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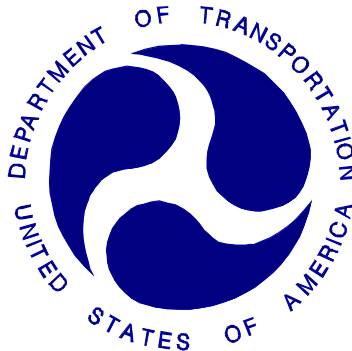
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

GENERAL MOTORS CORP
2005 PONTIAC G6
FOUR-DOOR SEDAN

NHTSA NUMBER: M50114

GENERAL DYNAMICS TEST NUMBER: 8642-NCAP-52

GENERAL DYNAMICS
ADVANCED INFORMATION ENGINEERING SERVICES
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November 19, 2004

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
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16. Abstract A frontal load cell barrier test of a 2005 Pontiac G6 Four-Door Sedan was performed at General Dynamics crash test facility in Buffalo, New York, on November 19, 2004. The impact velocity was 56.81 kph and the temperature at the barrier face was 20°C. The maximum post-test vehicle crush was 575 mm. The test vehicle was equipped with 3-point restraint systems with torso belt pretensioners and force limiters, knee bolsters, head restraints and airbags at both the driver and right outboard passenger seating positions. With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements.					
ATD Position	HIC	Clip (g's)	Chest Disp (mm)	Left Femur (N)	Right Femur (N)
Driver (061)	411.5	43.4	-35.0	-2940.8	-4755.8
Passenger (064)	539.6	48.5	-30.0	-283.5	-1117.9
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.81 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-01-D-32005. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 56.81 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

1.2 TEST PROCEDURE

This 56.81 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated December 1999. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301 "Fuel System Integrity" performance. Procedures for receiving, inspection testing and reporting of test results are described in the test procedures and are not repeated in this report.

One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with nine accelerometer array heads, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 061) and the right-front passenger (position 2) ATD (Serial No.064) were used in one test previous to this test where they did not exceed FMVSS 208 head, neck, chest or femur requirements. Certification details, along with instrumentation calibration data, are found in Appendix C.

The vehicle, occupant, camera and measurement data are presented in Section 2. Appendix A contains the still photograph prints. The 197 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Appendix C contains the dummy calibration data and Appendix D contains the transducer calibration dates.

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 36 load cells was impacted by a 2005 Pontiac G6 Four-Door Sedan at a velocity of 56.81 kph. The test was performed at General Dynamics on November 19, 2004. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The occupant data is summarized below.

	HIC	Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)	Belt Spool (mm)	Belt Stretch (mm/50 mm)
Driver ATD	411.5	43.4	-35.0	-2940.8	-4755.8	-	-
Passenger ATD	539.6	48.5	-30.0	-283.5	-1117.9	-	-

AUTOMATIC DOOR LOCK SUMMARY

ADL Equipped Test Vehicle:	Yes
ADL Activation Status:	Yes
Door Lock Condition:	Locked

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum vehicle static crush was 575 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The face to the top of the center of the airbag, the top of the head to the sun visor, the back of the head to the right of center of the head restraint, the chest to the airbag and the left and right knees to the knee bolster. The passenger's visible contact points were as follows: The face to the center of the airbag, the top of the head to the sun visor, the back of the head to the center of the head restraint, the chest to the airbag and the left and right knees to the knee bolster.

The 2005 Pontiac G6 Four-Door Sedan did not exceed the requirements of FMVSS 208, FMVSS 212, FMVSS 219, and FMVSS 301. Data pertaining to these standards are presented in the data sheets.

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA

DATA SHEET NO. 1 CRASH TEST SUMMARY

Vehicle NHTSA No.:	M50114	Test Mode:	56.3 kph Frontal Barrier	
Test Date:	November 19, 2004	Time:	12:05	Temperature: 20 °C
Vehicle Make/Model/Body Style:	2005 Pontiac G6 Four-Door Sedan			
Vehicle Test Weight:	1767.0	kg		
Vehicle/Barrier Impact Angle:	0	°		
Impact Velocity:	56.81	kph		
Maximum Static Crush:	575	mm		
Vehicle Rebound:	303	mm		
<u>DUMMIES:</u>		<u>DRIVER</u>	<u>PASSENGER</u>	
Type:		572E	572E	
Restraint System:		Three point safety belt with shoulder belt pretensioner and force limiters, airbag, knee bolster and head restraint	Three point safety belt with shoulder belt pretensioner and force limiters, airbag, knee bolster and head restraint	
Number of Data Channels:	197			
Number of Cameras:	1	Real Time		
	16	High Speed		
<u>DOOR OPENING DATA:</u>	<u>Closed, latched and operable without tools - Left Front</u>			
	<u>Closed, latched and operable without tools - Right Front</u>			
Front Seat(s) Data:		<u>DRIVER</u>	<u>PASSENGER</u>	
Seat Track Failure: (mm of shift)		20mm forward	15 mm forward	
Seat Back Failure:		None	None	
<u>VISIBLE DUMMY CONTACT POINTS:</u>		<u>DRIVER</u>	<u>PASSENGER</u>	
Head:		The face to the top of the center of the airbag, the top of the head to the sun visor, the back of the head to the right of center of the head restraint	The face to the center of the airbag, the top of the head to the sun visor, the back of the head to the center of the head restraint	
Abdomen:		-	-	
Chest:		Airbag	Airbag	
Knees:		Knee Bolster	Knee Bolster	

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2005 Pontiac G6 Four-Door Sedan

NHTSA No. : M50114 ; VIN: 1G2ZG548254124632 ; Color: Silver

Engine Data: 6 cylinders; - CID; 3.5 Liters; - cc

Placement: - Longitudinal or In-Line; X Transverse or Lateral

Transmission Data: 4 speeds; - Manual; X Automatic; X Overdrive

Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel Drive

Safety Belt Features – Driver X Pretensioner (Shoulder); X Load Limiter; X Adj. Anchorage

Safety Belt Features - Passenger X Pretensioner (Shoulder); X Load Limiter; X Adj. Anchorage

Major Options: X ADLs; X A/C; X Pwr.Strg.; X Pwr. Brakes

X Pwr. Windows; X Pwr. Door Locks; X Tilt Wheel

Date Received: 11/10/2004 ; Odometer Reading 89 km

Selling Dealer: Jim Culligan, Inc.

& Address: 8129 Main Street Williamsville, NY 14221-6032

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: General Motors Corp

Date of Manufacture 10/04

GVWR: 2004 kg; GAWR: 1091 kg FRONT; 913 kg REAR

DATA FROM TIRE PLACARD:

Recommended Tire Size: P215/60R16

* Recommended Cold Tire Pressure: 210 kPa FRONT; 210 kPa REAR

DATA FROM TIRE SIDEWALL:

Size of Tires on Test Vehicle: P215/60R16 94S ; Manufacturer: Uniroyal

Tire Pressure with Maximum Capacity Vehicle Load: Front: 240 kPa; Rear: 240 kPa

Treadwear: 540 ; Traction: A ; Temperature: A

VEHICLE CAPACITY DATA:

Type of Front Seats: - Bench; X Bucket; - Split Bench

Number of Occupants: 2 Front; 3 Rear; 5 Total

Vehicle Capacity Weight (VCW) = 404.0 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 63.8 kg

*Tire pressure used for test

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

Right Front =	<u>483.0</u>	kg	Right Rear =	<u>284.0</u>	kg
Left Front =	<u>486.0</u>	kg	Left Rear =	<u>303.0</u>	kg
TOTAL FRONT =	<u>969.0</u>	kg	TOTAL REAR =	<u>587.0</u>	kg
TOTAL DELIVERED WEIGHT =	<u>1556.0</u>	kg			
% of Total Front of Vehicle Weight =	<u>62.3</u>		% of Total Rear Weight =	<u>37.7</u>	%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW) =	<u>1556.0</u>	kg
Rated Cargo/Luggage Weight (RCLW) =	<u>63.8</u>	kg
Weight of 2 p.572 Dummies @ 76 each =	<u>152</u>	kg
TARGET TEST WEIGHT =	<u>1771.8</u>	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND

59.0

KG OF CARGO WEIGHT:

Right Front =	<u>521.0</u>	kg	Right Rear =	<u>357.0</u>	kg
Left Front =	<u>533.0</u>	kg	Left Rear =	<u>356.0</u>	kg
TOTAL FRONT =	<u>1054.0</u>	kg	TOTAL REAR =	<u>713.0</u>	kg
TOTAL TEST WEIGHT =	<u>1767.0</u>	kg			
% of Total Front Weight =	<u>59.6</u>	%	% of Total Rear Weight =	<u>40.4</u>	%
Weight of Ballast Secured in Vehicle Trunk Area =	<u>0</u>	kg			
Vehicle Components Removed for Weight Reduction:			<u>Rear Bumper, Rear windshield, Rear side glass, side mirrors, muffler, deck lid, 37.5 L of Stoddard</u>		

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED:	RF	<u>727</u>	LF	<u>720</u>	RR	<u>734</u>	LR	<u>728</u>
FULLY LOADED:	RF	<u>719</u>	LF	<u>710</u>	RR	<u>708</u>	LR	<u>702</u>
AS TESTED:	RF	<u>720</u>	LF	<u>713</u>	RR	<u>709</u>	LR	<u>710</u>
Vehicle's Wheel Base:		<u>2852</u>	mm					
Location of Vehicle's C.G.:		<u>1151</u>	mm rearward of front wheel center.					

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual =	<u>61.7</u>	liters
Usable Capacity Figure Furnished by COTR =	<u>61.7</u>	liters
Test Volume Range (92 to 94% of Usable Capacity) =	<u>56.76</u>	to <u>58</u> liters
ACTUAL TEST VOLUME=	<u>20.4</u>	liters (with entire fuel system filled)
Test Fluid Type:	<u>Stoddard Solution</u>	Spec. Grav. = <u>0.764</u>
Kinematic Viscosity =	<u>0.96</u>	centistokes; Color = <u>Orange</u>
Type of Fuel Pump: Electric-	<u>X</u>	Mechanical- <u>-</u>
Does Electric Pump operate with ignition switch "ON" & engine "OFF"	Yes- <u>X</u>	No- <u>-</u>
<u>Details of Fuel System: Tank – centered ahead of the rear axle; Lines – Inside right frame stiffener;</u>		
<u>Filler neck – Right side above the rear axle.</u>		

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°
Test Date: November 19, 2004 Time: 12:05 Temperature: 20 °C
Vehicle NHTSA No.: M50114
Required Impact Velocity Range: 55.5 to 57.1 kph

BARRIER IMPACT VELOCITY: (Speed traps within 5 feet of impact plane.)

Trap No. 1 = 56.81 kph; Trap No. 2 = 56.81 kph
Distance from vehicle to barrier: (1) entering trap = 813 mm
(2) exiting trap = 305 mm

VEHICLE STATIC CRUSH: (mm) (For frontal and rear impacts only.)

Vehicle Length:

Pre-Test	Left = <u>4687</u> ; C/L = <u>4803</u> ; Right = <u>4689</u>
Post-Test	Left = <u>4263</u> ; C/L = <u>4228</u> ; Right = <u>4327</u>
Crush	Left = <u>424</u> ; C/L = <u>575</u> ; Right = <u>362</u>
AVERAGE	= <u>454</u> mm

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

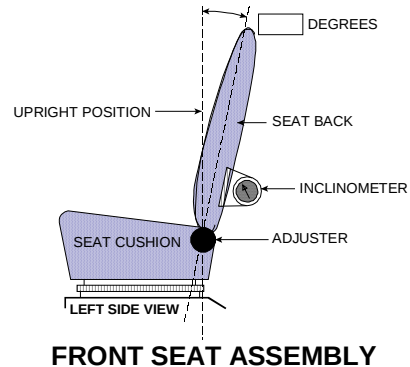
	Left = <u>312</u> ; C/L = <u>360</u> ; Right = <u>236</u>
AVERAGE	= <u>303</u> mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2005 Vehicle Model: Pontiac G6 Body Style : Four-Door Sedan

1. NOMINAL DESIGN RIDING POSITION:
for adjustable driver and passenger seat backs.
Please describe how to position the inclinometer to
measure the seat back angle. Include description of
the location of the adjustment latch detent, if
applicable.



Seat back angle for driver's seat: 19°

Measurement instructions: Measured on center of the rear of the seatback, matched with H-Point machine.

Seat back angle for passenger's seat: 19°

Measurement instructions: , matched with H-Point machine.

2. SEAT FORE AND AFT POSITIONING:

Positioning of the driver's seat: Set in mid-position of 0 to 270 mm (135 mm from forward most) or seat track detent 10 with the seat cushion in lowest position.

Positioning of the passenger's seat: Set in mid-position of 0 to 240 mm (120 mm from forward most) or seat track detent 12.

3. FUEL TANK CAPACITY DATA:

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 61.7 liters

B. "Usable Capacity" of the optional equipment fuel tank is - liters

C. "Usable Capacity" of the vehicle(s) used for certification
testing to requirements of FMVSS 301 = 61.7 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 59.05 liters

3.3 Is vehicle equipped with electric fuel pump? Yes- ☒ ; No- ☐

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

When the ignition key is turned to the 'ON' position and while the engine is running.

DATA SHEET NO. 4 TEST VEHICLE INFORMATION (cont.)

4. STEERING COLUMN ADJUSTMENTS:

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions: Set in mid-tilt (20.8°) and mid-telescope (25mm of 50 mm total travel)

5. SEAT BELT UPPER ANCHORAGE:

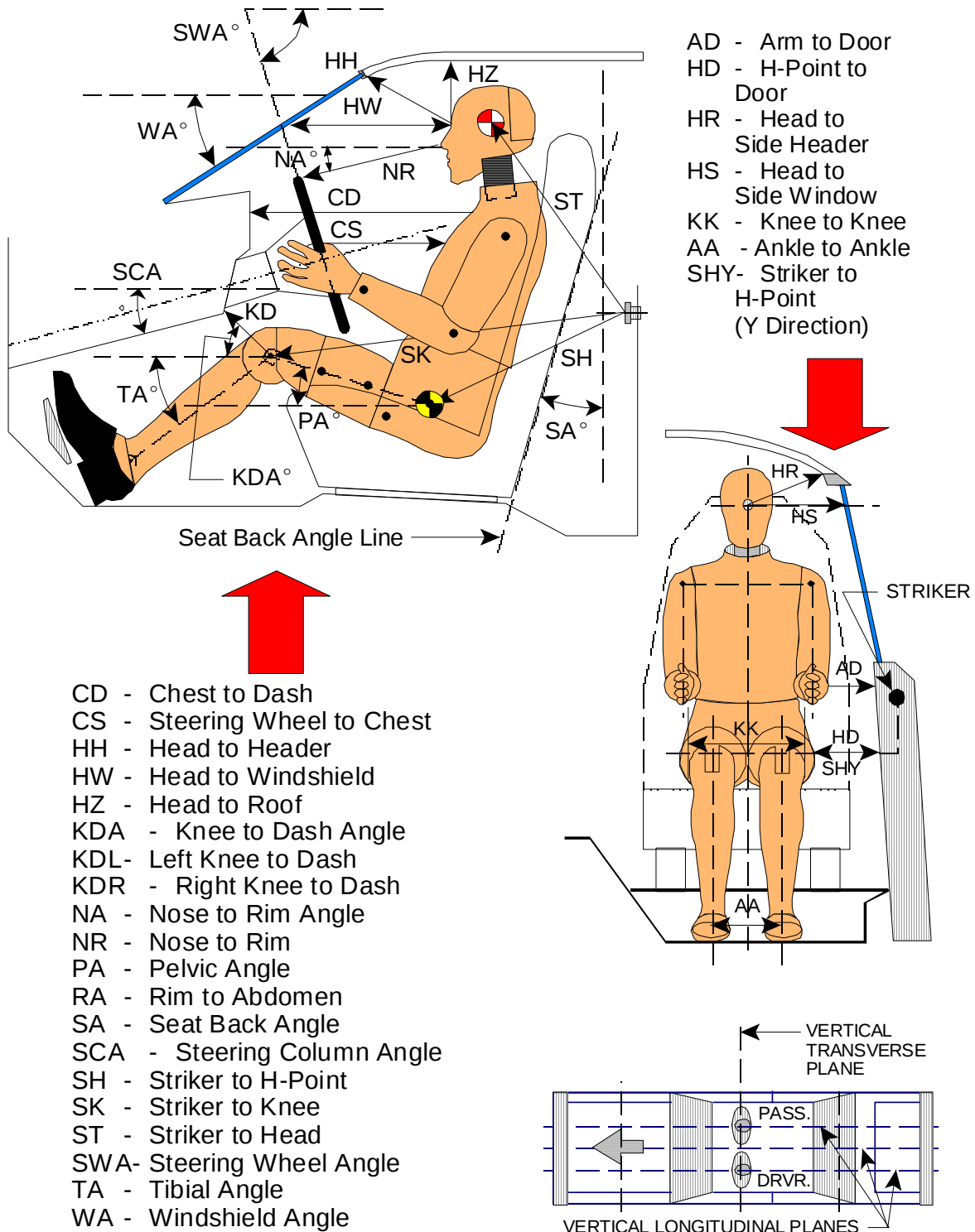
Nominal design riding position: Set in mid-position of 5 total detents. Detent 2 with upper most detent being detent 0.

6. AUTOMATIC DOOR LOCKS: Is test vehicle equipped with ADLs? X Yes; - No;

Does vehicle owner's manual describe how to deactivate ADLs? - Yes; X No; - N/A

Comments: The ADL's cannot be disabled in this vehicle. The test was conducted with locked doors.

DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE
DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



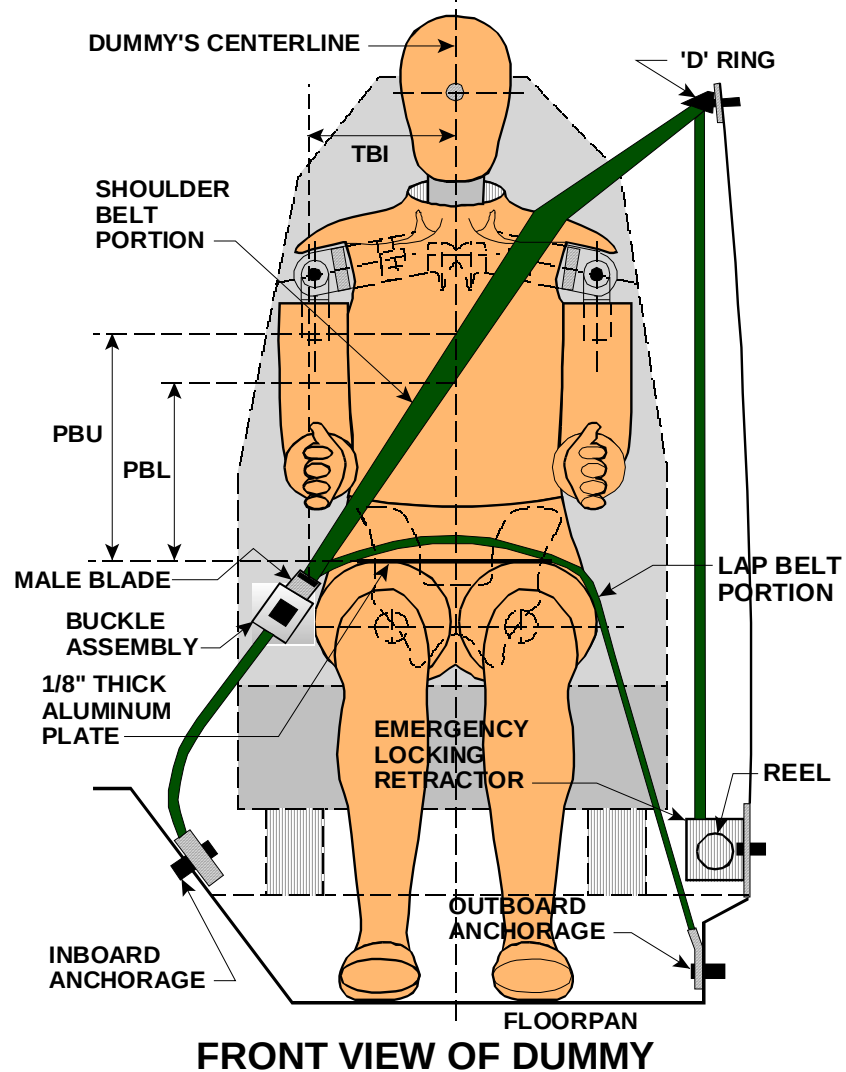
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #061)			PASS. (Serial #064)		
WA ^o	23 deg.			N/A		
SWA ^o	69.2 deg.			N/A		
SCA ^o	20.8 deg.			N/A		
SA ^o	19 deg.			19 deg.		
HZ	180			181		
HH	370			387		
HW	702			699		
HR	197			213		
NR	407	Angle	-10 deg.	N/A		
CD	552			573		
CS	322			N/A		
RA	224			N/A		
KDL	202	Angle (KDA)	30 deg.	207		
KDR	190			207	Angle (KDA)	35 deg.
PA ^o	22.4 deg.			24.4 deg.		
TA ^o	40.1 deg.			41.6 deg.		
KK	320			235		
AA	340			220		
ST	483	Angle	5 deg.	465	Angle	5 deg.
SK	584	Angle	95 deg.	580	Angle	100 deg.
SH	280	Angle	130 deg.	275	Angle	138 deg.
SHY	255			250		
HS	308			328		
HD	132			133		
AD	111			117		

Dimensions in millimeters

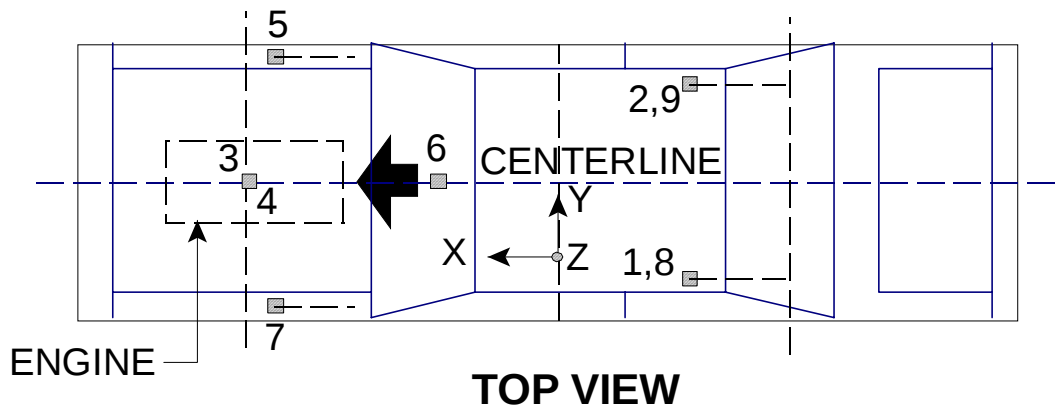
DATA SHEET NO. 6 SEAT BELT POSITIONING DATA

SEAT BELT POSITIONING DATA

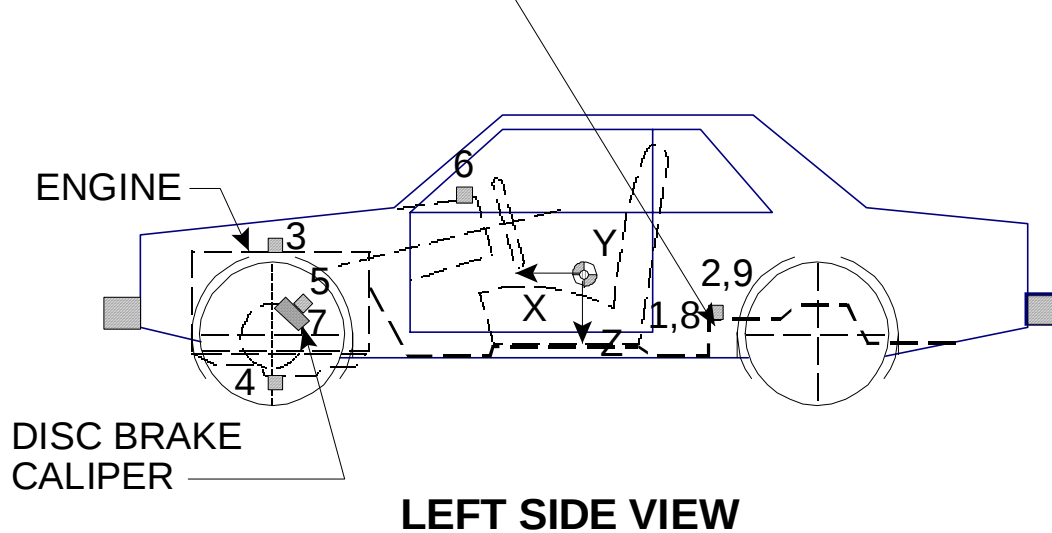


	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	280	300
PBL-- Top surface of alum. plate to belt lower edge	205	215
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



REAR SEAT CUSHION
ASSY. FRONT ATTACHMENT
BRACKET SUPPORT



Note: Vehicle accelerometer location and data summary shown in DATA SHEET NO. 7

DATA SHEET NO. 7 VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY (cont.)

LOCATION		PRE-TEST LENGTH (mm)		
		X	Y	Z
1	Left Rear Seat Cross Member X	1682	-651	-349
2	Right Rear Seat Cross Member X	1682	651	-349
3	Top of Engine Block	3991	-35	-849
4	Bottom of Engine	3871	138	-304
5	Disc Brake Caliper @ Right Side	3781	-638	-524
6	Instrument Panel	2992	0	-860
7	Disc Brake Caliper @Left Side	3781	638	-524
8	Left Rear Seat Cross Member Z	1682	-651	-349
9	Right Rear Seat Cross Member Z	1682	651	-349

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Left Rear Seat Cross Member X	2.9	129.4	-40.2	55.5
2	Right Rear Seat Cross Member X	2.4	124.0	-38.5	58.4
3	Top of Engine Block	57.7	46.6	-116.5	34.5
4	Bottom of Engine	349.8	42.9	-1100.8	35.1
5	Disc Brake Caliper @ Right Side	9.7	75.5	-104.6	36.4
6	Instrument Panel	19.9	78.1	-46.7	43.6
7	Disc Brake Caliper @Left Side	30.5	68.1	-109.6	47.4
8	Left Rear Seat Cross Member Z	5.2	89.1	-15.0	66.1
9	Right Rear Seat Cross Member Z	4.8	49.8	-11.2	73.6

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

Vehicle Year/Make/Model/Body Style: 2005 Pontiac G6 Four-Door Sedan

NHTSA Test No.: M50114 Test Date: November 19, 2004

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head 9 Array X Arm Y	g	2.0	199.8	-10.6	86.9	5.7	105.3	-25.0	71.0
Head 9 Array X Arm Z	g	30.8	56.6	-4.9	141.5	30.9	67.2	-5.9	152.2
Head 9 Array Y Arm X	g	2.9	190.6	-45.3	78.3	0.4	21.3	-65.8	82.2
Head 9 Array Y Arm Z	g	24.1	56.5	-1.8	21.3	24.2	70.0	-1.4	147.9
Head 9 Array Z Arm X	g	3.0	199.9	-47.1	74.9	1.2	32.5	-64.8	84.6
Head 9 Array Z Arm Y	g	2.1	199.8	-20.0	99.9	10.2	110.7	-18.4	83.2
Head X	g	2.1	189.3	-46.7	97.0	0.3	21.2	-66.9	82.2
Head Y	g	1.9	193.1	-14.4	94.3	3.5	106.5	-14.4	88.6
Head Z	g	23.8	56.2	-1.6	21.1	24.3	70.2	-0.9	147.5
Head Resultant	g	49.2	97.0	0.0	-48.6	68.2	81.4	0.0	9.0
Redundant Head X	g	3.4	190.2	-46.6	96.9	0.8	199.9	-66.6	82.2
Redundant Head Y	g	1.7	193.1	-15.5	95.2	3.1	121.1	-14.6	88.6
Redundant Head Z	g	23.8	56.2	-1.6	21.1	24.3	70.2	-1.0	149.1
Redundant Head Resultant	g	49.3	96.9	0.0	-49.6	67.9	82.2	0.0	9.4
Upper Neck Fx	N	405.9	75.6	-377.6	130.8	232.6	88.3	-397.0	145.4
Upper Neck Fy	N	127.5	77.2	-63.9	93.9	223.6	100.1	-34.3	66.8
Upper Neck Fz	N	1028.2	70.0	-83.4	111.8	1354.3	74.2	-64.7	149.2
Upper Neck F Resultant	N	1101.8	70.0	1.5	-49.6	1357.6	74.2	1.3	-44.4
Upper Neck Mx	N-m	5.3	92.1	-11.7	105.3	13.0	111.7	-3.6	182.6
Upper Neck My	N-m	39.5	69.8	-16.1	55.5	32.3	139.3	-30.0	103.9
Upper Neck Mz	N-m	13.7	93.1	-6.0	144.6	8.2	92.5	-4.5	139.0
Upper Neck M Resultant	N-m	40.5	69.8	0.0	-50.0	32.9	139.3	0.0	-31.1
Chest X	g	5.9	178.0	-43.6	65.5	1.8	188.8	-50.6	77.1
Chest Y	g	2.7	73.4	-5.3	57.7	3.7	50.1	-6.9	77.2
Chest Z	g	10.4	55.6	-9.9	88.3	9.0	53.2	-4.9	78.2
Chest Resultant	g	43.9	65.4	0.1	-50.0	51.3	77.1	0.0	-48.4

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)

Vehicle Year/Make/Model/Body Style: 2005 Pontiac G6 Four-Door Sedan

NHTSA Test No.: M50114 Test Date: November 19, 2004

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Redundant Chest X	g	5.8	178.1	-43.1	65.3	1.7	197.3	-48.9	77.1
Redundant Chest Y	g	2.8	73.3	-5.1	57.7	3.9	50.2	-6.9	77.4
Redundant Chest Z	g	10.2	55.5	-9.7	87.6	8.9	55.0	-5.3	78.2
Redundant Chest Resultant	g	43.4	65.2	0.1	-48.8	49.7	77.1	0.0	-48.4
Chest Displacement	mm	0.0	-31.9	-35.0	97.8	0.0	1.1	-30.0	97.8
Pelvic X	g	6.0	188.9	-74.4	63.4	3.8	98.8	-51.8	70.1
Pelvic Y	g	17.1	73.5	-8.2	49.7	8.2	52.2	-9.7	75.5
Pelvic Z	g	3.5	189.4	-35.3	74.1	3.0	198.7	-33.0	79.4
Pelvic Resultant	g	80.7	63.5	0.1	-12.0	57.5	60.0	0.0	-49.0
Left Femur	N	878.5	54.5	-2940.8	60.7	1460.8	62.7	-283.5	42.6
Right Femur	N	603.0	35.3	-4755.8	64.1	1446.1	57.4	-1117.9	71.0
Left Upper Tibia Mx	N-m	33.7	61.4	-23.7	70.2	§	§	§	§
Left Upper Tibia My	N-m	112.1	71.2	-26.7	59.8	109.8	57.3	-53.4	67.8
Left Lower Tibia Fz	N	13.1	151.1	-4091.2	68.2	90.5	23.3	-2950.7	56.0
Left Lower Tibia Mx	N-m	15.5	59.8	-1.5	199.9	12.3	59.8	-36.2	86.9
Left Lower Tibia My	N-m	35.1	67.6	-39.0	57.4	27.4	68.4	-29.3	58.2
Right Upper Tibia Mx	N-m	‡	‡	‡	‡	47.3	69.3	-14.0	107.2
Right Upper Tibia My	N-m	122.6	48.6	-10.1	156.0	82.5	57.1	-66.4	59.8
Right Lower Tibia Fz	N	131.2	156.4	-4430.5	50.4	63.2	164.1	-2924.5	43.2
Right Lower Tibia Mx	N-m	33.1	62.4	-28.5	53.2	33.1	93.8	-21.7	69.7
Right Lower Tibia My	N-m	49.0	69.8	-43.0	43.5	36.8	69.8	-38.3	57.8
Left Foot Aft Ax	g	11.4	71.9	-83.1	60.2	†	†	†	†
Left Foot Aft Az	g	12.0	81.3	-54.9	59.8	15.7	65.0	-37.6	45.0
Left Foot Fore Az	g	24.3	17.7	-70.8	60.1	24.3	78.8	-70.0	44.7
Right Foot Aft Ax	g	37.0	53.5	-114.5	47.6	22.2	75.1	-109.1	59.9
Right Foot Aft Az	g	7.1	67.1	-111.9	49.9	5.3	79.8	-42.0	42.4
Right Foot Fore Az	g	¹	¹	¹	¹	20.4	61.1	-58.2	41.5
Lap Belt Load	N	7756.9	60.5	-11.4	4.1	8167.2	61.3	-1.1	-50.0
Torso Belt	N	5424.4	53.3	-42.7	161.9	5514.9	54.0	-34.8	154.2

§ - Channel Opened

‡ - Data Clipped

† - Transducer Failed

¹ - Questionable after 36 ms

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)

Vehicle Year/Make/Model/Body Style: 2005 Pontiac G6 Four-Door Sedan

NHTSA Test No.: M50114 Test Date: November 19, 2004

HEAD INJURY CRITERIA (HIC)				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	411.5	67.3	103.3	42.0 g
Position #2 - Passenger	539.6	69.0	102.0	48.4 g

** HIC is as defined in FMVSS 208. The maximum time interval from t₁ to t₂ is 36 milliseconds.

CLIP SUMMARY*				
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #1 - Driver	43.4	64.5	67.5	429.1
Position #2 - Passenger	48.5	75.4	78.4	414.3

* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
REDUNDANT DATA

Vehicle Year/Make/Model/Body Style: 2005 Pontiac G6 Four-Door Sedan

NHTSA Test No.: M50114 Test Date: November 19, 2004

HEAD INJURY CRITERIA (HIC) REDUNDANT				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	412.5	67.3	103.3	42.0 g
Position #2 - Passenger	530.6	69.0	102.0	48.2 g

** HIC is as defined in FMVSS 208. The maximum time interval from t₁ to t₂ is 36 milliseconds.

CLIP SUMMARY* REDUNDANT				
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #1 - Driver	42.8	64.4	67.8	409.7
Position #2 - Passenger	46.9	75.4	78.4	382.3

* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

DATA SHEET NO. 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

Belt length from trim panel exit
to bolt hole anchor point for
continuous webbing systems.

Driver

Passenger

1435

1415

Shoulder belt length as measured
on Part 572 Dummy.

760

740

Lap belt length as measured
on Part 572 Dummy.

560

560

Dimensions in millimeters

DATA SHEET NO.10 SUMMARY OF FMVSS 212 DATA

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place and covered with a 0.0 mm molding.

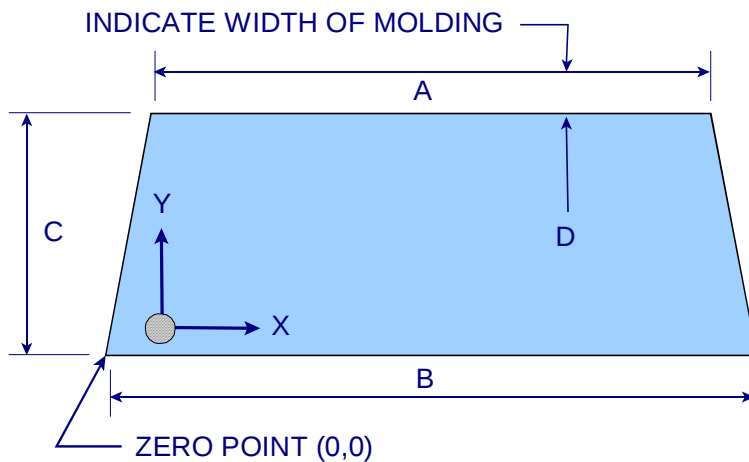
FMVSS 212 REQUIREMENTS:

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants,

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		% OF RETENTION
	PRE-TEST (mm)	POST-TEST (mm)	
RIGHT SIDE	2260	2260	100.0%
LEFT SIDE	2260	2260	100.0%
TOTAL	4520	4520	100.0%

AREA OF RETENTION FAILURE: None



DIMENSIONS (mm)	
A	1190
B	1530
C	900
D	0

FRONT VIEW OF WINDSHIELD

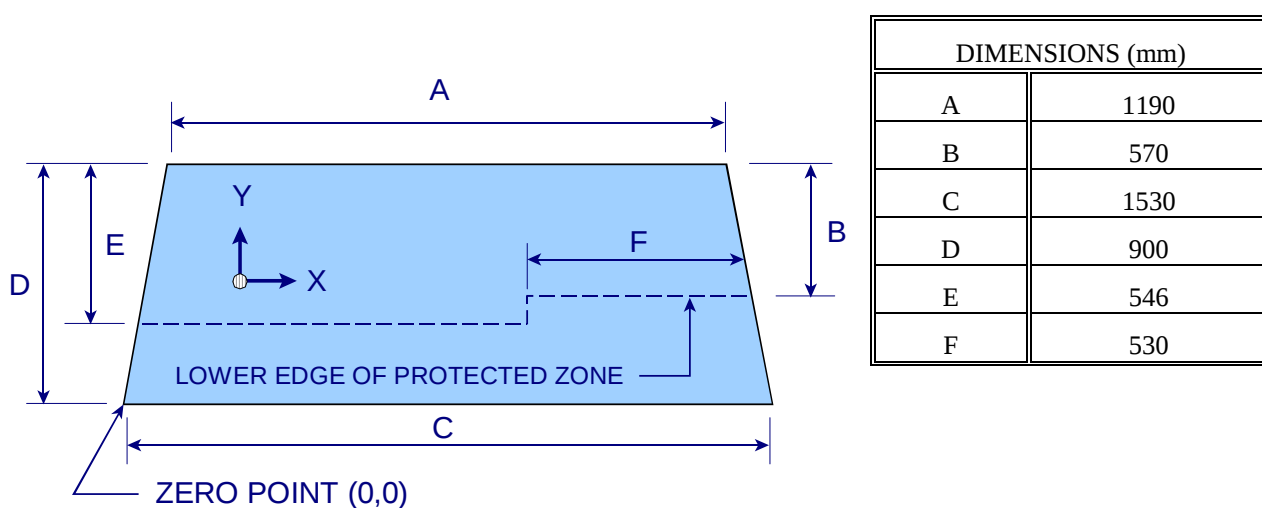
FAILURE DETAILS: None

DATA SHEET NO. 11 FMVSS NO. 219 (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 165 mm diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. The locus of points is drawn on the inner surface of the windshield contacted by the sphere across the width of the instrument panel. From the outermost contactable points extend the locus line horizontally to the edges of the windshield, then draw a line on the inner surface of the windshield below and 13 mm distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection of this line onto the outer surface of the windshield.

FMVSS 219 TEST DATA:



FRONT VIEW OF WINDSHIELD

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

(Show location of penetration on the above sketch)

COORDINATES		
	X	Y
1.	-	-
2.	-	-
3.	-	-
4.	-	-

DATA SHEET NO. 12 FMVSS NO. 301-75 "FUEL SYSTEM INTEGRITY" POST IMPACT TEST DATA

NHTSA TEST No.: M50114 TEST DATE: November 19, 2004

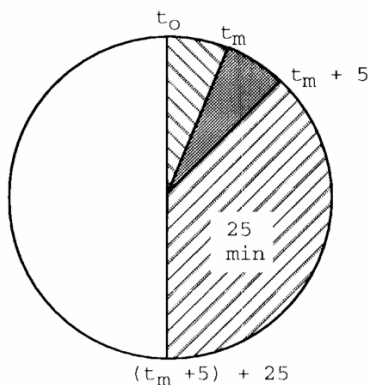
VEHICLE MAKE/MODEL: 2005 Pontiac G6 Four-Door Sedan

The test vehicle was filled from 92% to 94% of the manufacture's "usable" capacity. The electric fuel pump was operating if it will operate without engine operation. Two Part 572 anthropomorphic test devices were located at each of the front designated seating positions.

=====

TEST VEHICLE IMPACT TYPE: X Frontal (56 kph)
 - Oblique (48 kph) with _____ deg. barrier face first contacting _____
 - (driver/passenger) side
 - Rear Moving Barrier (48 kph)
 - Lateral Moving Barrier (32 kph)

FUEL SPILLAGE MEASUREMENT:



1. From impact until vehicle motion ceases
2. For 5 minute period after vehicle motion ceases
3. For next 25 minutes

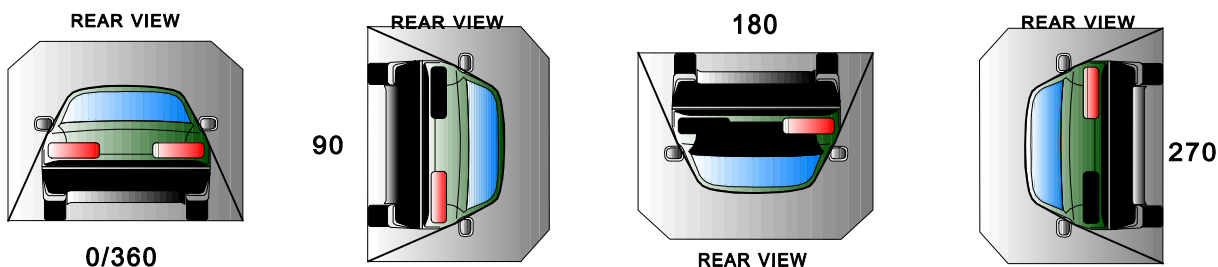
ACTUAL	MAX ALLOWED
0	28 g
0	141 g
0	28 g/min.

SOLVENT SPILLAGE DETAILS: None

DATA SHEET NO. 13 - ROLLOVER DATA

Vehicle: 2005 Pontiac G6 Four-Door Sedan

NHTSA No.: M50114



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Stage	Rotation Time (spec. 1 -3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
0° - 90°	1	minutes	12	seconds	5	minutes	6	minutes	12	seconds	7	minutes
90° - 180°	1	minutes	06	seconds	5	minutes	6	minutes	6	seconds	7	minutes
180°-270°	1	minutes	08	seconds	5	minutes	6	minutes	8	seconds	7	minutes
270°-360°	1	minutes	13	seconds	5	minutes	6	minutes	13	seconds	7	minutes

II. FMVSS 301 REQUIREMENTS: (Maximum allowable solvent spillage):

First 5 minutes from onset of rotation	6th min.	7th min.	8th min. (if required)
142 g	28 g	28 g	28 g

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

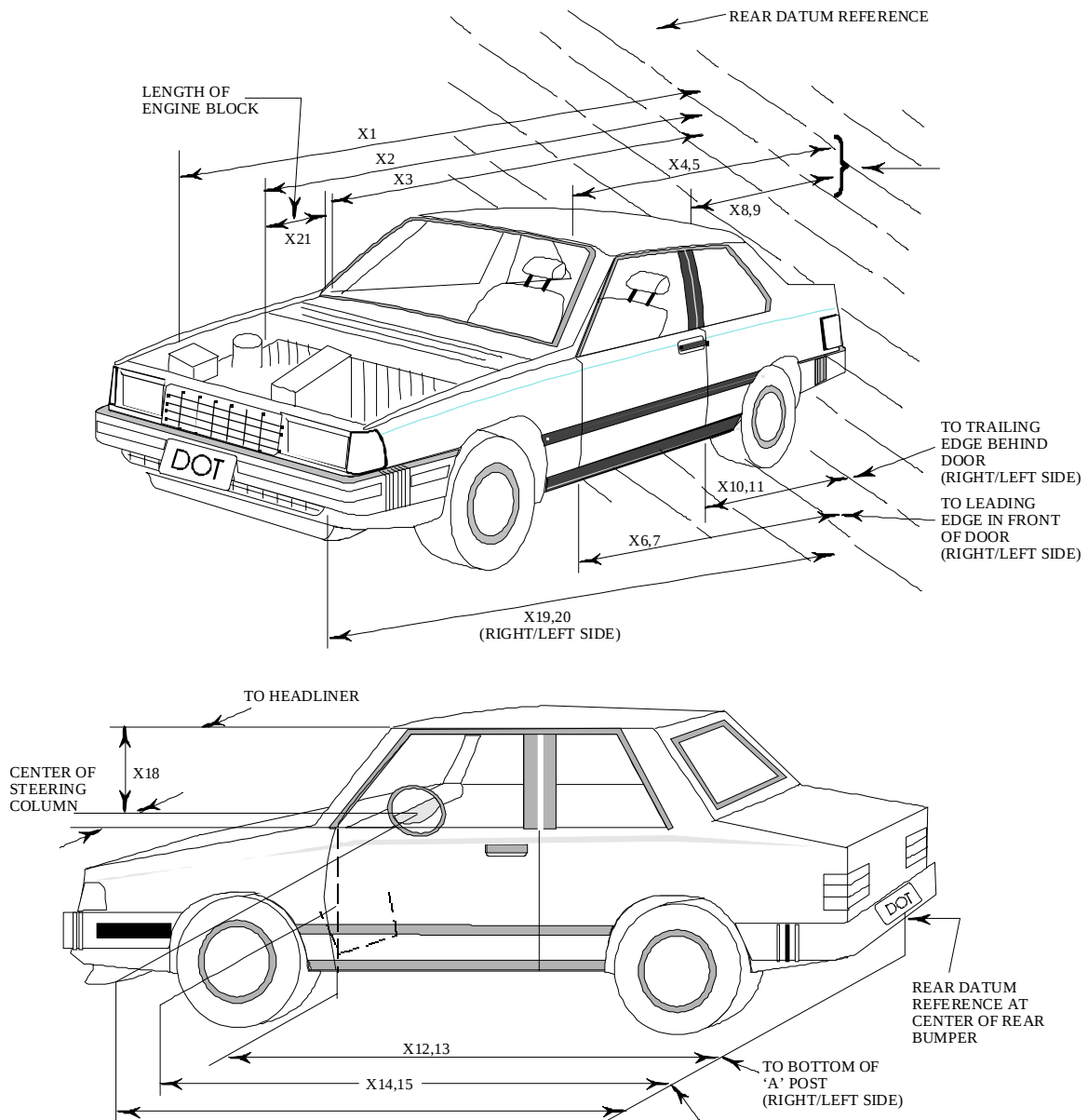
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	N/A
90° - 180°	0	0	0	N/A
180°-270°	0	0	0	N/A
270°-360°	0	0	0	N/A

Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

Rollover Stage	Spillage Location
0° - 90°	None
90° - 180°	None
180°-270°	None
270°-360°	None

DATA SHEET NO. 14 TEST VEHICLE MEASUREMENTS

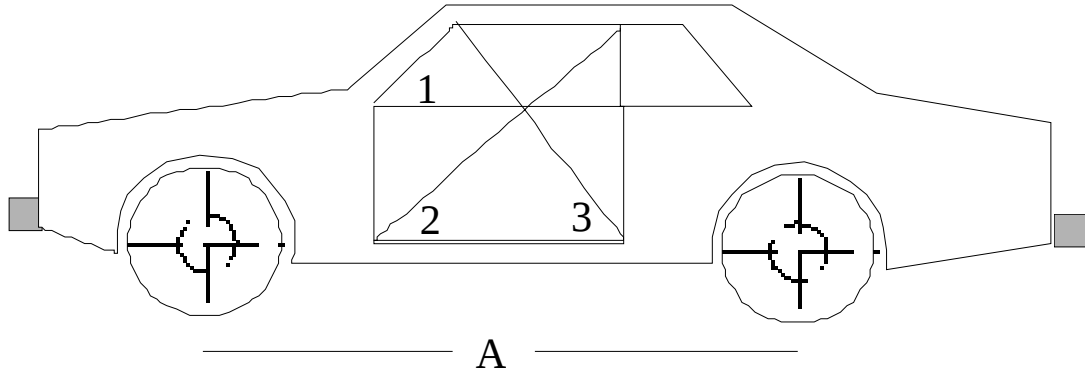


DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4803	4228	575
X2	Rear Surface of Vehicle to Front of Engine	4210	3969	241
X3	Rear Surface of Vehicle to Firewall	3656	3589	67
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3304	3296	8
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3306	3306	0
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3276	3264	12
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3275	3274	1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2188	2181	7
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2189	2189	0
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2217	2207	10
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2217	2217	0
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3438	3431	7
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3438	3437	1
X14	Rear Surface of Vehicle to Firewall, Right Side	3854	3737	117
X15	Rear Surface of Vehicle to Firewall, Left Side	3855	3773	82
X16	Rear Surface of Vehicle to Steering Column	2809	2816	-7
X17	Center of Steering Column to "A" Post	305	305	0
X18	Center of Steering Column to Headliner	424	429	-5
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4689	4327	362
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4687	4263	424
X21	Length of Engine Block	316	316	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	3000	2990	10
CD	Rear Surface of Vehicle to Center of Dash Panel	3053	3035	18
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2991	2987	4

All Dimensions in mm

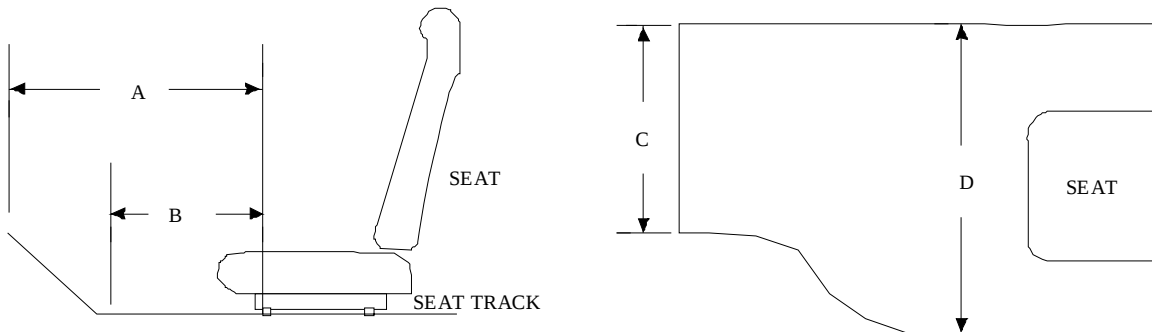
DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
 VEHICLE INTRUSION MEASUREMENTS
 DOOR OPENING WIDTH



UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	1033	1382	904	1035	1459	898
AFTER TEST	1032	1383	904	1035	1458	899
DIFFERENCE	1	-1	0	0	1	-1

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2852	2854
AFTER TEST	2763	2779
DIFFERENCE	89	75

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
 VEHICLE INTRUSION MEASUREMENTS
 STATIC FOOTWELL DEFORMATION



DRIVER

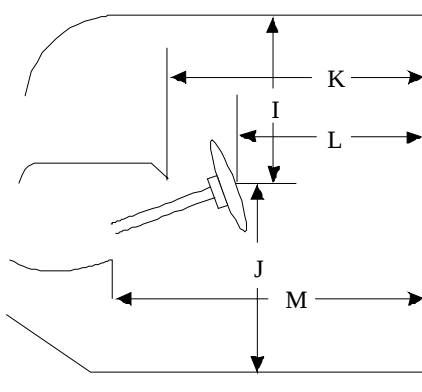
Measurement	Pre-Test	Post-Test	Difference
A	1213	1121	92
B	1005	971	34
C	444	457	-13
D	443	449	-6

PASSENGER

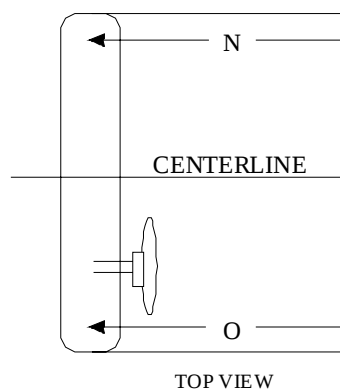
Measurement	Pre-Test	Post-Test	Difference
A	1197	1140	57
B	943	954	-11
C	438	437	1
D	448	441	7

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
VEHICLE INTRUSION MEASUREMENTS
STATIC PASSENGER COMPARTMENT INTRUSION

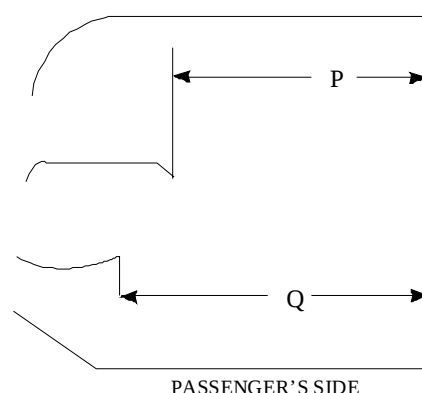


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE

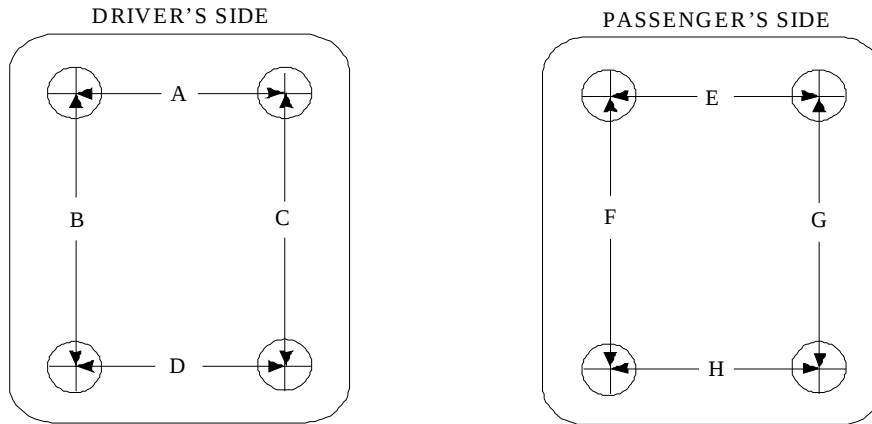


PASSENGER'S SIDE

Measurement	Pre-Test	Post-Test	Difference
I	424	429	-5
J	631	637	-6
K	1775	1760	15
L	1576	1581	-5
M	1804	1793	11
N	1765	1763	2
O	1757	1753	4
P = K (PASS.)	1795	1788	7
Q = M (PASS.)	1794	1772	22

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
FLOORBOARD DEFORMATION

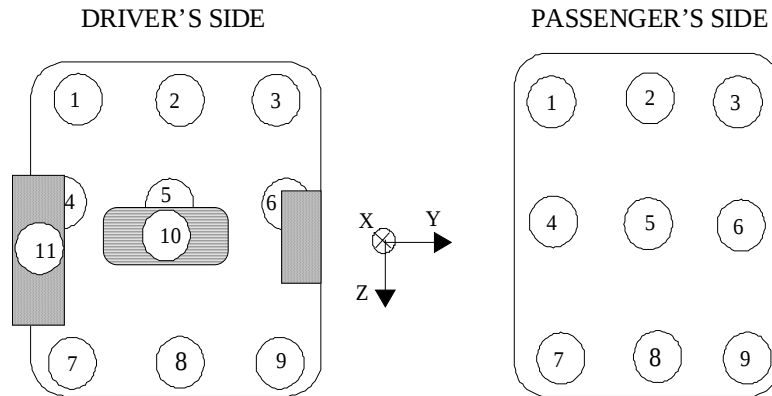


TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	444	457	-13
B	370	364	6
C	411	398	13
D	443	449	-6
E	438	437	1
F	398	397	1
G	351	347	4
H	448	441	7

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
TOE-PAN INTRUSION



Driver Side Toe-pan Measurements

Toe-pan Location	X Deformation (mm)			Z Deformation (mm)		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3468	3423	45	-466	-500	34
2	3497	3403	94	-460	-485	25
3	3494	3385	109	-454	-486	32
4	3401	3374	27	-364	-395	31
5	3412	3378	34	-349	-380	31
6	3437	3365	72	-333	-374	41
7	3277	3255	22	-285	-303	18
8	3288	3254	34	-274	-298	24
9	3306	3277	29	-254	-259	5
10	3314	3288	26	-466	-466	0
11	3372	3354	18	-409	-433	24

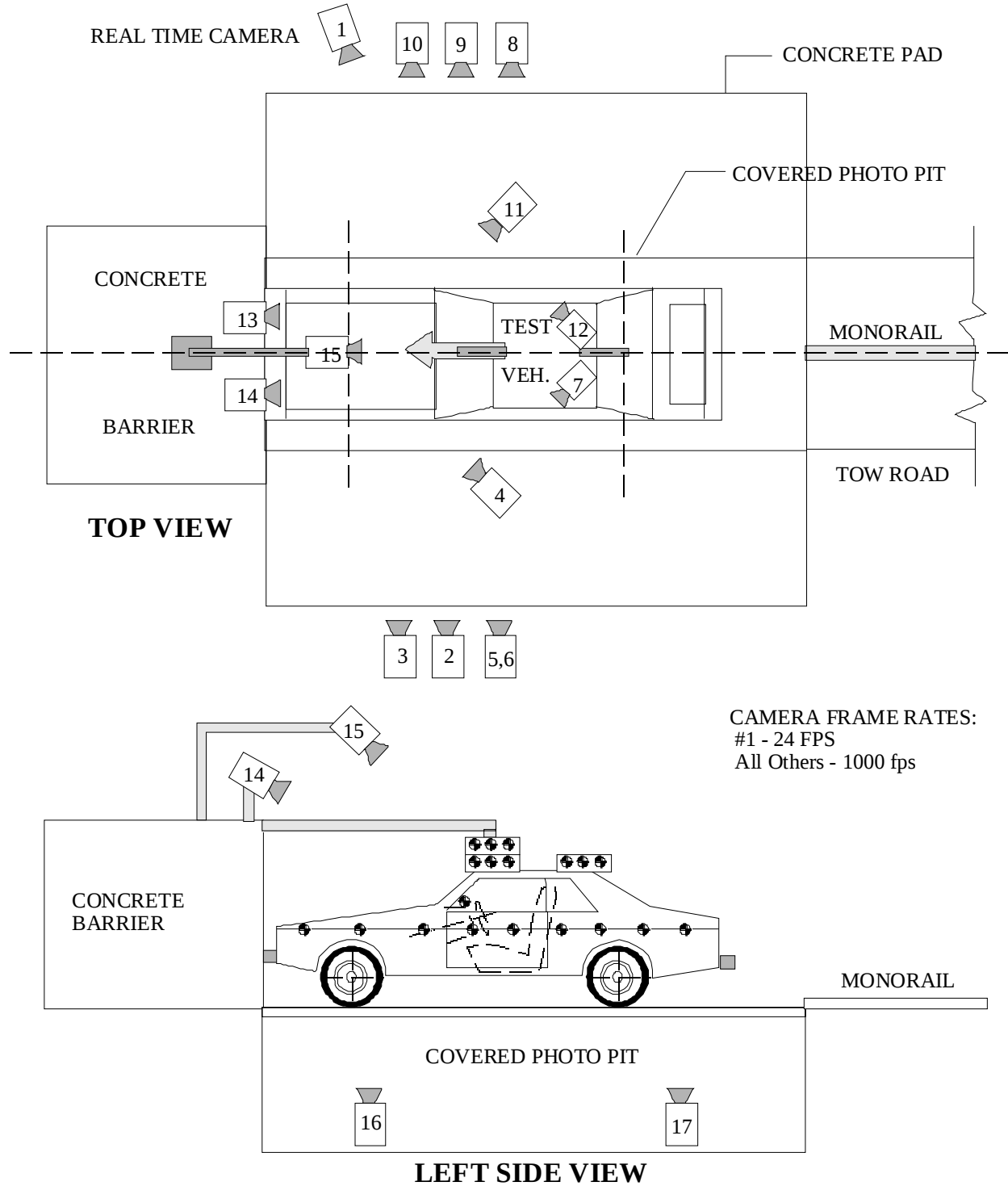
Passenger Side Toe-pan Measurements

Toe-pan Location	X Deformation (mm)			Z Deformation (mm)		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3468	3390	78	-415	-432	17
2	3481	3414	67	-418	-433	15
3	3404	3390	14	-424	-428	4
4	3363	3357	6	-338	-355	17
5	3361	3350	11	-335	-375	40
6	3362	3361	1	-335	-369	34
7	3233	3228	5	-269	-287	18
8	3227	3228	-1	-260	-280	20
9	3237	3239	-2	-263	-291	28

Reference: SAE: X = Rear Bumper (Positive: forward); Z = Ground (Positive: down)

DATA SHEET NO.15 HIGH-SPEED CAMERA LOCATIONS

NOTE: Camera information shown in DATA SHEET NO. 15.



DATA SHEET NO.15 HIGH-SPEED CAMERA LOCATIONS (cont.)

NHTSA Test No.: M50114 Vehicle: 2005 Pontiac G6 Four-Door Sedan

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)*			ANGLE (deg)**	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	30
2	Overall Left Side	7650	1560	1302	-4.8	7362	24	1000
3	Left Side View	8395	745	1045	-2.1	8107	25	1000
4	Driver and Interior View	7805	2710	2052	-8.7	-	35	500
5	Steering Column (Bottom)	7947	1905	1170	-2.4	7659	25	1000
6	Steering Column (Top)	7947	1905	1785	-7.0	7659	25	1000
7	Left CRS View	2625	3150	2288	-24.1	-	28	500
8	Overall Right Side	7263	2152	1070	-3	7551	24	500
9	Right Side View	8180	1285	1110	-3	8468	25	1000
10	Right Passenger View	8090	2022	1290	-2	8378	35	1000
11	Passenger and Interior View	7356	2842	1980	-7	-	35	500
12	Right CRS View	3100	2730	2260	-24.1	-	28	500
13	Passenger Front View	620	-92	1987	-32.4	-	13	500
14	Driver Front View	620	-92	1987	-32	-	13	500
15	Windshield View	0	-530	3374	-49	-	13	500
16	Pit View of Engine	0	615	-3048	90	-	13	500
17	Pit View of Fuel Tank	0	2770	-3048	90	-	13	500

*X = film plane to monorail centerline ** = referenced to horizontal plane

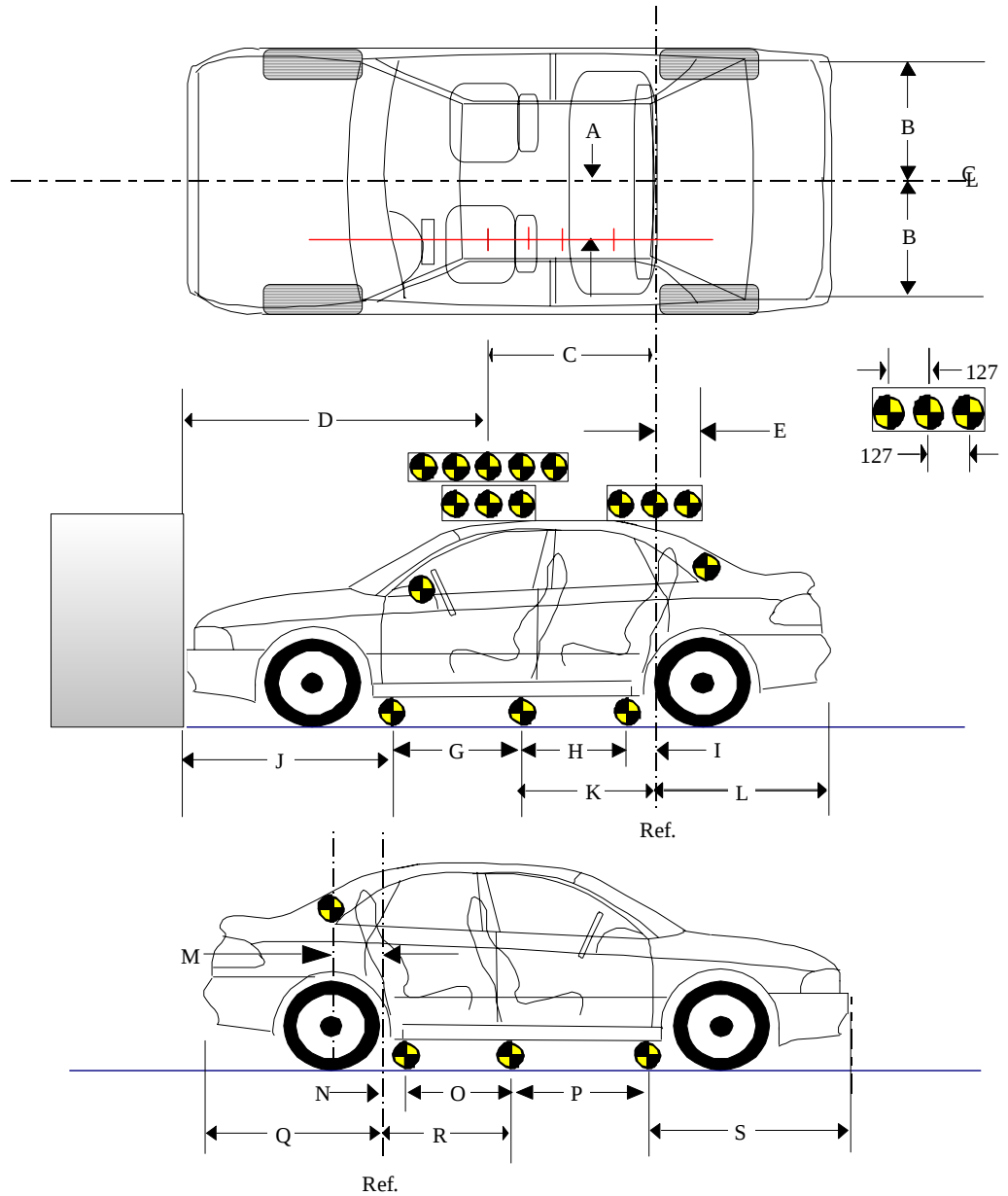
Y = film plane to impact location N.T. indicates No Timing

Z = film plane to ground

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

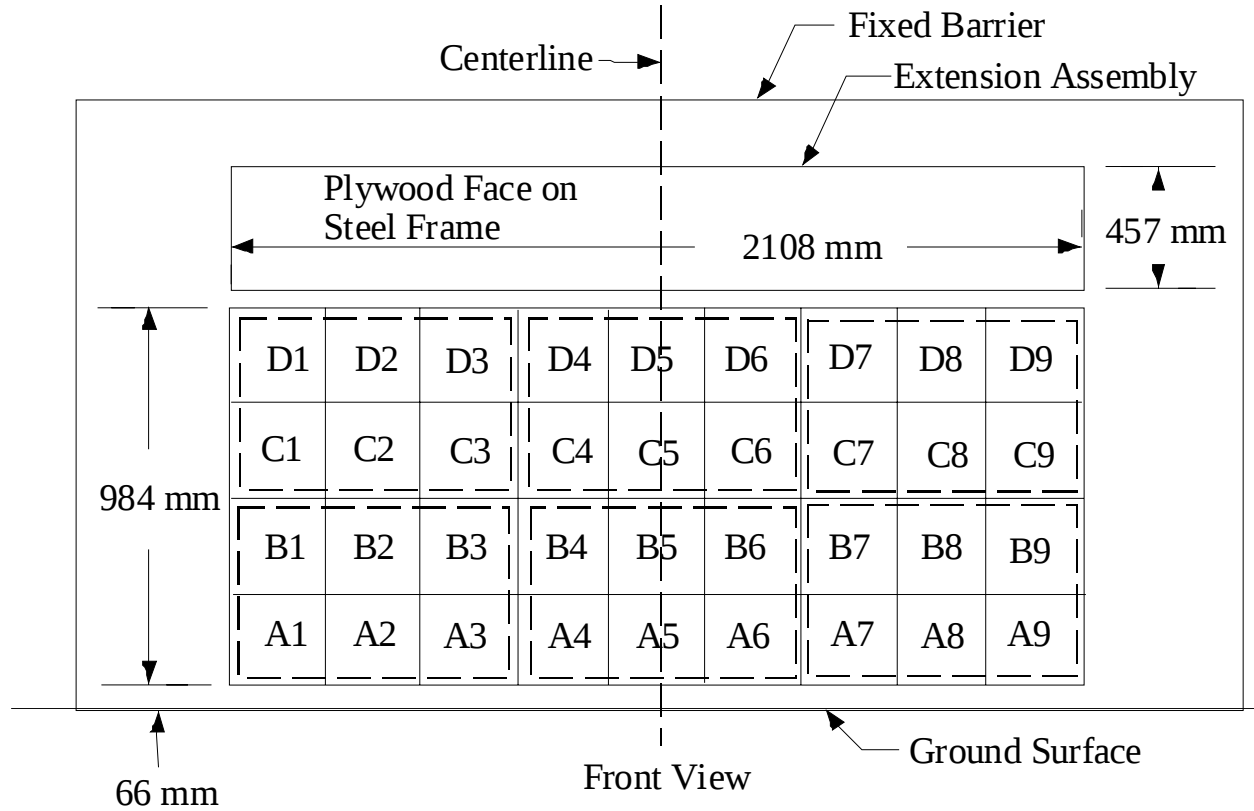
(Dimensions in millimeters)

A	364
B	576
C	1217
D	2276
E	21
F	-
G	983
H	983
I	63
J	1464
K	1046
L	1310
M	24
N	61
O	983
P	989
Q	1310
R	1044
S	1460



DATA SHEET NO. 17 LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells
 4 Rows
 9 Columns
 6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

The following data is presented in Appendix B:

- (1)Data from 36 individual load cells
- (2)Total or Sum of 36 individual load cells
- (3)Data from 6 Groupings shown above (6 cells/group)

DATA SHEET NO. 18 POST TEST AIR BAG DATA

NHTSA No.: M50114; Test Date: November 19, 2004; Technician: P. MacDiarmid

Vehicle Model Year/Make/Model: 2005 Pontiac G6 Four-Door Sedan

A. No. of vent holes: 0 -Driver 2 -Passenger

B. Size of vent holes: (mm²) - -Driver 2827 -Passenger

C. Total vent area: (mm²) N/A -Driver 5654 -Passenger

D. Deflated air bag length and width dimensions or, if round, diameter. (mm)

Driver: 500 -Height; 500 -Width; 250 -Depth

Passenger: 700 -Height; 420 -Width; 525 -Depth

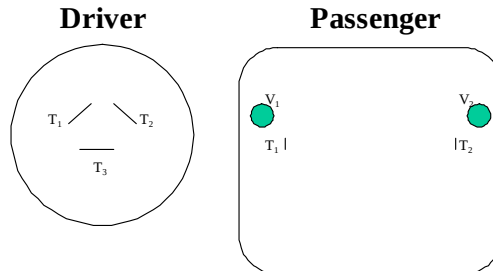
E. Is the air bag tethered?

Driver: X -Yes; - -No; If yes, record length of tether- 250

Passenger: X -Yes; - -No; If yes, record length of tether- 525

Sketch the air bag showing the location of the vent holes, how the bag is tethered, and where the bag is tethered. Also describe how the tethers are attached to the bag and the steering wheel.

(Note: Not to scale; V_n = Vent hole_n, T_n = Tether_n).



F. Record part numbers and manufacturer name of the air bag and gas generator.

Driver: Air bag: 16867924 GMX380/GMX381/GMT191 DAB

Generator: -

Passenger: Air bag: 16869859 GMX381 PAB

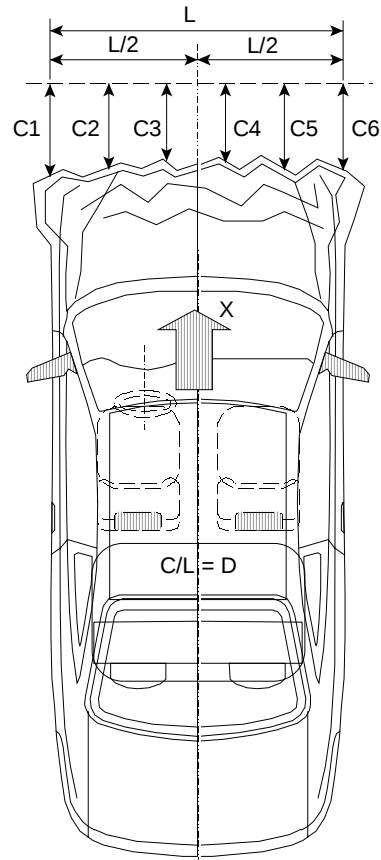
Generator: -

DATA SHEET NO. 19 ACCIDENT INVESTIGATION DIVISION DATA
FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Pontiac G6 Four-Door Sedan
 NHTSA Test No.: M50114 VIN: 1G2ZG548254124632
 Model Year: 2005 Build Date: 10/04 Test Date: November 19, 2004
 Vehicle Size Category: Compact Test Weight: 1767.0 kg
 Vehicle Wheelbase: 2852 mm; Front Overhang: 1021 mm; Overall Width: 1793 mm
 Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4552	4226	326
C2 =	4700	4263	437
C3 =	4783	4242	541
C4 =	4785	4272	513
C5 =	4704	4327	377
C6 =	4558	4291	267



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region: L1= 1443 mm
 L2= 721.5 mm
 L5= 288.6 mm

APPENDIX A
PHOTOGRAPHS

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Figure A-1 LOAD CELL LOCATIONS

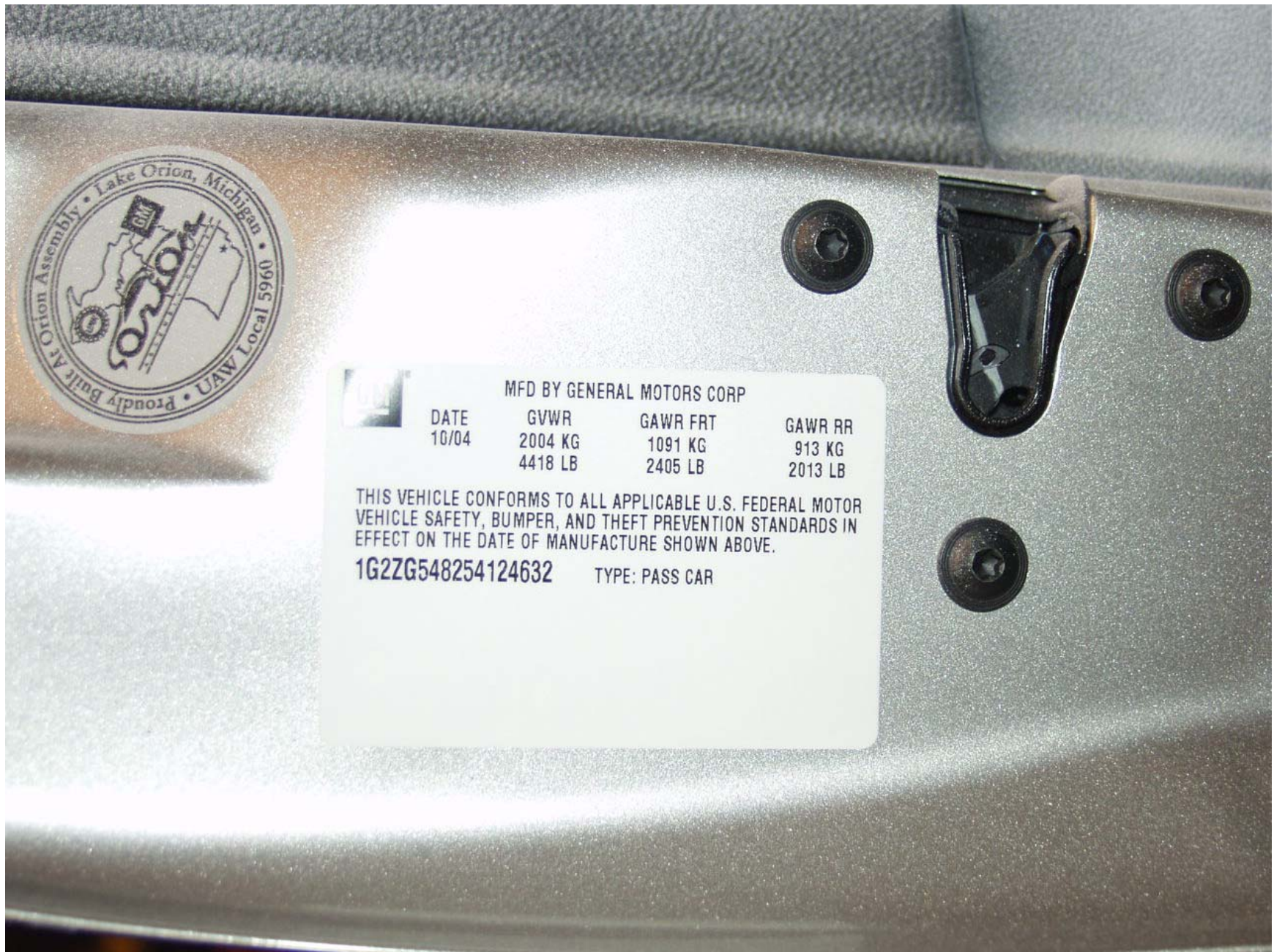


Figure A-2 VEHICLE CERTIFICATION PLACARD



TIRE AND LOADING INFORMATION

SEATING CAPACITY | TOTAL 5 | FRONT 2 | CENTER 0 | REAR 3

The combined weight of occupants and cargo should never exceed 404 kg or 891 lbs.

ORIGINAL TIRE SIZE	COLD TIRE INFLATION PRESSURE	
P215/60R16	FRONT	210 kPa, 30 PSI
P215/60R16	REAR	210 kPa, 30 PSI
T125/70R16	SPARE	420 kPa, 60 PSI

**SEE OWNER'S
MANUAL FOR
ADDITIONAL
INFORMATION**

Figure A-3 VEHICLE TIRE PLACARD



Figure A-4 RIGHT FRONT, AS RECEIVED



Figure A-5 LEFT REAR, AS RECEIVED

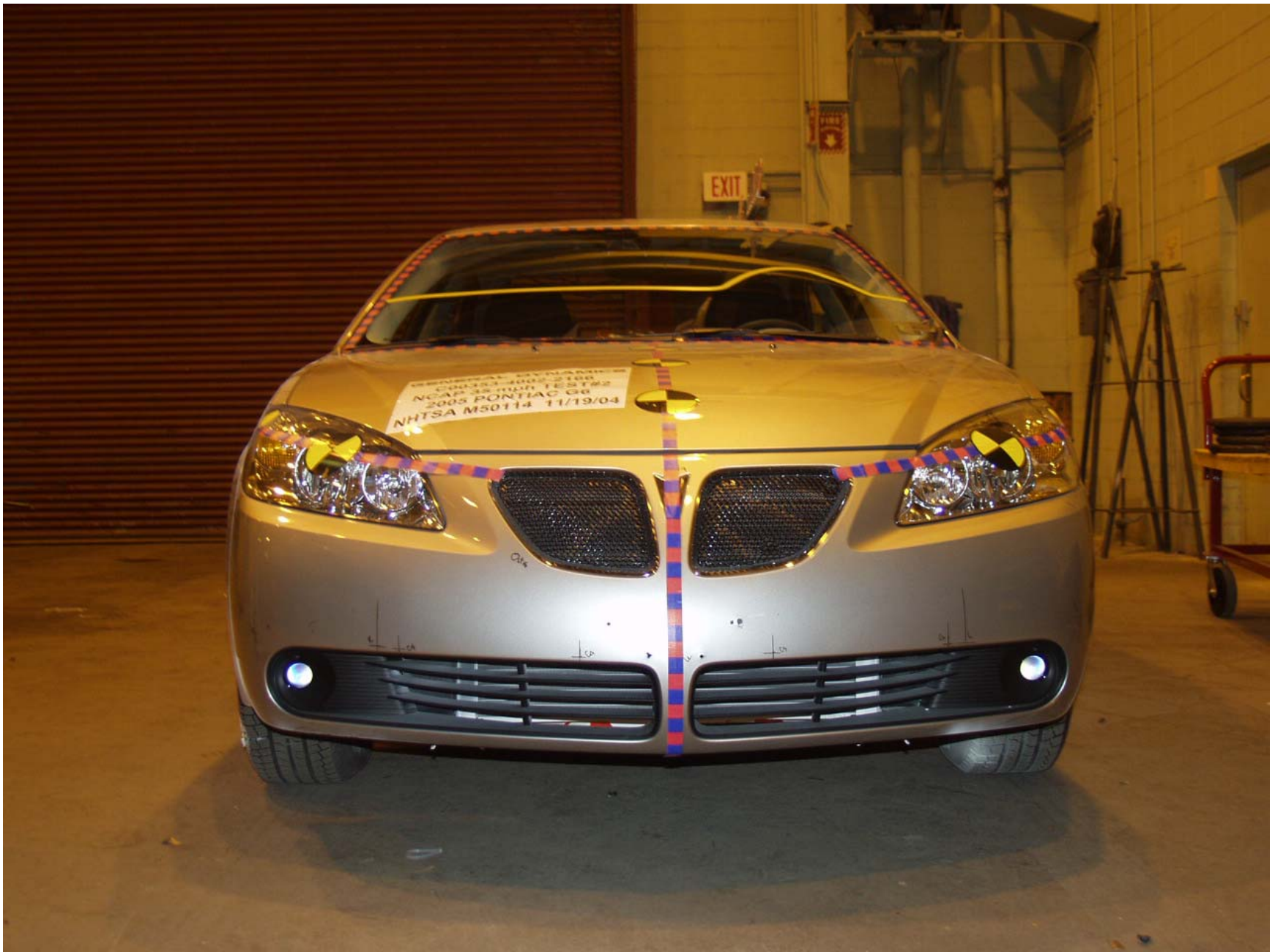


Figure A-6 PRE-TEST FRONT VIEW



Figure A-7 POST-TEST FRONT VIEW



Figure A-8 PRE-TEST LEFT SIDE VIEW



Figure A-9 POST-TEST LEFT SIDE VIEW



Figure A-10 PRE-TEST RIGHT SIDE VIEW



Figure A-11 POST-TEST RIGHT SIDE VIEW



Figure A-12 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-13 POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-14 PRE-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-15 POST-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-16 LEFT REAR THREE-QUARTER VIEW OF DOORS AFTER IMPACT



Figure A-17 RIGHT REAR THREE-QUARTER VIEW OF DOORS AFTER IMPACT



Figure A-18 PRE-TEST WINDSHIELD VIEW



Figure A-19 POST-TEST WINDSHIELDVIEW



Figure A-20 PRE-TEST ENGINE COMPARTMENT VIEW



Figure A-21 POST-TEST ENGINE COMPARTMENT VIEW

M50114



Figure A-22 PRE-TEST FUEL CAP VIEW



Figure A-23 POST-TEST FUEL CAP VIEW



Figure A-24 PRE-TEST FRONT UNDERBODY VIEW

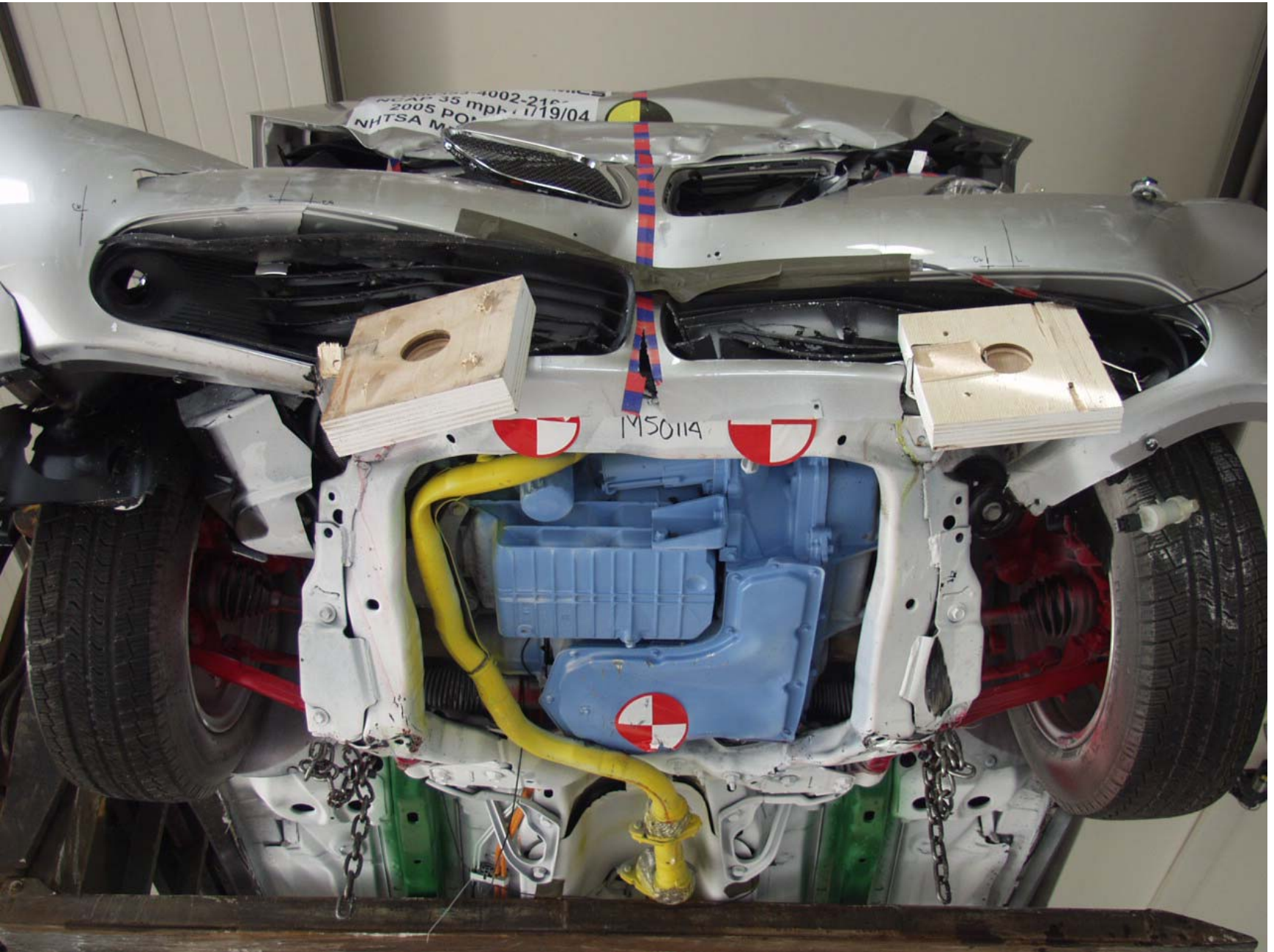


Figure A-25 POST-TEST FRONT UNDERBODY VIEW

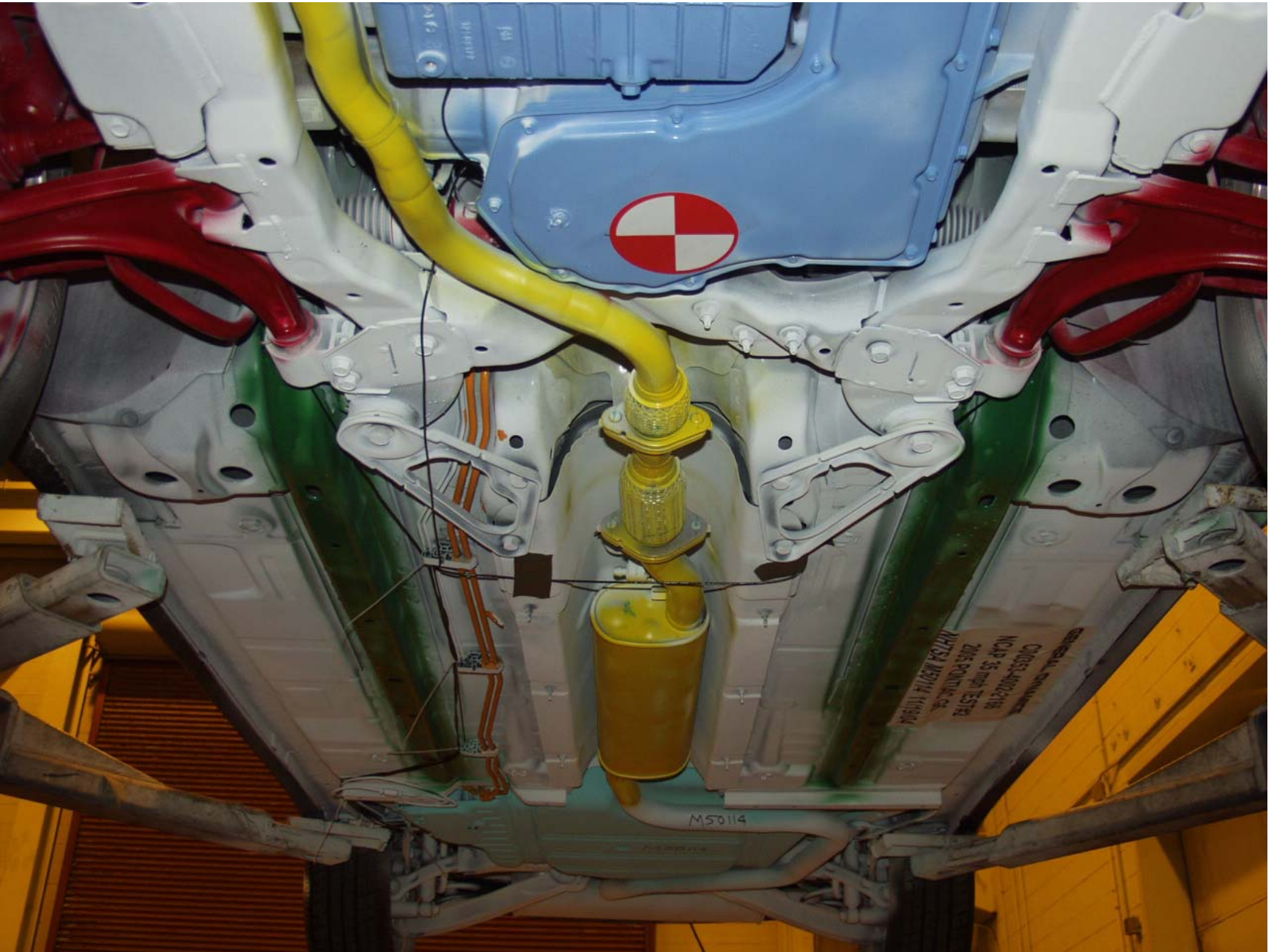


Figure A-26 PRE-TEST MID UNDERBODY VIEW



Figure A-27 POST-TEST MID UNDERBODY VIEW



Figure A-28 PRE-TEST REAR UNDERBODY VIEW



Figure A-29 POST-TEST REAR UNDERBODY VIEW

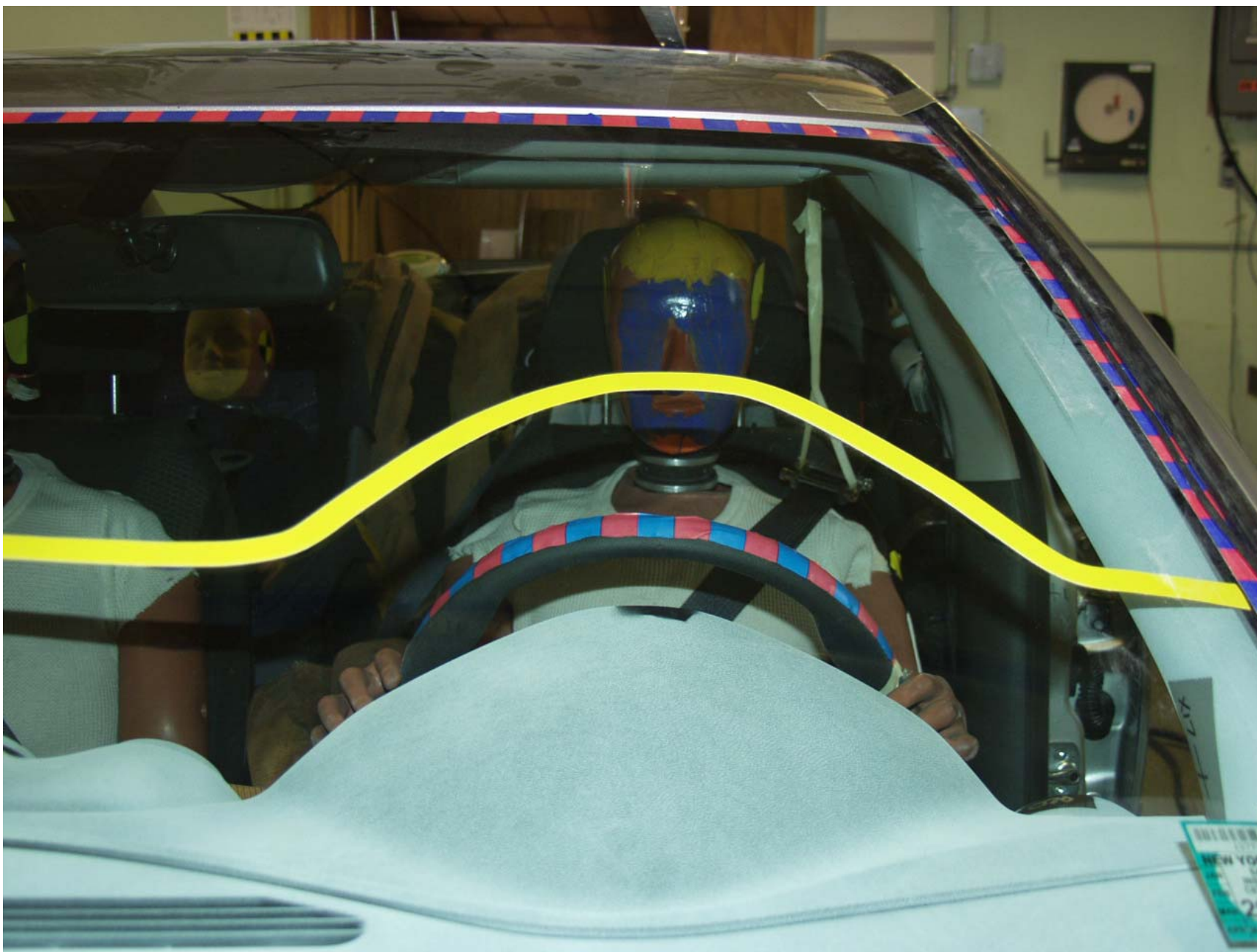


Figure A-30 PRE-TEST DRIVER HEAD LOCATION



Figure A-31 POST-TEST DRIVER HEAD LOCATION



Figure A-32 PRE-TEST DRIVER POSITION VIEW



Figure A-33 POST-TEST DRIVER POSITION VIEW



Figure A-34 PRE-TEST DRIVER AND INTERIOR VIEW



Figure A-35 POST-TEST DRIVER AND INTERIOR VIEW



Figure A-36 PRE-TEST DRIVER FEET VIEW

M50114

Figure A-37 POST-TEST DRIVER FEET VIEW



A-41

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Figure A-38 PRE-TEST DRIVER KNEE BOLSTER VIEW



Figure A-39 POST-TEST DRIVER KNEE BOLSTER VIEW

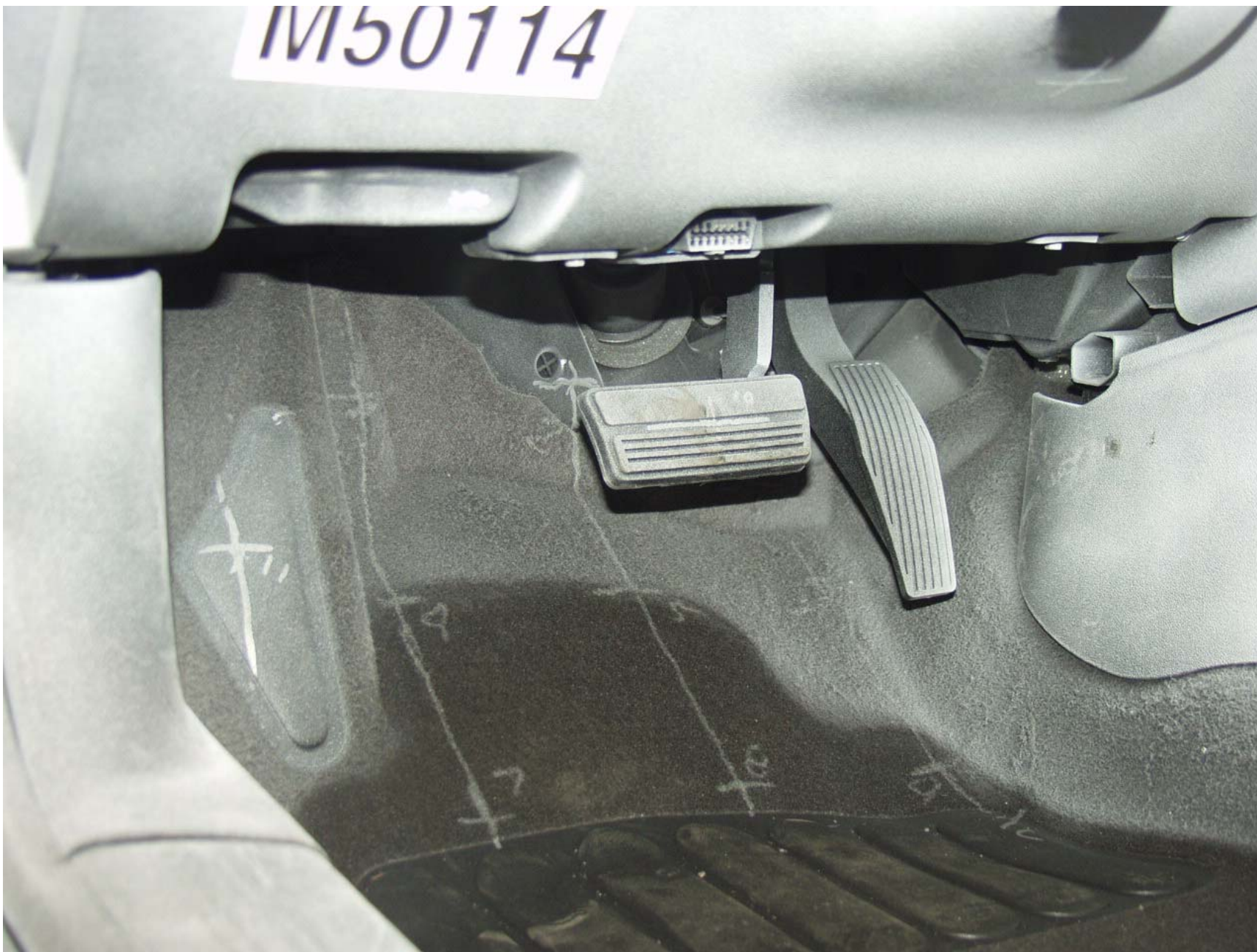


Figure A-40 PRE-TEST DRIVER FLOOR PAN VIEW



Figure A-41 POST-TEST DRIVER FLOOR PAN VIEW



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Figure A-42 POST-TEST DRIVER HEAD VIEW



Figure A-43 POST-TEST DRIVER CONTACT TO AIRBAG



Figure A-44 PRE-TEST PASSENGER HEAD LOCATION



Figure A-45 POST-TEST PASSENGER HEAD LOCATION



Figure A-46 PRE-TEST PASSENGER POSITION VIEW

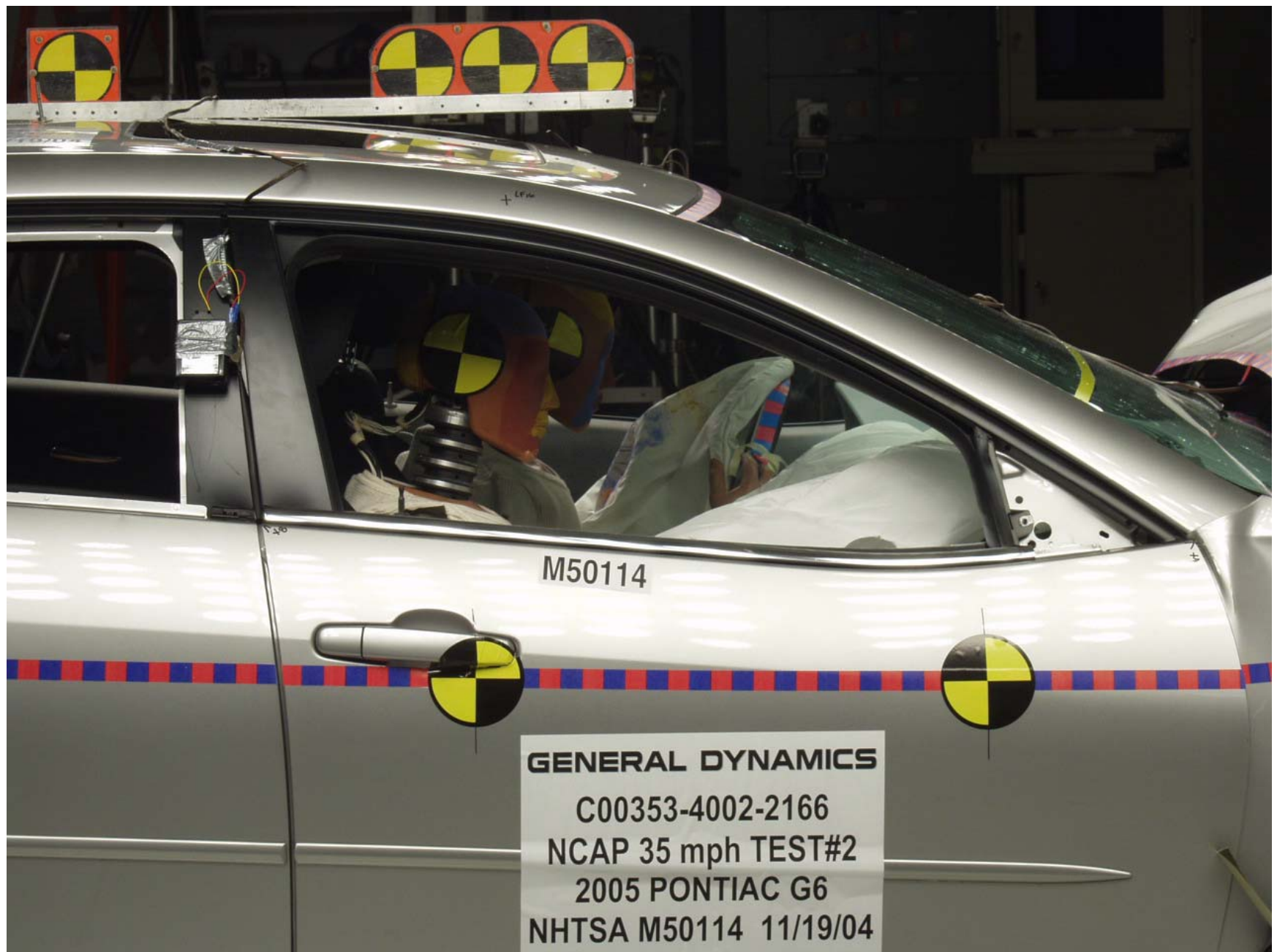


Figure A-47 POST-TEST PASSENGER POSITION VIEW



Figure A-48 PRE-TEST PASSENGER AND INTERIOR VIEW



Figure A-49 POST-TEST PASSENGER AND INTERIOR VIEW



Figure A-50 PRE- TEST PASSENGER FEET VIEW



Figure A-51 POST-TEST PASSENGER FEET VIEW



Figure A-52 PRE-TEST PASSENGER KNEE BOLSTER VIEW



Figure A-53 POST-TEST PASSENGER KNEE BOLSTER VIEW



Figure A-54 PRE-TEST PASSENGER FLOOR PAN VIEW



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8642-NCAP-52

Figure A-55 POST-TEST PASSENGER FLOOR PAN VIEW



Figure A-56 POST-TEST PASSENGER HEAD VIEW



Figure A-57 POST-TEST PASSENGER CONTACT TO AIRBAG



Figure A-58 ROLLOVER VIEW



Figure A-59 IMPACT VIEW

APPENDIX B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

**Hybrid III Dummy Sign Conventions
Load Cells and Special Transducers**

Transducer	SAE Sign Convention (positive unless noted)
Upper Neck Load Cell	Fx Head rearward Fy Head left Fz Neck in tension Mx Left ear to left shoulder My Chin to chest (flexion) Mz Chin to left shoulder (look left)
Chest Displacement Potentiometer	Compression is negative
Pelvic Load Cell (Lower Lumbar)	Fx Chest rearward Fy Chest left Fz Spine in tension
Femur Load Cell	Compression is negative
Upper Tibia Load Cell (right and left leg)	Mx Support tibia at ends, load left side center My Support tibia at ends, load front (shin) center
Lower Tibia Load Cell (right and left leg)	Fz Tibia in tension Mx Support tibia at ends, load left side center My Support tibia at ends, load front (shin) center

DATA CHANNEL FILTER CLASS SUMMARY

NHTSA TEST NO.

DATA TYPE	SAE FILTER CLASS (Hz)
Dummy Head Accelerations	1000
Dummy Chest Accelerations	180
Dummy Chest Displacements	600
Dummy Femur Forces	600
Dummy Belt Loads	60
Dummy Belt Displacements	180
Dummy Neck Forces	1000
Dummy Neck Moments	600
Vehicle Accelerations	60
Vehicle Velocity Integrations	180
Vehicle Displacement Integrations	180
Load Cell Barrier Forces	60

Table of Data Plots

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
1	V1P1 Head 9 Array X Arm Ay [g, CFC_1000]	B-8
2	V1P1 Head 9 Array X Arm Az [g, CFC_1000]	B-8
3	V1P1 Head 9 Array Y Arm Ax [g, CFC_1000]	B-8
4	V1P1 Head 9 Array Y Arm Az [g, CFC_1000]	B-8
5	V1P1 Head 9 Array Z Arm Ax [g, CFC_1000]	B-9
6	V1P1 Head 9 Array Z Arm Ay [g, CFC_1000]	B-9
7	V1P1 Head CG x [g, CFC_1000]	B-10
8	V1P1 Head CG y [g, CFC_1000]	B-10
9	V1P1 Head CG z [g, CFC_1000]	B-10
10	V1P1 Head CG Resultant [g, CFC_1000]	B-10
11	V1P1 Head CG Red x [g, CFC_1000]	B-11
12	V1P1 Head CG Red y [g, CFC_1000]	B-11
13	V1P1 Head CG Red z [g, CFC_1000]	B-11
14	V1P1 Head CG Red Resultant [g, CFC_1000]	B-11
15	V1P1 Upper Neck Fx [N, CFC_1000]	B-12
16	V1P1 Upper Neck Fy [N, CFC_1000]	B-12
17	V1P1 Upper Neck Fz [N, CFC_1000]	B-12
18	V1P1 Upper Neck F Resultant [N, CFC_1000]	B-12
19	V1P1 Upper Neck Mx [N-m, CFC_600]	B-13
20	V1P1 Upper Neck My [N-m, CFC_600]	B-13
21	V1P1 Upper Neck Mz [N-m, CFC_600]	B-13
22	V1P1 Upper Neck M Resultant [N-m, CFC_600]	B-13
23	V1P1 Chest x [g, CFC_180]	B-14
24	V1P1 Chest y [g, CFC_180]	B-14
25	V1P1 Chest z [g, CFC_180]	B-14
26	V1P1 Chest Resultant [g, CFC_180]	B-14
27	V1P1 Chest Red x [g, CFC_180]	B-15
28	V1P1 Chest Red y [g, CFC_180]	B-15
29	V1P1 Chest Red z [g, CFC_180]	B-15
30	V1P1 Chest Red Resultant [g, CFC_180]	B-15
31	V1P1 Chest Compression x [mm, CFC_600]	B-16
32	V1P1 Pelvic x [g, CFC_1000]	B-17
33	V1P1 Pelvic y [g, CFC_1000]	B-17
34	V1P1 Pelvic z [g, CFC_1000]	B-17
35	V1P1 Pelvic Resultant [g, CFC_1000]	B-17
36	V1P1 Left Femur z [N, CFC_600]	B-18
37	V1P1 Right Femur z [N, CFC_600]	B-18
38	V1P1 Left Upper Tibia Mx [N-m, CFC_600]	B-19
39	V1P1 Left Upper Tibia My [N-m, CFC_600]	B-19
40	V1P1 Left Lower Tibia Fz [N, CFC_600]	B-20
41	V1P1 Left Lower Tibia Mx [N-m, CFC_600]	B-20
42	V1P1 Left Lower Tibia My [N-m, CFC_600]	B-20
43	V1P1 Right Upper Tibia Mx [N-m, CFC_600]	B-21
44	V1P1 Right Upper Tibia My [N-m, CFC_600]	B-21
45	V1P1 Right Lower Tibia Fz [N, CFC_600]	B-22
46	V1P1 Right Lower Tibia Mx [N-m, CFC_600]	B-22

Table of Data Plots (Continued)

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
47	V1P1 Right Lower Tibia My [N-m, CFC_600]	B-22
48	V1P1 Left Foot Aft x [g, CFC_600]	B-23
49	V1P1 Left Foot Aft z [g, CFC_600]	B-23
50	V1P1 Left Foot Fore z [g, CFC_600]	B-23
51	V1P1 Right Foot Aft x [g, CFC_600]	B-24
52	V1P1 Right Foot Aft z [g, CFC_600]	B-24
53	V1P1 Right Foot Fore z [g, CFC_600]	B-24
54	V1 Driver Lap Belt [N, CFC_60]	B-25
55	V1 Driver Torso Belt [N, CFC_60]	B-25
56	V1P2 Head 9 Array X Arm Ay [g, CFC_1000]	B-26
57	V1P2 Head 9 Array X Arm Az [g, CFC_1000]	B-26
58	V1P2 Head 9 Array Y Arm Ax [g, CFC_1000]	B-26
59	V1P2 Head 9 Array Y Arm Az [g, CFC_1000]	B-26
60	V1P2 Head 9 Array Z Arm Ax [g, CFC_1000]	B-27
61	V1P2 Head 9 Array Z Arm Ay [g, CFC_1000]	B-27
62	V1P2 Head CG x [g, CFC_1000]	B-28
63	V1P2 Head CG y [g, CFC_1000]	B-28
64	V1P2 Head CG z [g, CFC_1000]	B-28
65	V1P2 Head CG Resultant [g, CFC_1000]	B-28
66	V1P2 Head CG Red x [g, CFC_1000]	B-29
67	V1P2 Head CG Red y [g, CFC_1000]	B-29
68	V1P2 Head CG Red z [g, CFC_1000]	B-29
69	V1P2 Head CG Red Resultant [g, CFC_1000]	B-29
70	V1P2 Upper Neck Fx [N, CFC_1000]	B-30
71	V1P2 Upper Neck Fy [N, CFC_1000]	B-30
72	V1P2 Upper Neck Fz [N, CFC_1000]	B-30
73	V1P2 Upper Neck F Resultant [N, CFC_1000]	B-30
74	V1P2 Upper Neck Mx [N-m, CFC_600]	B-31
75	V1P2 Upper Neck My [N-m, CFC_600]	B-31
76	V1P2 Upper Neck Mz [N-m, CFC_600]	B-31
77	V1P2 Upper Neck M Resultant [N-m, CFC_600]	B-31
78	V1P2 Chest x [g, CFC_180]	B-32
79	V1P2 Chest y [g, CFC_180]	B-32
80	V1P2 Chest z [g, CFC_180]	B-32
81	V1P2 Chest Resultant [g, CFC_180]	B-32
82	V1P2 Chest Red x [g, CFC_180]	B-33
83	V1P2 Chest Red y [g, CFC_180]	B-33
84	V1P2 Chest Red z [g, CFC_180]	B-33
85	V1P2 Chest Red Resultant [g, CFC_180]	B-33
86	V1P2 Chest Compression x [mm, CFC_600]	B-34
87	V1P2 Pelvic x [g, CFC_1000]	B-35
88	V1P2 Pelvic y [g, CFC_1000]	B-35
89	V1P2 Pelvic z [g, CFC_1000]	B-35
90	V1P2 Pelvic Resultant [g, CFC_1000]	B-35
91	V1P2 Left Femur z [N, CFC_600]	B-36
92	V1P2 Right Femur z [N, CFC_600]	B-36

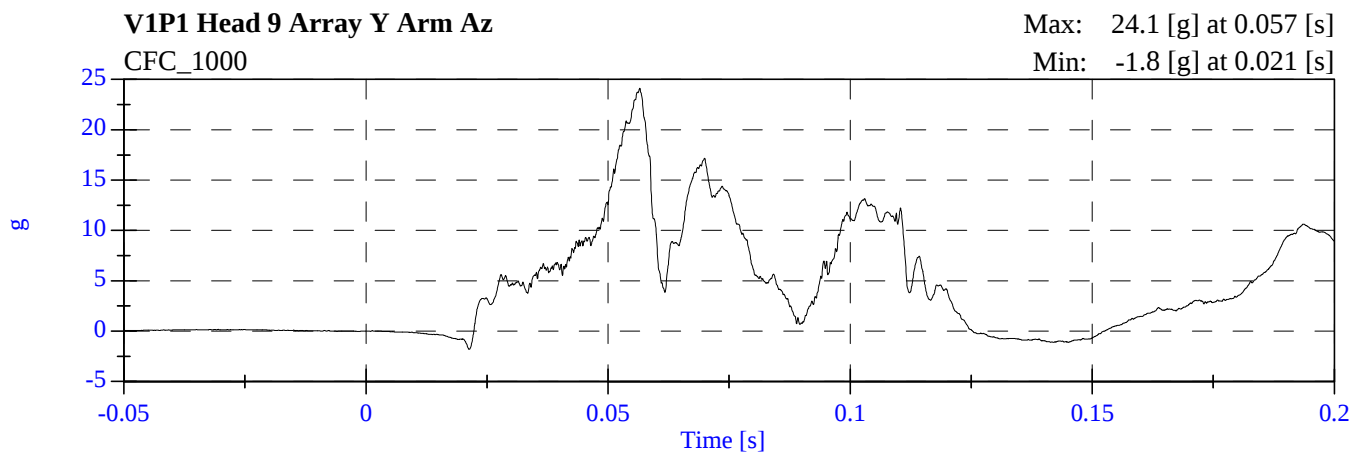
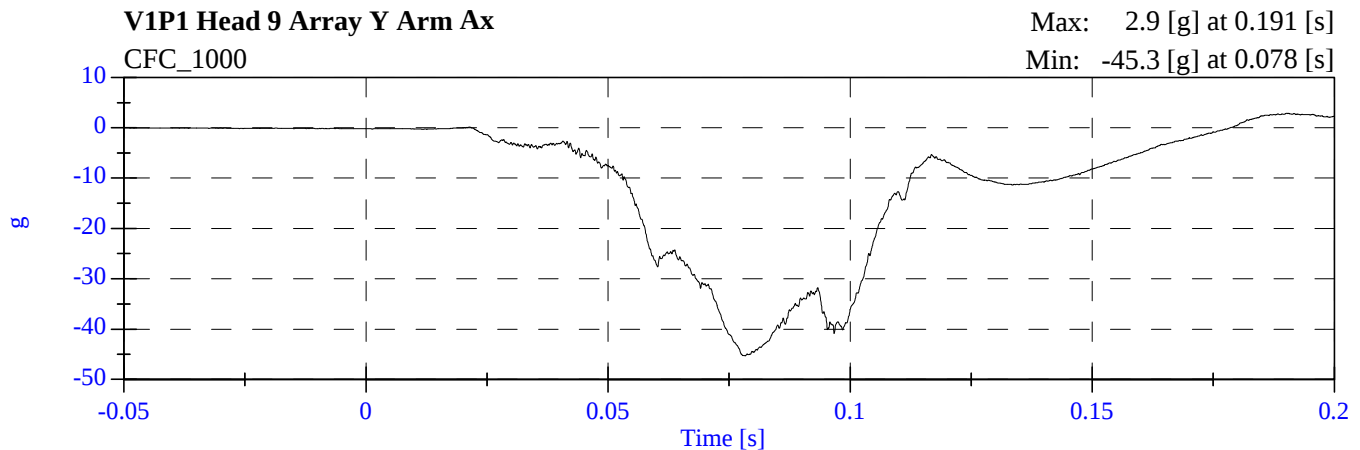
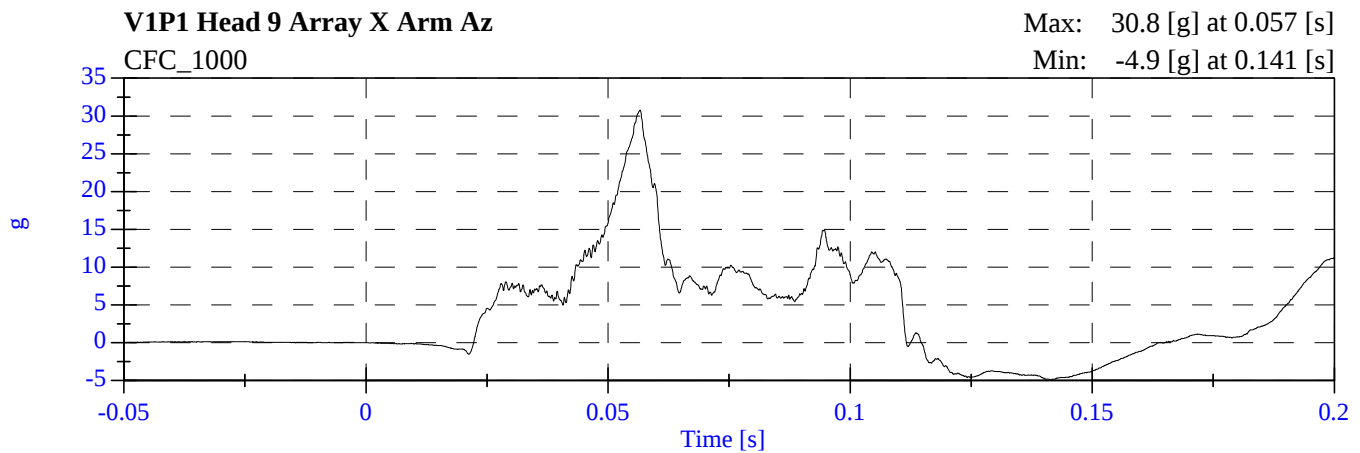
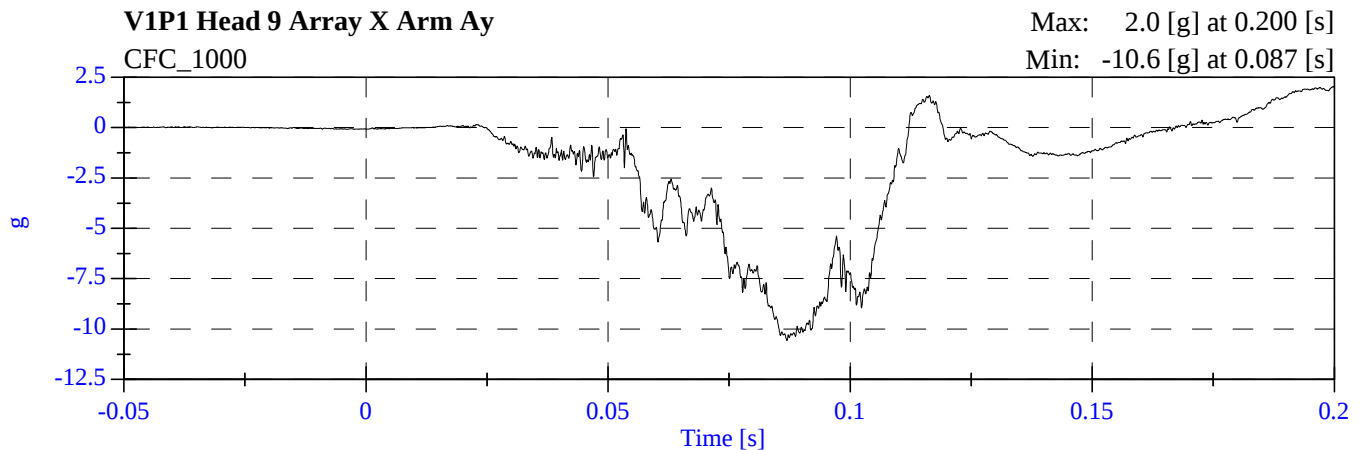
Table of Data Plots (Continued)

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
93	V1P2 Left Upper Tibia Mx [N-m, CFC_600]	B-37
94	V1P2 Left Upper Tibia My [N-m, CFC_600]	B-37
95	V1P2 Left Lower Tibia Fz [N, CFC_600]	B-38
96	V1P2 Left Lower Tibia Mx [N-m, CFC_600]	B-38
97	V1P2 Left Lower Tibia My [N-m, CFC_600]	B-38
98	V1P2 Right Upper Tibia Mx [N-m, CFC_600]	B-39
99	V1P2 Right Upper Tibia My [N-m, CFC_600]	B-39
100	V1P2 Right Lower Tibia Fz [N, CFC_600]	B-40
101	V1P2 Right Lower Tibia Mx [N-m, CFC_600]	B-40
102	V1P2 Right Lower Tibia My [N-m, CFC_600]	B-40
103	V1P2 Left Foot Aft x [g, CFC_600]	B-41
104	V1P2 Left Foot Aft z [g, CFC_600]	B-41
105	V1P2 Left Foot Fore z [g, CFC_600]	B-41
106	V1P2 Right Foot Aft x [g, CFC_600]	B-42
107	V1P2 Right Foot Aft z [g, CFC_600]	B-42
108	V1P2 Right Foot Fore z [g, CFC_600]	B-42
109	V1 RFP Lap Belt [N, CFC_60]	B-43
110	V1 RFP Torso Belt [N, CFC_60]	B-43
111	V1 Left Rear #1x [g, CFC_60]	B-44
112	V1 Left Rear #1x Velocity [kph, CFC_180]	B-44
113	V1 Left Rear #1x Displacement [mm, CFC_180]	B-44
114	V1 Right Rear #2x [g, CFC_60]	B-45
115	V1 Right Rear #2x Velocity [kph, CFC_180]	B-45
116	V1 Right Rear #2x Displacement [mm, CFC_180]	B-45
117	V1 Engine Top #3x [g, CFC_60]	B-46
118	V1 Engine Top #3x Velocity [kph, CFC_180]	B-46
119	V1 Engine Top #3x Displacement [mm, CFC_180]	B-46
120	V1 Engine Bottom #4x [g, CFC_60]	B-47
121	V1 Engine Bottom #4x Velocity [kph, CFC_180]	B-47
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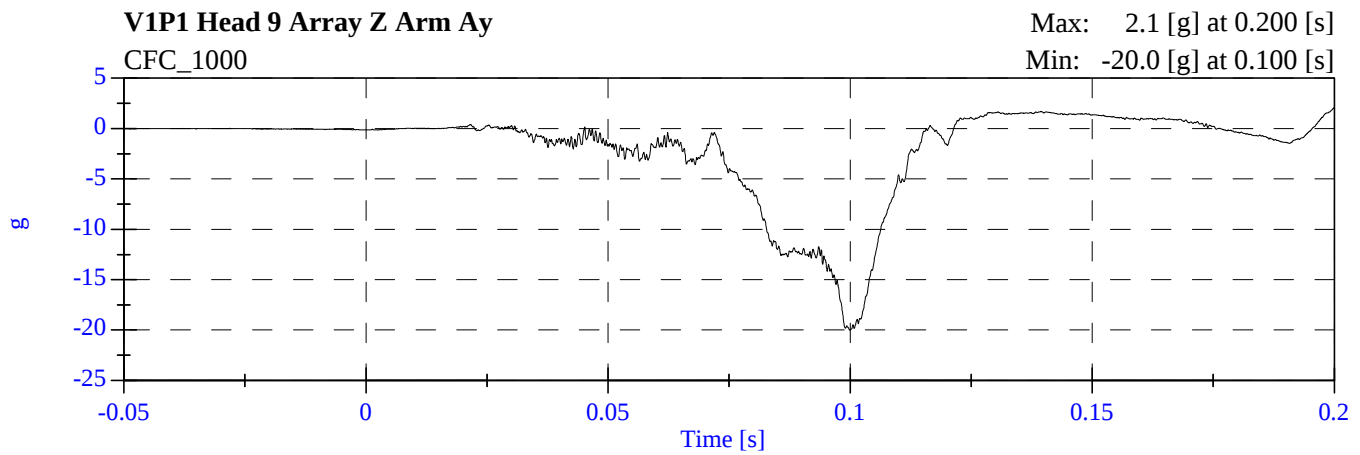
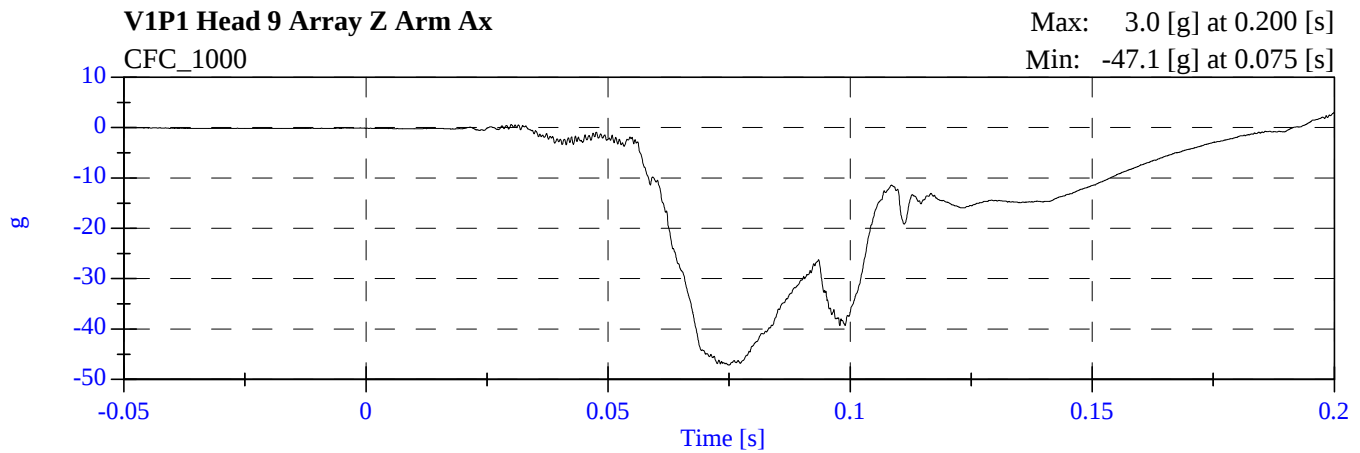
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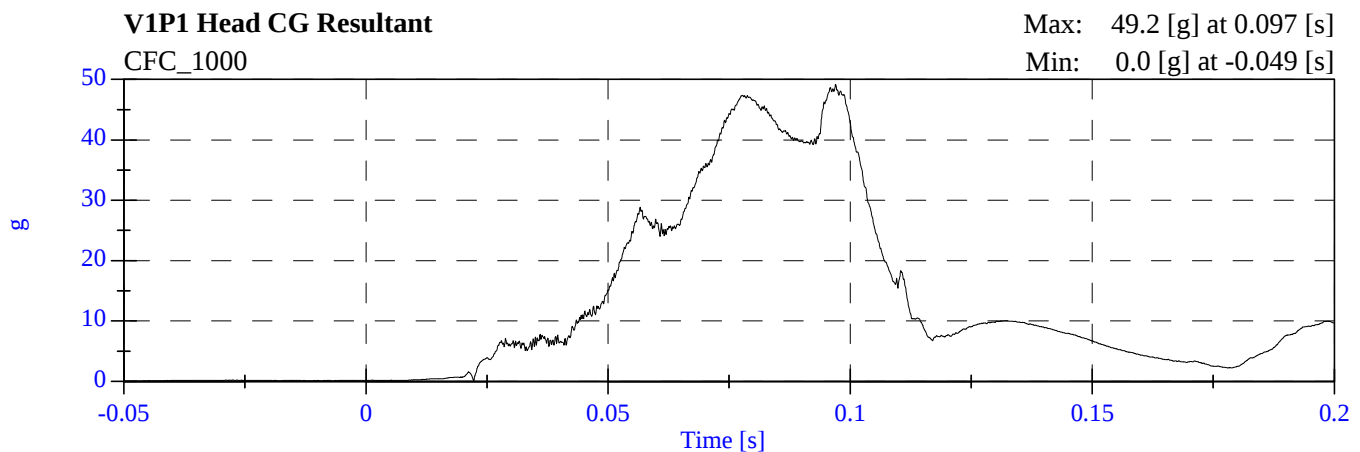
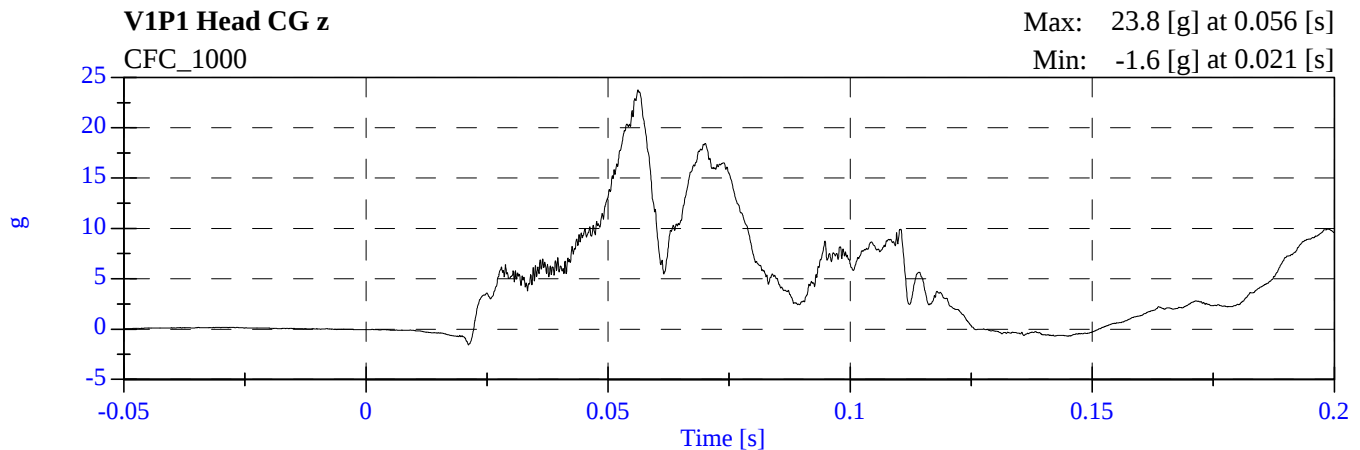
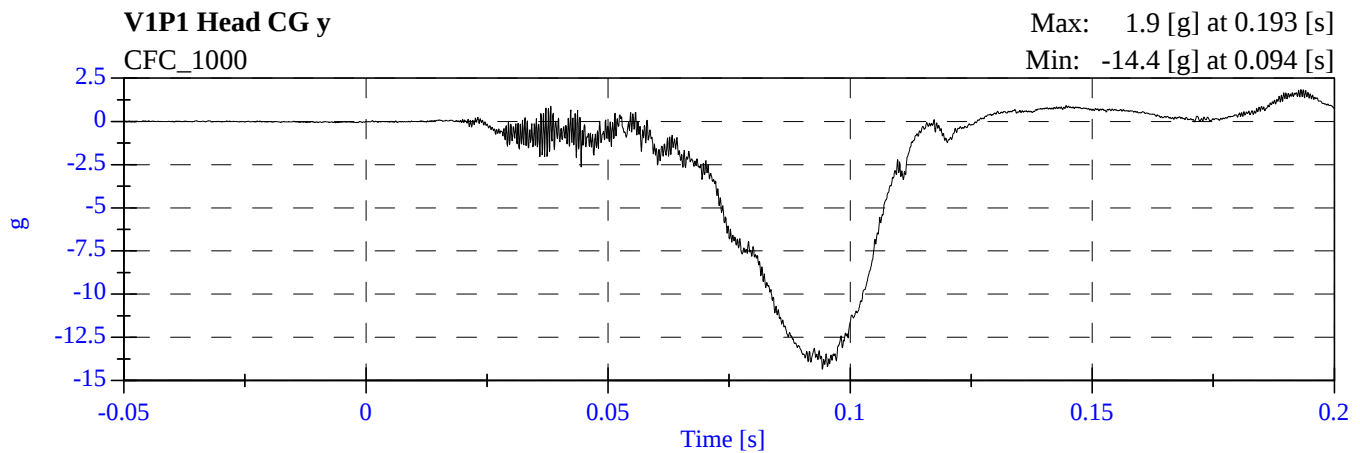
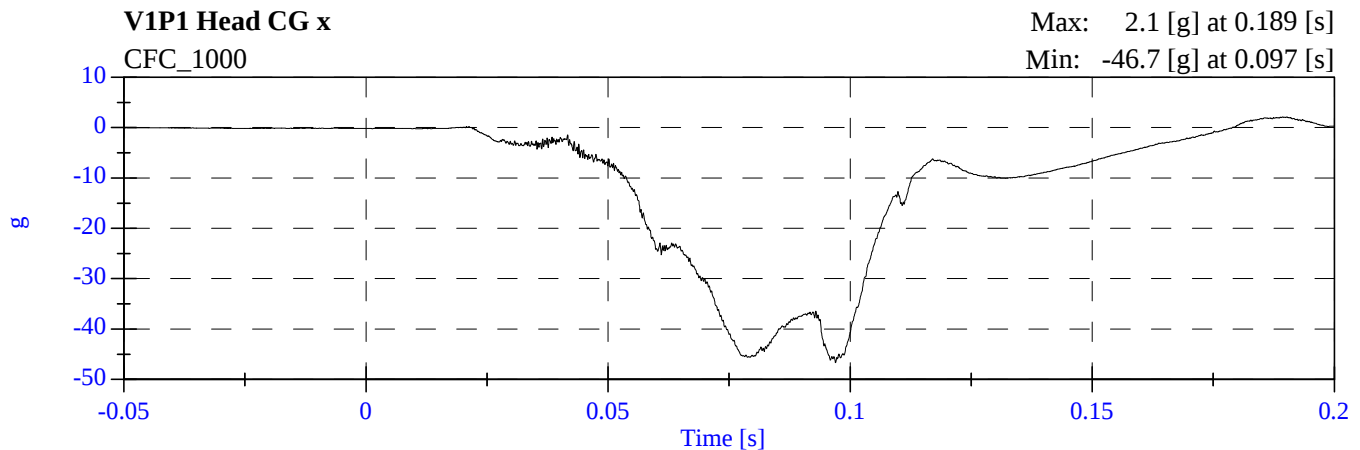
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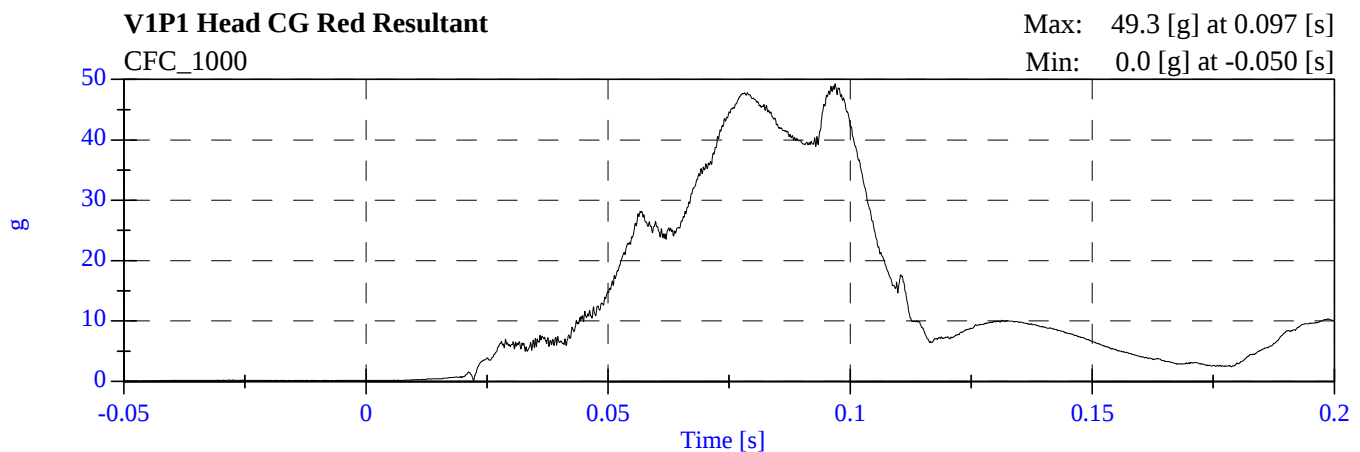
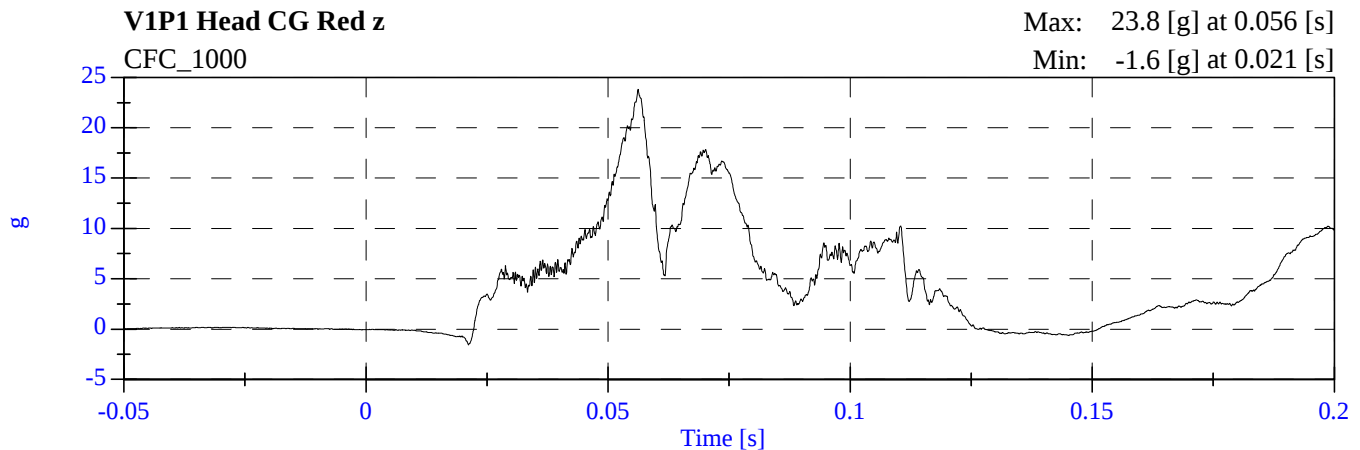
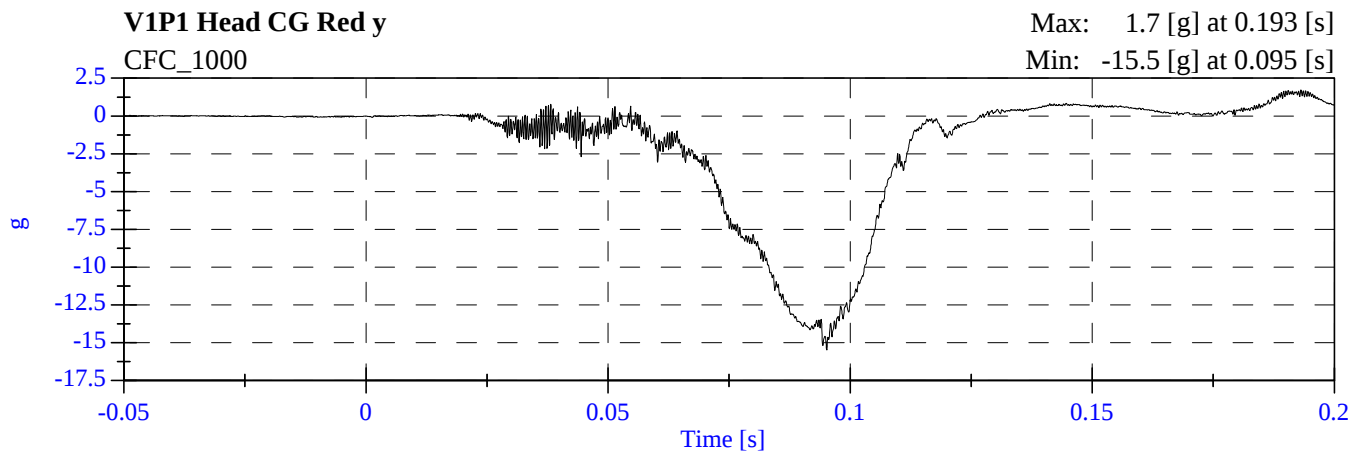
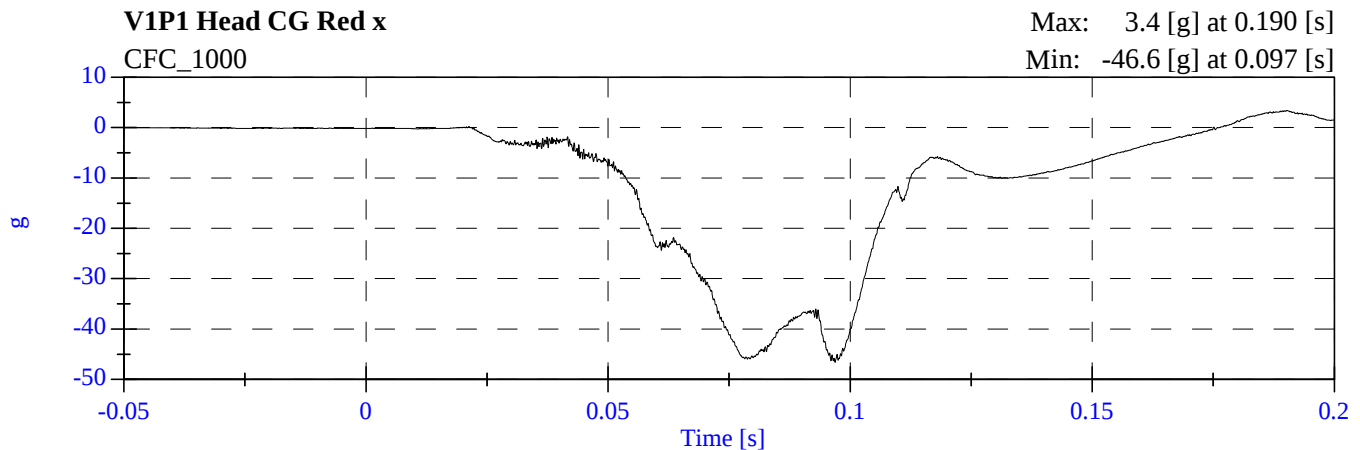
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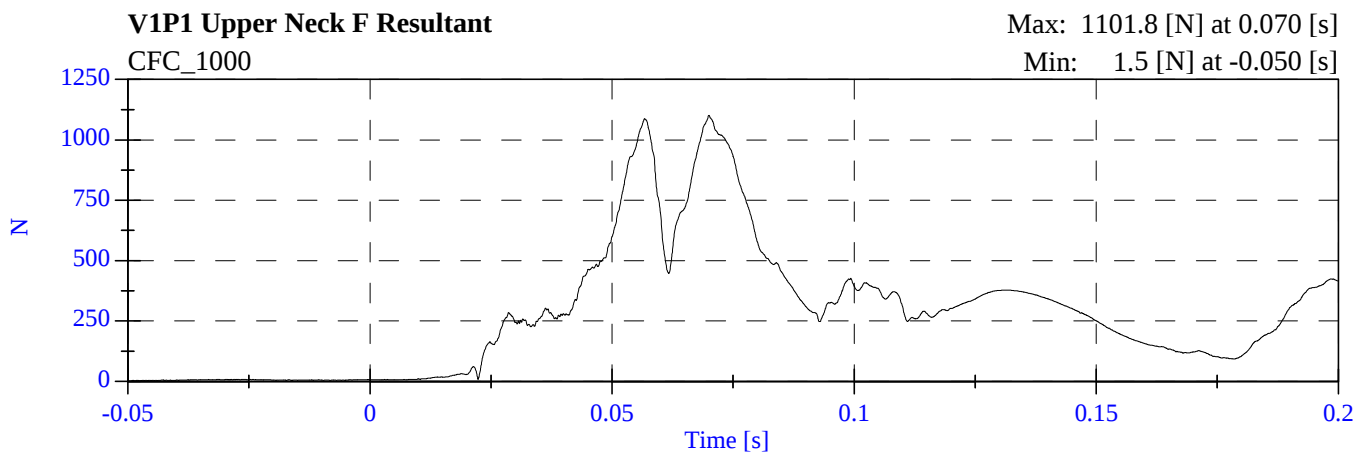
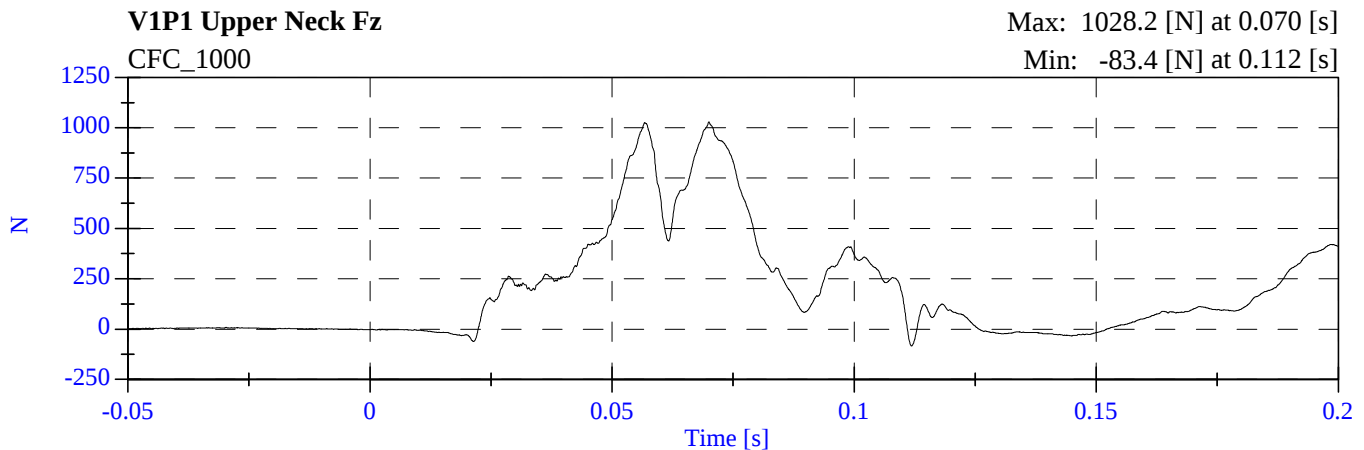
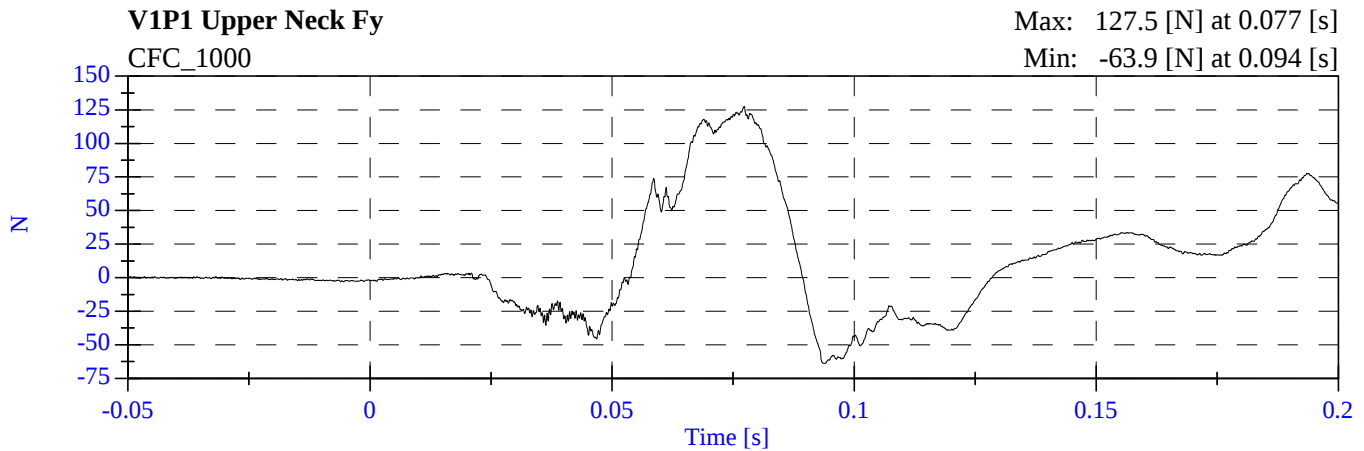
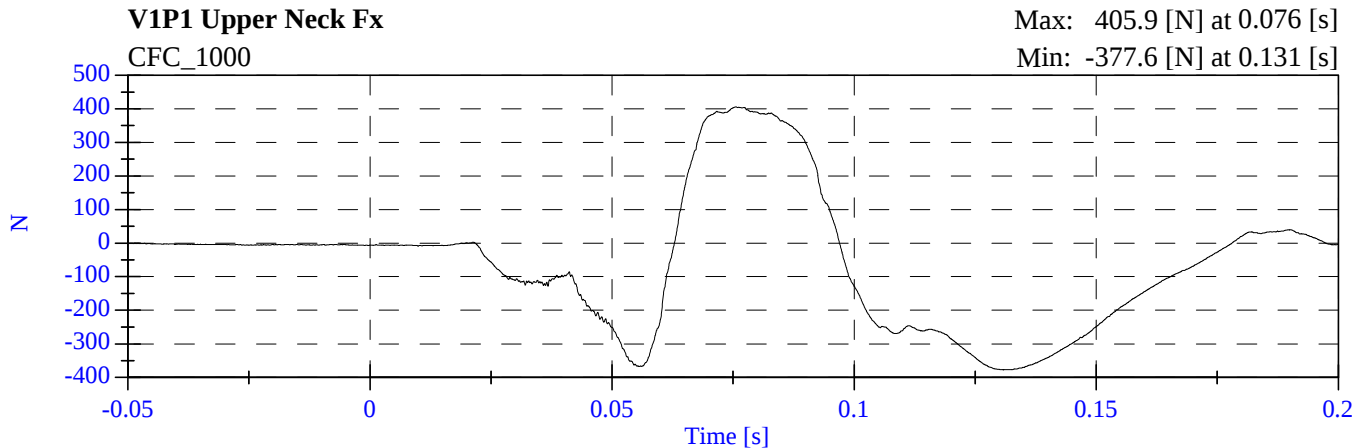
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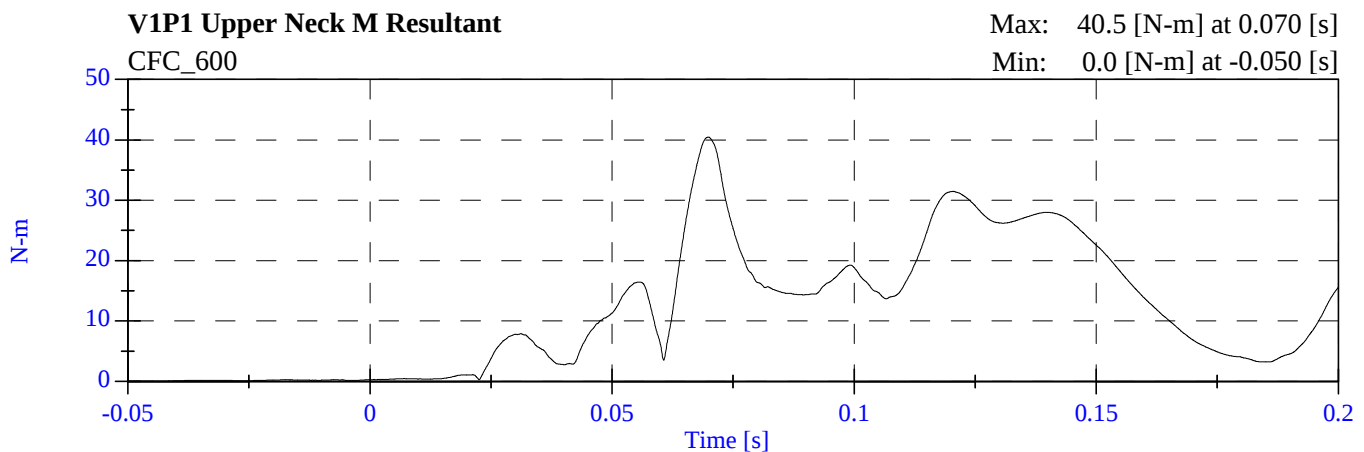
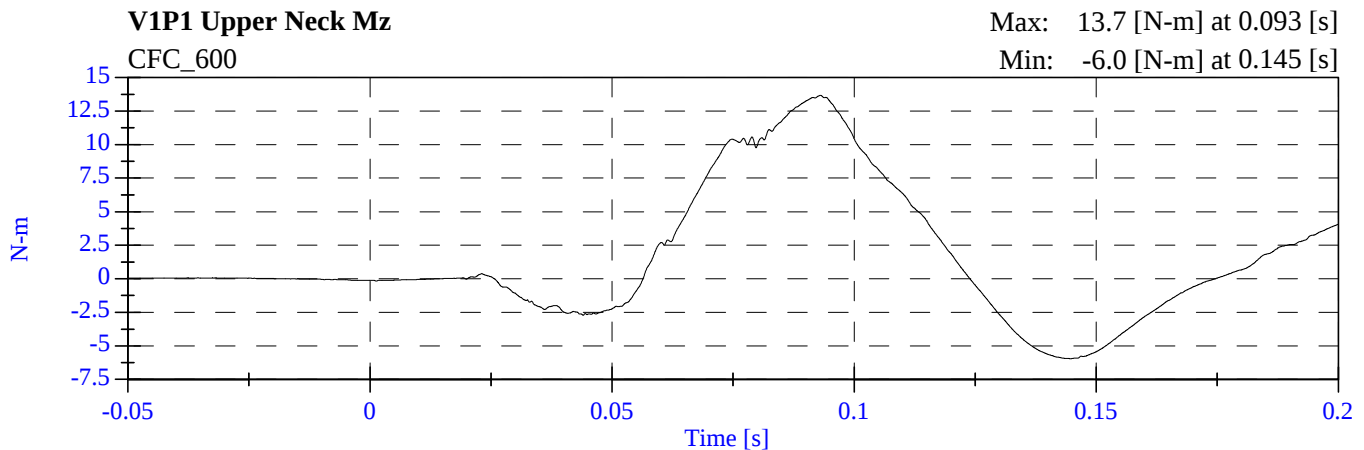
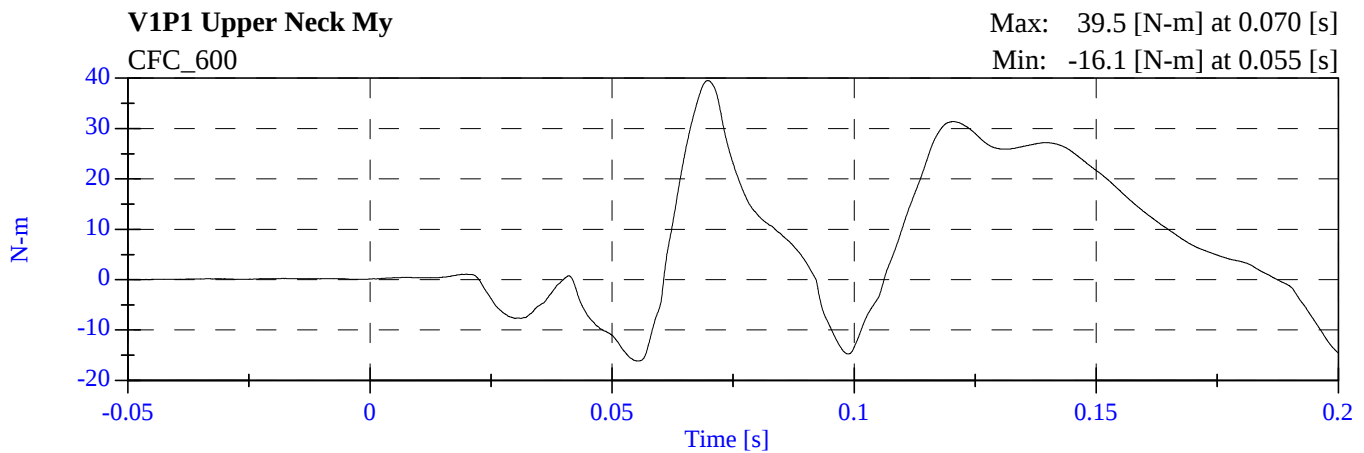
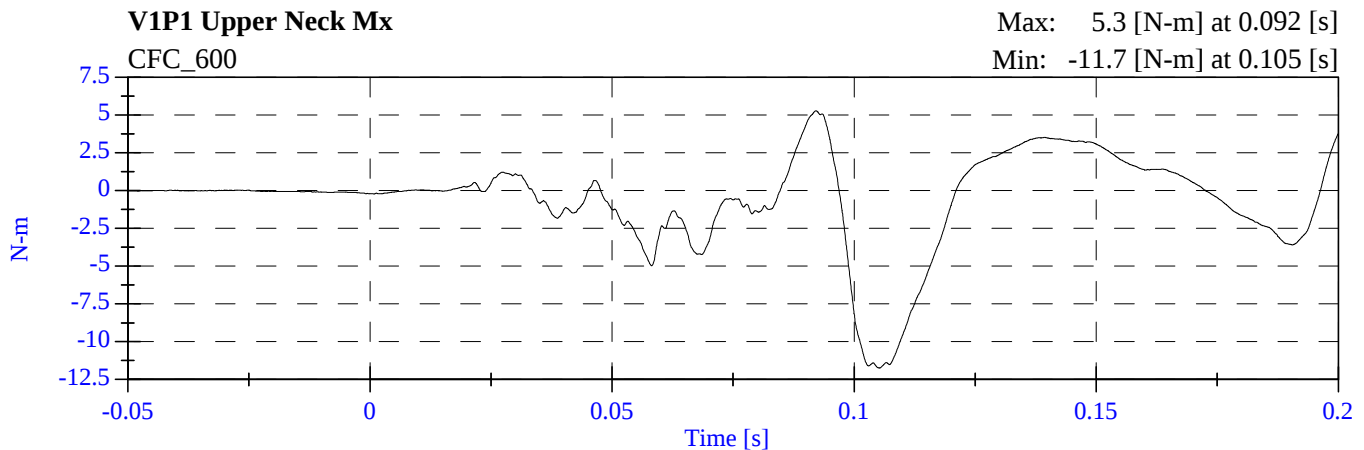
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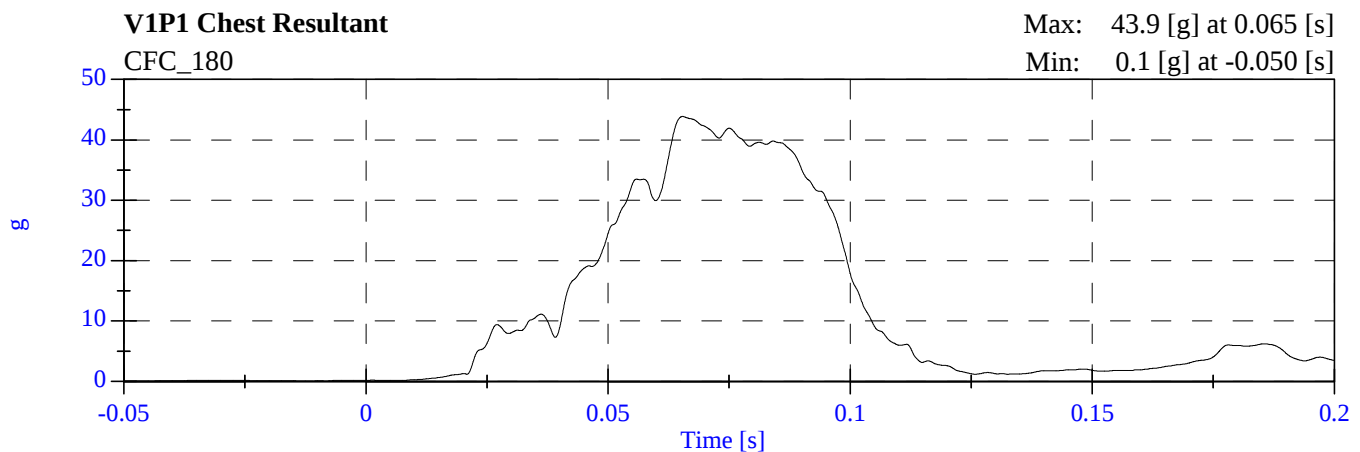
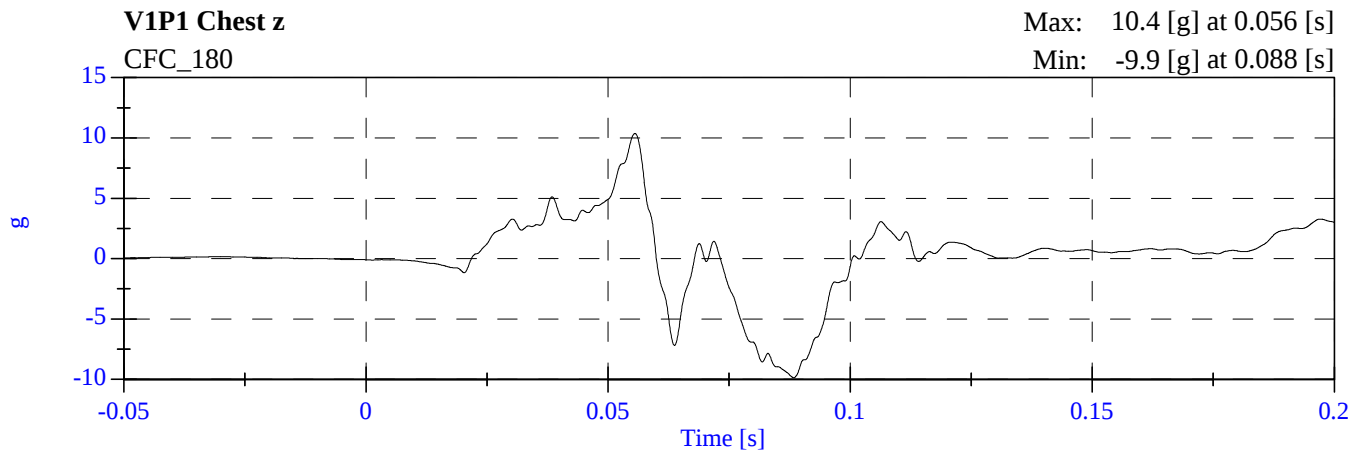
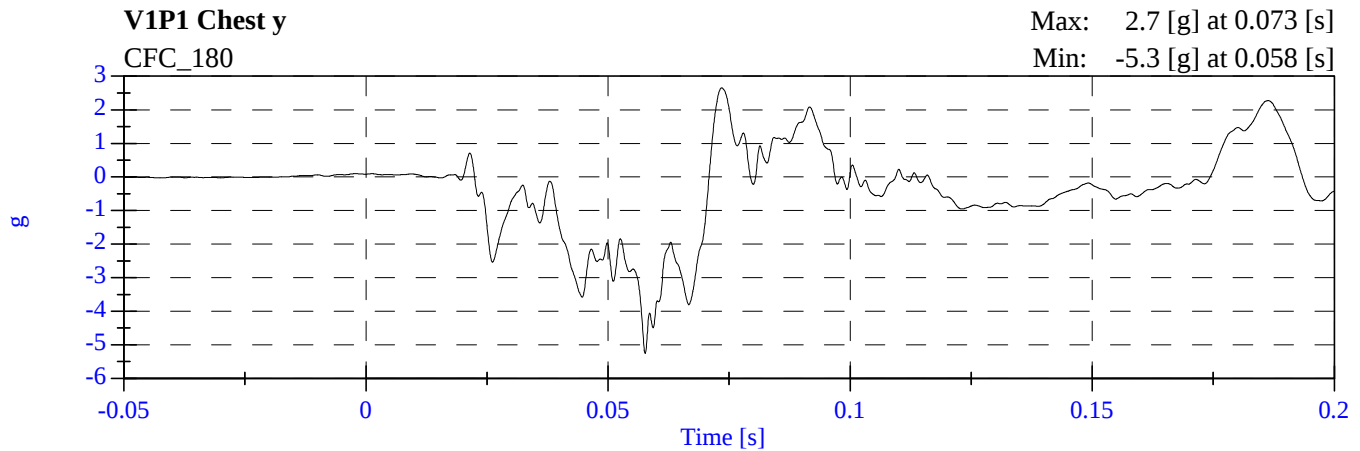
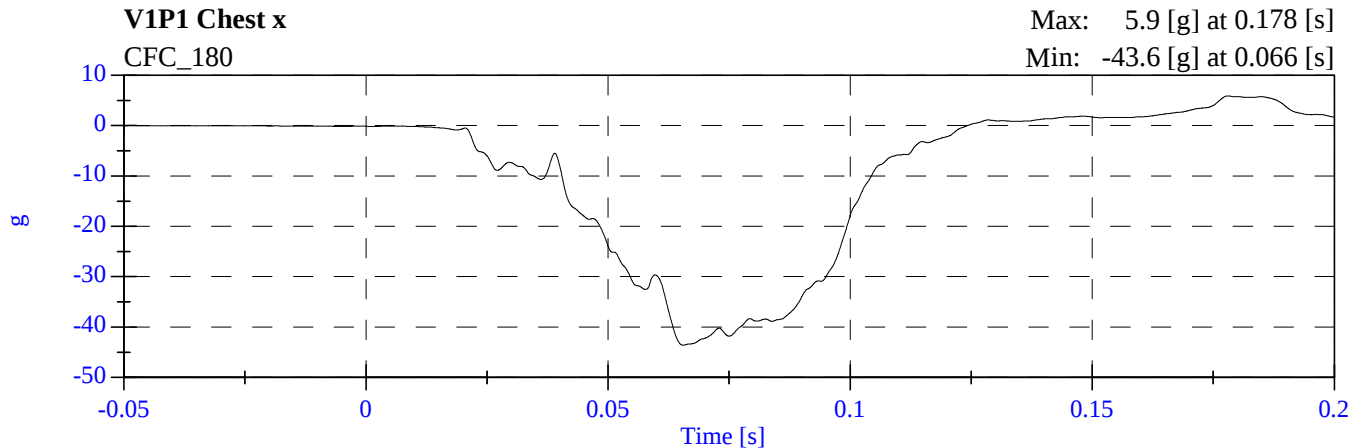
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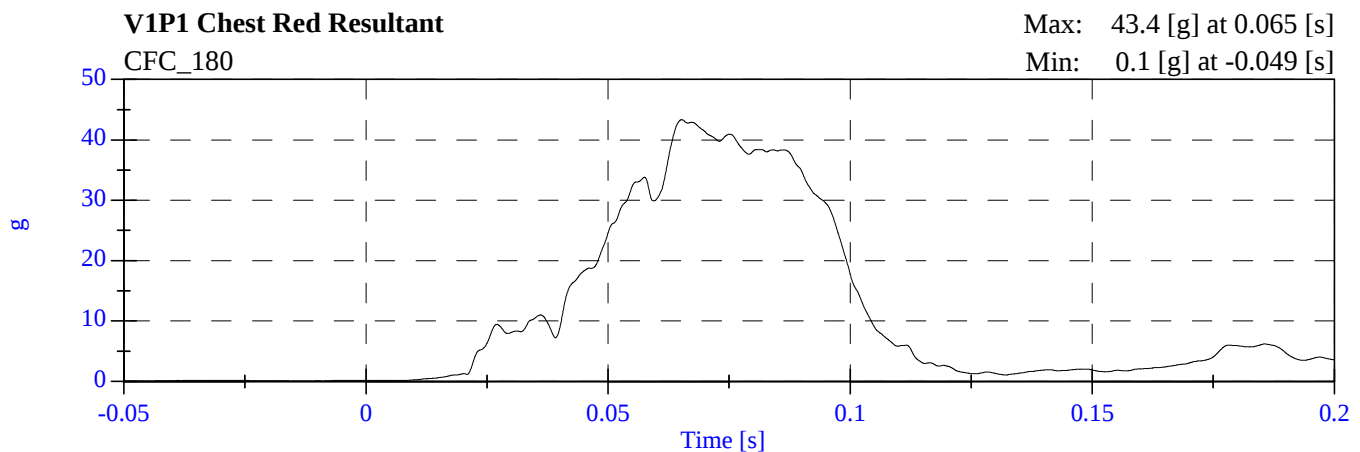
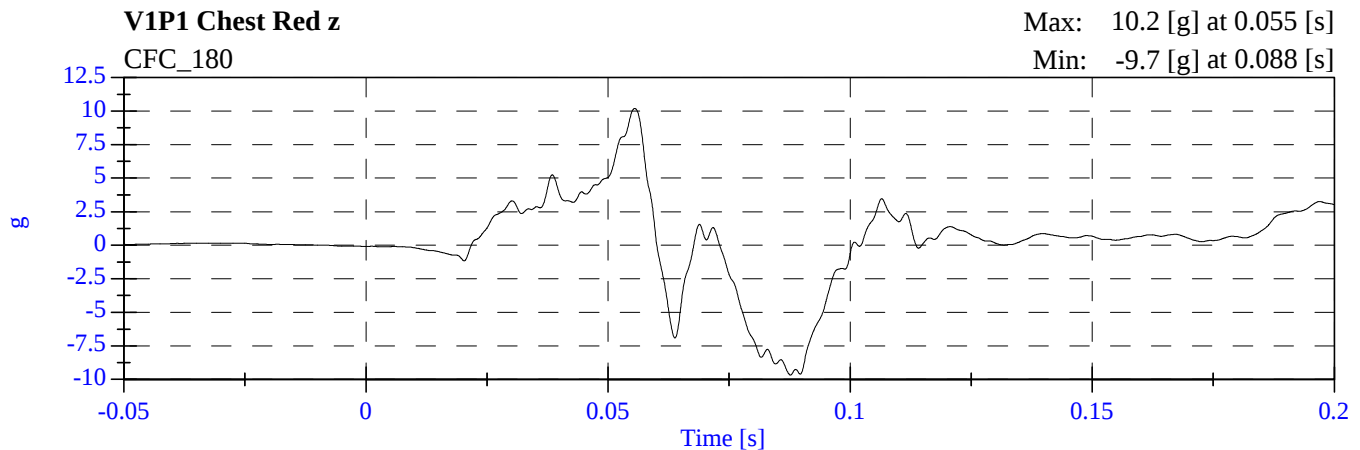
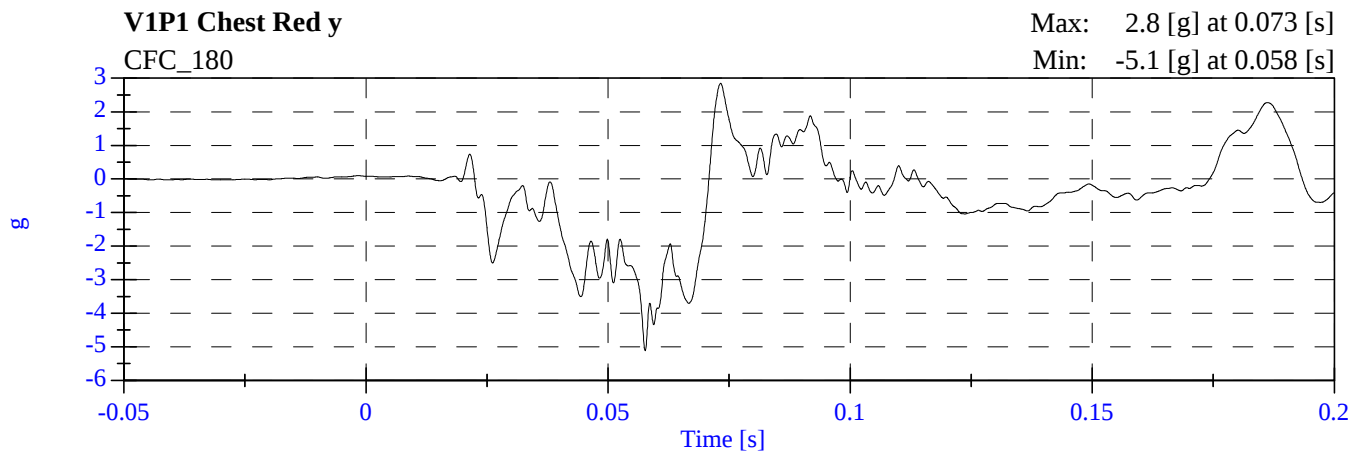
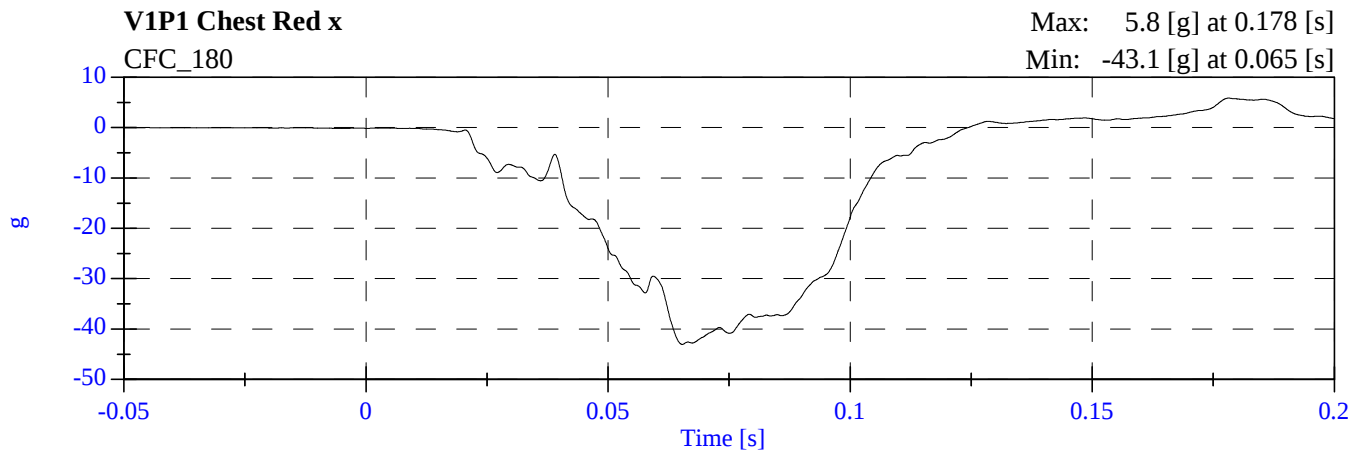
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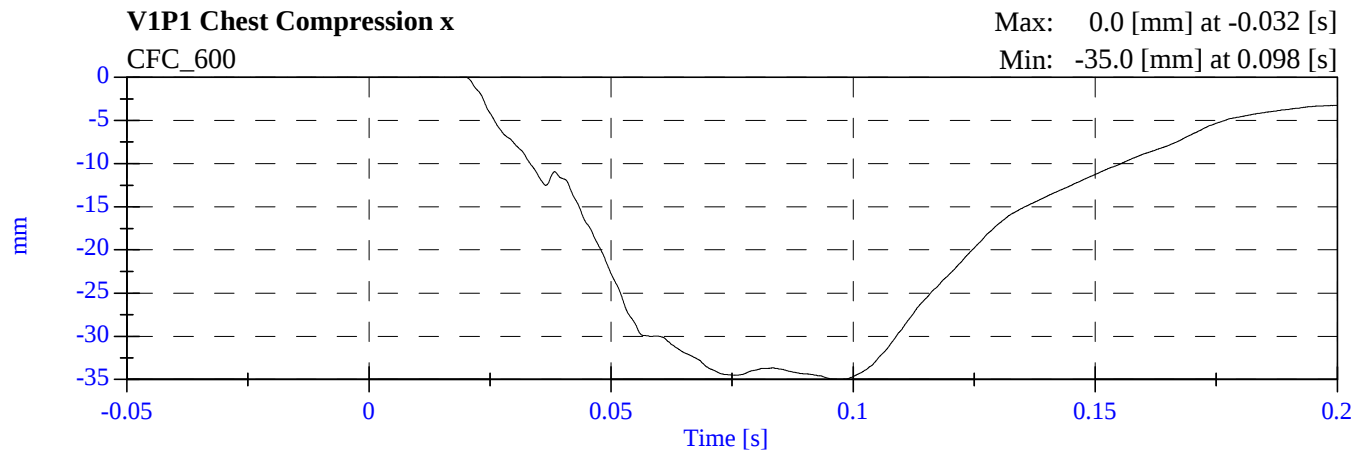
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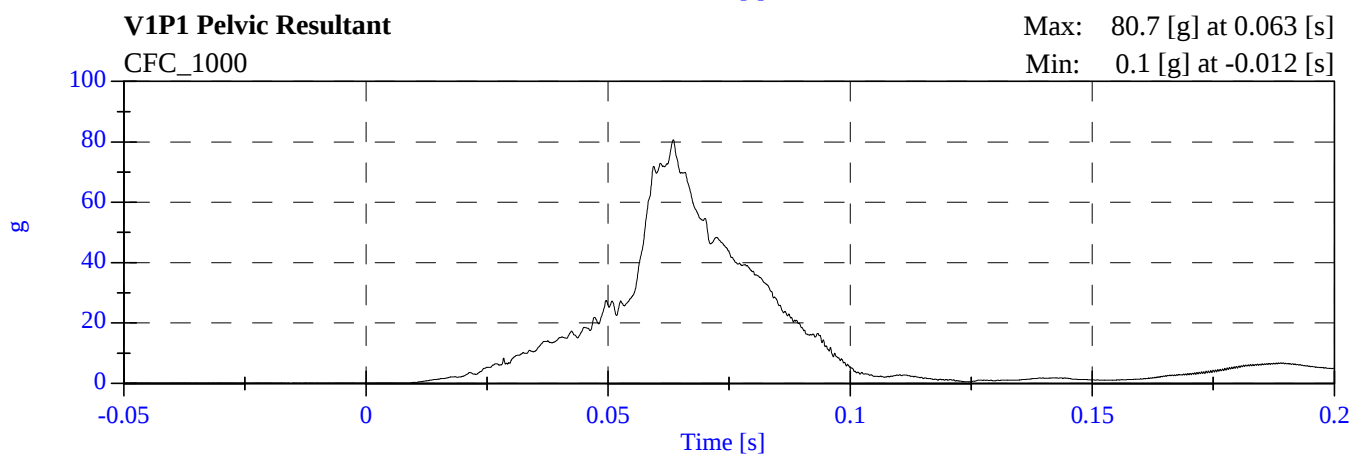
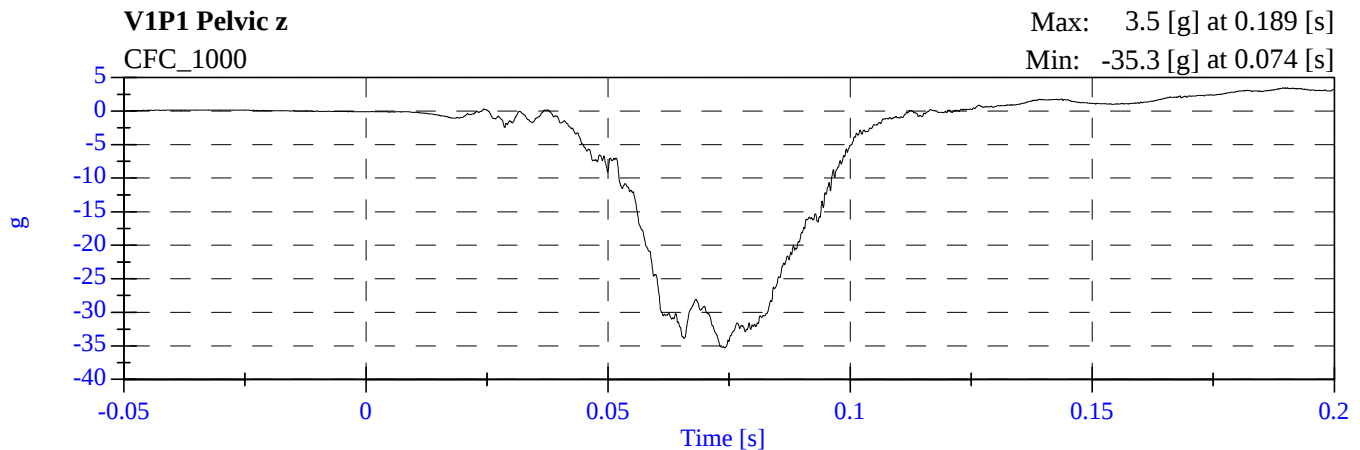
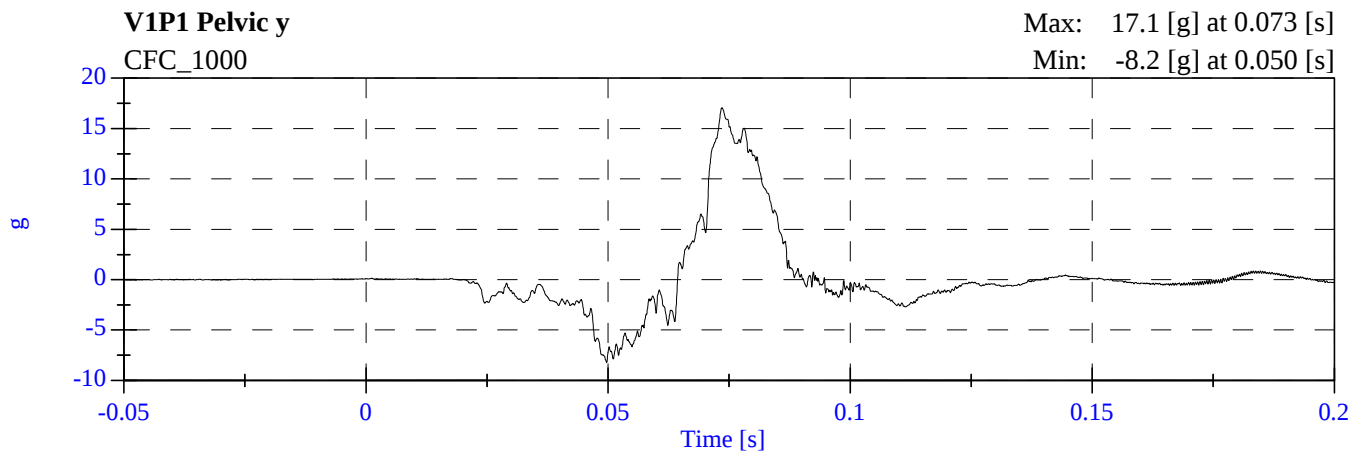
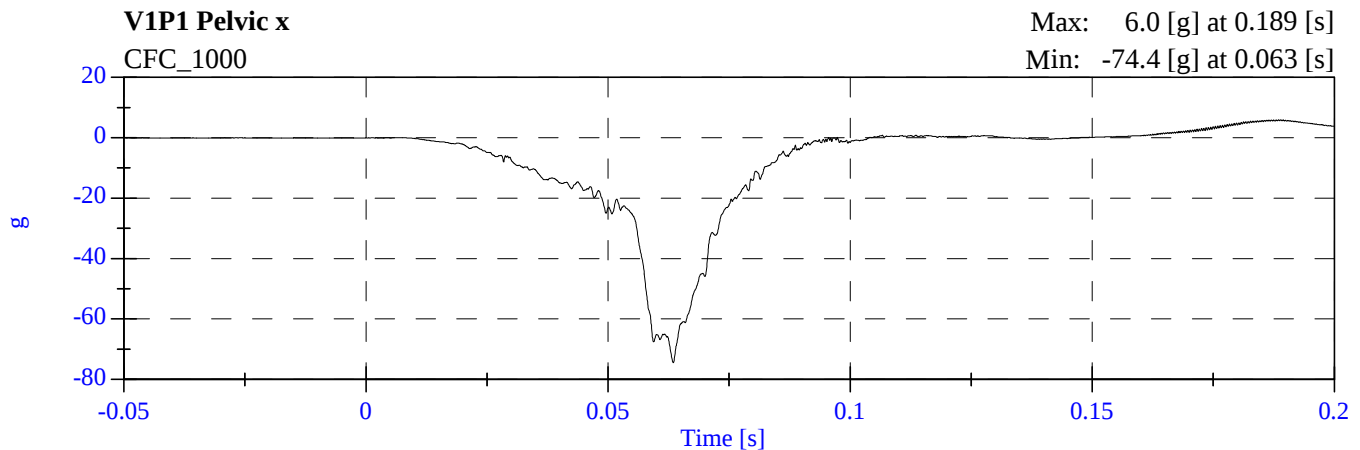
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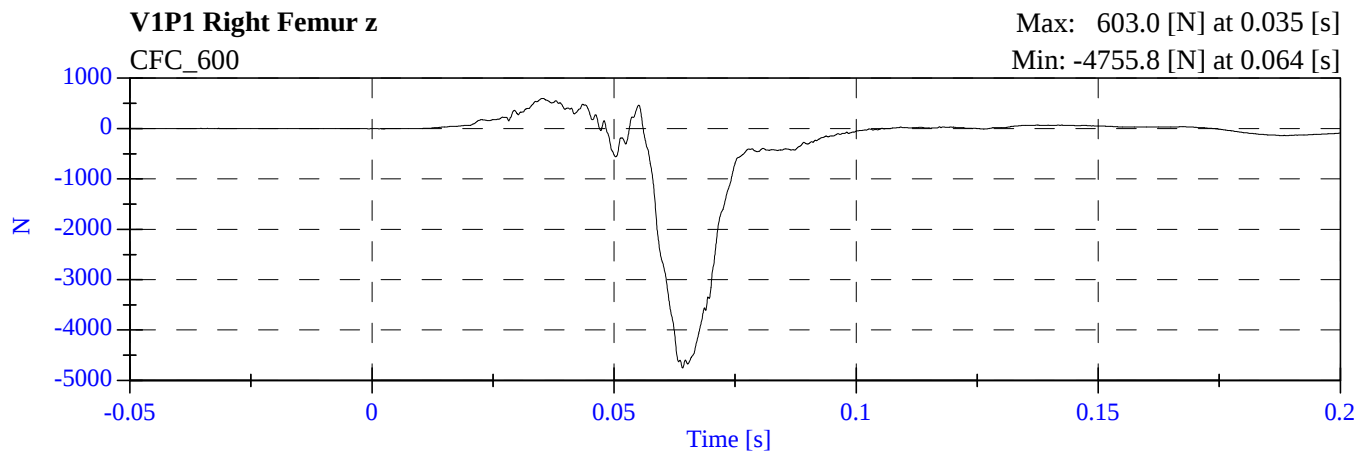
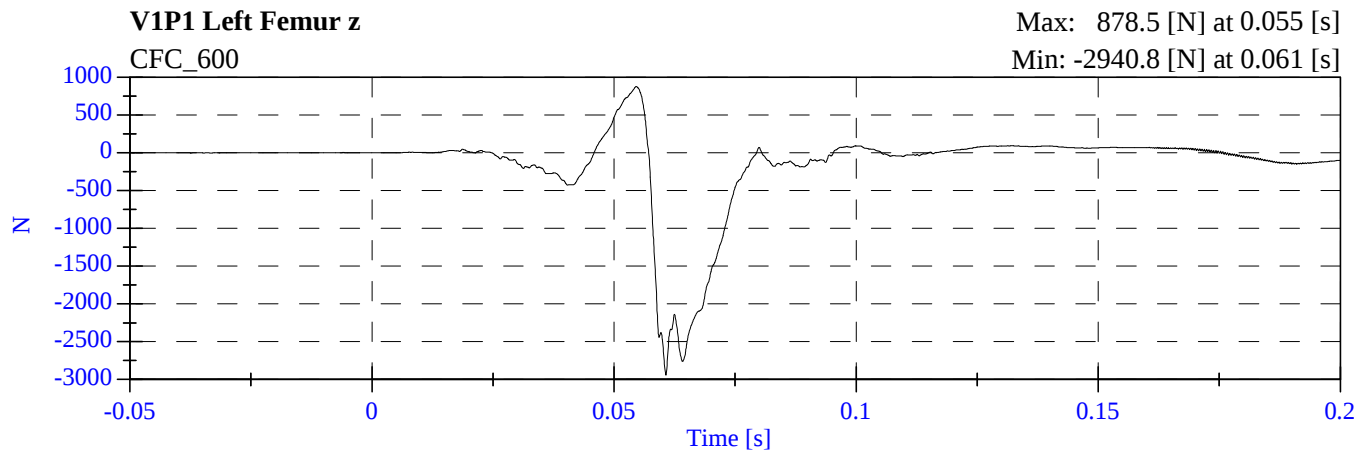
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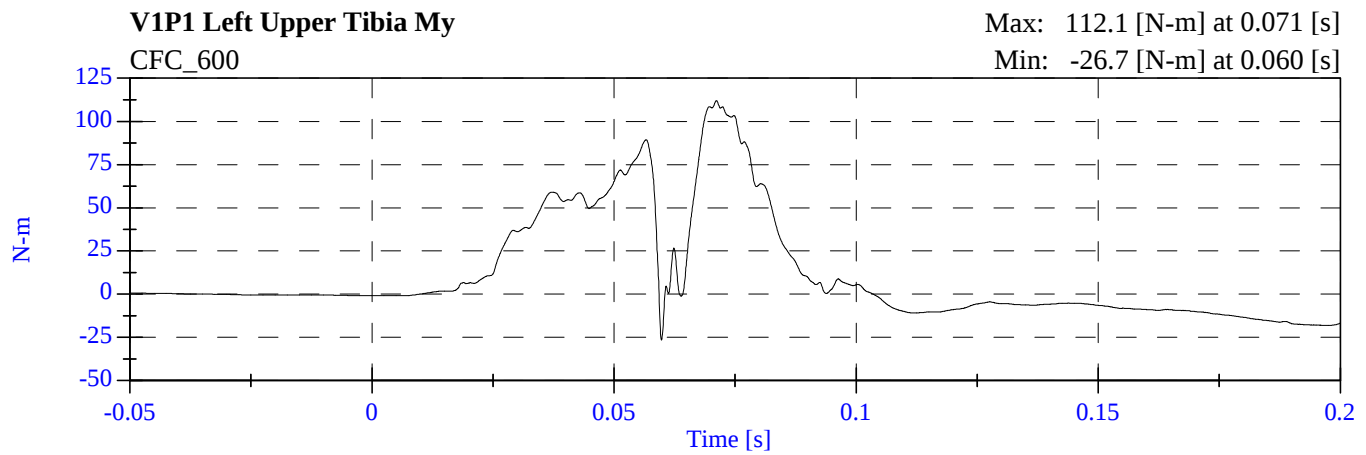
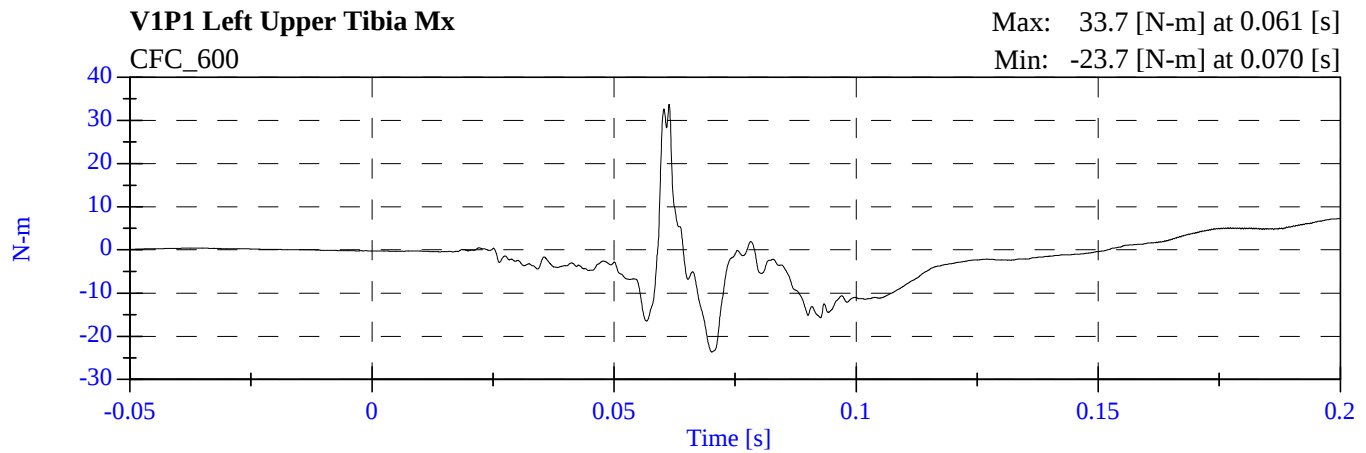
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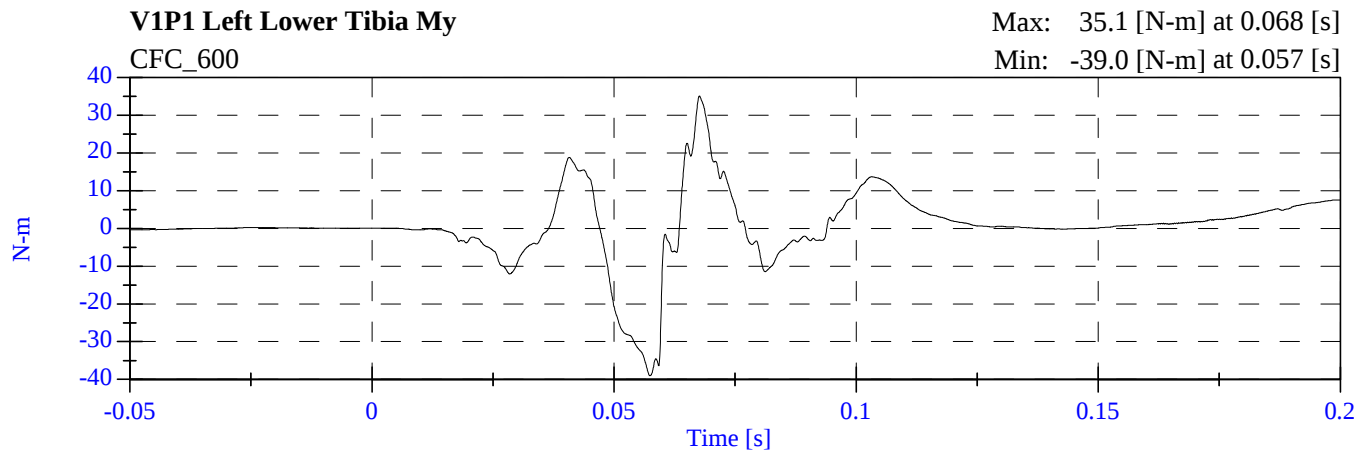
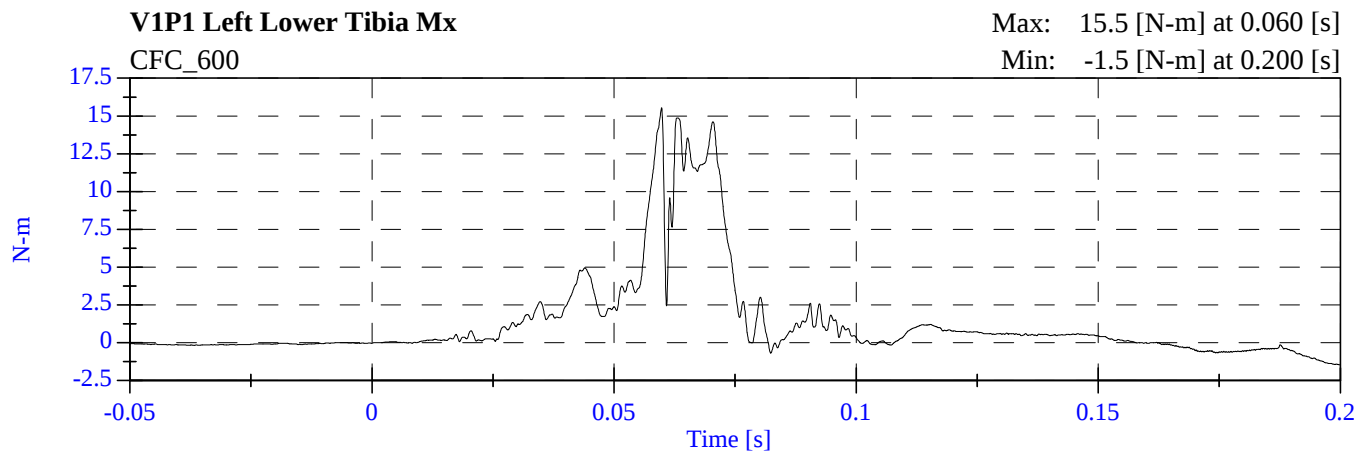
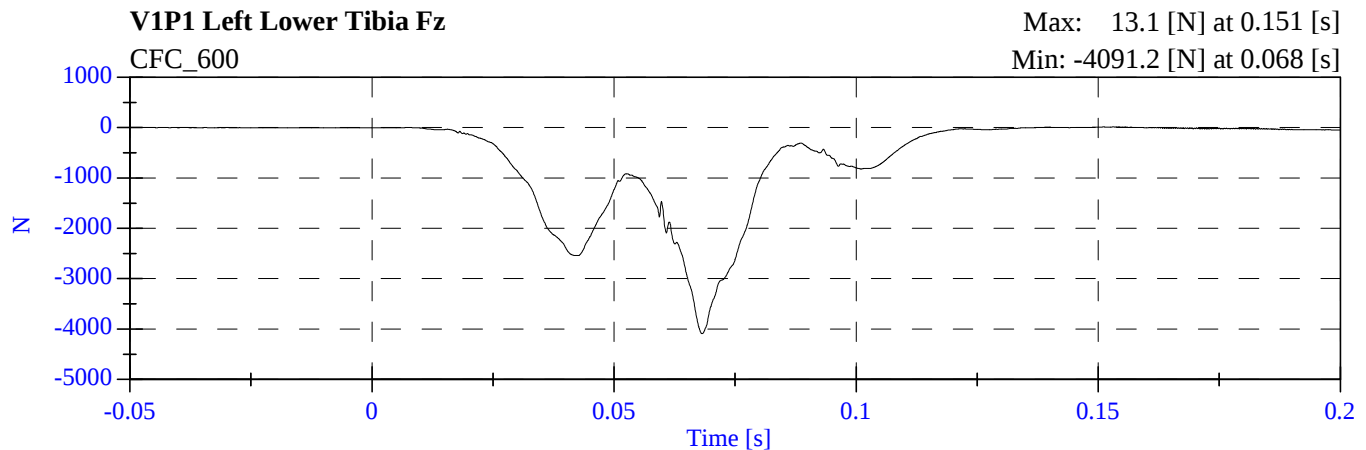
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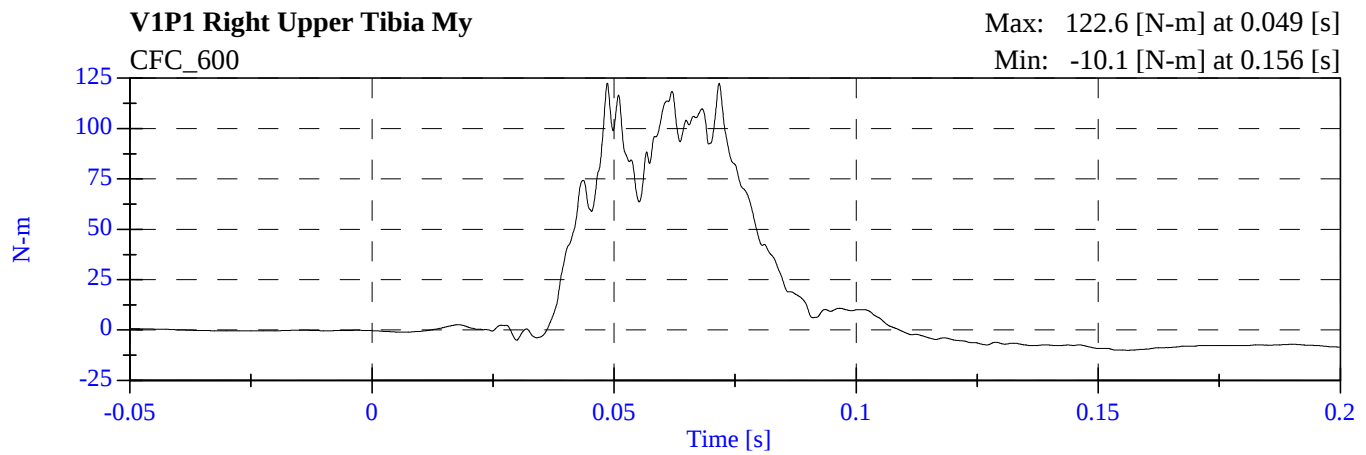
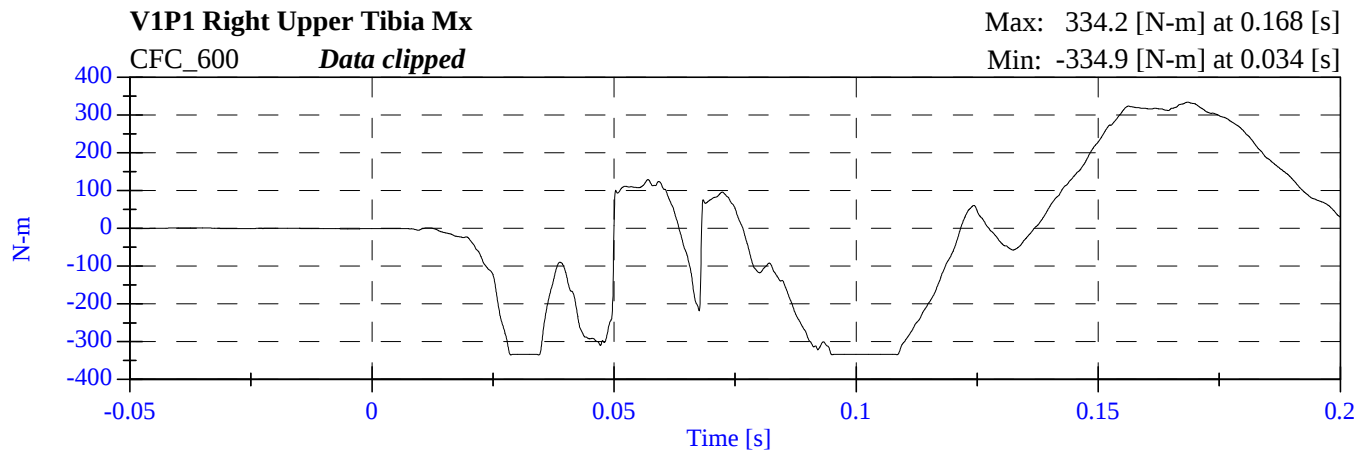
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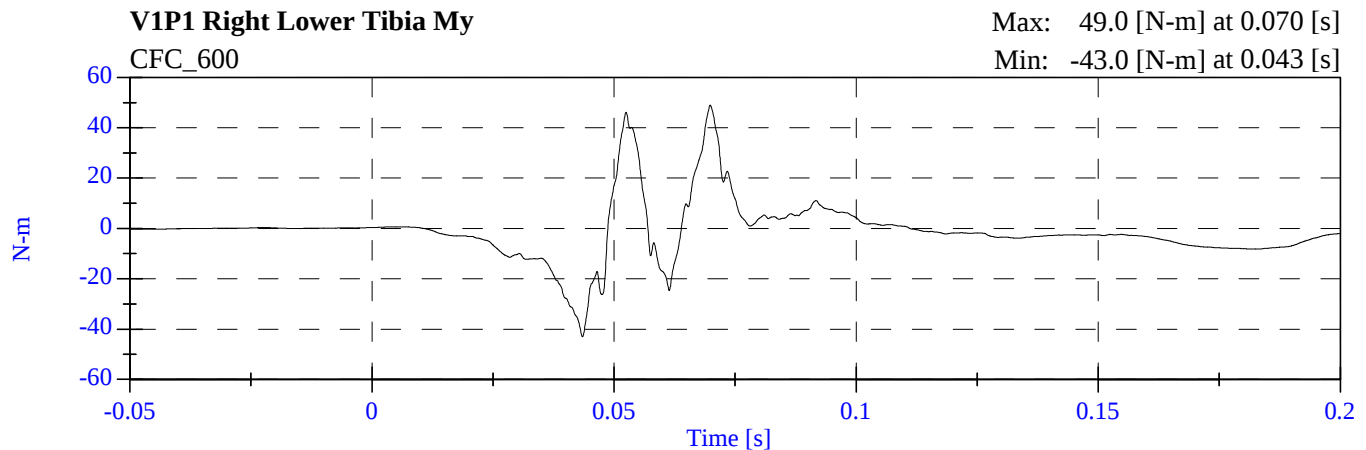
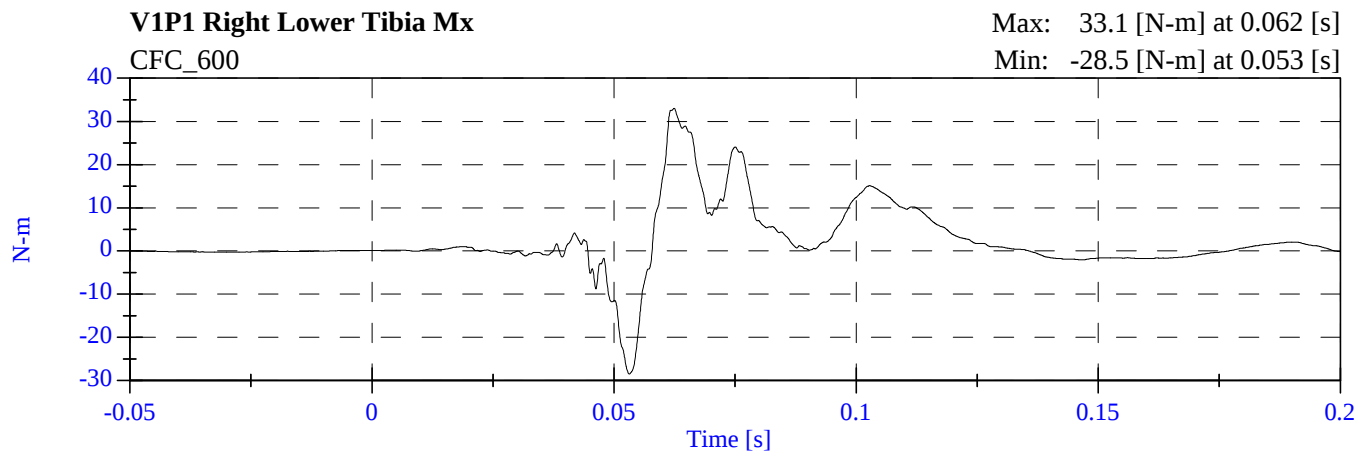
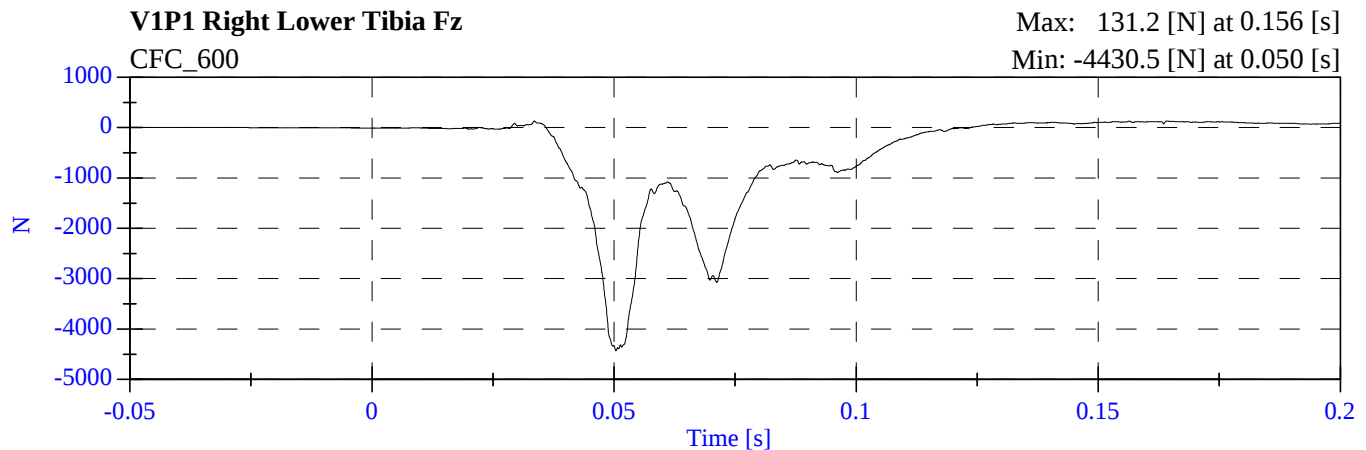
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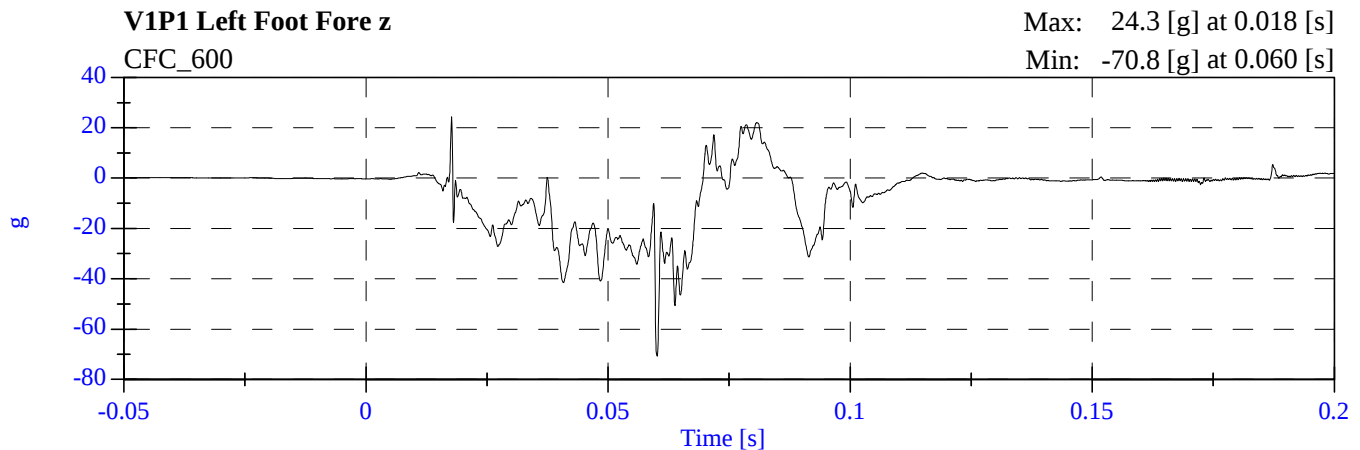
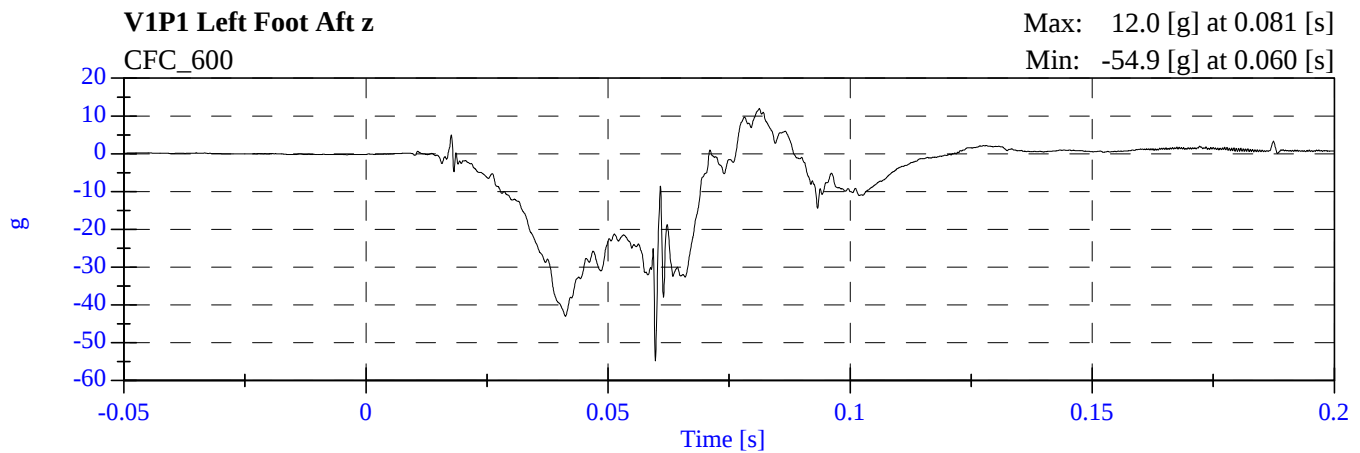
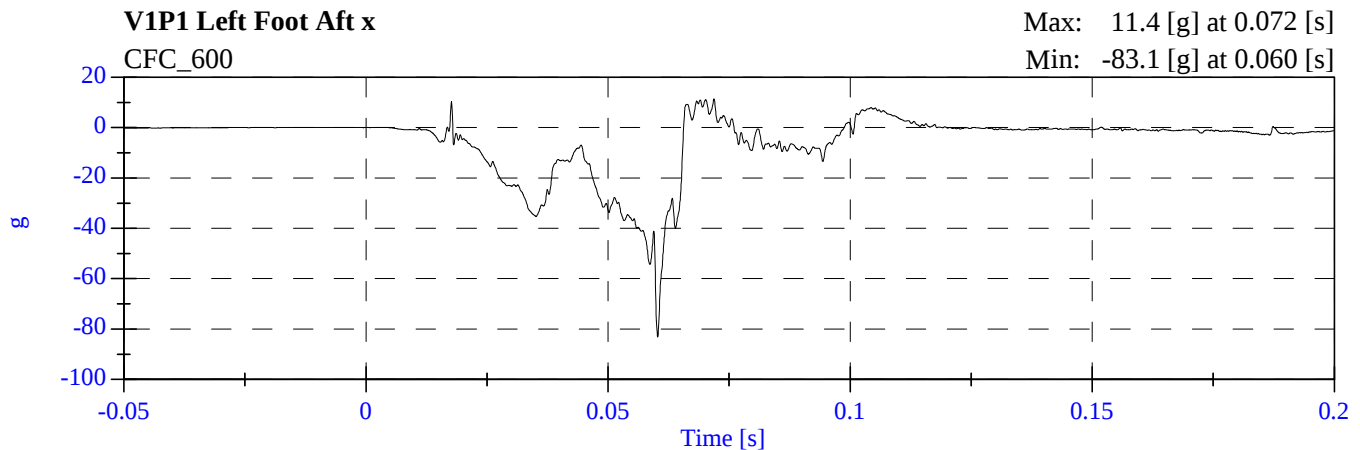
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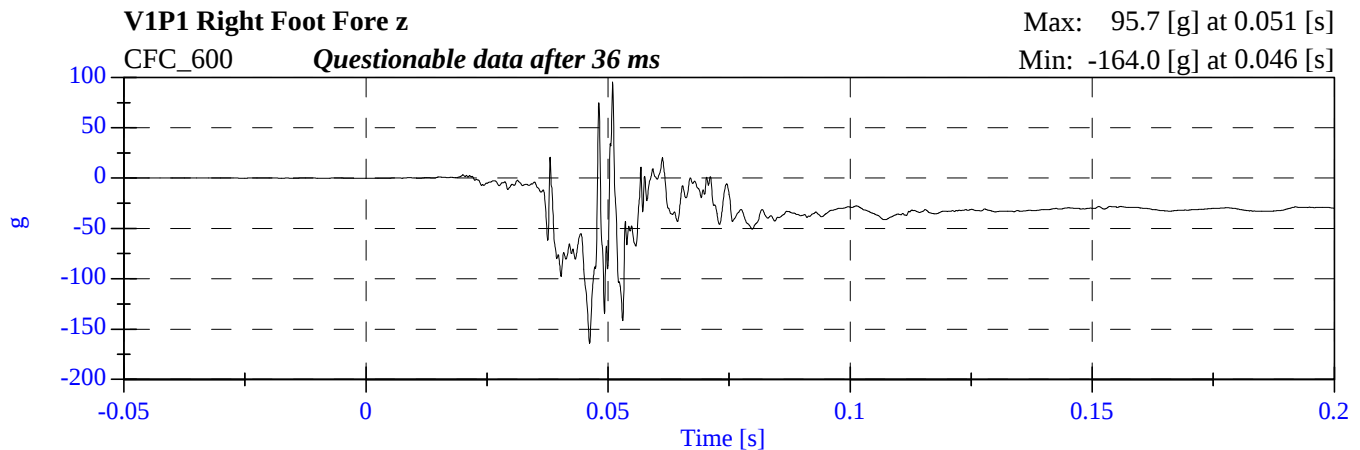
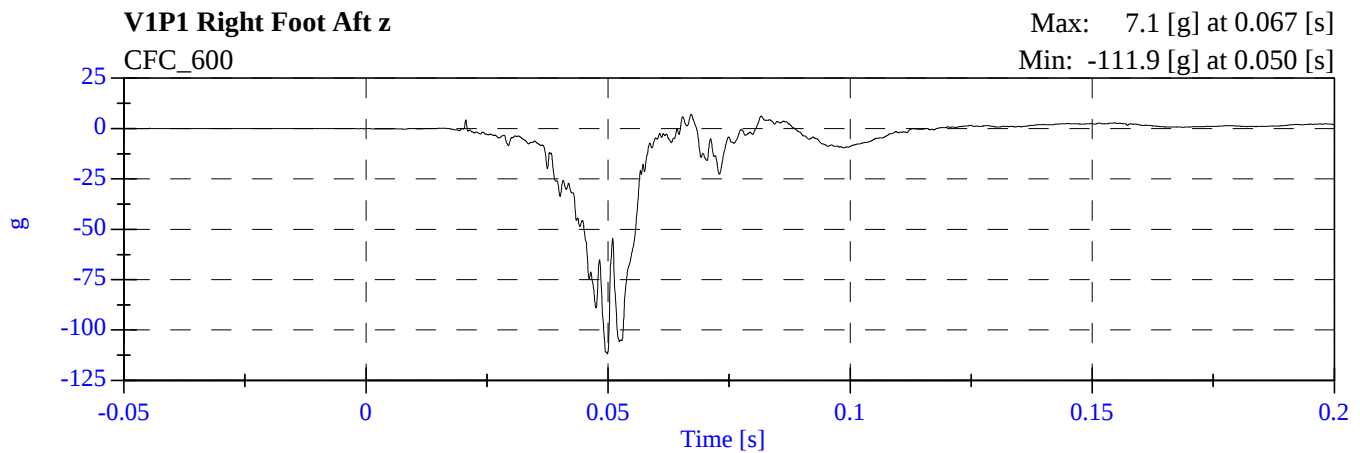
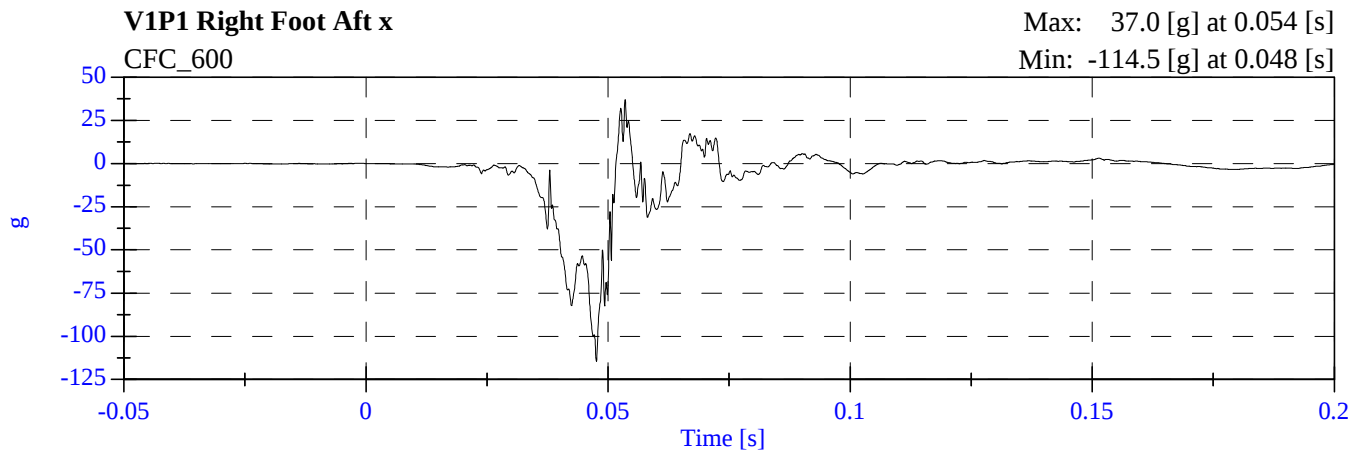
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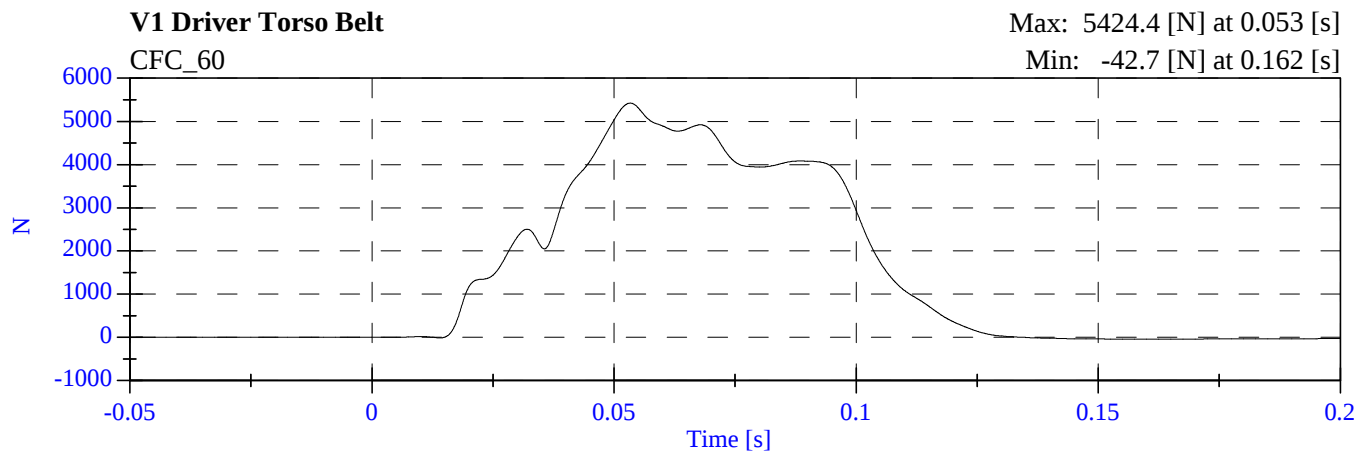
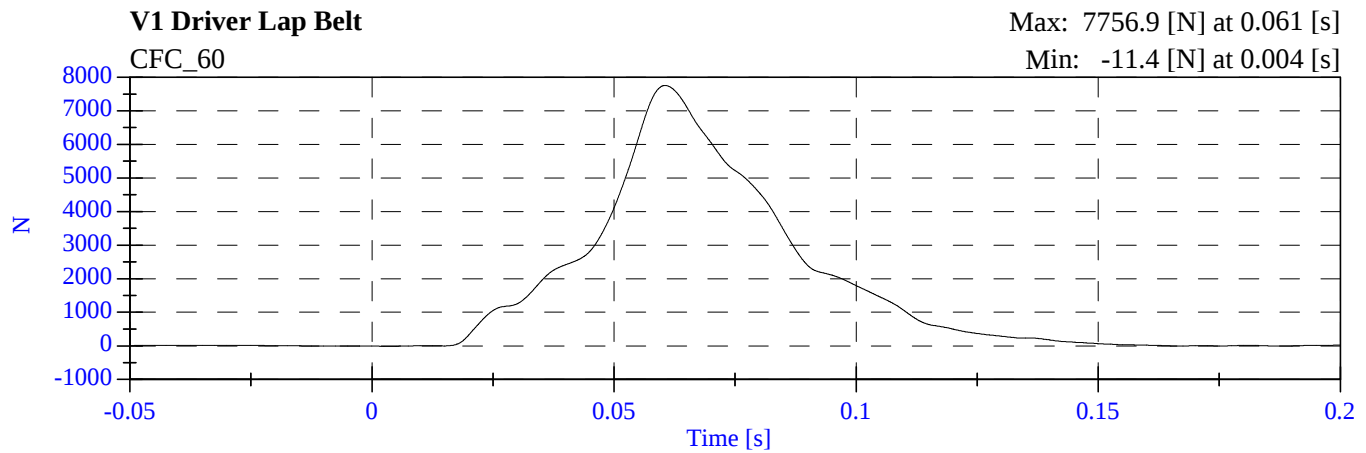
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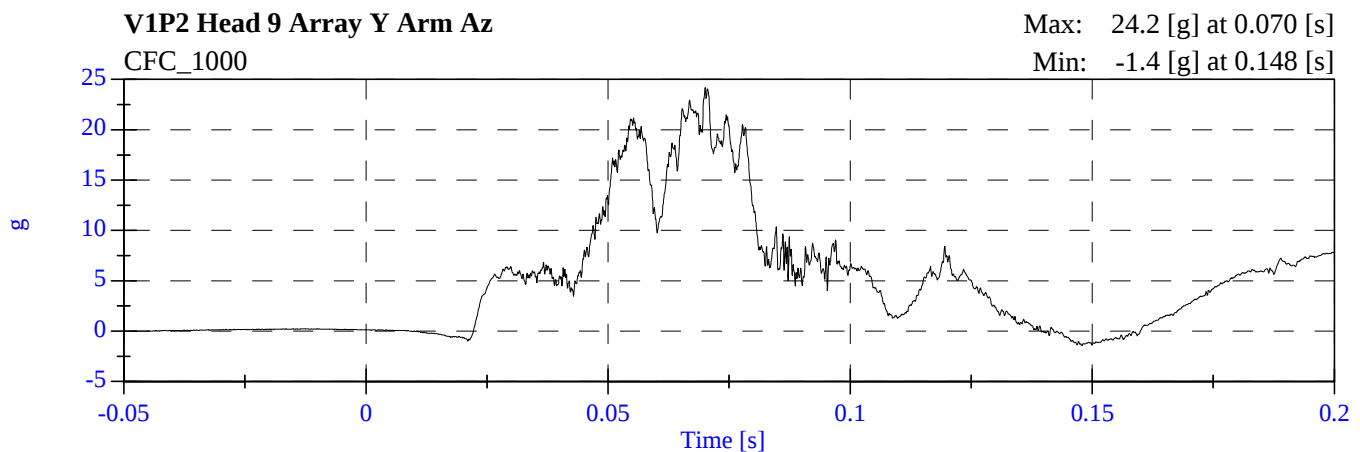
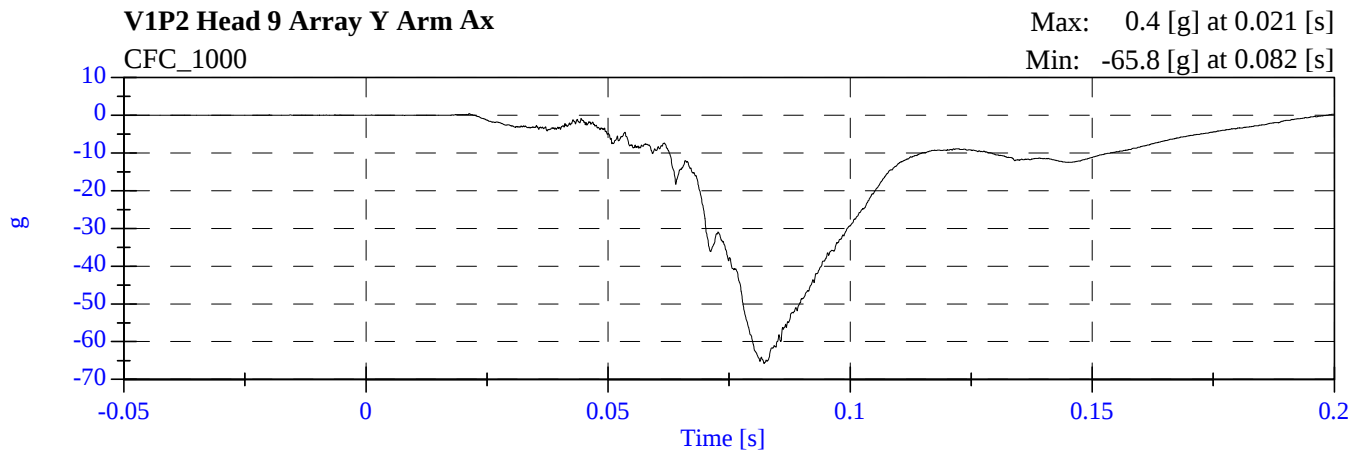
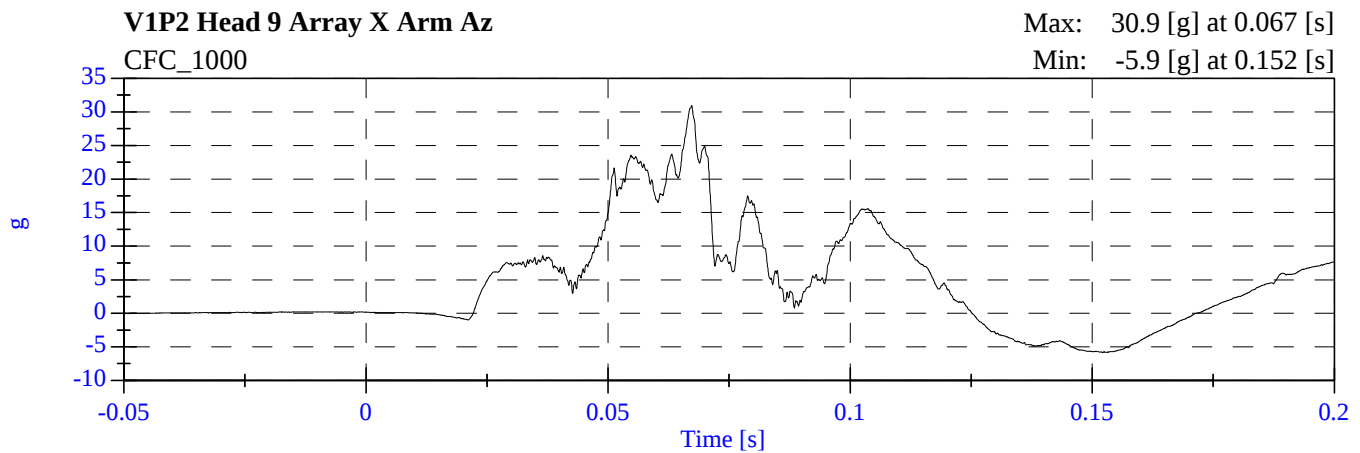
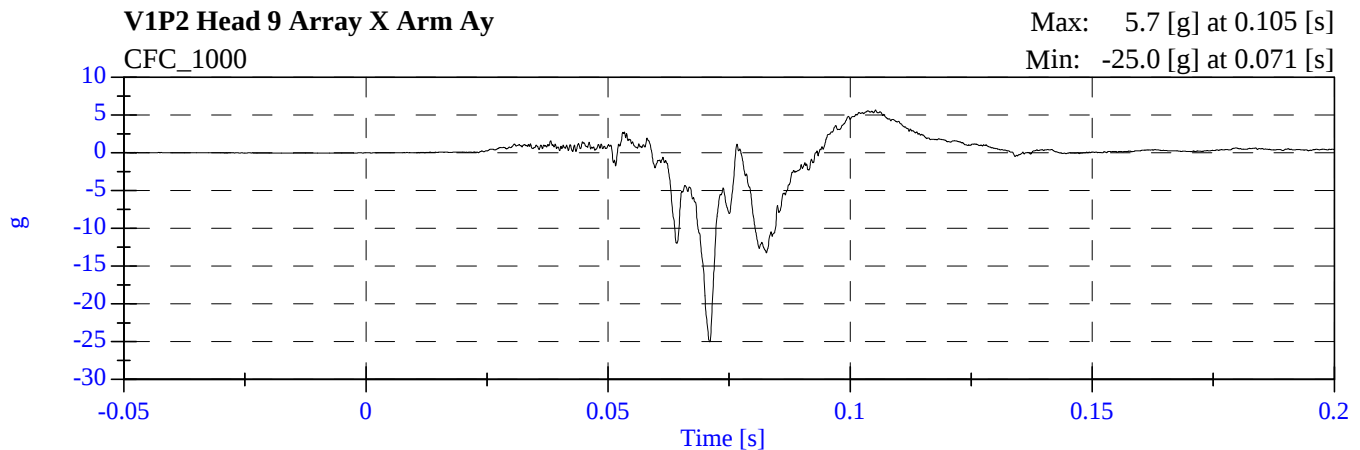
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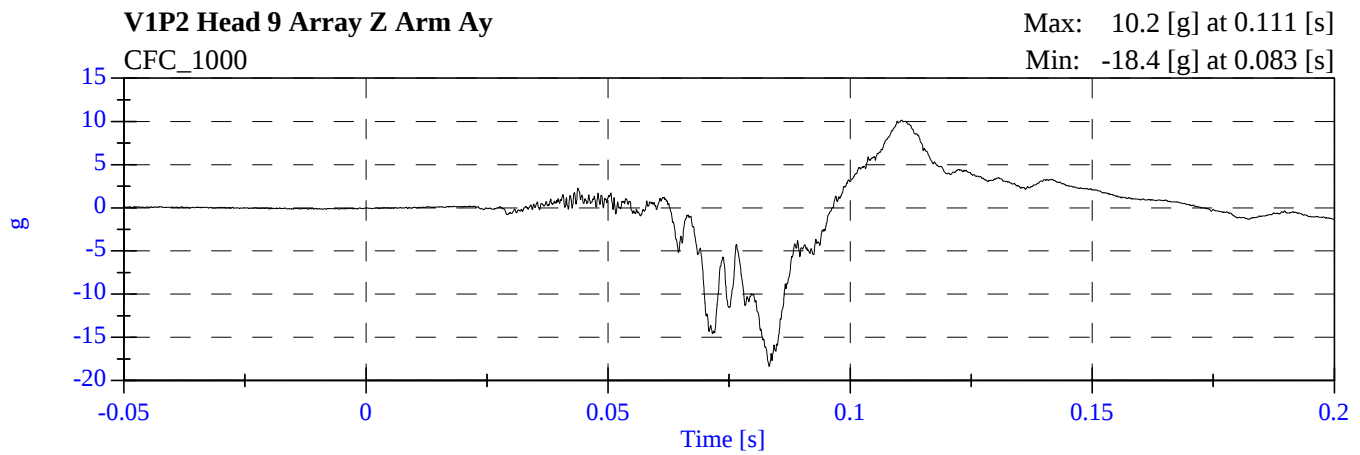
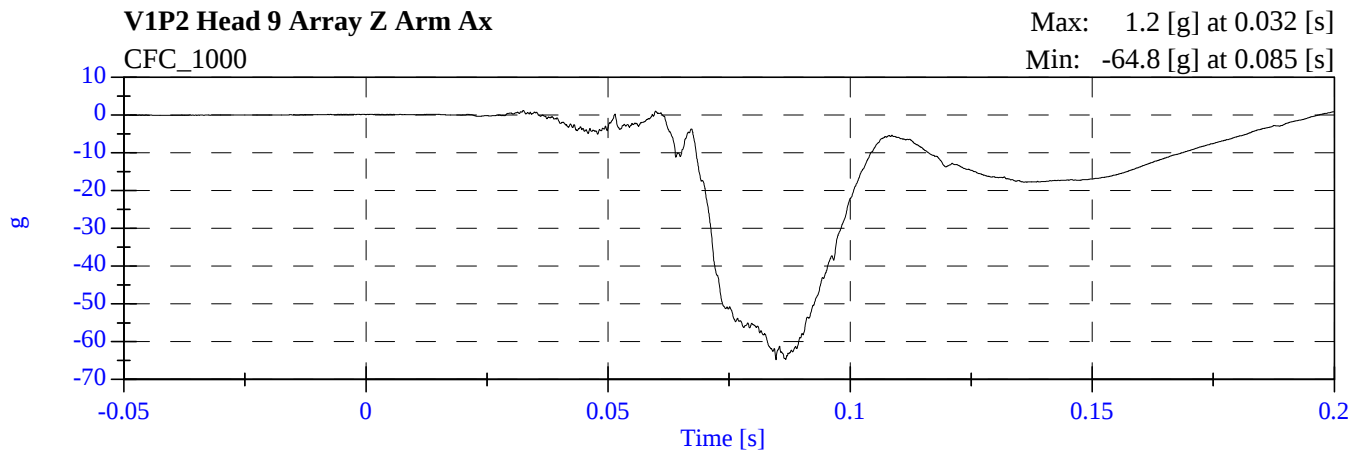
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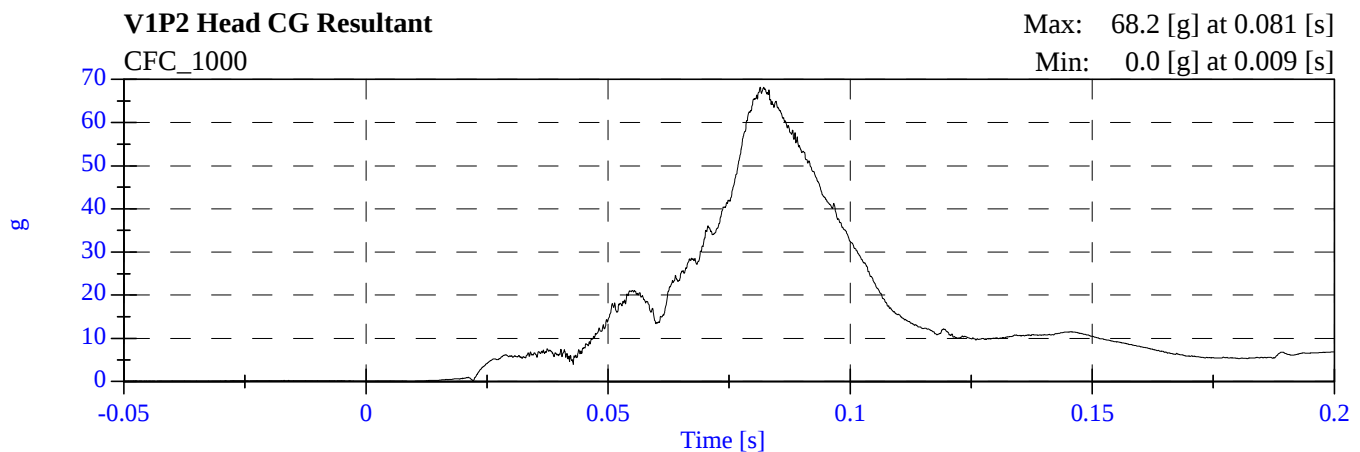
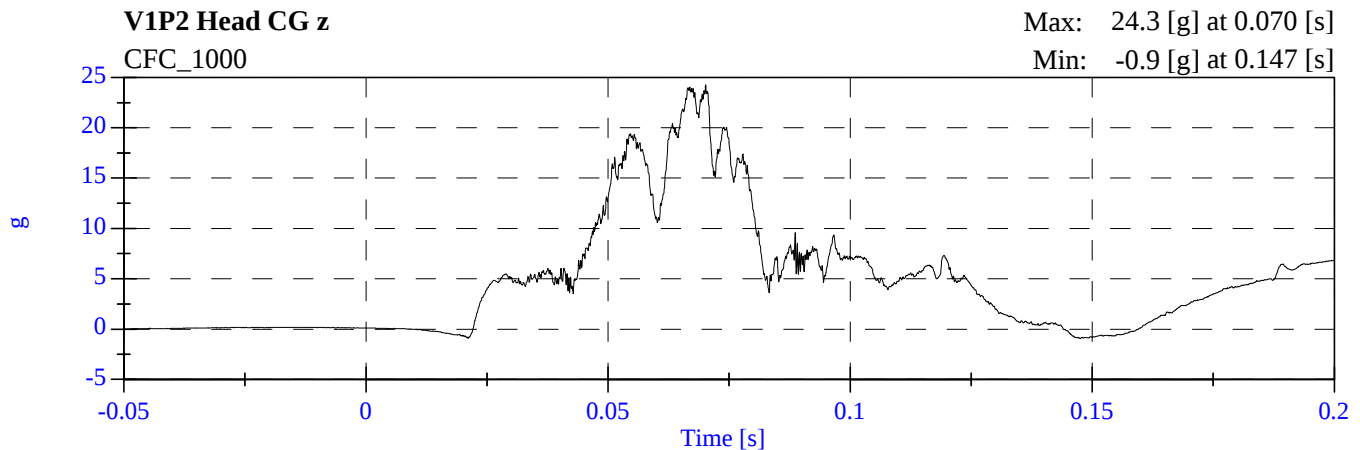
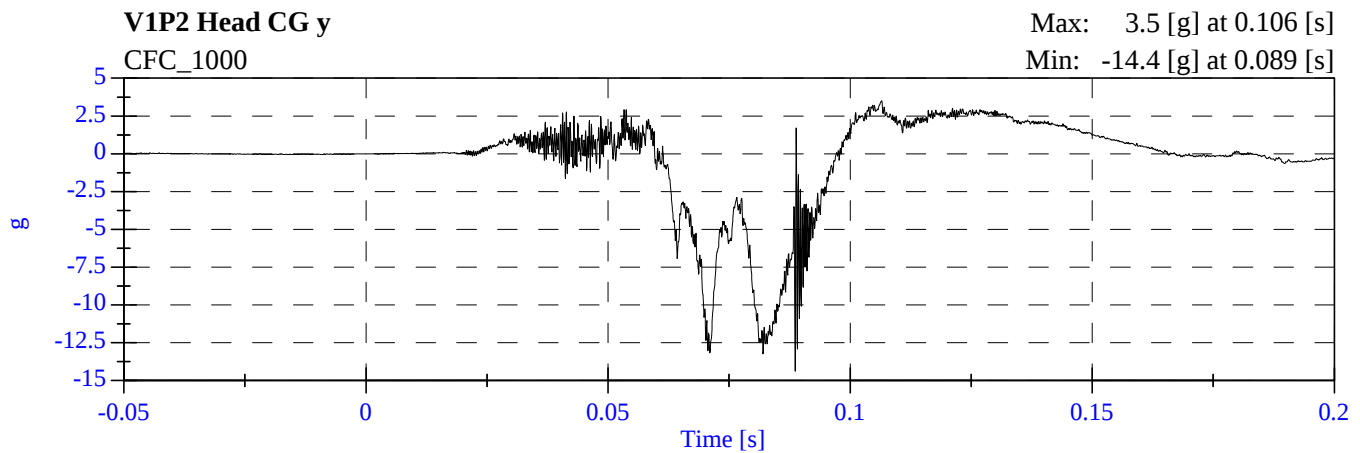
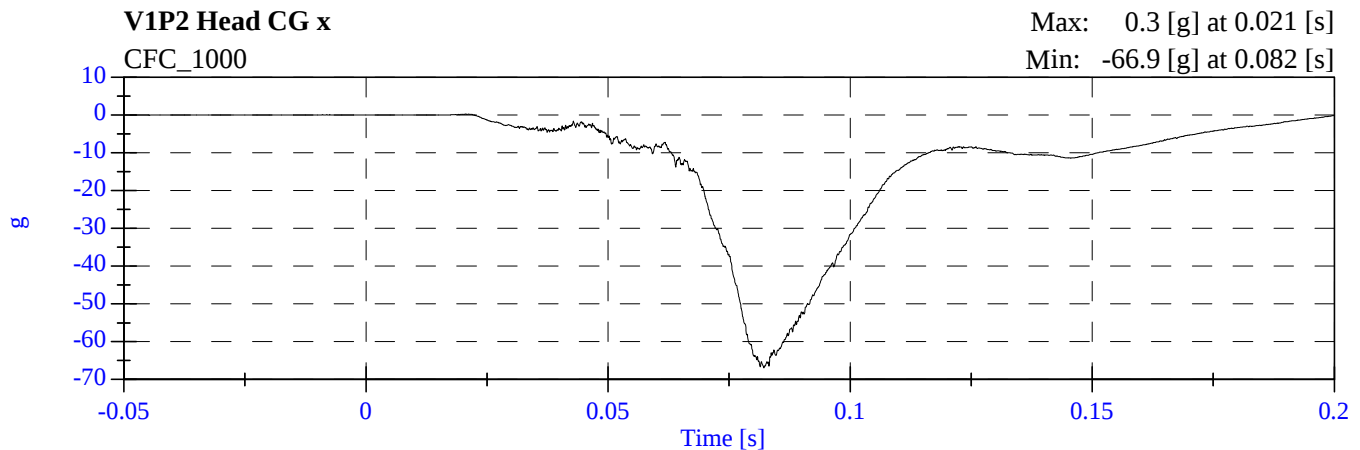
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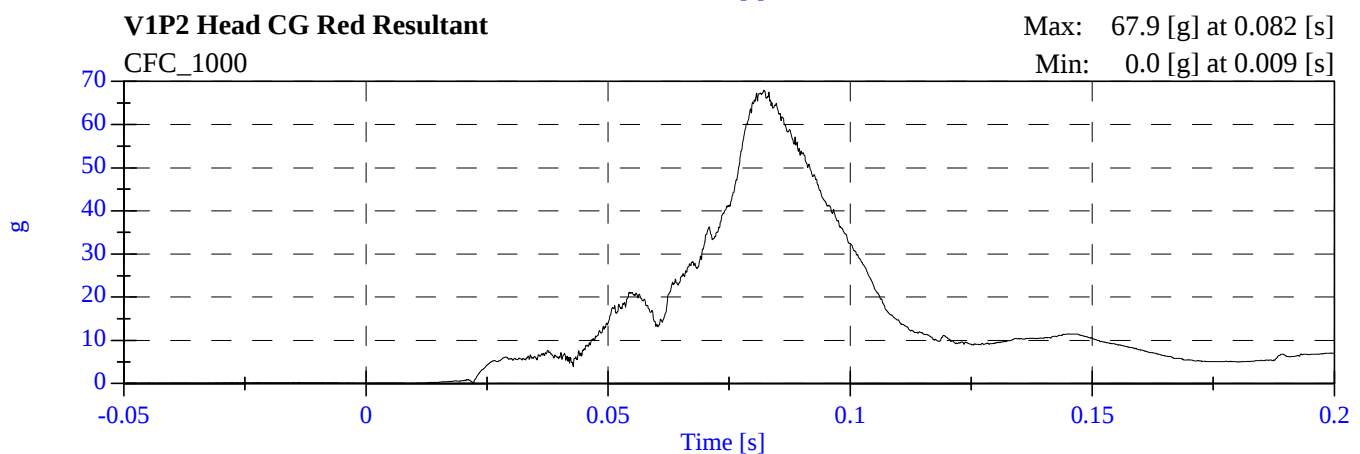
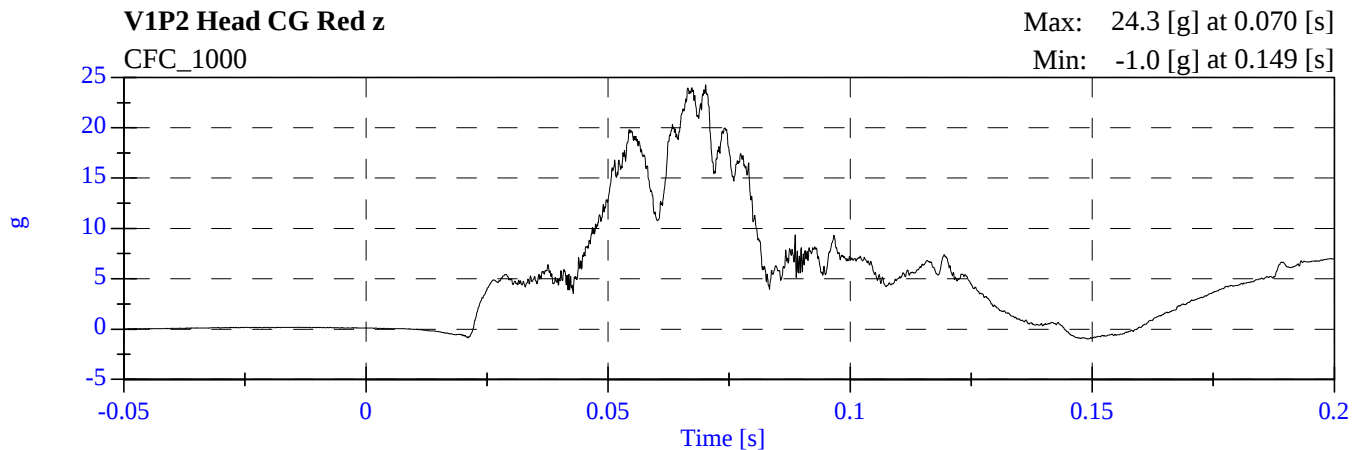
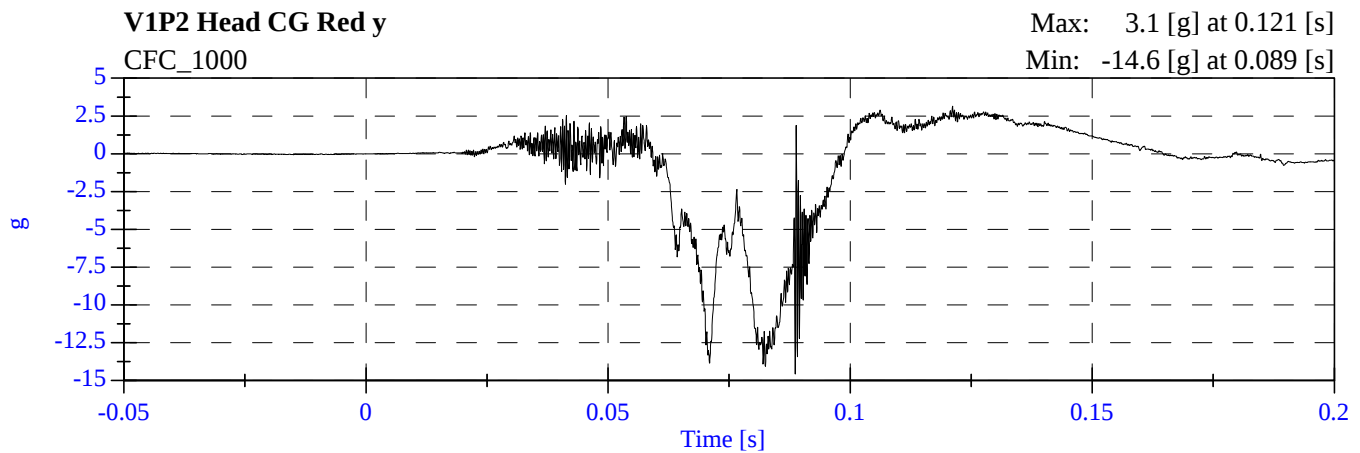
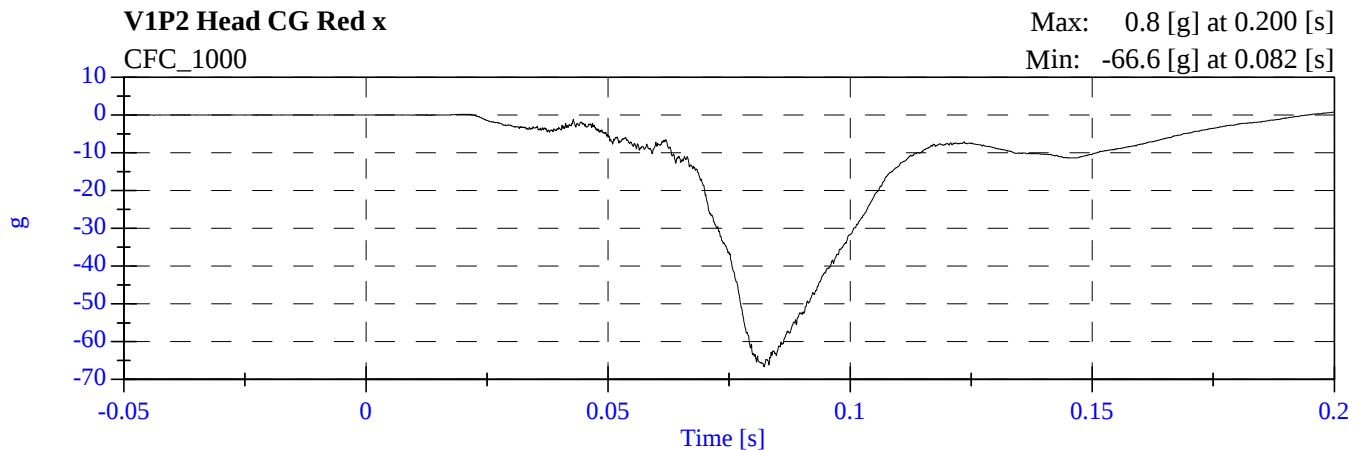
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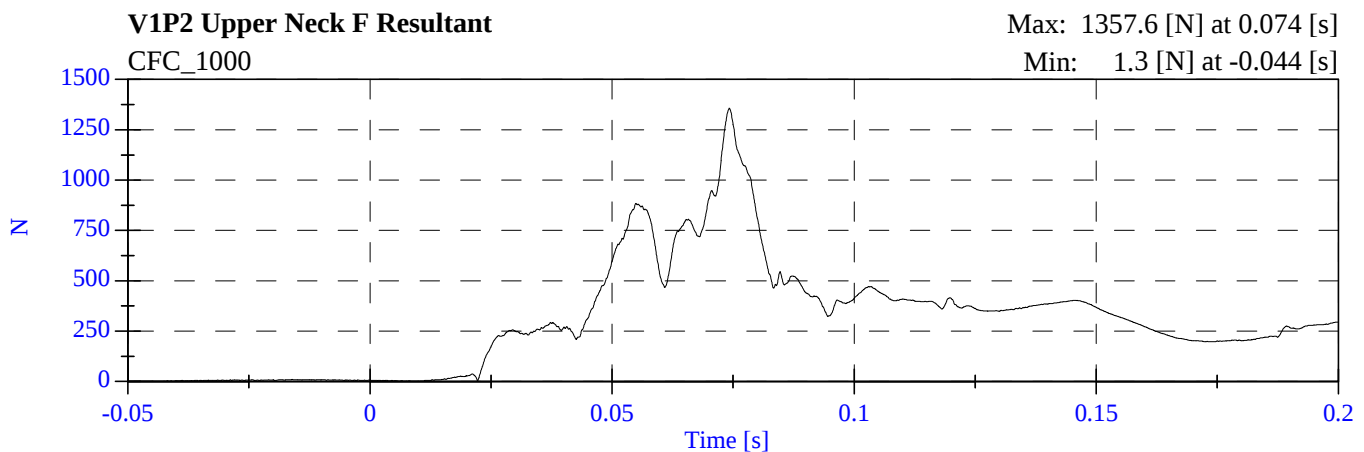
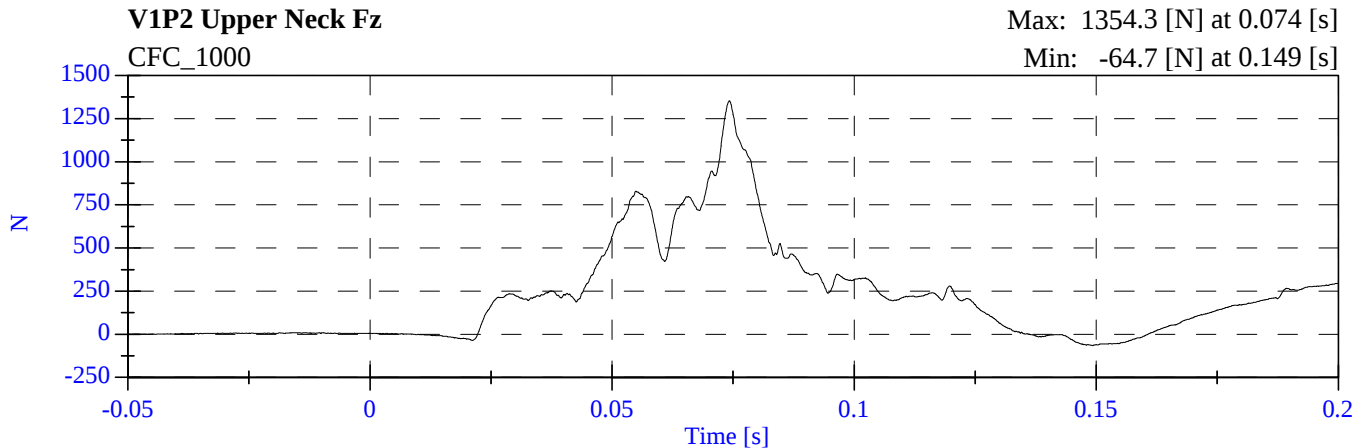
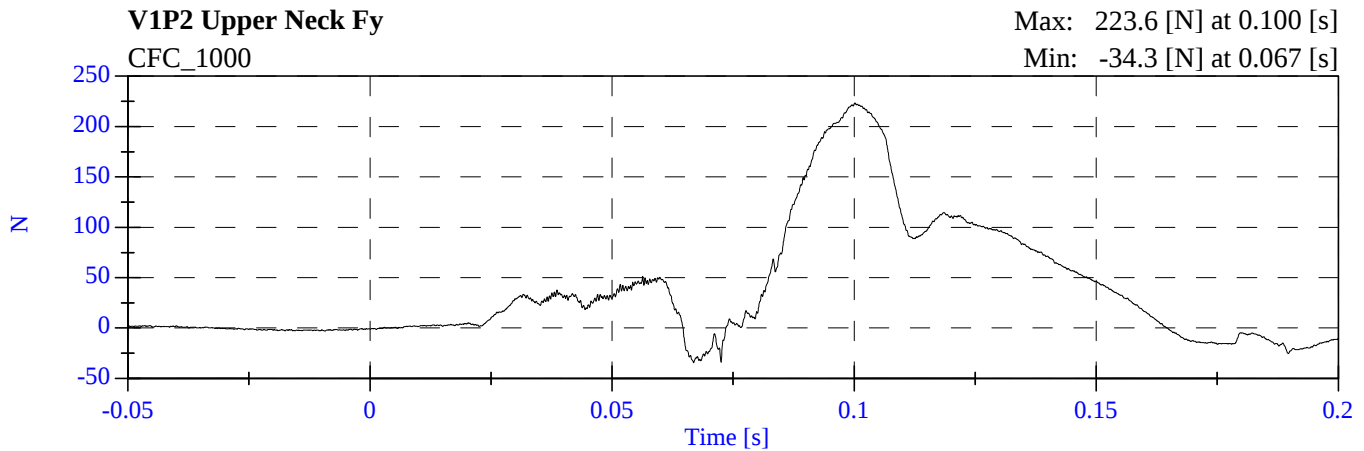
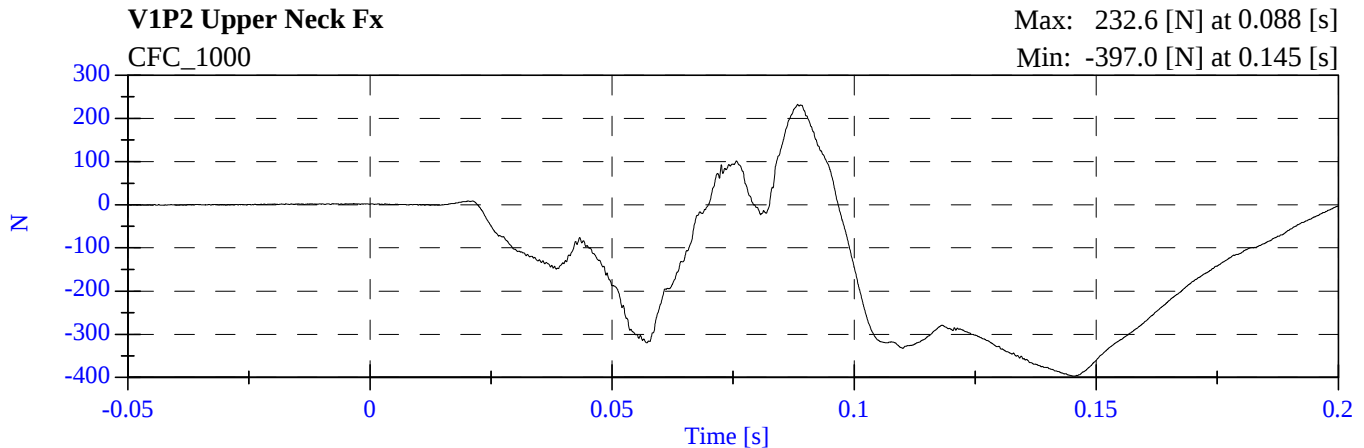
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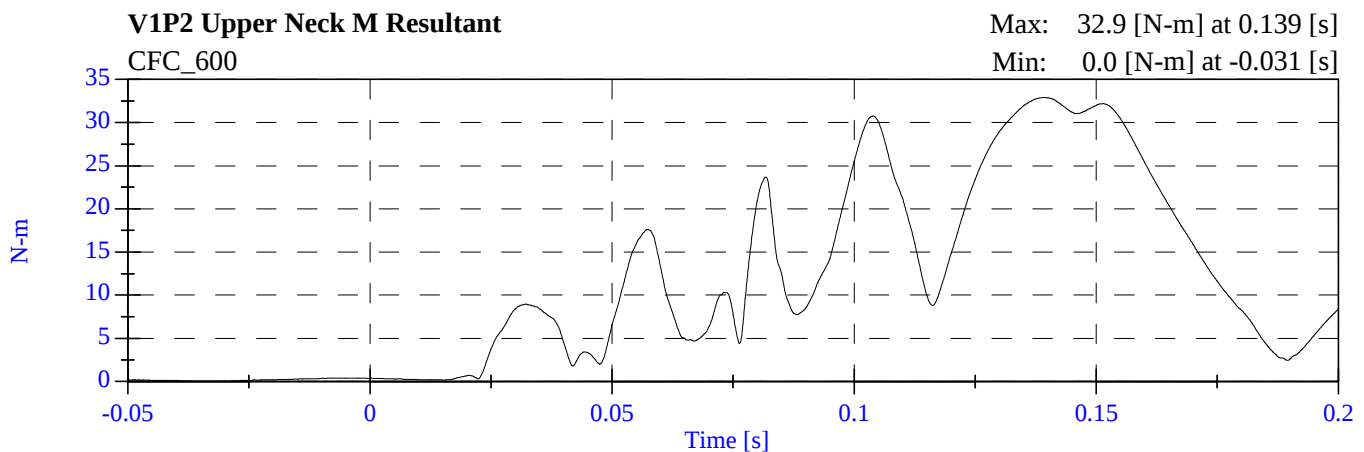
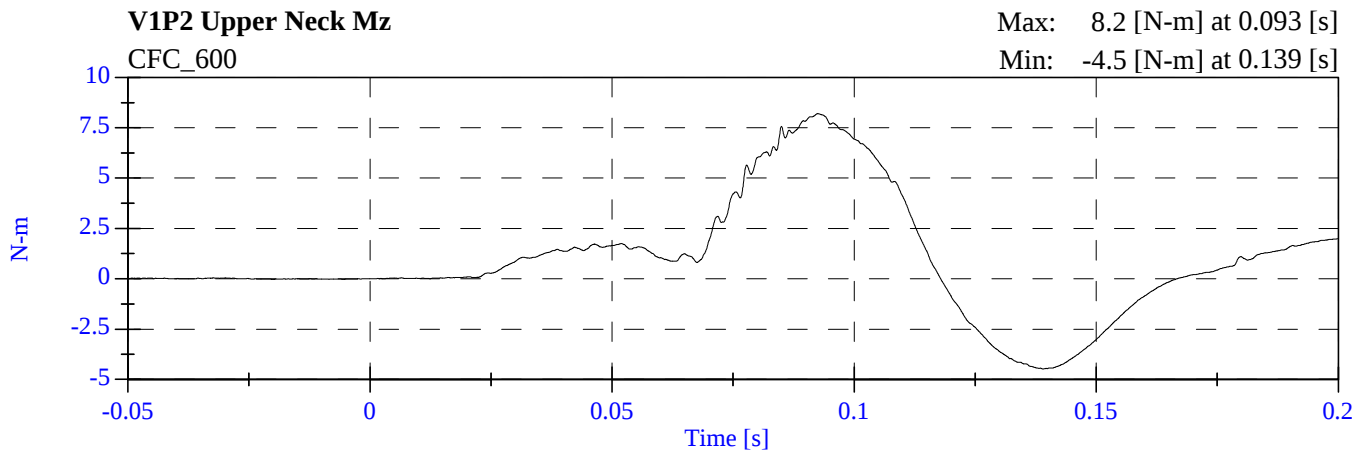
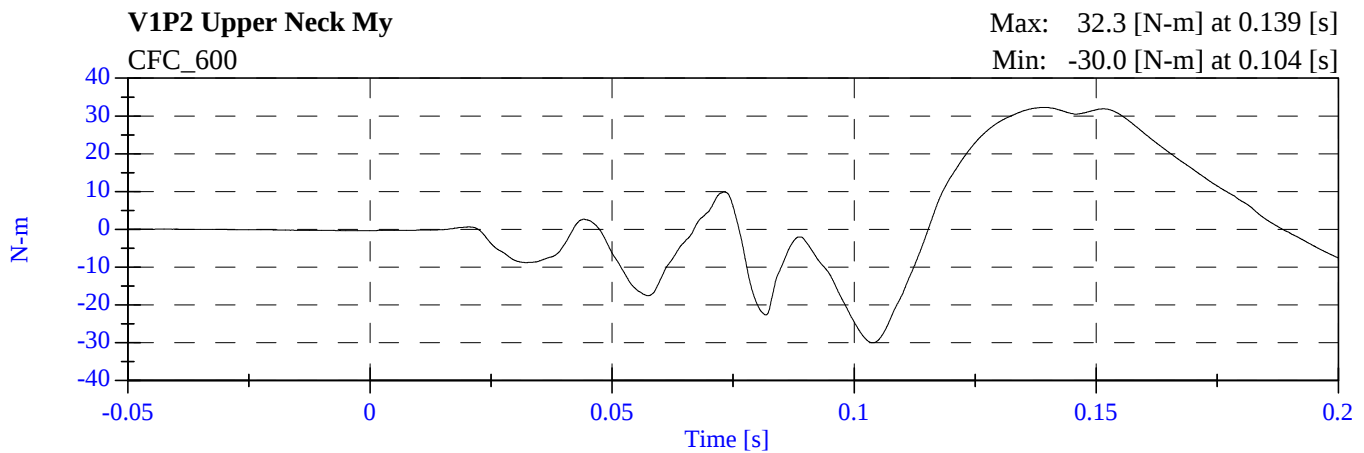
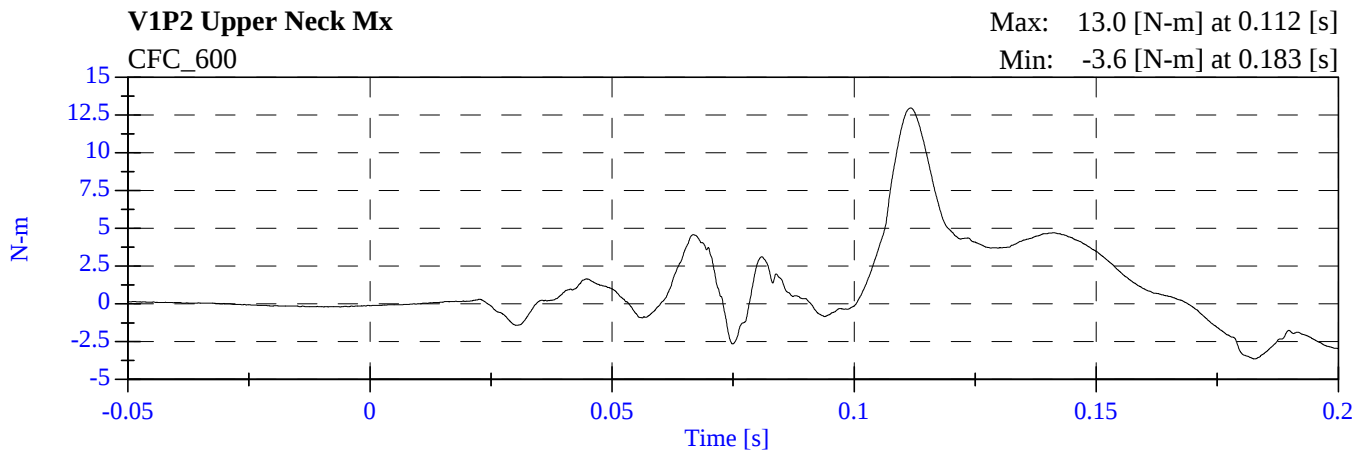
2005 NCAP Test 2 2005 Pontiac G6 M50114 - November 19, 2004



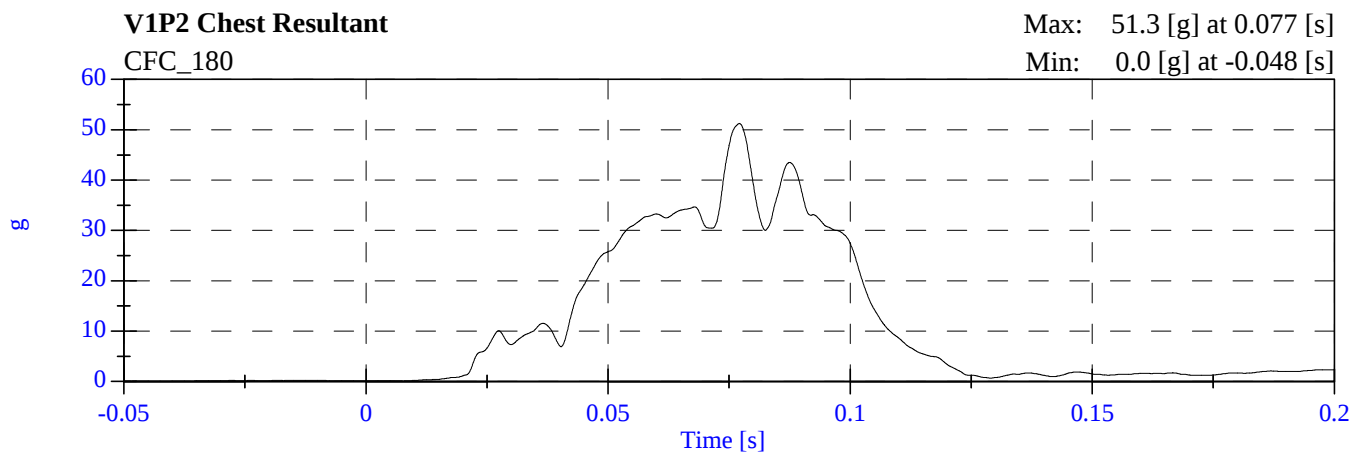
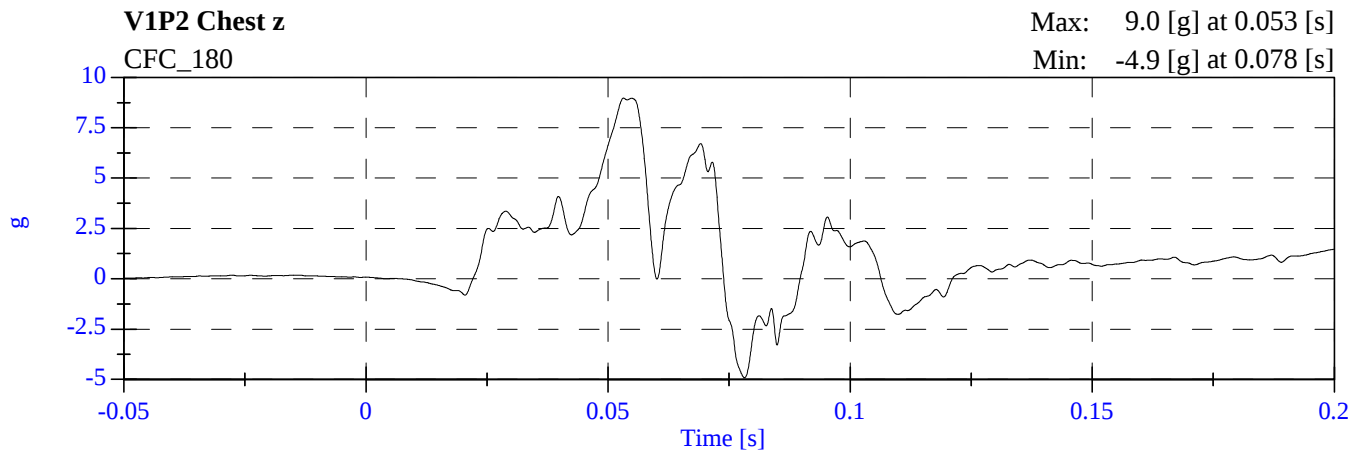
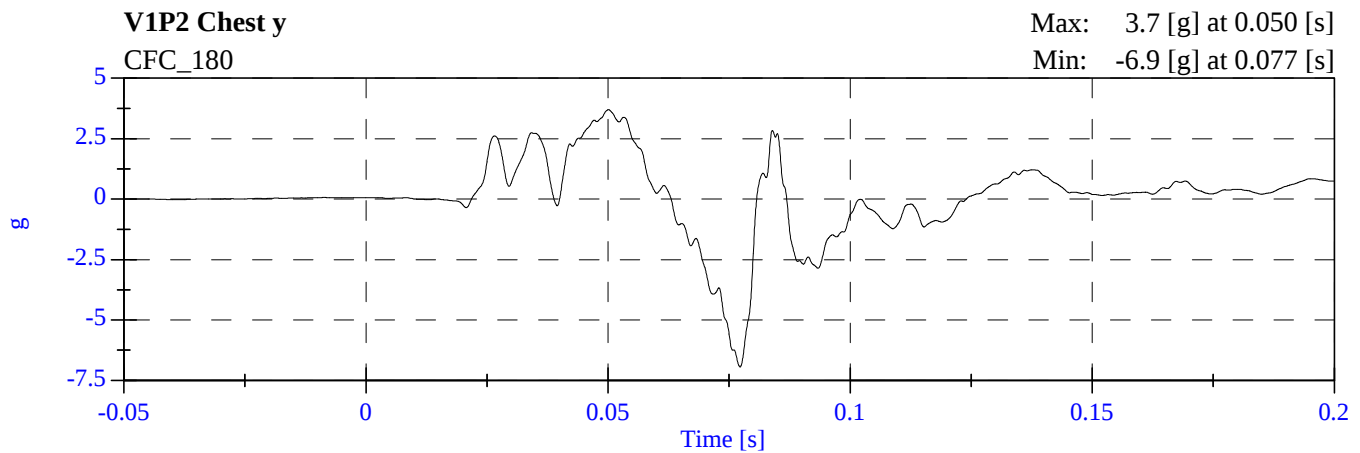
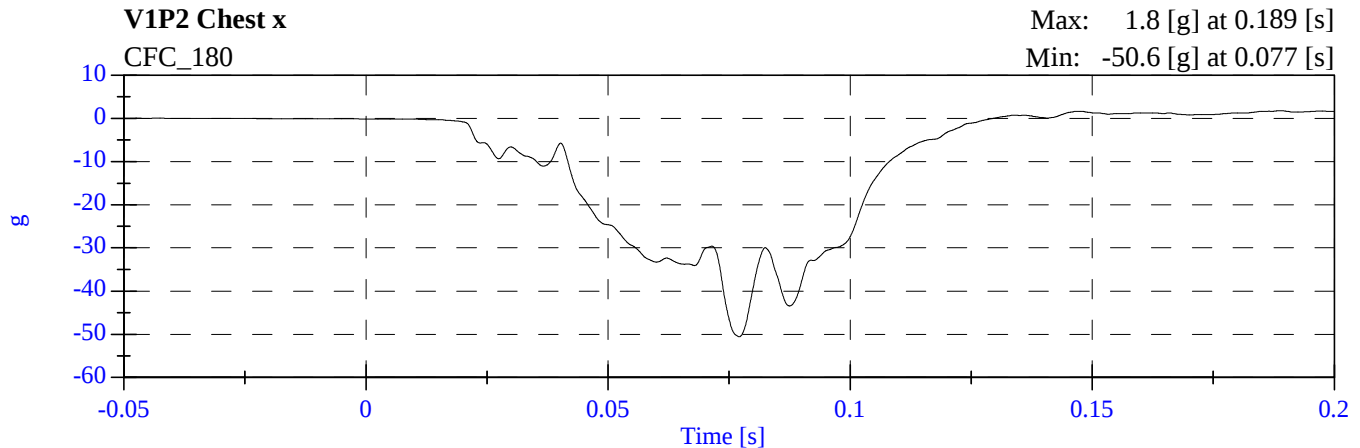
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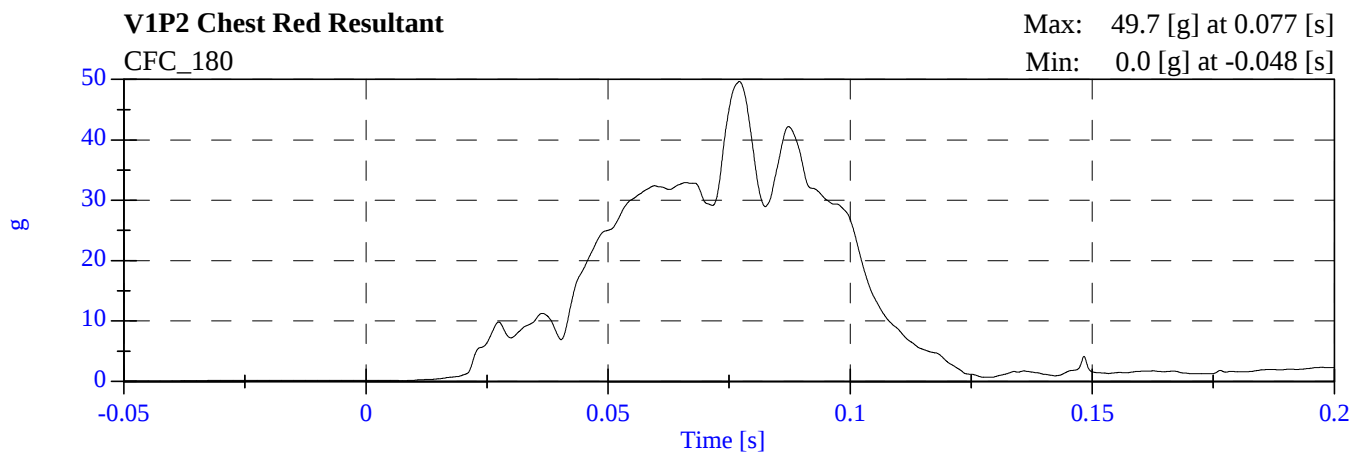
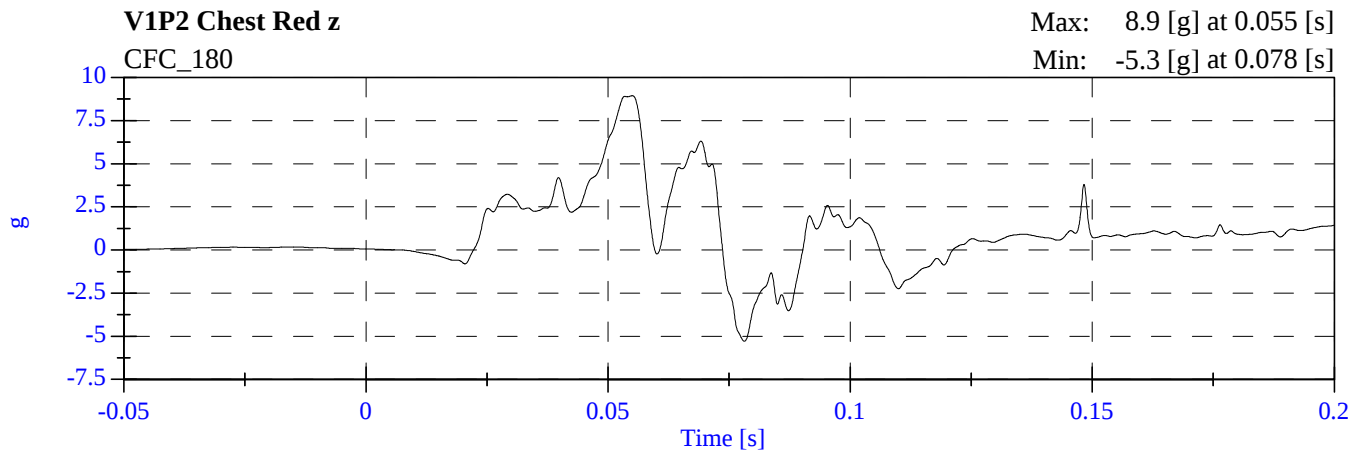
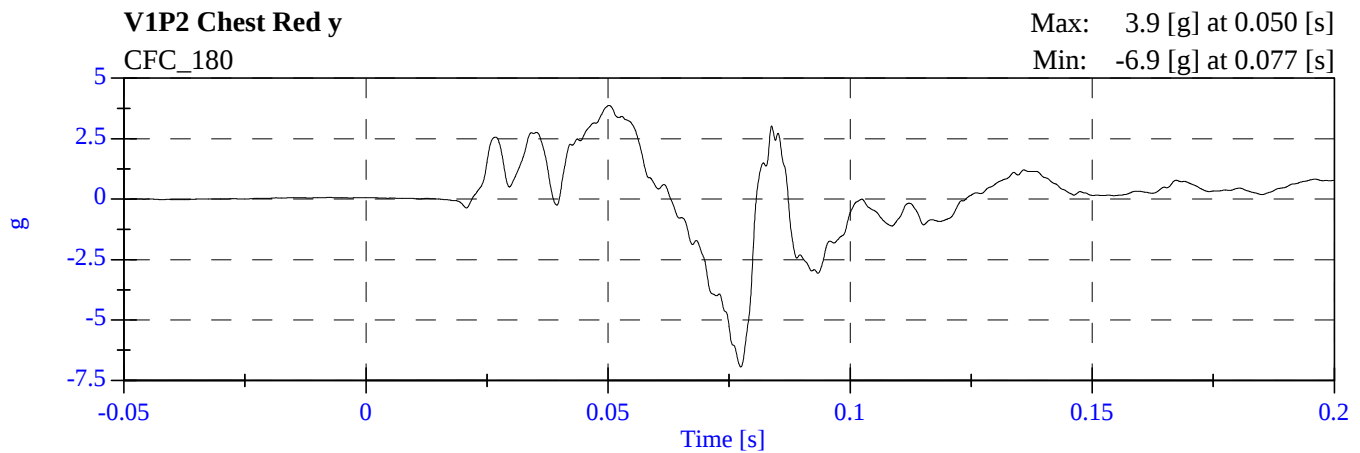
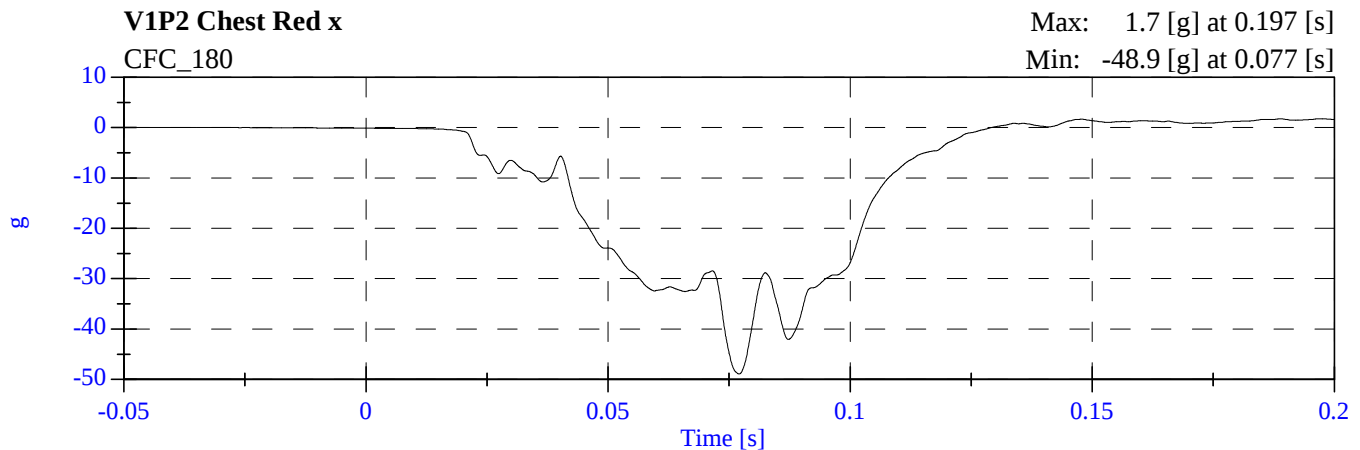
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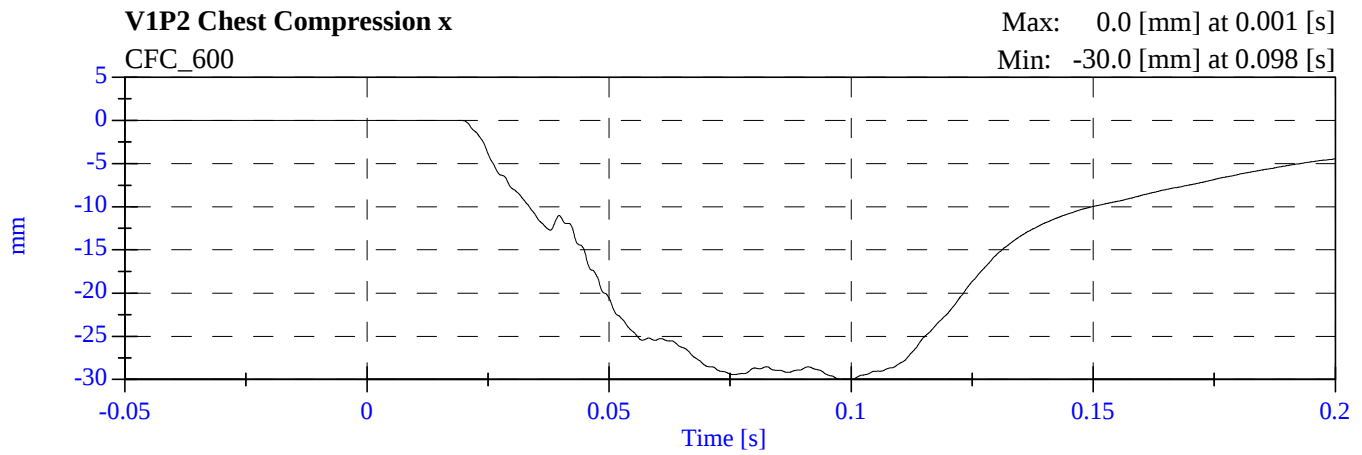
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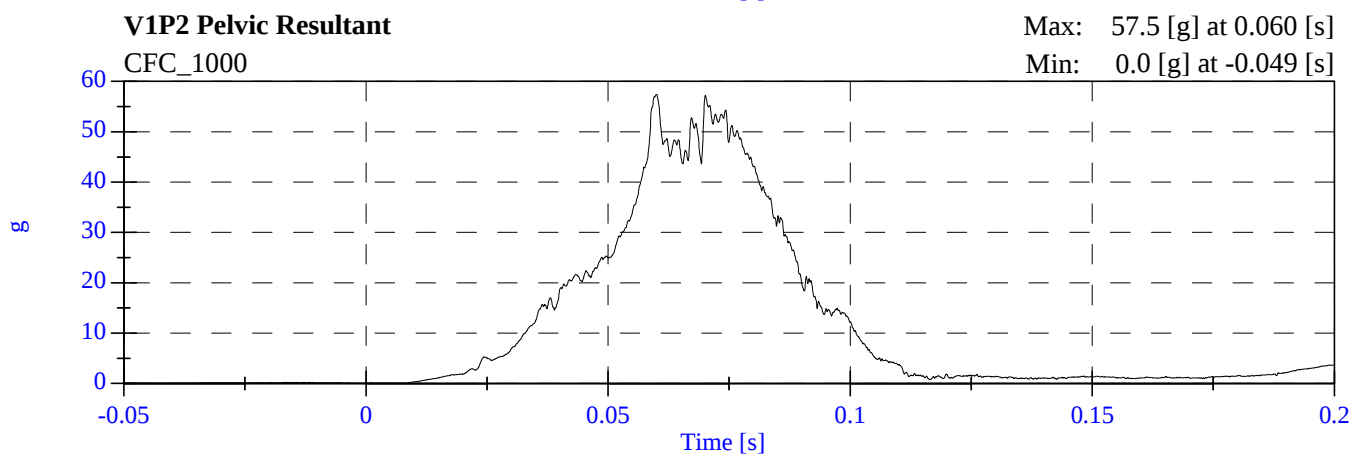
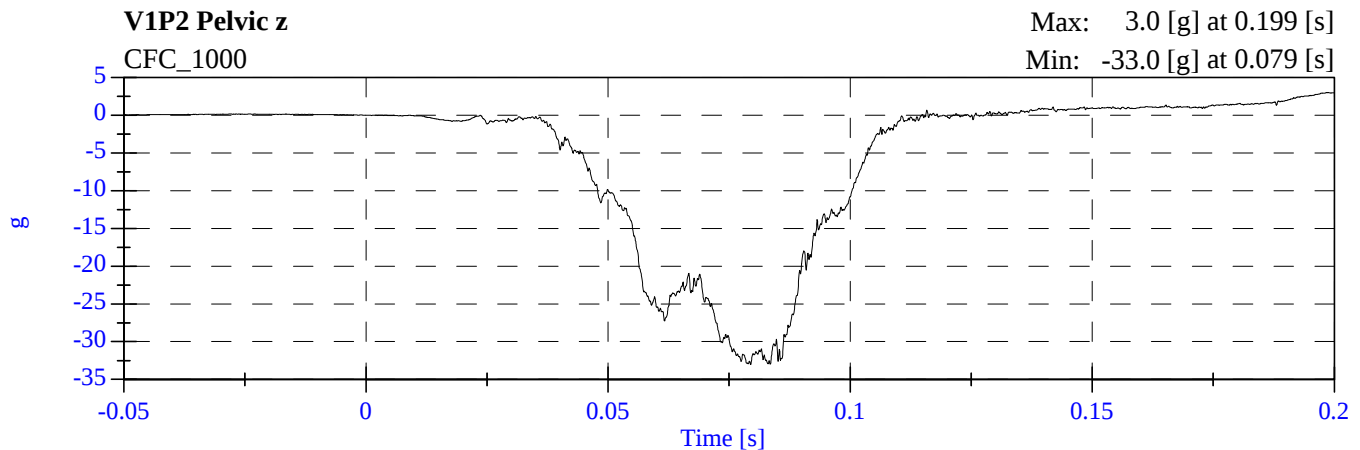
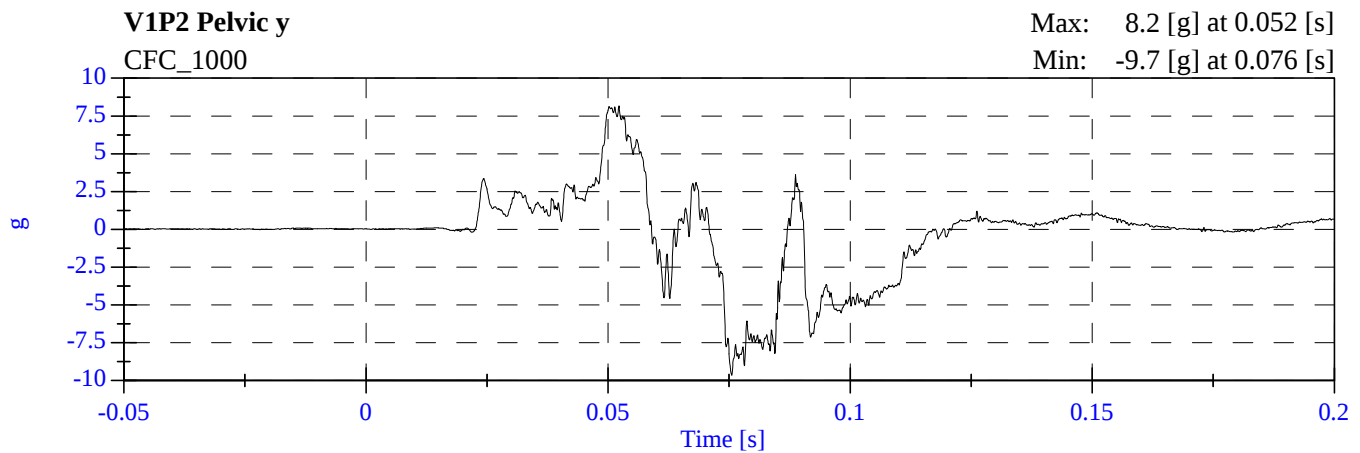
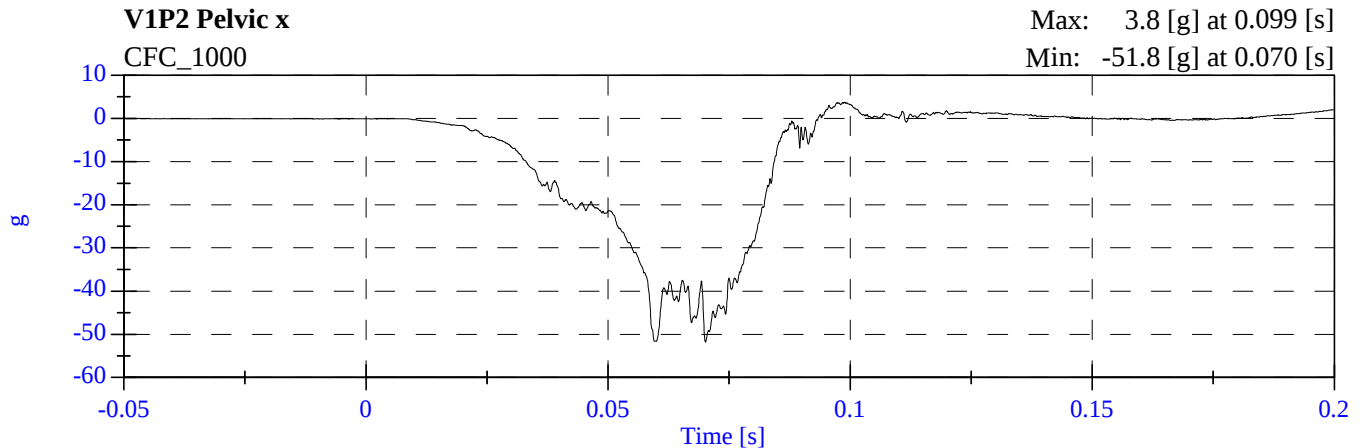
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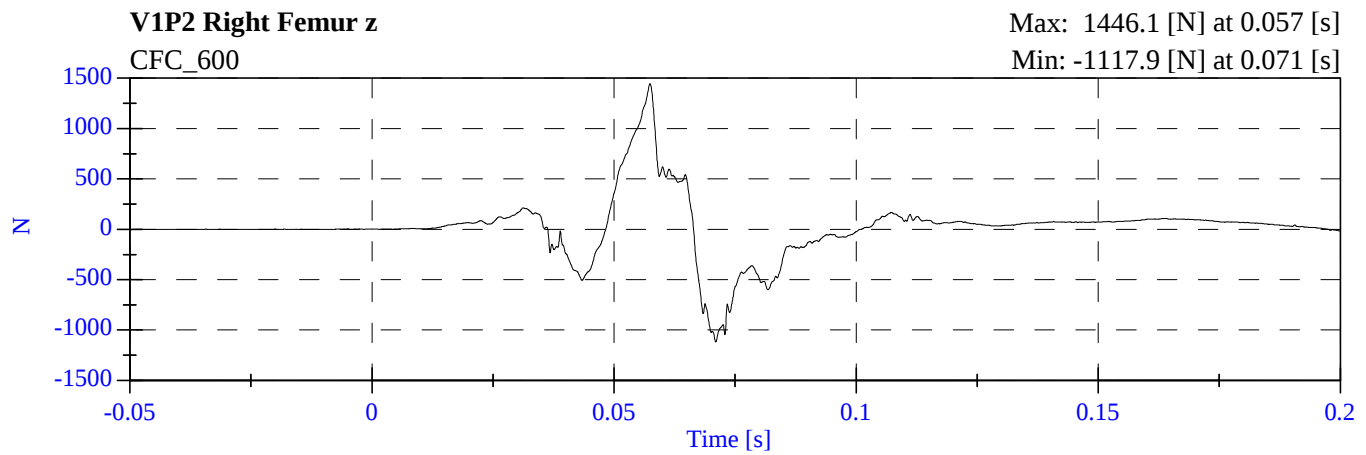
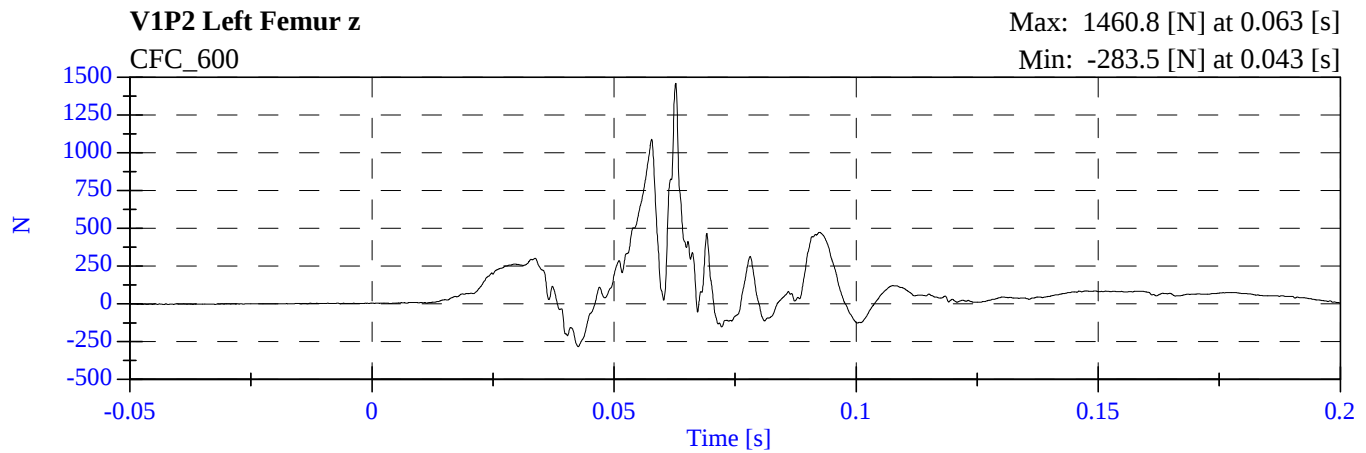
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M50114 - November 19, 2004**



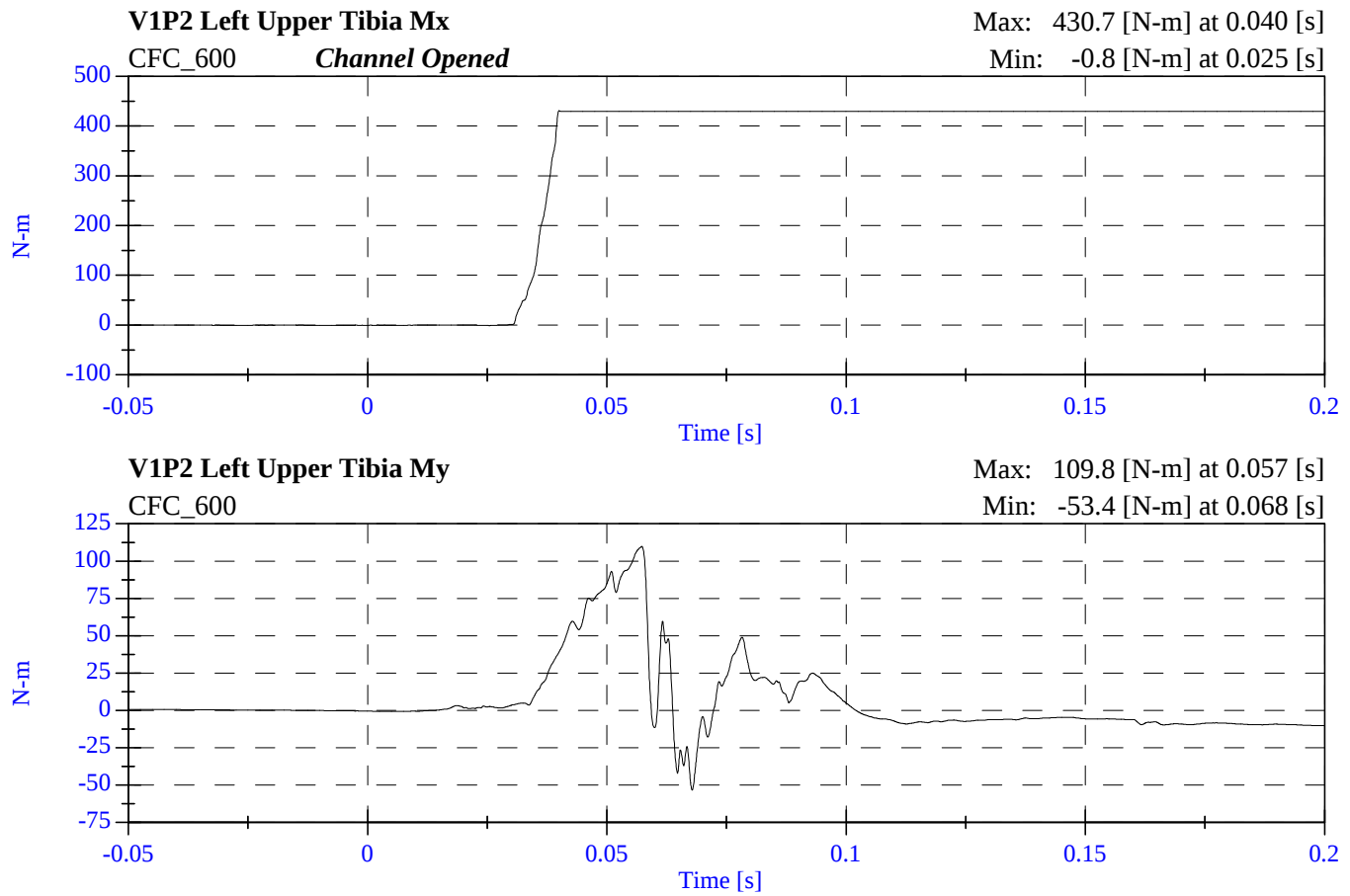
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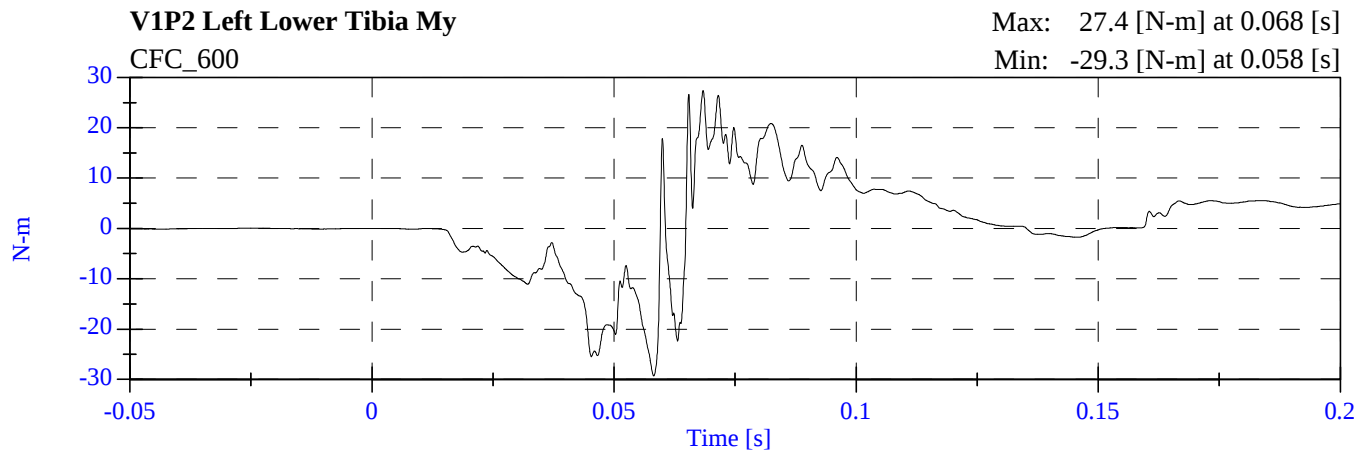
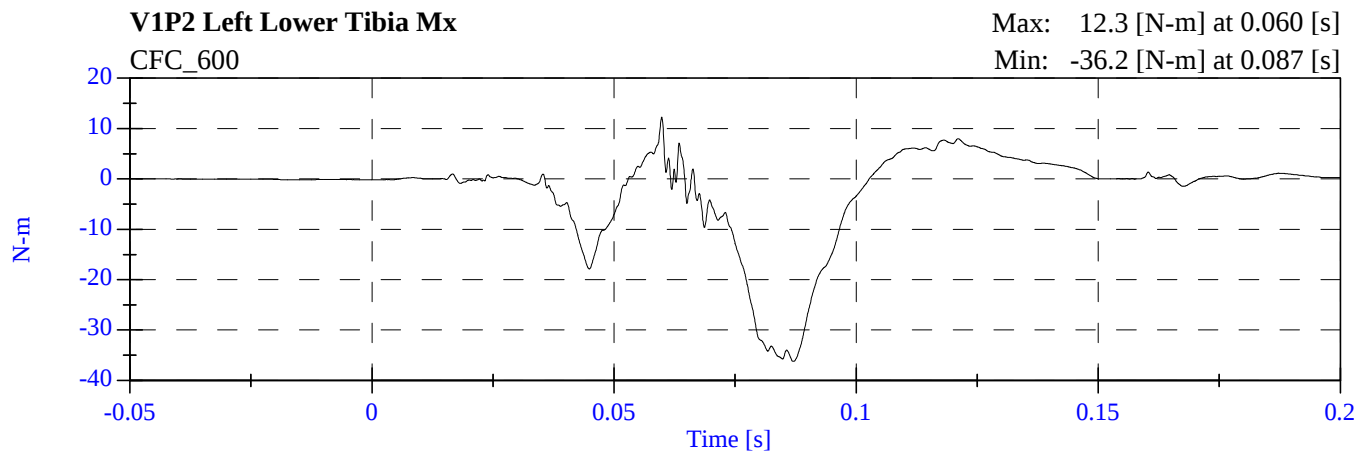
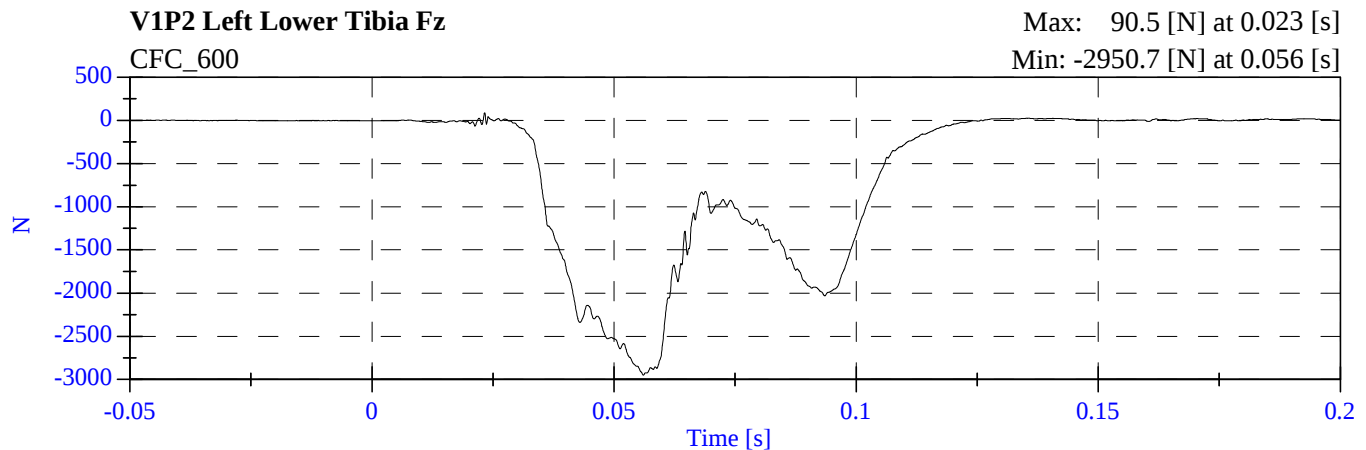
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M50114 - November 19, 2004**



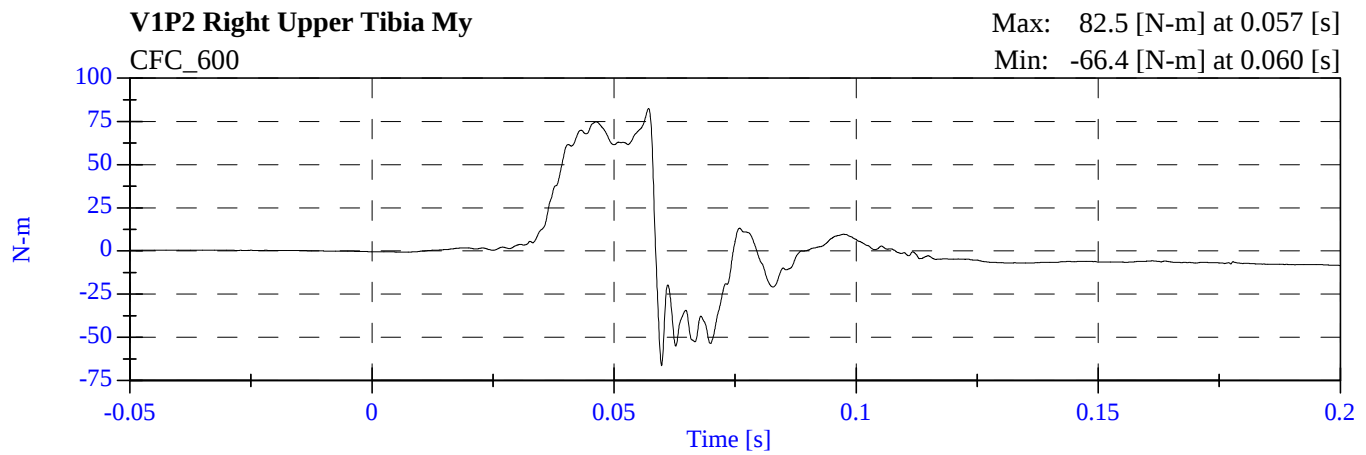
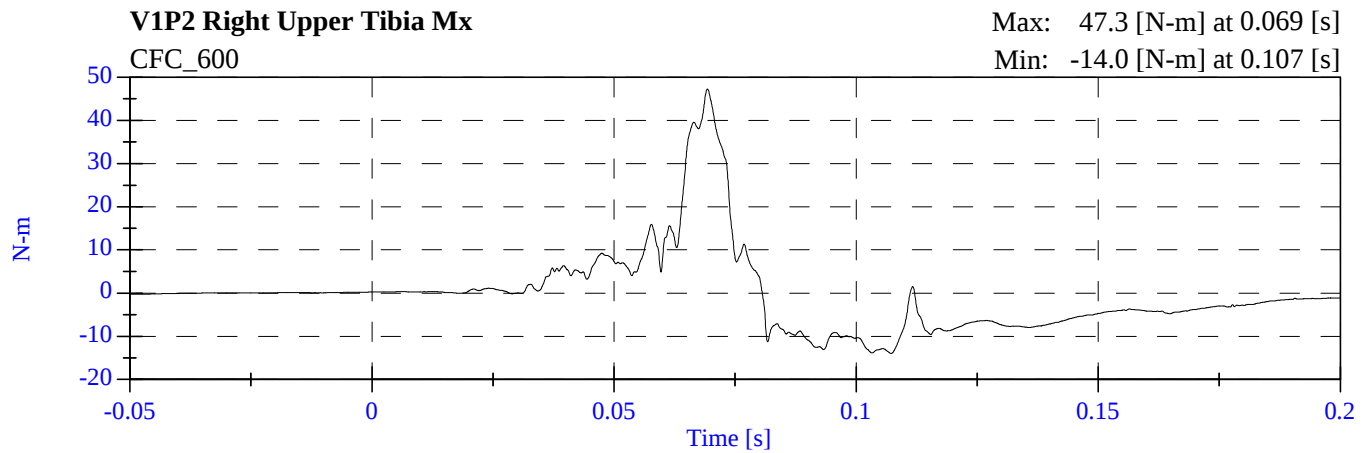
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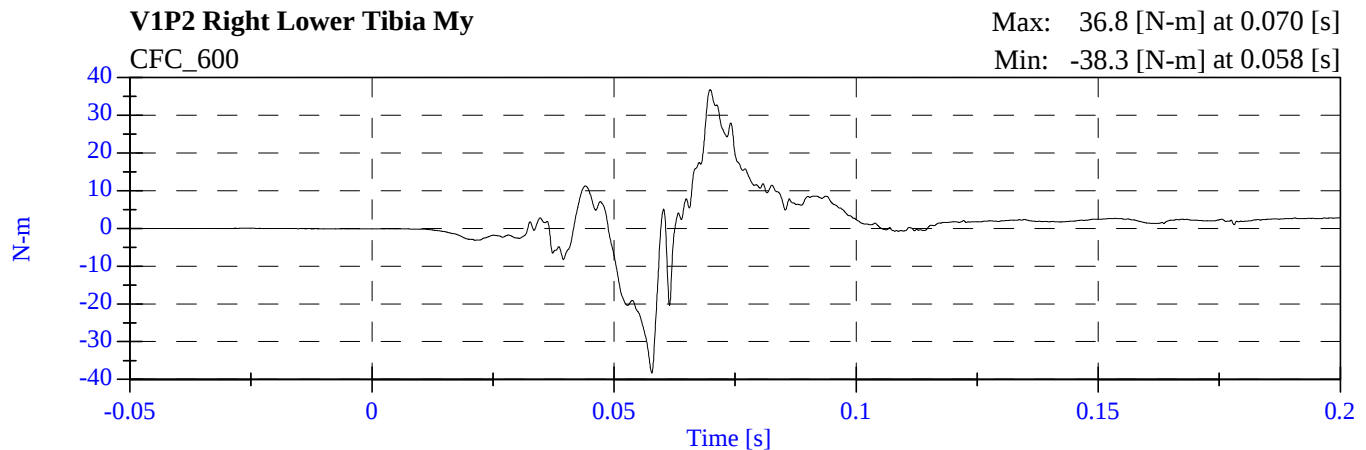
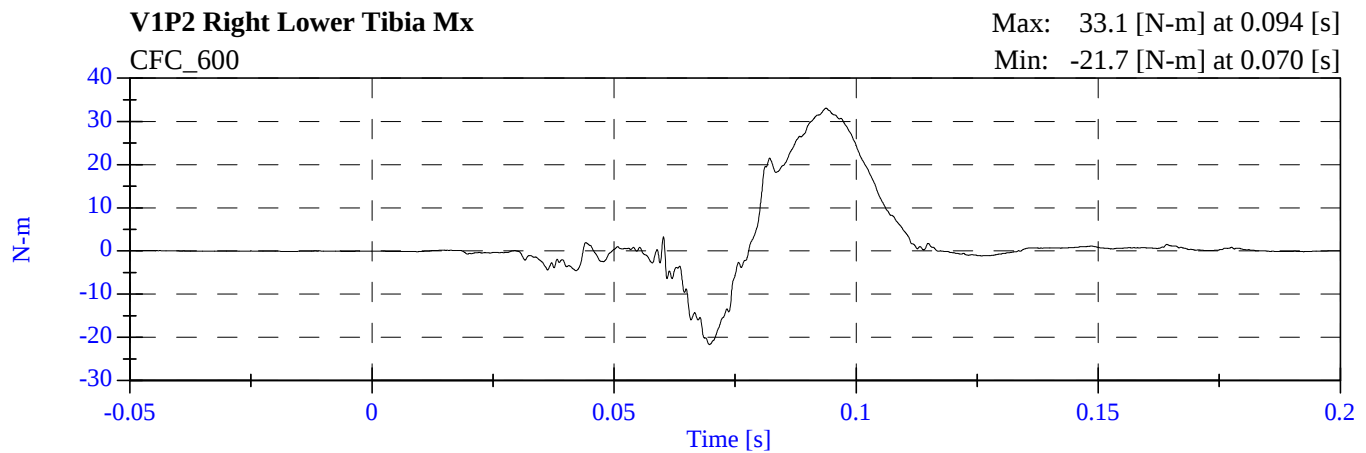
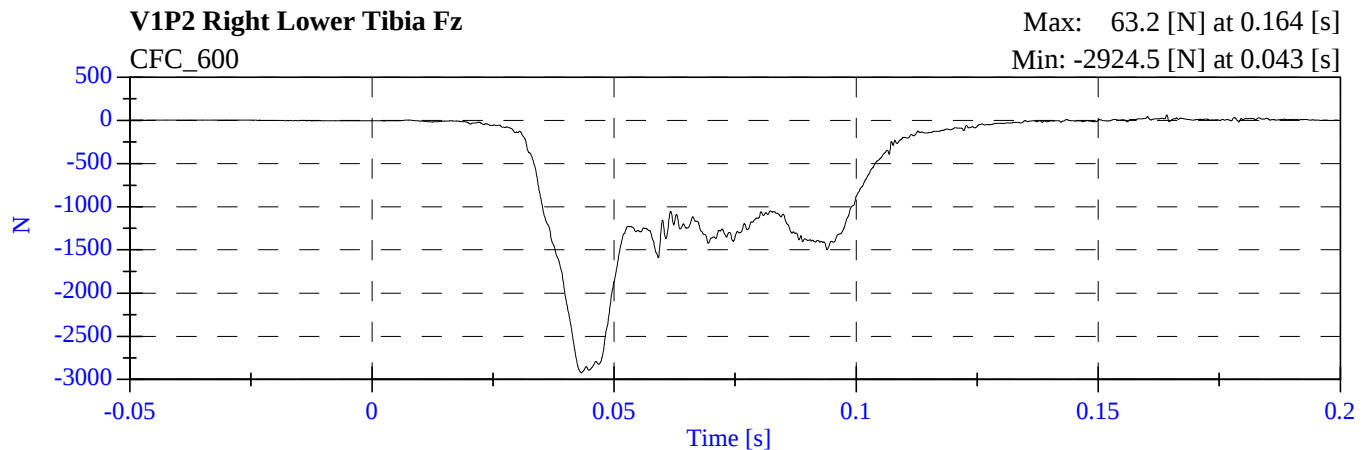
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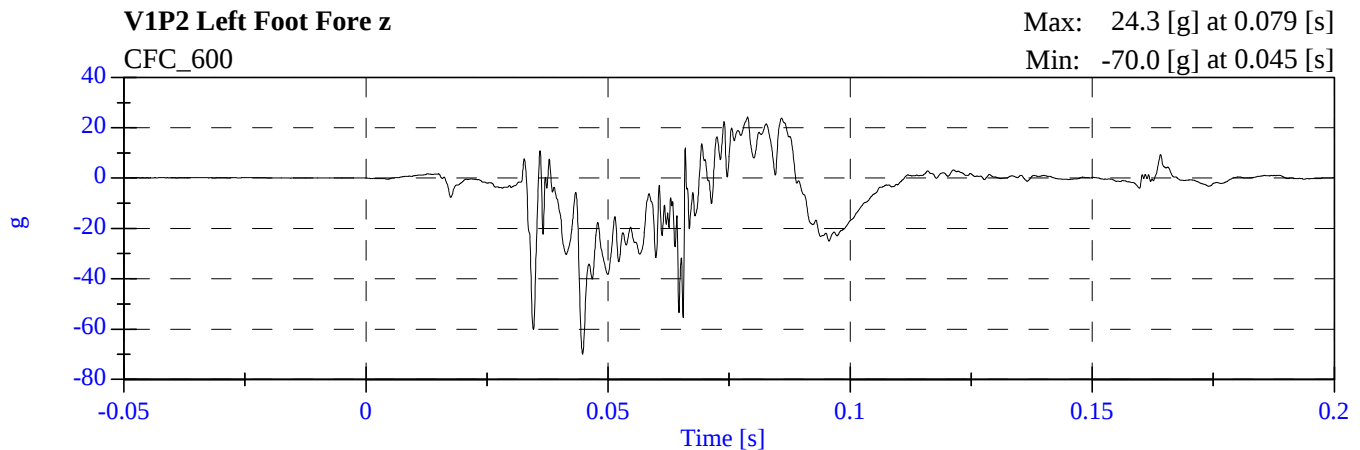
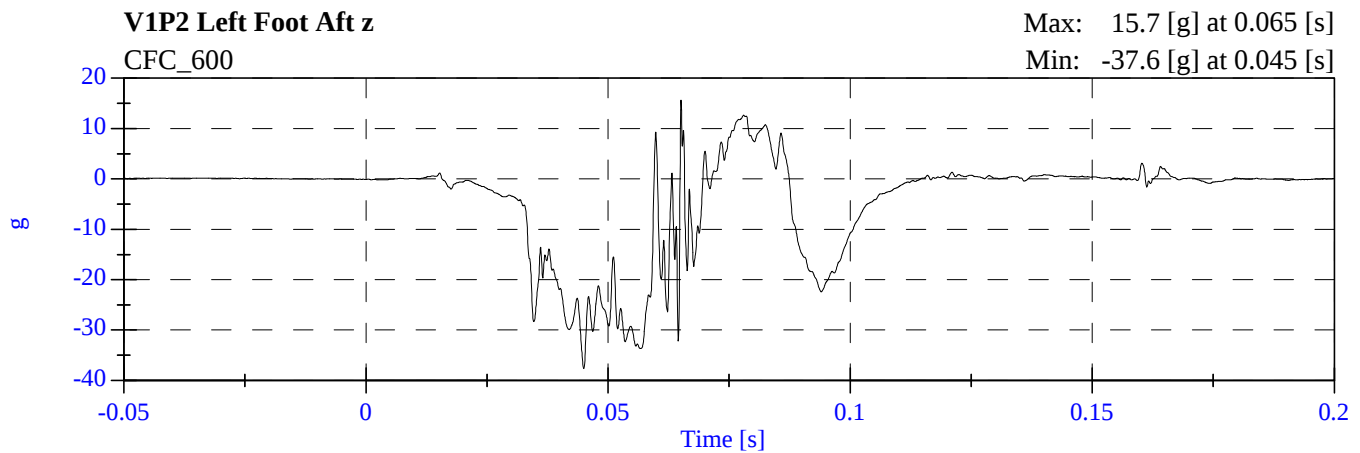
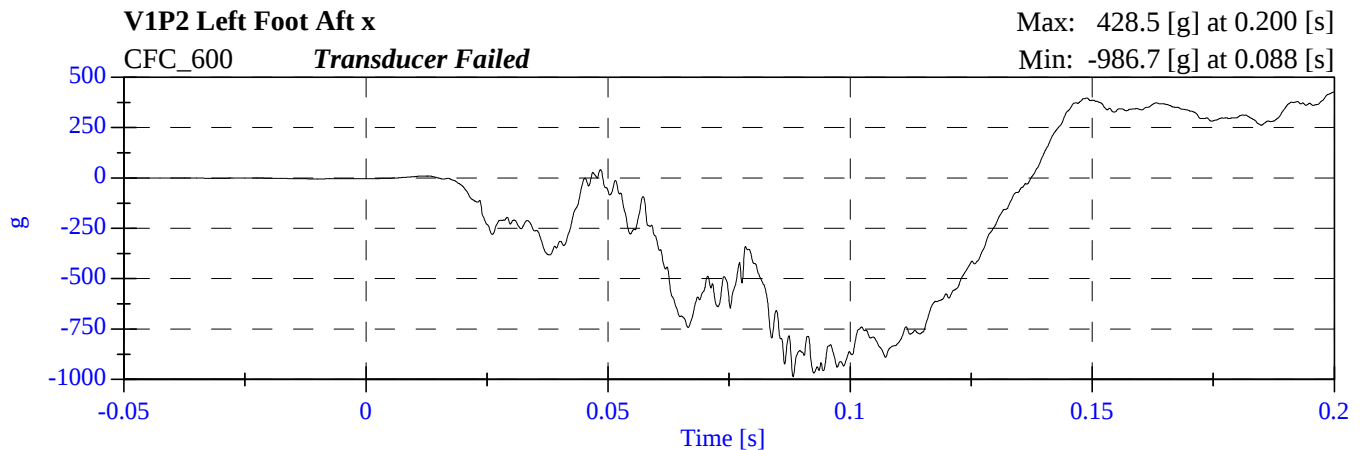
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M50114 - November 19, 2004**



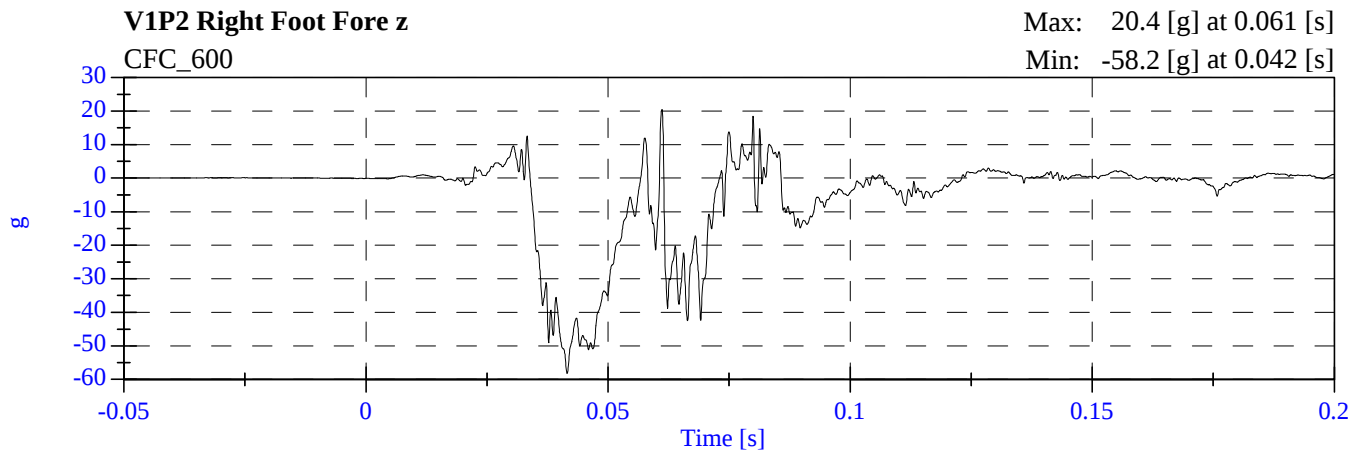
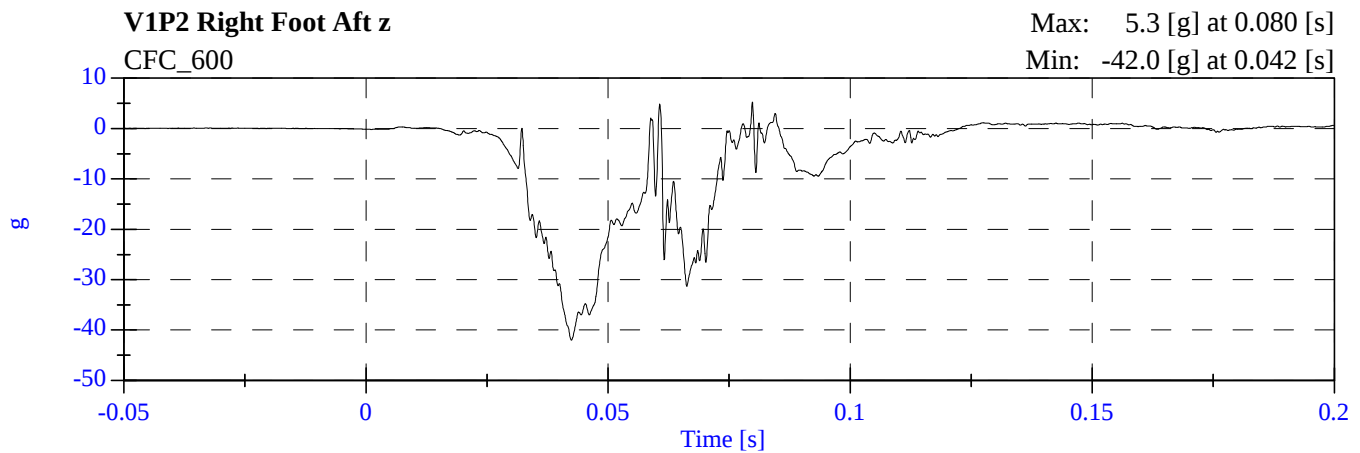
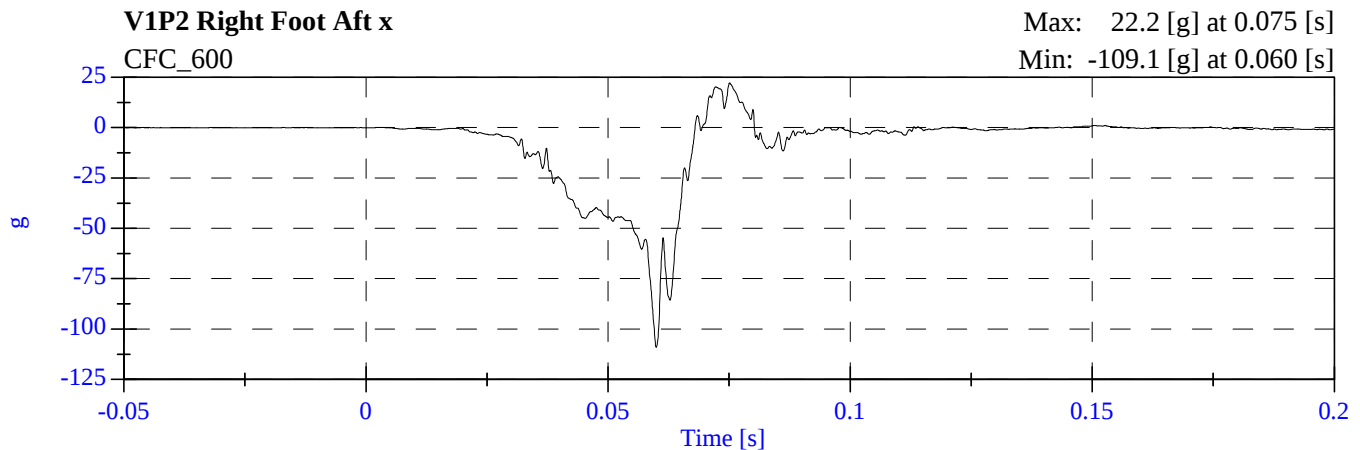
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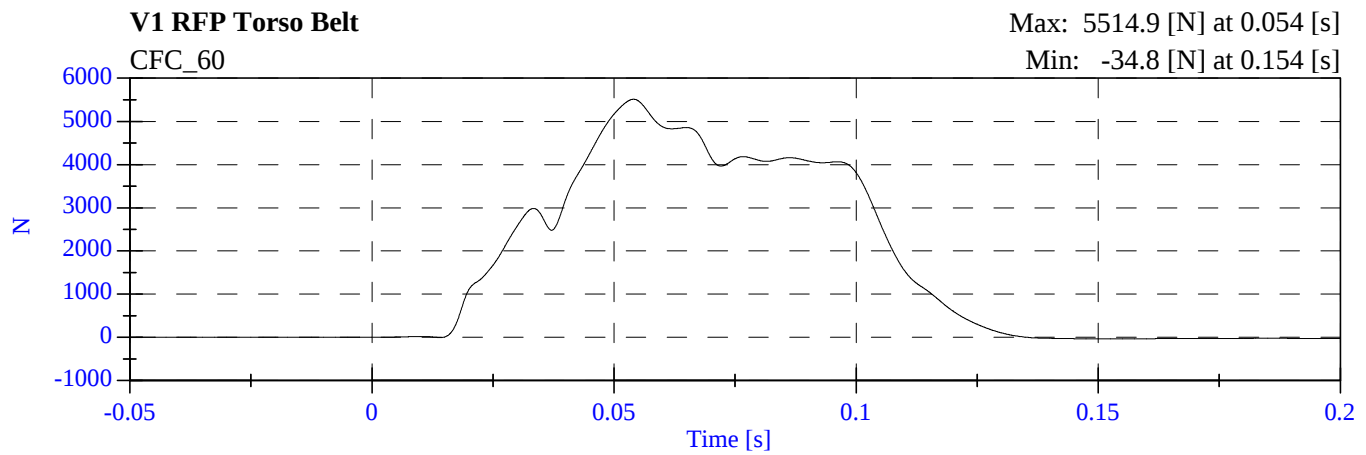
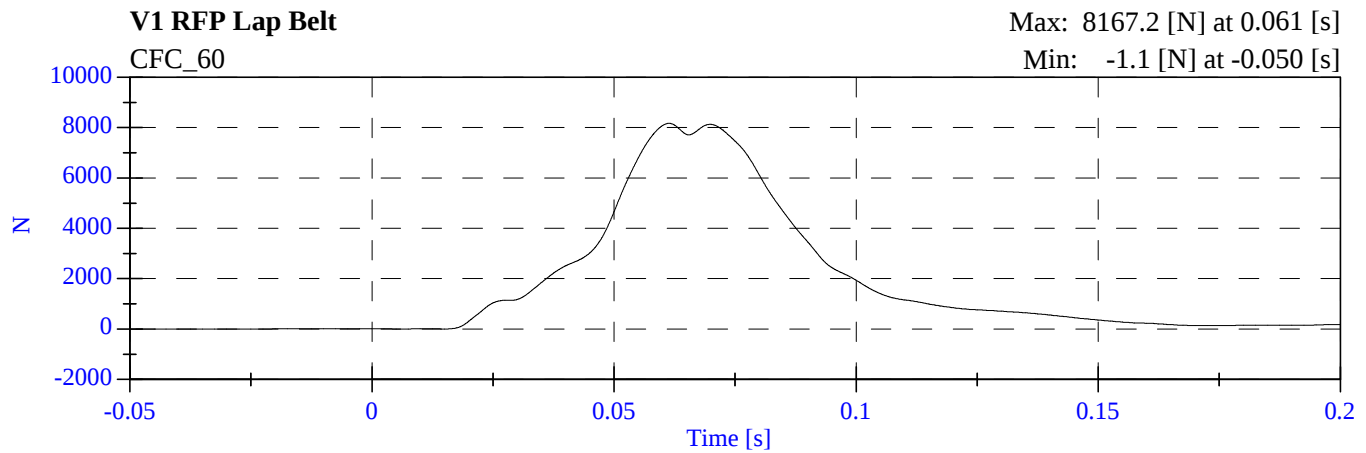
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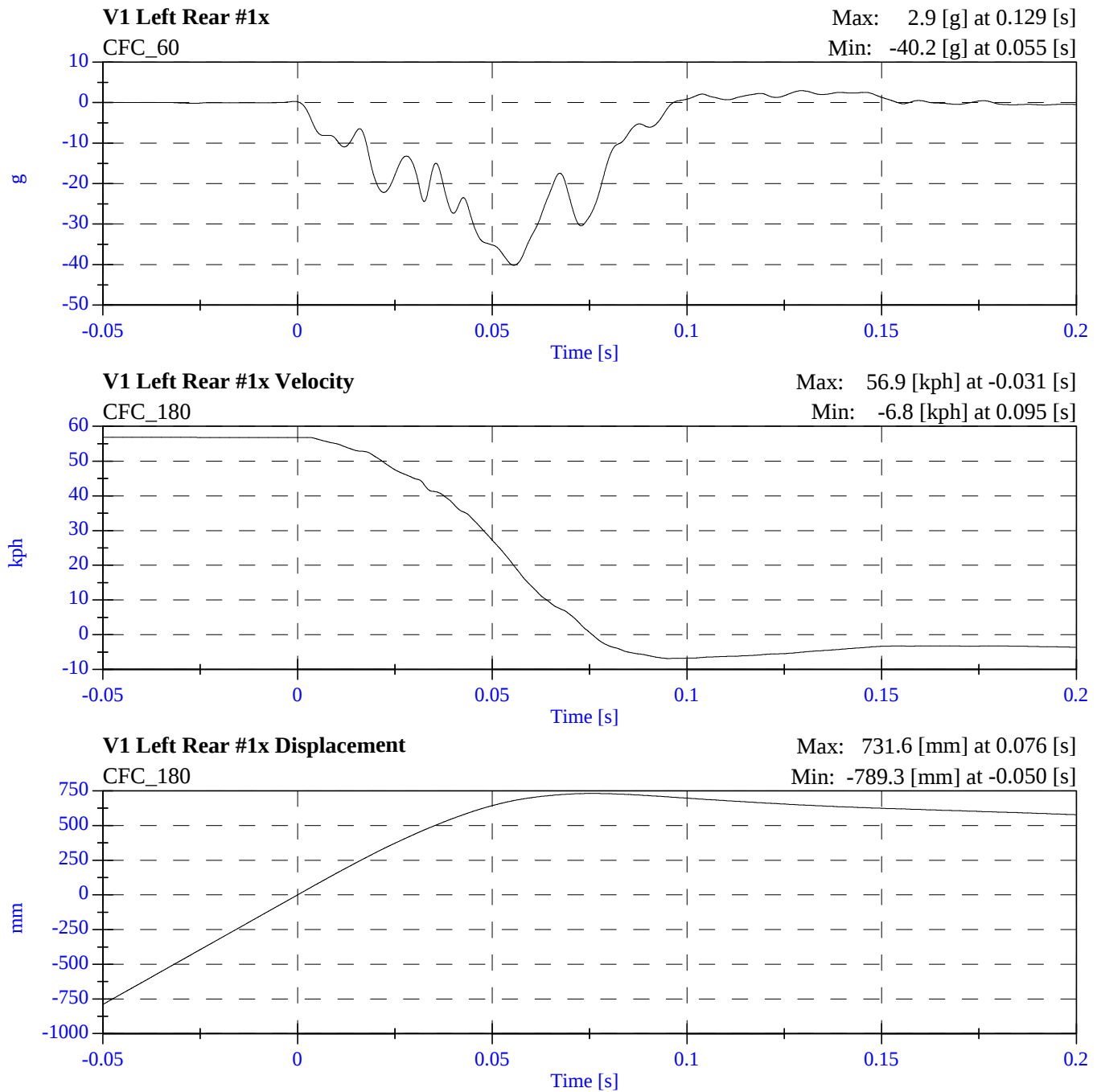
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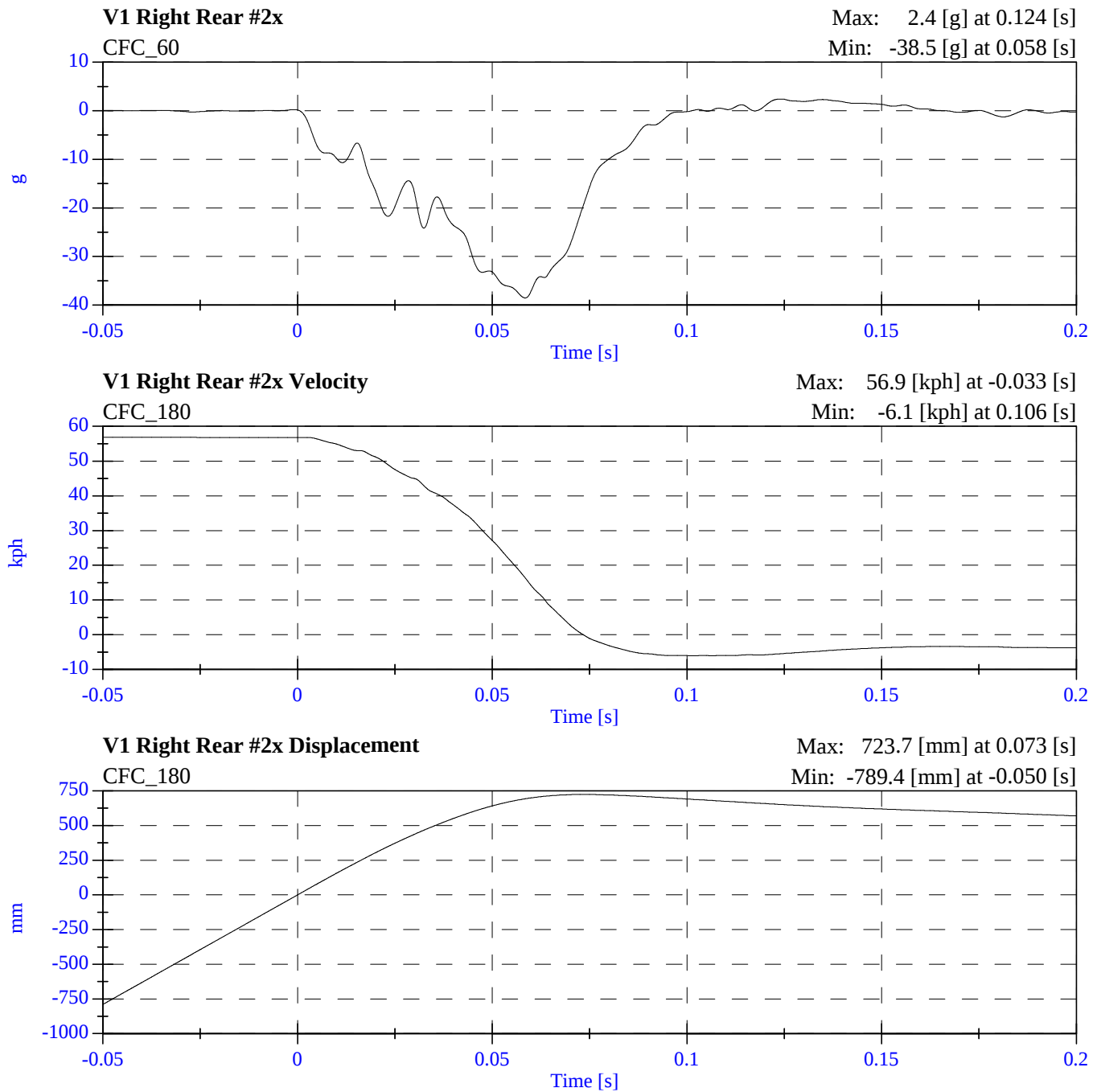
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M50114 - November 19, 2004**



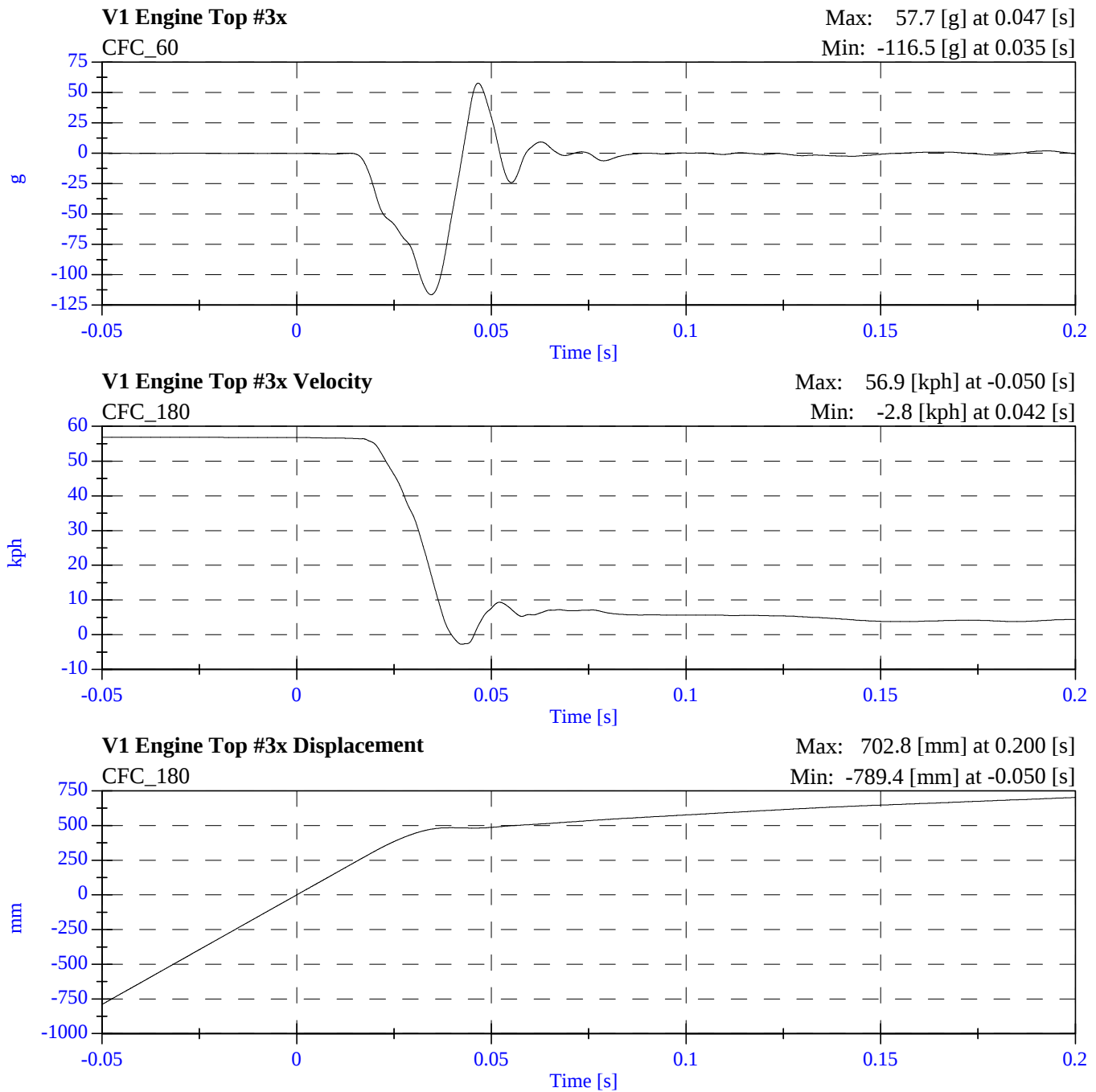
2005 NCAP Test 2 2005 Pontiac G6 M50114 - November 19, 2004



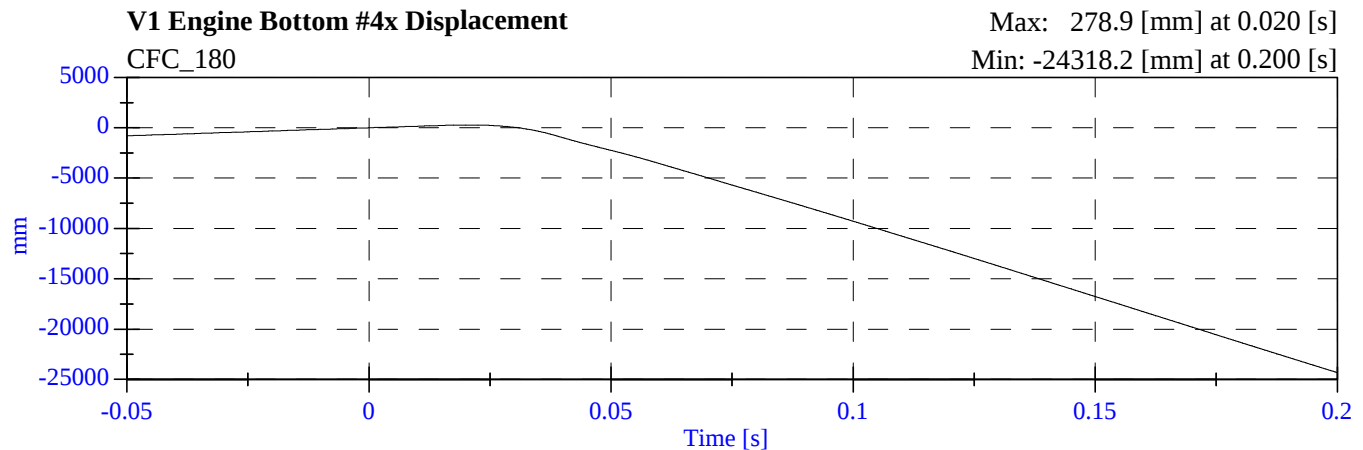
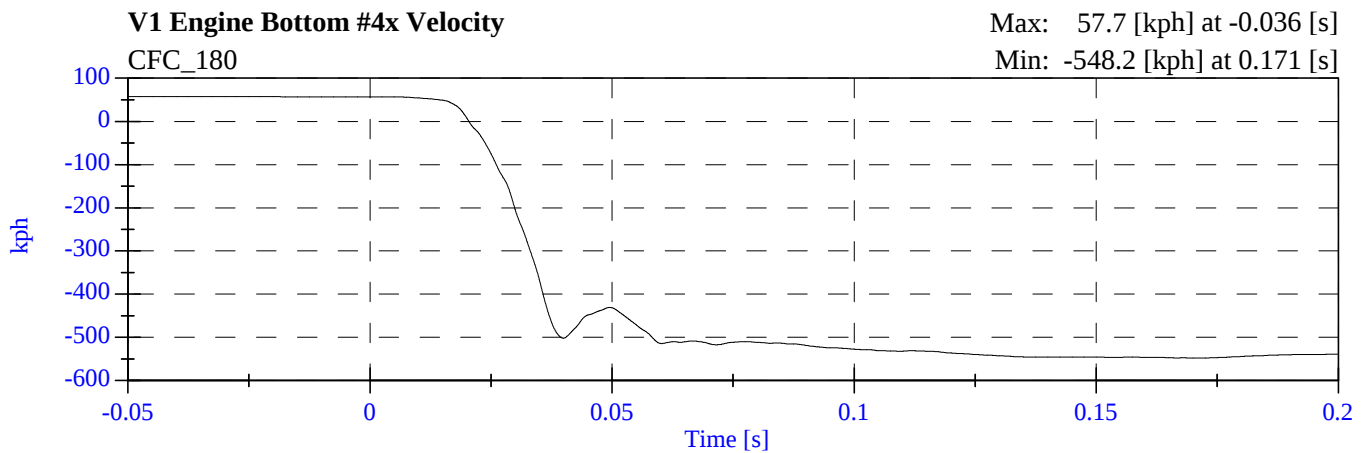
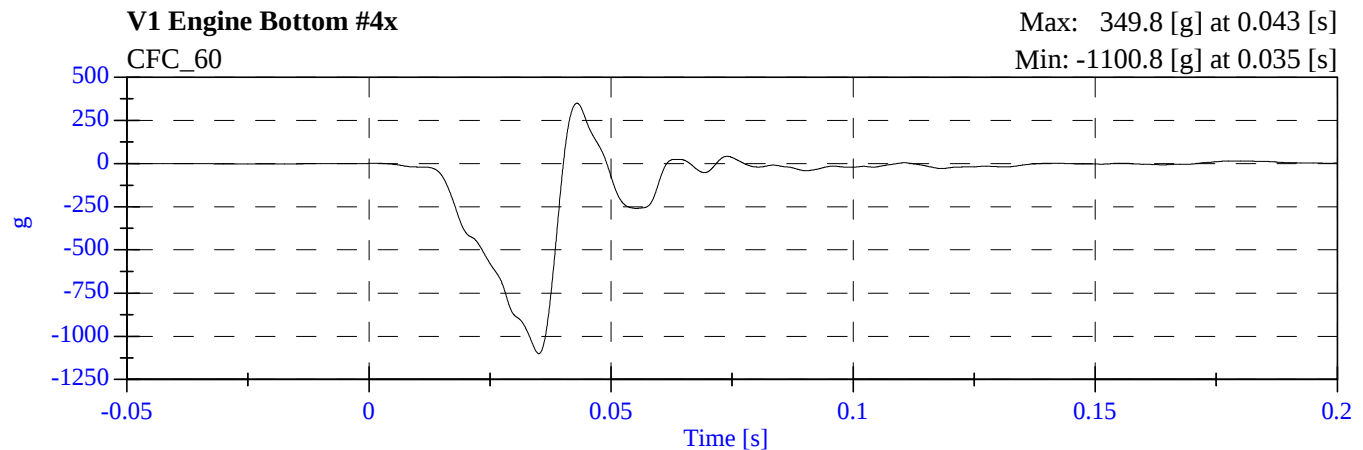
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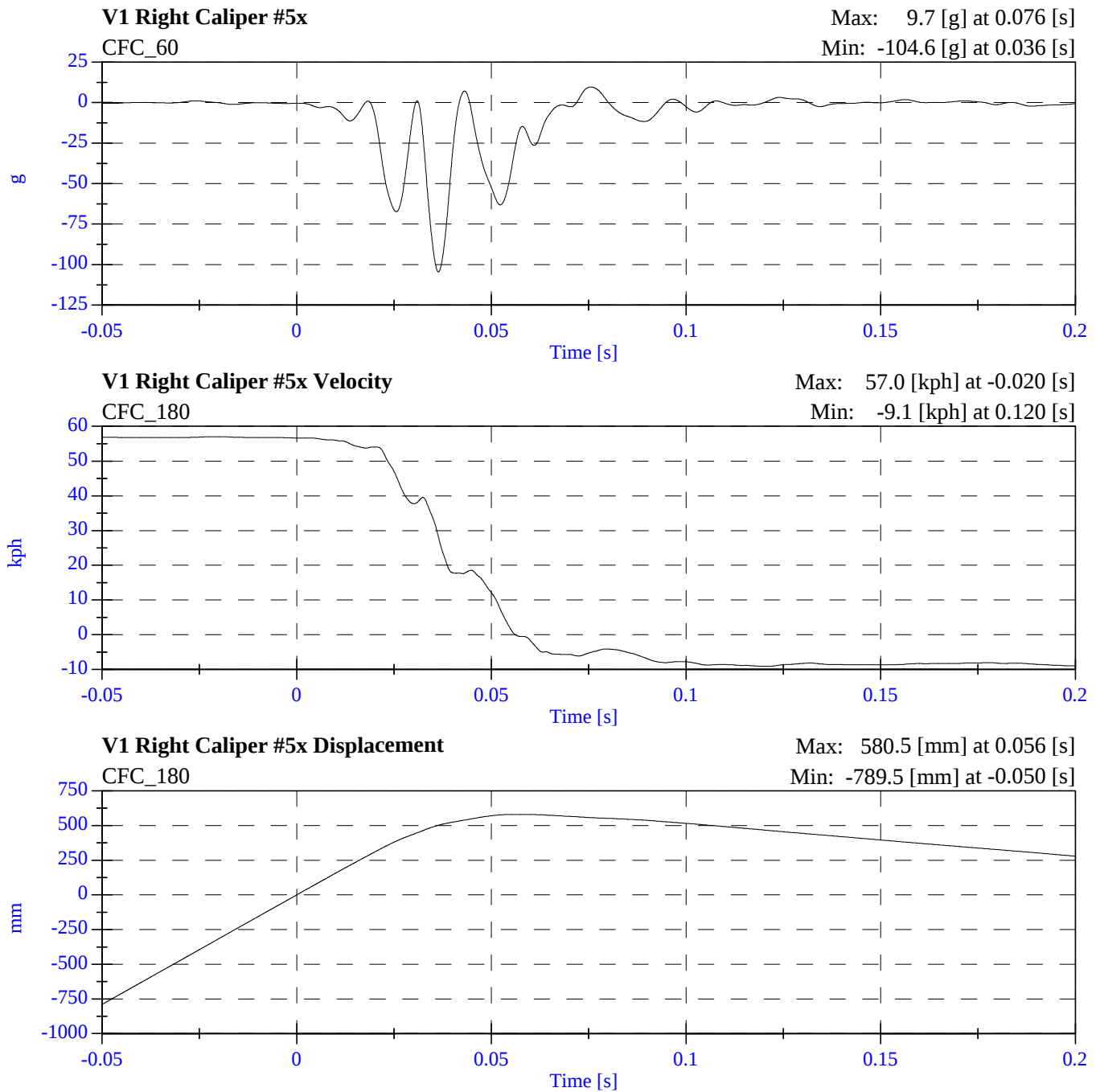
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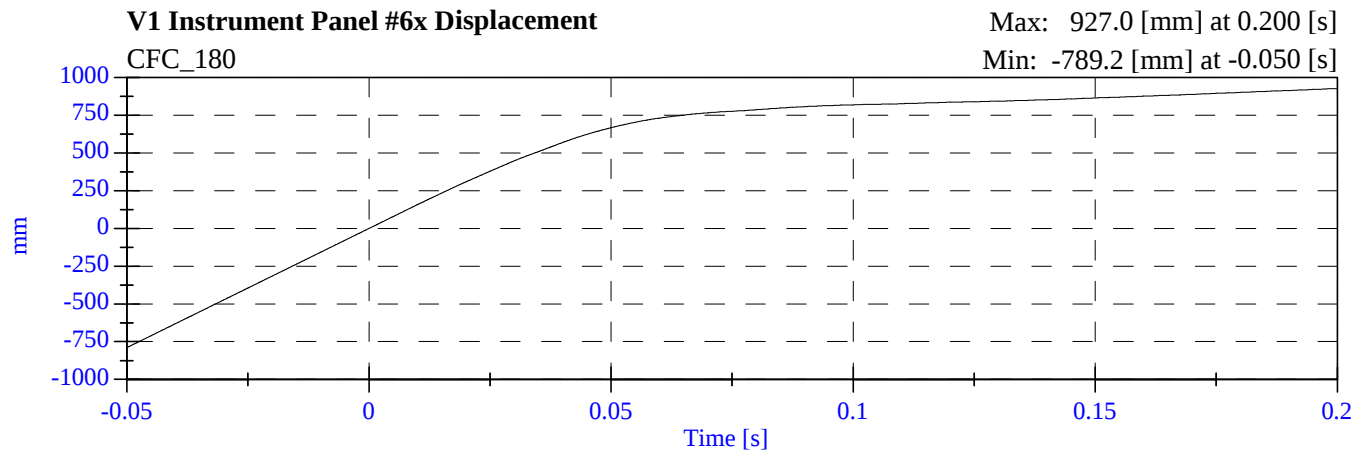
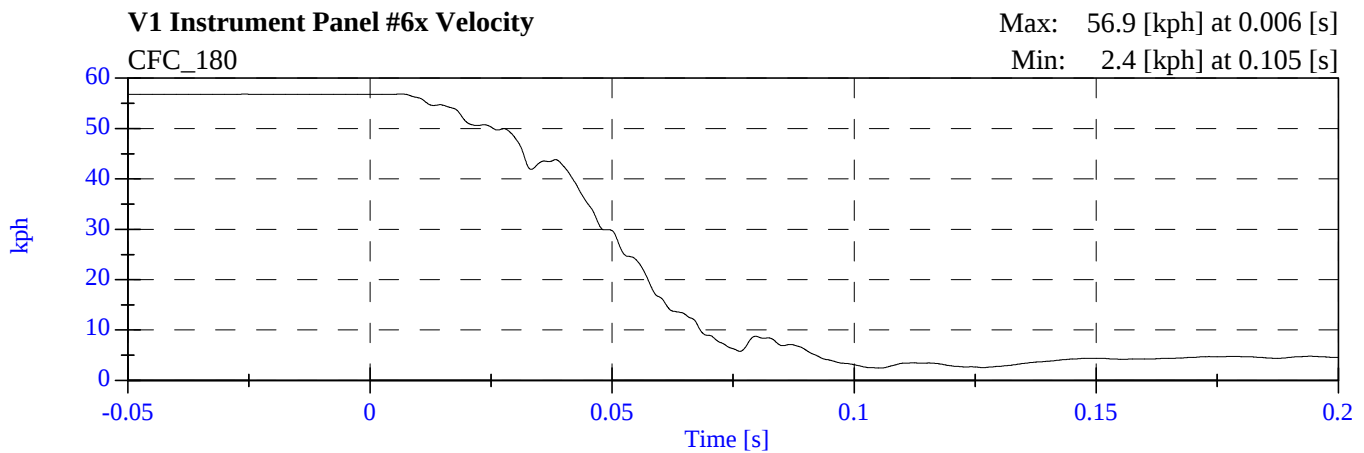
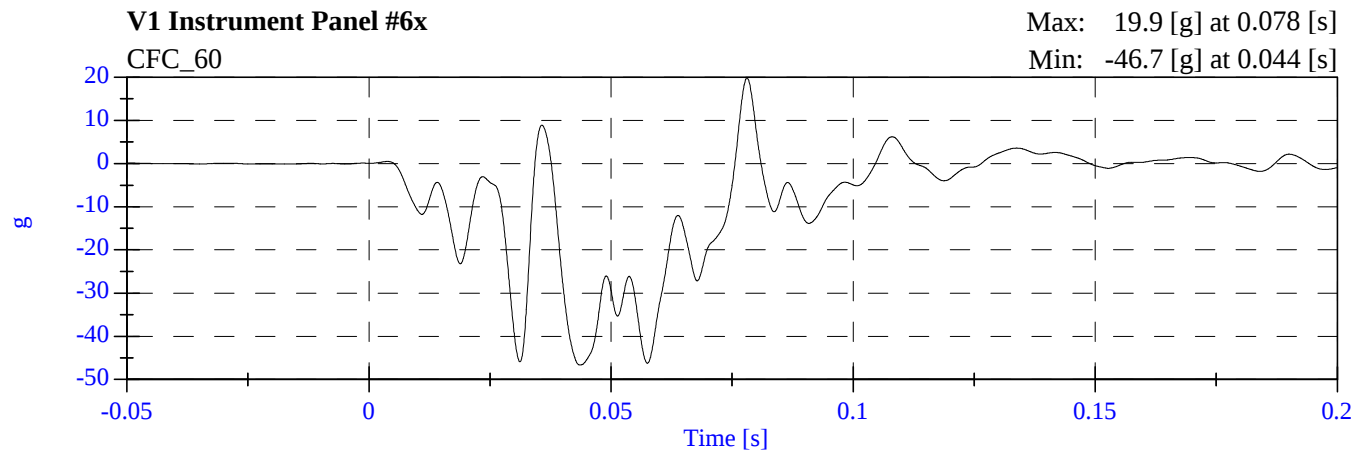
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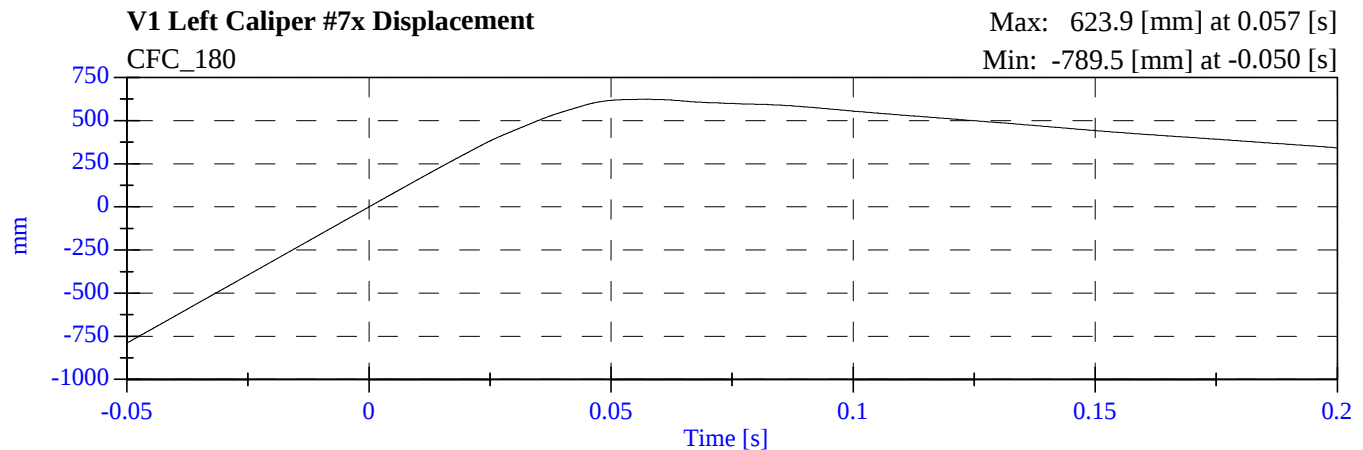
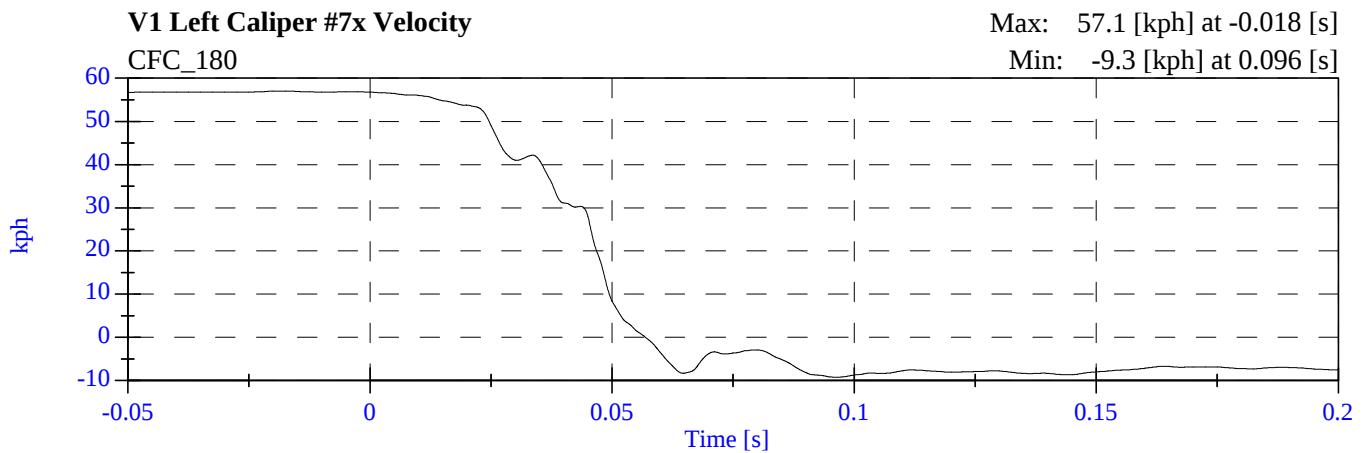
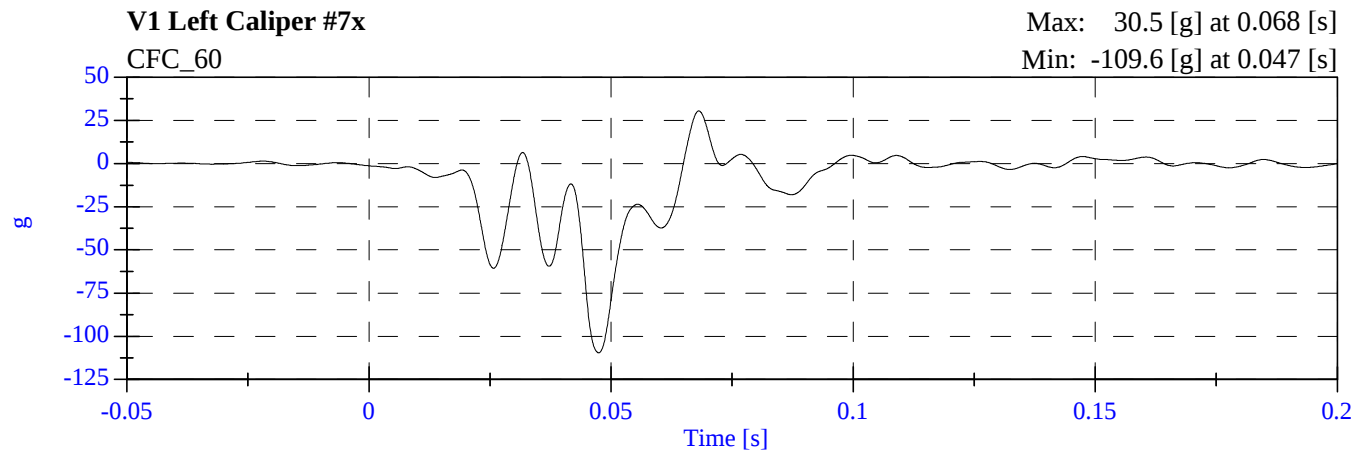
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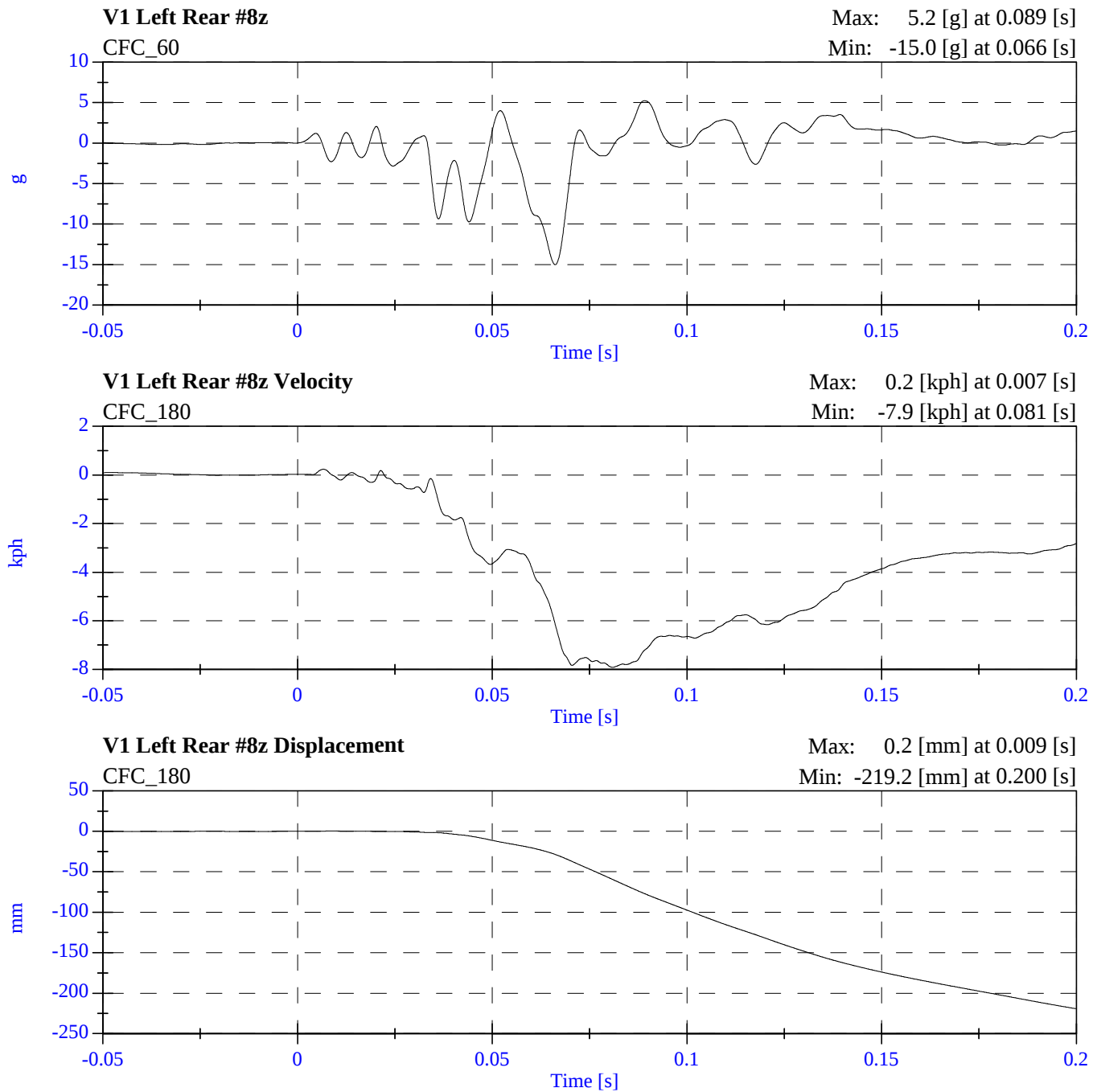
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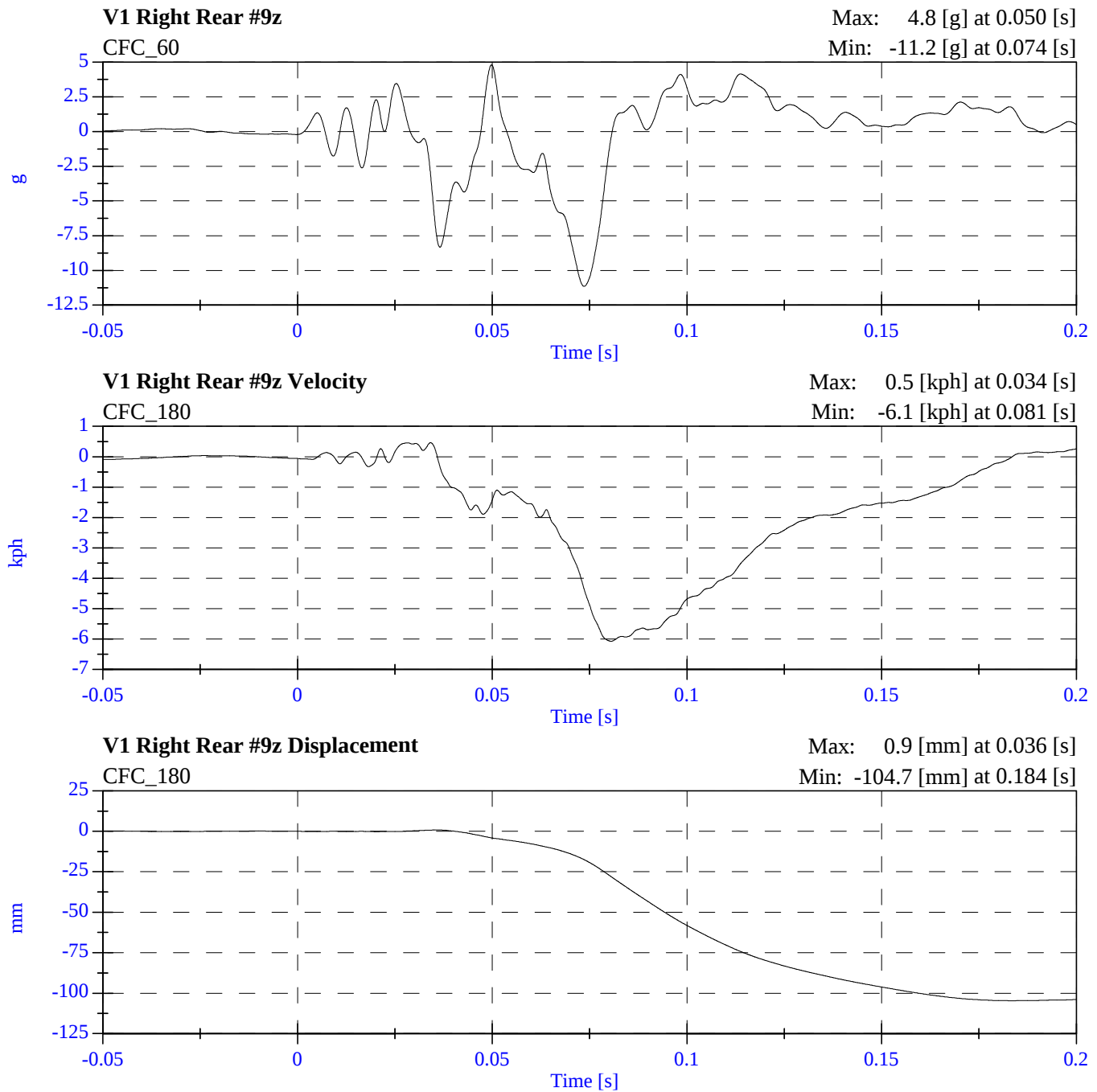
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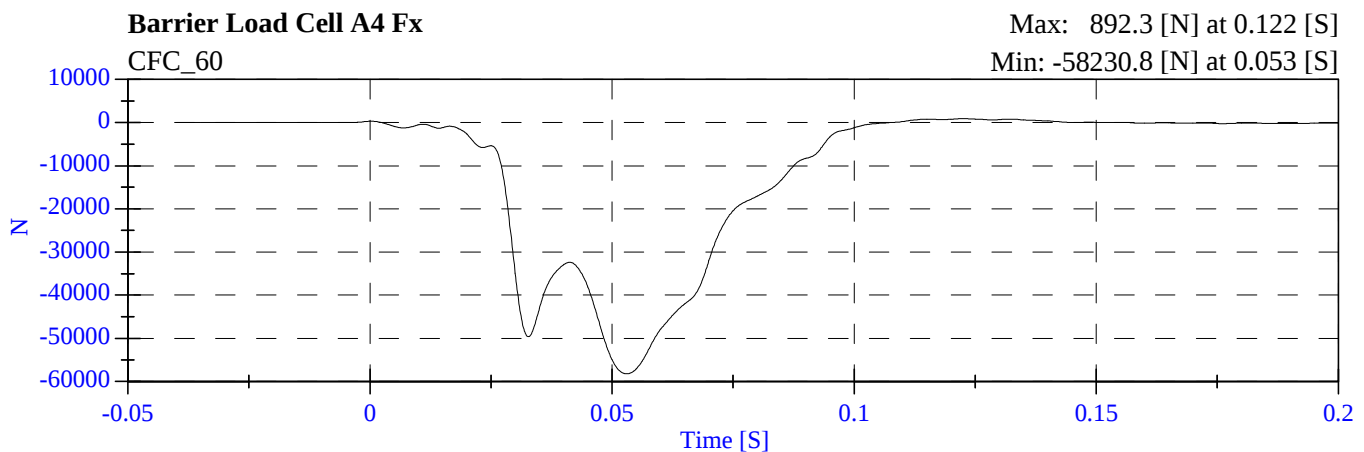
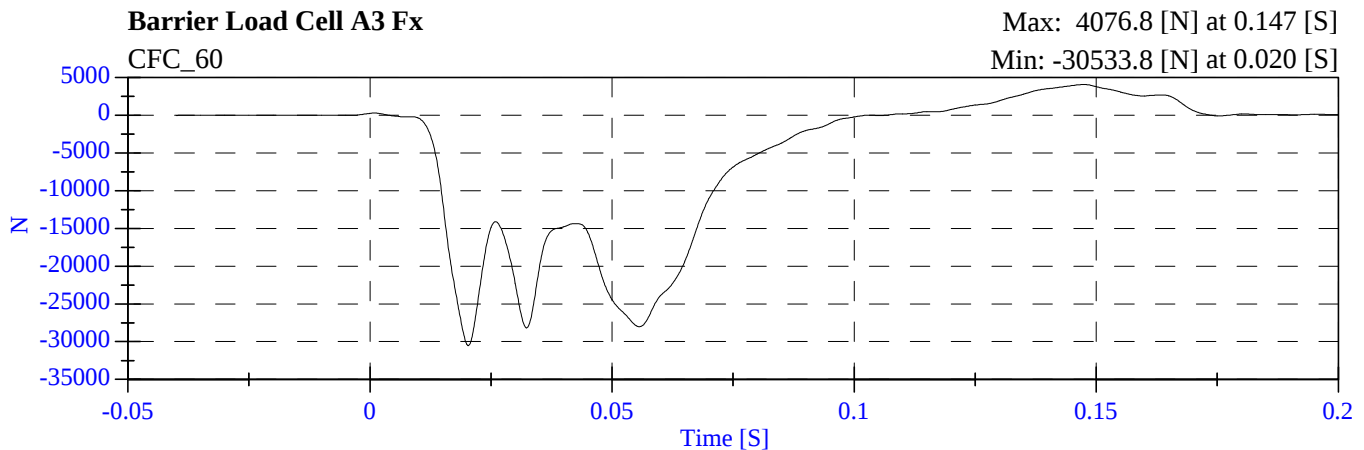
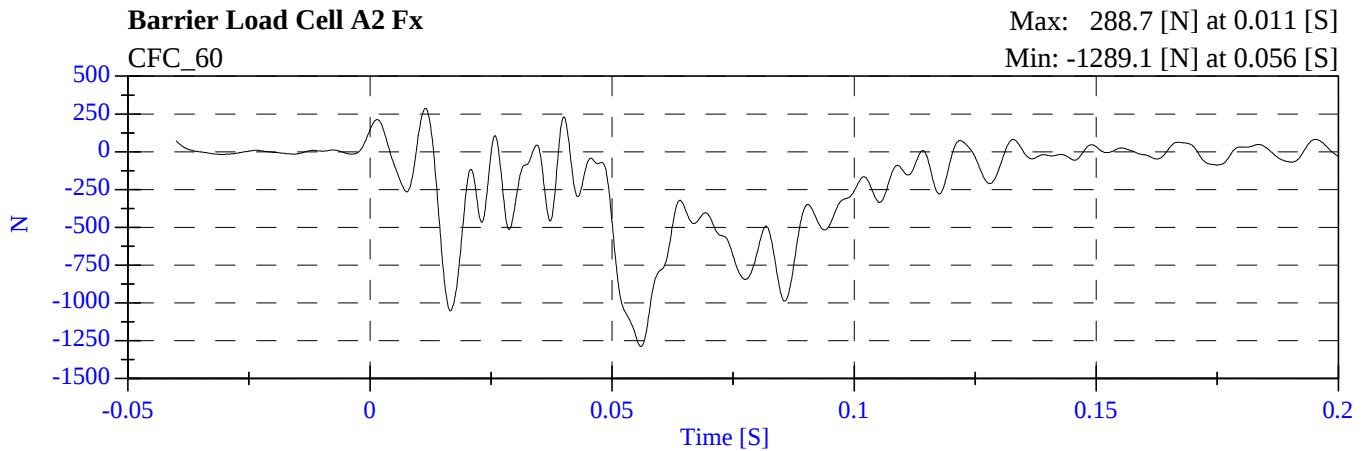
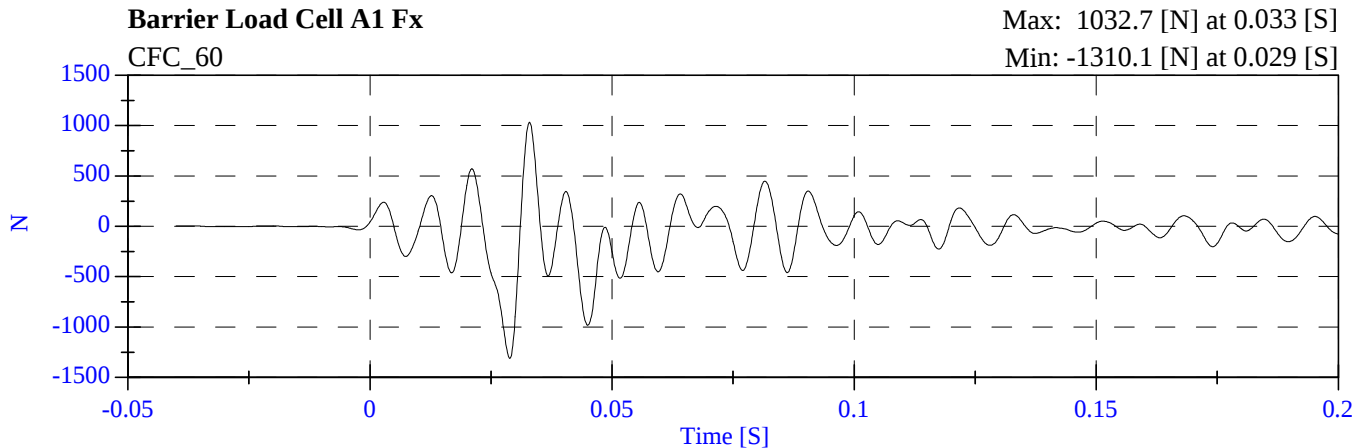
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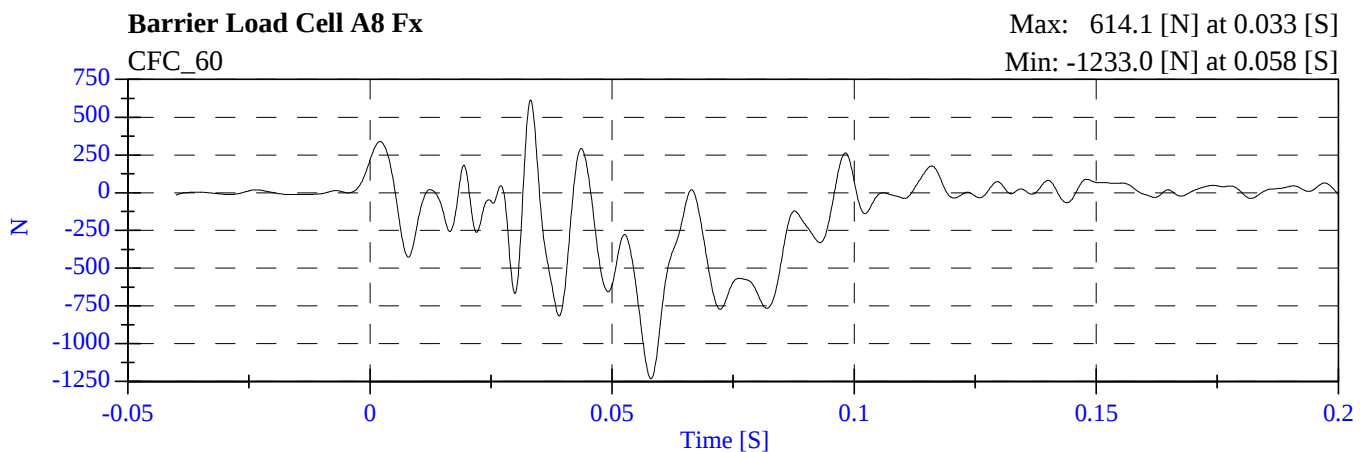
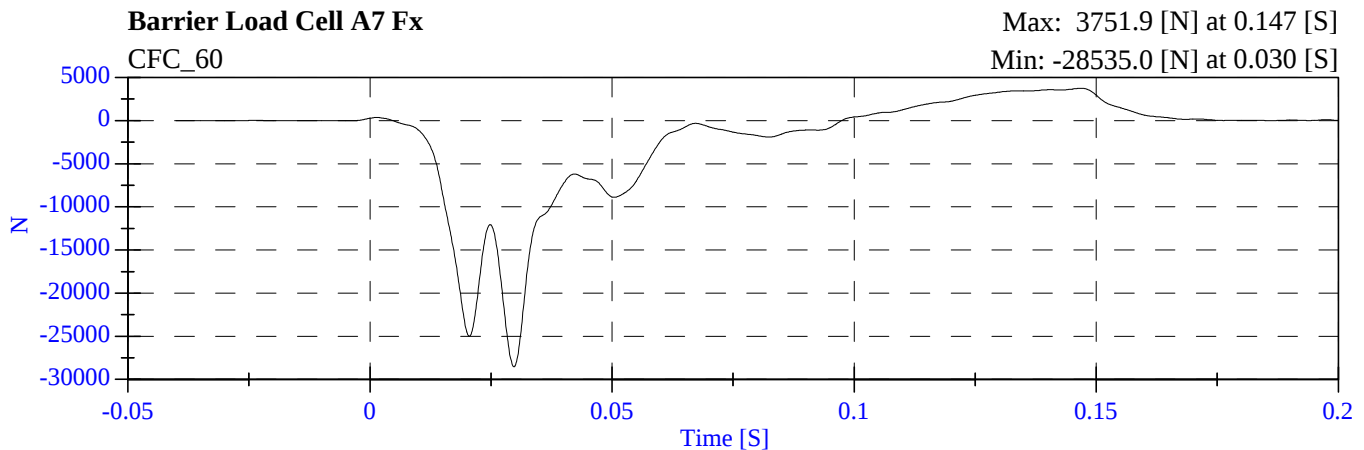
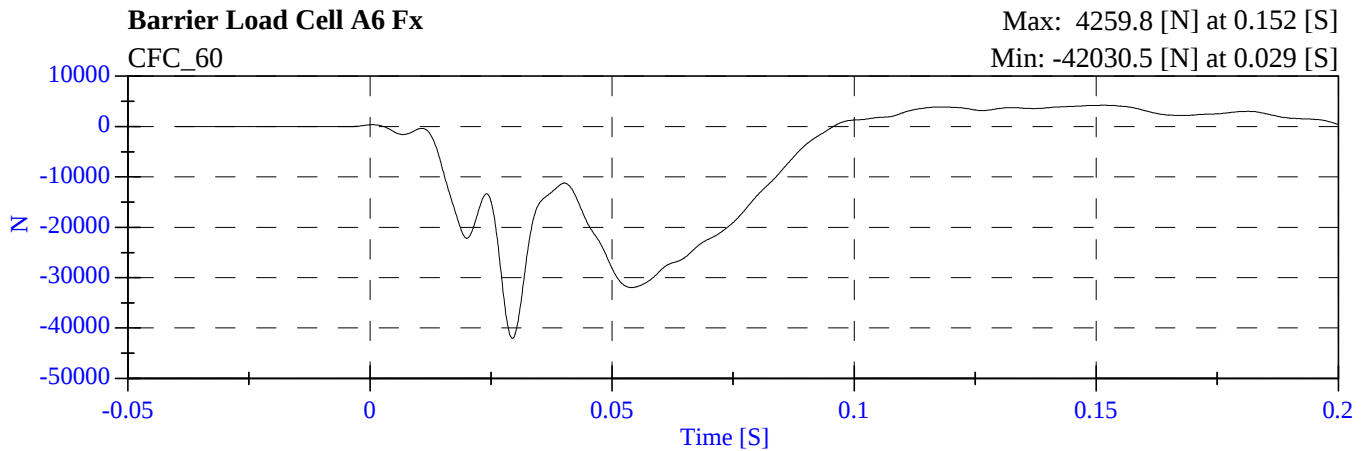
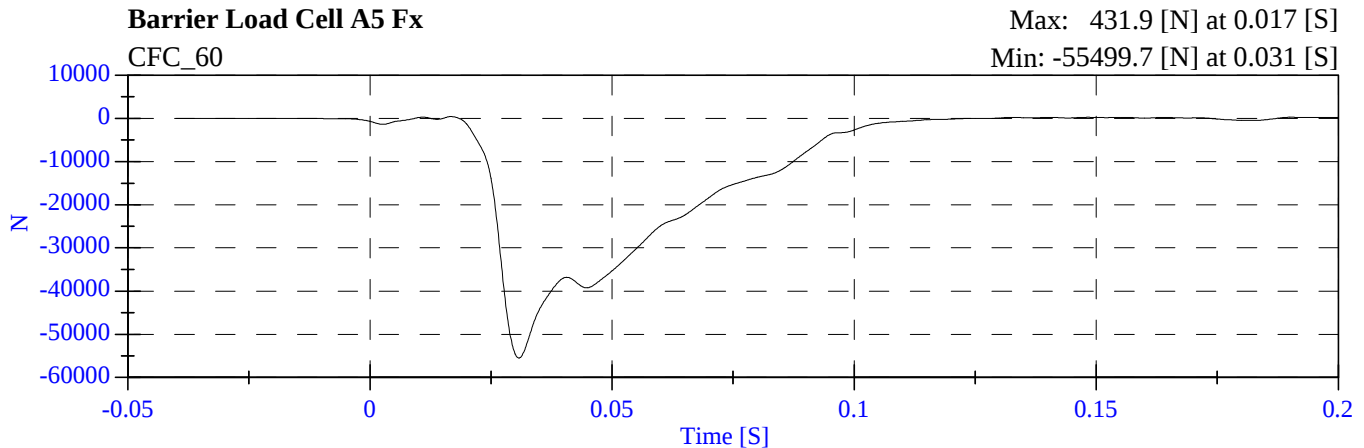
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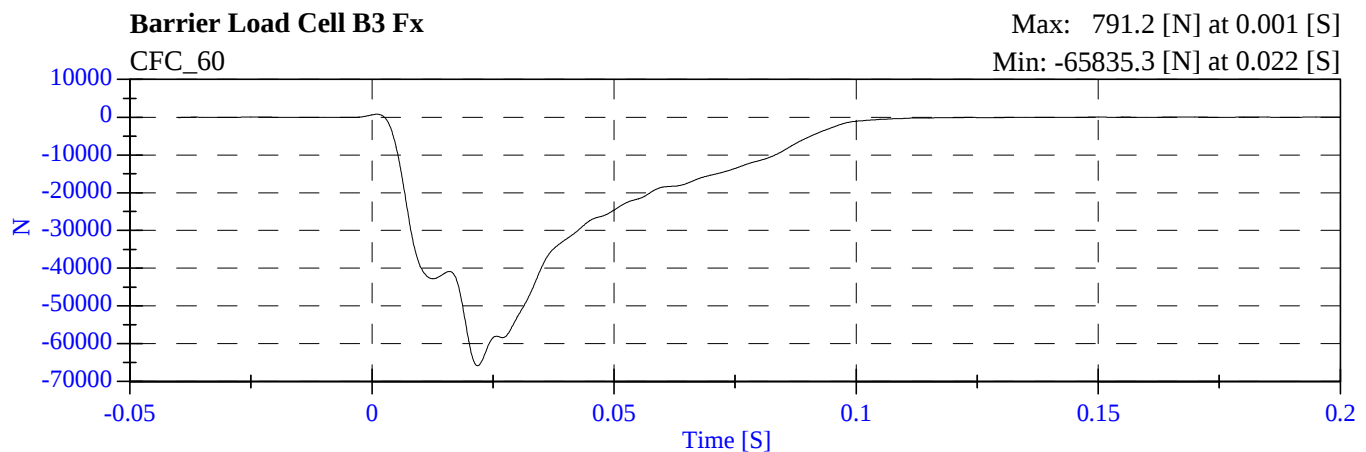
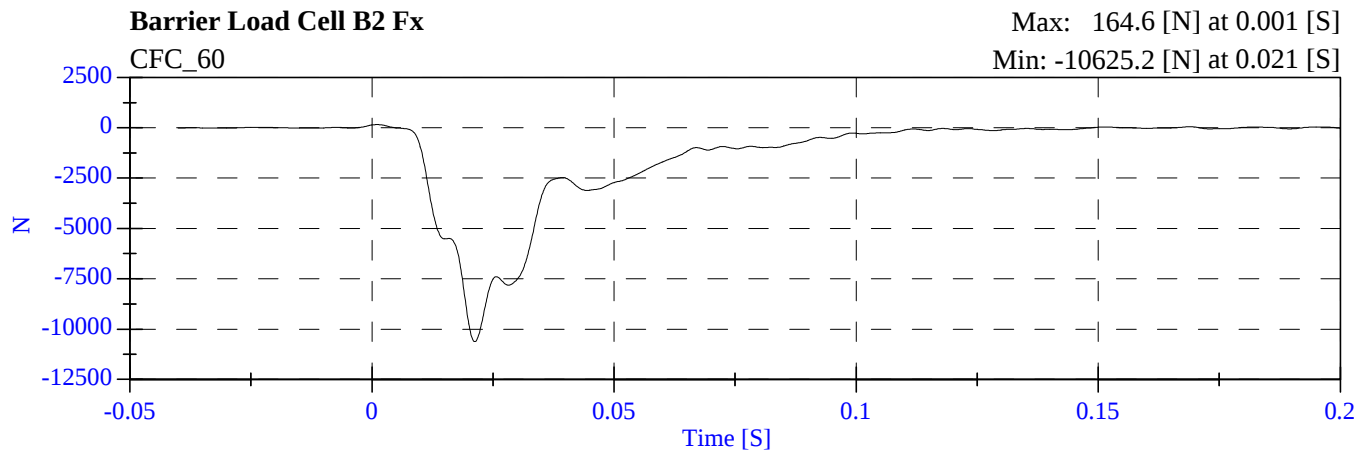
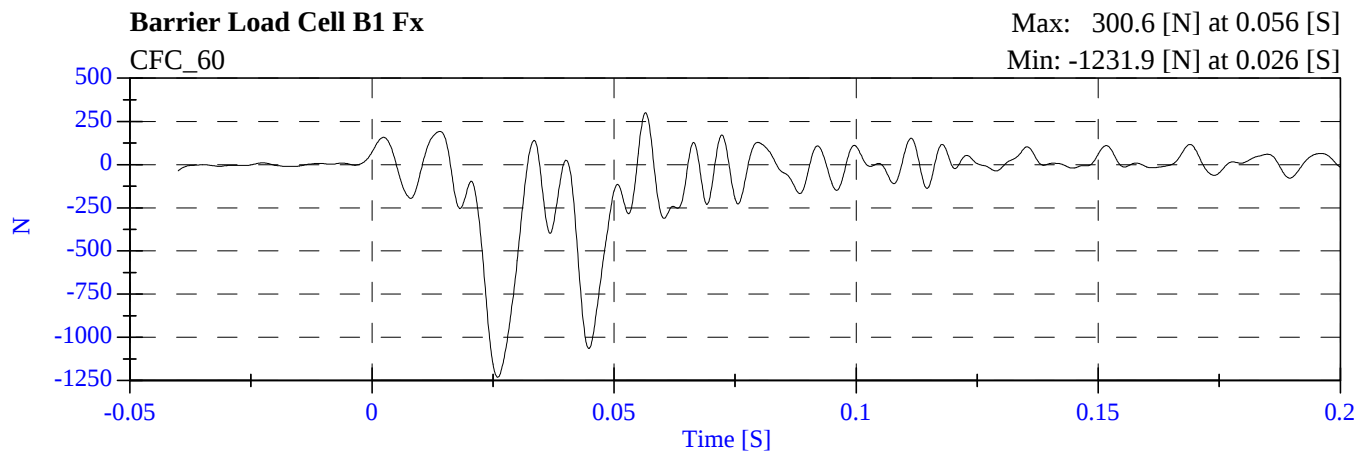
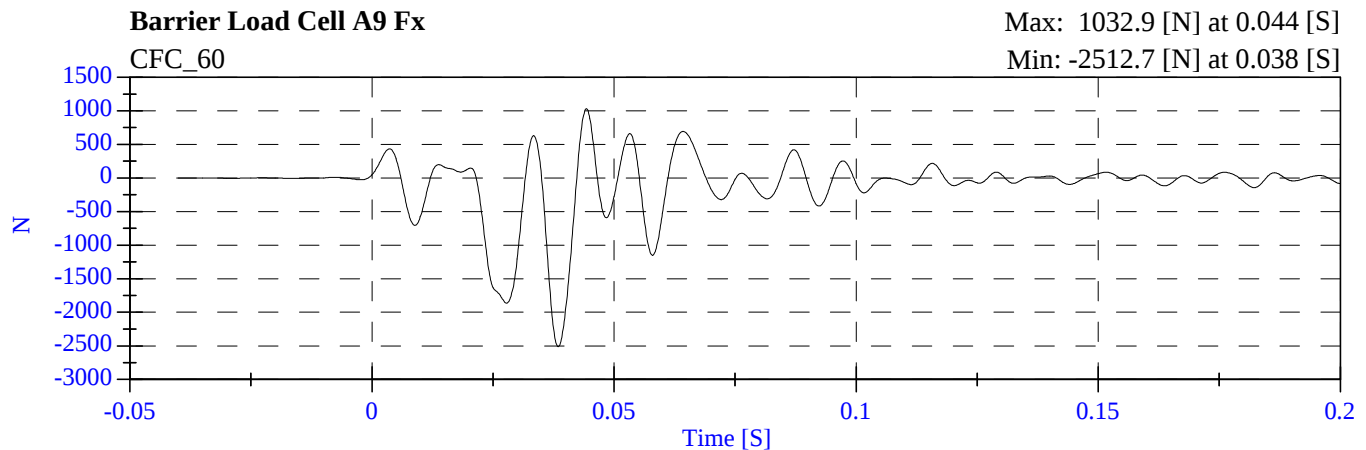
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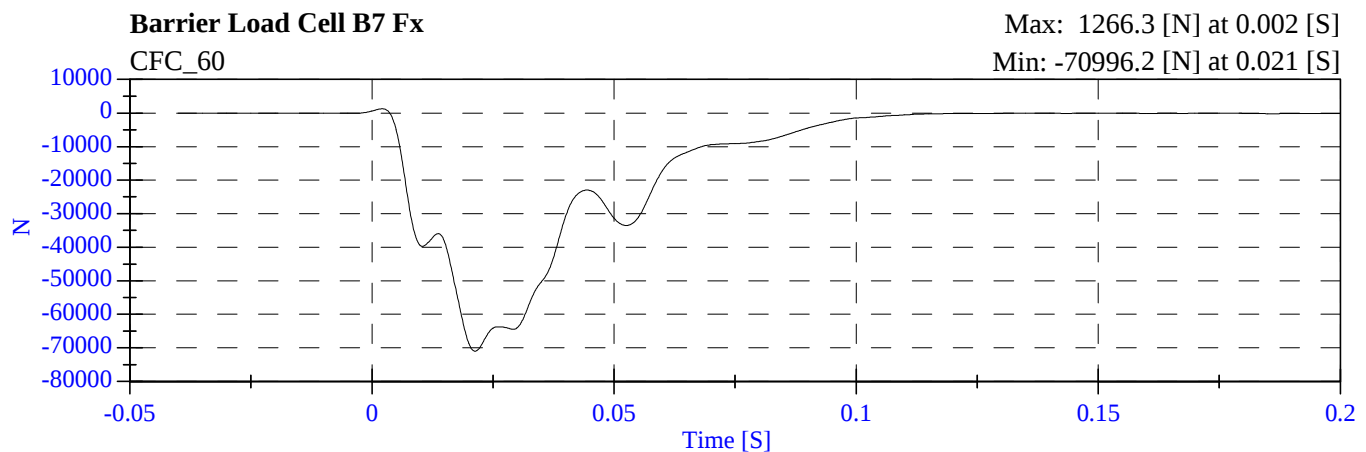
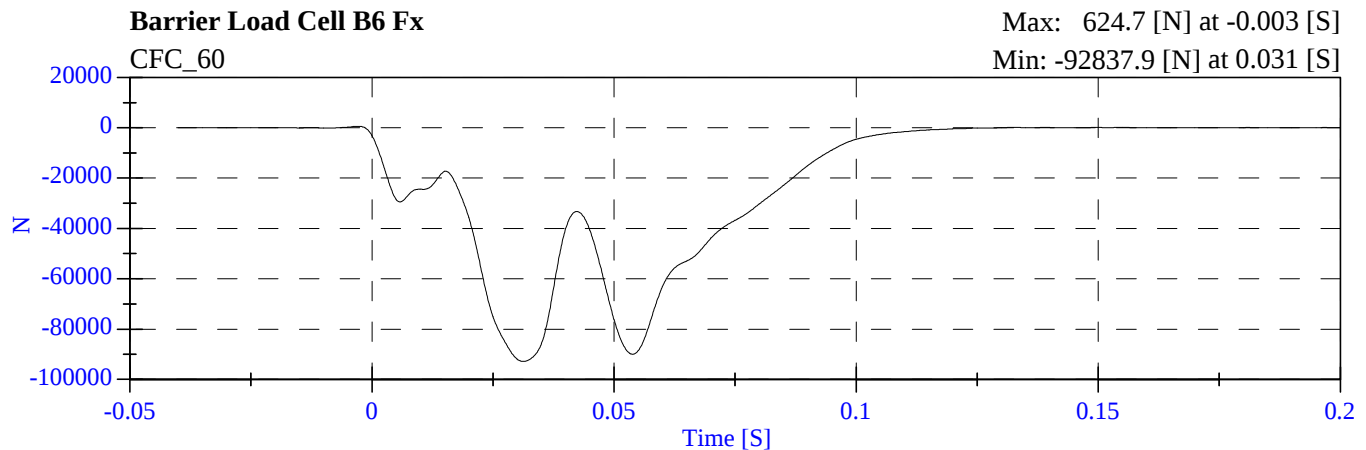
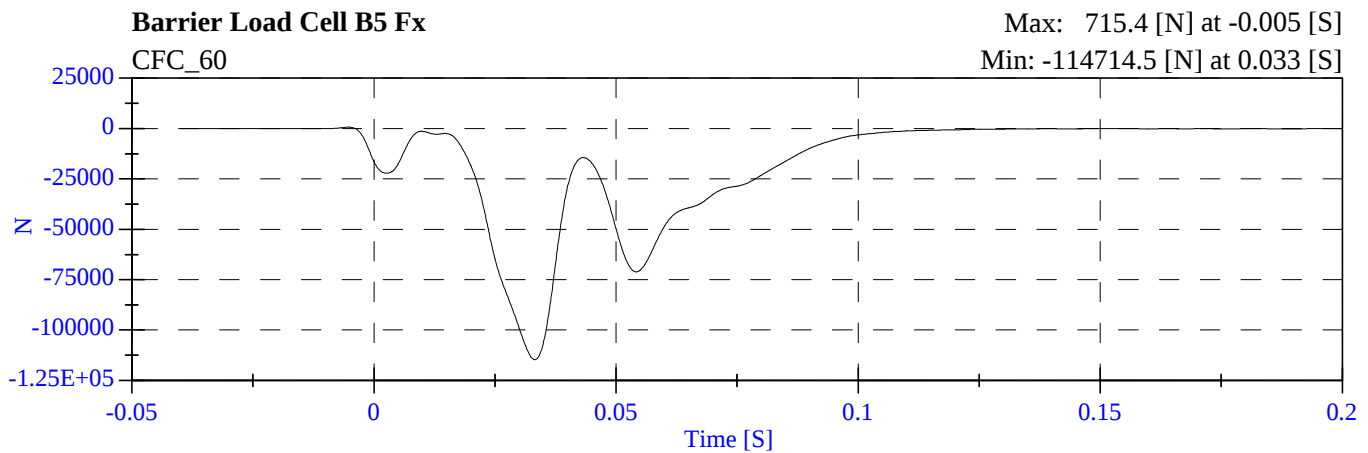
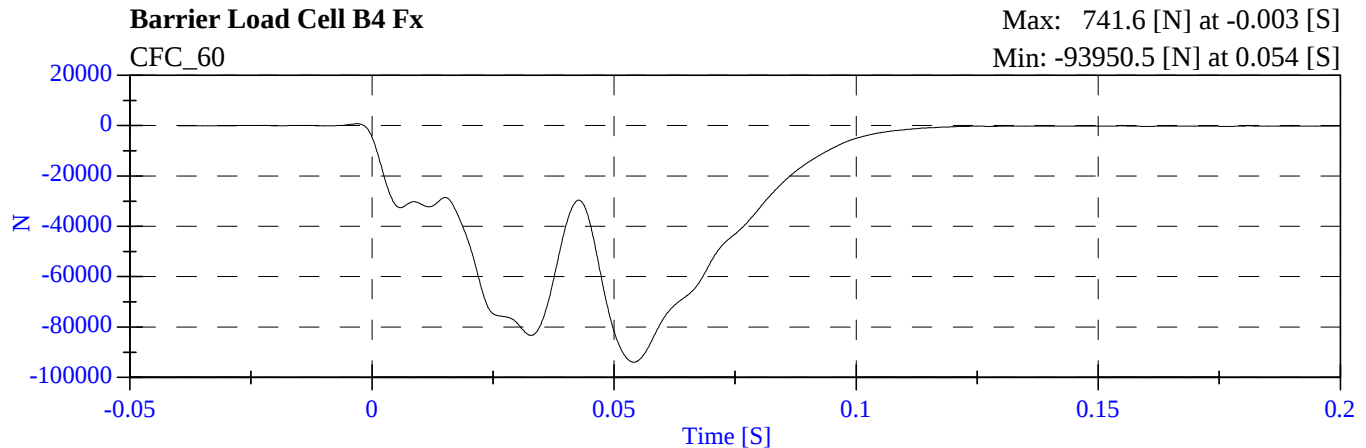
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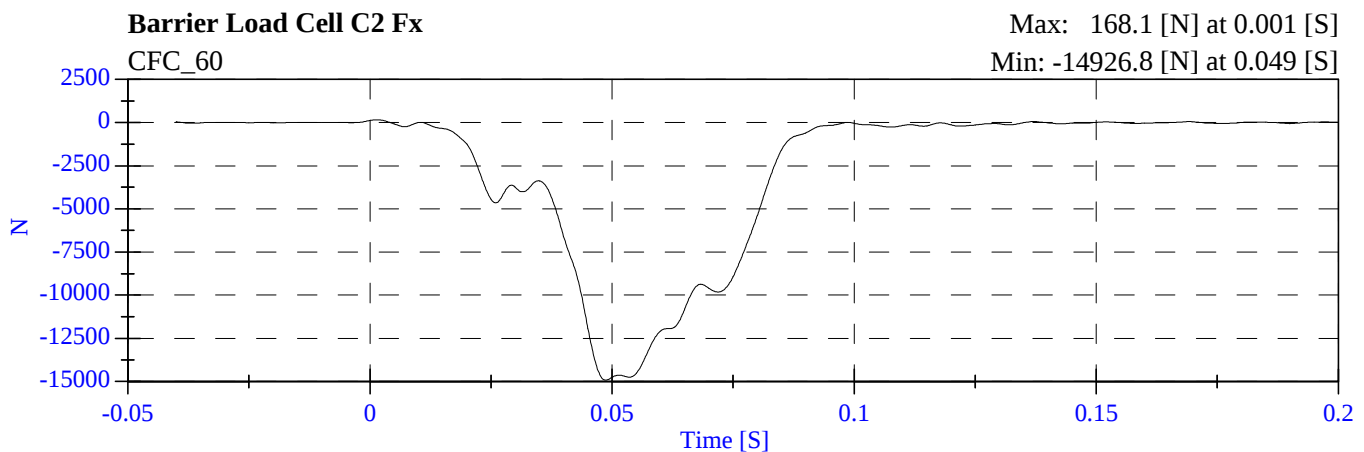
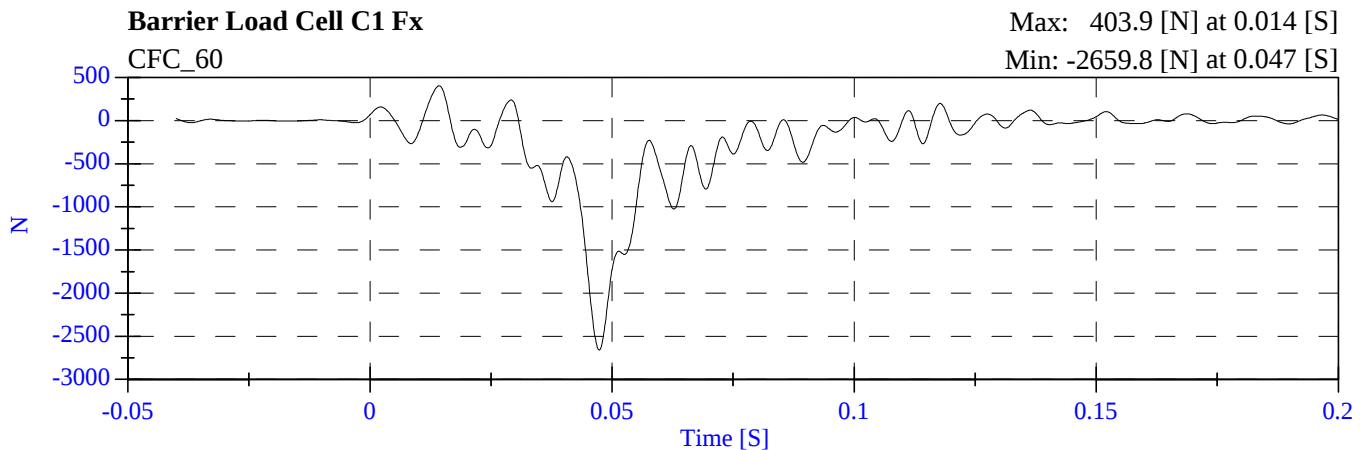
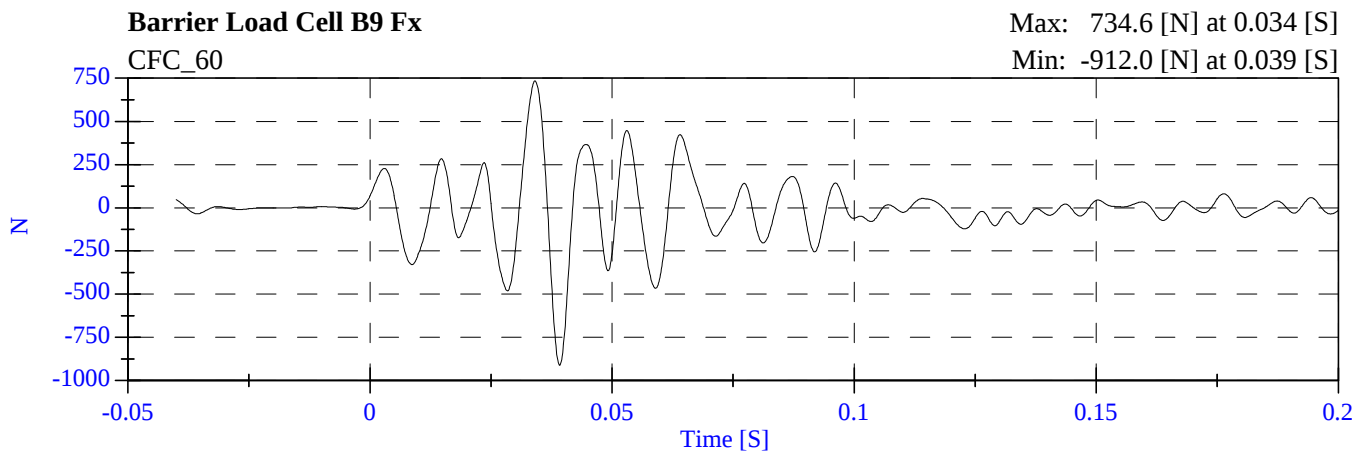
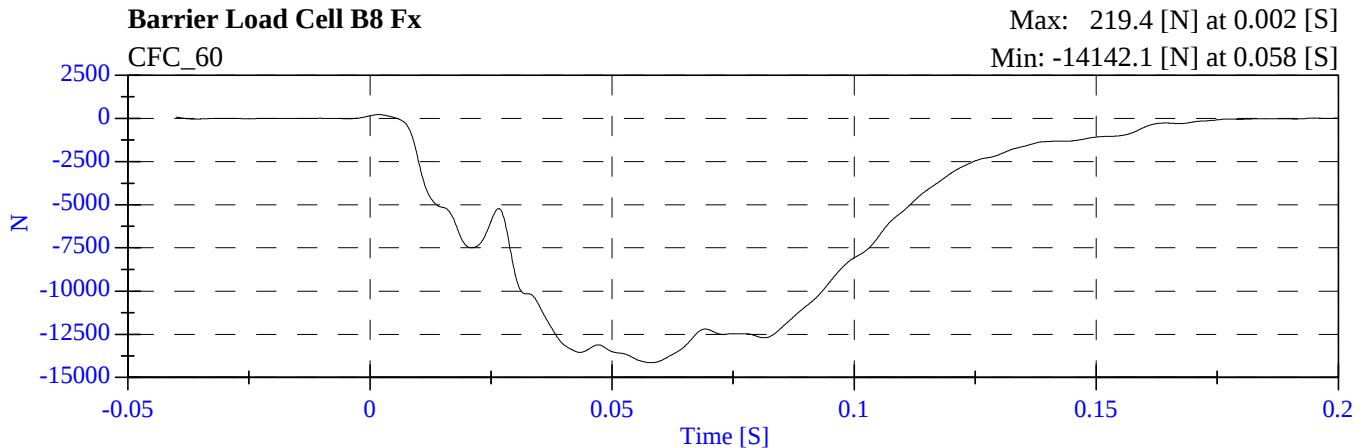


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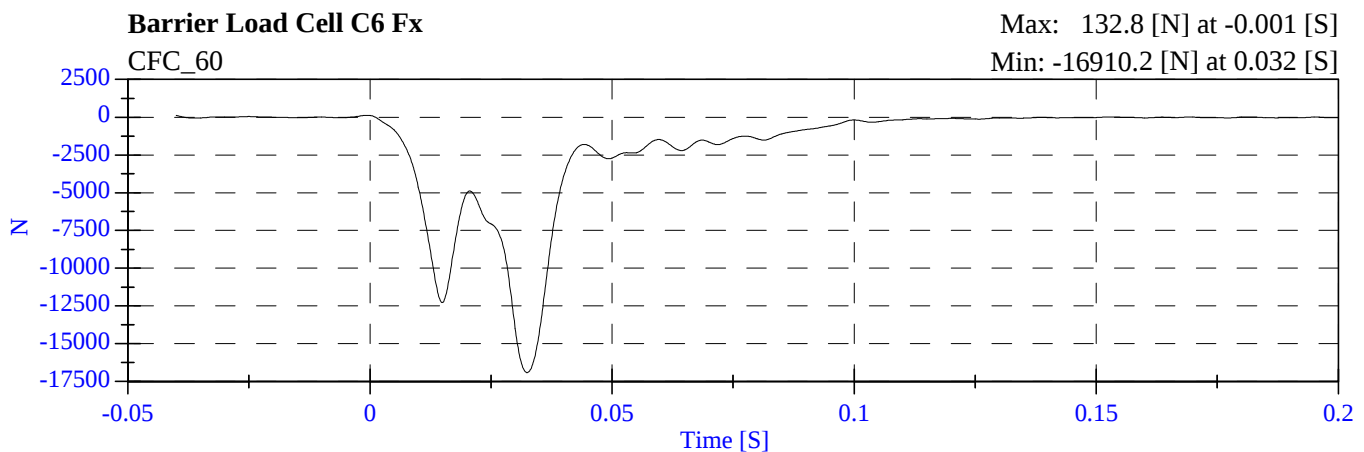
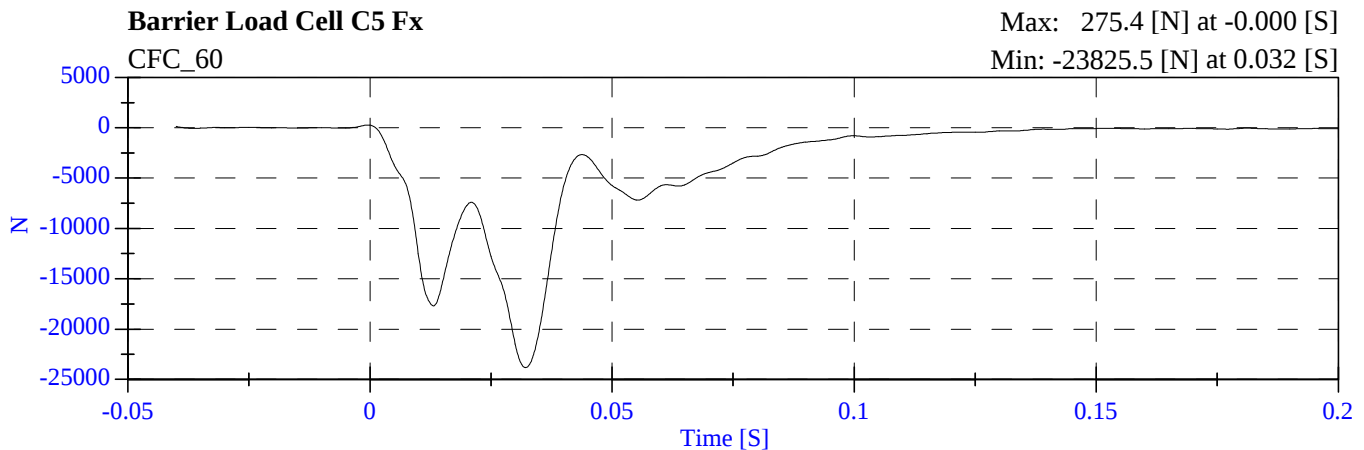
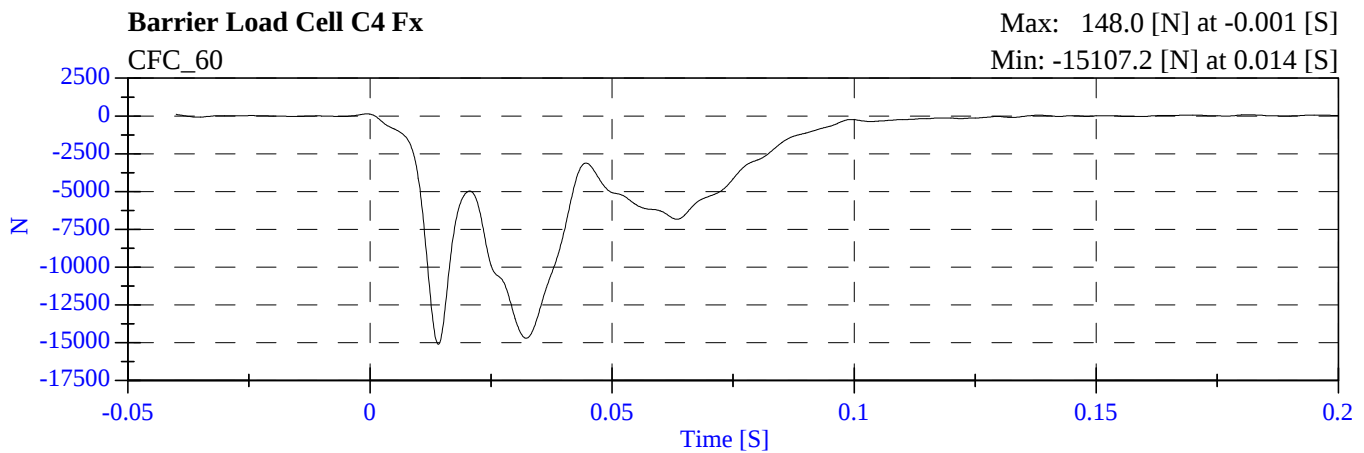
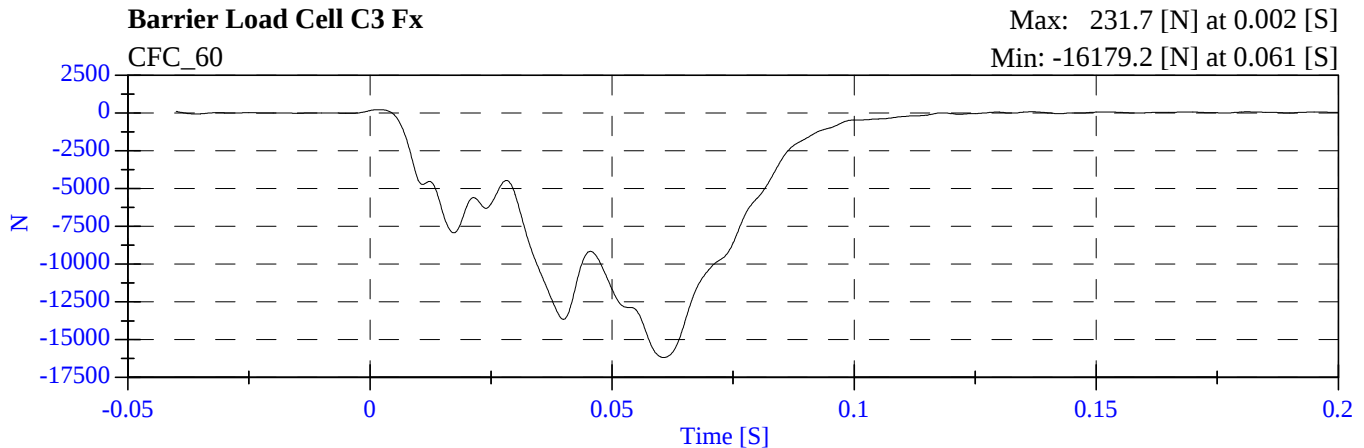


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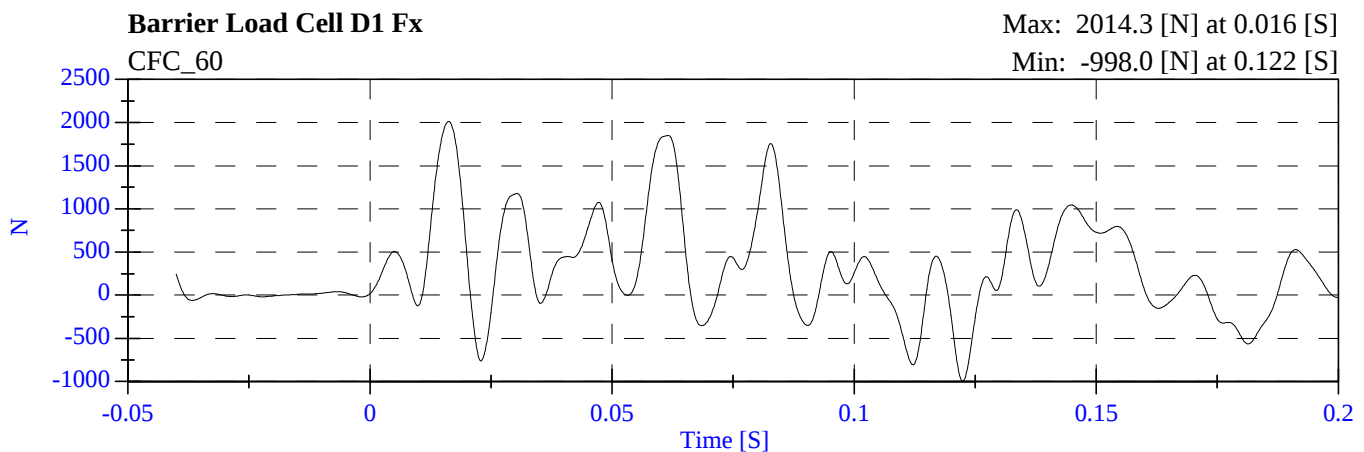
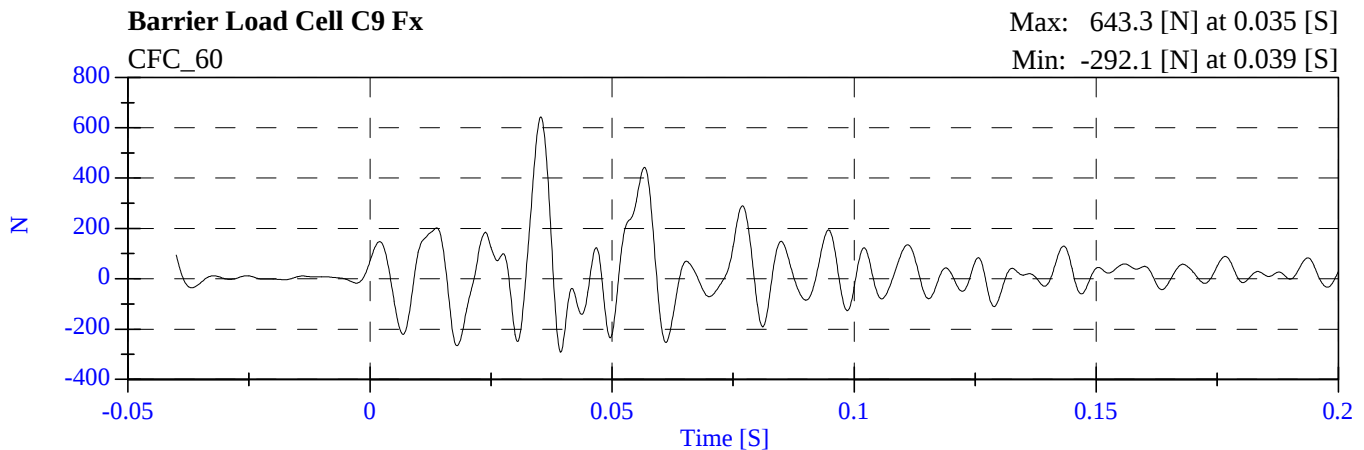
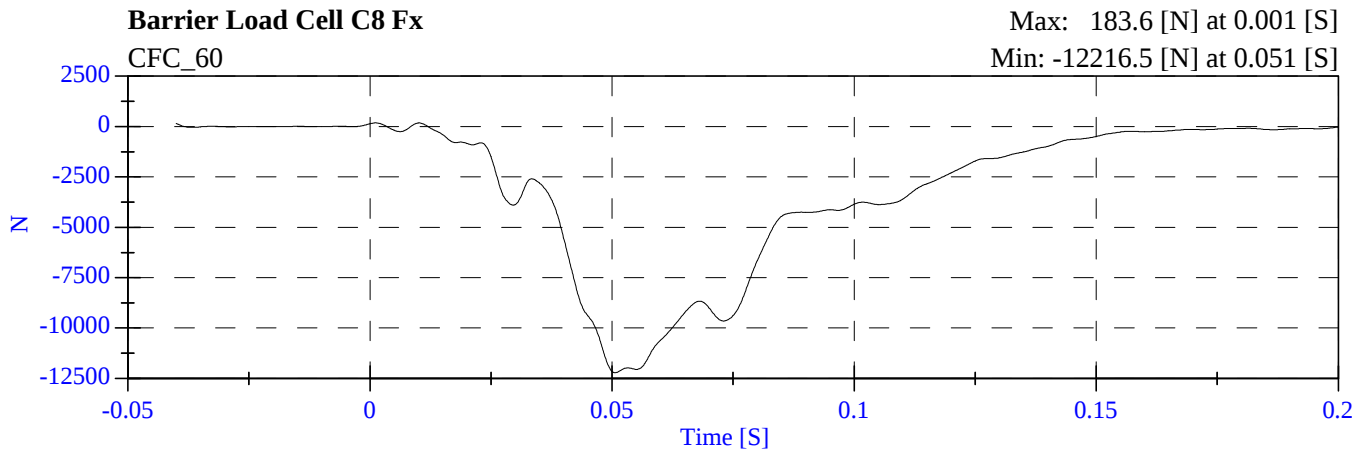
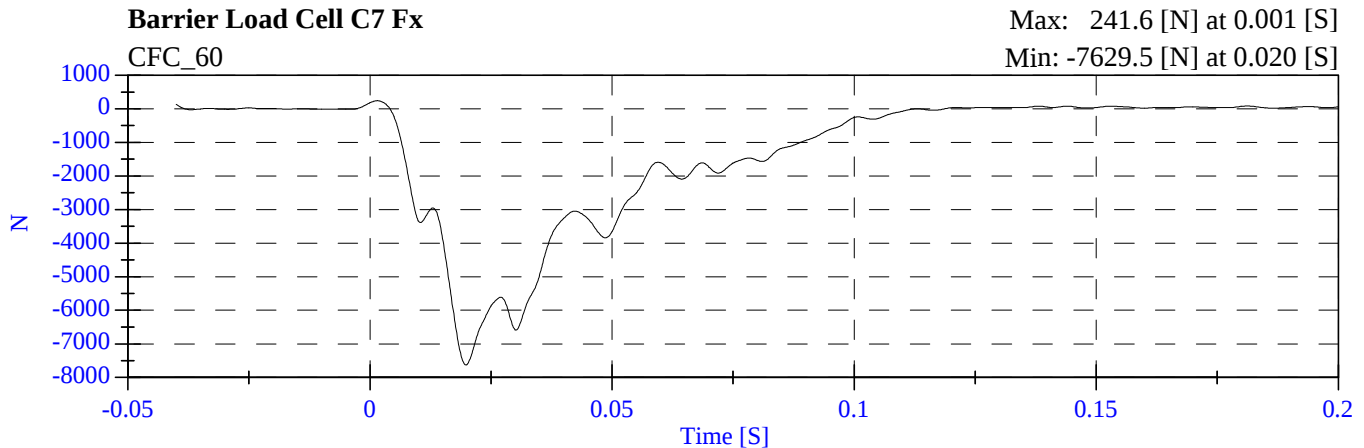


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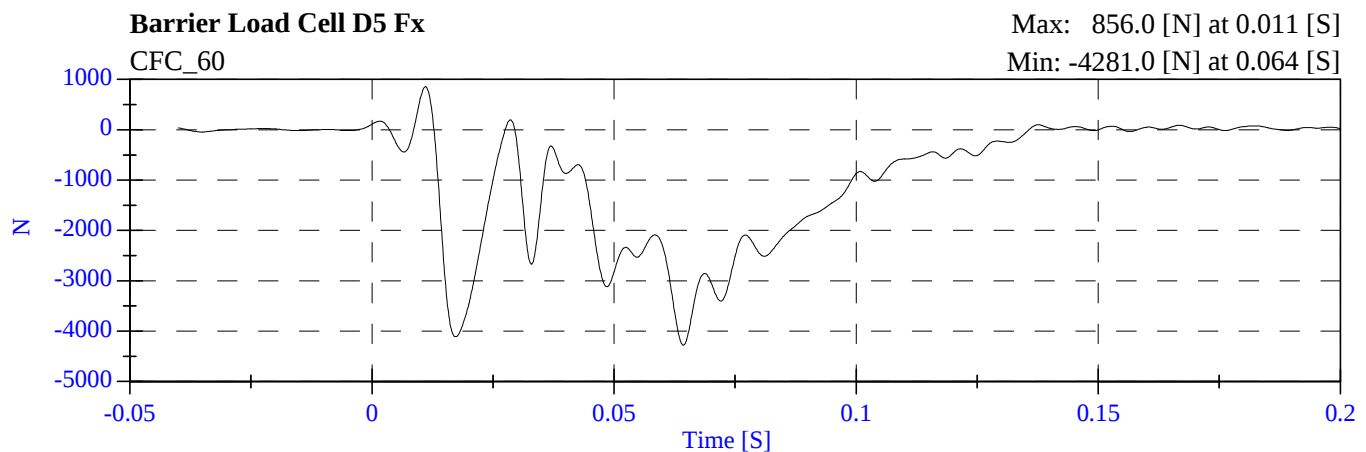
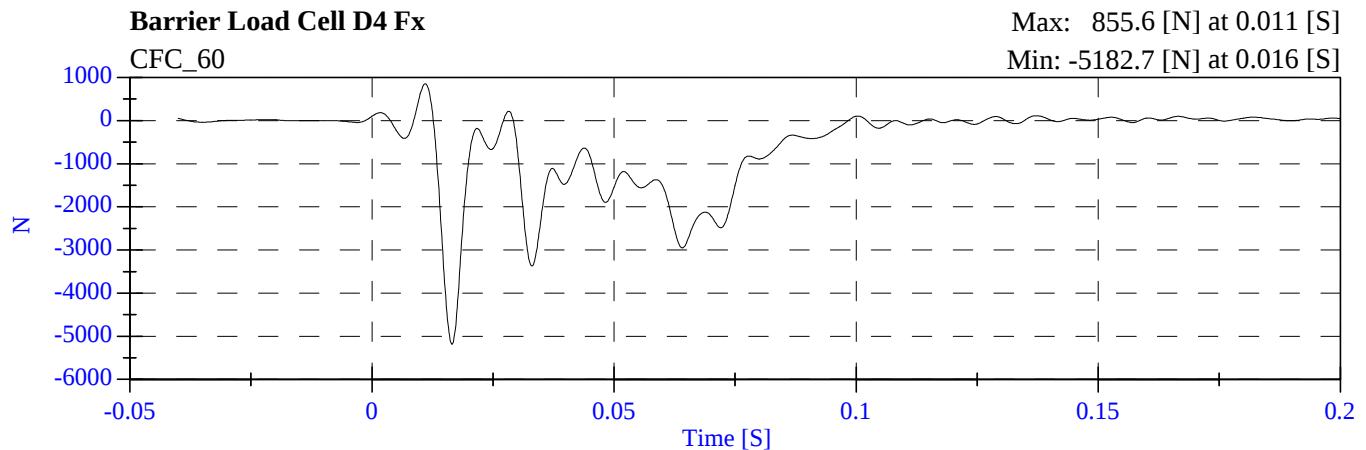
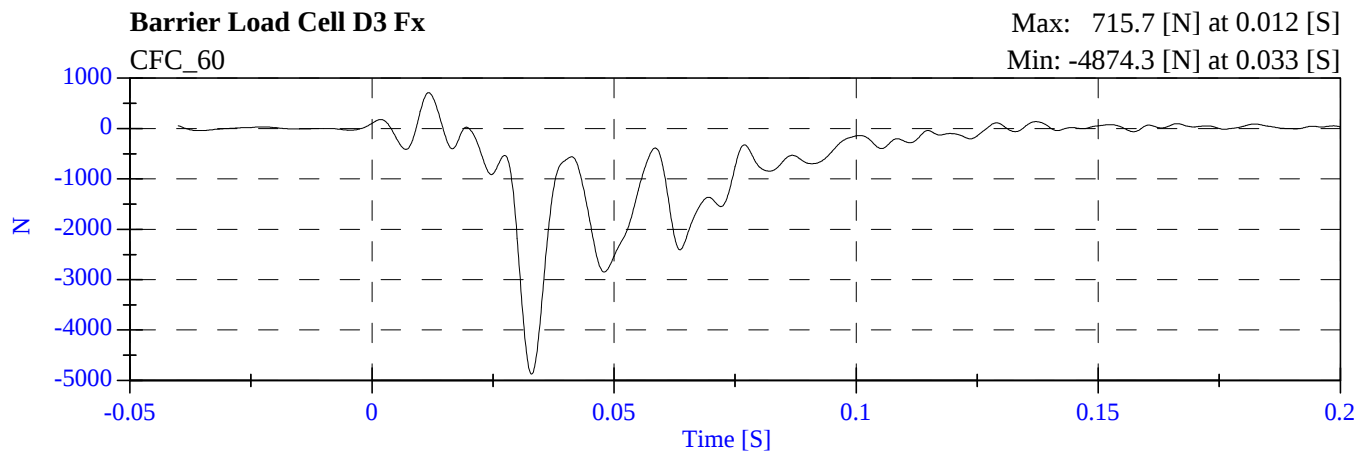
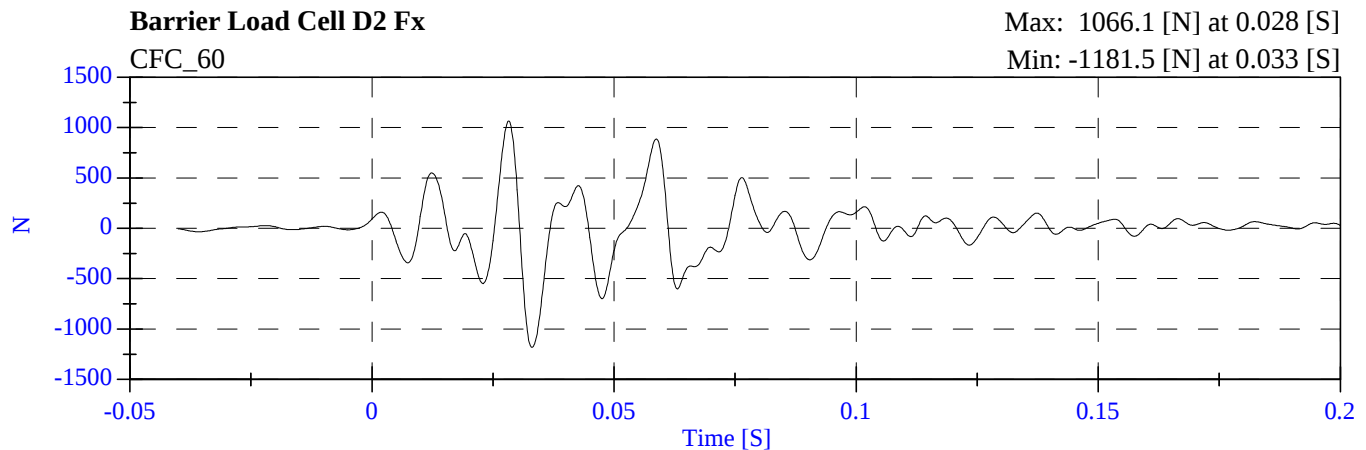
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M50114 - November 19, 2004



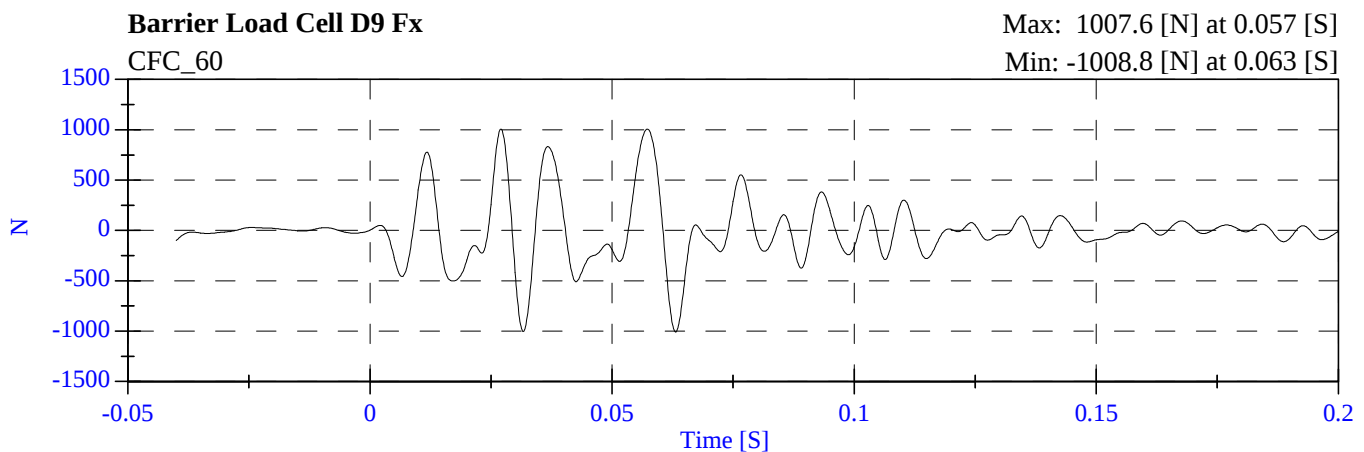
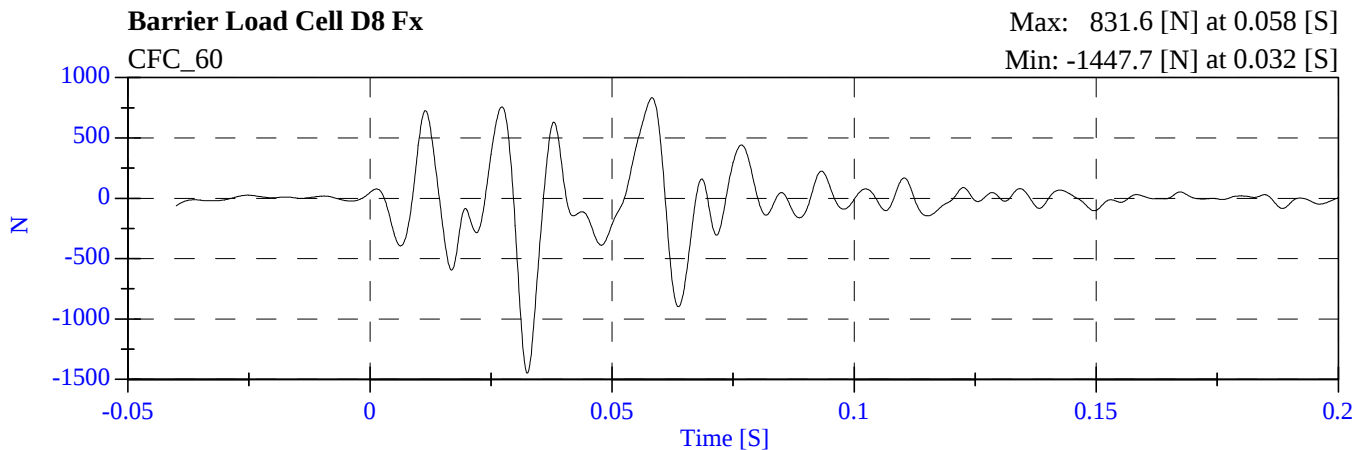
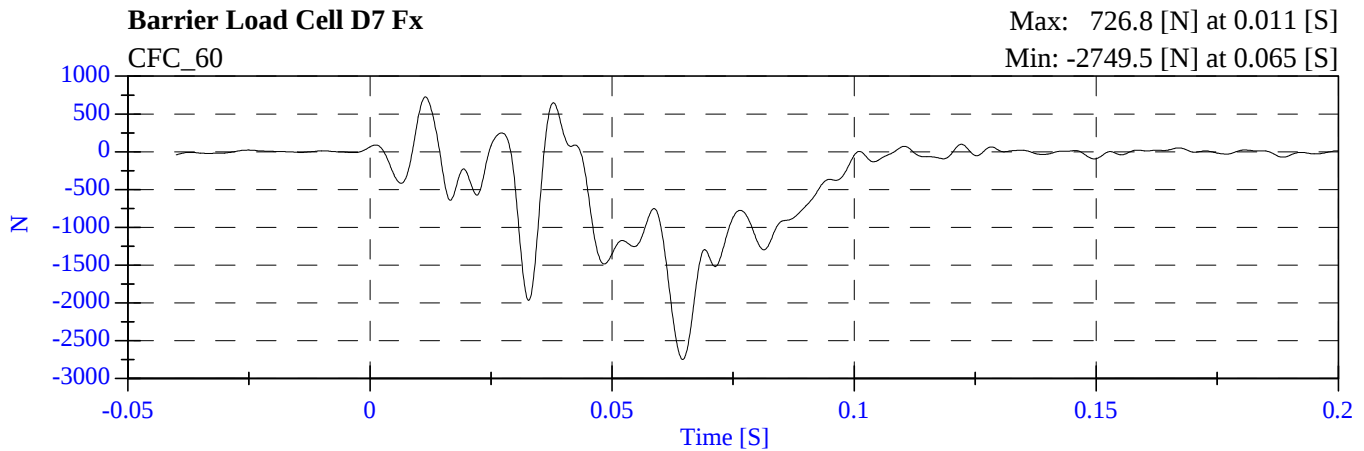
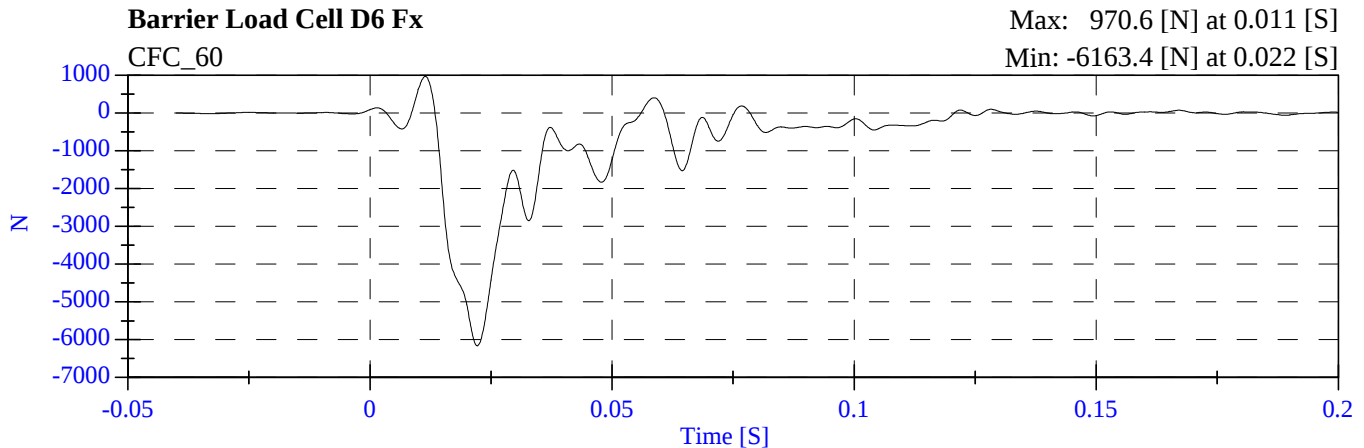
2005 NCAP Test 2 - 2005 Pontiac G6

M50114 - November 19, 2004



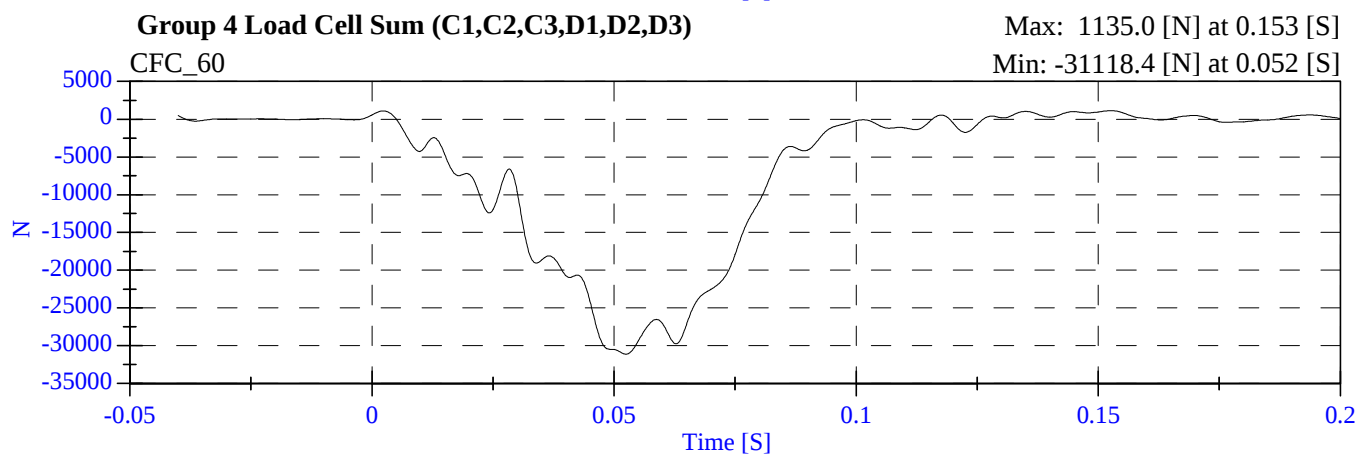
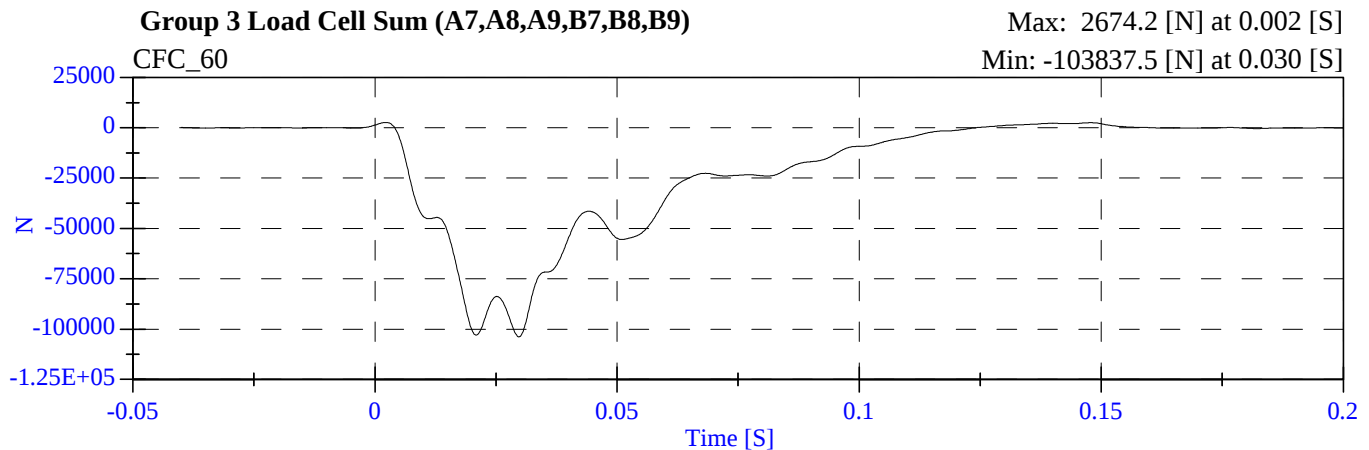
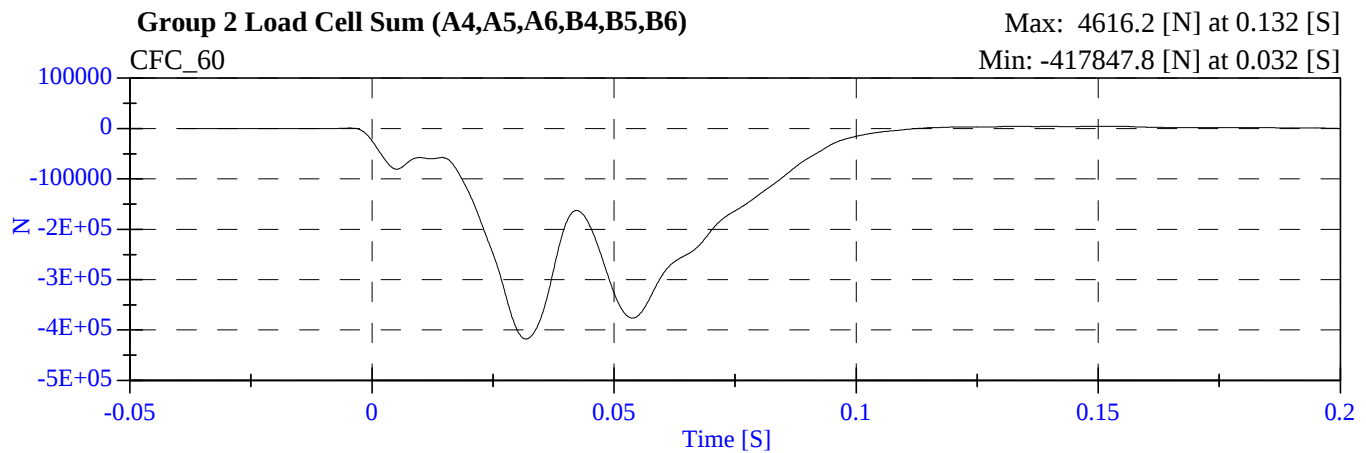
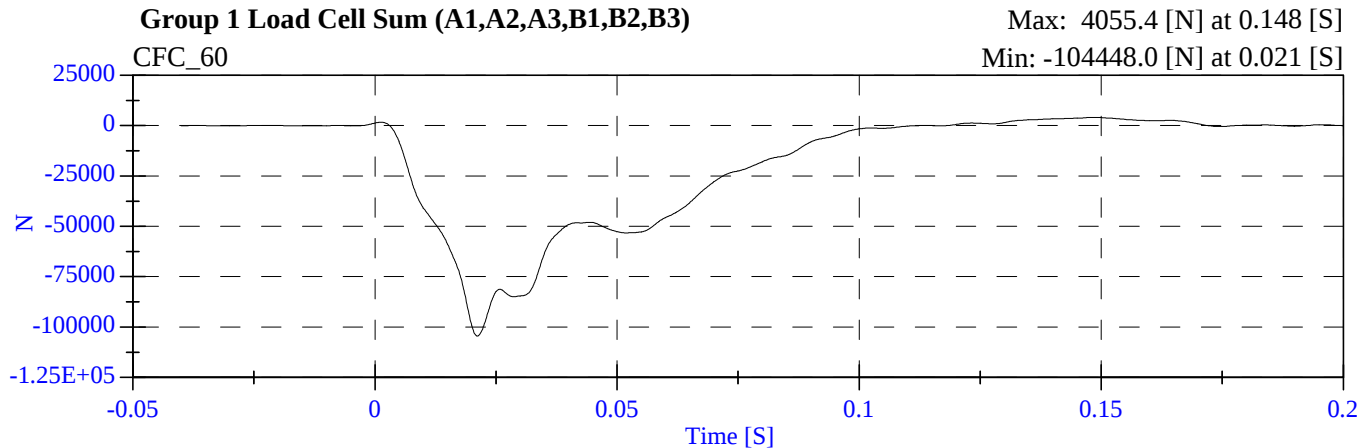
2005 NCAP Test 2 - 2005 Pontiac G6

M50114 - November 19, 2004

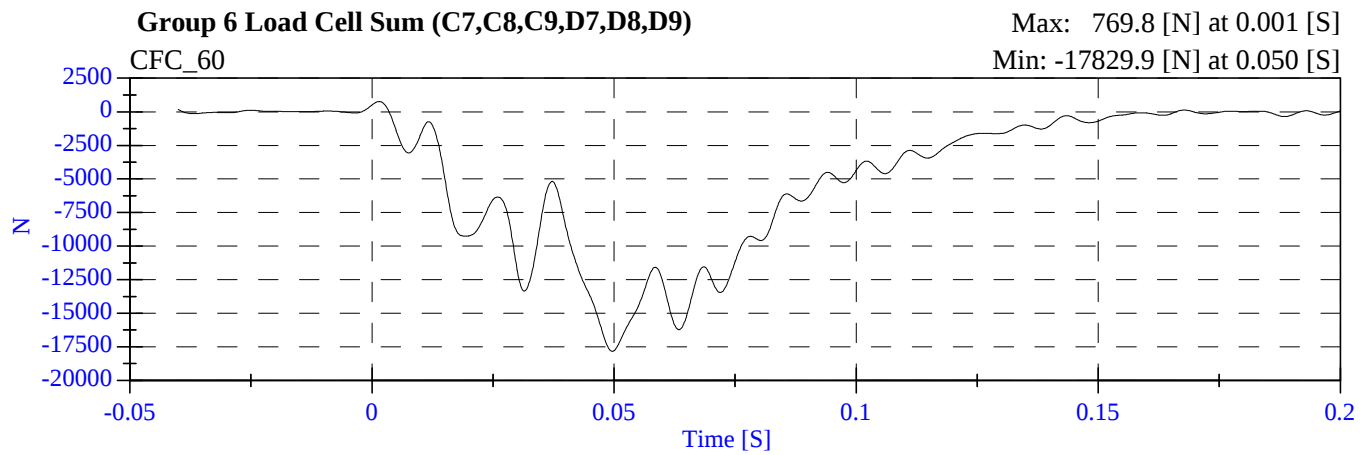
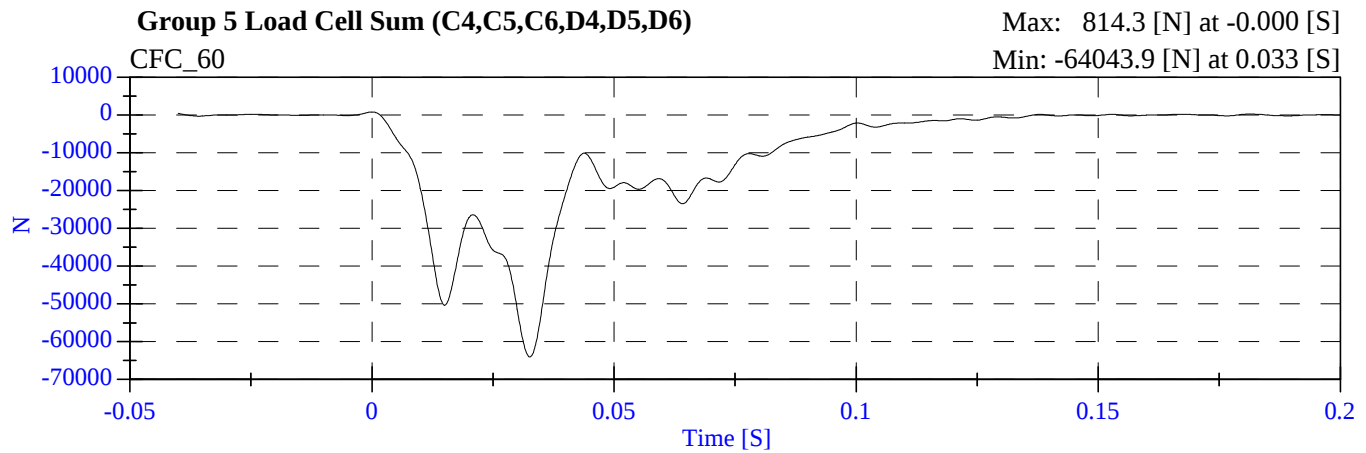


2005 NCAP Test 2 - 2005 Pontiac G6

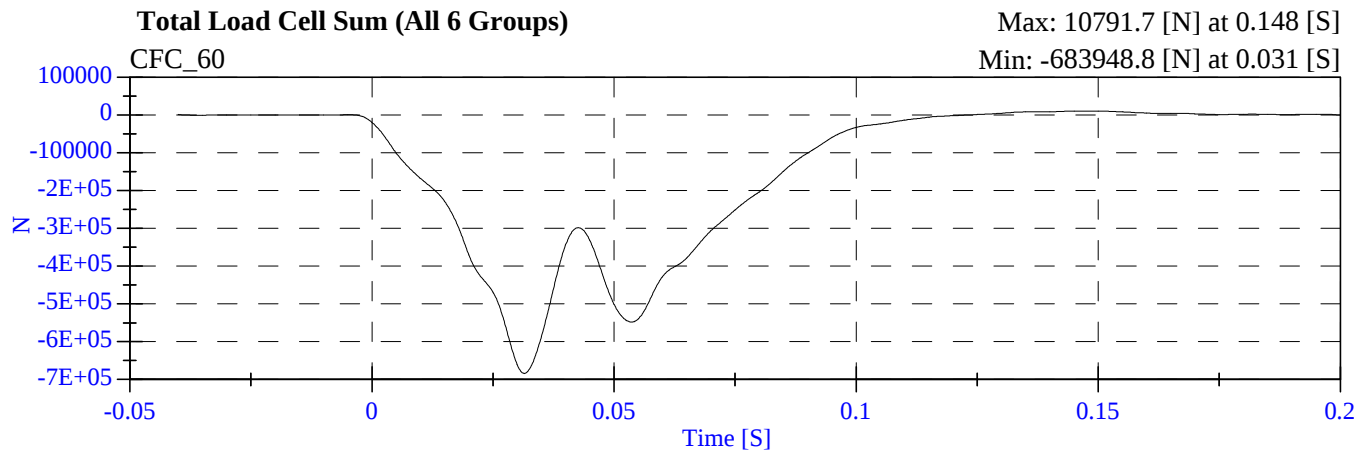
M50114 - November 19, 2004



2005 NCAP Test 2 - 2005 Pontiac G6 M50114 - November 19, 2004



2005 NCAP Test 2 - 2005 Pontiac G6 M50114 - November 19, 2004



APPENDIX C

PART 572B/E DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA SHEETS

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of General Dynamics. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

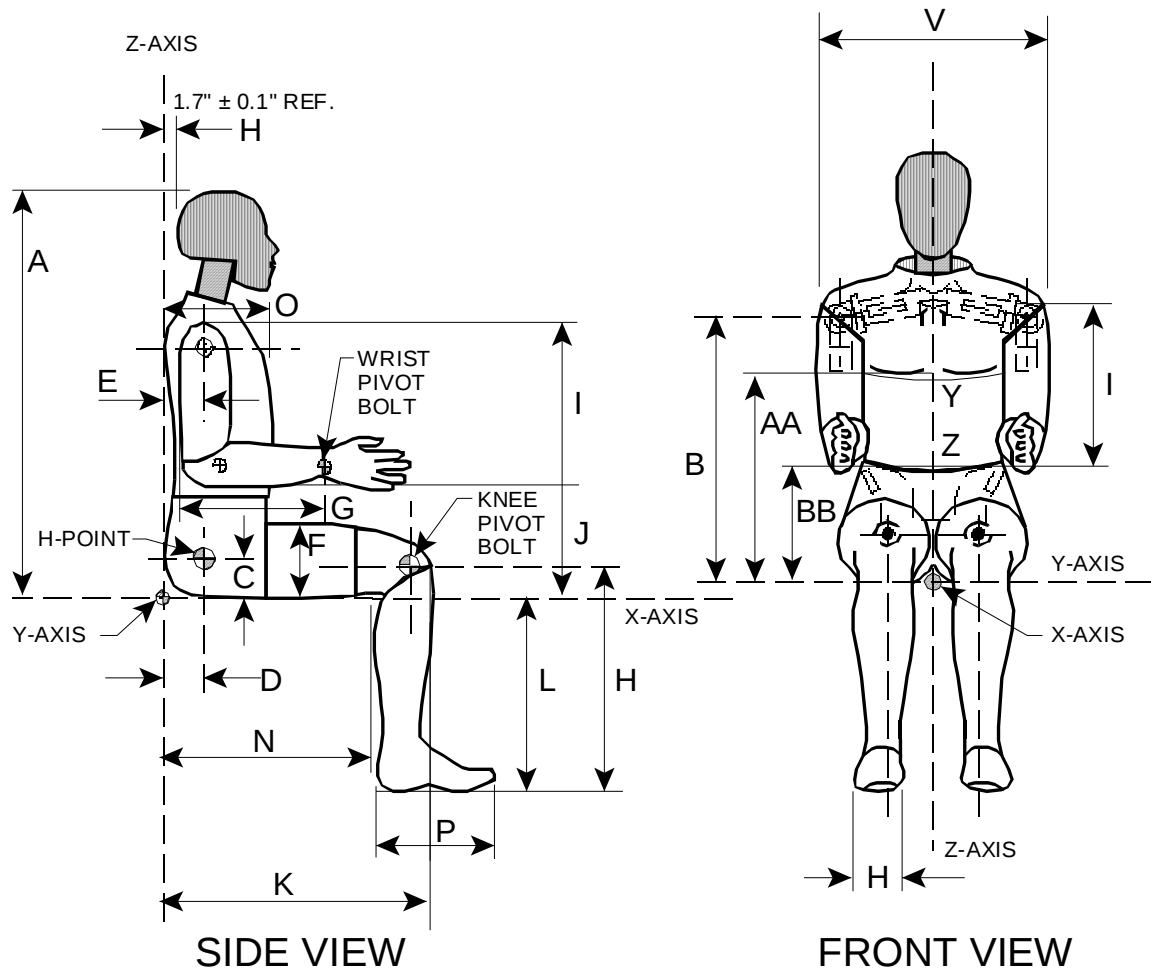
<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	061	November 16, 2004
#2/Right Front Passenger	064	November 16, 2004

Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Inducant Testing Final Report No. 6525-V-1.

DUMMY CONFIGURATION DIMENSIONS

EXTERNAL DIMENSIONS SPECIFICATIONS



NOTE: Figure is referenced to the erect seated position. The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude.
(REF: S572.31(A)(6))

PART 572E
HEAD DROP TEST

Dummy Serial Number 061
Sequential Test Number 1
Date November 12, 2004
Workfile 061H 11-12-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	72
Relative Humidity	10% - 70%	19.00
Peak Resultant Acceleration	225-275 G's	259.60
Peak Lateral Acceleration	15 G's Max	7.76
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	061	
Sequential Test Number	7	
Date	11-15-2004	6 Axis Neck Transducer
Workfile	061 H-N7 11-15-04	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.00
Relative Humidity		10% - 70%	35.00
Impact Velocity		22.60 - 23.40 Ft/s	23.10
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	23.07
	20 ms	17.60 - 22.60 G's	22.58
	30 ms	12.50 - 18.50 G's	17.63
Max Pendulum G's Above 30 ms		29 G's Max	17.63
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	38.50
D Plane Rotation	Max	64 - 78 Deg	64.96
	Time	57 - 64 ms	57.00
Moment About Occipital Condyle	Max	88.13 – 108.47 Nm	91.70
	Time	47 - 58 ms	48.60
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	118.00
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	97.00

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	061	
Sequential Test Number	3	
Date	11-15-2004	6 Axis Neck Transducer
Workfile	061ext H-N3 11-15-04	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.00
Relative Humidity		10% - 70%	35.00
Impact Velocity		19.50 - 20.30 Ft/s	20.10
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	17.24
	20 ms	14.00 - 19.00 G's	14.99
	30 ms	11.00 - 16.00 G's	12.51
Max Pendulum G's Above 30 ms		22 G's Max	12.51
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	45.70
D Plane Rotation	Max	81 - 106 Deg	82.58
	Time	72 - 82 ms	79.50
Moment About Occipital Condyle	Max	-79.99 - -52.88 Nm	-60.76
	Time	65 - 79 ms	65.60
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	169.70
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	144.40

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 061
Sequential Test Number 1
Date 11-16-2004
Workfile 061 Torso 11-16-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.00
Relative Humidity	10% - 70%	35.00
Pendulum Velocity	21.6 - 22.4 Ft/s	22.35
Maximum Deflection	2.50 - 2.86 in	2.52
Maximum Resistive Force	1160 - 1325 Lbs	1245.63
Internal Hysteresis	69 - 85 %	73.65

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 061
Sequential Test Number 1
Date 11/15/2004
Workfile 061LF 11-15-04/ 061RF 11-15-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	70.00
Relative Humidity	10% - 70%	35.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1296.37
RIGHT KNEE		
Temperature	66 - 78 Deg F	70.00
Relative Humidity	10% - 70%	35.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1258.68

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 061
Sequential Test Number 1
Date November 16, 2004

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70.00
Relative Humidity			37.00
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.2
Waist Circumference	Z	32.9 - 34.1 in	33.6
Chest Depth	O	8.4 - 9.0 in	8.4
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.8
Thigh Clearance	F	5.5 - 6.1 in	6.0
Buttock Knee Length	K	22.8 - 23.8 in	23.6
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.7
Knee Pivot Height	M	19.1 - 19.7 in	19.4
Foot Length	P	9.9 - 10.5 in	10.1
Foot Breadth	W	3.6 - 4.2 in	3.8
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.5
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.1
Elbow Rest Height	J	7.5 - 8.3 in	7.8
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.4
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
HEAD DROP TEST

Dummy Serial Number 064
Sequential Test Number 2
Date 11-13-2004
Workfile 064 H2 11-13-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.0
Relative Humidity	10% - 70%	35.00
Peak Resultant Acceleration	225-275 G's	255.41
Peak Lateral Acceleration	15 G's Max	10.03
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	064	
Sequential Test Number	3	
Date	11-16-2004	6 Axis Neck Transducer
Workfile	064 Flex H-N3 11-16-04	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.00
Relative Humidity		10% - 70%	35.00
Impact Velocity		22.60 - 23.40 Ft/s	23.10
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	22.70
	20 ms	17.60 - 22.60 G's	19.73
	30 ms	12.50 - 18.50 G's	15.95
Max Pendulum G's Above 30 ms		29 G's Max	21.73
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	42.0
D Plane Rotation	Max	64 - 78 Deg	66.47
	Time	57 - 64 ms	62.00
Moment About Occipital Condyle	Max	88.13 – 108.47 Nm	91.54
	Time	47 - 58 ms	54.70
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	125.00
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	97.60

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	064	
Sequential Test Number	2	
Date	11-15-2004	6 Axis Neck Transducer
Workfile	064 ext H-N2 11-15-04	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.00
Relative Humidity		10% - 70%	35.00
Impact Velocity		19.50 - 20.30 Ft/s	20.10
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	19.98
	20 ms	14.00 - 19.00 G's	18.86
	30 ms	11.00 - 16.00 G's	15.91
Max Pendulum G's Above 30 ms		22 G's Max	15.91
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	38.10
D Plane Rotation	Max	81 - 106 Deg	94.41
	Time	72 - 82 ms	76.10
Moment About Occipital Condyle	Max	-79.99 - -52.88 Nm	-68.67
	Time	65 - 79 ms	70.50
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	162.20
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	142.20

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 064
Sequential Test Number 1
Date 11-16-2004
Workfile 064 Torso 11-16-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.00
Relative Humidity	10% - 70%	35.00
Pendulum Velocity	21.6 - 22.4 Ft/s	22.40
Maximum Deflection	2.50 - 2.86 in	2.54
Maximum Resistive Force	1160 - 1325 Lbs	1233.84
Internal Hysteresis	69 - 85 %	75.35

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 064
Sequential Test Number 1
Date 11/15/2004
Workfile 064LF 11-15-04/ 064RF 11-15-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	70.00
Relative Humidity	10% - 70%	35.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1200.16
RIGHT KNEE		
Temperature	66 - 78 Deg F	70.00
Relative Humidity	10% - 70%	35.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1293.28

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 064
Sequential Test Number 1
Date November 16, 2004

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70.00
Relative Humidity			37.00
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.2
Waist Circumference	Z	32.9 - 34.1 in	34.0
Chest Depth	O	8.4 - 9.0 in	8.6
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.8
Thigh Clearance	F	5.5 - 6.1 in	6.0
Buttock Knee Length	K	22.8 - 23.8 in	23.6
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.3
Knee Pivot Height	M	19.1 - 19.7 in	19.4
Foot Length	P	9.9 - 10.5 in	10.2
Foot Breadth	W	3.6 - 4.2 in	3.8
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.6
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.4
Elbow Rest Height	J	7.5 - 8.3 in	8.0
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.4
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6

Remarks:

Laboratory Technician:

B. Swiecicki

APPENDIX D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 061)		Manufacturer	Serial #	Calibration	
				Last	Next
Head 9 Array	X Arm Y	ENDEVCO	AC-P32295	12-Jul-04	12-Jan-05
	X Arm Z	ENDEVCO	AC-P32455	12-Jul-04	12-Jan-05
	Y Arm X	ENDEVCO	AC-P32227	12-Jul-04	12-Jan-05
	Y Arm Z	ENDEVCO	AC-P32139	12-Jul-04	12-Jan-05
	Z Arm X	ENDEVCO	AC-P32197	12-Jul-04	12-Jan-05
	Z Arm Y	ENDEVCO	AC-P32464	12-Jul-04	12-Jan-05
Head	X	ENDEVCO	AC-P32276	12-Jul-04	12-Jan-05
	Y	ENDEVCO	AC-P32146	12-Jul-04	12-Jan-05
	Z	ENDEVCO	AC-P32217	12-Jul-04	12-Jan-05
Head	X (R)	ENDEVCO	AC-P32289	12-Jul-04	12-Jan-05
	Y (R)	ENDEVCO	AC-P32225	12-Jul-04	12-Jan-05
	Z (R)	ENDEVCO	AC-P32453	12-Jul-04	12-Jan-05
Neck Load Cell	X	DENTON	LC-1633Fx	05-Aug-04	05-Feb-05
	Y	DENTON	LC-1633Fy	05-Aug-04	05-Feb-05
	Z	DENTON	LC-1633Fz	05-Aug-04	05-Feb-05
Neck Moment	X	DENTON	LC-1633Mx	05-Aug-04	05-Feb-05
	Y	DENTON	LC-1633My	05-Aug-04	05-Feb-05
	Z	DENTON	LC-1633Mz	05-Aug-04	05-Feb-05
Chest	X	ENDEVCO	AC-P16863	19-Jul-04	19-Jan-05
	Y	ENDEVCO	AC-P17283	19-Jul-04	19-Jan-05
	Z	ENDEVCO	AC-P23640	14-Jul-04	14-Jan-05
Chest	X (R)	ENDEVCO	AC-P17235	14-Jul-04	14-Jan-05
	Y (R)	ENDEVCO	AC-P17285	19-Jul-04	19-Jan-05
	Z (R)	ENDEVCO	AC-P14393	14-Jul-04	14-Jan-05
Chest Deflection	X	SERVO	DS-061	11-Nov-04	11-Jun-05
Pelvic	X	ENDEVCO	AC-P23939	08-Sep-04	08-Mar-05
	Y	ENDEVCO	AC-P23999	08-Sep-04	08-Mar-05
	Z	ENDEVCO	AC-P23993	08-Sep-04	08-Mar-05

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 061)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	GSE	LC-656	05-Nov-04	05-May-05
Right Femur Load Cell	Fz	GSE	LC-657	05-Nov-04	05-May-05
Left Upper Tibia	Mx	DENTON	LC-199Mx	24-Aug-04	24-Feb-05
	My	DENTON	LC-199My	24-Aug-04	24-Feb-05
Left Lower Tibia	Fz	DENTON	LC-128Fz	23-Aug-04	23-Feb-05
	Mx	DENTON	LC-128Mx	23-Aug-04	23-Feb-05
	My	DENTON	LC-128My	23-Aug-04	23-Feb-05
Right Upper Tibia	Mx	DENTON	LC-200Mx	14-Sep-04	14-Mar-05
	My	DENTON	LC-200My	14-Sep-04	14-Mar-05
Right Lower Tibia	Fz	DENTON	LC-129Fz	10-Aug-04	10-Feb-05
	Mx	DENTON	LC-129Mx	10-Aug-04	10-Feb-05
	My	DENTON	LC-129My	10-Aug-04	10-Feb-05
Left Foot Rear	X	ENDEVCO	AC-AJ8C0	08-Nov-04	08-May-05
	Z	ENDEVCO	AC-J19868	08-Nov-04	08-May-05
Left Foot Front	Z	ENDEVCO	AC-J34378	08-Nov-04	08-May-05
Right Foot Rear	X	ENTRAN	AC-01G18-F15	08-Nov-04	08-May-05
	Z	ENTRAN	AC-01G18-F14	08-Nov-04	08-May-05
Right Foot Front	Z	ENTRAN	AC-00L13-F04	08-Nov-04	08-May-05
Lap Belt Load Cell		LEBOW	LC-706	01-Nov-04	01-May-05
Shoulder Belt Load Cell		First Technology	LC-156	01-Nov-04	01-May-05

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 064)		Manufacturer	Serial #	Calibration	
				Last	Next
Head 9 Array	X Arm Y	ENDEVCO	AC-P17563	26-Jul-04	26-Jan-05
	X Arm Z	ENDEVCO	AC-P32218	04-Nov-04	04-May-05
	Y Arm X	ENDEVCO	AC-P14965	26-Jul-04	26-Jan-05
	Y Arm Z	ENDEVCO	AC-P18948	20-Jul-04	20-Jan-05
	Z Arm X	ENDEVCO	AC-P18785	07-Sep-04	07-Mar-05
	Z Arm Y	ENDEVCO	AC-P23926	20-Jul-04	20-Jan-05
Head	X	ENDEVCO	AC-P18524	19-Aug-04	19-Feb-05
	Y	ENDEVCO	AC-P18518	19-Aug-04	19-Feb-05
	Z	ENDEVCO	AC-P18533	19-Aug-04	19-Feb-05
Head	X (R)	ENDEVCO	AC-P18514	19-Aug-04	19-Feb-05
	Y (R)	ENDEVCO	AC-P18688	19-Aug-04	19-Feb-05
	Z (R)	ENDEVCO	AC-P18531	19-Aug-04	19-Feb-05
Neck Load Cell	X	DENTON	LC-1634Fx	05-Aug-04	05-Feb-05
	Y	DENTON	LC-1634Fy	05-Aug-04	05-Feb-05
	Z	DENTON	LC-1634Fz	05-Aug-04	05-Feb-05
Neck Moment	X	DENTON	LC-1634Mx	05-Aug-04	05-Feb-05
	Y	DENTON	LC-1634My	05-Aug-04	05-Feb-05
	Z	DENTON	LC-1634Mz	05-Aug-04	05-Feb-05
Chest	X	ENDEVCO	AC-P17141	19-Jul-04	19-Jan-05
	Y	ENDEVCO	AC-P16832	19-Jul-04	19-Jan-05
	Z	ENDEVCO	AC-P17152	19-Jul-04	19-Jan-05
Chest	X (R)	ENDEVCO	AC-P16286	19-Jul-04	19-Jan-05
	Y (R)	ENDEVCO	AC-P17242	19-Jul-04	19-Jan-05
	Z (R)	ENDEVCO	AC-P16591	07-Oct-04	07-Apr-05
Chest Deflection	X	SERVO	DS-064	11-Nov-04	11-May-05
Pelvic	X	ENDEVCO	AC-P12587	16-Aug-04	16-Feb-05
	Y	ENDEVCO	AC-P17236	16-Aug-04	16-Feb-05
	Z	ENDEVCO	AC-P16597	16-Aug-04	16-Feb-05

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 064)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	GSE	LC-653	05-Nov-04	05-May-05
Right Femur Load Cell	Fz	GSE	LC-654	05-Nov-04	05-May-05
Left Upper Tibia	Mx	DENTON	LC-264Mx	23-Aug-04	23-Feb-05
	My	DENTON	LC-264My	23-Aug-04	23-Feb-05
Left Lower Tibia	Fz	DENTON	LC-177Fz	23-Aug-04	23-Feb-05
	Mx	DENTON	LC-177Mx	23-Aug-04	23-Feb-05
	My	DENTON	LC-177My	23-Aug-04	23-Feb-05
Right Upper Tibia	Mx	DENTON	LC-265Mx	10-Aug-04	10-Feb-05
	My	DENTON	LC-265My	10-Aug-04	10-Feb-05
Right Lower Tibia	Fz	DENTON	LC-178Fz	14-Aug-04	14-Feb-05
	Mx	DENTON	LC-178Mx	14-Aug-04	14-Feb-05
	My	DENTON	LC-178My	14-Aug-04	14-Feb-05
Left Foot Rear	X	ENTRAN	AC-01J02-F09	08-Nov-04	08-May-05
	Z	ENTRAN	AC-01G18-F03	08-Nov-04	08-May-05
Left Foot Front	Z	ENTRAN	AC-01G18-F05	08-Nov-04	08-May-05
Right Foot Rear	X	ENDEVCO	AC-J36176	08-Nov-04	08-May-05
	Z	ENDEVCO	AC-J18662	08-Nov-04	08-May-05
Right Foot Front	Z	ENDEVCO	AC-J18059	08-Nov-04	08-May-05
Lap Belt Load Cell		LEBOW	LC-707	01-Nov-04	01-May-05
Shoulder Belt Load Cell		First Technology	LC-175	01-Nov-04	01-May-05

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ICS	AC-FGP50	24-Aug-04	24-Feb-05
Right Rear Seat Crossmember X	ICS	AC-FGP19	27-Aug-04	27-Feb-05
Top of Engine	ICS	AC-FGP25	24-Aug-04	24-Feb-05
Bottom of Engine	ICS	AC-FGP27	24-Aug-04	24-Feb-05
Right Disc Brake Caliper	ICS	AC-FGP40	24-Aug-04	24-Feb-05
Instrument Panel	ICS	AC-FGP42	20-Aug-04	20-Feb-05
Left Disc Brake Caliper	ICS	AC-FGP13	24-Aug-04	24-Feb-05
Left Seat Rear Crossmember Z	ICS	AC-FGP26	27-Aug-04	27-Feb-05
Right Seat Rear Crossmember Z	ICS	AC-FGP29	27-Aug-04	27-Feb-05

REPORT NUMBER: CAL-05-02

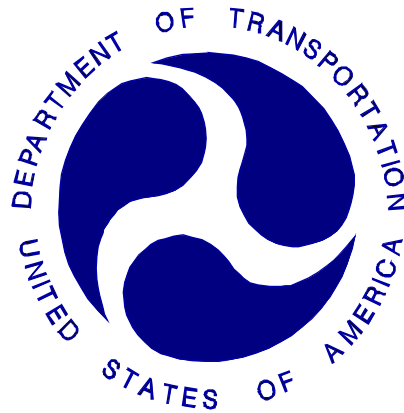
NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

EVENFLO TITAN V FORWARD FACING CONVERTIBLE WITH LATCH AND TOP TETHER
AND GRACO TURBOBOOSTER

NHTSA NUMBER: M50114

GENERAL DYNAMICS REPORT NUMBER: 8642-NCAP-52

GENERAL DYNAMICS
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225



November 19, 2004

FINAL REPORT

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
Mail Code: NVS-111
400 Seventh Street, SW, Room No. 5313
Washington, DC 20590

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-01-D-32005. This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

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1. Report No. CAL-05-02		2. Government Accession No.		3. Recipient's Catalog No.	
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				6. Performing Organization Code CAL	
7. Author(s) Patrick G. MacDiarmid, Jr., Project Engineer David J. Travale, Program Manager				8. Performing Organization Report No. 8642-NCAP-52	
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12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NVS-111 400 Seventh SW, Room 5313 Washington, D.C. 20590				13. Type of Report and Period Covered Final Report, November 2004	
				14. Sponsoring Agency Code NVS-111	
15. Supplementary Notes					
16. Abstract This CRS test was performed in conjunction with a New Car Assessment Program (NCAP) load cell barrier test. An Evenflo Titan V with LATCH and Top Tether Forward Facing Convertible was secured in Position 3 (P3) with the LATCH system and top tether. A Graco Turbobooster booster seat was secured in Position 4 (P4) with the vehicle seat belt (ALR mode). This test was conducted at the General Dynamics Crash Test Facility in Buffalo, New York, on November 19, 2004.					
ATD Position		HIC 15		HIC 36	
P3 (Right Rear) (040)		633.7		684.3	
P4 (Left Rear) (009)		688.8		1010.4	
				Clip (3 ms)	
				52.0	
				58.8	
17. Key Words New Car Assessment Program (NCAP)				18. Distribution Statement	
				<u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Reference Division Room 5111 (NAD-52) 400 Seventh St., S.W. Washington, D.C. 20590 Telephone No. (202) 366-4946 ATTN: Robert Hornicle	
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SECTION 1

PURPOSE AND SUMMARY OF TEST M35306

The purpose of this test was to obtain CRS performance data in a frontal impact NCAP condition. These data constitute part of the general consumer information collected by the New Car Assessment Program (NCAP).

The 56.81 kph NCAP frontal impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

SUMMARY

Both child dummies were instrumented with head, chest, and pelvic triaxial accelerometers. In addition, chest displacement and upper six axial neck force and moment load cell sensors were utilized. Position 3 was equipped with left and right clavicle force transducers, lumbar spine force and moment transducers, left and right lower ASIS force transducers and left and right femur force transducers.

The right rear (Position 3) child dummy (serial no. 040) and left rear (Position 4) child dummy (serial no. 009) were calibrated previous to this test. Child dummy certification information is found in section 5.

The right rear child dummy's HIC (15 ms) was 633.7, maximum chest deceleration over 3 ms was 52.0 g's. The left rear child dummy's HIC (15 ms) was 688.8, maximum chest deceleration over 3 ms was 58.8 g's.

SECTION 2
DATA SHEET NO. 1
CRASH TEST SUMMARY

TEST DUMMY INFORMATION:

DESCRIPTION	Position #3 CRS	Position #4 CRS
ATD Type/Serial No.	Hybrid III 3C/040	Hybrid III 10C /009
Restraint System:	Evenflo Titan V forward facing LATCH	Graco Turbobooster

Number of Data Channels 55
Number of Cameras: 1 Real Time
2 High Speed

POST TEST DOOR OPENING

DESCRIPTION	FRONT	REAR
Left Side Doors	Closed, Latched and Operable without tools	Closed, Latched and Operable without tools
Right Side Doors	Closed, Latched and Operable without tools	Closed, Latched and Operable without tools
Hatch/Other Door	N/A	N/A

POST TEST SEAT DATA

LOCATION	SEAT MOVEMENT (mm)	SEAT BACK FAILURE
P1 (Left Front)	20 mm forward	None
P2 (Right Front)	15 mm forward	None
P3 (Right Rear)	0	None
P4 (Left Rear)	0	None

VISIBLE DUMMY CONTACT POINTS

	Position #3 CRS	Position #4 CRS
Head Contact:	The face and chin to the chest and the top and back of the head to the child restraint	The face and chin to the chest and the back of the head to the child restraint
Upper Torso Contact:	None	None
Lower Torso Contact:	None	None
Left Knee Contact:	None	None
Right Knee Contact:	None	None

DATA SHEET NO. 2

CRS PARAMETER DATA

CRS: Evenflo Titan V forward facing LATCH and Graco Turbobooster

NHTSA No. M50114

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Delivered Weight of Vehicle with Maximum Fluids = 1556 kg (A)

AS TESTED WEIGHT OF VEHICLE

(2 P572E + 1 P572P w/ CRS + 1 10 year old w/ CRS +CARGO + EQUIPMENT & INSTRUMENTATION):

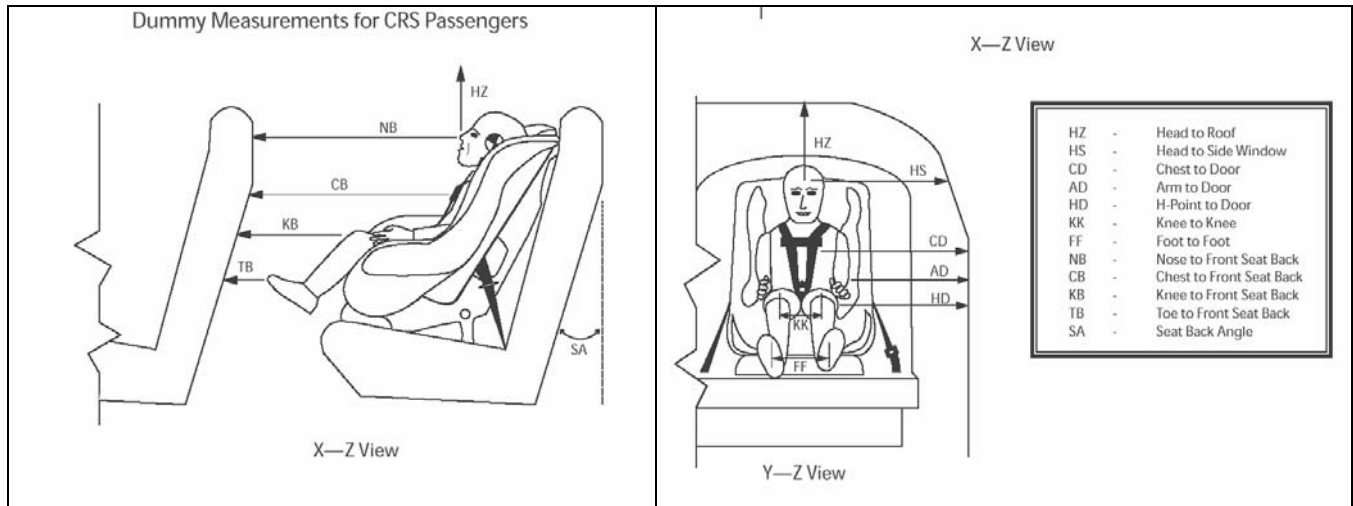
Left Front	=	<u>521.0</u>	kg	Left Rear	=	<u>357.0</u>	kg
Right Front	=	<u>533.0</u>	kg	Right Rear	=	<u>356.0</u>	kg
TOTAL FRONT	=	<u>1054.0</u>	kg	TOTAL REAR	=	<u>713.0</u>	kg
TOTAL TEST WEIGHT =		<u>1767.0</u>	kg				

DATA SHEET NO. 3

CHILD DUMMY POSITIONING IN VEHICLE

CRS: Evenflo Titan V forward facing LATCH and Graco Turbobooster

NHTSA No. M50114



Measurement	(mm)	(mm)
	P3 CRS (040)	P4 CRS (009)
SA	53	24
HS	309	215
CD	330	328
AD	236	180
HD	284	204
HZ	326	162
NB	588	640
CB	229	563
KK	100	140
FF	100	160
KB – LEFT	425	325
KB – RIGHT	425	314
TB – LEFT	152	125
TB – RIGHT	152	135
Top Tether Anchor to CRS		
Angle	-	N/A
Length	185	N/A
X	185	N/A
Y	20	N/A
Z	25	N/A

All dimensions in mm (unless noted)

P3 – Right Rear Passenger (CRS #1)

P4 – Left Rear Passenger (CRS #2)

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES

CRS: Evenflo Titan V forward facing LATCH and Graco Turbo booster

NHTSA No. M50114

DESCRIPTION	Unit	MAXIMUM VALUE							
		Position #3				Position #4			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head X	g	102.8	177.7	-36.5	81.6	0.5	31.0	-44.3	109.0
Head Y	g	2.5	188.7	-20.0	177.1	1.9	173.4	-28.4	108.8
Head Z	g	60.4	87.0	-2.2	39.1	76.0	87.0	-1.7	37.6
Head Resultant	g	107.3	177.6	0.0	-35.3	82.0	87.0	0.0	-17.2
Upper Neck Fx	N	166.4	172.7	-637.4	72.5	16.4	32.9	-1030.3	88.4
Upper Neck Fy	N	121.9	183.4	-25.4	174.4	89.9	106.7	-284.0	96.8
Upper Neck Fz	N	2274.6	82.2	-47.2	35.7	2489.2	87.0	-60.0	45.5
Upper Neck F Resultant	N	2347.2	82.3	0.5	-49.9	2688.2	87.0	1.8	-18.9
Upper Neck Mx	N-m	4.0	177.6	-3.7	184.9	8.3	160.7	-35.0	106.7
Upper Neck My	N-m	7.1	174.1	-14.4	184.2	8.6	101.6	-35.6	70.5
Upper Neck Mz	N-m	1.8	199.9	-2.6	103.5	4.0	199.8	-6.5	75.4
Upper Neck M Resultant	N-m	14.9	184.3	0.0	-48.9	36.1	70.6	0.0	-21.3
Left Clavicle Fx	N	-	-	-	-	33.2	130.6	-2944.4	71.9
Left Clavicle Fz	N	-	-	-	-	1397.2	73.3	-265.3	107.2
Right Clavicle Fx	N	-	-	-	-	134.6	76.9	-908.8	105.4
Right Clavicle Fz	N	-	-	-	-	525.6	105.4	-76.3	49.2
Chest X	g	20.6	170.0	-38.8	79.9	4.3	107.0	-53.0	70.0
Chest Y	g	3.6	88.6	-2.3	187.4	2.5	199.9	-20.9	70.3
Chest Z	g	20.0	181.4	-43.3	71.8	14.8	100.9	-23.4	76.4
Chest Resultant	g	53.6	67.4	0.0	-39.0	59.2	70.3	0.1	-18.2
Chest Displacement	g	0.0	-29.2	-19.5	110.1	0.2	88.8	-0.1	165.0
Lumbar Fx	N	-	-	-	-	1135.8	85.3	-492.5	62.5
Lumbar Fy	N	-	-	-	-	78.6	140.4	-2065.7	90.0
Lumbar Fz	N	-	-	-	-	1299.5	107.6	-2739.6	73.6
Lumbar F Resultant	N	-	-	-	-	2911.4	73.6	1.8	-12.5
Lumbar Mx	Nm	-	-	-	-	0.6	17.8	-189.0	88.7
Lumbar My	Nm	-	-	-	-	123.8	118.6	-8.4	80.4
Lumbar Mz	Nm	-	-	-	-	60.1	74.1	-0.3	-27.9
Lumbar M Resultant	Nm	-	-	-	-	201.8	88.7	0.2	-49.9

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Evenflo Titan V forward facing LATCH and Graco Turbobooster

NHTSA No. M50114

		MAXIMUM VALUE							
		Position #3				Position #4			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Pelvic X	g	7.5	119.9	-45.2	63.0	13.6	160.1	-63.7	67.4
Pelvic Y	g	4.3	74.2	-9.2	83.5	19.7	73.8	-15.1	56.3
Pelvic Z	g	25.5	181.1	-50.2	66.0	6.3	103.2	-47.9	71.6
Pelvic Resultant	g	64.4	66.0	0.1	-31.6	75.4	71.7	0.1	-17.6
Left Lower ASIS Fx	N	-	-	-	-	1.9	27.3	-421.5	81.7
Left Upper ASIS Fx	N	-	-	-	-	78.4	97.4	-39.4	80.9
Right Lower ASIS Fx	N	-	-	-	-	27.8	182.5	-865.3	88.7
Right Upper ASIS Fx	N	-	-	-	-	377.2	103.2	-385.3	68.7
Left Femur Force	N	-	-	-	-	2058.4	66.9	-255.8	180.3
Left Femur Force	N	-	-	-	-	632.2	47.4	-1002.6	59.4
Latch Belt Load	N	4046.4	75.4	-226.6	138.3	-	-	-	-
Tether Belt Load	N	3191.5	74.5	-72.2	129.6	-	-	-	-
Tether Belt Load	N	-	-	-	-	§	§	§	§
Lap Belt Load	N	-	-	-	-	10025.6	68.7	-54.7	174.4

§- Wire Cut

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Evenflo Titan V forward facing LATCH and Graco Turbobooster

NHTSA No. M50114

	HEAD INJURY CRITERIA (HIC)							
	HIC15				HIC36			
	HIC	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂	HIC	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #3 - Right	633.7	173.3	183.3	84.9	684.3	67.8	102.6	52.2
Position #4 - Left	688.8	81.0	96.0	73.3	1010.4	74.5	110.5	60.2

	CLIP SUMMARY*			
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #3 - Right	52.0	66.4	69.4	539.1
Position #4 - Left	58.8	69.6	72.6	590.4

* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

	FEMUR SUMMARY			
	Left Femur (N)	t ₁ (msec)	Right Femur (N)	t ₂ (msec)
Position #3 - Right	-	-	-	-
Position #4 - Left	-255.8	180.3	-1002.6	59.4

DATA SHEET NO. 5

CRS PERFORMANCE DATA

CRS: Evenflo Titan V forward facing LATCH and Graco Turbobooster

NHTSA No. M50114

		MAXIMUM VALUE			
DESCRIPTION	Unit	Positive	Time (ms)	Negative	Time (ms)
P3 CRS X	g	§	§	§	§
P3 CRS Y	g	§	§	§	§
P3 CRS Z	g	§	§	§	§
P3 CRS Resultant	g	§	§	§	§

§ - Transducer dislodged during the event

DATA SHEET NO. 5

CRS PERFORMANCE DATA (CONTINUED)

CRS: Evenflo Titan V forward facing LATCH and Graco Turbobooster

NHTSA No. M50114

POSITION #3 CRS POST-TEST INSPECTION (Serial No. 3672098 P1 – 22JAN04)

LOCATION	DAMAGE	REMARKS
Upper Tether Strap	No	None
Upper Tether Buckle	No	None
Upper Tether Hook	No	None
Vehicle Upper Tether Anchor	No	None
Lower Anchor Strap	No	None
Lower Anchor Buckle	No	None
Lower Anchor Hooks	No	None
Vehicle Lower CRS Anchors	No	None
Five Point Harness Connections	No	None
Cracks on CRS	No	None
Fabric Tears on CRS	No	None
Vehicle Seat Structure	No	None
Vehicle Seat Fabric Tears	No	None
Child Dummy	No	None

POSITION #4 CRS POST-TEST INSPECTION (Serial No. JJ0917041915559 - 091704)

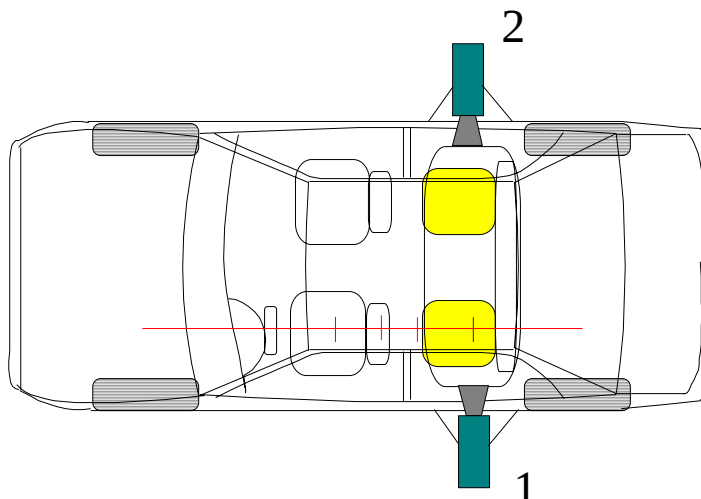
LOCATION	DAMAGE	REMARKS
Upper Tether Strap	NA	NA
Upper Tether Buckle	NA	NA
Upper Tether Hook	NA	NA
Vehicle Upper Tether Anchor	NA	NA
Lower Anchor Strap	NA	NA
Lower Anchor Buckle	NA	NA
Lower Anchor Hooks	NA	NA
Vehicle Lower CRS Anchors	NA	NA
Five Point Harness Connections	NA	NA
Cracks on CRS	No	None
Fabric Tears on CRS	No	None
Vehicle Seat Structure	No	None
Vehicle Seat Fabric Tears	No	None
Child Dummy	No	None

DATA SHEET NO. 6

CRS CAMERA DATA

CRS: Evenflo Titan V forward facing LATCH and Graco Turbo booster

NHTSA No. M50114



Camera No.	View	Coordinates (millimeters)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Left side CRS lateral view	2625	3150	2288	-24.1	28	1000
2	Right side CRS lateral view	3100	2730	2260	-24.1	28	1000

* Reference (from point of impact); all measurements accurate to within ± 6 mm.

X = + Forward

Y = + To Right

Z = + Down

SECTION 3

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Figure 3-1 CLOSE-UP VIEW OF POSITION 3 CRS LABEL



Figure 3-2 PRE-TEST FRONTAL VIEW OF POSITION 3 CRS



Figure 3-3 POST-TEST FRONTAL VIEW OF POSITION 3 CRS



Figure 3-4 PRE-TEST REAR VIEW OF POSITION 3 CRS



Figure 3-5 POST-TEST REAR VIEW OF POSITION 3 CRS



Figure 3-6 PRE-TEST LEFT SIDE VIEW OF POSITION 3 CRS



Figure 3-7 POST-TEST LEFT SIDE VIEW OF POSITION 3 CRS



Figure 3-8 PRE-TEST RIGHT SIDE VIEW OF POSITION 3 CRS



Figure 3-9 POST-TEST RIGHT SIDE VIEW OF POSITION 3 CRS

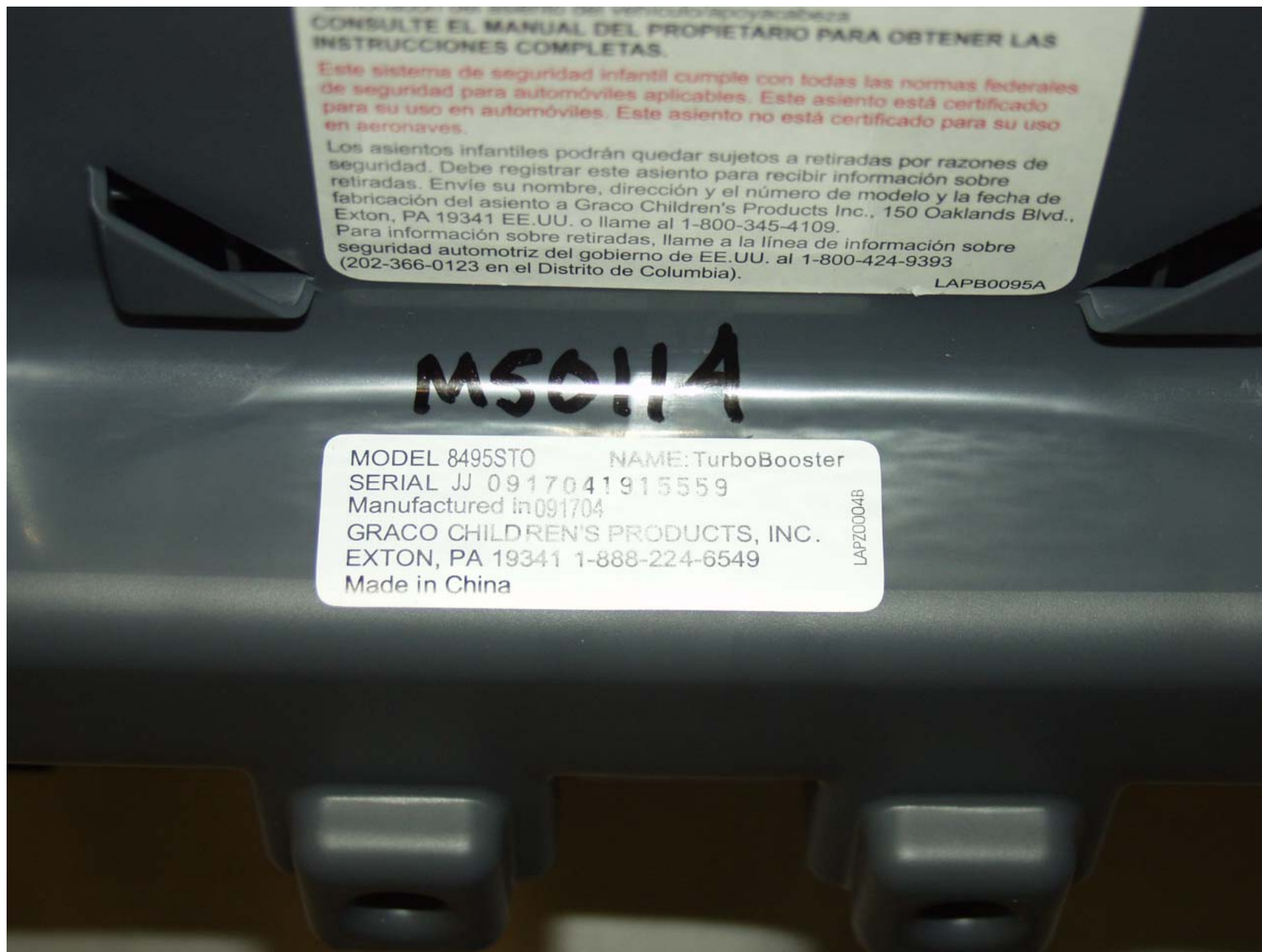


Figure 3-10 CLOSE-UP VIEW OF POSITION 4 CRS LABEL



Figure 3-11 PRE-TEST FRONTAL VIEW OF POSITION 4 CRS



Figure 3-12 POST-TEST FRONTAL VIEW OF POSITION 4 CRS



Figure 3-13 PRE-TEST REAR VIEW OF POSITION 4 CRS



Figure 3-14 POST-TEST REAR VIEW OF POSITION 4 CRS



Figure 3-15 PRE-TEST LEFT SIDE VIEW OF POSITION 4 CRS



Figure 3-16 POST-TEST LEFT SIDE VIEW OF POSITION 4 CRS



Figure 3-17 PRE-TEST RIGHT SIDE VIEW OF POSITION 4 CRS



Figure 3-18 POST-TEST RIGHT SIDE VIEW OF POSITION 4 CRS



Figure 3-19 PRE-TEST POSITION 3 LEFT SIDE VIEW



Figure 3-20 POST-TEST POSITION 3 LEFT SIDE VIEW



Figure 3-21 PRE-TEST POSITION 4 LEFT SIDE VIEW



Figure 3-22 POST-TEST POSITION 4 LEFT SIDE VIEW



Figure 3-23 PRE-TEST POSITION 3 RIGHT SIDE VIEW



Figure 3-24 POST-TEST POSITION 3 RIGHT SIDE VIEW



Figure 3-25 PRE-TEST POSITION 4 RIGHT SIDE VIEW



Figure 3-26 POST-TEST POSITION 4 RIGHT SIDE VIEW



Figure 3-27 PRE-TEST POSITION 3 FRONT VIEW



Figure 3-28 POST-TEST POSITION 3 FRONT VIEW



Figure 3-29 PRE-TEST POSITION 4 FRONT VIEW



Figure 3-30 POST-TEST POSITION 4 FRONT VIEW

SECTION 4

CHILD DUMMY RESPONSE AND CRS DATA TRACES

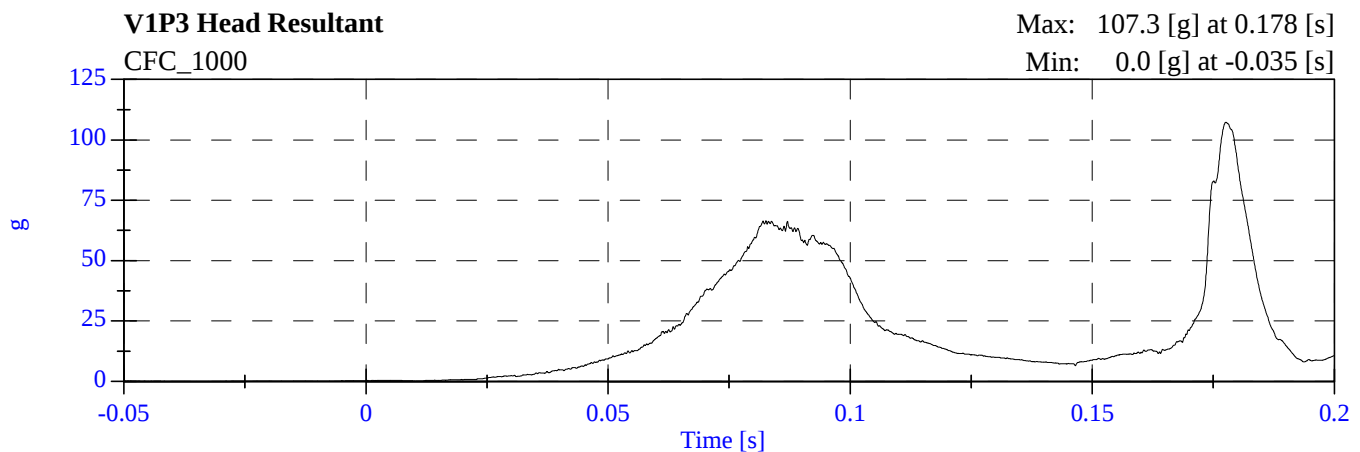
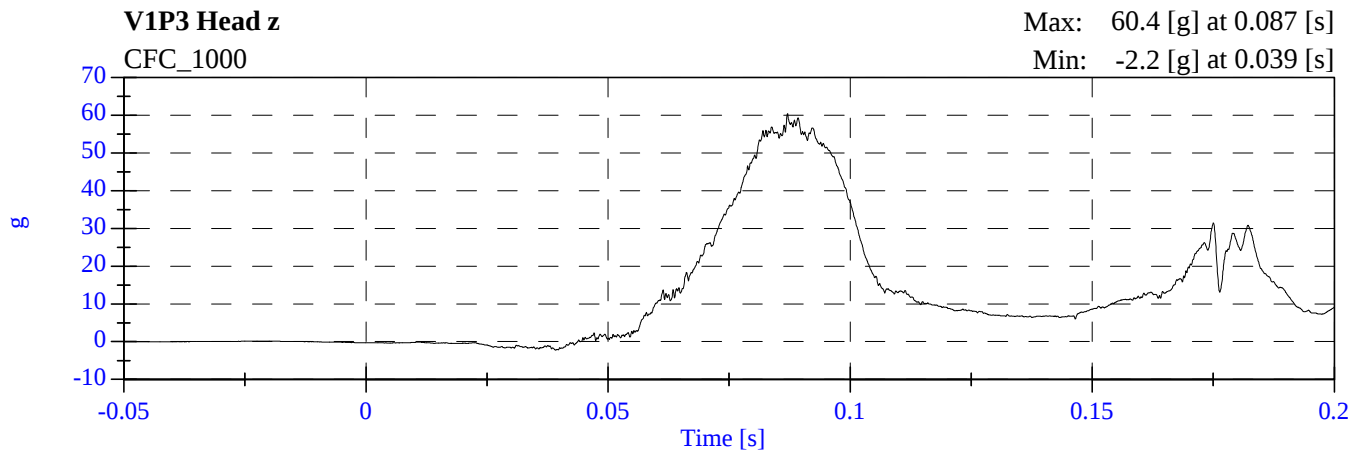
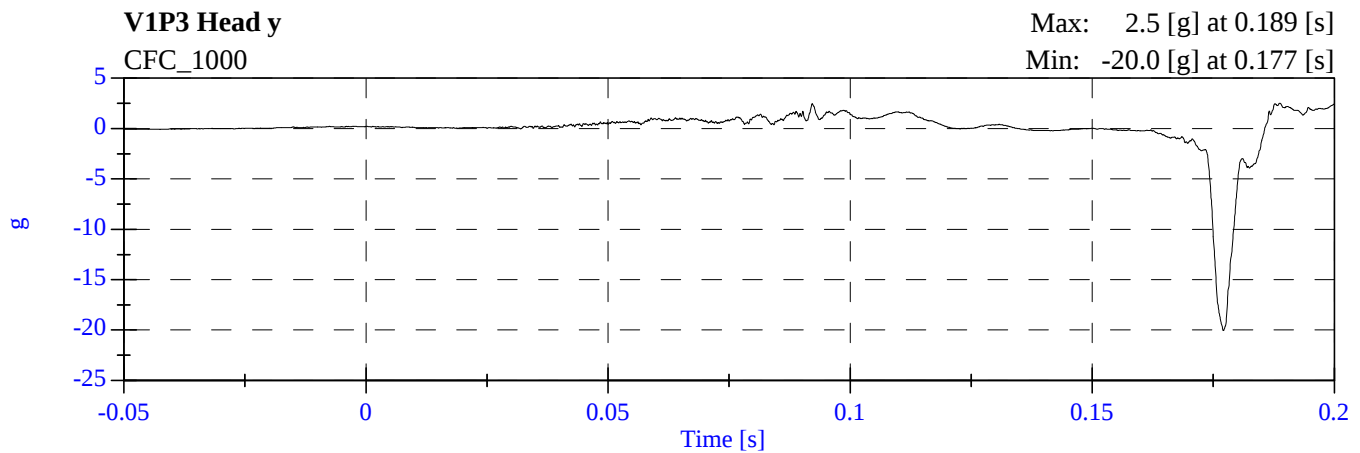
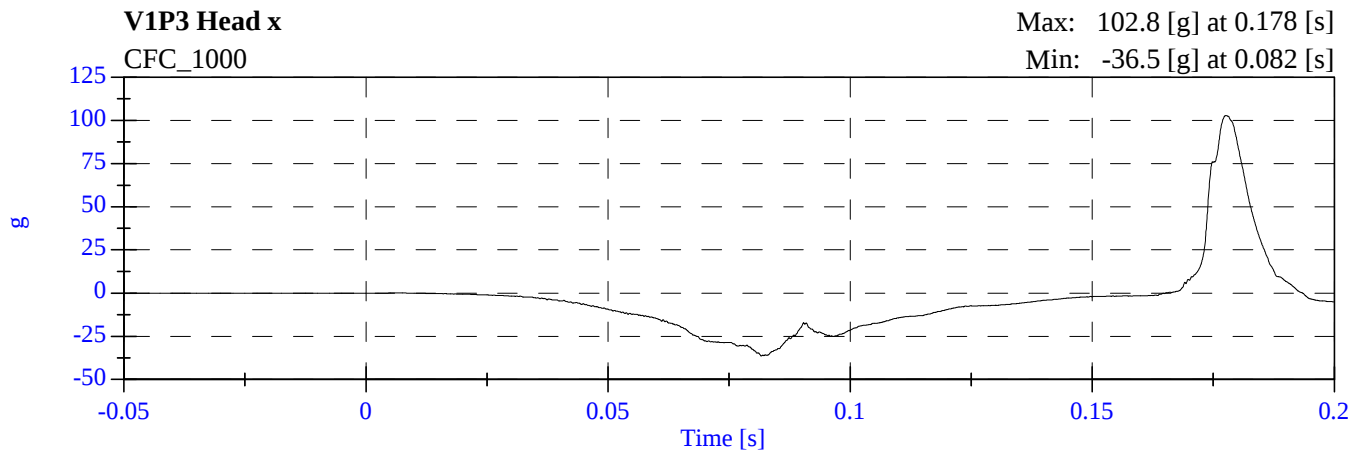
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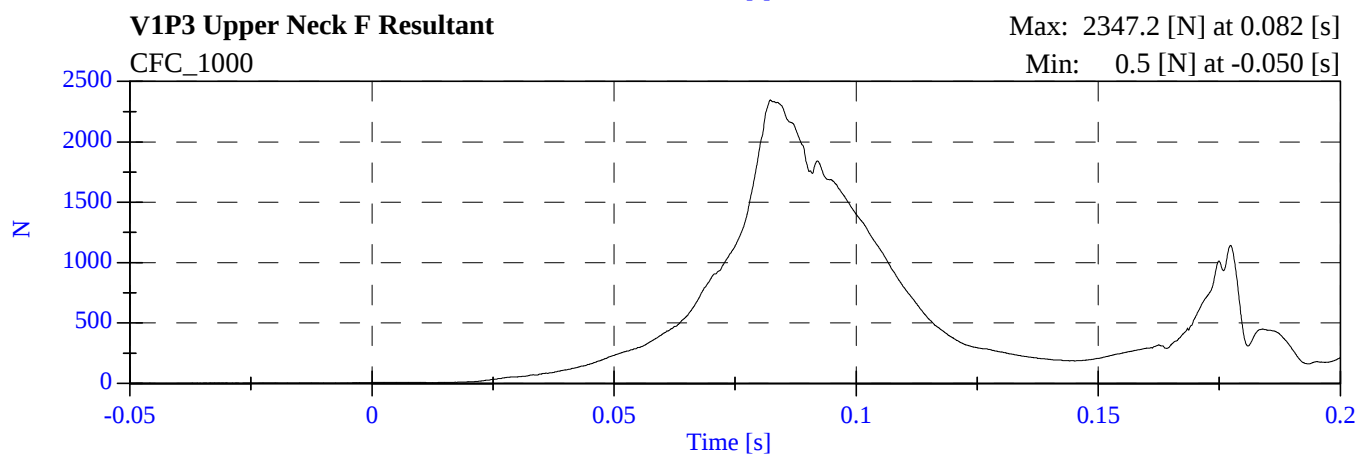
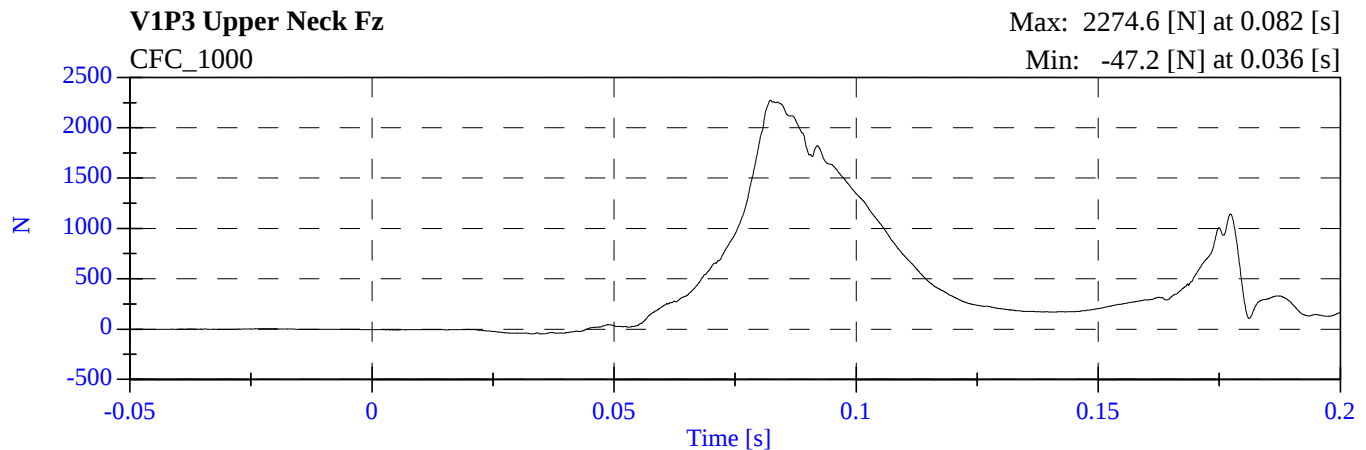
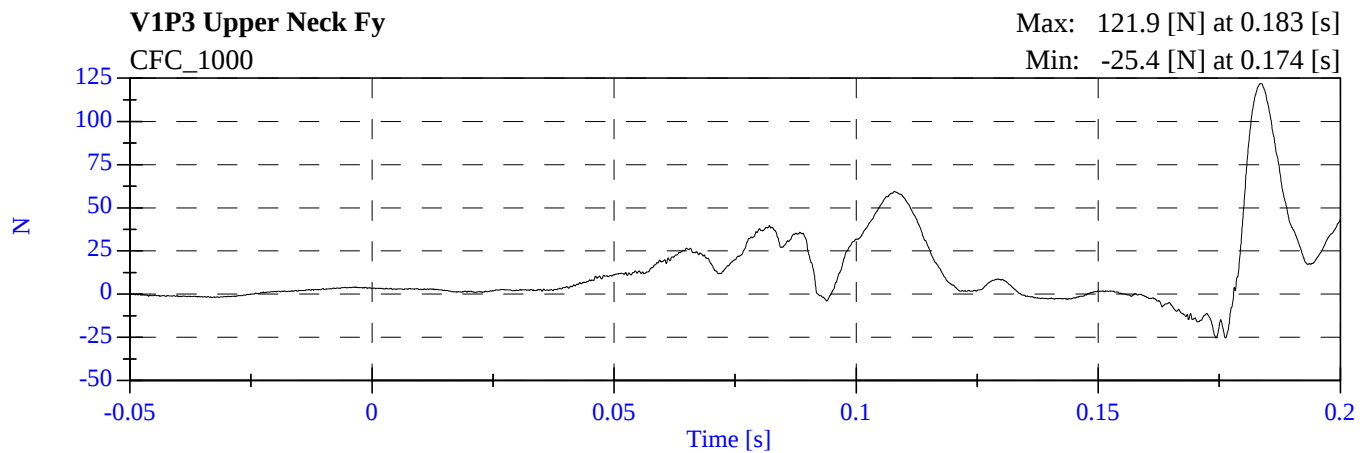
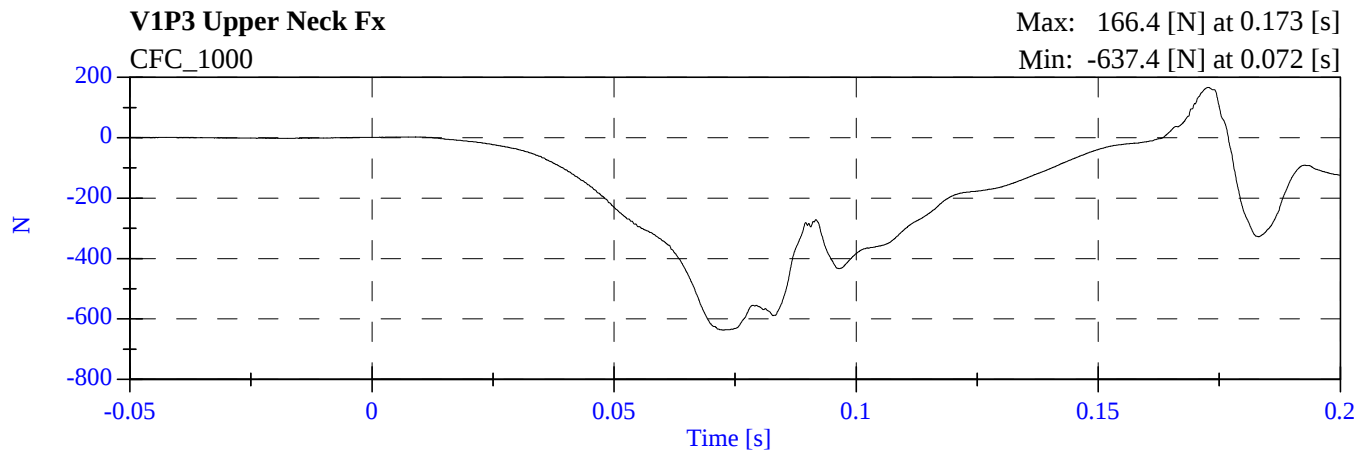
TABLE OF DATA PLOTS (Continued)

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72	V1P3 CRS z Velocity [kph, CFC_180]	4-25
73	V1P3 CRS z Displacement [mm, CFC_180]	4-25
74	V1P3 CRS Resultant [g, CFC_60]	4-25

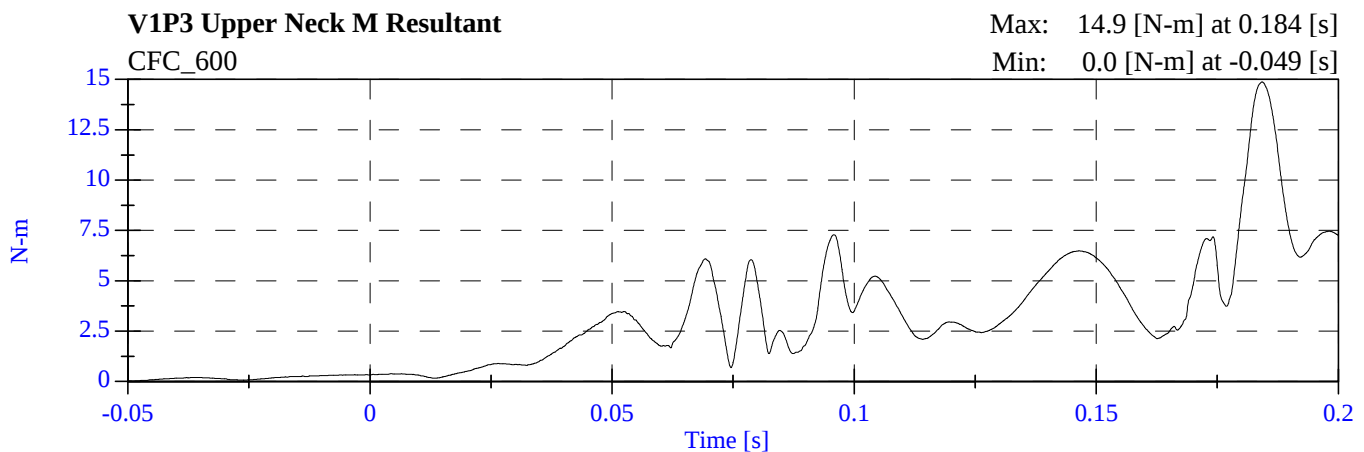
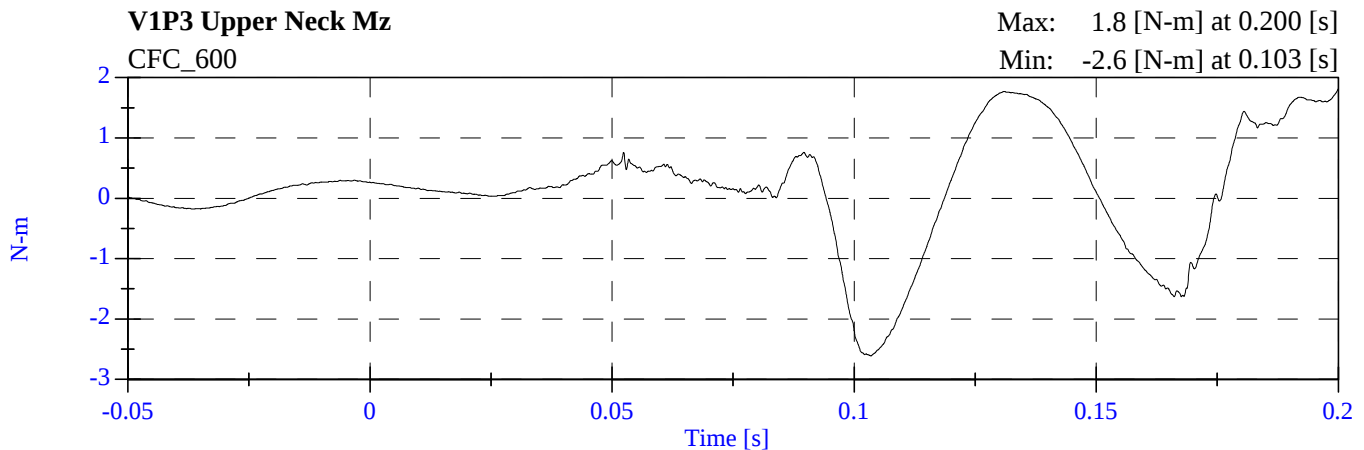
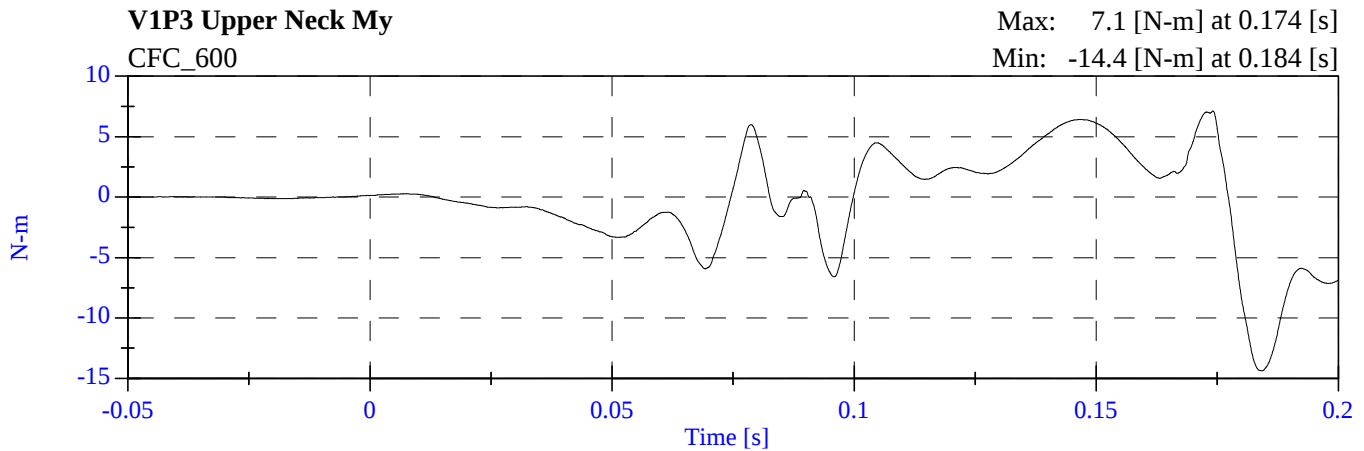
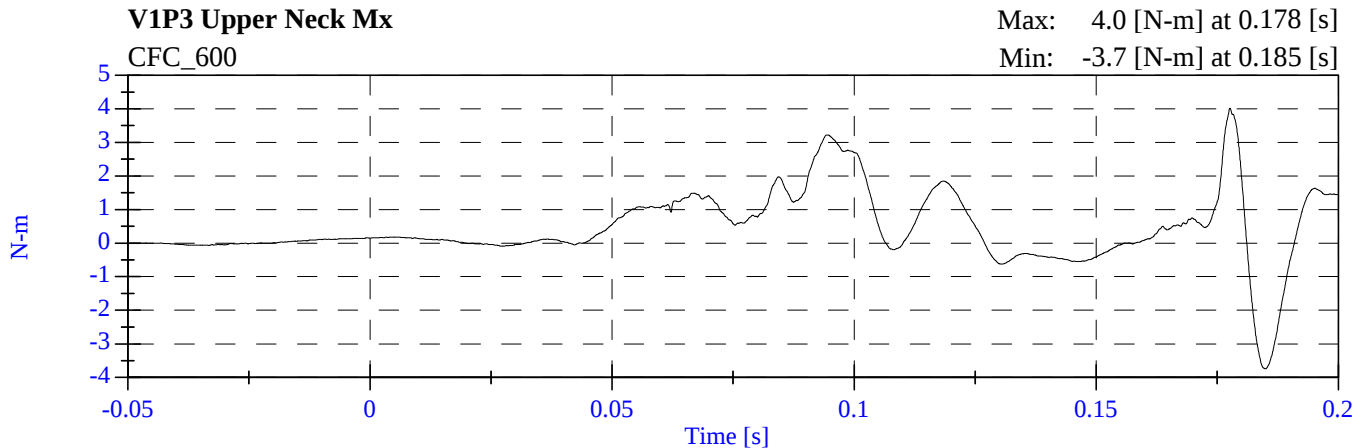
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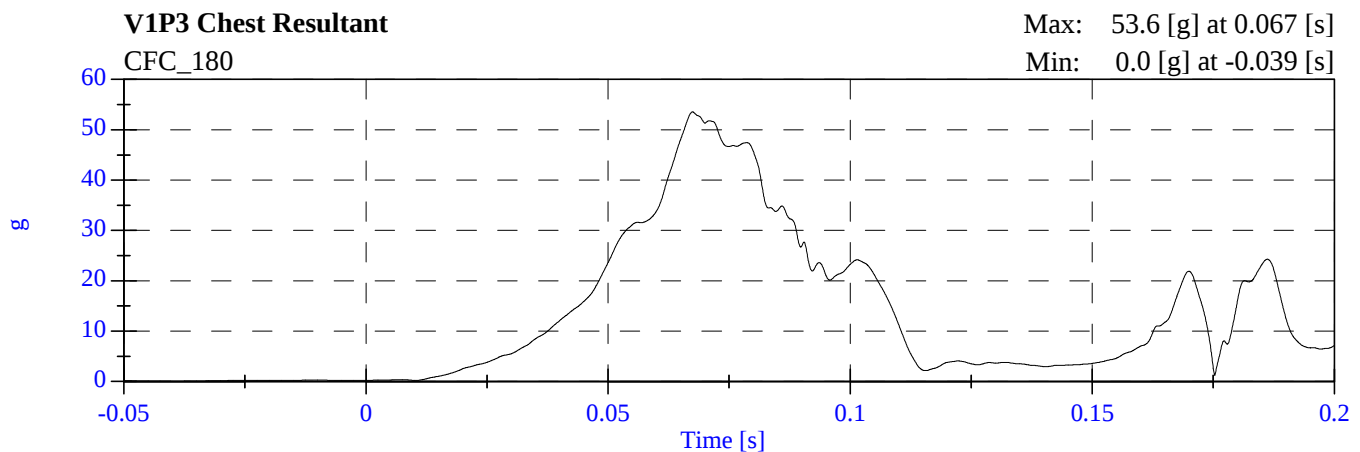
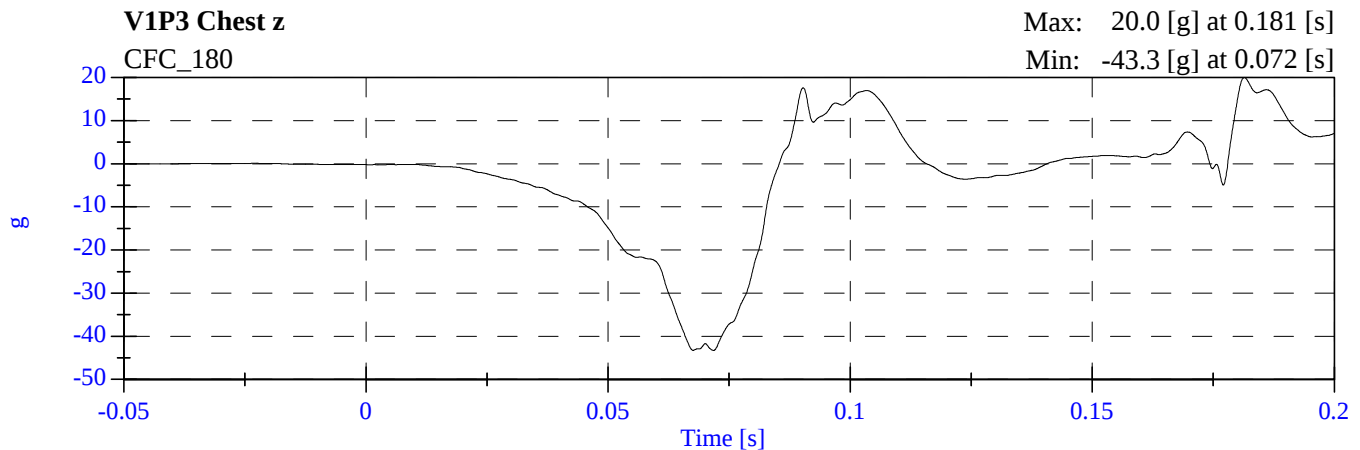
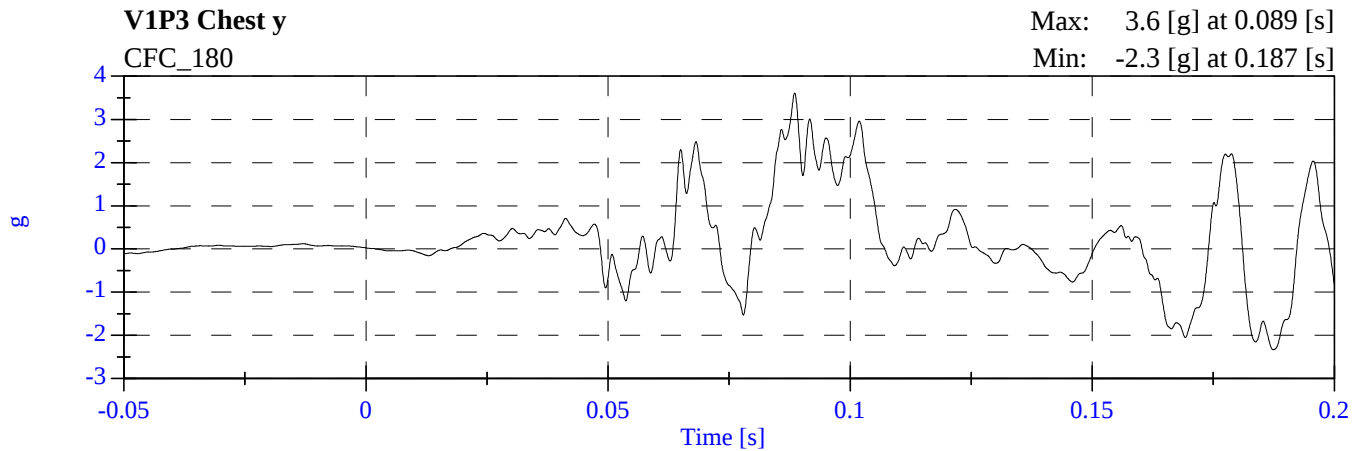
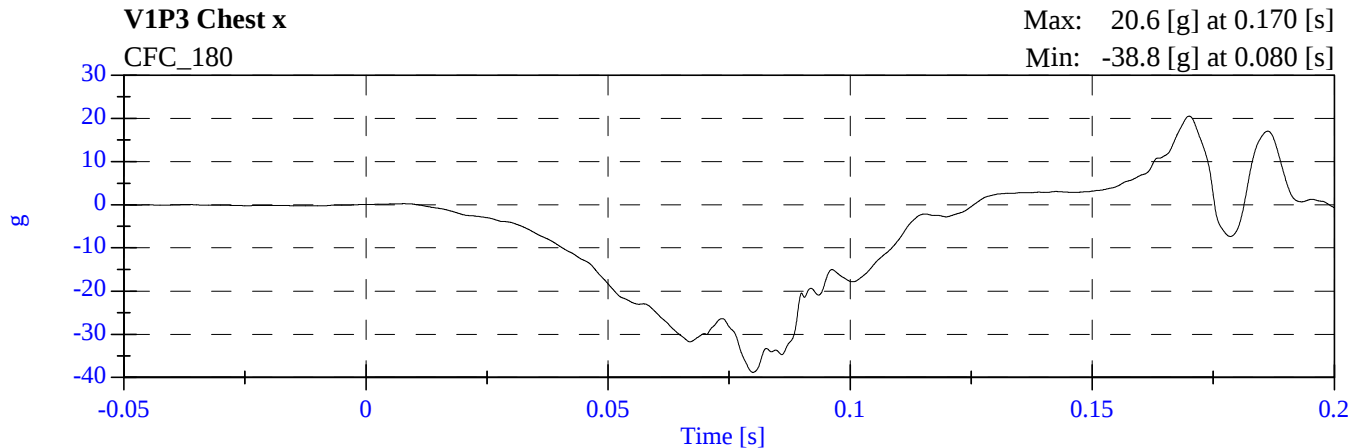
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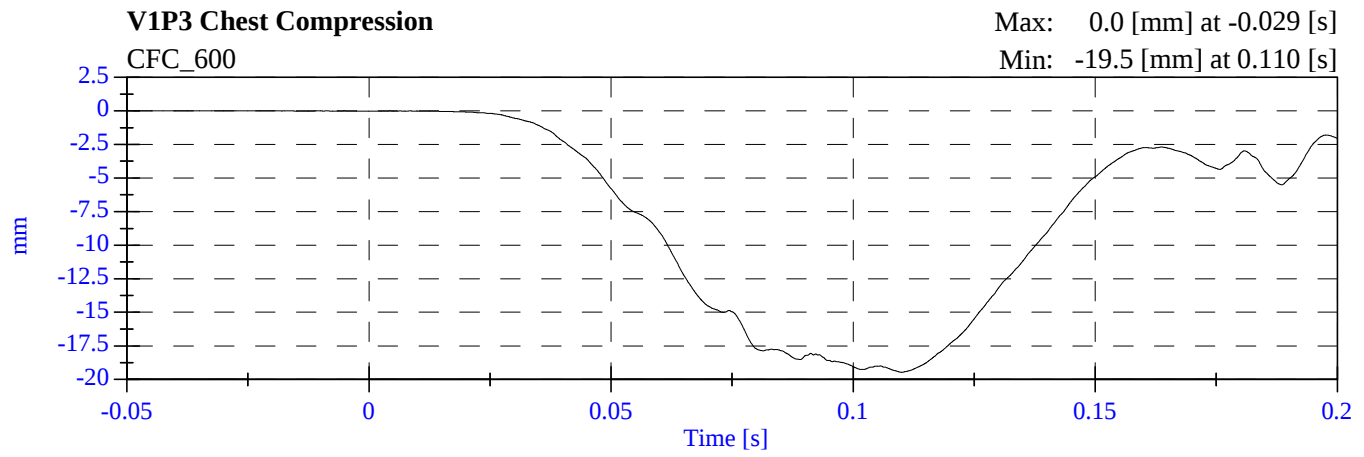
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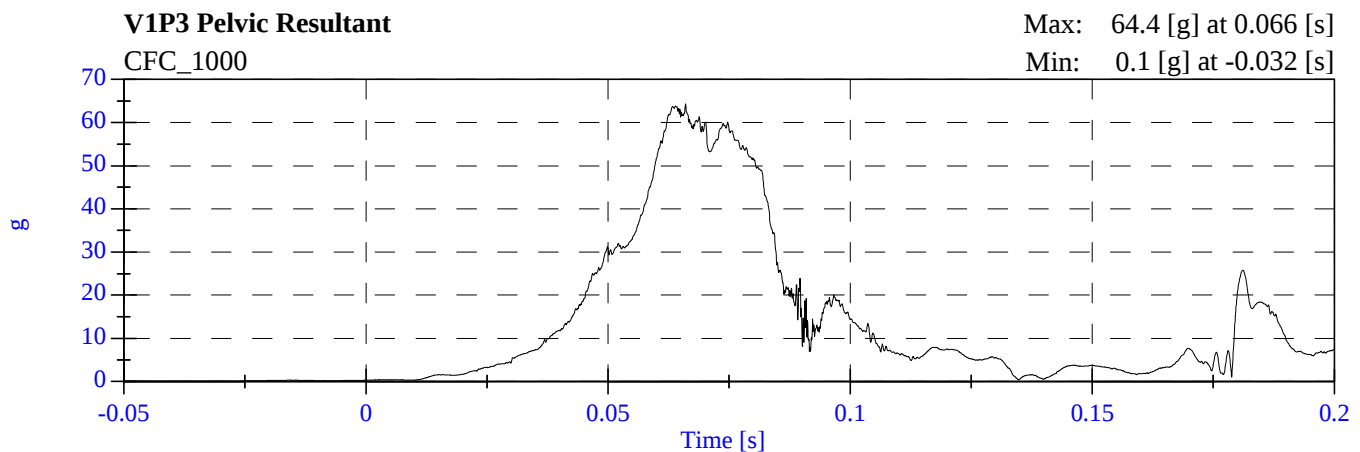
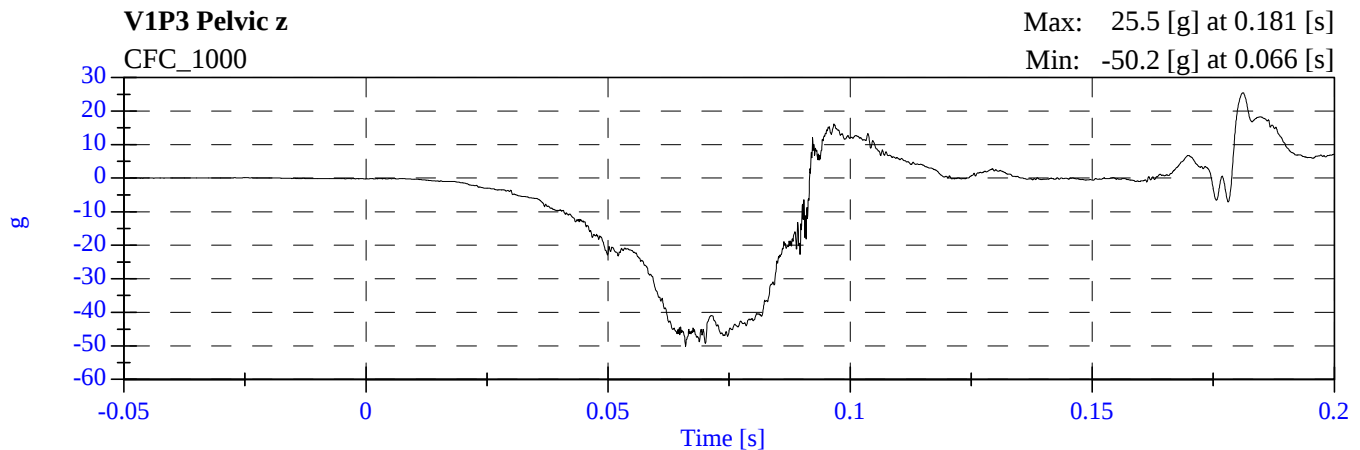
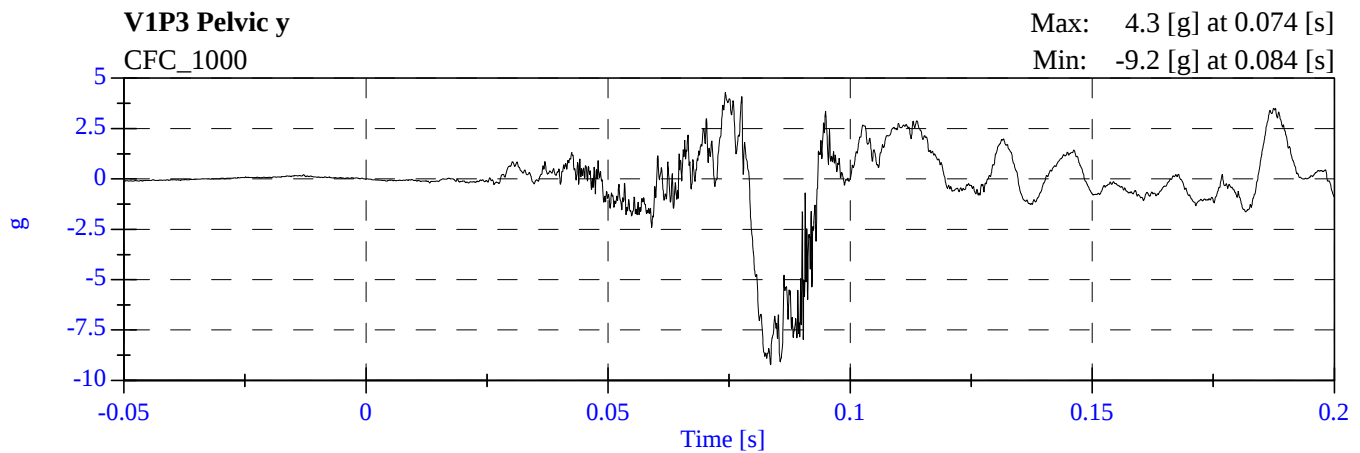
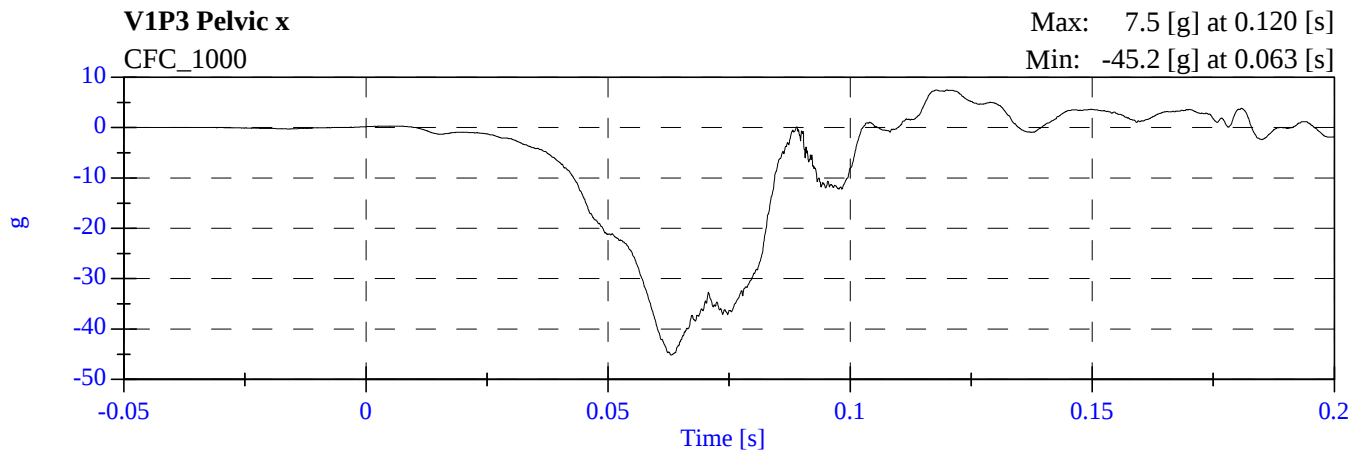
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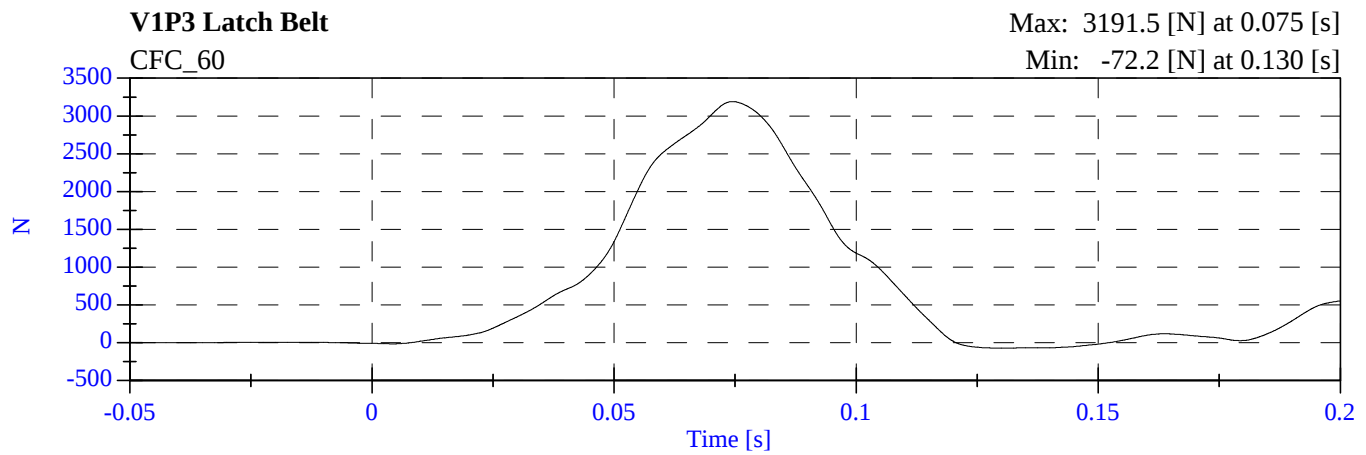
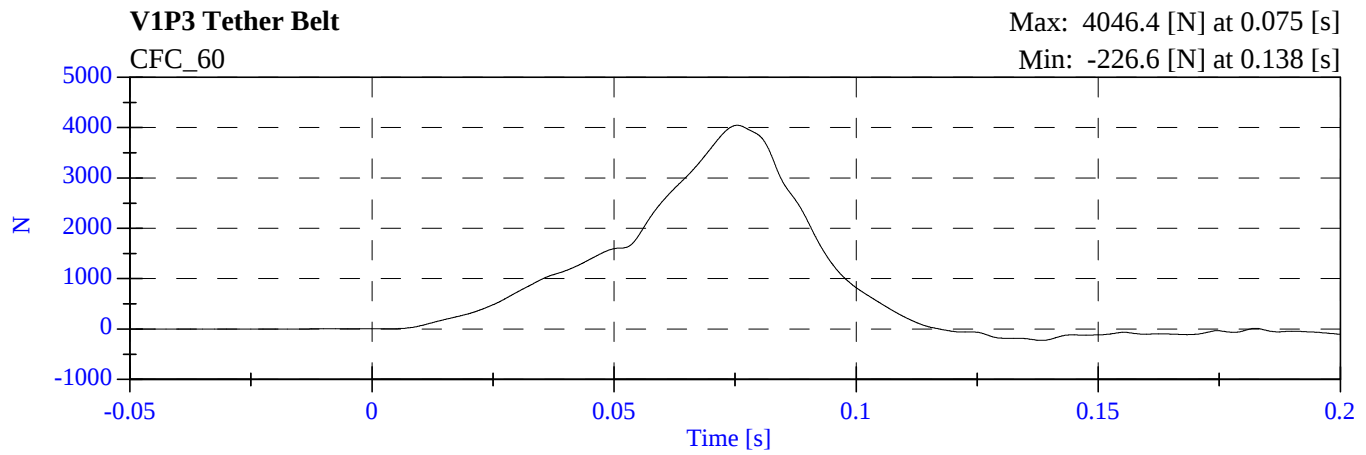
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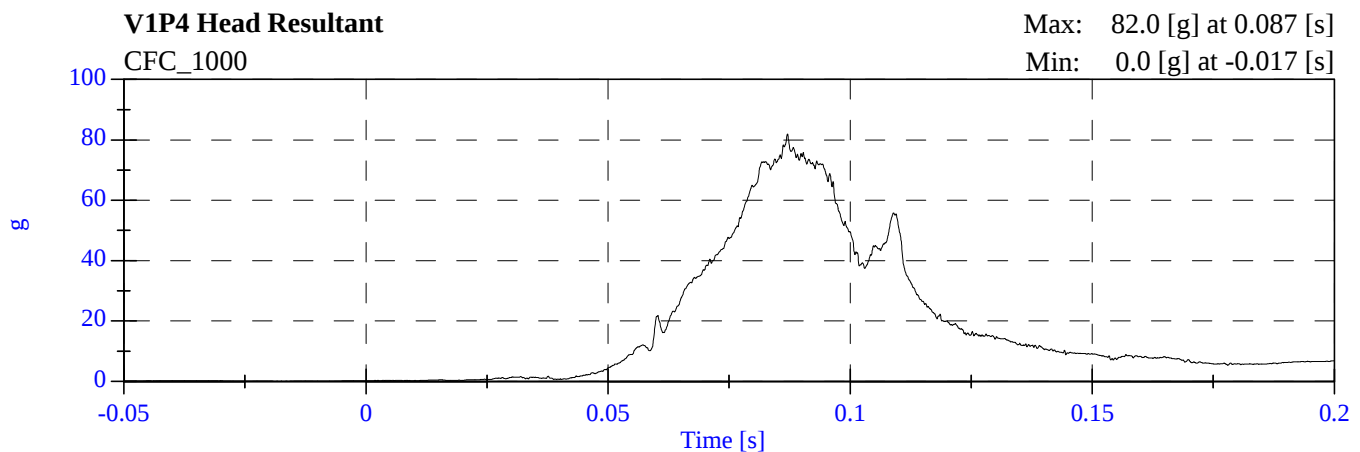
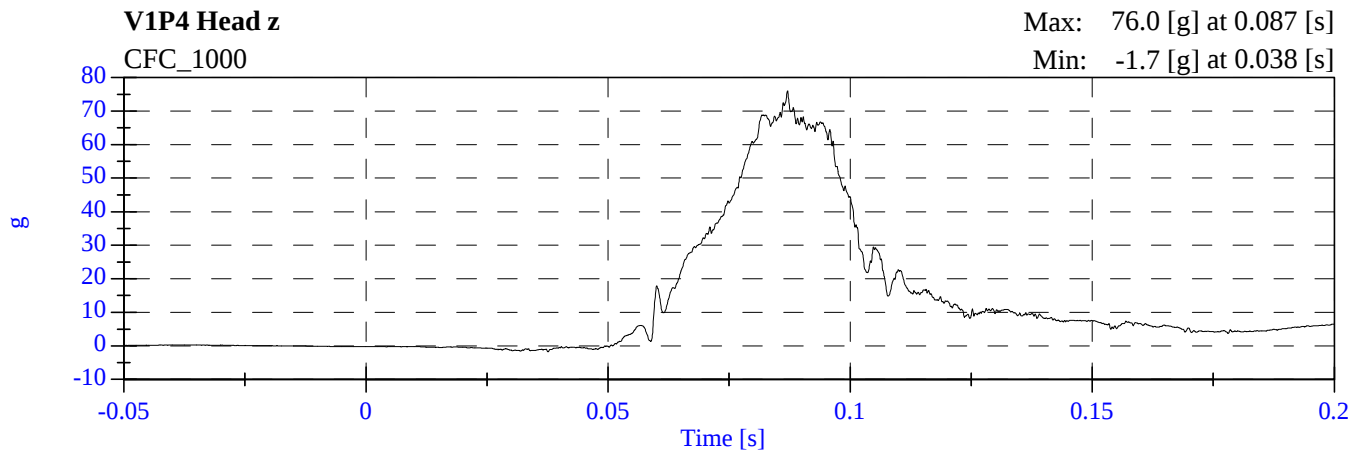
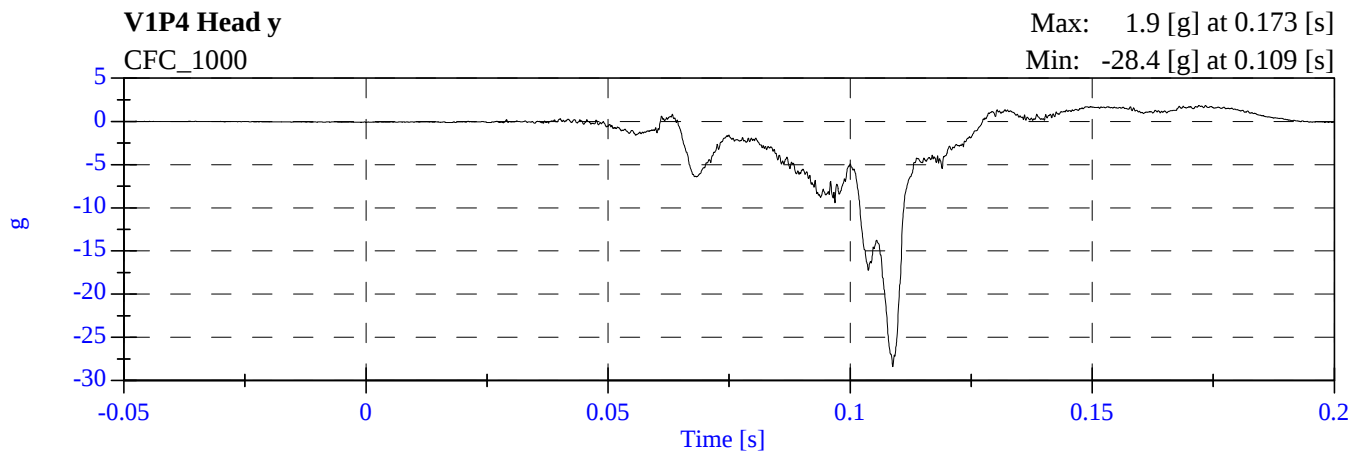
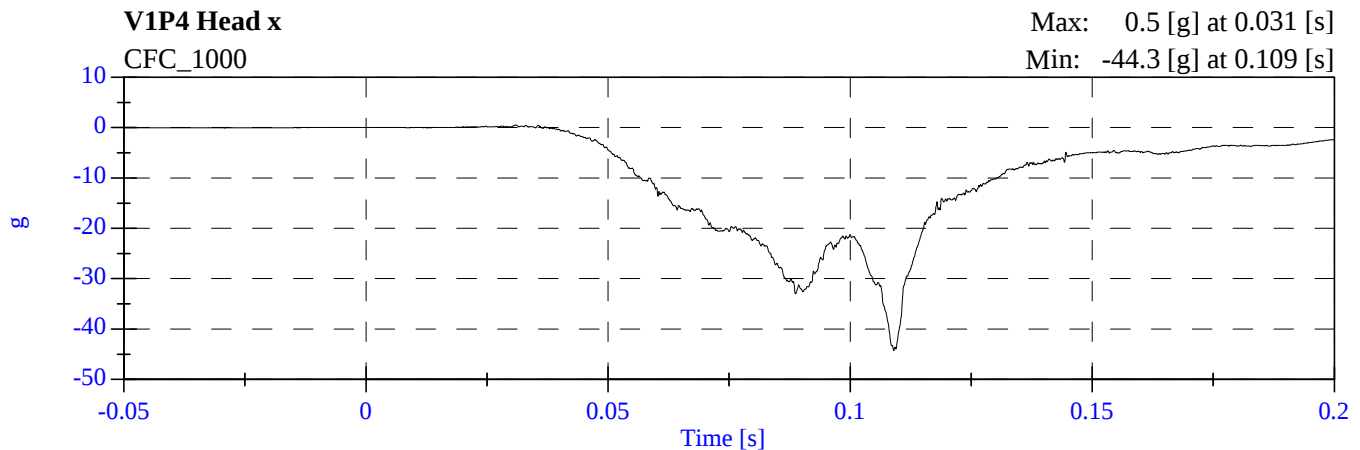
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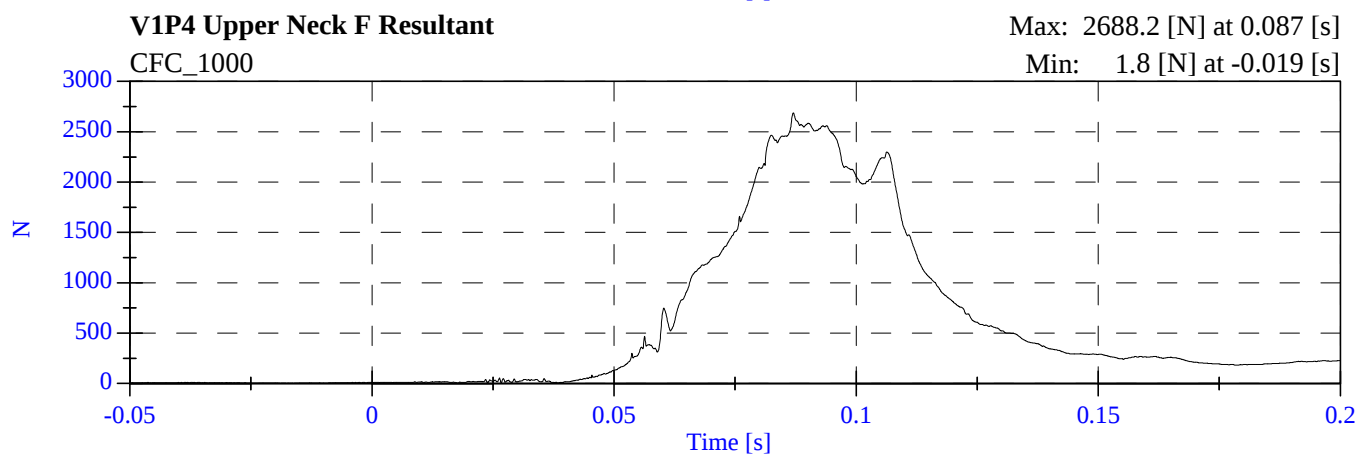
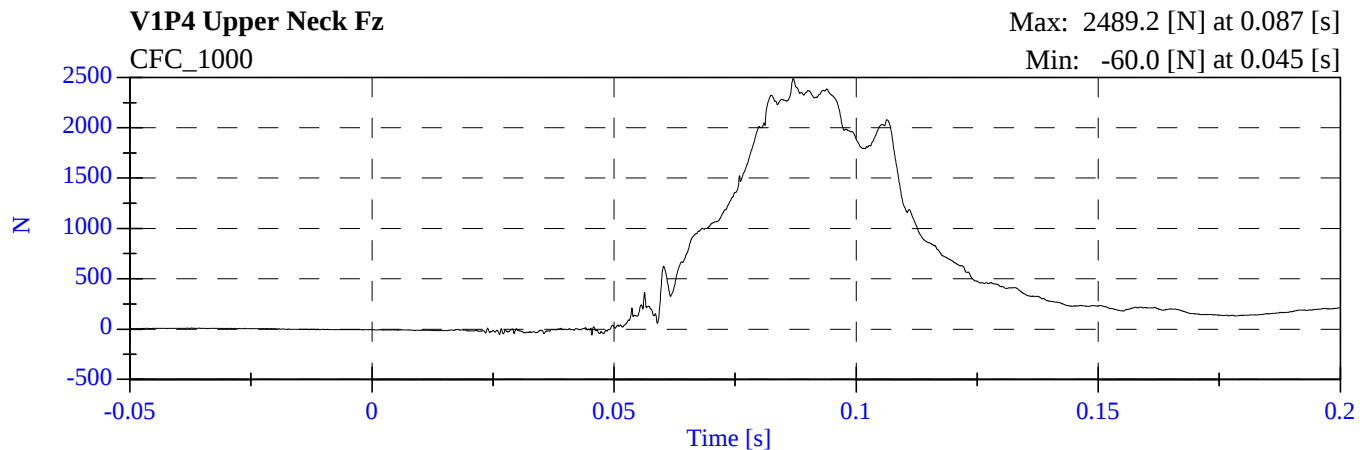
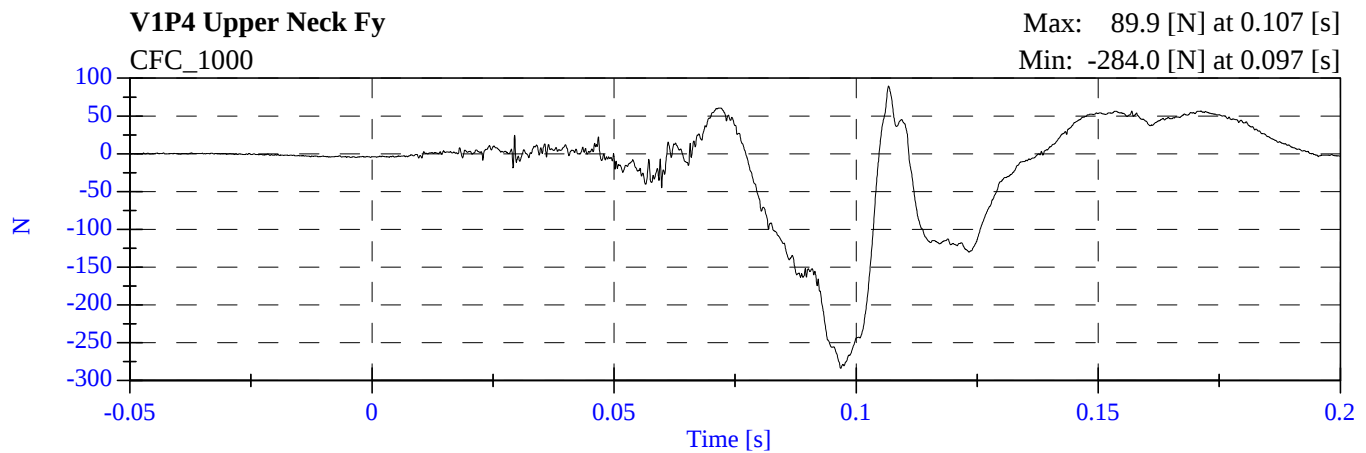
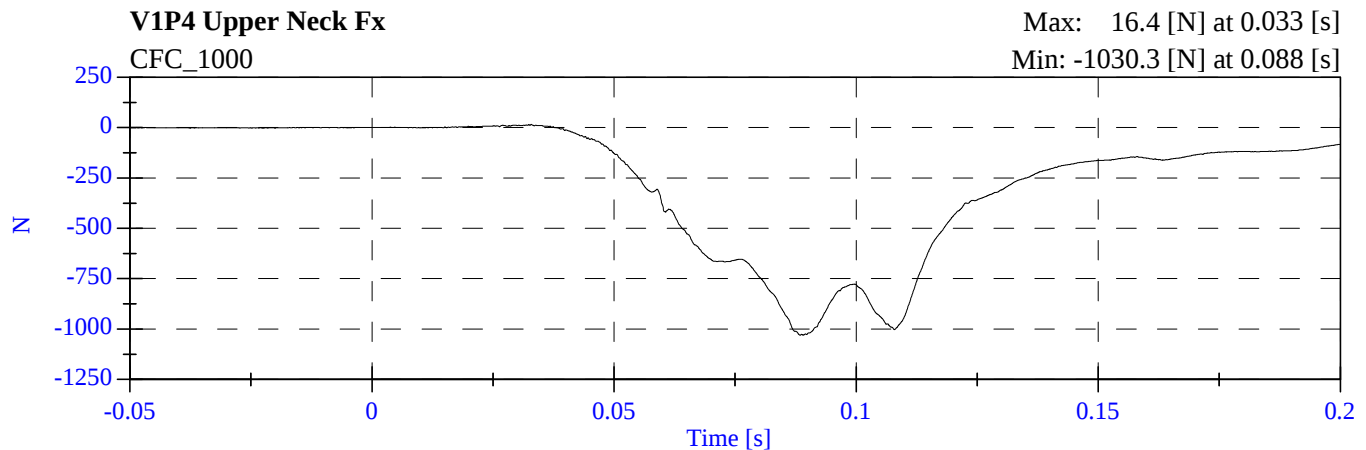
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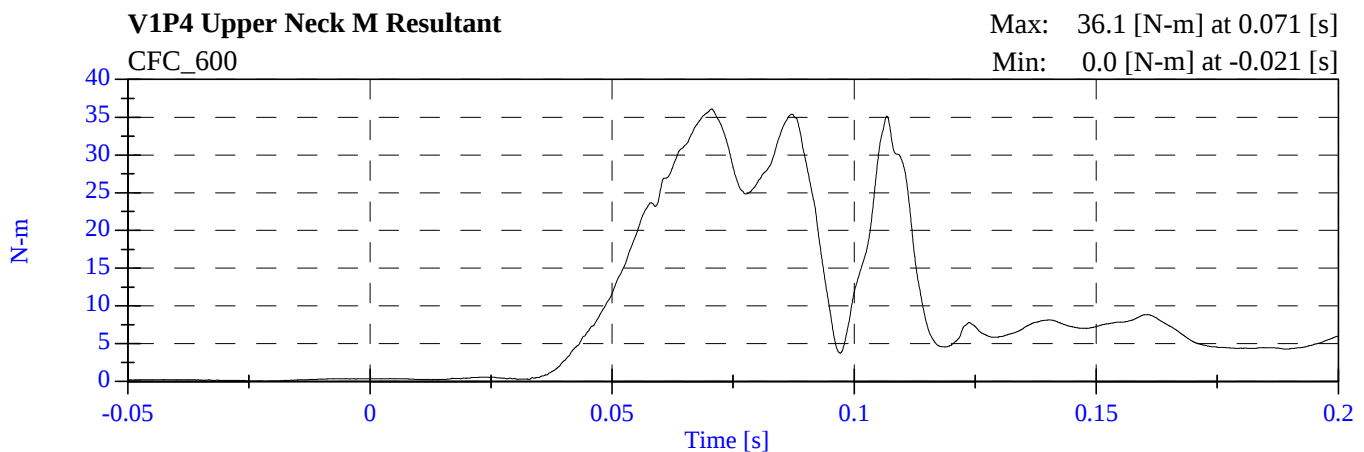
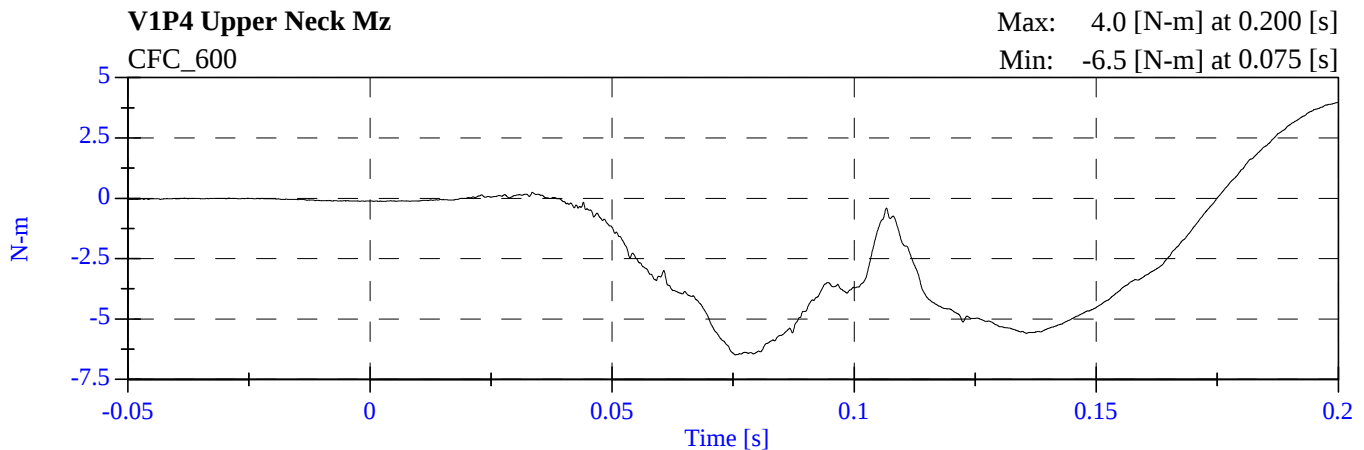
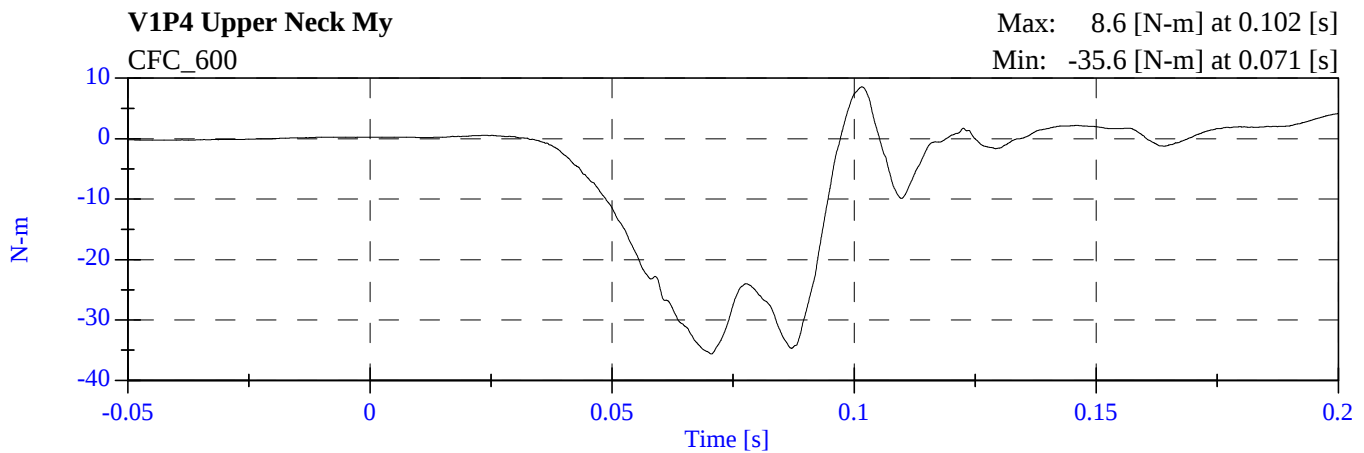
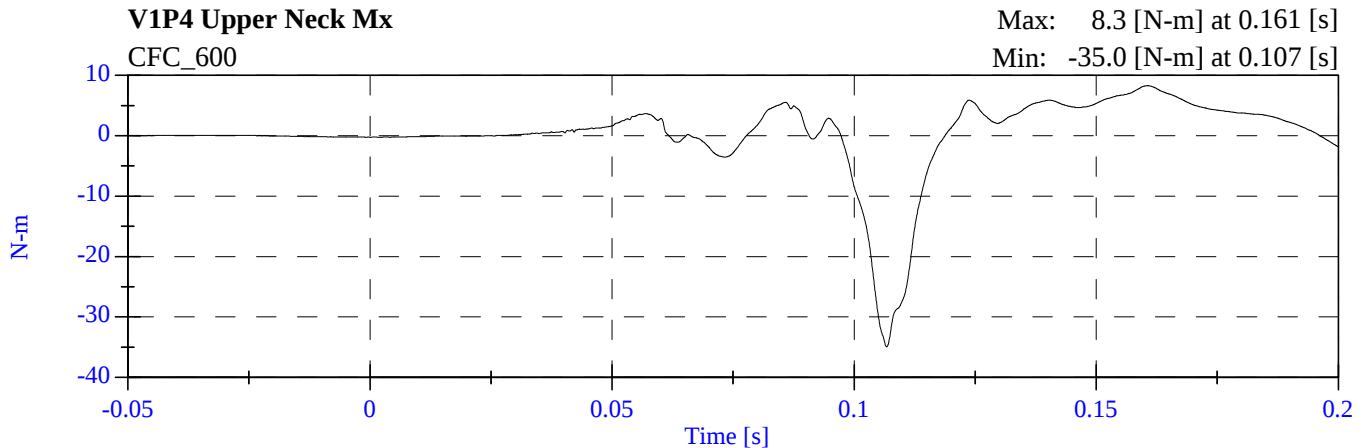
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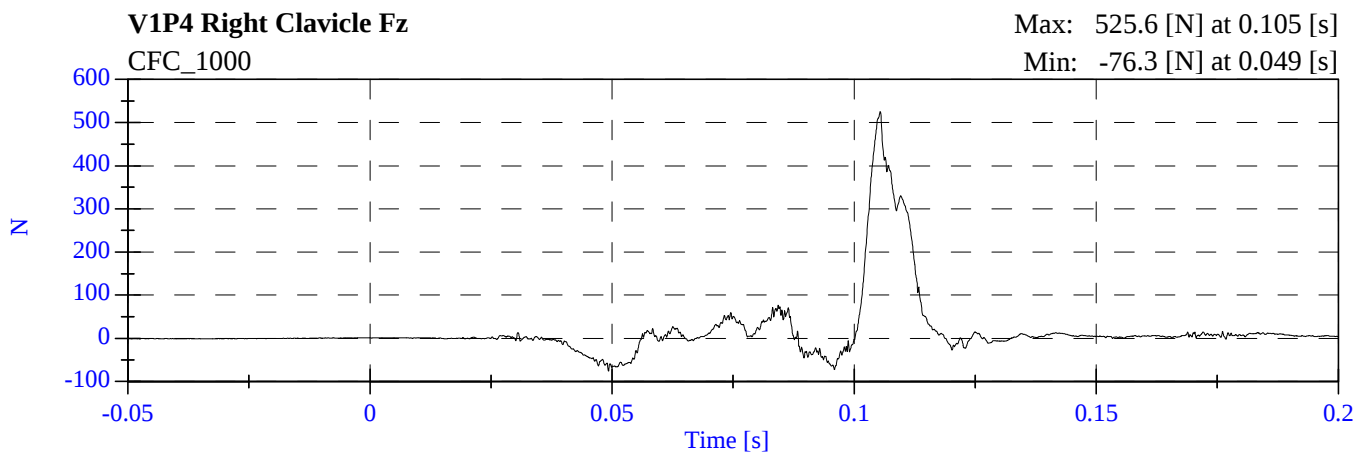
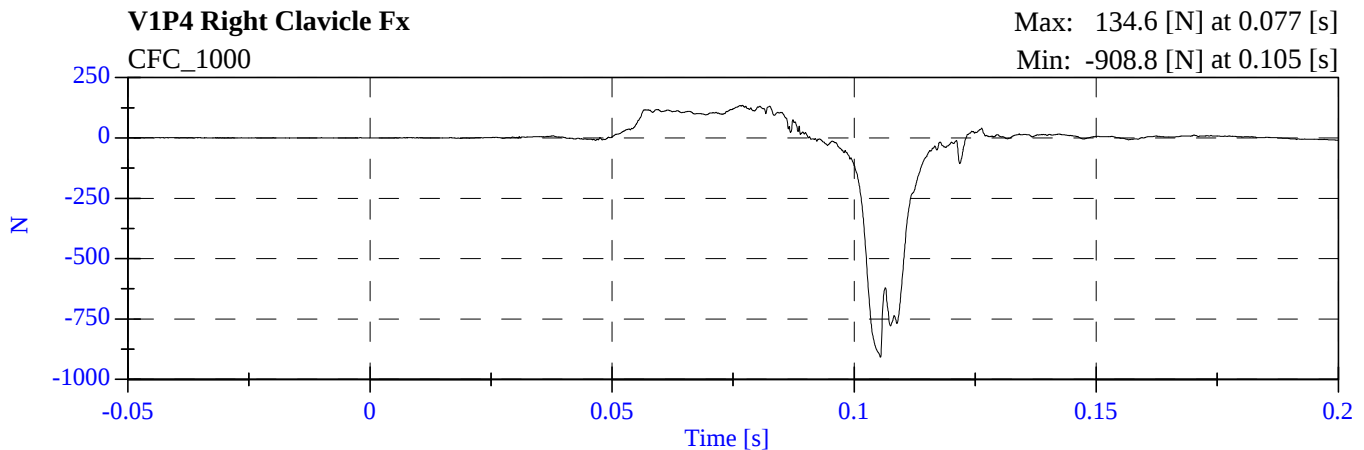
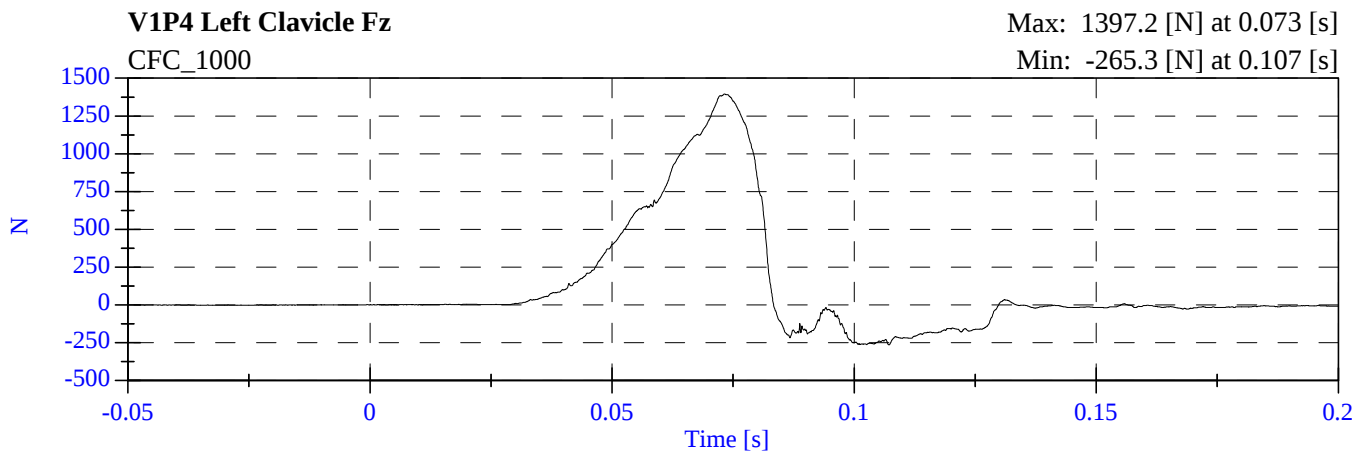
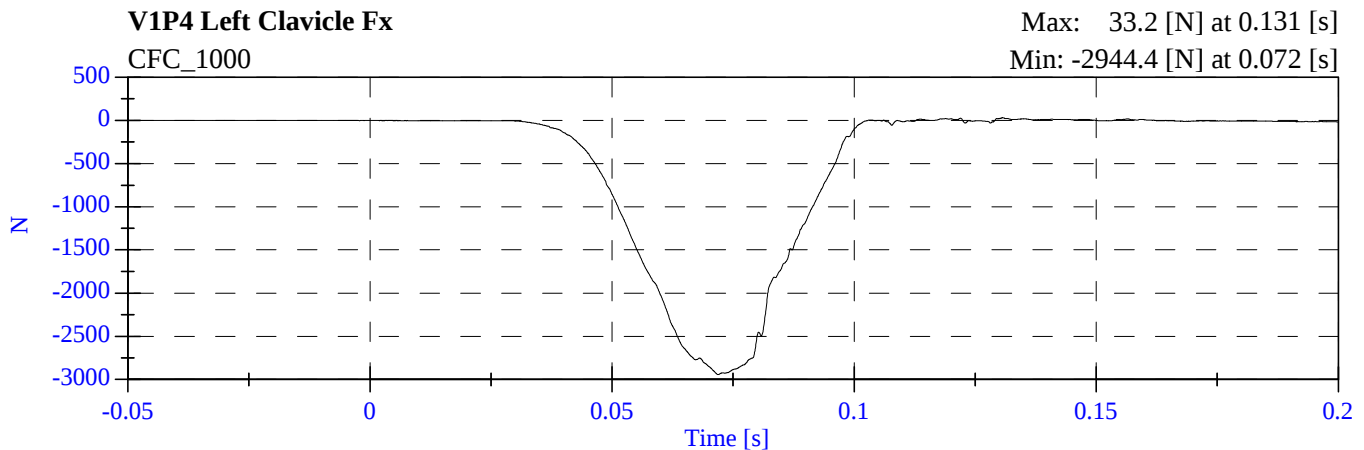
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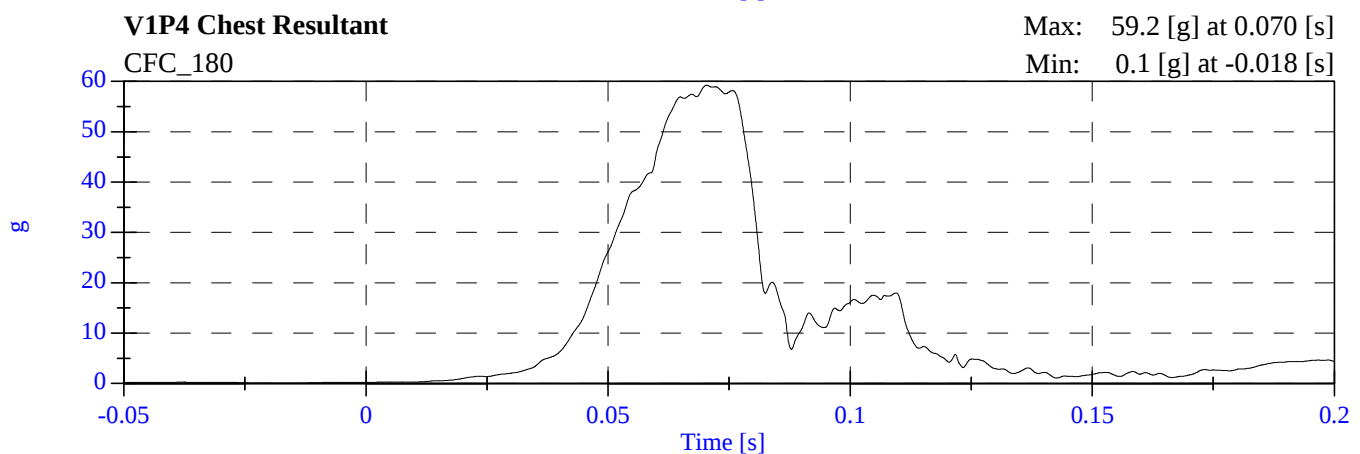
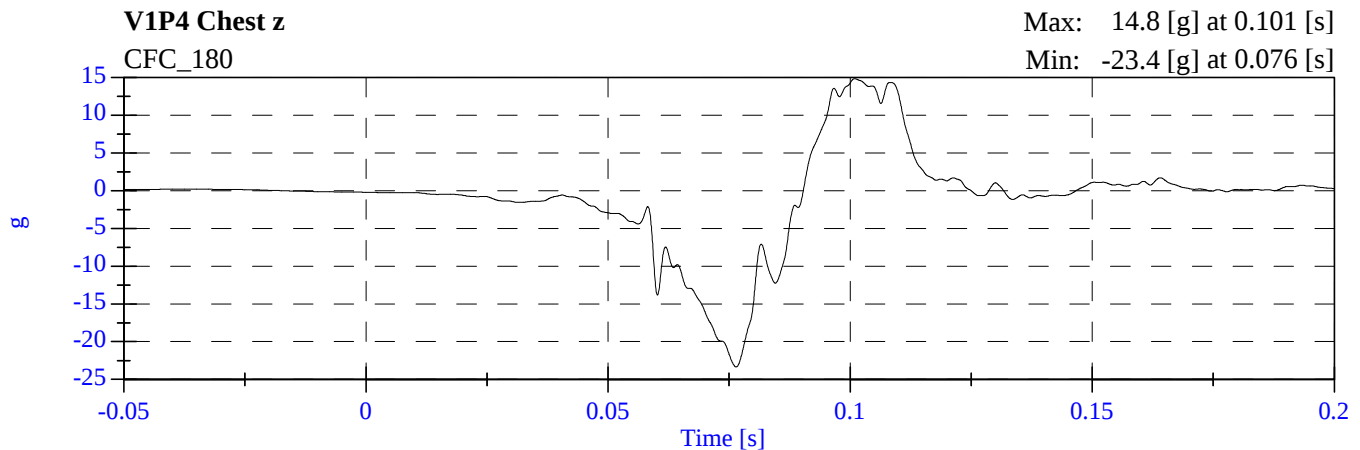
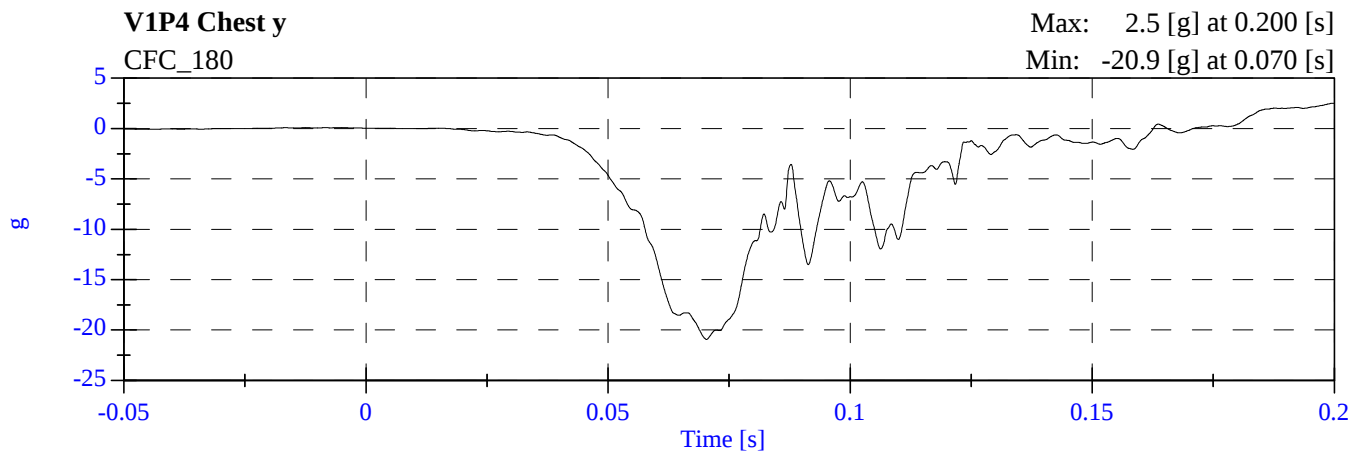
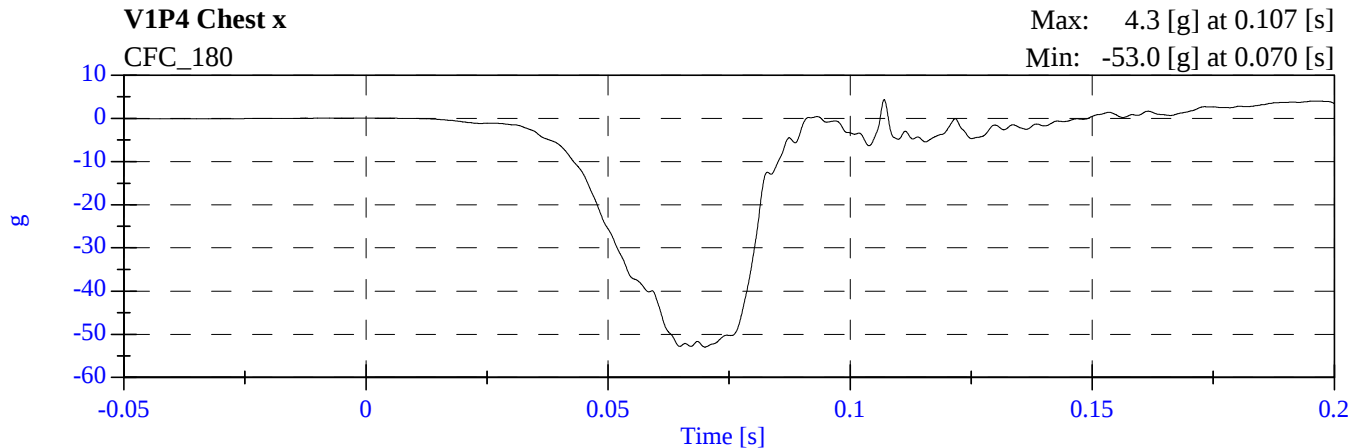
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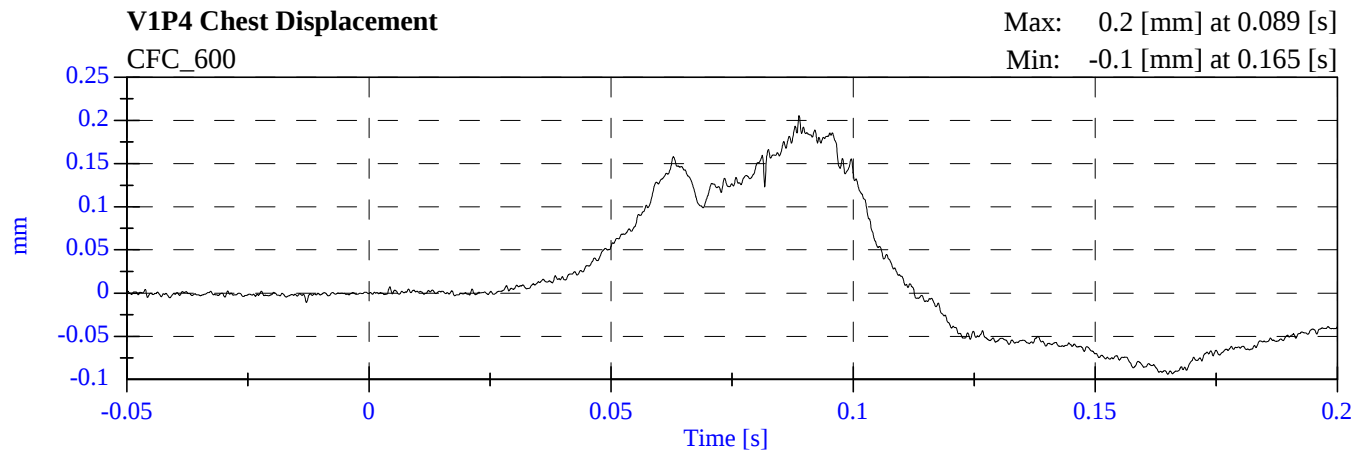
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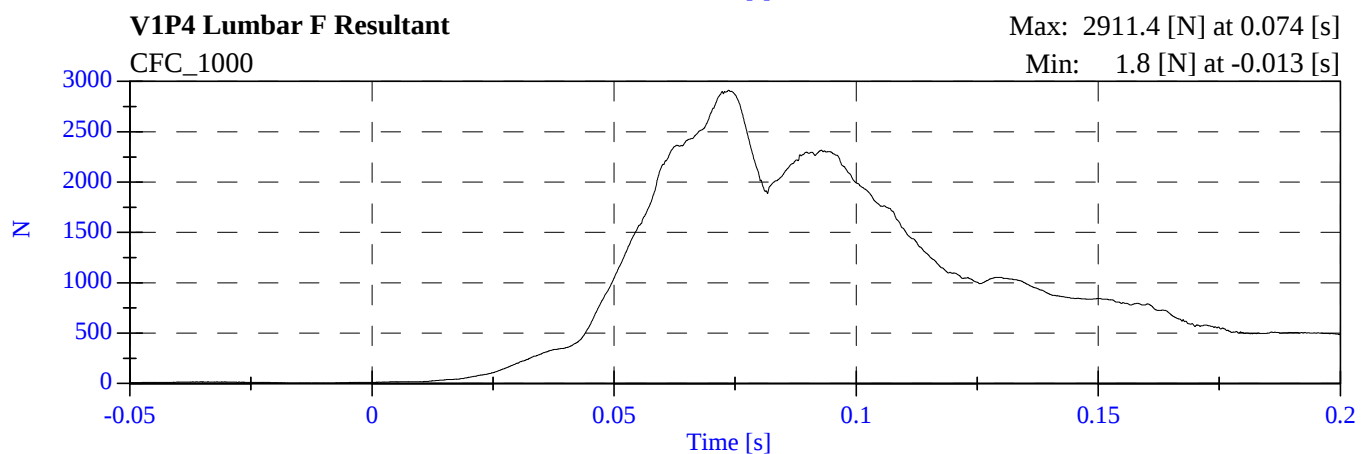
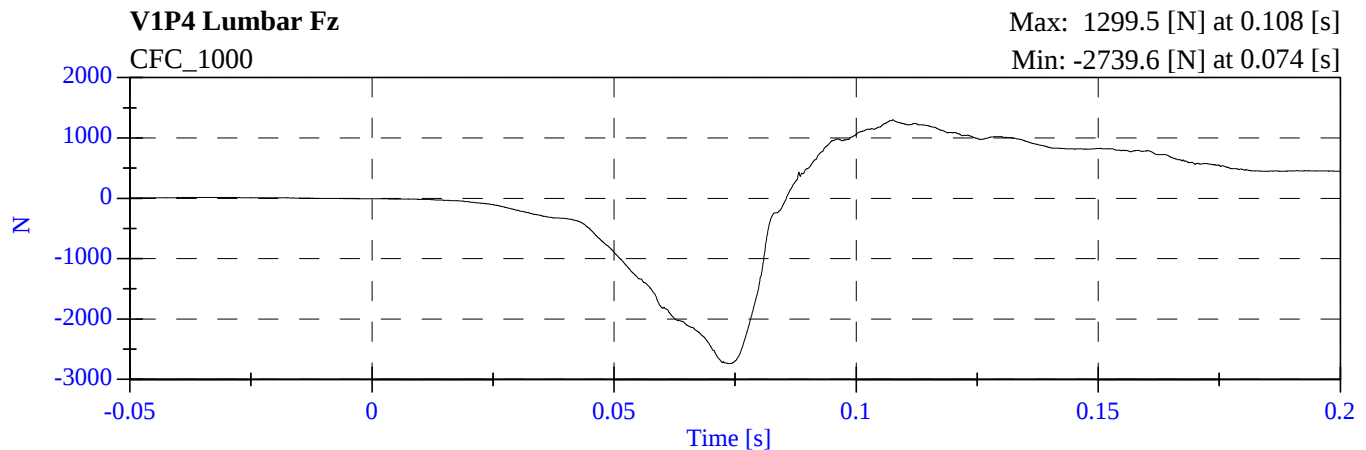
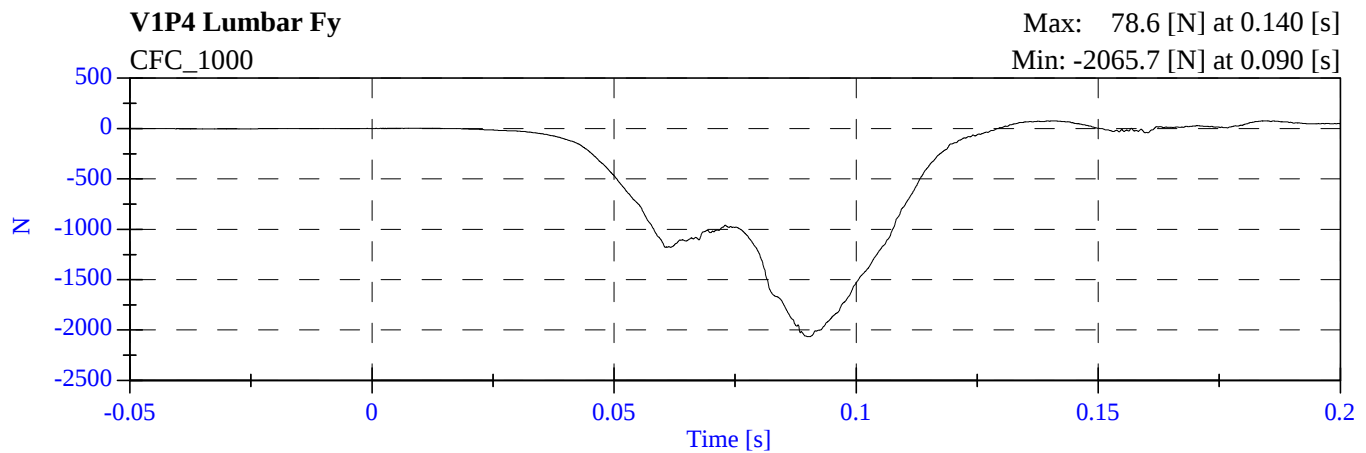
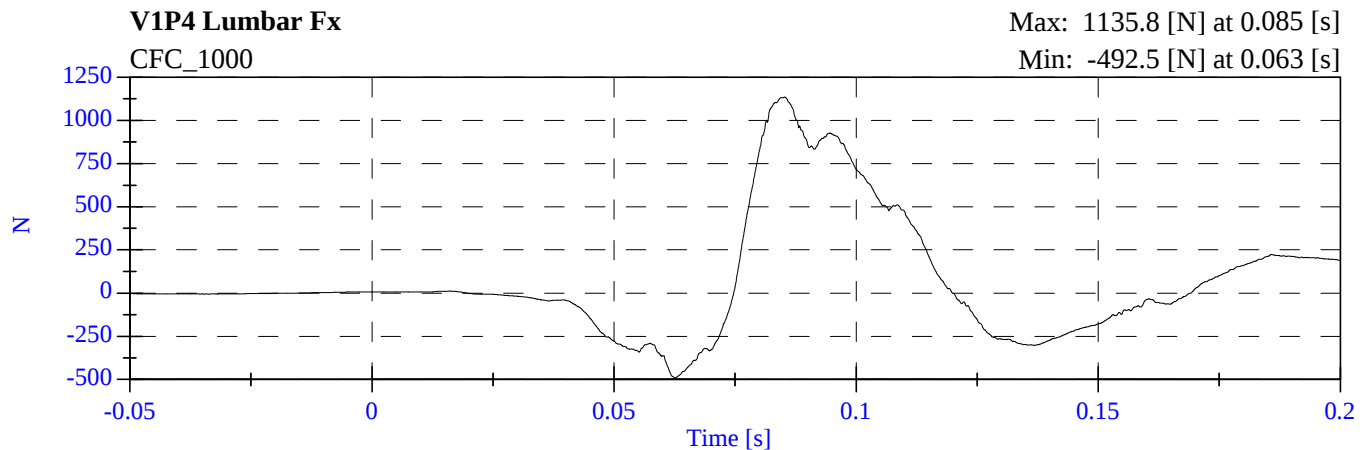
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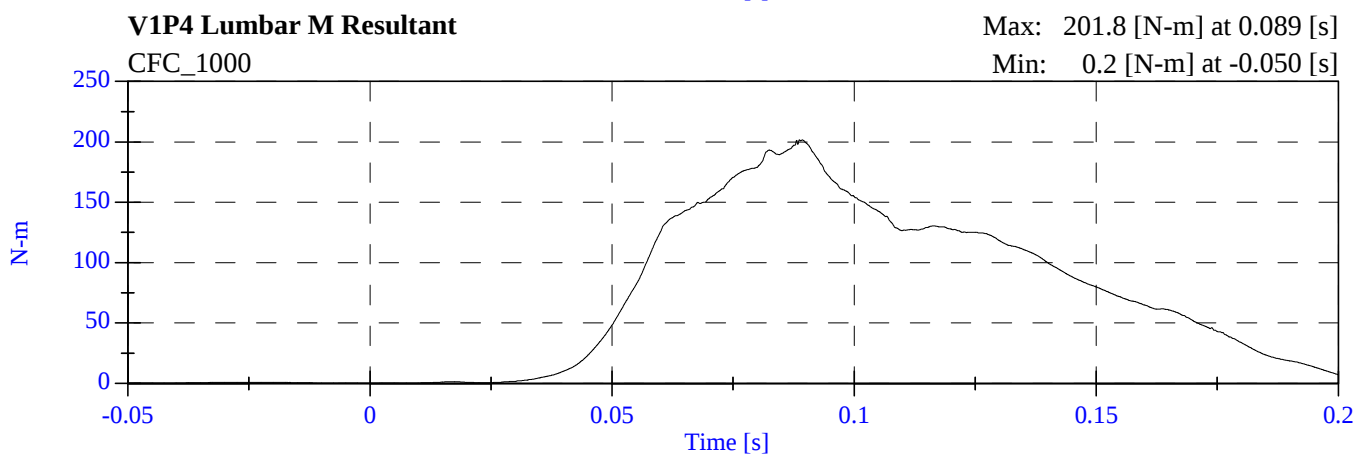
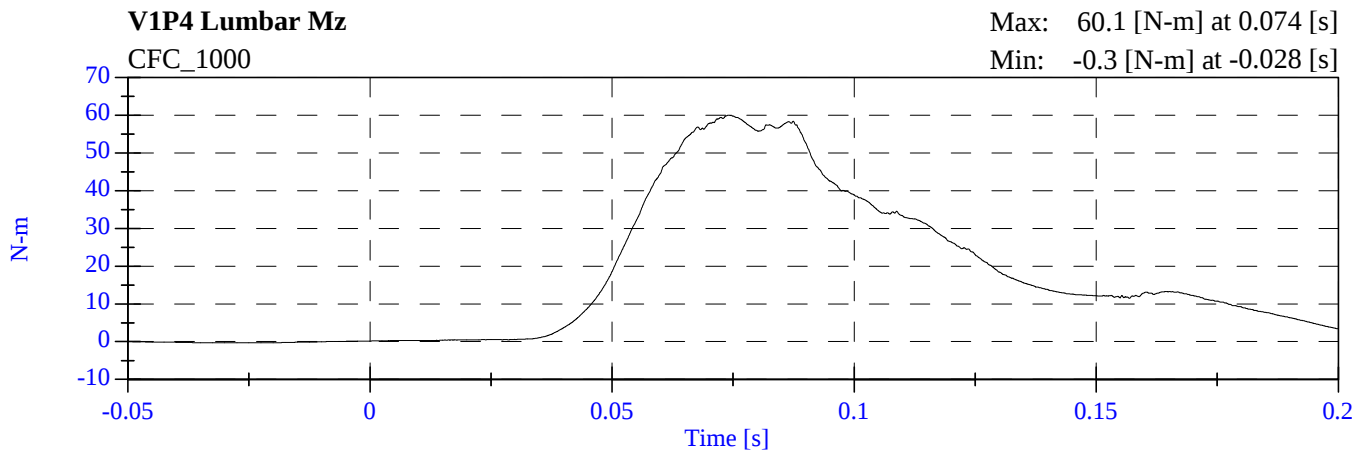
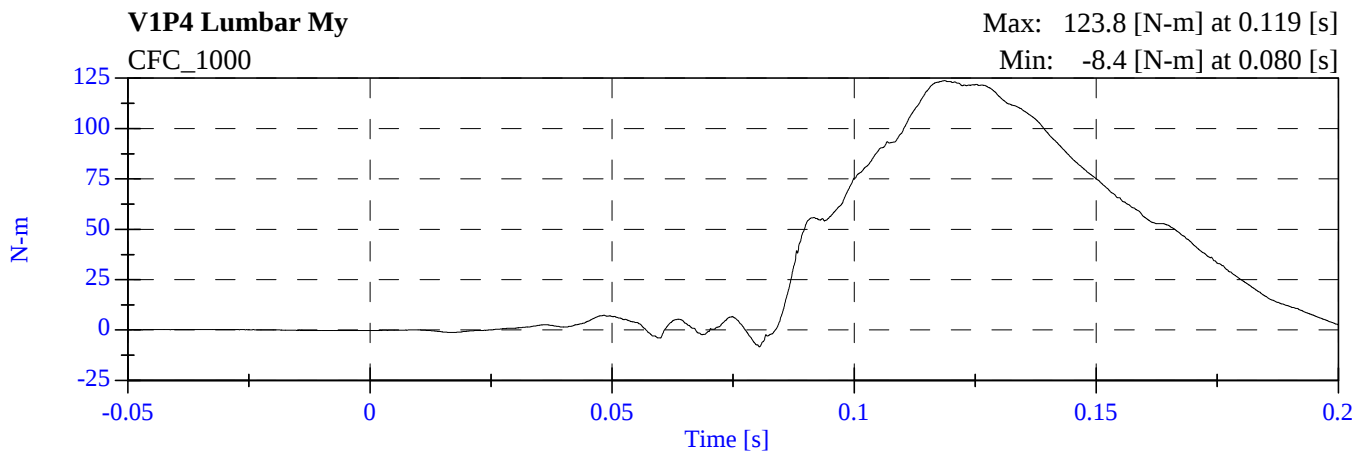
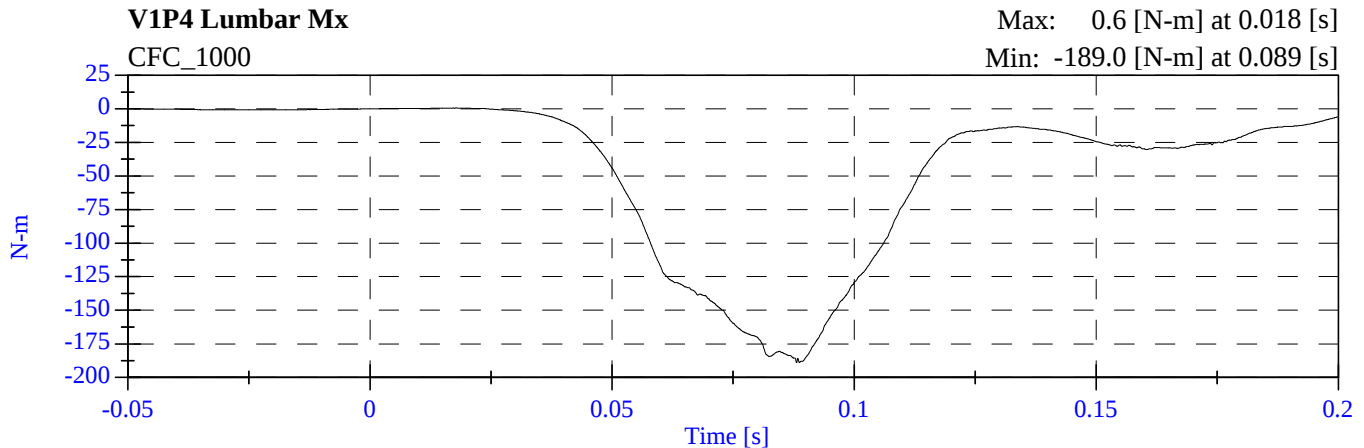
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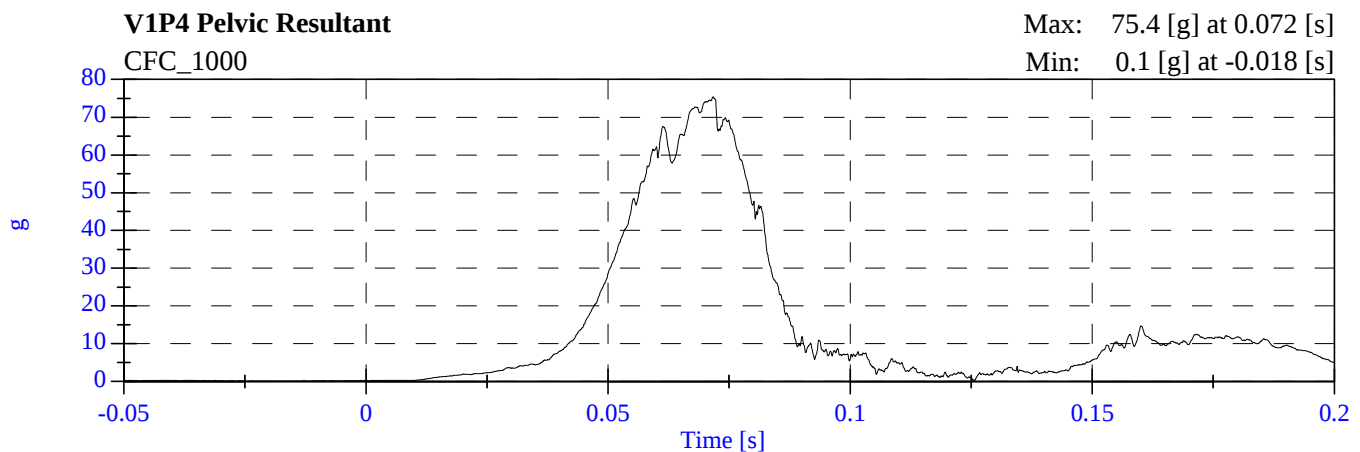
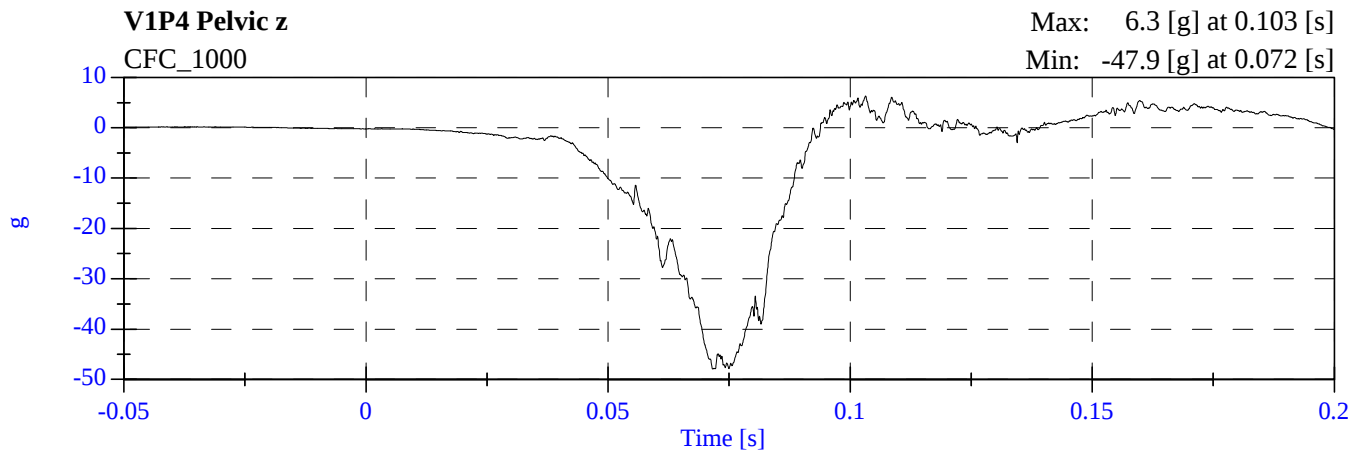
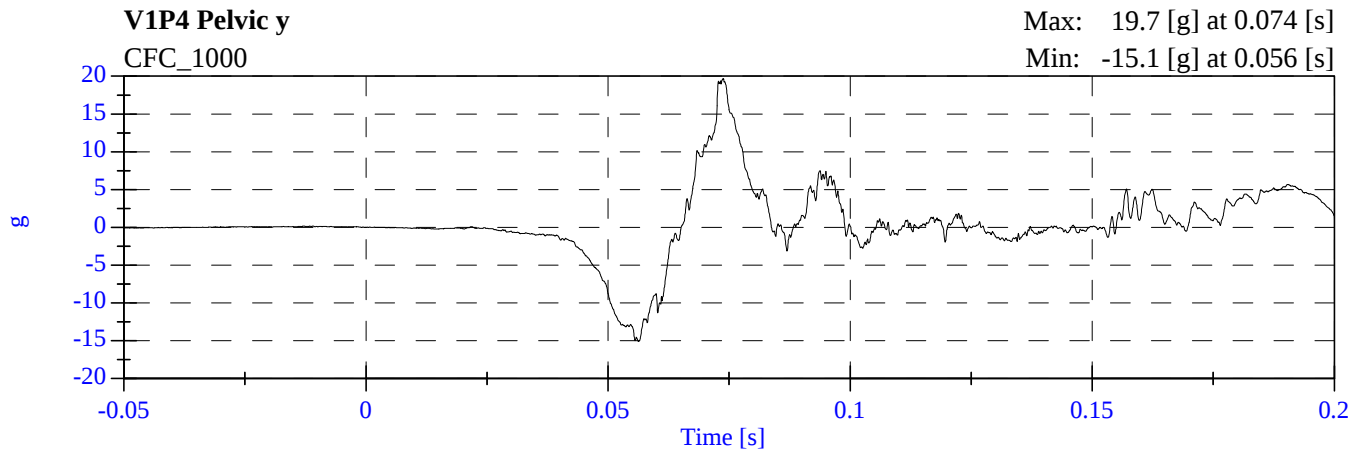
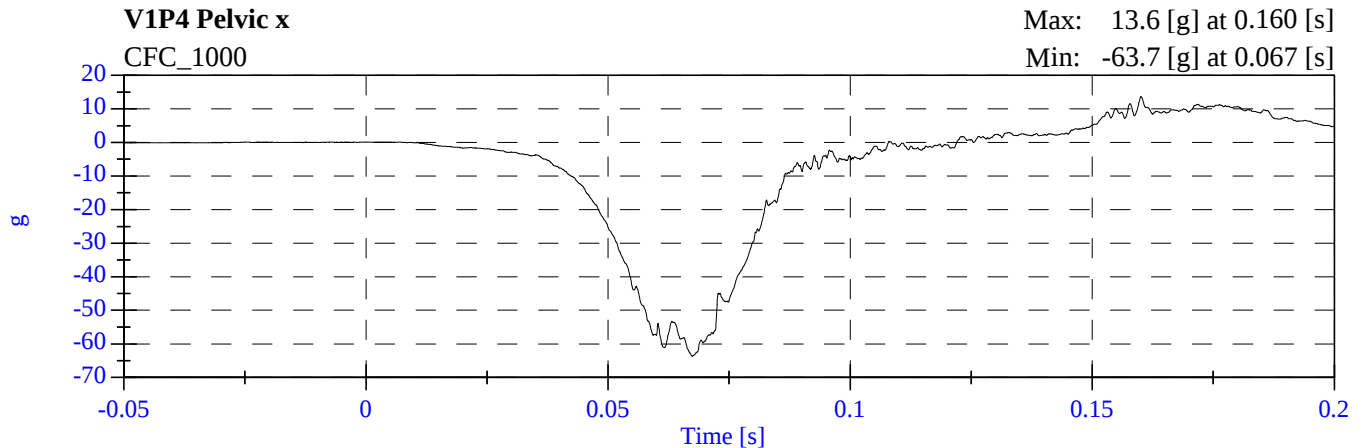
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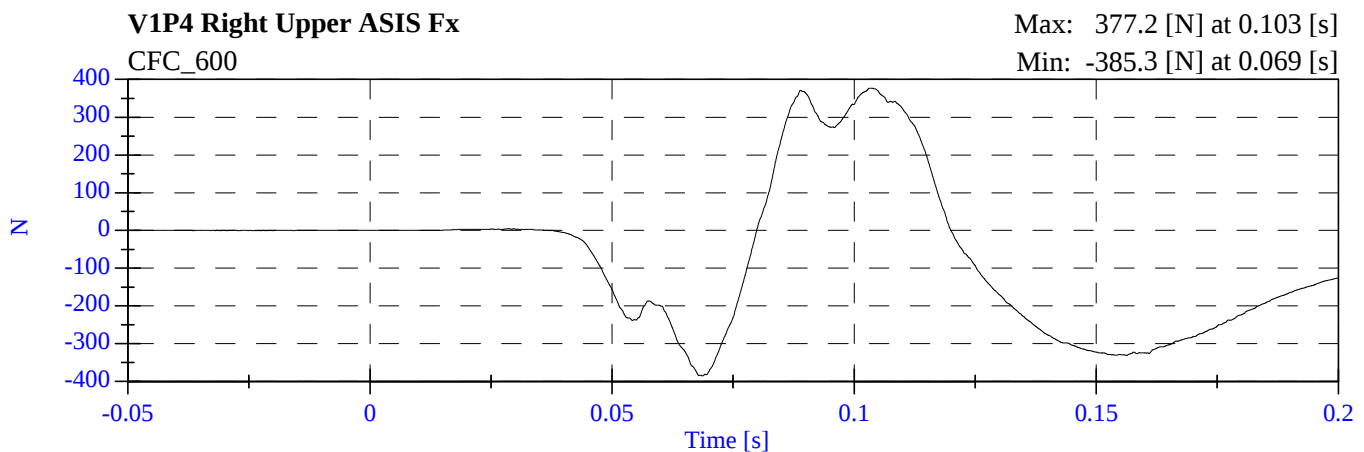
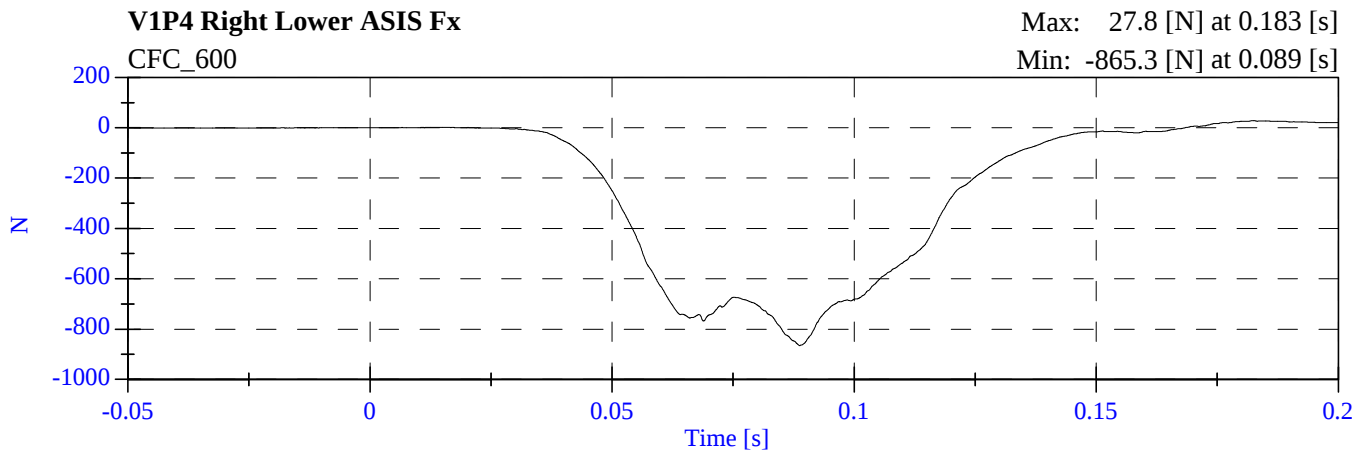
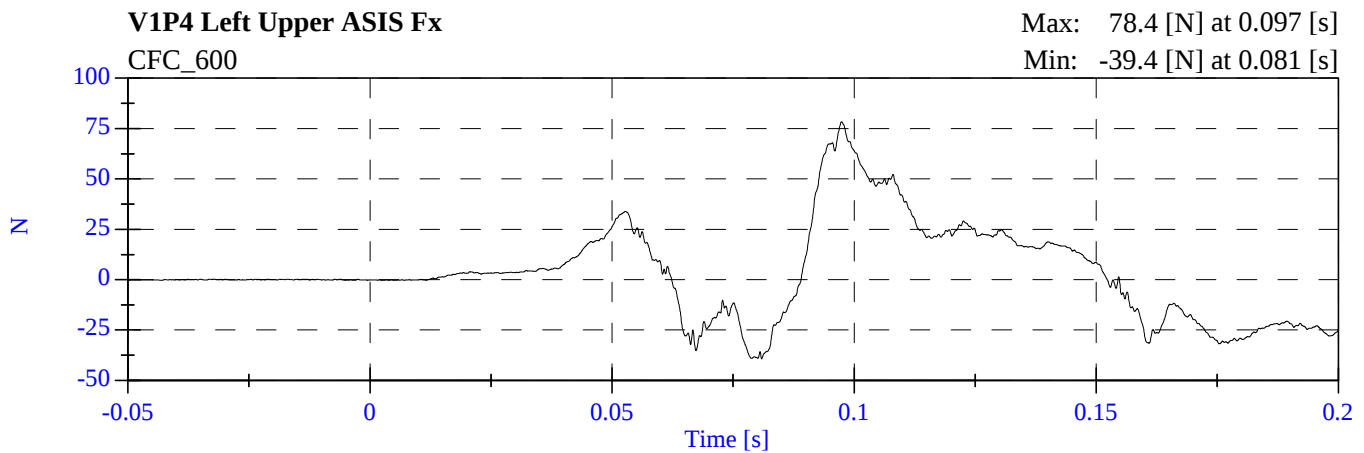
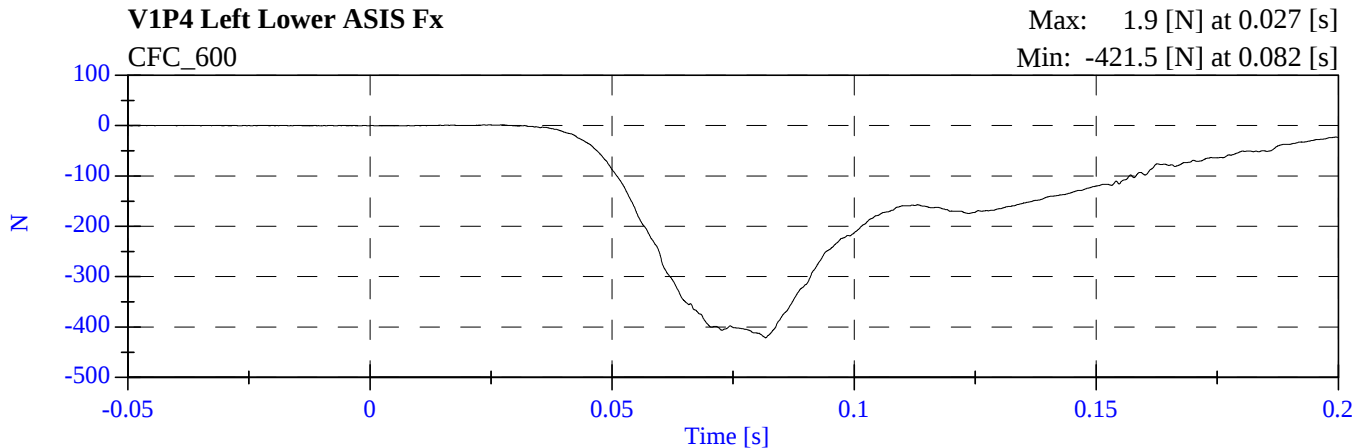
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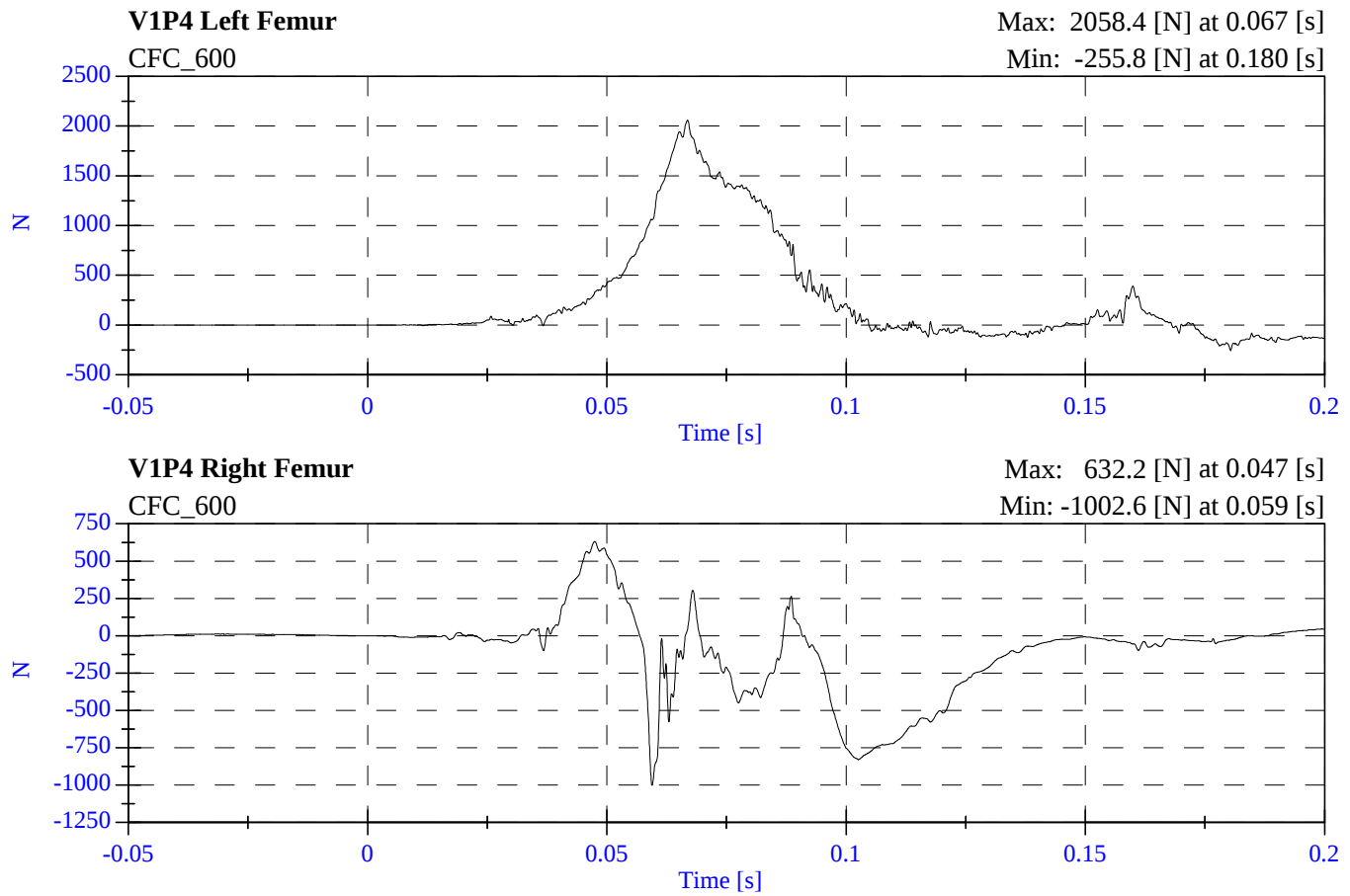
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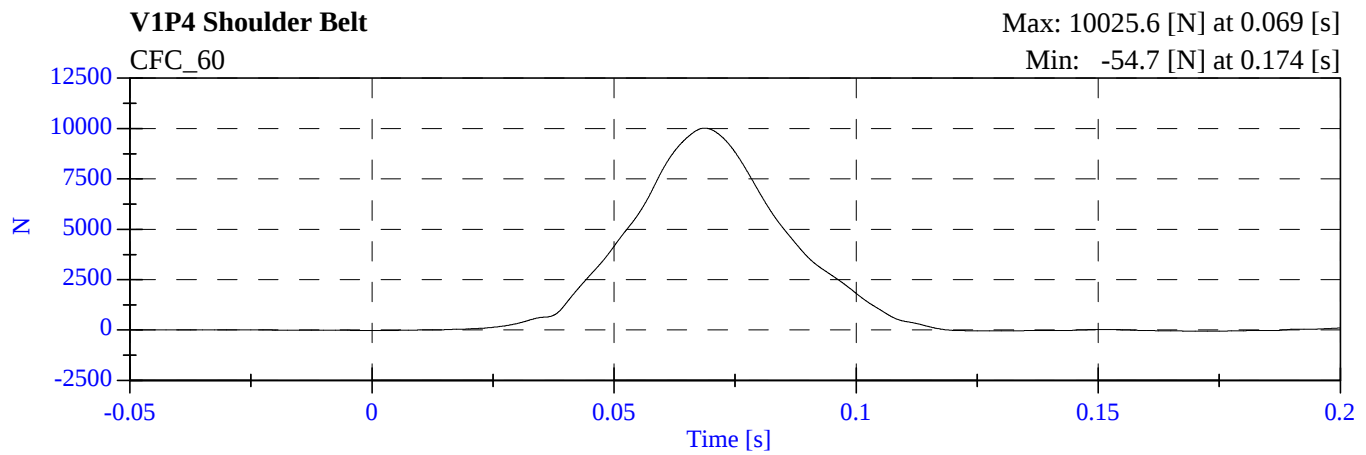
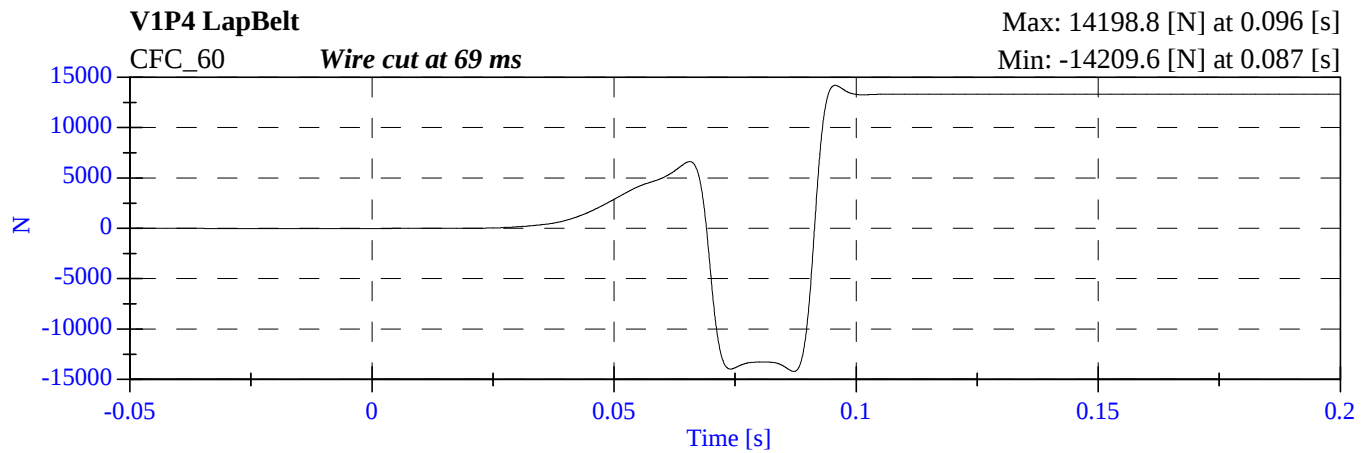
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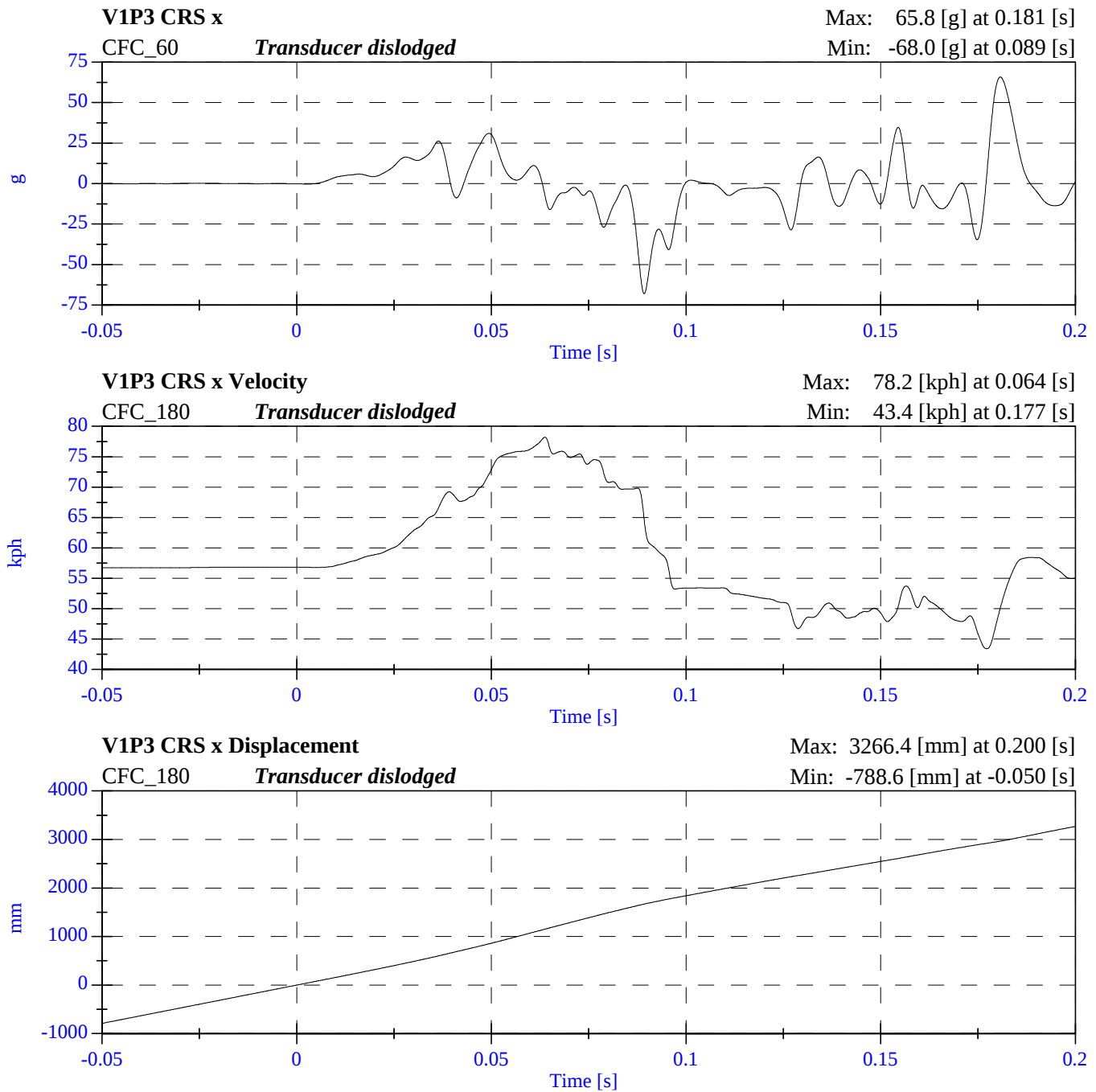
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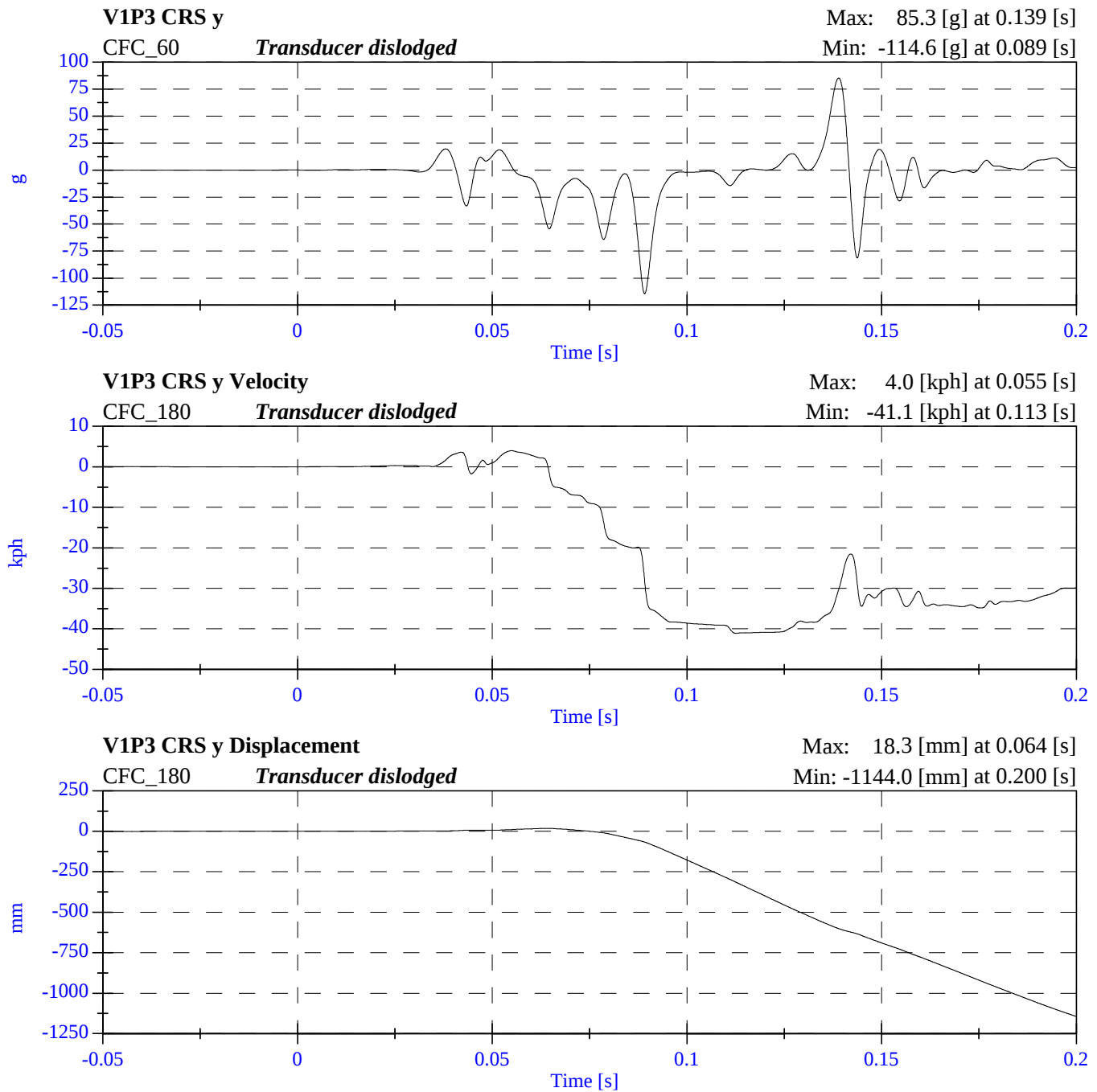
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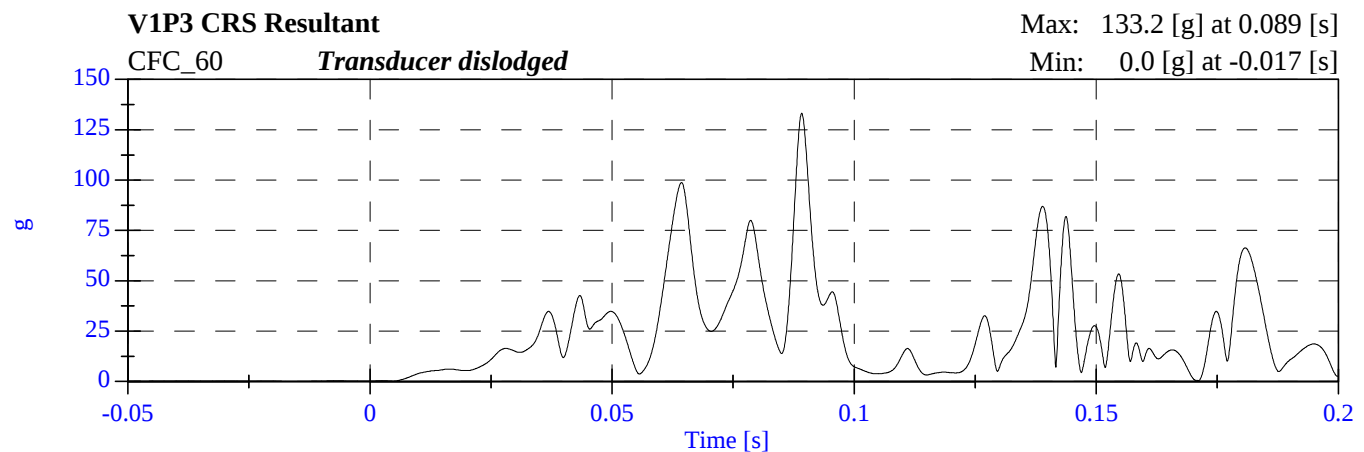
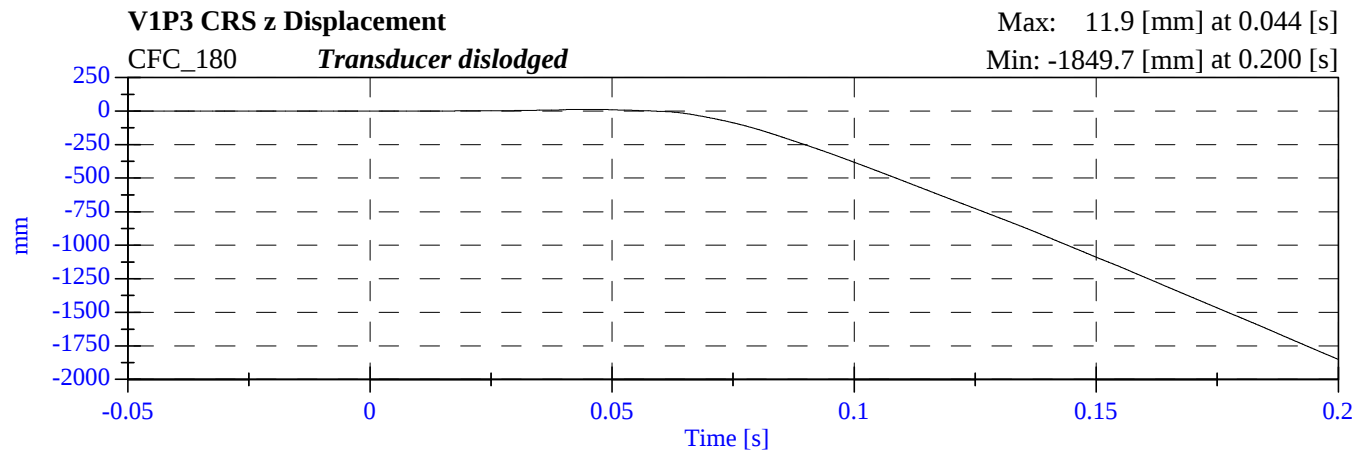
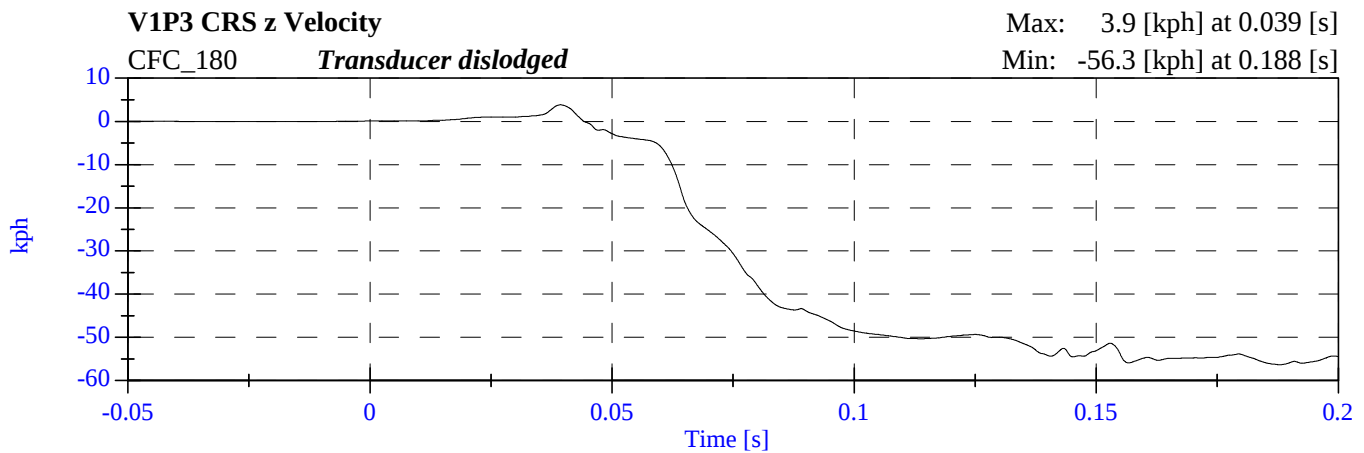
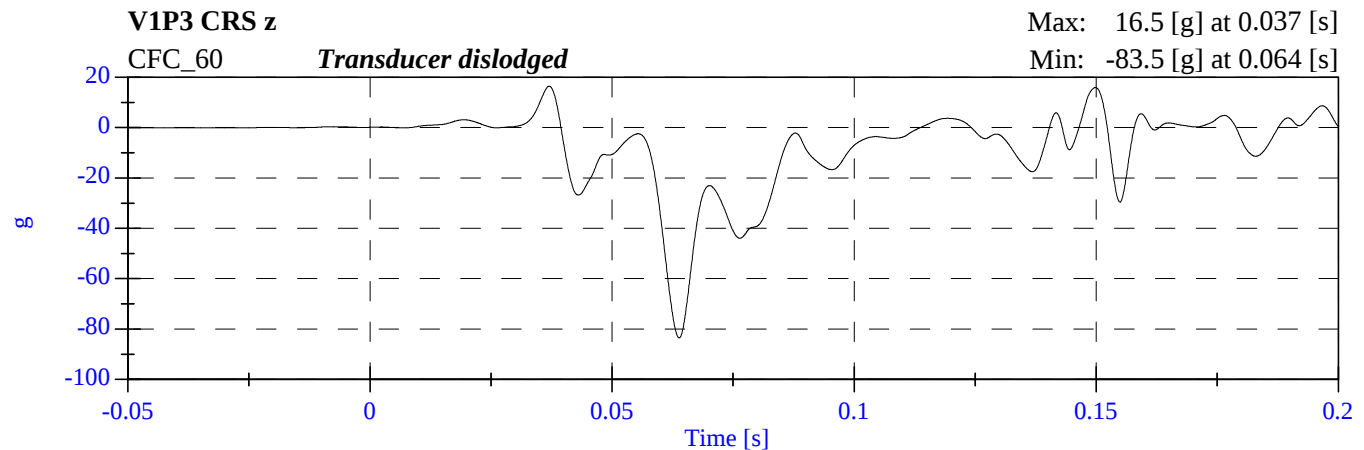
2005 NCAP Test 2 2005 Pontiac G6 M50114 - November 19, 2004



2005 NCAP Test 2 2005 Pontiac G6 M50114 - November 19, 2004



2005 NCAP Test 2 2005 Pontiac G6 M50114 - November 19, 2004



SECTION 5

CHILD DUMMY CALIBRATION INFORMATION

**Transportation Research Center
Inc.**

ATD Calibration Report

for

VRTC

**HIII 3 Year Old Serial No. 040
Calibration No. 04**



Transportation Research Center Inc.
P.O. Box B-67
10820 St. Rt. 347
East Liberty, OH 43319-0367

Transportation Research Center Inc.
572P HIII 3 Year Old Dummy
External Dimensions
Serial No. 040 Calibration No. 04
08/06/04

Test Parameter	Dimension	Specification	Results	Pass
Total Sitting Height	A	538.5 - 553.7 mm	550 mm	Yes
Shoulder Pivot Height	B	307.3 - 322.6 mm	315 mm	Yes
Hip Pivot Height	C	33.0 - 43.2 mm	40 mm	Yes
Hip Pivot from Backline	D	56.9 - 67.1 mm	63 mm	Yes
Shoulder Pivot from Backline	E	58.4 - 68.6 mm	66 mm	Yes
Thigh Clearance	F	81.0 - 91.2 mm	85 mm	Yes
Back of Elbow to Finger Tip	G	247.4 - 262.6 mm	254 mm	Yes
Head Back to Backline	H	48.3 - 58.4 mm	53 mm	Yes
Shoulder to Elbow Length	I	185.0 - 200.7 mm	197 mm	Yes
Elbow Rest Height	J	133.6 - 148.8 mm	140 mm	Yes
Buttock to Knee Length	K	287.3 - 302.5 mm	295 mm	Yes
Popliteal Height	L	221.0 - 236.2 mm	226 mm	Yes
Knee to Floor Height	M	241.6 - 256.8 mm	251 mm	Yes
Buttock Popliteal Length	N	217.9 - 233.2 mm	224 mm	Yes
Chest Depth with Jacket	O	134.6 - 149.9 mm	143 mm	Yes
Foot Length	P	137.7 - 147.8 mm	140 mm	Yes
Stature	Q	932.2 - 957.6 mm	944 mm	Yes
Buttock to Knee Pivot Length	R	251.5 - 261.6 mm	254 mm	Yes
Head Breadth	S	128.3 - 143.5 mm	135 mm	Yes
Head Depth	T	167.4 - 182.6 mm	175 mm	Yes
Hip Breadth	U	200.7 - 215.9 mm	205 mm	Yes
Shoulder Breadth	V	236.5 - 251.7 mm	243 mm	Yes
Foot Breadth	W	53.6 - 63.8 mm	57 mm	Yes
Head Circumference	X	500.4 - 515.6 mm	502 mm	Yes
Chest Circumference with Jacket	Y	527.1 - 552.5 mm	543 mm	Yes
Waist Circumference	Z	527.1 - 552.5 mm	545 mm	Yes
Reference Location for Chest Circumference	AA	248.9 - 259.1 mm	254 mm	Yes
Reference Location for Waist Circumference	BB	160.0 - 170.2 mm	165 mm	Yes

Technician



Approved





Transportation Research Center Inc.

572P Head Drop Test

HIII 3 Year Old Serial No. 040 Calibration No. 04 - 2

Test Date 08/05/2004

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Peak Resultant Acceleration	250 - 280 g	254.1 g	Yes
Peak Lateral Acceleration	15 g Max	-3.0 g	Yes
Is Acceleration Curve Unimodal?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved

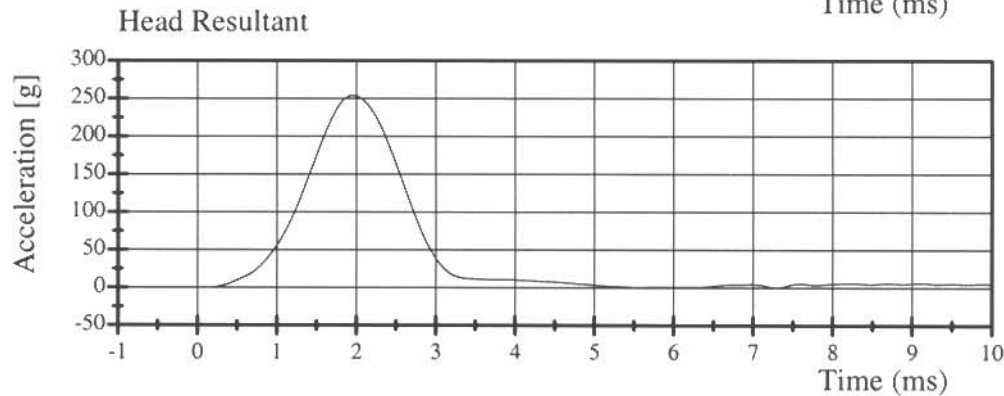
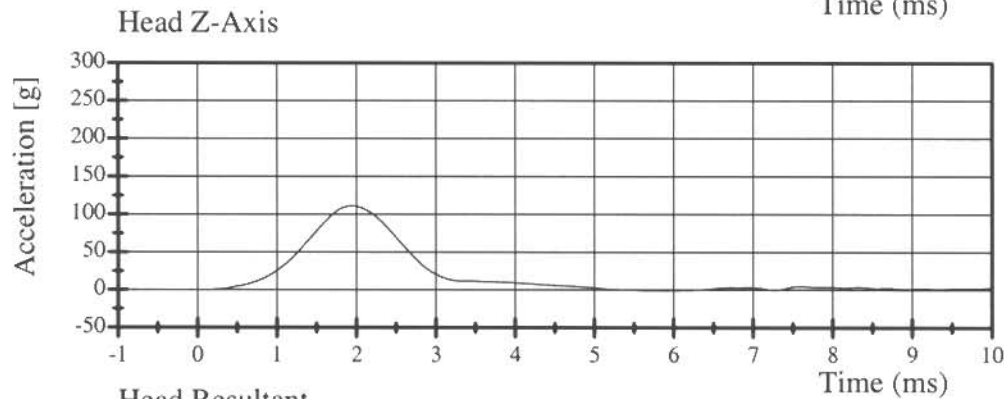
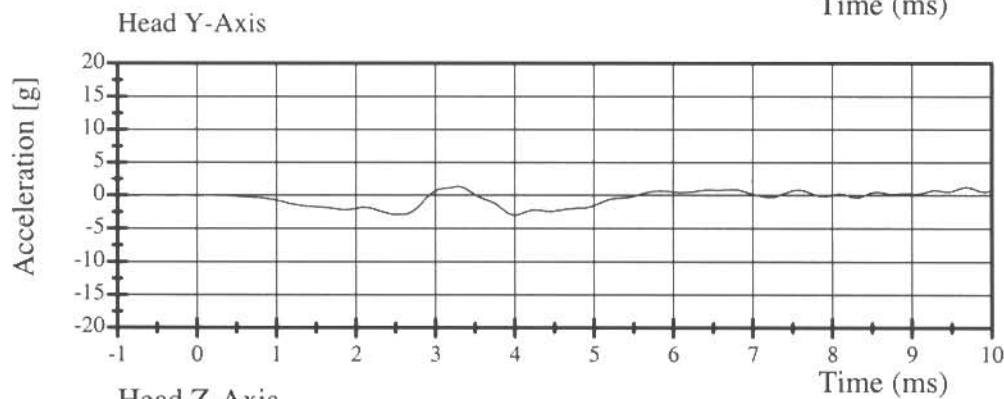
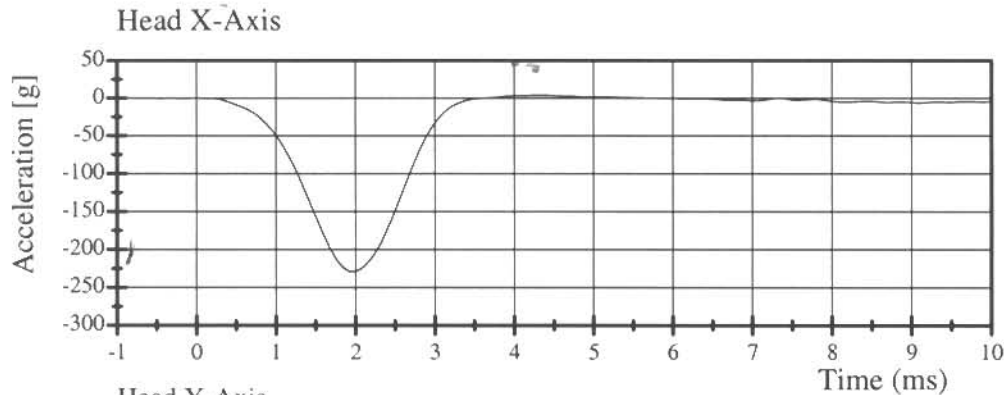


Transportation Research Center Inc.

572P Head Drop Test

HIII 3 Year Old Serial No. 040 Calibration No. 04 - 2

Test Date 08/05/2004



Transportation Research Center Inc.

572P Neck Flexion Test - 6 Channel Transducer

HIII 3 Year Old Serial No. 040 Calibration No. 04 - 1

Test Date 08/06/2004

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Impact Velocity	5.40 - 5.60 m/s	5.58 m/s	Yes
Integrated Pendulum Velocity			
10 ms	2.00 - 2.70 m/s	2.44 m/s	Yes
15 ms	3.00 - 4.00 m/s	3.50 m/s	Yes
20 ms	4.00 - 5.10 m/s	4.76 m/s	Yes
Peak D Plane Rotation	70 - 82 °	72.7 °	Yes
Peak Moment About Occipital Condyles (During time interval rotation is within specified corridors)	42.0 - 53.0 N·m	42.70 N·m	Yes
Positive Moment Decay Time To 10 N·m	60 - 80 ms	70.72 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



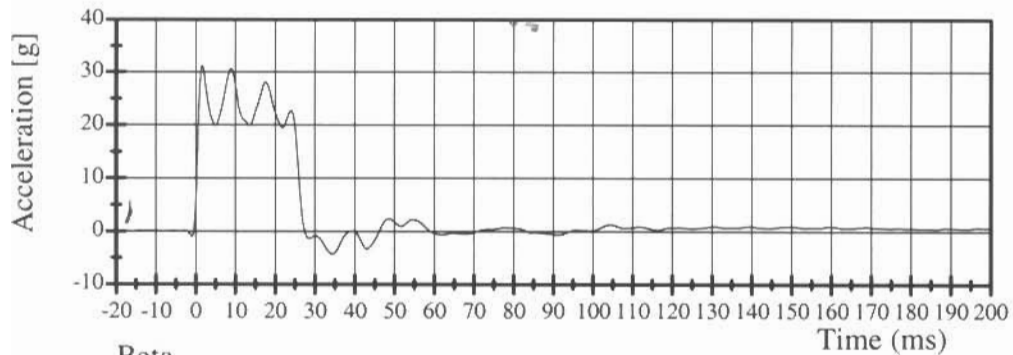
Transportation Research Center Inc.

572P Neck Flexion Test

HIII 3 Year Old Serial No. 040 Calibration No. 04 - 1

Test Date 08/06/2004

Pendulum Deceleration

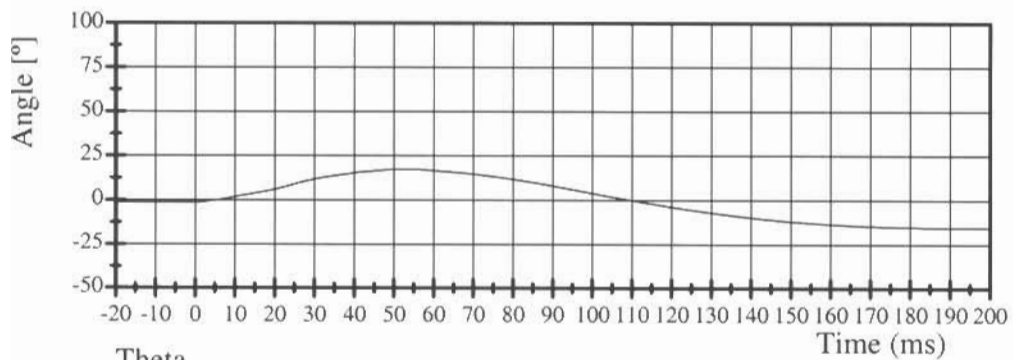


Filter Class: 180

Max: 31.2 g at 1.7 ms

Min: -4.3 g at 34.4 ms

Beta

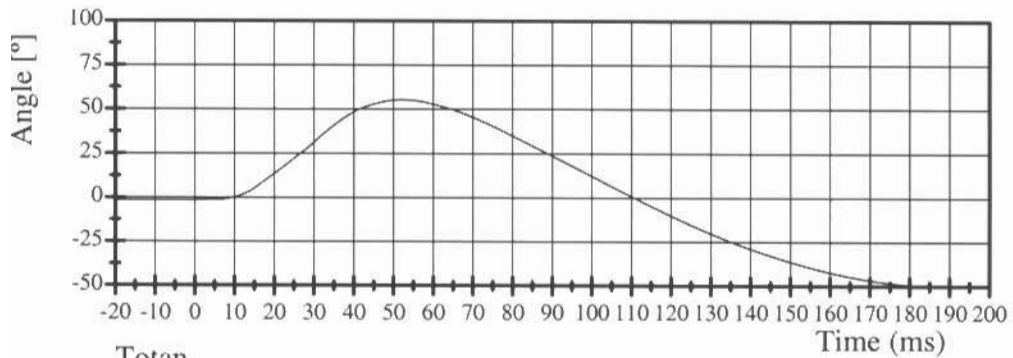


Filter Class: 60

Max: 17.4 ° at 52.0 ms

Min: -15.4 ° at 192.4 ms

Theta

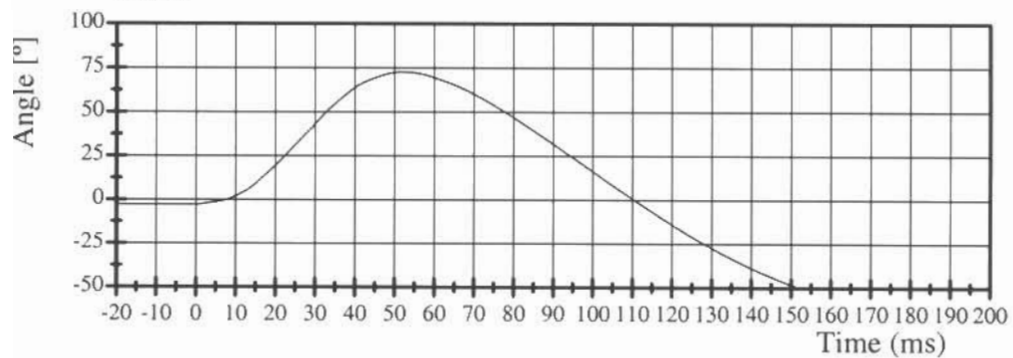


Filter Class: 60

Max: 55.3 ° at 52.0 ms

Min: -50.0 ° at 192.3 ms

Totan



Filter Class: 60

Max: 72.7 ° at 52.0 ms

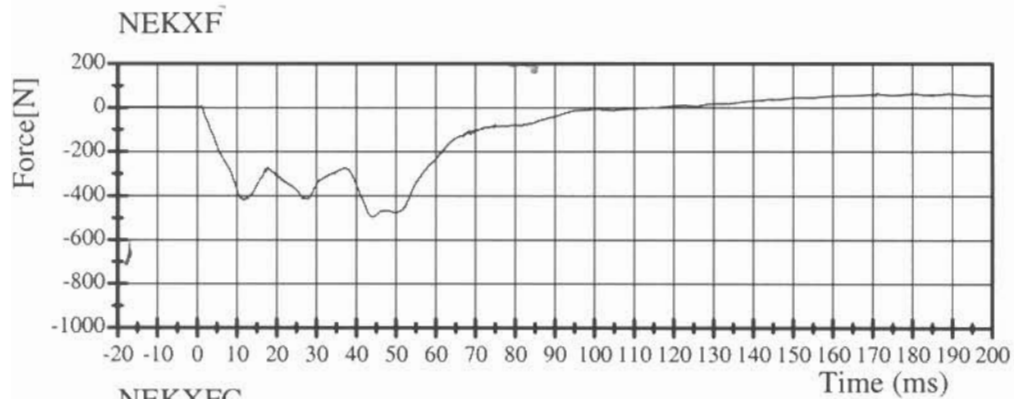
Min: -65.4 ° at 192.3 ms

Transportation Research Center Inc.

572P Neck Flexion Test

HIII 3 Year Old Serial No. 040 Calibration No. 04 - 1

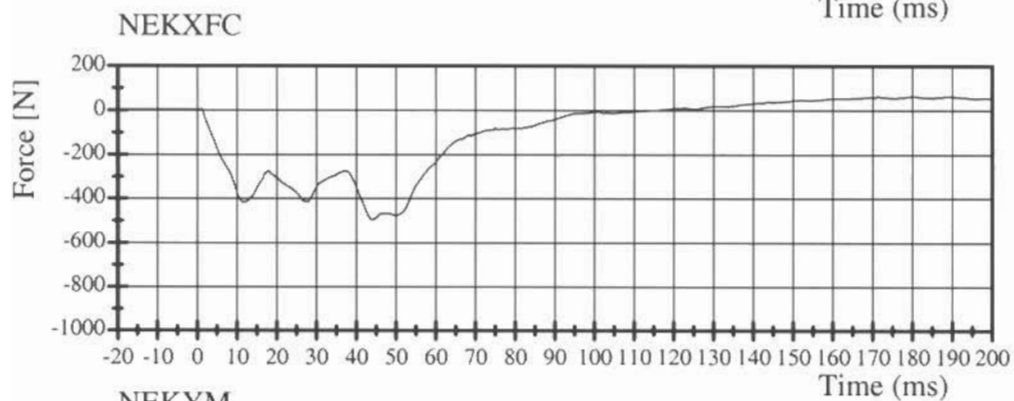
Test Date 08/06/2004



Filter Class: 1000

Max: 66.6 N at 171.1 ms

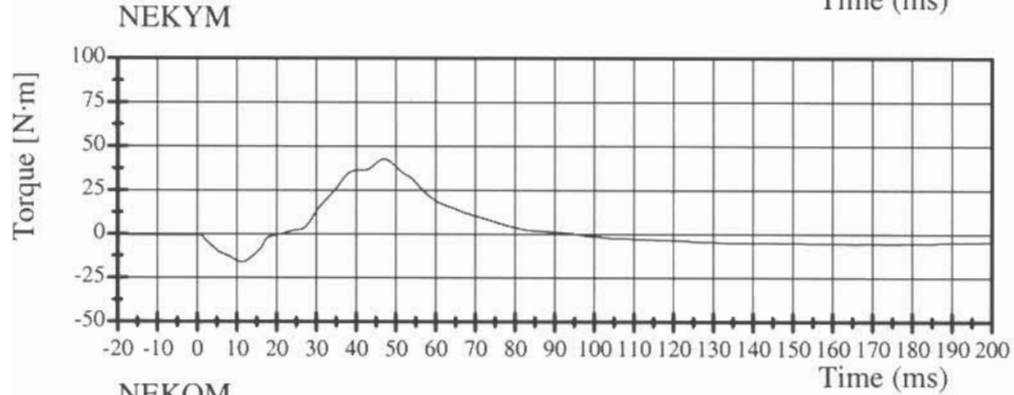
Min: -494.8 N at 43.8 ms



Filter Class: 600

Max: 64.4 N at 171.2 ms

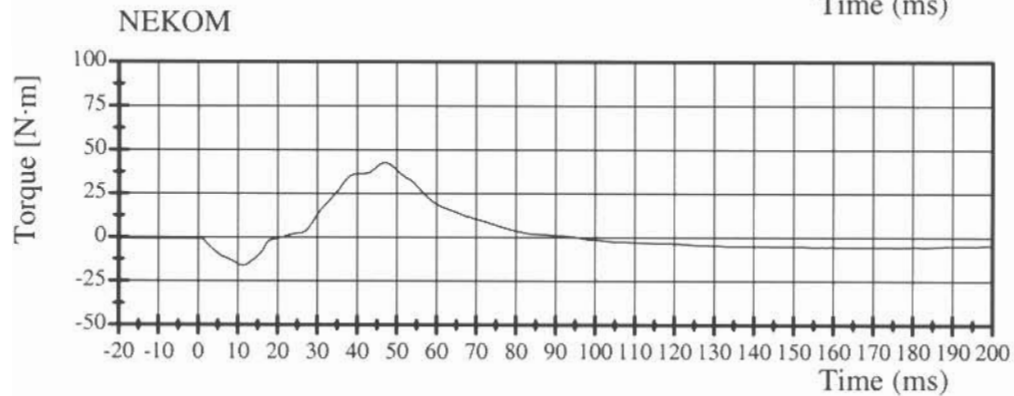
Min: -494.5 N at 43.9 ms



Filter Class: 600

Max: 42.7 N·m at 46.8 ms

Min: -16.0 N·m at 11.6 ms



Filter Class: 600

Max: 42.7 N·m at 46.8 ms

Min: -16.0 N·m at 11.6 ms

Transportation Research Center Inc.

572P Neck Extension Test - 6 Channel Transducer

HIII 3 Year Old Serial No. 040 Calibration No. 04 - 3

Test Date 08/06/2004

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Impact Velocity	3.55 - 3.75 m/s	3.66 m/s	Yes
Integrated Pendulum Velocity			
10 ms	1.00 - 1.40 m/s	1.19 m/s	Yes
15 ms	1.90 - 2.50 m/s	2.10 m/s	Yes
20 ms	2.80 - 3.50 m/s	2.86 m/s	Yes
Peak D Plane Rotation	83 - 93 °	84.2 °	Yes
Peak Moment About Occipital Condyles (During time interval rotation is within specified corridors)	-53.3 - (-43.7) N·m	-44.22 N·m	Yes
Positive Moment Decay Time To -10 N·m	60 - 80 ms	70.80 ms	Yes

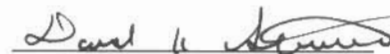
Test meets specifications.

Comments:

Technician



Approved



08.06.2004 10:06:41 1000

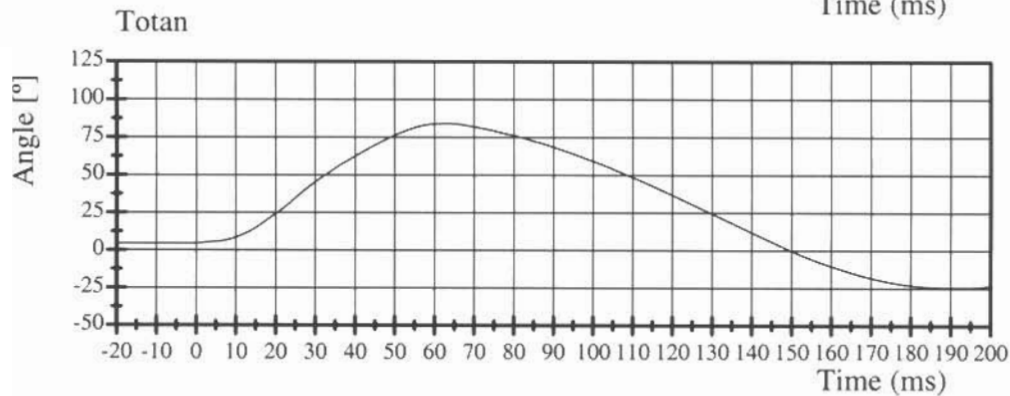
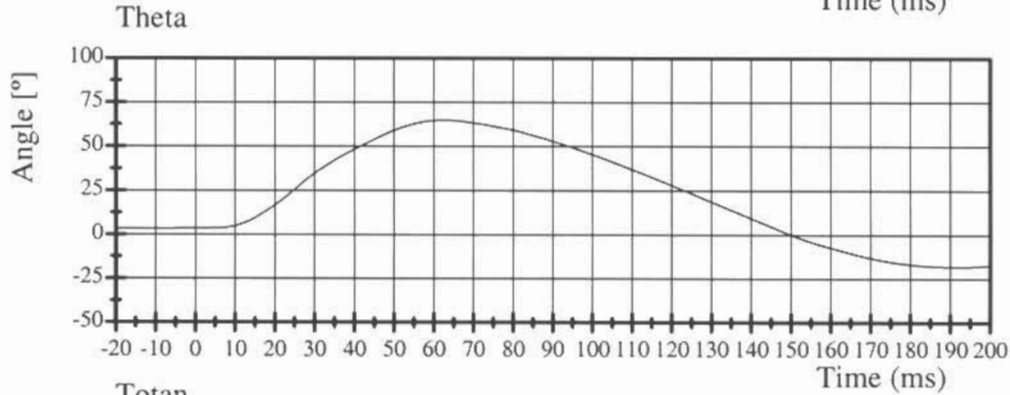
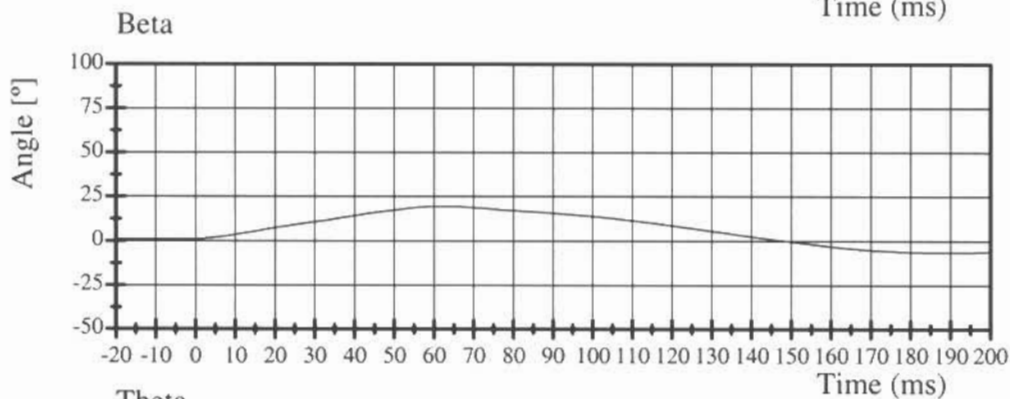
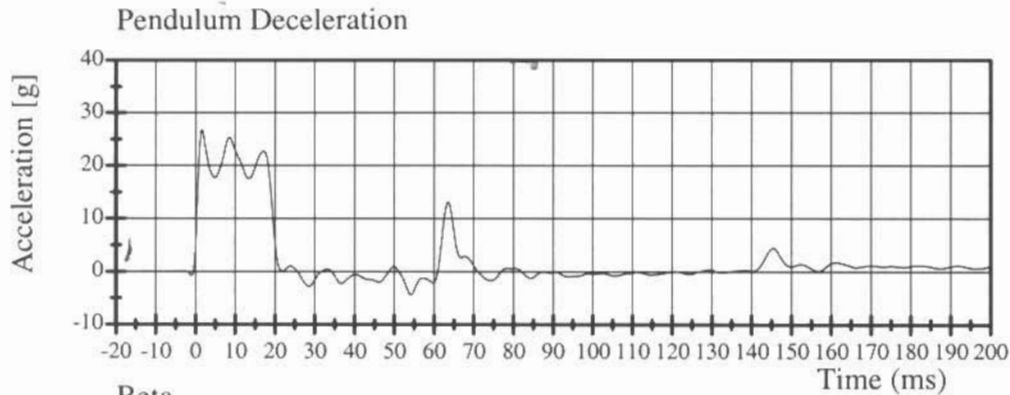


Transportation Research Center Inc.

572P Neck Extension Test

HIII 3 Year Old Serial No. 040 Calibration No. 04 - 3

Test Date 08/06/2004

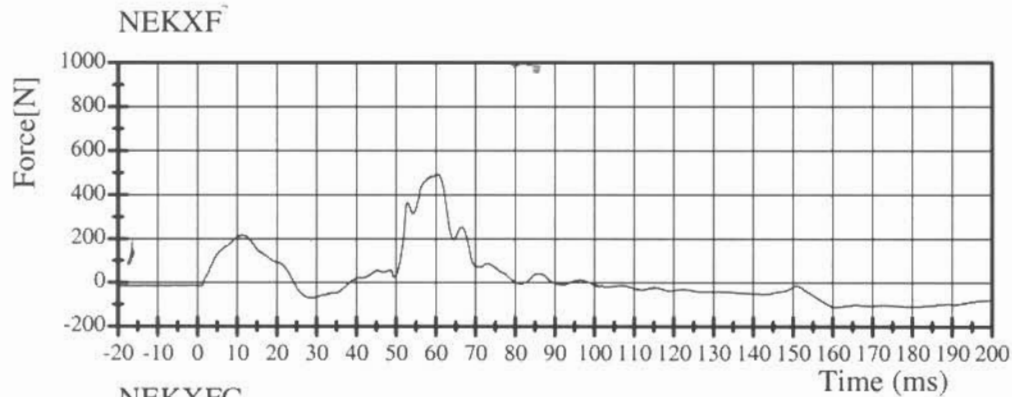


Transportation Research Center Inc.

572P Neck Extension Test

HIII 3 Year Old Serial No. 040 Calibration No. 04 - 3

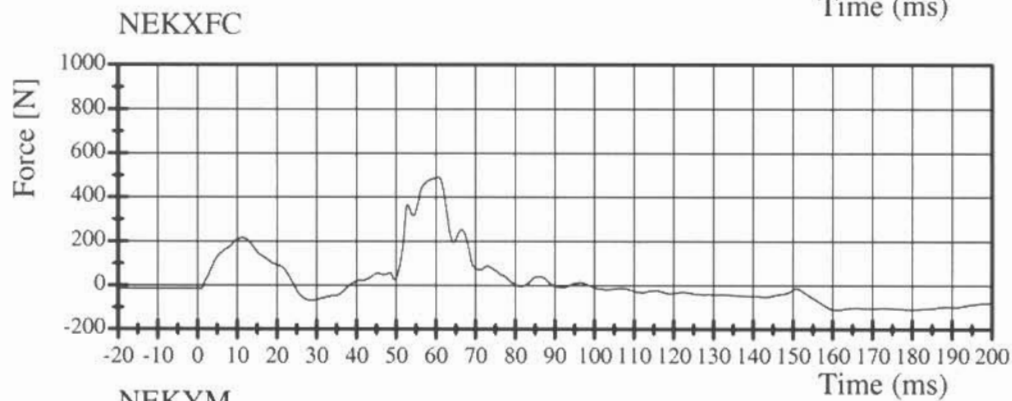
Test Date 08/06/2004



Filter Class: 1000

Max: 491.8 N at 60.8 ms

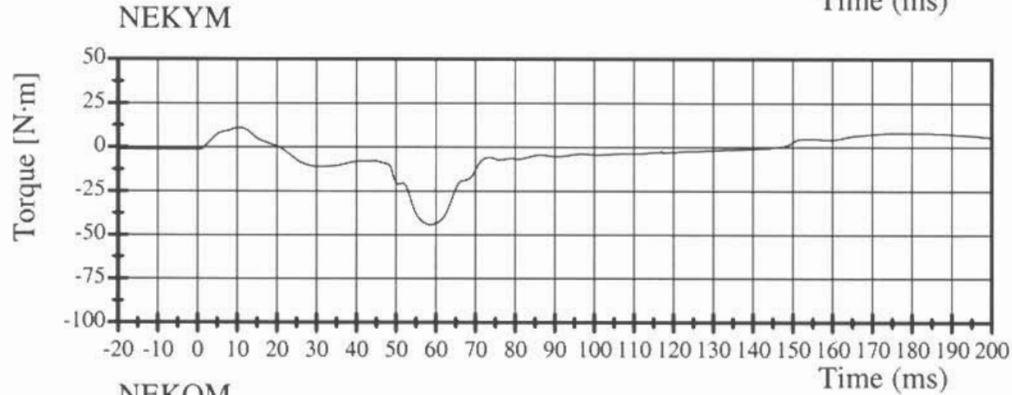
Min: -111.4 N at 161.0 ms



Filter Class: 600

Max: 491.8 N at 60.6 ms

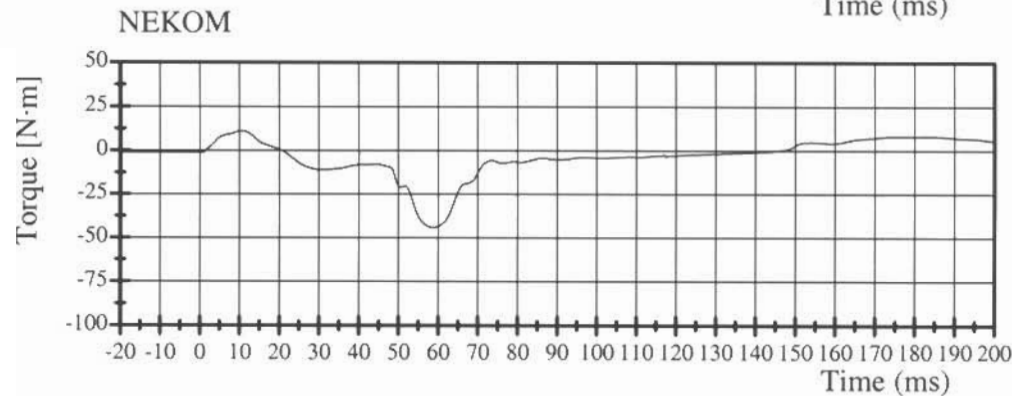
Min: -111.3 N at 161.0 ms



Filter Class: 600

Max: 11.1 N·m at 10.4 ms

Min: -44.2 N·m at 58.6 ms



Filter Class: 600

Max: 11.1 N·m at 10.4 ms

Min: -44.2 N·m at 58.6 ms

Transportation Research Center Inc.

572P Thorax Test

HIH 3 Year Old Serial No. 040 Calibration No. 04 - 1

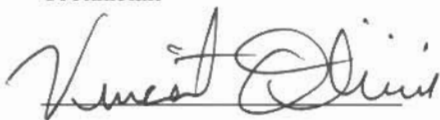
Test Date 08/05/2004

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	5.90 - 6.10 m/s	5.97 m/s	Yes
Maximum Chest Deflection	-38.0 - (-32.0) mm	-35.8 mm	Yes
Peak Impact Probe Force Within Compression Corridor	680 - 810 N	741 N	Yes
Internal Hysteresis	65 - 85 %	67 %	Yes
Maximum Force Between 12.5 mm & 32 mm Of Deflection	<= 910	758	Yes

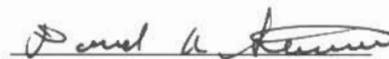
Test meets specifications.

Comments:

Technician



Approved



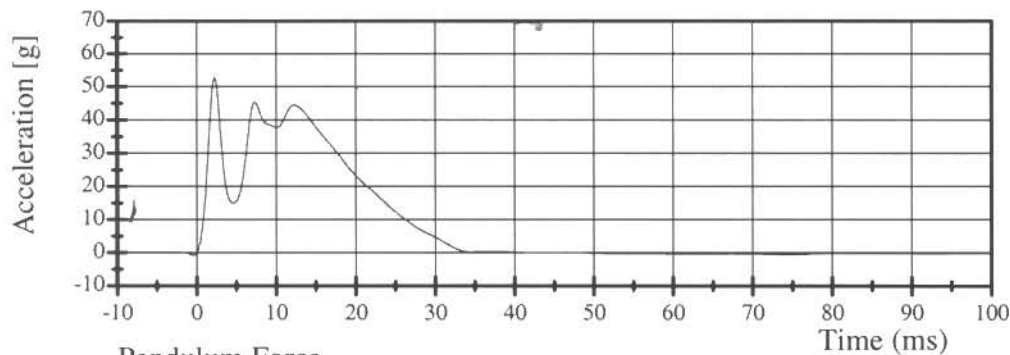
Transportation Research Center Inc.

572P Thorax Test

HIII 3 Year Old Serial No. 040 Calibration No. 04 - 1

Test Date 08/05/2004

Pendulum Deceleration

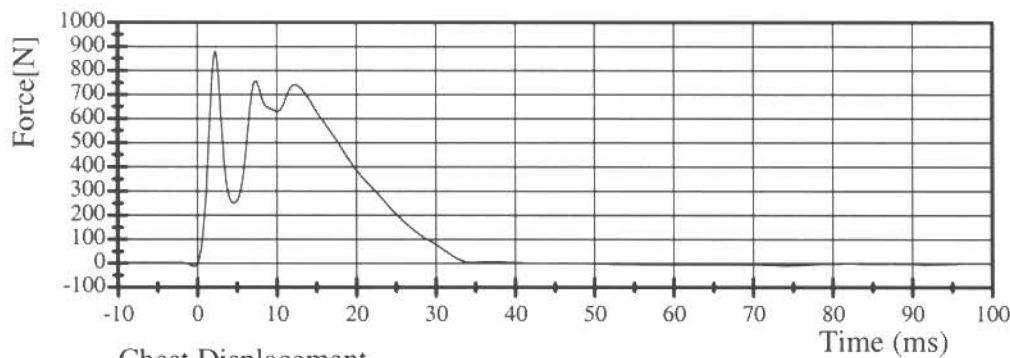


Filter Class: 180

Max: 52.8 g at 2.2 ms

Min: -0.7 g at -0.4 ms

Pendulum Force

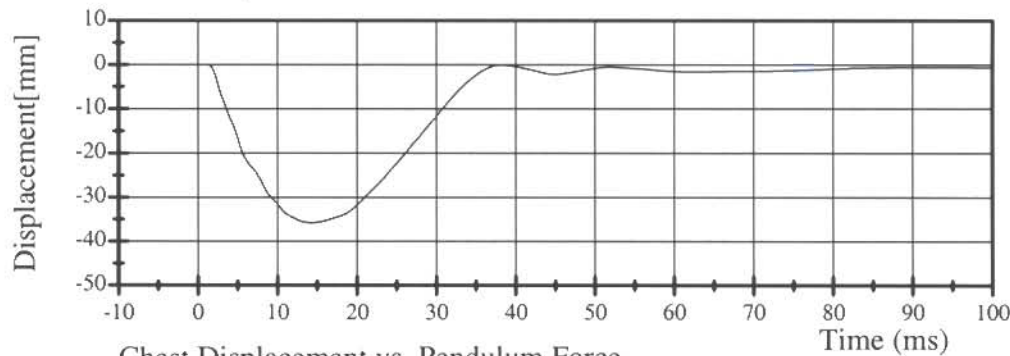


Filter Class: 180

Max: 880.2 N at 2.2 ms

Min: -11.7 N at -0.4 ms

Chest Displacement

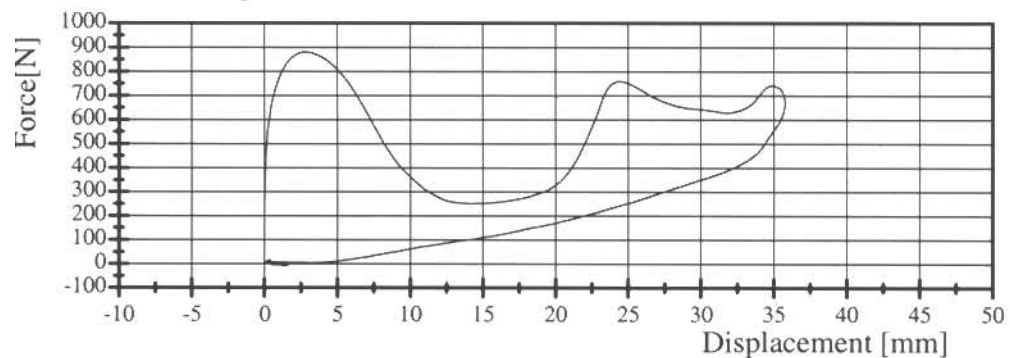


Filter Class: 600

Max: 0.0 mm at -80.0 ms

Min: -35.8 mm at 14.3 ms

Chest Displacement vs. Pendulum Force



TRANSPORTATION RESEARCH CENTER INC.

TORSO FLEXION TEST

HYBRID III THREE-YEAR-OLD

CAL DATE: 04-Aug-04

TRC, INC.

TEST NO: 040C04TF1

572 P SN 040 TORSO FLEX CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 – 70 %	56 %
INITIAL ANGLE OF UNSUPPORTRED DUMMY	<= 15 DEG. REFERENCED TO VERTICAL	8.3 DEG.
MAXIMUM FORCE AT 45 DEG. DURING 10 SECOND PERIOD	130 – 180 N	165.3 N
RETURN ANGLE		5.4 °
DIFFERENCE BETWEEN RETURN ANGLE & INTIAL ANGLE	+/- 8 ° OF INTIAL ANGLE	2.9 °
RATE	0.5° - 1.5°/sec	1.06 °/sec

TEST MEETS SPECIFICATIONS

TECHNICIAN



Transportation Research Center Inc.

ATD Calibration Report

for

VRTC

**HIII 10 Year Old
Serial No. D009
Calibration No. 01**



Transportation Research Center Inc.
P.O. Box B-67
10820 St. Rt. 347
East Liberty, OH 43319-0367

Transportation Research Center Inc.
572N HHH 10 Year Old Dummy
External Dimensions
Serial No. D009 Calibration No. 01
Date: 8/02/04

Symbol	Description	Specification*	Results	Pass
		mm	mm	
A	Total Sitting Height	710.3 - 736.6	726	Yes
B	Shoulder Pivot Height	384.8 - 405.1	395	Yes
C	Hip Pivot Height	77.5 - 87.6	84	Yes
D	Hip Pivot from Backline	133.1 - 143.3	142	Yes
E	Shoulder Pivot from Backline	80.0 - 90.2	85	Yes
F	Thigh Clearance	105.4 - 120.6	112	Yes
G	Back of Elbow to Wrist Pivot	227.4 - 242.6	233	Yes
H	Head Back to Backline	45.8 - 50.8	48	Yes
I	Shoulder to Elbow Length	269.2 - 284.5	271	Yes
J	Elbow Rest Height	137.2 - 157.5	145	Yes
K	Buttock to Knee Length	463.6 - 483.9	475	Yes
L	Popliteal Height	321.3 - 341.6	335	Yes
M	Knee to Floor Height	370.4 - 388.6	380	Yes
N	Buttock Popliteal Height	367.0 - 387.4	375	Yes
O	Chest Depth without Jacket	157.5 - 172.7	163	Yes
P	Foot Length	188.0 - 203.2	194	Yes
Q	Standing Height (A-C+R-D+M)	1296.7 REF	1299	
R	Buttock to Knee Pivot Length	414.0 - 434.3	419	Yes
S	Head Breadth	137.1 - 147.3	142	Yes
T	Head Depth	177.8 - 188.0	182	Yes
U	Hip Breadth	256.6 - 271.8	264	Yes
V	Shoulder Breadth	307.4 - 322.6	315	Yes
W	Foot Breadth	68.6 - 83.8	75	Yes
X	Head Circumference	528.3 - 548.7	538	Yes
Y	Chest Circumference with Jacket	690.9 - 716.3	704	Yes
Z	Waist Circumference	696.0 - 721.4	706	Yes
AA	Reference Location for Chest Circumference	337.8 - 348.0	342	Yes
BB	Reference Location for Waist Circumference	* *	182	

* With specification revisions provided by VRTC 08/02/04

** Measured 1 cm below top rear surface of pelvis flesh, parallel to pelvis rim

Technician



Approved




Transportation Research Center Inc.

Head Drop Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 2

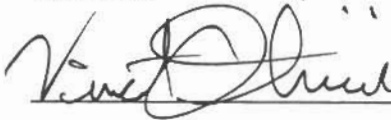
Test Date 07/26/2004

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Peak Resultant Acceleration	240 - 295 g	246.4 g	Yes
Peak Lateral Acceleration	15 g Max	-1.7 g	Yes
Oscillations After Main Pulse	Less Than 10% of Peak Resultant Acceleration?	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved



07.26.2004 11:13:55 609

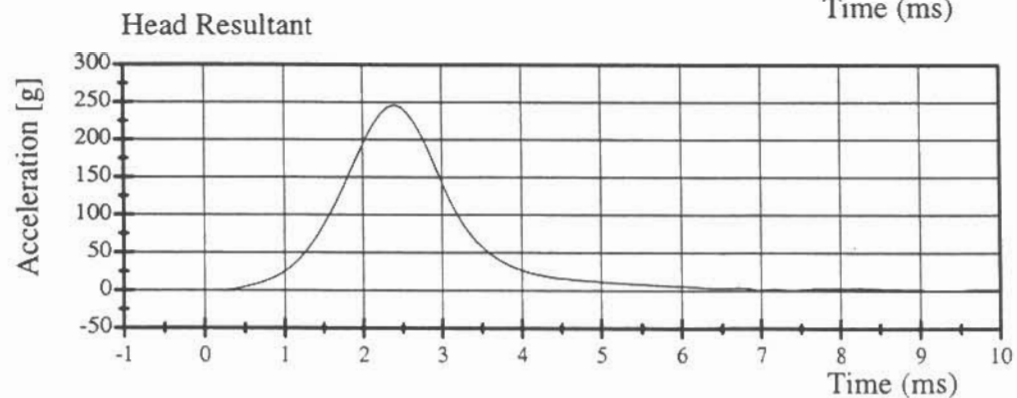
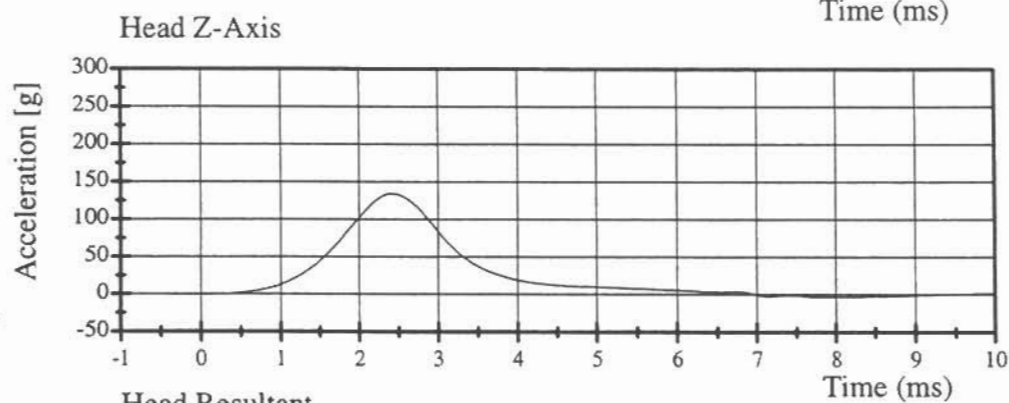
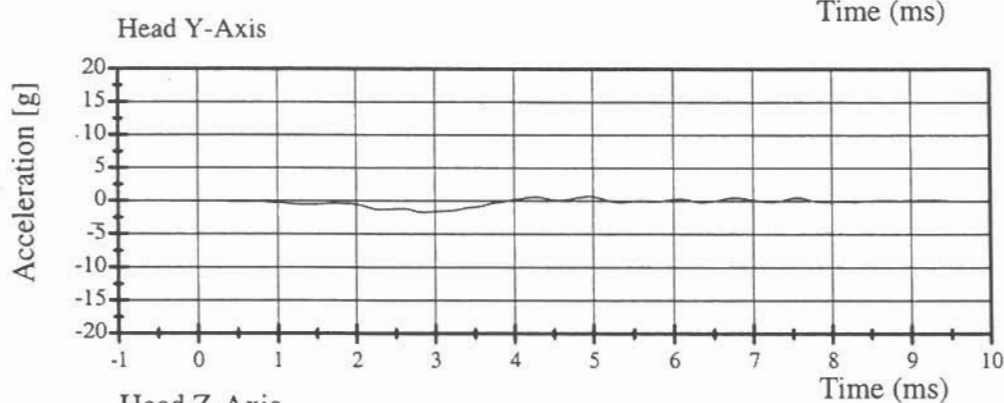
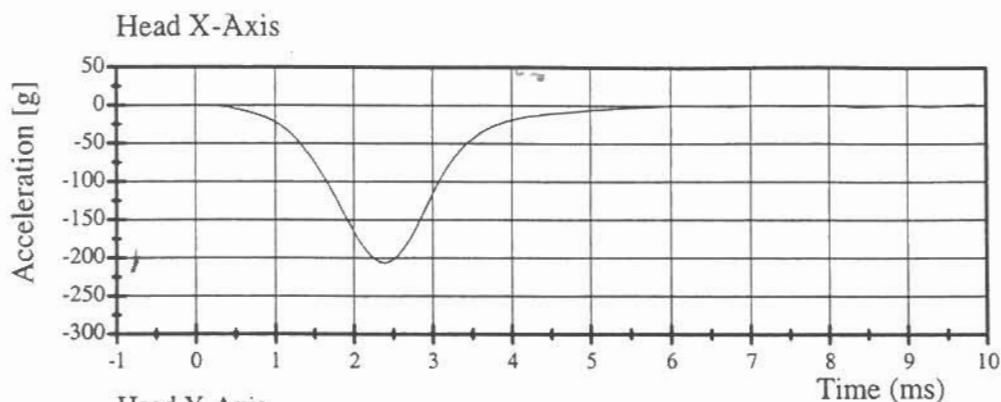


Transportation Research Center Inc.

Head Drop Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 2

Test Date 07/26/2004



Transportation Research Center Inc.

Neck Flexion Test - 6 Channel Transducer

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 1

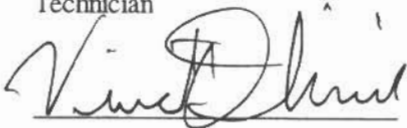
Test Date 07/29/2004

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Impact Velocity	5.98 - 6.22 m/s	6.11 m/s	Yes
Integrated Pendulum Velocity			
10 ms	1.64 - 2.04 m/s	1.90 m/s	Yes
20 ms	3.04 - 4.04 m/s	3.71 m/s	Yes
30 ms	4.45 - 5.65 m/s	5.35 m/s	Yes
Peak D Plane Rotation	74.0 - 88.0 °	78.4 °	Yes
Peak Moment About Occipital Condyles (During time interval rotation is within specified corridors)	51.0 - 65.0 N·m	52.85 N·m	Yes
Positive Moment Decay Time To 10 N·m	85 - 105 ms	95.84 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



07.29.2004 13:28:39 593



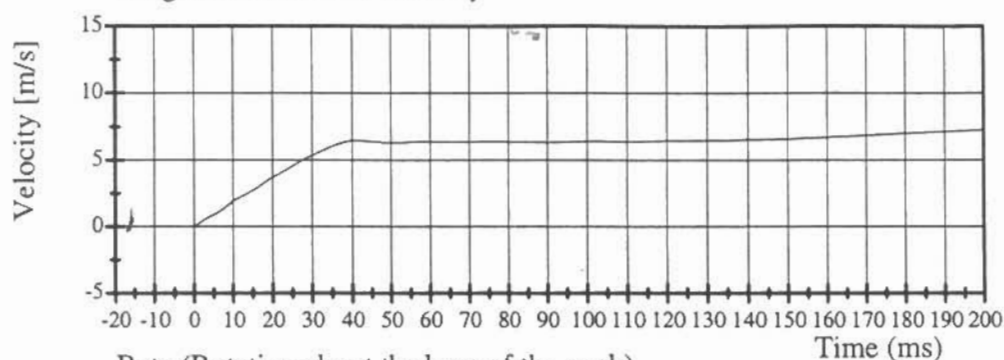
Transportation Research Center Inc.

Neck Flexion Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 1

Test Date 07/29/2004

Integrated Pendulum Velocity

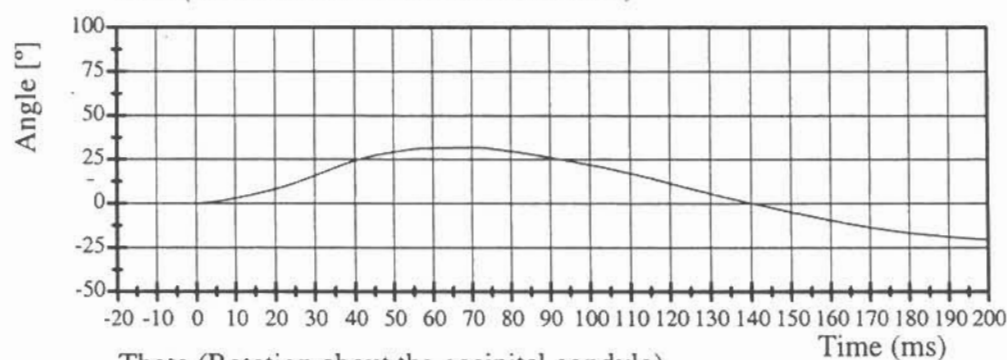


Filter Claßs: 180

Max: 7.95 m/s at 952.6 ms

Min: -0.00 m/s at -30.2 ms

Beta (Rotation about the base of the neck)

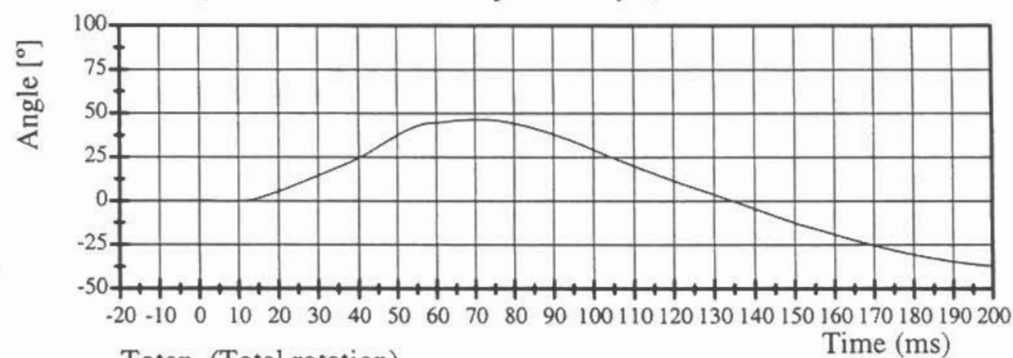


Filter Class: 60

Max: 32.0 ° at 68.8 ms

Min: -21.0 ° at 212.4 ms

Theta (Rotation about the occipital condyle)

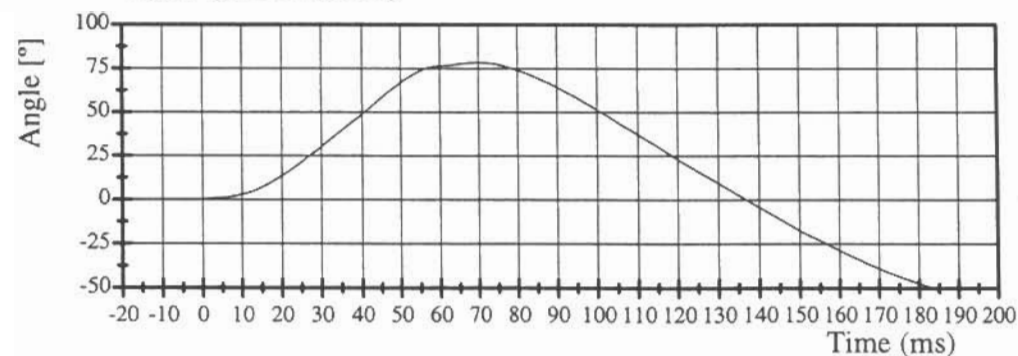


Filter Class: 60

Max: 46.4 ° at 71.0 ms

Min: -38.3 ° at 212.4 ms

Totan (Total rotation)



Filter Class: 60

Max: 78.4 ° at 69.7 ms

Min: -59.2 ° at 212.4 ms

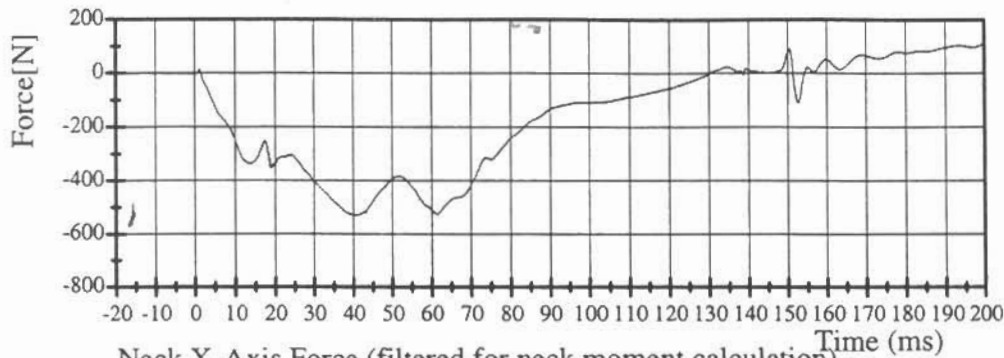
Transportation Research Center Inc.

Neck Flexion Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 1

Test Date 07/29/2004

Neck X-Axis Force

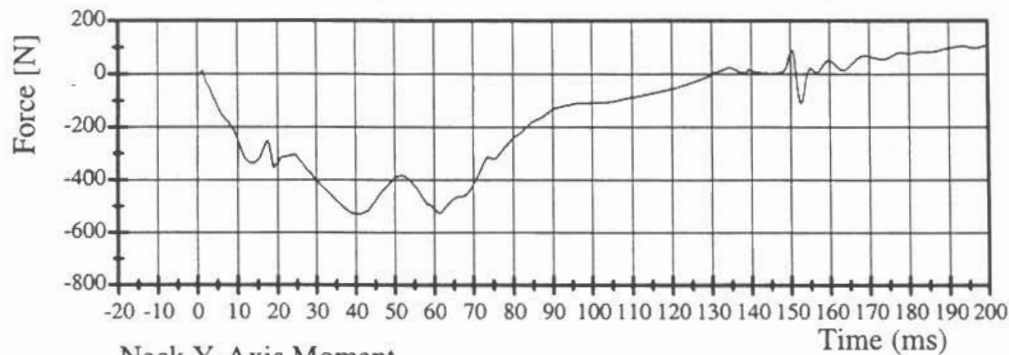


Filter Class: 1000

Max: 110.5 N at 201.4 ms

Min: -529.4 N at 40.5 ms

Neck X-Axis Force (filtered for neck moment calculation)

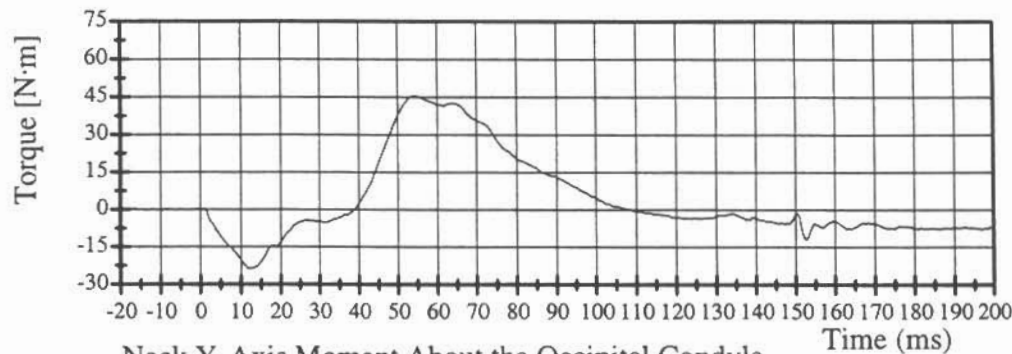


Filter Class: 600

Max: 110.2 N at 201.4 ms

Min: -529.2 N at 40.6 ms

Neck Y-Axis Moment

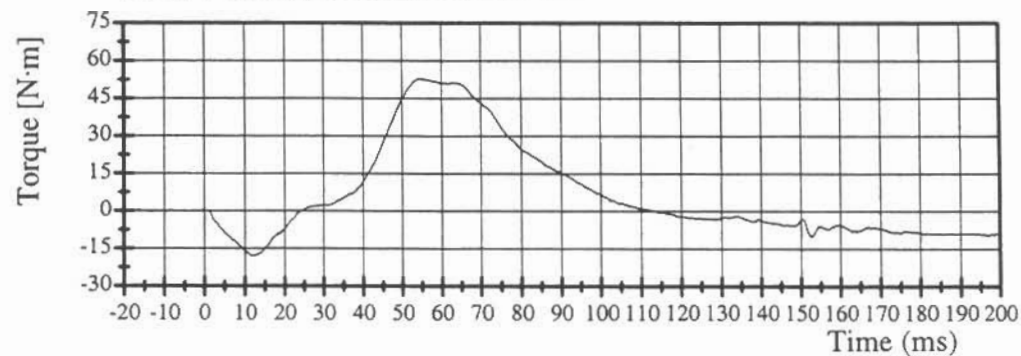


Filter Class: 600

Max: 45.5 N·m at 54.1 ms

Min: -23.6 N·m at 11.8 ms

Neck Y-Axis Moment About the Occipital Condyle



Filter Class: 600

Max: 52.9 N·m at 55.3 ms

Min: -18.0 N·m at 11.7 ms

Transportation Research Center Inc.

Neck Extension Test - 6 Channel Transducer

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 1

Test Date 07/29/2004

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Impact Velocity	4.91 - 5.15 m/s	5.01 m/s	Yes
Integrated Pendulum Velocity			
10 ms	1.49 - 1.89 m/s	1.62 m/s	Yes
20 ms	2.88 - 3.68 m/s	3.15 m/s	Yes
30 ms	4.20 - 5.20 m/s	4.60 m/s	Yes
Peak D Plane Rotation	98.5 - 113.5 °	104.2 °	Yes
Peak Moment About Occipital Condyles (During time interval rotation is within specified corridors)	(-47.0) - (-35.0) N·m	-40.40 N·m	Yes
Negative Moment Decay Time To -10 N·m	100 - 120 ms	107.36 ms	Yes

Test meets specifications.

Comments:

Technician

Vince Oliveri

Approved

V. J. Watter

07.29.2004 14:22:22 724



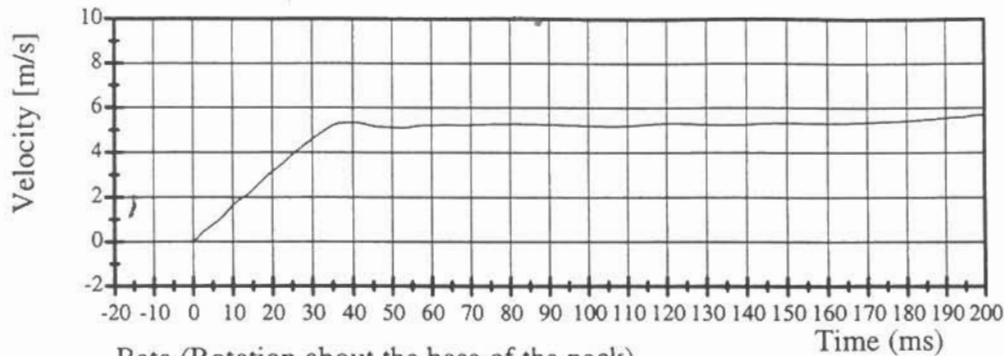
Transportation Research Center Inc.

Neck Extension Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 1

Test Date 07/29/2004

Integrated Pendulum Velocity

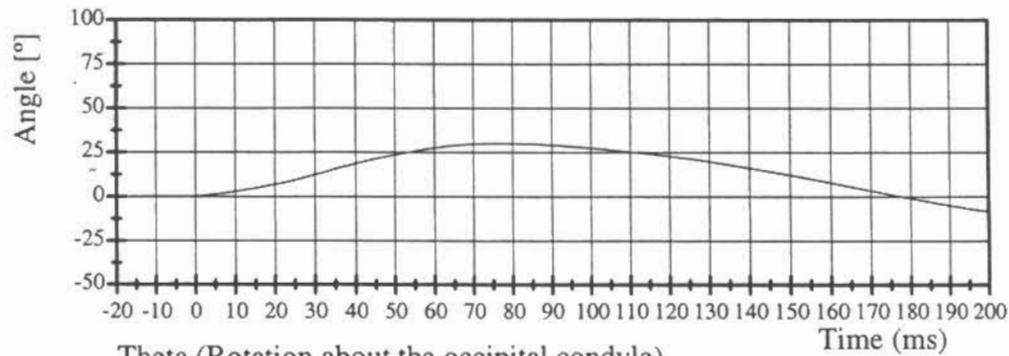


Filter Class: 180

Max: 6.7 m/s at 857.0 ms

Min: -0.0 m/s at -0.6 ms

Beta (Rotation about the base of the neck)

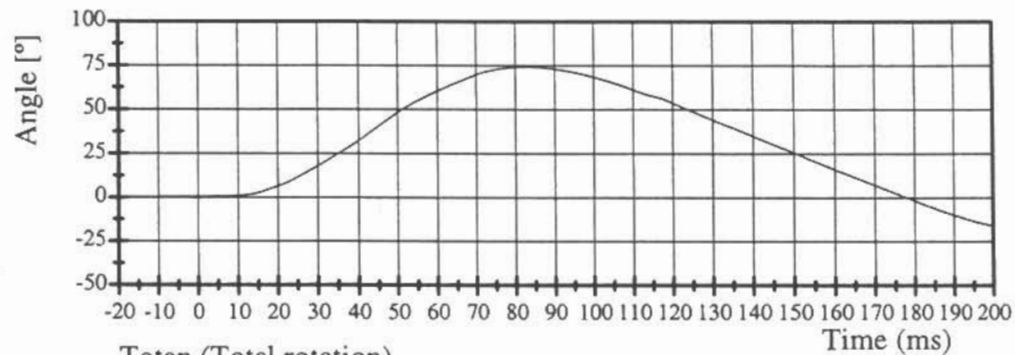


Filter Class: 60

Max: 30.0 ° at 73.8 ms

Min: -12.9 ° at 232.6 ms

Theta (Rotation about the occipital condyle)

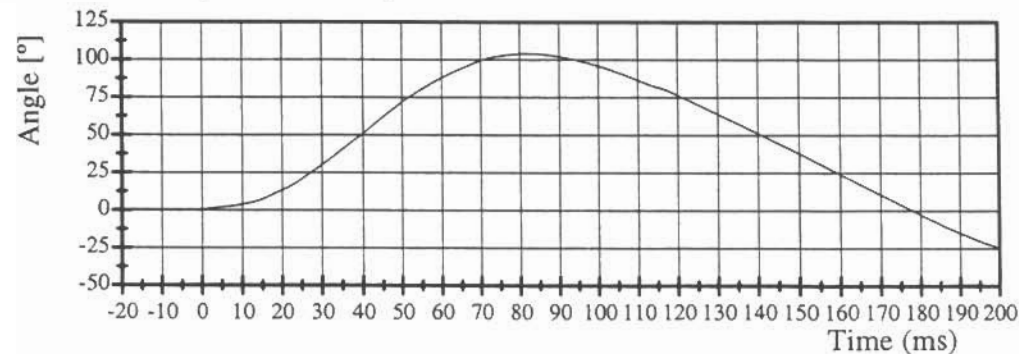


Filter Class: 60

Max: 74.3 ° at 82.9 ms

Min: -23.5 ° at 229.0 ms

Totan (Total rotation)



Filter Class: 60

Max: 104.2 ° at 82.5 ms

Min: -36.4 ° at 229.3 ms

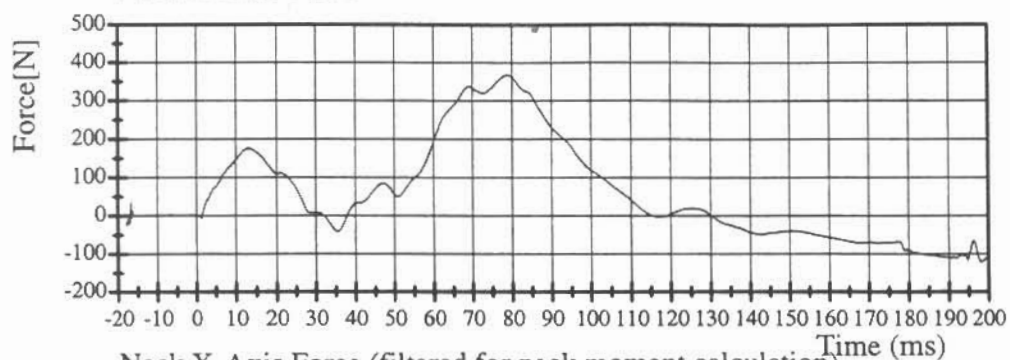
Transportation Research Center Inc.

Neck Extension Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 1

Test Date 07/29/2004

Neck X-Axis Force

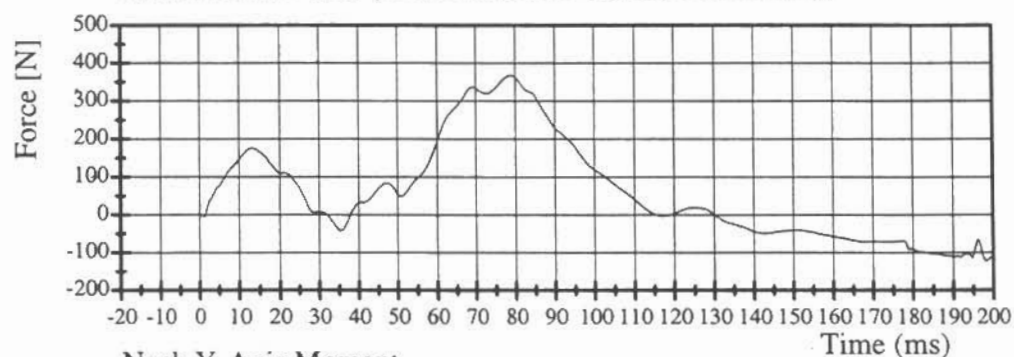


Filter Class: 1000

Max: 367.7 N at 78.9 ms

Min: -140.6 N at 211.0 ms

Neck X-Axis Force (filtered for neck moment calculation)

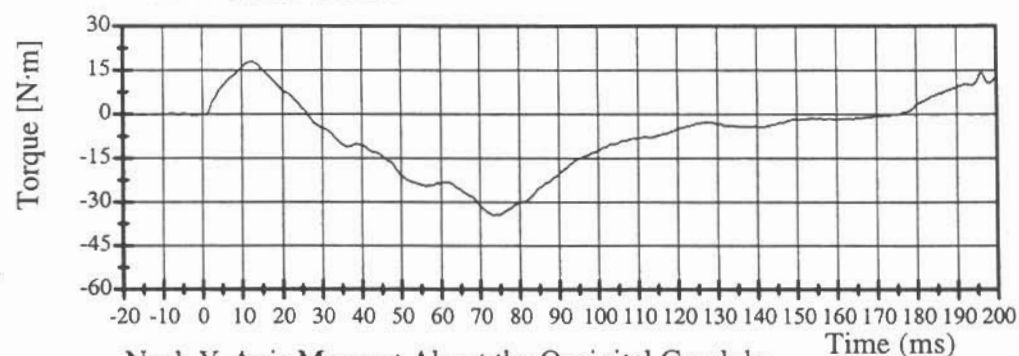


Filter Class: 600

Max: 367.4 N at 78.9 ms

Min: -140.3 N at 211.0 ms

Neck Y-Axis Moment

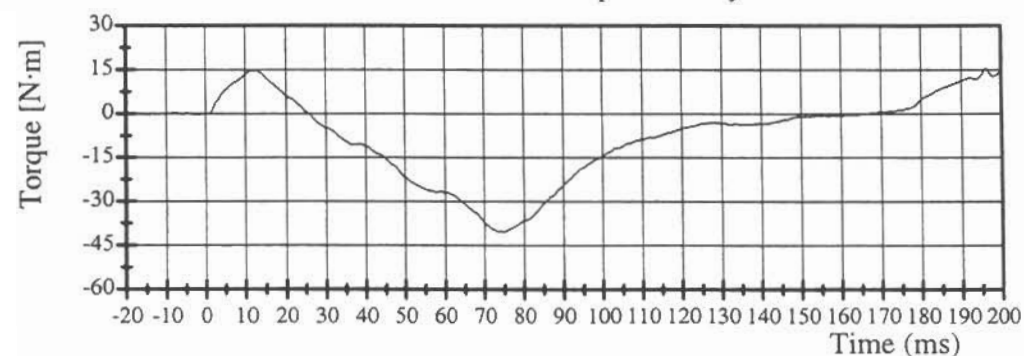


Filter Class: 600

Max: 17.9 N·m at 12.6 ms

Min: -34.6 N·m at 73.4 ms

Neck Y-Axis Moment About the Occipital Condyle



Filter Class: 600

Max: 16.8 N·m at 224.0 ms

Min: -40.4 N·m at 74.7 ms

Transportation Research Center Inc.

Thorax Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 8

Test Date 08/02/2004

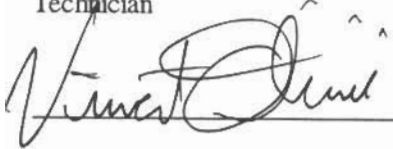
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Velocity	5.88 - 6.12 m/s	5.88	Yes
Maximum Chest Deflection	-47.0 - (-39.0) mm	-42.5 mm	Yes
Peak Impact Probe Force Within Compression Corridor	1830 - 2330 N	2312 N	Yes
Internal Hysteresis	65 - 85 %	83.6 %	Yes

Test Meets Specifications.

Comments:

New rib stiffeners and replacement rib set # 22030024A installed.

Technician



Approved



08.02.2004 15:21:42 1166

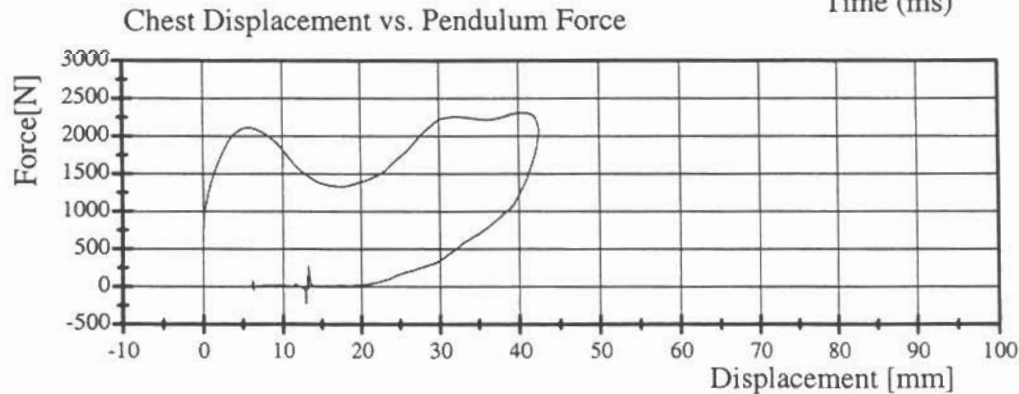
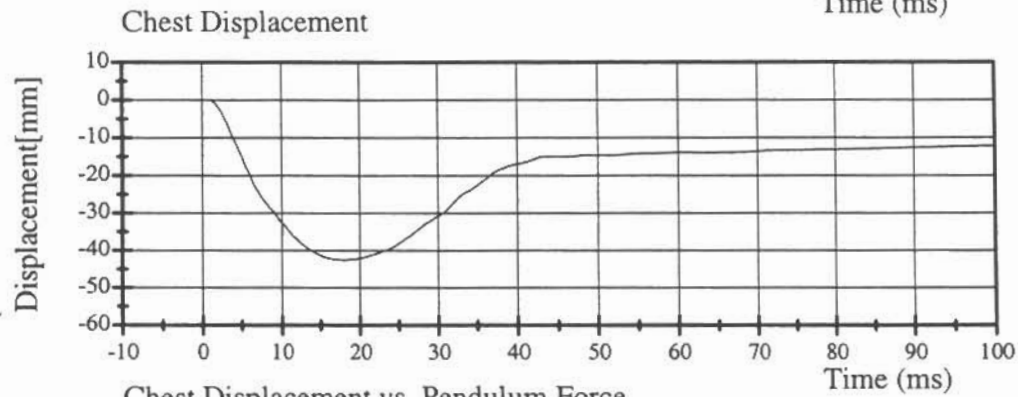
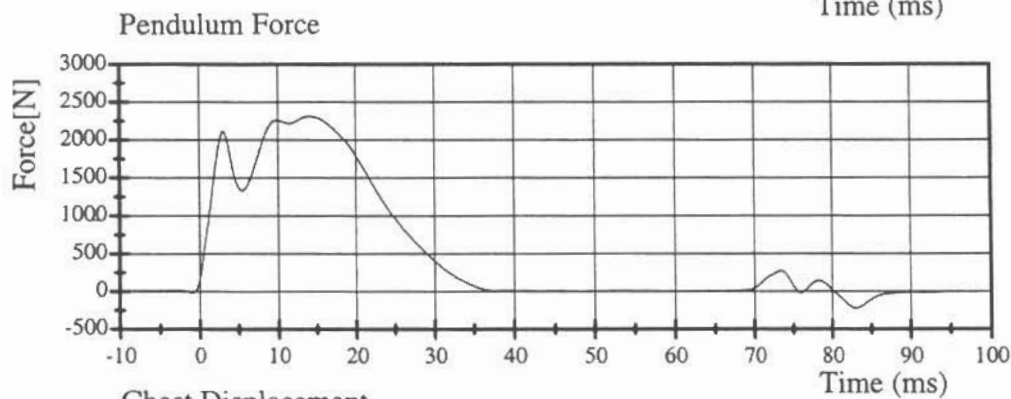
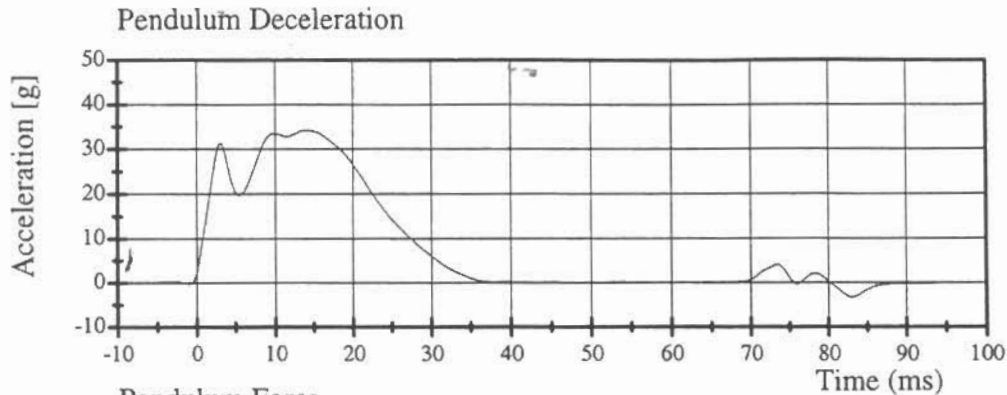


Transportation Research Center Inc.

Thorax Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 8

Test Date 08/02/2004



TRANSPORTATION RESEARCH CENTER INC.

TORSO FLEXION TEST

HYBRID III TEN YEAR-OLD

CAL DATE: 23-Jul-04

TRC, INC.

TEST NO: D009C01TF8

SND009 TORSO FLEX CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6 – 22.2° C	21.7 ° C
RELATIVE HUMIDITY	10 – 70 %	50 %
INITIAL ANGLE OF UNSUPPORTRED DUMMY	<= 20° REFERENCED TO VERTICAL	15.0 °
MAXIMUM FORCE AT 35 DEG. DURING 10 SECOND PERIOD	180 - 240 N	232.3 N
RETURN ANGLE		19.6 °
DIFFERENCE BETWEEN RETURN ANGLE & INTIAL ANGLE	+/- 8 ° OF INTIAL ANGLE	4.6 °
RATE	0.5° - 1.5°/sec	1.00 °/sec

TEST MEETS SPECIFICATIONS

Comments:

TECHNICIAN



Transportation Research Center Inc.

Left Knee Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 1

Test Date 07/30/2004

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.09 m/s	Yes
Maximum Pendulum Force	2560 - 3140 N	2958 N	Yes

Test meets specifications.

Comments:

Technician

Vincent Oliver

Approved

V. J. Walter

07.30.2004 15:10:53 1855



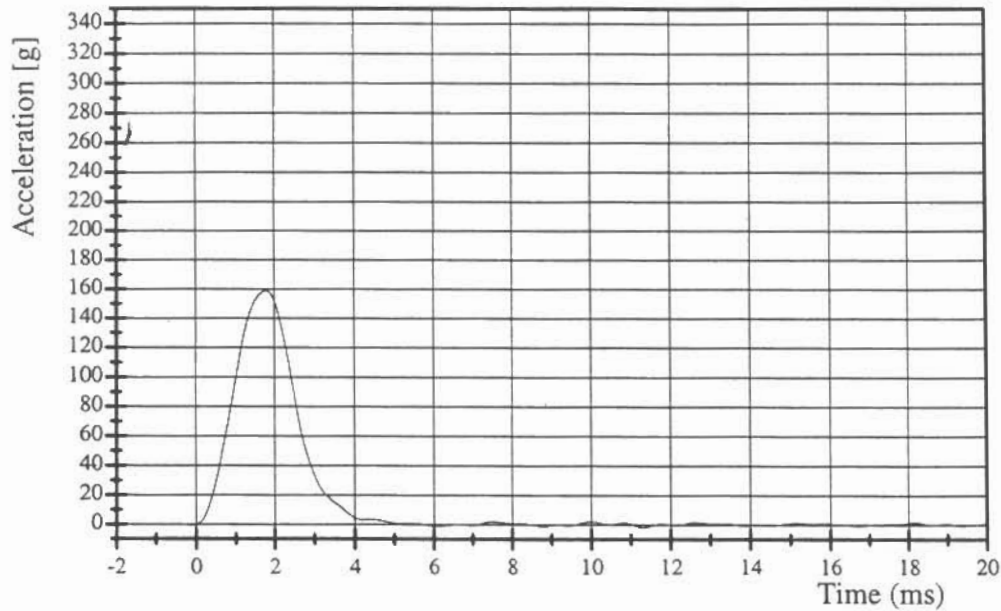
Transportation Research Center Inc.

Left Knee Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 1

Test Date 07/30/2004

Pendulum Deceleration

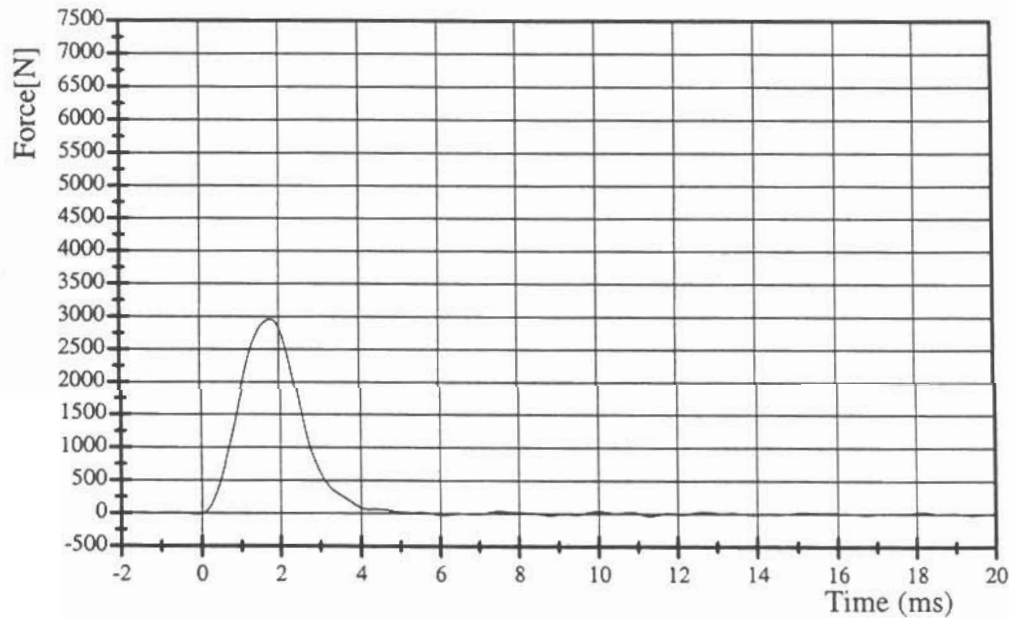


Filter Class: 600

Max: 158.8 g at 1.8 ms

Min: -1.9 g at 11.3 ms

Pendulum Force



Filter Class: 600

Max: 2958.4 N at 1.8 ms

Min: -34.8 N at 11.3 ms

07.30.2004 15:10:54 1855



Transportation Research Center Inc.

Right Knee Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 1

Test Date 07/30/2004

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.09 m/s	Yes
Maximum Pendulum Force	2560 - 3140 N	3022 N	Yes

Test meets specifications.

Comments:

Technician



Approved



07.30.2004 15:24:00 1854



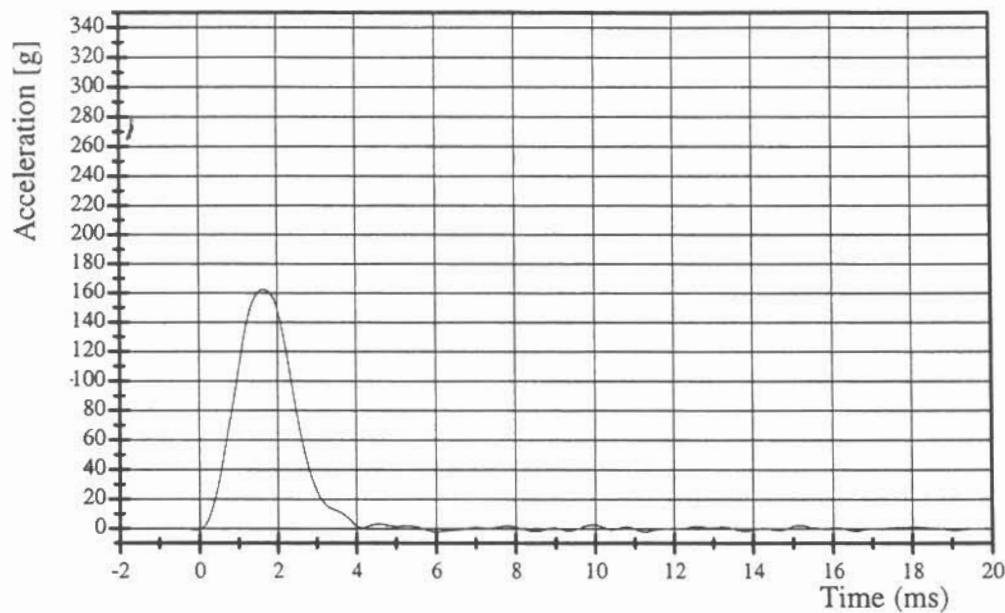
Transportation Research Center Inc.

Right Knee Test

HIII 10 Year Old Serial No. D009 Calibration No. 01 - 1

Test Date 07/30/2004

Pendulum Deceleration

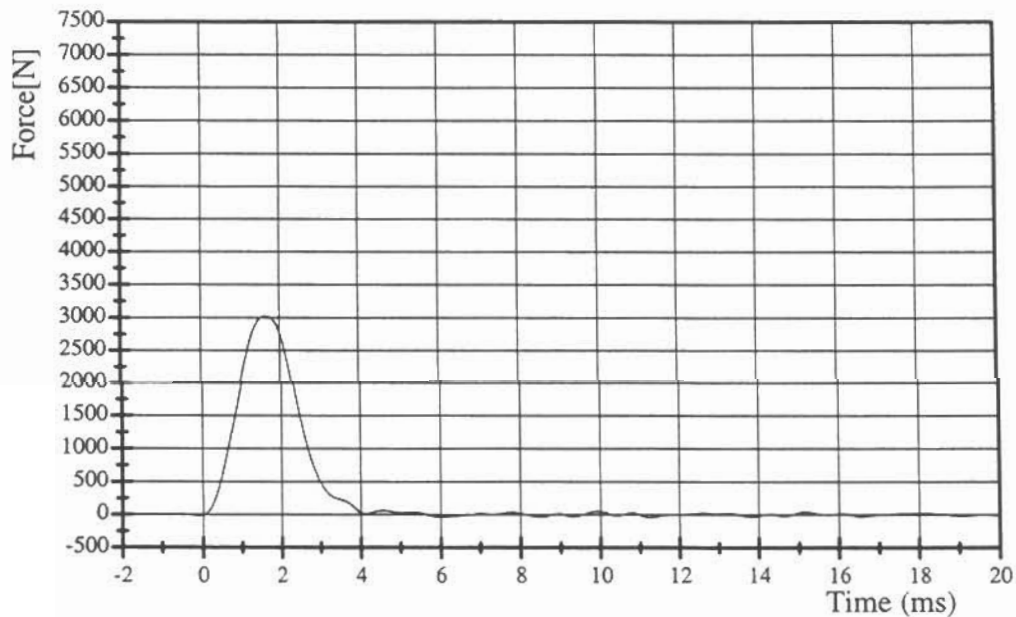


Filter Class: 600

Max: 162.2 g at 1.7 ms

Min: -2.2 g at 11.3 ms

Pendulum Force



Filter Class: 600

Max: 3022.0 N at 1.7 ms

Min: -40.4 N at 11.3 ms

SECTION 6

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

HYBRID III 3C INSTRUMENTATION

	POSITION #3 (RIGHT) SERIAL NO.: 3672098 P1 - 22JAN04		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	AC-J36611	ENDEVCO	22-Jul-04
HEAD AY	AC-J19501	ENDEVCO	21-Jul-04
HEAD AZ	AC-J27466	ENDEVCO	22-Jul-04
UPPER NECK FX	LC-210Fx	Denton	02-Aug-04
UPPER NECK FY	LC-210Fy	Denton	02-Aug-04
UPPER NECK FZ	LC-210Fz	Denton	02-Aug-04
UPPER NECK MX	LC-210Mx	Denton	02-Aug-04
UPPER NECK MY	LC-210My	Denton	02-Aug-04
UPPER NECK MZ	LC-210Mz	Denton	02-Aug-04
CHEST AX	AC-J20047	ENDEVCO	22-Jul-04
CHEST AY	AC-CC92H	ENDEVCO	22-Jul-04
CHEST AZ	AC-J29006	ENDEVCO	22-Jul-04
CHEST DISPLACEMENT X	DS-040	SERVO	02-Aug-04
PELVIS AX	AC-01G18-F09	ENTRAN	27-Oct-04
PELVIS AY	AC-J27525	ENDEVCO	22-Jul-04
PELVIS AZ	AC-J17988	ENDEVCO	22-Jul-04
TETHER BELT LOAD	LC-170	First Technology	01-Nov-04
LATCH BELT LOAD	LC-174	First Technology	01-Nov-04

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

HYBRID III 6C INSTRUMENTATION

	POSITION #4 (LEFT) SERIAL NO.: JJ 0917041915559 - 091704		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	AC-P16616	ENDEVCO	16-Aug-04
HEAD AY	AC-P16628	ENDEVCO	16-Aug-04
HEAD AZ	AC-P23178	ENDEVCO	16-Aug-04
UPPER NECK FX	LC-1625Fx	DENTON	20-Jul-04
UPPER NECK FY	LC-1625Fy	DENTON	20-Jul-04
UPPER NECK FZ	LC-1625Fz	DENTON	20-Jul-04
UPPER NECK MX	LC-1625Mx	DENTON	20-Jul-04
UPPER NECK MY	LC-1625My	DENTON	20-Jul-04
UPPER NECK MZ	LC-1625Mz	DENTON	20-Jul-04
Left Clavicle Fx	LC-075LFx	Denton	26-Aug-04
Left Clavicle Fz	LC-075LFz	DENTON	26-Aug-04
Right Clavicle Fx	LC-075RFx	Denton	26-Aug-04
Right Clavicle Fz	LC-075RFz	Denton	26-Aug-04
CHEST AX	AC-P32224	ENDEVCO	16-Aug-04
CHEST AY	AC-P32204	ENDEVCO	16-Aug-04
CHEST AZ	AC-P16625	ENDEVCO	16-Aug-04
CHEST DISPLACEMENT X	DS-009	SERVO	21-Jul-04
LUMBAR FX	LC-135Fx	DENTON	26-Aug-04
LUMBAR FY	LC-135Fy	DENTON	26-Aug-04
LUMBAR FZ	LC-135Fz	DENTON	26-Aug-04
LUMBAR MX	LC-135Mx	DENTON	26-Aug-04
LUMBAR MY	LC-135My	DENTON	26-Aug-04
LUMBAR MZ	LC-135Mz	DENTON	26-Aug-04
PELVIS AX	AC-P23940	ENDEVCO	16-Aug-04
PELVIS AY	AC-P23804	ENDEVCO	12-Nov-04
PELVIS AZ	AC-P18741	ENDEVCO	16-Aug-04
LEFT LOWER ASIS FX	LC-089LLFx	Denton	25-Aug-04
LEFT UPPER ASIS FX	LC-089LUFx	Denton	25-Aug-04
RIGHT LOWER ASIS FX	LC-089RLFx	Denton	25-Aug-04
RIGHT UPPER ASIS FX	LC-089RUFx	Denton	25-Aug-04
LEFT FEMUR	LC-237	DENTON	21-Jul-04
RIGHT FEMUR	LC-238	DENTON	21-Jul-04
LAP BELT LOAD	LC-180	First Technology	01-Nov-04
TORSO BELT LOAD	LC-635	LEBOW	01-Nov-04

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

CRS INSTRUMENTATION

	CRS Accelerometers		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
P3 CRS AX	AC-J33071	ENDEVCO	29-May-04
P3 CRS AY	AC-J30491	ENDEVCO	20-Jul-04
P3 CRS AZ	AC-J31011	ENDEVCO	04-Nov-04