

REPORT NUMBER: 8708-SLEDNCAP-27

**CHILD RESTRAINT SYSTEM IN
DYNAMIC SLED TEST
EVENFLO TRIUMPH 5 WITH A HYIII THREE YEAR OLD
SAFETY FIRST COMFORT RIDE WITH A HYIII THREE YEAR OLD**

**TEST NUMBER: 08-3-43
09-3-44**

**PREPARED BY:
VERIDIAN ENGINEERING
4455 GENESEE STREET
BUFFALO, NEW YORK 14225**



**AUGUST 29TH, 2003
SEPTEMBER 2ND, 2003**

DRAFT REPORT

**PREPARED FOR:
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Manager, New Car Assessment Program

Date of Acceptance

COTR, NCAP Dynamic Sled Test Program

Date of Acceptance

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16. Abstract This report contains the results of tests performed in accordance with FMVSS 213 Final Rule Published June 24th, 2003 for FMVSS 213 Child Restraint Systems. One (1) seat was tested during run 08-3-43. Position 6 was an Evenflo Triumph 5 Child Restraint System. This seat was tested with a HYIII 3 year old ATD. One (1) seat was tested during run 09-3-44. Position 6 was a Safety First Comfort Ride Child Restraint System. This seat was tested with a HYIII 3 year old ATD.			
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SECTION 1

PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This dynamic sled testing is part of the FY' 03 New Car Assessment Program (NCAP) sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract Number DTNH22-01-D-32005. The purpose of this test is to obtain child seat research data for frontal dynamic testing.

1.2 TEST PROCEDURE

These frontal dynamic sled test were conducted in accordance with the child restraint test procedure provided by the FMVSS No. 213 Final Rule published June 24th, 2003. Any reference to FMVSS No. 213 in this document refers to the Final Rule published June 24th, 2003, for FMVSS No. 213 Child Restraint Systems.

Test 08-3-43 was conducted at Veridian Engineering on August 29th, 2003 at a speed of 46.5 kph (28.9 mph). The FMVSS No. 213 sled pulse was used as a crash pulse. The requirements specified in the FMVSS No. 213 were also followed.

The bench seat contained one anthropomorphic test device (ATD). One (1) Hybrid III 3 year old size ATD, Serial Number 044, was instrumented with head, chest, and pelvic tri-axial accelerometers, and upper and lower neck load cells. The child ATD was positioned according to the child seat manufacturer's instructions. The data was digitally sampled at 20,000 samples per second and processed per Section IP11 of the Laboratory Test Procedure.

Test 09-3-44 was conducted at Veridian Engineering on September 2nd, 2003 at a speed of 46.8 kph (29.1 mph). The FMVSS No. 213 sled pulse was used as a crash pulse. The requirements specified in the FMVSS No. 213 were also followed.

The bench seat contained one anthropomorphic test device (ATD). One (1) Hybrid III 3 year old size ATD, Serial Number 044, was instrumented with head, chest, and pelvic tri-axial accelerometers, and upper and lower neck load cells. The child ATD was positioned according to the child seat manufacturer's instructions. The data was digitally sampled at 20,000 samples per second and processed per Section IP11 of the Laboratory Test Procedure.

SECTION 2

CHILD RESTRAINT INFORMATION

Test No.: 08-3-43

Test Date: August 29th, 2003

Child Restraint Type (forward-facing, rearward facing, booster)	FORWARD FACING
LATCH or NON-LATCH	LAP BELT WITH TETHER
Harness Type	5 -POINT
Child Restraint Manufacturer	EVENFLO
Child Restraint Model	TRIUMPH 5
Model Number	3561328 P1
Date of Manufacture	7/30/2003
Child Restraint Height Limits (mm)	483 - 1016
Child Restraint Weight Limits (kg)	2.3 – 18.1
Weight of Child Restraint (kg)	9.2

Test No.: 09-3-44

Test Date: September 2nd, 2003

Child Restraint Type (forward-facing, rearward facing, booster)	FORWARD FACING
LATCH or NON-LATCH	LAP BELT WITH TETHER
Harness Type	5 POINT
Child Restraint Manufacturer	SAFETY FIRST
Child Restraint Model	COMFORT RIDE
Model Number	22-400-BRD
Date of Manufacture	01/27/2003
Child Restraint Height Limits (mm)	483 - 1016
Child Restraint Weight Limits (kg)	2.3 – 18.1
Weight of Child Restraint (kg)	4.4

SECTION 3

POST-TEST OBSERVATIONS

Test No.: 08-3-43

Test Date: August 29th, 2003

Child Seat	EVENFLO TRIUMPH 5
Belt Fraying	NONE
Stress Marks	NONE
Cracks	NONE
Buckle Stress	NONE
Latch Hooks	NONE
Max. Head Excursion (mm)	495
Max. Knee Excursion (mm)	729
Velocity	46.5
Acceleration (G's)	23.4

Test No.: 09-3-44

Test Date: September 2nd, 2003

Child Seat	SAFETY FIRST COMFORT RIDE
Belt Fraying	NONE
Stress Marks	NONE
Cracks	NONE
Buckle Stress	NONE
Latch Hooks	NONE
Max. Head Excursion (mm)	655
Max. Knee Excursion (mm)	698
Velocity	46.8
Acceleration (G's)	23.2

SECTION 4

HYBRID III 3 YEAR OLD ATD INJURY CRITERIA AND SENSOR DATA

Test No.: 08-3-43

Test Date: August 29th, 2003

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Head CG	X	G's	46.9	169.6	-69.5	70.0
Head CG	Y	G's	3.1	172.3	-4.0	69.2
Head CG	Z	G's	31.6	52.6	-0.0	-20.0
Head CG Resultant	N/A	G's	70.6	70.0		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Chest CG	X	G's	15.8	197.2	-33.1	56.8
Chest CG	Y	G's	1.5	151.4	-4.6	72.9
Chest CG	Z	G's	7.0	176.2	-35.1	68.4
Chest CG Resultant	N/A	G's	45.9	59.1		

SEAT BELT SENSOR PEAK VALUES

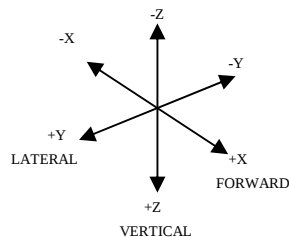
Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Tether Belt	N/A	Newtons	NA	NA		

HEAD INJURY CRITERIA (HIC)

Location	P6 (Center) Rear Passenger			
	HIC	Avg. G's	T ¹	T ²
Head CG Primary (36 msec)	534.1	46.6	50.0	86.0
Head CG Primary (15 msec)	372.8	57.3	61.8	76.8

CHEST CLIP (3 MSEC)

Location	P6 (Center) Rear Passenger		
	Clip	T ¹	T ²
Chest CG Primary	45.1	57.8	60.8



HYBRID III 3 YEAR OLD ATD INJURY CRITERIA AND SENSOR DATA...(continued)

Test No.: 08-3-43

Test Date: August 29th, 2003

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Pelvis	X	G's	13.5	89.3	-40.6	65.5
Pelvis	Y	G's	7.7	65.6	-13.5	65.3
Pelvis	Z	G's	12.6	65.5	-82.8	65.2

UPPER NECK PEAK FORCES AND MOMENTS

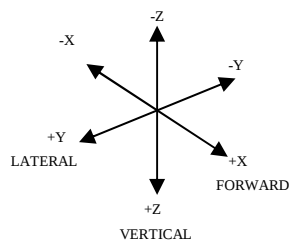
Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Neck Force	X	Newtons	32.6	128.6	-1814.9	68.7
Neck Force	Y	Newtons	55.4	56.5	-37.8	186.7
Neck Force	Z	Newtons	129.8	195.2	-2179.7	69.2
Neck Moment	X	Nm	9.1	66.9	-1.6	183.6
Neck Moment	Y	Nm	22.7	64.0	-3.6	126.1
Neck Moment	Z	Nm	0.8	42.9	-3.9	66.9

LOWER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Neck Force	X	Newtons	116.3	169.6	-1106.2	70.7
Neck Force	Y	Newtons	163.9	66.1	-49.1	105.3
Neck Force	Z	Newtons	763.0	49.8	-492.3	68.7
Neck Moment	X	Nm	5.8	188.4	-17.9	68.7
Neck Moment	Y	Nm	169.7	66.0	-11.1	169.3
Neck Moment	Z	Nm	1.4	134.6	-6.3	66.2

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Chest CG	X	mm	0.1	18.3	-18.8	71.4



HYBRID III 3 YEAR OLD ATD INJURY CRITERIA AND SENSOR DATA

Test No.: 09-3-44

Test Date: September 2nd, 2003

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Head CG	X	G's	23.7	207.5	-28.9	93.6
Head CG	Y	G's	2.3	247.6	-7.8	104.0
Head CG	Z	G's	40.0	75.8	-0.0	5.5
Head CG Resultant	N/A	G's	46.4	76.0		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Chest CG	X	G's	12.9	230.7	-34.9	56.7
Chest CG	Y	G's	1.2	204.6	-3.8	83.0
Chest CG	Z	G's	8.4	102.6	-30.6	59.6
Chest CG Resultant	N/A	G's	45.8	58.8		

SEAT BELT SENSOR PEAK VALUES

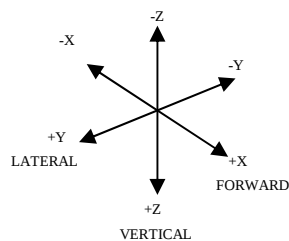
Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Tether Belt	N/A	Newtons	NA	NA		

HEAD INJURY CRITERIA (HIC)

Location	P6 (Center) Rear Passenger			
	HIC	Avg. G's	T ¹	T ²
Head CG Primary (36 msec)	403.7	41.7	66.6	102.6
Head CG Primary (15 msec)	207.8	45.4	72.7	87.7

CHEST CLIP (3 MSEC)

Location	P6 (Center) Rear Passenger		
	Clip	T ¹	T ²
Chest CG Primary	45.0	57.1	60.1



HYBRID III 3 YEAR OLD ATD INJURY CRITERIA AND SENSOR DATA...(continued)

Test No.: 09-3-44

Test Date: September 2nd, 2003

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Pelvis	X	G's	56.2	113.3	-44.8	57.7
Pelvis	Y	G's	4.1	235.2	-4.8	86.2
Pelvis	Z	G's	17.6	113.8	-35.1	61.1

UPPER NECK PEAK FORCES AND MOMENTS

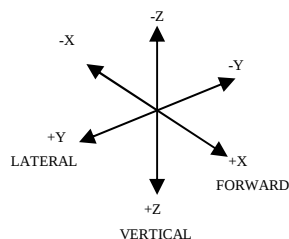
Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Neck Force	X	Newtons	116.6	206.0	-670.0	96.9
Neck Force	Y	Newtons	81.1	100.2	-36.7	219.6
Neck Force	Z	Newtons	1.6	4.8	-1529.6	81.7
Neck Moment	X	Nm	5.0	103.7	-3.0	213.4
Neck Moment	Y	Nm	11.5	92.5	-4.7	153.2
Neck Moment	Z	Nm	1.3	204.3	-3.0	250.0

LOWER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Neck Force	X	Newtons	282.2	205.1	-1136.8	87.3
Neck Force	Y	Newtons	33.3	220.4	-60.2	100.1
Neck Force	Z	Newtons	717.5	81.2	-1.0	3.5
Neck Moment	X	Nm	5.4	220.4	-15.8	101.1
Neck Moment	Y	Nm	100.7	81.4	-19.0	205.5
Neck Moment	Z	Nm	1.7	237.3	-6.3	91.8

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Chest CG	X	mm	0.1	217.0	-22.3	101.3



SECTION 5

SLED TEST SET-UP

Test No.: 08-3-43

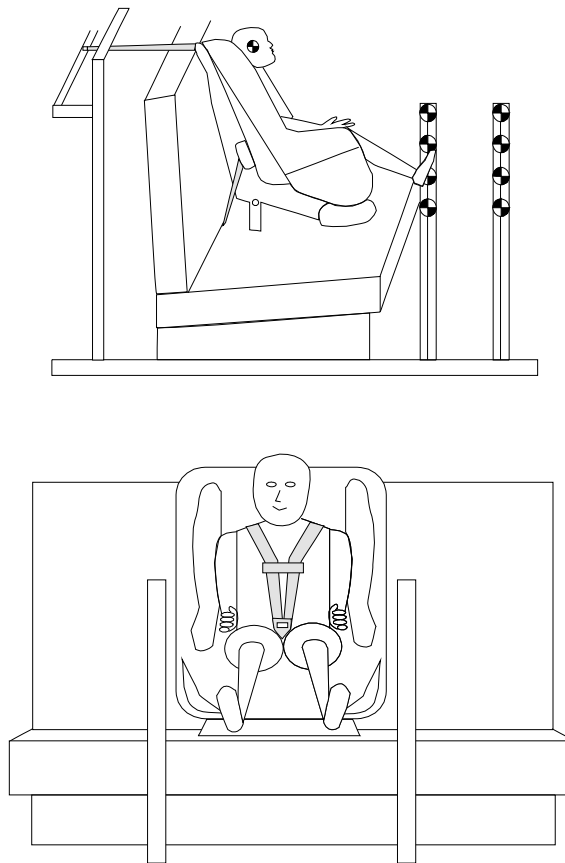
Test No.: 09-3-44

Test Date: August 29th, 2003

Test Date: September 2nd, 2003

An FMVSS 213 test bench was fastened on the sled in order to simulate a frontal impact. One child seat was placed on the bench and fastened in a manner suggested in the owner's manual of the child seat. Stadia poles were set up to measure dummy head and knee excursions.

Pre-test Infant and Car Seat Positions

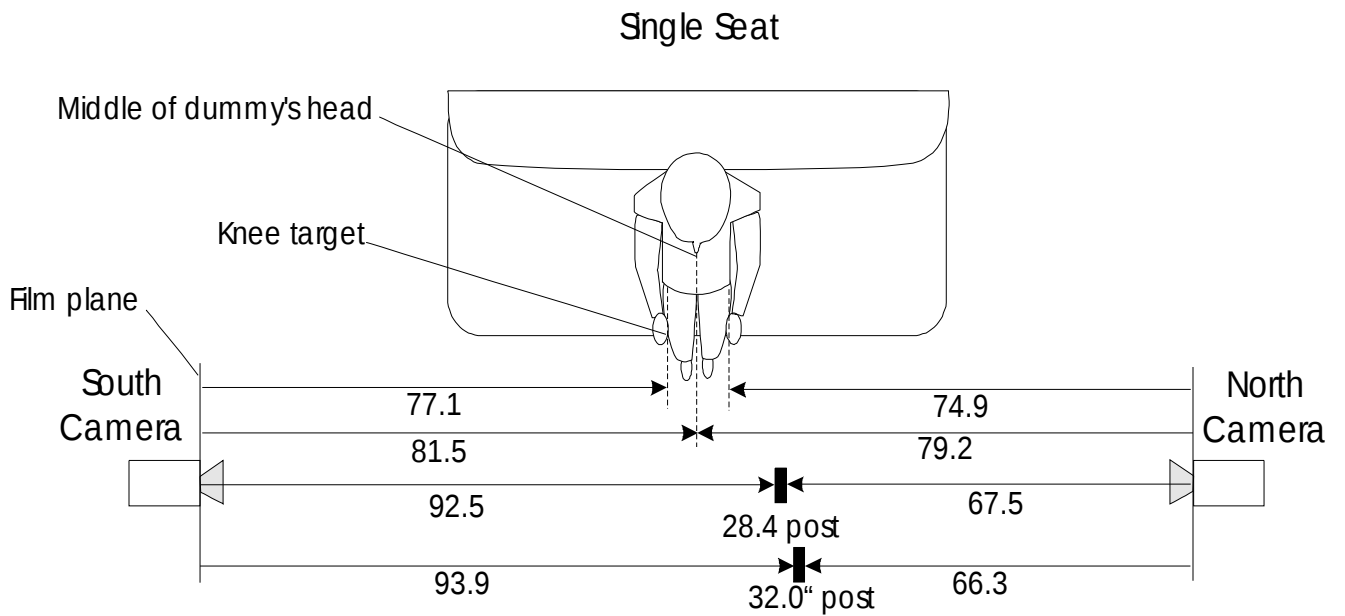


SECTION 6
CAMERA LOCATION

Test No.: 08-3-43
Test No.: 09-3-44

Test Date: August 29th, 2003
Test Date: September 2nd, 2003

There were two cameras mounted onto the sled carriage for views of the left and right side of the child seat.



SECTION 7
PHOTOGRAPHS

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Test 08-3-43 Pre Test Right Side View



Test 08-3-43 Post Test Right Side View



Test 08-3-43 Pre Test Right Front View



Test 08-3-43 Post Test Right Front View



Test 08-3-43 Pre Test Left Front View



Test 08-3-43 Post Test Left Front View



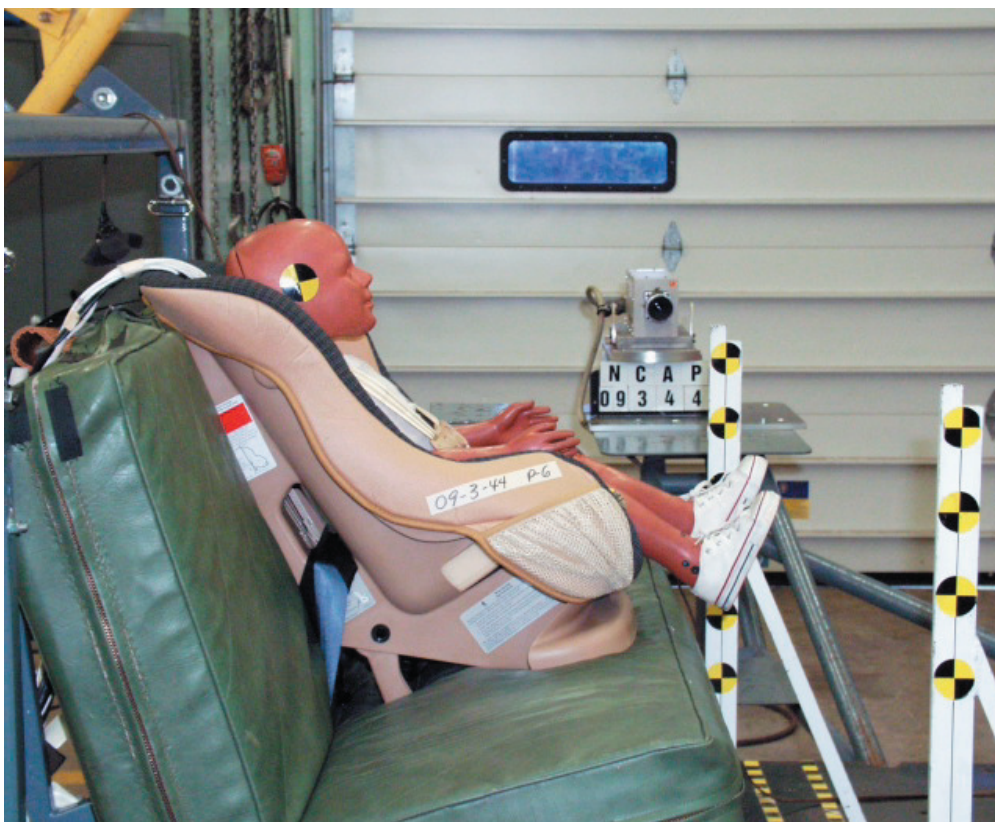
Test 08-3-43 Pre Test Left Side View



Test 08-3-43 Post Test Left Side View



Test 09-3-44 Pre Test Right Side View



Test 09-3-44 Post Test Right Side View



Test 09-3-44 Pre Test Right Front View



Test 09-3-44 Post Test Right Front View



Test 09-3-44 Pre Test Left Front View



Test 09-3-44 Post Test Left Front View



Test 09-3-44 Pre Test Left Side View



Test 09-3-44 Post Test Left Side View

SECTION 8

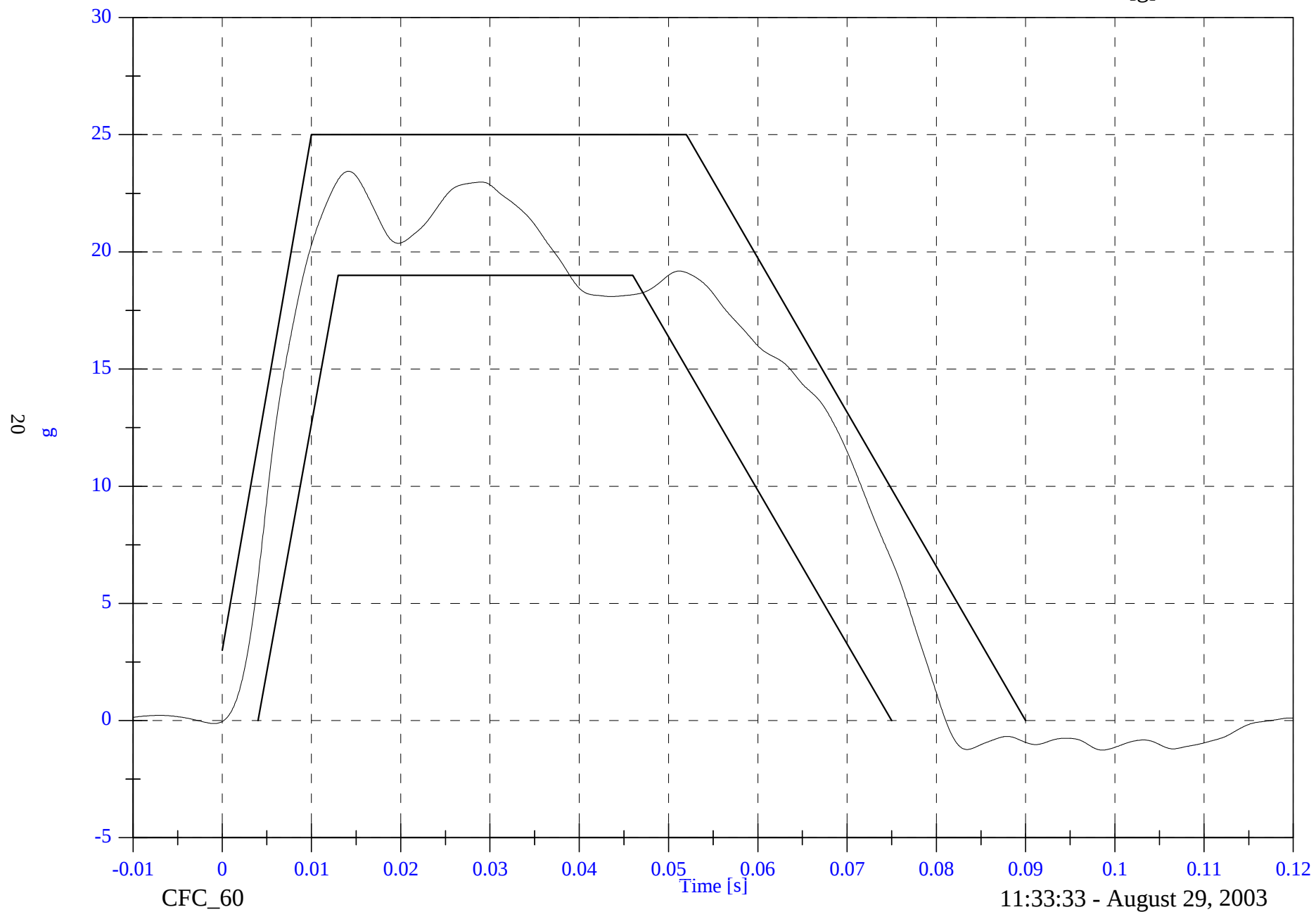
Data Plots

Sled Test NCAP SLED 08-3-43

Sled Pulse Corridor

Max: 23.4 [g] at 0.014 [s]

Min: -1.3 [g] at 0.099 [s]



FACILITY: HYGE SLED

DATE: August 29, 2003

TEST#: 08-3-43

TITLE: Sled Test NCAP SLED 08-3-43

CHN	NAME	Unit	Max	msec	Min	msec	Filt	Comment
26	Sled Acceleration	g	23.4	14.1	-1.3	98.6	CFC_60	
27	Sled Acceleration Velocity	kph	46.5	80.9	-0.1	-11.4	CFC_180	
28	Sled Acceleration Displacement	mm	2643.9	249.9	-0.0	-2.1	CFC_180	
29	P6 Head x	g	46.9	169.6	-69.5	70.0	CFC_1000	
30	P6 Head y	g	3.1	172.3	-4.0	69.2	CFC_1000	
31	P6 Head z	g	31.6	52.6	-0.0	-20.0	CFC_1000	
32	P6 Head Resultant	g	70.6	70.0	0.0	-14.2	CFC_1000	
33	P6 Upper Neck Fx	N	32.6	128.6	-1814.9	68.7	CFC_1000	
34	P6 Upper Neck Fy	N	55.4	56.5	-37.8	186.7	CFC_1000	
35	P6 Upper Neck Fz	N	129.8	195.2	-2179.7	69.2	CFC_1000	
36	P6 Upper Neck F Resultant	N	2836.4	69.2	0.1	-2.1	CFC_1000	
37	P6 Upper Neck Mx	N-m	9.1	66.9	-1.6	183.6	CFC_600	
38	P6 Upper Neck My	N-m	22.7	64.0	-3.6	126.1	CFC_600	
39	P6 Upper Neck Mz	N-m	0.8	42.9	-3.9	66.9	CFC_600	
40	P6 Upper Neck M Resultant	N-m	24.7	66.9	0.0	-8.0	CFC_600	
41	P6 Lower Neck Fx	N	116.3	169.6	-1106.2	70.7	CFC_1000	
42	P6 Lower Neck Fy	N	163.9	66.1	-49.1	105.3	CFC_1000	
43	P6 Lower Neck Fz	N	763.0	49.8	-492.3	68.7	CFC_1000	
44	P6 Lower Neck F Resultant	N	1201.7	70.0	0.0	-8.0	CFC_1000	
45	P6 Lower Neck Mx	N-m	5.8	188.4	-17.9	68.7	CFC_600	
46	P6 Lower Neck My	N-m	169.7	66.0	-11.1	169.3	CFC_600	
47	P6 Lower Neck Mz	N-m	1.4	134.6	-6.3	66.2	CFC_600	
48	P6 Lower Neck M Resultant	N-m	170.6	66.0	0.0	-8.5	CFC_600	
49	P6 Chest x	g	15.8	197.2	-33.1	56.8	CFC_180	
50	P6 Chest y	g	1.5	151.4	-4.6	72.9	CFC_180	
51	P6 Chest z	g	7.0	176.2	-35.1	68.4	CFC_180	
52	P6 Chest Resultant	g	45.9	59.1	0.0	-12.3	CFC_180	
53	P6 Pelvic x	g	13.5	89.3	-40.6	65.5	CFC_1000	
54	P6 Pelvic y	g	7.7	65.6	-13.5	65.3	CFC_1000	
55	P6 Pelvic z	g	12.6	65.5	-82.8	65.2	CFC_1000	
56	P6 Pelvic Resultant	g	92.3	65.2	0.0	-13.7	CFC_1000	
57	P6 Head Red z	g	40.1	174.4	-19.4	169.0	CFC_1000	
58	P6 Chest Compression	mm	0.1	18.3	-18.8	71.4	CFC_600	
59	P6 Upper Neck Moc	N-m	22.7	64.0	-3.6	126.1	CFC_600	

FACILITY: HYGE SLED

DATE: August 29, 2003

TEST#: 08-3-43

TITLE: Sled Test NCAP SLED 08-3-43

Version 5.00

=====

P6 HIC(36 ms): 534.1

t1: 50.0 msec

t2: 86.0 msec

Duration: 36.0 msec

Average Acceleration: 46.6 g

Input channels: P6 Head x (2) CFC_1000

P6 Head y (3) CFC_1000

P6 Head z (4) CFC_1000

P6 UP NECK Fx: Max: 32.6 N 128.6 msec

Min: -1814.9 N 68.7 msec

Input channel: P6 Upper Neck Fx (6) CFC_1000

P6 UP NECK Fz: Max: 129.8 N 195.2 msec

Min: -2179.7 N 69.2 msec

Input channel: P6 Upper Neck Fz (8) CFC_1000

P6 UP NECK MocY (3Y0 Child OOP)

Max: 22.7 N-m 64.0 msec

Min: -3.6 N-m 126.1 msec

Input channels: P6 Upper Neck Fx (6) CFC_600

P6 Upper Neck My (10) CFC_600

Docy: 0

P6 UP NECK Nij (3Y0 Child OOP)

Ntf: 0.22 Nij 192.8 msec CVt: 2120 CVf: 68

Nte: 0.00 Nij -16.6 msec CVt: 2120 Cve: 27

Ncf: 1.36 Nij 69.2 msec CVc: 2120 CVf: 68

Nce: 0.24 Nij 125.8 msec CVc: 2120 Cve: 27

Input channels: P6 Upper Neck Fz (8) CFC_600

P6 Upper Neck MocY [N-m, CFC_600] (63)

FACILITY: HYGE SLED

DATE: August 29, 2003

TEST#: 08-3-43

TITLE: Sled Test NCAP SLED 08-3-43

Version 5.00

=====

P6 CLIP(3 ms): 45.1 g

t1: 57.8 msec

t2: 60.8 msec

Duration: 3.0 msec

P6 CSI: 347.1

Input channels: P6 Chest x (18) CFC_180

P6 Chest y (19) CFC_180

P6 Chest z (20) CFC_180

P6 CHEST DISP: Max: 0.1 mm 18.3 msec

Min: -18.8 mm 71.4 msec

Input channel: P6 Chest Compression (21) CFC_600

=====

P6 HIC(15 ms): 372.8

t1: 61.8 msec

t2: 76.8 msec

Duration: 15.0 msec

Average Acceleration: 57.3 g

Input channels: P6 Head x (2) CFC_1000

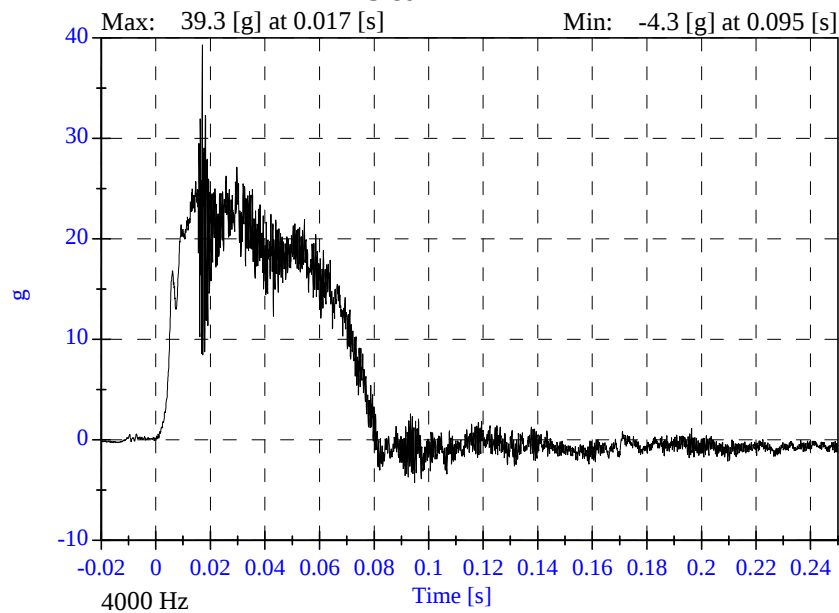
P6 Head y (3) CFC_1000

P6 Head z (4) CFC_1000

=====

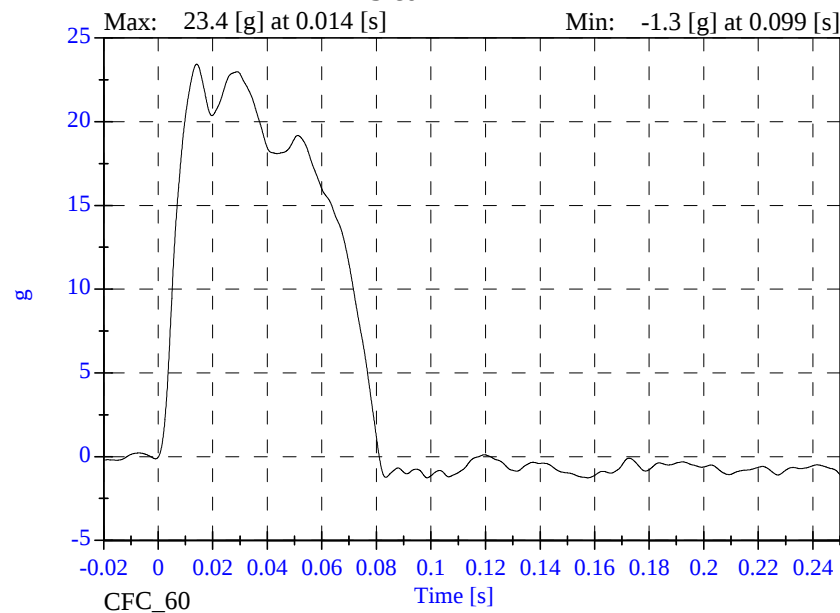
Sled Test NCAP SLED 08-3-43

Sled Acceleration

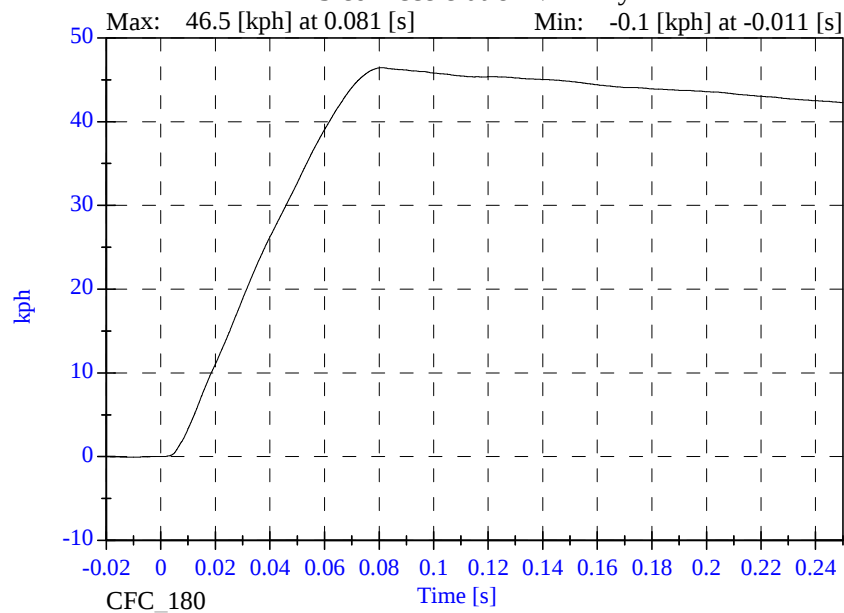


- August 29, 2003

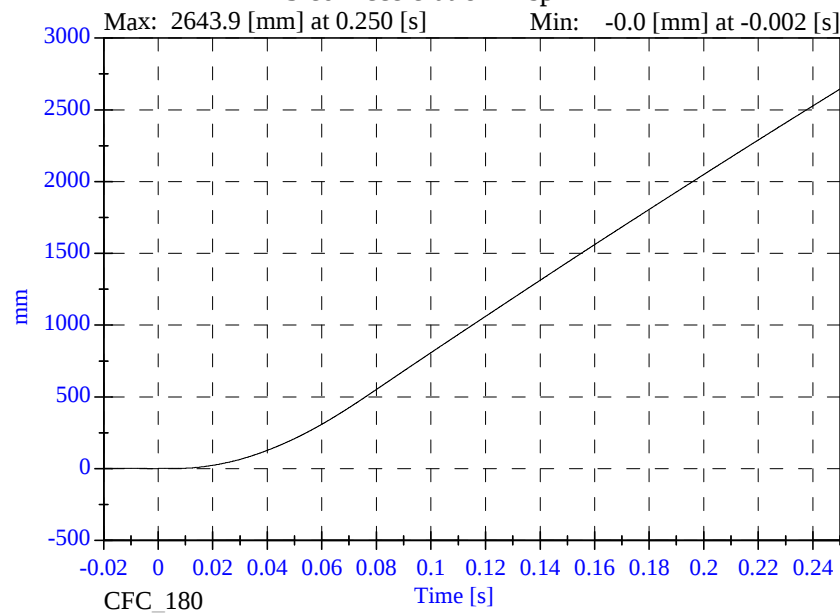
Sled Acceleration



Sled Acceleration Velocity



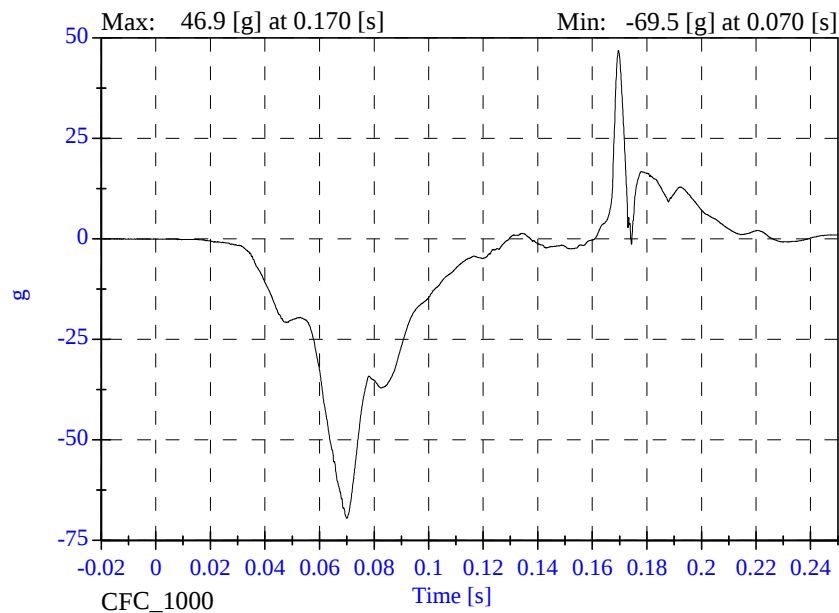
Sled Acceleration Displacement



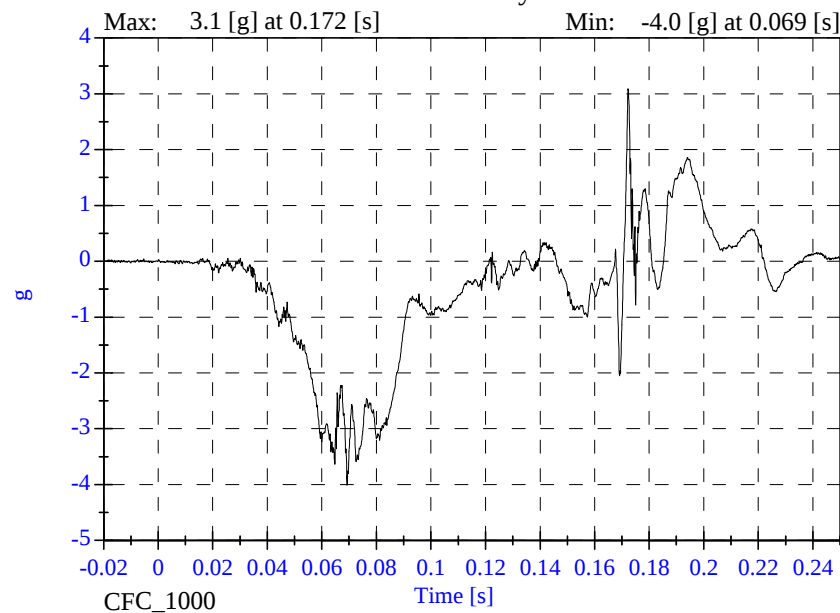
Sled Test NCAP SLED 08-3-43

- August 29, 2003

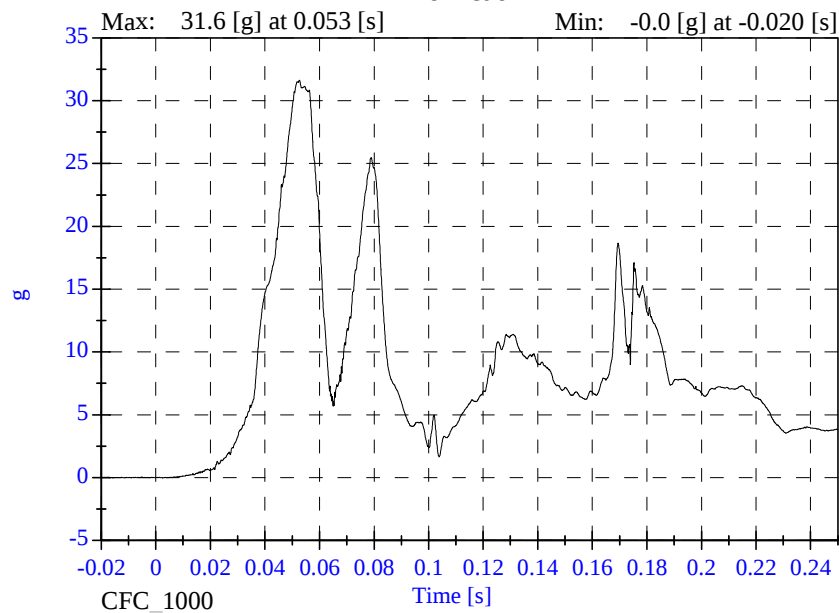
P6 Head x



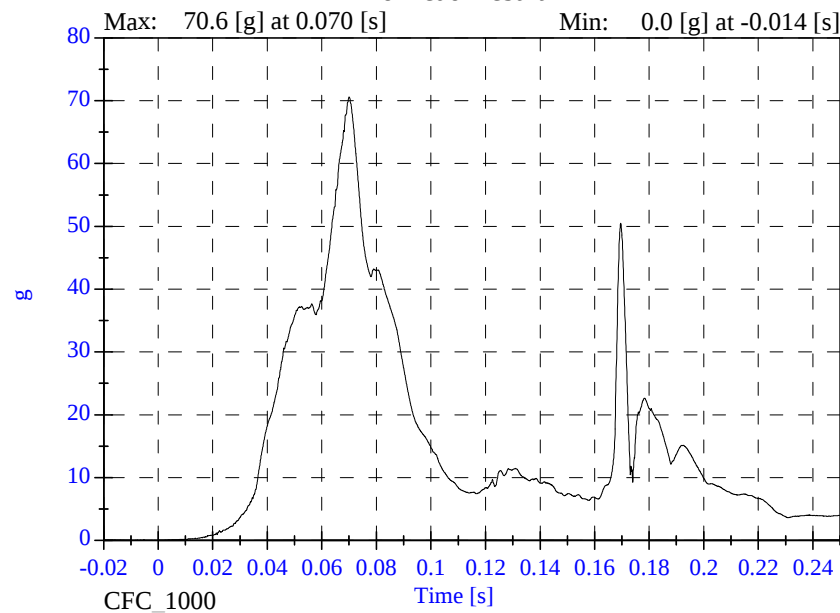
P6 Head y



P6 Head z

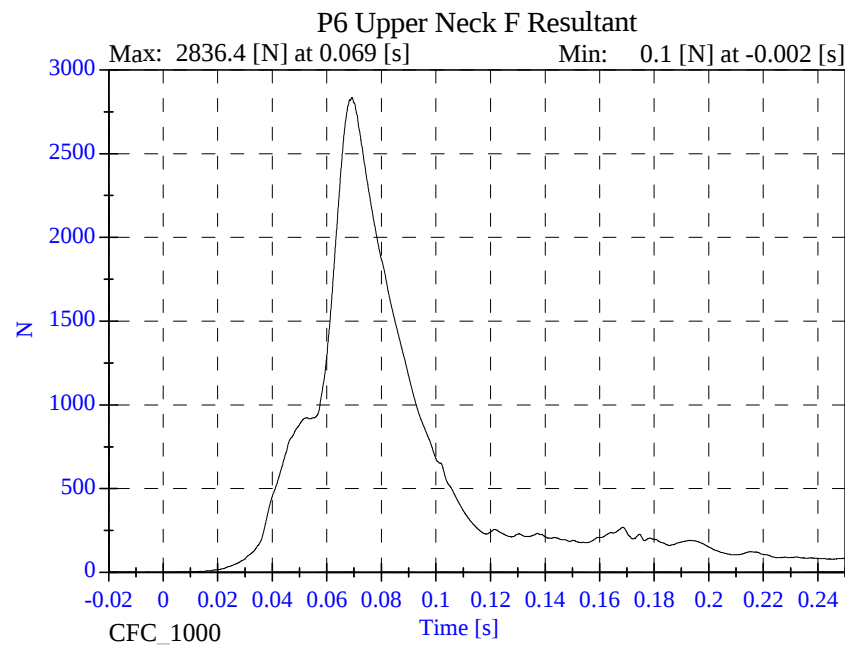
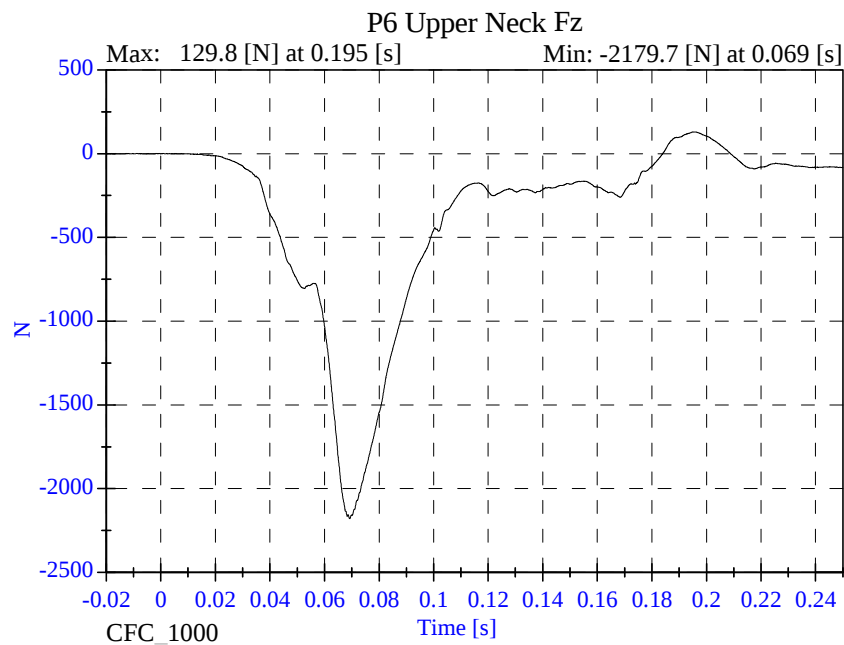
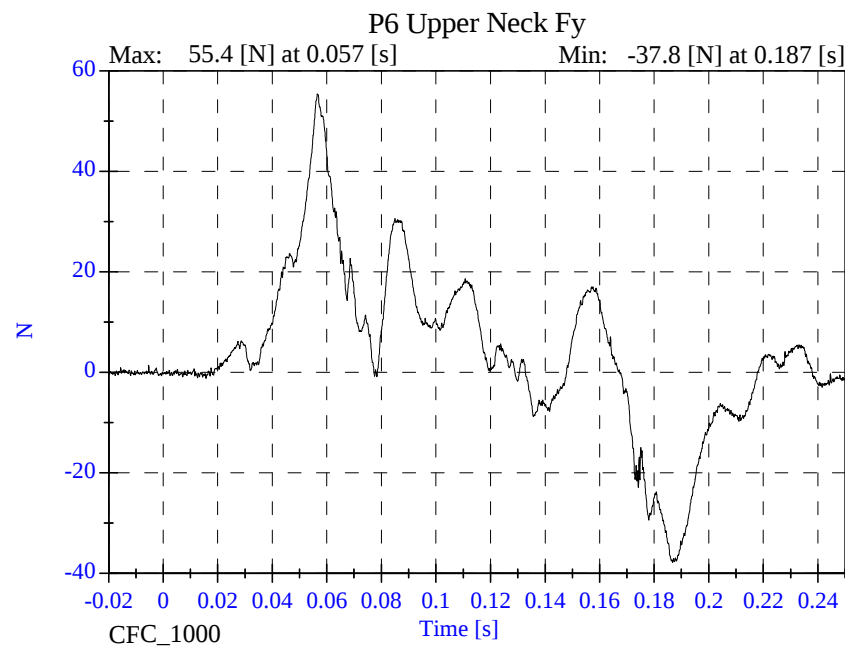
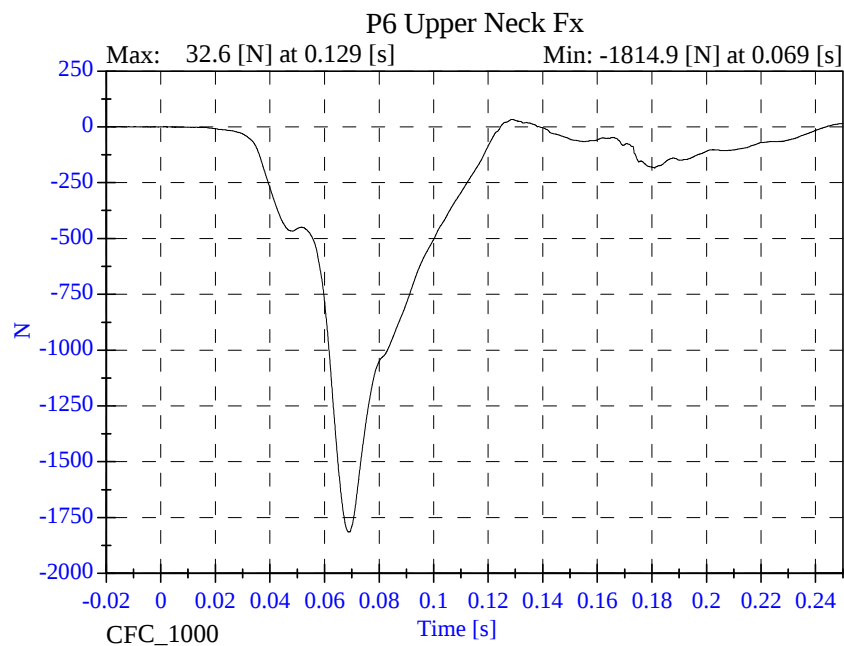


P6 Head Resultant



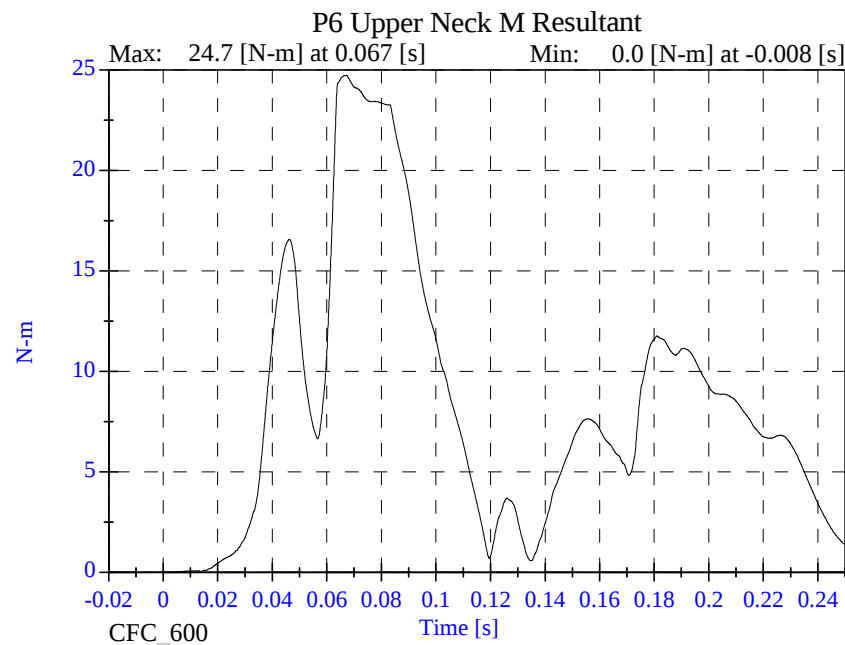
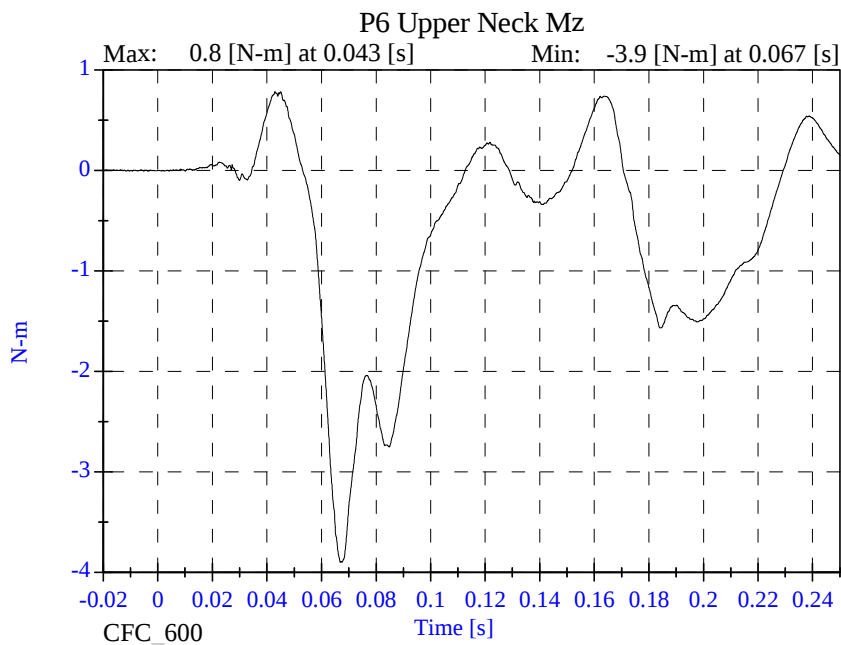
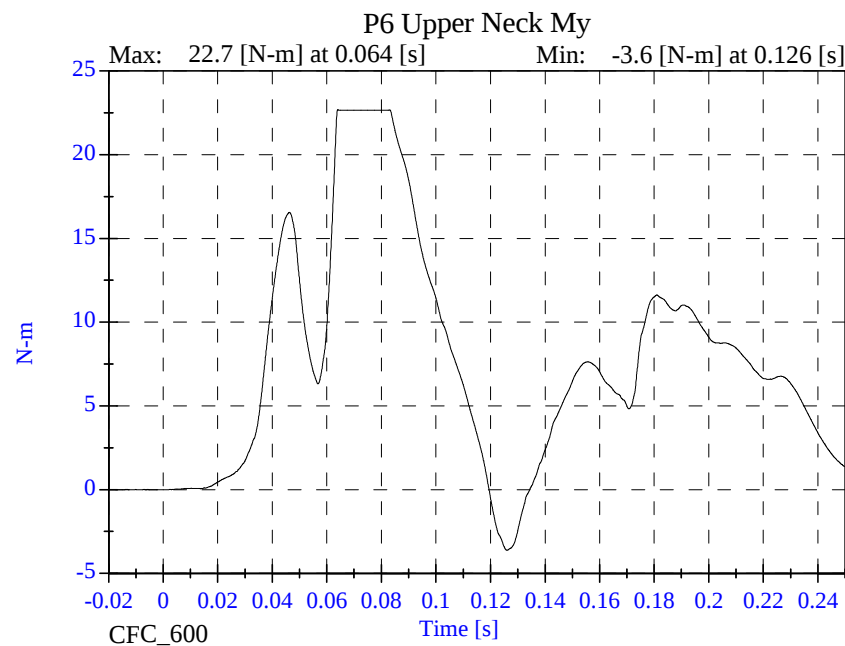
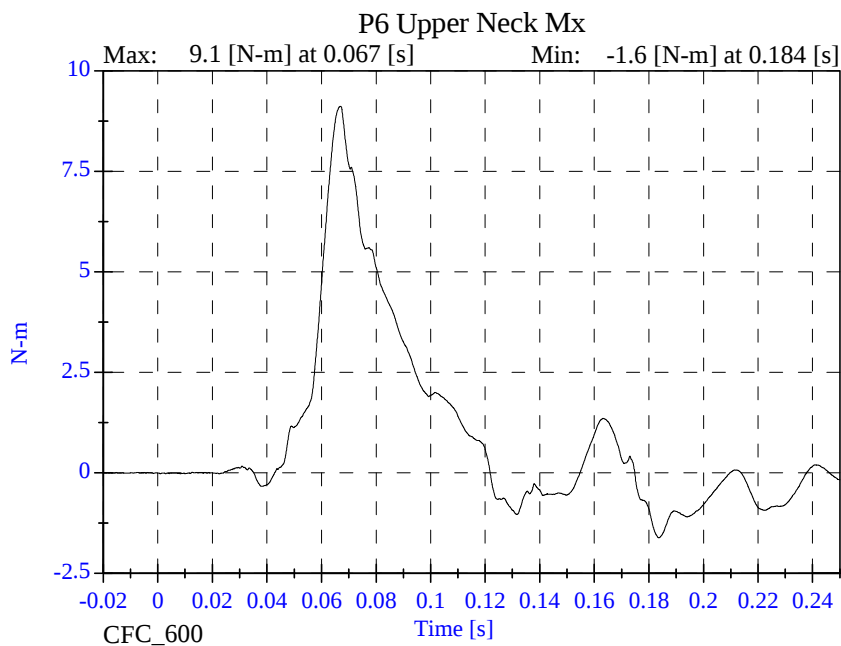
Sled Test NCAP SLED 08-3-43

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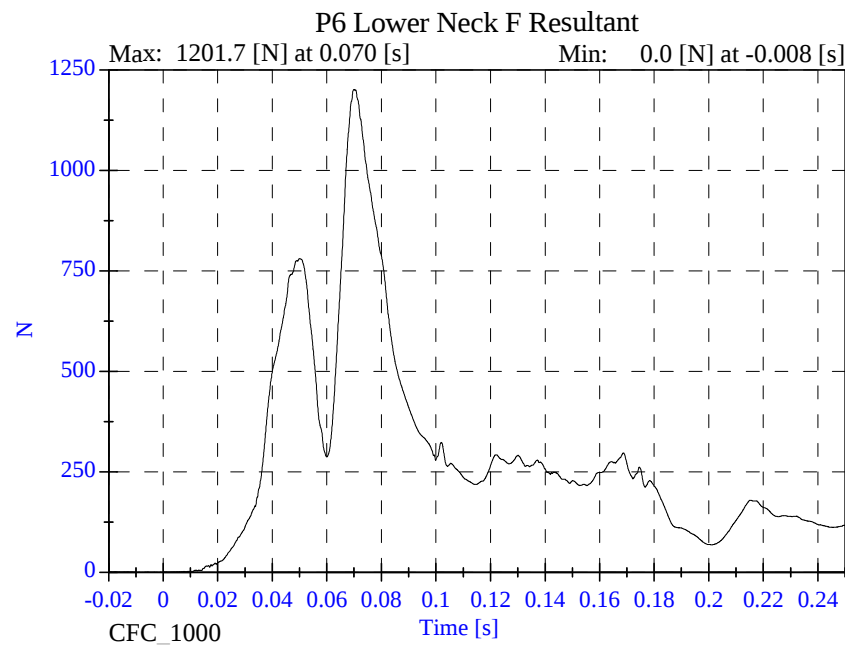
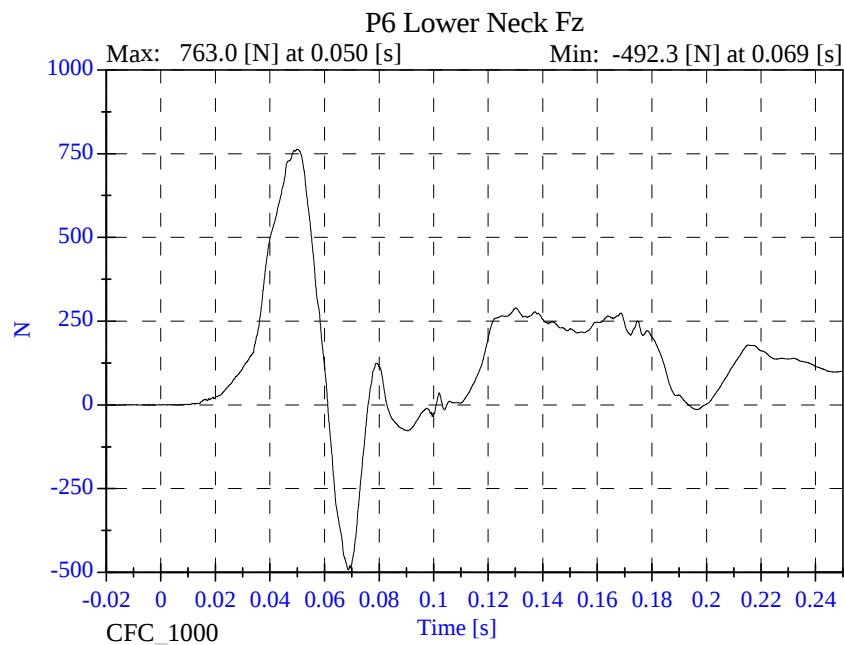
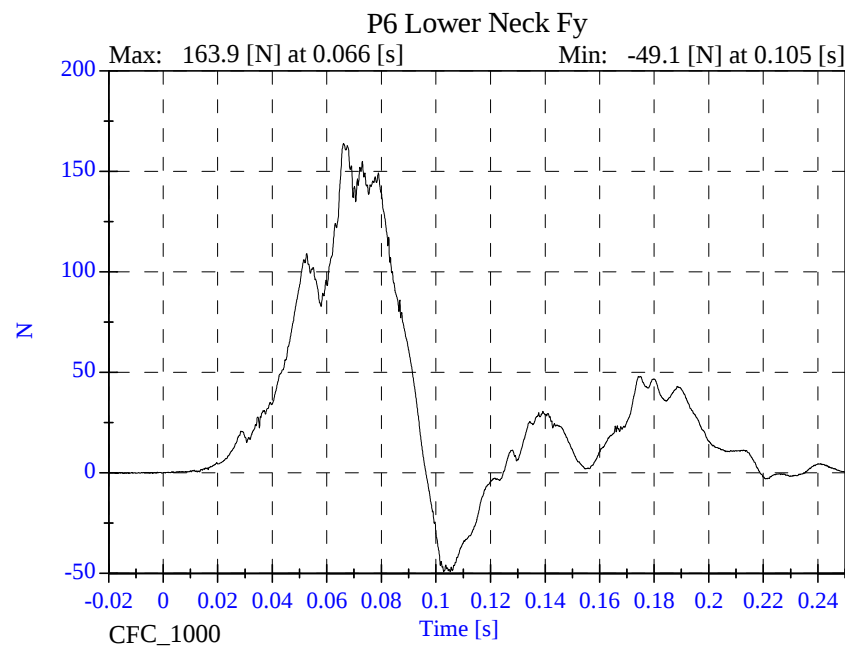
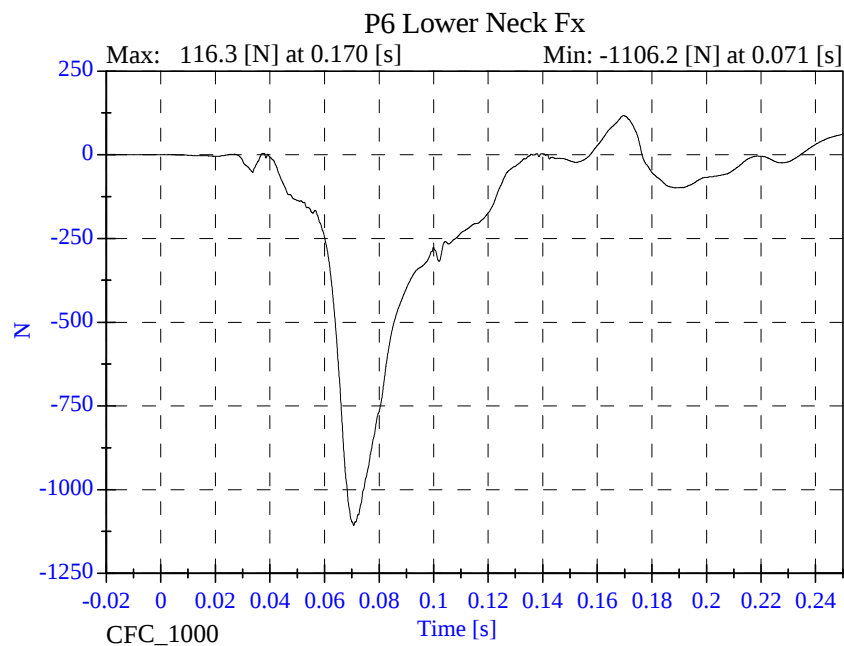
Sled Test NCAP SLED 08-3-43

- August 29, 2003



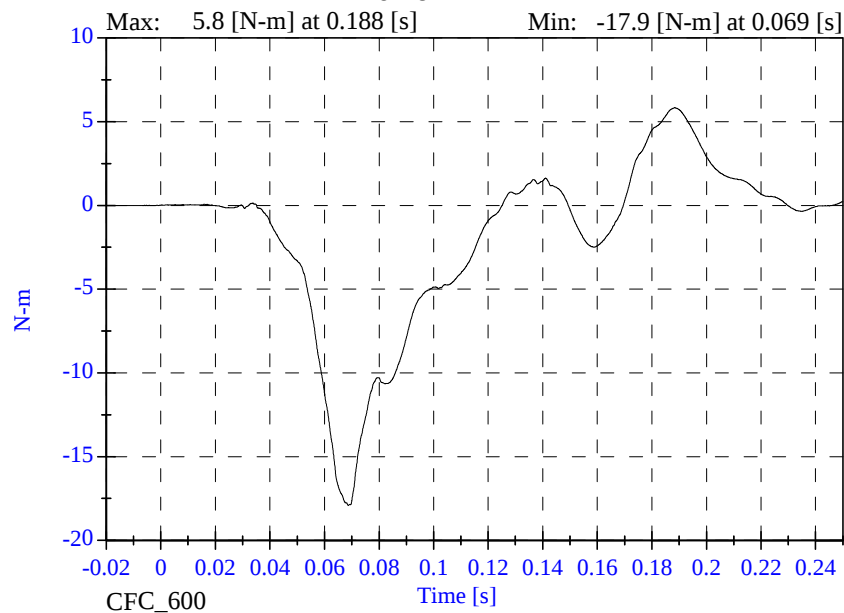
Sled Test NCAP SLED 08-3-43

- August 29, 2003



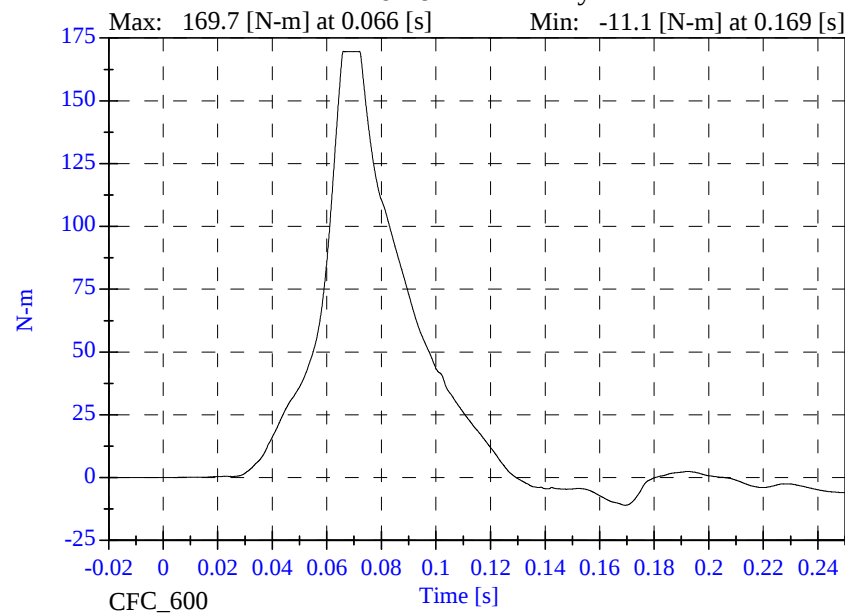
Sled Test NCAP SLED 08-3-43

P6 Lower Neck Mx

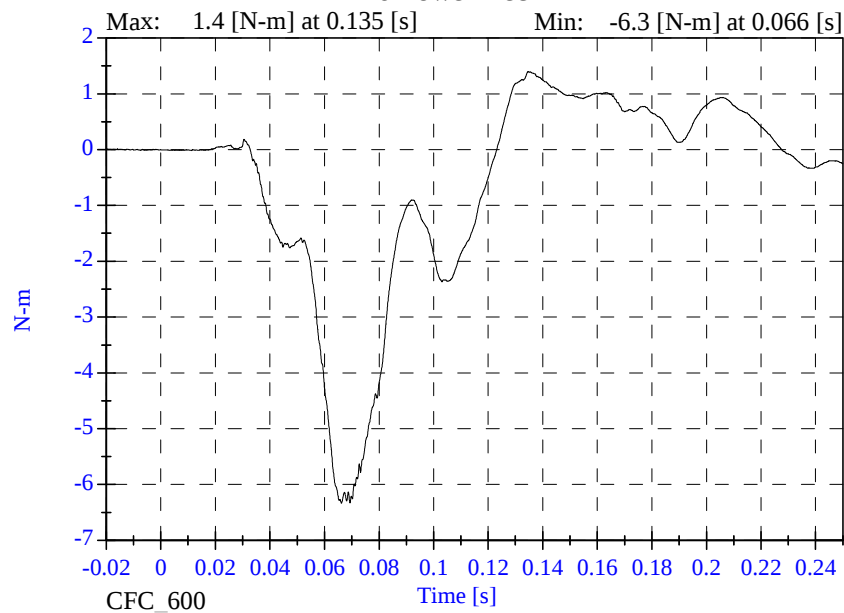


- August 29, 2003

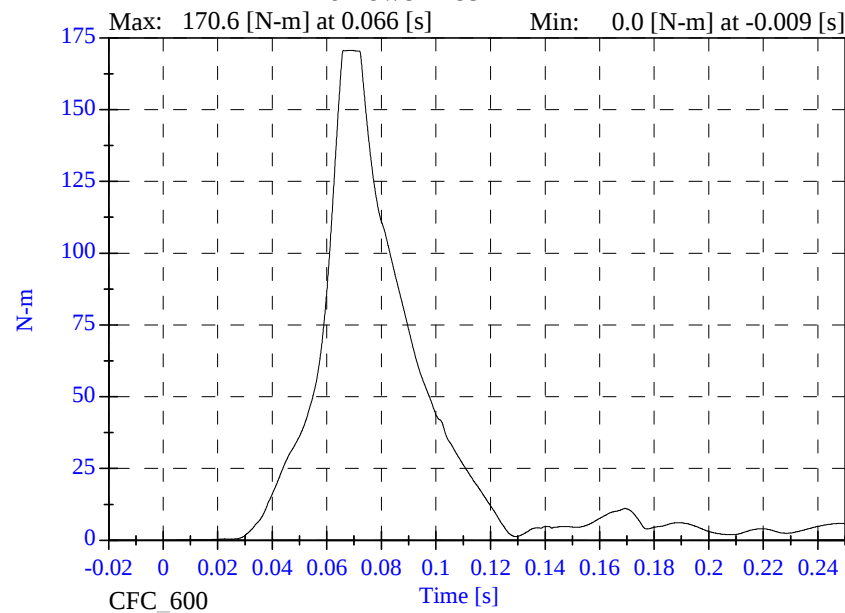
P6 Lower Neck My



P6 Lower Neck Mz



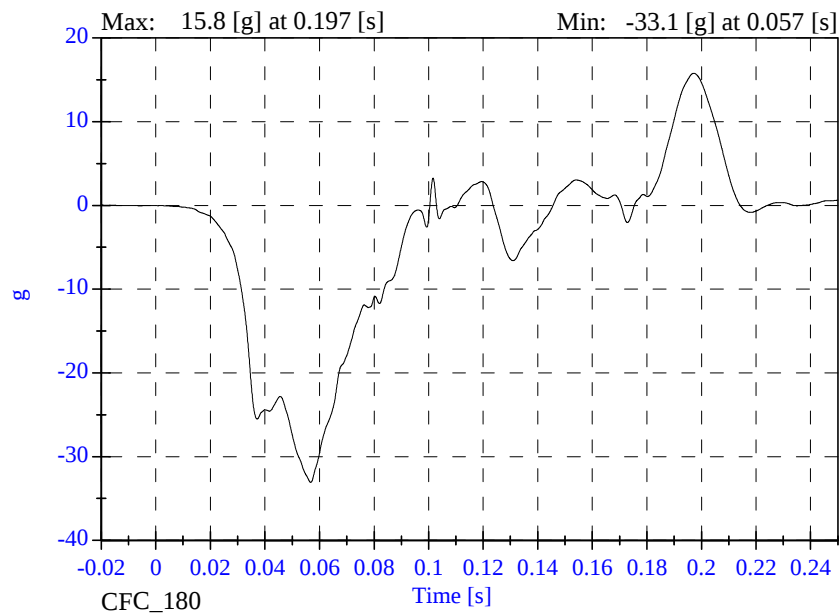
P6 Lower Neck M Resultant



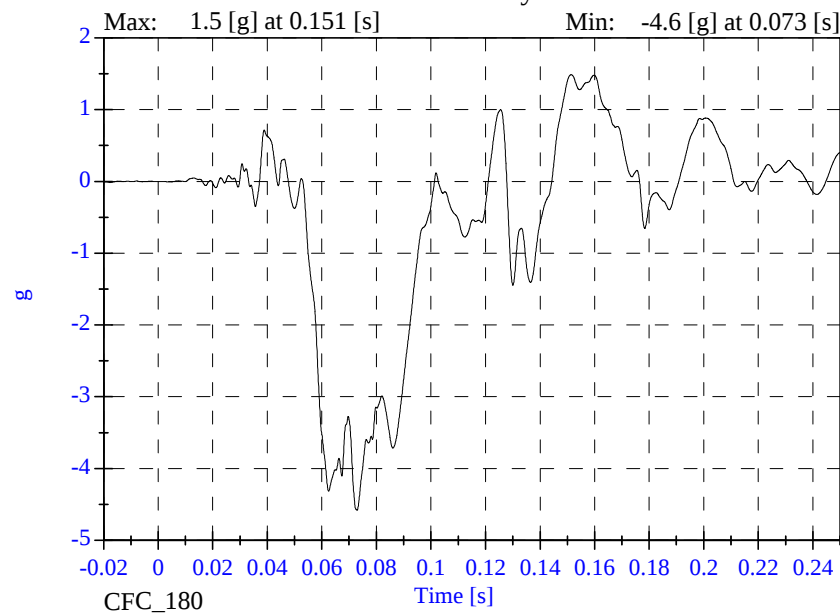
Sled Test NCAP SLED 08-3-43

- August 29, 2003

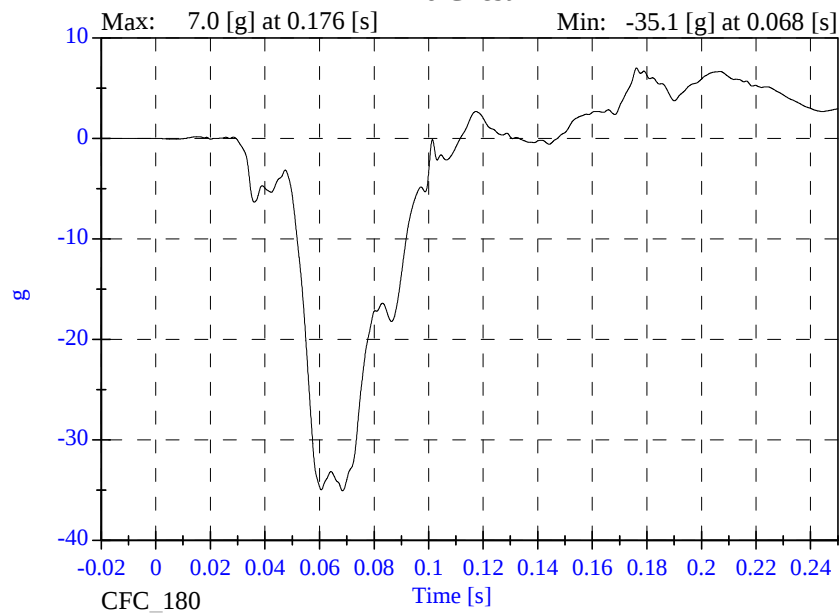
P6 Chest x



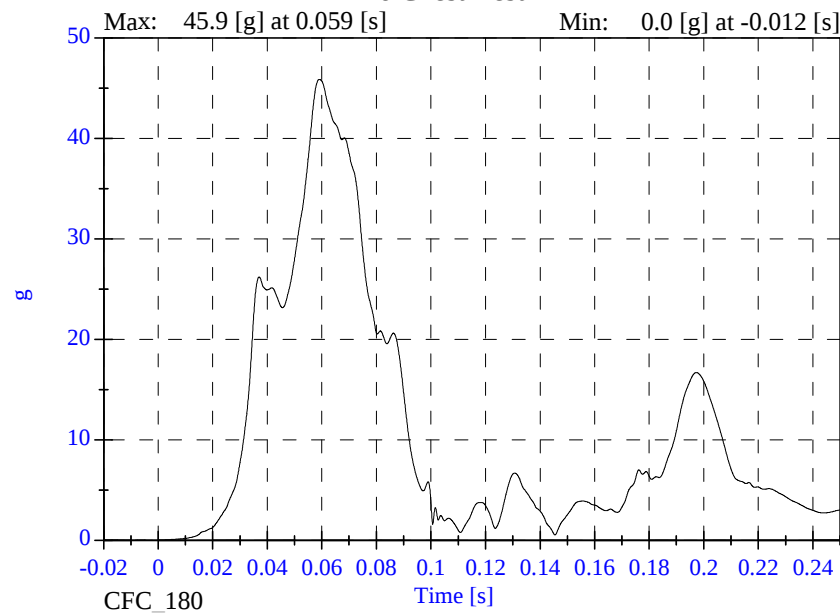
P6 Chest y



P6 Chest z



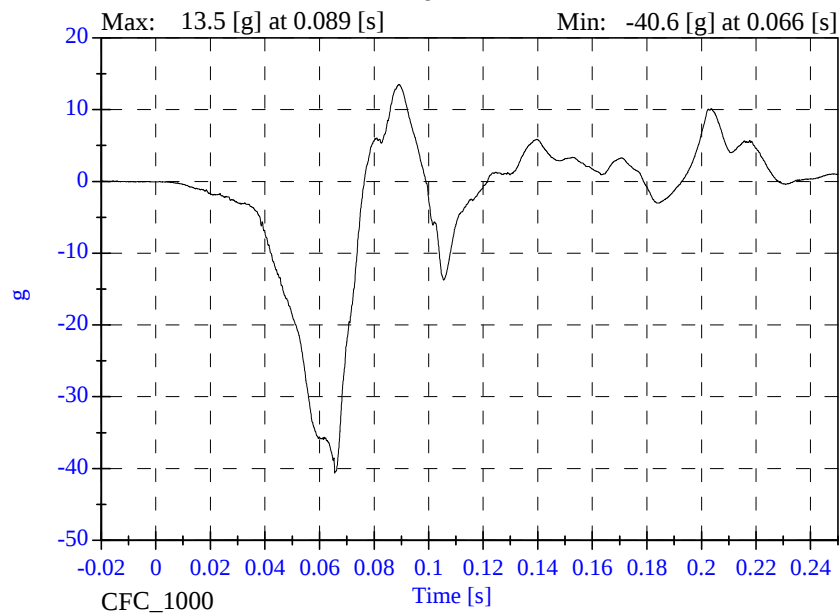
P6 Chest Resultant



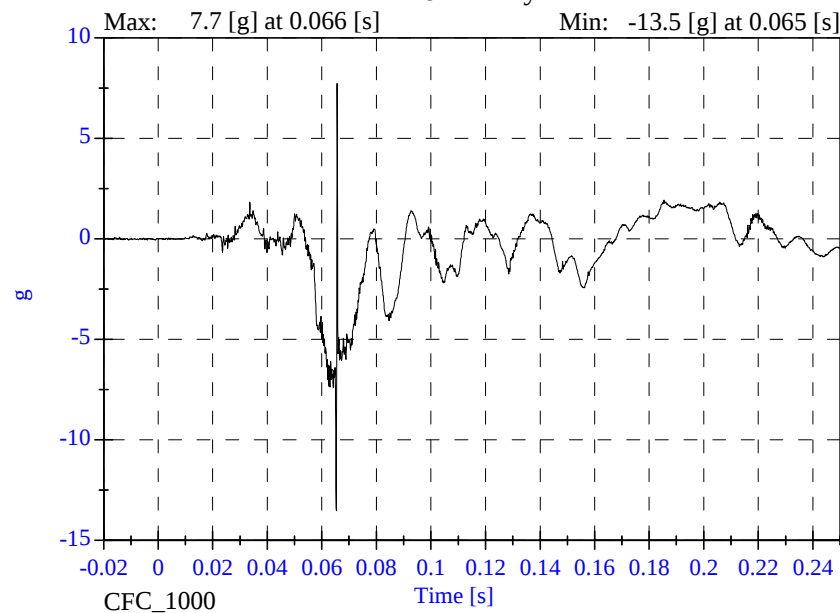
Sled Test NCAP SLED 08-3-43

- August 29, 2003

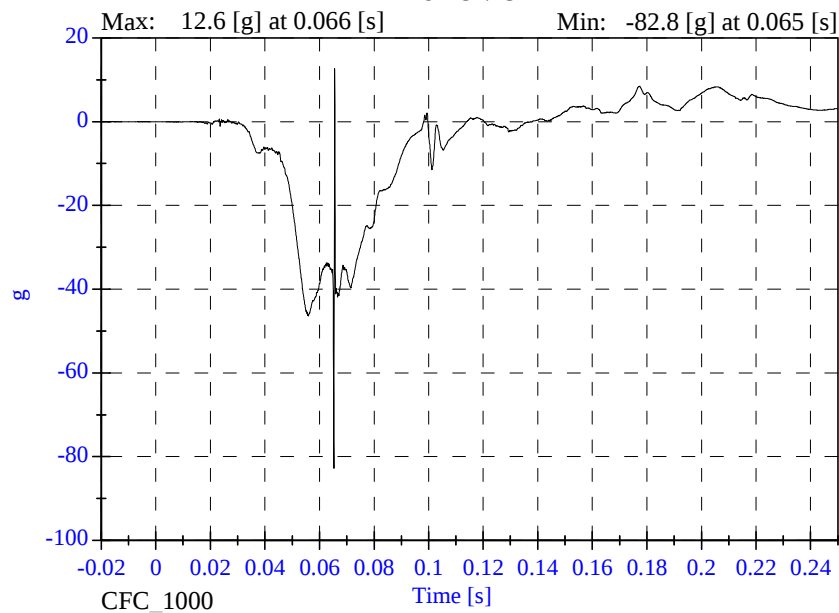
P6 Pelvic x



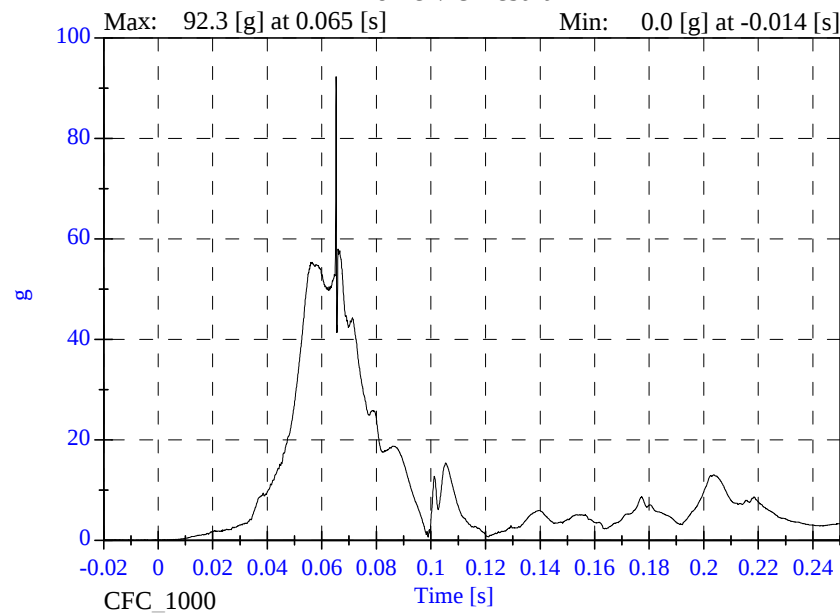
P6 Pelvic y



P6 Pelvic z



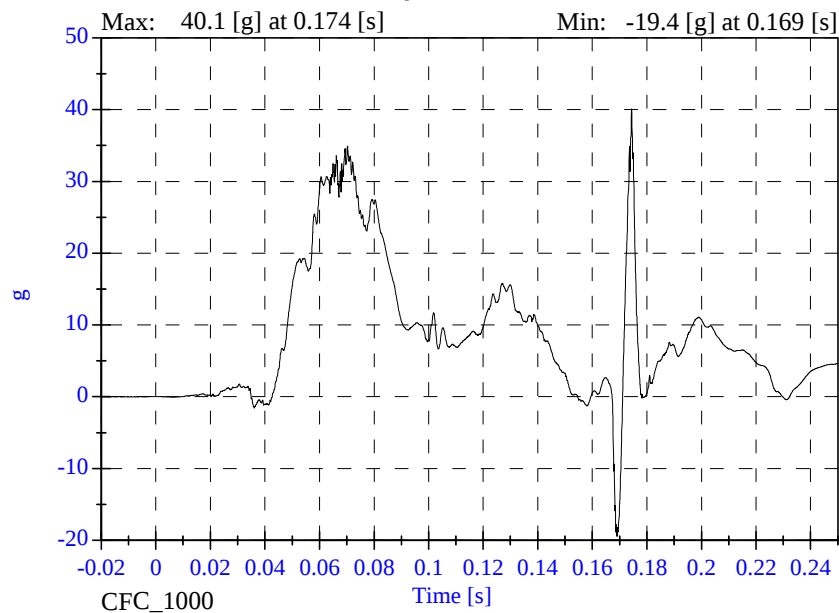
P6 Pelvic Resultant



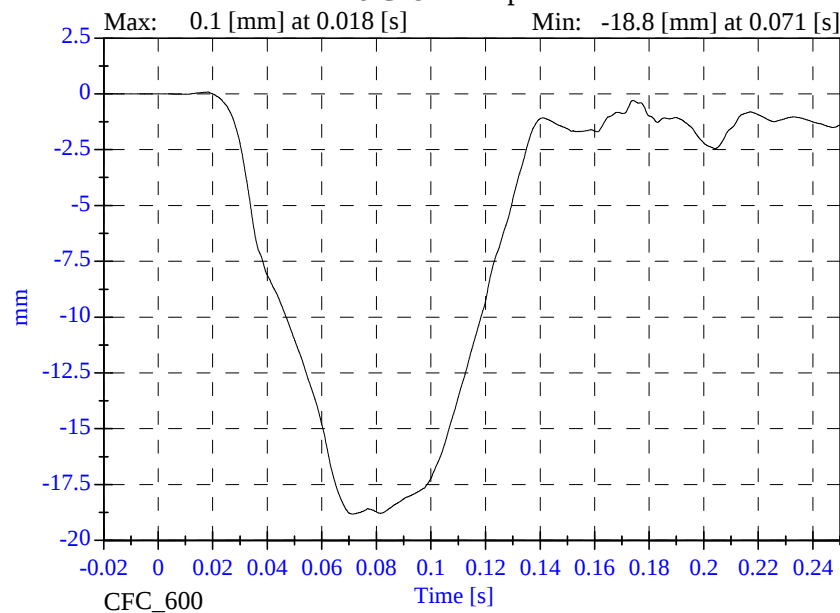
Sled Test NCAP SLED 08-3-43

- August 29, 2003

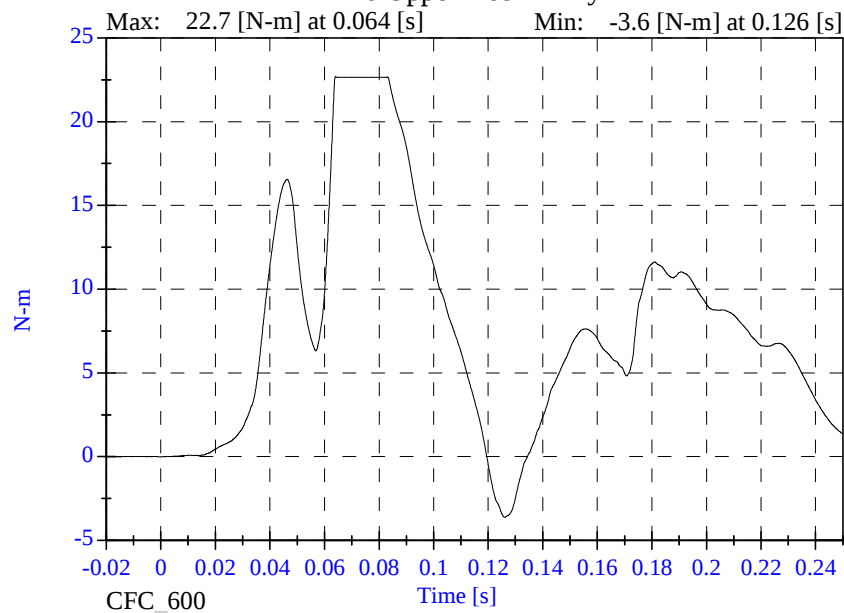
P6 Head Red z



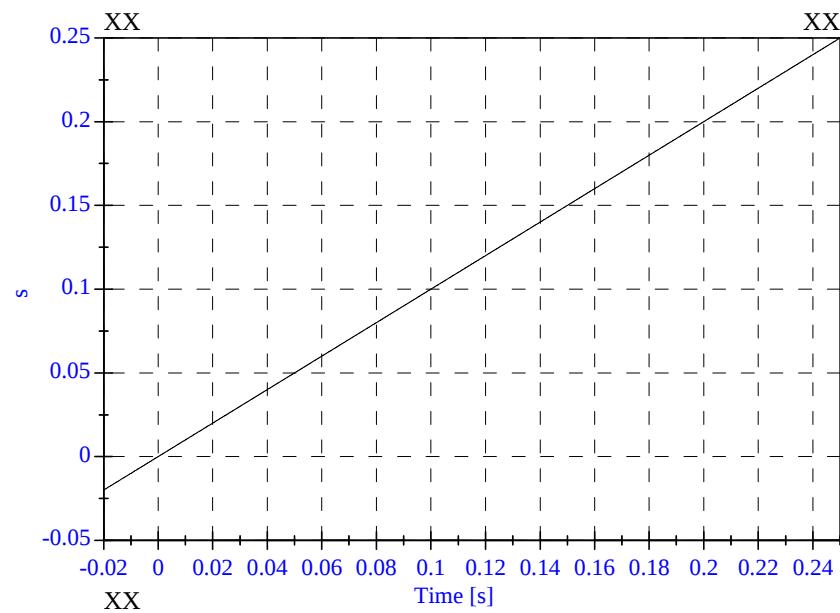
P6 Chest Compression



P6 Upper Neck Mocyc



BLANK

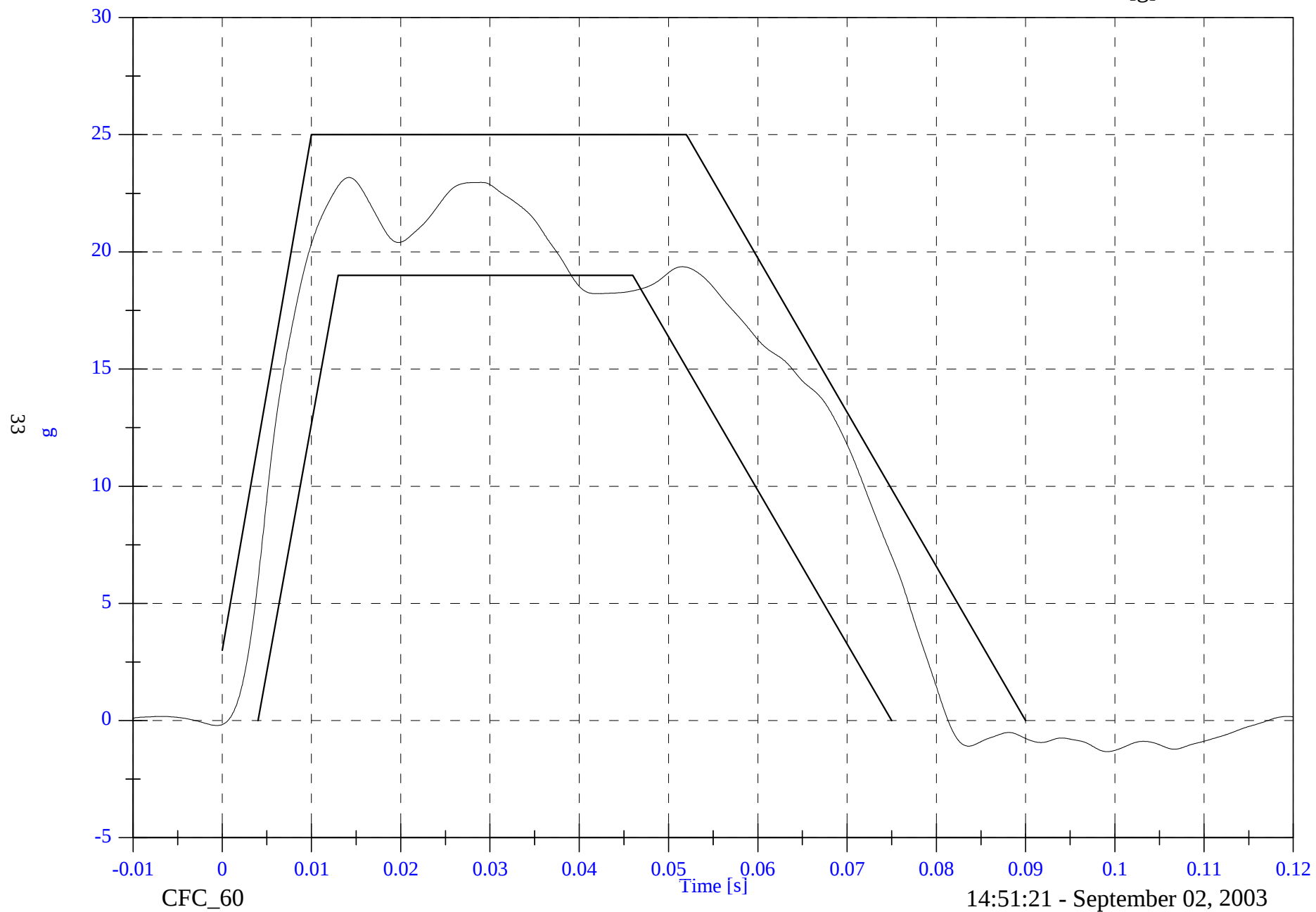


Sled Test NCAP SLED 09-3-44

Sled Pulse Corridor

Max: 23.2 [g] at 0.014 [s]

Min: -1.3 [g] at 0.099 [s]



FACILITY: HYGE SLED

DATE: September 02, 2003

TEST#: 09-3-44

TITLE: Sled Test NCAP SLED 09-3-44

CHN	NAME	Unit	Max	msec	Min	msec	Filt	Comment
26	Sled Acceleration	g	23.2	14.2	-1.3	99.2	CFC_60	
27	Sled Acceleration Velocity	kph	46.8	81.1	-0.0	-11.1	CFC_180	
28	Sled Acceleration Displacement	mm	2659.8	250.0	-0.0	-2.0	CFC_180	
29	P6 Head x	g	23.7	207.5	-28.9	93.6	CFC_1000	
30	P6 Head y	g	2.3	247.6	-7.8	104.0	CFC_1000	
31	P6 Head z	g	40.0	75.8	-0.0	5.5	CFC_1000	
32	P6 Head Resultant	g	46.4	76.0	0.0	-5.4	CFC_1000	
33	P6 Upper Neck Fx	N	116.6	206.0	-670.0	96.9	CFC_1000	
34	P6 Upper Neck Fy	N	81.1	100.2	-36.7	219.6	CFC_1000	
35	P6 Upper Neck Fz	N	1.6	4.8	-1529.6	81.7	CFC_1000	
36	P6 Upper Neck F Resultant	N	1638.6	81.7	0.1	-18.7	CFC_1000	
37	P6 Upper Neck Mx	N-m	5.0	103.7	-3.0	213.4	CFC_600	
38	P6 Upper Neck My	N-m	11.5	92.5	-4.7	153.2	CFC_600	
39	P6 Upper Neck Mz	N-m	1.3	204.3	-3.0	250.0	CFC_600	
40	P6 Upper Neck M Resultant	N-m	12.0	92.7	0.0	-18.6	CFC_600	
41	P6 Lower Neck Fx	N	282.2	205.1	-1136.8	87.3	CFC_1000	
42	P6 Lower Neck Fy	N	33.3	220.4	-60.2	100.1	CFC_1000	
43	P6 Lower Neck Fz	N	717.5	81.2	-1.0	3.5	CFC_1000	
44	P6 Lower Neck F Resultant	N	1326.4	82.3	0.0	-10.1	CFC_1000	
45	P6 Lower Neck Mx	N-m	5.4	220.4	-15.8	101.1	CFC_600	
46	P6 Lower Neck My	N-m	100.7	81.4	-19.0	205.5	CFC_600	
47	P6 Lower Neck Mz	N-m	1.7	237.3	-6.3	91.8	CFC_600	
48	P6 Lower Neck M Resultant	N-m	100.9	81.4	0.0	-15.8	CFC_600	
49	P6 Chest x	g	12.9	230.7	-34.9	56.7	CFC_180	
50	P6 Chest y	g	1.2	204.6	-3.8	83.0	CFC_180	
51	P6 Chest z	g	8.4	102.6	-30.6	59.6	CFC_180	
52	P6 Chest Resultant	g	45.8	58.8	0.0	-9.9	CFC_180	
53	P6 Pelvic x	g	56.2	113.3	-44.8	57.7	CFC_1000	
54	P6 Pelvic y	g	4.1	235.2	-4.8	86.2	CFC_1000	
55	P6 Pelvic z	g	17.6	113.8	-35.1	61.1	CFC_1000	
56	P6 Pelvic Resultant	g	58.6	113.3	0.0	-12.0	CFC_1000	
57	P6 Chest Compression	mm	0.1	217.0	-22.3	101.3	CFC_600	
58	P6 Head Red z	g	55.1	79.5	-9.0	211.4	CFC_1000	
59	P6 Upper Neck Mocy	N-m	11.5	92.5	-4.7	153.2	CFC_600	

FACILITY: HYGE SLED

DATE: September 02, 2003

TEST#: 09-3-44

TITLE: Sled Test NCAP SLED 09-3-44

Version 5.00

=====

P6 HIC(36 ms): 403.7

t1: 66.6 msec

t2: 102.6 msec

Duration: 36.0 msec

Average Acceleration: 41.7 g

Input channels: P6 Head x (2) CFC_1000

P6 Head y (3) CFC_1000

P6 Head z (4) CFC_1000

P6 UP NECK Fx: Max: 116.6 N 206.0 msec

Min: -670.0 N 96.9 msec

Input channel: P6 Upper Neck Fx (6) CFC_1000

P6 UP NECK Fz: Max: 1.6 N 4.8 msec

Min: -1529.6 N 81.7 msec

Input channel: P6 Upper Neck Fz (8) CFC_1000

P6 UP NECK MocY (3Y0 Child OOP)

Max: 11.5 N-m 92.5 msec

Min: -4.7 N-m 153.2 msec

Input channels: P6 Upper Neck Fx (6) CFC_600

P6 Upper Neck My (10) CFC_600

Docy: 0

P6 UP NECK Nij (3Y0 Child OOP)

Ntf: 0.00 Nij 13.6 msec CVt: 2120 CVf: 68

Nte: 0.00 Nij -17.5 msec CVt: 2120 CVe: 27

Ncf: 0.82 Nij 82.6 msec CVc: 2120 CVf: 68

Nce: 0.36 Nij 205.6 msec CVc: 2120 CVe: 27

Input channels: P6 Upper Neck Fz (8) CFC_600

P6 Upper Neck MocY [N-m, CFC_600] (63)

FACILITY: HYGE SLED

DATE: September 02, 2003

TEST#: 09-3-44

TITLE: Sled Test NCAP SLED 09-3-44

Version 5.00

=====

P6 CLIP(3 ms): 45.0 g

t1: 57.1 msec

t2: 60.1 msec

Duration: 3.0 msec

P6 CSI: 303.8

Input channels: P6 Chest x (18) CFC_180

P6 Chest y (19) CFC_180

P6 Chest z (20) CFC_180

P6 CHEST DISP: Max: 0.1 mm 217.0 msec

Min: -22.3 mm 101.3 msec

Input channel: P6 Chest Compression (21) CFC_600

=====

P6 HIC(15 ms): 207.8

t1: 72.7 msec

t2: 87.7 msec

Duration: 15.0 msec

Average Acceleration: 45.4 g

Input channels: P6 Head x (2) CFC_1000

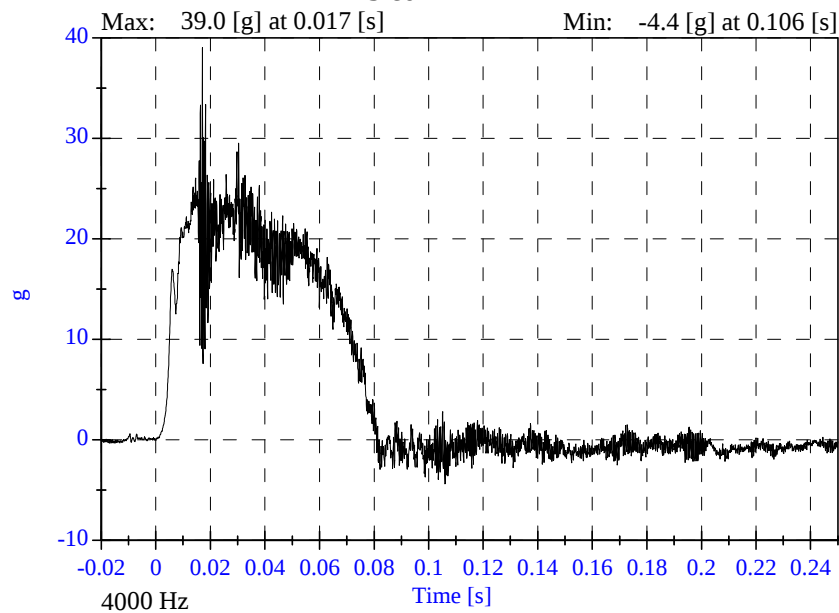
P6 Head y (3) CFC_1000

P6 Head z (4) CFC_1000

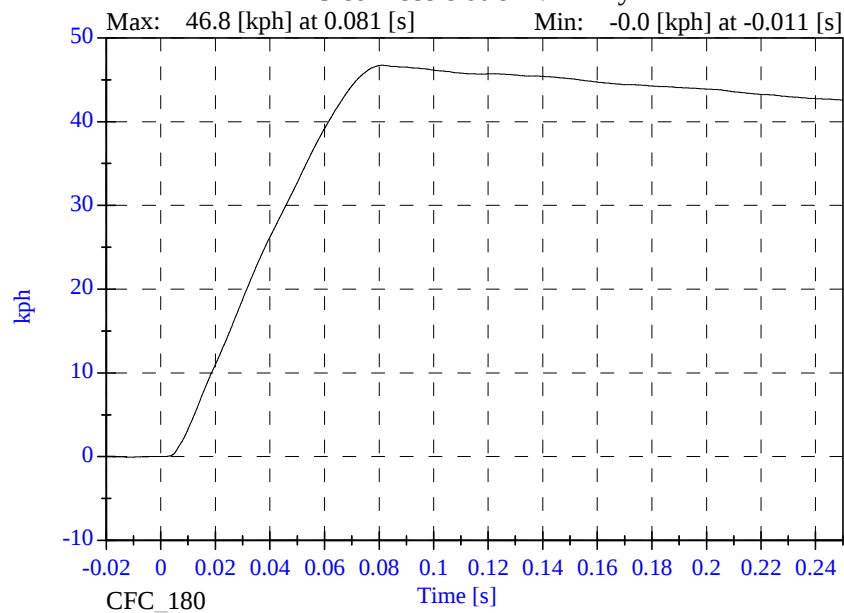
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Sled Test NCAP SLED 09-3-44

Sled Acceleration

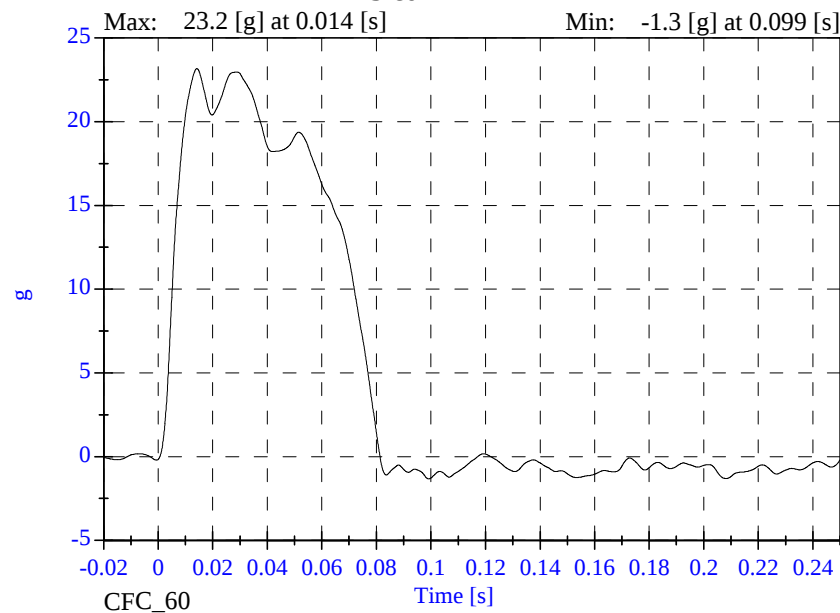


Sled Acceleration Velocity

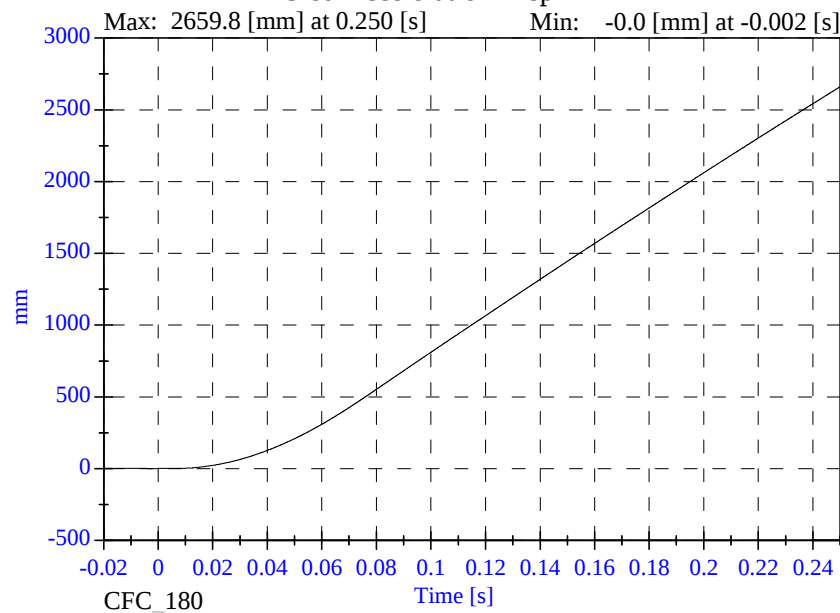


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Sled Acceleration



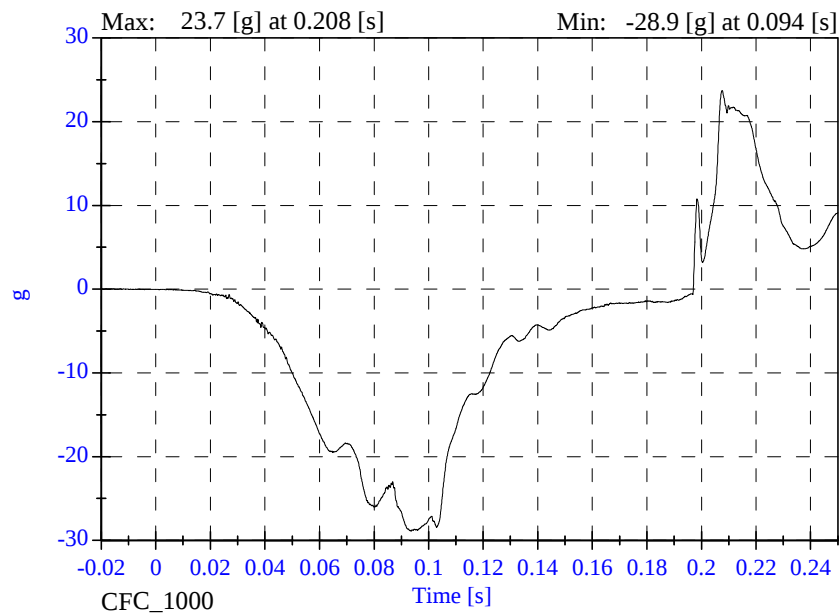
Sled Acceleration Displacement



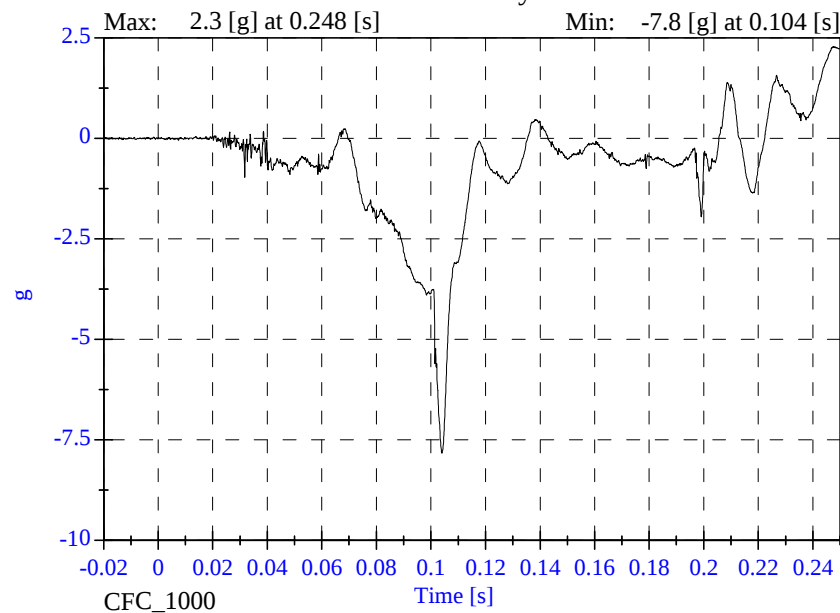
Sled Test NCAP SLED 09-3-44

- September 02, 2003

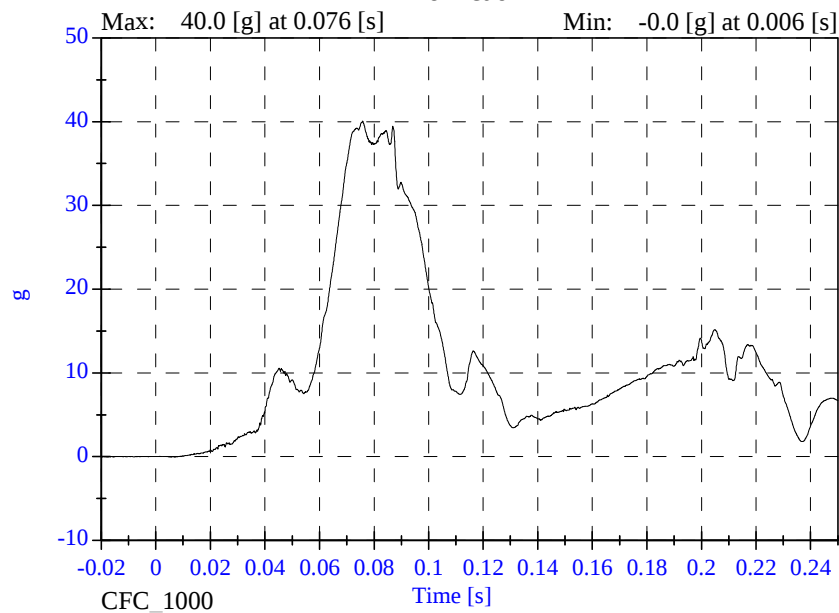
P6 Head x



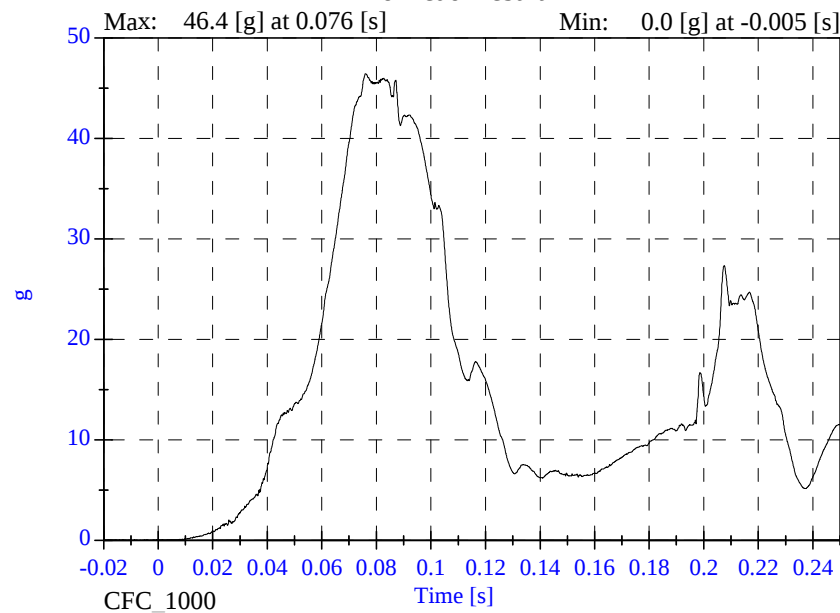
P6 Head y



P6 Head z



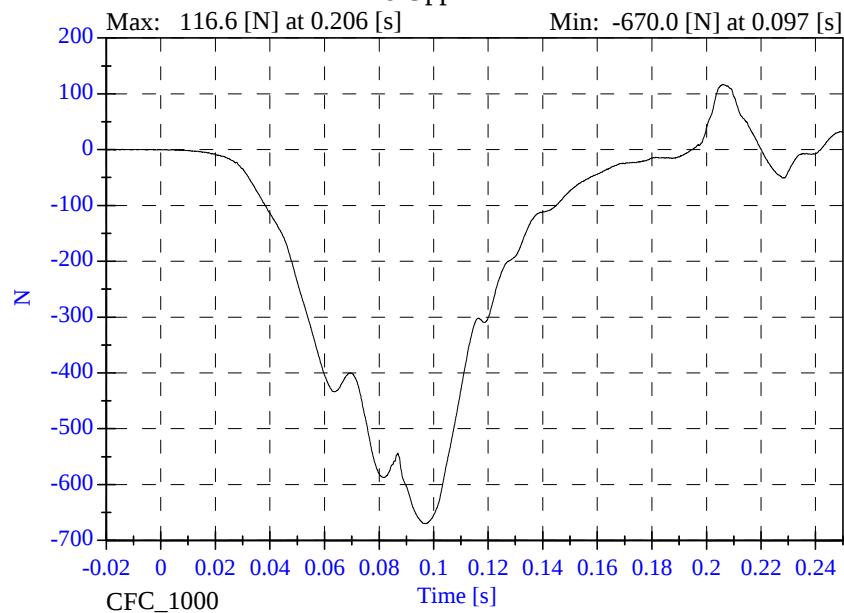
P6 Head Resultant



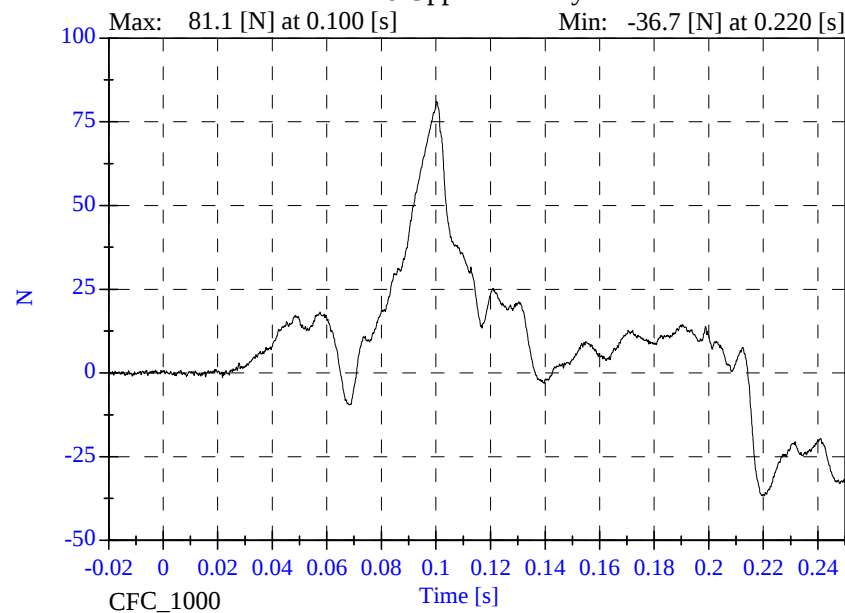
Sled Test NCAP SLED 09-3-44

- September 02, 2003

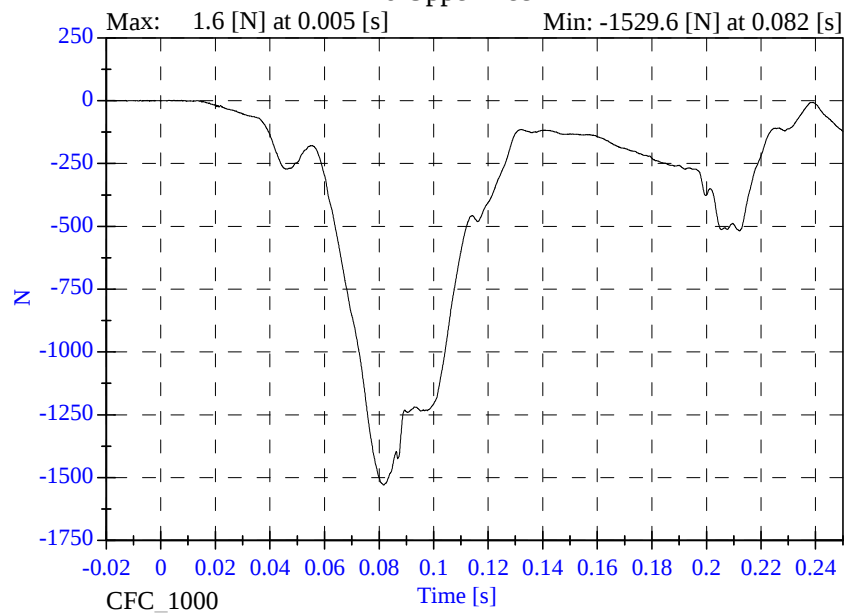
P6 Upper Neck Fx



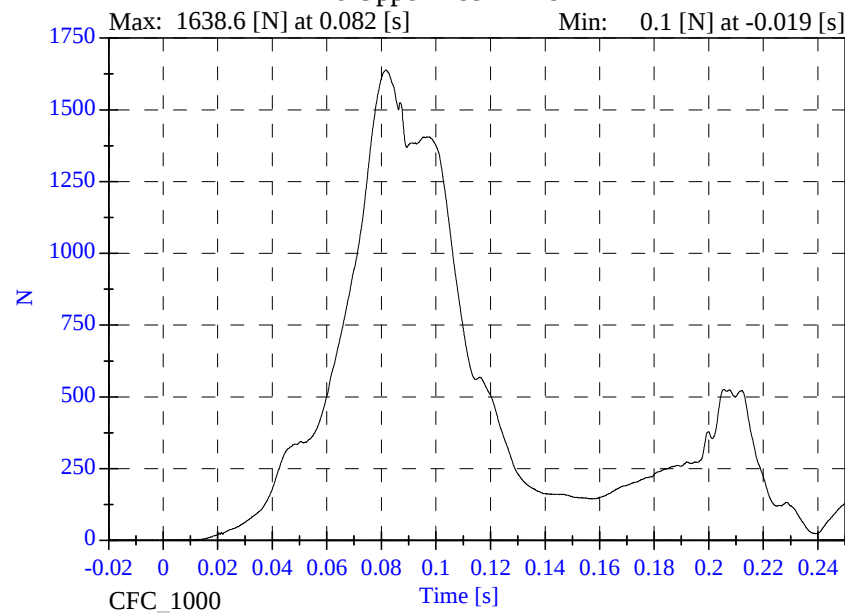
P6 Upper Neck Fy



P6 Upper Neck Fz



P6 Upper Neck F Resultant

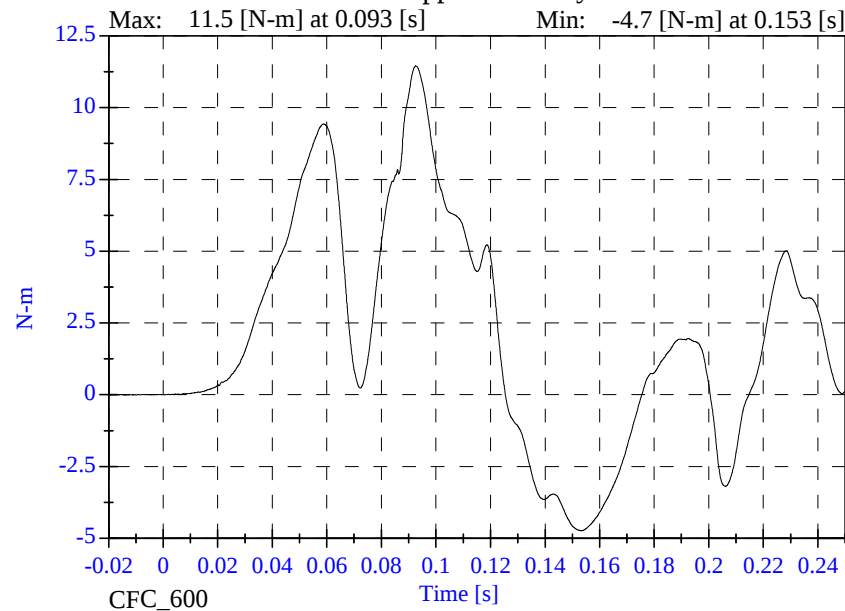
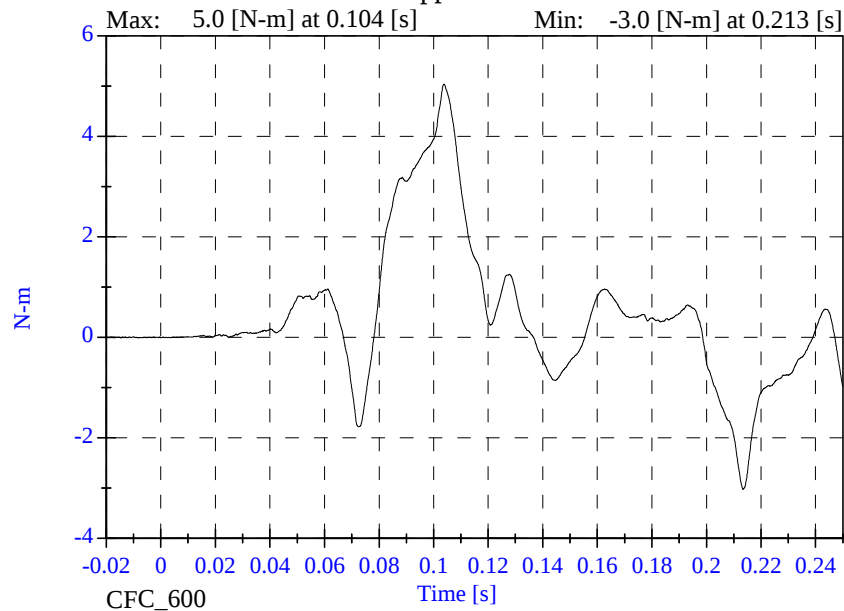


Sled Test NCAP SLED 09-3-44

- September 02, 2003

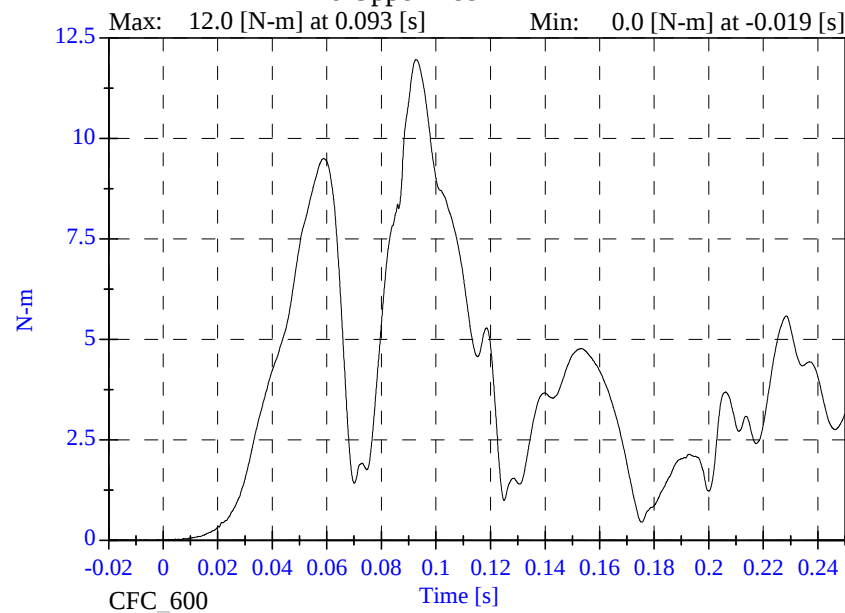
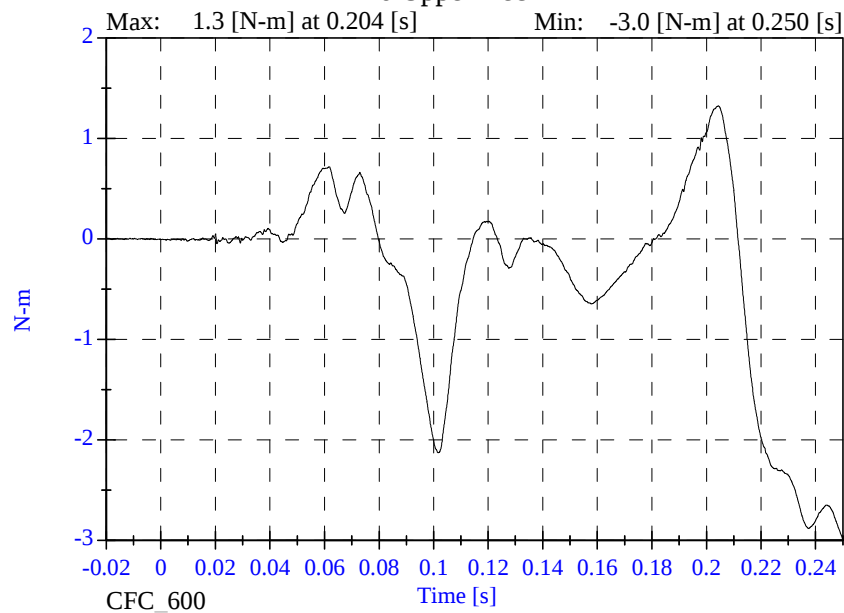
P6 Upper Neck Mx

P6 Upper Neck My



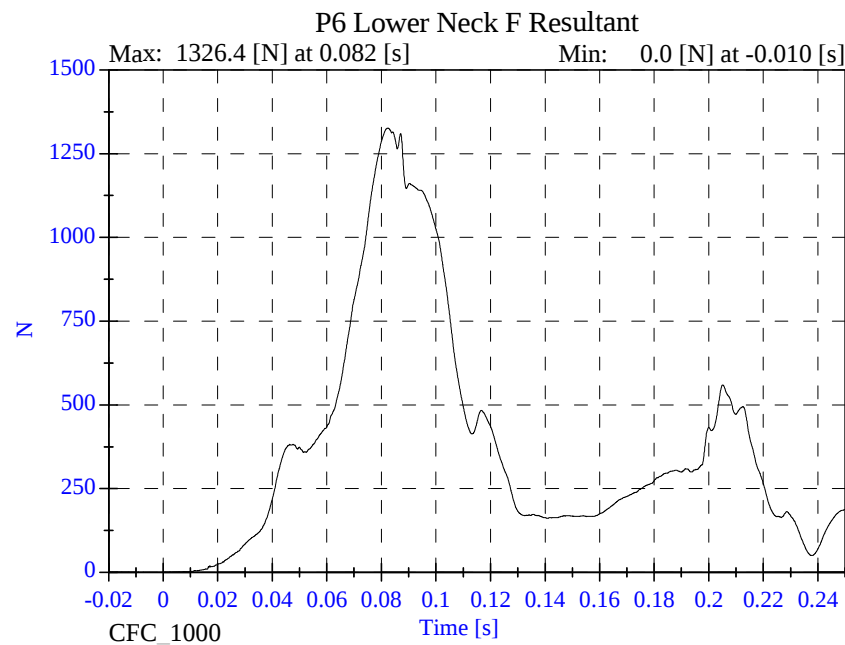
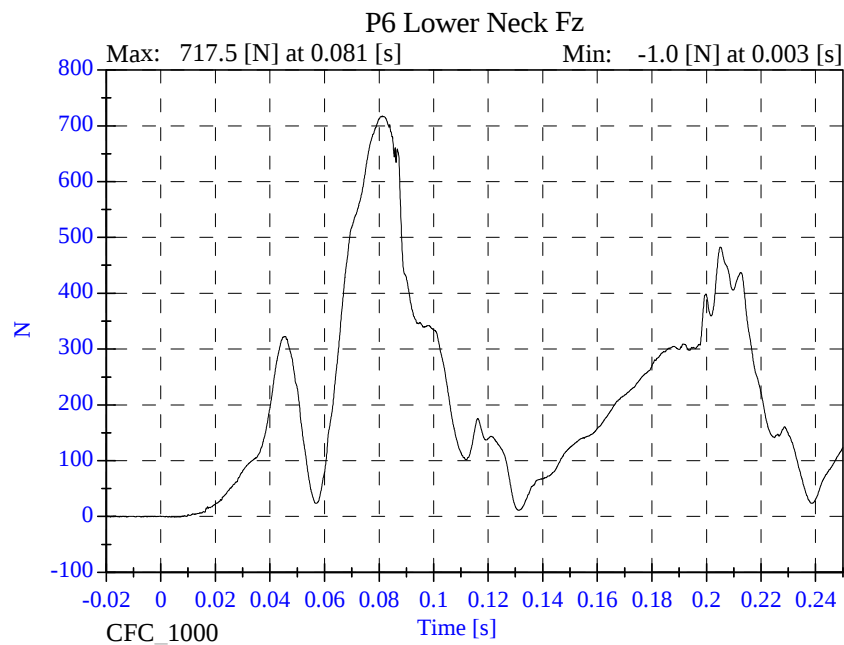
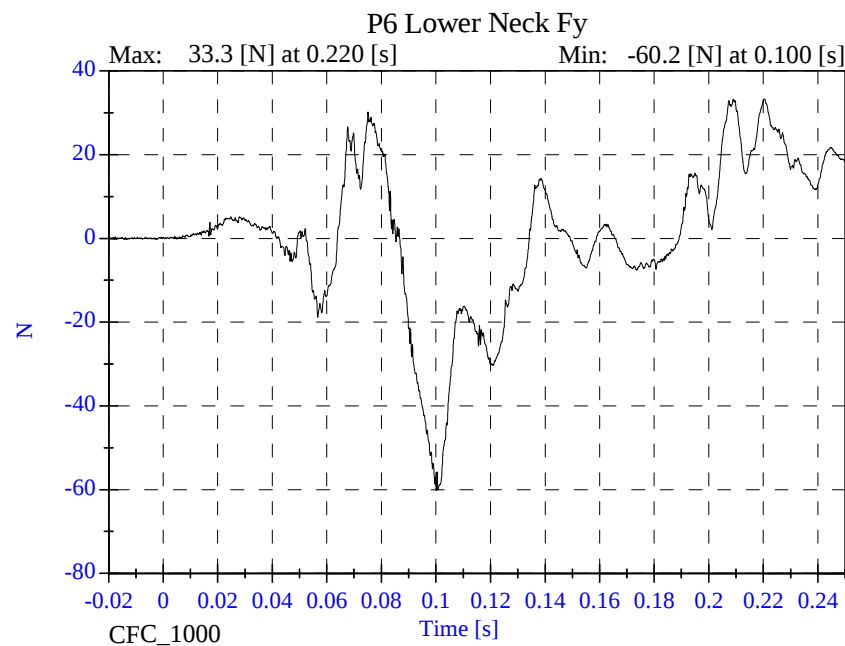
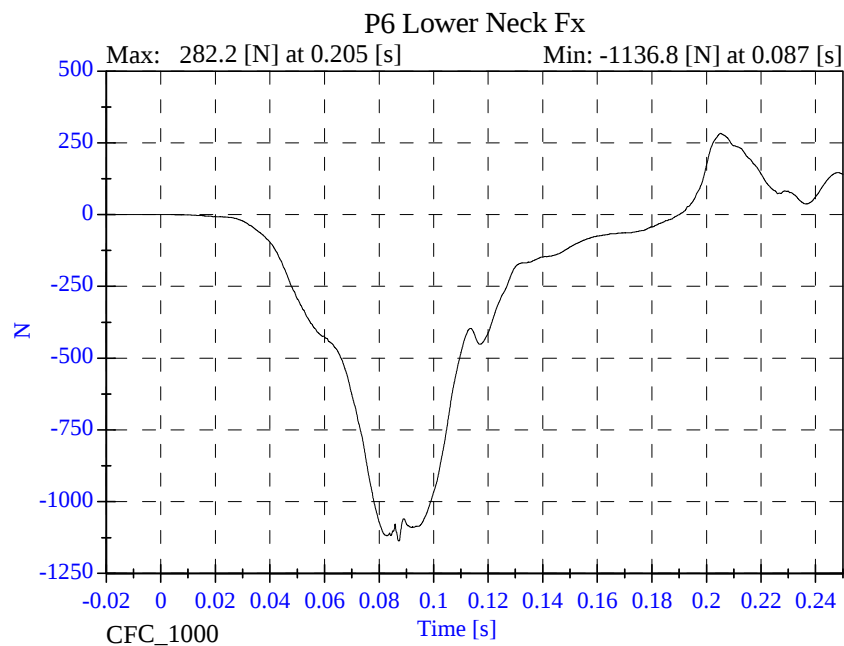
P6 Upper Neck Mz

P6 Upper Neck M Resultant



Sled Test NCAP SLED 09-3-44

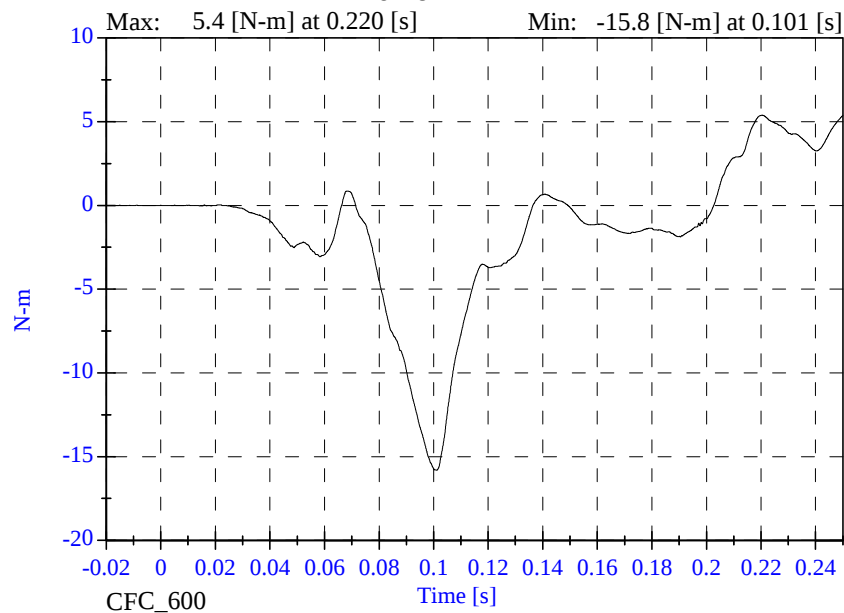
- September 02, 2003



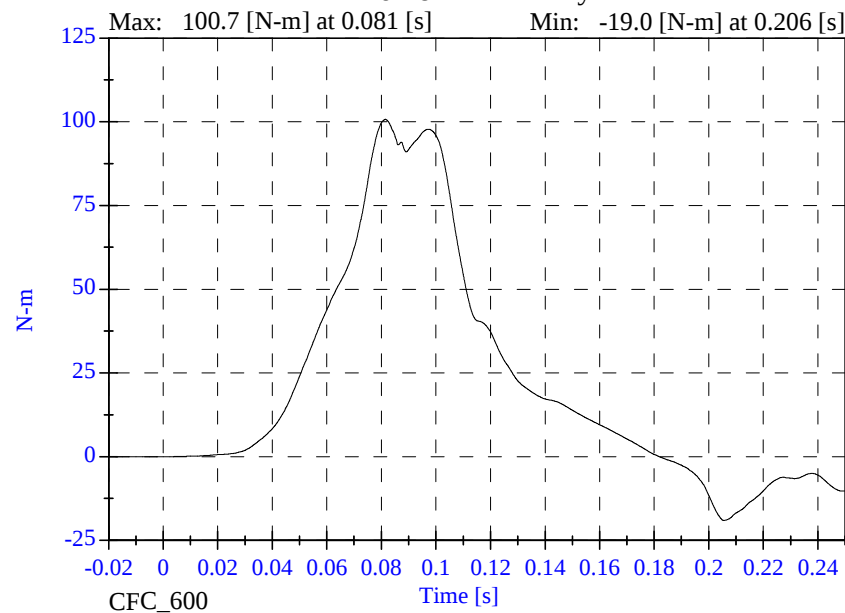
Sled Test NCAP SLED 09-3-44

- September 02, 2003

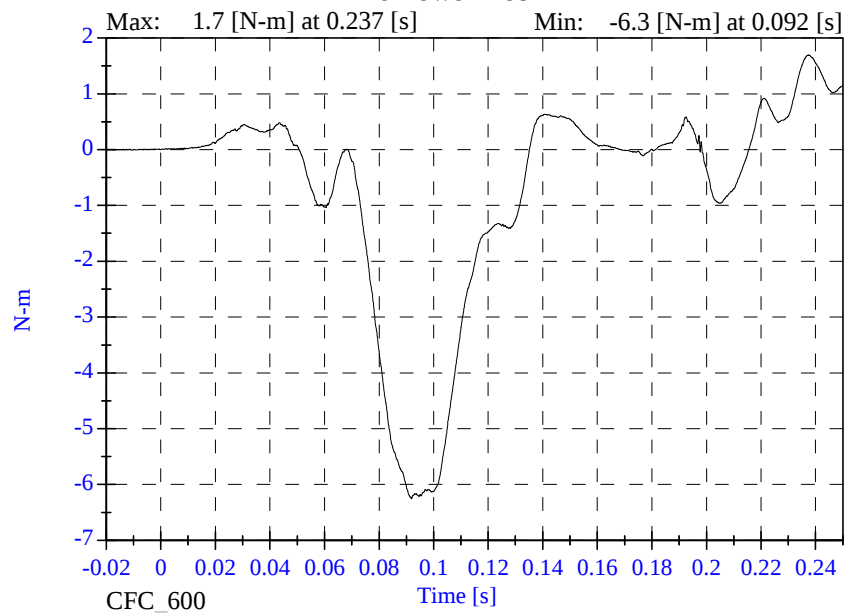
P6 Lower Neck Mx



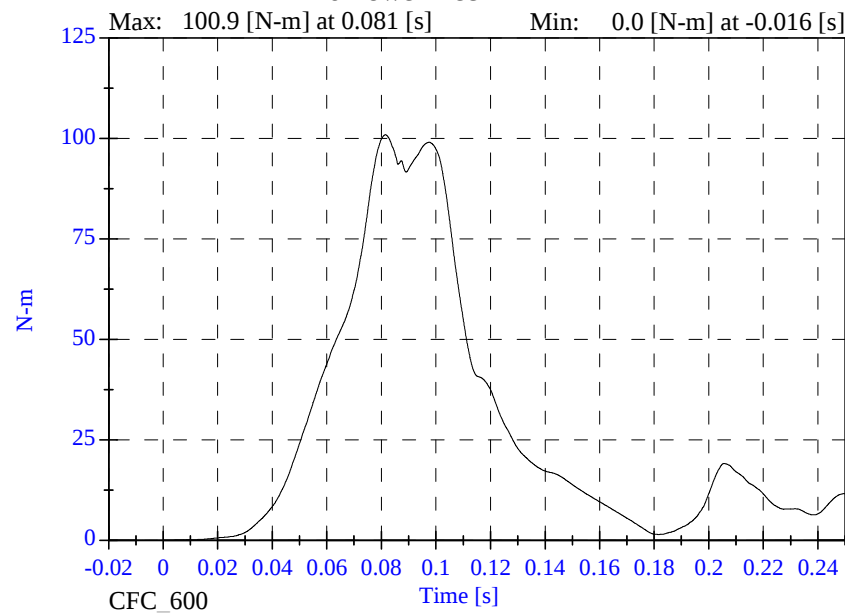
P6 Lower Neck My



P6 Lower Neck Mz

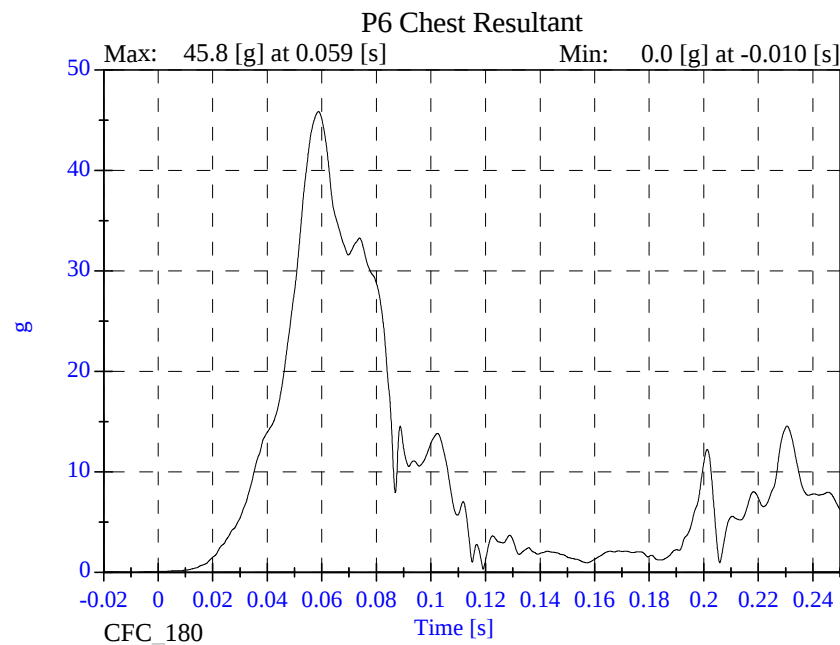
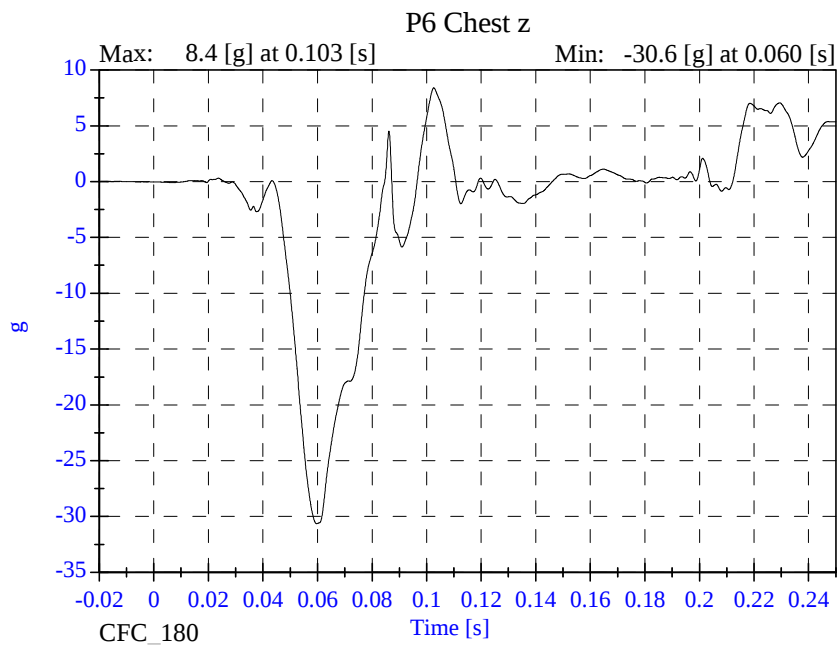
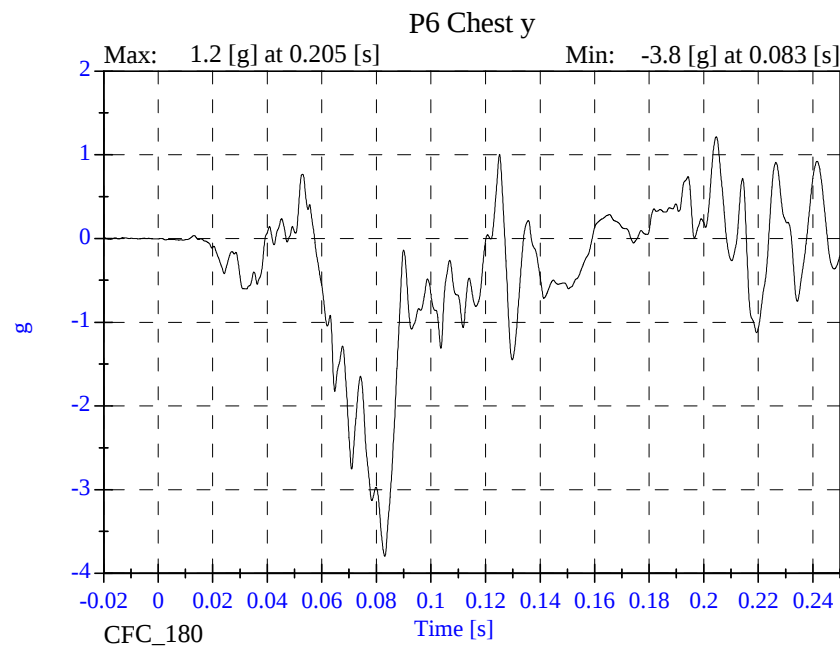
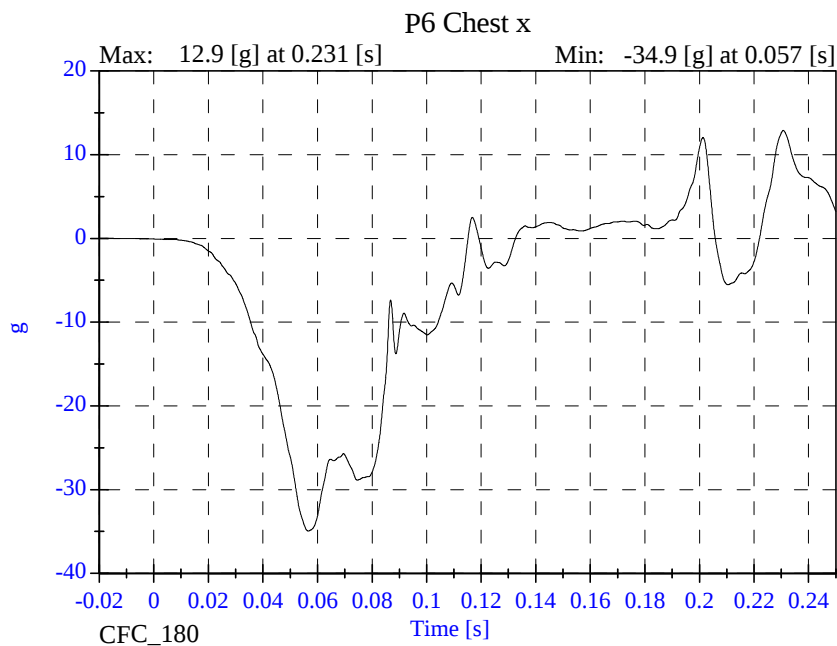


P6 Lower Neck M Resultant



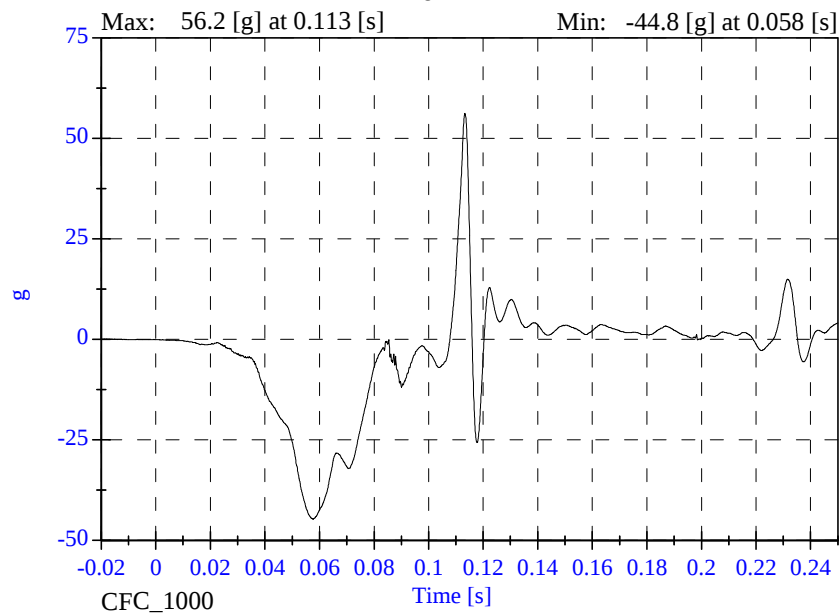
Sled Test NCAP SLED 09-3-44

- September 02, 2003



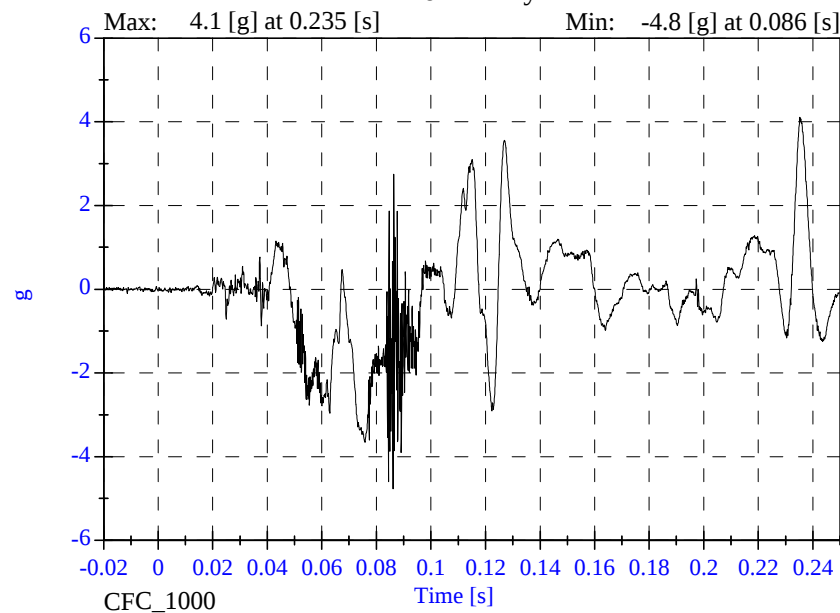
Sled Test NCAP SLED 09-3-44

P6 Pelvic x

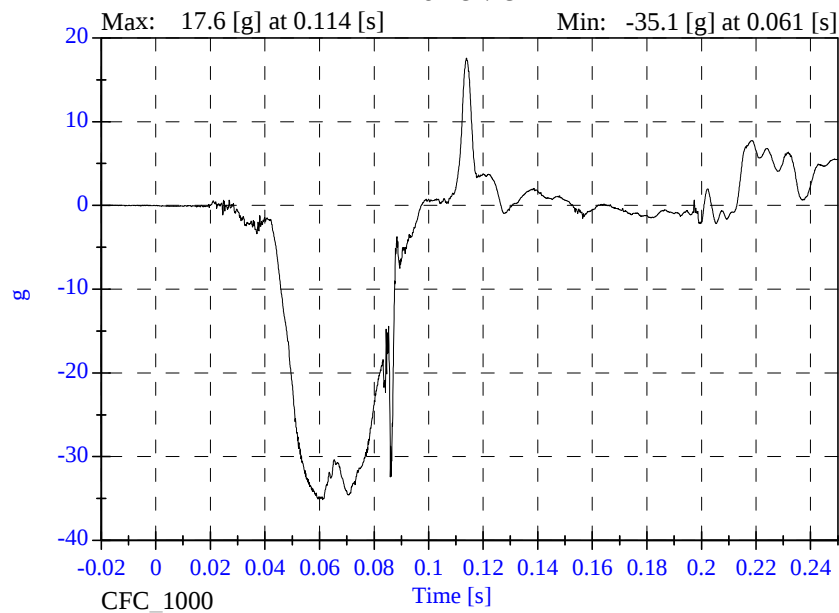


- September 02, 2003

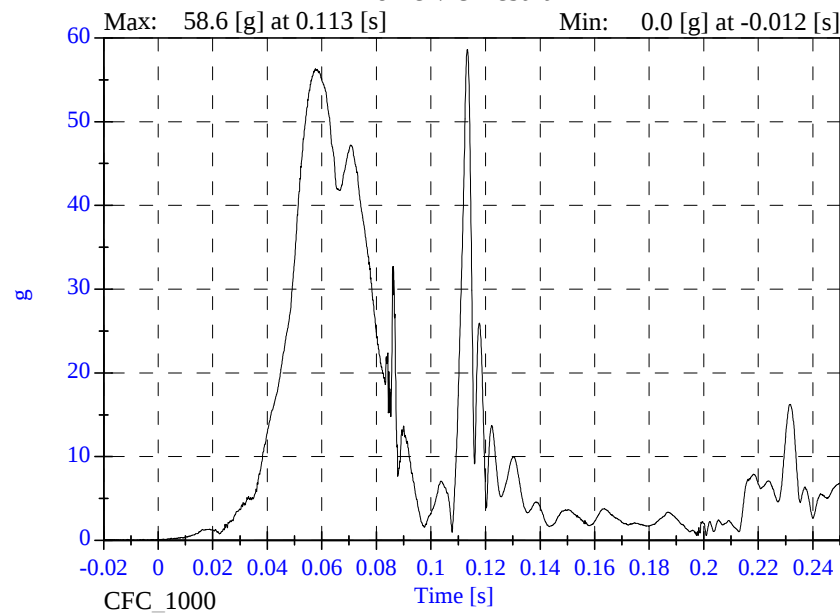
P6 Pelvic y



P6 Pelvic z

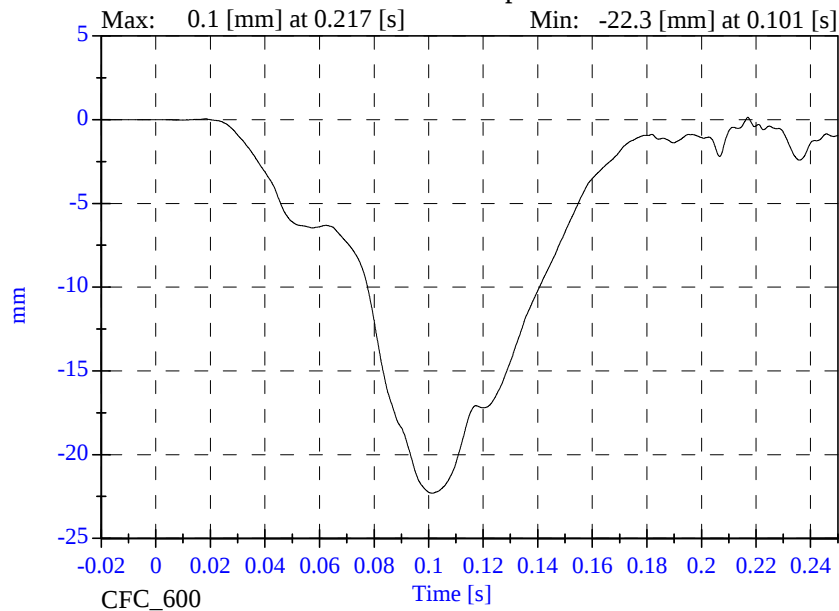


P6 Pelvic Resultant



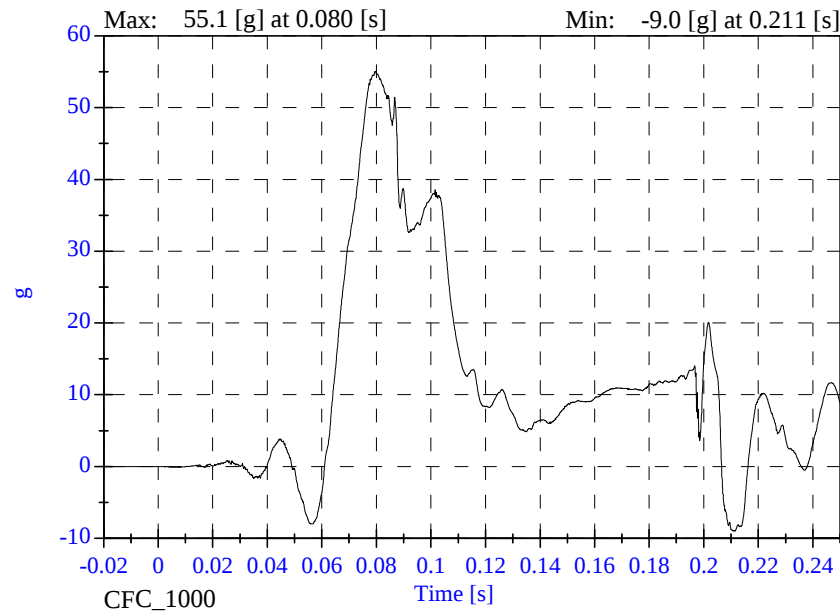
Sled Test NCAP SLED 09-3-44

P6 Chest Compression

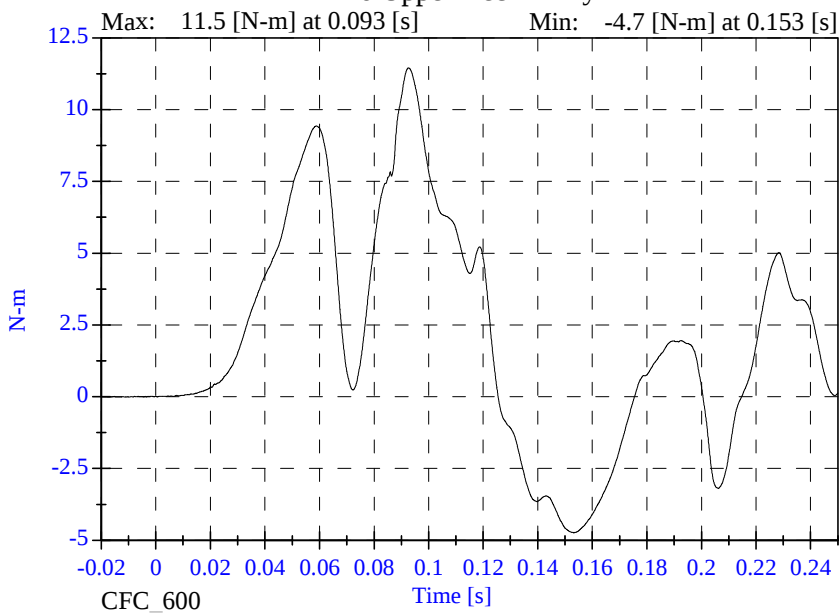


- September 02, 2003

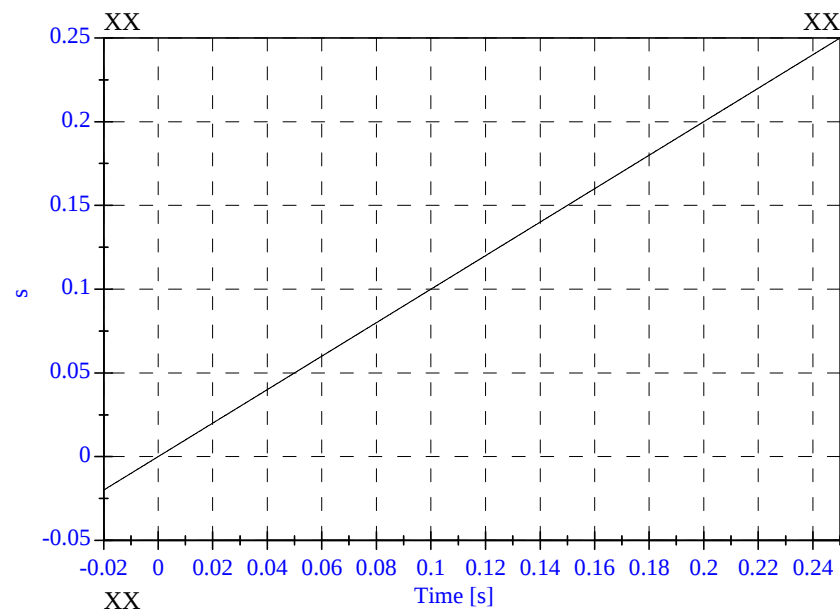
P6 Head Red z



P6 Upper Neck Mocyc



BLANK

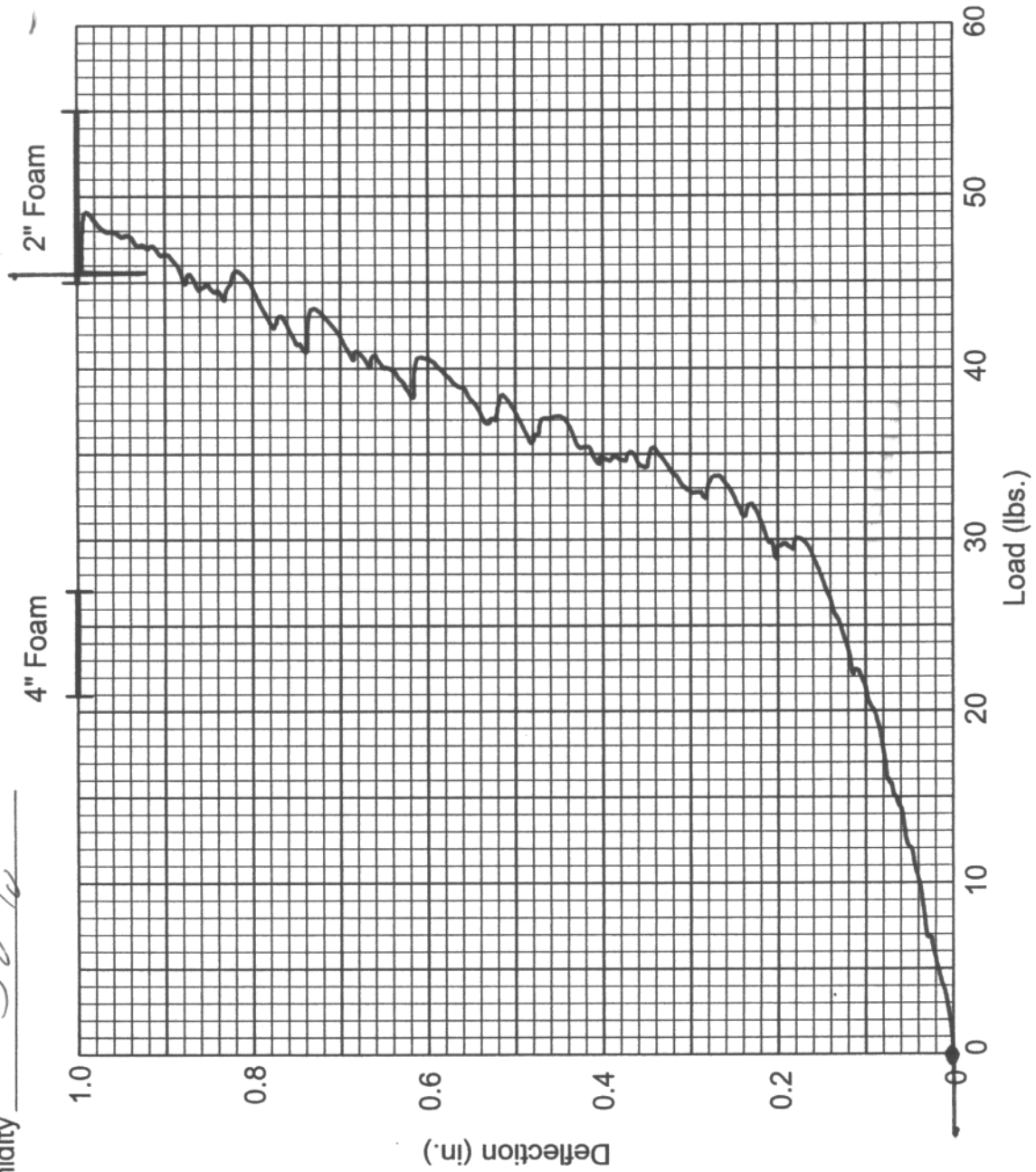


SECTION 9

Compression – Deflection Resistance Test

Date 8/29/03
 Performed By [Signature]
 Temp. 70°
 Humidity 50%

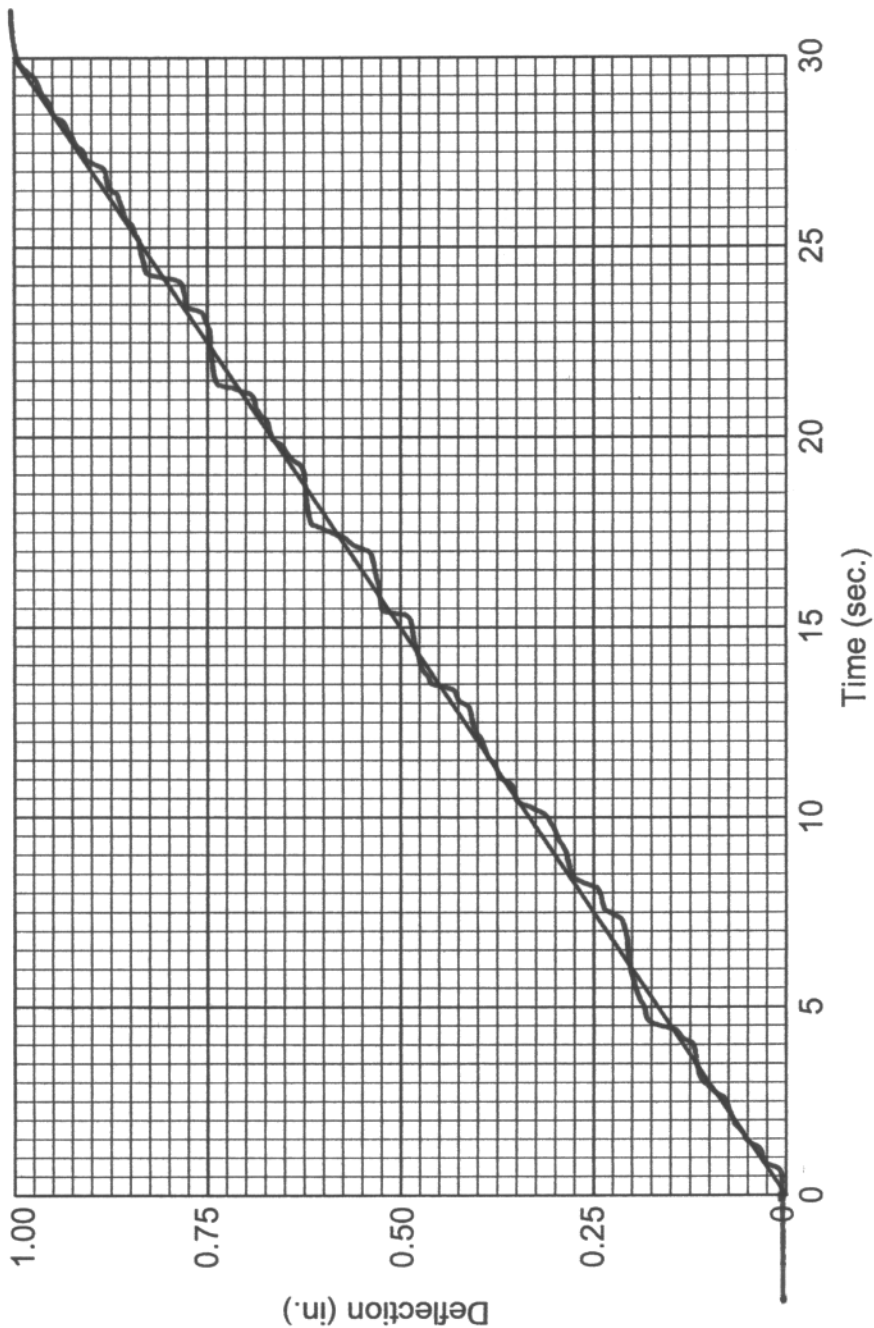
Foam No. 2 x 20" 2" x 29" IL



Compression - Deflection Resistance Test
 Child Seat Foam

Test 08-3-43

Date 8/29/03
 Temp 70°
 Humidity 50%
 Foam No. 2" X 20" 2" X 24" I-6



Compression - Deflection Resistance Test Child Seat Foam

Test 08-3-43

SEAT FOAM USAGE LOG

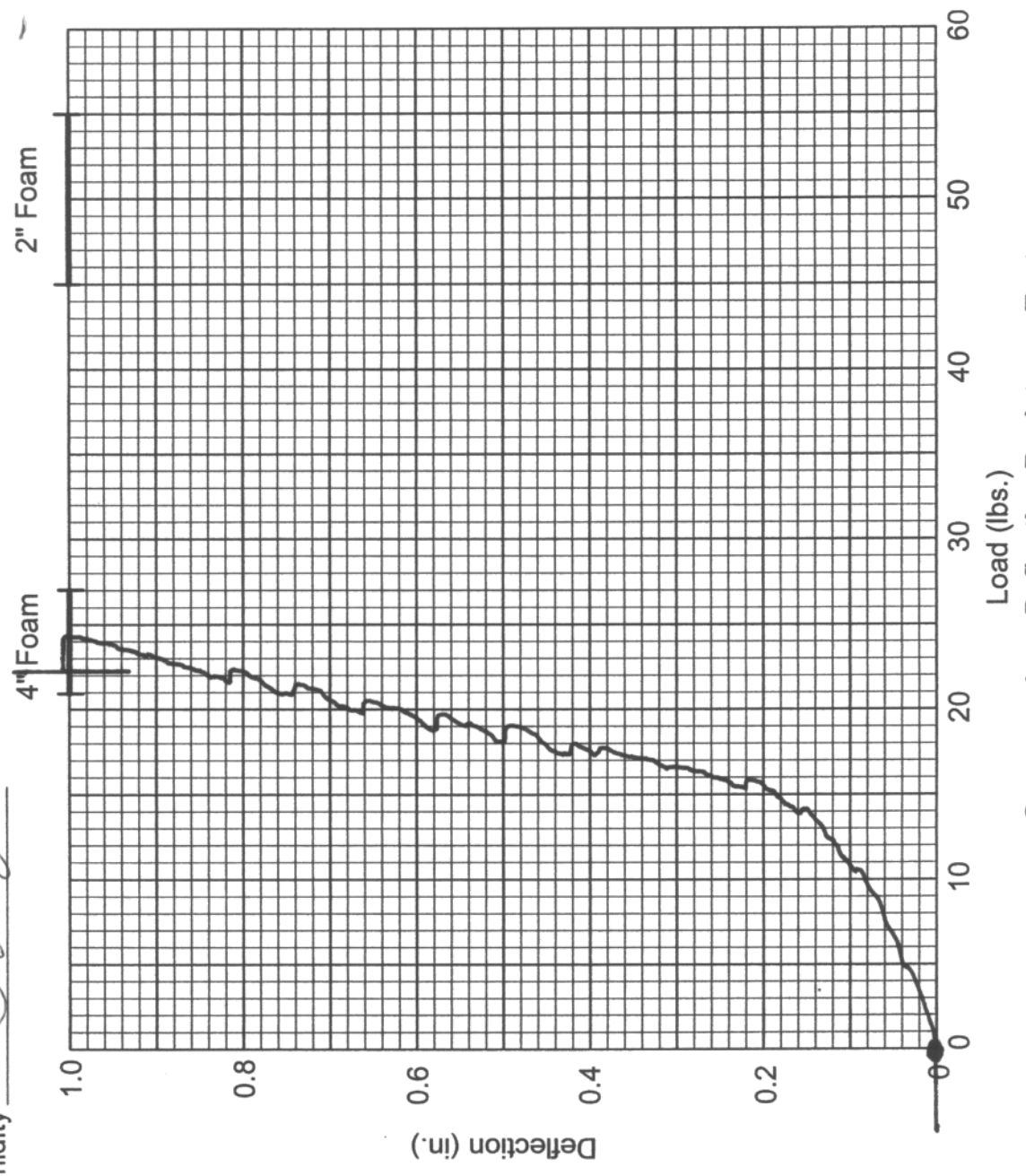
2' x 20" 2 x 24 IL

Foam I.D. Number

Date	Peak Load	Pass/Fail
8/29/03	45.5 LB	Pass

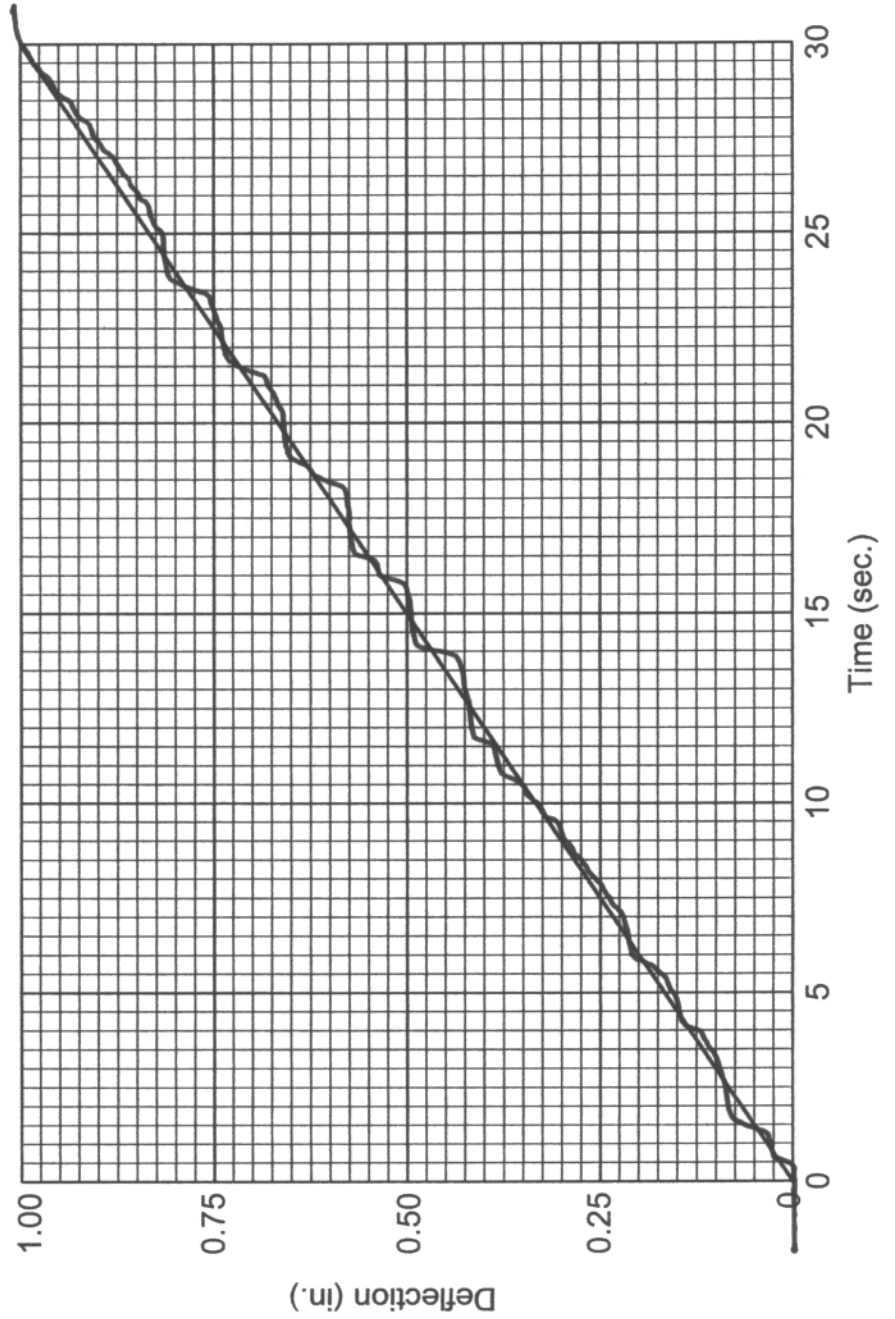
Date 8/29/03
 Performed By [Signature]
 Temp. 70°
 Humidity 50%

Foam No. 4" x 20" x 6"



Compression - Deflection Resistance Test
 Child Seat Foam
 Test 08-3-43

Date 8/29/03
 Temp 70°
 Humidity 50%
 Foam No. 4" X 20" IL



Compression - Deflection Resistance Test Child Seat Foam

Test 08-3-43

SEAT FOAM USAGE LOG

4" x 20" x 16"

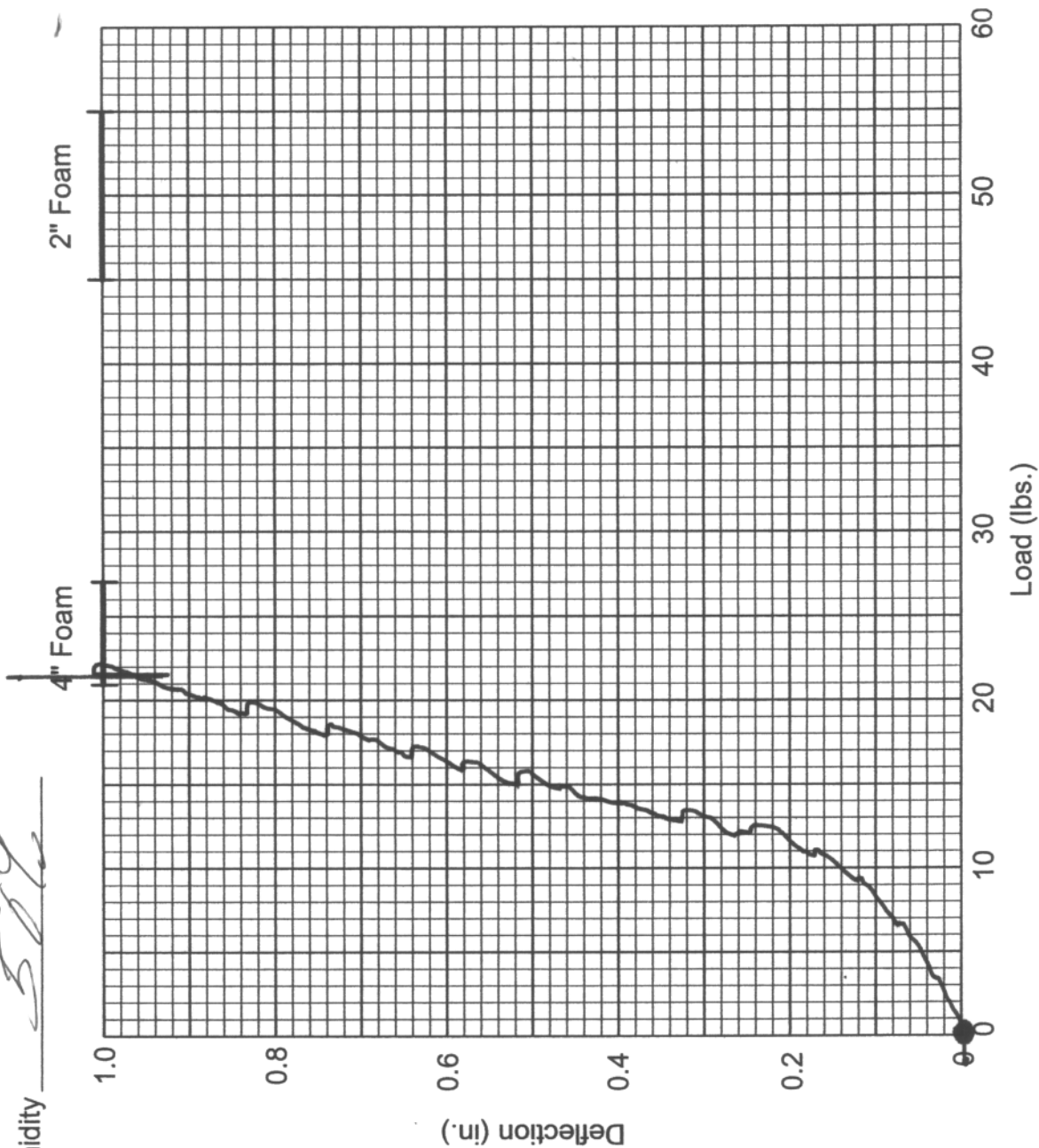
Foam I.D. Number

Date	Peak Load	Pass/Fail
8/29/03	22,250 lbs	

[Signature]

Date 8/29/03
 Performed By [Signature]
 Temp. 70°
 Humidity 50%

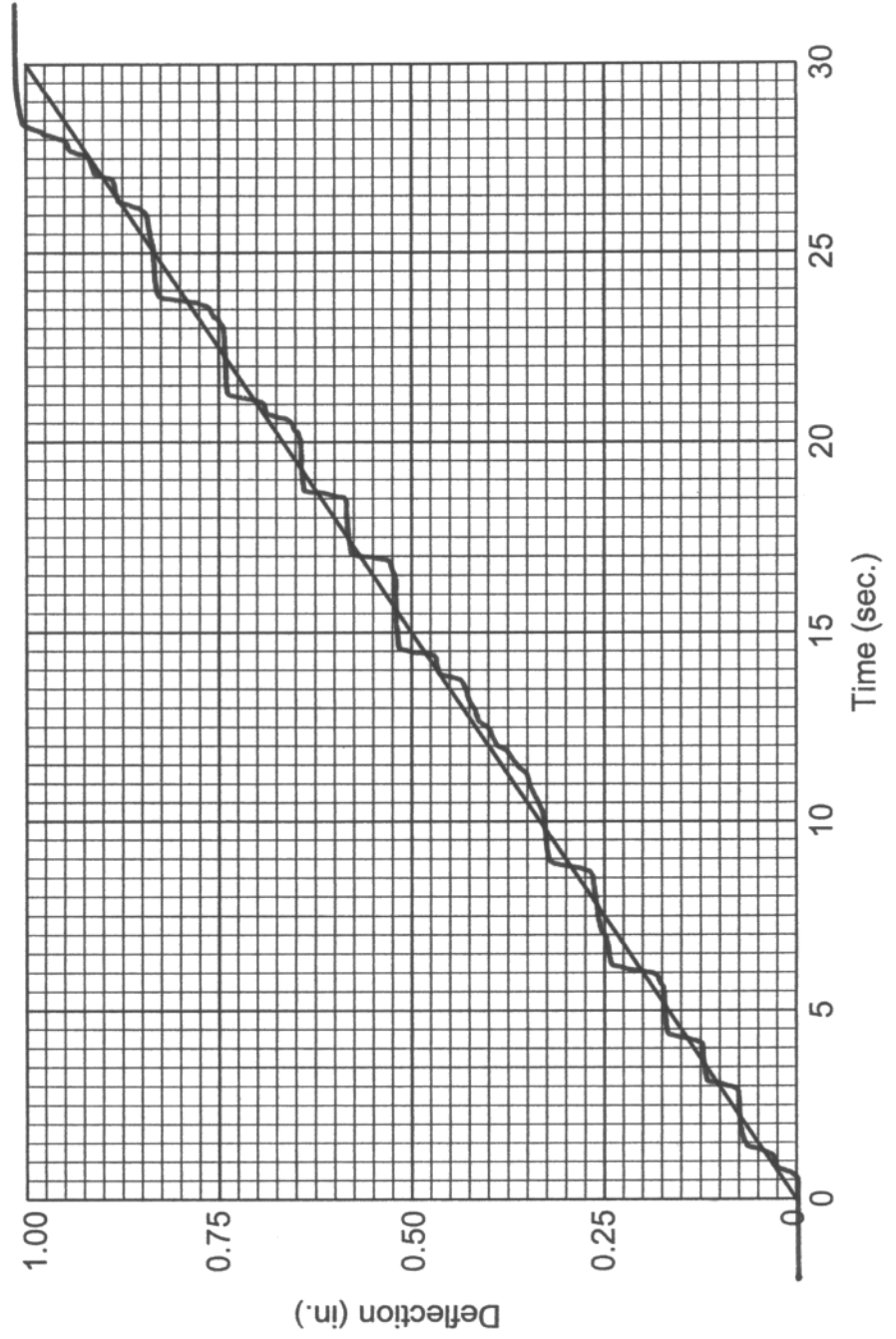
Foam No. 4x24 IG



Compression - Deflection Resistance Test
 Child Seat Foam

Test 08-3-43

Date 8/29/03
 Temp 70°
 Humidity 50%
 Foam No. 41X2A IL



Compression - Deflection Resistance Test Child Seat Foam

Test 08-3-43

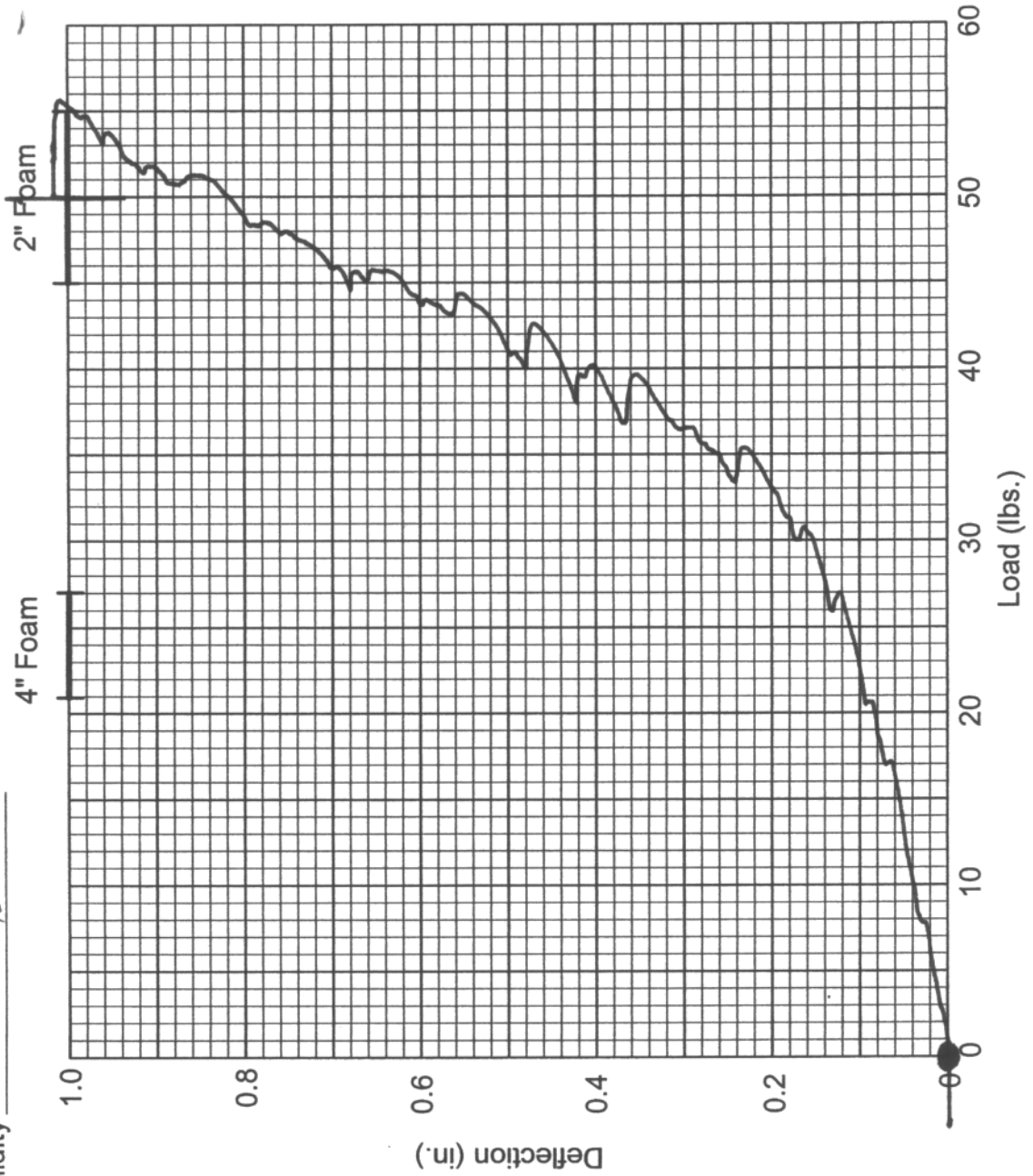
SEAT FOAM USAGE LOG

Foam I.D. Number 4" x 24" I6

Date	Peak Load	Pass/Fail
8/29/03	21.5 LBS	Pass

Date 7/2/03
 Performed By [Signature]
 Temp. 70°
 Humidity 50%

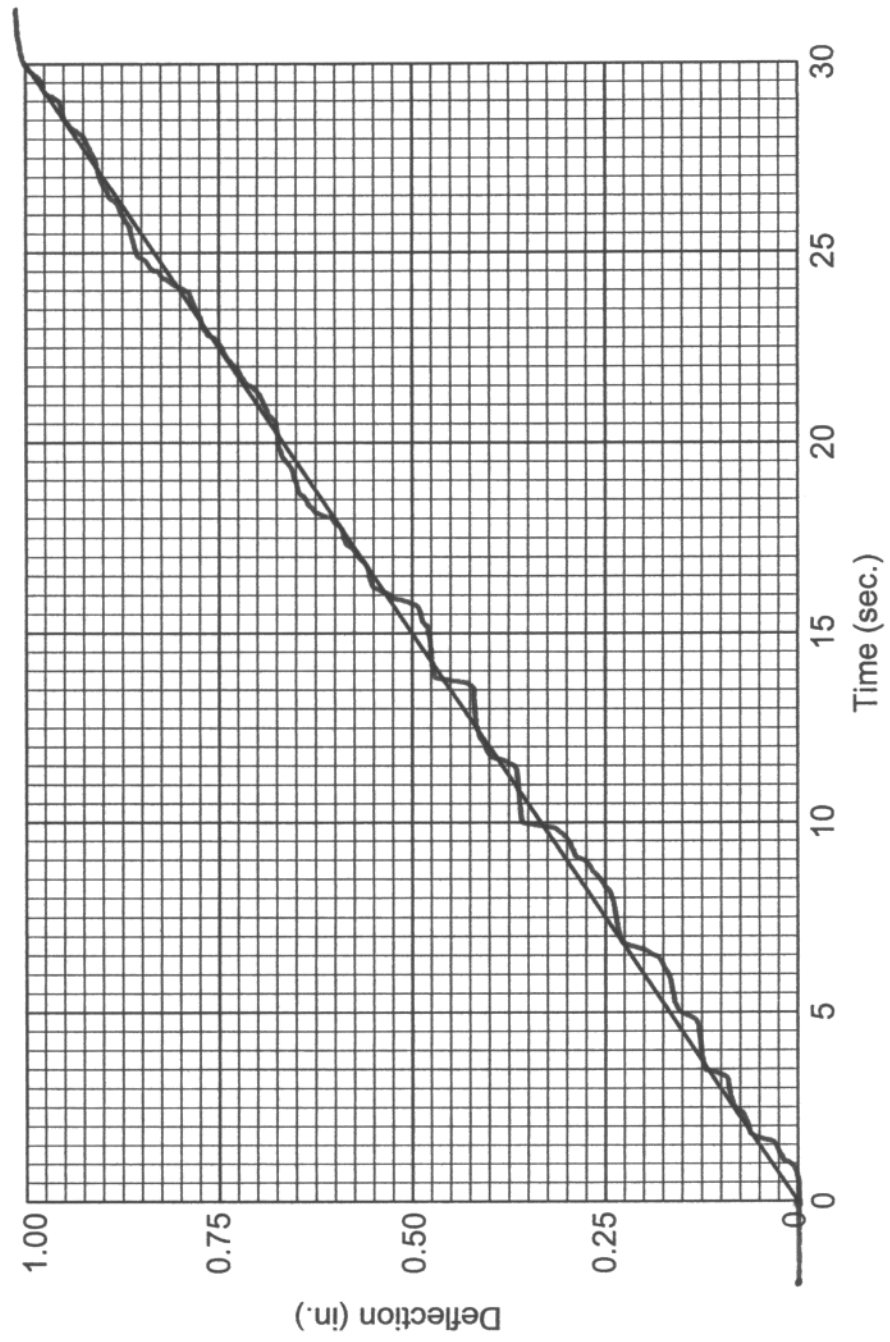
Foam No. 21, 20" 2" x 29" 1" x 4"



Compression - Deflection Resistance Test
 Child Seat Foam

Test 09-3-44

Date 9/2/03
 Temp 70°
 Humidity 60%
 Foam No. 2"x20" 2"x24" I 4



Compression - Deflection Resistance Test Child Seat Foam

Test 09-3-44

SEAT FOAM USAGE LOG

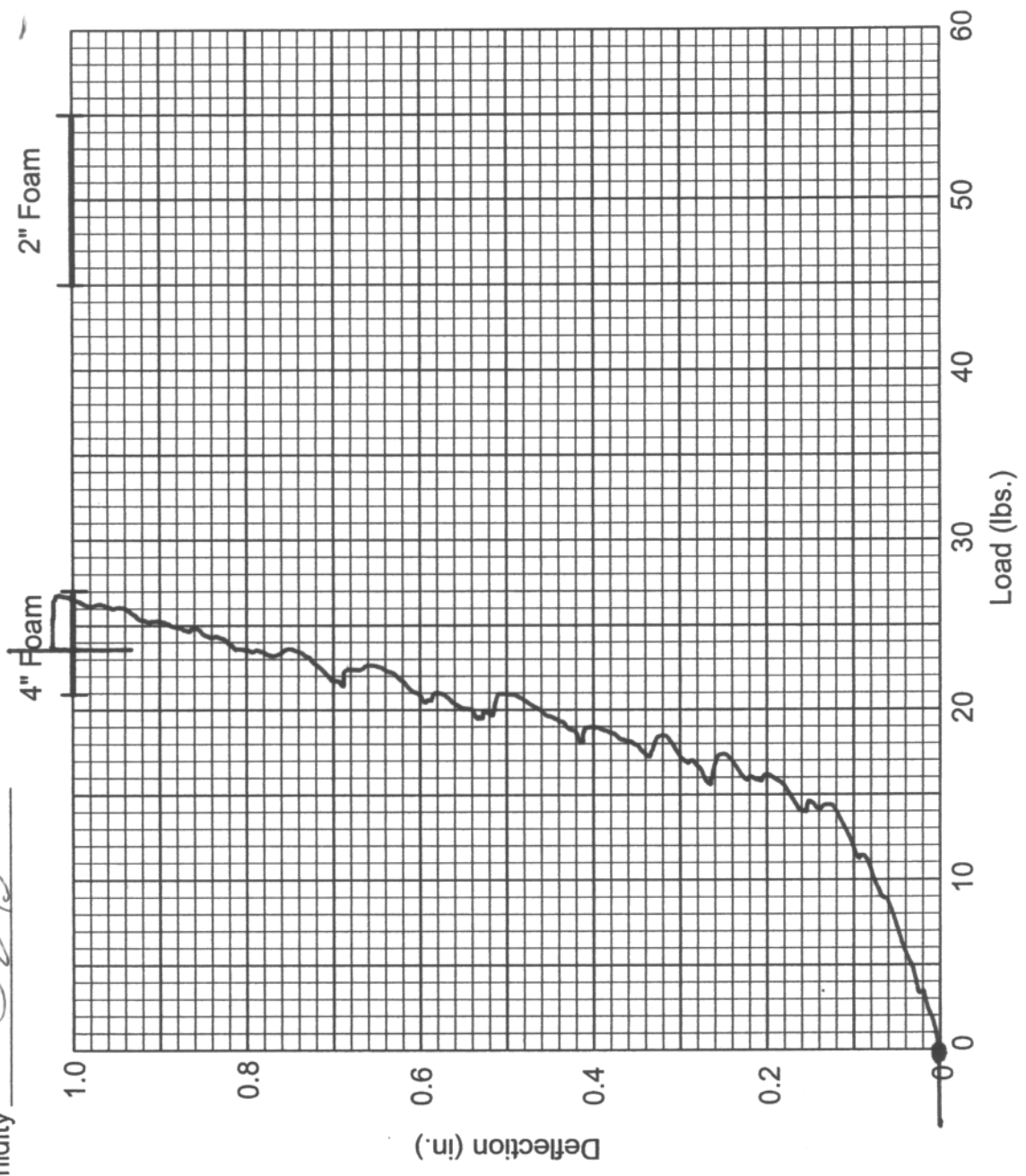
2" x 20" 2 x 24" 727

Foam I.D. Number _____

Date	Peak Load	Pass/Fail
9/2/03	50 LBS	Pass

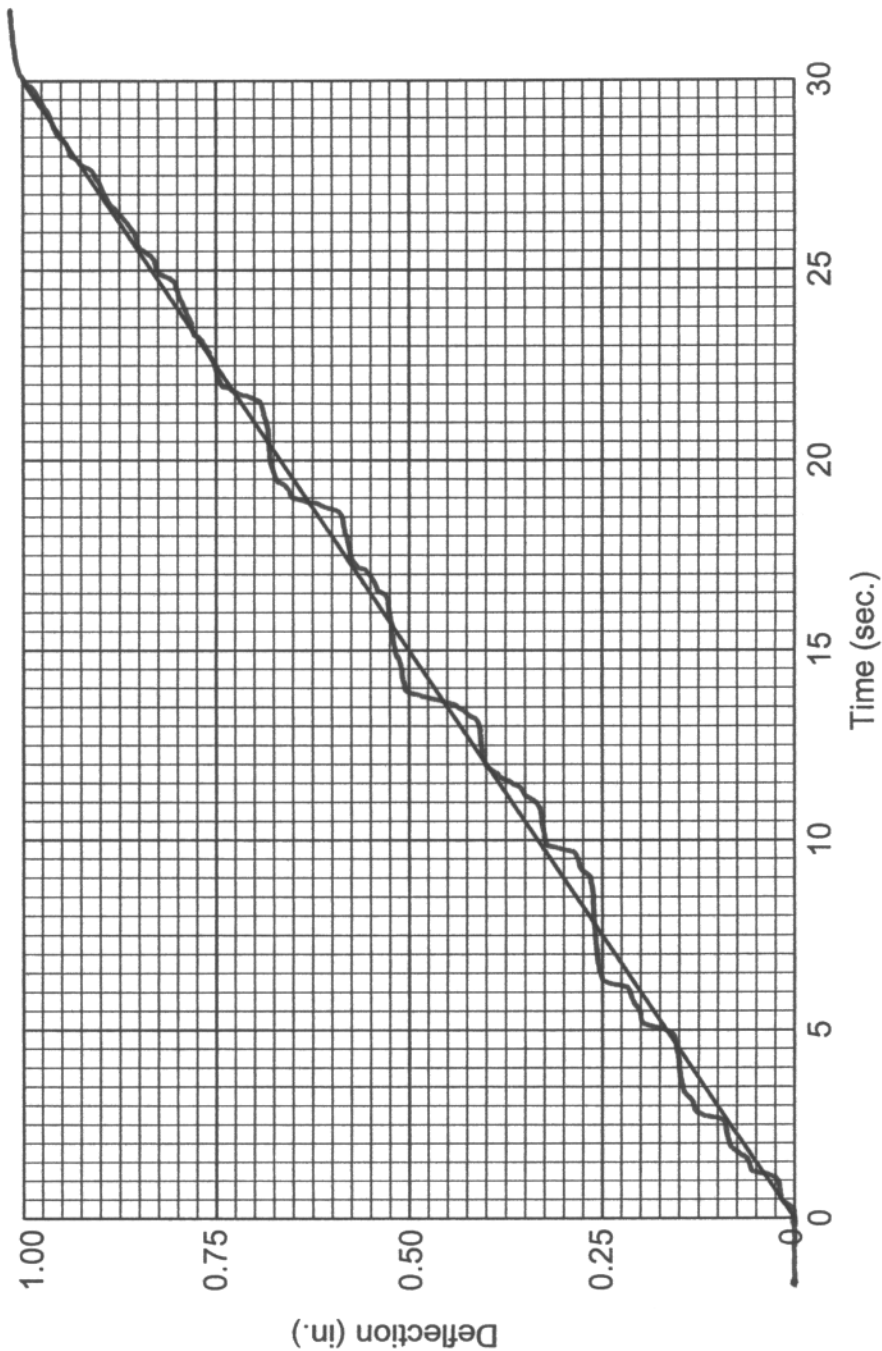
Date 9/2/03
 Performed By [Signature]
 Temp. 70°
 Humidity 50%

Foam No. 4" x 20" I4



Compression - Deflection Resistance Test
 Child Seat Foam
 Test 09-3-44

Date 9/2/03
 Temp 70°
 Humidity 50%
 Foam No. 4" X 20" I4



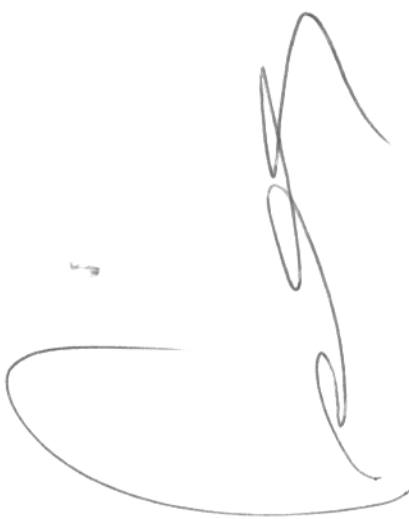
Compression - Deflection Resistance Test Child Seat Foam

Test 09-3-44

SEAT FOAM USAGE LOG

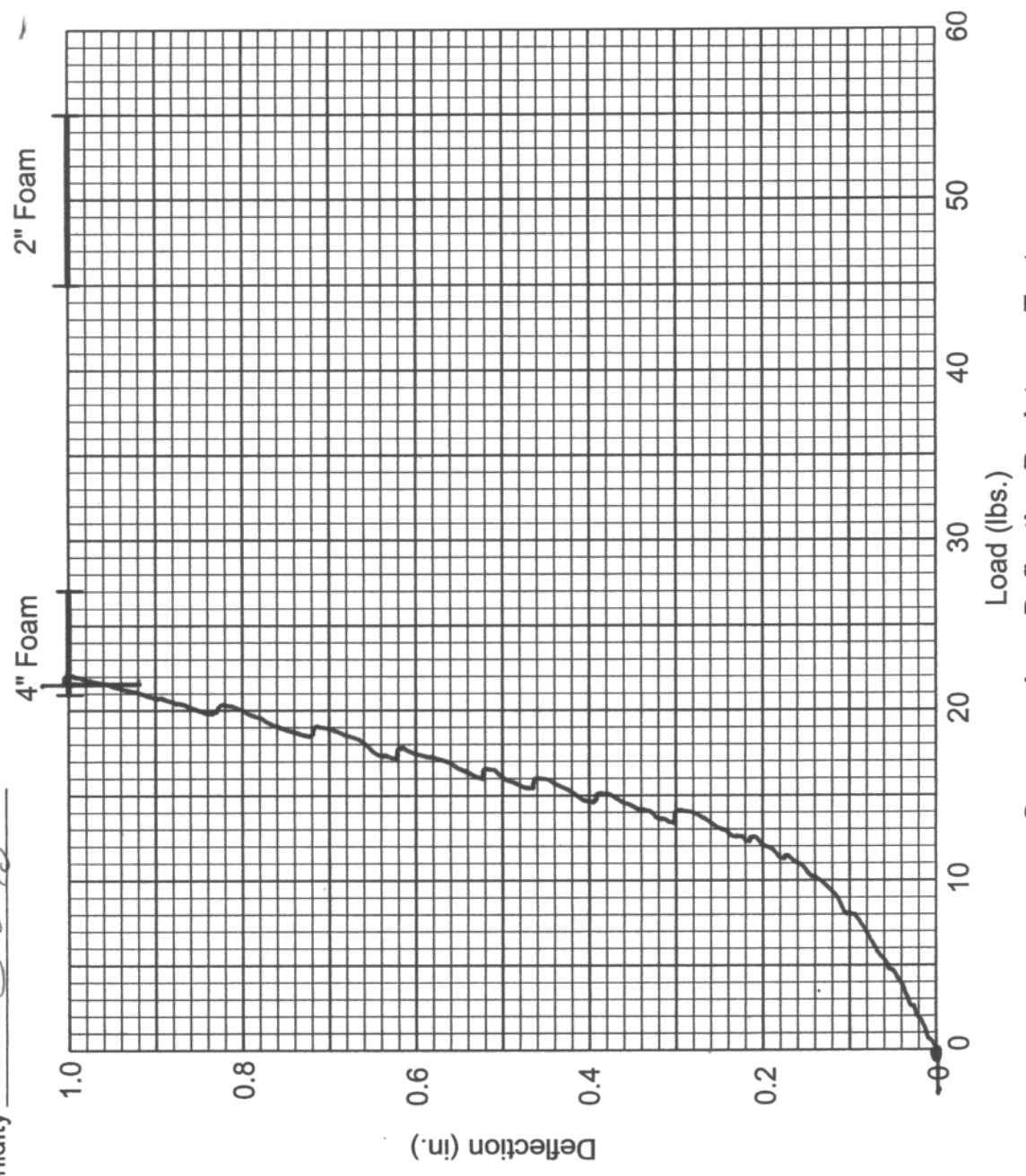
4" x 20" IA

Foam I.D. Number _____

Date	Peak Load	Pass/Fail
9/2/03	23.5 LBS	

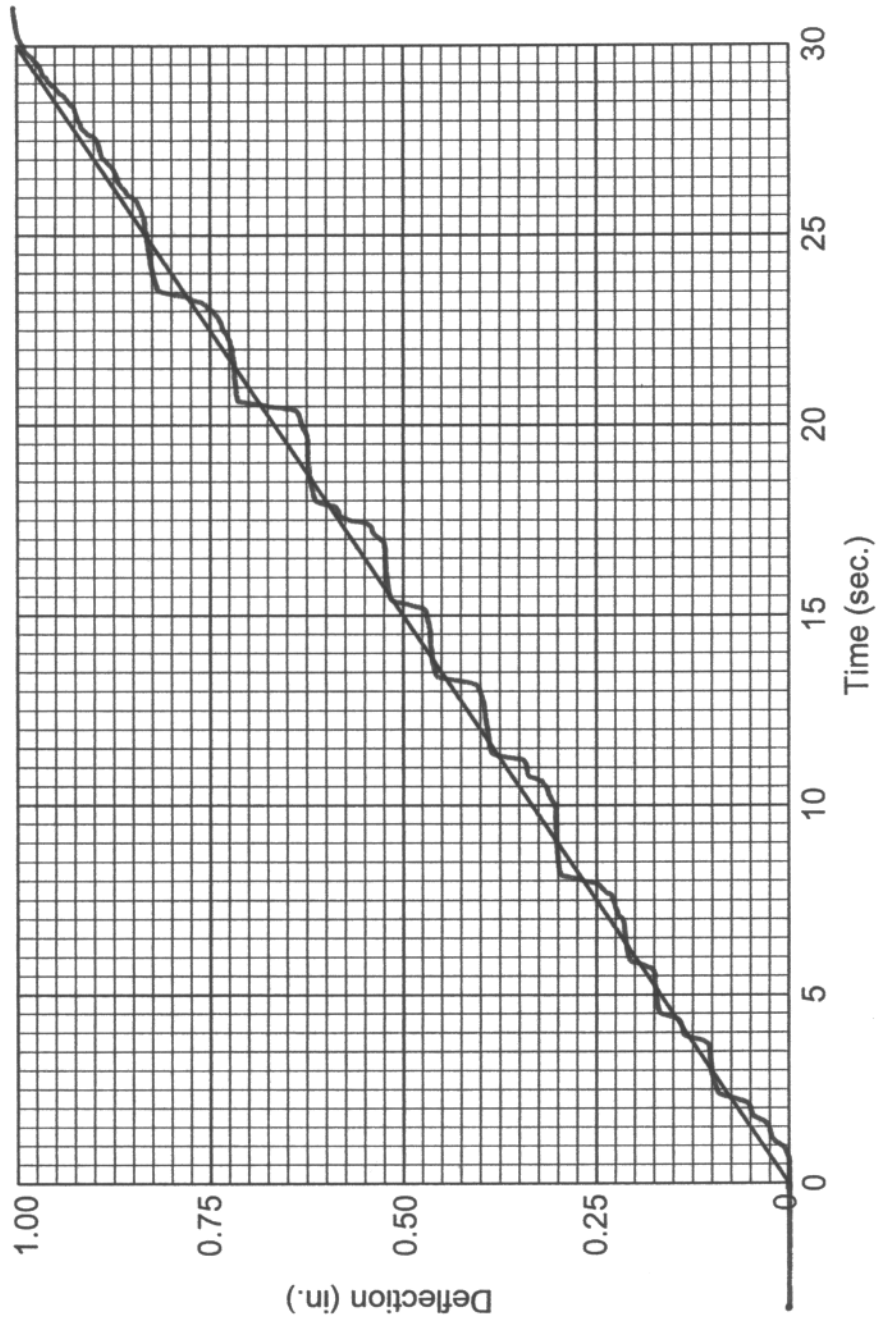
Date 9/2/03
 Performed By [Signature]
 Temp. 70°
 Humidity 50%

Foam No. 4 x 24" I 4



Compression - Deflection Resistance Test
 Child Seat Foam
 Test 09-3-44

Date 9/2/03
 Temp 70°
 Humidity 50%
 Foam No. 4" X 24" ID



Compression - Deflection Resistance Test Child Seat Foam

Test 09-3-44

SEAT FOAM USAGE LOG

" 4 X 24 19

Foam I.D. Number

Date	Peak Load	Pass/Fail
9/2/03	21.5 LBS	

SECTION 10

Child Dummy Calibration Data Traces and Tables

HYIII 3 Year Old Head Drop Test S/N:044

Part 572P Head Drop

Calibration Date:

July 22, 2003

Serial No: 044

Work File:

4001

-----TEST RESULTS-----

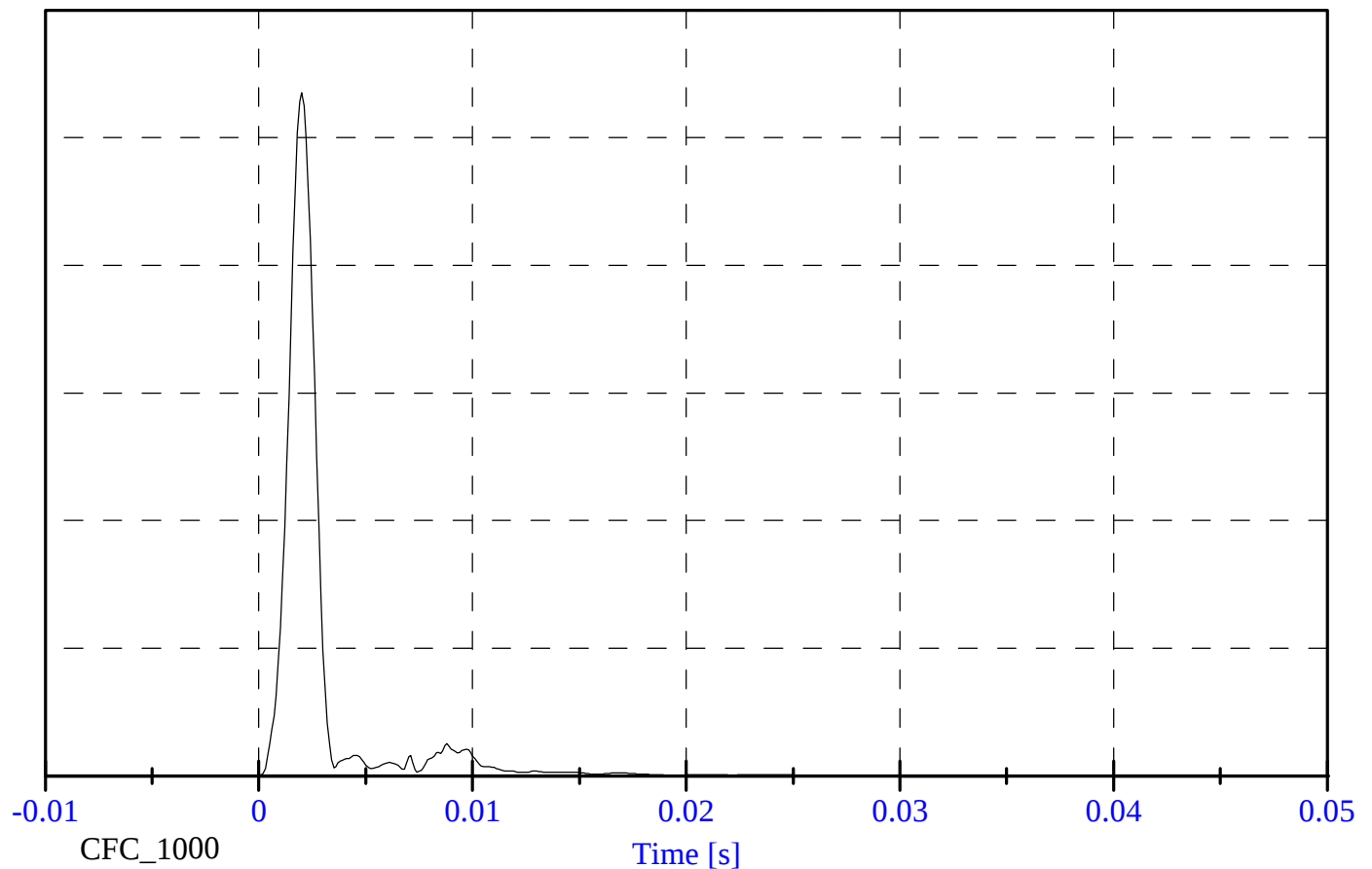
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	66.0-78.0 F	70.0 F	Passed
Lab Humidity:	10-70 %	35.00 %	Passed
Peak Resultant Accel.:	250-280 Gs	267.66 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	5.53 Gs	Passed
Curve PerCent NonModal:	< 10%	6.05 %	Passed

HYIII 3 Year Old Head Drop Test S/N:044

Head Resultant

Max: 267.7 [g] at 0.002 [s]

Min: 0.0 [g] at -0.080 [s]



Hybrid III Head Neck Extention Test S/N:044

Part 572P	Neck Extension Test	Calibration Date:	July 22, 2003
Serial No:	144	Work File:	4001

-----TEST RESULTS-----

<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	69.0-72.0 F	70.00 F	Passed
Lab Humidity:	10-70 %	35.00 %	Passed
Test Pendulum Speed:	11.58-12.38 ft/s	12.30 ft/s	Passed

-----PENDULUM PULSE-----

Pulse at 6 ms:	3.30- 4.60 ft/s	3.89 ft/s	Passed
Pulse at 10 ms:	6.20- 8.20 ft/s	6.94 ft/s	Passed
Pulse at 14 ms:	9.20-11.50 ft/s	9.47 ft/s	Passed

-----D PLANE ROTATION-----

Maximum Rotation:	83.0-93.0 Deg	86.18 Deg	Passed
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-----MOMENT ABOUT THE OCCIPITAL CONDYLE-----

Max Occipital Moment:	-53.30--43.70 N-m	-45.61 N-m	Passed
Occipital Moment Decay:	60.0-80.0 ms	71.60 ms	Passed

Hybrid III 3 Year Old Head Neck Flexion Test S/N:044

Part 572P	Neck Flexion Test	Calibration Date:	July 22, 2003
Serial No:	044	Work File:	4001

-----TEST RESULTS-----

<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.11 C	Passed
Lab Humidity:	10-70 %	36.00 %	Passed
Test Pendulum Speed:	5.40- 5.60 m/s	5.60 m/s	Passed

-----PENDULUM PULSE-----

Pulse at 10 ms:	2.00- 2.70 m/s	2.13 m/s	Passed
Pulse at 15 ms:	3.00- 4.00 m/s	3.10 m/s	Passed
Pulse at 20 ms:	4.00- 5.10 m/s	4.20 m/s	Passed

-----D PLANE ROTATION-----

Maximum Rotation:	70.0-82.0 Deg	81.53 Deg	Passed
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-----MOMENT ABOUT THE OCCIPITAL CONDYLE-----

Max Occipital Moment:	42.00- 53.00 N-m	47.85 N-m	Passed
Occipital Moment Decay:	60.0-80.0 ms	74.00 ms	Passed

Hybrid III 3 Year Old Thorax Test S/N:044

Part 572P Thorax Impact

Calibration Date:

July 22, 2003

Serial No: 044

Work File:

4001

-----TEST RESULTS-----

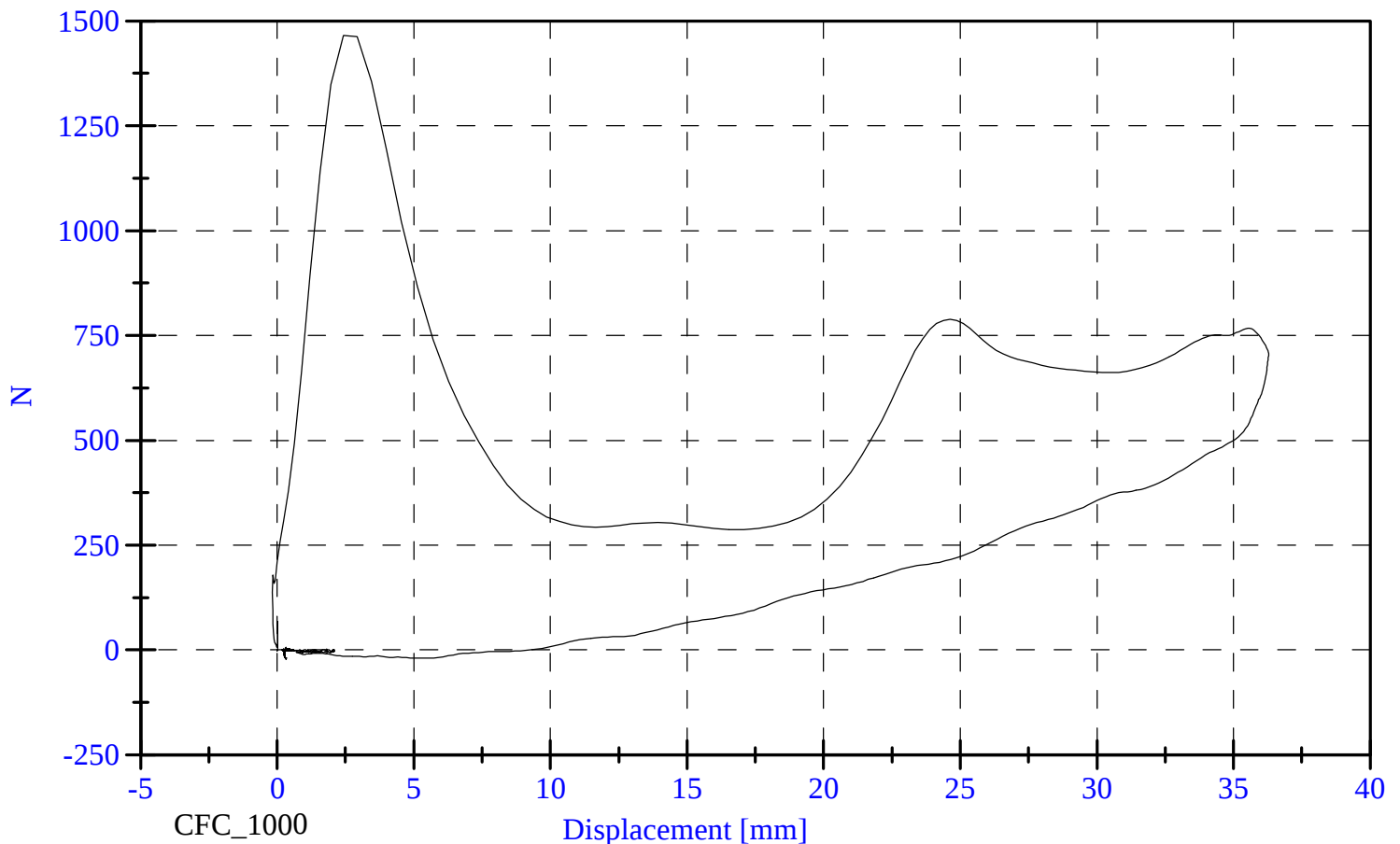
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.1 C	Passed
Lab Humidity:	10-70 %	36.00 %	Passed
Pendulum Velocity:	5.90- 6.10 m/s	6.08 m/s	Passed
Maximum Deflection:	32.00-38.00 mm	36.28 mm	Passed
Maximum Res. Force:	680.00- 810.00 N	767.48 N	Passed
Internal Hysteresis:	65-85 %	73.20 %	Passed
Pass Sternum Force Criteria?:	860.00 N	788.71	Passed

Hybrid III 3 Year Old Thorax Test S/N:044

Probe Force vs. Displacement

Max: 1465.5 [N] at 2.421 [mm]

Min: -21.7 [N] at 0.325 [mm]



SECTION 11

Test Equipment and Instrumentation Calibration

Calibrations for Test 08-3-43 and 09-3-44

SHORTNAME	SENSCOM	CALDATE
Sled Ax	MFG: ENDEVCO S/N: 10301	6/23/2003
P6 HDCG Ax	MFG: ENDEVCO S/N: P17912	7/17/2003
P6 HDCG Ay	MFG: ENDEVCO S/N: P17743	7/17/2003
P6 HDCG Az	MFG: ENDEVCO S/N: P17743	10/5/2001
P6 HDCG Az	MFG: ENDEVCO S/N: P17743	10/5/2001
P6 HDCG Az	MFG: ENDEVCO S/N: P15319	6/26/2003
P6 HDCG RAz	MFG: ENDEVCO S/N: P16279	6/25/2003
P6 CHST Ax	MFG: ENDEVCO S/N: P15334	7/17/2003
P6 CHST Ay	MFG: ENDEVCO S/N: P15321	7/17/2003
P6 CHST Az	MFG: ENDEVCO S/N: P17758	7/17/2003
P6 CHST Dx	MFG: SERVO S/N: 044	7/22/2003
P6 PVCN Ax	MFG: ENDEVCO S/N: P16755	7/17/2003
P6 PVCN Ay	MFG: ENDEVCO S/N: P15591	7/17/2003
P6 PVCN Az	MFG: ENDEVCO S/N: P16155	7/17/2003
P6 NEKU Fx	MFG: Denton S/N: 248-FX	7/18/2003
P6 NEKU Fy	MFG: Denton S/N: 248-FY	7/18/2003
P6 NEKU Fz	MFG: Denton S/N: 248-FZ	7/18/2003
P6 NEKU Mx	MFG: Denton S/N: 248-MX	7/18/2003
P6 NEKU My	MFG: Denton S/N: 248-MY	7/18/2003
P6 NEKU Mz	MFG: Denton S/N: 248-MZ	7/18/2003
P6 NEKL Fx	MFG: Denton S/N: 249Fx	7/18/2003
P6 NEKL Fy	MFG: Denton S/N: 249Fy	7/18/2003
P6 NEKL Fz	MFG: Denton S/N: 249Fz	7/18/2003
P6 NEKL Mx	MFG: Denton S/N: 249Mx	7/18/2003
P6 NEKL My	MFG: Denton S/N: 249My	7/18/2003
P6 NEKL Mz	MFG: Denton S/N: 249Mz	7/18/2003

SECTION 12

Link to High Speed Movies

Test 08-3-43 North View

Test 08-3-43 South View

SECTION 12 continued

[Link to High Speed Movies](#)

Test 09-3-44 North View

Test 09-3-44 South View