

**REPORT NUMBER: 8708-SLEDNCAP-02**

**CHILD RESTRAINT SYSTEM IN  
DYNAMIC SLED TEST  
EVENFLO EXPRESS**

**TEST NUMBER: 07-3-02**

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



**July 30<sup>th</sup> , 2003**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
OFFICE OF CRASHWORTHINESS STANDARDS  
400 SEVENTH STREET, SW, ROOM 5311  
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-01-D-32005

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Manager, New Car Assessment Program

\_\_\_\_\_  
Date of Acceptance

\_\_\_\_\_  
COTR, NCAP Frontal Impact Program

\_\_\_\_\_  
Date of Acceptance

## TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Child Restraint Systems in Dynamic Sled Test – Evenflo Express		5. Report Date July 30 <sup>th</sup> , 2003	
		6. Performing Organization Code	
7. Author David P. Roberts		8. Performing Organization Report No. 8708-SLEDNCAP-02	
9. Performing Organization Name and Address Veridian Engineering 4455 Genesee Street Buffalo, NY 14225		10. Work Unit No.	
		11. Contract or Grant No. DTNH22-97- D-32005	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh St , S.W. Washington, DC 20590		13. Type of Report and Period Covered Final Report July 2003 – November 2003	
		14. Sponsoring Agency Code	
15. Supplementary Notes Reviewed by: _____ Program Manager Approved by: _____ Head, Occupant Protection & Safety Research Section, Transportation Sciences Center			
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, on the Evenflo Express.			
17. Key Words FMVSS 213 Child Restraint Systems Indicant Compliance Testing		18. Distribution Statement	
19. Security Classif. (of this report) <b>UNCLASSIFIED</b>	20. Security Classif. (of this page) <b>UNCLASSIFIED</b>	21. No. of Pages	22. Price

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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

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

The test was conducted at Veridian Engineering on July 30<sup>th</sup>, 2003 at a speed of 46.1 kph (28.6 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.

The Pelvic Z accelerometer is not accurate after 80 milliseconds

## SECTION 2

### CHILD RESTRAINT INFORMATION

Test No.: 07-3-02

Test Date: July 30<sup>th</sup>, 2003

Child Restraint Type (forward-facing, rearward facing, booster)	FORWARD FACING
LATCH or NON-LATCH	LATCH
Harness Type	5 POINT
Child Restraint Manufacturer	EVENFLO
Child Restraint Model	EXPRESS
Model Number	3182198P1
Date of Manufacture	2/24/2003
Child Restraint Age Limits	AT LEAST 1 YEAR OLD
Child Restraint Weight Limits (kg)	9-36
Weight of Child Restraint (kg)	3.9

**SECTION 3**

**POST-TEST OBSERVATIONS**

Test No.: 07-3-02

Test Date: July 30<sup>th</sup>, 2003

Child Seat	EVENFLO EXPRESS
Belt Fraying	NONE
Stress Marks	NONE
Cracks	NONE
Buckle Stress	NONE
Latch Hooks	NONE
Max. Head Excursion (mm)	503
Max. Knee Excursion (mm)	635
Velocity	46.1
Acceleration (G's)	23.1

## SECTION 4

### HYBRID III 3 YEAR OLD ATD INJURY CRITERIA AND SENSOR DATA

Test No.: 07-3-02

Test Date: July 30<sup>th</sup>, 2003

#### HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Head CG	X	G's	51.9	176.6	-45.9	71.6
Head CG	Y	G's	7.1	176.8	-2.3	111.9
Head CG	Z	G's	43.3	61.5	-0.9	201.0
Head CG Resultant	N/A	G's	58.2	71.5		

#### CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Chest CG	X	G's	19.1	160.2	-37.4	44.6
Chest CG	Y	G's	5.3	45.6	-3.9	74.7
Chest CG	Z	G's	11.0	184.2	-32.9	56.2
Chest CG Resultant	N/A	G's	48.4	56.1		

#### SEAT BELT SENSOR PEAK VALUES

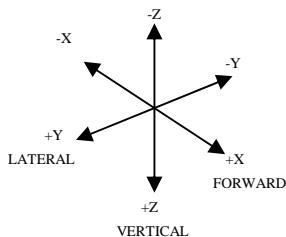
Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Tether Belt	N/A	Newtons	NA	NA		

#### HEAD INJURY CRITERIA (HIC)

Location	P6 (Center) Rear Passenger			
	HIC	Avg. G's	T <sup>1</sup>	T <sup>2</sup>
Head CG Primary (36 msec)	542.7	46.9	52.9	88.9
Head CG Primary (15 msec)	331.3	54.7	61.4	76.4

#### CHEST CLIP (3 MSEC)

Location	P6 (Center) Rear Passenger		
	Clip	T <sup>1</sup>	T <sup>2</sup>
Chest CG Primary	47.4	54.8	58.2



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

Test No.: 07-3-02

Test Date: July 30<sup>th</sup>, 2003

**PELVIC PEAK ACCELERATIONS**

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Pelvis	X	G's	8.0	157.0	-46.0	56.1
Pelvis	Y	G's	3.6	172.3	-8.2	77.9
Pelvis	Z	G's	N/A	N/A	N/A	N/A

**UPPER NECK PEAK FORCES AND MOMENTS**

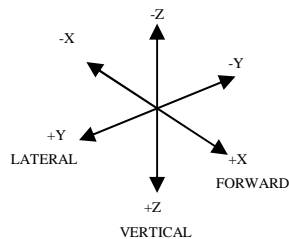
Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Neck Force	X	Newtons	194.2	164.3	-1238.5	71.3
Neck Force	Y	Newtons	73.4	55.1	-61.7	187.9
Neck Force	Z	Newtons	2200.0	71.2	-19.2	29.4
Neck Moment	X	Nm	5.5	61.7	-3.6	118.6
Neck Moment	Y	Nm	8.7	163.7	-22.6	73.4
Neck Moment	Z	Nm	2.1	212.5	-1.7	88.7

**LOWER NECK PEAK FORCES AND MOMENTS**

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Neck Force	X	Newtons	305.3	178.5	-1157.5	72.2
Neck Force	Y	Newtons	99.8	76.0	-73.4	104.0
Neck Force	Z	Newtons	797.1	178.8	-25.0	20.3
Neck Moment	X	Nm	13.4	59.2	-8.6	120.8
Neck Moment	Y	Nm	155.9	70.8	-18.2	177.7
Neck Moment	Z	Nm	4.7	59.4	-5.5	75.7

**CHEST PEAK DISPLACEMENTS**

Location	Axis	Units	P6 (Center) Rear Passenger			
			Max	Time	Min	Time
Chest CG	X	mm	0.0	-0.5	-20.5	84.3



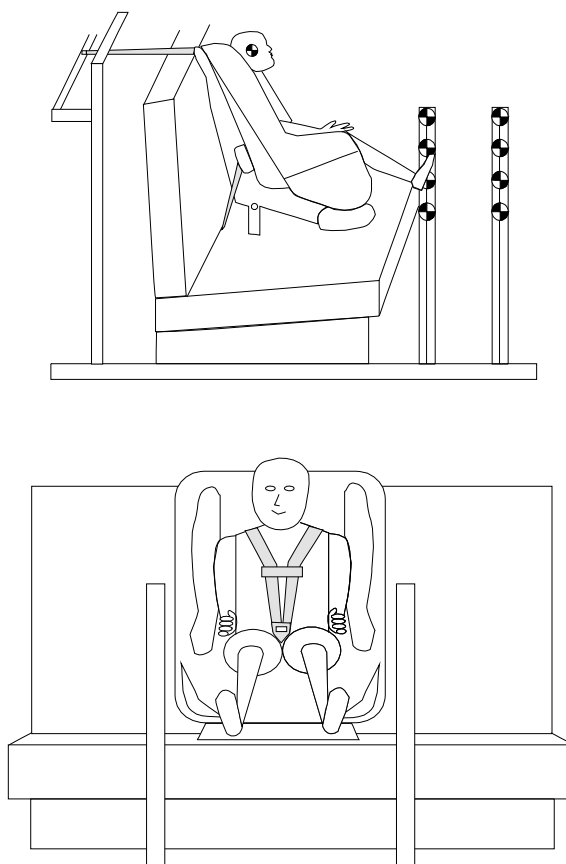
**SECTION 5**  
**SLED TEST SET-UP**

Test No.: 07-3-02

Test Date: July 30<sup>th</sup>, 2003

An FMVSS 213 test bench was fixtured 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



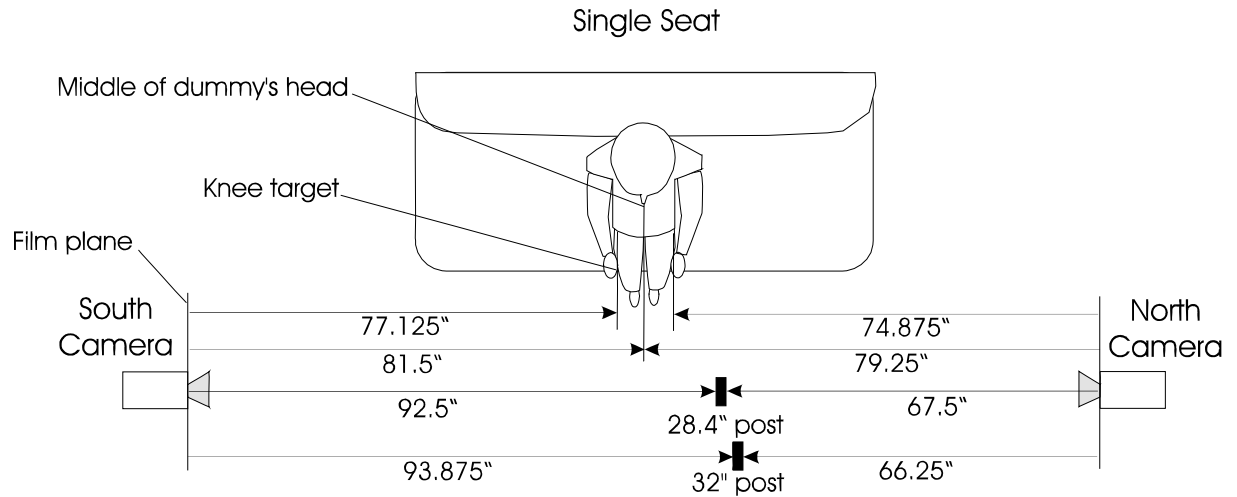
**SECTION 6**

## CAMERA LOCATION

Test No.: 07-3-02

Test Date: July 30<sup>th</sup>, 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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Photo 4 – Pre-Test Left Side View and Post-Test Left Side View	12



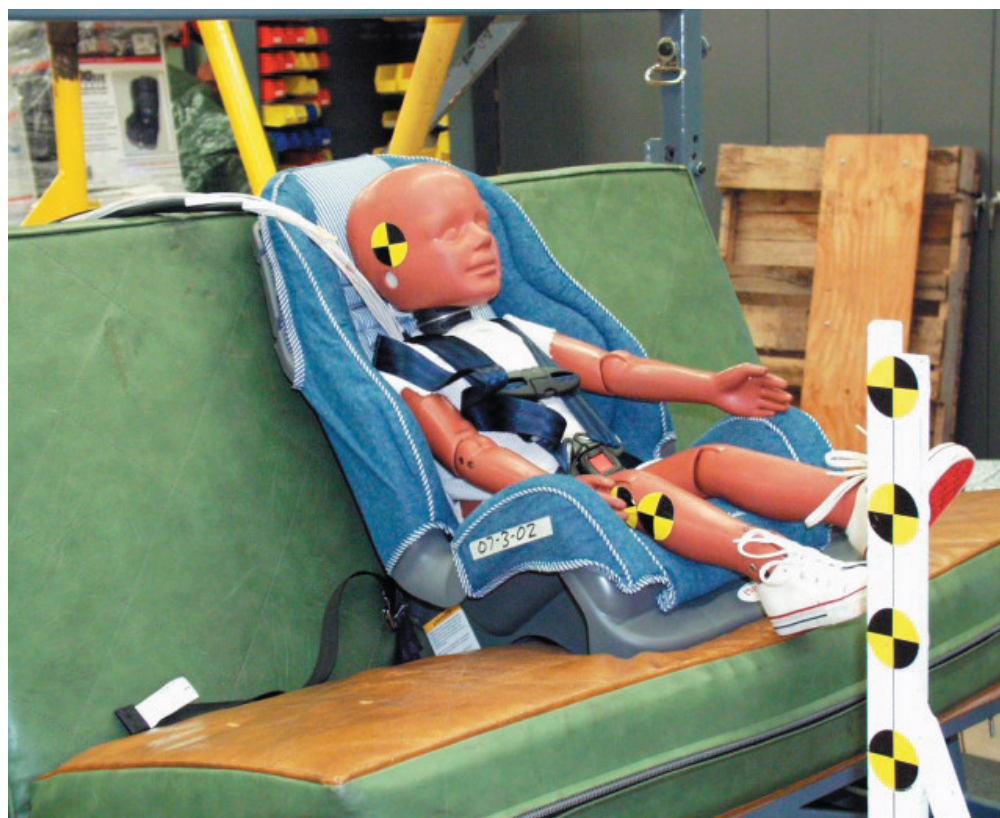
Pre Test Right Side View



Post Test Right Side View



Pre Test Right Front View



Post Test Right Front View



Pre Test Left Front View



Post Test Left Front View



Pre Test Left Side View



Post Test Left Side View

## **SECTION 8**

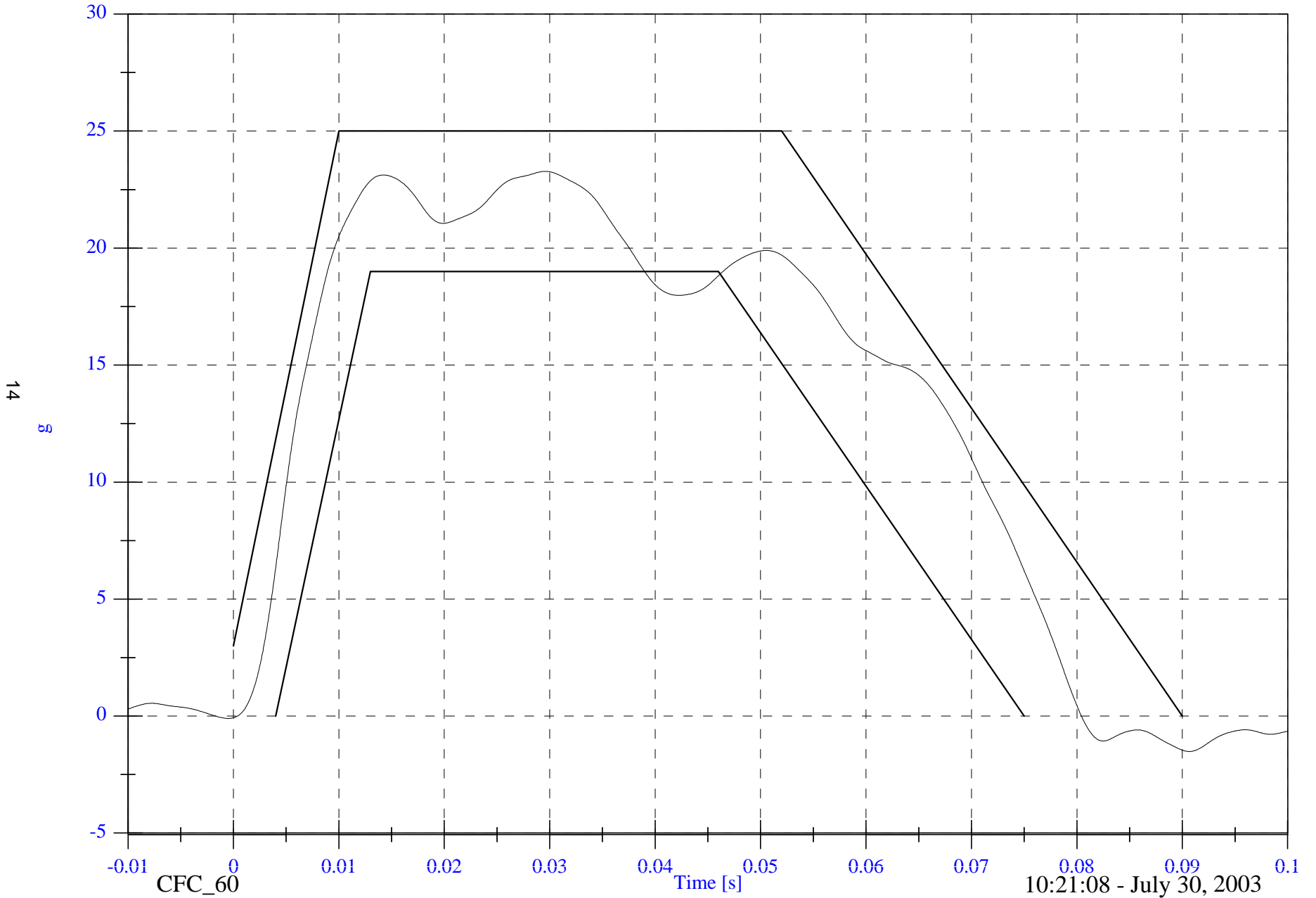
### **Data Plots**

Sled Test NCAP SLED 07-3-02

Sled Pulse Corridor

Max: 23.1 [g] at 0.030 [s]

Min: -1.8 [g] at 1.249 [s]



FACILITY: HYGE SLED  
 TEST#: 07-3-02  
 TITLE: Sled Test NCAP 07-3-02

DATE: July 30, 2003

CHN	NAME	Unit	Max	msec	Min	msec	Filt	Comment
26	Sled Acceleration	g	23.1	29.5	-1.7	90.6	CFC_60	
27	Sled Acceleration Velocity	kph	46.1	80.3	-0.1	-9.8	CFC_180	
28	Sled Acceleration Displacement	mm	2621.9	249.9	-0.0	-0.4	CFC_180	
29	P6 Head x	g	51.9	176.6	-45.9	71.6	CFC_1000	
30	P6 Head y	g	7.1	176.8	-2.3	111.9	CFC_1000	
31	P6 Head z	g	43.3	61.5	-0.9	201.0	CFC_1000	
32	P6 Head Red z	g	68.2	67.8	-40.5	176.5	CFC_1000	
33	P6 Upper Neck Fx	N	194.2	164.3	-1238.5	71.3	CFC_1000	
34	P6 Upper Neck Fy	N	73.4	55.1	-61.7	187.9	CFC_1000	
35	P6 Upper Neck Fz	N	2200.0	71.2	-19.2	29.4	CFC_1000	
36	P6 Upper Neck F Resultant	N	2524.6	71.2	0.2	-5.2	CFC_1000	
37	P6 Upper Neck Mx	N-m	5.5	61.7	-3.6	118.6	CFC_600	
38	P6 Upper Neck My	N-m	8.7	163.7	-22.6	73.4	CFC_600	
39	P6 Upper Neck Mz	N-m	2.1	212.5	-1.7	88.7	CFC_600	
40	P6 Upper Neck M Resultant	N-m	22.9	74.3	0.0	-13.7	CFC_600	
41	P6 Lower Neck Fx	N	305.3	178.5	-1157.5	72.2	CFC_1000	
42	P6 Lower Neck Fy	N	99.8	76.0	-73.4	104.0	CFC_1000	
43	P6 Lower Neck Fz	N	797.1	178.8	-25.0	20.3	CFC_1000	
44	P6 Lower Neck F Resultant	N	1262.1	75.1	0.1	-12.6	CFC_1000	
45	P6 Lower Neck Mx	N-m	13.4	59.2	-8.6	120.8	CFC_600	
46	P6 Lower Neck My	N-m	155.9	70.8	-18.2	177.7	CFC_600	
47	P6 Lower Neck Mz	N-m	4.7	59.4	-5.5	75.7	CFC_600	
48	P6 Lower Neck M Resultant	N-m	156.0	70.8	0.0	-8.0	CFC_600	
49	P6 Chest x	g	19.1	160.2	-37.4	44.6	CFC_180	
50	P6 Chest y	g	5.3	45.6	-3.9	74.7	CFC_180	
51	P6 Chest z	g	11.0	184.2	-32.9	56.2	CFC_180	
52	P6 Chest Resultant	g	48.4	56.1	0.0	-11.3	CFC_180	
53	P6 Pelvic x	g	8.0	157.0	-46.0	56.1	CFC_1000	
54	P6 Pelvic y	g	3.6	172.3	-8.2	77.9	CFC_1000	
55	P6 Pelvic z	g	355.0	249.9	-42.5	80.3	CFC_1000	
56	P6 Pelvic Resultant	g	355.0	249.9	0.0	-8.2	CFC_1000	
57	P6 Head Resultant	g	58.2	71.5	0.0	-14.8	CFC_1000	
58	P6 Chest Compression	mm	0.0	-0.5	-20.5	84.3	CFC_600	
59	P6 Upper Neck Mocy	N-m	8.7	163.7	-22.6	73.4	CFC_600	

FACILITY: HYGE SLED  
TEST#: 07-3-02  
TITLE: Sled Test NCAP 07-3-02  
Version 5.00

DATE: July 30, 2003

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P6 HIC(36 ms): 542.7  
t1: 52.9 msec  
t2: 88.9 msec  
Duration: 36.0 msec  
Average Acceleration: 46.9 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: 194.2 N 164.3 msec  
Min: -1238.5 N 71.3 msec  
Input channel: P6 Upper Neck Fx (6) CFC\_1000

P6 UP NECK Fz: Max: 2200.0 N 71.2 msec  
Min: -19.2 N 29.4 msec  
Input channel: P6 Upper Neck Fz (8) CFC\_1000

P6 UP NECK MocY (3YO Child OOP)  
Max: 8.7 N-m 163.7 msec  
Min: -22.6 N-m 73.4 msec  
Input channels: P6 Upper Neck Fx (6) CFC\_600  
P6 Upper Neck My (10) CFC\_600  
Docy: 0

P6 UP NECK Nij (3YO Child OOP)  
Ntf: 0.33 Nij 164.3 msec CVt: 2120 CVf: 68  
Nte: 1.85 Nij 72.4 msec CVt: 2120 CVe: 27  
Ncf: 0.00 Nij 3.9 msec CVc: 2120 CVf: 68  
Nce: 0.09 Nij 35.2 msec CVc: 2120 CVe: 27  
Input channels: P6 Upper Neck Fz (8) CFC\_600  
P6 Upper Neck MocY [N-m, CFC\_600] (55)

FACILITY: HYGE SLED  
TEST#: 07-3-02  
TITLE: Sled Test NCAP 07-3-02  
Version 5.00

DATE: July 30, 2003

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P6 CLIP(3 ms): 47.4 g  
t1: 54.8 msec  
t2: 58.2 msec  
Duration: 3.4 msec

P6 CSI: 399.0  
Input channels: P6 Chest x (18) CFC\_180  
P6 Chest y (19) CFC\_180  
P6 Chest z (20) CFC\_180

P6 CHEST DISP: Max: 0.0 mm -0.5 msec  
Min: -20.5 mm 84.3 msec  
Input channel: P6 Chest Compression (21) CFC\_600

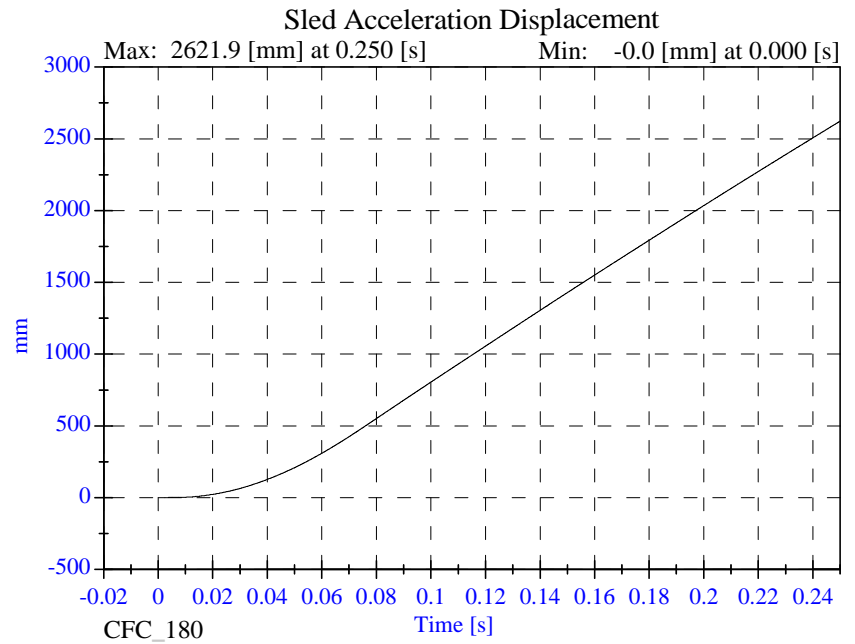
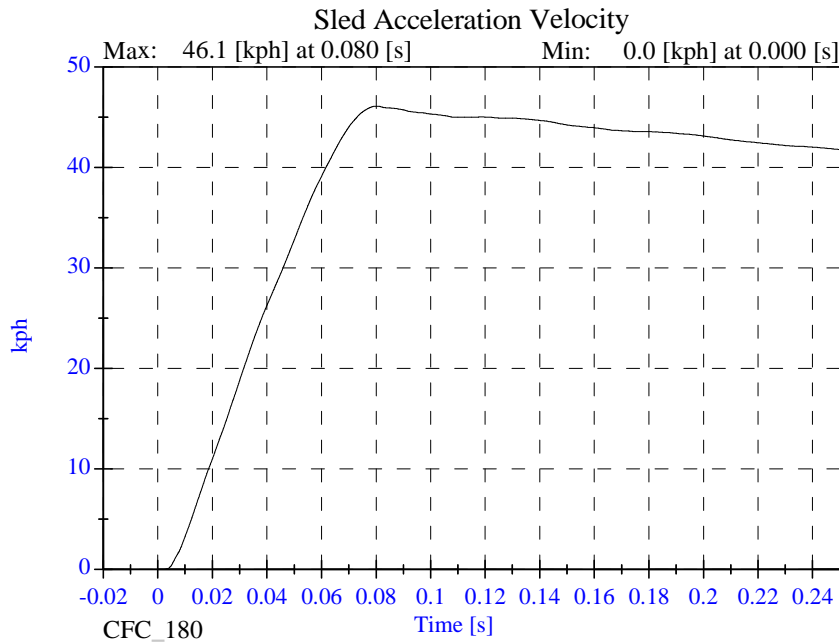
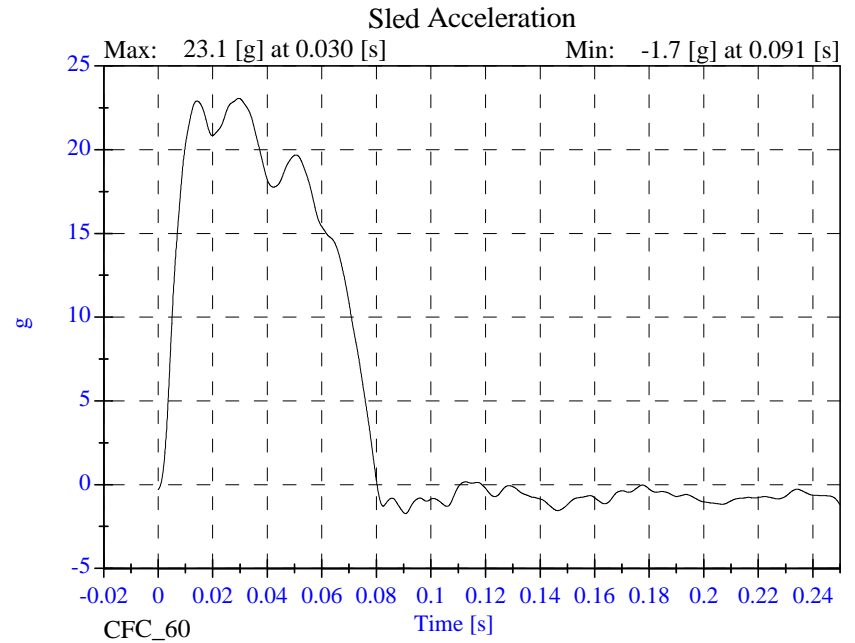
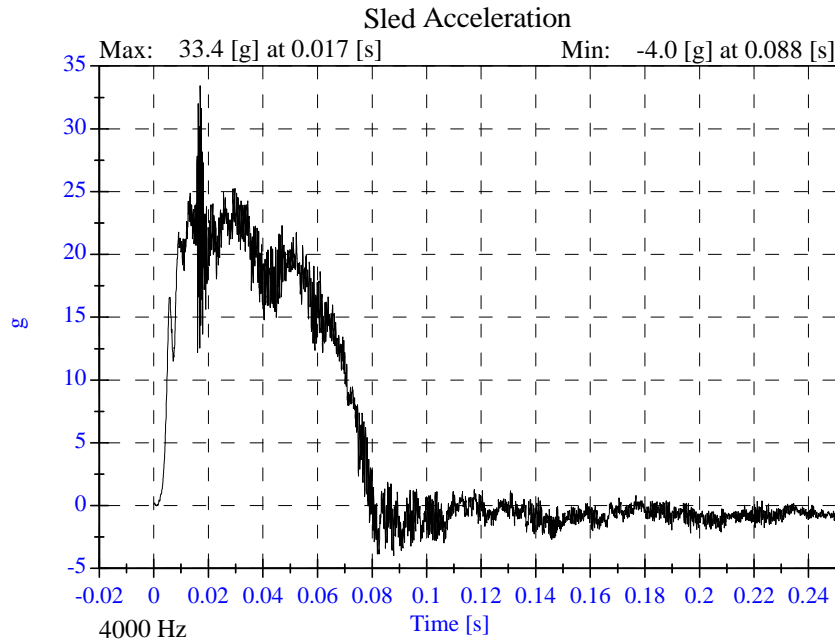
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P6 HIC(15 ms): 331.3  
t1: 61.4 msec  
t2: 76.4 msec  
Duration: 15.0 msec  
Average Acceleration: 54.7 g  
Input channels: P6 Head x (2) CFC\_1000  
P6 Head y (3) CFC\_1000  
P6 Head z (4) CFC\_1000

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# Sled Test NCAP 07-3-02

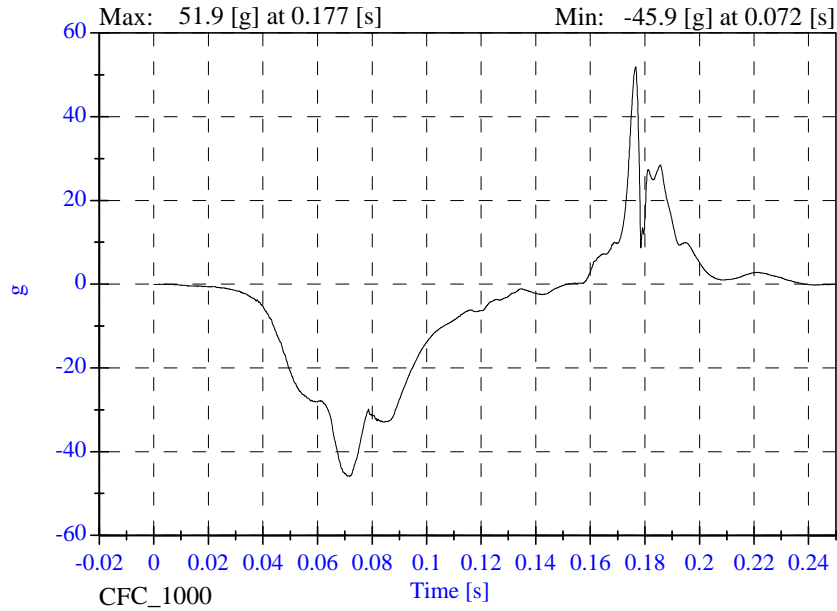
- July 30, 2003



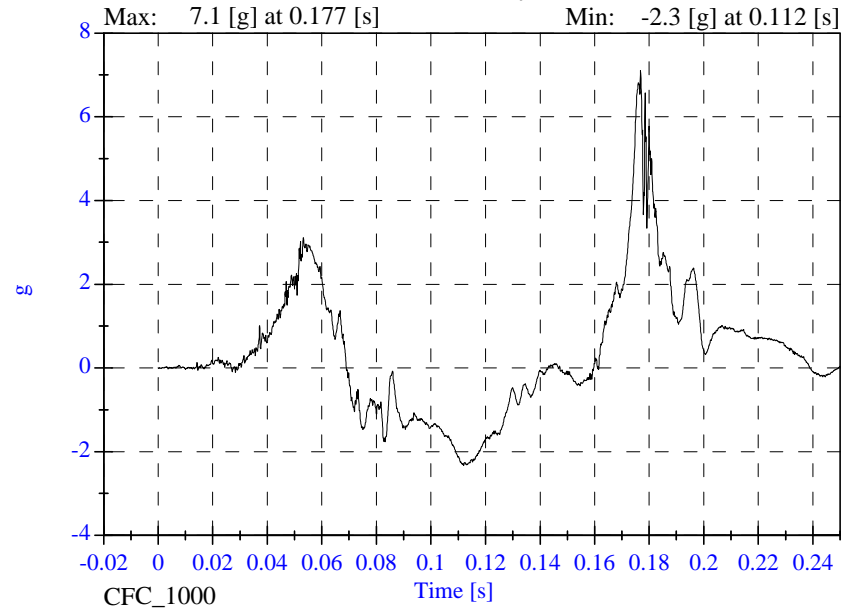
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- July 30, 2003

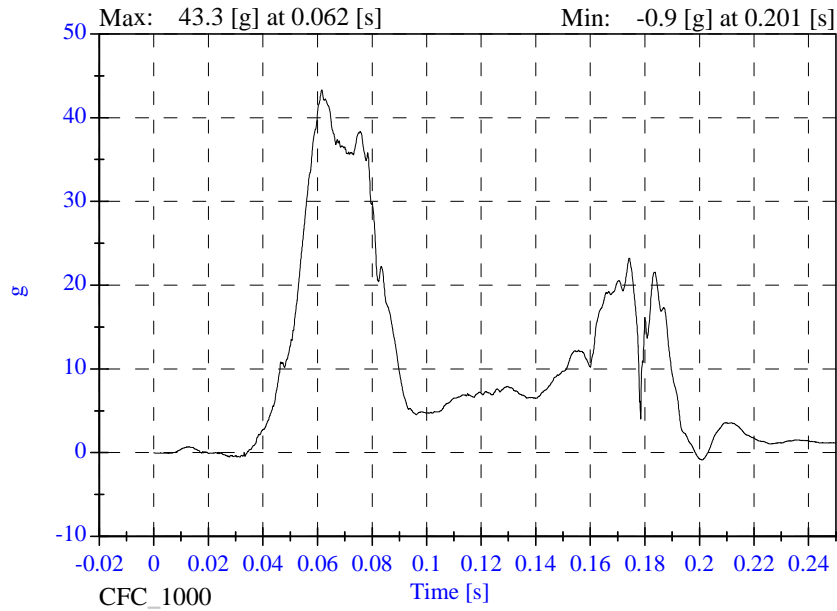
### P6 Head x



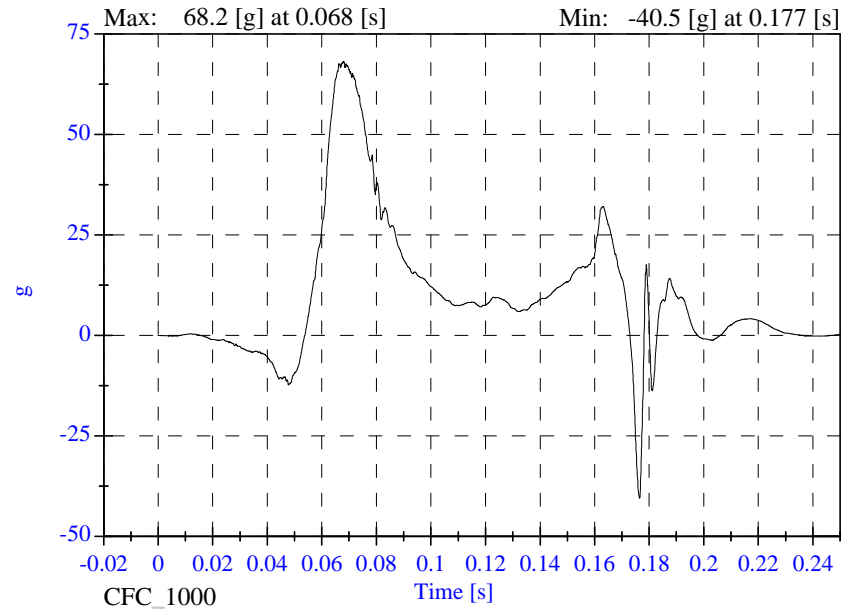
### P6 Head y



### P6 Head z

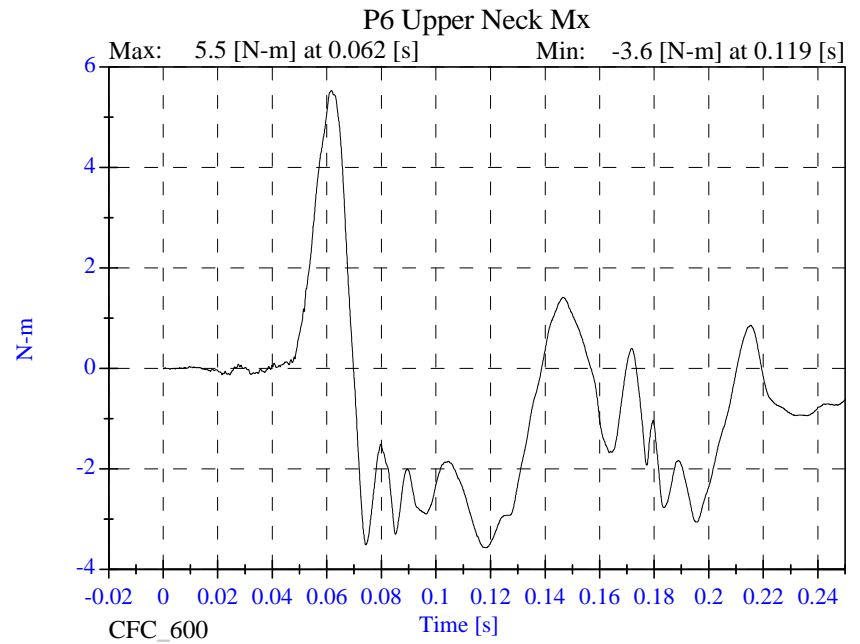
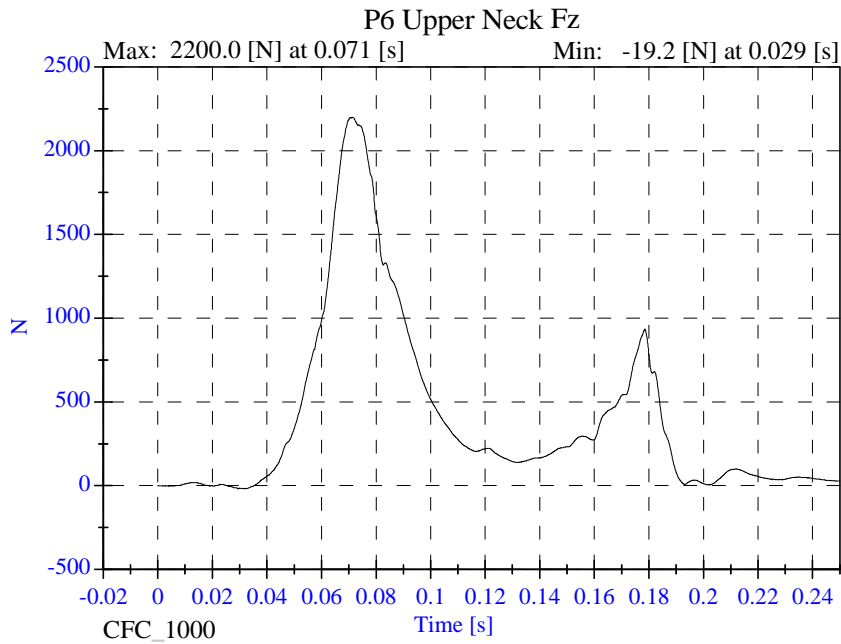
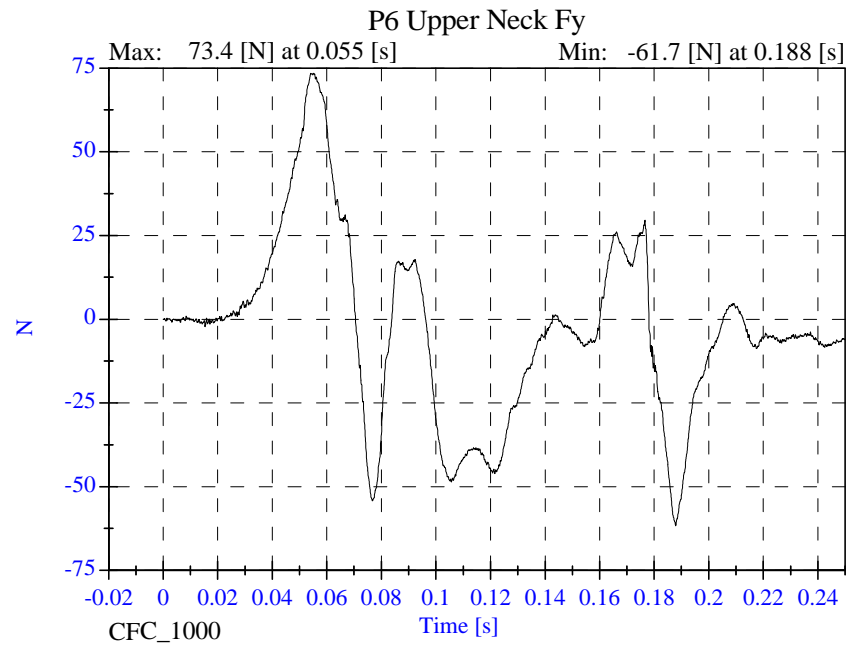
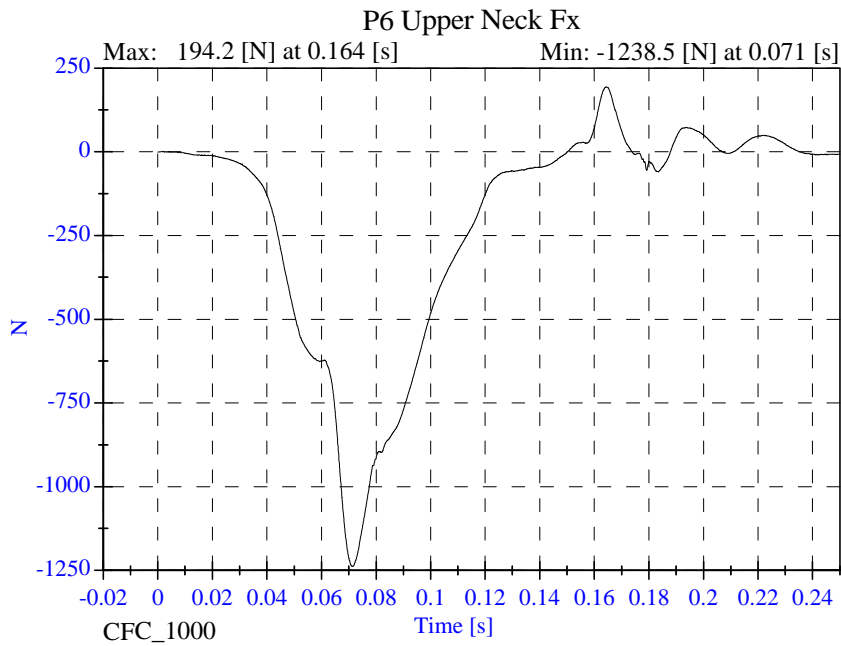


### P6 Head Red z



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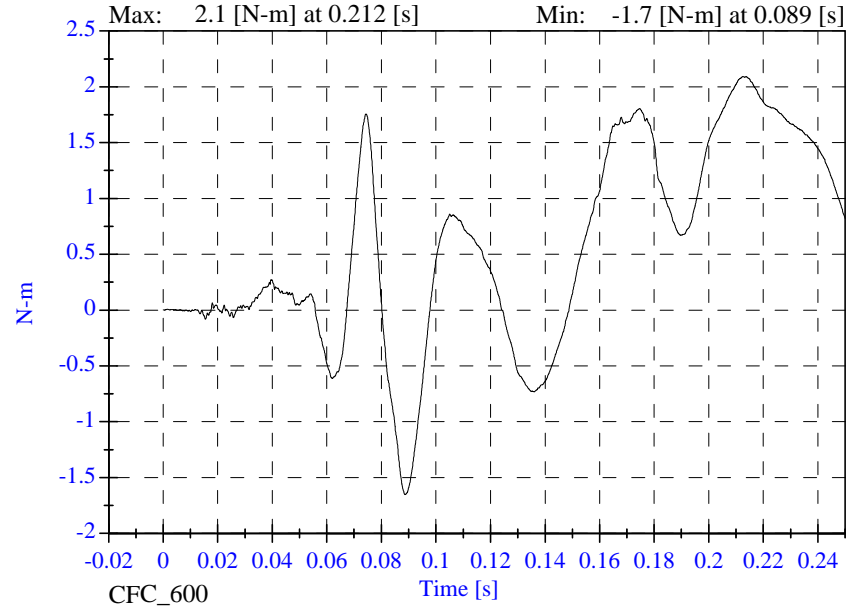
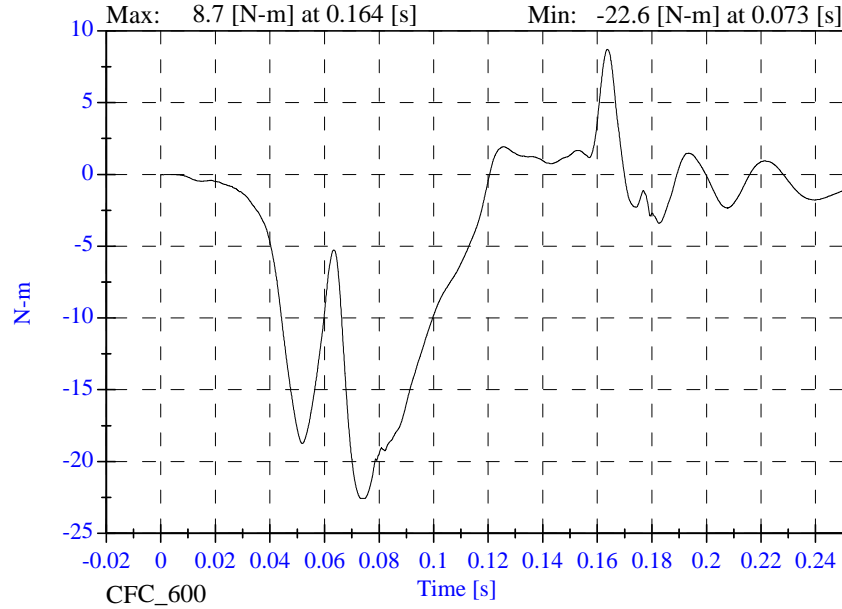


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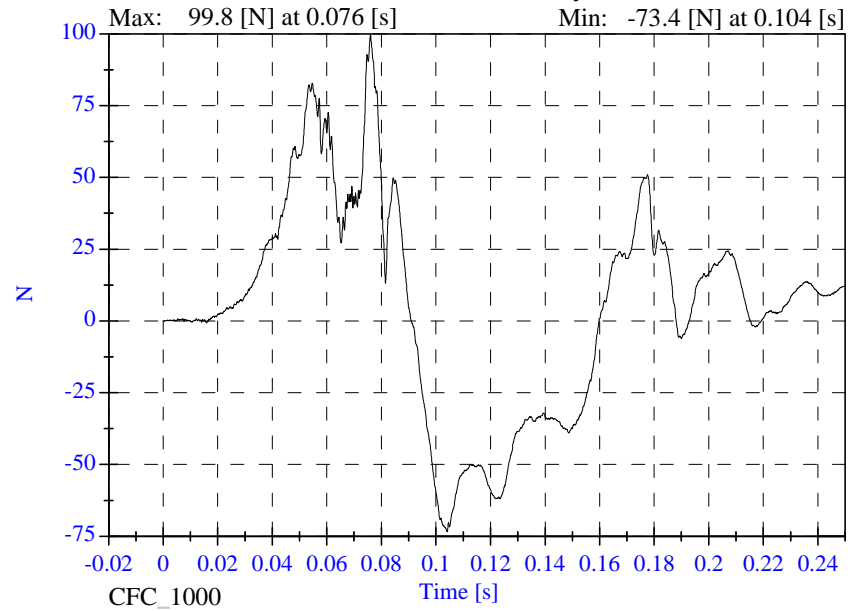
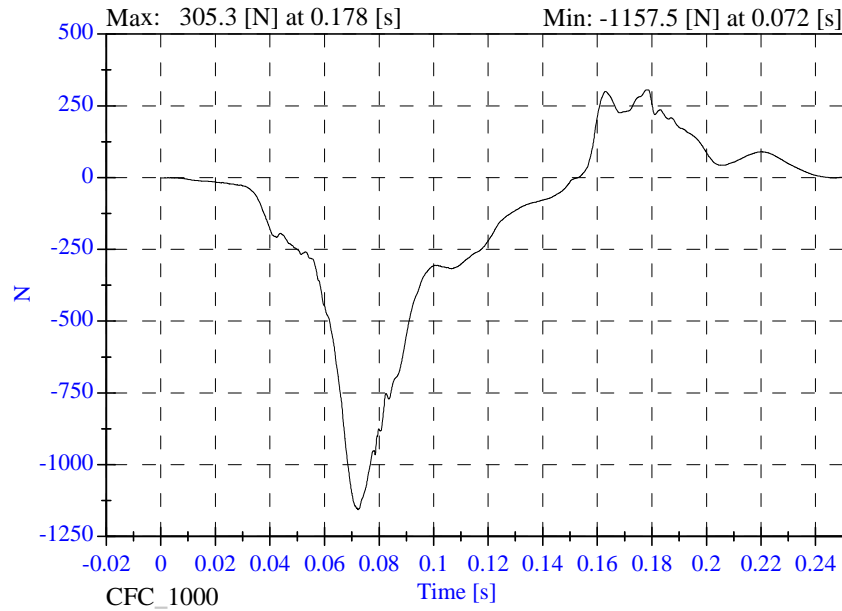
### P6 Upper Neck My

### P6 Upper Neck Mz



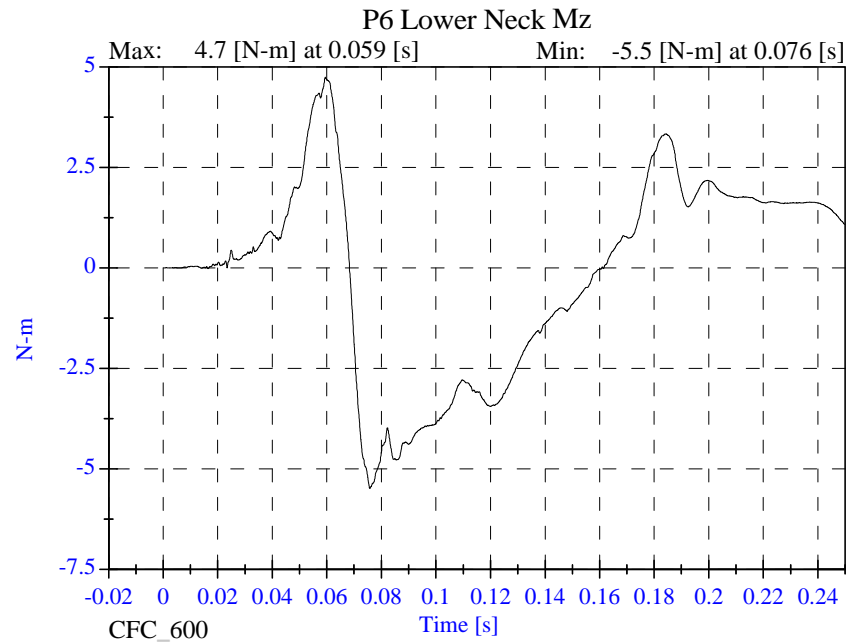
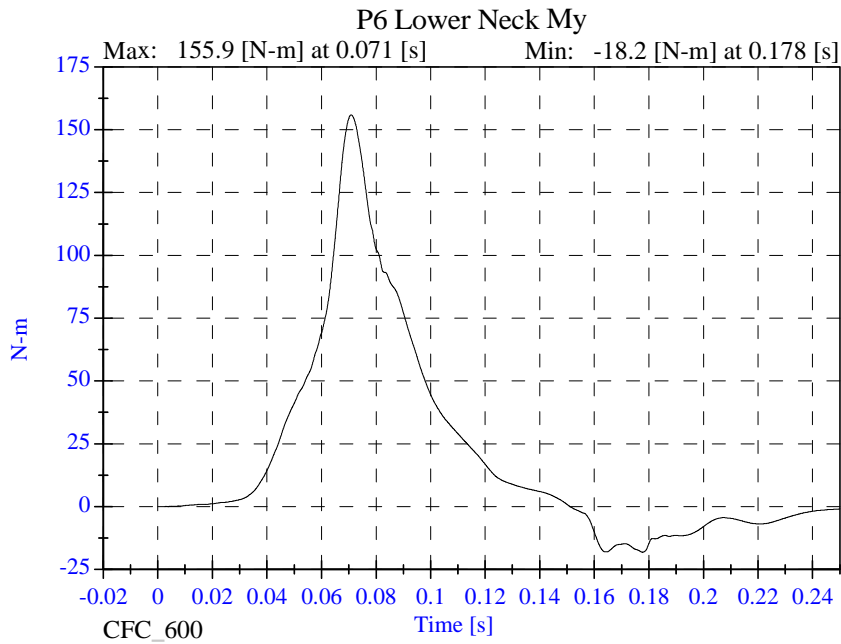
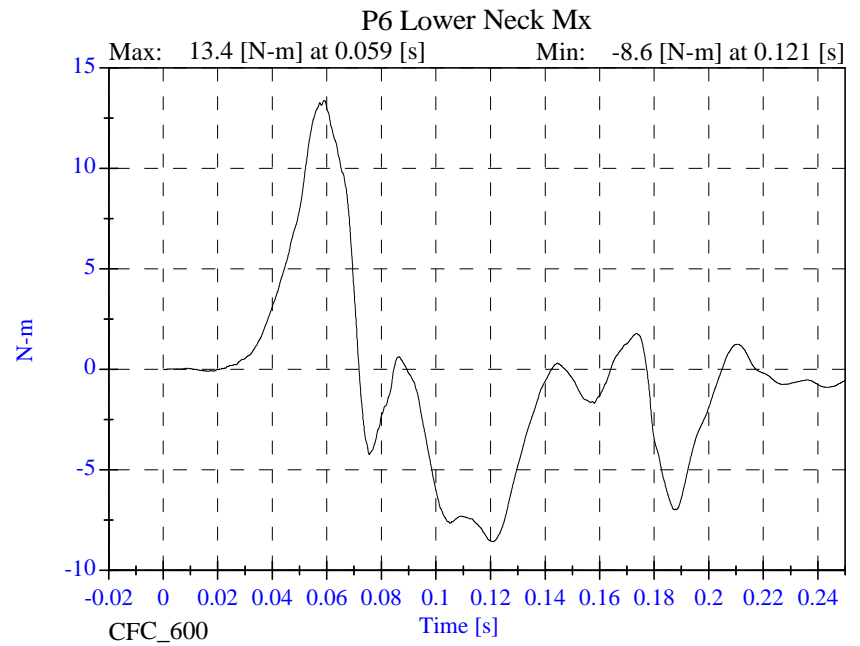
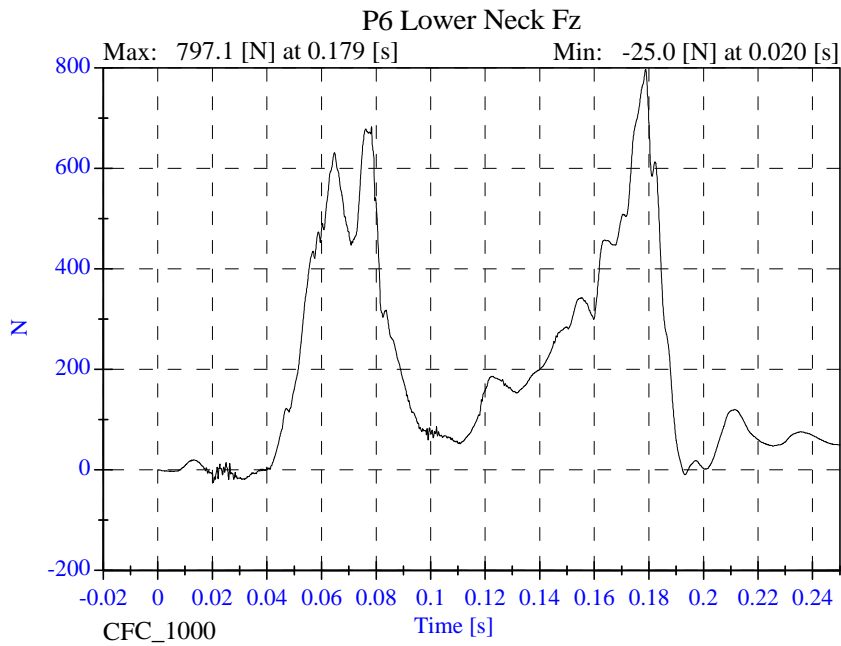
### P6 Lower Neck Fx

### P6 Lower Neck Fy



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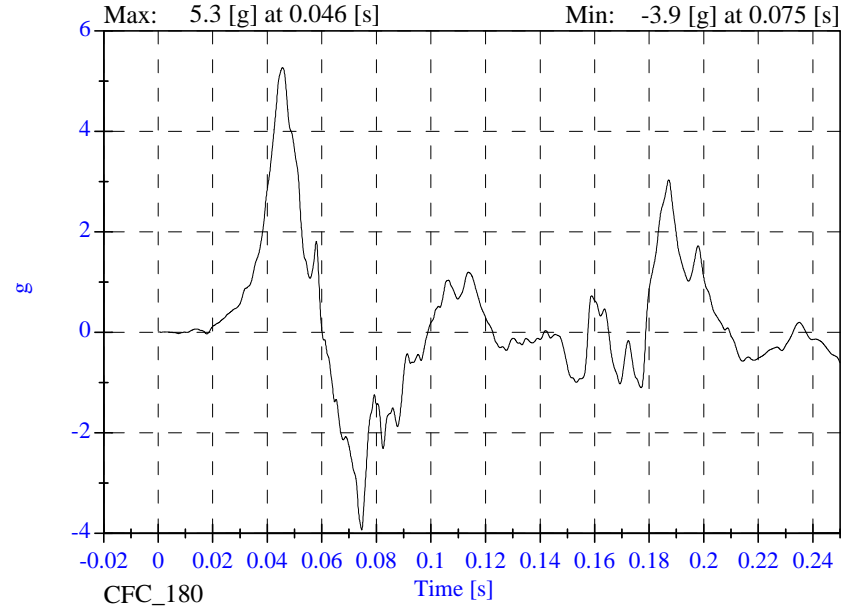
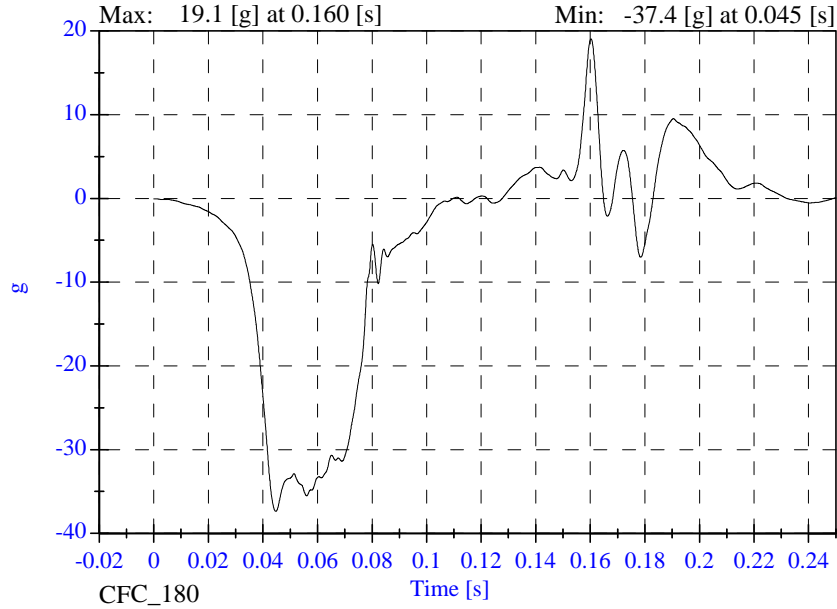


# Sled Test NCAP 07-3-02

- July 30, 2003

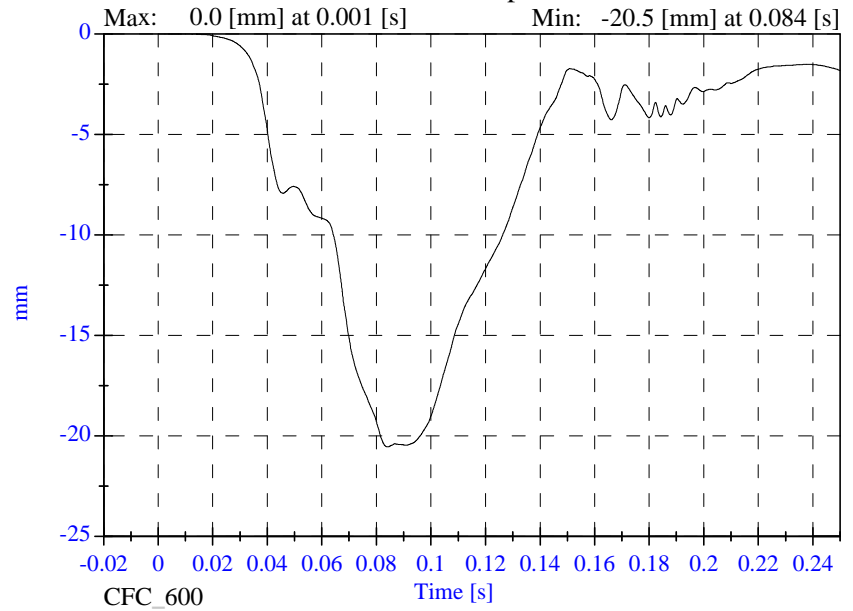
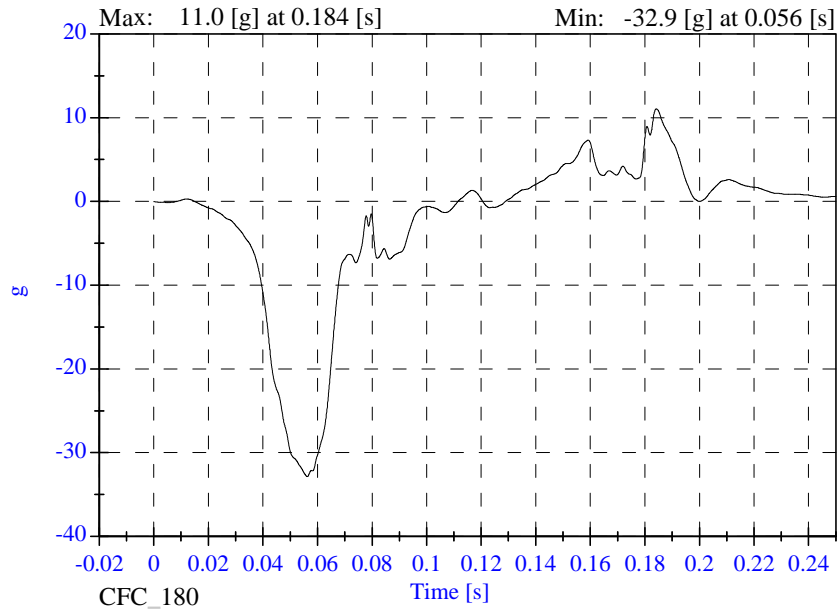
### P6 Chest x

### P6 Chest y



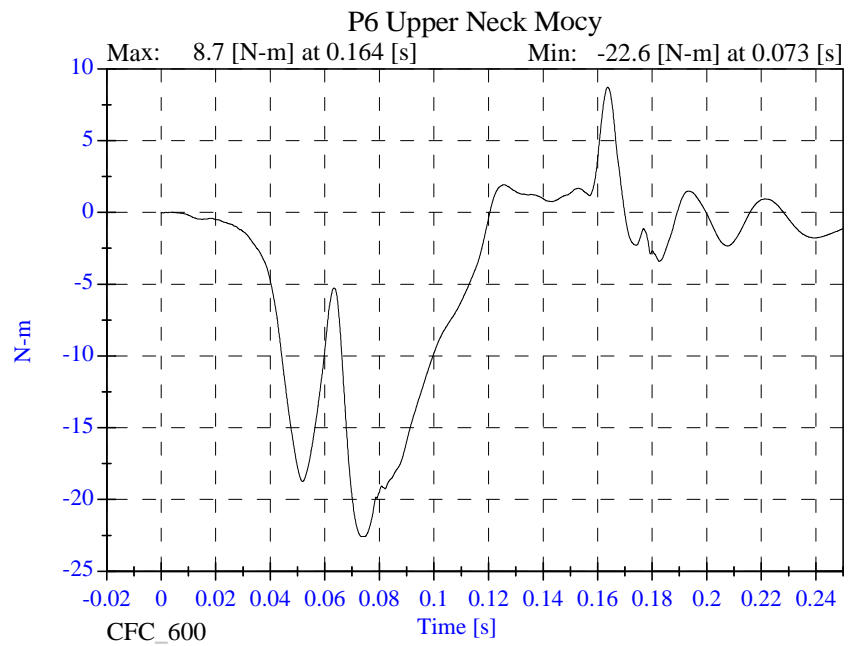
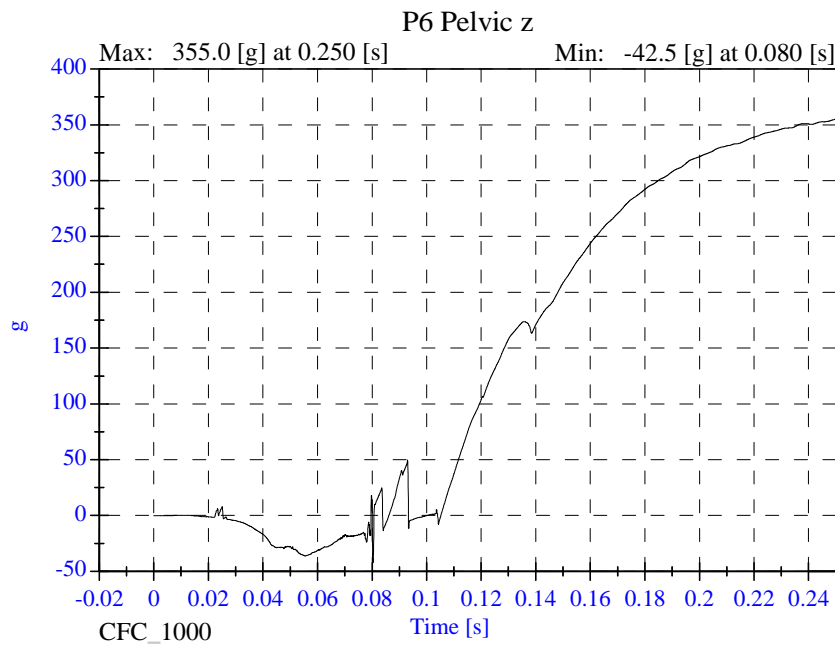
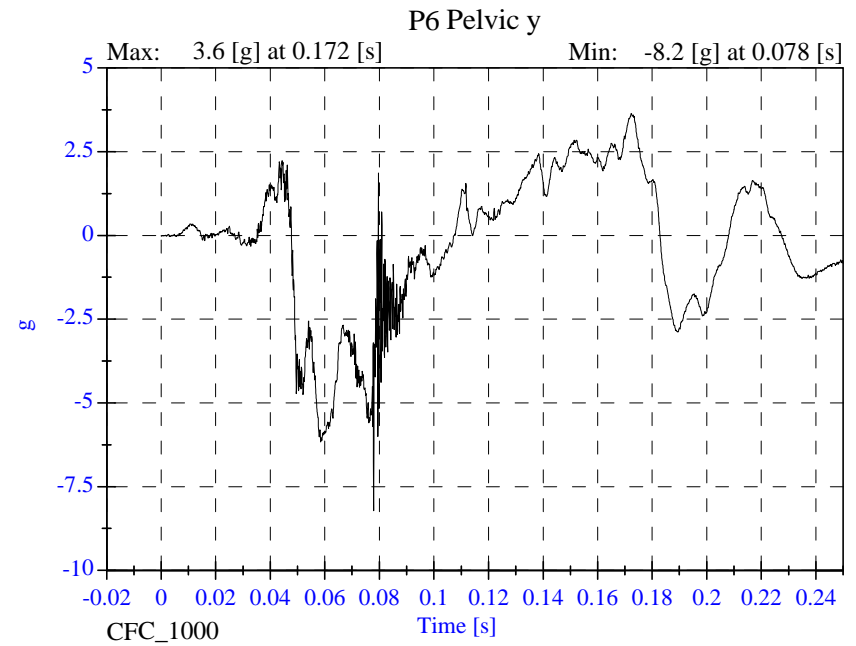
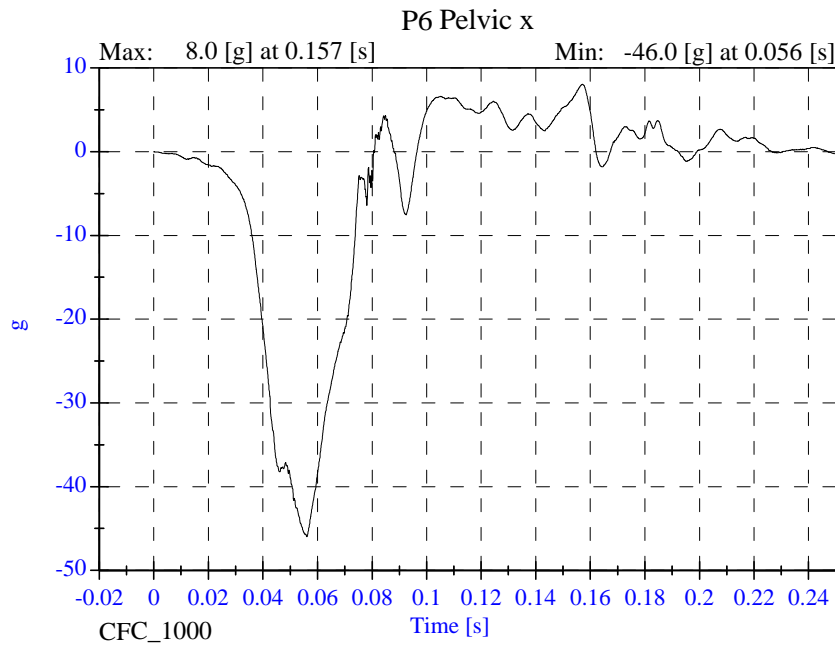
### P6 Chest z

### P6 Chest Compression



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**SECTION 9**

**Compression – Deflection Resistance Test**

Date

7/30/03

Performed By

[Signature]

Temp.

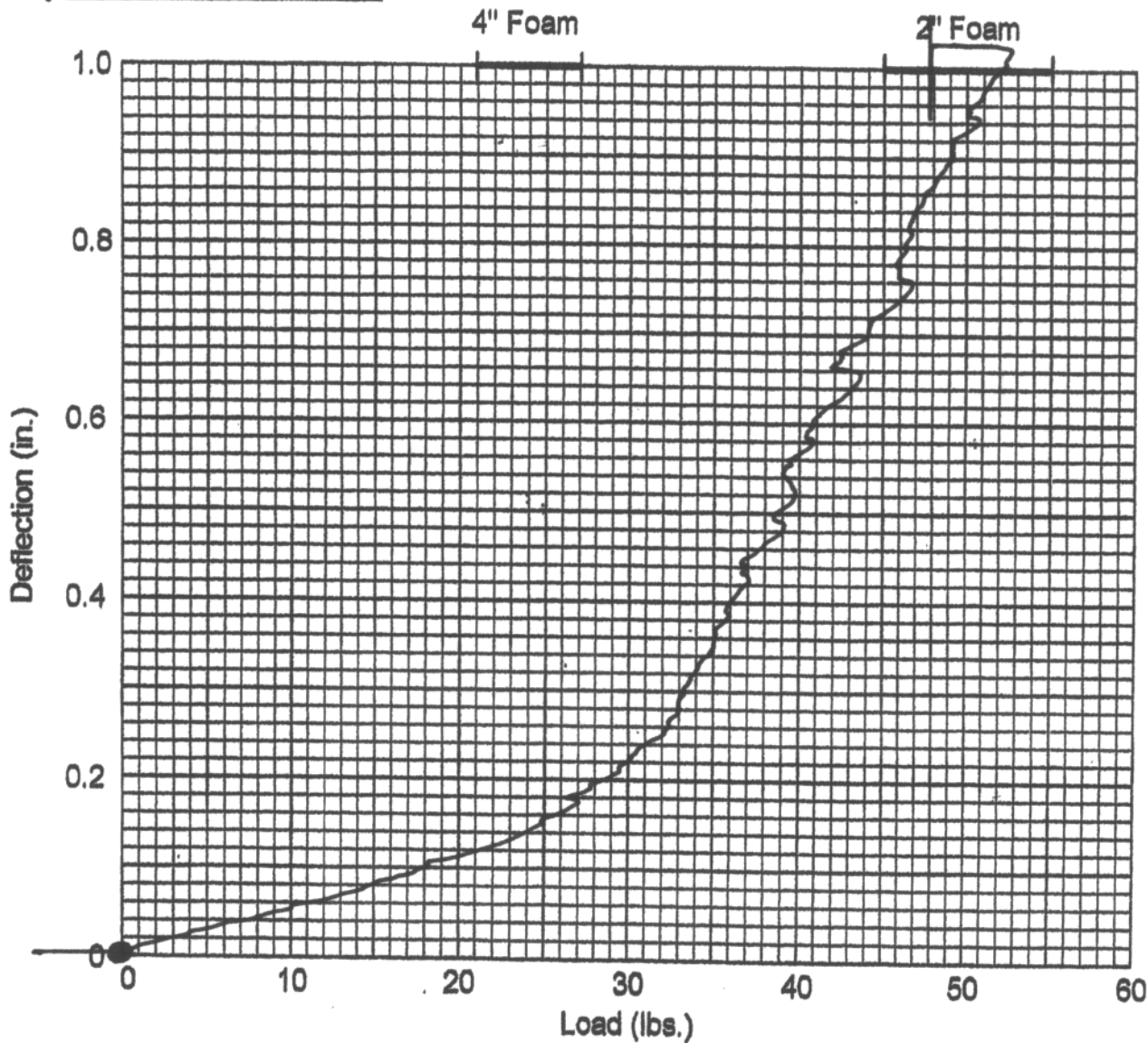
70°

Humidity

50%

Foam No.

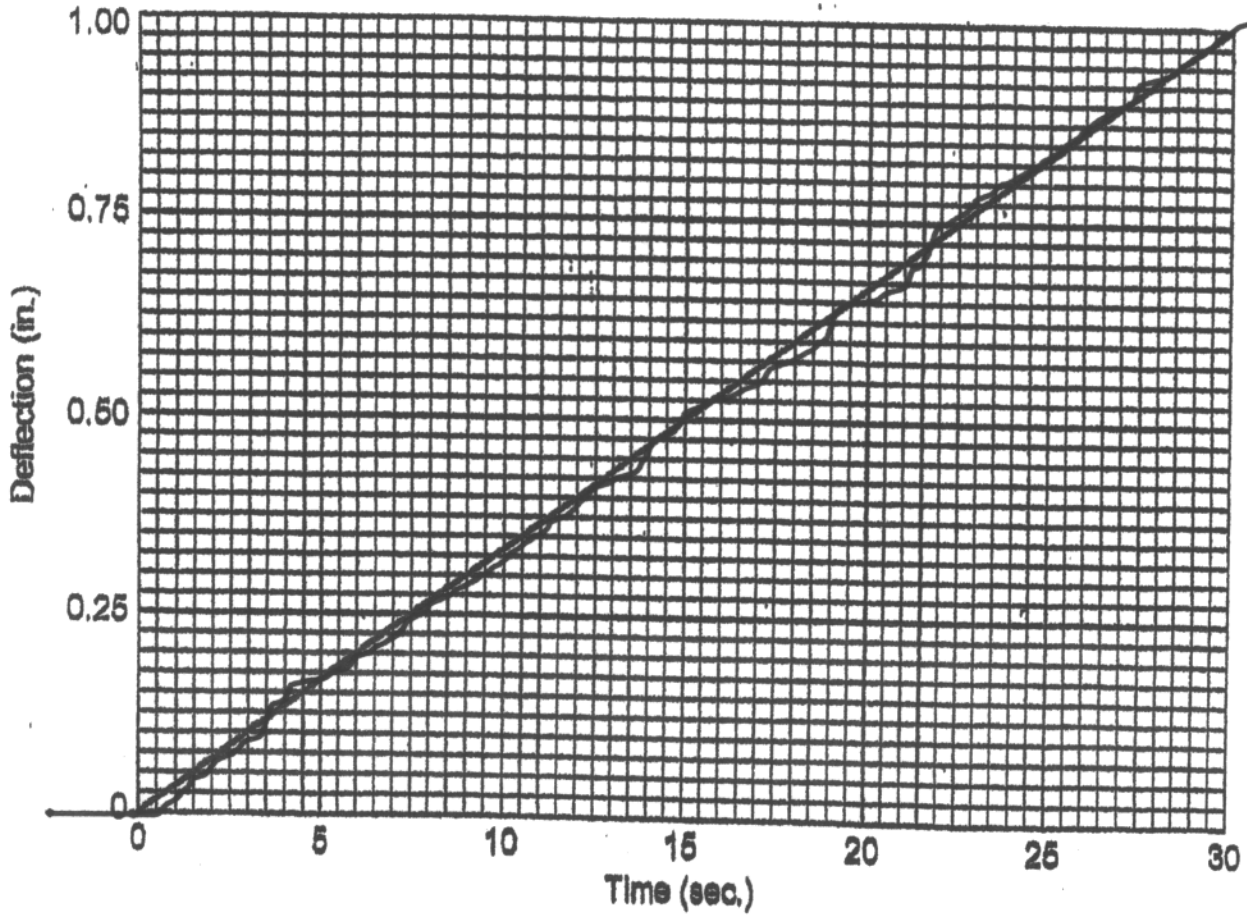
2" X 20" 2" X 24" IZ



Compression - Deflection Resistance Test  
Child Seat Foam

26

Date 7/30/03  
Temp 70°  
Humidity 50%  
Foam No. 2" X 20" 2 X 24" IZ



Compression - Deflection Resistance Test Child Seat Foam

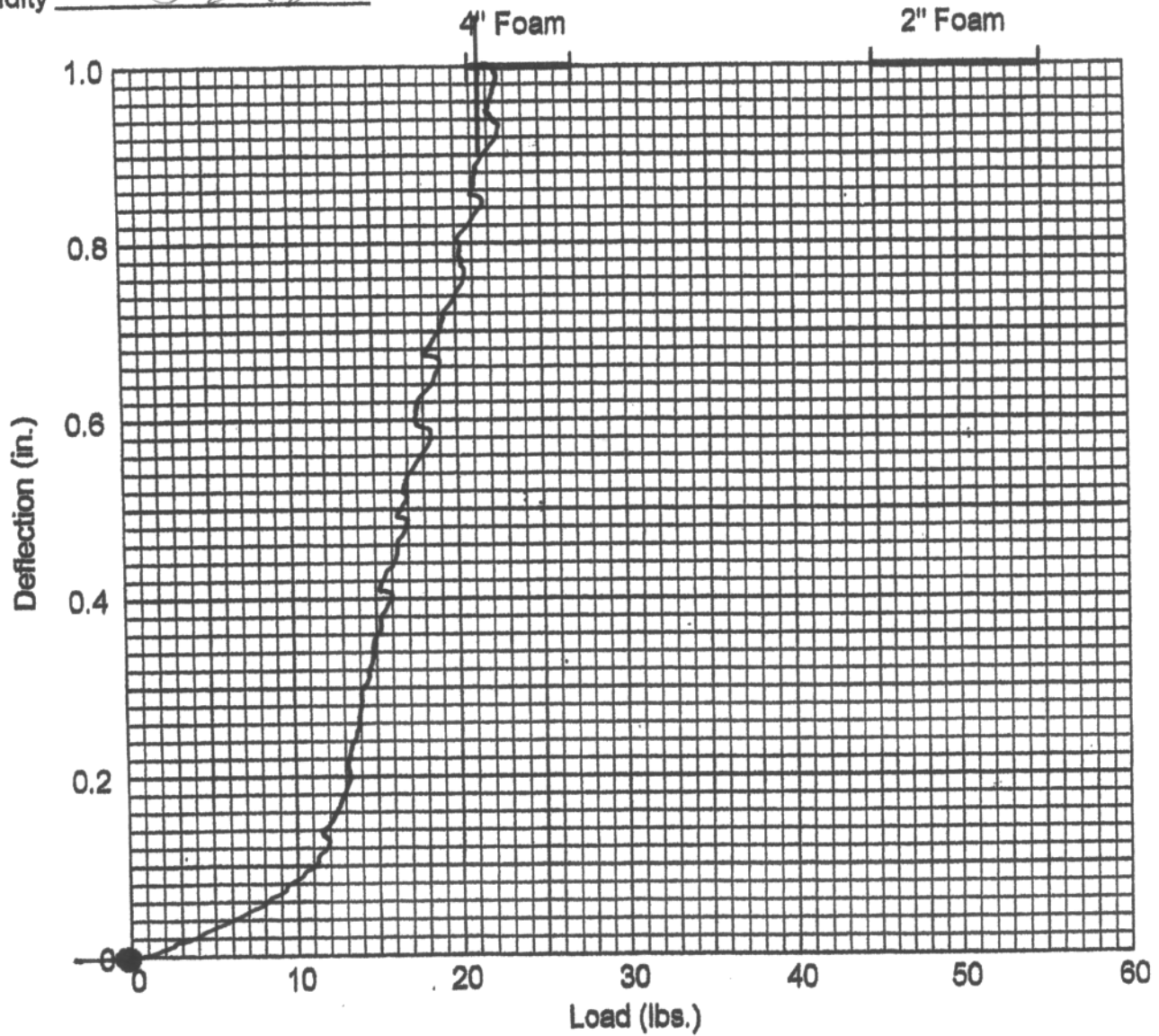
SEAT FOAM USAGE LOG

Foam I.D. Number 2" X 20" 2" X 24" T2

Date	Peak Load	Pass/Fail
7/30/03	47.75 LBS	Pass

Date 7/30/03  
Performed By SD  
Temp. 70°  
Humidity 50%

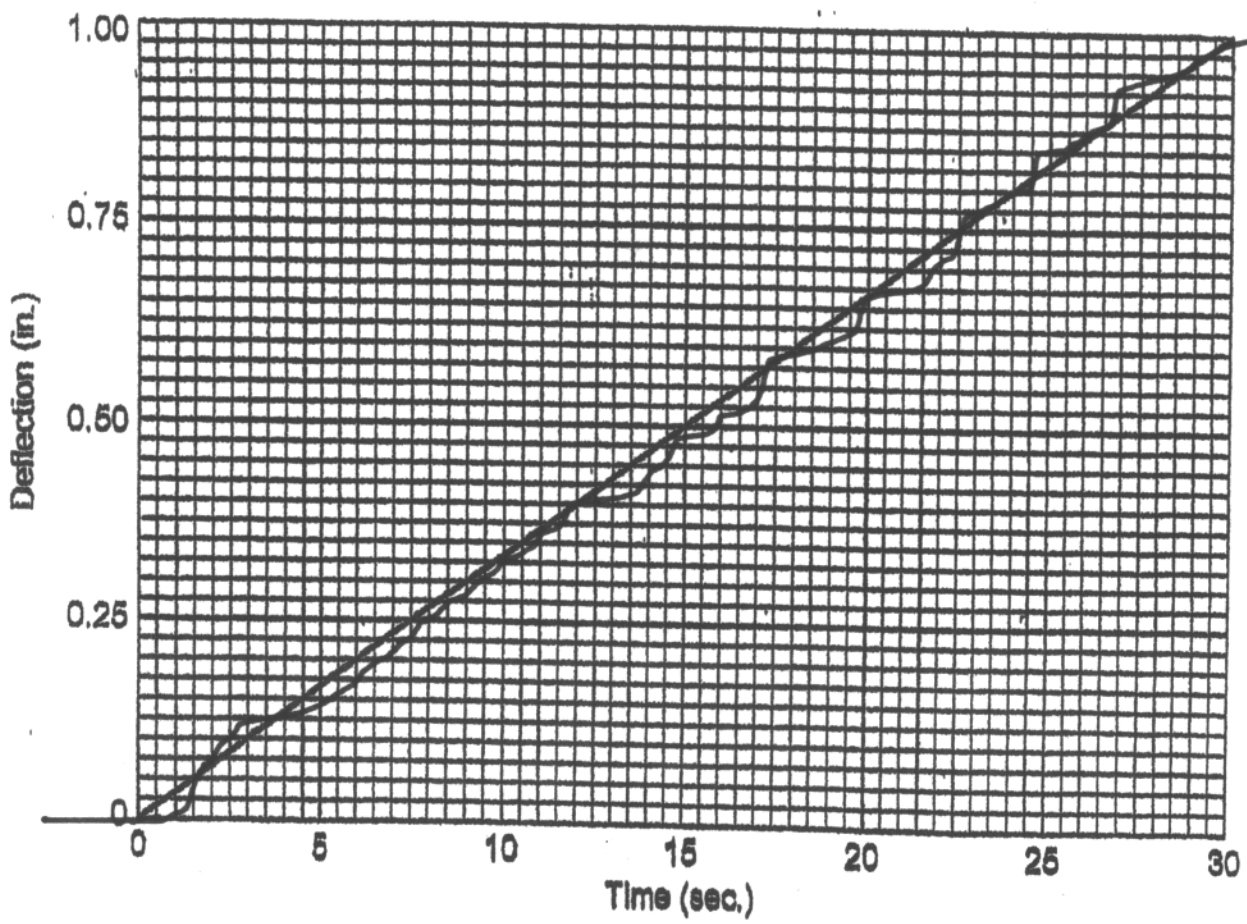
Foam No. 4" X 20" IZ



Compression - Deflection Resistance Test  
Child Seat Foam

29

Date 7/30/03  
Temp 70°  
Humidity 50%  
Foam No. A" X 20" I2



Compression - Deflection Resistance Test Child Seat Foam

30

### SEAT FOAM USAGE LOG

Foam I.D. Number AX 20" IZ

Date	Peak Load	Pass/Fail
4/30/03	21.5 LBS	PASS

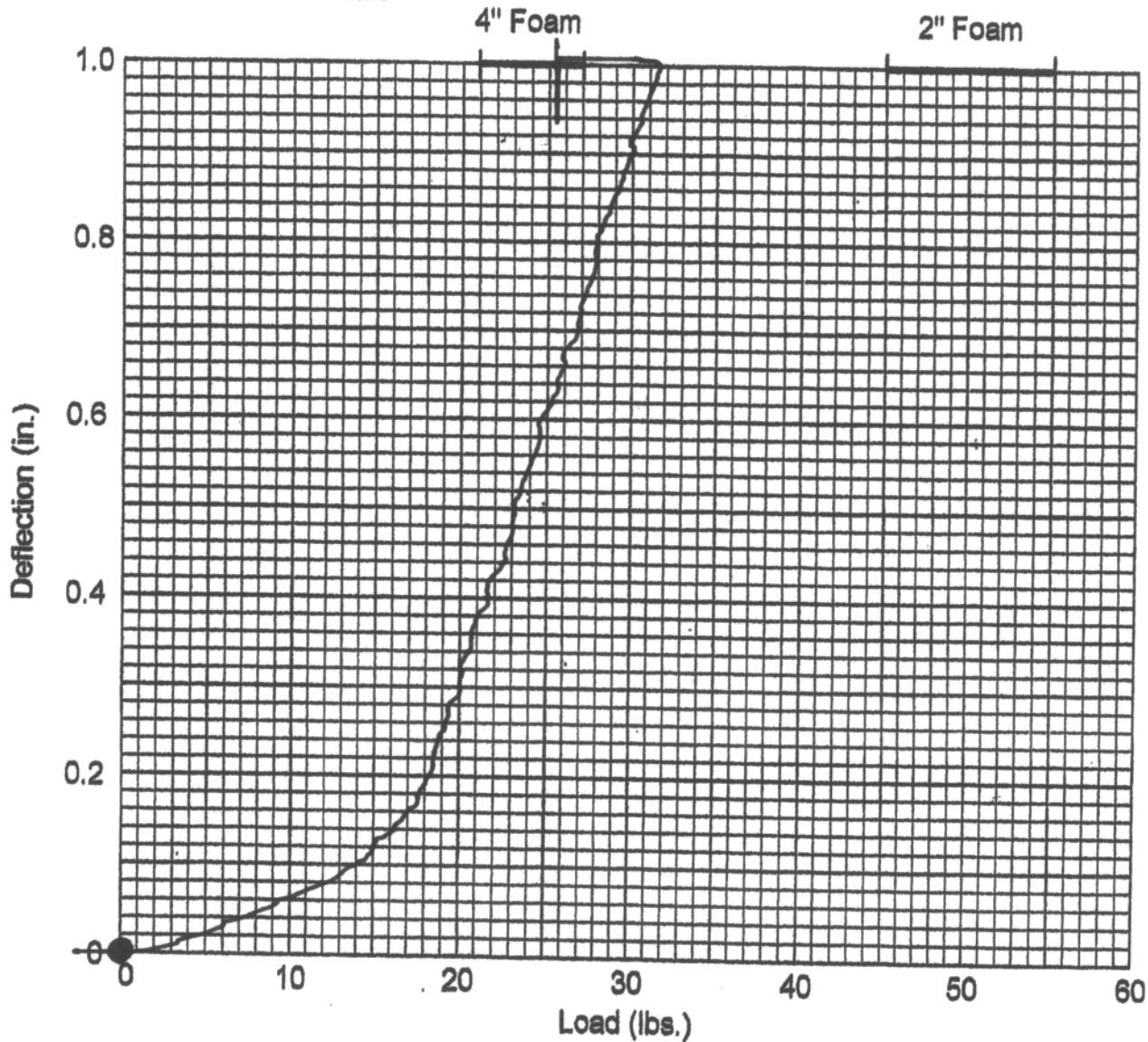
Date 7/30/99

Foam No. 4 x 24" IZ

Performed By [Signature]

Temp. 70°

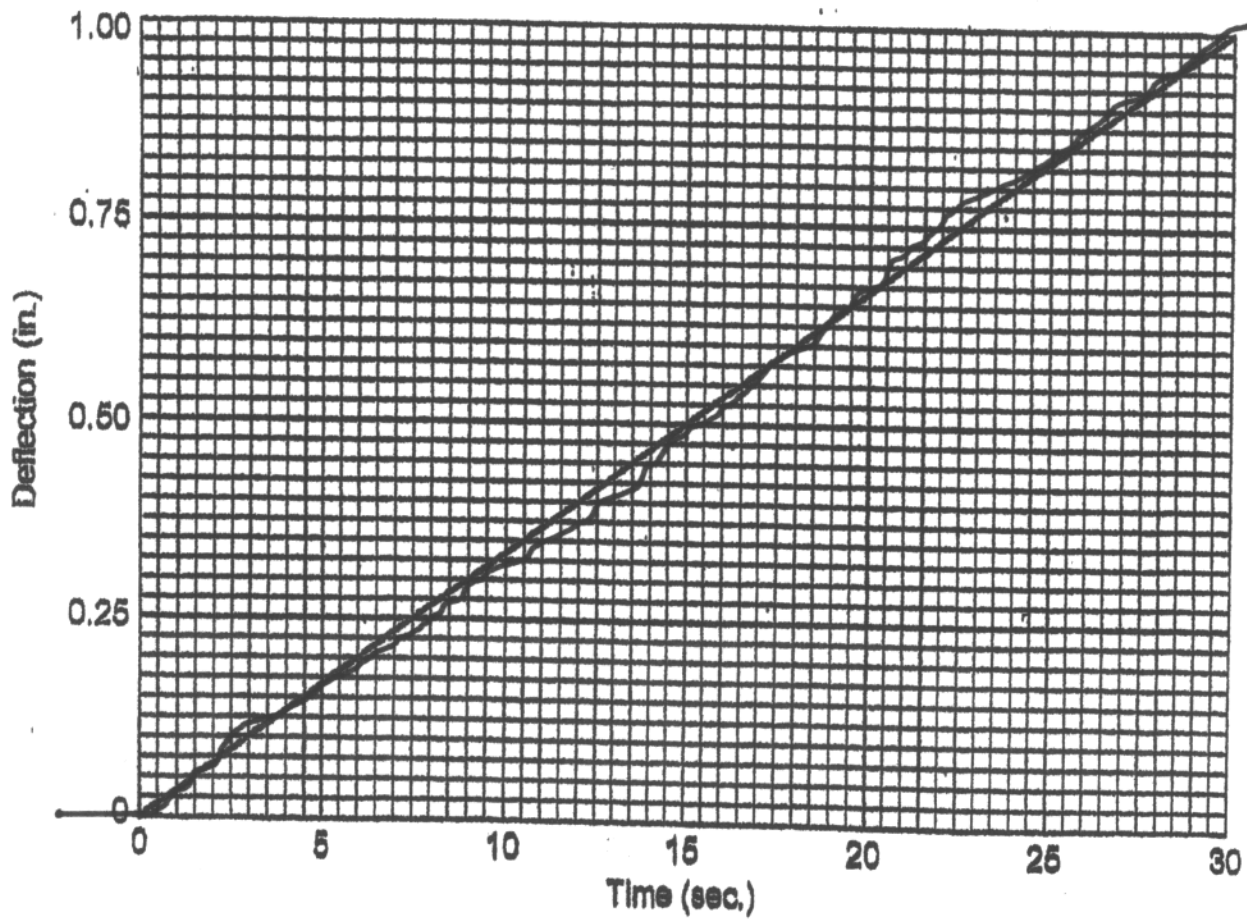
Humidity 50%



Compression - Deflection Resistance Test  
Child Seat Foam

32


Date 7/30/03  
Temp 70°  
Humidity 50%  
Foam No. 4" X 24" I2



Compression - Deflection Resistance Test Child Seat Foam

SEAT FOAM USAGE LOG

Foam I.D. Number 4" X 24" IL

Date	Peak Load	Pass/Fail
7/30/03	25.5 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

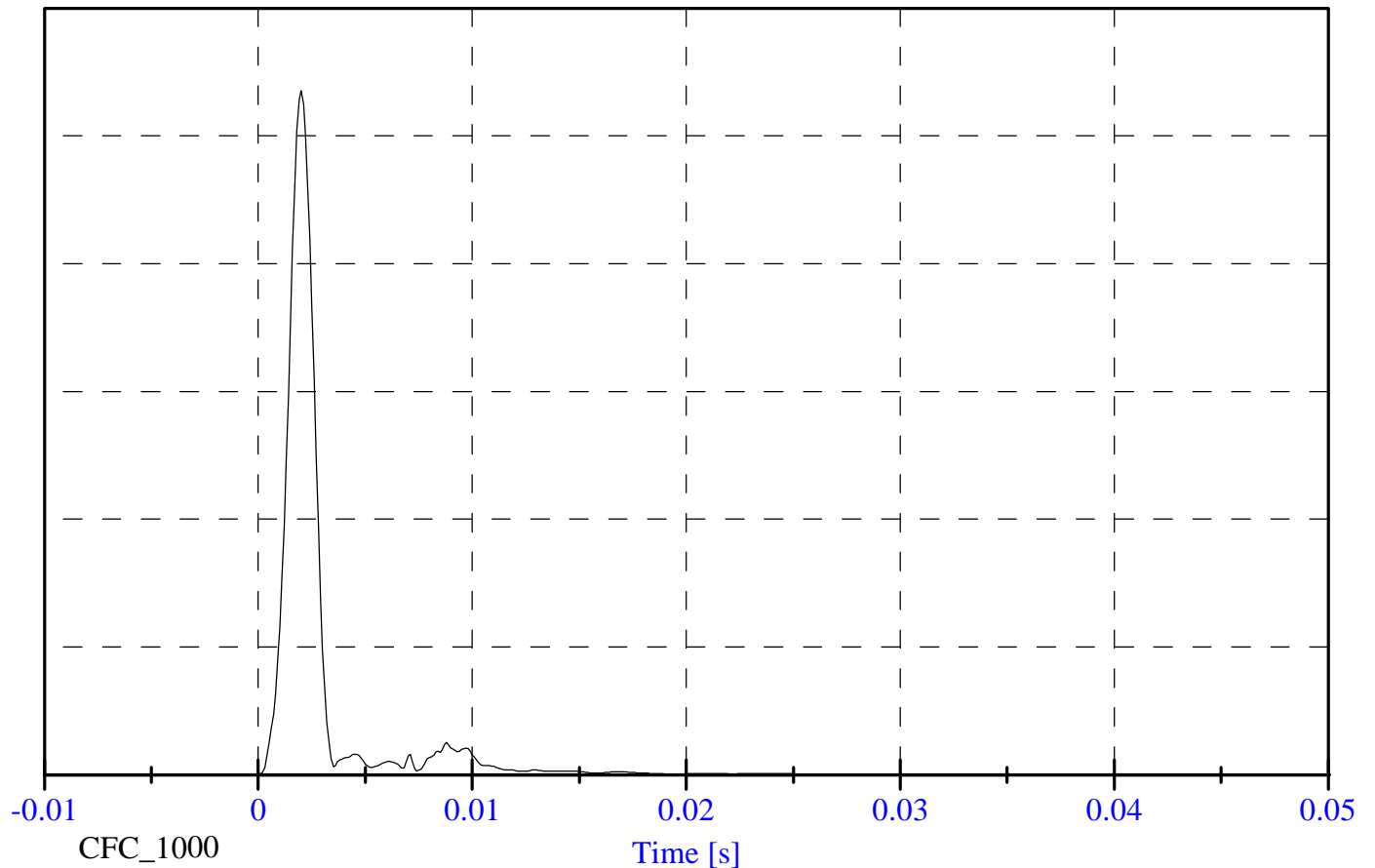
## -----TEST RESULTS-----

<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: 044 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

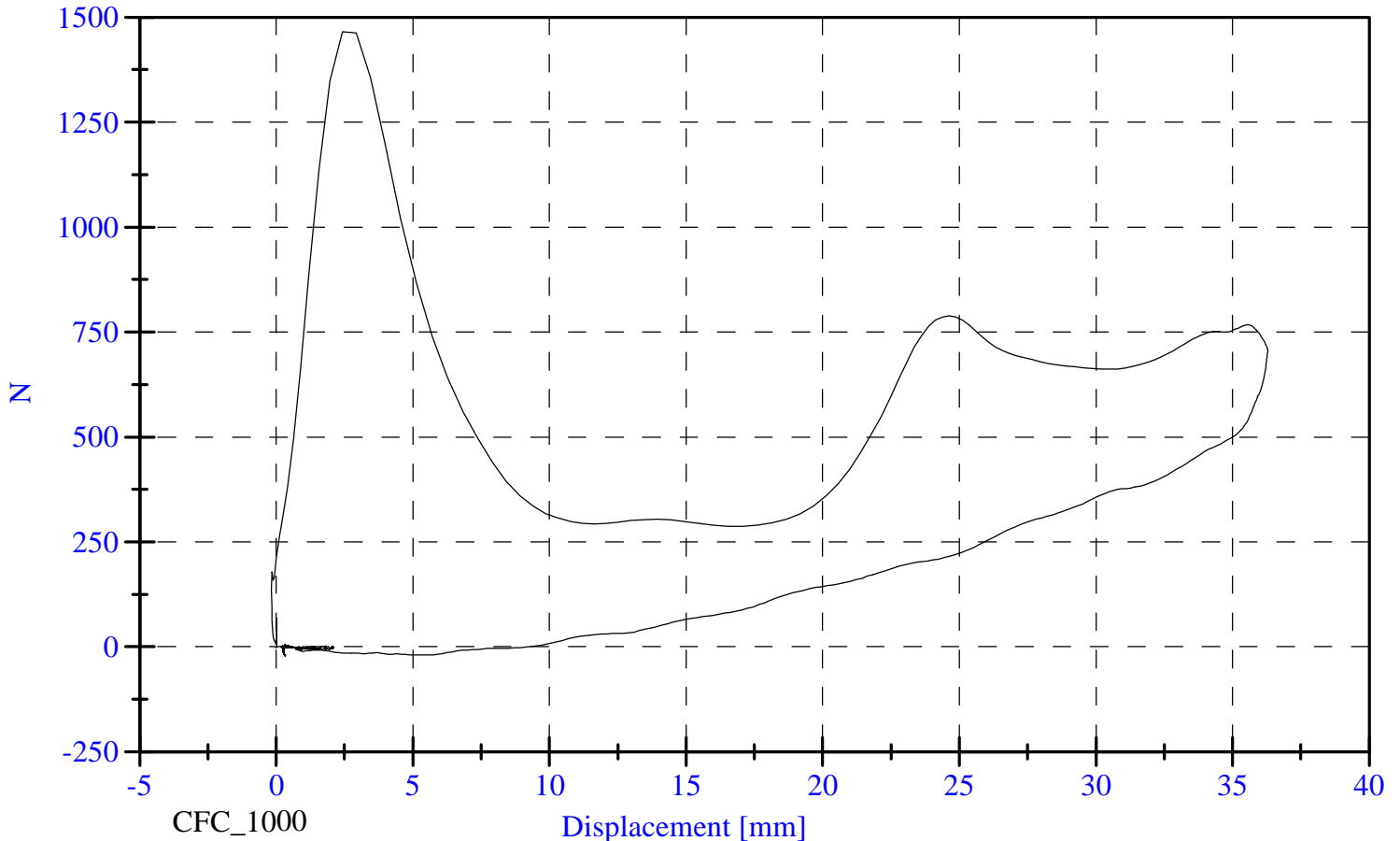
Serial No: 044

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**

## CALIBRATION DATA FOR TEST 07-3-02

SENSOR NAME	MANUFACTURER AND SERIAL NUMBER	CALDATE
Sled Ax	MFG: ENDEVCO S/N: 24144	7/24/2003
P6 Head Ax	MFG: ENDEVCO S/N: P17912	7/17/2003
P6 Head Ay	MFG: ENDEVCO S/N: P17743	7/17/2003
P6 Head Az	MFG: ENDEVCO S/N: P15319	6/26/2003
P6 Redundant Head Az	MFG: ENDEVCO S/N: P16279	6/25/2003
P6 Chest Ax	MFG: ENDEVCO S/N: P15334	7/17/2003
P6 Chest Ay	MFG: ENDEVCO S/N: P15321	7/17/2003
P6 Chest Az	MFG: ENDEVCO S/N: P17758	7/17/2003
P6 Chest Displacement	MFG: SERVO S/N: 044	7/22/2003
P6 Pelvic Ax	MFG: ENDEVCO S/N: P16755	7/17/2003
P6 Pelvic Ay	MFG: ENDEVCO S/N: P15591	7/17/2003
P6 Pelvic Az	MFG: ENDEVCO S/N: P16155	7/17/2003
P6 Upper Neck Load Cell Fx	MFG: Denton S/N: 248-FX	7/18/2003
P6 Upper Neck Load Cell Fy	MFG: Denton S/N: 248-FY	7/18/2003
P6 Upper Neck Load Cell Fz	MFG: Denton S/N: 248-FZ	7/18/2003
P6 Upper Neck Load Cell Mx	MFG: Denton S/N: 248-MX	7/18/2003
P6 Upper Neck Load Cell My	MFG: Denton S/N: 248-MY	7/18/2003
P6 Upper Neck Load Cell Mz	MFG: Denton S/N: 248-MZ	7/18/2003
P6 Lower Neck Load Cell Fx	MFG: Denton S/N: 249Fx	7/18/2003
P6 Lower Neck Load Cell Fy	MFG: Denton S/N: 249Fy	7/18/2003
P6 Lower Neck Load Cell Fz	MFG: Denton S/N: 249Fz	7/18/2003
P6 Lower Neck Load Cell Mx	MFG: Denton S/N: 249Mx	7/18/2003
P6 Lower Neck Load Cell My	MFG: Denton S/N: 249My	7/18/2003
P6 Lower Neck Load Cell Mz	MFG: Denton S/N: 249Mz	7/18/2003

**SECTION 12**

**Link to High Speed Movies**

**CLICK HERE TO VIEW  
HIGH SPEED VIDEO**