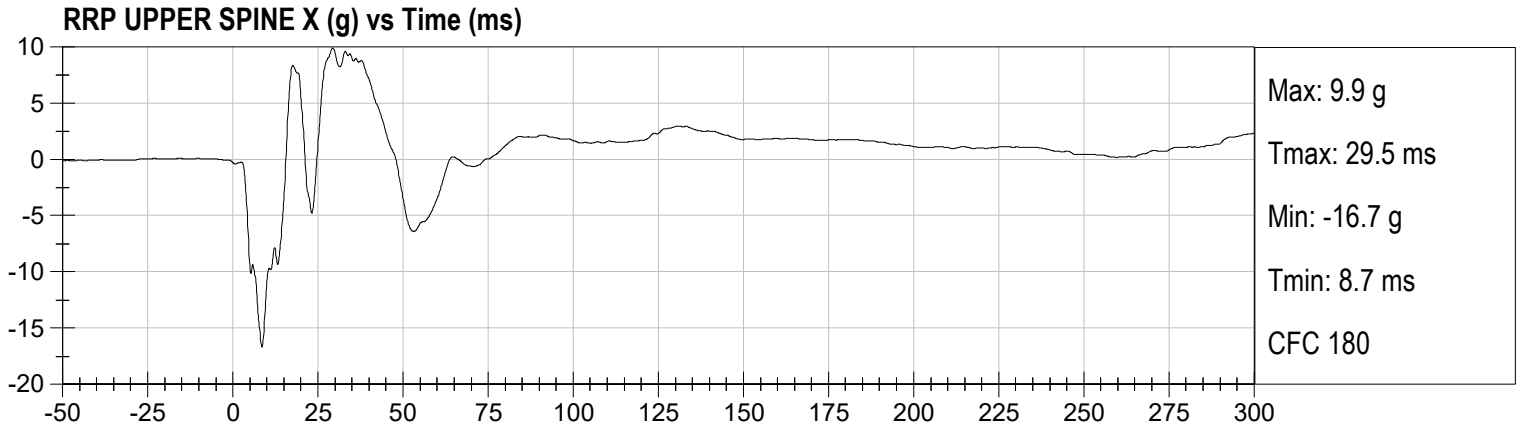


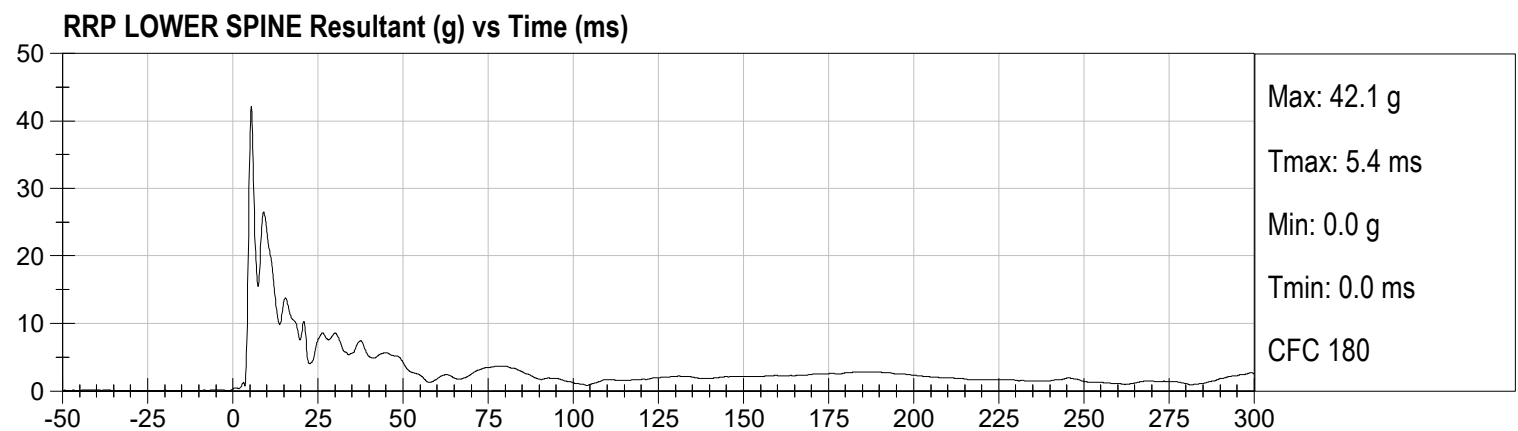
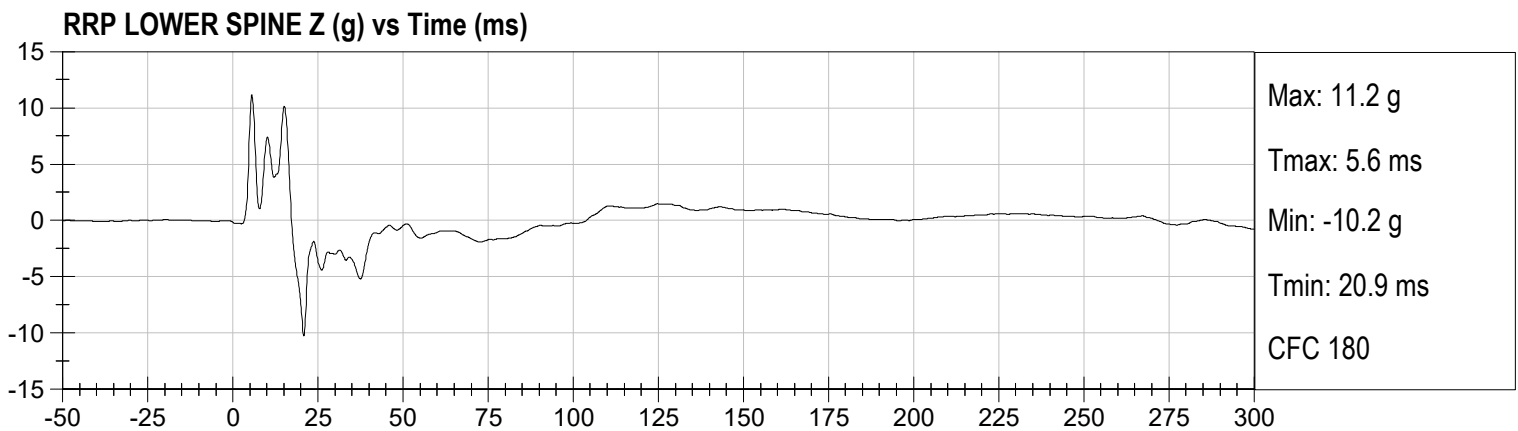
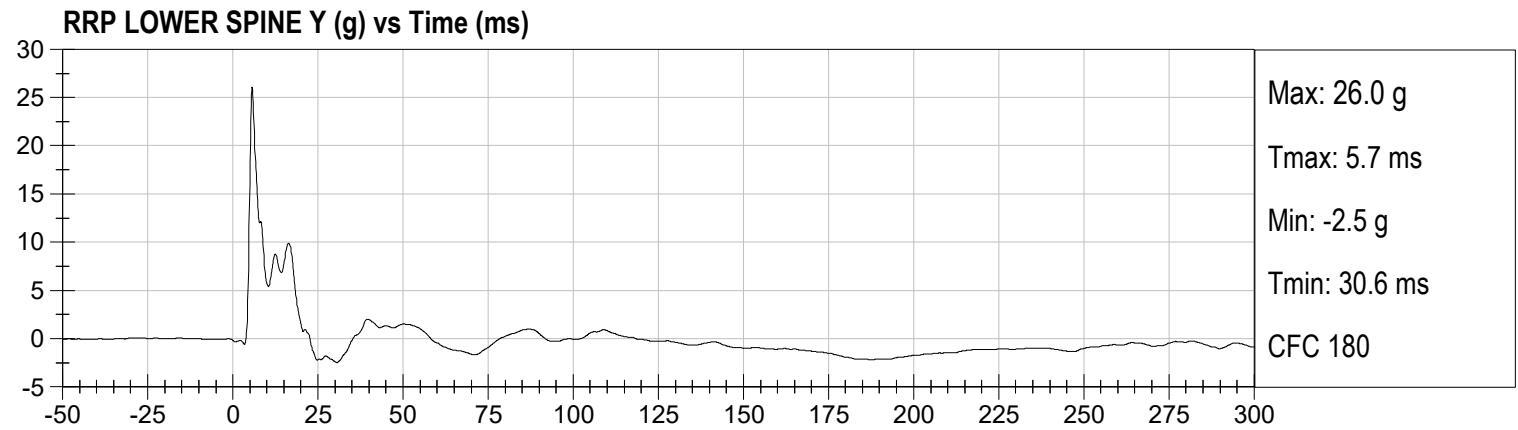
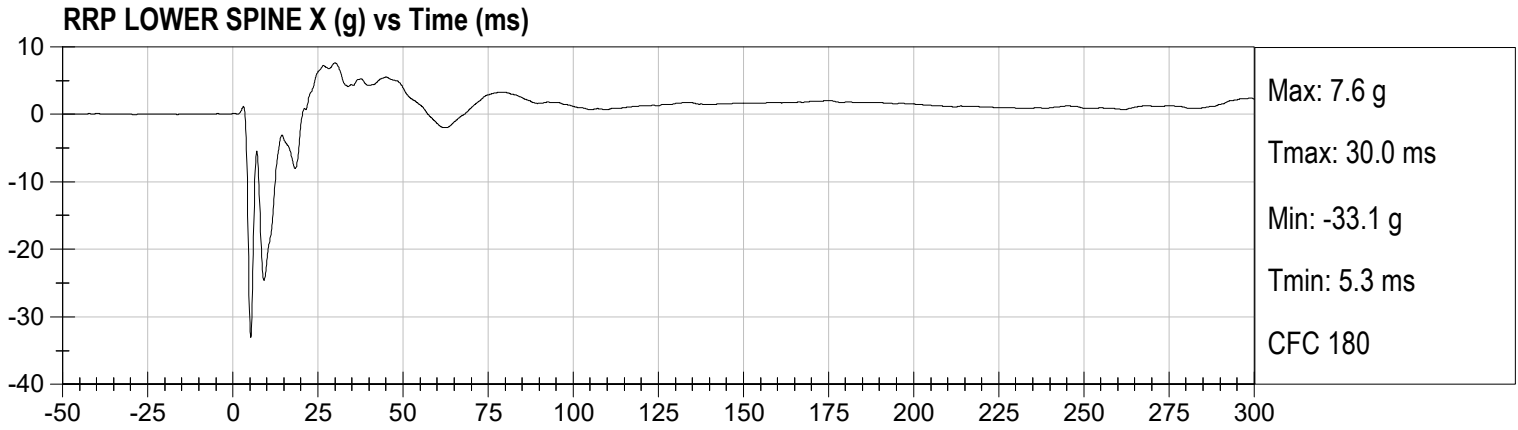


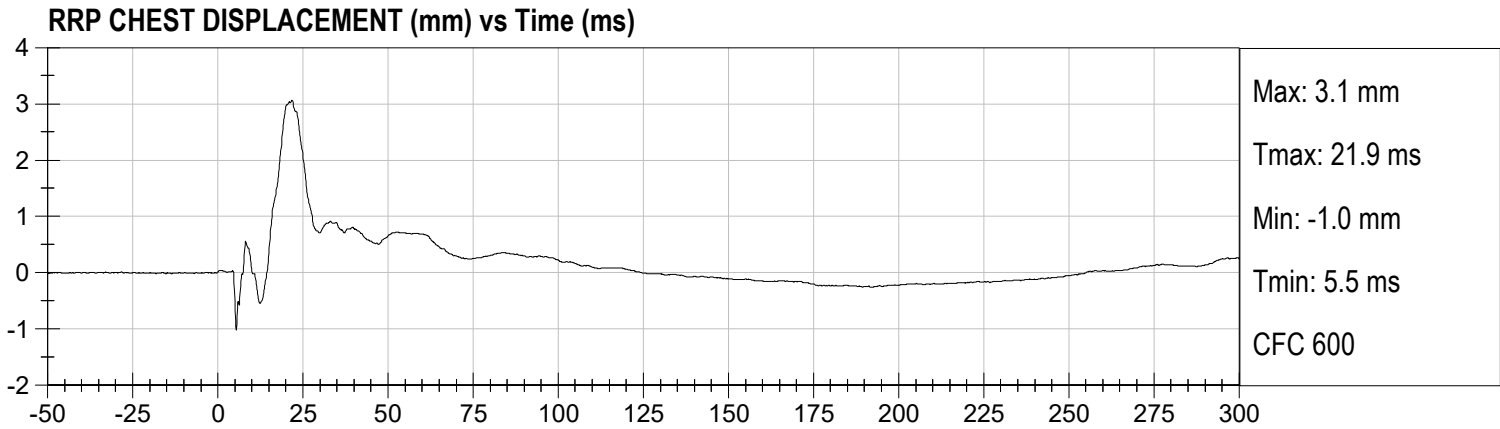
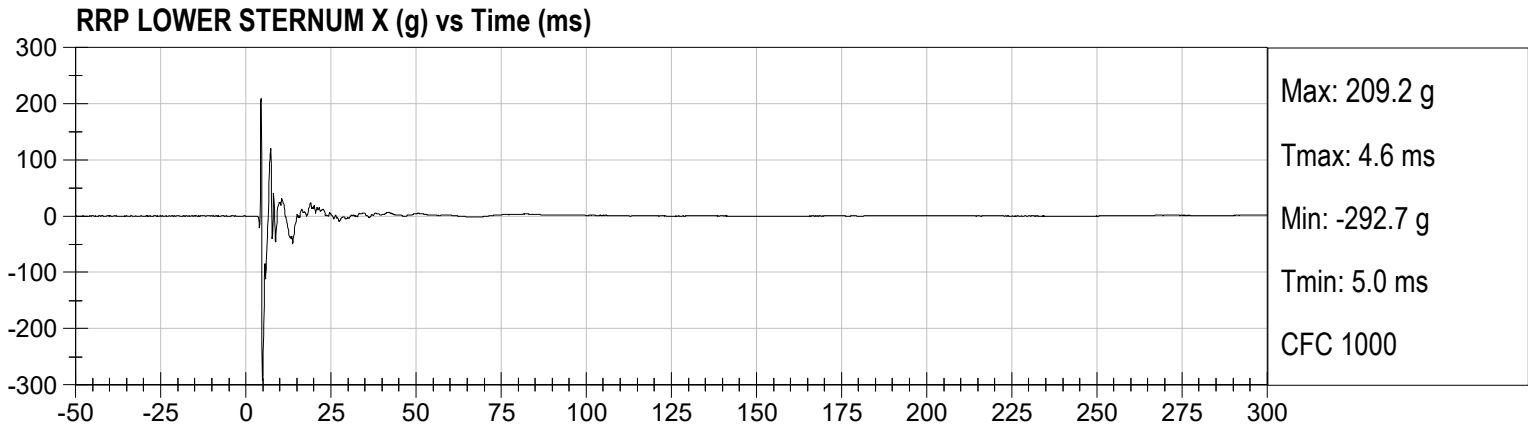
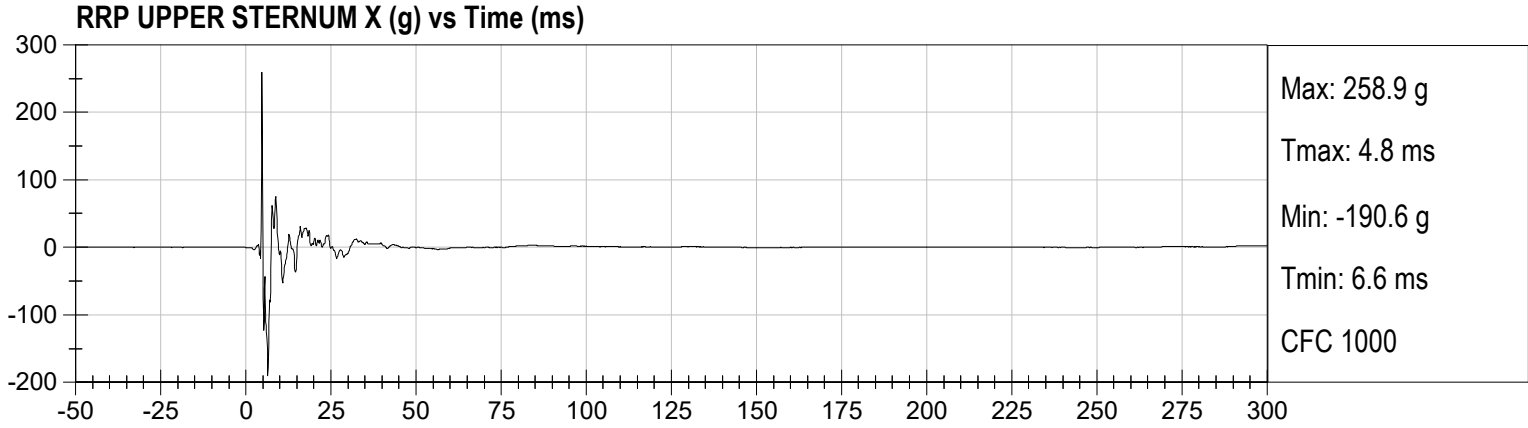




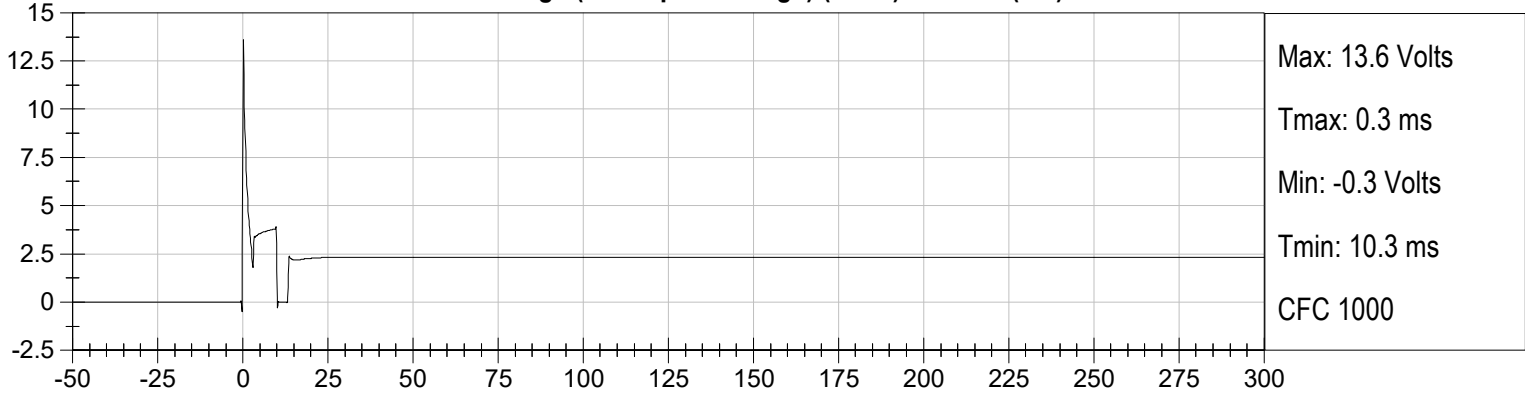




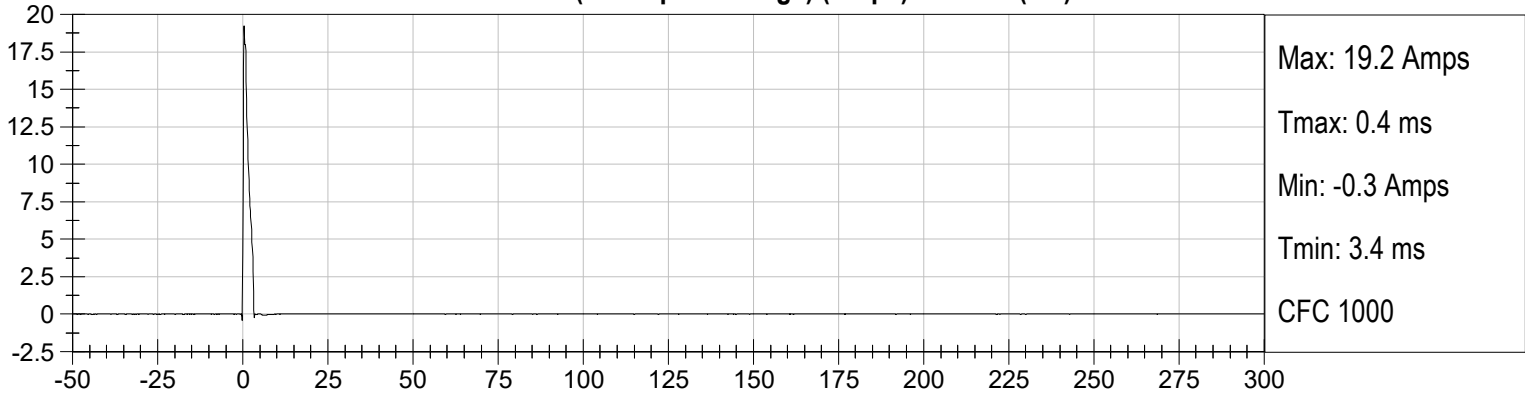




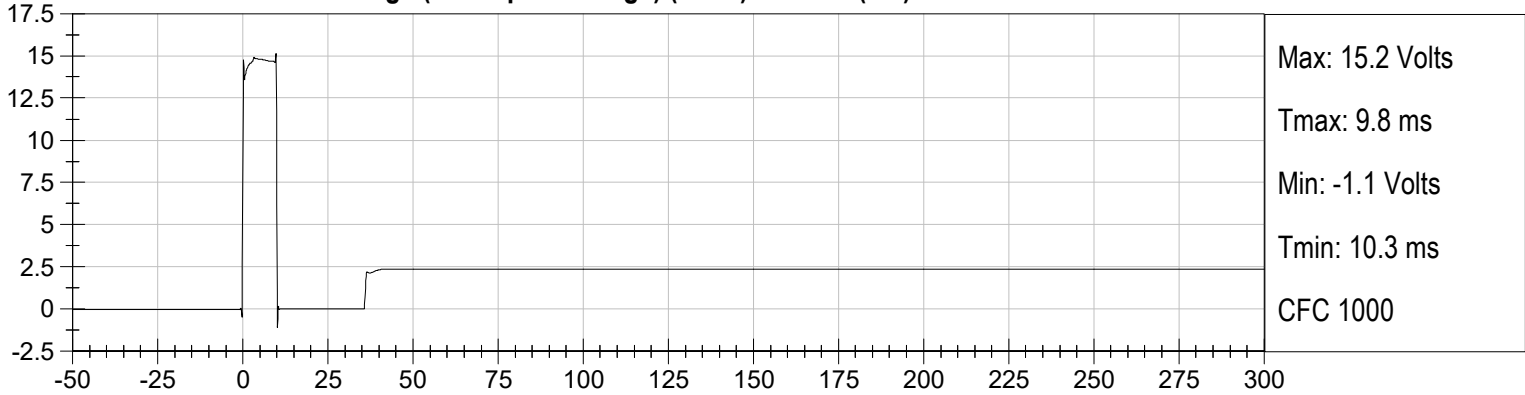
PASSENGER CURTAIN AB - Fire Voltage (DC Cap Discharge) (Volts) vs Time (ms)



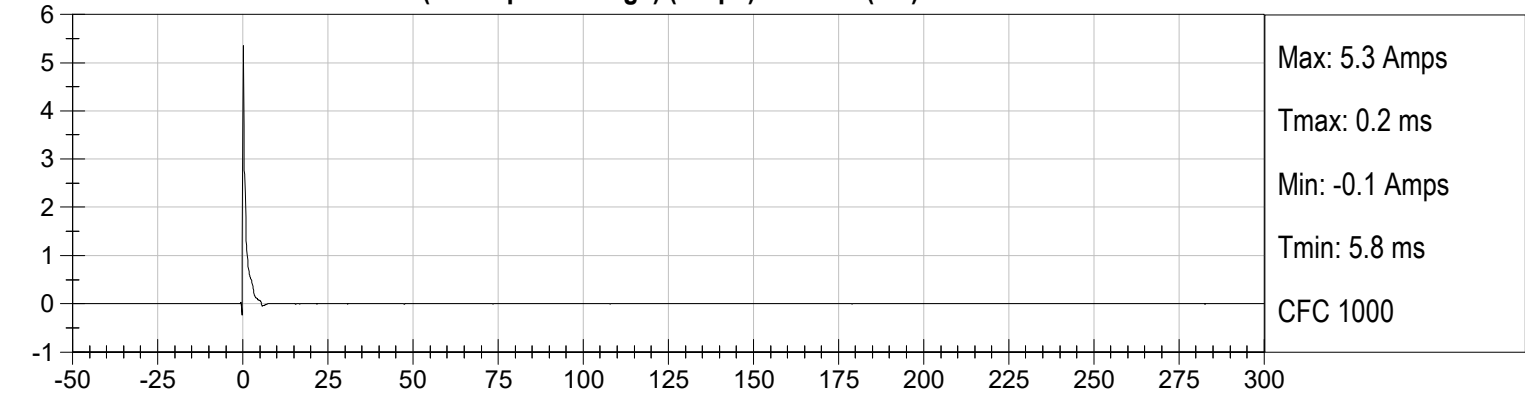
PASSENGER CURTAIN AB - Fire Current (DC Cap Discharge) (Amps) vs Time (ms)



RRP SEAT AB - Fire Voltage (DC Cap Discharge) (Volts) vs Time (ms)



RRP SEAT AB - Fire Current (DC Cap Discharge) (Amps) vs Time (ms)



APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

Hybrid III 3-Year-Old ATD

**MGA RESEARCH CORPORATION
 HEAD DROP TEST
 HYBRID III 3 YEAR OLD**

ATD Serial No: 082

Test ID: D182481

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Peak Resultant Acceleration	G's	250 to 280	254	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-14.5	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

Brian Roach

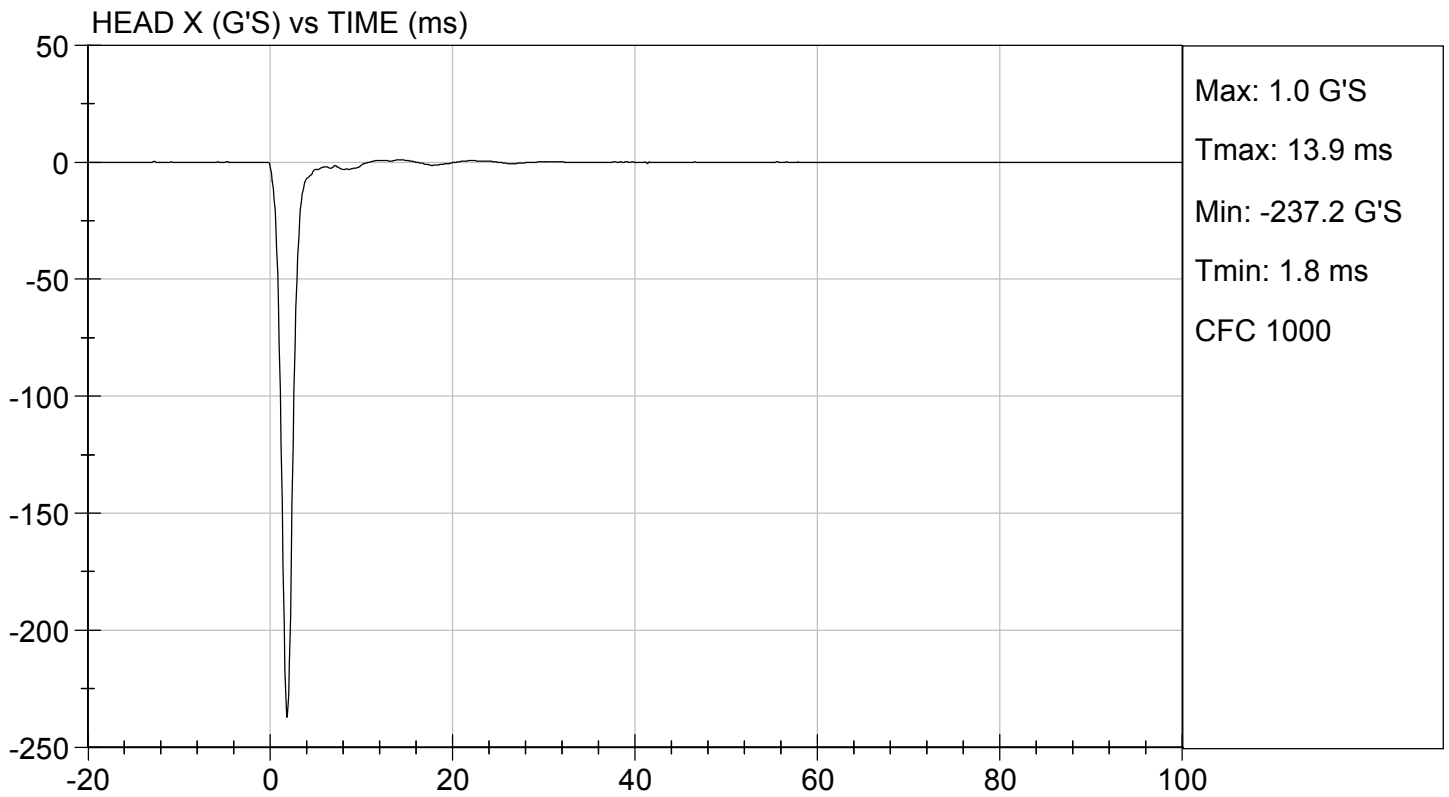
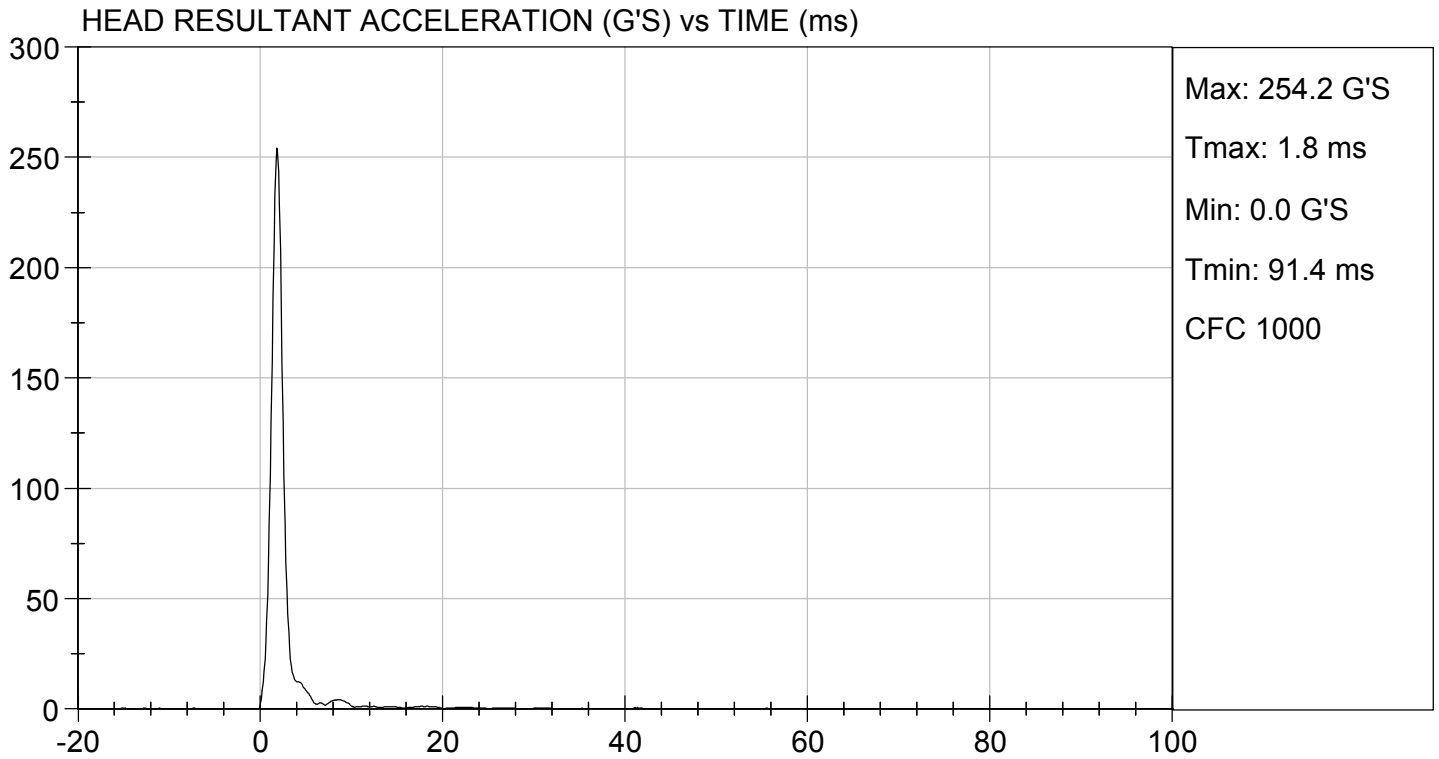
Laboratory Technician

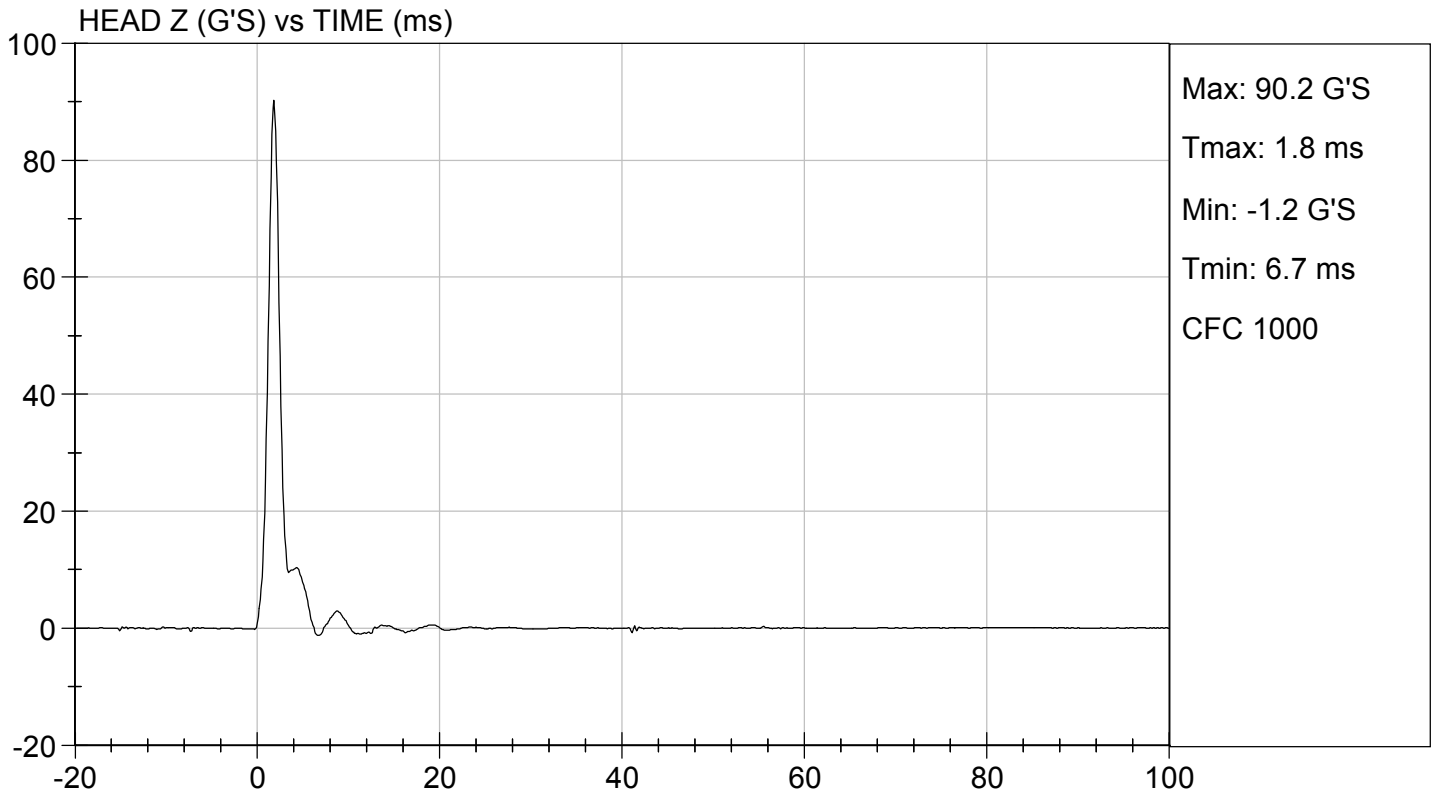
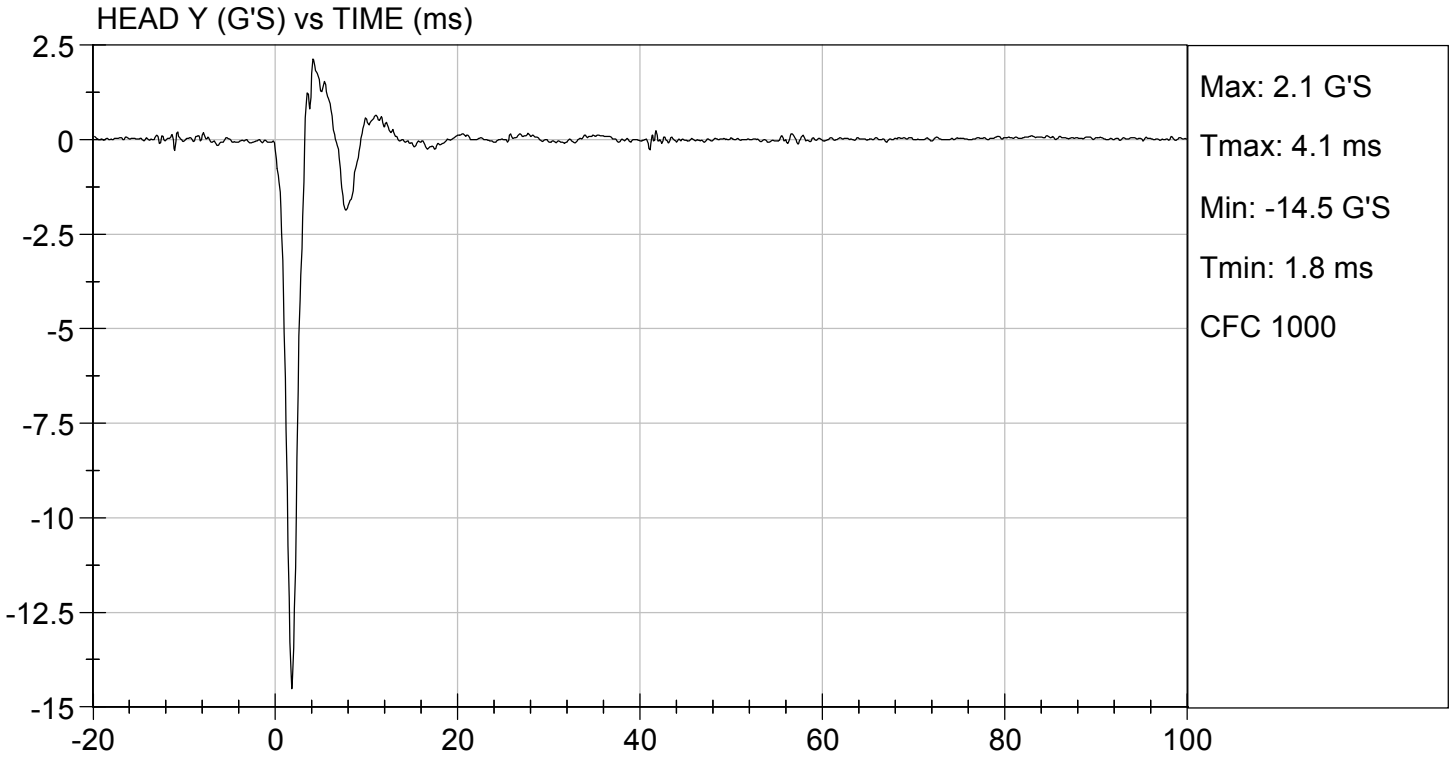
08/15/2018

Test Date

B. F. K.

Approved By





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 3 YEAR OLD

ATD Serial No: 082

Test I.D.: D182482

Tested Parameter	Units	Specification	Result	Pass/Fail	
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass	
Laboratory Relative Humidity	%	10 to 70	50	Pass	
Pendulum Speed	m/s	5.40 to 5.60	5.52	Pass	
Pendulum Velocity	10 msec	m/s	2.0 to 2.7	2.6	Pass
	15 msec	m/s	3.0 to 4.0	3.7	Pass
	20 msec	m/s	4.0 to 5.1	5.0	Pass
D Plane Rotation	deg	70 to 82	73	Pass	
Peak Moment within Deflection Corridor	Nm	42.0 to 53.0	46.2	Pass	
Positive Moment - Time Curve Decay to 10 Nm	msec	60.0 to 80.0	69	Pass	
Overall Test Results				Pass	

Brian Roach

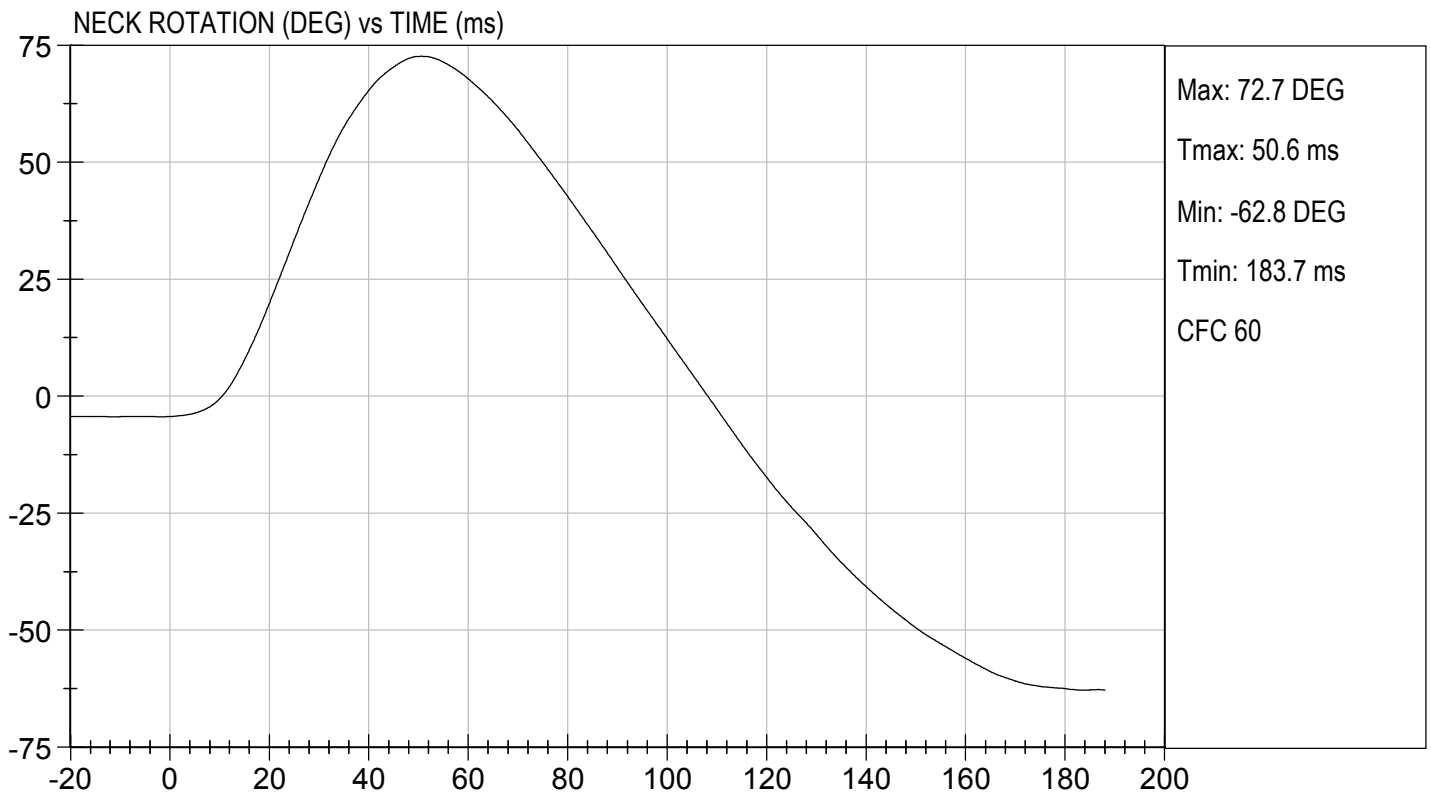
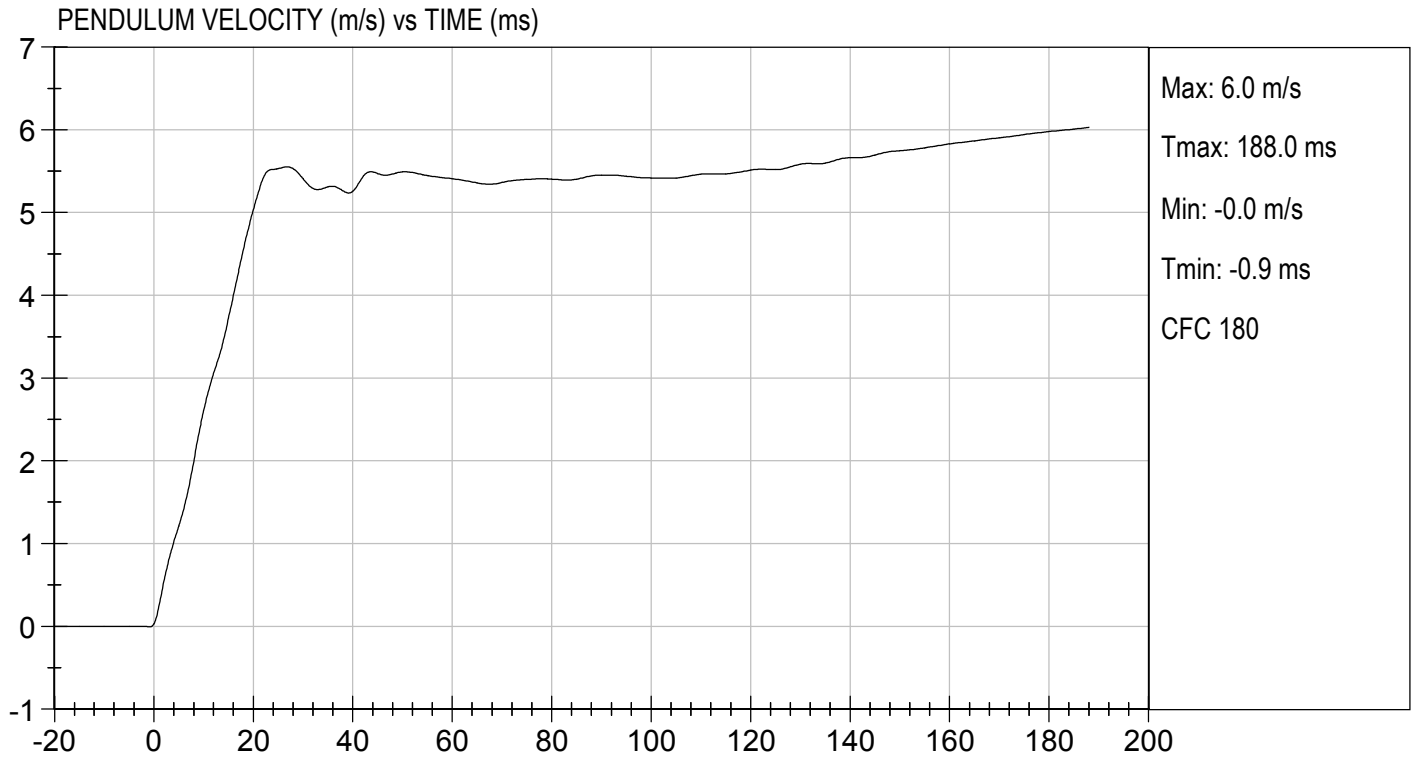
Laboratory Technician

08/16/2018

Test Date

B. F. H.

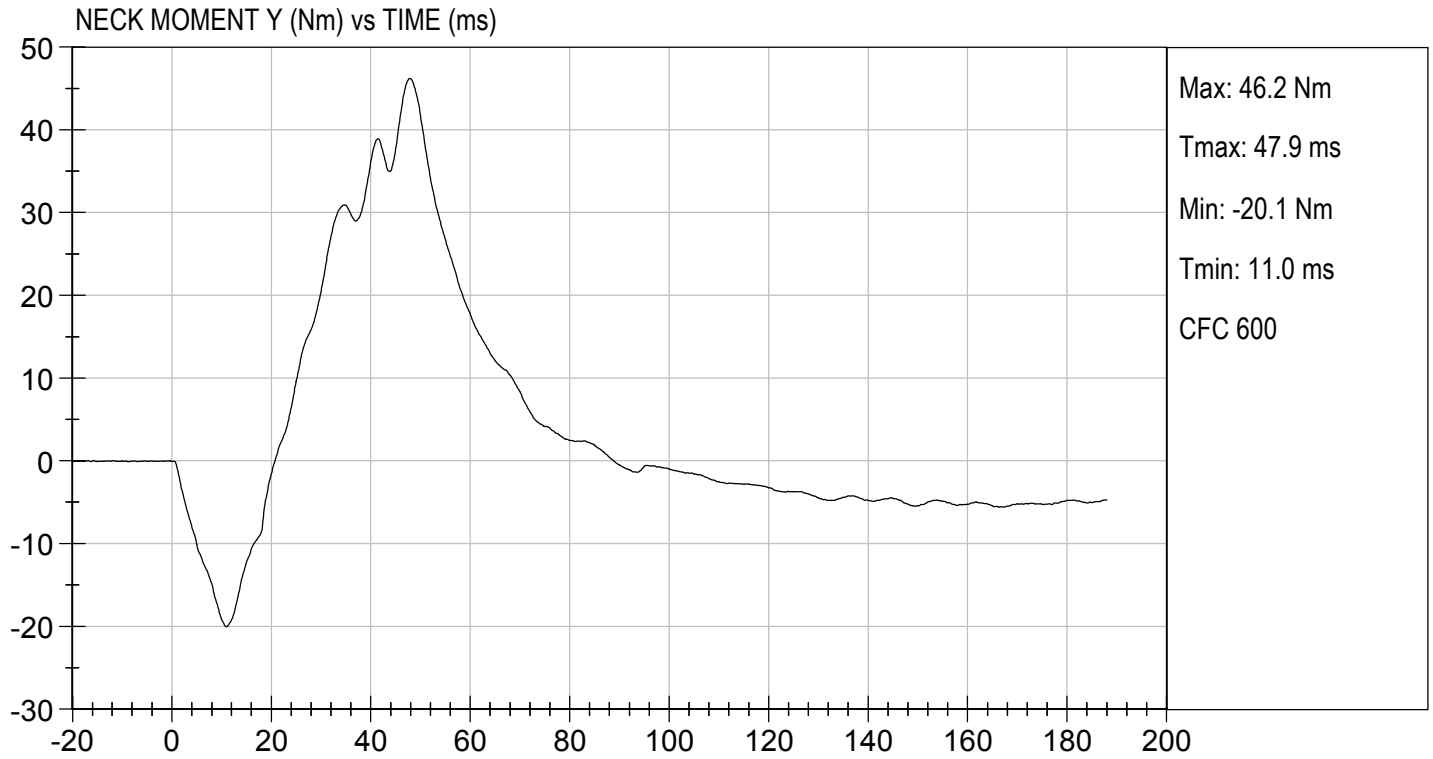
Approved By





TEST DESC: NECK FLEXION
VELOCITY: 18.12 ft/s, 5.52 m/s

TEST DATE: 08/16/2018
TEST #: D182482



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 3 YEAR OLD

ATD Serial No: 082

Test I.D: D182483

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	50	Pass
Pendulum Speed		m/s	3.55 to 3.75	3.71	Pass
Pendulum Velocity	6 ms	m/s	1.0 to 1.4	1.3	Pass
	10 ms	m/s	1.9 to 2.5	2.4	Pass
	14 ms	m/s	2.8 to 3.5	3.3	Pass
D Plane Rotation		deg	83 to 93	88	Pass
Peak Moment within Deflection Corridor		Nm	-53.3 to -43.7	-44.4	Pass
Negative Moment - Time Curve Decay to -10 Nm		ms	60.0 to 80.0	68	Pass
Overall Test Results					Pass

Brian Roach

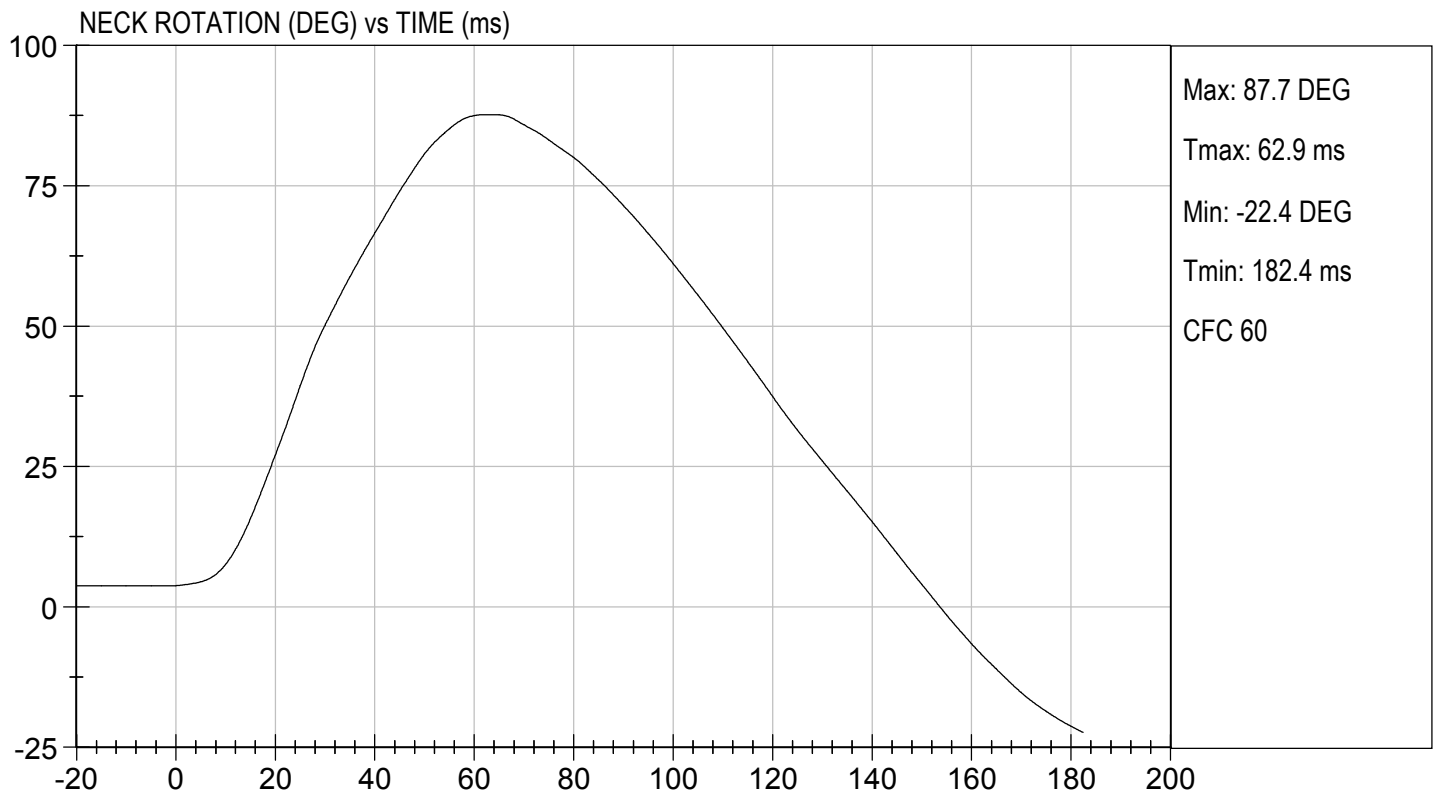
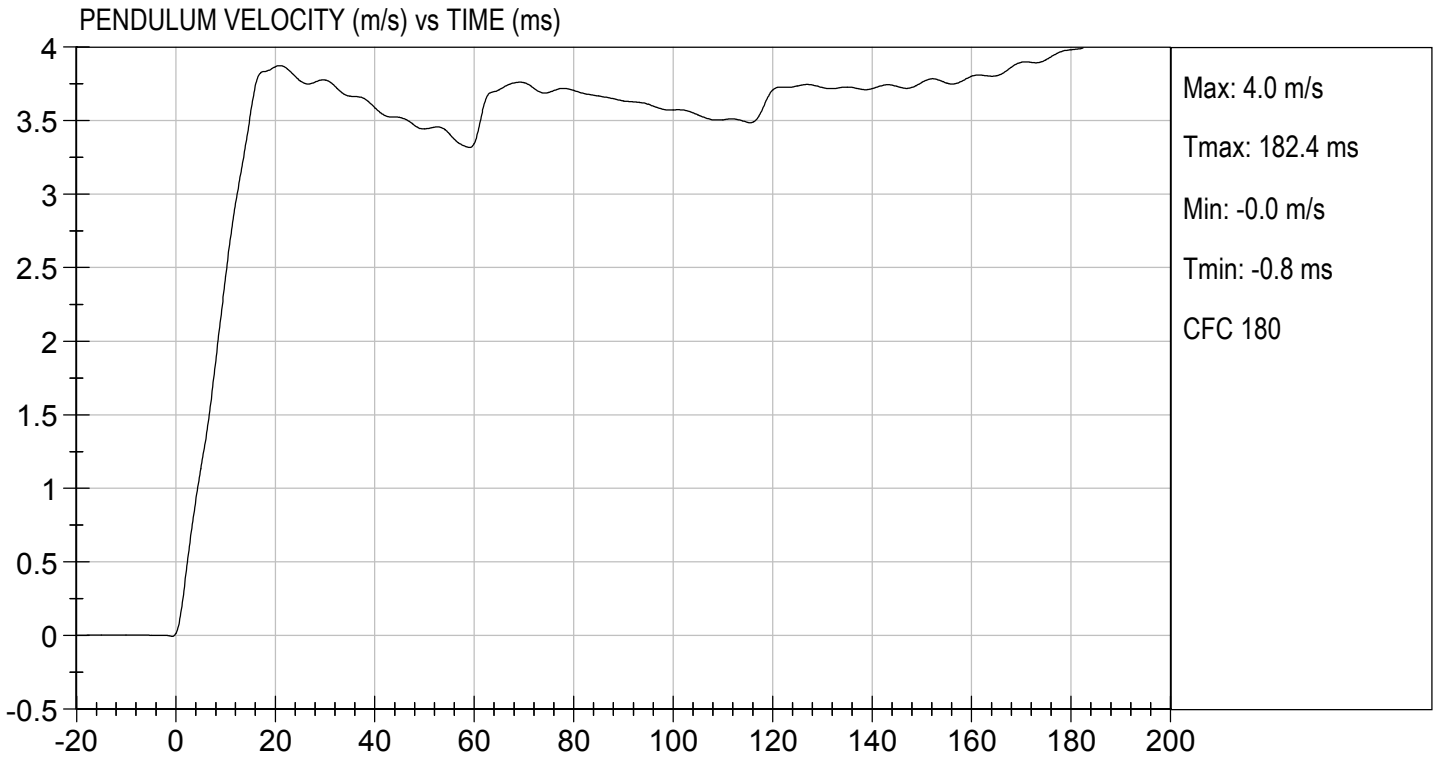
Laboratory Technician

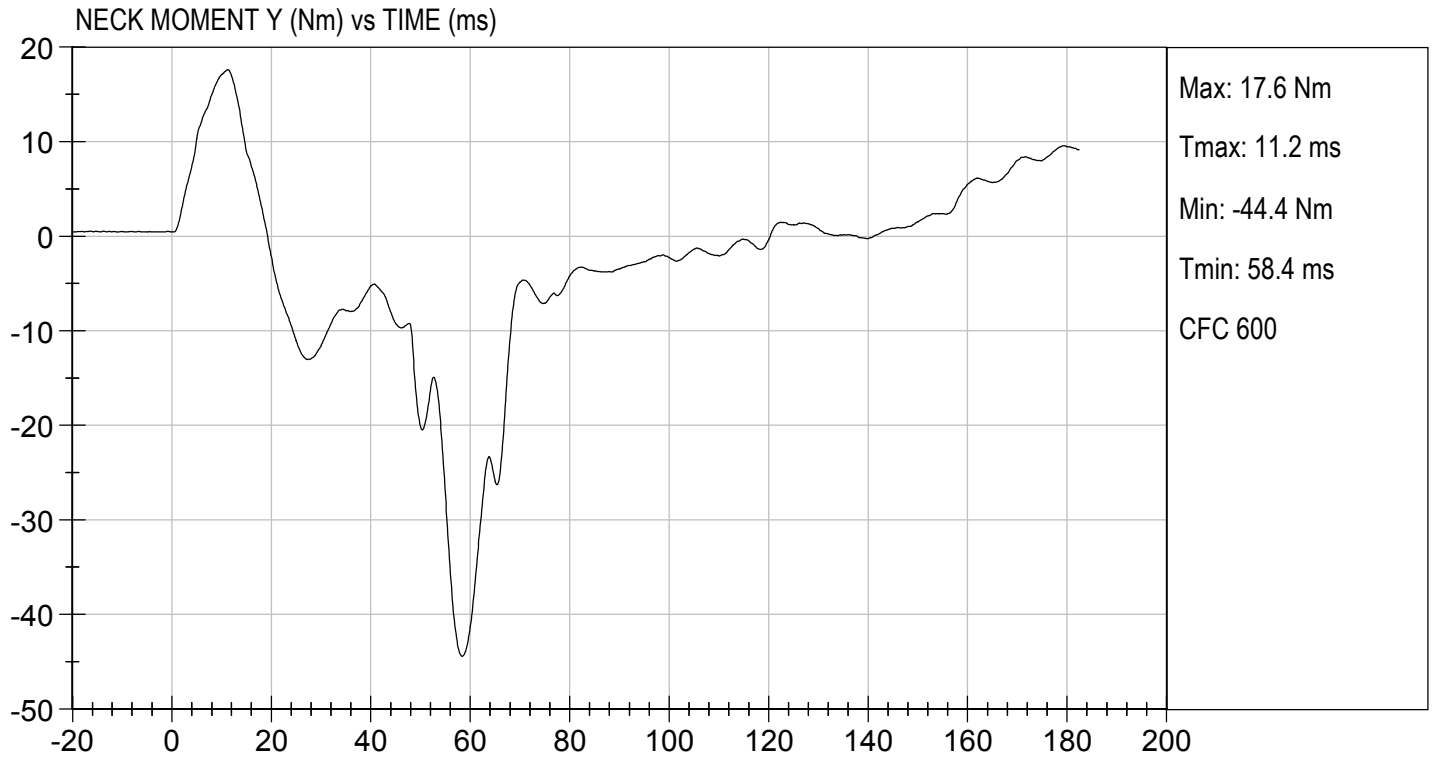
08/16/2018

Test Date

B. F.

Approved By





MGA RESEARCH CORPORATION
THORAX IMPACT TEST
HYBRID III 3 YEAR OLD

ATD Serial No: 082

Test I.D: D182484

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Probe Velocity	m/s	5.9 to 6.1	6.05	Pass
Peak Deflection	mm	32 to 38	34.1	Pass
Peak Resistive Force w/in Deflection Corridor	N	680 to 810	693	Pass
Internal Hysteresis	%	65 to 85	72.9	Pass
Max Force 12.5 mm - 32 mm Deflection	N	<= 910	746	Pass
Overall Test Results				Pass

Brian Roach

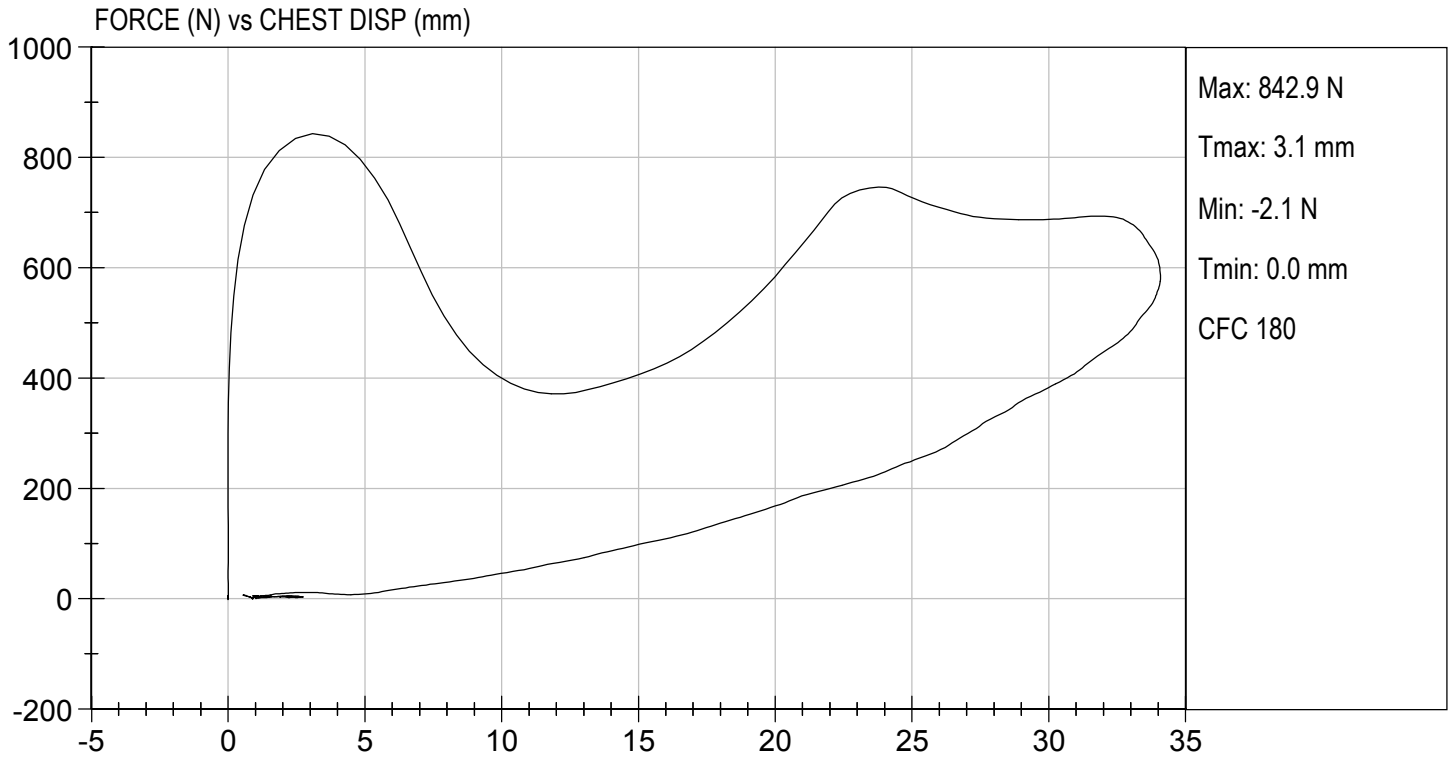
Laboratory Technician

08/14/2018

Test Date

B. F.

Approved By



MGA RESEARCH CORPORATION
TORSO FLEXION TEST
HYBRID III 3 YEAR OLD

ATD Serial No: 082

Test I.D: D182487

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Initial Angle	deg	0 to 15	5	Pass
Return Angle	deg	-10 to 10	5	Pass
Force at 45 deg	N	130 to 180	171	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.9	Pass
Overall Test Results				Pass

Brian Roach

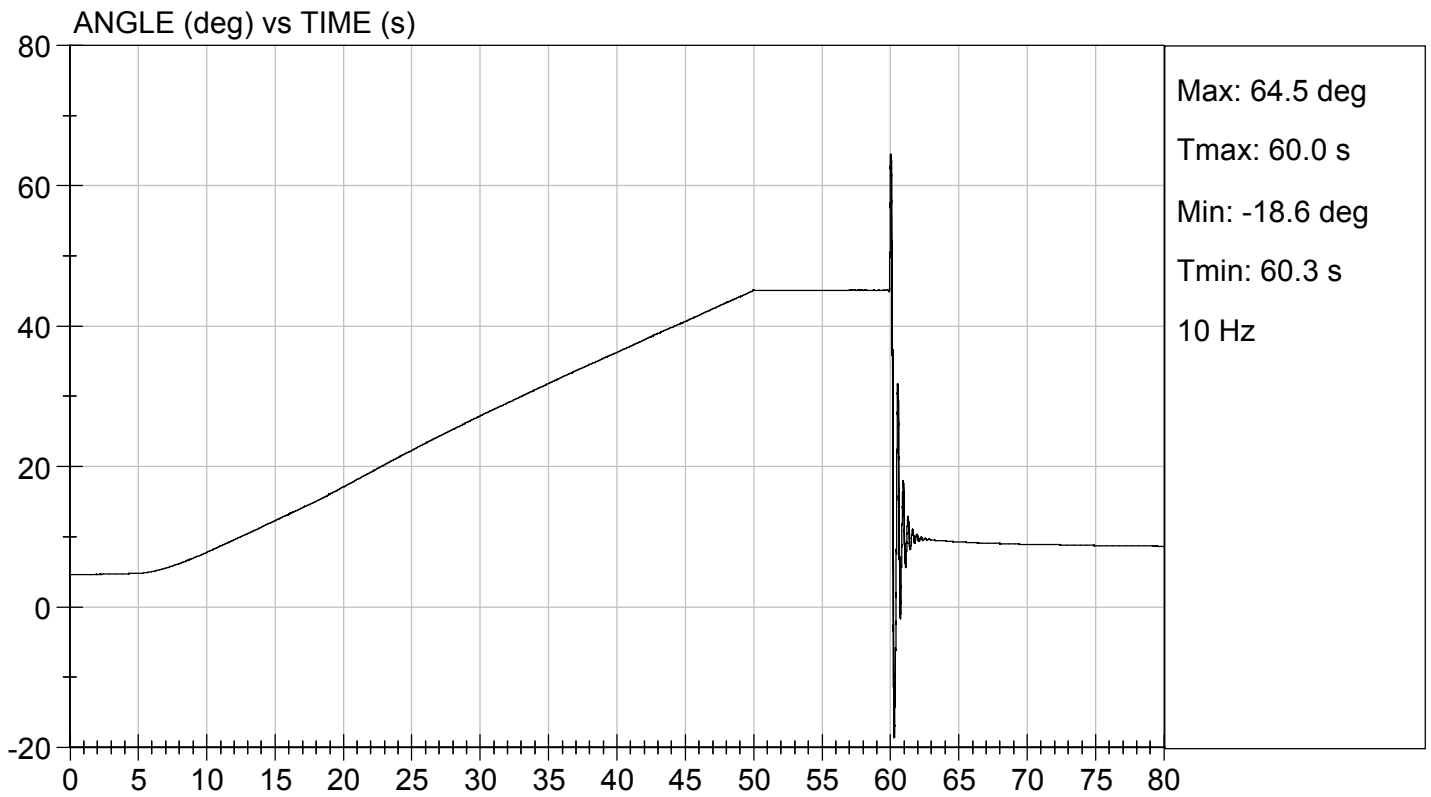
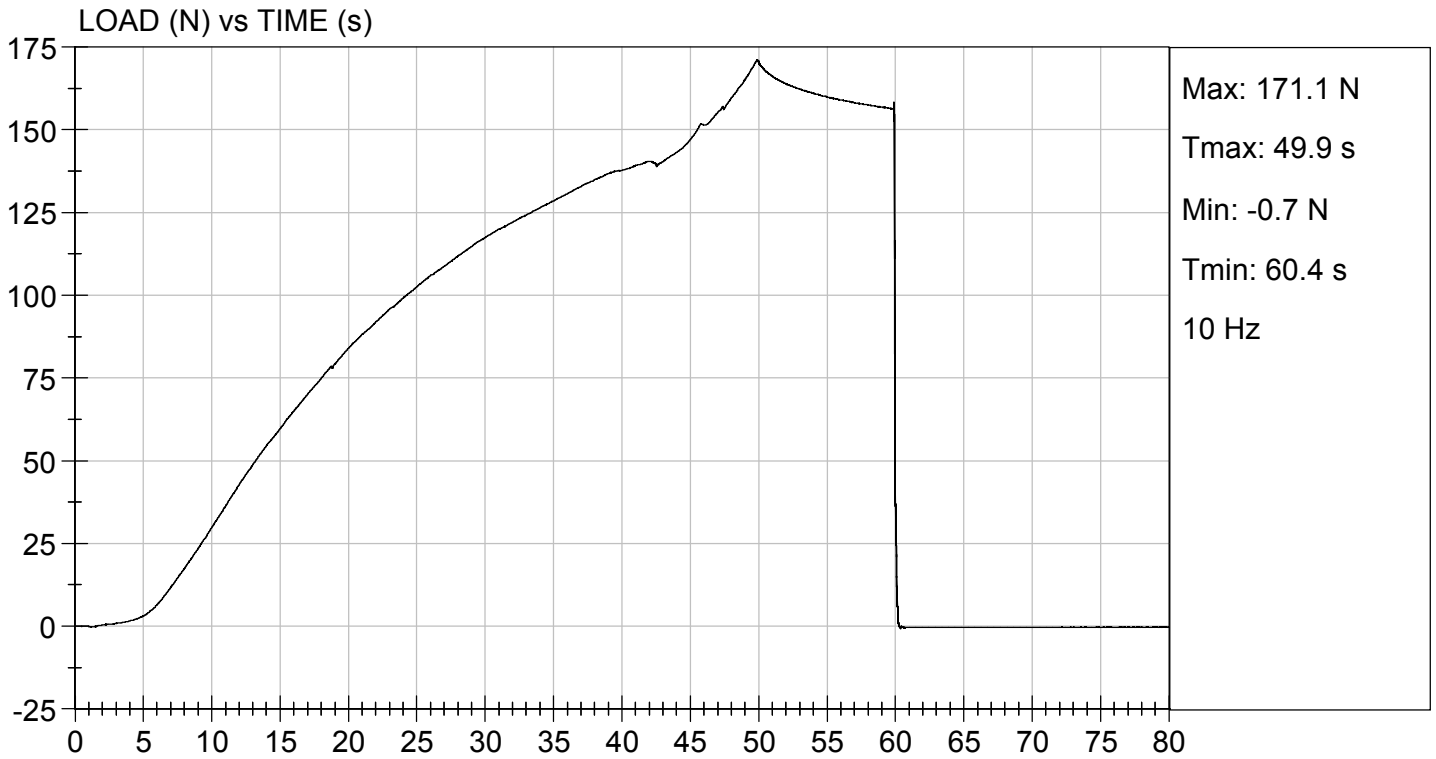
Laboratory Technician

08/16/2018

Test Date

B. F. K.

Approved By



CALIBRATION TEST RESULTS

POST-TEST

Hybrid III 3-Year-Old ATD

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 3 YEAR OLD

ATD Serial No: 082

Test ID: D183041

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	250 to 280	251	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-4.0	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

Brian Roach

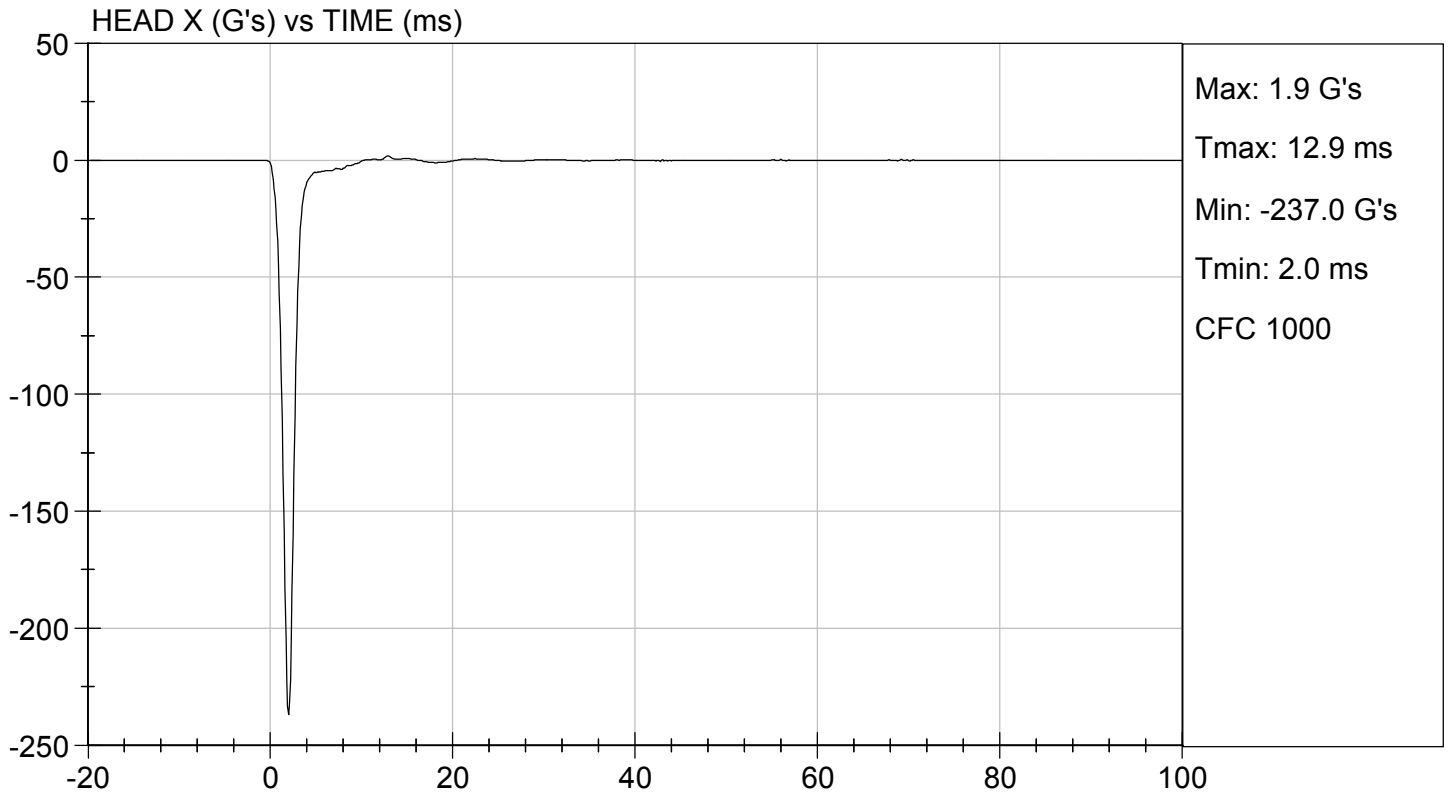
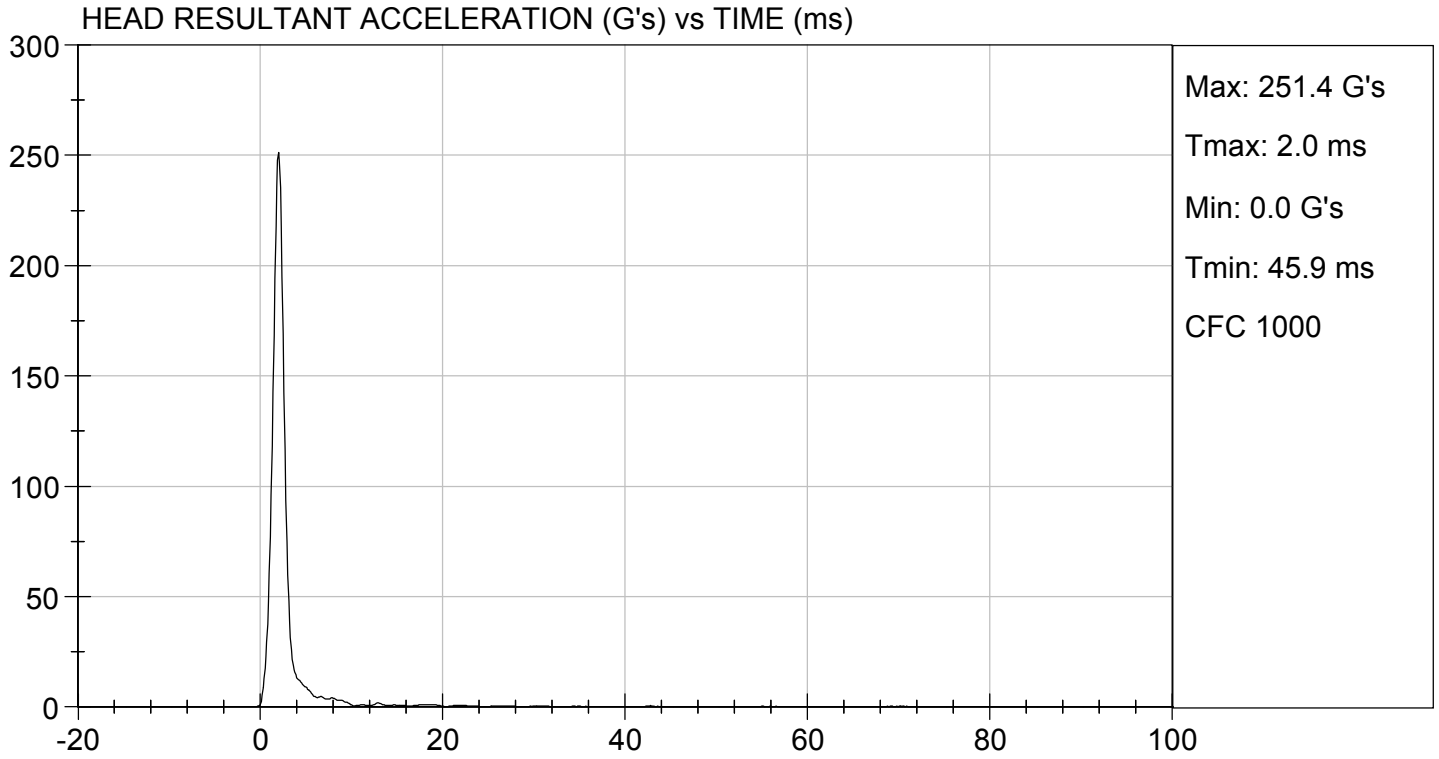
Laboratory Technician

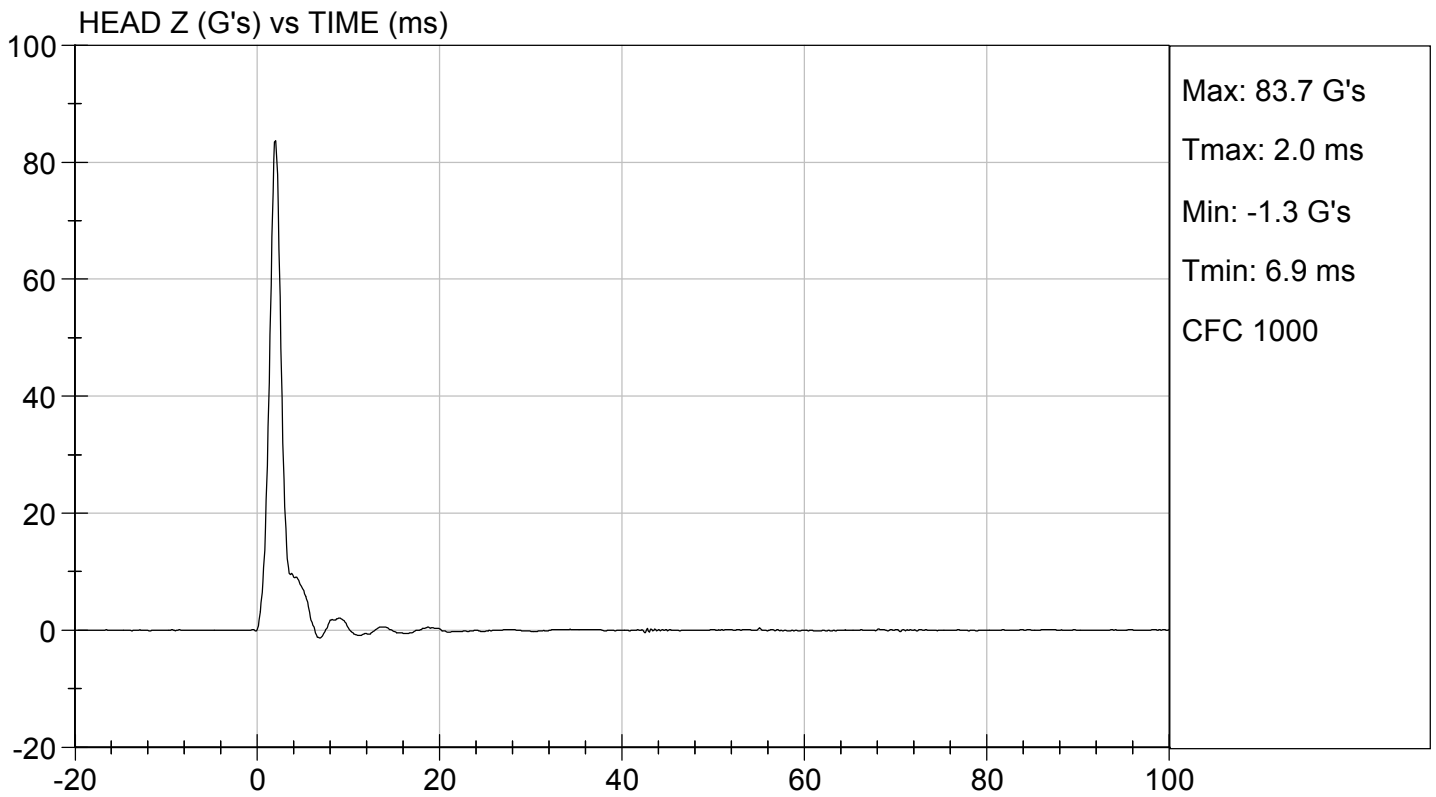
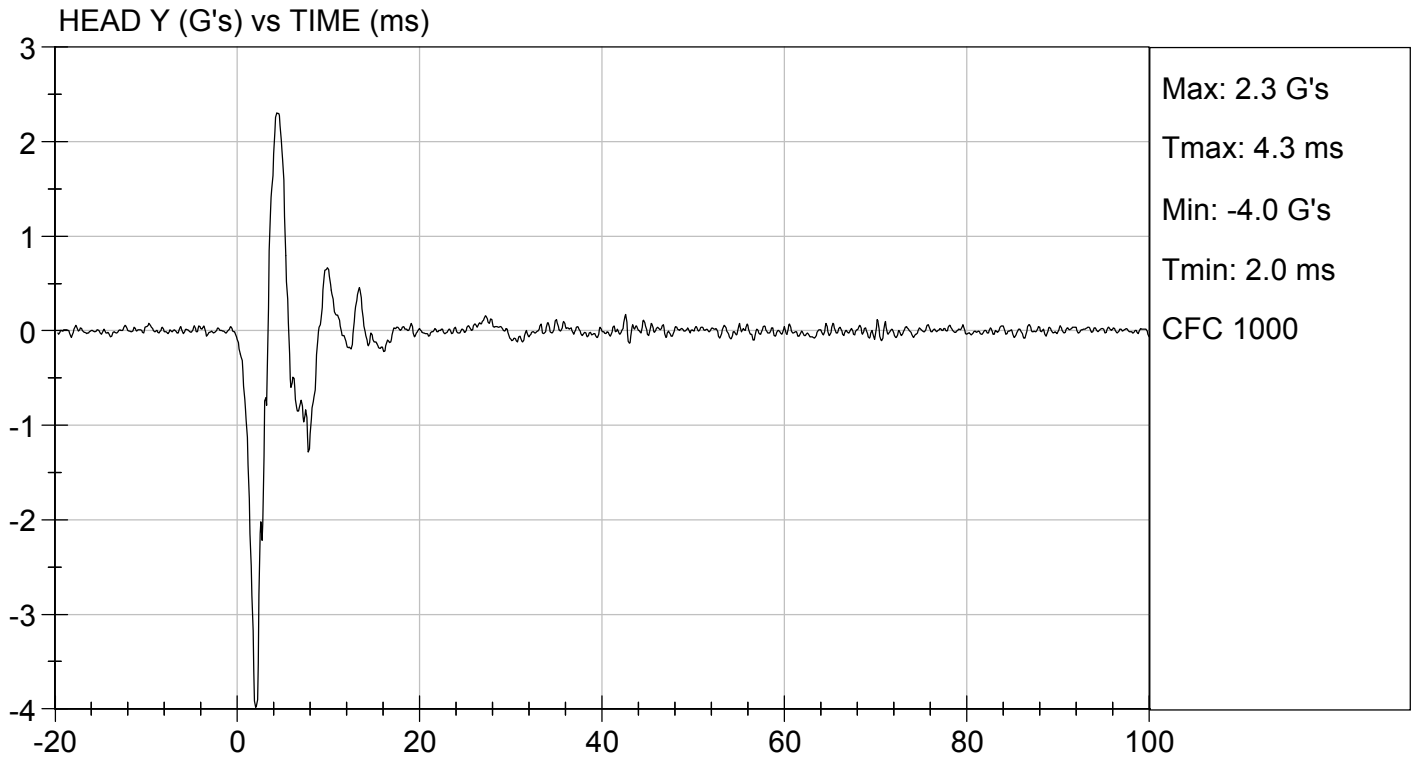
10/09/2018

Test Date

B. F. H.

Approved By





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 3 YEAR OLD

ATD Serial No: 082

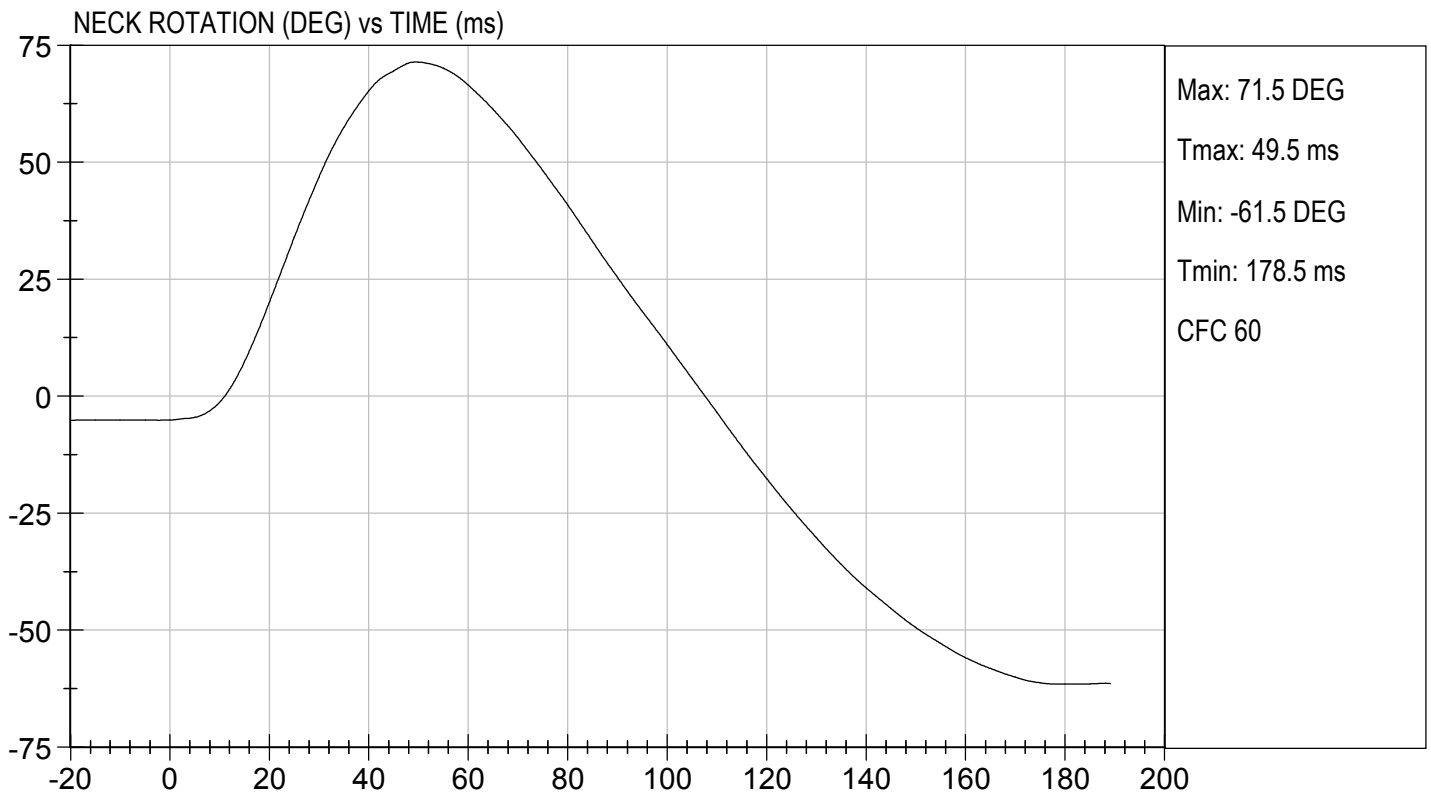
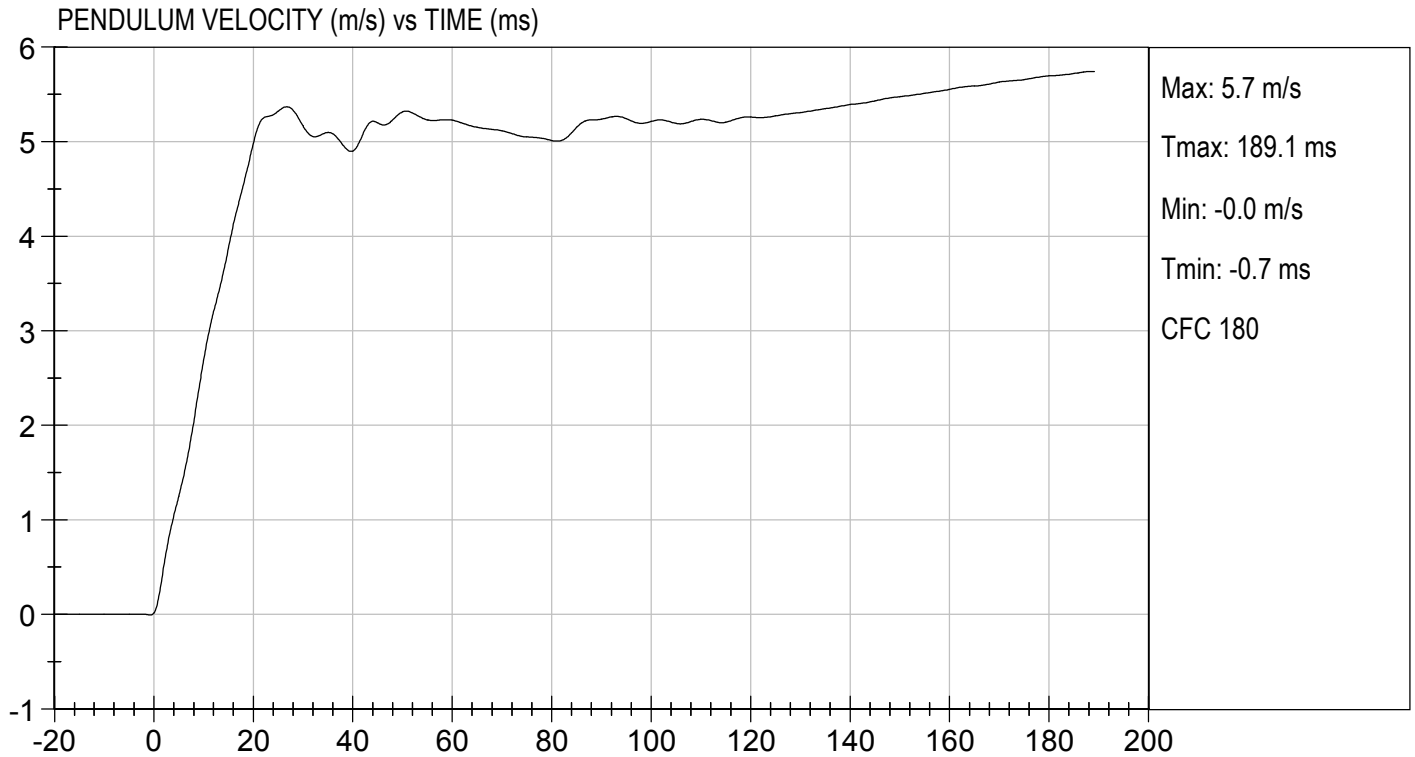
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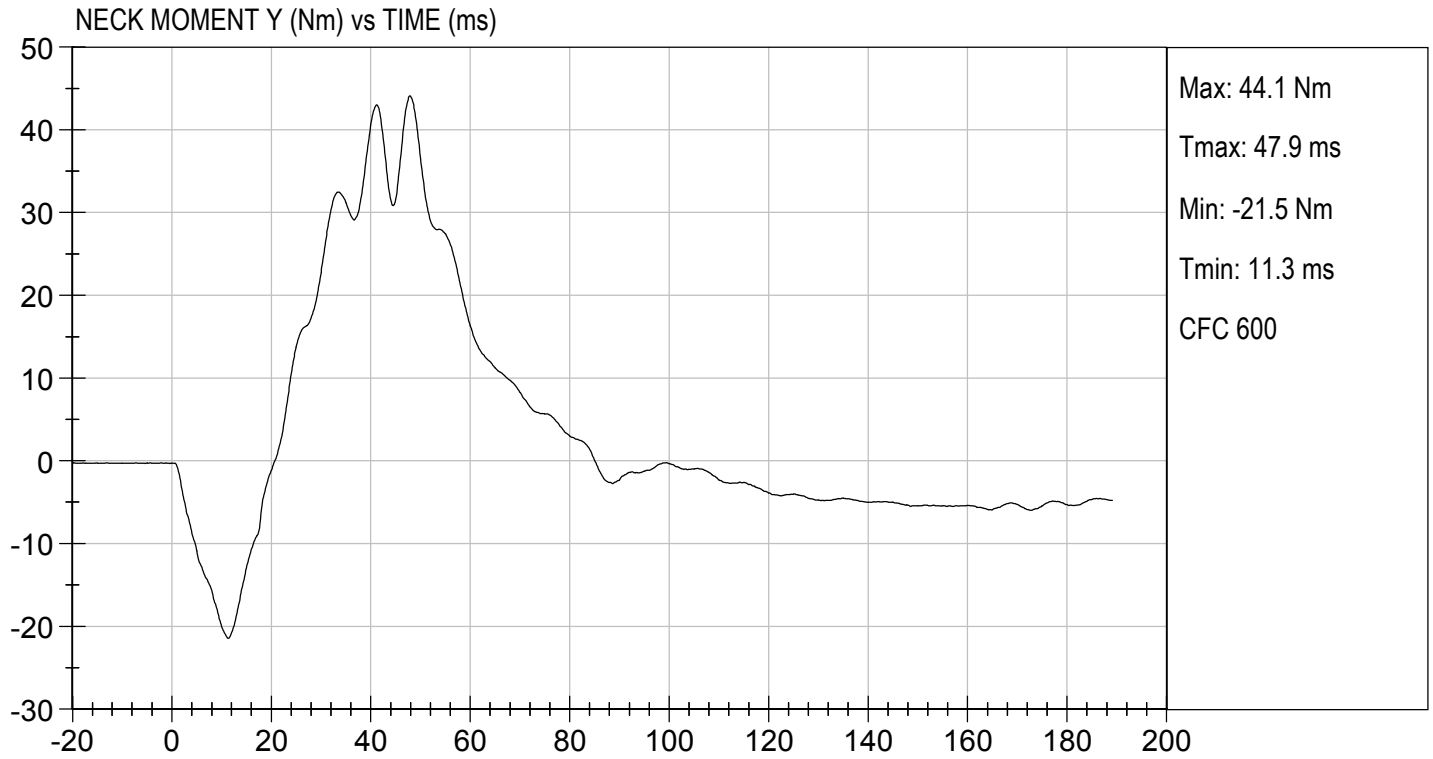
Tested Parameter	Units	Specification	Result	Pass/Fail	
Laboratory Temperature	deg C	20.6 to 22.2	21.1	Pass	
Laboratory Relative Humidity	%	10 to 70	51	Pass	
Pendulum Speed	m/s	5.40 to 5.60	5.52	Pass	
Pendulum Velocity	10 msec	m/s	2.0 to 2.7	2.7	Pass
	15 msec	m/s	3.0 to 4.0	3.9	Pass
	20 msec	m/s	4.0 to 5.1	5.0	Pass
D Plane Rotation	deg	70 to 82	71	Pass	
Peak Moment within Deflection Corridor	Nm	42.0 to 53.0	44.1	Pass	
Positive Moment - Time Curve Decay to 10 Nm	msec	60.0 to 80.0	67	Pass	
Overall Test Results				Pass	

Brian Roach
Laboratory Technician

10/10/2018
Test Date

B. F. H.
Approved By





MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 3 YEAR OLD

ATD Serial No: 082

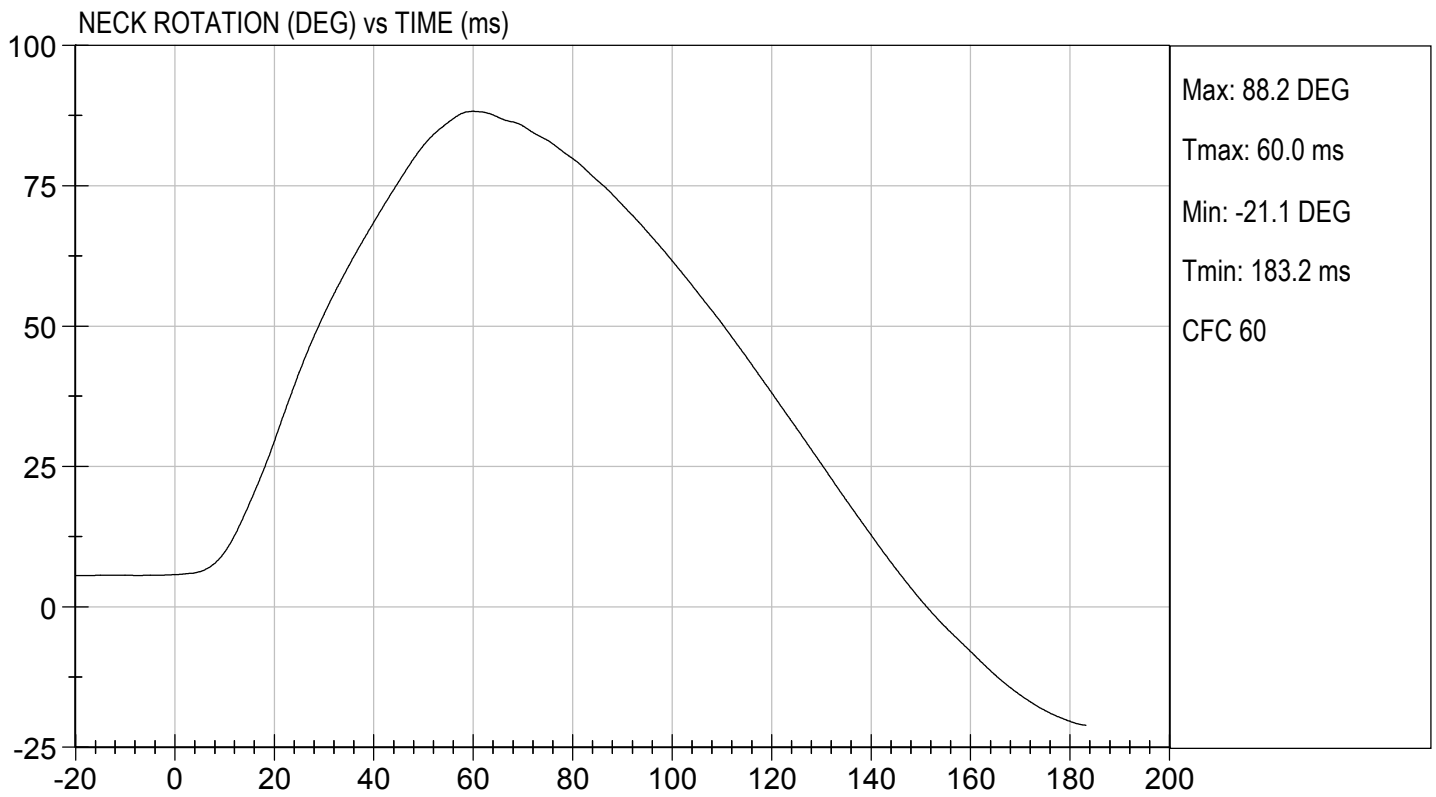
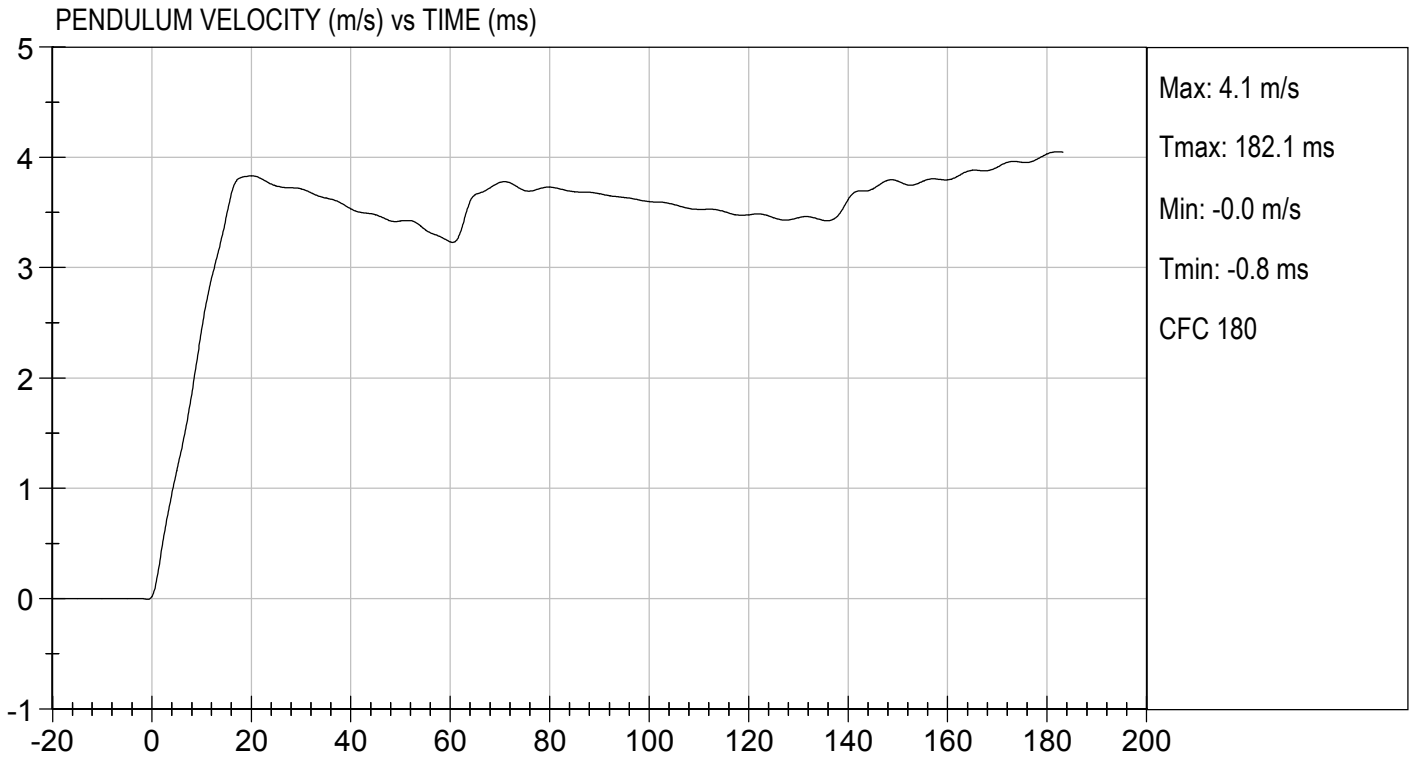
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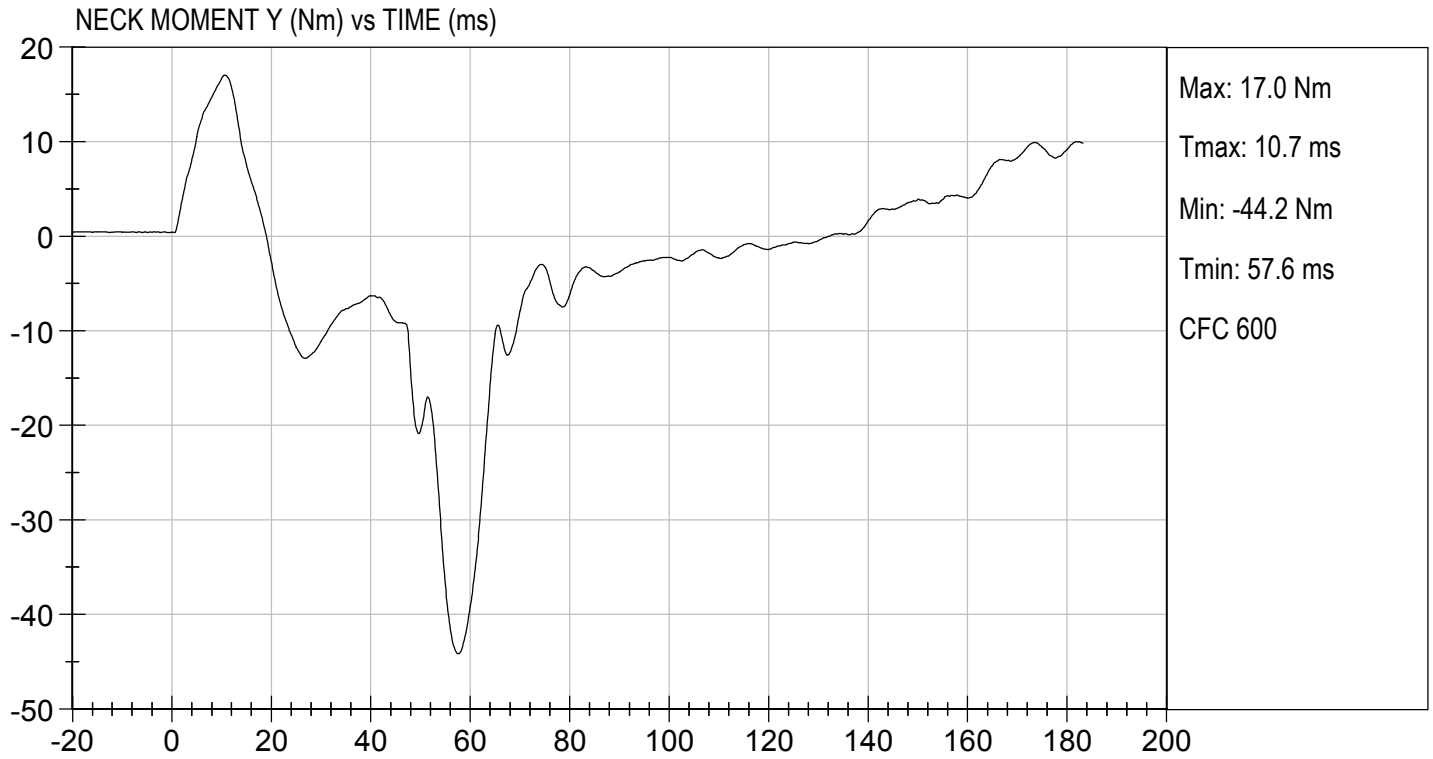
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	51	Pass
Pendulum Speed		m/s	3.55 to 3.75	3.63	Pass
Pendulum Velocity	6 ms	m/s	1.0 to 1.4	1.4	Pass
	10 ms	m/s	1.9 to 2.5	2.4	Pass
	14 ms	m/s	2.8 to 3.5	3.3	Pass
D Plane Rotation		deg	83 to 93	88	Pass
Peak Moment within Deflection Corridor		Nm	-53.3 to -43.7	-44.2	Pass
Negative Moment - Time Curve Decay to -10 Nm		ms	60.0 to 80.0	65	Pass
Overall Test Results					Pass

Brian Roach
Laboratory Technician

10/10/2018
Test Date

B. F. K.
Approved By





MGA RESEARCH CORPORATION
THORAX IMPACT TEST
HYBRID III 3 YEAR OLD

ATD Serial No: 082

Test I.D: D183044

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	51	Pass
Probe Velocity	m/s	5.9 to 6.1	5.98	Pass
Peak Deflection	mm	32 to 38	34.4	Pass
Peak Resistive Force w/in Deflection Corridor	N	680 to 810	724	Pass
Internal Hysteresis	%	65 to 85	72.2	Pass
Max Force 12.5 mm - 32 mm Deflection	N	<= 910	752	Pass
Overall Test Results				Pass

Brian Roach

Laboratory Technician

10/10/2018

Test Date

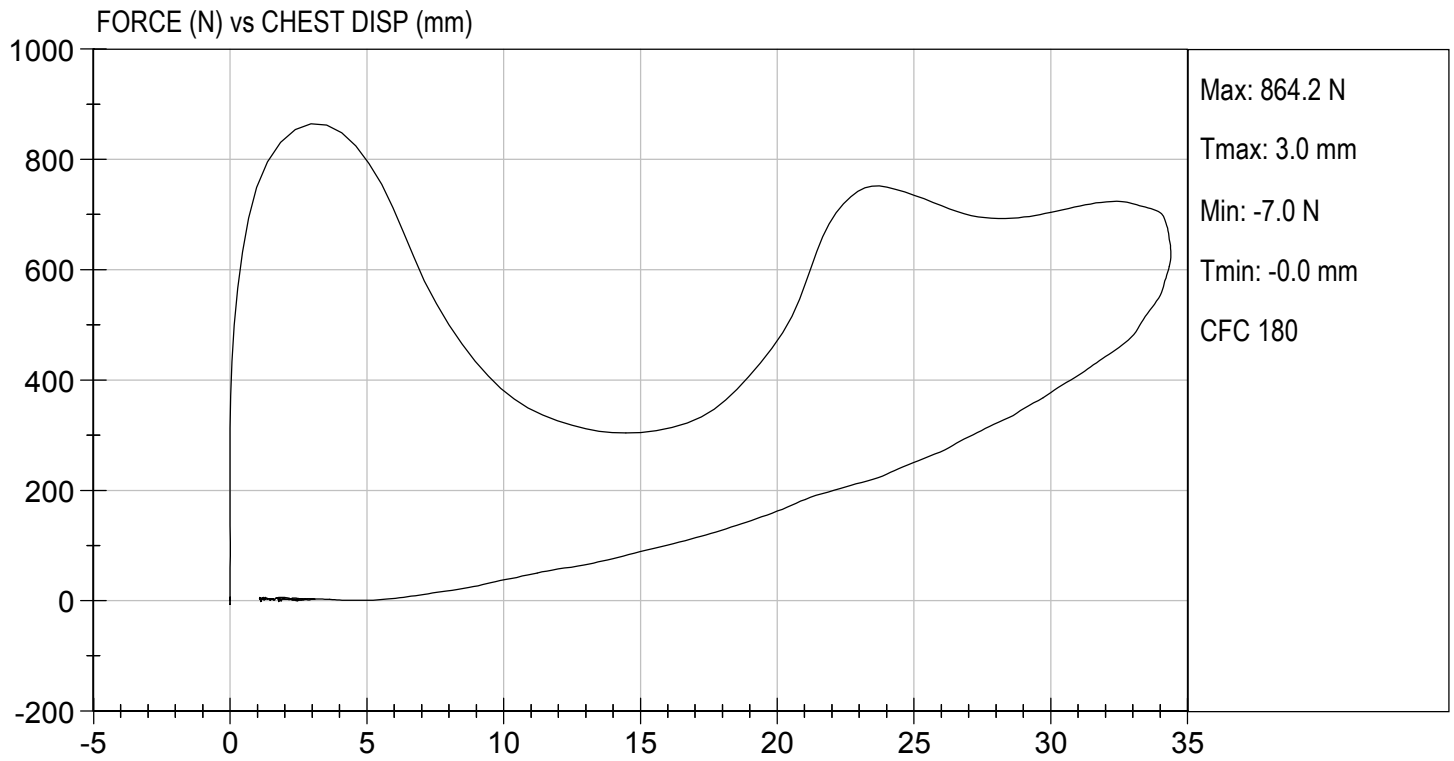
B. Fick

Approved By



TEST DESC: THORAX IMPACT
VELOCITY: 19.61 ft/s, 5.98 m/s

TEST DATE: 10/10/2018
TEST #: D183044



MGA RESEARCH CORPORATION
TORSO FLEXION TEST
HYBRID III 3 YEAR OLD

ATD Serial No: 082

Test I.D: D183047

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	52	Pass
Initial Angle	deg	0 to 15	3	Pass
Return Angle	deg	-10 to 10	3	Pass
Force at 45 deg	N	130 to 180	176	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	1.0	Pass
Overall Test Results				Pass

Brian Roach

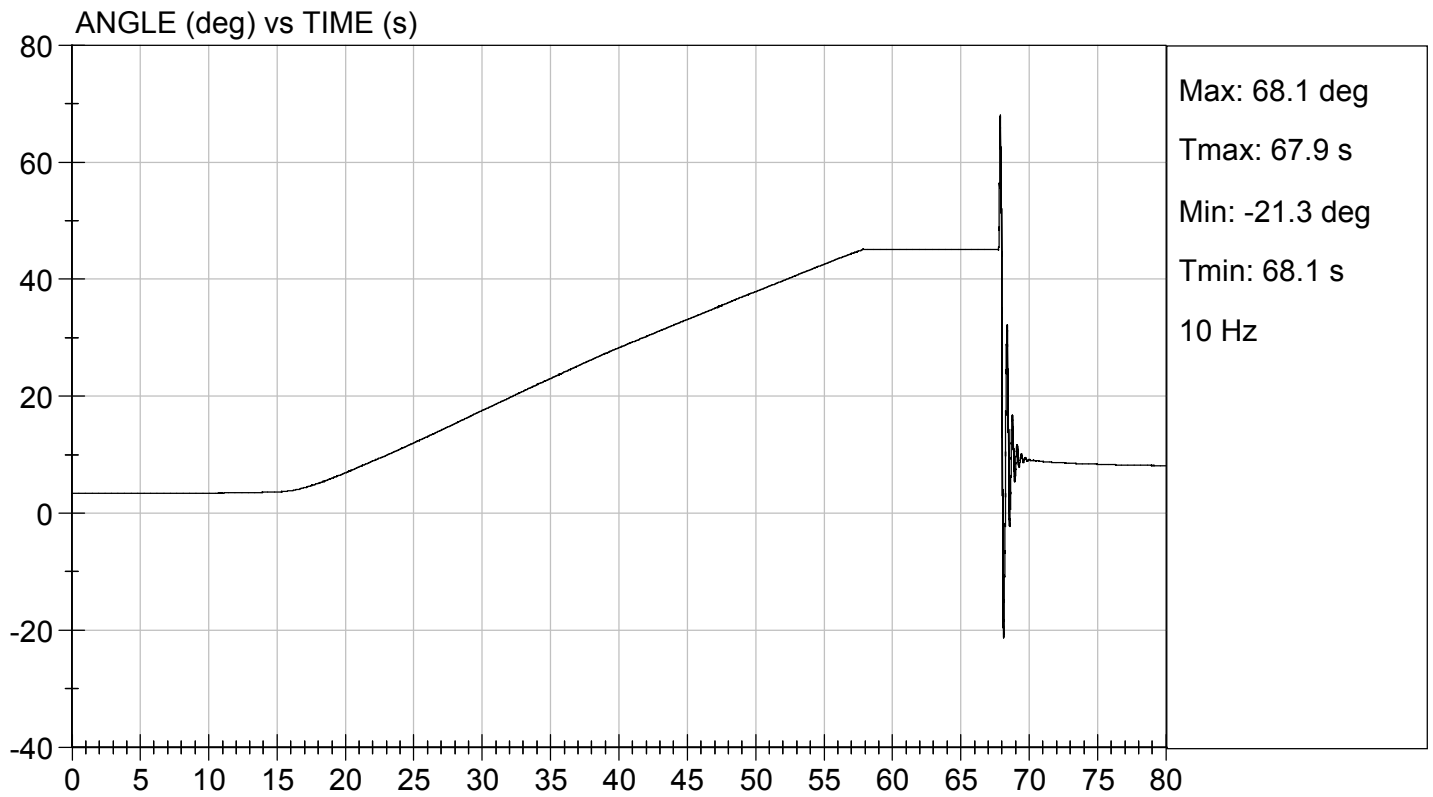
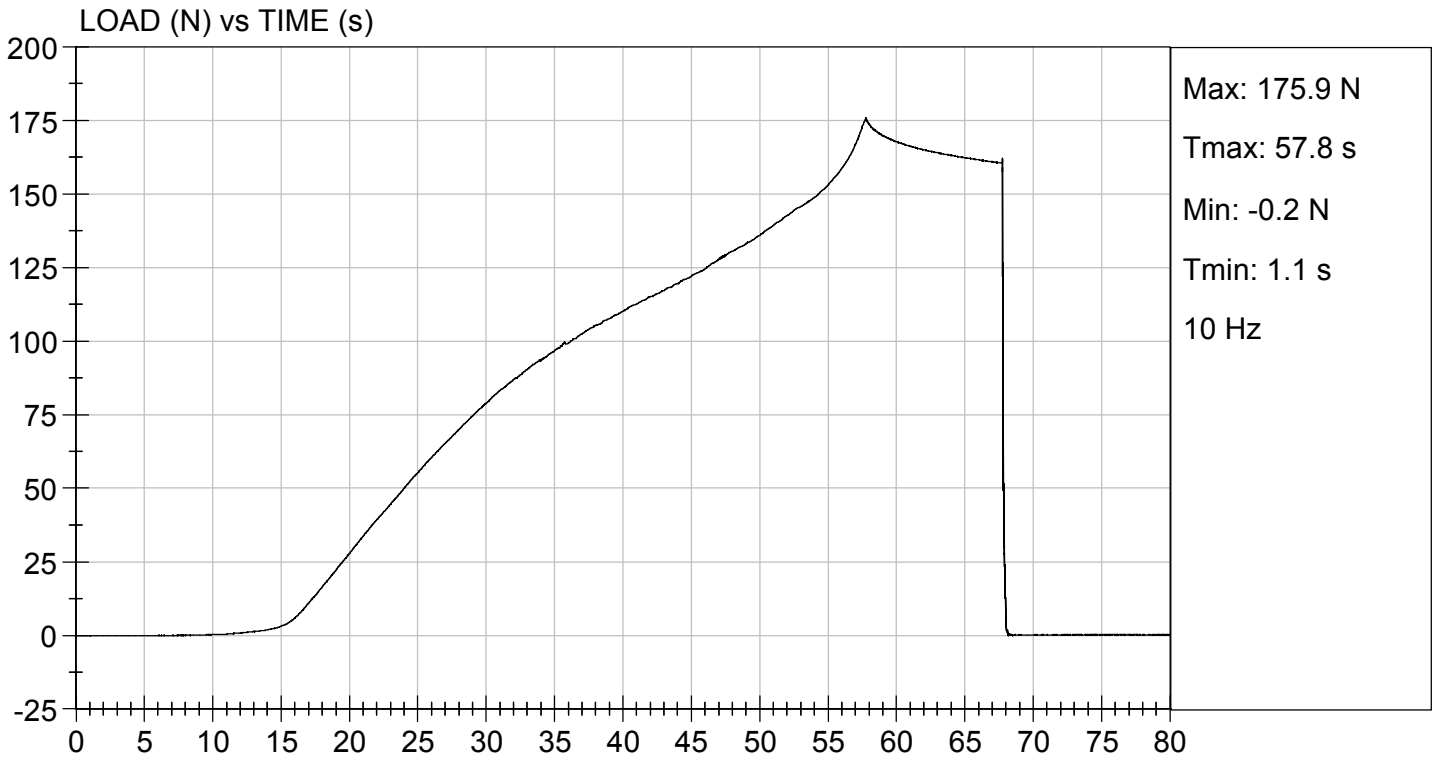
Laboratory Technician

10/10/2018

Test Date

B. F. K.

Approved By



**APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA**

Table 1 – Dummy Instrumentation

		HIII 3-Year-Old S/N 082		
		Serial Number	Manufacturer	Calibration Date
Head CG Accelerometers	X	P88333	Endevco	09/18/18
	Y	P88334	Endevco	09/18/18
	Z	P88335	Endevco	09/18/18
Upper Neck Load Cell		NG124	FTSS	08/02/18
Lower Neck Load Cell		NG249	Denton	08/02/18
Chest Accelerometers	X	P86724	Endevco	07/30/18
	Y	P86725	Endevco	07/30/18
	Z	P86726	Endevco	07/30/18
Chest Potentiometer		082	Servo	08/02/18
Upper Sternum Accelerometer	X	P88302	Endevco	05/24/18
Lower Sternum Accelerometer	X	P88303	Endevco	09/20/18
Upper Spine Accelerometers	X	P79639	Endevco	09/19/18
	Y	P79640	Endevco	09/19/18
	Z	P79641	Endevco	09/19/18
Lower Spine Accelerometers	X	P84445	Endevco	09/19/18
	Y	P84449	Endevco	09/19/18
	Z	P88720	Endevco	09/19/18