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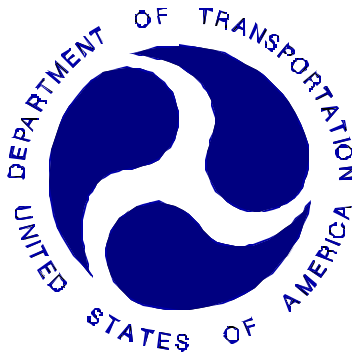
**NEW CAR ASSESSMENT PROGRAM (NCAP)  
FRONTAL BARRIER IMPACT TEST**

GENERAL MOTORS CORP  
2003 CHEVROLET TAHOE  
MPV

NHTSA NUMBER: M30109

VERIDIAN TEST NUMBER: 8642-NCAP-35

VERIDIAN ENGINEERING  
TRANSPORTATION SCIENCES CENTER  
P.O. BOX 400  
BUFFALO, NEW YORK 14225



March 14, 2003

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Rulemaking  
Office of Crashworthiness Standards  
Mail Code: NVS-111  
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Prepared by:

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Patrick G. MacDiarmid, Jr., Project Engineer

Approved by:

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David J. Travale, Program Manager  
Transportation Science Center

Approval Date:

FINAL REPORT ACCEPTANCE BY OCS:

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Manager, New Car Assessment Program (NCAP)  
NHTSA, Office of Crashworthiness Standards

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Date of Report Acceptance

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COTR, New Car Assessment Program (NCAP)  
NHTSA, Office of Crashworthiness Standards

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				6. Performing Organization Code CAL	
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15. Supplementary Notes					
16. Abstract					
<p>A frontal load cell barrier test of a 2003 Chevrolet Tahoe MPV was performed at Veridian Engineering crash test facility in Buffalo, New York, on March 14, 2003.</p> <p>The impact velocity was 56.33 kph and the temperature at the barrier face was 20°C. The maximum post-test vehicle crush was 615 mm. The test vehicle was equipped with 3-point restraint systems, knee bolsters, and airbags at both the driver and right outboard passenger seating positions.</p> <p>With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements.</p>					
<b>ATD Position</b>	<b>HIC</b>	<b>Clip (g's)</b>	<b>Chest Disp (mm)</b>	<b>Left Femur (N)</b>	<b>Right Femur (N)</b>
<b>Driver (061)</b>	724.2*	52.6	28.6	5746.0	9750.7
<b>Passenger (064)</b>	731.4	52.0	34.4	5044.2	6516.4
* Calculated using redundant Head X					
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## SECTION 1

### PURPOSE AND SUMMARY OF TEST

#### 1.1 PURPOSE

This 56.33 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 56.33 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

#### 1.2 TEST PROCEDURE

This 56.33 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 head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap belts to measure dummy 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 two tests previous to this test (M30506 and M35109) where they did not exceed FMVSS 208 head, 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 185 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 2003 Chevrolet Tahoe MPV at a velocity of 56.33 kph. The test was performed at Veridian Engineering on March 14, 2003. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The occupant data is summarized below.

	<b>HIC</b>	<b>Clip (g)</b>	<b>Chest Disp. (mm)</b>	<b>Left Femur (N)</b>	<b>Right Femur (N)</b>	<b>Belt Spool (mm)</b>	<b>Belt Stretch (mm/50 mm)</b>
<b>Driver ATD</b>	724.2*	52.6	28.6	5746.0	9750.7	-	-
<b>Passenger ATD</b>	731.4	52.0	34.4	5044.2	6516.4	-	-

\* Calculated using redundant Head X

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 615 mm and both the driver and passenger front side doors remained closed during the impact event and were operable without the use of tools after the impact. Both the driver and passenger rear side doors were closed and latched after the event. The driver side rear door required the use of tools to open while the rear passenger side door was operable without tools after the event.

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

The 2003 Chevrolet Tahoe MPV 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.:           M30109           Test Mode:           56.3 kph Frontal Barrier            
Test Date:           March 14, 2003           Time:           12:20           Temperature:           20           °C  
Vehicle Make/Model/Body Style:           2003 Chevrolet Tahoe MPV            
Vehicle Test Weight:           2706.0           kg  
Vehicle/Barrier Impact Angle:           0           °  
Impact Velocity:           56.33           kph  
Maximum Static Crush:           615           mm  
Vehicle Rebound:           757.7           mm

**DUMMIES:**

	<u>DRIVER</u>	<u>PASSENGER</u>
Type:	<u>          572E          </u>	<u>          572E          </u>
Restraint System:	<u>          Seatbelt, Airbag, Knee Bolster          </u>	<u>          Seatbelt, Airbag, Knee Bolster          </u>
Number of Data Channels:	<u>          185          </u>	
Number of Cameras:	<u>          1          </u> Real Time	
	<u>          16          </u> High Speed	

**DOOR OPENING DATA:**           Closed, Latched and Operable without Tools - Left Front            
          Closed, Latched and Operable without Tools - Right Front          

Front Seat(s) Data:

	<u>DRIVER</u>	<u>PASSENGER</u>
Seat Track Failure: (mm of shift)	<u>          4 mm forward          </u>	<u>          2 mm forward          </u>
Seat Back Failure:	<u>          None          </u>	<u>          None          </u>

**VISIBLE DUMMY CONTACT POINTS:**

	<u>DRIVER</u>	<u>PASSENGER</u>
Head:	<u>          The face to the top of the center of the airbag, the back of the head to the center of the head restraint          </u>	<u>          The face to the left of the center of the airbag, the back of the head to the left of center of the head restraint          </u>
Abdomen:	<u>          -          </u>	<u>          -          </u>
Chest:	<u>          Airbag          </u>	<u>          Airbag          </u>
Knees:	<u>          Knee Bolster          </u>	<u>          Knee Bolster          </u>

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2003 Chevrolet Tahoe MPV

NHTSA No. : M30109 ; VIN: 1GNEK13V63J176473 ; Color: Pewter

Engine Data: 8 cylinders; - CID; 4.8 Liters; - cc

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

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

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

Safety Belt Features – Driver - Pretensioner ; X Load Limiter; - Adj. Anchorage

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

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

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

Date Received: 3/10/2003 ; Odometer Reading 81 km

Selling Dealer: West-Herr Chevrolet of Orchard Park

& Address: 3575 Southwestern Boulevard Orchard Park, NY 14127

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: General Motors Corp.

Date of Manufacture 11/02

GVWR: 3130 kg; GAWR: 1633 kg FRONT; 1814 kg REAR

DATA FROM TIRE PLACARD:

Recommended Tire Size: P265/70R16

\* Recommended Cold Tire Pressure: 240 kpa FRONT; 240 kpa REAR

DATA FROM TIRE SIDEWALL:

Size of Tires on Test Vehicle: P265/70R16 111 S ; Manufacturer: Firestone

Tire Pressure with Maximum Capacity Vehicle Load: Front: 300 kPa; Rear: 300 kPa

Treadwear: 480 ; Traction: A ; Temperature: A

VEHICLE CAPACITY DATA:

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

Number of Occupants: 3 Front; 5 Rear; 8 Total

Vehicle Capacity Weight (VCW) = 707.0 kg

No. of Occupants x 68.04 kg = 544.32 kg

Rated Cargo/Luggage Weight (RCLW) = 162.68 kg (136.1 kg maximum)

\*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>599.5</u>	kg	Right Rear =	<u>562.5</u>	kg
Left Front =	<u>670.5</u>	kg	Left Rear =	<u>590.5</u>	kg
TOTAL FRONT =	<u>1270.0</u>	kg	TOTAL REAR =	<u>1153.0</u>	kg
TOTAL DELIVERED WEIGHT =	<u>2423.0</u>	kg			
% of Total Front of Vehicle Weight =	<u>52.4%</u>		% of Total Rear Weight =	<u>47.6%</u>	%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW) =	<u>2423.0</u>	kg
Rated Cargo/Luggage Weight (RCLW) =	<u>136.1</u>	kg
Weight of 2 p.572 Dummies @ 76 each =	<u>152</u>	kg
TARGET TEST WEIGHT =	<u>2711.1</u>	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 131.0 KG OF CARGO WEIGHT:

Right Front =	<u>636.0</u>	kg	Right Rear =	<u>678.5</u>	kg
Left Front =	<u>711.0</u>	kg	Left Rear =	<u>680.5</u>	kg
TOTAL FRONT =	<u>1347.0</u>	kg	TOTAL REAR =	<u>1359.0</u>	kg
TOTAL TEST WEIGHT =	<u>2706.0</u>	kg			
% of Total Front Weight =	<u>49.8%</u>	%	% of Total Rear Weight =	<u>50.2%</u>	%
Weight of Ballast Secured in Vehicle Trunk Area =	<u>10</u>	kg			
Vehicle Components Removed for Weight Reduction:	<u>None</u>				

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED:	RF	<u>898</u>	LF	<u>903</u>	RR	<u>952</u>	LR	<u>947</u>
FULLY LOADED:	RF	<u>893</u>	LF	<u>894</u>	RR	<u>922</u>	LR	<u>913</u>
AS TESTED:	RF	<u>893</u>	LF	<u>895</u>	RR	<u>927</u>	LR	<u>930</u>
Vehicle's Wheel Base:	<u>2950</u>	mm						
Location of Vehicle's C.G.:	<u>1482</u>	mm rearward of front wheel center.						

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual =	<u>98.4</u>	liters
Usable Capacity Figure Furnished by COTR =	<u>98.4</u>	liters
Test Volume Range (92 to 94% of Usable Capacity) =	<u>90.53</u>	to <u>92.5</u> liters
ACTUAL TEST VOLUME=	<u>90.85</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>
Details of Fuel System: Fuel tank – left of center ahead of rear axle; Lines – inside left frame rail;		
Filler – left side behind the rear axle.		

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°  
Test Date: March 14, 2003 Time: 12:20 Temperature: 20 °C  
Vehicle NHTSA No.: M30109  
Required Impact Velocity Range: 55.5 to 57.1 kph

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

Trap No. 1 = 56.33 kph; Trap No. 2 = 56.33 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 = 5013 ; C/L = 5064 ; Right = 5006  
Post-Test Left = 4438 ; C/L = 4463 ; Right = 4437  
Crush Left = 575 ; C/L = 601 ; Right = 569  
AVERAGE = 581.67 mm

VEHICLE REBOUND: (From rigid barrier only.)

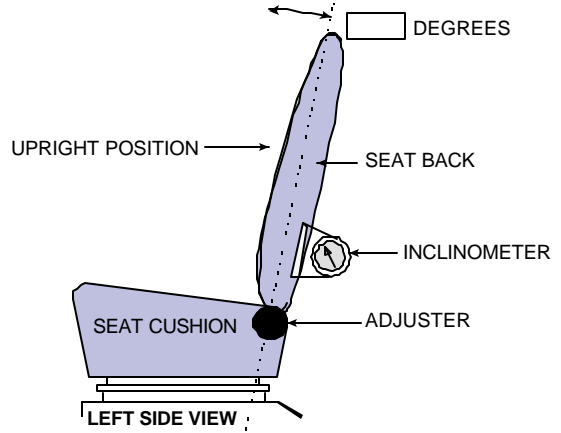
Distance from front of test vehicle to impact point:  
Left = 762 ; C/L = 750 ; Right = 761  
AVERAGE = 758 mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year :           2003    Vehicle Model:           Chevrolet Tahoe    Body Style :           MPV

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.



**FRONT SEAT ASSEMBLY**

Seat back angle for driver's seat:           15.5

Measurement instructions: Measured on seat back frame

Seat back angle for passenger's seat:       15.5

Measurement instructions: Same as the driver's seat

2. Seat Fore and Aft Positioning

Positioning of the driver's seat:           Placed in mid position

Positioning of the passenger's seat:       Placed in mid position

3. Fuel Tank Capacity Data

3.1 A. "Usable Capacity" of the standard equipment fuel tank is                               98.4 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 =                               98.4 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) =       90.85 liters

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

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

The pump will run for 3 seconds when the ignition is turned on. The pump runs continuously 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:                    The steering column is placed in the 4<sup>th</sup> detent with the uppermost stop being detent 1 (should measure 21° with respect to a level sill)

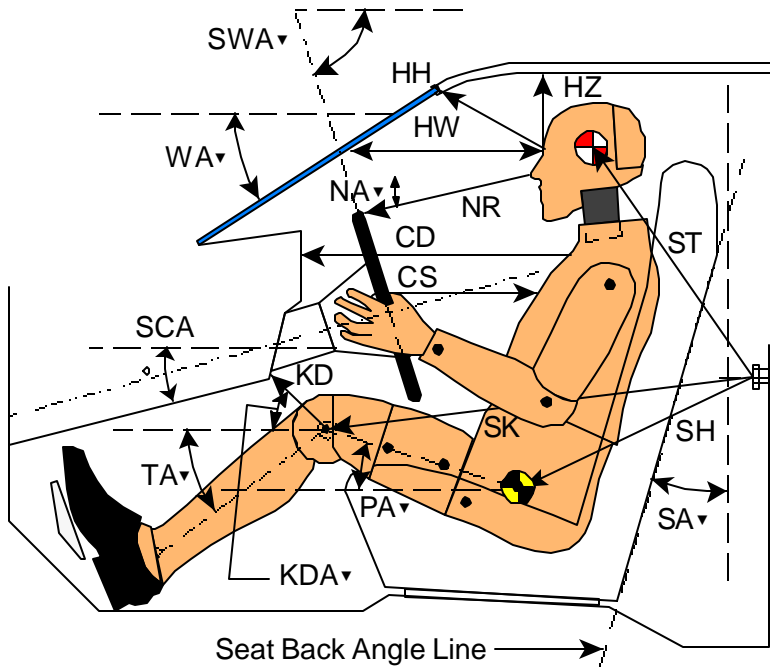
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5. SEAT BELT UPPER ANCHORAGE

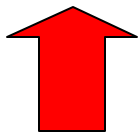
Nominal design riding position:        Not applicable

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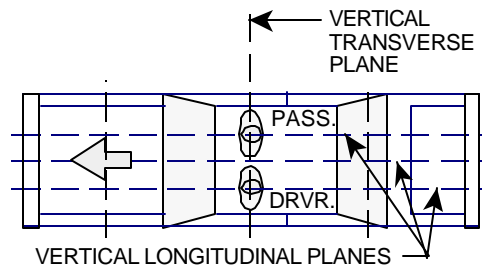
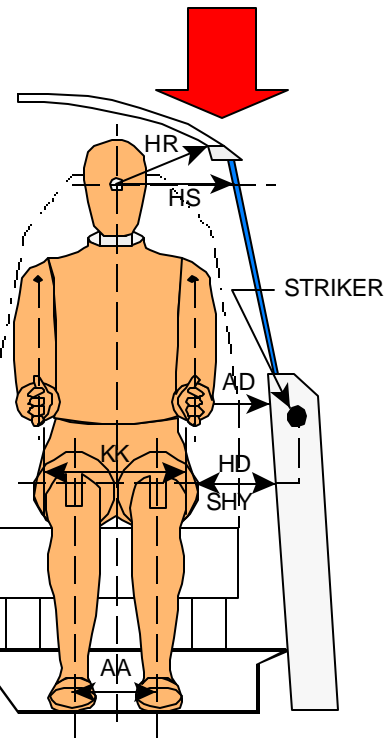
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE  
**DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS**



- AD - Arm to Door
- HD - H-Point to Door
- HR - Head to Side Header
- HS - Head to Side Window
- KK - Knee to Knee
- AA - Ankle to Ankle
- SHY- Striker to H-Point (Y Direction)



- CD - Chest to Dash
- CS - Steering Wheel to Chest
- HH - Head to Header
- HW - Head to Windshield
- HZ - Head to Roof
- KDA - Knee to Dash Angle
- KDL- Left Knee to Dash
- KDR - Right Knee to Dash
- NA - Nose to Rim Angle
- NR - Nose to Rim
- PA - Pelvic Angle
- RA - Rim to Abdomen
- SA - Seat Back Angle
- SCA - Steering Column Angle
- SH - Striker to H-Point
- SK - Striker to Knee
- ST - Striker to Head
- SWA- Steering Wheel Angle
- TA - Tibial Angle
- WA - Windshield Angle

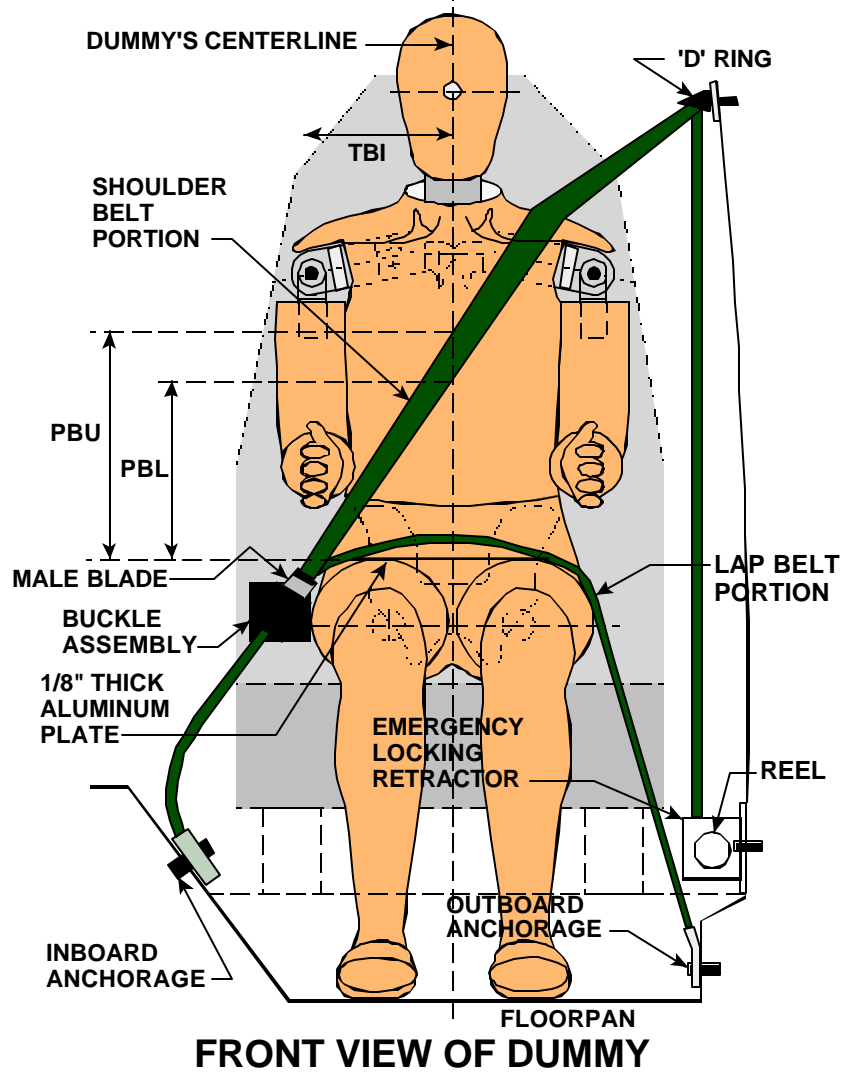


DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #061)			PASS. (Serial #064)		
WA <sup>o</sup>	38.0 deg.			N/A		
SWA <sup>o</sup>	59.0 deg.			N/A		
SCA <sup>o</sup>	21.0 deg.			N/A		
SA <sup>o</sup>	15.5 deg.			15.5 deg.		
HZ	267			252		
HH	499			492		
HW	707			672		
HR	230			189		
NR	377	Angle	-9 deg.	N/A		
CD	552			437		
CS	303			N/A		
RA	198			N/A		
KDL	162	Angle (KDA)	40 deg.	127		
KDR	173			156	Angle (KDA)	38 deg.
PA <sup>o</sup>	22.3 deg.			20.5 deg.		
TA <sup>o</sup>	46.1 deg.			47.2 deg.		
KK	300			250		
AA	260			200		
ST	635	Angle	17 deg.	660	Angle	20 deg.
SK	733	Angle	89 deg.	710	Angle	89 deg.
SH	345	Angle	99 deg.	310	Angle	99 deg.
SHY	228			227		
HS	314			324		
HD	155			161		
AD	136			125		

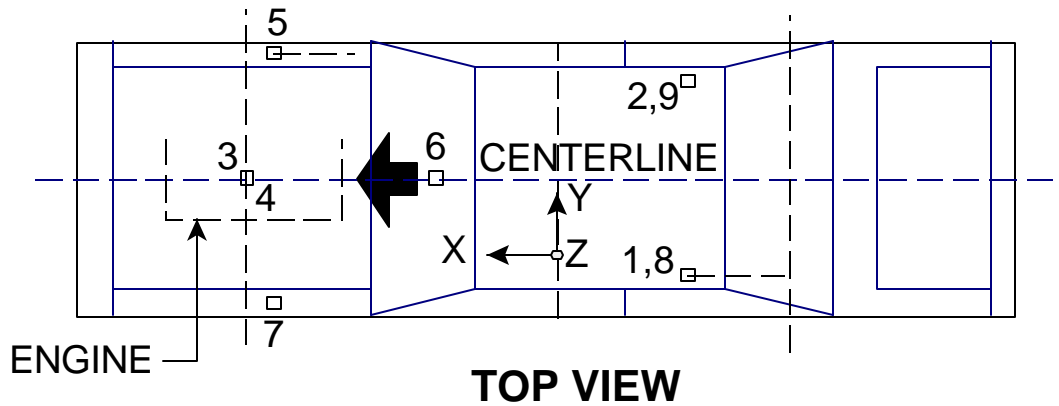
Dimensions in millimeters

**SEAT BELT POSITIONING DATA**

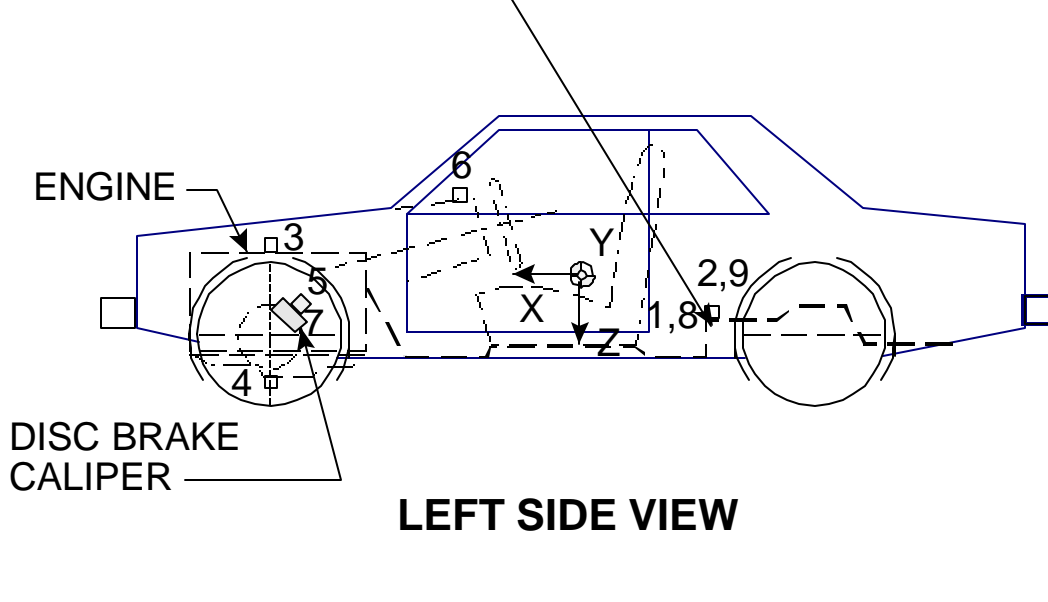


	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	330	340
PBL-- Top surface of alum. plate to belt lower edge	250	250
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

## 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	1807	-685	-628
2	Right Rear Seat Cross Member X	3655	778	-774
3	Top of Engine Block	4258	-105	-1163
4	Bottom of Engine	3409	91	-405
5	Disc Brake Caliper @ Right Side	3971	827	-429
6	Instrument Panel	3231	-24	-1088
7	Disc Brake Caliper @Left Side	3978	-829	-426
8	Left Rear Seat Cross Member Z	1807	-685	-628
9	Right Rear Seat Cross Member Z	1800	690	-632

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Left Rear Seat Cross Member X	8.8	155.9	-33.6	64.4
2	Right Rear Seat Cross Member X	2.2	185.2	-32.7	58.9
3	Top of Engine Block	*	*	*	*
4	Bottom of Engine†	**	**	**	**
5	Disc Brake Caliper @ Right Side†	**	**	**	**
6	Instrument Panel	***	***	***	***
7	Disc Brake Caliper @Left Side†	****	****	****	****
8	Left Rear Seat Cross Member Z	8.8	87.6	-9.5	28.4
9	Right Rear Seat Cross Member Z	6.1	13.9	-15.7	31.6

† Vehicle transmission support dislodged during the event severing the underbody transducer cables.

\*Wire Cut at 12 ms

\*\* Wire Cut at 56 ms

\*\*\*Wire Cut at 47 ms

\*\*\*\*Wire Cut at 66 ms

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

Vehicle Year/Make/Model/Body Style: 2003 Chevrolet Tahoe MPV

NHTSA Test No.: M30109 Test Date: March 14, 2003

DESCRIPTION	Unit	MAXIMUM VALUE							
		Driver				Passenger			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head 9 Array X Arm Y	g	*	*	*	*	14.1	87.3	-3.6	114.3
Head 9 Array X Arm Z	g	34.4	64.9	-8.9	133.8	47.4	65.8	-8.7	127.8
Head 9 Array Y Arm X	g	12.8	210.5	-65.4	83.6	9.6	249.5	-58.7	90.5
Head 9 Array Y Arm Z	g	26.5	59.2	-7.2	131.7	35.1	61.6	-8.4	127.0
Head 9 Array Z Arm X	g	17.4	211.3	-65.4	83.6	13.5	242.6	-64.9	85.3
Head 9 Array Z Arm Y	g	9.7	149.4	-25.4	90.4	14.5	82.1	-4.8	153.2
Head X	g	**	**	**	**	8.8	249.5	-62.8	88.1
Head Y	g	6.5	145.1	-19.1	87.7	12.3	88.3	-6.2	43.6
Head Z	g	26.8	67.8	-7.1	128.3	35.0	104.6	-10.1	124.6
Head Resultant	g	**	**	**	**	68.3	88.1	0.0	16.9
Redundant Head X	g	13.4	219.7	-66.7	85.5	8.9	238.8	-59.5	88.7
Redundant Head Y	g	6.7	143.7	-17.6	87.3	12.8	90.1	-5.9	43.6
Redundant Head Z	g	28.3	70.5	-6.7	127.4	32.3	61.7	-9.2	128.0
Redundant Head Resultant	g	68.6	85.5	0.1	16.9	66.1	88.7	0.0	16.5
Upper Neck Fx	N	807.6	85.8	-609.0	141.8	571.4	80.0	-486.1	148.2
Upper Neck Fy	N	504.4	17.0	-141.5	17.4	***	***	***	***
Upper Neck Fz	N	1751.0	73.0	-366.0	120.0	2171.9	72.4	-380.4	127.8
Upper Neck F Resultant	N	1866.5	73.4	5.3	28.1	***	***	***	***
Upper Neck Mx	N-m	19.2	149.4	-21.9	102.2	22.4	94.2	-10.2	155.5
Upper Neck My	N-m	42.7	154.2	-33.4	258.4	35.9	158.7	-34.1	64.3
Upper Neck Mz	N-m	16.8	96.4	-6.1	299.9	5.8	158.7	-18.7	108.1
Upper Neck M Resultant	N-m	46.5	154.1	0.3	12.6	38.0	81.4	0.1	24.6
Chest X	g	3.3	203.4	-51.2	74.8	2.4	166.9	-51.7	75.7
Chest Y	g	6.2	88.5	-5.9	52.9	5.3	72.7	-3.4	52.2
Chest Z	g	18.9	66.7	-14.3	122.1	20.5	56.2	-13.4	127.3
Chest Resultant	g	53.8	74.6	0.0	-26.8	53.0	75.8	0.0	-33.4

\*Questionable Data

\*\*Wire Cut at 110 ms

\*\*\*Data is Meaningless

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

Vehicle Year/Make/Model/Body Style: 2003 Chevrolet Tahoe MPV

NHTSA Test No.: M30109 Test Date: March 14, 2003

DESCRIPTION	Unit	MAXIMUM VALUE							
		Driver				Passenger			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Redundant Chest X	g	3.3	204.0	-51.1	75.0	2.5	168.4	-52.3	75.7
Redundant Chest Y	g	6.2	83.6	-5.4	52.9	5.2	74.4	-3.6	52.2
Redundant Chest Z	g	18.9	66.7	-14.0	121.9	20.4	56.2	-13.6	124.5
Redundant Chest Resultant	g	53.8	75.0	0.0	-25.1	53.6	75.9	0.0	-28.6
Chest Displacement	mm	0.0	-42.1	-28.6	70.8	0.0	-11.3	-34.4	90.0
Pelvic X	g	4.9	139.8	-98.8	50.4	4.2	122.5	-76.0	50.3
Pelvic Y	g	7.6	66.9	-25.1	50.4	5.7	90.3	-10.9	50.6
Pelvic Z	g	9.2	52.3	-20.0	109.7	7.7	52.0	-16.2	122.8
Pelvic Resultant	g	102.2	50.4	0.0	-45.3	76.7	50.3	0.0	-50.0
Left Femur	N	196.6	37.4	-5746.0	53.5	204.6	130.2	-5044.2	46.3
Right Femur	N	355.9	42.9	-9750.7	51.5	160.6	143.1	-6516.4	57.9
Left Upper Tibia Mx	N-m	62.7	64.3	-34.6	51.0	26.6	81.4	-127.9	57.5
Left Upper Tibia My	N-m	149.6	46.3	-149.2	57.4	112.8	48.5	-16.5	37.3
Left Lower Tibia Fz	N	513.6	87.6	-5689.5	53.7	95.3	135.8	-5429.4	52.7
Left Lower Tibia Mx	N-m	38.7	61.0	-19.2	51.4	45.4	62.0	-46.9	56.9
Left Lower Tibia My	N-m	65.0	42.7	-17.0	38.2	69.4	51.2	-10.4	275.4
Right Upper Tibia Mx	N-m	37.8	98.1	-62.2	52.3	14.1	297.0	-52.4	53.4
Right Upper Tibia My	N-m	56.7	46.6	-399.3	53.9	63.3	44.6	-41.5	54.0
Right Lower Tibia Fz	N	89.1	41.5	§	§	170.8	63.0	-2318.3	44.8
Right Lower Tibia Mx	N-m	34.6	48.9	-40.1	52.6	56.0	56.8	-28.0	49.9
Right Lower Tibia My	N-m	91.9	132.4	-116.7	49.4	81.7	56.7	-6.4	30.4
Left Foot Aft Ax	g	8.4	68.3	-111.2	49.3	36.9	57.5	-190.4	45.4
Left Foot Aft Az	g	46.0	42.4	-119.1	54.6	39.6	42.0	-77.6	51.9
Left Foot Fore Az	g	*	*	*	*	120.3	55.9	-259.0	44.4
Right Foot Aft Ax	g	111.5	53.5	-424.3	49.9	14.9	56.5	-121.4	48.8
Right Foot Aft Az	g	37.5	63.2	-328.9	48.5	21.5	43.9	-81.1	54.0
Right Foot Fore Az	g	**	**	**	**	47.1	49.5	-126.8	54.2
Lap Belt Load	N	4209.6	53.9	-1.3	-47.3	3632.8	51.0	-13.5	177.9

\*Wire Cut at 203 ms

\*\*Wire Cut at 46 ms

§ Data is clipped

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

Vehicle Year/Make/Model/Body Style: 2003 Chevrolet Tahoe MPV

NHTSA Test No.: M30109 Test Date: March 14, 2003

HEAD INJURY CRITERIA (HIC)				
	HIC**	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	Average Acceleration t <sub>1</sub> to t <sub>2</sub>
Position #1 - Driver	724.2	64.4	100.4	52.7 g
Position #2 - Passenger	731.4	64.9	100.9	52.9 g

\*\* HIC is as defined in FMVSS 208. The maximum time interval from t<sub>1</sub> to t<sub>2</sub> is 36 milliseconds.

† Calculated using Head Redundant X accelerometer, primary accelerometer cable was cut at 110 ms

CLIP SUMMARY*				
	CLIP (g's)	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	CSI
Position #1 - Driver	52.6	73.3	76.3	543.1
Position #2 - Passenger	52.0	74.2	77.2	514.7

\* 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: 2003 Chevrolet Tahoe MPV  
 NHTSA Test No.: M30109 Test Date: March 14, 2003

HEAD INJURY CRITERIA (HIC) <b>REDUNDANT</b>				
	HIC**	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	Average Acceleration t <sub>1</sub> to t <sub>2</sub>
Position #1 - Driver	732.6	64.5	100.5	52.9 g
Position #2 - Passenger	700.4	64.6	100.6	52.0 g

\*\* HIC is as defined in FMVSS 208. The maximum time interval from t<sub>1</sub> to t<sub>2</sub> is 36 milliseconds.

CLIP SUMMARY* <b>REDUNDANT</b>				
	CLIP (g's)	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	CSI
Position #1 - Driver	52.4	73.5	76.5	543.0
Position #2 - Passenger	52.4	74.2	77.2	529.3

\* 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

1465

1490

Shoulder belt length as measured  
on Part 572 Dummy.

830

840

Lap belt length as measured  
on Part 572 Dummy.

635

650

\_\_\_\_\_   
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 20 mm molding.

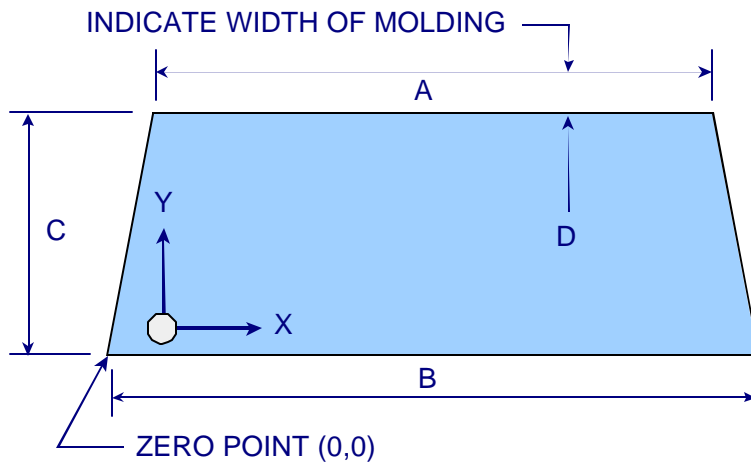
FMVSS 212 REQUIREMENTS:

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	2245	2245	100.0%
LEFT SIDE	2245	2245	100.0%
TOTAL	4490	4490	100.0%

AREA OF RETENTION FAILURE: None



DIMENSIONS (mm)	
A	1410
B	1760
C	660
D	20

**FRONT VIEW OF WINDSHIELD**

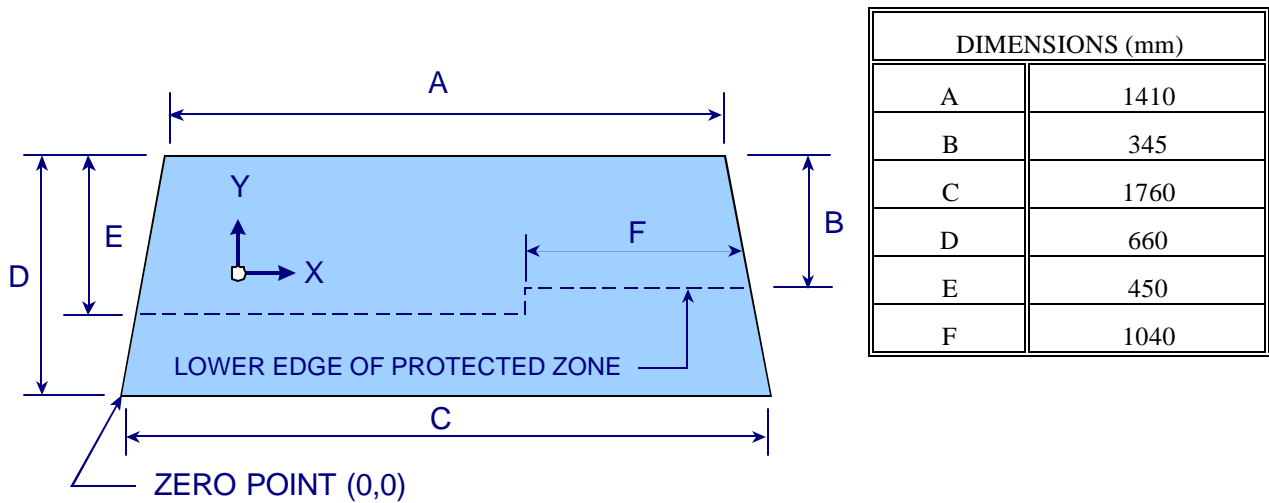
FAILURE DETAILS: None

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

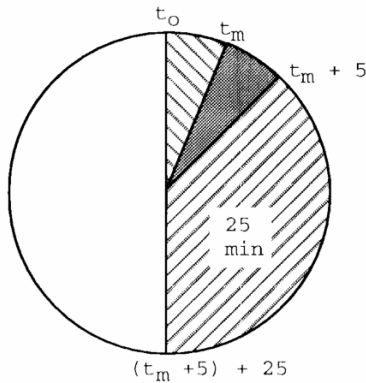
NHTSA TEST No.: M30109 TEST DATE: March 14, 2003  
VEHICLE MAKE/MODEL: 2003 Chevrolet Tahoe MPV

The test vehicle was filled from 92% to 94% of the manufacturer'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

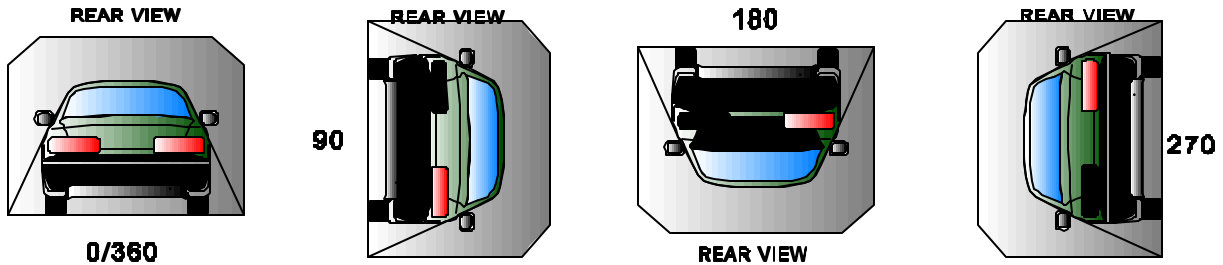
ACTUAL	MAX ALLOWED
0	28 g
0	141 g
0	28 g/min.

SOLVENT SPILLAGE DETAILS: None

**DATA SHEET NO. 13 - ROLLOVER DATA**

Vehicle: 2003 Chevrolet Tahoe MPV

NHTSA No.: M30109



**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	
	1	minutes	14	seconds	5	minutes	6	minutes	14	seconds	7	minutes
0° - 90°	1	minutes	04	seconds	5	minutes	6	minutes	4	seconds	7	minutes
90° - 180°	1	minutes	03	seconds	5	minutes	6	minutes	3	seconds	7	minutes
180° -270°	1	minutes	08	seconds	5	minutes	6	minutes	8	seconds	7	minutes
270° -360°	1	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:**

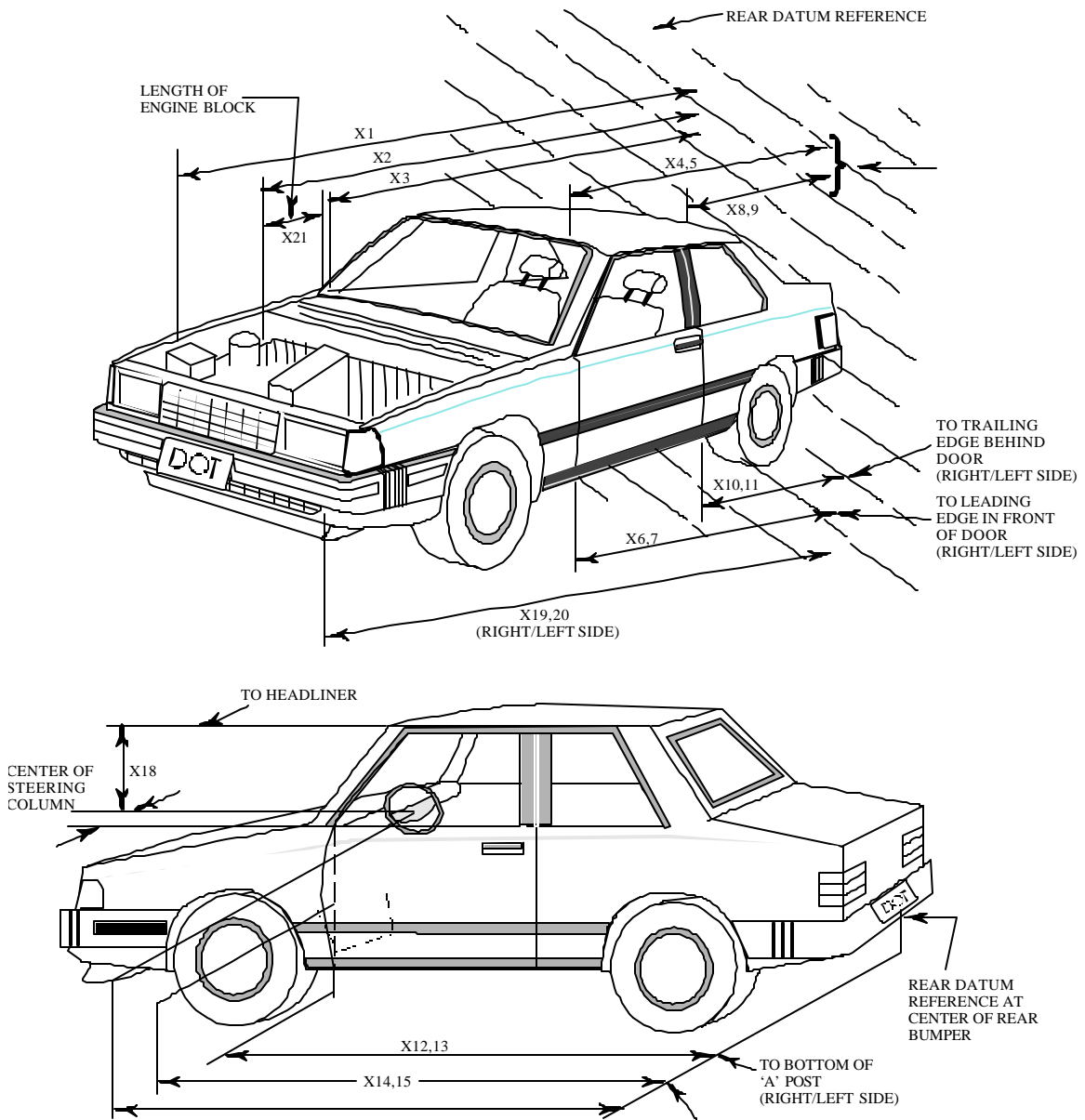
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	N/A
90° - 180°	0	0	0	N/A
180° -270°	0	0	0	N/A
270° -360°	0	0	0	N/A

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

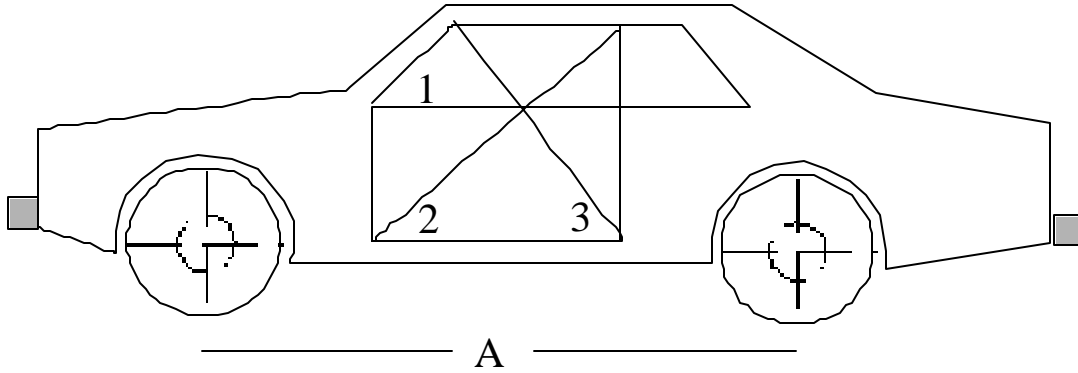


DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	5064	4463	601
X2	Rear Surface of Vehicle to Front of Engine	4341	4095	246
X3	Rear Surface of Vehicle to Firewall	3889	3808	81
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3513	3494	19
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3562	3537	25
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3505	3494	11
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3528	3496	32
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2346	2324	22
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2396	2368	28
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2353	2346	7
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2387	2362	25
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3521	3492	29
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3561	3536	25
X14	Rear Surface of Vehicle to Firewall, Right Side	3854	3825	29
X15	Rear Surface of Vehicle to Firewall, Left Side	3883	3847	36
X16	Rear Surface of Vehicle to Steering Column	3062	3051	11
X17	Center of Steering Column to "A" Post	318	299	19
X18	Center of Steering Column to Headliner	439	427	12
X19	Rear Surface of Vehicle to Right Side of Front Bumper	5006	4437	569
X20	Rear Surface of Vehicle to Left Side of Front Bumper	5013	4438	575
X21	Length of Engine Block	499	499	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	3202	3178	24
CD	Rear Surface of Vehicle to Center of Dash Panel	3254	3205	49
LD	Rear Surface of Vehicle to Left Side of Dash Panel	3244	3207	37

All Dimensions in mm

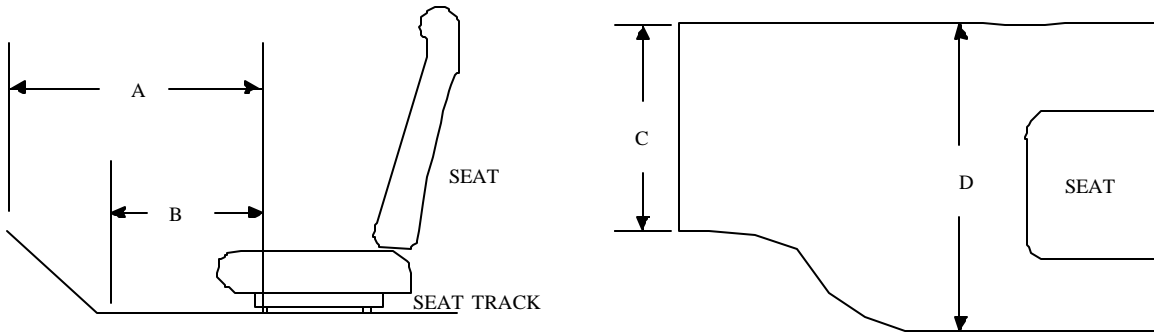
DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)  
 VEHICLE INTRUSION MEASUREMENTS  
 DOOR OPENING WIDTH



UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	1114	1573	1229	1122	1575	1255
AFTER TEST	1101	1564	1257	1105	1563	1266
DIFFERENCE	13	9	-28	17	12	-11

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2950	2950
AFTER TEST	2833	2838
DIFFERENCE	117	112

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



DRIVER

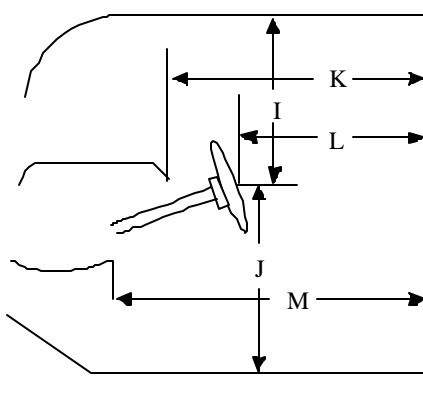
Measurement	Pre-Test	Post-Test	Difference
A	764	614	150
B	590	481	109
C	511	453	58
D	473	476	-3

PASSENGER

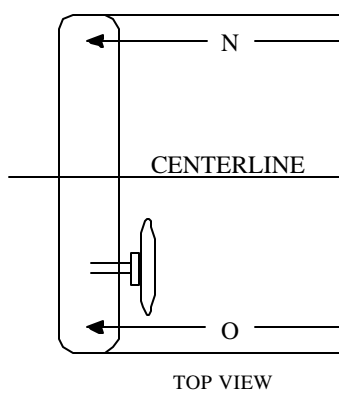
Measurement	Pre-Test	Post-Test	Difference
A	678	570	108
B	479	452	27
C	360	351	9
D	392	380	12

Units = mm

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

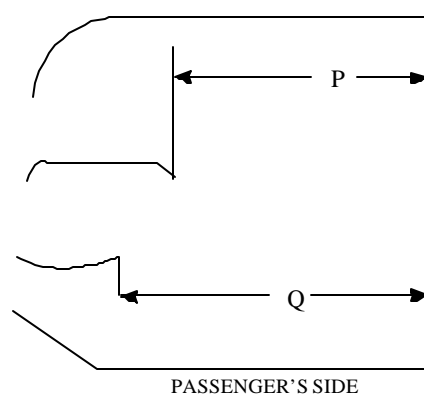


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS  
 FROM C-PILLAR  
 BELT ANCHORAGE

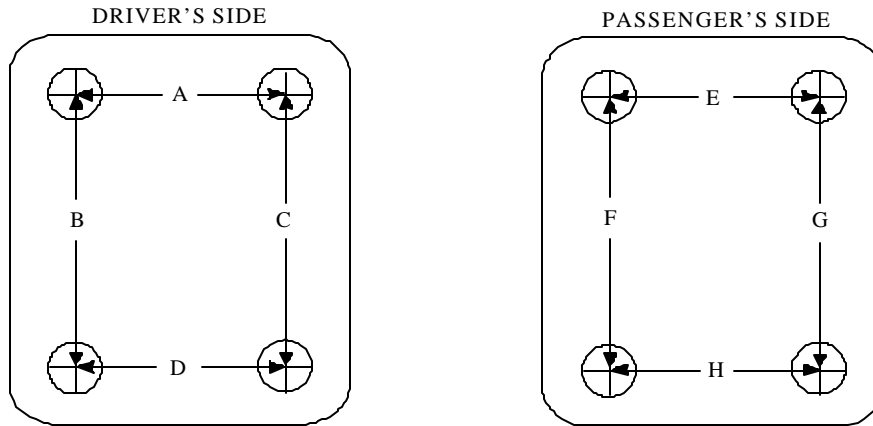


PASSENGER'S SIDE

Measurement	Pre-Test	Post-Test	Difference
I	439	427	12
J	708	784	-76
K	1737	1725	12
L	1508	1535	-27
M	1766	1733	33
N	1712	1739	-27
O	1690	1691	-1
P = K (PASS.)	1709	1735	-26
Q = M (PASS.)	1761	1777	-16

Units = mm

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

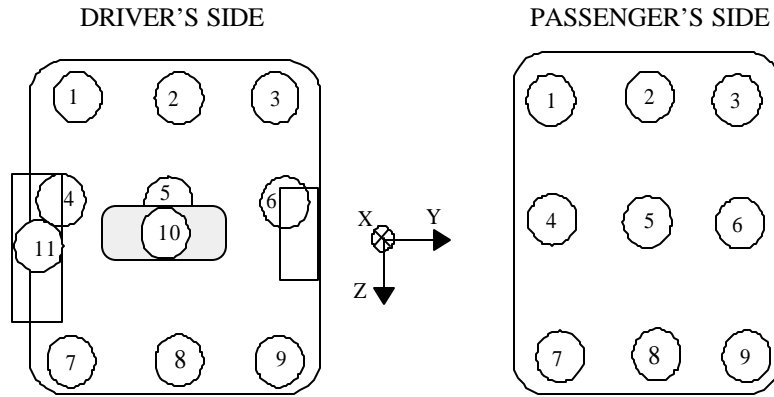


TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	511	453	58
B	447	427	20
C	372	370	3
D	473	476	-3
E	360	351	8
F	398	405	-7
G	364	292	72
H	392	380	12

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	3725	3625	100	-768	-757	-11
2	3805	3634	171	-707	-748	41
3	3787	3609	178	-709	-750	41
4	3698	3602	96	-667	-666	-1
5	3737	3578	159	-621	-672	51
6	3714	3531	183	-657	-699	42
7	3634	3542	92	-588	-588	0
8	3630	3501	129	-583	-606	23
9	3623	3476	147	-592	-606	14
10	3523	3421	102	-702	-700	-2
11	3676	3595	81	-679	-678	-1

**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	3626	3527	99	-736	-831	95
2	3677	3586	91	-745	-818	73
3	3655	3602	53	-774	-844	70
4	3566	3427	139	-658	-756	98
5	3569	3507	62	-660	-731	71
6	3579	3560	19	-666	-727	61
7	3469	3418	51	-584	-628	44
8	3478	3468	10	-577	-622	45
9	3479	3476	3	-582	-635	53

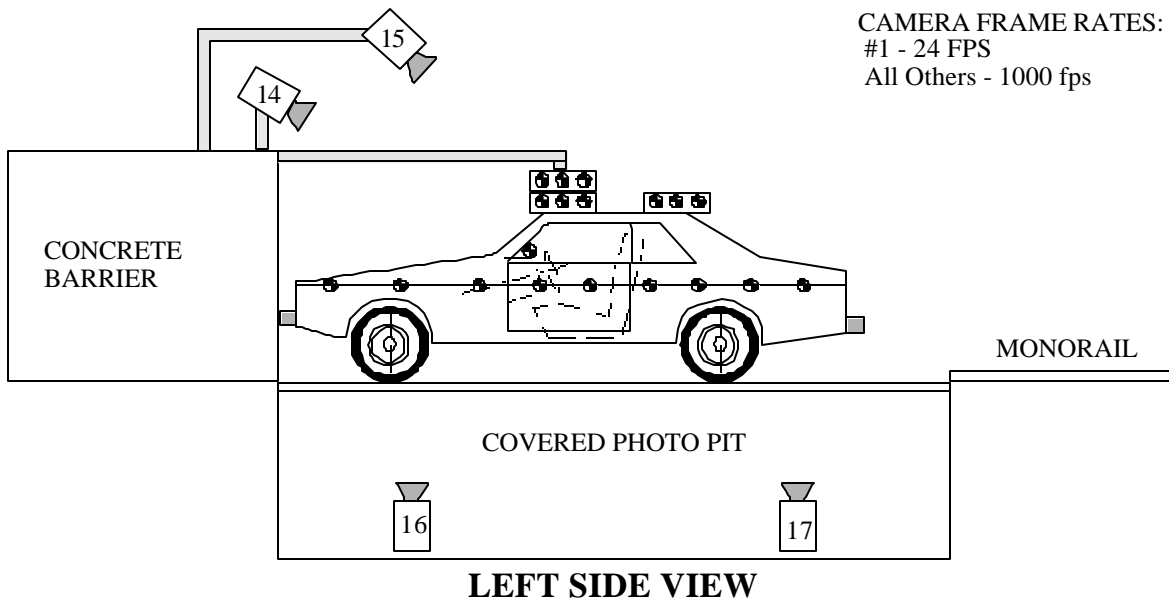
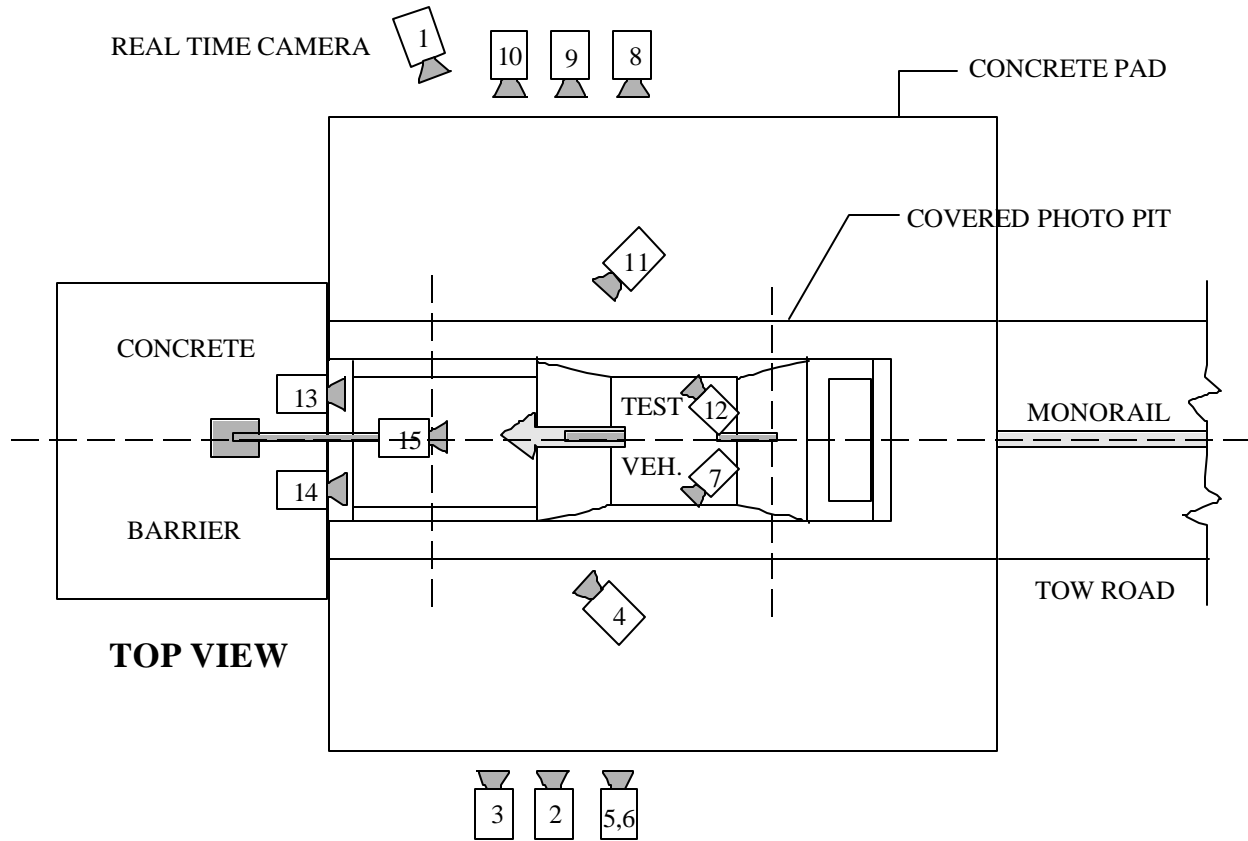
Reference: SAE: X = Rear Bumper (Positive: forward); Z = Ground (Positive: down)

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)  
TARGET VEHICLE STRUCTURAL MEASUREMENTS

	Elements	Pre-Test (mm)
1	Total length	5064
2	Total Width	2000
3	Bumper Top Height	670
4	Bumper Bottom Height	505
5	Longitudinal Member Top Height	610
6	Distance Between Longitudinal Members	800
7	Longitudinal Member Width	45
8	Engine top height	1185
9	Engine bottom height	240
10	Engine and gearbox width	570
11	Front bumper-engine distance	715
12	Front shock absorber fixing height	745
13	Bonnet leading edge height	1105
14	Front shock absorber fixing width	860
15	Front bumper – front axle distance	940
16	Front axle – a pillar distance	550
17	A-pillar – B pillar distance	1200
18	B-pillar – rear axle distance	1210
19	B-pillar – C Pillar distance	896
20	Roof sill bottom height	1650
21	Roof sill top height	1810
22	Floor sill bottom height	333
23	Floor sill top height	550

DATA SHEET NO.15 HIGH-SPEED CAMERA LOCATIONS

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



CAMERA FRAME RATES:  
 #1 - 24 FPS  
 All Others - 1000 fps

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

NHTSA Test No.:                   M30109                   Vehicle:                   2003 Chevrolet Tahoe MPV                  

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)*			ANGLE (deg)**	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	7080	1695	1140	-3	6705	12.5	1010
3	Left Side View	8600	945	1170	-4	8225	25	1030
4	Driver and Interior View	7390	2650	2005	-8	-	25	1050
5	Steering Column (Bottom)	7530	1950	1177	-2	7155	25	1000
6	Steering Column (Top)	7530	1950	1777	-9	7155	25	1040
7	Left Lateral View	3658	2693	2561	-26	-	13	1015
8	Overall Right Side	5863	2122	1206	-2	6265	12.5	1010
9	Right Side View	8752	1450	1164	-1	9154	25	1005
10	Right Passenger View	8702	2000	1374	0	9104	35	1010
11	Passenger and Interior View	6096	2827	2000	-9	-	25	1005
12	Right Lateral View	3642	2642	2557	-29	-	13	150
13	Passenger Front View	620	-92	1987	-20	-	13	1005
14	Driver Front View	620	-92	1987	-27	-	13	1000
15	Windshield View	0	-530	3374	-52	-	13	1005
16	Pit View of Engine	0	615	-3048	90	-	13	1005
17	Pit View of Fuel Tank	0	2603	-3048	90	-	13	1030

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

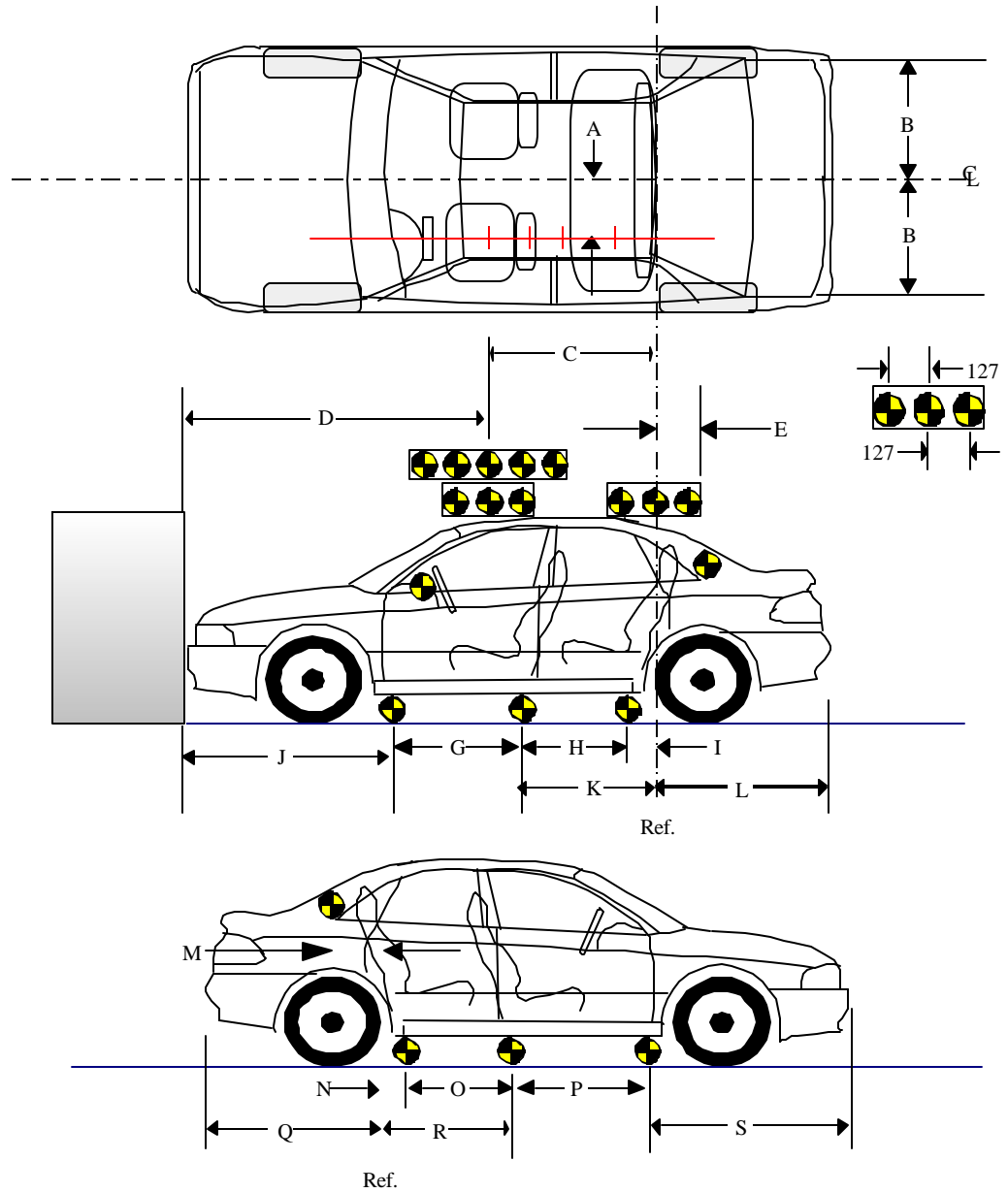
Y = film plane to impact location                      N.T. indicates No Timing

Z = film plane to ground

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

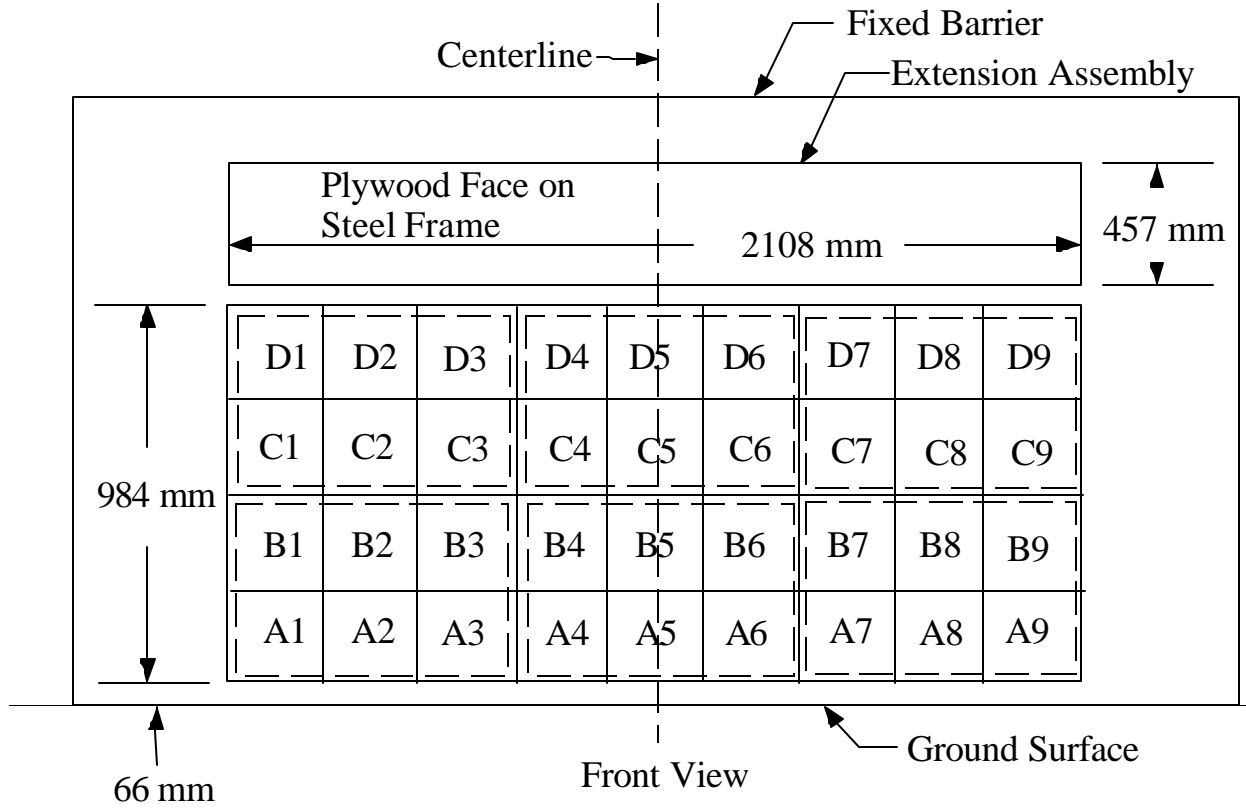
(Dimensions in millimeters)

A	478
B	777
C	1218
D	2262
E	407
F	1628
G	937
H	931
I	173
J	1450
K	1104
L	1571
M	428
N	176
O	946
P	934
Q	1529
R	1122
S	1479



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.:  M30109;  Test Date:  March 14, 2003;  Technician:  P. MacDiarmid

Vehicle Model Year/Make/Model:  2003 Chevrolet Tahoe MPV

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

B. Size of vent holes: (mm<sup>2</sup>)  490.9  -Driver  490.9  -Passenger

C. Total vent area: (mm<sup>2</sup>)  981.8  -Driver  981.8  -Passenger

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

Driver:  650  -Height;  500  -Width;  350  -Depth

Passenger:  550  -Height;  510  -Width;  750  -Depth

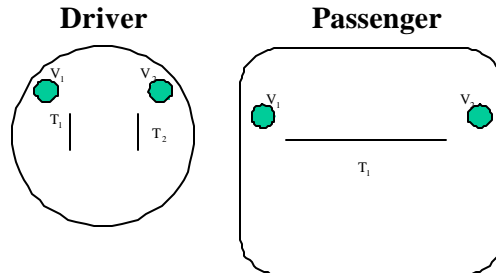
E. Is the air bag tethered?

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

Passenger:  X  -Yes;  -  -No; If yes, record length of tether-  500

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<sub>n</sub> = Vent hole<sub>n</sub>, T<sub>n</sub> = Tether<sub>n</sub>).



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

Driver:  Air bag: 312273 420d GMTG Driver 16872189

Generator: -

Passenger:  Air bag: G1ZNY102KLZ 6004356008 REV: B03

Generator: -

DATA SHEET NO. 19 ACCIDENT INVESTIGATION DIVISION DATA

FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Chevrolet Tahoe MPV

NHTSA Test No.: M30109 VIN: 1GNEK13V63J176473

Model Year: 2003 Build Date: 11/02 Test Date: March 14, 2003

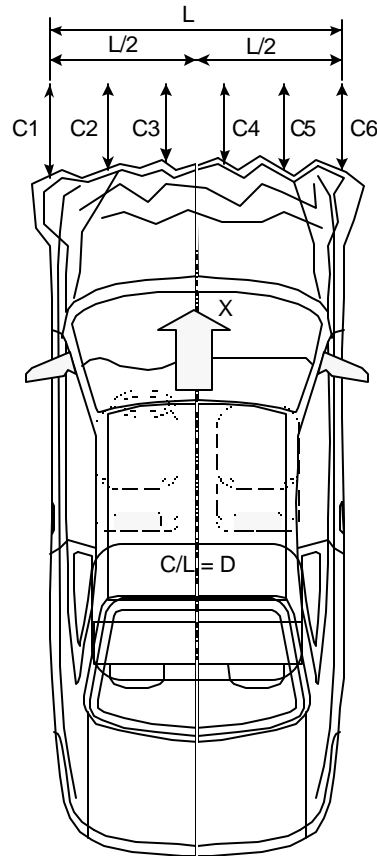
Vehicle Size Category: MPV Test Weight: 2706.0 kg

Vehicle Wheelbase: 2950 mm; Front Overhang: 936 mm; Overall Width: 2000 mm

Collision Deformation Classification (CDC) Code: 12FDEW 3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4852	4375	477
C2 =	4992	4415	577
C3 =	5056	4452	604
C4 =	5066	4451	615
C5 =	4990	4438	552
C6 =	4859	4360	499



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region: L1= 1768 mm

L2= 884.0 mm

L5= 353.6 mm

**APPENDIX A**  
**PHOTOGRAPHS**

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A-24	Pre-Test Front Underbody View	A-27
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A-35	Post-Test Driver And Interior View	A-38
A-36	Pre-Test Driver Feet View	A-39
A-37	Post-Test Driver Feet View	A-40
A-38	Pre-Test Driver Knee Bolster View	A-41
A-39	Post-Test Driver Knee Bolster View	A-42
A-40	Pre-Test Driver Floor Pan View	A-43
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A-42	Post-Test Driver Head View	A-45
A-43	Post-Test Driver Contact To Airbag	A-46

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A-52	Pre-Test Passenger Knee Bolster View	A-55
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A-54	Pre-Test Passenger Floor Pan View	A-57
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A-56	Post-Test Passenger Head View	A-59
A-57	Post-Test Passenger Contact To Airbag	A-60
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Figure A-1 LOAD CELL LOCATIONS



Figure A-2 VEHICLE CERTIFICATION PLACARD



Figure A-3 VEHICLE TIRE PLACARD



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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



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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 WINDSHIELD VIEW



Figure A-20 PRE-TEST ENGINE COMPARTMENT VIEW



Figure A-21 POST-TEST ENGINE COMPARTMENT VIEW



Figure A-22 PRE-TEST FUEL CAP VIEW

**M30109**



Figure A-23 POST-TEST FUEL CAP VIEW



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Figure A-24 PRE-TEST FRONT UNDERBODY VIEW

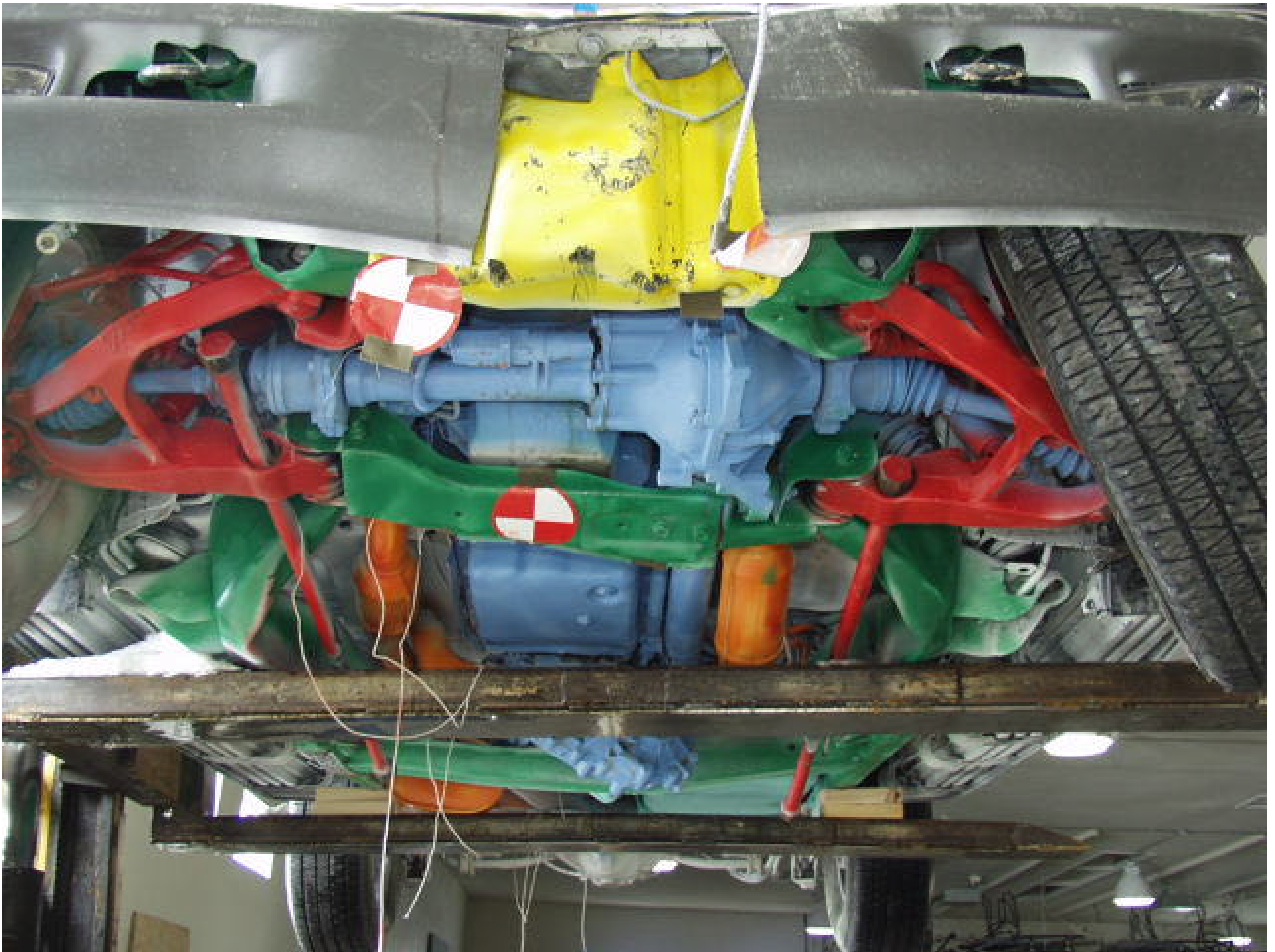


Figure A-25 POST-TEST FRONT UNDERBODY VIEW



Figure A-26 PRE-TEST MID UNDERBODY VIEW



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Figure A-27 POST-TEST MID UNDERBODY VIEW



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Figure A-28 PRE-TEST REAR UNDERBODY VIEW

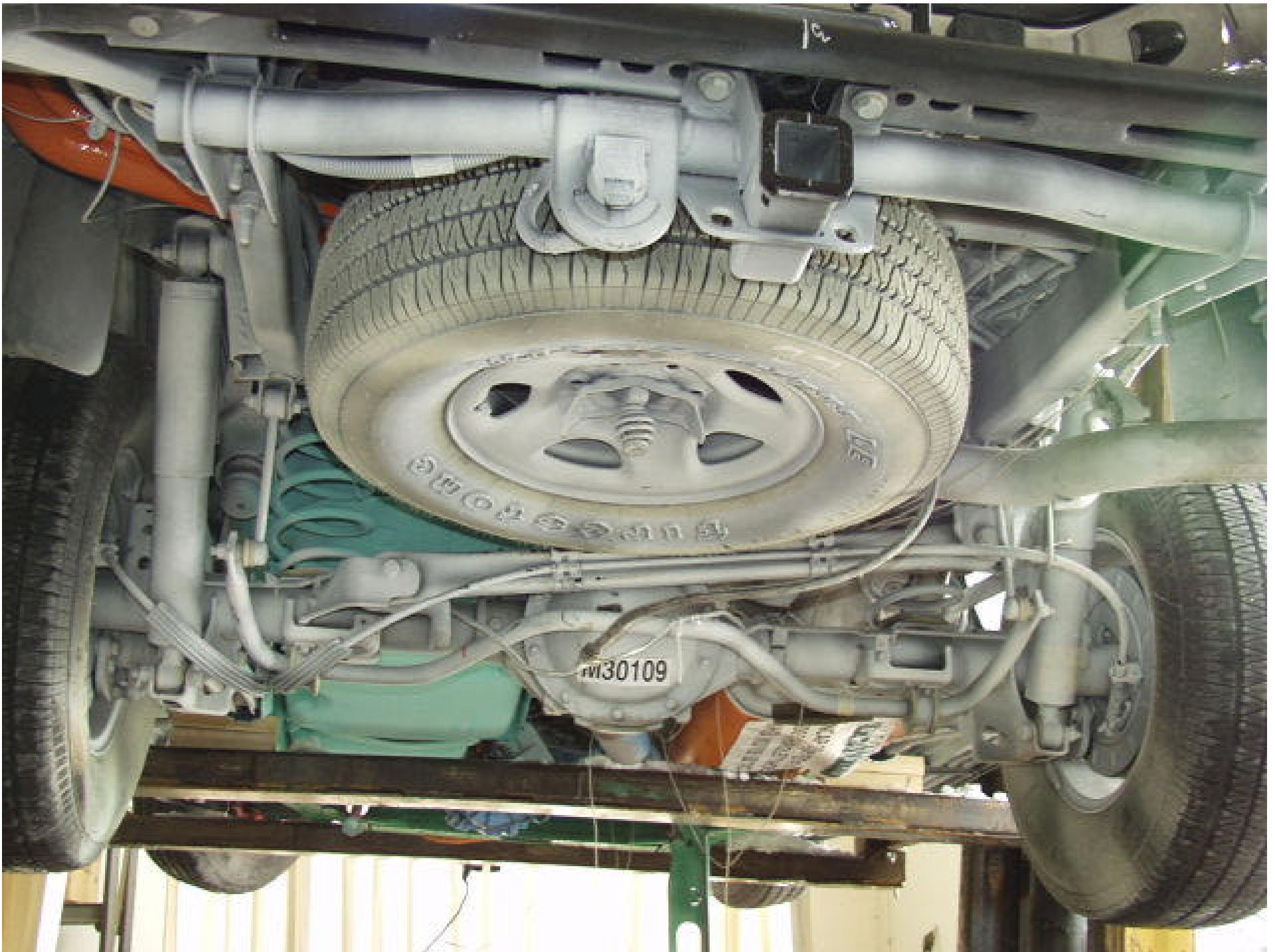


Figure A-29 POST-TEST REAR UNDERBODY VIEW



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Figure A-30 PRE-TEST DRIVER HEAD LOCATION



Figure A-31 POST-TEST DRIVER HEAD LOCATION



Figure A-32 PRE-TEST DRIVER POSITION VIEW



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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



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Figure A-37 POST-TEST DRIVER FEET VIEW



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Figure A-38 PRE-TEST DRIVER KNEE BOLSTER VIEW



Figure A-39 POST-TEST DRIVER KNEE BOLSTER VIEW



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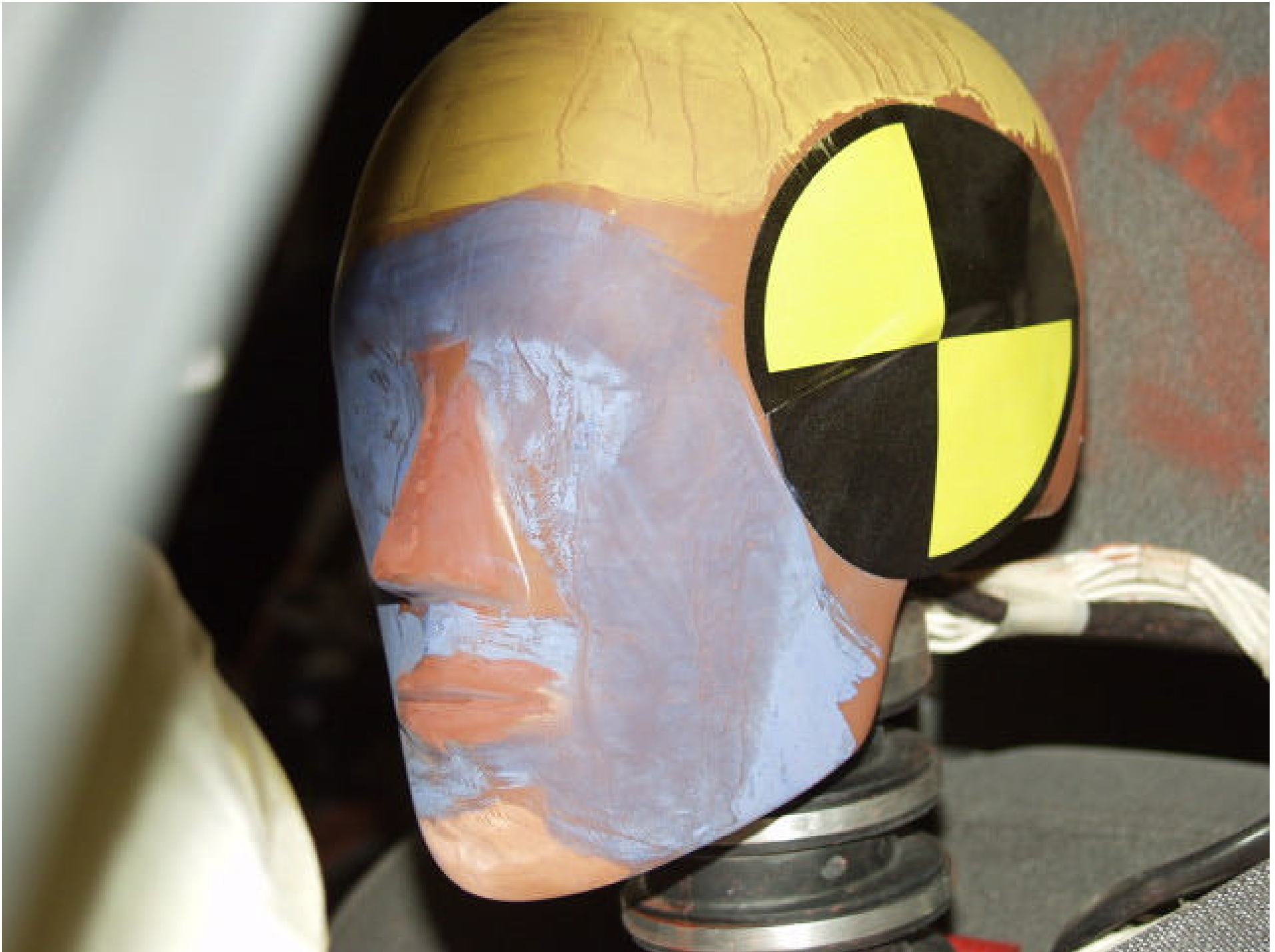
Figure A-40 PRE-TEST DRIVER FLOOR PAN VIEW



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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

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Figure A-47 POST-TEST PASSENGER POSITION VIEW



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Figure A-48 PRE-TEST PASSENGER AND INTERIOR VIEW



Figure A-49 POST-TEST PASSENGER AND INTERIOR VIEW



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Figure A-50 PRE- TEST PASSENGER FEET VIEW



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Figure A-51 POST-TEST PASSENGER FEET VIEW



Figure A-52 PRE-TEST PASSENGER KNEE BOLSTER VIEW



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Figure A-53 POST-TEST PASSENGER KNEE BOLSTER VIEW



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Figure A-54 PRE-TEST PASSENGER FLOOR PAN VIEW



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Figure A-55 POST-TEST PASSENGER FLOOR PAN VIEW



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Figure A-56 POST-TEST PASSENGER HEAD VIEW



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Figure A-57 POST-TEST PASSENGER CONTACT TO AIRBAG

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Figure A-58 ROLLOVER VIEW



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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**

<b>Transducer</b>	<b>SAE Sign Convention (positive unless noted)</b>
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. M30109

<b>DATA TYPE</b>	<b>SAE FILTER CLASS (Hz)</b>
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-9
3	V1P1 Head 9 Array Y Arm Ax [g, CFC_1000]	B-10
4	V1P1 Head 9 Array Y Arm Az [g, CFC_1000]	B-11
5	V1P1 Head 9 Array Z Arm Ax [g, CFC_1000]	B-12
6	V1P1 Head 9 Array Z Arm Ay [g, CFC_1000]	B-13
7	V1P1 Head CG x [g, CFC_1000]	B-14
8	V1P1 Head CG y [g, CFC_1000]	B-15
9	V1P1 Head CG z [g, CFC_1000]	B-16
10	V1P1 Head CG Resultant [g, CFC_1000]	B-17
11	V1P1 Head CG Red x [g, CFC_1000]	B-18
12	V1P1 Head CG Red y [g, CFC_1000]	B-19
13	V1P1 Head CG Red z [g, CFC_1000]	B-20
14	V1P1 Head CG Red Resultant [g, CFC_1000]	B-21
15	V1P1 Upper Neck Fx [N, CFC_1000]	B-22
16	V1P1 Upper Neck Fy [N, CFC_1000]	B-23
17	V1P1 Upper Neck Fz [N, CFC_1000]	B-24
18	V1P1 Upper Neck F Resultant [N, CFC_1000]	B-25
19	V1P1 Upper Neck Mx [N-m, CFC_600]	B-26
20	V1P1 Upper Neck My [N-m, CFC_600]	B-27
21	V1P1 Upper Neck Mz [N-m, CFC_600]	B-28
22	V1P1 Upper Neck M Resultant [N-m, CFC_600]	B-29
23	V1P1 Chest x [g, CFC_180]	B-30
24	V1P1 Chest y [g, CFC_180]	B-31
25	V1P1 Chest z [g, CFC_180]	B-32
26	V1P1 Chest Resultant [g, CFC_180]	B-33
27	V1P1 Chest Red x [g, CFC_180]	B-34
28	V1P1 Chest Red y [g, CFC_180]	B-35
29	V1P1 Chest Red z [g, CFC_180]	B-36
30	V1P1 Chest Red Resultant [g, CFC_180]	B-37
31	V1P1 Chest Compression x [mm, CFC_600]	B-38
32	V1P1 Pelvic x [g, CFC_1000]	B-39
33	V1P1 Pelvic y [g, CFC_1000]	B-40
34	V1P1 Pelvic z [g, CFC_1000]	B-41
35	V1P1 Pelvic Resultant [g, CFC_1000]	B-42
36	V1P1 Left Femur z [N, CFC_600]	B-43
37	V1P1 Right Femur z [N, CFC_600]	B-44
38	V1P1 Left Upper Tibia Mx [N-m, CFC_600]	B-45
39	V1P1 Left Upper Tibia My [N-m, CFC_600]	B-46
40	V1P1 Left Lower Tibia Fz [N, CFC_600]	B-47
41	V1P1 Left Lower Tibia Mx [N-m, CFC_600]	B-48
42	V1P1 Left Lower Tibia My [N-m, CFC_600]	B-49
43	V1P1 Right Upper Tibia Mx [N-m, CFC_600]	B-50
44	V1P1 Right Upper Tibia My [N-m, CFC_600]	B-51
45	V1P1 Right Lower Tibia Fz [N, CFC_600]	B-52
46	V1P1 Right Lower Tibia Mx [N-m, CFC_600]	B-53

**TABLE OF DATA PLOTS (continued)**

<b>PLOT</b>	<b>PLOT NAME[UNITS, CHANNEL FILTER CLASS]</b>	<b>PAGE</b>
47	V1P1 Right Lower Tibia My [N-m, CFC_600]	B-54
48	V1P1 Left Foot Aft x [g, CFC_600]	B-55
49	V1P1 Left Foot Aft z [g, CFC_600]	B-56
50	V1P1 Left Foot Fore z [g, CFC_600]	B-57
51	V1P1 Right Foot Aft x [g, CFC_600]	B-58
52	V1P1 Right Foot Aft z [g, CFC_600]	B-59
53	V1P1 Right Foot Fore z [g, CFC_600]	B-60
54	V1P1 Driver Lap Belt [N, CFC_60]	B-61
55	V1P2 Head 9 Array X Arm Ay [g, CFC_1000]	B-62
56	V1P2 Head 9 Array X Arm Az [g, CFC_1000]	B-63
57	V1P2 Head 9 Array Y Arm Ax [g, CFC_1000]	B-64
58	V1P2 Head 9 Array Y Arm Az [g, CFC_1000]	B-65
59	V1P2 Head 9 Array Z Arm Ax [g, CFC_1000]	B-66
60	V1P2 Head 9 Array Z Arm Ay [g, CFC_1000]	B-67
61	V1P2 Head CG x [g, CFC_1000]	B-68
62	V1P2 Head CG y [g, CFC_1000]	B-69
63	V1P2 Head CG z [g, CFC_1000]	B-70
64	V1P2 Head CG Resultant [g, CFC_1000]	B-71
65	V1P2 Head CG Red x [g, CFC_1000]	B-72
66	V1P2 Head CG Red y [g, CFC_1000]	B-73
67	V1P2 Head CG Red z [g, CFC_1000]	B-74
68	V1P2 Head CG Red Resultant [g, CFC_1000]	B-75
69	V1P2 Upper Neck Fx [N, CFC_1000]	B-76
70	V1P2 Upper Neck Fy [N, CFC_1000]	B-77
71	V1P2 Upper Neck Fz [N, CFC_1000]	B-78
72	V1P2 Upper Neck F Resultant [N, CFC_1000]	B-79
73	V1P2 Upper Neck Mx [N-m, CFC_600]	B-80
74	V1P2 Upper Neck My [N-m, CFC_600]	B-81
75	V1P2 Upper Neck Mz [N-m, CFC_600]	B-82
76	V1P2 Upper Neck M Resultant [N-m, CFC_600]	B-83
77	V1P2 Chest x [g, CFC_180]	B-84
78	V1P2 Chest y [g, CFC_180]	B-85
79	V1P2 Chest z [g, CFC_180]	B-86
80	V1P2 Chest Resultant [g, CFC_180]	B-87
81	V1P2 Chest Red x [g, CFC_180]	B-88
82	V1P2 Chest Red y [g, CFC_180]	B-89
83	V1P2 Chest Red z [g, CFC_180]	B-90
84	V1P2 Chest Red Resultant [g, CFC_180]	B-91
85	V1P2 Chest Compression x [mm, CFC_600]	B-92
86	V1P2 Pelvic x [g, CFC_1000]	B-93
87	V1P2 Pelvic y [g, CFC_1000]	B-94
88	V1P2 Pelvic z [g, CFC_1000]	B-95
89	V1P2 Pelvic Resultant [g, CFC_1000]	B-96
90	V1P2 Left Femur z [N, CFC_600]	B-97
91	V1P2 Right Femur z [N, CFC_600]	B-98
92	V1P2 Left Upper Tibia Mx [N-m, CFC_600]	B-99

**TABLE OF DATA PLOTS (continued)**

<b>PLOT</b>	<b>PLOT NAME[UNITS, CHANNEL FILTER CLASS]</b>	<b>PAGE</b>
93	V1P2 Left Upper Tibia My [N-m, CFC_600]	B-100
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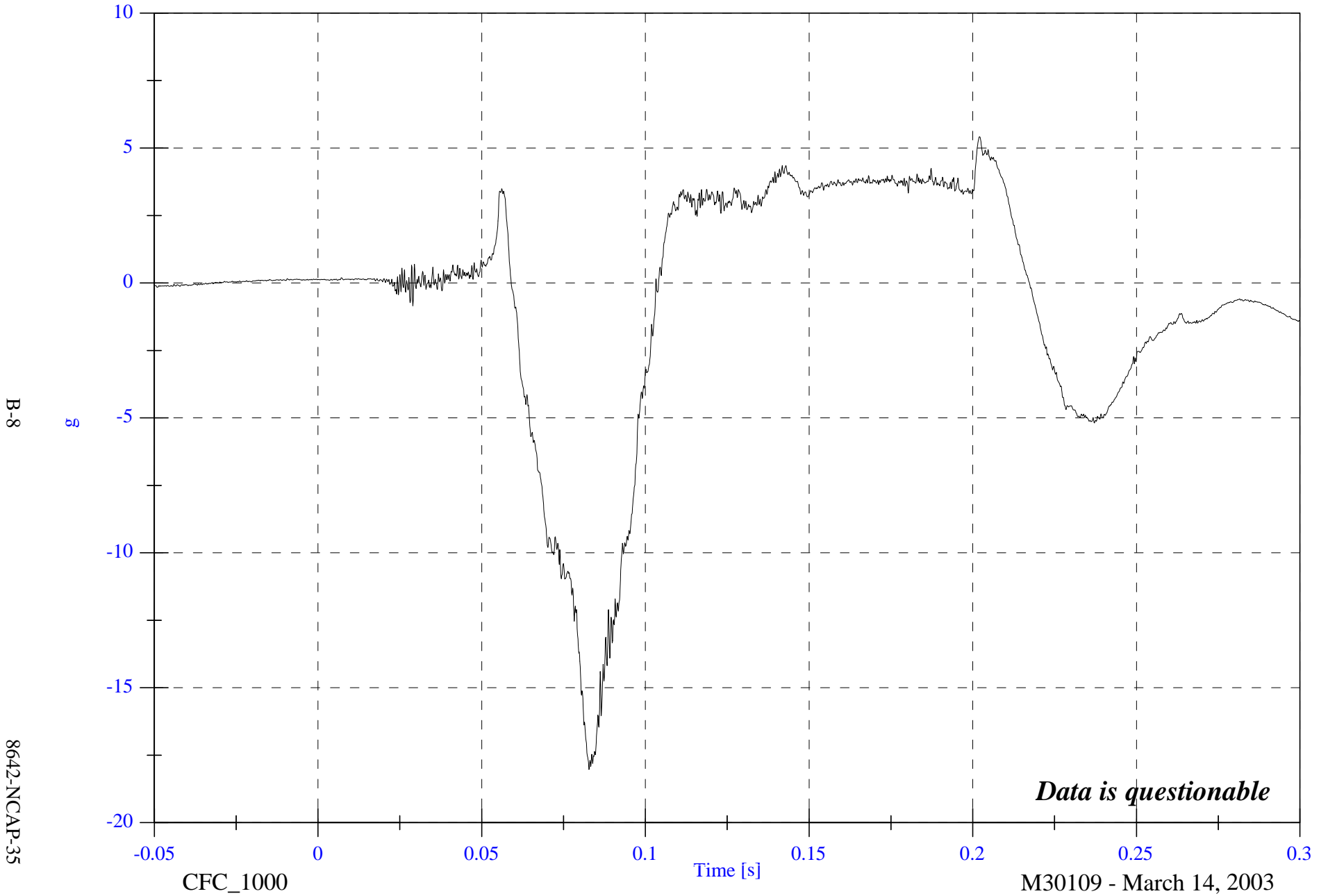
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2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P1 Head 9 Array X Arm Ay

Max: 5.4 [g] at 0.202 [s]

Min: -18.0 [g] at 0.083 [s]



B-8

8642-NCAP-35

CFC\_1000

Time [s]

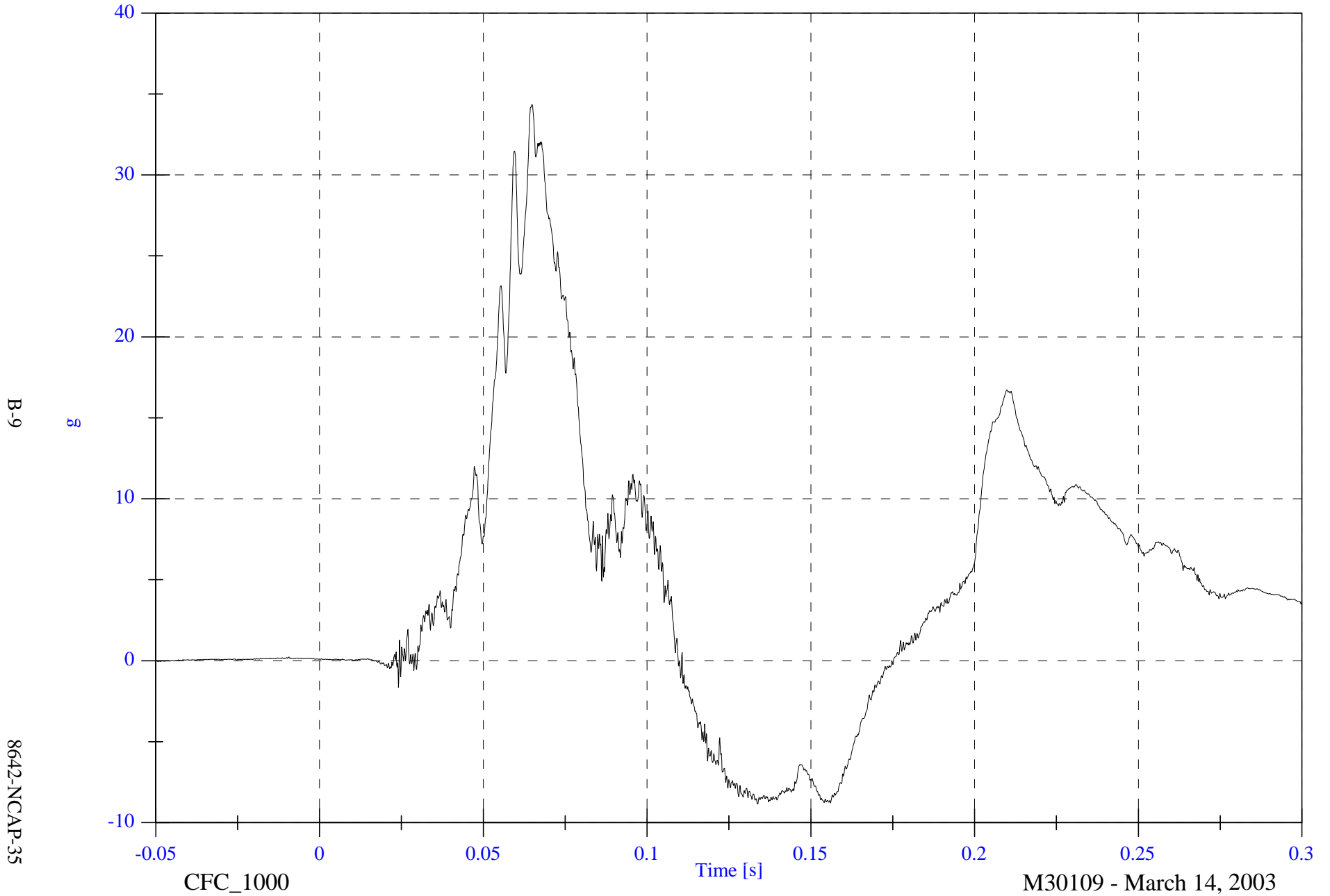
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP1 Head 9 Array X Arm Az

Max: 34.4 [g] at 0.065 [s]

Min: -8.9 [g] at 0.134 [s]



B-9

8642-NCAP-35

CFC\_1000

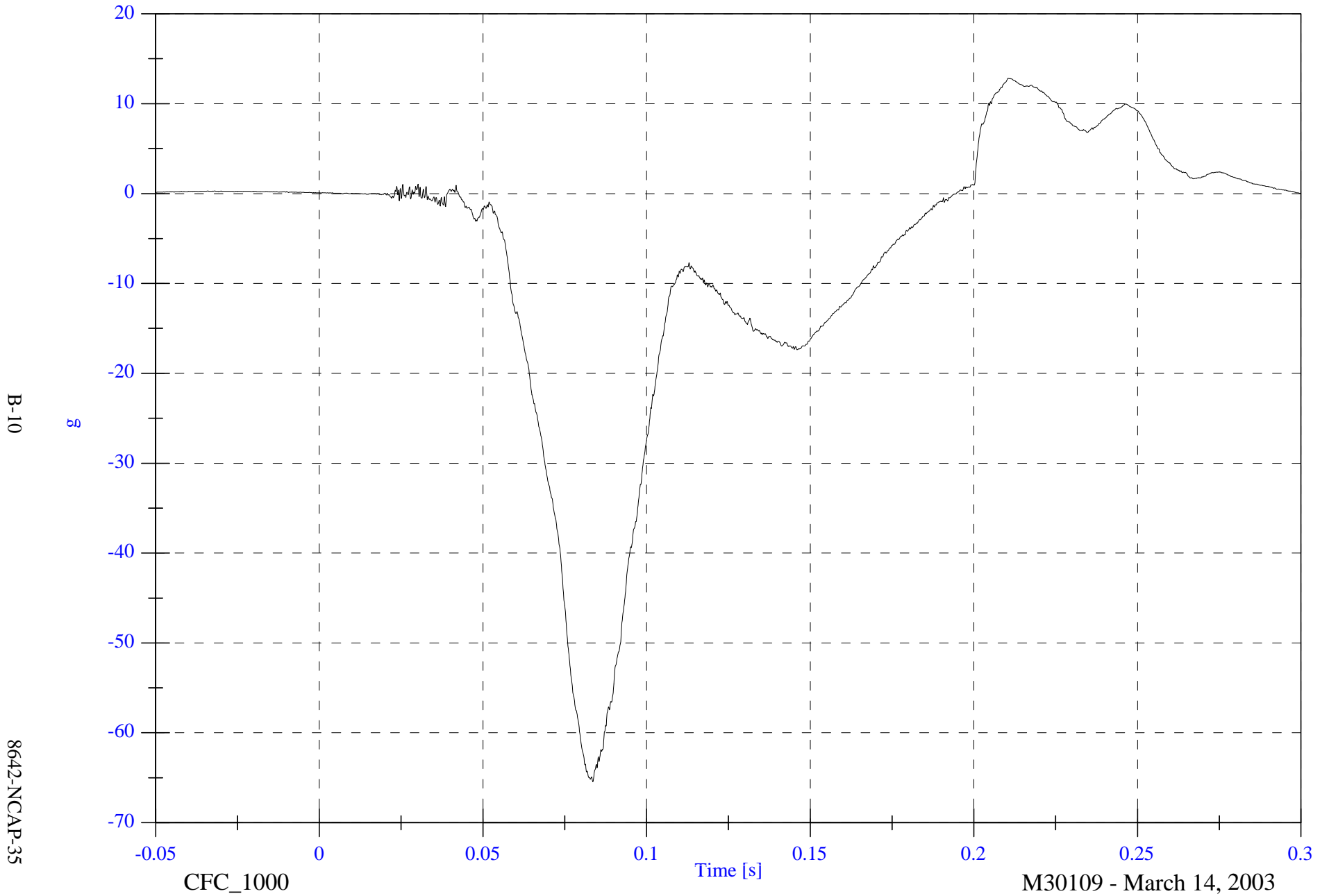
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P1 Head 9 Array Y Arm Ax

Max: 12.8 [g] at 0.210 [s]

Min: -65.4 [g] at 0.084 [s]



B-10

8642-NCAP-35

2003 NCAP Test 13 2003 Chevrolet Tahoe

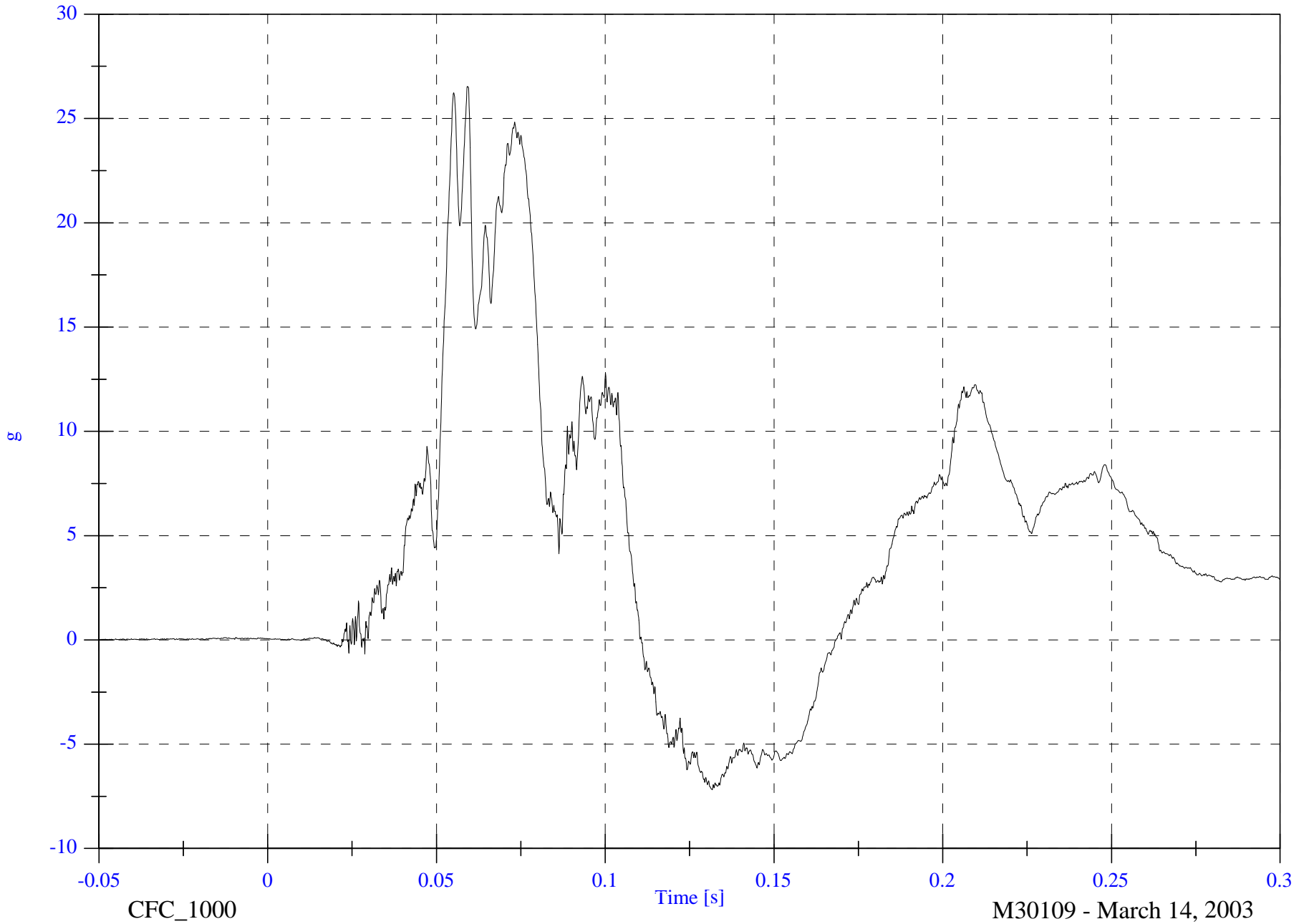
VIP1 Head 9 Array Y Arm Az

Max: 26.5 [g] at 0.059 [s]

Min: -7.2 [g] at 0.132 [s]

B-11

8642-NCAP-35



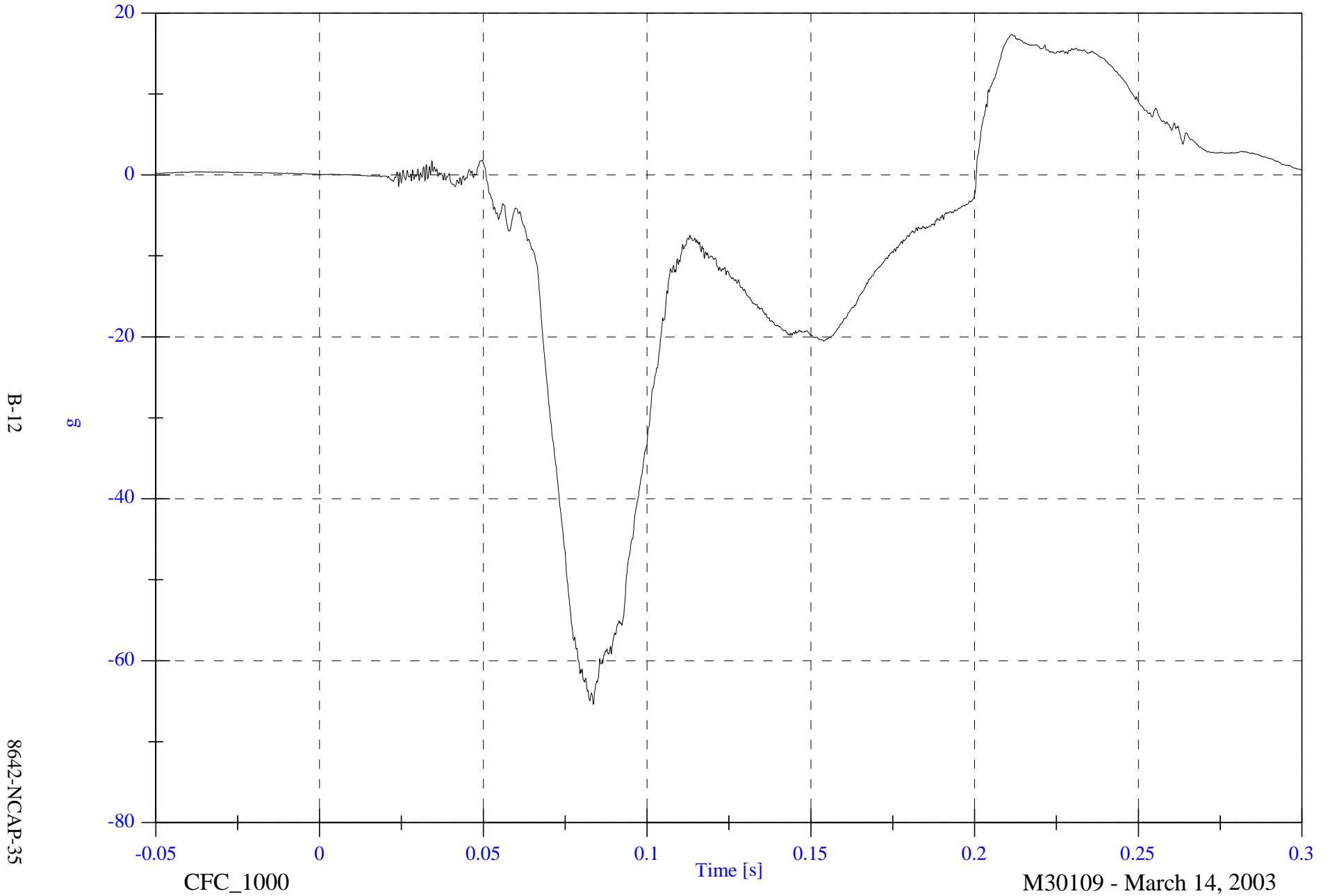
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P1 Head 9 Array Z Arm Ax

Max: 17.4 [g] at 0.211 [s]

Min: -65.4 [g] at 0.084 [s]



B-12

8642-NCAP-35

CFC\_1000

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

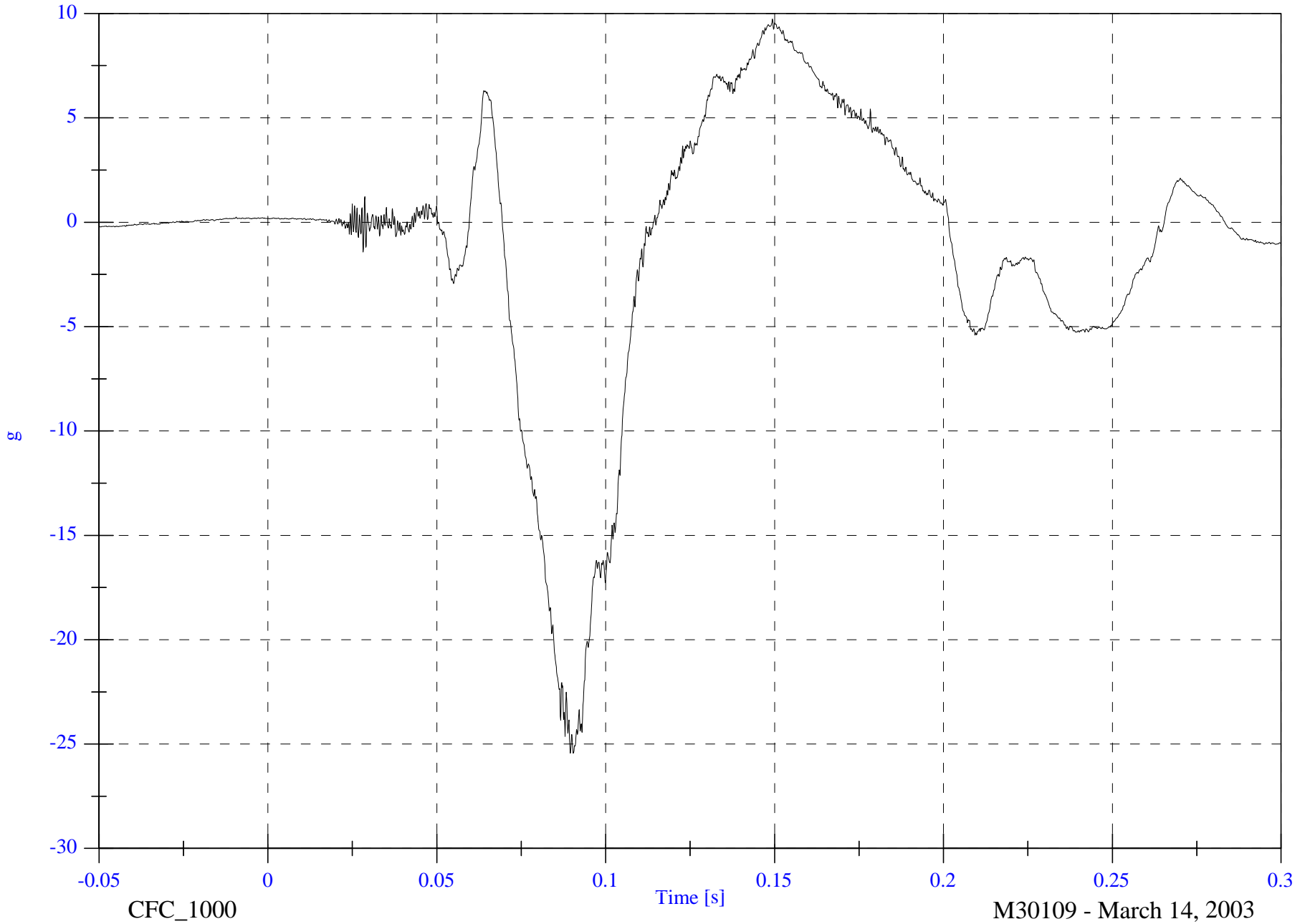
V1P1 Head 9 Array Z Arm Ay

Max: 9.7 [g] at 0.149 [s]

Min: -25.4 [g] at 0.090 [s]

B-13

8642-NCAP-35

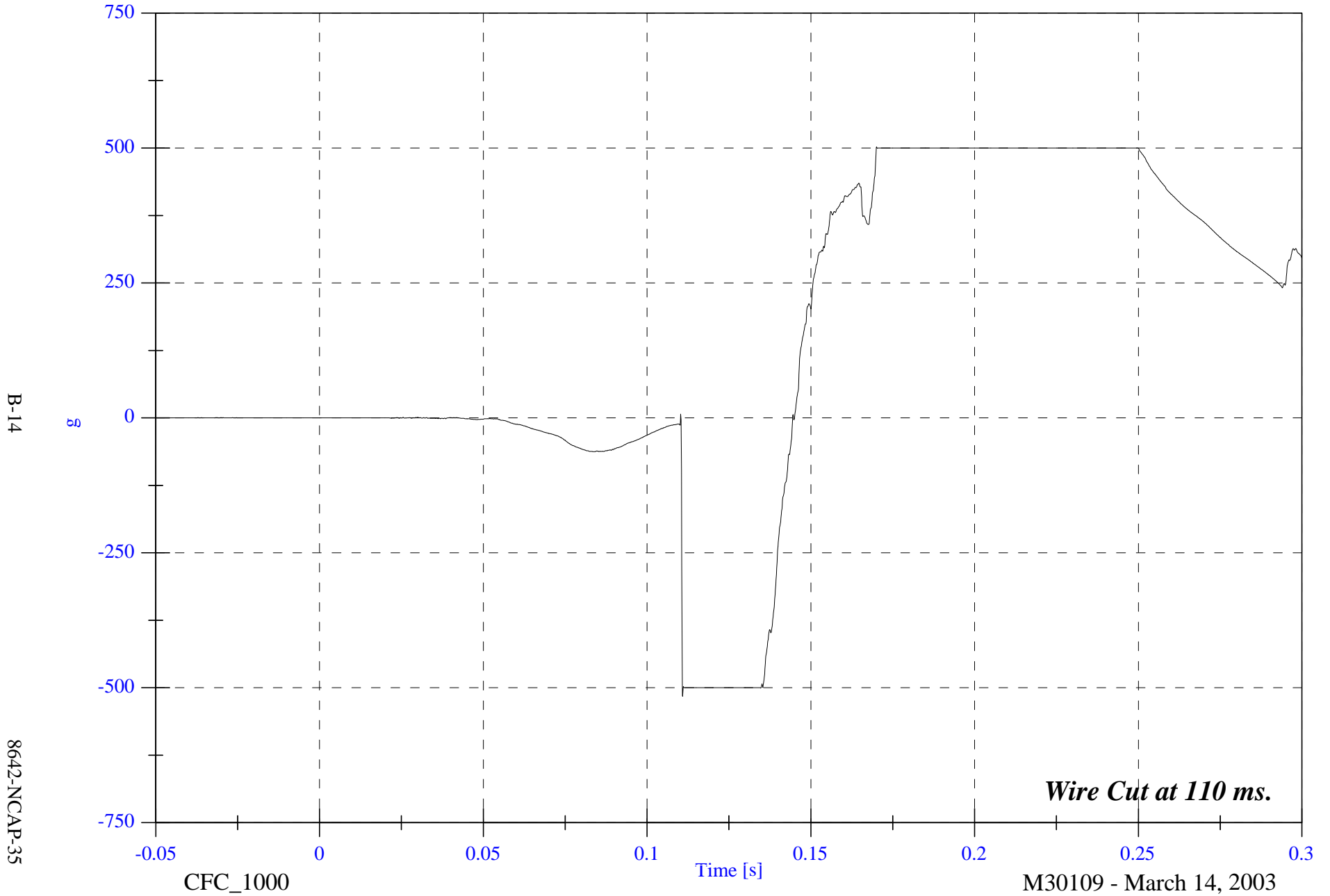


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 501.9 [g] at 0.170 [s]

Min: -515.8 [g] at 0.111 [s]

V1P1 Head CG x



*Wire Cut at 110 ms.*

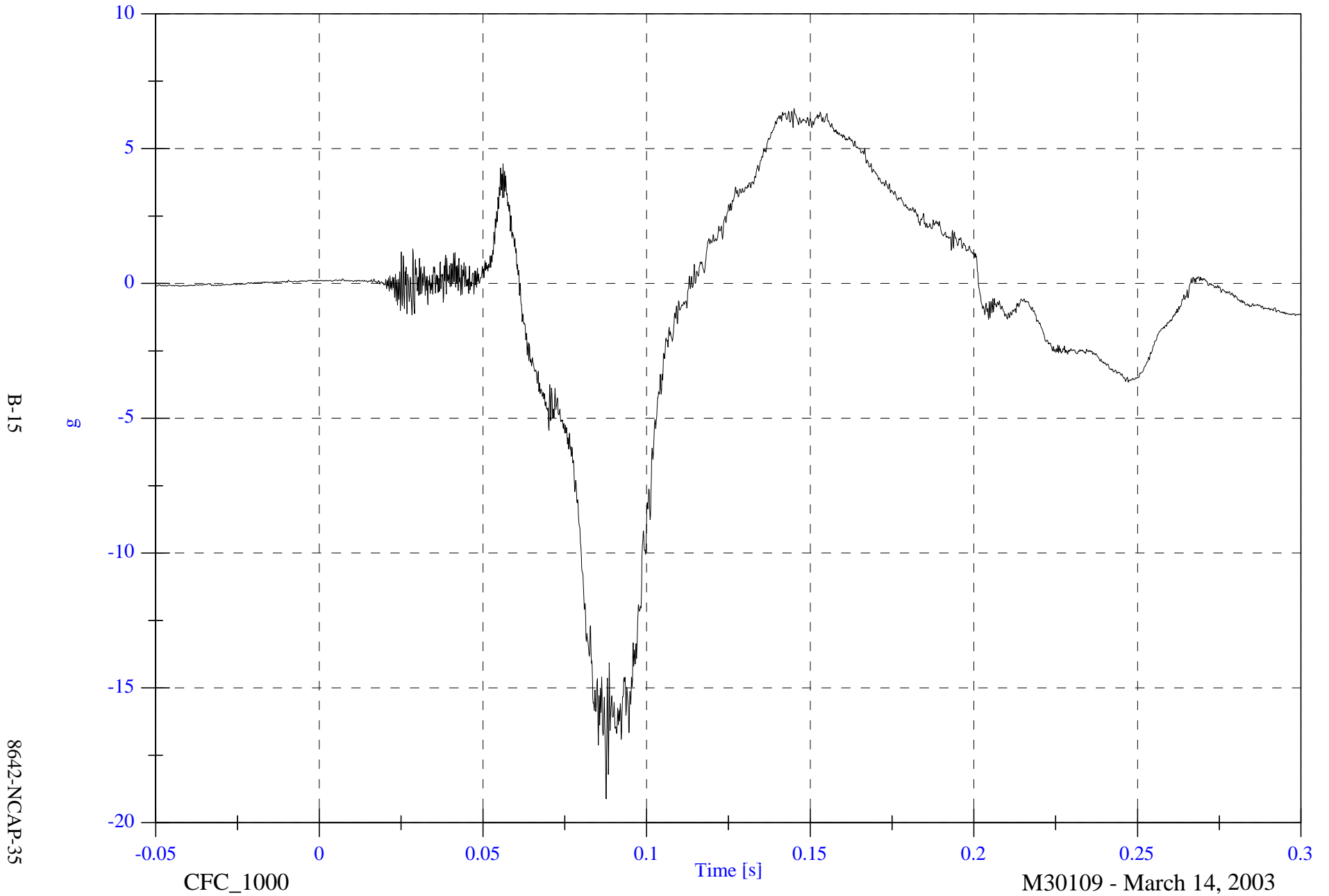
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 6.5 [g] at 0.145 [s]

Min: -19.1 [g] at 0.088 [s]

V1P1 Head CG y



B-15

8642-NCAP-35

CFC\_1000

Time [s]

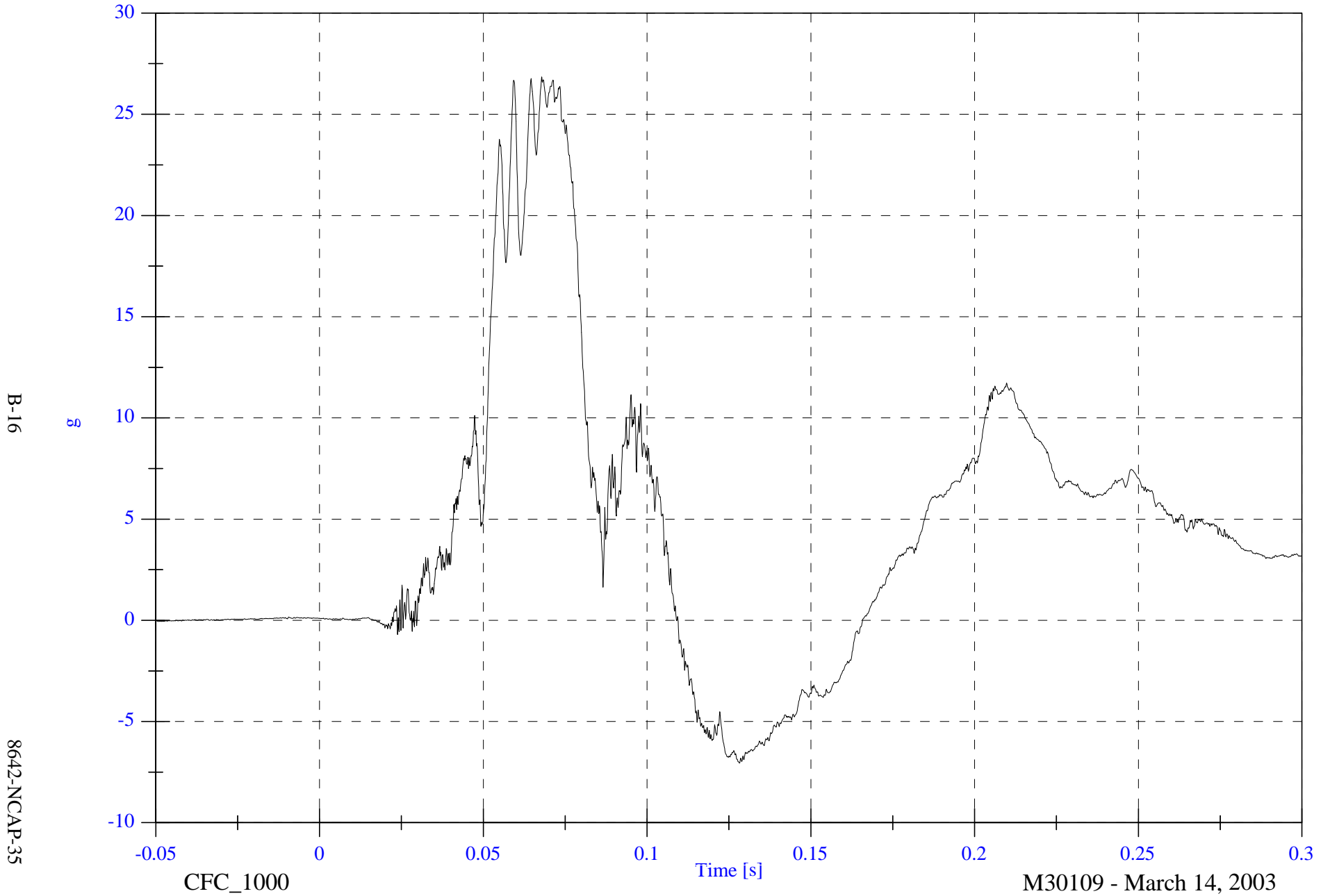
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P1 Head CG z

Max: 26.8 [g] at 0.068 [s]

Min: -7.1 [g] at 0.128 [s]



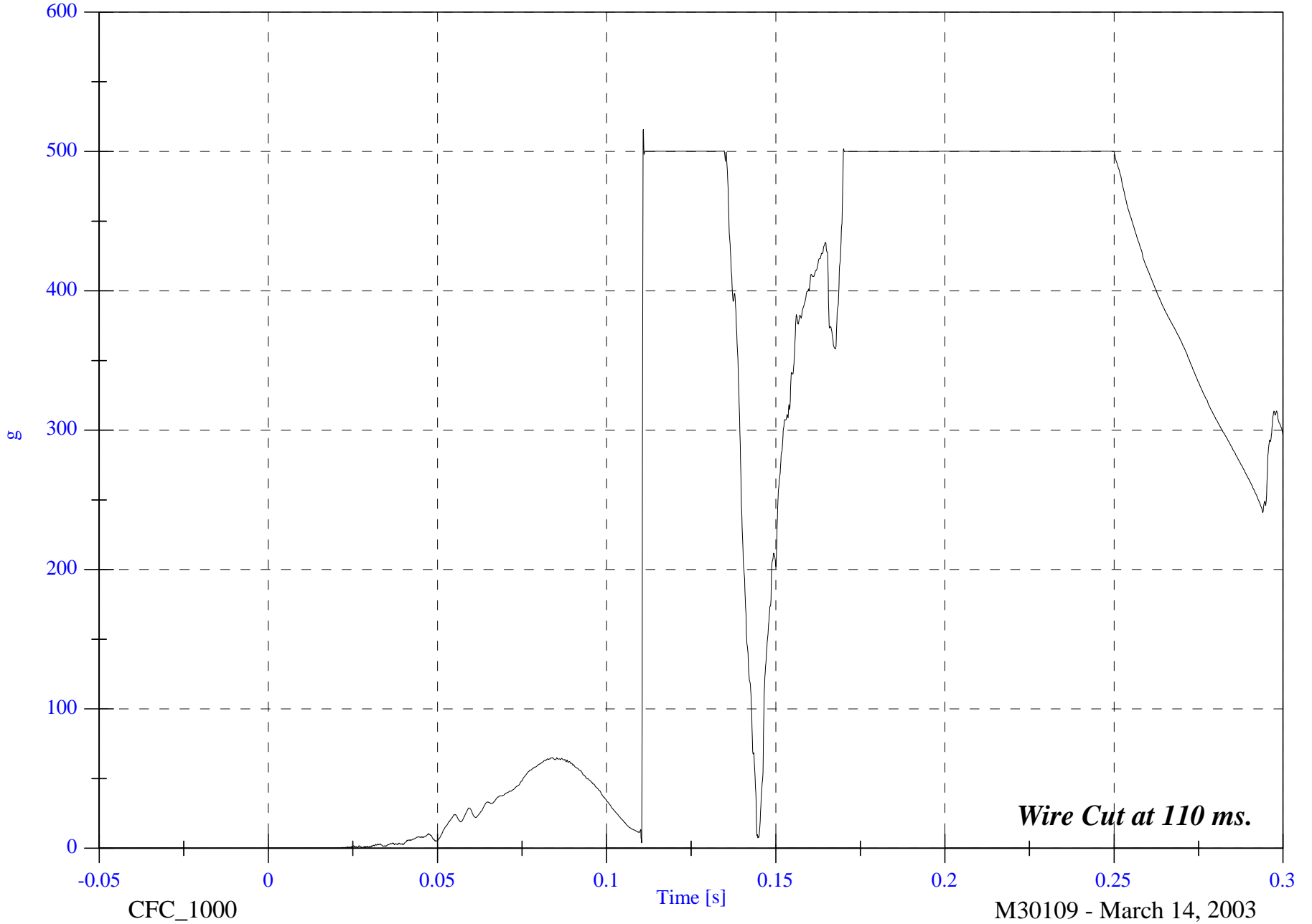
2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 515.8 [g] at 0.111 [s]

VIP1 Head CG Resultant

Min: 0.1 [g] at 0.028 [s]

B-17



8642-NCAP-35

*Wire Cut at 110 ms.*

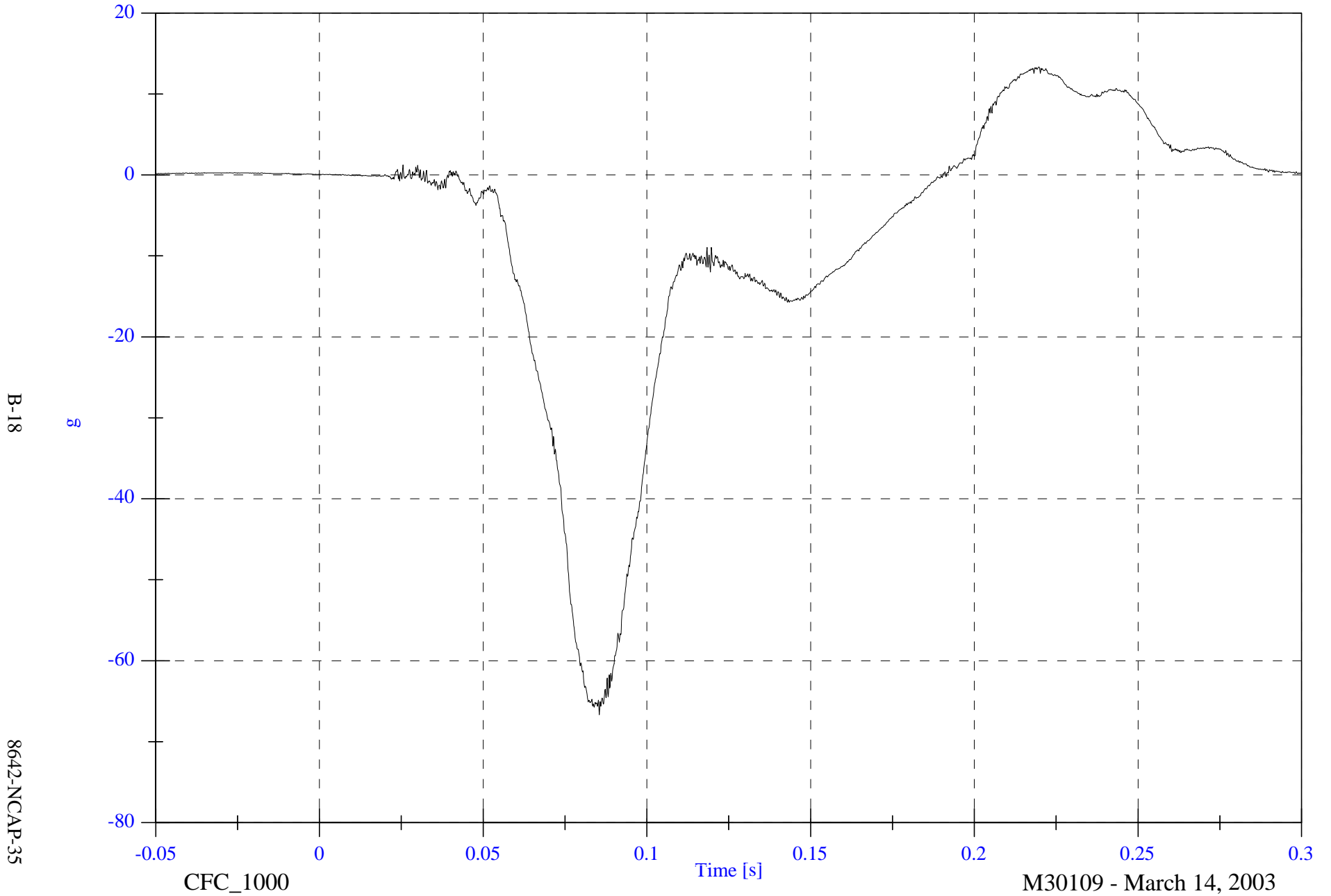
M30109 - March 14, 2003

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V1P1 Head CG Red x

Max: 13.4 [g] at 0.220 [s]

Min: -66.7 [g] at 0.086 [s]



B-18

8642-NCAP-35

CFC\_1000

Time [s]

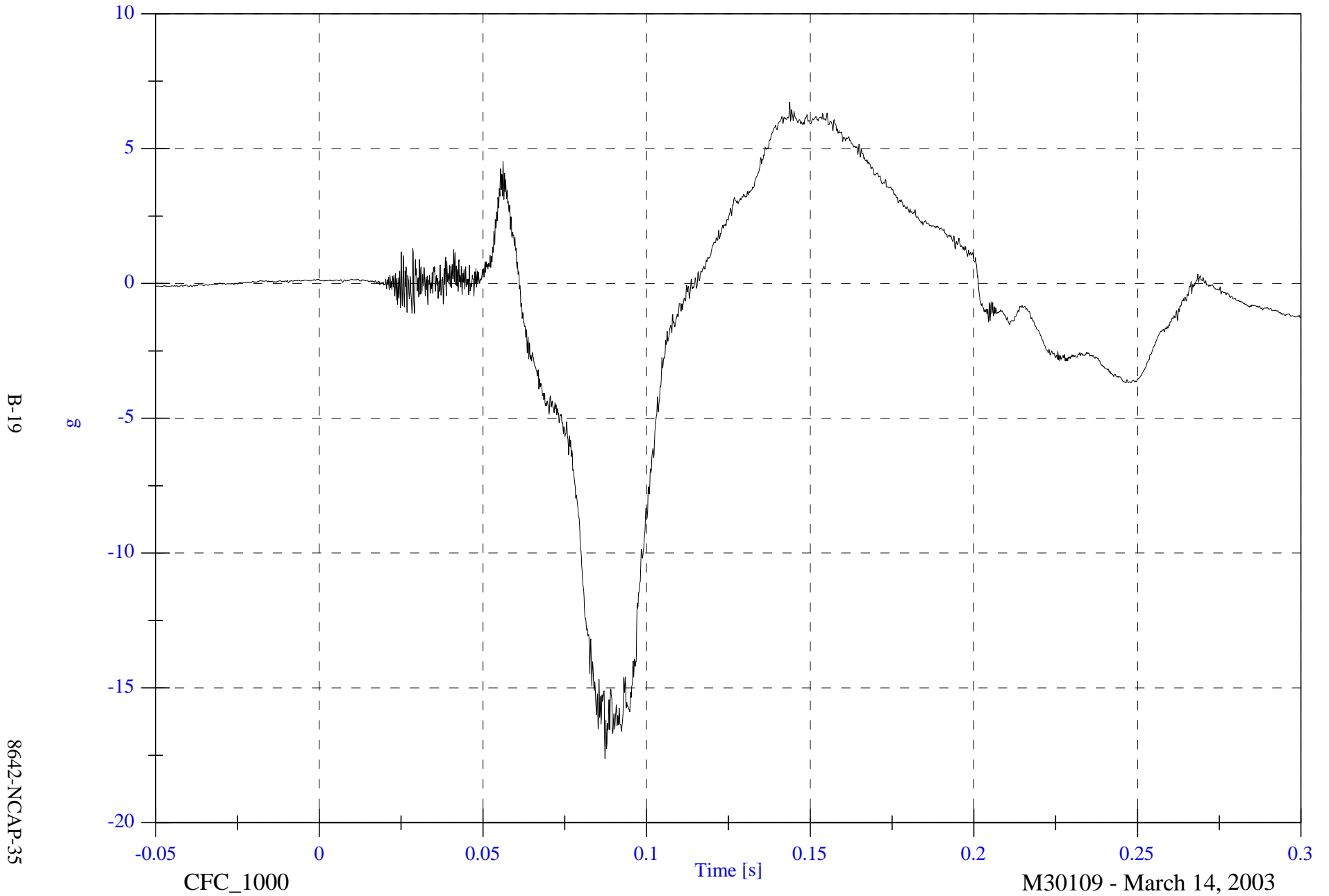
M30109 - March 14, 2003

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Max: 6.7 [g] at 0.144 [s]

Min: -17.6 [g] at 0.087 [s]

V1P1 Head CG Red y



B-19

8642-NCAP-35

CFC\_1000

Time [s]

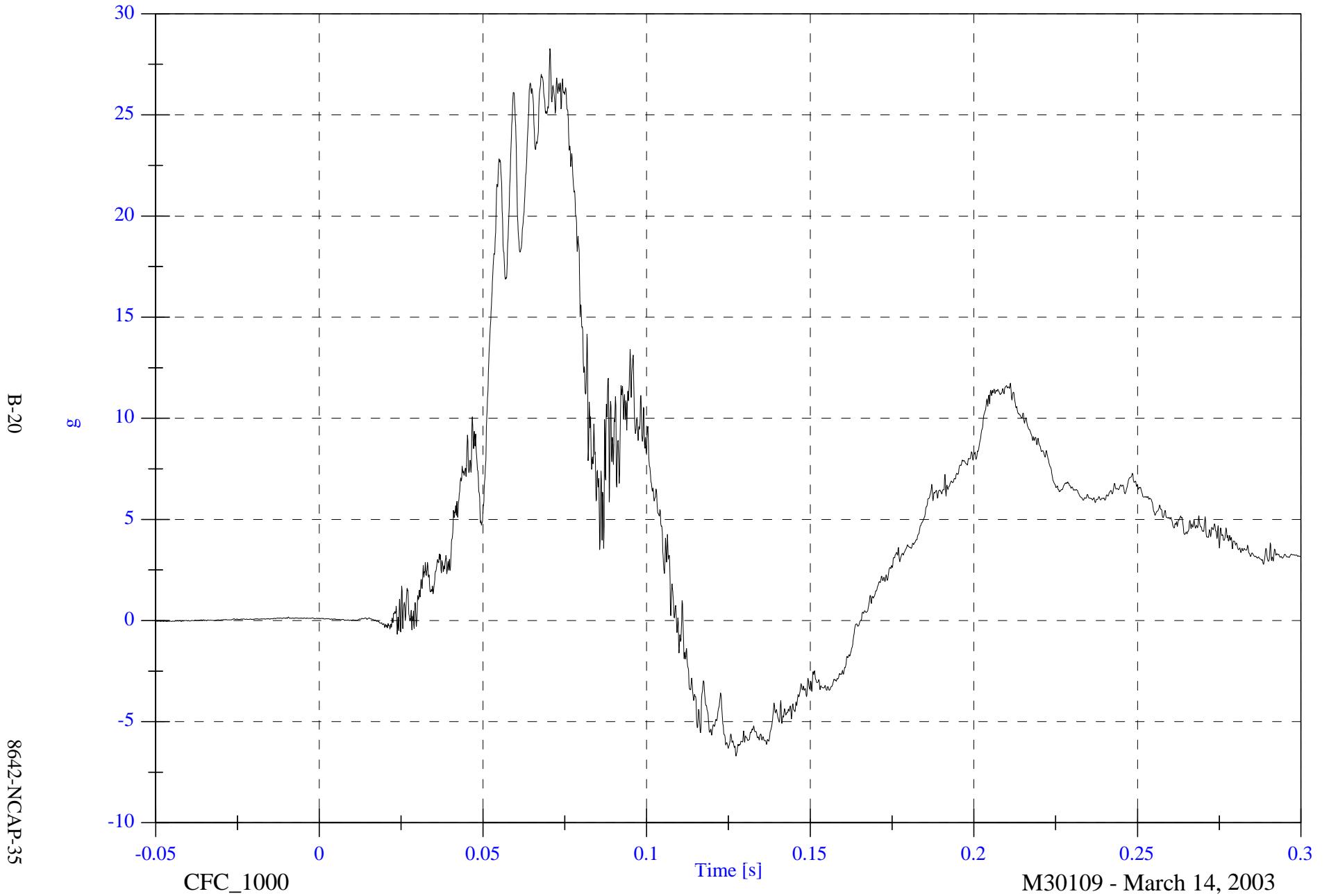
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V1P1 Head CG Red z

Max: 28.3 [g] at 0.070 [s]

Min: -6.7 [g] at 0.127 [s]



B-20

8642-NCAP-35

CFC\_1000

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

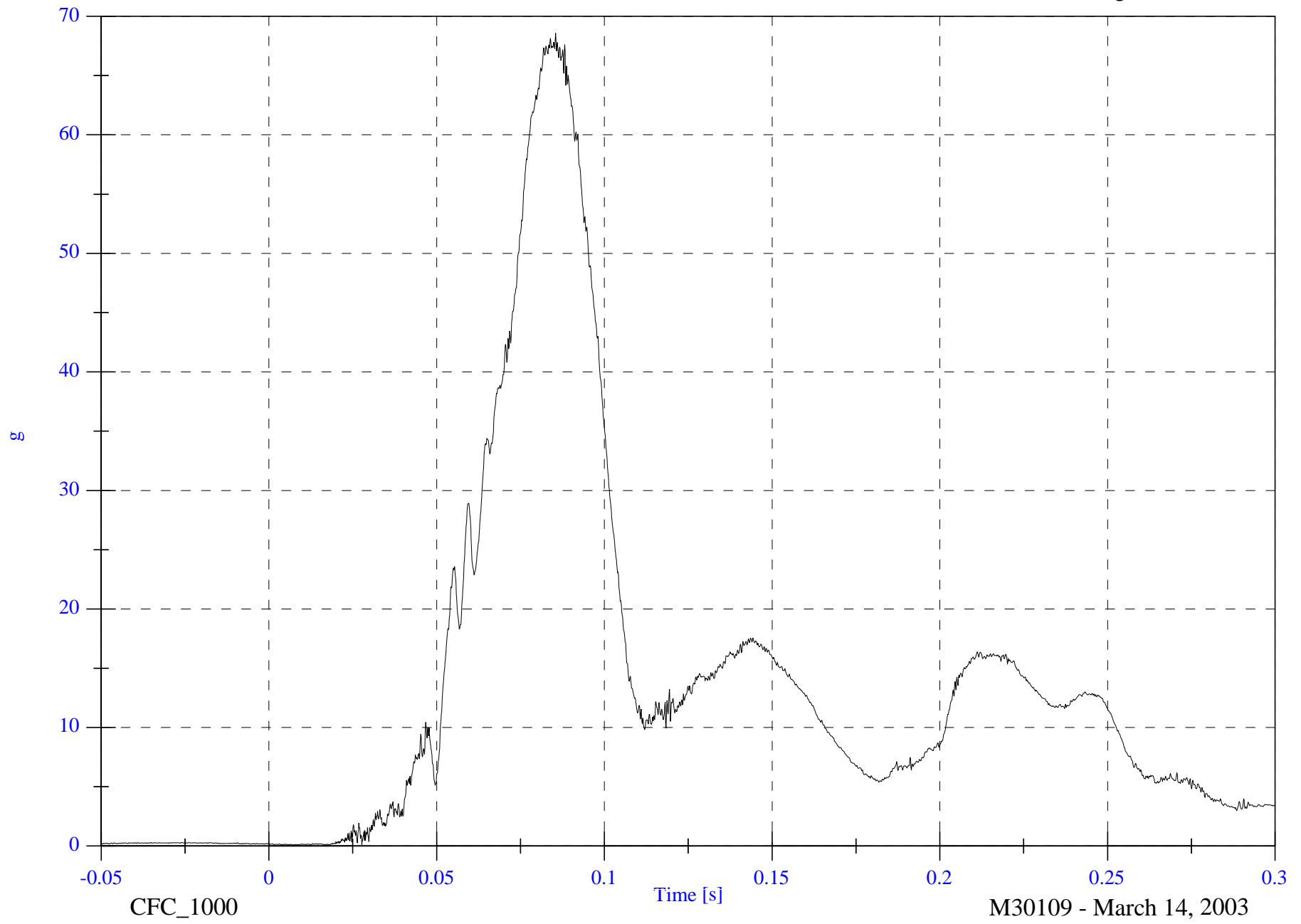
Max: 68.6 [g] at 0.086 [s]

V1P1 Head CG Red Resultant

Min: 0.1 [g] at 0.017 [s]

B-21

8642-NCAP-35



CFC\_1000

Time [s]

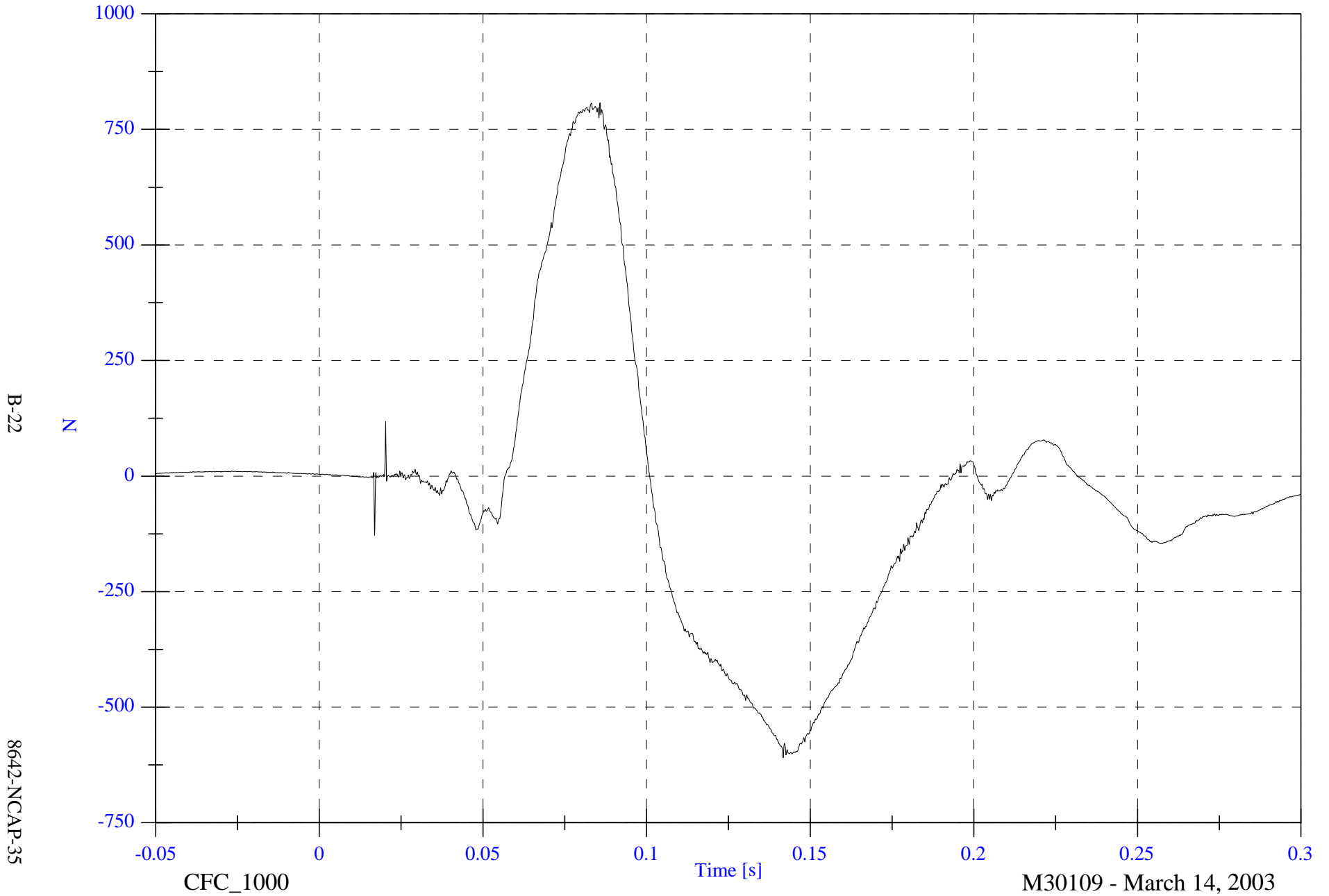
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 807.6 [N] at 0.086 [s]

Min: -609.0 [N] at 0.142 [s]

V1P1 Upper Neck Fx

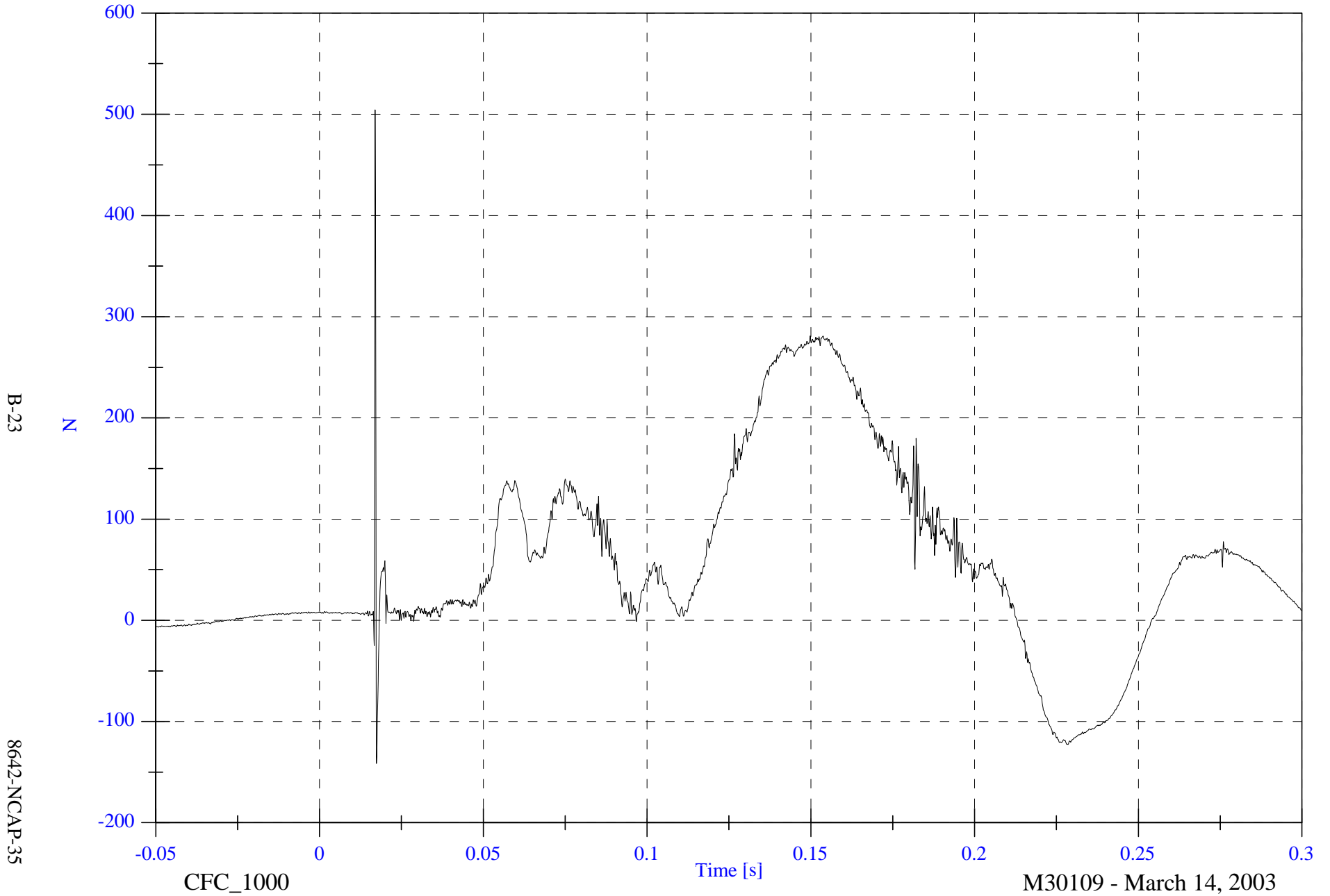


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 504.4 [N] at 0.017 [s]

Min: -141.5 [N] at 0.017 [s]

V1P1 Upper Neck Fy



B-23

8642-NCAP-35

CFC\_1000

Time [s]

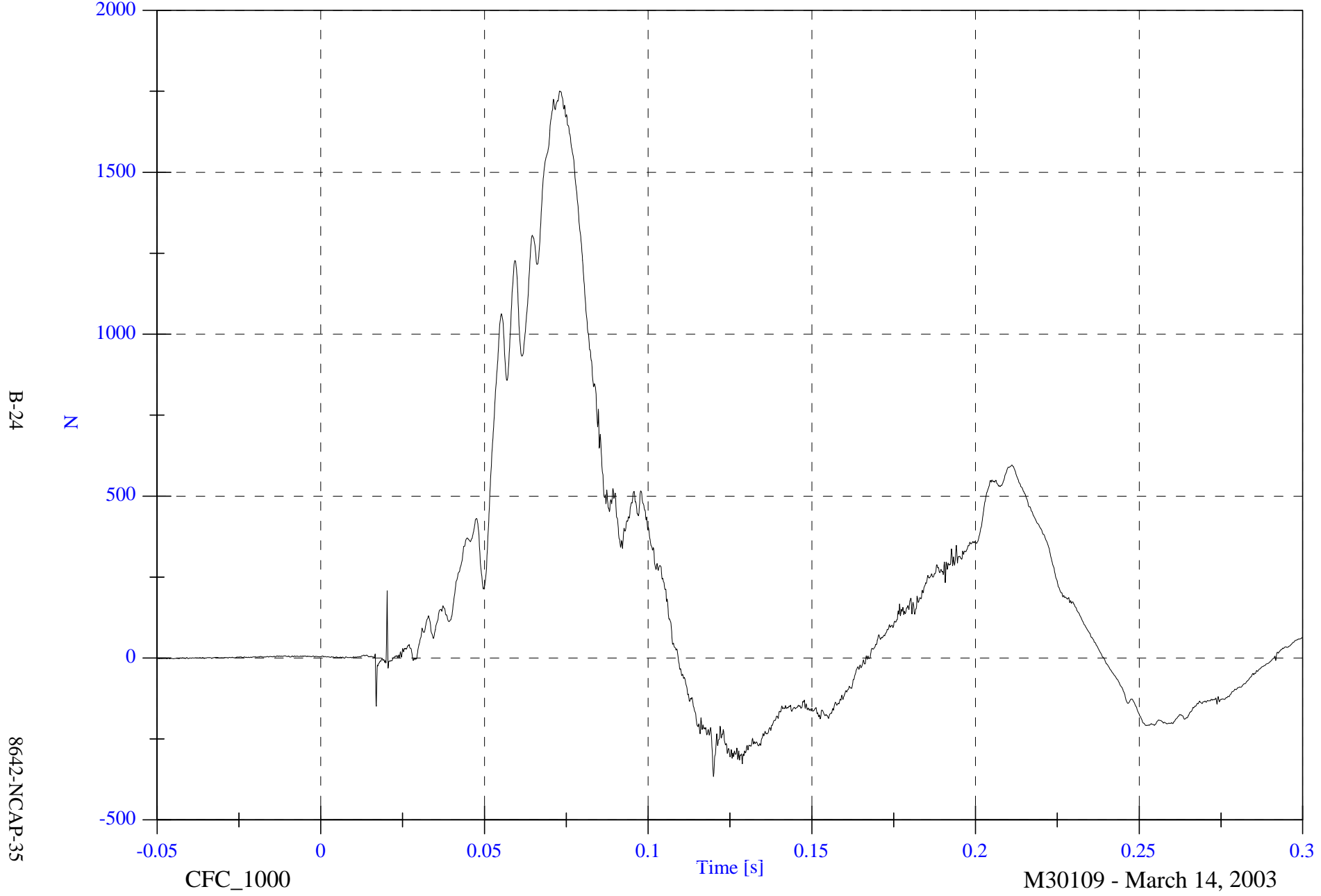
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 1751.0 [N] at 0.073 [s]

Min: -366.0 [N] at 0.120 [s]

V1P1 Upper Neck Fz



B-24

8642-NCAP-35

CFC\_1000

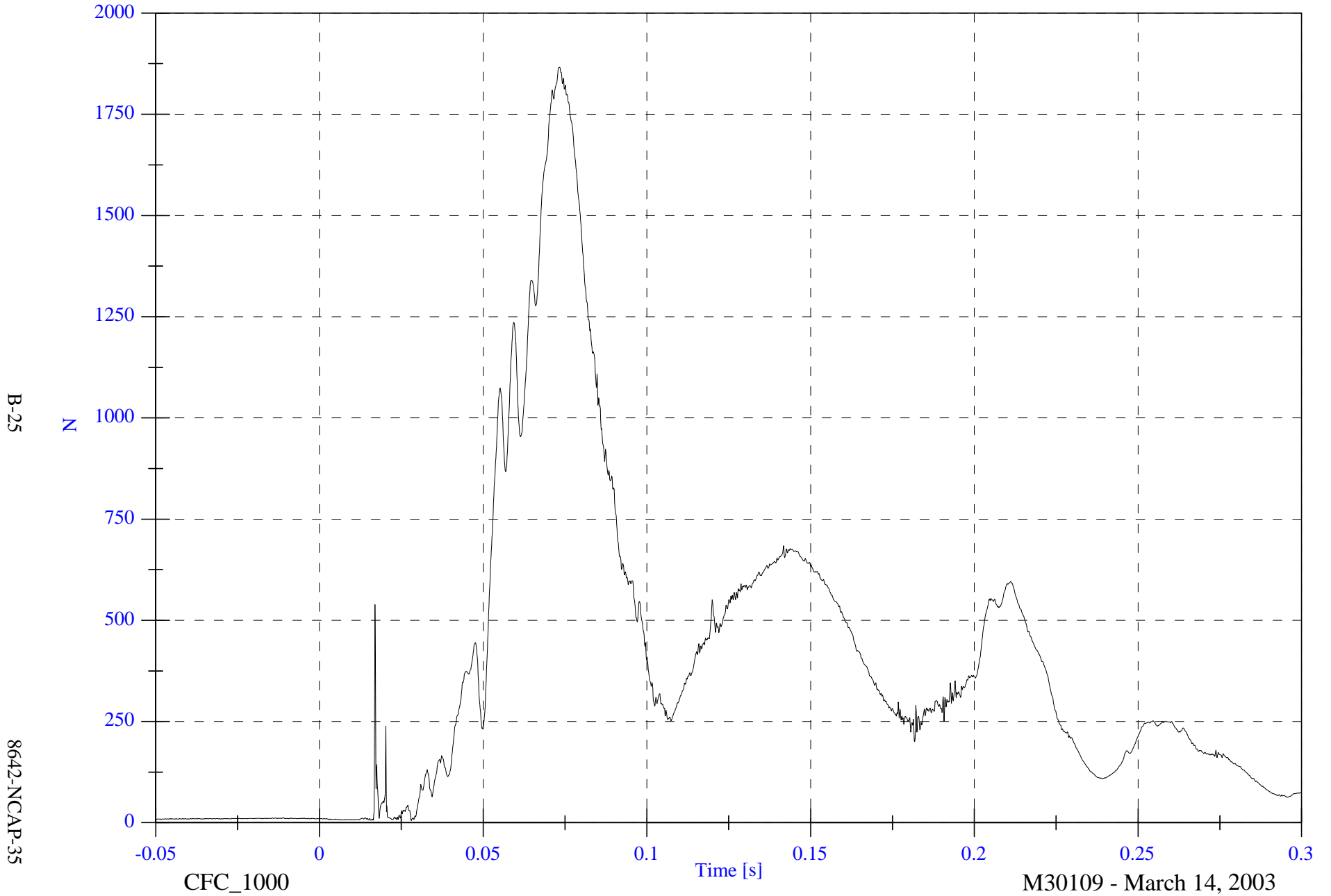
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 1866.5 [N] at 0.073 [s]

V1P1 Upper Neck F Resultant

Min: 5.3 [N] at 0.028 [s]



B-25

8642-NCAP-35

CFC\_1000

Time [s]

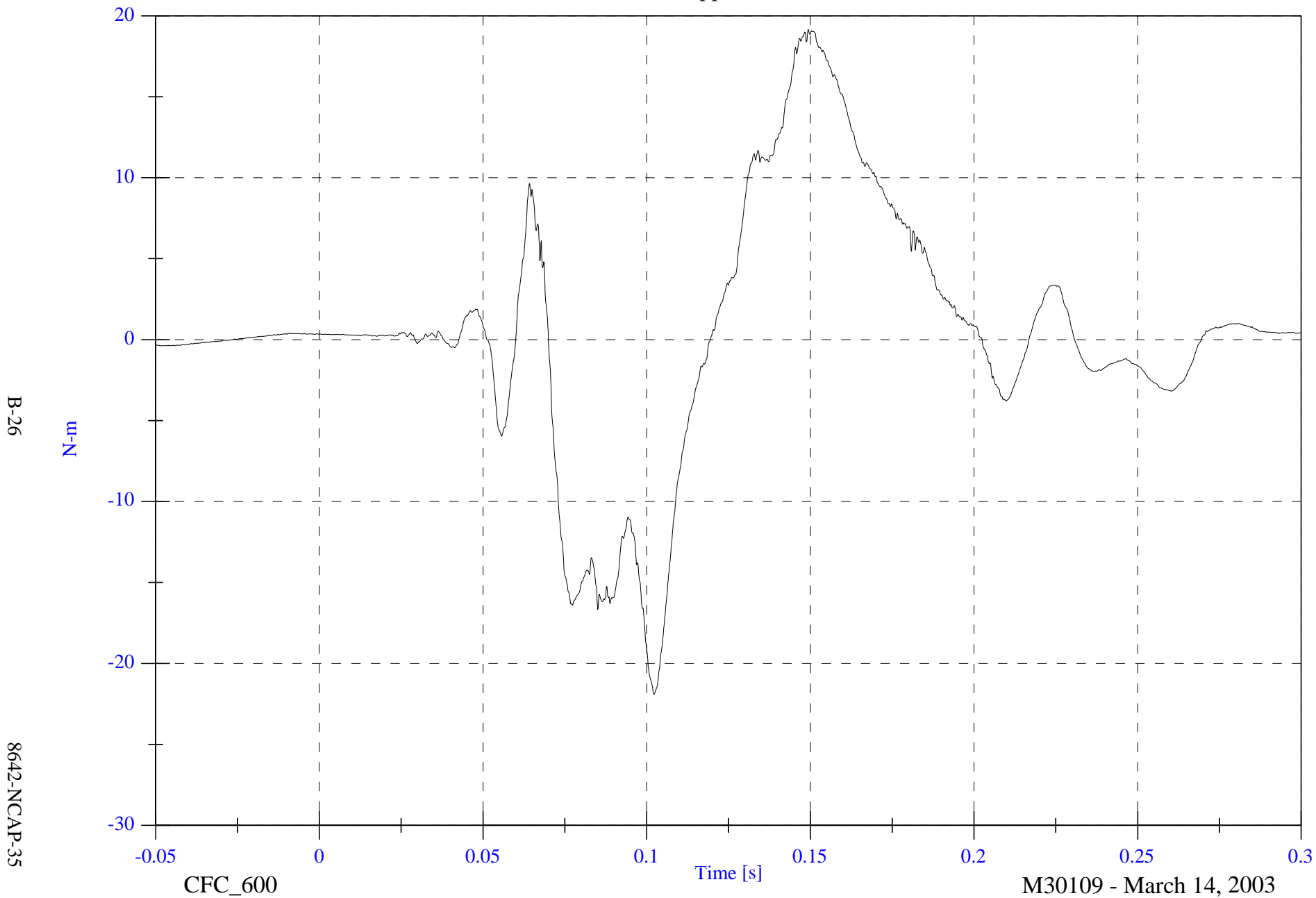
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 19.2 [N-m] at 0.149 [s]

Min: -21.9 [N-m] at 0.102 [s]

V1P1 Upper Neck Mx



B-26

8642-NCAP-35

CFC\_600

Time [s]

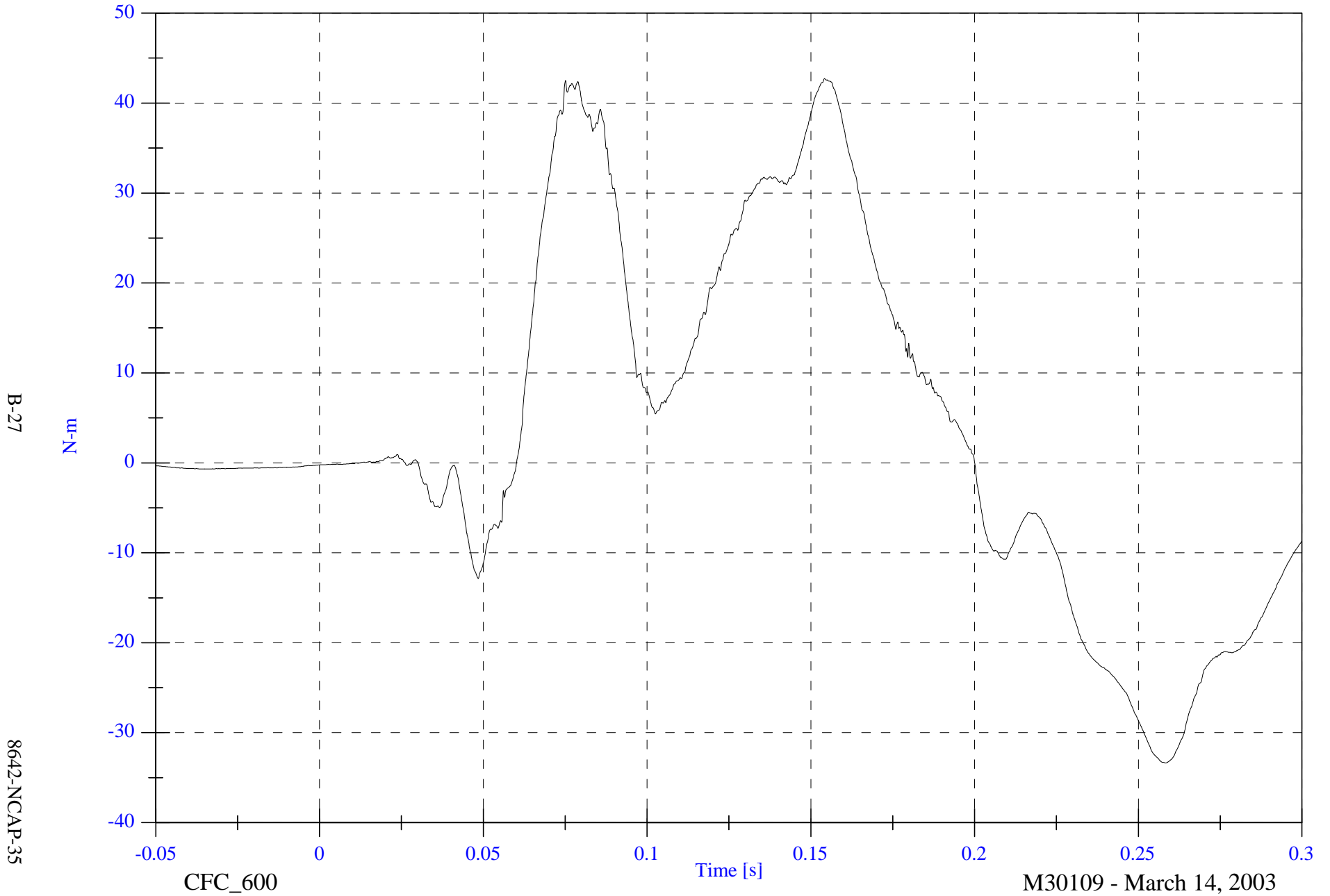
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 42.7 [N-m] at 0.154 [s]

Min: -33.4 [N-m] at 0.258 [s]

V1P1 Upper Neck My



B-27

8642-NCAP-35

CFC\_600

Time [s]

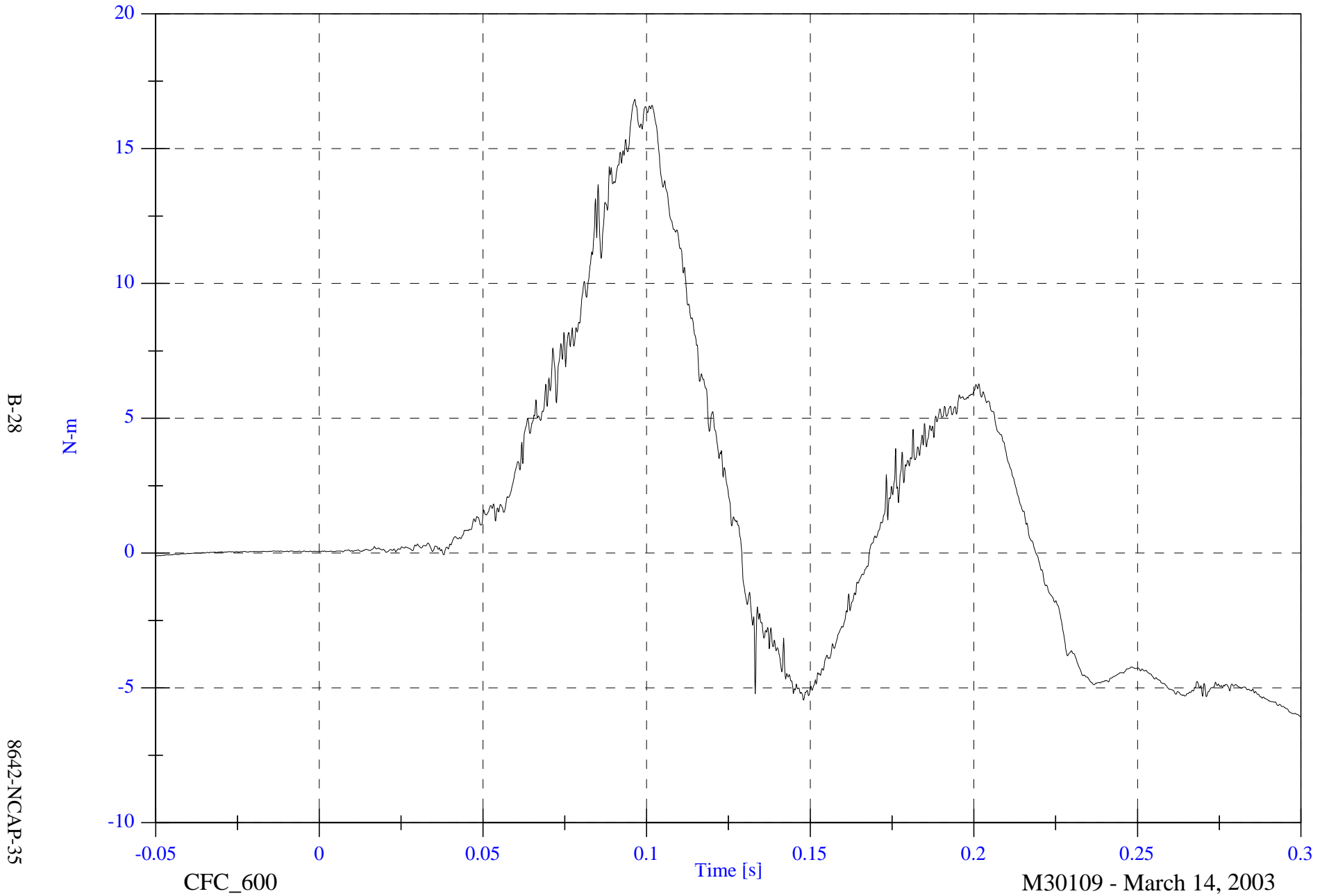
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 16.8 [N-m] at 0.096 [s]

Min: -6.1 [N-m] at 0.300 [s]

V1P1 Upper Neck Mz



B-28

8642-NCAP-35

2003 NCAP Test 13 2003 Chevrolet Tahoe

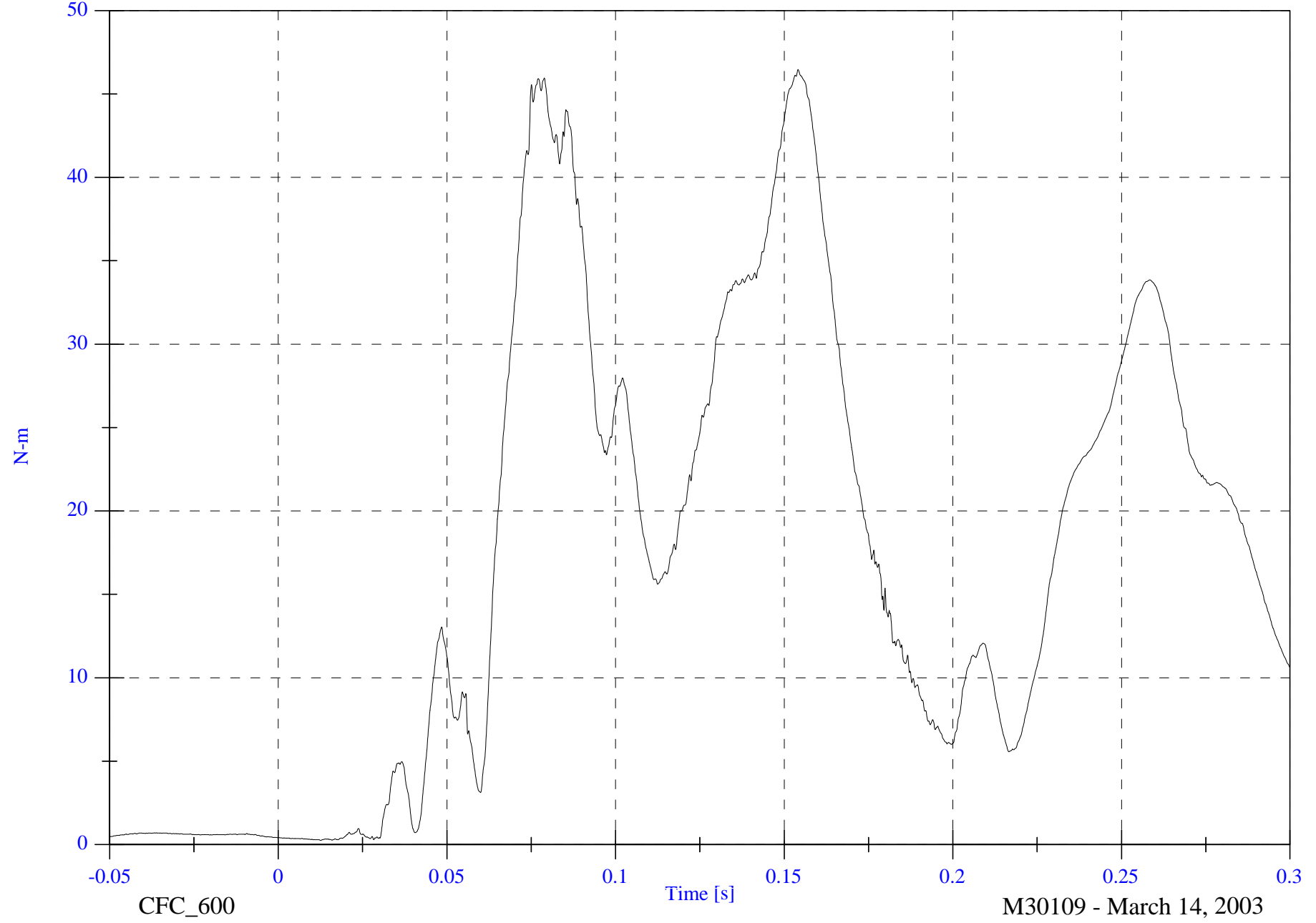
Max: 46.5 [N-m] at 0.154 [s]

V1P1 Upper Neck M Resultant

Min: 0.3 [N-m] at 0.013 [s]

B-29

8642-NCAP-35



CFC\_600

Time [s]

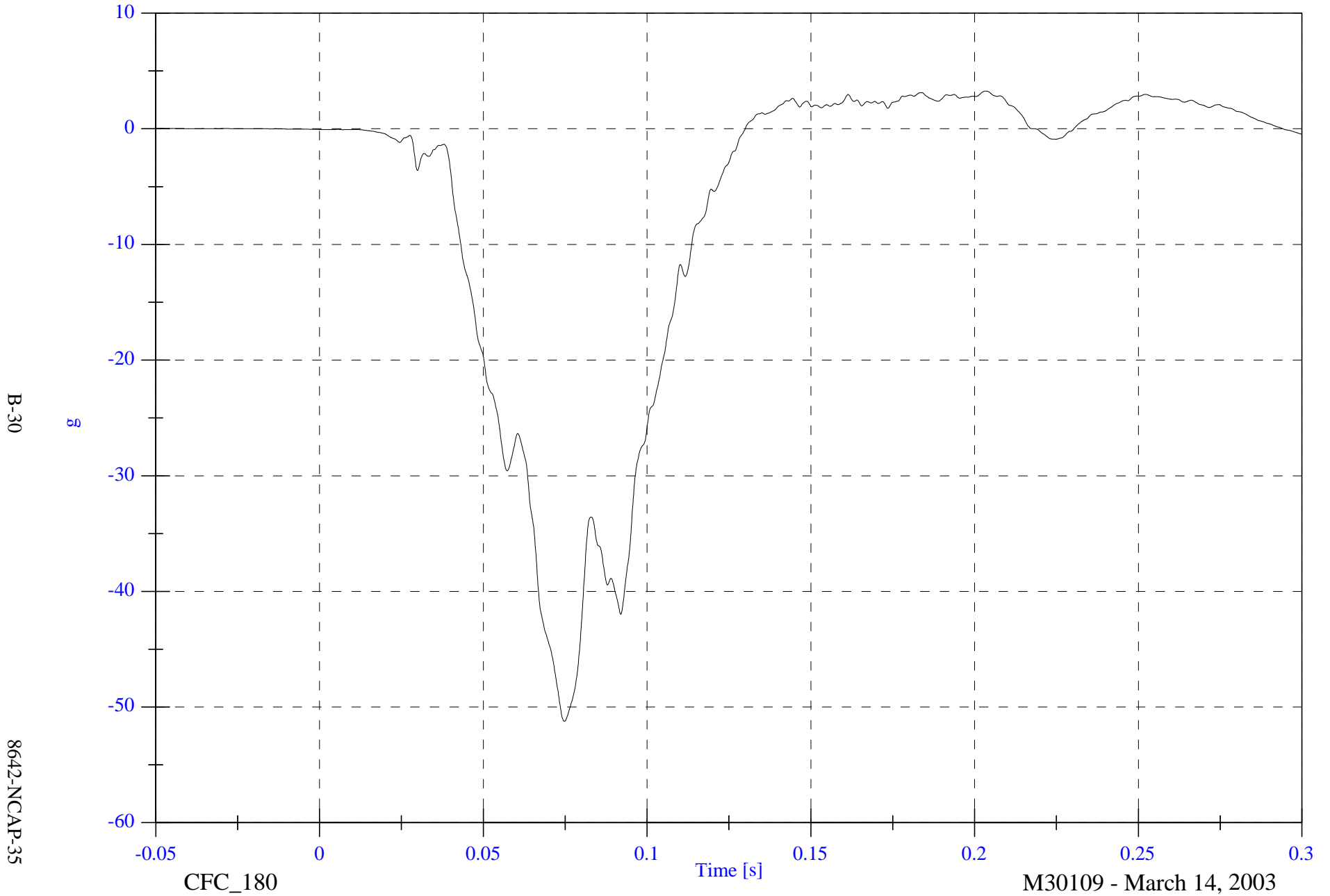
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP1 Chest x

Max: 3.3 [g] at 0.203 [s]

Min: -51.2 [g] at 0.075 [s]

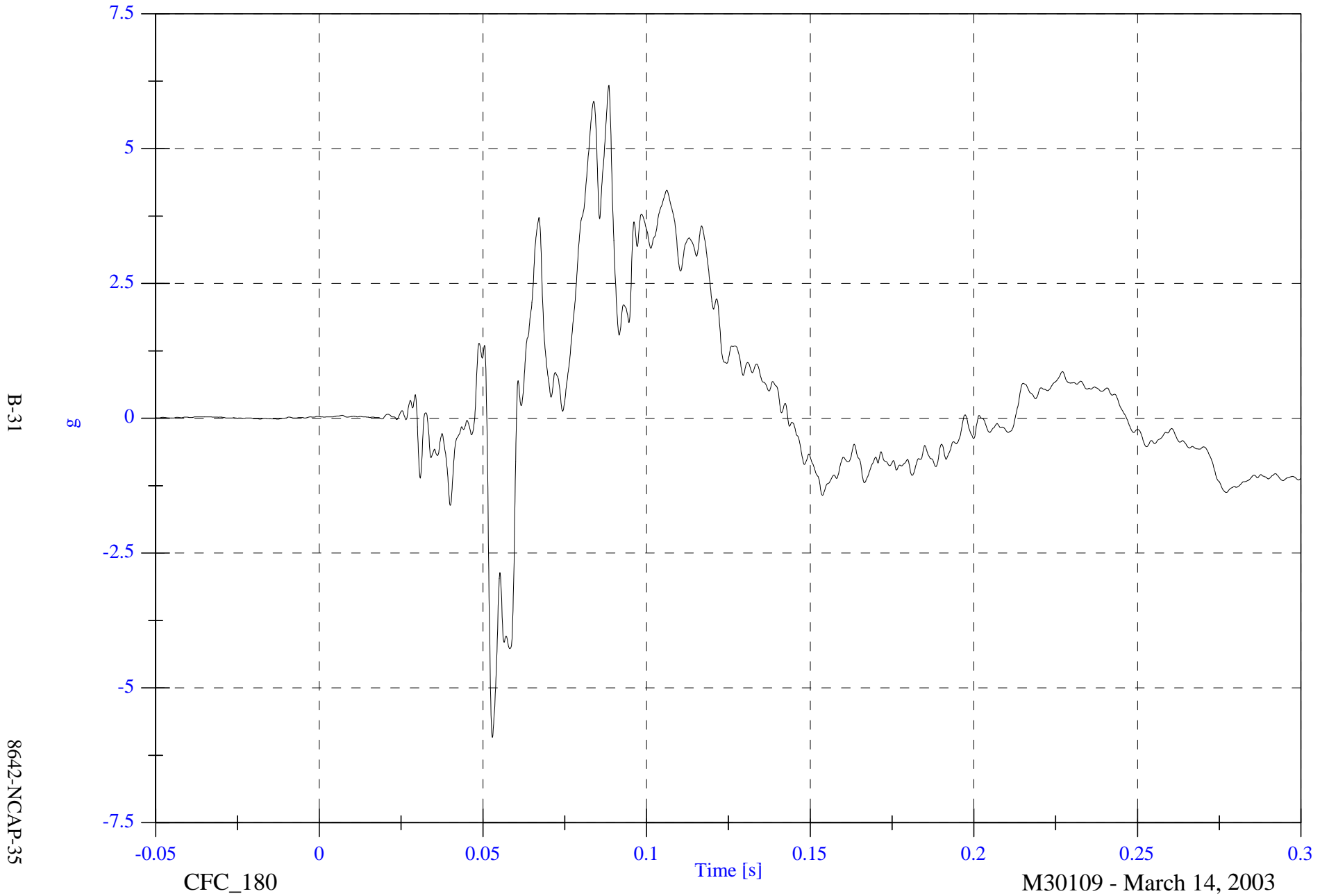


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 6.2 [g] at 0.088 [s]

Min: -5.9 [g] at 0.053 [s]

VIP1 Chest y

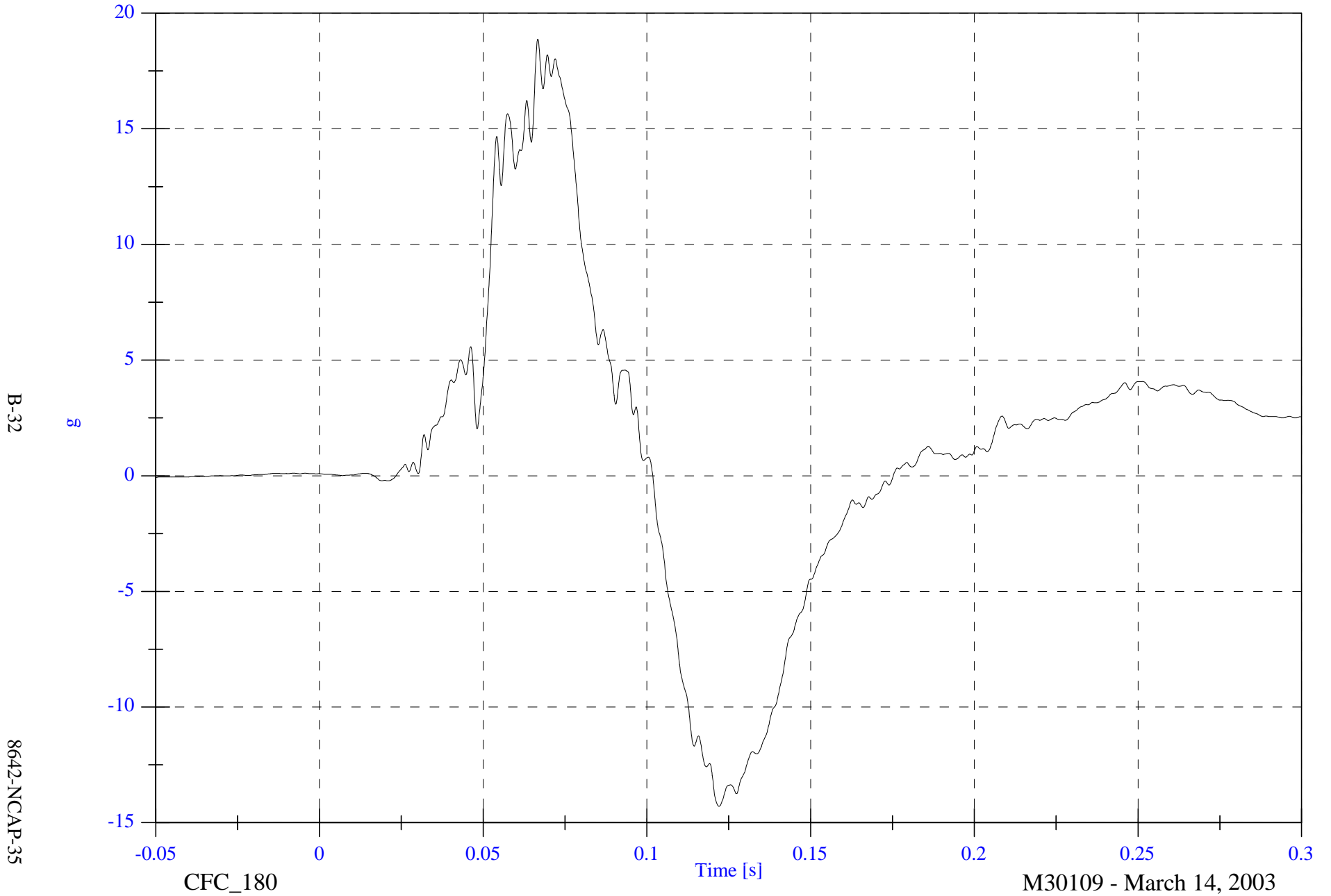


2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP1 Chest z

Max: 18.9 [g] at 0.067 [s]

Min: -14.3 [g] at 0.122 [s]



2003 NCAP Test 13 2003 Chevrolet Tahoe

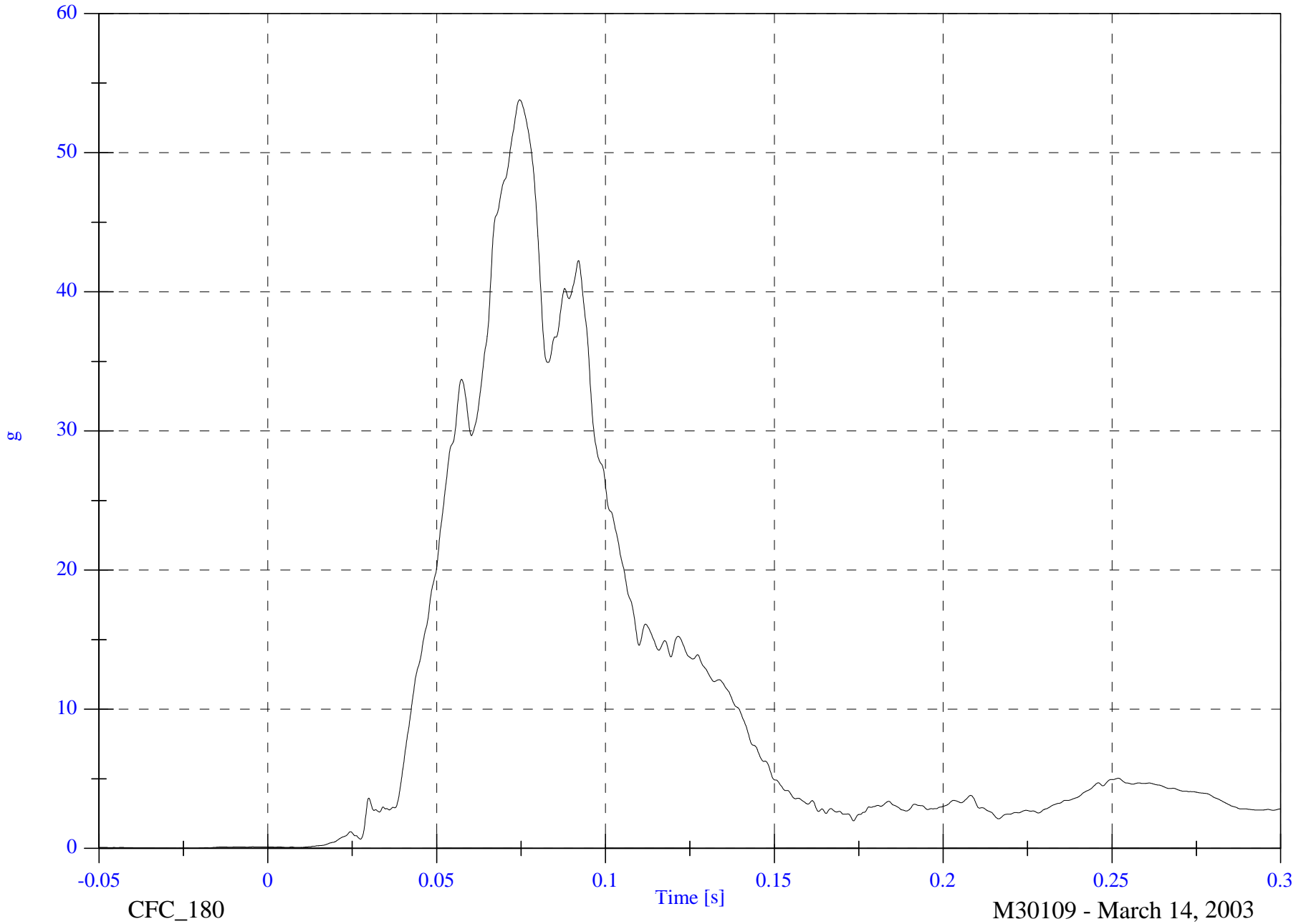
V1P1 Chest Resultant

Max: 53.8 [g] at 0.075 [s]

Min: 0.0 [g] at -0.027 [s]

B-33

8642-NCAP-35



CFC\_180

Time [s]

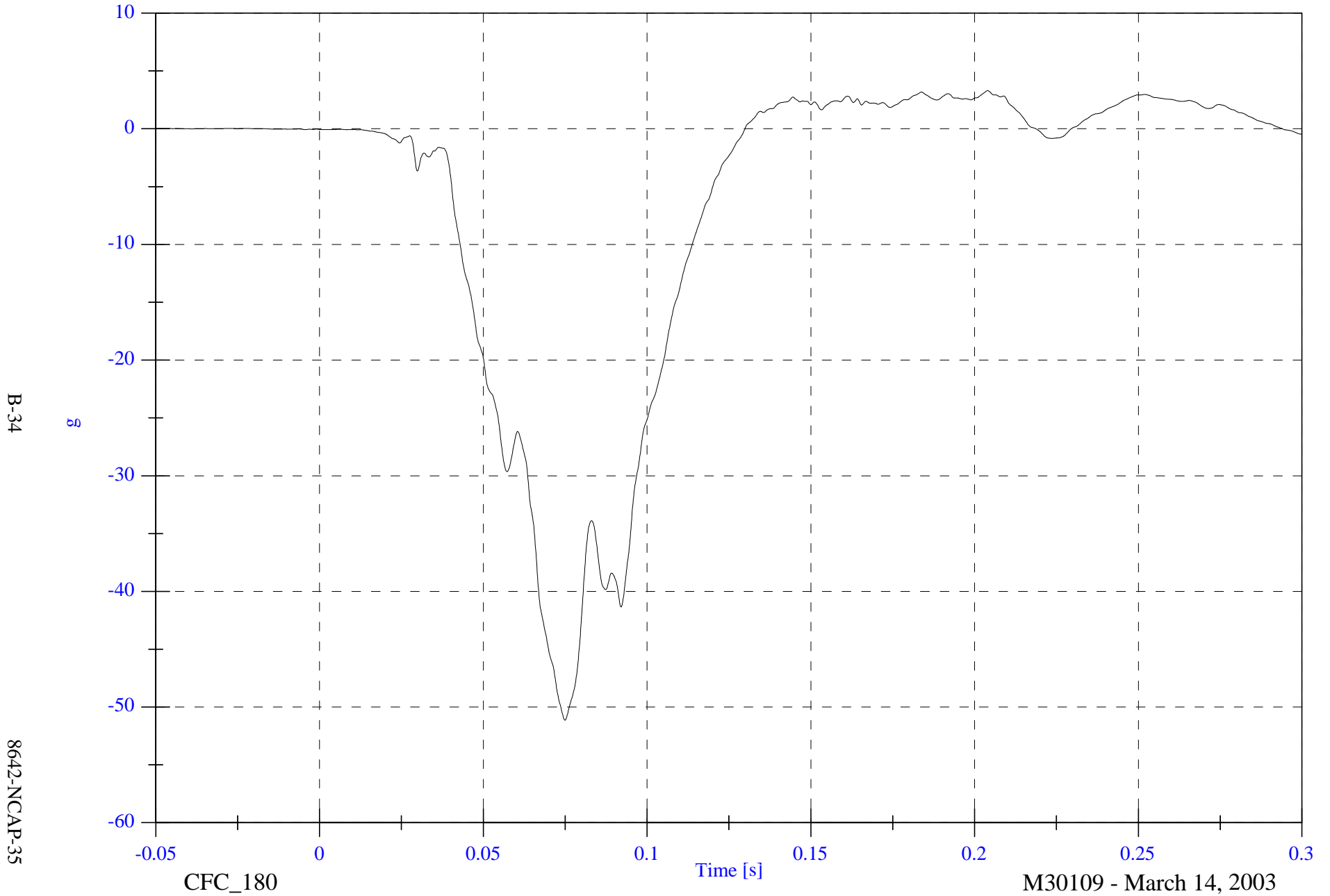
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP1 Chest Red x

Max: 3.3 [g] at 0.204 [s]

Min: -51.1 [g] at 0.075 [s]

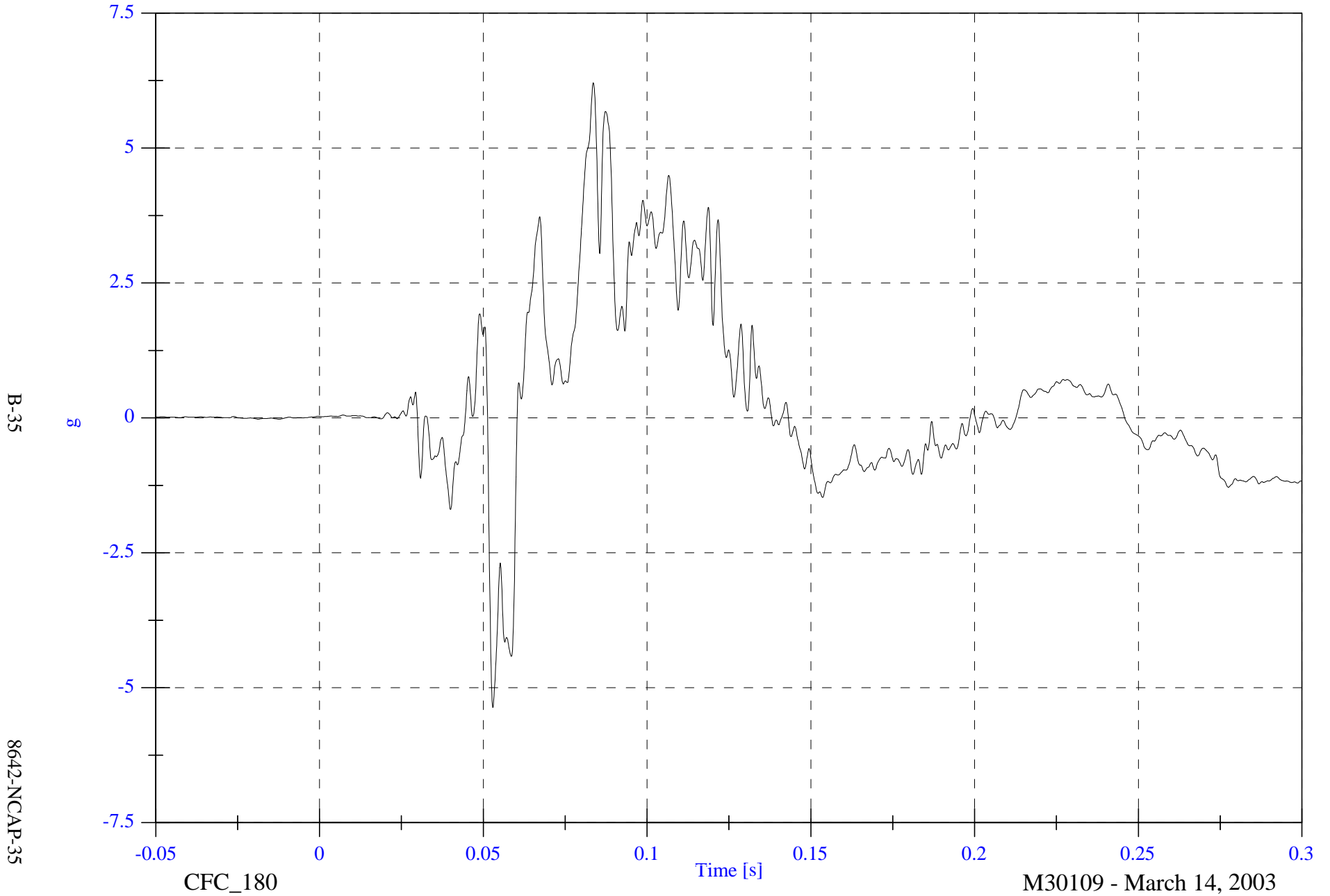


2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP1 Chest Red y

Max: 6.2 [g] at 0.084 [s]

Min: -5.4 [g] at 0.053 [s]

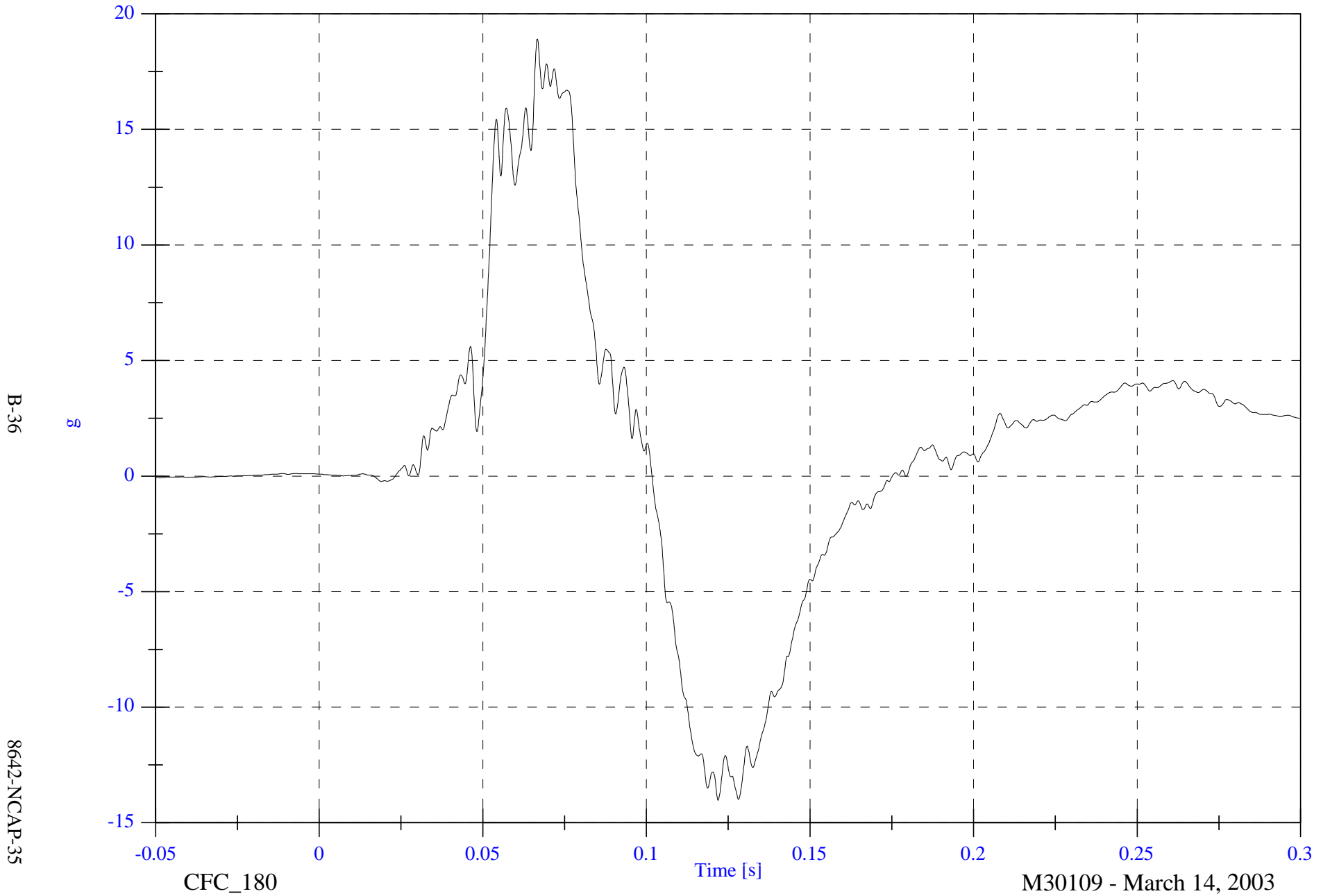


2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP1 Chest Red z

Max: 18.9 [g] at 0.067 [s]

Min: -14.0 [g] at 0.122 [s]



2003 NCAP Test 13 2003 Chevrolet Tahoe

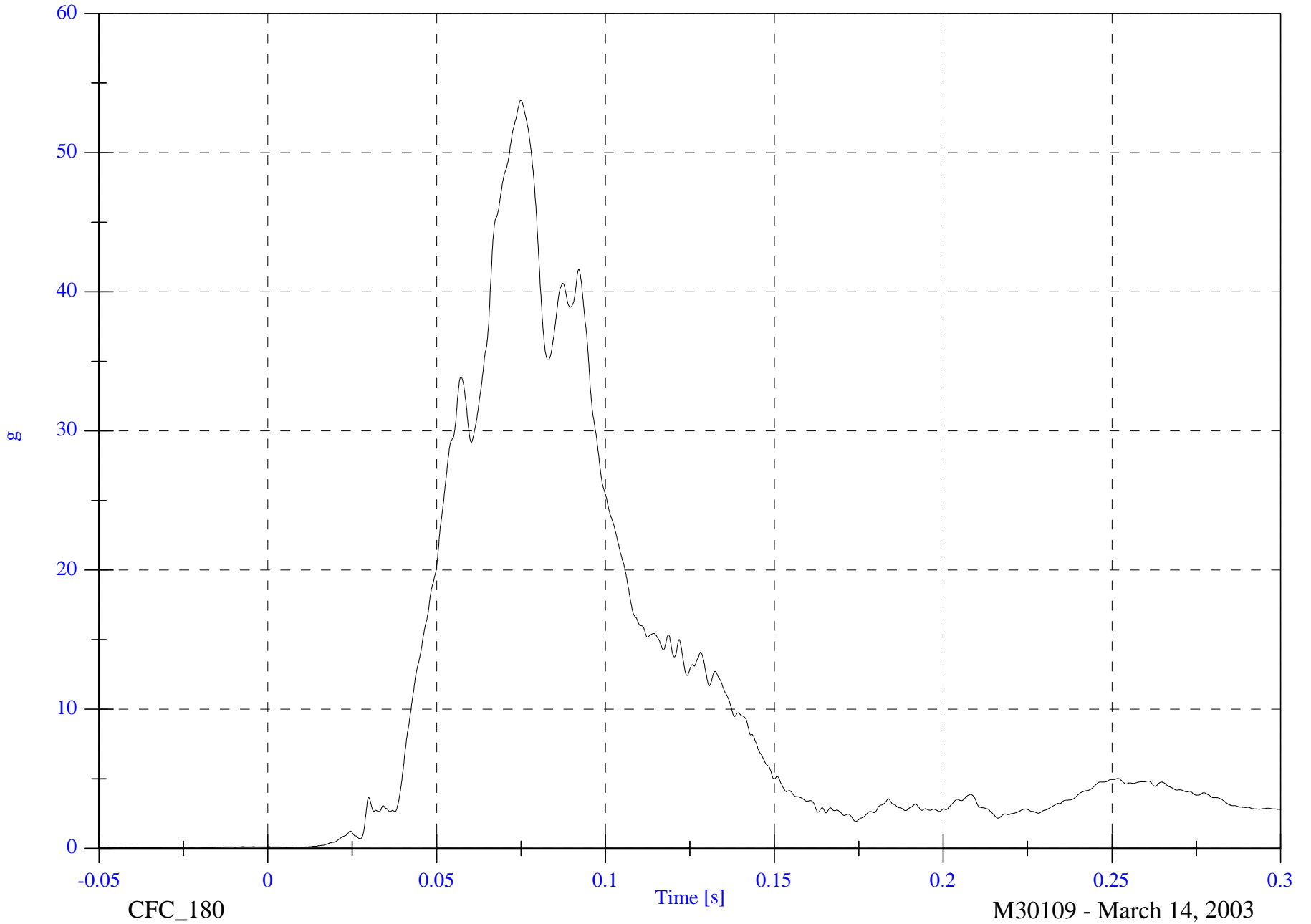
V1P1 Chest Red Resultant

Max: 53.8 [g] at 0.075 [s]

Min: 0.0 [g] at -0.025 [s]

B-37

8642-NCAP-35

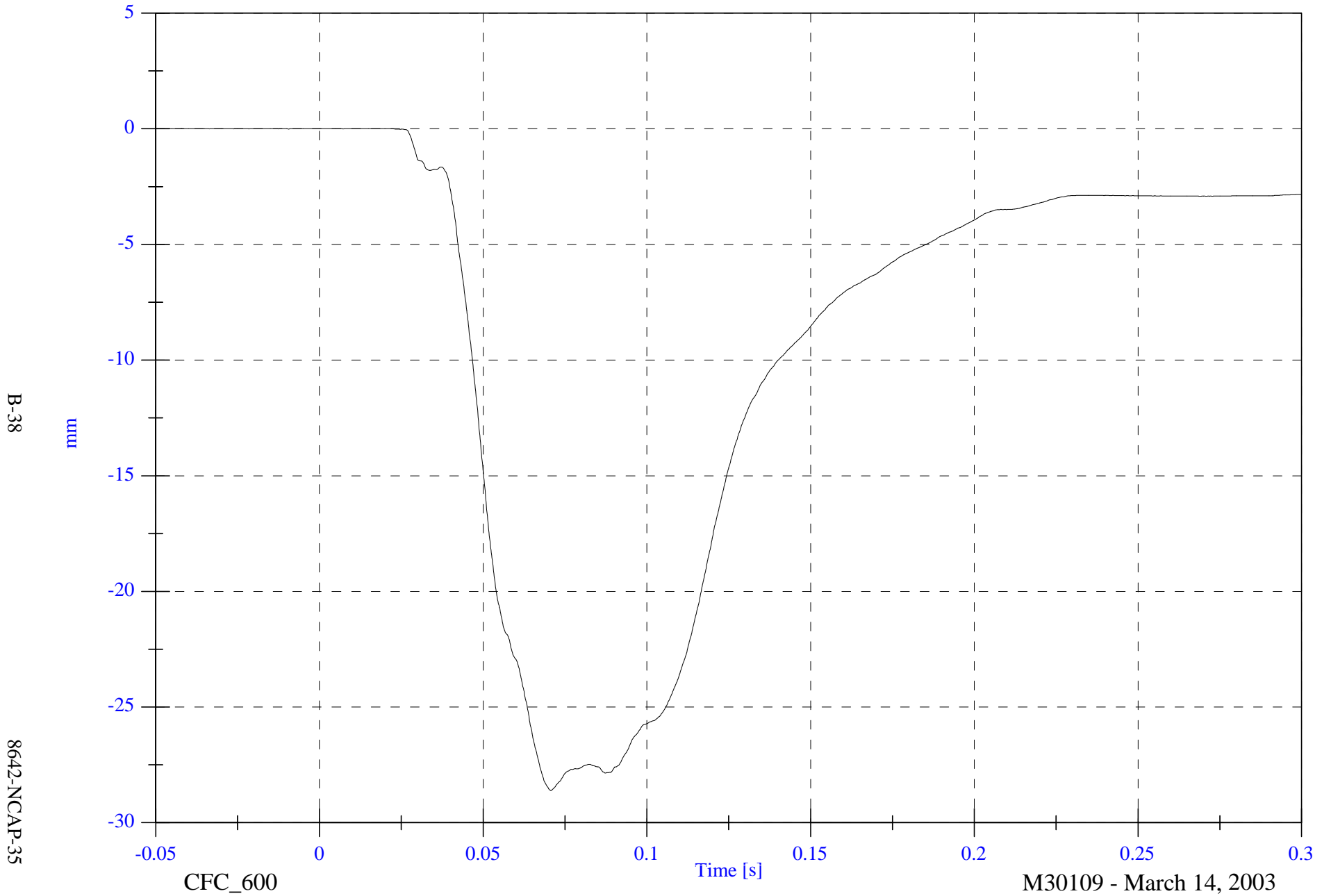


2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP1 Chest Compression x

Max: 0.0 [mm] at -0.042 [s]

Min: -28.6 [mm] at 0.071 [s]



B-38

mm

8642-NCAP-35

CFC\_600

Time [s]

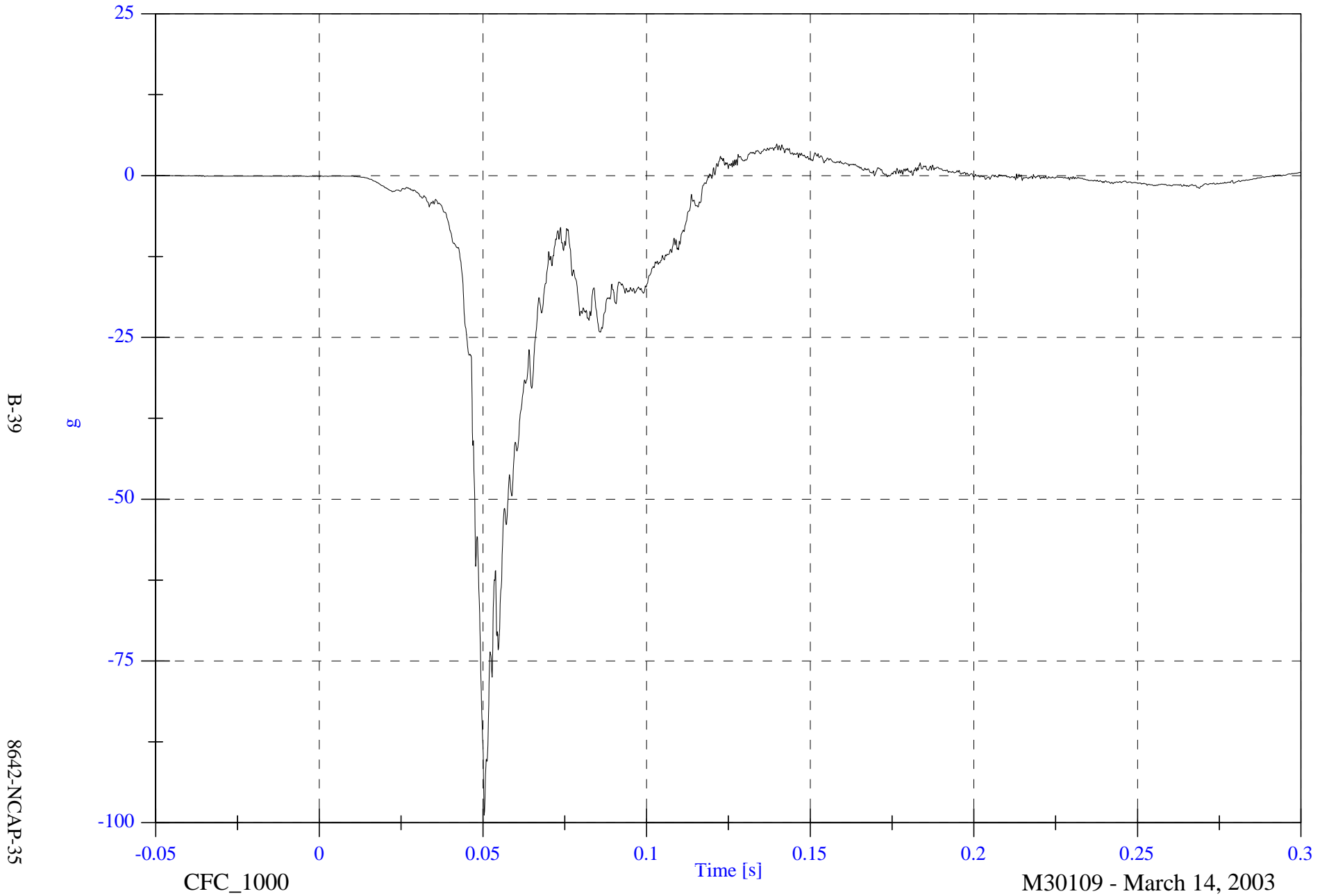
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 4.9 [g] at 0.140 [s]

Min: -98.8 [g] at 0.050 [s]

V1P1 Pelvic x



B-39

8642-NCAP-35

CFC\_1000

Time [s]

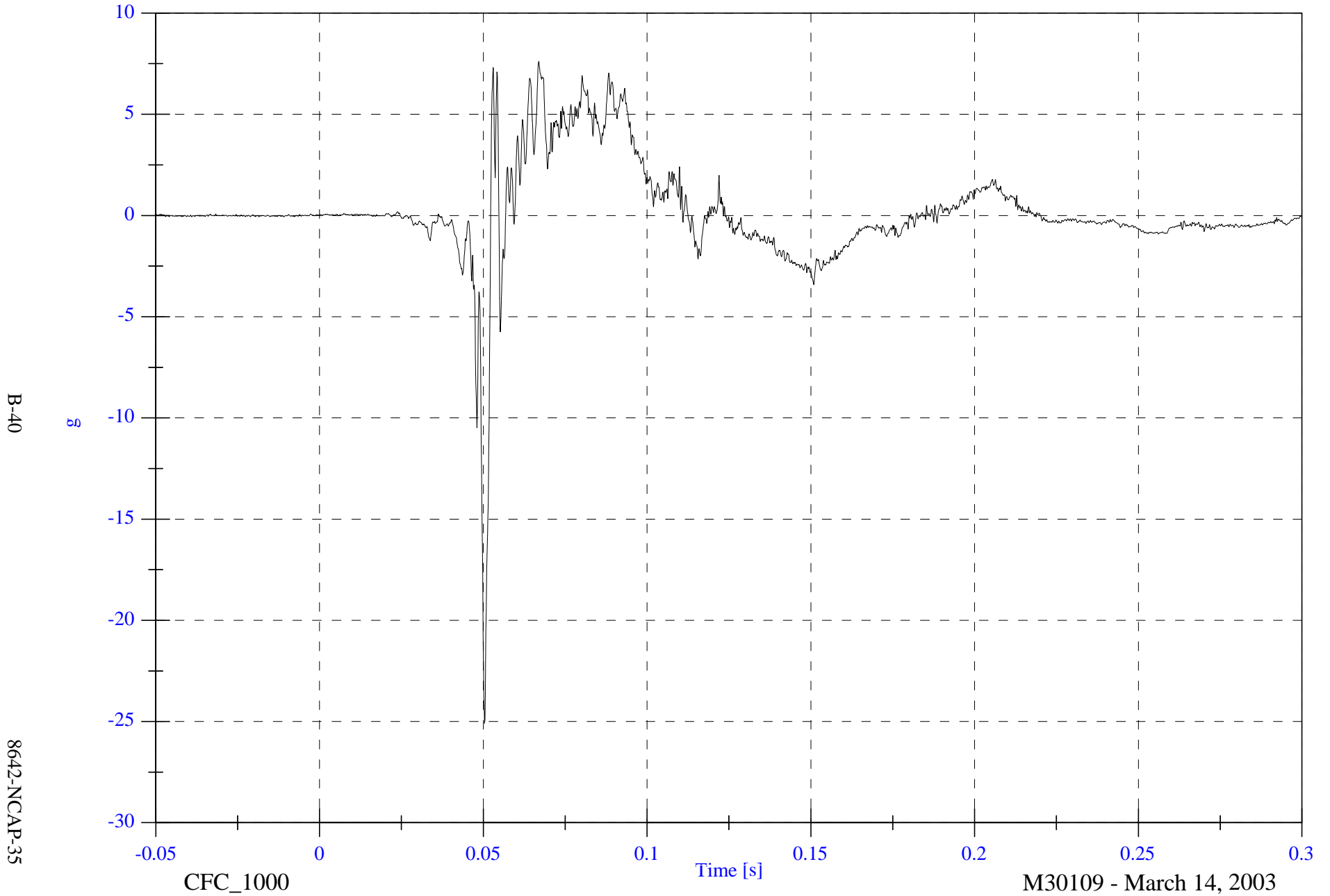
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 7.6 [g] at 0.067 [s]

Min: -25.1 [g] at 0.050 [s]

V1P1 Pelvic y

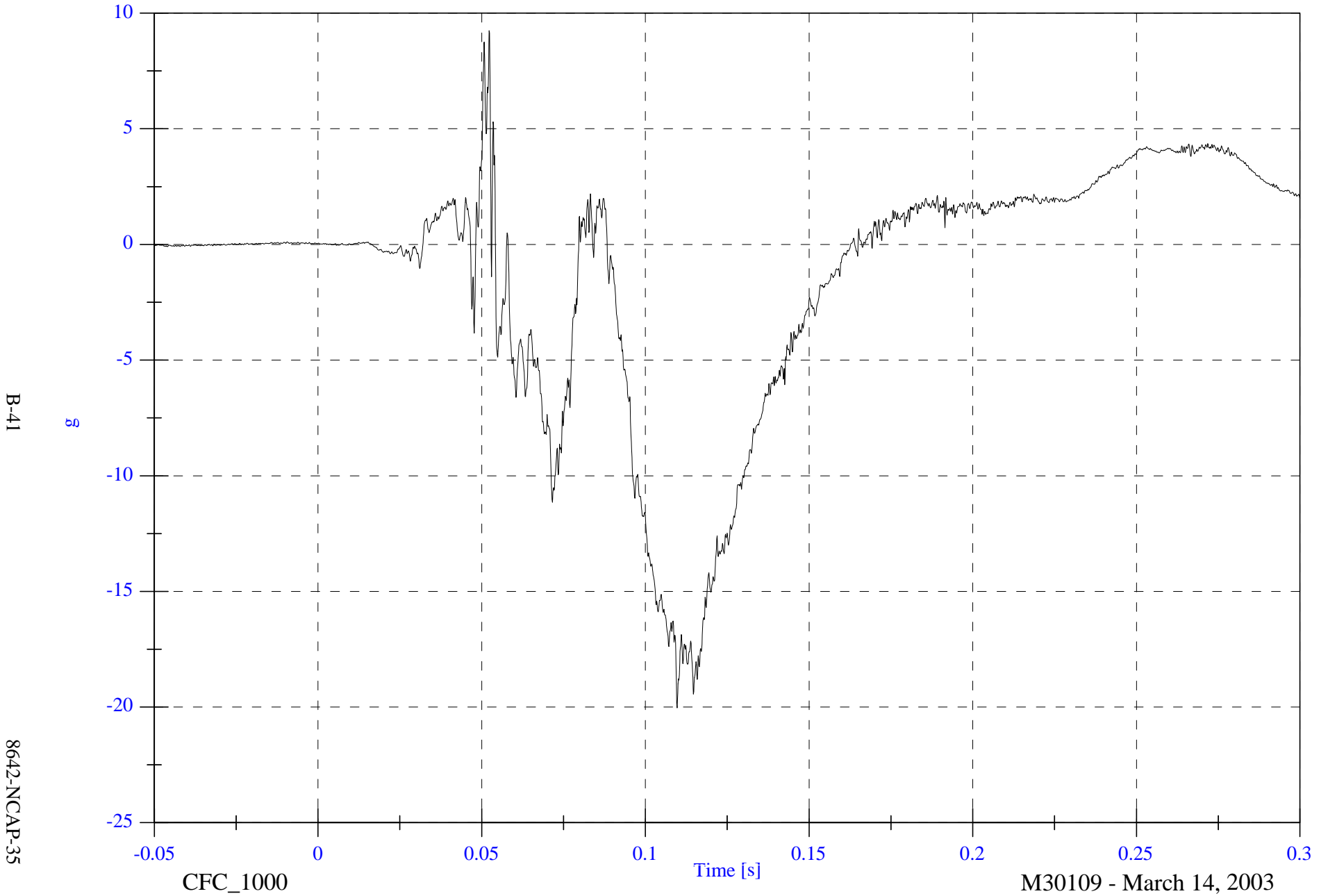


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 9.2 [g] at 0.052 [s]

Min: -20.0 [g] at 0.110 [s]

V1P1 Pelvic z



B-41

8642-NCAP-35

CFC\_1000

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

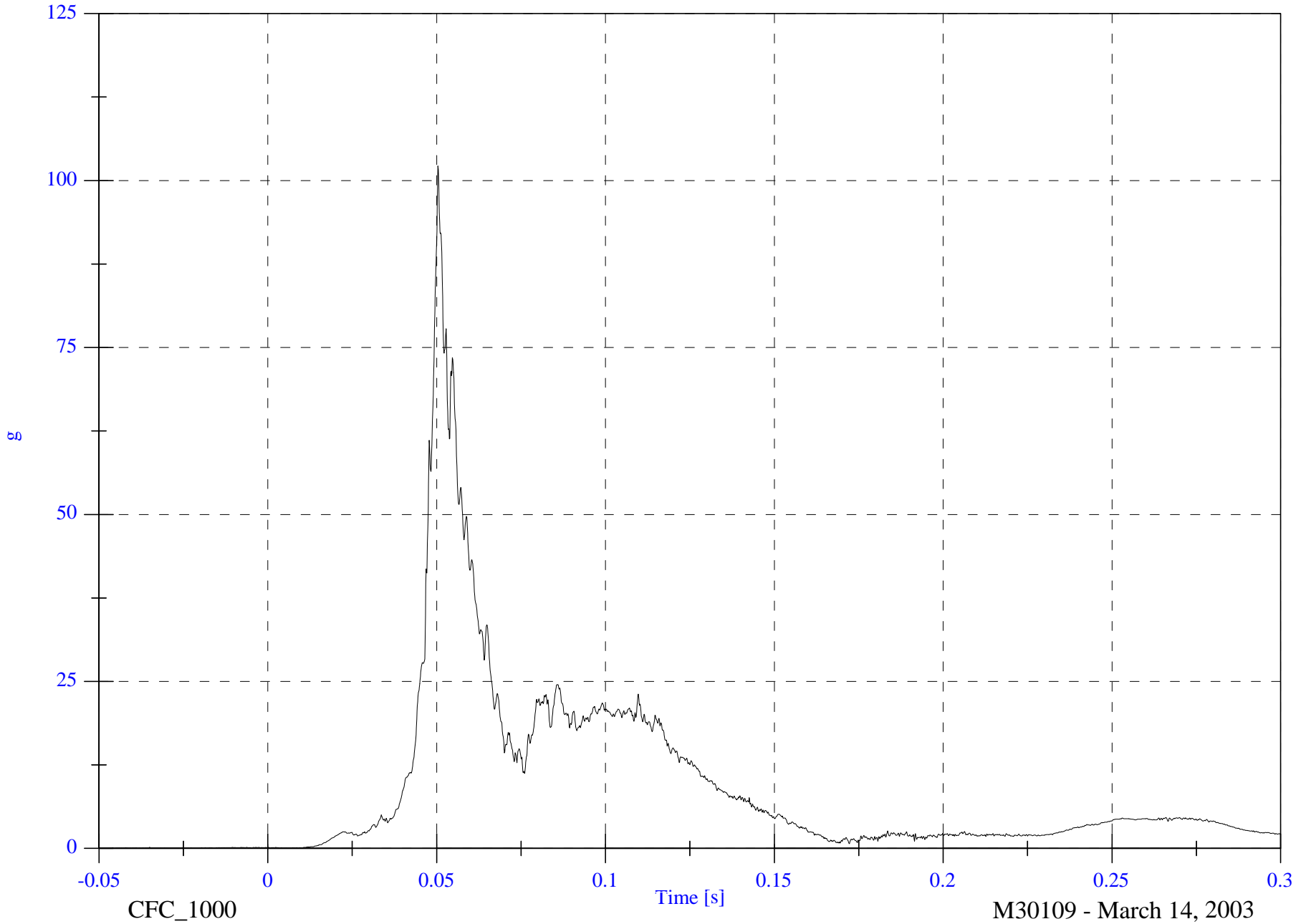
Max: 102.2 [g] at 0.050 [s]

V1P1 Pelvic Resultant

Min: 0.0 [g] at -0.045 [s]

B-42

8642-NCAP-35

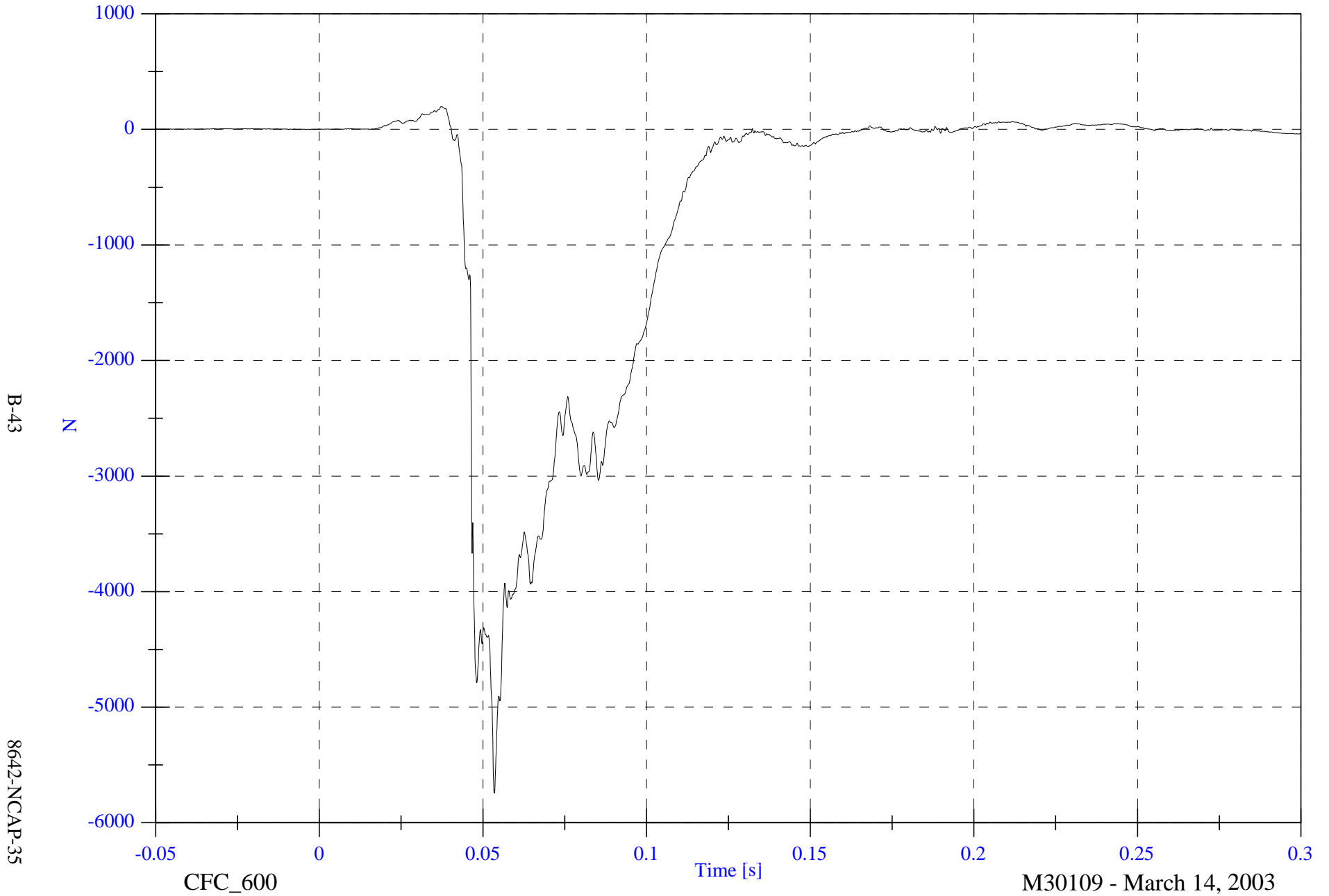


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P1 Left Femur z

Max: 196.6 [N] at 0.037 [s]

Min: -5746.0 [N] at 0.053 [s]



B-43

8642-NCAP-35

CFC\_600

Time [s]

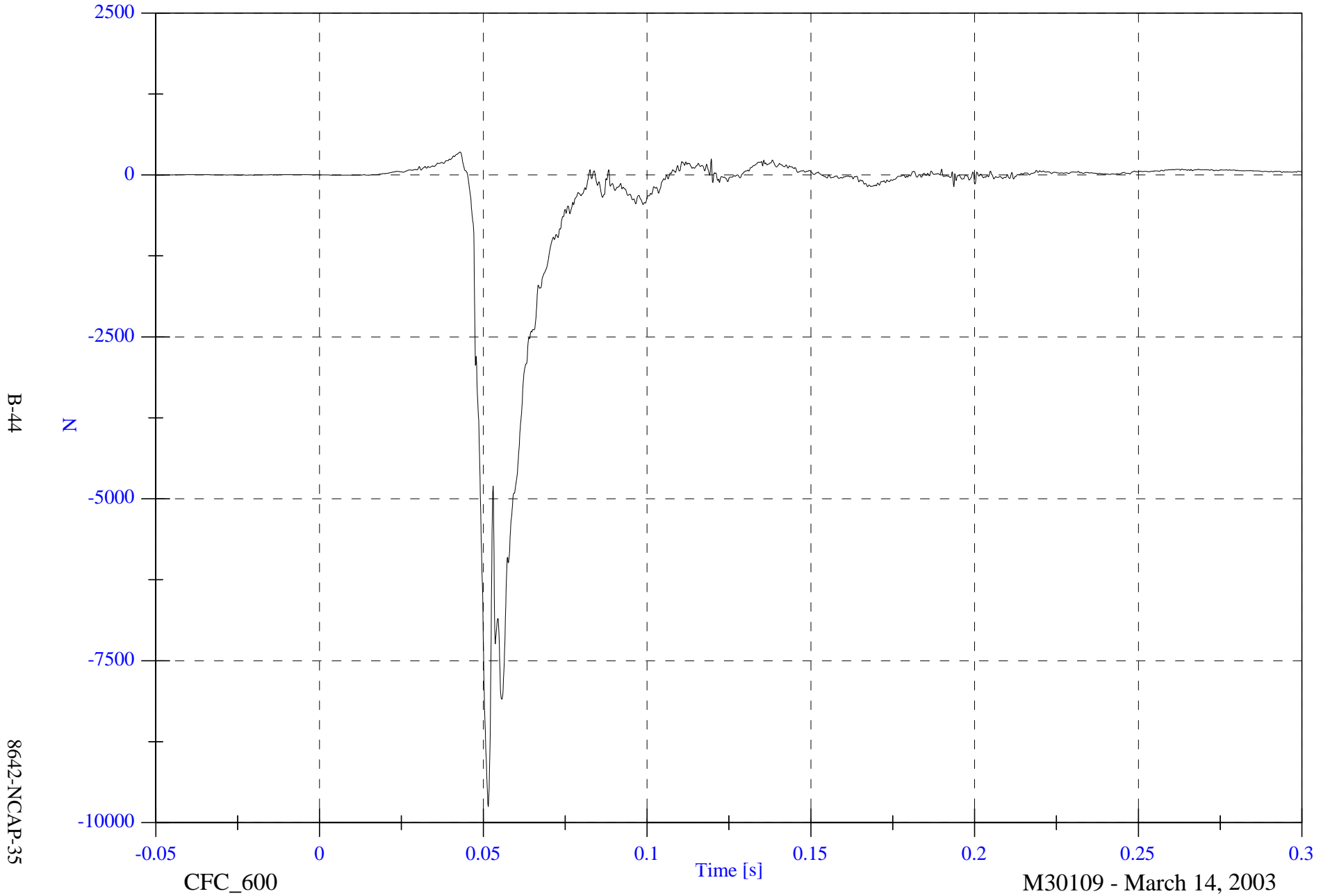
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 355.9 [N] at 0.043 [s]

Min: -9750.7 [N] at 0.051 [s]

V1P1 Right Femur z



2003 NCAP Test 13 2003 Chevrolet Tahoe

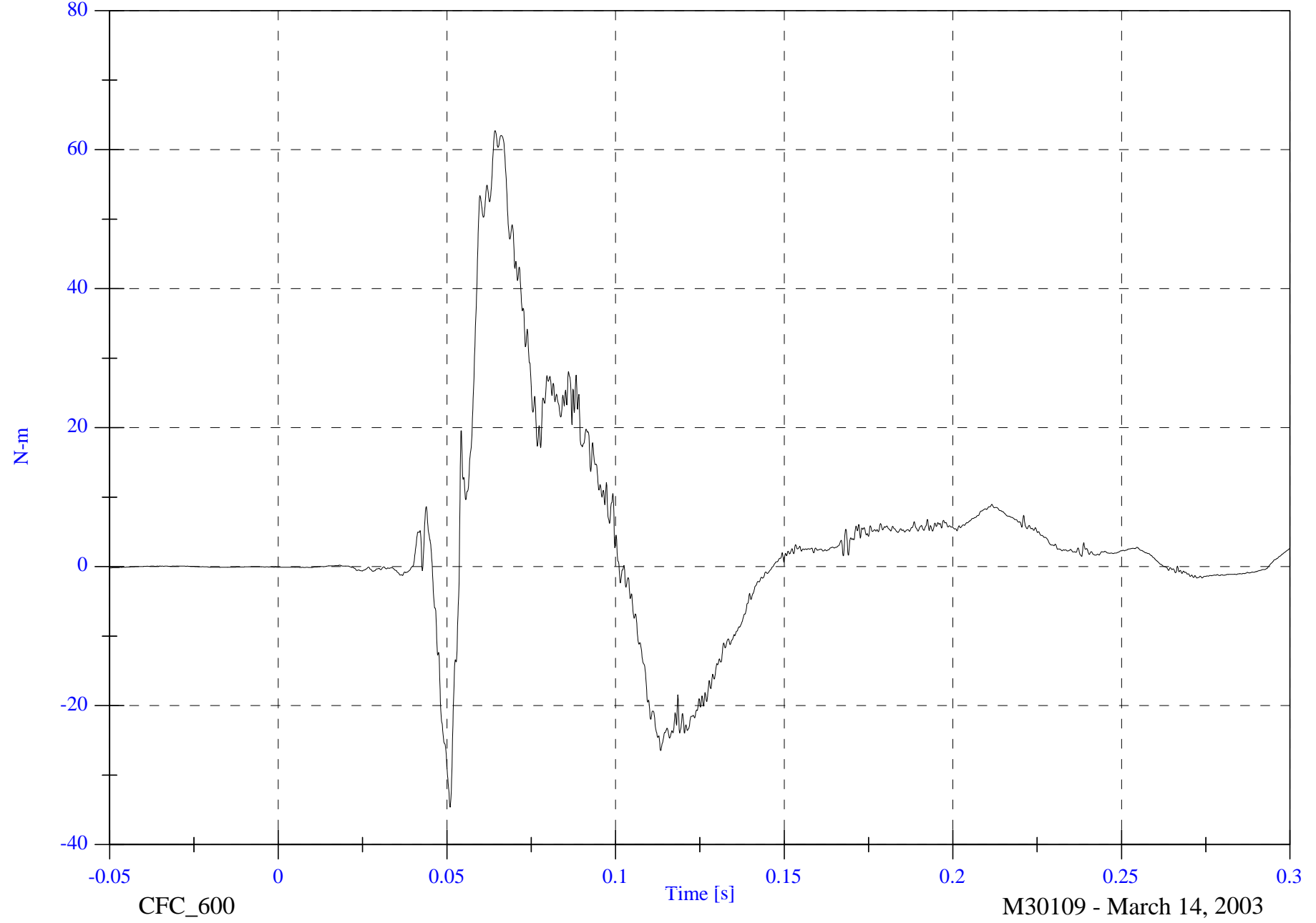
Max: 62.7 [N-m] at 0.064 [s]

V1P1 Left Upper Tibia Mx

Min: -34.6 [N-m] at 0.051 [s]

B-45

8642-NCAP-35



CFC\_600

Time [s]

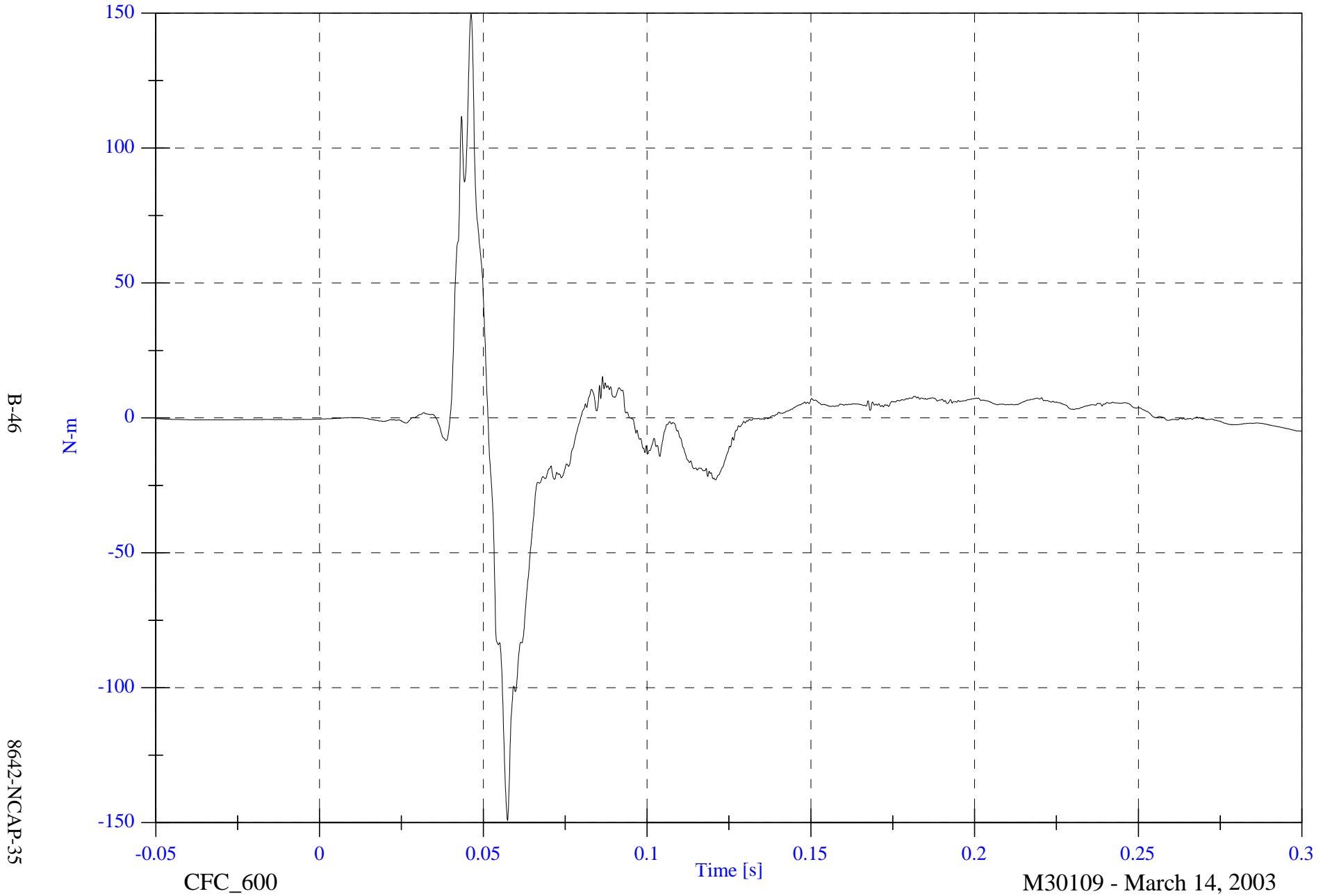
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 149.6 [N-m] at 0.046 [s]

V1P1 Left Upper Tibia My

Min: -149.2 [N-m] at 0.057 [s]



B-46

8642-NCAP-35

CFC\_600

Time [s]

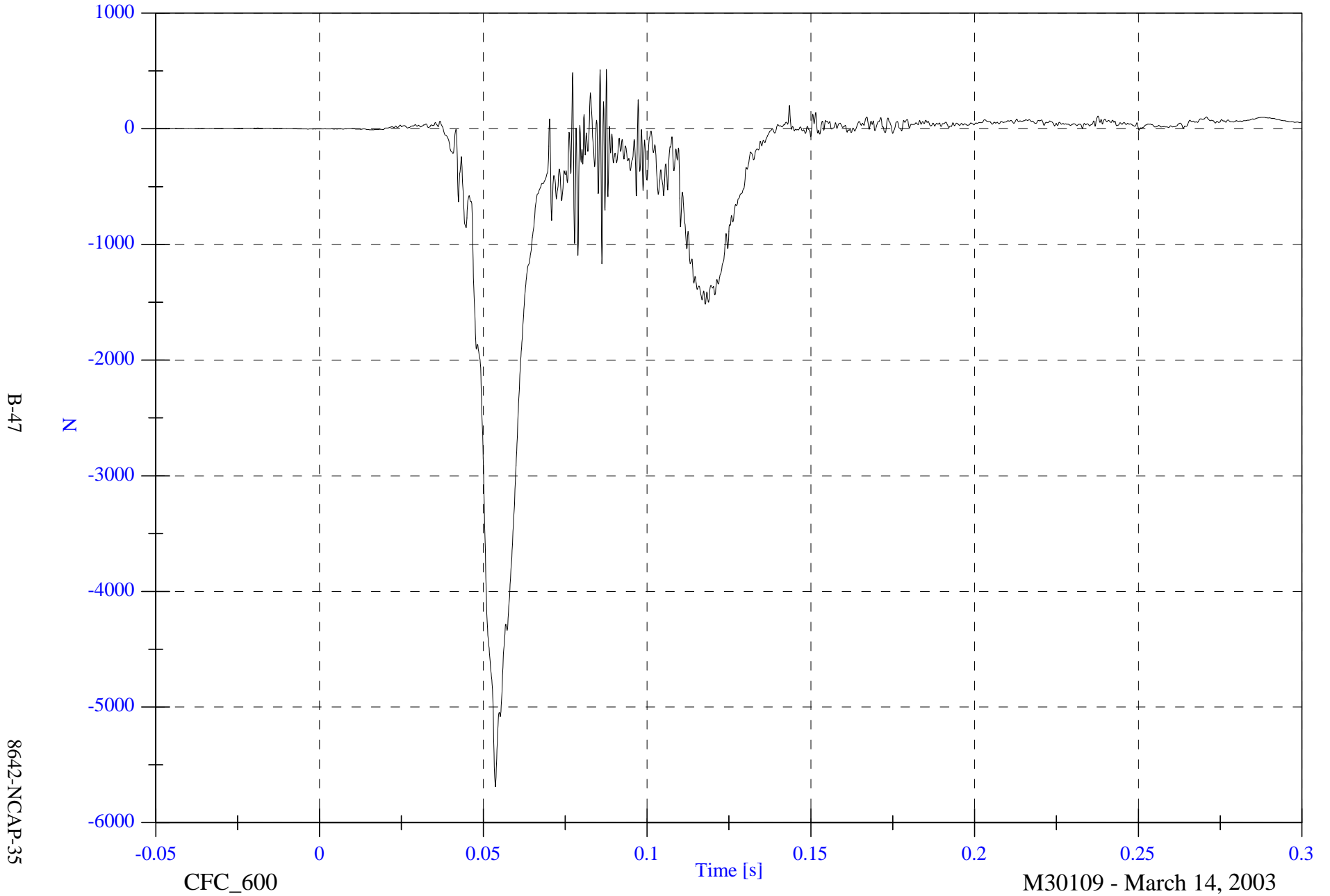
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P1 Left Lower Tibia Fz

Max: 513.6 [N] at 0.088 [s]

Min: -5689.5 [N] at 0.054 [s]



2003 NCAP Test 13 2003 Chevrolet Tahoe

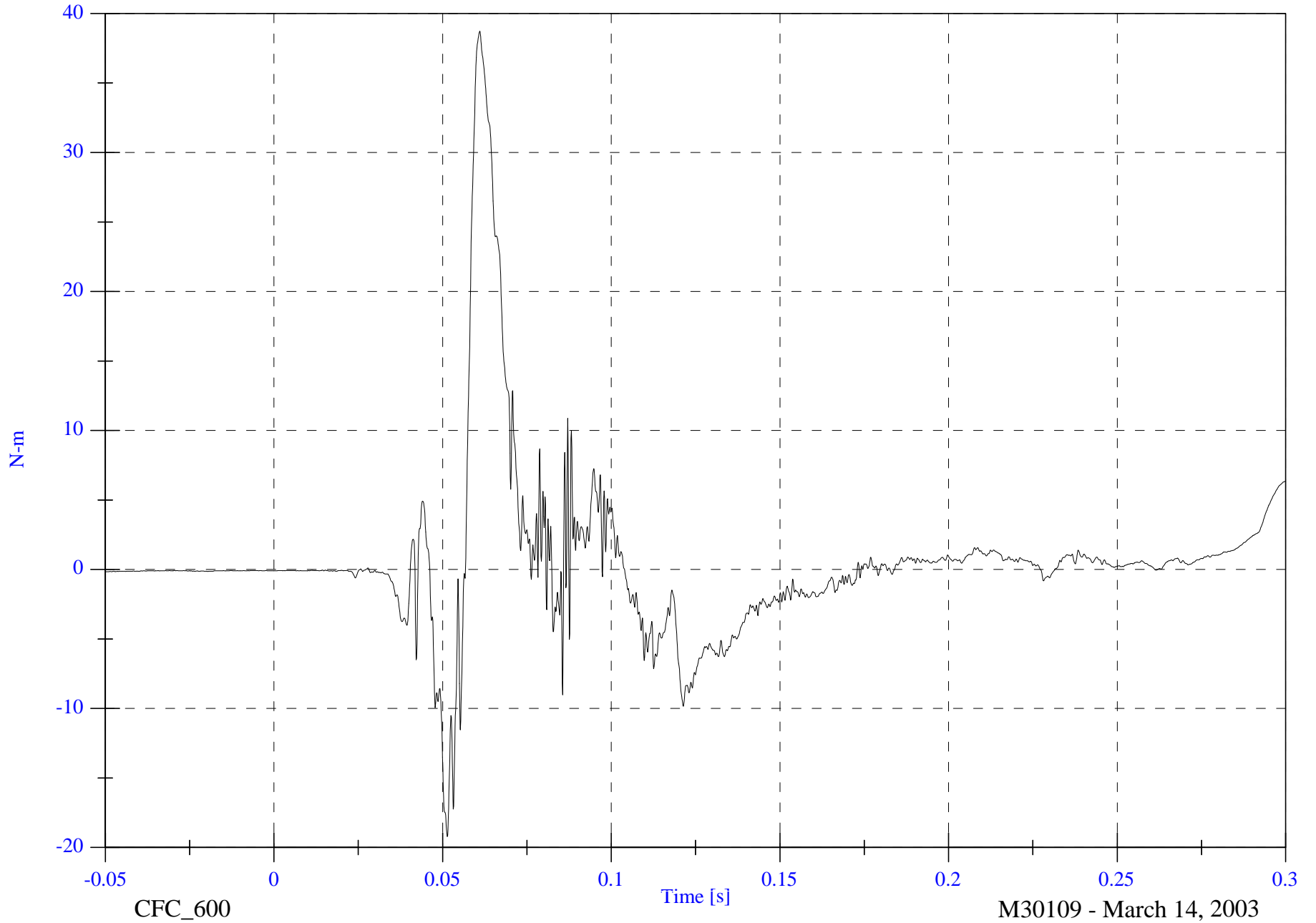
Max: 38.7 [N-m] at 0.061 [s]

VIP1 Left Lower Tibia Mx

Min: -19.2 [N-m] at 0.051 [s]

B-48

8642-NCAP-35



2003 NCAP Test 13 2003 Chevrolet Tahoe

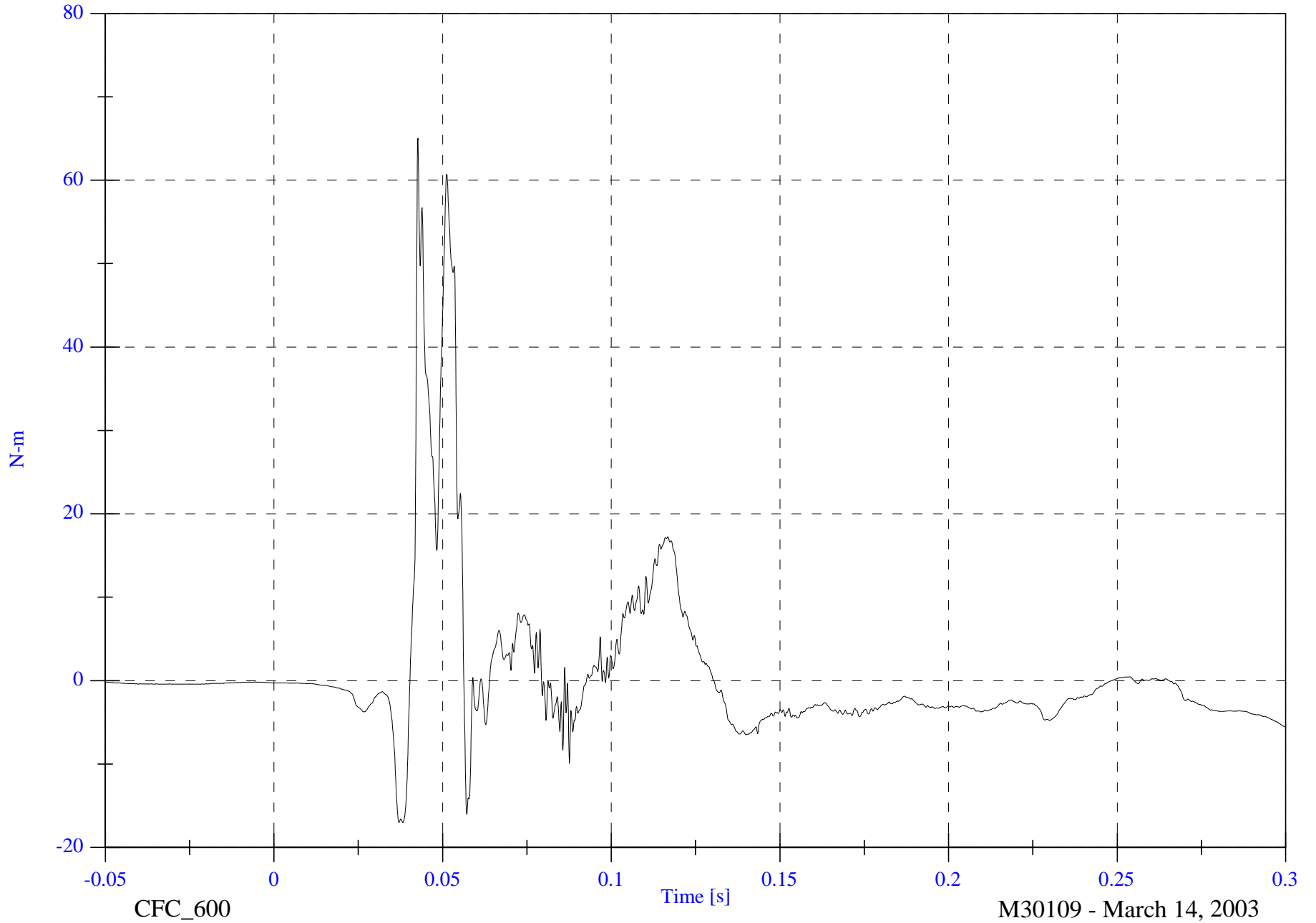
Max: 65.0 [N-m] at 0.043 [s]

VIP1 Left Lower Tibia My

Min: -17.0 [N-m] at 0.038 [s]

B-49

8642-NCAP-35

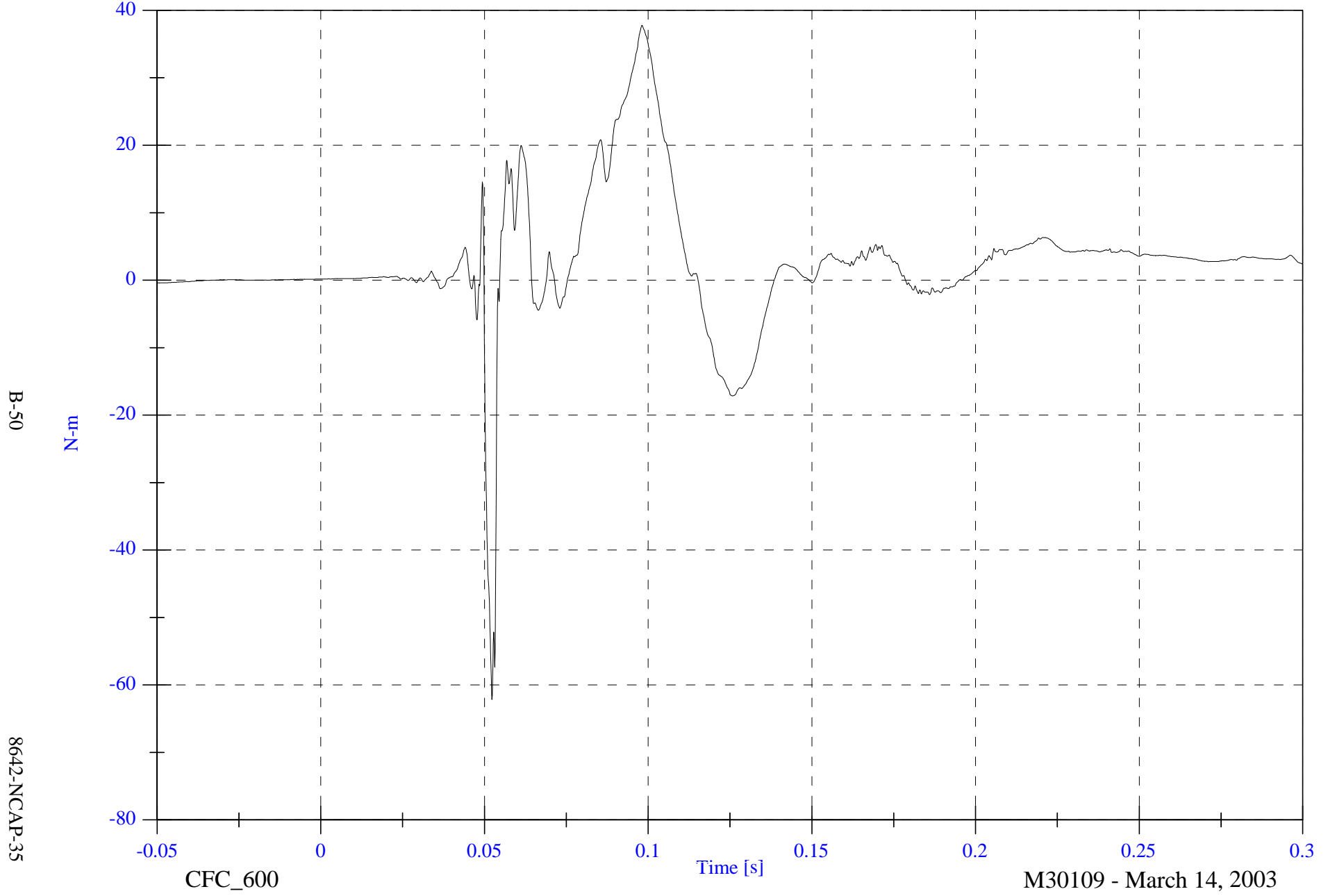


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 37.8 [N-m] at 0.098 [s]

Min: -62.2 [N-m] at 0.052 [s]

V1P1 Right Upper Tibia Mx



B-50

8642-NCAP-35

CFC\_600

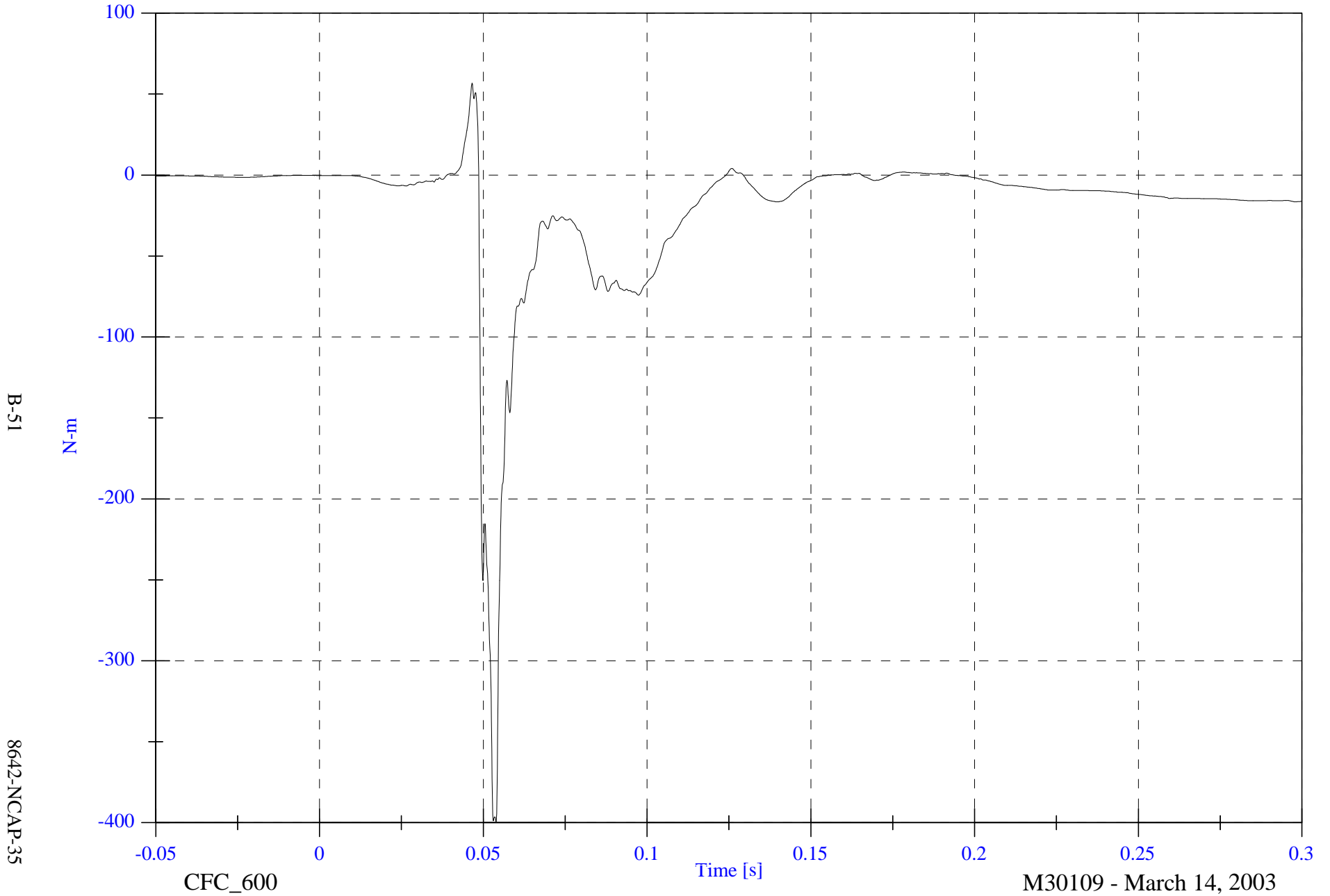
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P1 Right Upper Tibia My

Max: 56.7 [N-m] at 0.047 [s]

Min: -399.3 [N-m] at 0.054 [s]

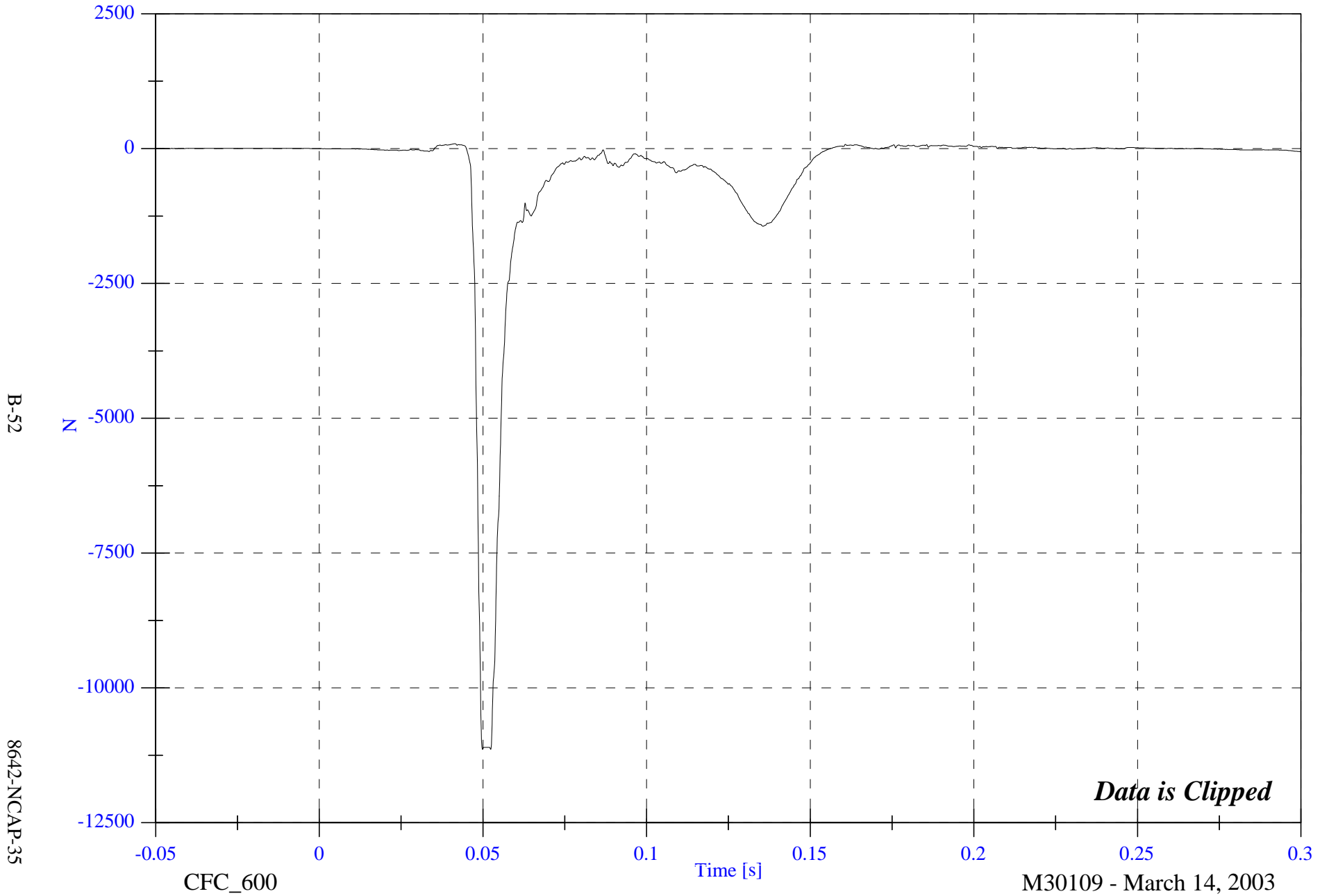


2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP1 Right Lower Tibia Fz

Max: 89.1 [N] at 0.041 [s]

Min: -11138.7 [N] at 0.052 [s]



B-52

8642-NCAP-35

CFC\_600

Time [s]

M30109 - March 14, 2003

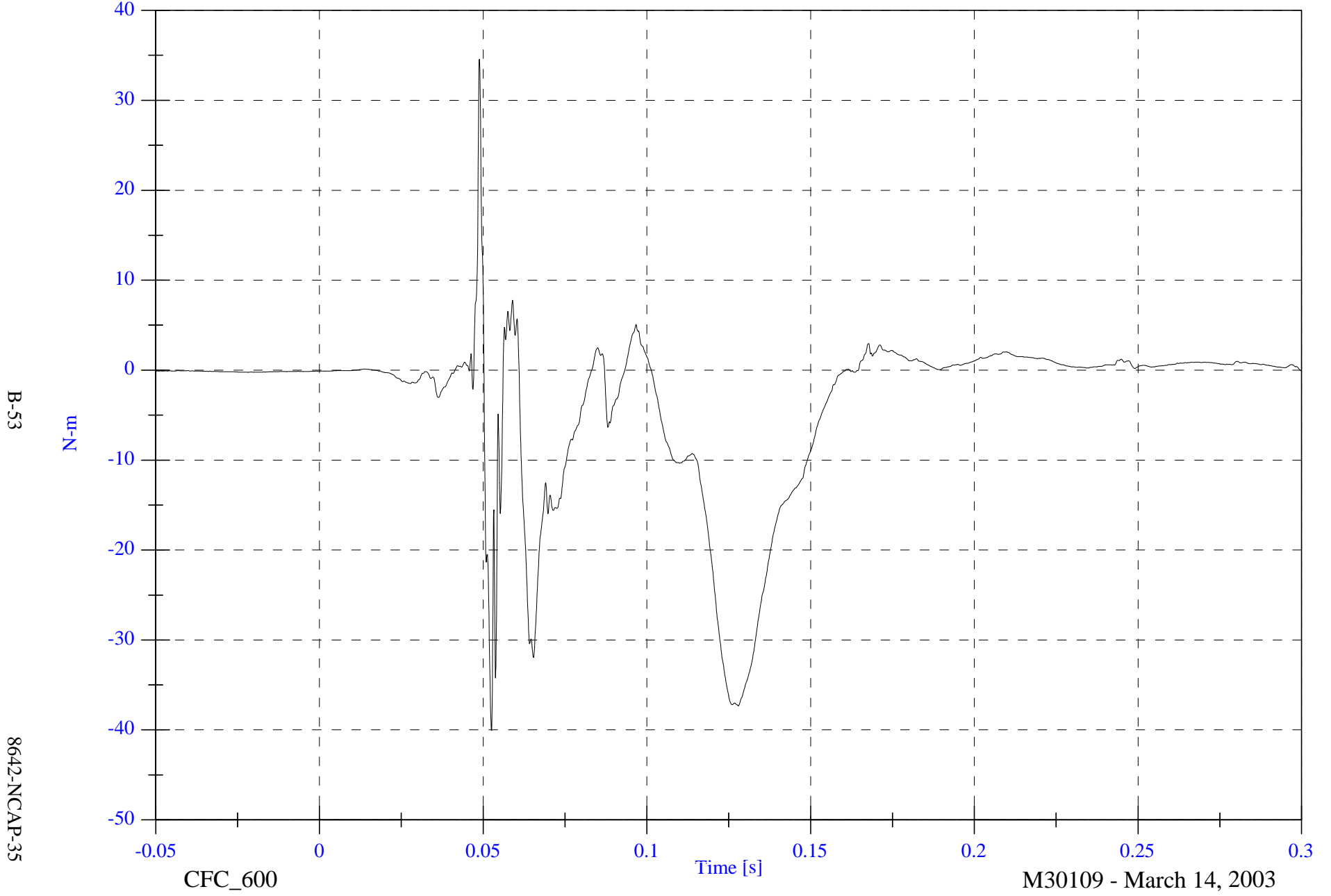
*Data is Clipped*

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 34.6 [N-m] at 0.049 [s]

V1P1 Right Lower Tibia Mx

Min: -40.1 [N-m] at 0.053 [s]



B-53

8642-NCAP-35

CFC\_600

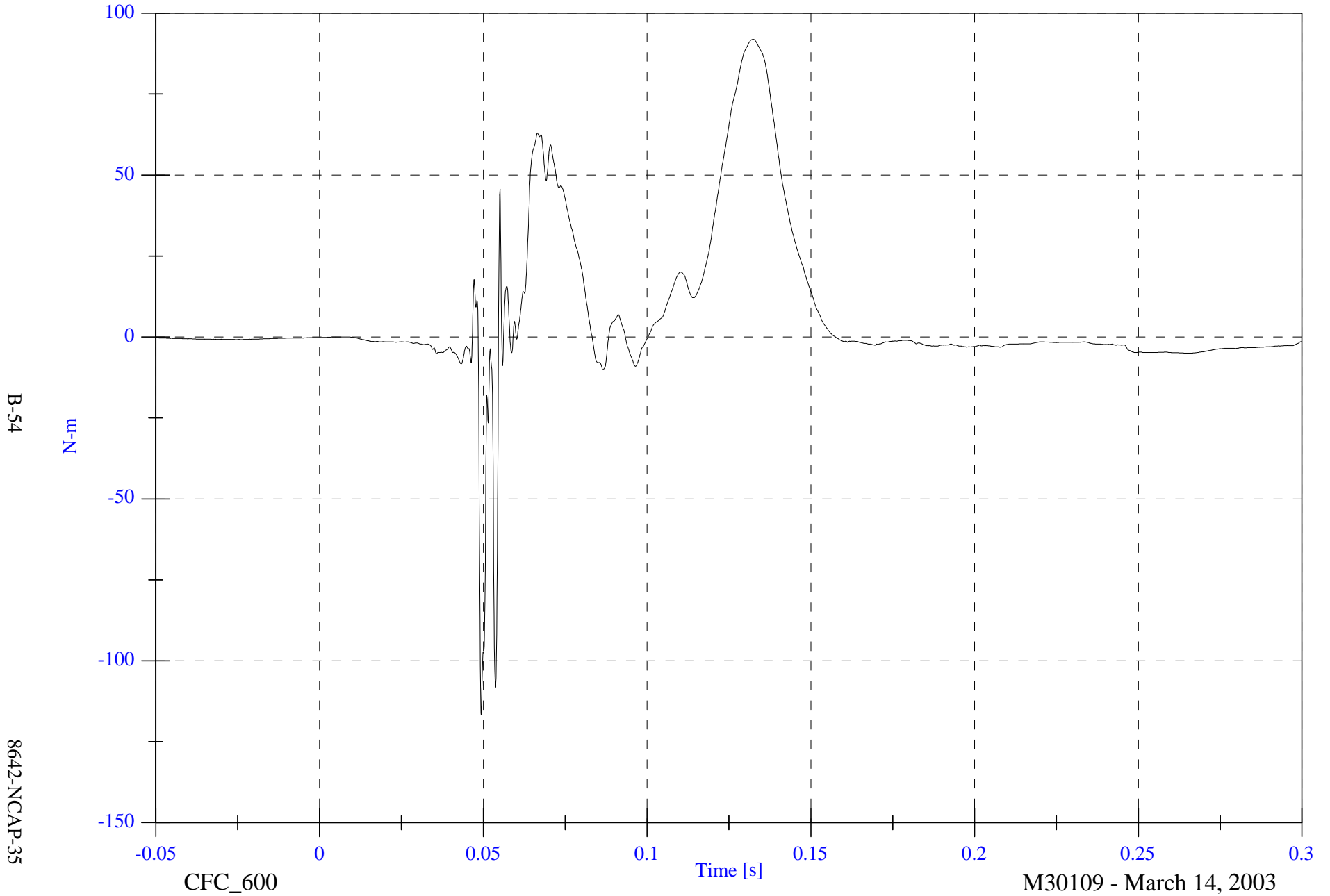
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P1 Right Lower Tibia My

Max: 91.9 [N-m] at 0.132 [s]

Min: -116.7 [N-m] at 0.049 [s]



B-54

8642-NCAP-35

CFC\_600

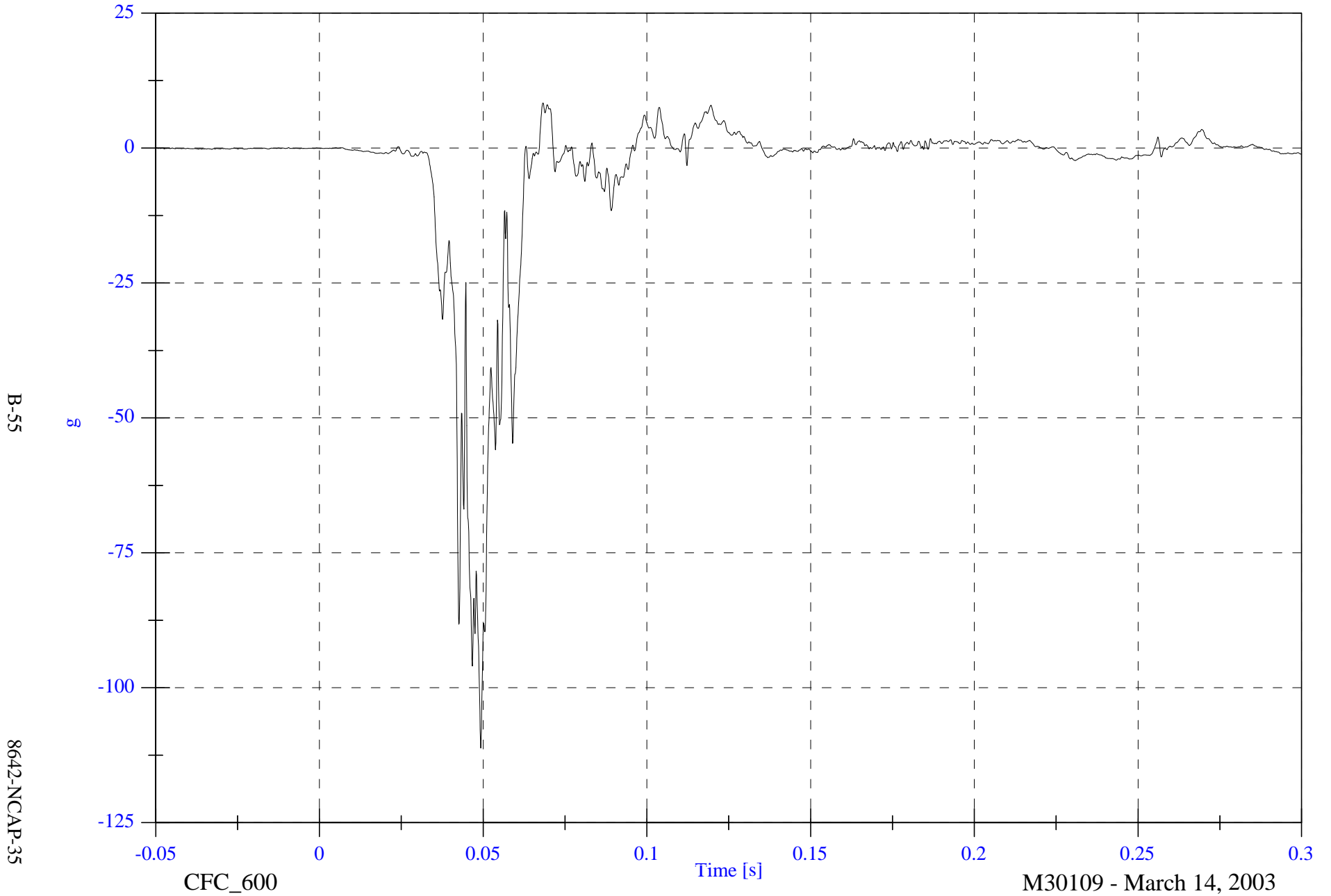
Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 8.4 [g] at 0.068 [s]  
Min: -111.2 [g] at 0.049 [s]

V1P1 Left Foot Aft x

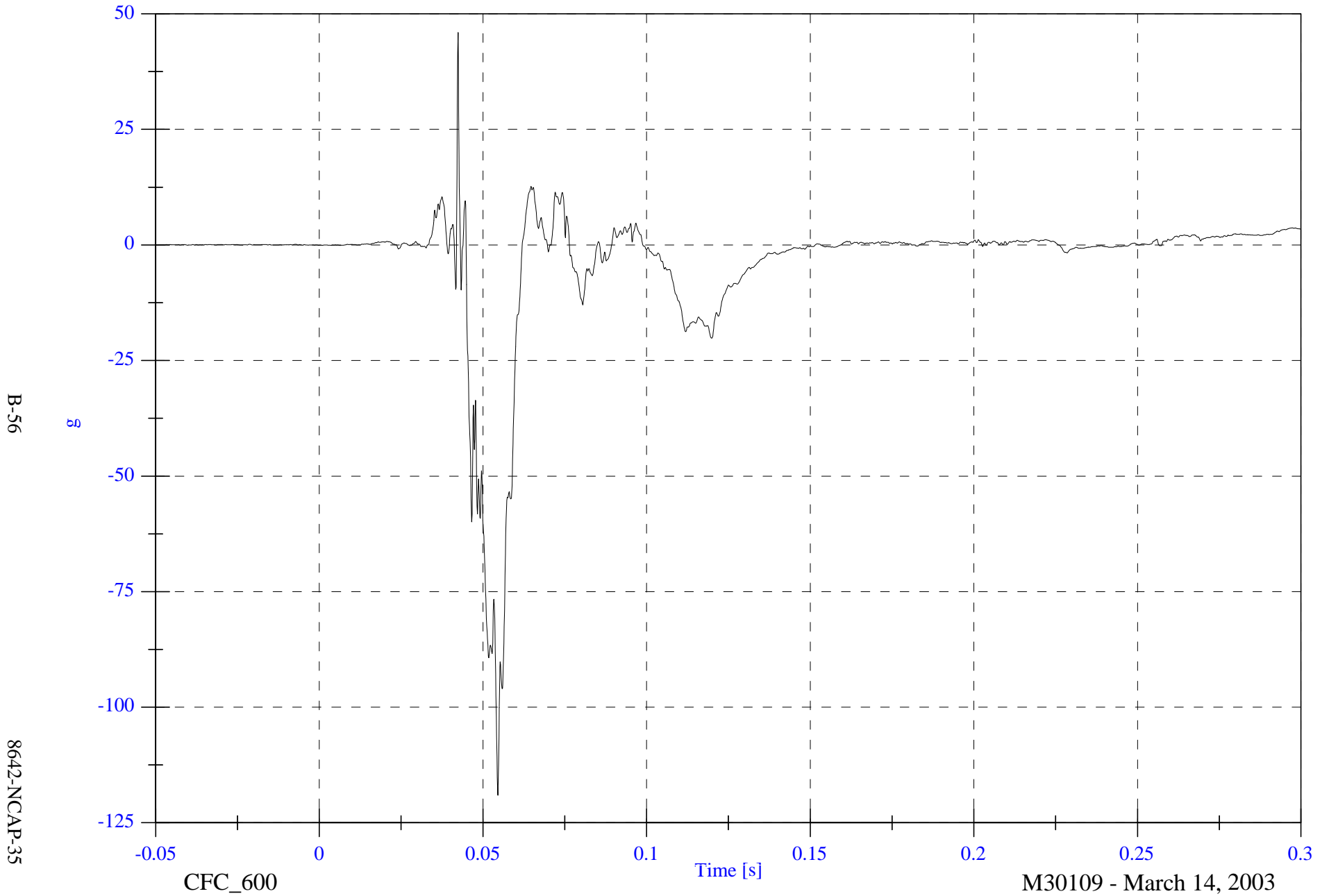


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 46.0 [g] at 0.042 [s]

Min: -119.1 [g] at 0.055 [s]

V1P1 Left Foot Aft z



B-56

8642-NCAP-35

CFC\_600

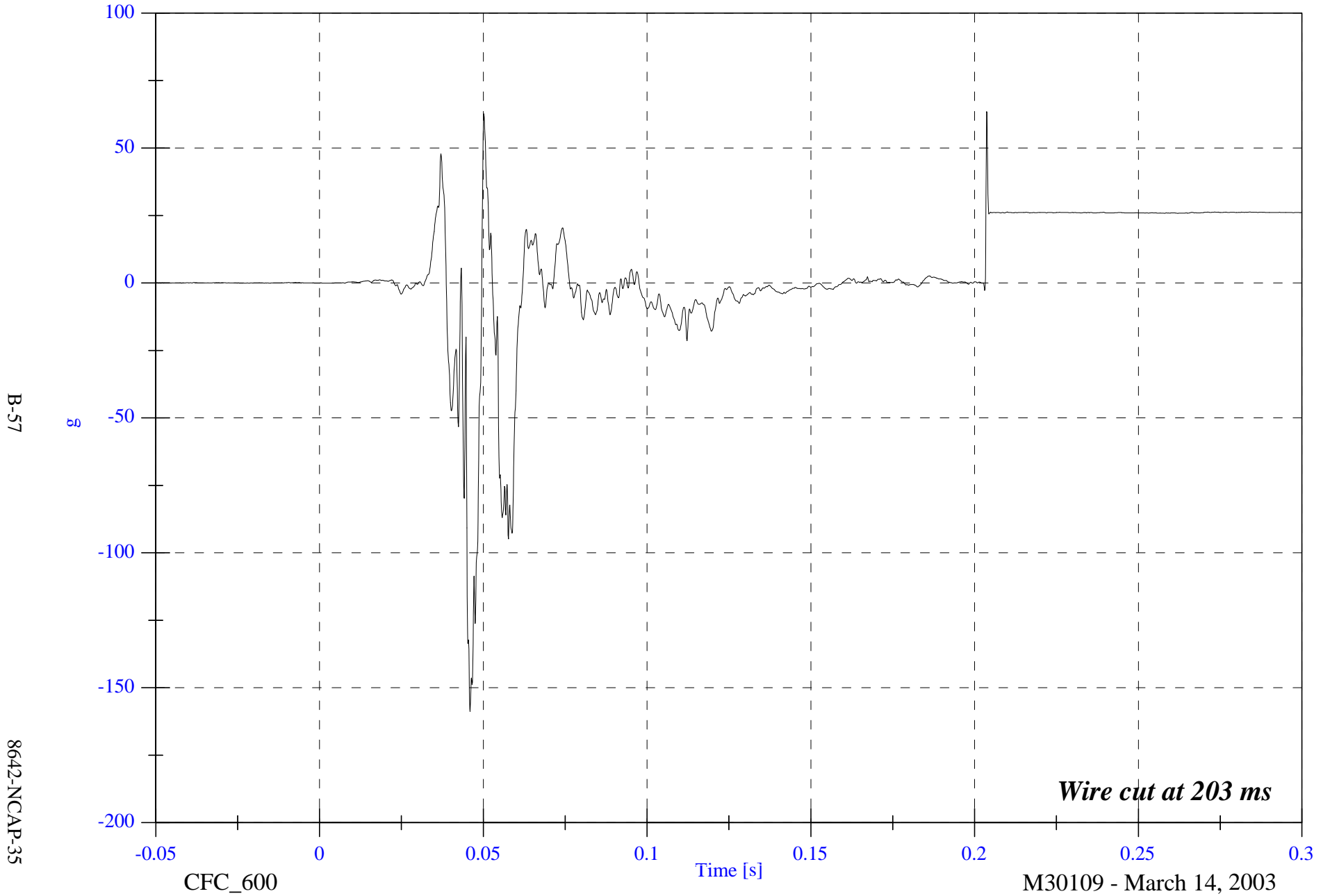
Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P1 Left Foot Fore z

Max: 63.5 [g] at 0.204 [s]  
Min: -158.7 [g] at 0.046 [s]



B-57

8642-NCAP-35

CFC\_600

Time [s]

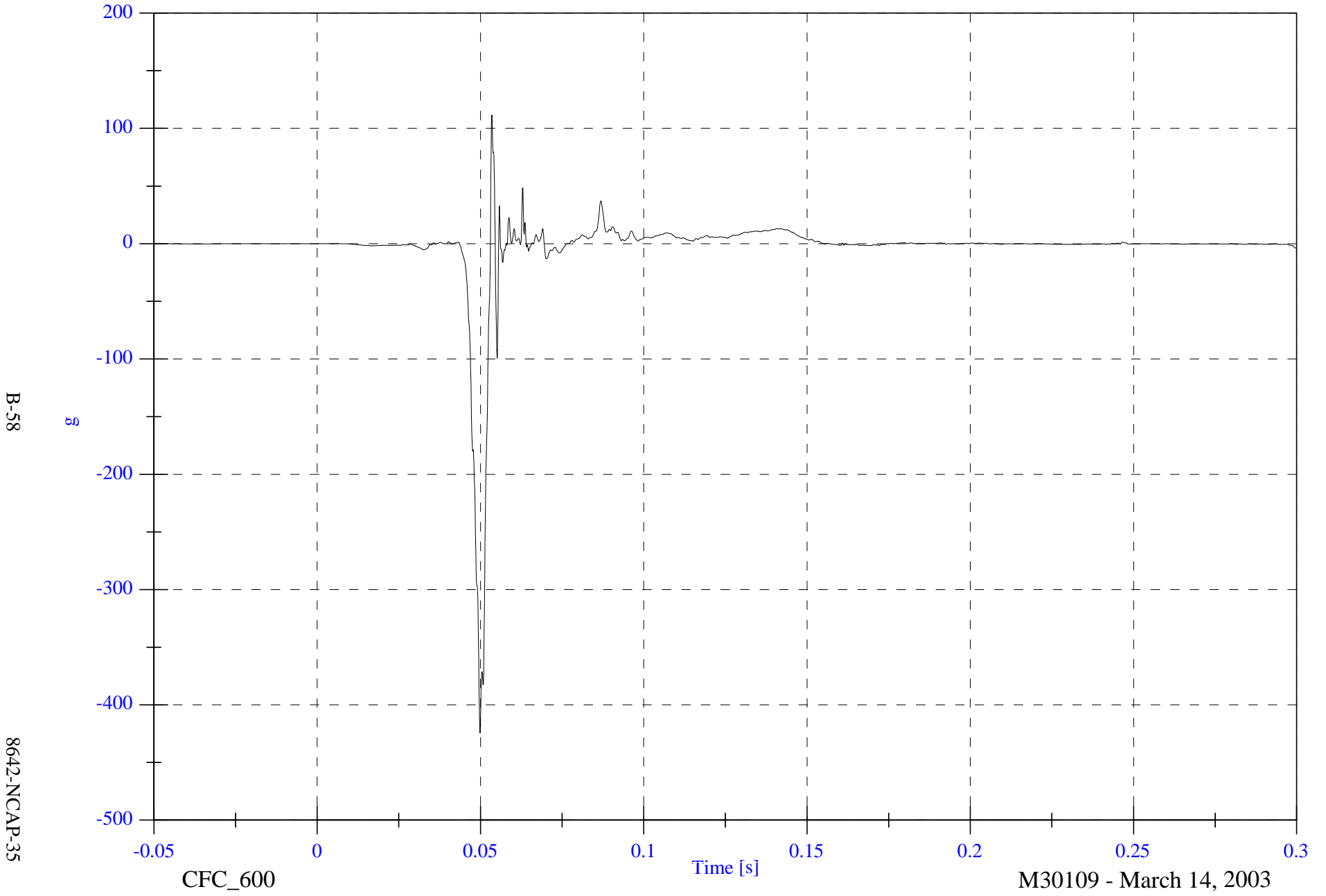
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP1 Right Foot Aft x

Max: 111.5 [g] at 0.053 [s]

Min: -424.3 [g] at 0.050 [s]

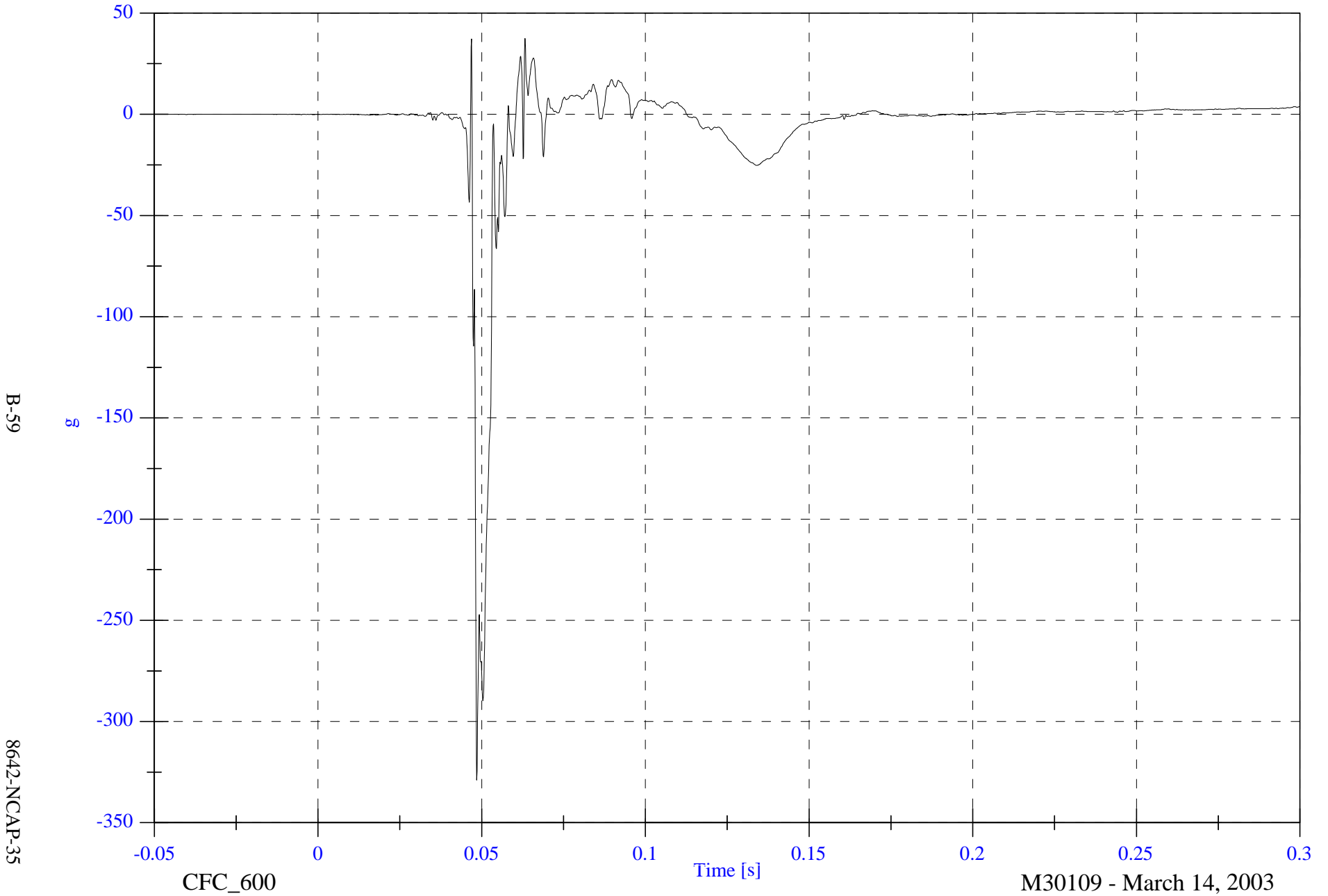


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P1 Right Foot Aft z

Max: 37.5 [g] at 0.063 [s]

Min: -328.9 [g] at 0.048 [s]

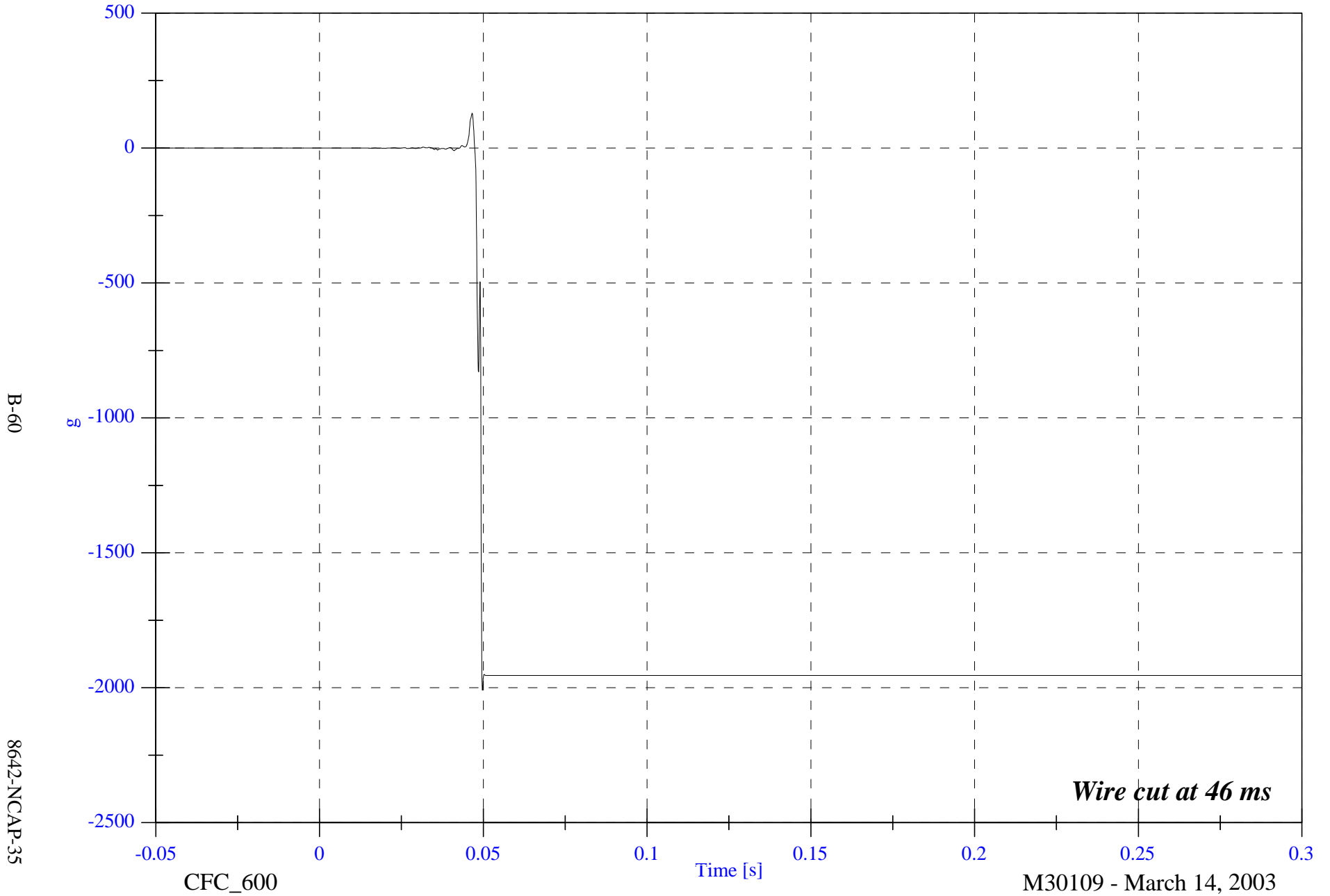


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 128.9 [g] at 0.047 [s]

Min: -2008.3 [g] at 0.050 [s]

V1P1 Right Foot Fore z



B-60

8642-NCAP-35

CFC\_600

Time [s]

M30109 - March 14, 2003

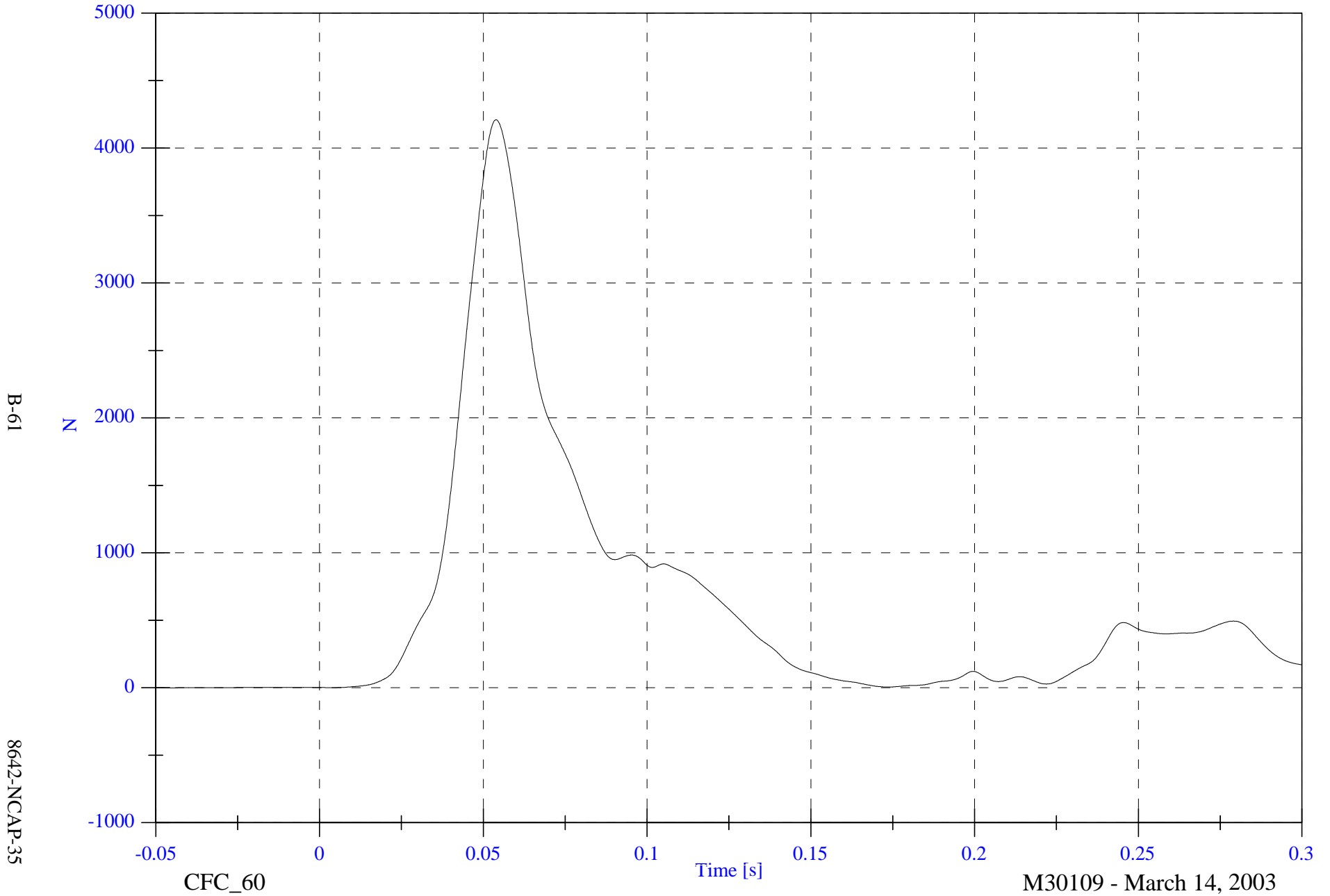
*Wire cut at 46 ms*

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 4209.6 [N] at 0.054 [s]

V1P1 Driver Lap Belt

Min: -1.3 [N] at -0.047 [s]



B-61

8642-NCAP-35

CFC\_60

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

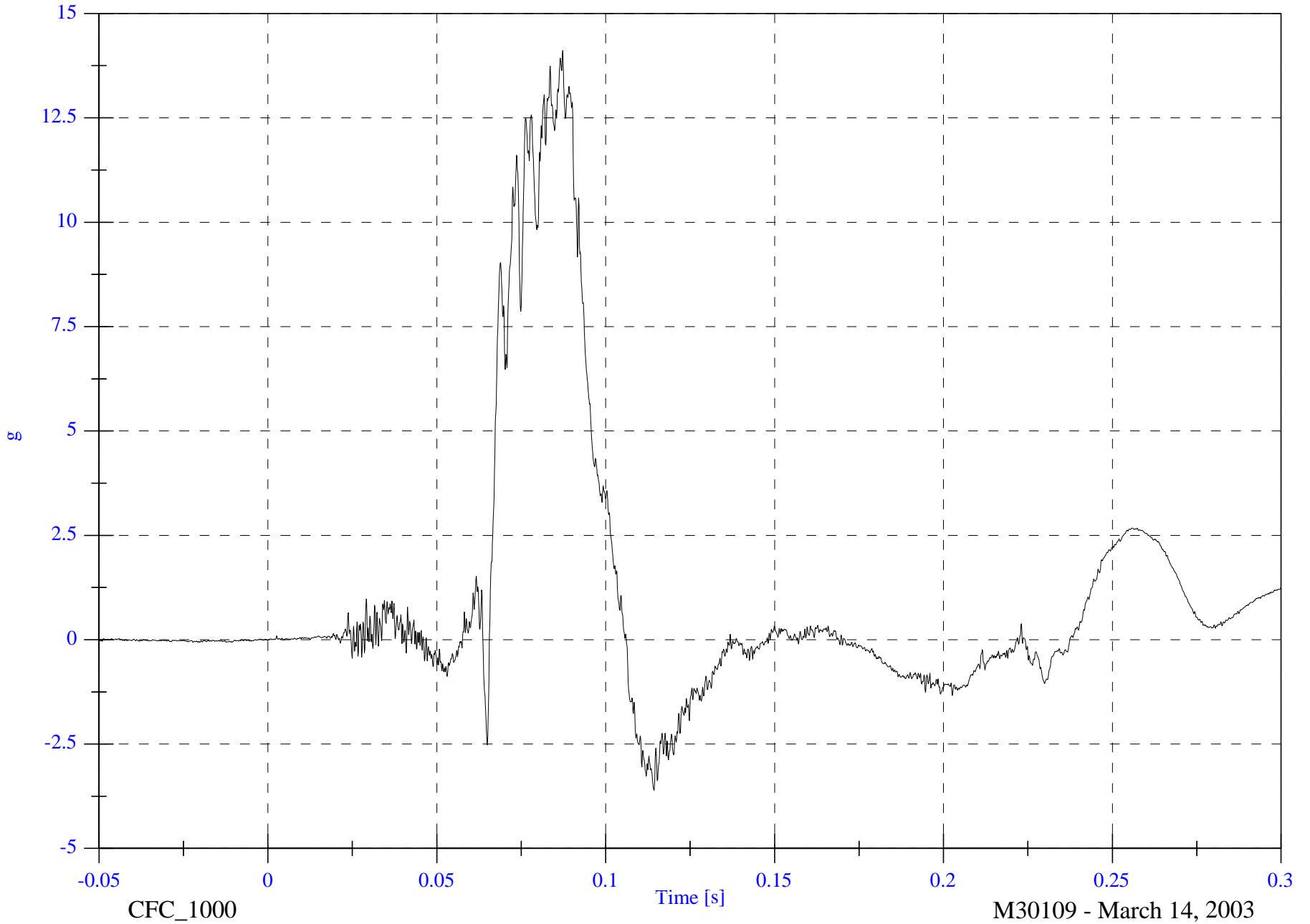
V1P2 Head 9 Array X Arm Ay

Max: 14.1 [g] at 0.087 [s]

Min: -3.6 [g] at 0.114 [s]

B-62

8642-NCAP-35

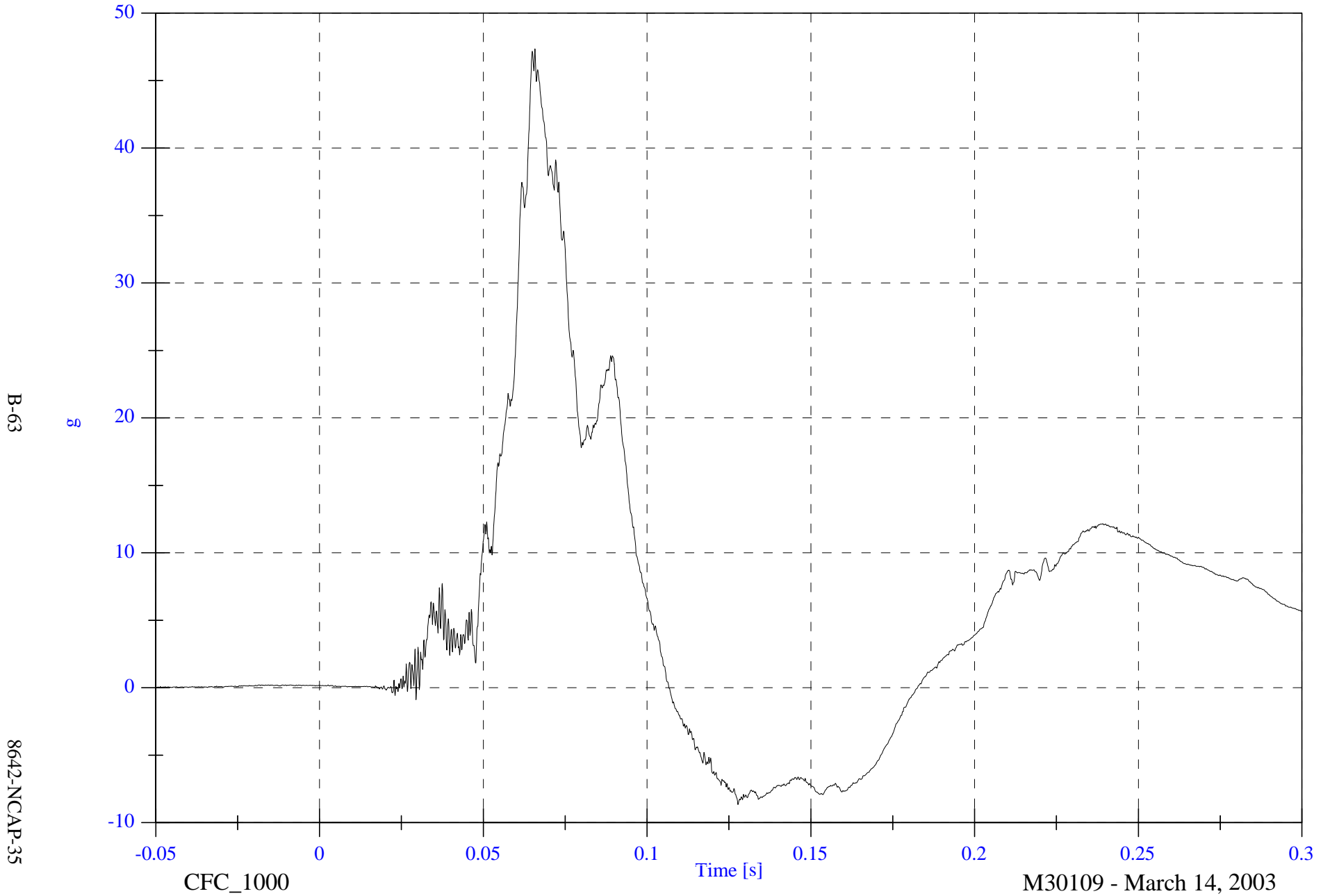


2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP2 Head 9 Array X Arm Az

Max: 47.4 [g] at 0.066 [s]

Min: -8.7 [g] at 0.128 [s]

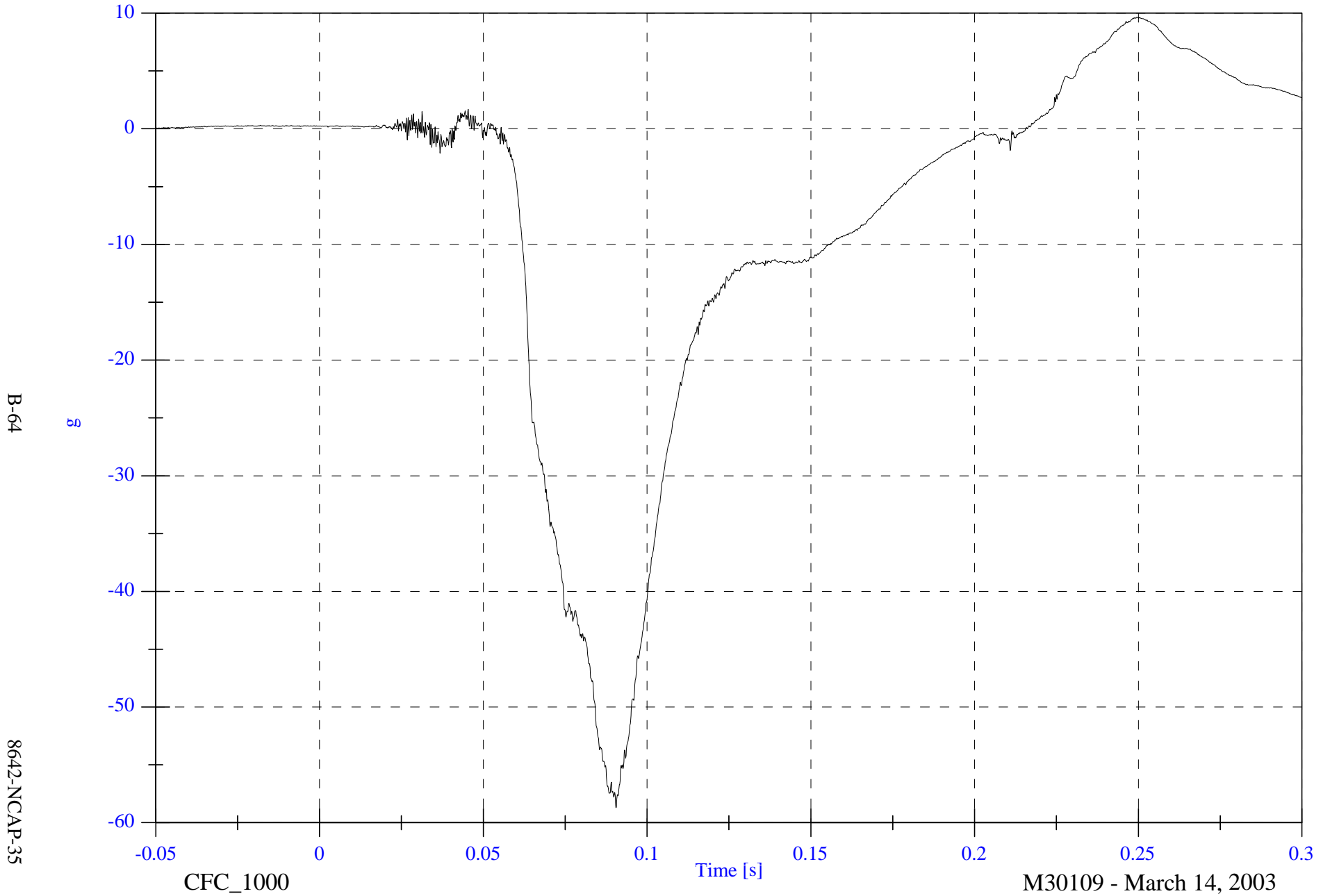


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Head 9 Array Y Arm Ax

Max: 9.6 [g] at 0.250 [s]

Min: -58.7 [g] at 0.090 [s]



B-64

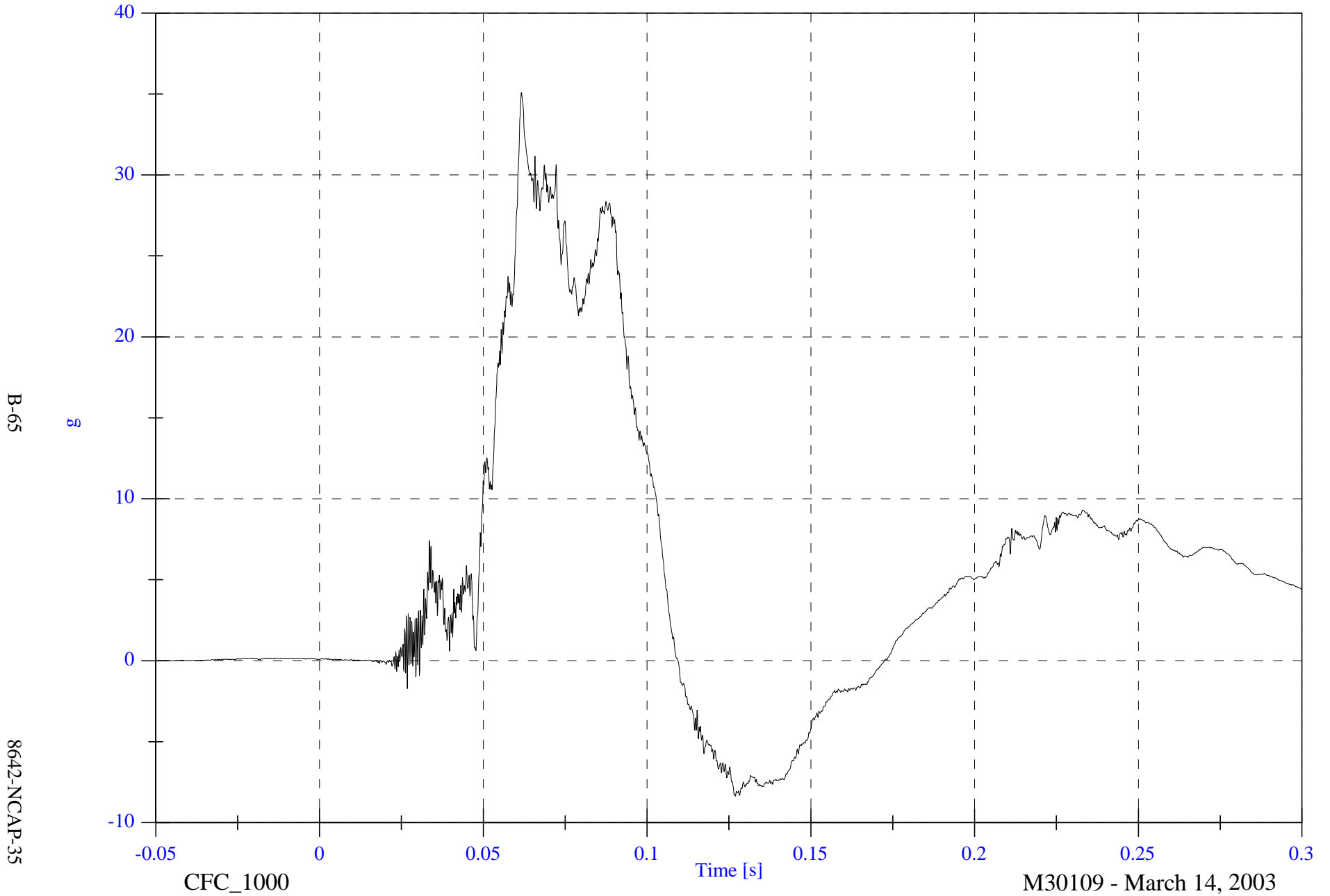
8642-NCAP-35

2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP2 Head 9 Array Y Arm Az

Max: 35.1 [g] at 0.062 [s]

Min: -8.4 [g] at 0.127 [s]

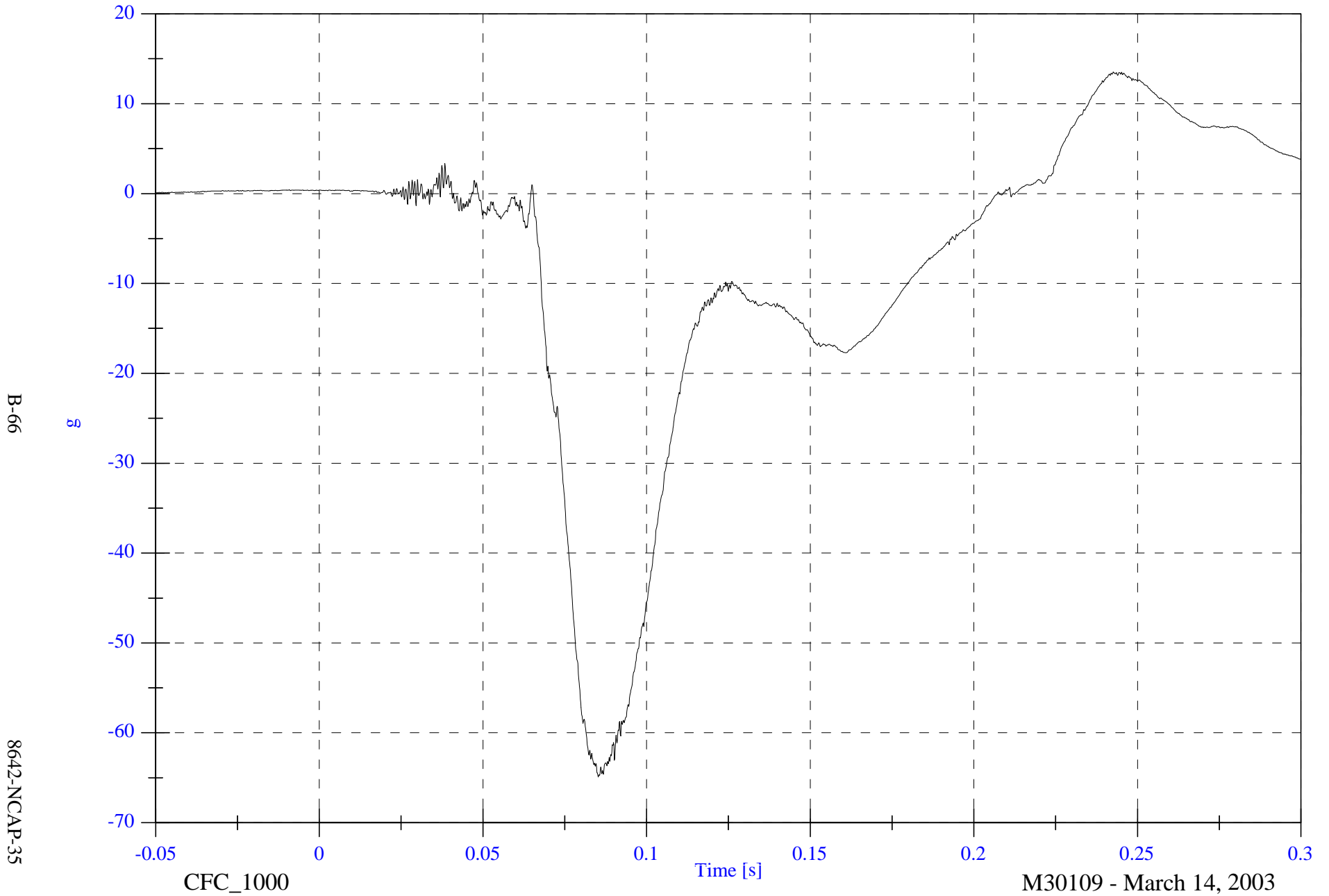


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Head 9 Array Z Arm Ax

Max: 13.5 [g] at 0.243 [s]

Min: -64.9 [g] at 0.085 [s]

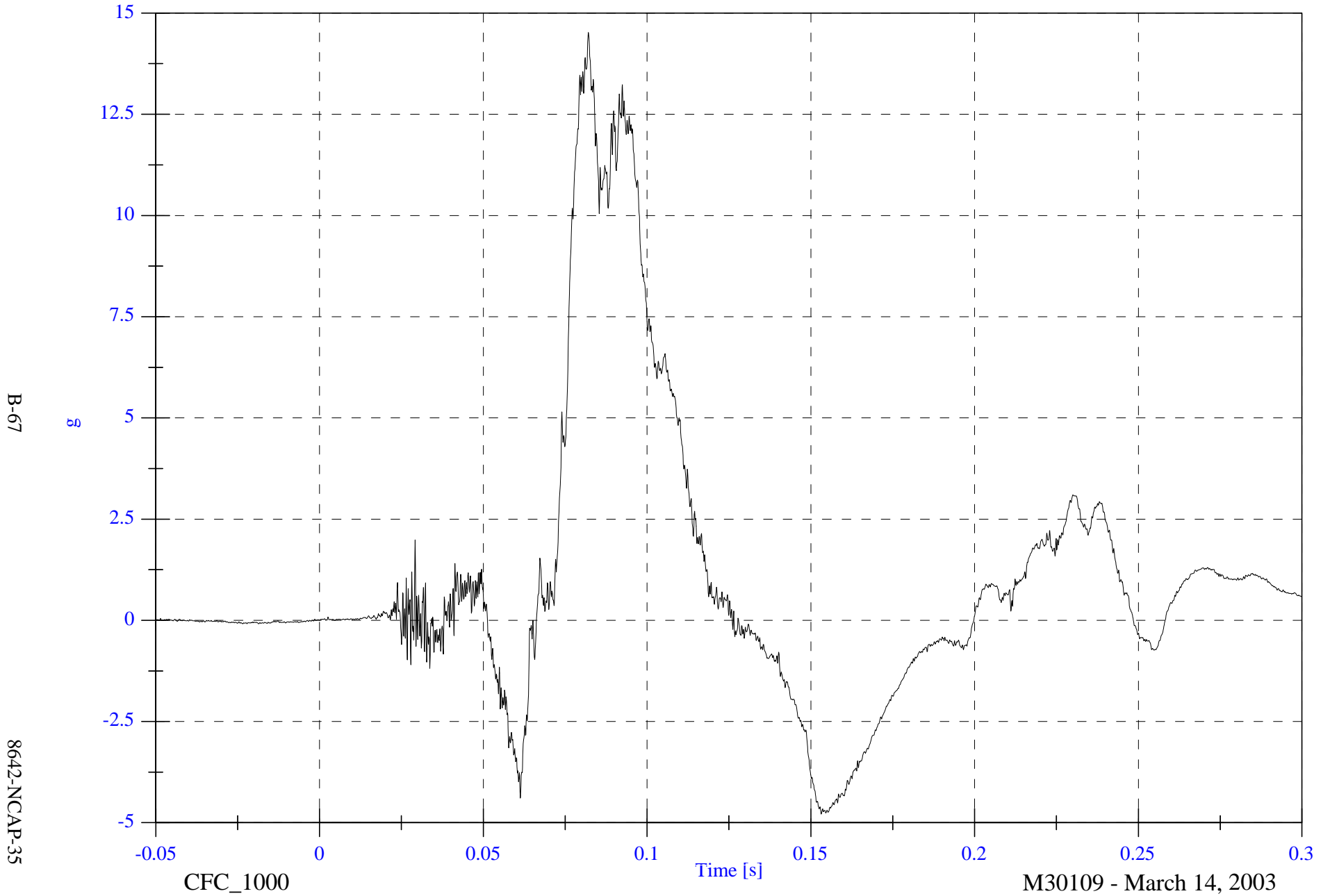


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Head 9 Array Z Arm Ay

Max: 14.5 [g] at 0.082 [s]

Min: -4.8 [g] at 0.153 [s]



B-67

8642-NCAP-35

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

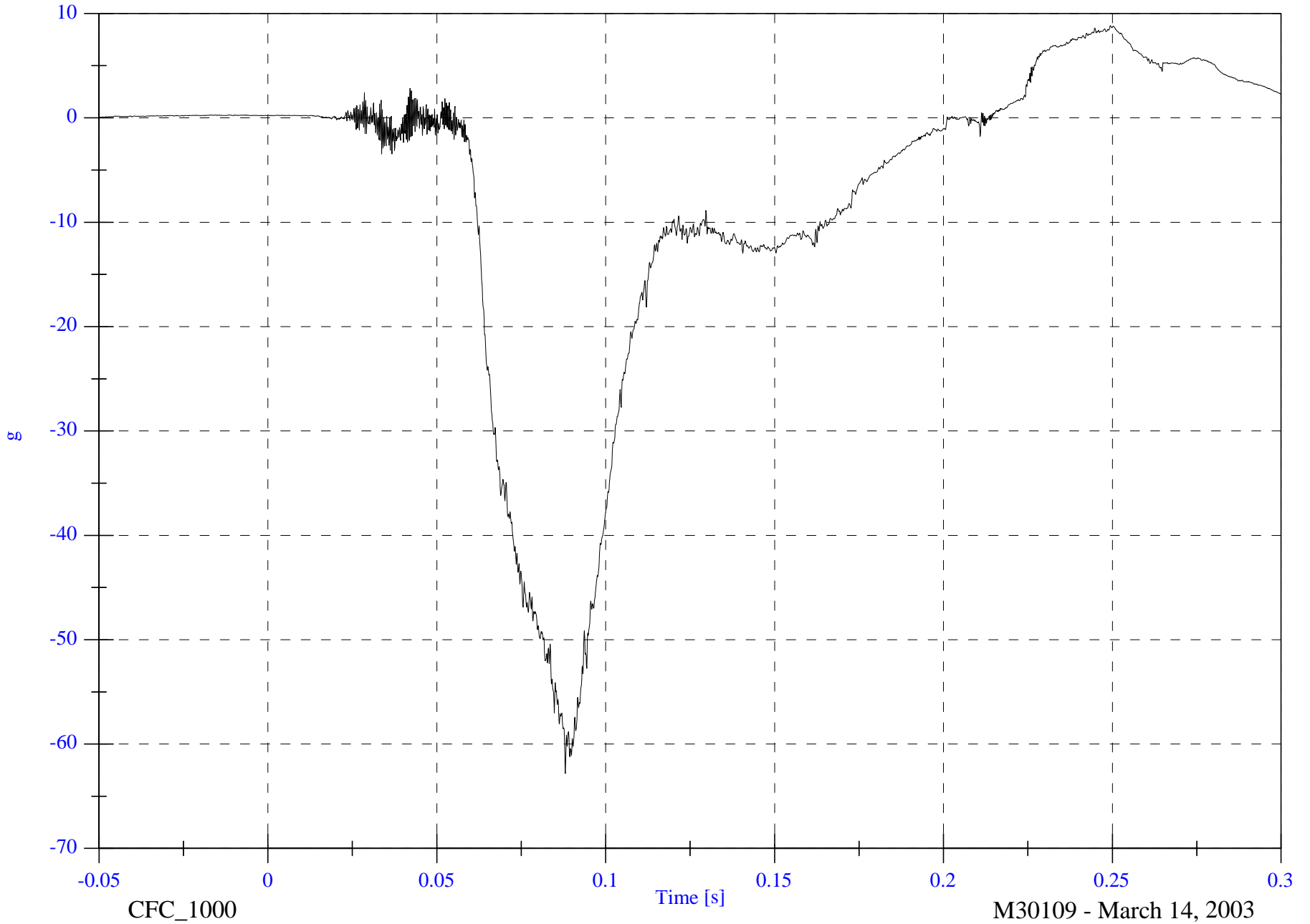
V1P2 Head CG x

Max: 8.8 [g] at 0.250 [s]

Min: -62.8 [g] at 0.088 [s]

B-68

8642-NCAP-35



CFC\_1000

Time [s]

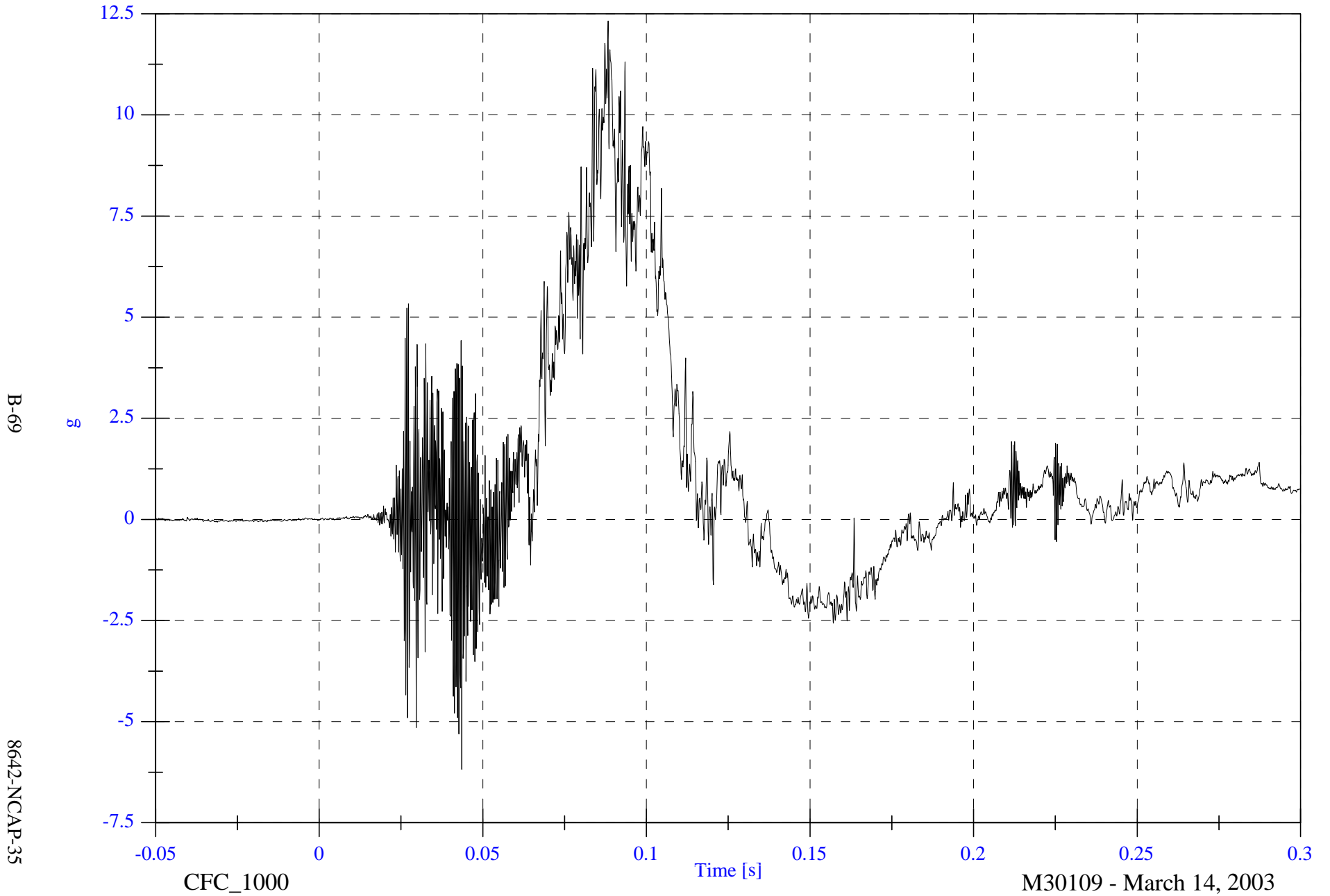
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 12.3 [g] at 0.088 [s]

Min: -6.2 [g] at 0.044 [s]

V1P2 Head CG y

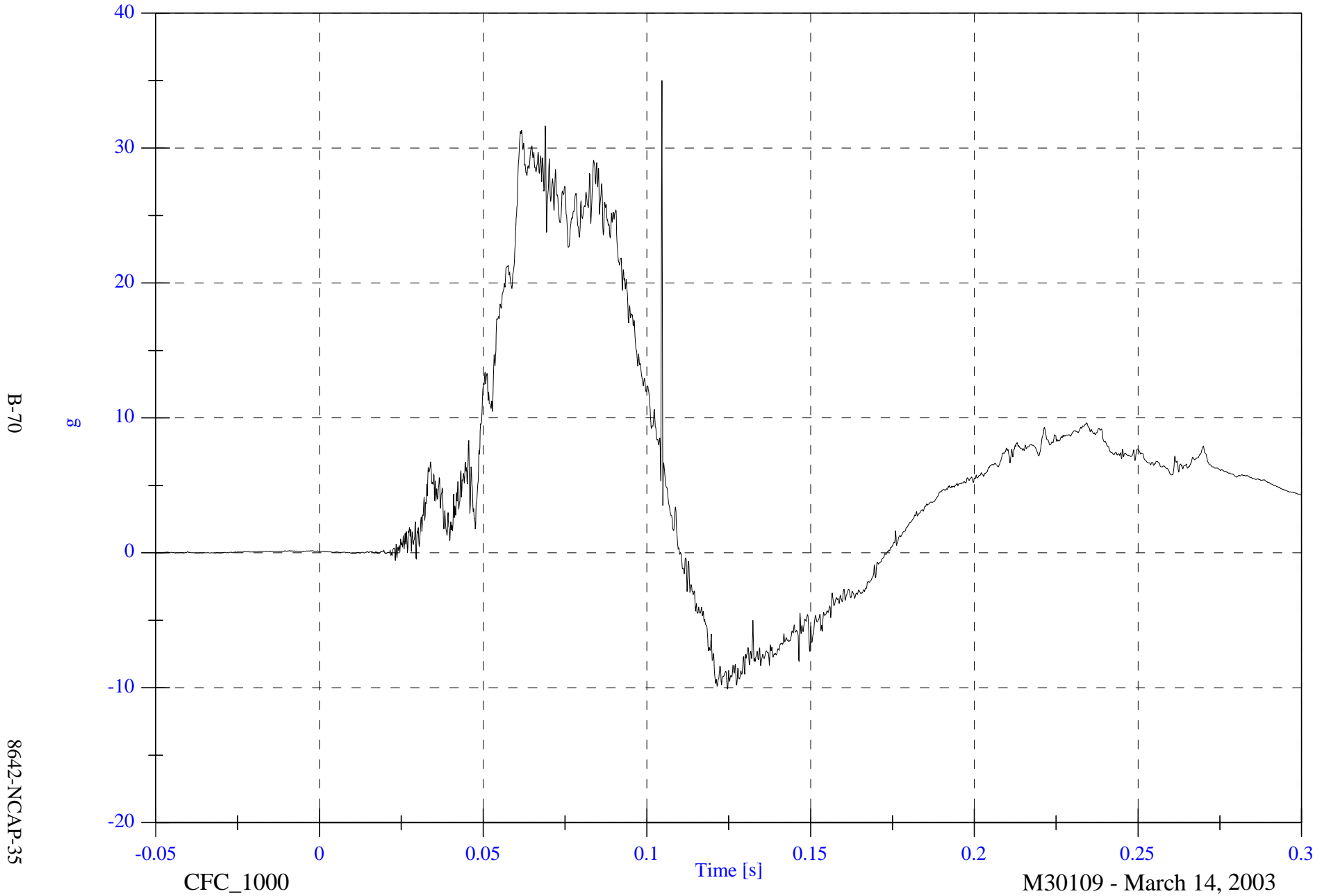


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Head CG z

Max: 35.0 [g] at 0.105 [s]

Min: -10.1 [g] at 0.125 [s]



B-70

8642-NCAP-35

CFC\_1000

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

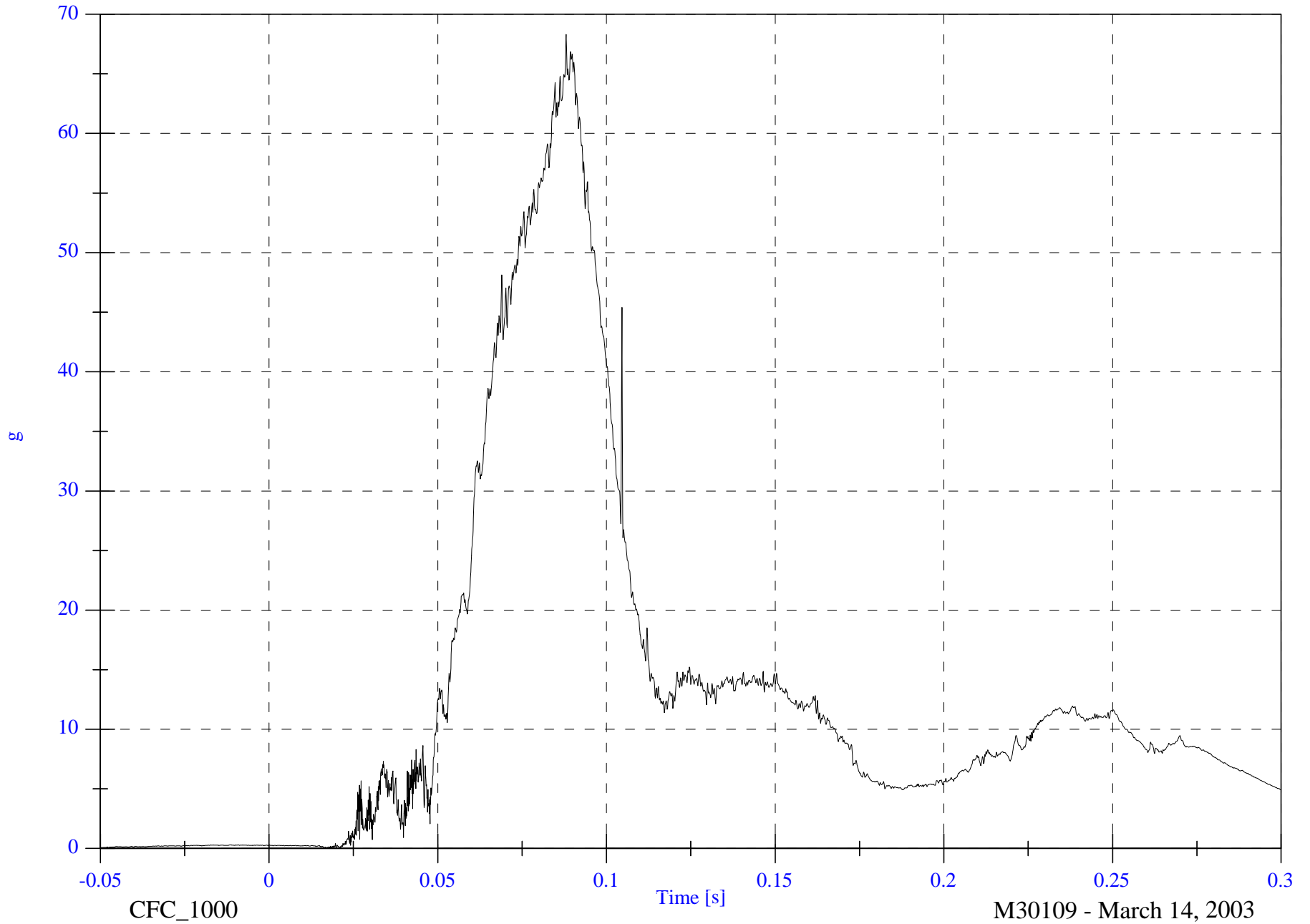
Max: 68.3 [g] at 0.088 [s]

V1P2 Head CG Resultant

Min: 0.0 [g] at 0.017 [s]

B-71

8642-NCAP-35



CFC\_1000

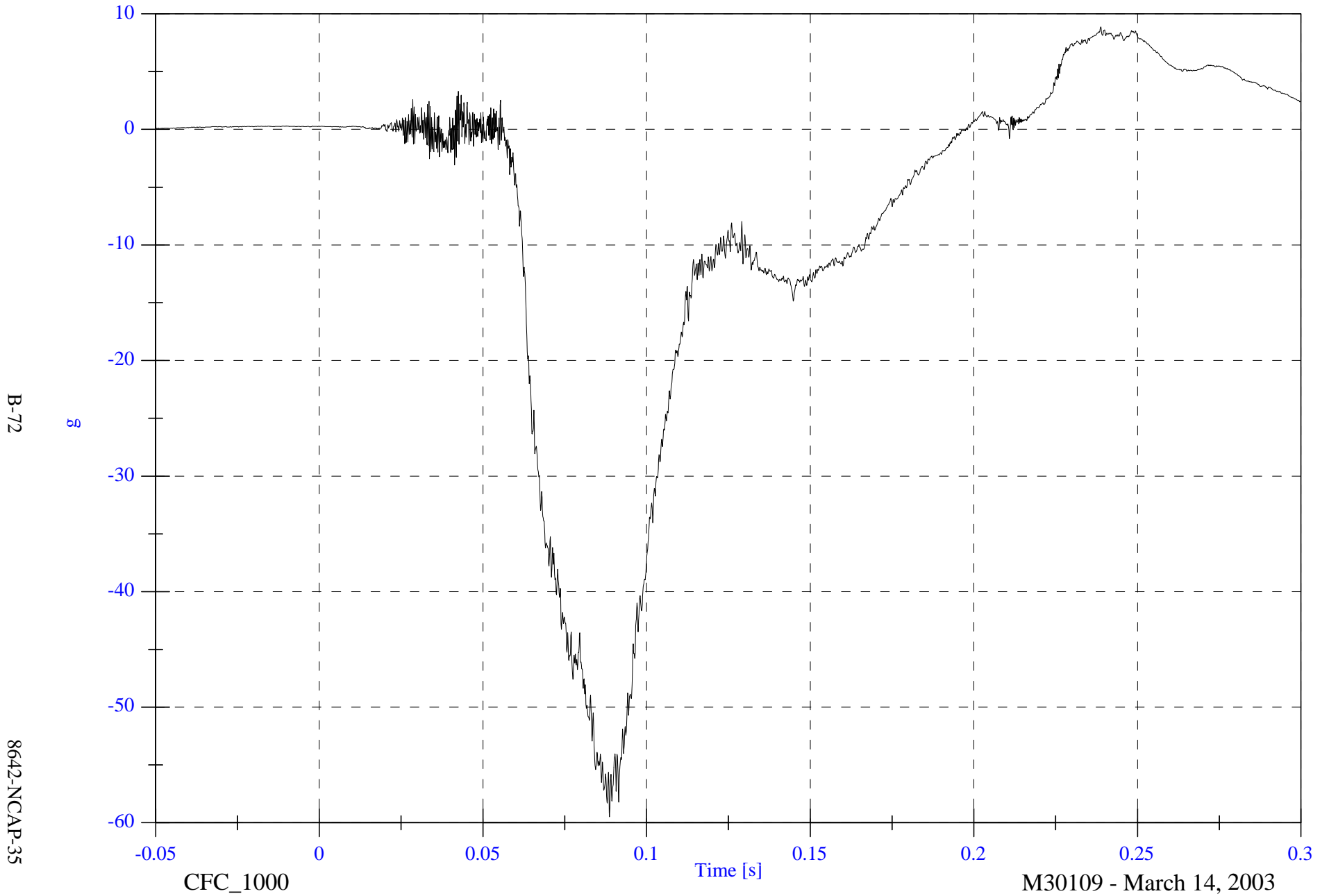
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Head CG Red x

Max: 8.9 [g] at 0.239 [s]

Min: -59.5 [g] at 0.089 [s]

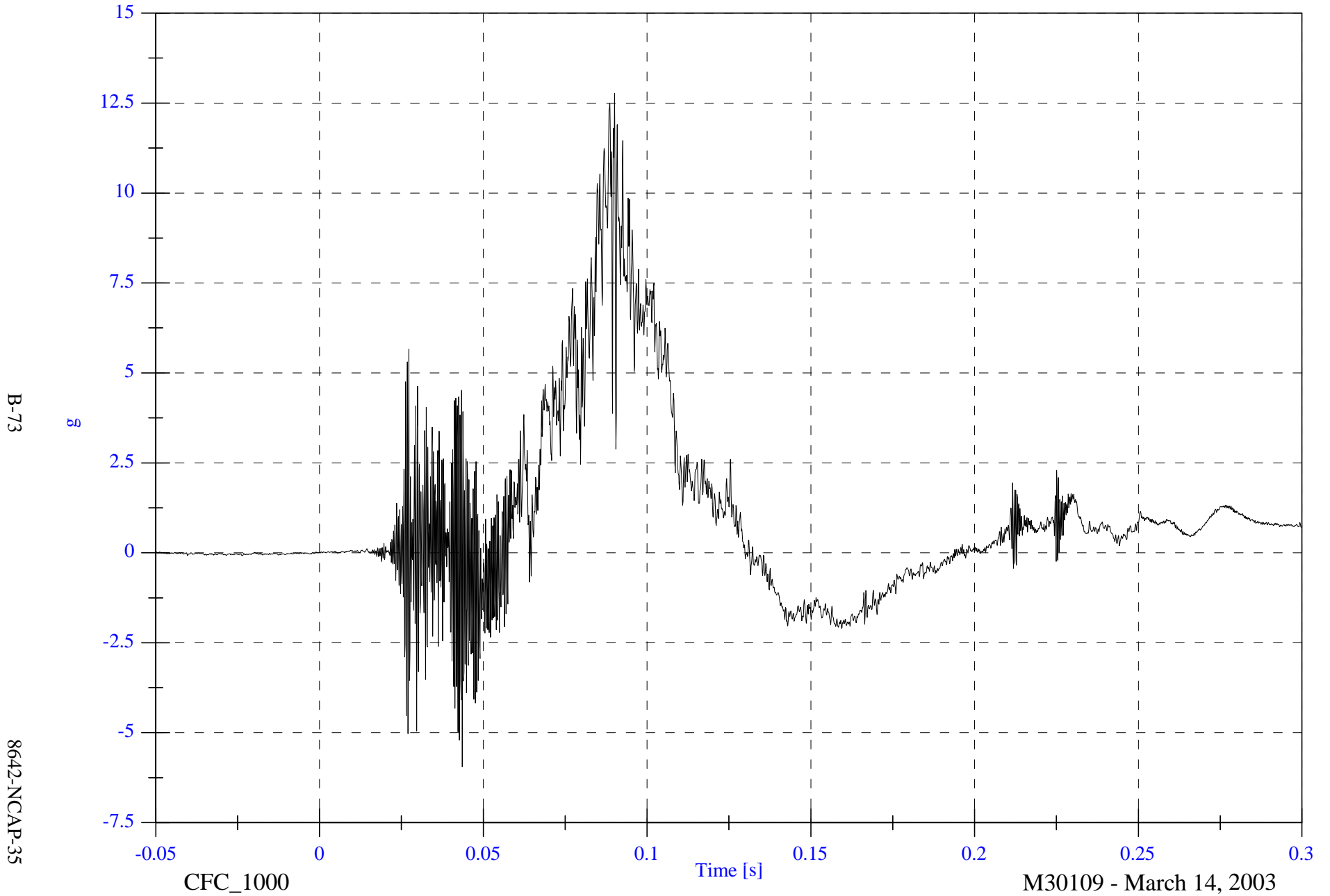


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Head CG Red y

Max: 12.8 [g] at 0.090 [s]

Min: -5.9 [g] at 0.044 [s]

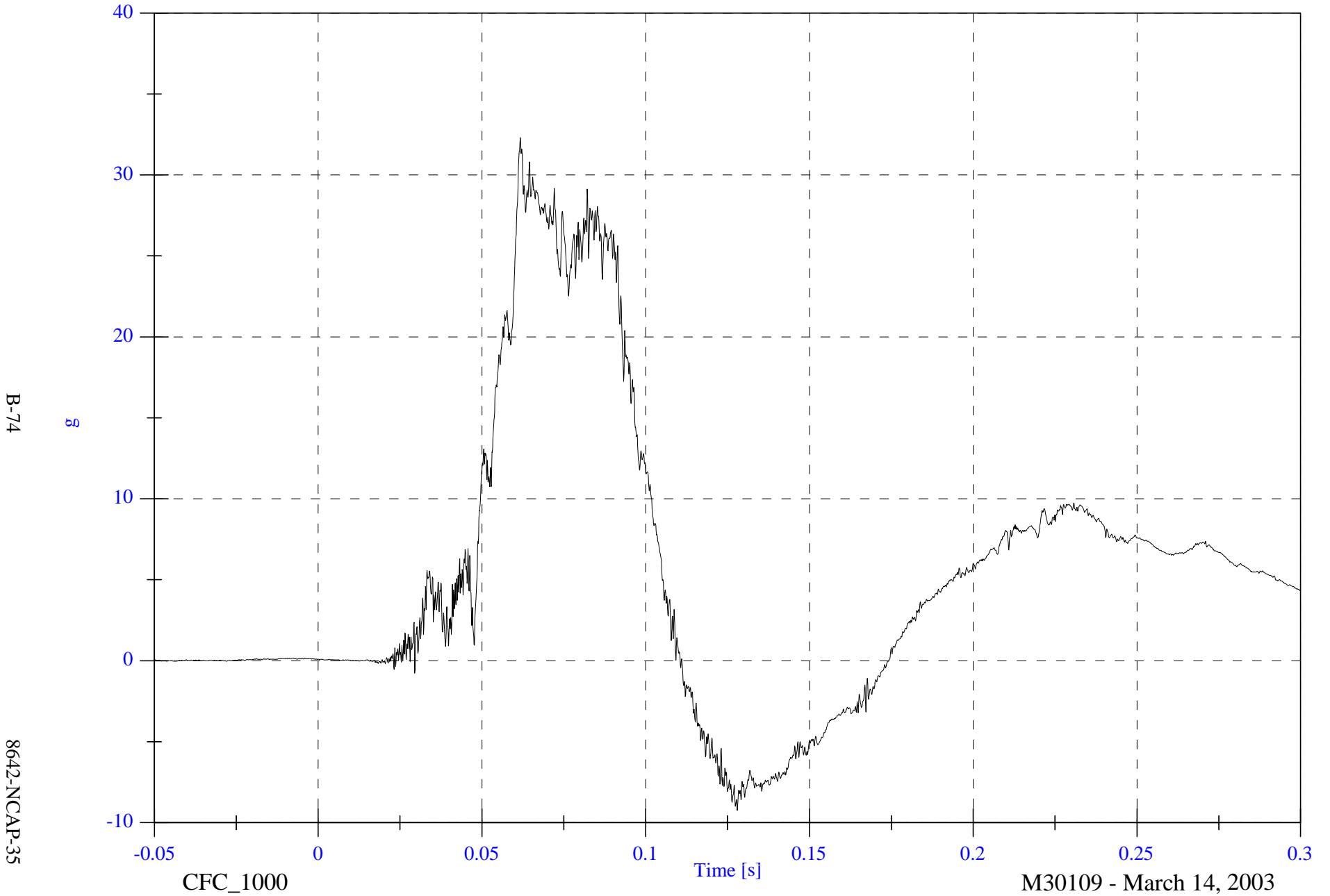


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 32.3 [g] at 0.062 [s]

Min: -9.2 [g] at 0.128 [s]

V1P2 Head CG Red z

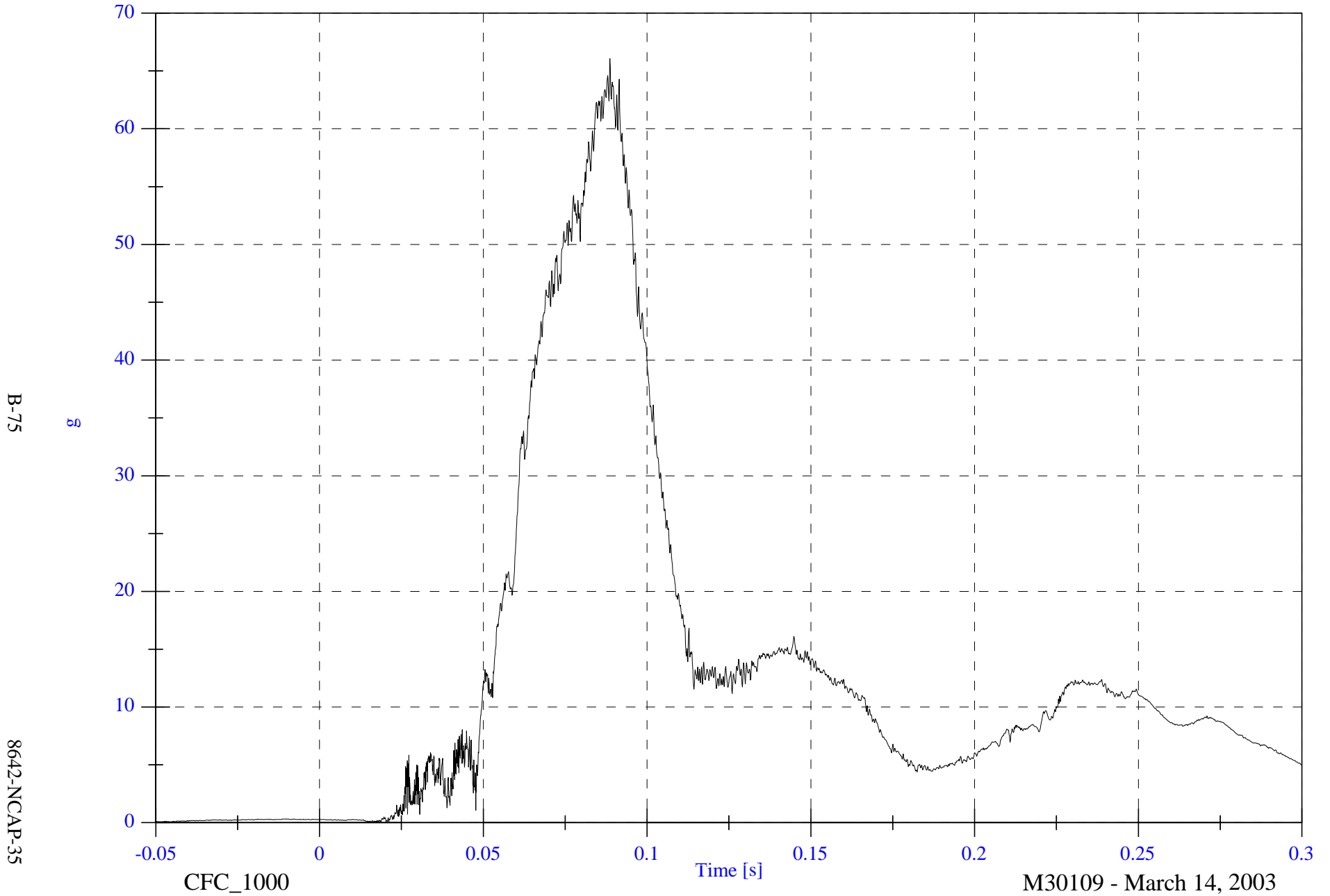


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Head CG Red Resultant

Max: 66.1 [g] at 0.089 [s]

Min: 0.0 [g] at 0.016 [s]



B-75

8642-NCAP-35

CFC\_1000

Time [s]

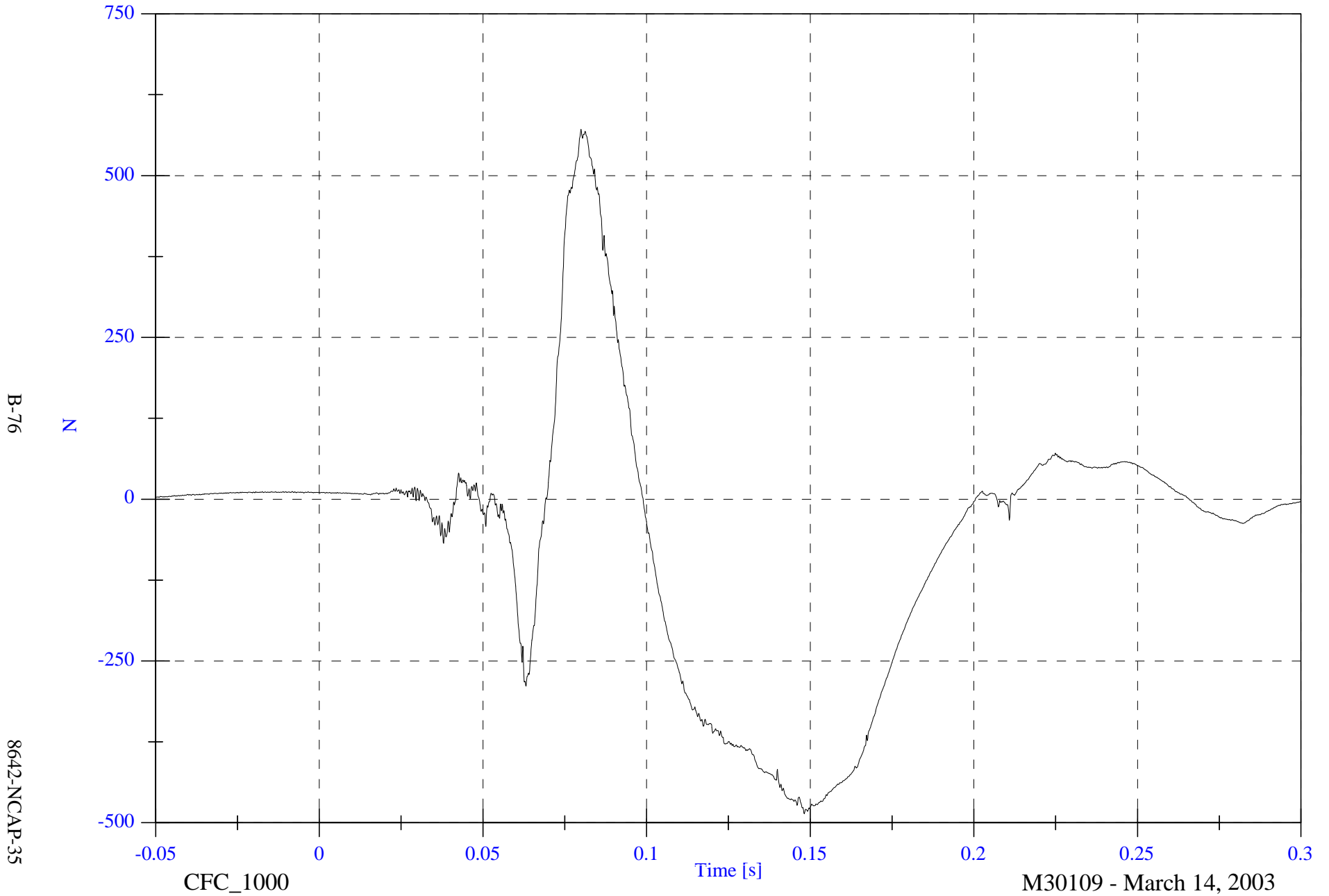
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 571.4 [N] at 0.080 [s]

Min: -486.1 [N] at 0.148 [s]

V1P2 Upper Neck Fx

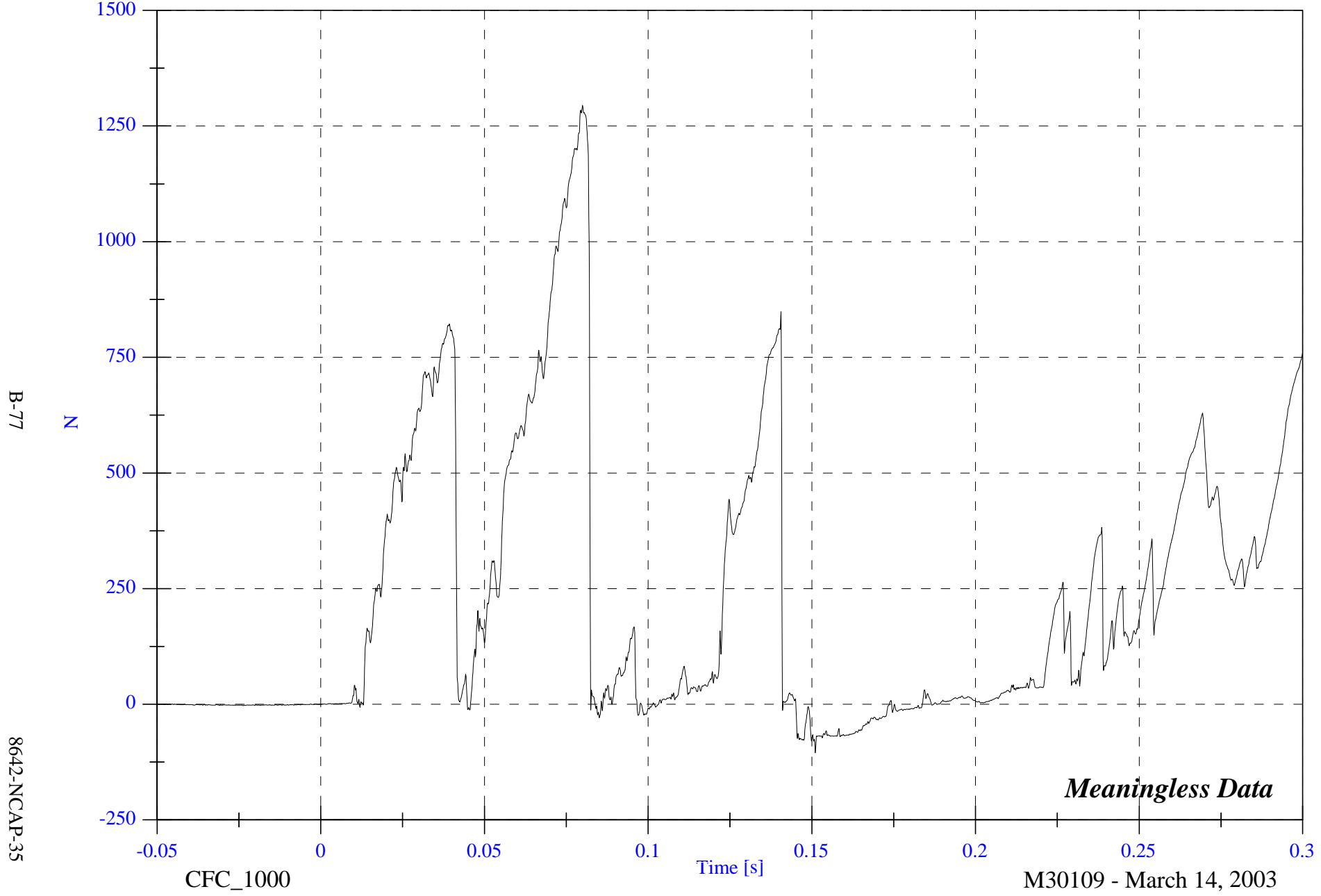


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 1294.1 [N] at 0.080 [s]

Min: -105.1 [N] at 0.151 [s]

V1P2 Upper Neck Fy



B-77

8642-NCAP-35

CFC\_1000

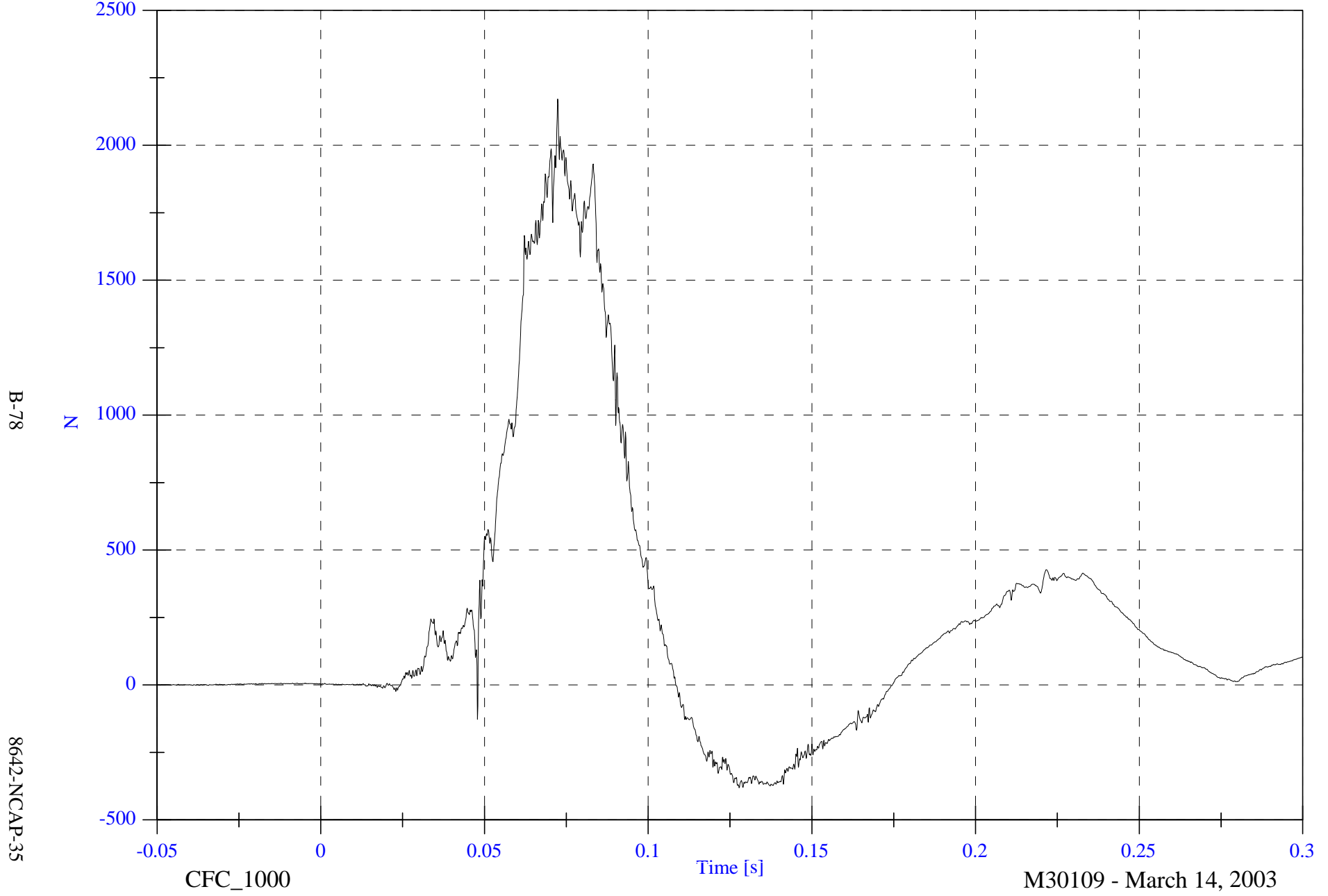
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 2171.9 [N] at 0.072 [s]

Min: -380.4 [N] at 0.128 [s]

V1P2 Upper Neck Fz



B-78

8642-NCAP-35

CFC\_1000

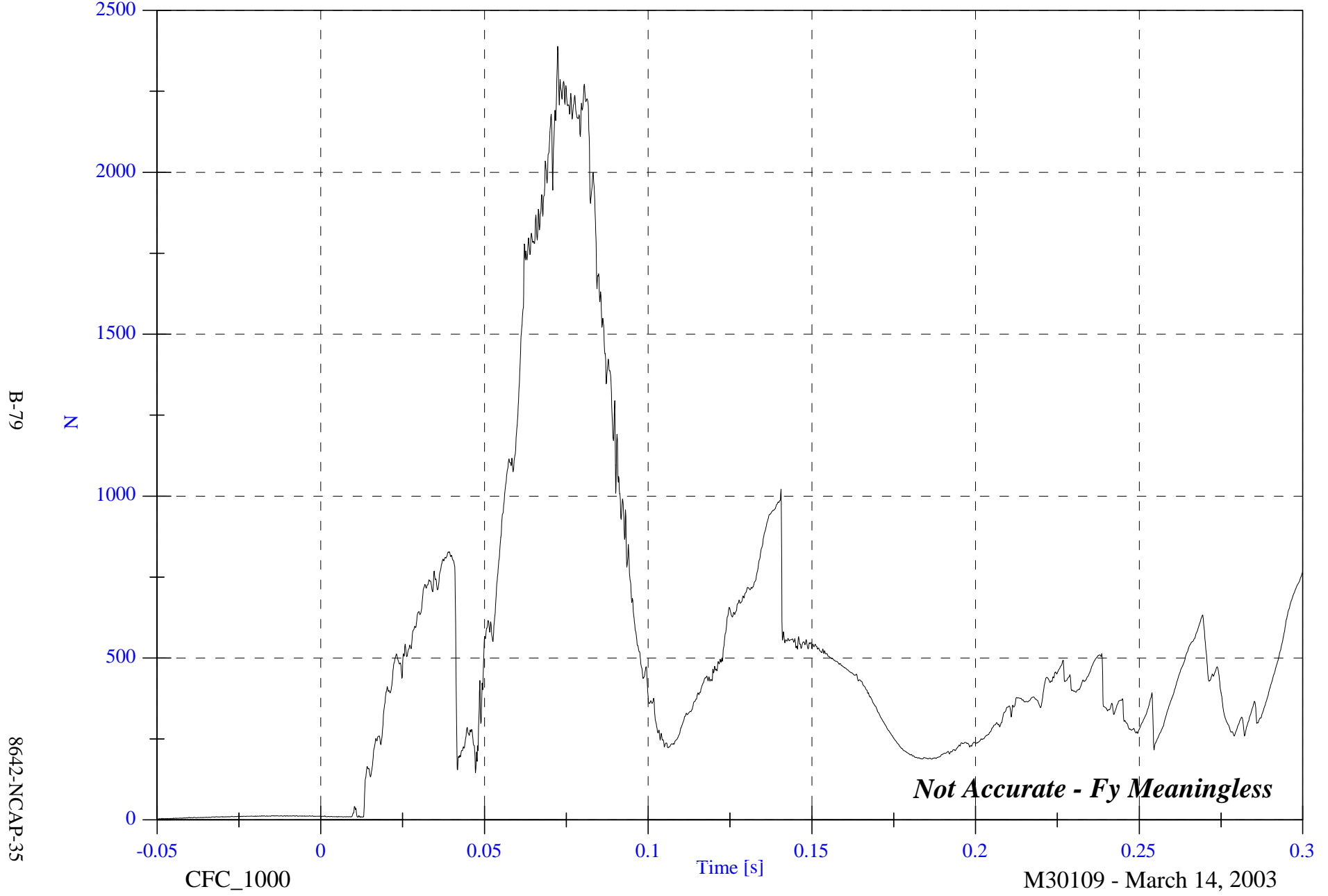
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 2388.6 [N] at 0.072 [s]

V1P2 Upper Neck F Resultant

Min: 3.0 [N] at -0.049 [s]



B-79

8642-NCAP-35

*Not Accurate - Fy Meaningless*

CFC\_1000

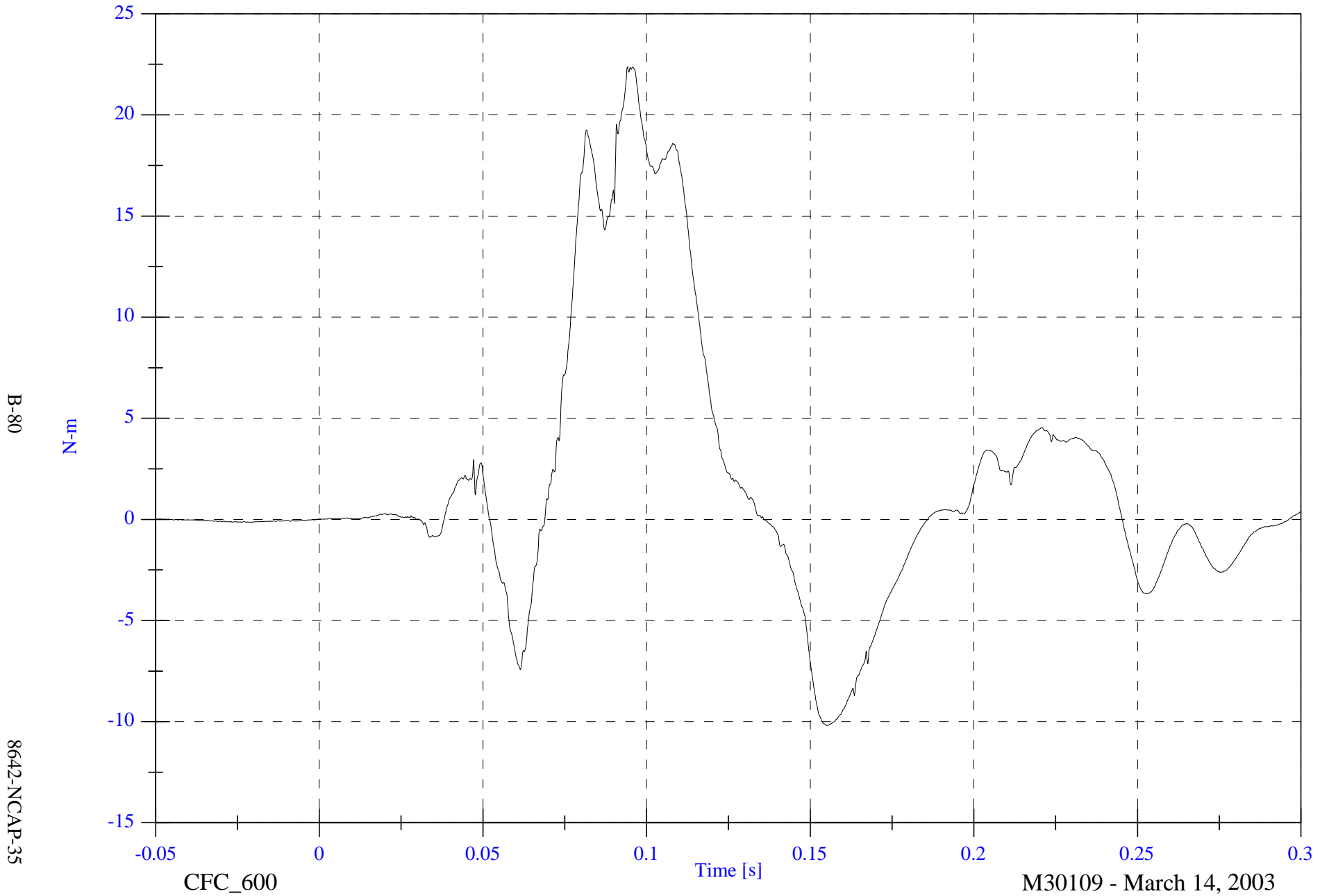
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 22.4 [N-m] at 0.094 [s]

Min: -10.2 [N-m] at 0.156 [s]

V1P2 Upper Neck Mx



B-80

8642-NCAP-35

CFC\_600

Time [s]

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2003 NCAP Test 13 2003 Chevrolet Tahoe

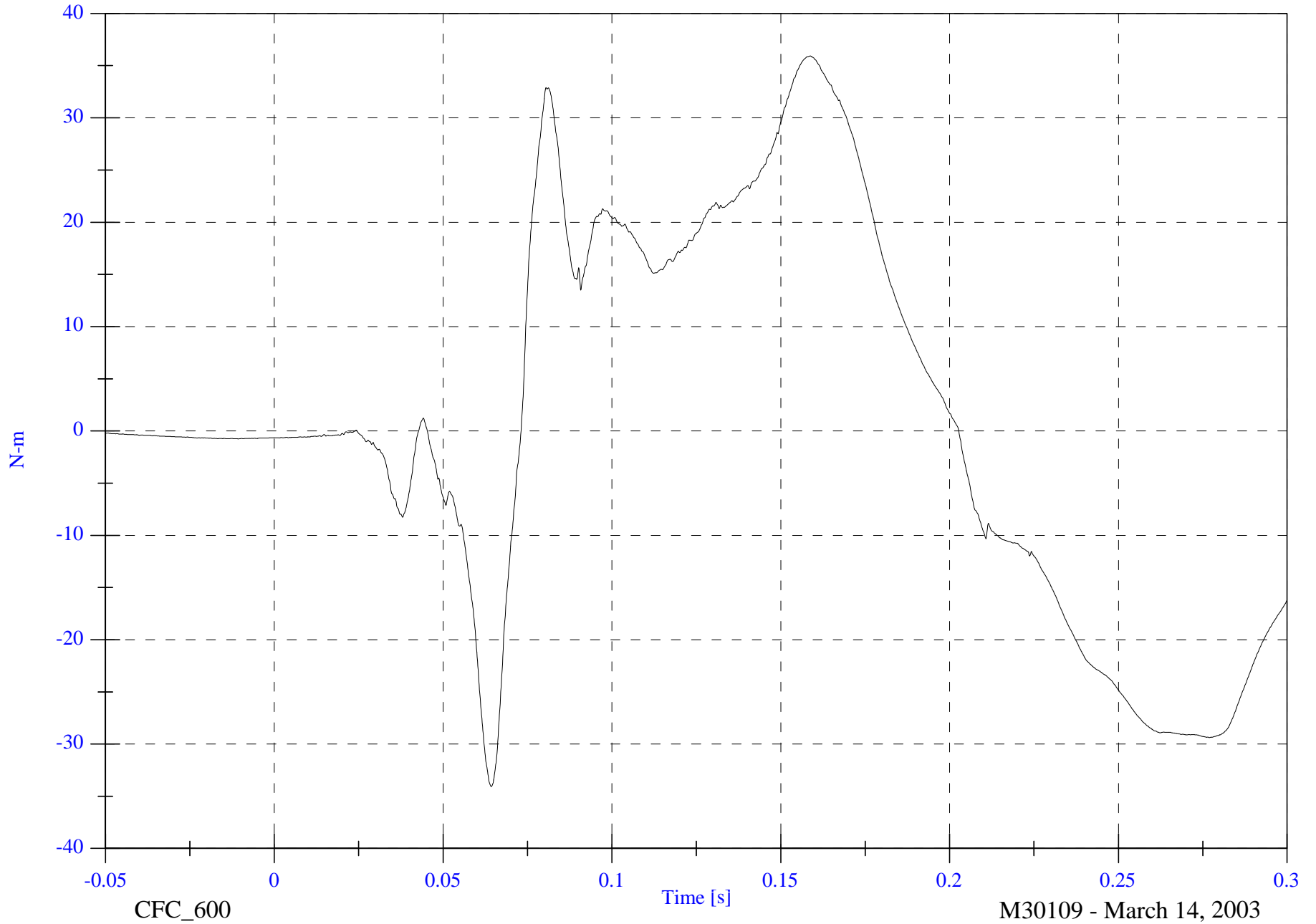
V1P2 Upper Neck My

Max: 35.9 [N-m] at 0.159 [s]

Min: -34.1 [N-m] at 0.064 [s]

B-81

8642-NCAP-35



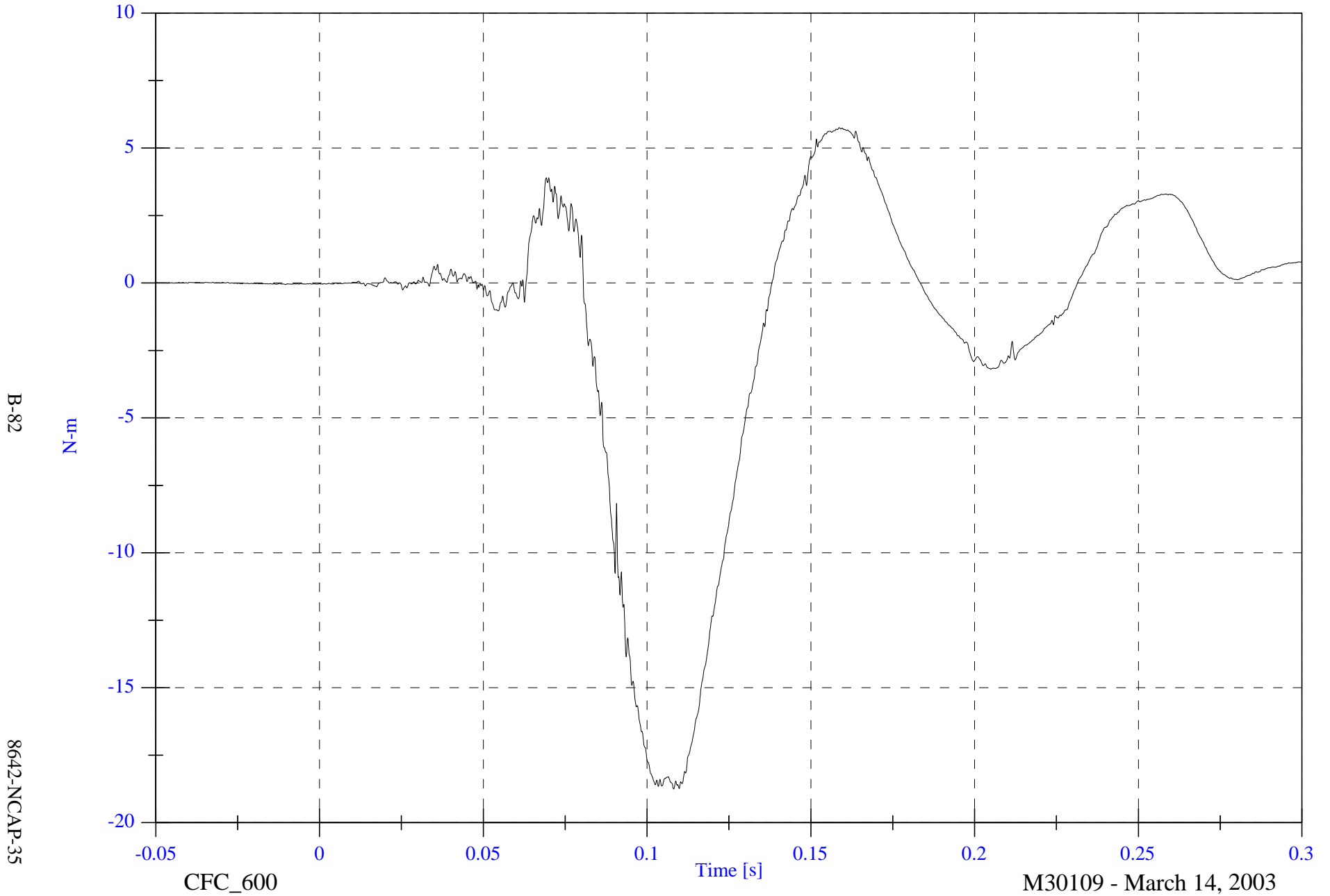
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Upper Neck Mz

Max: 5.8 [N-m] at 0.159 [s]

Min: -18.7 [N-m] at 0.108 [s]



B-82

8642-NCAP-35

CFC\_600

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

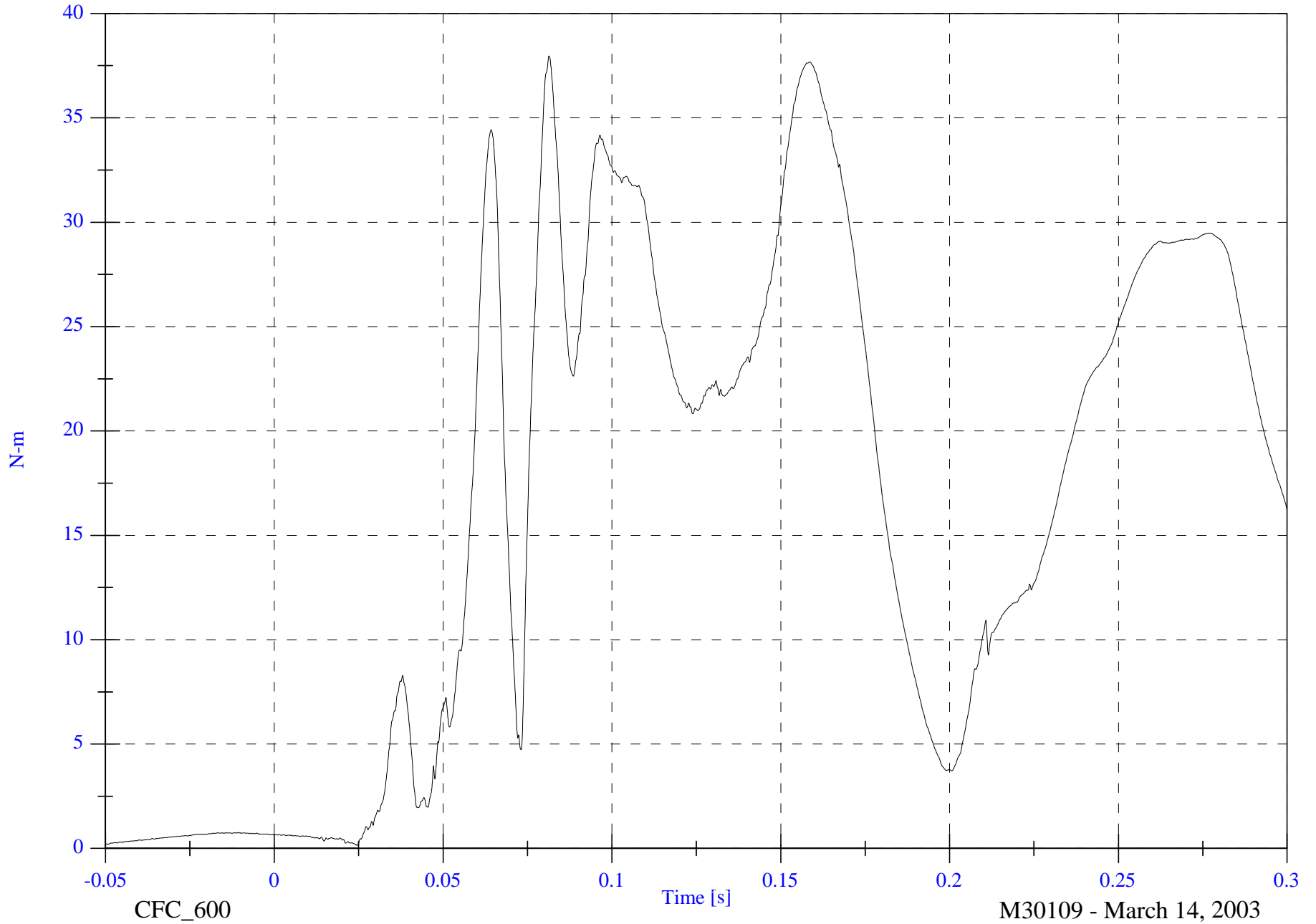
V1P2 Upper Neck M Resultant

Max: 38.0 [N-m] at 0.081 [s]

Min: 0.1 [N-m] at 0.025 [s]

B-83

8642-NCAP-35

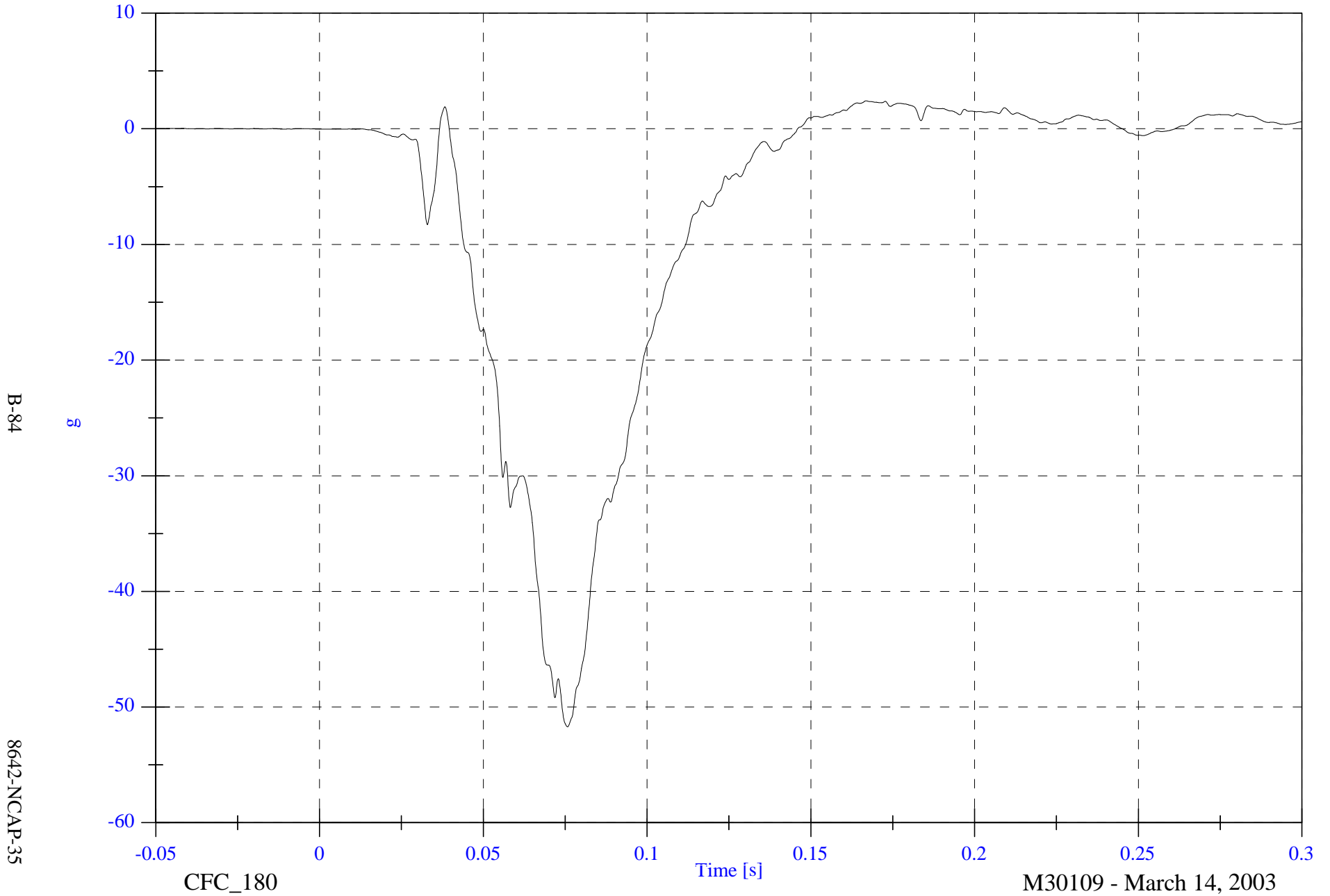


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 2.4 [g] at 0.167 [s]

Min: -51.7 [g] at 0.076 [s]

V1P2 Chest x



B-84

8642-NCAP-35

CFC\_180

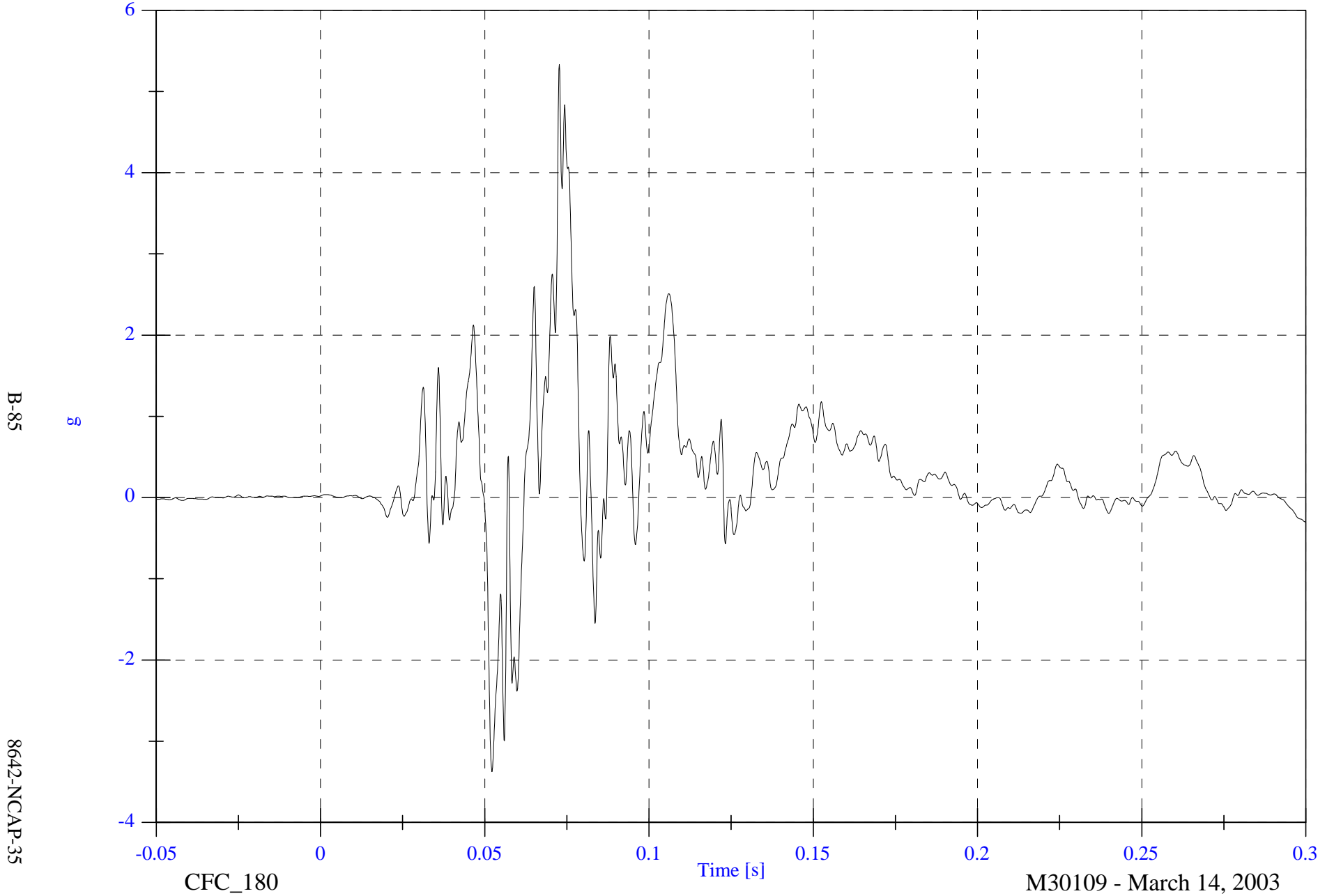
Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 5.3 [g] at 0.073 [s]  
Min: -3.4 [g] at 0.052 [s]

VIP2 Chest y

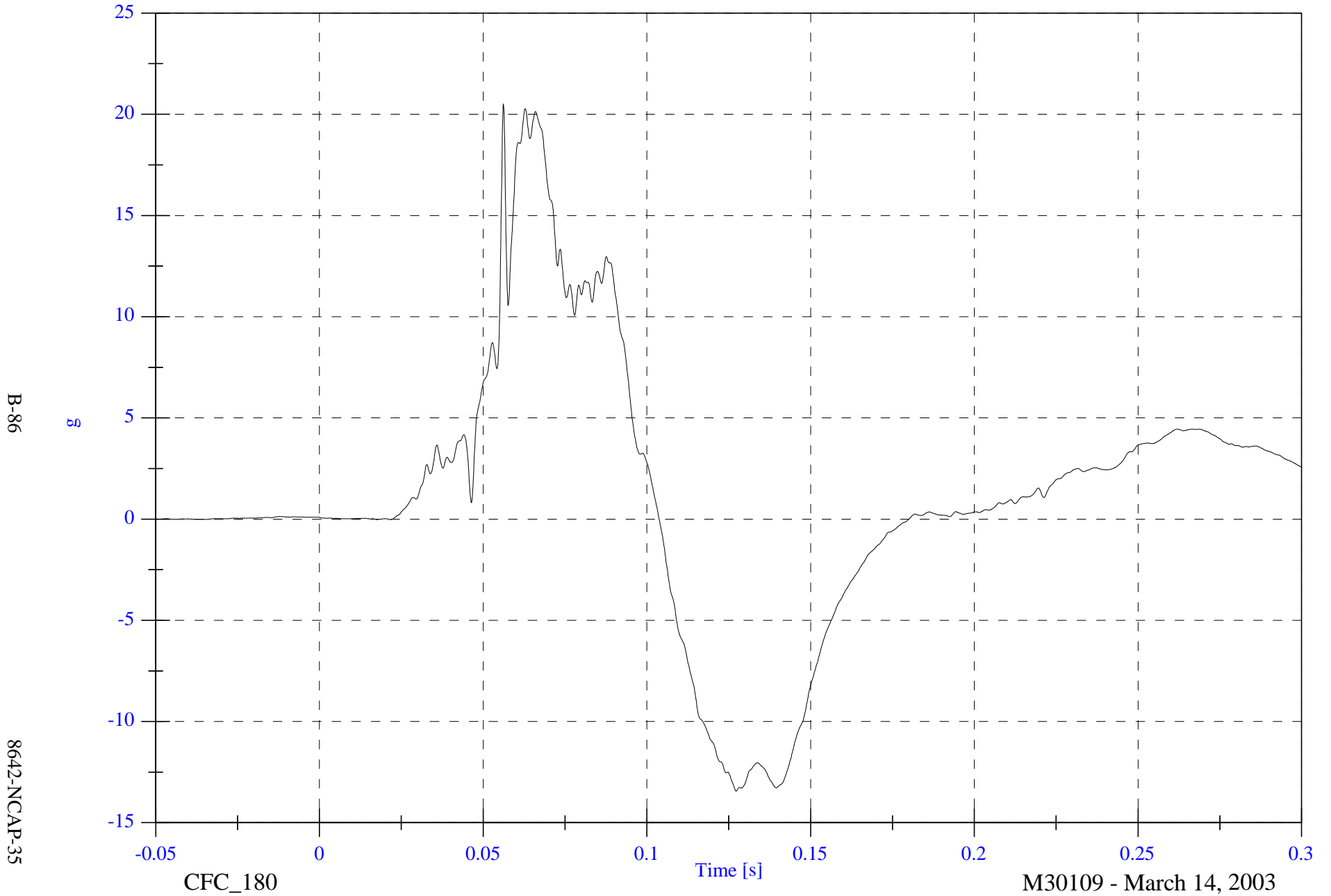


2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP2 Chest z

Max: 20.5 [g] at 0.056 [s]

Min: -13.4 [g] at 0.127 [s]



B-86

8642-NCAP-35

CFC\_180

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

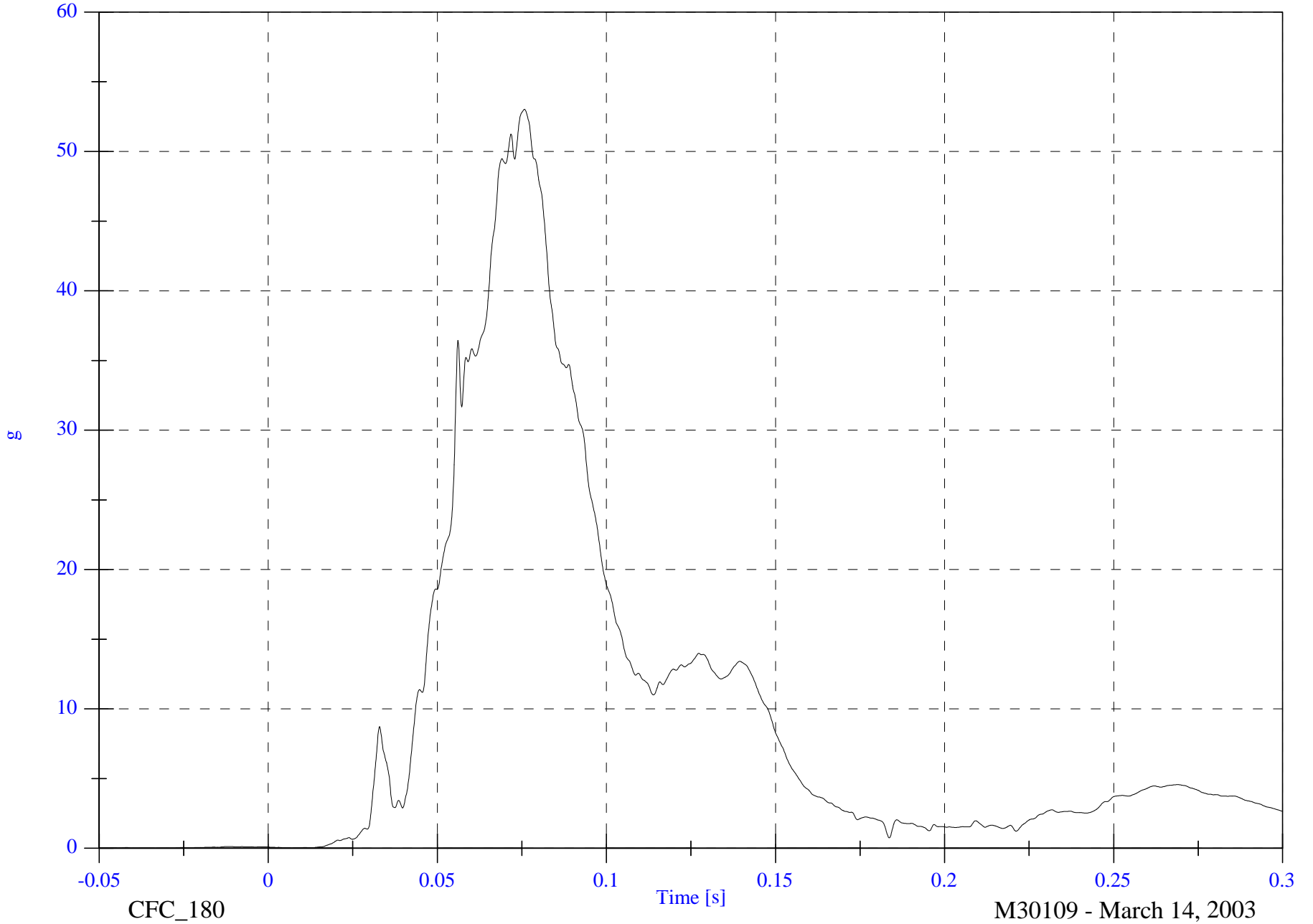
V1P2 Chest Resultant

Max: 53.0 [g] at 0.076 [s]

Min: 0.0 [g] at -0.033 [s]

B-87

8642-NCAP-35



CFC\_180

Time [s]

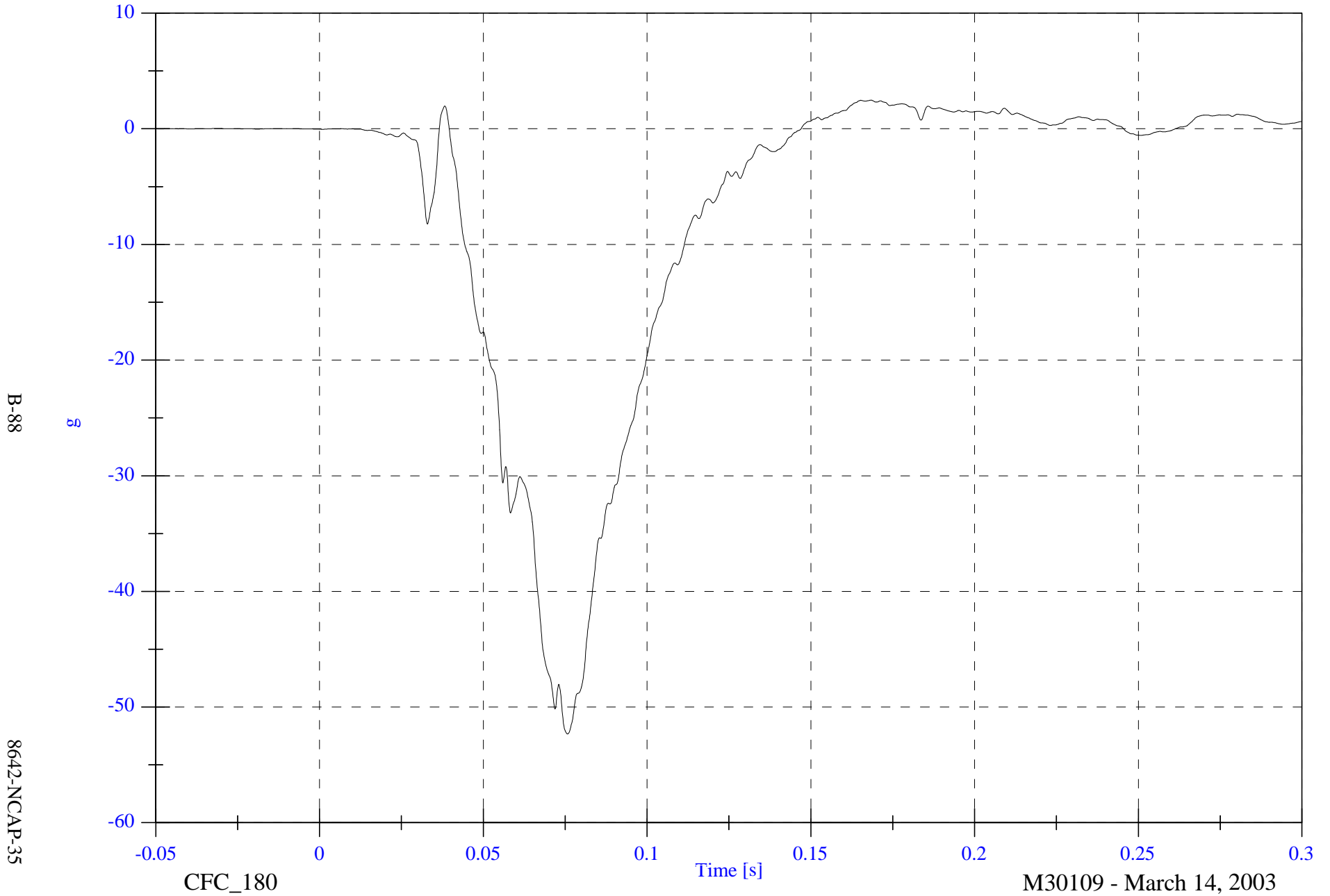
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Chest Red x

Max: 2.5 [g] at 0.168 [s]

Min: -52.3 [g] at 0.076 [s]



B-88

8642-NCAP-35

CFC\_180

Time [s]

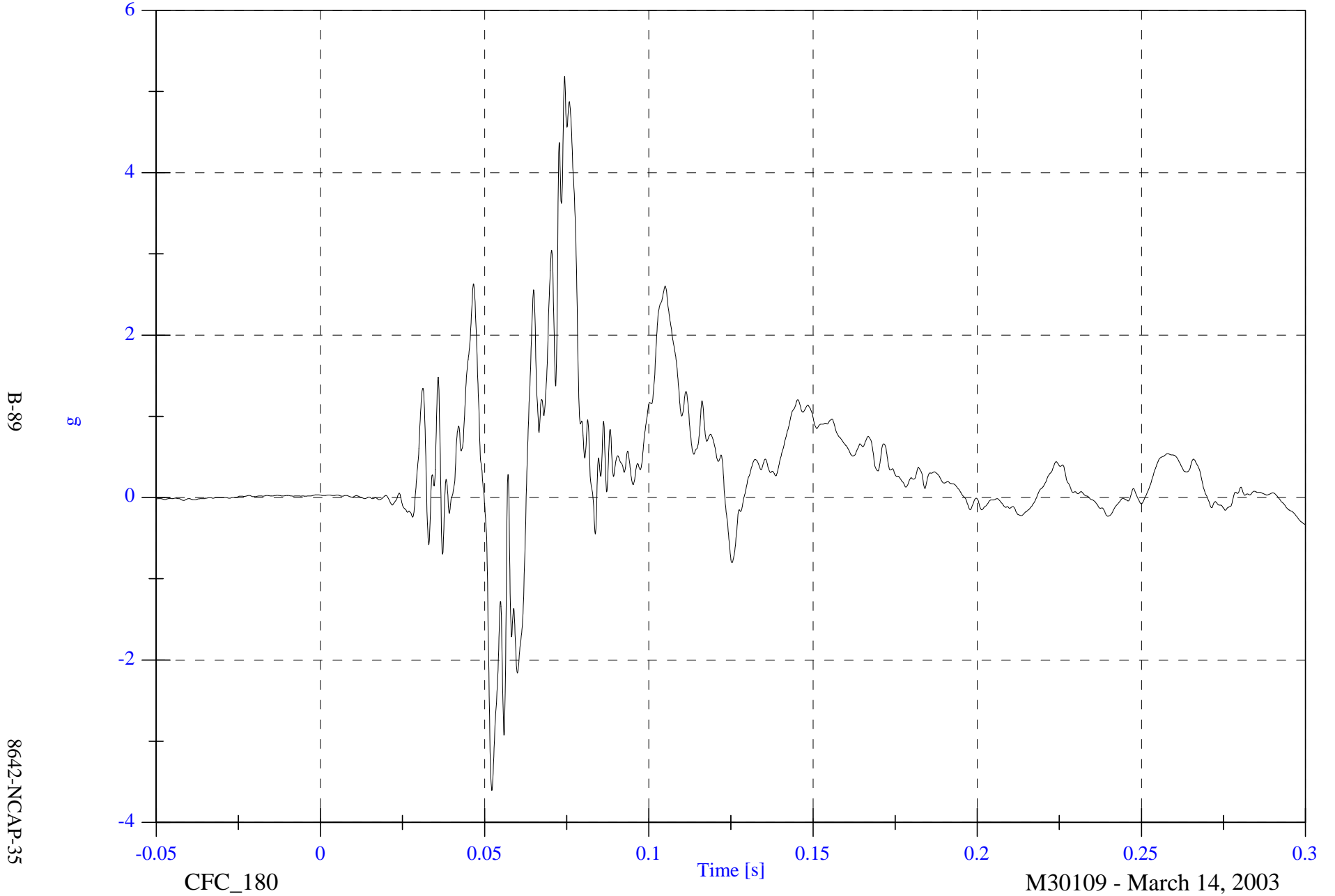
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Chest Red y

Max: 5.2 [g] at 0.074 [s]

Min: -3.6 [g] at 0.052 [s]

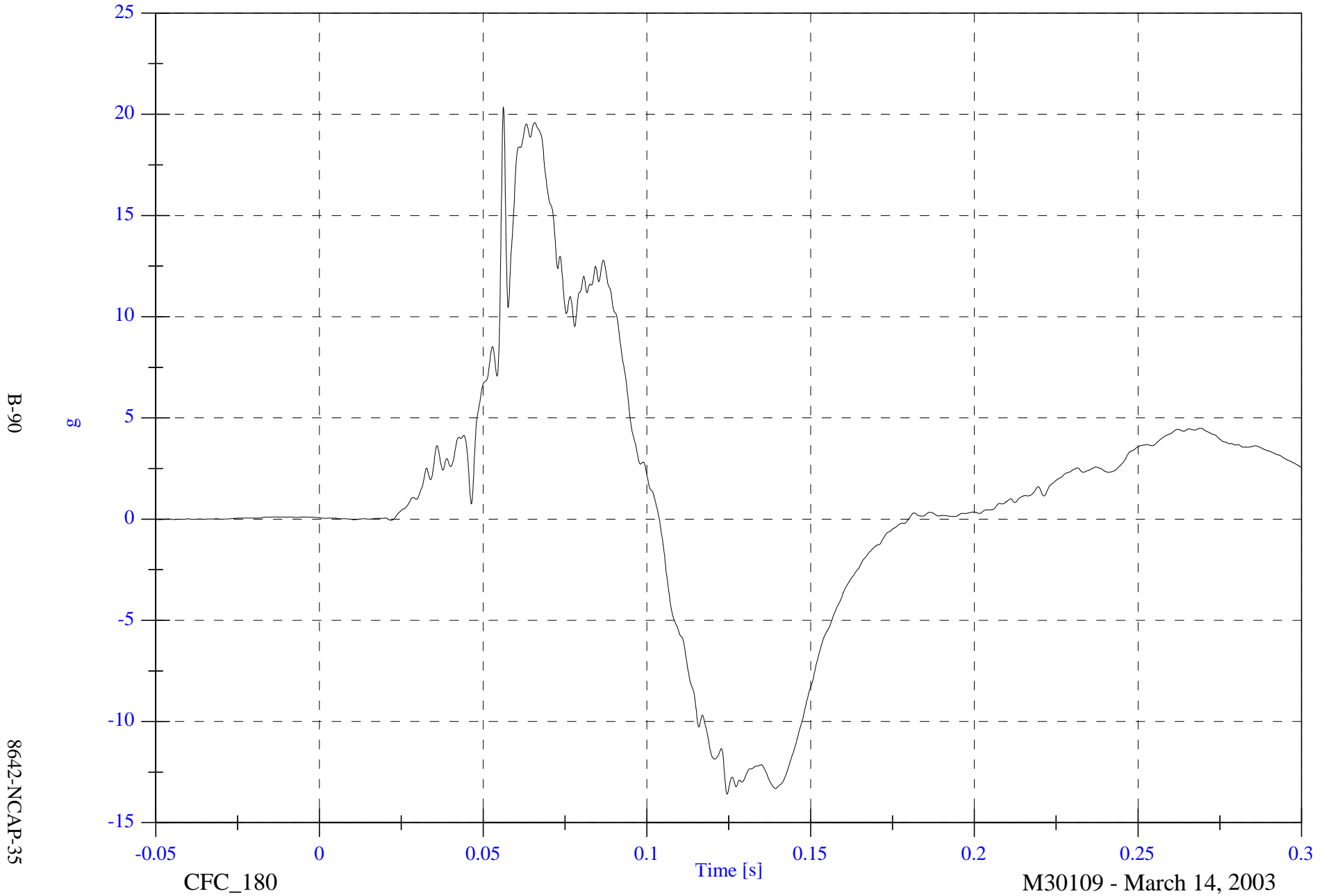


2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP2 Chest Red z

Max: 20.4 [g] at 0.056 [s]

Min: -13.6 [g] at 0.124 [s]



B-90

8642-NCAP-35

CFC\_180

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

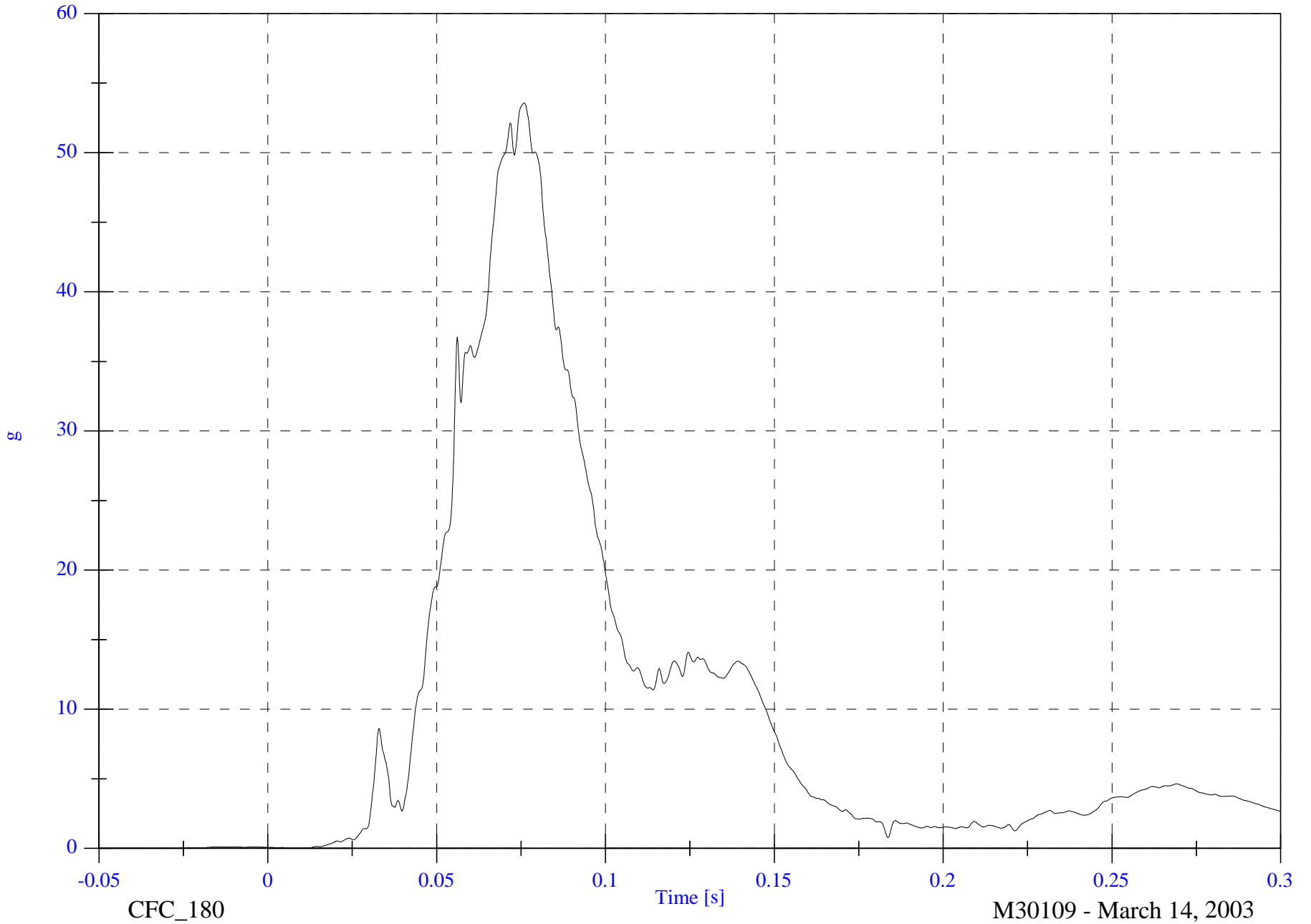
V1P2 Chest Red Resultant

Max: 53.6 [g] at 0.076 [s]

Min: 0.0 [g] at -0.029 [s]

B-91

8642-NCAP-35

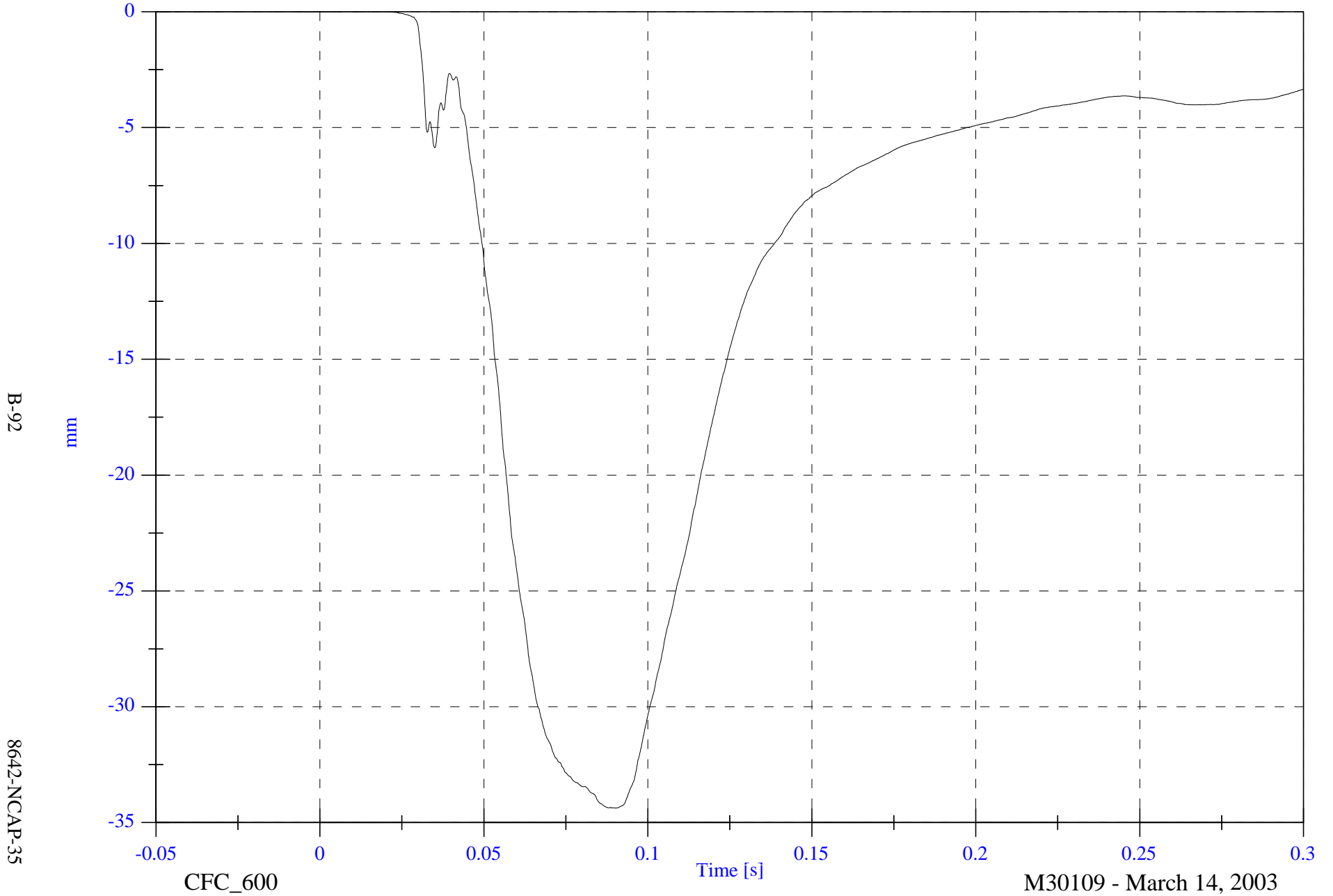


2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP2 Chest Compression x

Max: 0.0 [mm] at -0.011 [s]

Min: -34.4 [mm] at 0.090 [s]



B-92

8642-NCAP-35

CFC\_600

Time [s]

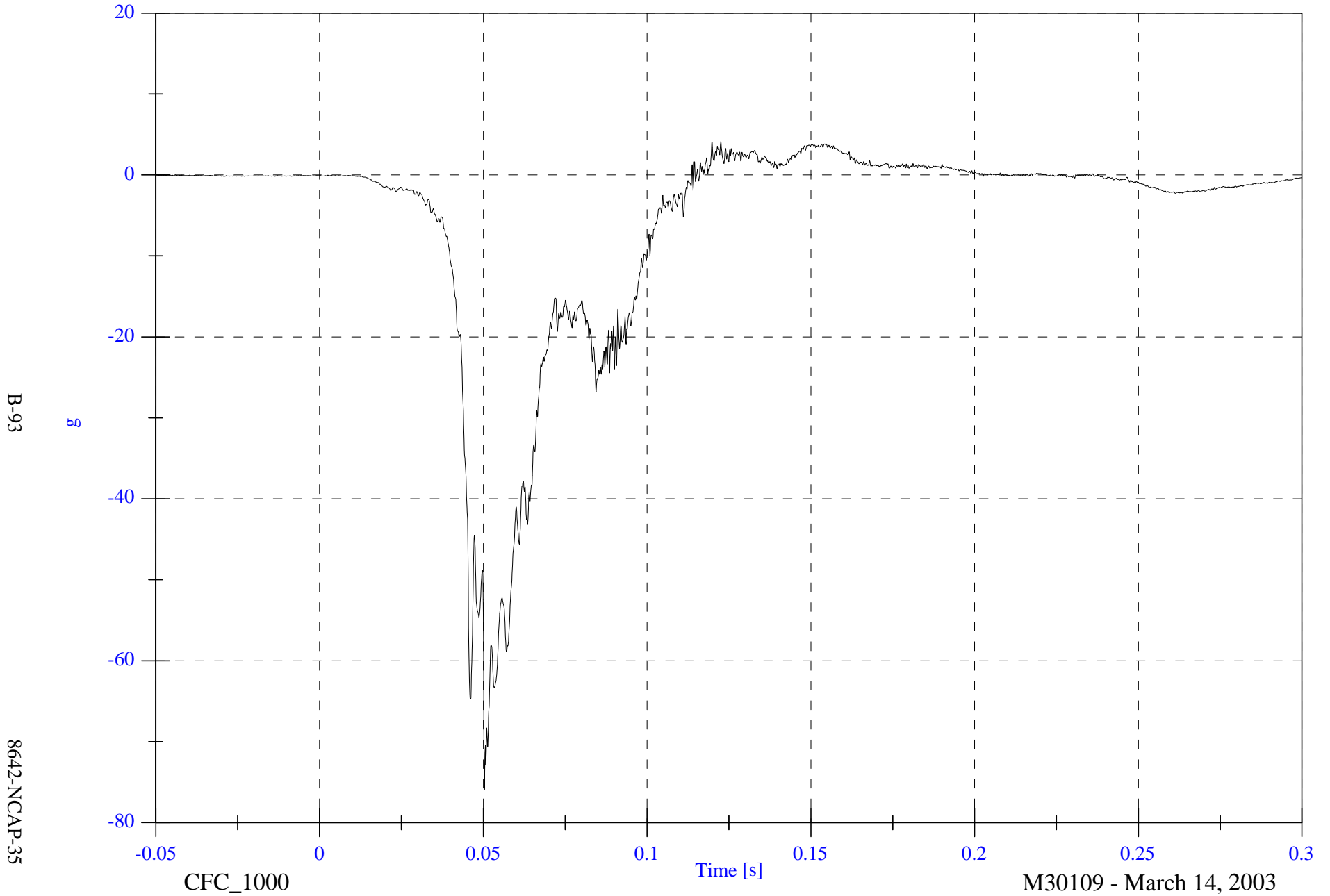
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 4.2 [g] at 0.123 [s]

Min: -76.0 [g] at 0.050 [s]

V1P2 Pelvic x

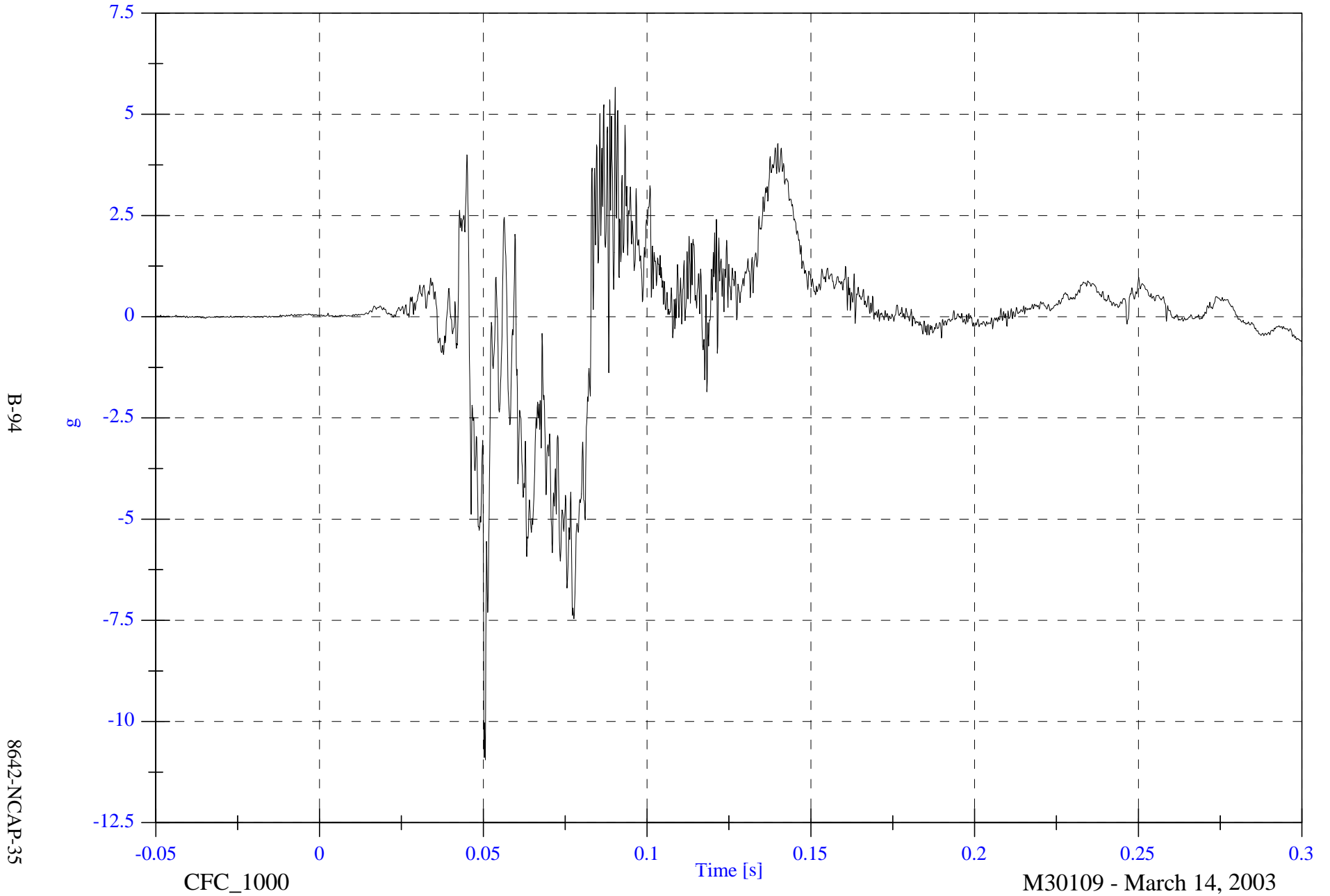


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 5.7 [g] at 0.090 [s]

Min: -10.9 [g] at 0.051 [s]

V1P2 Pelvic y

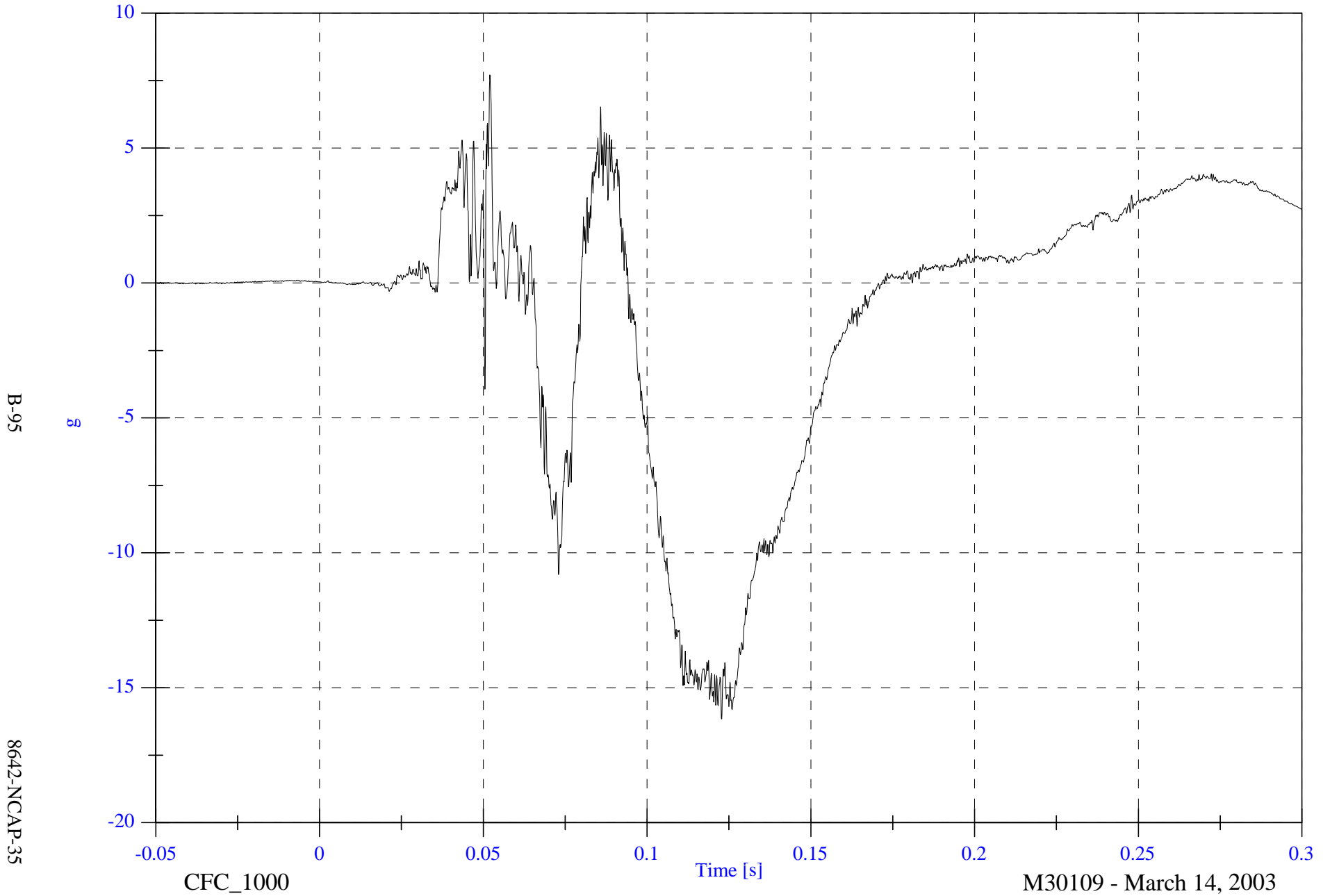


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Pelvic z

Max: 7.7 [g] at 0.052 [s]

Min: -16.2 [g] at 0.123 [s]



B-95

8642-NCAP-35

CFC\_1000

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

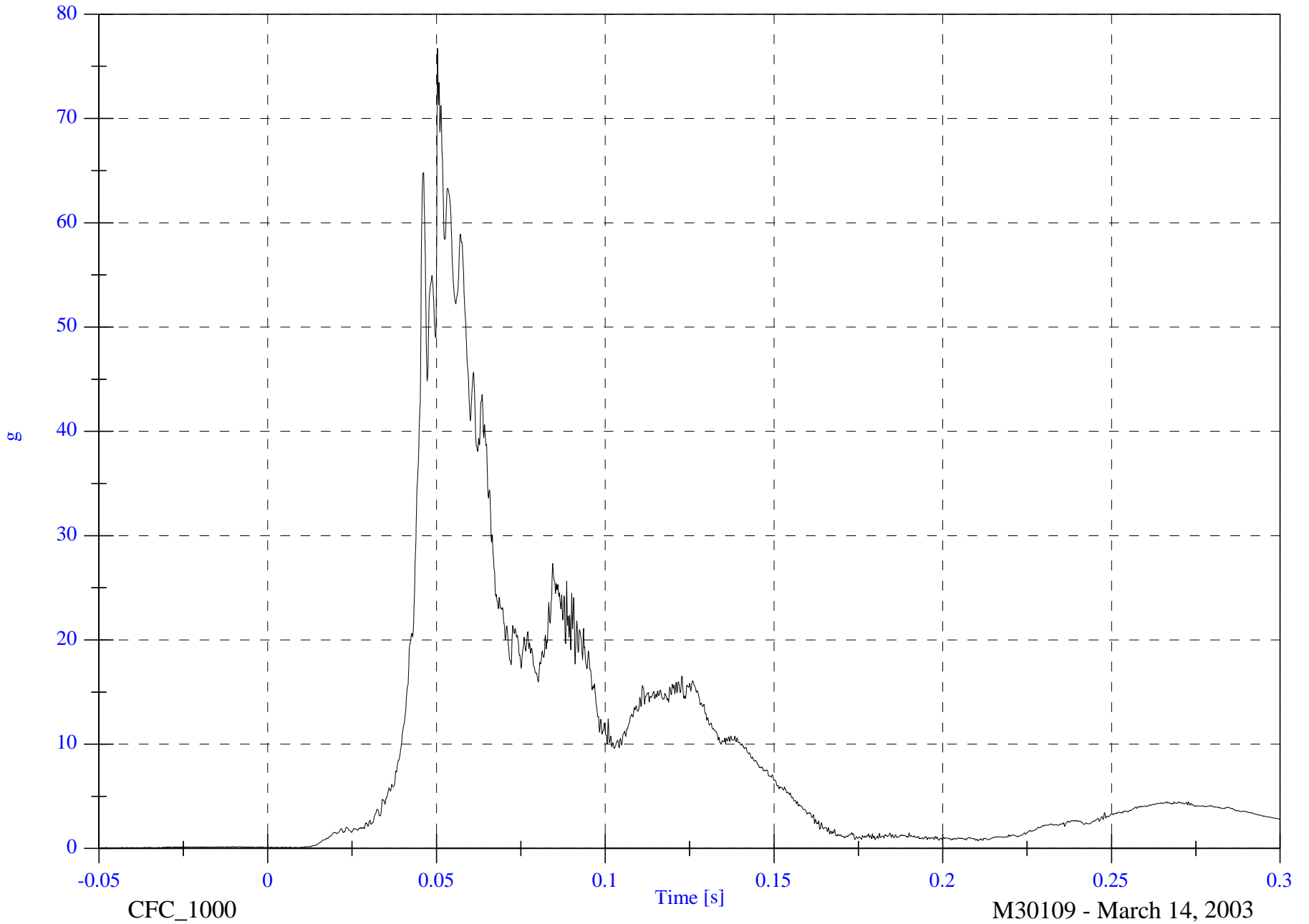
V1P2 Pelvic Resultant

Max: 76.7 [g] at 0.050 [s]

Min: 0.0 [g] at -0.050 [s]

B-96

8642-NCAP-35



CFC\_1000

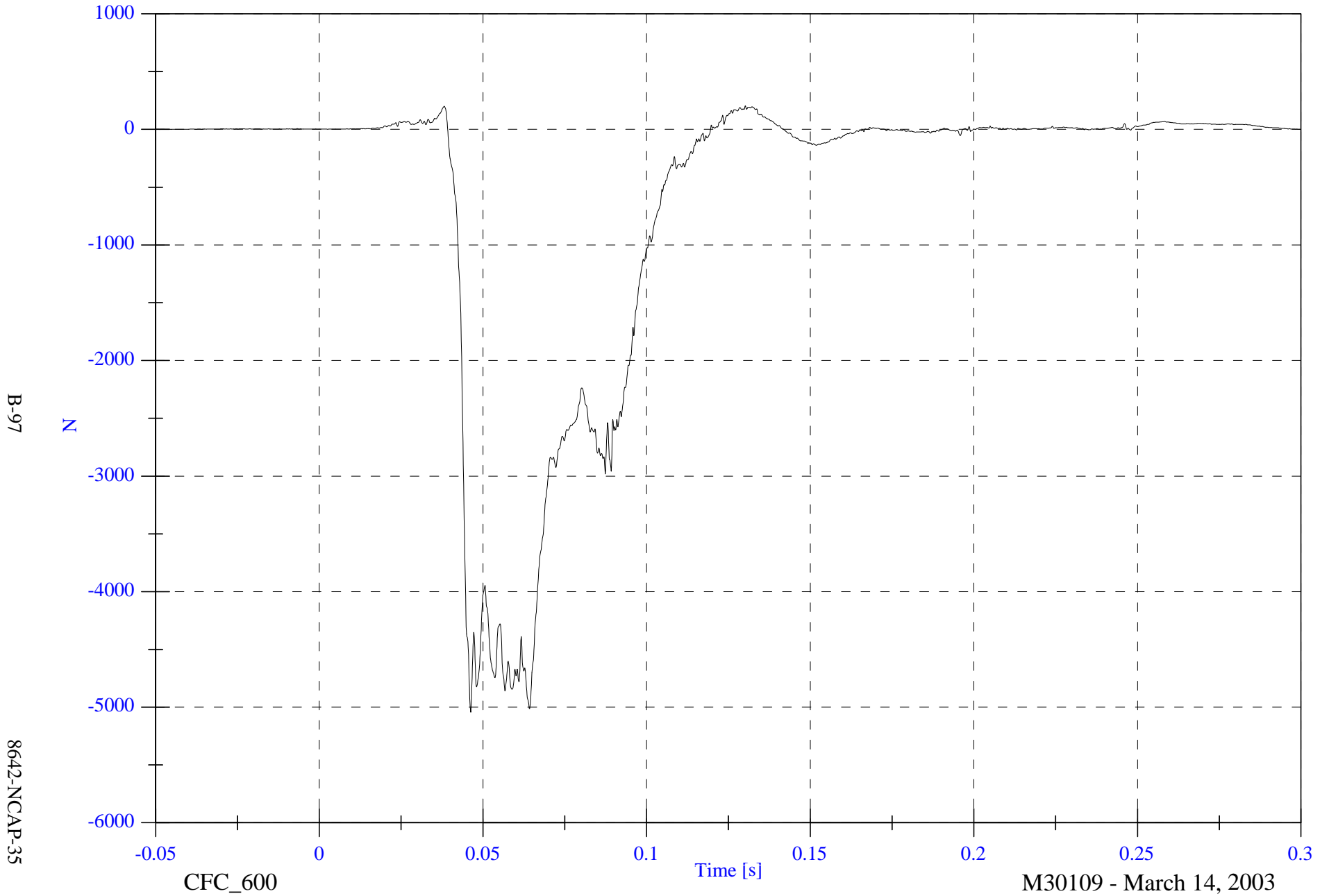
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Left Femur z

Max: 204.6 [N] at 0.130 [s]

Min: -5044.2 [N] at 0.046 [s]

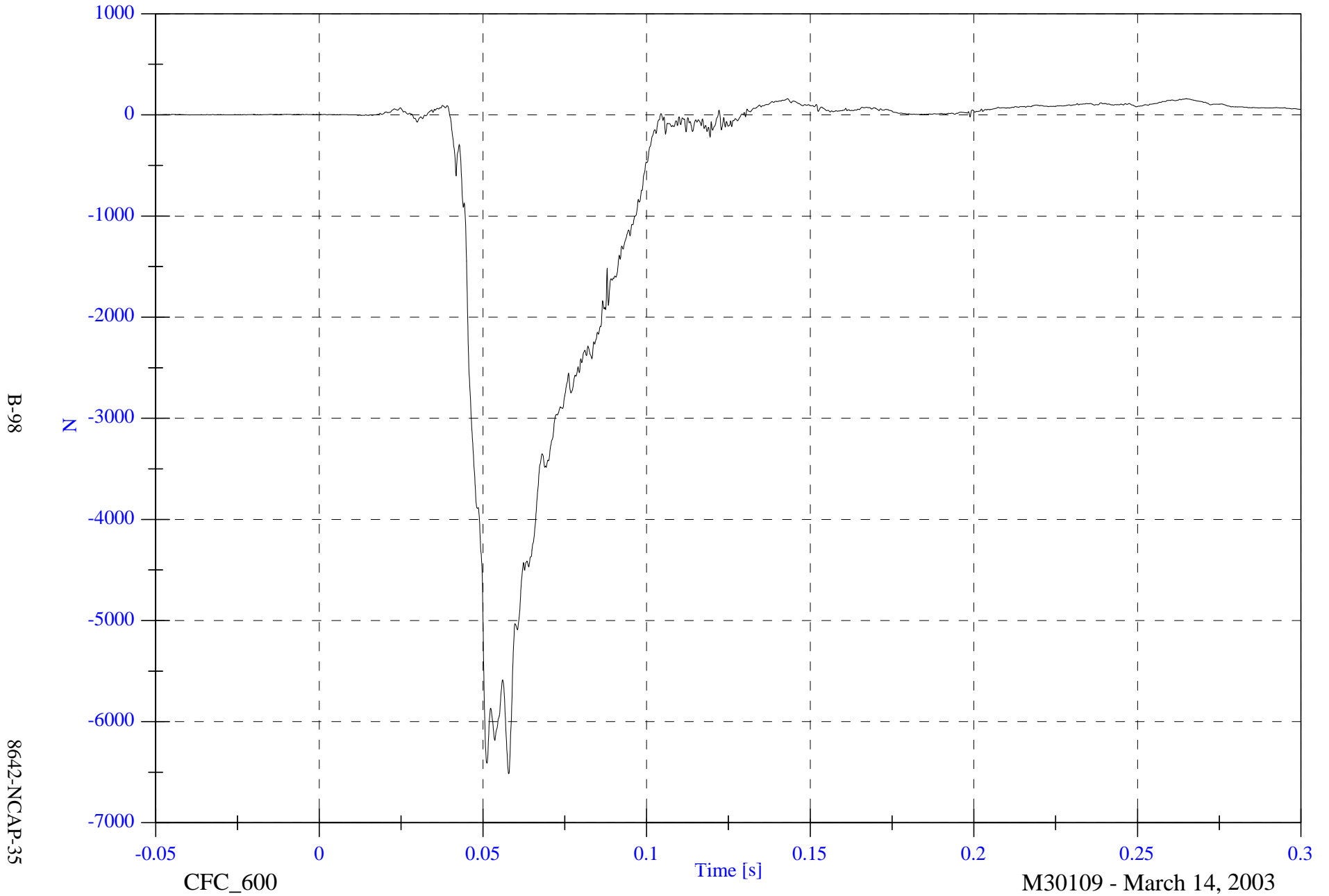


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 160.6 [N] at 0.143 [s]

Min: -6516.4 [N] at 0.058 [s]

V1P2 Right Femur z



B-98

8642-NCAP-35

CFC\_600

Time [s]

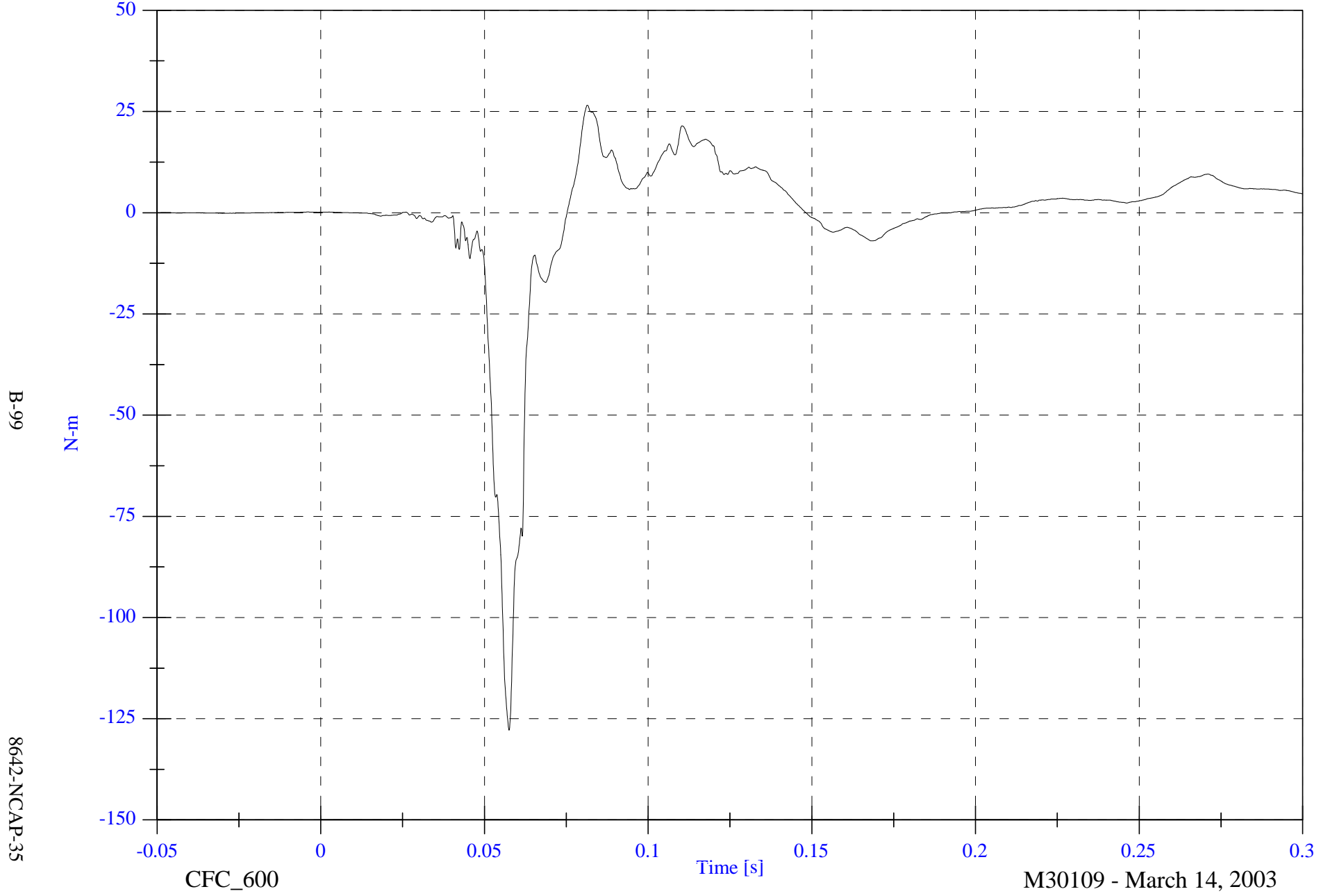
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 26.6 [N-m] at 0.081 [s]

Min: -127.9 [N-m] at 0.057 [s]

V1P2 Left Upper Tibia Mx



B-99

8642-NCAP-35

CFC\_600

Time [s]

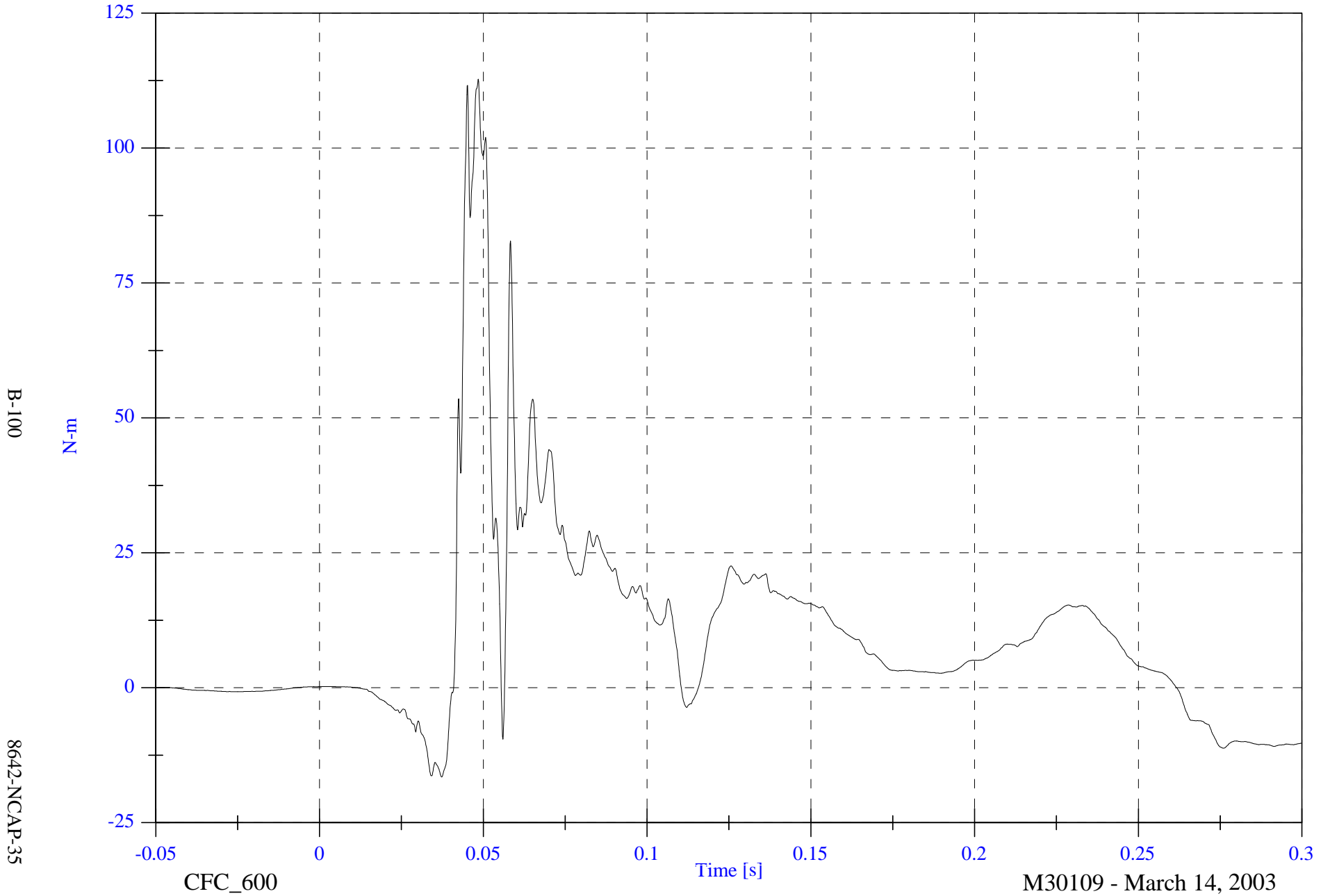
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 112.8 [N-m] at 0.048 [s]

V1P2 Left Upper Tibia My

Min: -16.5 [N-m] at 0.037 [s]



B-100

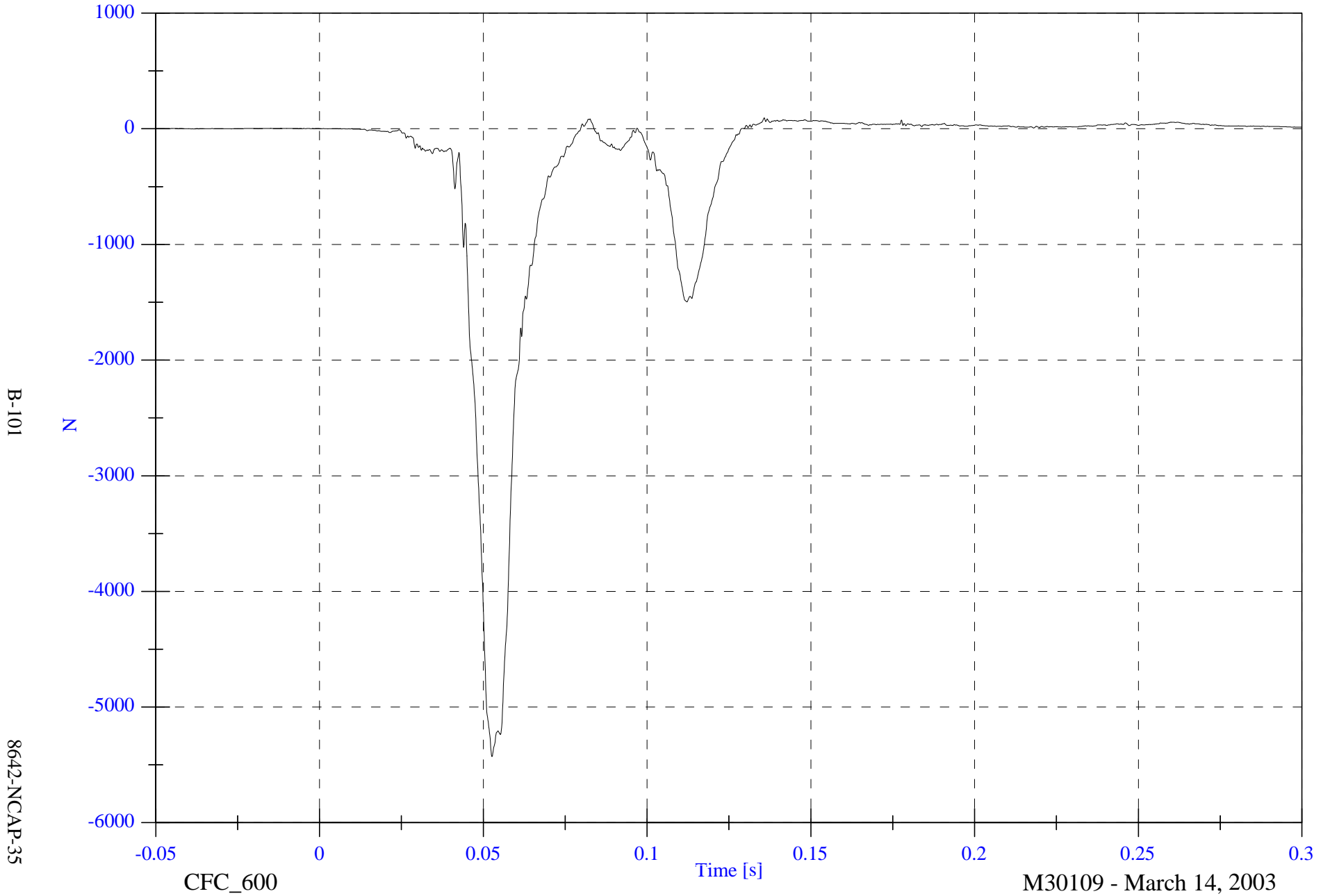
8642-NCAP-35

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Left Lower Tibia Fz

Max: 95.3 [N] at 0.136 [s]

Min: -5429.4 [N] at 0.053 [s]



2003 NCAP Test 13 2003 Chevrolet Tahoe

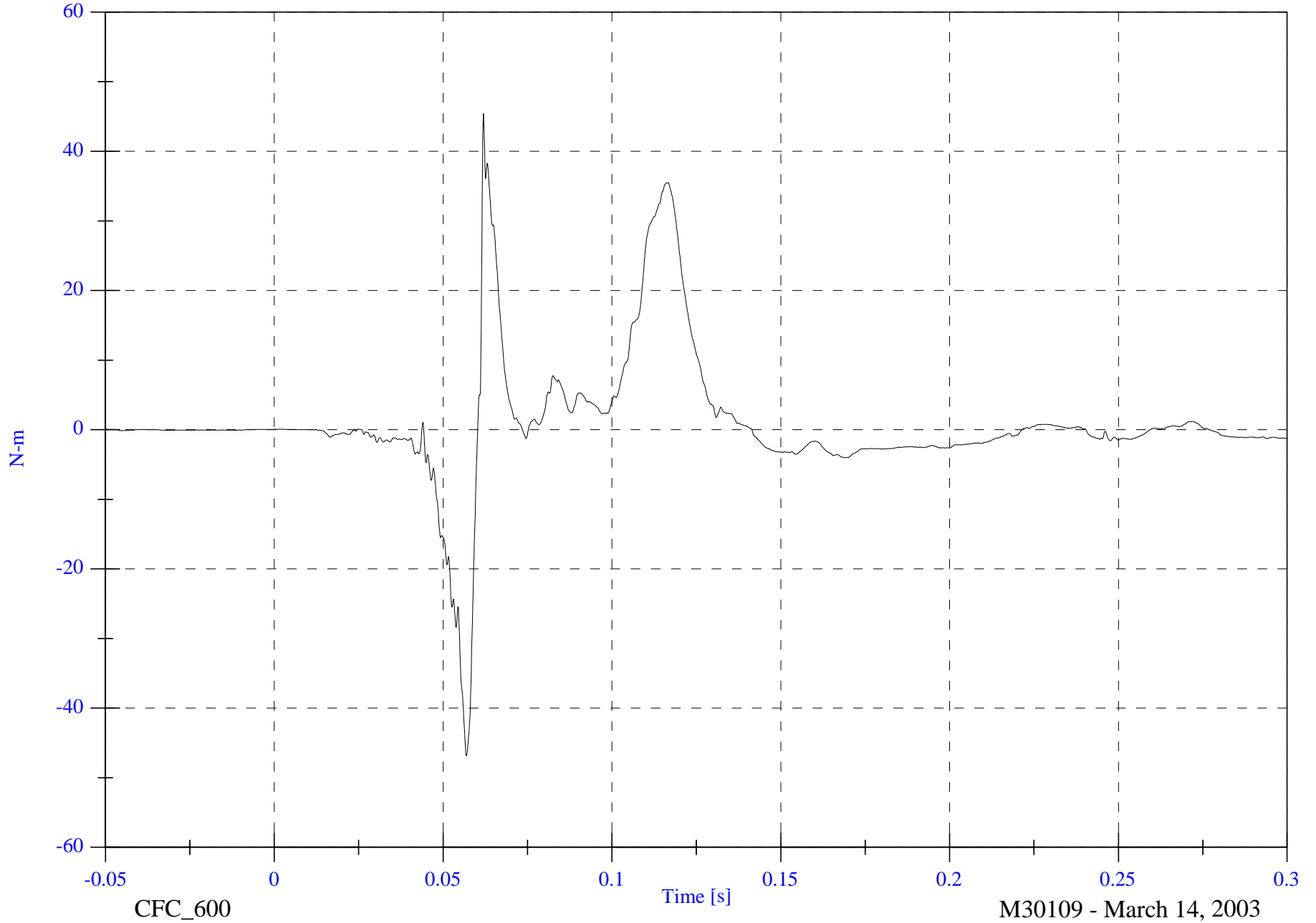
Max: 45.4 [N-m] at 0.062 [s]

VIP2 Left Lower Tibia Mx

Min: -46.9 [N-m] at 0.057 [s]

B-102

8642-NCAP-35



CFC\_600

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

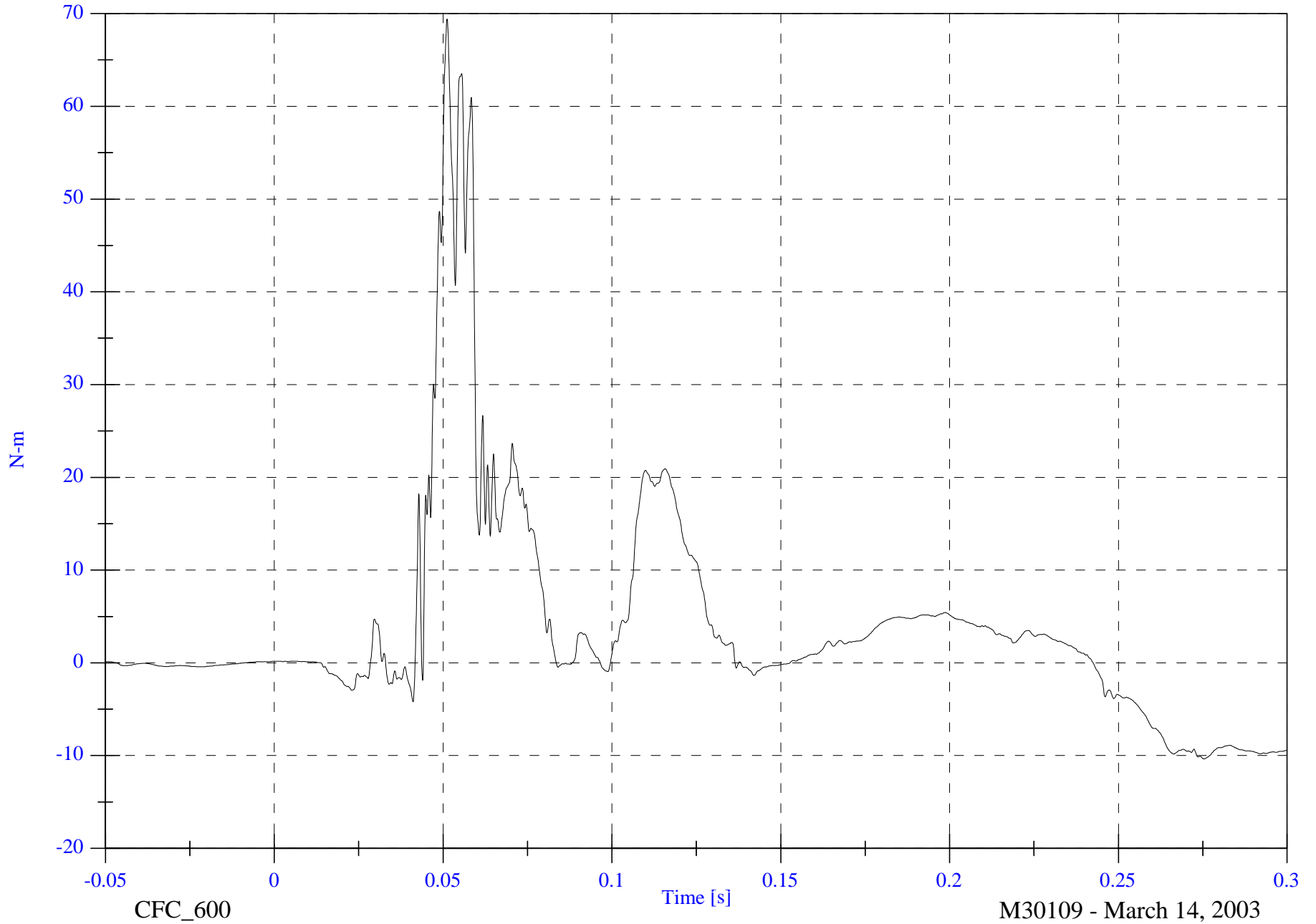
V1P2 Left Lower Tibia My

Max: 69.4 [N-m] at 0.051 [s]

Min: -10.4 [N-m] at 0.275 [s]

B-103

8642-NCAP-35



CFC\_600

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

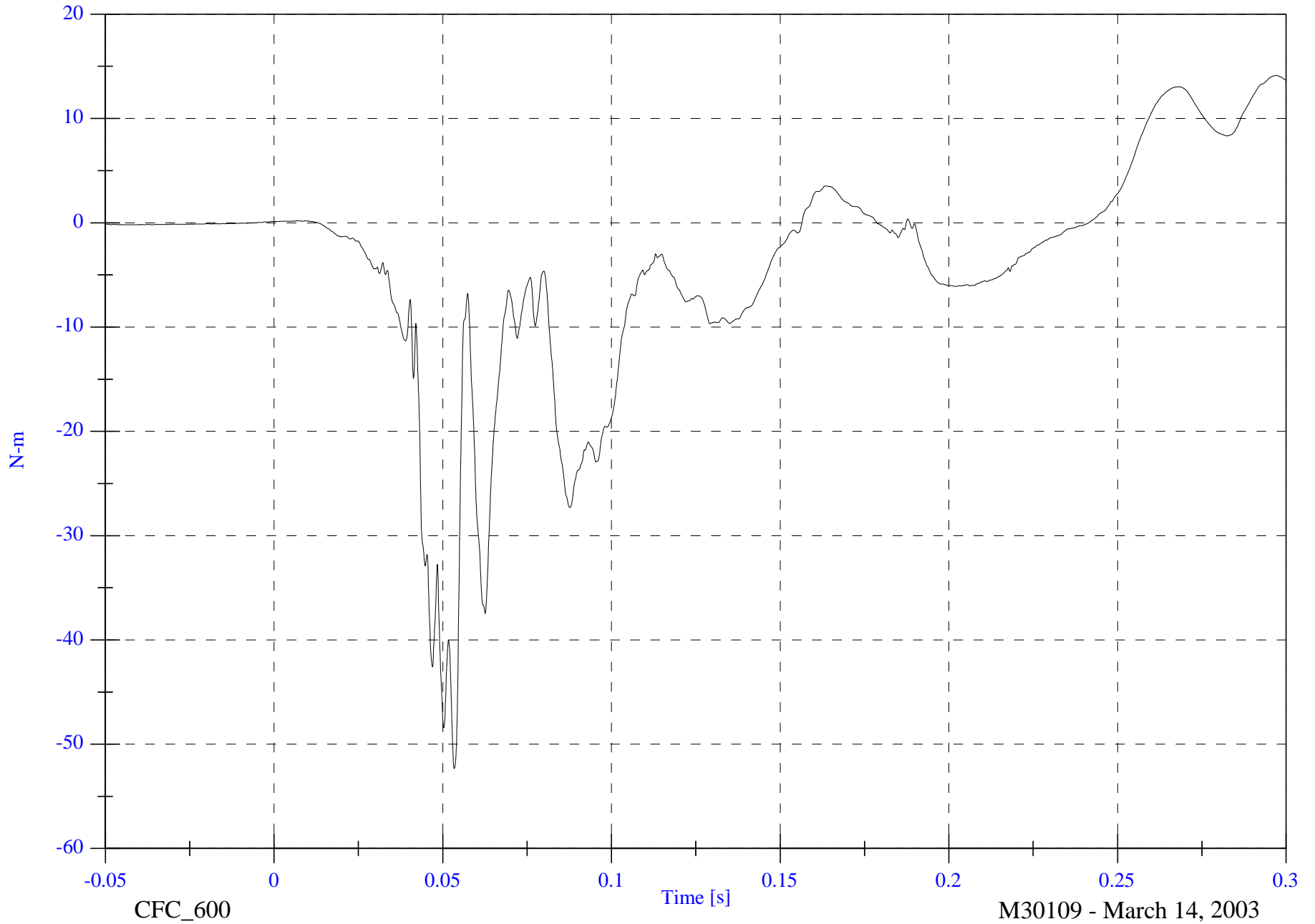
V1P2 Right Upper Tibia Mx

Max: 14.1 [N-m] at 0.297 [s]

Min: -52.4 [N-m] at 0.053 [s]

B-104

8642-NCAP-35



CFC\_600

Time [s]

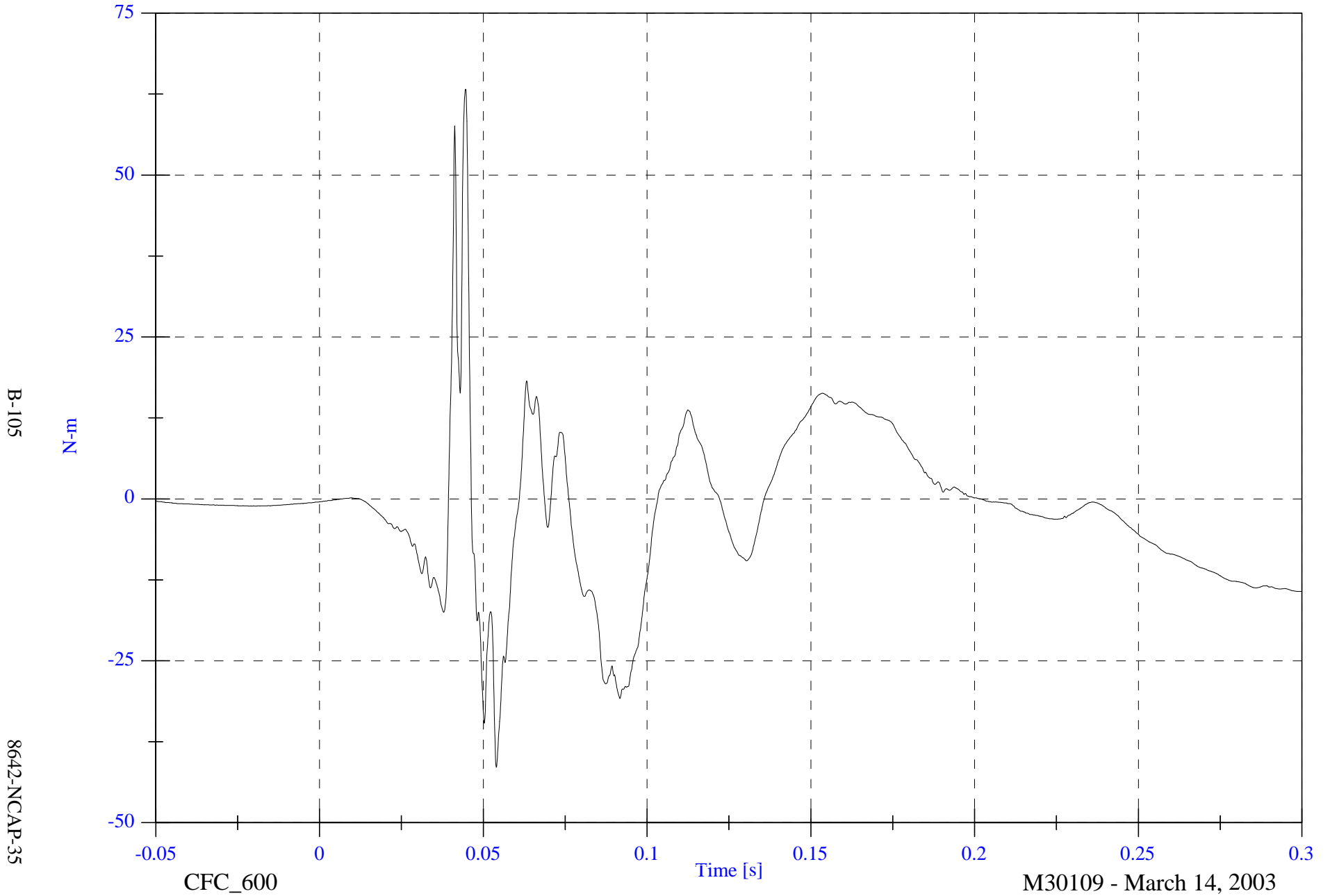
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Right Upper Tibia My

Max: 63.3 [N-m] at 0.045 [s]

Min: -41.5 [N-m] at 0.054 [s]



B-105

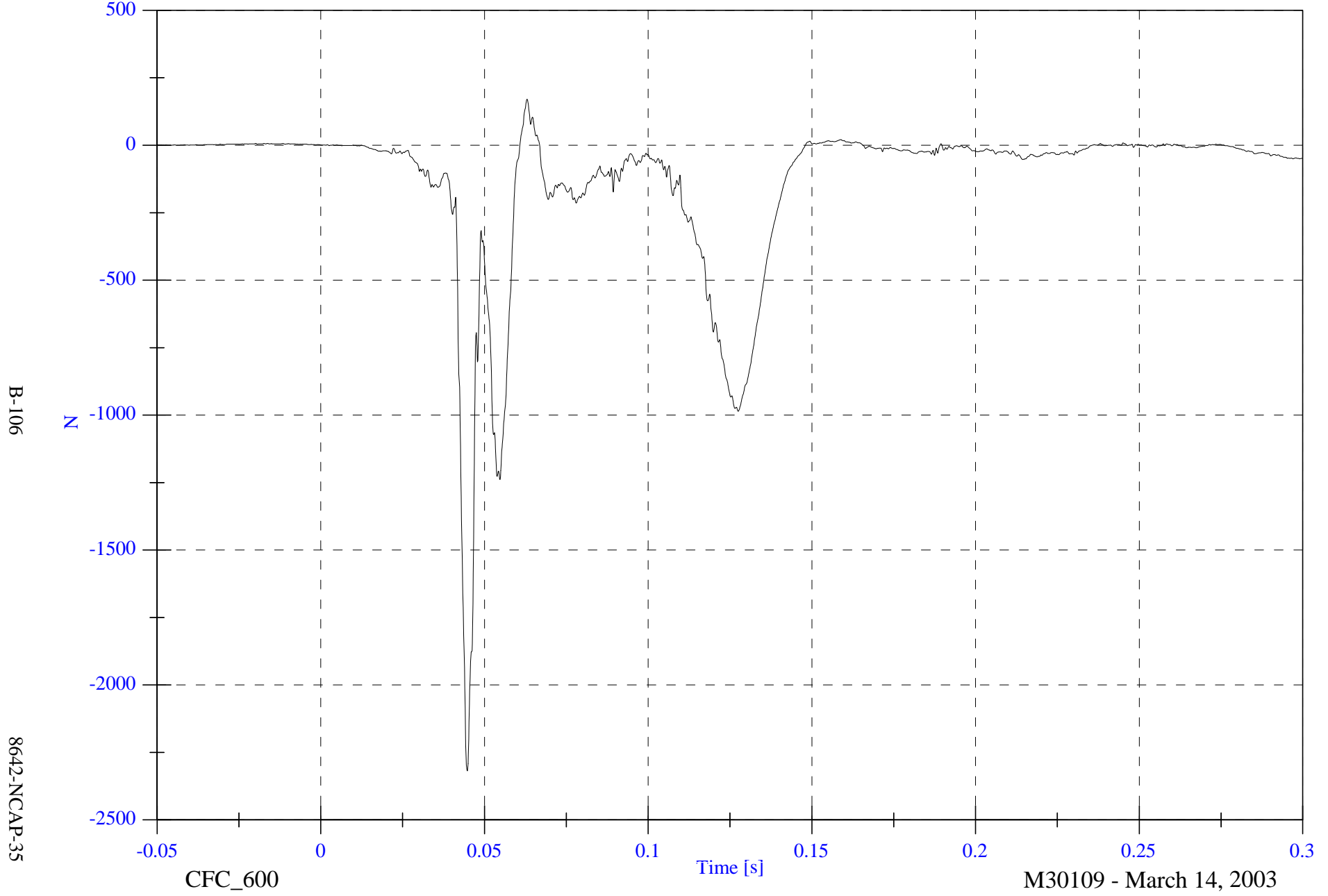
8642-NCAP-35

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Right Lower Tibia Fz

Max: 170.8 [N] at 0.063 [s]

Min: -2318.3 [N] at 0.045 [s]



B-106

8642-NCAP-35

CFC\_600

Time [s]

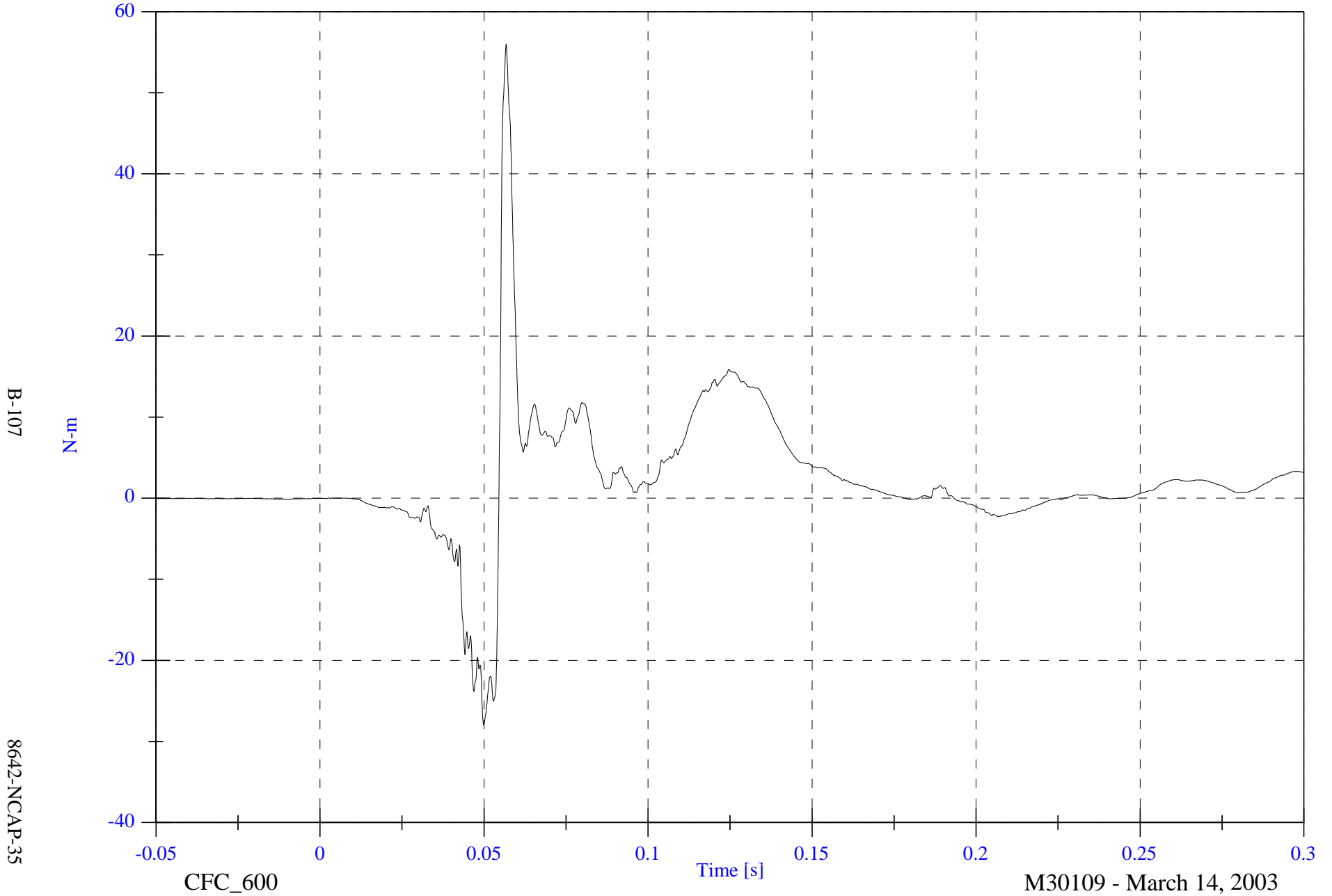
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Right Lower Tibia Mx

Max: 56.0 [N-m] at 0.057 [s]

Min: -28.0 [N-m] at 0.050 [s]



B-107

8642-NCAP-35

CFC\_600

Time [s]

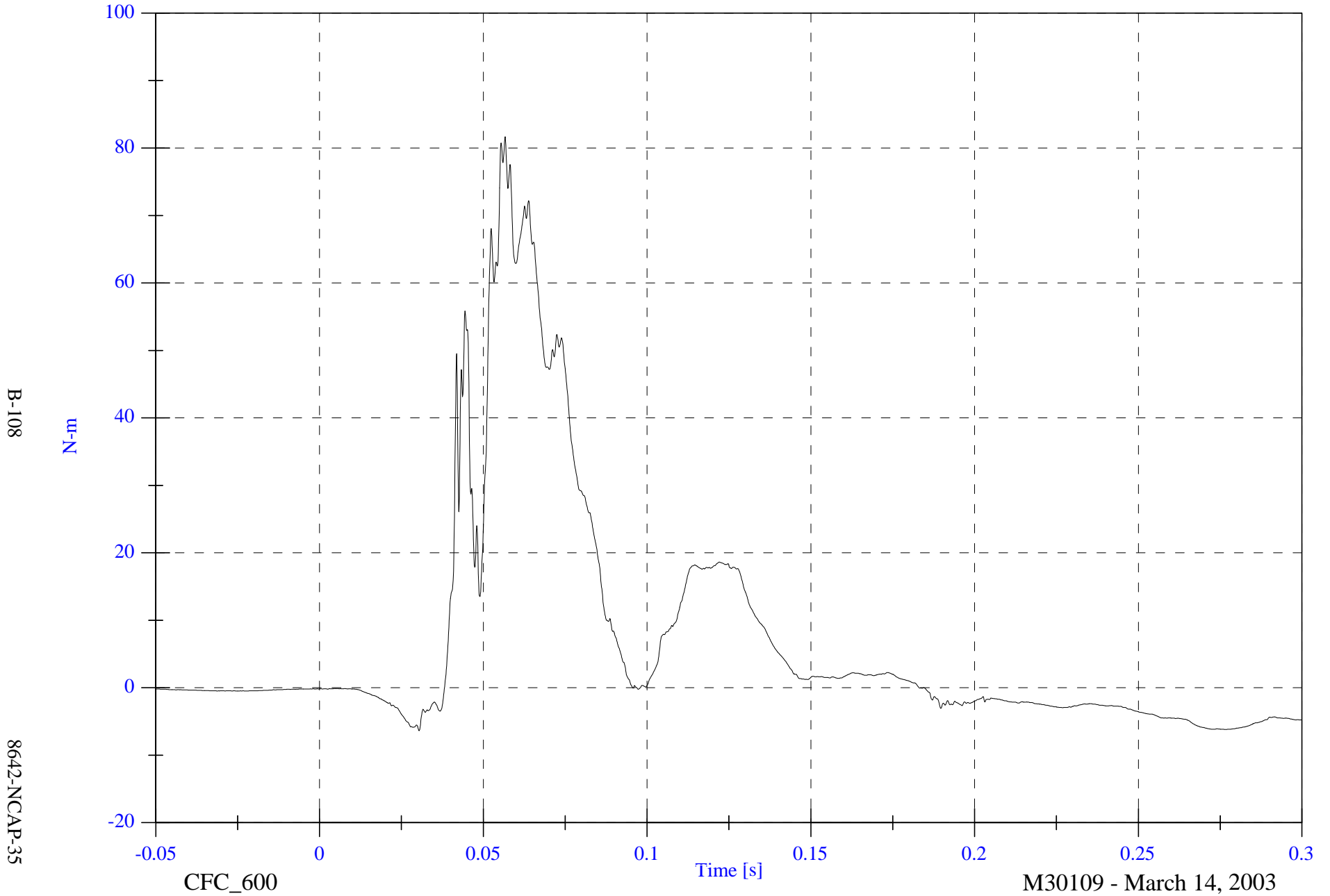
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 81.7 [N-m] at 0.057 [s]

V1P2 Right Lower Tibia My

Min: -6.4 [N-m] at 0.030 [s]



B-108

8642-NCAP-35

CFC\_600

Time [s]

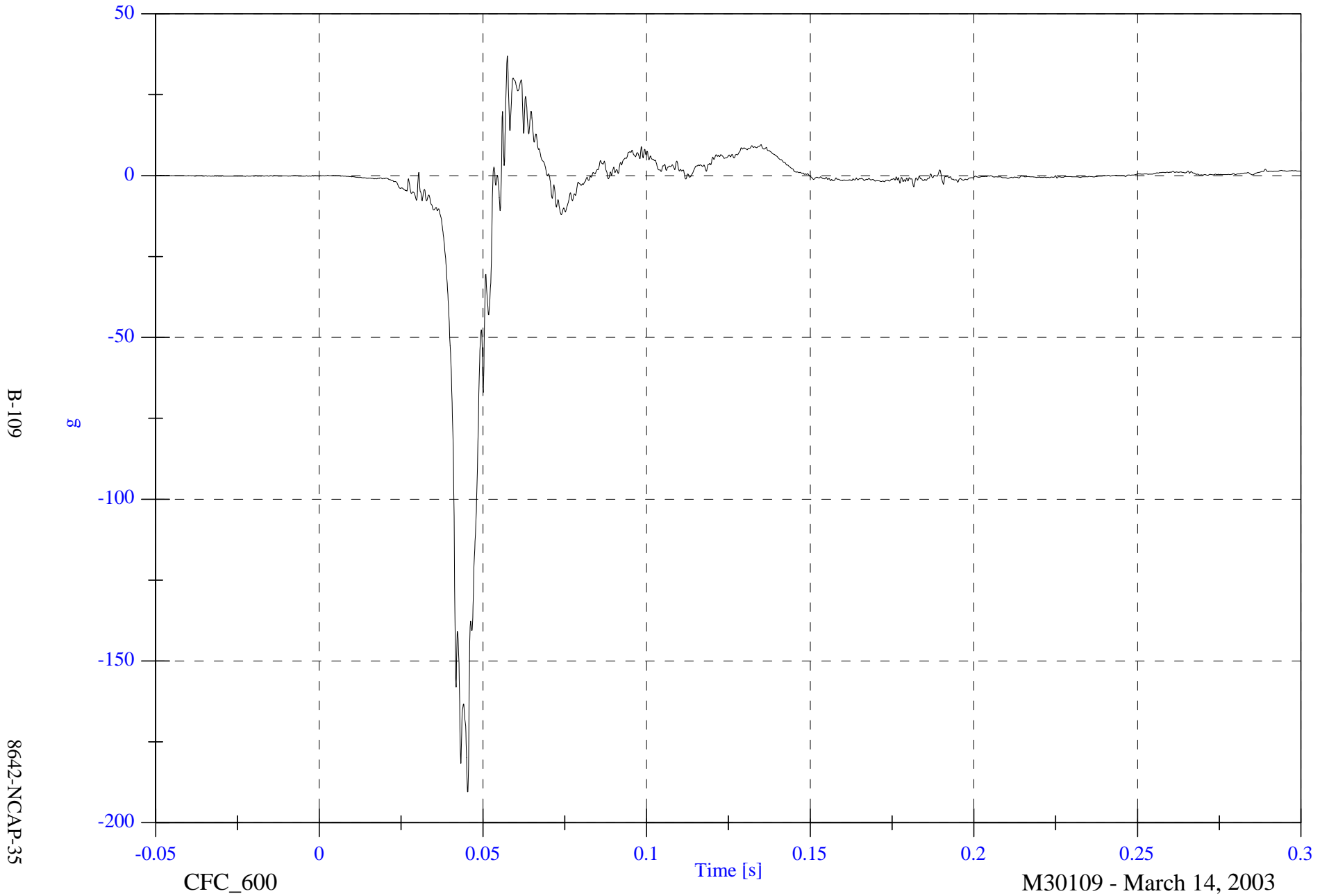
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 36.9 [g] at 0.057 [s]

Min: -190.4 [g] at 0.045 [s]

V1P2 Left Foot Aft x

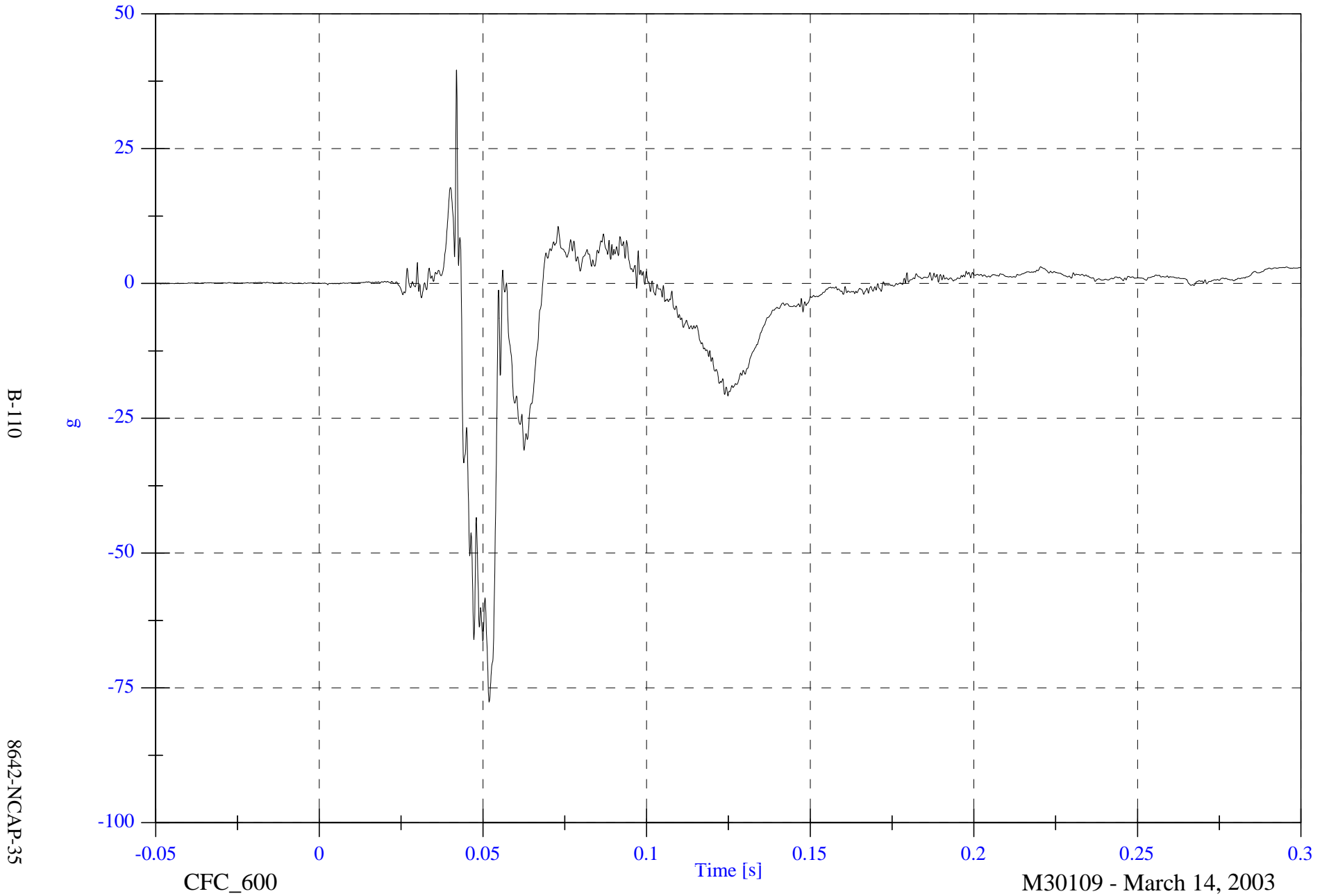


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 39.6 [g] at 0.042 [s]

Min: -77.6 [g] at 0.052 [s]

V1P2 Left Foot Aft z



B-110

8642-NCAP-35

CFC\_600

Time [s]

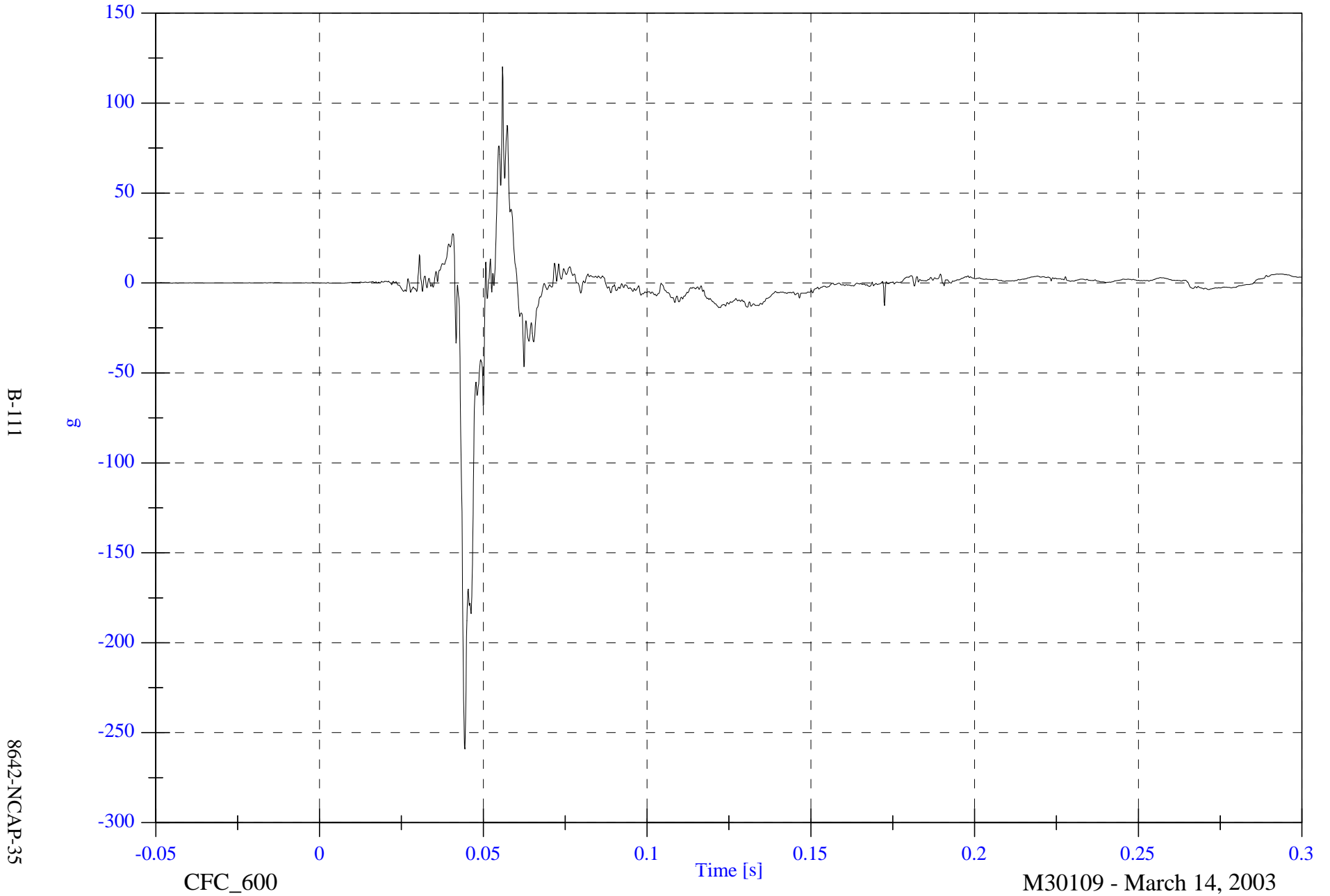
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Left Foot Fore z

Max: 120.3 [g] at 0.056 [s]

Min: -259.0 [g] at 0.044 [s]

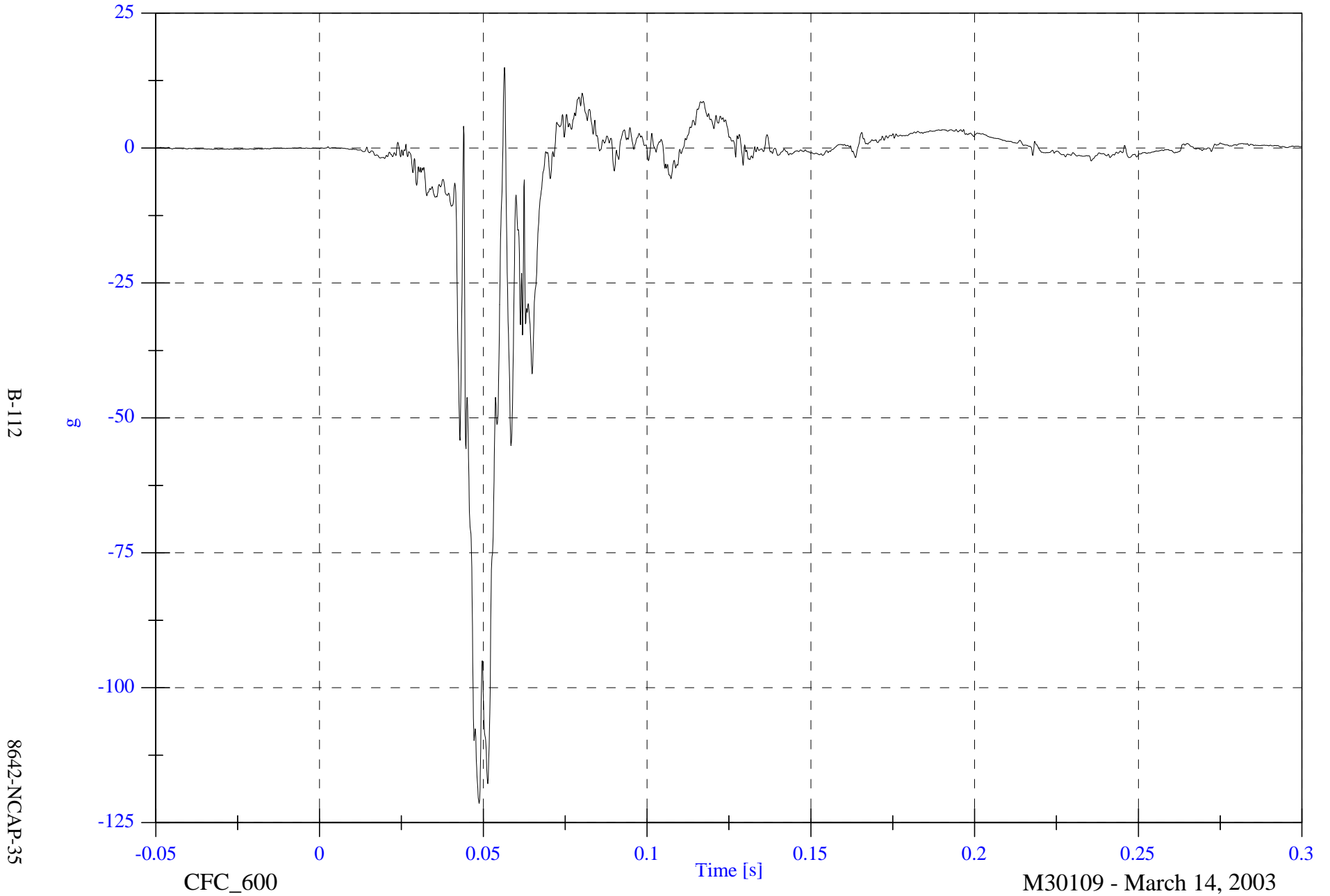


2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP2 Right Foot Aft x

Max: 14.9 [g] at 0.057 [s]

Min: -121.4 [g] at 0.049 [s]



B-112

8642-NCAP-35

CFC\_600

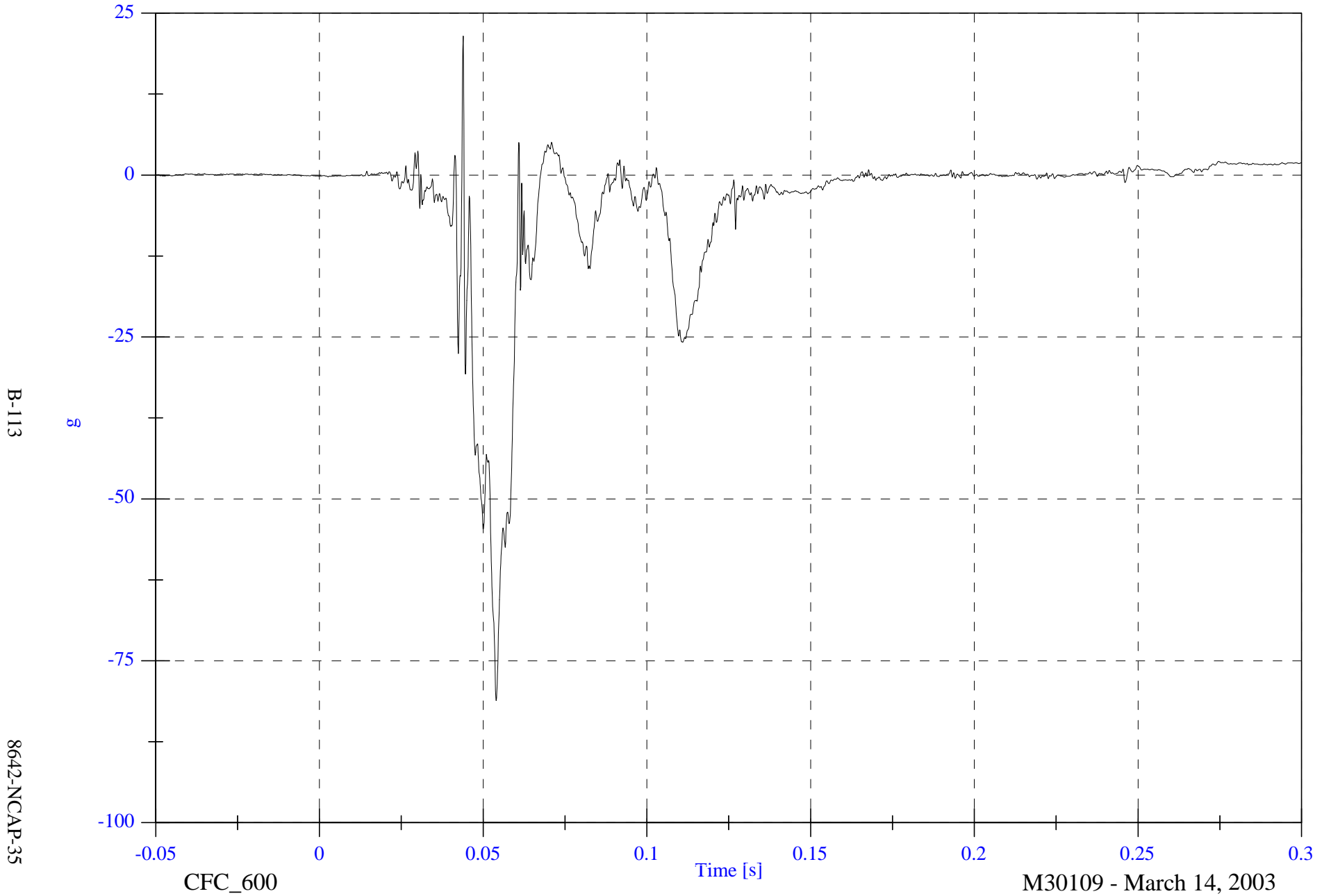
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Right Foot Aft z

Max: 21.5 [g] at 0.044 [s]

Min: -81.1 [g] at 0.054 [s]

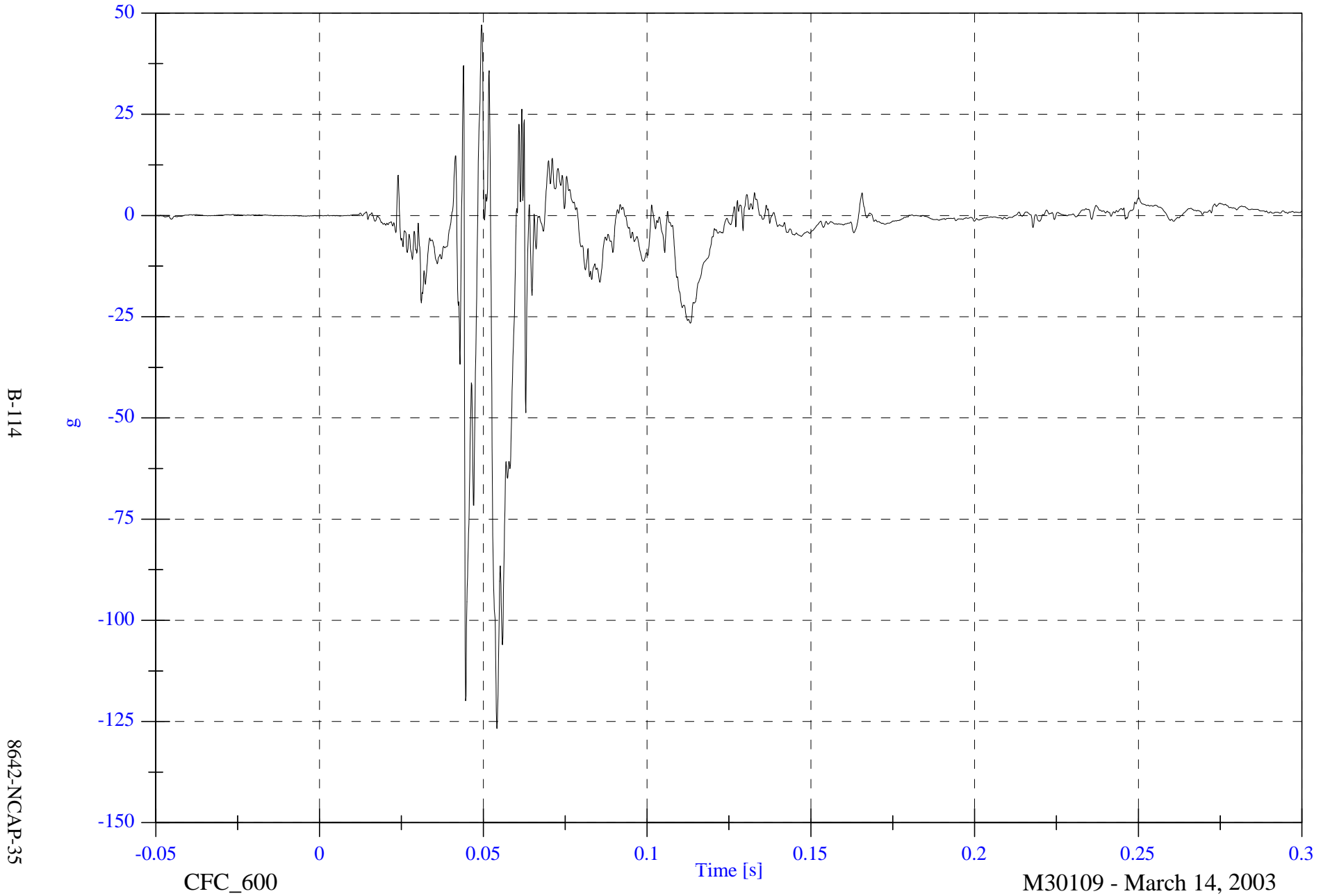


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 Right Foot Fore z

Max: 47.1 [g] at 0.049 [s]

Min: -126.8 [g] at 0.054 [s]

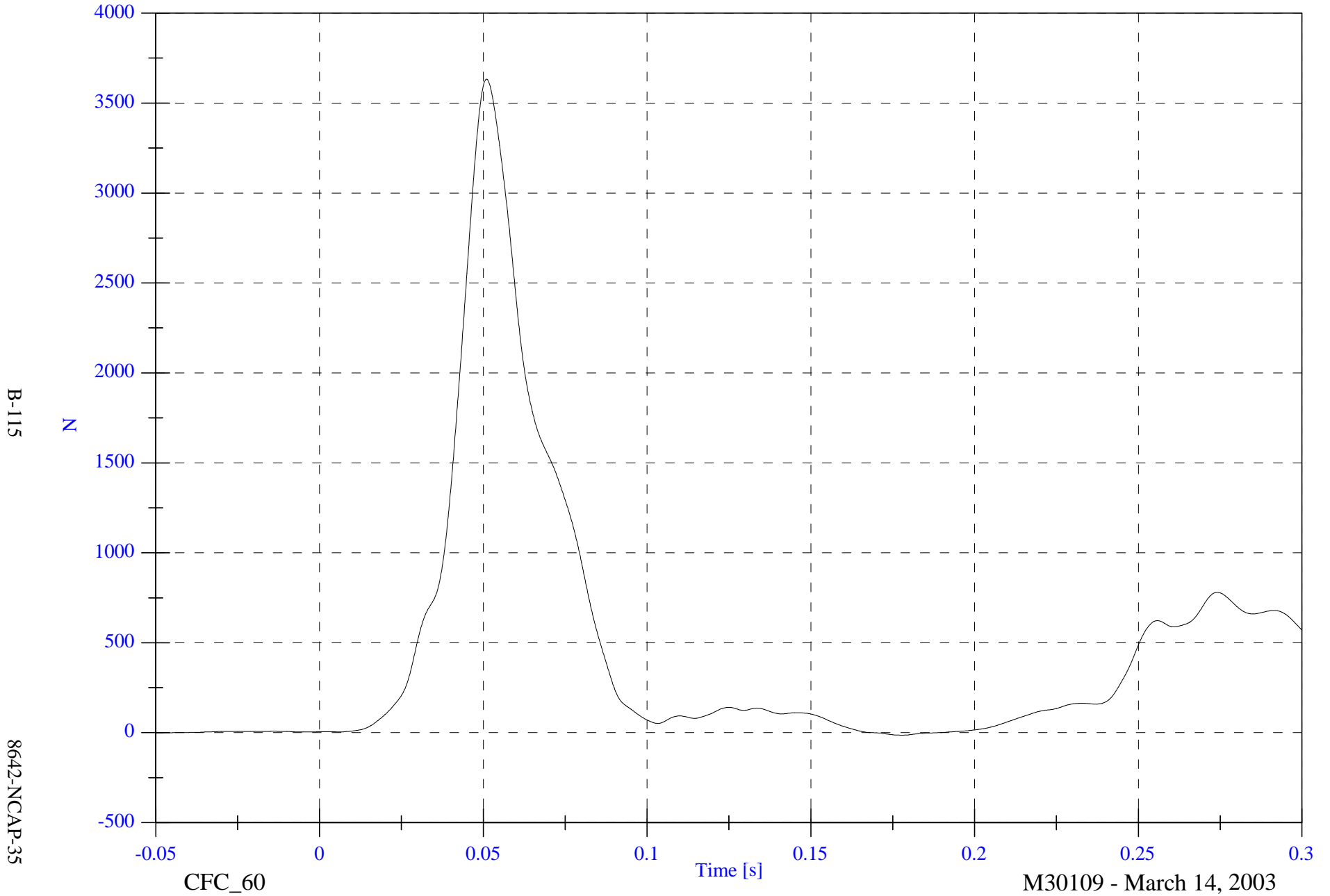


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P2 RFP Lap Belt

Max: 3632.8 [N] at 0.051 [s]

Min: -13.5 [N] at 0.178 [s]



B-115

8642-NCAP-35

CFC\_60

Time [s]

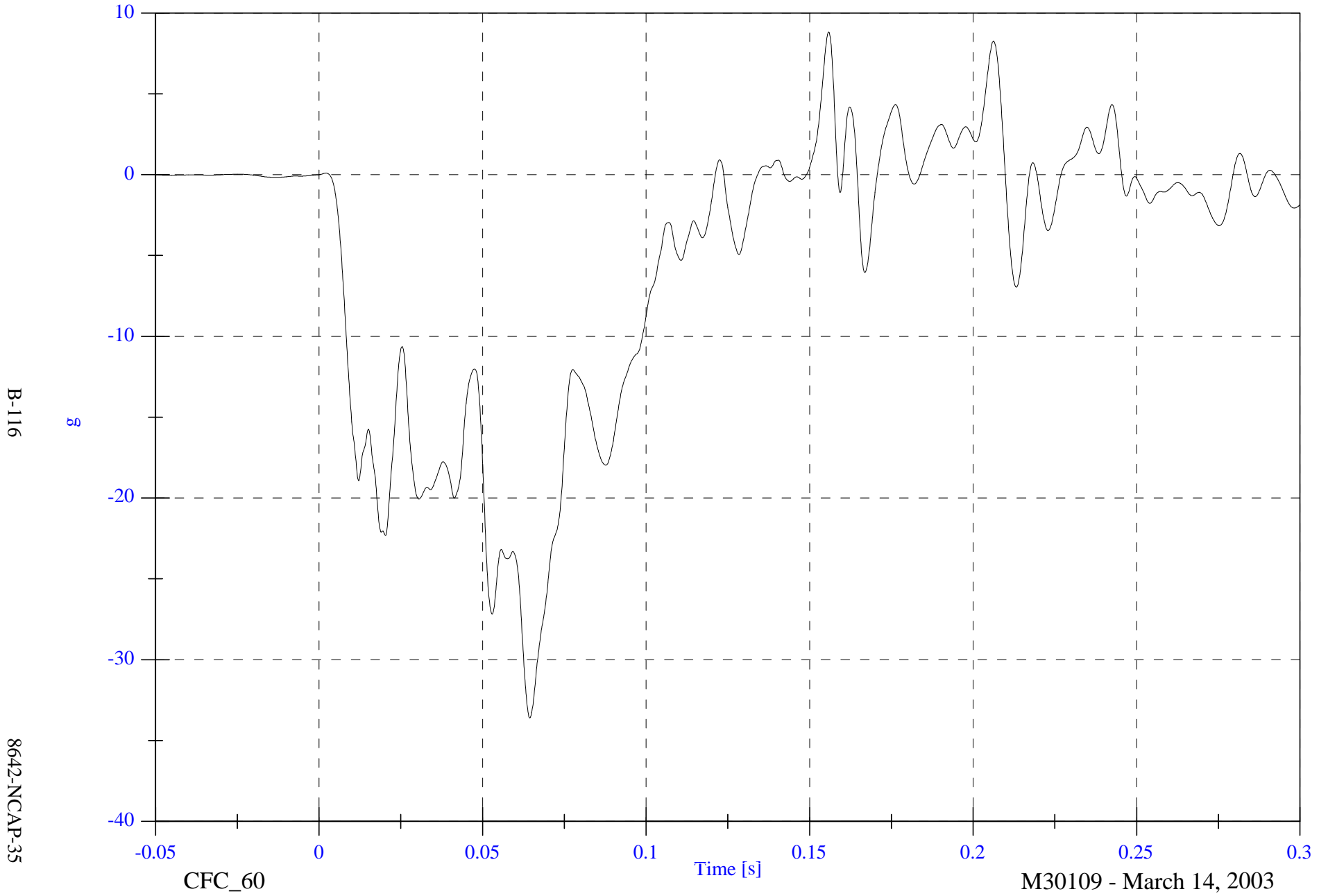
M30109 - March 14, 2003

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V1 Left Rear #1x

Max: 8.8 [g] at 0.156 [s]

Min: -33.6 [g] at 0.064 [s]



2003 NCAP Test 13 2003 Chevrolet Tahoe

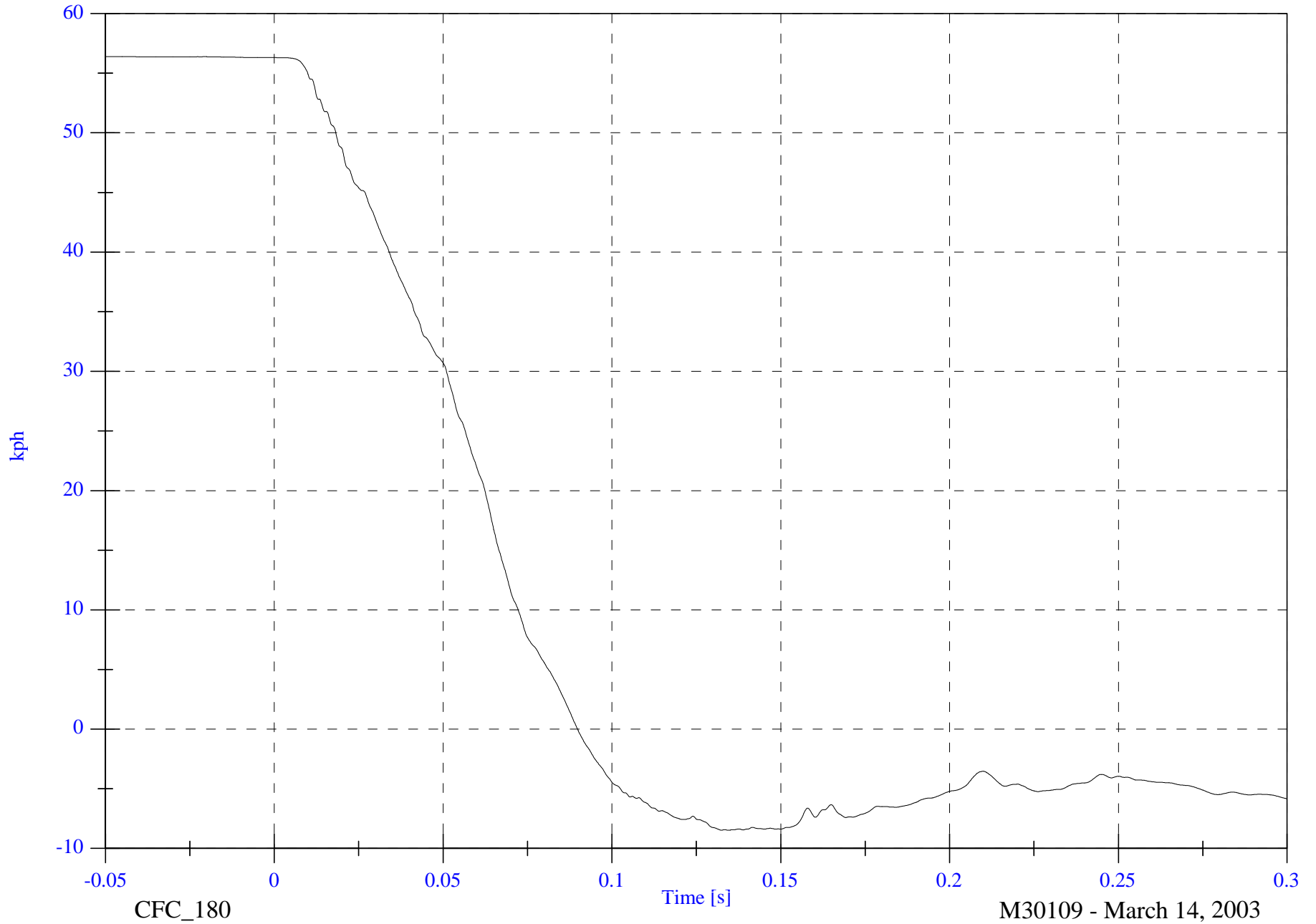
Max: 56.4 [kph] at -0.050 [s]

V1 Left Rear #1x Velocity

Min: -8.5 [kph] at 0.135 [s]

B-117

8642-NCAP-35



CFC\_180

Time [s]

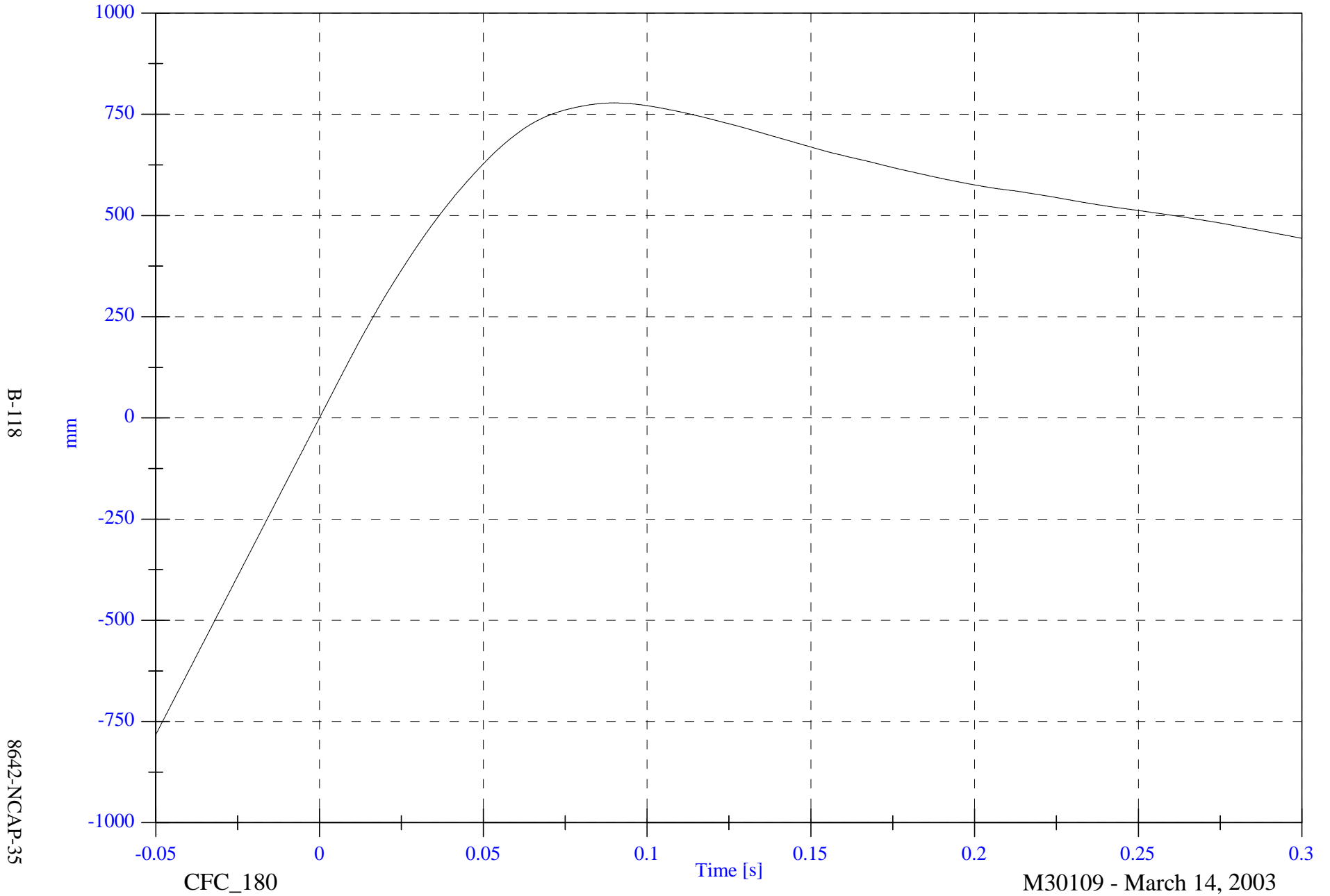
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Left Rear #1x Displacement

Max: 778.0 [mm] at 0.090 [s]

Min: -782.7 [mm] at -0.050 [s]



B-118

8642-NCAP-35

CFC\_180

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

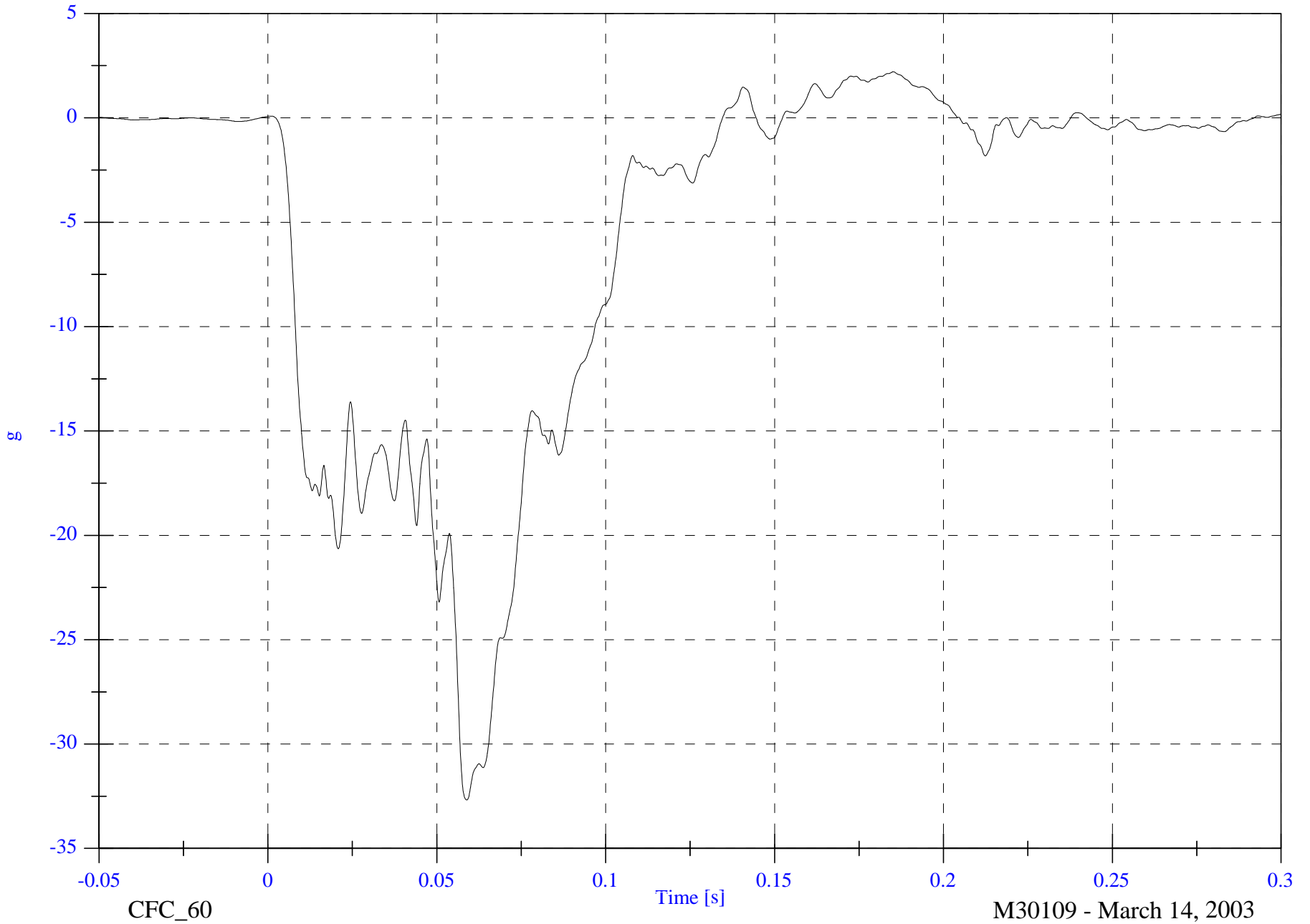
V1 Right Rear #2x

Max: 2.2 [g] at 0.185 [s]

Min: -32.7 [g] at 0.059 [s]

B-119

8642-NCAP-35



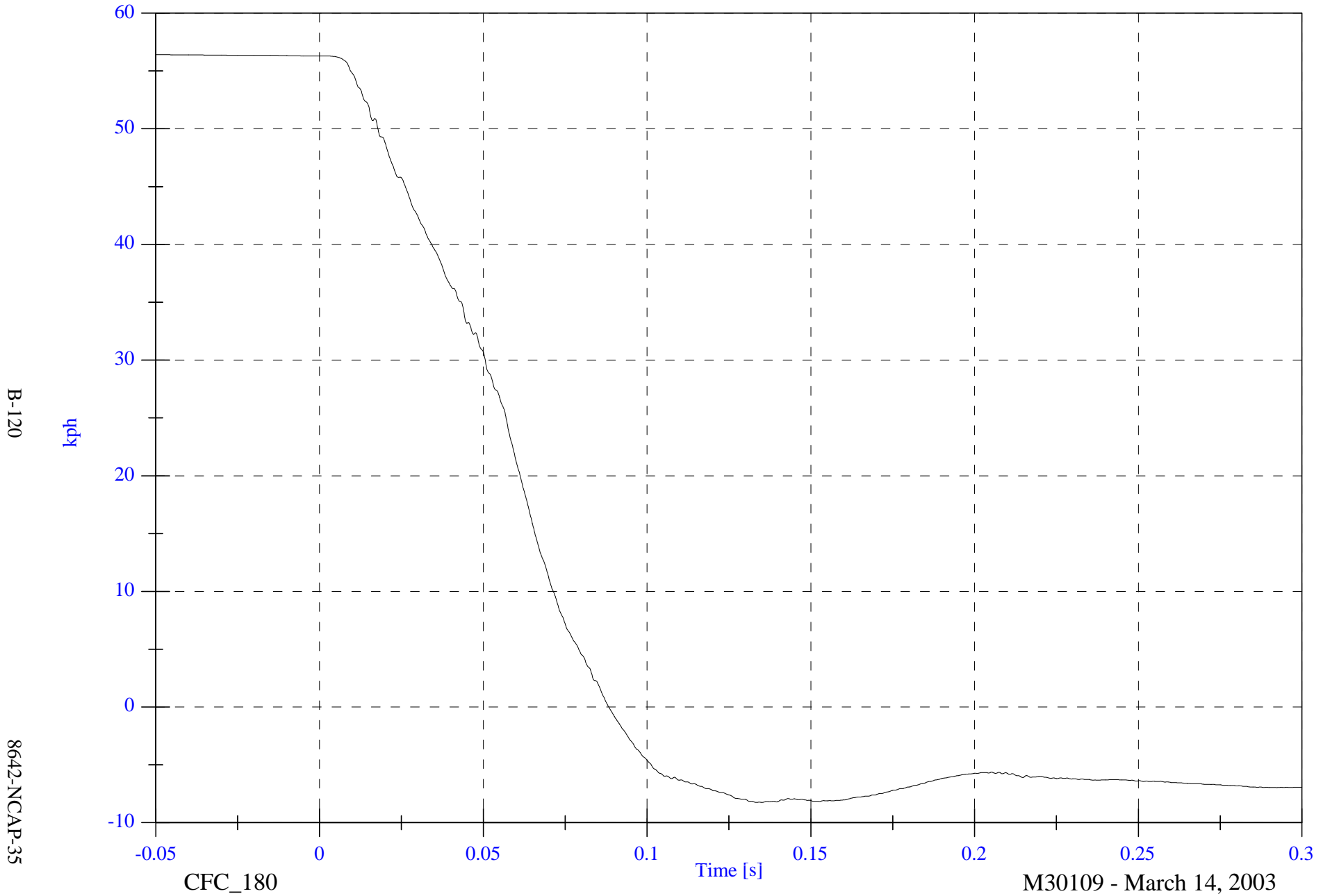
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 56.4 [kph] at -0.048 [s]

V1 Right Rear #2x Velocity

Min: -8.2 [kph] at 0.133 [s]



B-120

8642-NCAP-35

CFC\_180

Time [s]

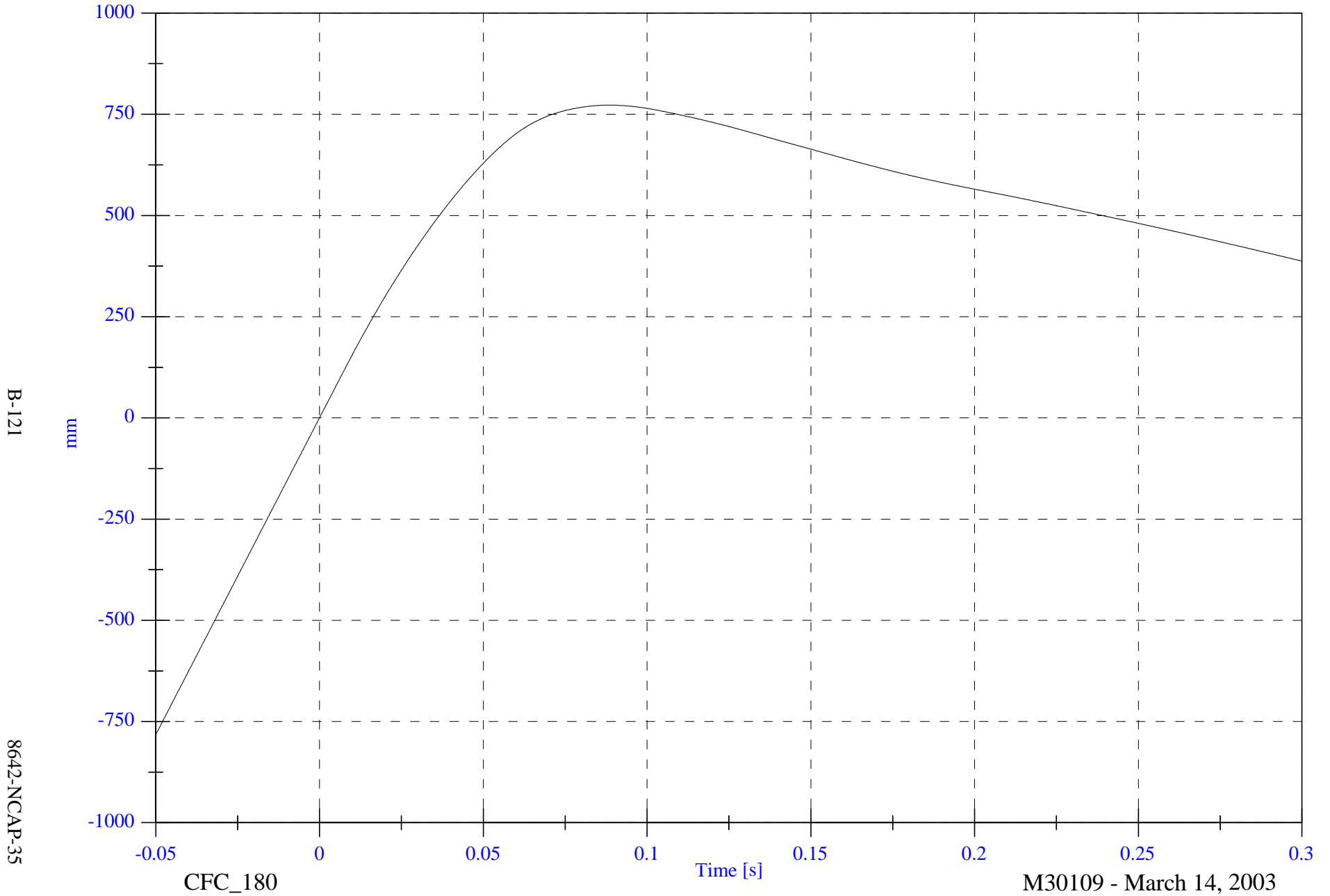
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Right Rear #2x Displacement

Max: 772.7 [mm] at 0.088 [s]

Min: -782.7 [mm] at -0.050 [s]



B-121

8642-NCAP-35

CFC\_180

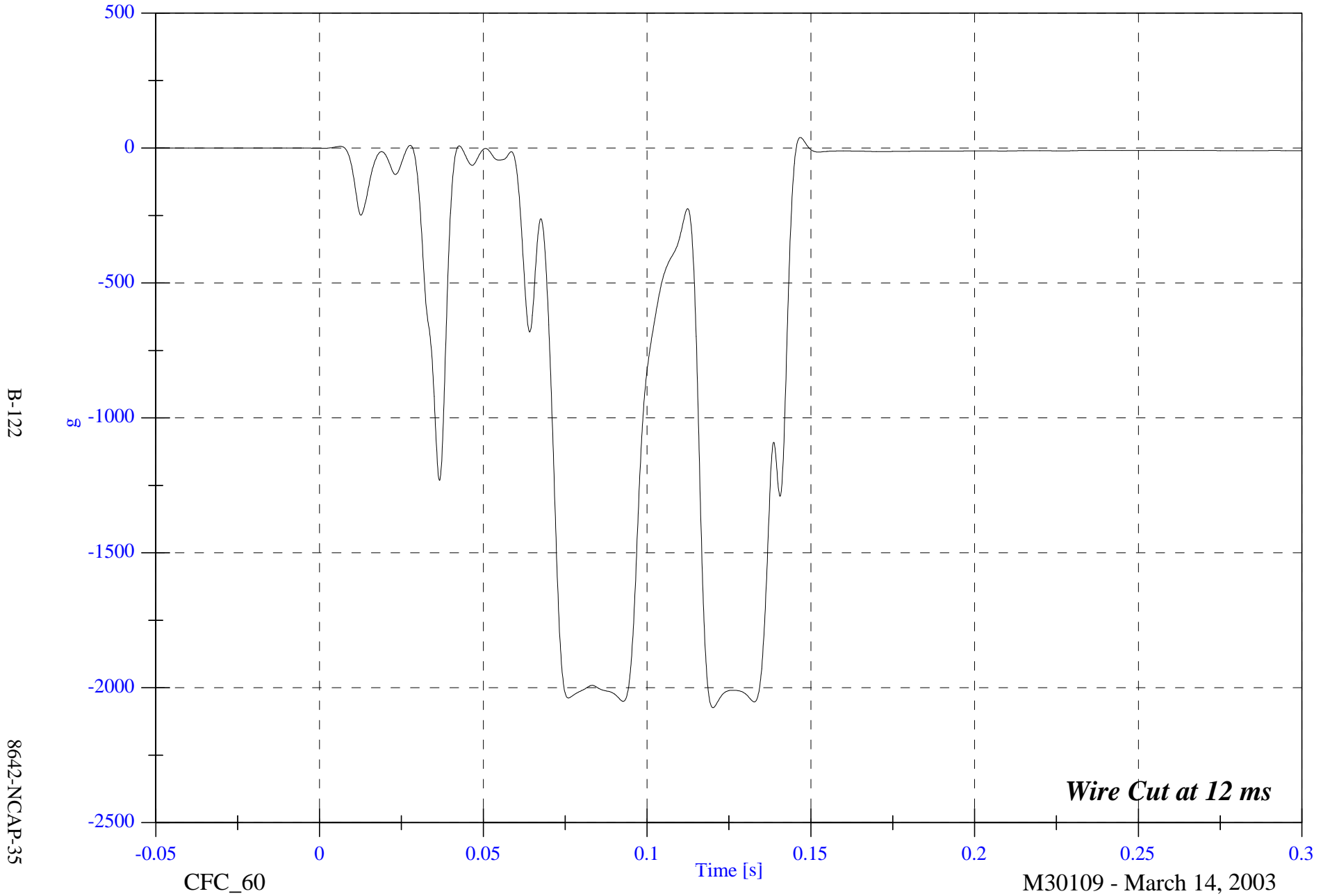
Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Engine Top #3x

Max: 39.3 [g] at 0.147 [s]  
Min: -2073.8 [g] at 0.120 [s]



B-122

8642-NCAP-35

CFC\_60

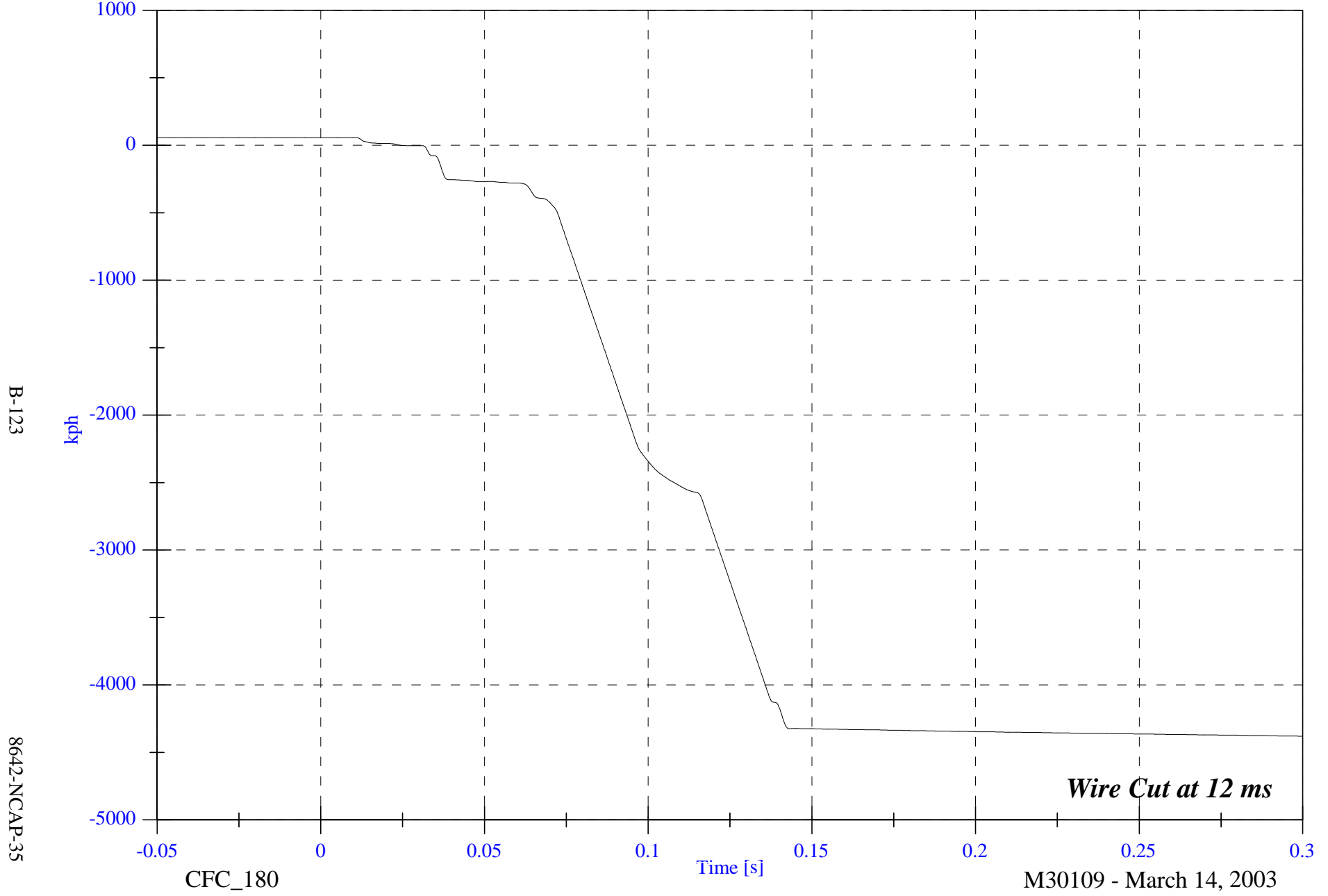
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 56.4 [kph] at -0.034 [s]

Min: -4379.7 [kph] at 0.300 [s]

### V1 Engine Top #3x Velocity



B-123

8642-NCAP-35

*Wire Cut at 12 ms*

CFC\_180

Time [s]

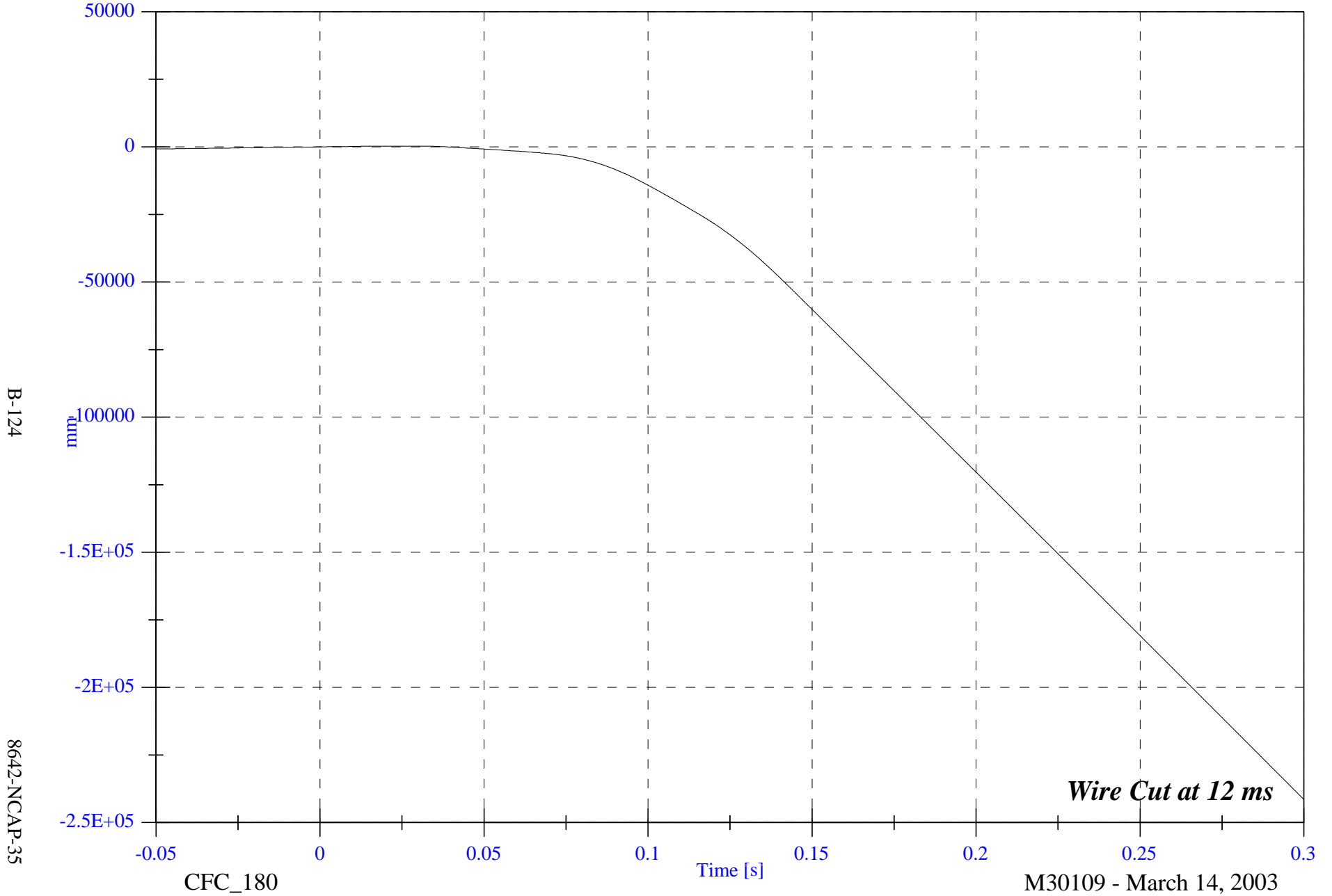
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Engine Top #3x Displacement

Max: 240.6 [mm] at 0.024 [s]

Min: -241401.3 [mm] at 0.300 [s]



B-124

8642-NCAP-35

CFC\_180

Time [s]

M30109 - March 14, 2003

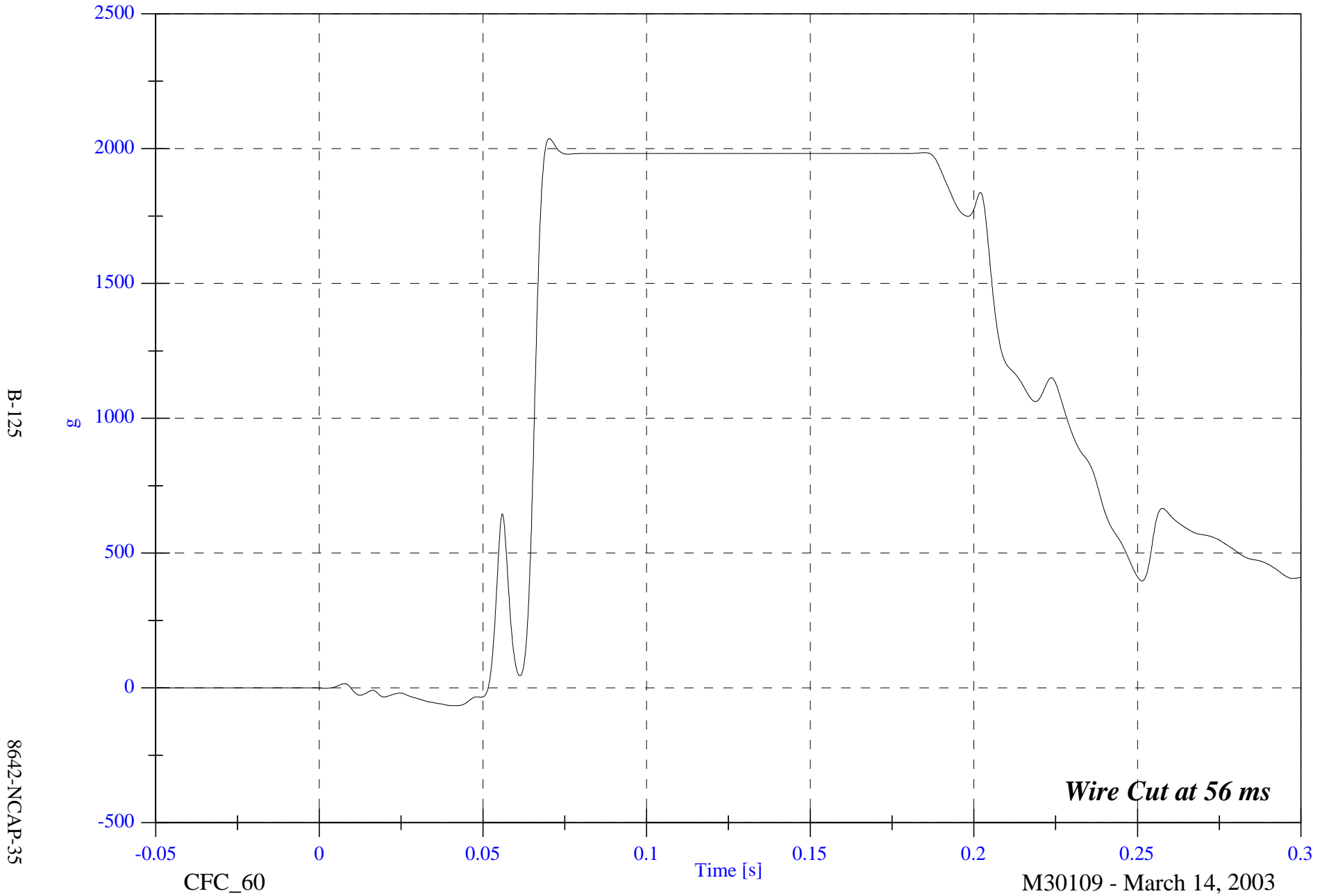
*Wire Cut at 12 ms*

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Engine Bottom #4x

Max: 2037.3 [g] at 0.070 [s]

Min: -65.8 [g] at 0.041 [s]



B-125

8642-NCAP-35

CFC\_60

Time [s]

M30109 - March 14, 2003

*Wire Cut at 56 ms*

2003 NCAP Test 13 2003 Chevrolet Tahoe

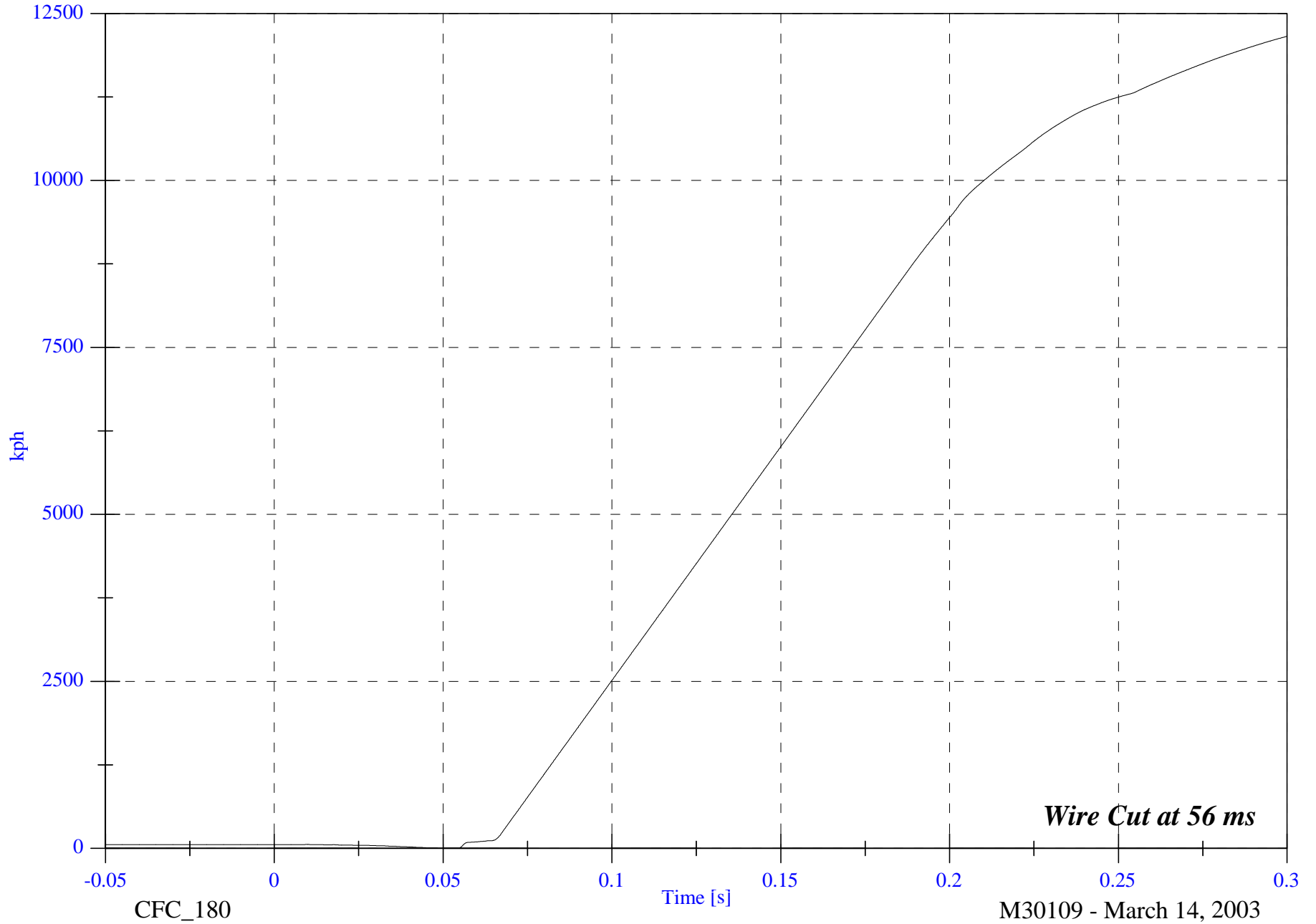
V1 Engine Bottom #4x Velocity

Max: 12159.0 [kph] at 0.300 [s]

Min: 2.9 [kph] at 0.054 [s]

B-126

8642-NCAP-35



*Wire Cut at 56 ms*

CFC\_180

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

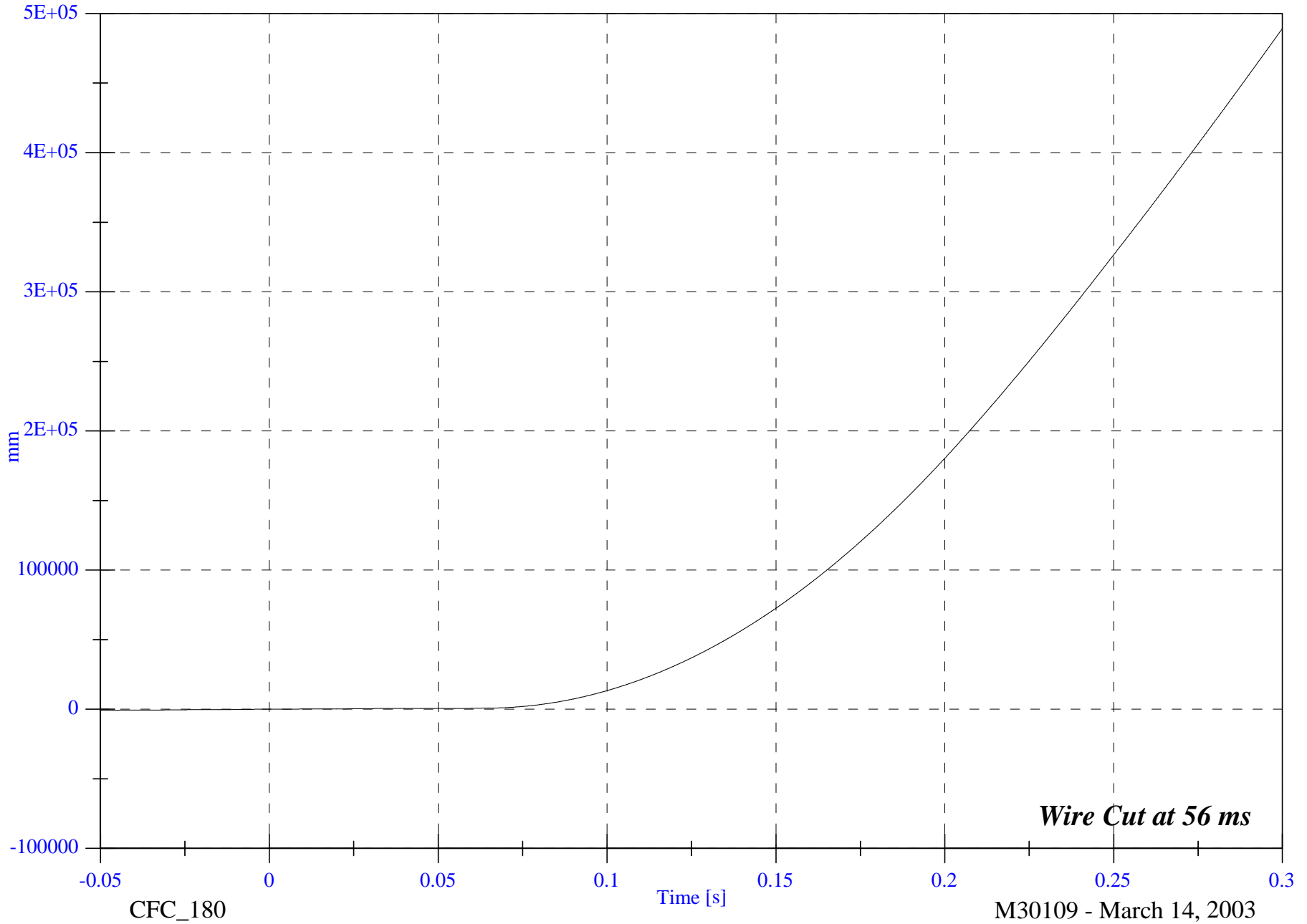
Max: 489009.1 [mm] at 0.300 [s]

V1 Engine Bottom #4x Displacement

Min: -781.6 [mm] at -0.050 [s]

B-127

8642-NCAP-35



*Wire Cut at 56 ms*

CFC\_180

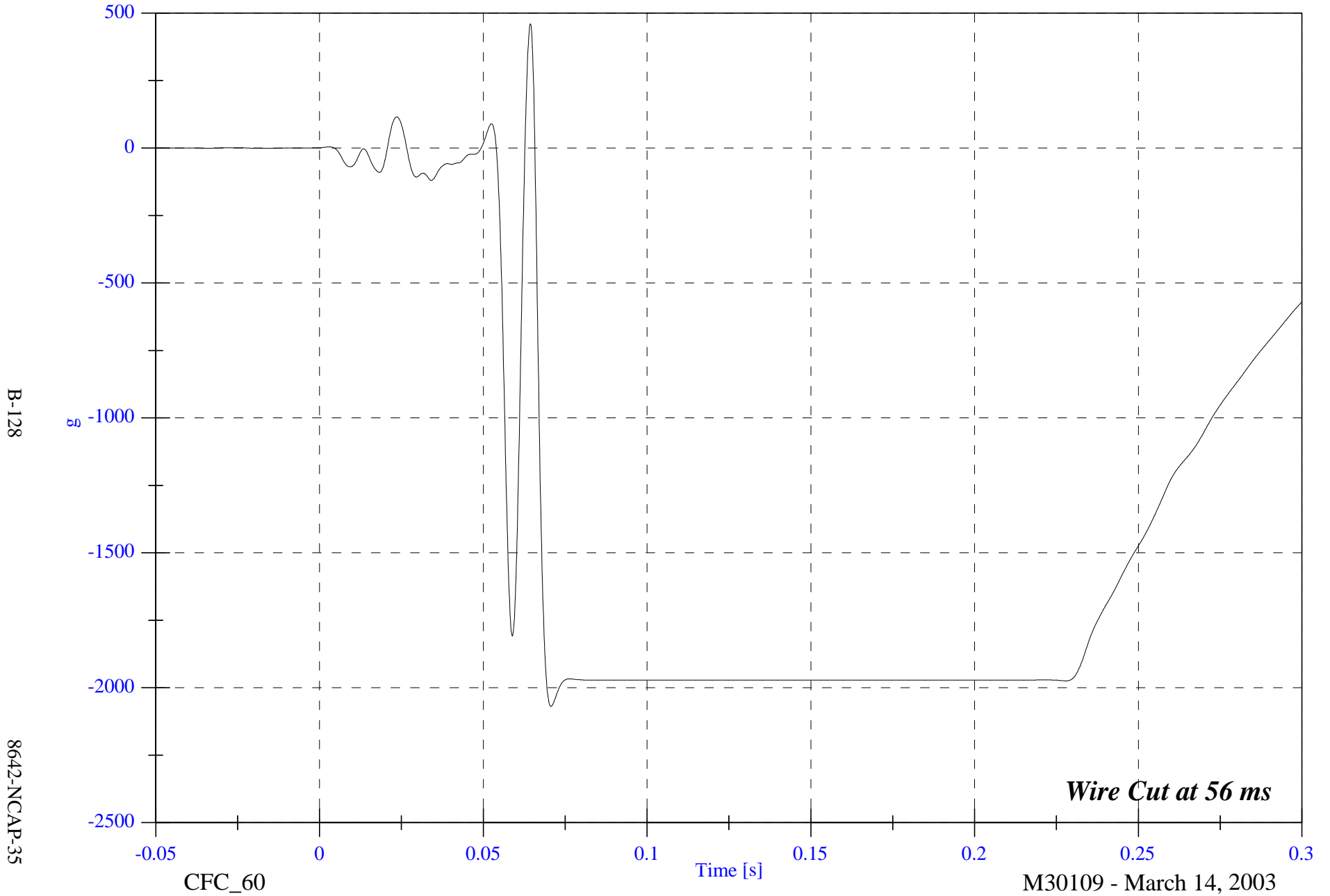
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Right Caliper #5x

Max: 460.7 [g] at 0.064 [s]

Min: -2068.9 [g] at 0.071 [s]



B-128

8642-NCAP-35

*Wire Cut at 56 ms*

CFC\_60

Time [s]

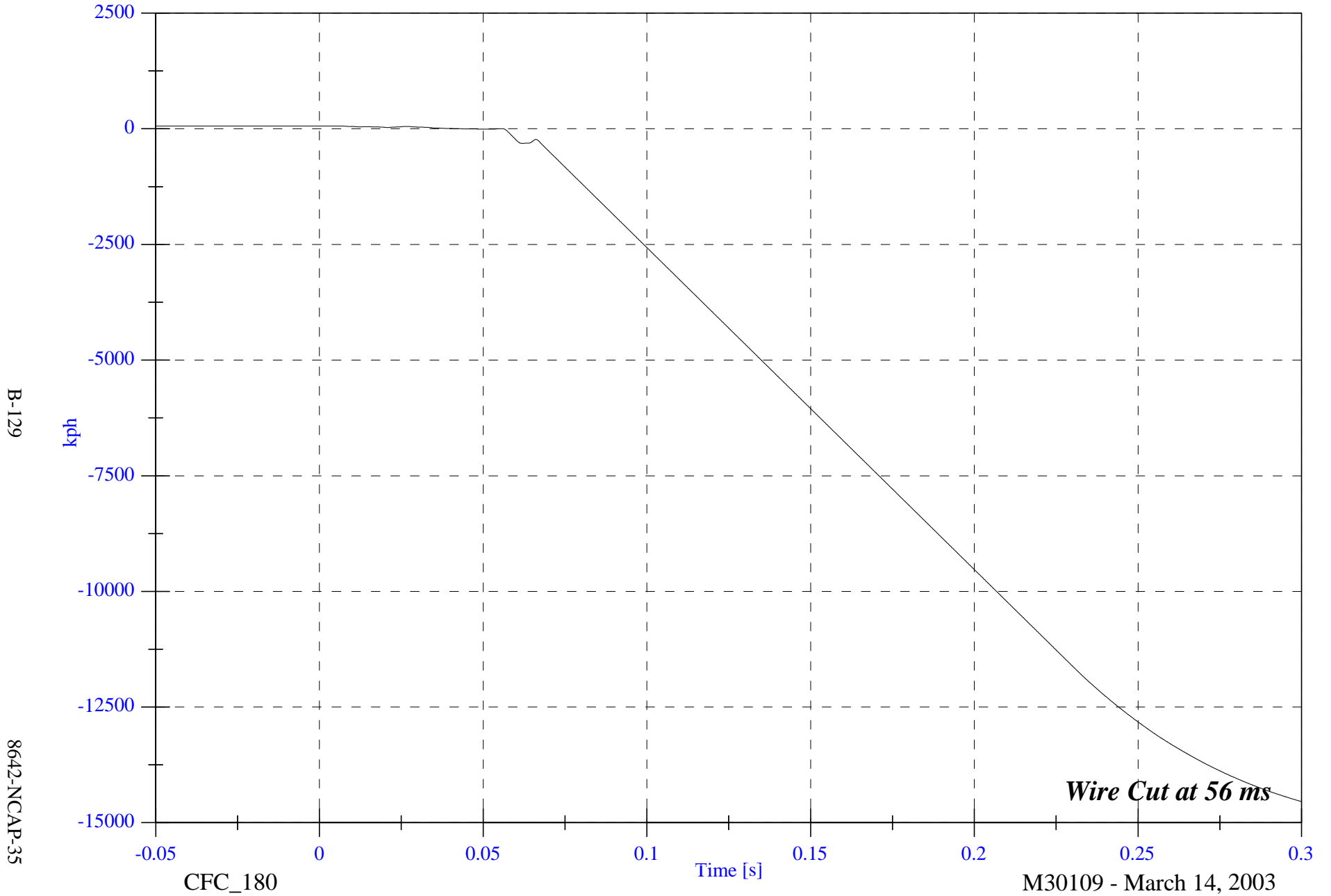
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Right Caliper #5x Velocity

Max: 57.0 [kph] at 0.006 [s]

Min: -14542.9 [kph] at 0.300 [s]



B-129

8642-NCAP-35

CFC\_180

Time [s]

M30109 - March 14, 2003

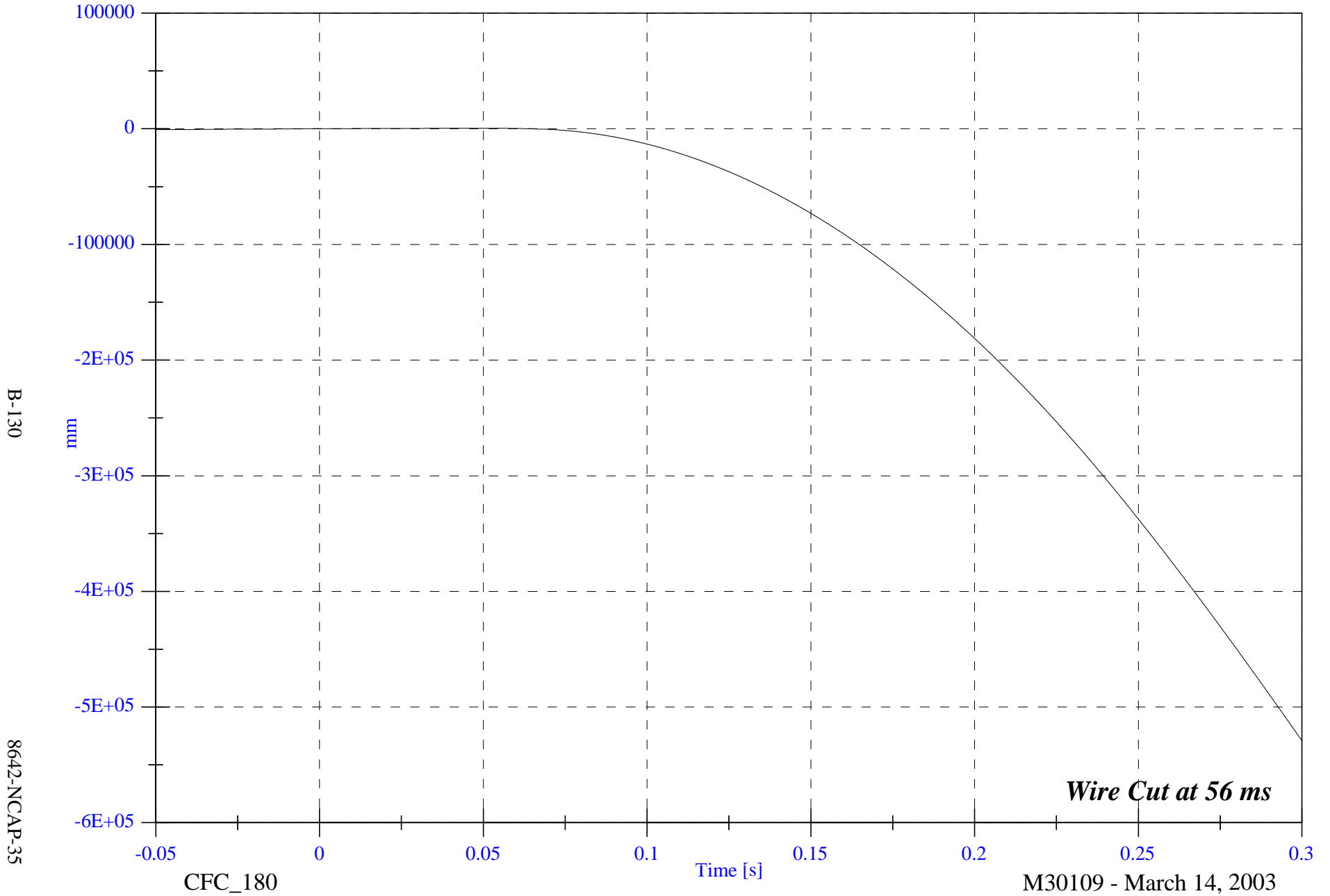
*Wire Cut at 56 ms*

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Right Caliper #5x Displacement

Max: 438.4 [mm] at 0.043 [s]

Min: -528838.1 [mm] at 0.300 [s]



B-130

8642-NCAP-35

CFC\_180

Time [s]

M30109 - March 14, 2003

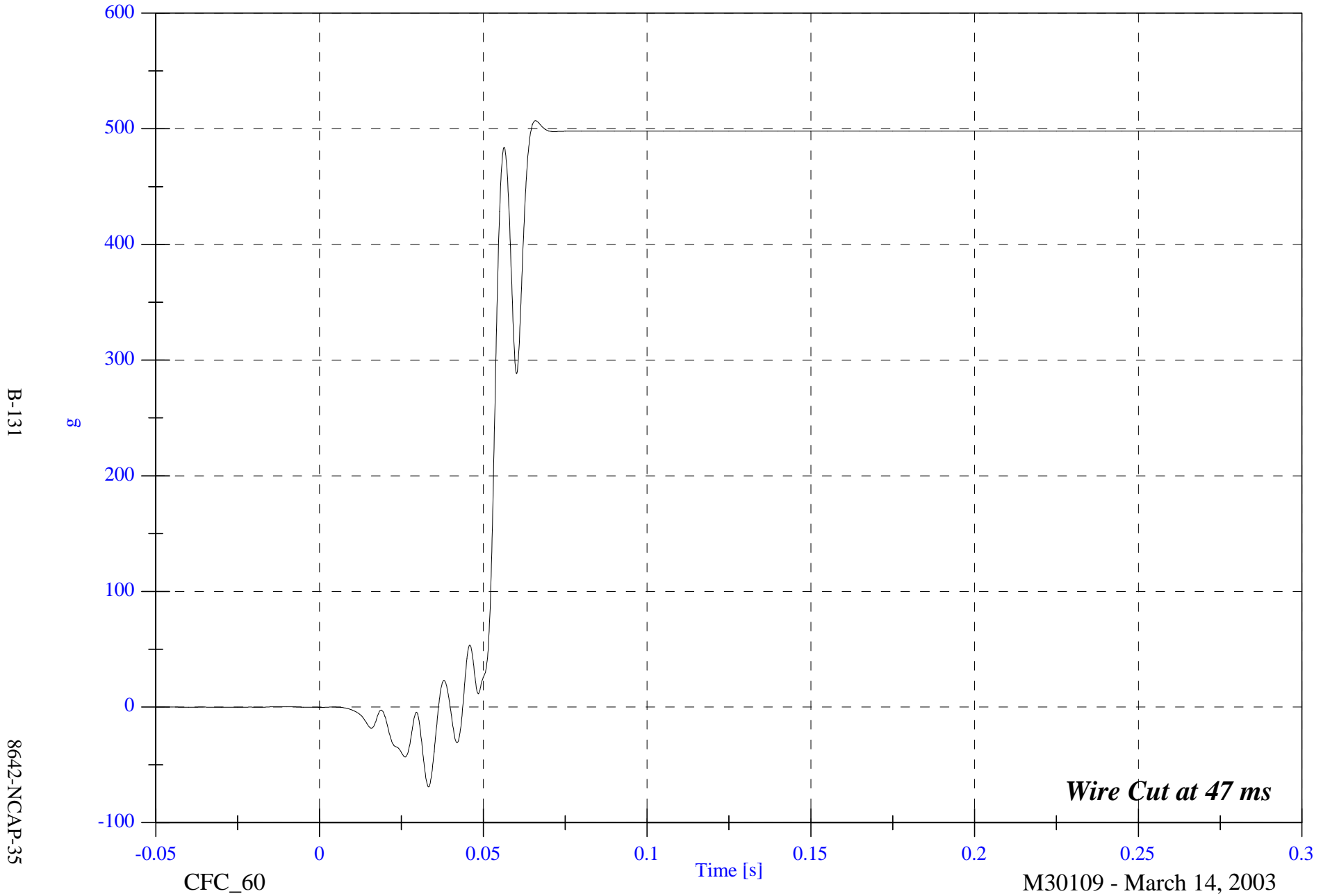
*Wire Cut at 56 ms*

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Instrument Panel #6x

Max: 506.9 [g] at 0.066 [s]

Min: -69.0 [g] at 0.033 [s]



B-131

8642-NCAP-35

2003 NCAP Test 13 2003 Chevrolet Tahoe

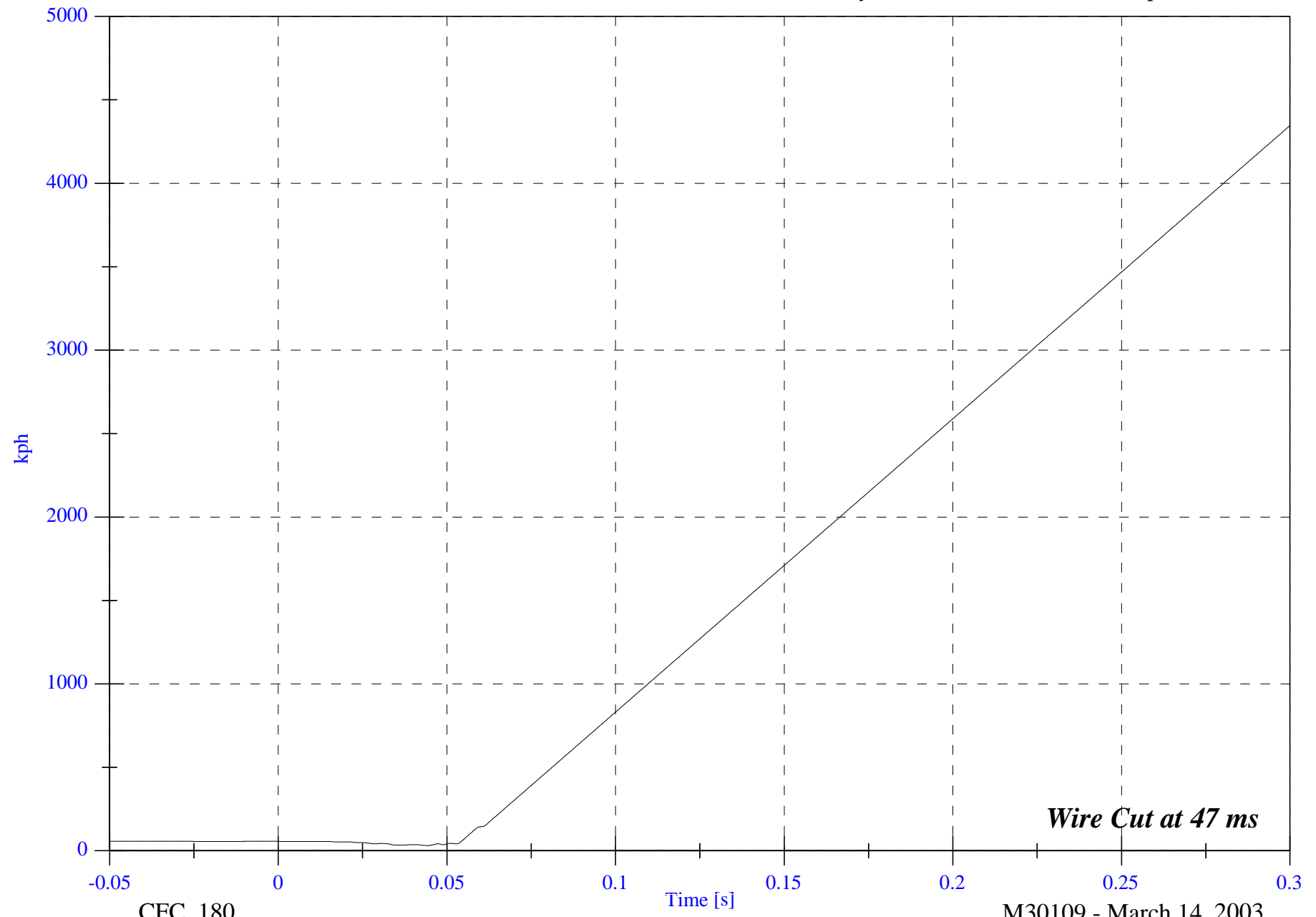
Max: 4344.5 [kph] at 0.300 [s]

V1 Instrument Panel #6x Velocity

Min: 30.8 [kph] at 0.044 [s]

B-132

8642-NCAP-35



*Wire Cut at 47 ms*

CFC\_180

Time [s]

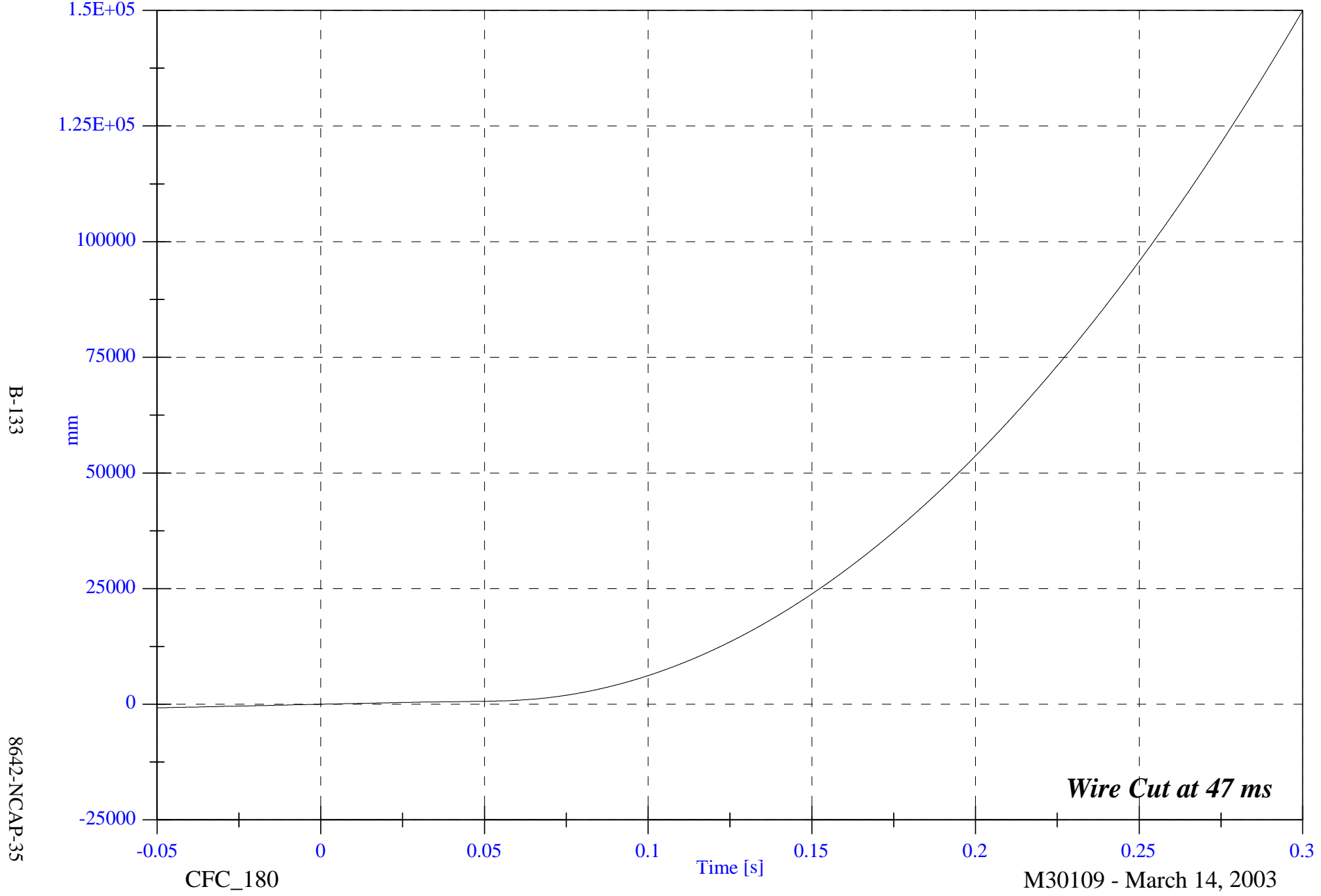
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 149865.8 [mm] at 0.300 [s]

V1 Instrument Panel #6x Displacement

Min: -782.6 [mm] at -0.050 [s]



B-133

8642-NCAP-35

CFC\_180

Time [s]

M30109 - March 14, 2003

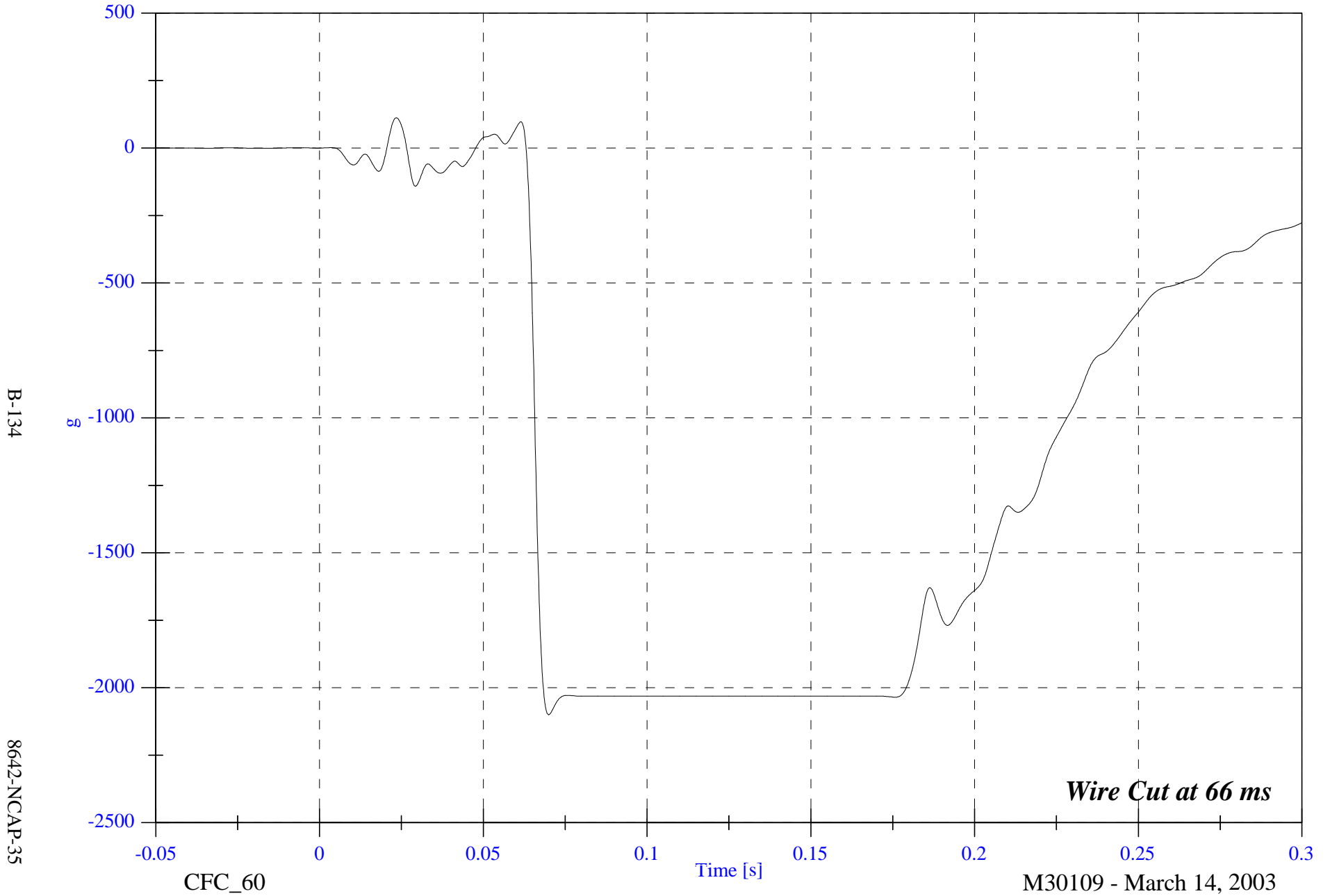
*Wire Cut at 47 ms*

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Left Caliper #7x

Max: 111.8 [g] at 0.023 [s]

Min: -2099.9 [g] at 0.070 [s]

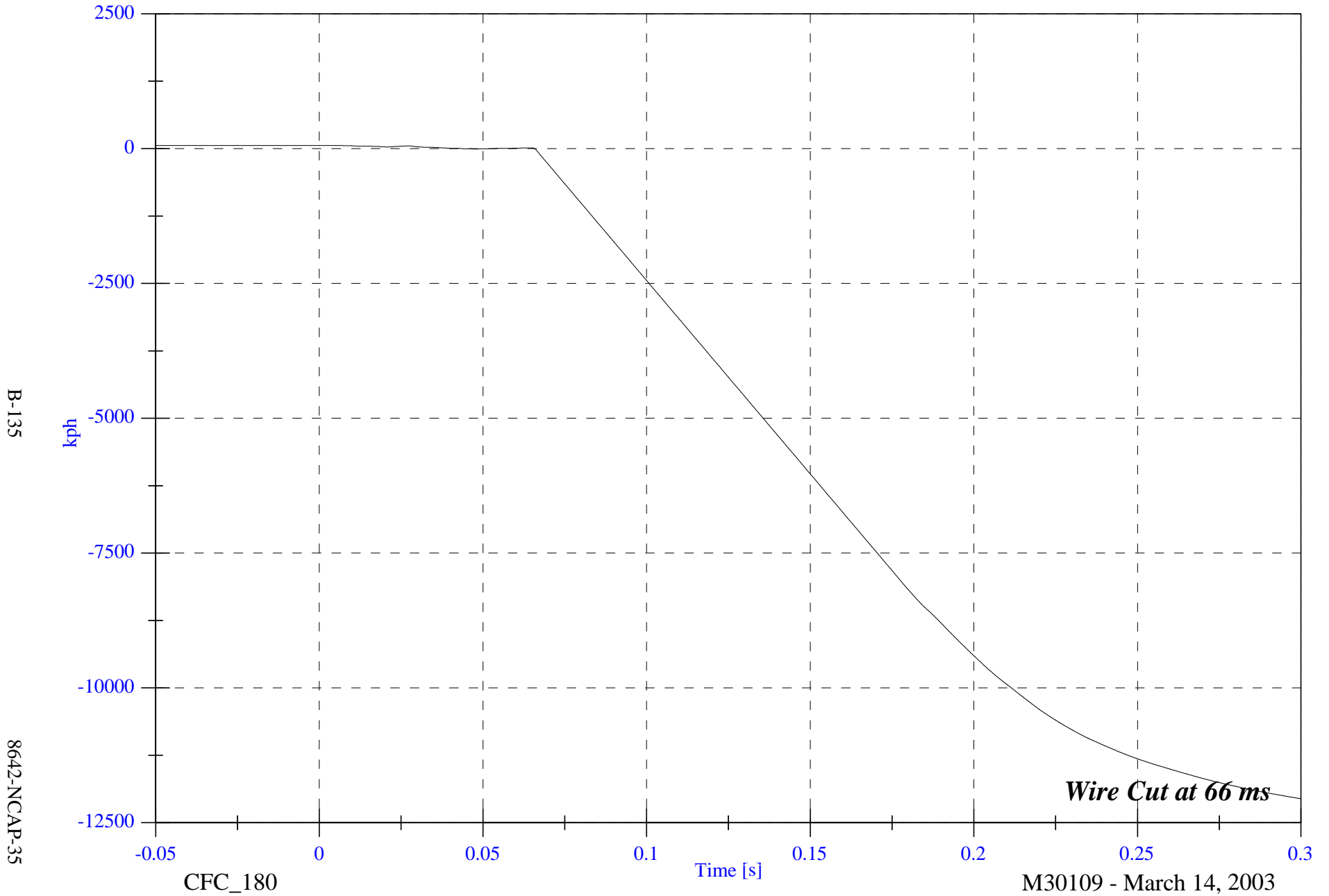


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Left Caliper #7x Velocity

Max: 56.6 [kph] at 0.007 [s]

Min: -12054.0 [kph] at 0.300 [s]



2003 NCAP Test 13 2003 Chevrolet Tahoe

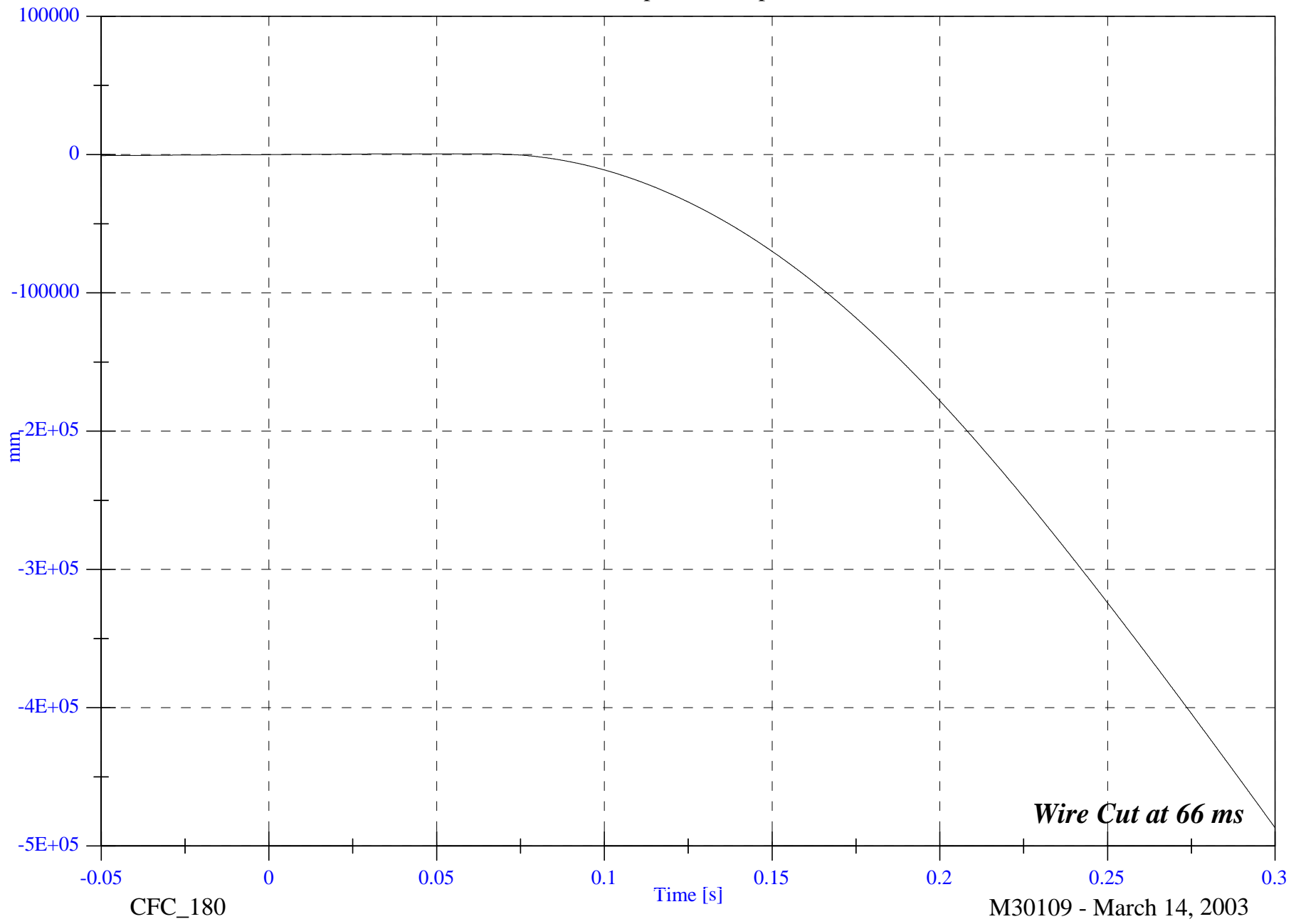
V1 Left Caliper #7x Displacement

Max: 465.2 [mm] at 0.066 [s]

Min: -486668.3 [mm] at 0.300 [s]

B-136

8642-NCAP-35



CFC\_180

Time [s]

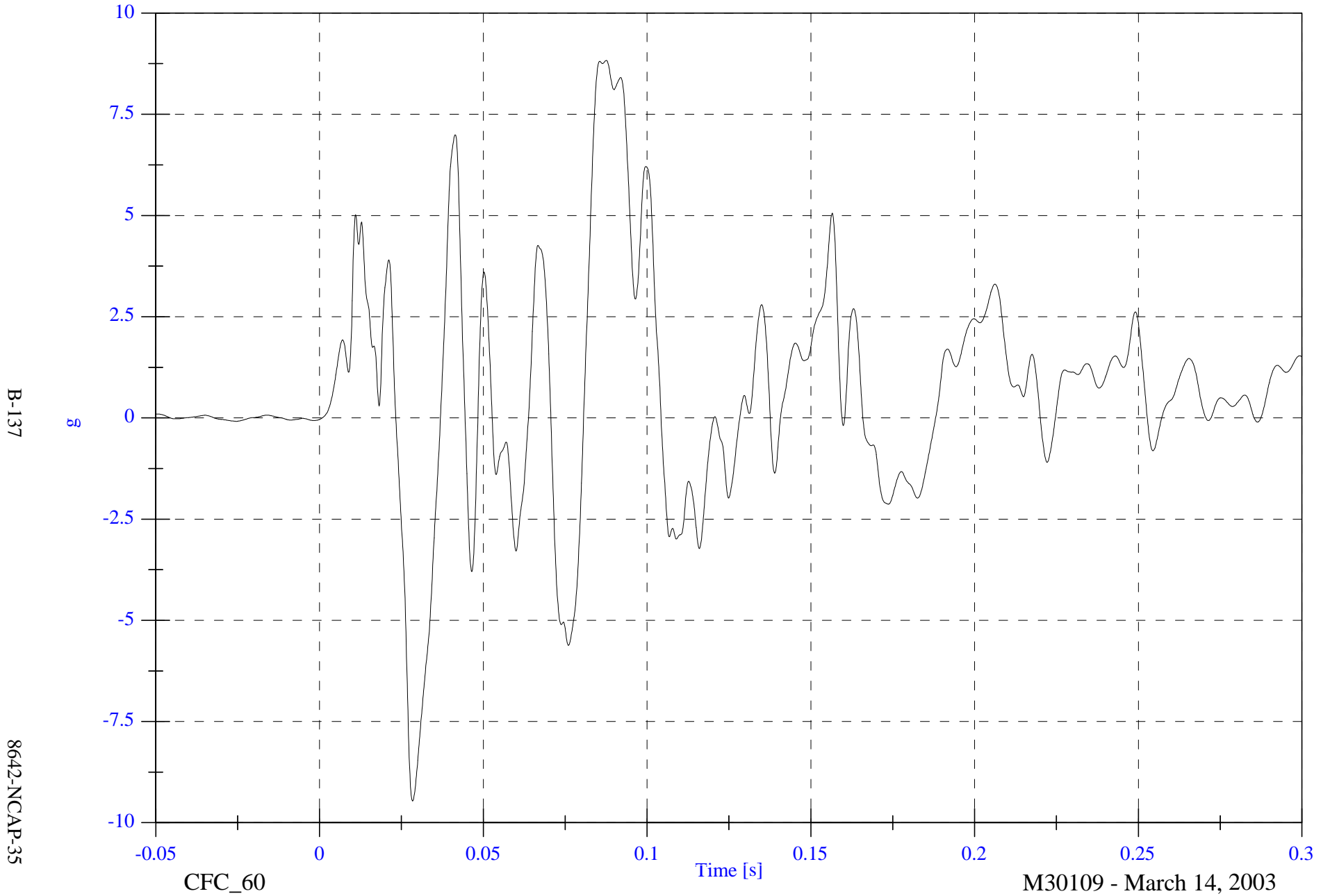
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Left Rear #8z

Max: 8.8 [g] at 0.088 [s]

Min: -9.5 [g] at 0.028 [s]



B-137

8642-NCAP-35

CFC\_60

Time [s]

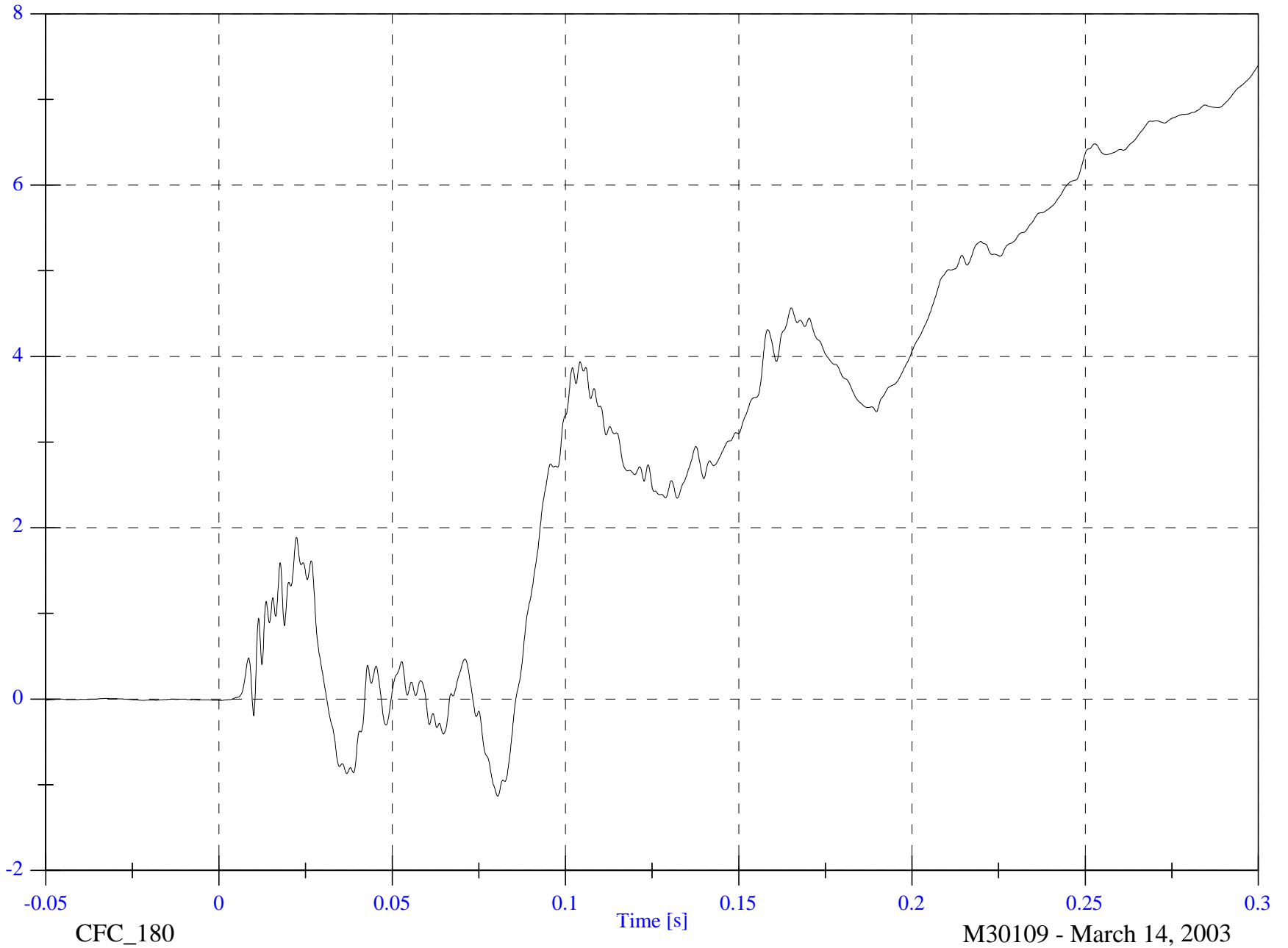
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 7.4 [kph] at 0.300 [s]

V1 Left Rear #8z Velocity

Min: -1.1 [kph] at 0.081 [s]



B-138

8642-NCAP-35

CFC\_180

Time [s]

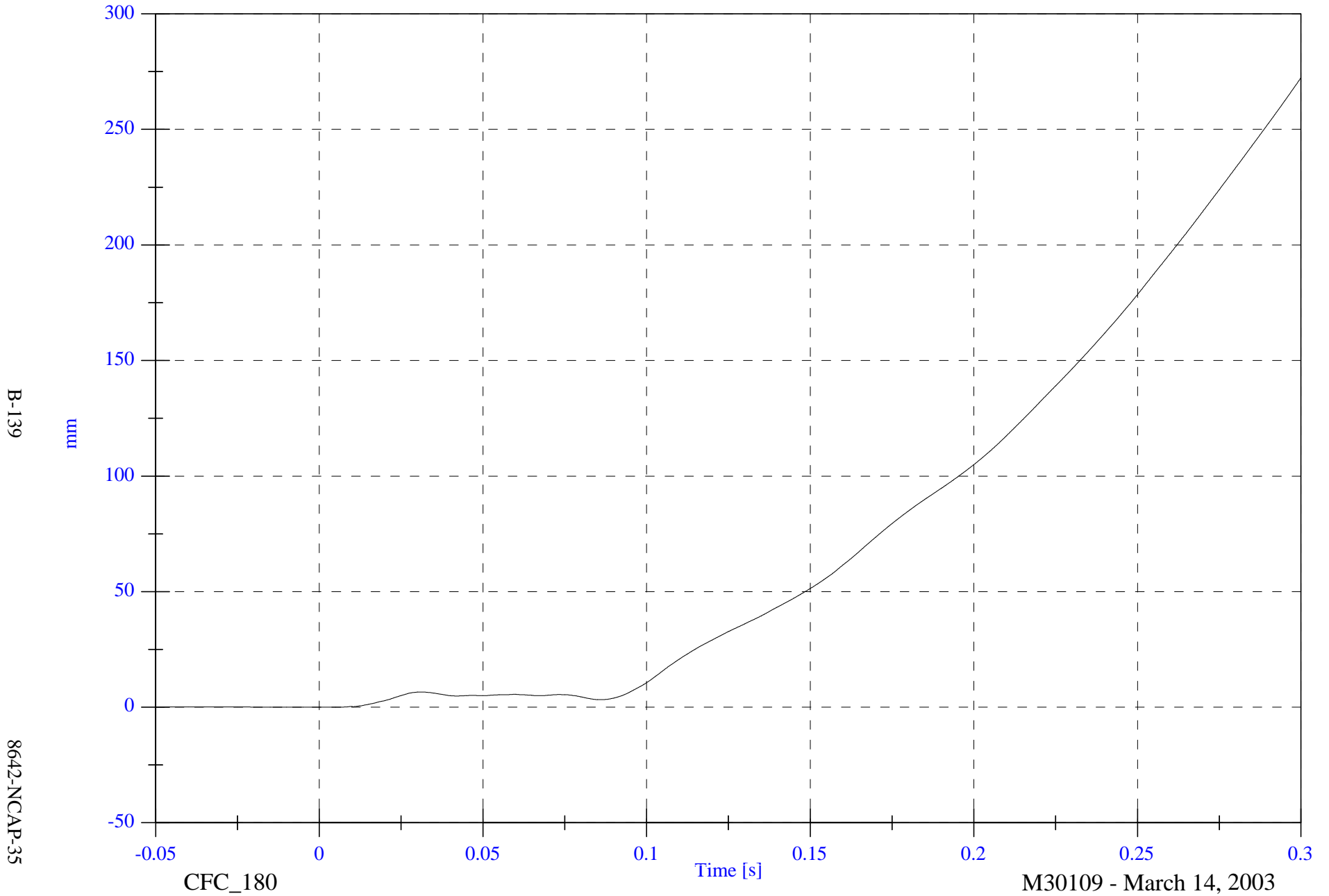
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 272.2 [mm] at 0.300 [s]

V1 Left Rear #8z Displacement

Min: -0.0 [mm] at 0.004 [s]



B-139

8642-NCAP-35

CFC\_180

Time [s]

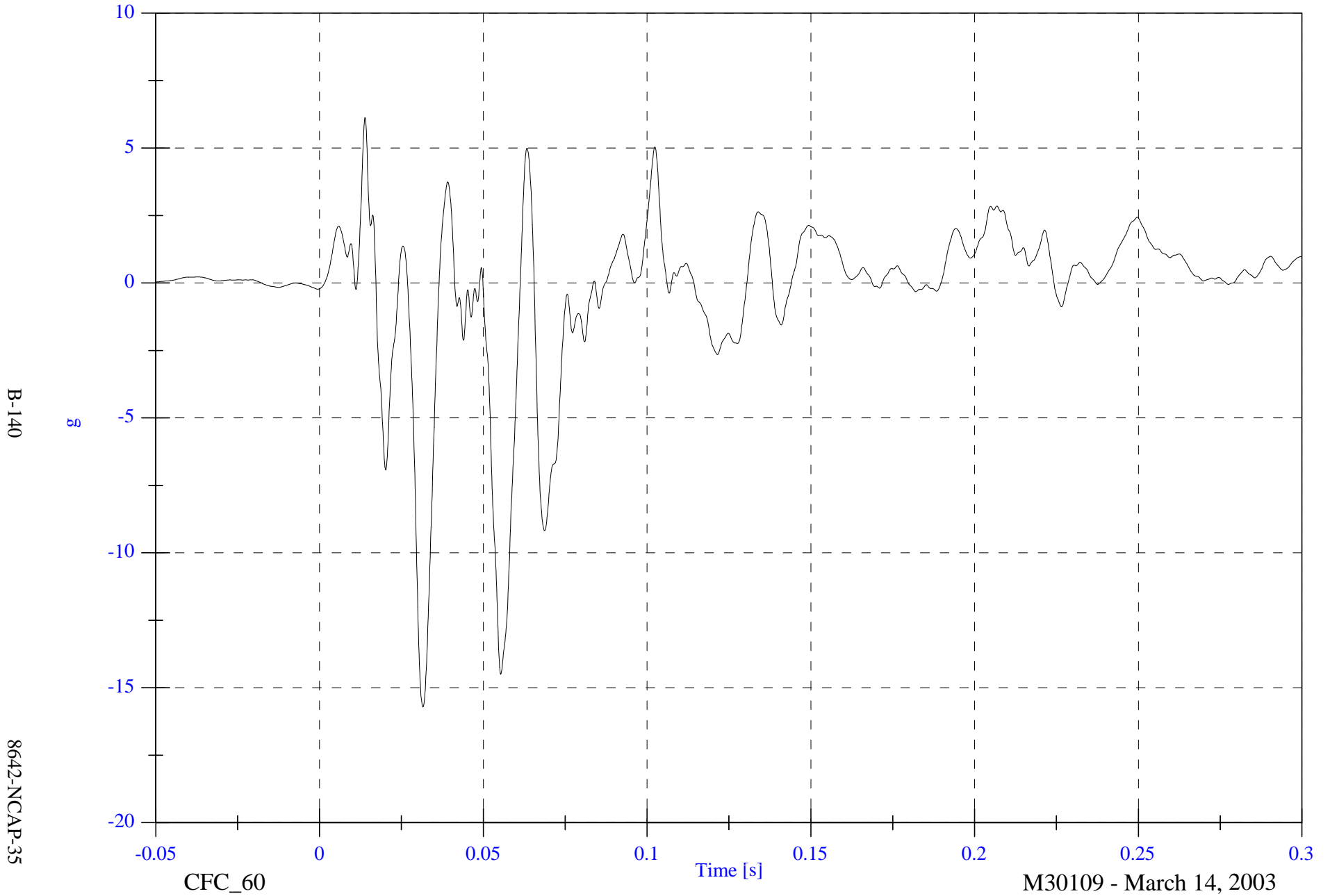
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Right Rear #9z

Max: 6.1 [g] at 0.014 [s]

Min: -15.7 [g] at 0.032 [s]



2003 NCAP Test 13 2003 Chevrolet Tahoe

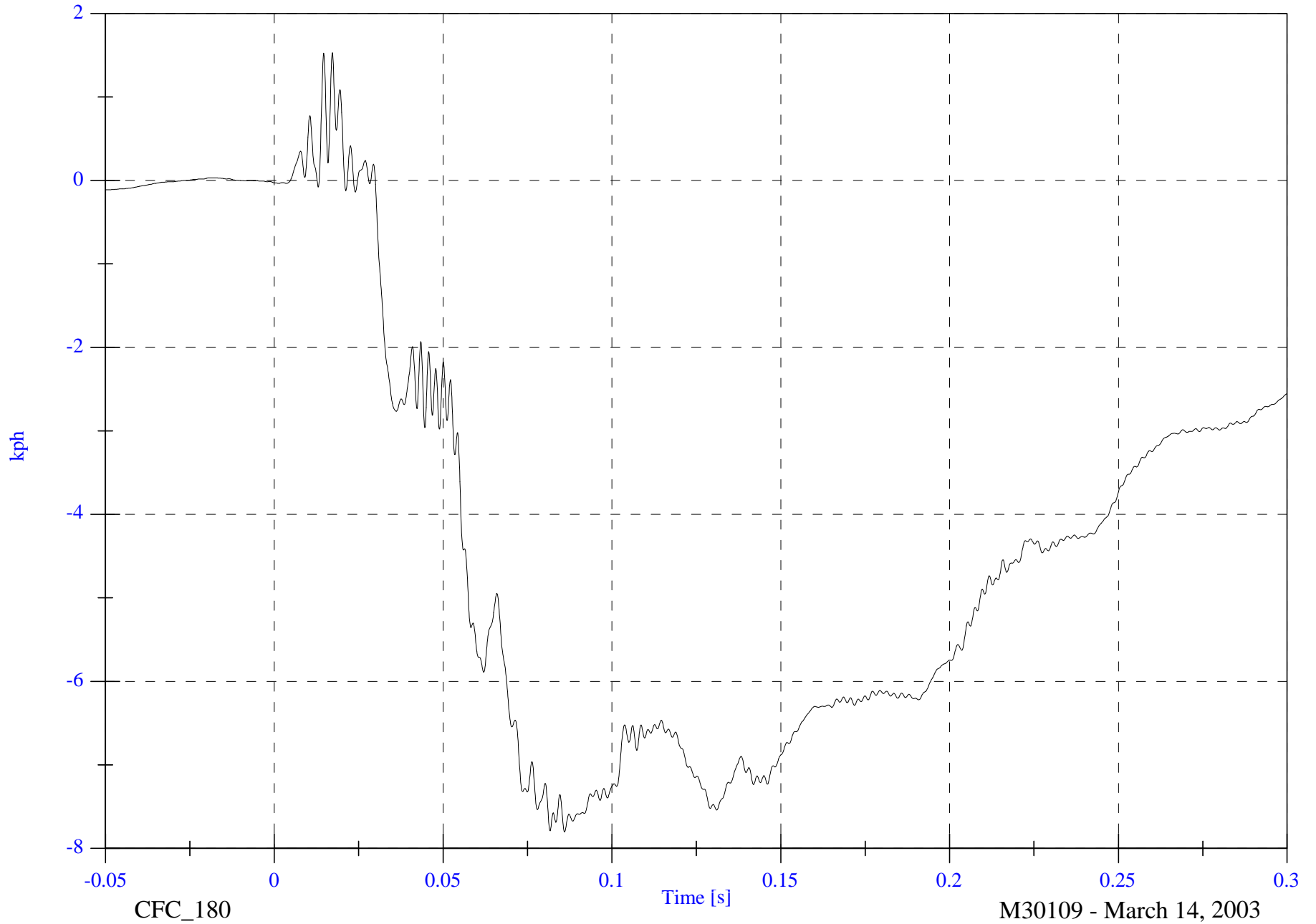
V1 Right Rear #9z Velocity

Max: 1.5 [kph] at 0.017 [s]

Min: -7.8 [kph] at 0.086 [s]

B-141

8642-NCAP-35



CFC\_180

Time [s]

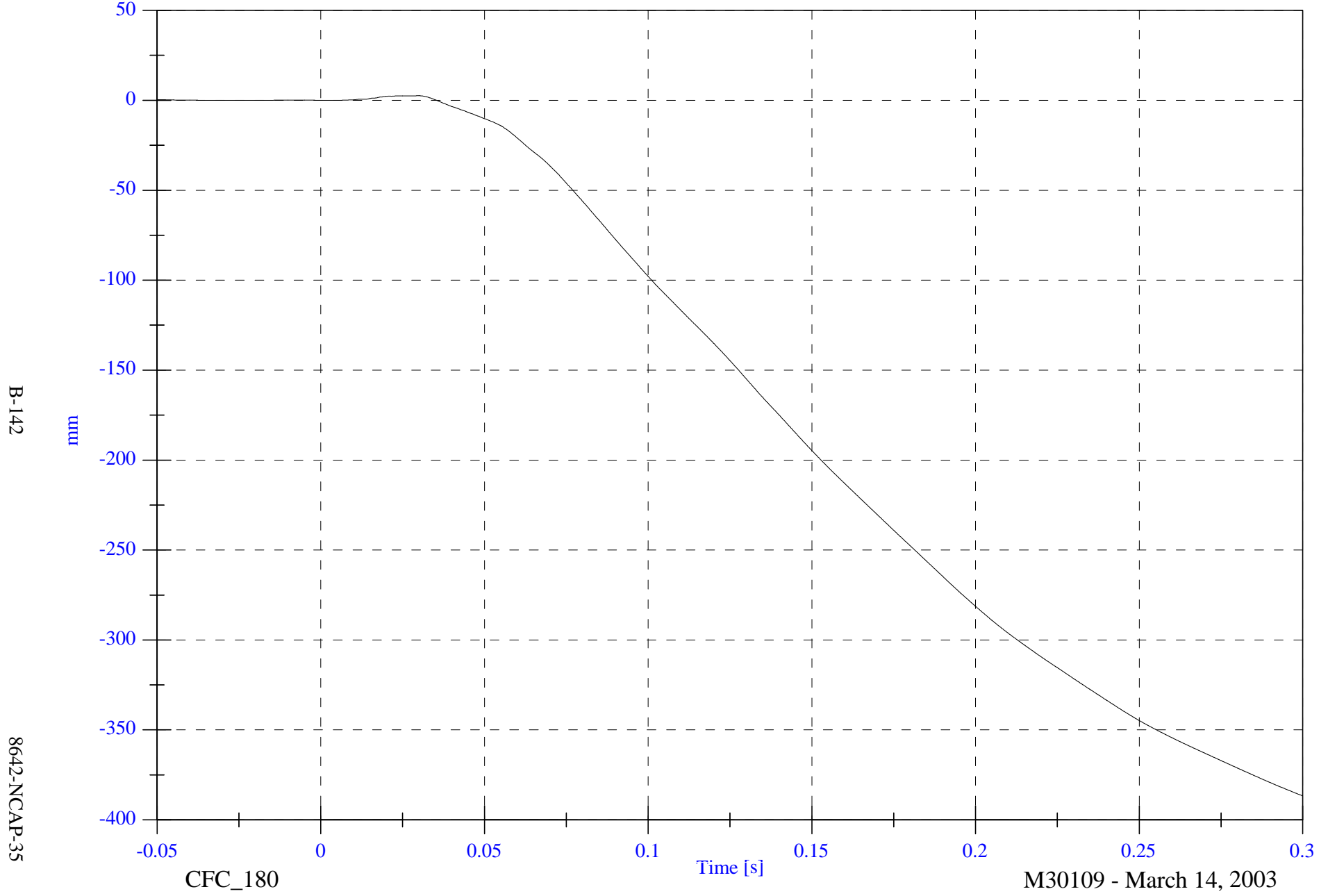
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1 Right Rear #9z Displacement

Max: 2.5 [mm] at 0.030 [s]

Min: -386.6 [mm] at 0.300 [s]



B-142

8642-NCAP-35

CFC\_180

Time [s]

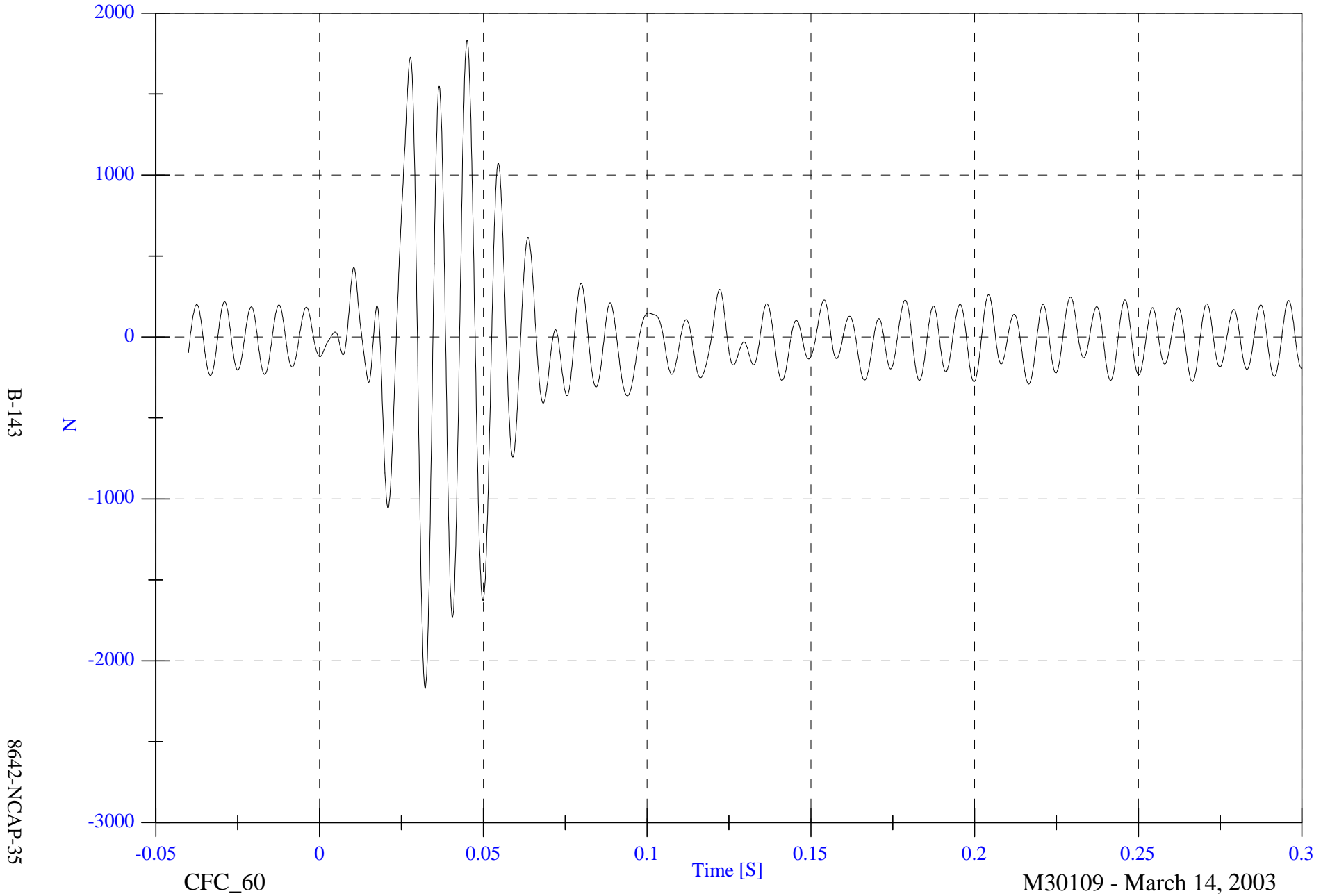
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell A1 Fx

Max: 1832.5 [N] at 0.045 [S]

Min: -2170.3 [N] at 0.032 [S]

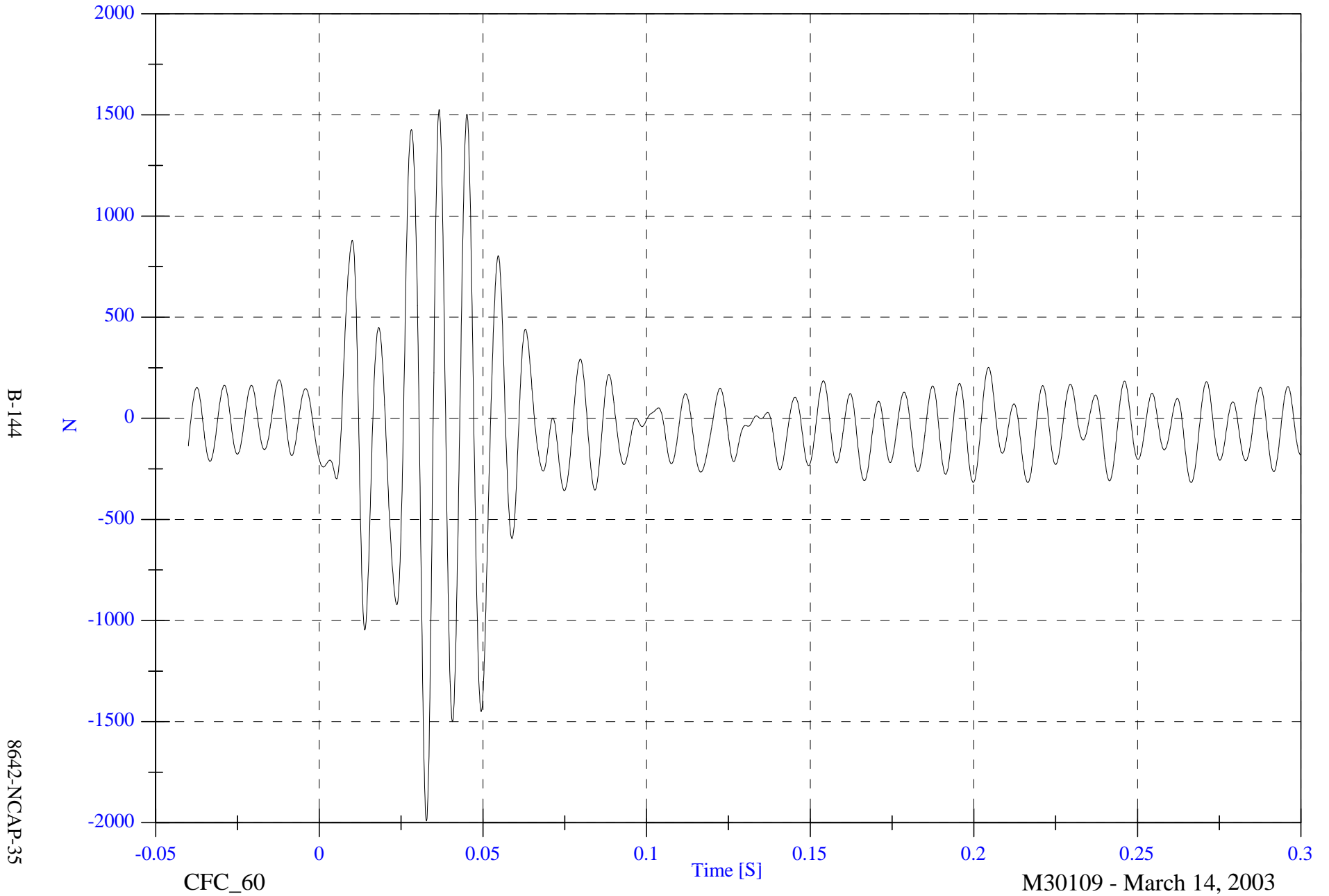


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 1526.4 [N] at 0.037 [S]

Barrier Load Cell A2 Fx

Min: -1990.5 [N] at 0.033 [S]



B-144

8642-NCAP-35

CFC\_60

Time [S]

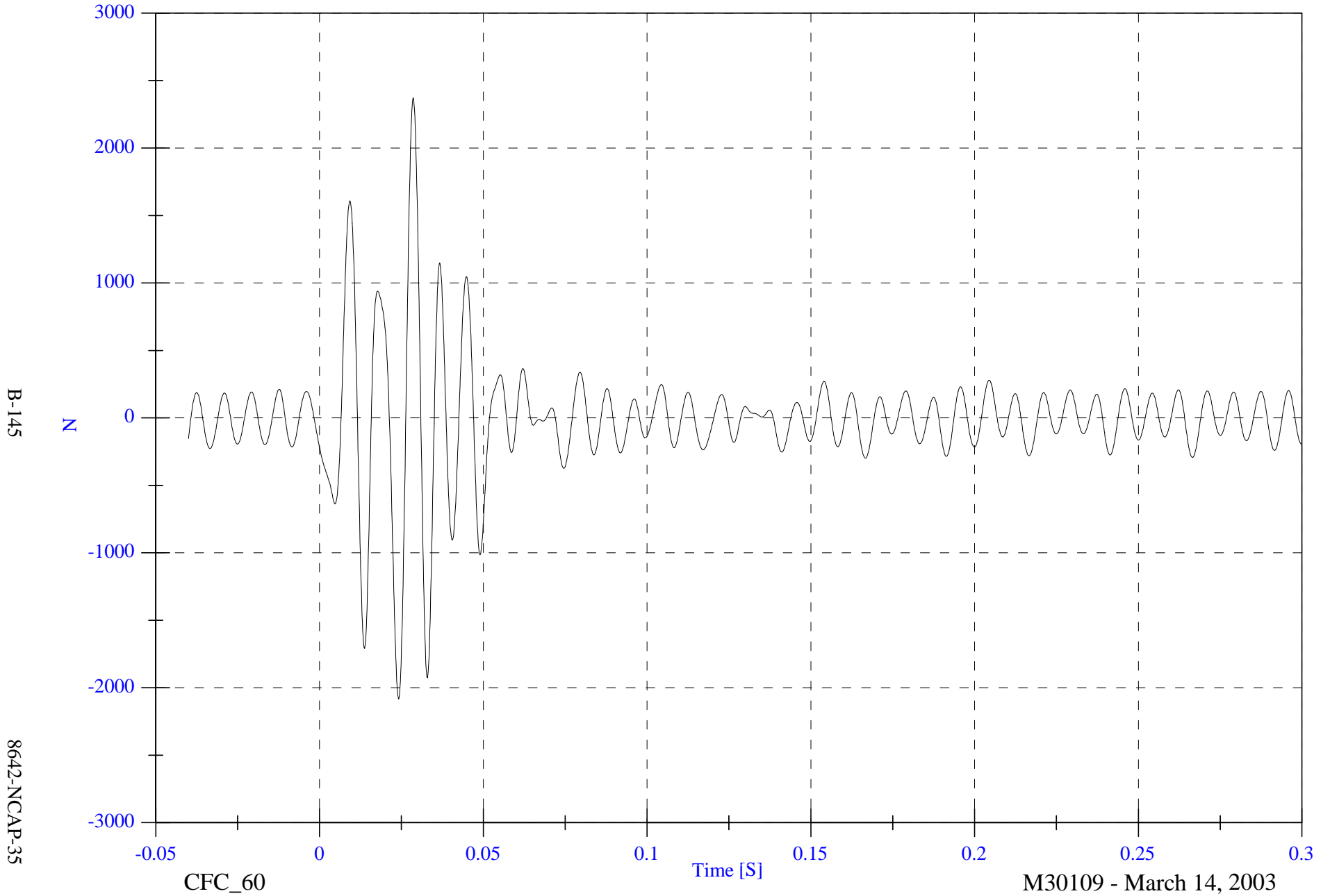
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell A3 Fx

Max: 2372.3 [N] at 0.029 [S]

Min: -2083.3 [N] at 0.024 [S]



B-145

8642-NCAP-35

CFC\_60

Time [S]

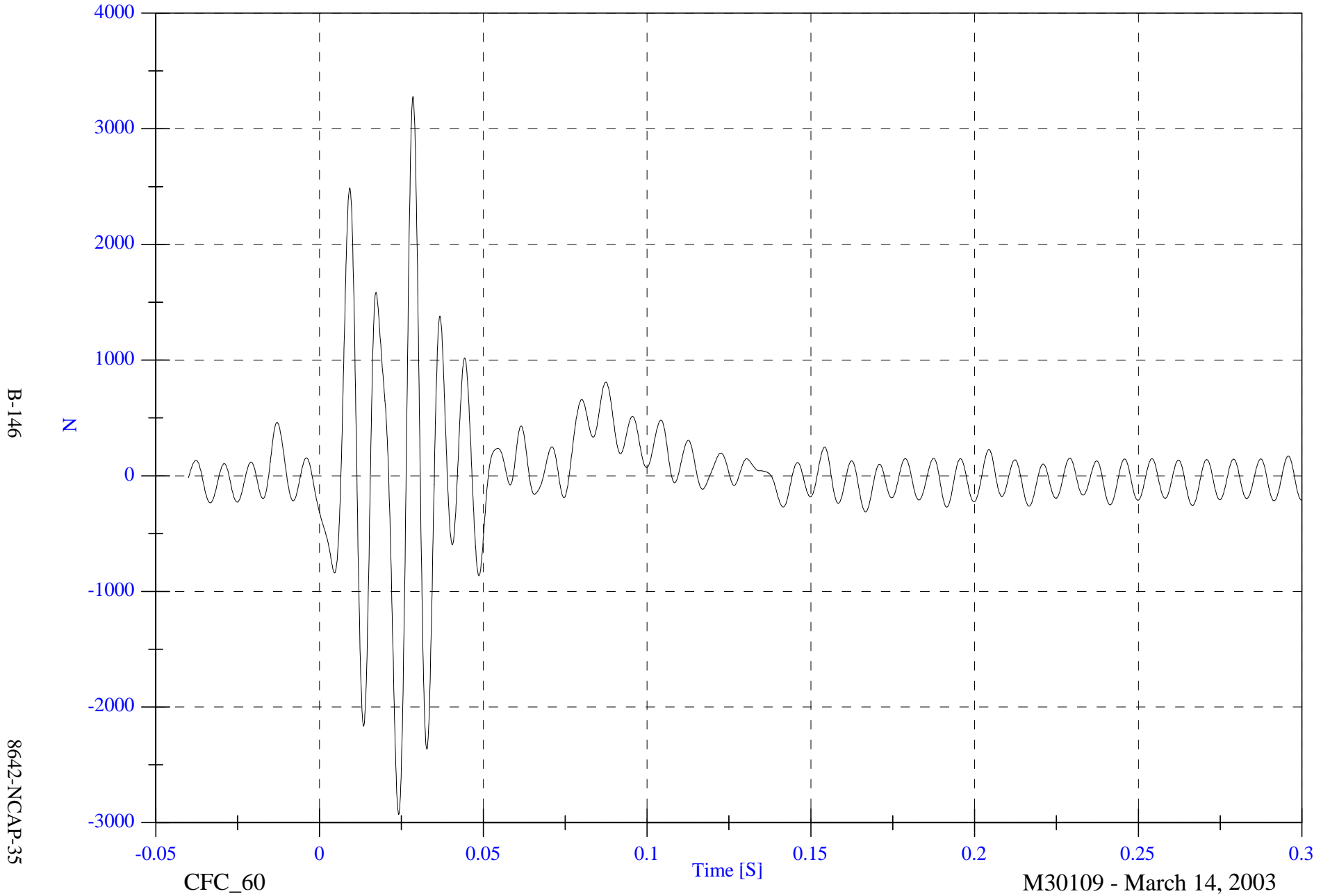
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell A4 Fx

Max: 3278.7 [N] at 0.029 [S]

Min: -2929.2 [N] at 0.024 [S]



B-146

8642-NCAP-35

CFC\_60

Time [S]

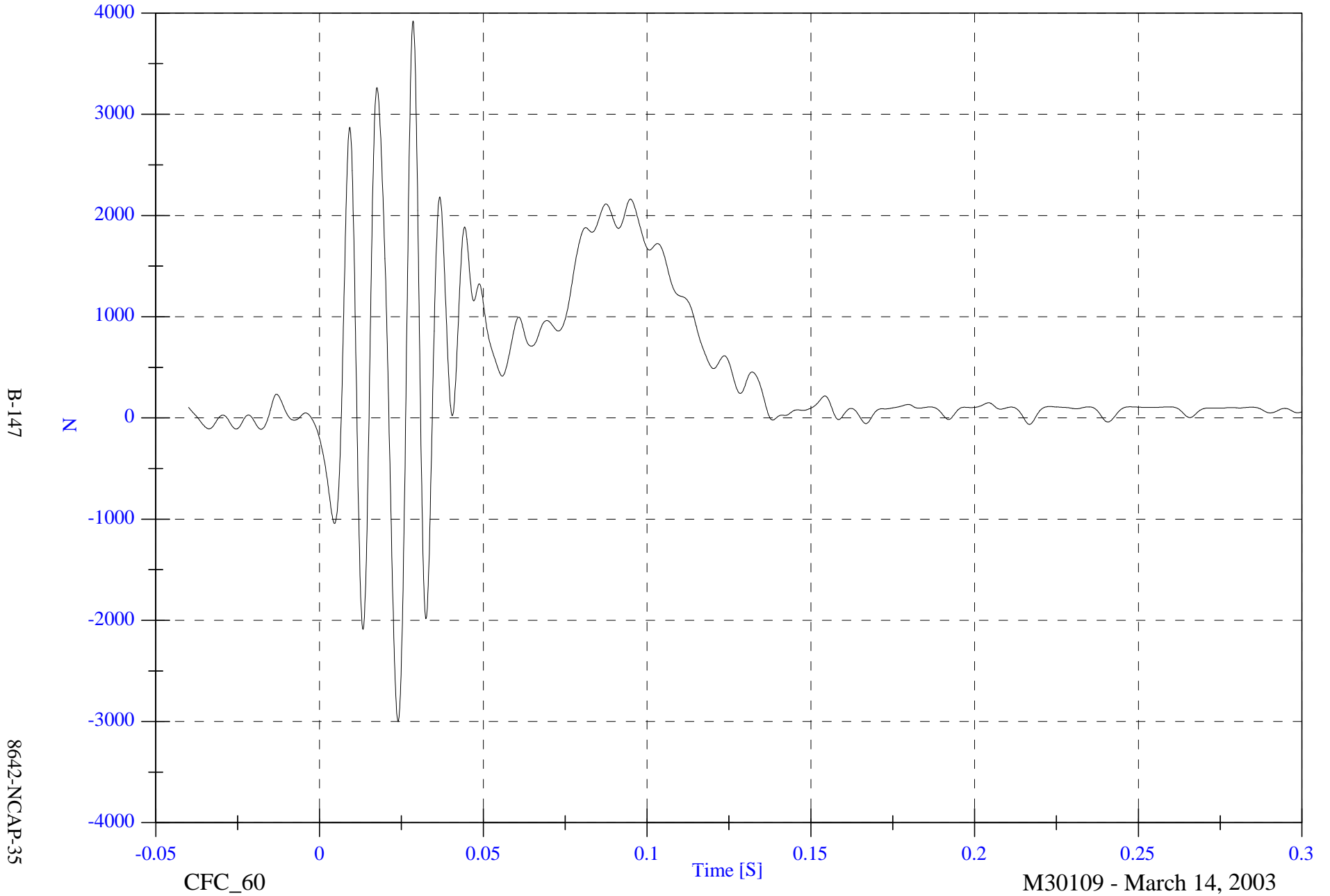
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell A5 Fx

Max: 3922.8 [N] at 0.029 [S]

Min: -3002.0 [N] at 0.024 [S]



B-147

8642-NCAP-35

CFC\_60

Time [S]

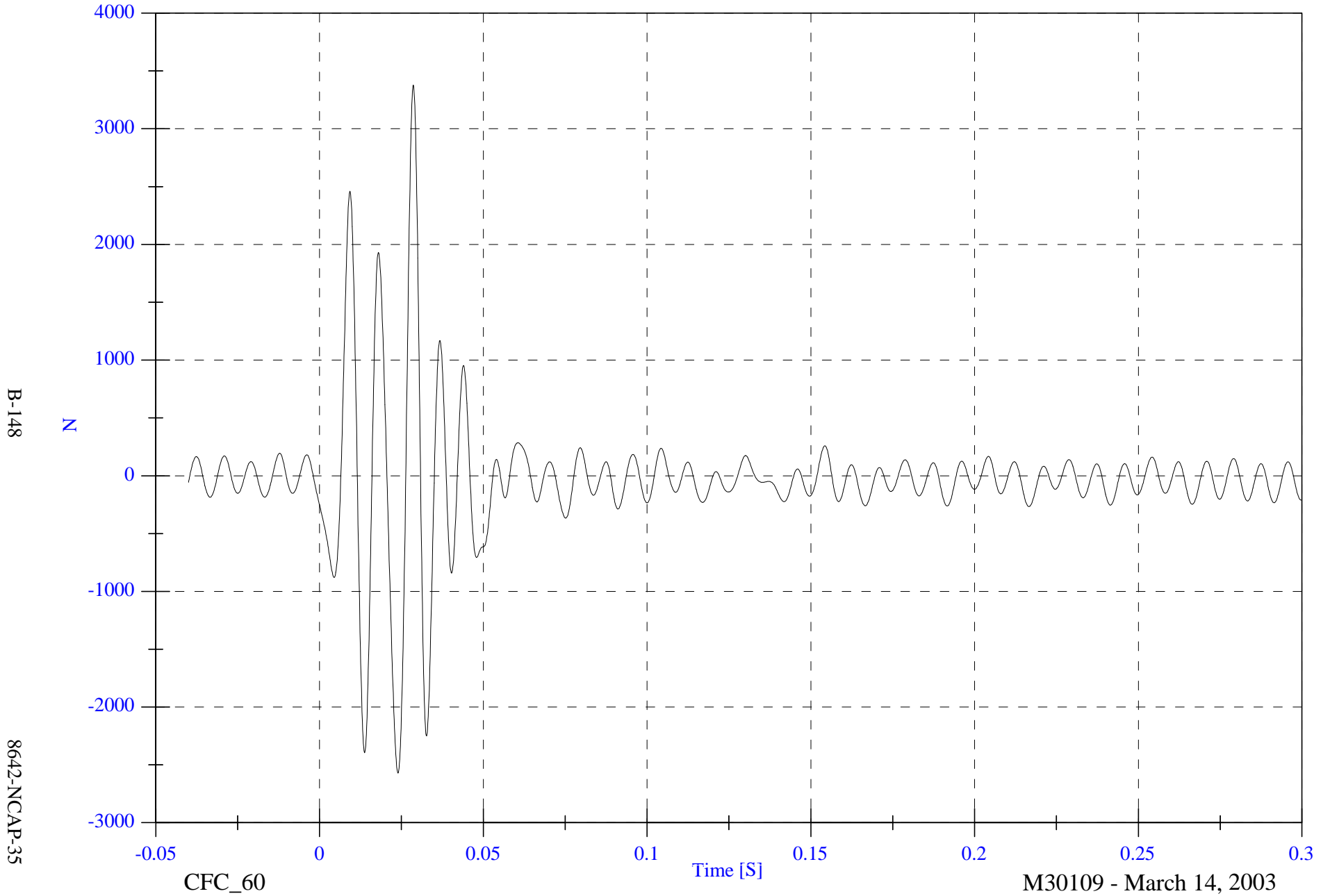
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell A6 Fx

Max: 3377.6 [N] at 0.029 [S]

Min: -2571.5 [N] at 0.024 [S]



B-148

8642-NCAP-35

CFC\_60

Time [S]

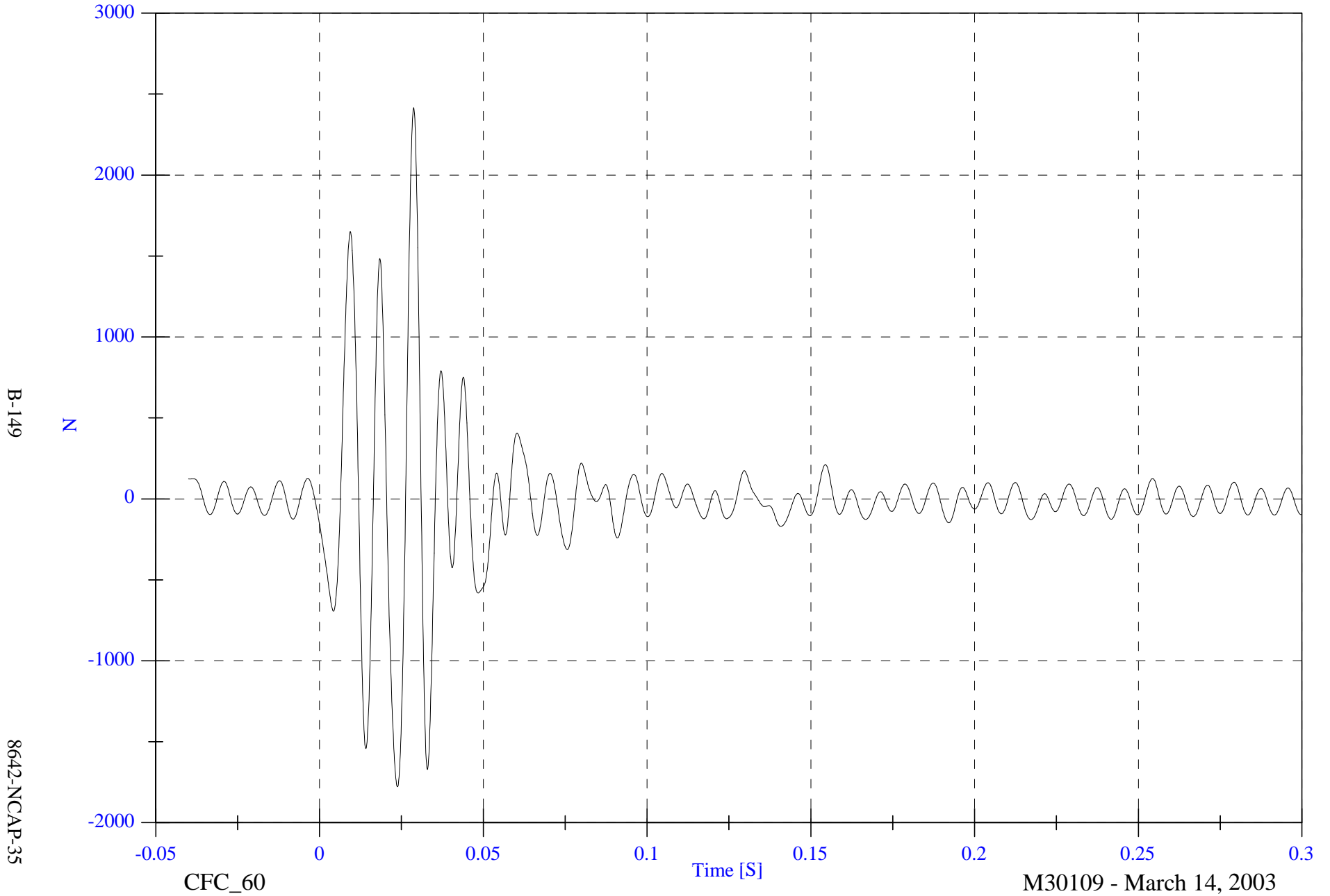
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell A7 Fx

Max: 2416.3 [N] at 0.029 [S]

Min: -1778.8 [N] at 0.024 [S]

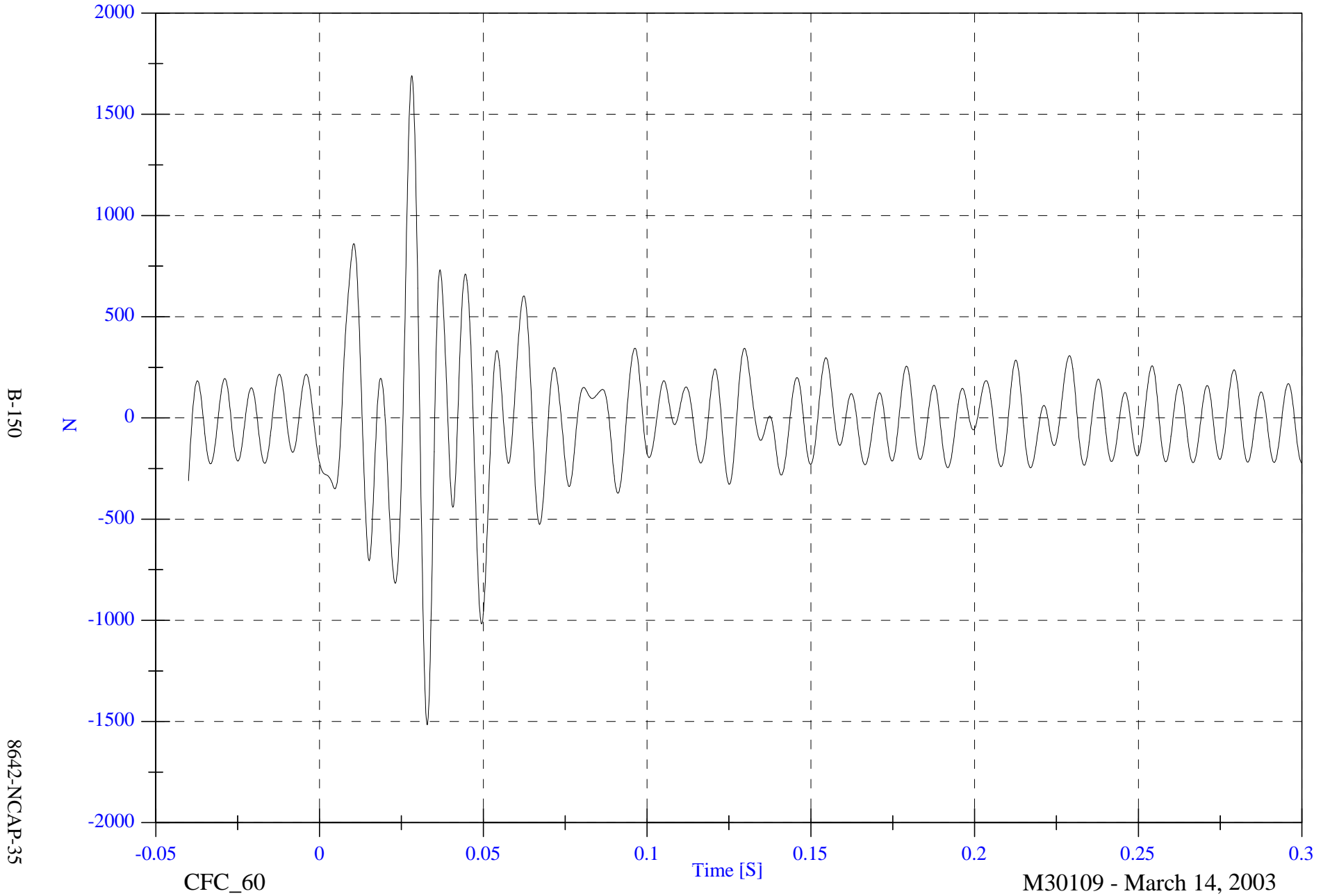


2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell A8 Fx

Max: 1690.9 [N] at 0.028 [S]

Min: -1516.6 [N] at 0.033 [S]

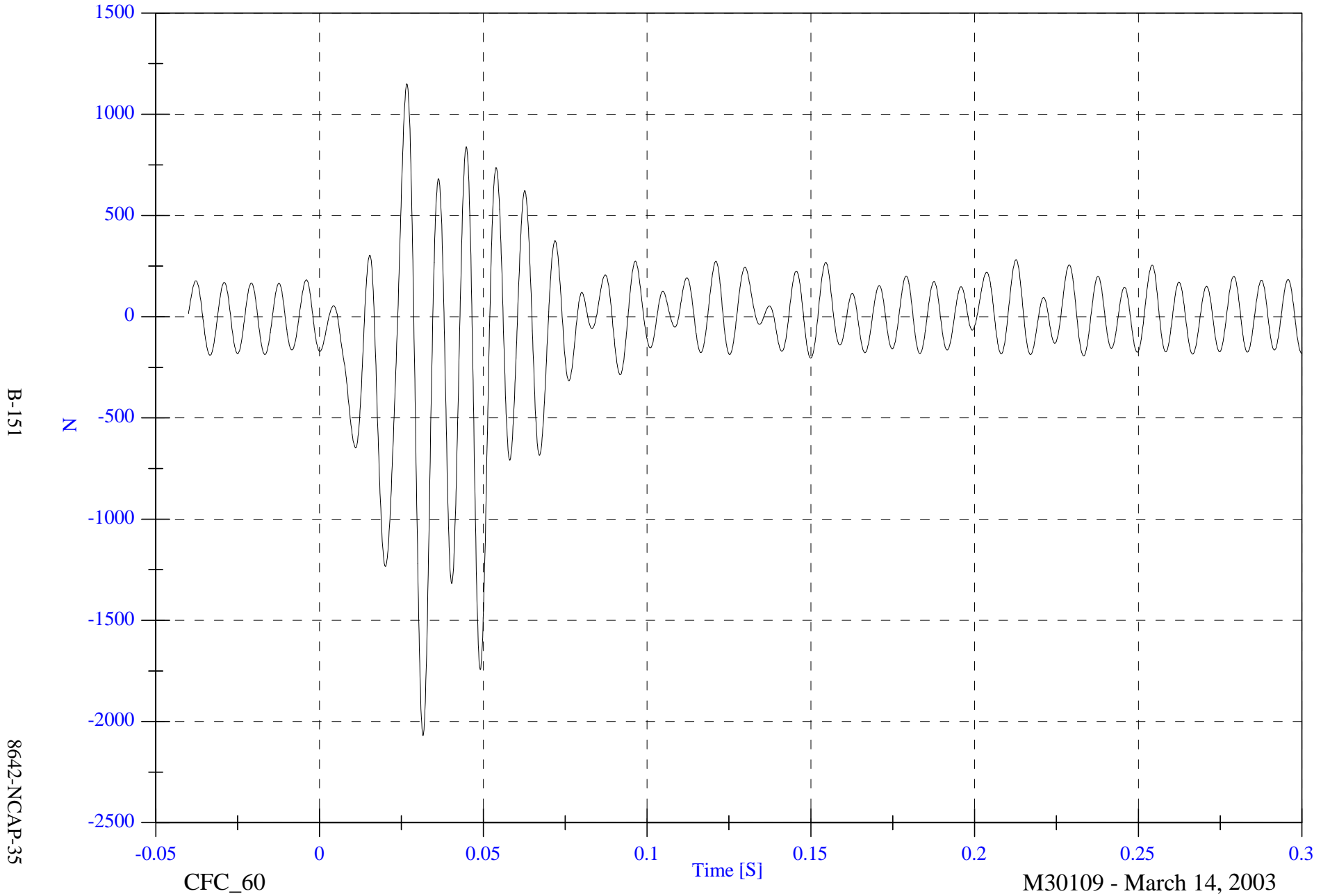


2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell A9 Fx

Max: 1150.6 [N] at 0.027 [S]

Min: -2070.7 [N] at 0.032 [S]

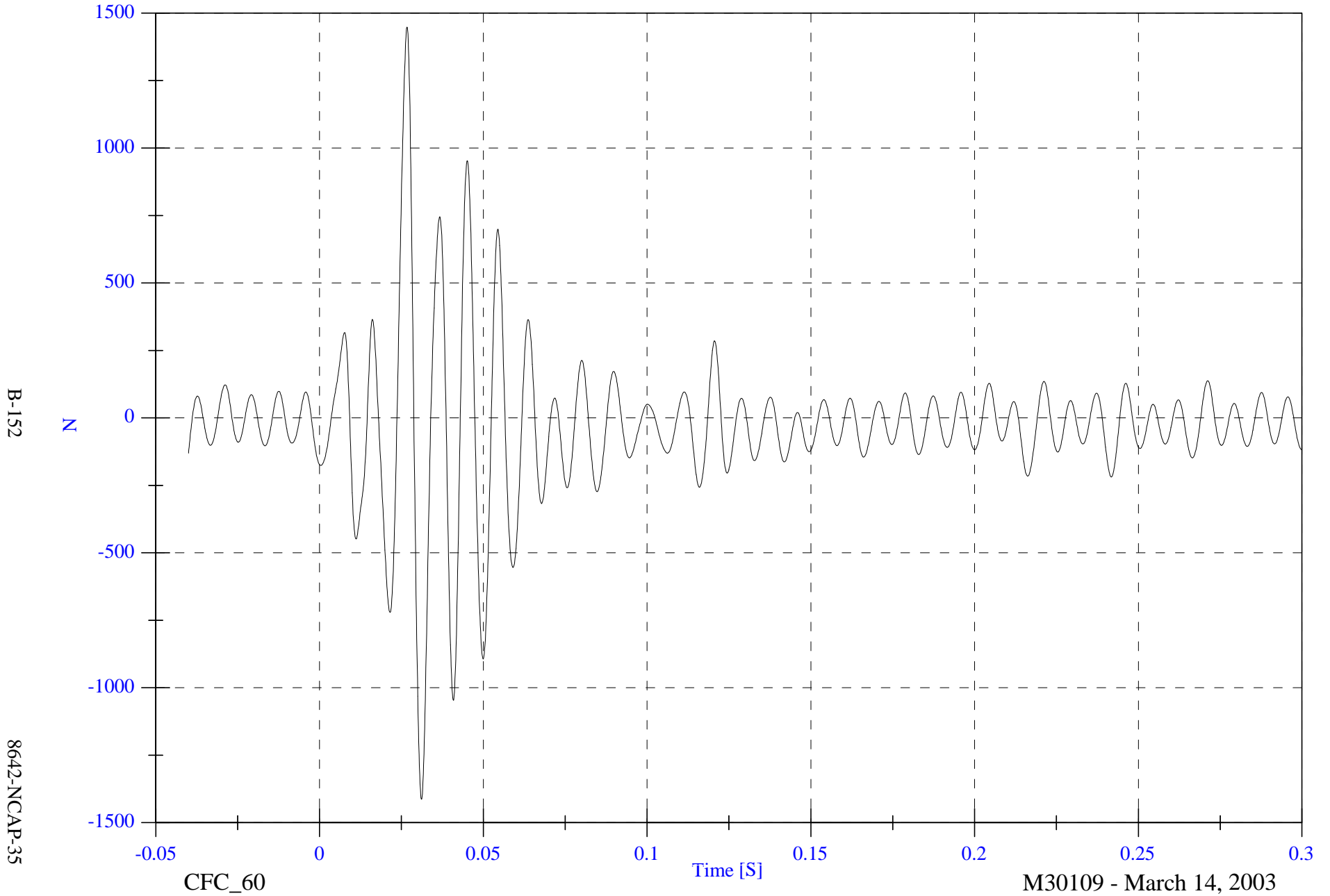


2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell B1 Fx

Max: 1448.3 [N] at 0.027 [S]

Min: -1412.8 [N] at 0.031 [S]



B-152

8642-NCAP-35

CFC\_60

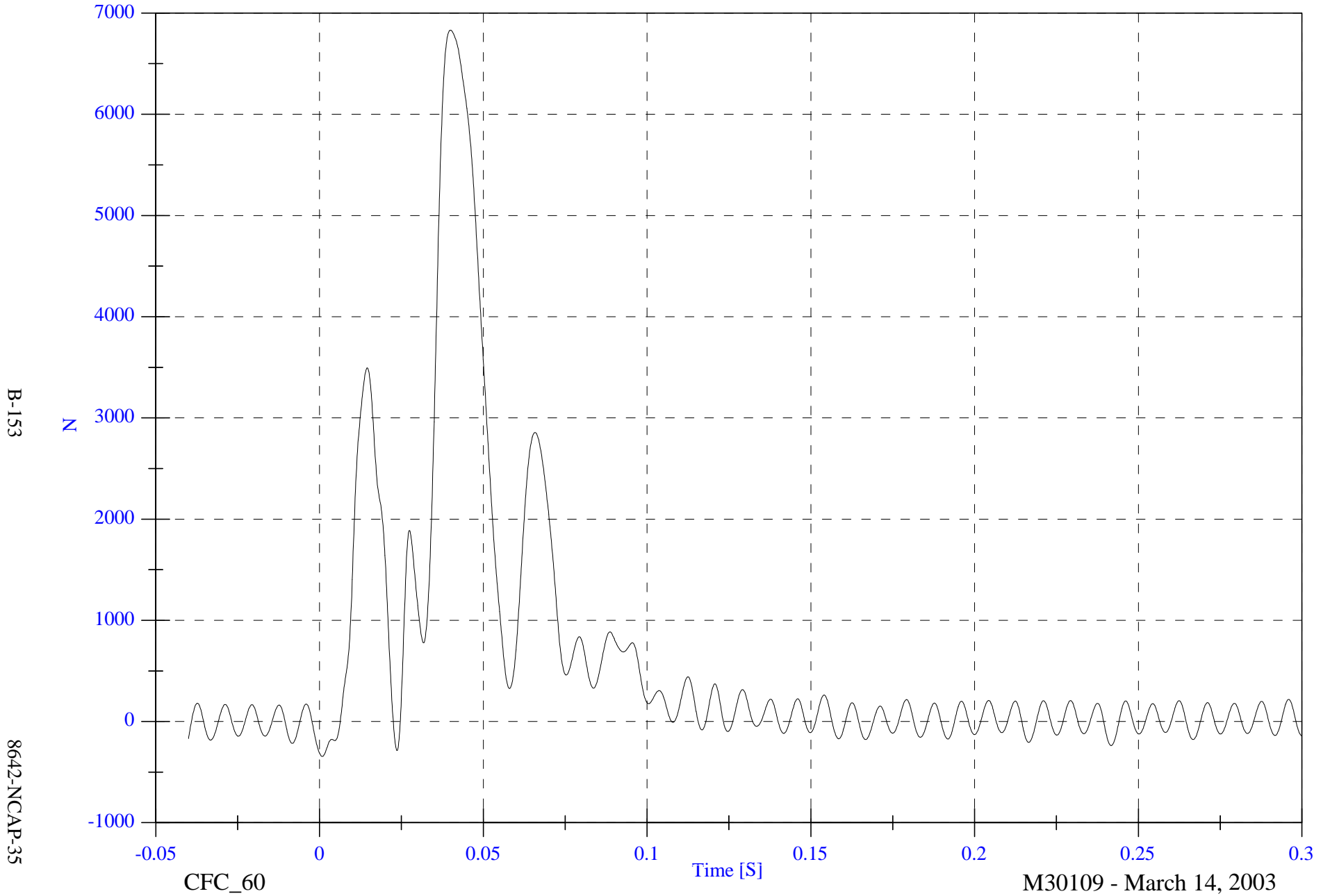
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell B2 Fx

Max: 6832.0 [N] at 0.040 [S]

Min: -344.8 [N] at 0.001 [S]



B-153

8642-NCAP-35

CFC\_60

Time [S]

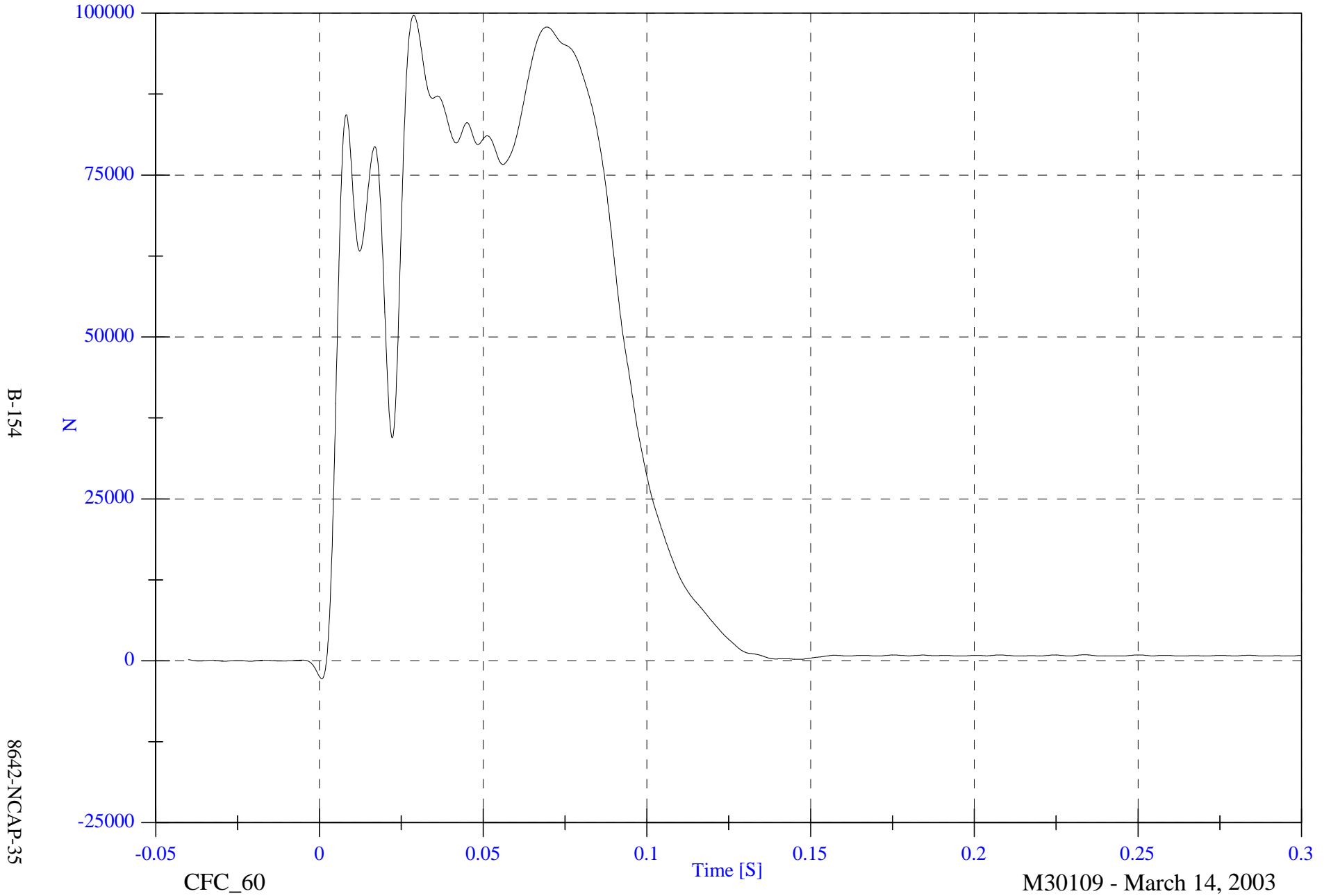
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell B3 Fx

Max: 99639.8 [N] at 0.029 [S]

Min: -2768.4 [N] at 0.001 [S]



B-154

8642-NCAP-35

CFC\_60

Time [S]

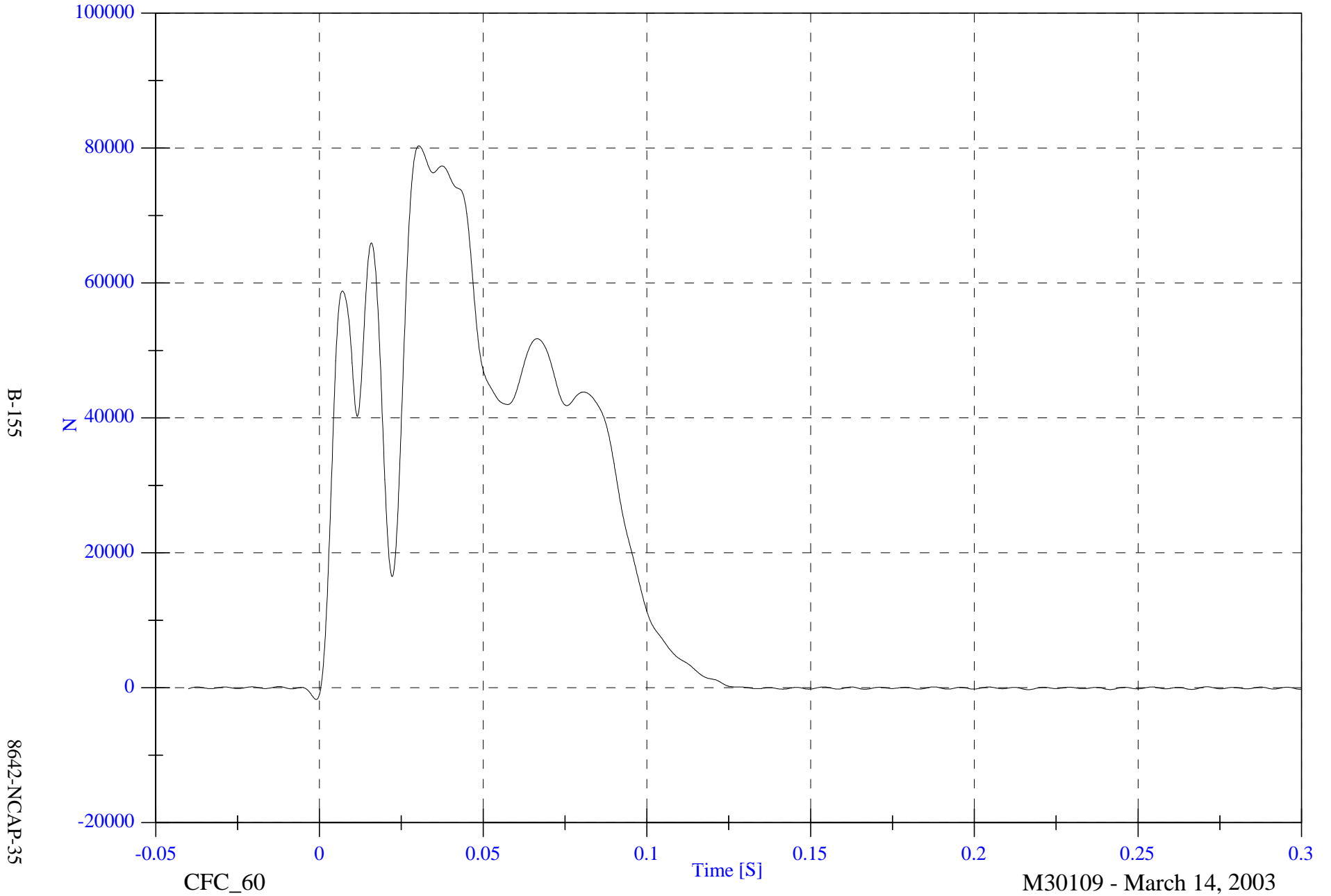
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell B4 Fx

Max: 80316.9 [N] at 0.030 [S]

Min: -1735.7 [N] at -0.001 [S]



B-155

8642-NCAP-35

CFC\_60

Time [S]

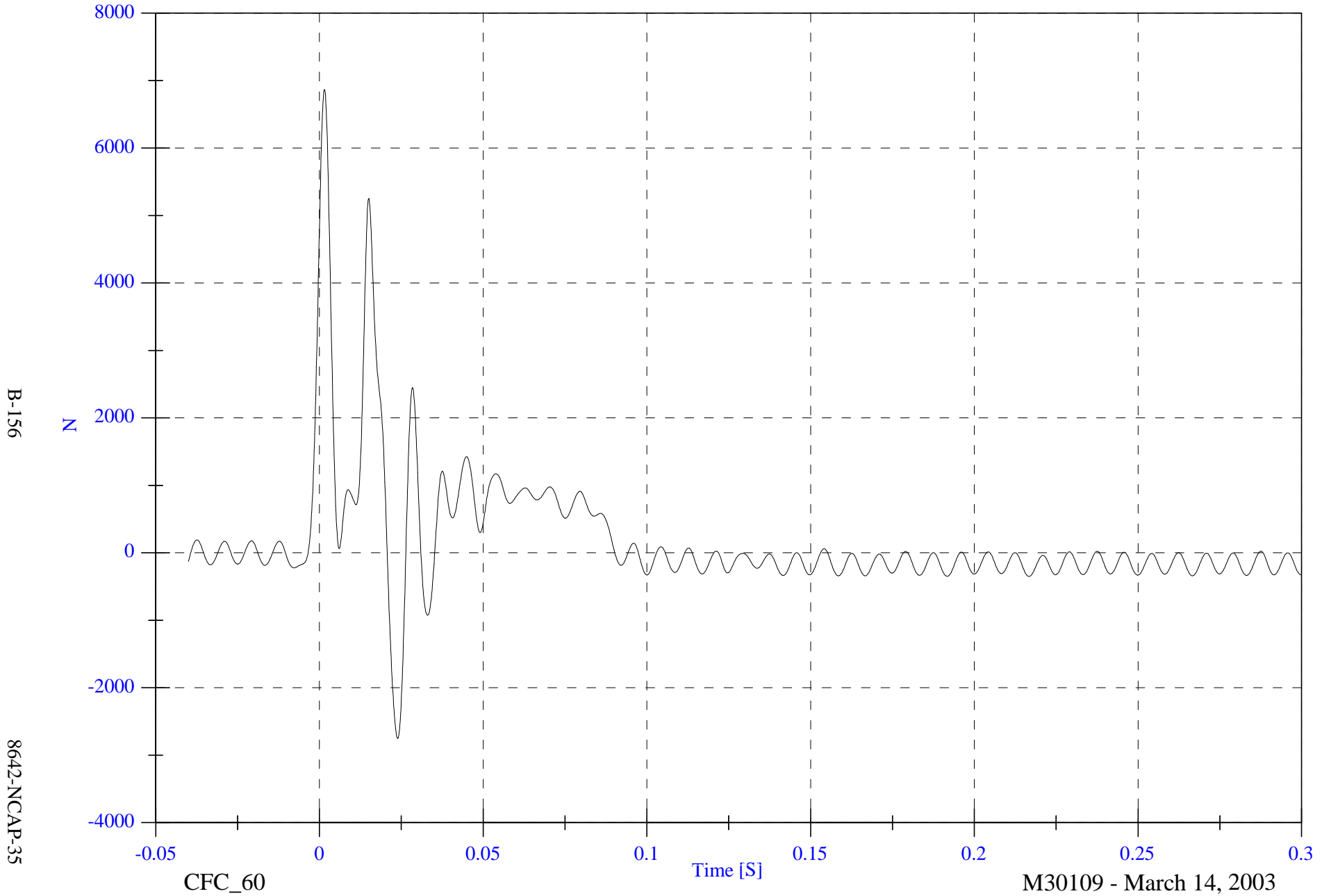
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell B5 Fx

Max: 6866.4 [N] at 0.001 [S]

Min: -2753.3 [N] at 0.024 [S]



B-156

8642-NCAP-35

CFC\_60

Time [S]

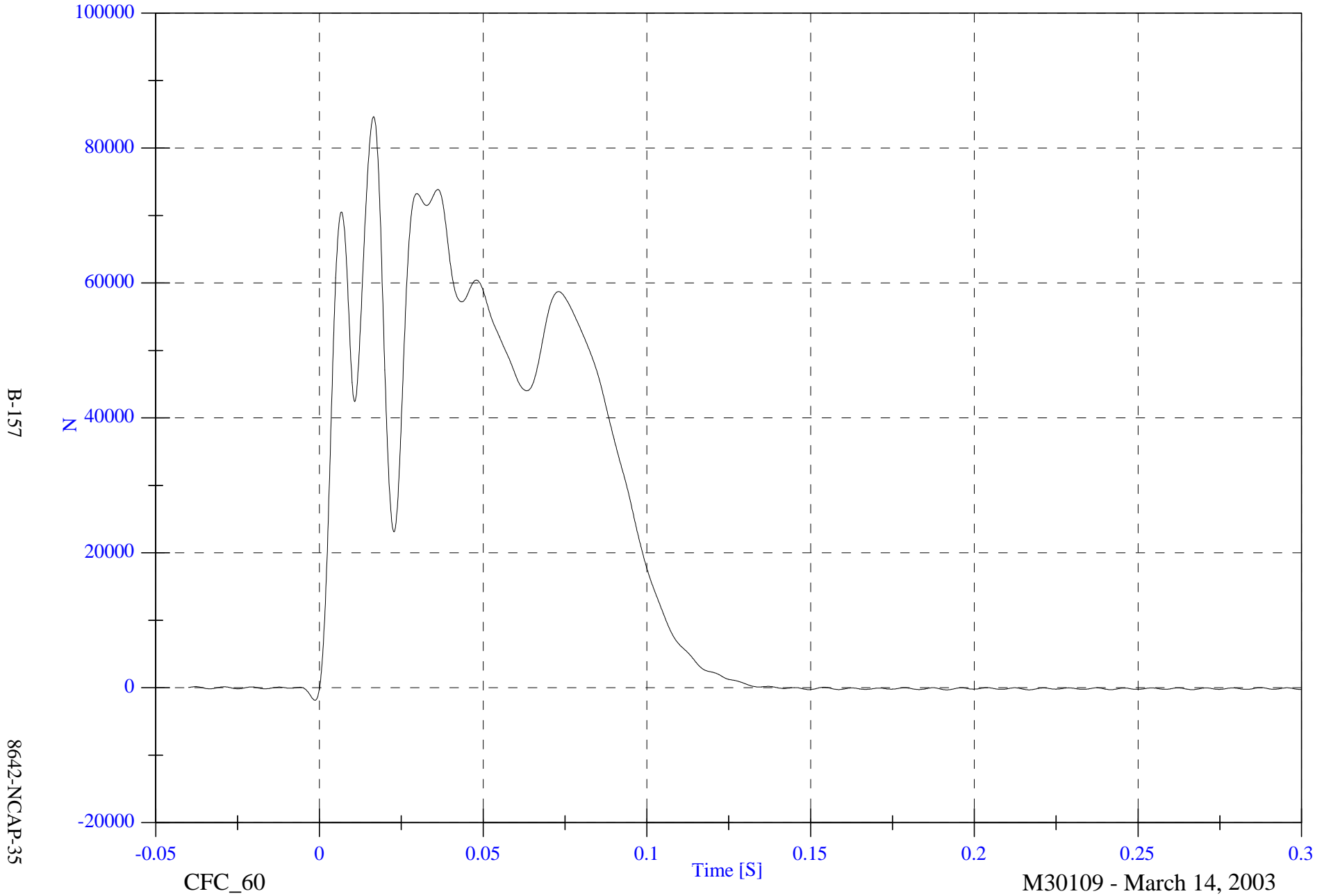
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell B6 Fx

Max: 84643.6 [N] at 0.017 [S]

Min: -1856.5 [N] at -0.001 [S]



B-157

8642-NCAP-35

CFC\_60

Time [S]

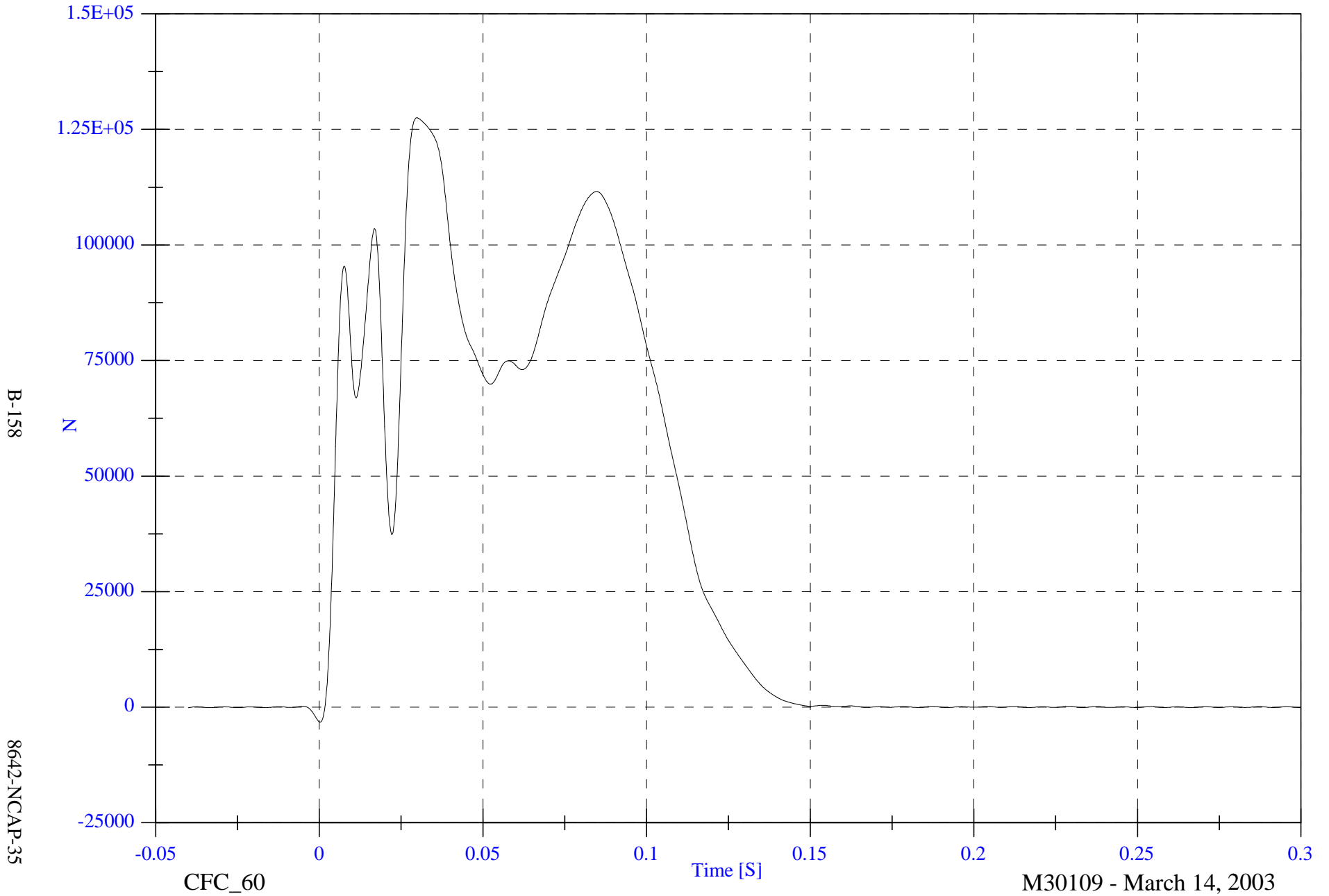
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 127497.8 [N] at 0.030 [S]

Barrier Load Cell B7 Fx

Min: -3226.1 [N] at 0.000 [S]



B-158

8642-NCAP-35

CFC\_60

Time [S]

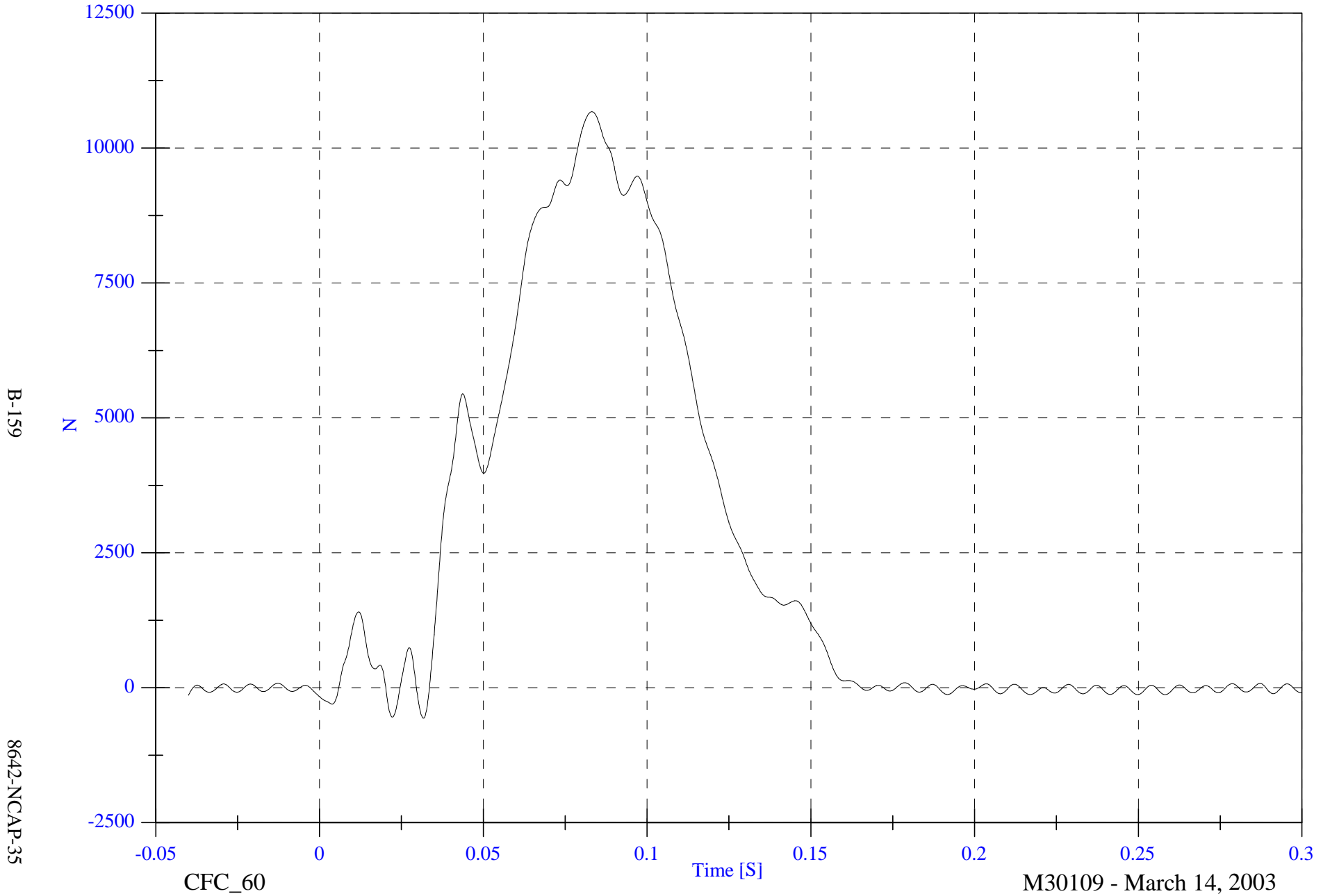
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell B8 Fx

Max: 10673.0 [N] at 0.083 [S]

Min: -565.5 [N] at 0.032 [S]



B-159

8642-NCAP-35

CFC\_60

Time [S]

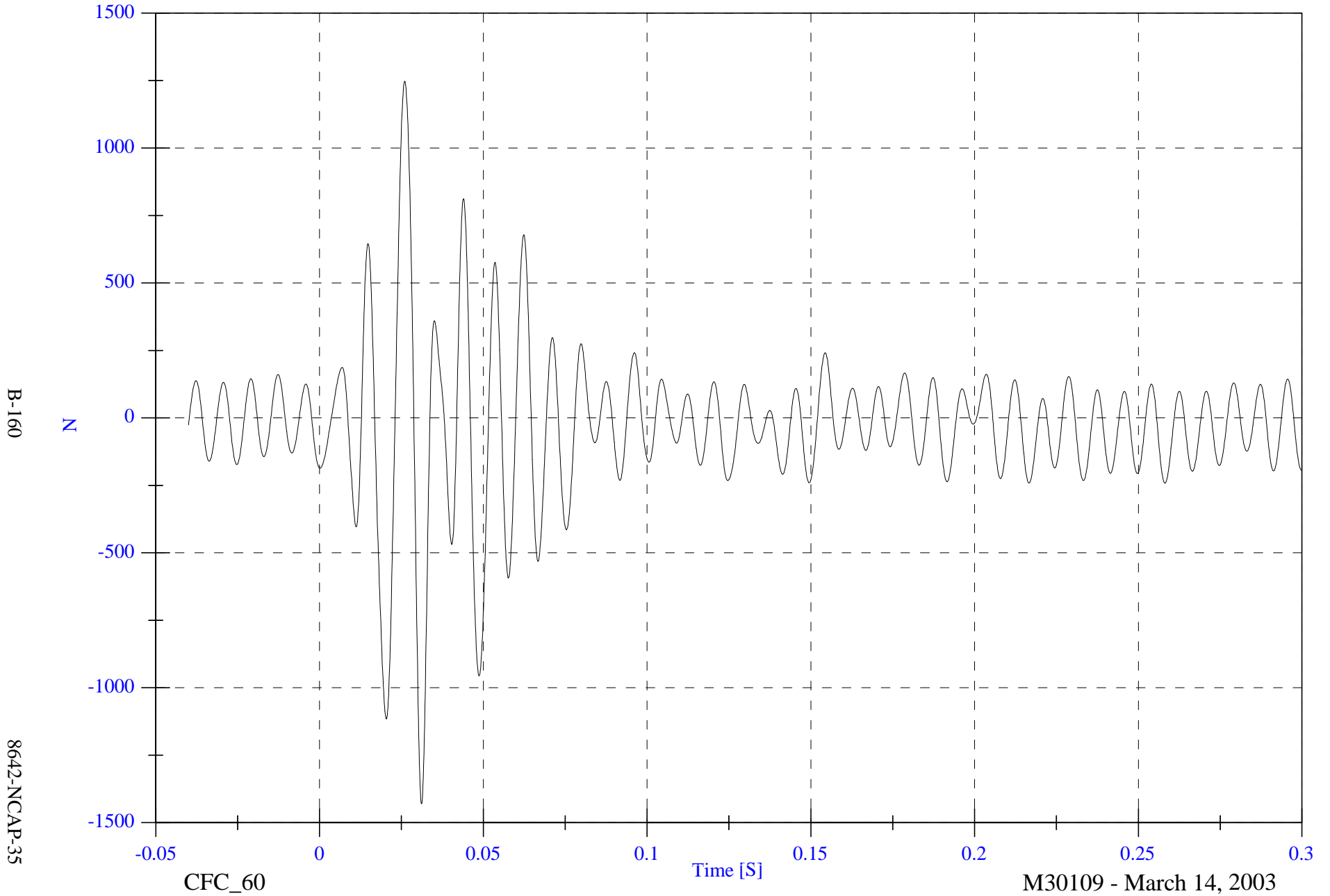
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell B9 Fx

Max: 1247.7 [N] at 0.026 [S]

Min: -1429.7 [N] at 0.031 [S]



B-160

8642-NCAP-35

CFC\_60

Time [S]

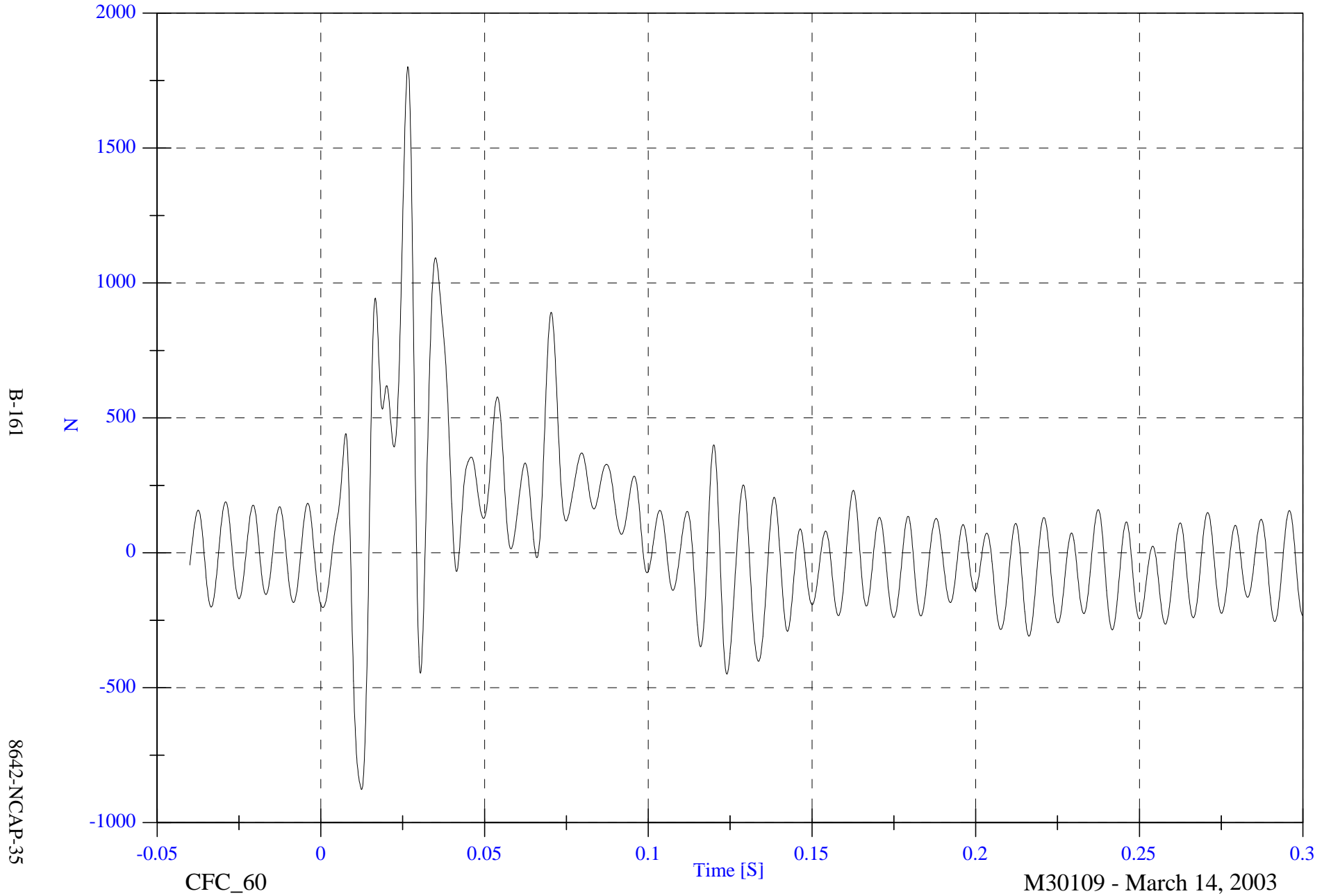
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell C1 Fx

Max: 1801.2 [N] at 0.027 [S]

Min: -876.8 [N] at 0.012 [S]



B-161

8642-NCAP-35

CFC\_60

Time [S]

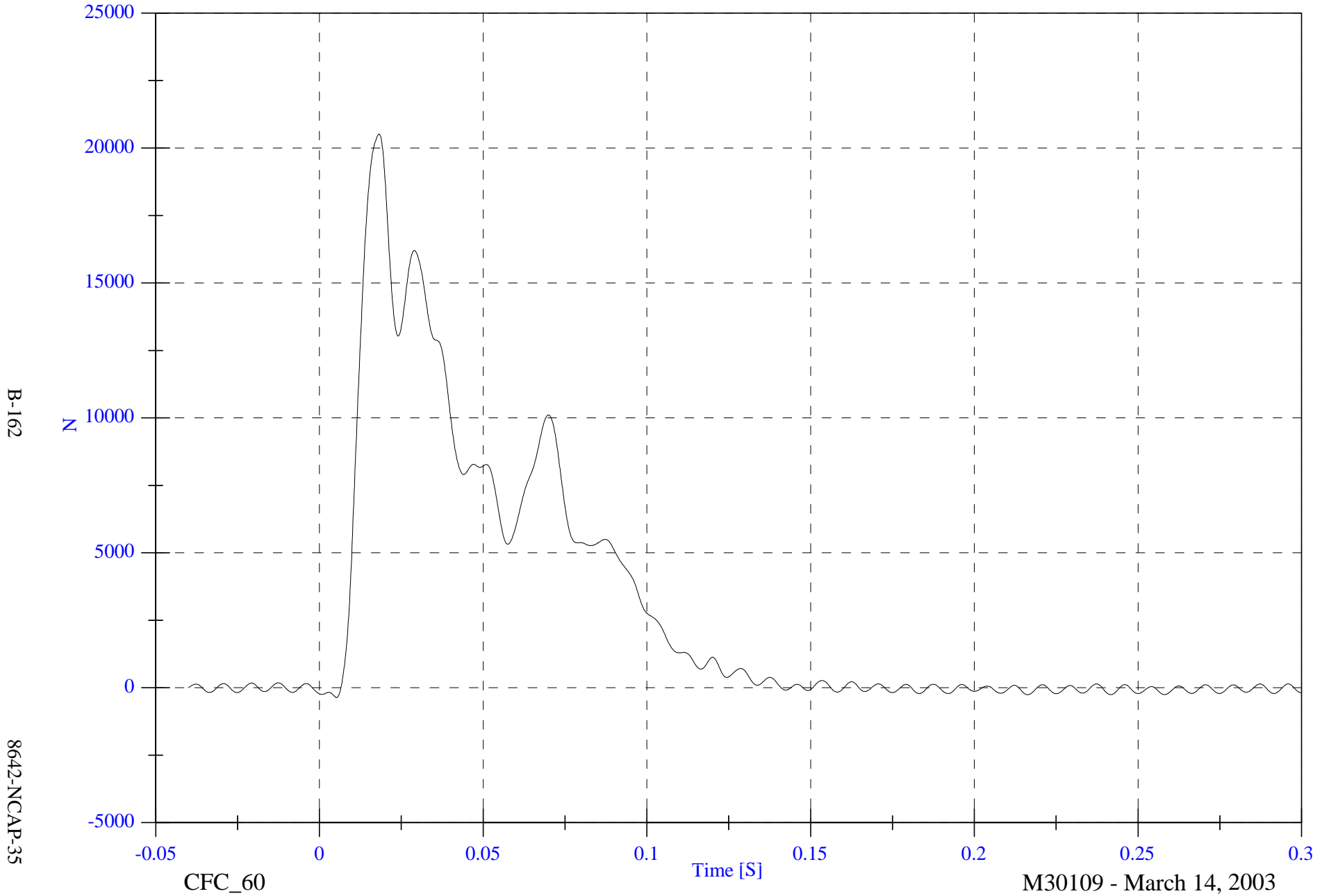
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell C2 Fx

Max: 20515.0 [N] at 0.018 [S]

Min: -362.2 [N] at 0.005 [S]



B-162

8642-NCAP-35

CFC\_60

Time [S]

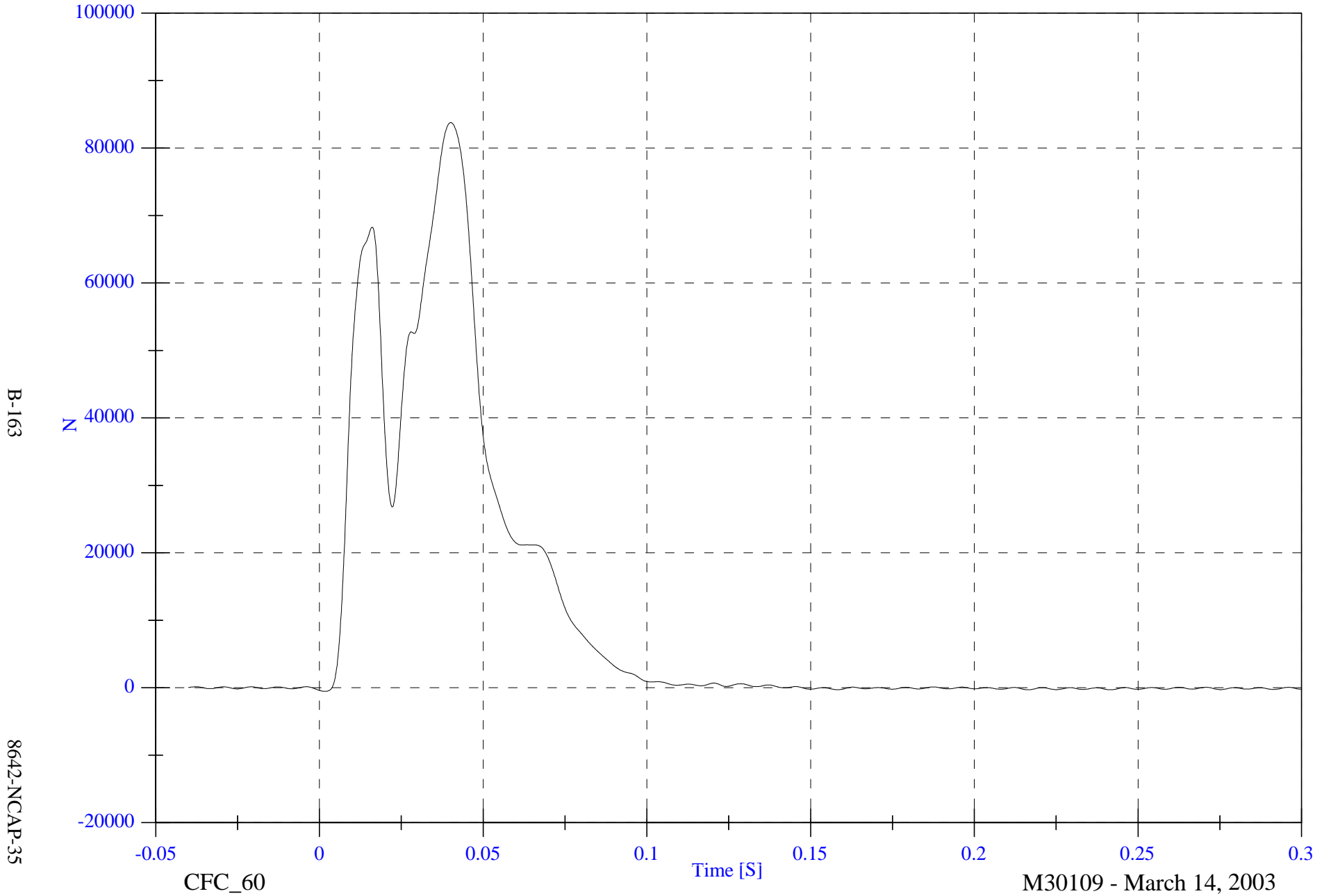
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell C3 Fx

Max: 83780.1 [N] at 0.040 [S]

Min: -521.3 [N] at 0.002 [S]

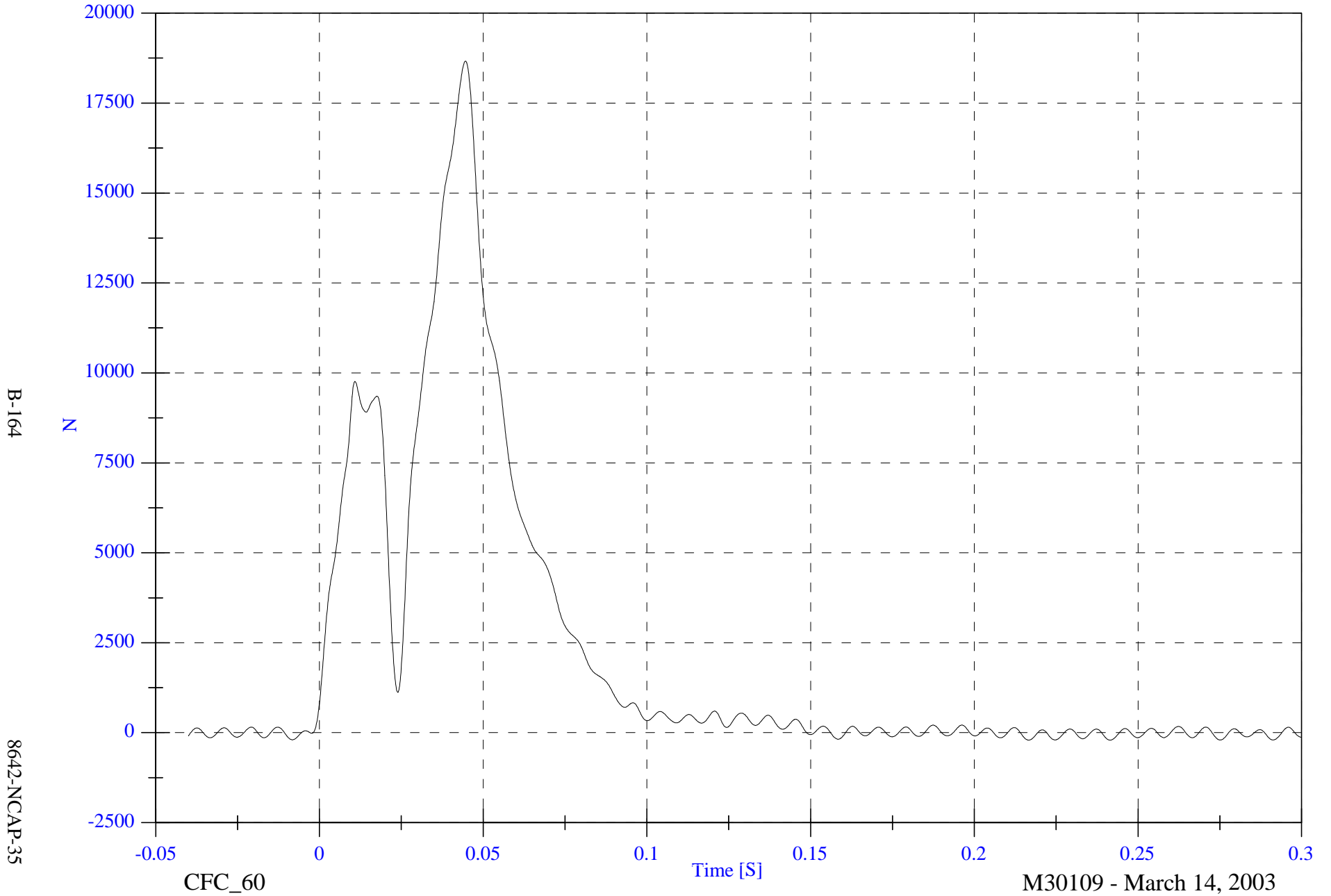


2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell C4 Fx

Max: 18666.5 [N] at 0.045 [S]

Min: -205.9 [N] at 0.241 [S]



B-164

8642-NCAP-35

CFC\_60

Time [S]

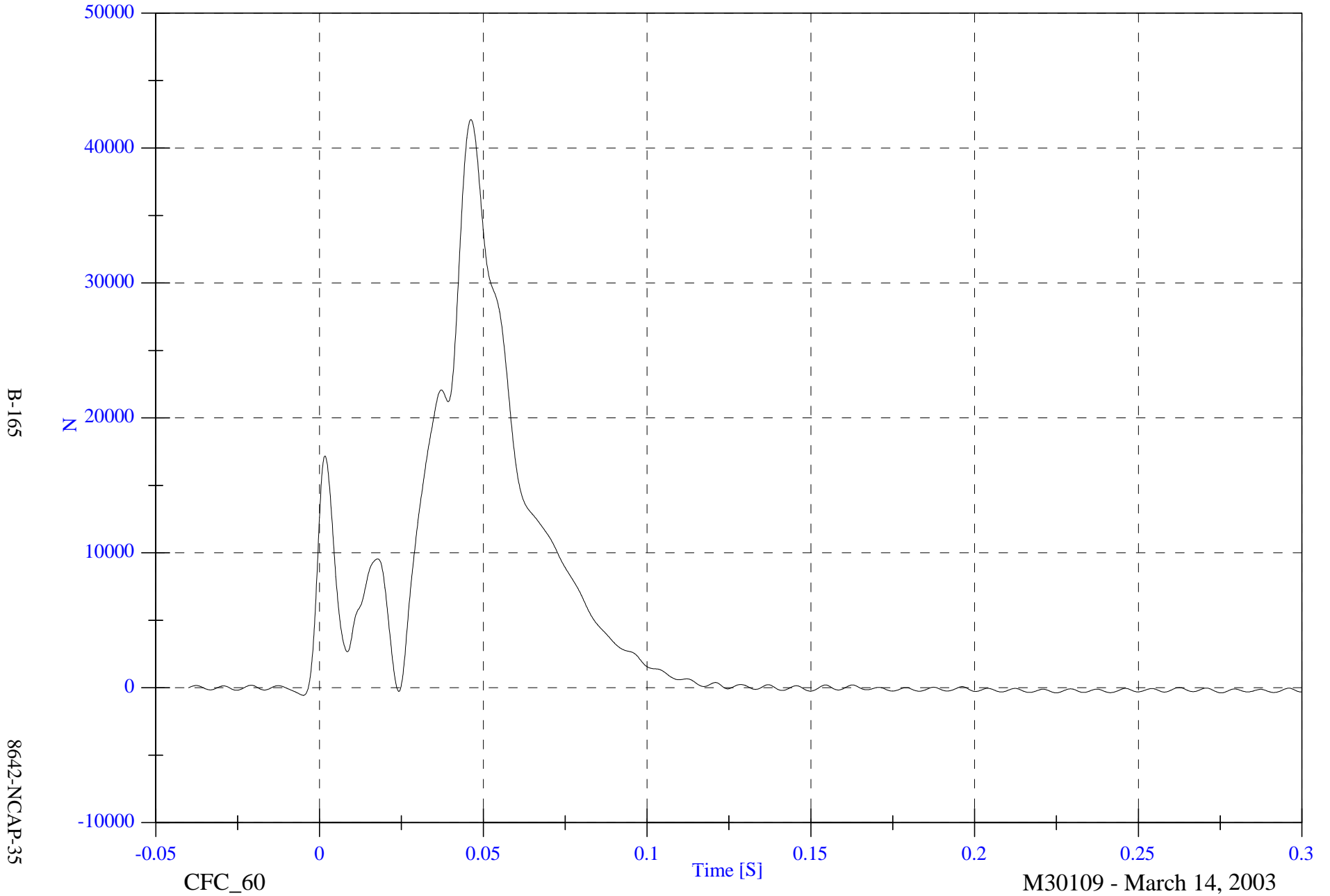
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell C5 Fx

Max: 42108.8 [N] at 0.046 [S]

Min: -560.2 [N] at -0.005 [S]



B-165

8642-NCAP-35

CFC\_60

Time [S]

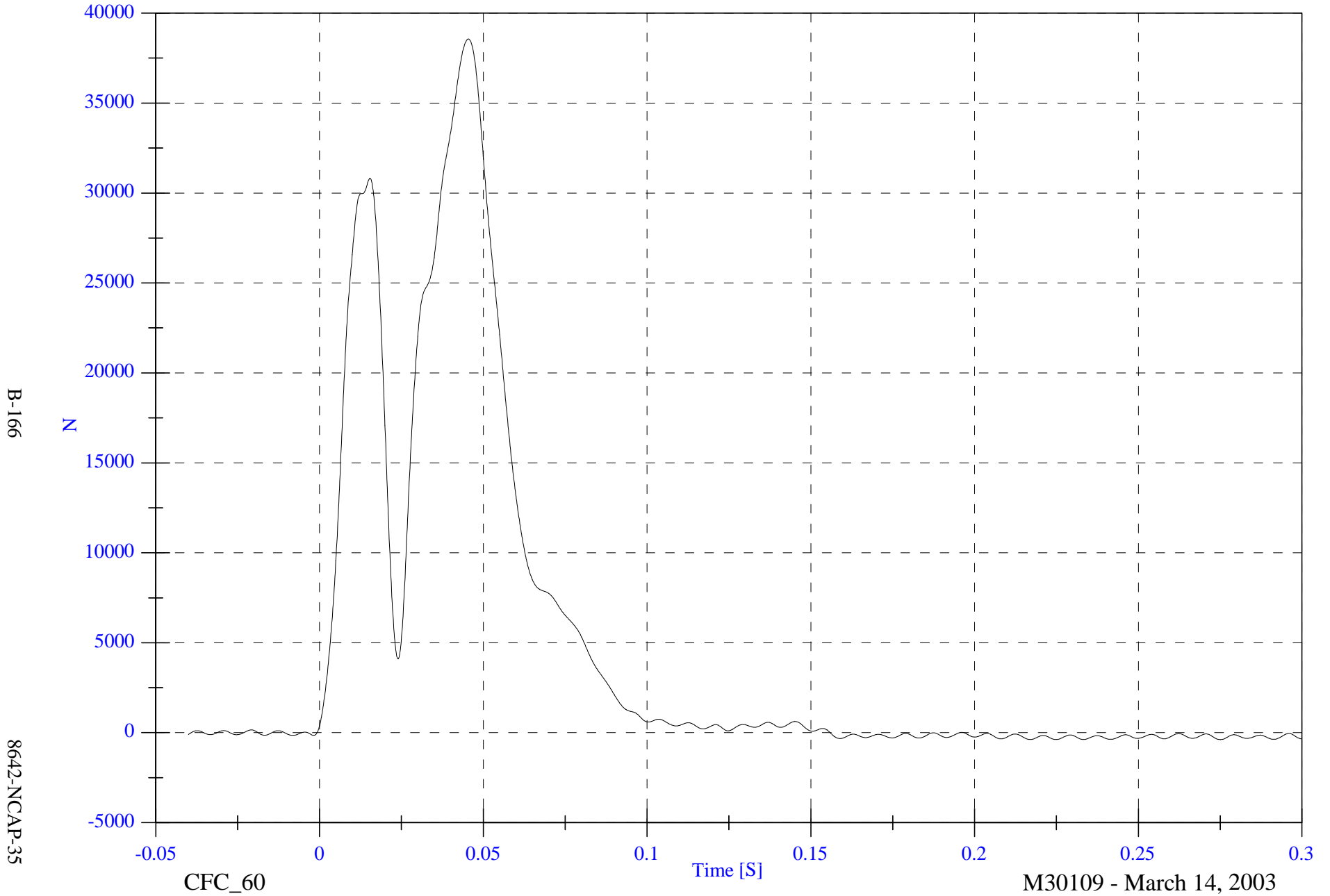
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell C6 Fx

Max: 38561.1 [N] at 0.045 [S]

Min: -383.3 [N] at 0.275 [S]



B-166

8642-NCAP-35

CFC\_60

Time [S]

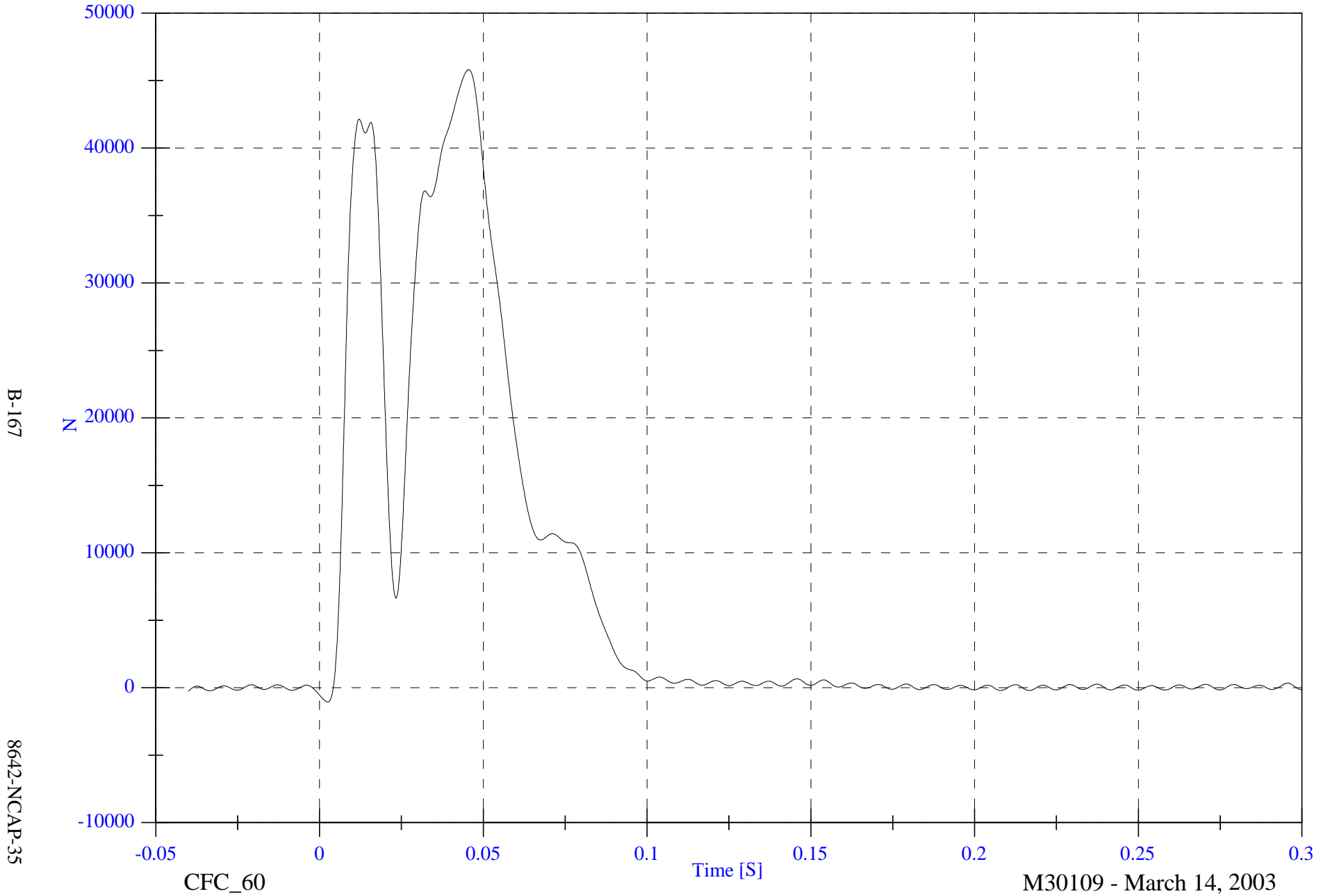
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell C7 Fx

Max: 45813.4 [N] at 0.046 [S]

Min: -1055.4 [N] at 0.002 [S]

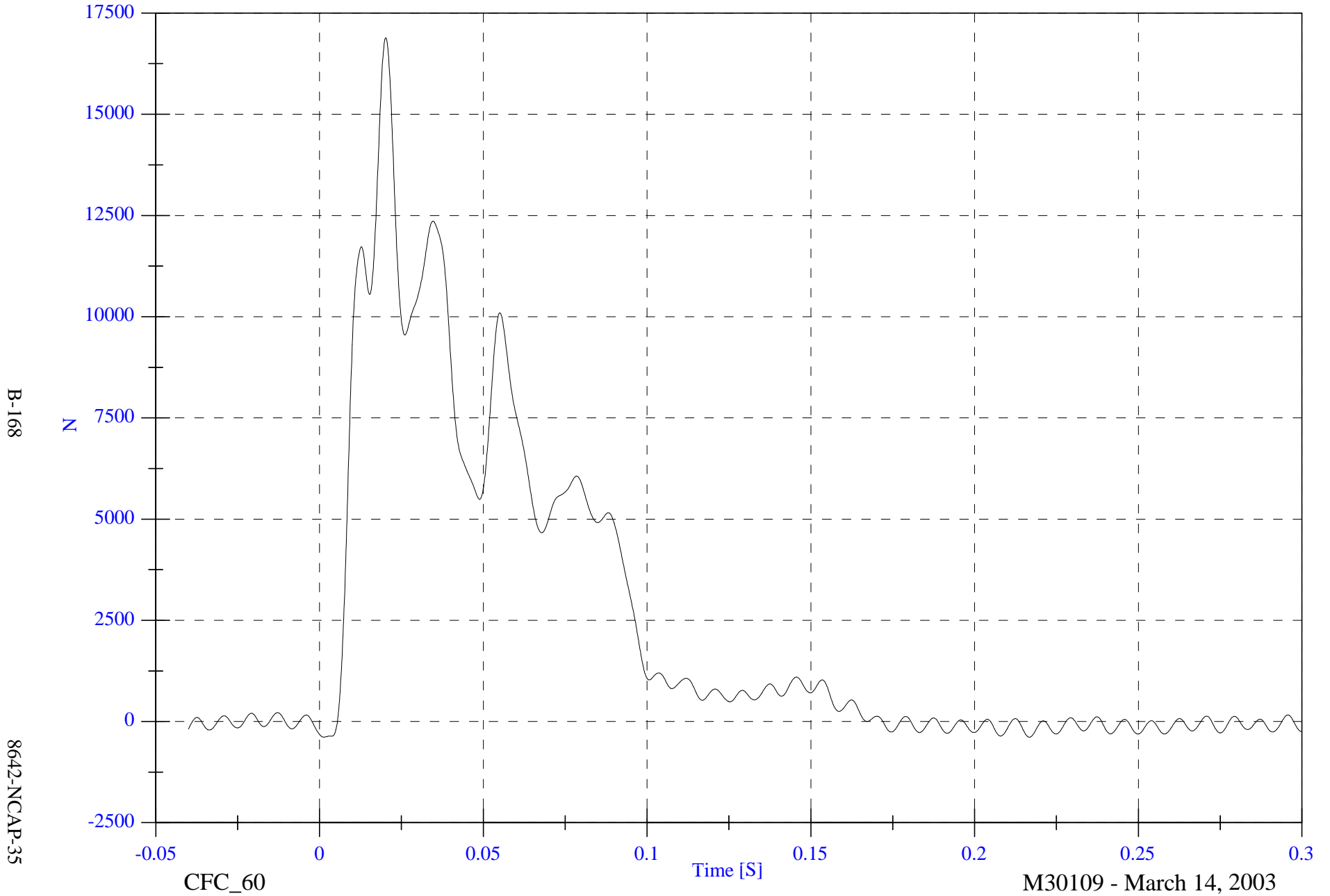


2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell C8 Fx

Max: 16891.4 [N] at 0.020 [S]

Min: -387.2 [N] at 0.217 [S]



B-168

8642-NCAP-35

CFC\_60

Time [S]

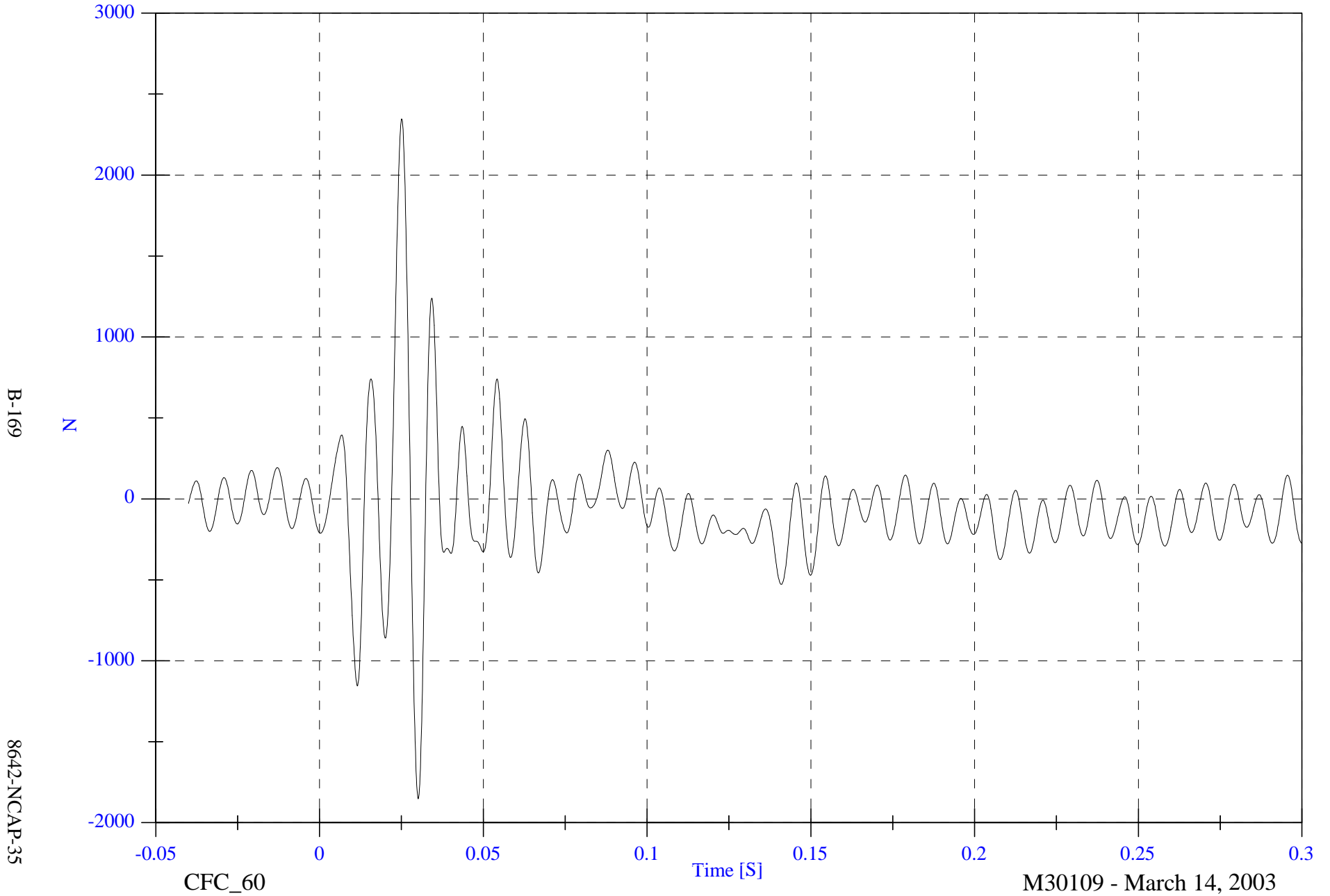
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell C9 Fx

Max: 2347.2 [N] at 0.025 [S]

Min: -1852.0 [N] at 0.030 [S]

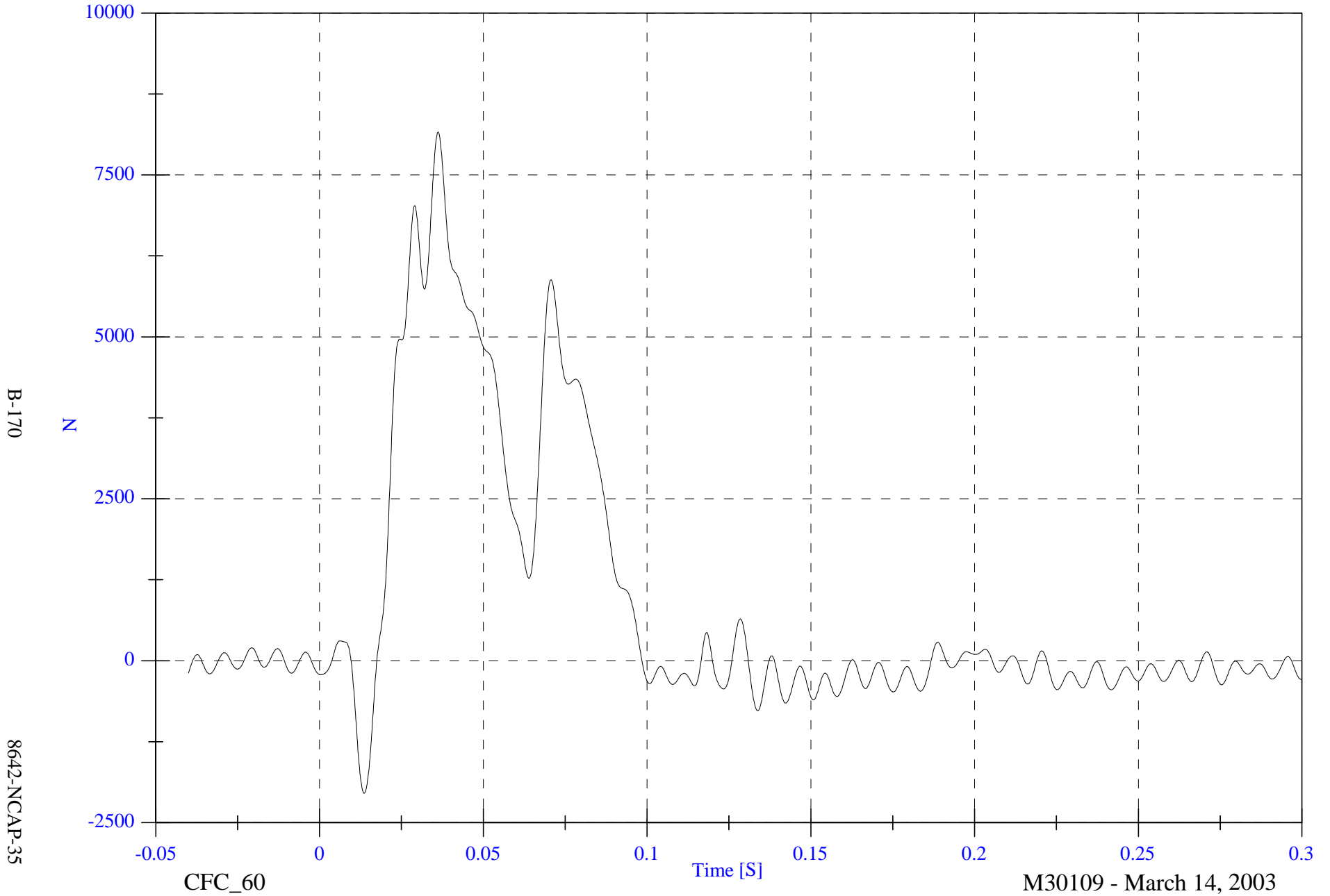


2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell D1 Fx

Max: 8165.1 [N] at 0.036 [S]

Min: -2046.3 [N] at 0.014 [S]



B-170

8642-NCAP-35

CFC\_60

Time [S]

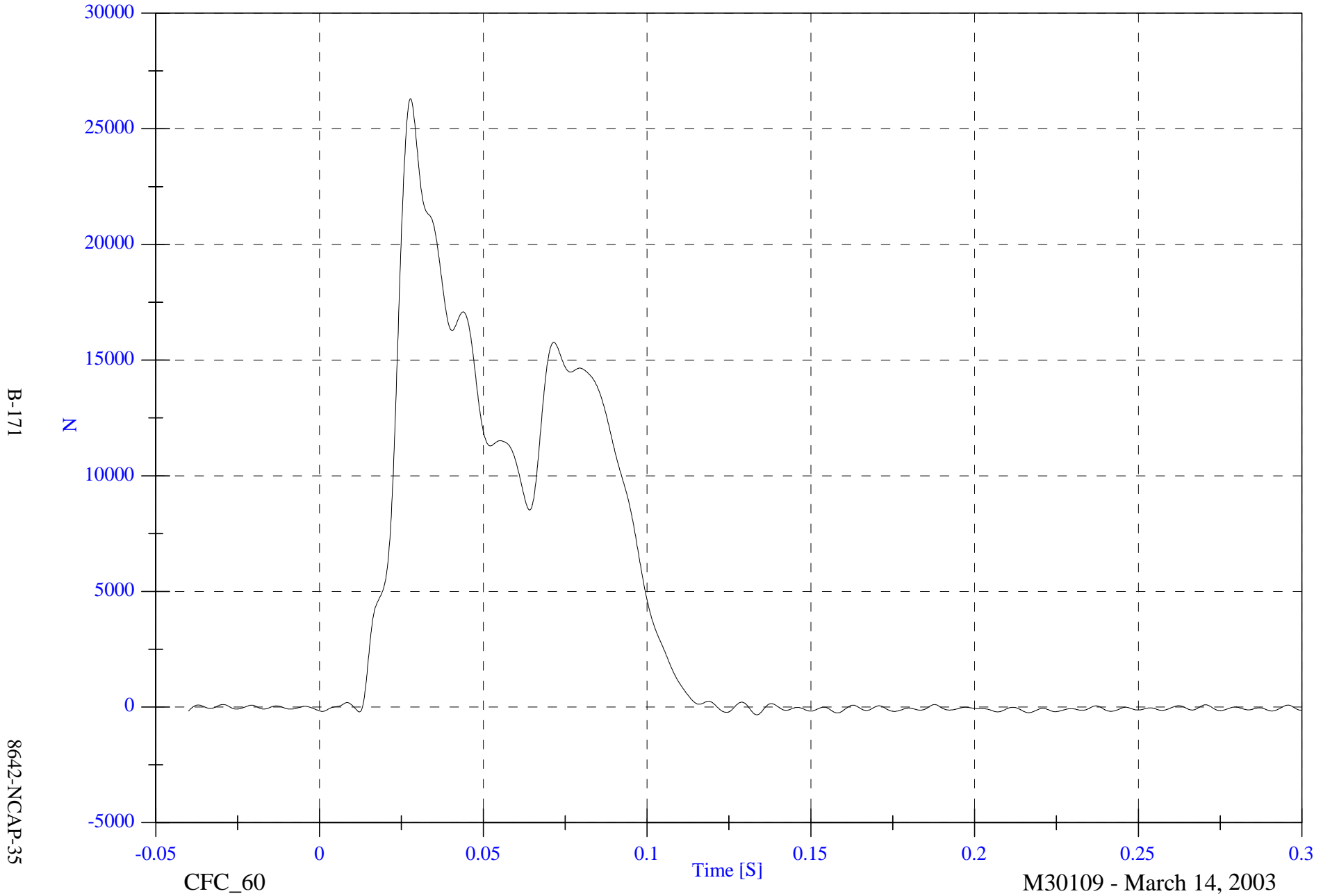
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell D2 Fx

Max: 26302.9 [N] at 0.028 [S]

Min: -334.7 [N] at 0.133 [S]



B-171

8642-NCAP-35

CFC\_60

Time [S]

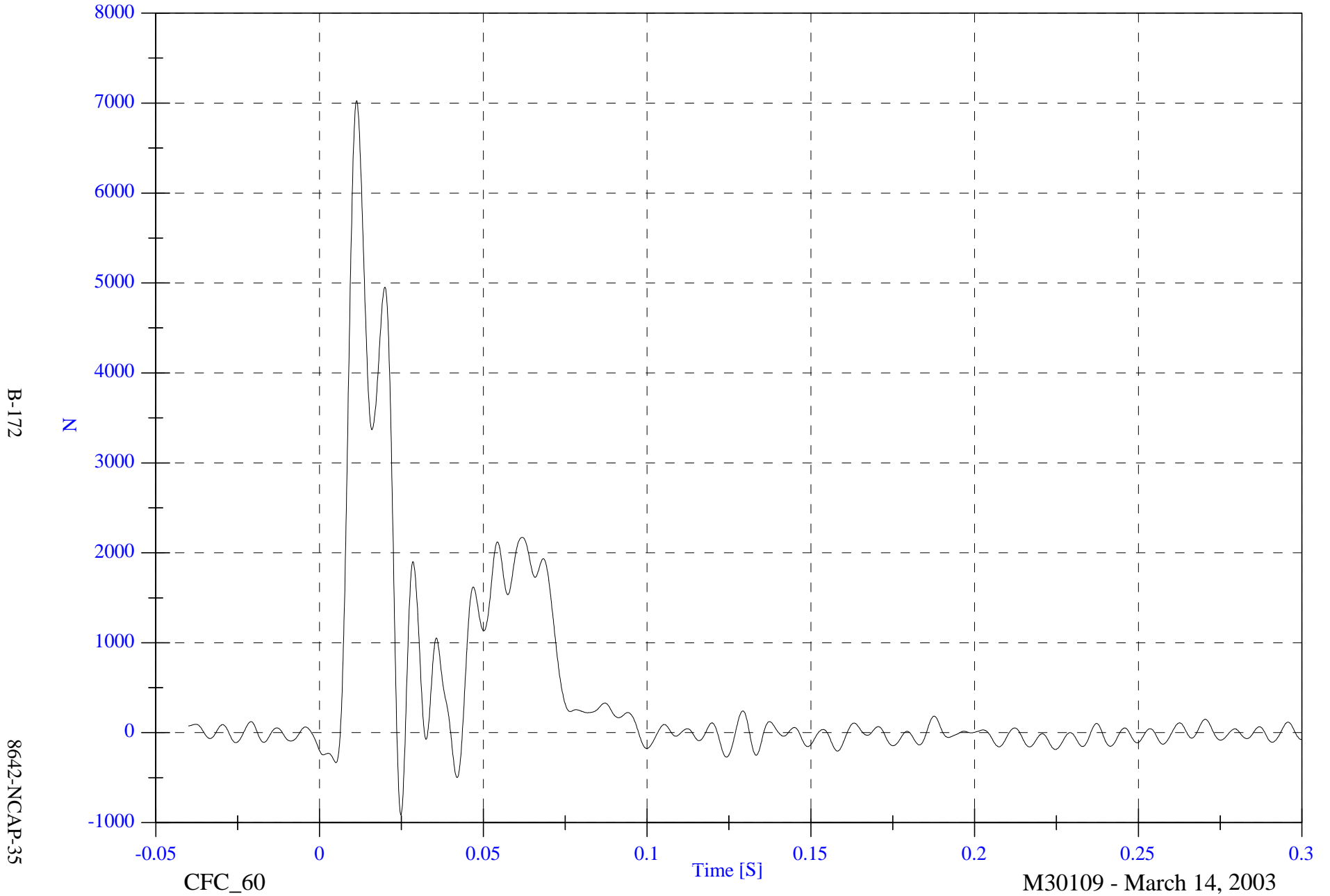
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell D3 Fx

Max: 7028.2 [N] at 0.011 [S]

Min: -914.8 [N] at 0.025 [S]

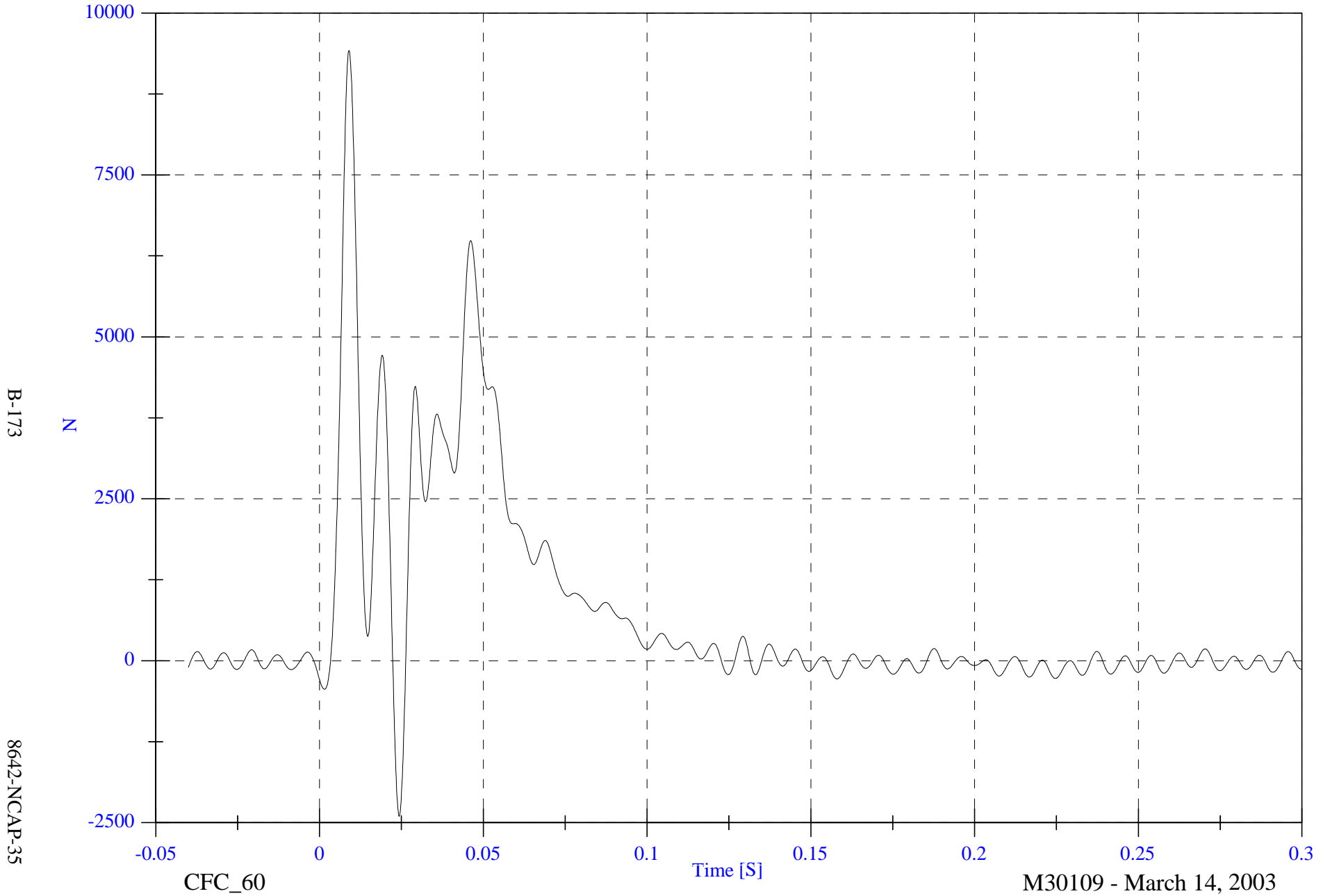


2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell D4 Fx

Max: 9423.3 [N] at 0.009 [S]

Min: -2400.6 [N] at 0.024 [S]



B-173

8642-NCAP-35

CFC\_60

Time [S]

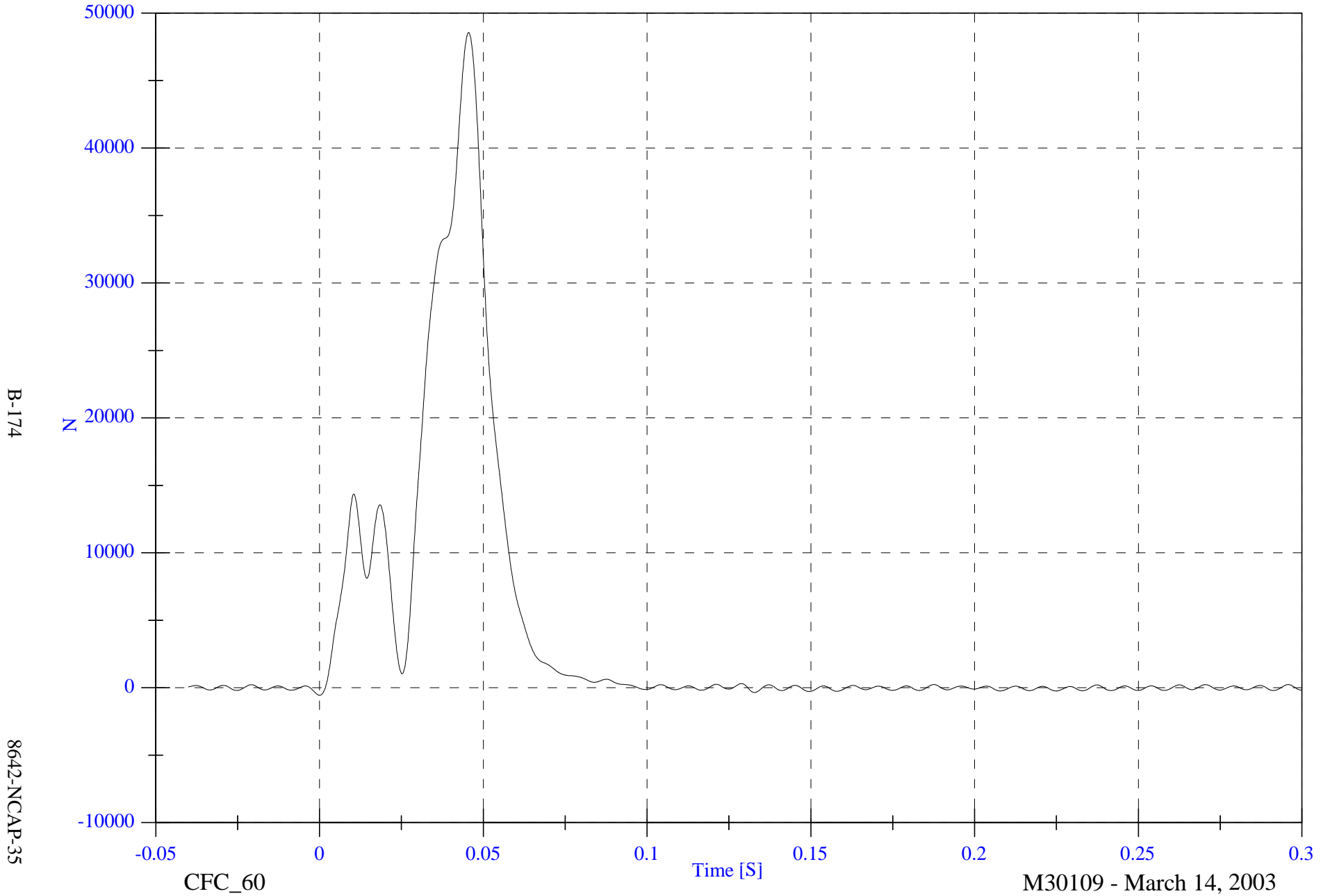
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell D5 Fx

Max: 48561.7 [N] at 0.045 [S]

Min: -557.8 [N] at 0.000 [S]



B-174

8642-NCAP-35

CFC\_60

Time [S]

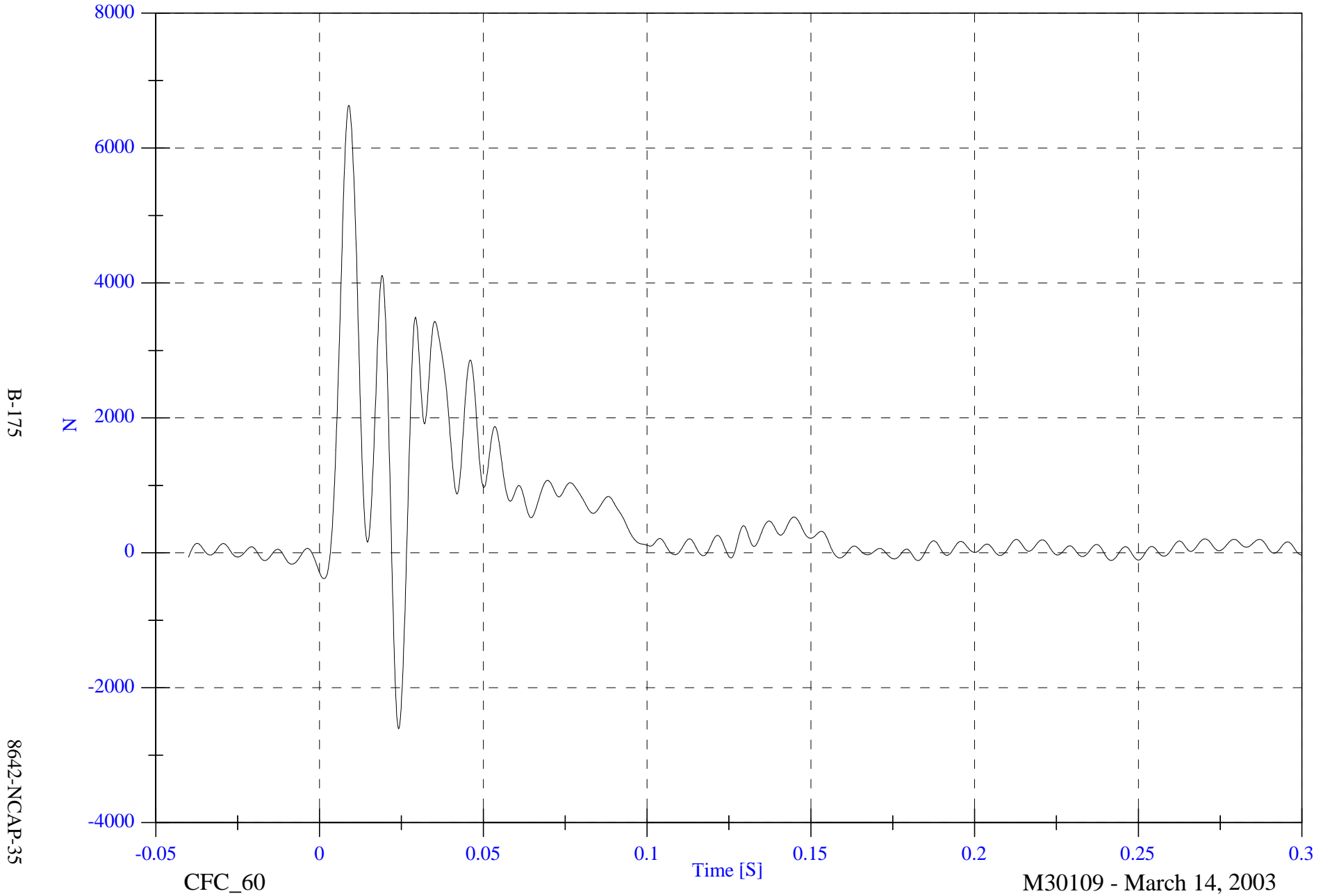
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell D6 Fx

Max: 6631.9 [N] at 0.009 [S]

Min: -2608.5 [N] at 0.024 [S]



B-175

8642-NCAP-35

CFC\_60

Time [S]

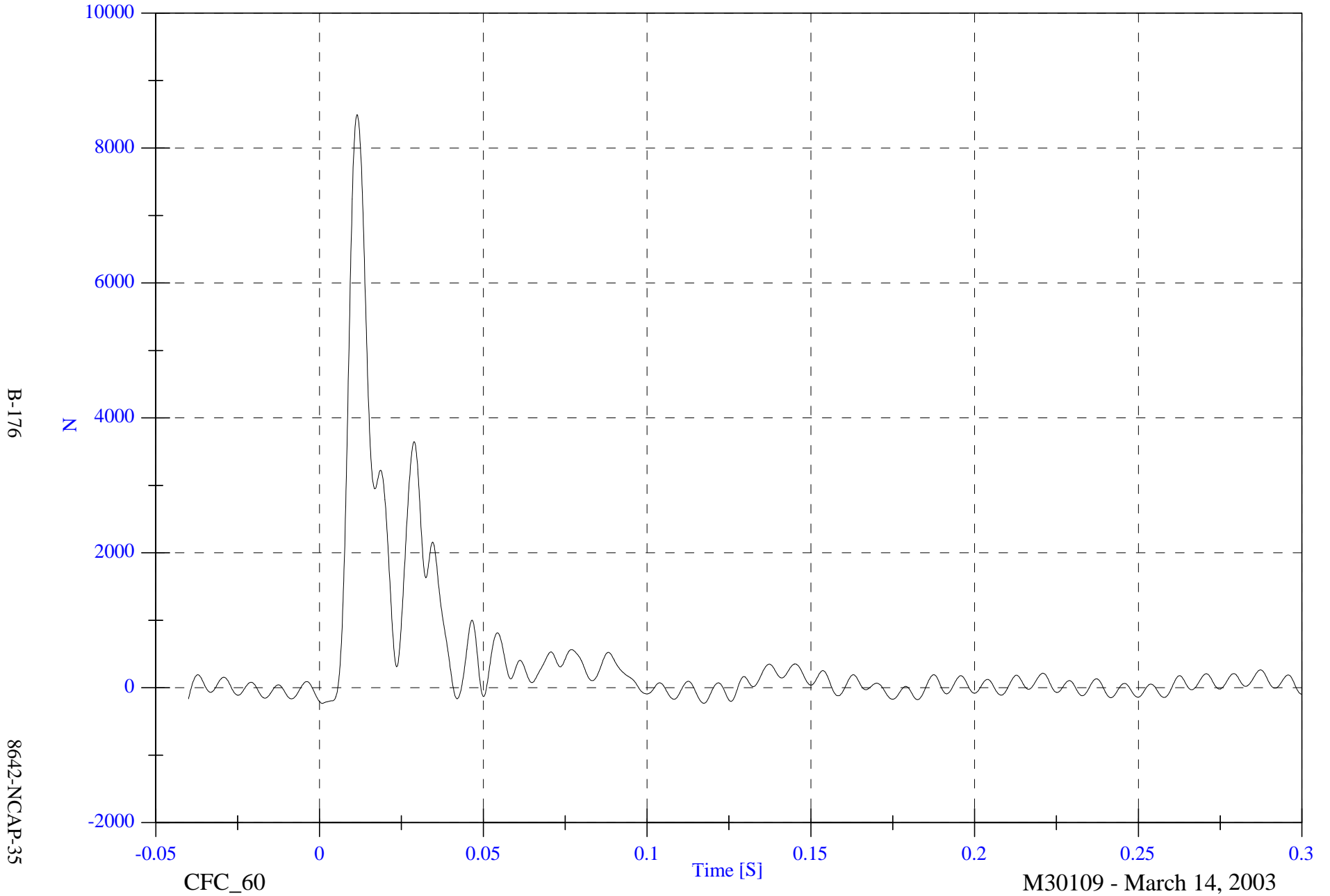
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell D7 Fx

Max: 8496.2 [N] at 0.011 [S]

Min: -230.6 [N] at 0.001 [S]



B-176

8642-NCAP-35

CFC\_60

Time [S]

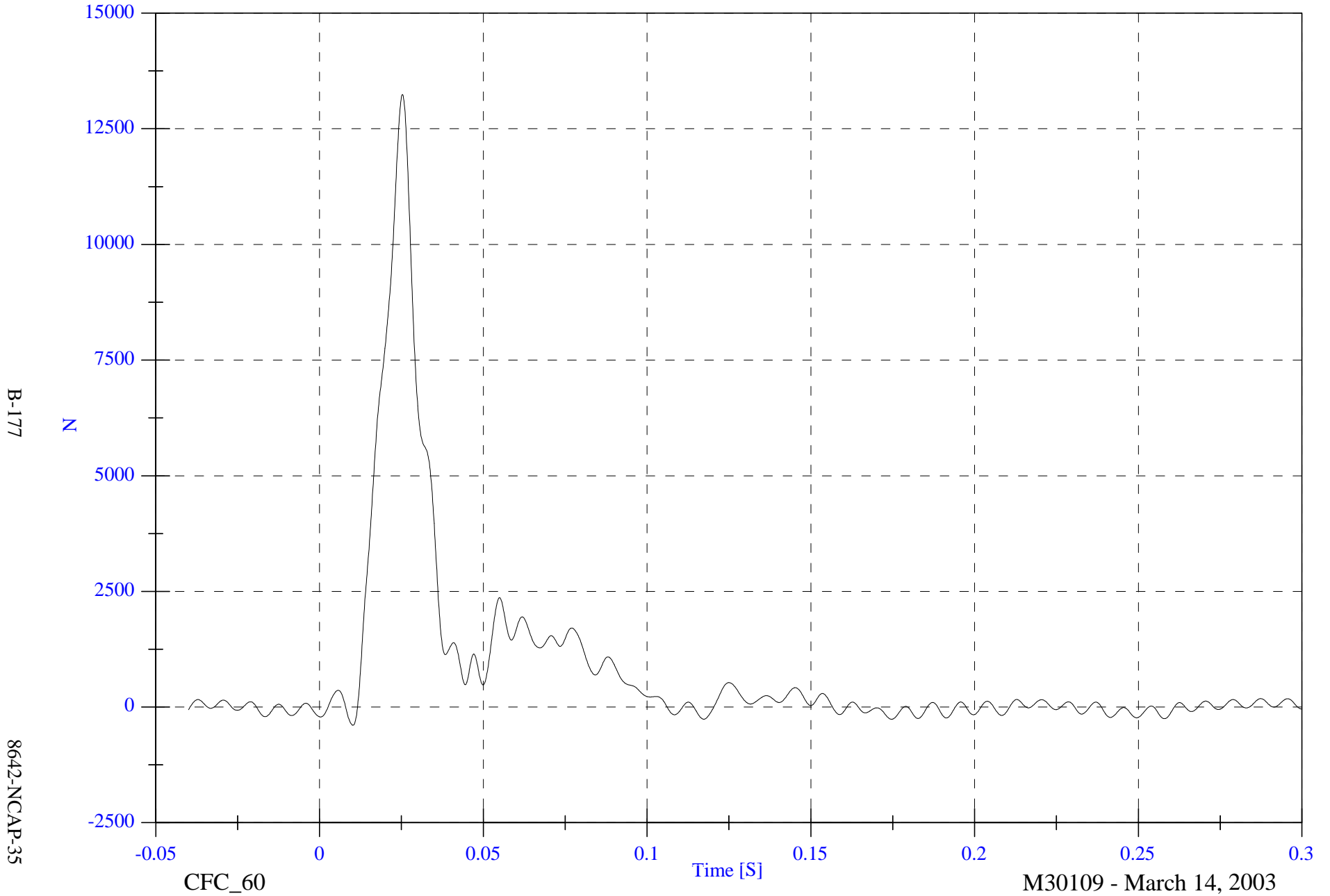
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell D8 Fx

Max: 13240.1 [N] at 0.025 [S]

Min: -394.2 [N] at 0.010 [S]

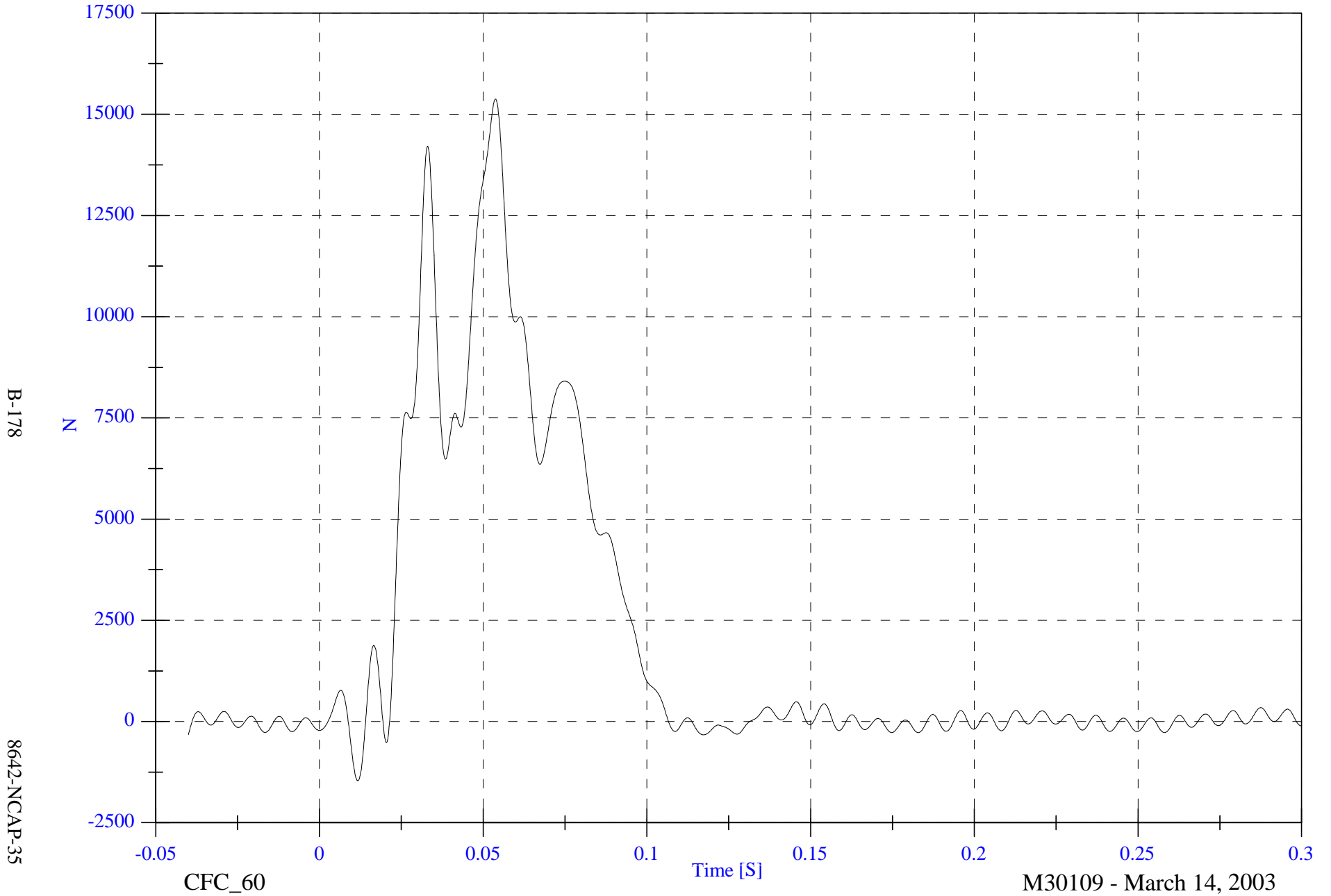


2003 NCAP Test 13 2003 Chevrolet Tahoe

Barrier Load Cell D9 Fx

Max: 15378.9 [N] at 0.054 [S]

Min: -1465.1 [N] at 0.012 [S]



B-178

8642-NCAP-35

CFC\_60

Time [S]

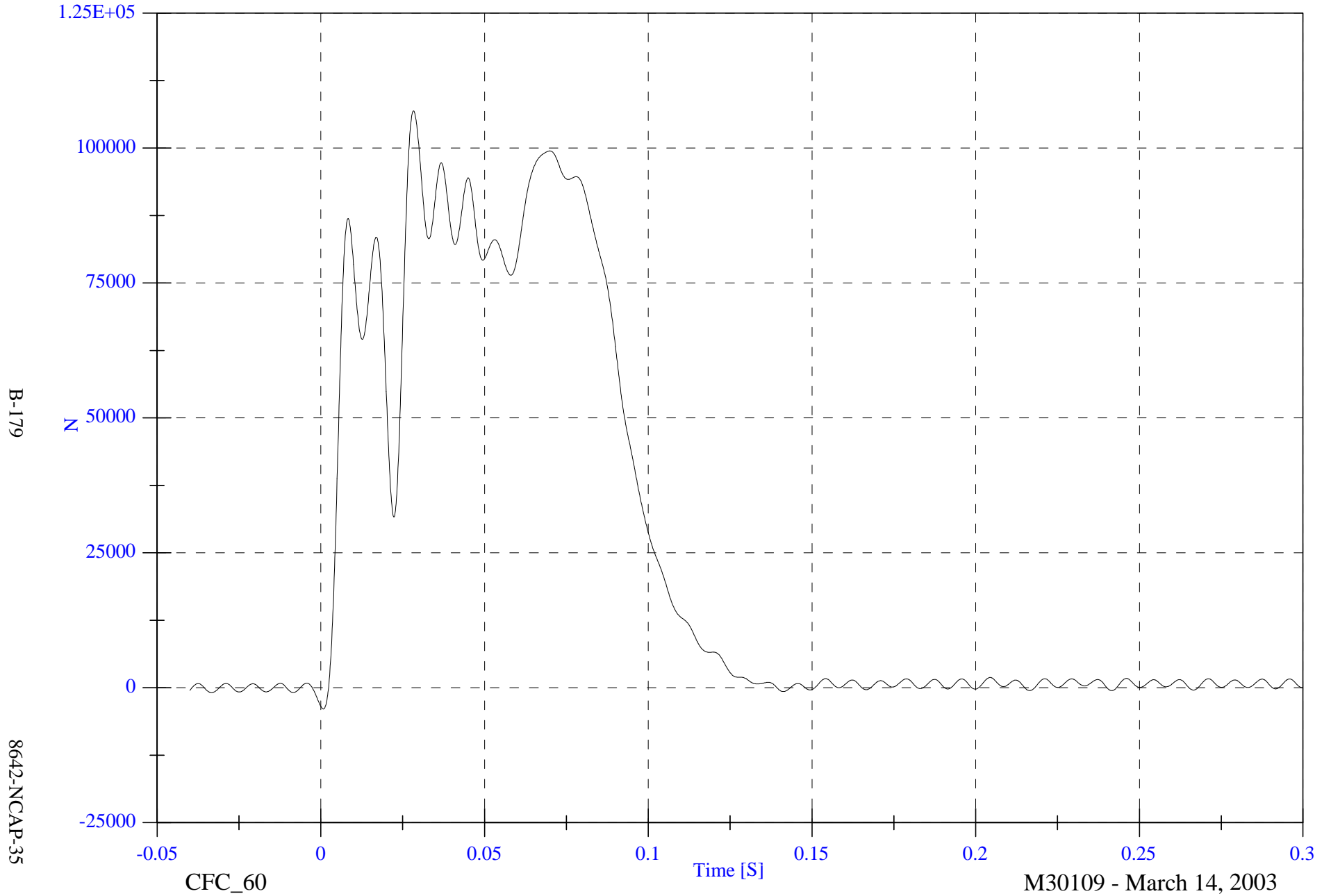
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Group 1 Load Cell Sum (A1,A2,A3,B1,B2,B3)

Max: 106885.8 [N] at 0.028 [S]

Min: -3932.2 [N] at 0.001 [S]



B-179

8642-NCAP-35

CFC\_60

Time [S]

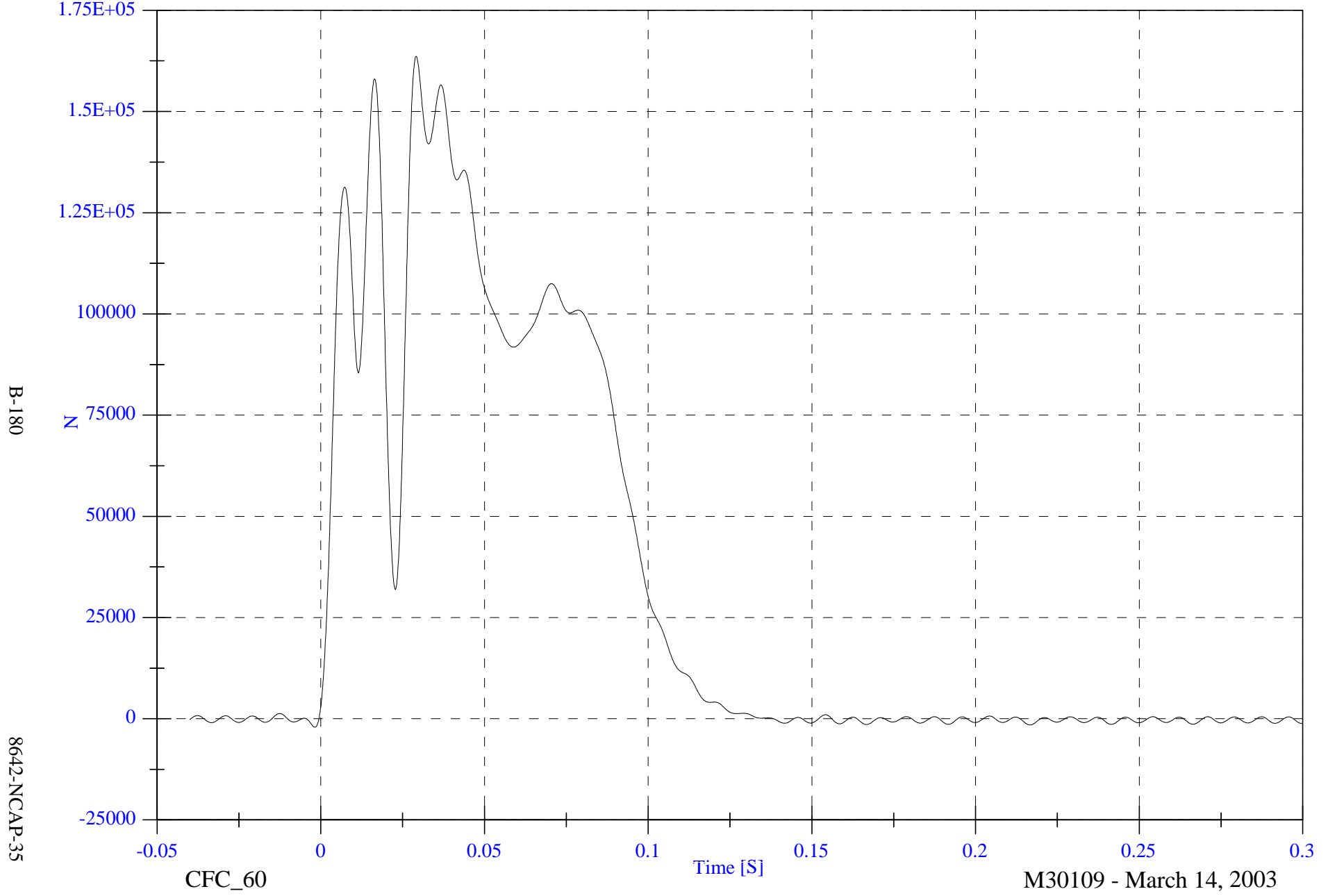
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Group 2 Load Cell Sum (A4,A5,A6,B4,B5,B6)

Max: 163628.3 [N] at 0.029 [S]

Min: -2118.1 [N] at -0.002 [S]



B-180

8642-NCAP-35

CFC\_60

Time [S]

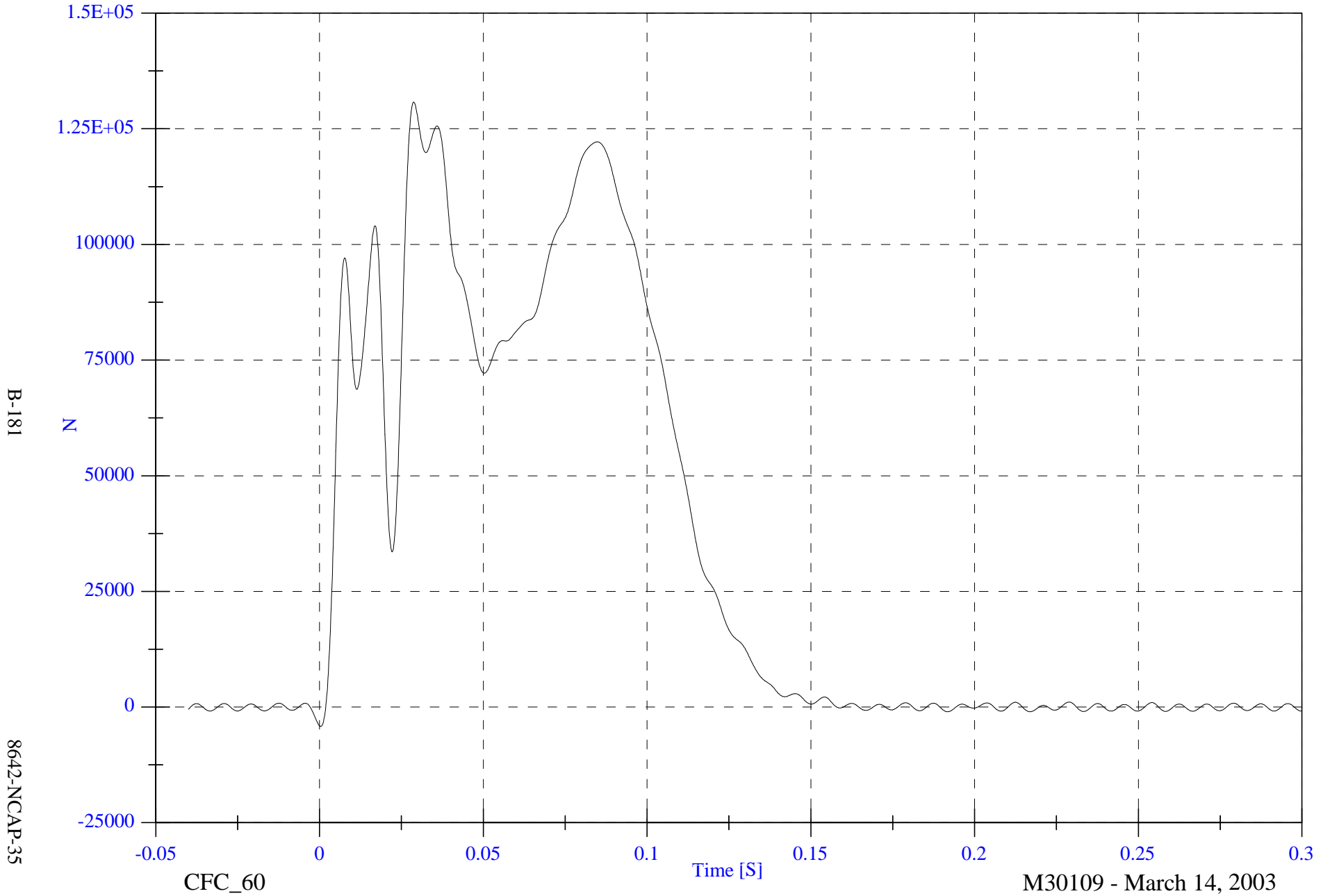
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Group 3 Load Cell Sum (A7,A8,A9,B7,B8,B9)

Max: 130782.6 [N] at 0.029 [S]

Min: -4198.5 [N] at 0.000 [S]



B-181

8642-NCAP-35

CFC\_60

Time [S]

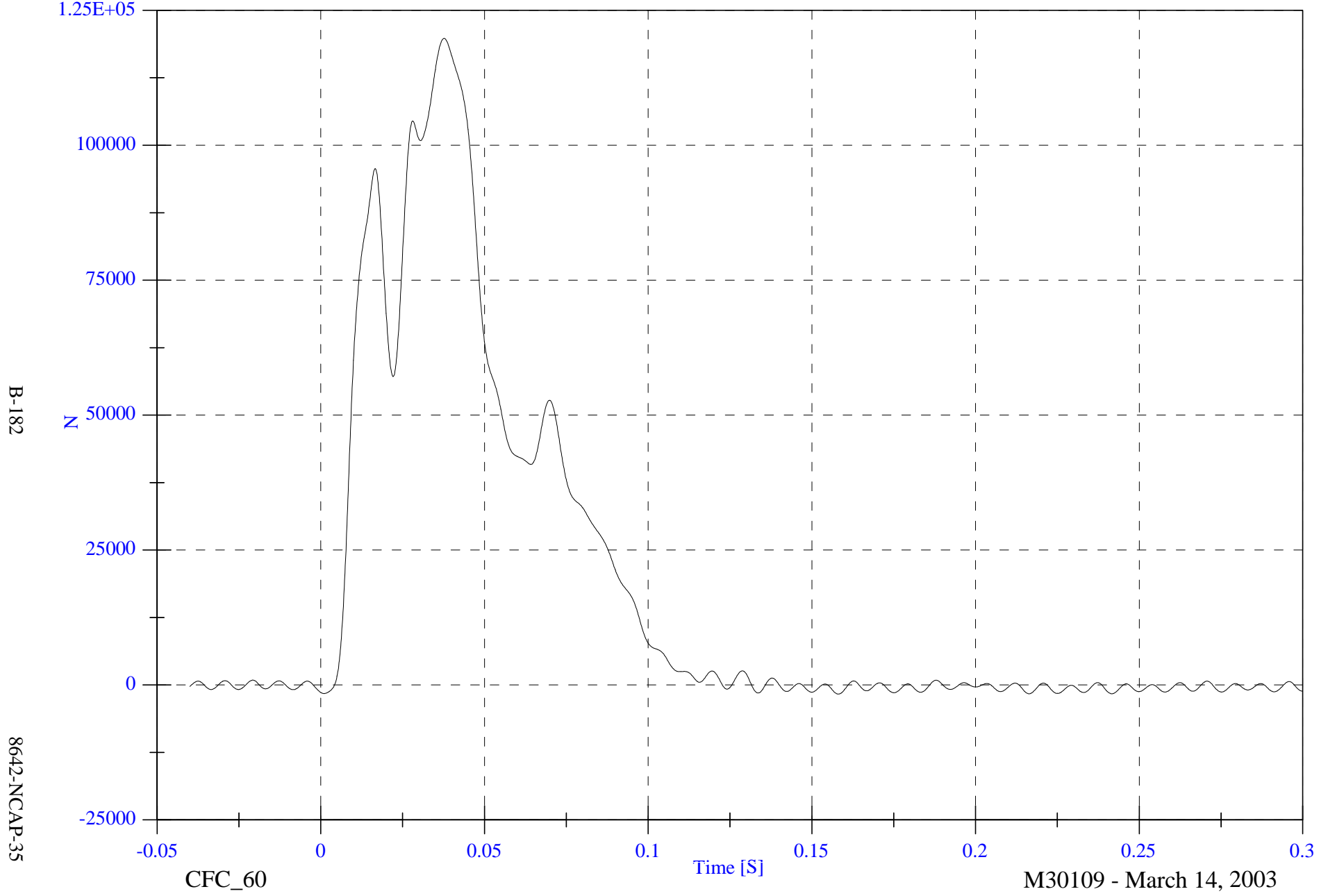
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Group 4 Load Cell Sum (C1,C2,C3,D1,D2,D3)

Max: 119797.2 [N] at 0.038 [S]

Min: -1688.5 [N] at 0.158 [S]



B-182

8642-NCAP-35

CFC\_60

Time [S]

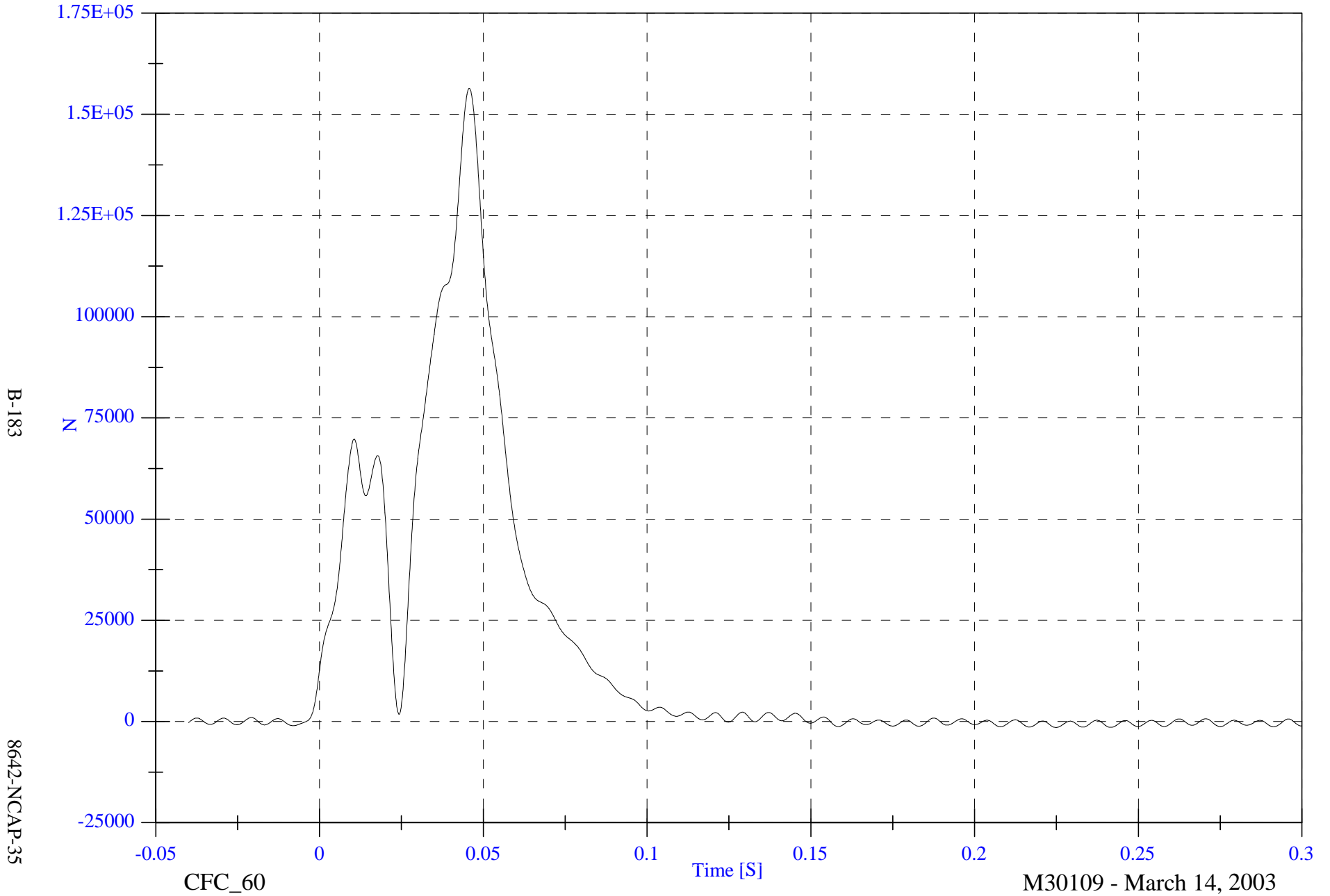
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Group 5 Load Cell Sum (C4,C5,C6,D4,D5,D6)

Max: 156406.0 [N] at 0.046 [S]

Min: -1487.4 [N] at 0.225 [S]



B-183

8642-NCAP-35

CFC\_60

Time [S]

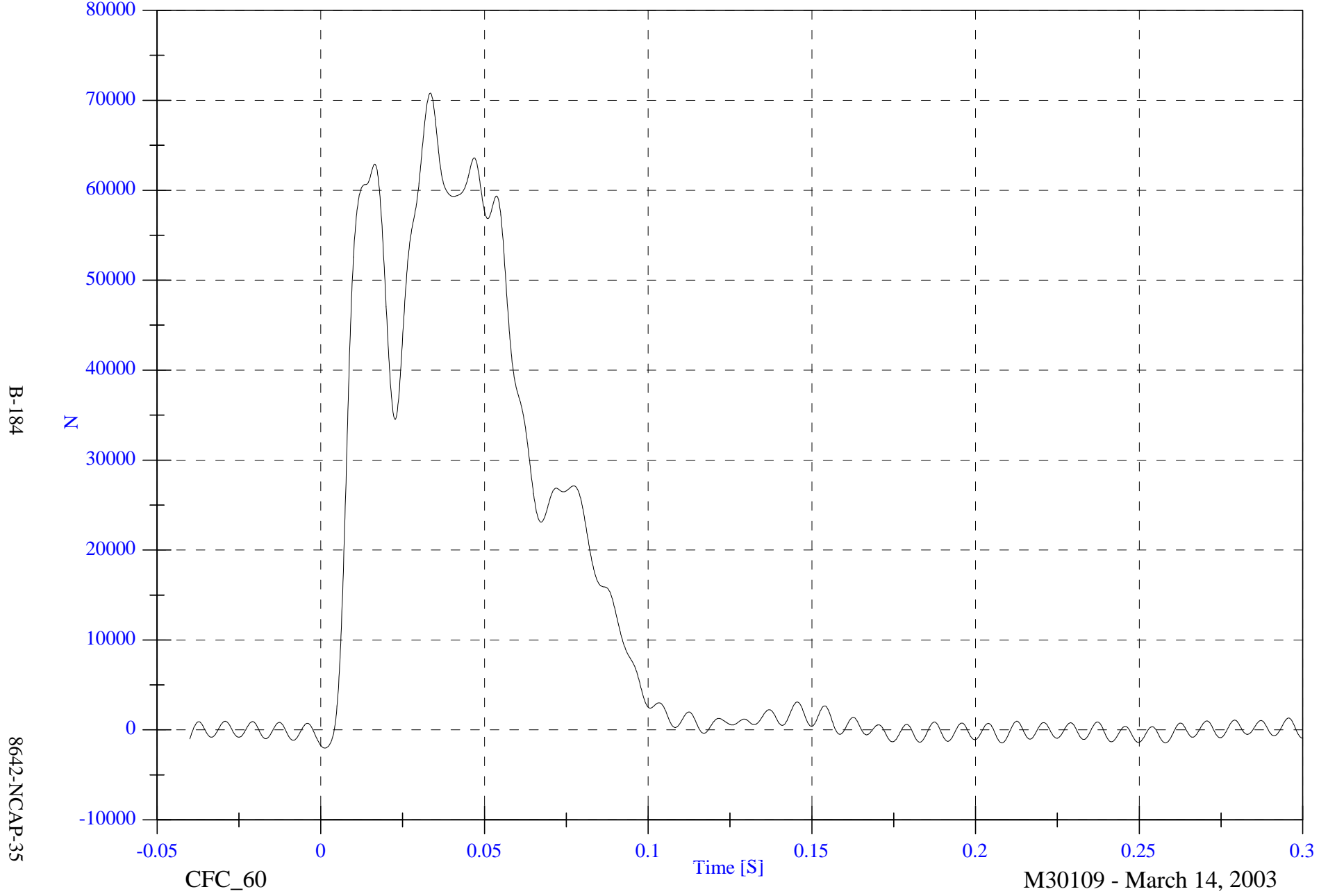
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Group 6 Load Cell Sum (C7,C8,C9,D7,D8,D9)

Max: 70806.6 [N] at 0.033 [S]

Min: -2013.1 [N] at 0.001 [S]



B-184

8642-NCAP-35

CFC\_60

Time [S]

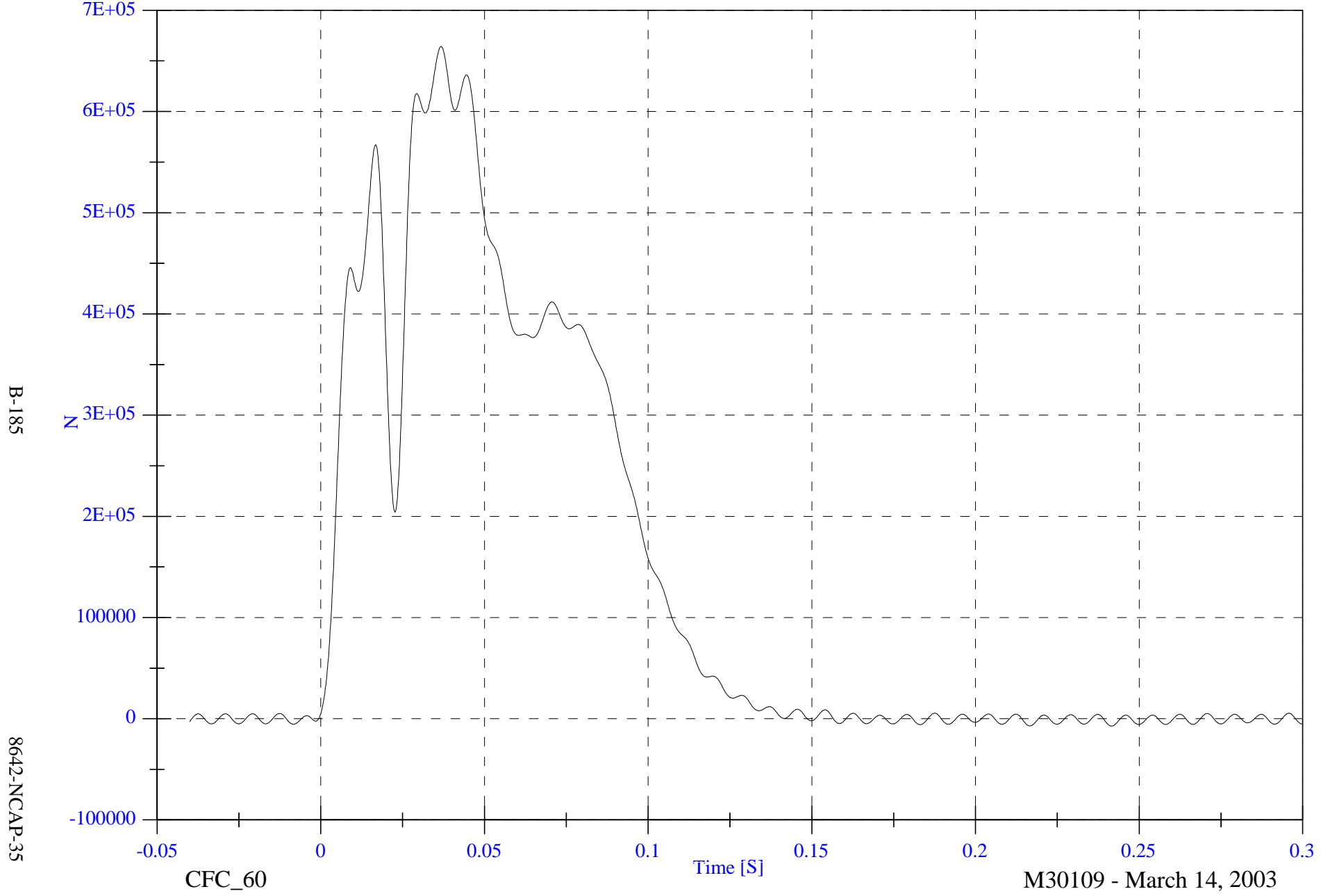
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 664270.8 [N] at 0.037 [S]

Total Load Cell Sum (All 6 Groups)

Min: -7214.2 [N] at 0.242 [S]



B-185

8642-NCAP-35

CFC\_60

Time [S]

M30109 - March 14, 2003

**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 Veridian Engineering. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

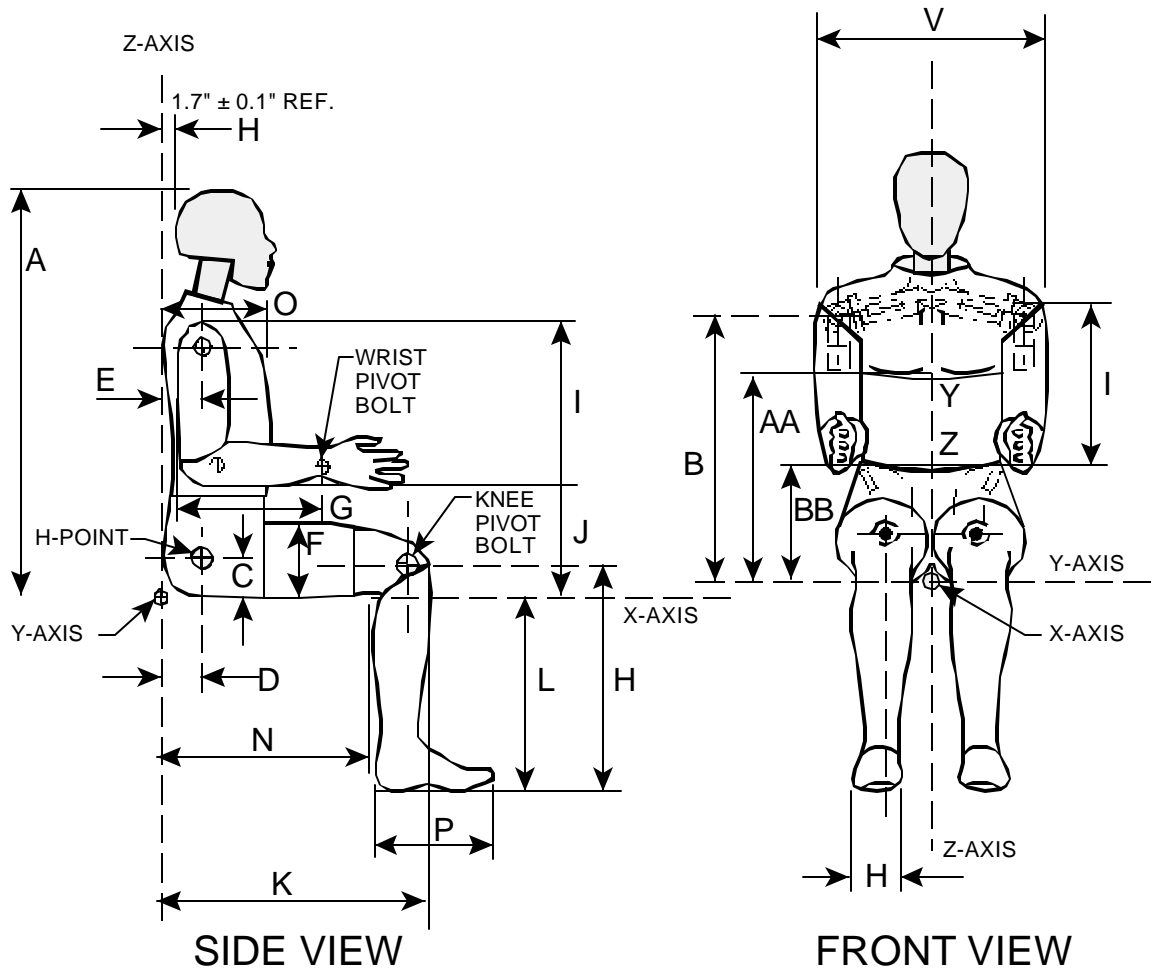
<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	061	February 14, 2003
#2/Right Front Passenger	064	February 14, 2003

#### 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 February 12, 2003  
Workfile 061H 2-12-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.0
Relative Humidity	10% - 70%	36.00
Peak Resultant Acceleration	225-275 G's	236.66
Peak Lateral Acceleration	15 G's Max	2.26
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E  
NECK FLEXION TEST

Dummy Serial Number	061	
Sequential Test Number	1	
Date	February 12, 2003	6 Axis Neck Transducer
Workfile	061Flx2 02-12-03	

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	22.88
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	23.36
	20 ms	17.60 - 22.60 G's	20.91
	30 ms	12.50 - 18.50 G's	17.14
Max Pendulum G's Above 30 ms		29 G's Max	17.14
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	37.70
D Plane Rotation	Max	64 - 78 Deg	67.77
	Time	57 - 64 ms	58.50
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	79.22
	Time	47 - 58 ms	49.30
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	114.30
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	98.20

Remarks:

Laboratory Technician:

B. Swiecicki

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PART 572E  
NECK EXTENSION TEST

Dummy Serial Number	061	
Sequential Test Number	1	
Date	February 12, 2003	6 Axis Neck Transducer
Workfile	061Ext 02-12-03	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.00
Relative Humidity	10% - 70%	37.00
Impact Velocity	19.50 - 20.30 Ft/s	19.50
Pendulum Deceleration	10 ms	17.20 - 21.20 G's
	20 ms	14.00 - 19.00 G's
	30 ms	11.00 - 16.00 G's
Max Pendulum G's Above 30 ms	22 G's Max	13.60
Deceleration - Time Curve Decay Time to 5 G's	38 - 46 ms	40.20
D Plane Rotation	Max	81 - 106 Deg
	Time	72 - 82 ms
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs
	Time	65 - 79 ms
Rotation Angle - Time Curve Decay Time to Zero	147 - 174 ms	154.40
Positive Moment - Time Curve Decay Time to Zero	120 - 148 ms	138.30

Remarks:

Laboratory Technician:

B. Swiecicki

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PART 572E  
THORAX IMPACT TEST

Dummy Serial Number 061  
Sequential Test Number 1  
Date February 14, 2003  
Workfile 061T 02-14-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	69.0
Relative Humidity	10% - 70%	33.00
Pendulum Velocity	21.6 - 22.4 Ft/s	22.13
Maximum Deflection	2.50 - 2.86 in	2.57
Maximum Resistive Force	1160 - 1325 Lbs	1308.56
Internal Hysteresis	69 - 85 %	73.78

Remarks:

Laboratory Technician:

\_\_\_\_\_ B. Swiecicki



PART 572E  
EXTERNAL DIMENSIONS

Dummy Serial Number           061  
Sequential Test Number        1  
Date                                February 14, 2003

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			38
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	3.6
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

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PART 572E  
HEAD DROP TEST

Dummy Serial Number 064  
Sequential Test Number 1  
Date February 12, 2003  
Workfile 064H 02-12-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.00
Relative Humidity	10% - 70%	36.00
Peak Resultant Acceleration	225-275 G's	263.01
Peak Lateral Acceleration	15 G's Max	12.86
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E  
NECK FLEXION TEST

Dummy Serial Number	064	
Sequential Test Number	5	
Date	February 13, 2003	6 Axis Neck Transducer
Workfile	064Flx5 2-13-03	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.00
Relative Humidity	10% - 70%	37.00
Impact Velocity	22.60 - 23.40 Ft/s	22.70
Pendulum Deceleration    10 ms	22.50 - 27.50 G's	24.00
20 ms	17.60 - 22.60 G's	20.74
30 ms	12.50 - 18.50 G's	14.85
Max Pendulum G's Above 30 ms	29 G's Max	14.85
Deceleration - Time Curve Decay Time to 5 G's	34 - 42 ms	38.30
D Plane Rotation            Max	64 - 78 Deg	68.73
Time	57 - 64 ms	57.80
Moment About Occipital    Max	65 - 80 Ft-Lbs	66.77
Condyle                        Time	47 - 58 ms	54.20
Rotation Angle - Time Curve Decay Time to Zero	113 - 128 ms	113.20
Positive Moment - Time Curve Decay Time to Zero	97 - 107 ms	98.20

Remarks:

Laboratory Technician: \_\_\_\_\_ B. Swiecicki \_\_\_\_\_

PART 572E  
NECK EXTENSION TEST

Dummy Serial Number	064	
Sequential Test Number	1	
Date	February 13, 2003	6 Axis Neck Transducer
Workfile	064Ext 02-13-03	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.00
Relative Humidity		10% - 70%	37.00
Impact Velocity		19.50 - 20.30 Ft/s	19.63
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	19.97
	20 ms	14.00 - 19.00 G's	16.78
	30 ms	11.00 - 16.00 G's	13.08
Max Pendulum G's Above 30 ms		22 G's Max	13.73
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	39.80
D Plane Rotation	Max	81 - 106 Deg	90.61
	Time	72 - 82 ms	75.10
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-49.00
	Time	65 - 79 ms	70.30
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	155.90
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	136.00

Remarks:

Laboratory Technician:

B. Swiecicki

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PART 572E  
THORAX IMPACT TEST

Dummy Serial Number 064  
Sequential Test Number 1  
Date February 14, 2003  
Workfile 064T 02-14-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	69.0
Relative Humidity	10% - 70%	33.00
Pendulum Velocity	21.6 - 22.4 Ft/s	22.13
Maximum Deflection	2.50 - 2.86 in	2.57
Maximum Resistive Force	1160 - 1325 Lbs	1283.69
Internal Hysteresis	69 - 85 %	74.47

Remarks:

Laboratory Technician:

\_\_\_\_\_ B. Swiecicki



PART 572E  
EXTERNAL DIMENSIONS

Dummy Serial Number           064  
Sequential Test Number         1  
Date                                 February 14, 2003

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			38
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	39.4
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

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## **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	ENTRAN	AC-01G18-F06	20-Sep-02	20-Mar-03
	X Arm Z	ENTRAN	AC-00L13-F39	20-Sep-02	20-Mar-03
	Y Arm X	ENTRAN	AC-00L13-F14	21-Sep-02	21-Mar-03
	Y Arm Z	ENTRAN	AC-01G18-F16	21-Sep-02	21-Mar-03
	Z Arm X	ENTRAN	AC-00L13-F72	21-Sep-02	21-Mar-03
	Z Arm Y	ENTRAN	AC-01G18-F12	21-Sep-02	21-Mar-03
Head	X	ENTRAN	AC-00L13-F04	21-Sep-02	21-Mar-03
	Y	ENTRAN	AC-01G18-F15	21-Sep-02	21-Mar-03
	Z	ENTRAN	AC-01G18-F14	21-Sep-02	21-Mar-03
Head	X (R)	ENDEVCO	AC-P23873	10-Oct-02	10-Apr-03
	Y (R)	ENTRAN	AC-01G18-F05	21-Sep-02	21-Mar-03
	Z (R)	ENDEVCO	AC-J14668	21-Sep-02	21-Mar-03
Neck Load Cell	X	DENTON	LC-205Fx	15-Oct-02	15-Apr-03
	Y	DENTON	LC-205Fy	15-Oct-02	15-Apr-03
	Z	DENTON	LC-205Fz	15-Oct-02	15-Apr-03
Neck Moment	X	DENTON	LC-205Mx	15-Oct-02	15-Apr-03
	Y	DENTON	LC-205My	15-Oct-02	15-Apr-03
	Z	DENTON	LC-205Mz	15-Oct-02	15-Apr-03
Chest	X	ENDEVCO	AC-P21373	20-Sep-02	20-Mar-03
	Y	ENDEVCO	AC-P22639	20-Sep-02	20-Mar-03
	Z	ENDEVCO	AC-P21297	20-Sep-02	20-Mar-03
Chest	X (R)	ENDEVCO	AC-P21171	20-Sep-02	20-Mar-03
	Y (R)	ENDEVCO	AC-P23136	20-Sep-02	20-Mar-03
	Z (R)	ENDEVCO	AC-P23128	20-Sep-02	20-Mar-03
Chest Deflection	X	SERVO	DS-061	23-Sep-02	23-Mar-03
Pelvic	X	ENDEVCO	AC-P21393	06-Mar-03	06-Mar-03
	Y	ENDEVCO	AC-P23788	06-Mar-03	06-Mar-03
	Z	ENDEVCO	AC-P16845	06-Mar-03	06-Mar-03

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-659	25-Sep-02	25-Mar-03	
Right Femur Load Cell Fz	GSE	LC-723	25-Sep-02	25-Mar-03	
Left Upper Tibia	Mx	DENTON	LC-016Mx	25-Oct-02	25-Apr-03
	My	DENTON	LC-016My	25-Oct-02	25-Apr-03
Left Lower Tibia	Fz	DENTON	LC-123Fz	25-Oct-02	25-Apr-03
	Mx	DENTON	LC-123Mx	25-Oct-02	25-Apr-03
	My	DENTON	LC-123My	25-Oct-02	25-Apr-03
Right Upper Tibia	Mx	DENTON	LC-023Mx	25-Oct-02	25-Apr-03
	My	DENTON	LC-023My	25-Oct-02	25-Apr-03
Right Lower Tibia	Fz	DENTON	LC-111Fz	25-Oct-02	25-Apr-03
	Mx	DENTON	LC-111Mx	25-Oct-02	25-Apr-03
	My	DENTON	LC-111My	25-Oct-02	25-Apr-03
Left Foot Rear	X	ENDEVCO	AC-P19343	20-Sep-02	20-Mar-03
	Z	ENDEVCO	AC-P16583	20-Sep-02	20-Mar-03
Left Foot Front	Z	ENDEVCO	AC-P18525	20-Sep-02	20-Mar-03
Right Foot Rear	X	ENDEVCO	AC-P18628	20-Sep-02	20-Mar-03
	Z	ENDEVCO	AC-P18741	20-Sep-02	20-Mar-03
Right Foot Front	Z	ENDEVCO	AC-P23276	20-Sep-02	20-Mar-03
Lap Belt Load Cell	LEBOW	LC-706	12-Nov-02	12-May-03	

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	ENTRAN	AC-01G18-F08	23-Sep-02	23-Mar-03
	X Arm Z	ENTRAN	AC-00L20-A13	23-Sep-02	23-Mar-03
	Y Arm X	ENTRAN	AC-00L20-A08	23-Sep-02	23-Mar-03
	Y Arm Z	ENTRAN	AC-01G18-F13	23-Sep-02	23-Mar-03
	Z Arm X	ENTRAN	AC-01J02-F18	23-Sep-02	23-Mar-03
	Z Arm Y	ENTRAN	AC-01G25-N11	23-Sep-02	23-Mar-03
Head	X	ENDEVCO	AC-J32184	27-Sep-02	27-Mar-03
	Y	ENDEVCO	AC-J32185	27-Sep-02	27-Mar-03
	Z	ENDEVCO	AC-J31011	27-Sep-02	27-Mar-03
Head	X (R)	ENDEVCO	AC-J31020	27-Sep-02	27-Mar-03
	Y (R)	ENDEVCO	AC-J31101	27-Sep-02	27-Mar-03
	Z (R)	ENDEVCO	AC-J31059	27-Sep-02	27-Mar-03
Neck Load Cell	X	DENTON	LC-440Fx	15-Oct-02	15-Apr-03
	Y	DENTON	LC-440Fy	15-Oct-02	15-Apr-03
	Z	DENTON	LC-440Fz	15-Oct-02	15-Apr-03
Neck Moment	X	DENTON	LC-440Mx	15-Oct-02	15-Apr-03
	Y	DENTON	LC-440My	15-Oct-02	15-Apr-03
	Z	DENTON	LC-440Mz	15-Oct-02	15-Apr-03
Chest	X	ENDEVCO	AC-J34019	28-Sep-02	28-Mar-03
	Y	ENDEVCO	AC-J33018	27-Sep-02	27-Mar-03
	Z	ENDEVCO	AC-J32783	28-Sep-02	28-Mar-03
Chest	X (R)	ENDEVCO	AC-J31066	28-Sep-02	28-Mar-03
	Y (R)	ENDEVCO	AC-P16979	27-Sep-02	27-Mar-03
	Z (R)	ENDEVCO	AC-J31022	28-Sep-02	28-Mar-03
Chest Deflection	X	SERVO	DS-064	23-Sep-02	23-Mar-03
Pelvic	X	ENDEVCO	AC-P23174	23-Sep-02	23-Mar-03
	Y	ENDEVCO	AC-P23164	23-Sep-02	23-Mar-03
	Z	ENDEVCO	AC-P23137	23-Sep-02	23-Mar-03

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-954	25-Sep-02	25-Mar-03	
Right Femur Load Cell Fz	GSE	LC-955	25-Sep-02	25-Mar-03	
Left Upper Tibia	Mx	DENTON	LC-045Mx	24-Oct-02	24-Apr-03
	My	DENTON	LC-045My	24-Oct-02	24-Apr-03
Left Lower Tibia	Fz	DENTON	LC-125Fz	24-Oct-02	24-Apr-03
	Mx	DENTON	LC-125Mx	24-Oct-02	24-Apr-03
	My	DENTON	LC-125My	24-Oct-02	24-Apr-03
Right Upper Tibia	Mx	DENTON	LC-038Mx	24-Oct-02	24-Apr-03
	My	DENTON	LC-038My	24-Oct-02	24-Apr-03
Right Lower Tibia	Fz	DENTON	LC-124Fz	24-Oct-02	24-Apr-03
	Mx	DENTON	LC-124Mx	24-Oct-02	24-Apr-03
	My	DENTON	LC-124My	24-Oct-02	24-Apr-03
Left Foot Rear	X	ENDEVCO	AC-J30491	23-Sep-02	23-Mar-03
	Z	ENDEVCO	AC-J31026	23-Sep-02	23-Mar-03
Left Foot Front	Z	ENDEVCO	AC-J32831	23-Sep-02	23-Mar-03
Right Foot Rear	X	ENDEVCO	AC-J33376	23-Sep-02	23-Mar-03
	Z	ENDEVCO	AC-J32832	23-Sep-02	23-Mar-03
Right Foot Front	Z	ENDEVCO	AC-J31095	23-Sep-02	23-Mar-03
Lap Belt Load Cell	LEBOW	LC-707	12-Nov-02	12-May-03	

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS  
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ICS	AC-8083-028	11-Nov-02	11-May-03
Right Rear Seat Crossmember X	ICS	AC-8084-006	20-Nov-02	20-May-03
Top of Engine	ICS	AC-6917-020	20-Nov-02	20-May-03
Bottom of Engine	ICS	AC-8084-024	11-Nov-02	11-May-03
Right Disc Brake Caliper	ICS	AC-9026-036	11-Nov-02	11-May-03
Instrument Panel	ICS	AC-8084-039	20-Nov-02	20-May-03
Left Disc Brake Caliper	ICS	AC-8084-018	11-Nov-02	11-May-03
Left Seat Rear Crossmember Z	ICS	AC-8062-003	11-Nov-02	11-May-03
Right Seat Rear Crossmember Z	ICS	AC-8084-041	20-Nov-02	20-May-03

REPORT NUMBER: CAL-03-13

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

EVENFLO VANGUARD V LATCH  
GRACO MY CARGO HIGHBACK BOOSTER

NHTSA NUMBER: M30109

VERIDIAN ENGINEERING REPORT NUMBER: 8642-NCAP-35

VERIDIAN ENGINEERING  
TRANSPORTATION SCIENCES CENTER  
P.O. BOX 400  
BUFFALO, NEW YORK 14225



March 14, 2003

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

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Prepared By:

\_\_\_\_\_  
Patrick G. MacDiarmid, Jr., Project Engineer

Approved By:

\_\_\_\_\_  
David J. Travale, Program Manager  
Transportation Sciences Center

Approval Date:

\_\_\_\_\_

FINAL REPORT ACCEPTANCE BY:

Accepted By:

\_\_\_\_\_

Acceptance Date:

\_\_\_\_\_

**TECHNICAL REPORT STANDARD TITLE PAGE**

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4. Title and Subtitle Final Report of Evenflo Vanguard VLATCH and Graco My CarGo Highback Booster NHTSA No.: M30109				5. Report Date March 14, 2003	
				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-35	
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				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. The subject Evenflo Vanguard VLATCH was secured in position 3 using a top tether and the Graco My CarGo Highback Booster was secured in position 4. This test was conducted at the Veridian Engineering Crash Test Facility in Buffalo, New York, on March 14, 2003.					
<b>ATD Position</b>		<b>HIC 15</b>		<b>HIC 36</b>	
<b>P3 (Right Rear) (044)</b>		334.6		682.6	
<b>P4 (Left Rear) (144)</b>		622.6*		950.7*	
* Head Y data was questionable					
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 5108 (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 M30109

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 56.33 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 six axial lower neck force and moment load cells.

The right rear (Position 3) child dummy (serial no. 044) and left rear (Position 4) child dummy (serial no. 144) were calibrated previous to this test. Child dummy certification information is found in section 5.

The right rear child dummy's HIC was 334.6, maximum chest deceleration over 3 ms was 38.0 g's. The left rear child dummy's HIC was 622.6, maximum chest deceleration over 3 ms was 36.8 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/044	Hybrid III 6C /144
Restraint System:	Evenflo Vangaurd V forward facing LATCH	Graco My CarGo Booster

Number of Data Channels \_\_\_\_\_ 46 \_\_\_\_\_  
 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 with tools
Right Side Doors	Closed, Latched and Operable without tools	Closed, Latched and Operable without tools
Hatch/Other Door	N/A	Closed, Latched and Operable without tools

POST TEST SEAT DATA

LOCATION	SEAT MOVEMENT (mm)	SEAT BACK FAILURE
P1 (Left Front)	4 mm forward	None
P2 (Right Front)	2 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 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 Vangaurd V forward facing LATCH and Graco My CarGo Highback Booster

NHTSA No. M30109

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Delivered Weight of Vehicle with Maximum Fluids = 2423.0 kg (A)

AS TESTED WEIGHT OF VEHICLE

(2 P572E + 1 P572P w/ CRS + 1 P572N w/ CRS + CARGO + EQUIPMENT & INSTRUMENTATION):

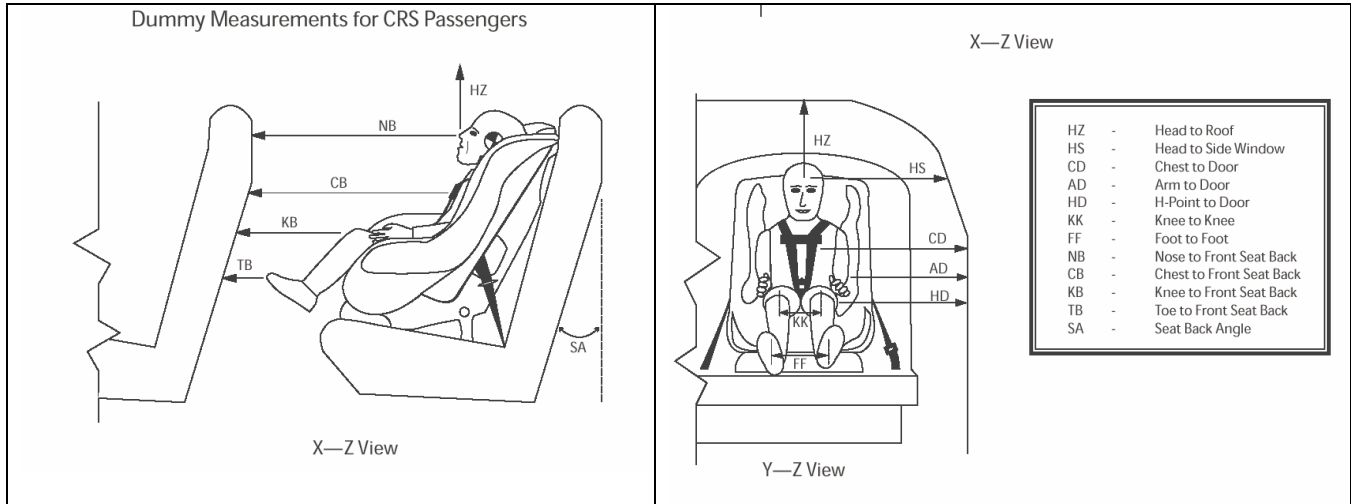
Left Front	=	<u>711.0</u>	kg	Left Rear	=	<u>680.5</u>	kg
Right Front	=	<u>636.0</u>	kg	Right Rear	=	<u>678.5</u>	kg
TOTAL FRONT	=	<u>711.0</u>	kg	TOTAL REAR	=	<u>680.5</u>	kg
TOTAL TEST WEIGHT =		<u>1314.5</u>	kg				

DATA SHEET NO. 3

CHILD DUMMY POSITIONING IN VEHICLE

CRS: Evenflo Vangaurd V forward facing LATCH and Graco My CarGo Highback Booster

NHTSA No. M30109



Measurement	Pre-Test (mm)		Post Test (mm)	
	P3 CRS ( 142)	P4 CRS (144)	P3 CRS ( 142)	P4 CRS (144)
SA	20	20	20	20
HS	419	375	387	396
CD	409	374	379	357
AD	268	230	236	197
HD	324	212	300	165
HZ	397	380	386	379
NB	619	598	596	556
CB	572	577	560	547
KK	150	125	175	115
FF	155	80	190	120
KB – LEFT	335	145	340	310
KB – RIGHT	350	145	350	300
TB – LEFT	120	290	90	135
TB – RIGHT	108	295	90	122

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 Vanguard V forward facing LATCH and Graco My CarGo Highback Booster

NHTSA No. M30109

DESCRIPTION	Unit	MAXIMUM VALUE							
		Position #3				Position #4			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head X	g	45.7	203.8	-35.5	116.5	11.9	242.8	-25.1	73.2
Head Y	g	4.3	124.2	-14.9	116.4	*	*	*	*
Head Z	g	51.4	97.5	-10.3	49.2	70.7	87.6	-2.3	45.6
Head Resultant	g	56.4	97.5	0.2	-29.7	*	*	*	*
Upper Neck Fx	N	29.8	282.2	-637.6	126.1	51.1	224.5	-680.0	73.4
Upper Neck Fy	N	74.7	213.6	-31.8	142.4	25.1	42.6	-113.3	90.3
Upper Neck Fz	N	1755.1	104.9	-272.7	48.5	2487.0	84.5	-139.4	39.7
Upper Neck F Resultant	N	1842.6	104.9	3.5	21.2	2544.1	83.0	4.1	13.6
Upper Neck Mx	N-m	*	*	*	*	5.7	117.0	-8.2	96.9
Upper Neck My	N-m	5.4	167.3	-13.4	213.6	30.8	104.3	-39.9	67.5
Upper Neck Mz	N-m	*	*	*	*	*	*	*	*
Upper Neck M Resultant	N-m	*	*	*	*	*	*	*	*
Lower Neck Fx	N	180.2	206.4	-640.8	109.4	-	-	-	-
Lower Neck Fy	N	73.6	214.1	-163.4	117.8	-	-	-	-
Lower Neck Fz	N	1221.4	104.4	-354.5	49.6	-	-	-	-
Lower Neck F Resultant	N	1372.0	104.3	3.1	20.9	-	-	-	-
Lower Neck Mx	N-m	11.8	81.0	-8.3	125.1	-	-	-	-
Lower Neck My	N-m	86.0	105.0	-12.9	205.6	-	-	-	-
Lower Neck Mz	N-m	4.1	85.1	-7.0	123.8	-	-	-	-
Lower Neck M Resultant	N-m	86.5	104.7	0.3	-30.2	-	-	-	-
Chest X	g	6.7	258.5	-34.0	84.1	2.8	10.4	-36.8	77.5
Chest Y	g	4.4	73.0	-4.4	127.0	3.0	90.6	-4.9	46.7
Chest Z	g	23.1	108.1	-22.3	52.3	14.3	78.0	-9.9	60.8
Chest Resultant	g	38.5	107.4	0.0	-40.4	39.4	77.9	0.1	5.4
Chest Displacement	g	0.0	-3.7	-17.2	120.8	0.1	-34.7	-25.5	92.4

\*Data is Questionable

**DATA SHEET 4**

**CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)**

CRS: Evenflo Vangaurd V forward facing LATCH and Graco My CarGo Highback Booster

NHTSA No. M30109

DESCRIPTION	Unit	MAXIMUM VALUE							
		Position #3				Position #4			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Pelvic X	g	8.2	178.7	-40.9	76.6	7.5	161.0	-29.9	52.0
Pelvic Y	g	8.2	67.2	-4.4	111.4	10.2	105.8	-8.3	68.6
Pelvic Z	g	18.4	211.3	-26.2	88.9	5.8	97.8	-23.7	61.8
Pelvic Resultant	g	46.1	67.1	0.0	-48.7	36.8	70.1	0.0	-9.0
Tether Belt Load	N	840.6	104.5	-111.4	209.8	-	-	-	-
Lap Belt Load	N	-	-	-	-	2199.0	76.1	-37.9	170.6

**DATA SHEET 4**

**CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)**

CRS: Evenflo Vanguard V forward facing LATCH and Graco My CarGo Highback Booster

NHTSA No. M30109

	HEAD INJURY CRITERIA (HIC)							
	HIC15				HIC36			
	HIC	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	Average Acceleration t <sub>1</sub> to t <sub>2</sub>	HIC	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	Average Acceleration t <sub>1</sub> to t <sub>2</sub>
Position #3 - Right	334.6	95.0	110.0	54.9 g	682.6*	86.1	122.1	51.4 g
Position #4 - Left	622.6	77.4	92.4	70.3 g	950.7*	68.5	103.8	59.2 g

\*Head Y data is questionable

	CLIP SUMMARY*			
	CLIP (g's)	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	CSI
Position #3 - Right	38.0	105.0	108.0	427.7
Position #4 - Left	36.8	76.5	79.5	300.2

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

\*\*Chext X Sensor Damaged – Data is Not Accurate

**Position 3 Neck Injury Summary (HIII 3 year old – In Position)**

Nij V10	Nij	Time (ms)	Z Force (N)	X Force (N)	Y Moment (N-m)
Ntf	0.41	86.3	947.9	-296.0	0.1
Nte	0.99	112.6	1581.6	-569.3	-9.3
Ncf	0.04	351.4	-82.4	-50.5	0.2
Nce	0.20	46.9	-246.1	-91.9	-2.5

**Peak Tension (CFC1000)** 1755.1 N

**Peak Compression (CFC1000)** -272.7 N

Nij Intercepts				Peak Limits	
Tension (CVt)	2340 N	Extension (mCVe)	30 N-m	Tension	1430 N
Compression (CVc)	2120 N	Flexion (mCVf)	68 N-m	Compression	-1380 N

Condyle Offset 0

**Position 4 Neck Injury Summary (HIII 6 year old – In Position)**

Nij V10	Nij	Time (ms)	Z Force (N)	X Force (N)	Y Moment (N-m)
Ntf	0.84	90.8	2267.8	-408.5	10.4
Nte	1.03	69.7	1201.7	-649.6	-27.0
Ncf	0.01	-87.0	-11.4	-7.4	0.5
Nce	0.28	273.9	-54.0	-20.9	-11.1

**Peak Tension (CFC1000)** 2487.0 N

**Peak Compression (CFC1000)** -139.4 N

**Critical Values**

Nij Intercepts				Peak Limits	
Tension (CVt)	3096 N	Extension (mCVe)	42 N-m	Tension	1890 N
Compression (CVc)	2800 N	Flexion (mCVf)	93 N-m	Compression	-1820 N

Condyle Offset -0.01778

**DATA SHEET NO. 5**

**CRS PERFORMANCE DATA**

CRS: Evenflo Vangaurd V forward facing LATCH and Graco My CarGo Highback Booster

NHTSA No. M30109

		MAXIMUM VALUE			
DESCRIPTION	Unit	Positive	Time (ms)	Negative	Time (ms)
<b>P3 CRS X</b>	<b>g</b>	10.9	191.4	-48.3	61.9
<b>P3 CRS Y</b>	<b>g</b>	9.9	130.0	-9.0	95.8
<b>P3 CRS Z</b>	<b>g</b>	13.4	223.5	-20.0	38.3
<b>P3 CRS Resultant</b>	<b>g</b>	51.5	62.1	0.0	-16.2
<b>P4 CRS X</b>	<b>g</b>	13.4	135.8	-29.7	73.6
<b>P4 CRS Y</b>	<b>g</b>	6.1	109.4	-6.7	23.3
<b>P4 CRS Z</b>	<b>g</b>	6.6	102.8	-14.4	78.3
<b>P4 CRS Resultant</b>	<b>g</b>	31.1	79.3	0.1	7.5

**DATA SHEET NO. 5**

**CRS PERFORMANCE DATA (CONTINUED)**

CRS: Evenflo Vanguard V forward facing LATCH and Graco My CarGo Highback Booster

NHTSA No. M30109

**POSITION #3 CRS POST-TEST INSPECTION (Serial No. 3691261 P1)**

<b>LOCATION</b>	<b>DAMAGE</b>	<b>REMARKS</b>
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. 8481LAN)**

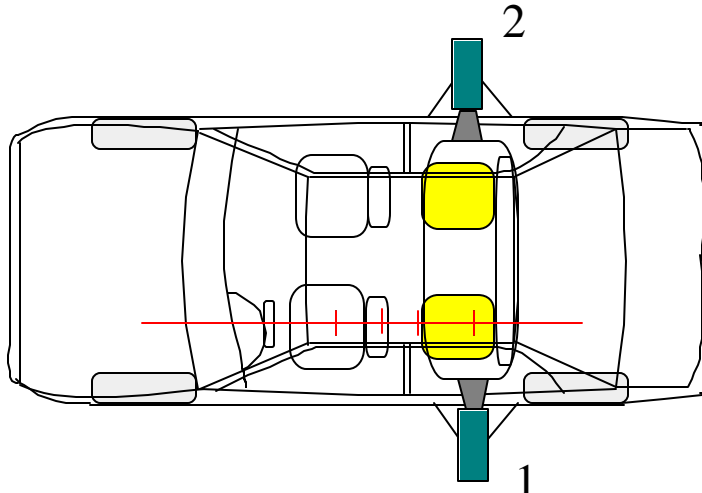
<b>LOCATION</b>	<b>DAMAGE</b>	<b>REMARKS</b>
Upper Tether Strap	NA	NA
Upper Tether Buckle	NA	NA
Upper Tether Hook	NA	NA
Vehicle Upper Tether Anchor	NA	NA
Lower Anchor Strap	NA	NA
Lower Anchor Buckle	NA	NA
Lower Anchor Hooks	NA	NA
Vehicle Lower CRS Anchors	NA	NA
Five Point Harness Connections	NA	NA
Cracks 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 Vanguard V forward facing LATCH and Graco My CarGo Highback Booster

NHTSA No. M30109



Camera No.	View	Coordinates (millimeters)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Left side CRS lateral view	3658	2693	2561	-26	13	1015
2	Right side CRS lateral view	3642	2642	2557	-29	13	1005

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

- X = + Forward
- Y = + To Right
- Z = + Down

**SECTION 3**

**PHOTOGRAPHS**

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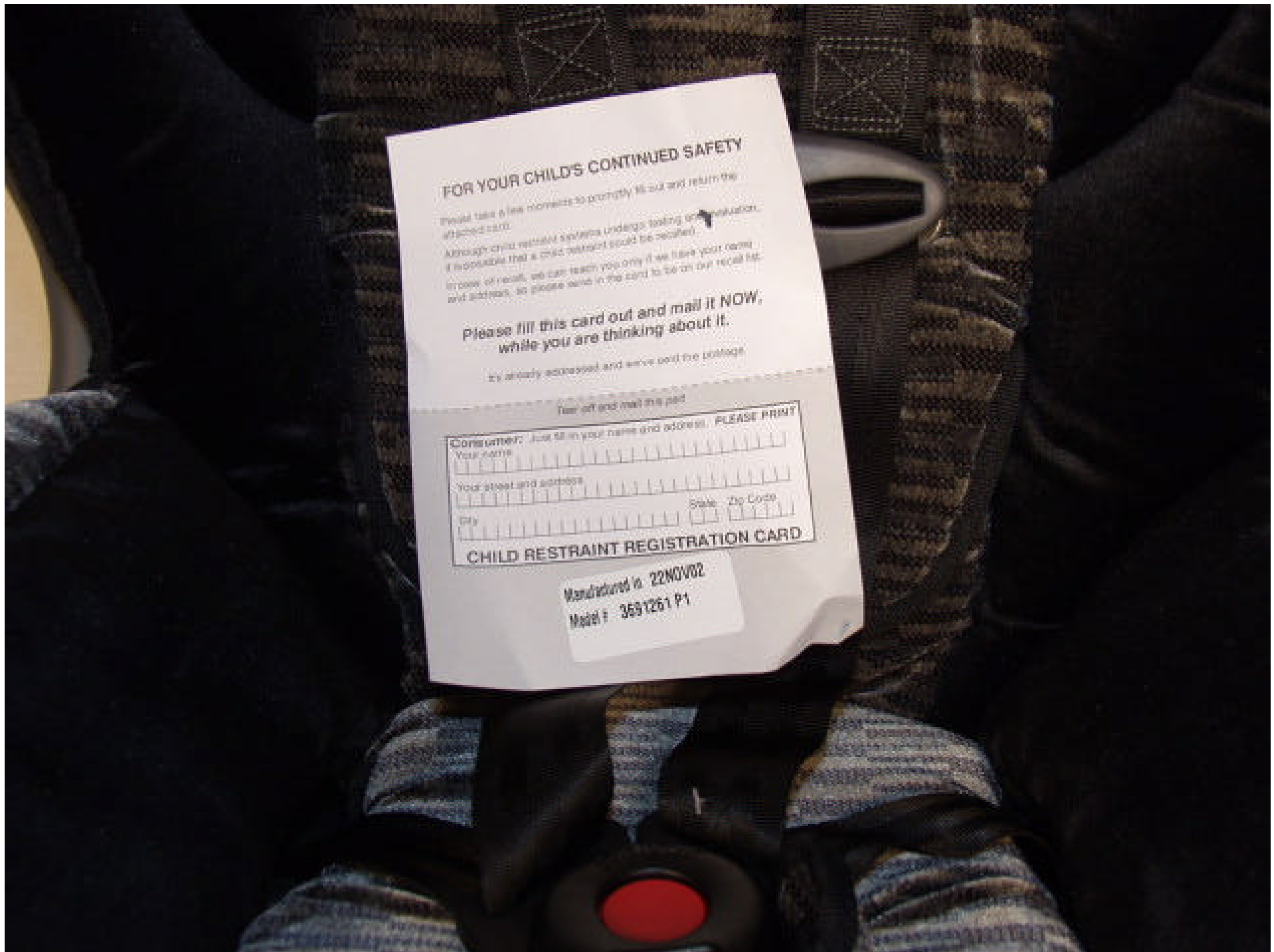


Figure 3-1 CLOSE-UP VIEW OF POSITION 3 CRS LABEL



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



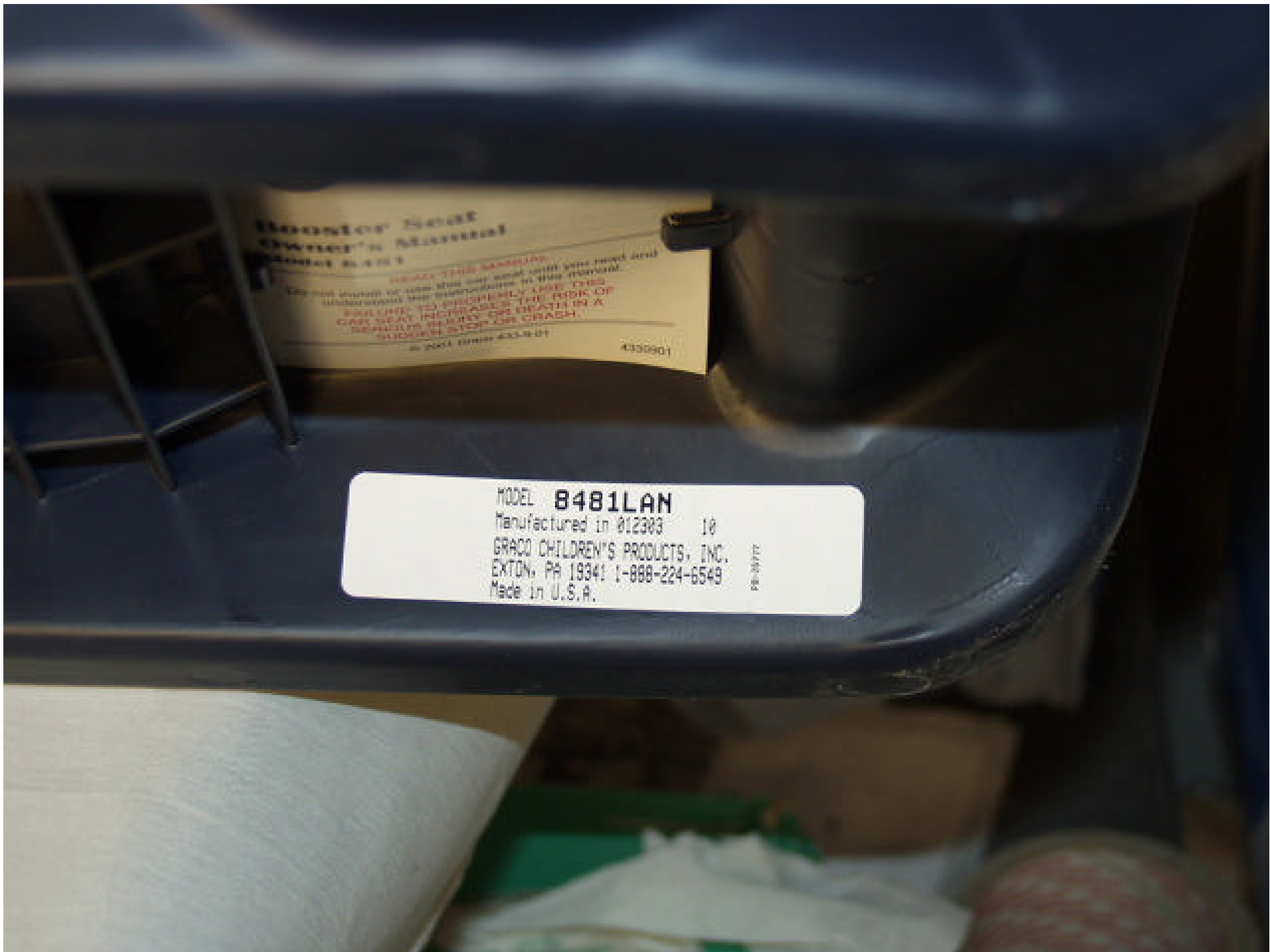
Figure 3-7 POST-TEST LEFT SIDE VIEW OF POSITION 3 CRS



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



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



MODEL **8481LAN**  
Manufactured in 012303 10  
GRACO CHILDREN'S PRODUCTS, INC.  
EXTON, PA 19341 1-888-224-6549  
Made in U.S.A.

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



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8642-NCAP-35

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

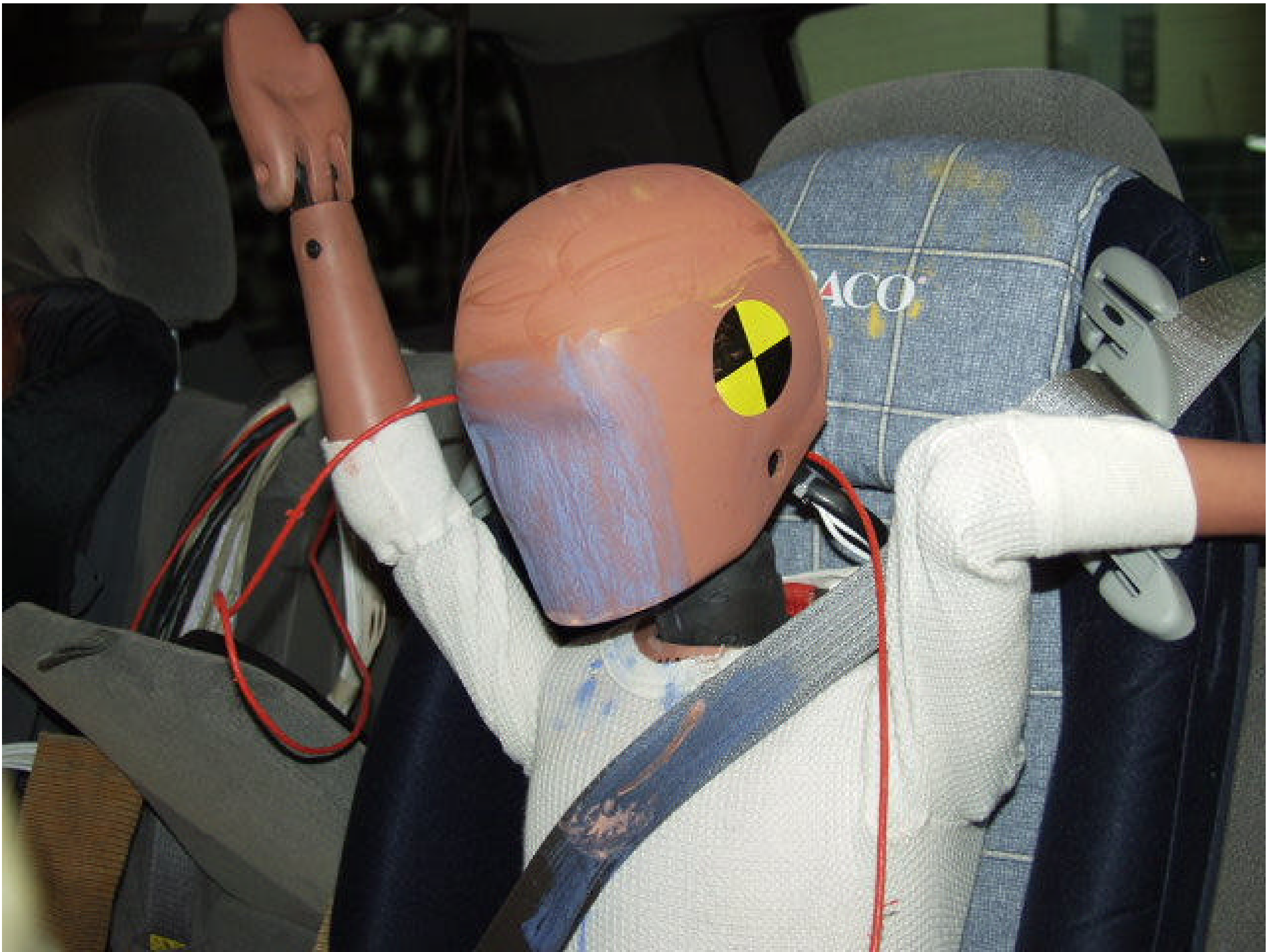


Figure 3-30 POST-TEST POSITION 4 FRONT VIEW

**SECTION 4**

**CHILD DUMMY RESPONSE AND CRS DATA TRACES**

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61	V1P3 Seat z Displacement [mm, CFC_180]	4-64
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63	V1P4 Seat x [g, CFC_60]	4-66
64	V1P4 Seat x Velocity [kph, CFC_180]	4-67
65	V1P4 Seat x Displacement [mm, CFC_180]	4-68
66	V1P4 Seat y [g, CFC_60]	4-69
67	V1P4 Seat y Velocity [kph, CFC_180]	4-70
68	V1P4 Seat y Displacement [mm, CFC_180]	4-71
69	V1P4 Seat z [g, CFC_60]	4-72
70	V1P4 Seat z Velocity [kph, CFC_180]	4-73
71	V1P4 Seat z Displacement [mm, CFC_180]	4-74
72	V1P4 Seat Resultant [g, CFC_60]	4-75

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P3 Head x

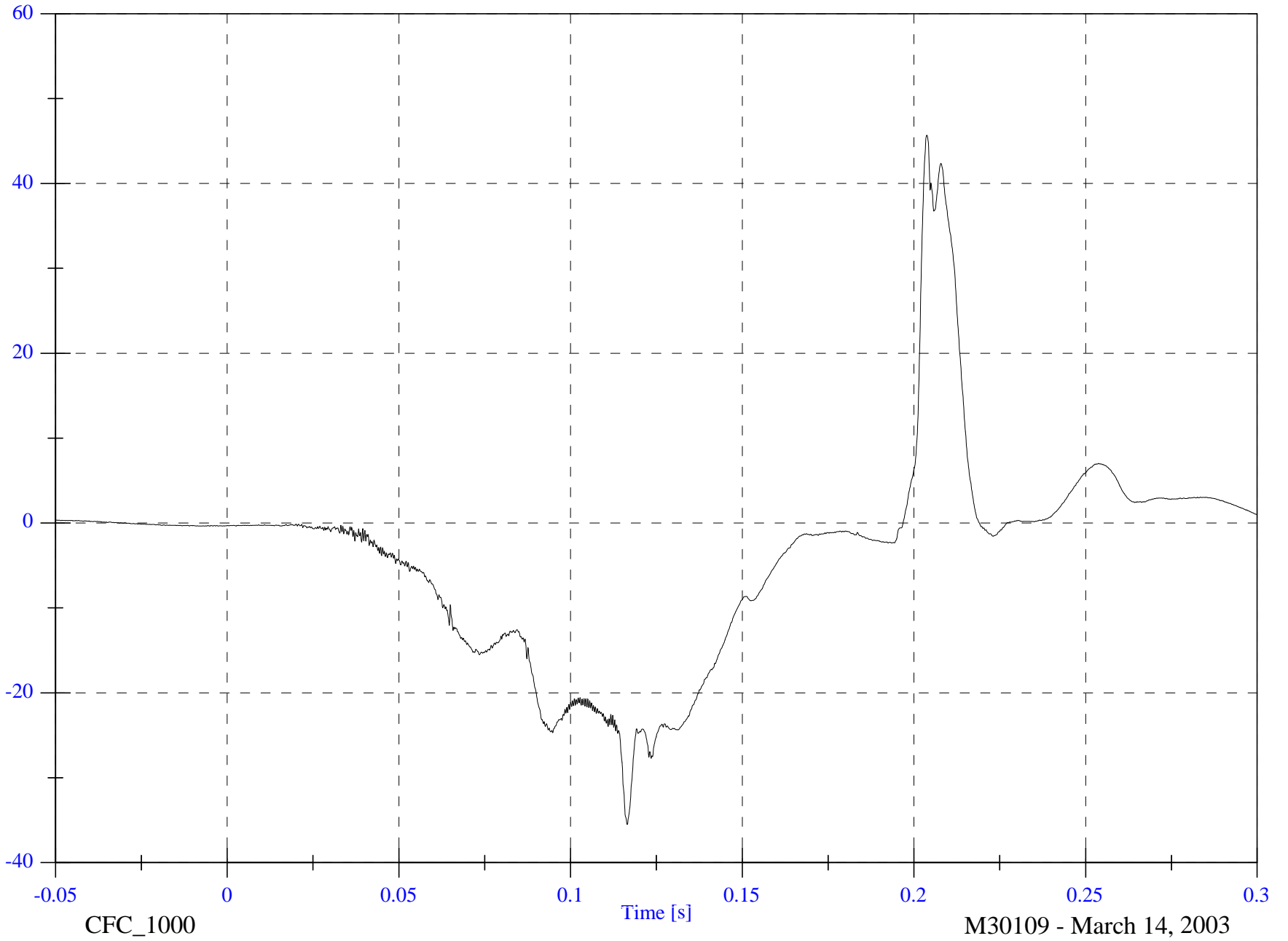
Max: 45.7 [g] at 0.204 [s]

Min: -35.5 [g] at 0.116 [s]

4-4

g

8642-NCAP-35

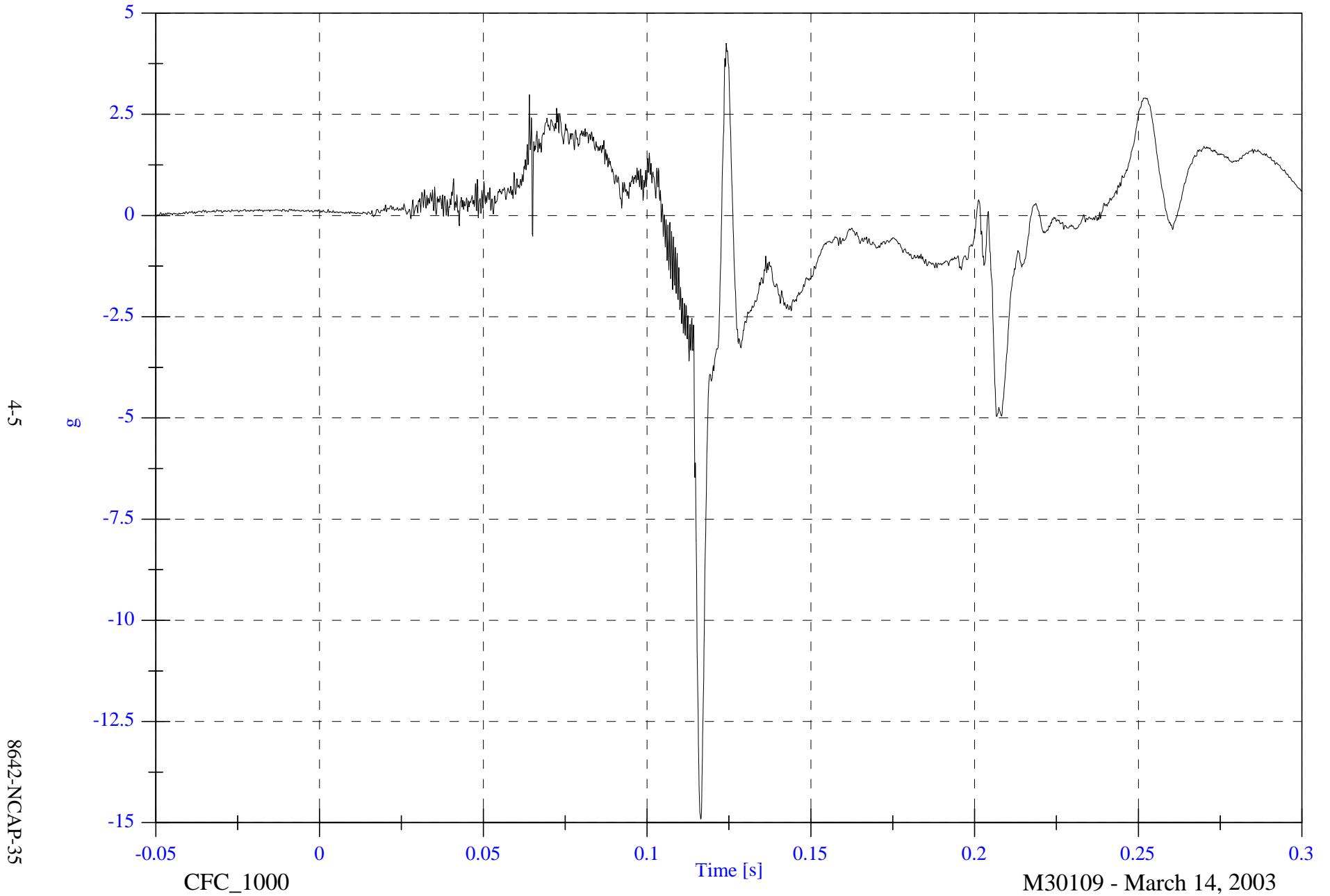


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 4.3 [g] at 0.124 [s]

Min: -14.9 [g] at 0.116 [s]

V1P3 Head y



4-5

g

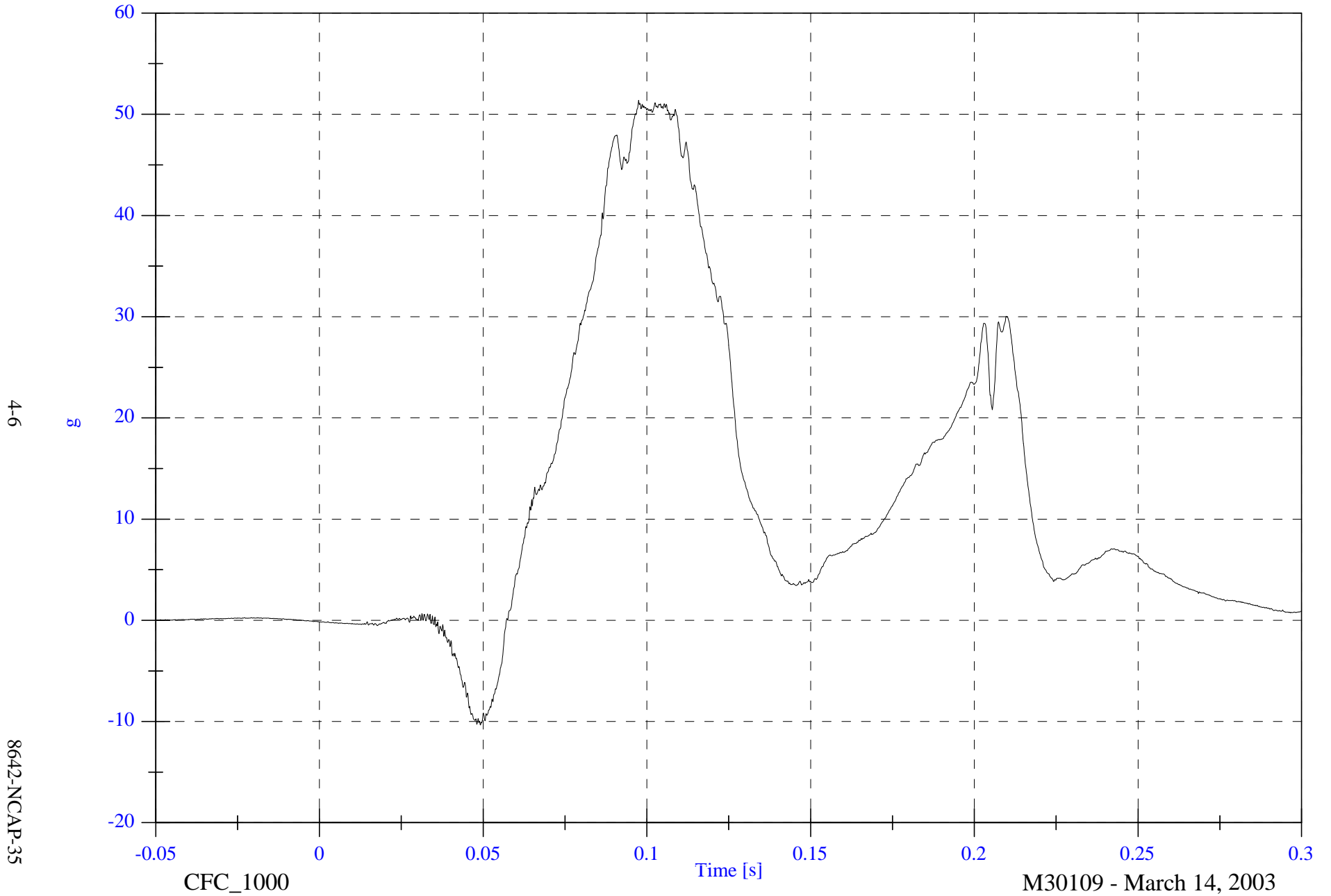
8642-NCAP-35

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 51.4 [g] at 0.097 [s]

Min: -10.3 [g] at 0.049 [s]

V1P3 Head z



2003 NCAP Test 13 2003 Chevrolet Tahoe

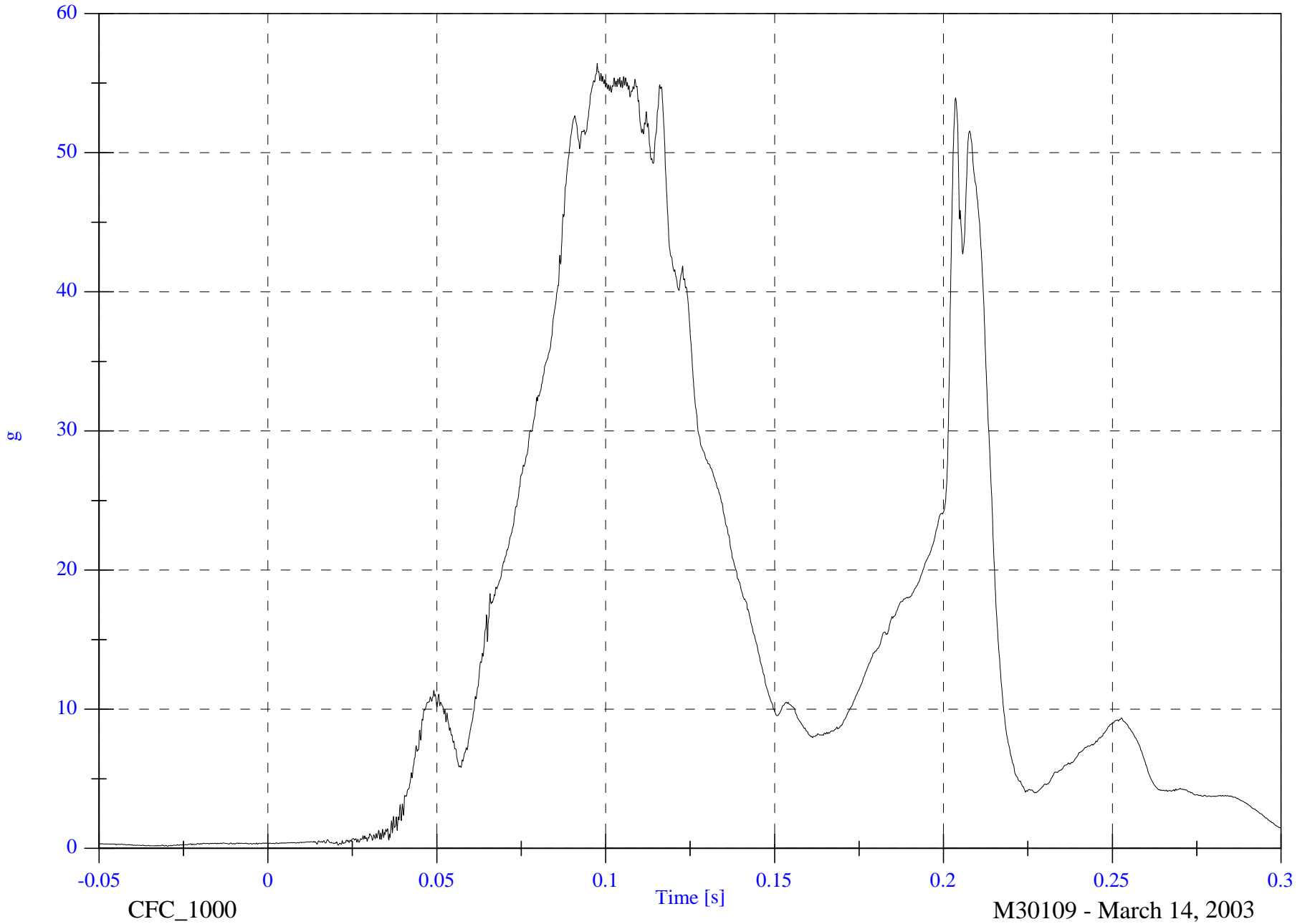
Max: 56.4 [g] at 0.097 [s]

V1P3 Head Resultant

Min: 0.2 [g] at -0.030 [s]

4-7

8642-NCAP-35



CFC\_1000

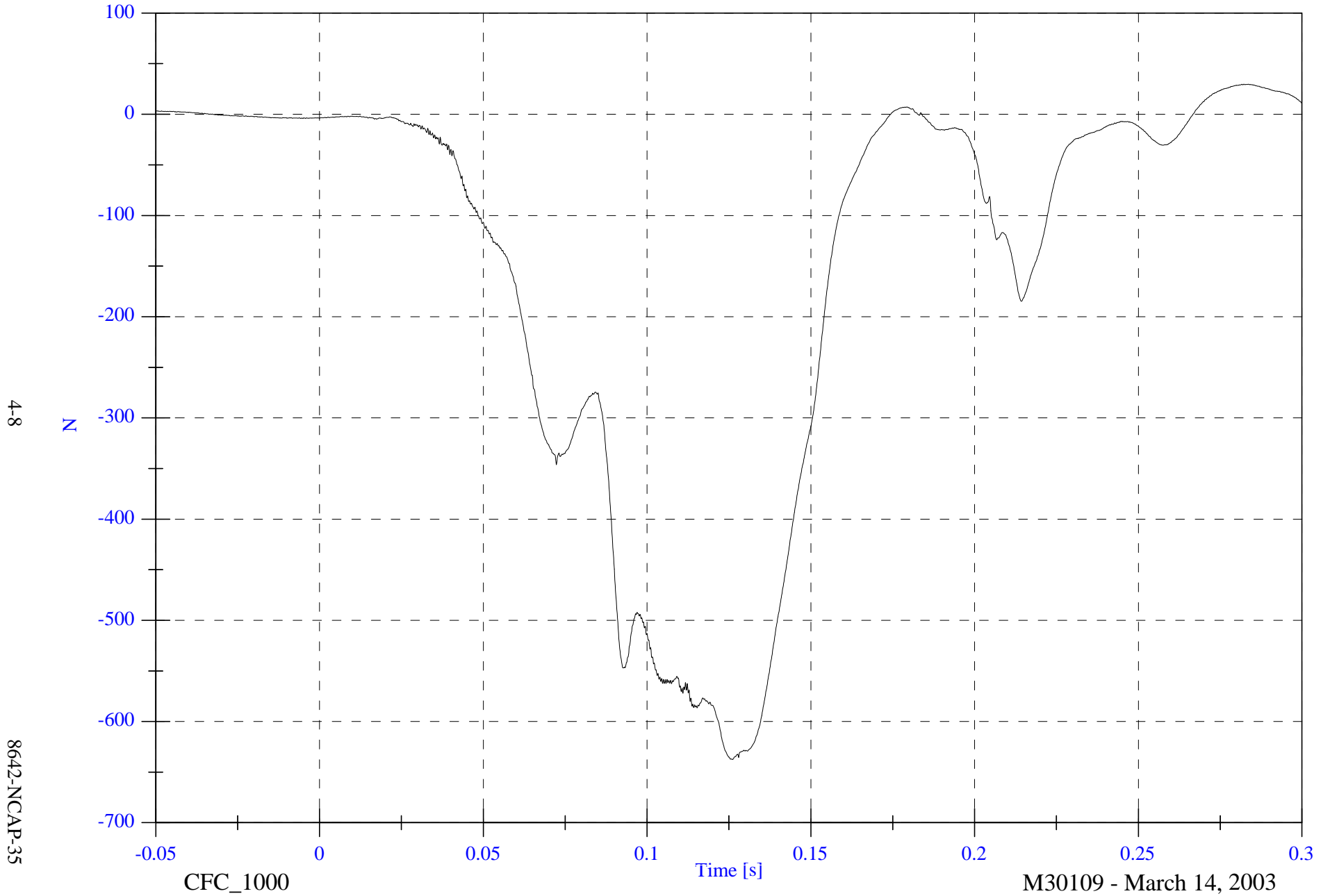
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 29.8 [N] at 0.282 [s]

V1P3 Upper Neck Fx

Min: -637.6 [N] at 0.126 [s]



4-8

8642-NCAP-35

CFC\_1000

Time [s]

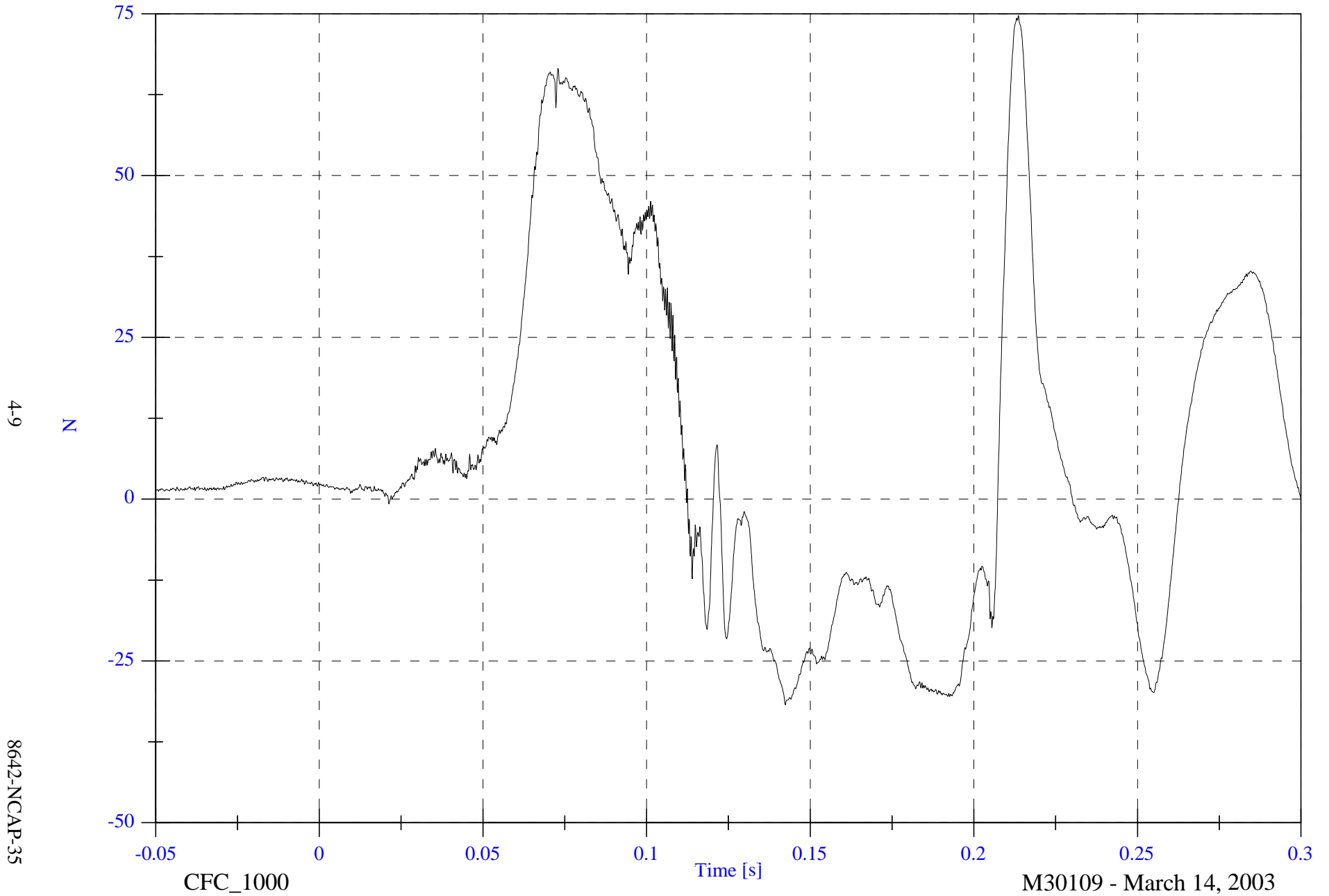
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P3 Upper Neck Fy

Max: 74.7 [N] at 0.214 [s]

Min: -31.8 [N] at 0.142 [s]



4-9

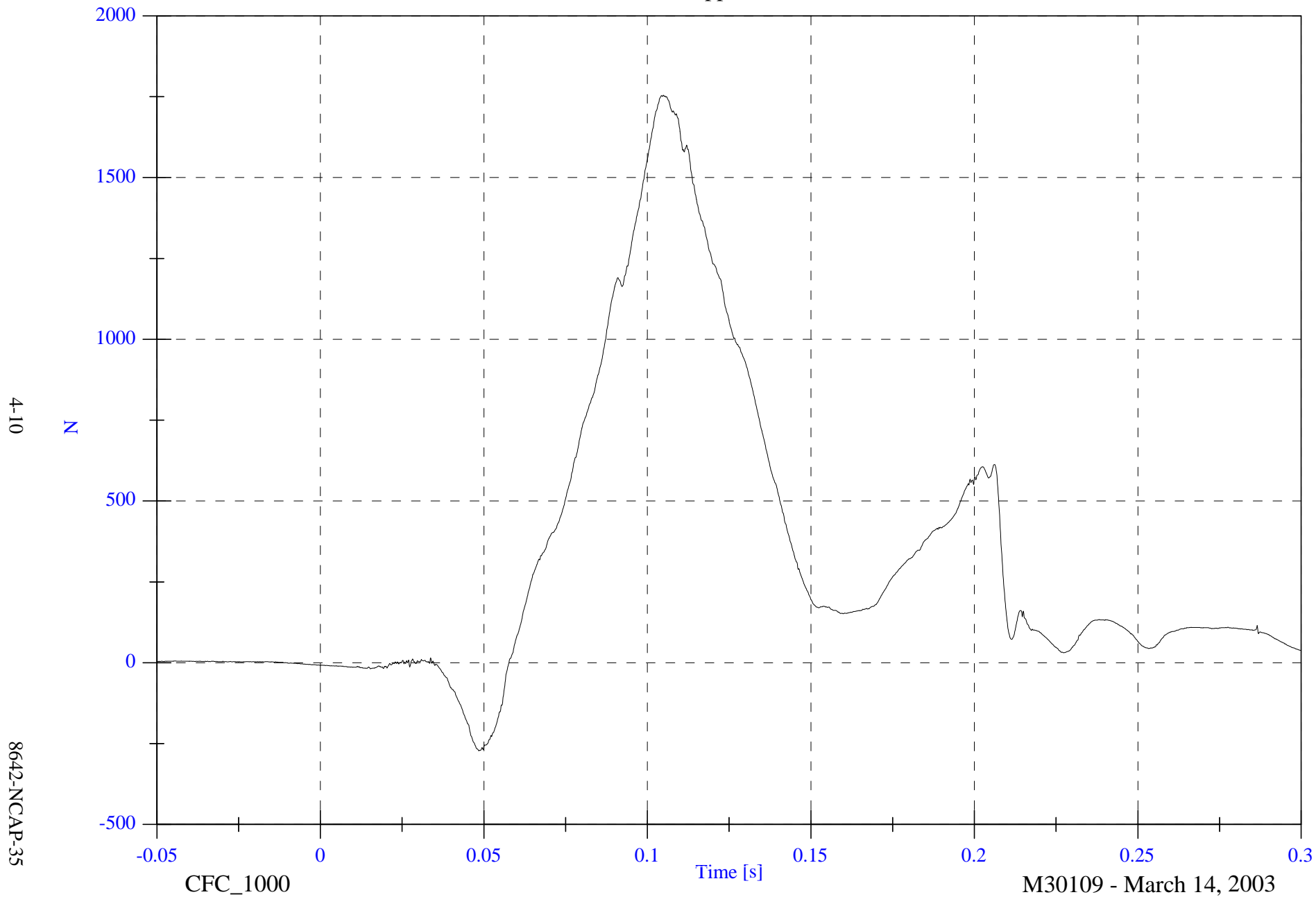
8642-NCAP-35

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 1755.1 [N] at 0.105 [s]

Min: -272.7 [N] at 0.048 [s]

V1P3 Upper Neck Fz



4-10

8642-NCAP-35

CFC\_1000

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

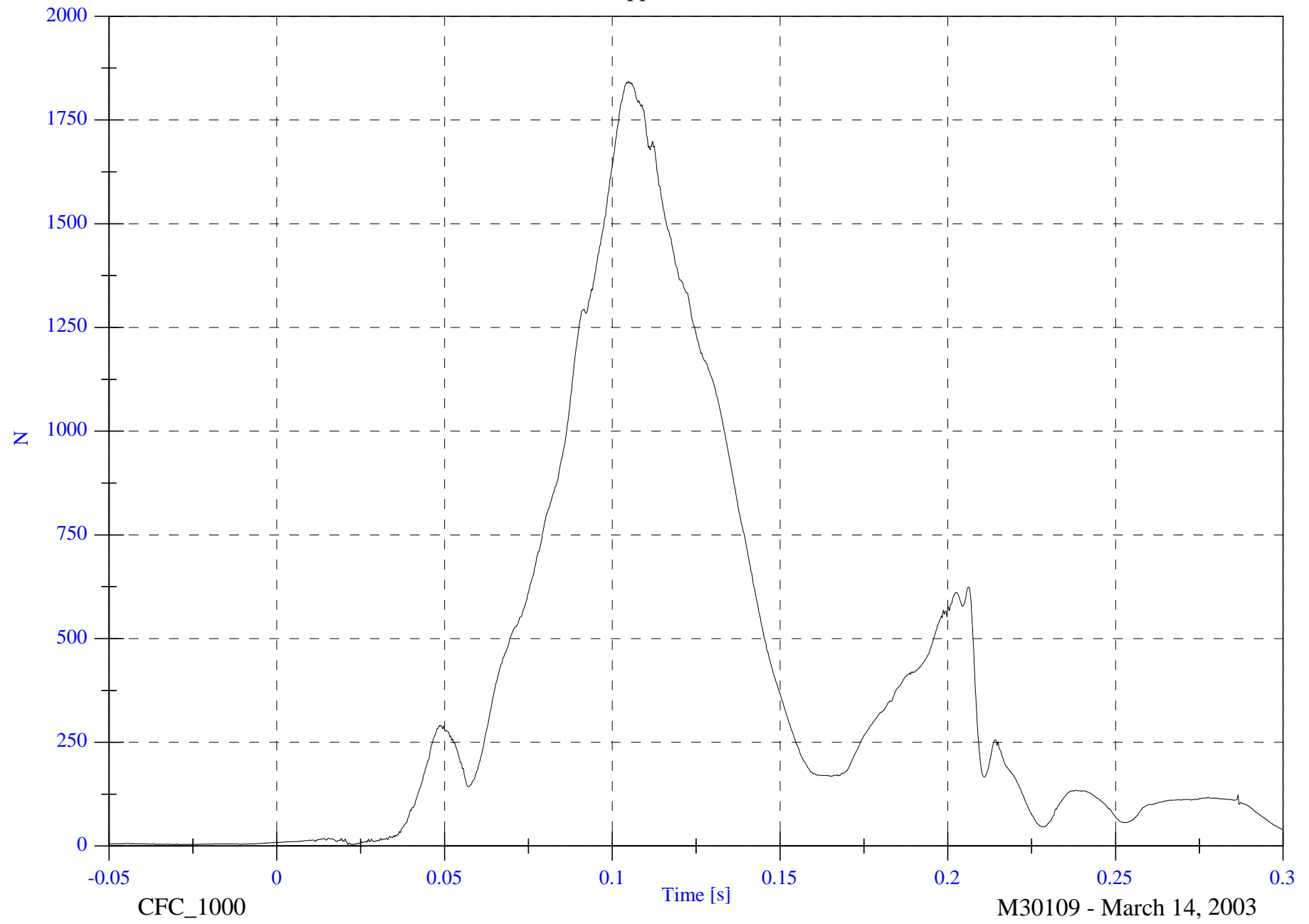
Max: 1842.6 [N] at 0.105 [s]

V1P3 Upper Neck F Resultant

Min: 3.5 [N] at 0.021 [s]

4-11

8642-NCAP-35



CFC\_1000

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

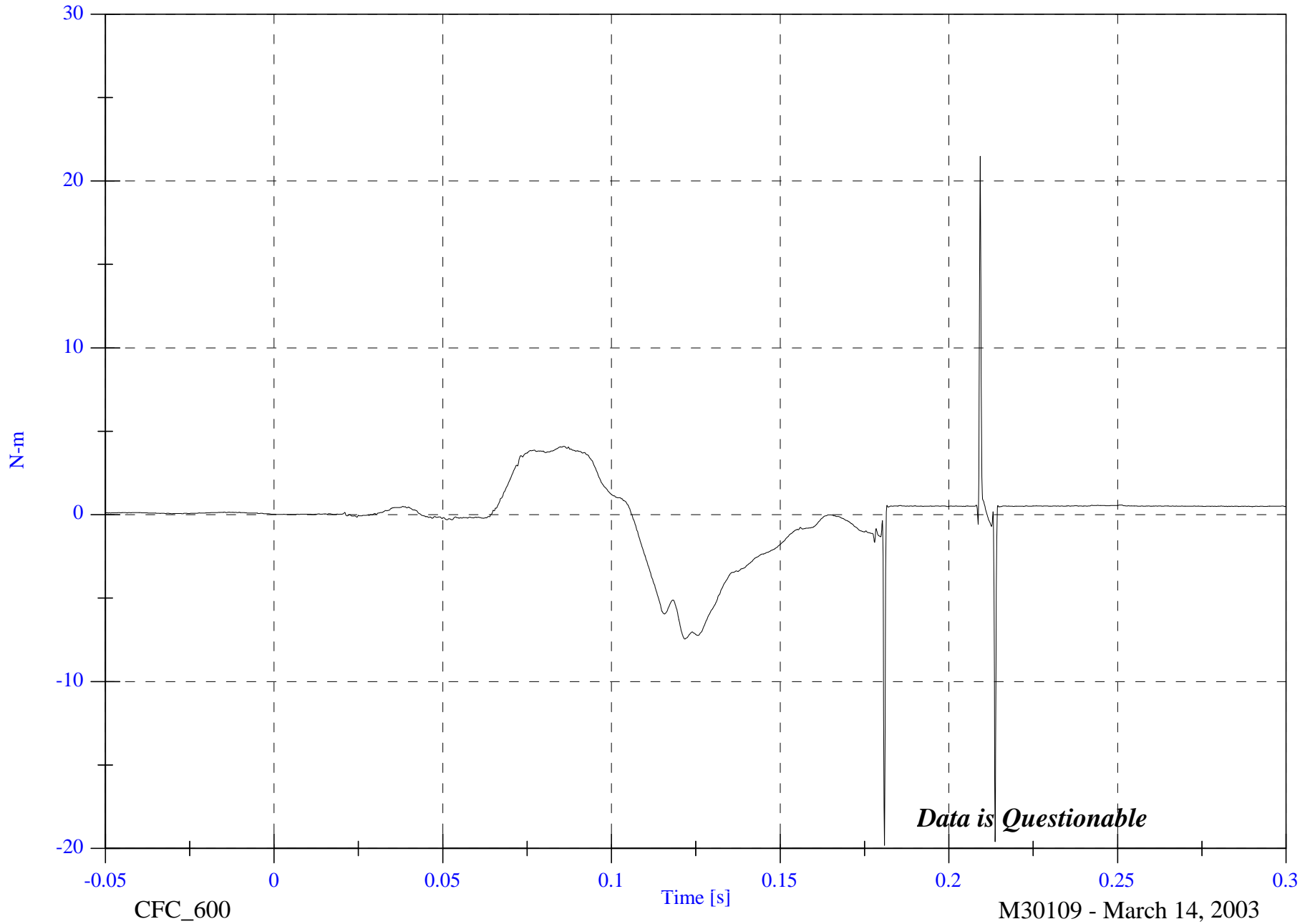
V1P3 Upper Neck Mx

Max: 21.5 [N-m] at 0.209 [s]

Min: -19.8 [N-m] at 0.181 [s]

4-12

8642-NCAP-35



*Data is Questionable*

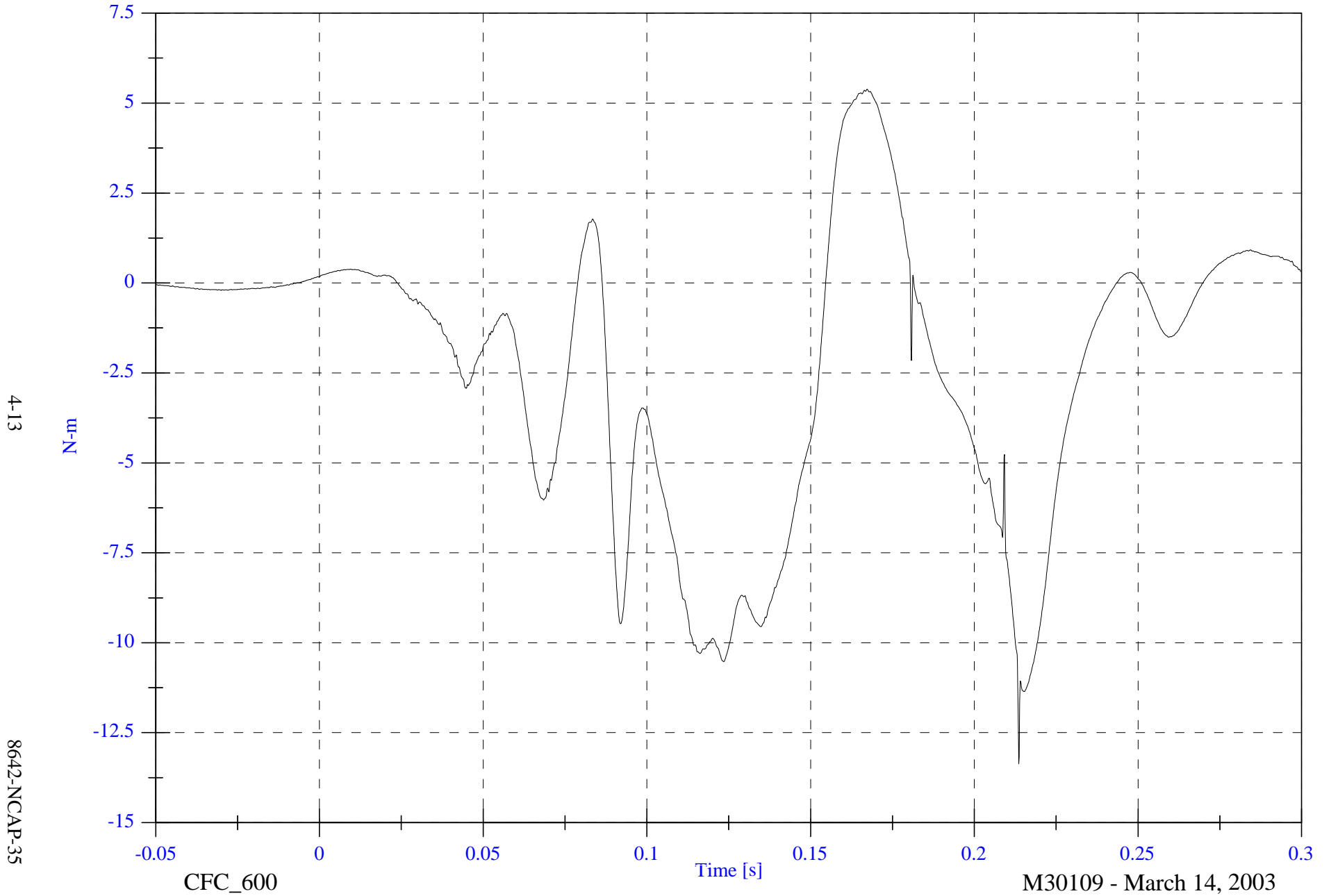
M30109 - March 14, 2003

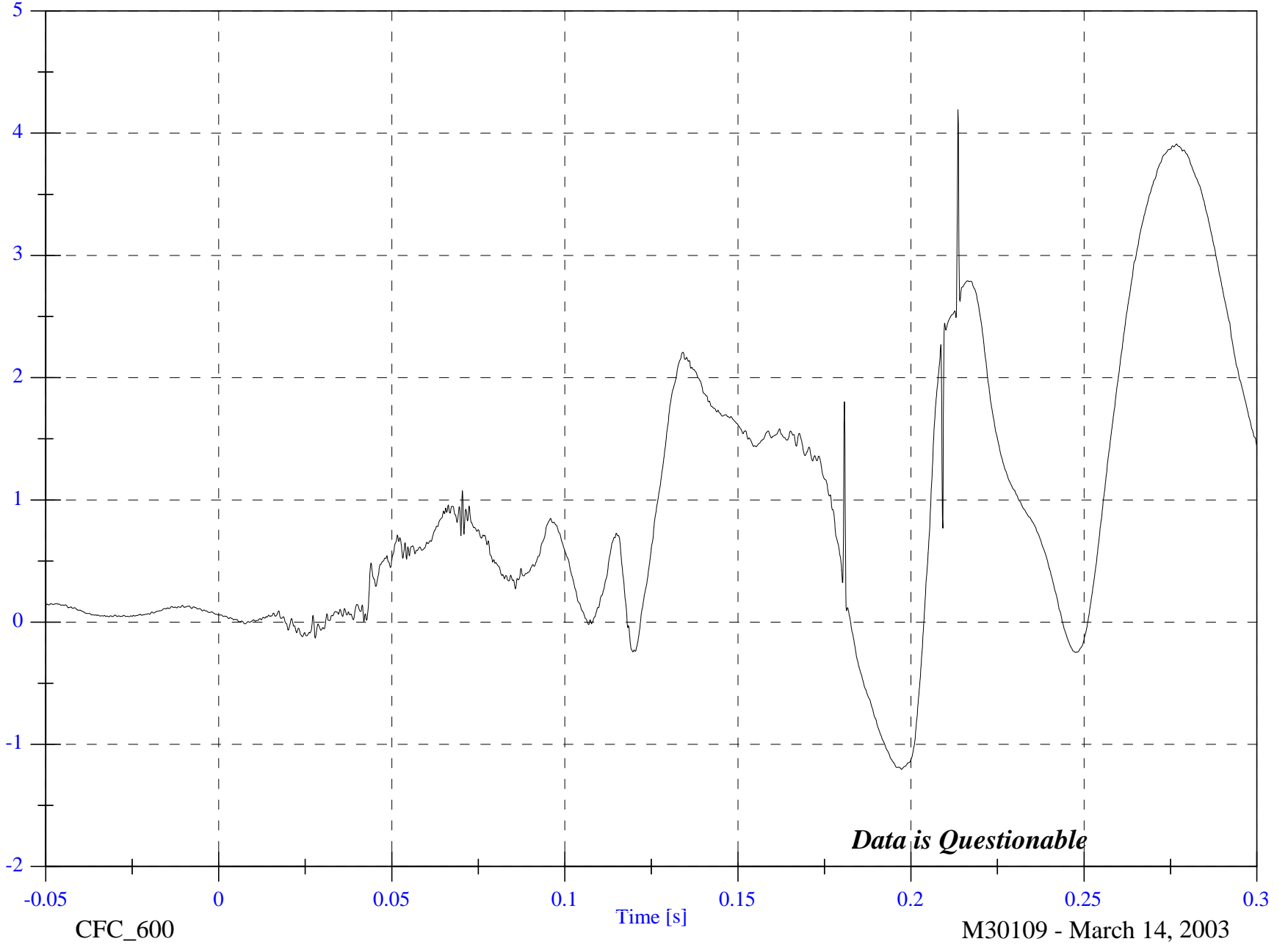
2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P3 Upper Neck My

Max: 5.4 [N-m] at 0.167 [s]

Min: -13.4 [N-m] at 0.214 [s]





2003 NCAP Test 13 2003 Chevrolet Tahoe

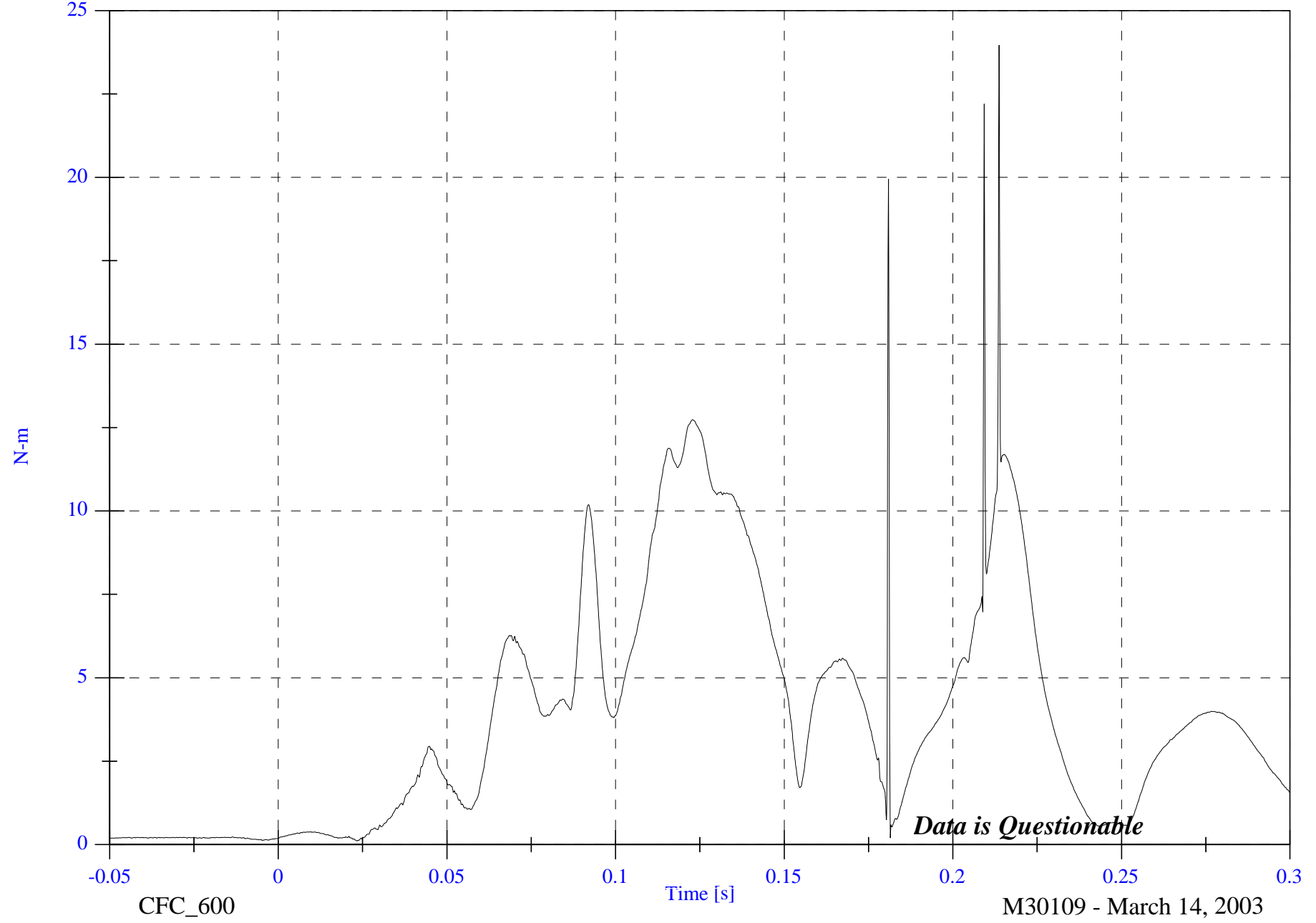
V1P3 Upper Neck M Resultant

Max: 24.0 [N-m] at 0.214 [s]

Min: 0.1 [N-m] at 0.023 [s]

4-15

8642-NCAP-35



*Data is Questionable*

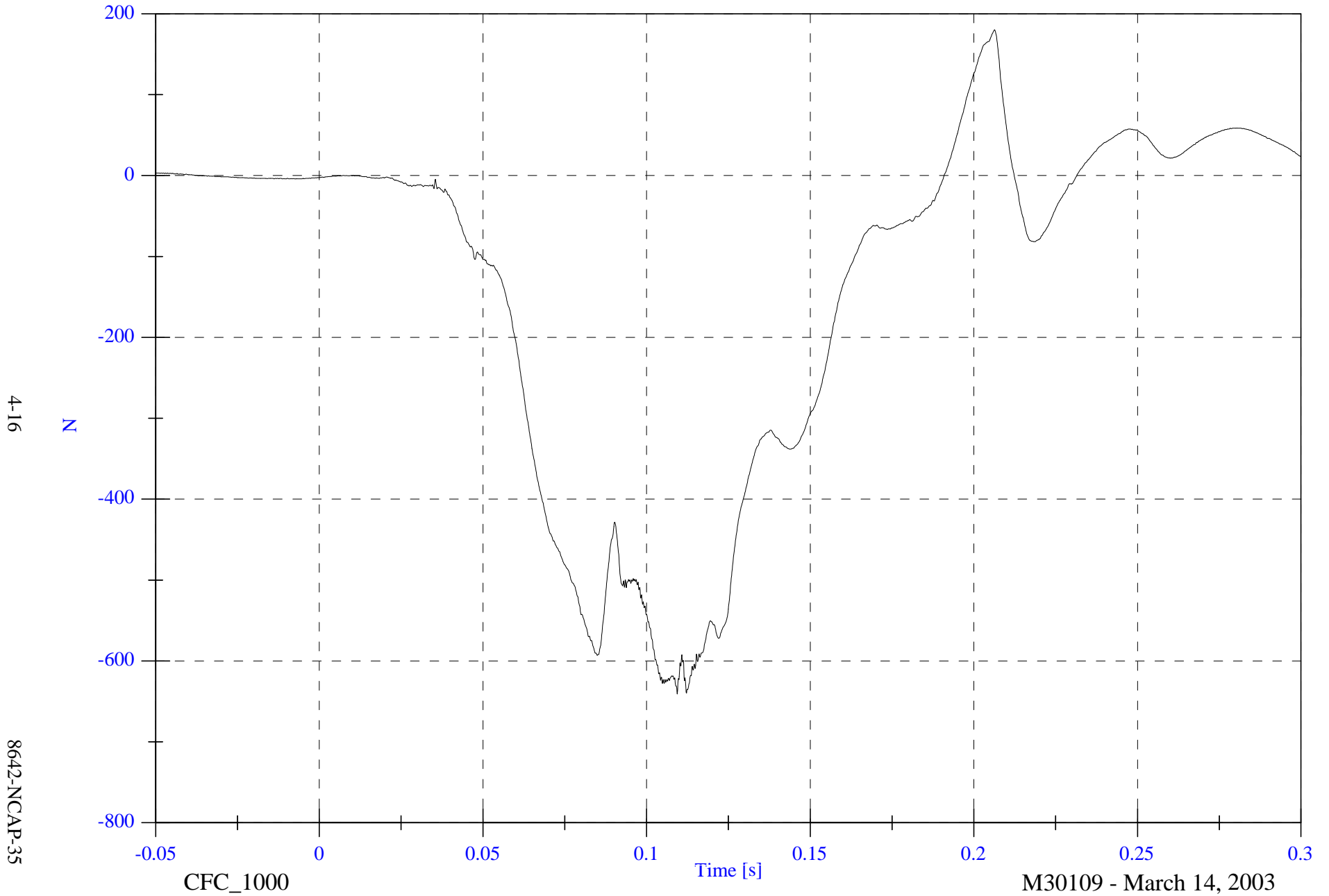
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 180.2 [N] at 0.206 [s]

V1P3 Lower Neck Fx

Min: -640.8 [N] at 0.109 [s]



4-16

8642-NCAP-35

CFC\_1000

Time [s]

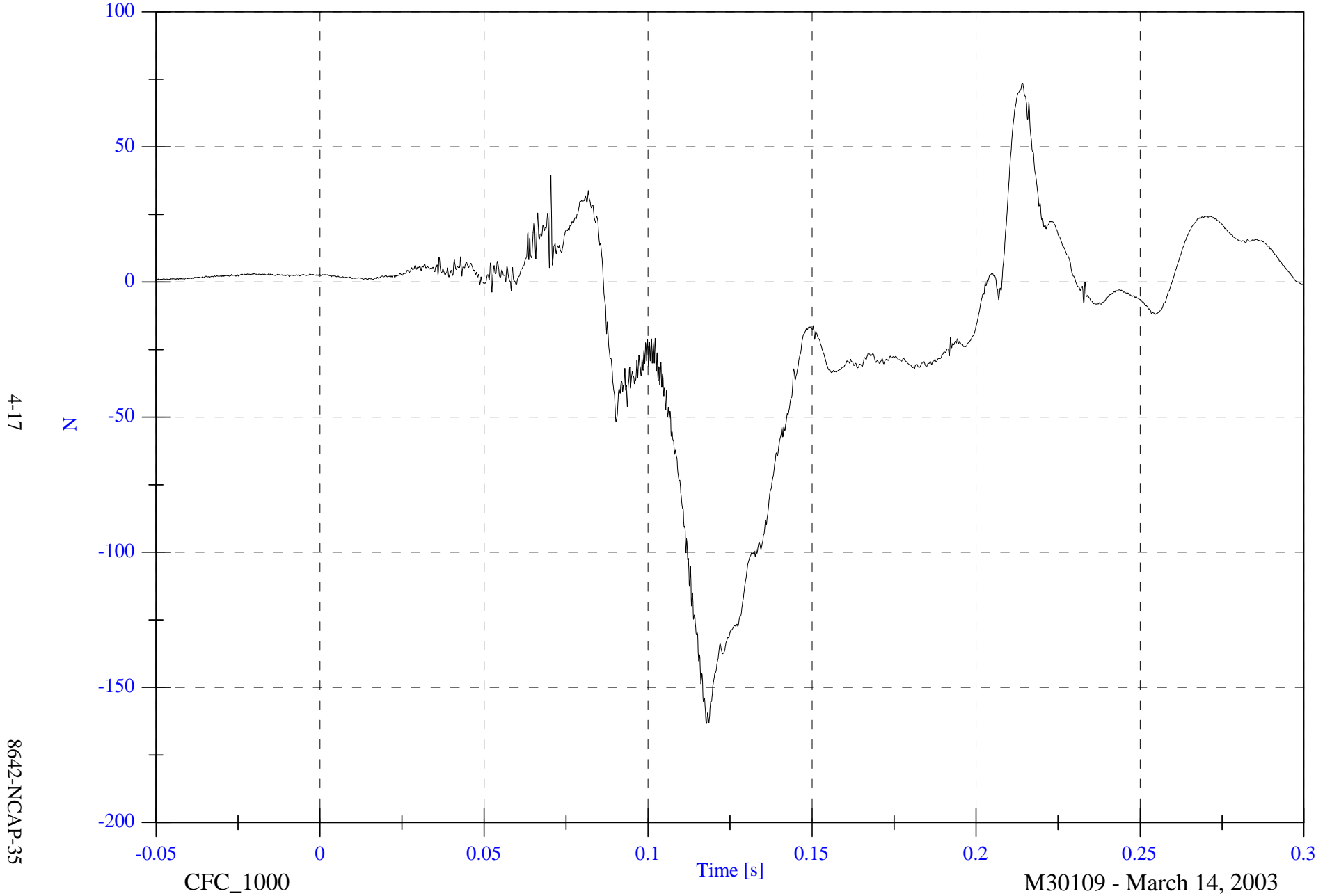
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P3 Lower Neck Fy

Max: 73.6 [N] at 0.214 [s]

Min: -163.4 [N] at 0.118 [s]



4-17

8642-NCAP-35

CFC\_1000

Time [s]

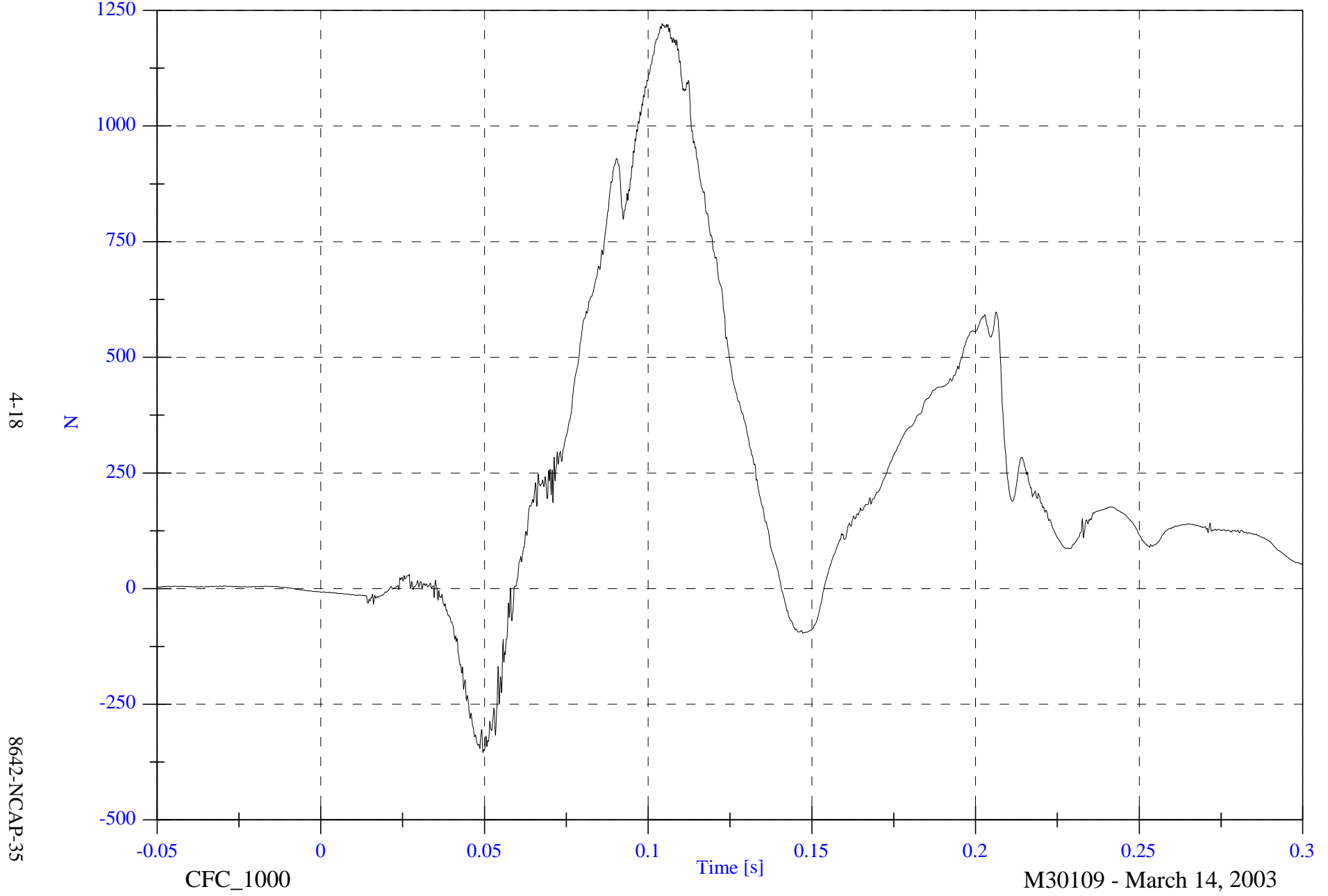
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 1221.4 [N] at 0.104 [s]

Min: -354.5 [N] at 0.050 [s]

V1P3 Lower Neck Fz



4-18

8642-NCAP-35

CFC\_1000

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

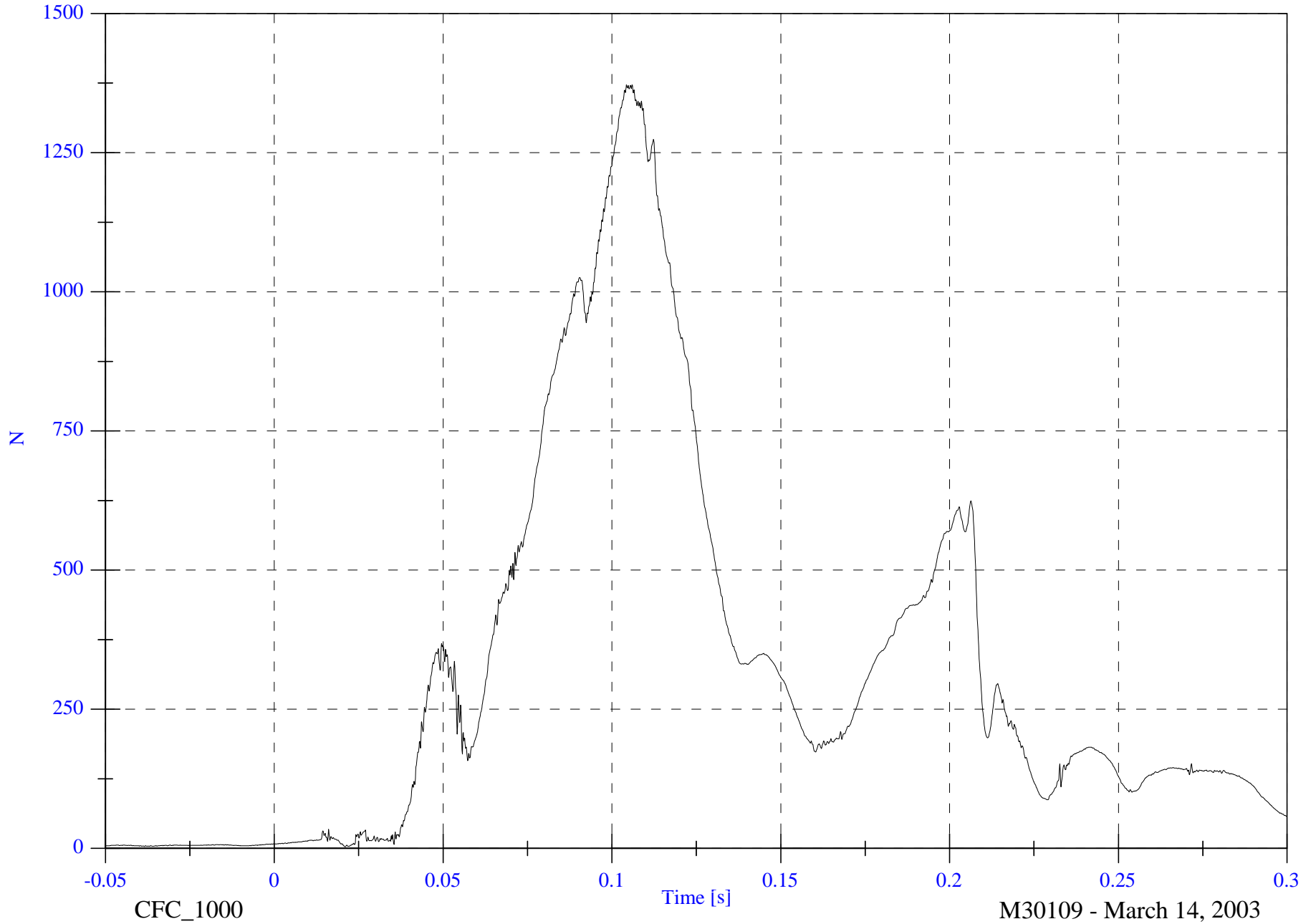
V1P3 Lower Neck F Resultant

Max: 1372.0 [N] at 0.104 [s]

Min: 3.1 [N] at 0.021 [s]

4-19

8642-NCAP-35



CFC\_1000

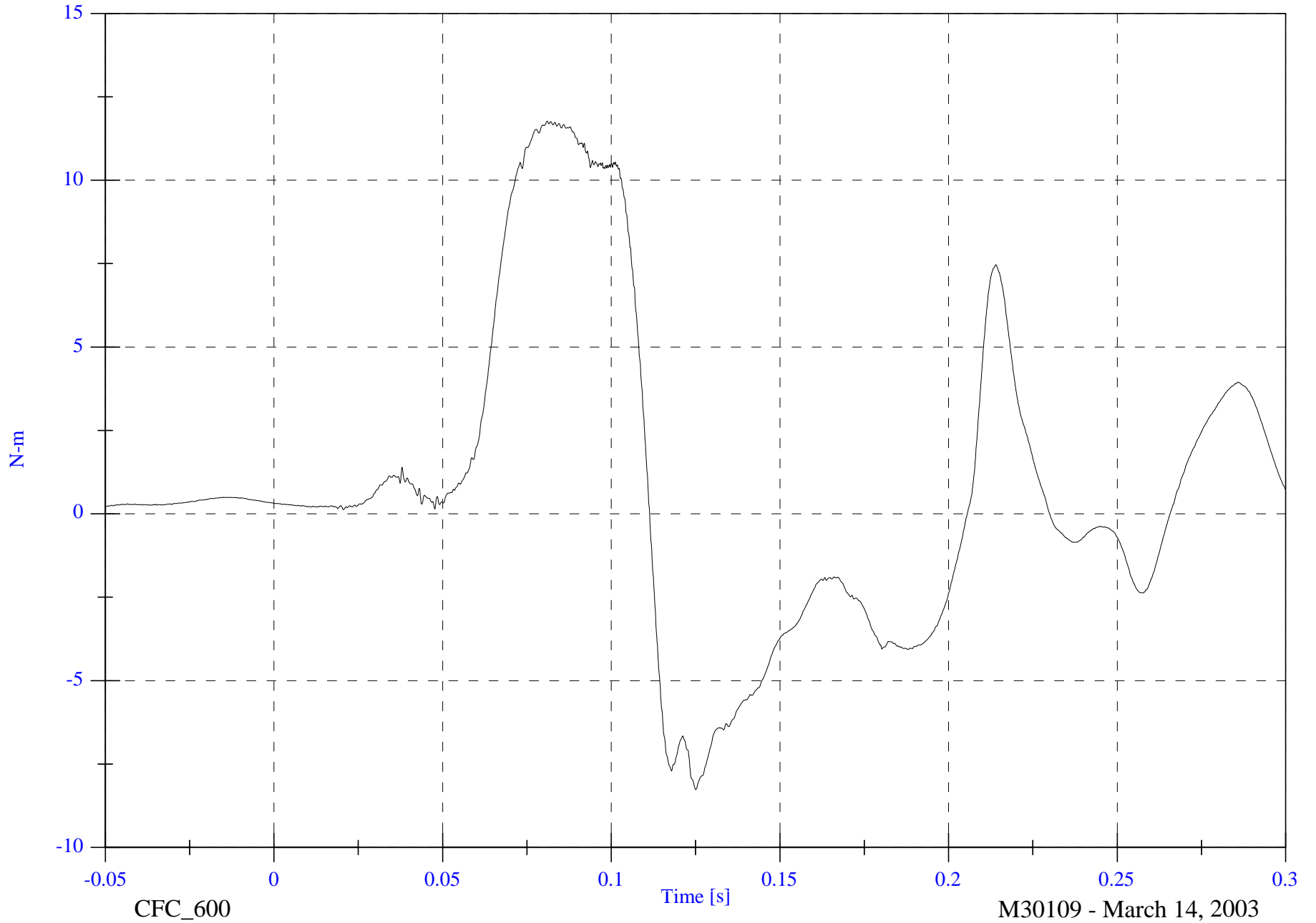
Time [s]

M30109 - March 14, 2003

V1P3 Lower Neck Mx

4-20

8642-NCAP-35

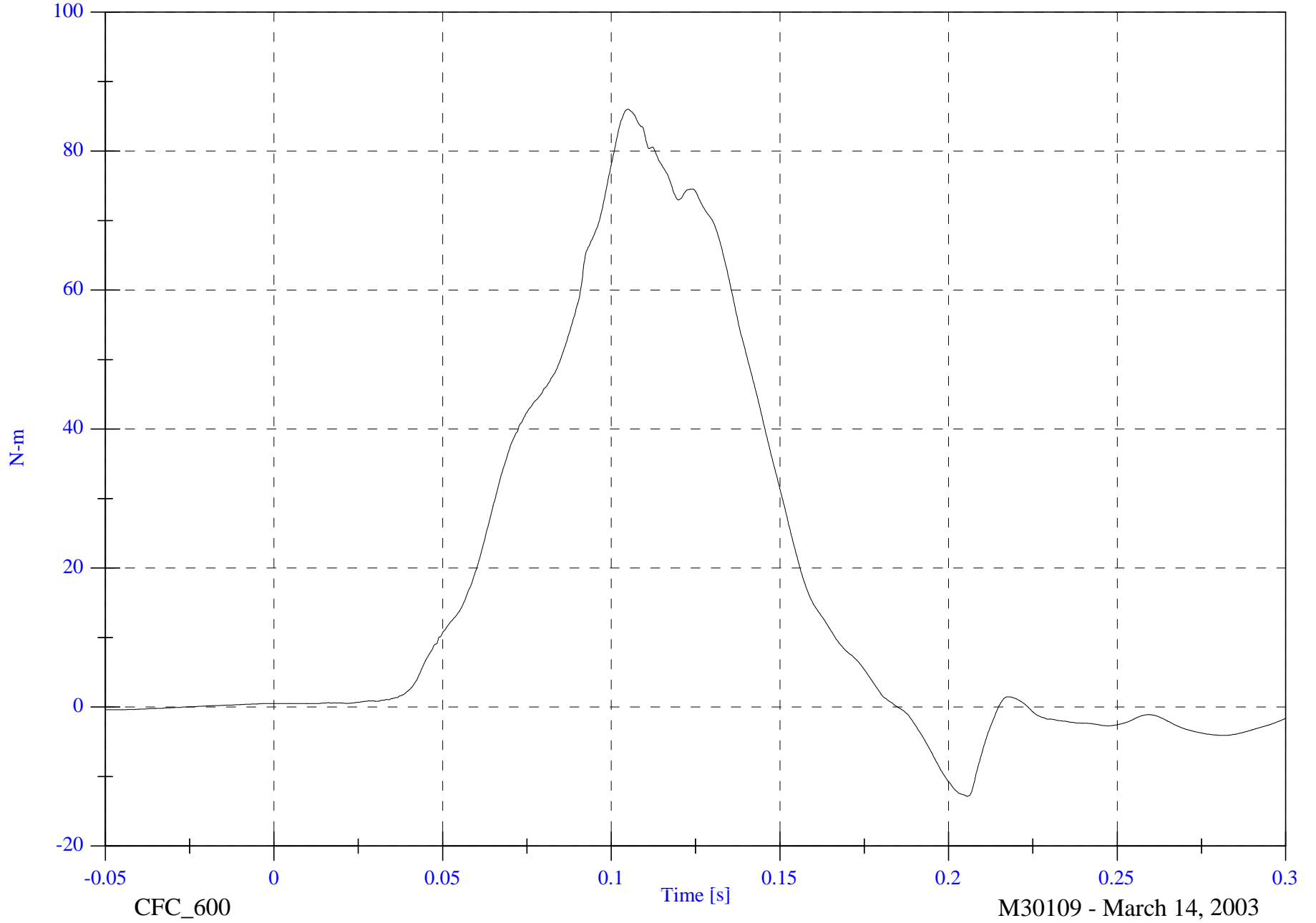


CFC\_600

M30109 - March 14, 2003

4-21

8642-NCAP-35

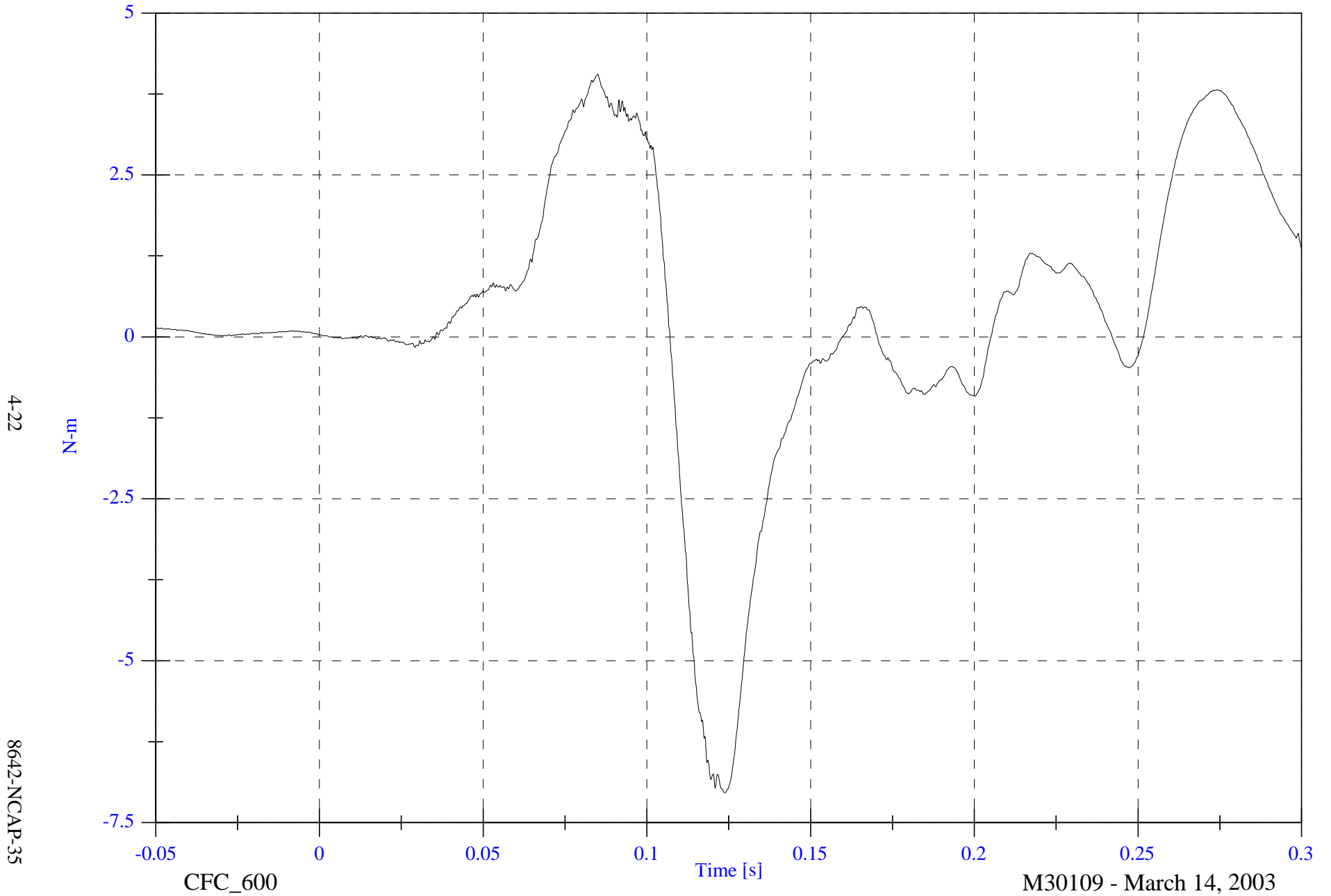


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P3 Lower Neck Mz

Max: 4.1 [N-m] at 0.085 [s]

Min: -7.0 [N-m] at 0.124 [s]



4-22

8642-NCAP-35

CFC\_600

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

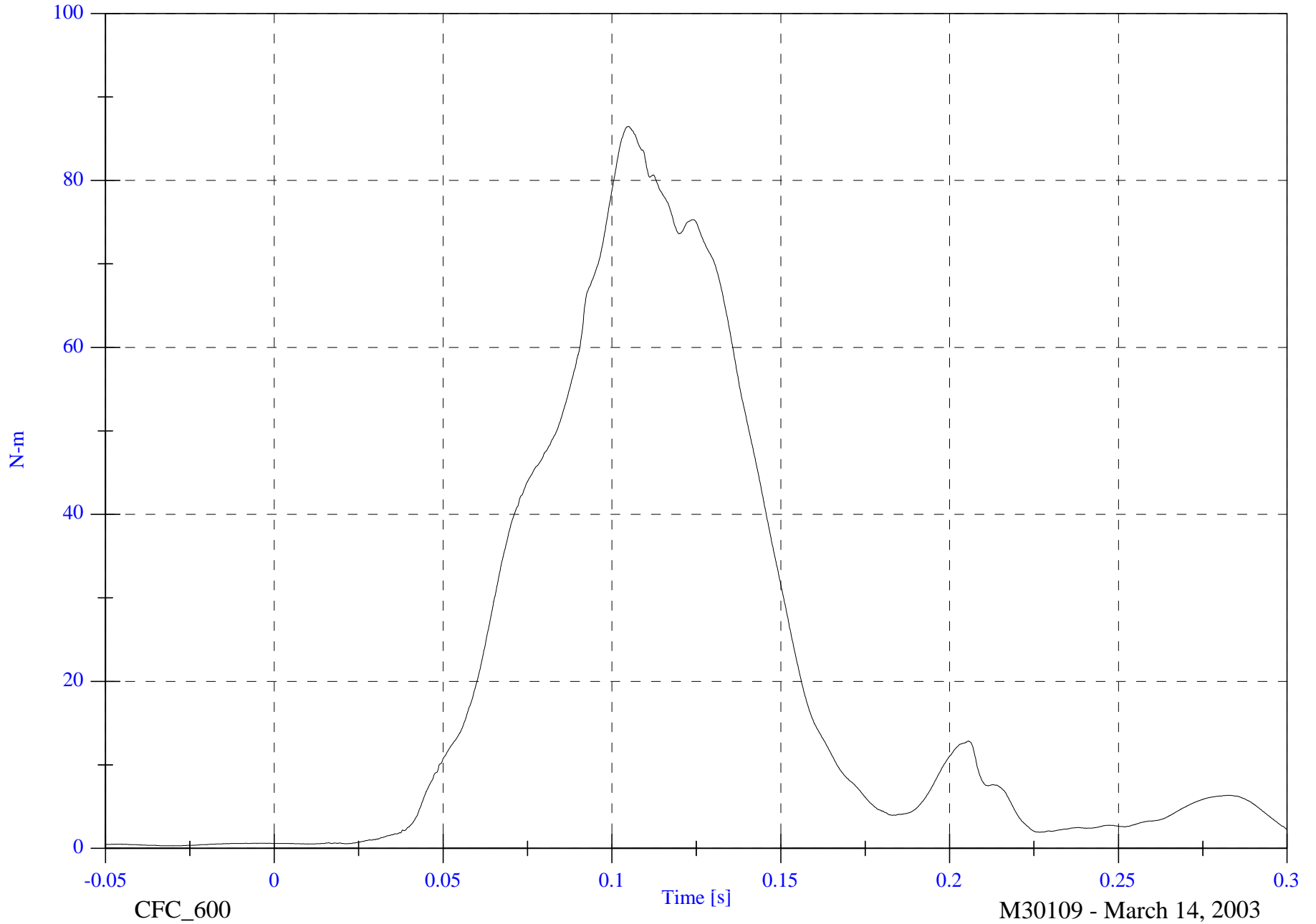
V1P3 Lower Neck M Resultant

Max: 86.5 [N-m] at 0.105 [s]

Min: 0.3 [N-m] at -0.030 [s]

4-23

8642-NCAP-35



CFC\_600

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

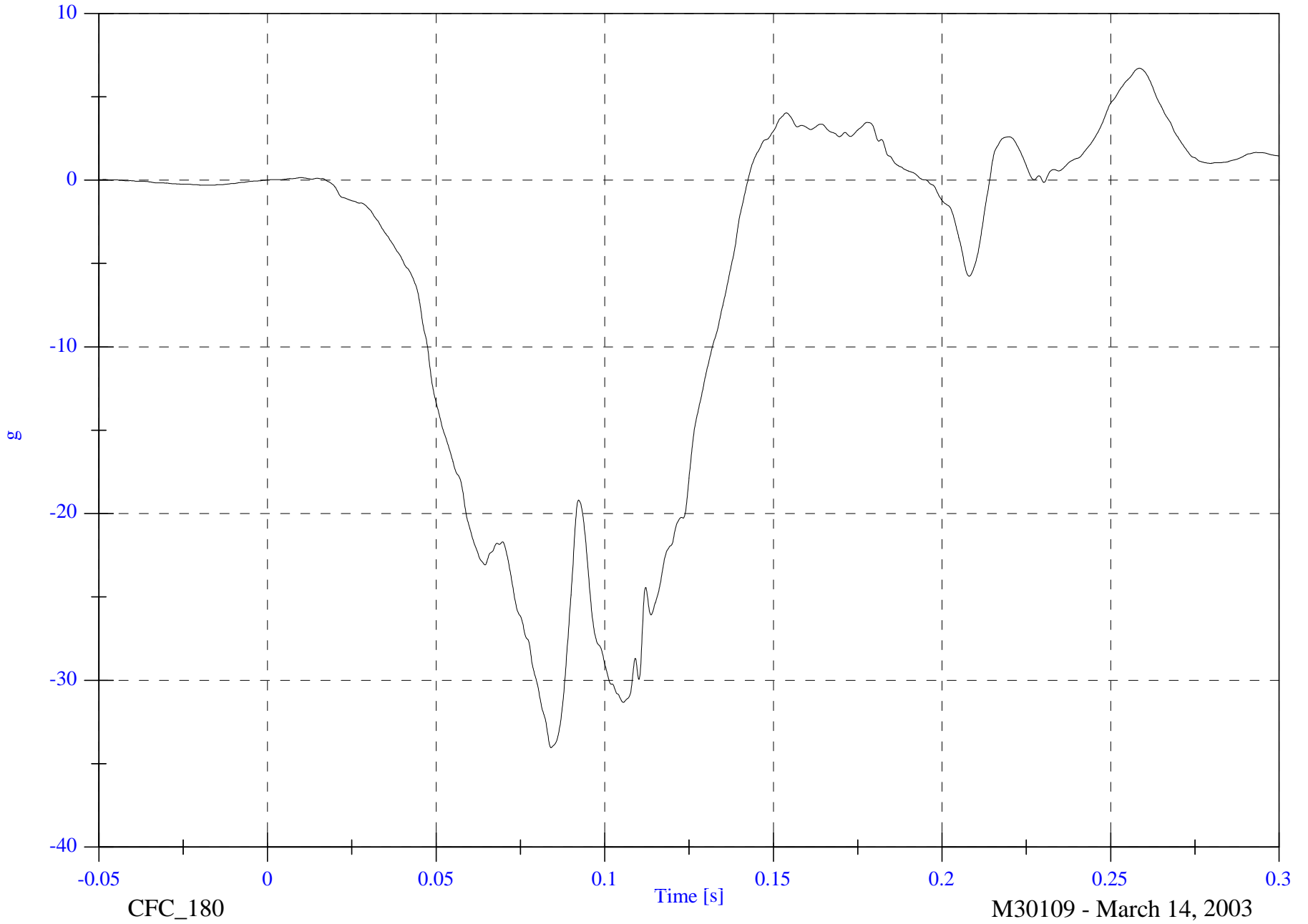
VIP3 Chest x

Max: 6.7 [g] at 0.259 [s]

Min: -34.0 [g] at 0.084 [s]

4-24

8642-NCAP-35

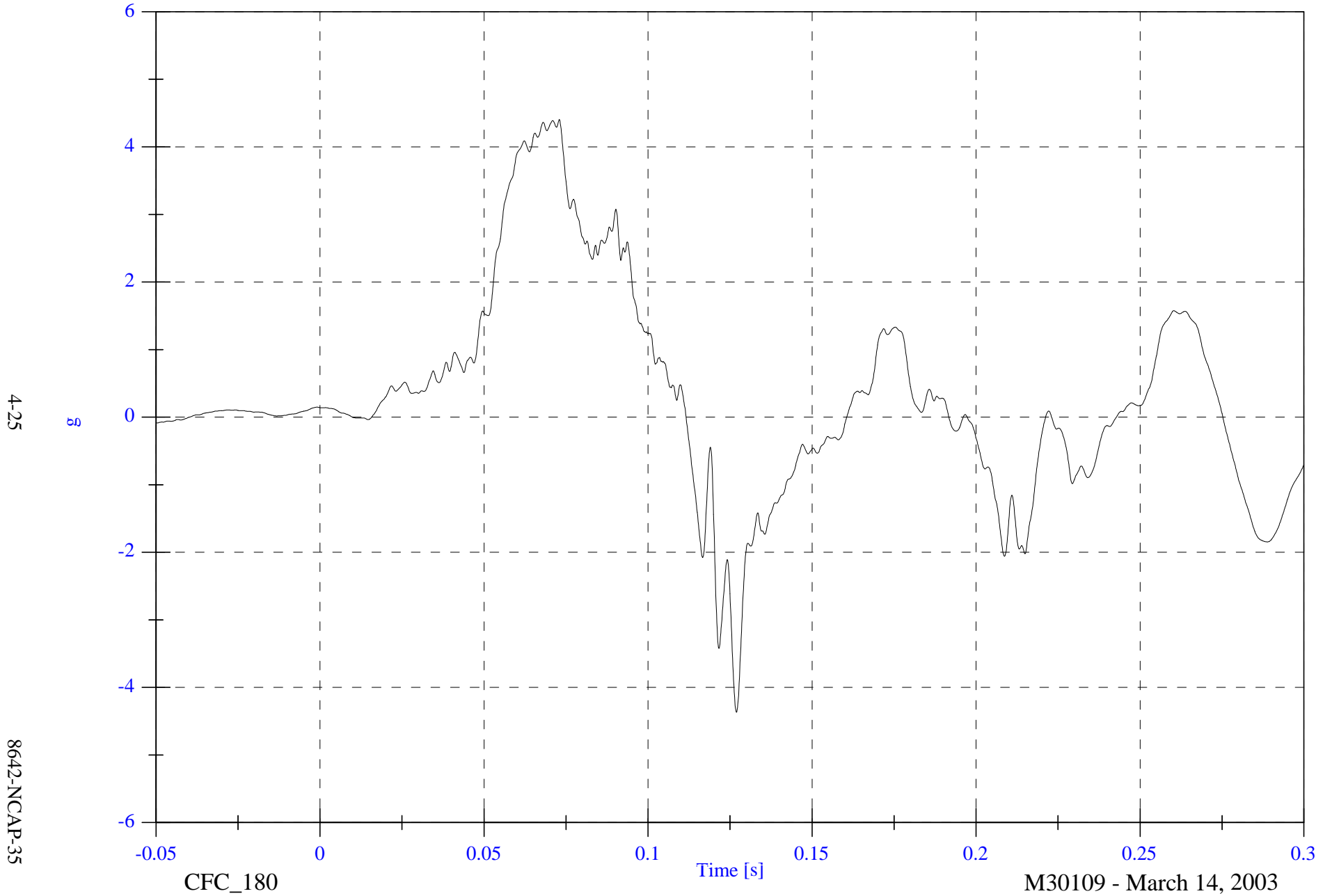


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 4.4 [g] at 0.073 [s]

VIP3 Chest y

Min: -4.4 [g] at 0.127 [s]



2003 NCAP Test 13 2003 Chevrolet Tahoe

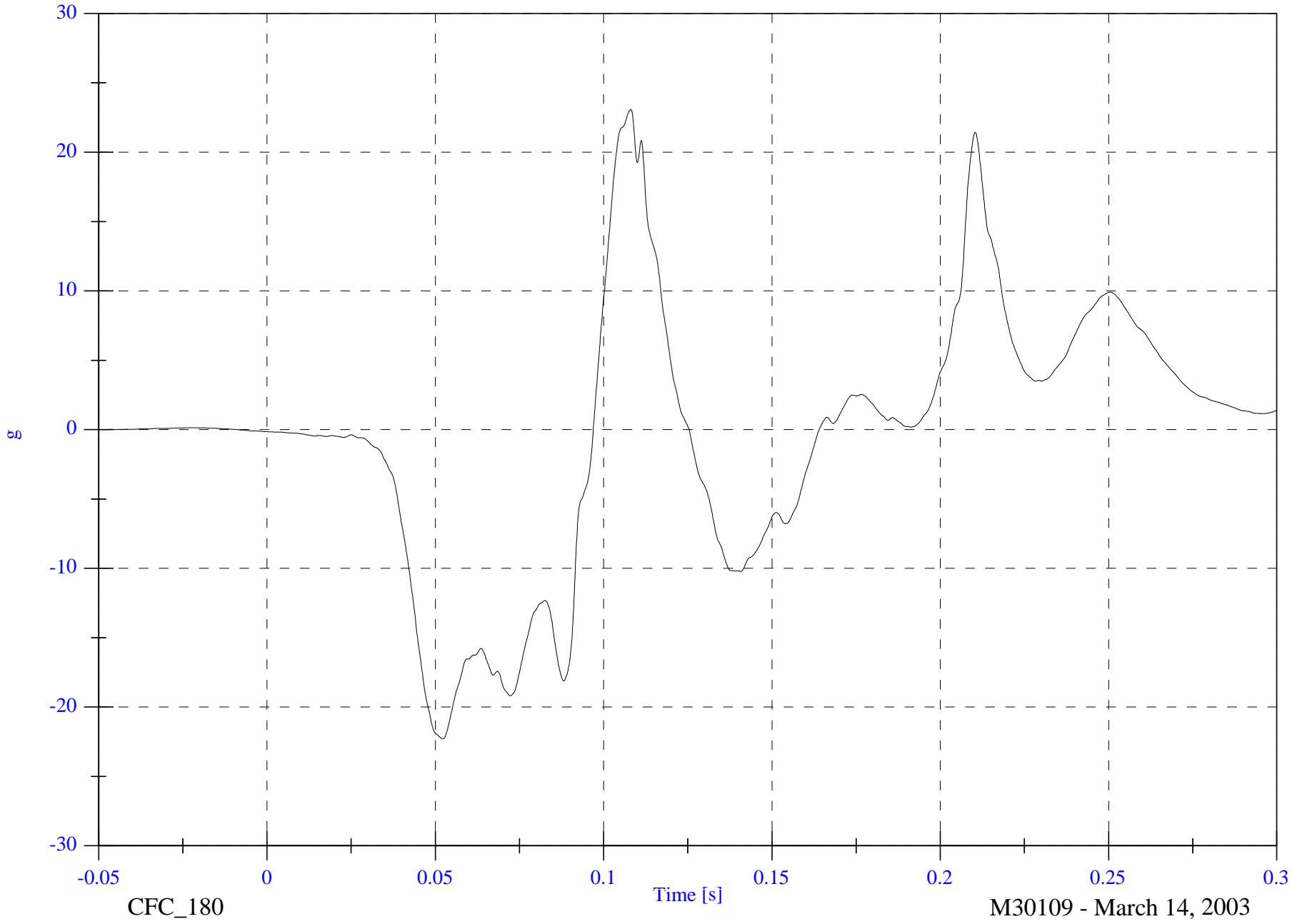
VIP3 Chest z

Max: 23.1 [g] at 0.108 [s]

Min: -22.3 [g] at 0.052 [s]

4-26

8642-NCAP-35

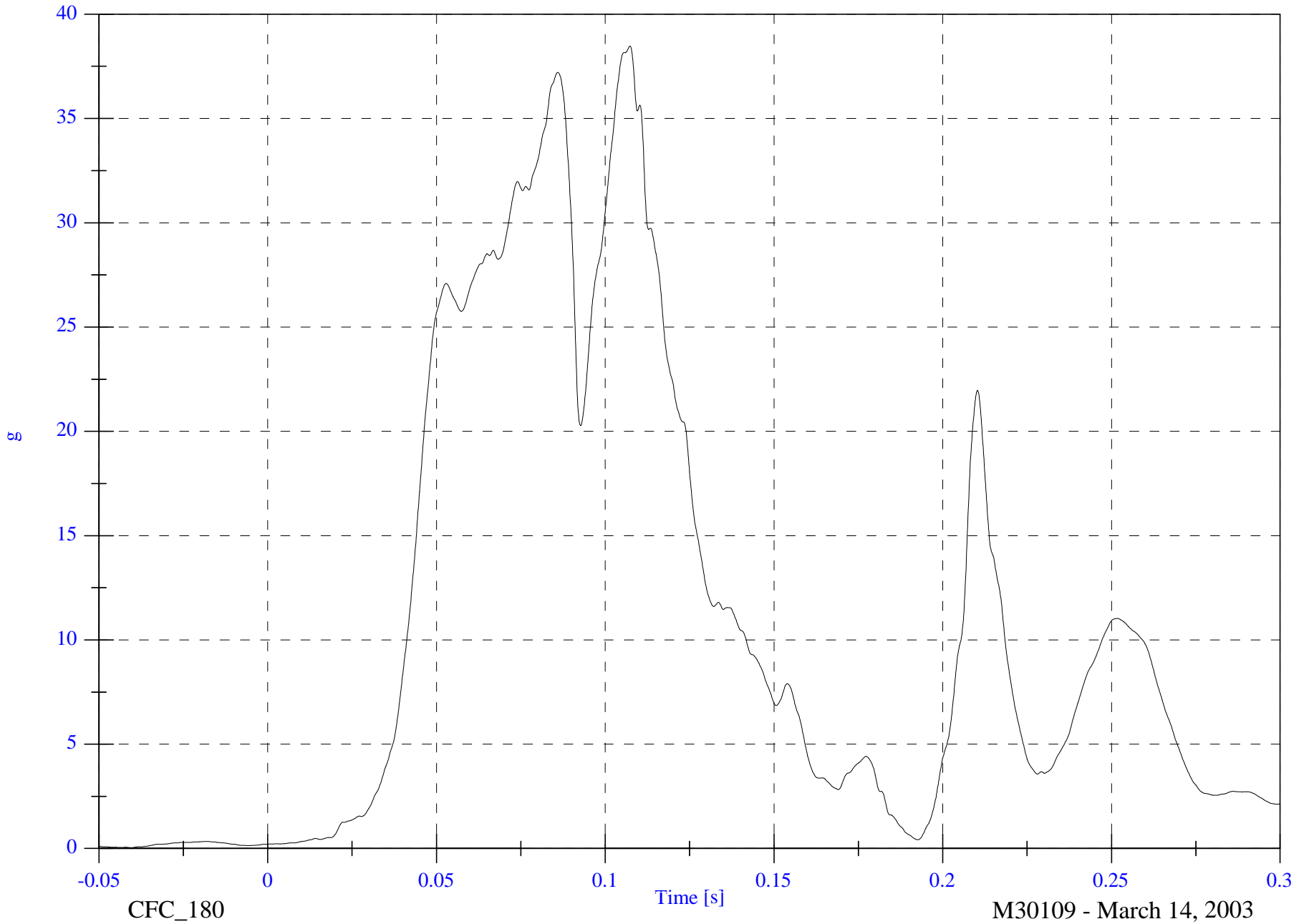


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P3 Chest Resultant

Max: 38.5 [g] at 0.107 [s]

Min: 0.0 [g] at -0.040 [s]



4-27

8642-NCAP-35

CFC\_180

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P3 Chest Compression

Max: 0.0 [mm] at -0.004 [s]

Min: -17.2 [mm] at 0.121 [s]

4-28

8642-NCAP-35



CFC\_600

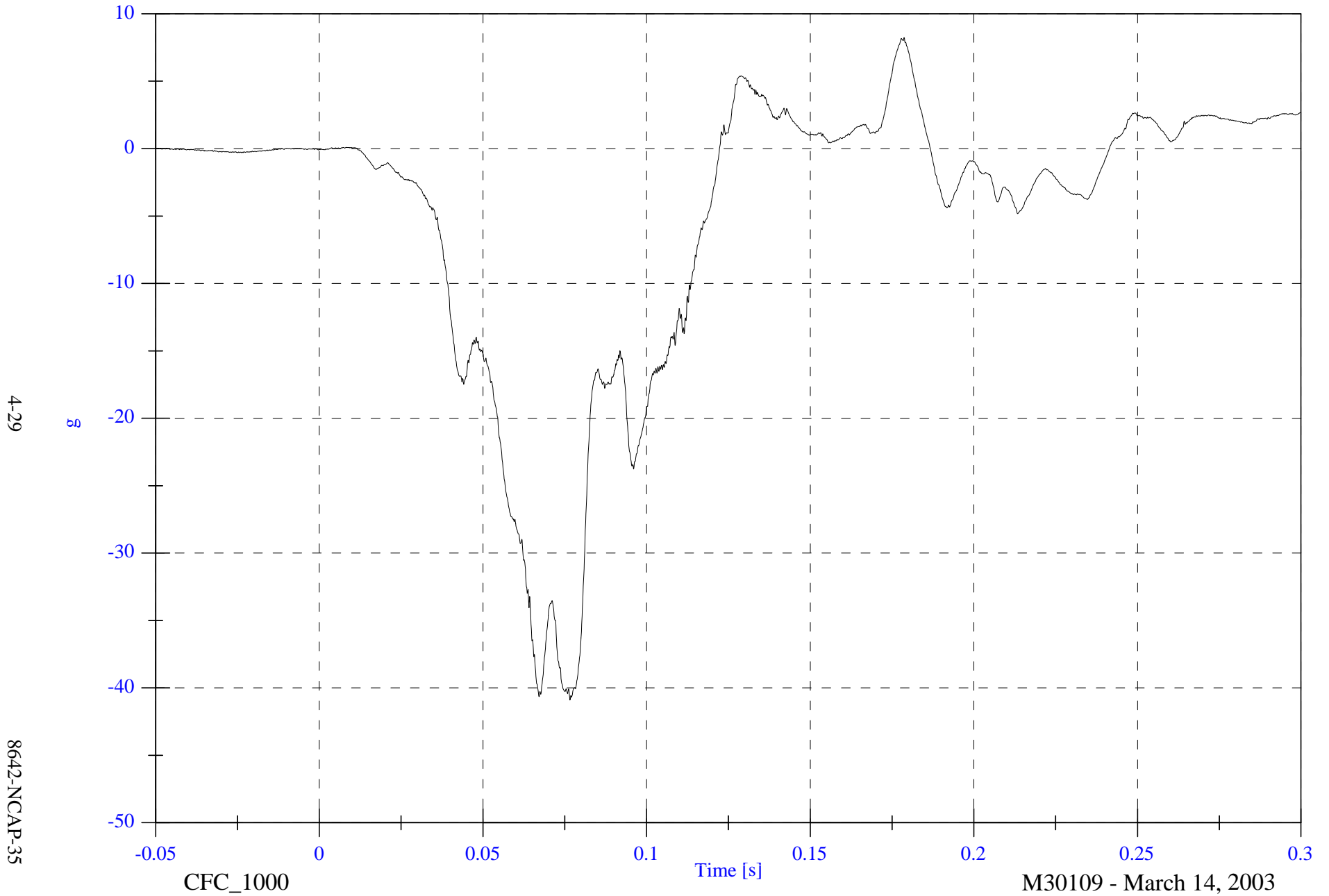
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 8.2 [g] at 0.179 [s]

Min: -40.9 [g] at 0.077 [s]

V1P3 Pelvic x

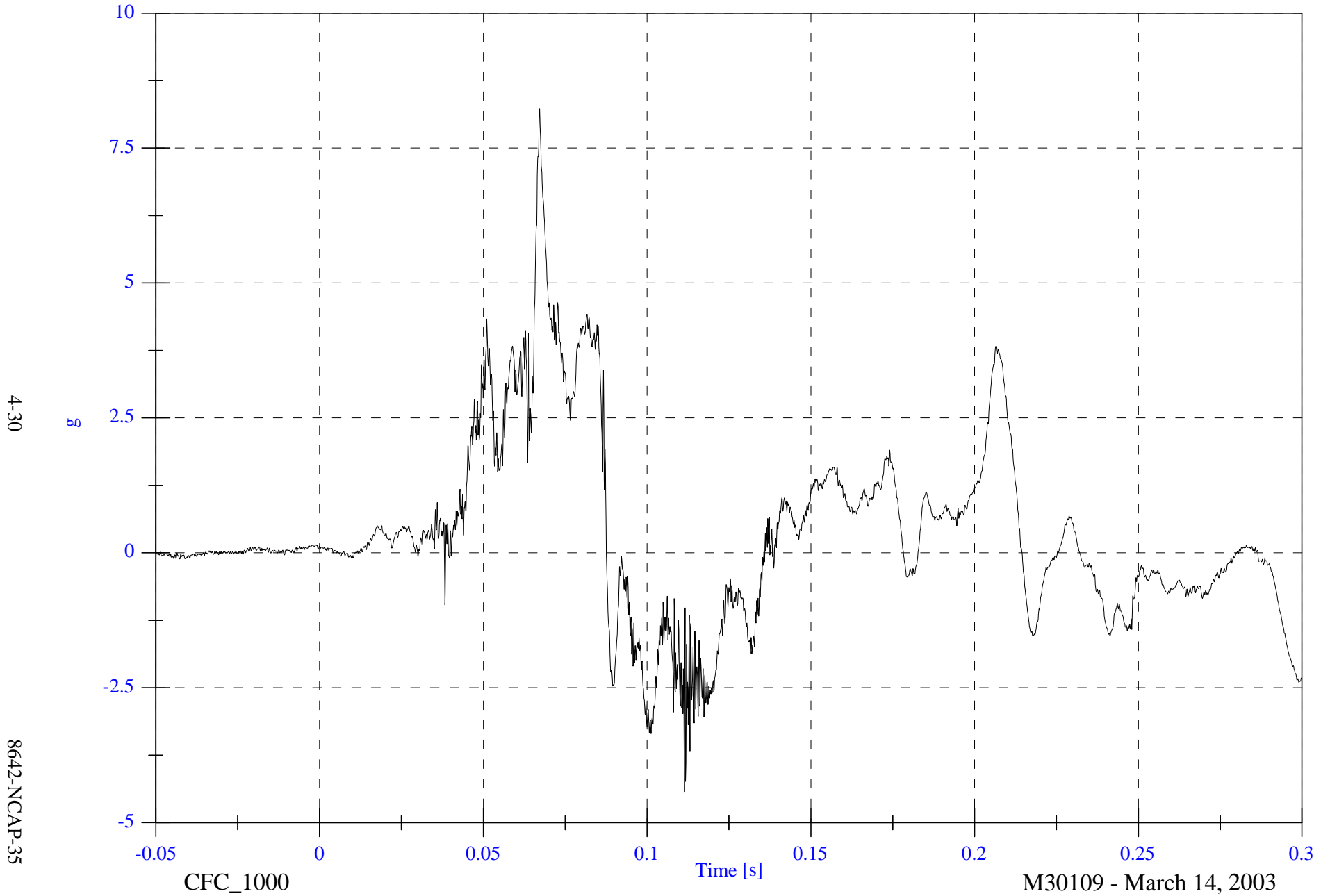


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 8.2 [g] at 0.067 [s]

Min: -4.4 [g] at 0.111 [s]

V1P3 Pelvic y

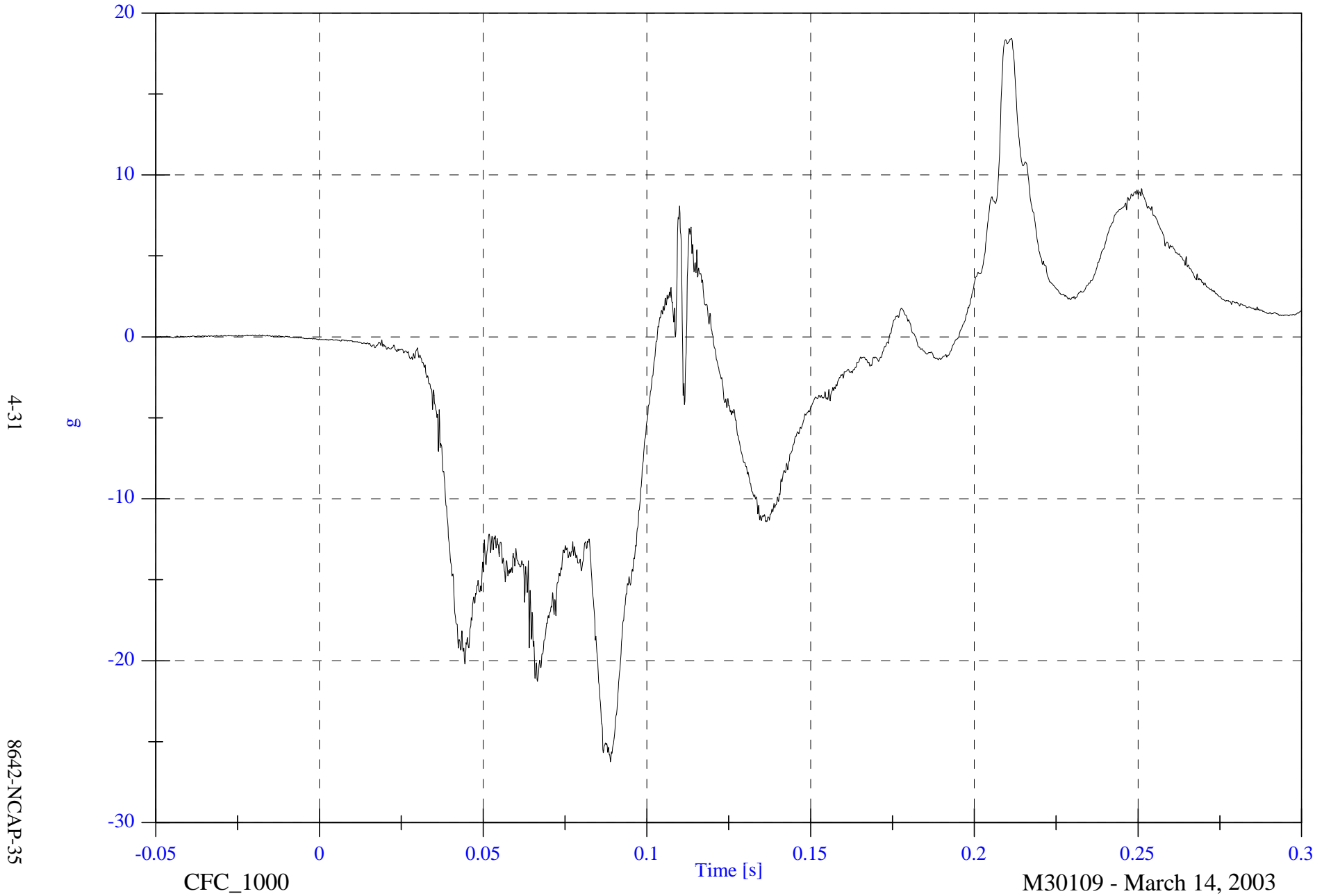


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 18.4 [g] at 0.211 [s]

Min: -26.2 [g] at 0.089 [s]

V1P3 Pelvic z



4-31

8642-NCAP-35

2003 NCAP Test 13 2003 Chevrolet Tahoe

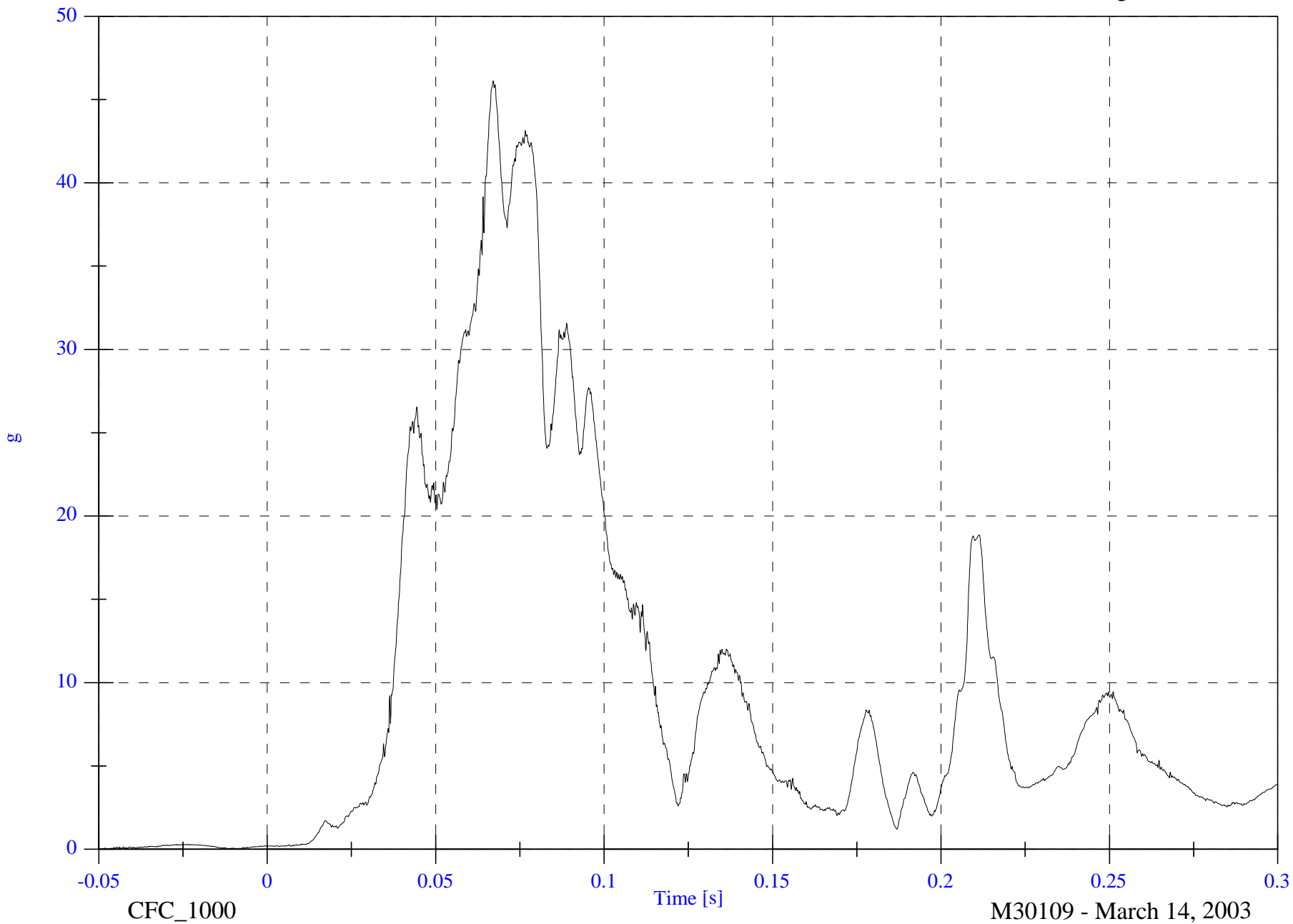
V1P3 Pelvic Resultant

Max: 46.1 [g] at 0.067 [s]

Min: 0.0 [g] at -0.049 [s]

4-32

8642-NCAP-35



2003 NCAP Test 13 2003 Chevrolet Tahoe

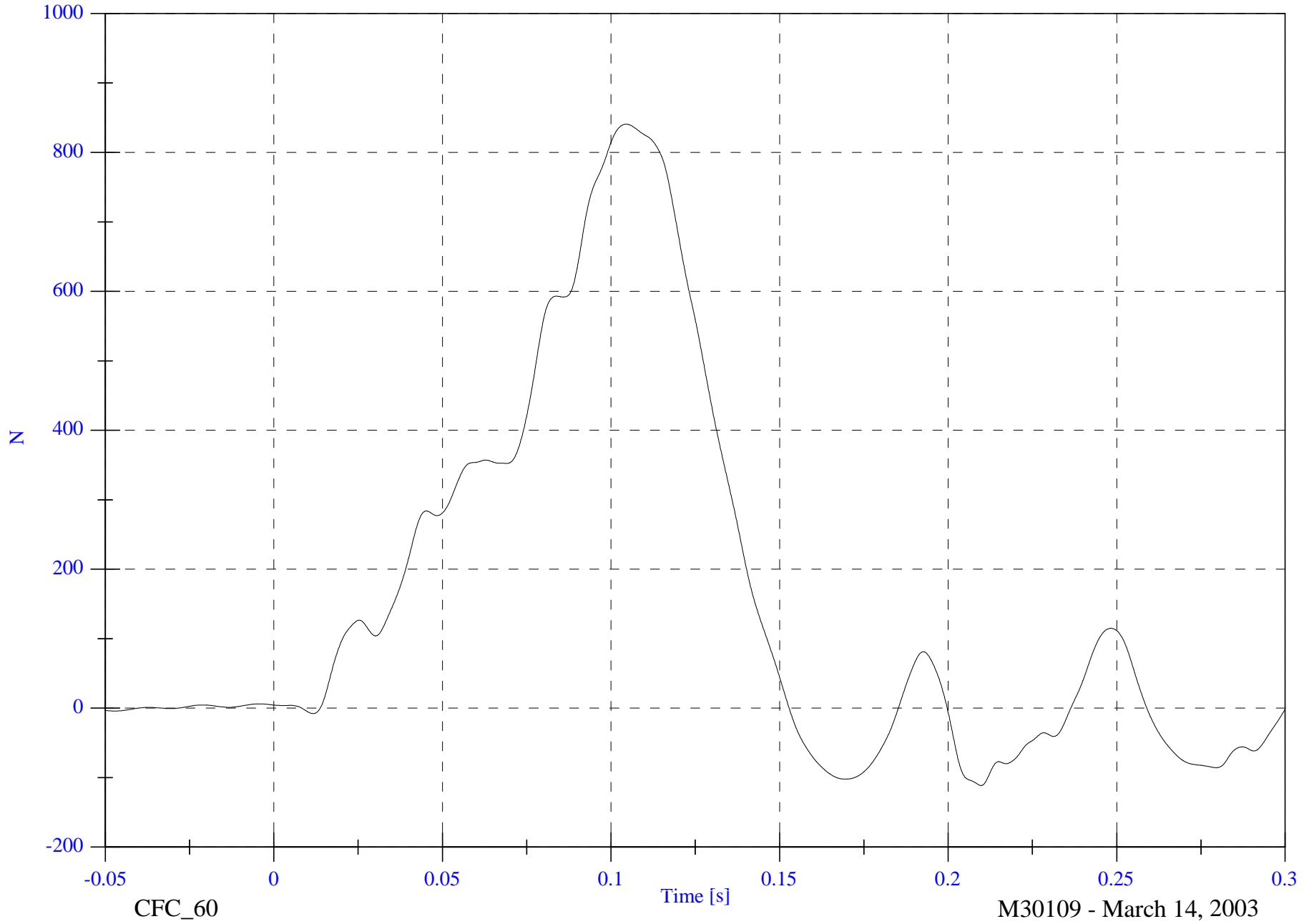
V1P3 Tether Belt

Max: 840.6 [N] at 0.105 [s]

Min: -111.4 [N] at 0.210 [s]

4-33

8642-NCAP-35



2003 NCAP Test 13 2003 Chevrolet Tahoe

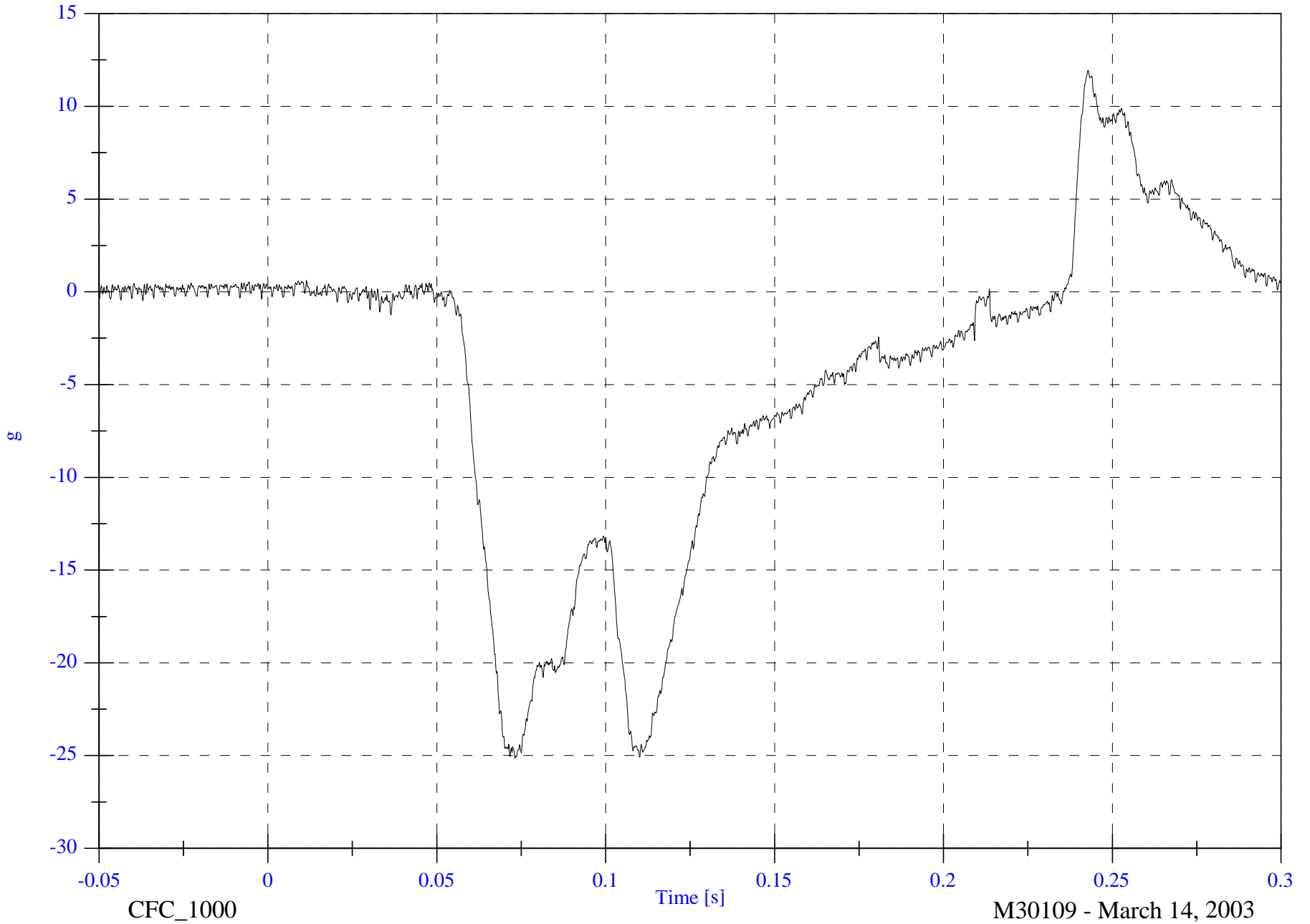
V1P4 Head x

Max: 11.9 [g] at 0.243 [s]

Min: -25.1 [g] at 0.073 [s]

4-34

8642-NCAP-35



CFC\_1000

Time [s]

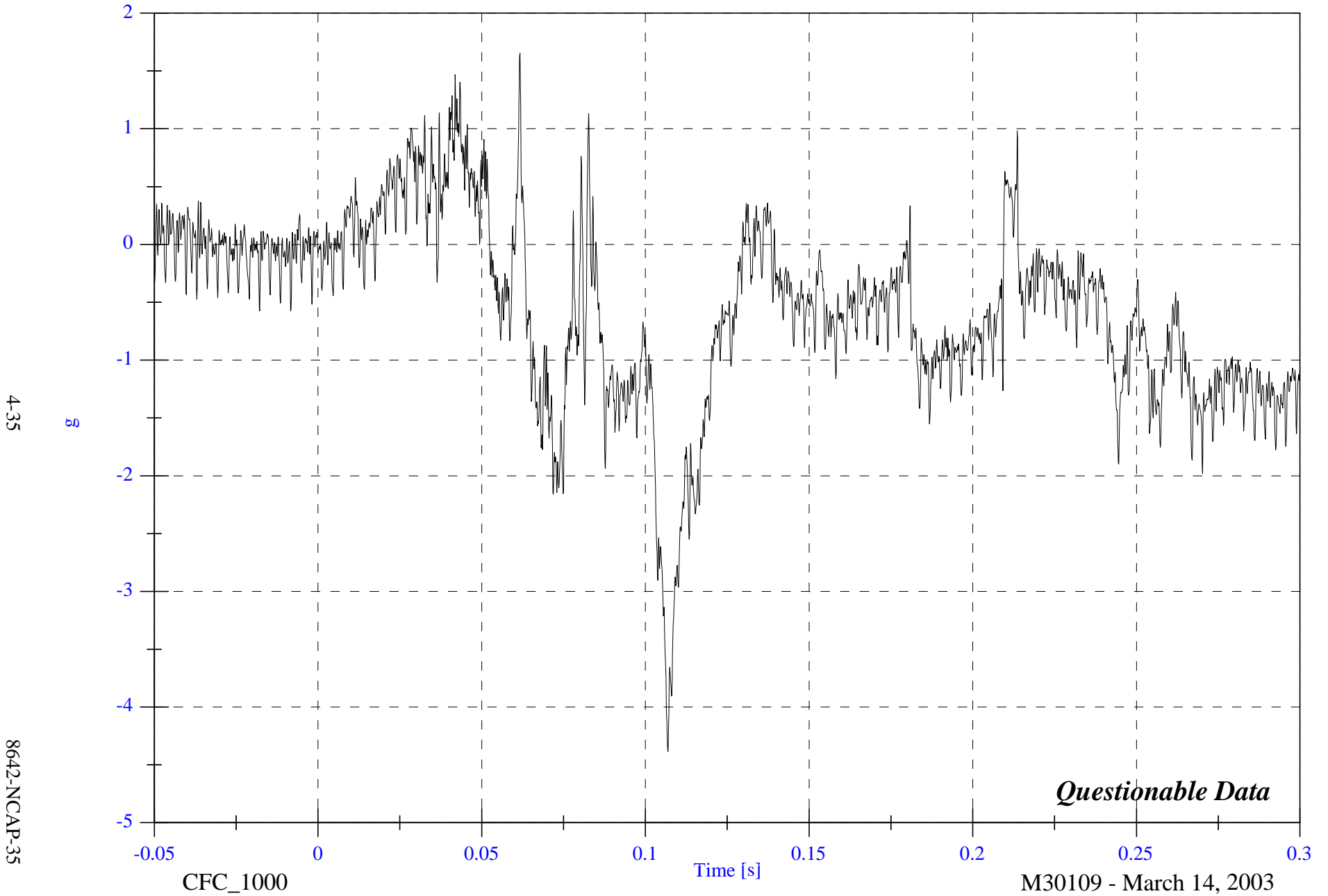
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 1.7 [g] at 0.062 [s]

Min: -4.4 [g] at 0.107 [s]

V1P4 Head y



2003 NCAP Test 13 2003 Chevrolet Tahoe

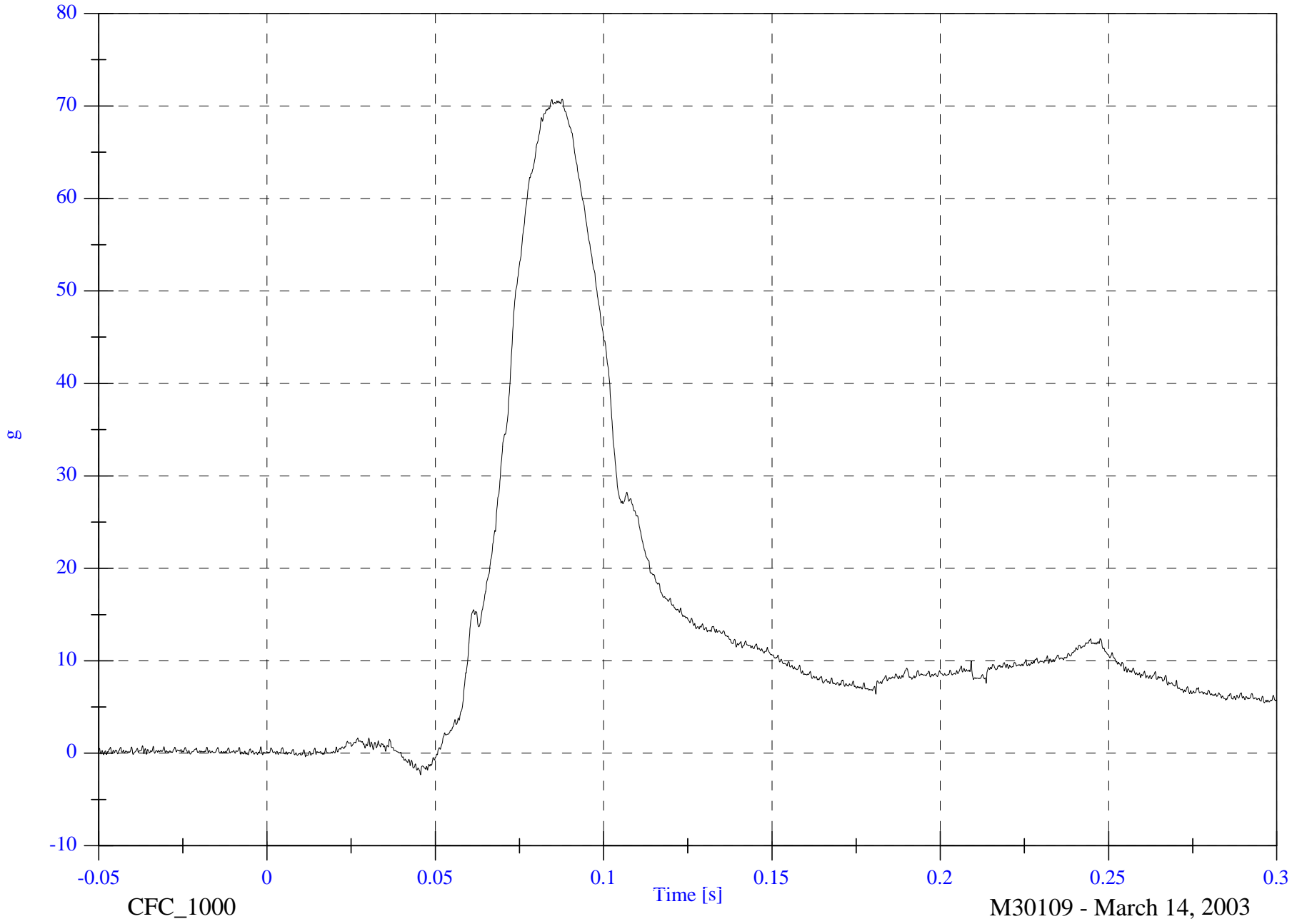
V1P4 Head z

Max: 70.7 [g] at 0.088 [s]

Min: -2.3 [g] at 0.046 [s]

4-36

8642-NCAP-35



CFC\_1000

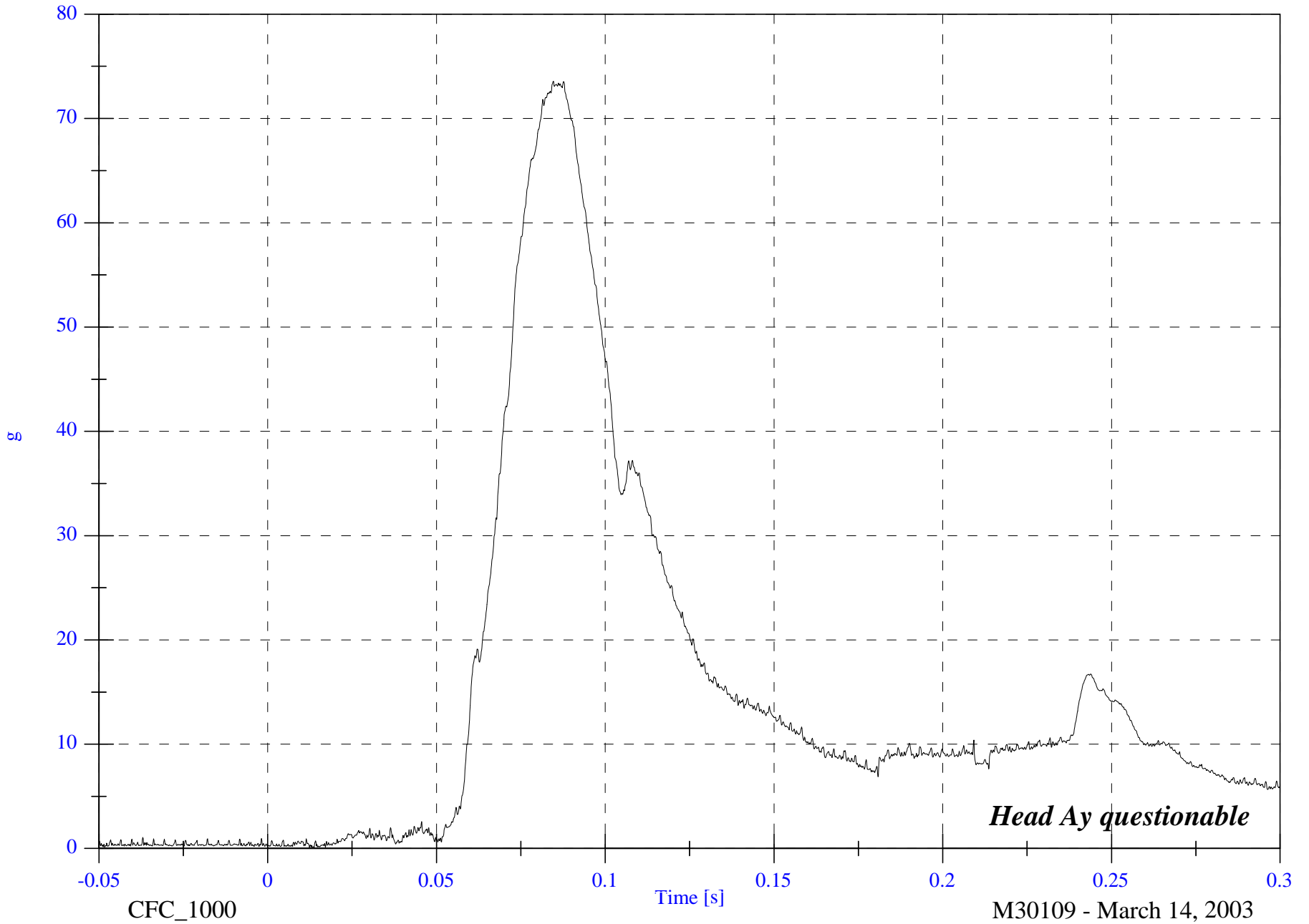
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 73.6 [g] at 0.085 [s]

V1P4 Head Resultant

Min: 0.1 [g] at 0.014 [s]



4-37

8642-NCAP-35

CFC\_1000

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

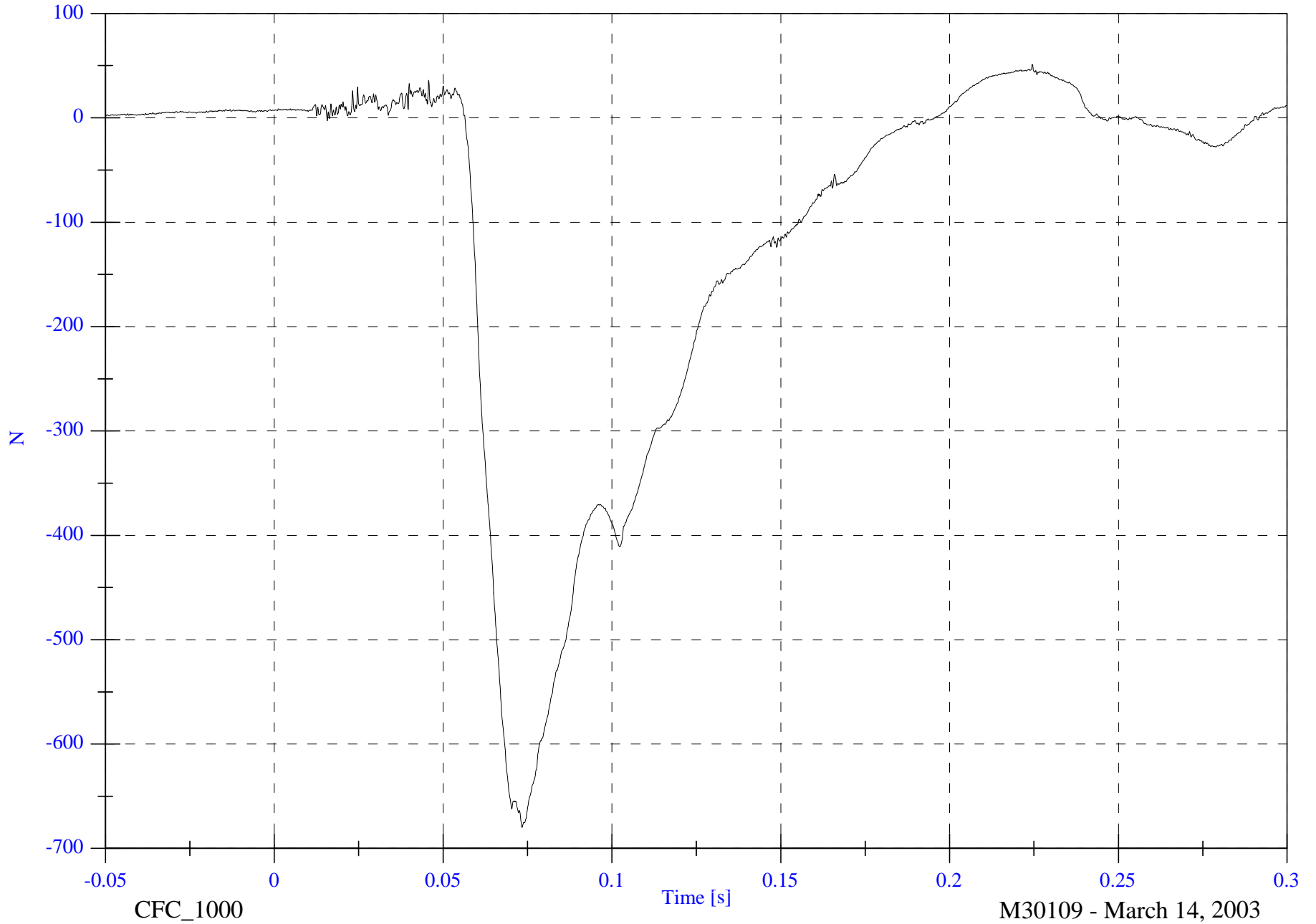
V1P4 Upper Neck Fx

Max: 51.1 [N] at 0.224 [s]

Min: -680.0 [N] at 0.073 [s]

4-38

8642-NCAP-35



CFC\_1000

Time [s]

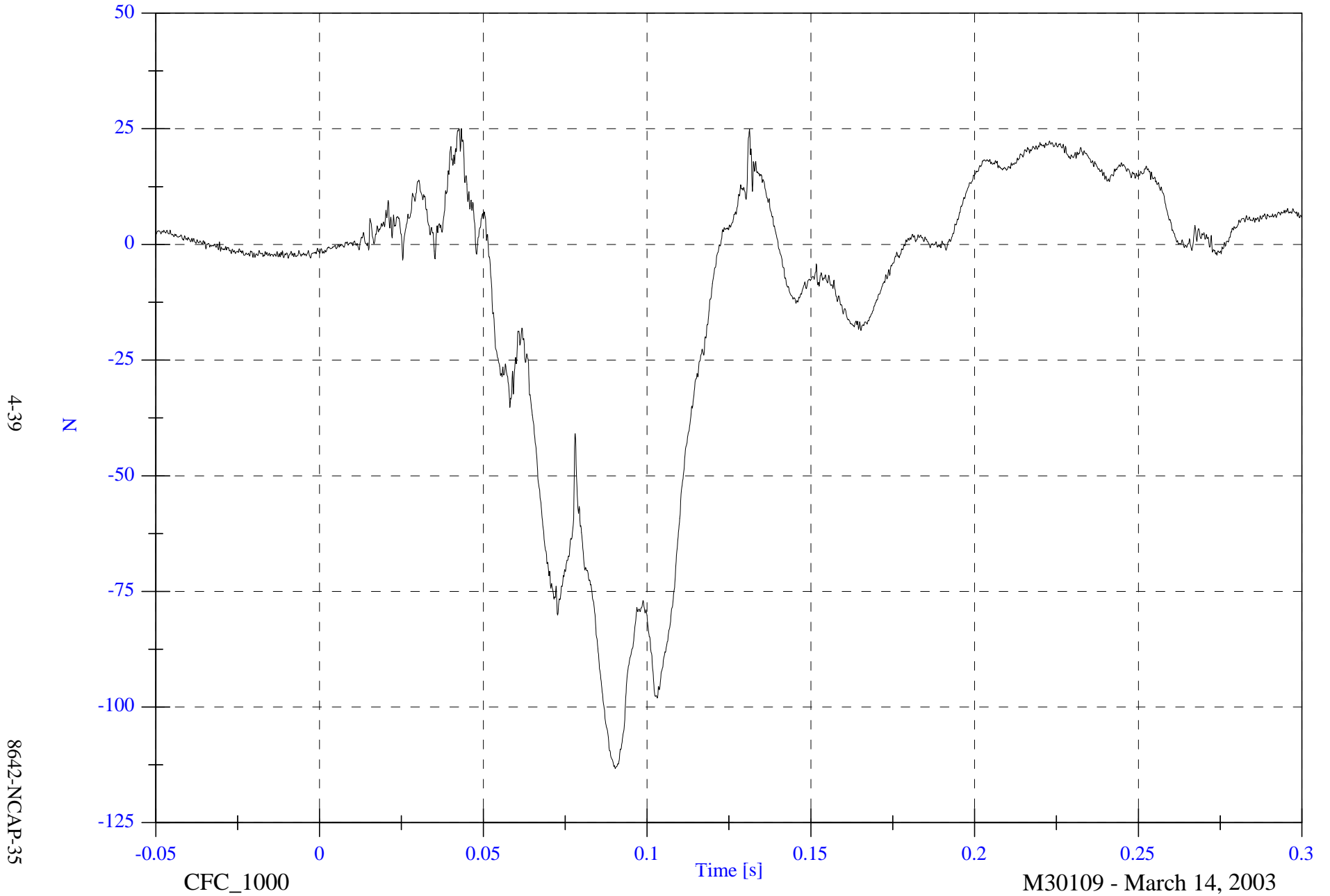
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 25.1 [N] at 0.043 [s]

Min: -113.3 [N] at 0.090 [s]

V1P4 Upper Neck Fy

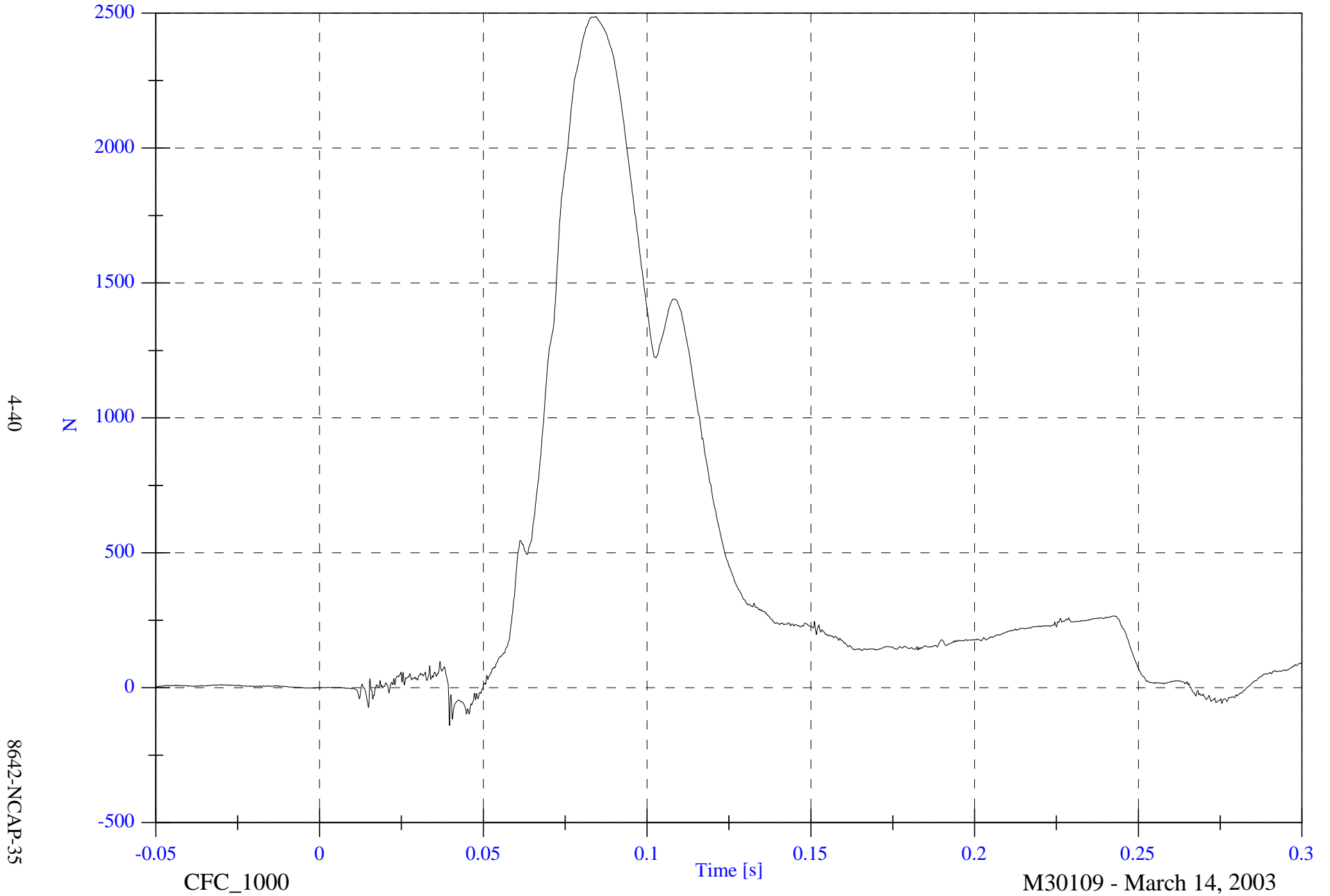


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 2487.0 [N] at 0.084 [s]

Min: -139.4 [N] at 0.040 [s]

V1P4 Upper Neck Fz



4-40

8642-NCAP-35

CFC\_1000

Time [s]

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2003 NCAP Test 13 2003 Chevrolet Tahoe

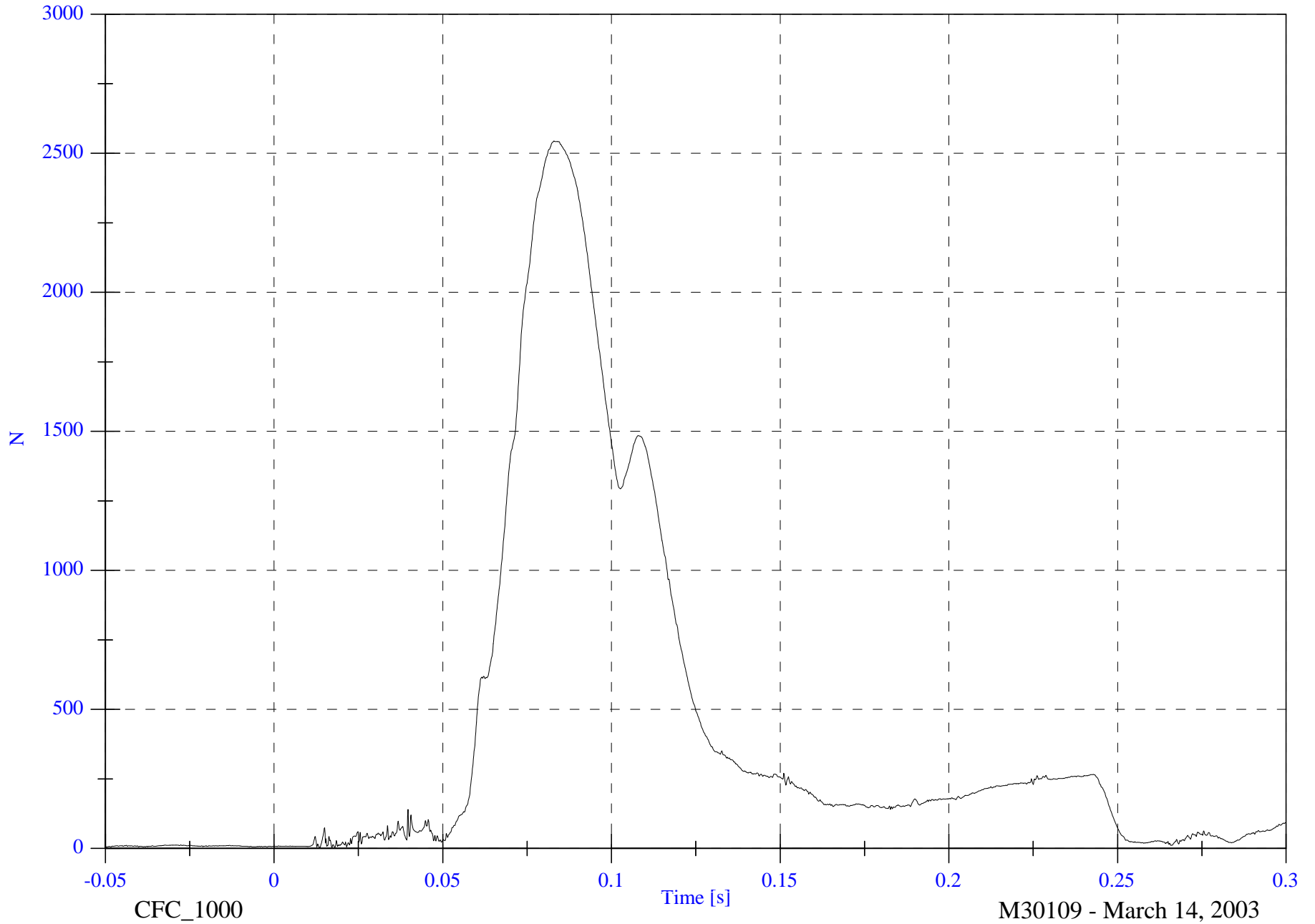
V1P4 Upper Neck F Resultant

Max: 2544.1 [N] at 0.083 [s]

Min: 4.1 [N] at 0.014 [s]

4-41

8642-NCAP-35

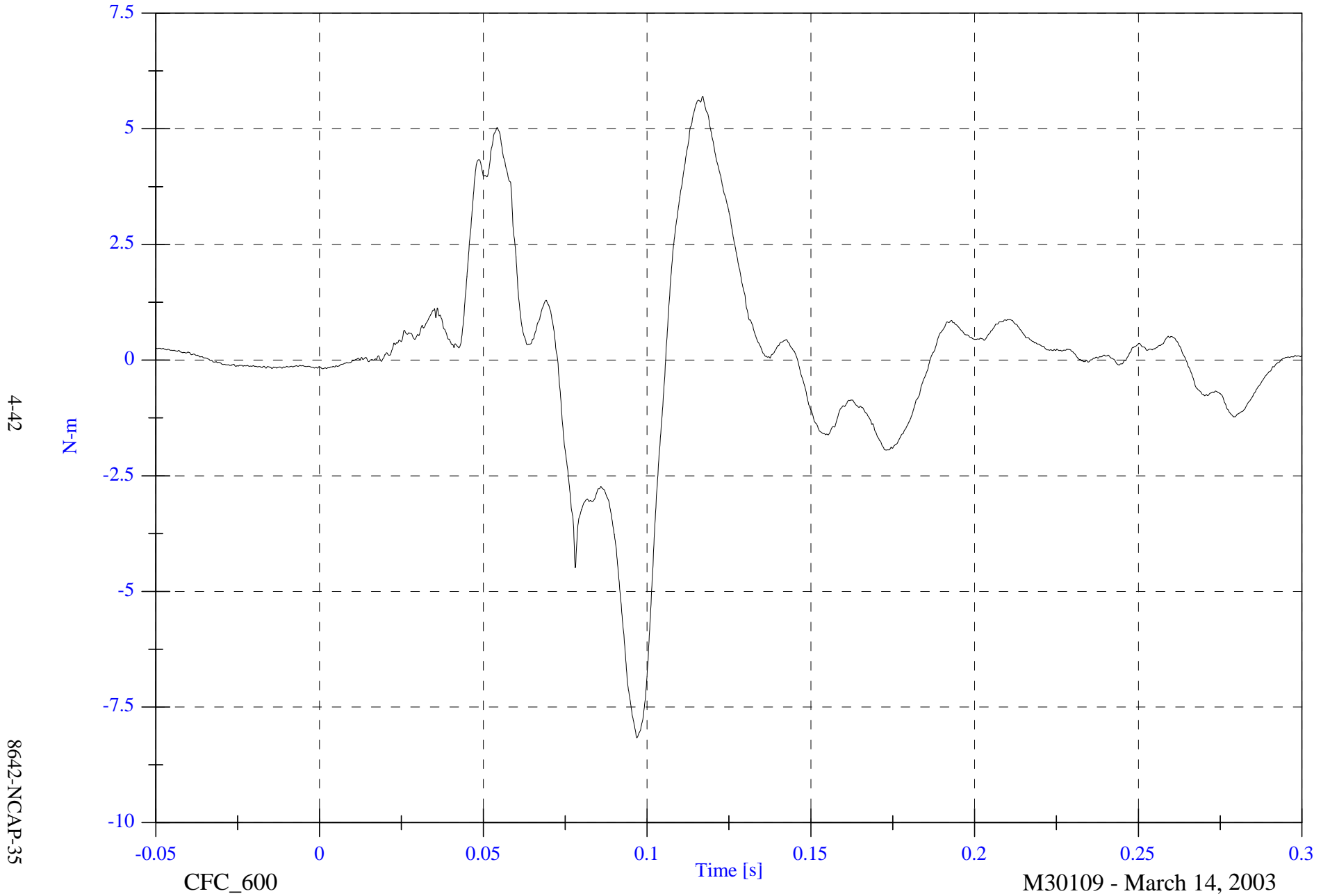


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P4 Upper Neck Mx

Max: 5.7 [N-m] at 0.117 [s]

Min: -8.2 [N-m] at 0.097 [s]



4-42

8642-NCAP-35

CFC\_600

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

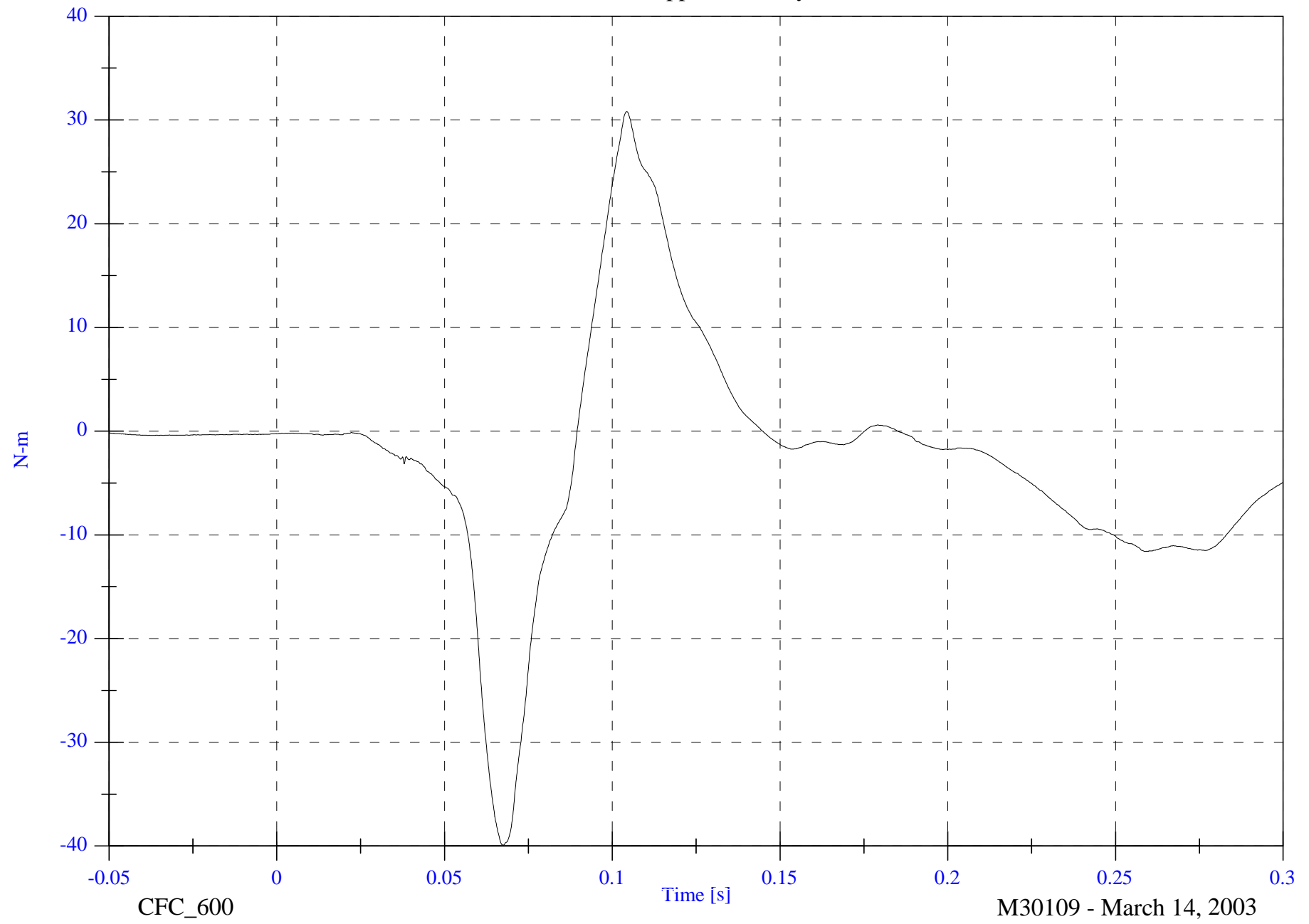
Max: 30.8 [N-m] at 0.104 [s]

Min: -39.9 [N-m] at 0.067 [s]

V1P4 Upper Neck My

4-43

8642-NCAP-35

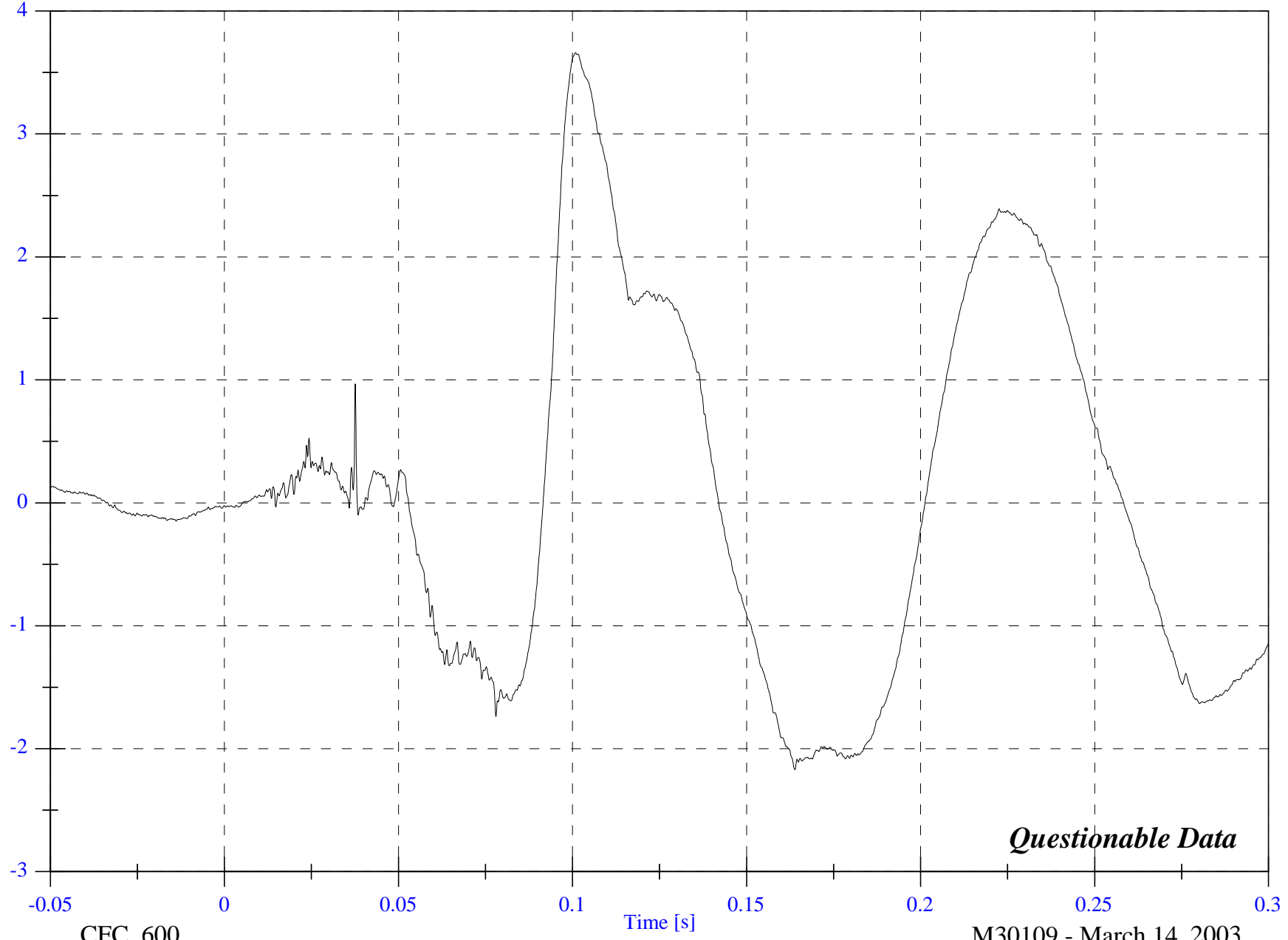


CFC\_600

Time [s]

M30109 - March 14, 2003

V1P4 Upper Neck Mz



4-44

8642-NCAP-35

CFC\_600

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

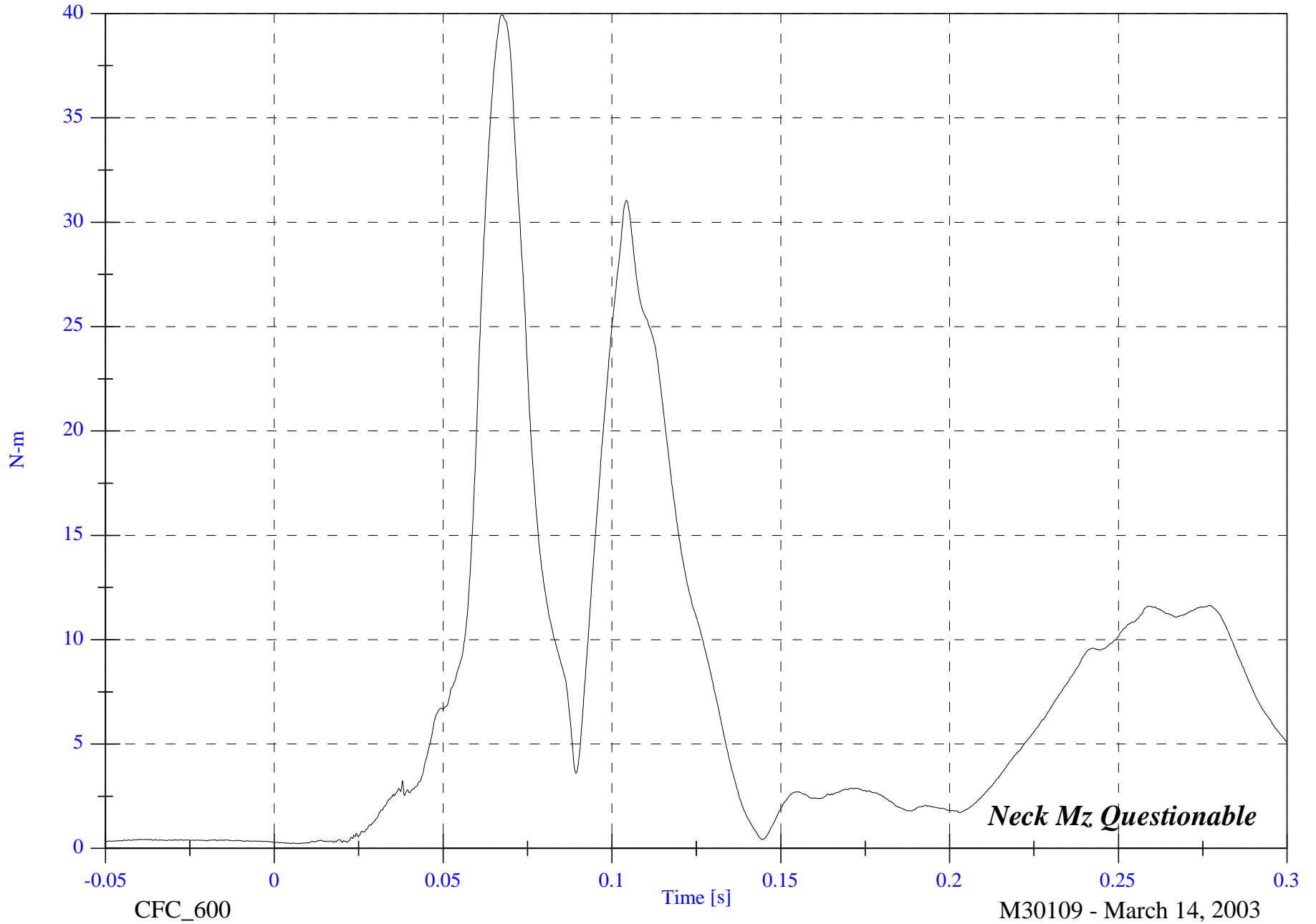
V1P4 Upper Neck M Resultant

Max: 39.9 [N-m] at 0.068 [s]

Min: 0.2 [N-m] at 0.007 [s]

4-45

8642-NCAP-35



*Neck Mz Questionable*

CFC\_600

Time [s]

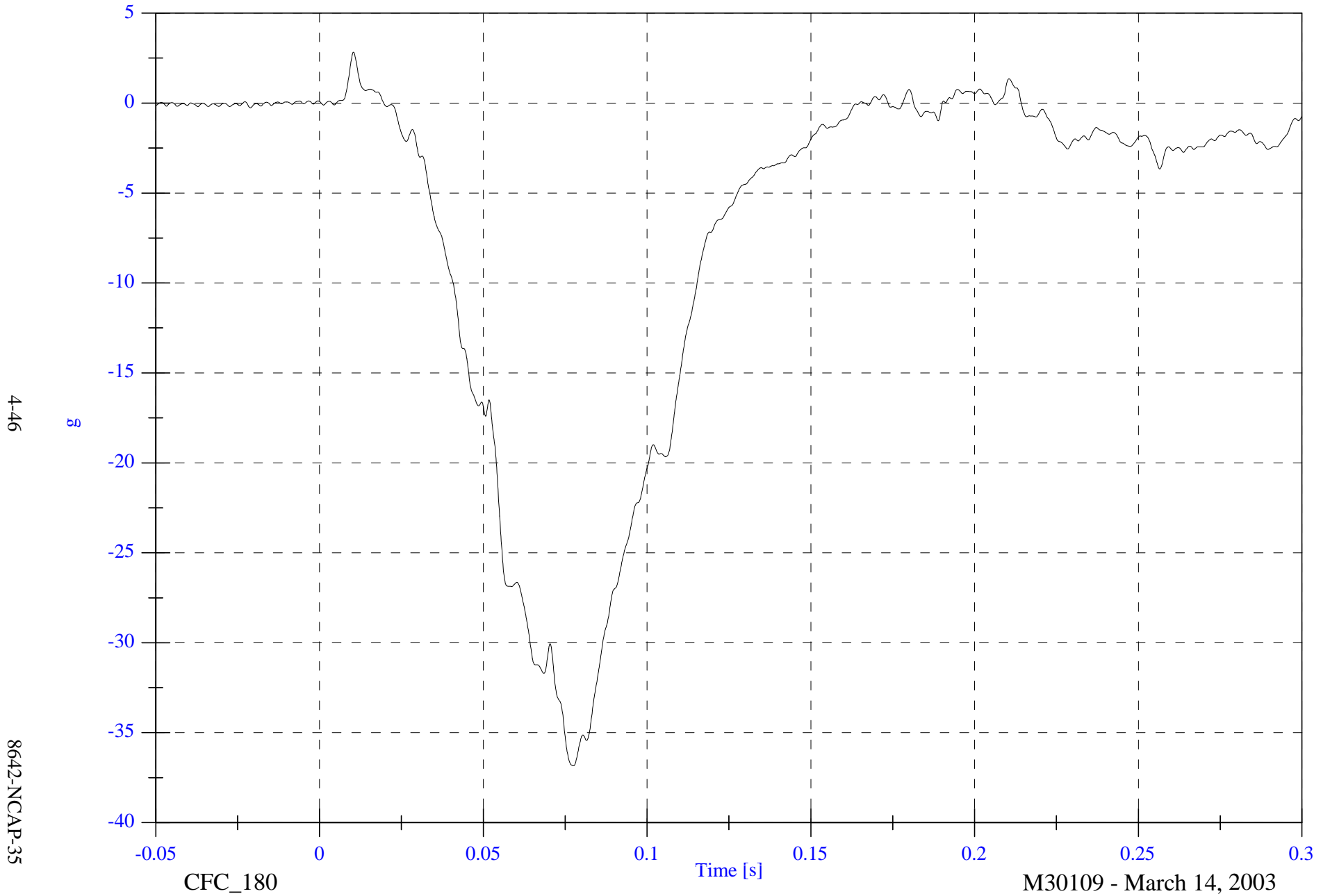
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP4 Chest x

Max: 2.8 [g] at 0.010 [s]

Min: -36.8 [g] at 0.077 [s]



2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 3.0 [g] at 0.091 [s]

Min: -4.9 [g] at 0.047 [s]

VIP4 Chest y



4-47

8642-NCAP-35

CFC\_180

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

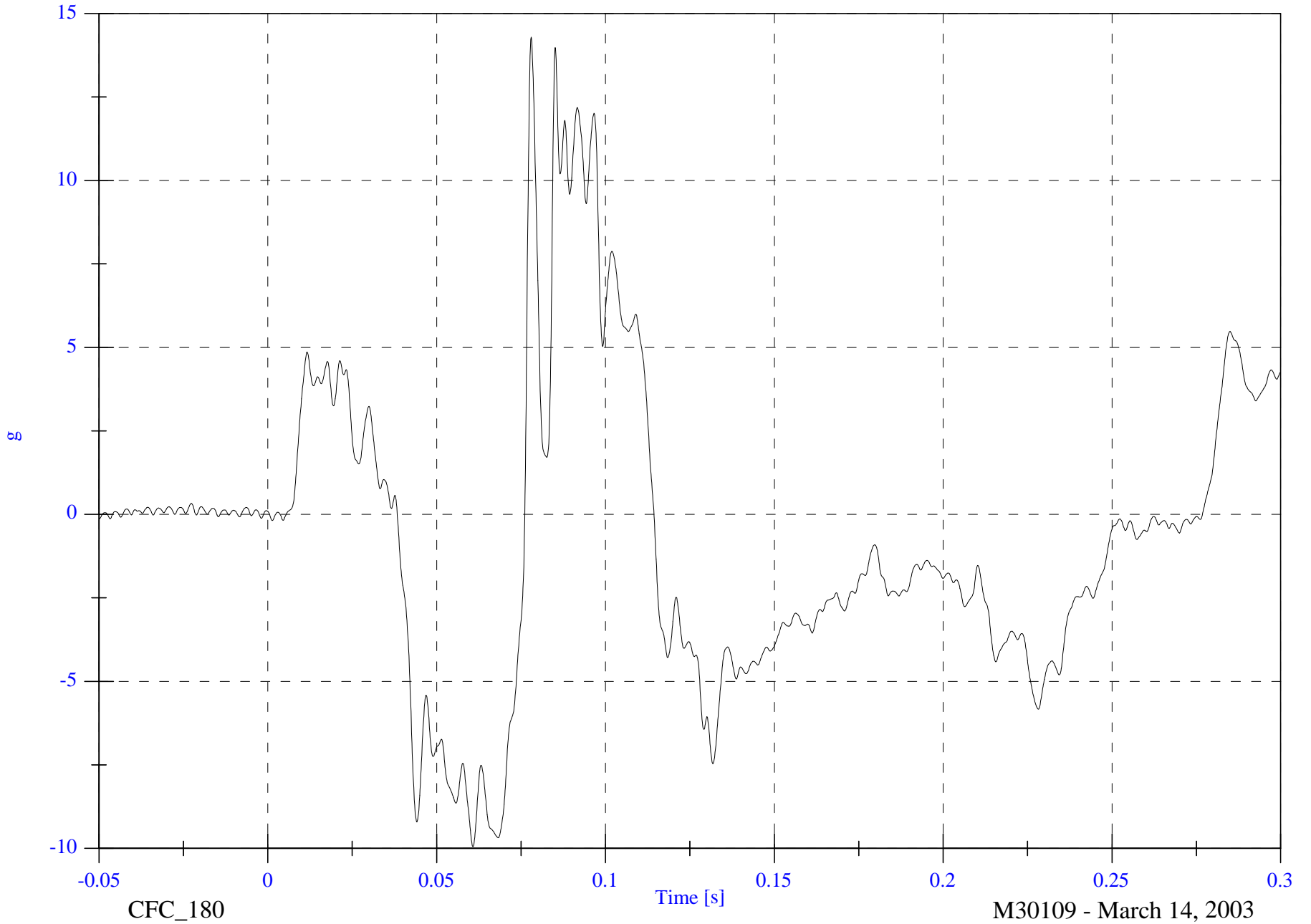
VIP4 Chest z

Max: 14.3 [g] at 0.078 [s]

Min: -9.9 [g] at 0.061 [s]

4-48

8642-NCAP-35



2003 NCAP Test 13 2003 Chevrolet Tahoe

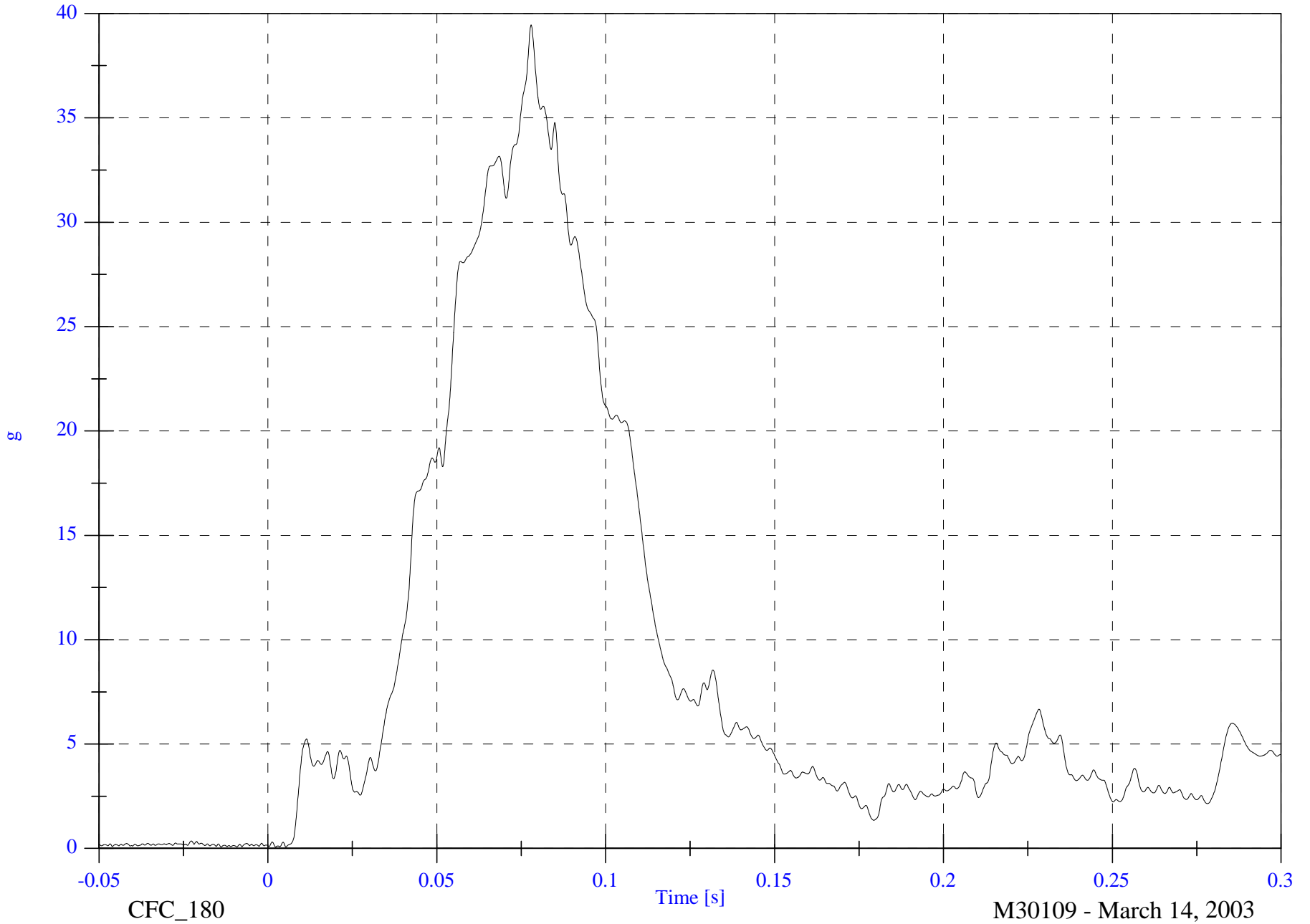
V1P4 Chest Resultant

Max: 39.4 [g] at 0.078 [s]

Min: 0.1 [g] at 0.005 [s]

4-49

8642-NCAP-35



-0.05

0

0.05

0.1

0.15

0.2

0.25

0.3

CFC\_180

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P4 Chest Compression

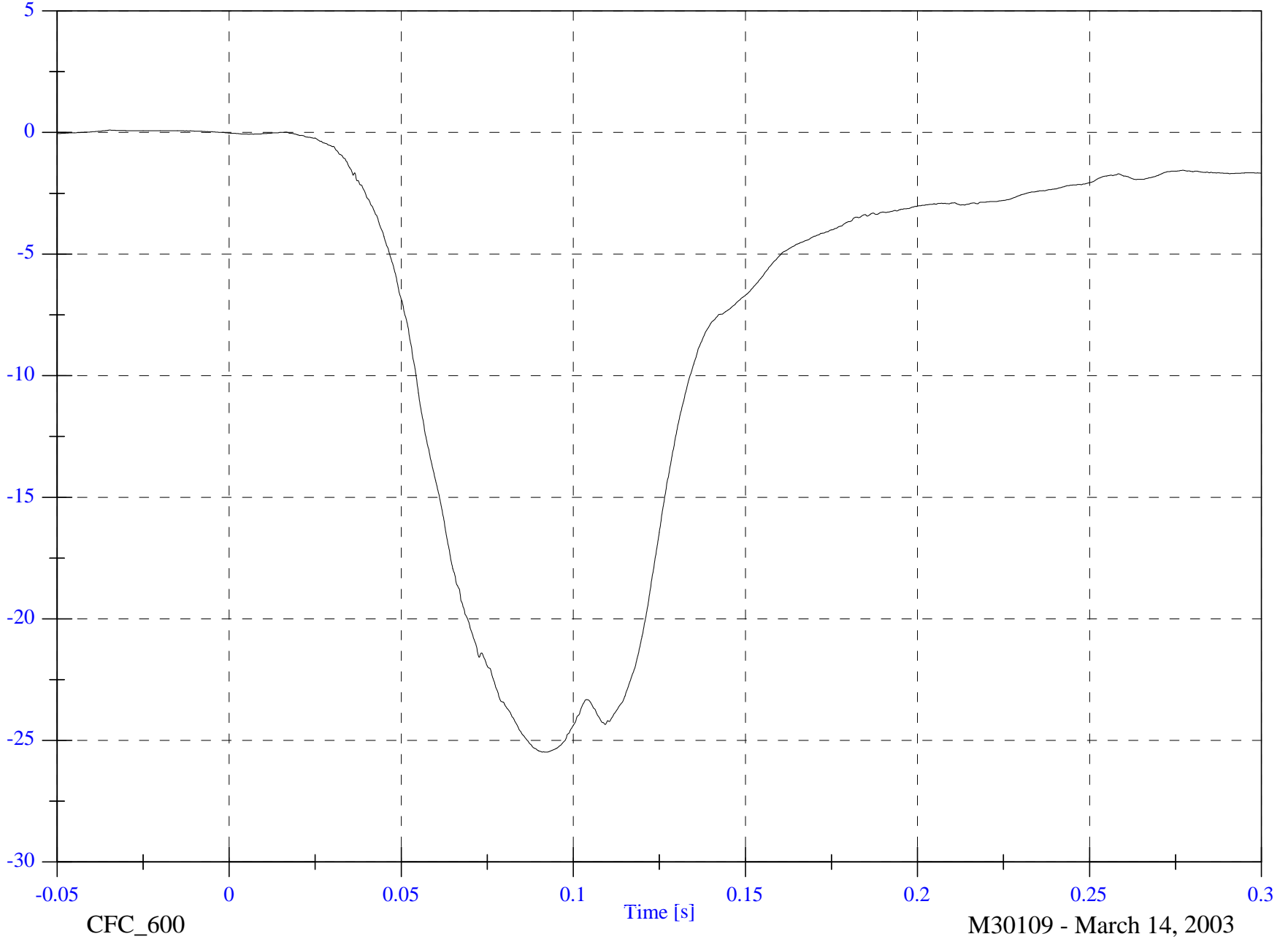
Max: 0.1 [mm] at -0.035 [s]

Min: -25.5 [mm] at 0.092 [s]

4-50

mm

8642-NCAP-35



2003 NCAP Test 13 2003 Chevrolet Tahoe

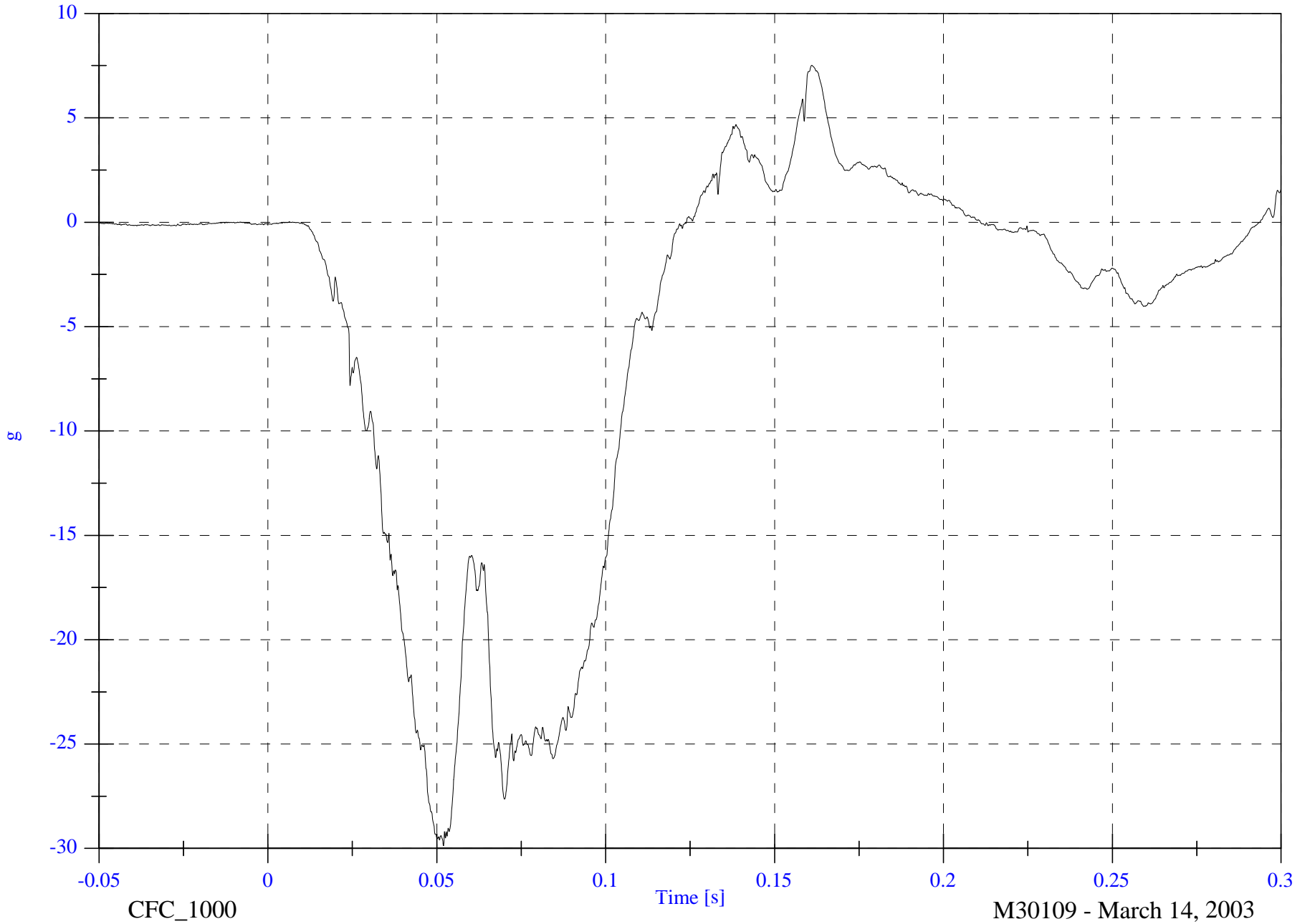
Max: 7.5 [g] at 0.161 [s]

Min: -29.9 [g] at 0.052 [s]

V1P4 Pelvic x

4-51

8642-NCAP-35



CFC\_1000

Time [s]

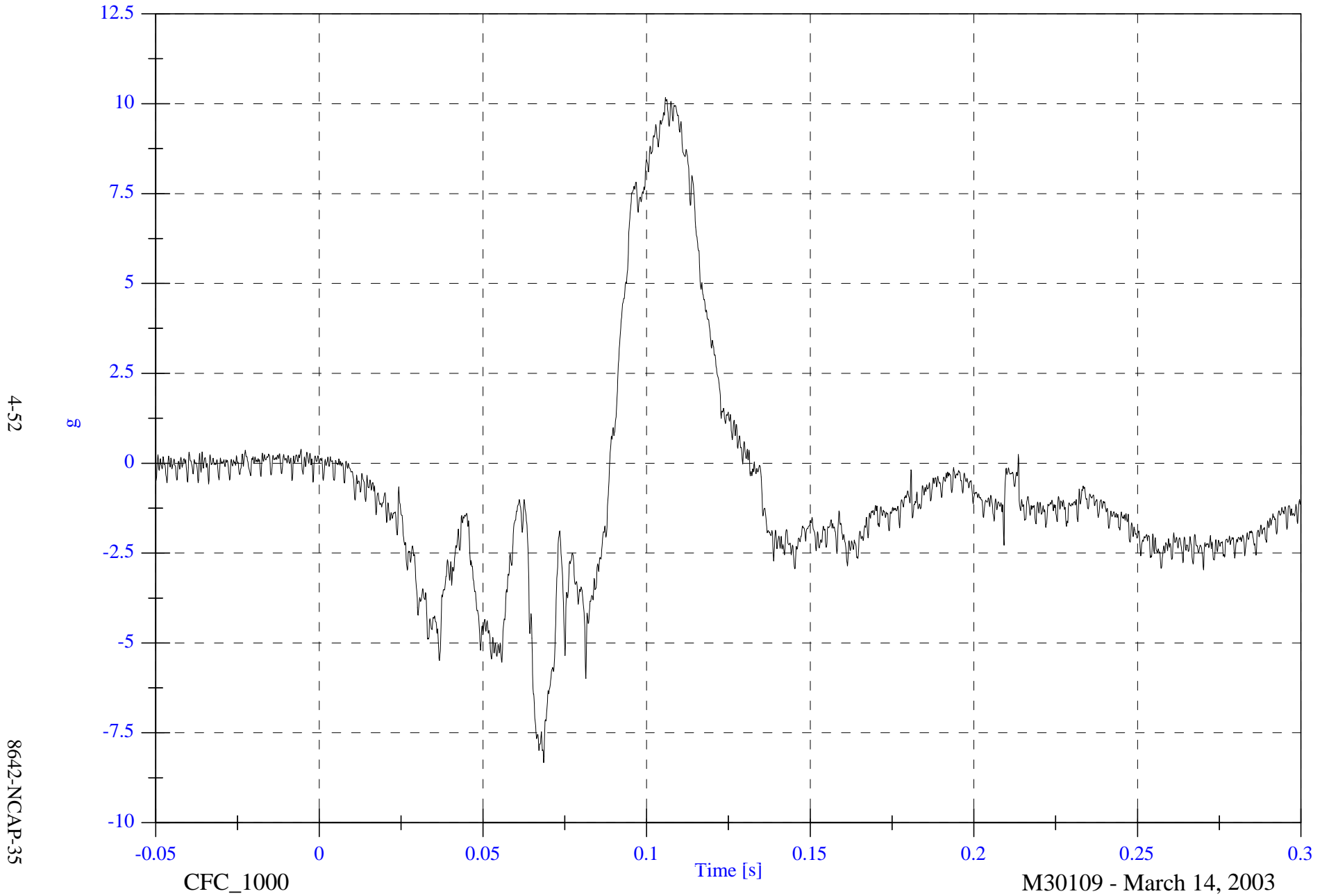
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 10.2 [g] at 0.106 [s]

Min: -8.3 [g] at 0.069 [s]

V1P4 Pelvic y

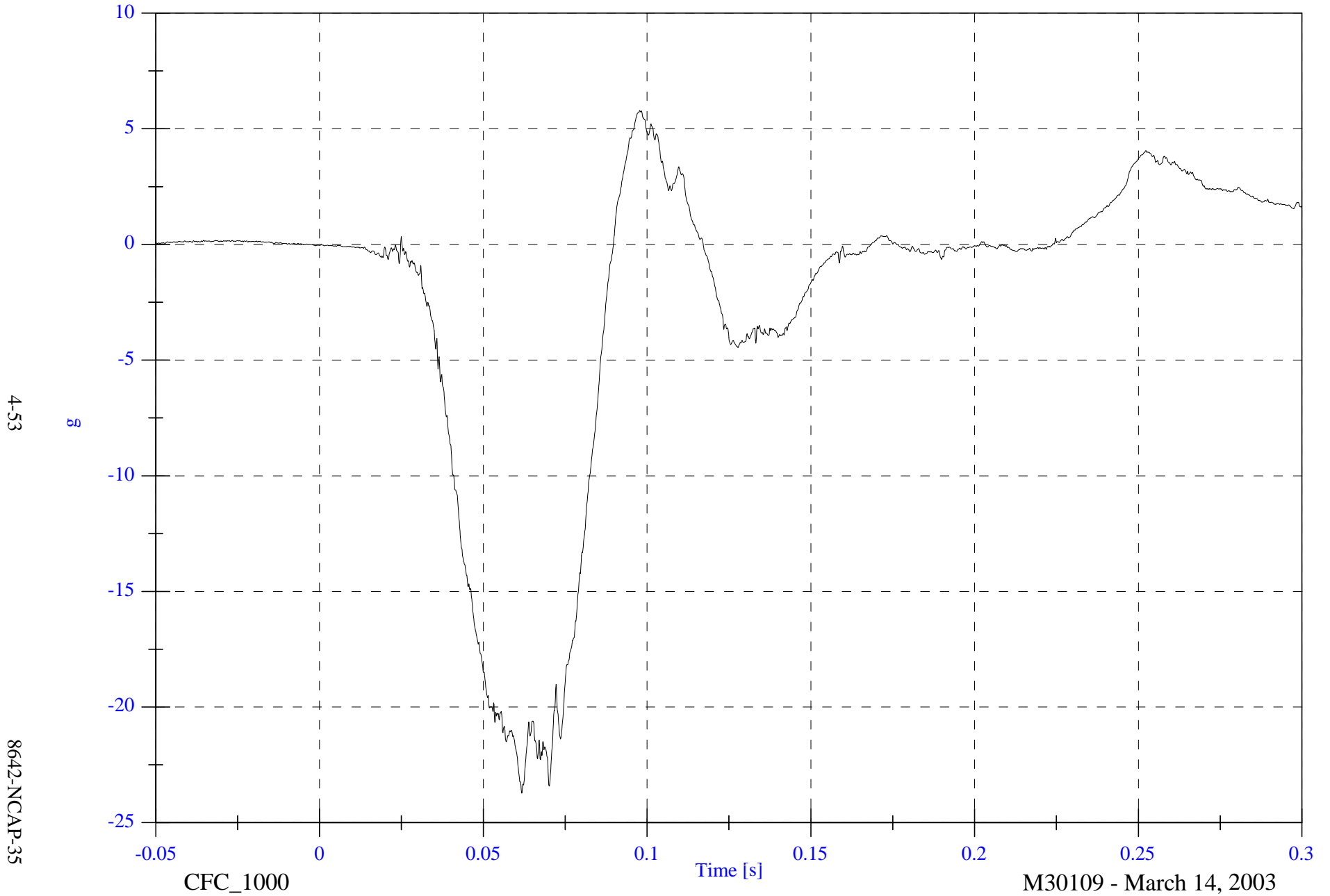


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 5.8 [g] at 0.098 [s]

Min: -23.7 [g] at 0.062 [s]

V1P4 Pelvic z



4-53

8642-NCAP-35

CFC\_1000

Time [s]

M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

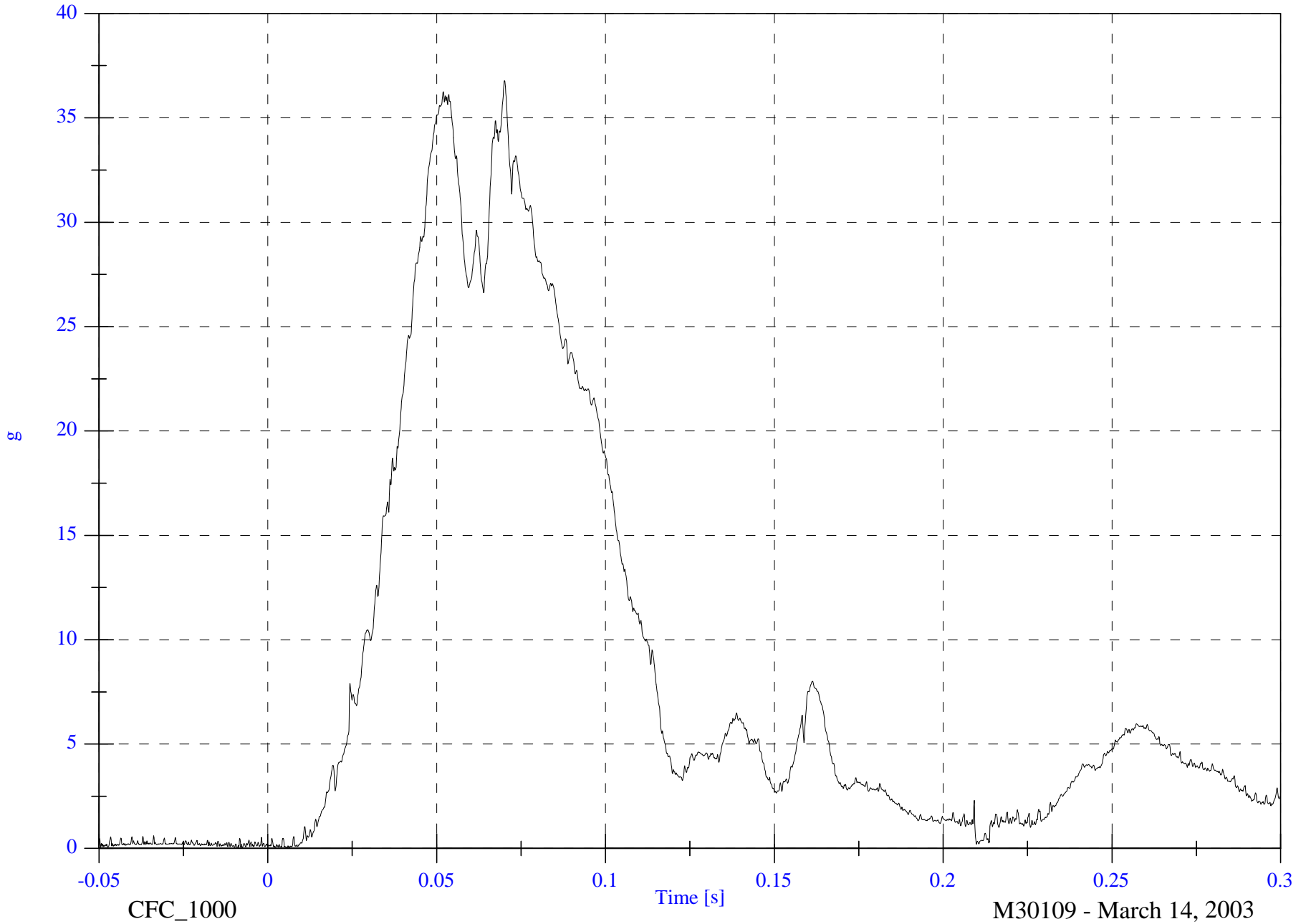
V1P4 Pelvic Resultant

Max: 36.8 [g] at 0.070 [s]

Min: 0.0 [g] at -0.009 [s]

4-54

8642-NCAP-35



CFC\_1000

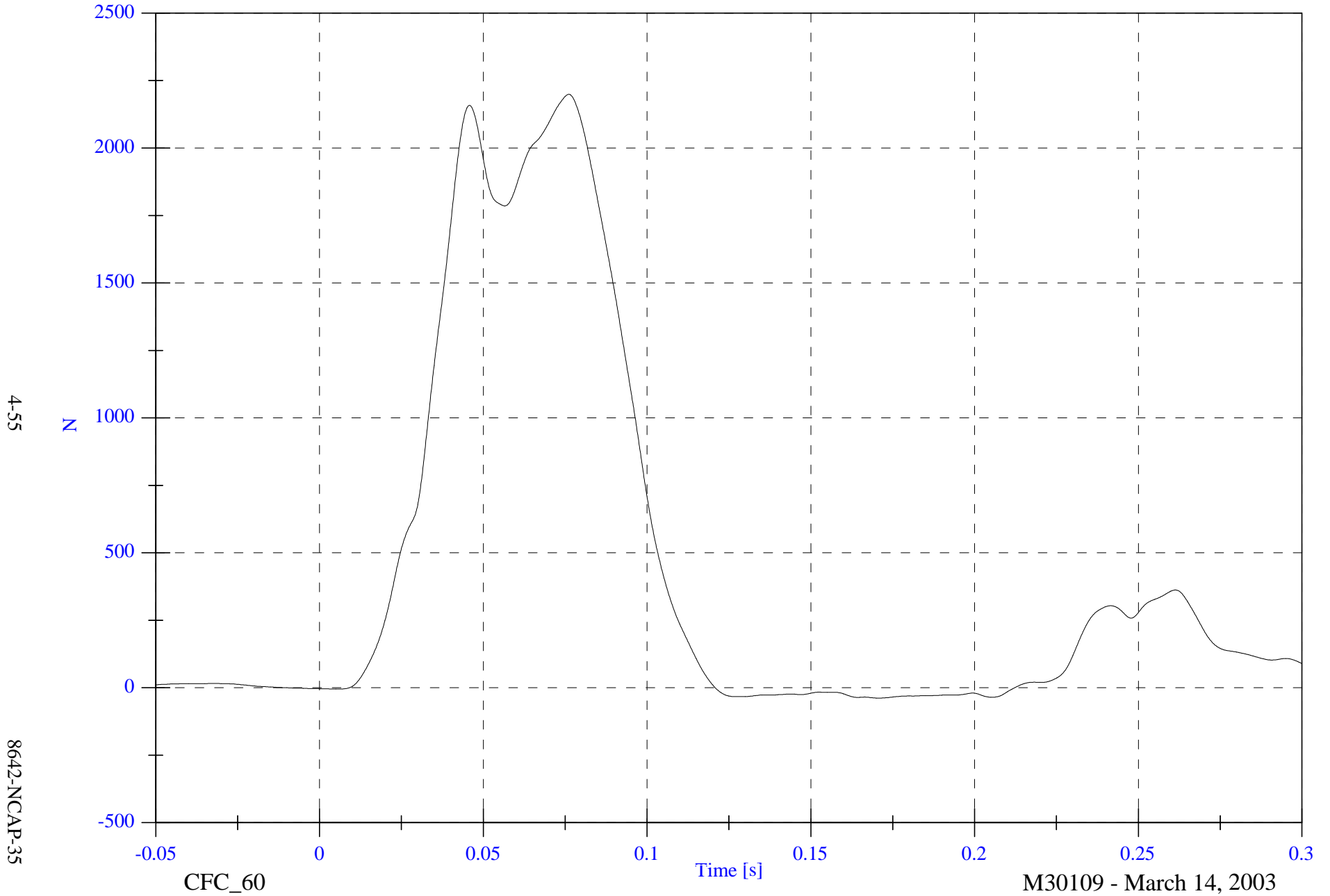
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P4 Lap Belt

Max: 2199.0 [N] at 0.076 [s]

Min: -37.9 [N] at 0.171 [s]

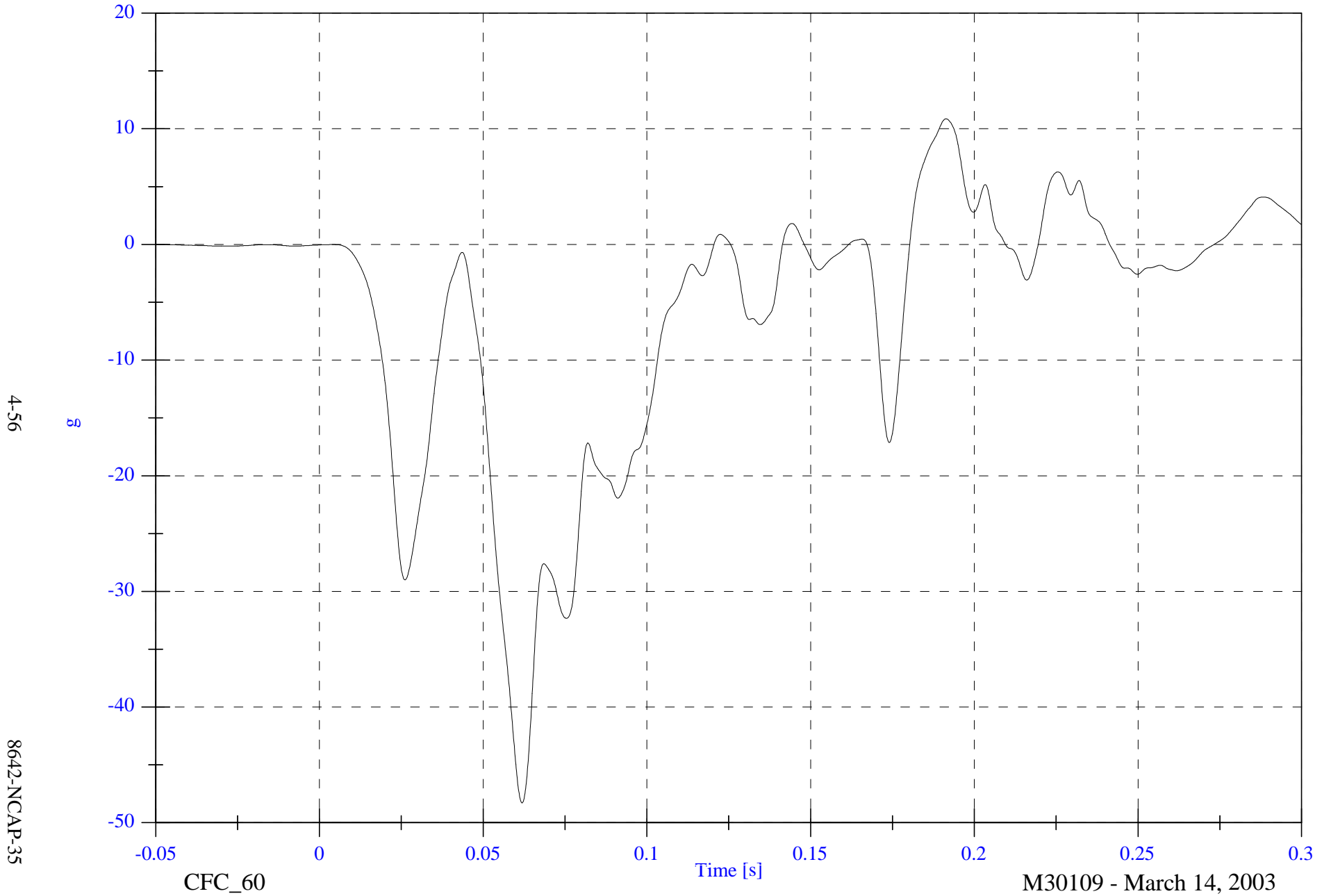


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P3 Seat x

Max: 10.9 [g] at 0.191 [s]

Min: -48.3 [g] at 0.062 [s]



4-56

8642-NCAP-35

2003 NCAP Test 13 2003 Chevrolet Tahoe

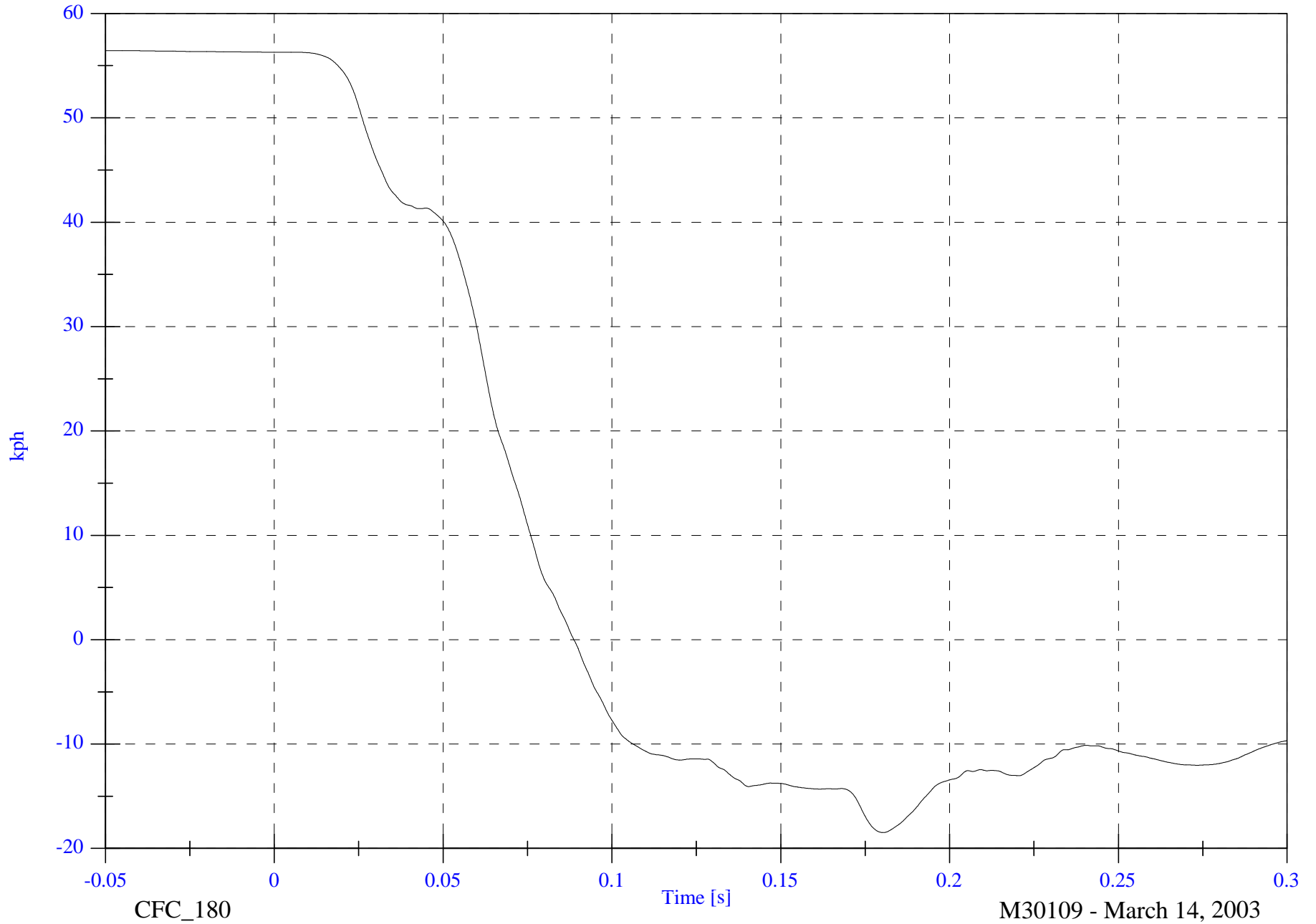
Max: 56.4 [kph] at -0.048 [s]

V1P3 Seat x Velocity

Min: -18.5 [kph] at 0.180 [s]

4-57

8642-NCAP-35



CFC\_180

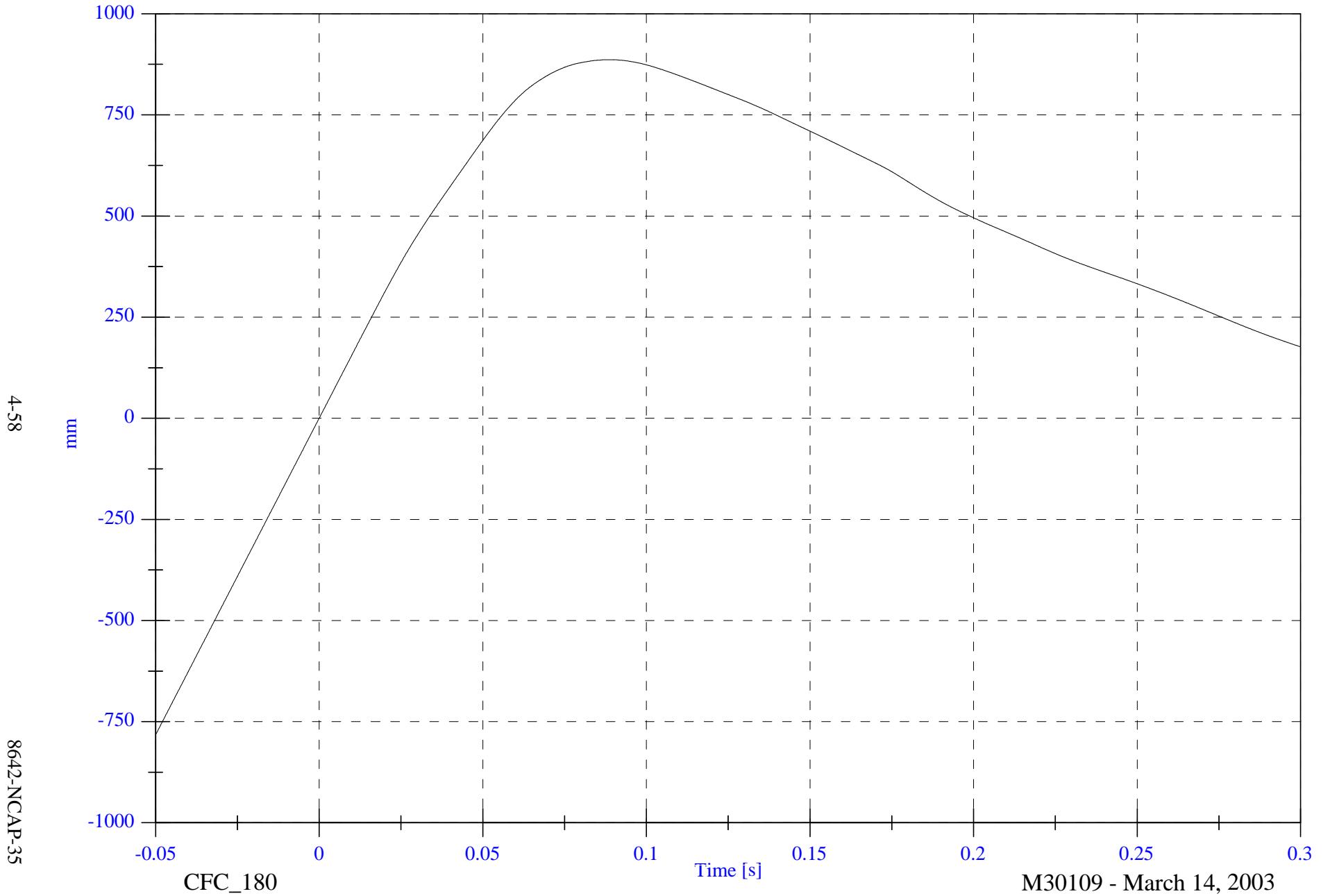
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 886.5 [mm] at 0.089 [s]

Min: -782.9 [mm] at -0.050 [s]

V1P3 Seat x Displacement



4-58

8642-NCAP-35

CFC\_180

Time [s]

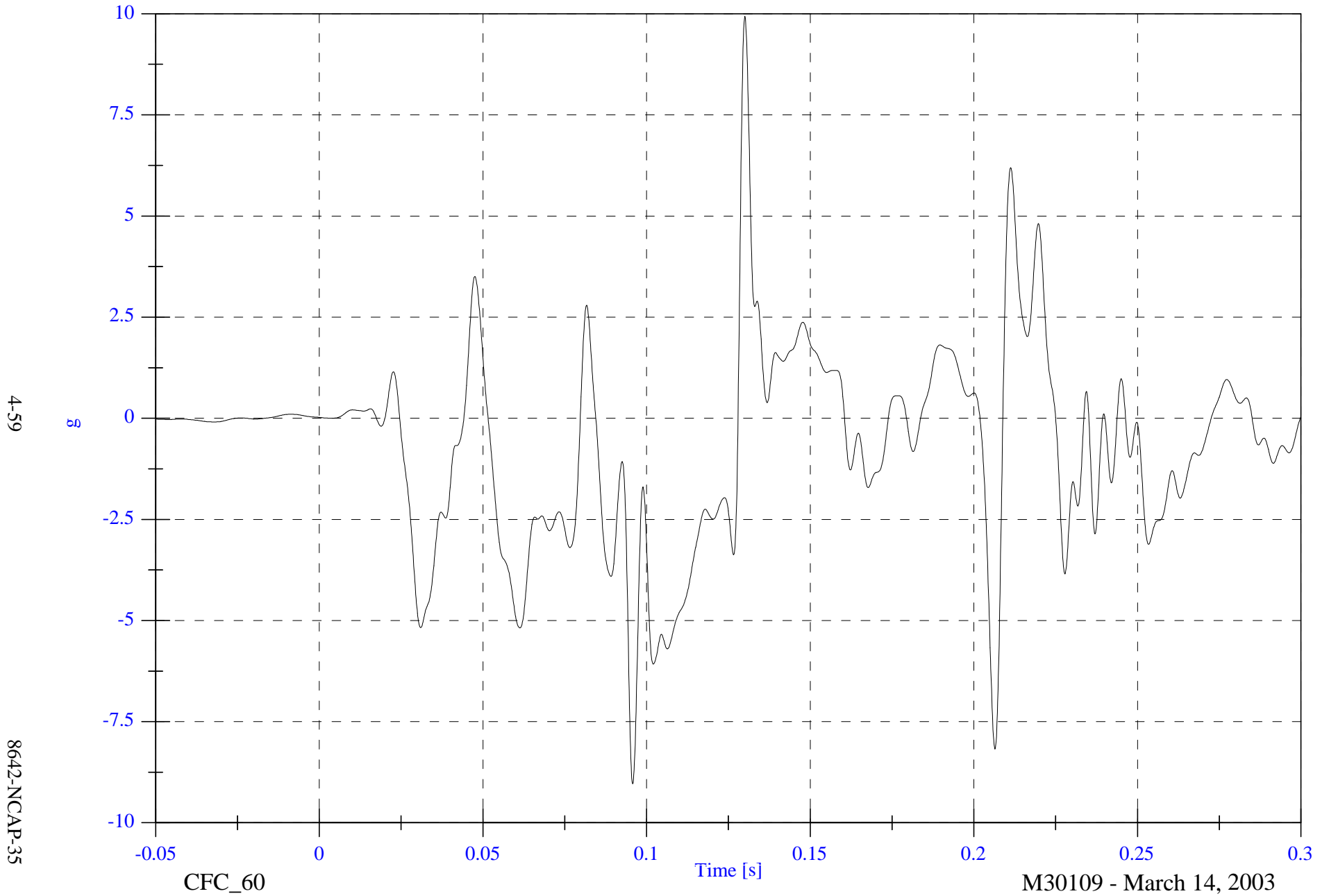
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 9.9 [g] at 0.130 [s]

Min: -9.0 [g] at 0.096 [s]

V1P3 Seat y

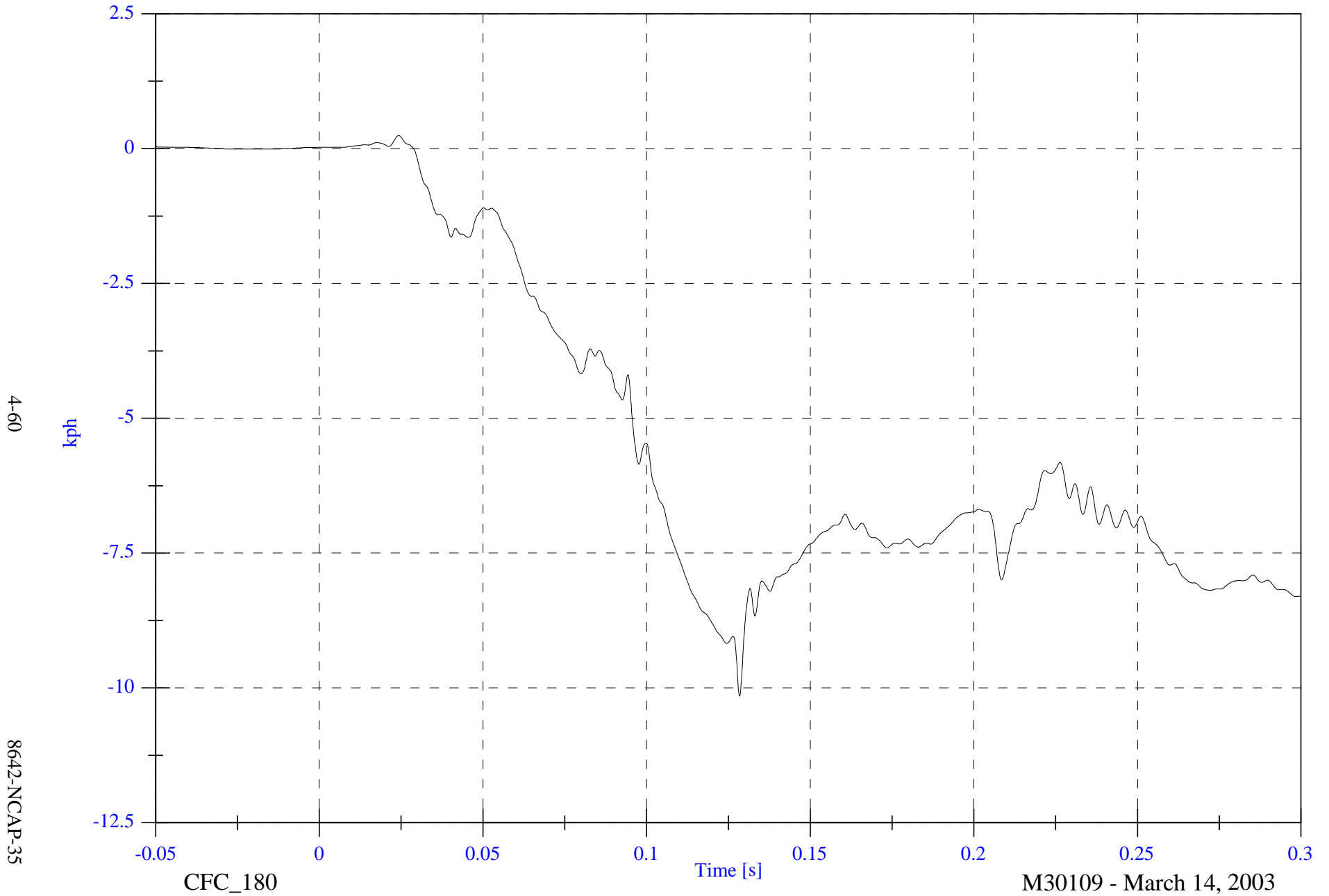


2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 0.2 [kph] at 0.024 [s]

Min: -10.2 [kph] at 0.128 [s]

### V1P3 Seat y Velocity



4-60

8642-NCAP-35

CFC\_180

Time [s]

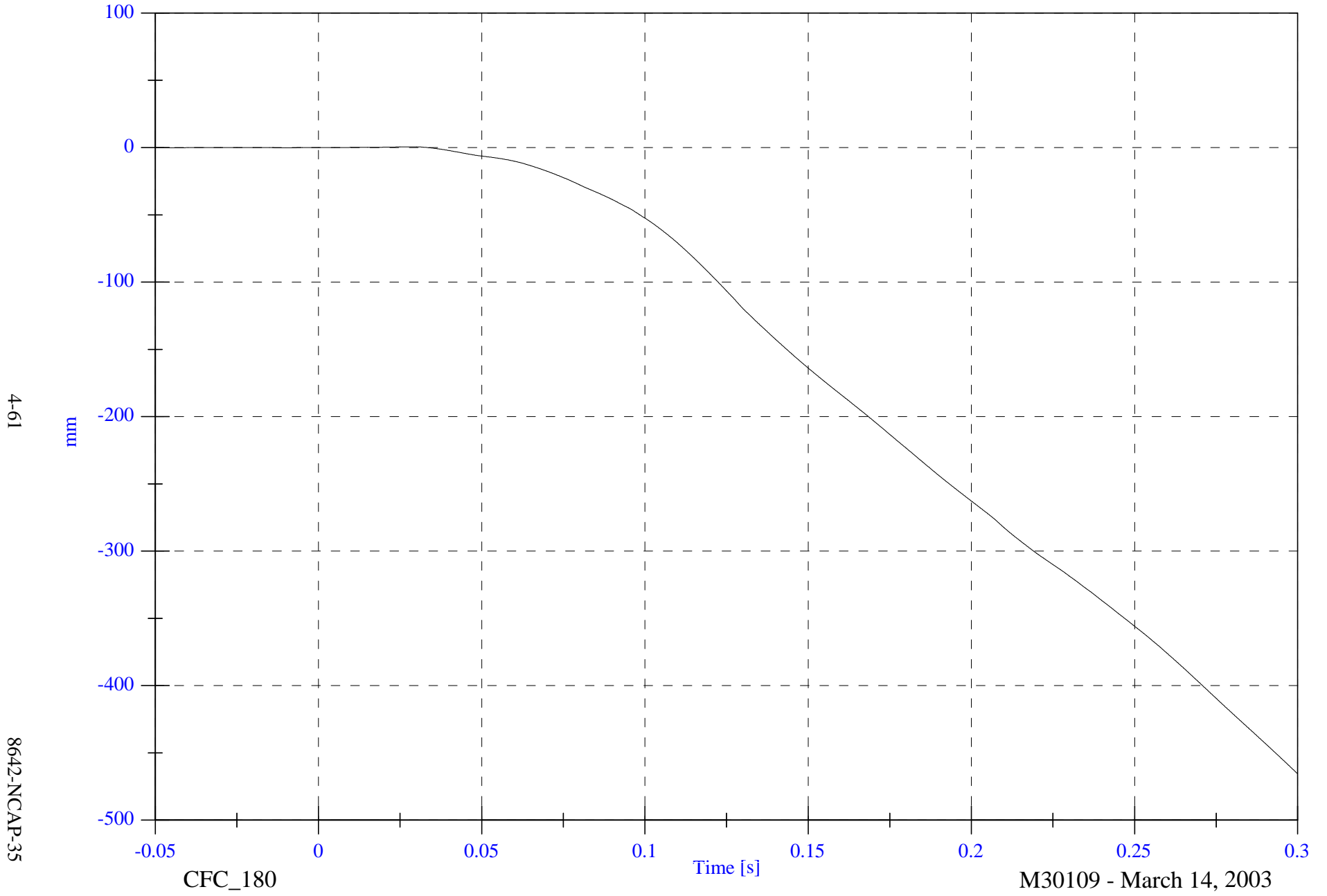
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P3 Seat y Displacement

Max: 0.6 [mm] at 0.029 [s]

Min: -465.4 [mm] at 0.300 [s]



4-61

8642-NCAP-35

CFC\_180

Time [s]

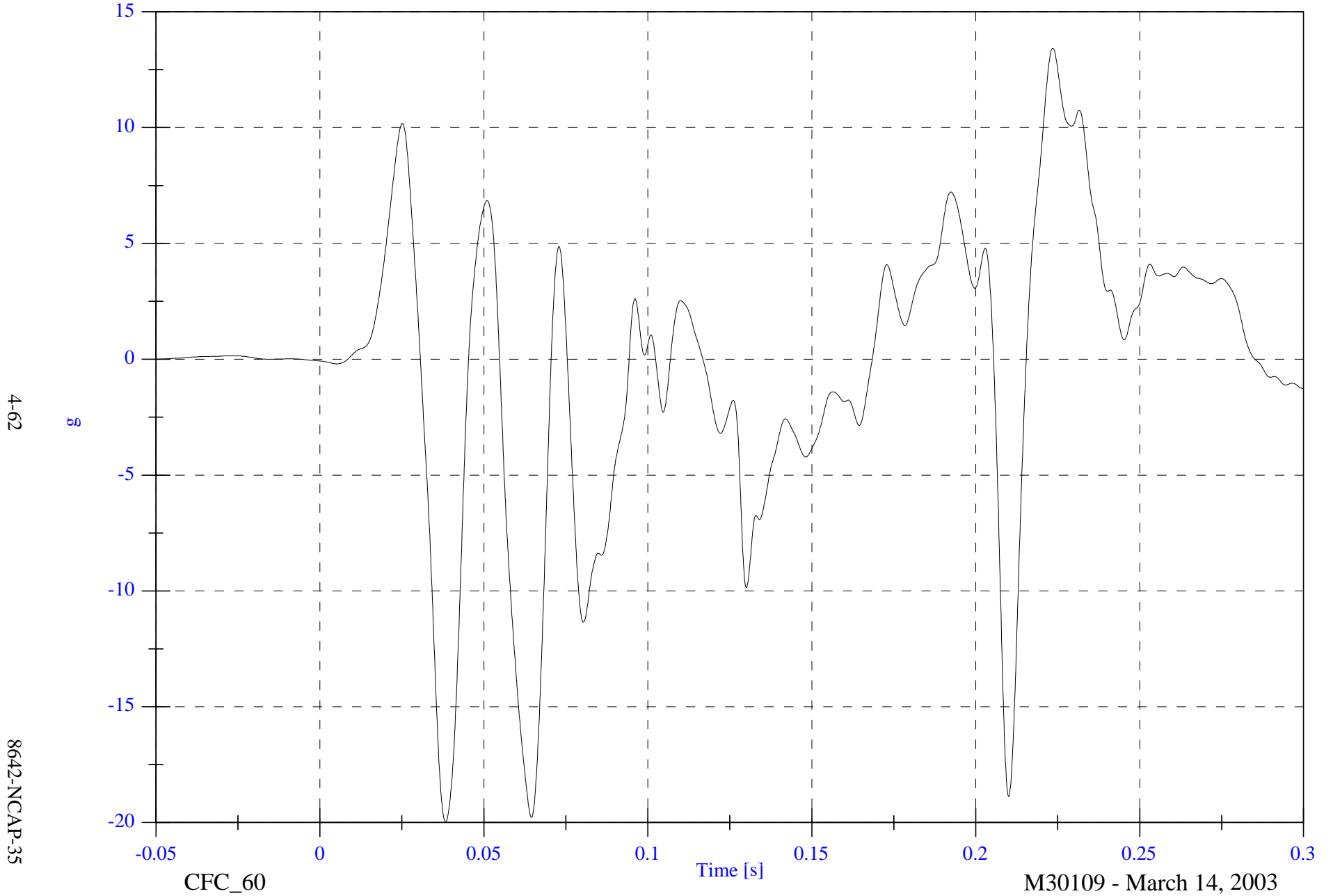
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P3 Seat z

Max: 13.4 [g] at 0.223 [s]

Min: -20.0 [g] at 0.038 [s]



4-62

8642-NCAP-35

CFC\_60

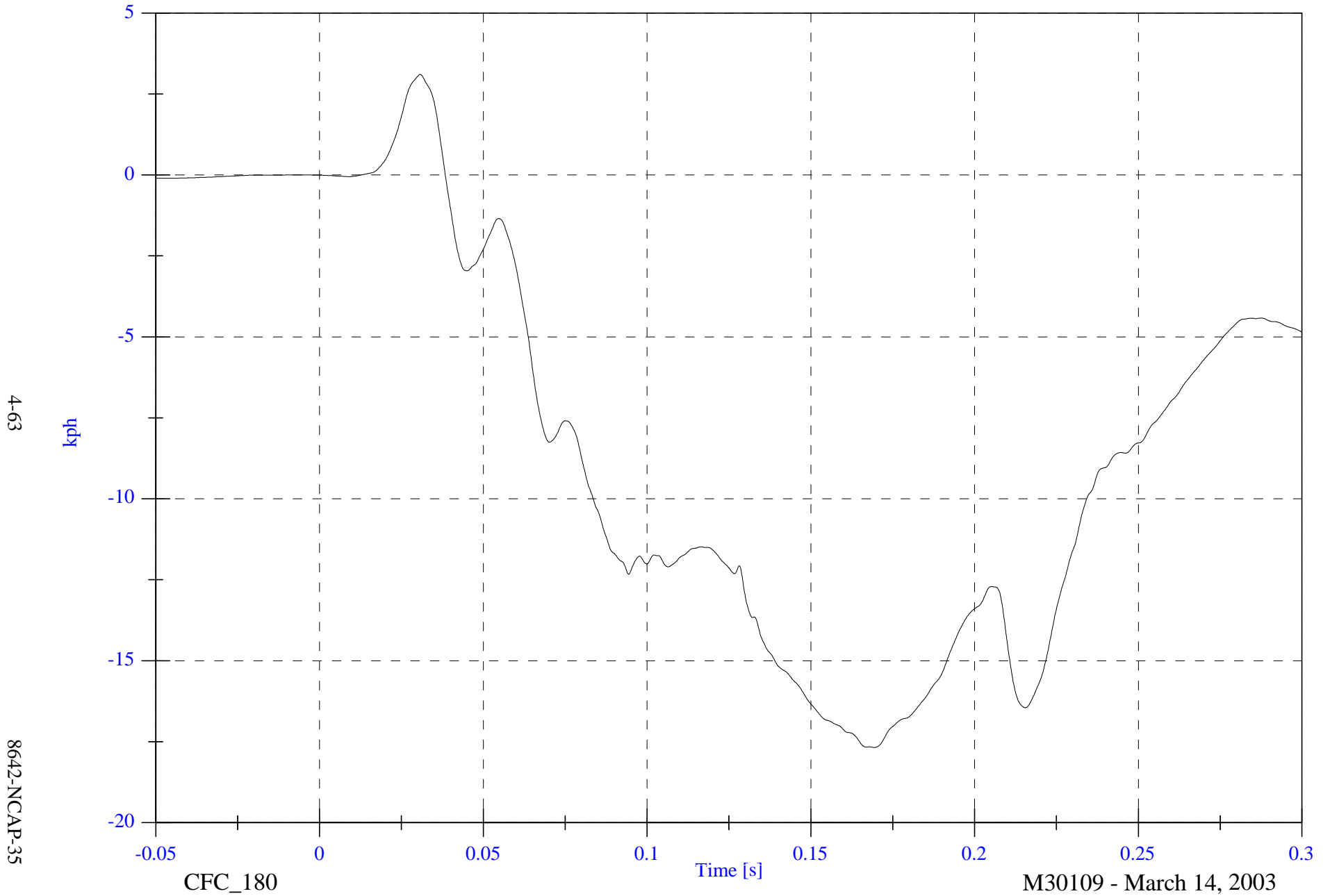
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 3.1 [kph] at 0.031 [s]

Min: -17.7 [kph] at 0.169 [s]

V1P3 Seat z Velocity



4-63

8642-NCAP-35

CFC\_180

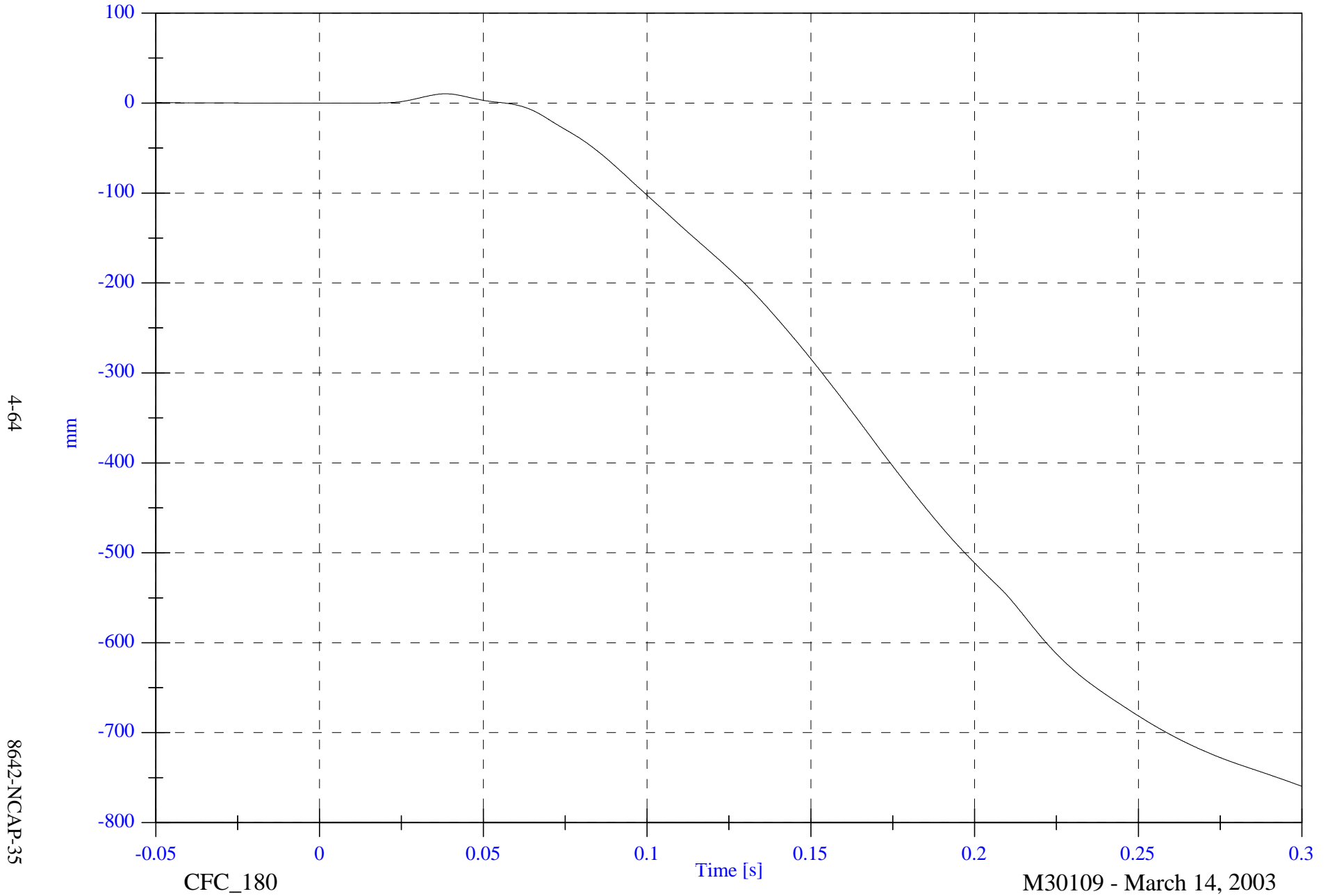
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P3 Seat z Displacement

Max: 10.3 [mm] at 0.038 [s]

Min: -759.5 [mm] at 0.300 [s]



4-64

8642-NCAP-35

CFC\_180

Time [s]

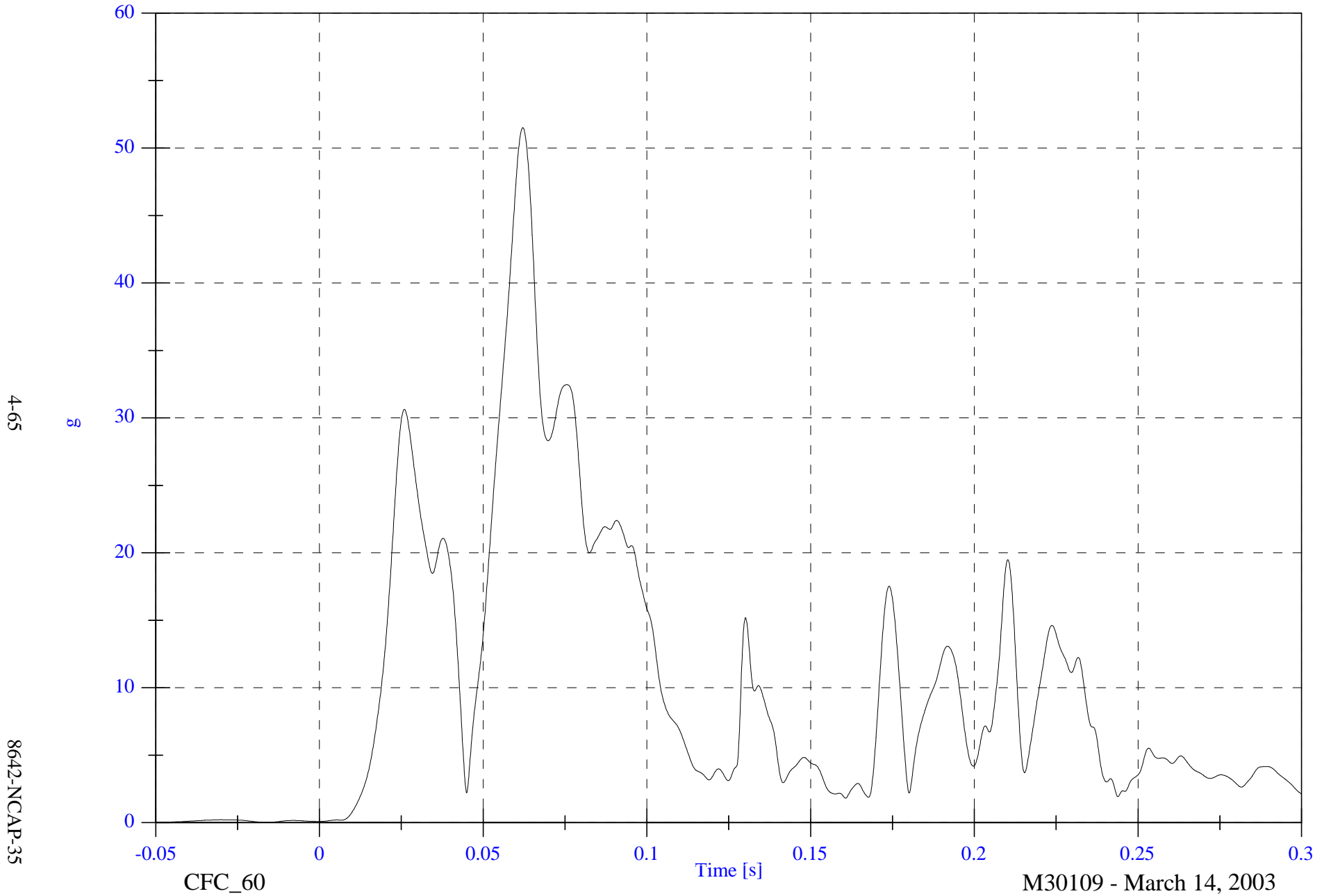
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP3 Seat Resultant

Max: 51.5 [g] at 0.062 [s]

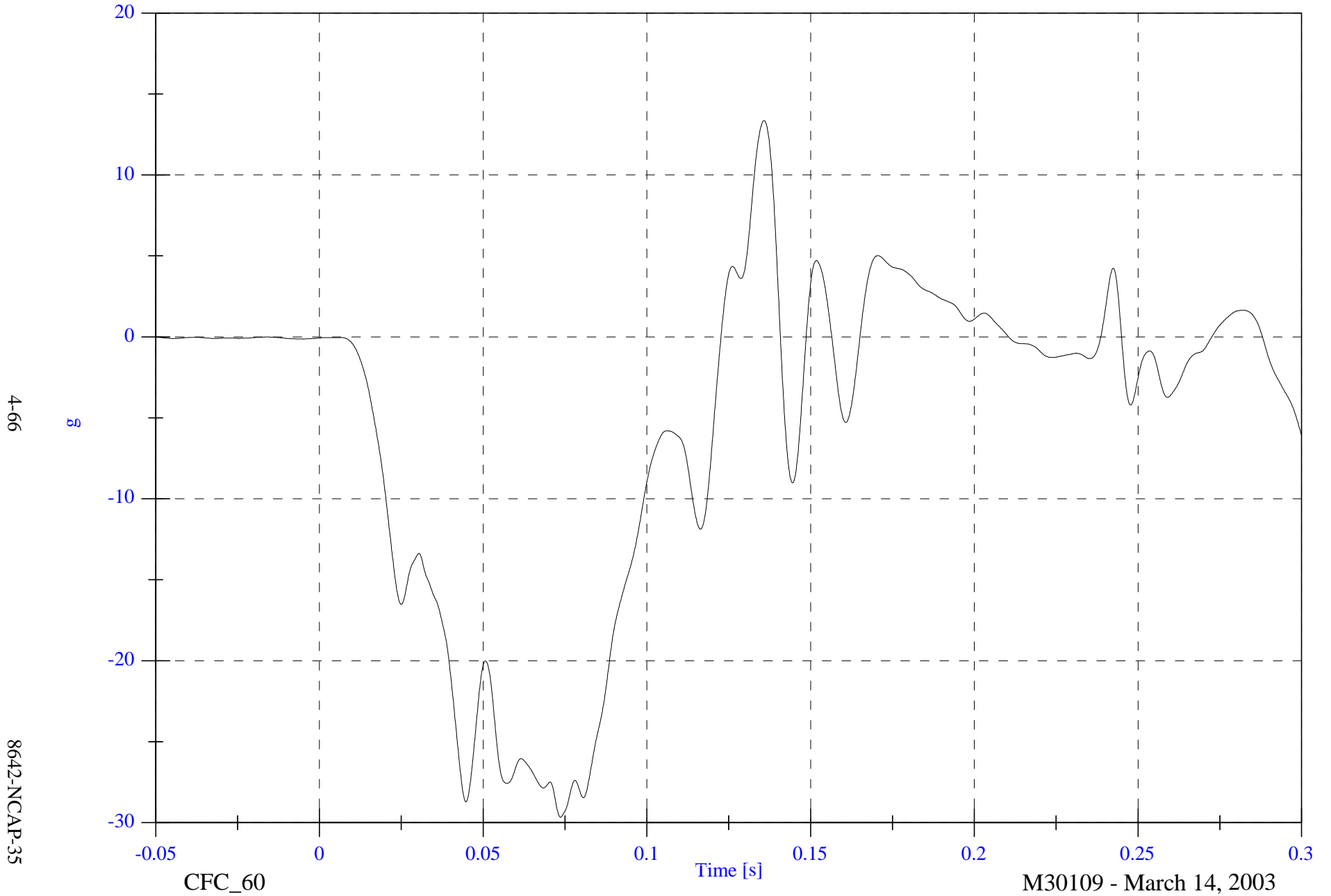
Min: 0.0 [g] at -0.016 [s]



2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 13.4 [g] at 0.136 [s]  
Min: -29.7 [g] at 0.074 [s]

V1P4 Seat x



2003 NCAP Test 13 2003 Chevrolet Tahoe

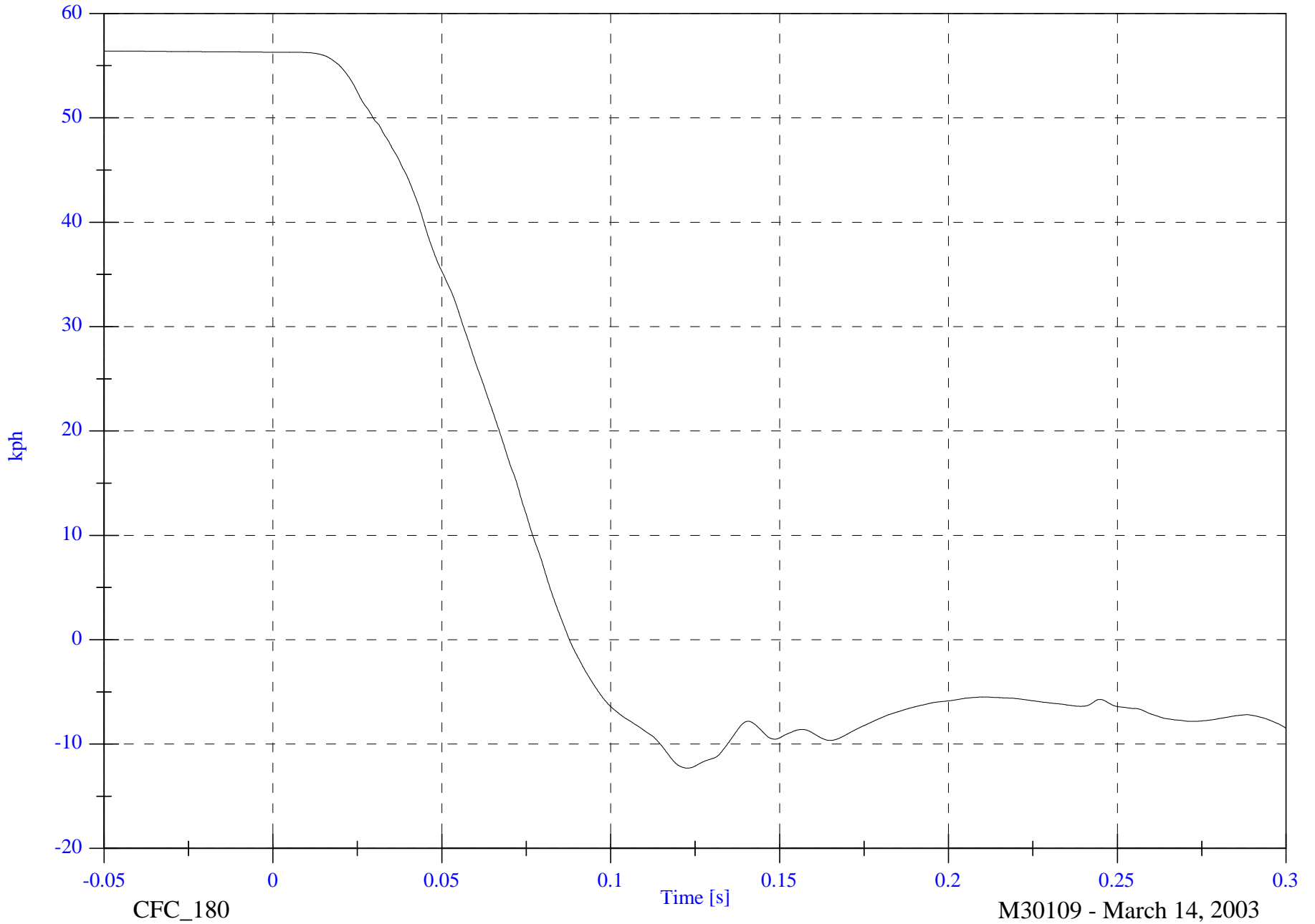
Max: 56.4 [kph] at -0.050 [s]

V1P4 Seat x Velocity

Min: -12.3 [kph] at 0.123 [s]

4-67

8642-NCAP-35



CFC\_180

Time [s]

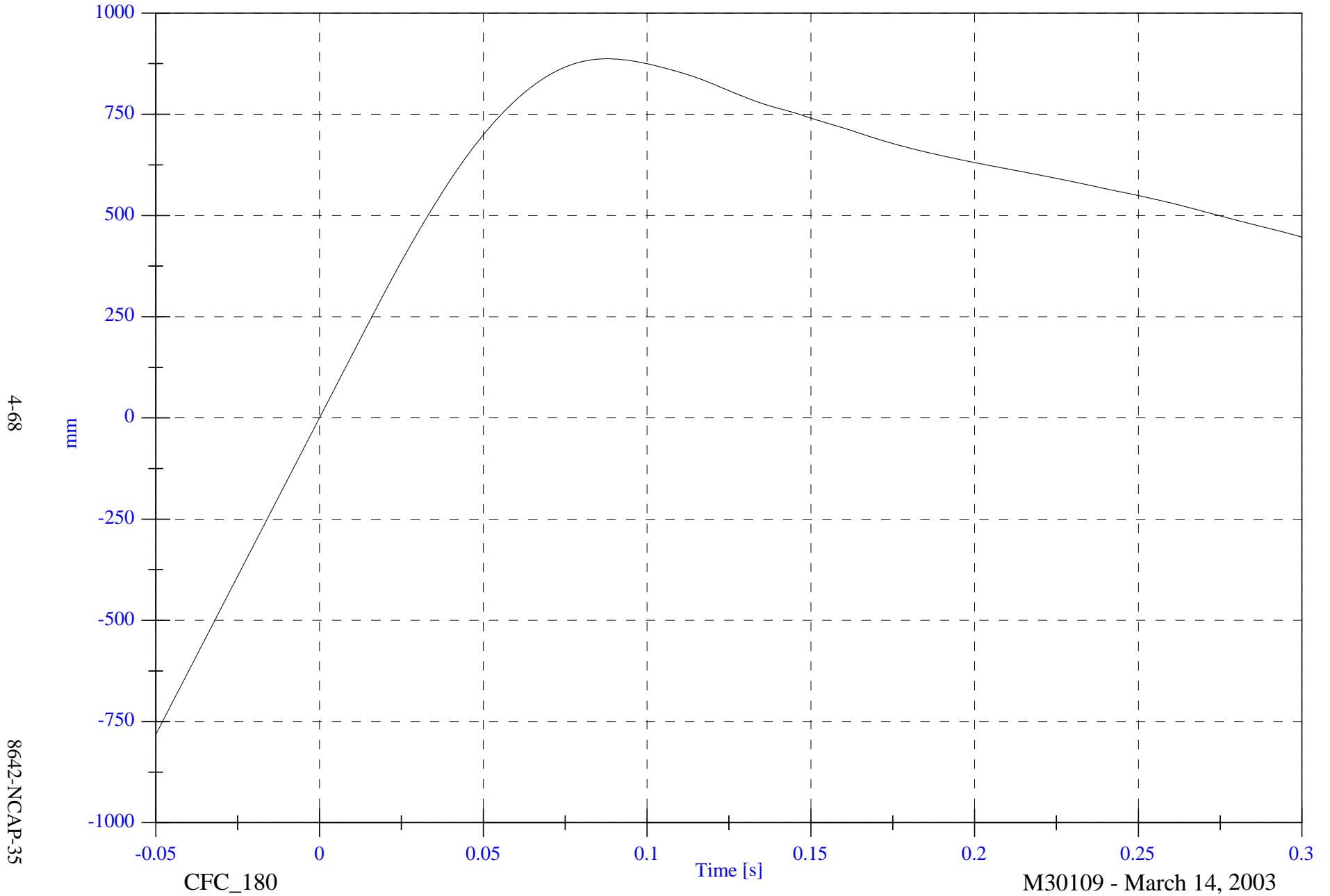
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P4 Seat x Displacement

Max: 887.1 [mm] at 0.088 [s]

Min: -782.7 [mm] at -0.050 [s]



4-68

8642-NCAP-35

CFC\_180

Time [s]

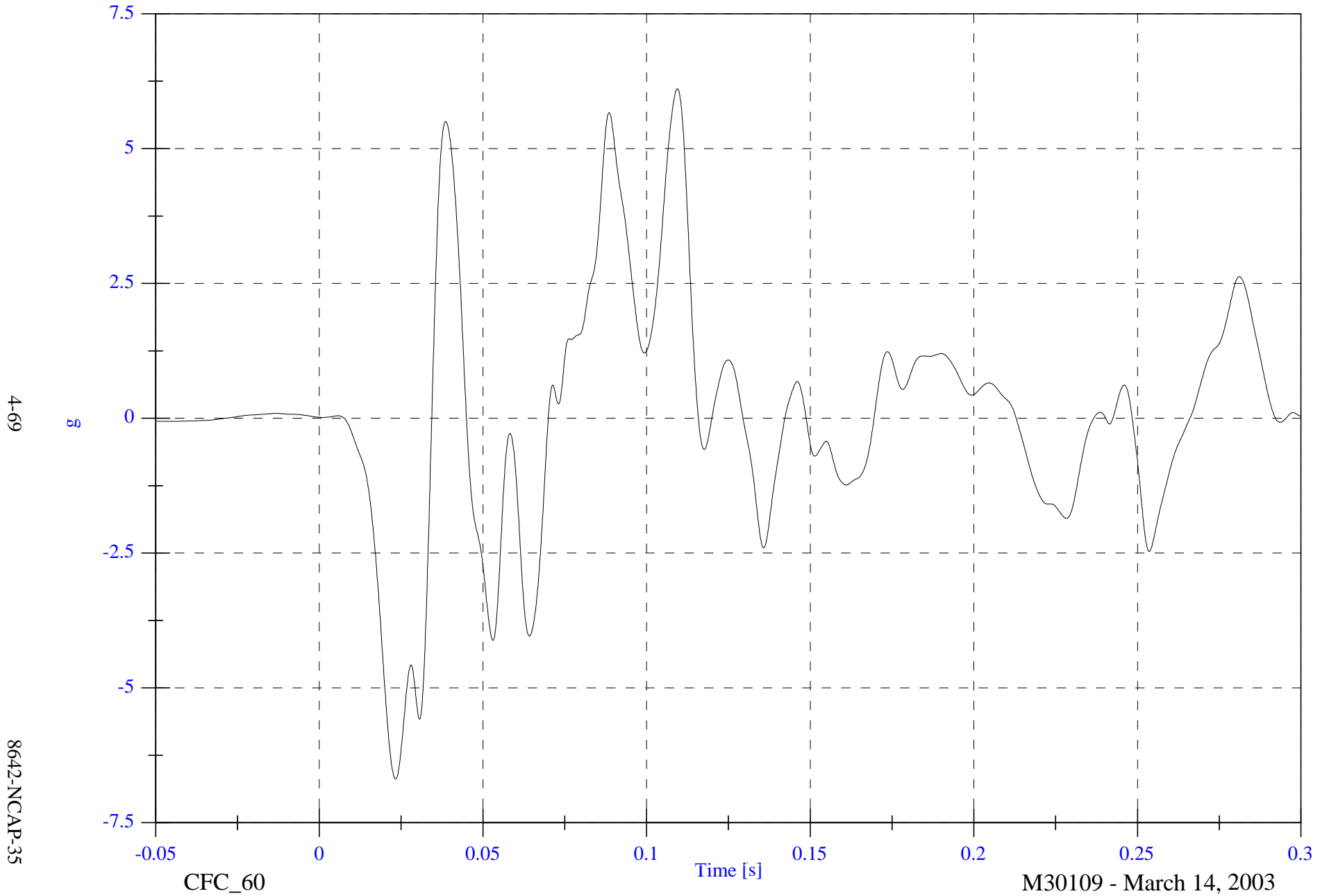
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 6.1 [g] at 0.109 [s]

Min: -6.7 [g] at 0.023 [s]

V1P4 Seat y



2003 NCAP Test 13 2003 Chevrolet Tahoe

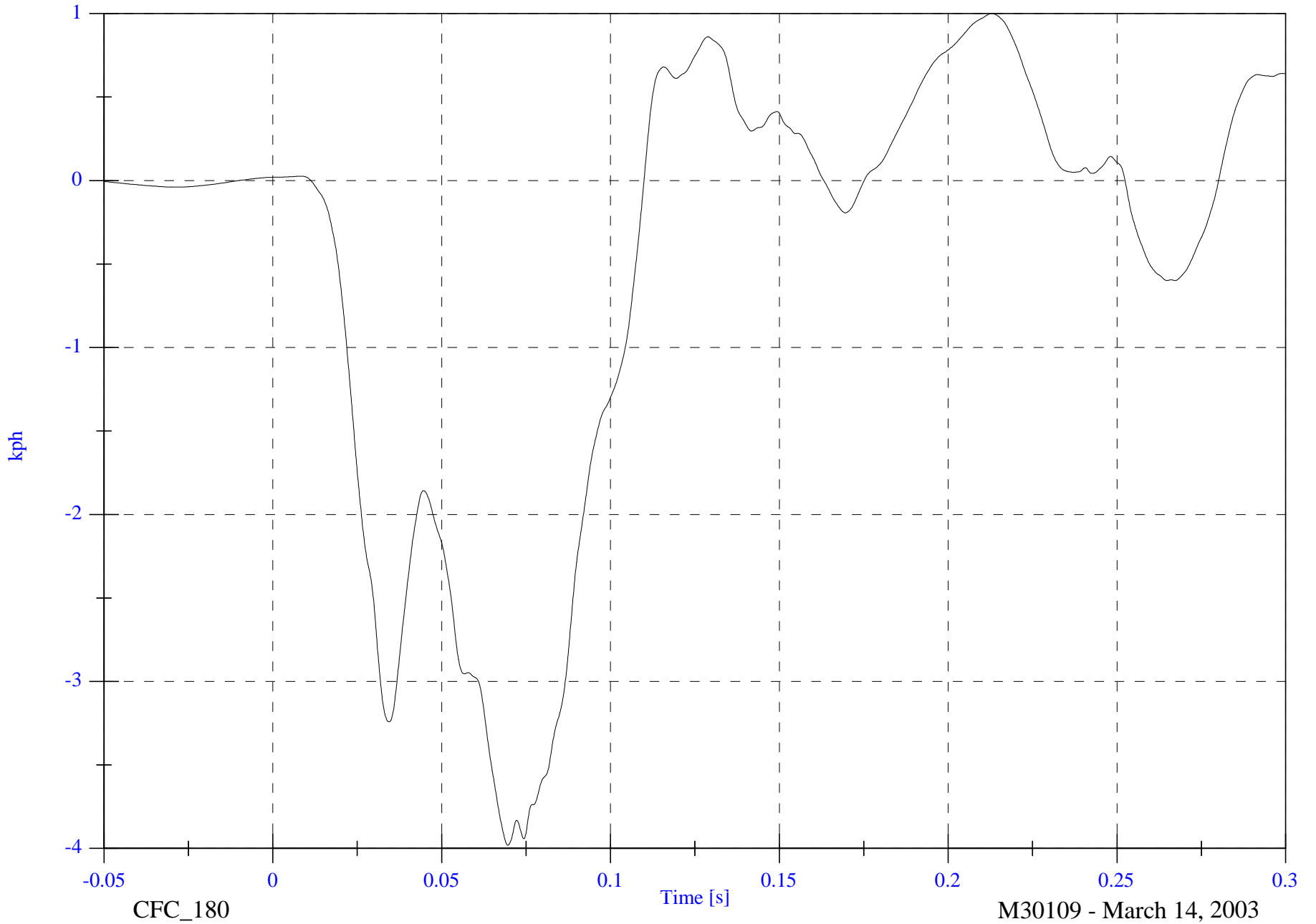
V1P4 Seat y Velocity

Max: 1.0 [kph] at 0.213 [s]

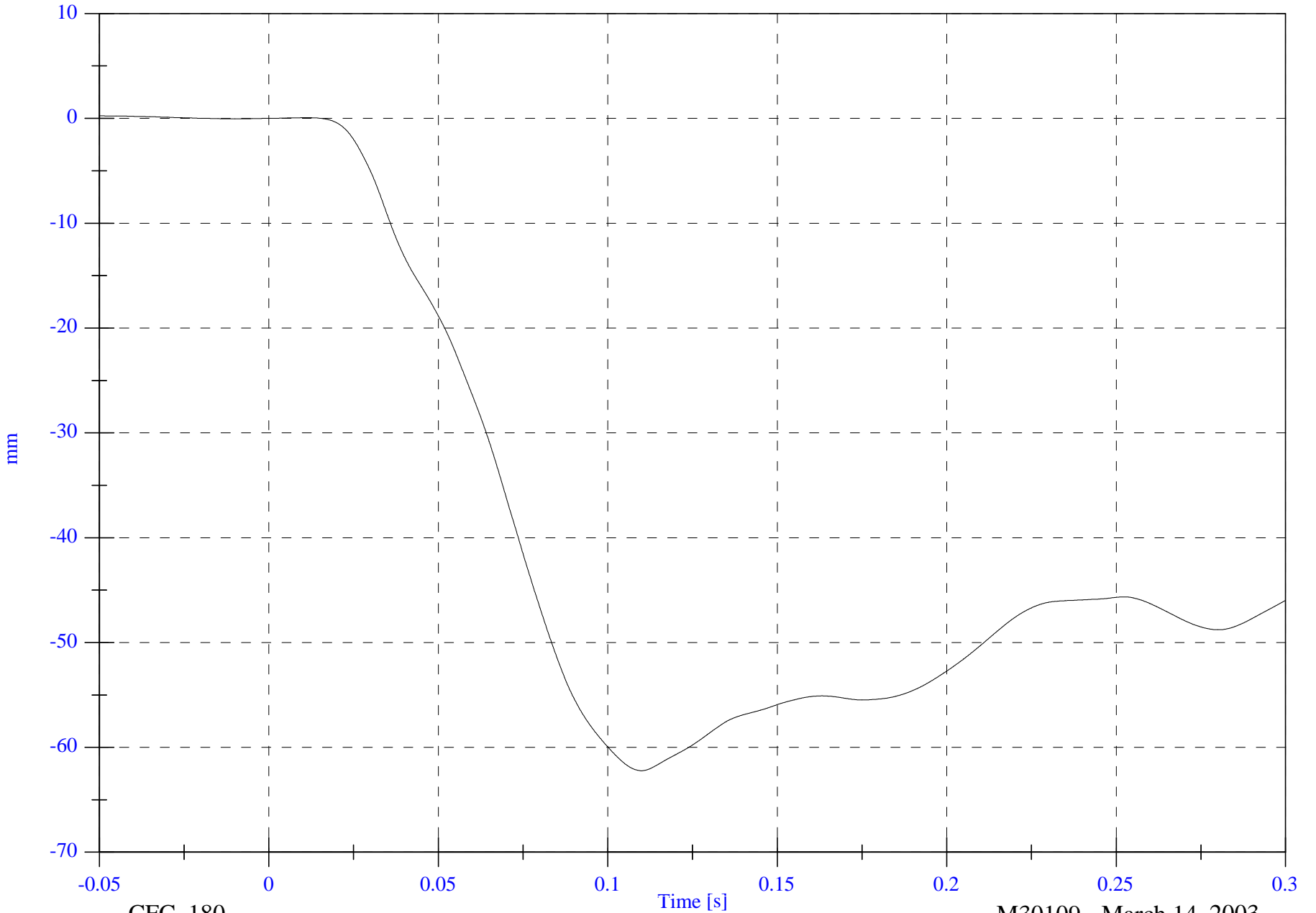
Min: -4.0 [kph] at 0.070 [s]

4-70

8642-NCAP-35



V1P4 Seat y Displacement

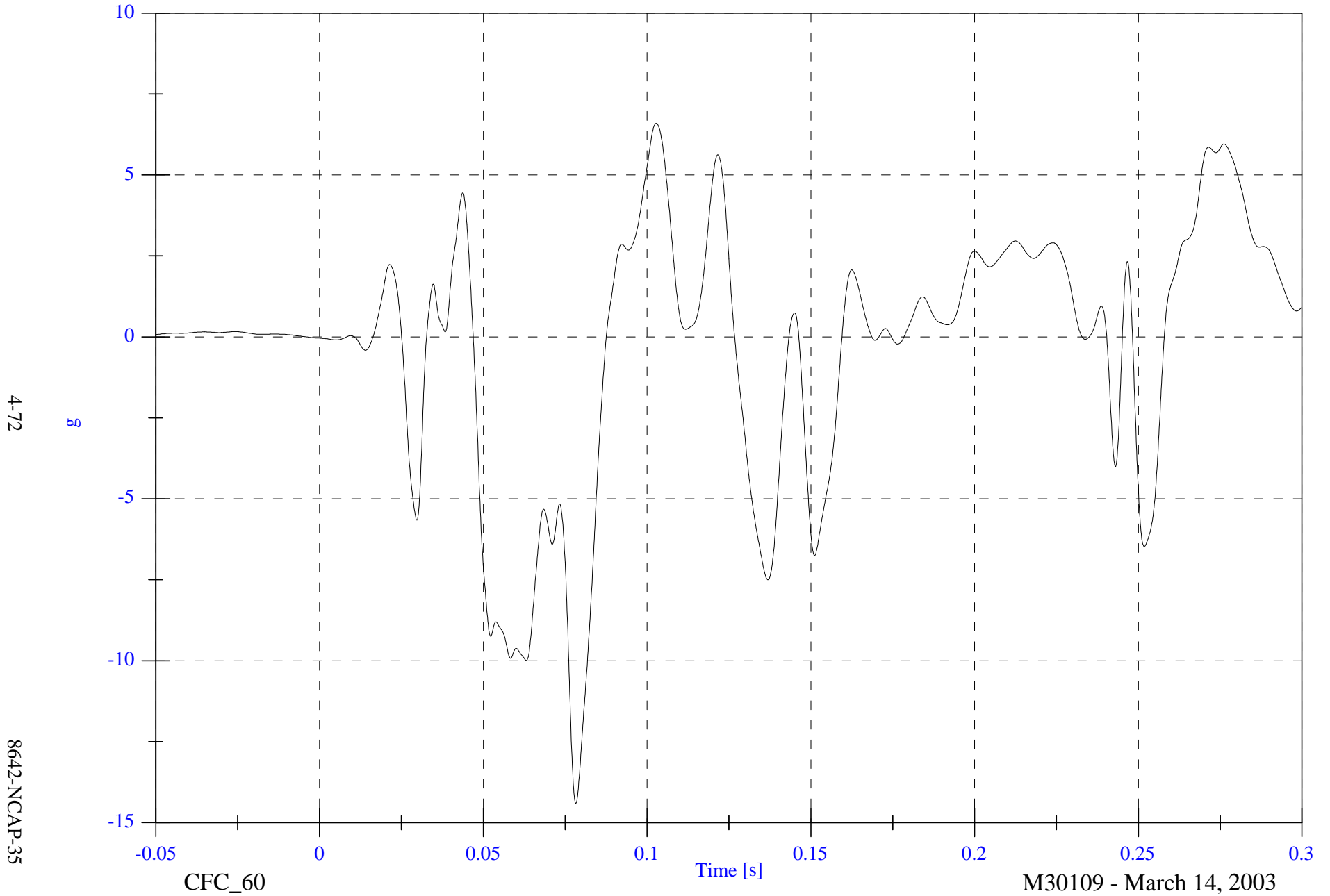


2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P4 Seat z

Max: 6.6 [g] at 0.103 [s]

Min: -14.4 [g] at 0.078 [s]



4-72

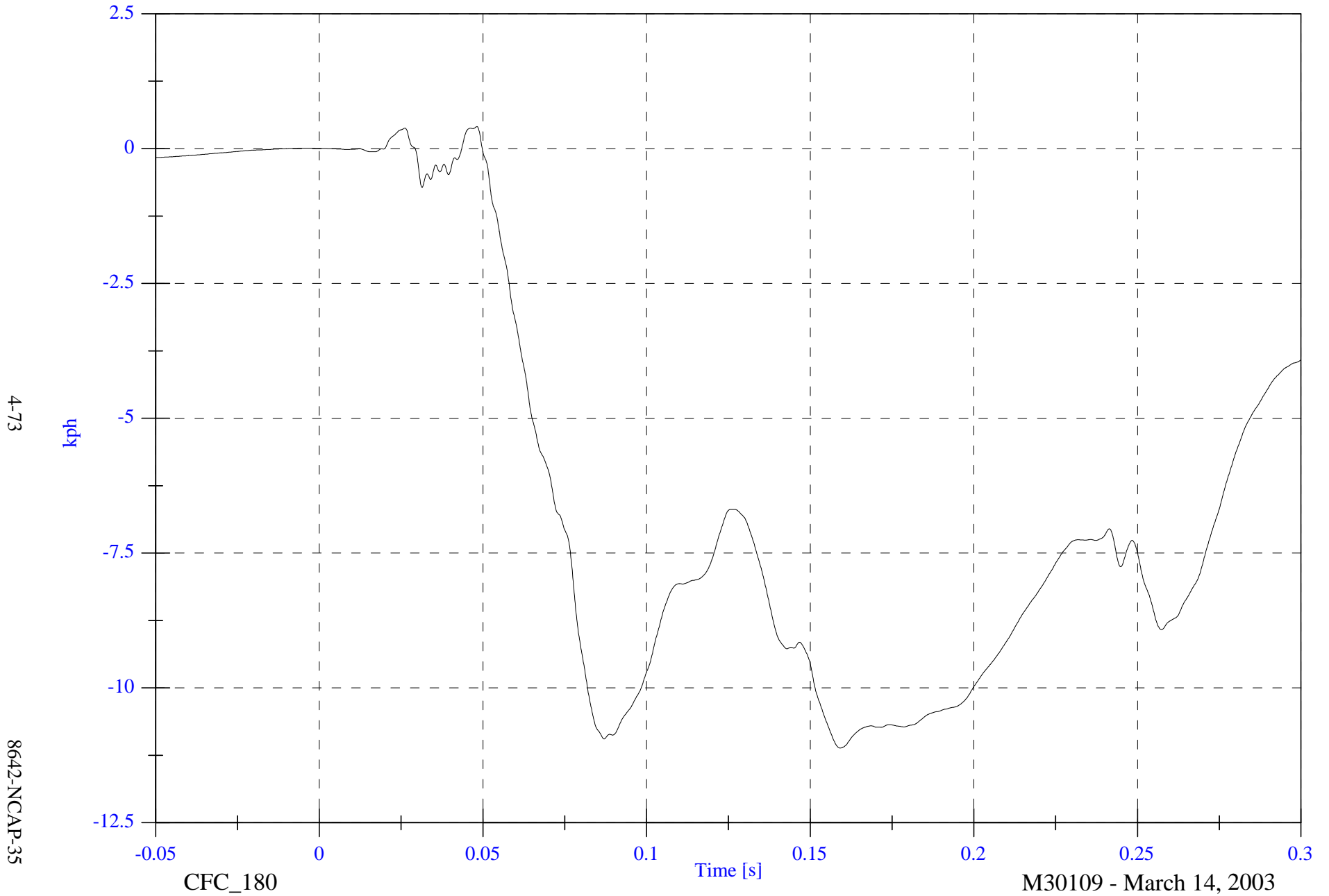
8642-NCAP-35

2003 NCAP Test 13 2003 Chevrolet Tahoe

Max: 0.4 [kph] at 0.048 [s]

Min: -11.1 [kph] at 0.159 [s]

### V1P4 Seat z Velocity



4-73

8642-NCAP-35

CFC\_180

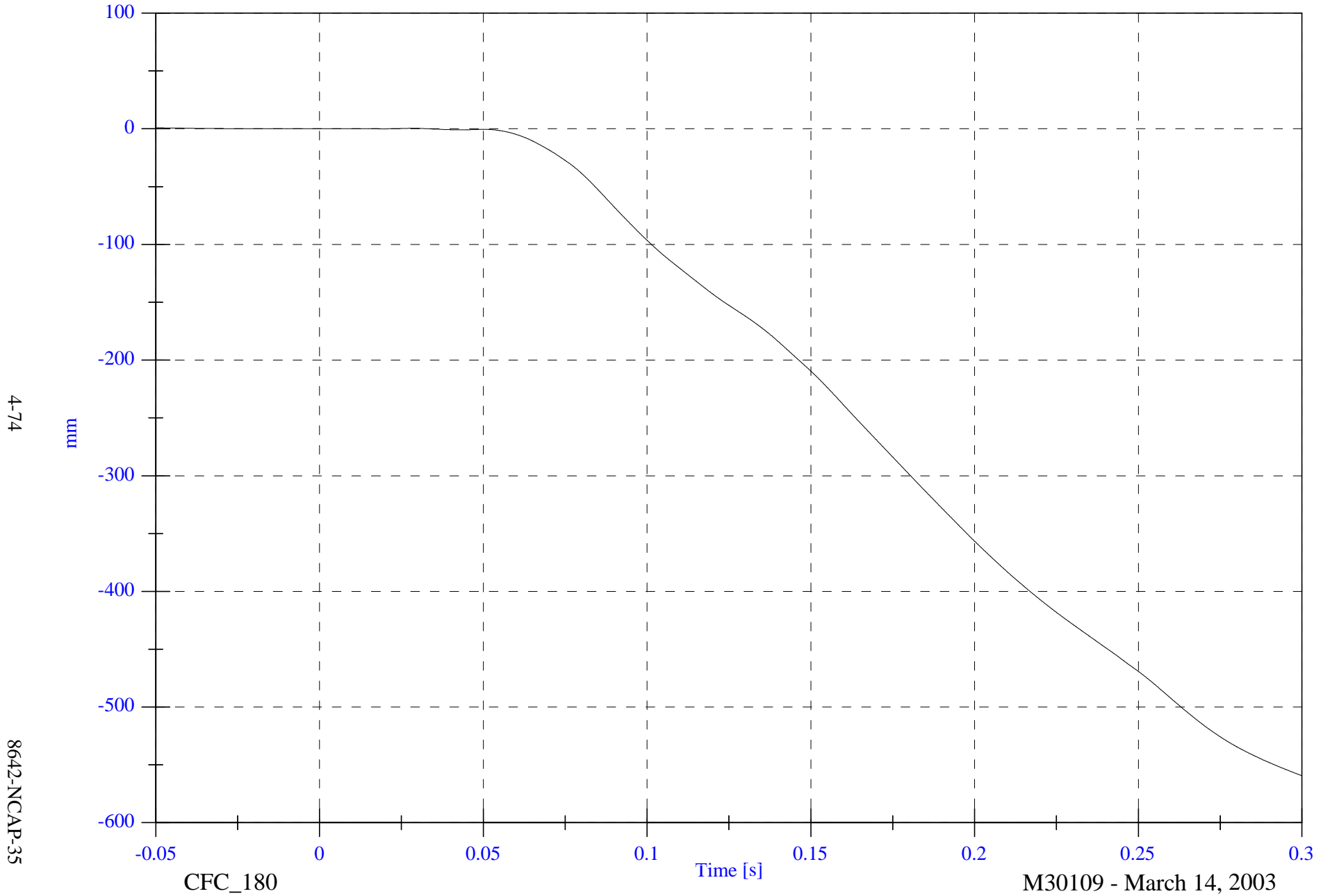
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

V1P4 Seat z Displacement

Max: 0.9 [mm] at -0.050 [s]

Min: -559.4 [mm] at 0.300 [s]



4-74

8642-NCAP-35

CFC\_180

Time [s]

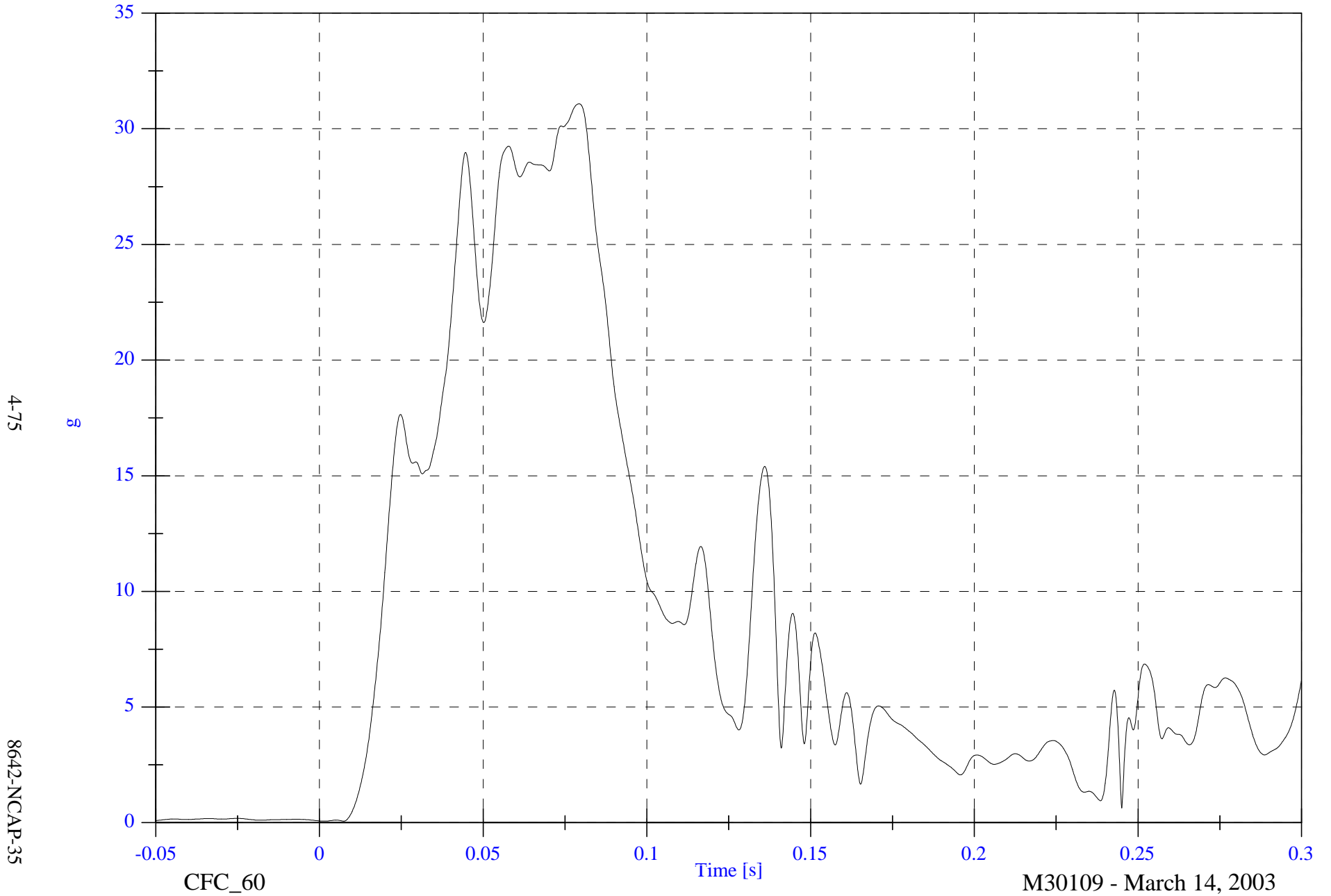
M30109 - March 14, 2003

2003 NCAP Test 13 2003 Chevrolet Tahoe

VIP4 Seat Resultant

Max: 31.1 [g] at 0.079 [s]

Min: 0.1 [g] at 0.007 [s]



## SECTION 5

### CHILD DUMMY CALIBRATION INFORMATION

ATD 144 was Certified by VRTC prior to the test program.  
The certification data can be found in the copy of the bound  
report

# 044 Head Drop

Part 572P Head Drop

Calibration Date: 01-27-03

Serial No: 044

Work File: 044H 01-27-03

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

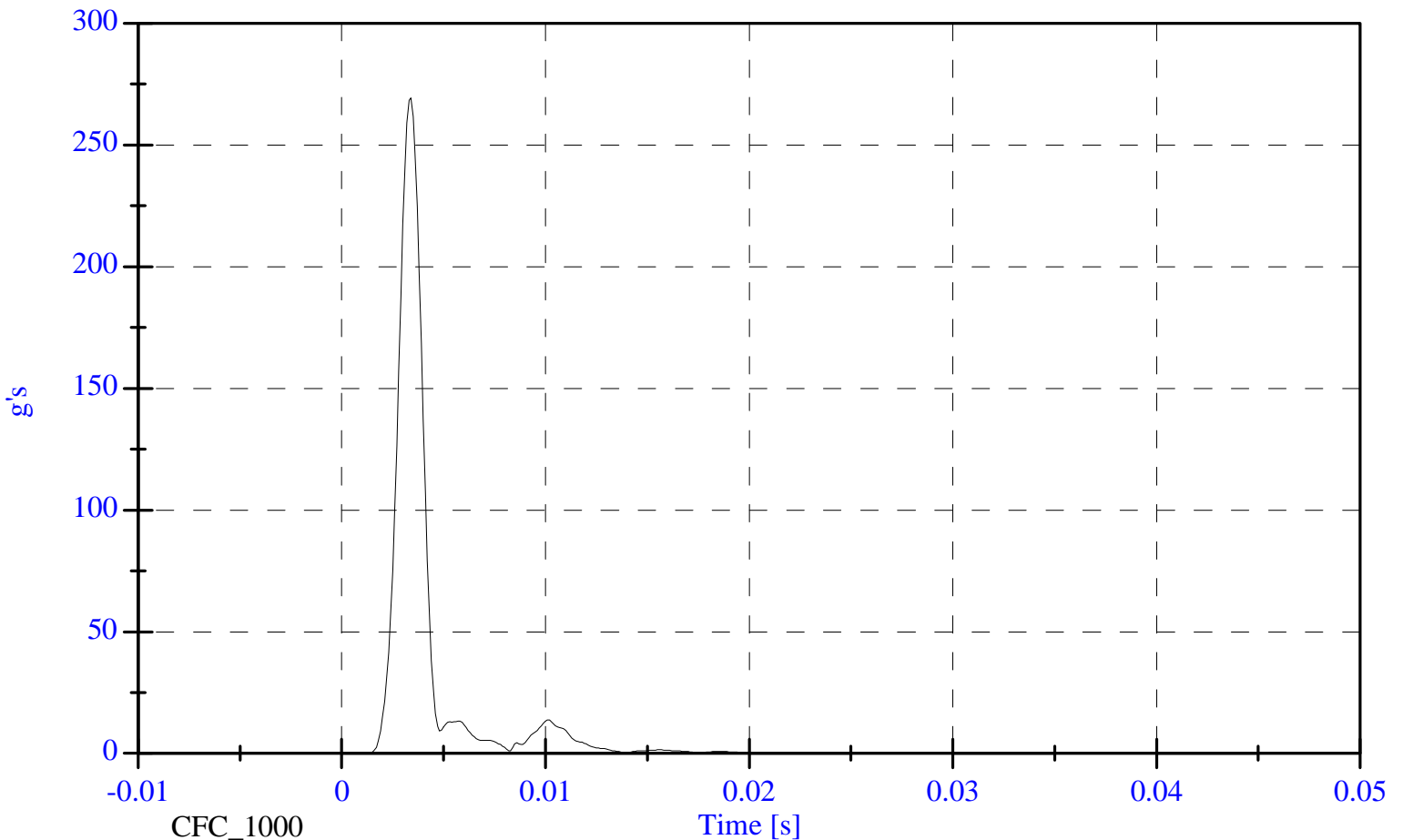
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	66.0-78.0 F	70.0 F	Passed
Lab Humidity:	10-70 %	37.00 %	Passed
Peak Resultant Accel.:	250-280 Gs	269.30 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	3.21 Gs	Passed
Curve PerCent NonModal:	< 10%	5.12 %	Passed

044 Head Drop

Head Resultant

Max: 269.3 [g's] at 0.003 [s]

Min: 0.0 [g's] at -0.009 [s]



# 044 Neck Flexion

Part 572P Neck Flexion Test Calibration Date: 01-27-03  
Serial No: 044 Work File: 044N 01-27-03

## -----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 %	37.00 %	Passed
Test Pendulum Speed:	5.40- 5.60 m/s	5.43 m/s	Passed

## -----PENDULUM PULSE-----

Pulse at 10 ms:	2.00- 2.70 m/s	2.04 m/s	Passed
Pulse at 15 ms:	3.00- 4.00 m/s	3.05 m/s	Passed
Pulse at 20 ms:	4.00- 5.10 m/s	4.25 m/s	Passed

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

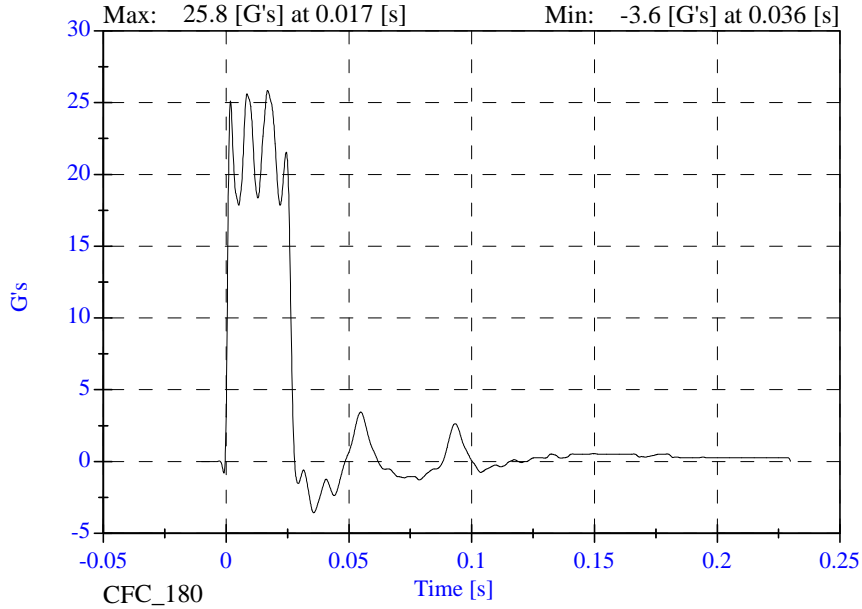
Maximum Rotation:	70.0-82.0 Deg	75.22 Deg	Passed
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## -----MOMENT ABOUT THE OCCIPITAL CONDYLE-----

Max Occipital Moment:	42.00- 53.00 N-m	45.09 N-m	Passed
Occipital Moment Decay:	60.0-80.0 ms	76.10 ms	Passed

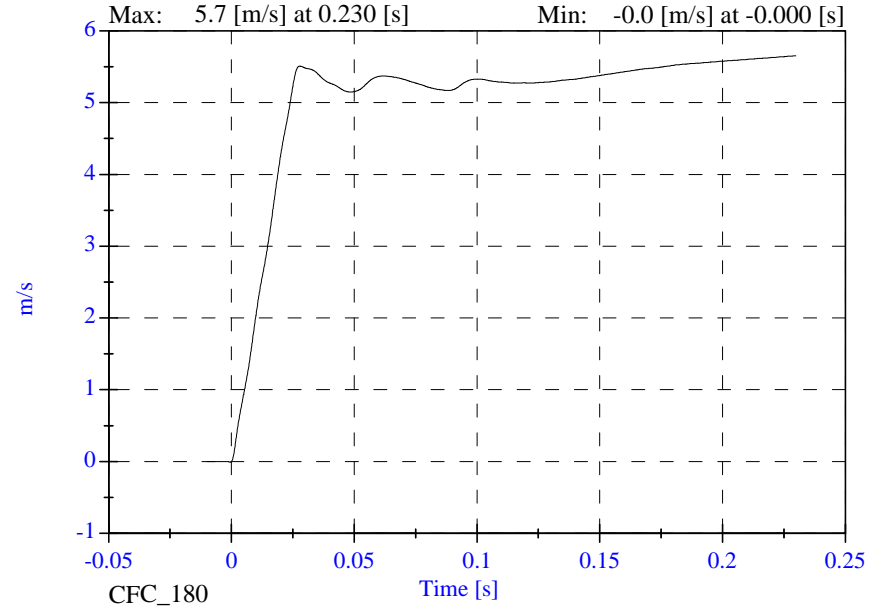
# 044 Neck Flexion

## Pendulum Acceleration

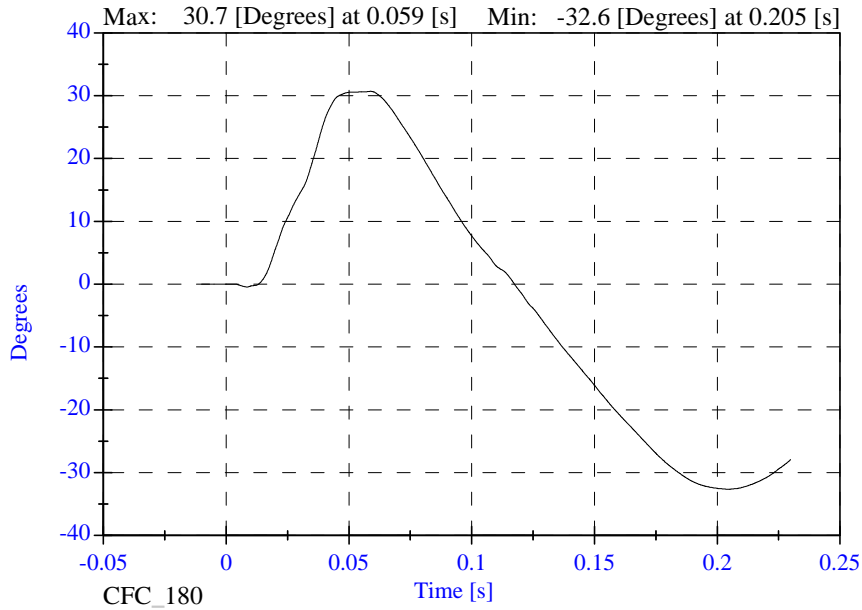


# 70 - 01-27-03

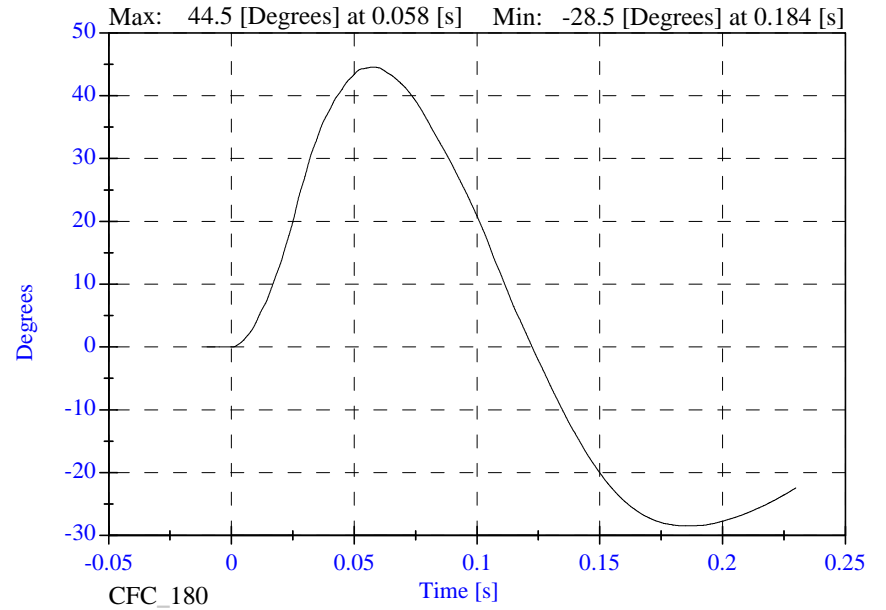
## Pendulum Velocity



## Head Rotation

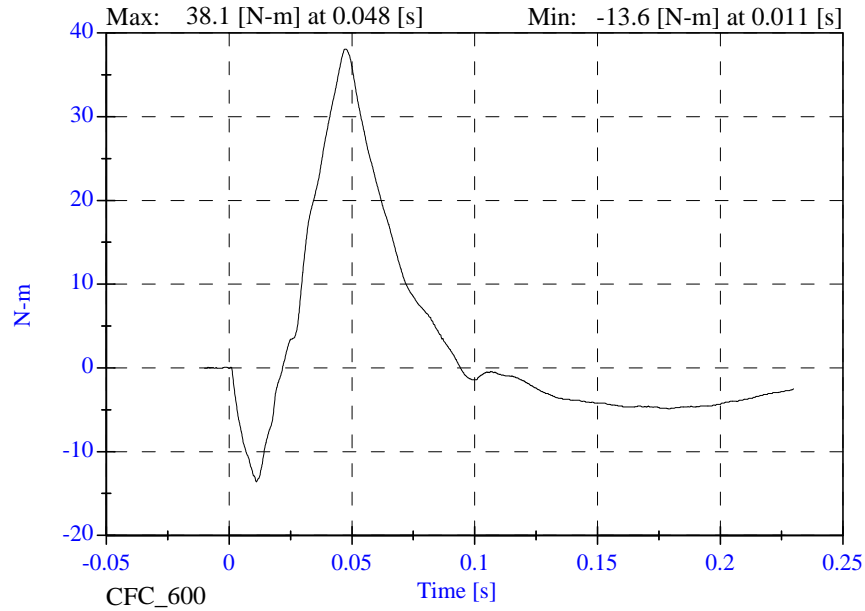


## Arm Rotation



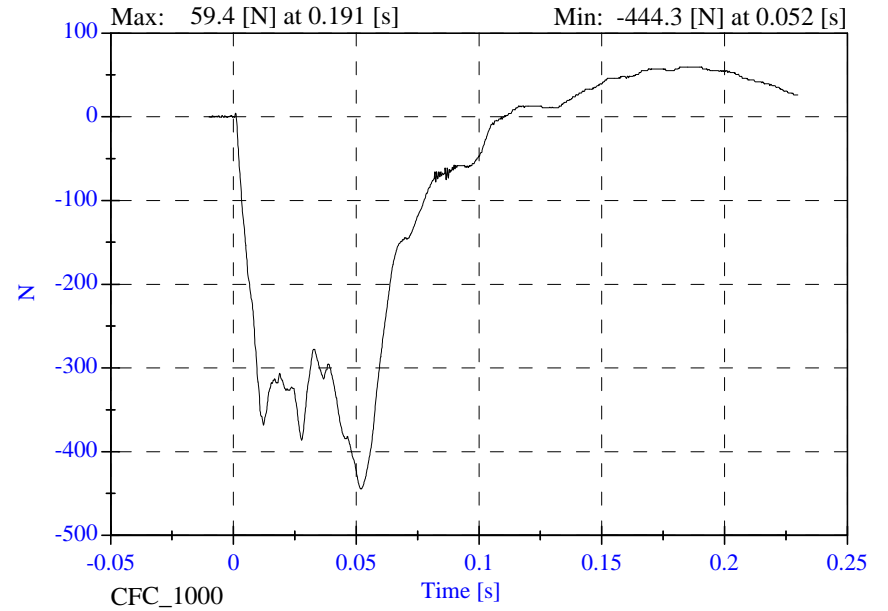
### 044 Neck Flexion

Neck Moment Y

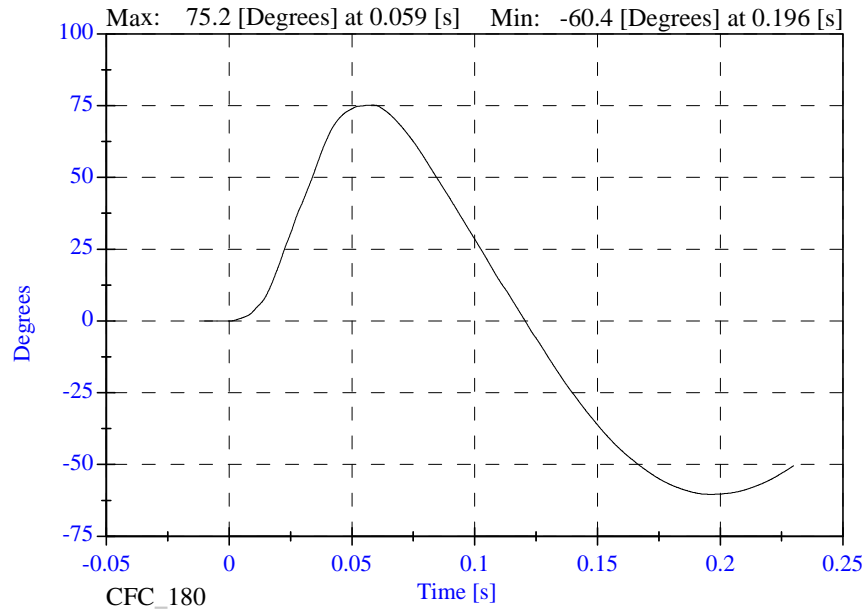


### 70 - 01-27-03

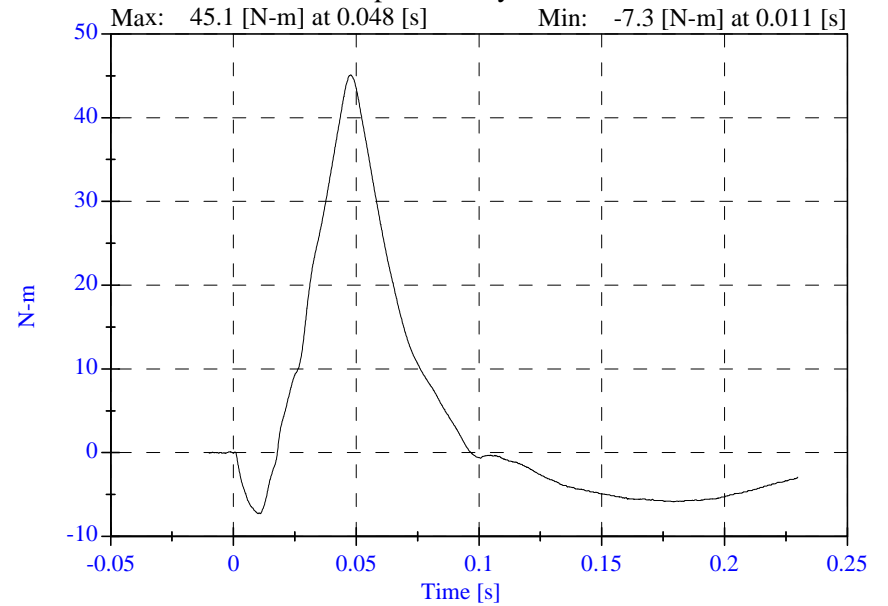
Neck Force X



Total Rotation



Occipital Condyle Moment



# 044 Neck Extension

Part 572P Neck Extension Test Calibration Date: 01-28-03  
Serial No: 044 Work File: 044Ext3 01-28-03

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

<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	69.0-72.0 F	71.00 F	Passed
Lab Humidity:	10-70 %	31.00 %	Passed
Test Pendulum Speed:	11.58-12.38 ft/s	12.05 ft/s	Passed

## -----PENDULUM PULSE-----

Pulse at 6 ms:	3.30- 4.60 ft/s	3.69 ft/s	Passed
Pulse at 10 ms:	6.20- 8.20 ft/s	6.62 ft/s	Passed
Pulse at 14 ms:	9.20-11.50 ft/s	9.32 ft/s	Passed

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

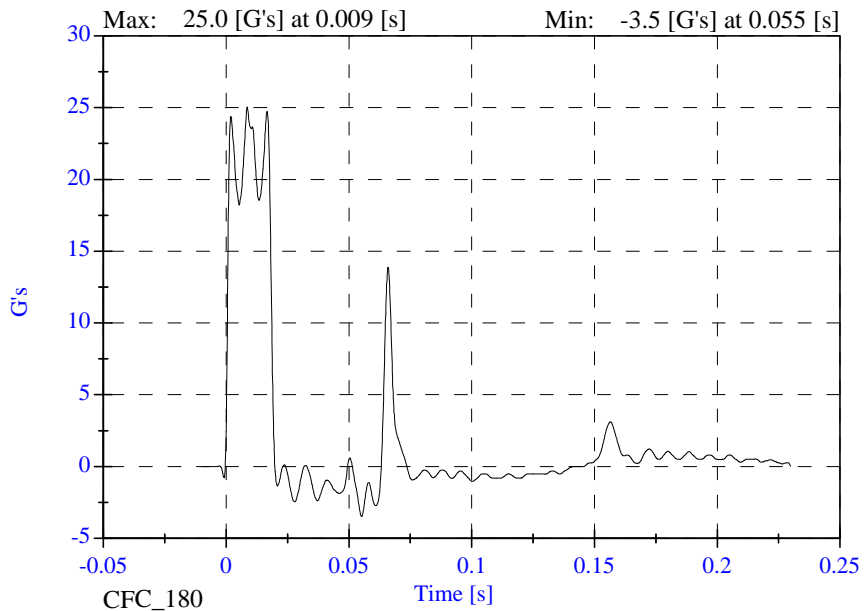
Maximum Rotation:	83.0-93.0 Deg	83.96 Deg	Passed
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## -----MOMENT ABOUT THE OCCIPITAL CONDYLE-----

Max Occipital Moment:	-53.30--43.70 N-m	-51.96 N-m	Passed
Occipital Moment Decay:	60.0-80.0 ms	74.40 ms	Passed

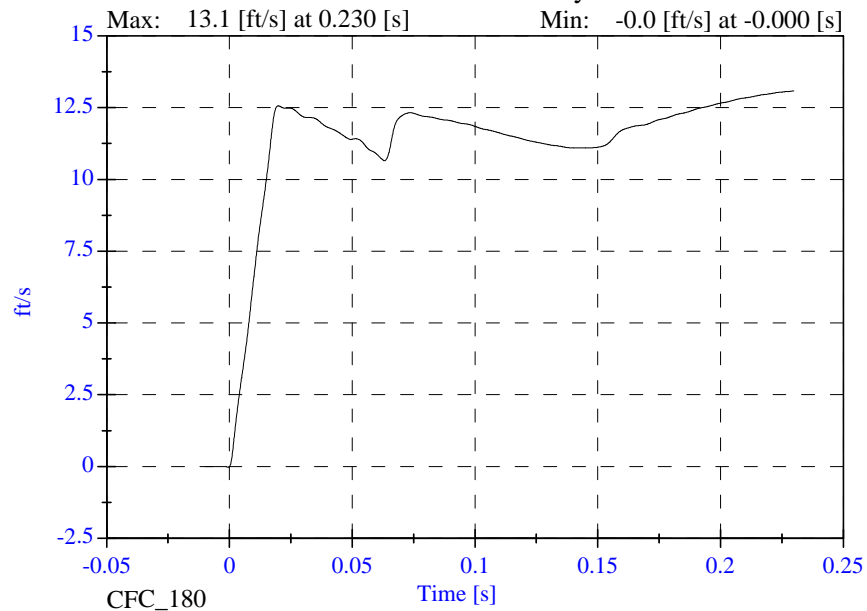
# 044 Neck Extension

## Pendulum Acceleration

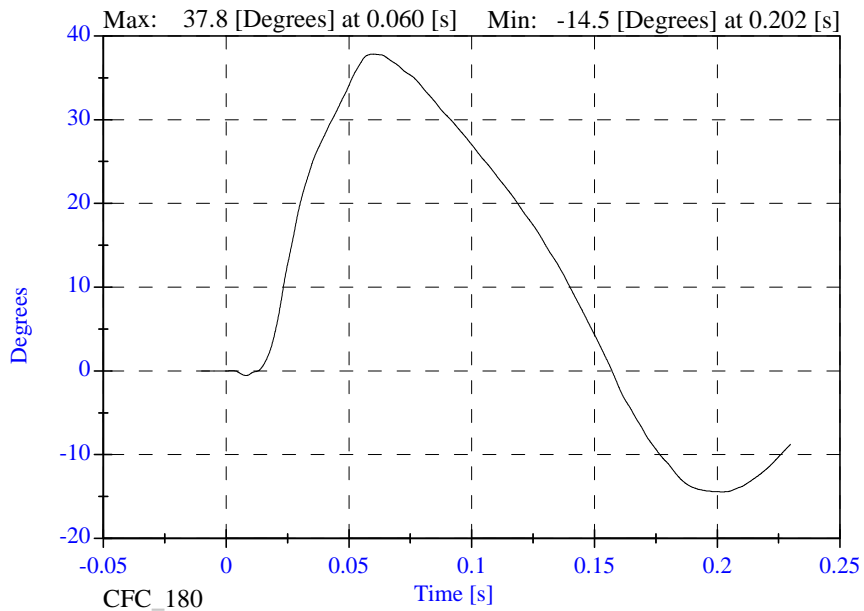


# 71 - 01-28-03

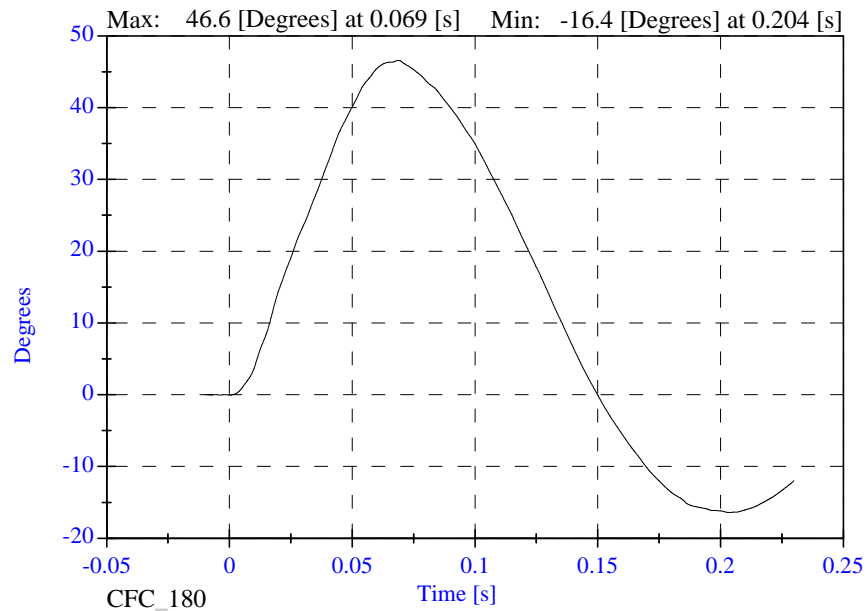
## Pendulum Velocity



## Head Rotation

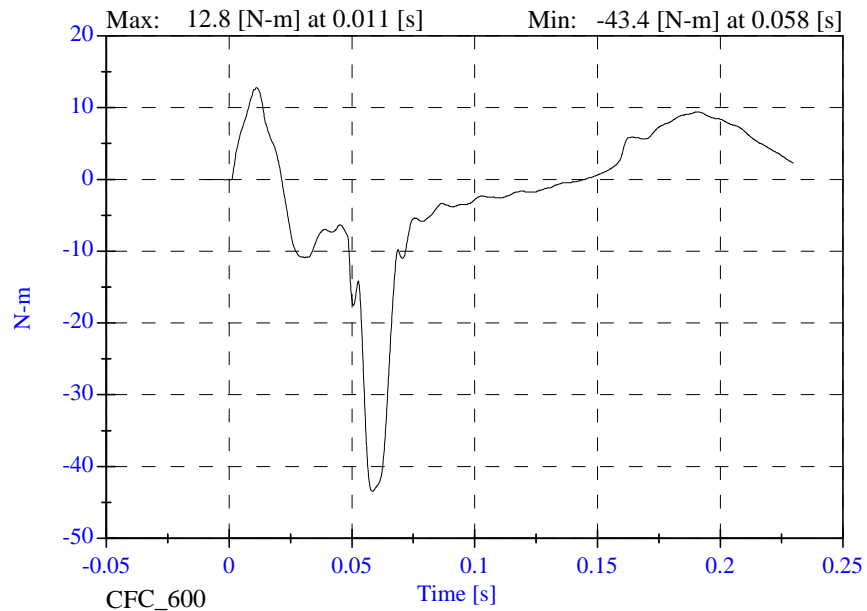


## Arm Rotation



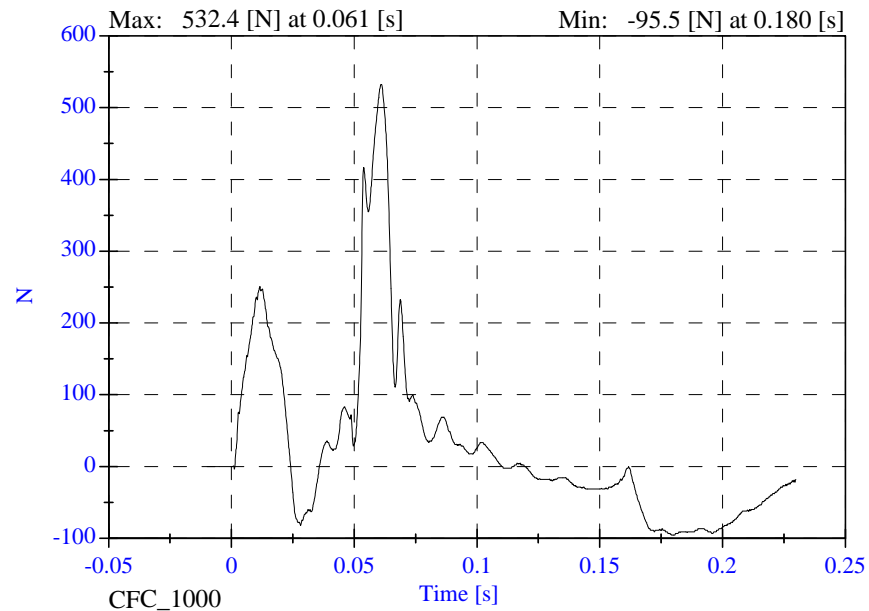
### 044 Neck Extension

Neck Moment Y

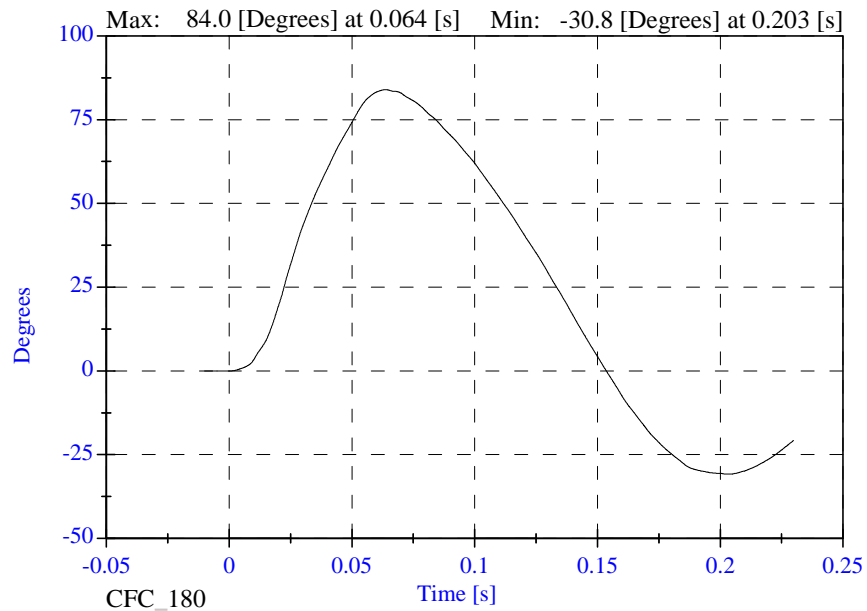


### 71 - 01-28-03

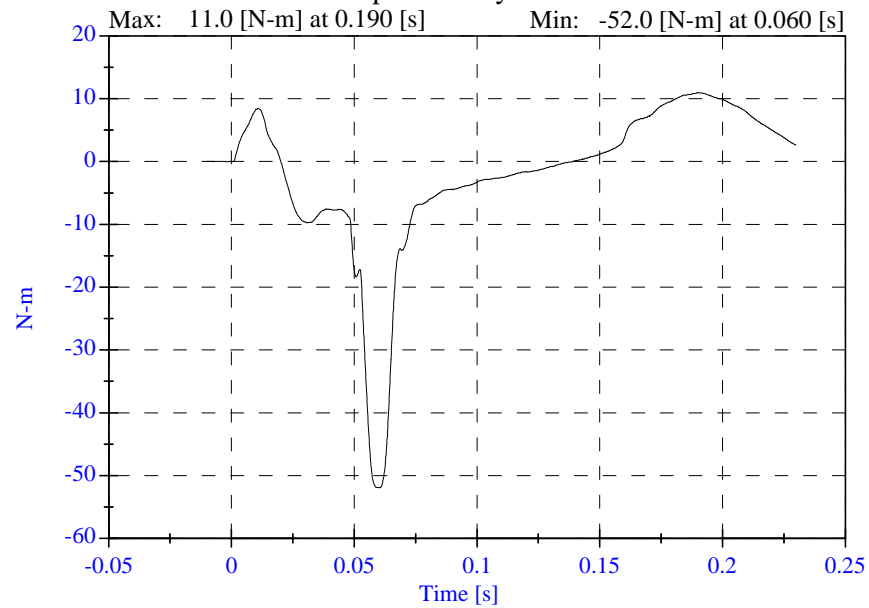
Neck Force X



Total Rotation



Occipital Condyle Moment



# 044 Chest Impact

Part 572P Thorax Impact

Calibration Date: 01-28-03

Serial No: 044

Work File: 044T1 01-28-03

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

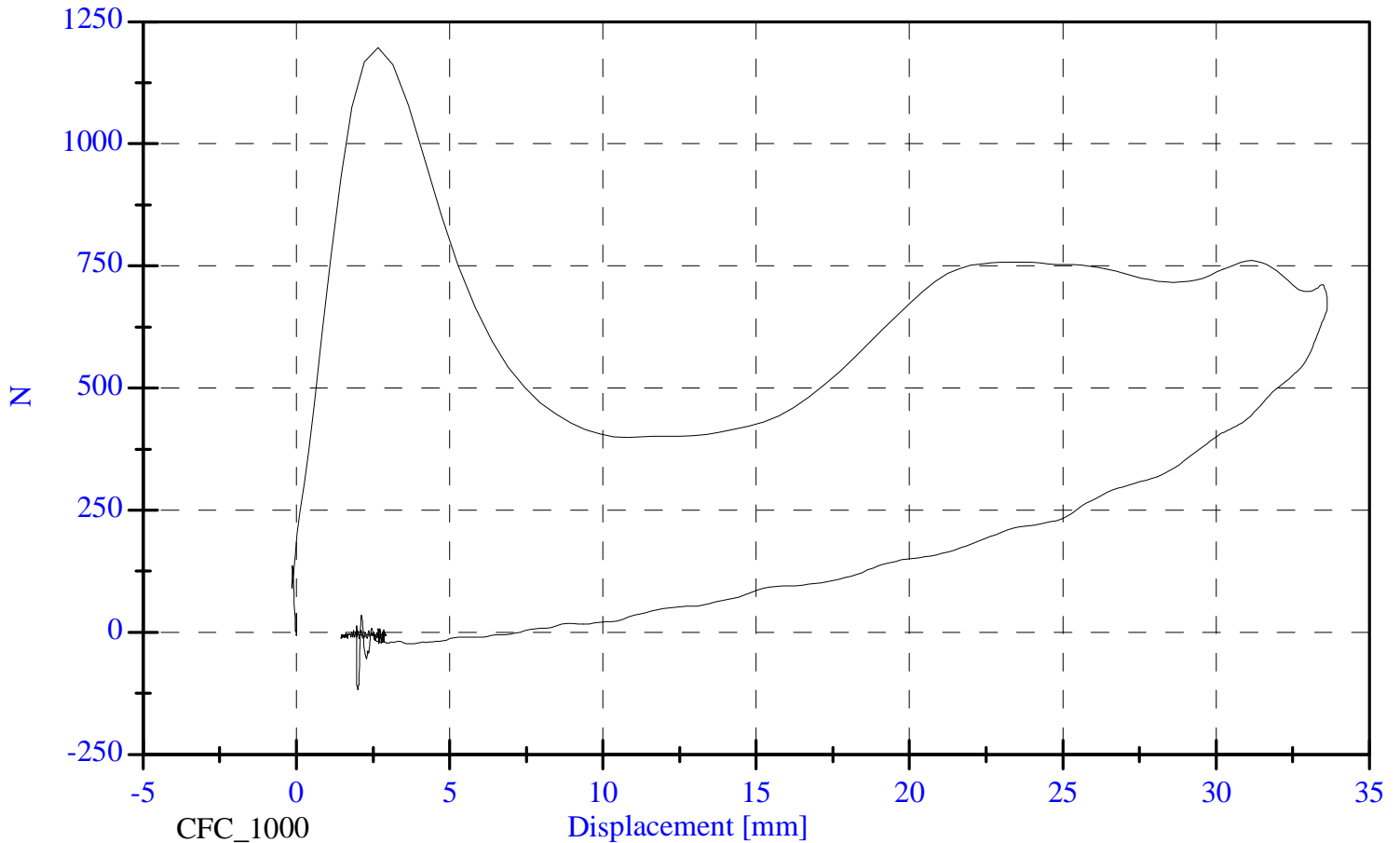
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.1 C	Passed
Lab Humidity:	10-70 %	33.00 %	Passed
Pendulum Velocity:	5.90- 6.10 m/s	5.94 m/s	Passed
Maximum Deflection:	32.00-38.00 mm	33.62 mm	Passed
Maximum Res. Force:	680.00- 810.00 N	740.30 N	Passed
Internal Hysteresis:	65-85 %	76.47 %	Passed
Pass Sternum Force Criteria?:	860.00 N	760.89	Passed

044 Chest Impact

Probe Force vs. Displacement

Max: 1196.8 [N] at 2.669 [mm]

Min: -117.8 [N] at 2.005 [mm]



044 Lumbar Spi ne Fl exi on Spi ne\_Fl exi on\_test. txt

Date: 1-28-03

Result: 45 degrees - 38.8 lbf

Certified By: B. Swi eci cki Date: 01-28-03

**SECTION 6**

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**HYBRID III 3C INSTRUMENTATION**

	POSITION #3 (RIGHT) SERIAL NO.: 3591261 P1		
	MANUFACTURER	SERIAL NUMBER	CALIBRATION DATE
HEAD AX	ENDEVCO	AC-P17912	11-Nov-02
HEAD AY	ENDEVCO	AC-P17743	11-Nov-02
HEAD AZ	ENDEVCO	AC-P15319	11-Nov-02
UPPER NECK FX	DENTON	LC-248-FX	15-Oct-02
UPPER NECK FY	DENTON	LC-248-FY	15-Oct-02
UPPER NECK FZ	DENTON	LC-248-FZ	15-Oct-02
UPPER NECK MX	DENTON	LC-248-MX	15-Oct-02
UPPER NECK MY	DENTON	LC-248-MY	15-Oct-02
UPPER NECK MZ	DENTON	LC-248-MZ	15-Oct-02
LOWER NECK FX	DENTON	LC-249-FX	15-Oct-02
LOWER NECK FY	DENTON	LC-249-FY	15-Oct-02
LOWER NECK FZ	DENTON	LC-249-FZ	15-Oct-02
LOWER NECK MX	DENTON	LC-249-MX	15-Oct-02
LOWER NECK MY	DENTON	LC-249-MY	15-Oct-02
LOWER NECK MZ	DENTON	LC-249-MZ	15-Oct-02
CHEST AX	ENDEVCO	AC-P15334	11-Nov-02
CHEST AY	ENDEVCO	AC-P15321	11-Nov-02
CHEST AZ	ENDEVCO	AC-P17758	11-Nov-02
CHEST DISPLACEMENT X	SERVO	DS-044	12-Nov-02
PELVIS AX	ENDEVCO	AC-P16755	11-Nov-02
PELVIS AY	ENDEVCO	AC-P15591	11-Nov-02
PELVIS AZ	ENDEVCO	AC-P16155	11-Nov-02
TETHER BELT LOAD	LEBOW	LC-711	12-Nov-02

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**HYBRID III 6C INSTRUMENTATION**

	POSITION #4 (LEFT) SERIAL NO.: 8481LAN		
	MANUFACTURER	SERIAL NUMBER	CALIBRATION DATE
HEAD AX	ENTRAN	AC-02I02I10-N25	13-Nov-02
HEAD AY	ENTRAN	AC-02I02I10-N09	13-Nov-02
HEAD AZ	ENTRAN	AC-02I02I10-N17	13-Nov-02
UPPER NECK FX	DENTON	LC-1037Fx	05-Dec-02
UPPER NECK FY	DENTON	LC-1037Fy	05-Dec-02
UPPER NECK FZ	DENTON	LC-1037Fz	05-Dec-02
UPPER NECK MX	DENTON	LC-1037Mx	05-Dec-02
UPPER NECK MY	DENTON	LC-1037My	05-Dec-02
UPPER NECK MZ	DENTON	LC-1037Mz	05-Dec-02
CHEST AX	ENTRAN	AC-02I02I10-N04	14-Nov-02
CHEST AY	ENTRAN	AC-02I02I10-N15	14-Nov-02
CHEST AZ	ENTRAN	AC-02I02I24-N07	14-Nov-02
CHEST DISPLACEMENT X	SERVO	DS-144	22-Jan-03
PELVIS AX	ENTRAN	AC-02I02I10-N01	13-Nov-02
PELVIS AY	ENTRAN	AC-02I02I10-N02	13-Nov-02
PELVIS AZ	ENTRAN	AC-02A16-A28	12-Dec-02
LAP BELT LOAD	LEBOW	LC-712	12-Nov-02

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**CRS INSTRUMENTATION**

	CRS Accelerometers		
	MANUFACTURER	SERIAL NUMBER	CALIBRATION DATE
P3 CRS AX	ENDEVCO	AC-B11408	10-Feb-03
P3 CRS AY	ENDEVCO	AC-A13513	10-Feb-03
P3 CRS AZ	ENDEVCO	AC-B10827	10-Feb-03
P4 CRS AX	ENDEVCO	AC-J31042	10-Feb-03
P4 CRS AY	ENDEVCO	AC-BB51	11-Feb-03
P4 CRS AZ	ENDEVCO	AC-J32791	11-Feb-03