

REPORT NUMBER: CAL-03-11

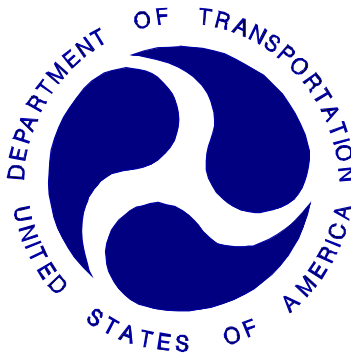
**NEW CAR ASSESSMENT PROGRAM (NCAP)  
FRONTAL BARRIER IMPACT TEST**

ISUZU MOTORS LIMITED  
2003 ISUZU RODEO  
MPV

NHTSA NUMBER: M30506

VERIDIAN TEST NUMBER: 8642-NCAP-33

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



February 28, 2003

FINAL REPORT

PREPARED FOR:

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

This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by:

---

Lawrence Q. Valvo, Project Engineer

Approved by:

---

David J. Travale, Program Manager  
Transportation Science Center

Approval Date:

---

FINAL REPORT ACCEPTANCE BY OCS:

---

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

---

Date of Report Acceptance

---

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

---

Date of Report Acceptance

**TECHNICAL REPORT STANDARD TITLE PAGE**

1. <i>Report No.</i> CAL-03-11		2. <i>Government Accession No.</i>		3. <i>Recipient's Catalog No.</i>	
4. <i>Title and Subtitle</i> Final Report of NEW CAR ASSESSMENT PROGRAM (NCAP) Testing of a 2003 Isuzu Rodeo MPV NHTSA No. M30506				5. <i>Report Date</i> February 28, 2003	
				6. <i>Performing Organization Code</i> CAL	
7. <i>Author(s)</i> David J. Travale, Program Manager Lawrence Q. Valvo, Project Engineer				8. <i>Performing Organization Report No.</i> 8642-NCAP-33	
9. <i>Performing Organization Name and Address</i> Veridian Engineering 4455 Genesee Street Buffalo, New York 14225				10. <i>Work Unit No.</i>	
				11. <i>Contract or Grant No.</i> DTNH22-01-D-32005	
12. <i>Sponsoring Agency Name and Address</i> U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NVS-111 400 Seventh, SW, Room 5313 Washington, D.C. 20590				13. <i>Type of Report and Period Covered</i> Final Report February 2003 - March 2003	
				14. <i>Sponsoring Agency Code</i> NVS-111	
15. <i>Supplementary Notes</i>					
16. <i>Abstract</i>  A frontal load cell barrier test of a 2003 Isuzu Rodeo MPV was performed at Veridian Engineering crash test facility in Buffalo, New York, on February 28, 2003. The impact velocity was 56.65 kph and the temperature at the barrier face was 21.1 °C. The maximum post-test vehicle crush was 474 mm. The test vehicle was equipped with load limiting 3-point restraint systems, knee bolsters, and airbags at both the driver and right outboard passenger seating positions. With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements.					
<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>	894.7	57.9	34.3	3673.5	5867.3
<b>Passenger (064)</b>	590.0	52.9	41.2	4913.7	2327.7
17. <i>Key Words</i> 56 kph Frontal Barrier Impact test New Car Assessment Program (NCAP)				18. <i>Distribution Statement</i> <u>Copies of this report are available from:</u> NHTSA Technical Reference Division National Highway Traffic Safety Admin. 400 Seventh St., SW, Room 5108 Washington, DC 20590	
19. <i>Security Classif. (of this report)</i> UNCLASSIFIED		20. <i>Security Classif. (of this page)</i> UNCLASSIFIED		21. <i>No. of Pages</i> 310	22. <i>Price</i>

**Form DOT F1700.7 (8-69)**

## TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	PURPOSE AND SUMMARY OF NCAP TEST	1-1
2	OCCUPANT AND VEHICLE INFORMATION	2-1
<u>Data Sheet</u>	<u>Description</u>	
1.	CRASH TEST SUMMARY	2-1
2.	GENERAL TEST AND VEHICLE PARAMETER DATA	2-2
3.	POST IMPACT DATA	2-4
4.	TEST VEHICLE INFORMATION	2-5
5.	DUMMY POSITIONING IN VEHICLE	2-7
6.	SEAT BELT POSITIONING DATA	2-9
7.	VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY	2-10
8.	DUMMY INJURY CRITERIA VALUES	2-12
9.	SEAT BELT PERFORMANCE DATA	2-16
10.	SUMMARY OF FMVSS 212 DATA	2-17
11.	WINDSHIELD ZONE INTRUSION FMVSS 219 DATA	2-18
12.	FMVSS 301 FUEL SYSTEM INTEGRITY DATA	2-19
13.	FMVSS 301 ROLLOVER DATA	2-20
14.	VEHICLE MEASUREMENTS	2-21
15.	CAMERA DATA	2-29
16.	REFERENCE PHOTO TARGETS	2-31
17.	LOAD CELL LOCATIONS ON FIXED BARRIER	2-32
18.	POST TEST AIR BAG DATA	2-33
19.	ACCIDENT INVESTIGATION DIVISION DATA	2-34
APPENDIX A	PHOTOGRAPHS	A-1
APPENDIX B	VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA	B-1
APPENDIX C	PART 572E DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION TESTS	C-1
APPENDIX D	DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION	D-1

## SECTION 1

### PURPOSE AND SUMMARY OF TEST

#### 1.1 PURPOSE

This 56.65 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 56.65 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

#### 1.2 TEST PROCEDURE

This 56.65 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 and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 061) and the right-front passenger (position 2) ATD (Serial No.064) were calibrated previous to this test. 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 141 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 Isuzu Rodeo MPV at a velocity of 56.65 kph. The test was performed at Veridian Engineering on February 28, 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>	894.7	57.9	34.3	3673.5	5867.3	-	0.2
<b>Passenger ATD</b>	590.0	52.9	41.2	4913.7	2327.7	-	0.5

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 474 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: Face to center of airbag, back of head to head restraint, chest to airbag, left knee to knee bolster left of steering column, right knee to knee bolster right of steering column. The passenger's visible contact points were as follows: Face to center of airbag, back of head to outboard half of head restraint, chest to airbag, left knee to left quarter of the glove compartment door, right knee to right quarter of the glove compartment door.

The 2003 Isuzu Rodeo 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.:           M30506           Test Mode:           56.3 kph Frontal Barrier          

Test Date:           February 28, 2003           Time:           14:15           Temperature:           21.1           °C

Vehicle Make/Model/Body Style:           2003 Isuzu Rodeo MPV          

Vehicle Test Weight:           2102.5           kg

Vehicle/Barrier Impact Angle:           0           °

Impact Velocity:           56.65           kph

Maximum Static Crush:           474           mm

Vehicle Rebound:           831           mm

<u>DUMMIES:</u>	<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:           105          

Number of Cameras:           1           Real Time

          16           High Speed

DOOR OPENING DATA:           Door remained closed and latched, door opened without tools           - Left Front  
          Door remained closed and latched, door opened without tools           - Right Front

Front Seat(s) Data:	<u>DRIVER</u>	<u>PASSENGER</u>
Seat Track Failure: (mm of shift)	<u>          0          </u>	<u>          0          </u>
Seat Back Failure:	<u>          None          </u>	<u>          None          </u>

<u>VISIBLE DUMMY CONTACT POINTS:</u>	<u>DRIVER</u>	<u>PASSENGER</u>
Head:	<u>          Face to center of airbag; Back of head to head restraint.          </u>	<u>          Face to center of airbag; Back of head to outboard half of head restraint.          </u>
Abdomen:	<u>          None          </u>	<u>          None          </u>
Chest:	<u>          Airbag          </u>	<u>          Airbag          </u>
Knees:	<u>          Left knee to knee bolster left of steering column; Right knee to knee bolster right of steering column.          </u>	<u>          Left knee to left quarter of glove compartment door; Right knee to right quarter of glove compartment door.          </u>

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2003 Isuzu Rodeo MPV

NHTSA No. : M30506 ; VIN: 4S2DM58W434301030 ; Color: Red

Engine Data: 6 cylinders; - CID; 3.2 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 (Shoulder); X Load Limiter; X Adj. Anchorage

Safety Belt Features - Passenger - Pretensioner (Shoulder); X Load Limiter; X 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: 2/19/03 ; Odometer Reading 123.9 km

Selling Dealer: Towne Isuzu

& Address: 3050 Orchard Park Road, Buffalo, NY 14224

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Isuzu Motors Limited

Date of Manufacture JAN.03

GVWR: 2360 kg; GAWR: 1135 kg FRONT; 1315 kg REAR

DATA FROM TIRE PLACARD:

Recommended Tire Size: P245/70 R16

\* Recommended Cold Tire Pressure: 180 kPa FRONT; 180 kPa REAR

DATA FROM TIRE SIDEWALL:

Size of Tires on Test Vehicle: P245/70 R16 ; Manufacturer: Bridgestone

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

Treadwear: 180 ; Traction: B ; Temperature: B

VEHICLE CAPACITY DATA:

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

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

Vehicle Capacity Weight (VCW) = 538.5 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 198.3† kg

\*Tire pressure used for test

† Maximum RCLW value of 136.1 kg was used for target weight calculation.

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>489.5</u>	kg	Right Rear =	<u>412.0</u>	kg
Left Front =	<u>499.5</u>	kg	Left Rear =	<u>420.5</u>	kg
TOTAL FRONT =	<u>989.0</u>	kg	TOTAL REAR =	<u>832.5</u>	kg
TOTAL DELIVERED WEIGHT =	<u>1821.5</u>	kg			
% of Total Front of Vehicle Weight =	<u>54.3%</u>		% of Total Rear Weight =	<u>45.7%</u>	%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW) =	<u>1821.5</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>2109.6</u>	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 129.0 KG OF CARGO WEIGHT:

Right Front =	<u>534.5</u>	kg	Right Rear =	<u>520.0</u>	kg
Left Front =	<u>518.0</u>	kg	Left Rear =	<u>530.0</u>	kg
TOTAL FRONT =	<u>1052.5</u>	kg	TOTAL REAR =	<u>1050.0</u>	kg
TOTAL TEST WEIGHT =	<u>2102.5</u>	kg			
% of Total Front Weight =	<u>50.1%</u>	%	% of Total Rear Weight =	<u>49.9%</u>	%
Weight of Ballast Secured in Vehicle Trunk Area =	<u>15.9</u>	kg			
Vehicle Components Removed for Weight Reduction:	<u>None</u>				

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED:	RF	<u>854</u>	LF	<u>853</u>	RR	<u>874</u>	LR	<u>875</u>
FULLY LOADED:	RF	<u>846</u>	LF	<u>845</u>	RR	<u>829</u>	LR	<u>831</u>
AS TESTED:	RF	<u>846</u>	LF	<u>845</u>	RR	<u>831</u>	LR	<u>834</u>
Vehicle's Wheel Base:	<u>2701</u>	mm						
Location of Vehicle's C.G.:	<u>1349</u>	mm rearward of front wheel center.						

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual =	<u>74</u>	liters
Usable Capacity Figure Furnished by COTR =	<u>71.6</u>	liters
Test Volume Range (92 to 94% of Usable Capacity) =	<u>65.87</u>	to <u>67.3</u> liters
ACTUAL TEST VOLUME=	<u>67</u>	liters (with entire fuel system filled)
Test Fluid Type:	<u>Stoddard Solution</u>	; Spec. Grav. = <u>0.764</u>
Kinematic Viscosity =	<u>0.96</u>	centistokes; Color = <u>Orange</u>
Type of Fuel Pump: Electric-	<u>X</u>	; Mechanical- <u>-</u>
Does Electric Pump operate with ignition switch "ON" & engine "OFF"	Yes- <u>X</u>	No- <u>-</u>
<u>Details of Fuel System: Fuel Tank – Located on the left side of the vehicle underbody forward of the rear axle;</u>		
<u>Fuel Lines -Routed along the vehicle underbody inboard of the left frame rail; Fuel Filler – Located on the left rear quarter panel rear of the rear wheel.</u>		

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°  
Test Date: February 28, 2003 Time: 14:15 Temperature: 21.1 °C  
Vehicle NHTSA No.: M30506  
Required Impact Velocity Range: 55.5 to 57.1 kph

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

Trap No. 1 = 56.65 kph; Trap No. 2 = 56.65 kph  
Distance from vehicle to barrier: (1) entering trap = 813 mm  
(2) exiting trap = 305 mm

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

Vehicle Length:

Pre-Test	Left = <u>4431</u> ; C/L = <u>4508</u> ; Right = <u>4425</u>
Post-Test	Left = <u>4011</u> ; C/L = <u>4038</u> ; Right = <u>4012</u>
Crush	Left = <u>420</u> ; C/L = <u>470</u> ; Right = <u>413</u>
AVERAGE	= <u>434</u> mm

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

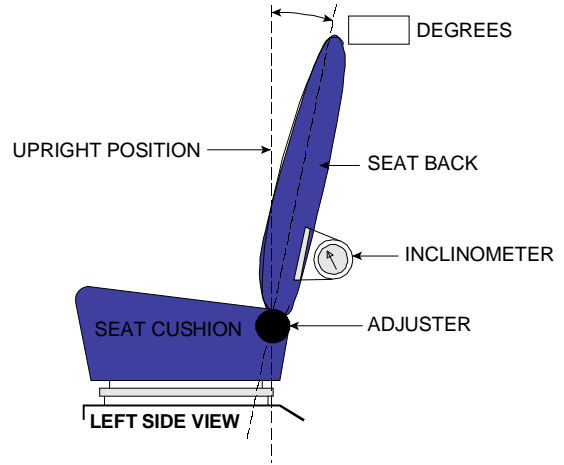
	Left = <u>867</u> ; C/L = <u>823</u> ; Right = <u>804</u>
AVERAGE	= <u>831</u> mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year :           2003    Vehicle Model:           Isuzu Rodeo           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:           21 degrees

Measurement instructions: Where the most upright position is defined as detent 1, place the seatback in detent 5.

Seat back angle for passenger's seat:           21 degrees

Measurement instructions: Where the most upright position is defined as detent 1, place the seatback in detent 5.

2. Seat Fore and Aft Positioning

Positioning of the driver's seat:           Where the most rearward position is defined as detent 1, place the seat in detent 11.

Positioning of the passenger's seat:           Where the most rearward position is defined as detent 1, place the seat in detent 11.

3. Fuel Tank Capacity Data

3.1 A. "Usable Capacity" of the standard equipment fuel tank is           74 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 =           71.6 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) =           67.0 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 fuel pump operates briefly when the ignition it turned on and the engine is not started. The fuel pump operates 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:                    Where the lowest position is defined as detent 1, place the steering column  
in detent 3.

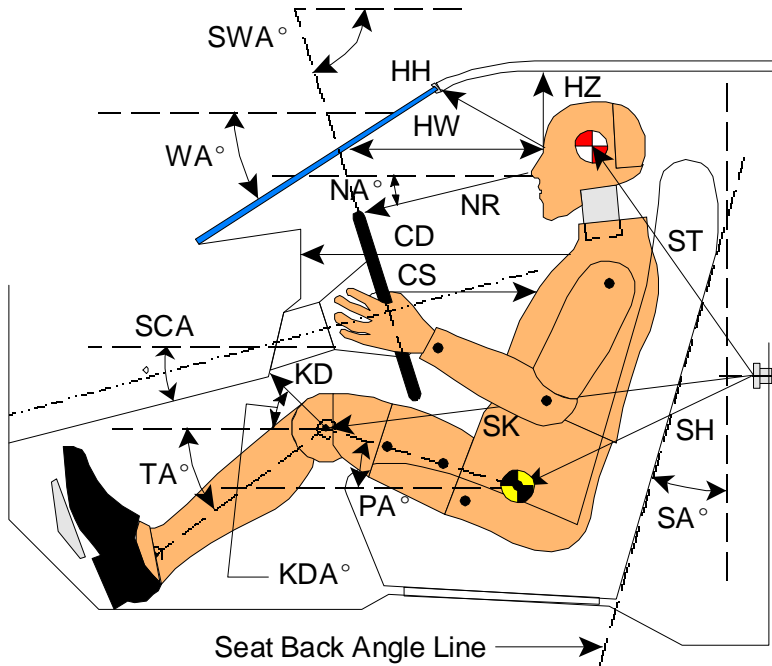
---

5. SEAT BELT UPPER ANCHORAGE

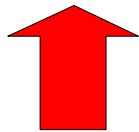
Nominal design riding position:        Where the upper-most position is defined as detent 1, place the adjustable  
anchorage in detent 5.

---

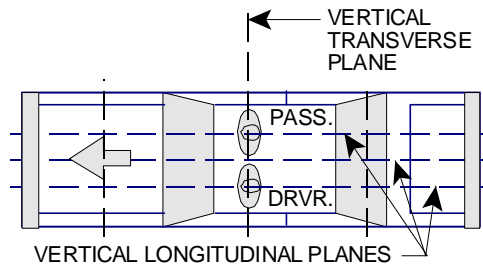
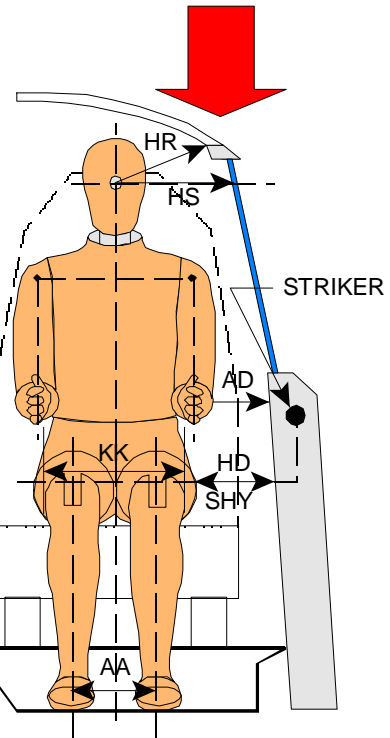
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE  
**DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS**



- 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

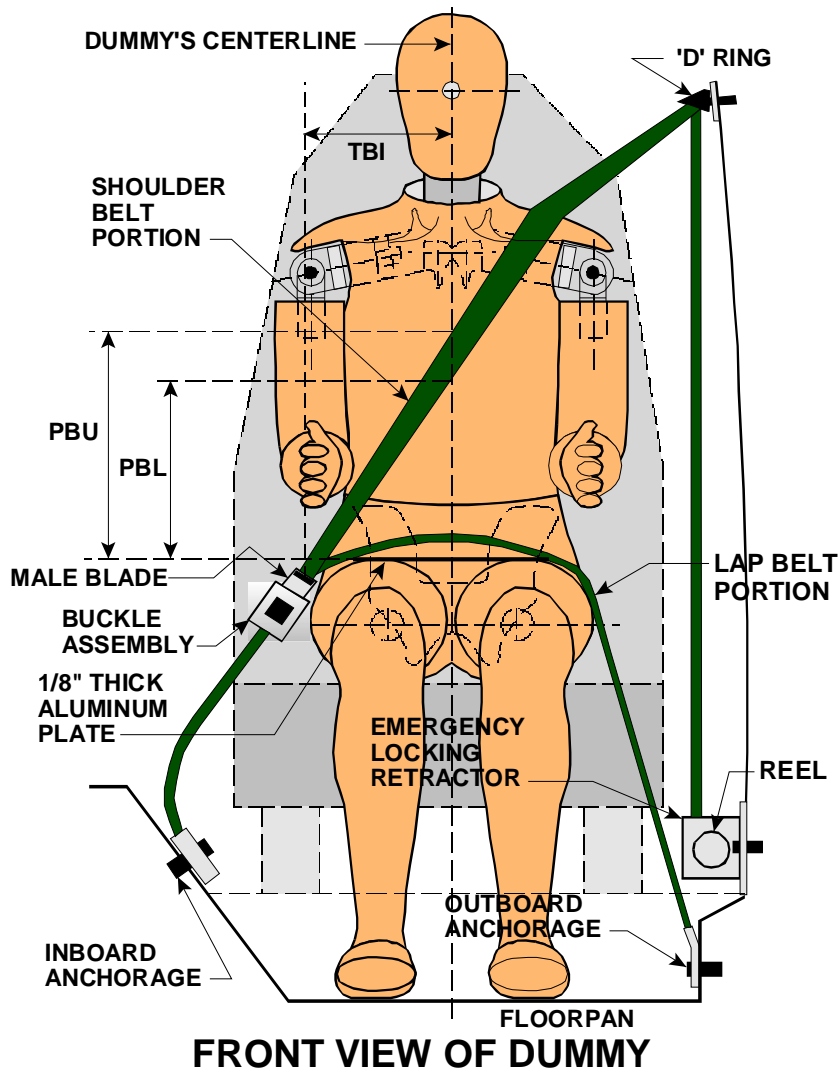


DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #061)			PASS. (Serial #064)		
WA <sup>o</sup>	35.5 deg.			N/A		
SWA <sup>o</sup>	65 deg.			N/A		
SCA <sup>o</sup>	25 deg.			N/A		
SA <sup>o</sup>	21 deg. (9 deg. of head restraint post)			21 deg. (9 deg. of head restraint post)		
HZ	185			192		
HH	376			385		
HW	553			559		
HR	230			233		
NR	405	Angle	14 deg.	N/A		
CD	534			550		
CS	309			N/A		
RA	195			N/A		
KDL	181	Angle (KDA)	22 deg.	163		
KDR	167			160	Angle (KDA)	25 deg.
PA <sup>o</sup>	24.2 deg.			24.9 deg.		
TA <sup>o</sup>	43.7 deg.			40.2 deg.		
KK	418			340		
AA	335			204		
ST	575	Angle	12 deg.	565	Angle	12 deg.
SK	636	Angle	88 deg.	655	Angle	87 deg.
SH	285	Angle	108 deg.	282	Angle	106 deg.
SHY	219			204		
HS	334			332		
HD	159			145		
AD	106			98		

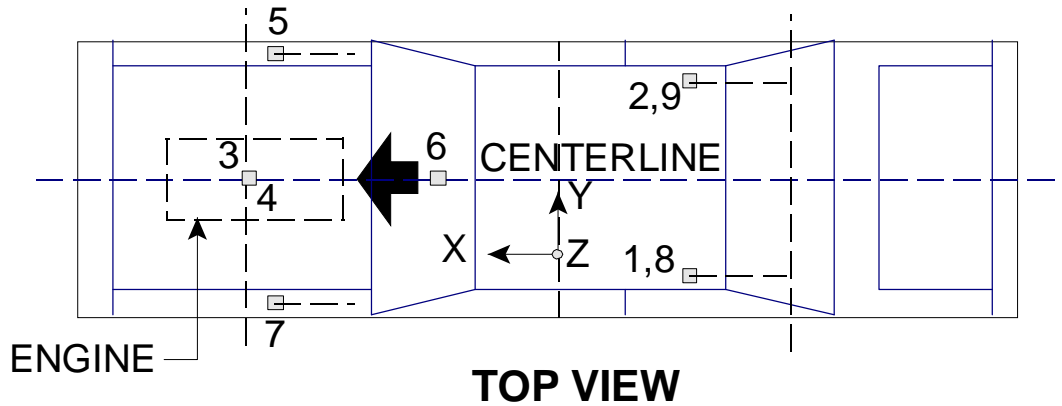
Dimensions in millimeters

**SEAT BELT POSITIONING DATA**

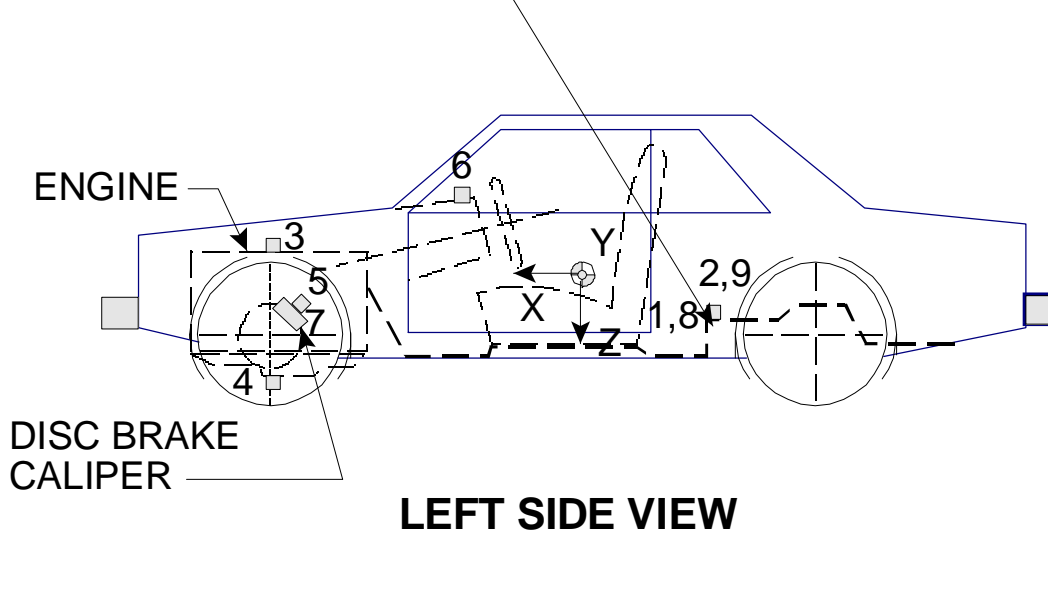


	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	316	315
PBL-- Top surface of alum. plate to belt lower edge	240	238
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

## 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	1815	-658	-466
2	Right Rear Seat Cross Member X	1809	649	-478
3	Top of Engine Block	3800	-65	-974
4	Bottom of Engine	3447	-22	-269
5	Disc Brake Caliper @ Right Side	3559	806	-318
6	Instrument Panel	2949	-4	-1131
7	Disc Brake Caliper @Left Side	3556	-813	-306
8	Left Rear Seat Cross Member Z	1815	-658	-466
9	Right Rear Seat Cross Member Z	1809	649	-478

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Left Rear Seat Cross Member X	3.1	156.9	-39.9	46.6
2	Right Rear Seat Cross Member X	5.5	137.1	-47.8	14.3
3	Top of Engine Block	58.9	50.2	†	-
4	Bottom of Engine	††	-	††	-
5	Disc Brake Caliper @ Right Side	‡	-	‡	-
6	Instrument Panel	90.8	53.5	-118.9	60.7
7	Disc Brake Caliper @Left Side	††	-	-117.1	18.1
8	Left Rear Seat Cross Member Z	13.8	44.8	-51.7	57.5
9	Right Rear Seat Cross Member Z	22.2	34.5	-32.7	52.7

† Data invalid: 22-23 ms and after 54 ms

†† Data cable damaged at 31 ms

‡ Data cable damaged at 29 ms

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

Vehicle Year/Make/Model/Body Style: 2003 Isuzu Rodeo MPV

NHTSA Test No.: M30506 Test Date: February 28, 2003

DESCRIPTION	Unit	MAXIMUM VALUE							
		Driver				Passenger			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head 9 Array X Arm Y	g	9.2	104.1	-38.6	79.5	10.0	52.5	-5.4	130.6
Head 9 Array X Arm Z	g	32.9	50.9	-24.2	87.9	45.8	51.0	-12.0	123.2
Head 9 Array Y Arm X	g	19.4	208.3	-77.6	72.5	18.1	215.8	-52.4	77.2
Head 9 Array Y Arm Z	g	23.8	46.1	-18.1	82.3	35.2	52.6	-1.4	24.5
Head 9 Array Z Arm X	g	21.3	105.0	-97.2	71.0	31.3	215.7	-50.5	78.6
Head 9 Array Z Arm Y	g	16.4	183.0	-35.9	86.9	13.7	210.5	-10.4	126.9
Head X	g	13.7	208.6	-69.9	72.4	21.4	215.9	-53.1	78.8
Head Y	g	7.9	183.9	-37.2	79.7	8.9	79.5	-5.5	128.9
Head Z	g	26.0	49.9	-16.4	82.4	32.1	52.6	-2.7	123.2
Head Resultant	g	75.2	73.2	-	-	59.6	77.8	-	-
Redundant Head X	g	14.4	208.7	-71.7	72.3	21.4	216.0	-52.5	79.8
Redundant Head Y	g	7.7	183.9	-39.0	82.2	9.2	79.5	-5.2	130.8
Redundant Head Z	g	26.6	49.9	-13.8	82.8	32.4	53.3	-2.5	123.8
Redundant Head Resultant	g	76.9	72.9	-	-	59.0	77.4	-	-
Upper Neck Fx	N	1377.2	70.8	-206.0	213.5	496.3	62.0	-783.8	117.3
Upper Neck Fy	N	†	-	†	-	235.5	77.8	-210.0	129.4
Upper Neck Fz	N	1670.6	55.4	-382.0	107.2	1487.4	73.8	-1101.8	230.0
Upper Neck F Resultant	N	†	-	-	-	1510.3	71.8	-	-
Upper Neck Mx	N-m	24.7	176.8	-25.2	124.1	12.6	103.4	-20.1	126.9
Upper Neck My	N-m	83.2	70.2	-35.6	105.3	67.3	122.2	-65.1	240.0
Upper Neck Mz	N-m	44.3	98.7	-10.5	244.2	12.3	290.2	-6.3	121.7
Upper Neck M Resultant	N-m	86.2	70.2	-	-	69.8	122.2	-	-
Chest X	g	4.8	169.8	-62.8	76.2	4.9	239.2	-51.7	54.9
Chest Y	g	5.3	89.5	-6.5	44.0	8.6	61.3	-5.0	80.3
Chest Z	g	16.4	48.1	-12.2	98.3	17.7	52.6	-15.2	95.6
Chest Resultant	g	63.0	76.2	-	-	53.8	54.5	-	-

† Upper Neck Fy data is invalid after 37 ms

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

Vehicle Year/Make/Model/Body Style: 2003 Isuzu Rodeo MPV

NHTSA Test No.: M30506 Test Date: February 28, 2003

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Redundant Chest X	g	4.8	169.8	-62.9	76.2	5.0	239.2	-52.4	54.8
Redundant Chest Y	g	5.1	89.7	-6.0	42.7	9.3	61.4	-5.0	80.3
Redundant Chest Z	g	15.9	48.2	-12.2	98.3	17.3	52.5	-15.5	95.6
Redundant Chest Resultant	g	63.1	76.2	-	-	54.3	54.4	-	-
Chest Displacement	mm	0.0	9.7	-34.3	60.9	0.0	13.9	-41.2	80.1
Pelvic X	g	2.8	124.5	-74.1	45.7	5.2	98.6	-78.0	48.1
Pelvic Y	g	12.0	65.6	-19.0	41.7	11.4	49.3	-14.1	87.8
Pelvic Z	g	†	-	†	-	4.5	227.5	-33.4	64.5
Pelvic Resultant	g	†	-	-	-	78.8	48.2	-	-
Left Femur	N	221.5	87.9	-3673.5	42.5	710.9	40.6	-4913.7	49.8
Right Femur	N	576.5	36.0	-5867.3	41.3	228.6	28.3	-2327.7	47.8
Left Upper Tibia Mx	N-m	9.6	215.3	-61.1	40.7	23.3	52.9	-23.7	76.8
Left Upper Tibia My	N-m	177.8	46.8	-71.8	36.2	75.6	47.9	-42.6	39.5
Left Lower Tibia Fz	N	337.1	59.8	-2085.4	35.1	57.7	235.6	-1476.7	83.3
Left Lower Tibia Mx	N-m	32.9	41.1	-20.7	36.9	19.1	49.3	-14.7	75.0
Left Lower Tibia My	N-m	54.4	44.7	-22.7	36.6	69.9	70.8	-32.9	34.4
Right Upper Tibia Mx	N-m	61.6	47.7	-16.0	190.9	40.8	66.3	-87.2	43.6
Right Upper Tibia My	N-m	110.9	39.0	-36.1	35.8	120.7	59.1	-102.1	40.4
Right Lower Tibia Fz	N	182.4	69.3	-2557.4	41.1	598.9	45.8	-1424.2	83.3
Right Lower Tibia Mx	N-m	66.5	47.2	-21.6	41.7	70.1	49.3	-47.7	41.7
Right Lower Tibia My	N-m	197.7	51.8	-123.6	40.1	130.0	53.7	-102.1	41.1
Left Foot Aft Ax	g	31.5	100.0	-92.8	40.6	73.1	48.8	-162.0	40.8
Left Foot Aft Az	g	13.0	237.4	-66.9	36.1	10.9	70.2	-63.2	41.2
Left Foot Fore Az	g	77.3	32.9	-110.5	40.2	84.5	47.4	-156.8	38.7
Right Foot Aft Ax	g	92.1	55.4	-309.1	39.1	20.9	56.8	-114.4	41.9
Right Foot Aft Az	g	35.0	57.4	-187.1	39.1	15.0	29.4	-73.8	43.4
Right Foot Fore Az	g	186.9	51.0	-481.9	38.7	72.6	56.8	-216.8	37.7
Lap Belt Load	N	8273.8	53.1	-11.5	7.9	10880.0	55.1	-29.2	5.8
Torso Belt	N	5024.4	65.5	-3.3	-35.4	5595.2	75.5	-14.6	191.2

† Pelvic Az transducer failed, data is invalid.

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

Vehicle Year/Make/Model/Body Style: 2003 Isuzu Rodeo MPV

NHTSA Test No.: M30506 Test Date: February 28, 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	894.7	54.1	87.8	58.8
Position #2 - Passenger	590.0	61.7	97.7	48.5

\*\* 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*				
	CLIP (g's)	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	CSI
Position #1 - Driver	57.9	74.8	77.8	693.0
Position #2 - Passenger	52.9	52.8	55.8	600.4

\* 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 Isuzu Rodeo MPV

NHTSA Test No.: M30506 Test Date: February 28, 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	950.1	53.5	87.6	60.0
Position #2 - Passenger	571.9	61.6	97.6	47.9

\*\* 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	57.9	74.8	77.8	689.9
Position #2 - Passenger	53.7	52.7	55.7	622.0

\* 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

<u>BELT LENGTH DATA:</u>	<u>Driver</u>	<u>Passenger</u>
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	<u>1719</u>	<u>1723</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>867</u>	<u>873</u>
Lap belt length as measured on Part 572 Dummy.	<u>852</u>	<u>850</u>
<u>SHOULDER BELT SPOOL-OFF DATA:</u>		
As determined by film analysis.	<u>†</u>	<u>†</u>
As determined mechanically.	<u>178</u>	<u>148</u>
As determined electronically.	<u>††</u>	<u>††</u>
<u>BELT STRETCH DATA:</u>		
Measured electronically between shoulder belt load cell and the "D" ring.	<u>†† mm/m</u>	<u>†† mm/m</u>
Measured mechanically.	<u>4 mm/m</u>	<u>10 mm/m</u>

† Onboard camera was used for CRS views. Close-up high speed camera view of shoulder belts is not available.

†† Device could not be installed on vehicle seat belts.

\_\_\_\_\_ 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 15 mm molding.

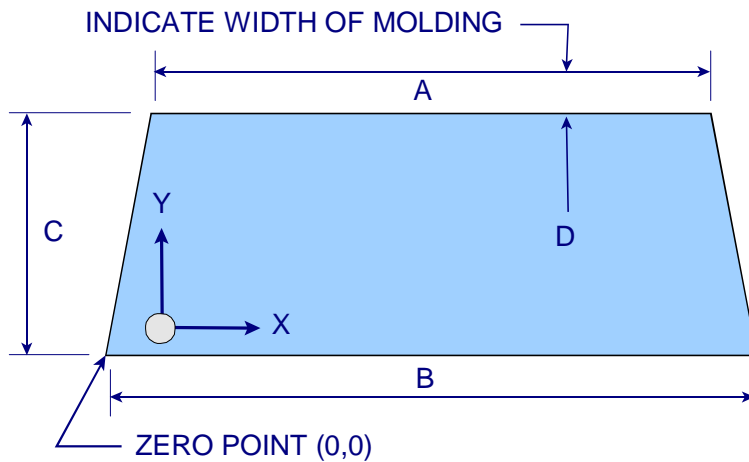
FMVSS 212 REQUIREMENTS:

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	2042	2042	100.0%
LEFT SIDE	2042	2042	100.0%
TOTAL	4084	4084	100.0%

AREA OF RETENTION FAILURE: None



DIMENSIONS (mm)	
A	1184
B	1440
C	730
D	15

**FRONT VIEW OF WINDSHIELD**

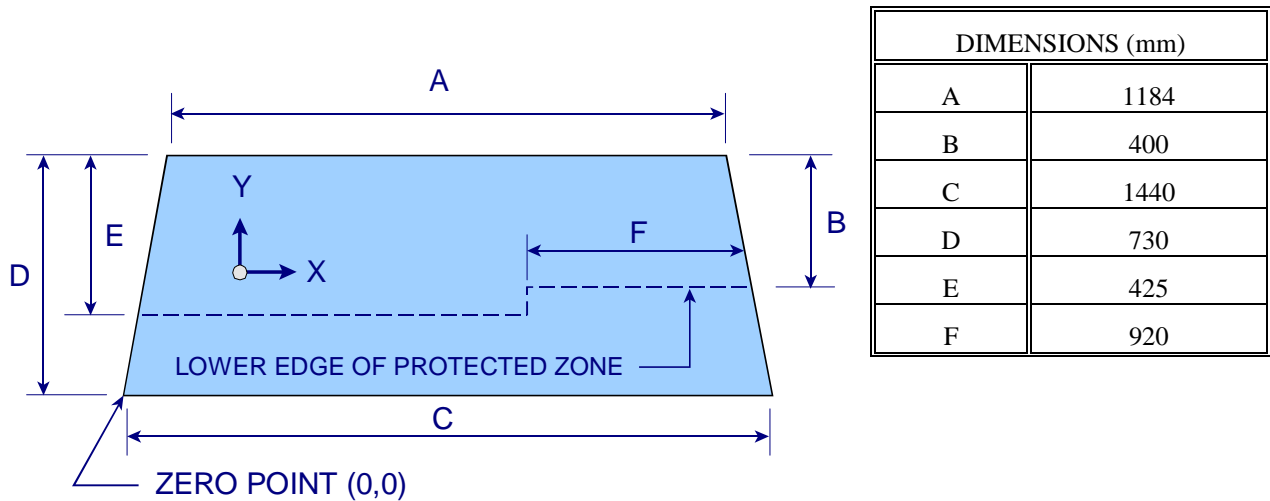
FAILURE DETAILS: None

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

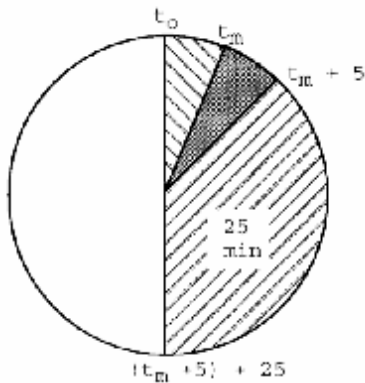
NHTSA TEST No.: M30506 TEST DATE: February 28, 2003  
VEHICLE MAKE/MODEL: 2003 Isuzu Rodeo MPV

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

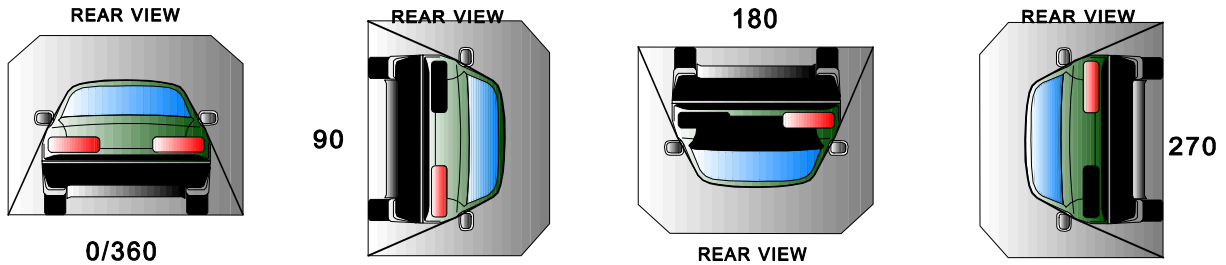
ACTUAL	MAX ALLOWED
0	28 g
0	141 g
0	28 g/min.

SOLVENT SPILLAGE DETAILS: None

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

Vehicle: 2003 Isuzu Rodeo MPV

NHTSA No.: M30506



**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	11	seconds	5	minutes	6	minutes	11	seconds	7	minutes
0° - 90°	1	minutes	4	seconds	5	minutes	6	minutes	4	seconds	7	minutes
90° - 180°	1	minutes	10	seconds	5	minutes	6	minutes	10	seconds	7	minutes
180°-270°	1	minutes	8	seconds	5	minutes	6	minutes	8	seconds	7	minutes

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

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

**III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:**

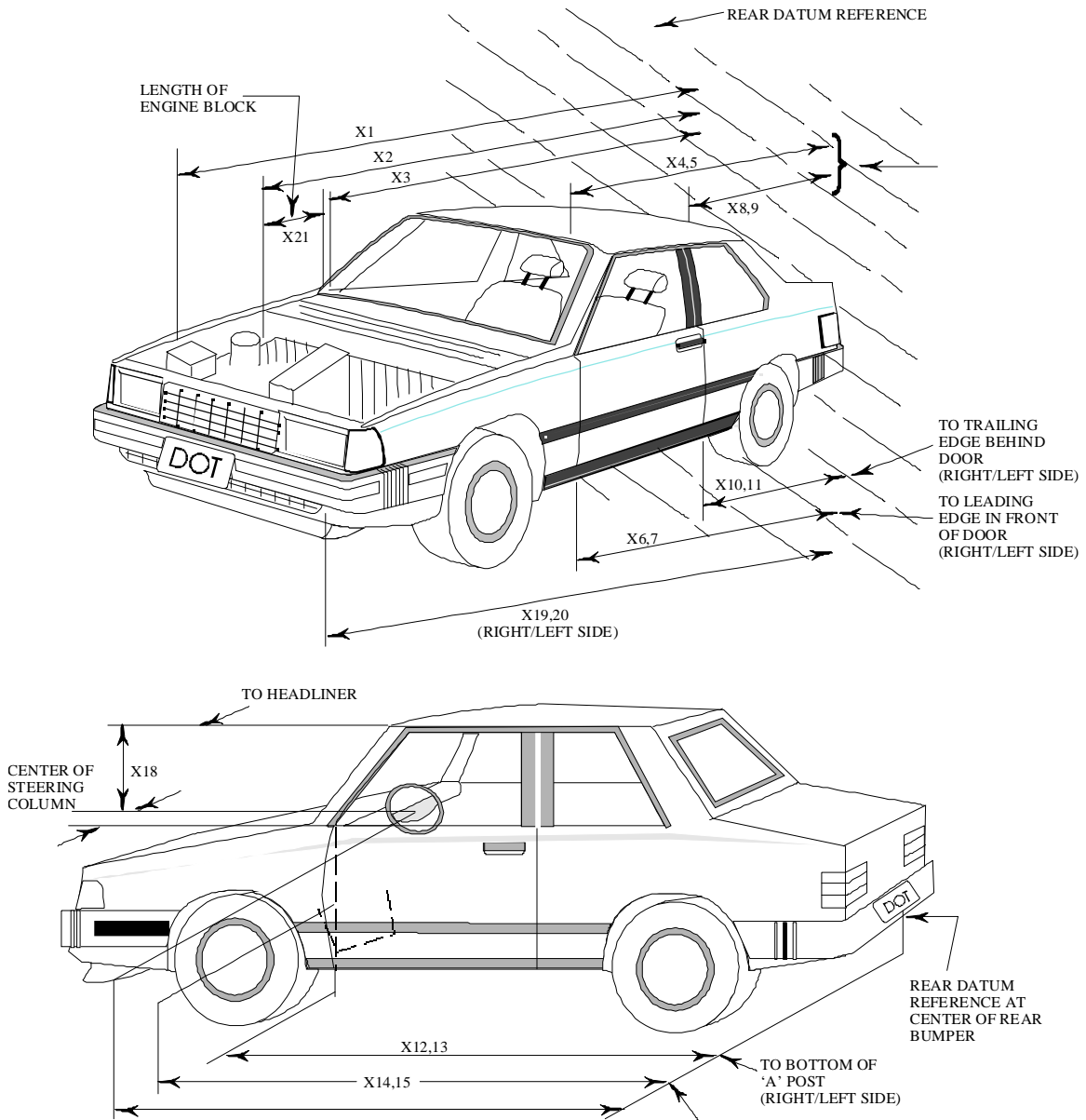
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	-
90° - 180°	0	0	0	-
180°-270°	0	0	0	-
270°-360°	0	0	0	-

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

**IV. SOLVENT SPILLAGE LOCATION(S):**

Rollover Stage	Spillage Location
0° - 90°	-
90° - 180°	-
180°-270°	-
270°-360°	-

DATA SHEET NO. 14 TEST VEHICLE MEASUREMENTS

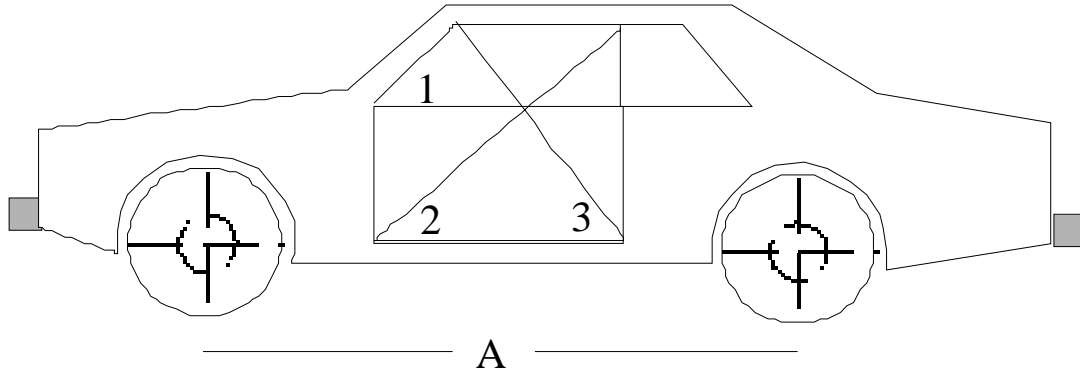


DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4508	4038	470
X2	Rear Surface of Vehicle to Front of Engine	3984	3836	148
X3	Rear Surface of Vehicle to Firewall	3447	3289	158
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3167	3140	27
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3165	3138	27
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3168	3173	-5
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3165	3164	1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2063	2039	24
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2056	2036	20
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2056	2055	1
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2046	2036	10
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3285	3237	48
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3274	3236	38
X14	Rear Surface of Vehicle to Firewall, Right Side	3446	3357	89
X15	Rear Surface of Vehicle to Firewall, Left Side	3450	3346	104
X16	Rear Surface of Vehicle to Steering Column	2728	2675	53
X17	Center of Steering Column to "A" Post	295	279	16
X18	Center of Steering Column to Headliner	430	377	53
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4425	4012	413
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4431	4011	420
X21	Length of Engine Block	555	531	24
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2919	2908	11
CD	Rear Surface of Vehicle to Center of Dash Panel	2968	2913	55
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2921	2894	27

All Dimensions in mm

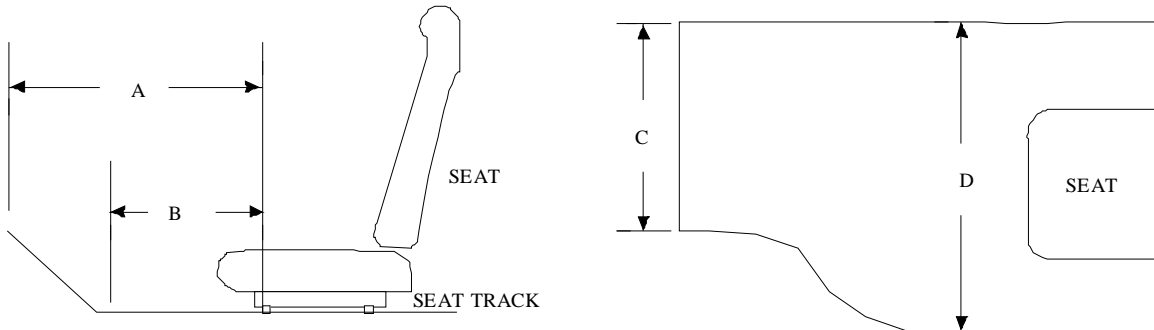
DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)  
 VEHICLE INTRUSION MEASUREMENTS  
 DOOR OPENING WIDTH



UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	1058	1498	1099	1058	1497	1097
AFTER TEST	1051	1475	1133	1051	1462	1138
DIFFERENCE	7	23	-34	7	35	-41

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2701	2701
AFTER TEST	2683	2571
DIFFERENCE	18	130

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



DRIVER

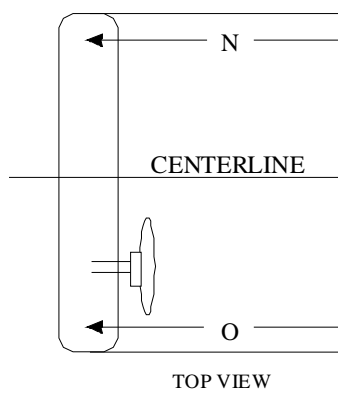
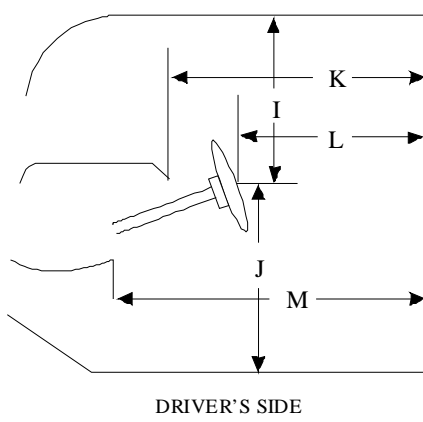
Measurement	Pre-Test	Post-Test	Difference
A	747	684	63
B	638	610	28
C	393	430	-37
D	457	448	9

PASSENGER

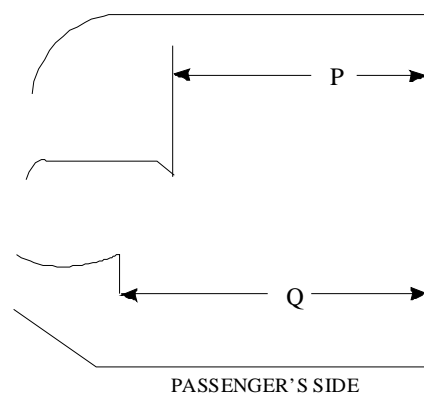
Measurement	Pre-Test	Post-Test	Difference
A	743	668	75
B	609	606	3
C	426	372	54
D	439	433	6

Units = mm

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



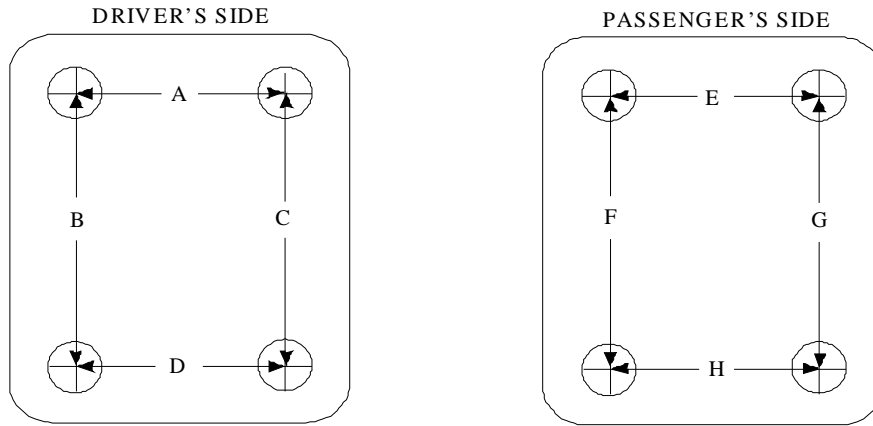
MEASUREMENTS  
FROM C-PILLAR  
BELT ANCHORAGE



Measurement	Pre-Test	Post-Test	Difference
I	430	377	53
J	583	660	-77
K	1878	1884	-6
L	1715	1662	53
M	1918	1902	16
N	1902	1892	10
O	1907	1880	27
P = K (PASS.)	1950	1913	37
Q = M (PASS.)	1972	1983	-11

Units = mm

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

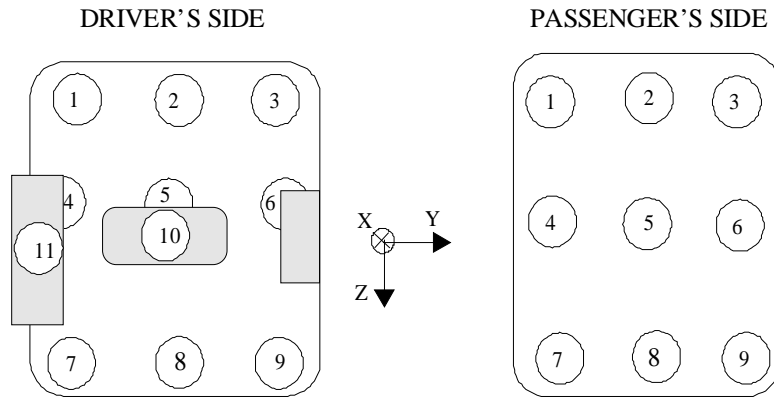


TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	393	430	-37
B	469	445	24
C	406	399	7
D	457	448	9
E	426	372	54
F	487	523	-36
G	444	429	15
H	439	433	6

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	3322	3293	29	-677	-719	42
2	3394	3331	63	-663	-723	60
3	3379	3275	104	-671	-735	64
4	3287	3264	23	-578	-626	48
5	3356	3299	57	-568	-625	57
6	3323	3230	93	-579	-643	64
7	3252	3244	8	-506	-545	39
8	3285	3258	27	-497	-535	38
9	3259	3223	36	-501	-546	45
10	3189	3075	114	-618	-697	79
11	3242	3231	11	-599	-642	43

**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	3345	3264	81	-666	-739	73
2	3399	3317	82	-663	-740	77
3	3321	3296	25	-670	-737	67
4	3309	3254	55	-583	-639	56
5	3346	3297	49	-570	-637	67
6	3285	3261	24	-577	-637	60
7	3228	3193	35	-507	-561	54
8	3265	3255	10	-490	-533	43
9	3249	3237	12	-504	-560	56

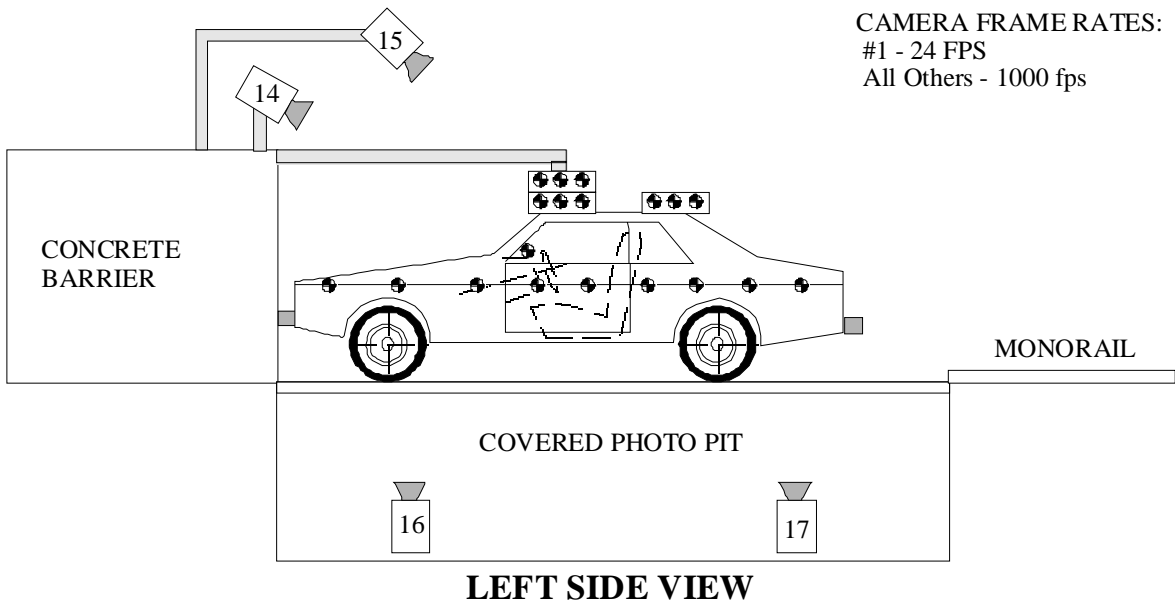
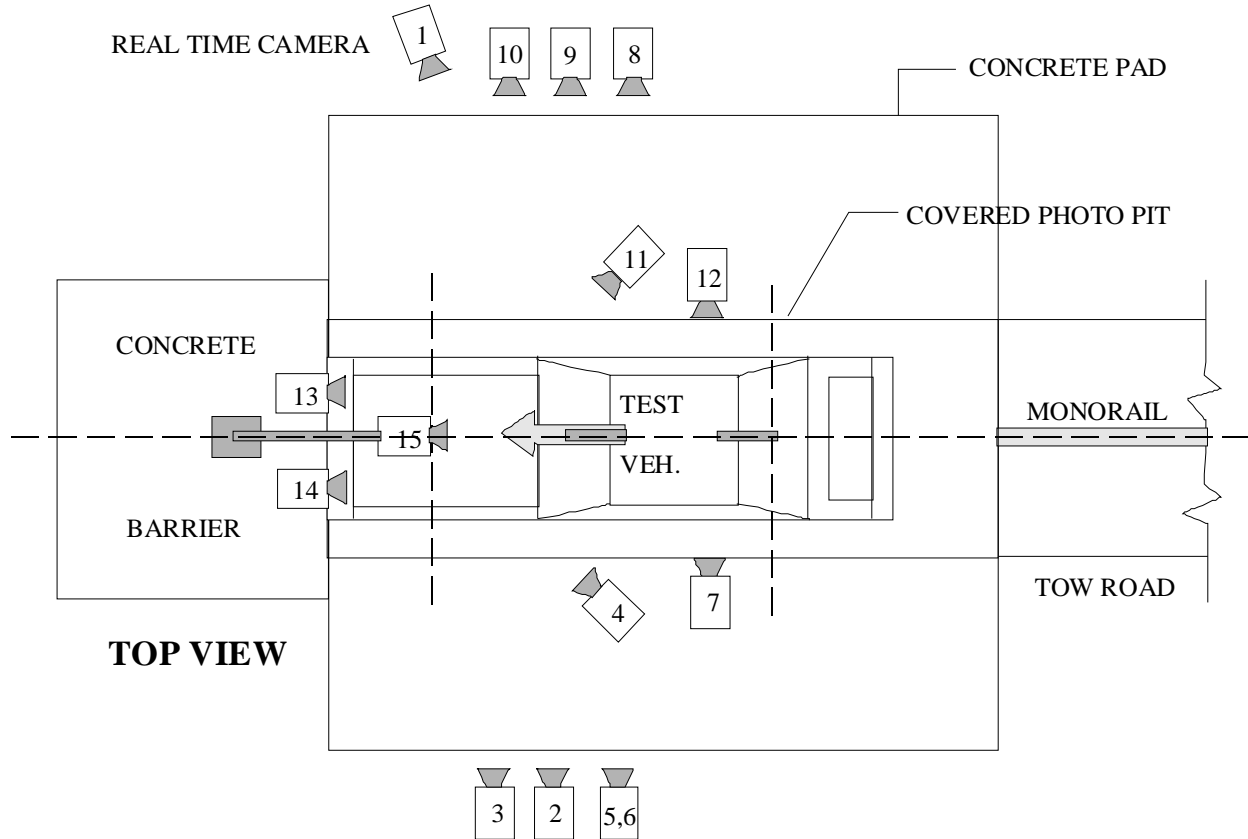
Reference: SAE: X = Rear Bumper (Positive: forward); Z = Ground (Positive: down)

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

	Elements	Pre-Test (mm)
1	Total length	4508
2	Total Width	1708
3	Bumper Top Height	680
4	Bumper Bottom Height	410
5	Longitudinal Member Top Height	532
6	Distance Between Longitudinal Members	818
7	Longitudinal Member Width	65
8	Engine top height	1032
9	Engine bottom height	245
10	Engine and gearbox width	645
11	Front bumper-engine distance	570
12	Front shock absorber fixing height	630
13	Bonnet leading edge height	934
14	Front shock absorber fixing width	890
15	Front bumper – front axle distance	789
16	Front axle – a pillar distance	460
17	A-pillar – B pillar distance	1150
18	B-pillar – rear axle distance	1065
19	B-pillar – C Pillar distance	1070
20	Roof sill bottom height	1560
21	Roof sill top height	1653
22	Floor sill bottom height	363
23	Floor sill top height	525

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.:           M30506           Vehicle:           2003 Isuzu Rodeo 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	6441	1565	1145	-1	6062	12.5	1030
3	Left Side View	8060	810	1110	2	7681	25	1025
4	Driver and Interior View	7241	2695	1980	-7	-	25	1060
5	Steering Column (Bottom)	7371	1885	1165	-2	6992	25	1020
6	Steering Column (Top)	7371	1885	1765	-7	6992	25	1025
7	CRS View Left	3390	2920	2550	-21	-	25	1030
8	Overall Right Side	6671	1985	1085	-2	6952	12.5	1020
9	Right Side View	7990	1445	1140	-1	8271	25	1005
10	Right Passenger View	8010	1885	1380	2	8291	35	1015
11	Passenger and Interior View	7141	2690	2000	-7	-	25	1010
12	CRS View Right	3410	2455	2466	-24	-	25	1035
13	Passenger Front View	620	-92	1987	-31	-	13	1005
14	Driver Front View	620	-92	1987	-32	-	13	1025
15	Windshield View	0	-530	3374	-49	-	13	1005
16	Pit View of Engine	0	615	-3048	90	-	13	1010
17	Pit View of Fuel Tank	0	2795	-3048	90	-	13	1015

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

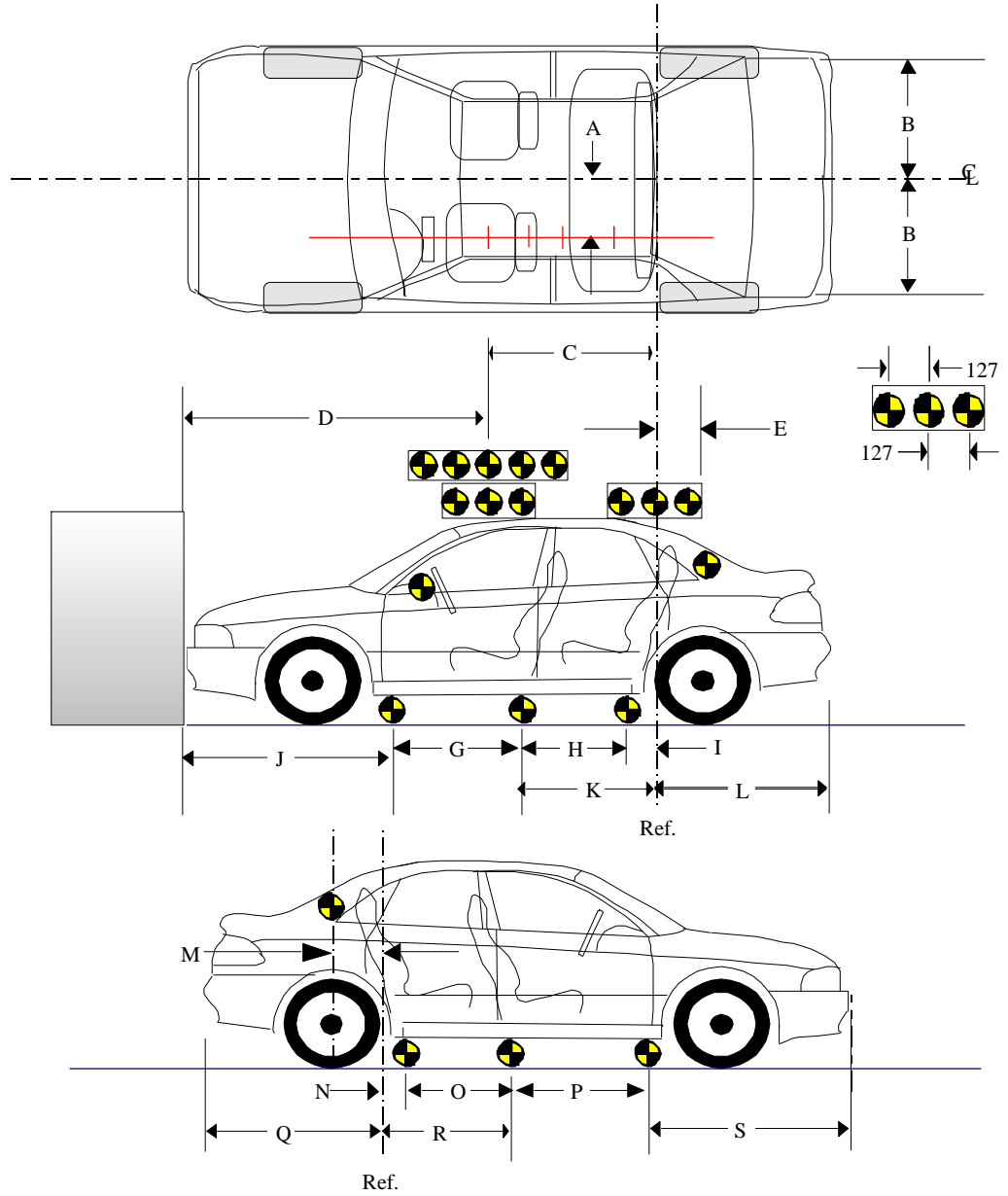
Y = film plane to impact location                      N.T. indicates No Timing

Z = film plane to ground

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

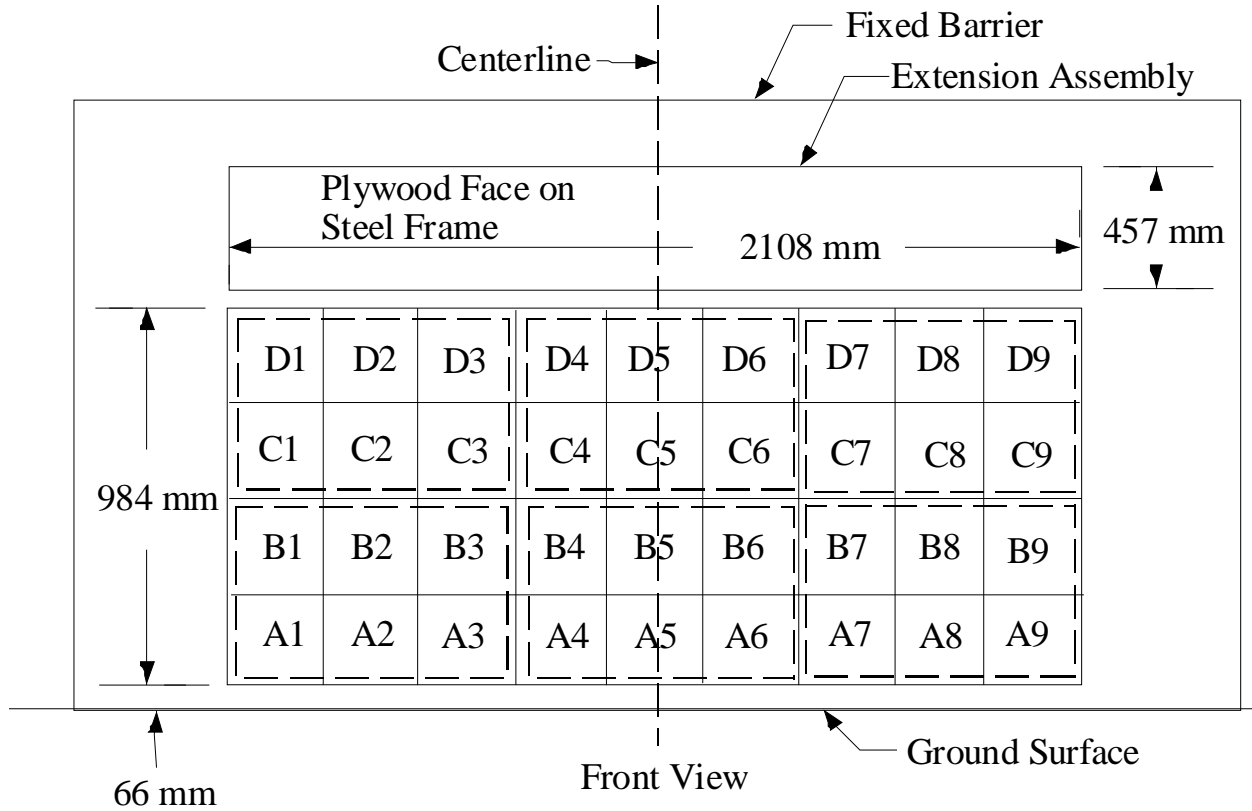
(Dimensions in millimeters)

A	357
B	660
C	1219
D	1904
E	367
F	1491
G	878
H	872
I	106
J	1263
K	978
L	1389
M	369
N	107
O	877
P	873
Q	1388
R	984
S	1264



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. 19 ACCIDENT INVESTIGATION DIVISION DATA

FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Isuzu Rodeo MPV

NHTSA Test No.: M30506 VIN: 4S2DM58W434301030

Model Year: 2003 Build Date: JAN.03 Test Date: February 28, 2003

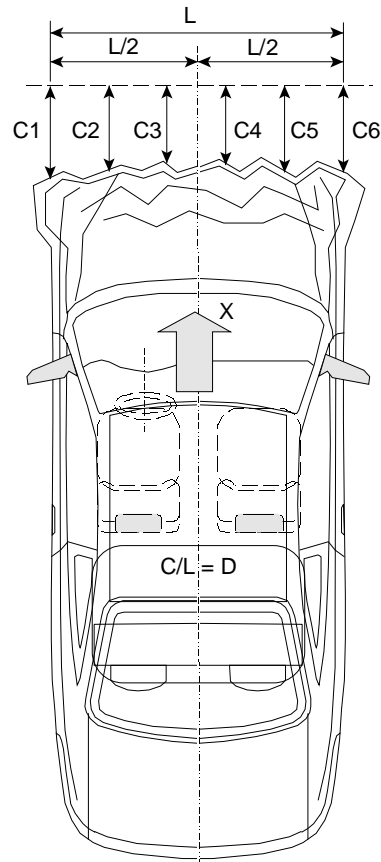
Vehicle Size Category: MPV Test Weight: 2102.5 kg

Vehicle Wheelbase: 2701 mm; Front Overhang: 790 mm; Overall Width: 1708 mm

Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4347	3949	398
C2 =	4467	4030	437
C3 =	4500	4026	474
C4 =	4499	4038	461
C5 =	4461	4028	433
C6 =	4337	3956	381



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region: L1= 1544 mm

L2= 772.0 mm

L5= 308.8 mm

**APPENDIX A**  
**PHOTOGRAPHS**

TABLE OF PHOTOGRAPHS

<u>Figure</u>	<u>Title</u>	<u>Page</u>
A-1	Load Cell Locations	A-4
A-2	Vehicle Placard	A-5
A-3	Tire Placard	A-6
A-4	Right Front, As Received	A-7
A-5	Left Rear, As Received	A-8
A-6	Pre-Test Front View	A-9
A-7	Post-Test Front View	A-10
A-8	Pre-Test Left Side View	A-11
A-9	Post-Test Left Side View	A-12
A-10	Pre-Test Right Side View	A-13
A-11	Post-Test Right Side View	A-14
A-12	Pre-Test Right Front Three-Quarter View	A-15
A-13	Post-Test Right Front Three-Quarter View	A-16
A-14	Pre-Test Left Rear Three-Quarter View	A-17
A-15	Post-Test Left Rear Three-Quarter View	A-18
A-16	Left Rear Three-Quarter View Of Doors After Impact	A-19
A-17	Right Rear Three-Quarter View Of Doors After Impact	A-20
A-18	Pre-Test Windshield View	A-21
A-19	Post-Test Windshield View	A-22
A-20	Pre-Test Engine Compartment View	A-23
A-21	Post-Test Engine Compartment View	A-24
A-22	Pre-Test Fuel Cap View	A-25
A-23	Post-Test Fuel Cap View	A-26
A-24	Pre-Test Front Underbody View	A-27
A-25	Post-Test Front Underbody View	A-28
A-26	Pre-Test Mid Underbody View	A-29
A-27	Post-Test Mid Underbody View	A-30
A-28	Pre-Test Rear Underbody View	A-31
A-29	Post-Test Rear Underbody View	A-32
A-30	Pre-Test Driver Head Location	A-33
A-31	Post-Test Driver Head Location	A-34
A-32	Pre-Test Driver Position View	A-35
A-33	Post-Test Driver Position View	A-36
A-34	Pre-Test Driver And Interior View	A-37
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
A-41	Post-Test Driver Floor Pan View	A-44
A-42	Post-Test Driver Head View	A-45
A-43	Post-Test Driver Contact To Airbag	A-46

TABLE OF PHOTOGRAPHS (CONTINUED)

<u>Figure</u>	<u>Title</u>	<u>Page</u>
A-44	Pre-Test Passenger Head Location	A-47
A-45	Post-Test Passenger Head Location	A-48
A-46	Pre-Test Passenger Position View	A-49
A-47	Post-Test Passenger Position View	A-50
A-48	Pre-Test Passenger And Interior View	A-51
A-49	Post-Test Passenger And Interior View	A-52
A-50	Pre-Test Passenger Feet View	A-53
A-51	Post-Test Passenger Feet View	A-54
A-52	Pre-Test Passenger Knee Bolster View	A-55
A-53	Post-Test Passenger Knee Bolster View	A-56
A-54	Pre-Test Passenger Floor Pan View	A-57
A-55	Post-Test Passenger Floor Pan View	A-58
A-56	Post-Test Passenger Head View	A-59
A-57	Post-Test Passenger Contact To Airbag	A-60
A-58	Rollover View	A-61
A-59	Impact View	A-62

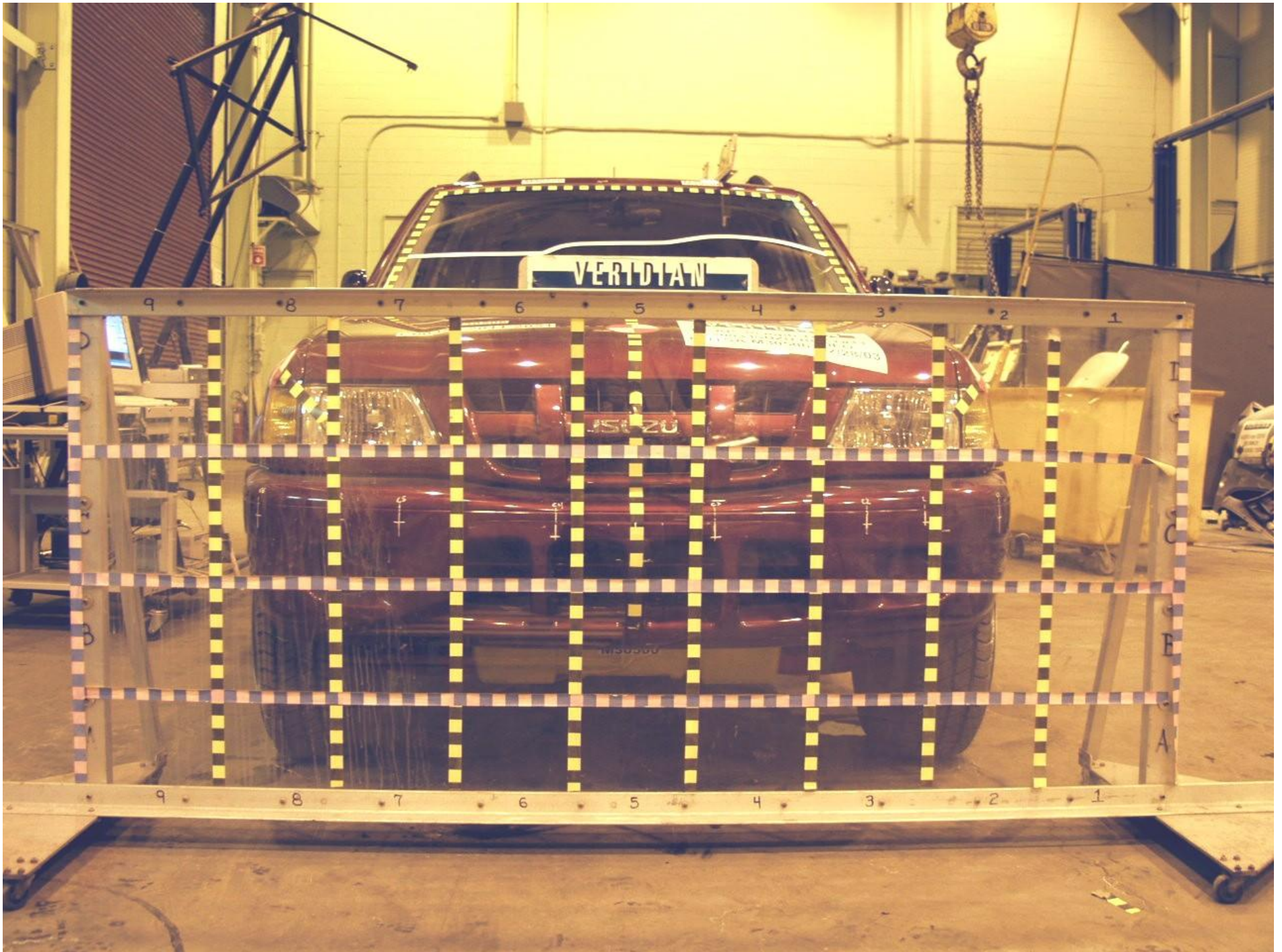


Figure A-1 LOAD CELL LOCATIONS

**MANUFACTURED BY  
ISUZU MOTORS LIMITED**

**JAN.03**

**GVWR: 2360KG (5200LBS)**

**GAWR: FRONT-1135KG**

**(2500LBS) WITH**

**P245/70R16 TIRES &**

**16X7 RIMS AT 180KPA**

**(26PSI) COLD.**

**GAWR: REAR-1315KG**

**(2900LBS) WITH**

**P245/70R16 TIRES &**

**16X7 RIMS AT 180KPA**

**(26PSI) COLD.**

**THIS VEHICLE CONFORMS TO  
ALL APPLICABLE FEDERAL  
MOTOR VEHICLE SAFETY AND  
THEFT PREVENTION STANDARDS  
IN EFFECT ON THE DATE OF  
MANUFACTURE SHOWN ABOVE.**

**4S2DM58W434301030**

**MPV**

**ASSEMBLED BY SUBARU OF  
INDIANA AUTOMOTIVE, INC.**

Figure A-2 VEHICLE CERTIFICATION PLACARD

See Vehicle Certification Placard

Figure A-3 VEHICLE TIRE PLACARD

Photograph Not Available

Photograph Not Available

Figure A-5 LEFT REAR, AS RECEIVED



Figure A-6 PRE-TEST FRONT VIEW



Figure A-7 POST-TEST FRONT VIEW



Figure A-8 PRE-TEST LEFT SIDE VIEW



Figure A-9 POST-TEST LEFT SIDE VIEW



Figure A-10 PRE-TEST RIGHT SIDE VIEW



Figure A-11 POST-TEST RIGHT SIDE VIEW



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



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



A-17

8642-NCAP-33

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



A-22

8642-NCAP-33

Figure A-19 POST-TEST WINDSHIELDVIEW



Figure A-20 PRE-TEST ENGINE COMPARTMENT VIEW



A-24

8642-NCAP-33

Figure A-21 POST-TEST ENGINE COMPARTMENT VIEW



Figure A-22 PRE-TEST FUEL CAP VIEW

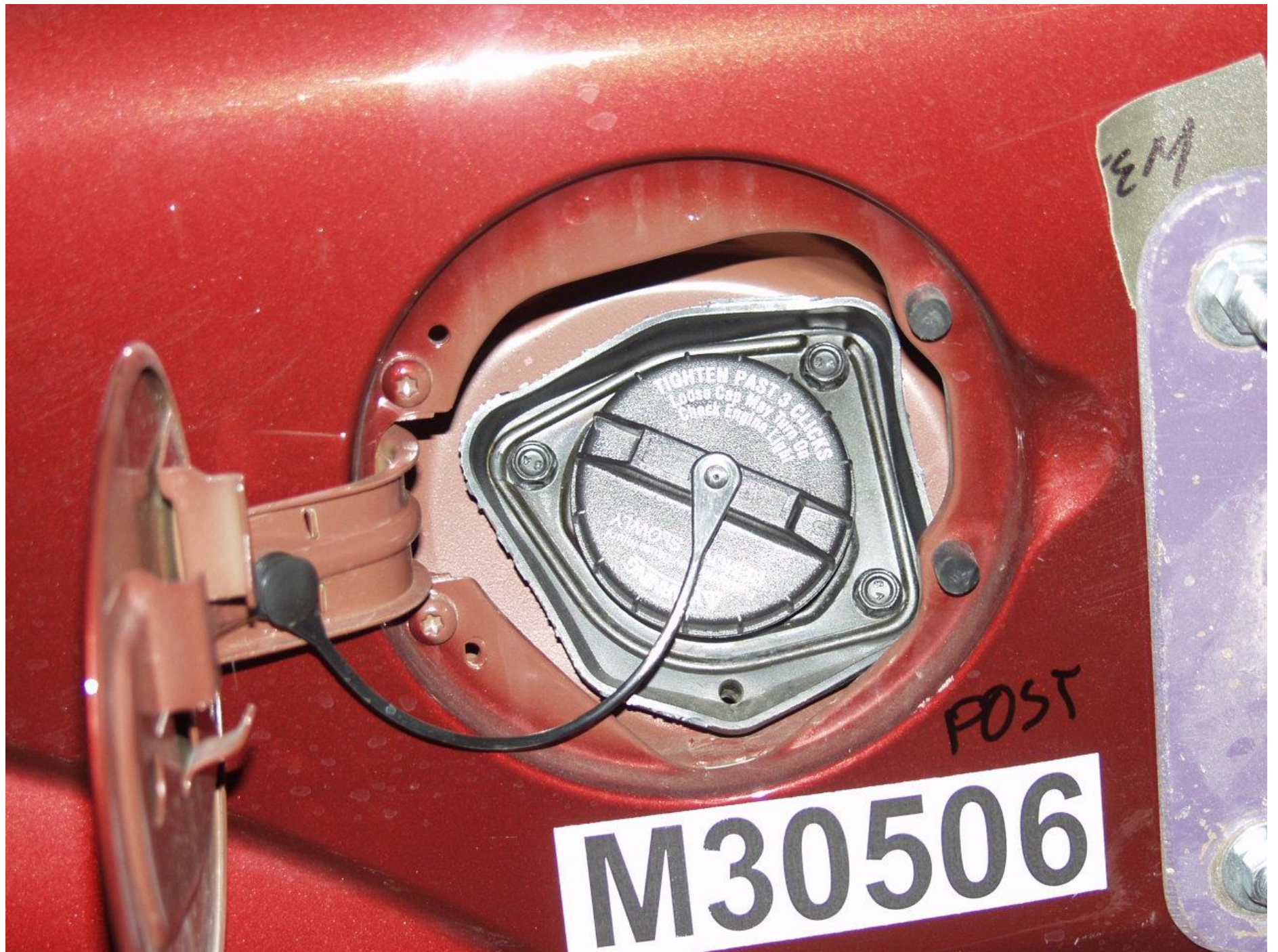


Figure A-23 POST-TEST FUEL CAP VIEW



A-27

8642-NCAP-33

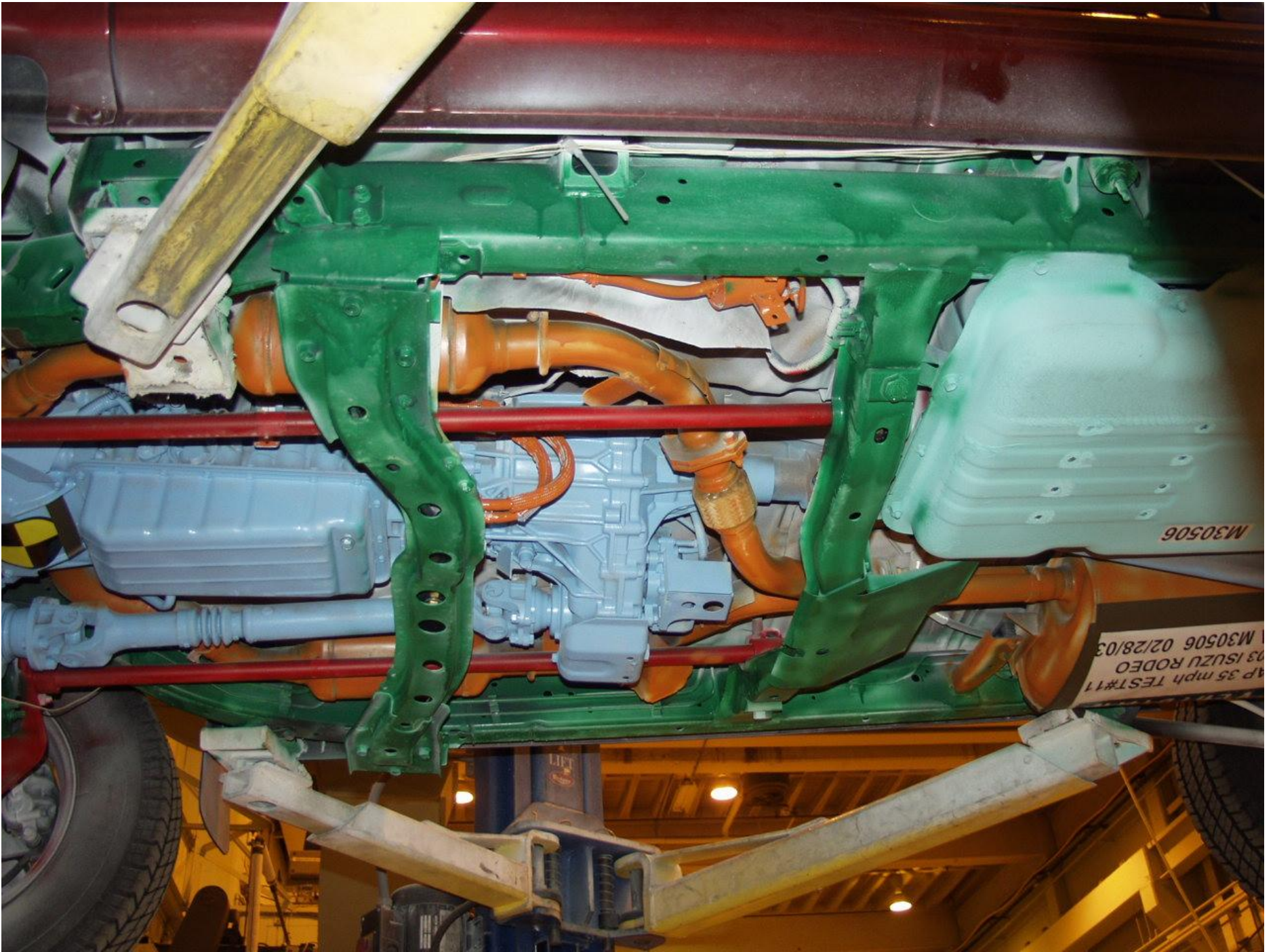
Figure A-24 PRE-TEST FRONT UNDERBODY VIEW



A-28

8642-NCAP-33

Figure A-25 POST-TEST FRONT UNDERBODY VIEW



A-29

8642-NCAP-33

Figure A-26 PRE-TEST MID UNDERBODY VIEW



Figure A-27 POST-TEST MID UNDERBODY VIEW



Figure A-28 PRE-TEST REAR UNDERBODY VIEW



Figure A-29 POST-TEST REAR UNDERBODY VIEW



A-33

8642-NCAP-33

Figure A-30 PRE-TEST DRIVER HEAD LOCATION



A-34

8642-NCAP-33

Figure A-31 POST-TEST DRIVER HEAD LOCATION



Figure A-32 PRE-TEST DRIVER POSITION VIEW



Figure A-33 POST-TEST DRIVER POSITION VIEW



A-37

8642-NCAP-33

Figure A-34 PRE-TEST DRIVER AND INTERIOR VIEW



A-38

8642-NCAP-33

Figure A-35 POST-TEST DRIVER AND INTERIOR VIEW



Figure A-36 PRE-TEST DRIVER FEET VIEW



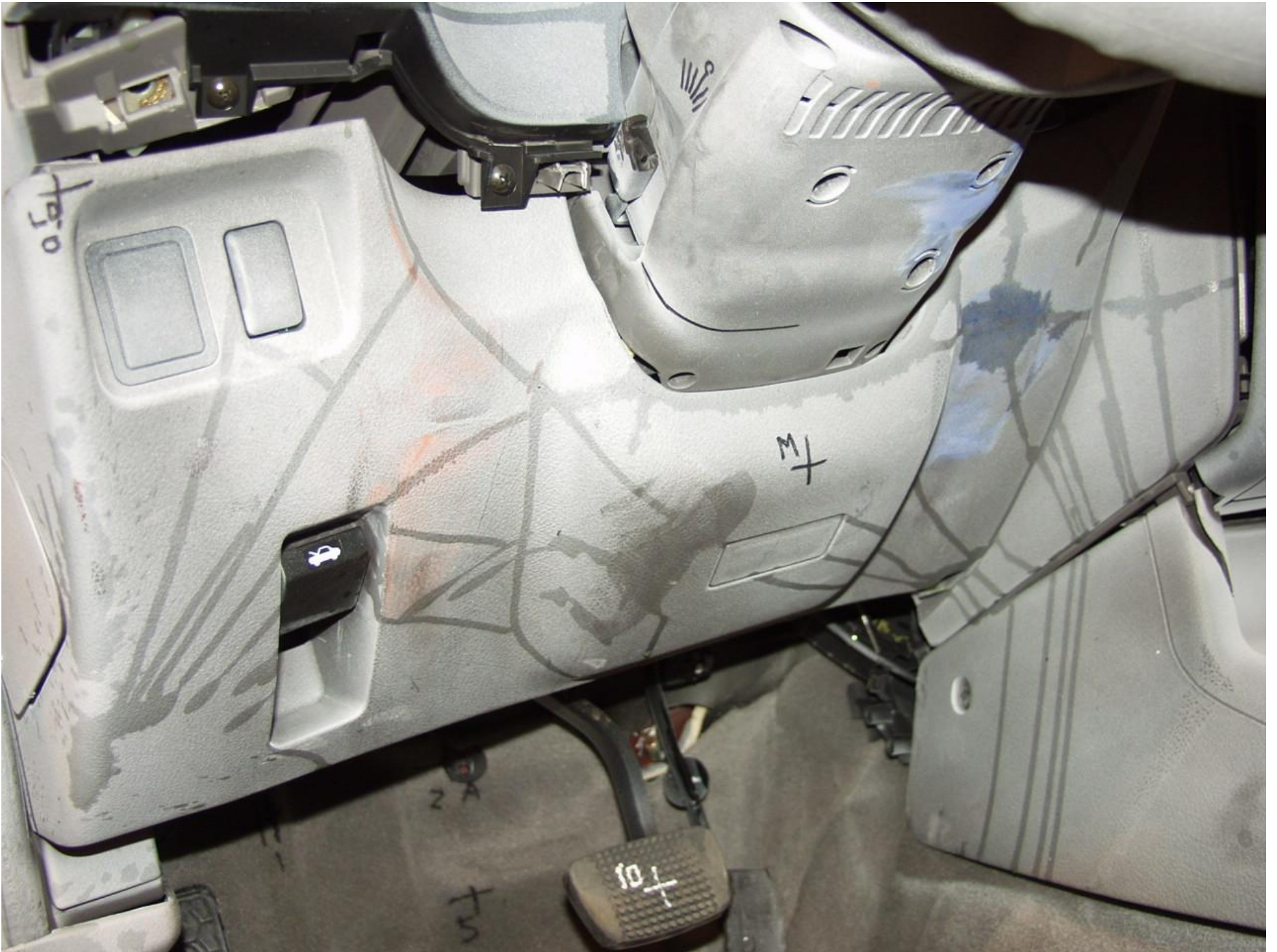
A-40

8642-NCAP-33

Figure A-37 POST-TEST DRIVER FEET VIEW



Figure A-38 PRE-TEST DRIVER KNEE BOLSTER VIEW



A-42

8642-NCAP-33

Figure A-39 POST-TEST DRIVER KNEE BOLSTER VIEW



A-43

8642-NCAP-33

Figure A-40 PRE-TEST DRIVER FLOOR PAN VIEW



A-44

8642-NCAP-33

Figure A-41 POST-TEST DRIVER FLOOR PAN VIEW



Figure A-42 POST-TEST DRIVER HEAD VIEW



Figure A-43 POST-TEST DRIVER CONTACT TO AIRBAG



A-47

8642-NCAP-33

Figure A-44 PRE-TEST PASSENGER HEAD LOCATION



A-48

8642-NCAP-33

Figure A-45 POST-TEST PASSENGER HEAD LOCATION



A-49

8642-NCAP-33

Figure A-46 PRE-TEST PASSENGER POSITION VIEW

A-50

8642-NCAP-33



Figure A-47 POST-TEST PASSENGER POSITION VIEW



A-51

8642-NCAP-33

Figure A-48 PRE-TEST PASSENGER AND INTERIOR VIEW



A-52

8642-NCAP-33

Figure A-49 POST-TEST PASSENGER AND INTERIOR VIEW



A-53

8642-NCAP-33

Figure A-50 PRE- TEST PASSENGER FEET VIEW



A-54

8642-NCAP-33

Figure A-51 POST-TEST PASSENGER FEET VIEW

A-55

8642-NCAP-33



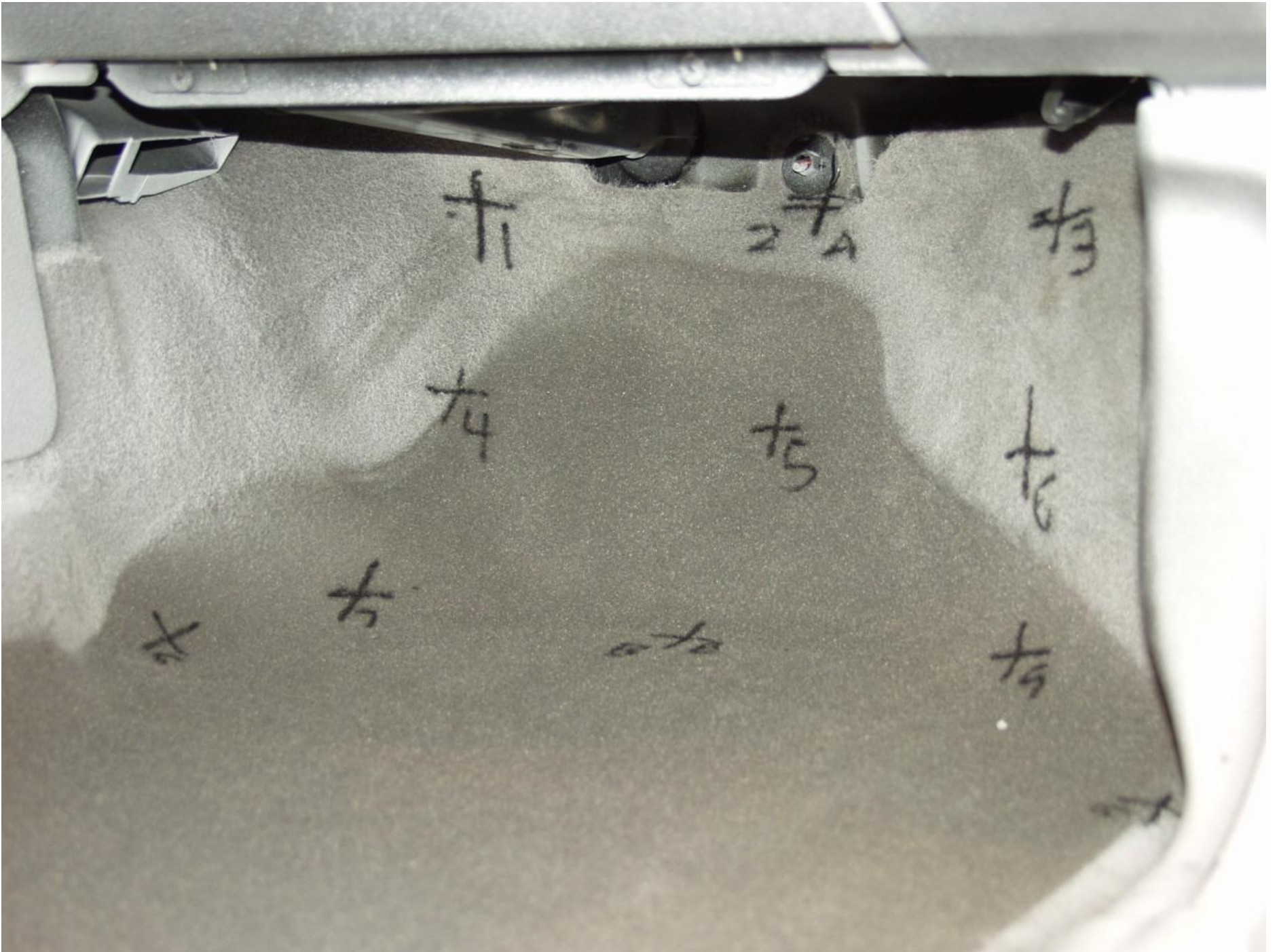
Figure A-52 PRE-TEST PASSENGER KNEE BOLSTER VIEW



A-56

8642-NCAP-33

Figure A-53 POST-TEST PASSENGER KNEE BOLSTER VIEW



A-57

8642-NCAP-33

Figure A-54 PRE-TEST PASSENGER FLOOR PAN VIEW



Figure A-55 POST-TEST PASSENGER FLOOR PAN VIEW



Figure A-56 POST-TEST PASSENGER HEAD VIEW



A-60

8642-NCAP-33

Figure A-57 POST-TEST PASSENGER CONTACT TO AIRBAG



Figure A-58 ROLLOVER VIEW



A-62

8642-NCAP-33

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. M30506

<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
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 Lap Belt Load Cell [N, CFC_60]	B-61
55	V1P1 Shoulder Belt Load [N, CFC_60]	B-62
56	V1P2 Head 9 Array X Arm Ay [g, CFC_1000]	B-63
57	V1P2 Head 9 Array X Arm Az [g, CFC_1000]	B-64
58	V1P2 Head 9 Array Y Arm Ax [g, CFC_1000]	B-65
59	V1P2 Head 9 Array Y Arm Az [g, CFC_1000]	B-66
60	V1P2 Head 9 Array Z Arm Ax [g, CFC_1000]	B-67
61	V1P2 Head 9 Array Z Arm Ay [g, CFC_1000]	B-68
62	V1P2 Head CG x [g, CFC_1000]	B-69
63	V1P2 Head CG y [g, CFC_1000]	B-70
64	V1P2 Head CG z [g, CFC_1000]	B-71
65	V1P2 Head CG Resultant [g, CFC_1000]	B-72
66	V1P2 Head CG Red x [g, CFC_1000]	B-73
67	V1P2 Head CG Red y [g, CFC_1000]	B-74
68	V1P2 Head CG Red z [g, CFC_1000]	B-75
69	V1P2 Head CG Red Resultant [g, CFC_1000]	B-76
70	V1P2 Upper Neck Fx [N, CFC_1000]	B-77
71	V1P2 Upper Neck Fy [N, CFC_1000]	B-78
72	V1P2 Upper Neck Fz [N, CFC_1000]	B-79
73	V1P2 Upper Neck F Resultant [N, CFC_1000]	B-80
74	V1P2 Upper Neck Mx [N-m, CFC_600]	B-81
75	V1P2 Upper Neck My [N-m, CFC_600]	B-82
76	V1P2 Upper Neck Mz [N-m, CFC_600]	B-83
77	V1P2 Upper Neck M Resultant [N-m, CFC_600]	B-84
78	V1P2 Chest x [g, CFC_180]	B-85
79	V1P2 Chest y [g, CFC_180]	B-86
80	V1P2 Chest z [g, CFC_180]	B-87
81	V1P2 Chest Resultant [g, CFC_180]	B-88
82	V1P2 Chest Red x [g, CFC_180]	B-89
83	V1P2 Chest Red y [g, CFC_180]	B-90
84	V1P2 Chest Red z [g, CFC_180]	B-91
85	V1P2 Chest Red Resultant [g, CFC_180]	B-92
86	V1P2 Chest Compression x [mm, CFC_600]	B-93
87	V1P2 Pelvic x [g, CFC_1000]	B-94
88	V1P2 Pelvic y [g, CFC_1000]	B-95
89	V1P2 Pelvic z [g, CFC_1000]	B-96

90	V1P2 Pelvic Resultant [g, CFC_1000]	B-97
91	V1P2 Left Femur z [N, CFC_600]	B-98
92	V1P2 Right Femur z [N, CFC_600]	B-99
93	V1P2 Left Upper Tibia Mx [N-m, CFC_600]	B-100
94	V1P2 Left Upper Tibia My [N-m, CFC_600]	B-101
95	V1P2 Left Lower Tibia Fz [N, CFC_600]	B-102
96	V1P2 Left Lower Tibia Mx [N-m, CFC_600]	B-103
97	V1P2 Left Lower Tibia My [N-m, CFC_600]	B-104
98	V1P2 Right Upper Tibia Mx [N-m, CFC_600]	B-105
99	V1P2 Right Upper Tibia My [N-m, CFC_600]	B-106
100	V1P2 Right Lower Tibia Fz [N, CFC_600]	B-107
101	V1P2 Right Lower Tibia Mx [N-m, CFC_600]	B-108
102	V1P2 Right Lower Tibia My [N-m, CFC_600]	B-109
103	V1P2 Left Foot Aft x [g, CFC_600]	B-110
104	V1P2 Left Foot Aft z [g, CFC_600]	B-111
105	V1P2 Left Foot Fore z [g, CFC_600]	B-112
106	V1P2 Right Foot Aft x [g, CFC_600]	B-113
107	V1P2 Right Foot Aft z [g, CFC_600]	B-114
108	V1P2 Right Foot Fore z [g, CFC_600]	B-115
109	V1P2 Lap Belt Load [N, CFC_60]	B-116
110	V1P2 Shoulder Belt Load Cell [N, CFC_60]	B-117
111	V1 Left Rear #1x [g, CFC_60]	B-118
112	V1 Left Rear #1x Velocity [kph, CFC_180]	B-119
113	V1 Left Rear #1x Displacement [mm, CFC_180]	B-120
114	V1 Right Rear #2x [g, CFC_60]	B-121
115	V1 Right Rear #2x Velocity [kph, CFC_180]	B-122
116	V1 Right Rear #2x Displacement [mm, CFC_180]	B-123
117	V1 Engine Top #3x [g, CFC_60]	B-124
118	V1 Engine Top #3x Velocity [kph, CFC_180]	B-125
119	V1 Engine Top #3x Displacement [mm, CFC_180]	B-126
120	V1 Engine Bottom #4x [g, CFC_60]	B-127
121	V1 Engine Bottom #4x Velocity [kph, CFC_180]	B-128
122	V1 Engine Bottom #4x Displacement [mm, CFC_180]	B-129
123	V1 Right Caliper #5x [g, CFC_60]	B-130
124	V1 Right Caliper #5x Velocity [kph, CFC_180]	B-131
125	V1 Right Caliper #5x Displacement [mm, CFC_180]	B-132
126	V1 Instrument Panel #6x [g, CFC_60]	B-133
127	V1 Instrument Panel #6x Velocity [kph, CFC_180]	B-134
128	V1 Instrument Panel #6x Displacement [mm, CFC_180]	B-135
129	V1 Left Caliper #7x [g, CFC_60]	B-136
130	V1 Left Caliper #7x Velocity [kph, CFC_180]	B-137
131	V1 Left Caliper #7x Displacement [mm, CFC_180]	B-138
132	V1 Left Rear #8z [g, CFC_60]	B-139
133	V1 Left Rear #8z Velocity [kph, CFC_180]	B-140
134	V1 Left Rear #8z Displacement [mm, CFC_180]	B-141
135	V1 Right Rear #9z [g, CFC_60]	B-142
136	V1 Right Rear #9z Velocity [kph, CFC_180]	B-143

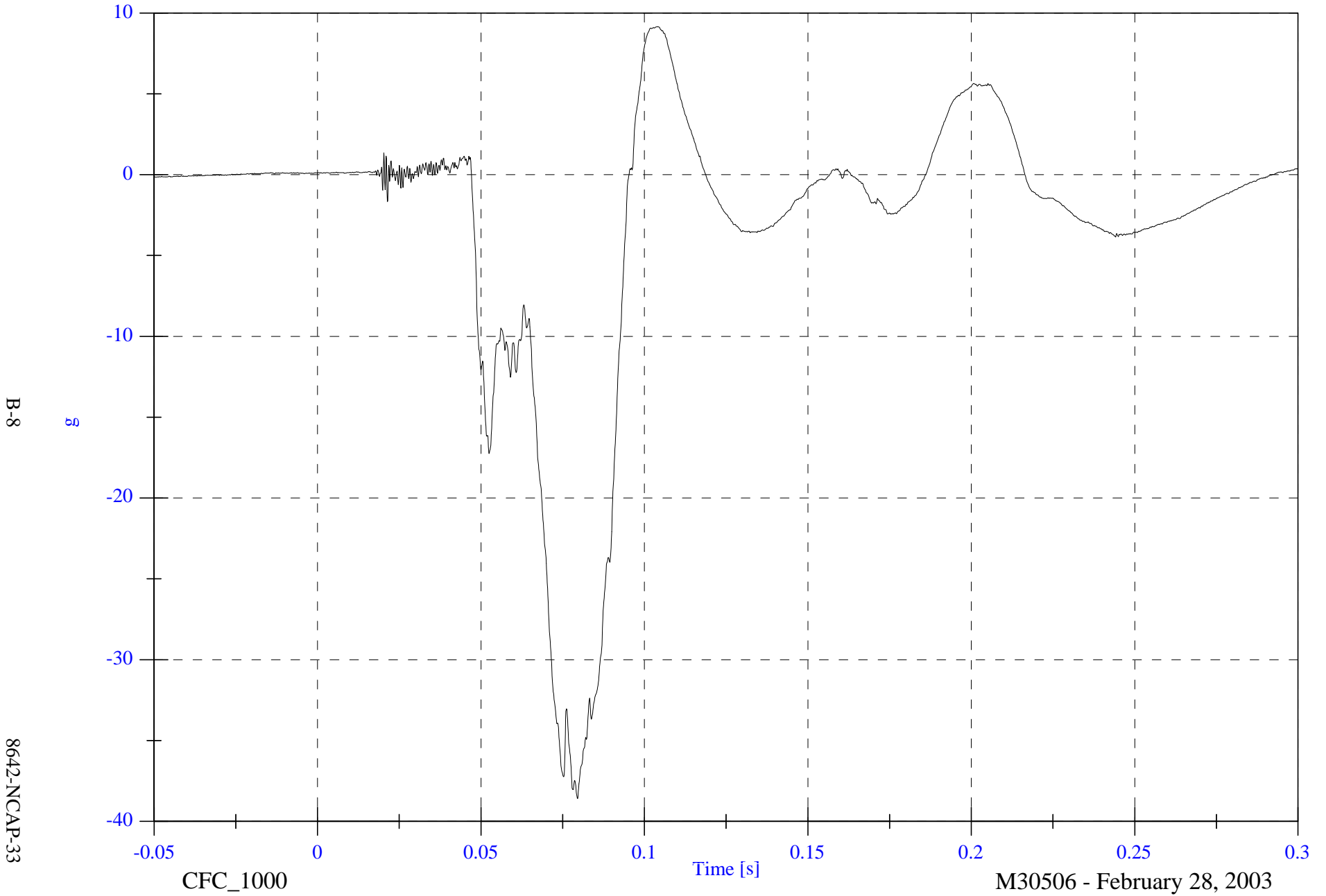
137	V1 Right Rear #9z Displacement [mm, CFC_180]	B-144
138	Barrier Load Cell A1 Fx [N, CFC_60]	B-145
139	Barrier Load Cell A2 Fx [N, CFC_60]	B-146
140	Barrier Load Cell A3 Fx [N, CFC_60]	B-147
141	Barrier Load Cell A4 Fx [N, CFC_60]	B-148
142	Barrier Load Cell A5 Fx [N, CFC_60]	B-149
143	Barrier Load Cell A6 Fx [N, CFC_60]	B-150
144	Barrier Load Cell A7 Fx [N, CFC_60]	B-151
145	Barrier Load Cell A8 Fx [N, CFC_60]	B-152
146	Barrier Load Cell A9 Fx [N, CFC_60]	B-153
147	Barrier Load Cell B1 Fx [N, CFC_60]	B-154
148	Barrier Load Cell B2 Fx [N, CFC_60]	B-155
149	Barrier Load Cell B3 Fx [N, CFC_60]	B-156
150	Barrier Load Cell B4 Fx [N, CFC_60]	B-157
151	Barrier Load Cell B5 Fx [N, CFC_60]	B-158
152	Barrier Load Cell B6 Fx [N, CFC_60]	B-159
153	Barrier Load Cell B7 Fx [N, CFC_60]	B-160
154	Barrier Load Cell B8 Fx [N, CFC_60]	B-161
155	Barrier Load Cell B9 Fx [N, CFC_60]	B-162
156	Barrier Load Cell C1 Fx [N, CFC_60]	B-163
157	Barrier Load Cell C2 Fx [N, CFC_60]	B-164
158	Barrier Load Cell C3 Fx [N, CFC_60]	B-165
159	Barrier Load Cell C4 Fx [N, CFC_60]	B-166
160	Barrier Load Cell C5 Fx [N, CFC_60]	B-167
161	Barrier Load Cell C6 Fx [N, CFC_60]	B-168
162	Barrier Load Cell C7 Fx [N, CFC_60]	B-169
163	Barrier Load Cell C8 Fx [N, CFC_60]	B-170
164	Barrier Load Cell C9 Fx [N, CFC_60]	B-171
165	Barrier Load Cell D1 Fx [N, CFC_60]	B-172
166	Barrier Load Cell D2 Fx [N, CFC_60]	B-173
167	Barrier Load Cell D3 Fx [N, CFC_60]	B-174
168	Barrier Load Cell D4 Fx [N, CFC_60]	B-175
169	Barrier Load Cell D5 Fx [N, CFC_60]	B-176
170	Barrier Load Cell D6 Fx [N, CFC_60]	B-177
171	Barrier Load Cell D7 Fx [N, CFC_60]	B-178
172	Barrier Load Cell D8 Fx [N, CFC_60]	B-179
173	Barrier Load Cell D9 Fx [N, CFC_60]	B-180
174	Group 1 Load Cell Sum (A1,A2,A3,B1,B2,B3)	B-181
175	Group 2 Load Cell Sum (A4,A5,A6,B4,B5,B6)	B-182
176	Group 3 Load Cell Sum (A7,A8,A9,B7,B8,B9)	B-183
177	Group 4 Load Cell Sum (C1,C2,C3,D1,D2,D3)	B-184
178	Group 5 Load Cell Sum (C4,C5,C6,D4,D5,D6)	B-185
179	Group 6 Load Cell Sum (C7,C8,C9,D7,D8,D9)	B-186
180	Total Load Cell Sum (All 6 Groups)	B-187

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head 9 Array X Arm Ay

Max: 9.2 [g] at 0.104 [s]

Min: -38.6 [g] at 0.079 [s]

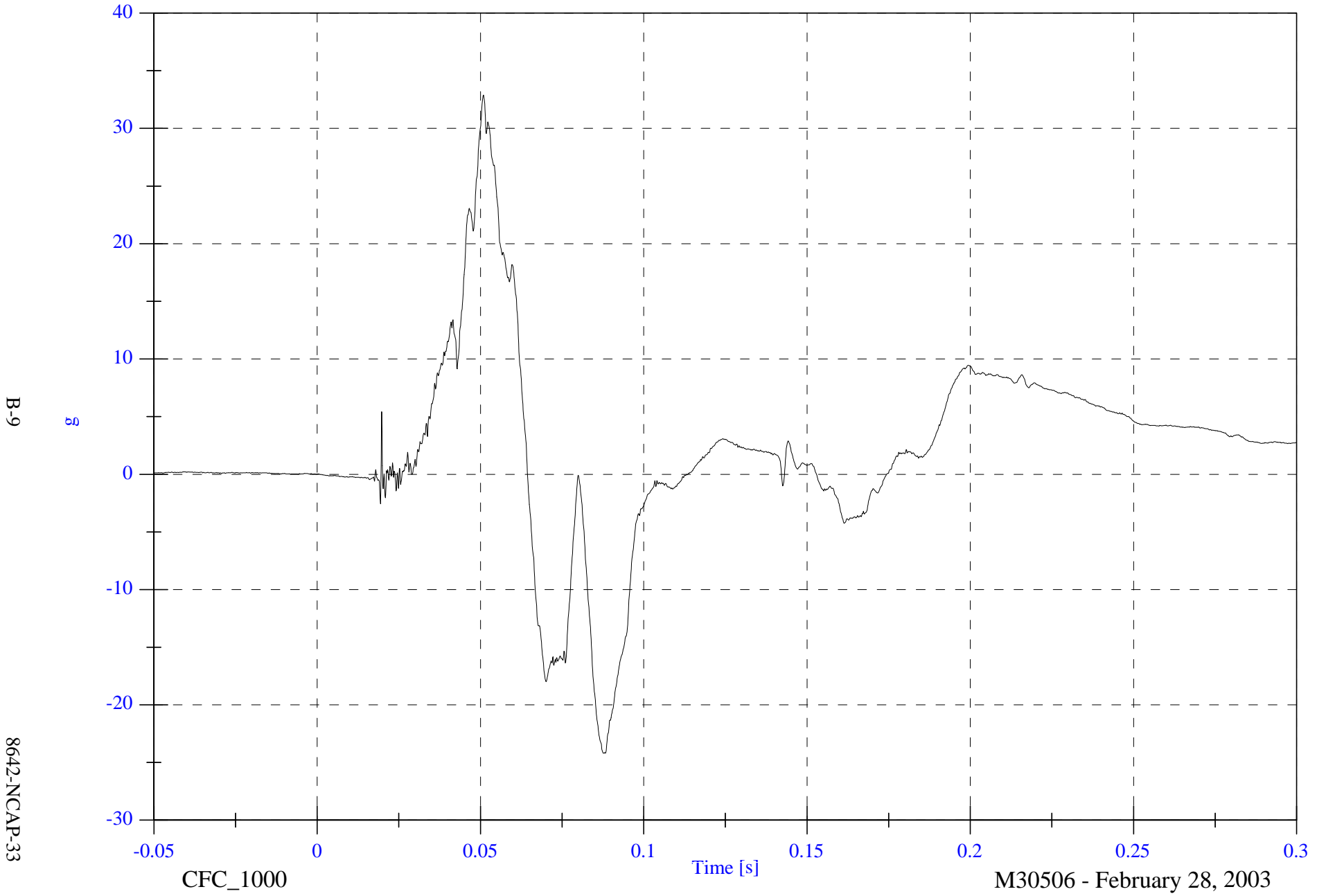


NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head 9 Array X Arm Az

Max: 32.9 [g] at 0.051 [s]

Min: -24.2 [g] at 0.088 [s]



B-9

8642-NCAP-33

CFC\_1000

Time [s]

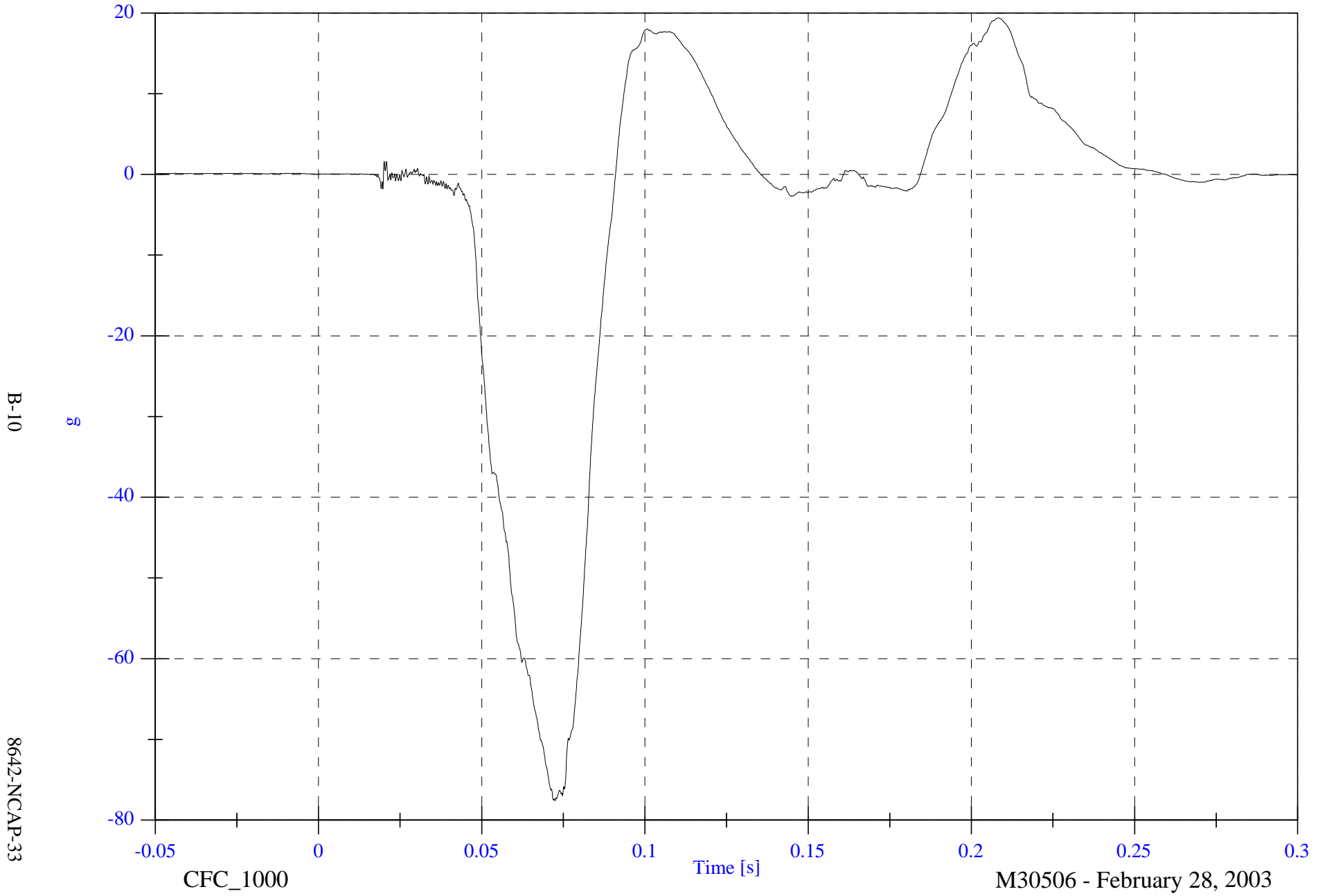
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head 9 Array Y Arm Ax

Max: 19.4 [g] at 0.208 [s]

Min: -77.6 [g] at 0.072 [s]



B-10

8642-NCAP-33

CFC\_1000

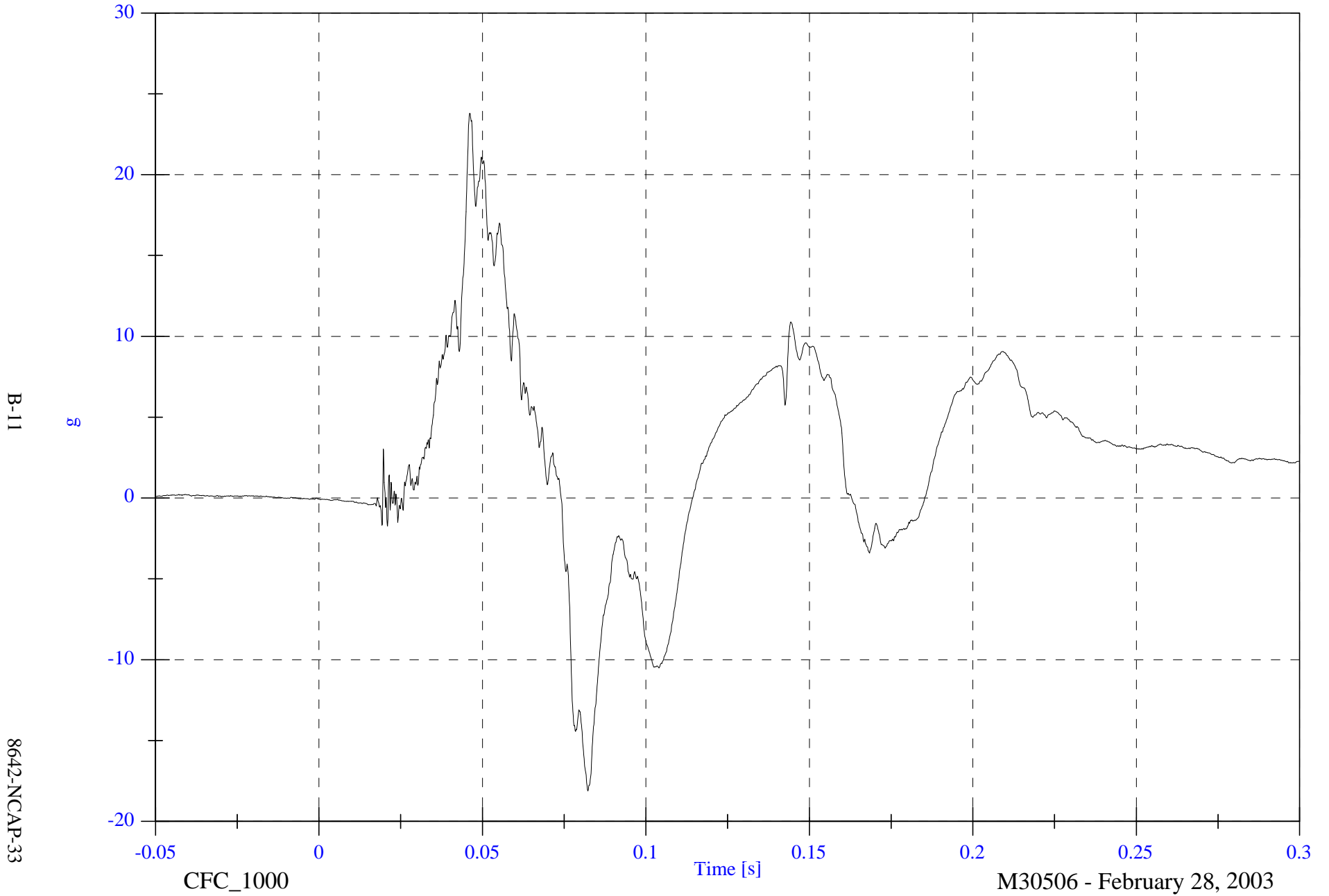
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head 9 Array Y Arm Az

Max: 23.8 [g] at 0.046 [s]

Min: -18.1 [g] at 0.082 [s]

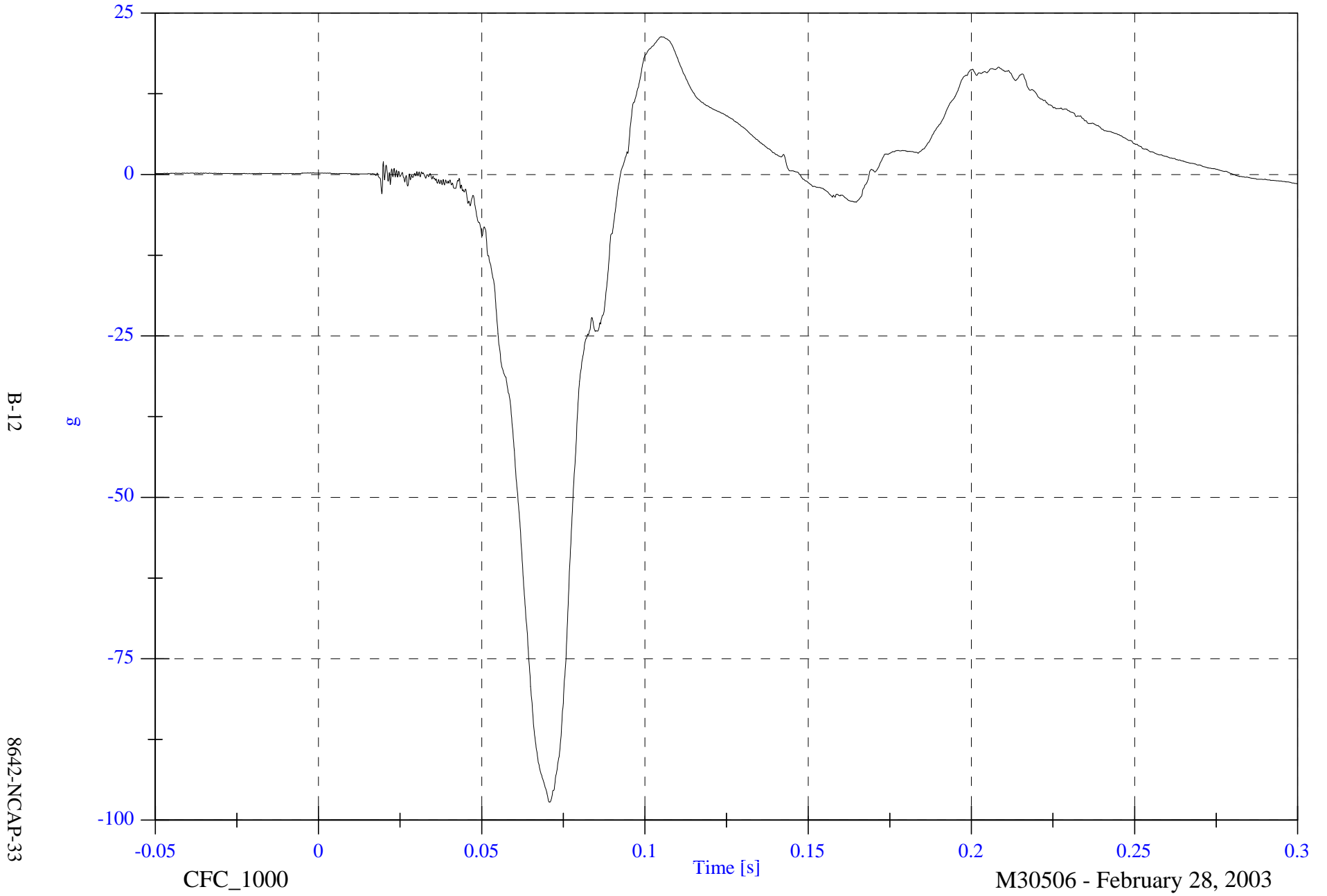


NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head 9 Array Z Arm Ax

Max: 21.3 [g] at 0.105 [s]

Min: -97.2 [g] at 0.071 [s]



B-12

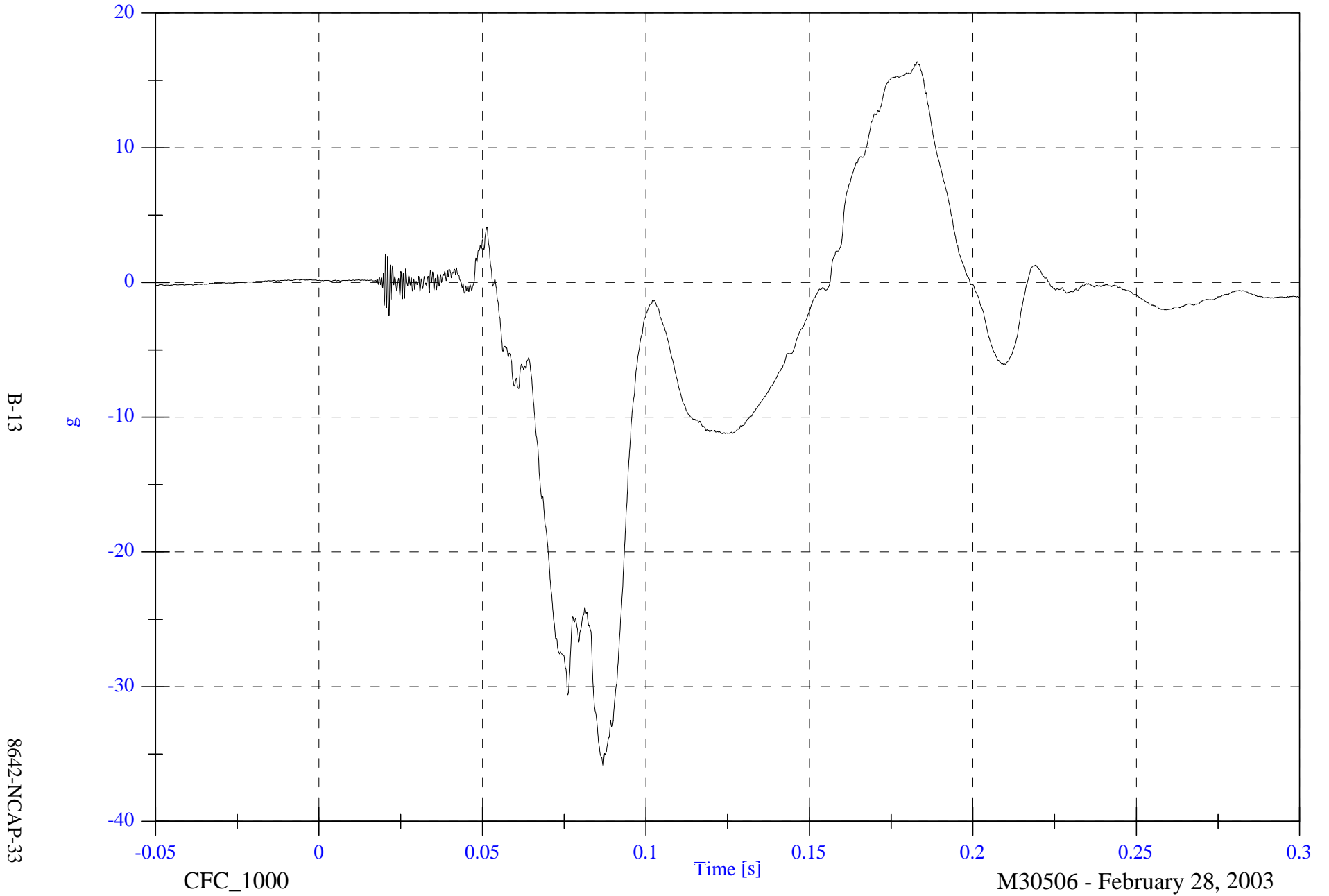
8642-NCAP-33

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head 9 Array Z Arm Ay

Max: 16.4 [g] at 0.183 [s]

Min: -35.9 [g] at 0.087 [s]

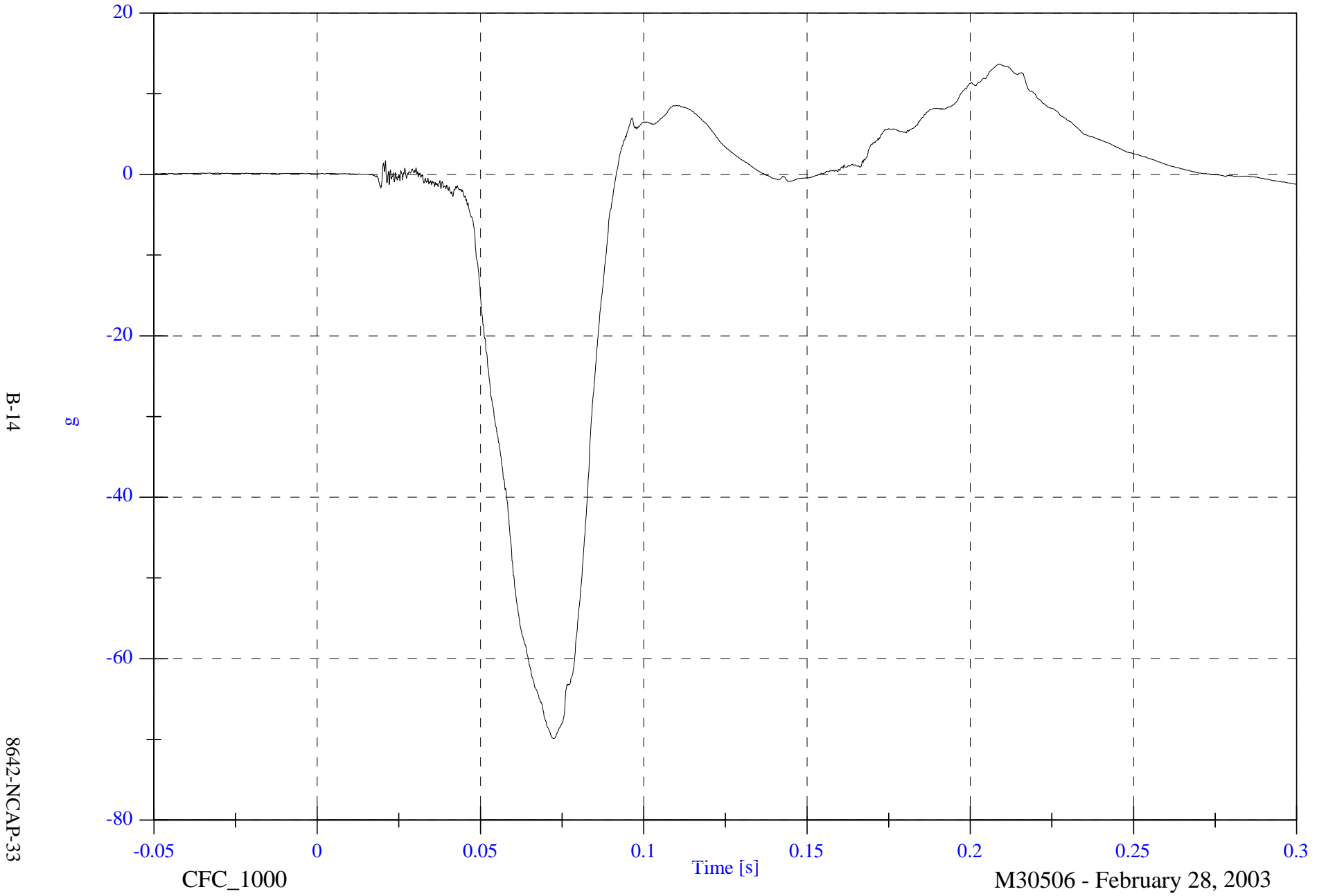


NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head CG x

Max: 13.7 [g] at 0.209 [s]

Min: -69.9 [g] at 0.072 [s]



B-14

8642-NCAP-33

CFC\_1000

Time [s]

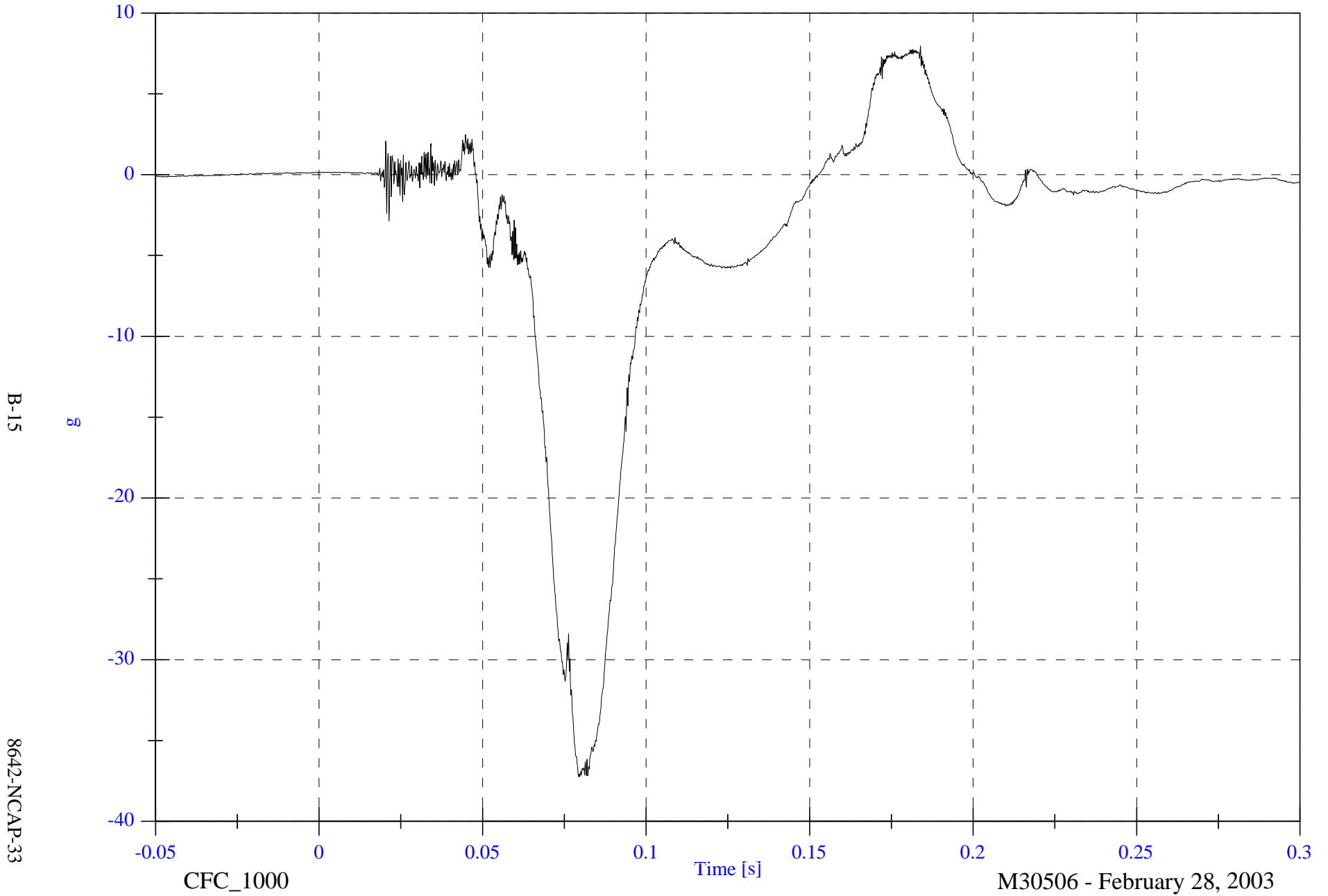
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head CG y

Max: 7.9 [g] at 0.184 [s]

Min: -37.2 [g] at 0.080 [s]



B-15

8642-NCAP-33

CFC\_1000

Time [s]

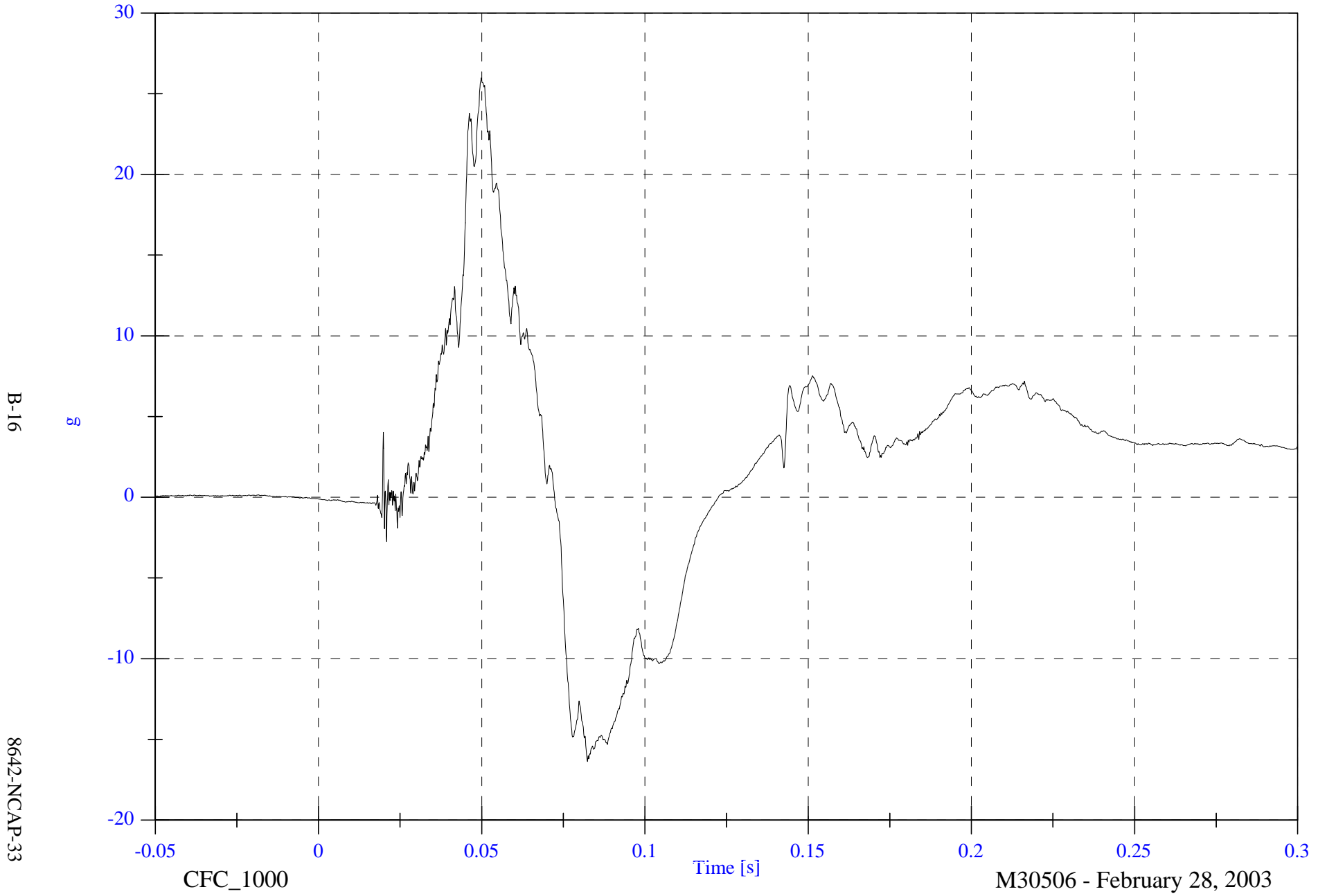
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head CG z

Max: 26.0 [g] at 0.050 [s]

Min: -16.4 [g] at 0.082 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

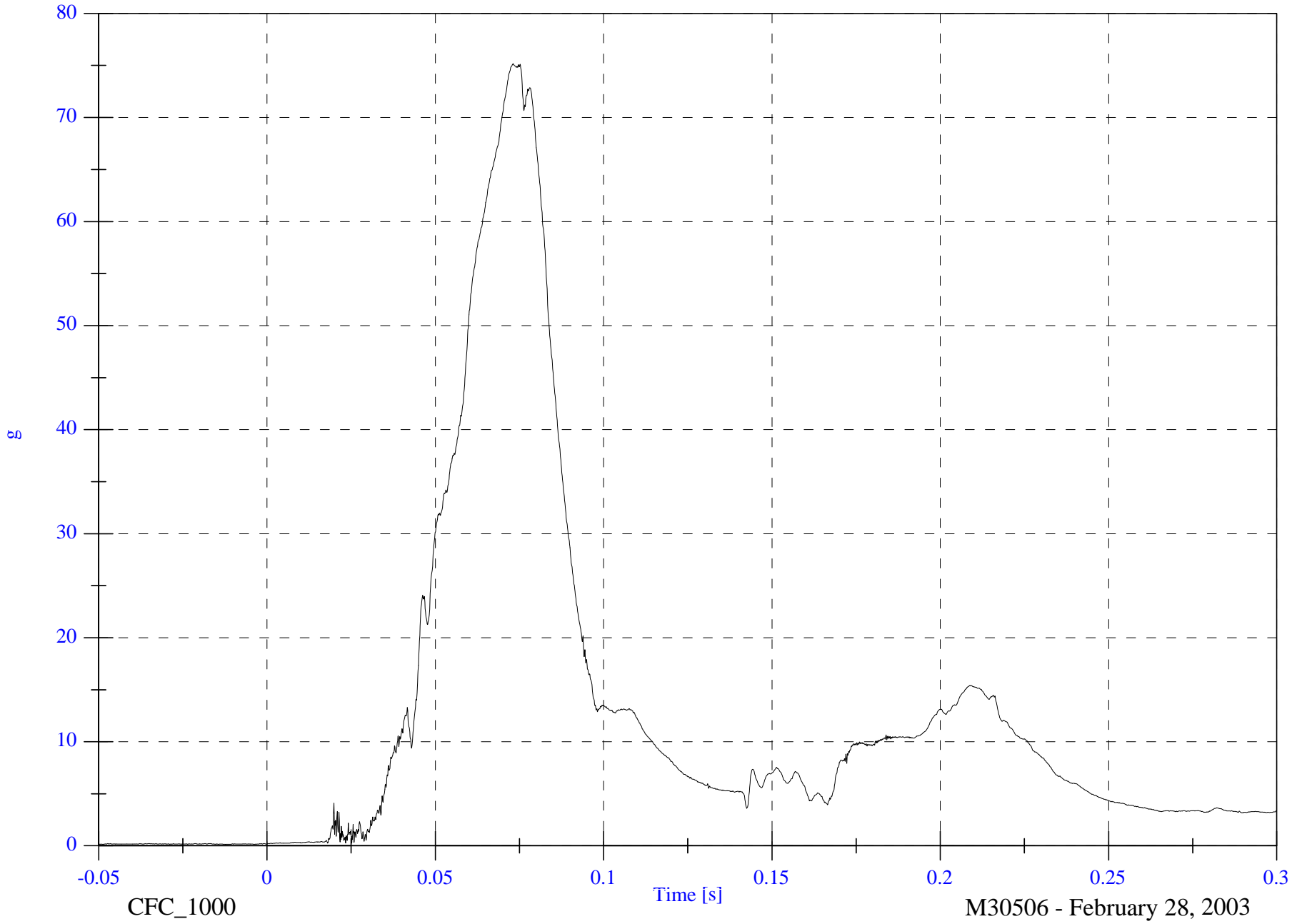
V1P1 Head CG Resultant

Max: 75.2 [g] at 0.073 [s]

Min: 0.1 [g] at -0.012 [s]

B-17

8642-NCAP-33



CFC\_1000

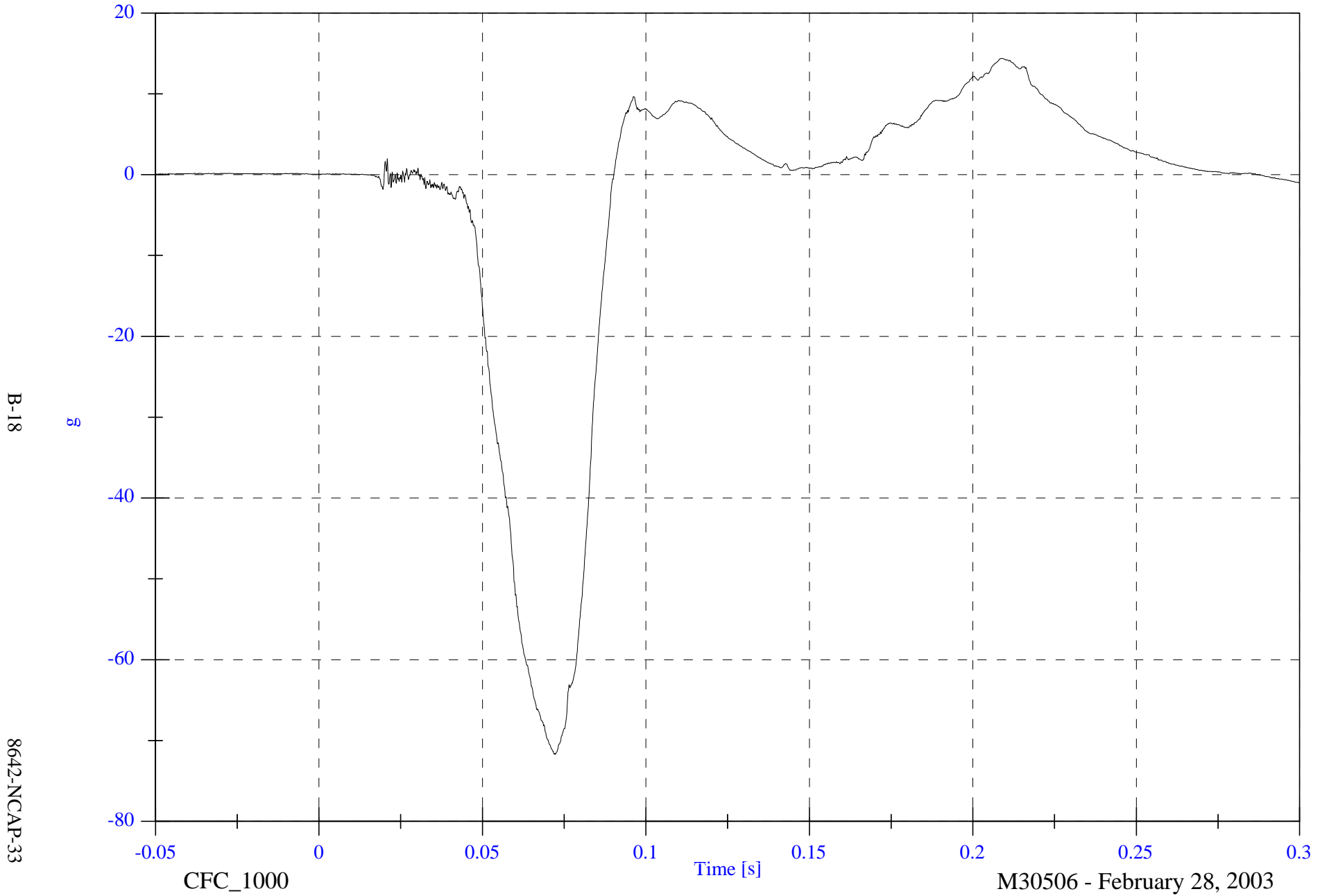
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 14.4 [g] at 0.209 [s]

Min: -71.7 [g] at 0.072 [s]

V1P1 Head CG Red x

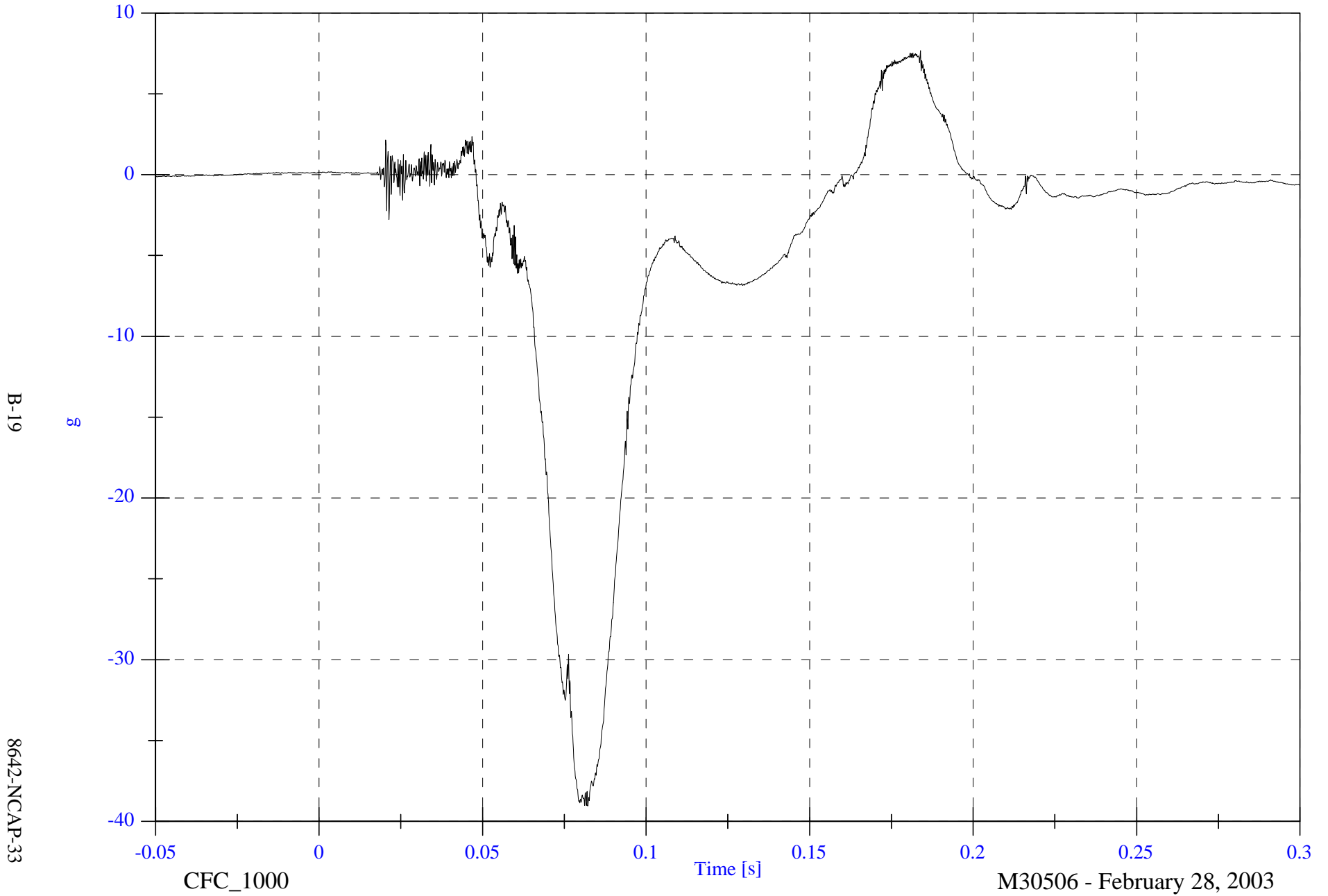


NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head CG Red y

Max: 7.7 [g] at 0.184 [s]

Min: -39.0 [g] at 0.082 [s]



B-19

8642-NCAP-33

CFC\_1000

Time [s]

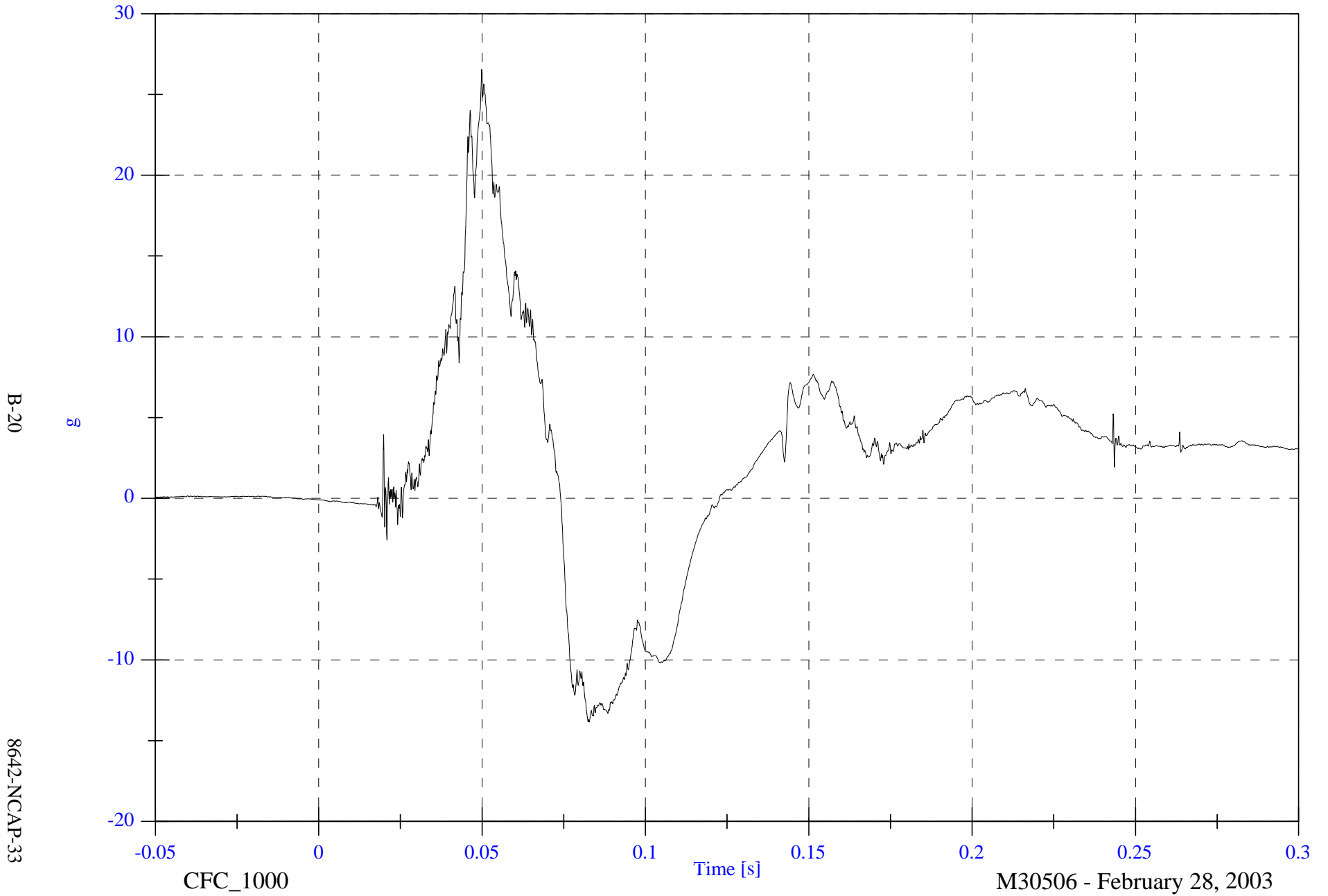
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head CG Red z

Max: 26.6 [g] at 0.050 [s]

Min: -13.8 [g] at 0.083 [s]

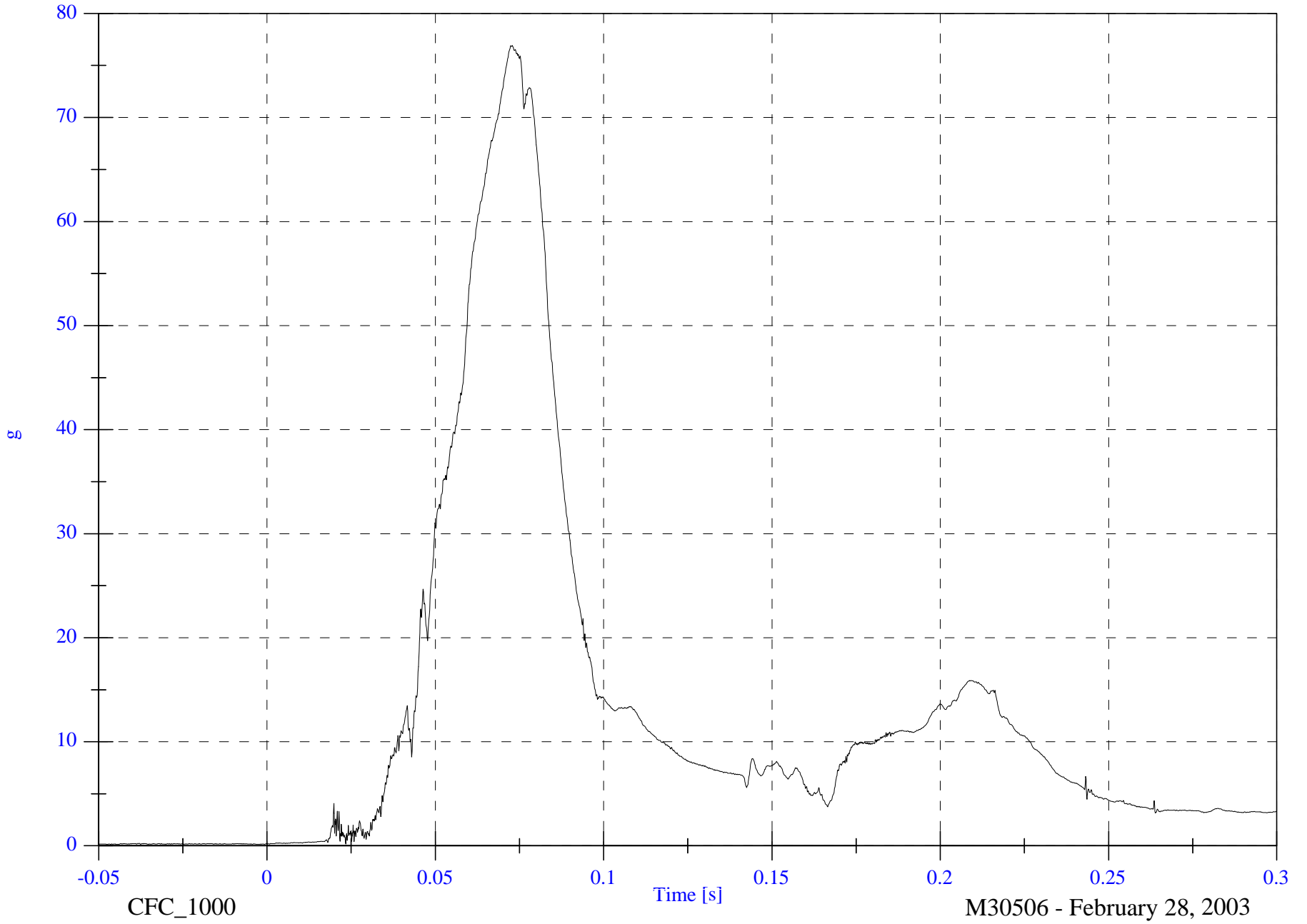


NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Head CG Red Resultant

Max: 76.9 [g] at 0.073 [s]

Min: 0.1 [g] at -0.046 [s]



B-21

8642-NCAP-33

CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 1377.2 [N] at 0.071 [s]

V1P1 Upper Neck Fx

Min: -206.0 [N] at 0.213 [s]

B-22

8642-NCAP-33



NCAP Test #11 - 2003 Isuzu Rodeo

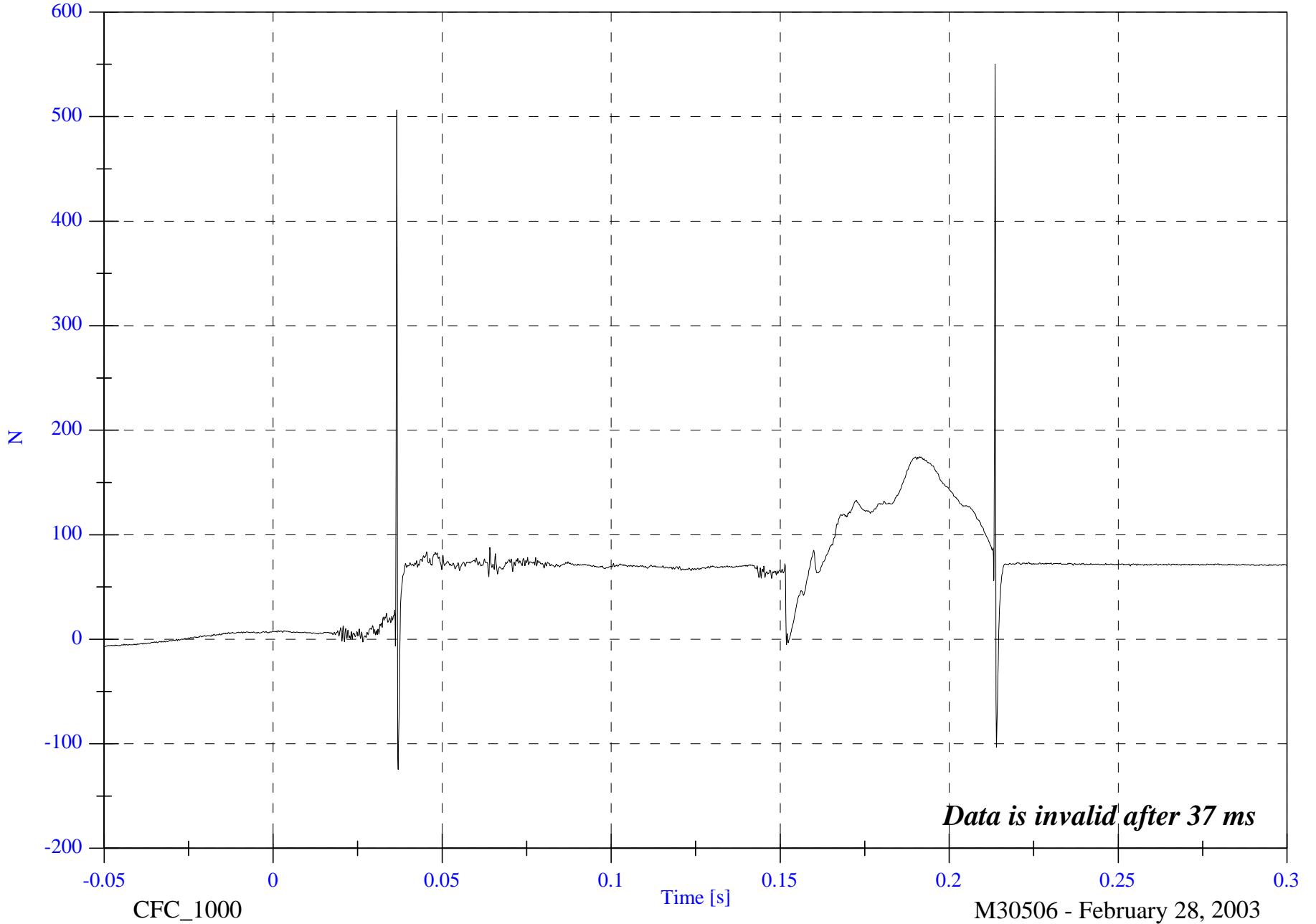
VIP1 Upper Neck Fy

Max: 550.4 [N] at 0.214 [s]

Min: -124.4 [N] at 0.037 [s]

B-23

8642-NCAP-33

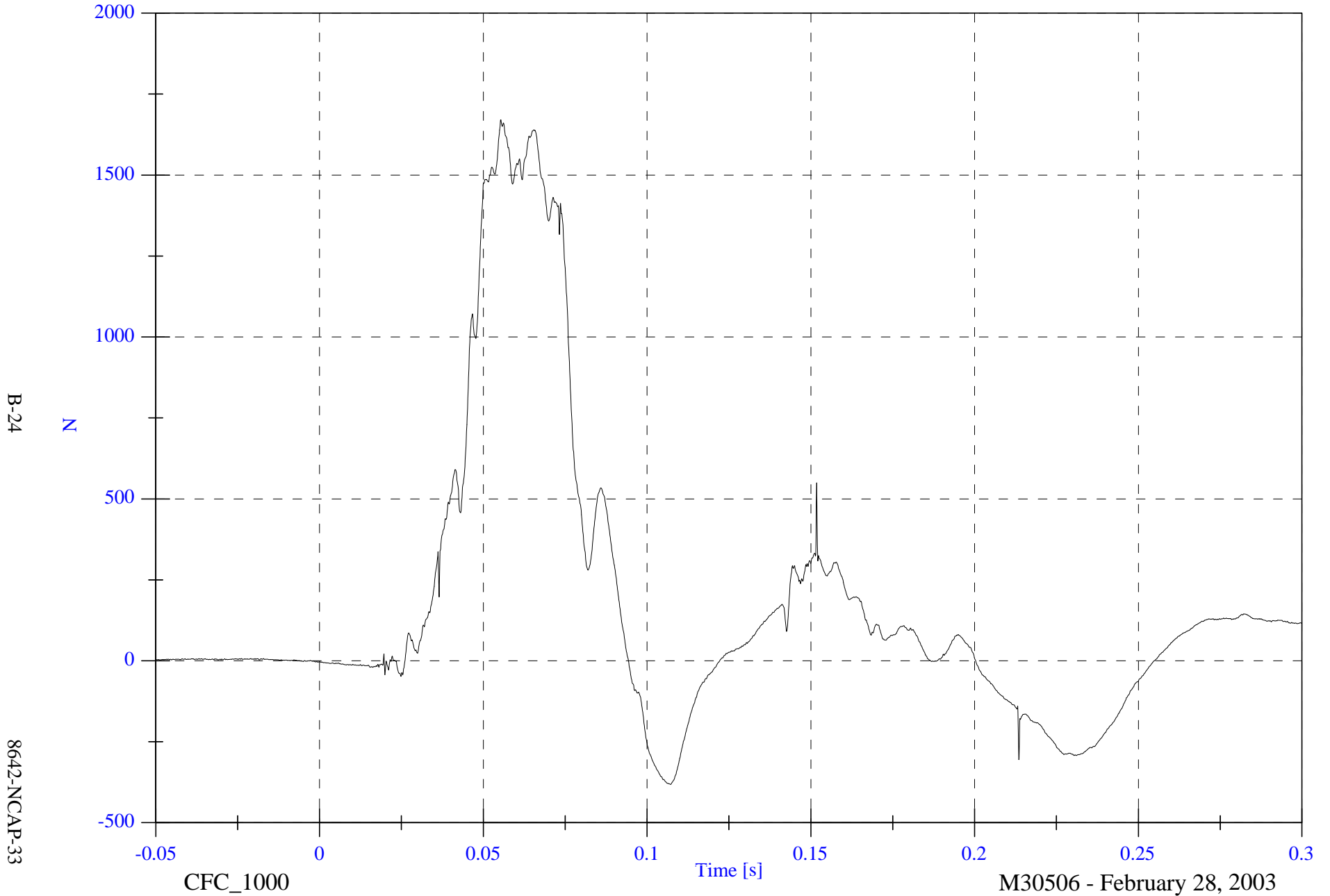


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 1670.6 [N] at 0.055 [s]

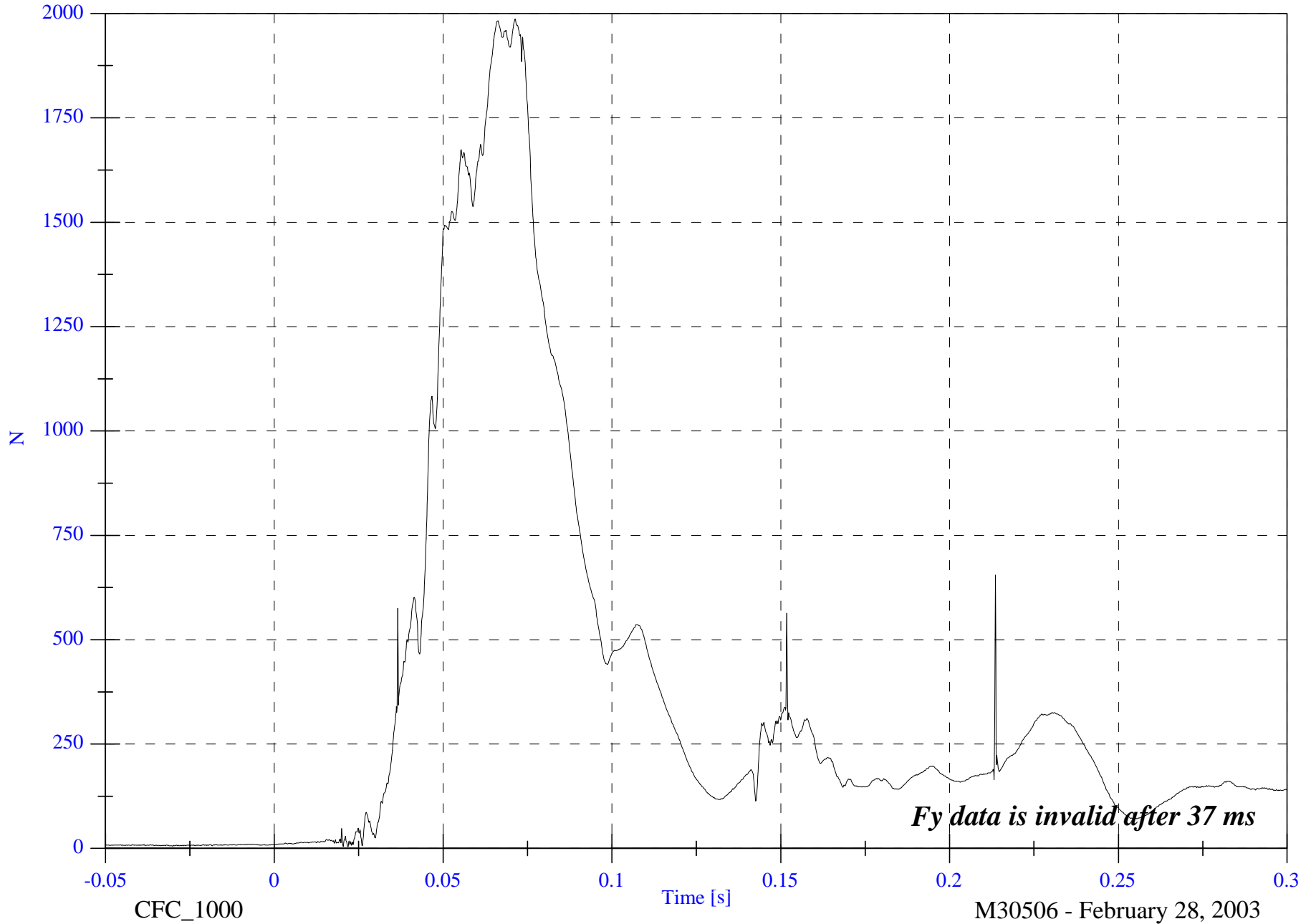
V1P1 Upper Neck Fz

Min: -382.0 [N] at 0.107 [s]



B-25

8642-NCAP-33



NCAP Test #11 - 2003 Isuzu Rodeo

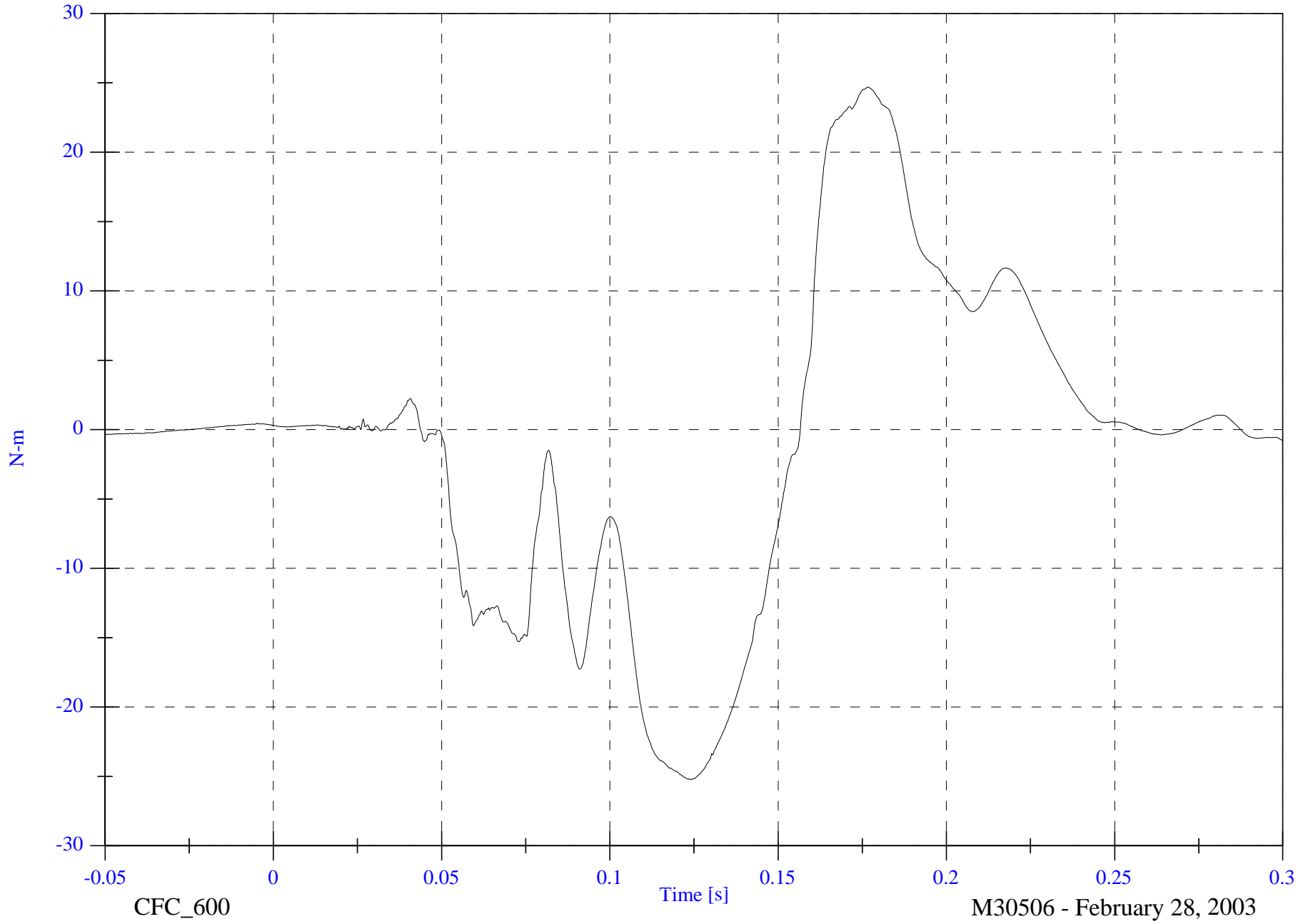
V1P1 Upper Neck Mx

Max: 24.7 [N-m] at 0.177 [s]

Min: -25.2 [N-m] at 0.124 [s]

B-26

8642-NCAP-33



CFC\_600

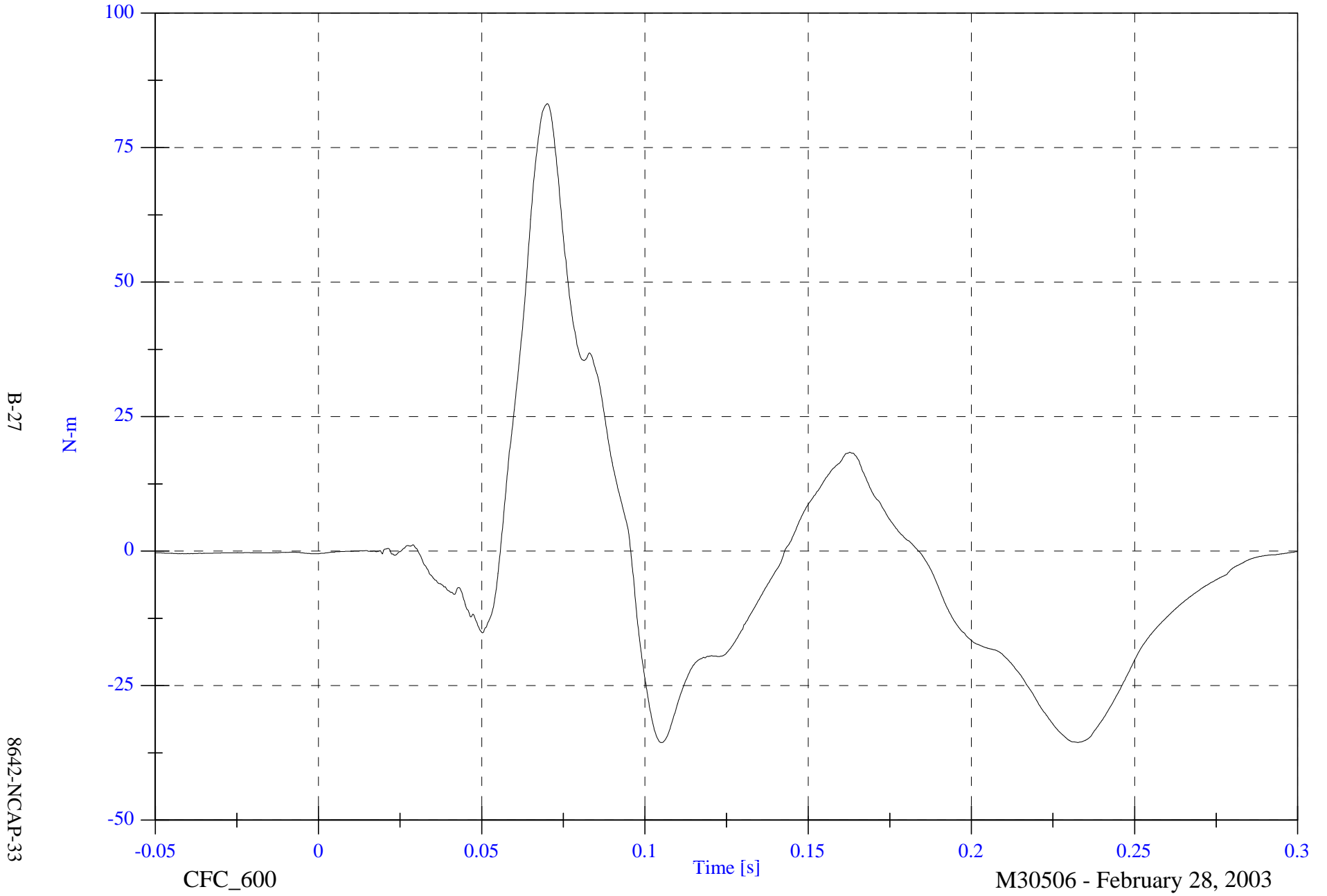
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Upper Neck My

Max: 83.2 [N-m] at 0.070 [s]

Min: -35.6 [N-m] at 0.105 [s]



B-27

8642-NCAP-33

CFC\_600

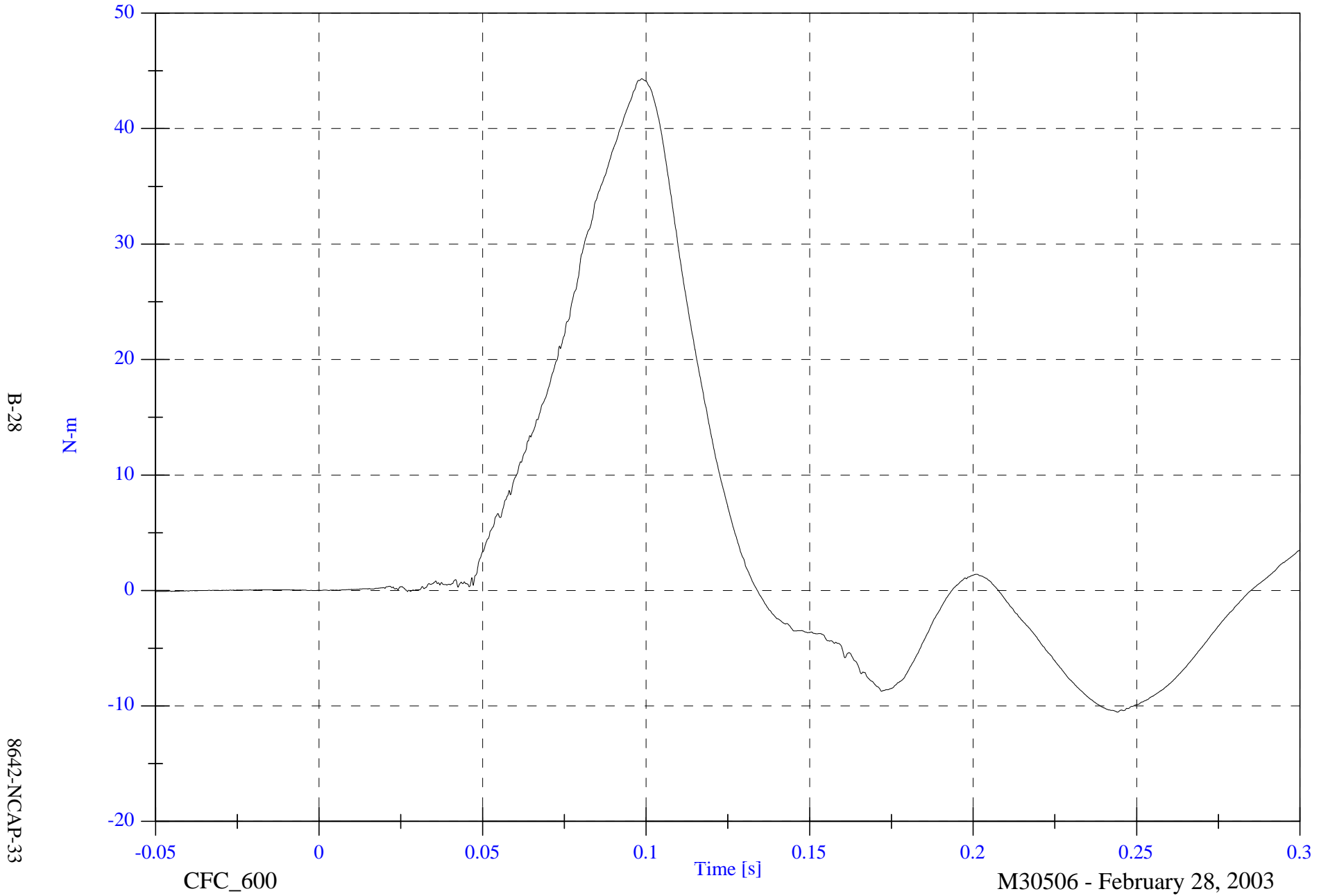
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 44.3 [N-m] at 0.099 [s]

Min: -10.5 [N-m] at 0.244 [s]

V1P1 Upper Neck Mz



B-28

8642-NCAP-33

CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

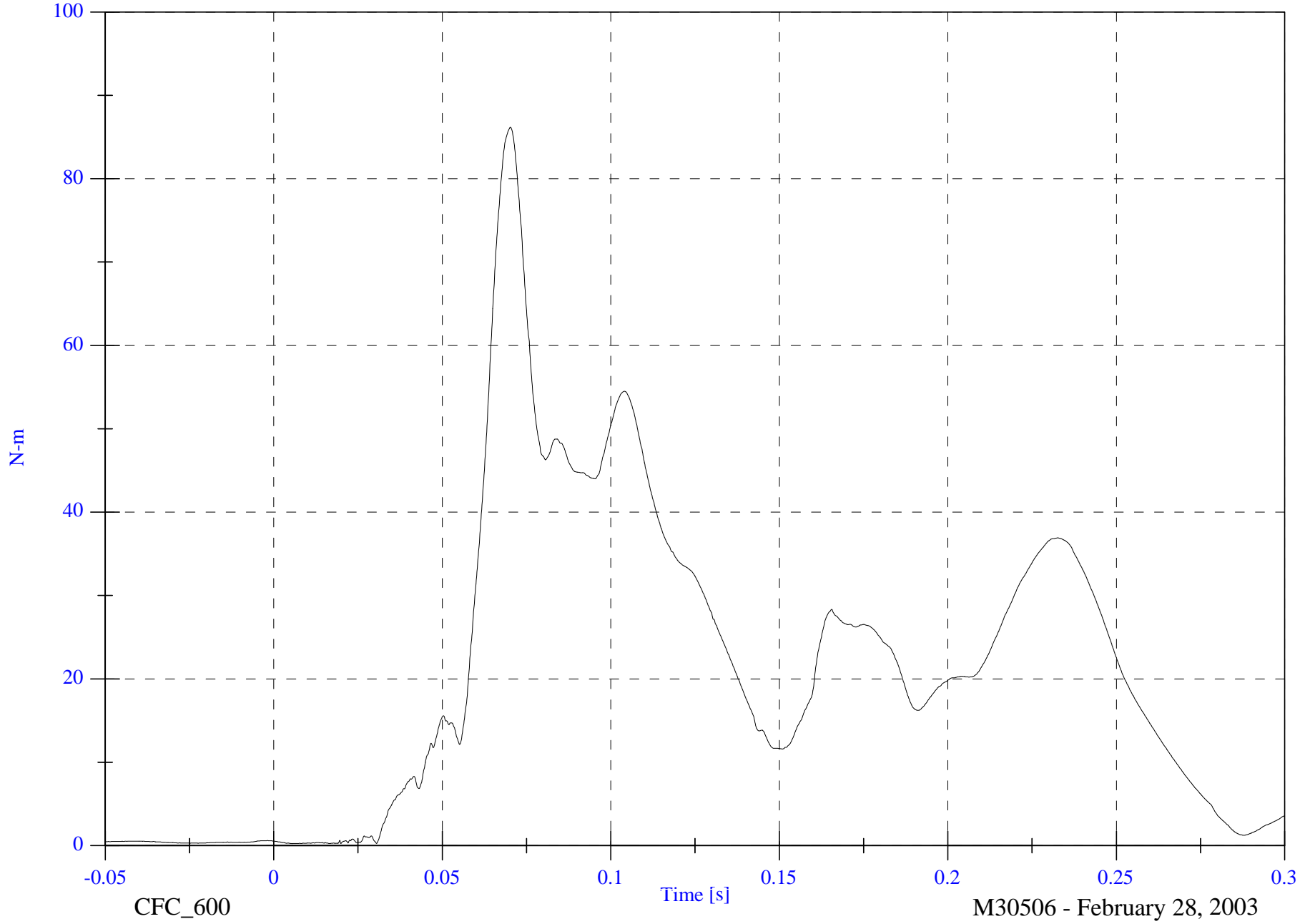
V1P1 Upper Neck M Resultant

Max: 86.2 [N-m] at 0.070 [s]

Min: 0.2 [N-m] at 0.005 [s]

B-29

8642-NCAP-33



CFC\_600

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

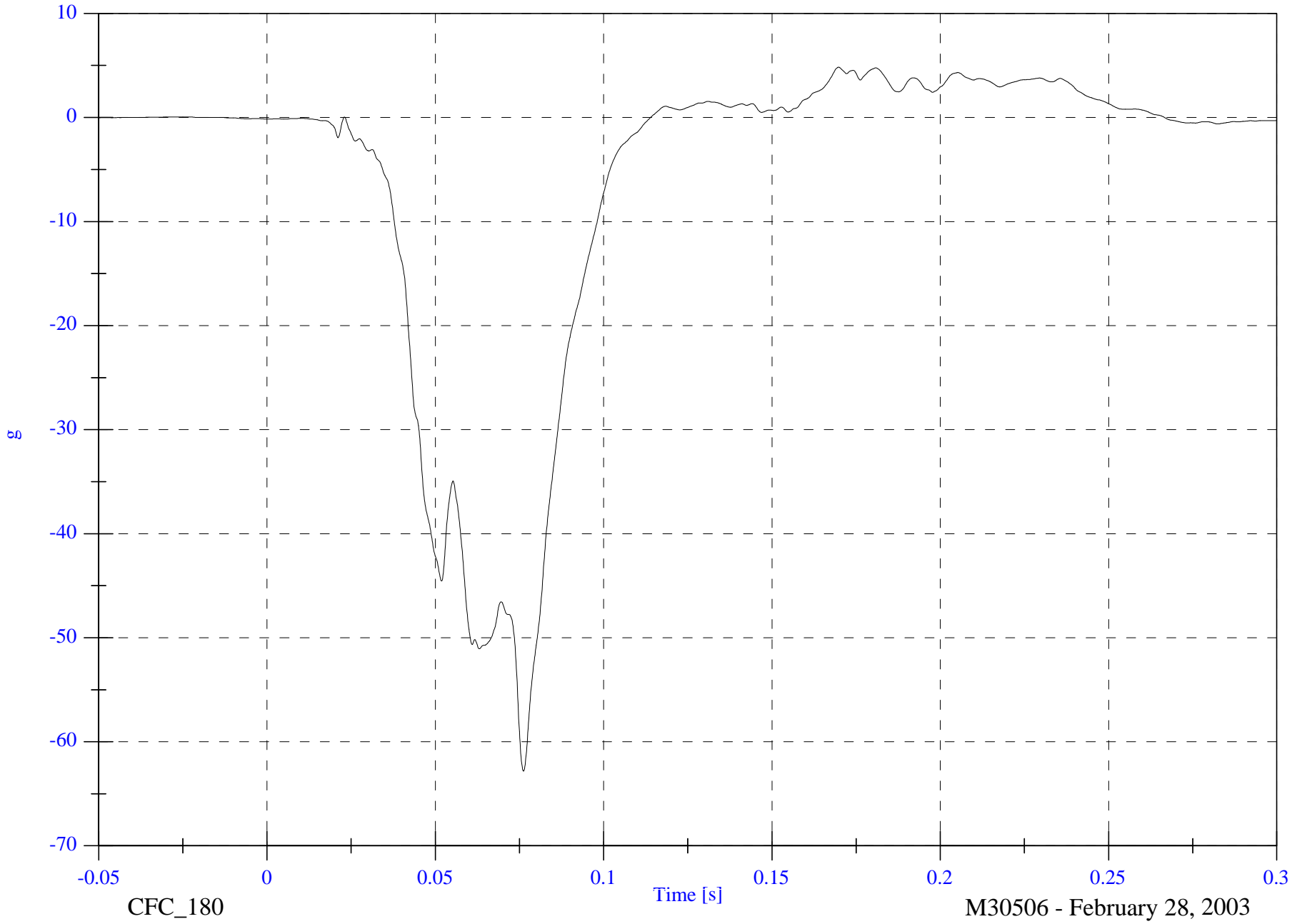
VIP1 Chest x

Max: 4.8 [g] at 0.170 [s]

Min: -62.8 [g] at 0.076 [s]

B-30

8642-NCAP-33



CFC\_180

Time [s]

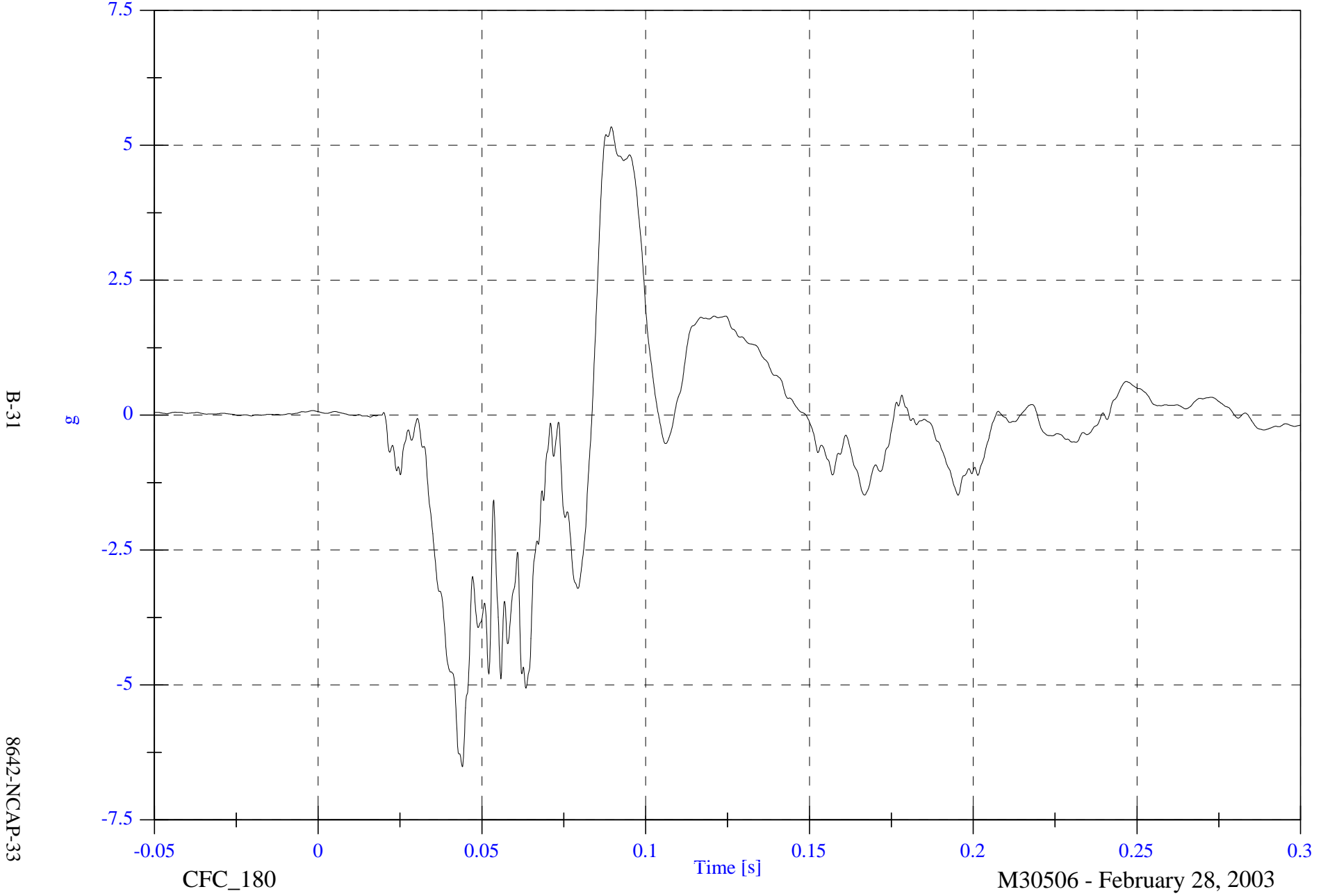
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

VIP1 Chest y

Max: 5.3 [g] at 0.090 [s]

Min: -6.5 [g] at 0.044 [s]



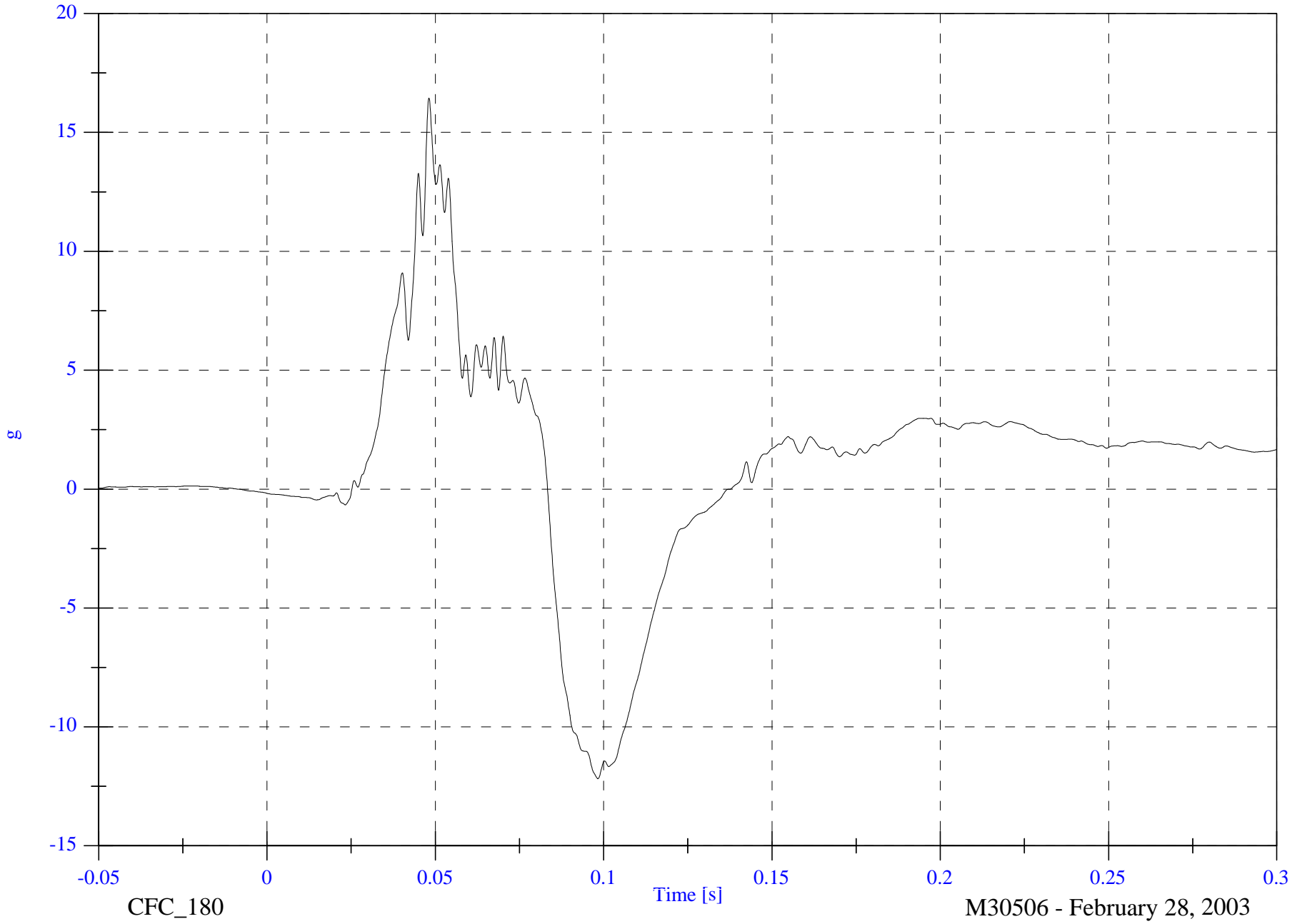
NCAP Test #11 - 2003 Isuzu Rodeo

VIP1 Chest z

Max: 16.4 [g] at 0.048 [s]  
Min: -12.2 [g] at 0.098 [s]

B-32

8642-NCAP-33



CFC\_180

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

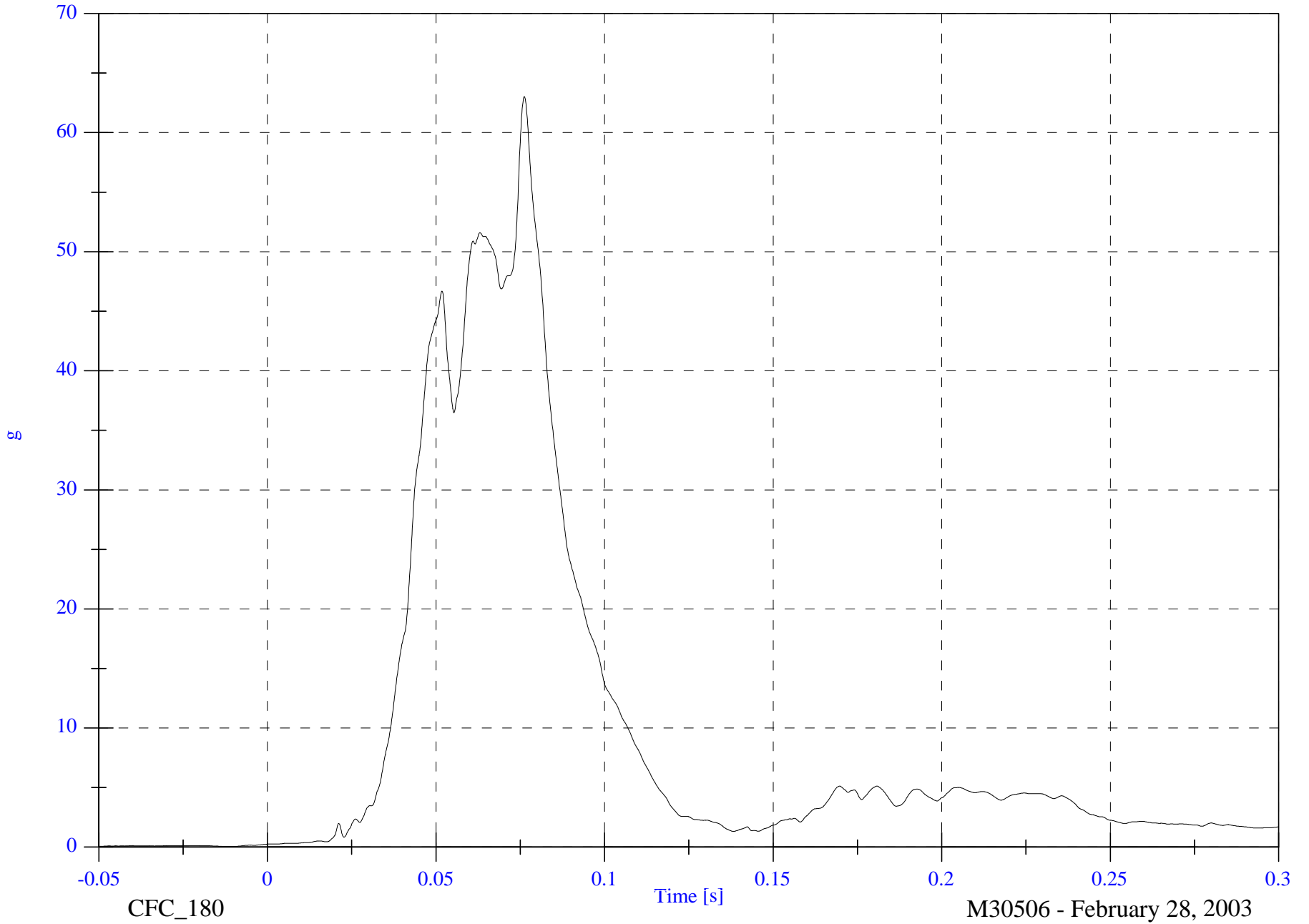
V1P1 Chest Resultant

Max: 63.0 [g] at 0.076 [s]

Min: 0.0 [g] at -0.012 [s]

B-33

8642-NCAP-33



CFC\_180

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

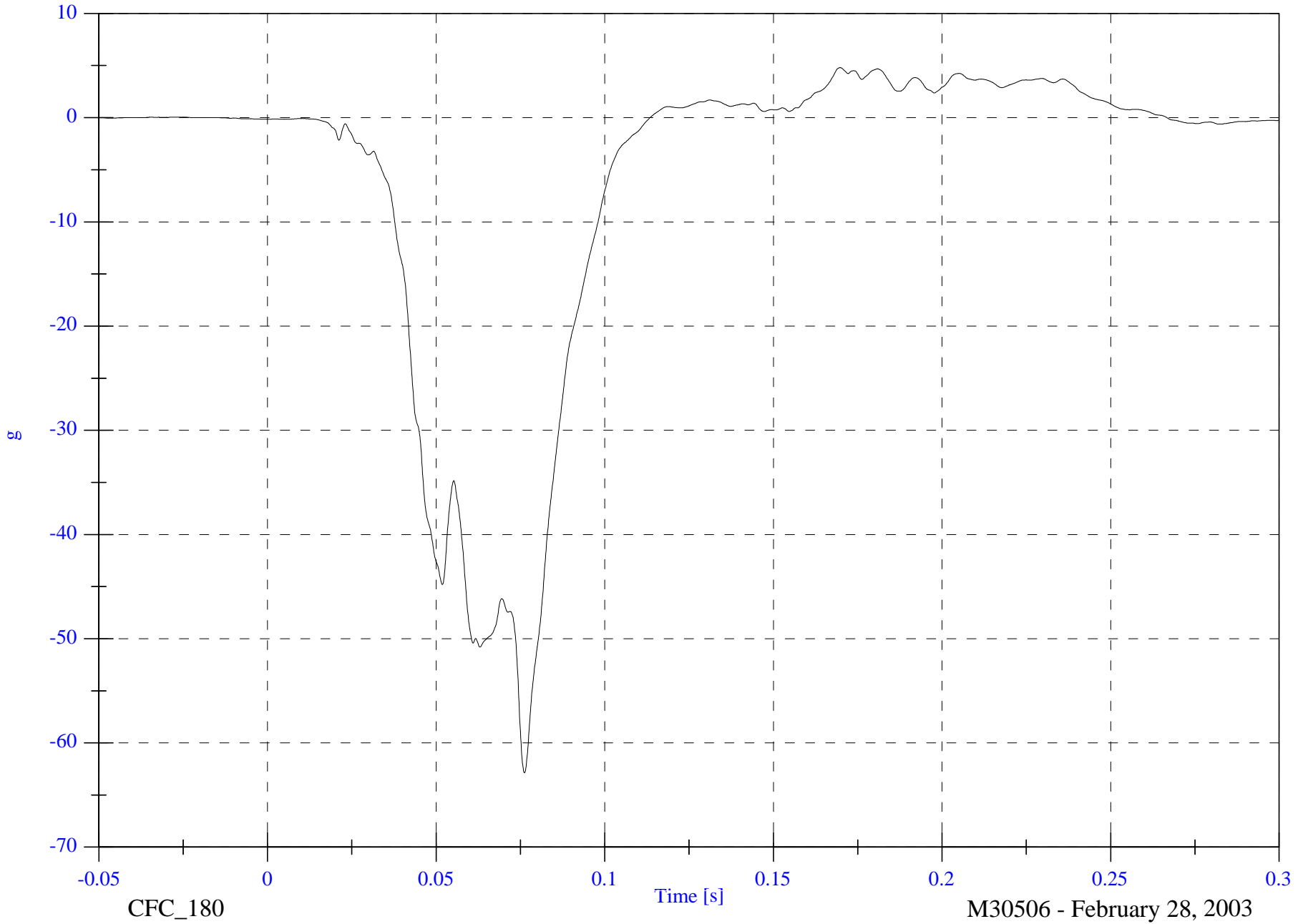
VIP1 Chest Red x

Max: 4.8 [g] at 0.170 [s]

Min: -62.9 [g] at 0.076 [s]

B-34

8642-NCAP-33

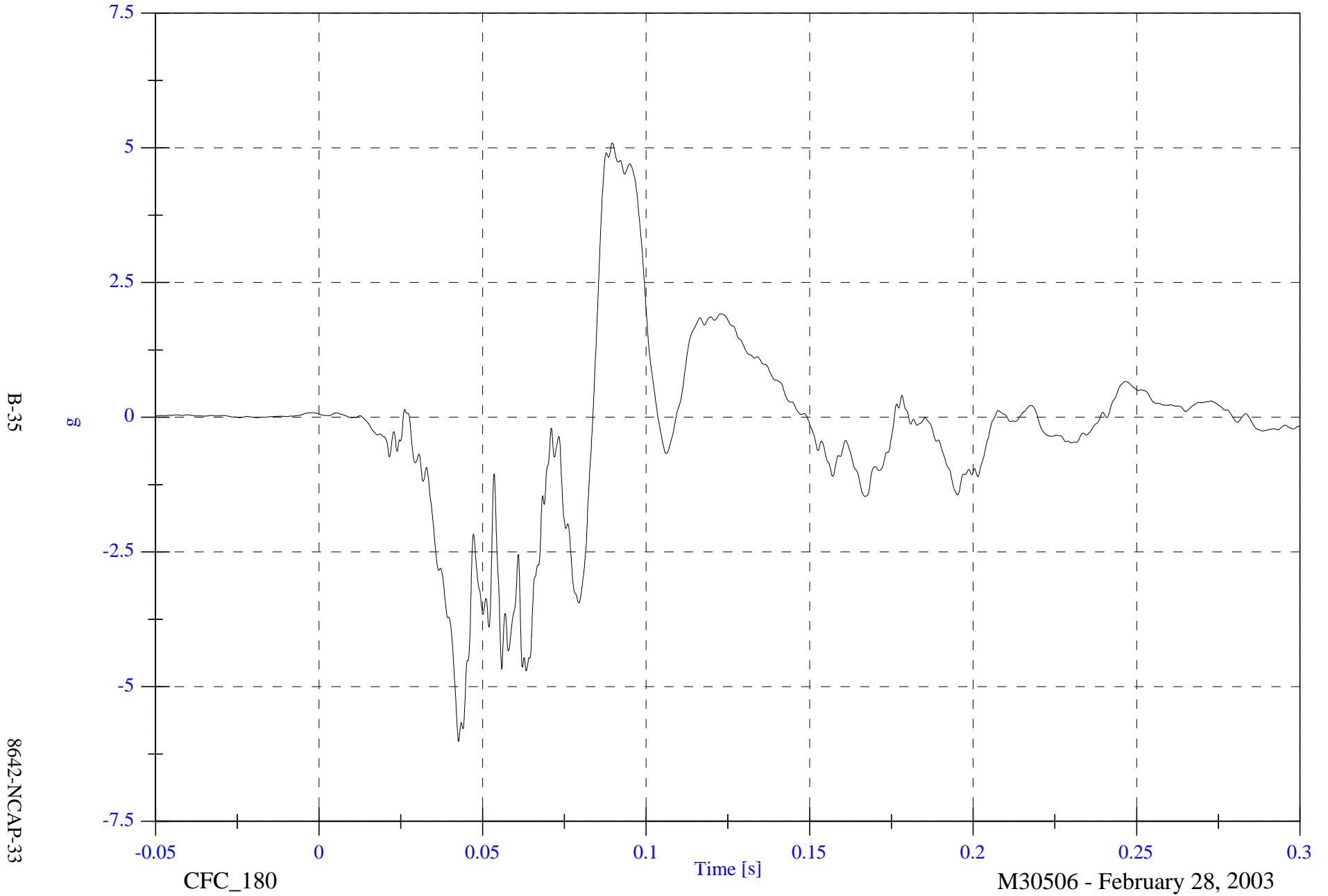


NCAP Test #11 - 2003 Isuzu Rodeo

VIP1 Chest Red y

Max: 5.1 [g] at 0.090 [s]

Min: -6.0 [g] at 0.043 [s]

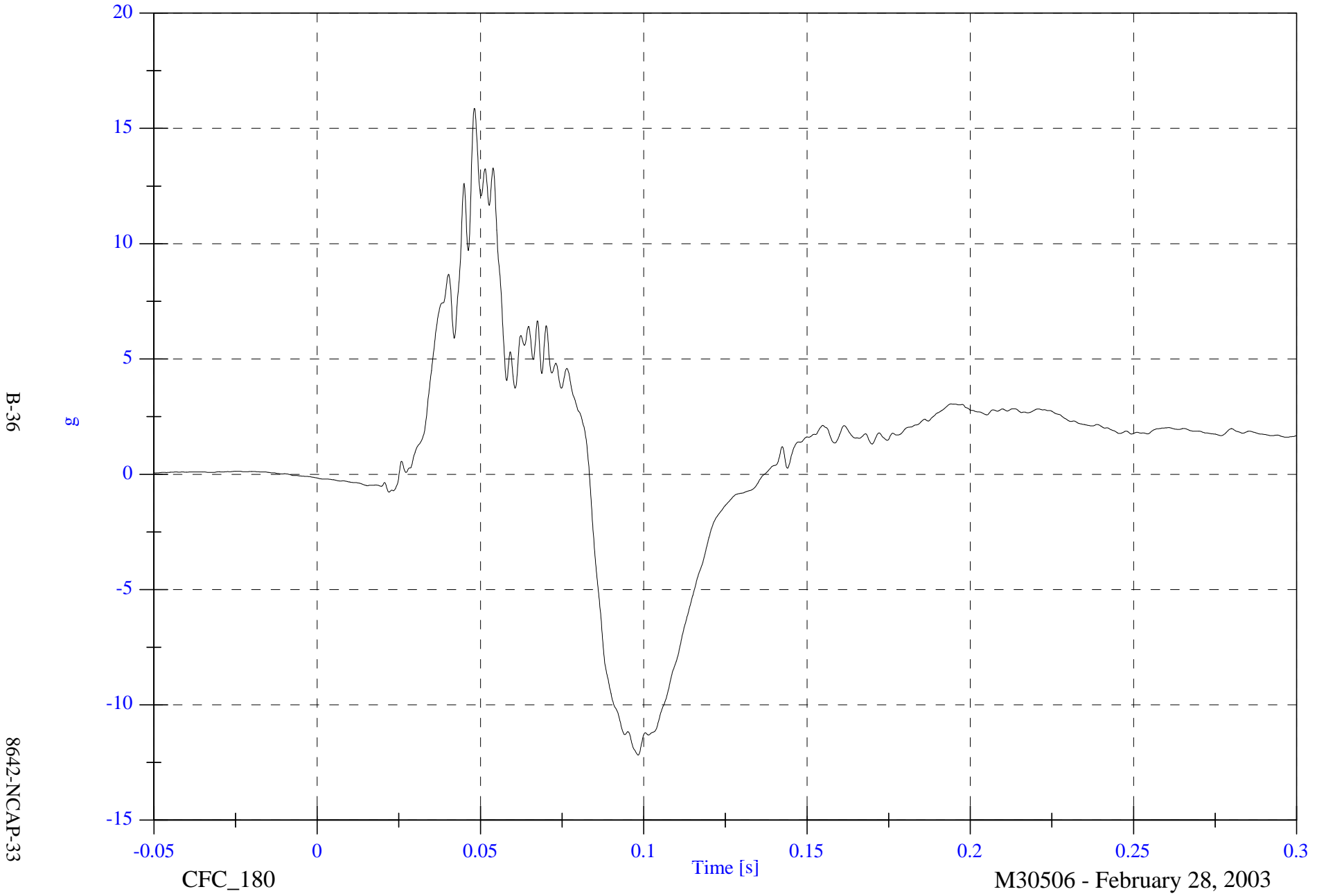


NCAP Test #11 - 2003 Isuzu Rodeo

VIP1 Chest Red z

Max: 15.9 [g] at 0.048 [s]

Min: -12.2 [g] at 0.098 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

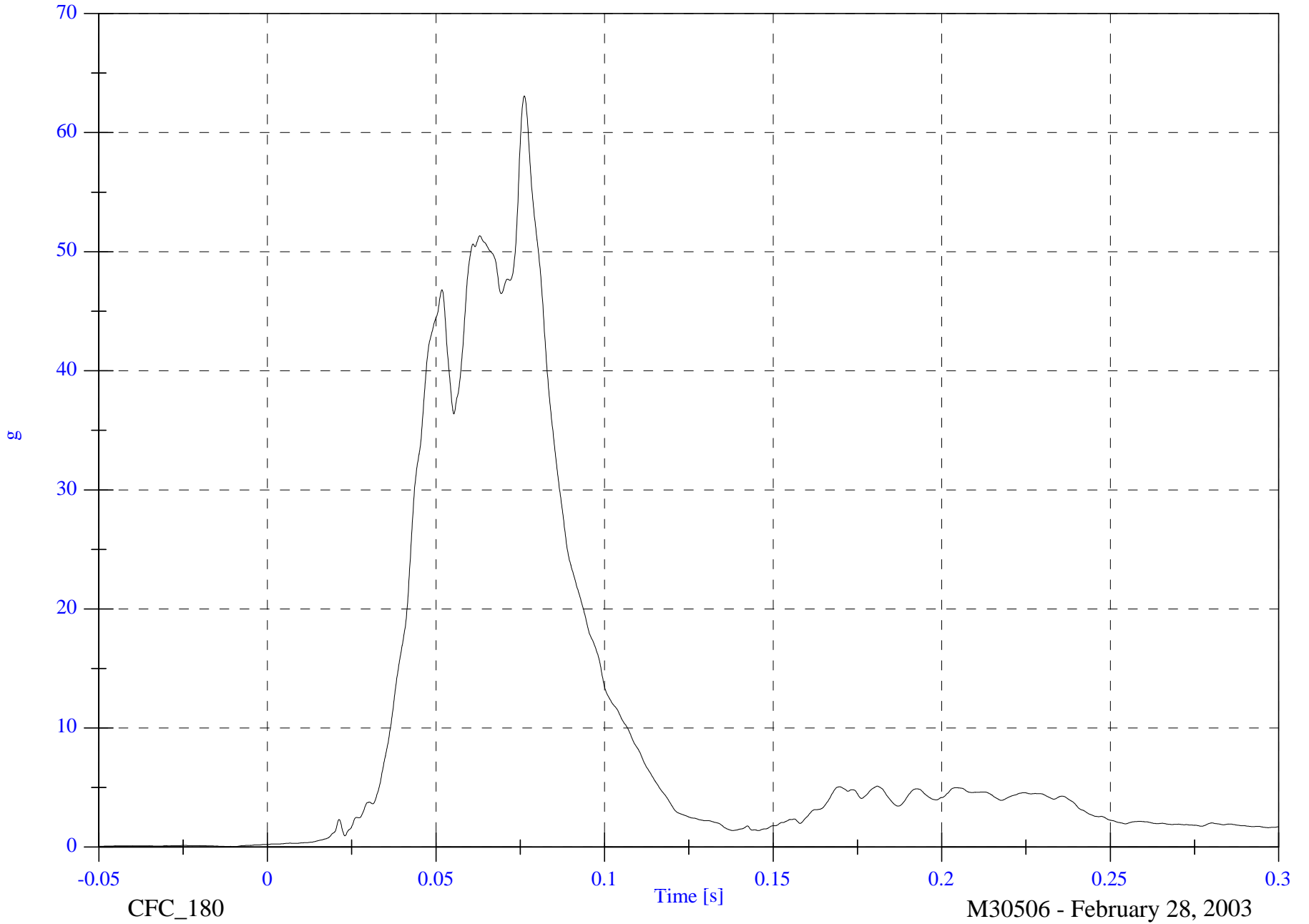
V1P1 Chest Red Resultant

Max: 63.1 [g] at 0.076 [s]

Min: 0.0 [g] at -0.012 [s]

B-37

8642-NCAP-33



CFC\_180

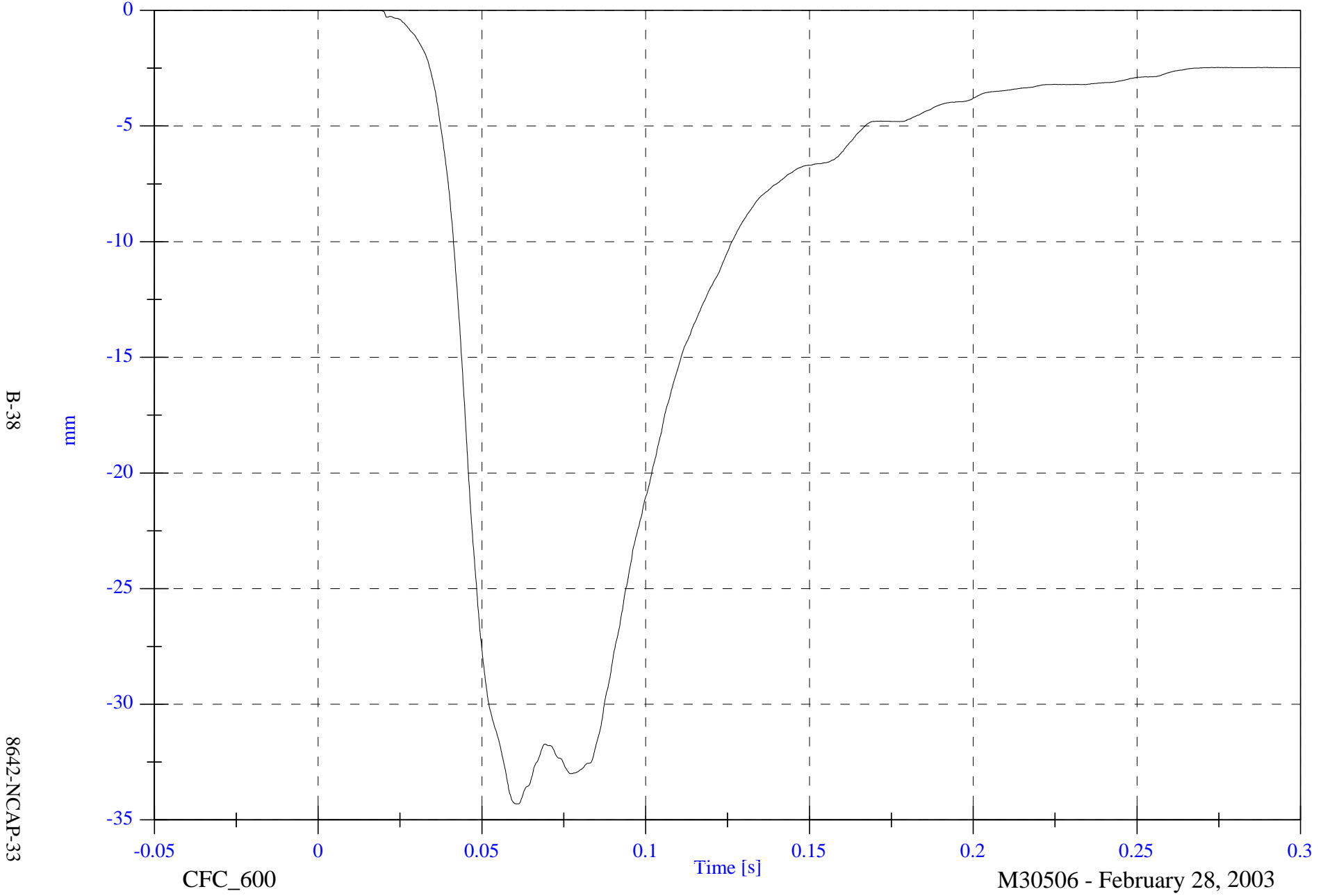
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

VIP1 Chest Compression x

Max: 0.0 [mm] at 0.010 [s]

Min: -34.3 [mm] at 0.061 [s]



B-38

mm

8642-NCAP-33

CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

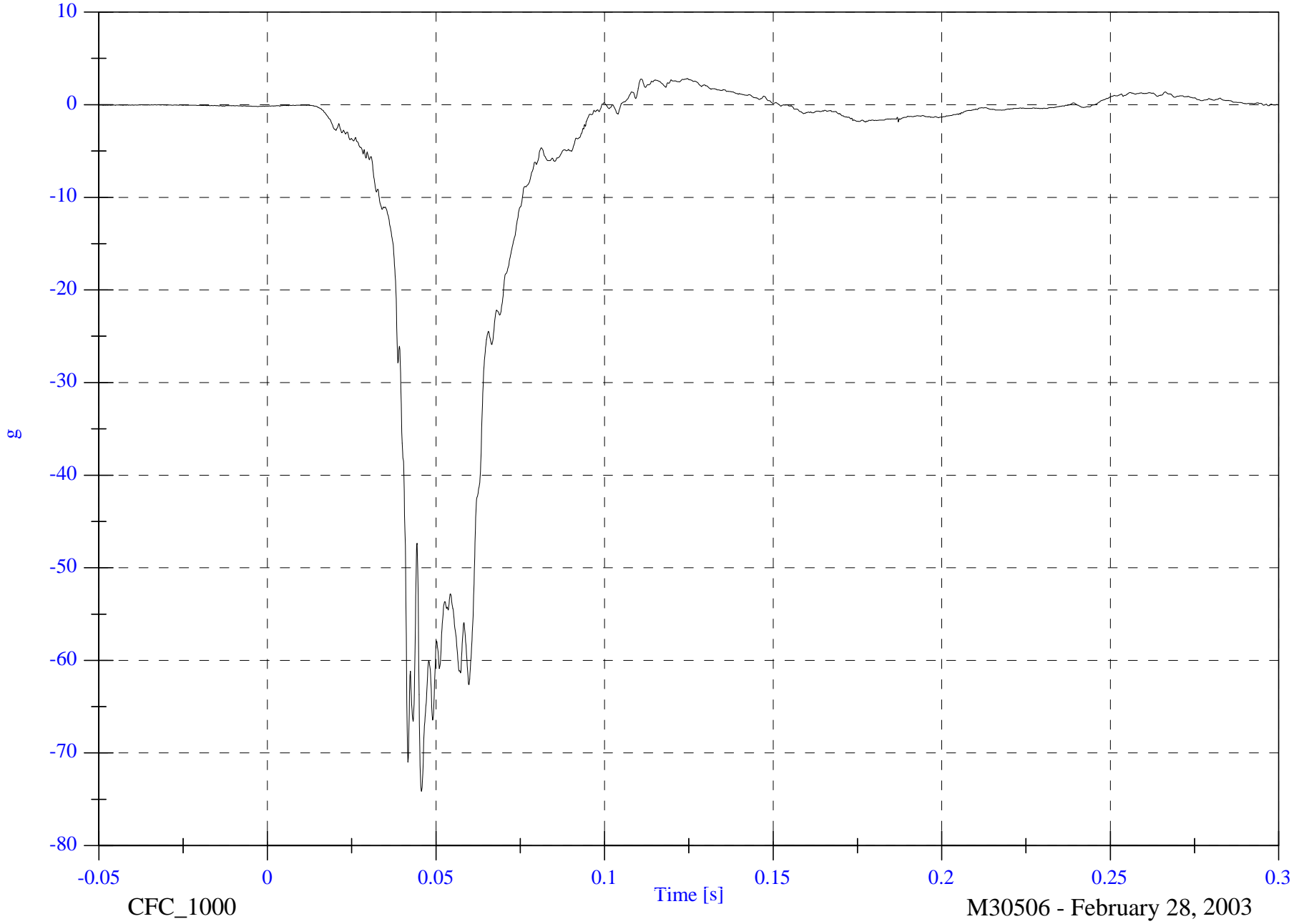
V1P1 Pelvic x

Max: 2.8 [g] at 0.124 [s]

Min: -74.1 [g] at 0.046 [s]

B-39

8642-NCAP-33



CFC\_1000

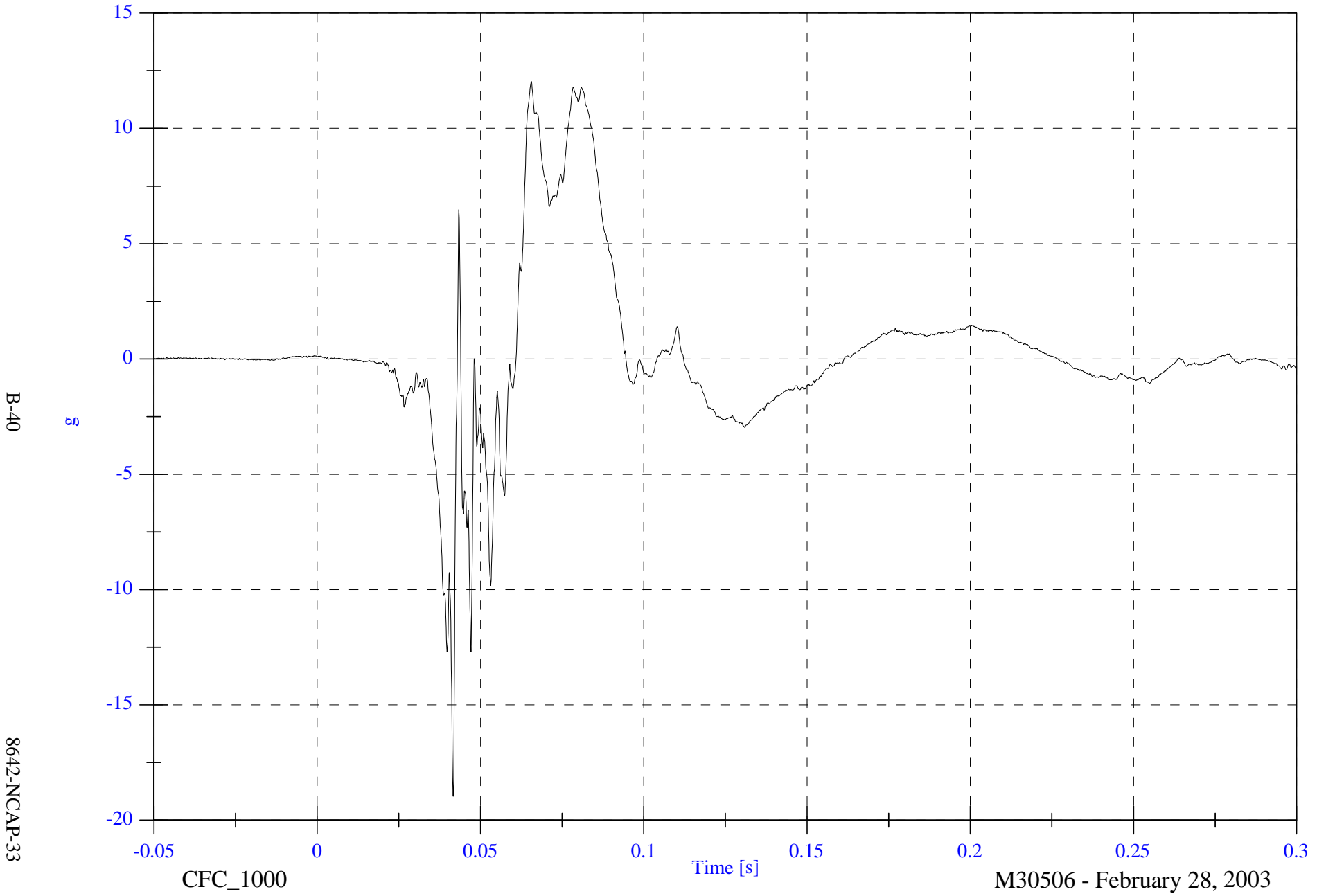
Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 12.0 [g] at 0.066 [s]  
Min: -19.0 [g] at 0.042 [s]

V1P1 Pelvic y

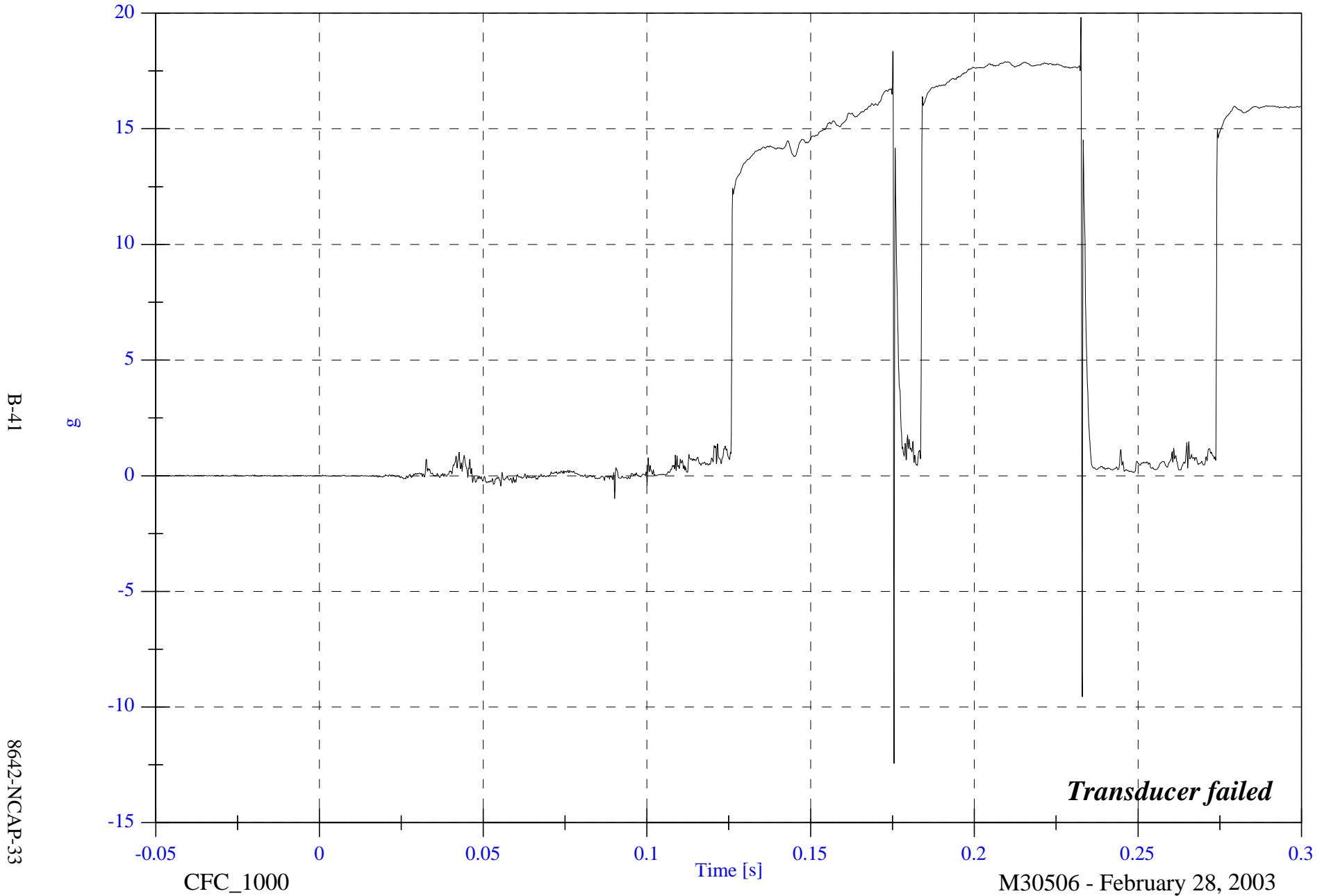


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 19.8 [g] at 0.233 [s]

Min: -12.4 [g] at 0.175 [s]

V1P1 Pelvic z



B-41

8642-NCAP-33

CFC\_1000

Time [s]

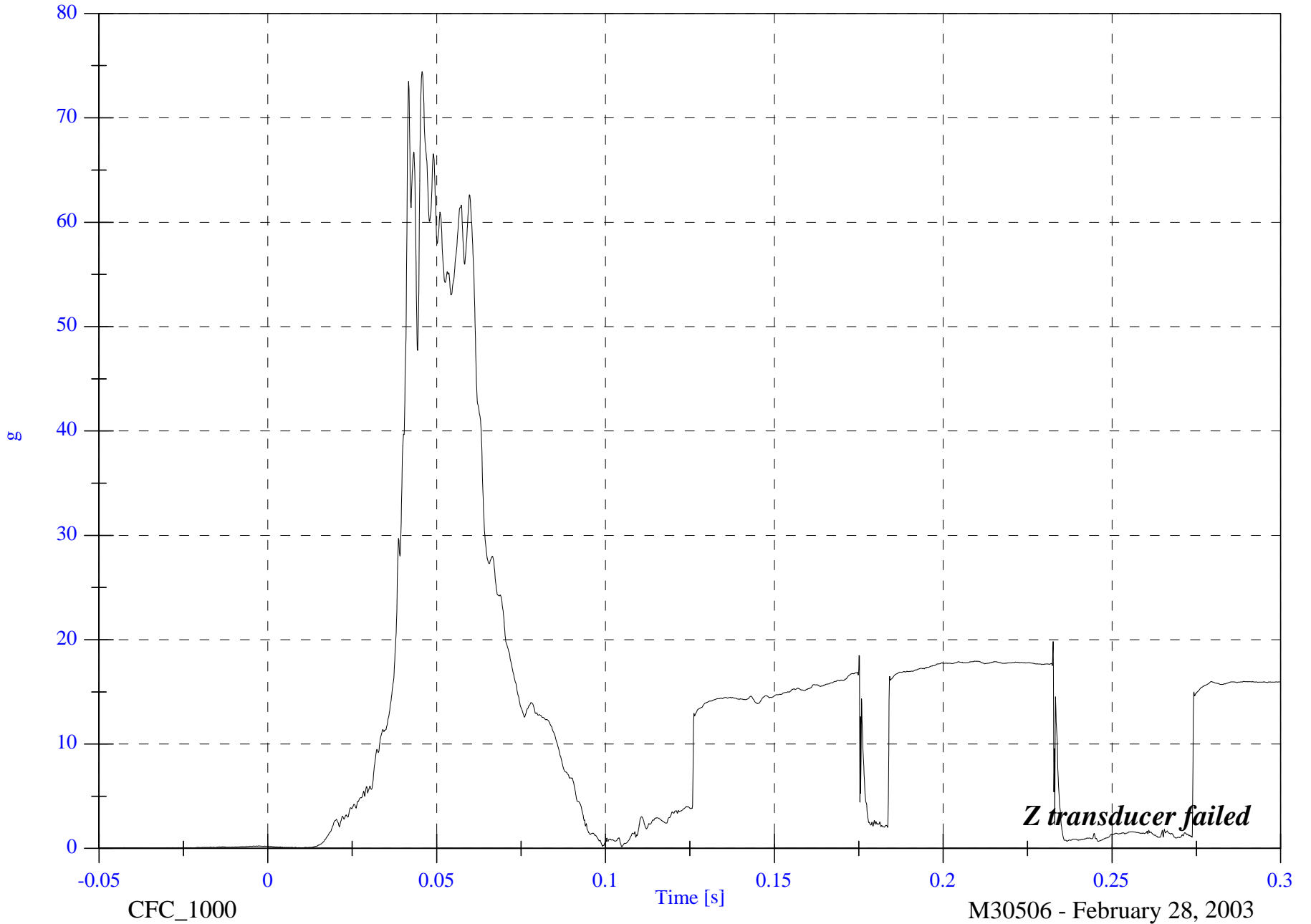
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Pelvic Resultant

Max: 74.4 [g] at 0.046 [s]

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



B-42

8642-NCAP-33

CFC\_1000

Time [s]

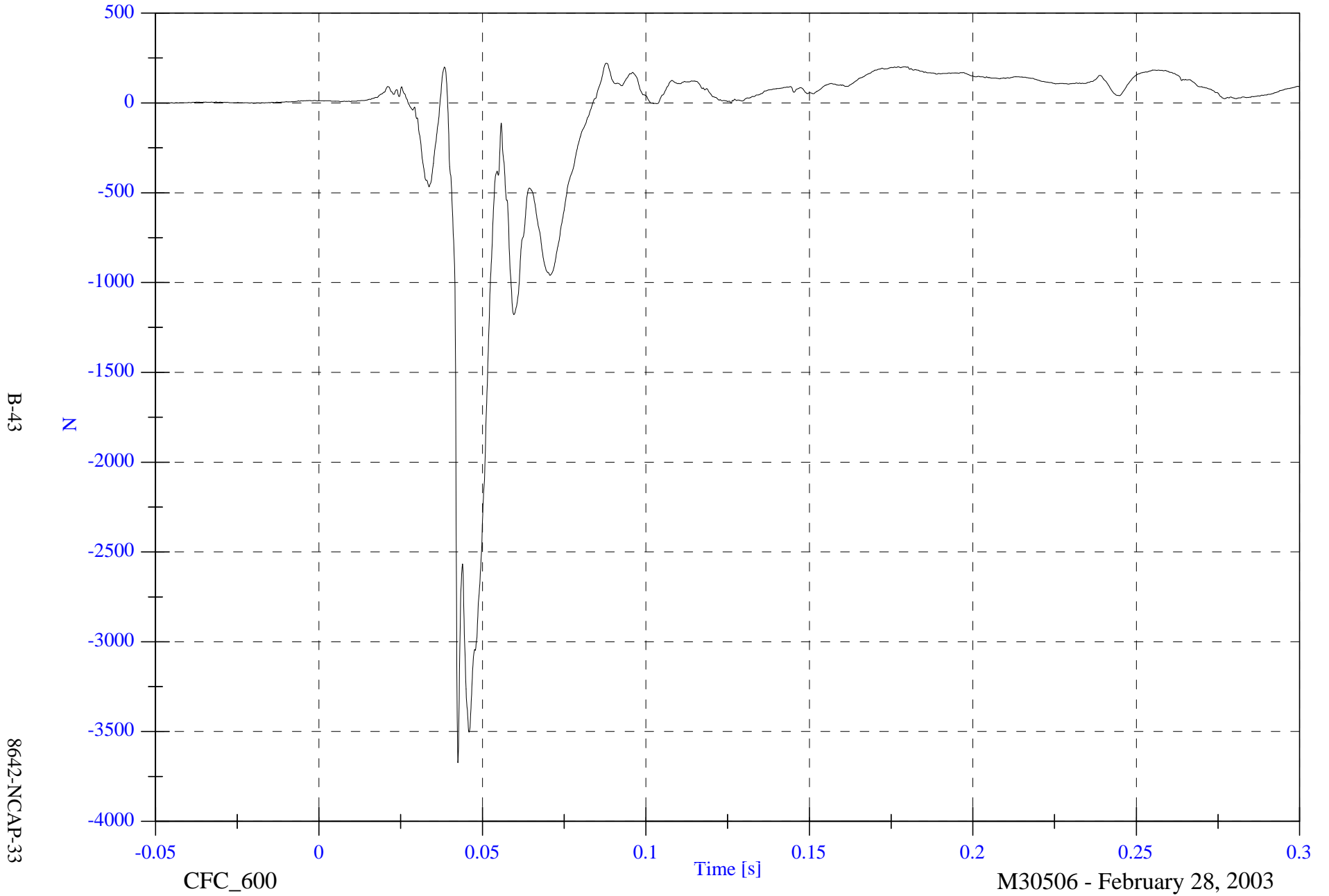
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Left Femur z

Max: 221.5 [N] at 0.088 [s]

Min: -3673.5 [N] at 0.043 [s]



B-43

8642-NCAP-33

CFC\_600

Time [s]

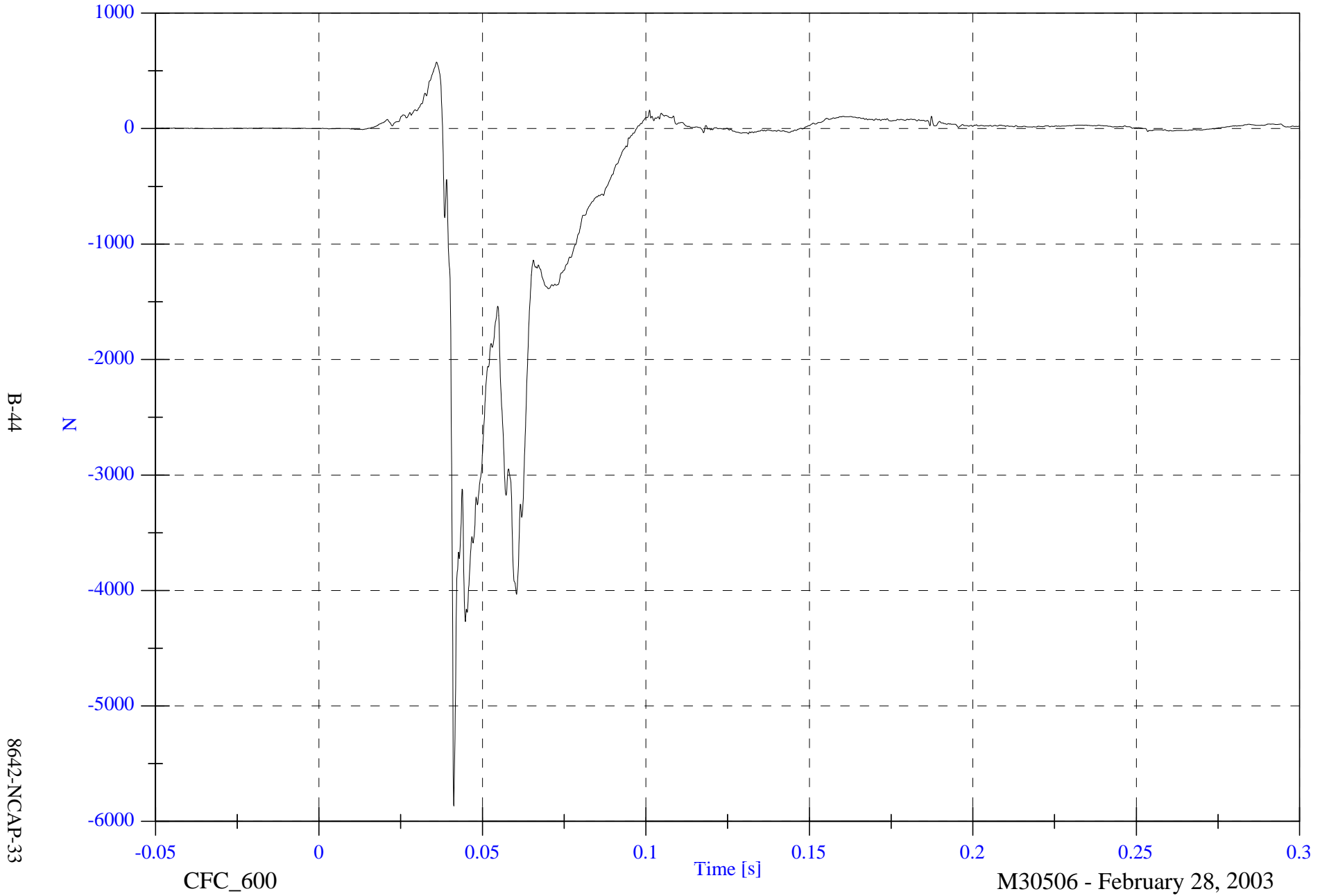
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 576.5 [N] at 0.036 [s]

Min: -5867.3 [N] at 0.041 [s]

V1P1 Right Femur z

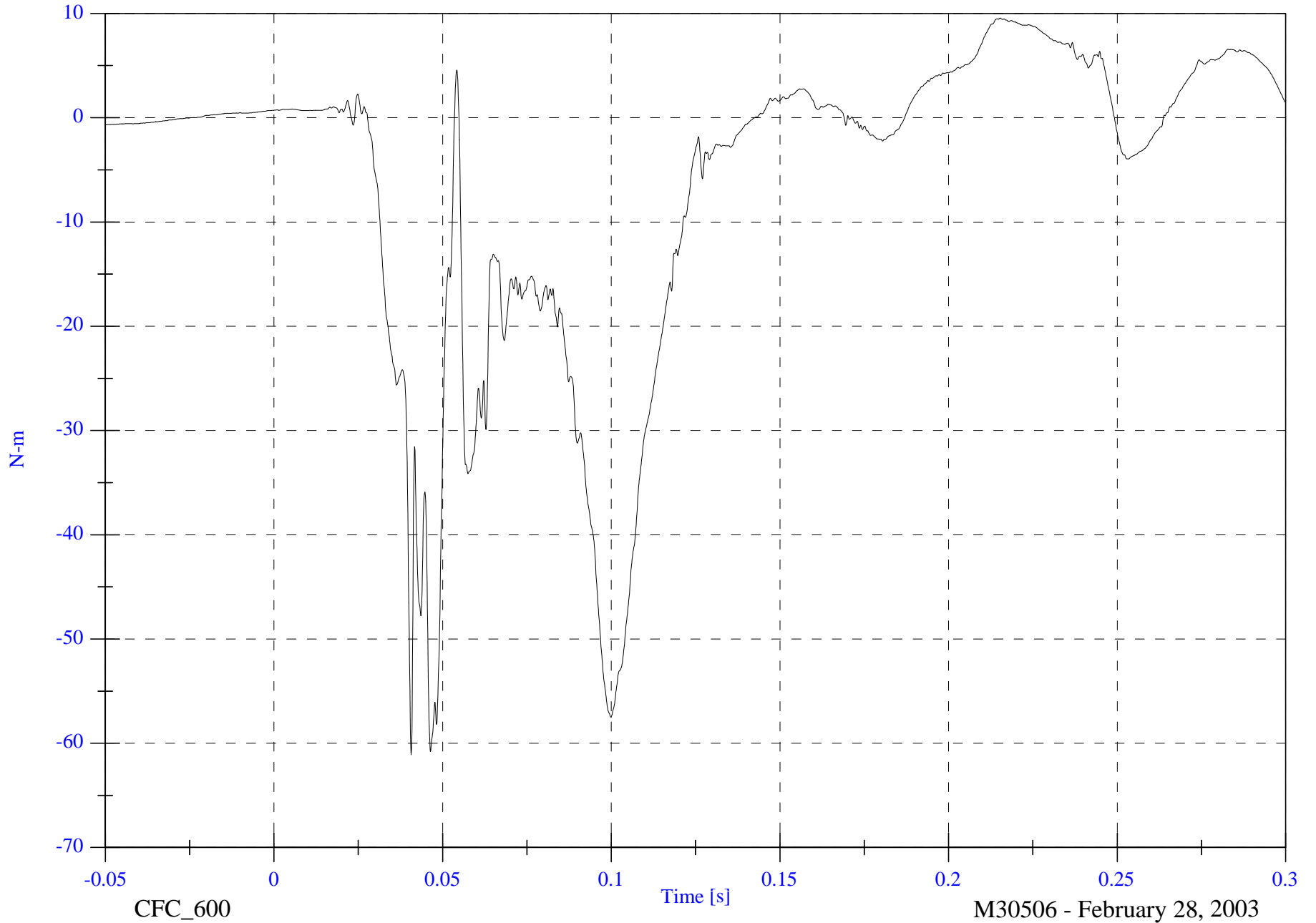


NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Left Upper Tibia Mx

Max: 9.6 [N-m] at 0.215 [s]

Min: -61.1 [N-m] at 0.041 [s]



B-45

8642-NCAP-33

CFC\_600

Time [s]

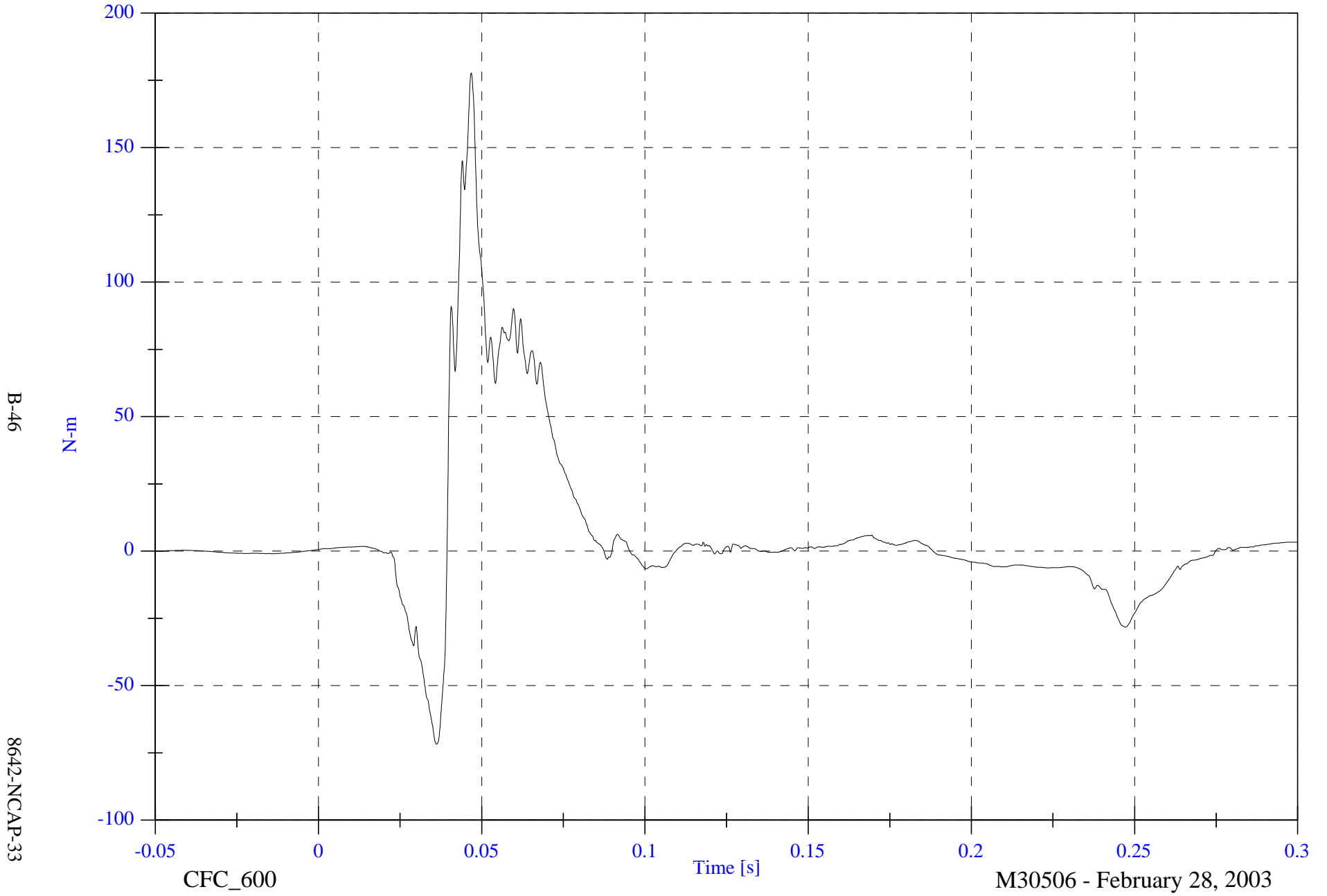
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Left Upper Tibia My

Max: 177.8 [N-m] at 0.047 [s]

Min: -71.8 [N-m] at 0.036 [s]



B-46

8642-NCAP-33

CFC\_600

Time [s]

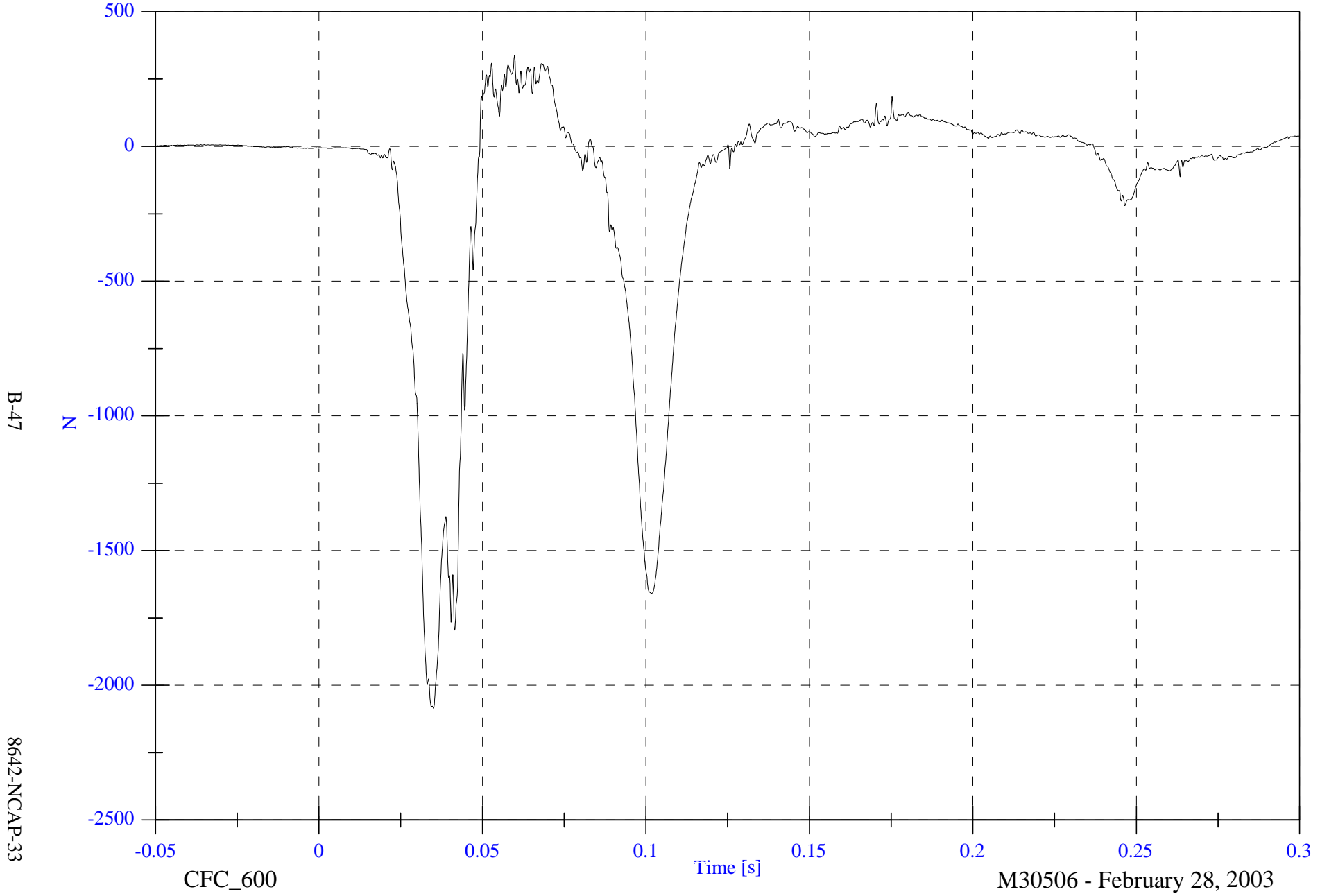
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 337.1 [N] at 0.060 [s]

V1P1 Left Lower Tibia Fz

Min: -2085.4 [N] at 0.035 [s]



B-47

8642-NCAP-33

CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

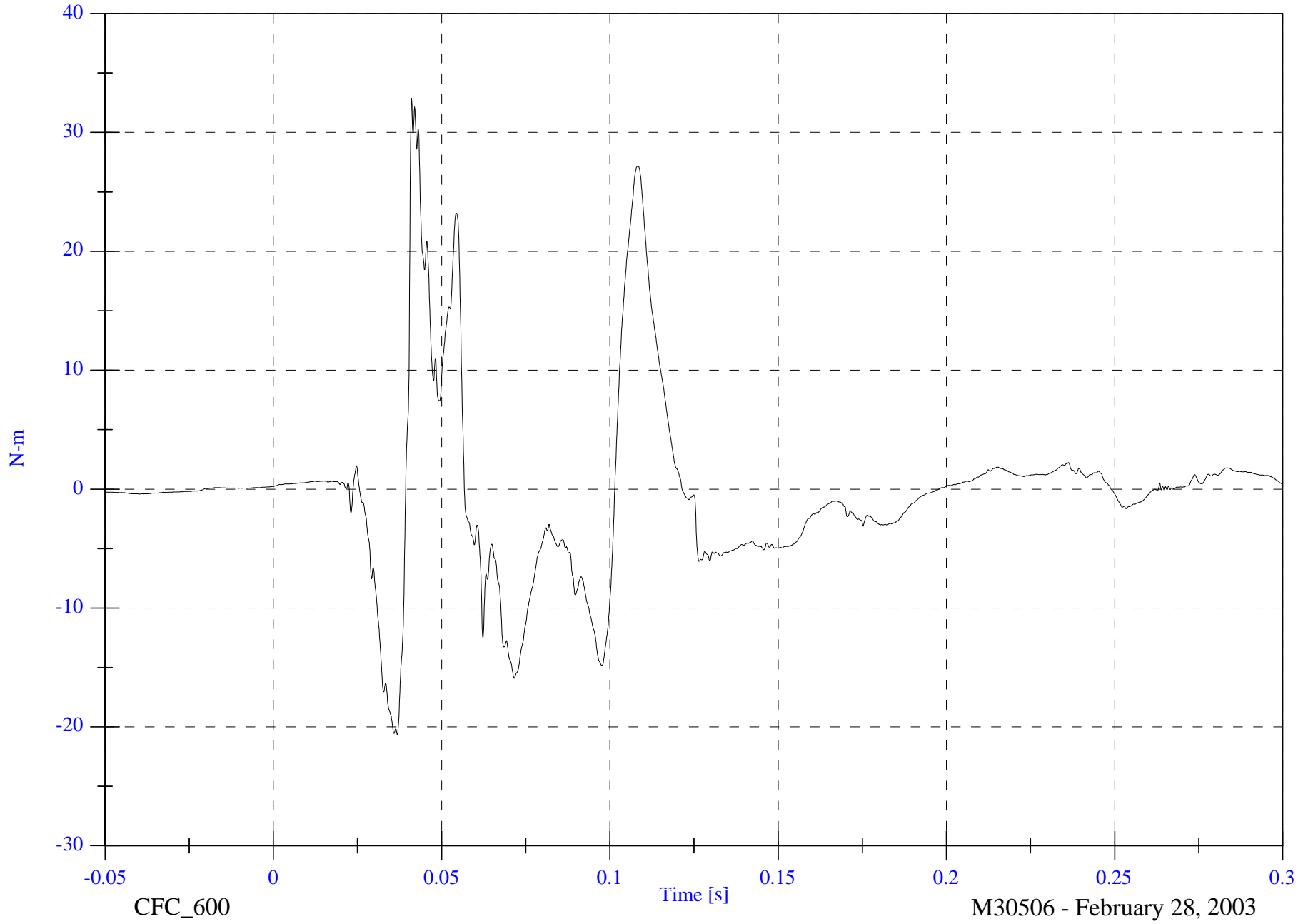
Max: 32.9 [N-m] at 0.041 [s]

V1P1 Left Lower Tibia Mx

Min: -20.7 [N-m] at 0.037 [s]

B-48

8642-NCAP-33



CFC\_600

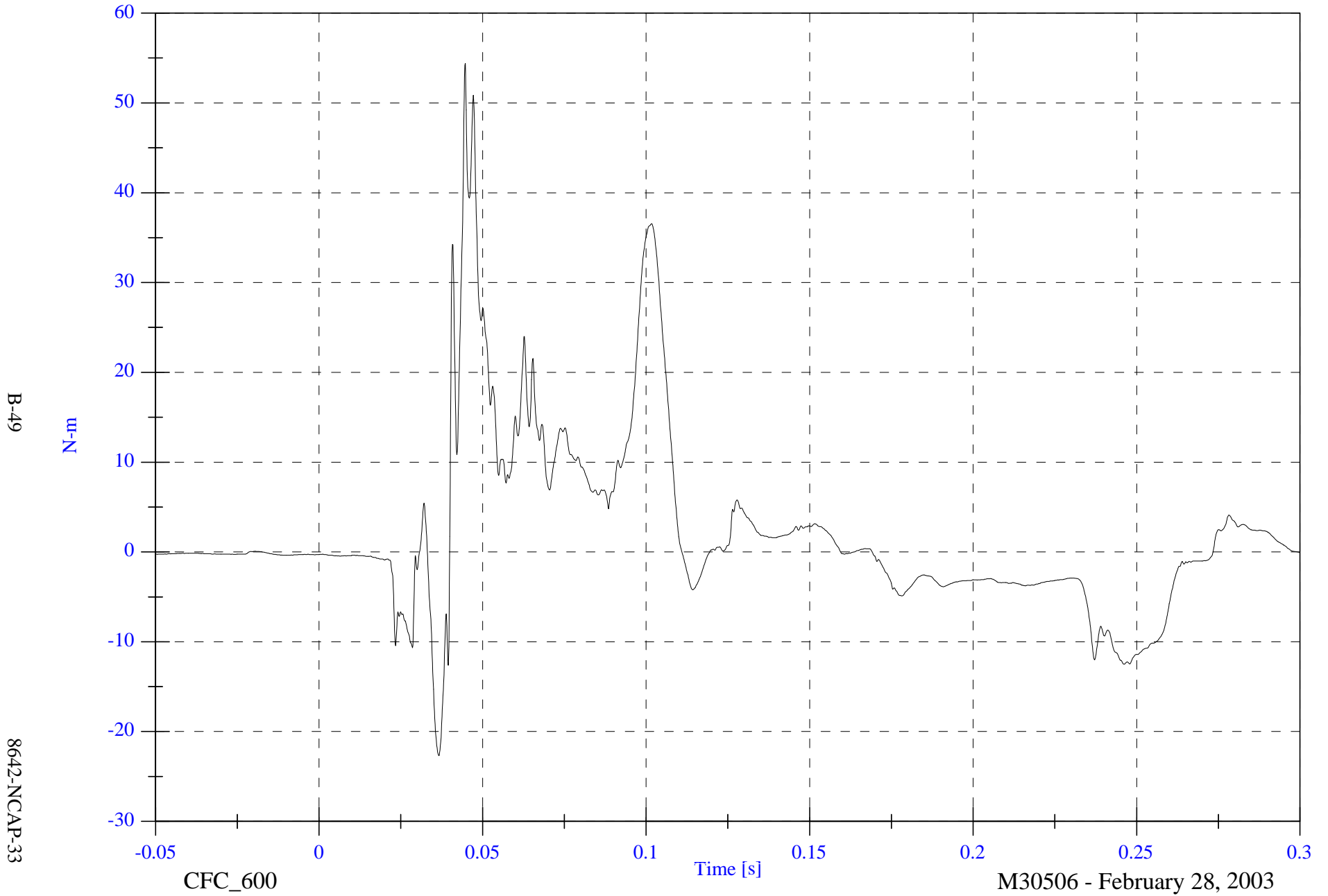
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 54.4 [N-m] at 0.045 [s]

VIP1 Left Lower Tibia My

Min: -22.7 [N-m] at 0.037 [s]



B-49

8642-NCAP-33

CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

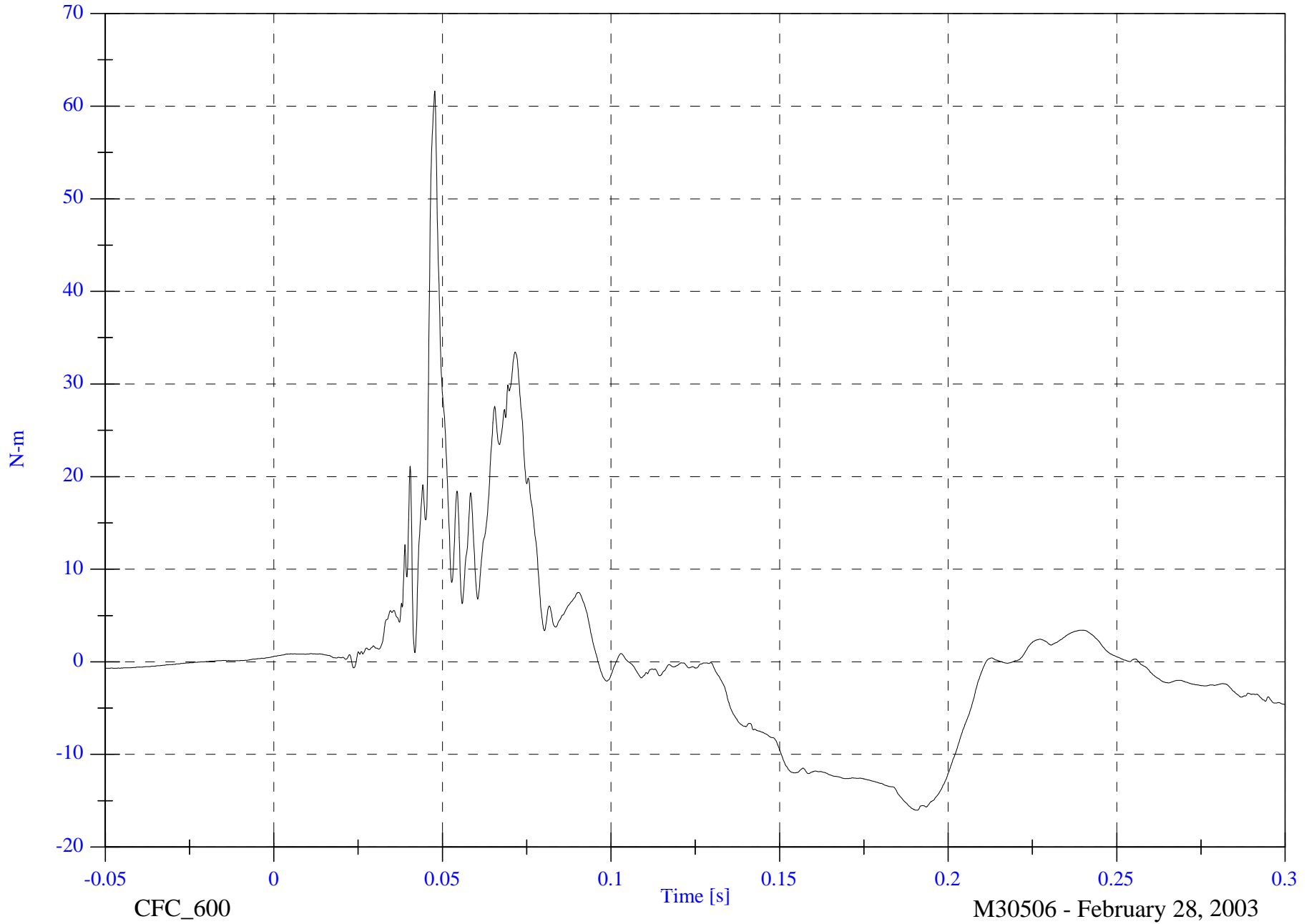
V1P1 Right Upper Tibia Mx

Max: 61.6 [N-m] at 0.048 [s]

Min: -16.0 [N-m] at 0.191 [s]

B-50

8642-NCAP-33



CFC\_600

Time [s]

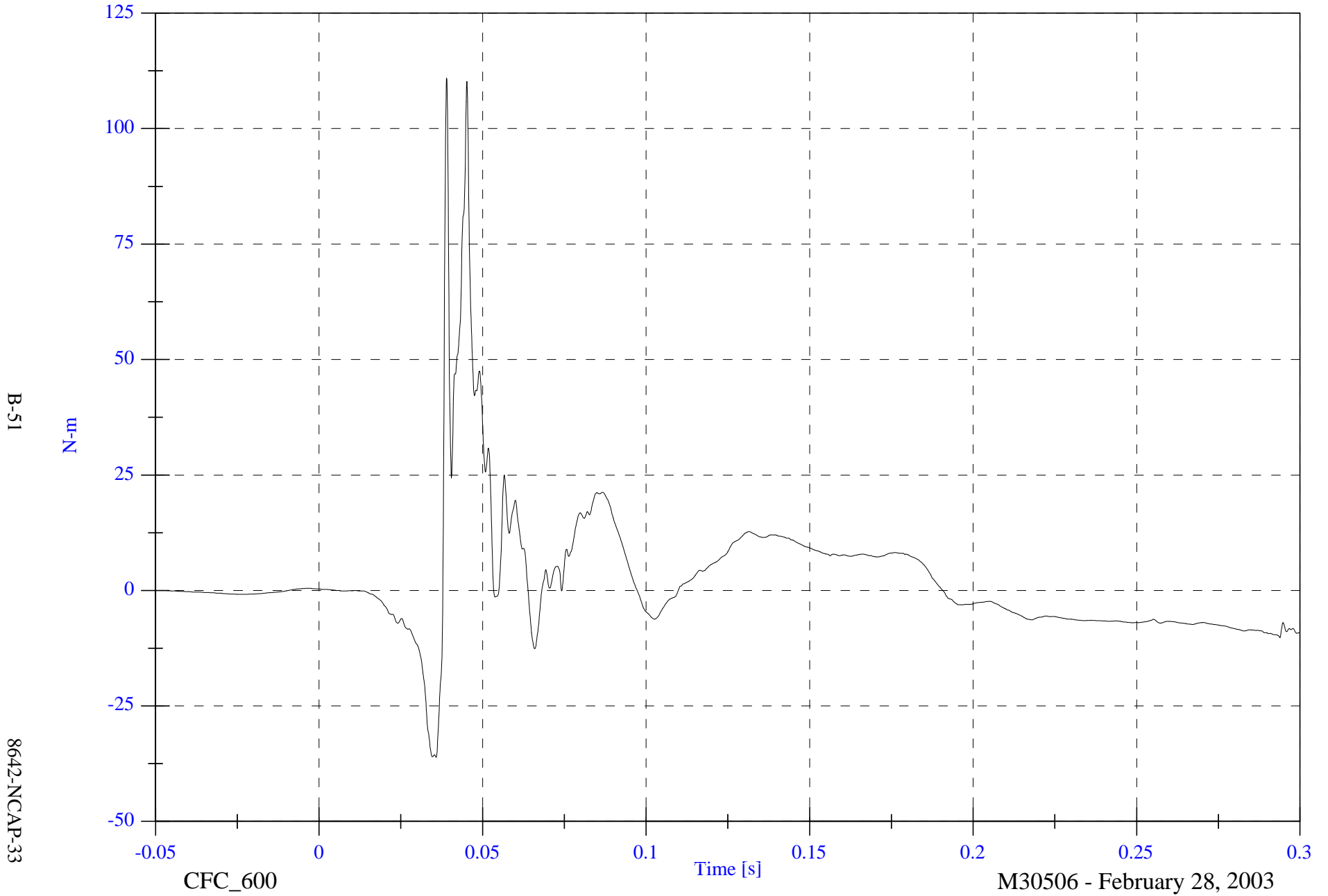
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 110.9 [N-m] at 0.039 [s]

V1P1 Right Upper Tibia My

Min: -36.1 [N-m] at 0.036 [s]



B-51

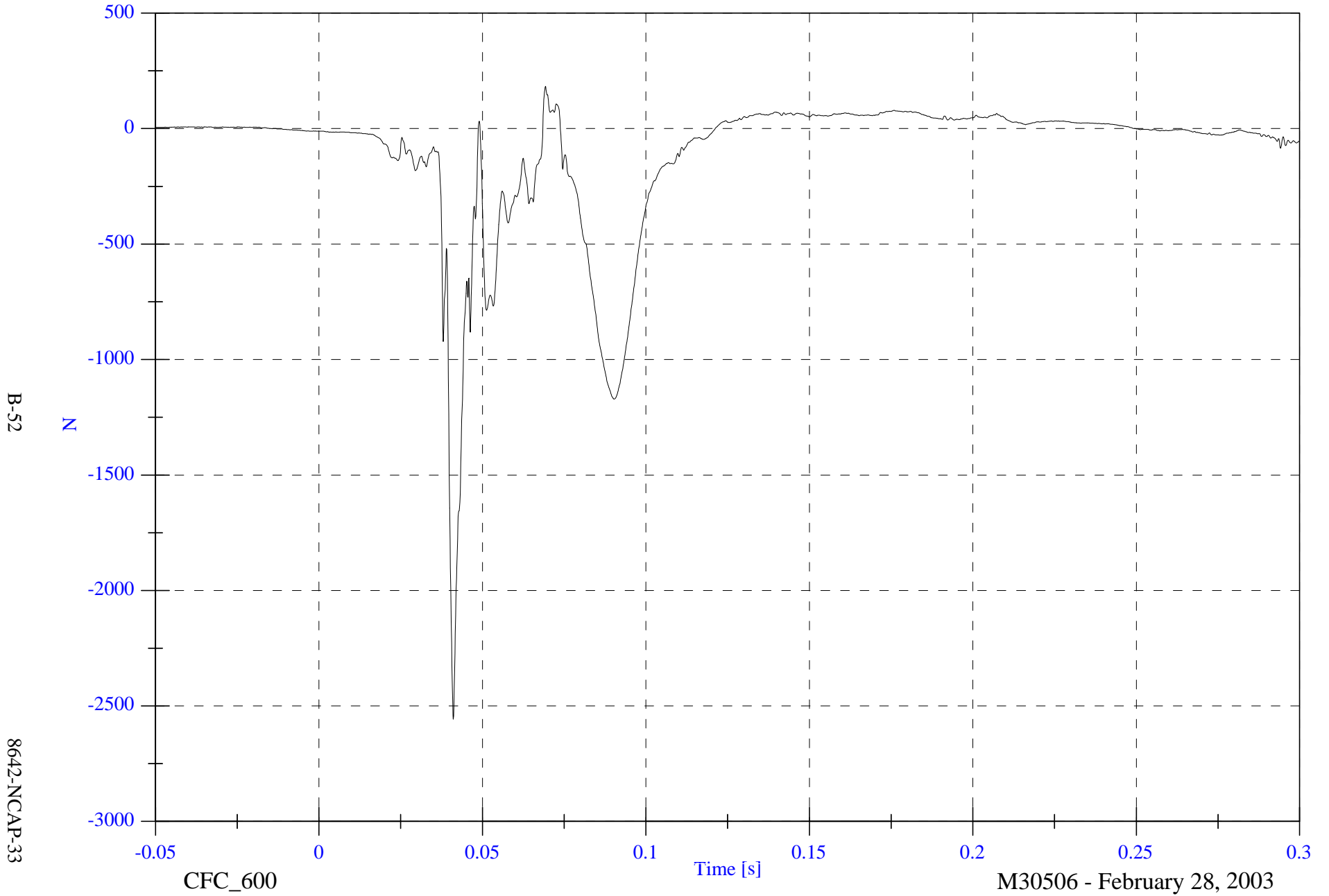
8642-NCAP-33

NCAP Test #11 - 2003 Isuzu Rodeo

VIP1 Right Lower Tibia Fz

Max: 182.4 [N] at 0.069 [s]

Min: -2557.4 [N] at 0.041 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

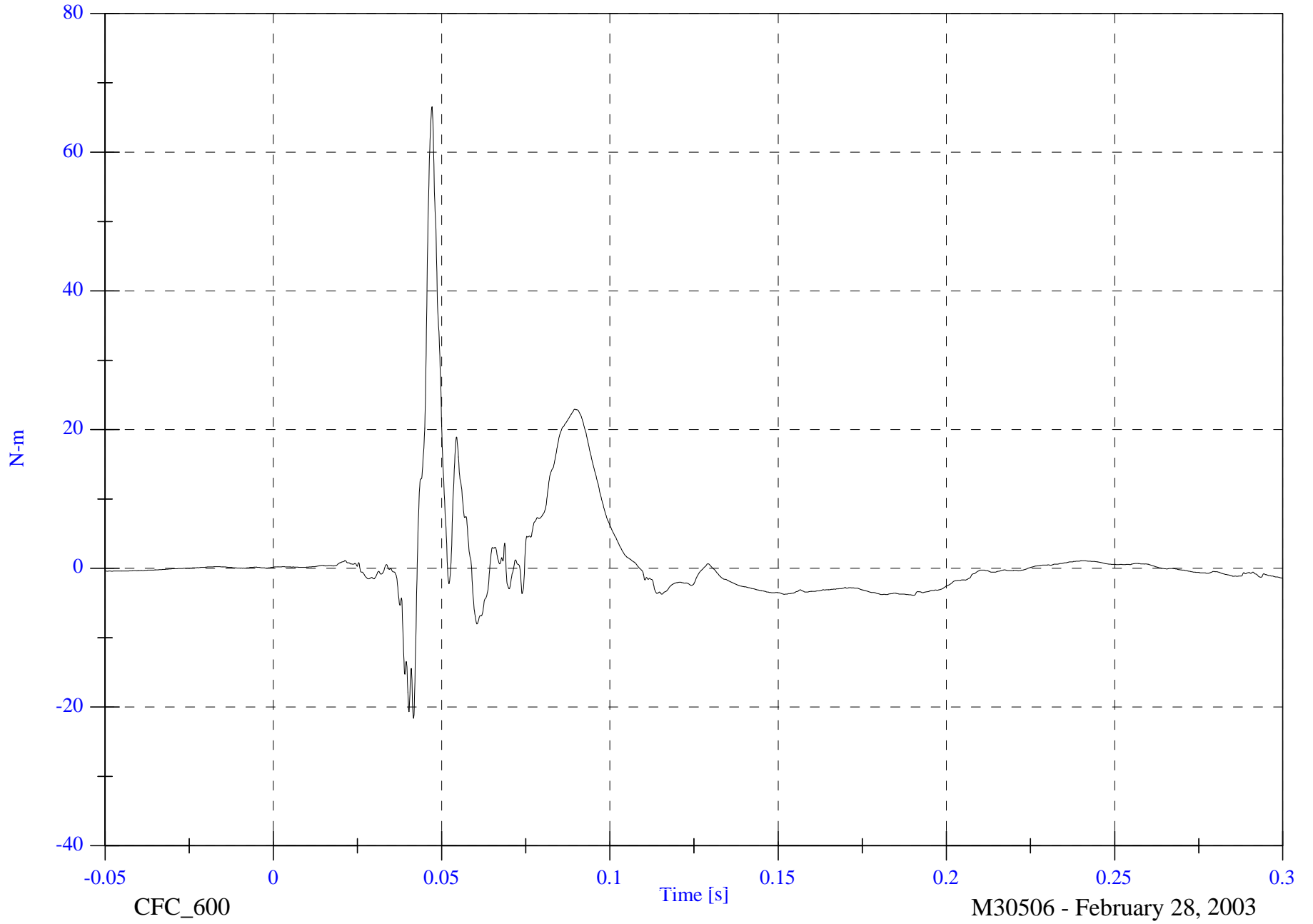
Max: 66.5 [N-m] at 0.047 [s]

V1P1 Right Lower Tibia Mx

Min: -21.6 [N-m] at 0.042 [s]

B-53

8642-NCAP-33

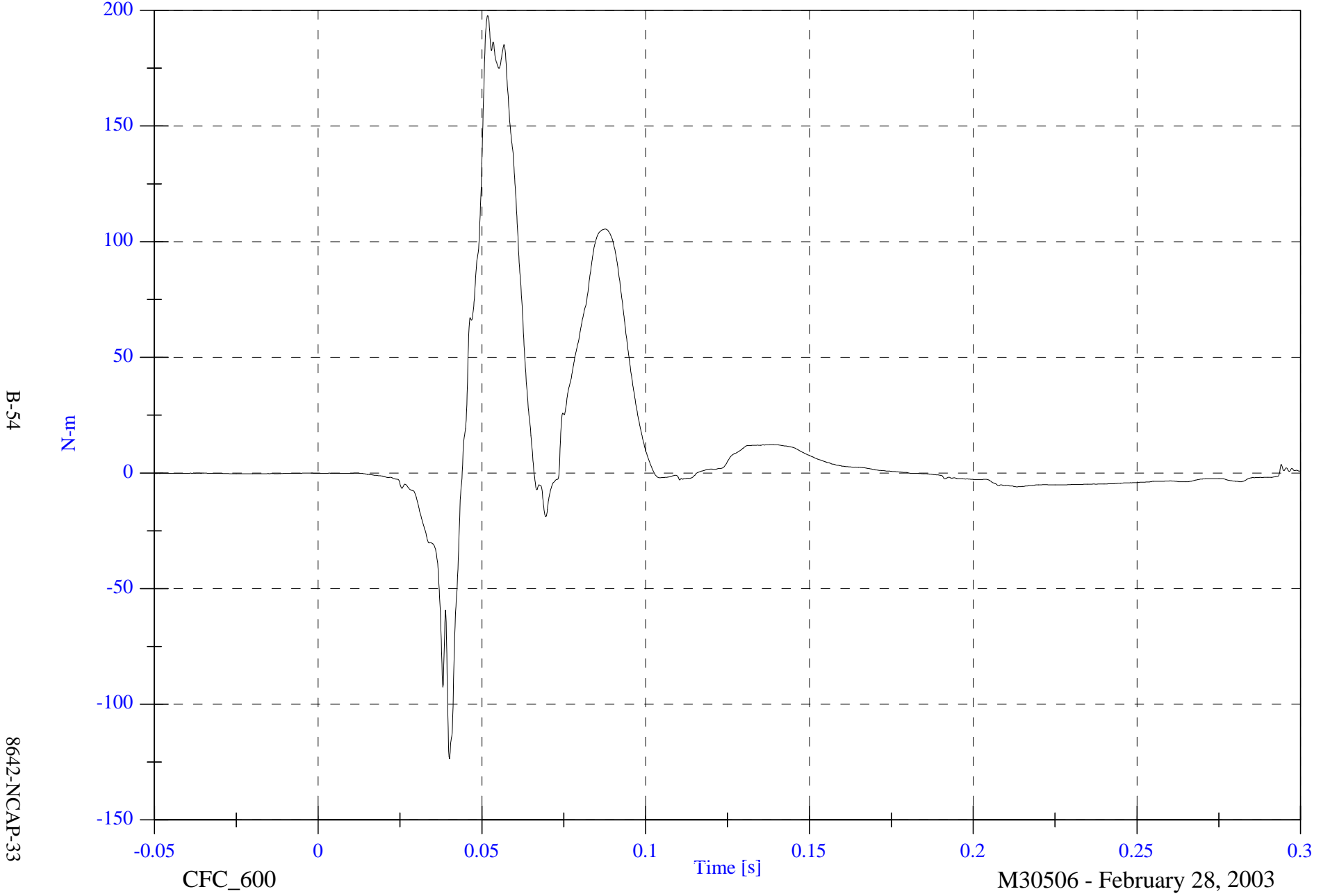


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 197.7 [N-m] at 0.052 [s]

V1P1 Right Lower Tibia My

Min: -123.6 [N-m] at 0.040 [s]



B-54

8642-NCAP-33

CFC\_600

Time [s]

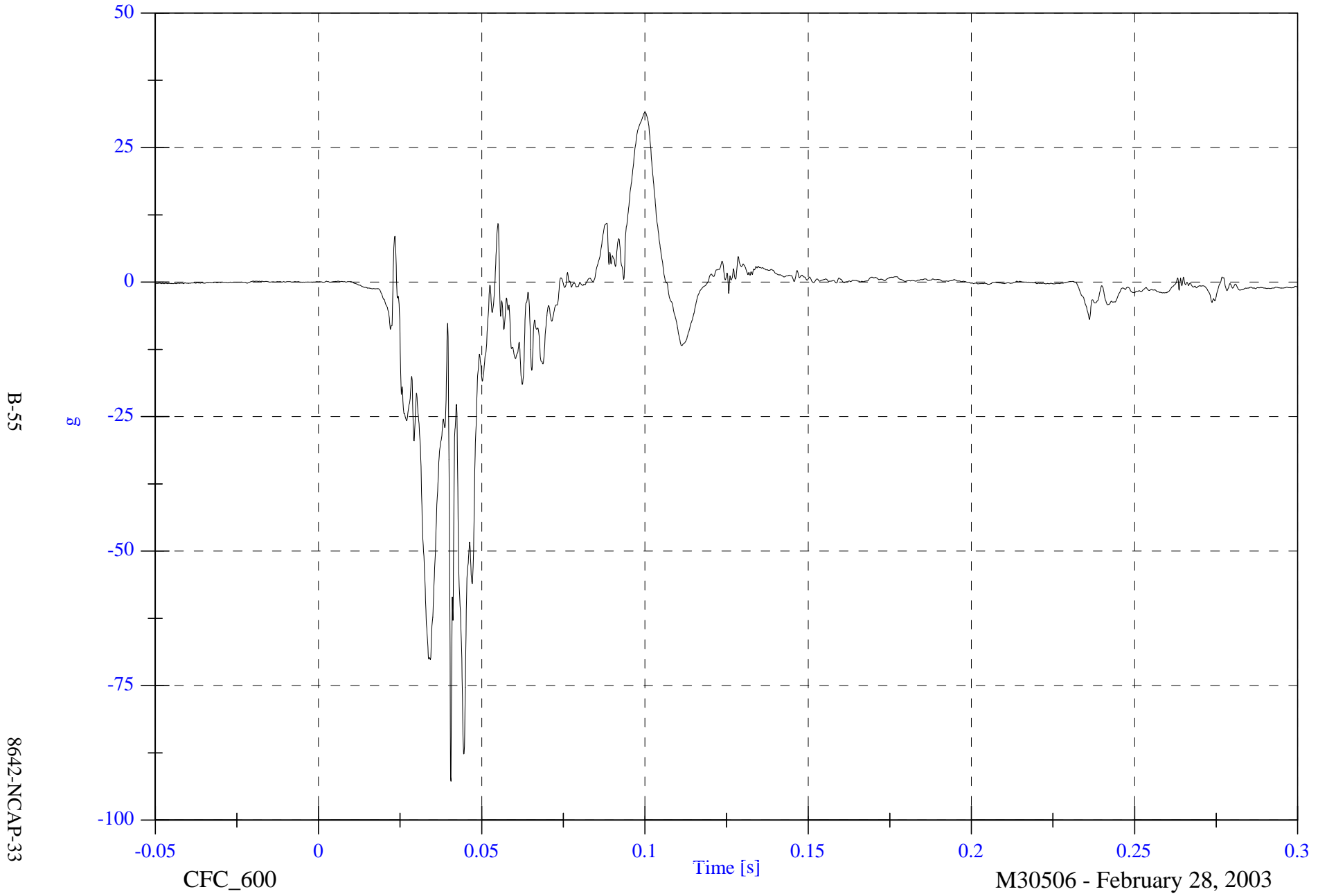
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 31.5 [g] at 0.100 [s]

Min: -92.8 [g] at 0.041 [s]

V1P1 Left Foot Aft x



B-55

8642-NCAP-33

CFC\_600

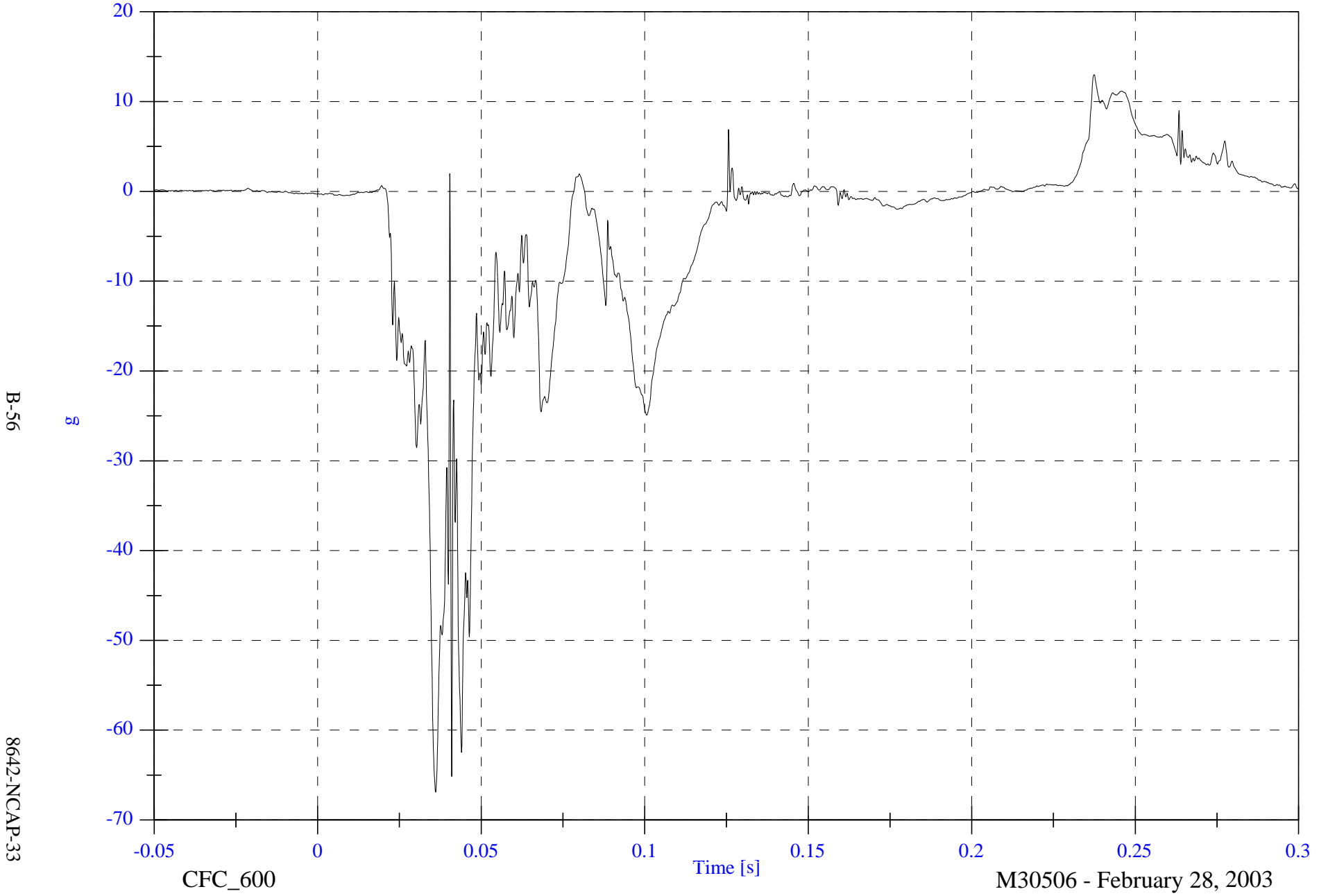
Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Left Foot Aft z

Max: 13.0 [g] at 0.237 [s]  
Min: -66.9 [g] at 0.036 [s]



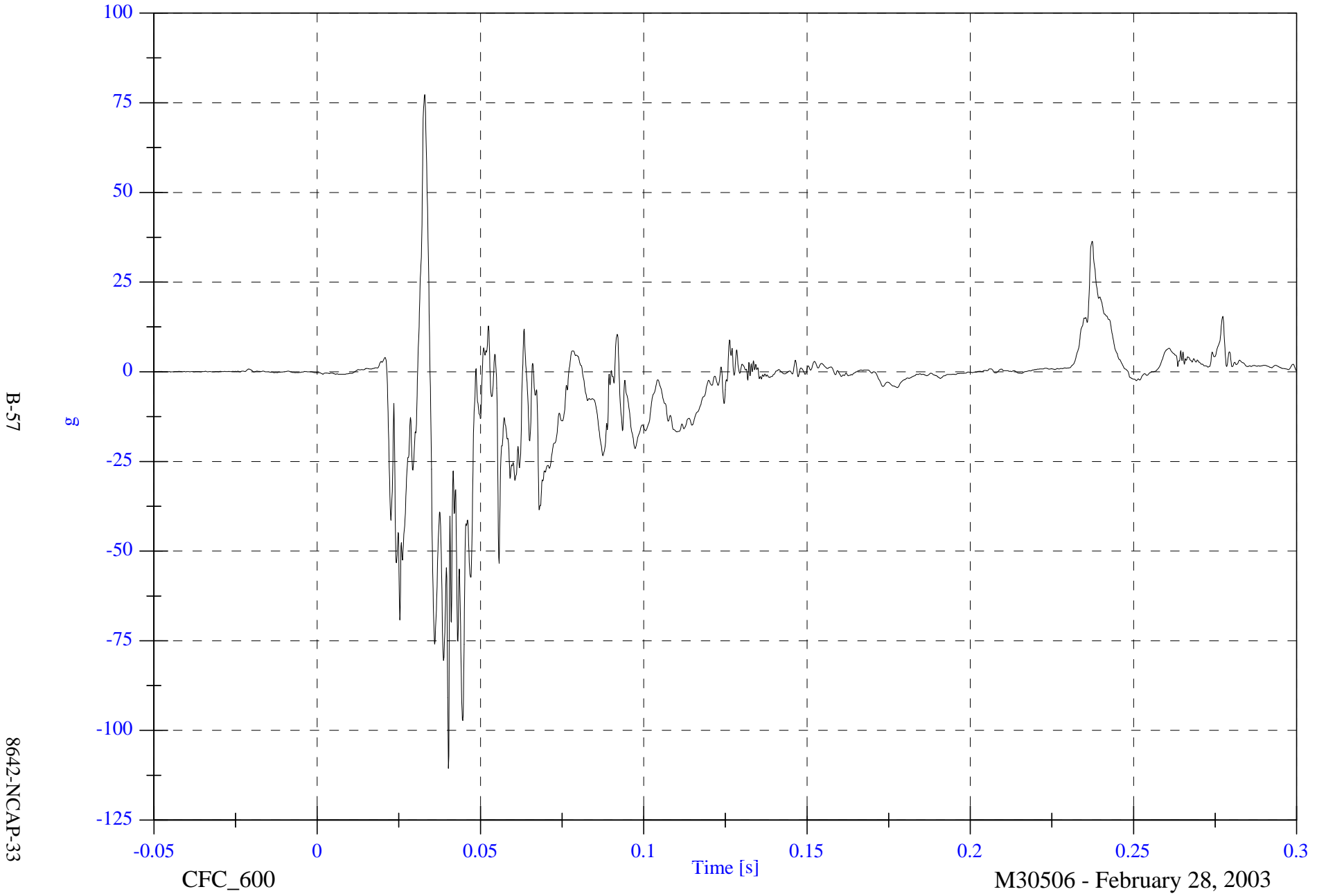
B-56

8642-NCAP-33

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Left Foot Fore z

Max: 77.3 [g] at 0.033 [s]  
Min: -110.5 [g] at 0.040 [s]



B-57

8642-NCAP-33

CFC\_600

Time [s]

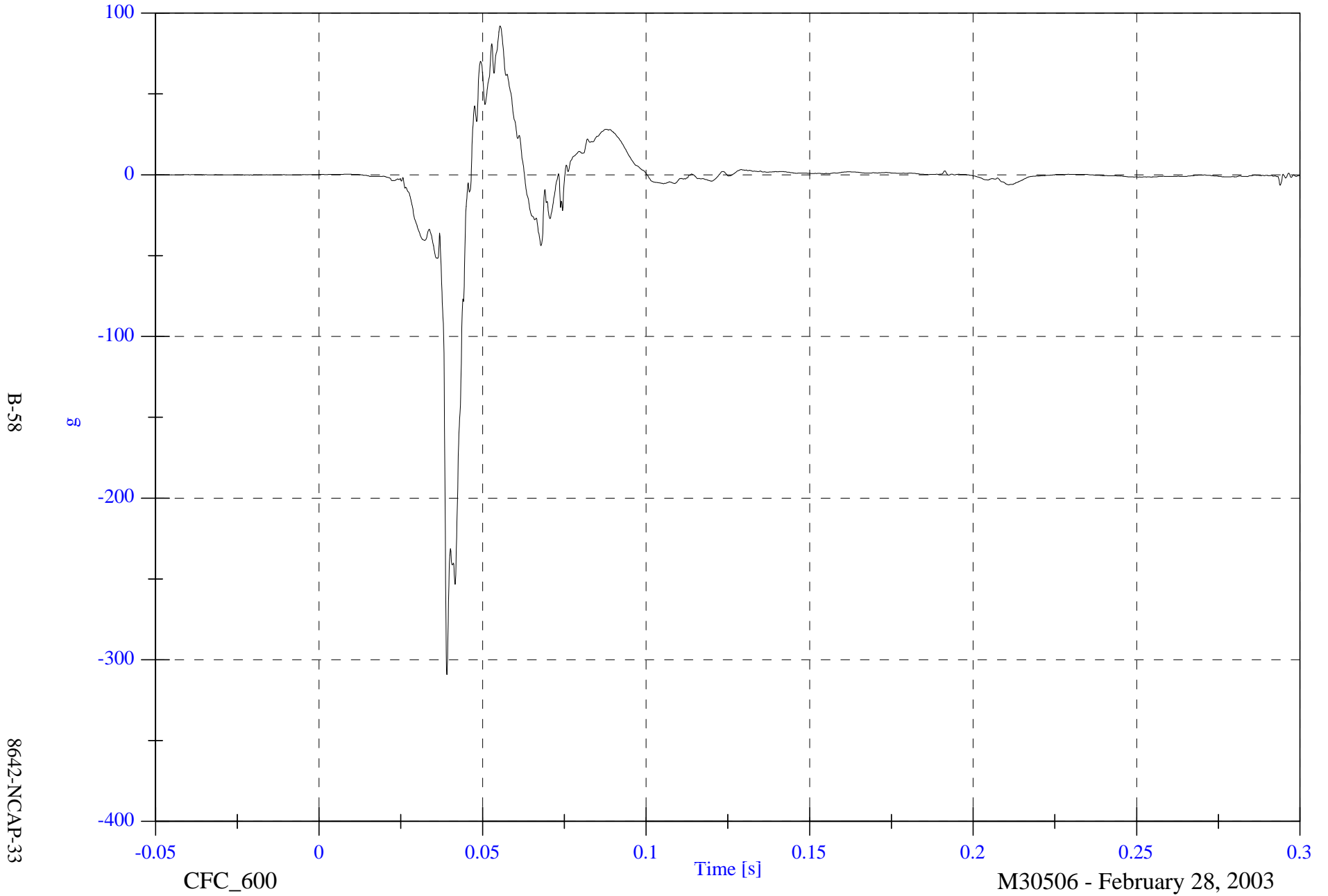
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

VIP1 Right Foot Aft x

Max: 92.1 [g] at 0.055 [s]

Min: -309.1 [g] at 0.039 [s]



B-58

8642-NCAP-33

CFC\_600

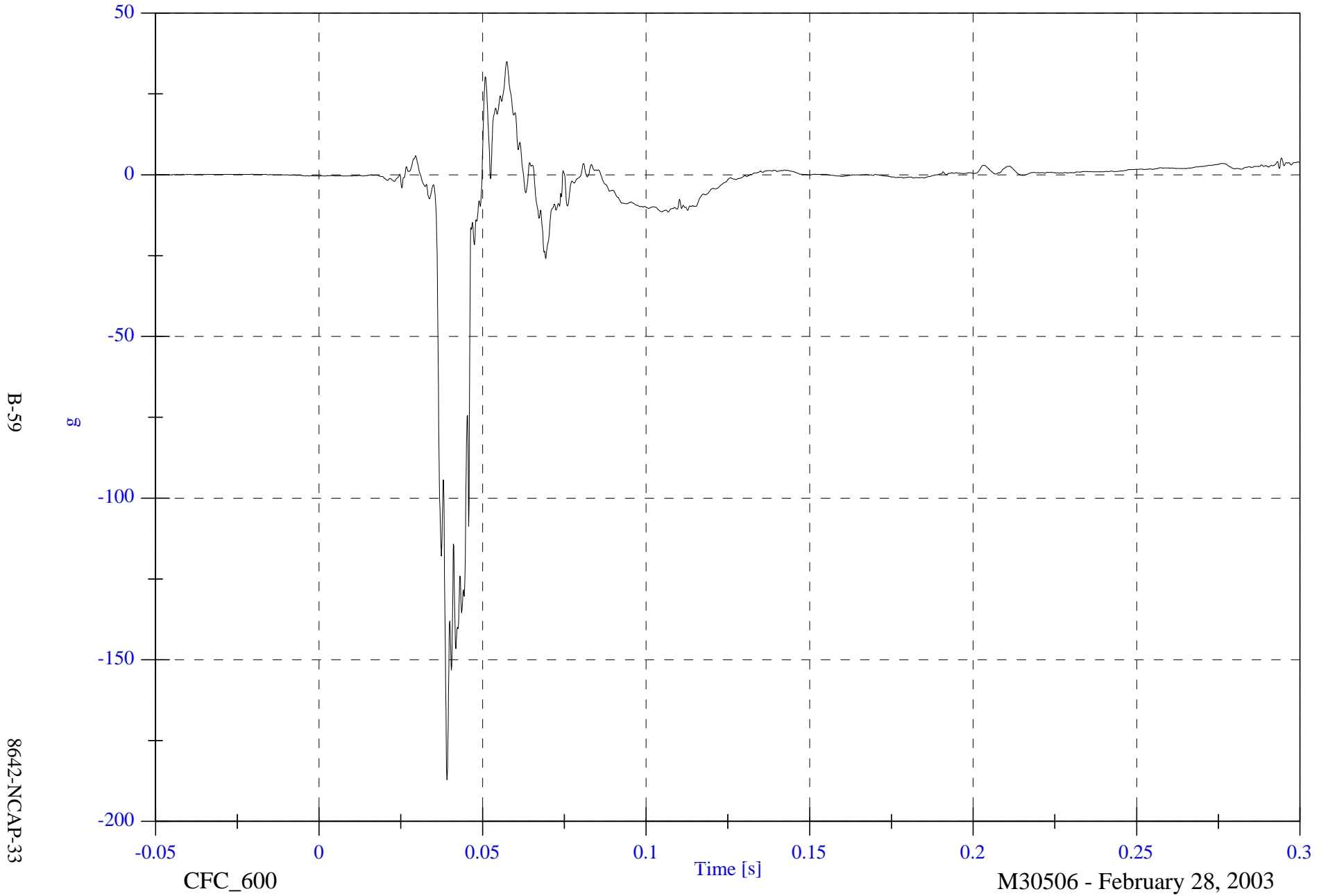
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Right Foot Aft z

Max: 35.0 [g] at 0.057 [s]

Min: -187.1 [g] at 0.039 [s]

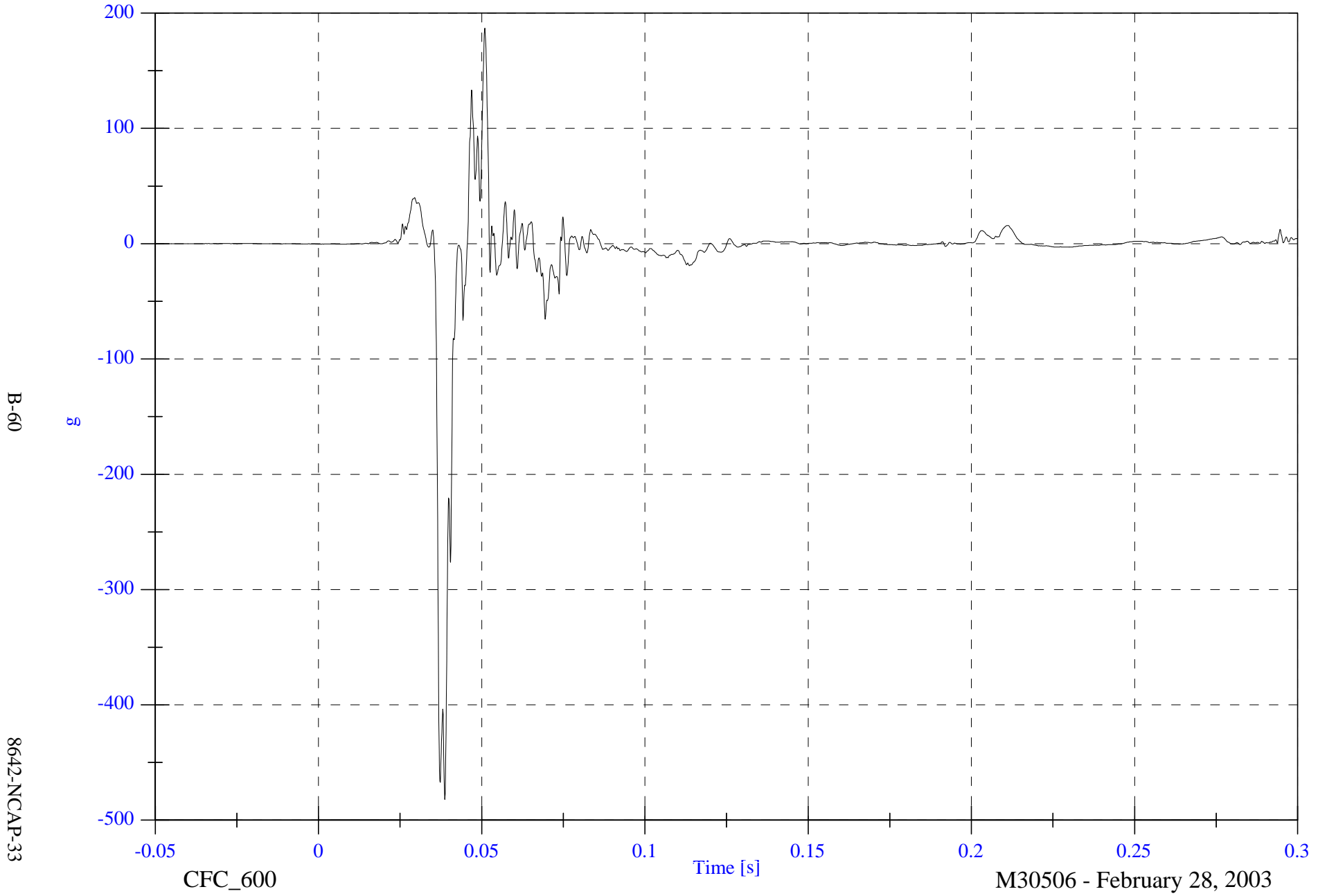


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 186.9 [g] at 0.051 [s]

Min: -481.9 [g] at 0.039 [s]

V1P1 Right Foot Fore z

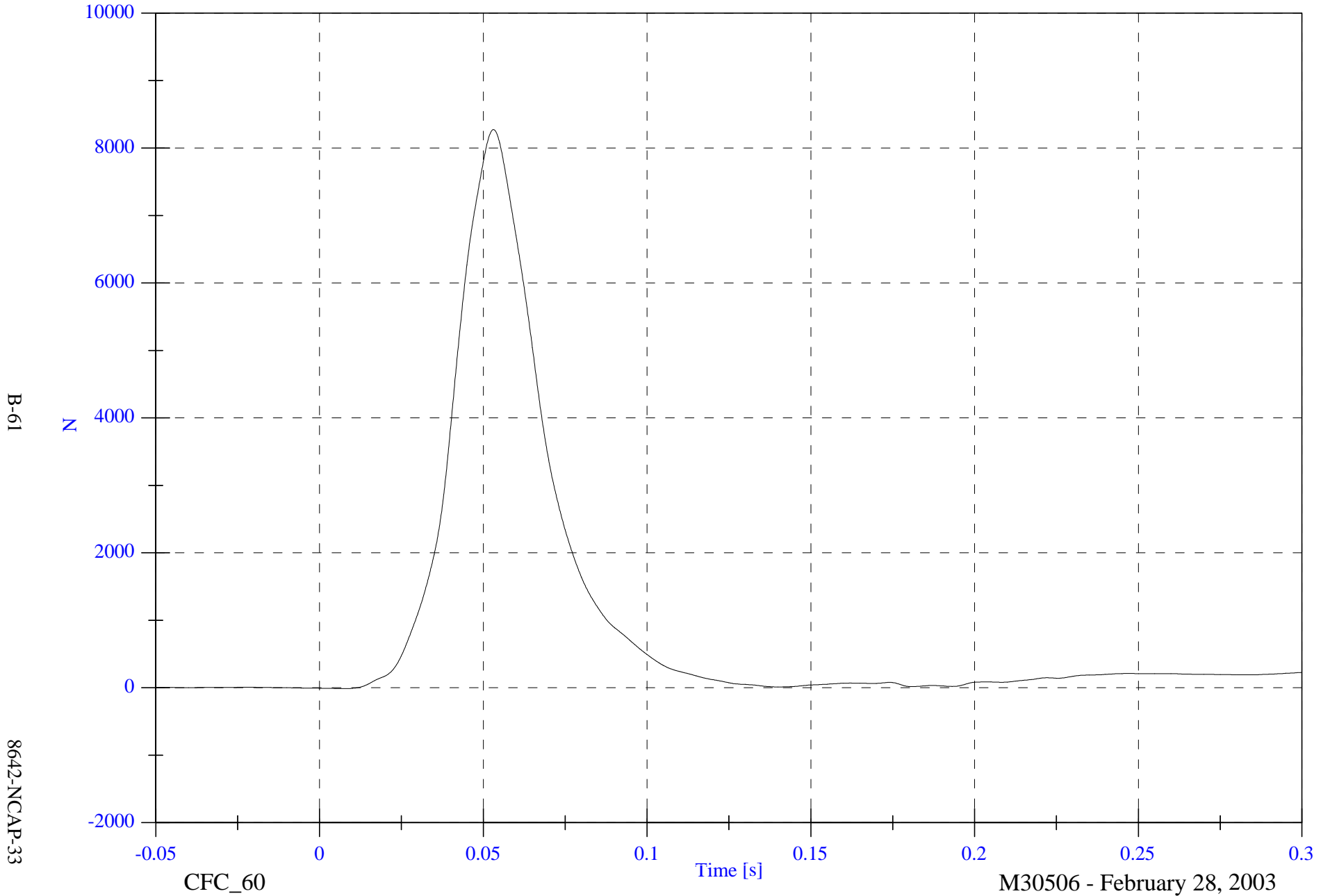


NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Lap Belt Load Cell

Max: 8273.8 [N] at 0.053 [s]

Min: -11.5 [N] at 0.008 [s]



B-61

8642-NCAP-33

CFC\_60

Time [s]

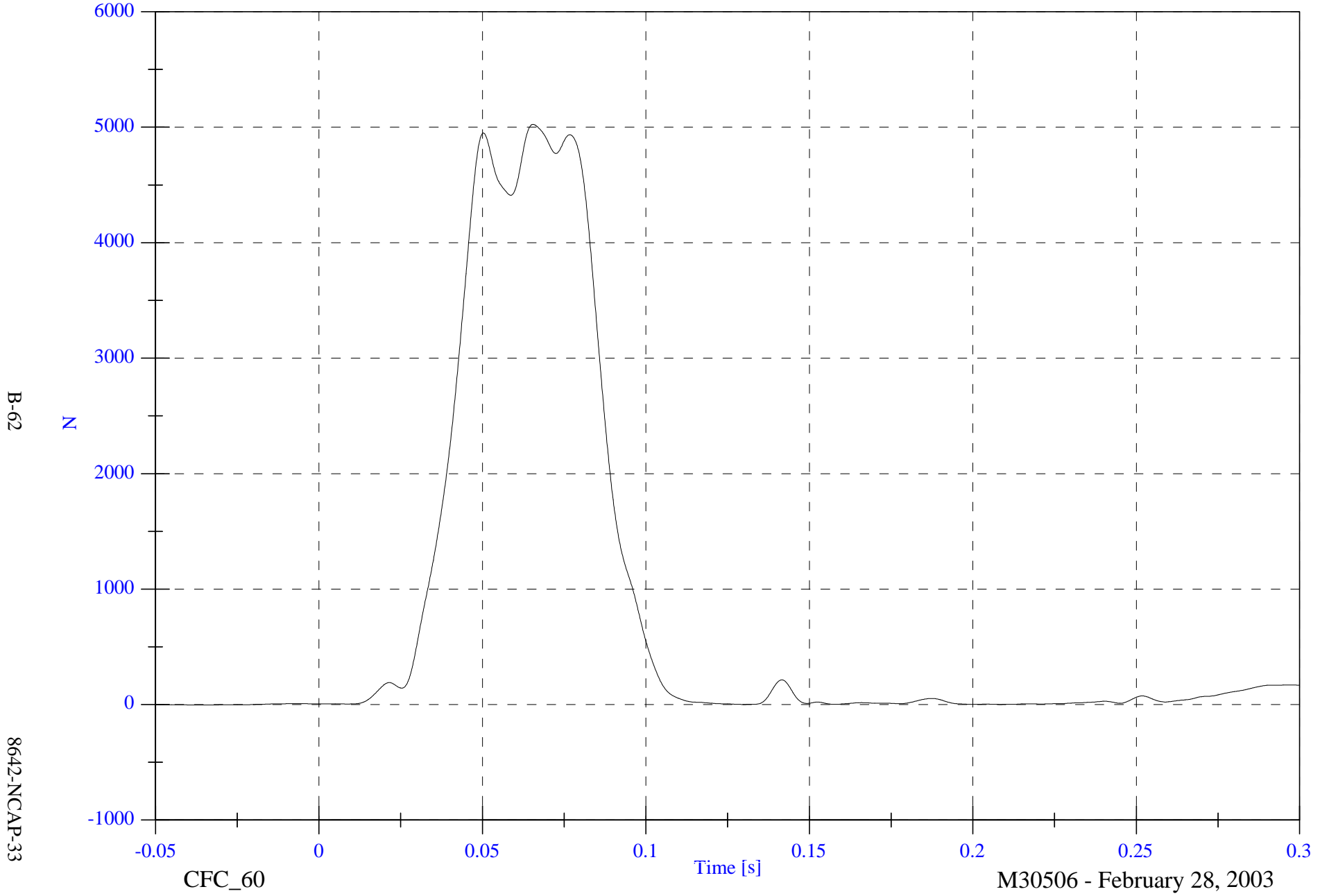
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P1 Shoulder Belt Load

Max: 5024.4 [N] at 0.065 [s]

Min: -3.3 [N] at -0.035 [s]

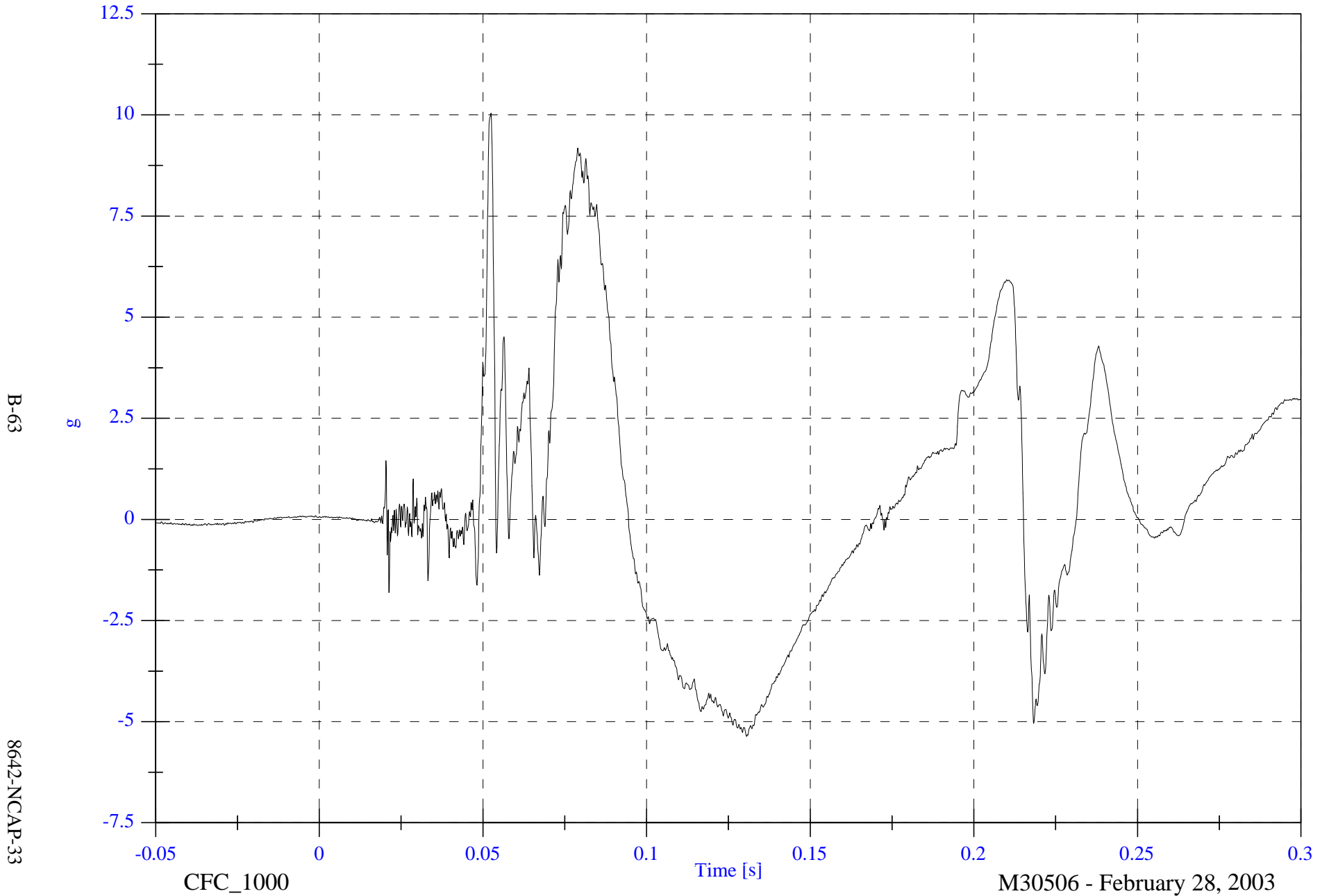


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Head 9 Array X Arm Ay

Max: 10.0 [g] at 0.053 [s]

Min: -5.4 [g] at 0.131 [s]



B-63

8642-NCAP-33

CFC\_1000

Time [s]

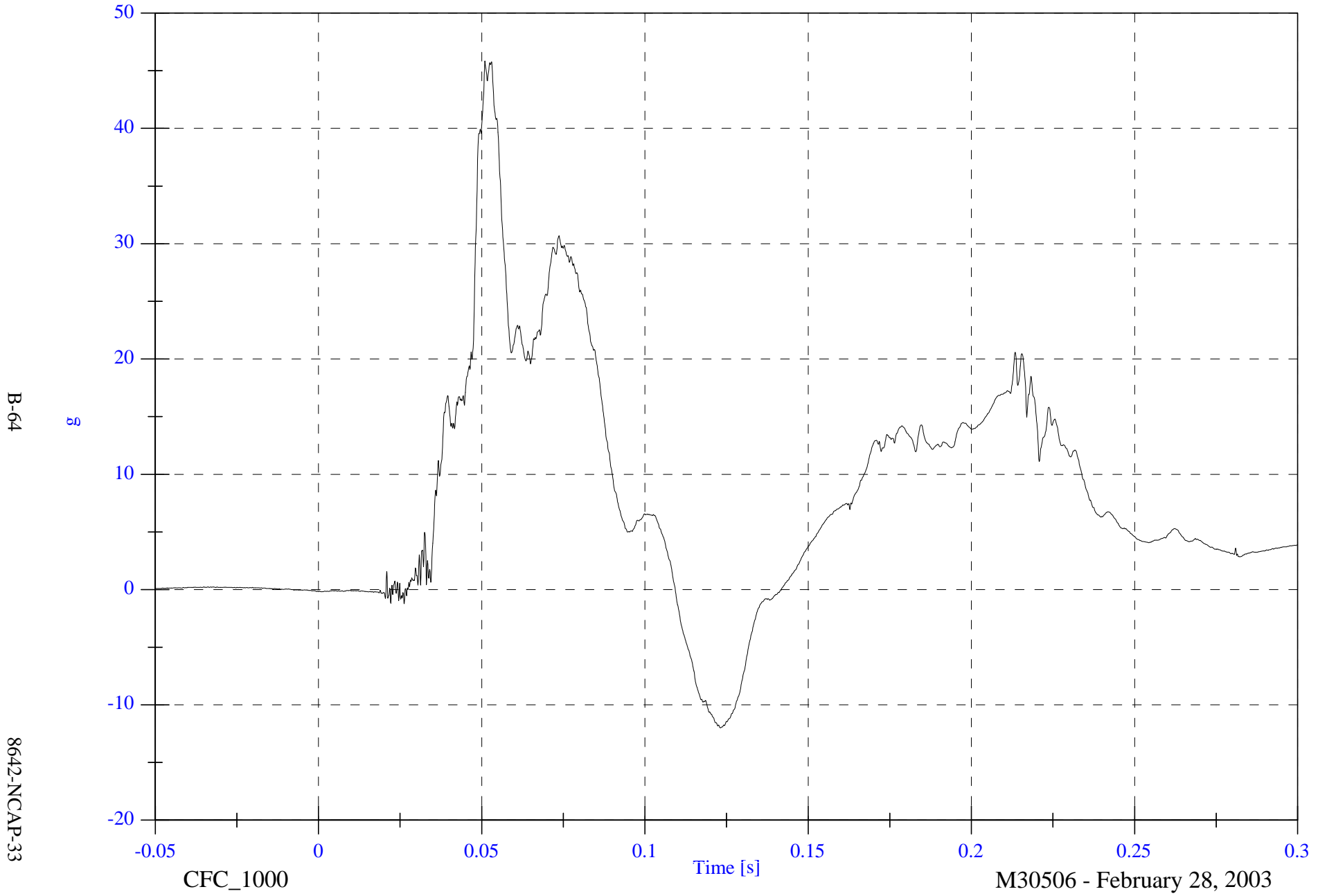
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Head 9 Array X Arm Az

Max: 45.8 [g] at 0.051 [s]

Min: -12.0 [g] at 0.123 [s]

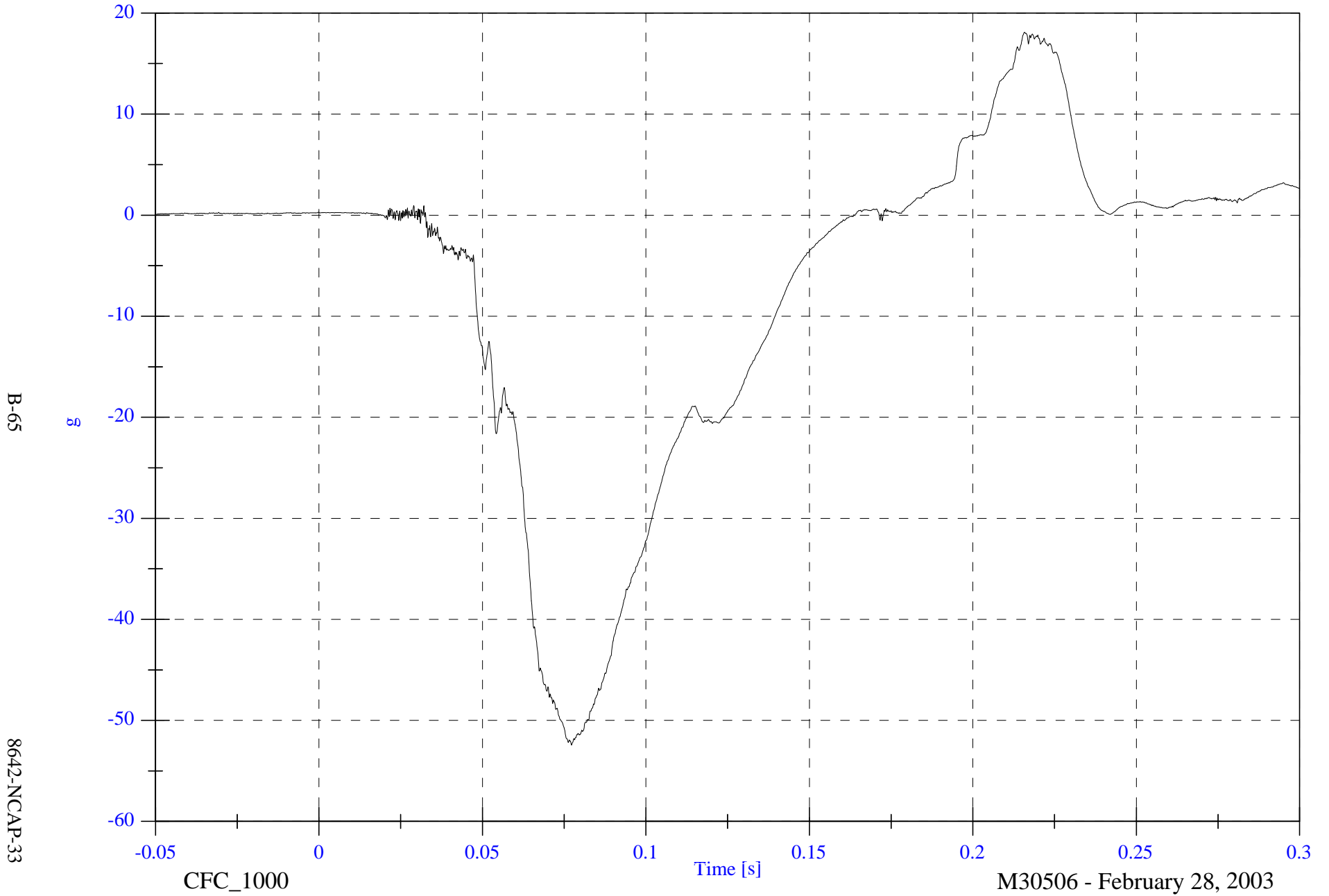


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Head 9 Array Y Arm Ax

Max: 18.1 [g] at 0.216 [s]

Min: -52.4 [g] at 0.077 [s]



B-65

8642-NCAP-33

NCAP Test #11 - 2003 Isuzu Rodeo

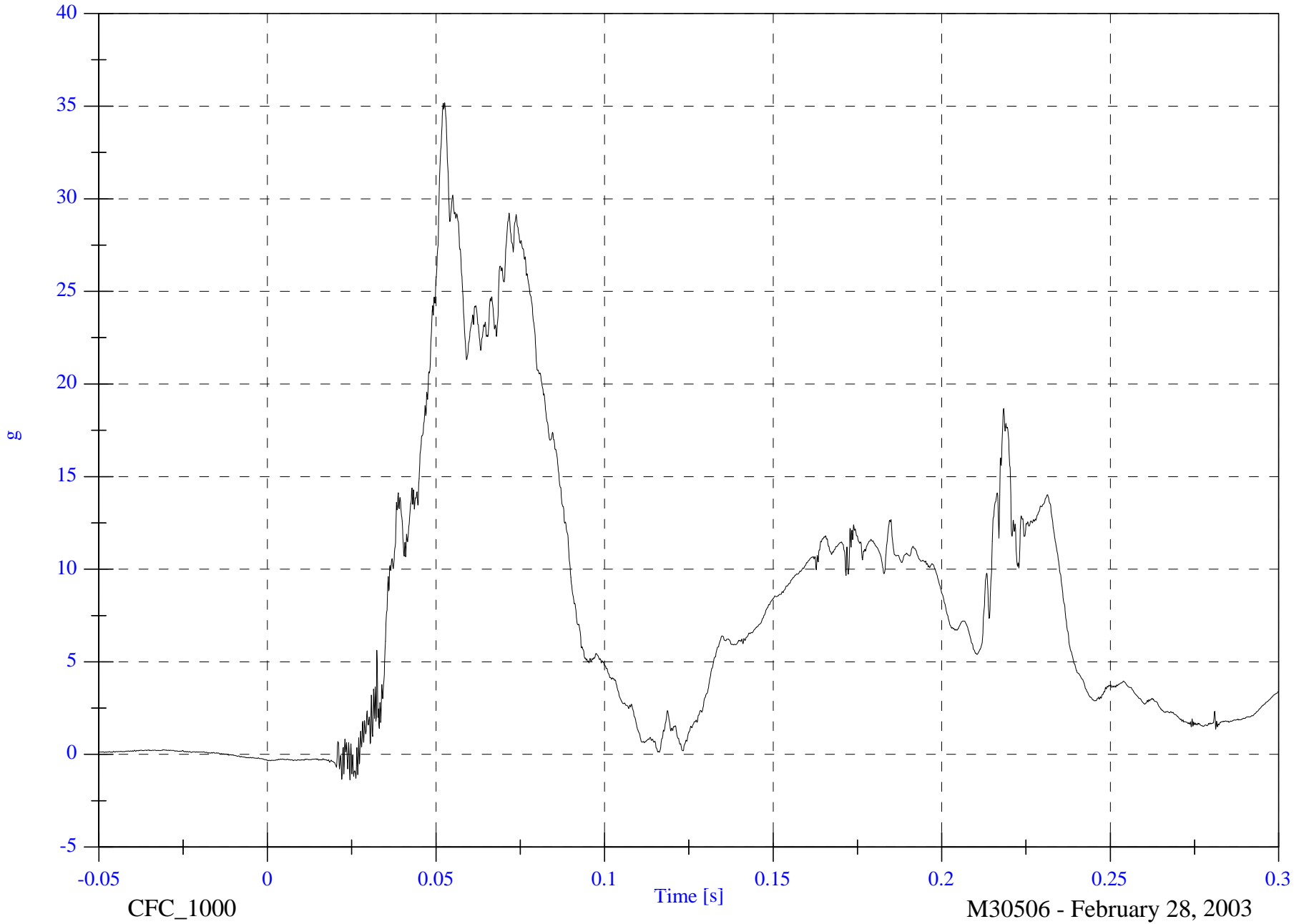
V1P2 Head 9 Array Y Arm Az

Max: 35.2 [g] at 0.053 [s]

Min: -1.4 [g] at 0.025 [s]

B-66

8642-NCAP-33



CFC\_1000

Time [s]

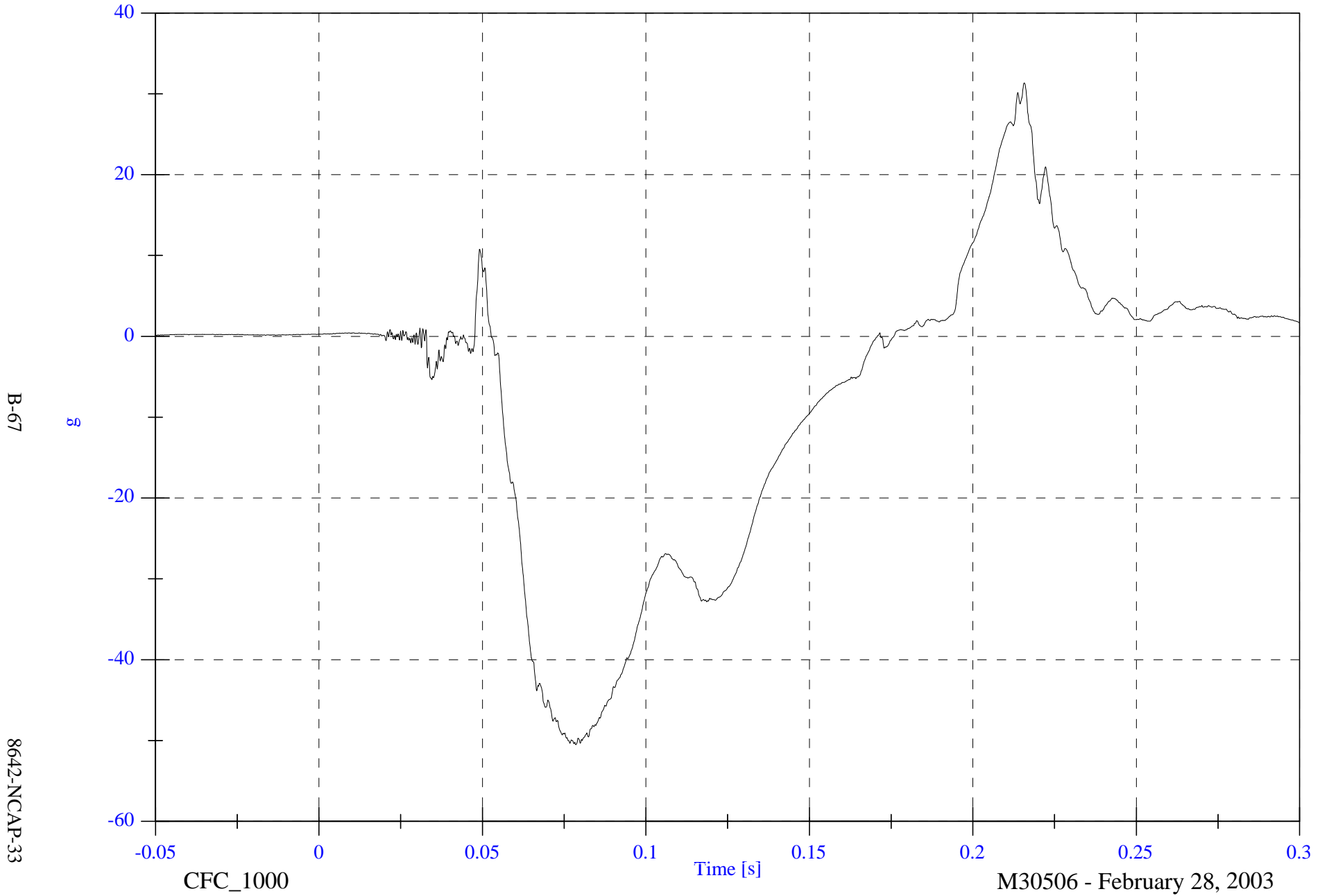
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Head 9 Array Z Arm Ax

Max: 31.3 [g] at 0.216 [s]

Min: -50.5 [g] at 0.079 [s]



B-67

8642-NCAP-33

CFC\_1000

Time [s]

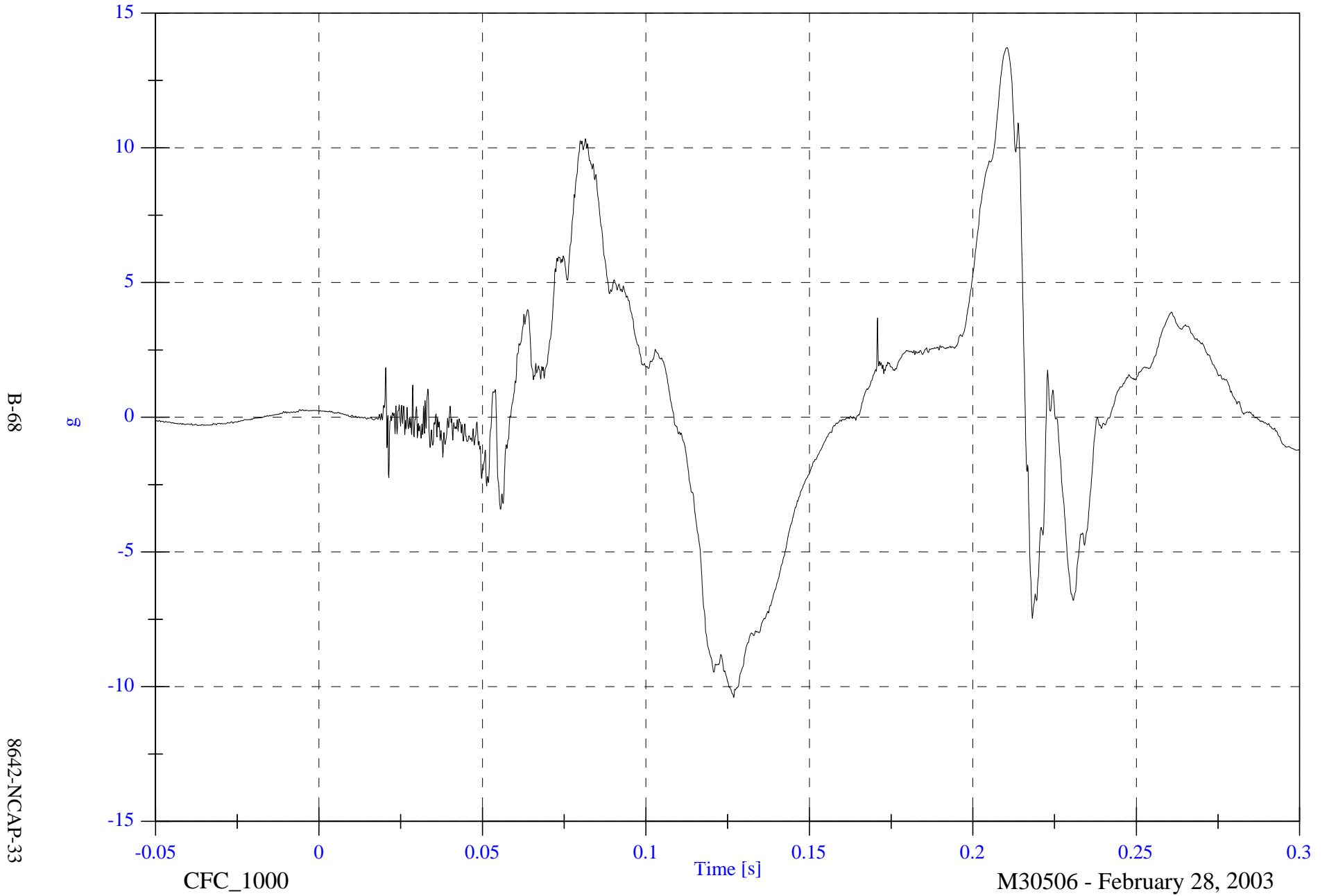
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Head 9 Array Z Arm Ay

Max: 13.7 [g] at 0.210 [s]

Min: -10.4 [g] at 0.127 [s]



B-68

8642-NCAP-33

NCAP Test #11 - 2003 Isuzu Rodeo

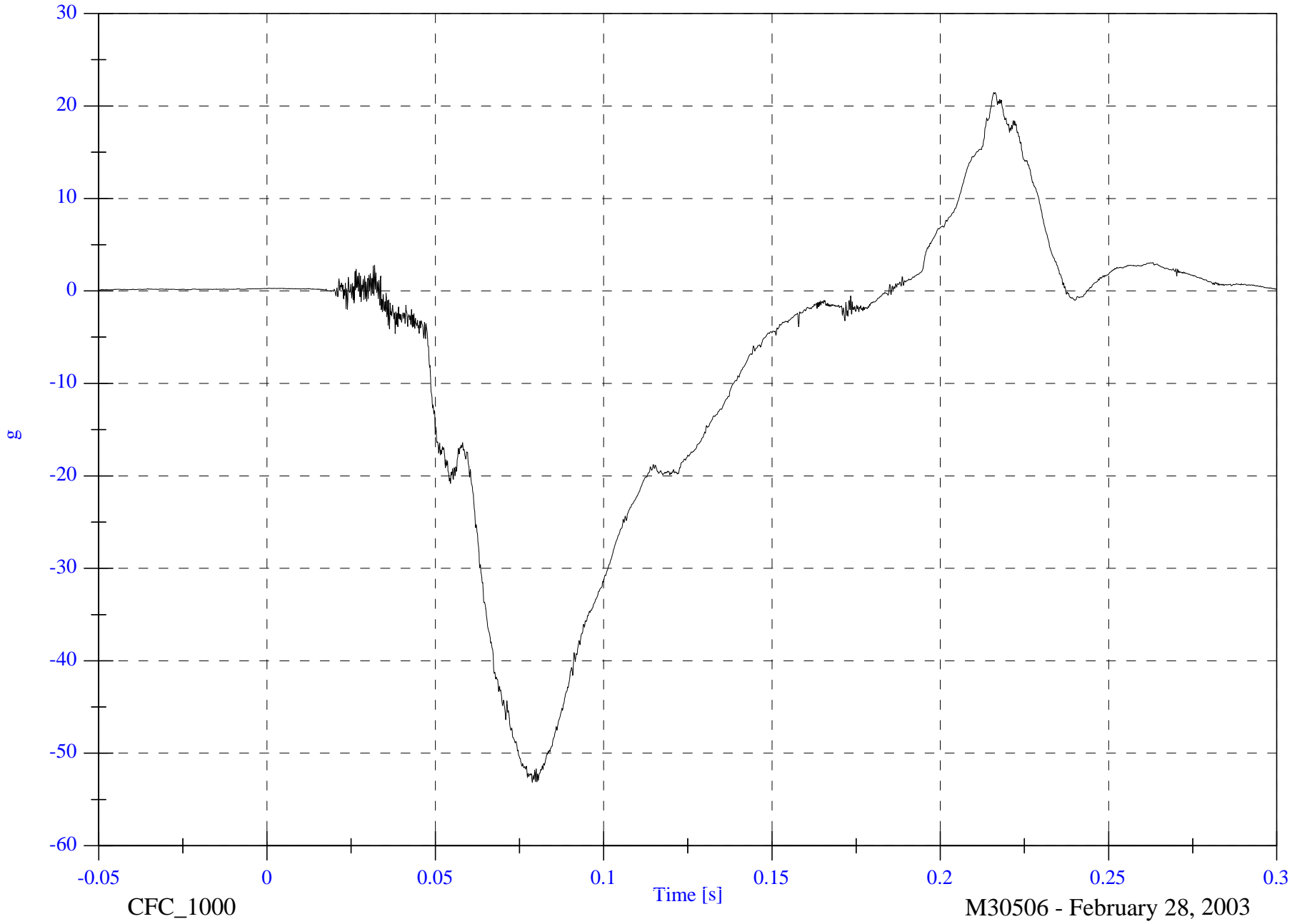
V1P2 Head CG x

Max: 21.4 [g] at 0.216 [s]

Min: -53.1 [g] at 0.079 [s]

B-69

8642-NCAP-33



CFC\_1000

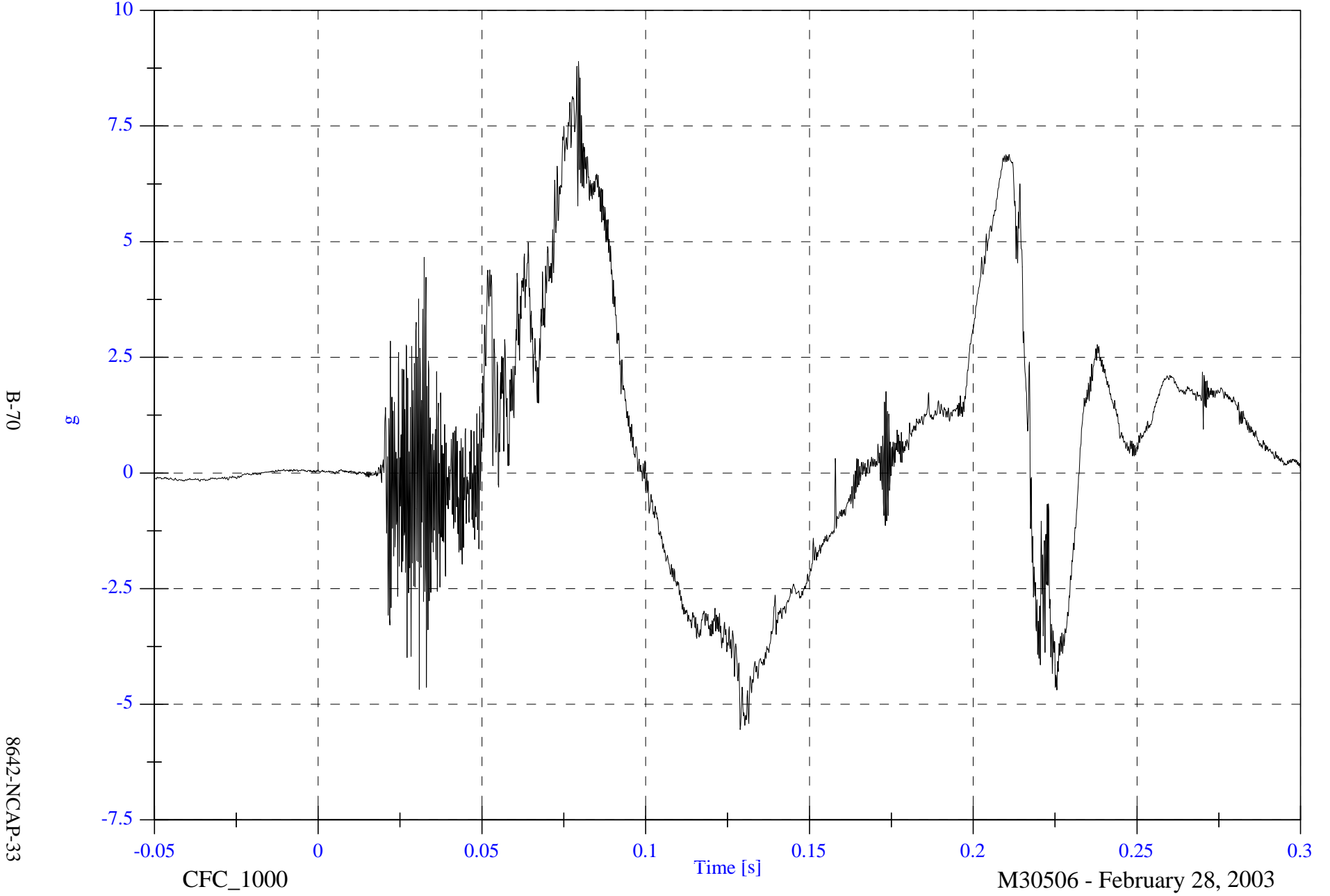
Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Head CG y

Max: 8.9 [g] at 0.079 [s]  
Min: -5.5 [g] at 0.129 [s]



B-70

8642-NCAP-33

CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

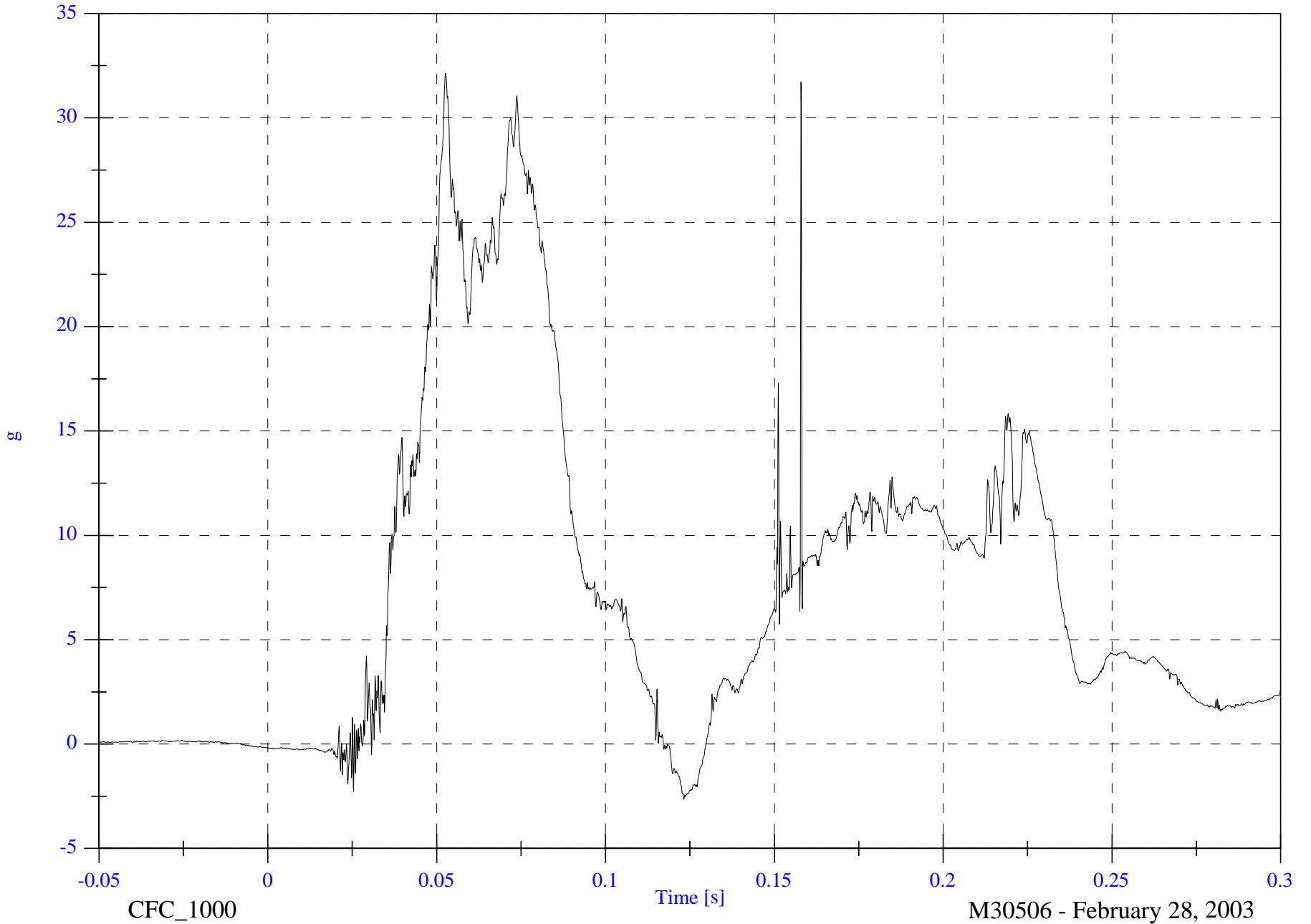
V1P2 Head CG z

Max: 32.1 [g] at 0.053 [s]

Min: -2.7 [g] at 0.123 [s]

B-71

8642-NCAP-33



CFC\_1000

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

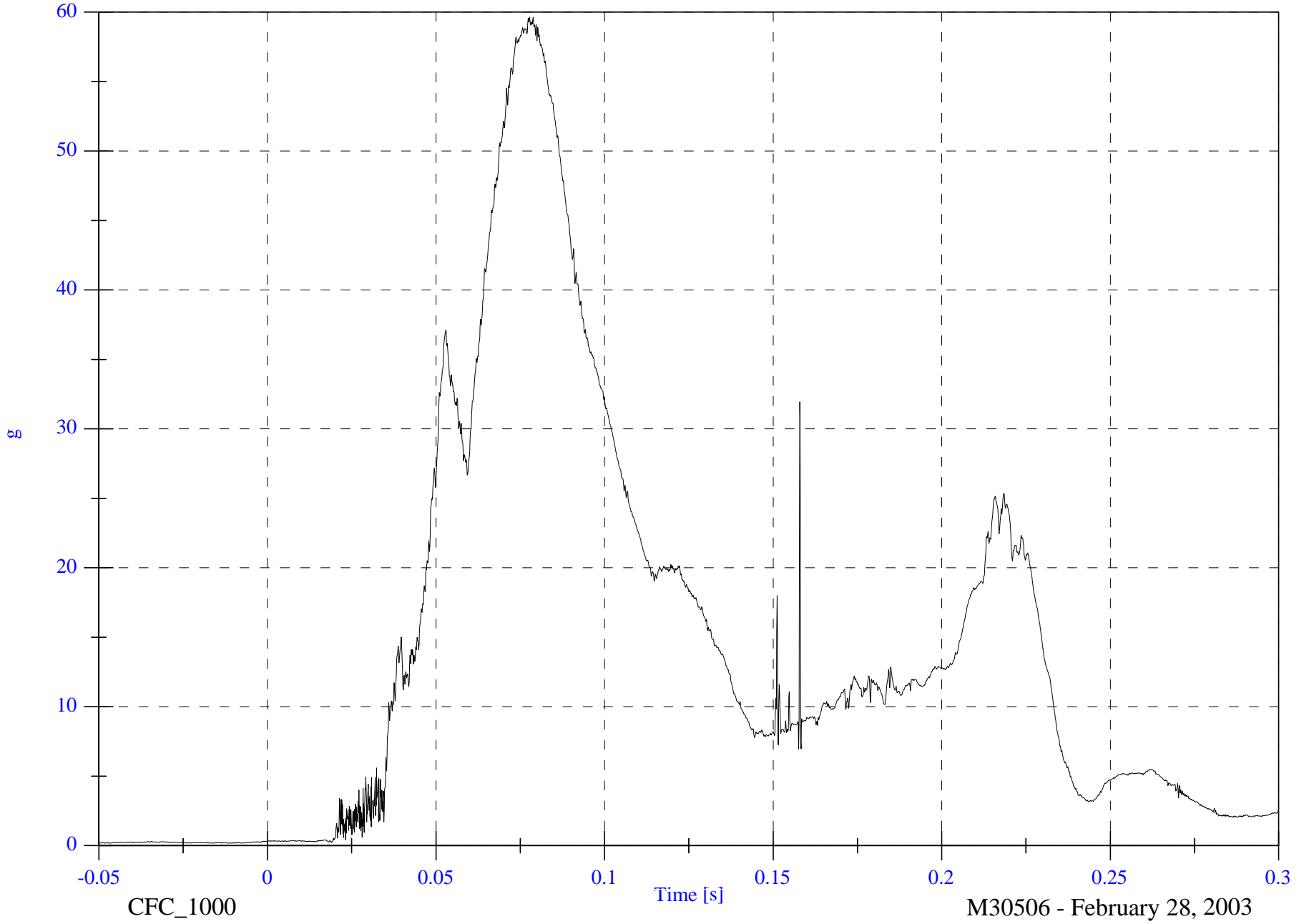
V1P2 Head CG Resultant

Max: 59.6 [g] at 0.078 [s]

Min: 0.2 [g] at -0.011 [s]

B-72

8642-NCAP-33



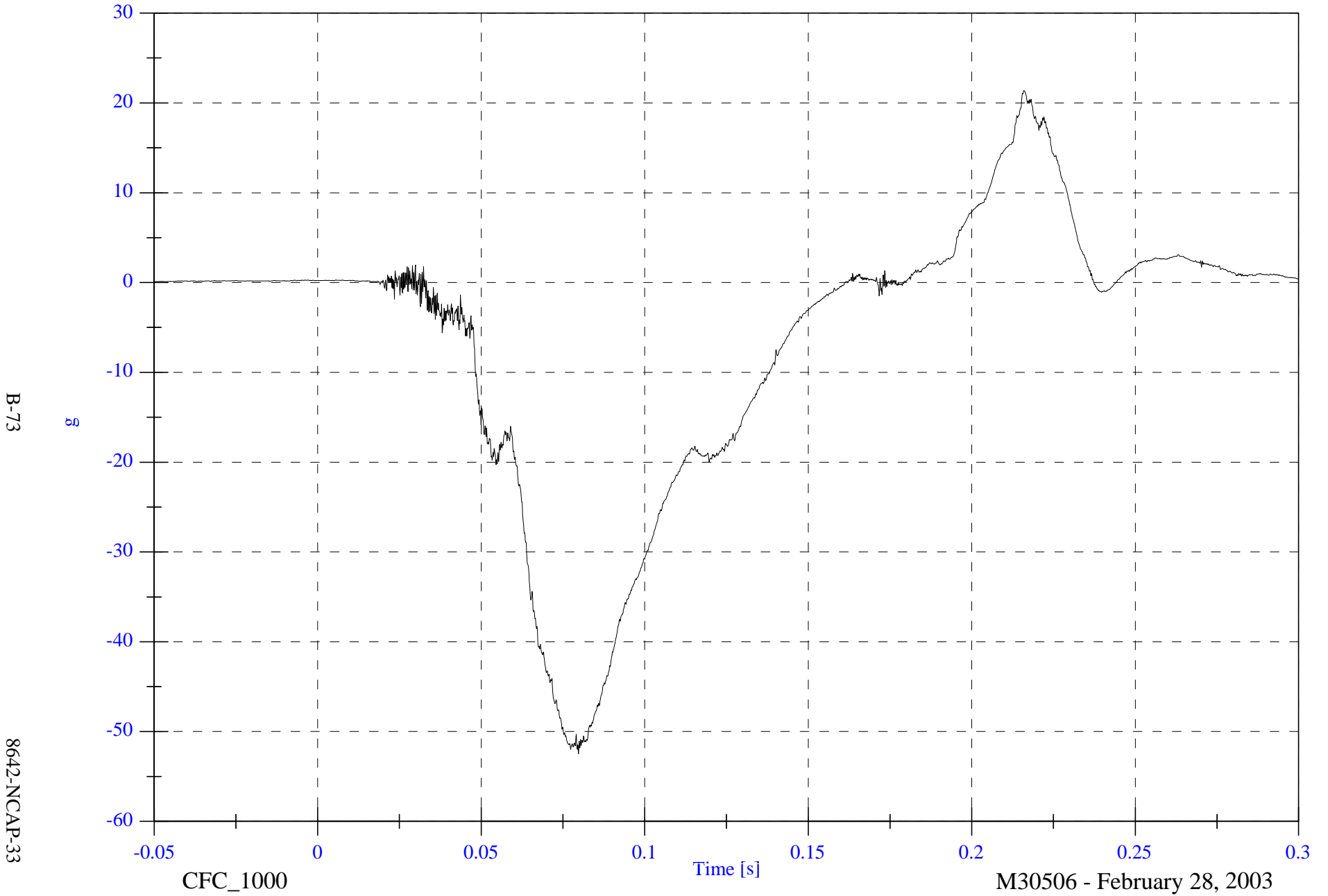
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Head CG Red x

Max: 21.4 [g] at 0.216 [s]

Min: -52.5 [g] at 0.080 [s]

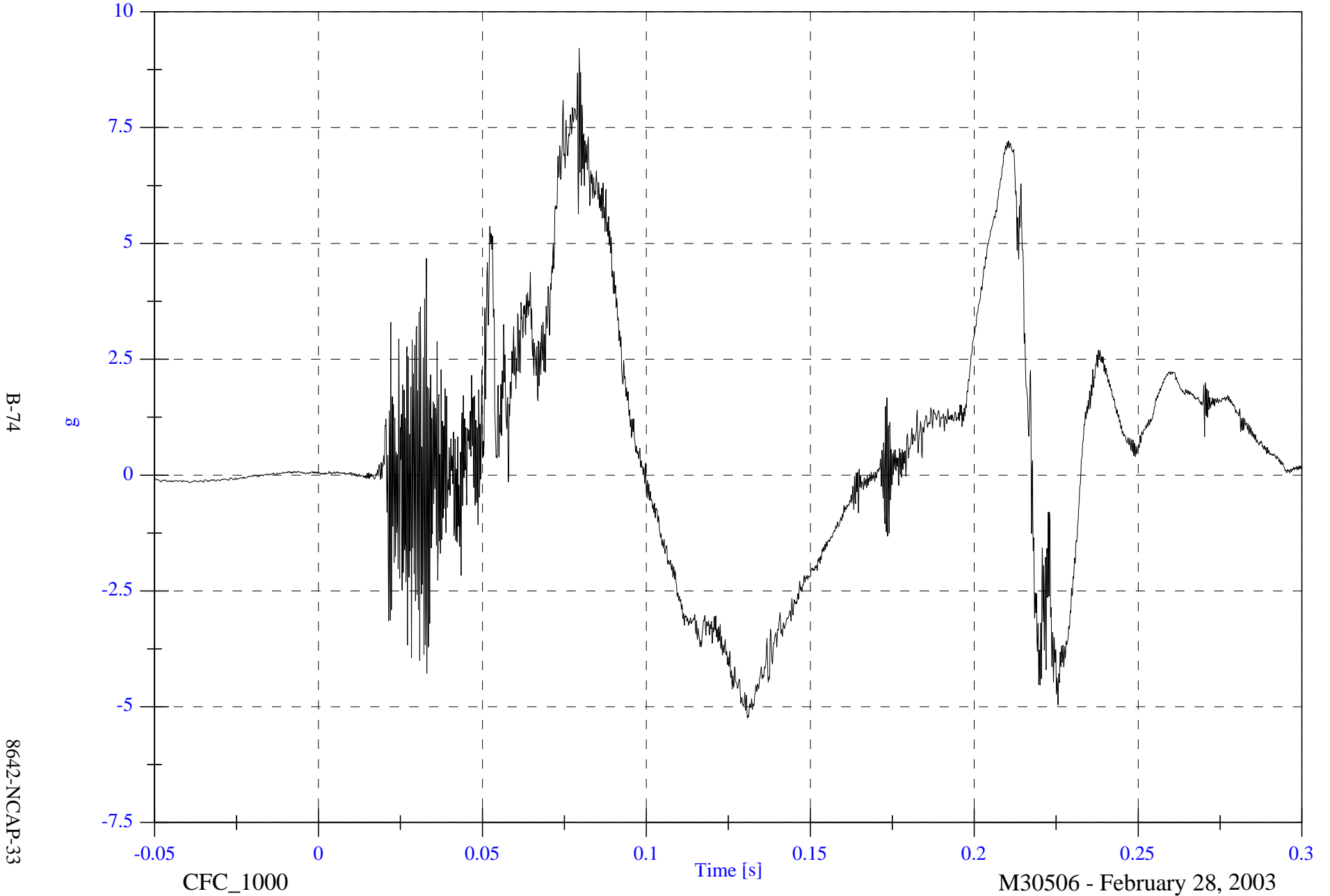


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Head CG Red y

Max: 9.2 [g] at 0.079 [s]

Min: -5.2 [g] at 0.131 [s]



B-74

8642-NCAP-33

CFC\_1000

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

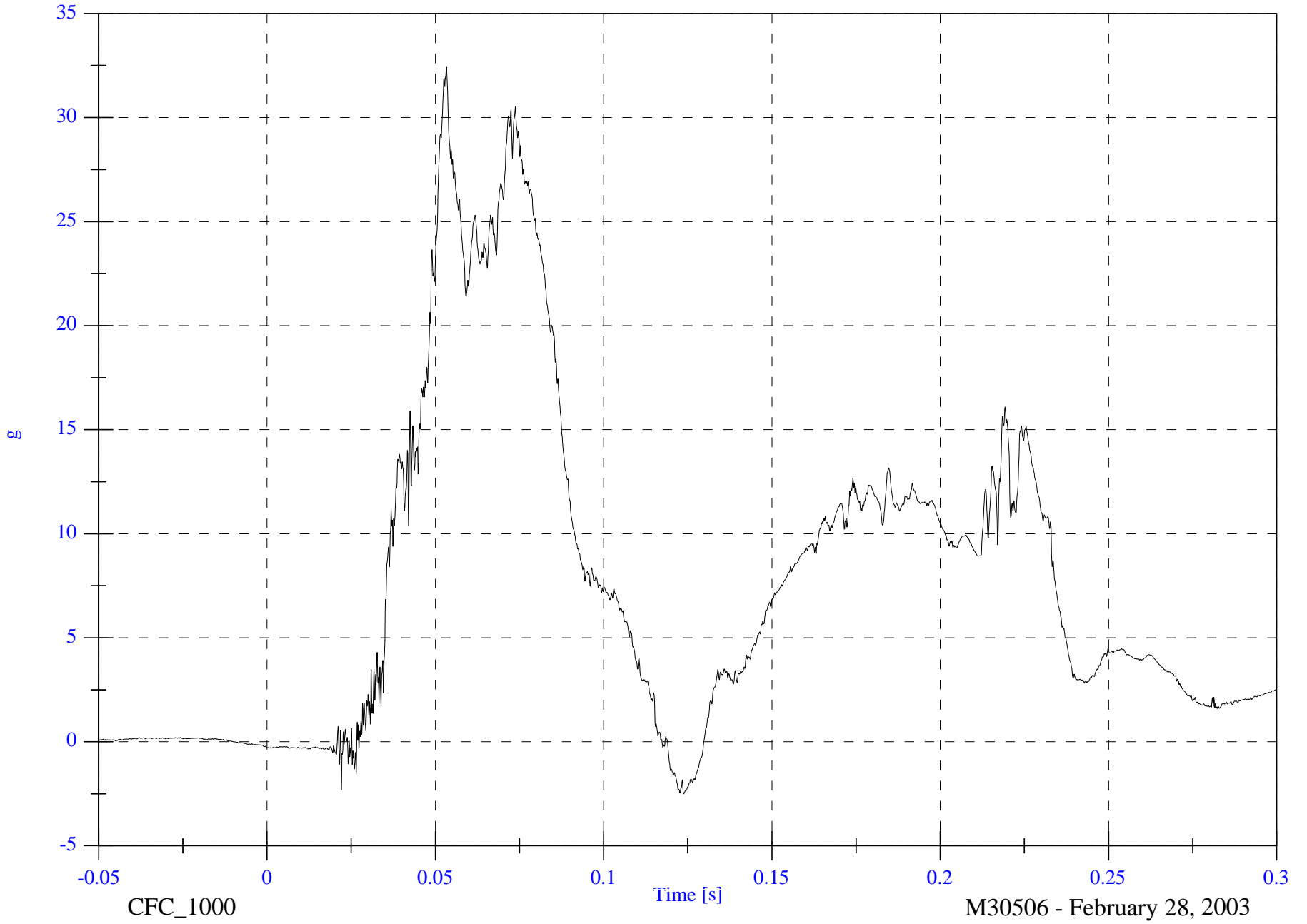
V1P2 Head CG Red z

Max: 32.4 [g] at 0.053 [s]

Min: -2.5 [g] at 0.124 [s]

B-75

8642-NCAP-33



M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

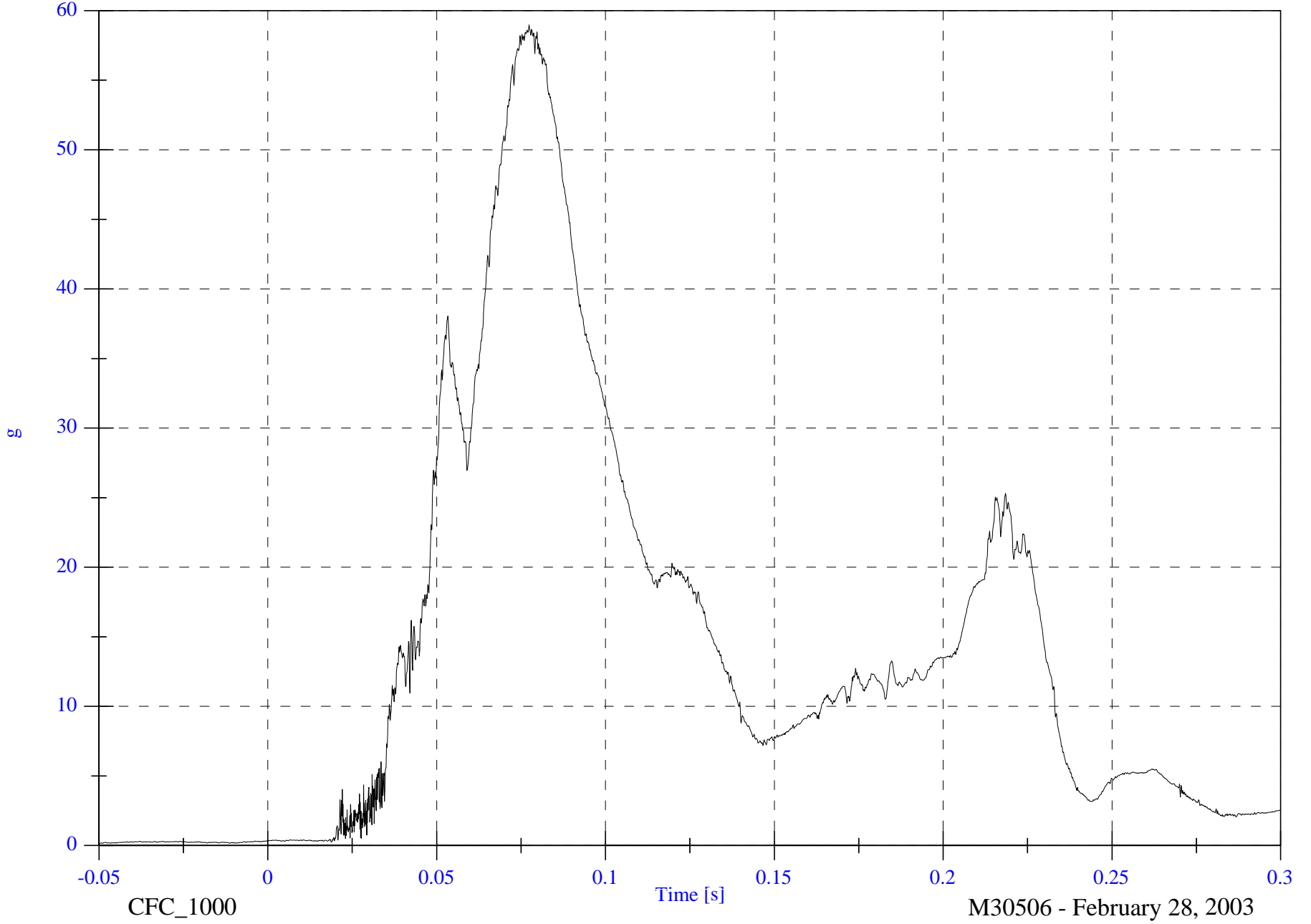
V1P2 Head CG Red Resultant

Max: 59.0 [g] at 0.077 [s]

Min: 0.1 [g] at -0.050 [s]

B-76

8642-NCAP-33

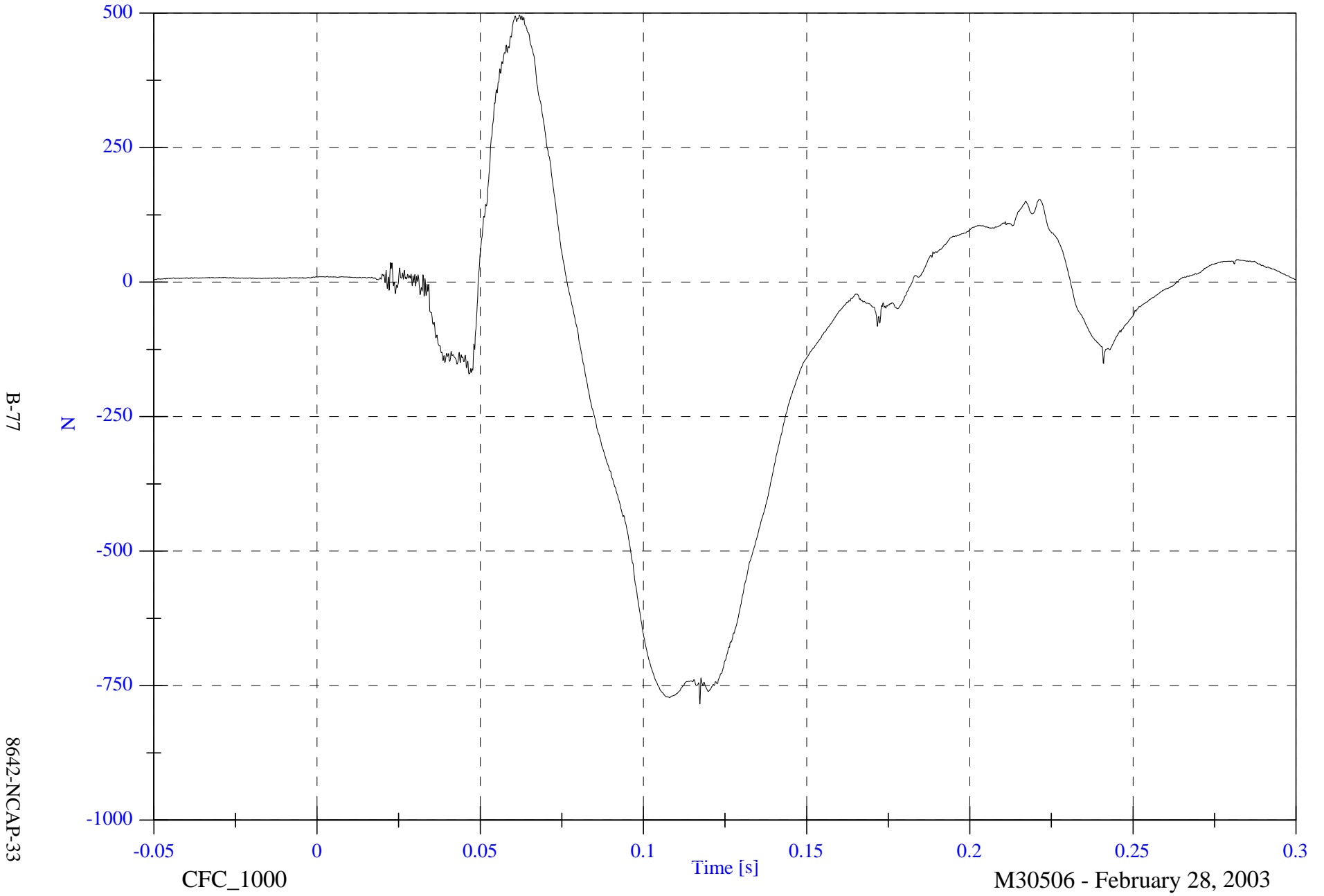


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 496.3 [N] at 0.062 [s]

V1P2 Upper Neck Fx

Min: -783.8 [N] at 0.117 [s]

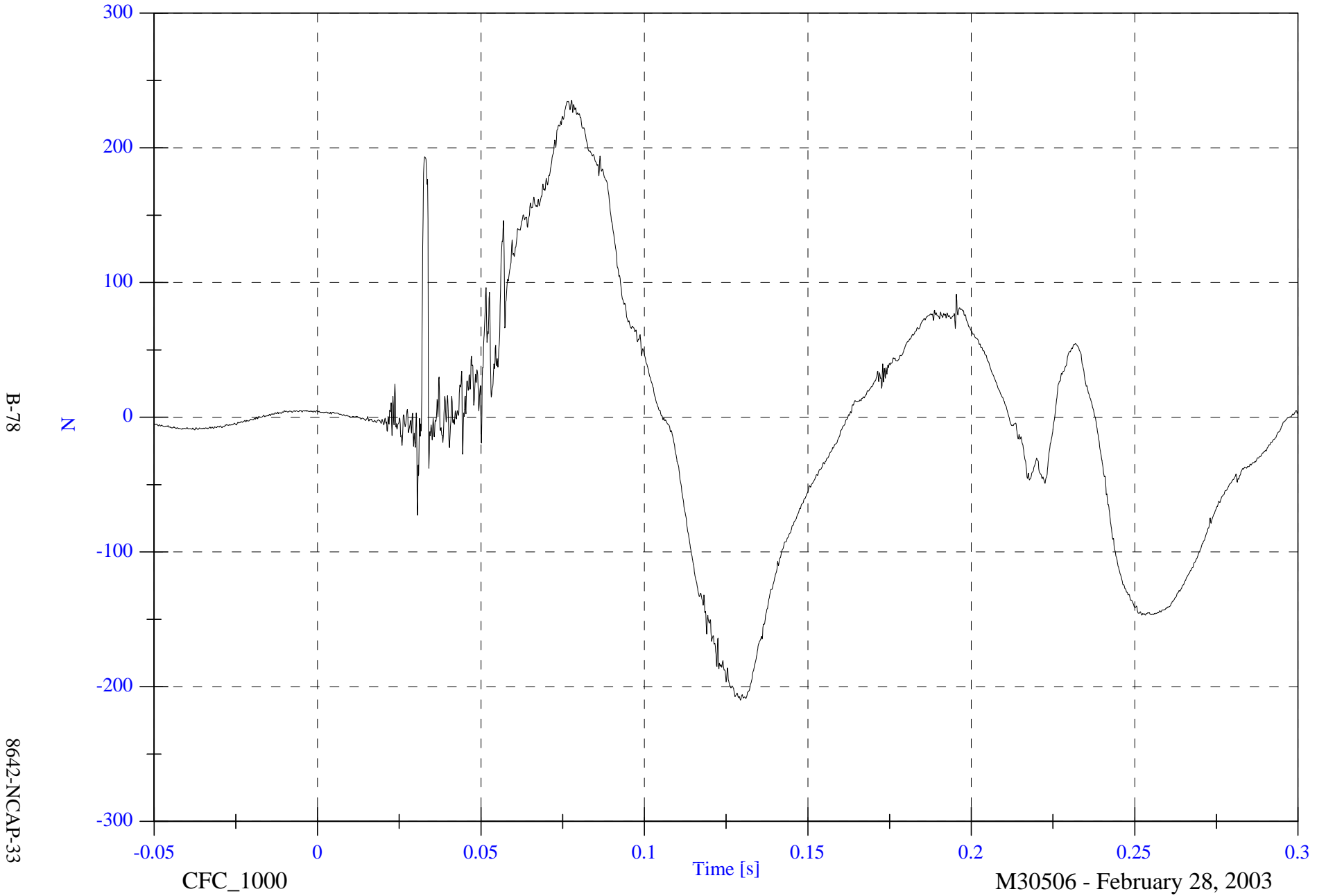


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Upper Neck Fy

Max: 235.5 [N] at 0.078 [s]

Min: -210.0 [N] at 0.129 [s]



B-78

8642-NCAP-33

CFC\_1000

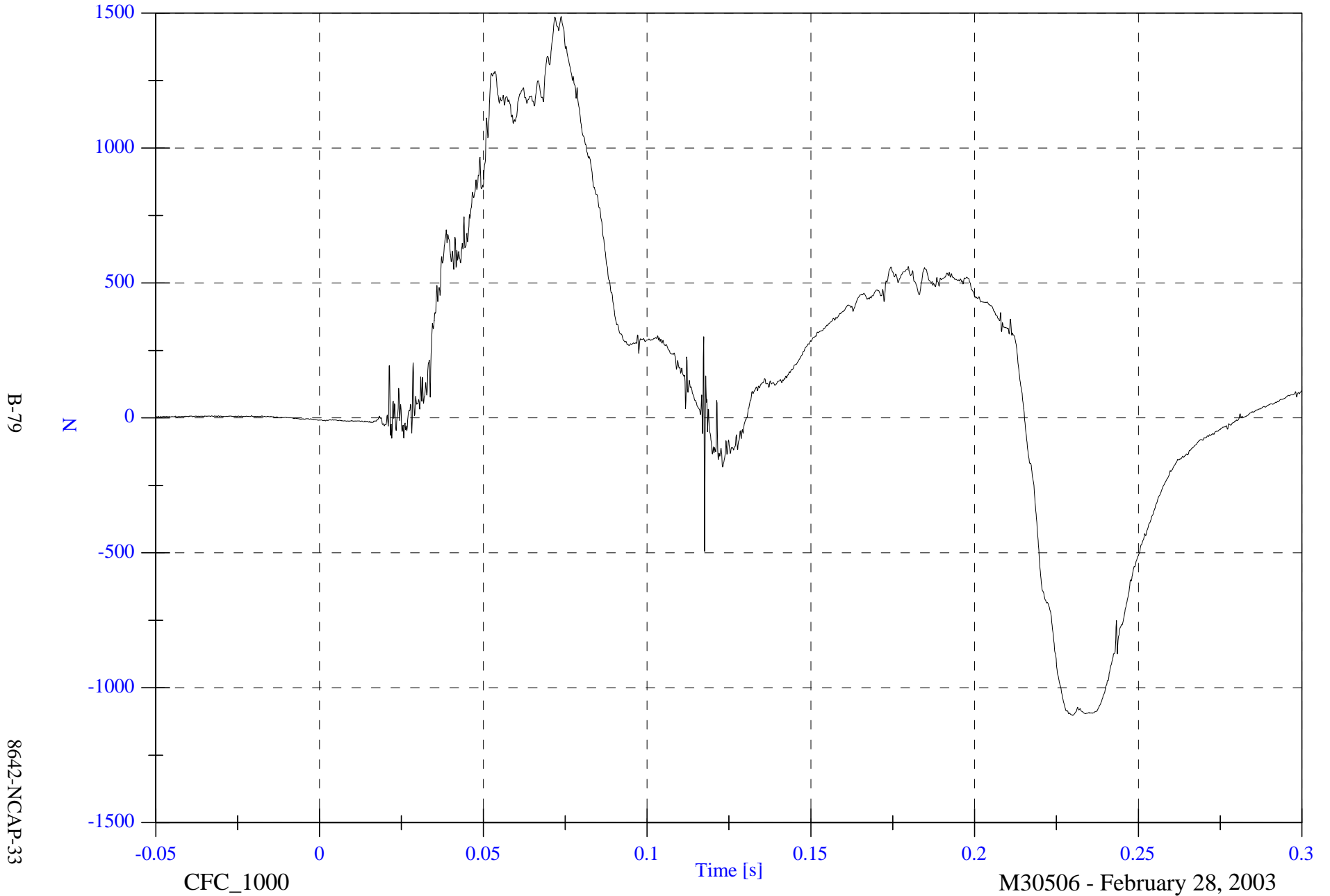
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 1487.4 [N] at 0.074 [s]

V1P2 Upper Neck Fz

Min: -1101.8 [N] at 0.230 [s]



B-79

8642-NCAP-33

CFC\_1000

Time [s]

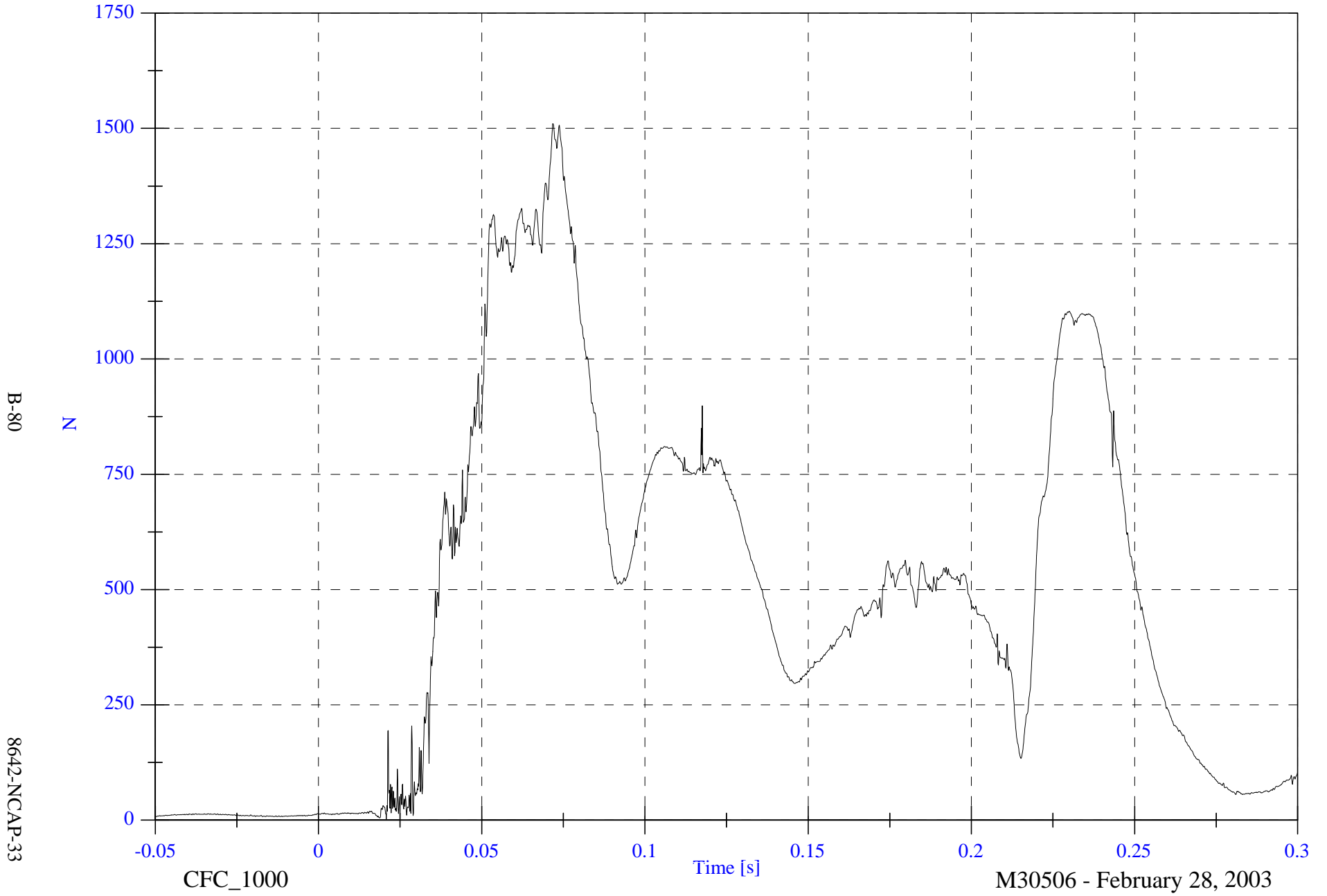
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Upper Neck F Resultant

Max: 1510.3 [N] at 0.072 [s]

Min: 2.1 [N] at 0.021 [s]



B-80

8642-NCAP-33

NCAP Test #11 - 2003 Isuzu Rodeo

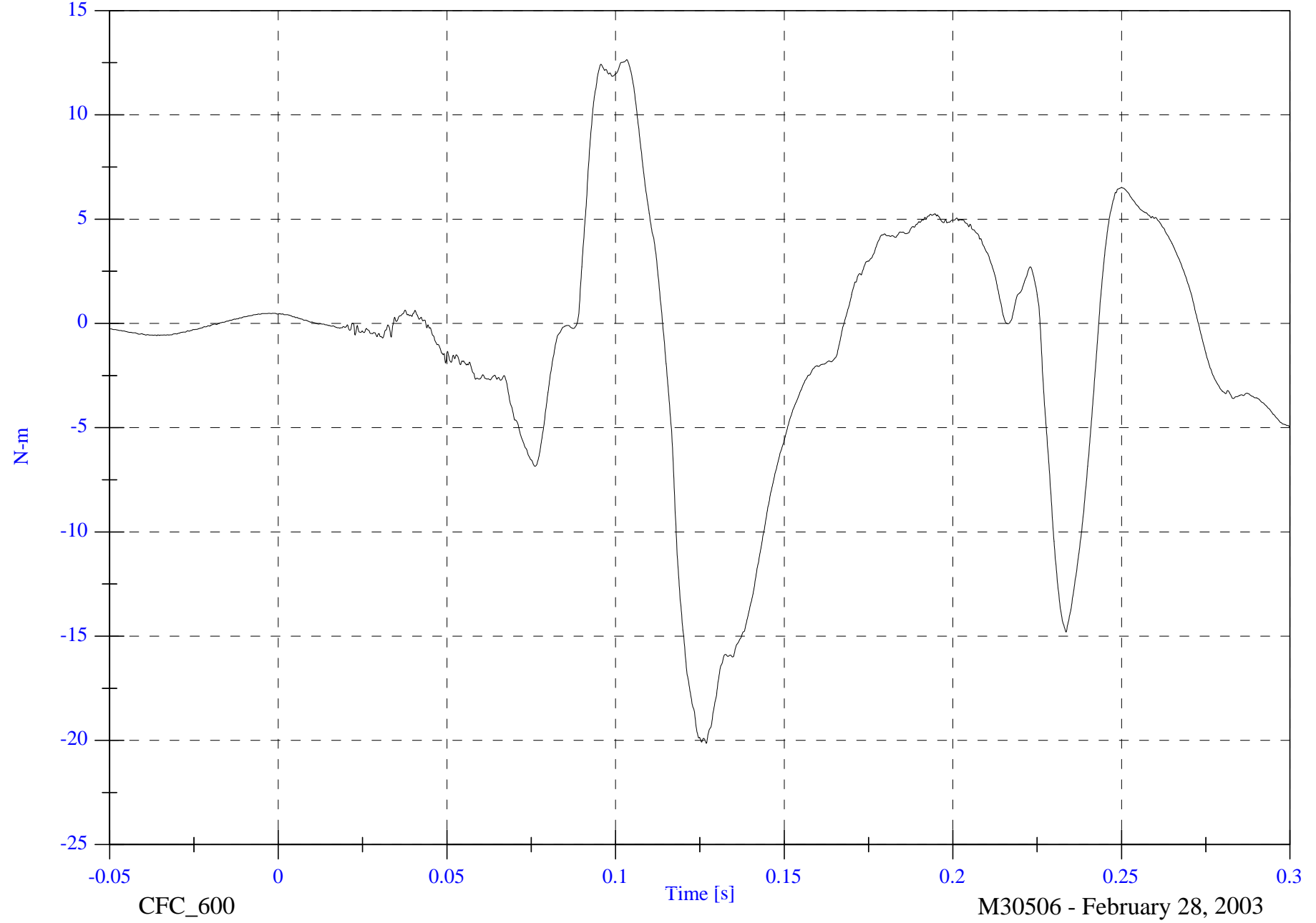
Max: 12.6 [N-m] at 0.103 [s]

Min: -20.1 [N-m] at 0.127 [s]

V1P2 Upper Neck Mx

B-81

8642-NCAP-33



CFC\_600

Time [s]

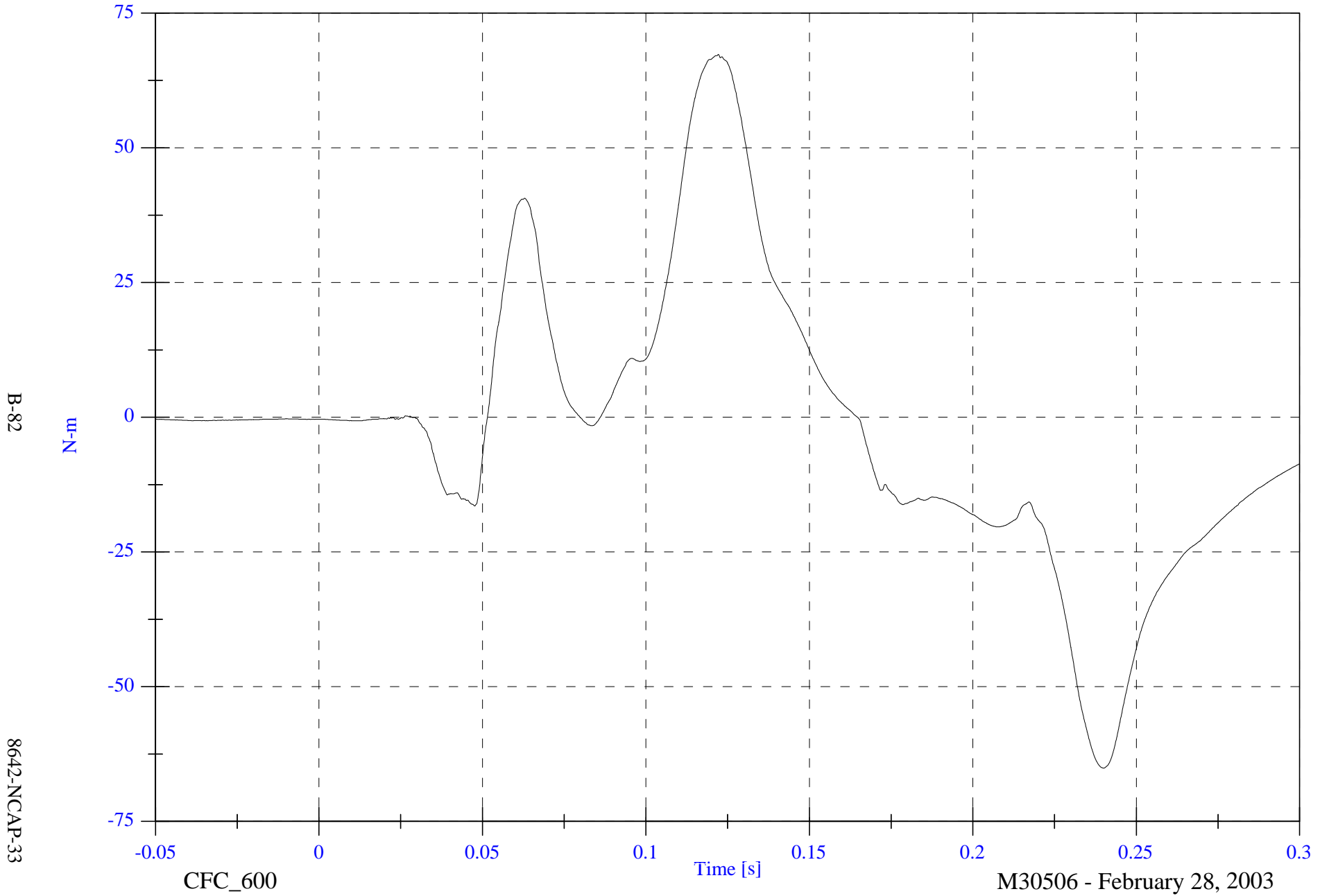
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 67.3 [N-m] at 0.122 [s]

Min: -65.1 [N-m] at 0.240 [s]

V1P2 Upper Neck My



B-82

8642-NCAP-33

CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

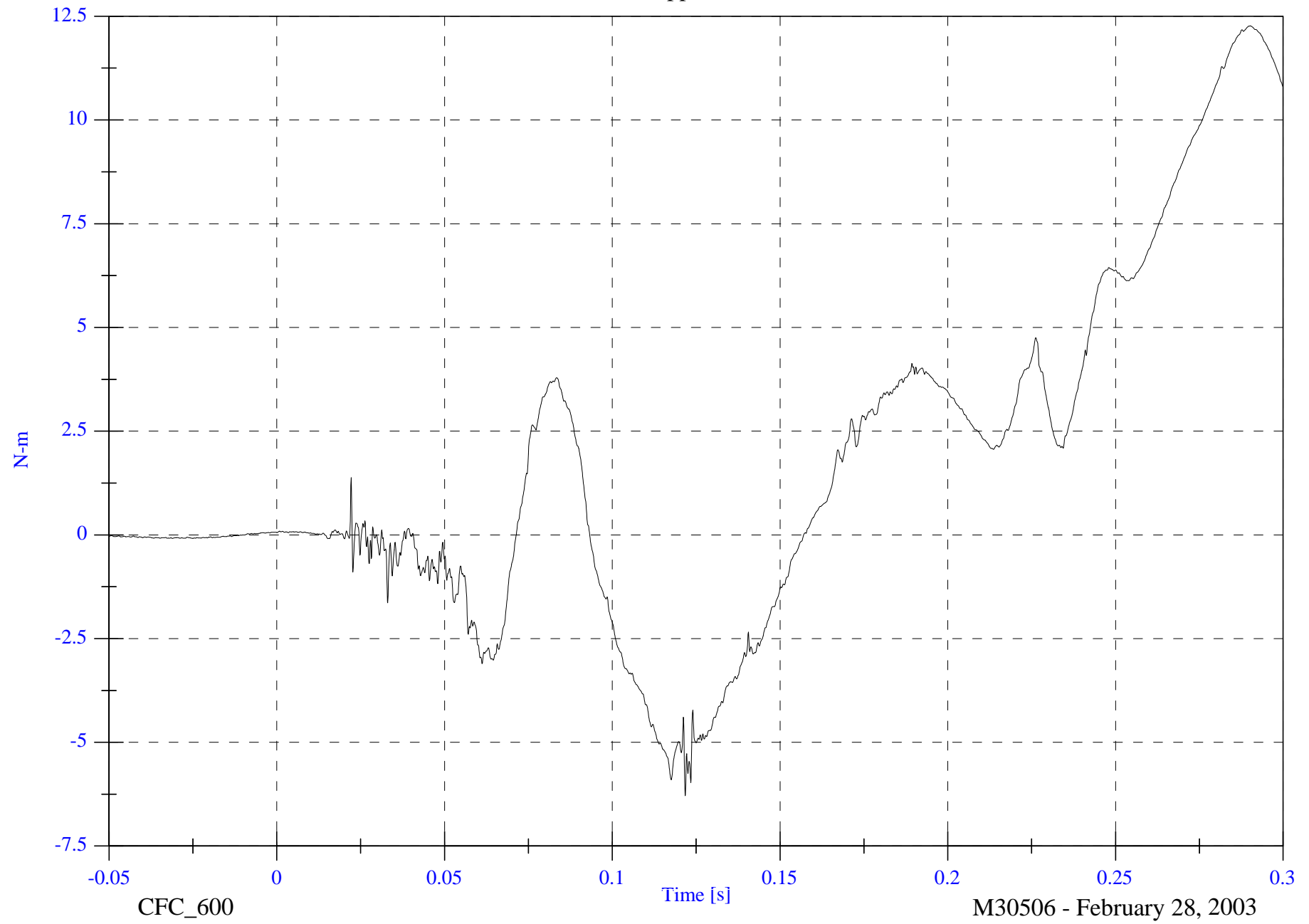
V1P2 Upper Neck Mz

Max: 12.3 [N-m] at 0.290 [s]

Min: -6.3 [N-m] at 0.122 [s]

B-83

8642-NCAP-33



CFC\_600

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

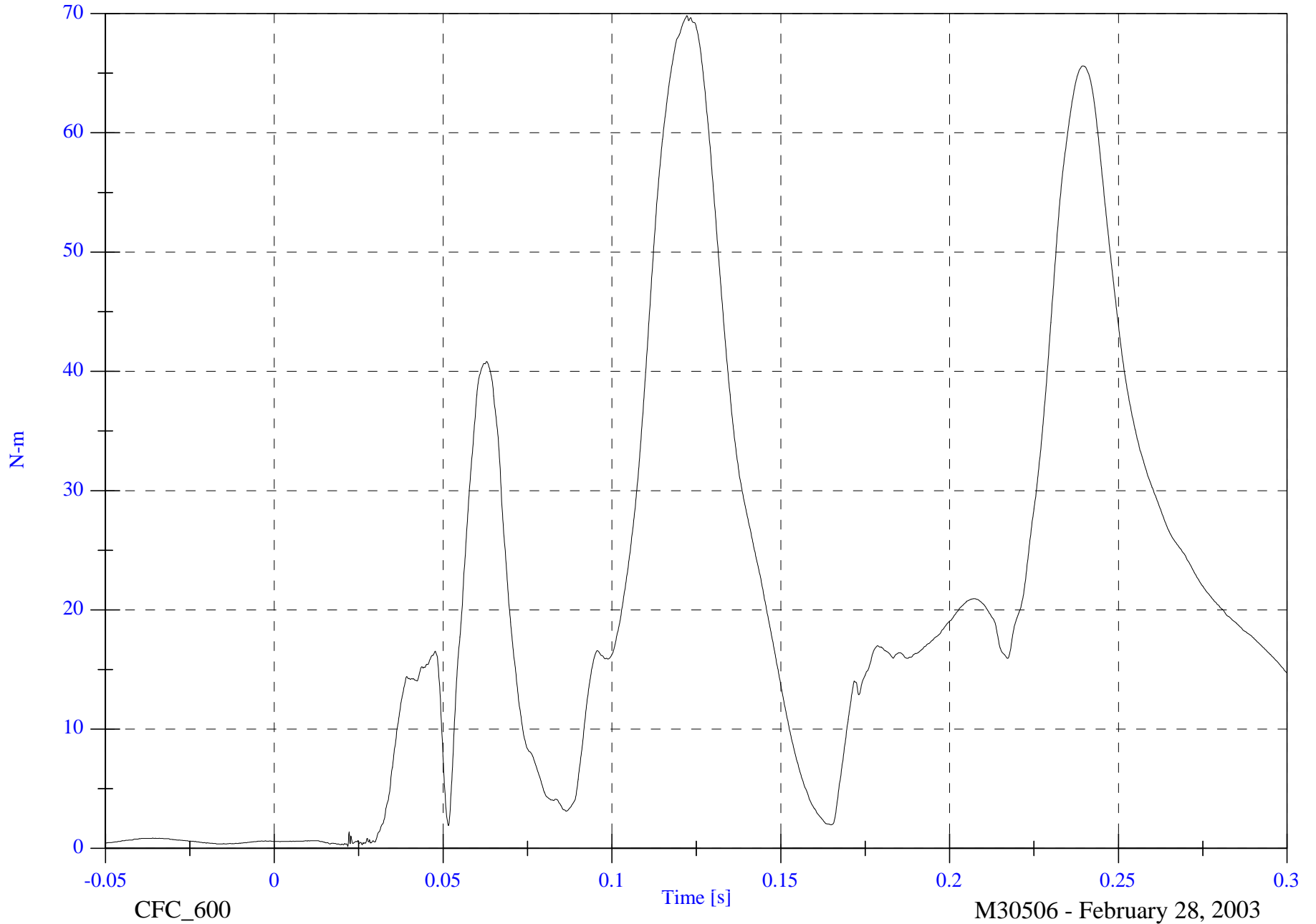
V1P2 Upper Neck M Resultant

Max: 69.8 [N-m] at 0.122 [s]

Min: 0.1 [N-m] at 0.022 [s]

B-84

8642-NCAP-33



CFC\_600

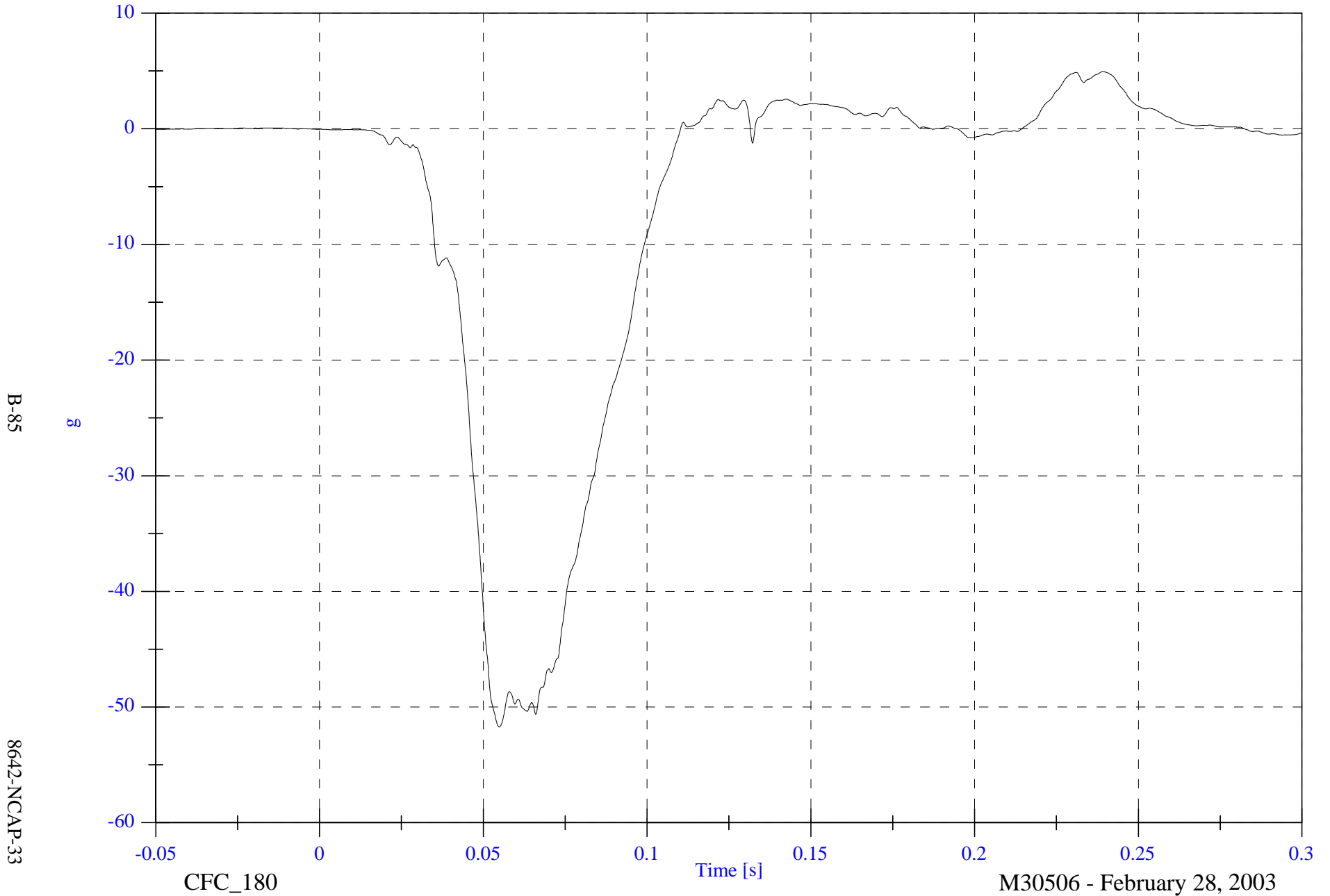
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Chest x

Max: 4.9 [g] at 0.239 [s]

Min: -51.7 [g] at 0.055 [s]

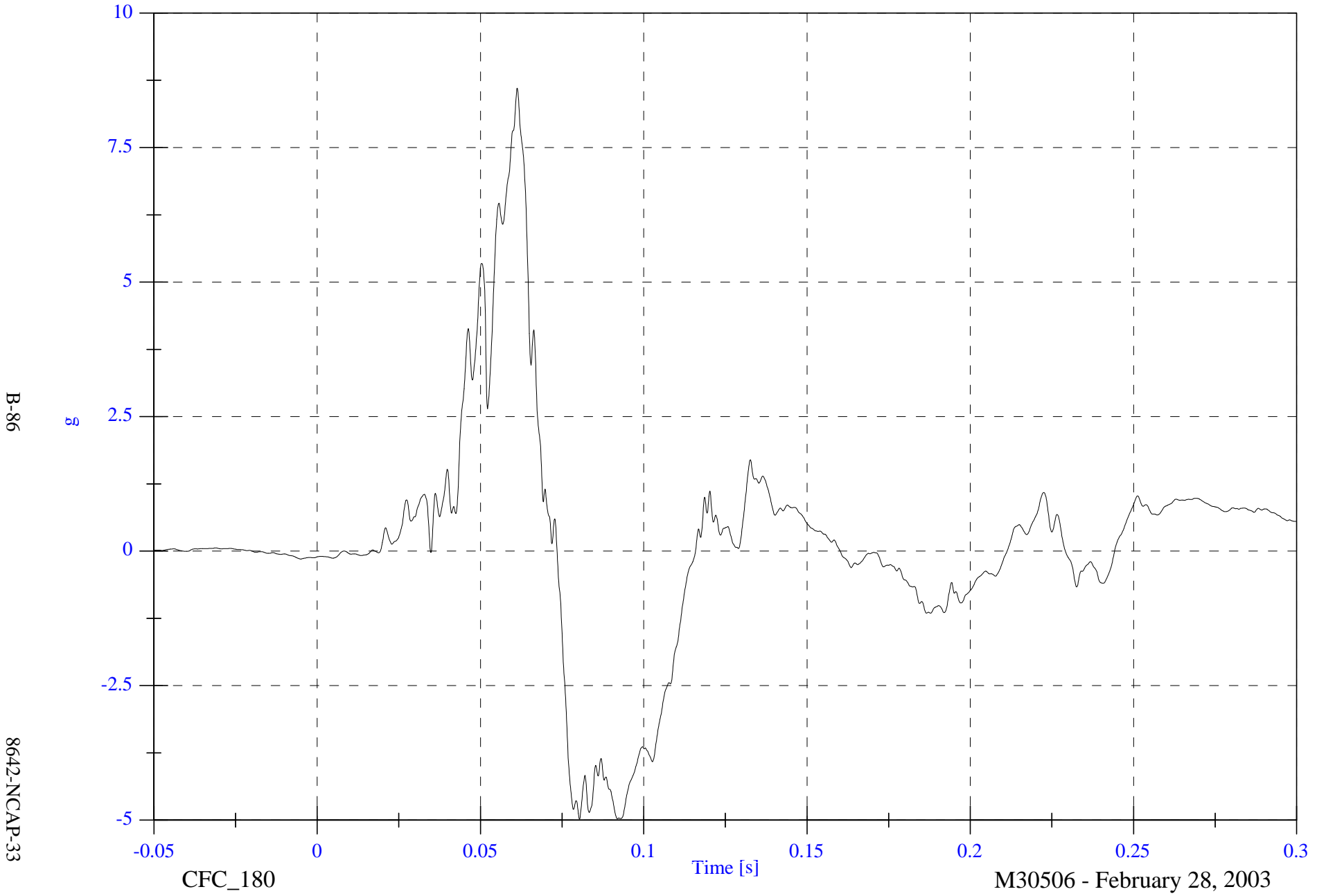


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Chest y

Max: 8.6 [g] at 0.061 [s]

Min: -5.0 [g] at 0.080 [s]



B-86

8642-NCAP-33

CFC\_180

Time [s]

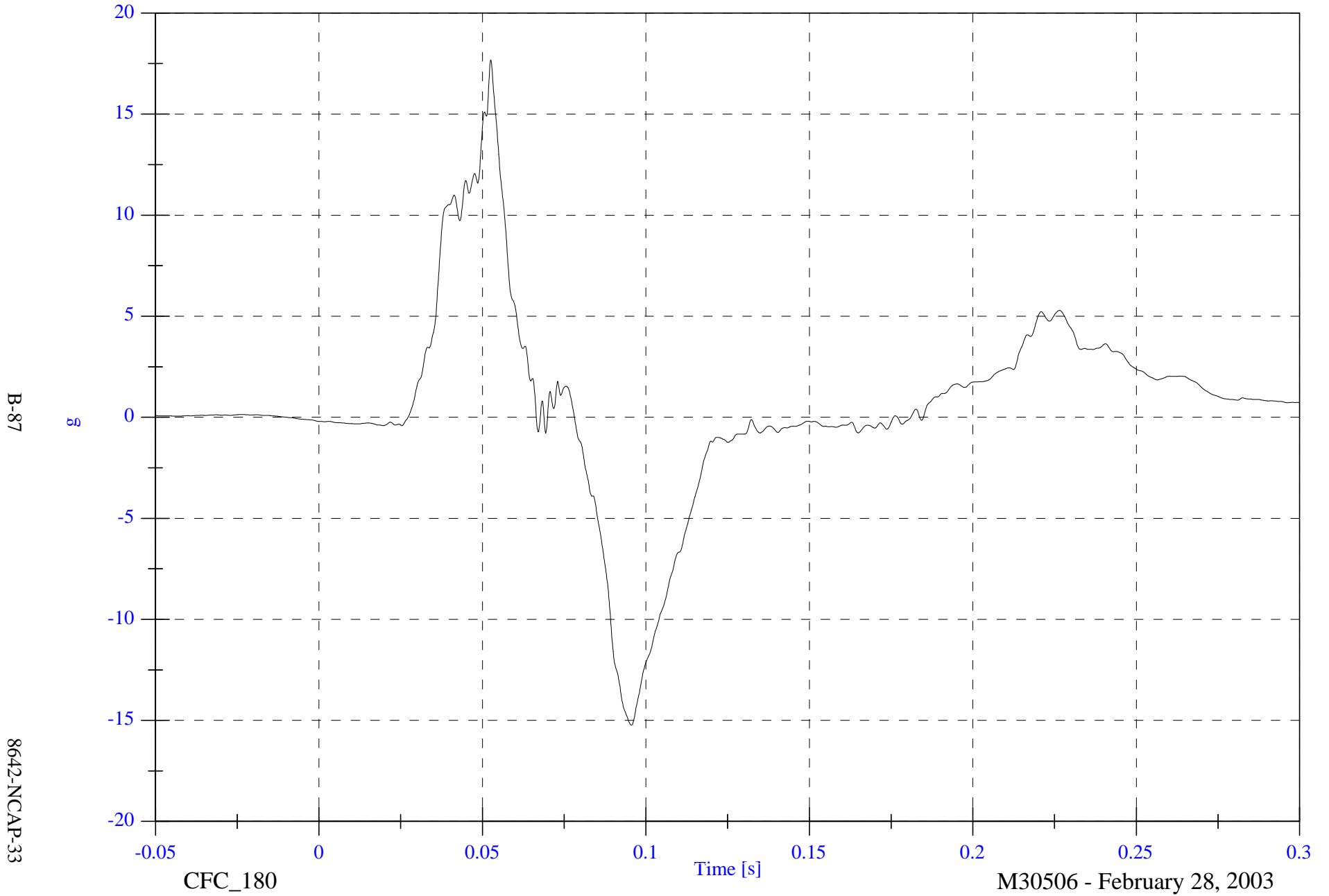
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

VIP2 Chest z

Max: 17.7 [g] at 0.053 [s]

Min: -15.2 [g] at 0.096 [s]



B-87

8642-NCAP-33

CFC\_180

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

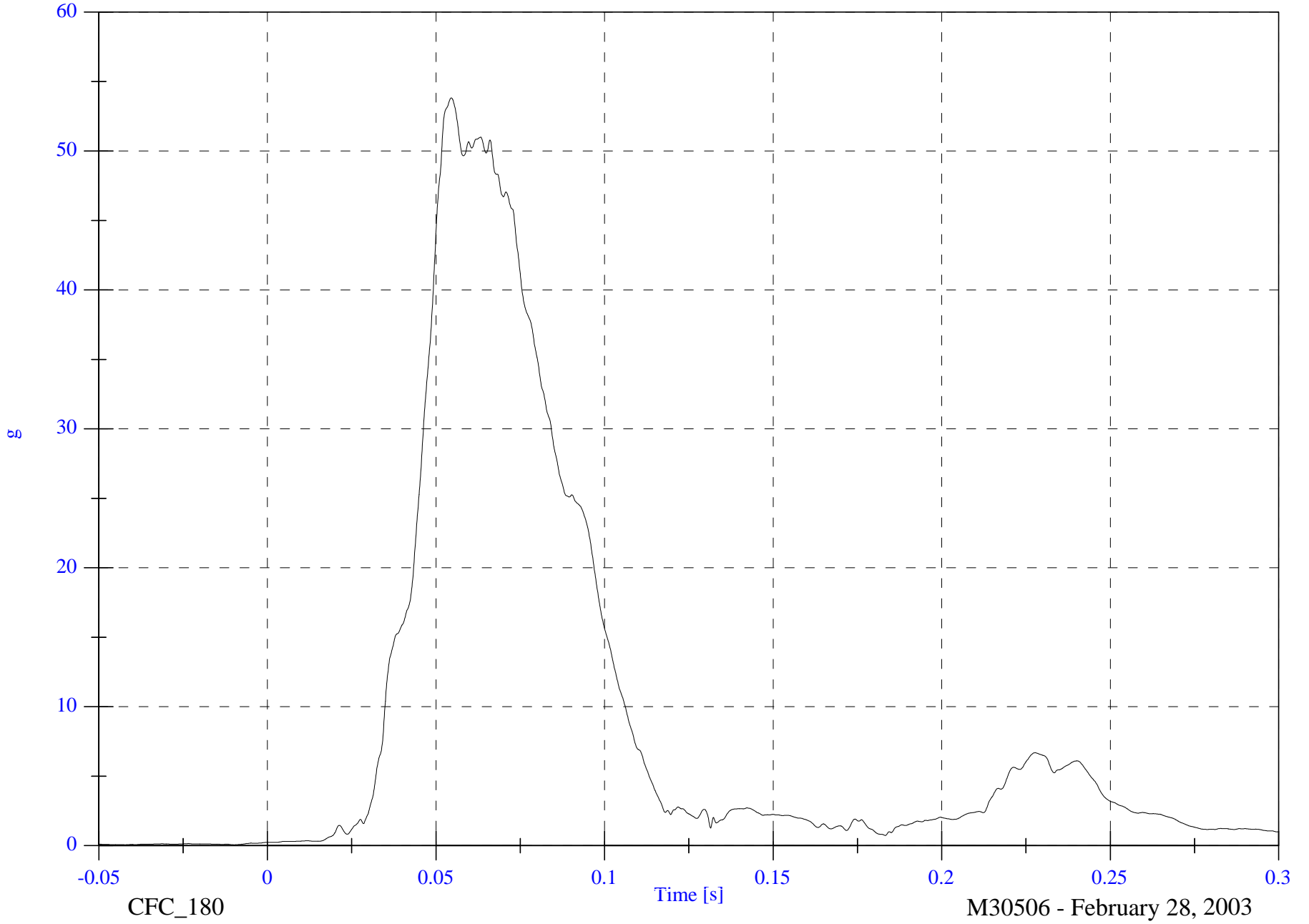
V1P2 Chest Resultant

Max: 53.8 [g] at 0.054 [s]

Min: 0.1 [g] at -0.010 [s]

B-88

8642-NCAP-33



CFC\_180

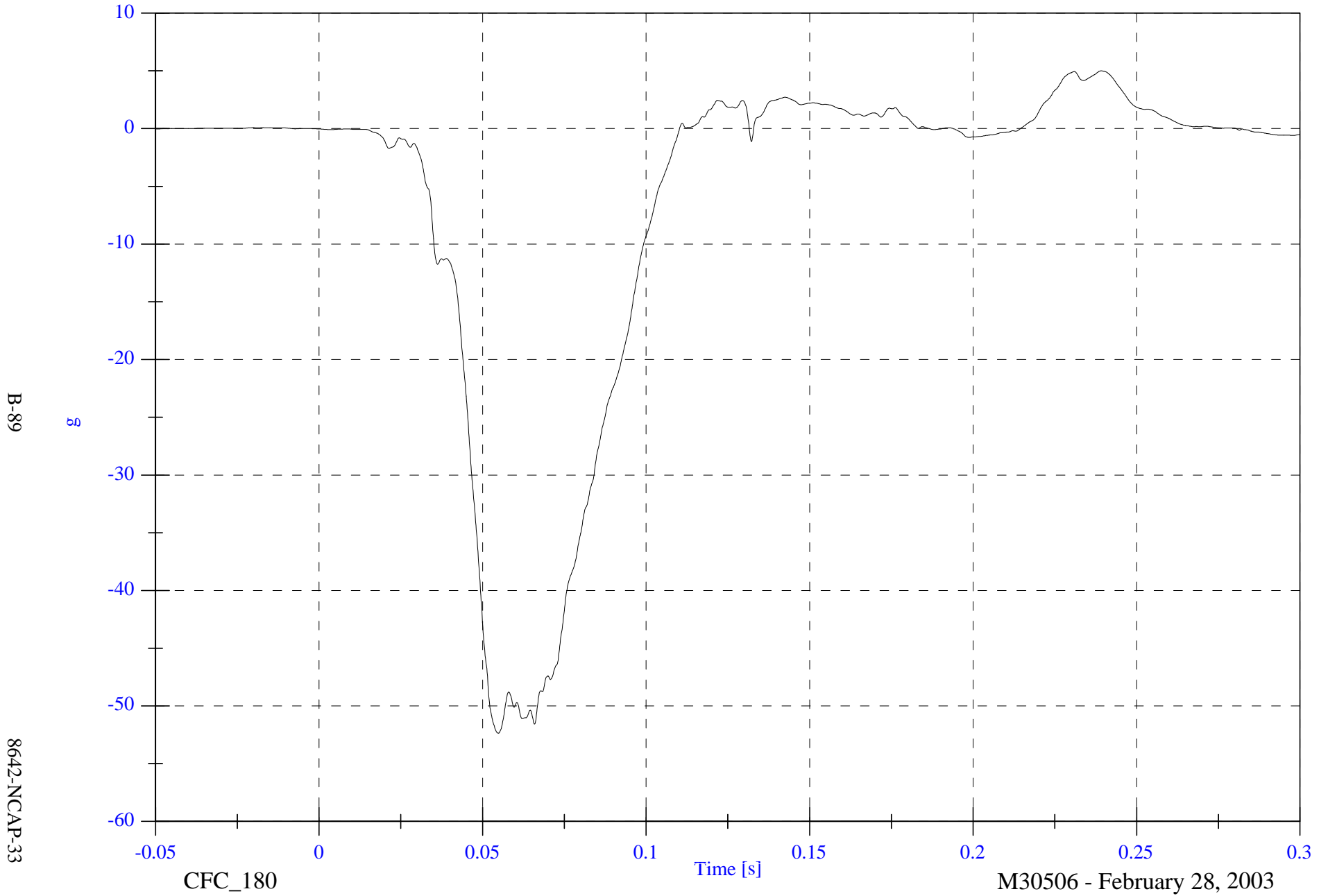
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Chest Red x

Max: 5.0 [g] at 0.239 [s]

Min: -52.4 [g] at 0.055 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

VIP2 Chest Red y

Max: 9.3 [g] at 0.061 [s]

Min: -5.0 [g] at 0.080 [s]

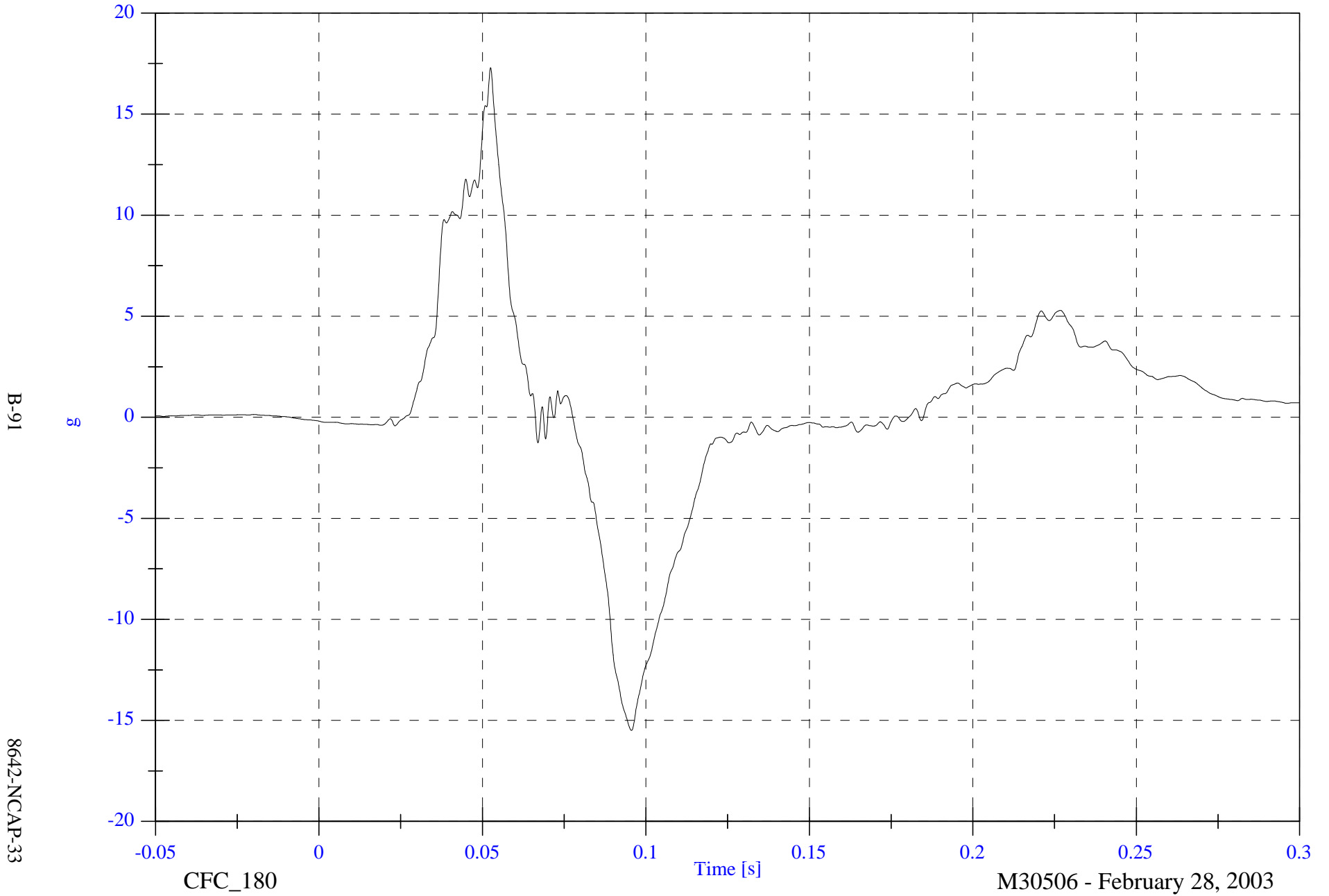


NCAP Test #11 - 2003 Isuzu Rodeo

VIP2 Chest Red z

Max: 17.3 [g] at 0.053 [s]

Min: -15.5 [g] at 0.096 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

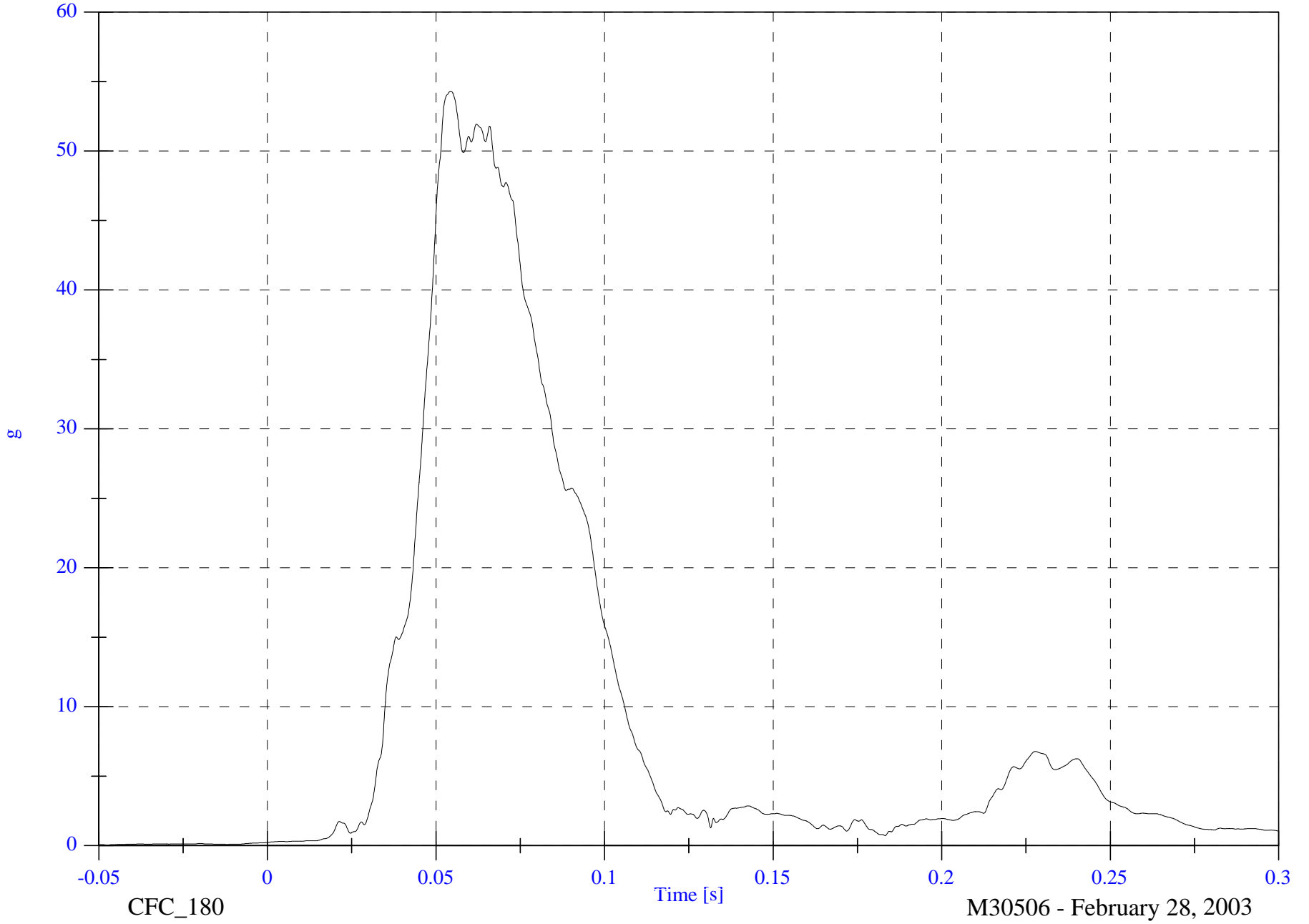
V1P2 Chest Red Resultant

Max: 54.3 [g] at 0.054 [s]

Min: 0.0 [g] at -0.048 [s]

B-92

8642-NCAP-33



CFC\_180

Time [s]

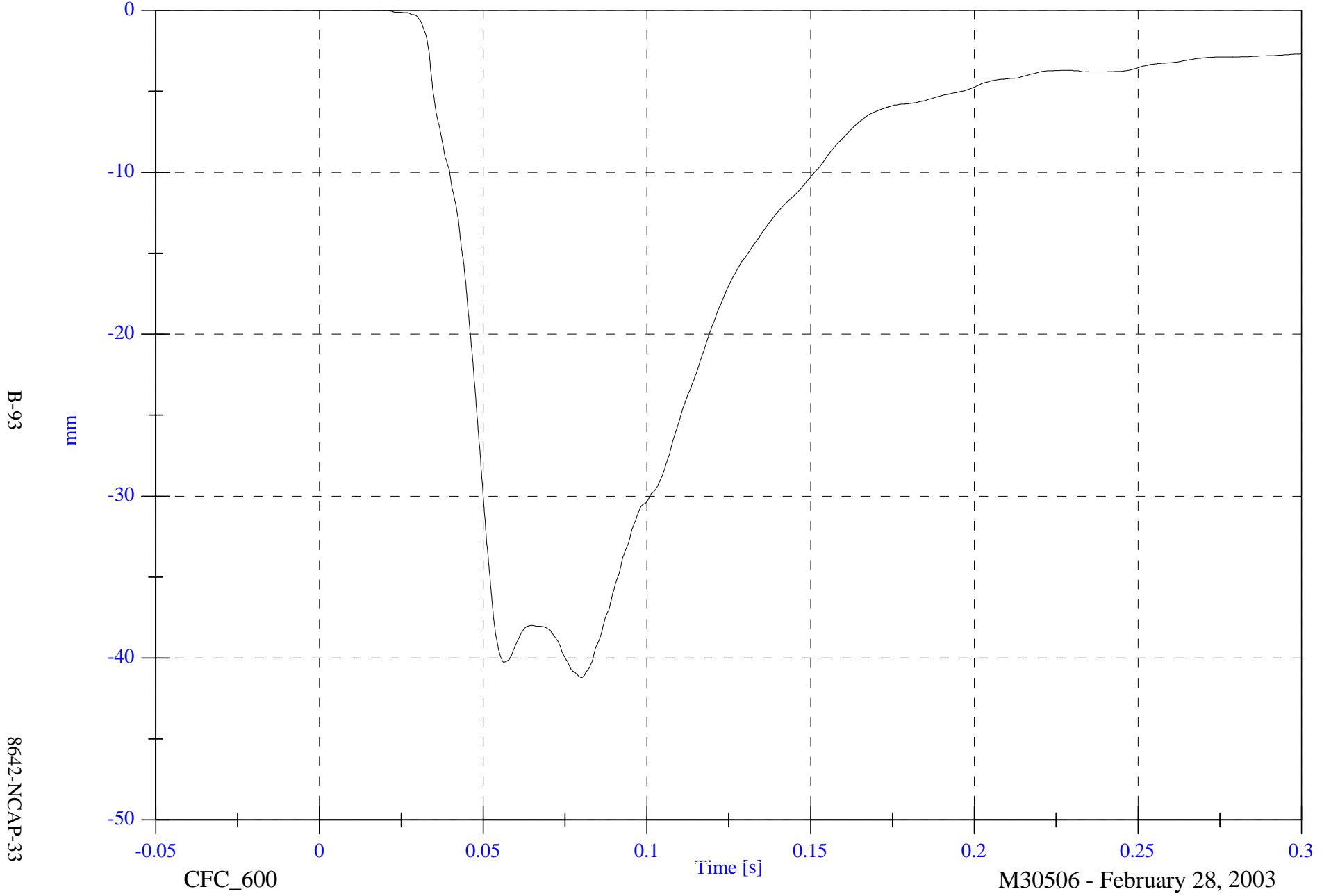
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

VIP2 Chest Compression x

Max: 0.0 [mm] at 0.014 [s]

Min: -41.2 [mm] at 0.080 [s]



B-93

8642-NCAP-33

CFC\_600

Time [s]

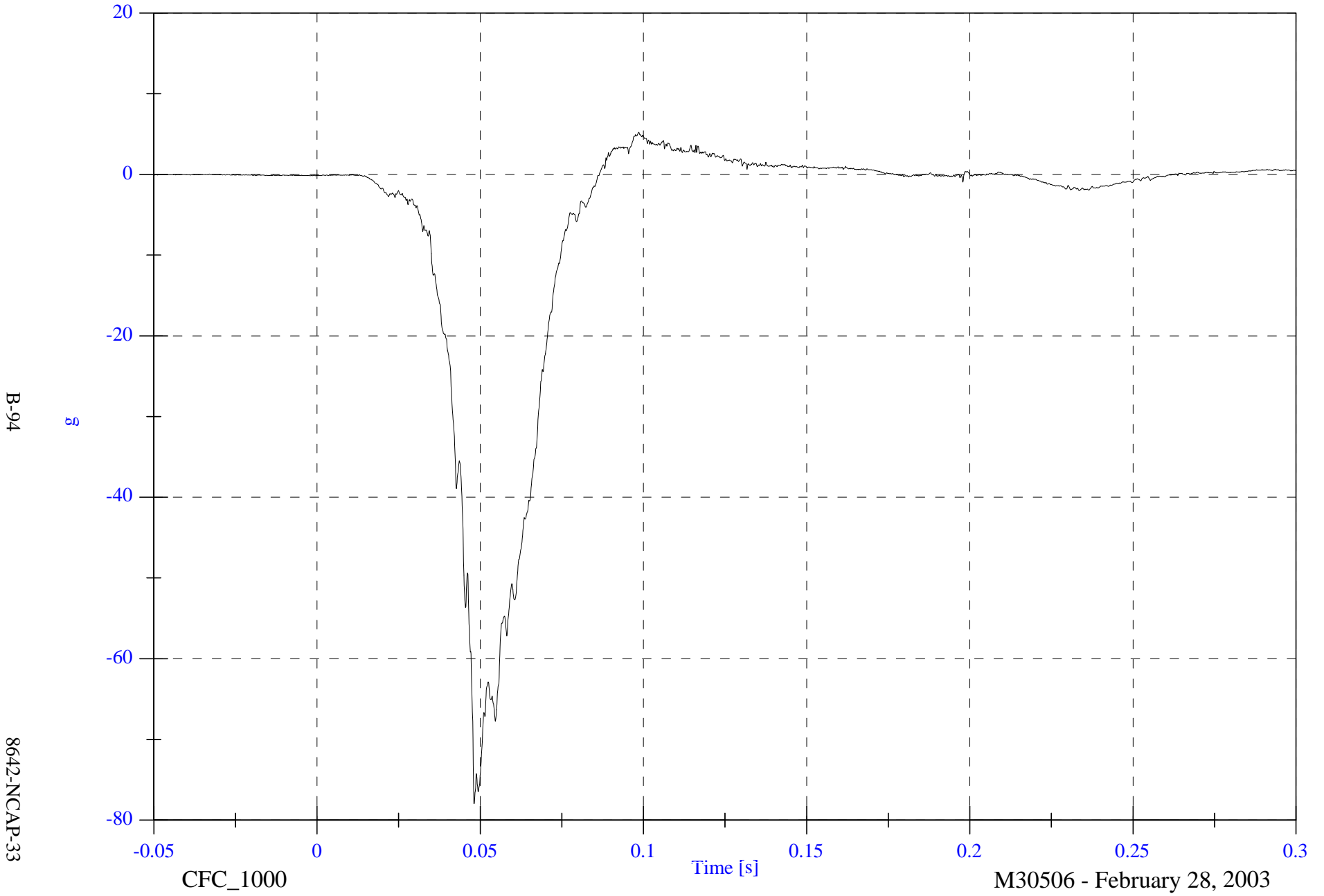
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Pelvic x

Max: 5.2 [g] at 0.099 [s]

Min: -78.0 [g] at 0.048 [s]

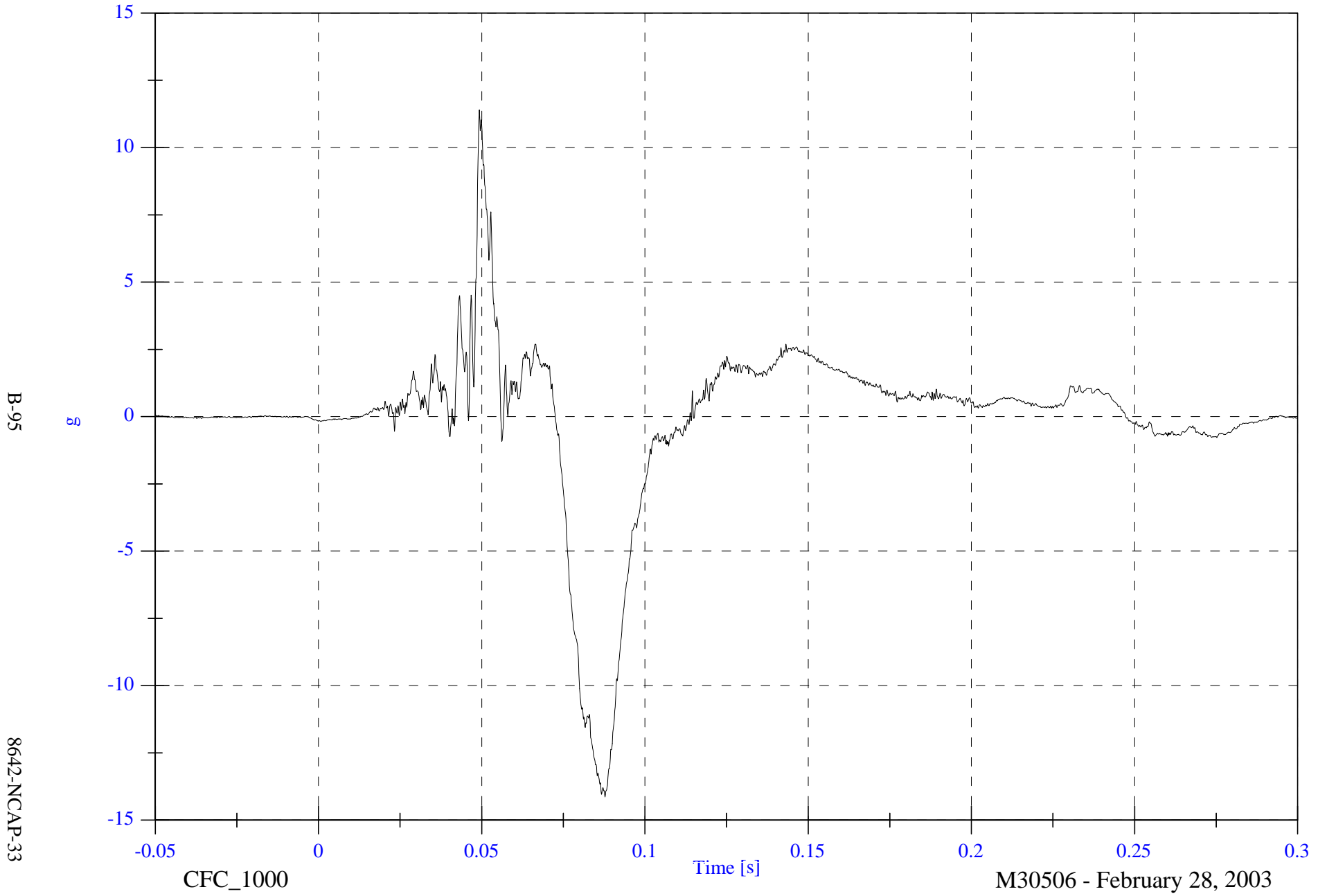


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Pelvic y

Max: 11.4 [g] at 0.049 [s]

Min: -14.1 [g] at 0.088 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

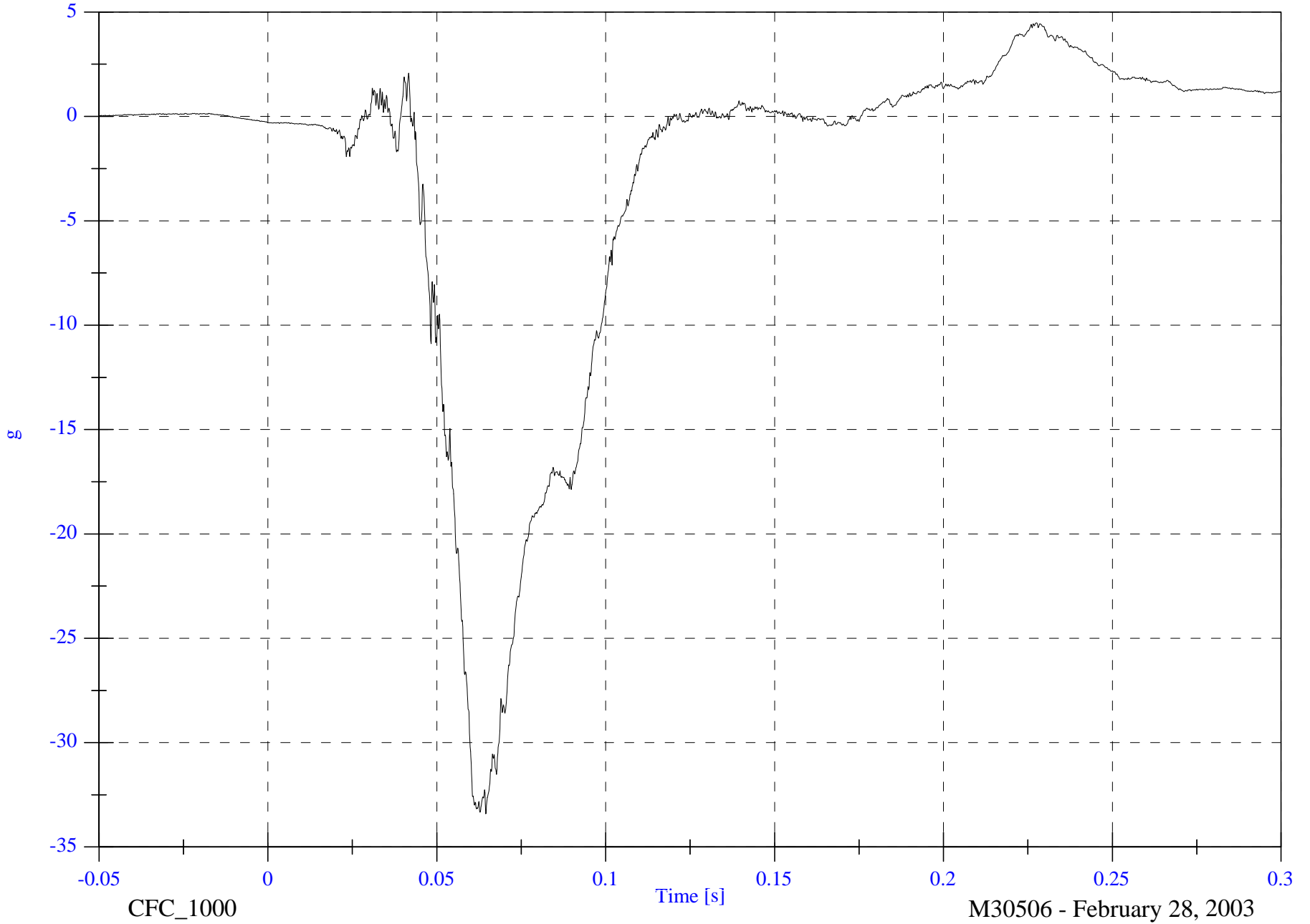
V1P2 Pelvic z

Max: 4.5 [g] at 0.227 [s]

Min: -33.4 [g] at 0.064 [s]

B-96

8642-NCAP-33



CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

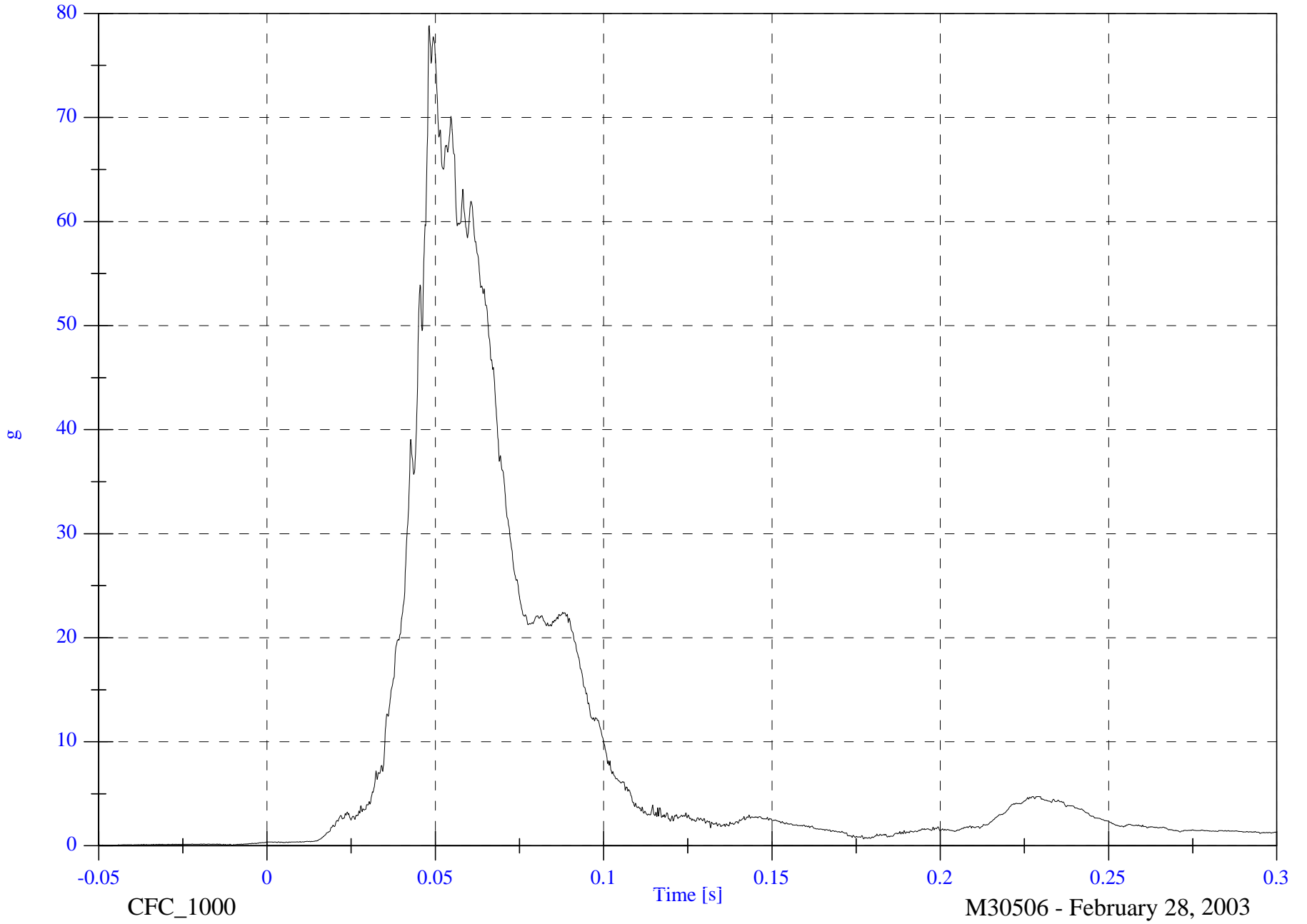
V1P2 Pelvic Resultant

Max: 78.8 [g] at 0.048 [s]

Min: 0.0 [g] at -0.047 [s]

B-97

8642-NCAP-33



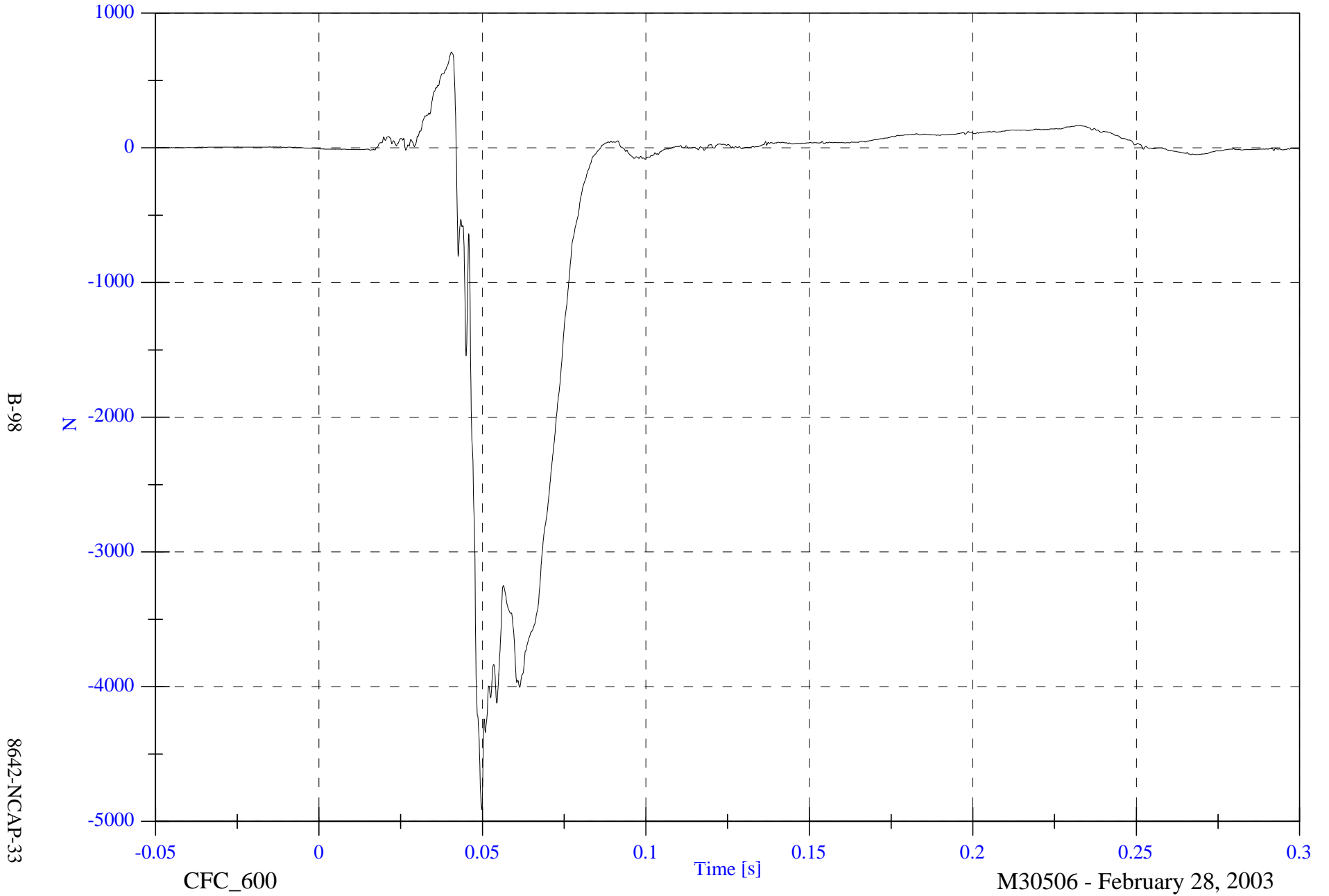
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Left Femur z

Max: 710.9 [N] at 0.041 [s]

Min: -4913.7 [N] at 0.050 [s]

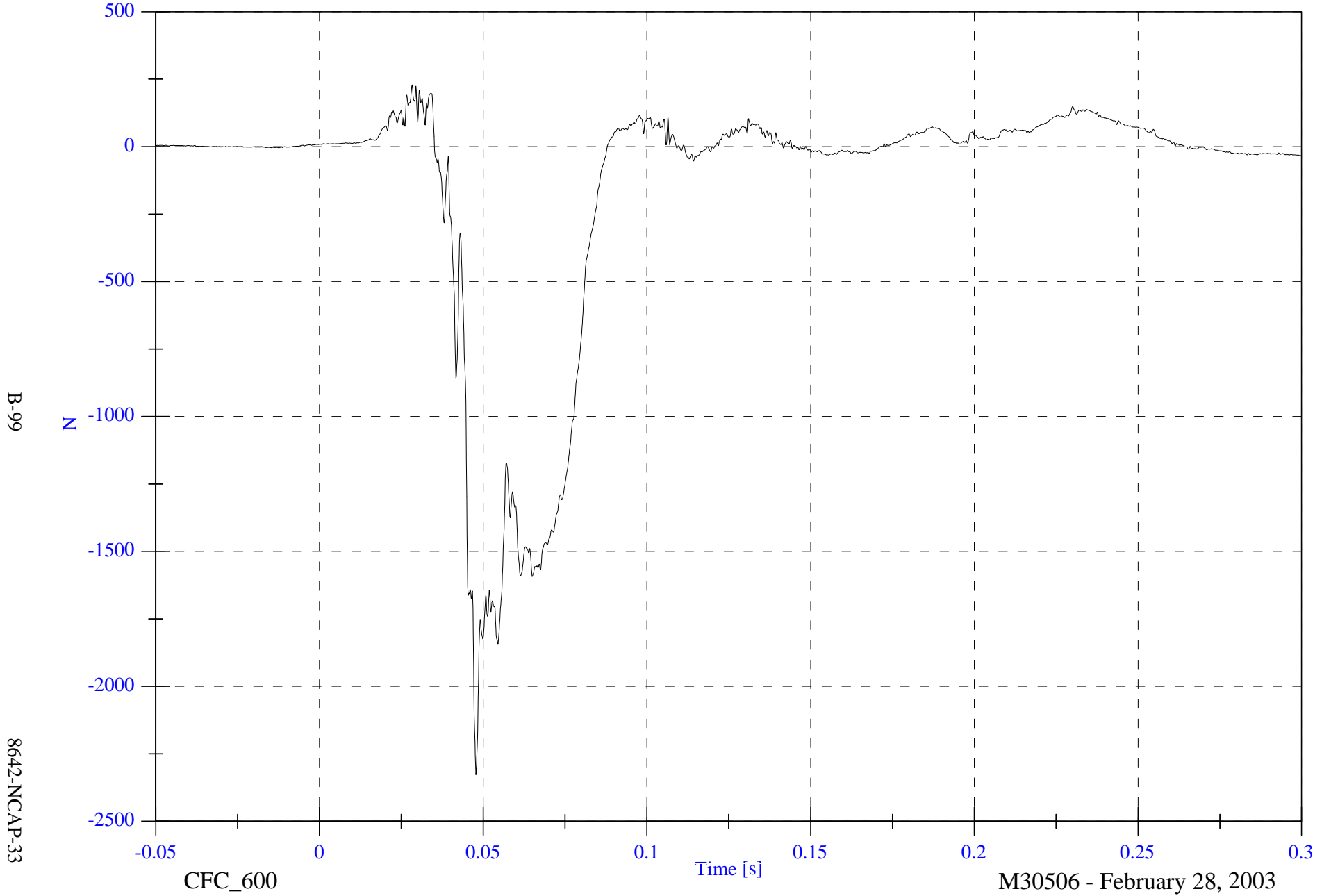


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Right Femur z

Max: 228.6 [N] at 0.028 [s]

Min: -2327.7 [N] at 0.048 [s]

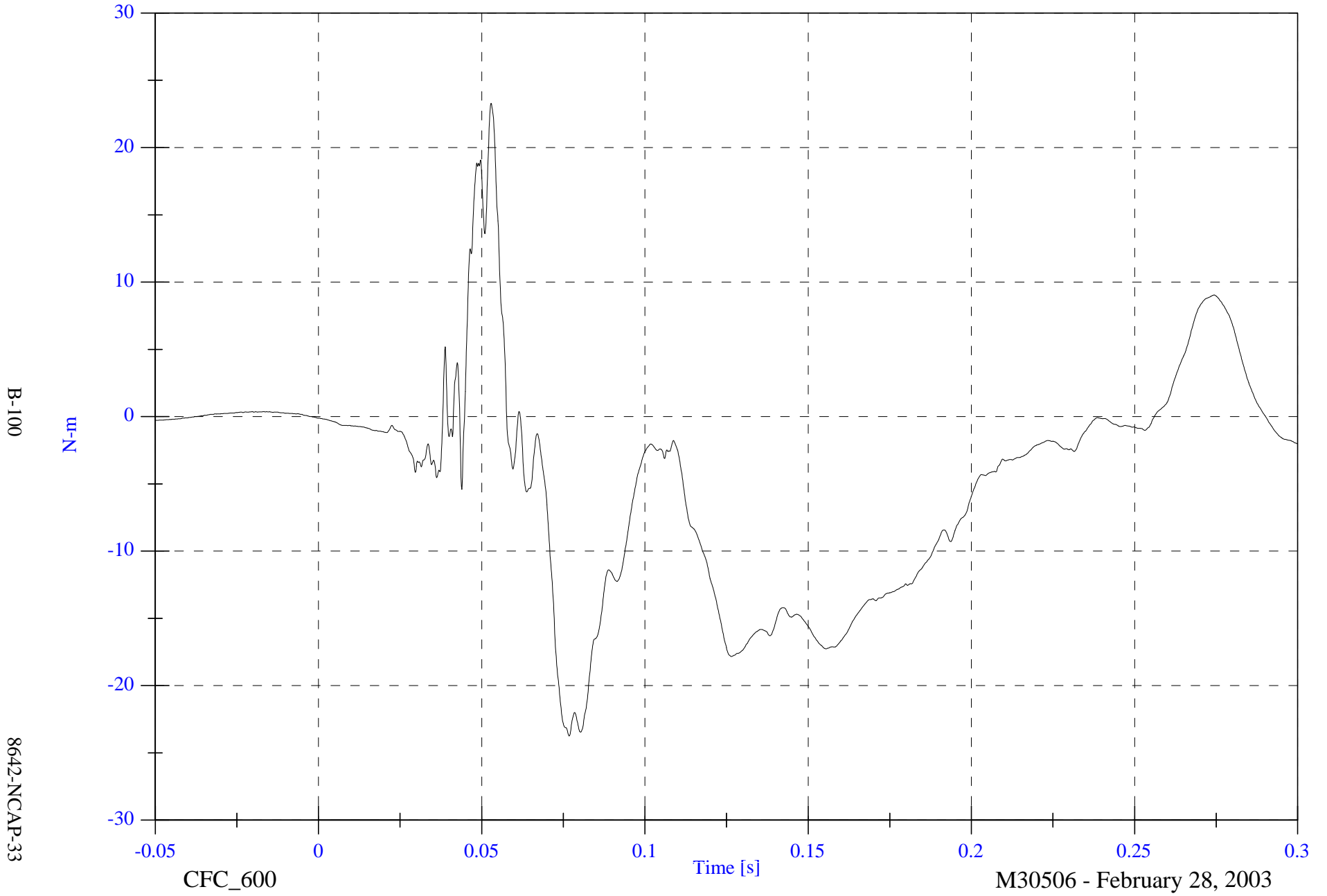


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Left Upper Tibia Mx

Max: 23.3 [N-m] at 0.053 [s]

Min: -23.7 [N-m] at 0.077 [s]



B-100

8642-NCAP-33

CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

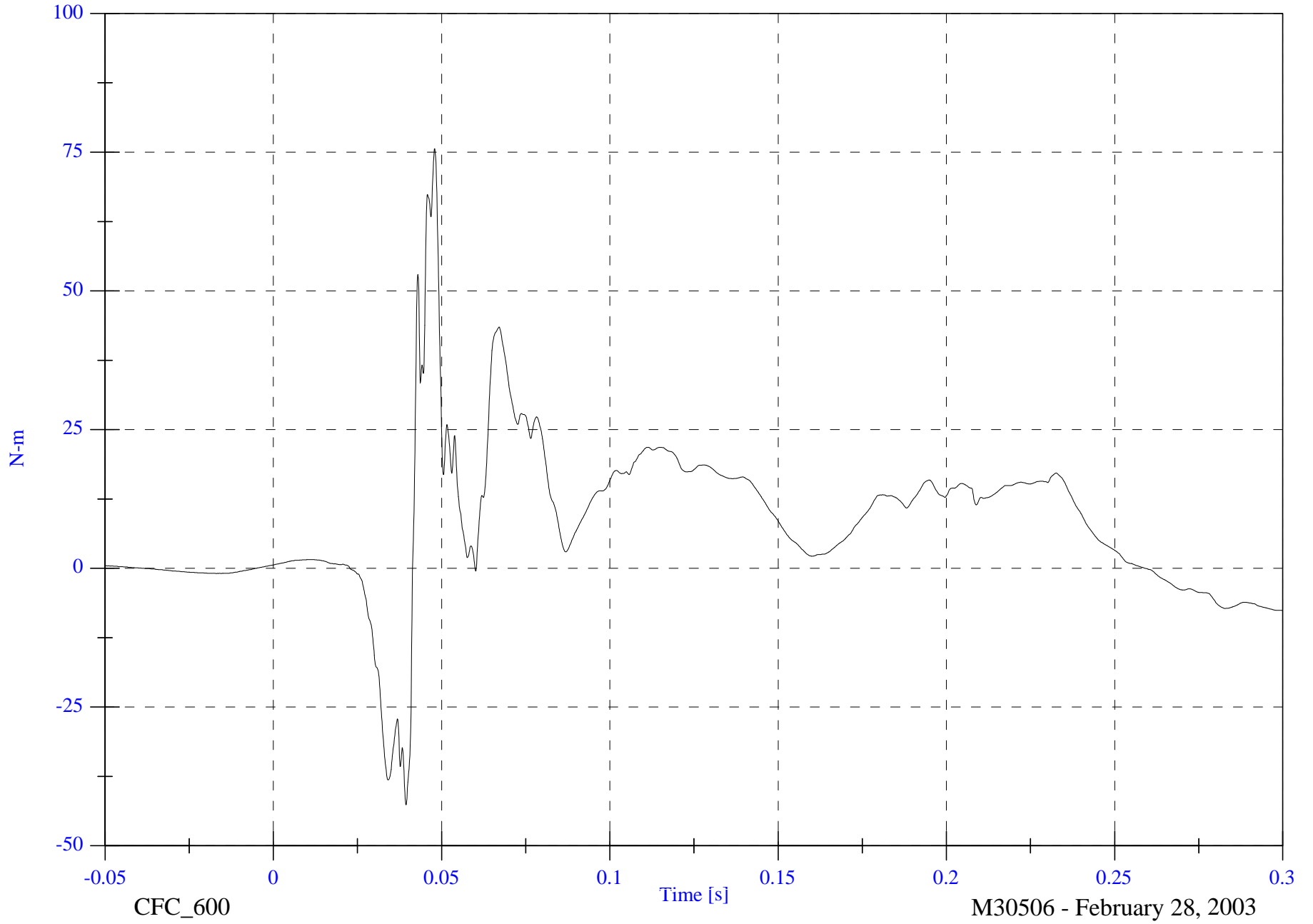
V1P2 Left Upper Tibia My

Max: 75.6 [N-m] at 0.048 [s]

Min: -42.6 [N-m] at 0.039 [s]

B-101

8642-NCAP-33



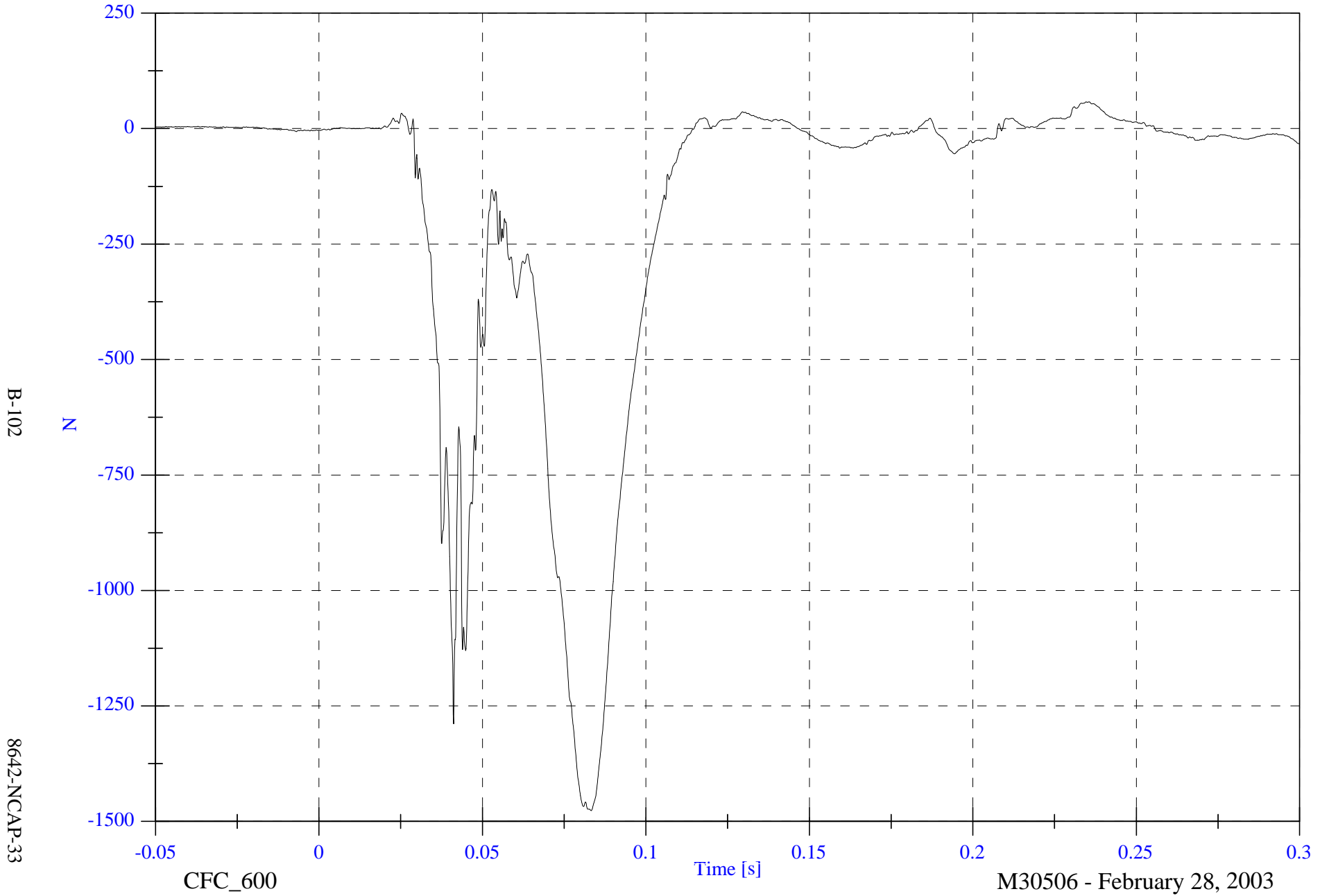
CFC\_600

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Left Lower Tibia Fz

Max: 57.7 [N] at 0.236 [s]  
Min: -1476.7 [N] at 0.083 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

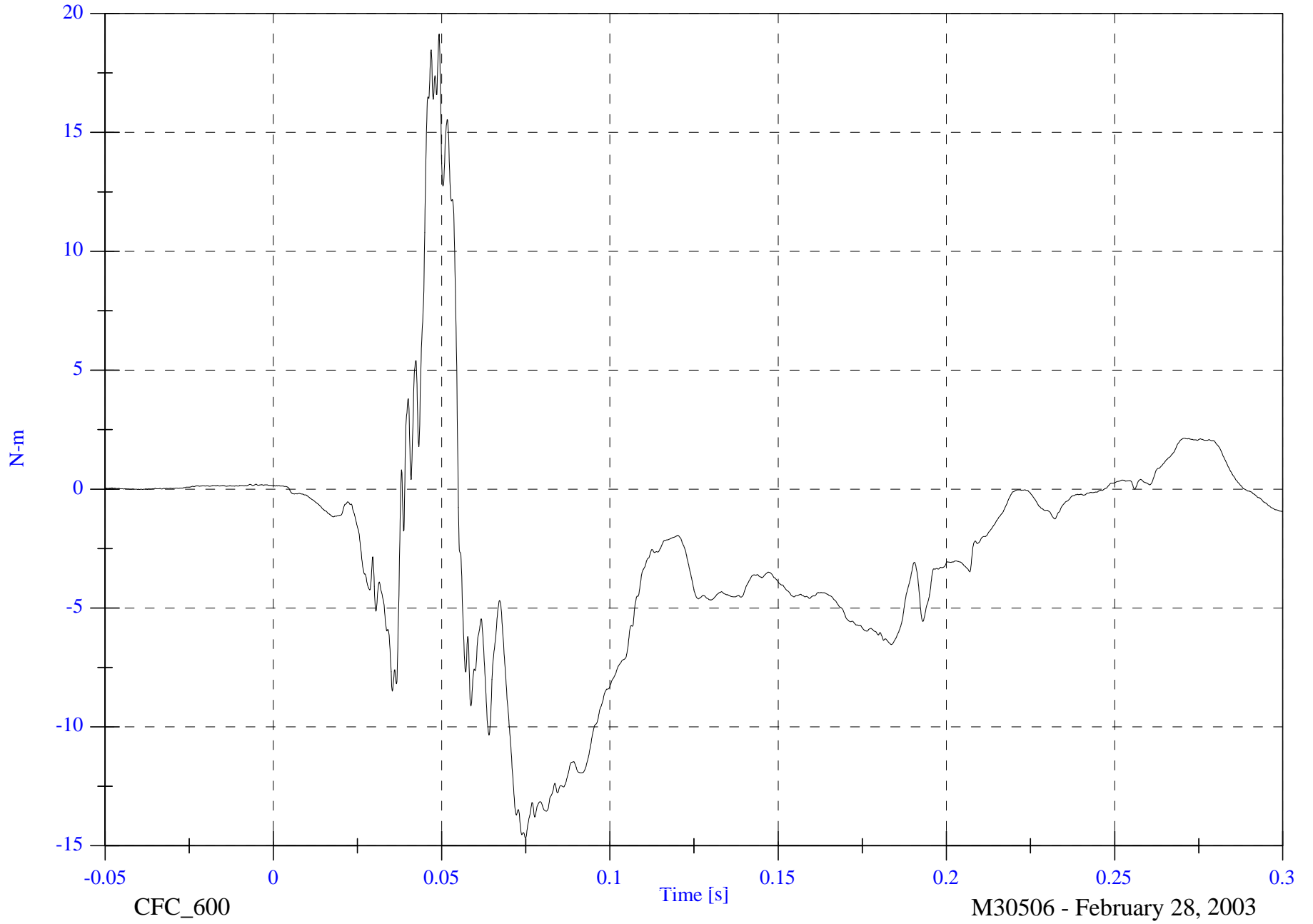
V1P2 Left Lower Tibia Mx

Max: 19.1 [N-m] at 0.049 [s]

Min: -14.7 [N-m] at 0.075 [s]

B-103

8642-NCAP-33



CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

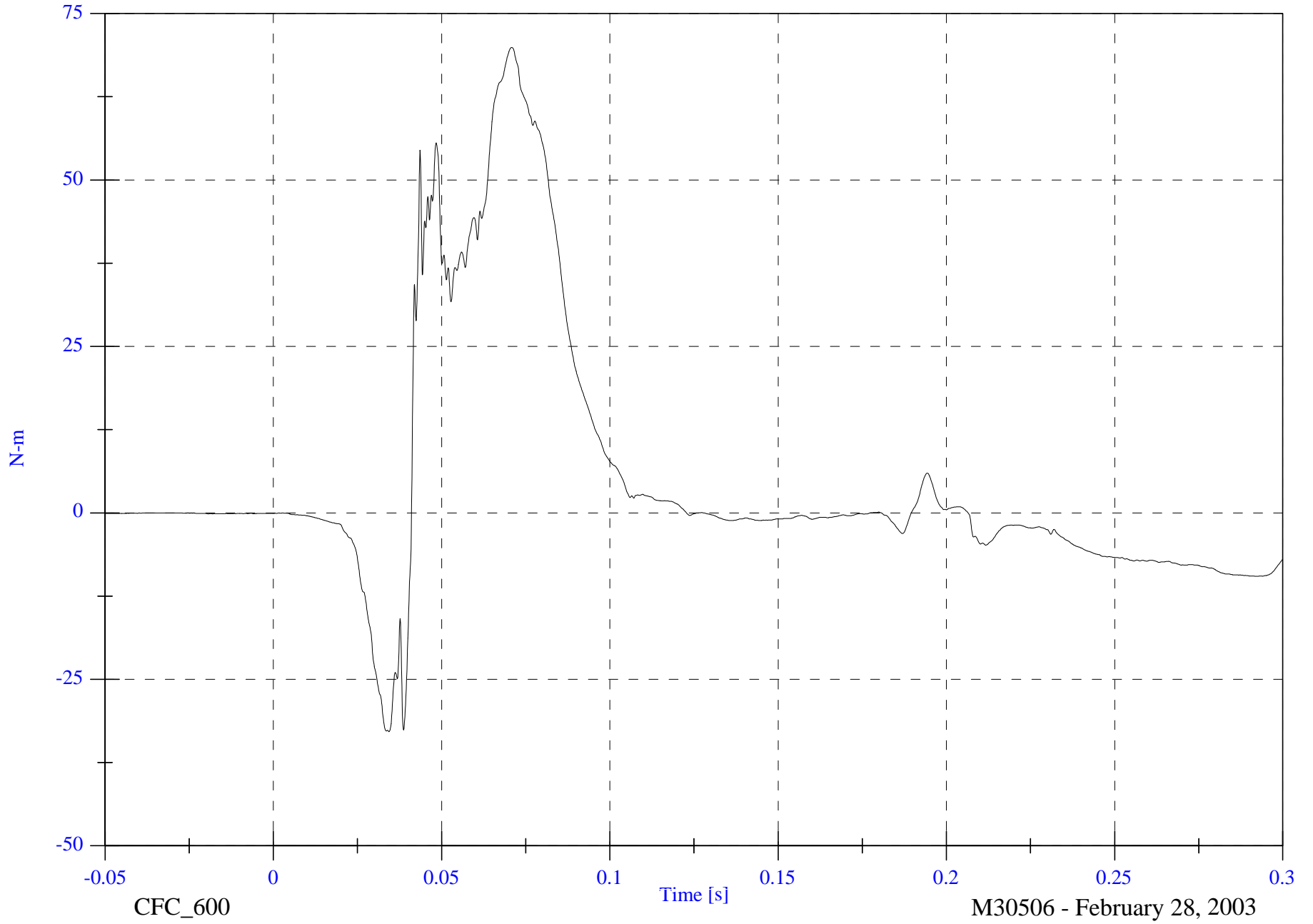
Max: 69.9 [N-m] at 0.071 [s]

V1P2 Left Lower Tibia My

Min: -32.9 [N-m] at 0.034 [s]

B-104

8642-NCAP-33



CFC\_600

Time [s]

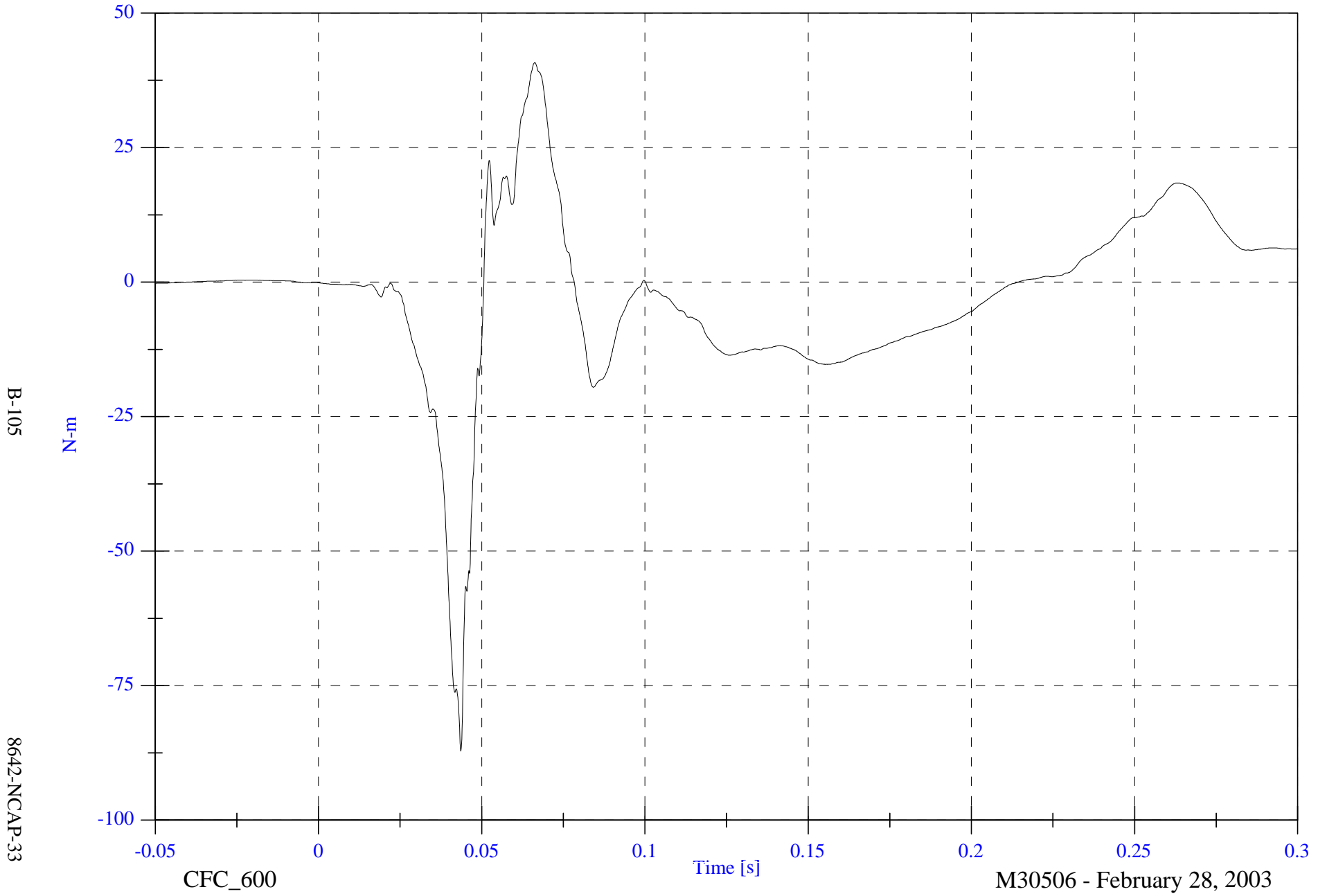
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Right Upper Tibia Mx

Max: 40.8 [N-m] at 0.066 [s]

Min: -87.2 [N-m] at 0.044 [s]



B-105

8642-NCAP-33

CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

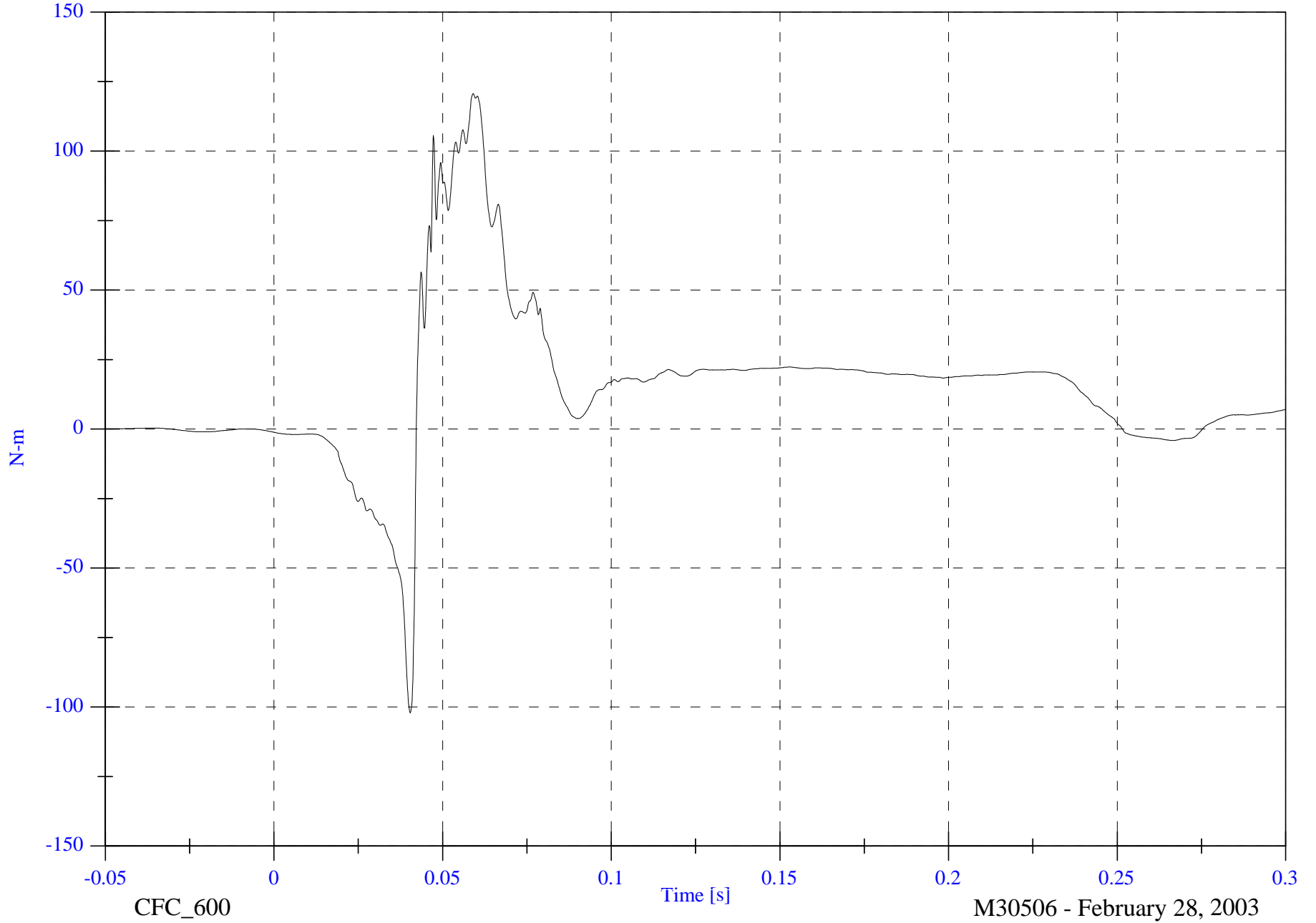
V1P2 Right Upper Tibia My

Max: 120.7 [N-m] at 0.059 [s]

Min: -102.1 [N-m] at 0.040 [s]

B-106

8642-NCAP-33



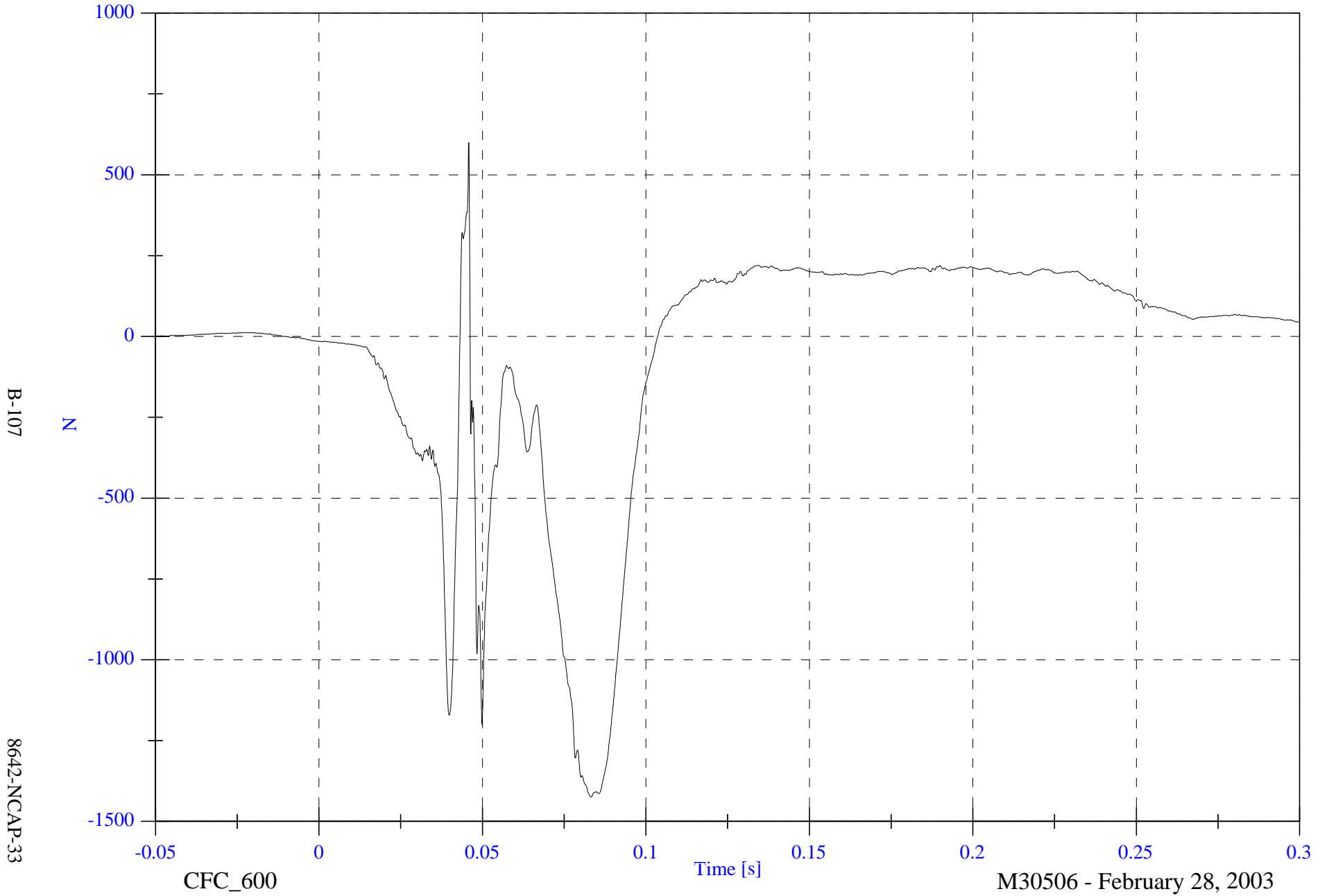
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Right Lower Tibia Fz

Max: 598.9 [N] at 0.046 [s]

Min: -1424.2 [N] at 0.083 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

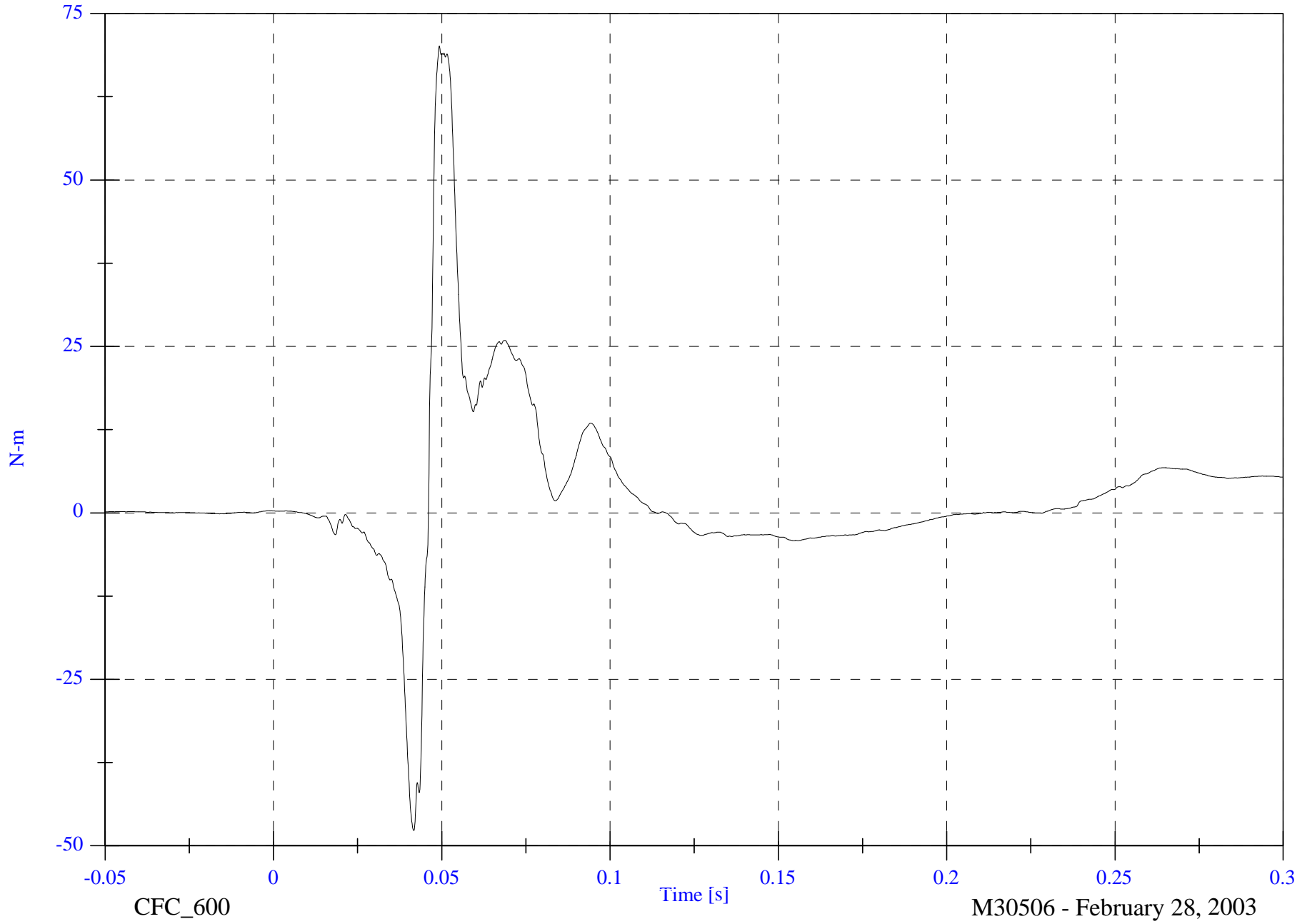
V1P2 Right Lower Tibia Mx

Max: 70.1 [N-m] at 0.049 [s]

Min: -47.7 [N-m] at 0.042 [s]

B-108

8642-NCAP-33



CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

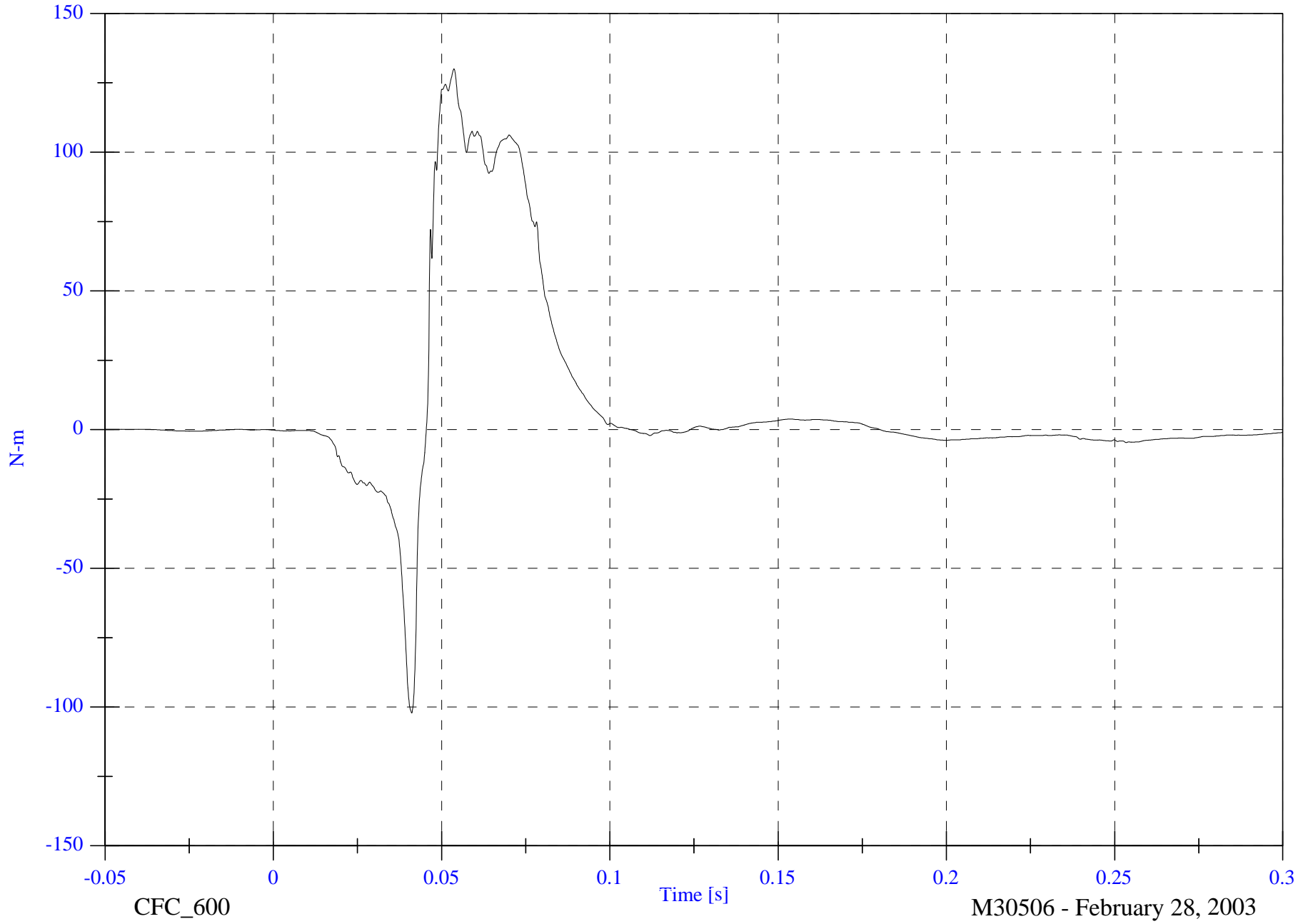
V1P2 Right Lower Tibia My

Max: 130.0 [N-m] at 0.054 [s]

Min: -102.1 [N-m] at 0.041 [s]

B-109

8642-NCAP-33



CFC\_600

Time [s]

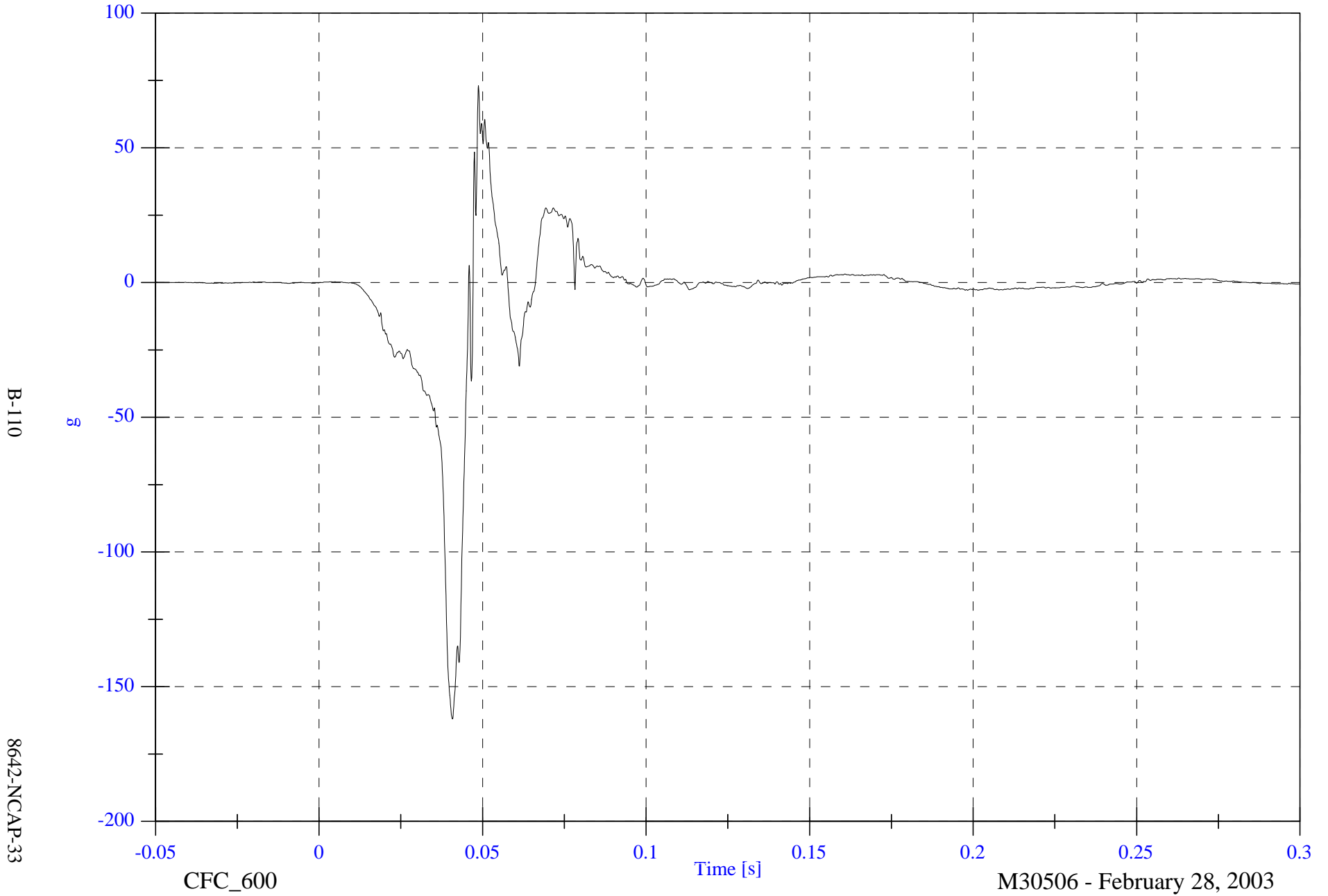
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Left Foot Aft x

Max: 73.1 [g] at 0.049 [s]

Min: -162.0 [g] at 0.041 [s]

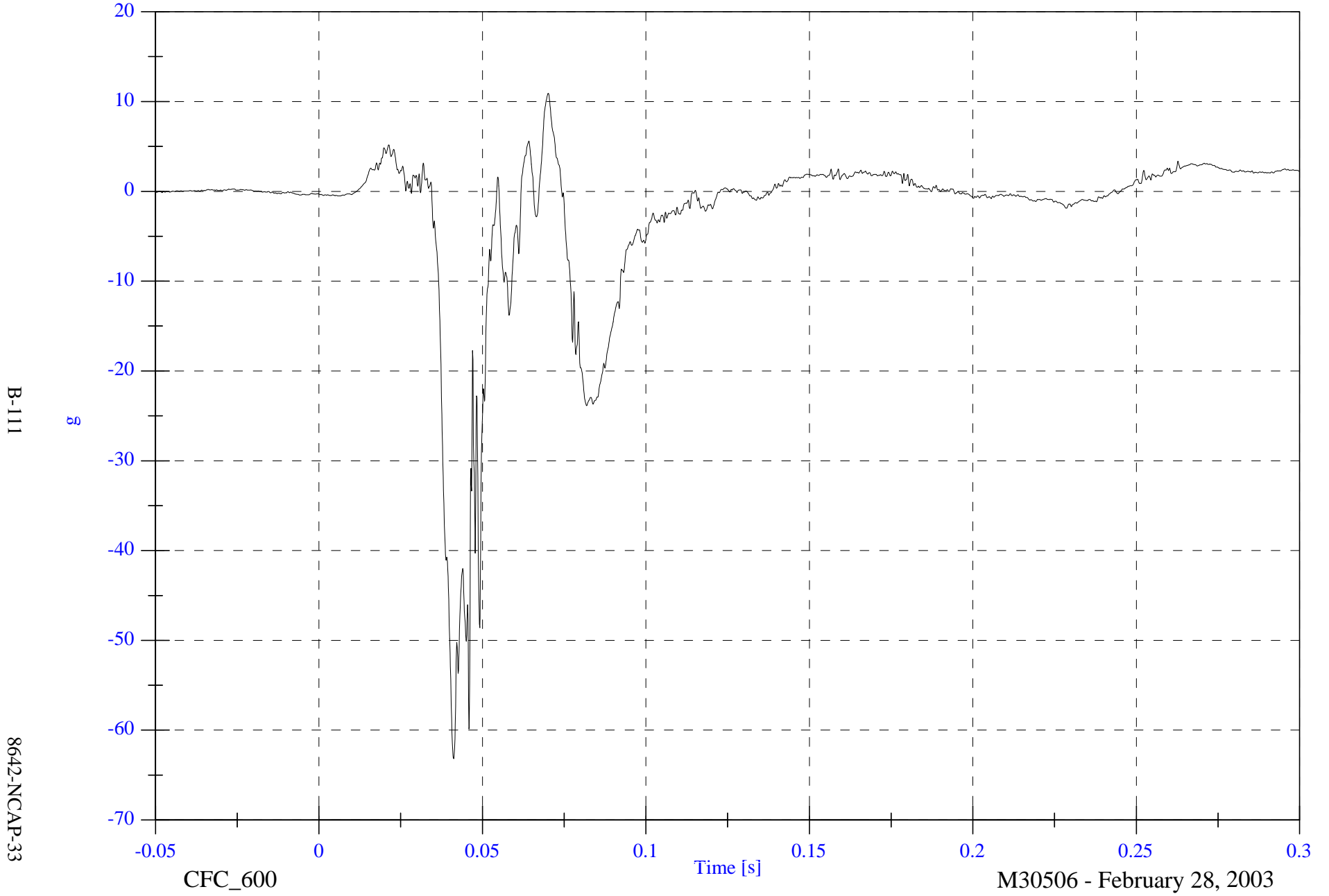


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Left Foot Aft z

Max: 10.9 [g] at 0.070 [s]

Min: -63.2 [g] at 0.041 [s]



B-111

8642-NCAP-33

CFC\_600

Time [s]

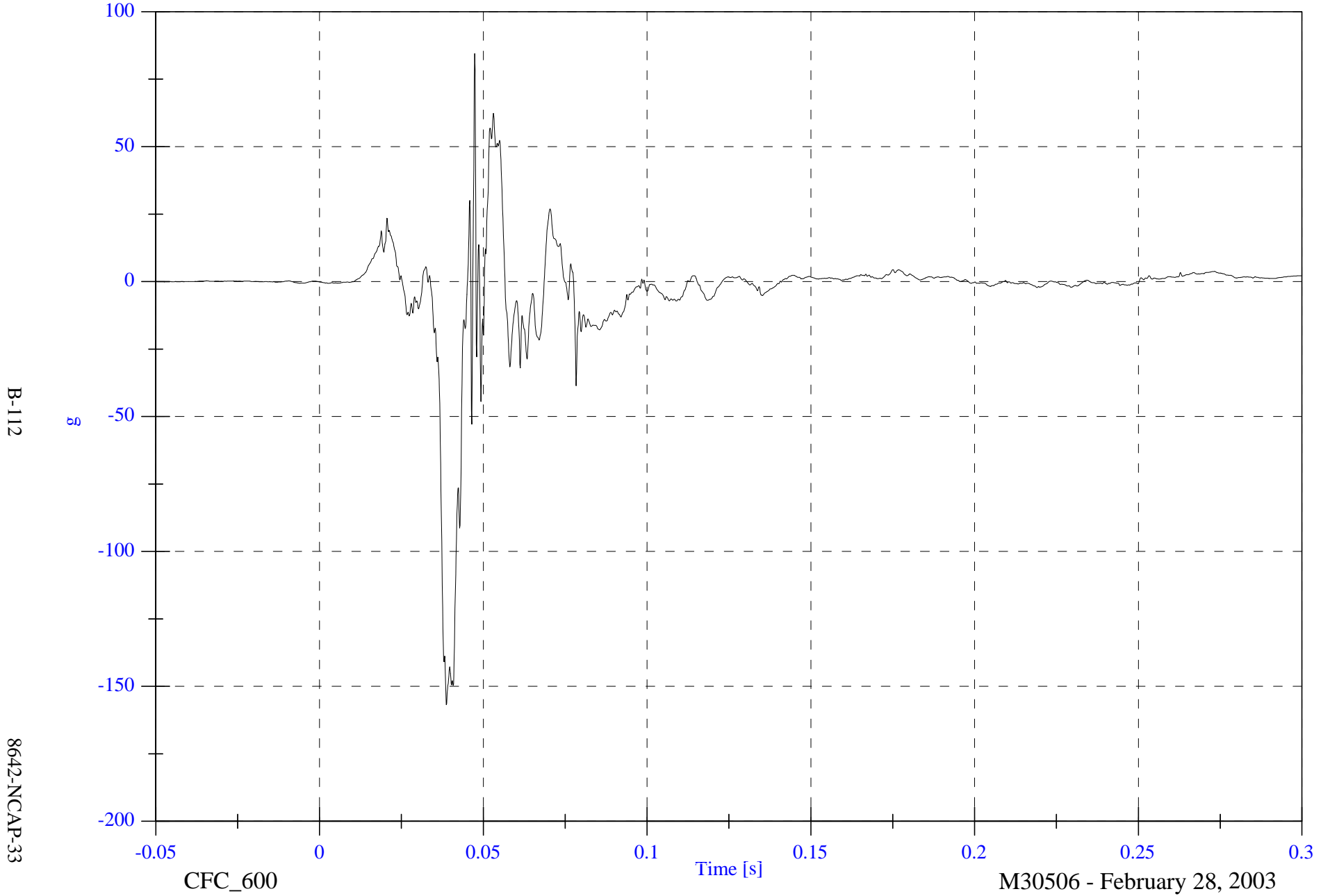
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Left Foot Fore z

Max: 84.5 [g] at 0.047 [s]

Min: -156.8 [g] at 0.039 [s]

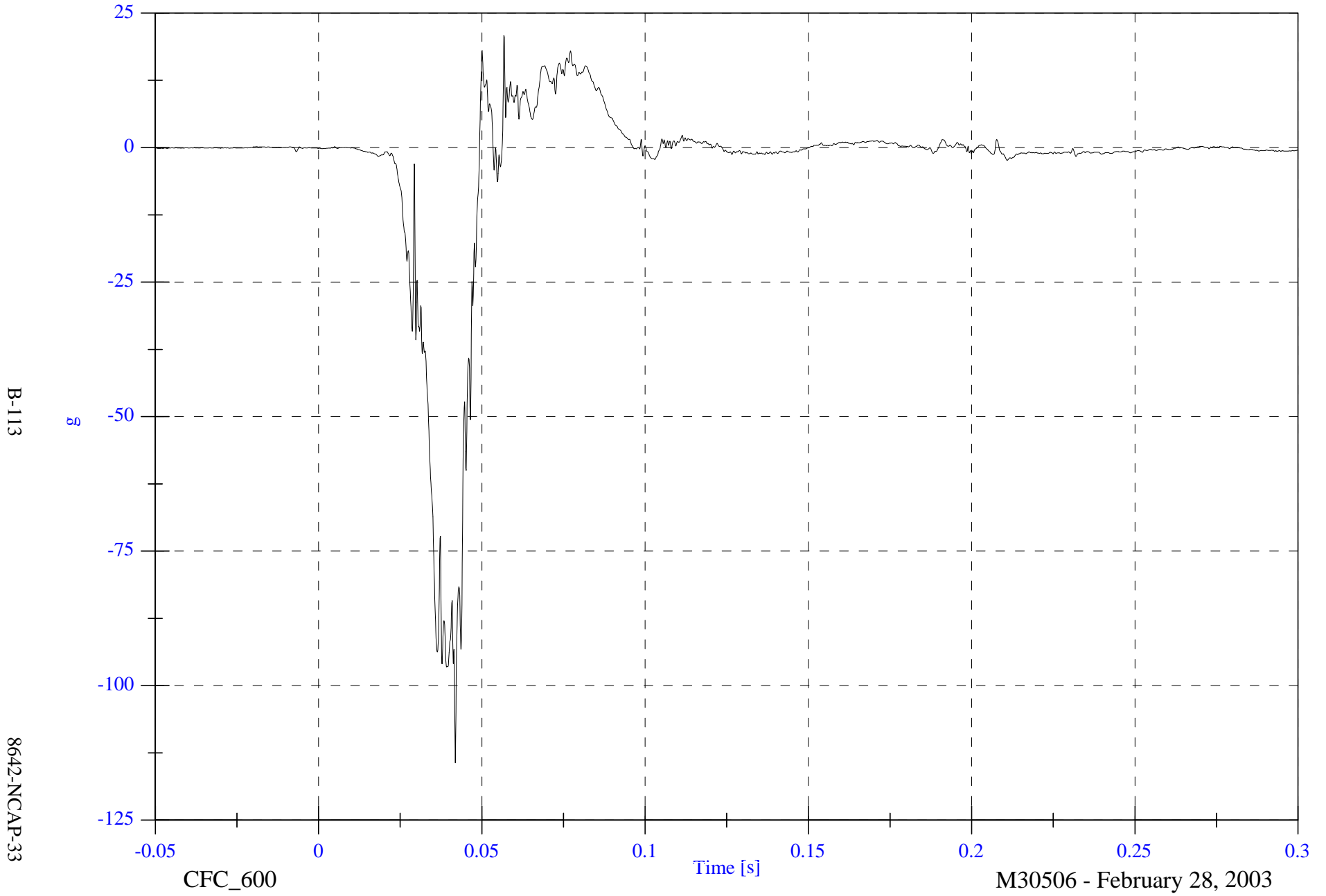


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Right Foot Aft x

Max: 20.9 [g] at 0.057 [s]

Min: -114.4 [g] at 0.042 [s]



B-113

8642-NCAP-33

CFC\_600

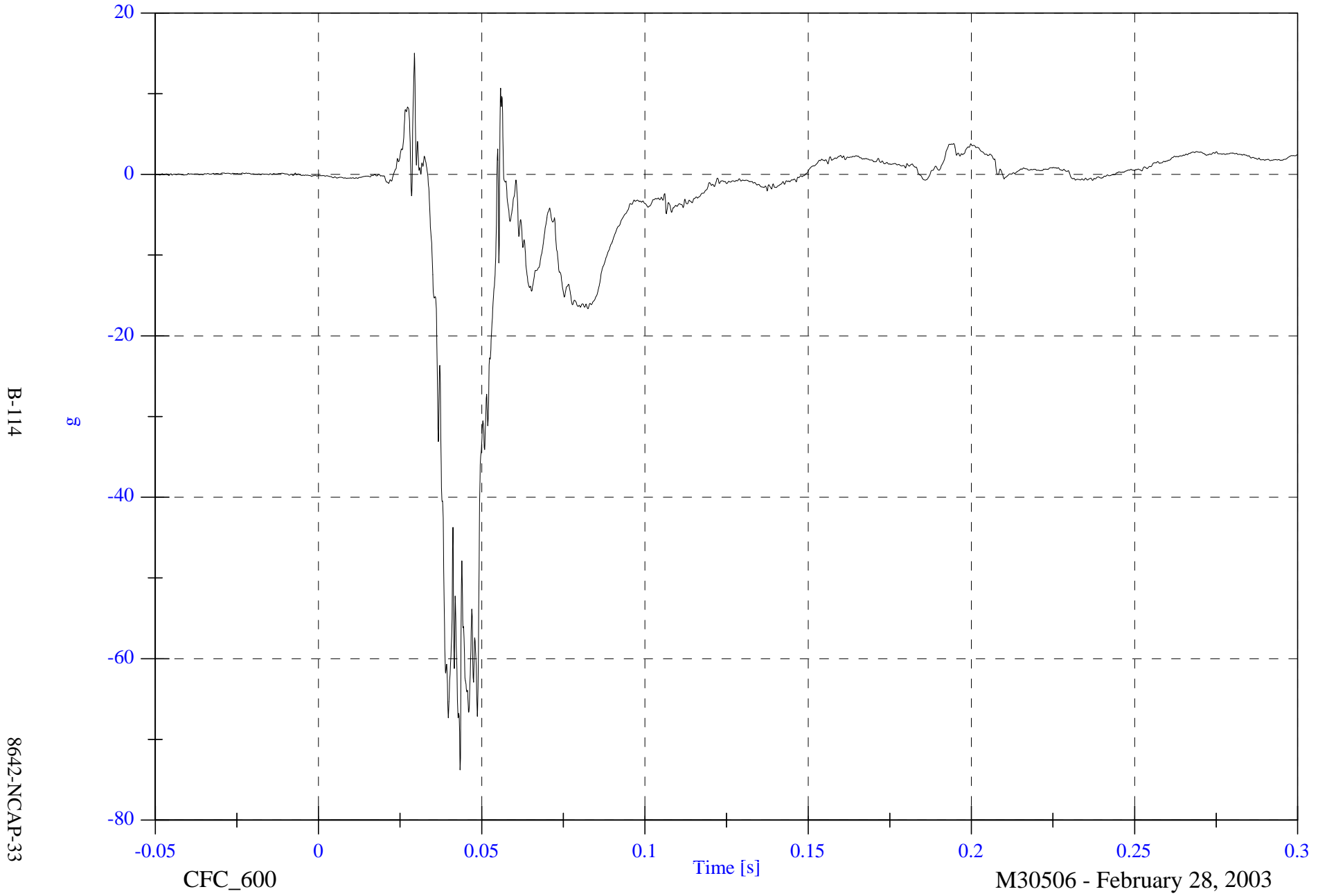
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Right Foot Aft z

Max: 15.0 [g] at 0.029 [s]

Min: -73.8 [g] at 0.043 [s]

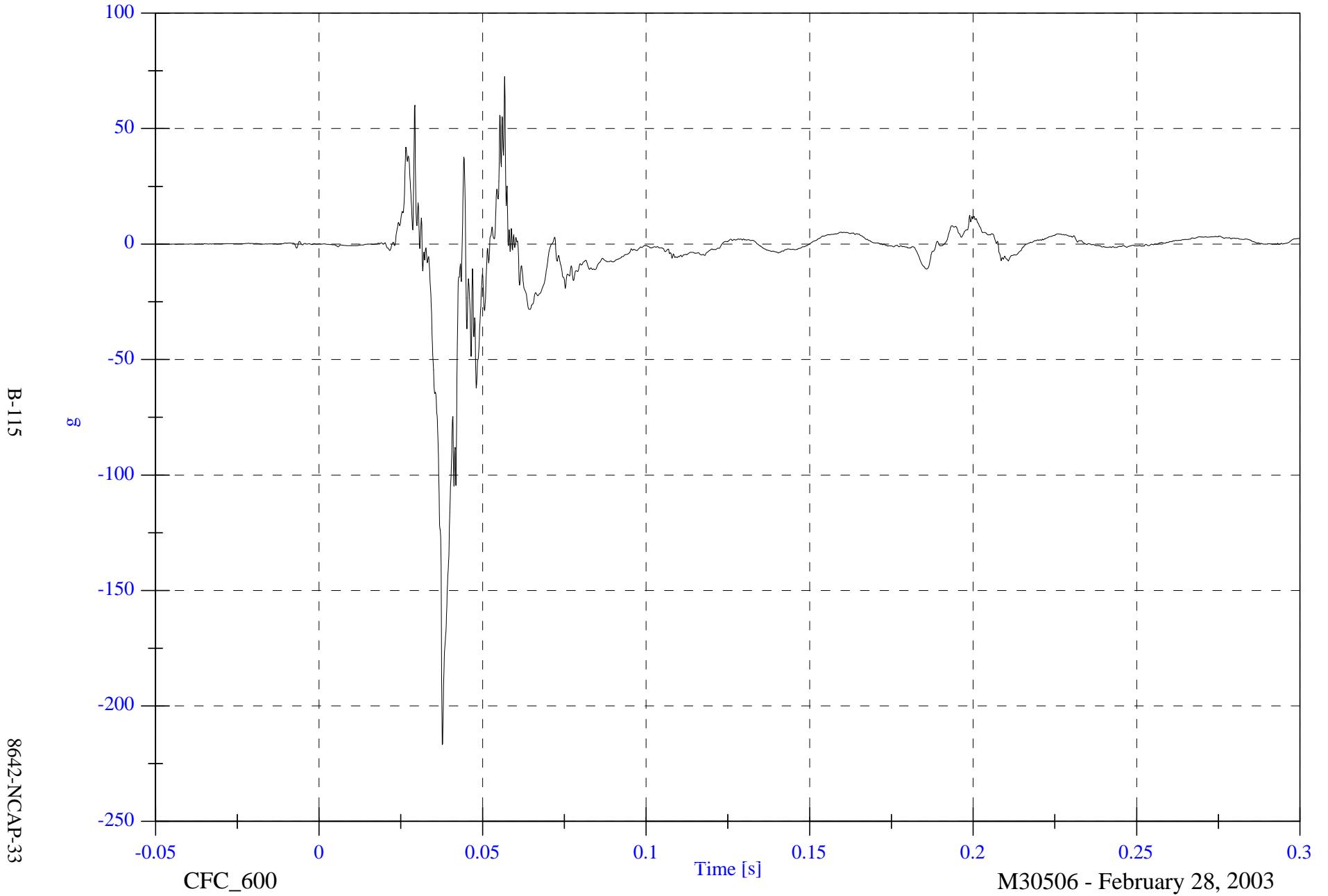


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Right Foot Fore z

Max: 72.6 [g] at 0.057 [s]

Min: -216.8 [g] at 0.038 [s]

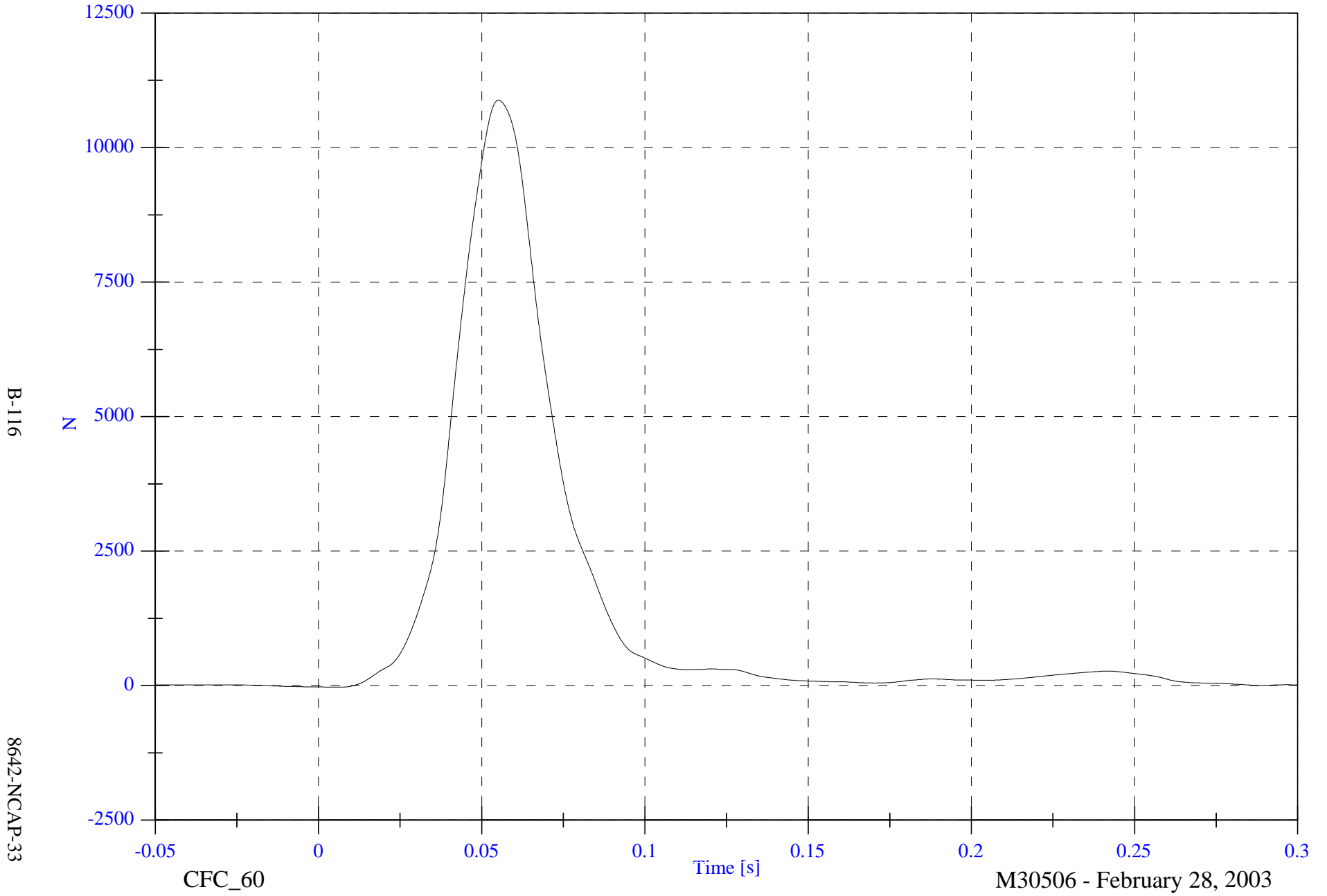


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Lap Belt Load

Max: 10880.0 [N] at 0.055 [s]

Min: -29.2 [N] at 0.006 [s]

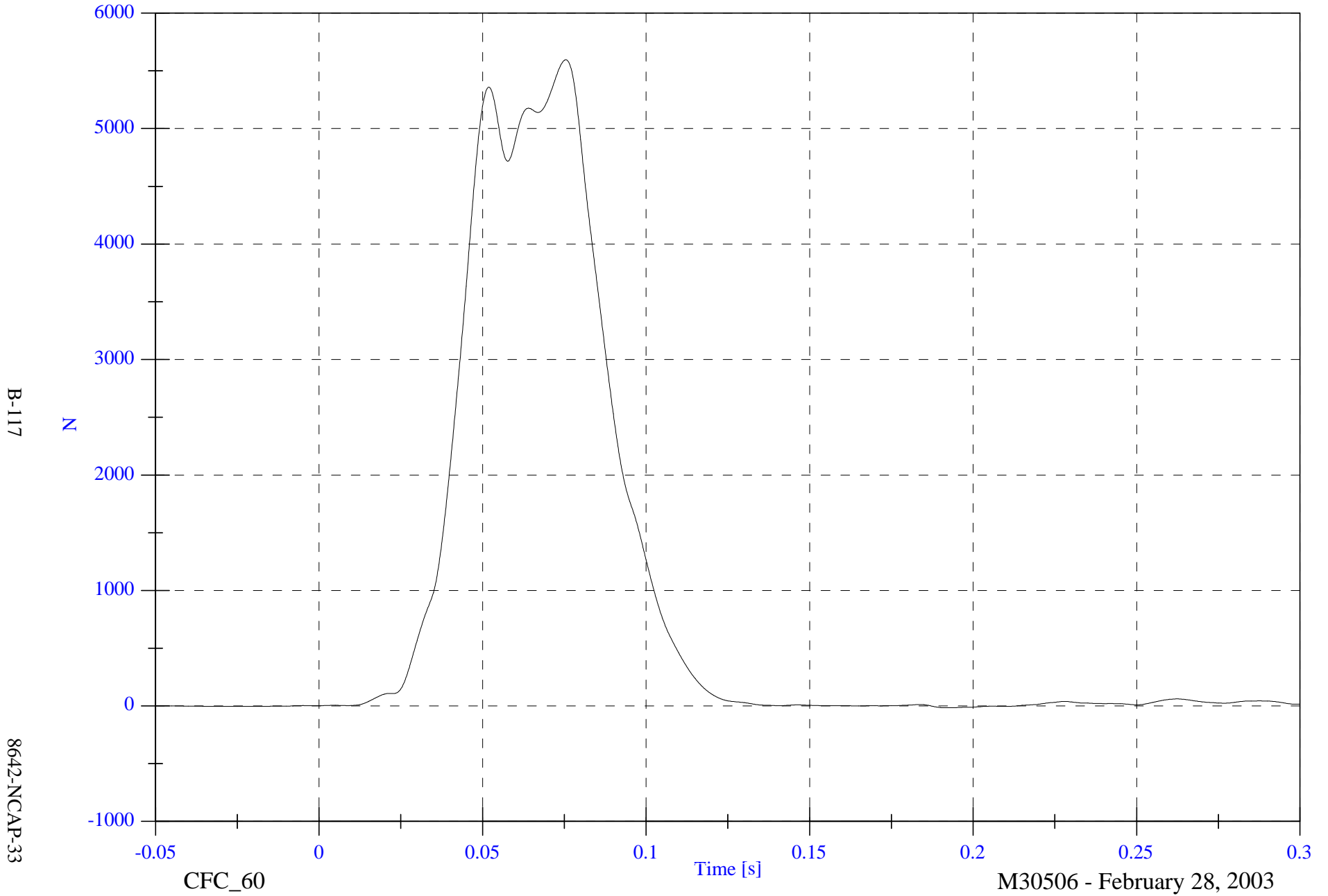


NCAP Test #11 - 2003 Isuzu Rodeo

V1P2 Shoulder Belt Load Cell

Max: 5595.2 [N] at 0.076 [s]

Min: -14.6 [N] at 0.191 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

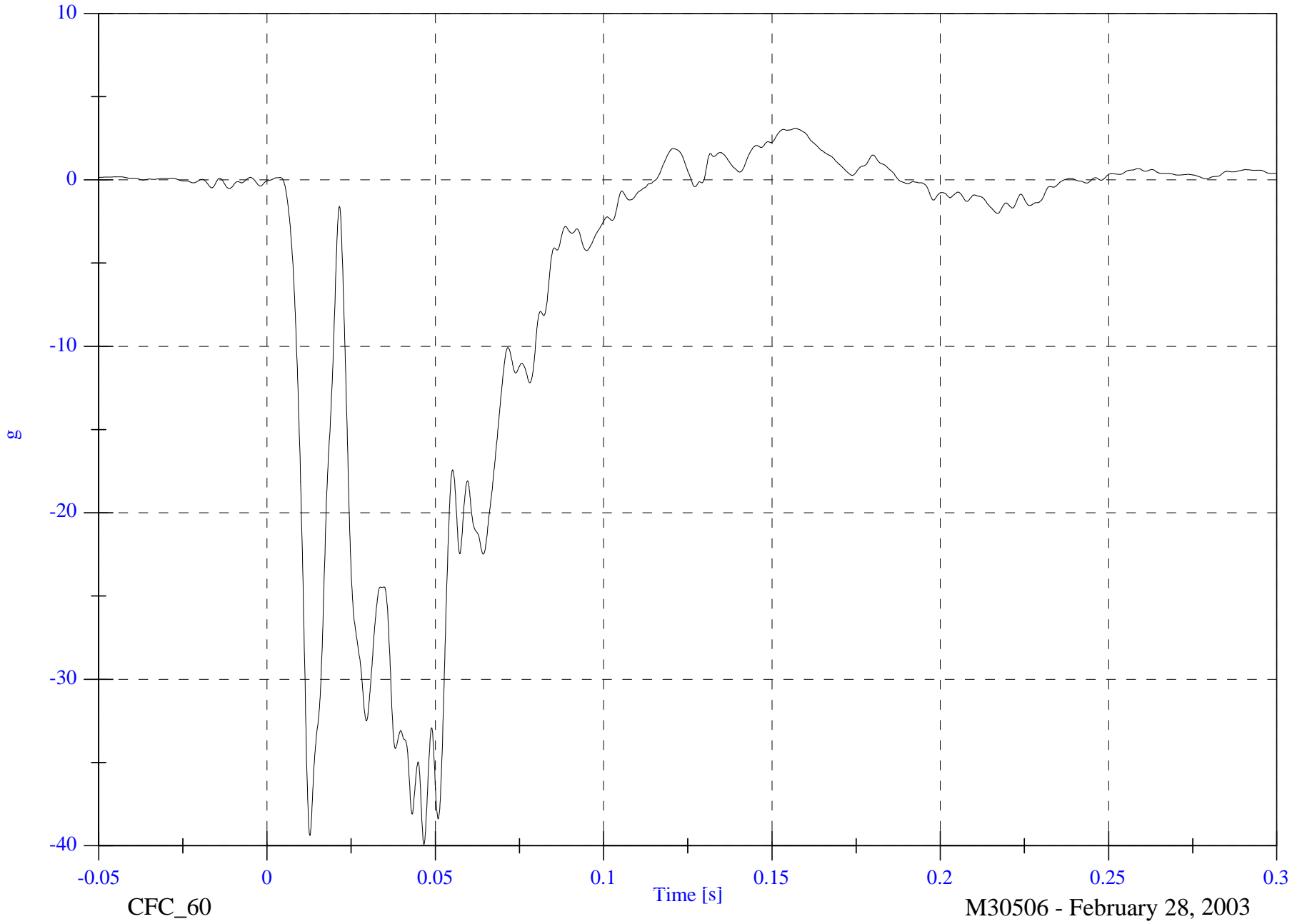
V1 Left Rear #1x

Max: 3.1 [g] at 0.157 [s]

Min: -39.9 [g] at 0.047 [s]

B-118

8642-NCAP-33



CFC\_60

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

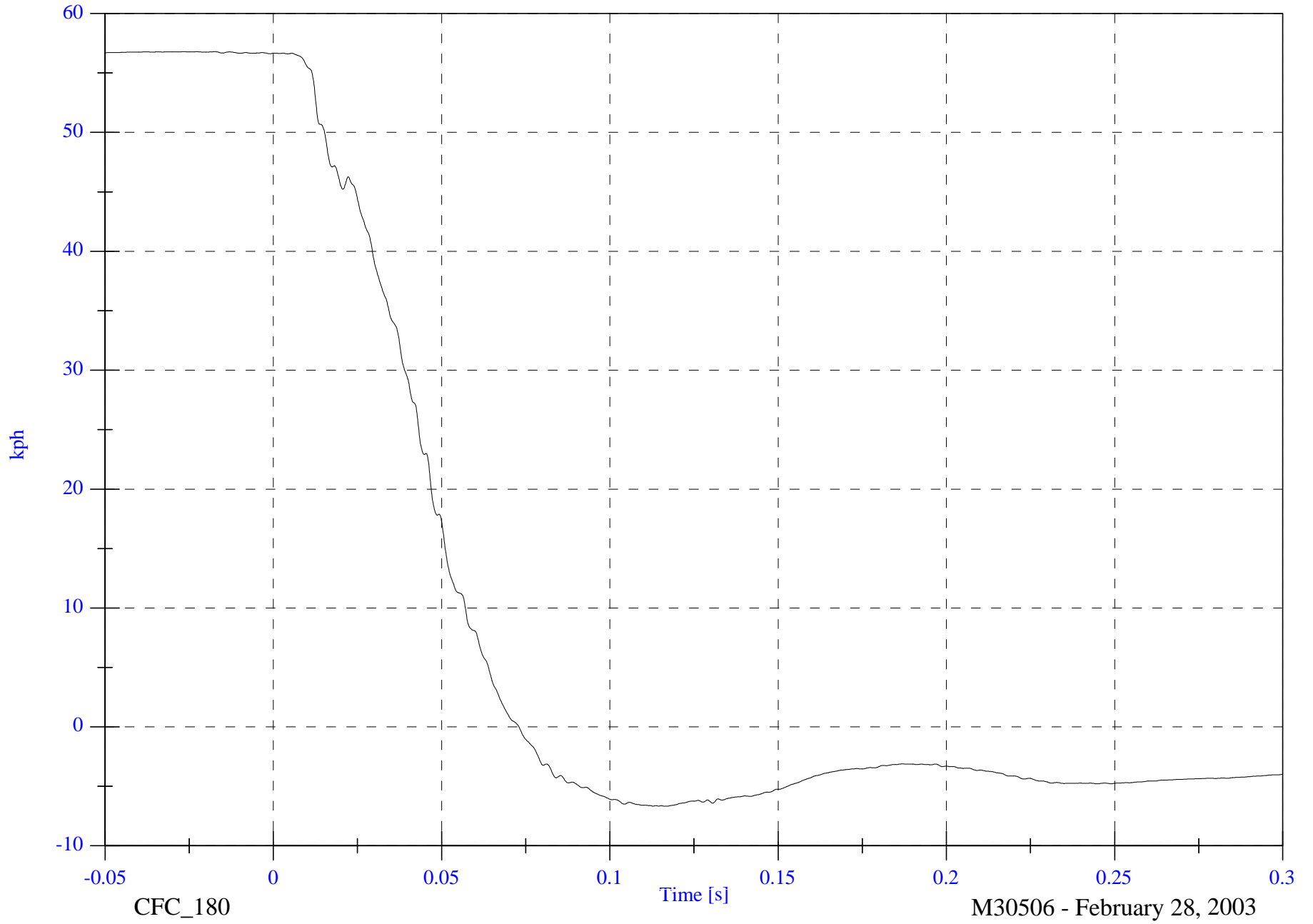
V1 Left Rear #1x Velocity

Max: 56.8 [kph] at -0.017 [s]

Min: -6.7 [kph] at 0.113 [s]

B-119

8642-NCAP-33



CFC\_180

Time [s]

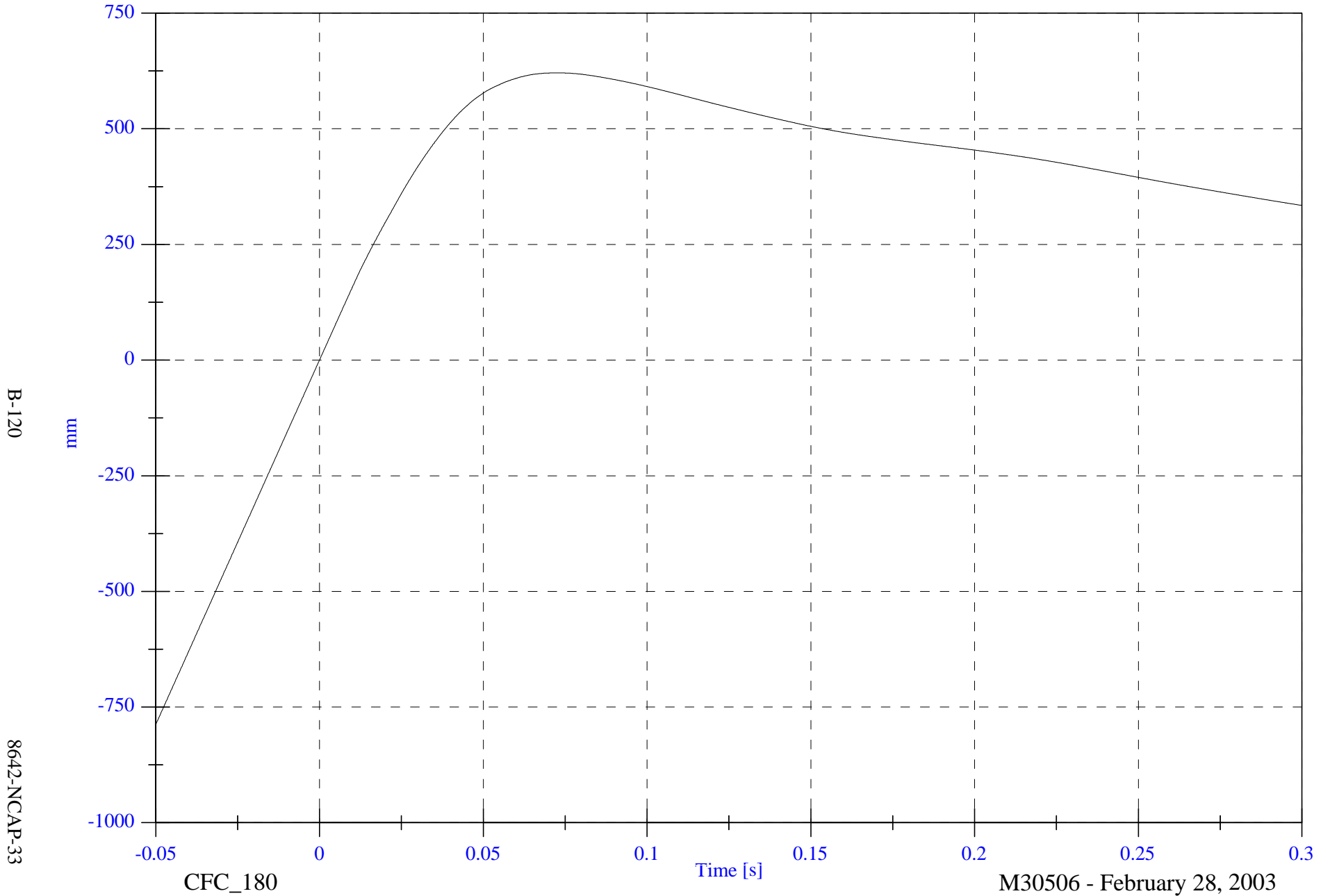
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1 Left Rear #1x Displacement

Max: 620.8 [mm] at 0.073 [s]

Min: -788.0 [mm] at -0.050 [s]



B-120

8642-NCAP-33

CFC\_180

Time [s]

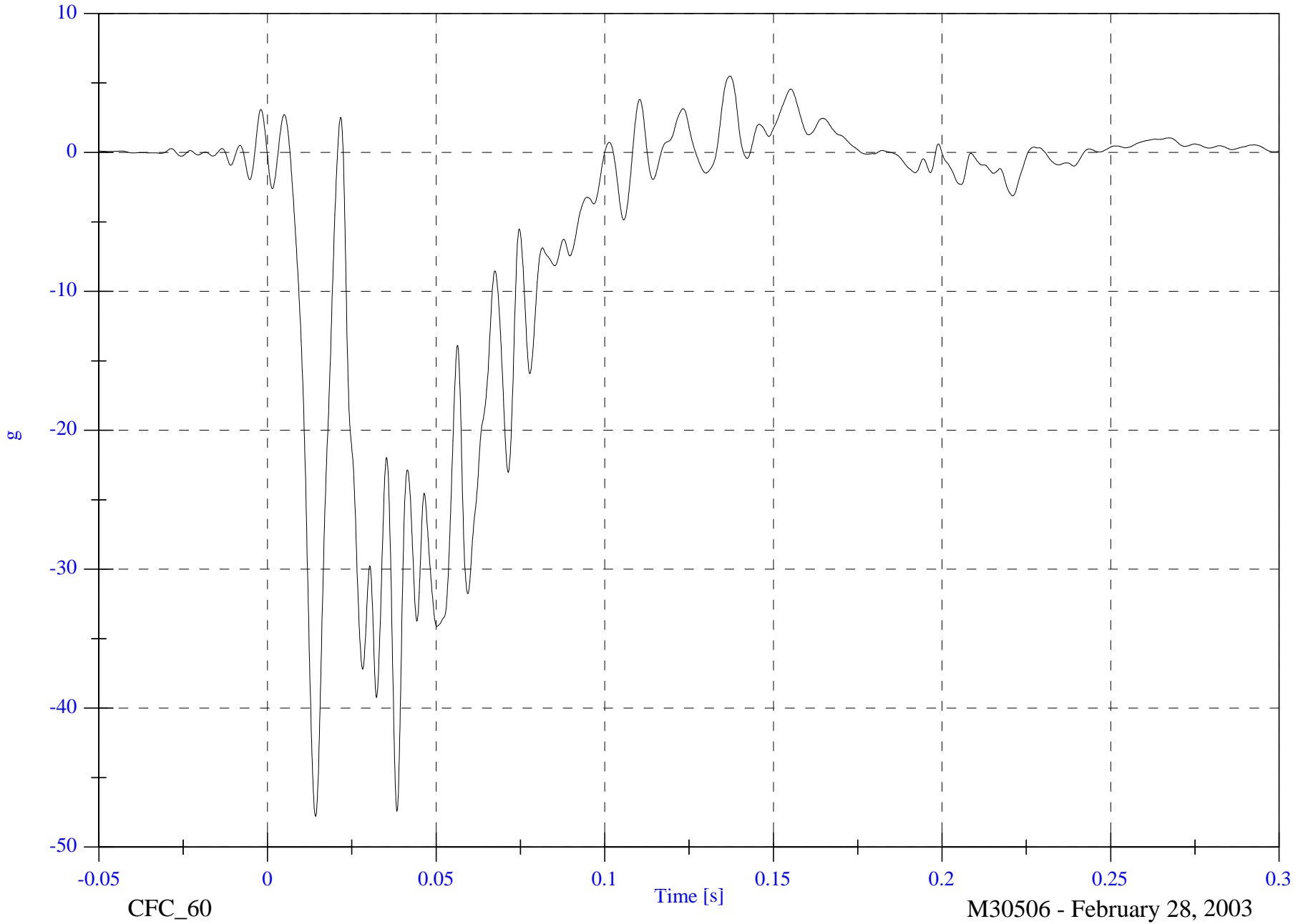
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1 Right Rear #2x

Max: 5.5 [g] at 0.137 [s]

Min: -47.8 [g] at 0.014 [s]



B-121

8642-NCAP-33

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

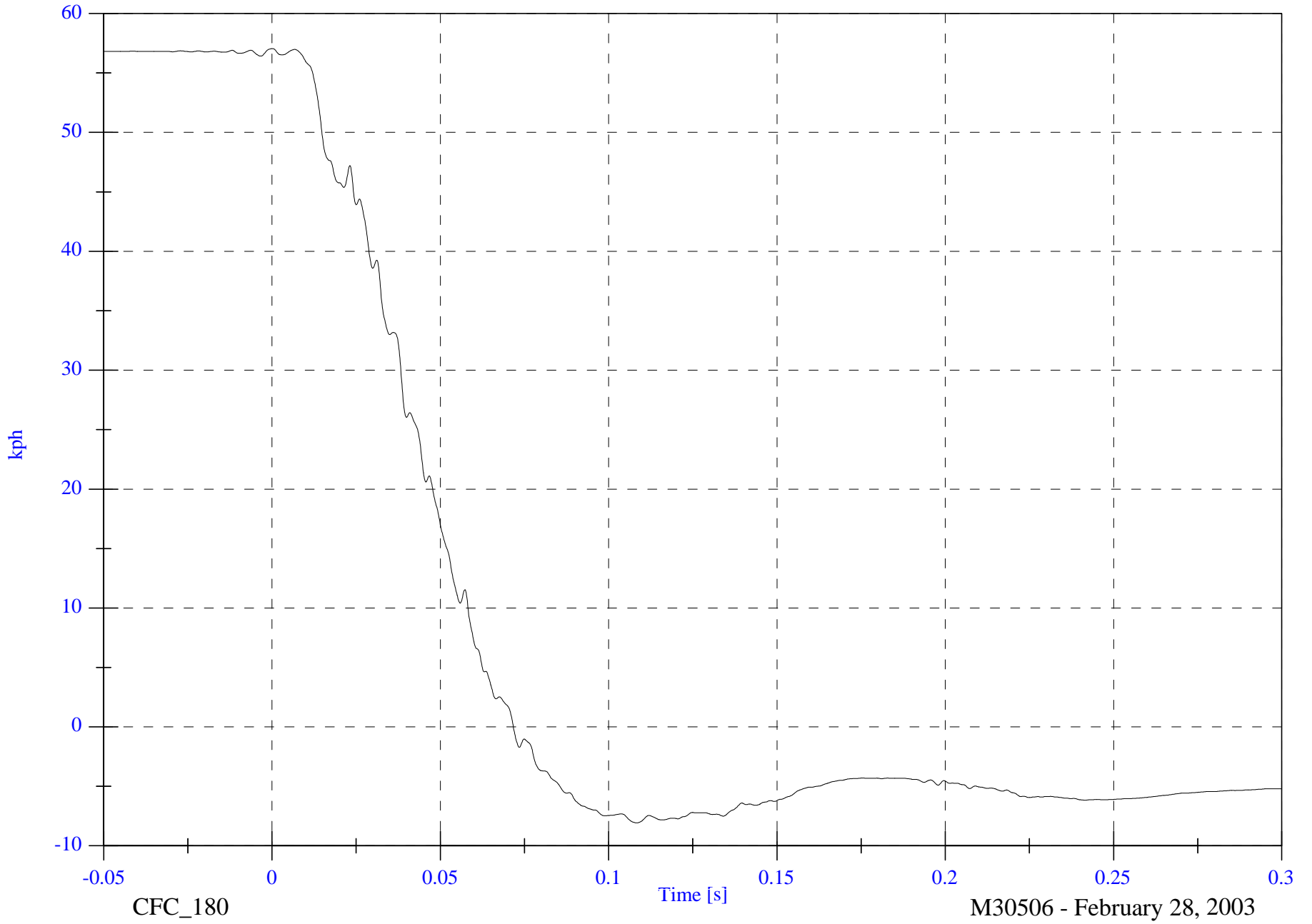
V1 Right Rear #2x Velocity

Max: 57.0 [kph] at 0.000 [s]

Min: -8.1 [kph] at 0.108 [s]

B-122

8642-NCAP-33



CFC\_180

Time [s]

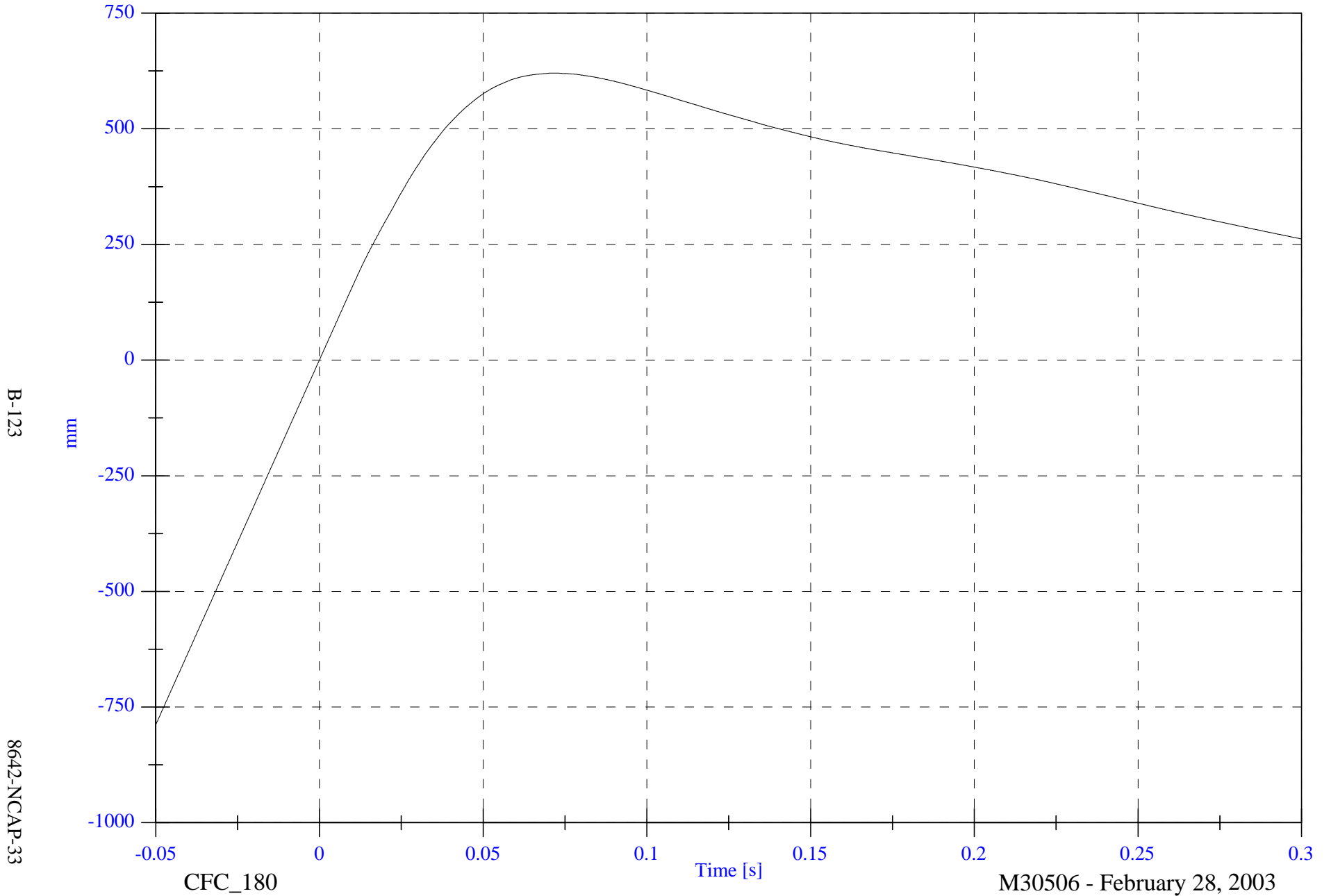
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1 Right Rear #2x Displacement

Max: 620.4 [mm] at 0.072 [s]

Min: -788.7 [mm] at -0.050 [s]



B-123

8642-NCAP-33

CFC\_180

Time [s]

M30506 - February 28, 2003

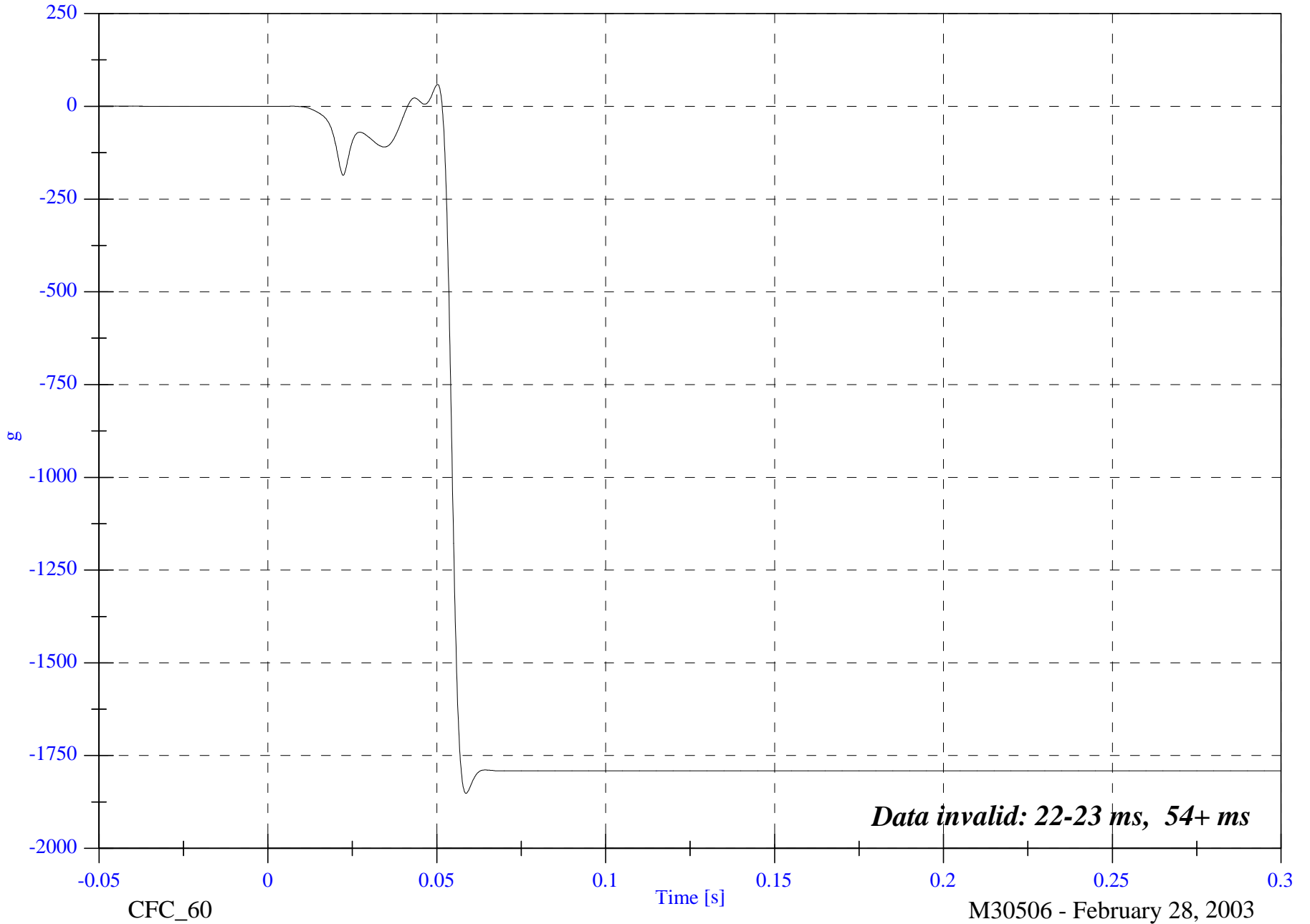
NCAP Test #11 - 2003 Isuzu Rodeo

V1 Engine Top #3x

Max: 58.9 [g] at 0.050 [s]  
Min: -1851.4 [g] at 0.059 [s]

B-124

8642-NCAP-33



*Data invalid: 22-23 ms, 54+ ms*

M30506 - February 28, 2003

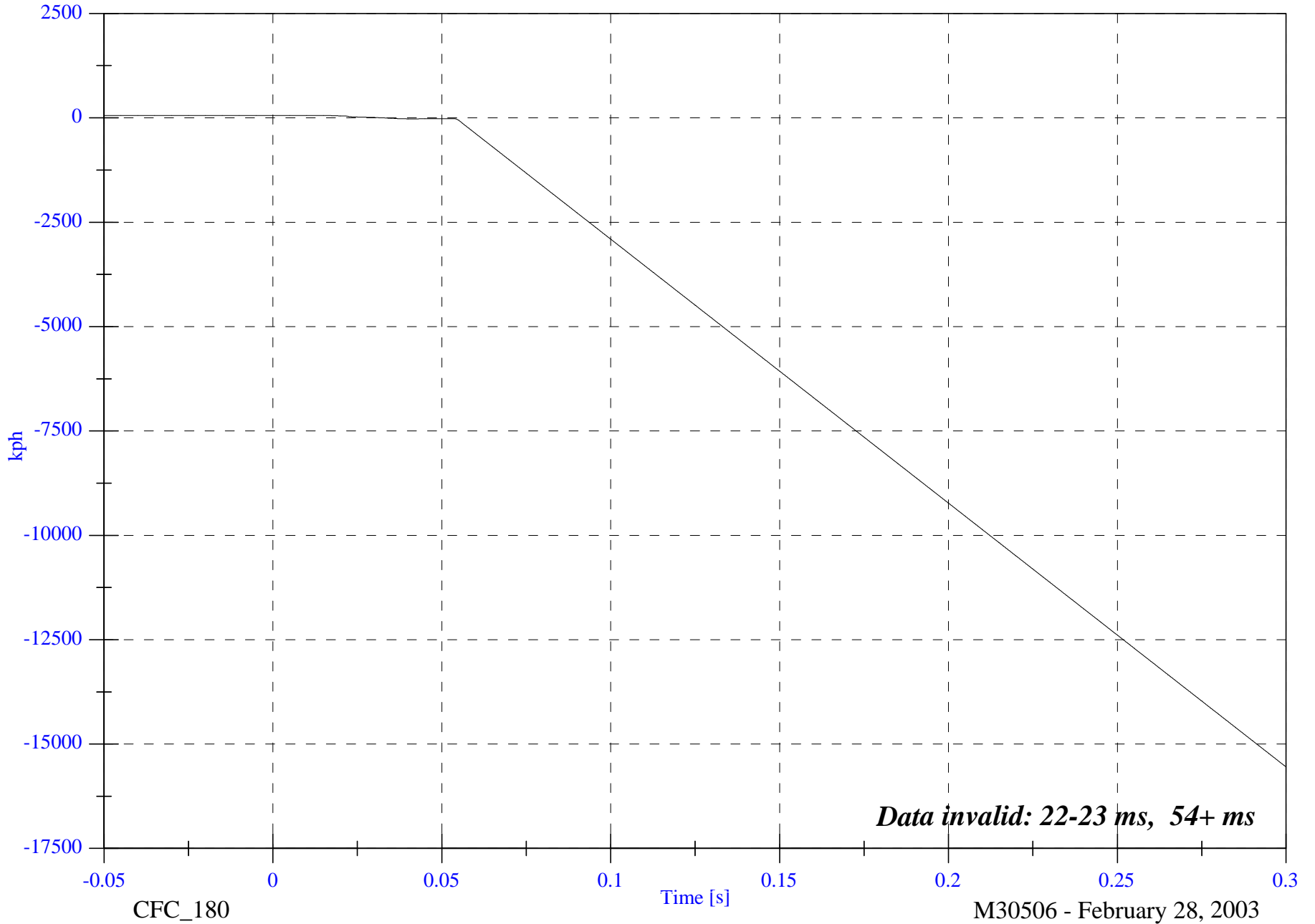
NCAP Test #11 - 2003 Isuzu Rodeo

V1 Engine Top #3x Velocity

Max: 56.7 [kph] at -0.037 [s]  
Min: -15544.9 [kph] at 0.300 [s]

B-125

8642-NCAP-33

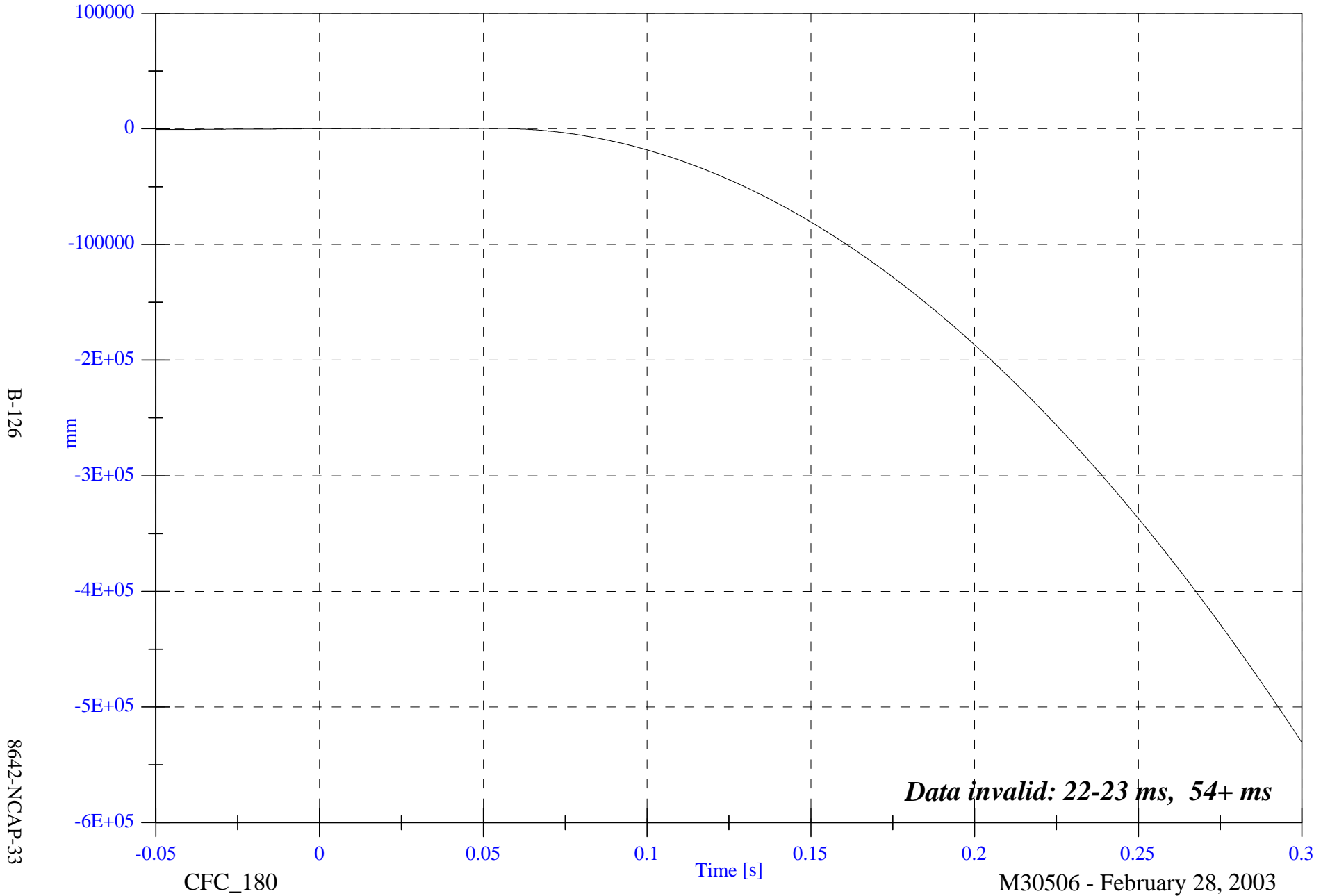


NCAP Test #11 - 2003 Isuzu Rodeo

V1 Engine Top #3x Displacement

Max: 378.6 [mm] at 0.032 [s]

Min: -530489.5 [mm] at 0.300 [s]



B-126

8642-NCAP-33

CFC\_180

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1 Engine Bottom #4x

Max: 347.6 [g] at 0.035 [s]

Min: -1789.6 [g] at 0.103 [s]



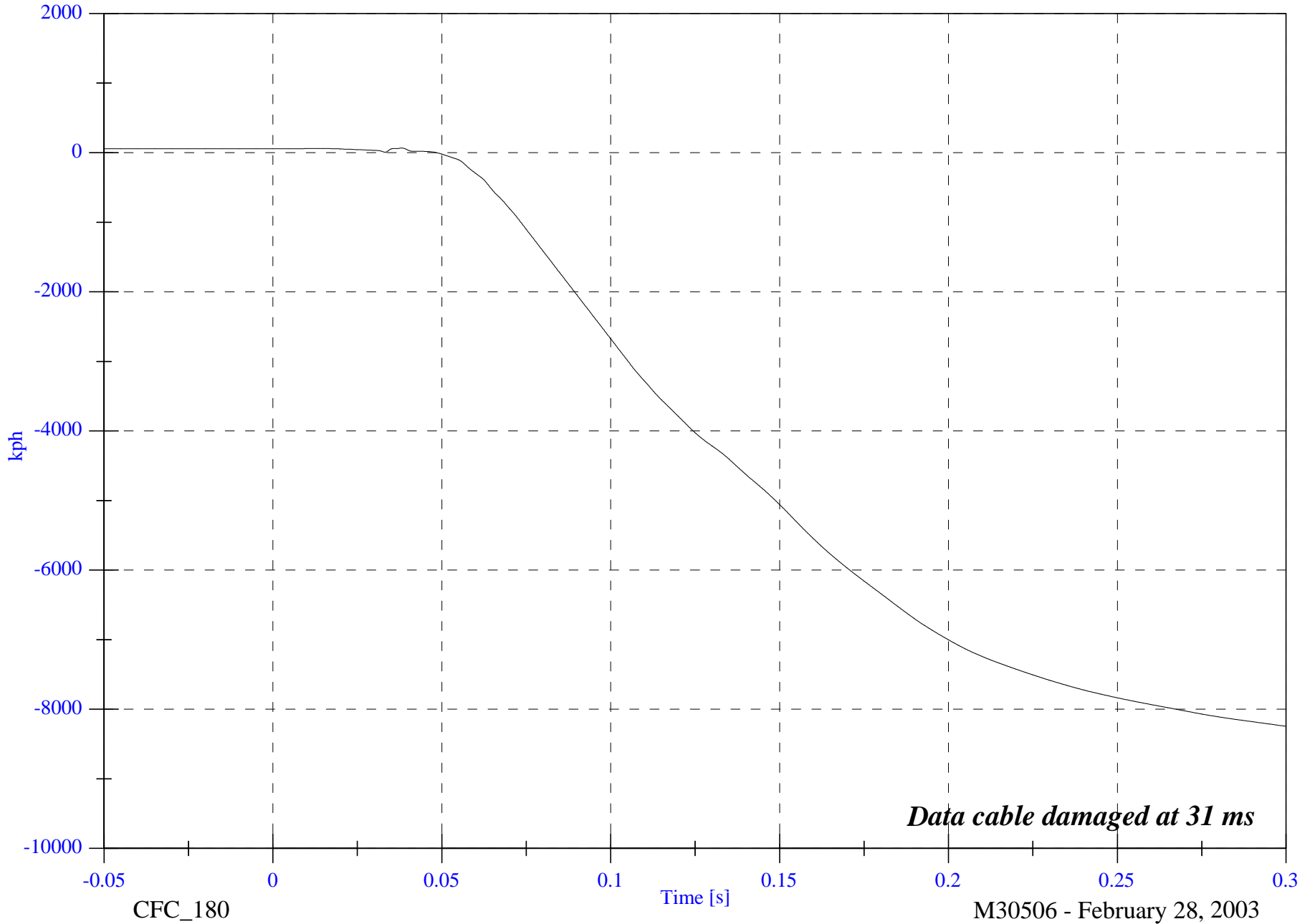
NCAP Test #11 - 2003 Isuzu Rodeo

V1 Engine Bottom #4x Velocity

Max: 66.2 [kph] at 0.038 [s]  
Min: -8245.2 [kph] at 0.300 [s]

B-128

8642-NCAP-33



*Data cable damaged at 31 ms*

CFC\_180

Time [s]

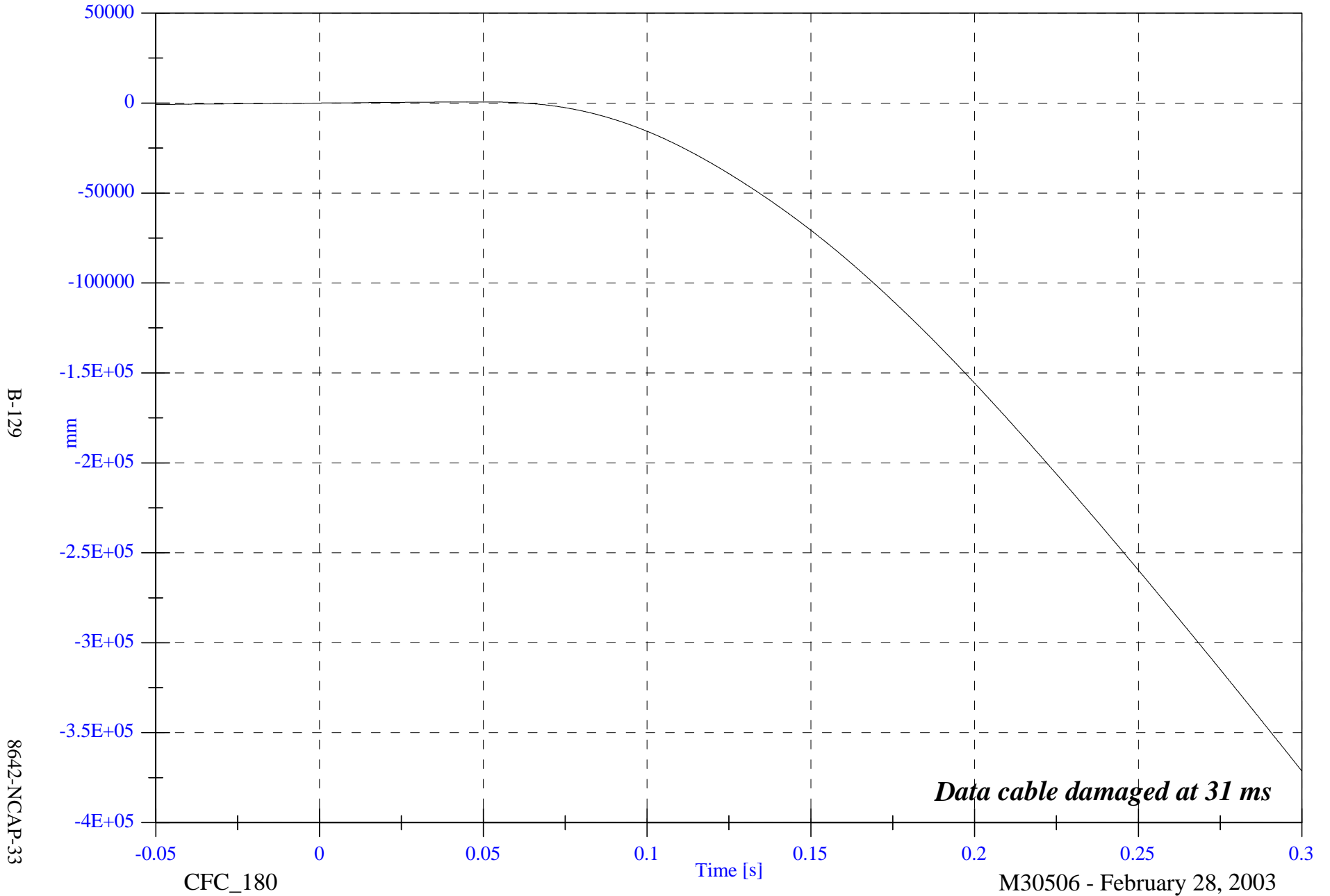
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1 Engine Bottom #4x Displacement

Max: 595.2 [mm] at 0.048 [s]

Min: -371236.8 [mm] at 0.300 [s]



B-129

8642-NCAP-33

CFC\_180

Time [s]

M30506 - February 28, 2003

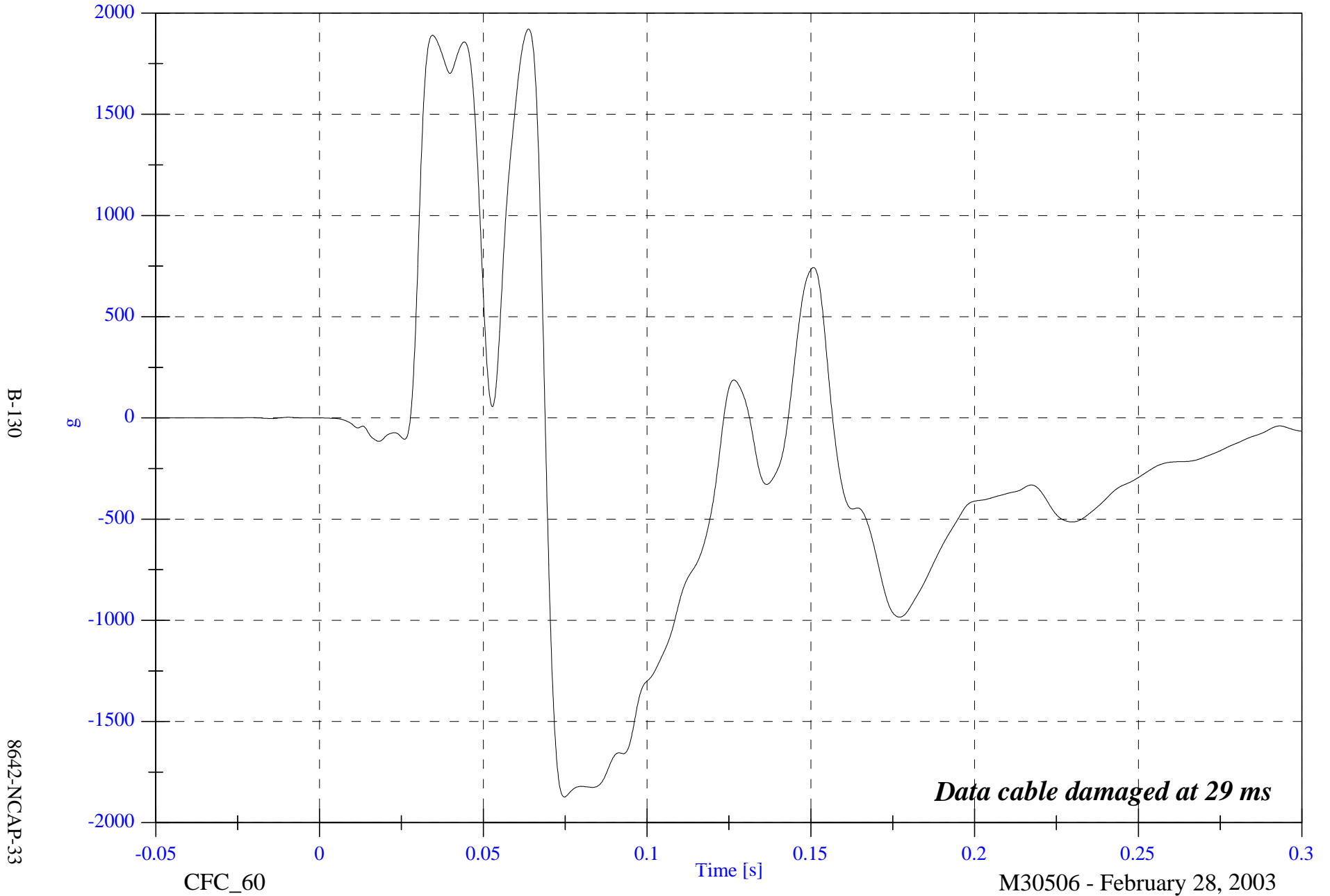
*Data cable damaged at 31 ms*

NCAP Test #11 - 2003 Isuzu Rodeo

V1 Right Caliper #5x

Max: 1921.1 [g] at 0.064 [s]

Min: -1872.9 [g] at 0.075 [s]



B-130

8642-NCAP-33

CFC\_60

Time [s]

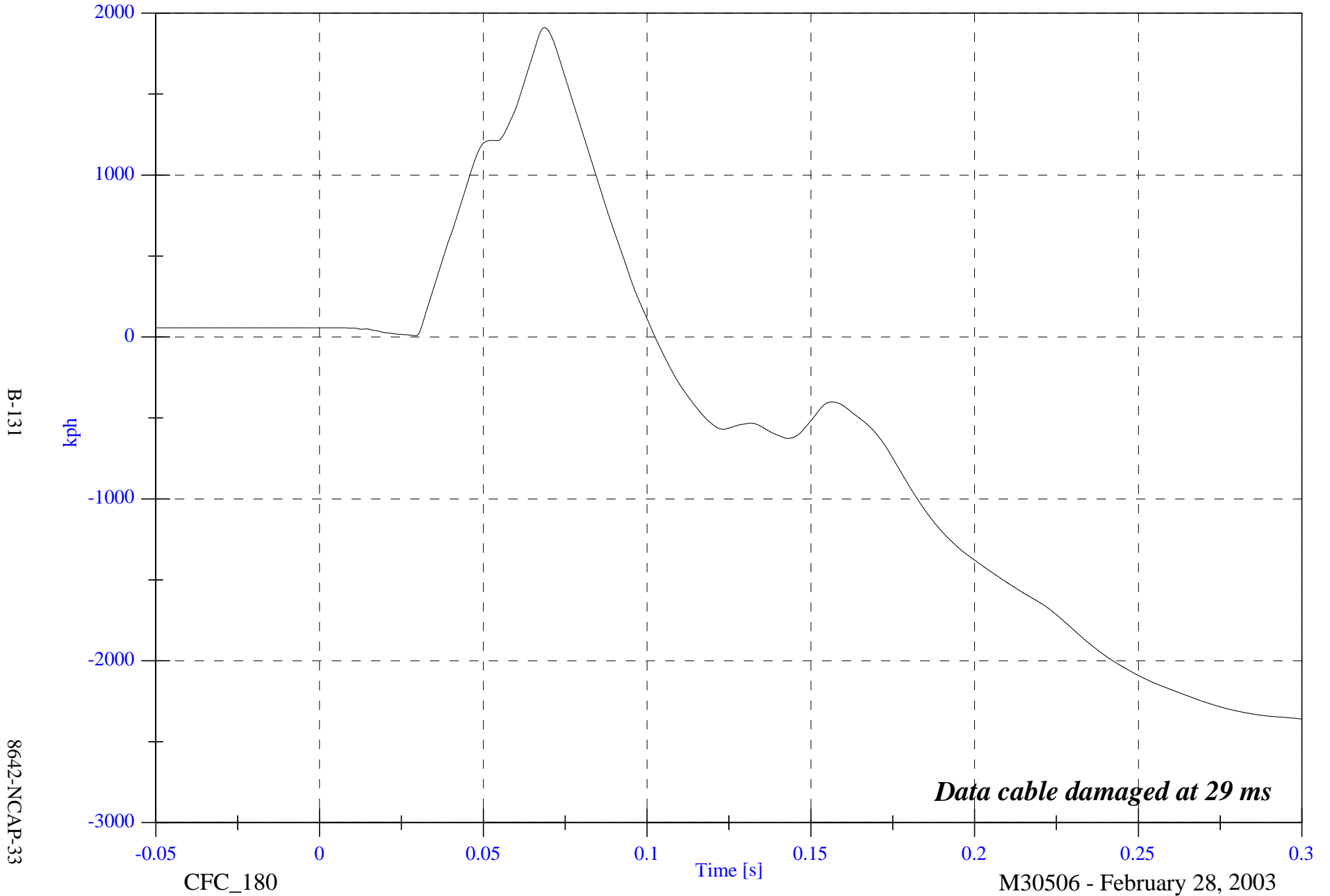
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 1910.1 [kph] at 0.069 [s]

Min: -2360.1 [kph] at 0.300 [s]

V1 Right Caliper #5x Velocity



B-131

8642-NCAP-33

*Data cable damaged at 29 ms*

CFC\_180

Time [s]

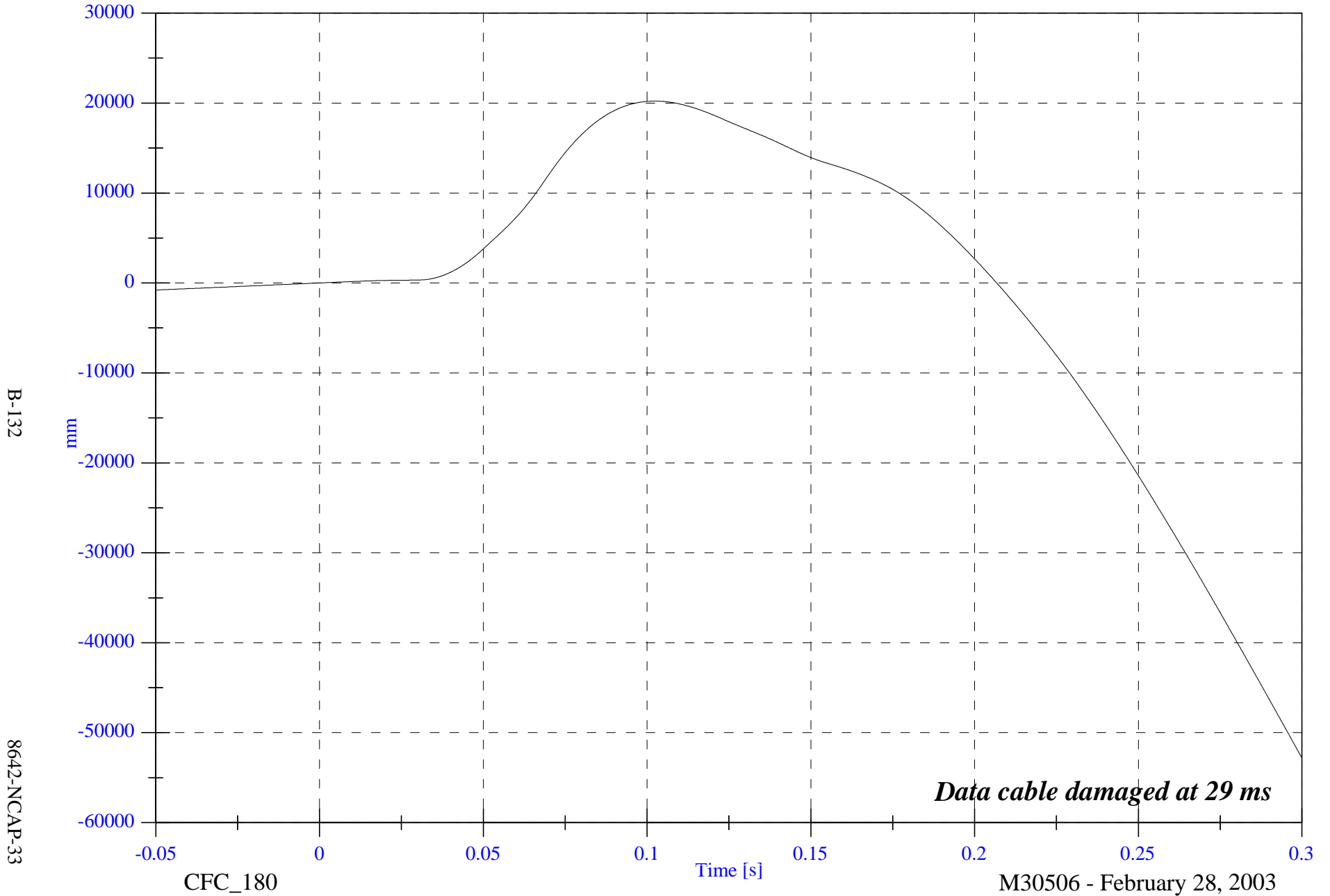
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1 Right Caliper #5x Displacement

Max: 20218.9 [mm] at 0.102 [s]

Min: -52769.8 [mm] at 0.300 [s]



B-132

8642-NCAP-33

CFC\_180

Time [s]

M30506 - February 28, 2003

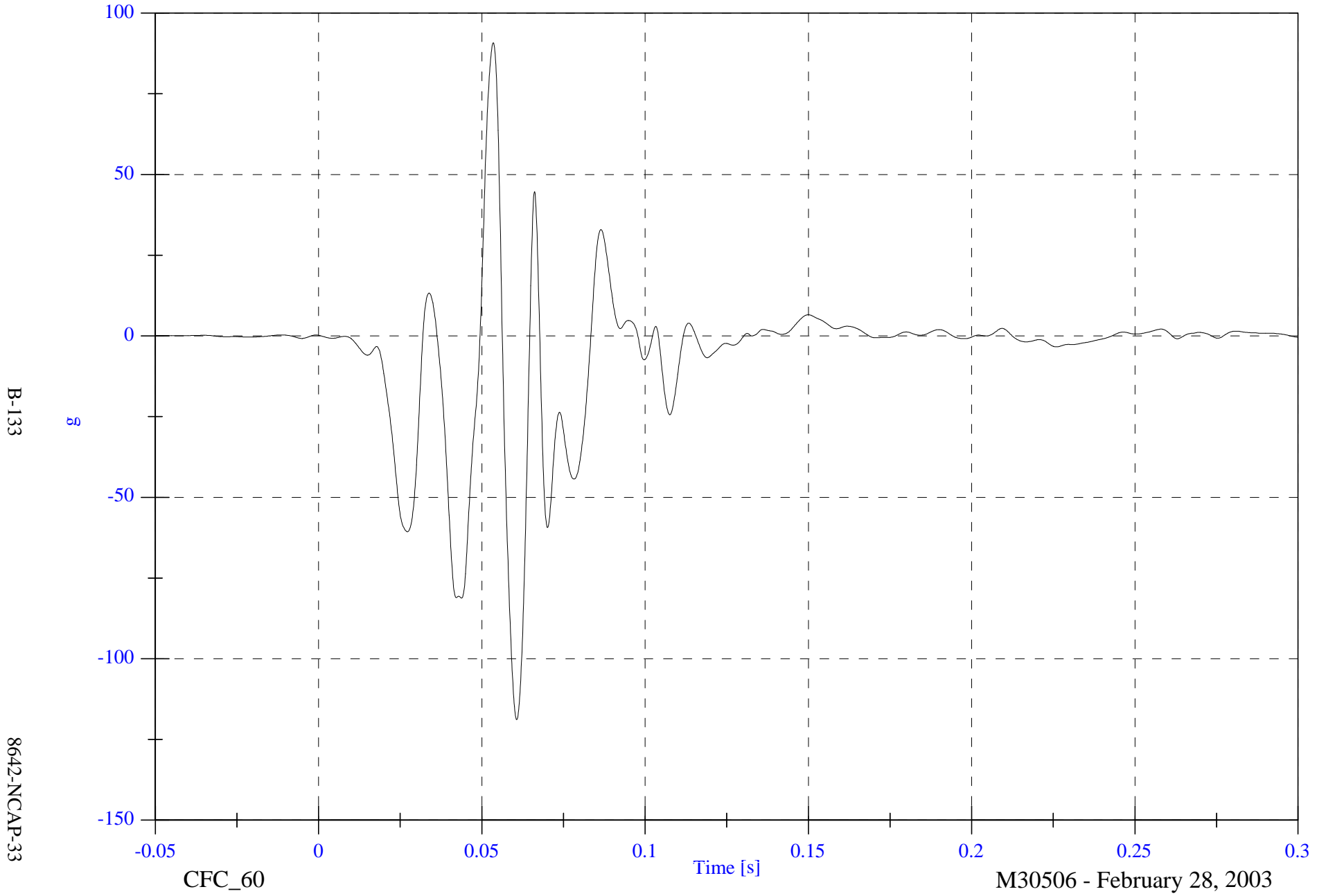
*Data cable damaged at 29 ms*

NCAP Test #11 - 2003 Isuzu Rodeo

V1 Instrument Panel #6x

Max: 90.8 [g] at 0.053 [s]

Min: -118.9 [g] at 0.061 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

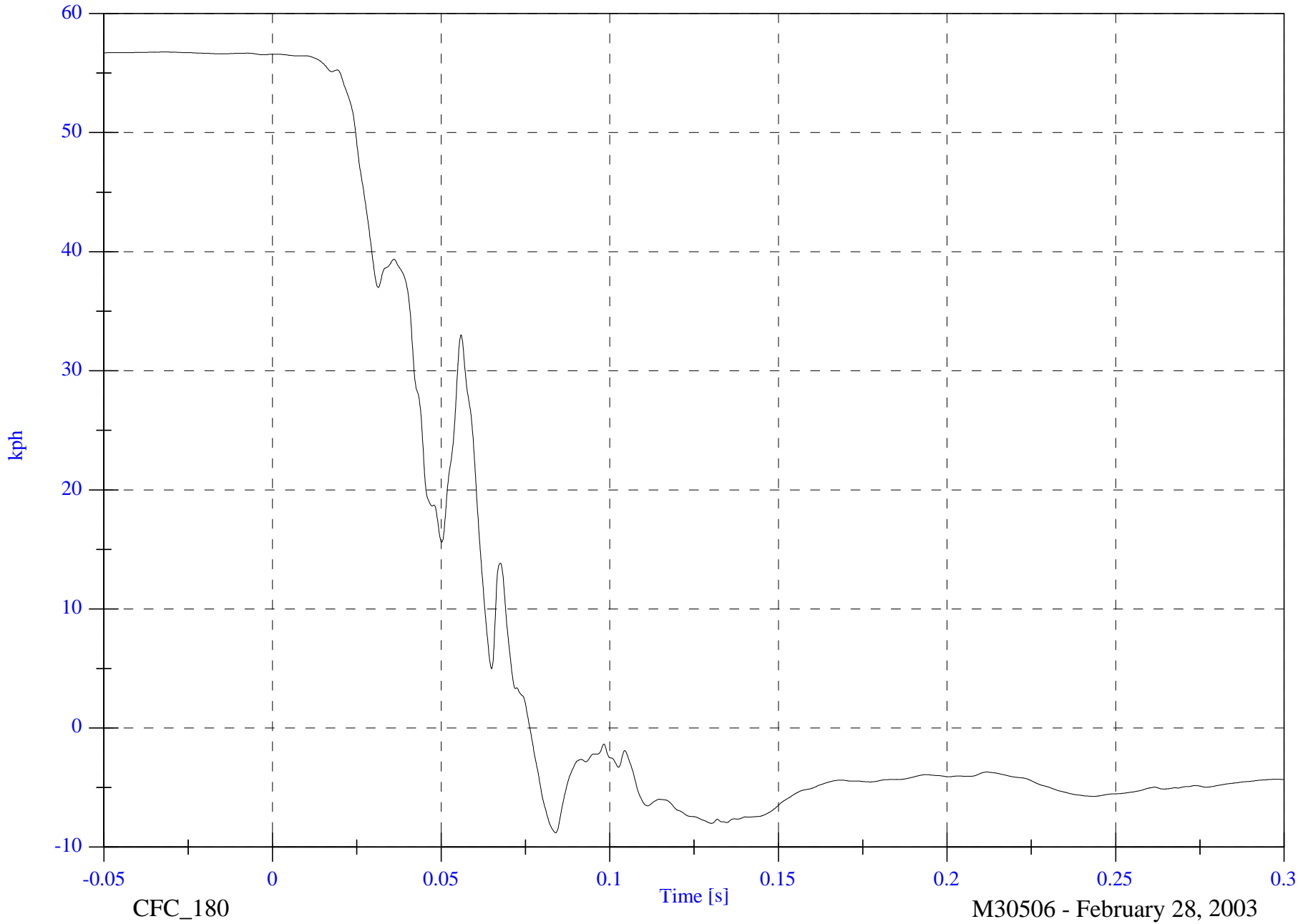
V1 Instrument Panel #6x Velocity

Max: 56.8 [kph] at -0.032 [s]

Min: -8.8 [kph] at 0.084 [s]

B-134

8642-NCAP-33



CFC\_180

Time [s]

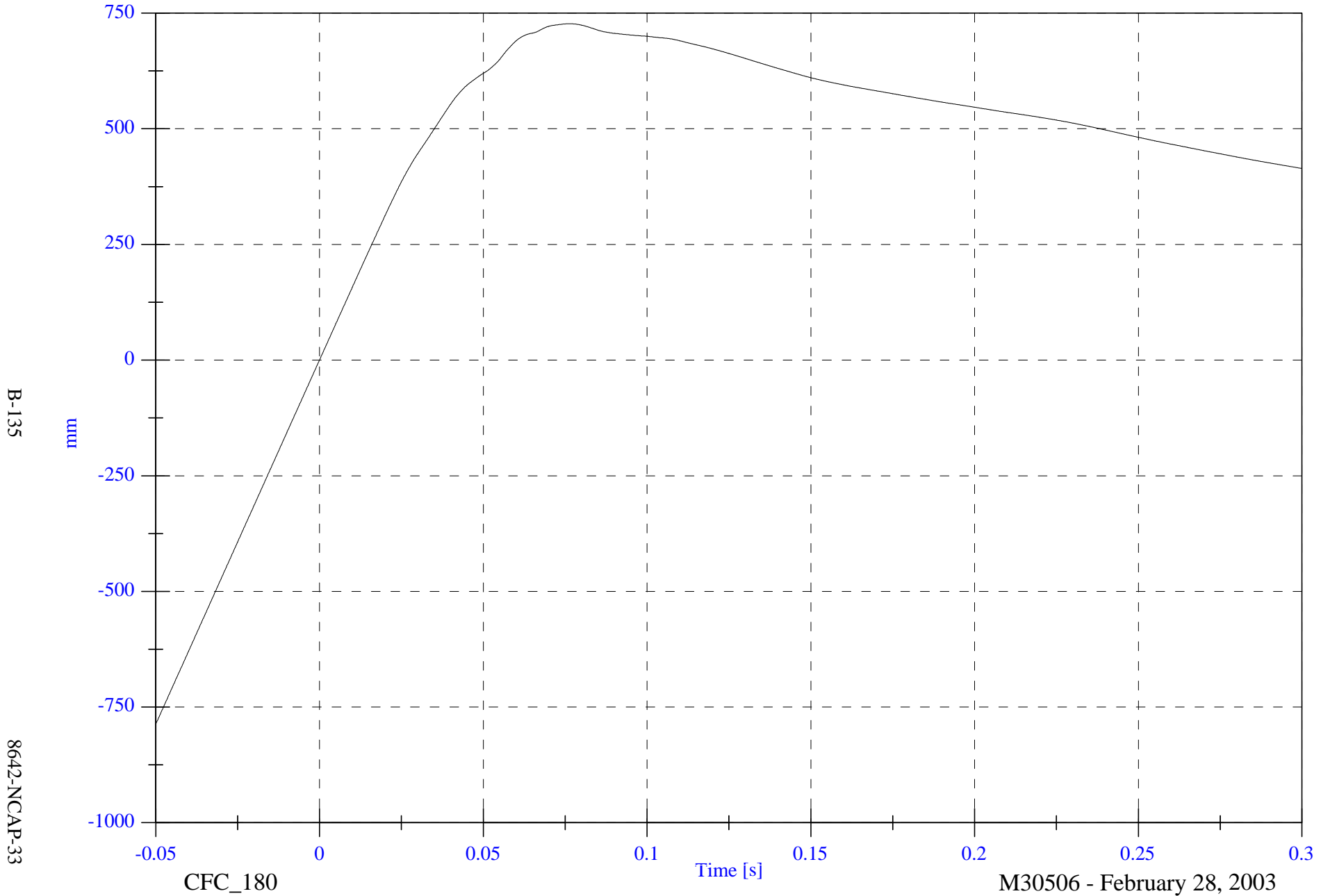
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1 Instrument Panel #6x Displacement

Max: 726.9 [mm] at 0.076 [s]

Min: -787.2 [mm] at -0.050 [s]



B-135

8642-NCAP-33

CFC\_180

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

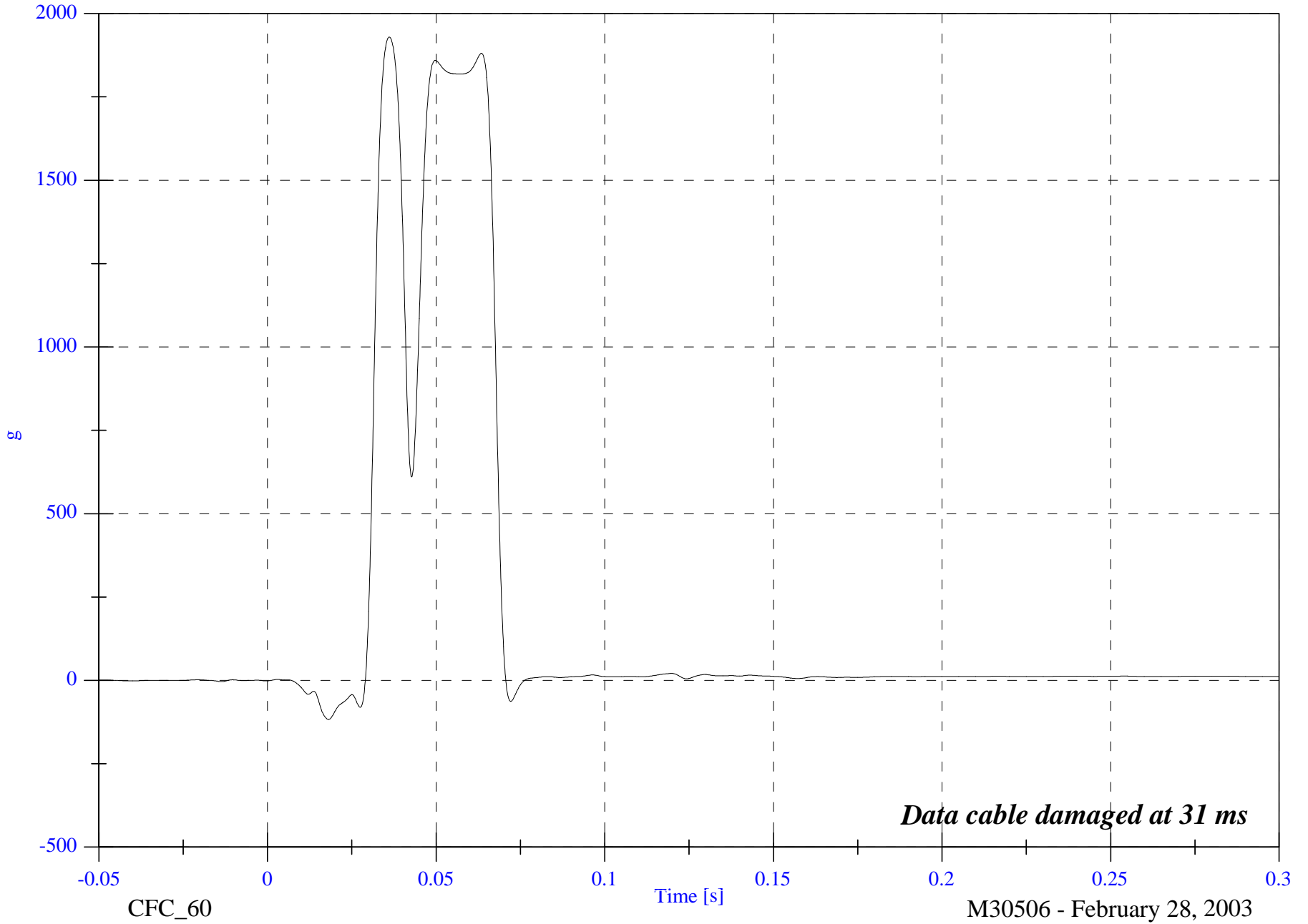
V1 Left Caliper #7x

Max: 1929.5 [g] at 0.036 [s]

Min: -117.1 [g] at 0.018 [s]

B-136

8642-NCAP-33



*Data cable damaged at 31 ms*

CFC\_60

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

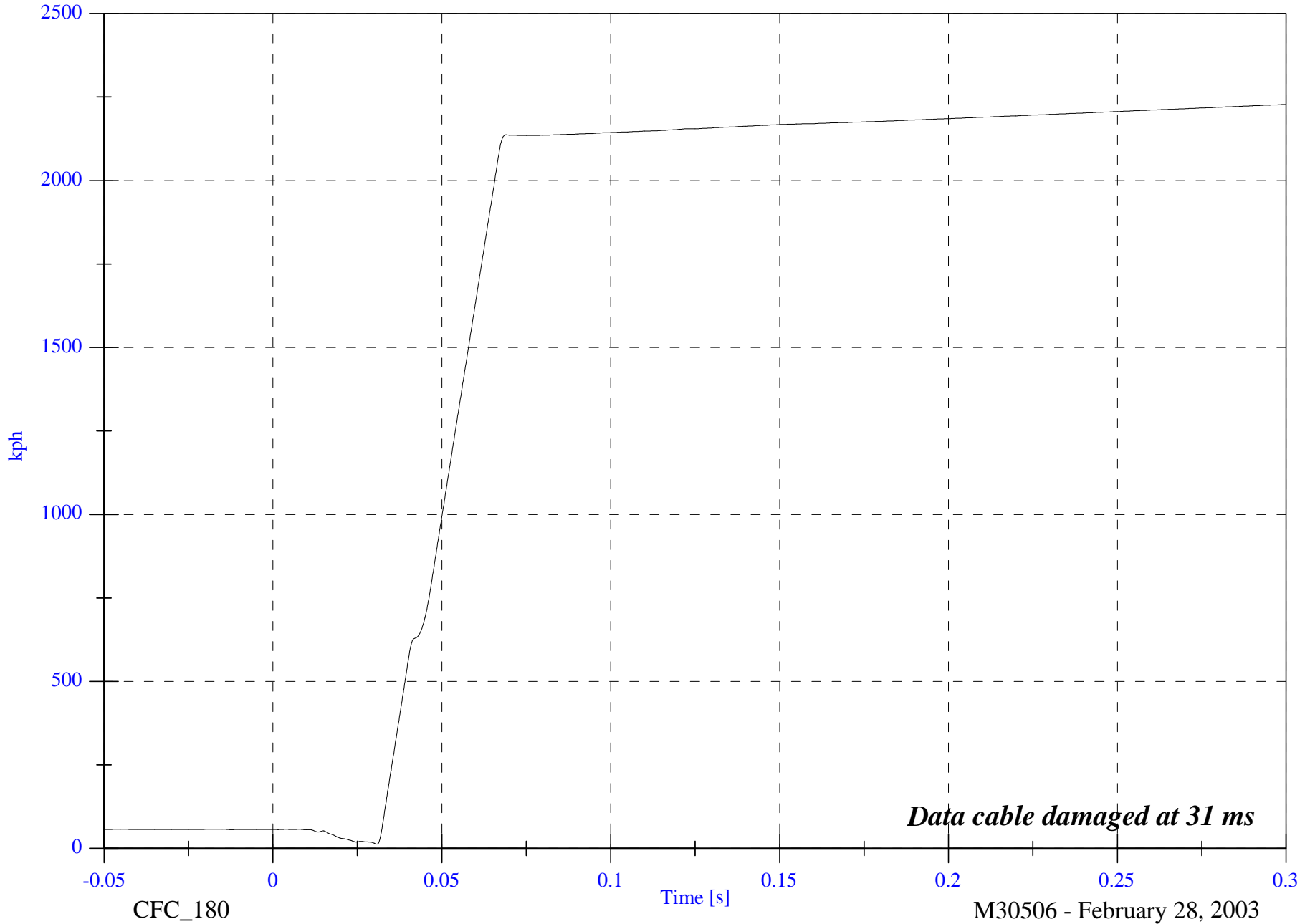
V1 Left Caliper #7x Velocity

Max: 2227.6 [kph] at 0.300 [s]

Min: 12.6 [kph] at 0.031 [s]

B-137

8642-NCAP-33



*Data cable damaged at 31 ms*

CFC\_180

Time [s]

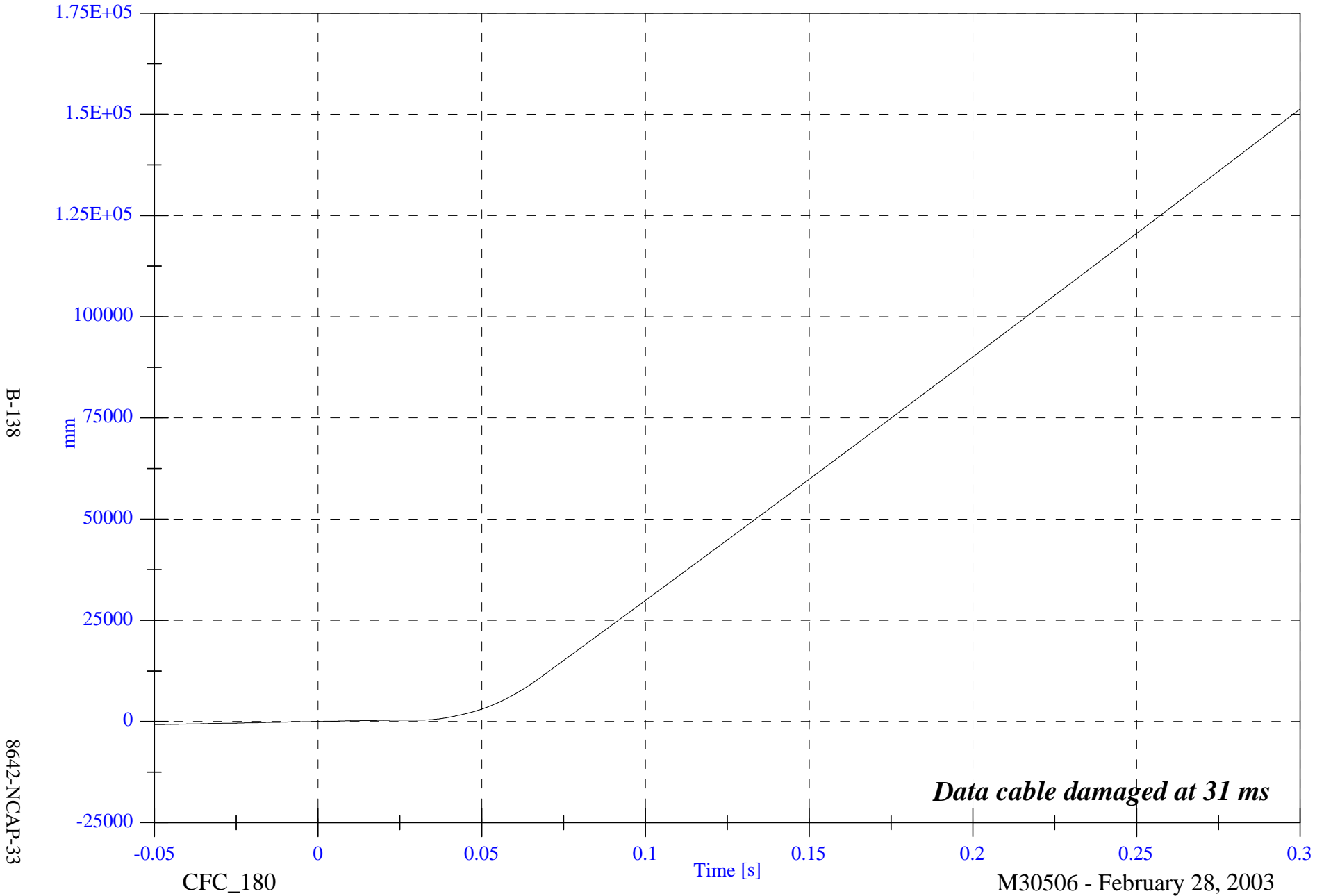
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1 Left Caliper #7x Displacement

Max: 151283.7 [mm] at 0.300 [s]

Min: -786.5 [mm] at -0.050 [s]



B-138

8642-NCAP-33

CFC\_180

Time [s]

M30506 - February 28, 2003

*Data cable damaged at 31 ms*

NCAP Test #11 - 2003 Isuzu Rodeo

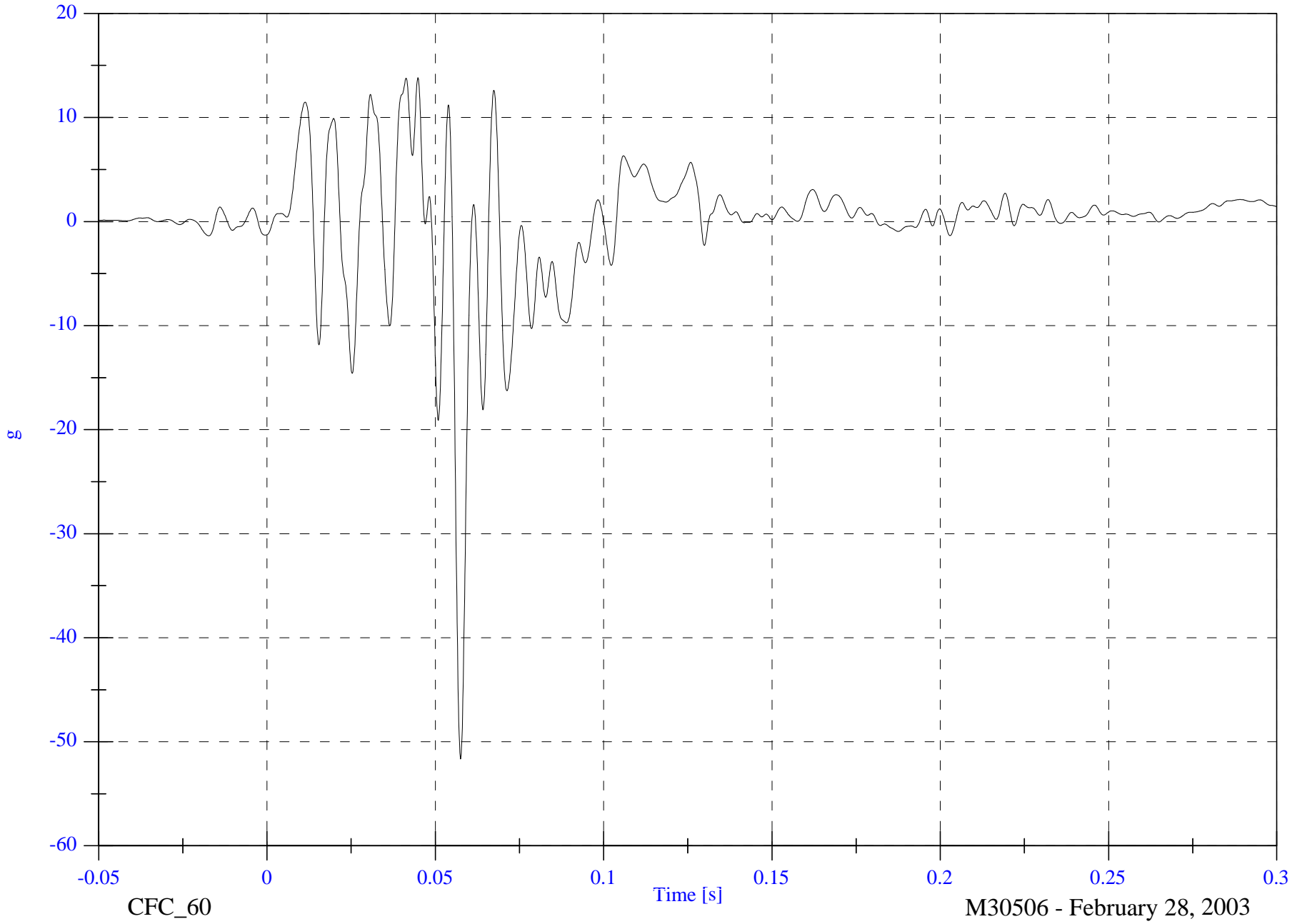
V1 Left Rear #8z

Max: 13.8 [g] at 0.045 [s]

Min: -51.7 [g] at 0.057 [s]

B-139

8642-NCAP-33



CFC\_60

Time [s]

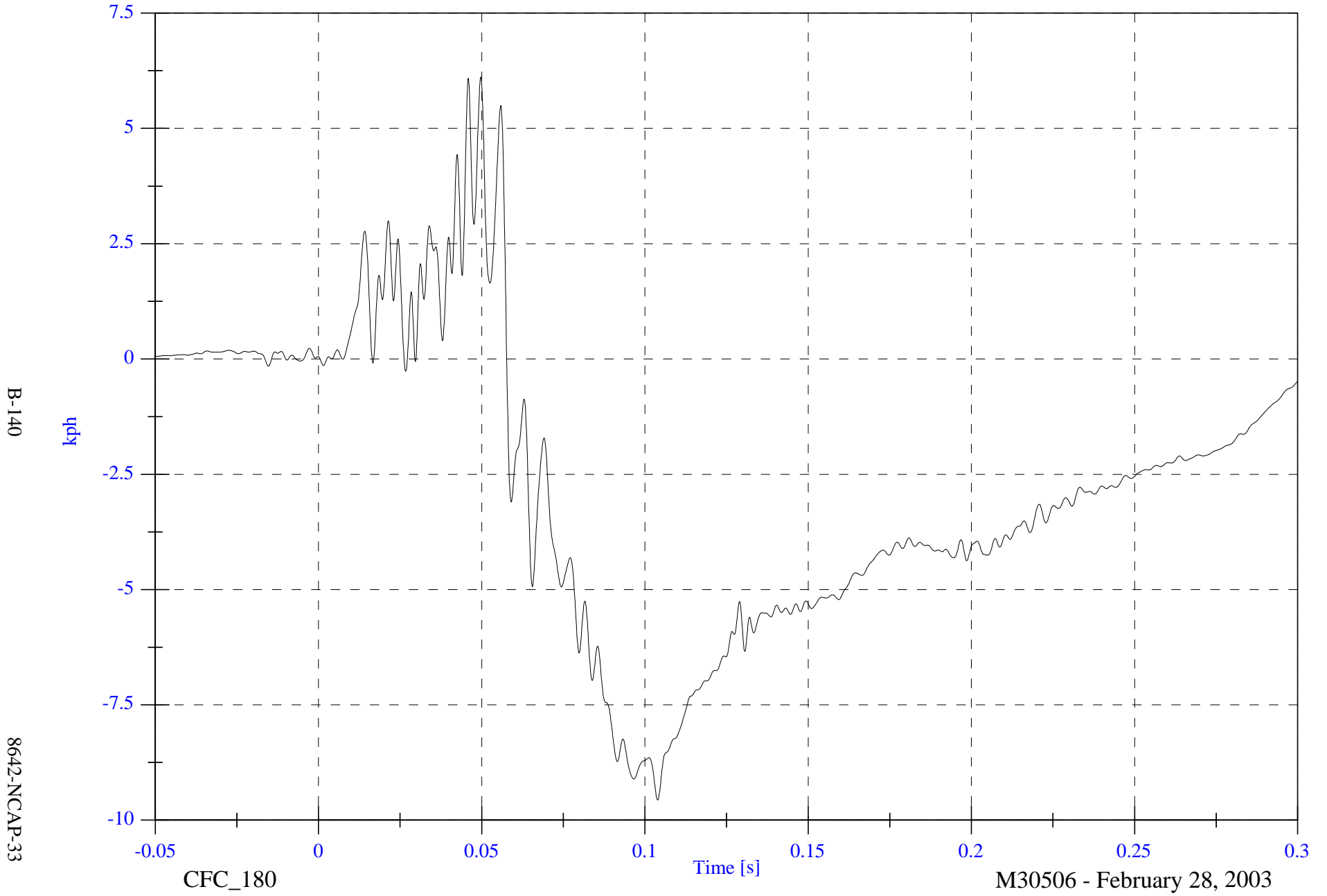
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 6.1 [kph] at 0.050 [s]

V1 Left Rear #8z Velocity

Min: -9.6 [kph] at 0.104 [s]



B-140

8642-NCAP-33

CFC\_180

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

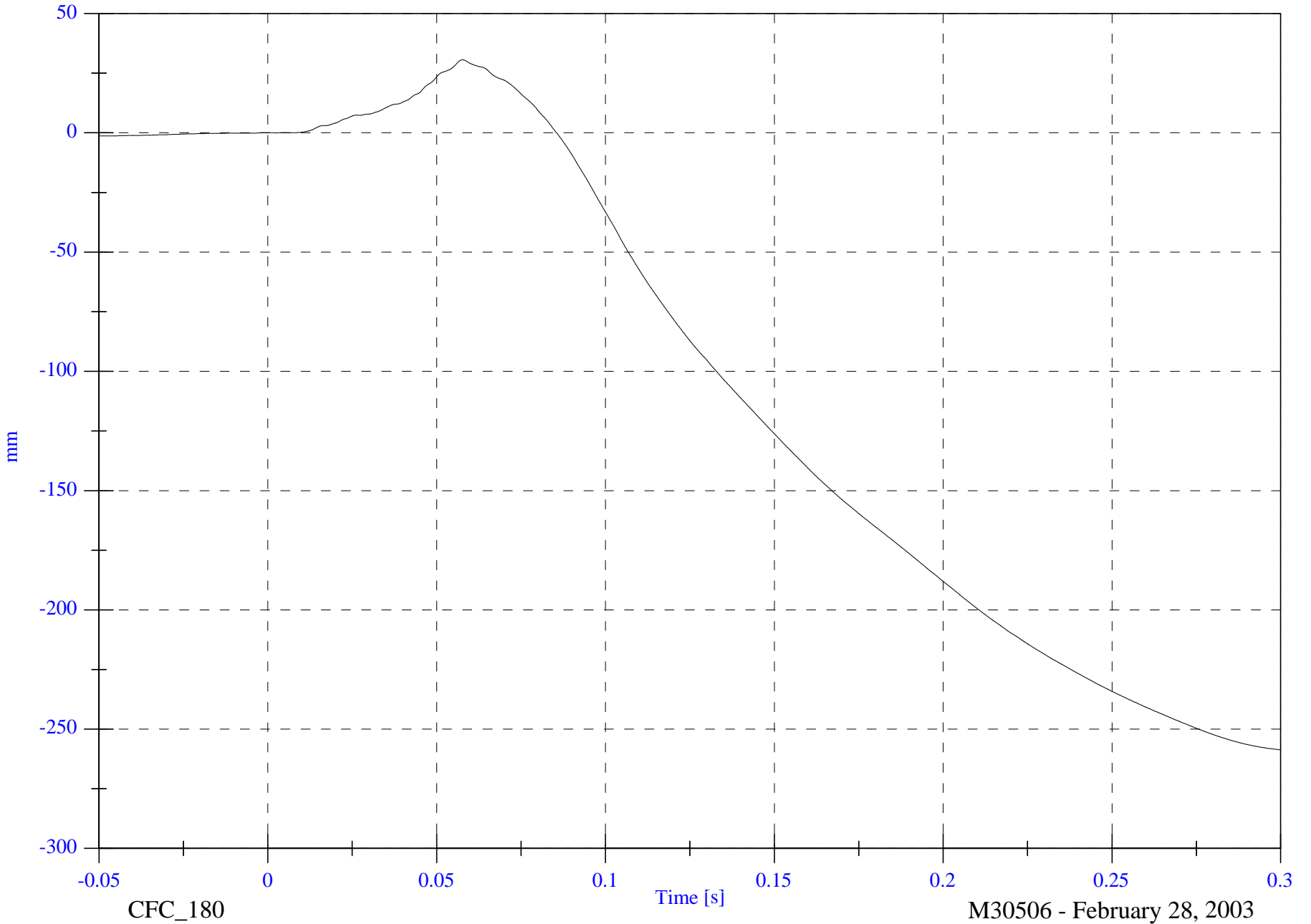
V1 Left Rear #8z Displacement

Max: 30.6 [mm] at 0.058 [s]

Min: -258.7 [mm] at 0.300 [s]

B-141

8642-NCAP-33



CFC\_180

Time [s]

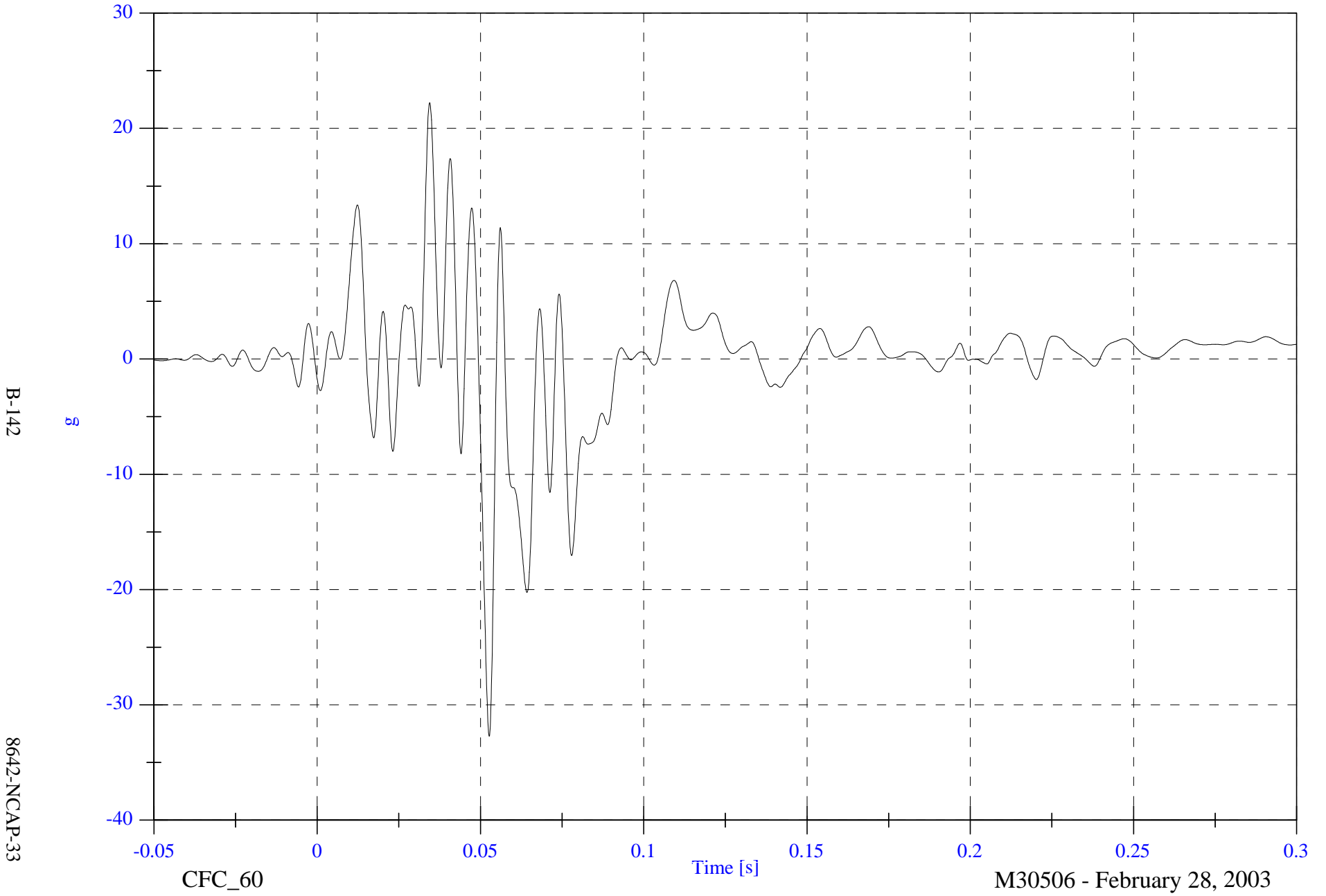
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1 Right Rear #9z

Max: 22.2 [g] at 0.034 [s]

Min: -32.7 [g] at 0.053 [s]

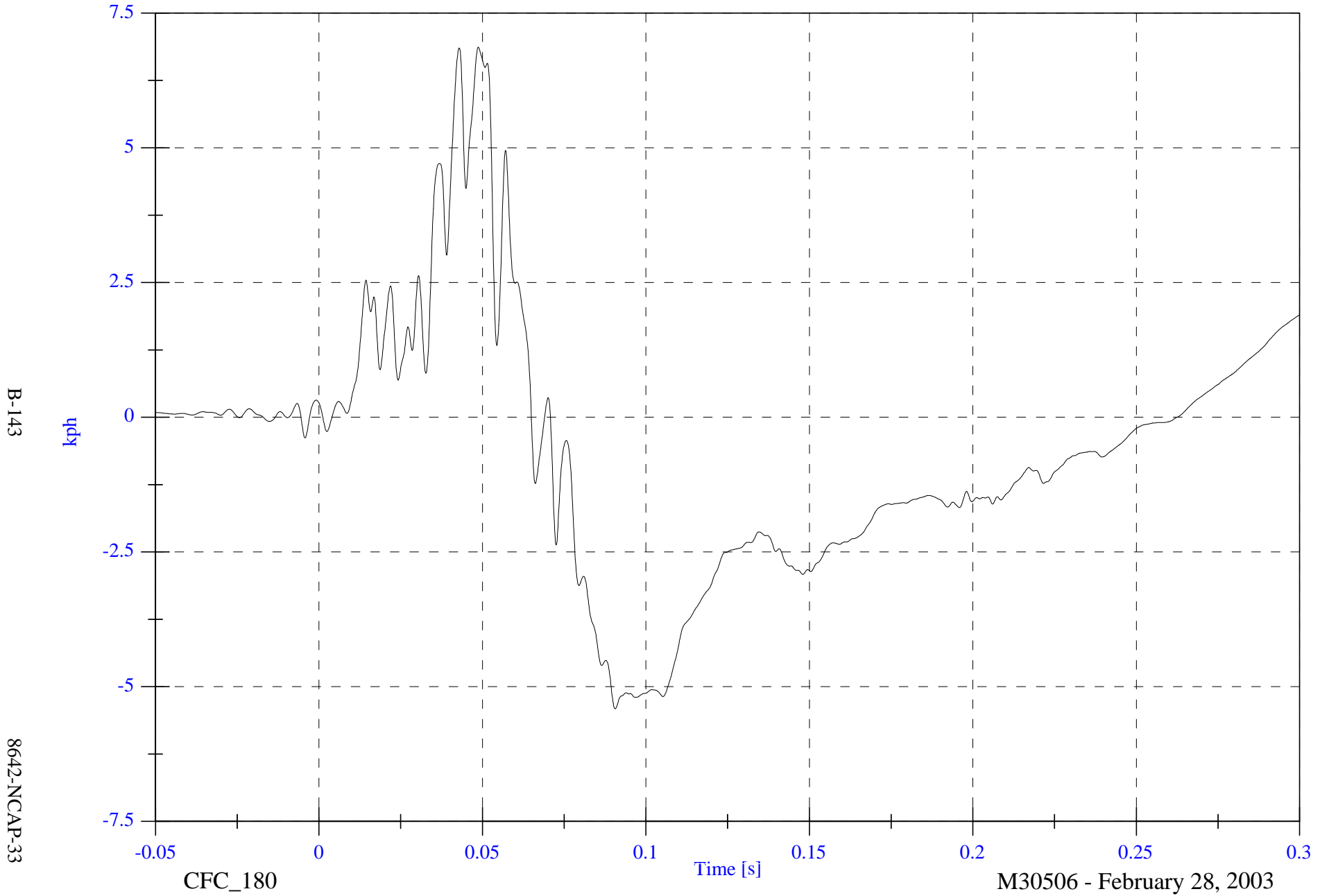


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 6.9 [kph] at 0.049 [s]

V1 Right Rear #9z Velocity

Min: -5.4 [kph] at 0.091 [s]



B-143

8642-NCAP-33

CFC\_180

Time [s]

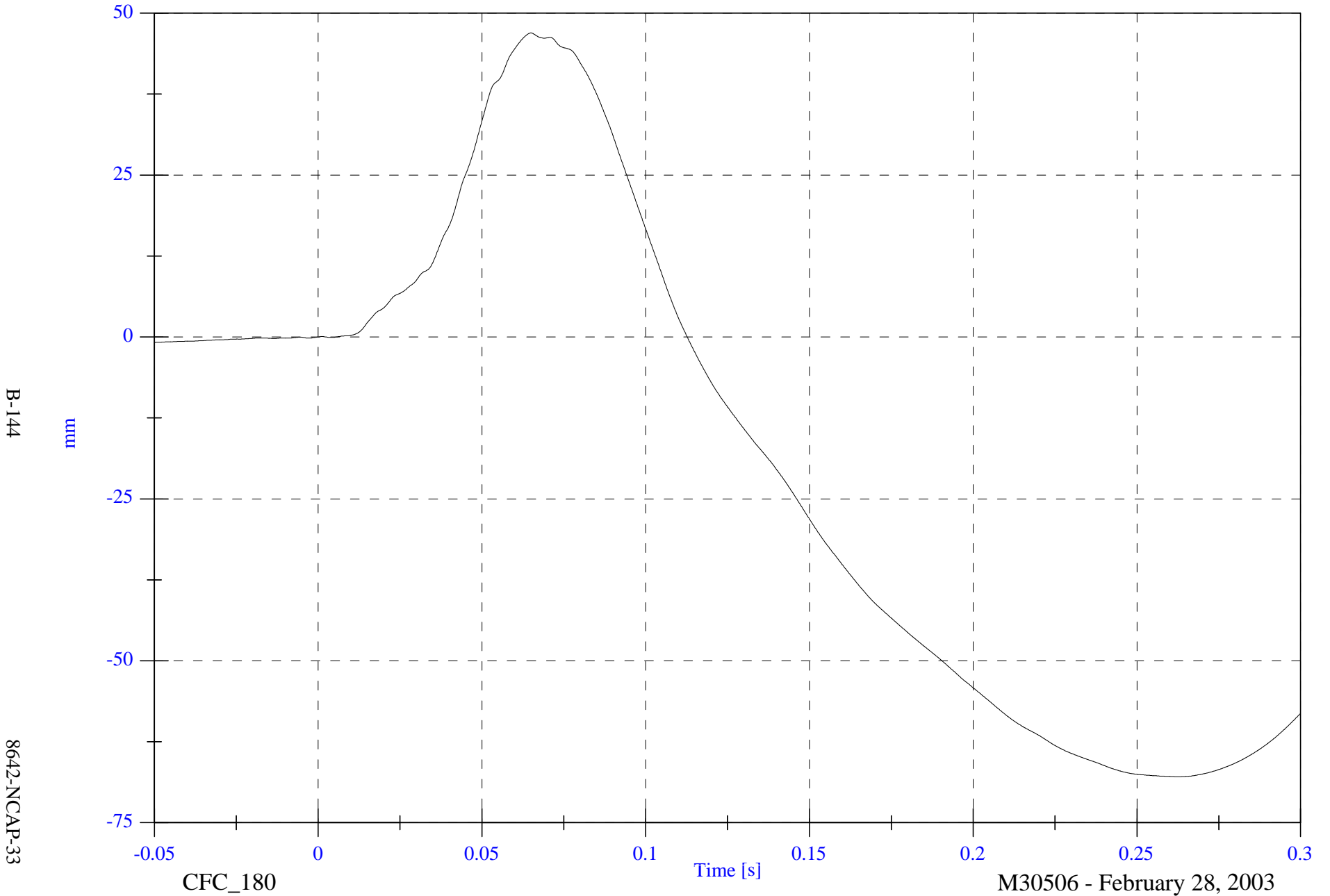
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 46.9 [mm] at 0.065 [s]

Min: -67.9 [mm] at 0.262 [s]

V1 Right Rear #9z Displacement



B-144

8642-NCAP-33

CFC\_180

Time [s]

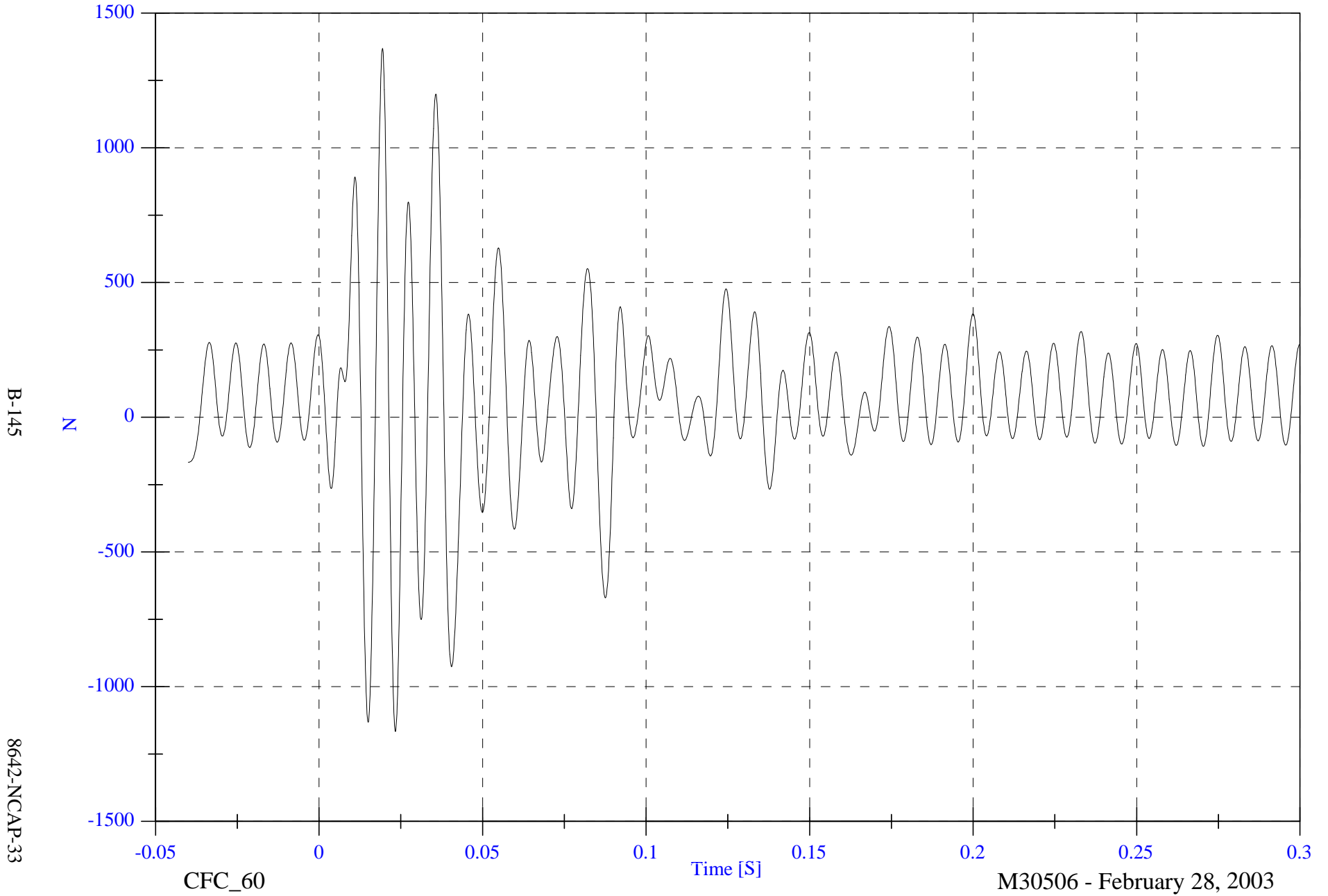
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 1368.7 [N] at 0.019 [S]

Barrier Load Cell A1 Fx

Min: -1165.9 [N] at 0.023 [S]

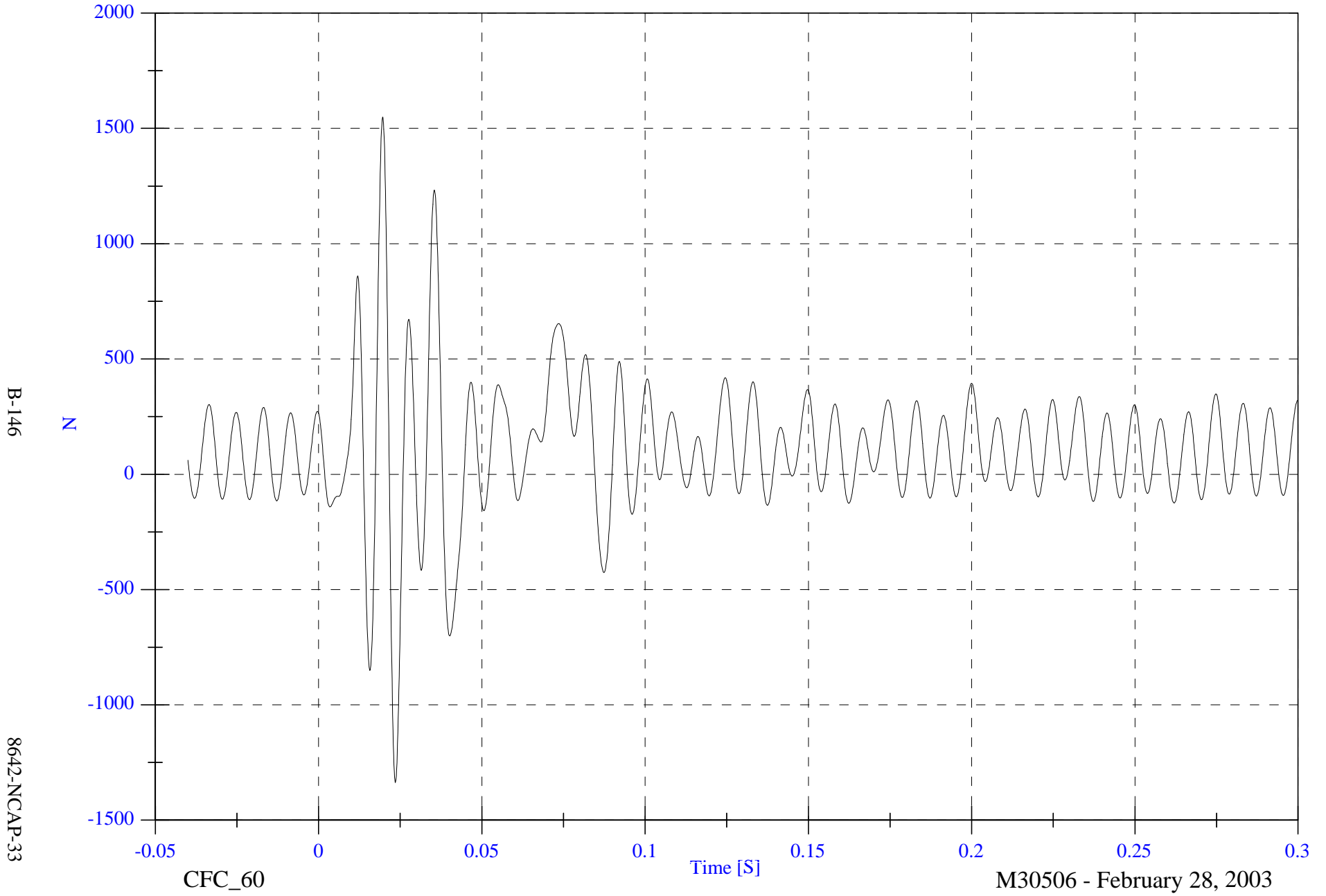


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 1549.1 [N] at 0.020 [S]

Barrier Load Cell A2 Fx

Min: -1337.0 [N] at 0.023 [S]



B-146

8642-NCAP-33

CFC\_60

Time [S]

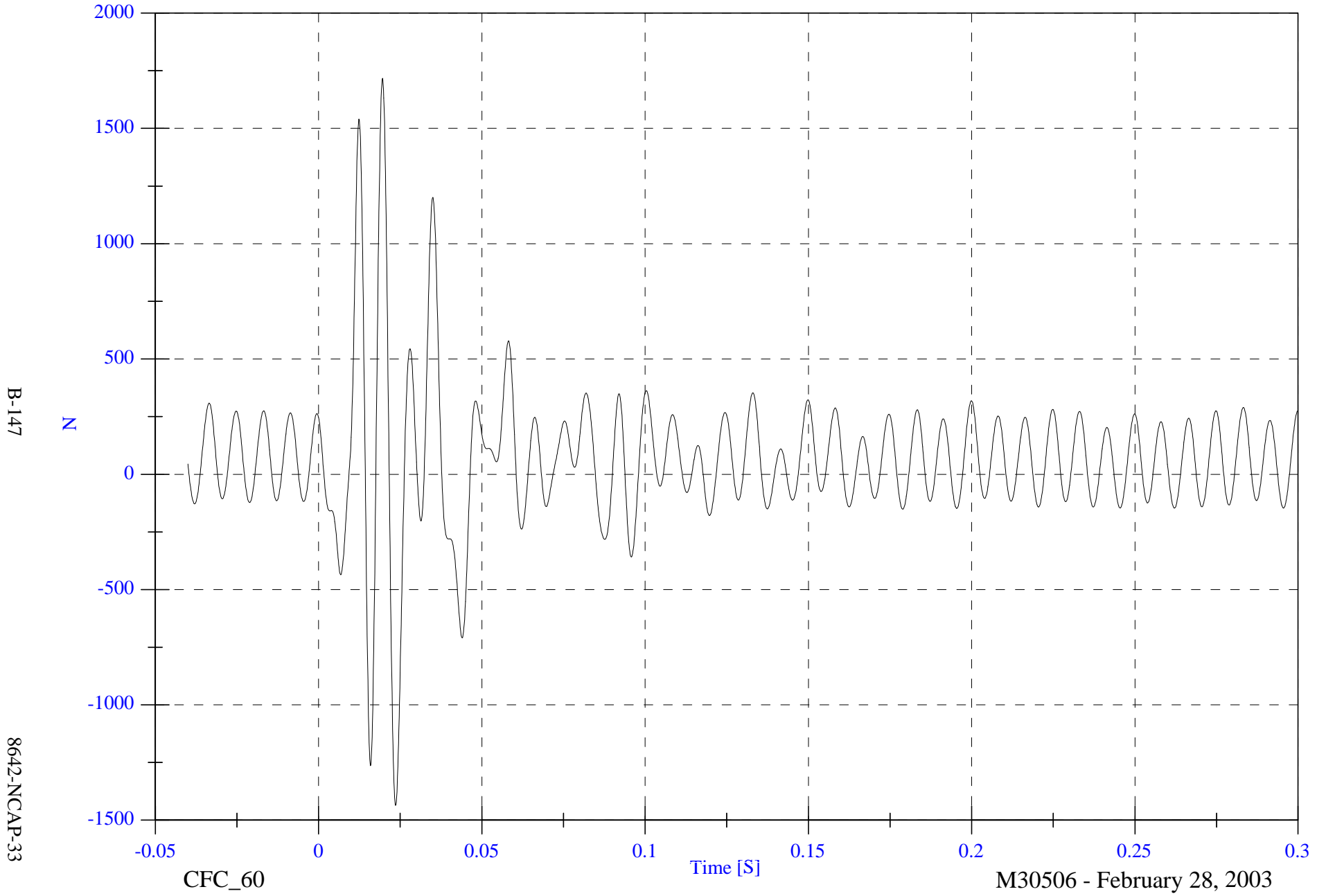
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell A3 Fx

Max: 1716.8 [N] at 0.020 [S]

Min: -1436.7 [N] at 0.024 [S]



B-147

8642-NCAP-33

CFC\_60

Time [S]

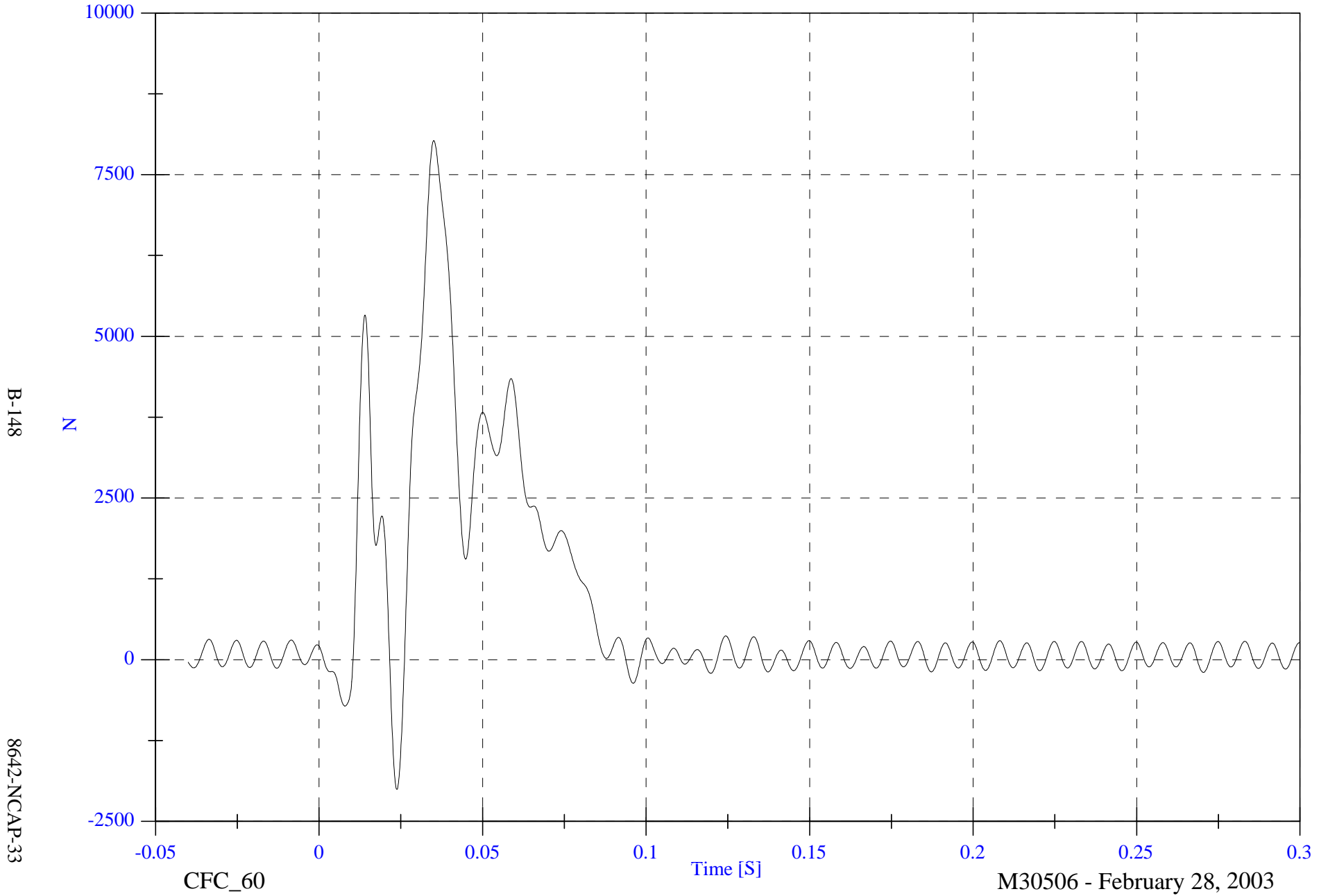
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell A4 Fx

Max: 8029.3 [N] at 0.035 [S]

Min: -2005.8 [N] at 0.024 [S]



B-148

8642-NCAP-33

CFC\_60

Time [S]

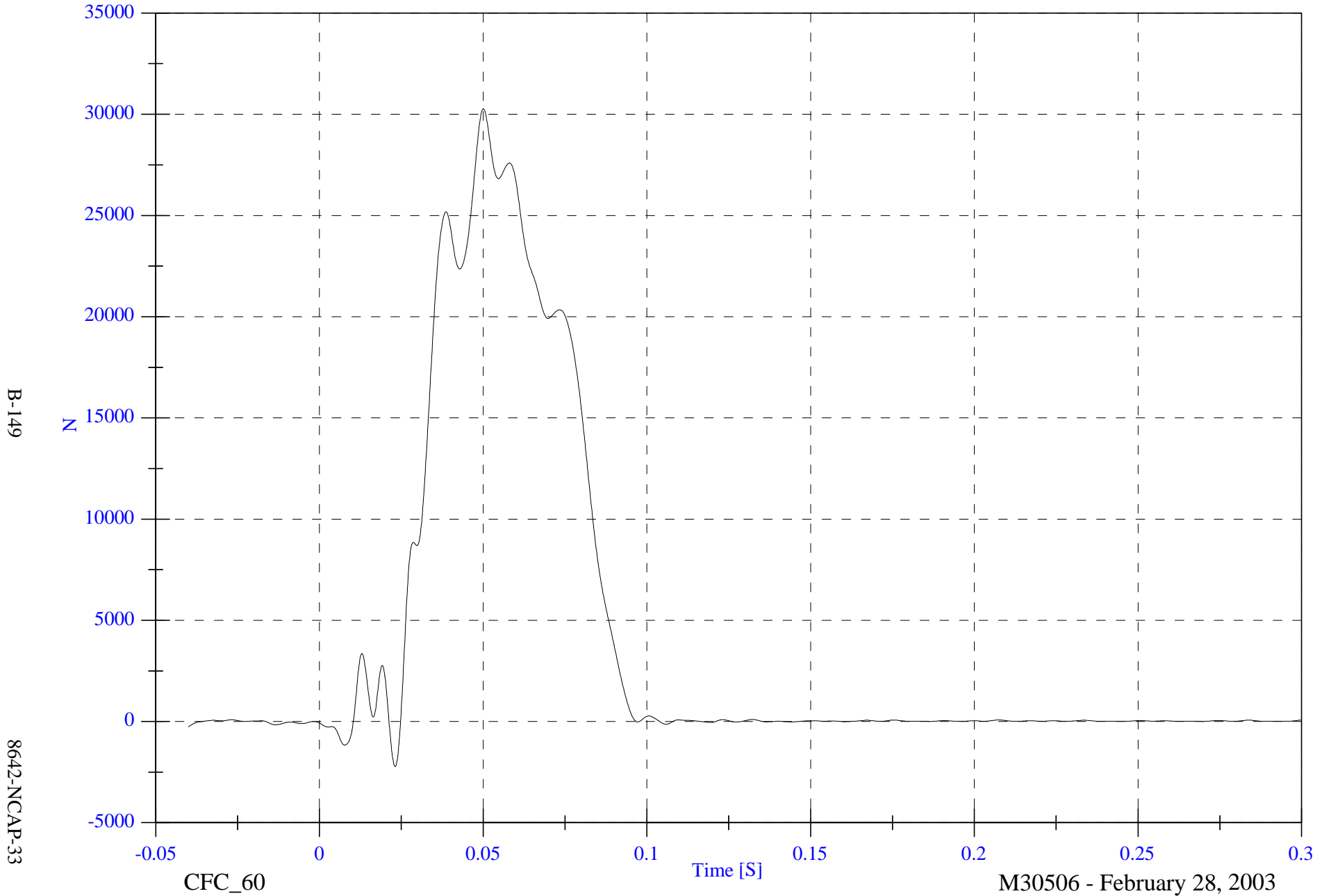
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell A5 Fx

Max: 30273.2 [N] at 0.050 [S]

Min: -2224.6 [N] at 0.023 [S]

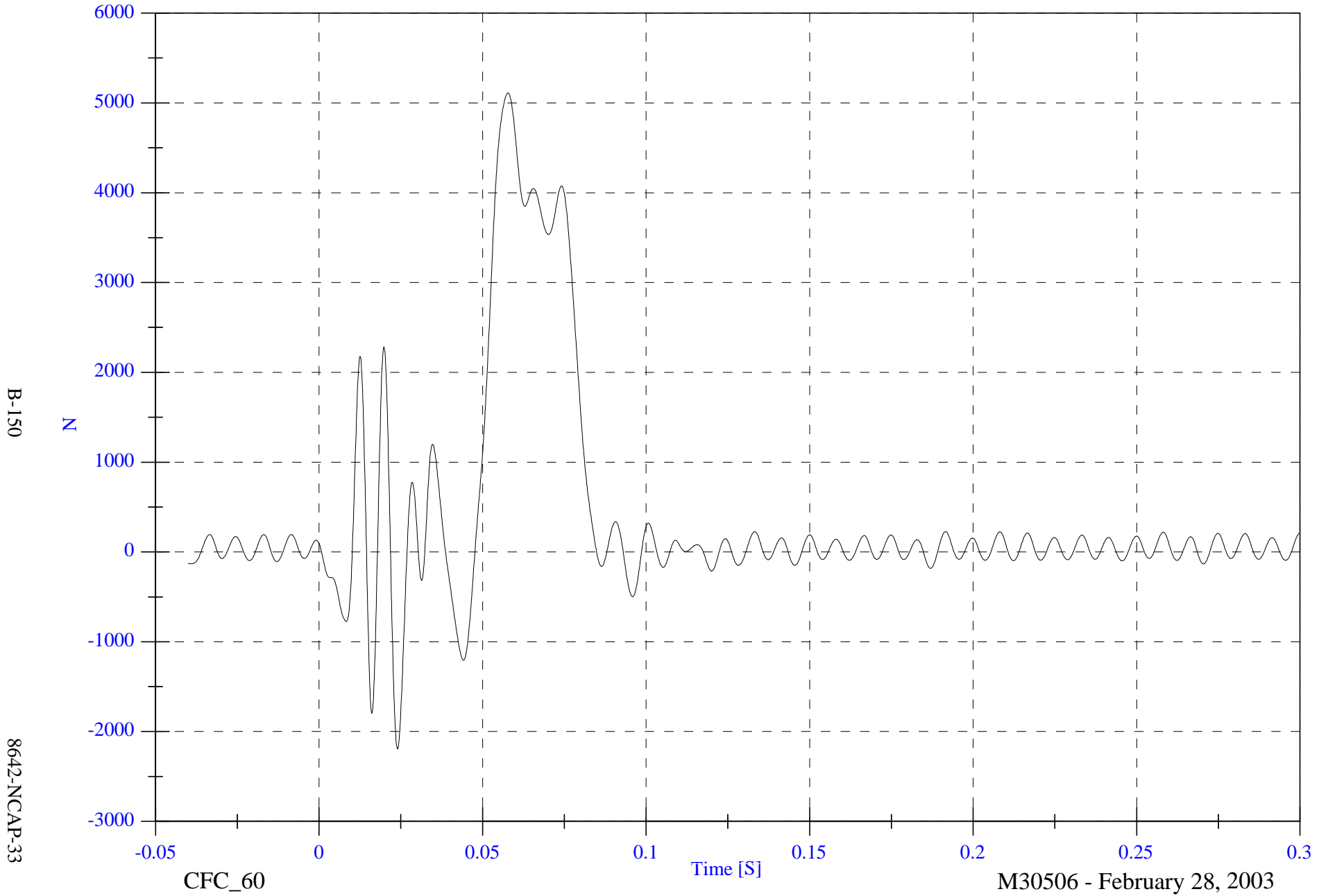


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell A6 Fx

Max: 5111.0 [N] at 0.058 [S]

Min: -2193.3 [N] at 0.024 [S]

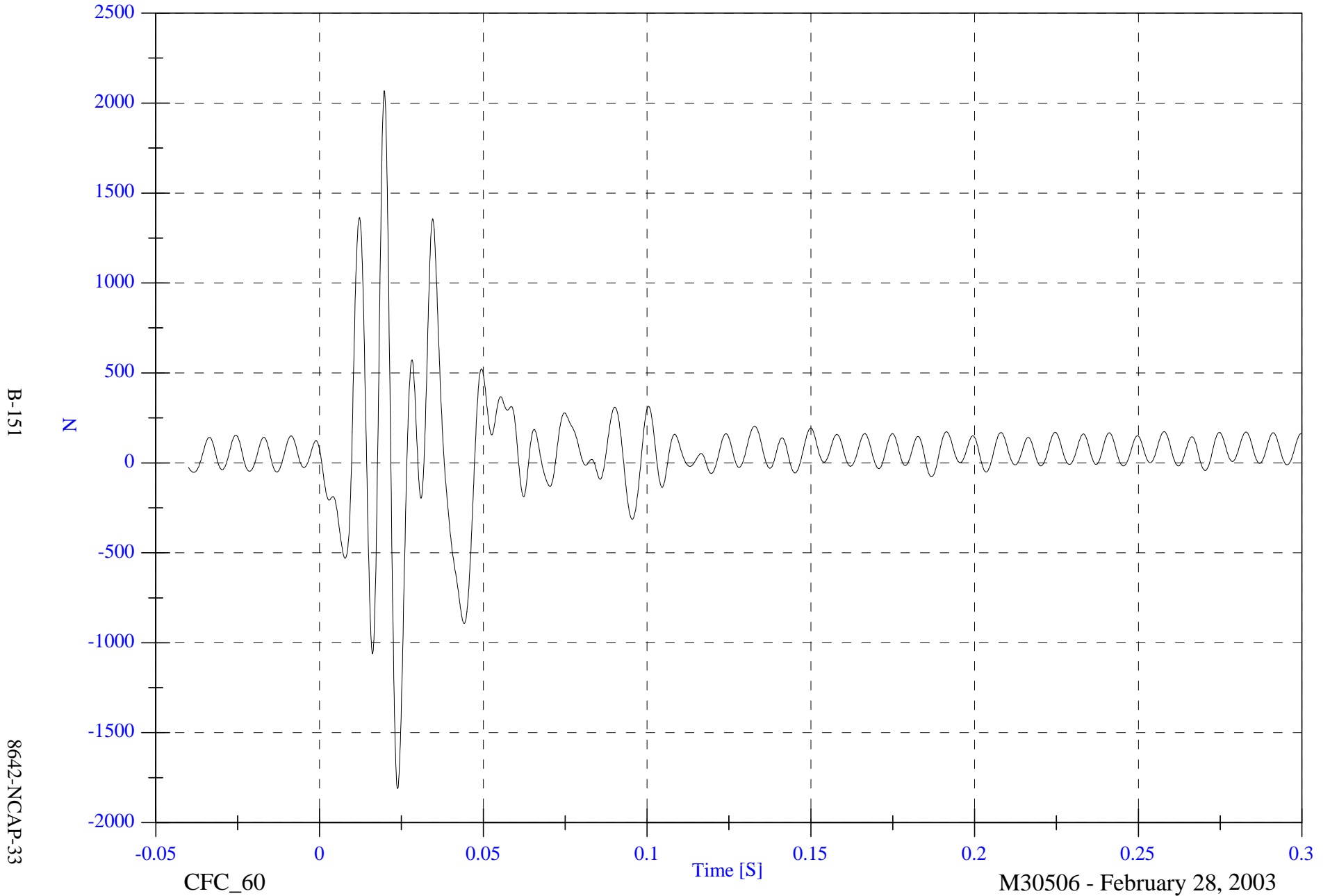


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell A7 Fx

Max: 2068.5 [N] at 0.020 [S]

Min: -1811.1 [N] at 0.024 [S]

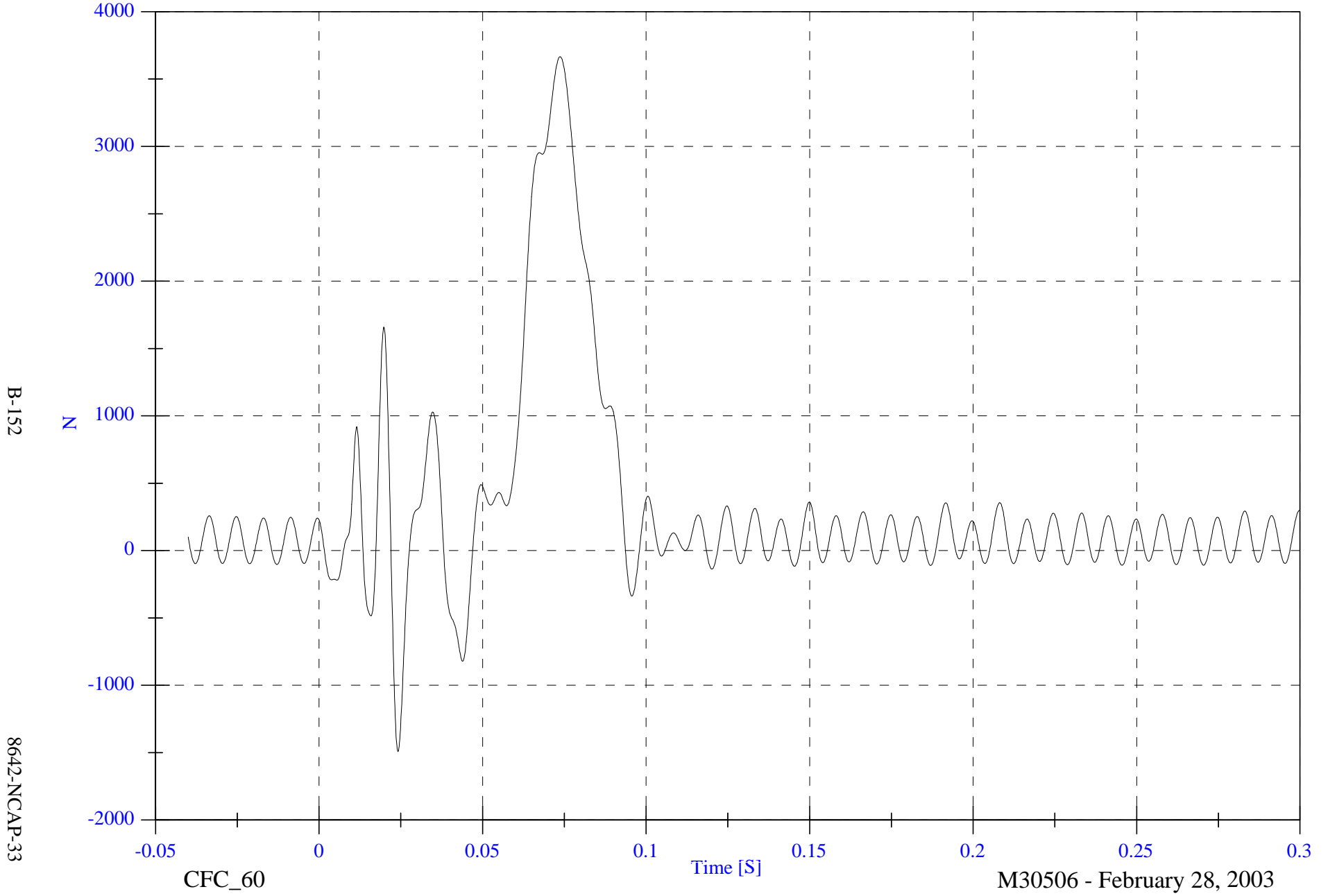


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell A8 Fx

Max: 3666.2 [N] at 0.074 [S]

Min: -1491.8 [N] at 0.024 [S]



B-152

8642-NCAP-33

CFC\_60

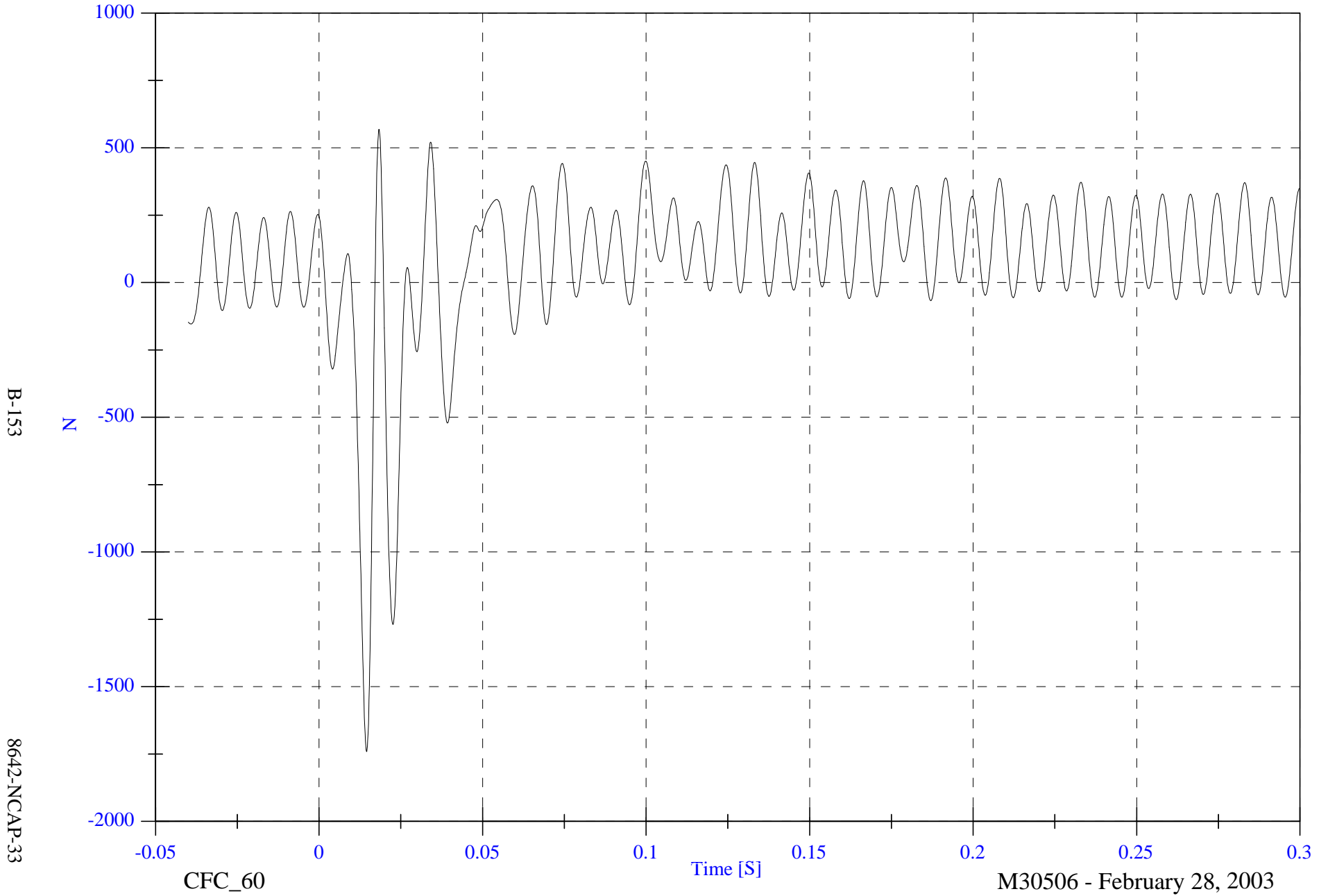
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell A9 Fx

Max: 568.2 [N] at 0.018 [S]

Min: -1741.0 [N] at 0.015 [S]



B-153

8642-NCAP-33

CFC\_60

Time [S]

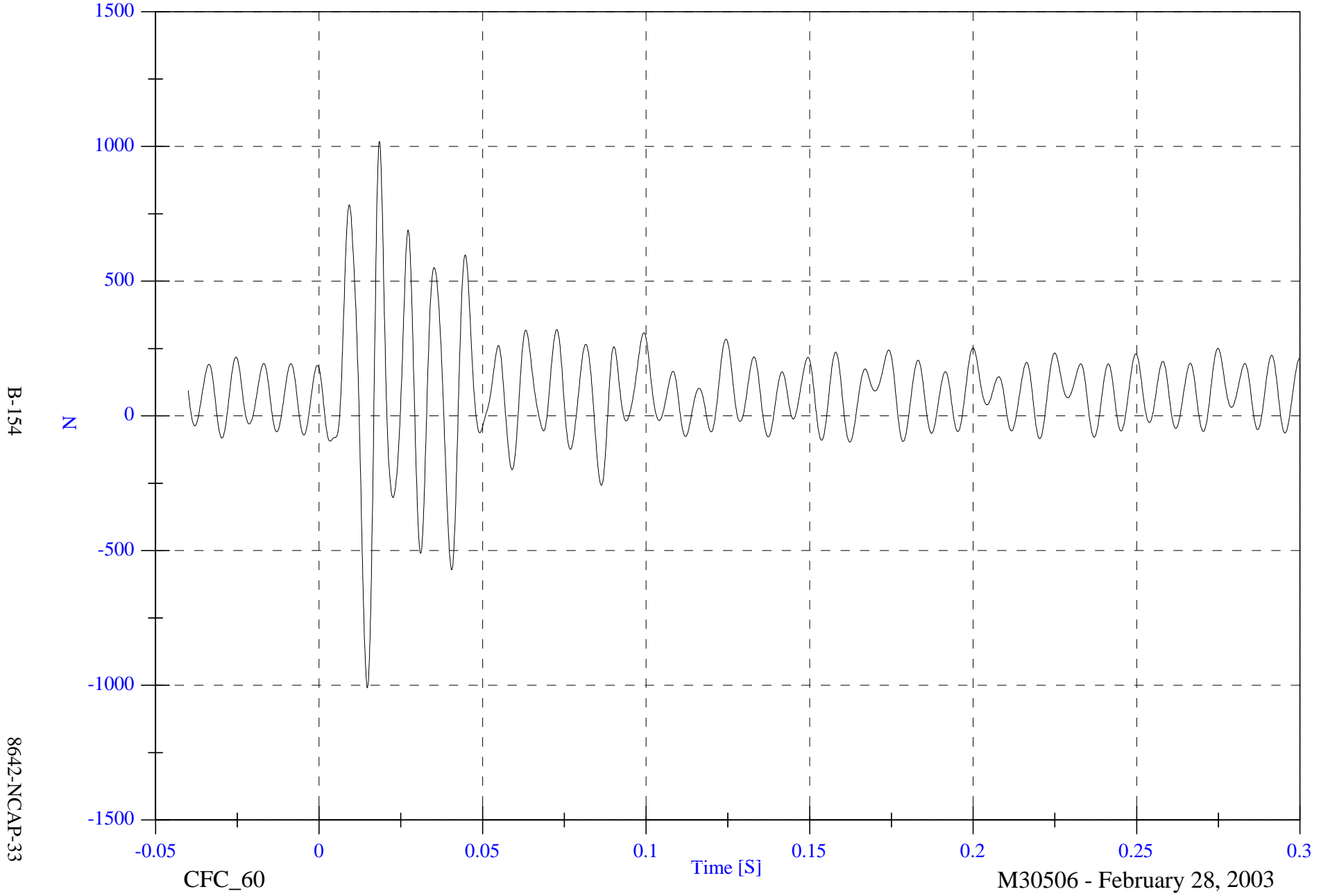
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell B1 Fx

Max: 1019.1 [N] at 0.018 [S]

Min: -1009.8 [N] at 0.015 [S]



B-154

8642-NCAP-33

CFC\_60

Time [S]

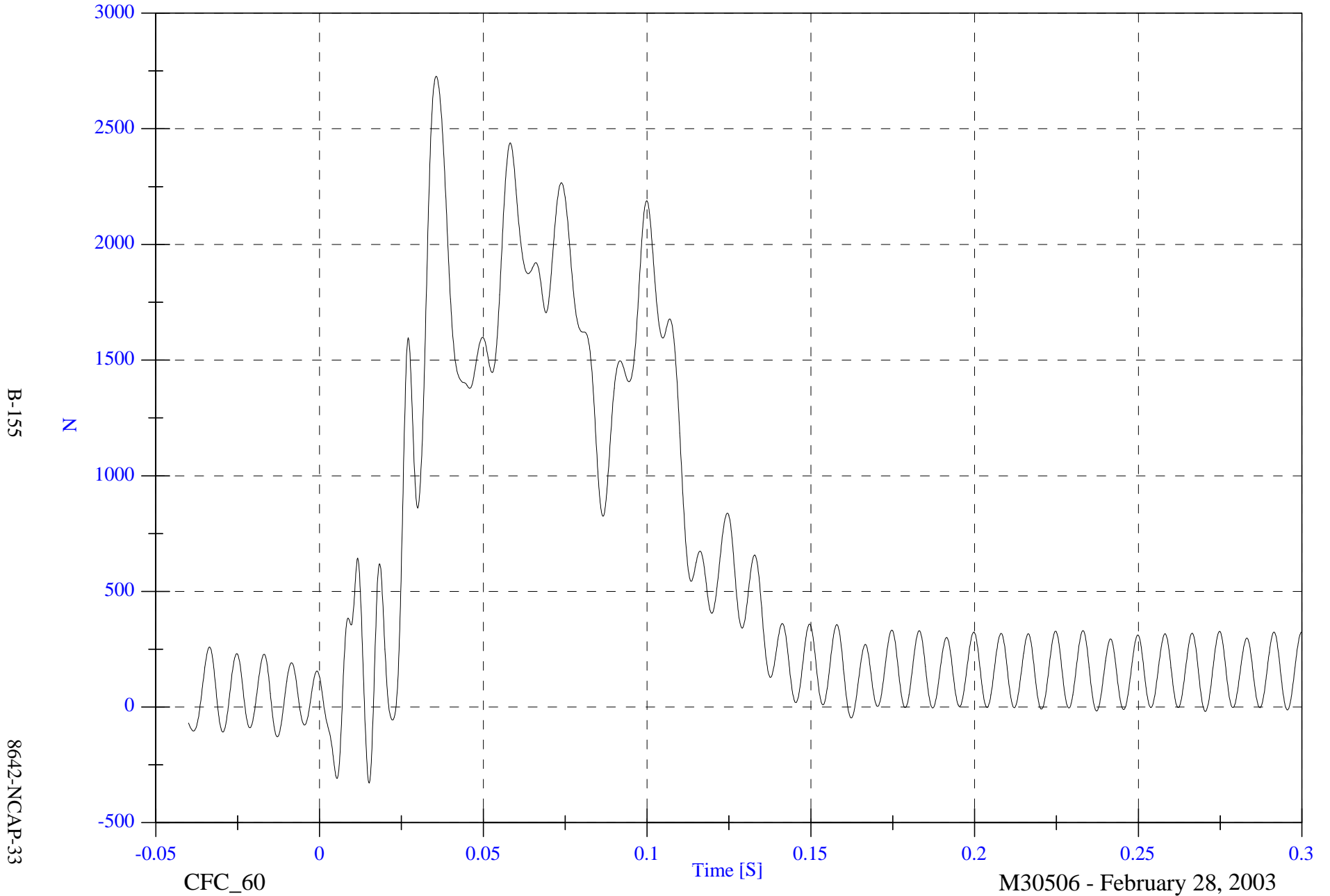
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 2726.6 [N] at 0.036 [S]

Barrier Load Cell B2 Fx

Min: -328.7 [N] at 0.015 [S]



B-155

8642-NCAP-33

CFC\_60

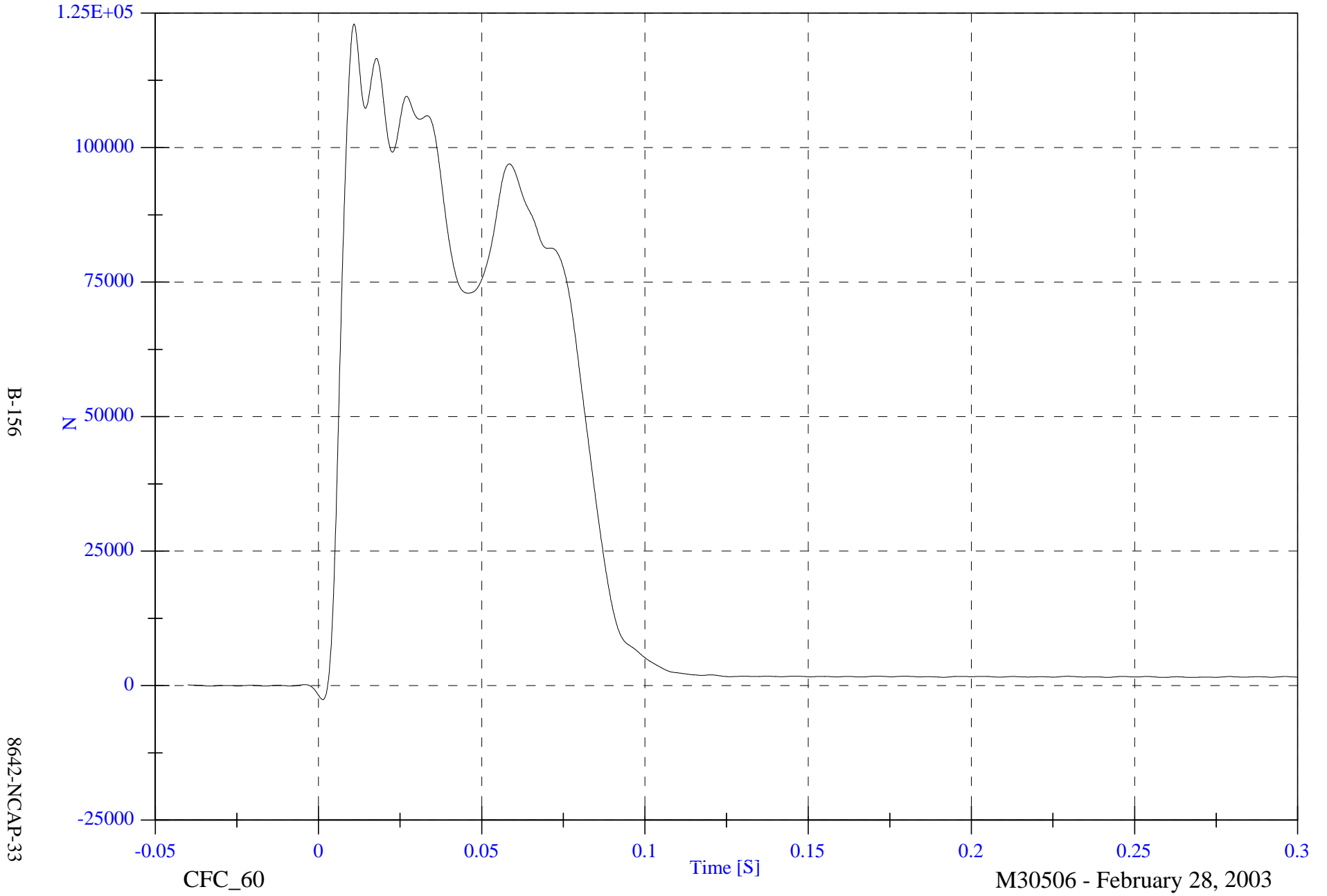
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell B3 Fx

Max: 122962.0 [N] at 0.011 [S]

Min: -2595.1 [N] at 0.001 [S]



B-156

8642-NCAP-33

CFC\_60

Time [S]

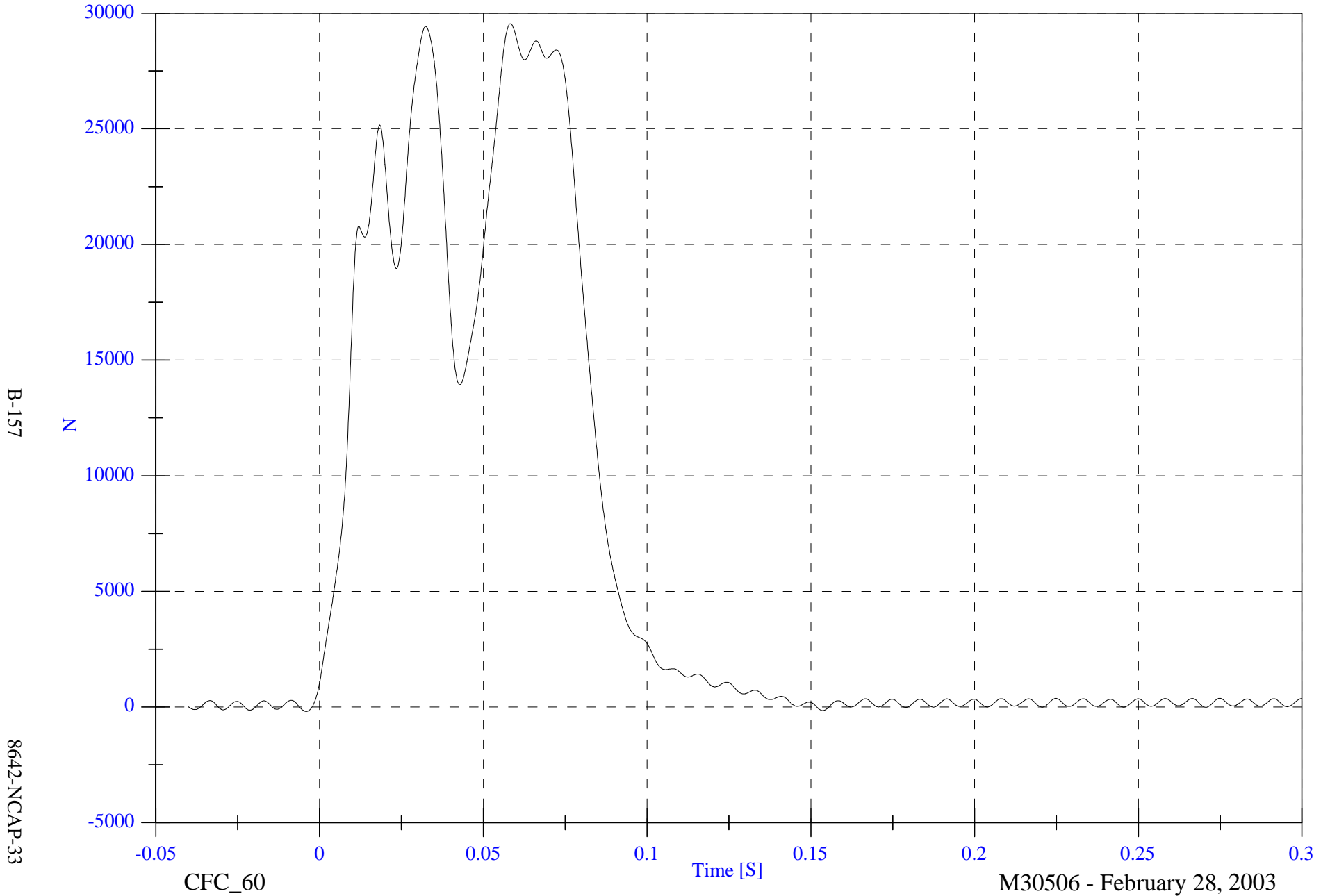
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell B4 Fx

Max: 29542.9 [N] at 0.058 [S]

Min: -189.4 [N] at -0.004 [S]

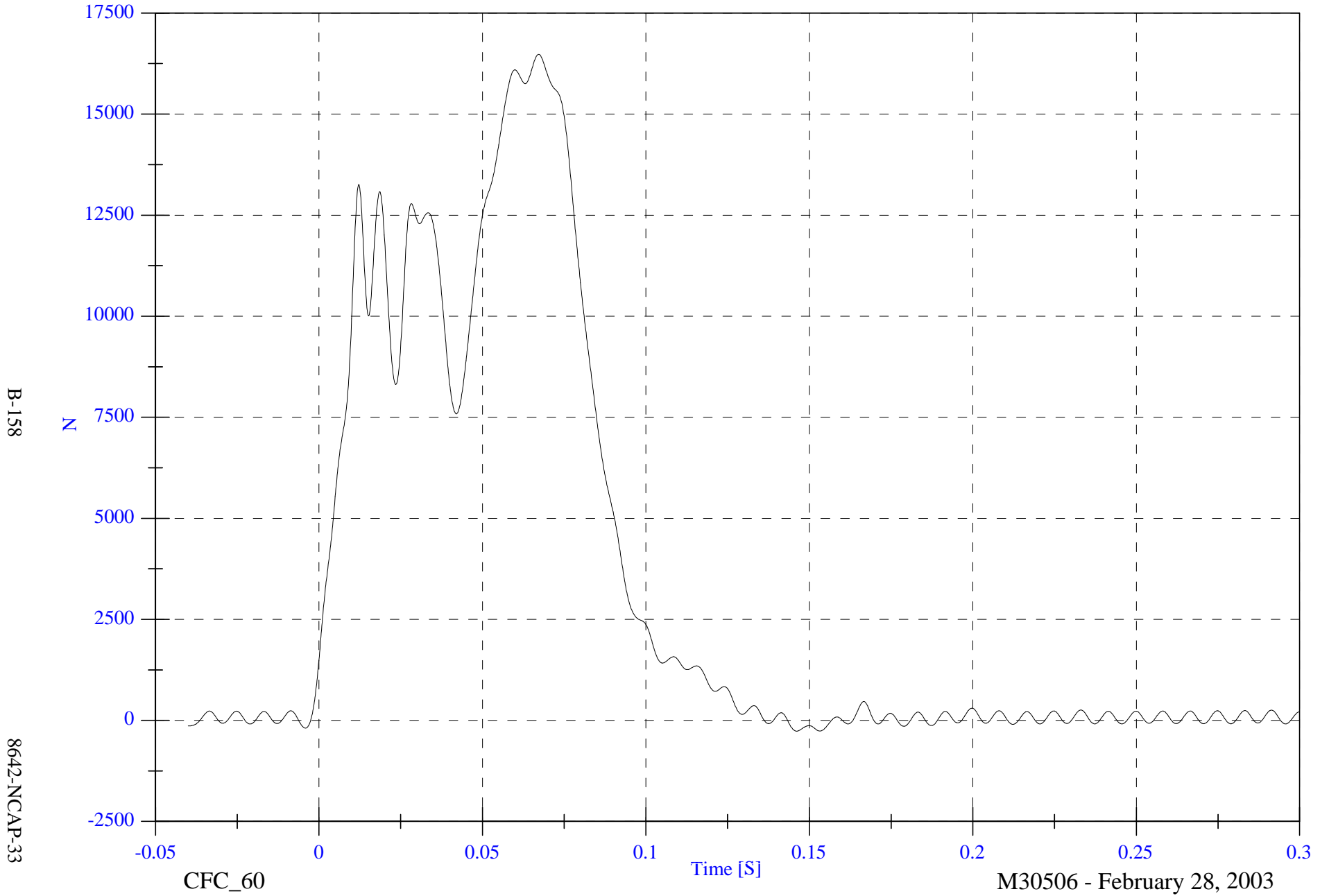


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell B5 Fx

Max: 16479.9 [N] at 0.067 [S]

Min: -265.4 [N] at 0.146 [S]



B-158

8642-NCAP-33

CFC\_60

Time [S]

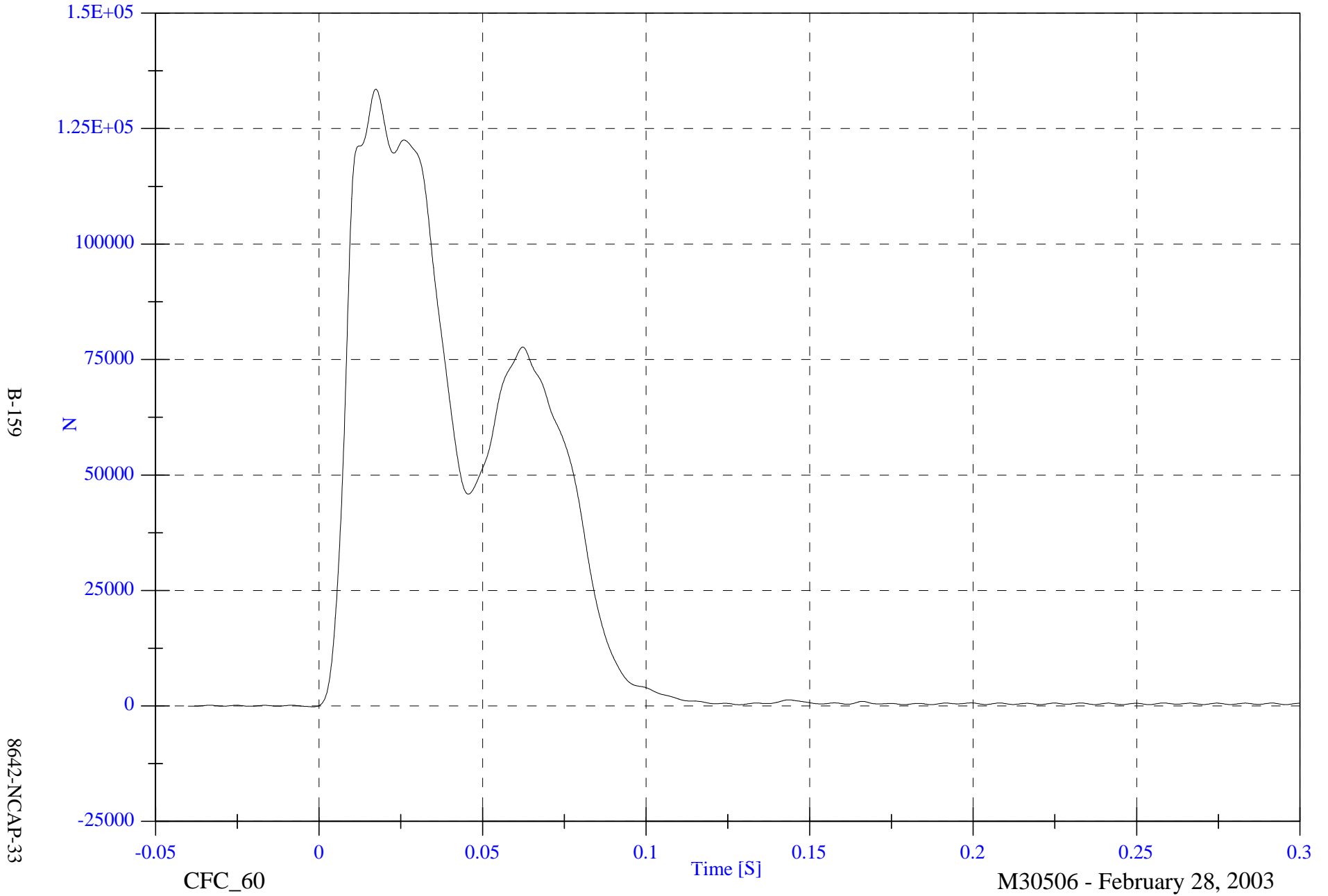
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell B6 Fx

Max: 133529.8 [N] at 0.017 [S]

Min: -171.5 [N] at -0.002 [S]



B-159

8642-NCAP-33

CFC\_60

Time [S]

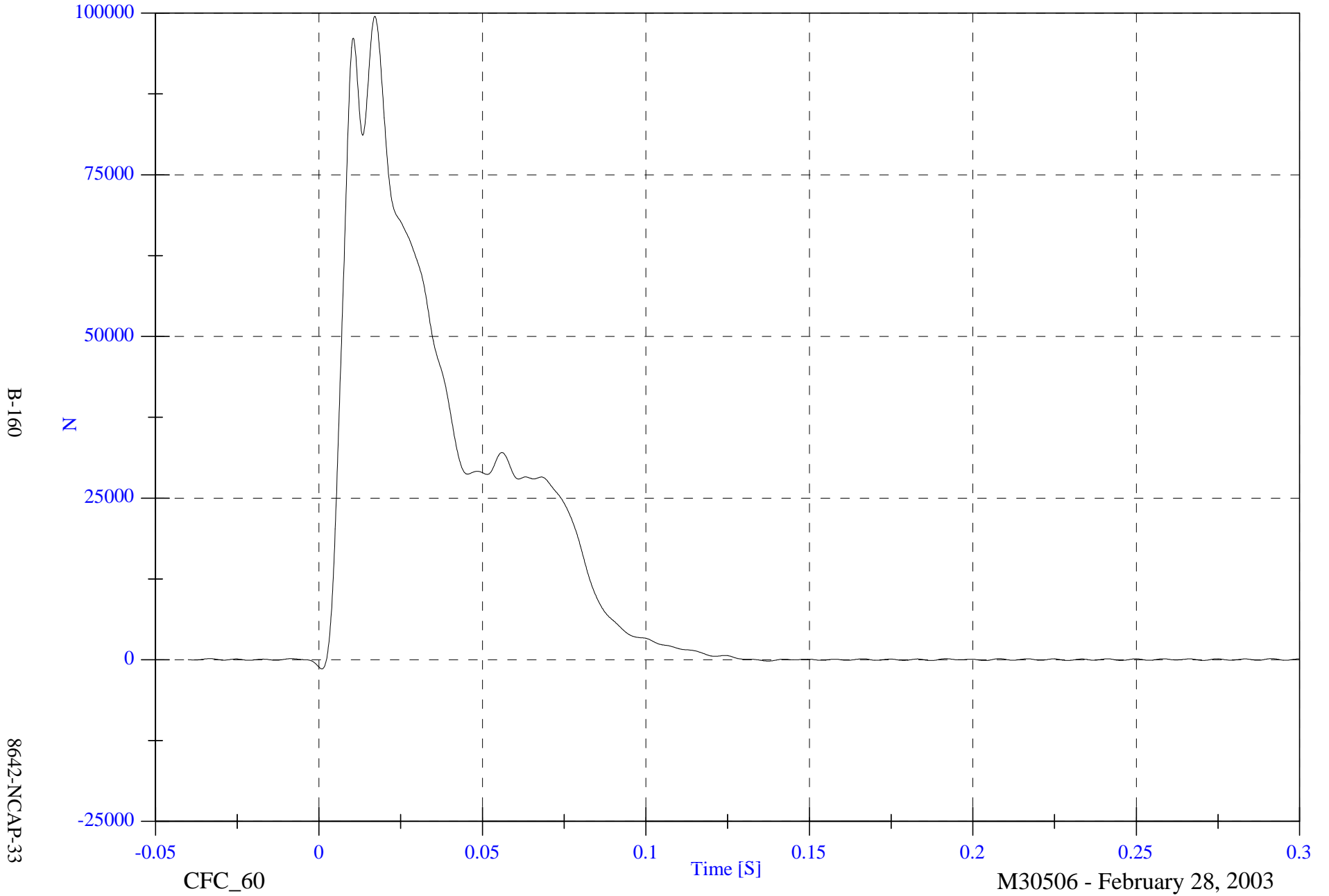
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell B7 Fx

Max: 99495.4 [N] at 0.017 [S]

Min: -1411.3 [N] at 0.001 [S]



B-160

8642-NCAP-33

CFC\_60

Time [S]

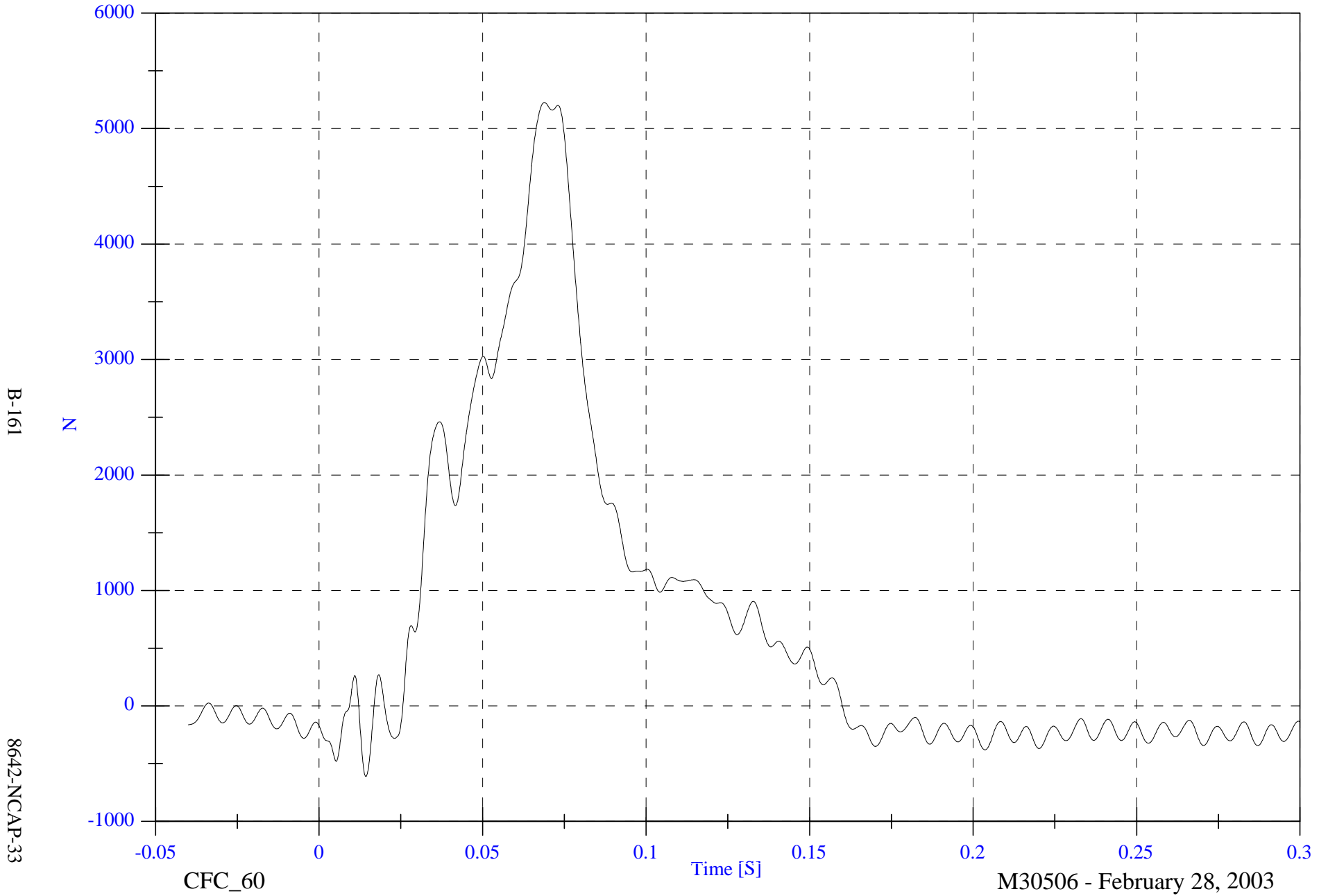
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell B8 Fx

Max: 5226.0 [N] at 0.069 [S]

Min: -610.6 [N] at 0.014 [S]

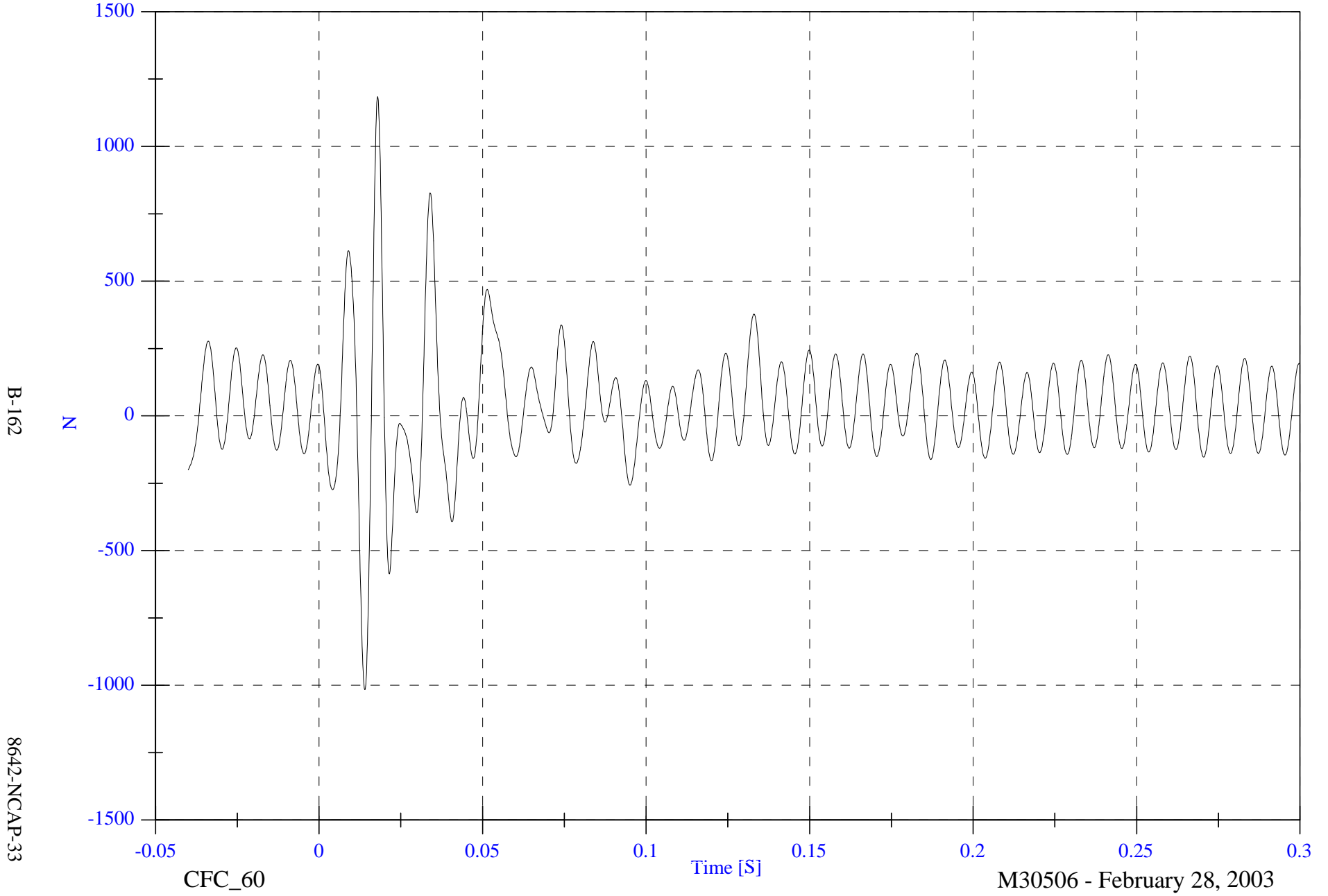


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell B9 Fx

Max: 1184.5 [N] at 0.018 [S]

Min: -1016.2 [N] at 0.014 [S]



NCAP Test #11 - 2003 Isuzu Rodeo

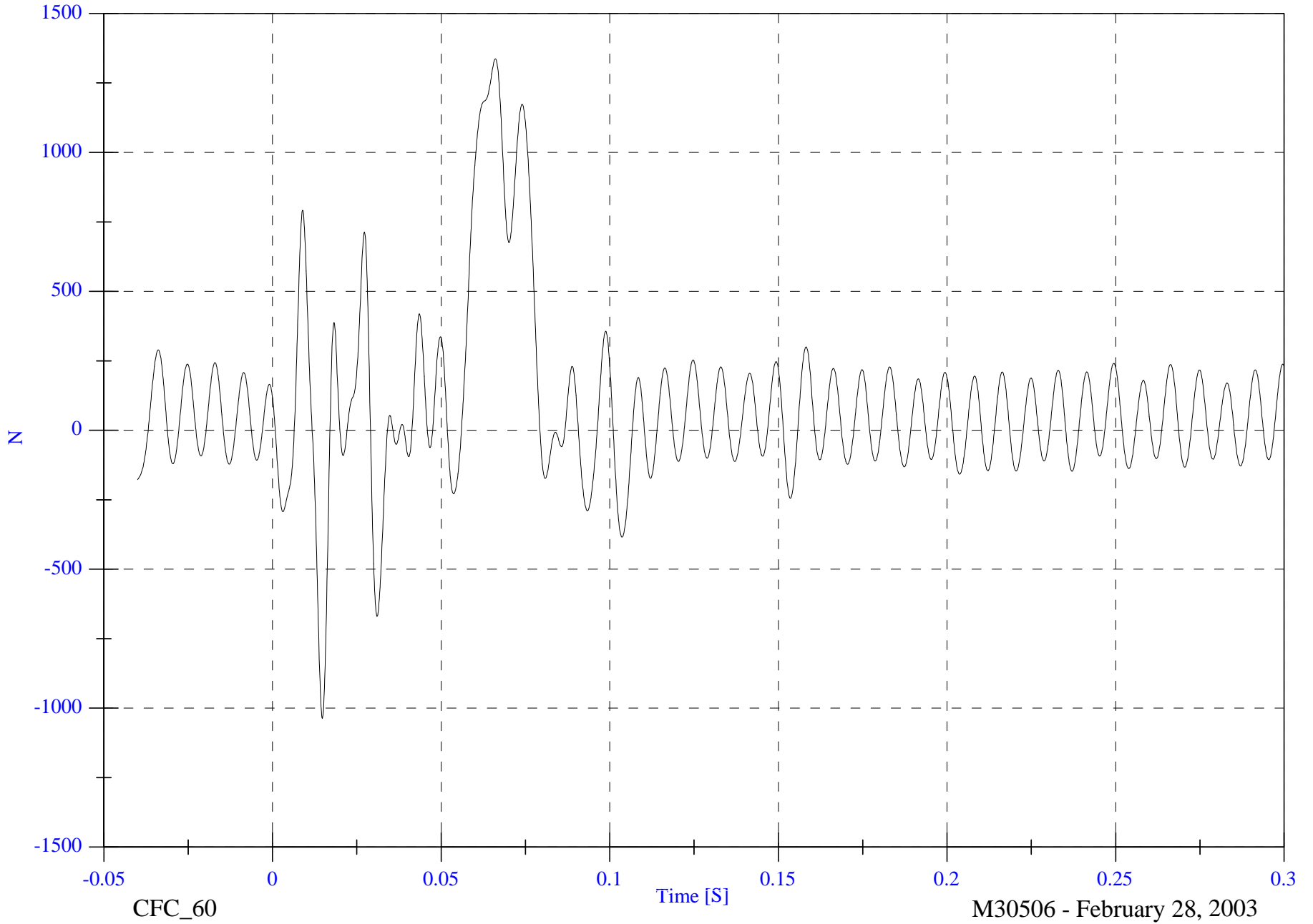
Barrier Load Cell C1 Fx

Max: 1336.6 [N] at 0.066 [S]

Min: -1036.4 [N] at 0.015 [S]

B-163

8642-NCAP-33



CFC\_60

Time [S]

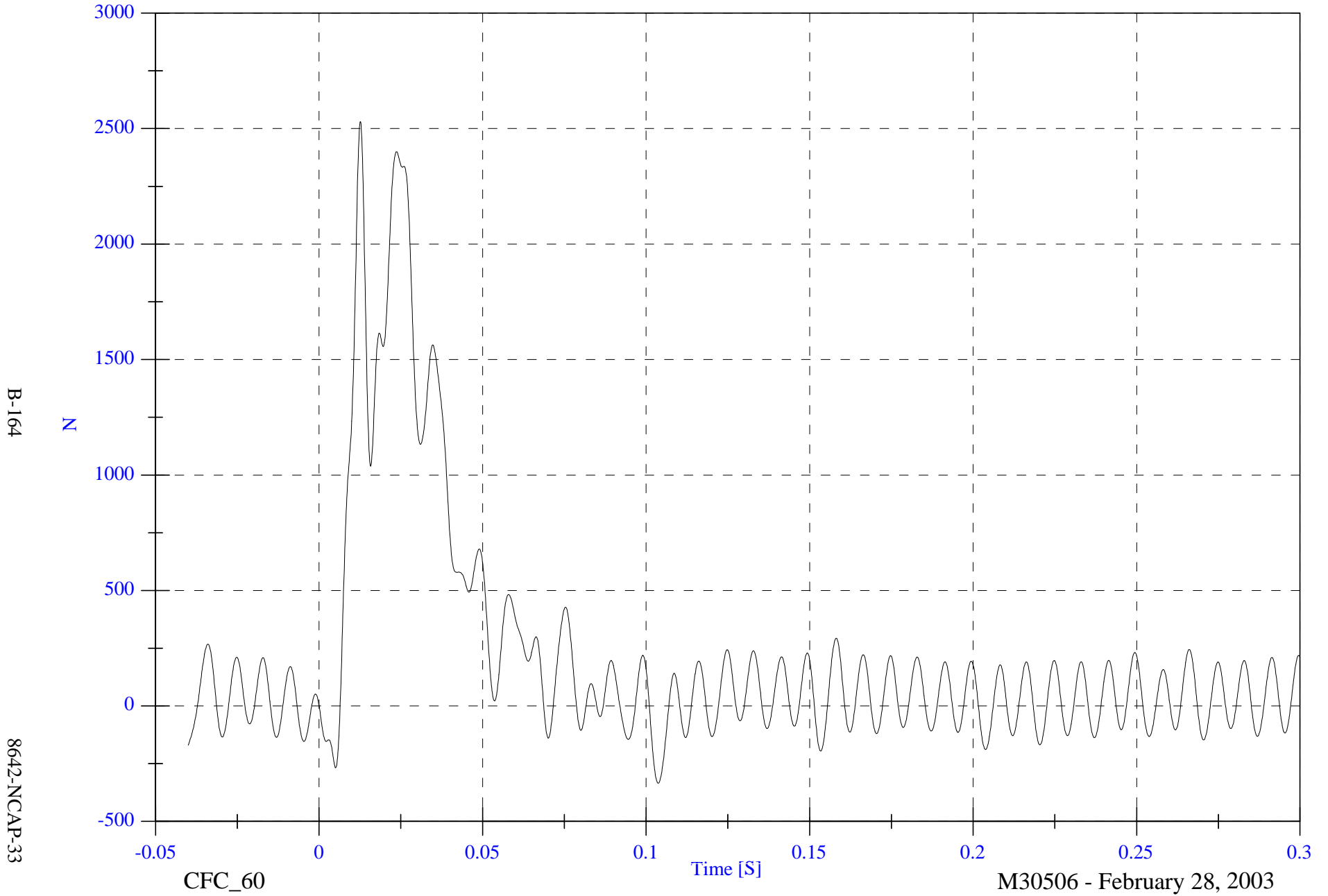
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 2529.4 [N] at 0.013 [S]

Barrier Load Cell C2 Fx

Min: -334.8 [N] at 0.104 [S]

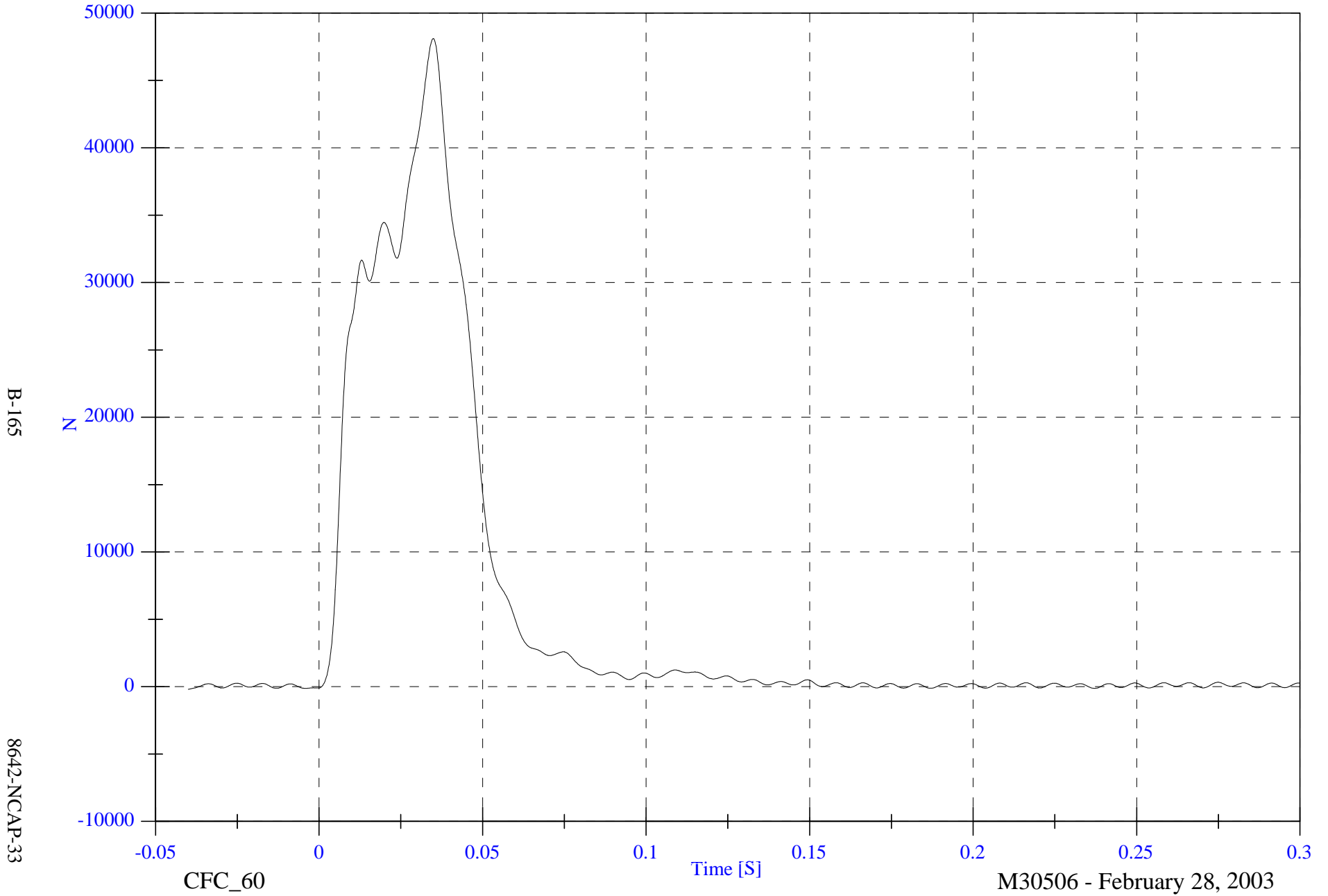


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell C3 Fx

Max: 48105.5 [N] at 0.035 [S]

Min: -193.8 [N] at -0.040 [S]

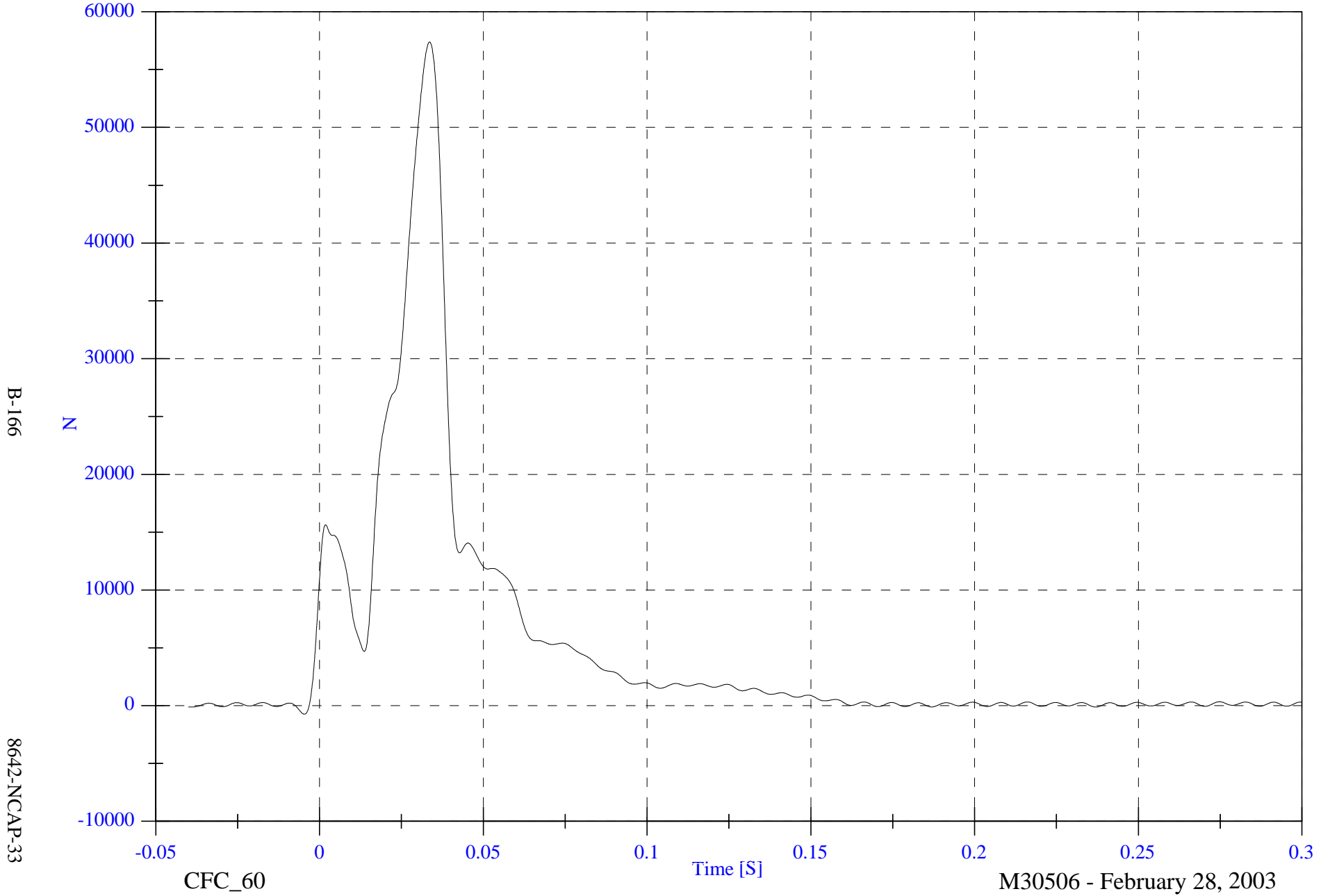


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell C4 Fx

Max: 57387.4 [N] at 0.034 [S]

Min: -742.1 [N] at -0.005 [S]

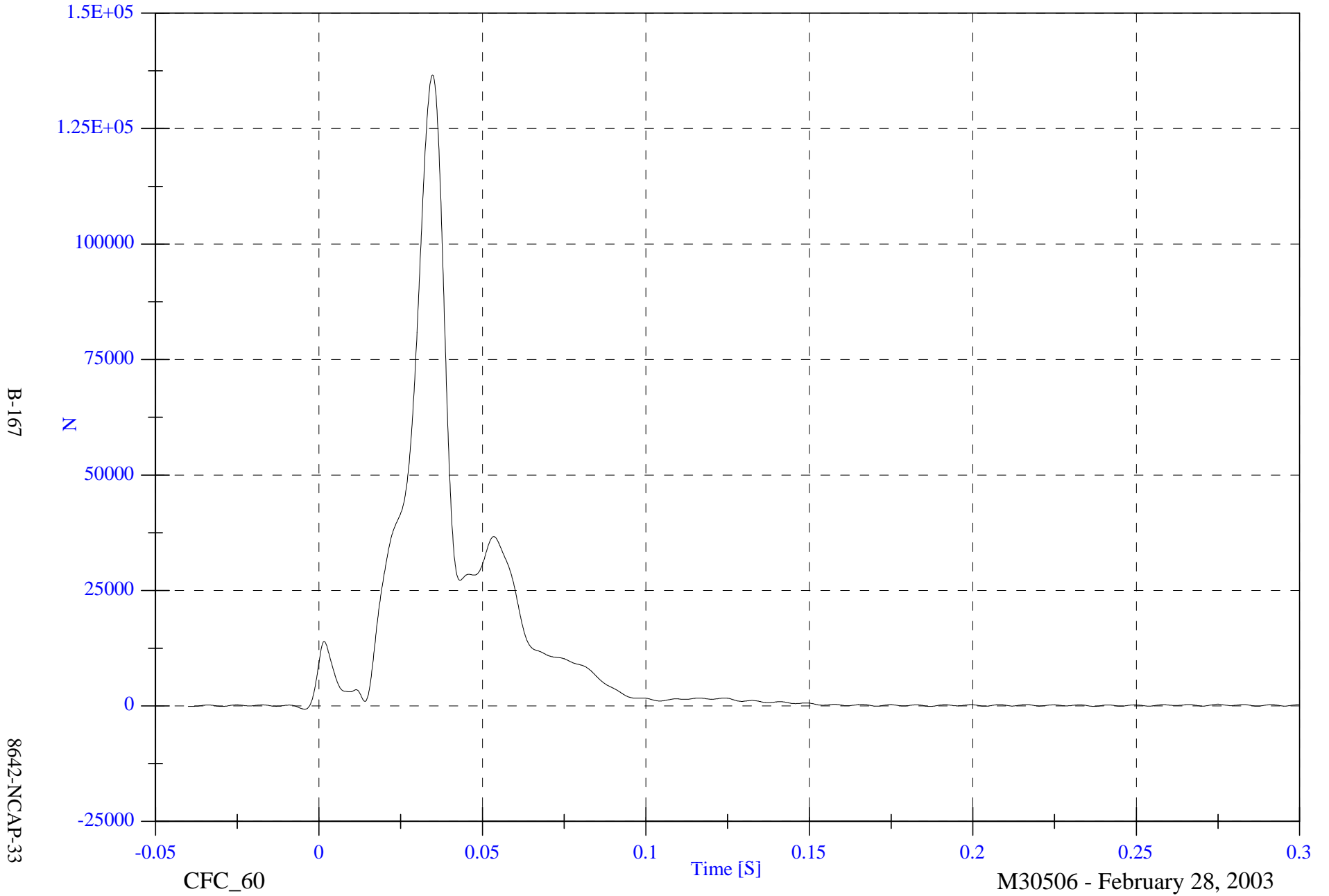


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 136621.9 [N] at 0.035 [S]

Barrier Load Cell C5 Fx

Min: -716.7 [N] at -0.004 [S]



B-167

8642-NCAP-33

CFC\_60

Time [S]

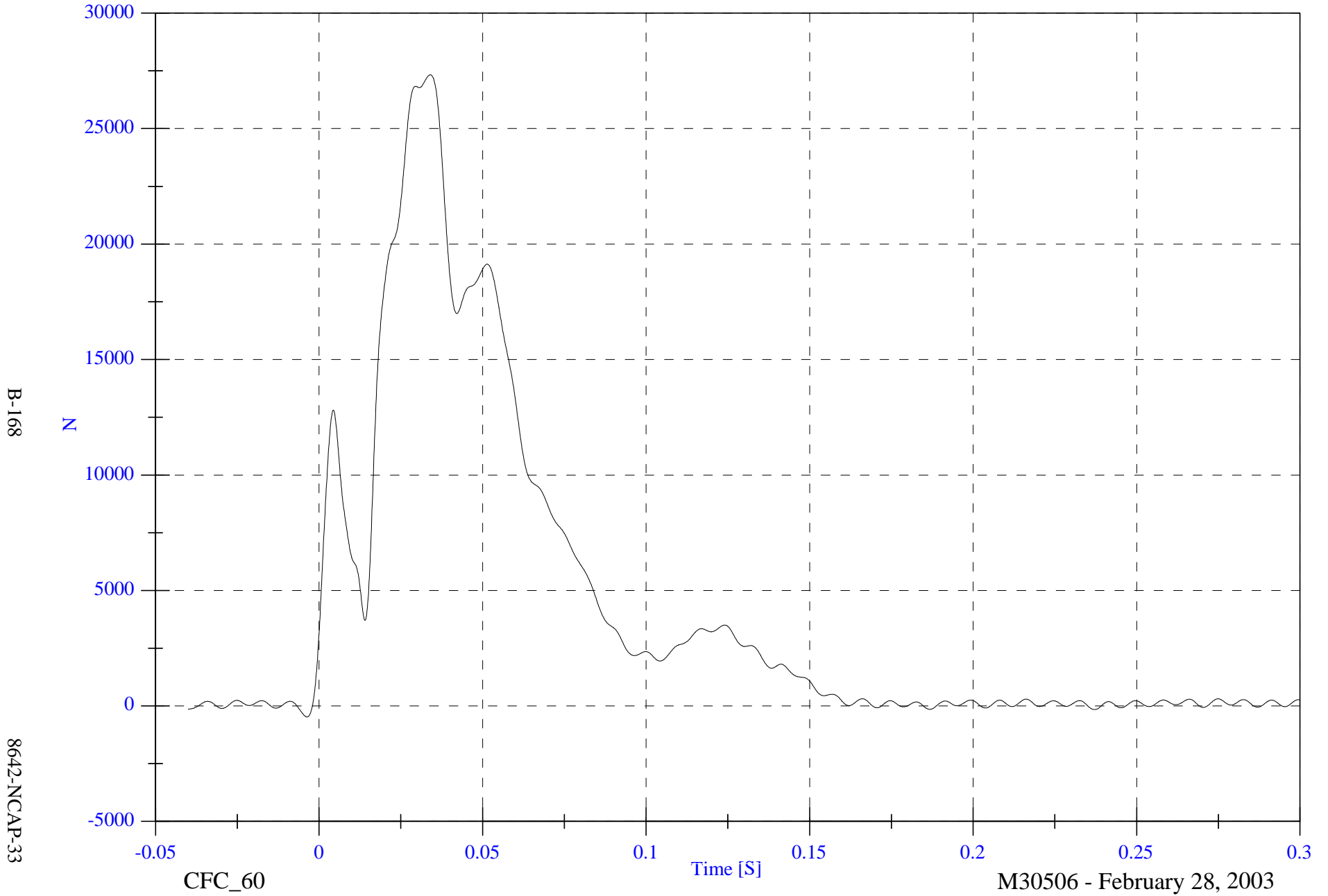
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell C6 Fx

Max: 27329.4 [N] at 0.034 [S]

Min: -475.6 [N] at -0.004 [S]



B-168

8642-NCAP-33

CFC\_60

Time [S]

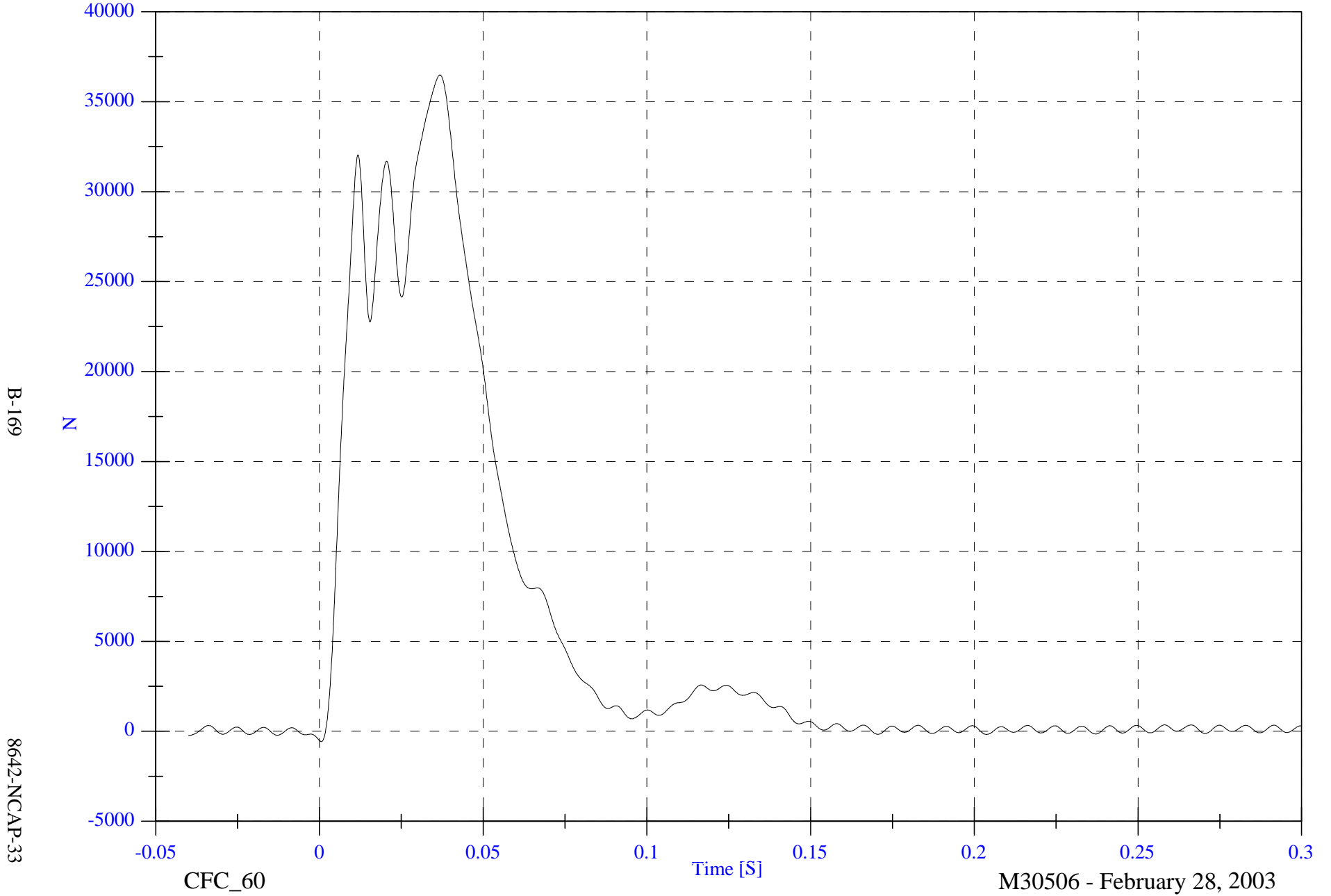
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 36484.0 [N] at 0.037 [S]

Barrier Load Cell C7 Fx

Min: -567.5 [N] at 0.001 [S]



B-169

8642-NCAP-33

CFC\_60

Time [S]

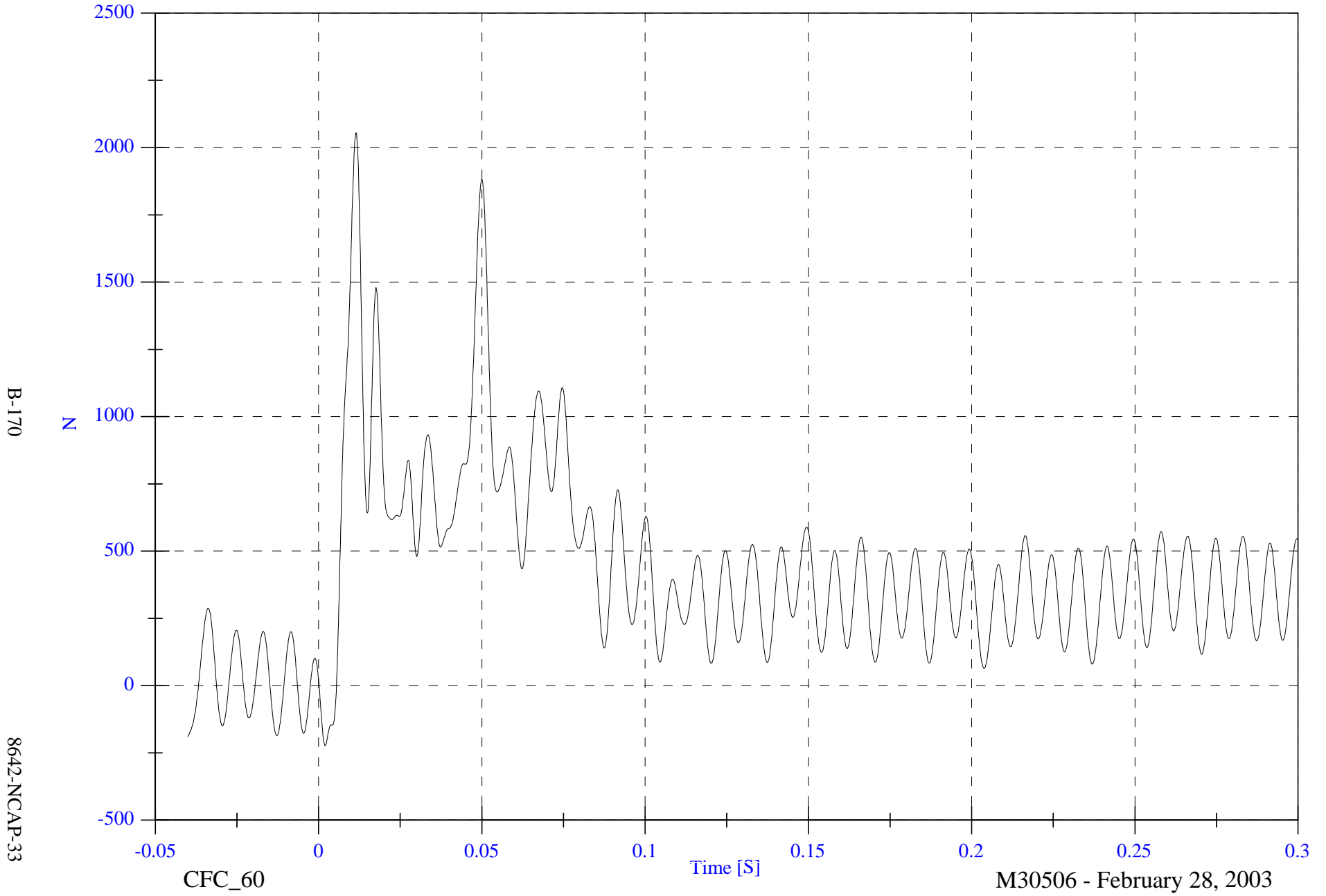
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 2055.2 [N] at 0.011 [S]

Barrier Load Cell C8 Fx

Min: -223.3 [N] at 0.002 [S]



B-170

8642-NCAP-33

CFC\_60

Time [S]

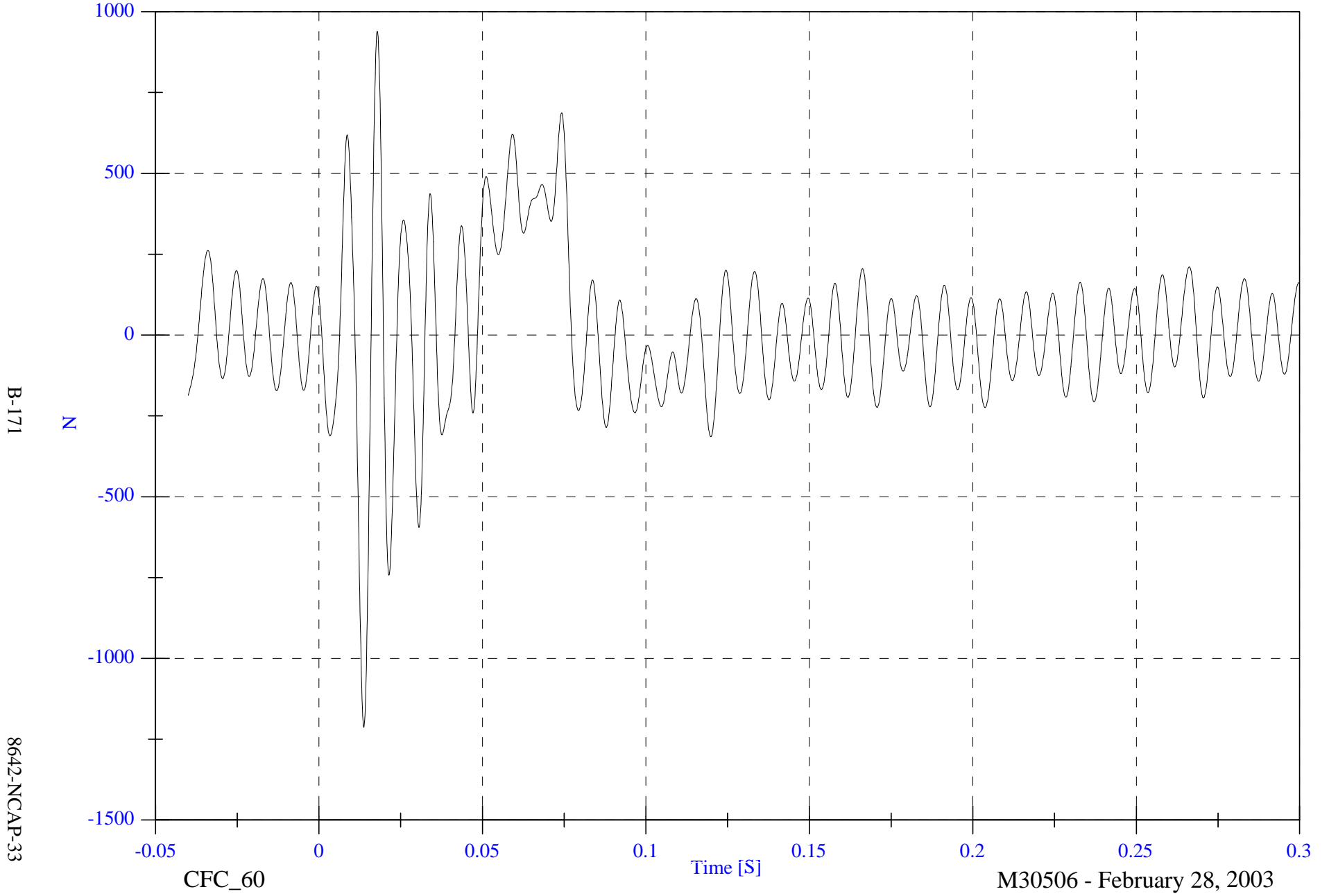
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 939.3 [N] at 0.018 [S]

Barrier Load Cell C9 Fx

Min: -1213.2 [N] at 0.014 [S]



B-171

8642-NCAP-33

CFC\_60

Time [S]

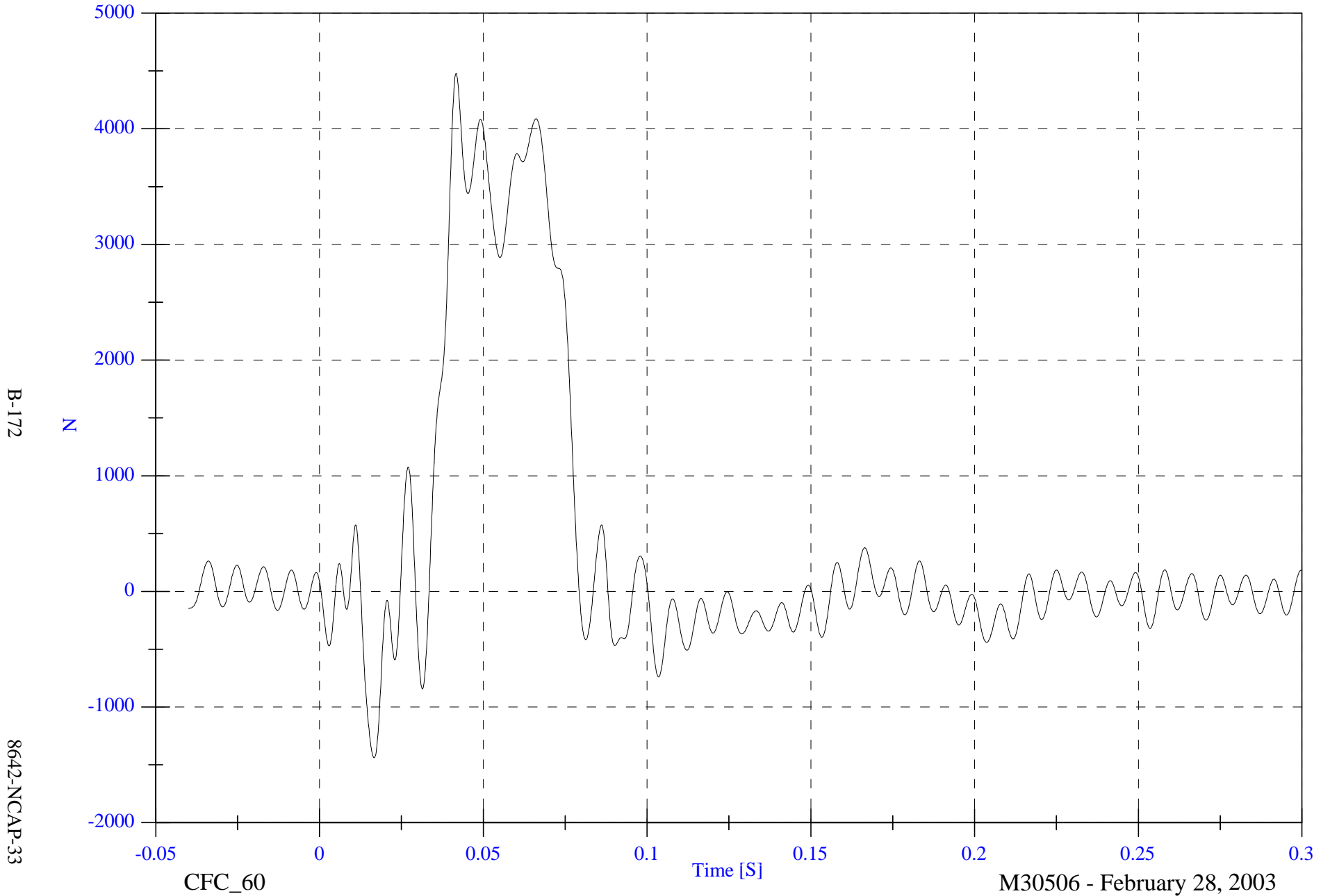
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 4478.8 [N] at 0.042 [S]

Barrier Load Cell D1 Fx

Min: -1438.9 [N] at 0.017 [S]

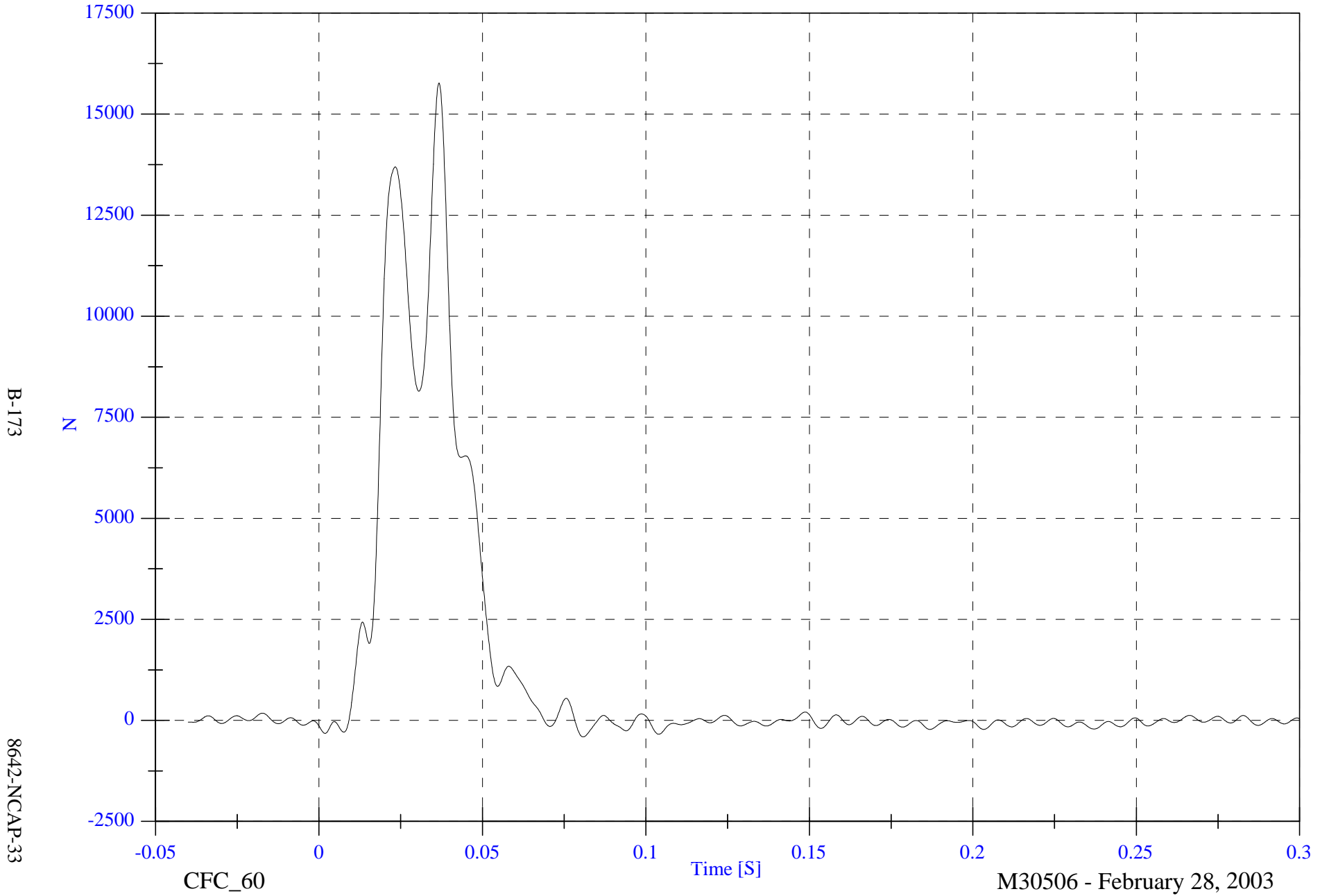


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell D2 Fx

Max: 15772.1 [N] at 0.037 [S]

Min: -409.7 [N] at 0.081 [S]

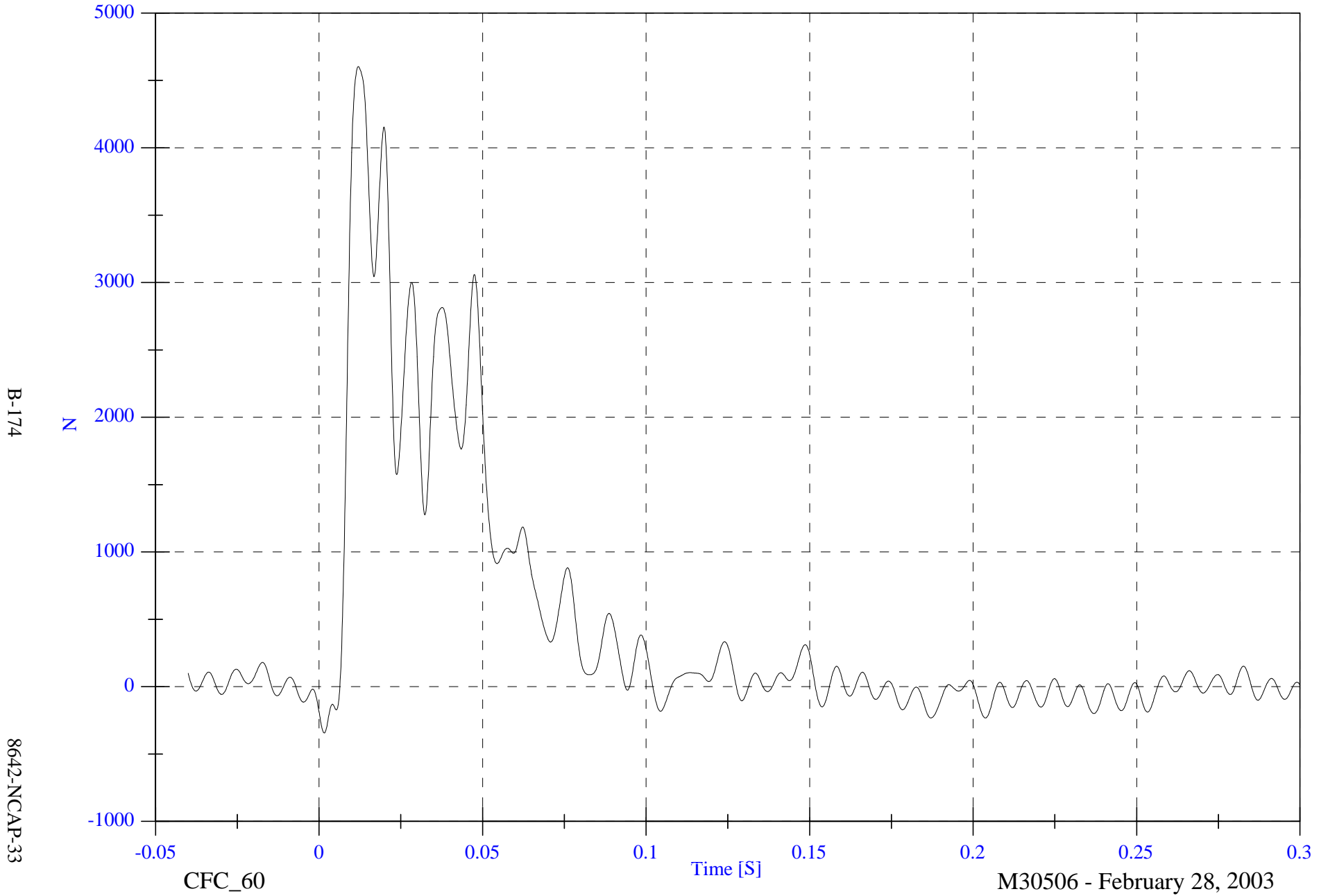


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 4602.8 [N] at 0.012 [S]

Barrier Load Cell D3 Fx

Min: -343.6 [N] at 0.002 [S]



B-174

8642-NCAP-33

CFC\_60

Time [S]

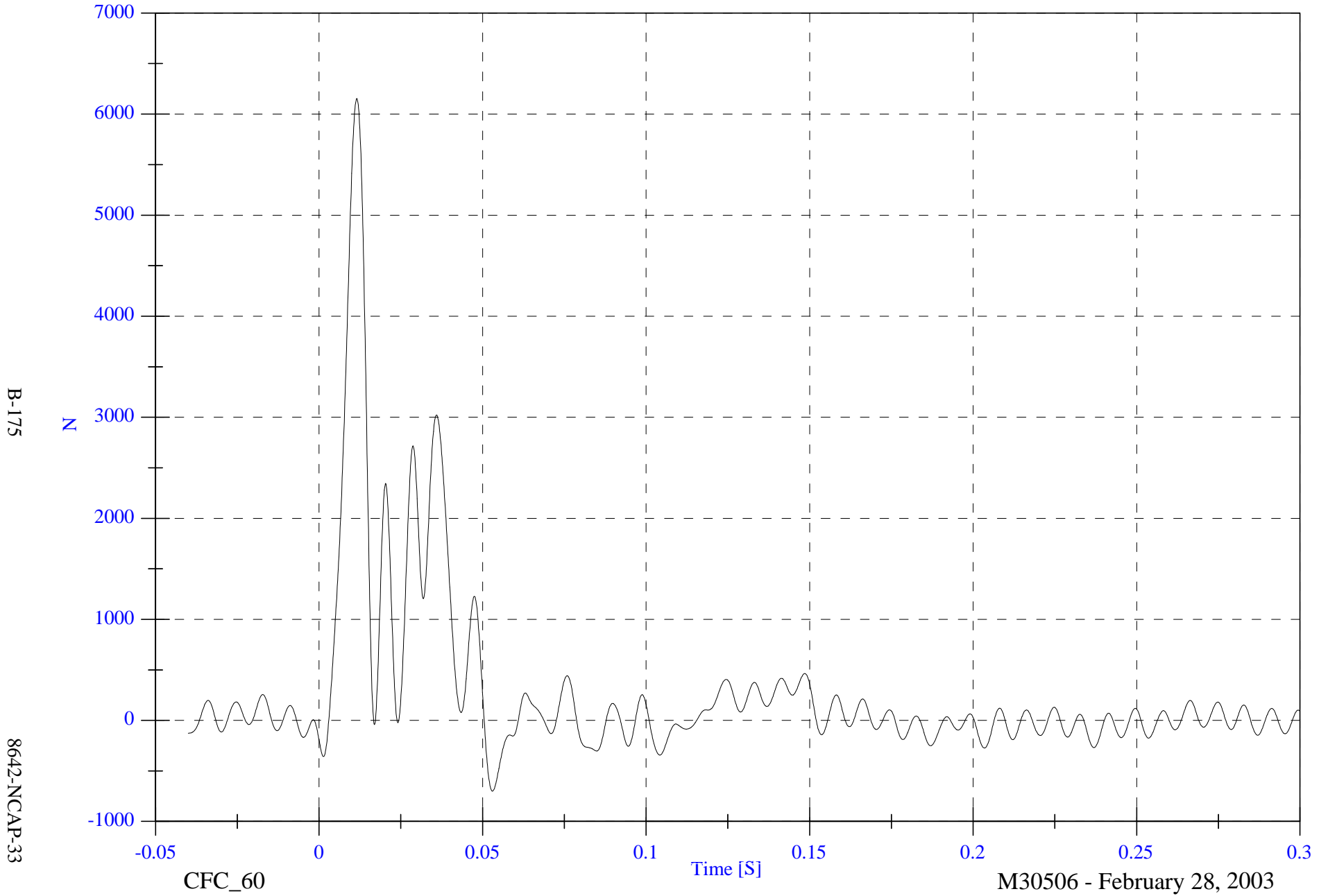
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell D4 Fx

Max: 6154.6 [N] at 0.012 [S]

Min: -700.7 [N] at 0.053 [S]

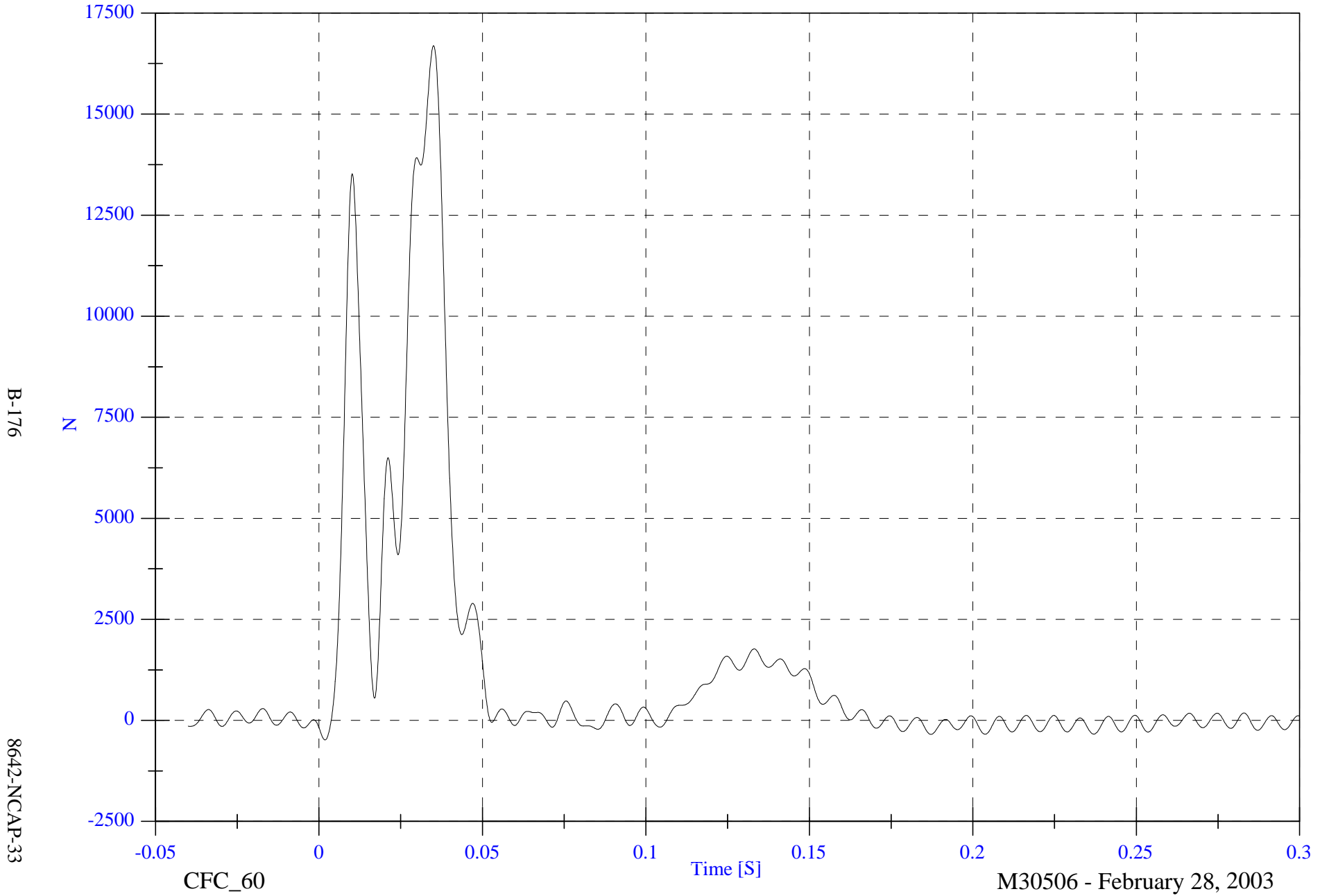


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell D5 Fx

Max: 16693.0 [N] at 0.035 [S]

Min: -484.4 [N] at 0.002 [S]

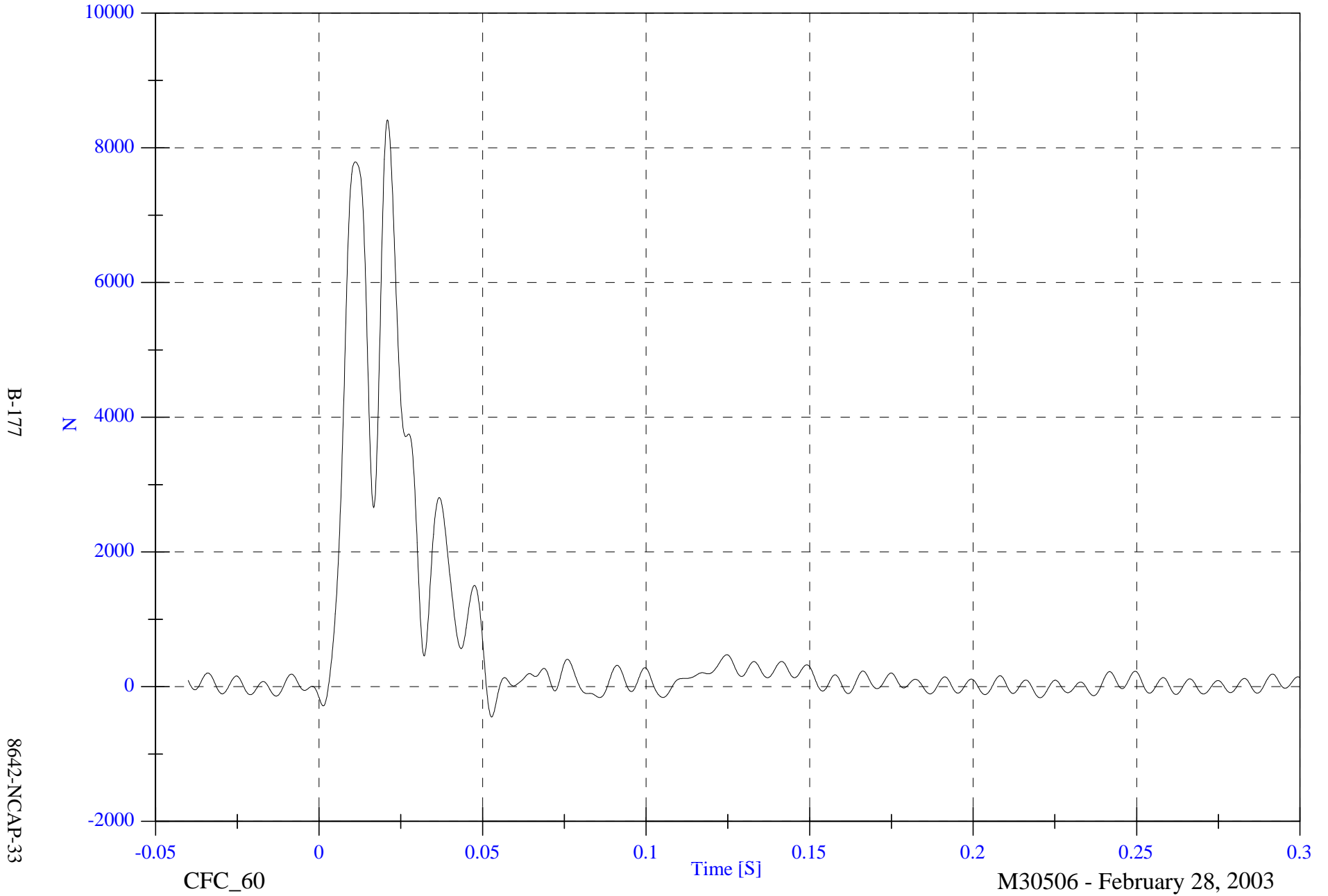


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell D6 Fx

Max: 8413.6 [N] at 0.021 [S]

Min: -449.8 [N] at 0.053 [S]

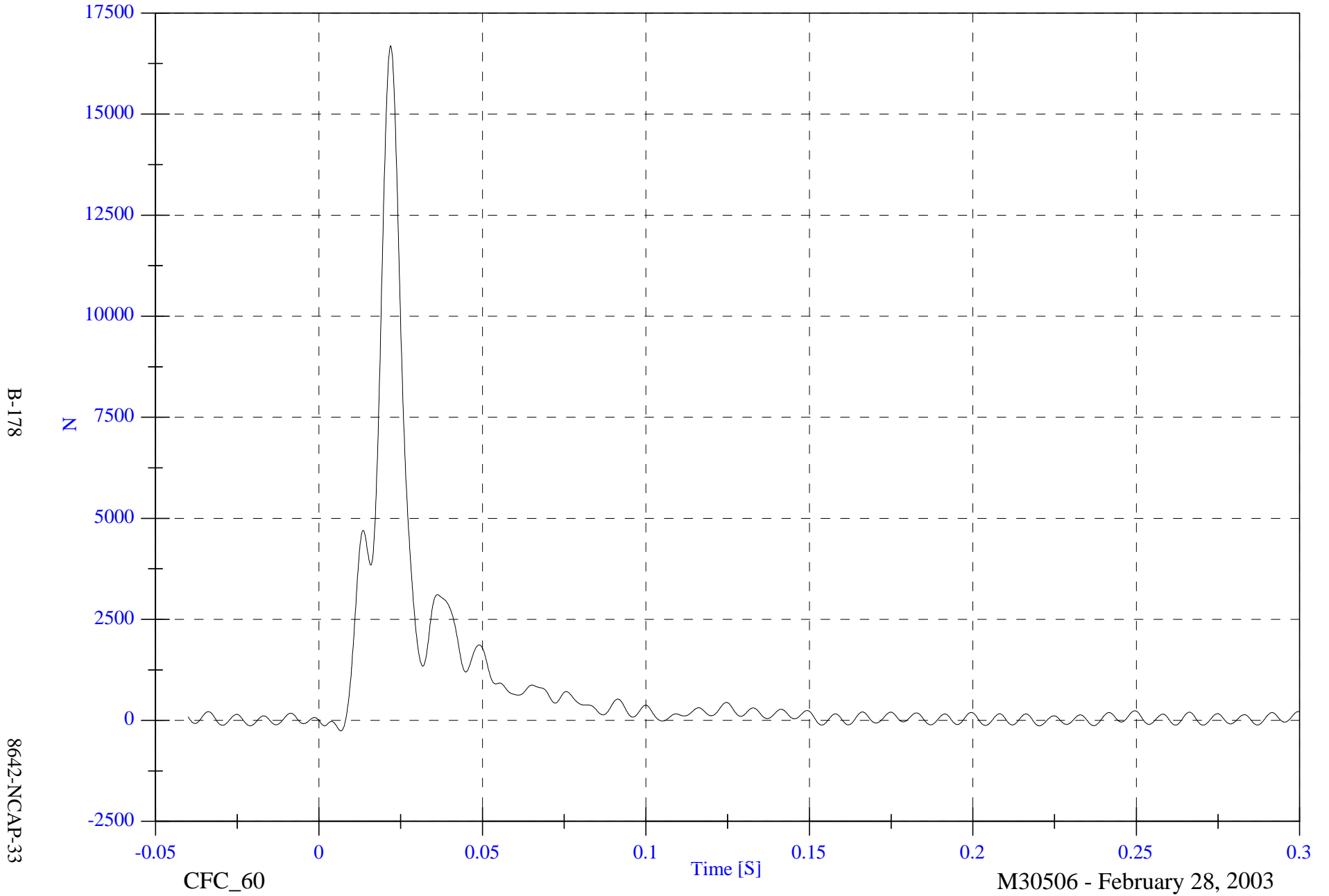


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell D7 Fx

Max: 16690.8 [N] at 0.022 [S]

Min: -261.1 [N] at 0.007 [S]

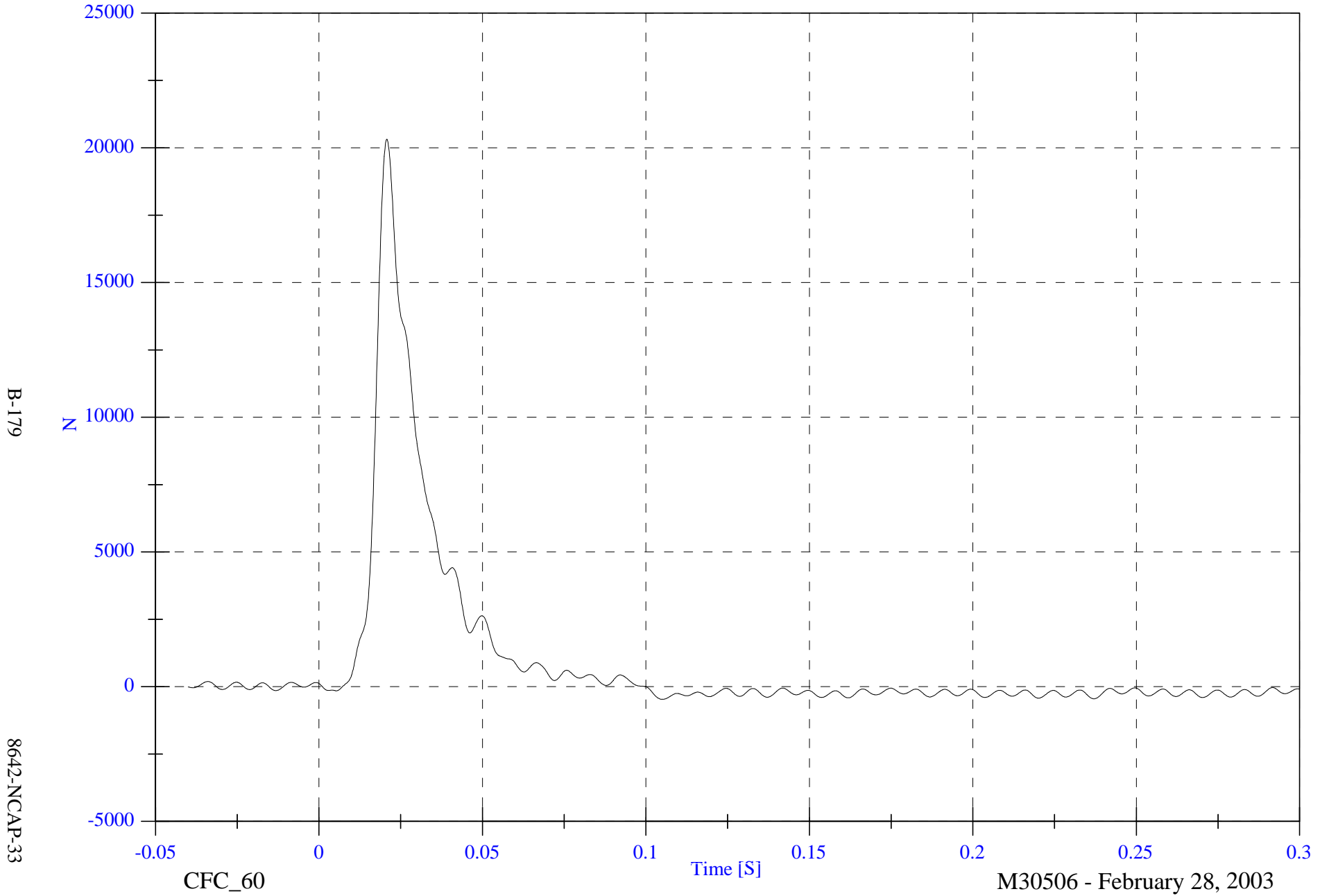


NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell D8 Fx

Max: 20316.5 [N] at 0.021 [S]

Min: -470.0 [N] at 0.105 [S]



B-179

8642-NCAP-33

CFC\_60

Time [S]

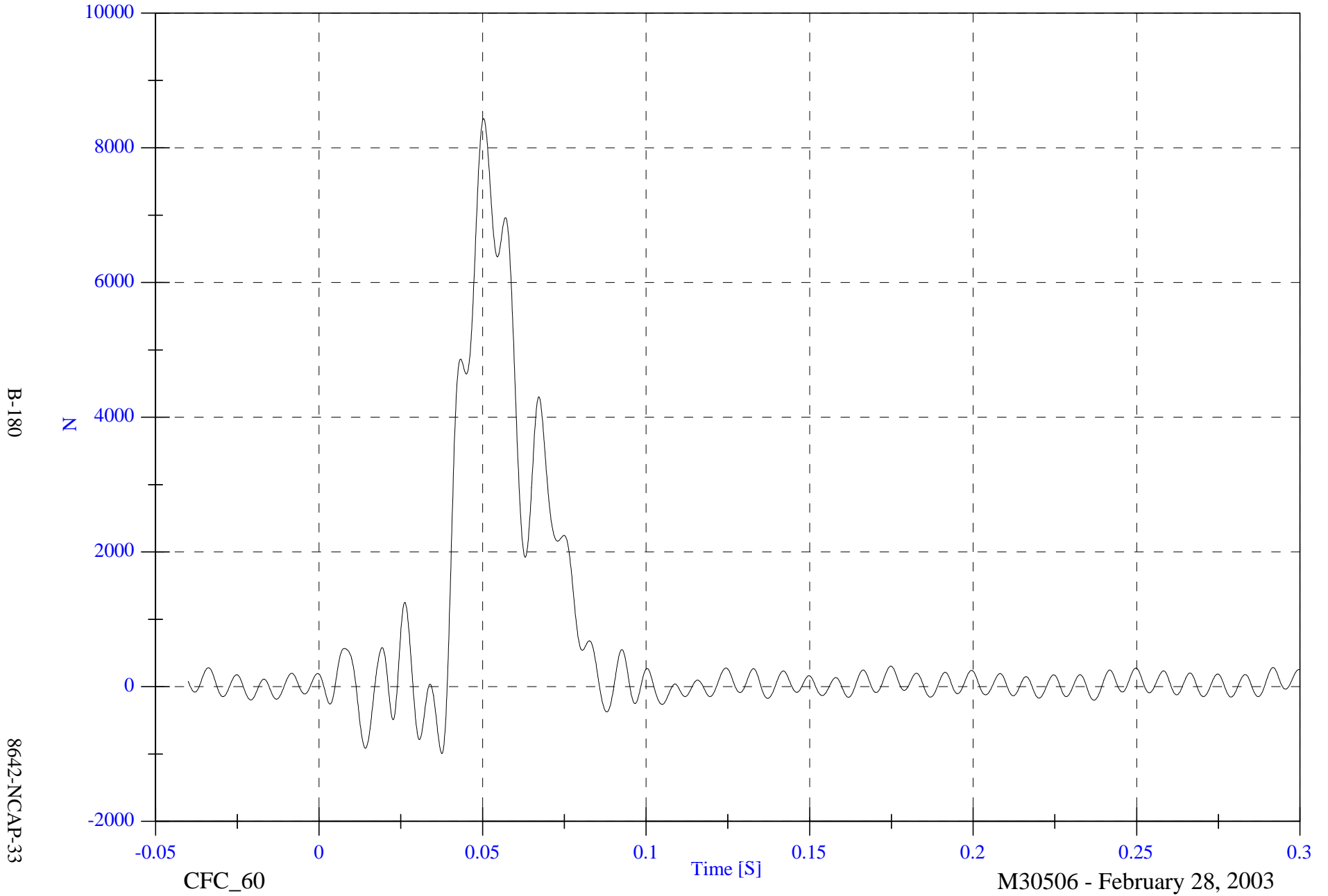
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Barrier Load Cell D9 Fx

Max: 8434.4 [N] at 0.050 [S]

Min: -993.2 [N] at 0.038 [S]



B-180

8642-NCAP-33

CFC\_60

Time [S]

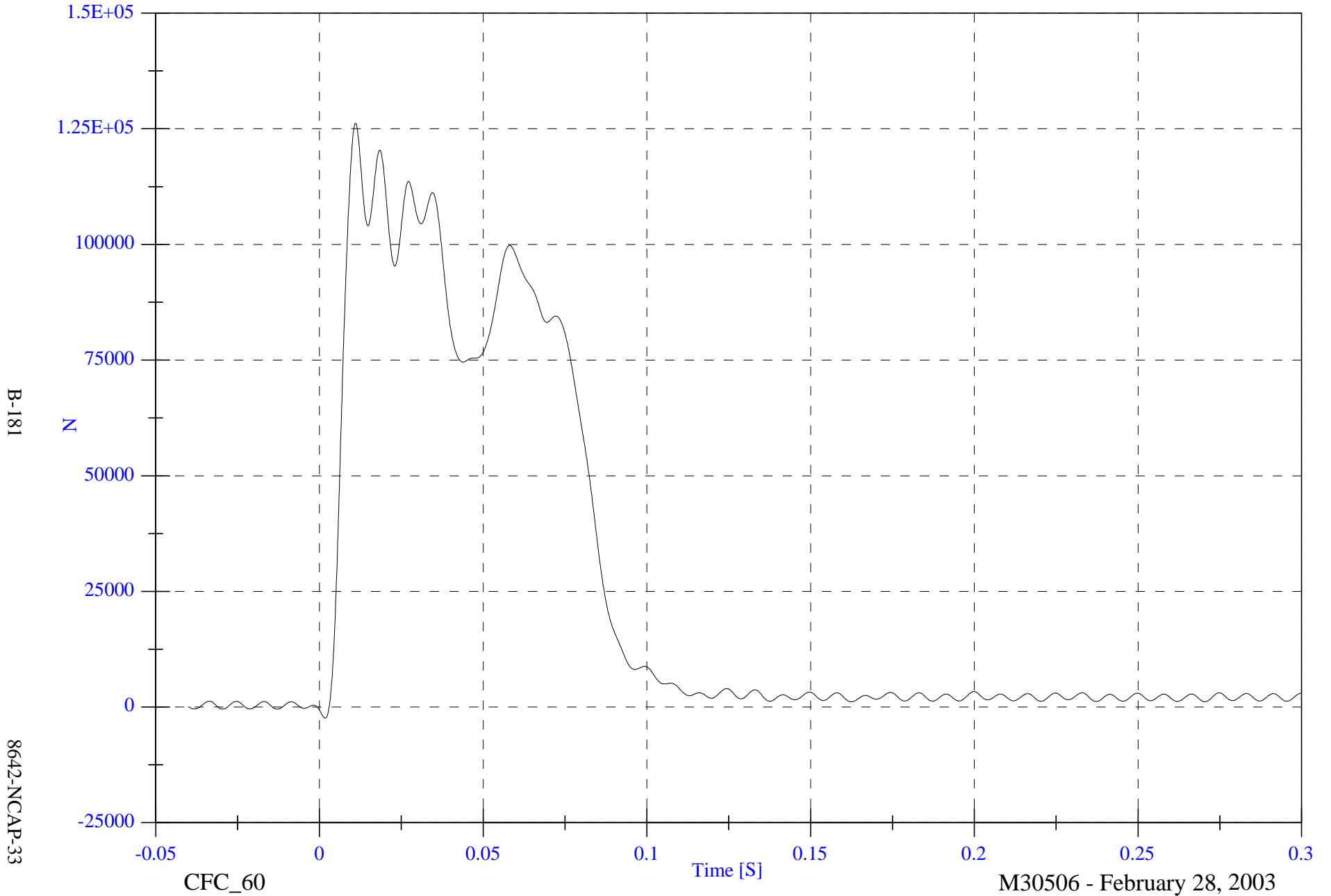
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

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

Max: 126185.2 [N] at 0.011 [S]

Min: -2426.6 [N] at 0.002 [S]

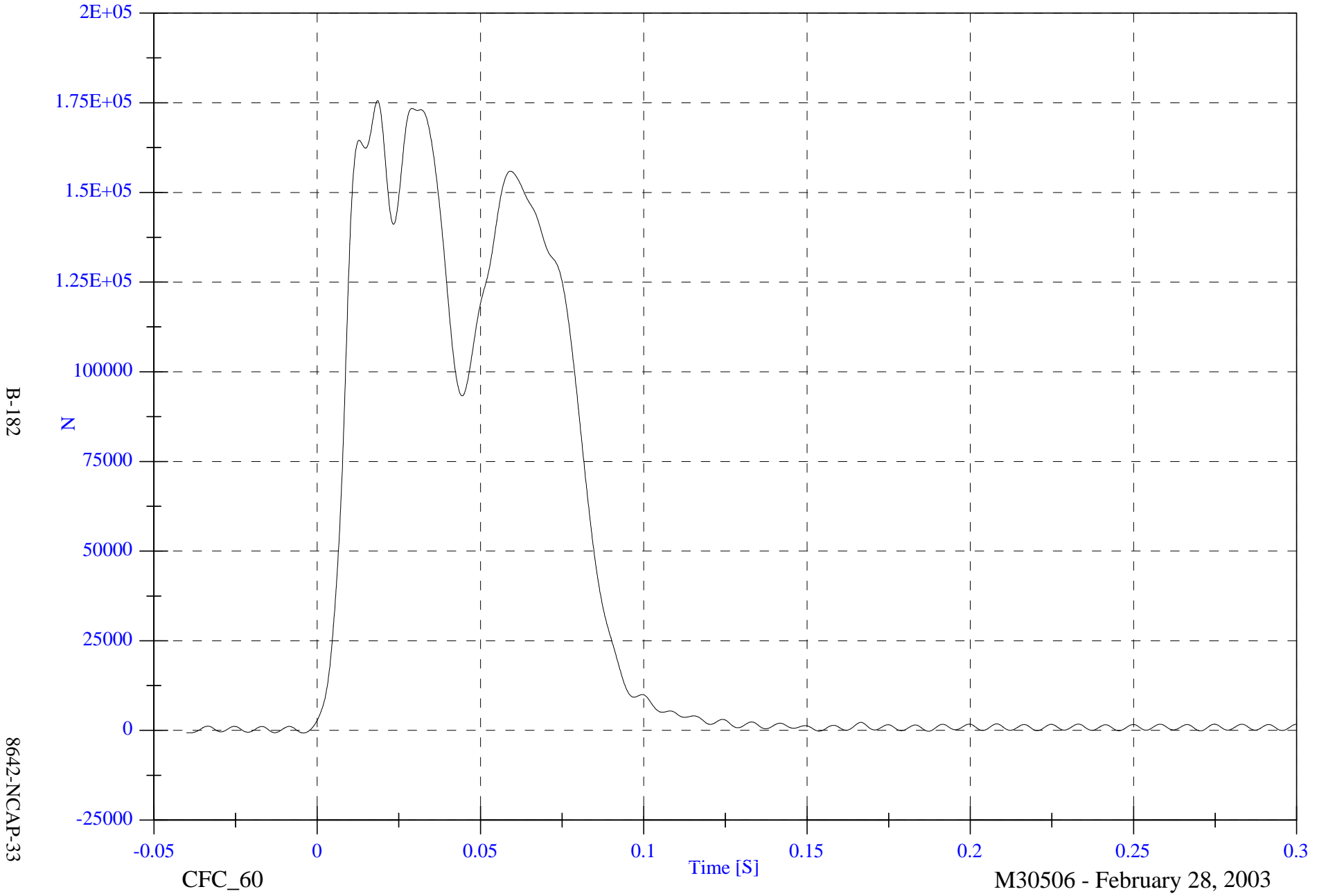


NCAP Test #11 - 2003 Isuzu Rodeo

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

Max: 175552.4 [N] at 0.018 [S]

Min: -695.8 [N] at -0.004 [S]



B-182

8642-NCAP-33

CFC\_60

Time [S]

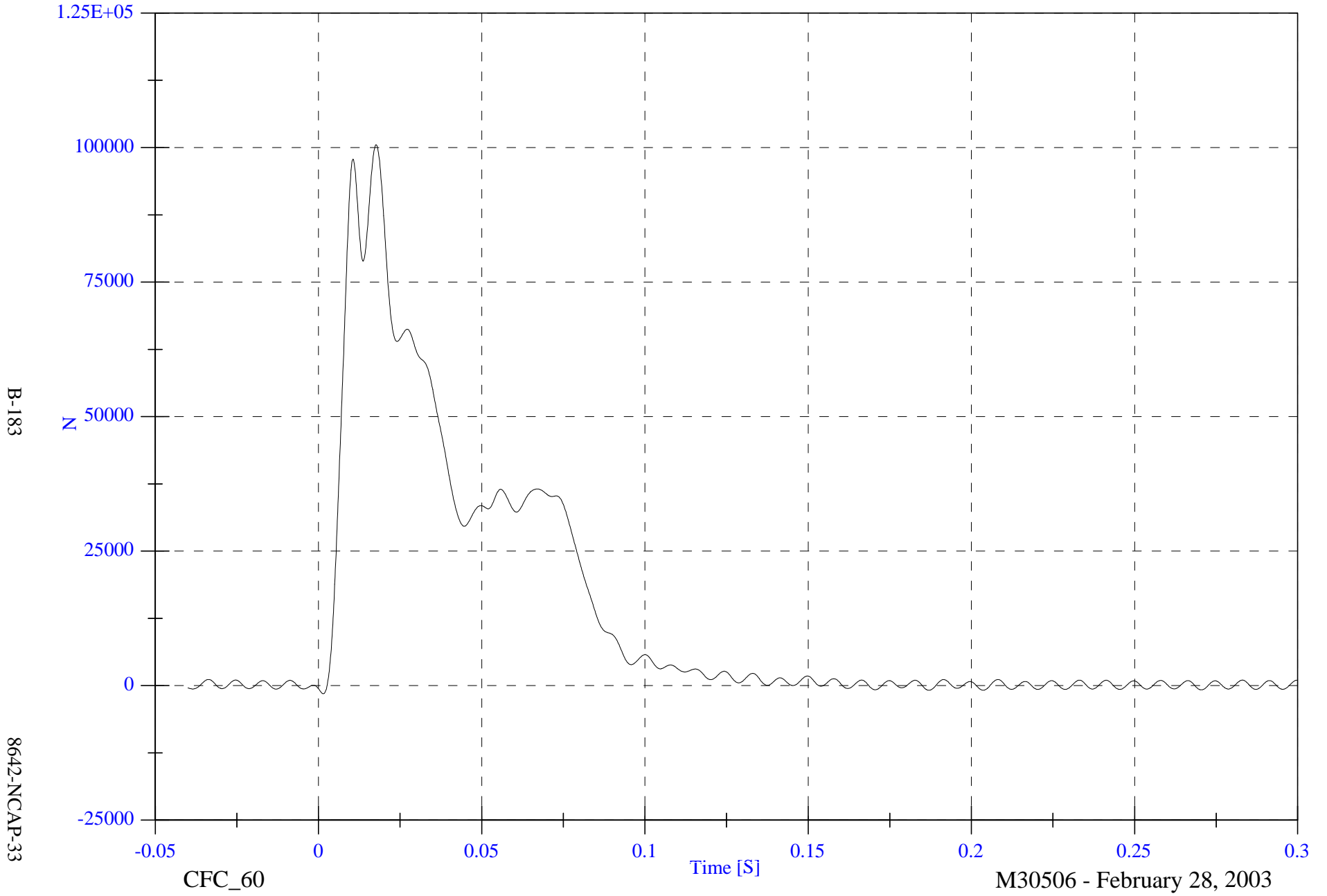
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

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

Max: 100530.0 [N] at 0.018 [S]

Min: -1508.2 [N] at 0.001 [S]



B-183

8642-NCAP-33

CFC\_60

Time [S]

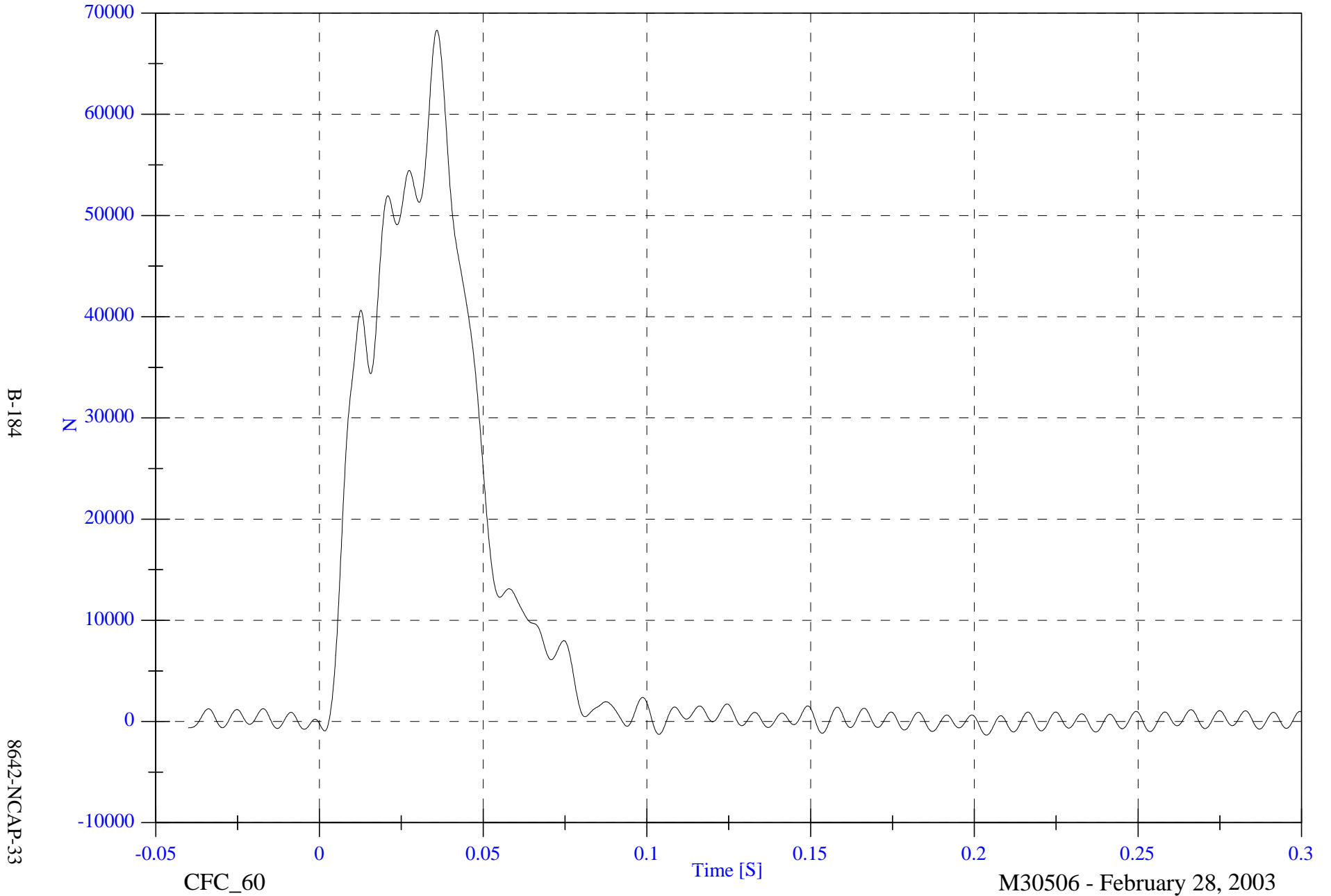
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

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

Max: 68320.7 [N] at 0.036 [S]

Min: -1342.0 [N] at 0.204 [S]



B-184

8642-NCAP-33

CFC\_60

Time [S]

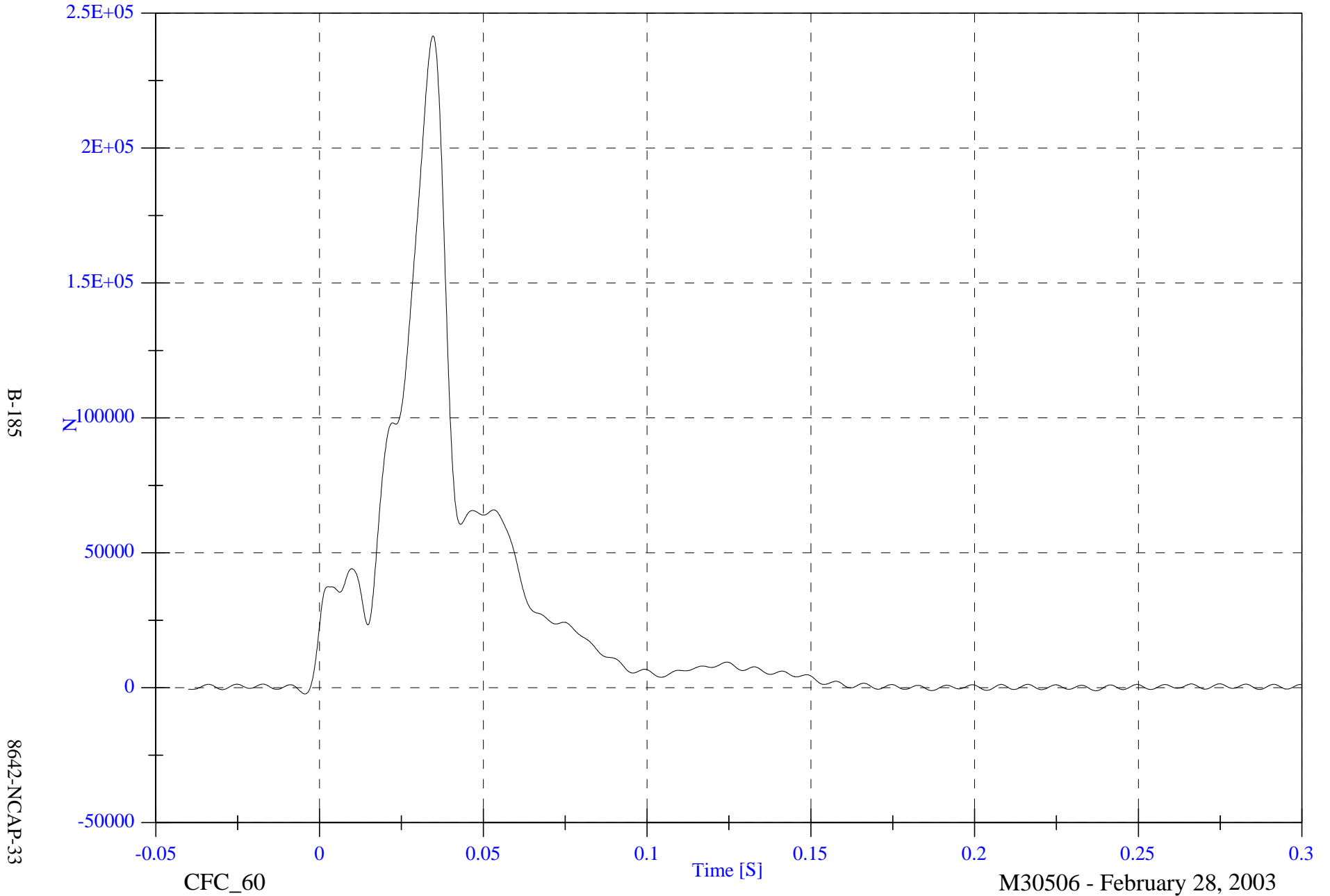
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

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

Max: 241574.5 [N] at 0.035 [S]

Min: -2276.1 [N] at -0.004 [S]



B-185

8642-NCAP-33

CFC\_60

Time [S]

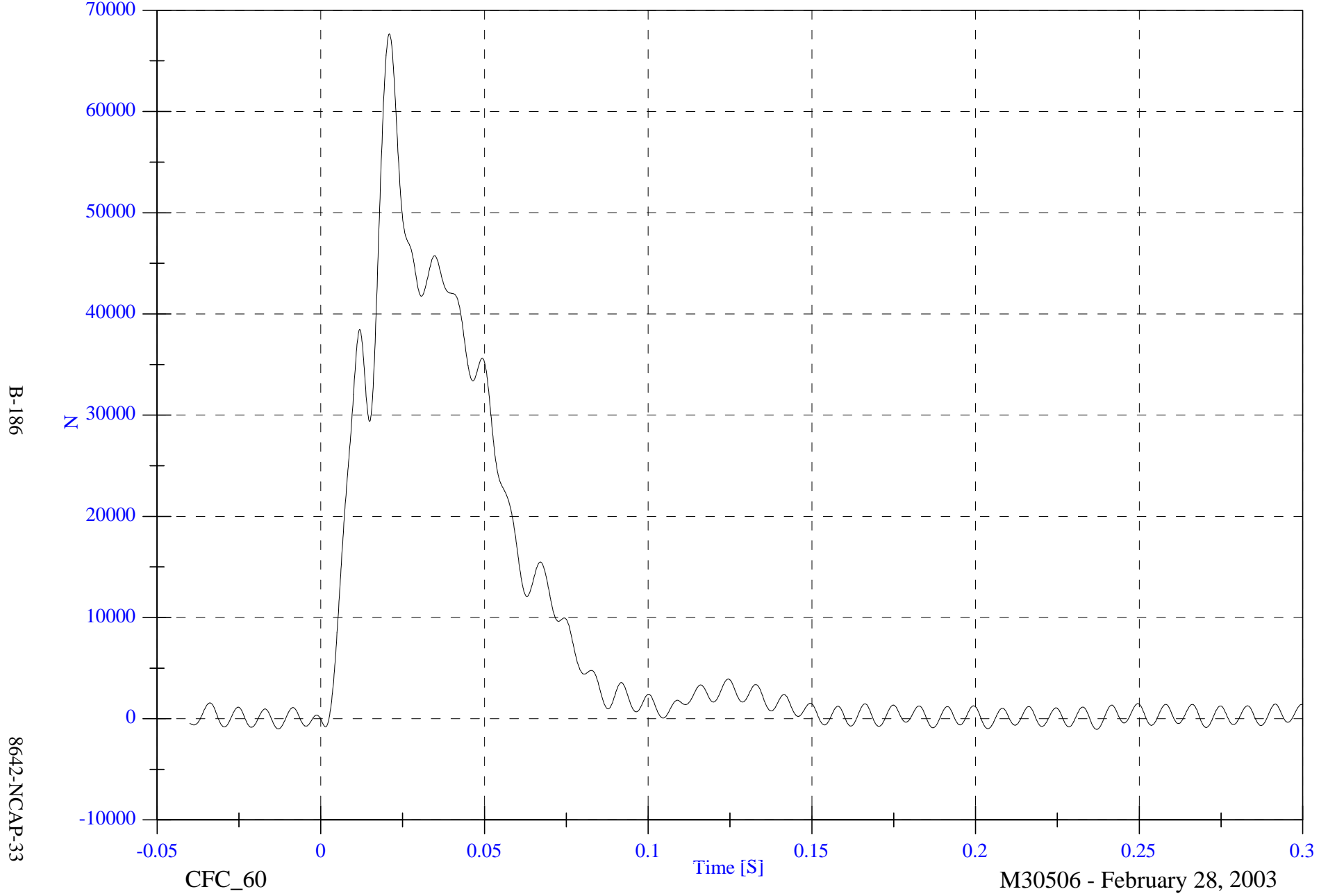
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

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

Max: 67679.5 [N] at 0.021 [S]

Min: -1055.9 [N] at 0.237 [S]



B-186

8642-NCAP-33

CFC\_60

Time [S]

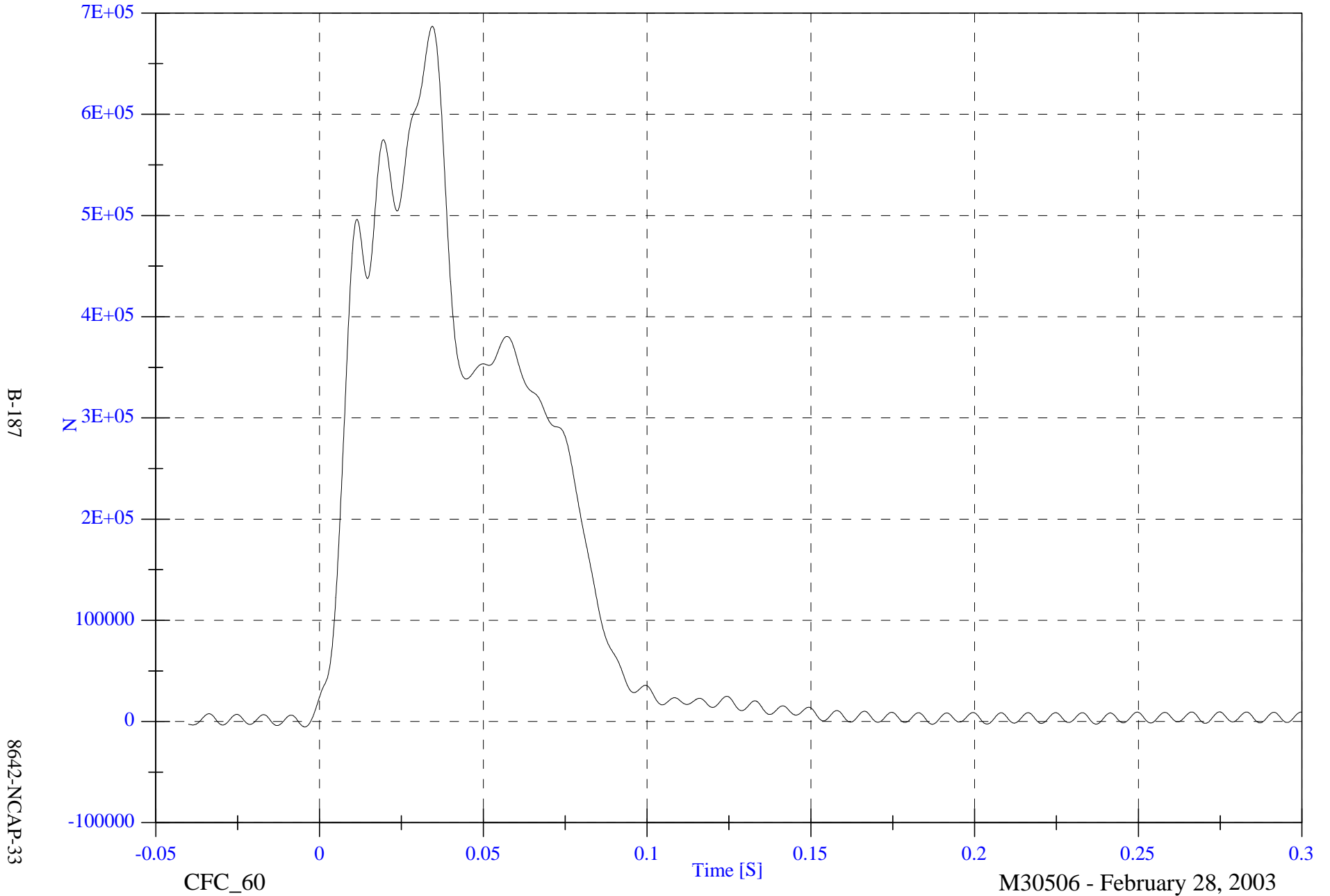
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 686969.1 [N] at 0.034 [S]

Total Load Cell Sum (All 6 Groups)

Min: -5329.5 [N] at -0.005 [S]



B-187

8642-NCAP-33

CFC\_60

Time [S]

M30506 - February 28, 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:

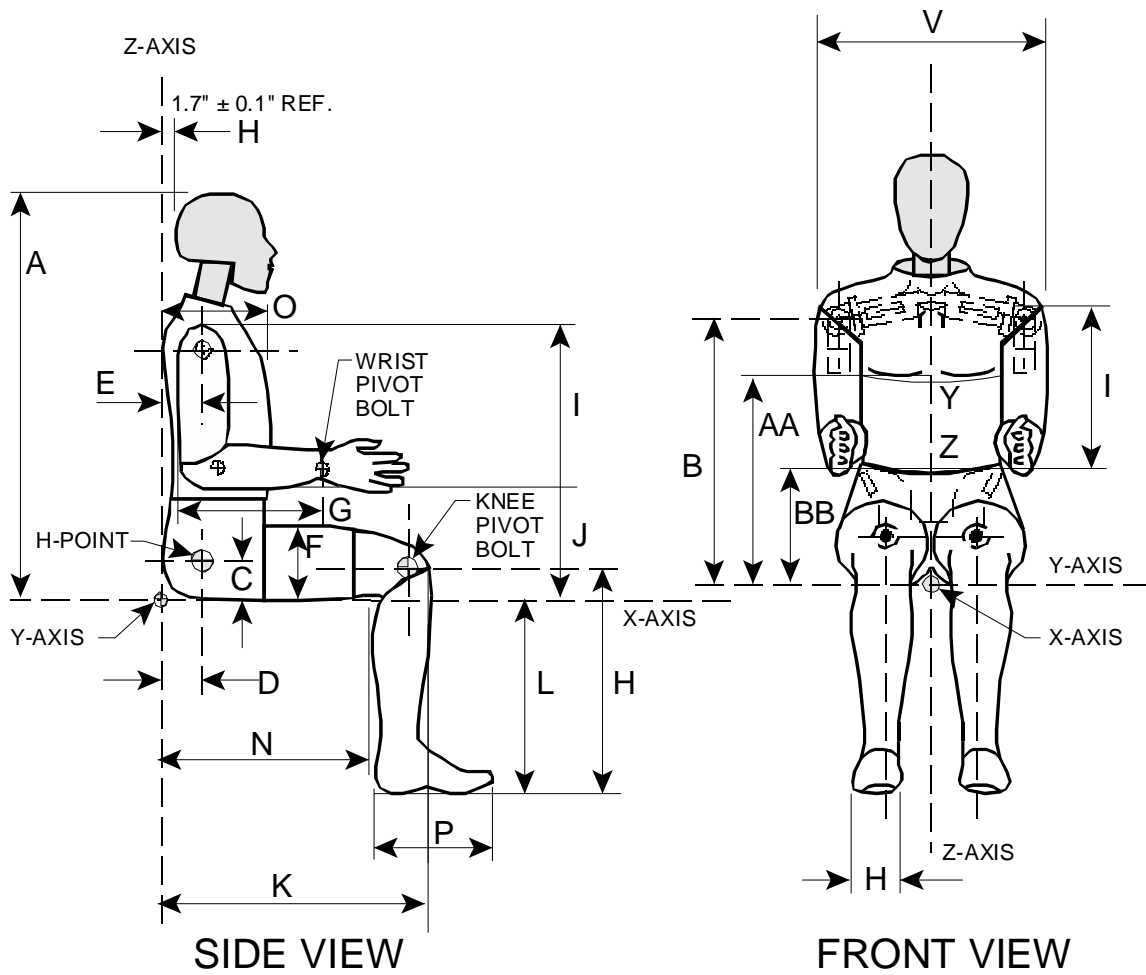
<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	061	February 14, 2003
#2/Right Front Passenger	064	February 14, 2003

#### 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 Indicant 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

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

---

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  
KNEE IMPACT TEST

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

TEST PARAMETER	SPECIFICATION	TEST RESULTS
<b>LEFT KNEE</b>		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	38.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1234.58
<b>RIGHT KNEE</b>		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	38.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1200.90

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

---

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 Condyle	Max	65 - 80 Ft-Lbs	66.77
	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
	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	13.73
Deceleration - Time Curve Decay Time to 5 G's	38 - 46 ms	39.80
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	155.90
Positive Moment - Time Curve Decay Time to Zero	120 - 148 ms	136.00

Remarks:

Laboratory Technician:

B. Swiecicki

---

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  
KNEE IMPACT TEST

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

TEST PARAMETER	SPECIFICATION	TEST RESULTS
<b>LEFT KNEE</b>		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	38.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1183.07
<b>RIGHT KNEE</b>		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	38.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1179.97

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

---

## **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	09/20/02	03/21/03
	X Arm Z	ENTRAN	AC-00L13-F39	09/20/02	03/21/03
	Y Arm X	ENTRAN	AC-00L13-F14	09/21/02	03/22/03
	Y Arm Z	ENTRAN	AC-01G18-F16	09/21/02	03/22/03
	Z Arm X	ENTRAN	AC-00L13-F72	09/21/02	03/22/03
	Z Arm Y	ENTRAN	AC-01G18-F12	09/21/02	03/22/03
Head	X	ENTRAN	AC-00L13-F04	09/21/02	03/22/03
	Y	ENTRAN	AC-01G18-F15	09/21/02	03/22/03
	Z	ENTRAN	AC-01G18-F14	09/21/02	03/22/03
Head	X (R)	ENDEVCO	AC-P23873	10/10/02	04/10/03
	Y (R)	ENTRAN	AC-01G18-F05	09/21/02	03/22/03
	Z (R)	ENDEVCO	AC-J14668	09/21/02	03/22/03
Neck Load Cell	X	DENTON	LC-205FX	10/15/02	04/15/03
	Y	DENTON	LC-205FY	10/15/02	04/15/03
	Z	DENTON	LC-205FZ	10/15/02	04/15/03
Neck Moment	X	DENTON	LC-205MX	10/15/02	04/15/03
	Y	DENTON	LC-205MY	10/15/02	04/15/03
	Z	DENTON	LC-205MZ	10/15/02	04/15/03
Chest	X	ENDEVCO	AC-P21373	09/20/02	03/21/03
	Y	ENDEVCO	AC-P22639	09/20/02	03/21/03
	Z	ENDEVCO	AC-P21297	09/20/02	03/21/03
Chest	X (R)	ENDEVCO	AC-P21171	09/20/02	03/21/03
	Y (R)	ENDEVCO	AC-P23136	09/20/02	03/21/03
	Z (R)	ENDEVCO	AC-P23128	09/20/02	03/21/03
Chest Deflection	X	SERVO	DS-061	09/23/02	03/24/03
Pelvic	X	ENDEVCO	AC-P21441	09/20/02	03/21/03
	Y	ENDEVCO	AC-P19246	09/20/02	03/21/03
	Z	ENDEVCO	AC-P21516	09/20/02	03/21/03

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	09/25/02	03/26/03
Right Femur Load Cell	Fz	GSE	LC-723	09/25/02	03/26/03
Left Upper Tibia	Mx	DENTON	LC-016MX	10/25/02	04/25/03
	My	DENTON	LC-016MY	10/25/02	04/25/03
Left Lower Tibia	Fz	DENTON	LC-123FZ	10/25/02	04/25/03
	Mx	DENTON	LC-123MX	10/25/02	04/25/03
	My	DENTON	LC-123MY	10/25/02	04/25/03
Right Upper Tibia	Mx	DENTON	LC-023MX	10/25/02	04/25/03
	My	DENTON	LC-023MY	10/25/02	04/25/03
Right Lower Tibia	Fz	DENTON	LC-111FZ	10/25/02	04/25/03
	Mx	DENTON	LC-111MX	10/25/02	04/25/03
	My	DENTON	LC-111MY	10/25/02	04/25/03
Left Foot Rear	X	ENDEVCO	AC-P19343	09/20/02	03/21/03
	Z	ENDEVCO	AC-P16583	09/20/02	03/21/03
Left Foot Front	Z	ENDEVCO	AC-P18525	09/20/02	03/21/03
Right Foot Rear	X	ENDEVCO	AC-P18628	09/20/02	03/21/03
	Z	ENDEVCO	AC-P18741	09/20/02	03/21/03
Right Foot Front	Z	ENDEVCO	AC-P23276	09/20/02	03/21/03
Lap Belt Load Cell		LEBOW	LC-706	11/12/02	05/13/03
Shoulder Belt Load Cell		LEBOW	LC-712	11/12/02	05/13/03
Belt Stretch Transducer		-	-	-	-

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	09/23/02	03/24/03
	X Arm Z	ENTRAN	AC-00L20-A13	09/23/02	03/24/03
	Y Arm X	ENTRAN	AC-00L20-A08	09/23/02	03/24/03
	Y Arm Z	ENTRAN	AC-01G18-F13	09/23/02	03/24/03
	Z Arm X	ENTRAN	AC-01J02-F18	09/23/02	03/24/03
	Z Arm Y	ENTRAN	AC-01G25-N11	09/23/02	03/24/03
Head	X	ENDEVCO	AC-J32184	09/27/02	03/28/03
	Y	ENDEVCO	AC-J32185	09/27/02	03/28/03
	Z	ENDEVCO	AC-J31011	09/27/02	03/28/03
Head	X (R)	ENDEVCO	AC-J31020	09/27/02	03/28/03
	Y (R)	ENDEVCO	AC-J31101	09/27/02	03/28/03
	Z (R)	ENDEVCO	AC-J31059	09/27/02	03/28/03
Neck Load Cell	X	DENTON	LC-440FX	10/15/02	04/15/03
	Y	DENTON	LC-440FY	10/15/02	04/15/03
	Z	DENTON	LC-440FZ	10/15/02	04/15/03
Neck Moment	X	DENTON	LC-440MX	10/15/02	04/15/03
	Y	DENTON	LC-440MY	10/15/02	04/15/03
	Z	DENTON	LC-440MZ	10/15/02	04/15/03
Chest	X	ENDEVCO	AC-J34019	09/28/02	03/29/03
	Y	ENDEVCO	AC-J33018	09/27/02	03/28/03
	Z	ENDEVCO	AC-J32783	09/28/02	03/29/03
Chest	X (R)	ENDEVCO	AC-J31066	09/28/02	03/29/03
	Y (R)	ENDEVCO	AC-P16979	09/27/02	03/28/03
	Z (R)	ENDEVCO	AC-J31022	09/28/02	03/29/03
Chest Deflection	X	SERVO	DS-064	09/23/02	03/24/03
Pelvic	X	ENDEVCO	AC-P23174	09/23/02	03/24/03
	Y	ENDEVCO	AC-P23164	09/23/02	03/24/03
	Z	ENDEVCO	AC-P23137	09/23/02	03/24/03

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	09/25/02	03/26/03
Right Femur Load Cell	Fz	GSE	LC-955	09/25/02	03/26/03
Left Upper Tibia	Mx	DENTON	LC-045MX	10/24/02	04/24/03
	My	DENTON	LC-045MY	10/24/02	04/24/03
Left Lower Tibia	Fz	DENTON	LC-125FZ	10/24/02	04/24/03
	Mx	DENTON	LC-125MX	10/24/02	04/24/03
	My	DENTON	LC-125MY	10/24/02	04/24/03
Right Upper Tibia	Mx	DENTON	LC-038MX	10/24/02	04/24/03
	My	DENTON	LC-038MY	10/24/02	04/24/03
Right Lower Tibia	Fz	DENTON	LC-124FZ	10/24/02	04/24/03
	Mx	DENTON	LC-124MX	10/24/02	04/24/03
	My	DENTON	LC-124MY	10/24/02	04/24/03
Left Foot Rear	X	ENDEVCO	AC-J30491	09/23/02	03/24/03
	Z	ENDEVCO	AC-J31026	09/23/02	03/24/03
Left Foot Front	Z	ENDEVCO	AC-J32831	09/23/02	03/24/03
Right Foot Rear	X	ENDEVCO	AC-J33376	09/23/02	03/24/03
	Z	ENDEVCO	AC-J32832	09/23/02	03/24/03
Right Foot Front	Z	ENDEVCO	AC-J31095	09/23/02	03/24/03
Lap Belt Load Cell		LEBOW	LC-707	11/12/02	05/13/03
Shoulder Belt Load Cell		LEBOW	LC-711	11/12/02	05/13/03
Belt Stretch Transducer		-	-	-	-

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS  
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ICS	AC-8062-003	11/11/02	05/12/03
Right Rear Seat Crossmember X	ICS	AC-8084-020	11/20/02	05/21/03
Top of Engine	ICS	AC-8084-022	11/20/02	05/21/03
Bottom of Engine	ICS	AC-8084-024	11/11/02	05/12/03
Right Disc Brake Caliper	ICS	AC-8084-018	11/11/02	05/12/03
Instrument Panel	ICS	AC-6917-020	11/20/02	05/21/03
Left Disc Brake Caliper	ICS	AC-8083-037	11/21/02	05/22/03
Left Seat Rear Crossmember Z	ICS	AC-8083-028	11/11/02	05/12/03
Right Seat Rear Crossmember Z	ICS	AC-6917-012	11/11/02	05/12/03

REPORT NUMBER: CAL-03-11

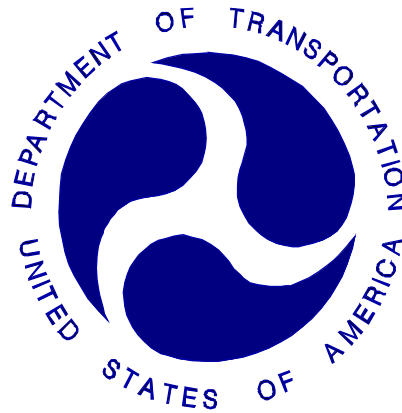
**NEW CAR ASSESSMENT PROGRAM (NCAP)  
FRONTAL BARRIER IMPACT TEST**

EVENFLO VANGUARD 5 COMFORT TOUCH  
FORWARD FACING CONVERTIBLE  
SECURED WITH THE LATCH SYSTEM AND THE TOP TETHER  
AND  
EVENFLO VANGUARD COMFORT TOUCH  
FORWARD FACING CONVERTIBLE (WITH OVERHEAD SHIELD)  
SECURED WITH THE LATCH SYSTEM AND THE TOP TETHER

NHTSA NUMBER: M30506

VERIDIAN ENGINEERING REPORT NUMBER: 8642-NCAP-33

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



February 28, 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

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

Prepared By:

\_\_\_\_\_  
Lawrence Q. Valvo, 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**

1. Report No. CAL-03-11		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of Evenflo Vanguard Comfort Touch Forward Facing Convertible CRSs (5-Point Belt and Overhead Shield Models) NHTSA No.: M30506				5. Report Date February 28, 2003	
				6. Performing Organization Code CAL	
7. Author(s) Lawrence Q. Valvo, Project Engineer David J. Travale, Program Manager				8. Performing Organization Report No. 8642-NCAP-33	
9. Performing Organization Name and Address Veridian Engineering Transportation Sciences Center P.O. Box 400 Buffalo, New York 14225				10. Work Unit No.	
				11. Contract or Grant No. DTNH22-01-D-32005	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NVS-111 400 Seventh SW, Room 5313 Washington, D.C. 20590				13. Type of Report and Period Covered Final Report February 2003 – March 2003	
				14. Sponsoring Agency Code NVS-111	
15. Supplementary Notes					
16. Abstract This CRS test was performed in conjunction with a New Car Assessment Program (NCAP) load cell barrier test. An Evenflo Vanguard 5 Comfort Touch forward facing convertible CRS was secured in Position 3 (P3) with the LATCH system and top tether. An Evenflo Vanguard Comfort Touch forward facing convertible CRS (with overhead shield) was secured in Position 4 (P4) with the LATCH system and top tether. This test was conducted at the Veridian Engineering Crash Test Facility in Buffalo, New York, on February 28, 2003.					
<b>ATD Position</b>		<b>HIC 15</b>		<b>HIC 36</b>	
<b>P3 (Right Rear) (044)</b>		560.4		995.3	
<b>P4 (Left Rear) (142)</b>		340.5		708.7	
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	
19. Security Classification of Report UNCLASSIFIED		20. Security Classification of Page UNCLASSIFIED		21. No. of Pages 153	
22. Price					

## TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	PURPOSE AND SUMMARY OF NCAP TEST	1-1
2	DATA SHEETS	2-1
	Data Sheet 1 – Crash Test Summary	2-1
	Data Sheet 2 – CRS Parameter Data	2-2
	Data Sheet 3 – CRS Dummy Positioning in Vehicle	2-3
	Data Sheet 4 – CRS Dummy Injury Criteria Values	2-4
	Data Sheet 5 – CRS Performance Data	2-7
	Data Sheet 6 – CRS Camera Data	2-9
3	PHOTOGRAPHS	3-1
4	CHILD DUMMY RESPONSE AND CRS DATA TRACES	4-1
5	CHILD DUMMY CALIBRATION INFORMATION	5-1
6	TEST EQUIPMENT LIST AND CALIBRATION INFORMATION	6-1

## SECTION 1

### PURPOSE AND SUMMARY OF TEST M30506

The purpose of this test was to obtain CRS performance data in a frontal impact NCAP condition. The 56.65 kph NCAP frontal impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

#### SUMMARY

A forward facing convertible 5-point belt CRS and a 3 year old child dummy (serial no. 044) was secured in the right rear occupant position (Position 3 or P3). A forward facing convertible overhead shield CRS and a 3 year old child dummy (serial no. 142) was secured in the left rear occupant position (Position 4 or P4). Both 3 Year Old Hybrid III (P572 P) child dummies were instrumented with head, chest, and pelvic triaxial accelerometers, a chest displacement sensor, and upper/lower six axial neck load cells. In addition, Position 4 was equipped with a head rear Z-direction accelerometer. The dummies were calibrated previous to this test and the certification information is found in section 5.

The right rear child dummy's HIC was 560.4, maximum chest deceleration over 3 ms was 54.9 g's. The left rear child dummy's HIC was 340.5, maximum chest deceleration over 3 ms was 47.2 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 3C /142
Restraint System:	Evenflo Vanguard 5 Comfort Touch forward facing convertible secured with LATCH and top tether.	Evenflo Vanguard Comfort Touch forward facing convertible (with overhead shield) secured with LATCH and top tether.

Number of Data Channels \_\_\_\_\_ 53  
Number of Cameras: \_\_\_\_\_ 1 \_\_\_\_\_ Real Time  
\_\_\_\_\_ 2 \_\_\_\_\_ High Speed

POST TEST DOOR OPENING

DESCRIPTION	FRONT	REAR
Left Side Doors	Door remained closed and latched, door opened without tools	Door remained closed and latched, door opened without tools
Right Side Doors	Door remained closed and latched, door opened without tools	Door remained closed and latched, door opened without tools
Hatch/Other Door	-	Hatch remained closed and latched, door opened without tools

POST TEST SEAT DATA

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

VISIBLE DUMMY CONTACT POINTS

	Position #3 CRS	Position #4 CRS
Head Contact:	Chin to chest; Back of the head to CRS seat back	Face to center of shield; Back of the head to CRS seat back
Upper Torso Contact:	None	None
Lower Torso Contact:	None	None
Left Knee Contact:	Left foot to P2 seat back	Left foot to P1 seat back
Right Knee Contact:	Right foot to P2 seat back	Right foot to P1 seat back

**DATA SHEET NO. 2**

**CRS PARAMETER DATA**

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30506

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Delivered Weight of Vehicle with Maximum Fluids = 1821.5 kg (A)

AS TESTED WEIGHT OF VEHICLE

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

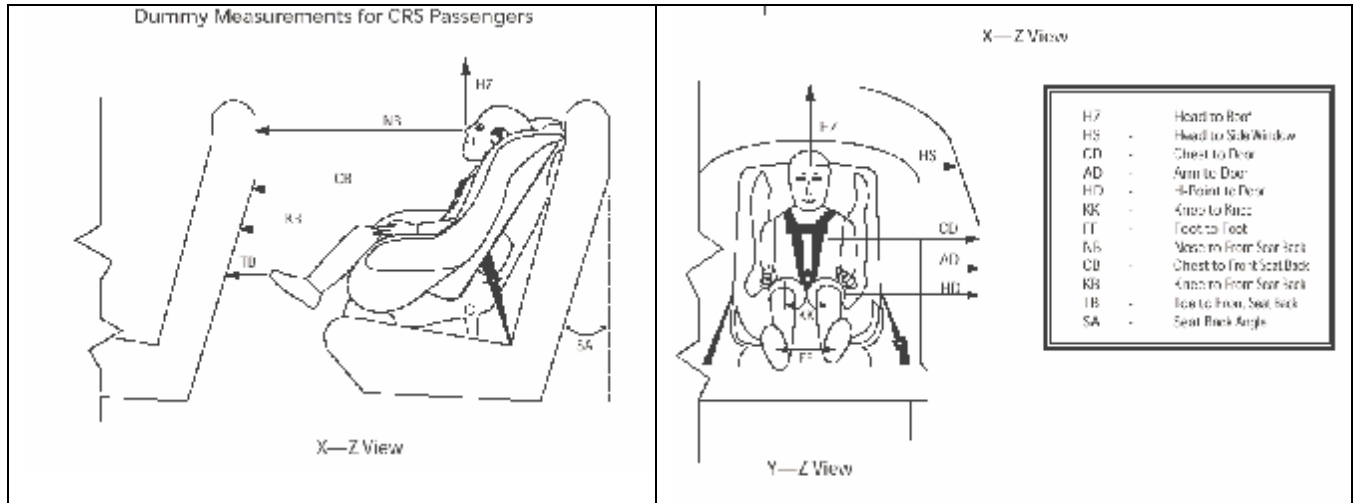
Left Front	=	<u>518.0</u>	kg	Left Rear	=	<u>530.0</u>	kg
Right Front	=	<u>534.5</u>	kg	Right Rear	=	<u>520.0</u>	kg
TOTAL FRONT	=	<u>518.0</u>	kg	TOTAL REAR	=	<u>530.0</u>	kg
TOTAL TEST WEIGHT	=	<u>1054.5</u>	kg				

### DATA SHEET NO. 3

### CHILD DUMMY POSITIONING IN VEHICLE

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30506



Measurement	Pre-Test (mm)		Post Test (mm)	
	P3 CRS (044)	P4 CRS (142)	P3 CRS (044)	P4 CRS (142)
SA	25.4	254	23.3	23.3
HS	375	398	365	389
CD	344	365	345	404
AD	203	225	203	202
HD	250	254	251	248
HZ	380	370	399	407
NB	657	670	673	659
CB	630	618	663	608
KK	185	175	189	205
FF	207	220	232	234
KB – LEFT	449	452	440	360
KB – RIGHT	455	446	434	349
TB – LEFT	144	125	153	158
TB – RIGHT	138	123	131	137

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 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30506

DESCRIPTION	Unit	MAXIMUM VALUE							
		Position #3				Position #4			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head X	g	64.3	203.9	-42.6	102.7	50.5	204.8	-46.7	105.1
Head Y	g	4.7	102.6	-5.9	203.5	5.7	203.2	-4.1	62.6
Head Z	g	65.9	83.3	-13.7	43.5	52.8	81.5	-14.6	43.5
Head Resultant	g	71.8	204.0	-	-	58.4	204.9	-	-
Head Rear Z	g	-	-	-	-	68.0	86.1	-26.8	43.6
Upper Neck Fx	N	4.4	-1.8	-1065.3	100.8	3.1	-15.2	-861.5	97.7
Upper Neck Fy	N	73.4	85.1	-46.2	234.0	49.4	266.0	-49.9	66.0
Upper Neck Fz	N	2084.7	91.4	-379.5	43.9	1648.6	91.4	-421.1	43.8
Upper Neck F Resultant	N	2254.6	92.0	-	-	1796.2	91.4	-	-
Upper Neck Mx	N-m	4.6	53.8	-3.8	213.7	4.7	271.4	-2.2	72.4
Upper Neck My	N-m	5.3	137.8	-19.3	101.8	7.5	298.9	-15.0	213.5
Upper Neck Mz	N-m	4.3	269.8	-1.6	188.9	1.8	76.3	-2.0	262.6
Upper Neck M Resultant	N-m	19.4	101.8	-	-	15.0	213.5	-	-
Lower Neck Fx	N	147.8	194.0	-1176.8	95.9	143.7	202.9	-763.2	95.5
Lower Neck Fy	N	61.0	44.9	-208.8	106.0	90.0	100.0	-36.0	275.8
Lower Neck Fz	N	1338.0	78.3	-452.9	44.1	1128.6	82.0	-566.7	44.0
Lower Neck F Resultant	N	1553.4	83.3	-	-	1238.5	82.0	-	-
Lower Neck Mx	N-m	12.0	87.9	-6.8	109.2	6.4	266.9	-8.0	70.3
Lower Neck My	N-m	131.6	98.7	-12.1	197.2	112.6	98.4	-9.8	202.6
Lower Neck Mz	N-m	4.1	79.2	-4.5	112.5	1.6	139.9	-3.1	59.6
Lower Neck M Resultant	N-m	131.7	98.6	-	-	112.6	98.4	-	-
Chest X	g	11.1	236.2	-45.8	73.2	9.3	235.3	-34.0	57.4
Chest Y	g	7.8	75.3	-2.6	46.4	2.9	71.9	-3.7	94.1
Chest Z	g	16.4	90.9	-32.0	71.9	16.5	207.9	-35.2	61.6
Chest Resultant	g	56.1	72.8	-	-	47.9	60.9	-	-
Chest Displacement	g	0.0	26.4	-25.5	105.3	0.2	25.2	-16.2	62.5

**DATA SHEET 4**

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

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30506

DESCRIPTION	Unit	MAXIMUM VALUE							
		Position #3				Position #4			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
<b>Pelvic X</b>	<b>g</b>	13.3	136.0	-54.6	66.4	7.0	110.0	-51.8	60.2
<b>Pelvic Y</b>	<b>g</b>	11.2	68.5	-6.4	90.6	3.0	281.8	-22.3	34.7
<b>Pelvic Z</b>	<b>g</b>	10.5	206.3	-37.3	40.1	15.3	208.1	-38.1	61.5
<b>Pelvic Resultant</b>	<b>g</b>	62.3	66.4	-	-	64.2	61.2	-	-
<b>Tether Belt Load</b>	<b>N</b>	2279.3	66.5	-106.4	290.8	2095.2	65.1	-145.3	245.8

**DATA SHEET 4**

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

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30506

	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	560.4	75.4	90.4	67.4	995.3	69.6	105.6	59.8
Position #4 - Left	340.5	76.9	91.9	55.3	708.7	72.3	108.3	52.2

	CLIP SUMMARY*			
	CLIP (g's)	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	CSI
Position #3 - Right	54.9	71.3	74.3	516.1
Position #4 - Left	47.2	59.2	62.2	392.2

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

**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	0.18	140.8	270.5	-14.5	4.4
Nte	1.44	99.7	1902.4	-1062.1	-18.7
Ncf	0.01	-0.8	-14.1	4.1	0.0
Nce	0.60	215.6	-85.3	-289.9	-16.7

**Peak Tension (CFC1000) 2084.7 N**

**Peak Compression (CFC1000) -379.5 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 3 year old – In Position)**

Nij V10	Nij	Time (ms)	Z Force (N)	X Force (N)	Y Moment (N-m)
Ntf	0.64	85.0	1457.4	-562.7	1.5
Nte	0.84	103.6	1373.8	-836.2	-7.7
Ncf	0.12	298.4	-17.6	-47.4	7.5
Nce	0.59	233.9	-383.4	-273.7	-12.2

**Peak Tension (CFC1000) 1648.6 N**

**Peak Compression (CFC1000) -421.1 N**

**Critical Values**

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

**DATA SHEET NO. 5**

**CRS PERFORMANCE DATA**

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30506

		MAXIMUM VALUE			
DESCRIPTION	Unit	Positive	Time (ms)	Negative	Time (ms)
P3 CRS X	g	19.1	131.8	-47.3	59.6
P3 CRS Y	g	7.2	134.3	-6.6	52.4
P3 CRS Z	g	22.8	128.3	-24.1	75.6
P3 CRS Resultant	g	47.8	59.4	-	-
P4 CRS X	g	†	-	†	-
P4 CRS Y	g	4.8	272.9	-7.3	36.1
P4 CRS Z	g	16.8	25.8	-20.6	80.9
P4 CRS Resultant	g	†	-	-	-

P4 CRS Ax channel opened after 36 ms, data after this time is invalid.

**DATA SHEET NO. 5**

**CRS PERFORMANCE DATA (CONTINUED)**

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30506

**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. 3681261 P1)**

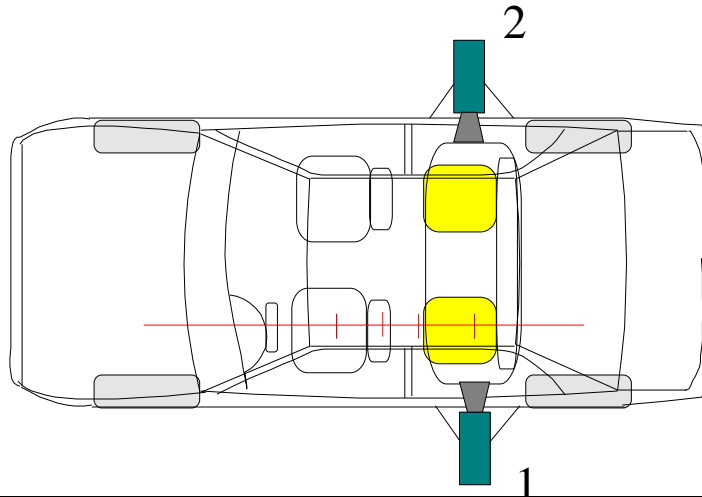
<b>LOCATION</b>	<b>DAMAGE</b>	<b>REMARKS</b>
Upper Tether Strap	No	None
Upper Tether Buckle	No	None
Upper Tether Hook	No	None
Vehicle Upper Tether Anchor	No	None
Lower Anchor Strap	No	None
Lower Anchor Buckle	No	None
Lower Anchor Hooks	No	None
Vehicle Lower CRS Anchors	No	None
Harness Connections	No	None
Overhead Shield	No	The P4 CRS adjustable shield slid to its forward-most adjustment position during the event (a total displacement of 42 mm from its original position). The adjustable shield was verified locked prior to the test.
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 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30506



Camera No.	View	Coordinates (millimeters)			Angle** (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Left side CRS lateral view	3390	2920	2550	-21	25	1030
2	Right side CRS lateral view	3410	2455	2466	-24	25	1035

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

\*\* = referenced to horizontal plane

- X = film plane to monorail centerline
- Y = film plane to impact location
- Z = film plane to ground

**SECTION 3**

**PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

<u>Figure</u>	<u>Photograph Title</u>	<u>Page</u>
Figure 3- 1	CLOSE-UP VIEW OF POSITION 3 CRS LABEL	3- 3
Figure 3- 2	PRE-TEST FRONTAL VIEW OF POSITION 3 CRS	3- 4
Figure 3- 3	POST-TEST FRONTAL VIEW OF POSITION 3 CRS	3- 5
Figure 3- 4	PRE-TEST REAR VIEW OF POSITION 3 CRS	3- 6
Figure 3- 5	POST-TEST REAR VIEW OF POSITION 3 CRS	3- 7
Figure 3- 6	PRE-TEST LEFT SIDE VIEW OF POSITION 3 CRS	3- 8
Figure 3- 7	POST-TEST LEFT SIDE VIEW OF POSITION 3 CRS	3- 9
Figure 3- 8	PRE-TEST RIGHT SIDE VIEW OF POSITION 3 CRS	3- 10
Figure 3- 9	POST-TEST RIGHT SIDE VIEW OF POSITION 3 CRS	3- 11
Figure 3- 10	CLOSE-UP VIEW OF POSITION 4 CRS LABEL	3- 12
Figure 3- 11	PRE-TEST FRONTAL VIEW OF POSITION 4 CRS	3- 13
Figure 3- 12	POST-TEST FRONTAL VIEW OF POSITION 4 CRS	3- 14
Figure 3- 13	PRE-TEST REAR VIEW OF POSITION 4 CRS	3- 15
Figure 3- 14	POST-TEST REAR VIEW OF POSITION 4 CRS	3- 16
Figure 3- 15	PRE-TEST LEFT SIDE VIEW OF POSITION 4 CRS	3- 17
Figure 3- 16	POST-TEST LEFT SIDE VIEW OF POSITION 4 CRS	3- 18
Figure 3- 17	PRE-TEST RIGHT SIDE VIEW OF POSITION 4 CRS	3- 19
Figure 3- 18	POST-TEST RIGHT SIDE VIEW OF POSITION 4 CRS	3- 20
Figure 3- 19	PRE-TEST POSITION 3 LEFT SIDE VIEW	3- 21
Figure 3- 20	POST-TEST POSITION 3 LEFT SIDE VIEW	3- 22
Figure 3- 21	PRE-TEST POSITION 4 LEFT SIDE VIEW	3- 23
Figure 3- 22	POST-TEST POSITION 4 LEFT SIDE VIEW	3- 24
Figure 3- 23	PRE-TEST POSITION 3 RIGHT SIDE VIEW	3- 25
Figure 3- 24	POST-TEST POSITION 3 RIGHT SIDE VIEW	3- 26
Figure 3- 25	PRE-TEST POSITION 4 RIGHT SIDE VIEW	3- 27
Figure 3- 26	POST-TEST POSITION 4 RIGHT SIDE VIEW	3- 28
Figure 3- 27	PRE-TEST POSITION 3 FRONT VIEW	3- 29
Figure 3- 28	POST-TEST POSITION 3 FRONT VIEW	3- 30
Figure 3- 29	PRE-TEST POSITION 4 FRONT VIEW	3- 31
Figure 3- 30	POST-TEST POSITION 4 FRONT VIEW	3- 32

THIS PRODUCT AFTER

Manufactured in 22NOV02  
Model # 3691261 P1

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



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



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



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



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



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



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



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



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

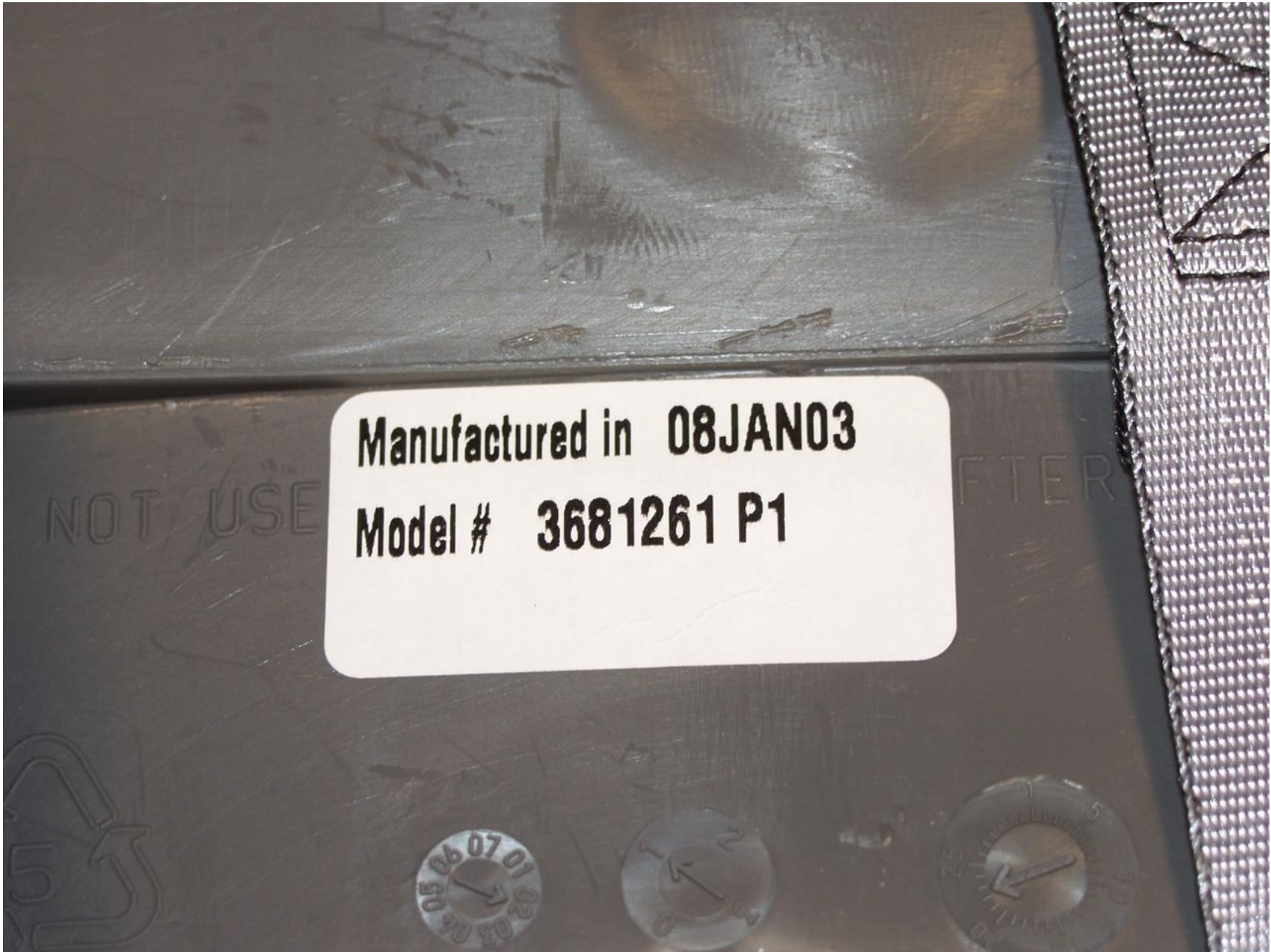


Figure 3-10: CLOSE-UP VIEW OF POSITION 4 CRS LABEL



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



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



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

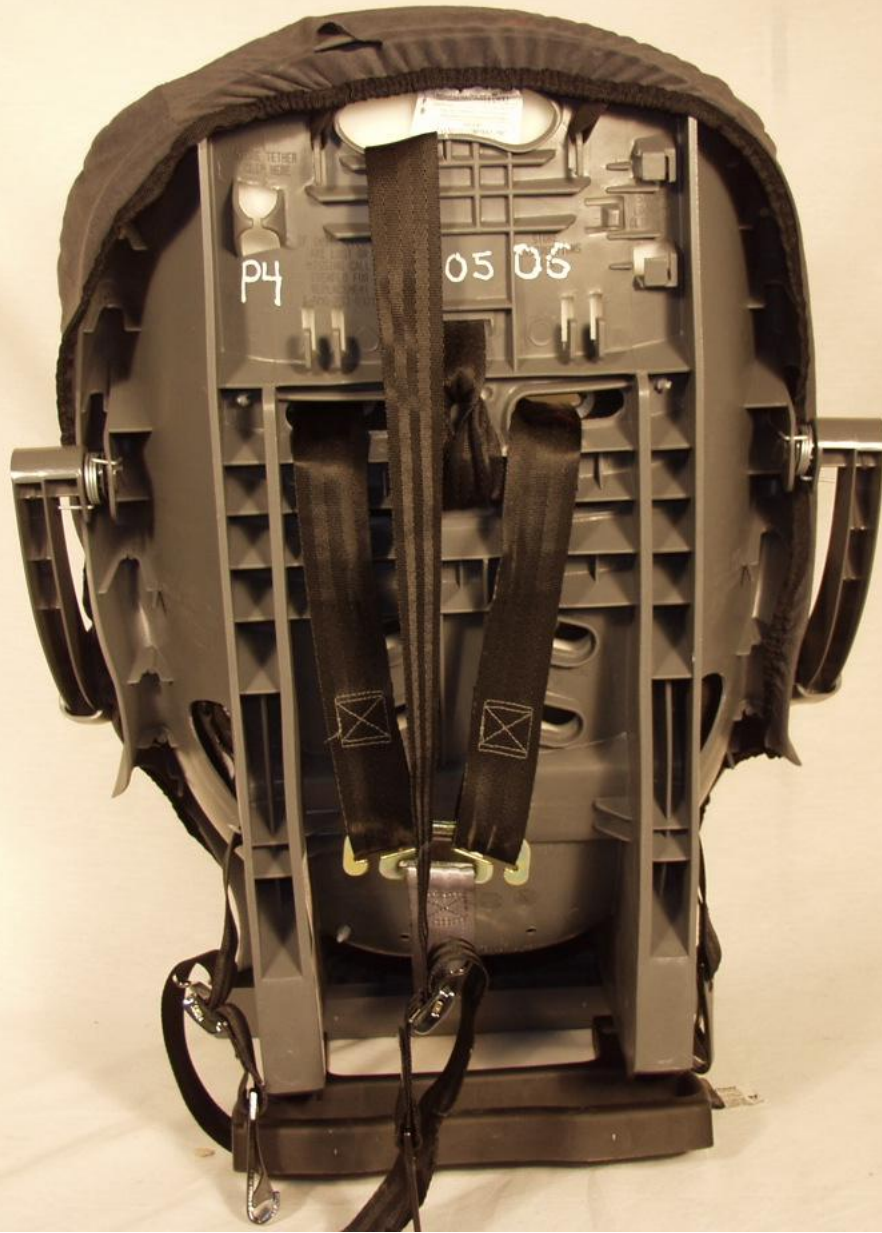


Figure 3-14: POST-TEST REAR VIEW OF POSITION 4 CRS



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



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



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



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



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



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



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



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



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



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



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



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



Figure 3-27: PRE-TEST POSITION 3 FRONT VIEW



Figure 3-28: POST-TEST POSITION 3 FRONT VIEW



Figure 3-29: PRE-TEST POSITION 4 FRONT VIEW



Figure 3-30: POST-TEST POSITION 4 FRONT VIEW

## **SECTION 4**

### **CHILD DUMMY RESPONSE AND CRS DATA TRACES**

## TABLE OF DATA PLOTS

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
1	V1P3 Head x [g, CFC_1000]	4-4
2	V1P3 Head y [g, CFC_1000]	4-5
3	V1P3 Head z [g, CFC_1000]	4-6
4	V1P3 Head Resultant [g, CFC_1000]	4-7
5	V1P3 Upper Neck Fx [N, CFC_1000]	4-8
6	V1P3 Upper Neck Fy [N, CFC_1000]	4-9
7	V1P3 Upper Neck Fz [N, CFC_1000]	4-10
8	V1P3 Upper Neck F Resultant [N, CFC_1000]	4-11
9	V1P3 Upper Neck Mx [N-m, CFC_600]	4-12
10	V1P3 Upper Neck My [N-m, CFC_600]	4-13
11	V1P3 Upper Neck Mz [N-m, CFC_600]	4-14
12	V1P3 Upper Neck M Resultant [N-m, CFC_600]	4-15
13	V1P3 Lower Neck Fx [N, CFC_1000]	4-16
14	V1P3 Lower Neck Fy [N, CFC_1000]	4-17
15	V1P3 Lower Neck Fz [N, CFC_1000]	4-18
16	V1P3 Lower Neck F Resultant [N, CFC_1000]	4-19
17	V1P3 Lower Neck Mx [N-m, CFC_600]	4-20
18	V1P3 Lower Neck My [N-m, CFC_600]	4-21
19	V1P3 Lower Neck Mz [N-m, CFC_600]	4-22
20	V1P3 Lower Neck M Resultant [N-m, CFC_600]	4-23
21	V1P3 Chest x [g, CFC_180]	4-24
22	V1P3 Chest y [g, CFC_180]	4-25
23	V1P3 Chest z [g, CFC_180]	4-26
24	V1P3 Chest Resultant [g, CFC_180]	4-27
25	V1P3 Chest Compression [mm, CFC_600]	4-28
26	V1P3 Pelvic x [g, CFC_1000]	4-29
27	V1P3 Pelvic y [g, CFC_1000]	4-30
28	V1P3 Pelvic z [g, CFC_1000]	4-31
29	V1P3 Pelvic Resultant [g, CFC_1000]	4-32
30	V1P3 Top Tether Load [N, CFC_60]	4-33
31	V1P3 CRS x [g, CFC_60]	4-34
32	V1P3 CRS x Velocity [kph, CFC_180]	4-35
33	V1P3 CRS x Displacement [mm, CFC_180]	4-36
34	V1P3 CRS y [g, CFC_60]	4-37
35	V1P3 CRS y Velocity [kph, CFC_180]	4-38
36	V1P3 CRS y Displacement [mm, CFC_180]	4-39
37	V1P3 CRS z [g, CFC_60]	4-40
38	V1P3 CRS z Velocity [kph, CFC_180]	4-41
39	V1P3 CRS z Displacement [mm, CFC_180]	4-42
40	V1P3 CRS Resultant [g, CFC_60]	4-43
41	V1P4 Head x [g, CFC_1000]	4-44
42	V1P4 Head y [g, CFC_1000]	4-45
43	V1P4 Head z [g, CFC_1000]	4-46
44	V1P4 Head Resultant [g, CFC_1000]	4-47
45	V1P4 Head Rear z [g, CFC_1000]	4-48
46	V1P4 Upper Neck Fx [N, CFC_1000]	4-49
47	V1P4 Upper Neck Fy [N, CFC_1000]	4-50
48	V1P4 Upper Neck Fz [N, CFC_1000]	4-51
49	V1P4 Upper Neck F Resultant [N, CFC_1000]	4-52

## TABLE OF DATA PLOTS (Continued)

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
50	V1P4 Upper Neck Mx [N-m, CFC_600]	4-53
51	V1P4 Upper Neck My [N-m, CFC_600]	4-54
52	V1P4 Upper Neck Mz [N-m, CFC_600]	4-55
53	V1P4 Upper Neck M Resultant [N-m, CFC_600]	4-56
54	V1P4 Lower Neck Fx [N, CFC_1000]	4-57
55	V1P4 Lower Neck Fy [N, CFC_1000]	4-58
56	V1P4 Lower Neck Fz [N, CFC_1000]	4-59
57	V1P4 Lower Neck F Resultant [N, CFC_1000]	4-60
58	V1P4 Lower Neck Mx [N-m, CFC_600]	4-61
59	V1P4 Lower Neck My [N-m, CFC_600]	4-62
60	V1P4 Lower Neck Mz [N-m, CFC_600]	4-63
61	V1P4 Lower Neck M Resultant [N-m, CFC_600]	4-64
62	V1P4 Chest x [g, CFC_180]	4-65
63	V1P4 Chest y [g, CFC_180]	4-66
64	V1P4 Chest z [g, CFC_180]	4-67
65	V1P4 Chest Resultant [g, CFC_180]	4-68
66	V1P4 Chest Compression [mm, CFC_600]	4-69
67	V1P4 Pelvic x [g, CFC_1000]	4-70
68	V1P4 Pelvic y [g, CFC_1000]	4-71
69	V1P4 Pelvic z [g, CFC_1000]	4-72
70	V1P4 Pelvic Resultant [g, CFC_1000]	4-73
71	V1P4 Top Tether Load [N, CFC_60]	4-74
72	V1P4 CRS x [g, CFC_60]	4-75
73	V1P4 CRS x Velocity [kph, CFC_180]	4-76
74	V1P4 CRS x Displacement [mm, CFC_180]	4-77
75	V1P4 CRS y [g, CFC_60]	4-78
76	V1P4 CRS y Velocity [kph, CFC_180]	4-79
77	V1P4 CRS y Displacement [mm, CFC_180]	4-80
78	V1P4 CRS z [g, CFC_60]	4-81
79	V1P4 CRS z Velocity [kph, CFC_180]	4-82
80	V1P4 CRS z Displacement [mm, CFC_180]	4-83
81	V1P4 CRS Resultant [g, CFC_60]	4-84

NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 Head x

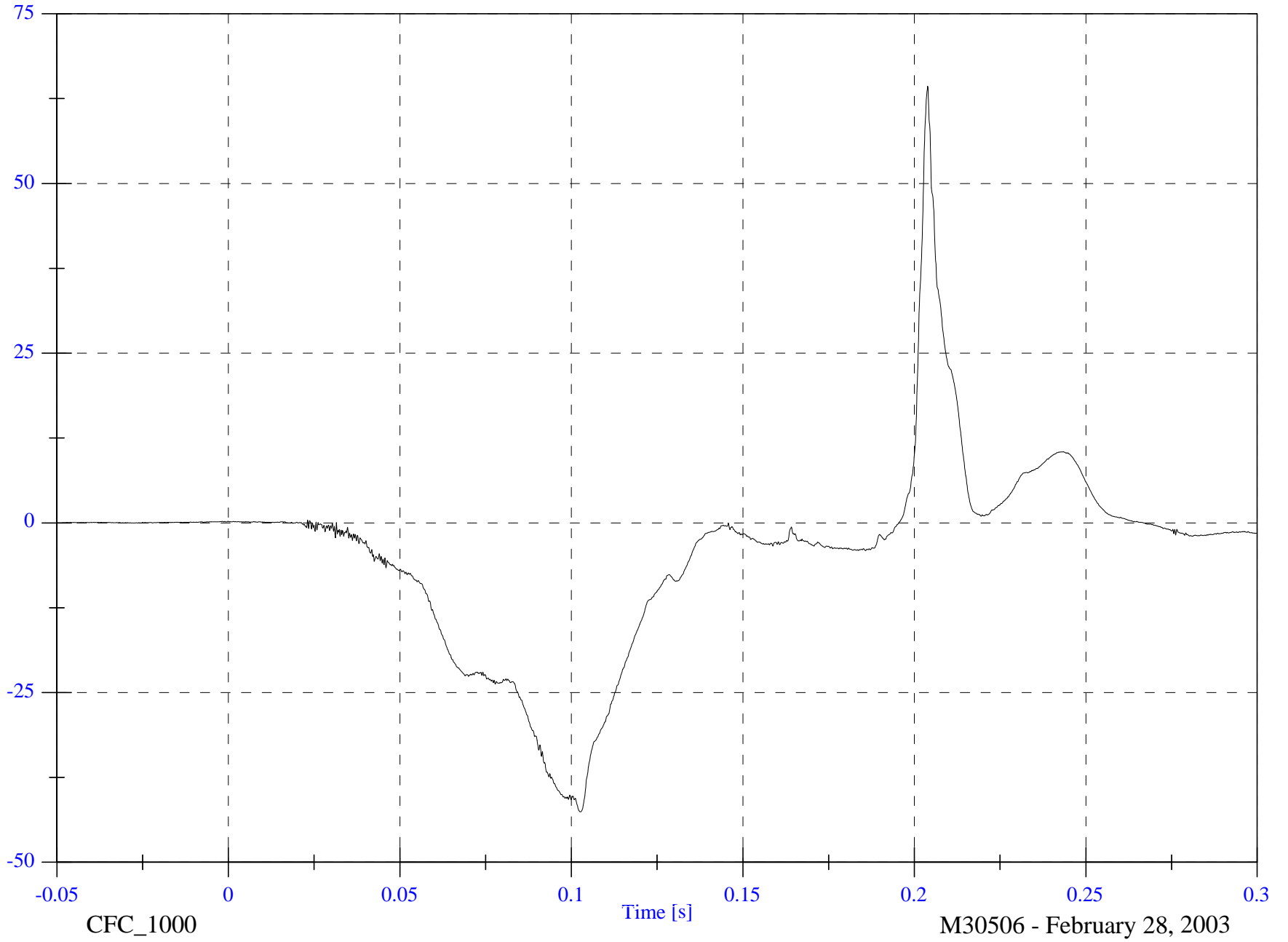
Max: 64.3 [g] at 0.204 [s]

Min: -42.6 [g] at 0.103 [s]

4-4

g

8642-NCAP-33

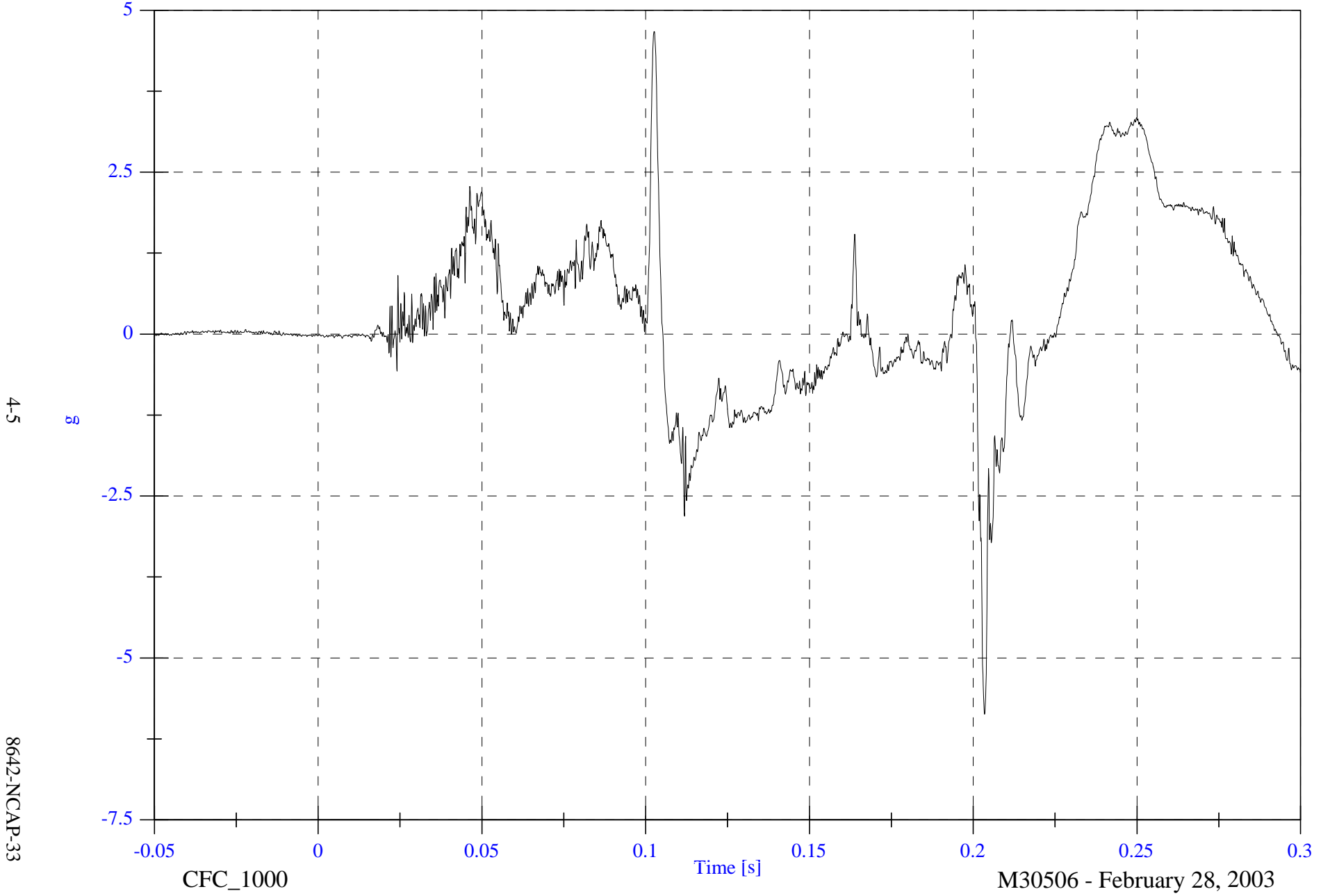


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 4.7 [g] at 0.103 [s]

Min: -5.9 [g] at 0.203 [s]

V1P3 Head y



NCAP Test #11 - 2003 Isuzu Rodeo

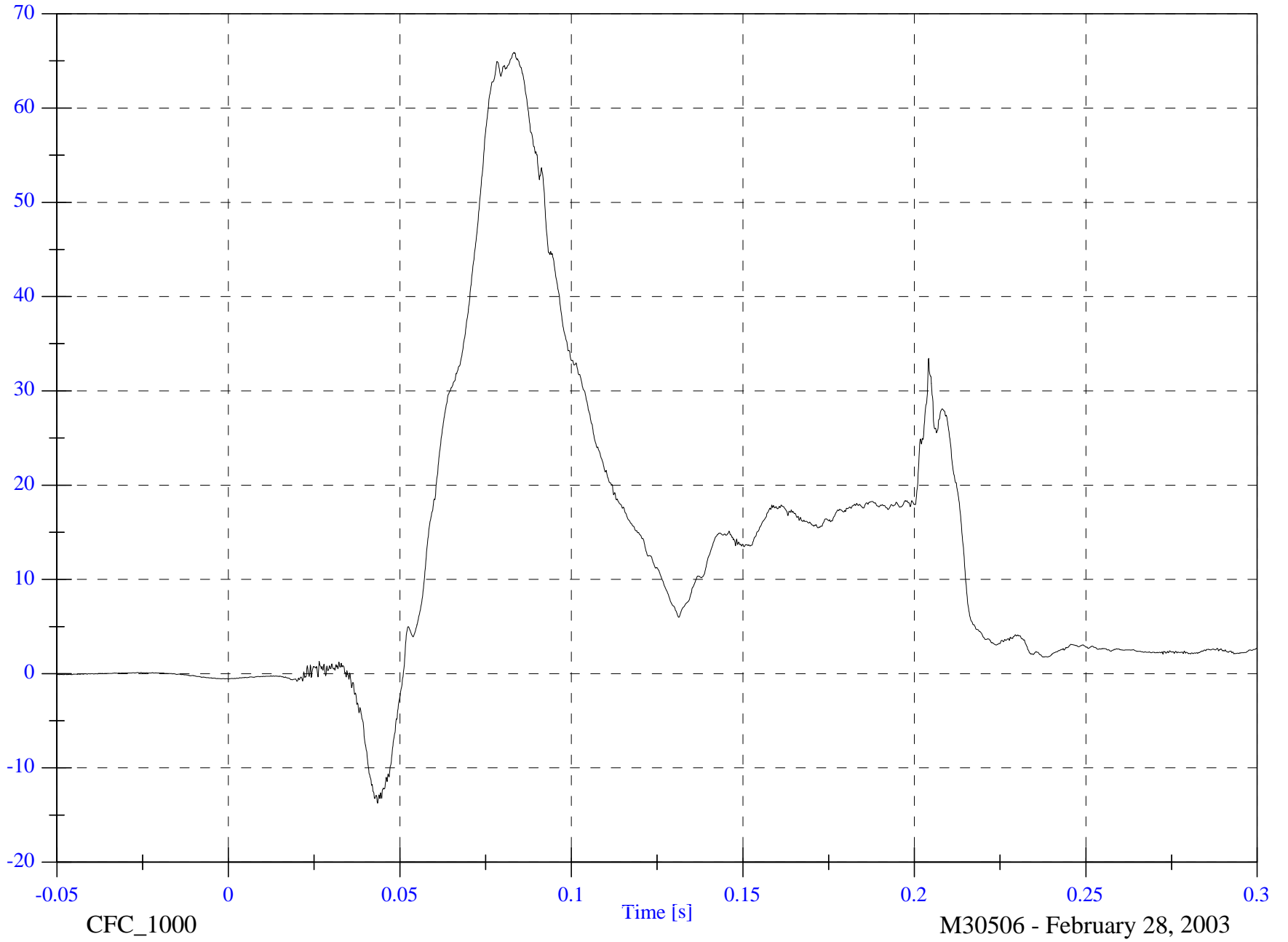
V1P3 Head z

Max: 65.9 [g] at 0.083 [s]

Min: -13.7 [g] at 0.043 [s]

4-6

g



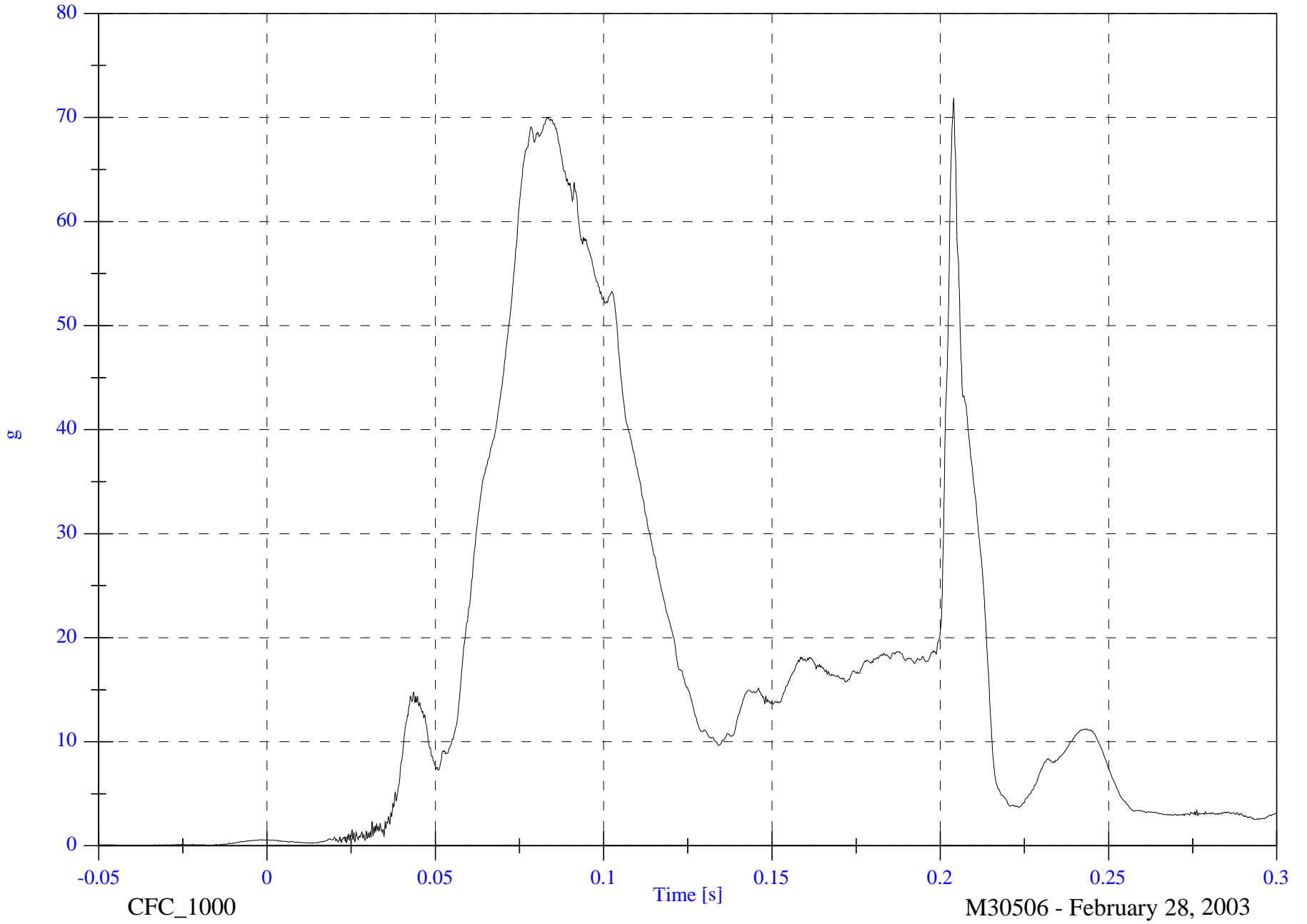
8642-NCAP-33

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 Head Resultant

Max: 71.8 [g] at 0.204 [s]  
Min: 0.0 [g] at -0.042 [s]



4-7

8642-NCAP-33

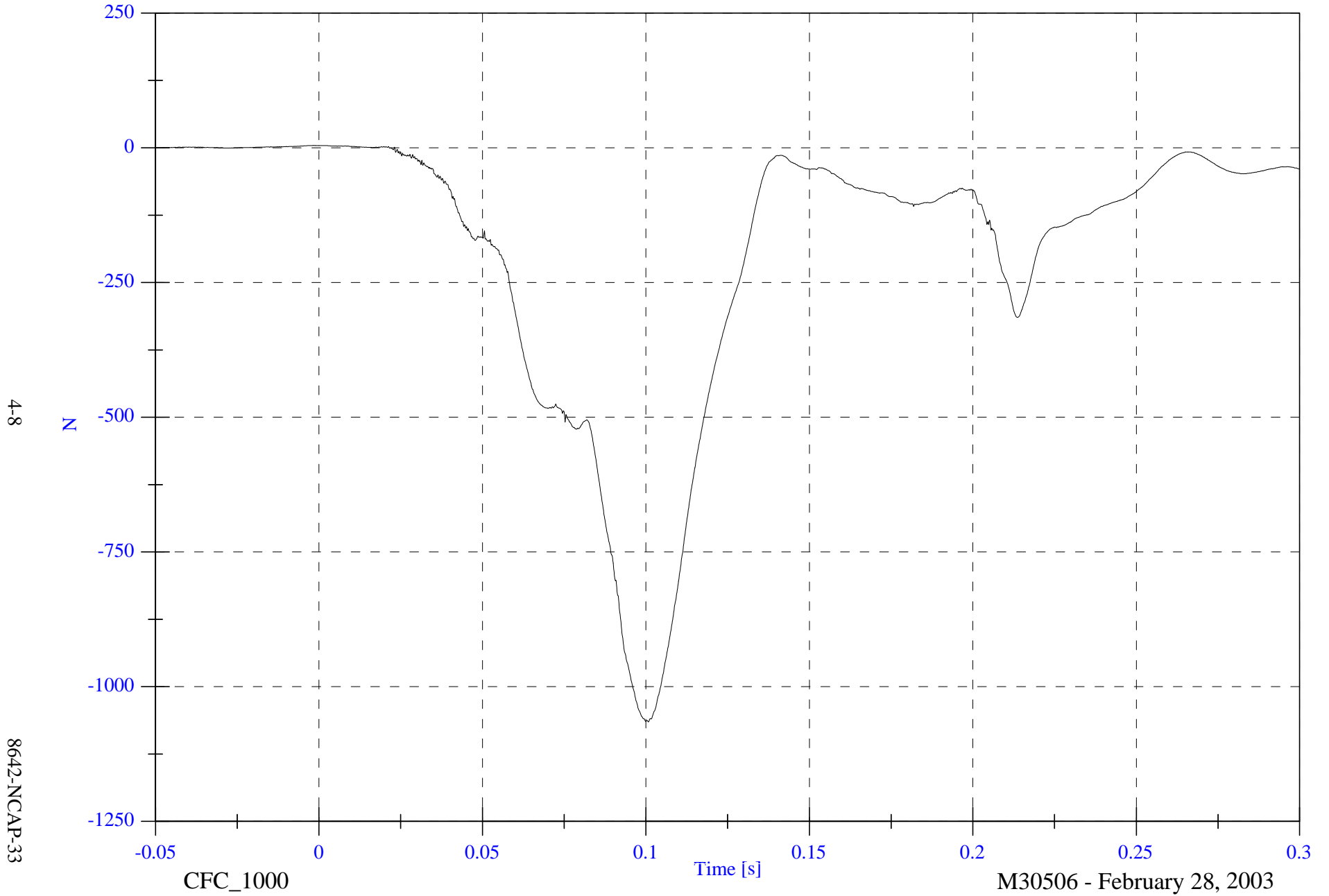
CFC\_1000

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 Upper Neck Fx

Max: 4.4 [N] at -0.002 [s]  
Min: -1065.3 [N] at 0.101 [s]

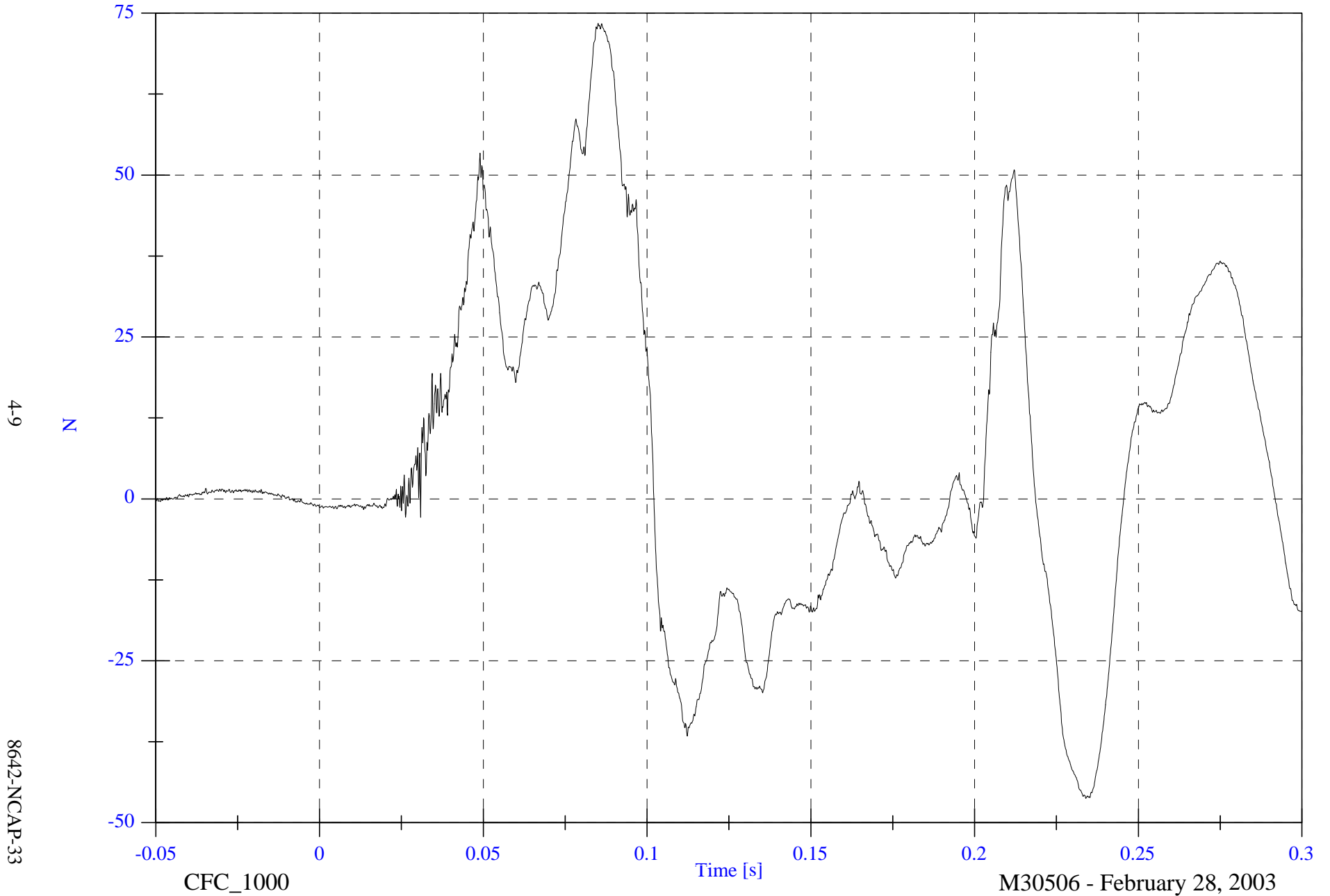


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 73.4 [N] at 0.085 [s]

Min: -46.2 [N] at 0.234 [s]

V1P3 Upper Neck Fy

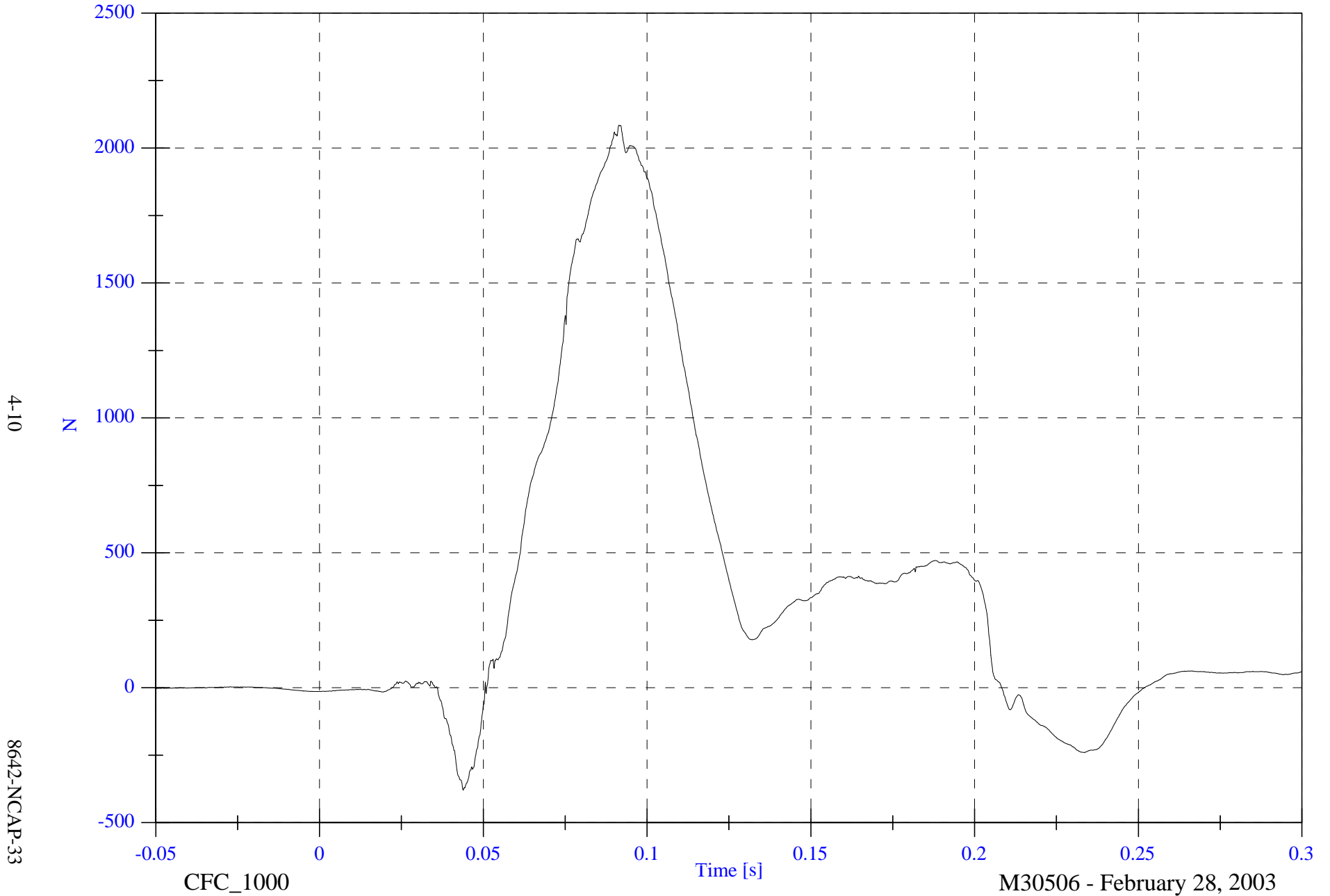


NCAP Test #11 - 2003 Isuzu Rodeo

Max: 2084.7 [N] at 0.091 [s]

V1P3 Upper Neck Fz

Min: -379.5 [N] at 0.044 [s]



4-10

8642-NCAP-33

CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

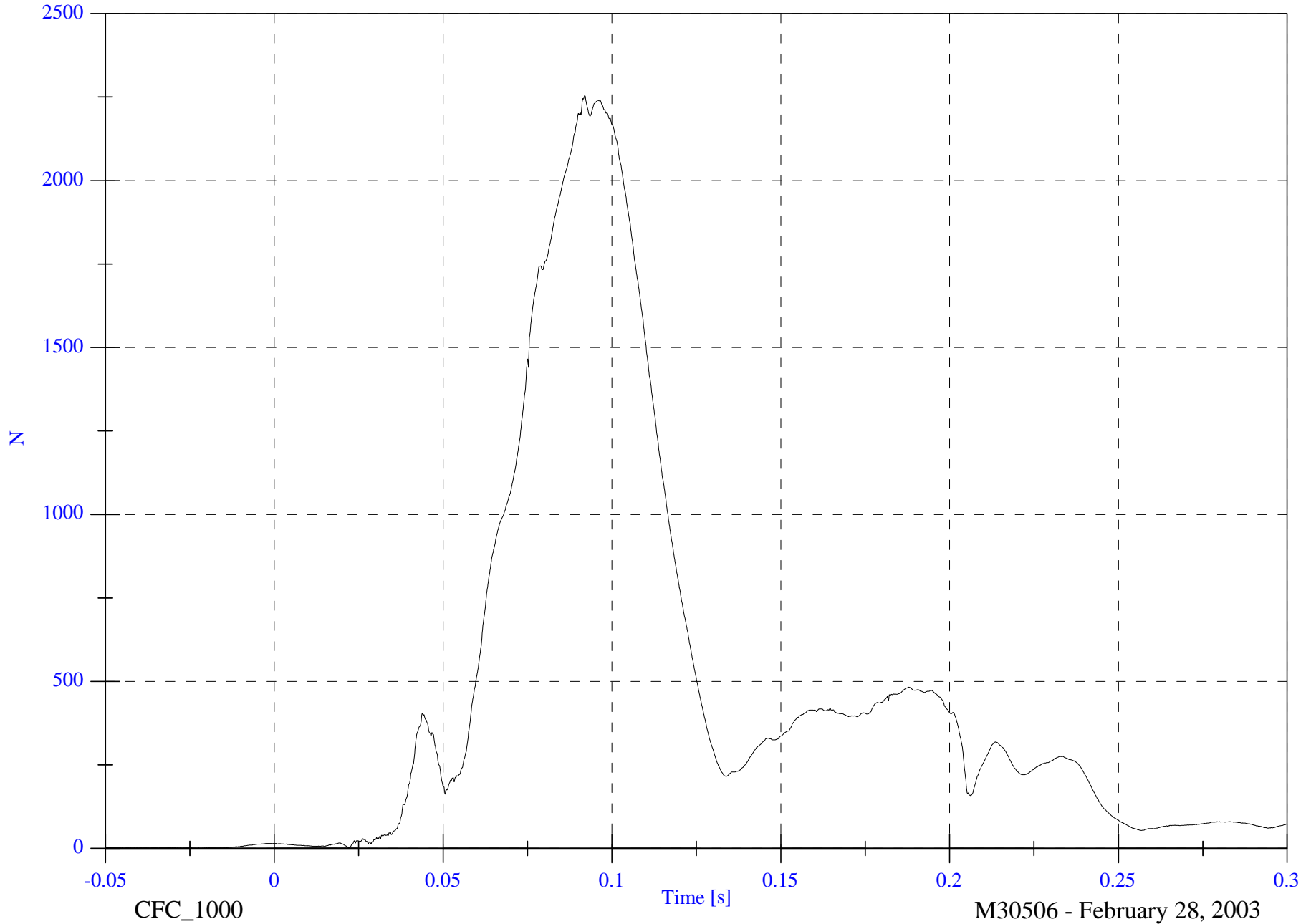
V1P3 Upper Neck F Resultant

Max: 2254.6 [N] at 0.092 [s]

Min: 0.6 [N] at -0.045 [s]

4-11

8642-NCAP-33



CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

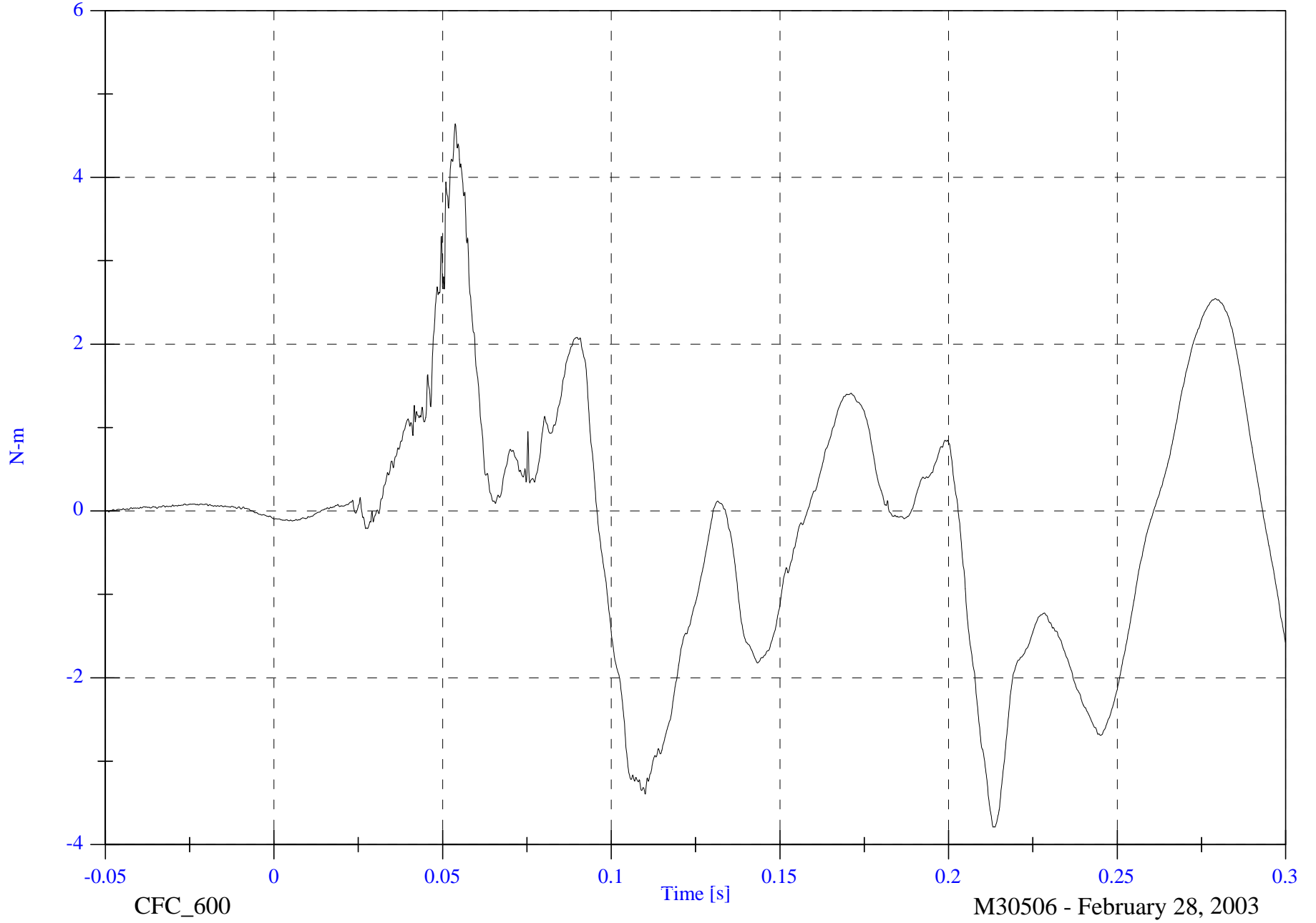
Max: 4.6 [N-m] at 0.054 [s]

V1P3 Upper Neck Mx

Min: -3.8 [N-m] at 0.214 [s]

4-12

8642-NCAP-33



CFC\_600

M30506 - February 28, 2003

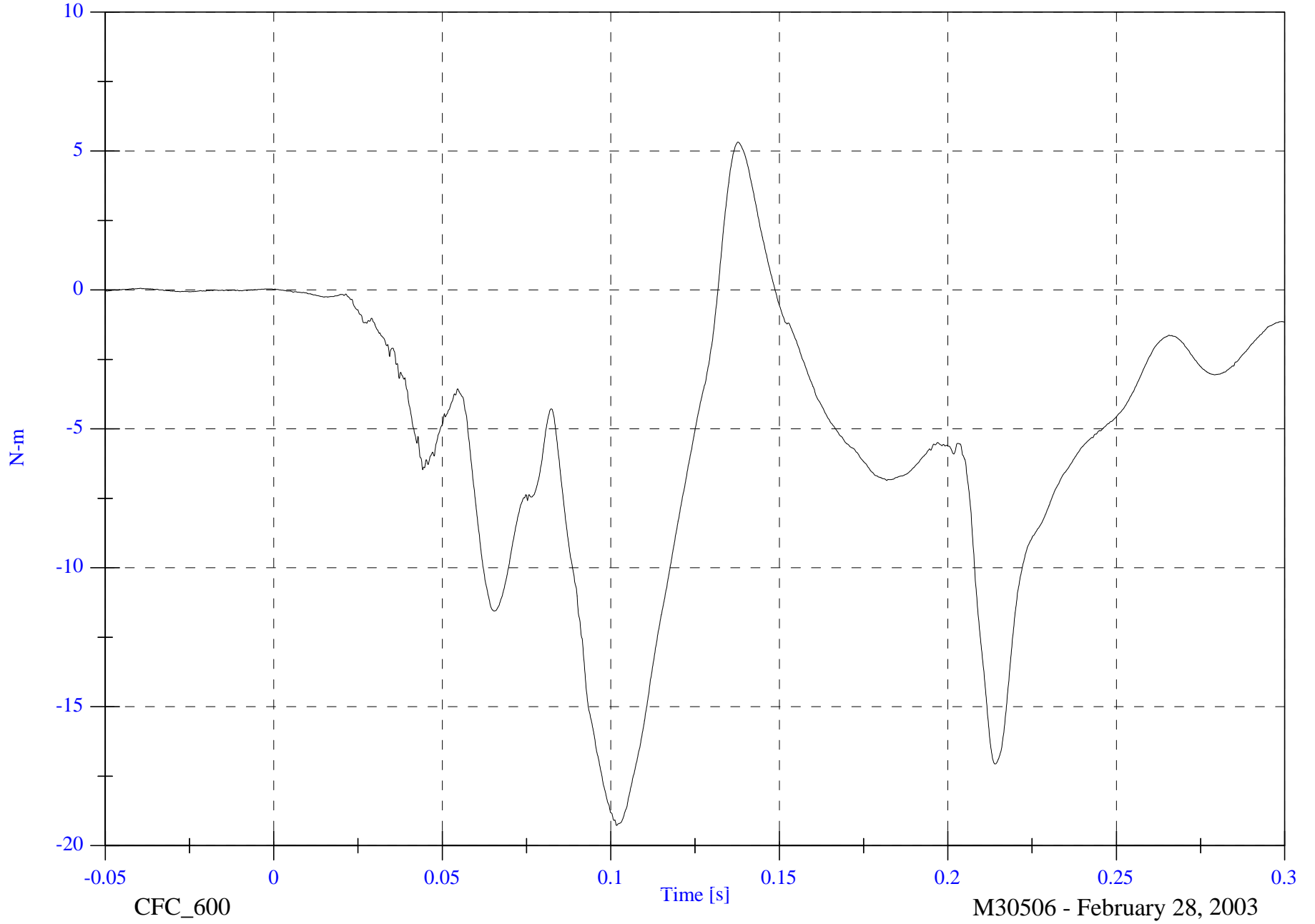
NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 Upper Neck My

Max: 5.3 [N-m] at 0.138 [s]  
Min: -19.3 [N-m] at 0.102 [s]

4-13

8642-NCAP-33



CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

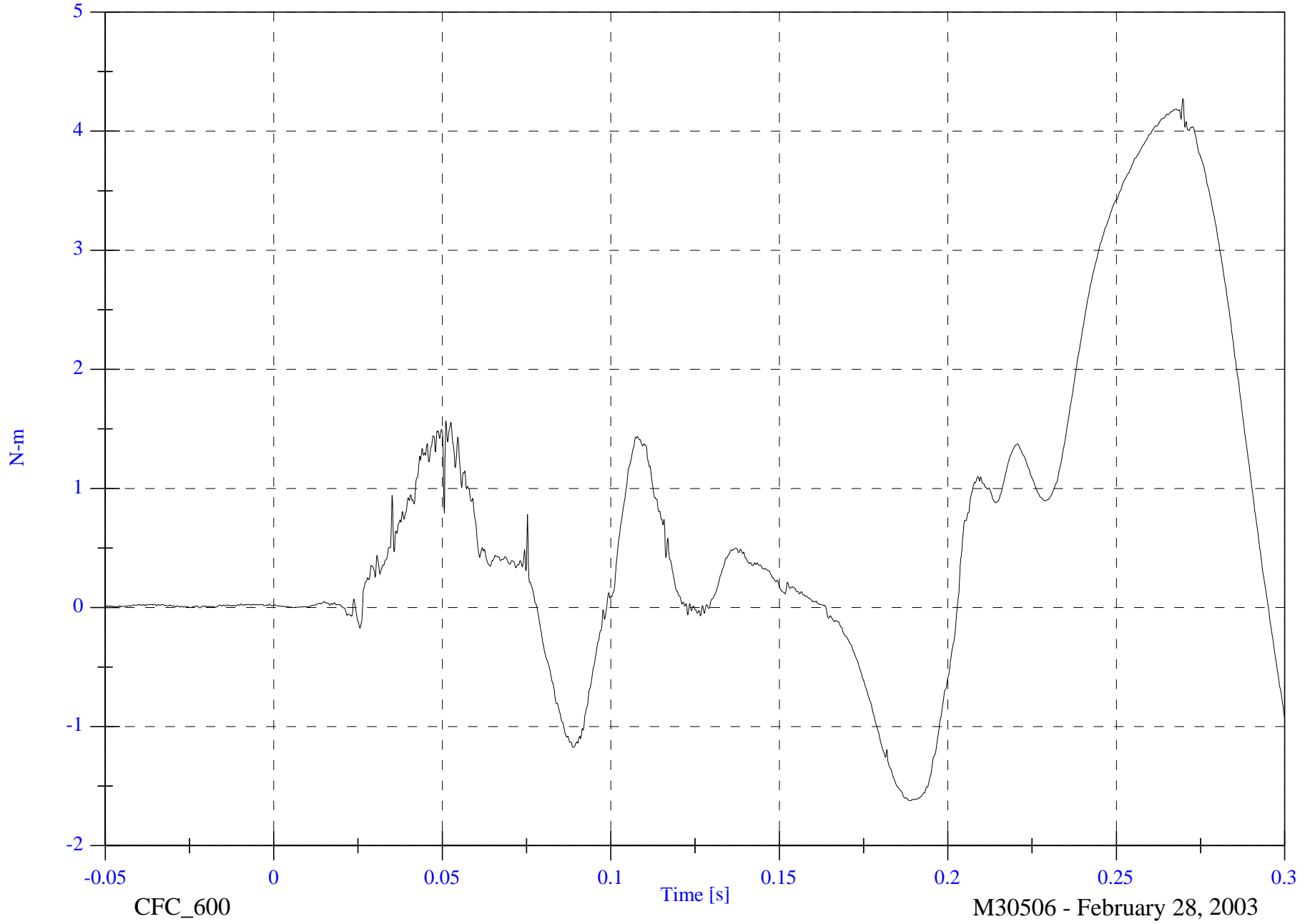
V1P3 Upper Neck Mz

Max: 4.3 [N-m] at 0.270 [s]

Min: -1.6 [N-m] at 0.189 [s]

4-14

8642-NCAP-33



CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

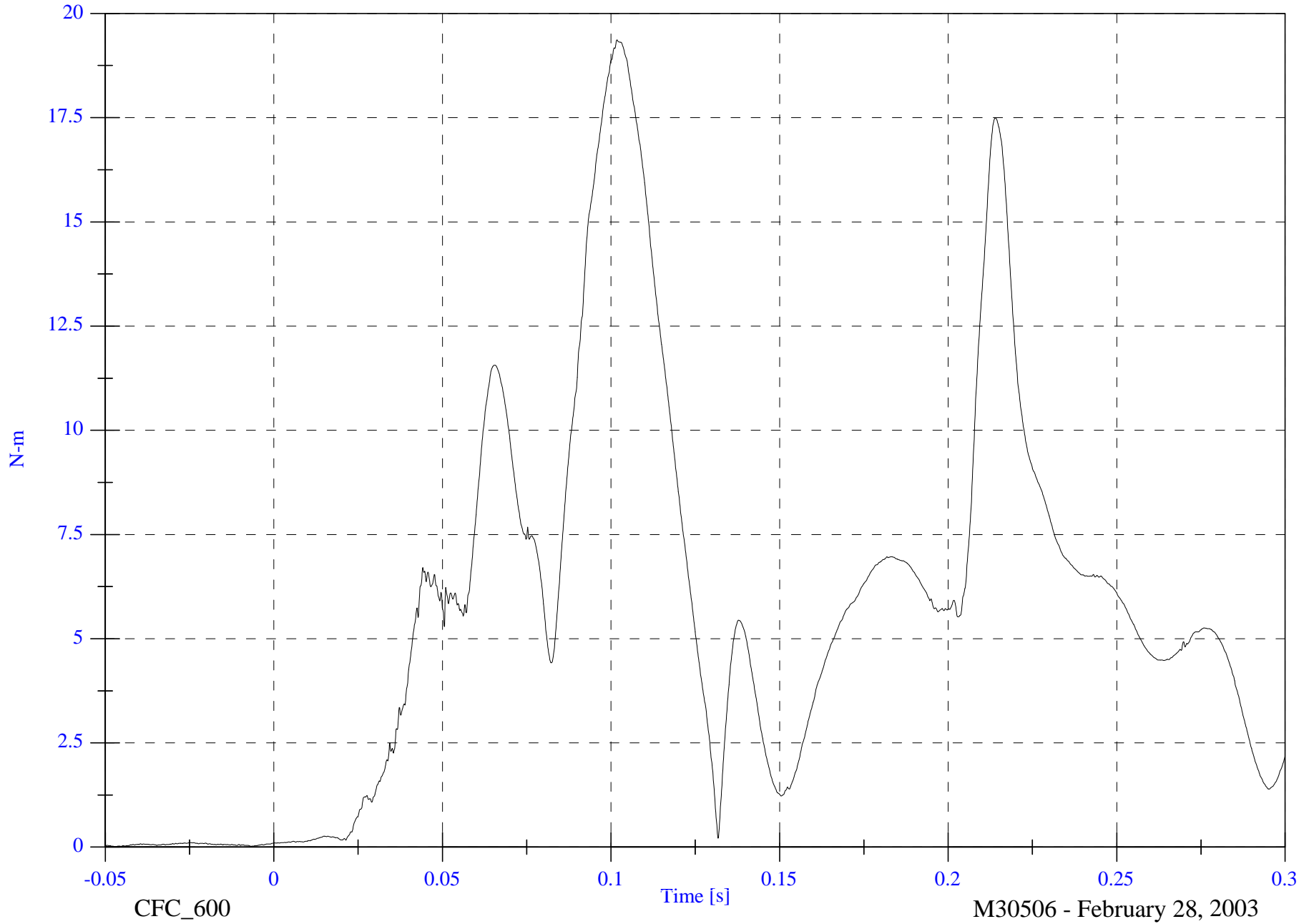
V1P3 Upper Neck M Resultant

Max: 19.4 [N-m] at 0.102 [s]

Min: 0.0 [N-m] at -0.047 [s]

4-15

8642-NCAP-33



CFC\_600

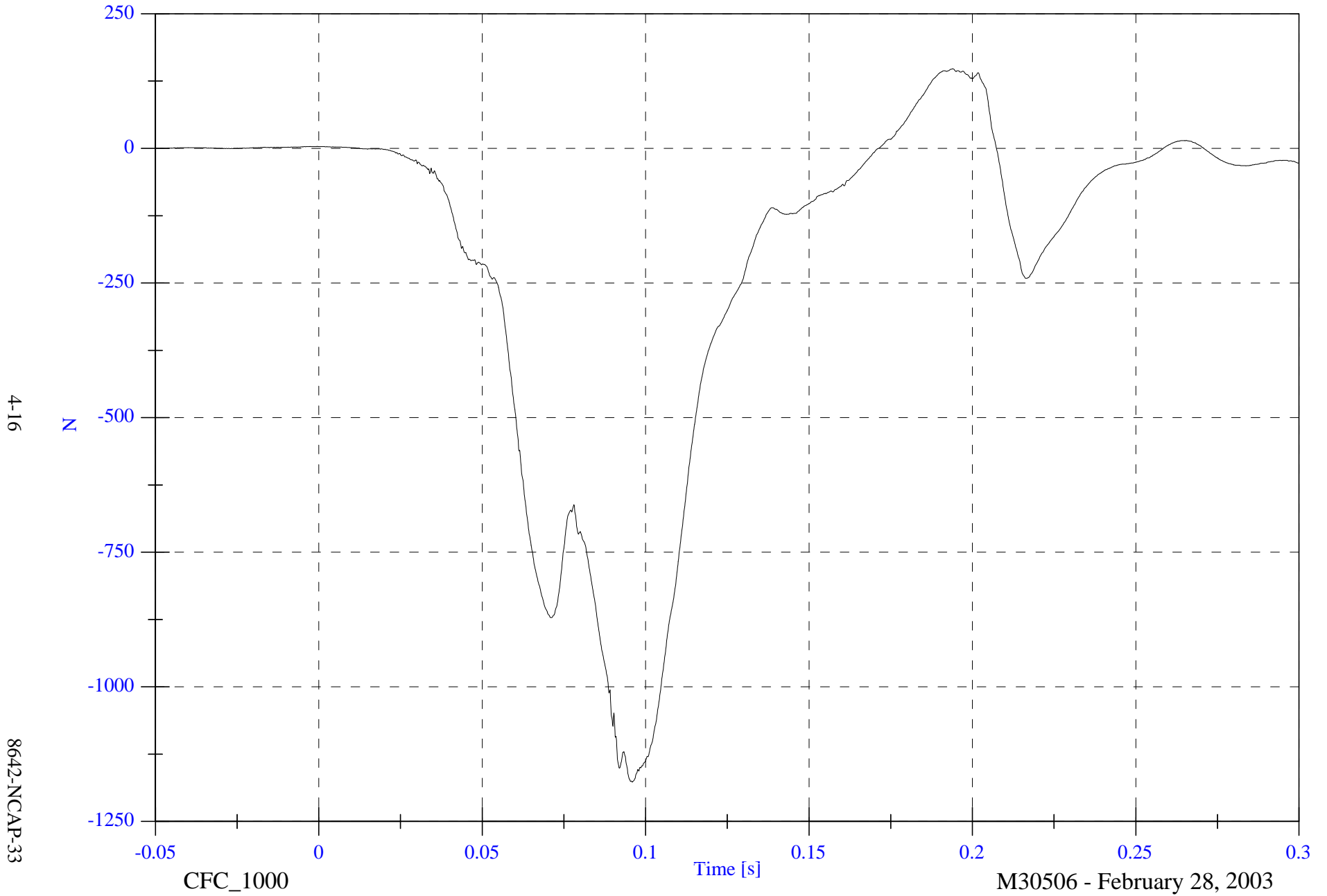
Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 Lower Neck Fx

Max: 147.8 [N] at 0.194 [s]  
Min: -1176.8 [N] at 0.096 [s]



4-16

8642-NCAP-33

CFC\_1000

Time [s]

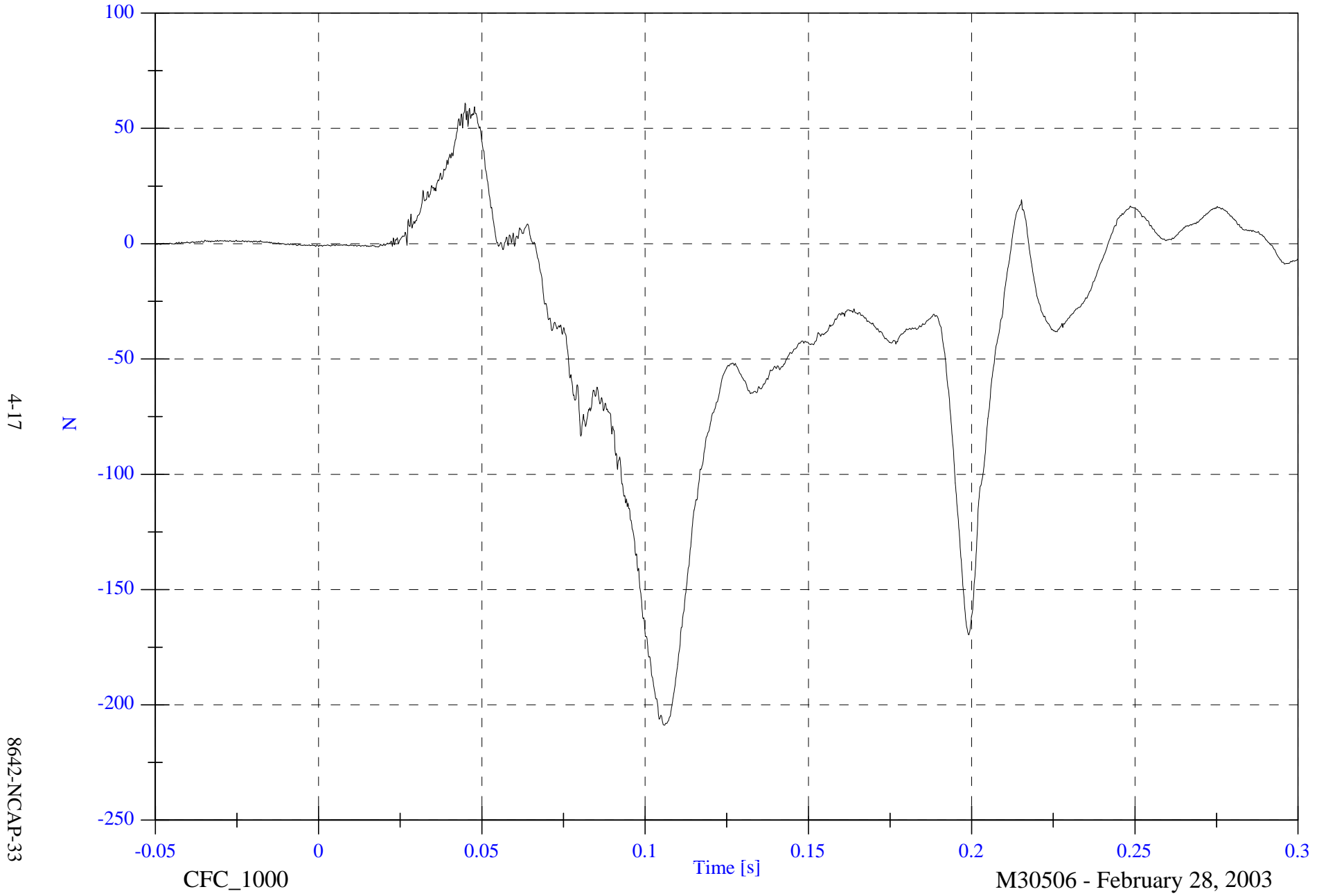
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 Lower Neck Fy

Max: 61.0 [N] at 0.045 [s]

Min: -208.8 [N] at 0.106 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

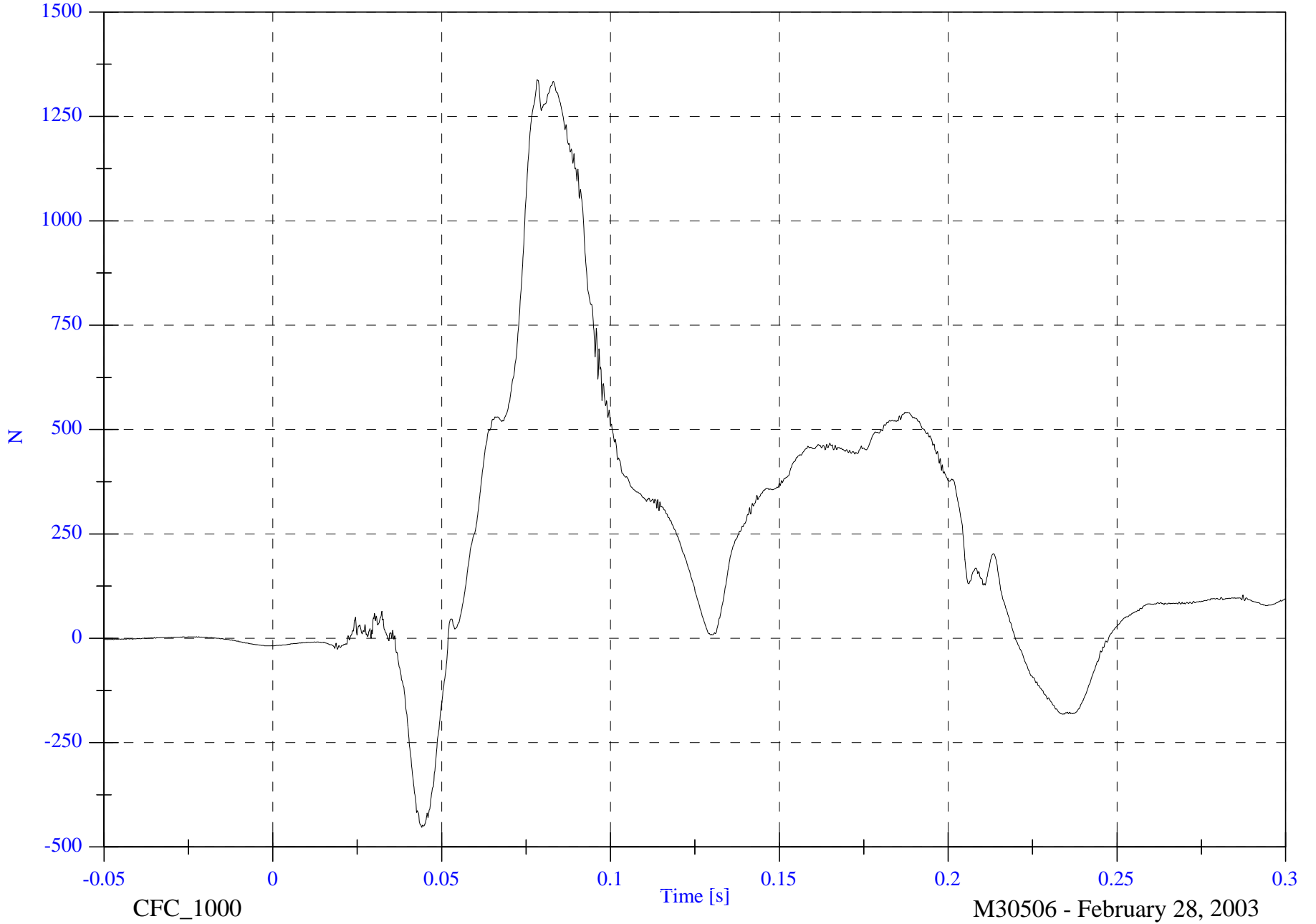
Max: 1338.0 [N] at 0.078 [s]

V1P3 Lower Neck Fz

Min: -452.9 [N] at 0.044 [s]

4-18

8642-NCAP-33



CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

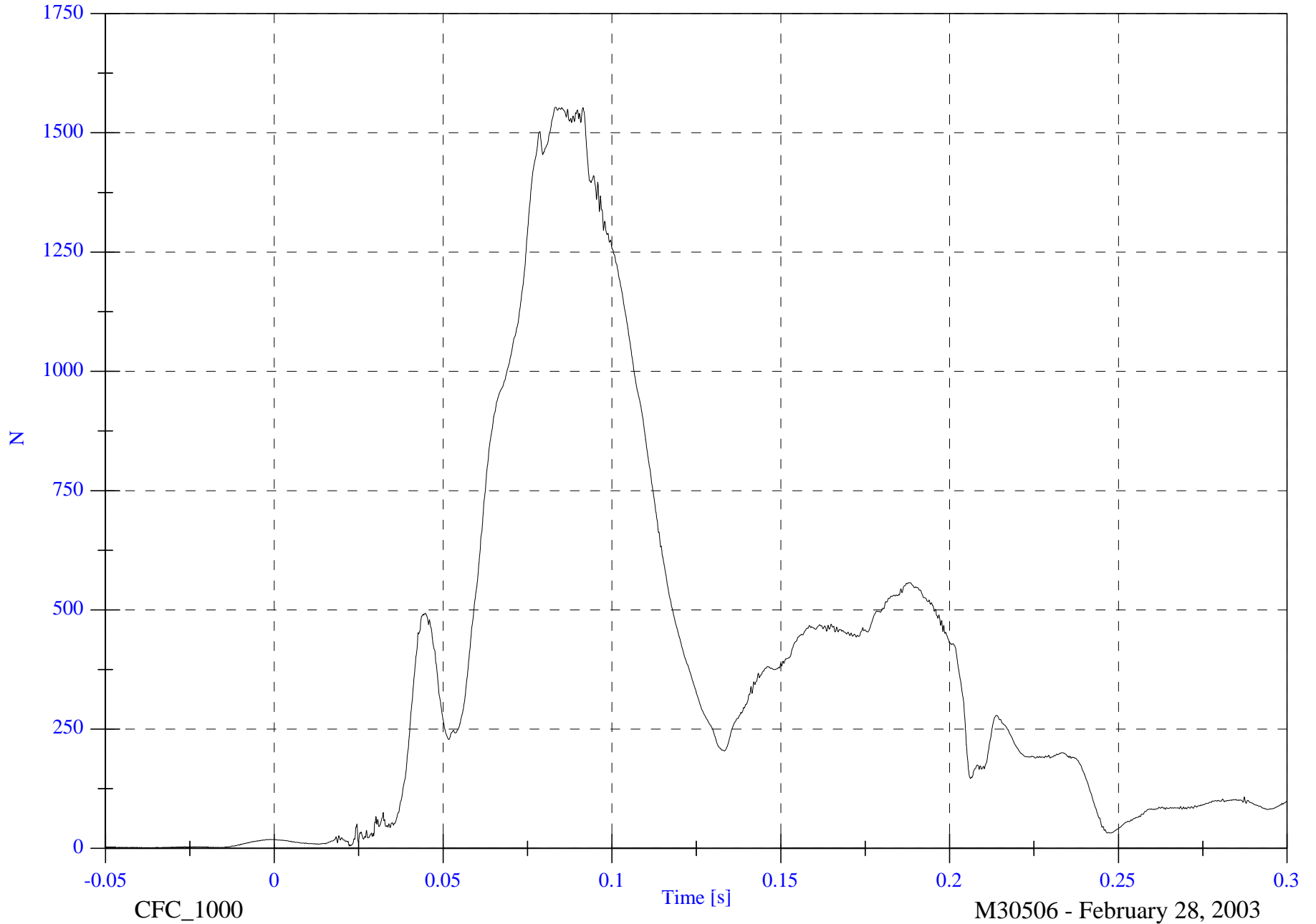
V1P3 Lower Neck F Resultant

Max: 1553.4 [N] at 0.083 [s]

Min: 1.2 [N] at -0.035 [s]

4-19

8642-NCAP-33



CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

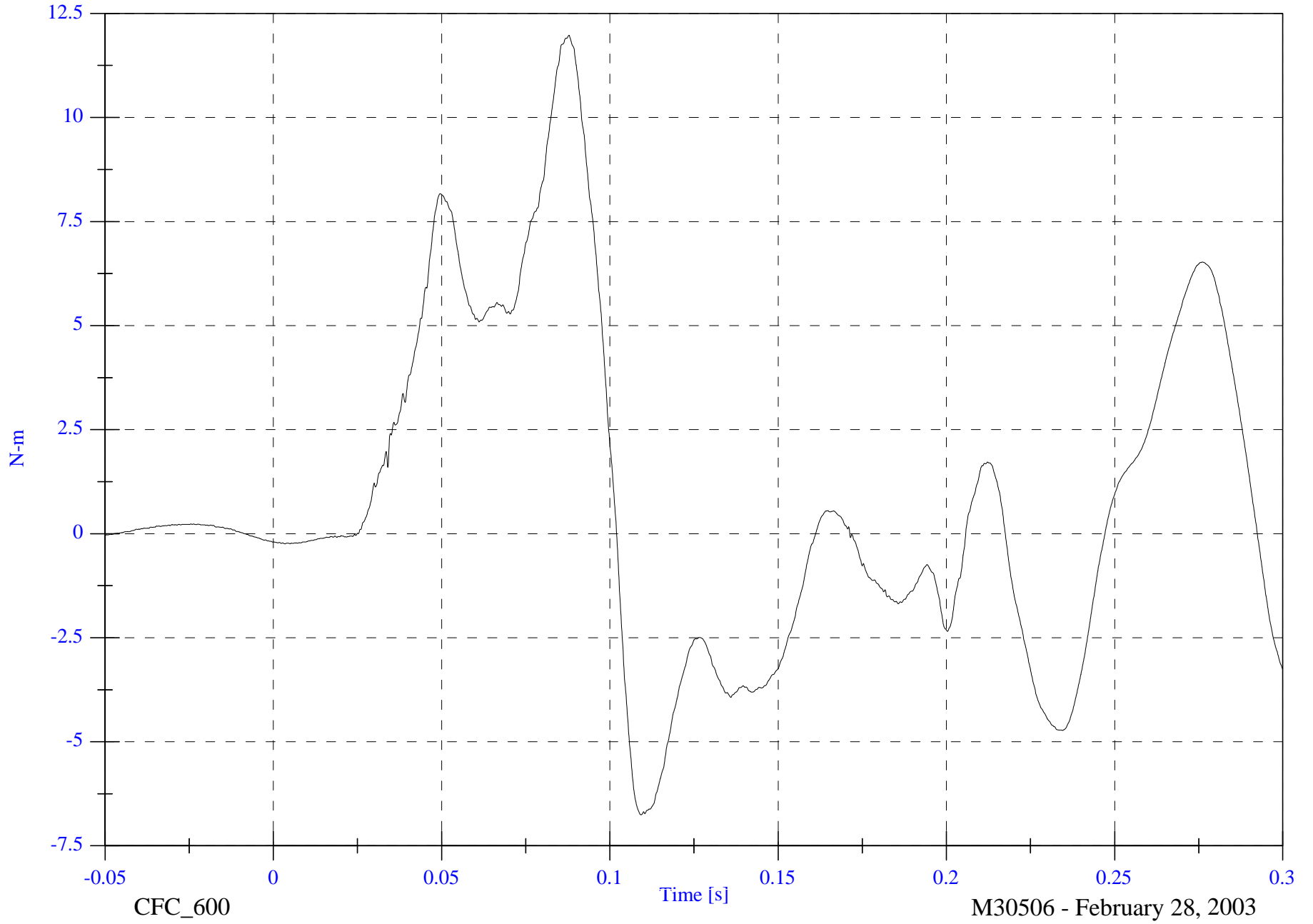
Max: 12.0 [N-m] at 0.088 [s]

V1P3 Lower Neck Mx

Min: -6.8 [N-m] at 0.109 [s]

4-20

8642-NCAP-33



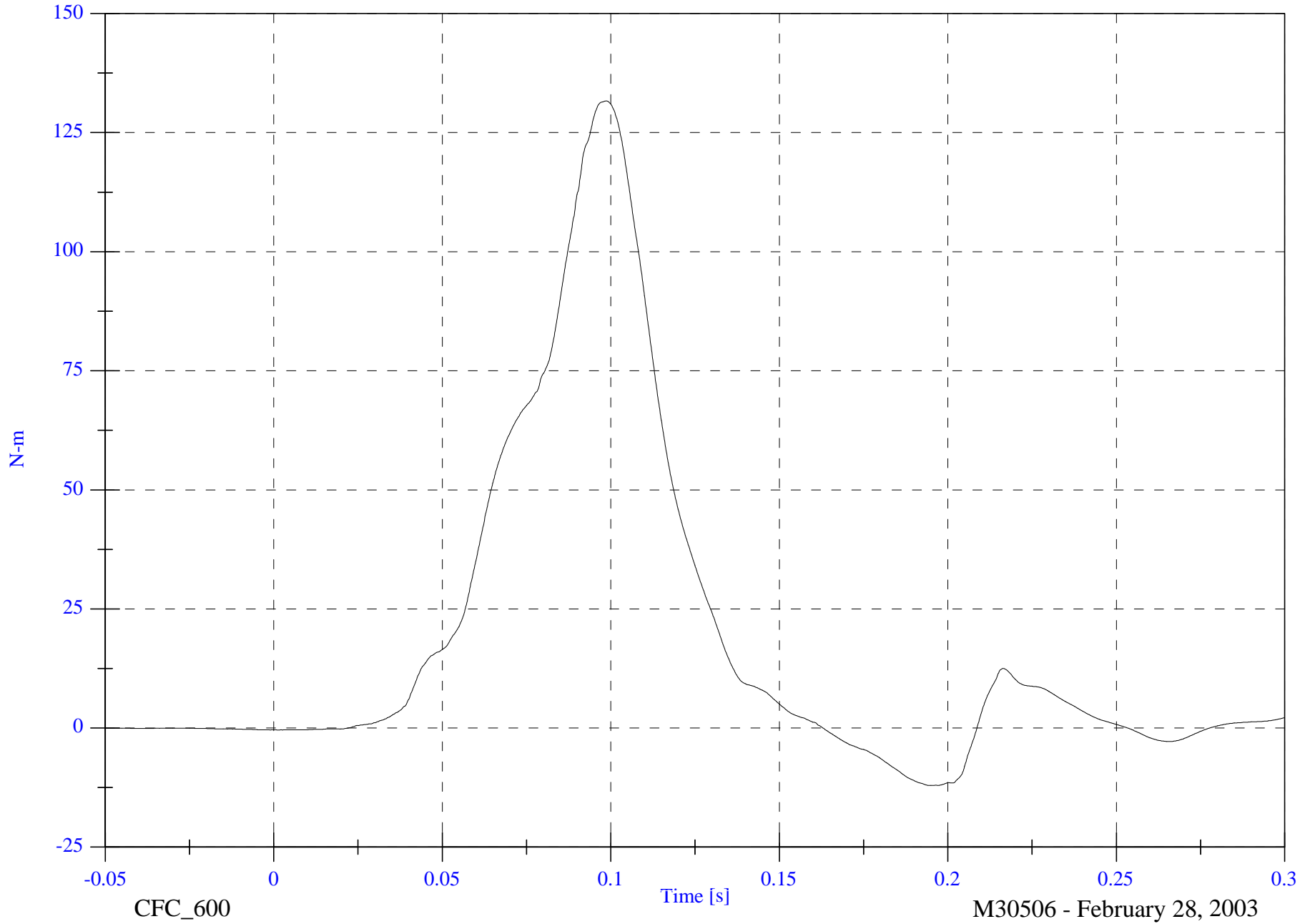
CFC\_600

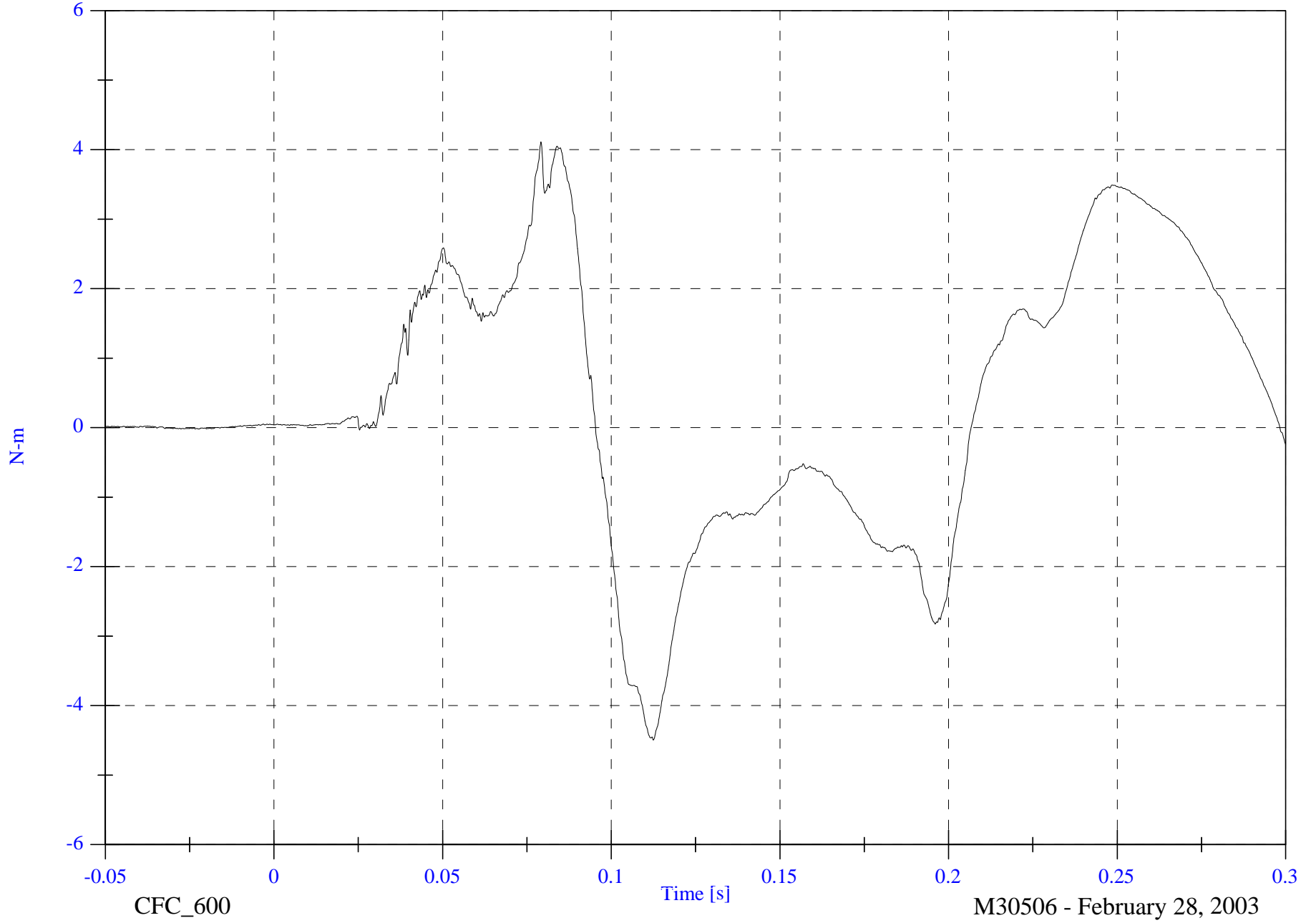
M30506 - February 28, 2003

V1P3 Lower Neck My

4-21

8642-NCAP-33



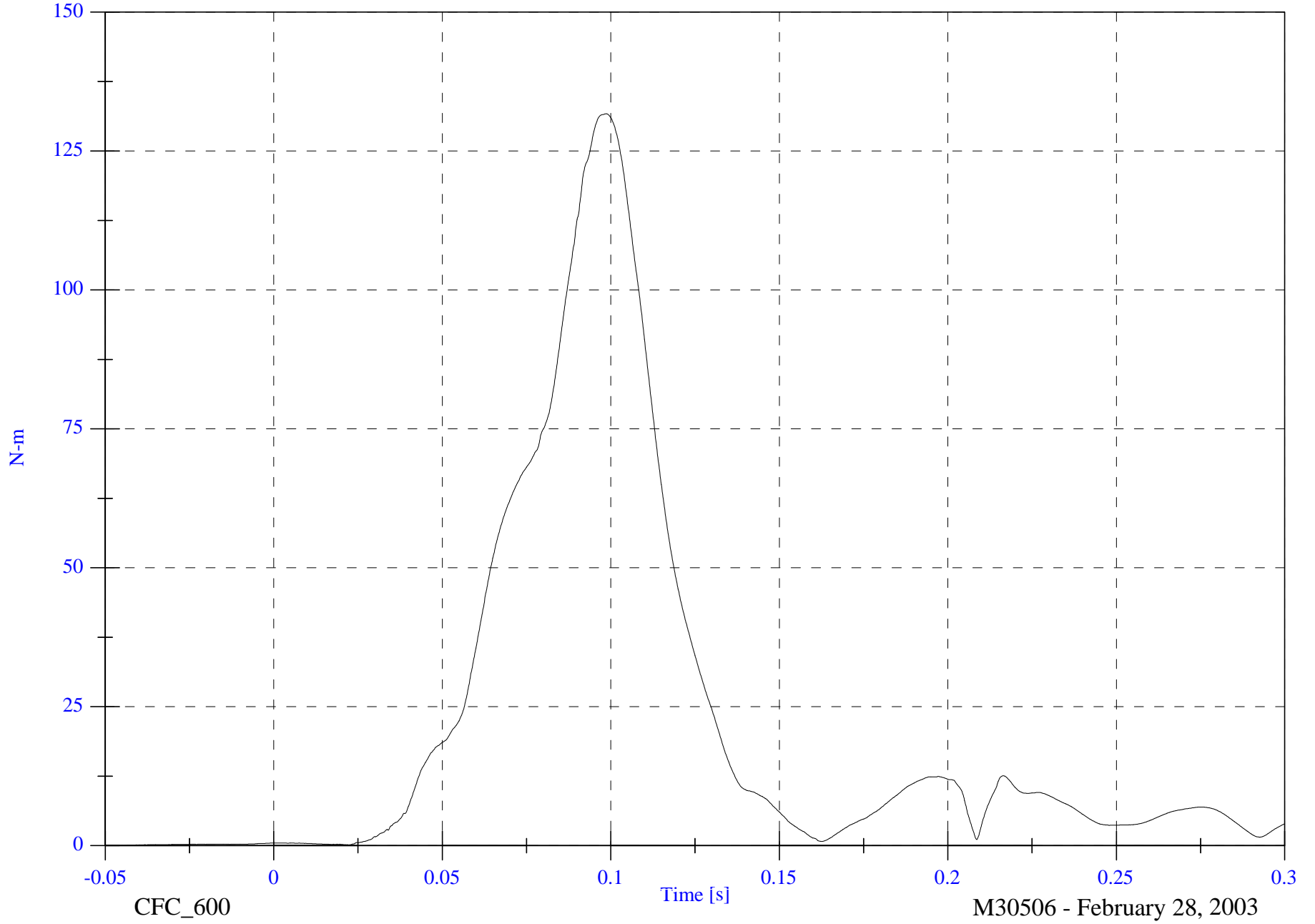


NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 Lower Neck M Resultant

Max: 131.7 [N-m] at 0.099 [s]

Min: 0.0 [N-m] at -0.048 [s]



4-23

8642-NCAP-33

CFC\_600

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

VIP3 Chest x

Max: 11.1 [g] at 0.236 [s]  
Min: -45.8 [g] at 0.073 [s]

4-24

8642-NCAP-33



NCAP Test #11 - 2003 Isuzu Rodeo

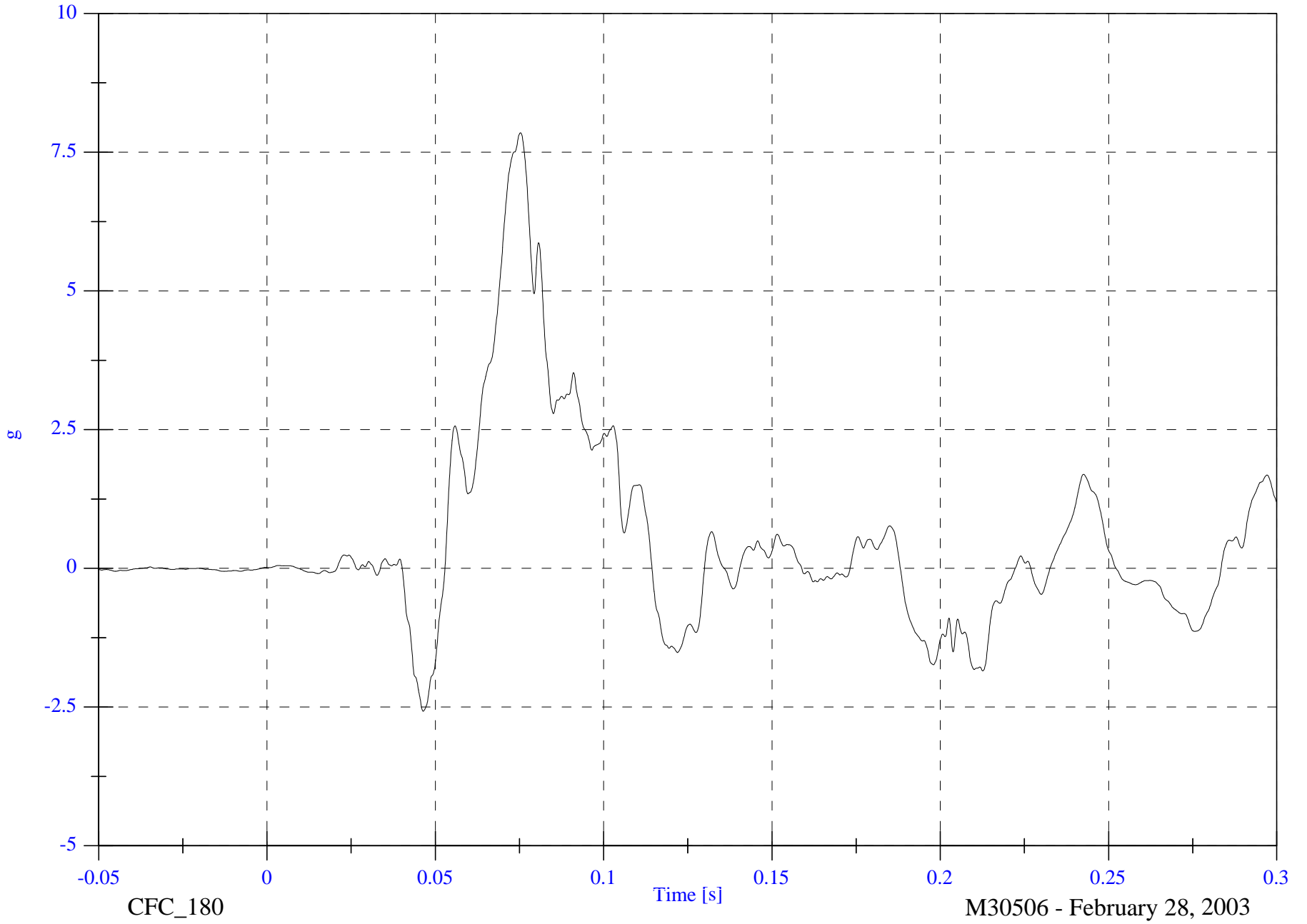
VIP3 Chest y

Max: 7.8 [g] at 0.075 [s]

Min: -2.6 [g] at 0.046 [s]

4-25

8642-NCAP-33



CFC\_180

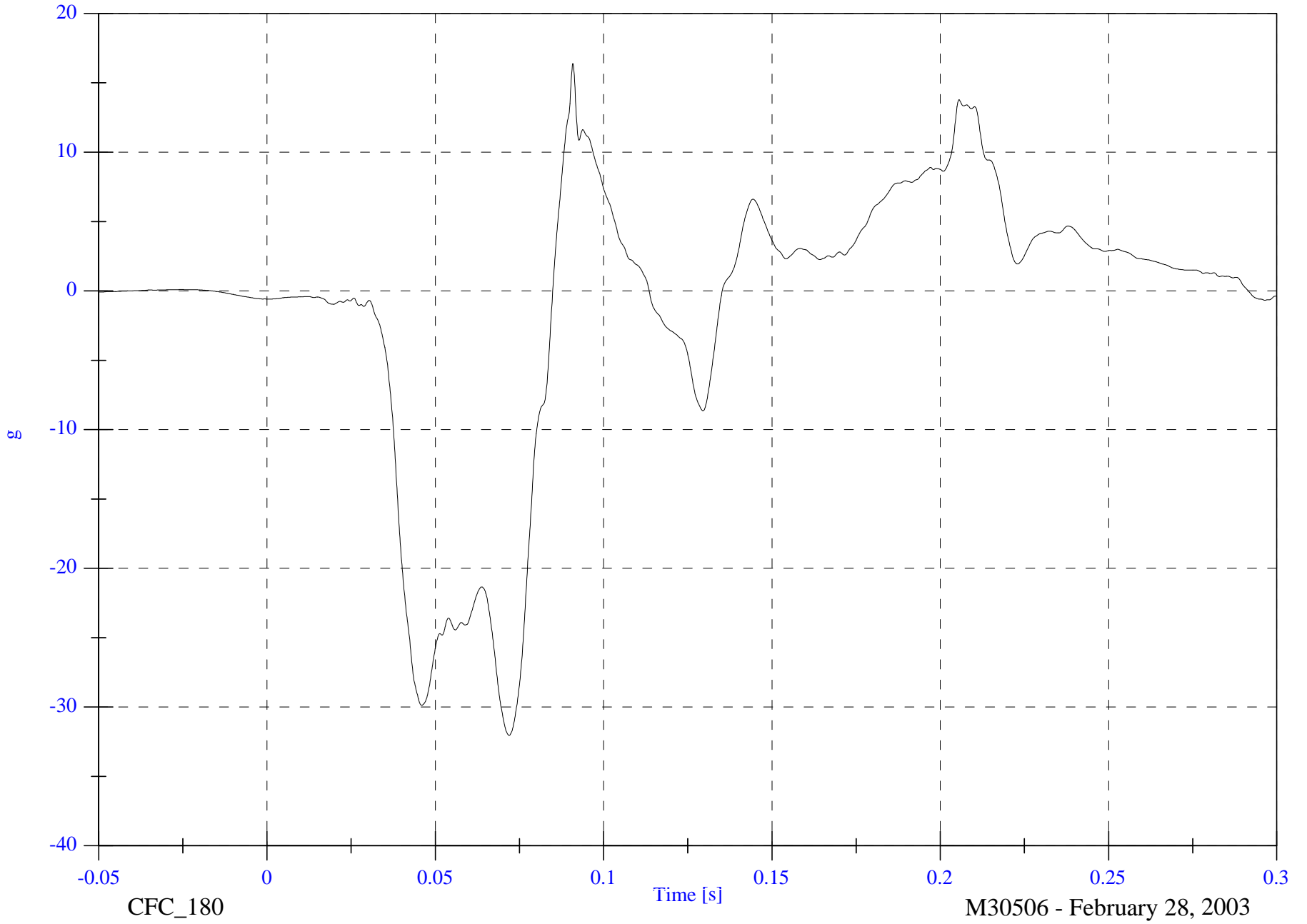
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

VIP3 Chest z

Max: 16.4 [g] at 0.091 [s]

Min: -32.0 [g] at 0.072 [s]



4-26

8642-NCAP-33

CFC\_180

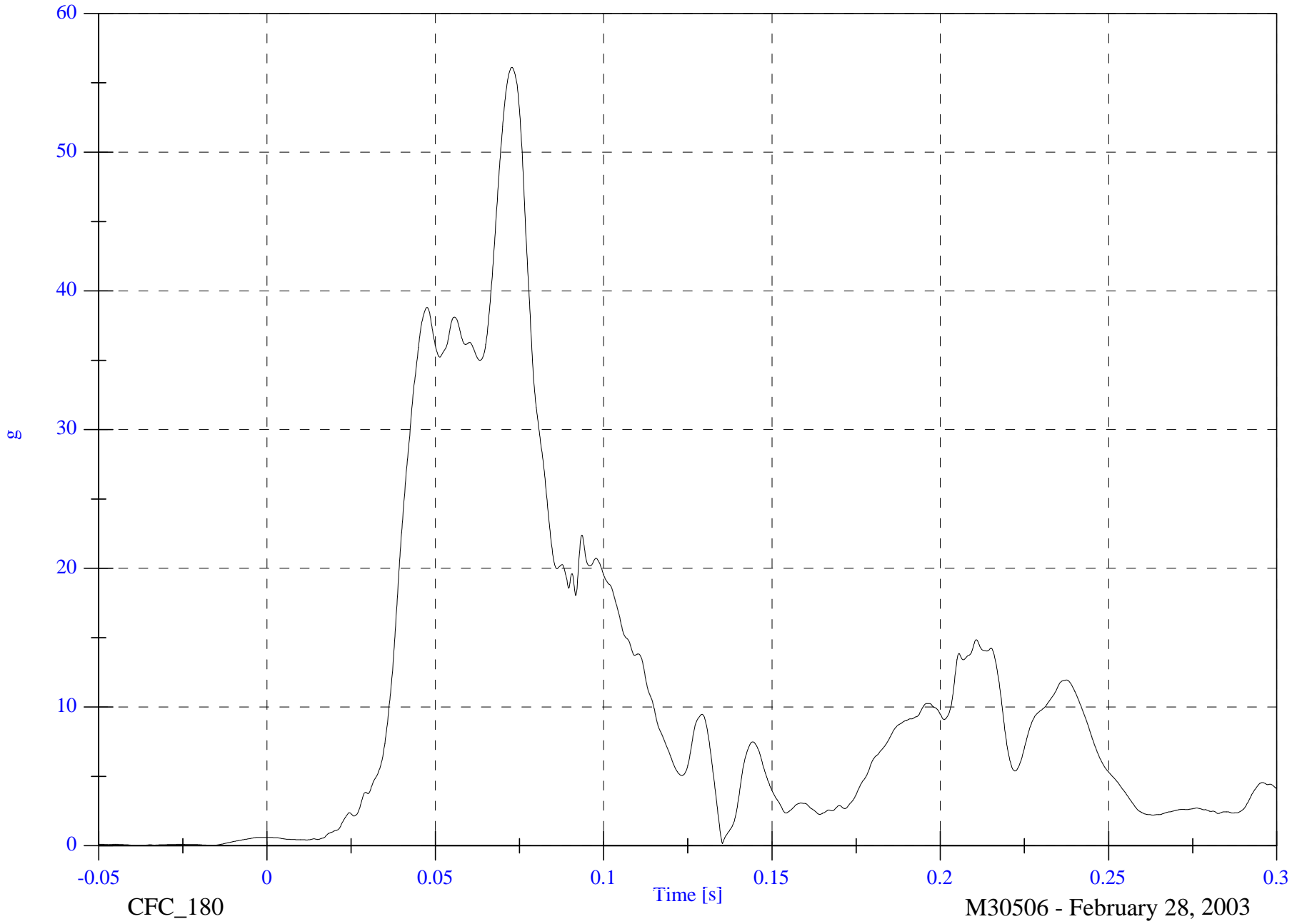
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 Chest Resultant

Max: 56.1 [g] at 0.073 [s]

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



4-27

8642-NCAP-33

CFC\_180

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

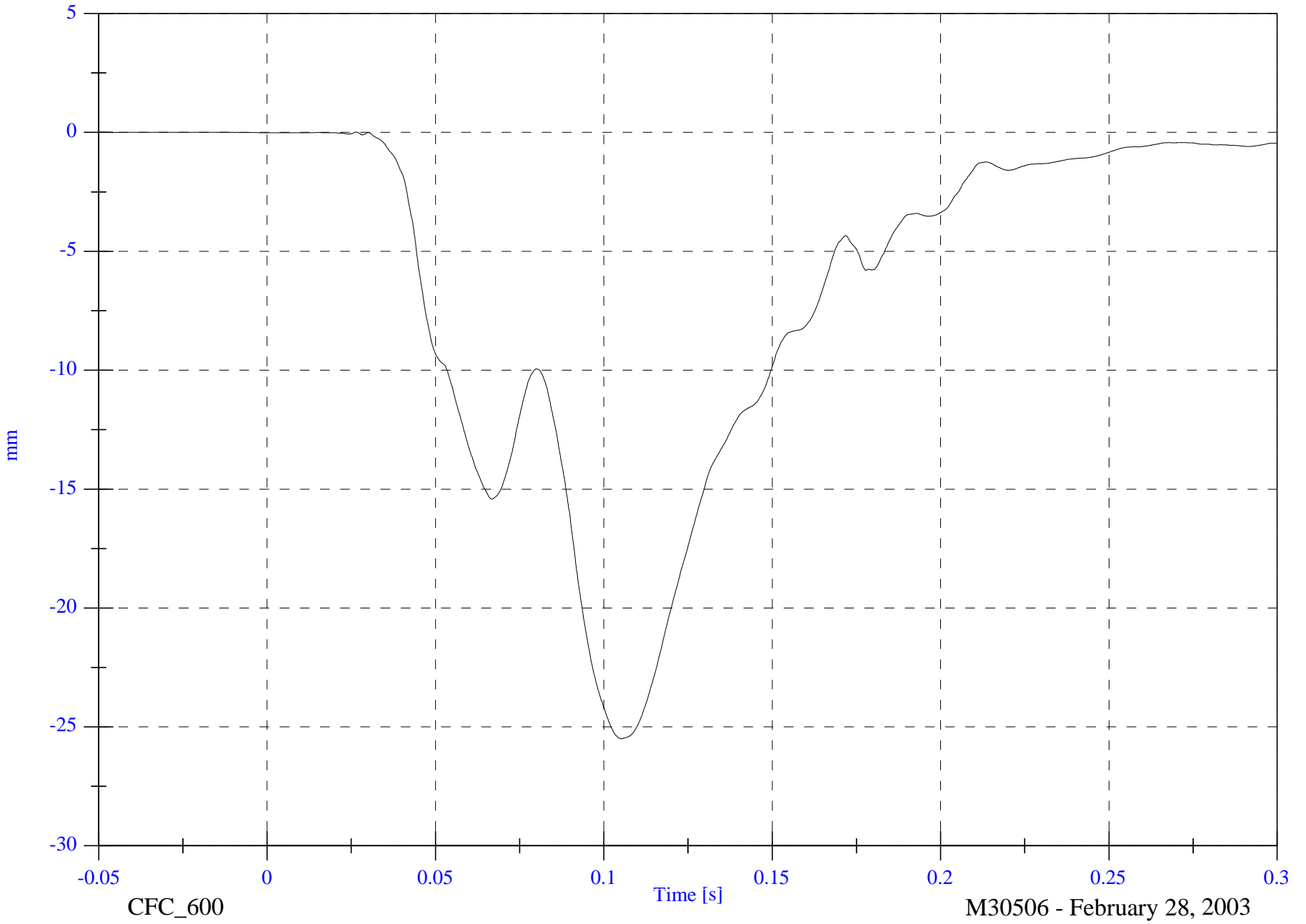
V1P3 Chest Compression

Max: 0.0 [mm] at 0.026 [s]

Min: -25.5 [mm] at 0.105 [s]

4-28

8642-NCAP-33



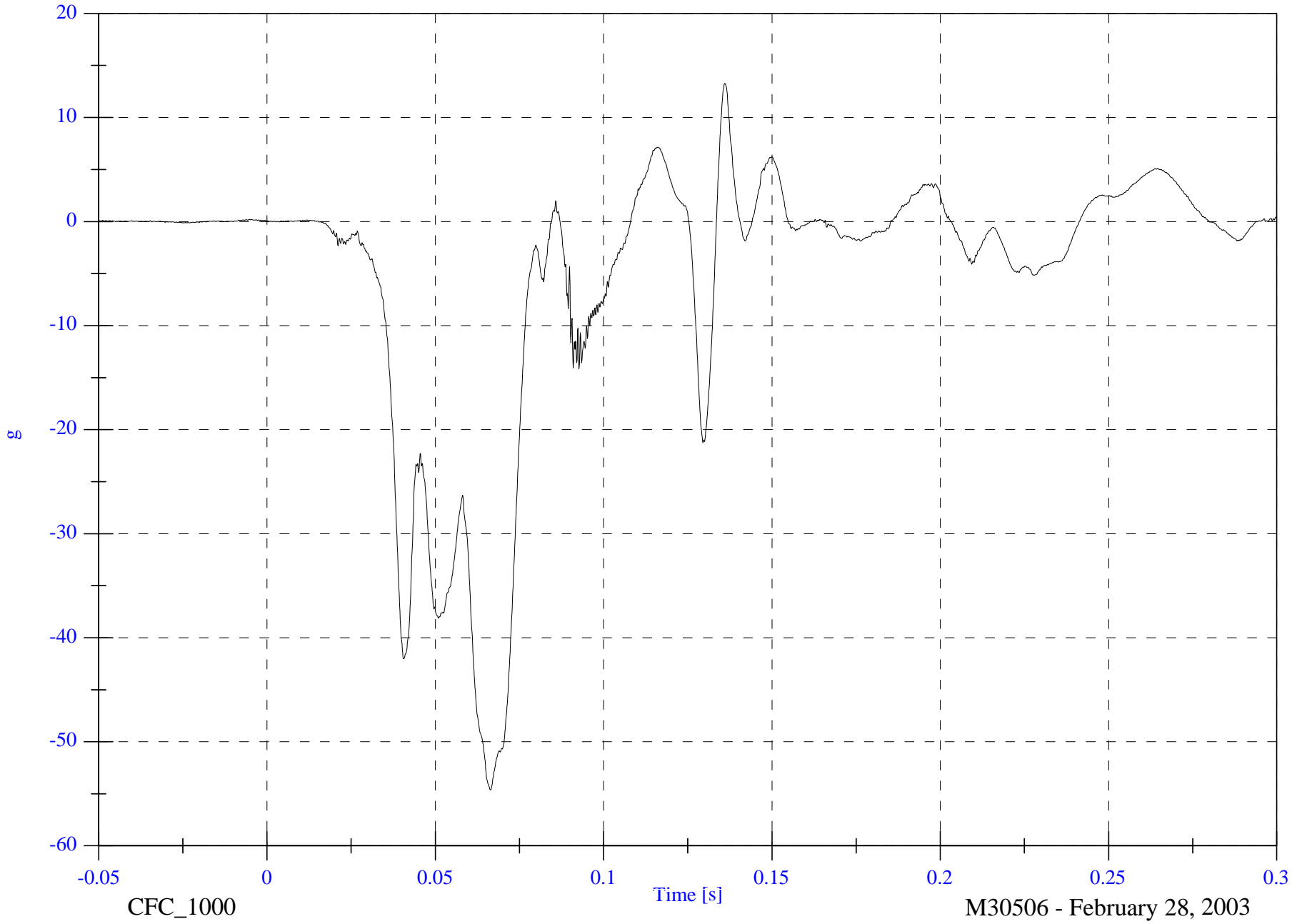
CFC\_600

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 13.3 [g] at 0.136 [s]  
Min: -54.6 [g] at 0.066 [s]

V1P3 Pelvic x



4-29

8642-NCAP-33

CFC\_1000

M30506 - February 28, 2003

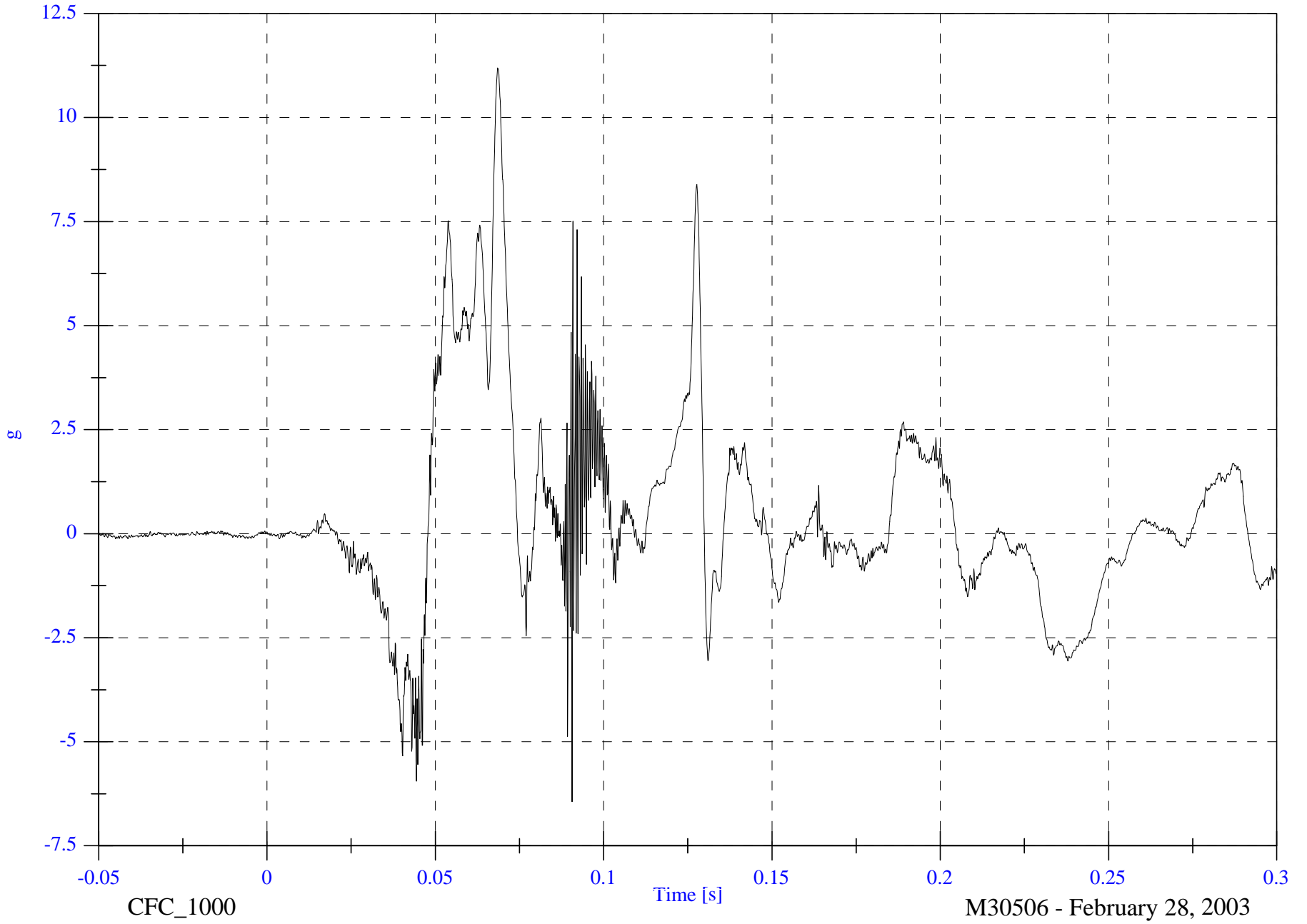
NCAP Test #11 - 2003 Isuzu Rodeo

Max: 11.2 [g] at 0.068 [s]  
Min: -6.4 [g] at 0.091 [s]

V1P3 Pelvic y

4-30

8642-NCAP-33

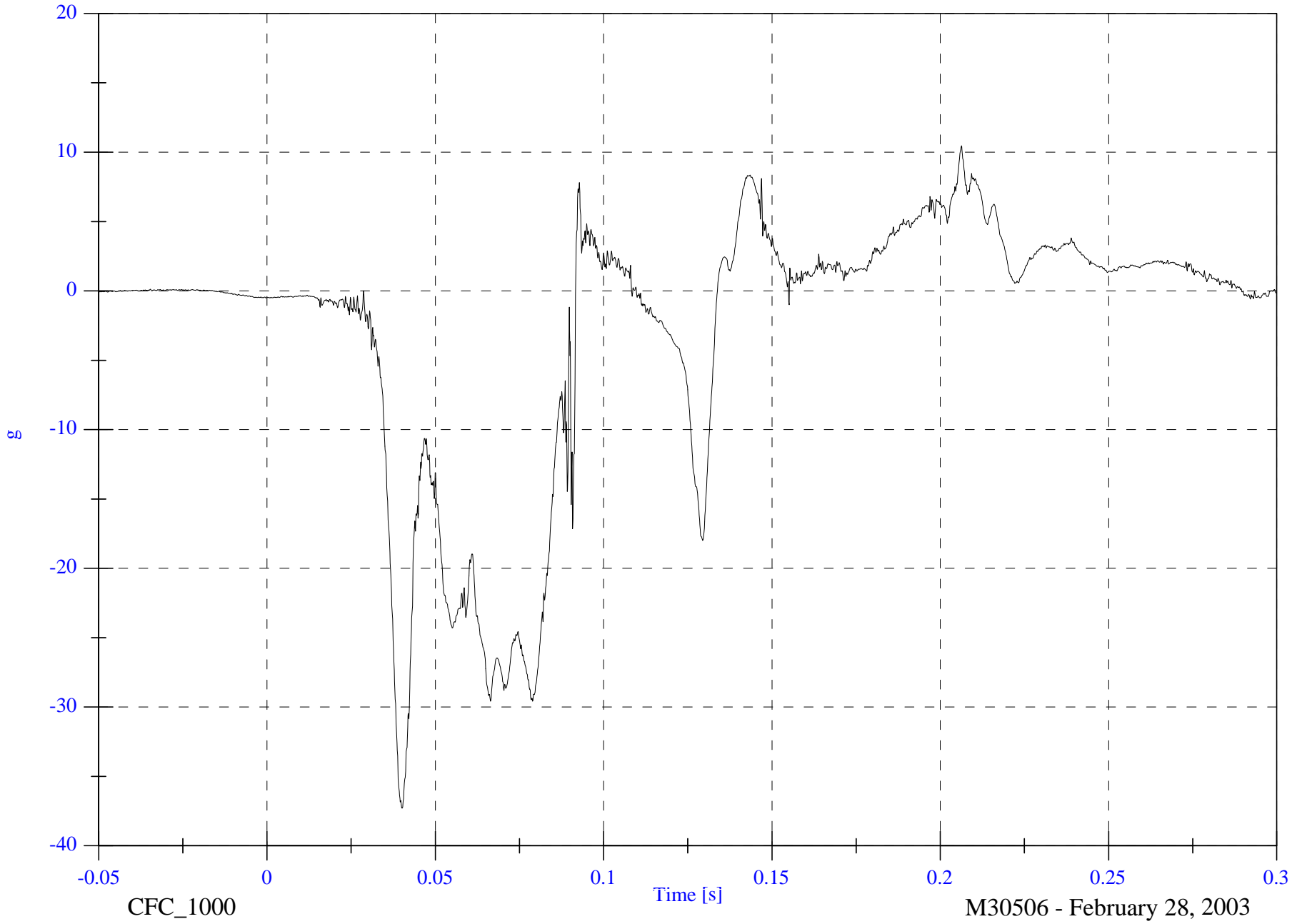


NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 Pelvic z

Max: 10.5 [g] at 0.206 [s]

Min: -37.3 [g] at 0.040 [s]



4-31

8642-NCAP-33

CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

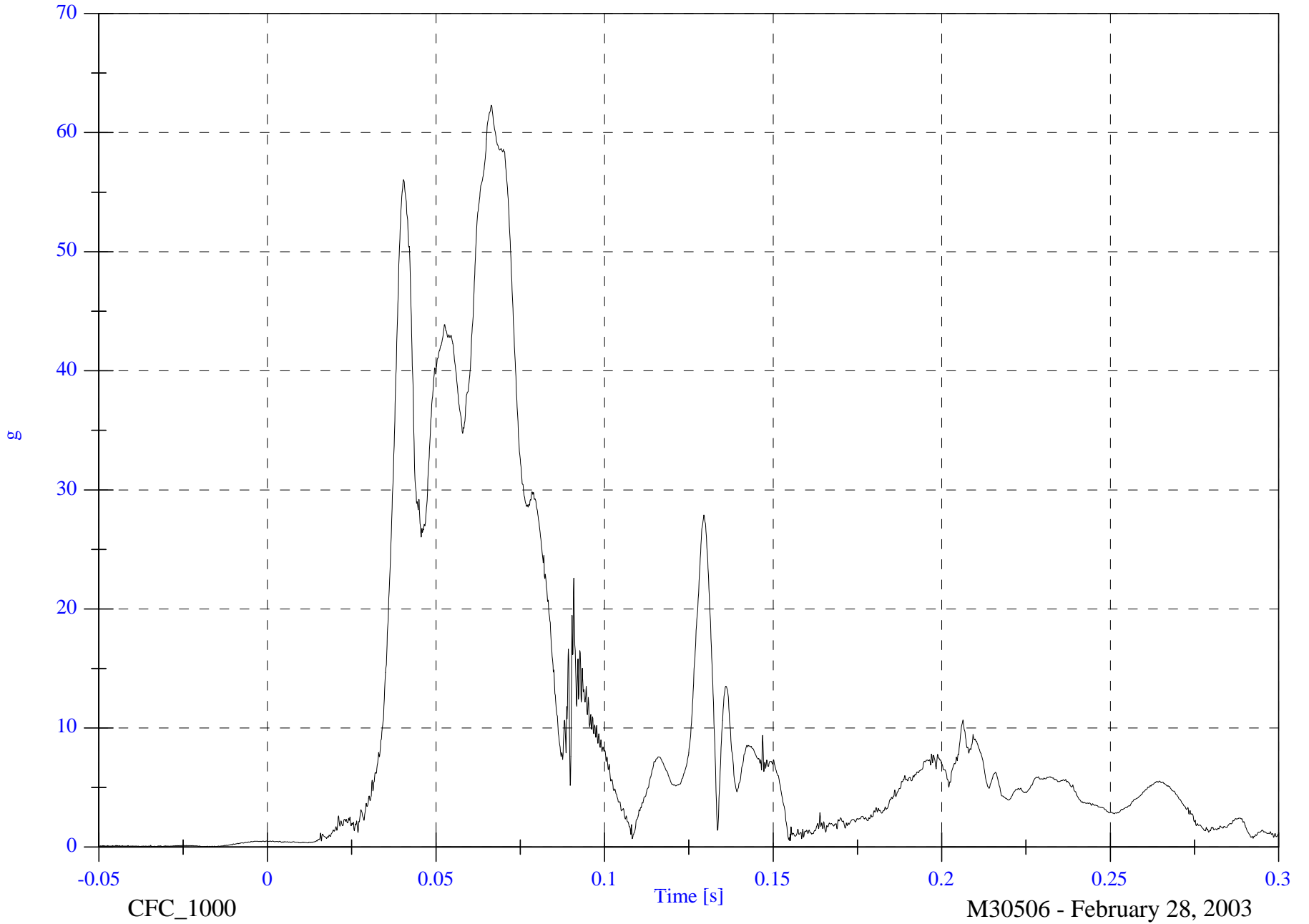
V1P3 Pelvic Resultant

Max: 62.3 [g] at 0.066 [s]

Min: 0.0 [g] at -0.017 [s]

4-32

8642-NCAP-33



NCAP Test #11 - 2003 Isuzu Rodeo

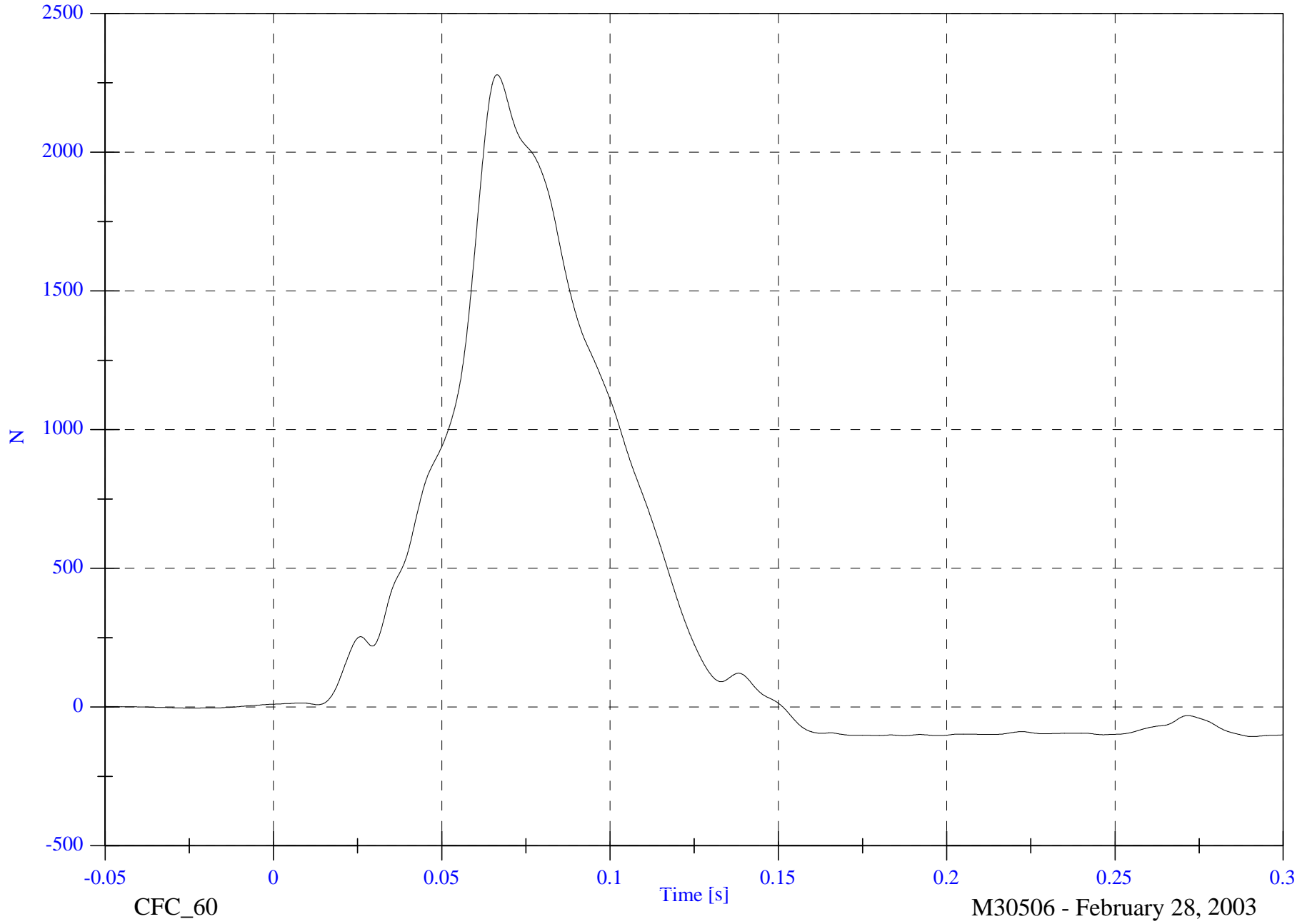
V1P3 Top Tether Load

Max: 2279.3 [N] at 0.067 [s]

Min: -106.4 [N] at 0.291 [s]

4-33

8642-NCAP-33



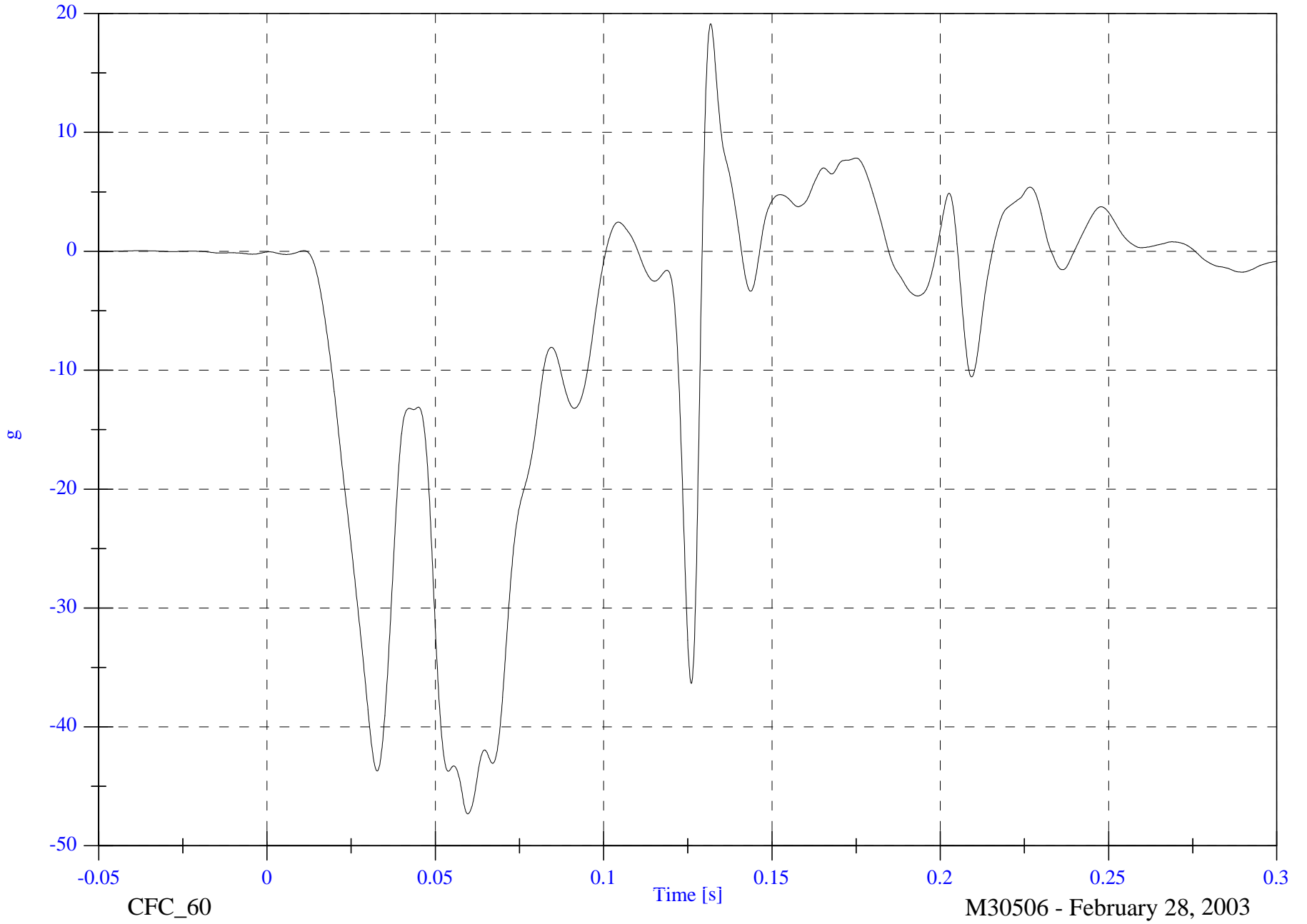
NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 CRS x

Max: 19.1 [g] at 0.132 [s]  
Min: -47.3 [g] at 0.060 [s]

4-34

8642-NCAP-33



CFC\_60

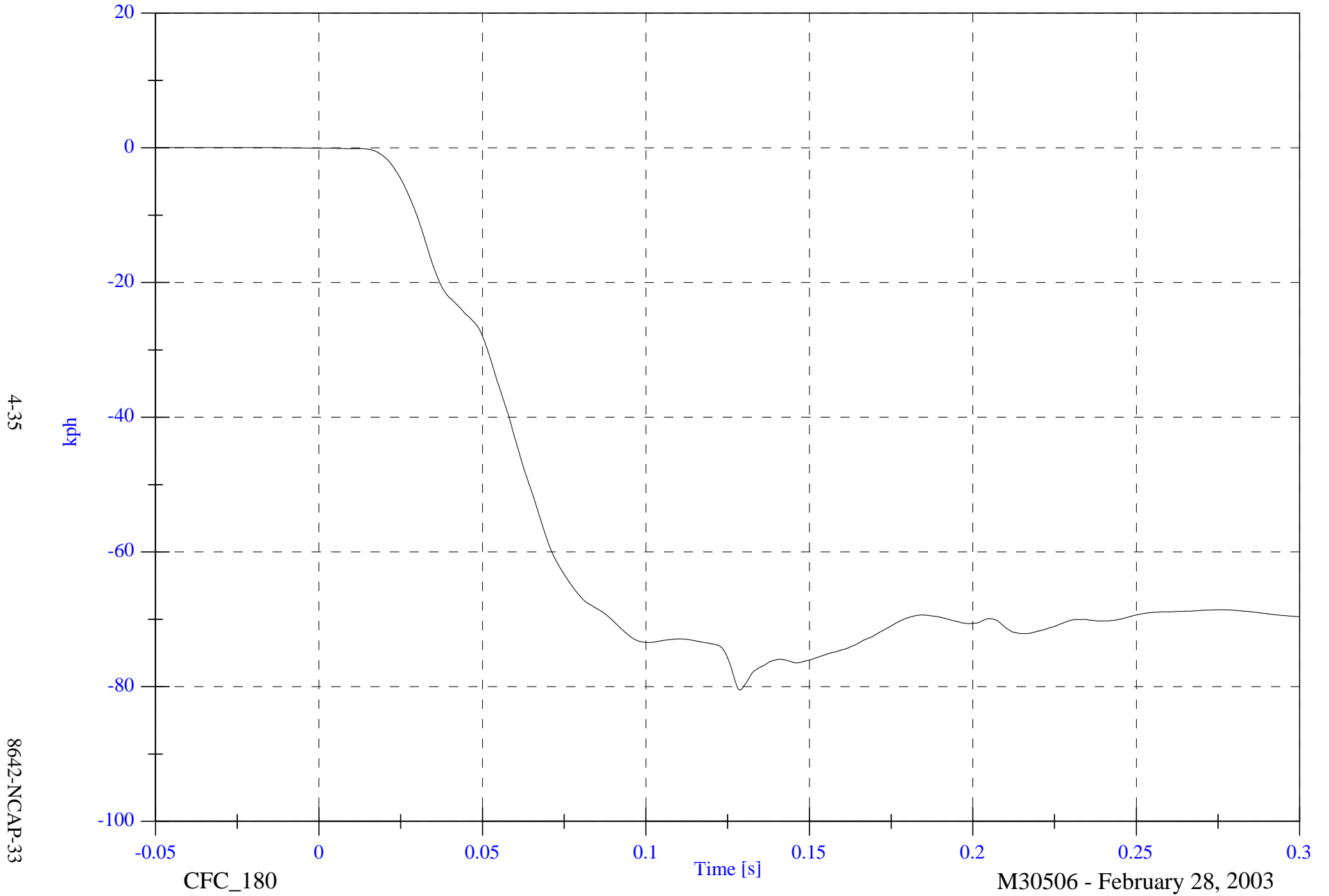
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 0.0 [kph] at -0.032 [s]

Min: -80.5 [kph] at 0.129 [s]

V1P3 CRS x Velocity



4-35

8642-NCAP-33

CFC\_180

Time [s]

M30506 - February 28, 2003

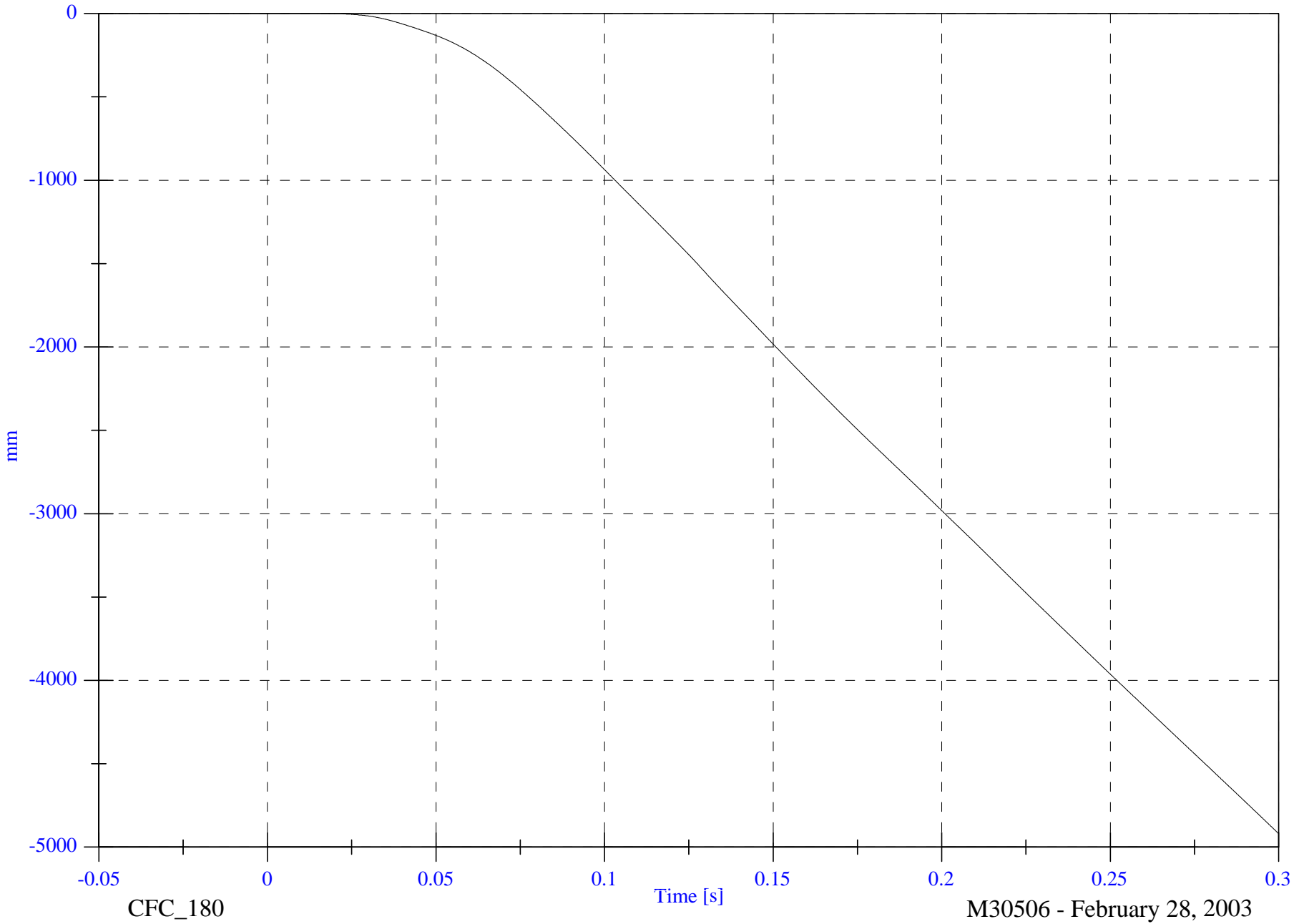
NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 CRS x Displacement

Max: 0.1 [mm] at -0.010 [s]  
Min: -4918.1 [mm] at 0.300 [s]

4-36

8642-NCAP-33



CFC\_180

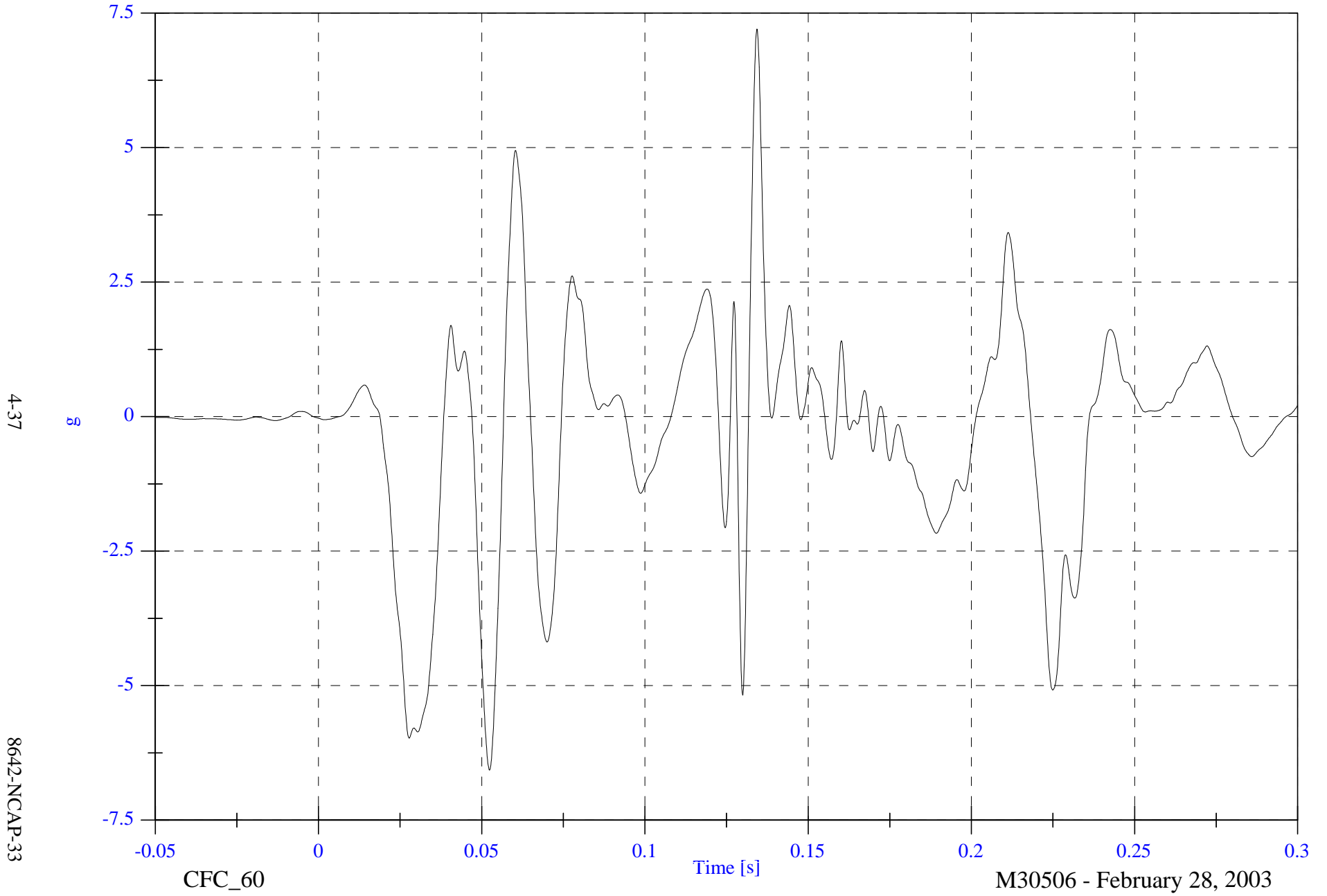
Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 7.2 [g] at 0.134 [s]  
Min: -6.6 [g] at 0.052 [s]

V1P3 CRS y



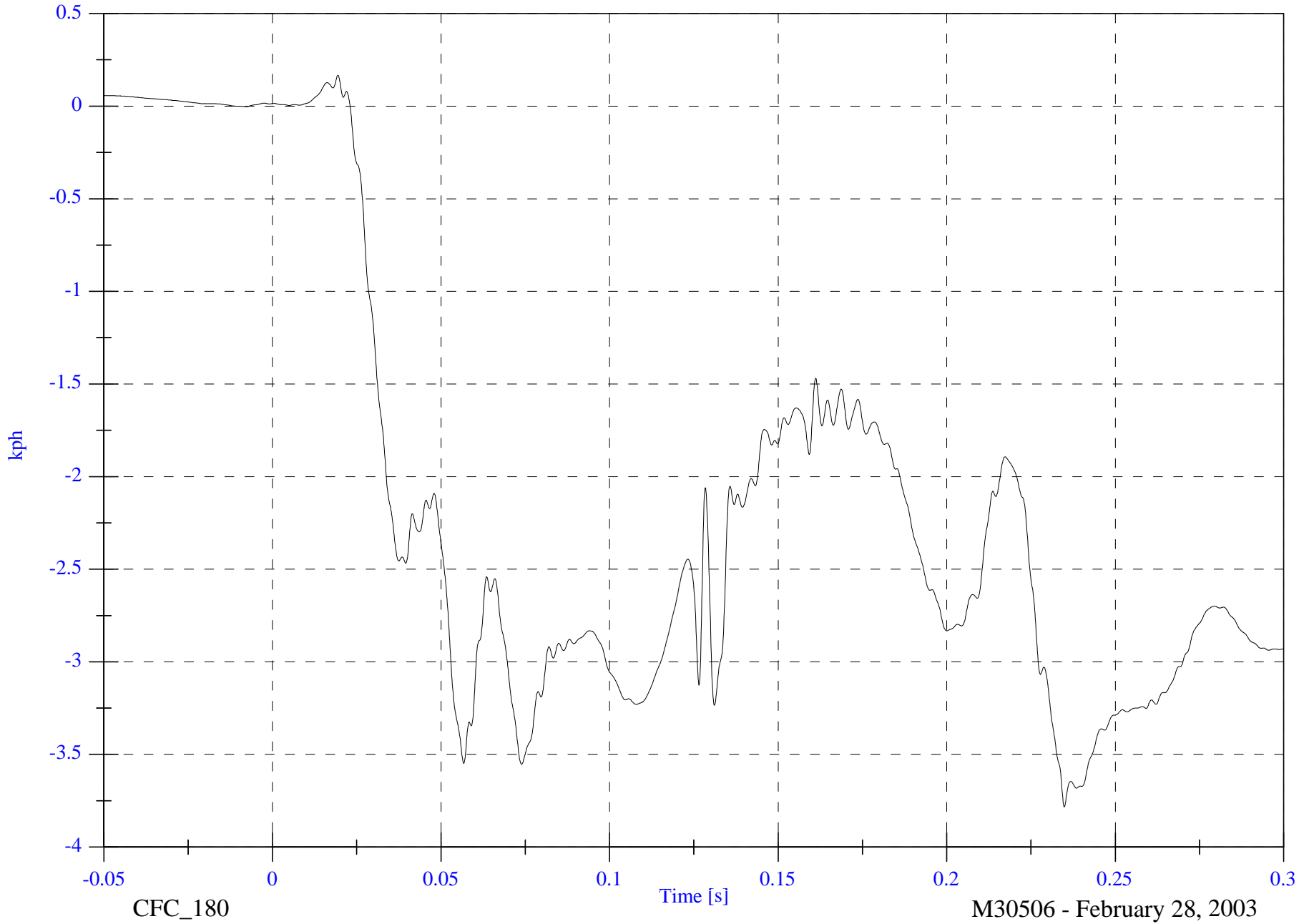
NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 CRS y Velocity

Max: 0.2 [kph] at 0.020 [s]  
Min: -3.8 [kph] at 0.235 [s]

4-38

8642-NCAP-33



CFC\_180

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

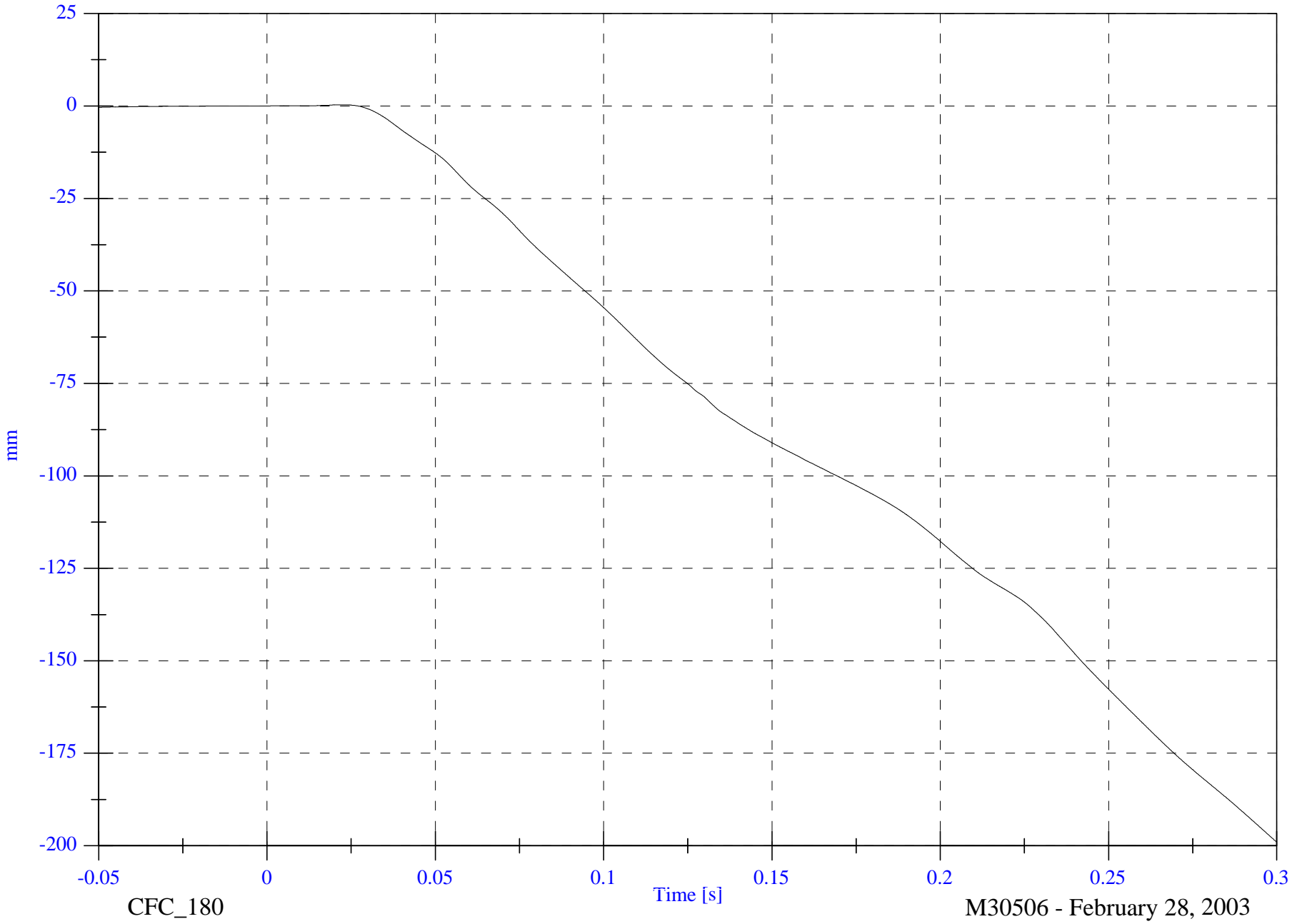
V1P3 CRS y Displacement

Max: 0.3 [mm] at 0.023 [s]

Min: -199.0 [mm] at 0.300 [s]

4-39

8642-NCAP-33



CFC\_180

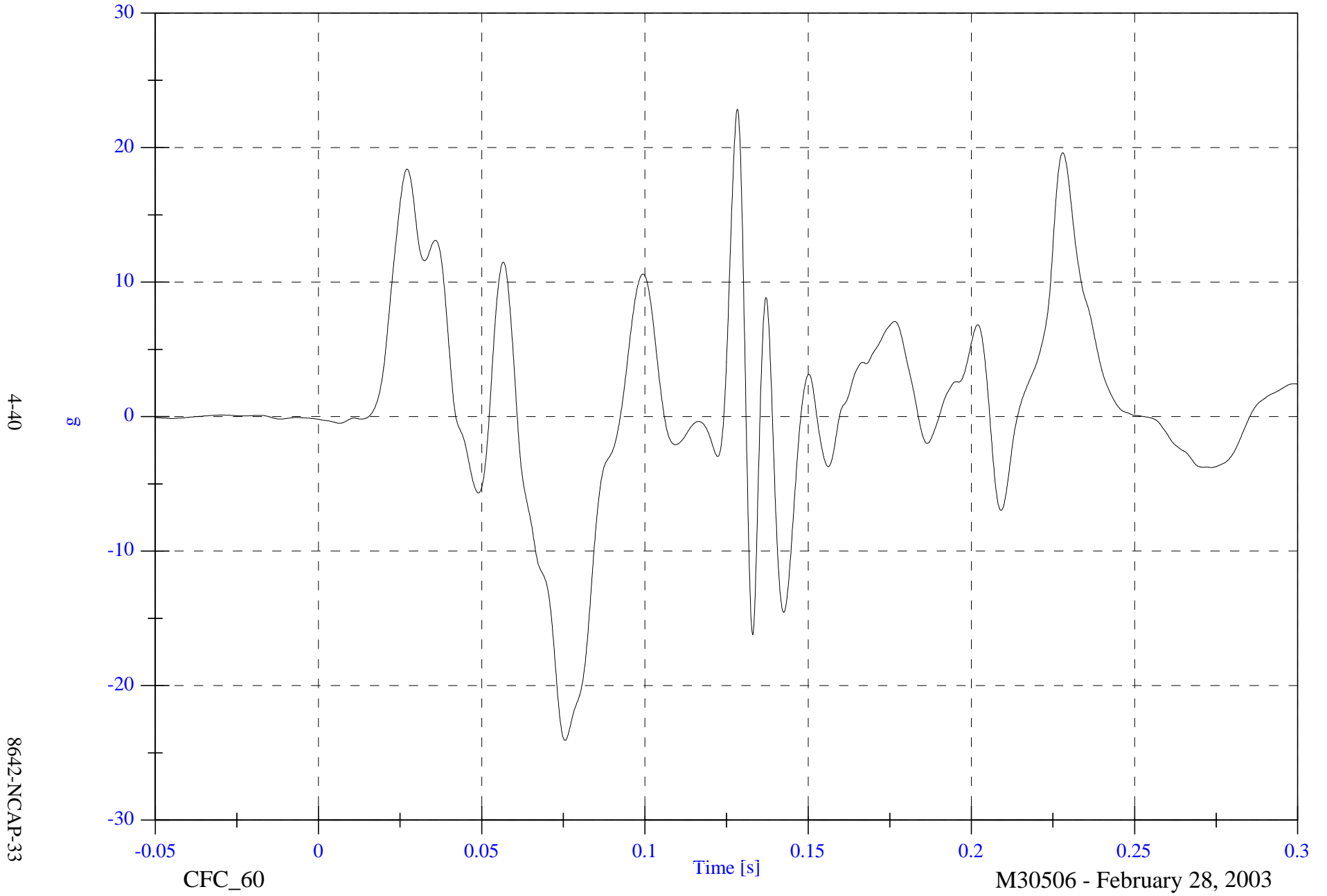
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 22.8 [g] at 0.128 [s]

Min: -24.1 [g] at 0.076 [s]

V1P3 CRS z

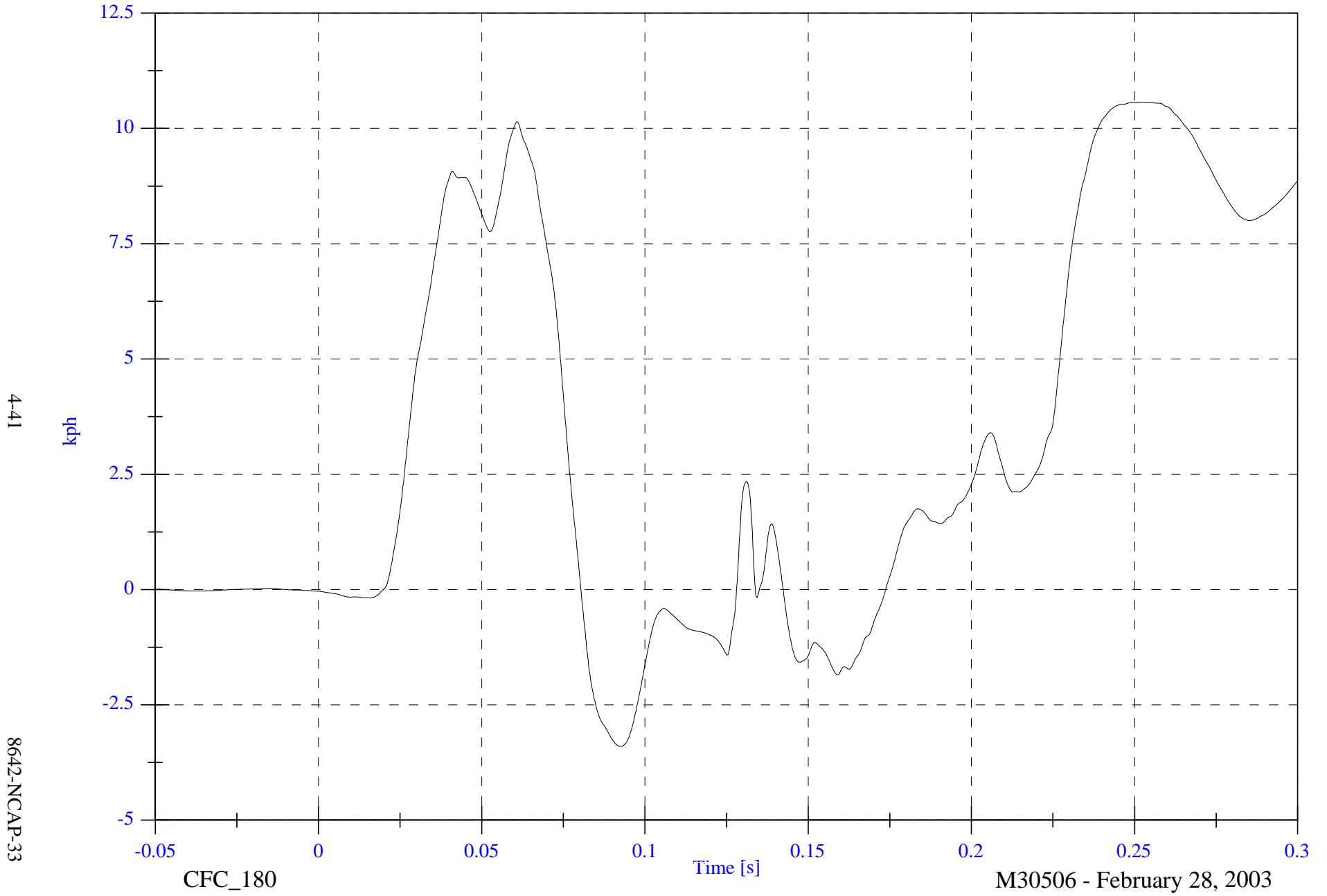


NCAP Test #11 - 2003 Isuzu Rodeo

V1P3 CRS z Velocity

Max: 10.6 [kph] at 0.252 [s]

Min: -3.4 [kph] at 0.092 [s]



4-41

8642-NCAP-33

CFC\_180

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

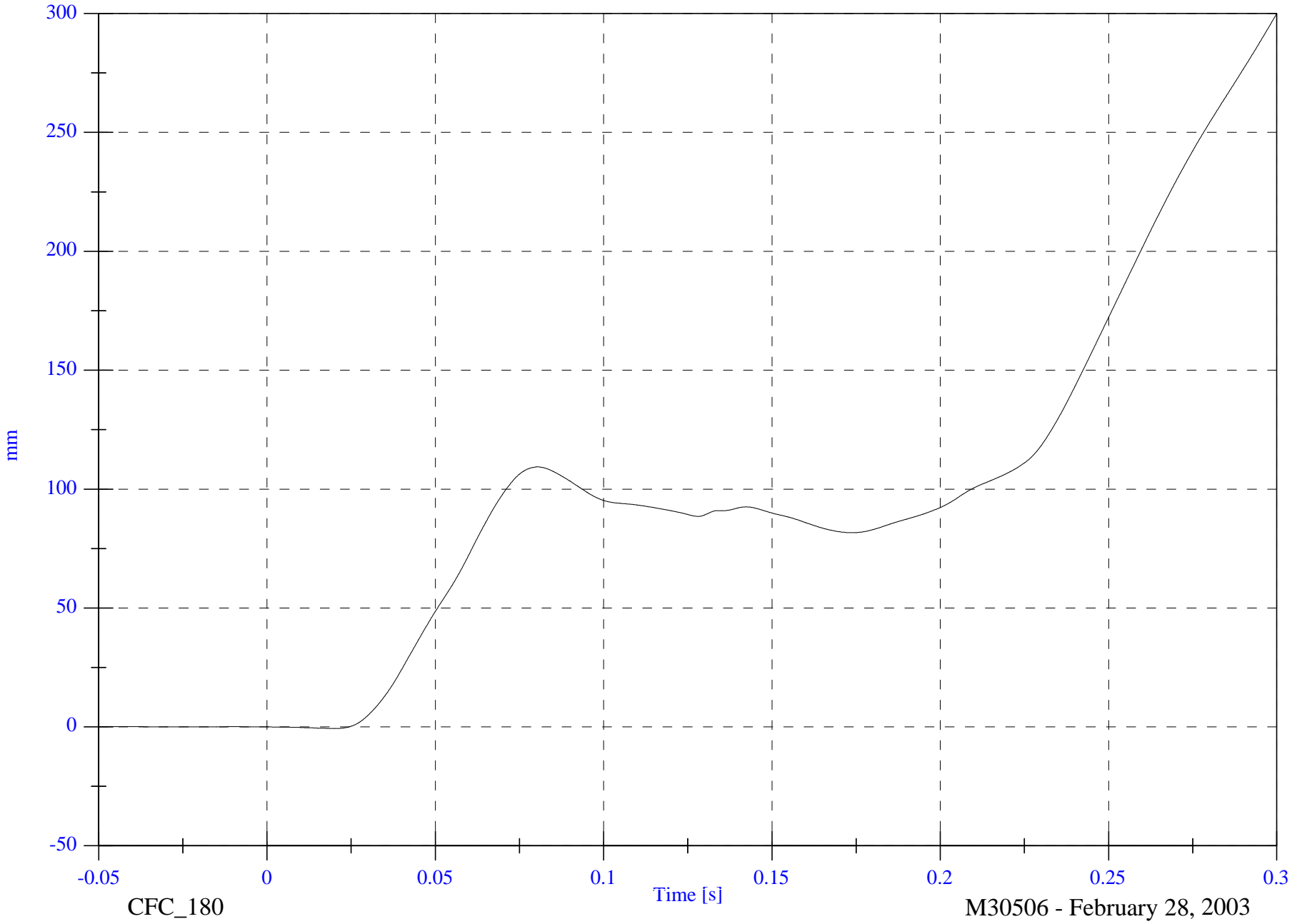
V1P3 CRS z Displacement

Max: 299.8 [mm] at 0.300 [s]

Min: -0.7 [mm] at 0.020 [s]

4-42

8642-NCAP-33



NCAP Test #11 - 2003 Isuzu Rodeo

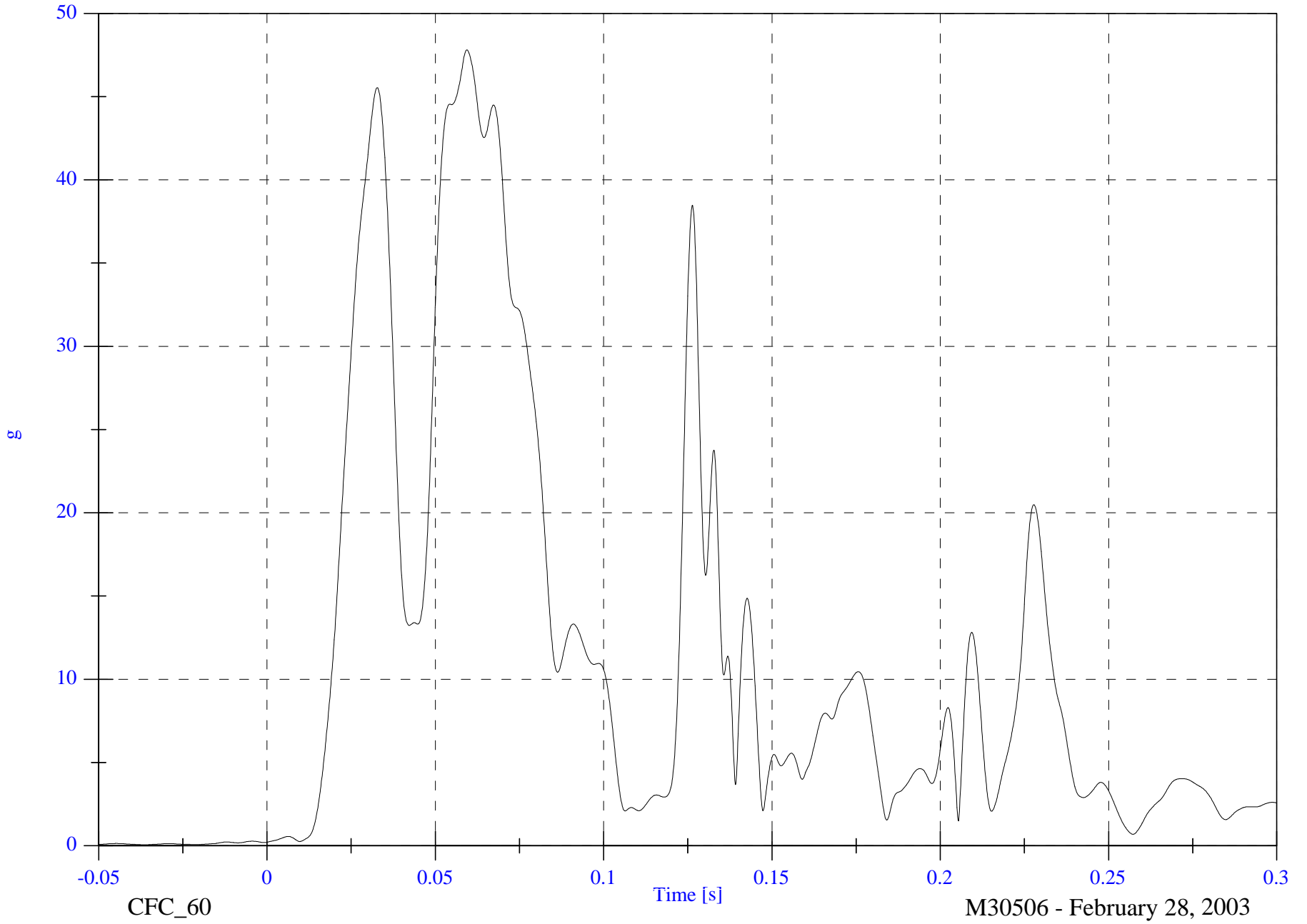
V1P3 CRS Resultant

Max: 47.8 [g] at 0.059 [s]

Min: 0.1 [g] at -0.036 [s]

4-43

8642-NCAP-33



CFC\_60

M30506 - February 28, 2003

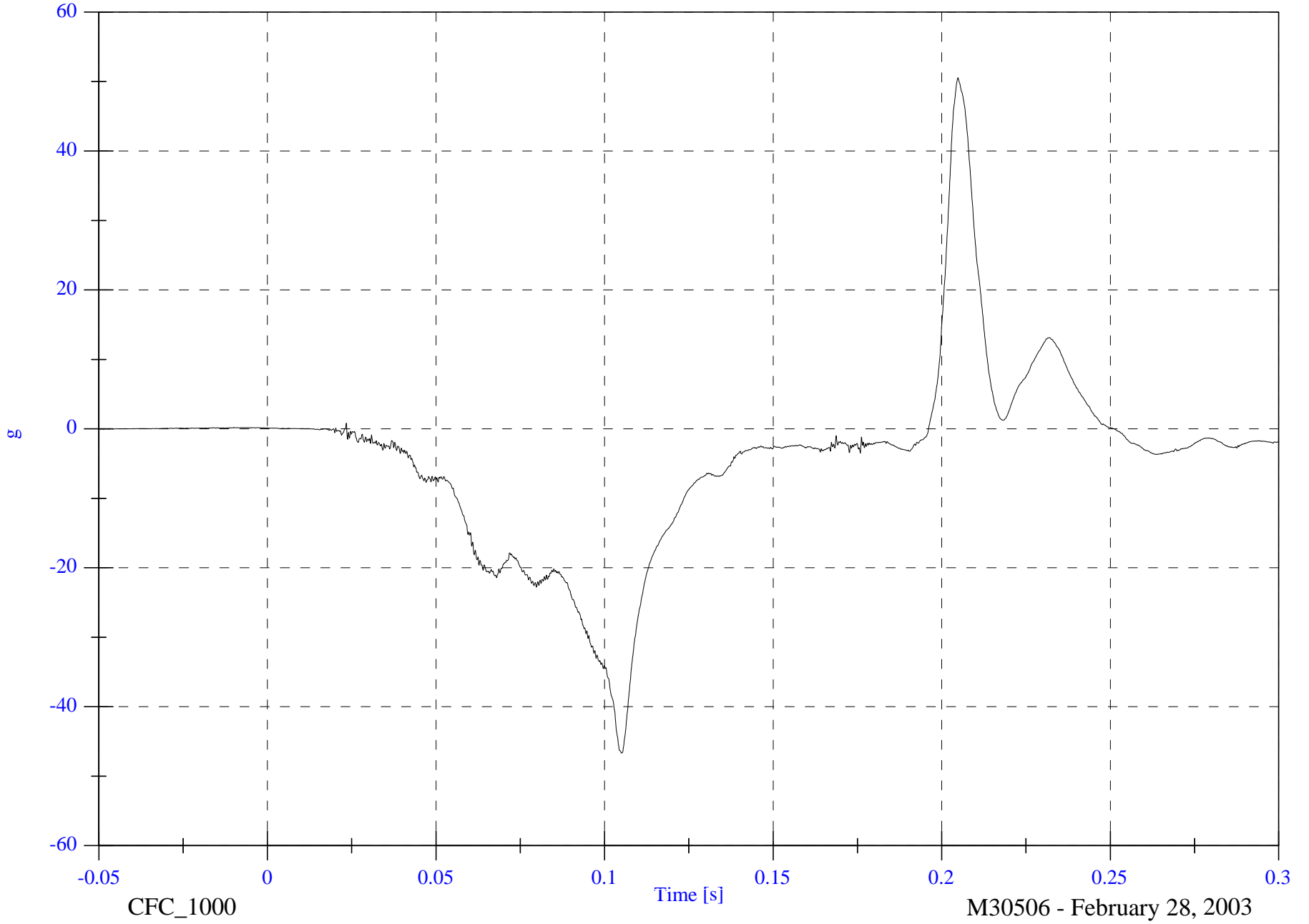
NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 Head x

Max: 50.5 [g] at 0.205 [s]  
Min: -46.7 [g] at 0.105 [s]

4-44

8642-NCAP-33



CFC\_1000

M30506 - February 28, 2003

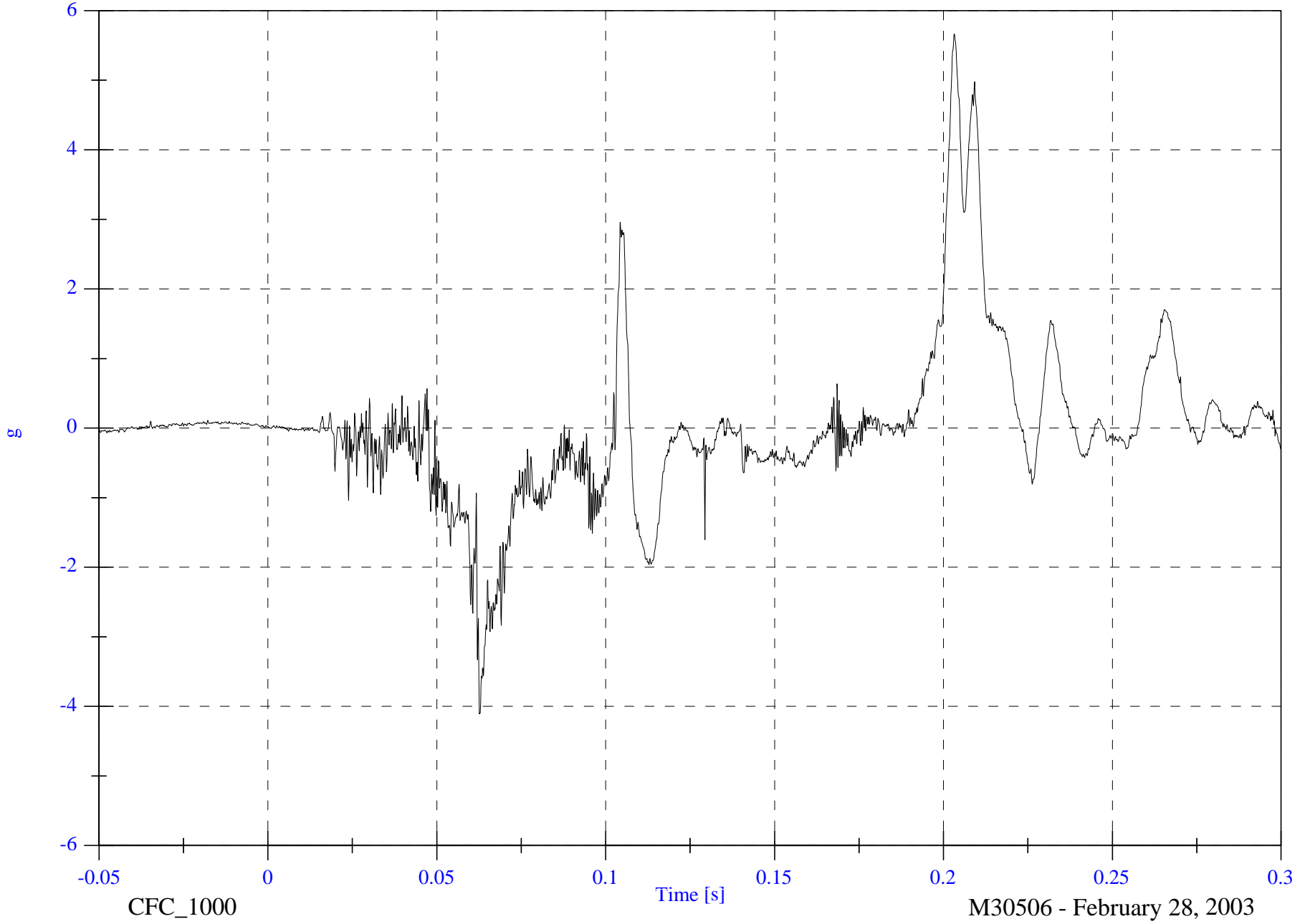
NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 Head y

Max: 5.7 [g] at 0.203 [s]  
Min: -4.1 [g] at 0.063 [s]

4-45

8642-NCAP-33



CFC\_1000

Time [s]

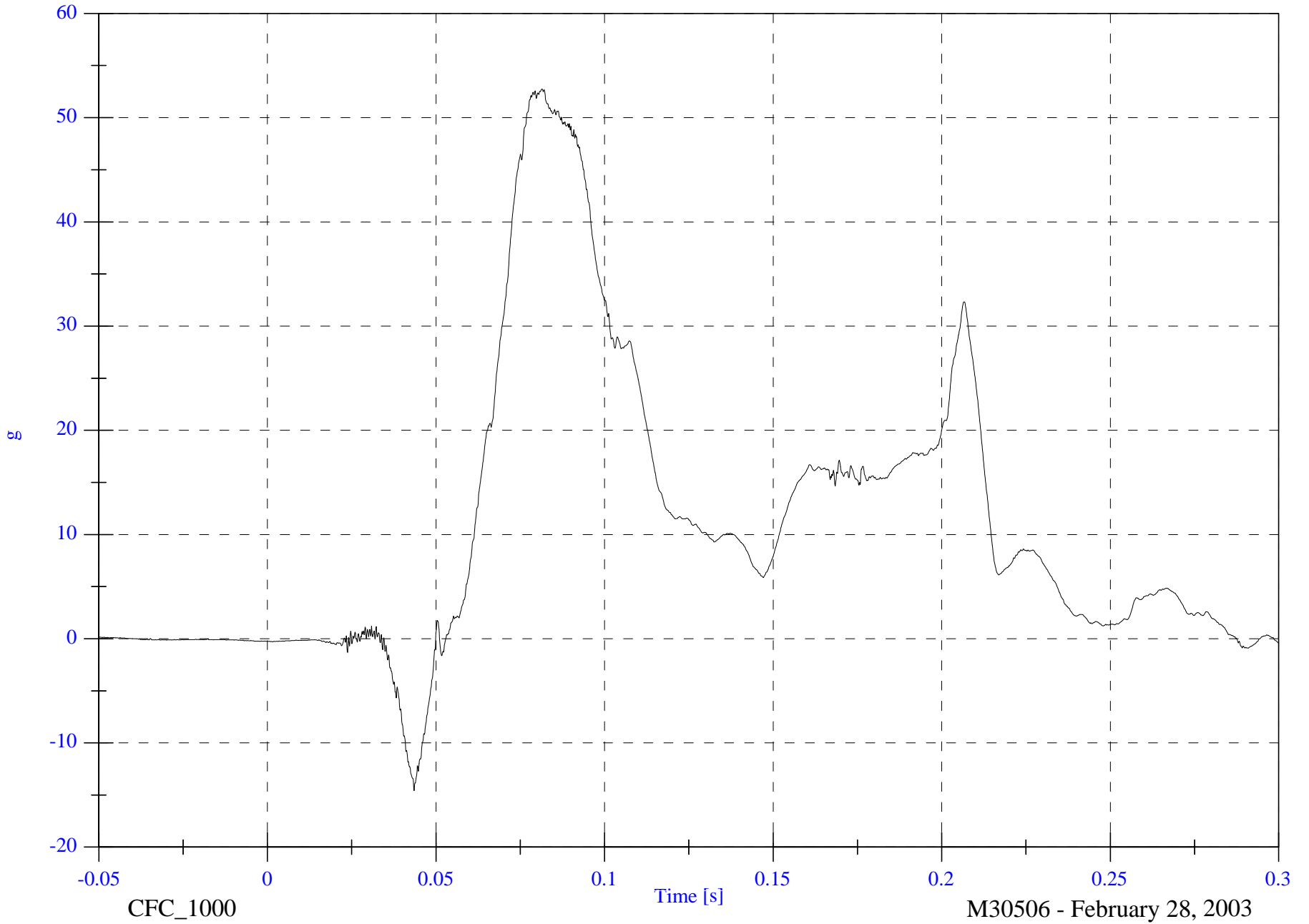
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 Head z

Max: 52.8 [g] at 0.081 [s]

Min: -14.6 [g] at 0.043 [s]



4-46

8642-NCAP-33

CFC\_1000

Time [s]

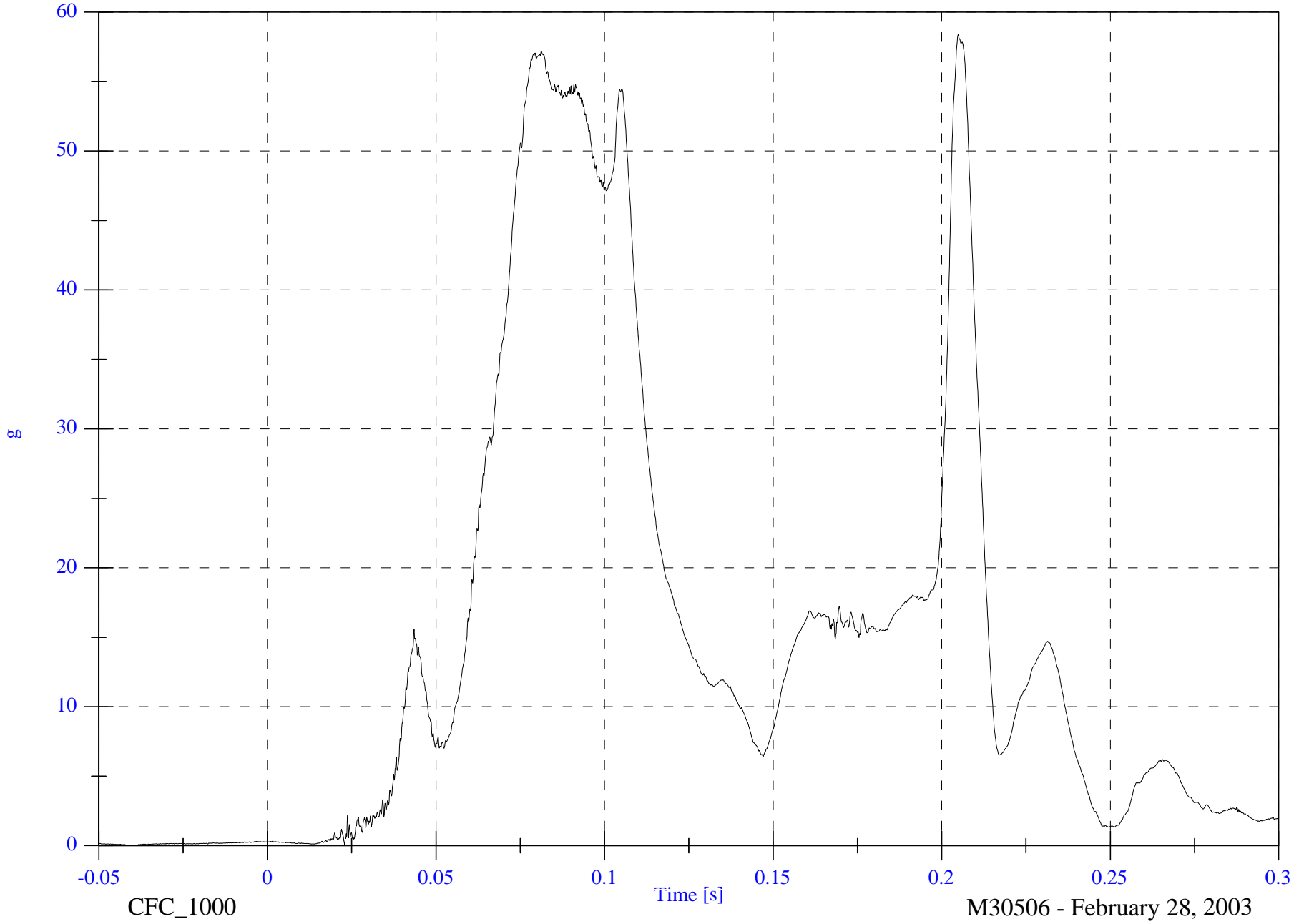
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 Head Resultant

Max: 58.4 [g] at 0.205 [s]

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



4-47

8642-NCAP-33

CFC\_1000

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

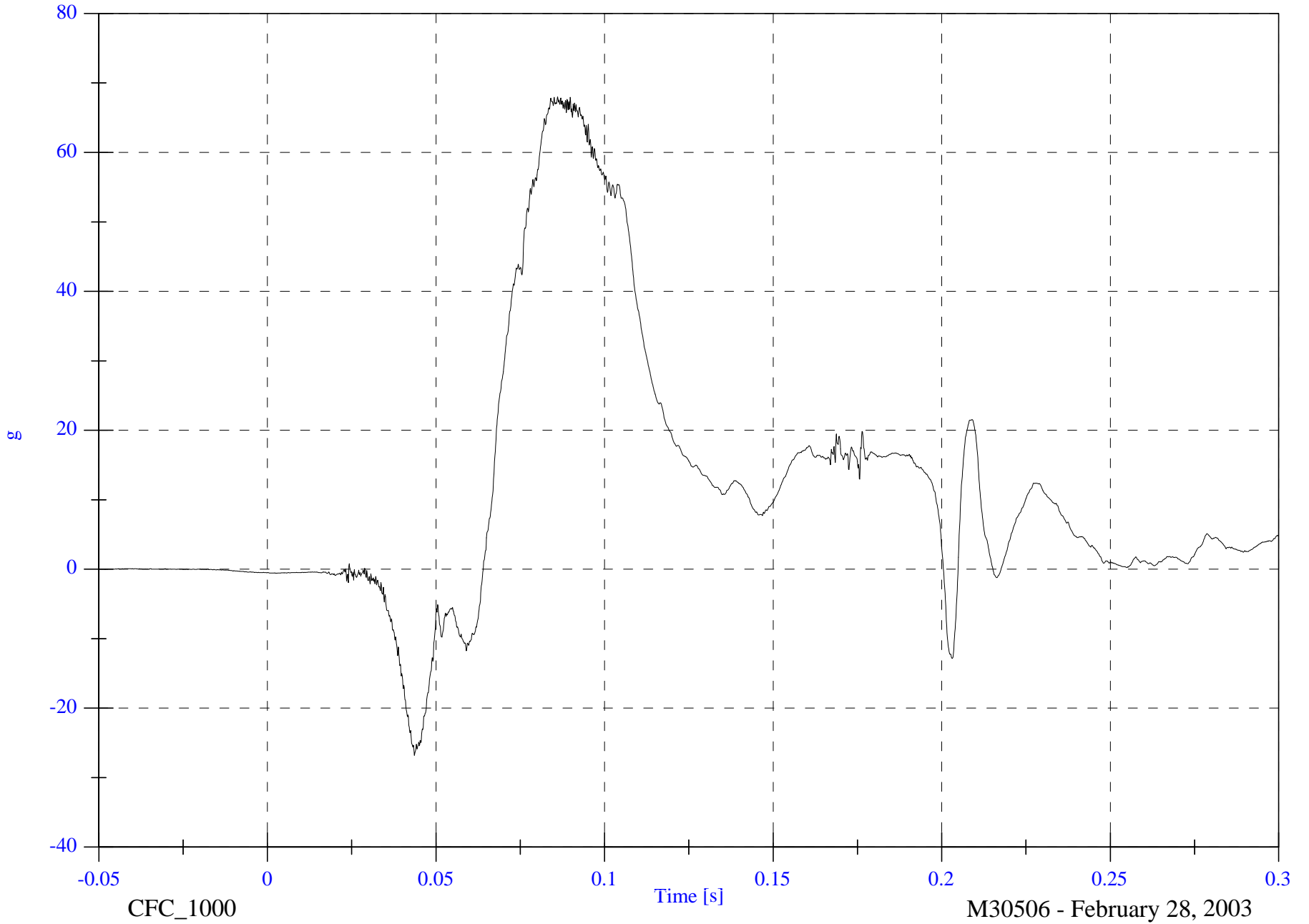
V1P4 Head Rear z

Max: 68.0 [g] at 0.086 [s]

Min: -26.8 [g] at 0.044 [s]

4-48

8642-NCAP-33

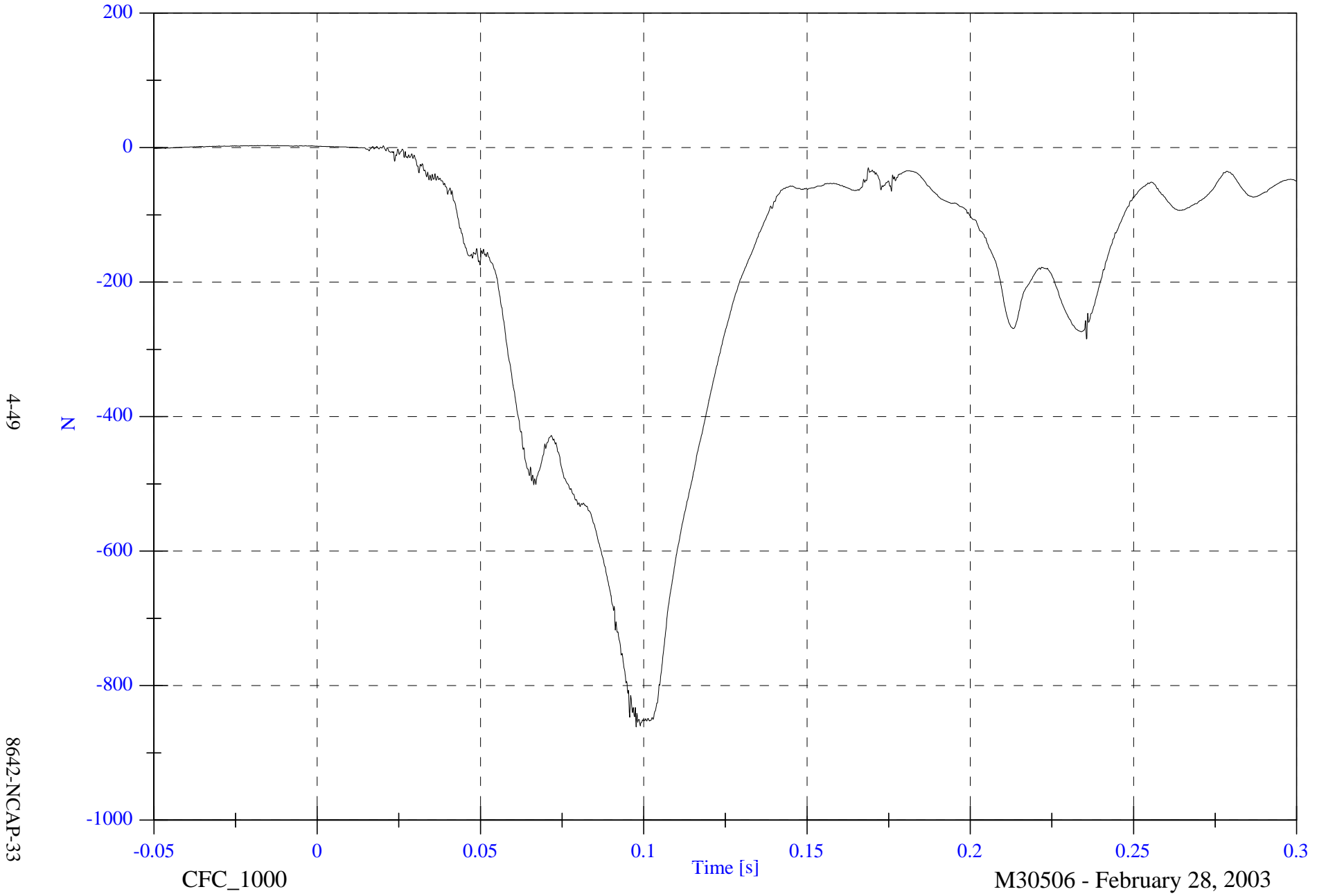


NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 Upper Neck Fx

Max: 3.1 [N] at -0.015 [s]

Min: -861.5 [N] at 0.098 [s]



4-49

8642-NCAP-33

CFC\_1000

Time [s]

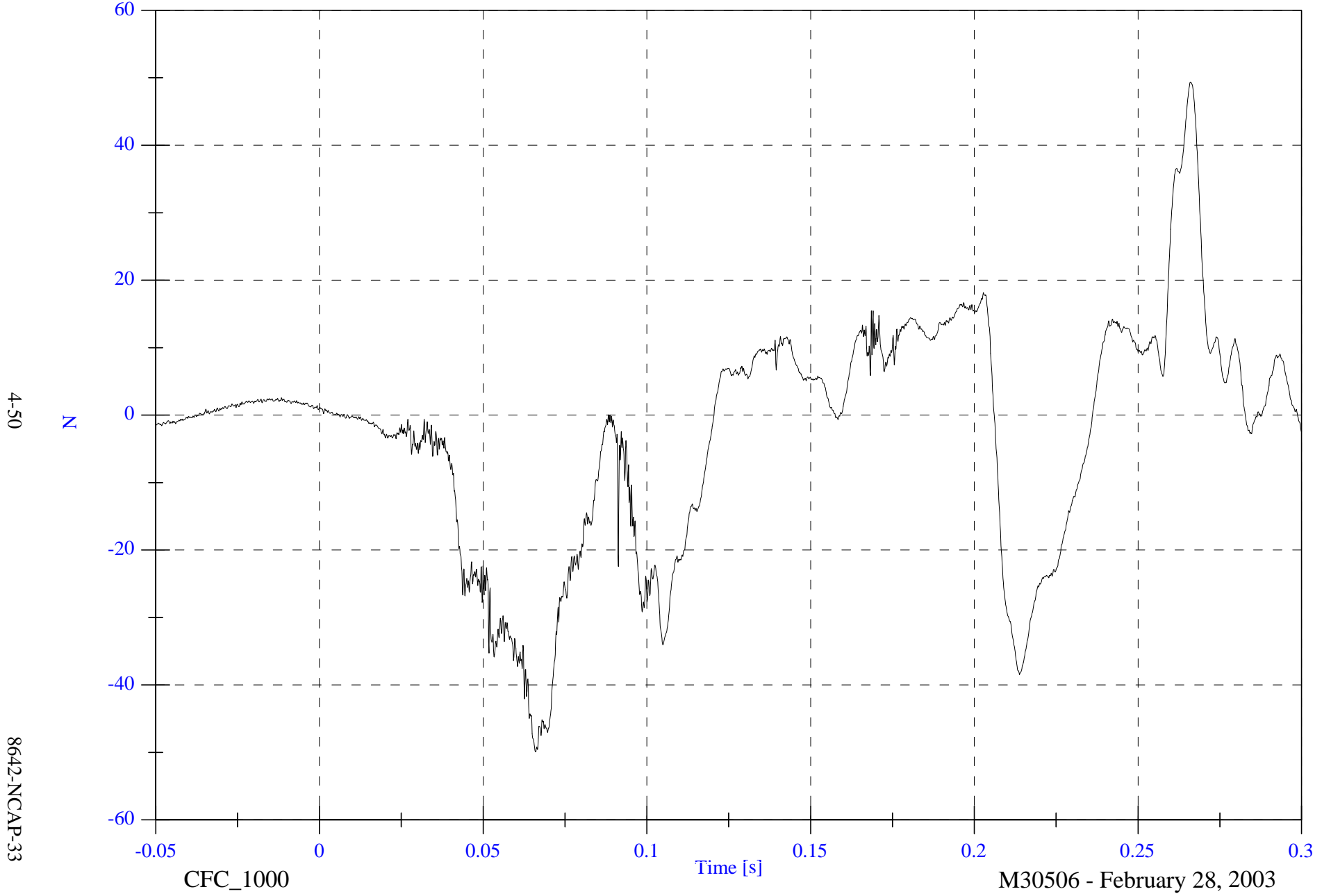
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 Upper Neck Fy

Max: 49.4 [N] at 0.266 [s]

Min: -49.9 [N] at 0.066 [s]



4-50

N

8642-NCAP-33

CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

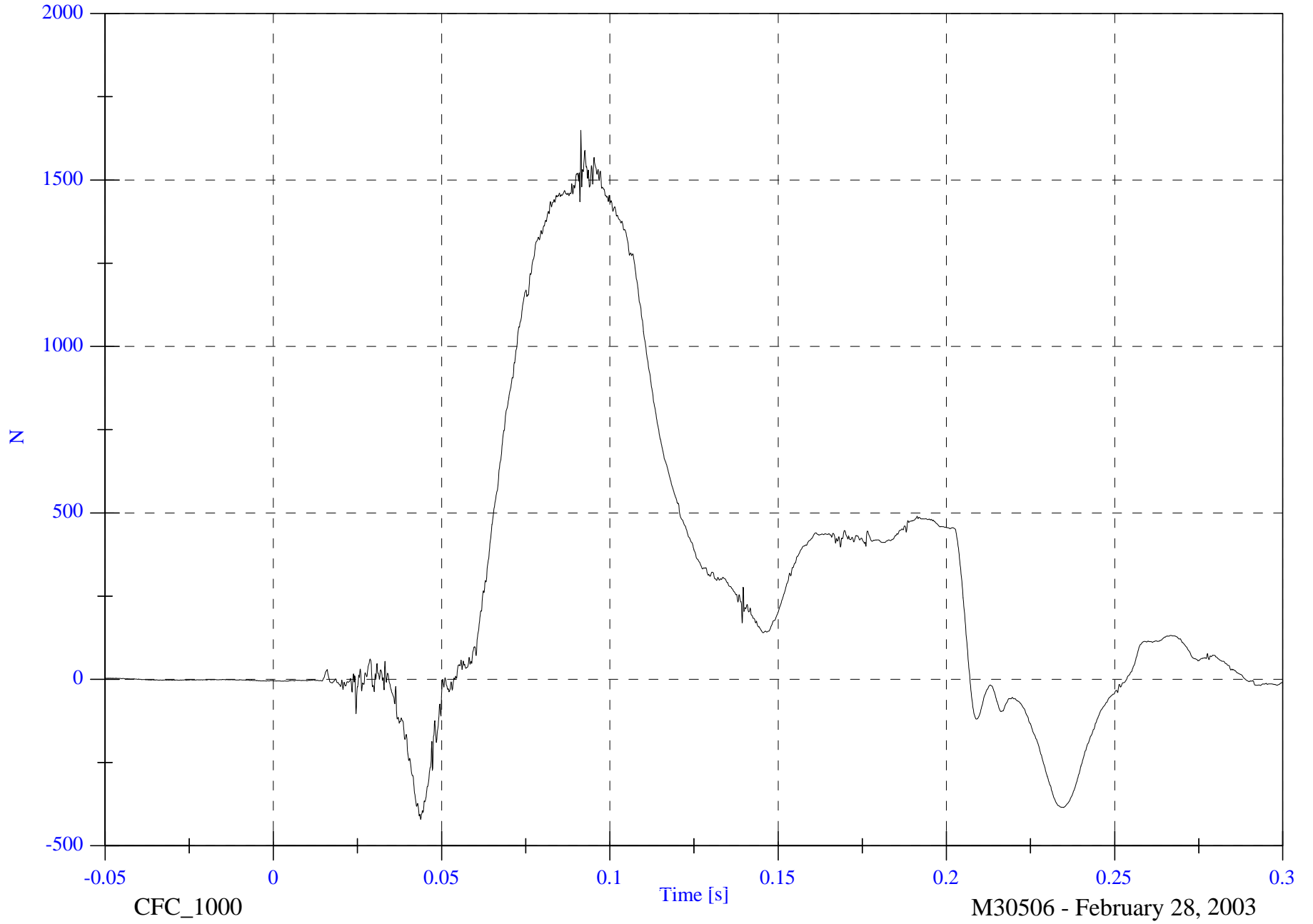
Max: 1648.6 [N] at 0.091 [s]

V1P4 Upper Neck Fz

Min: -421.1 [N] at 0.044 [s]

4-51

8642-NCAP-33



NCAP Test #11 - 2003 Isuzu Rodeo

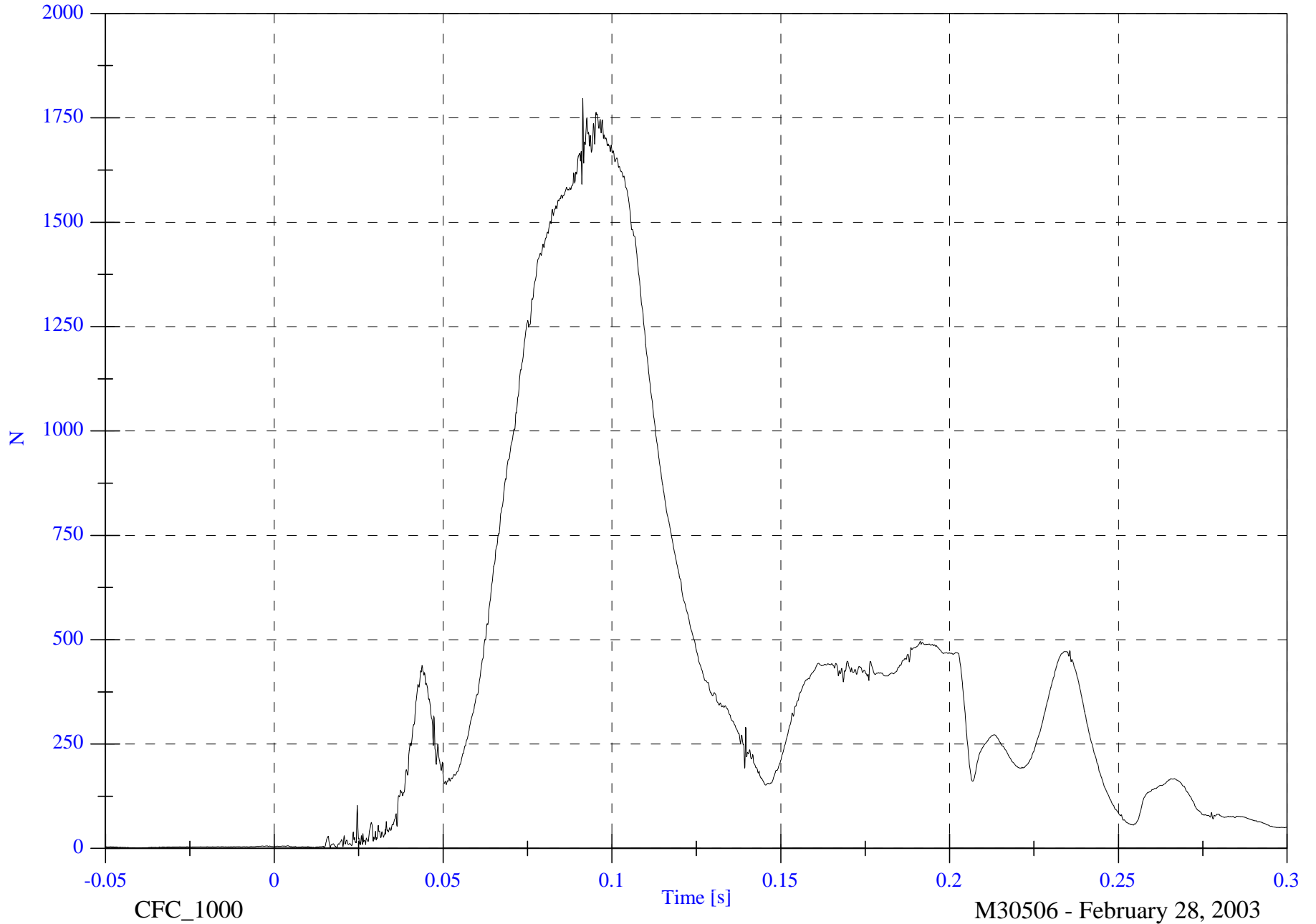
Max: 1796.2 [N] at 0.091 [s]

V1P4 Upper Neck F Resultant

Min: 0.7 [N] at -0.040 [s]

4-52

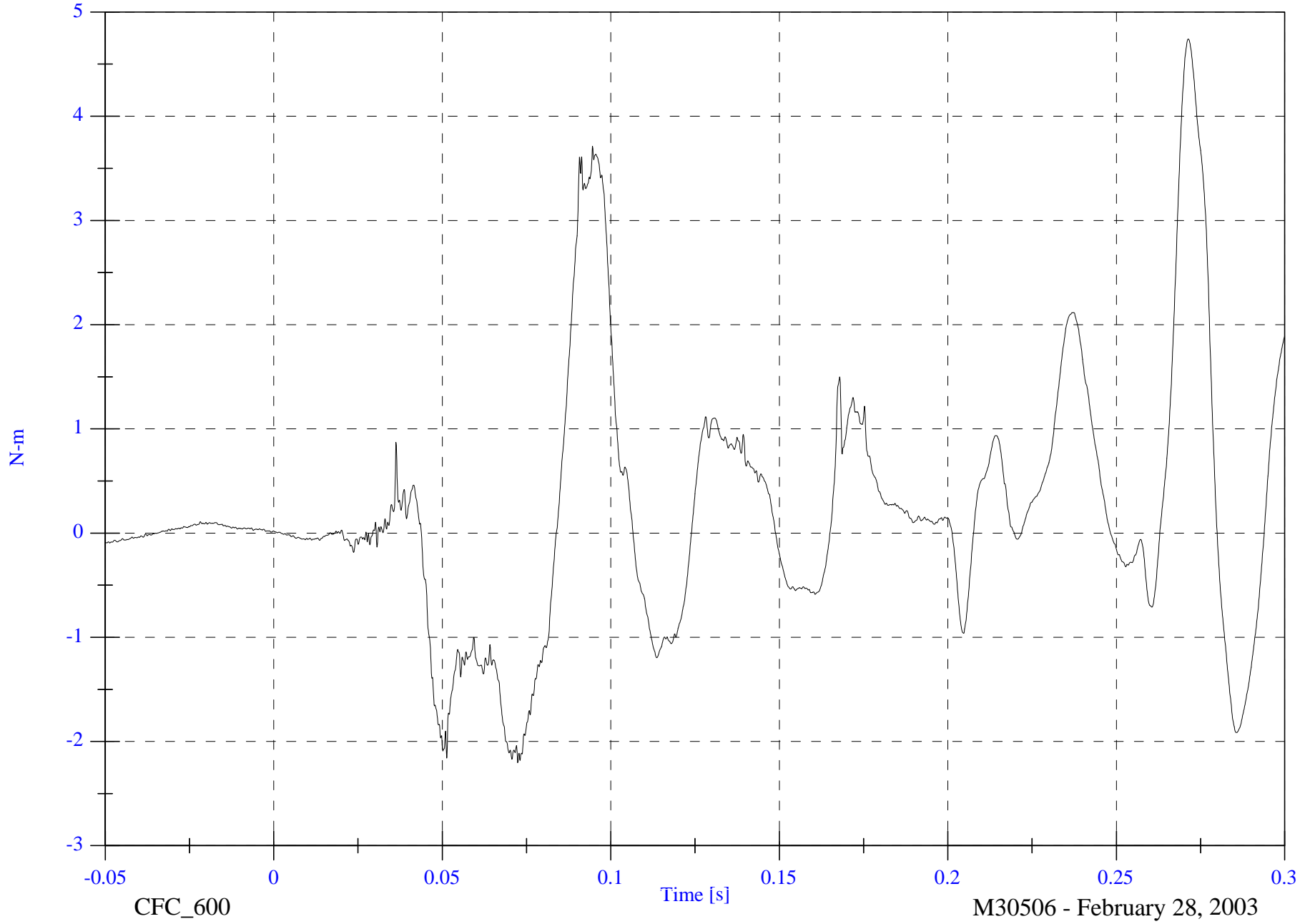
8642-NCAP-33



NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 Upper Neck Mx

Max: 4.7 [N-m] at 0.271 [s]  
Min: -2.2 [N-m] at 0.072 [s]



4-53

8642-NCAP-33

CFC\_600

Time [s]

M30506 - February 28, 2003

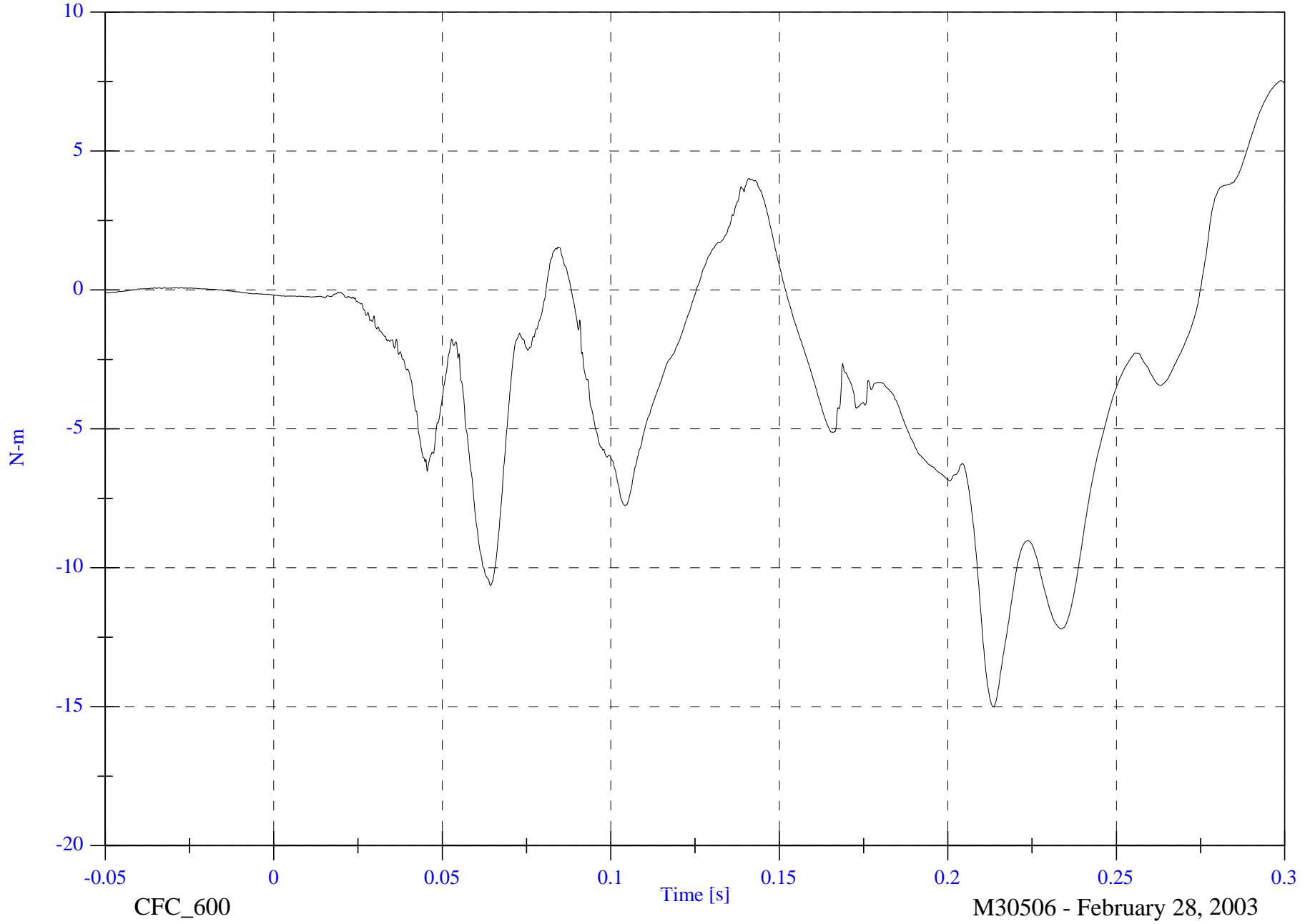
NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 Upper Neck My

Max: 7.5 [N-m] at 0.299 [s]  
Min: -15.0 [N-m] at 0.213 [s]

4-54

8642-NCAP-33



CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

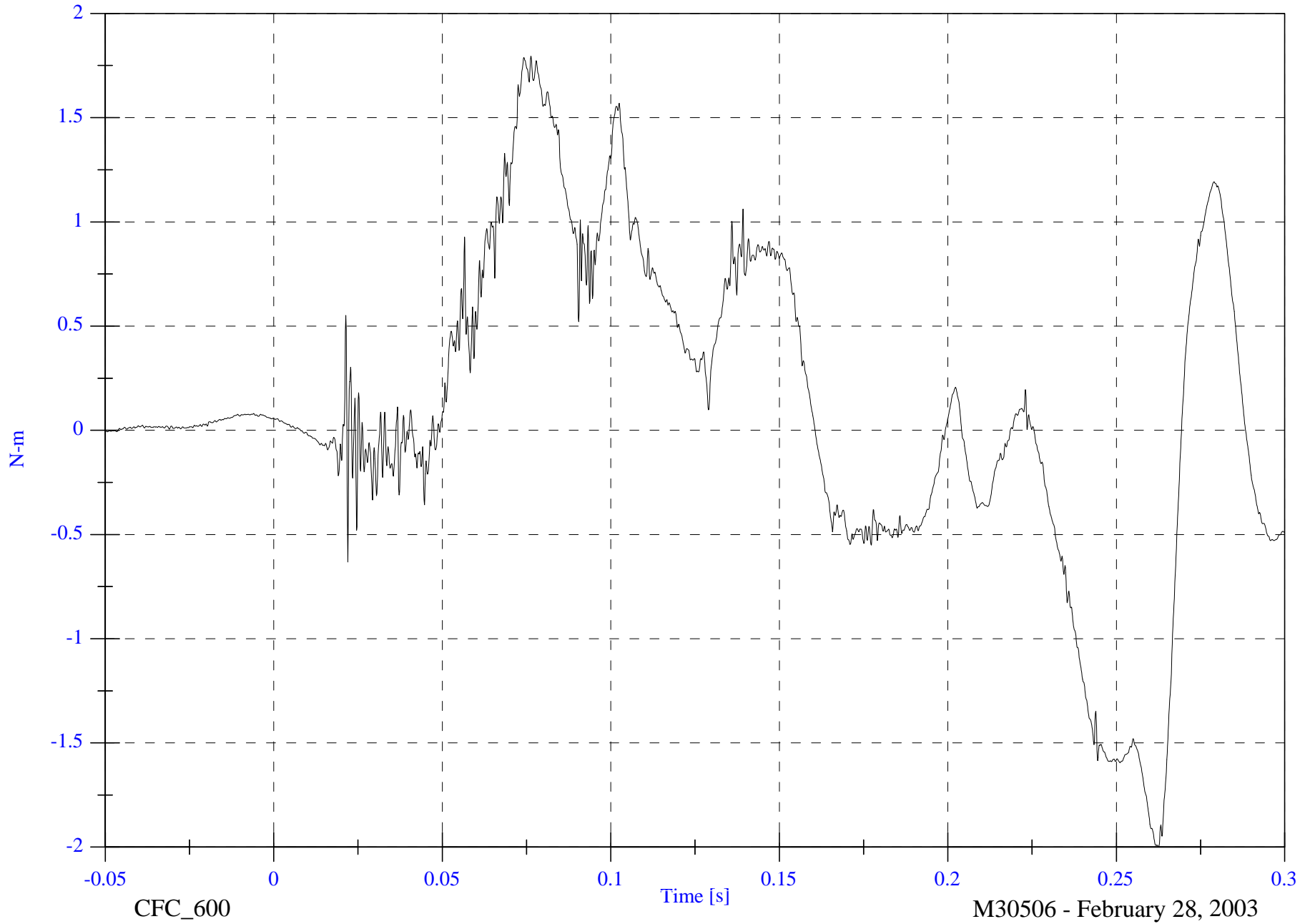
Max: 1.8 [N-m] at 0.076 [s]

V1P4 Upper Neck Mz

Min: -2.0 [N-m] at 0.263 [s]

4-55

8642-NCAP-33



CFC\_600

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

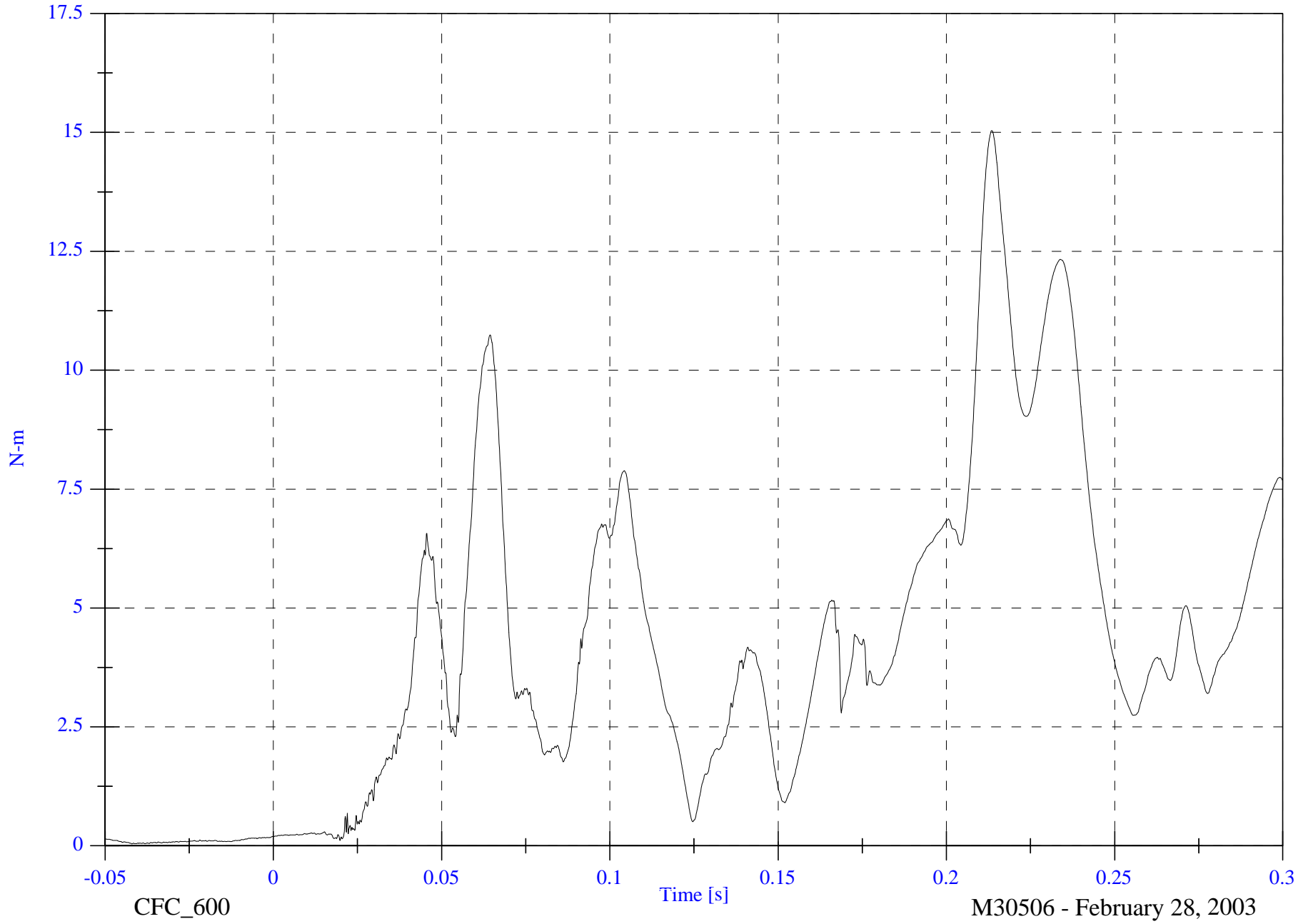
V1P4 Upper Neck M Resultant

Max: 15.0 [N-m] at 0.213 [s]

Min: 0.0 [N-m] at -0.042 [s]

4-56

8642-NCAP-33



CFC\_600

Time [s]

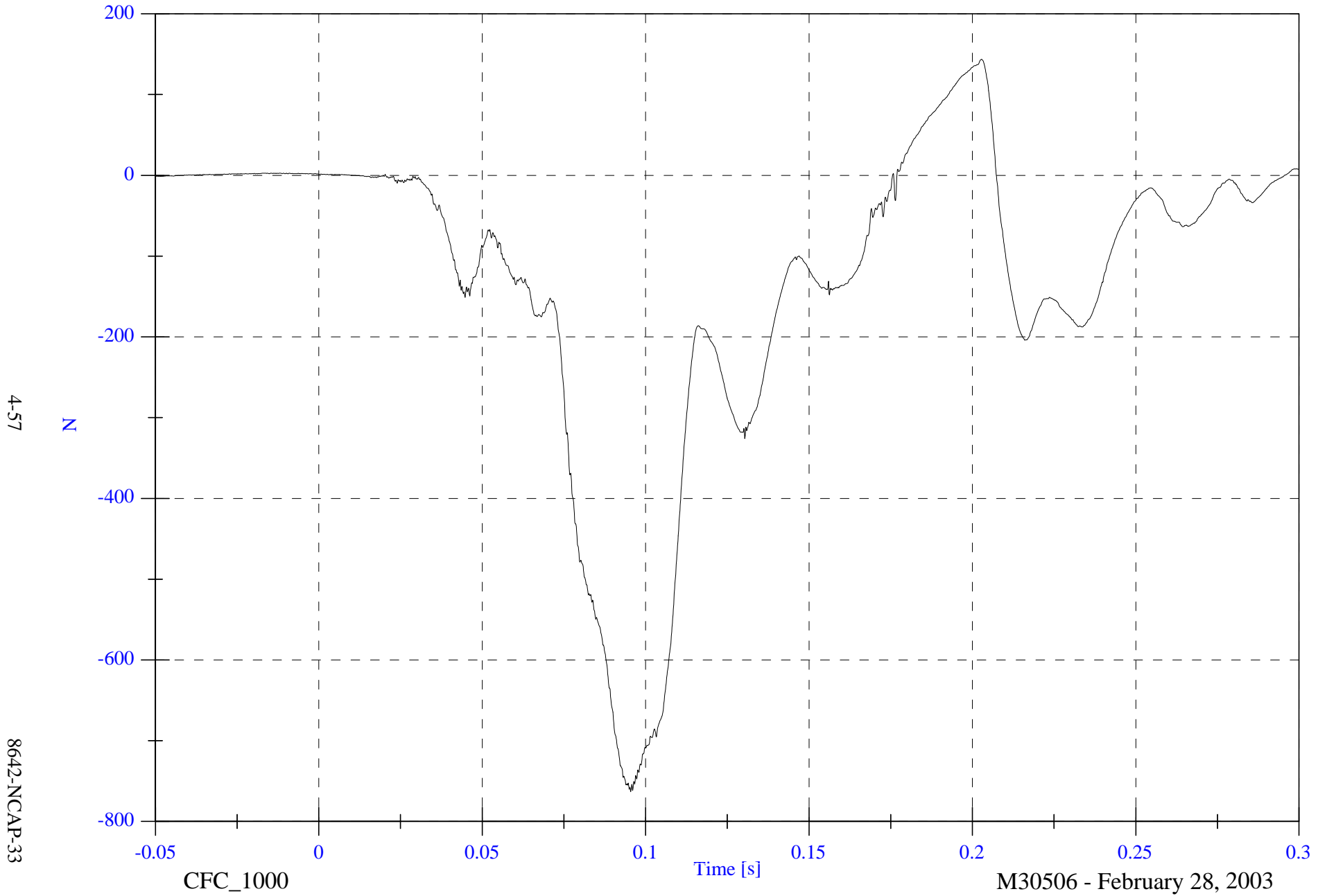
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 Lower Neck Fx

Max: 143.7 [N] at 0.203 [s]

Min: -763.2 [N] at 0.095 [s]



4-57

8642-NCAP-33

CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

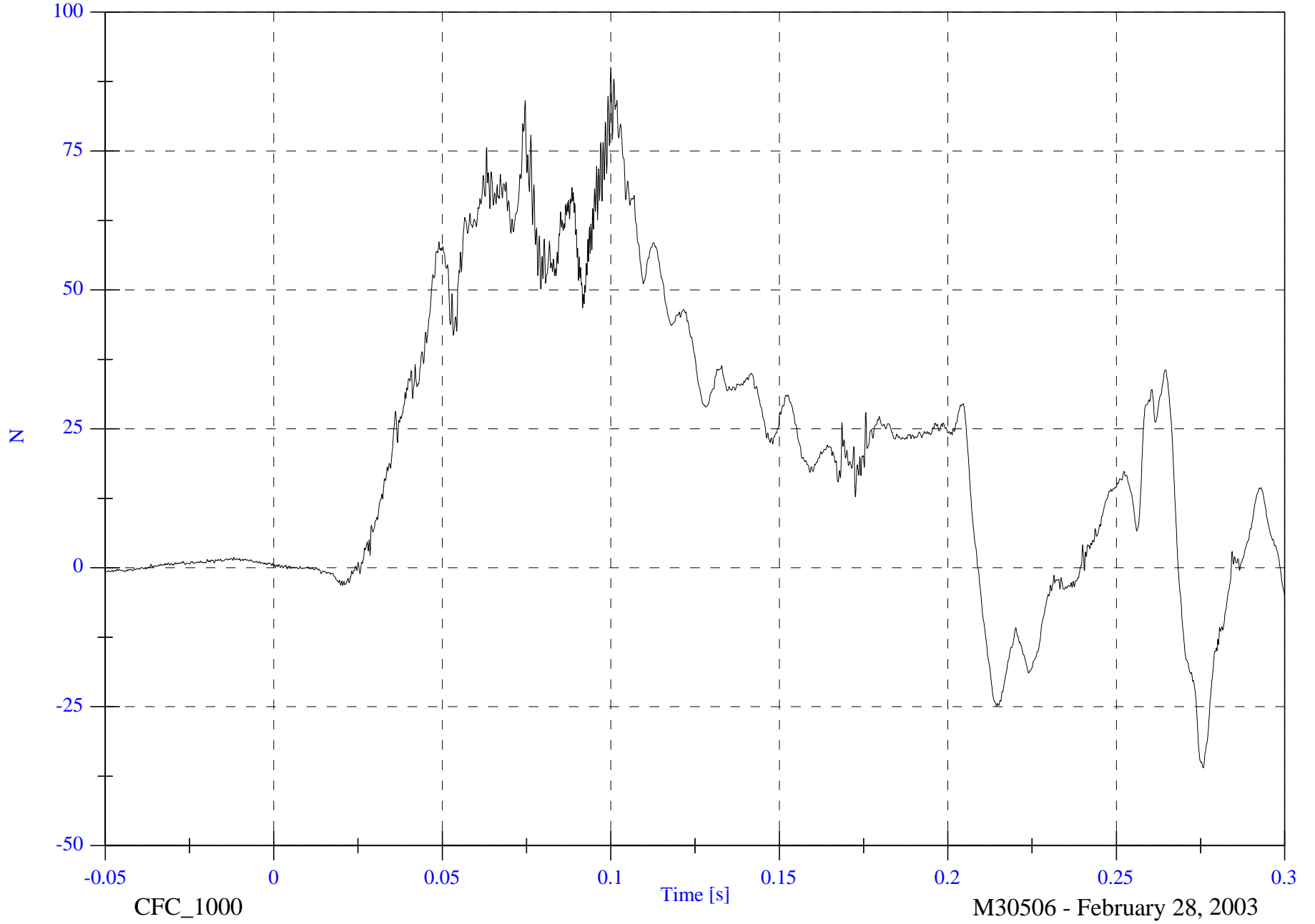
V1P4 Lower Neck Fy

Max: 90.0 [N] at 0.100 [s]

Min: -36.0 [N] at 0.276 [s]

4-58

8642-NCAP-33



CFC\_1000

Time [s]

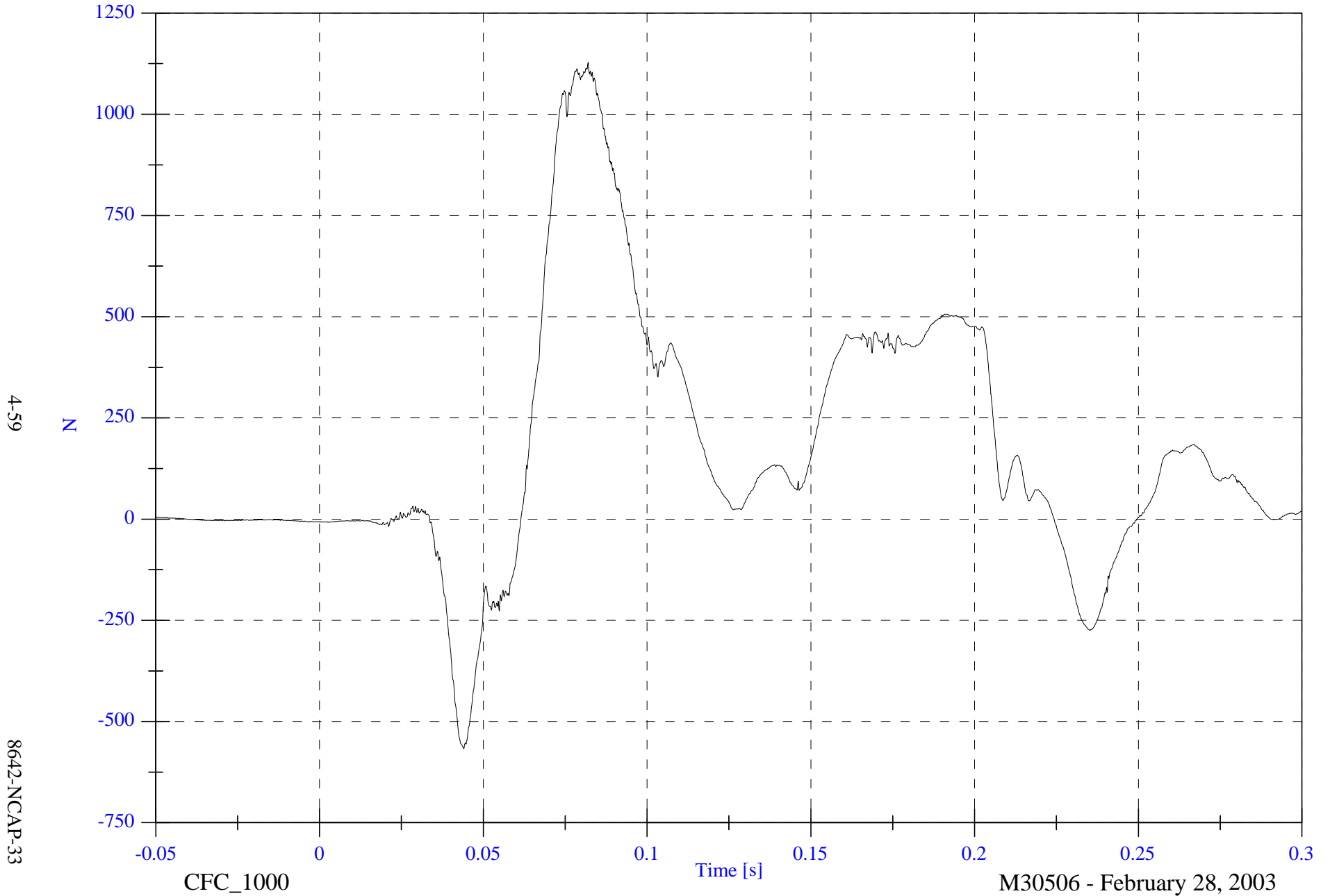
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 1128.6 [N] at 0.082 [s]

V1P4 Lower Neck Fz

Min: -566.7 [N] at 0.044 [s]



4-59

8642-NCAP-33

CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

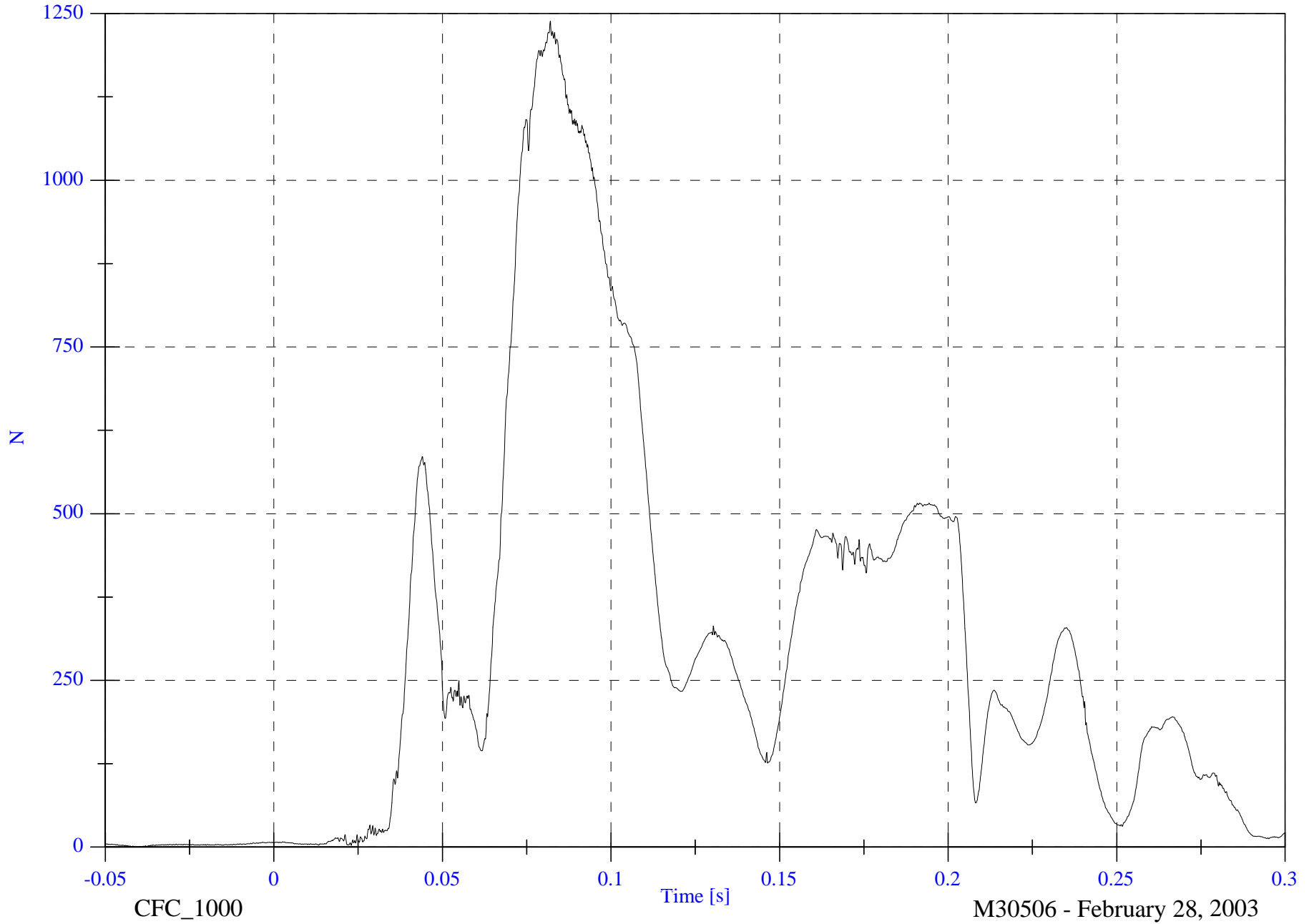
Max: 1238.5 [N] at 0.082 [s]

V1P4 Lower Neck F Resultant

Min: 0.2 [N] at -0.040 [s]

4-60

8642-NCAP-33



CFC\_1000

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

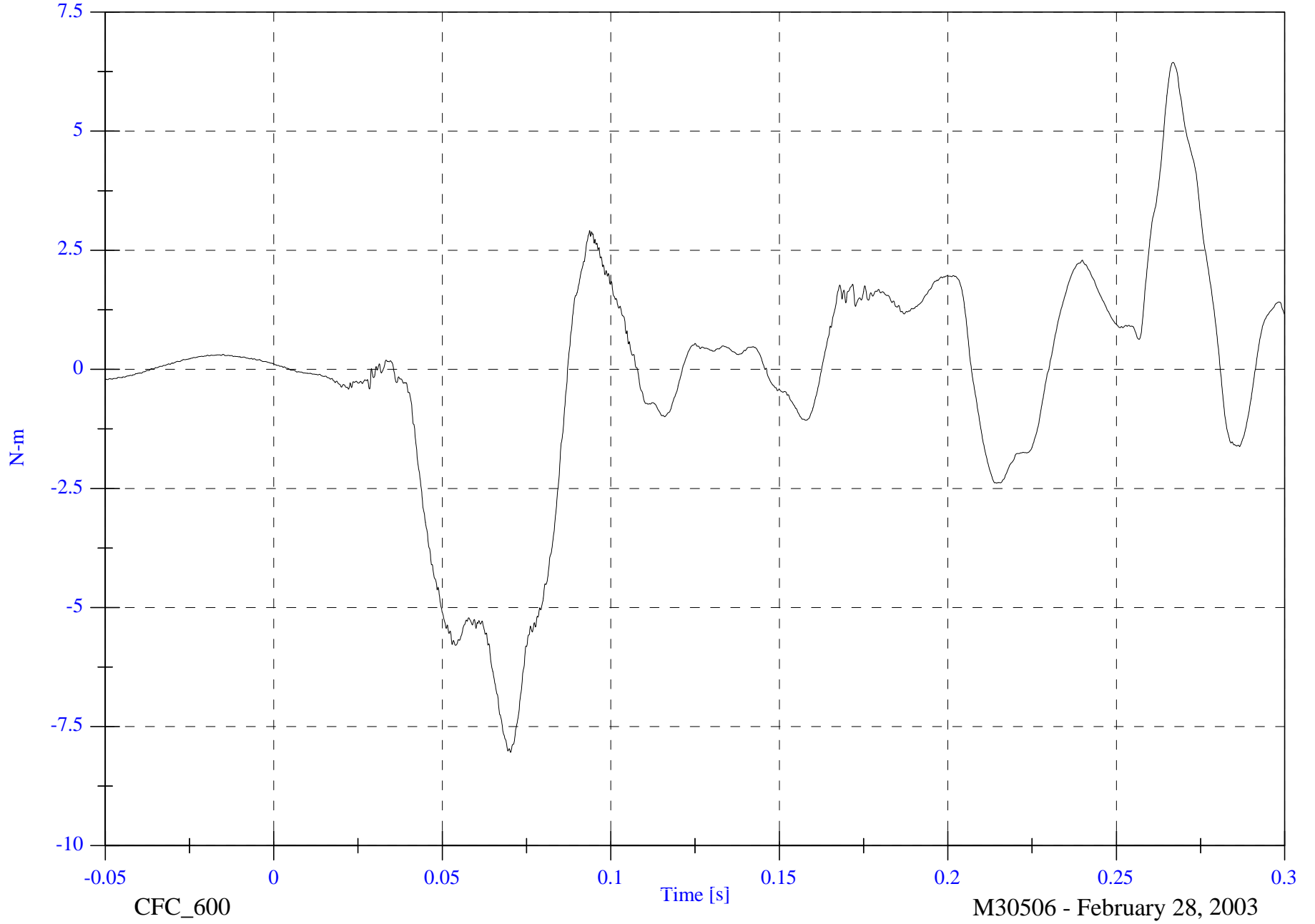
Max: 6.4 [N-m] at 0.267 [s]

V1P4 Lower Neck Mx

Min: -8.0 [N-m] at 0.070 [s]

4-61

8642-NCAP-33



CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

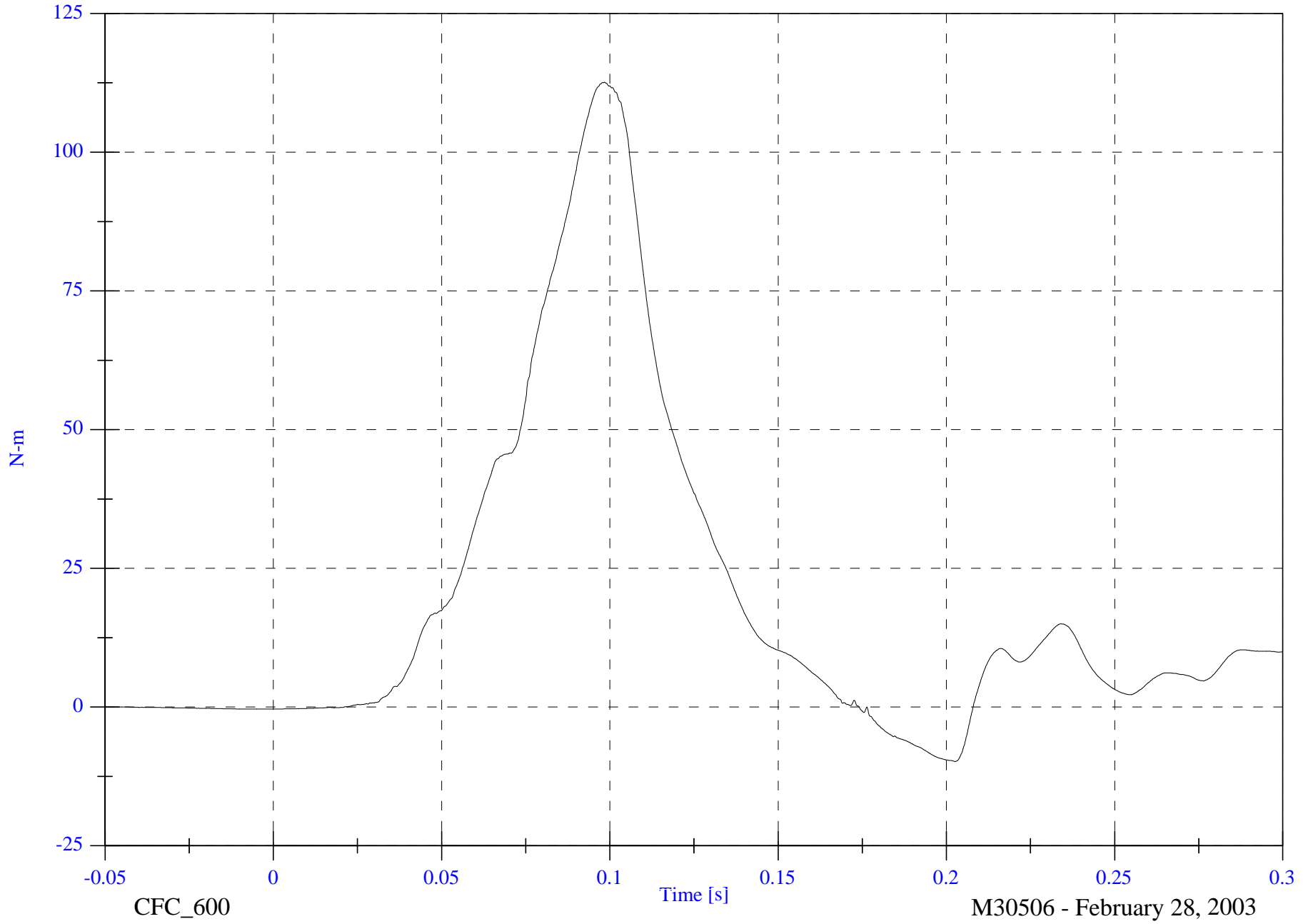
Max: 112.6 [N-m] at 0.098 [s]

V1P4 Lower Neck My

Min: -9.8 [N-m] at 0.203 [s]

4-62

8642-NCAP-33



CFC\_600

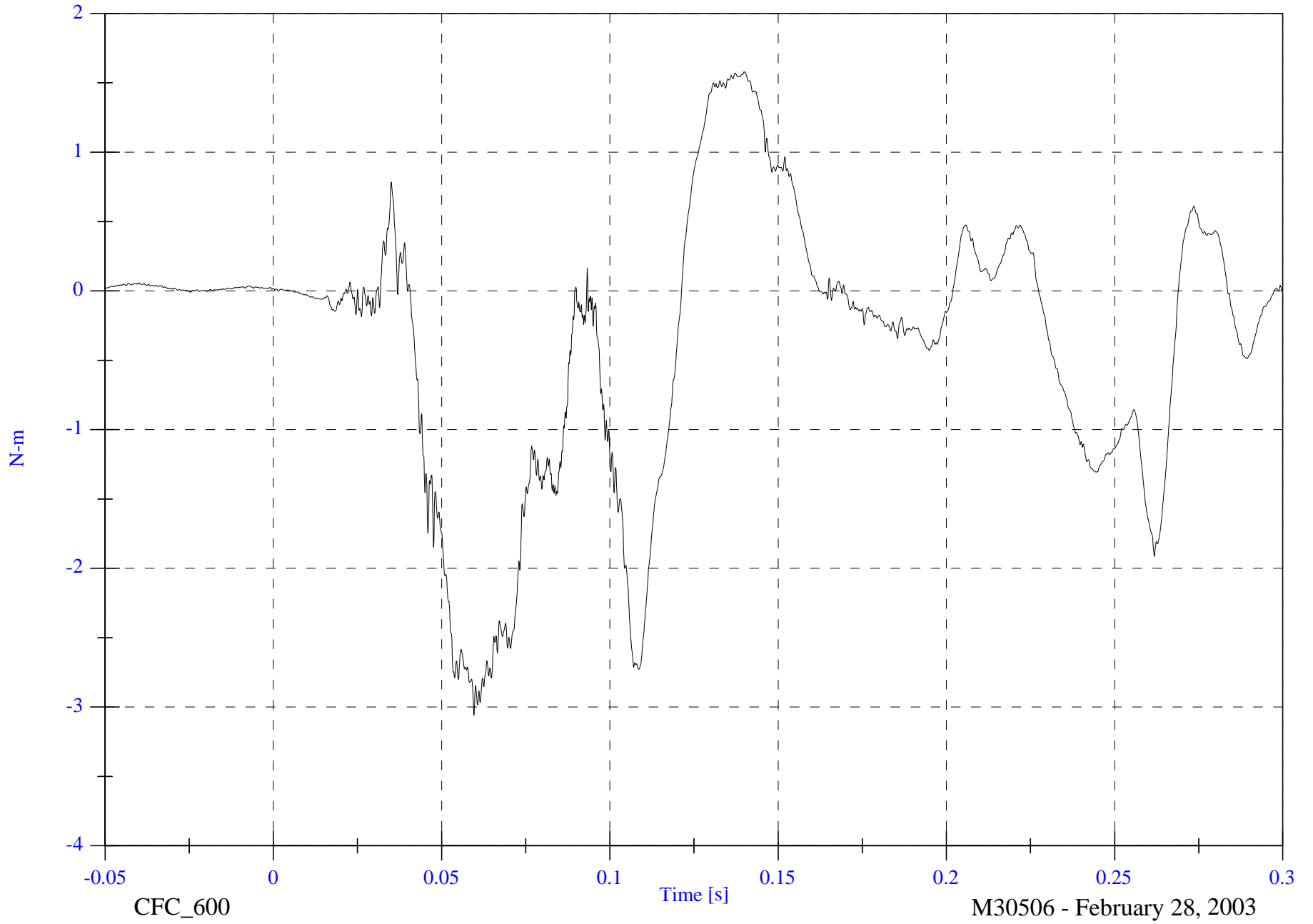
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 Lower Neck Mz

Max: 1.6 [N-m] at 0.140 [s]

Min: -3.1 [N-m] at 0.060 [s]



4-63

8642-NCAP-33

CFC\_600

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

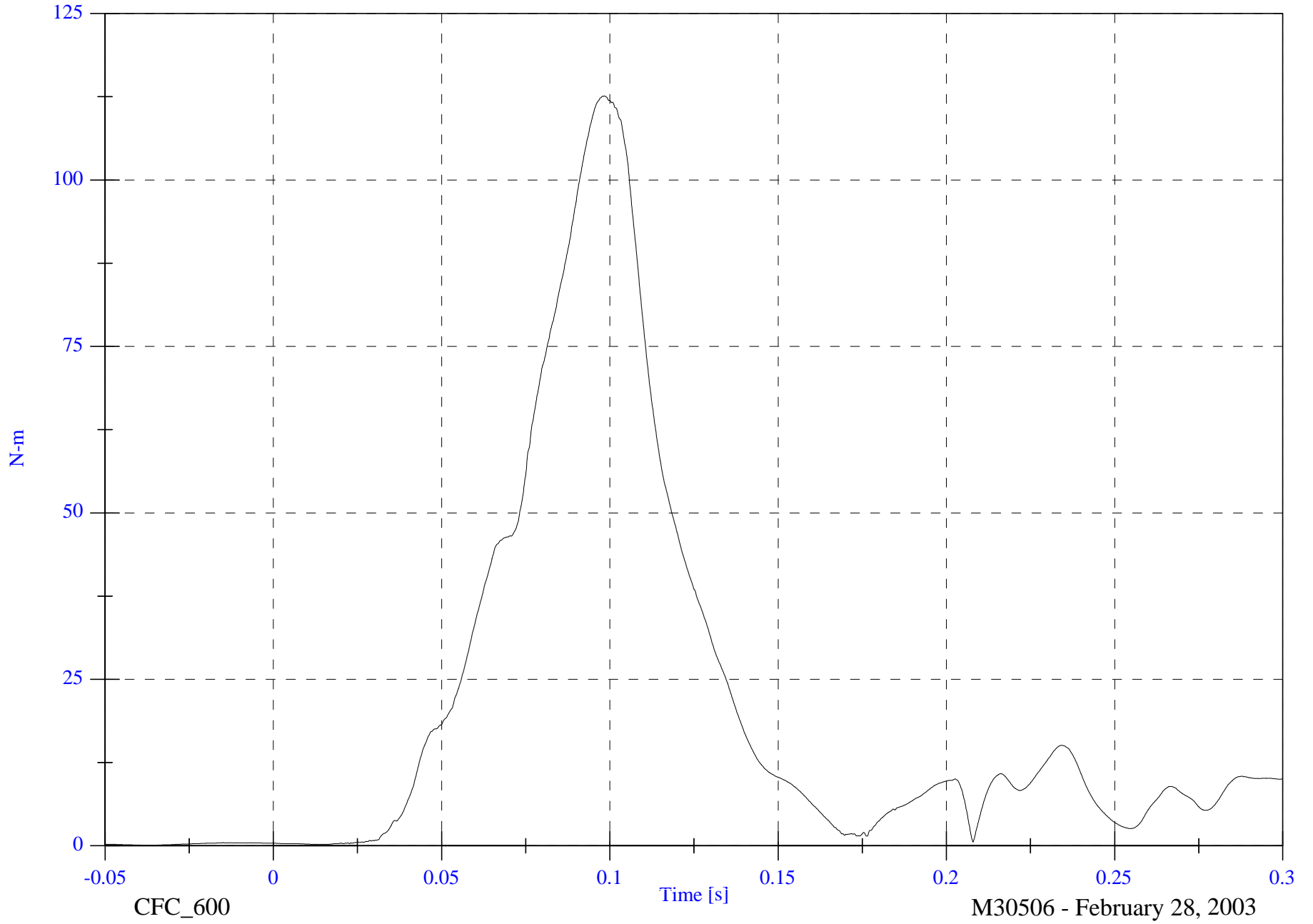
V1P4 Lower Neck M Resultant

Max: 112.6 [N-m] at 0.098 [s]

Min: 0.1 [N-m] at -0.036 [s]

4-64

8642-NCAP-33



CFC\_600

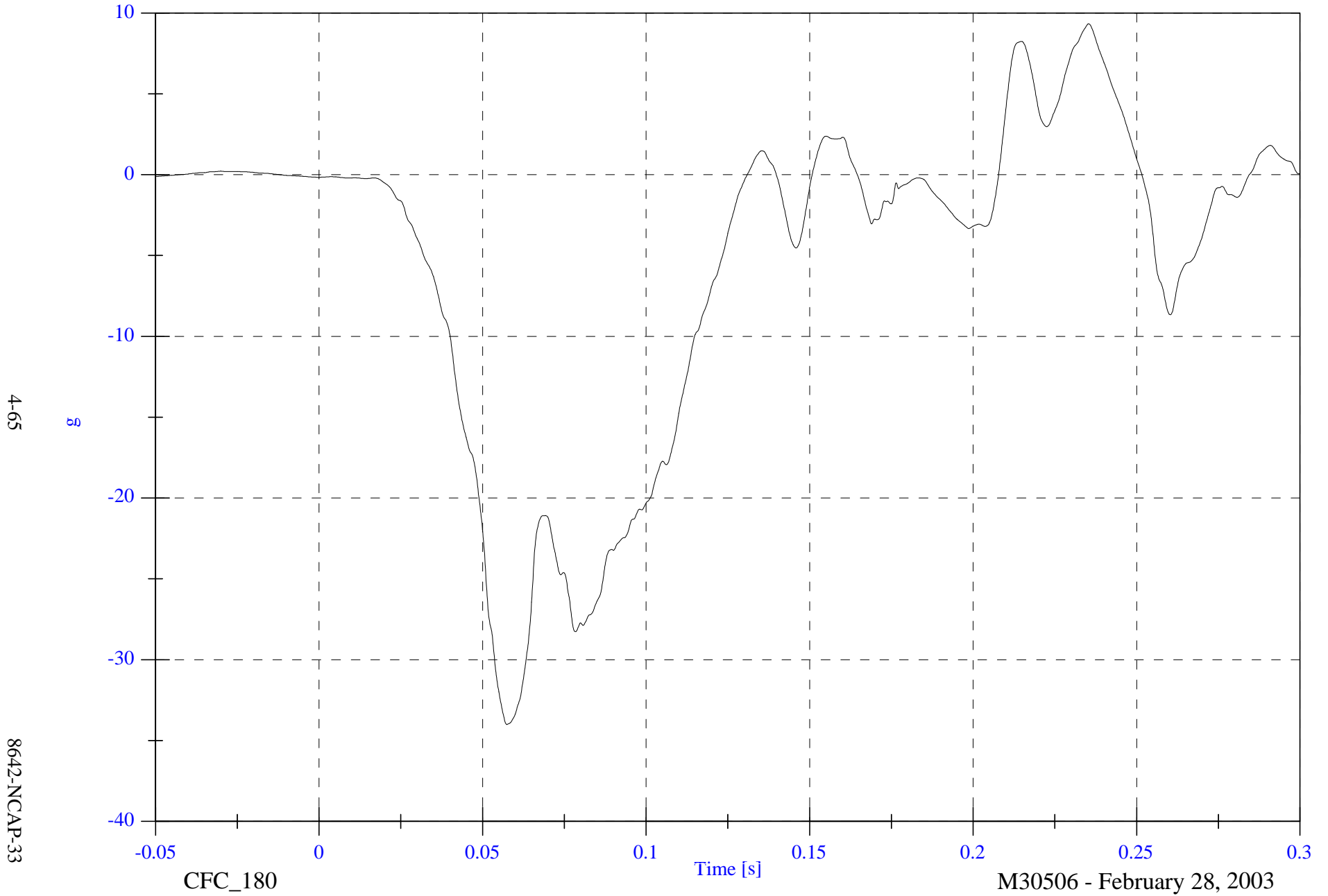
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

VIP4 Chest x

Max: 9.3 [g] at 0.235 [s]

Min: -34.0 [g] at 0.057 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

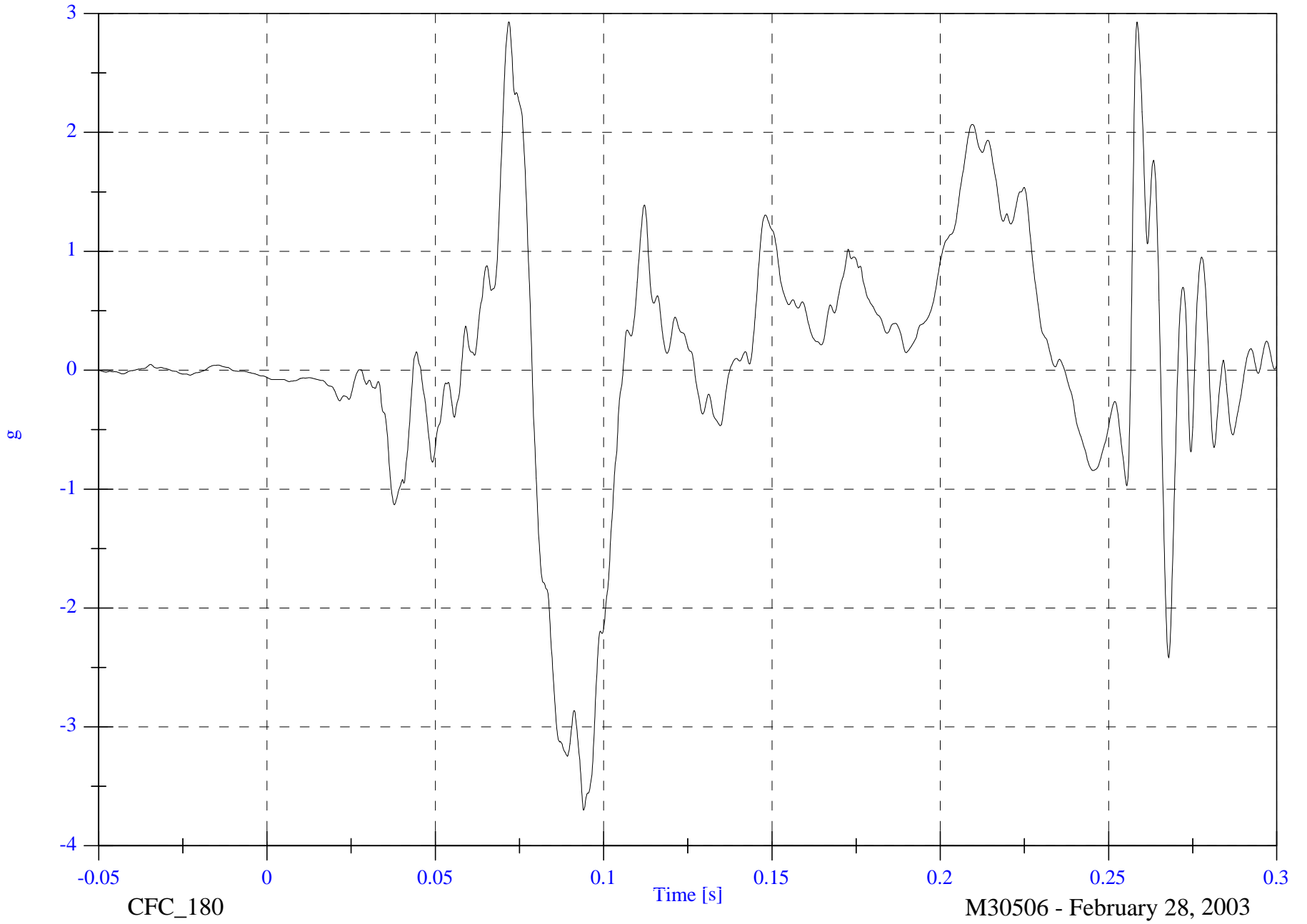
VIP4 Chest y

Max: 2.9 [g] at 0.072 [s]

Min: -3.7 [g] at 0.094 [s]

4-66

8642-NCAP-33



CFC\_180

Time [s]

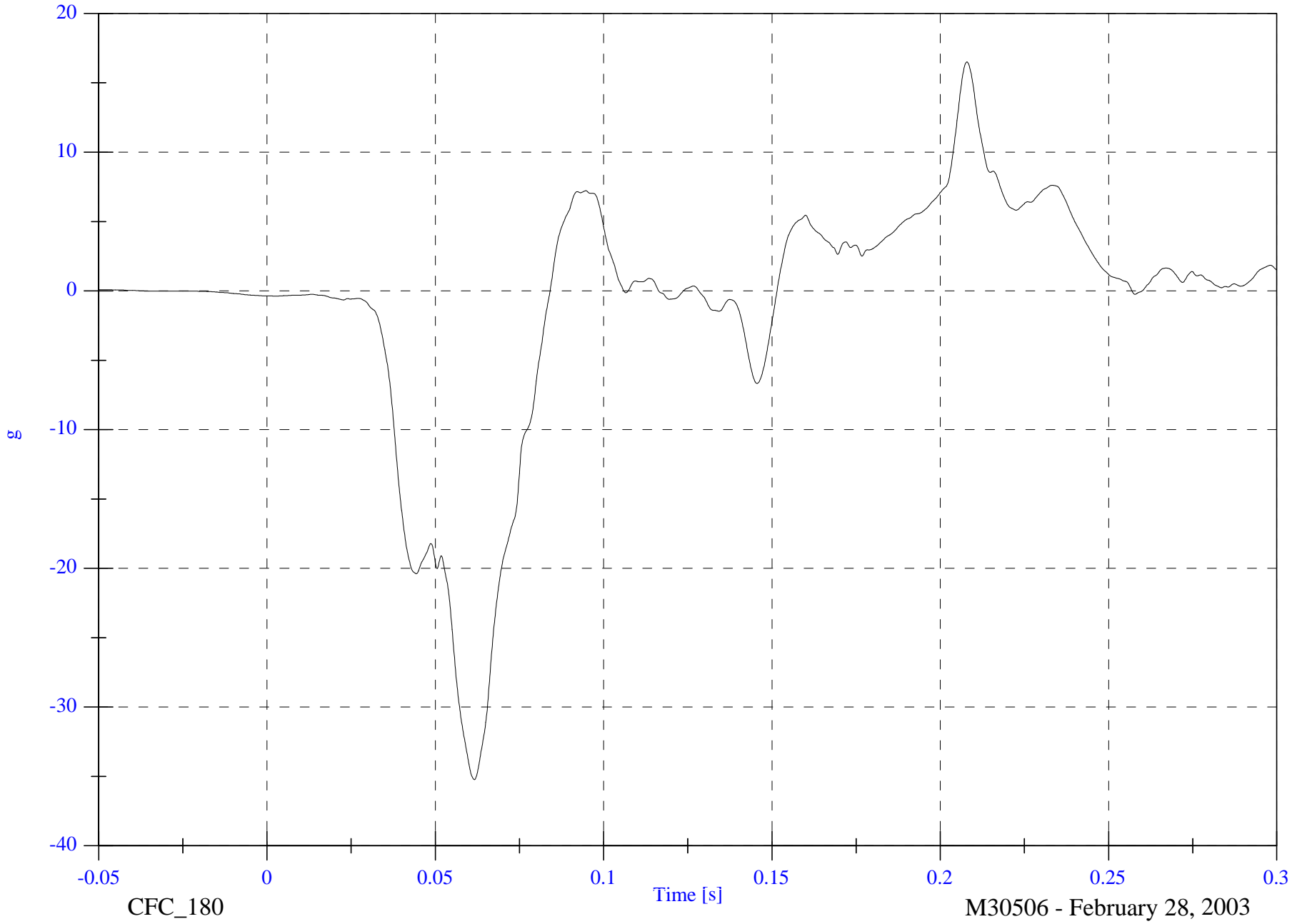
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

VIP4 Chest z

Max: 16.5 [g] at 0.208 [s]

Min: -35.2 [g] at 0.062 [s]



4-67

8642-NCAP-33

CFC\_180

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

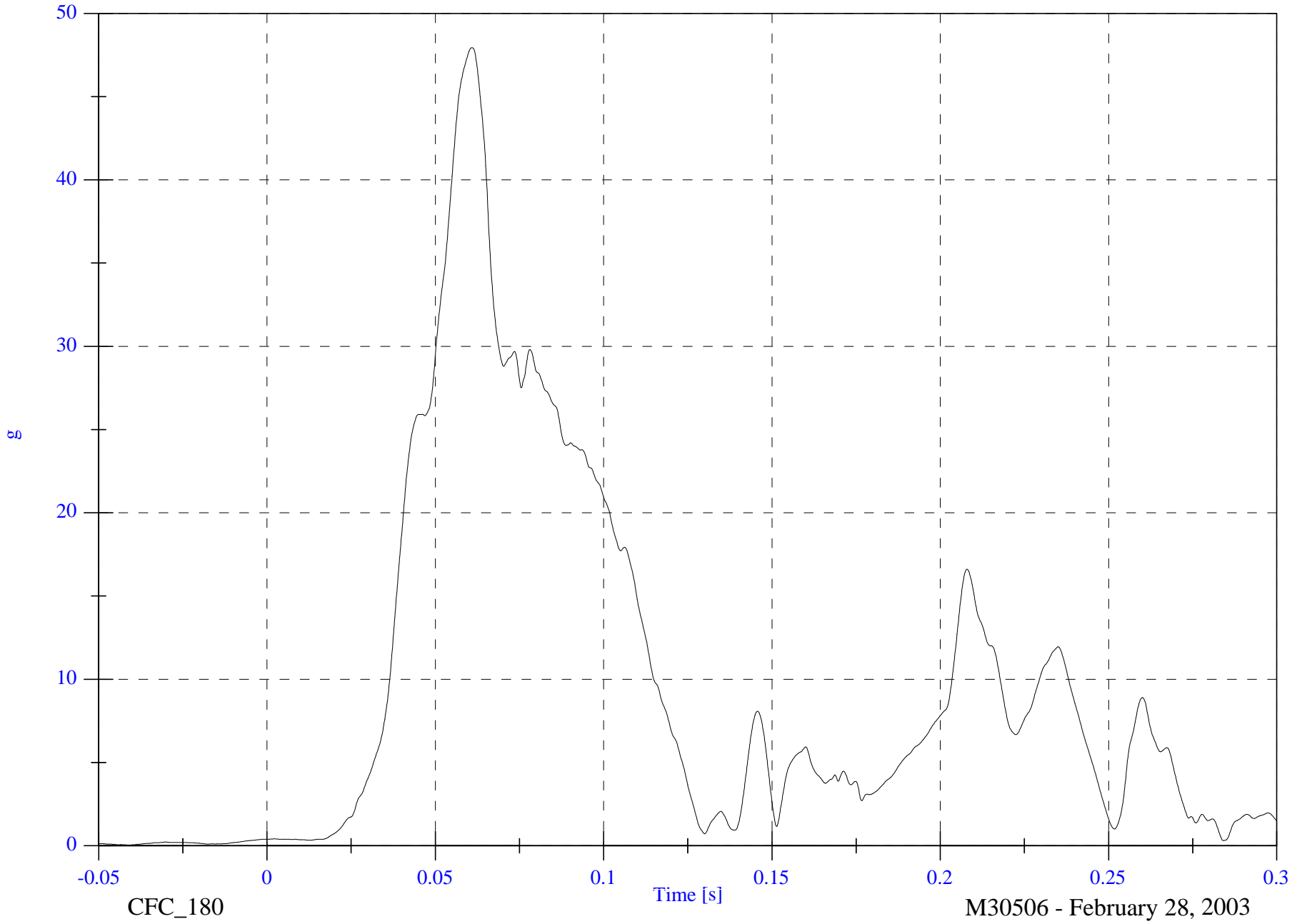
V1P4 Chest Resultant

Max: 47.9 [g] at 0.061 [s]

Min: 0.0 [g] at -0.041 [s]

4-68

8642-NCAP-33



CFC\_180

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

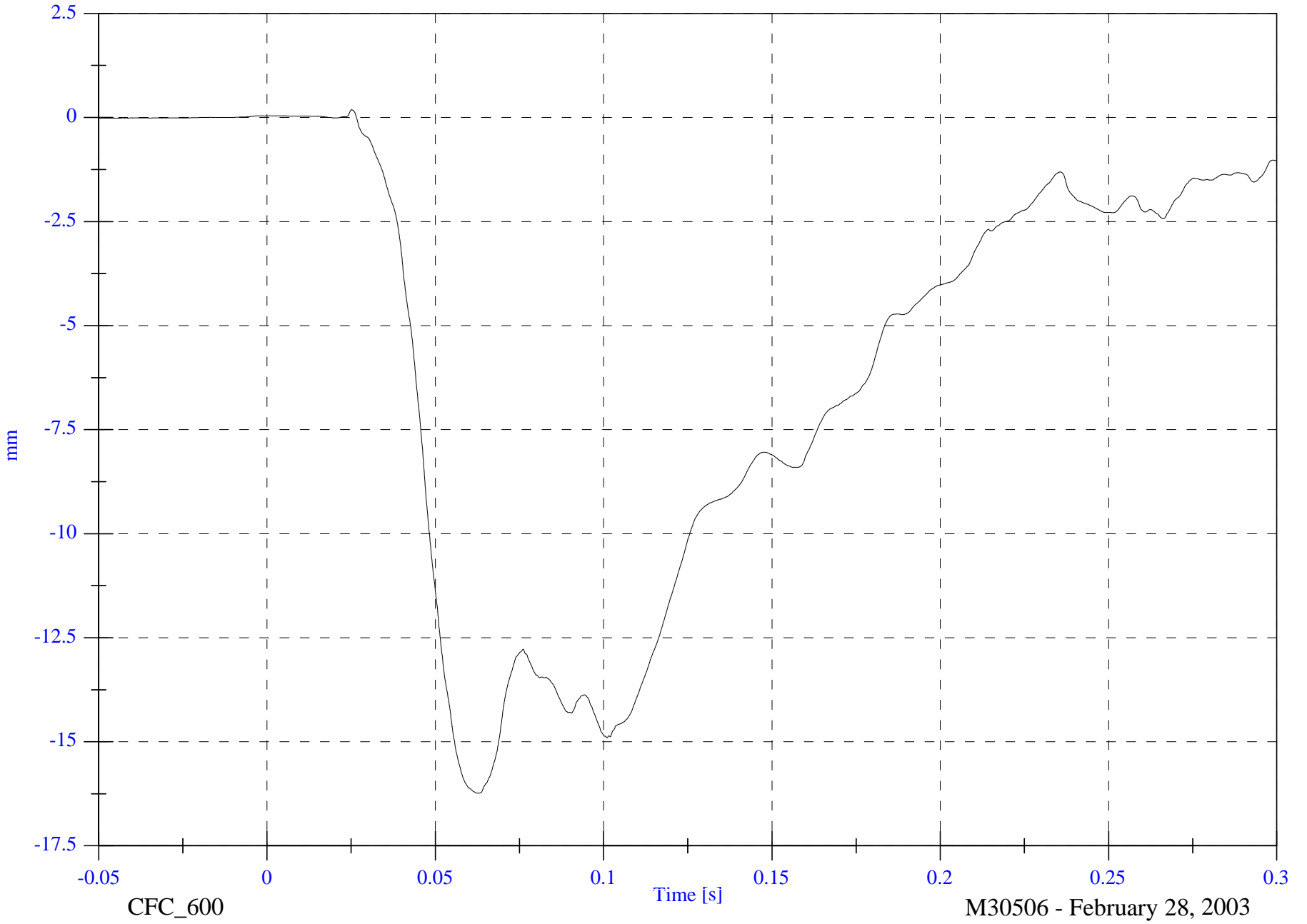
V1P4 Chest Compression

Max: 0.2 [mm] at 0.025 [s]

Min: -16.2 [mm] at 0.062 [s]

4-69

8642-NCAP-33



CFC\_600

Time [s]

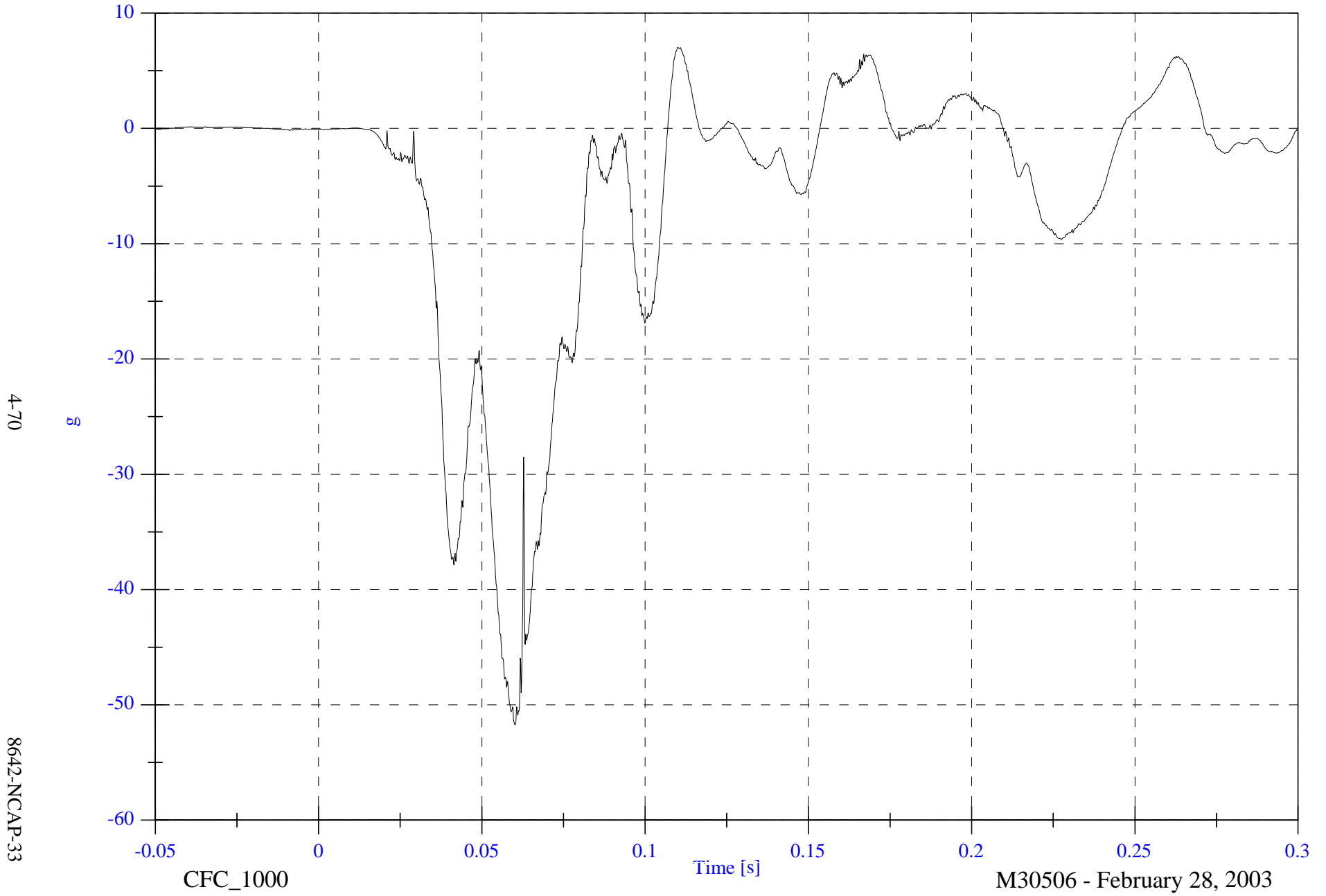
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 7.0 [g] at 0.110 [s]

Min: -51.8 [g] at 0.060 [s]

V1P4 Pelvic x



4-70

8642-NCAP-33

CFC\_1000

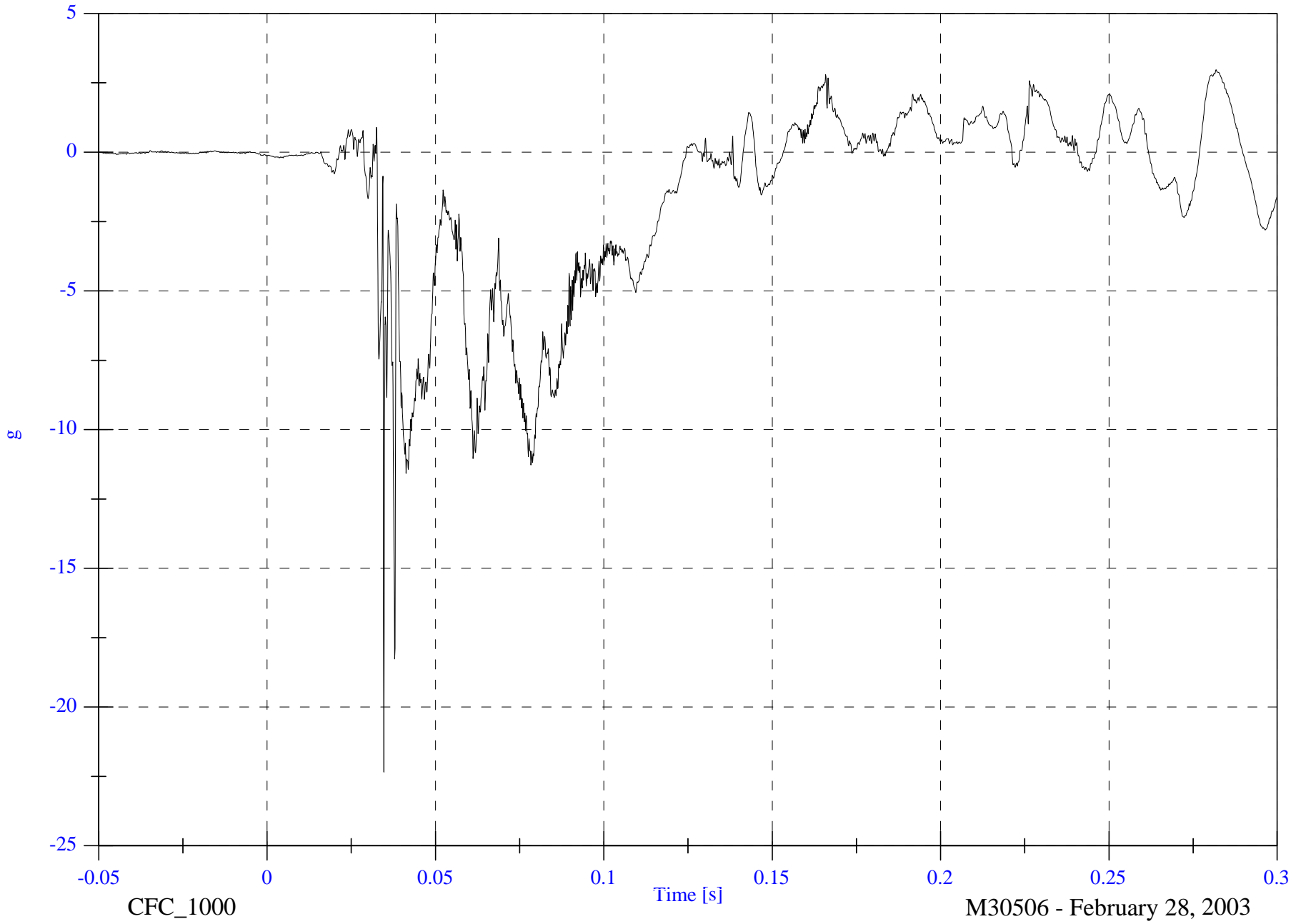
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

Max: 3.0 [g] at 0.282 [s]

Min: -22.3 [g] at 0.035 [s]

V1P4 Pelvic y



4-71

8642-NCAP-33

CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

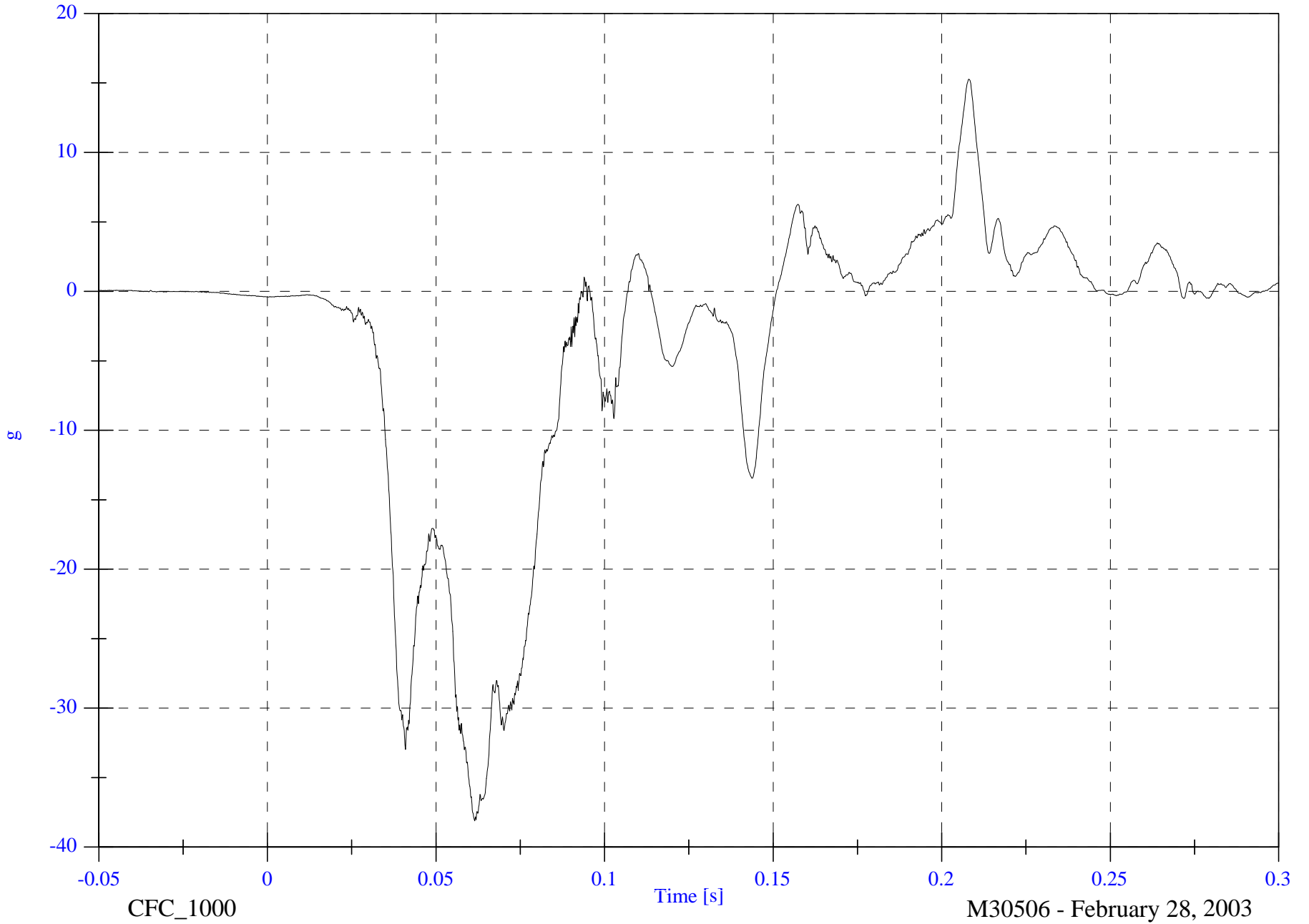
V1P4 Pelvic z

Max: 15.3 [g] at 0.208 [s]

Min: -38.1 [g] at 0.062 [s]

4-72

8642-NCAP-33



CFC\_1000

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

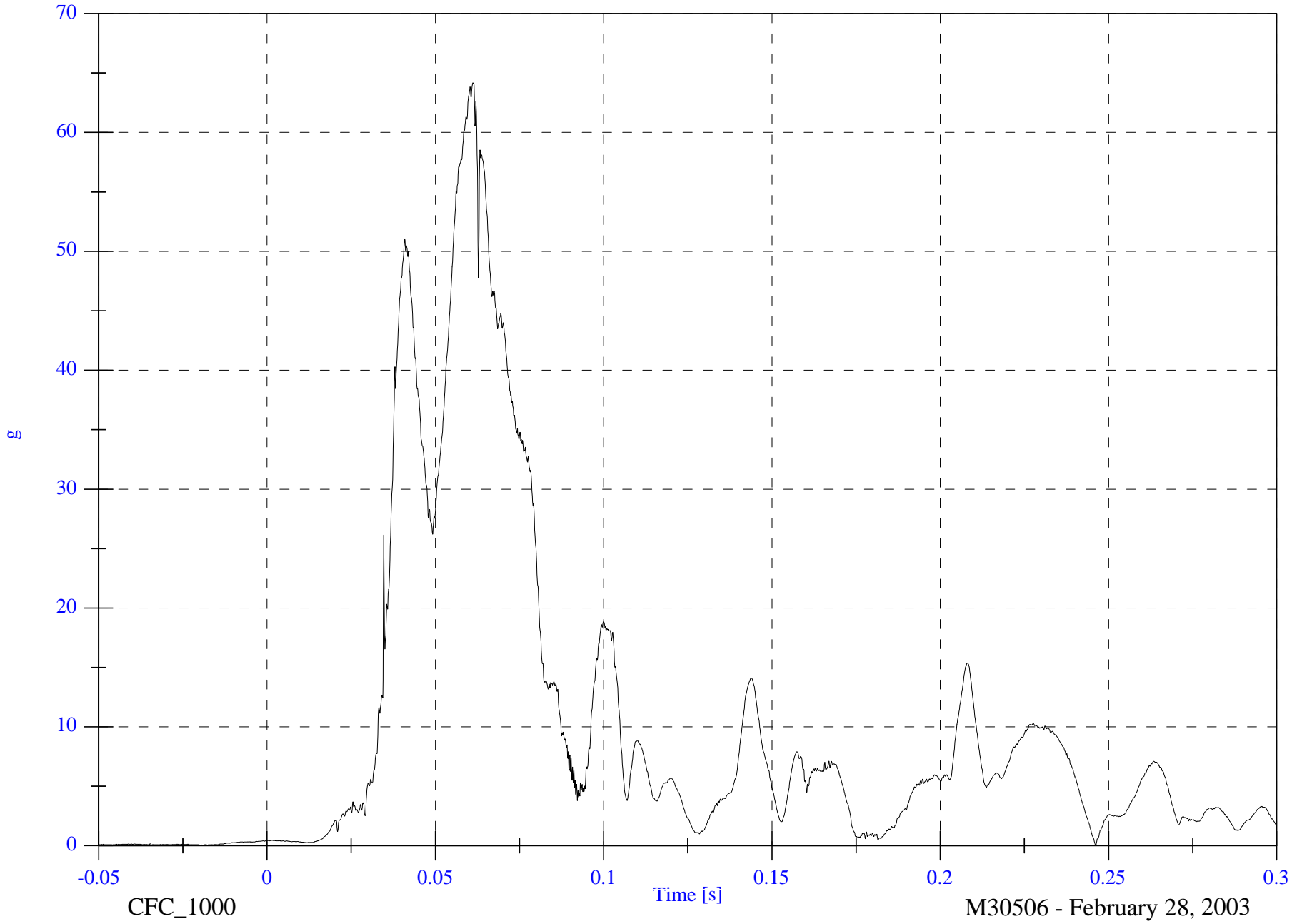
V1P4 Pelvic Resultant

Max: 64.2 [g] at 0.061 [s]

Min: 0.0 [g] at 0.246 [s]

4-73

8642-NCAP-33



CFC\_1000

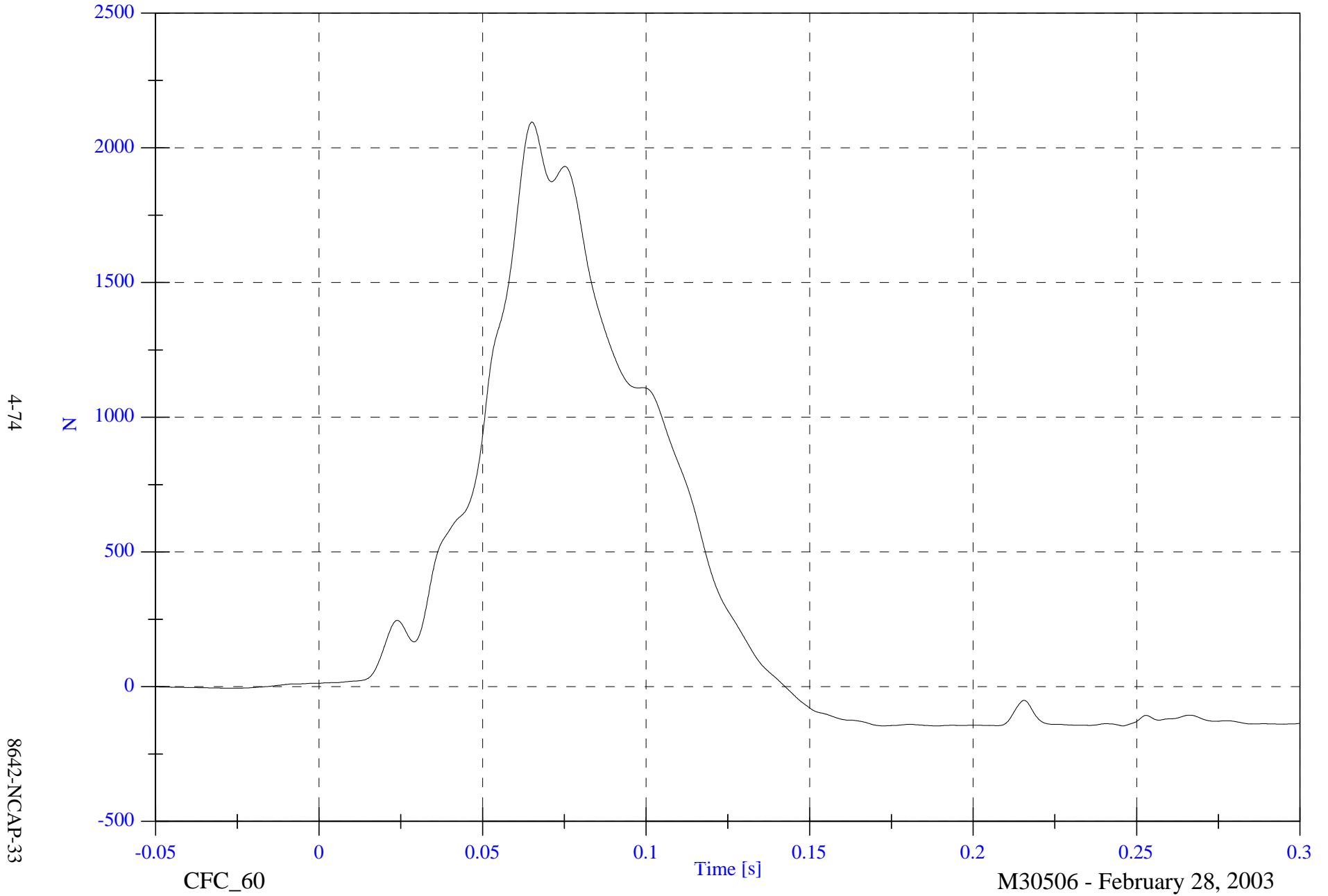
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

VIP4 Top Tether Load

Max: 2095.2 [N] at 0.065 [s]

Min: -145.3 [N] at 0.246 [s]



4-74

8642-NCAP-33

CFC\_60

Time [s]

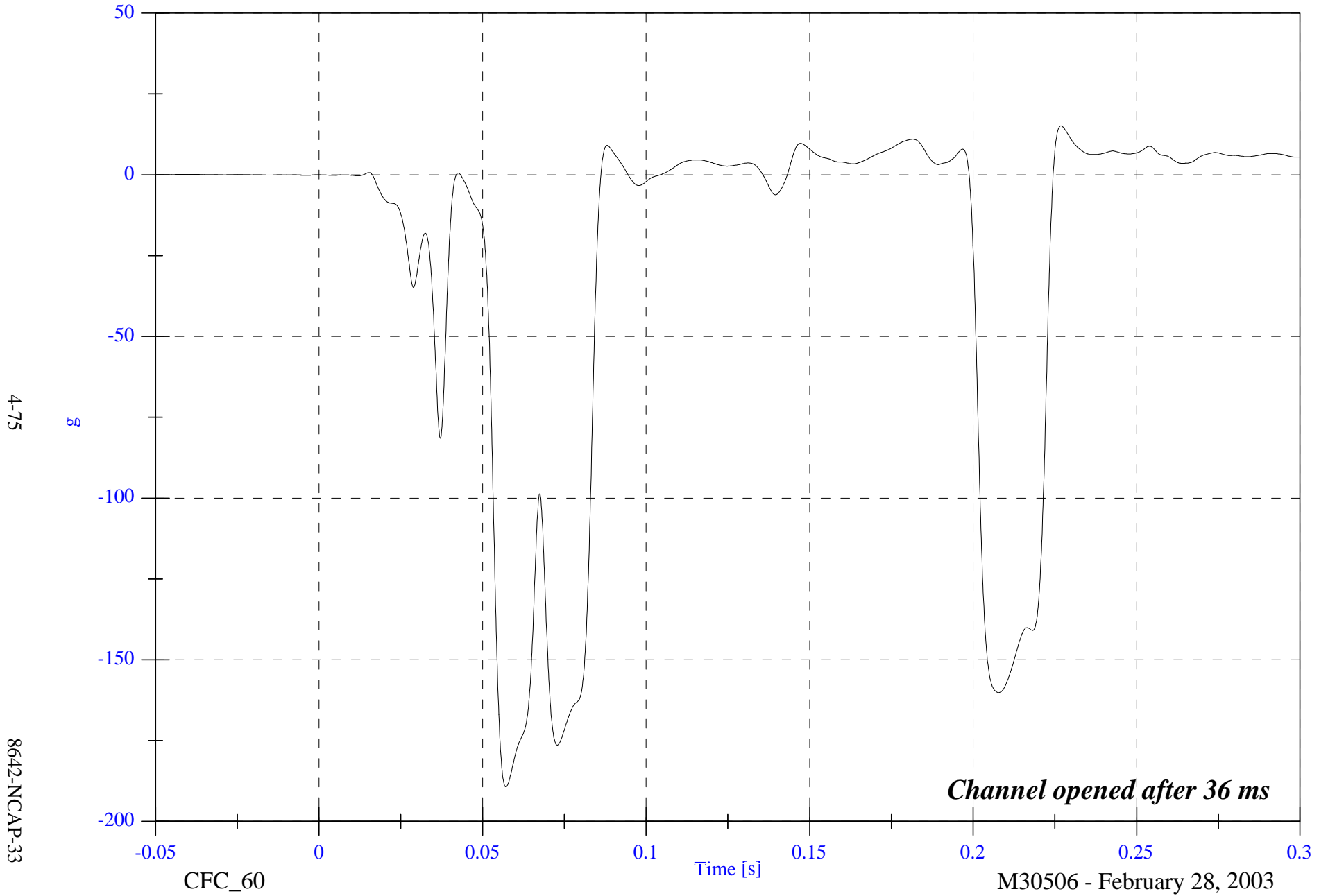
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 CRS x

Max: 15.1 [g] at 0.227 [s]

Min: -189.3 [g] at 0.057 [s]



4-75

8642-NCAP-33

NCAP Test #11 - 2003 Isuzu Rodeo

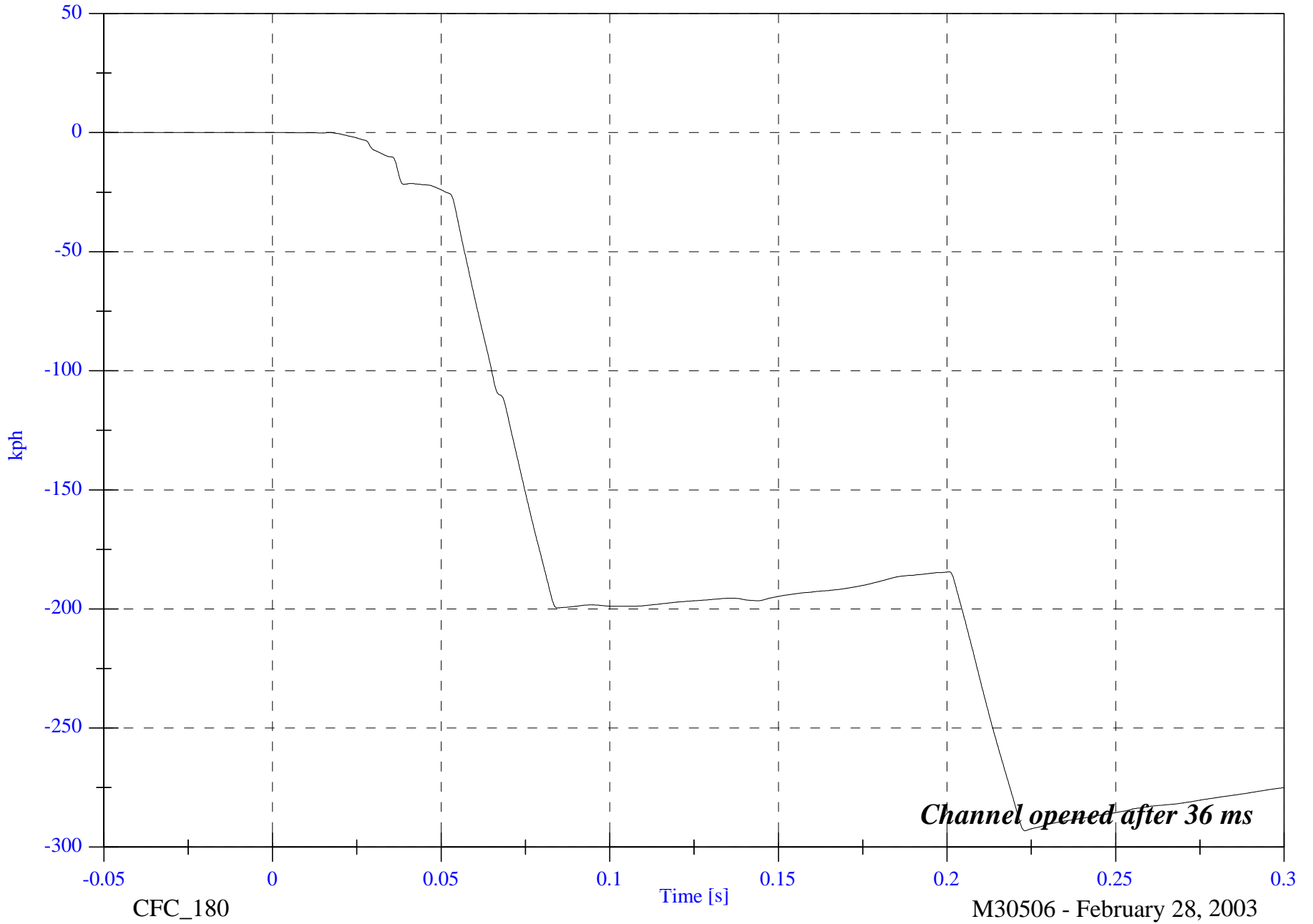
V1P4 CRS x Velocity

Max: 0.1 [kph] at 0.017 [s]

Min: -293.1 [kph] at 0.223 [s]

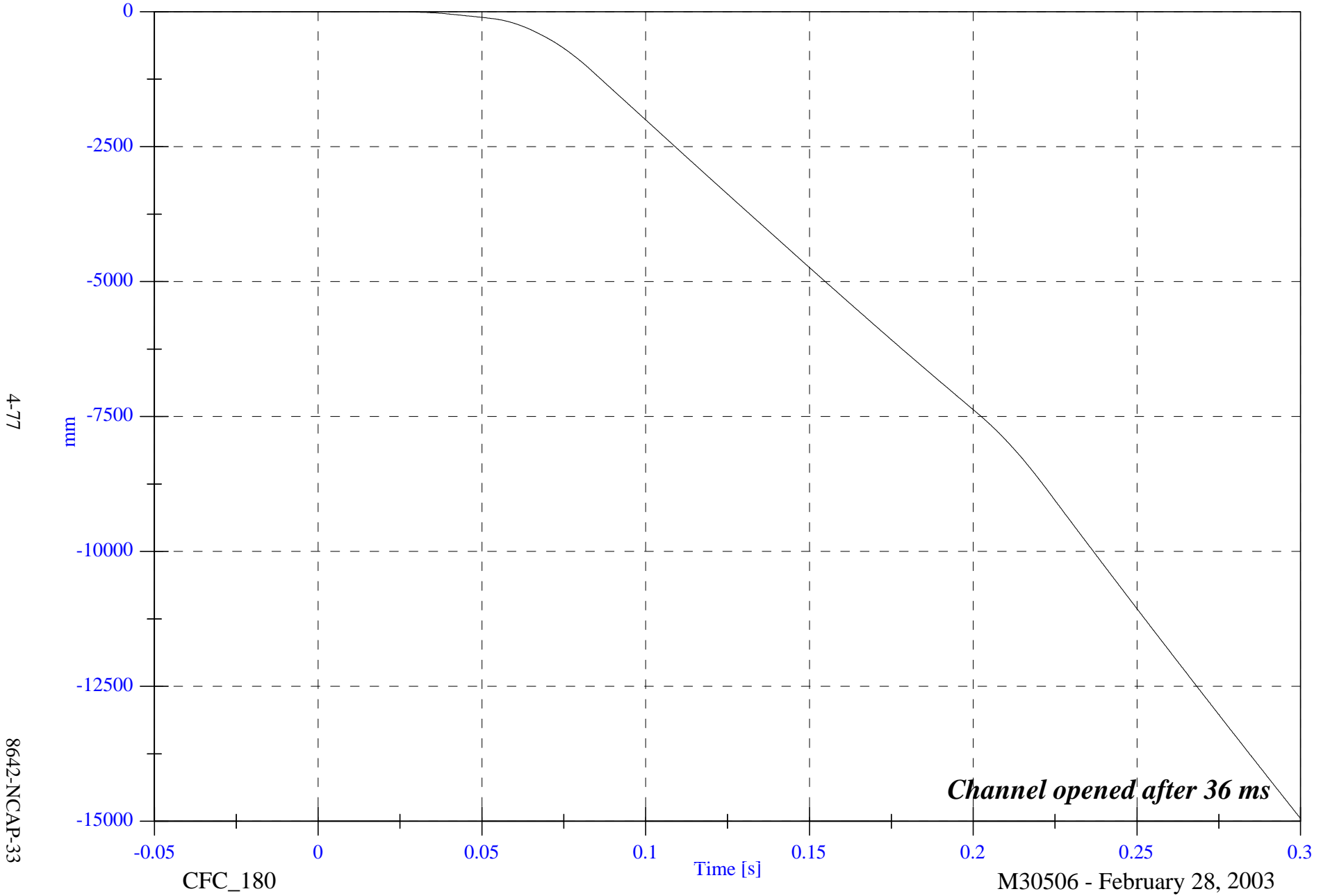
4-76

8642-NCAP-33



*Channel opened after 36 ms*

V1P4 CRS x Displacement



4-77

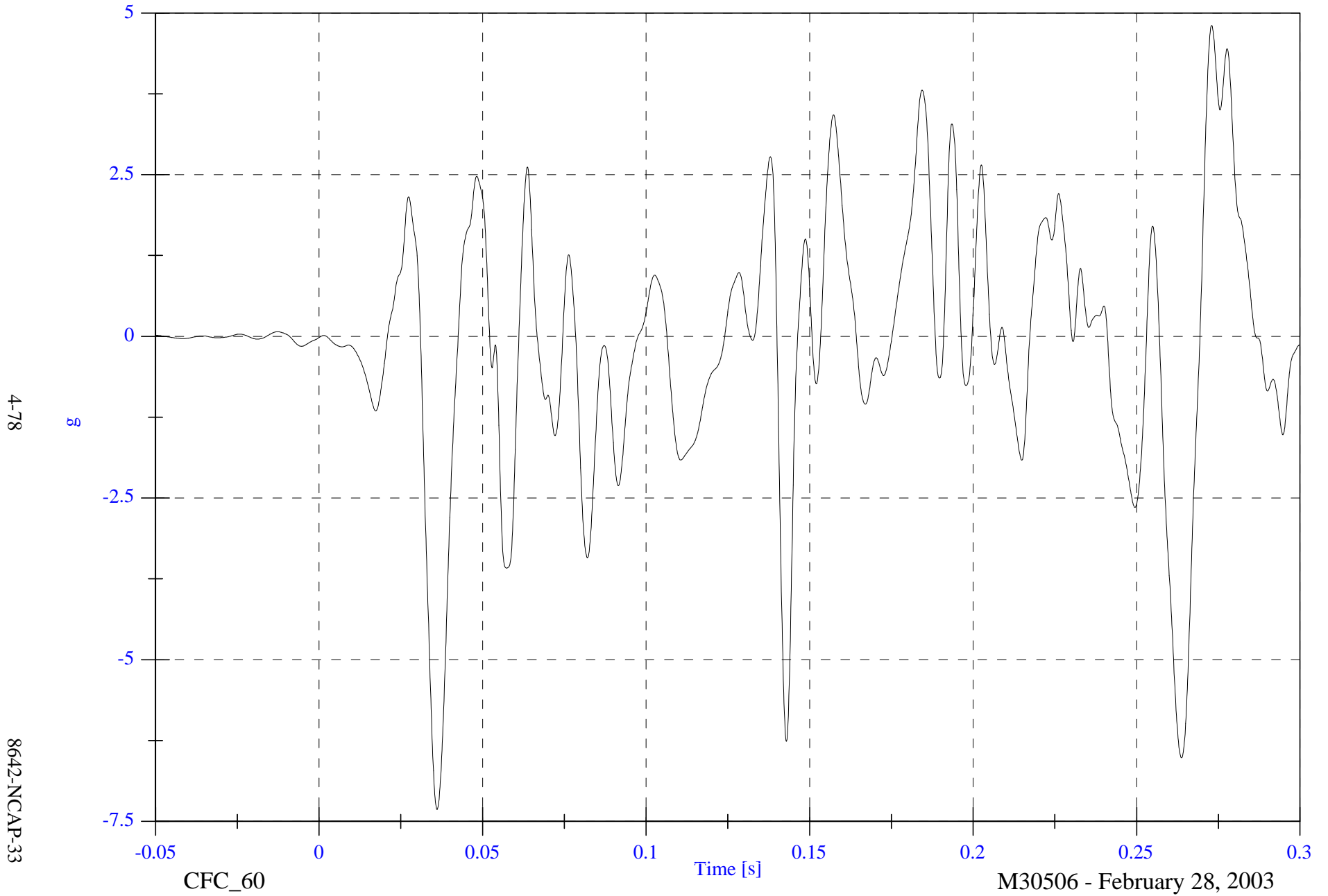
8642-NCAP-33

NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 CRS y

Max: 4.8 [g] at 0.273 [s]

Min: -7.3 [g] at 0.036 [s]



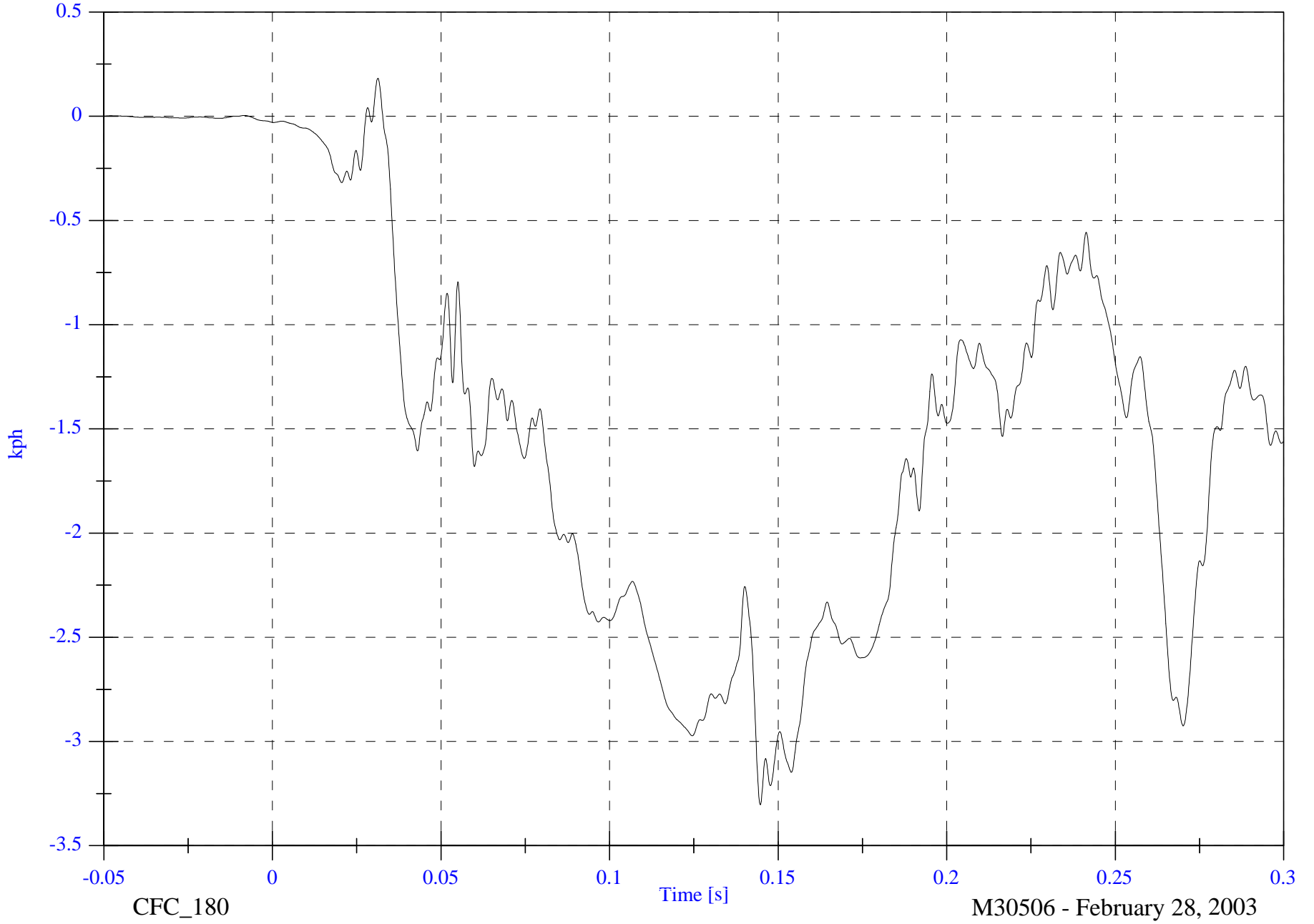
NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 CRS y Velocity

Max: 0.2 [kph] at 0.031 [s]  
Min: -3.3 [kph] at 0.145 [s]

4-79

8642-NCAP-33



CFC\_180

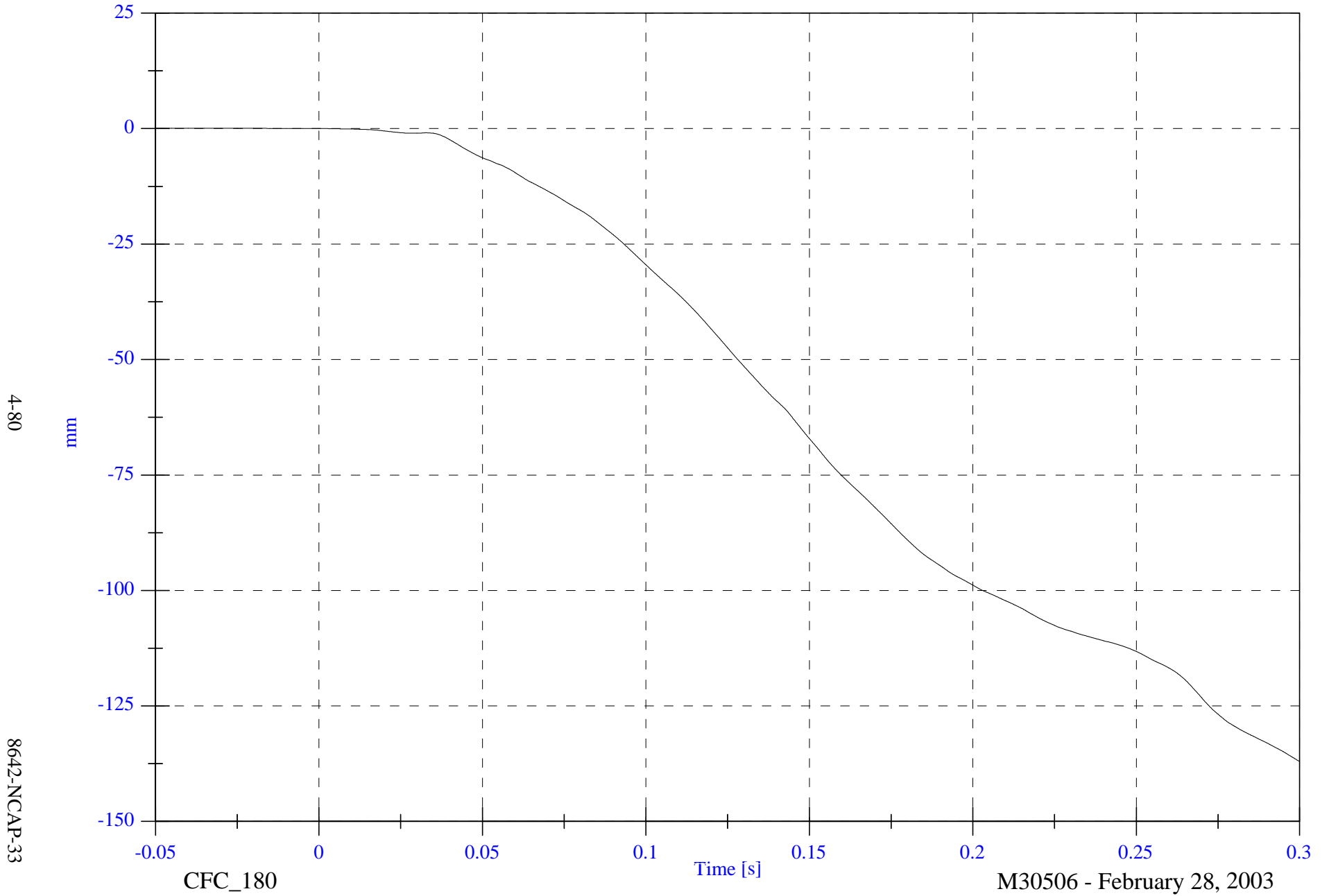
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 CRS y Displacement

Max: 0.1 [mm] at -0.044 [s]

Min: -137.0 [mm] at 0.300 [s]



4-80

8642-NCAP-33

CFC\_180

Time [s]

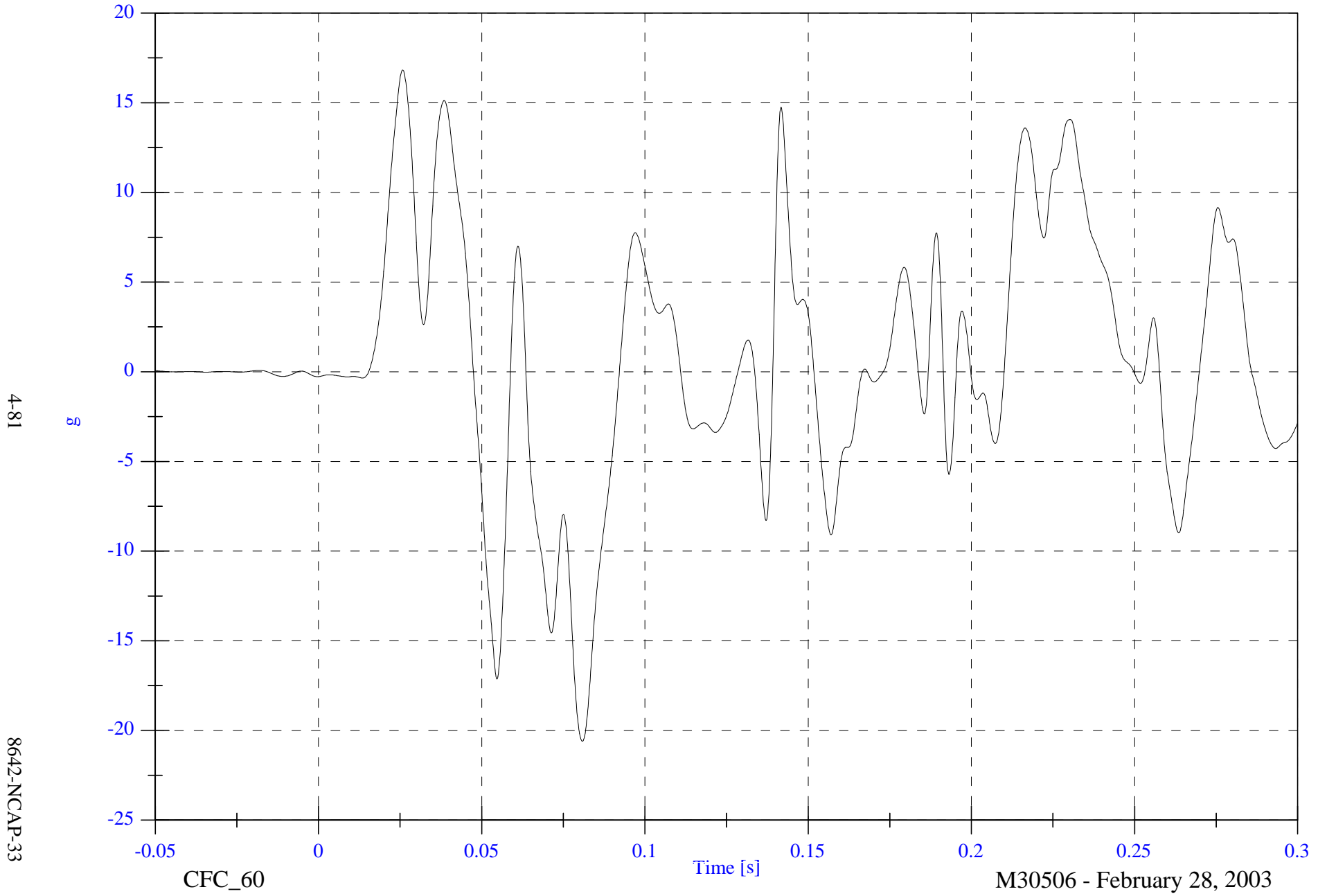
M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

V1P4 CRS z

Max: 16.8 [g] at 0.026 [s]

Min: -20.6 [g] at 0.081 [s]



NCAP Test #11 - 2003 Isuzu Rodeo

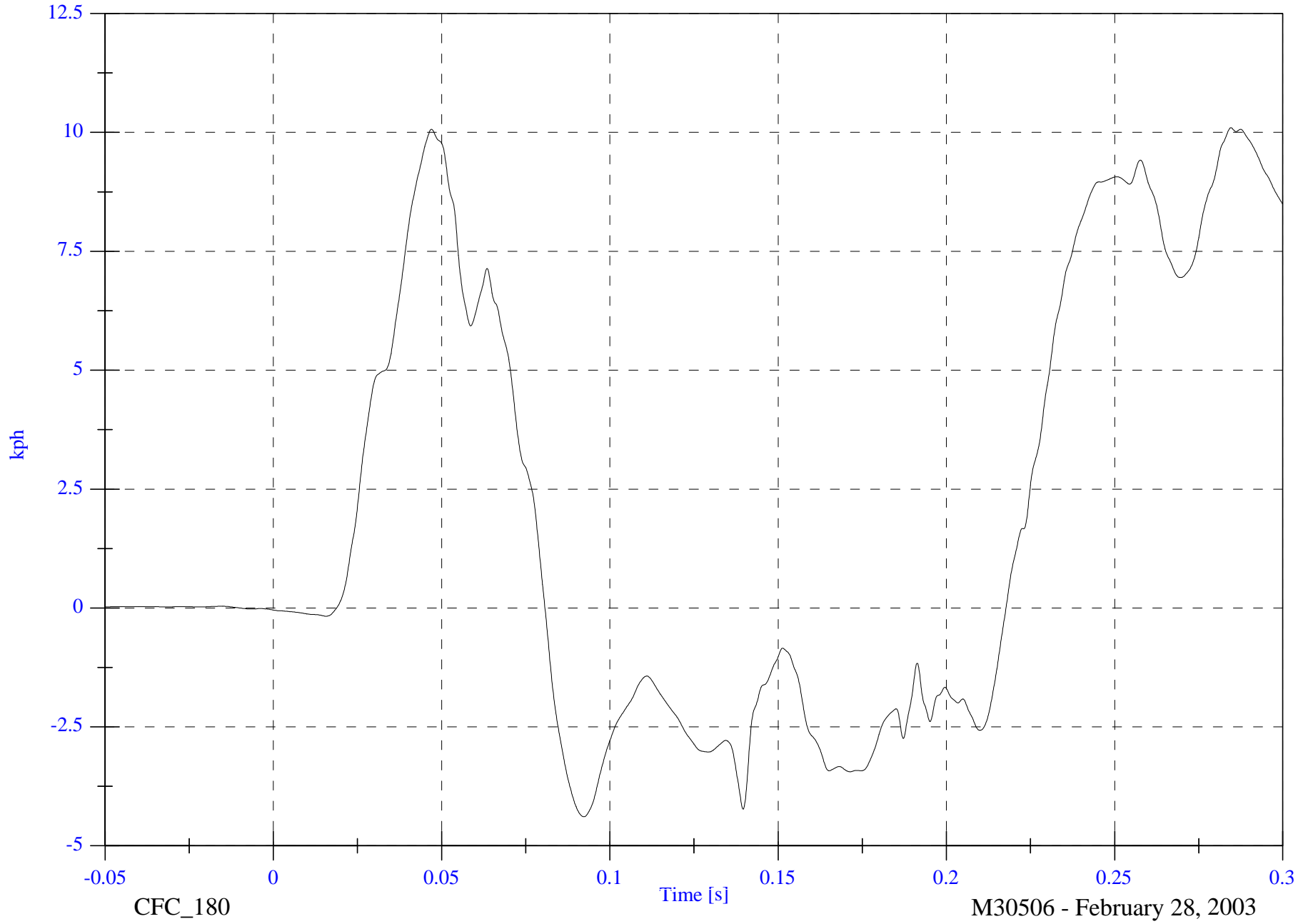
V1P4 CRS z Velocity

Max: 10.1 [kph] at 0.285 [s]

Min: -4.4 [kph] at 0.092 [s]

4-82

8642-NCAP-33



NCAP Test #11 - 2003 Isuzu Rodeo

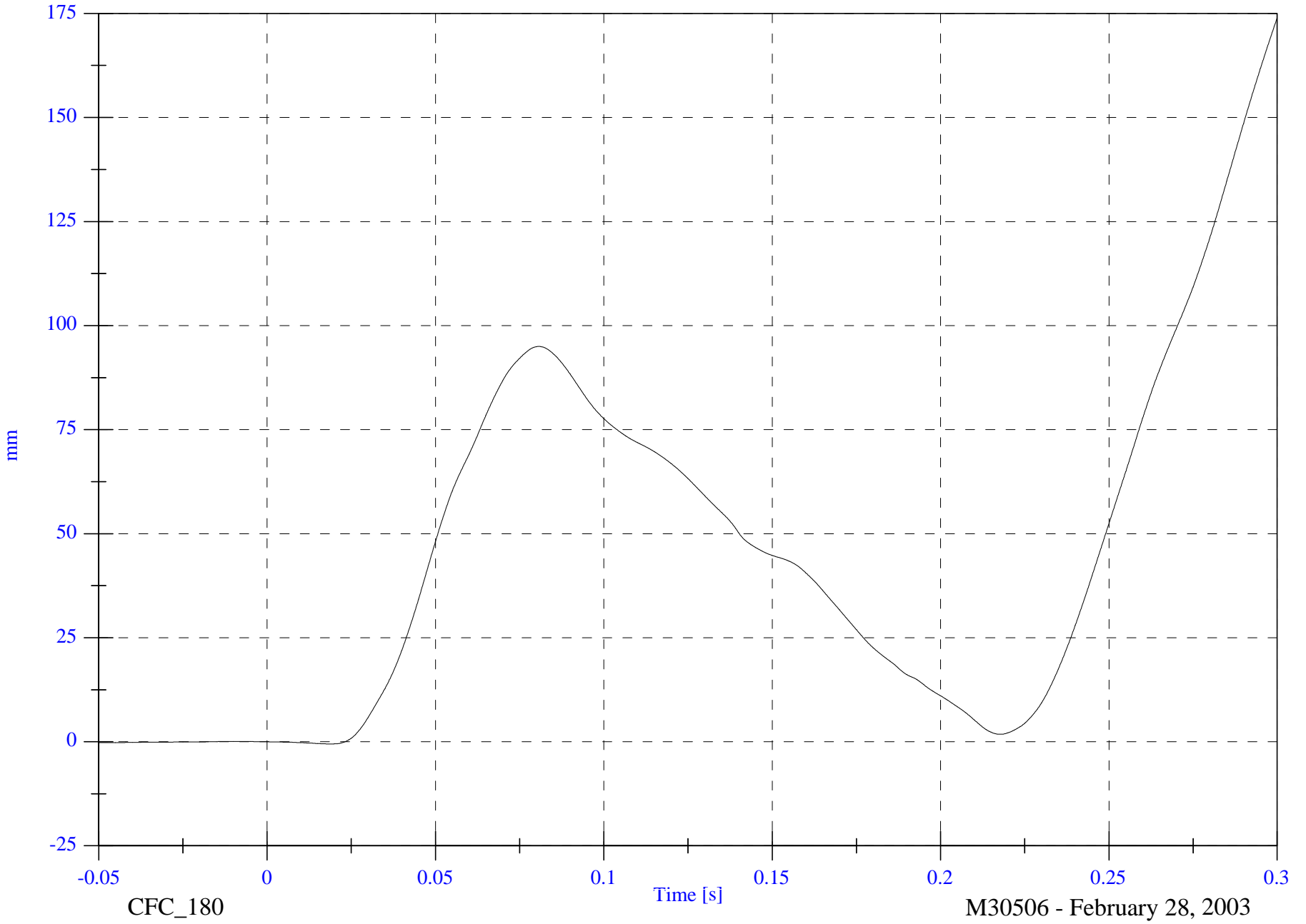
V1P4 CRS z Displacement

Max: 173.8 [mm] at 0.300 [s]

Min: -0.6 [mm] at 0.019 [s]

4-83

8642-NCAP-33



CFC\_180

Time [s]

M30506 - February 28, 2003

NCAP Test #11 - 2003 Isuzu Rodeo

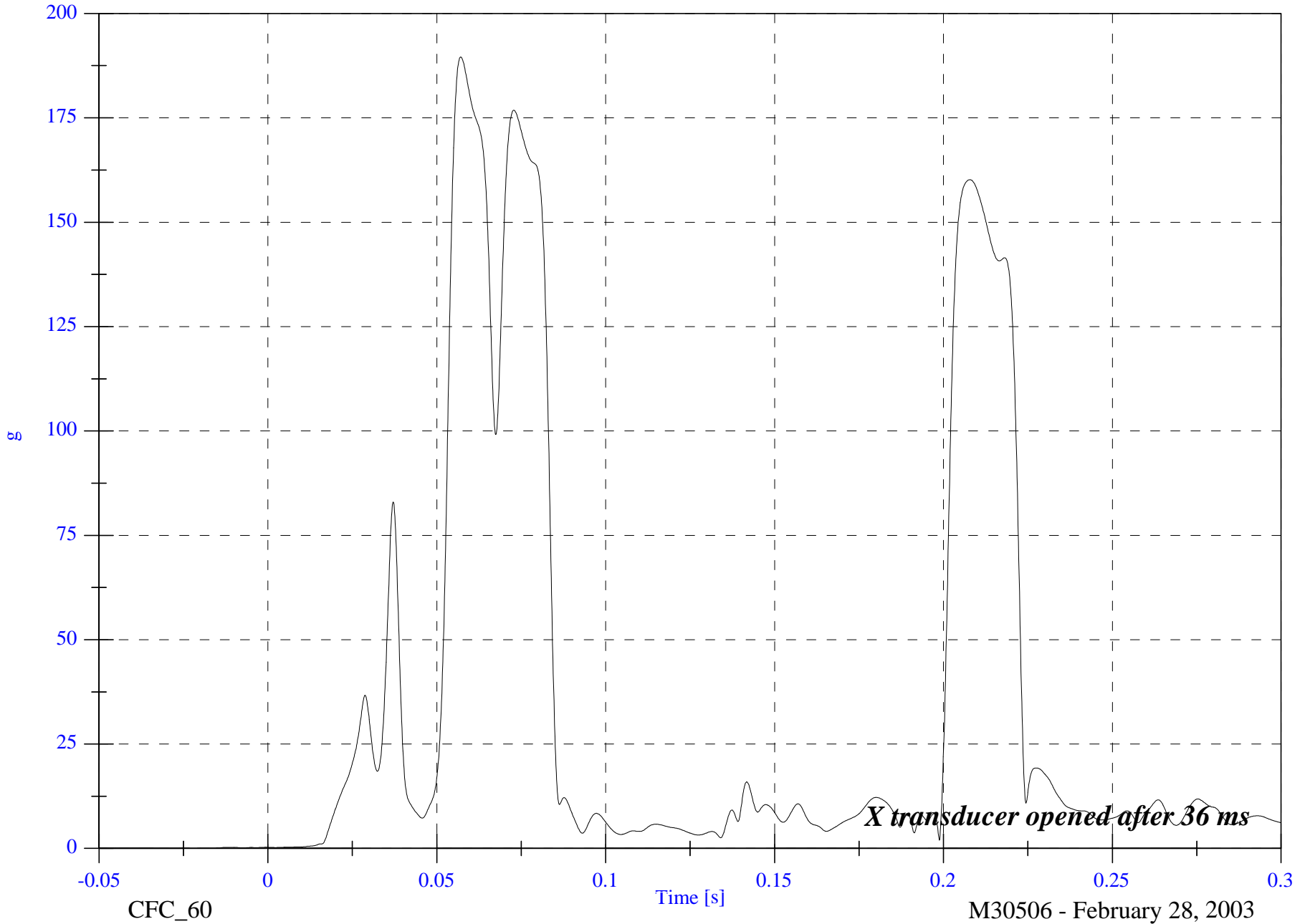
VIP4 CRS Resultant

Max: 189.6 [g] at 0.057 [s]

Min: 0.0 [g] at -0.022 [s]

4-84

8642-NCAP-33



CFC\_60

Time [s]

M30506 - February 28, 2003

**SECTION 5**

**CHILD DUMMY CALIBRATION INFORMATION**

# 044 Head Drop

Part 572P Head Drop

Calibration Date: 01-27-03

Serial No: 044

Work File: 044H 01-27-03

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

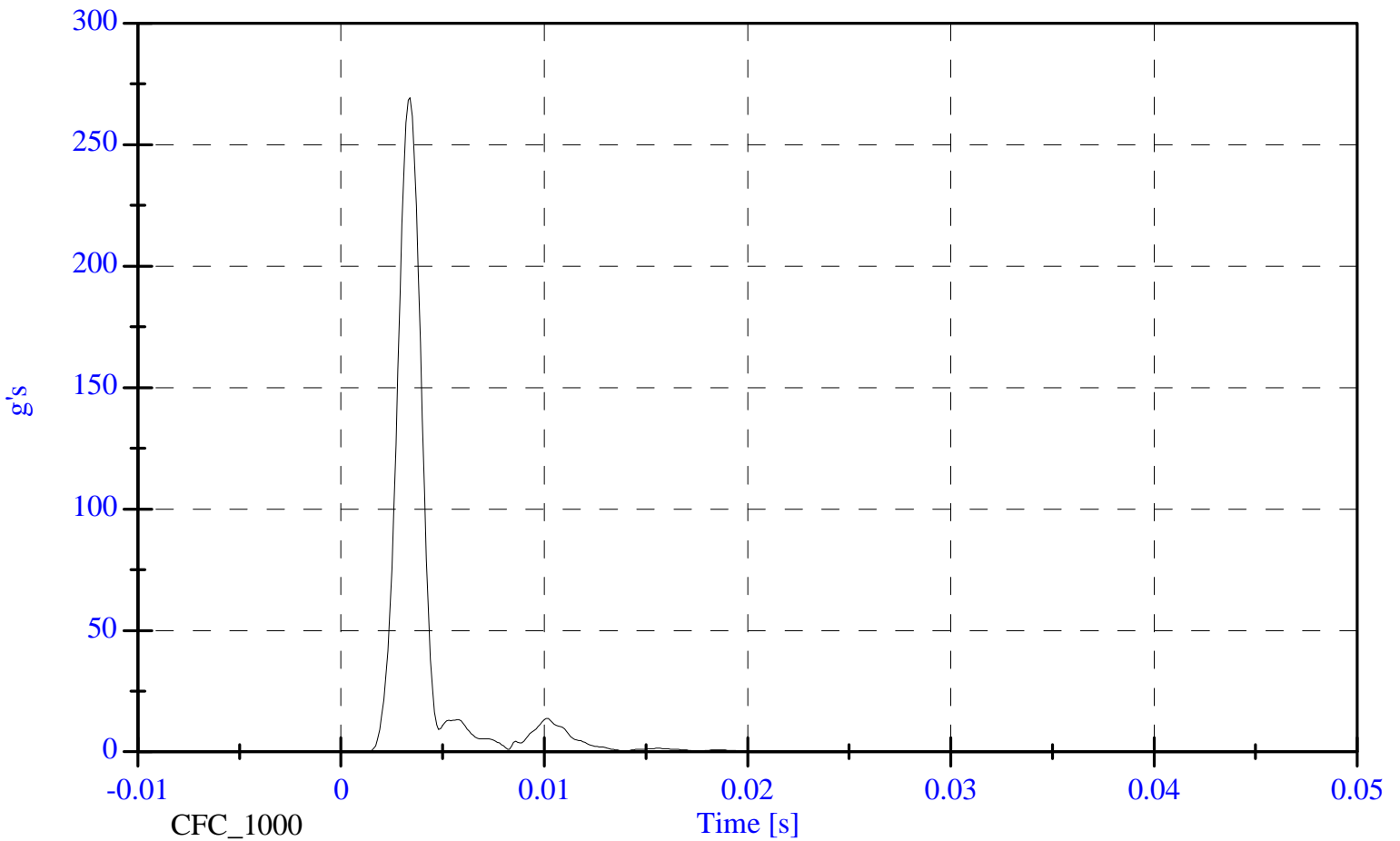
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	66.0-78.0 F	70.0 F	Passed
Lab Humidity:	10-70 %	37.00 %	Passed
Peak Resultant Accel.:	250-280 Gs	269.30 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	3.21 Gs	Passed
Curve PerCent NonModal:	< 10%	5.12 %	Passed

044 Head Drop

Head Resultant

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

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



# 044 Chest Impact

Part 572P Thorax Impact

Calibration Date: 01-28-03

Serial No: 044

Work File: 044T1 01-28-03

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

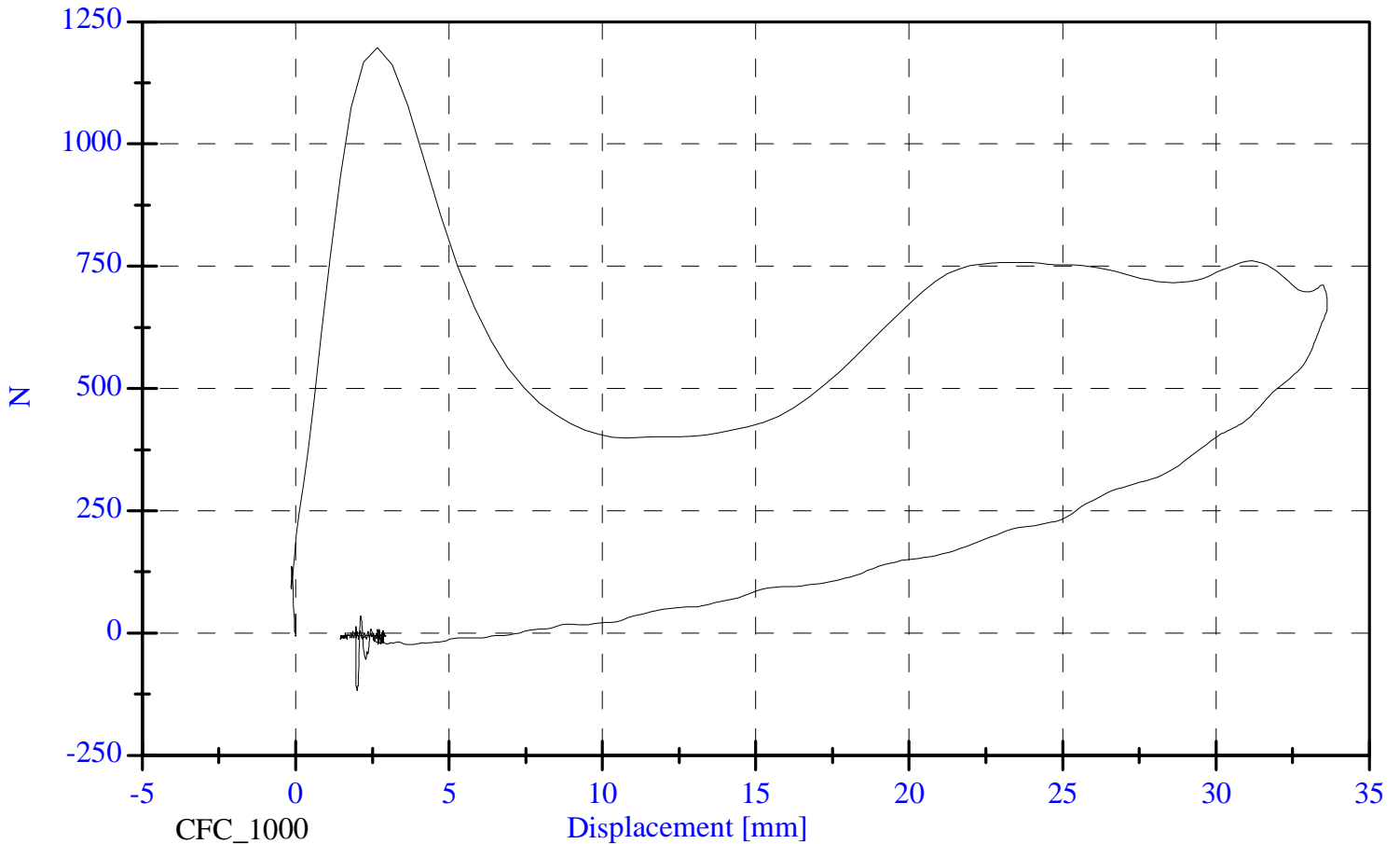
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.1 C	Passed
Lab Humidity:	10-70 %	33.00 %	Passed
Pendulum Velocity:	5.90- 6.10 m/s	5.94 m/s	Passed
Maximum Deflection:	32.00-38.00 mm	33.62 mm	Passed
Maximum Res. Force:	680.00- 810.00 N	740.30 N	Passed
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 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-----

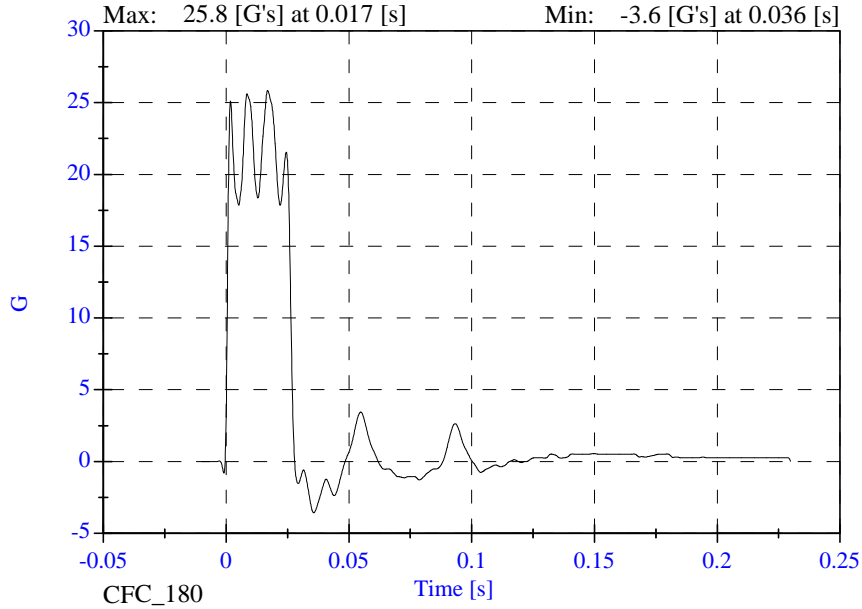
Maximum Rotation:	70.0-82.0 Deg	75.22 Deg	Passed
-------------------	---------------	-----------	--------

## -----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

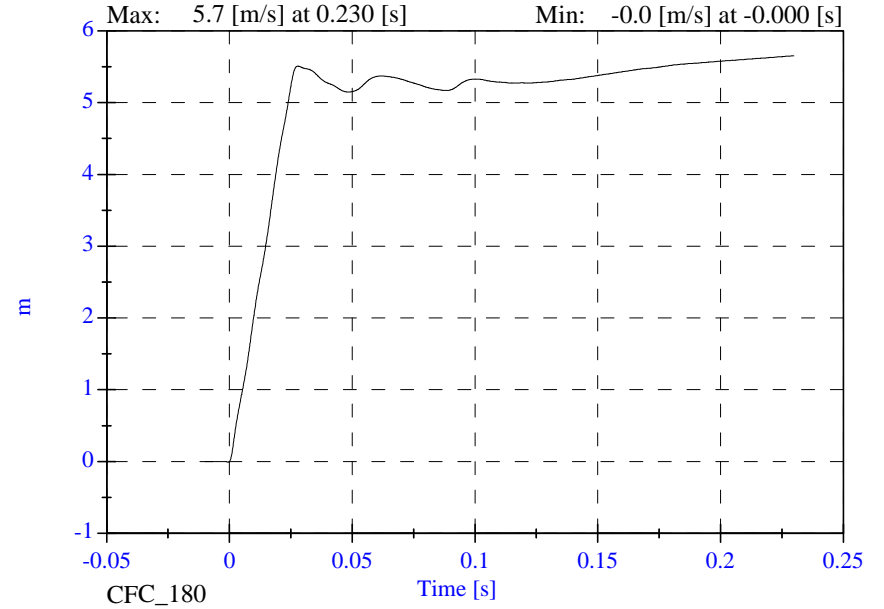
# 044 Neck Flexion

## Pendulum Acceleration

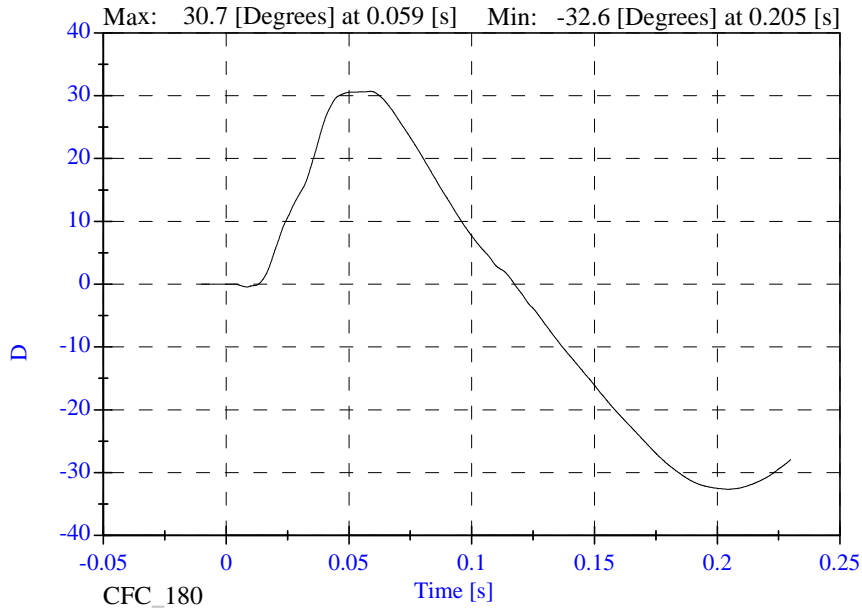


# 70 - 01-27-03

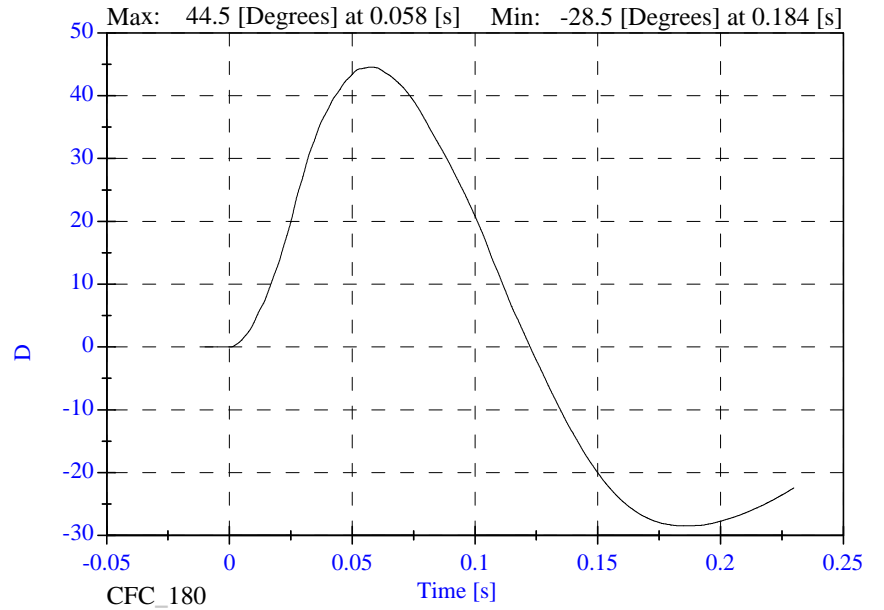
## Pendulum Velocity



## Head Rotation

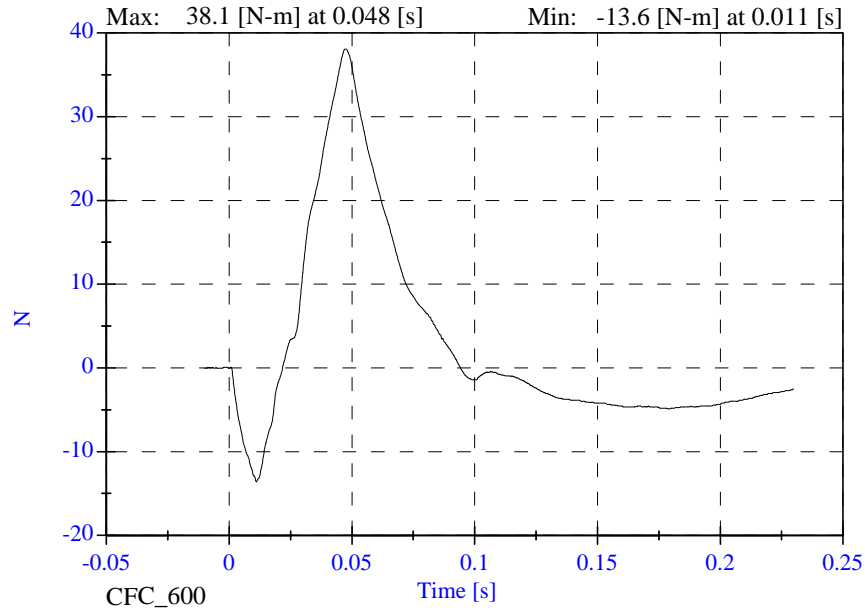


## Arm Rotation



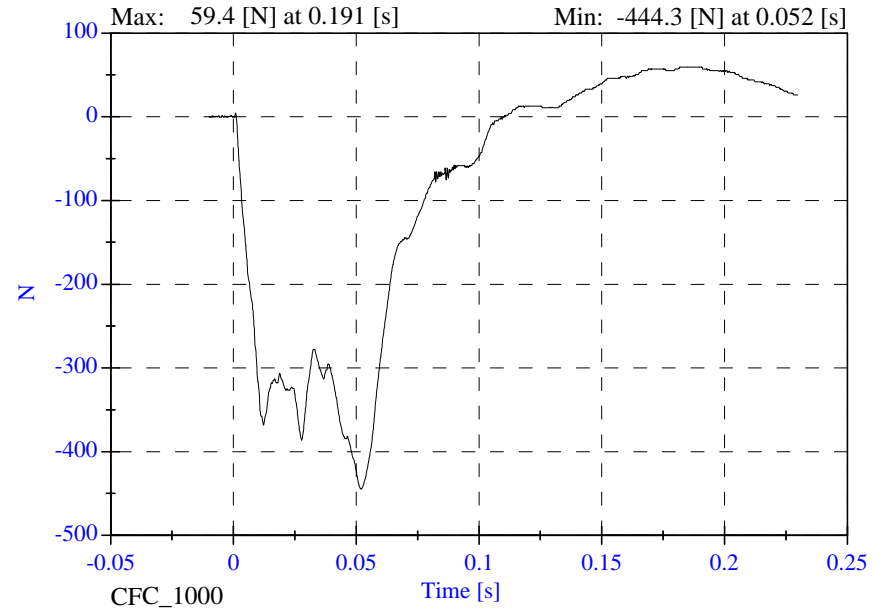
### 044 Neck Flexion

Neck Moment Y

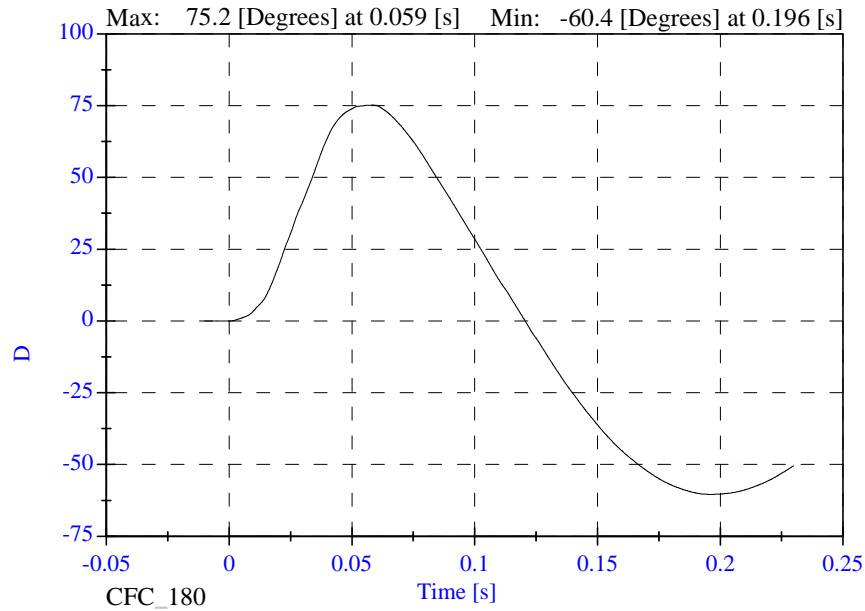


### 70 - 01-27-03

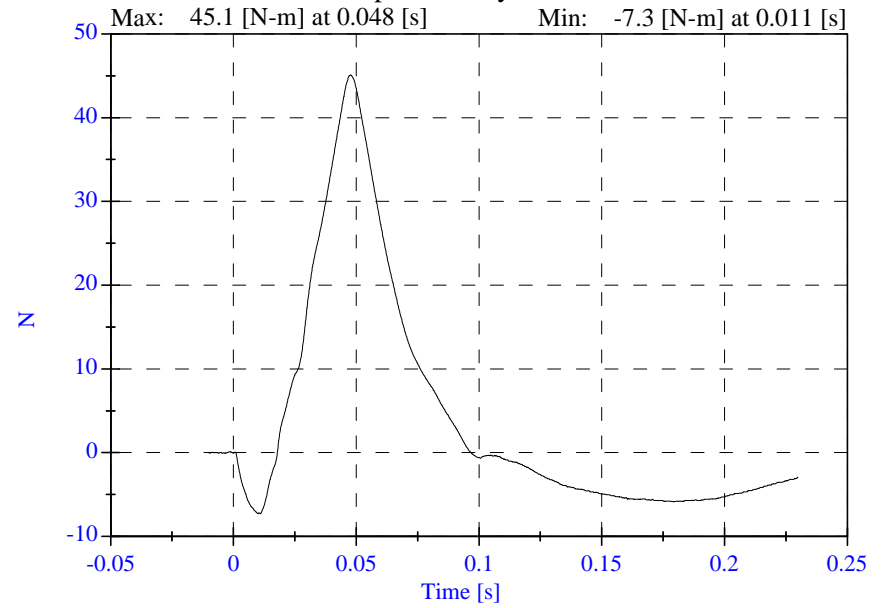
Neck Force X



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-----

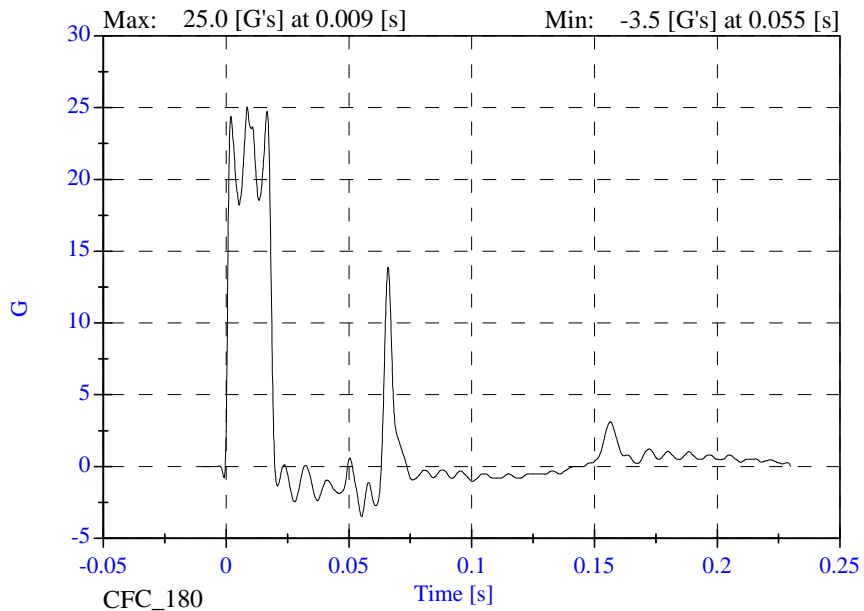
Maximum Rotation:	83.0-93.0 Deg	83.96 Deg	Passed
-------------------	---------------	-----------	--------

## -----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

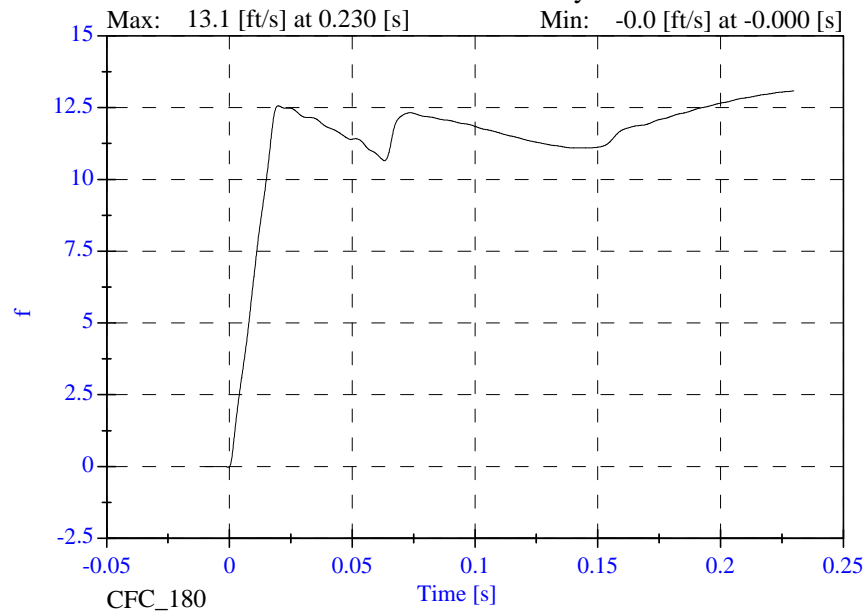
# 044 Neck Extension

## Pendulum Acceleration

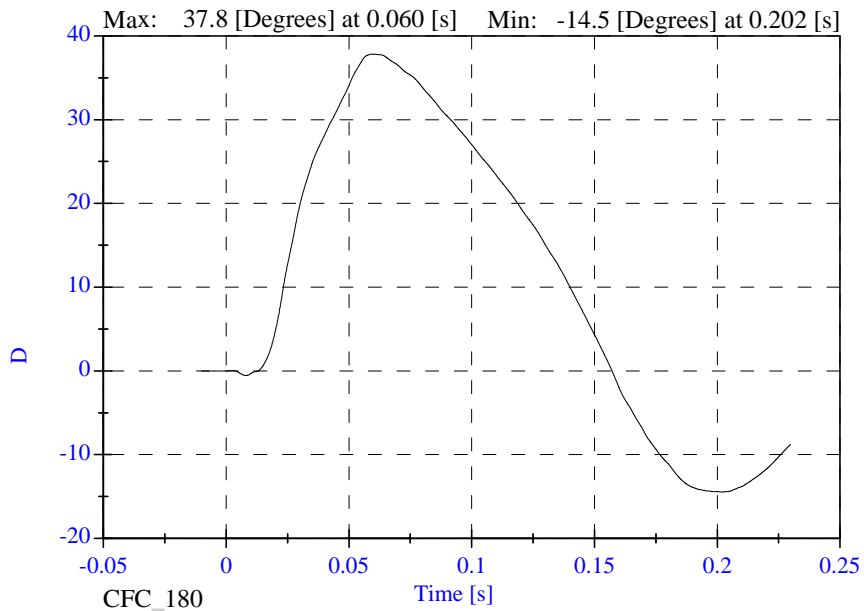


# 71 - 01-28-03

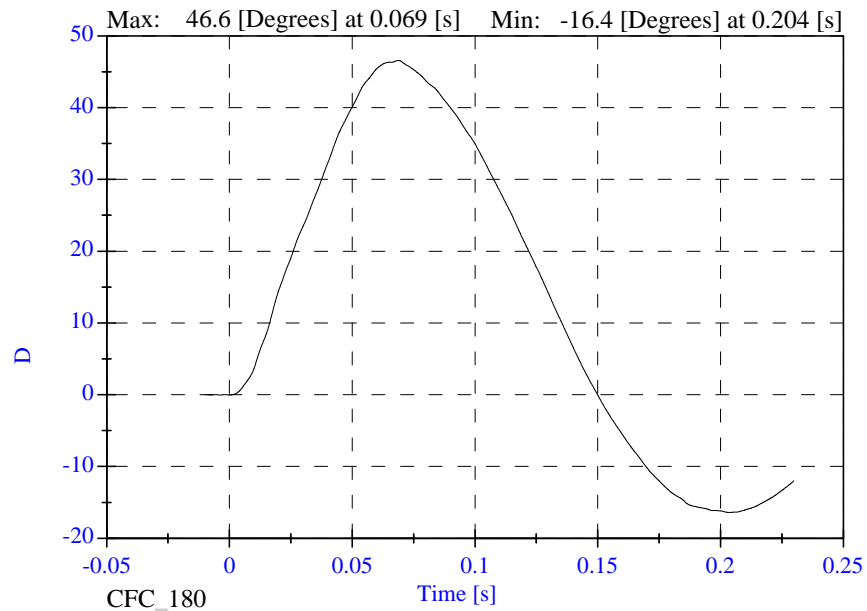
## Pendulum Velocity



## Head Rotation

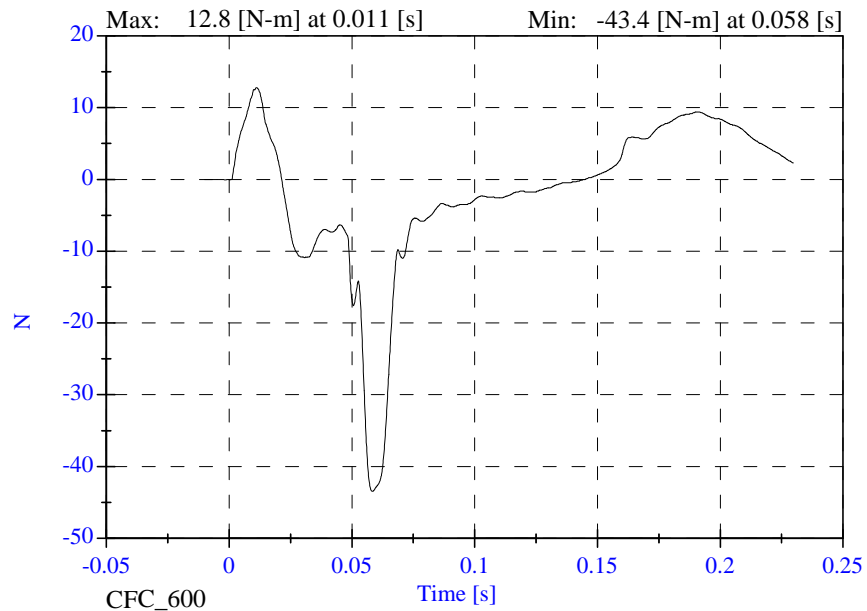


## Arm Rotation



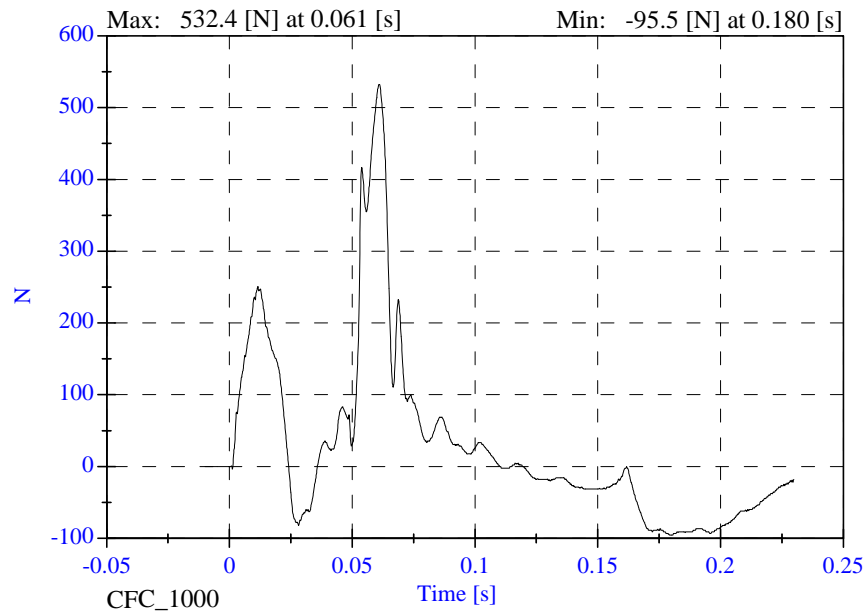
### 044 Neck Extension

Neck Moment Y

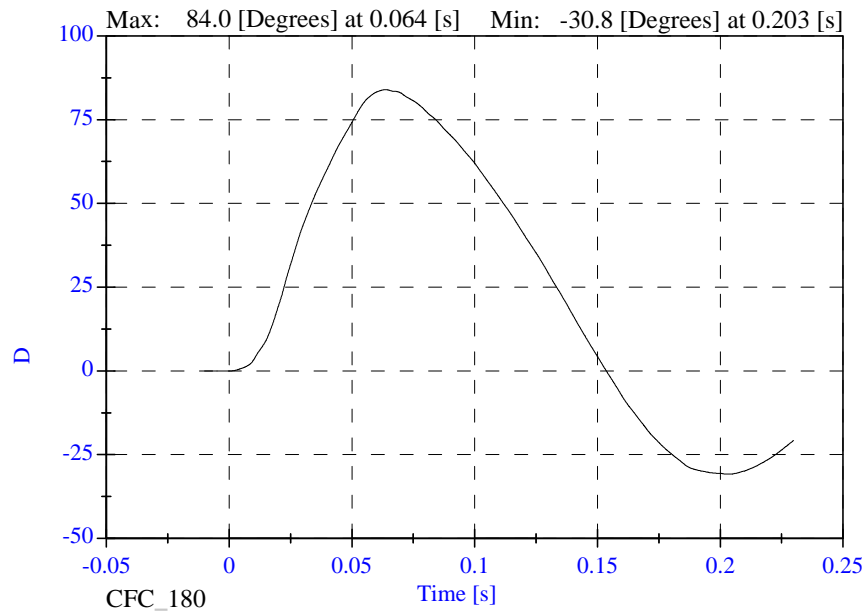


### 71 - 01-28-03

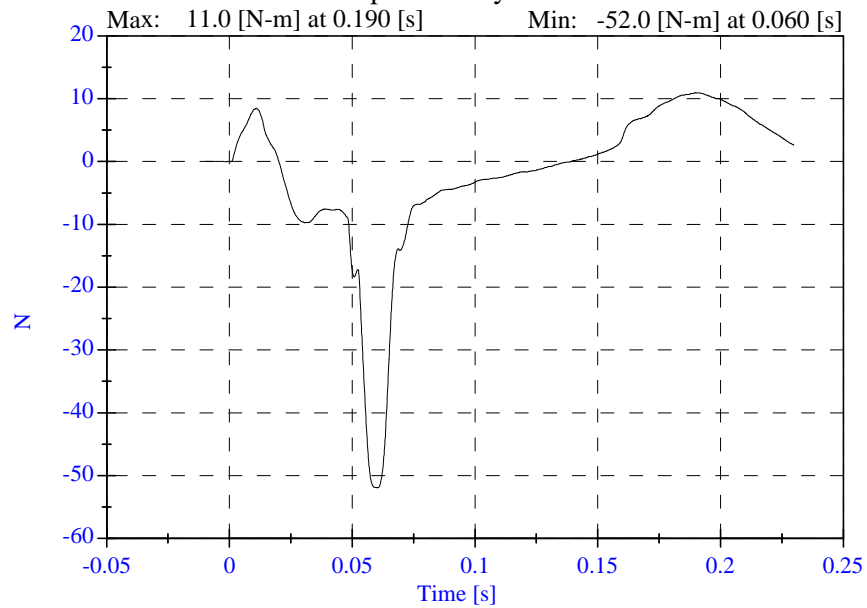
Neck Force X



Total Rotation



Occipital Condyle Moment



044 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. Swiecki Date: 01-28-03

# 142 Head Drop

Part 572P Head Drop

Calibration Date: 11-15-02

Serial No: 142

Work File: 142H1 11-15-02

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

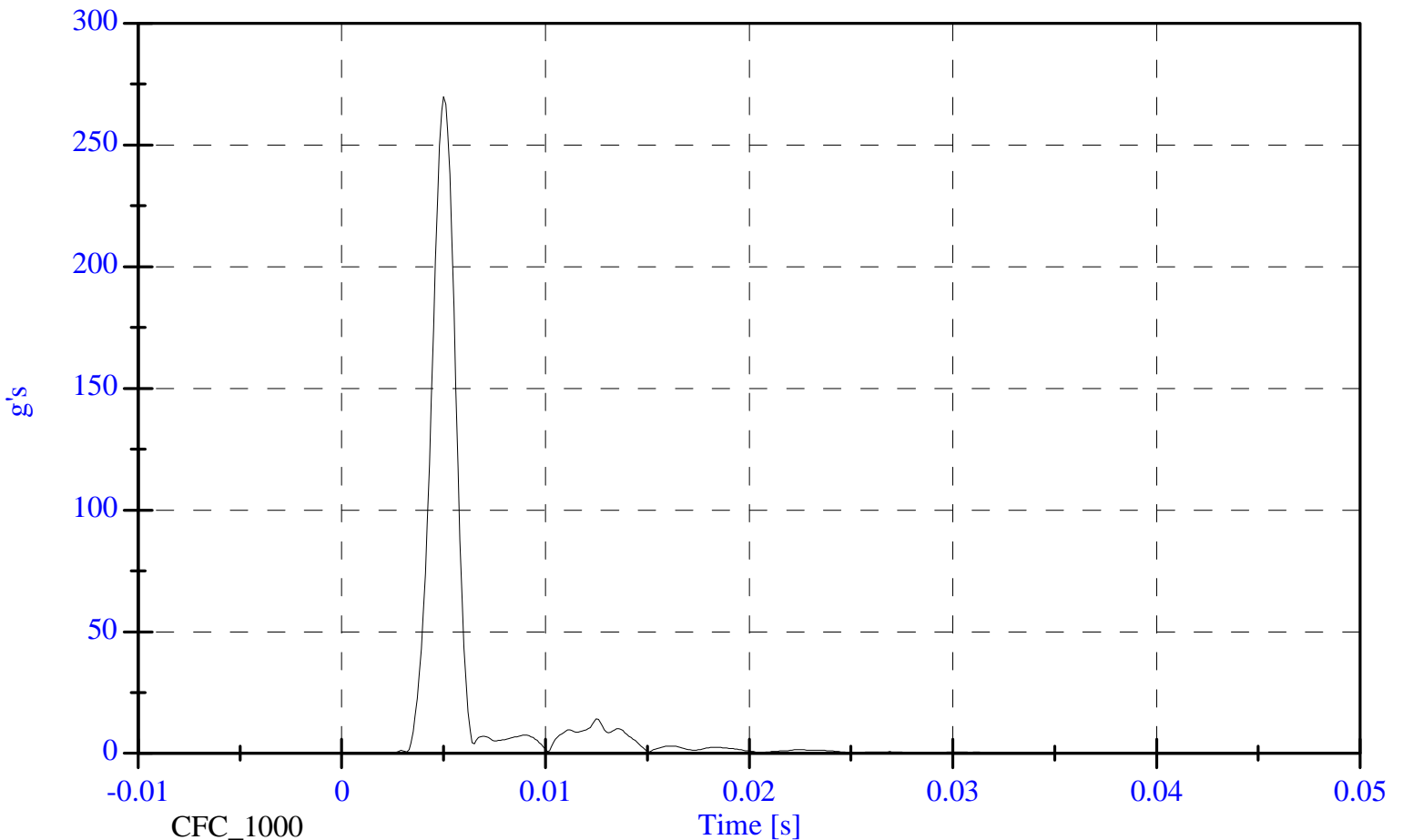
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	66.0-78.0 F	69.0 F	Passed
Lab Humidity:	10-70 %	33.00 %	Passed
Peak Resultant Accel.:	250-280 Gs	269.74 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	8.65 Gs	Passed
Curve PerCent NonModal:	< 10%	5.27 %	Passed

142 Head Drop

Head Resultant

Max: 269.7 [g's] at 0.005 [s]

Min: 0.0 [g's] at -0.010 [s]



# 142 Chest Impact

Part 572P Thorax Impact

Calibration Date: 11-21-02

Serial No: 142

Work File: 142T 11-21-02

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

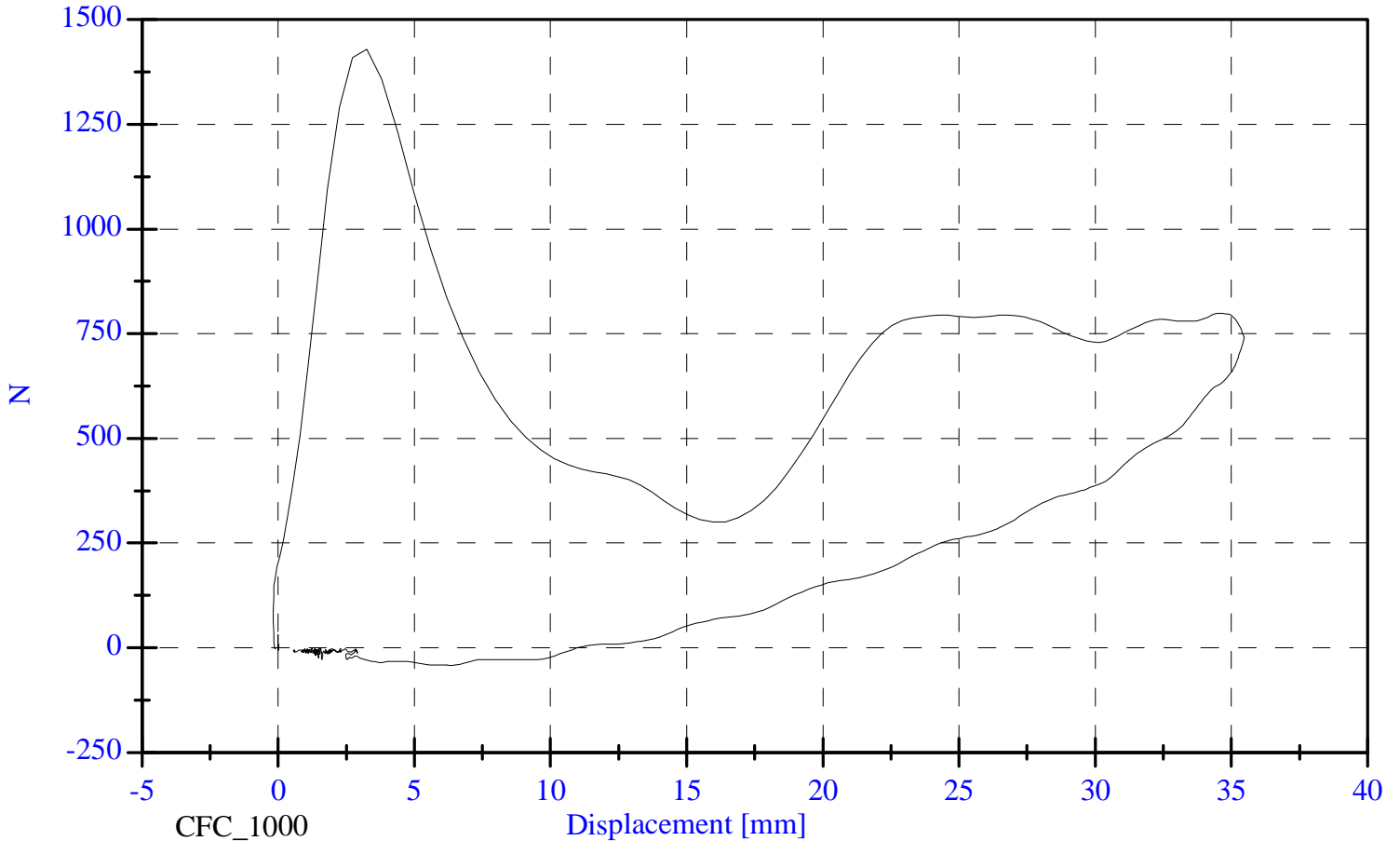
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.1 C	Passed
Lab Humidity:	10-70 %	35.00 %	Passed
Pendulum Velocity:	5.90- 6.10 m/s	6.03 m/s	Passed
Maximum Deflection:	32.00-38.00 mm	35.46 mm	Passed
Maximum Res. Force:	680.00- 810.00 N	798.56 N	Passed
Internal Hysteresis:	65-85 %	75.17 %	Passed
Pass Sternum Force Criteria?:	860.00 N	798.56	Passed

142 Chest Impact

Probe Force vs. Displacement

Max: 1429.2 [N] at 3.251 [mm]

Min: -42.0 [N] at 6.333 [mm]



142 Neck Flex  
 Part 572P Neck Flexion Test  
 Part 572P Serial No: 142  
 Calibration Date: 11-20-02  
 Work File: 142Flx1 11-20-02

## -----Neck Test Results-----

TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	20.6-22.2 C	21.11 C	Passed
Lab Humidity:	10-70 %	33.00 %	Passed
Test Pendulum Speed:	5.40- 5.60 m/s	5.55 m/s	Passed

## -----Pendulum Pulse-----

Pulse at 10 ms:	2.00- 2.70 m/s	2.09 m/s	Passed
Pulse at 15 ms:	3.00- 4.00 m/s	3.13 m/s	Passed
Deceleration at 20 ms:	4.00- 5.10 m/s	4.33 m/s	Passed

## -----D Plane Rotation-----

Maximum Rotation:	70.0-82.0 Deg	77.98 Deg	Passed
-------------------	---------------	-----------	--------

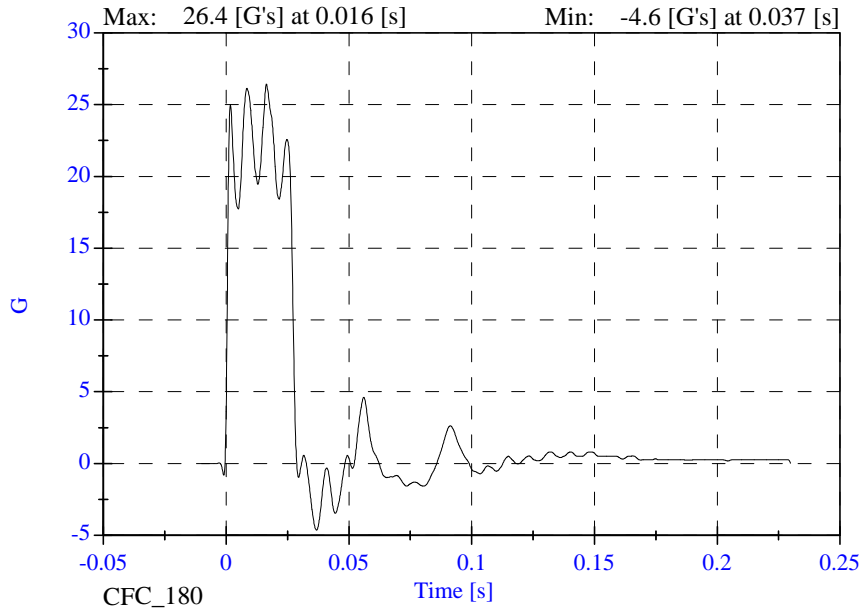
## -----Moment About the Occipital Condyle-----

Max Occipital Moment:	42.00- 53.00 N-M	44.98 N-M	Passed
Occipital Moment Decay:	60.0-80.0 ms	71.10 ms	Passed

Certified By: B. Swiecki      Date: 11-20-02

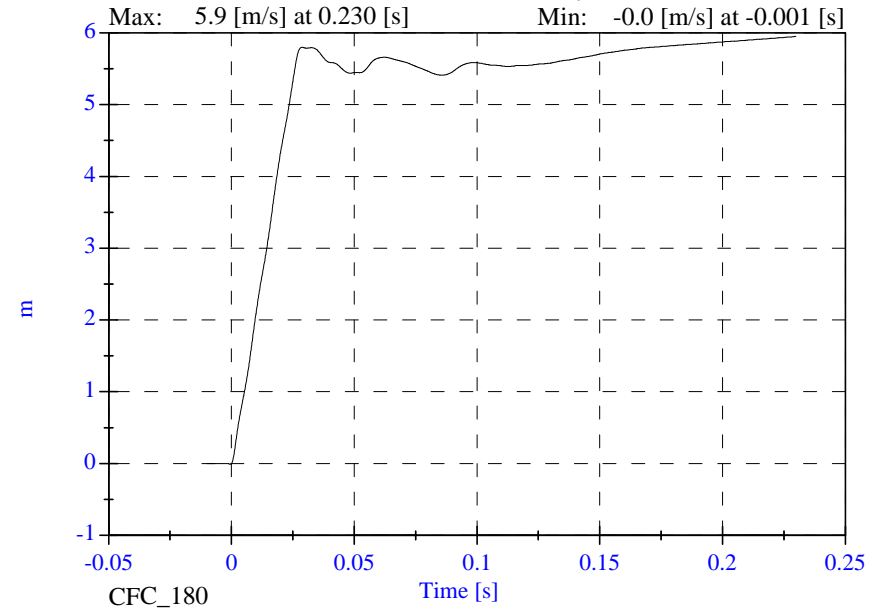
# 142 Neck Flex

## Pendulum Acceleration

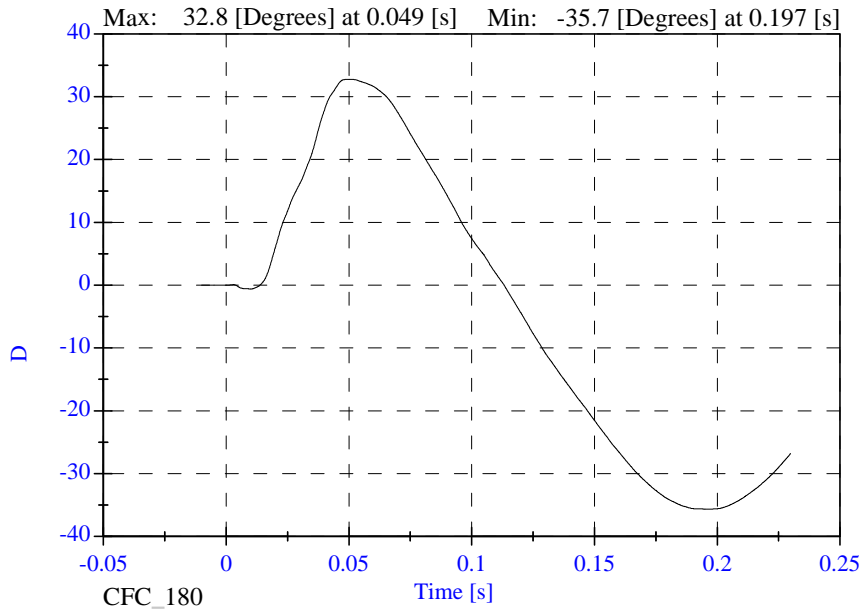


# 11-20-02

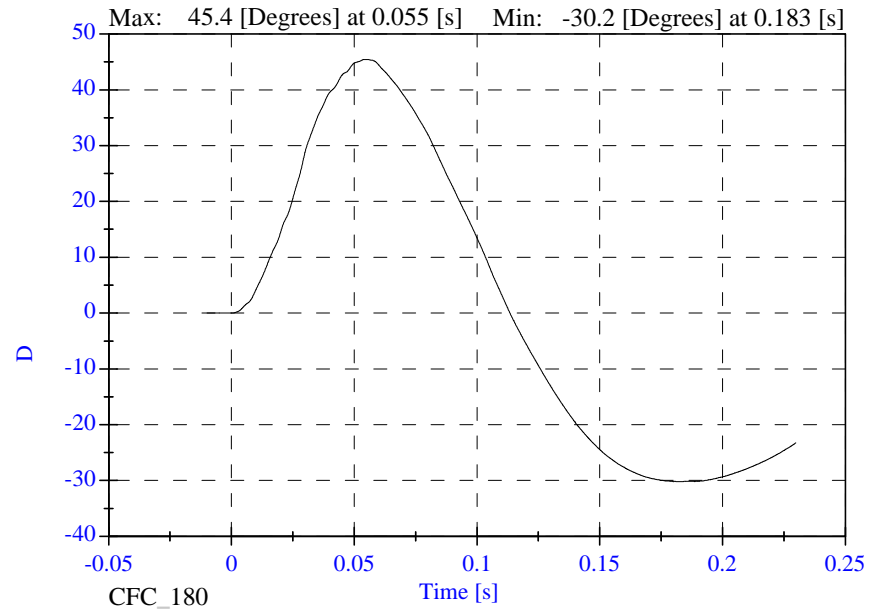
## Pendulum Velocity



## Head Rotation

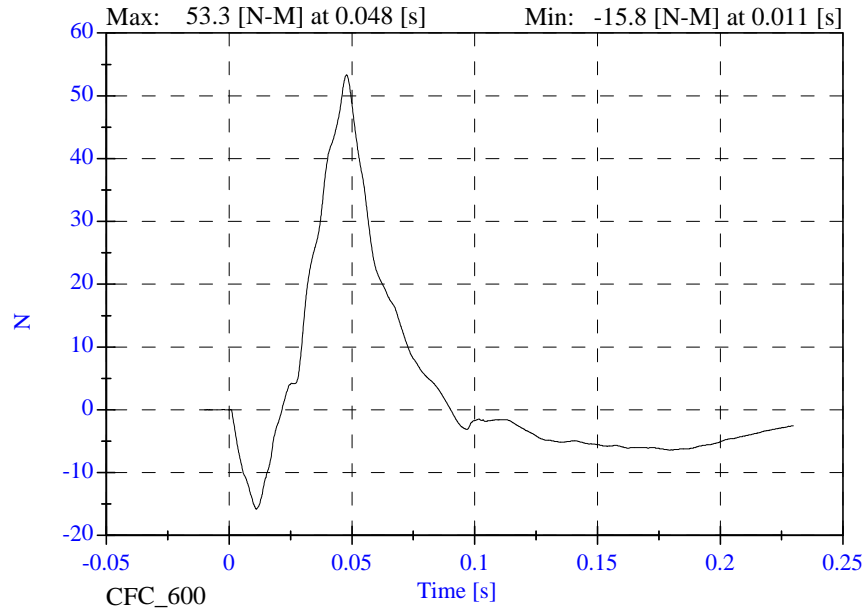


## Arm Rotation



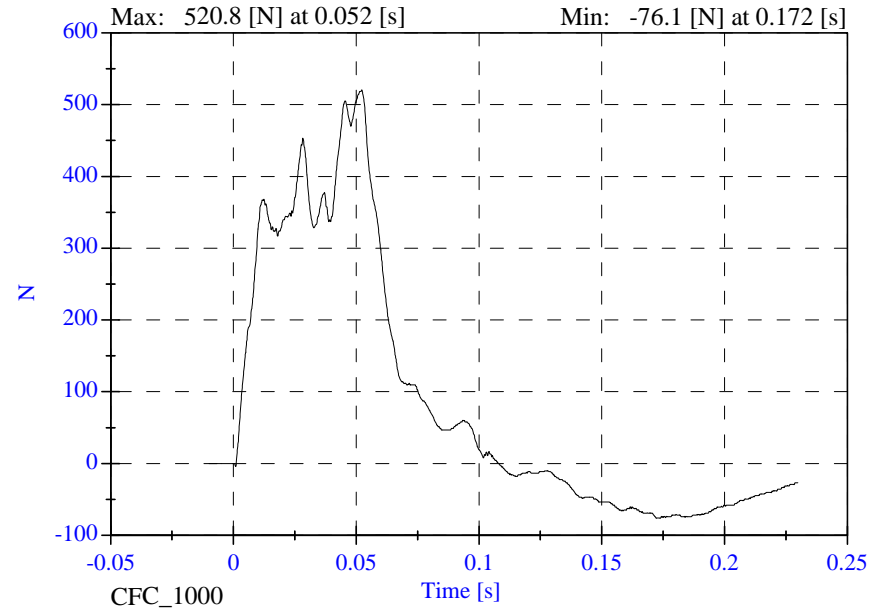
# 142 Neck Flex

Neck Moment Y

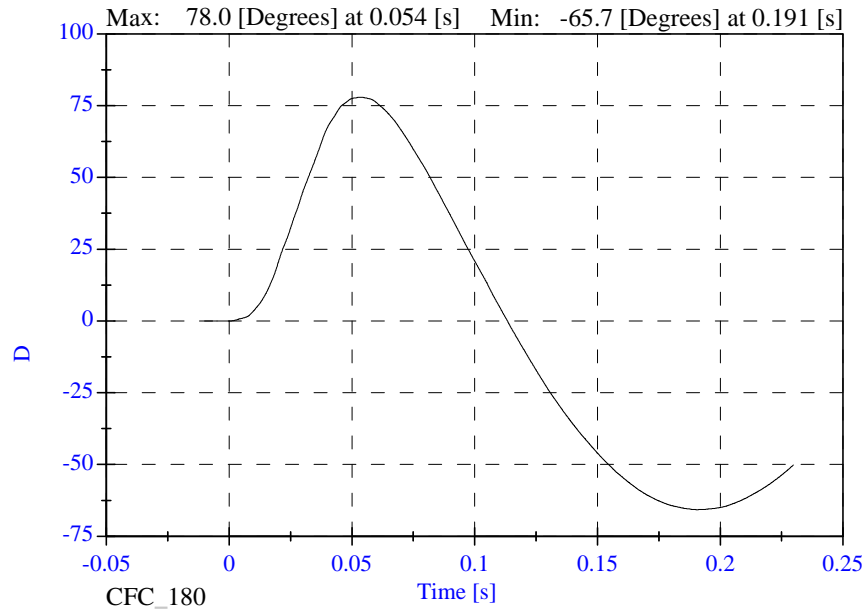


# 11-20-02

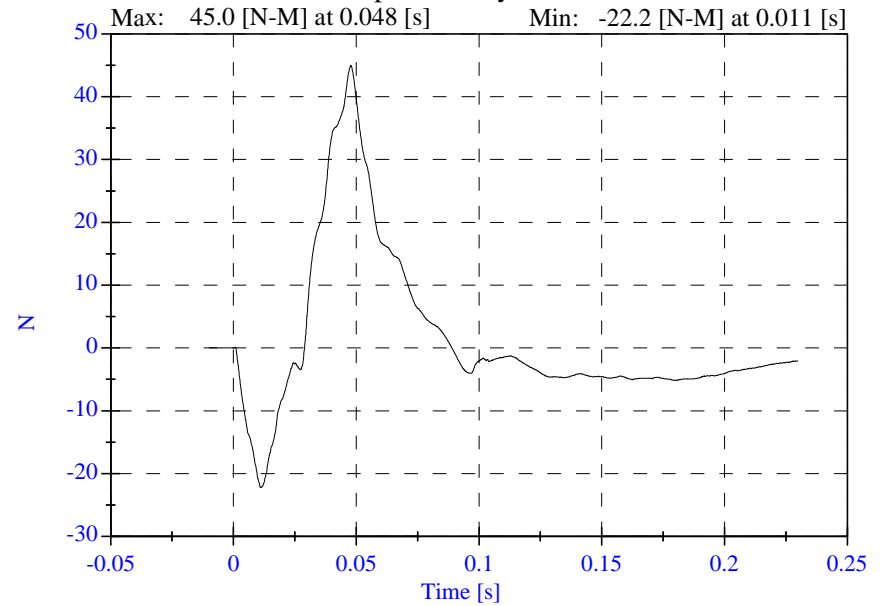
Neck Force X



Total Rotation



Occipital Condyle Moment



142 Neck Ext.  
 Part 572P Neck Extension Test  
 Part 572P Serial No: 142  
 Calibration Date: 11-20-02  
 Work File: 142Ext9 11-20-02

## -----Neck Test Results-----

TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	20.6-22.2 C	21.11 F	Passed
Lab Humidity:	10-70 %	33.00 %	Passed
Test Pendulum Speed:	3.55- 3.75 m/s	3.66 m/s	Passed

## -----Pendulum Pulse-----

Pulse at 6 ms:	1.00- 1.40 m/s	1.20 m/s	Passed
Pulse at 10 ms:	1.90- 2.50 m/s	2.12 m/s	Passed
Deceleration at 14 ms:	2.80- 3.50 m/s	2.83 m/s	Passed

## -----D Plane Rotation-----

Maximum Rotation:	83.0-93.0 Deg	84.61 Deg	Passed
-------------------	---------------	-----------	--------

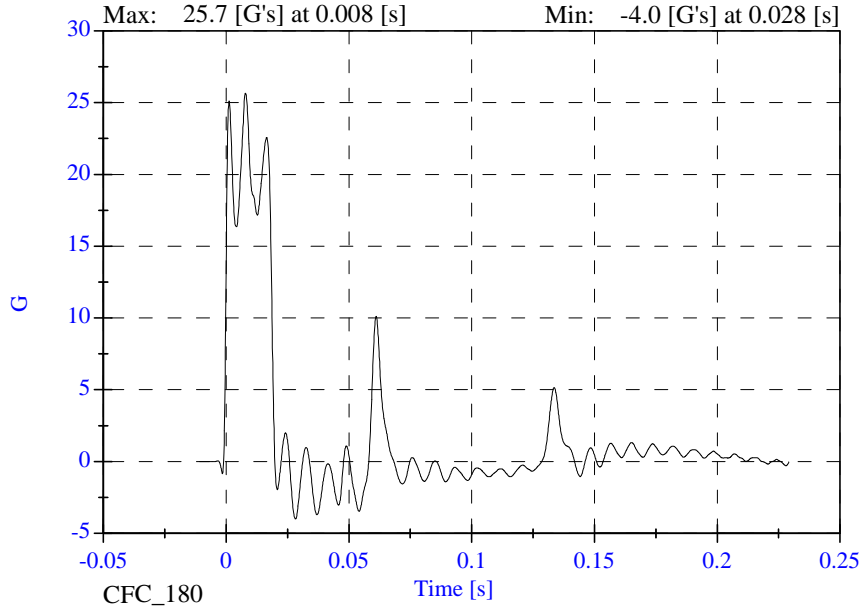
## -----Moment About the Occipital Condyle-----

Max Occipital Moment:	-53.30--43.70 N-m	-49.03 N	Passed
Occipital Moment Decay:	60.0-80.0 ms	67.70 ms	Passed

Certified By: B. Swiecki      Date: 11-20-02

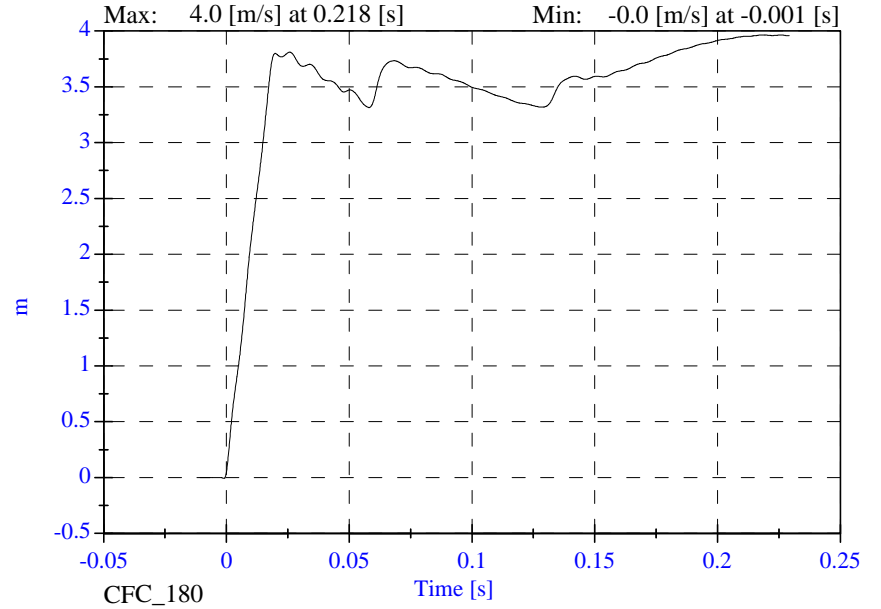
# 142 Neck Ext.

## Pendulum Acceleration

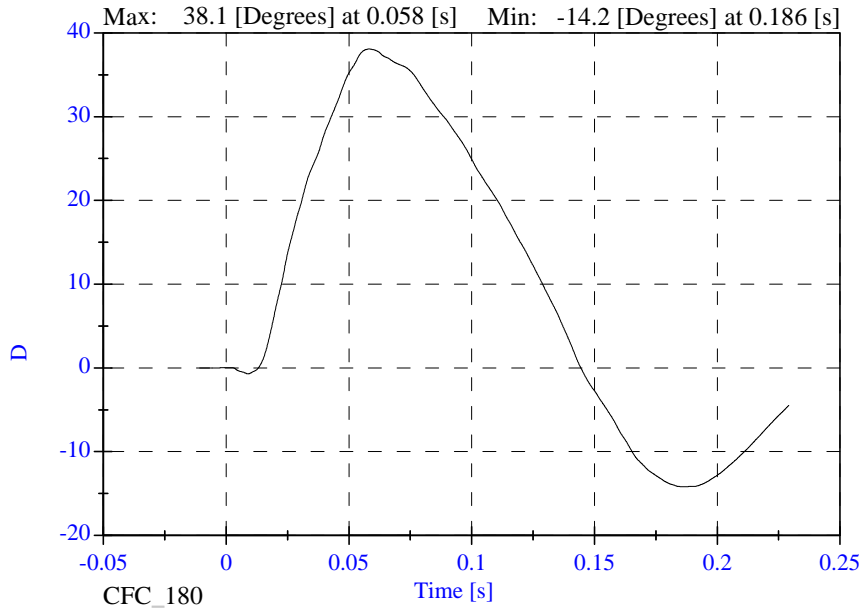


# 11-20-02

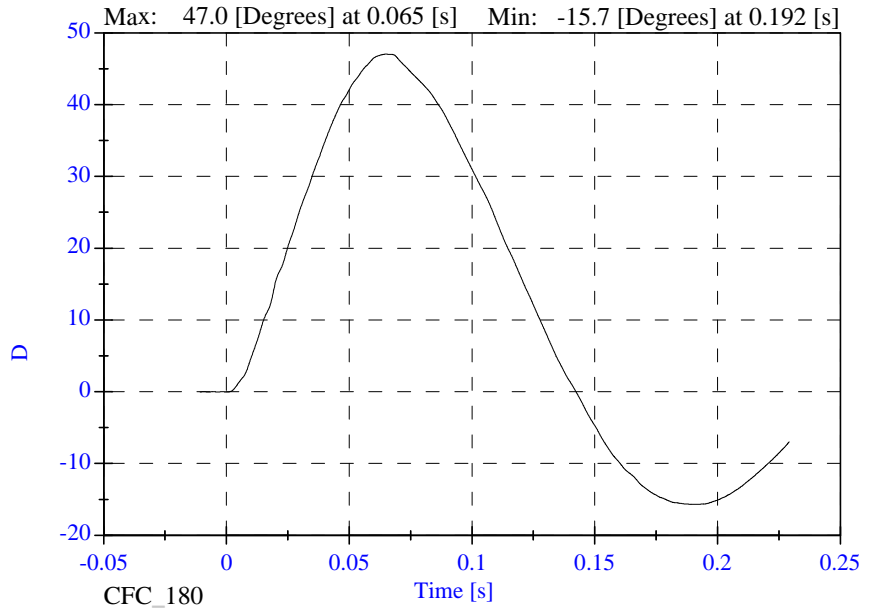
## Pendulum Velocity



## Head Rotation

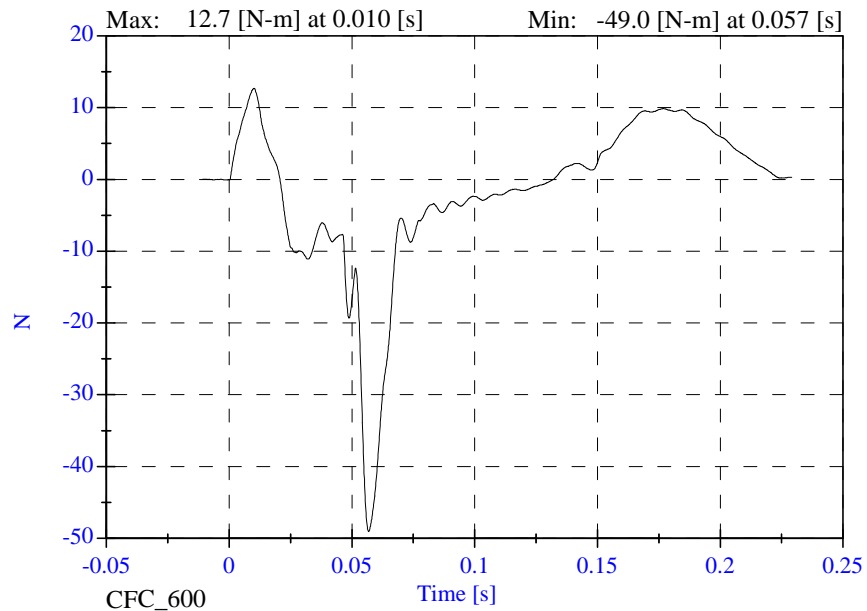


## Arm Rotation



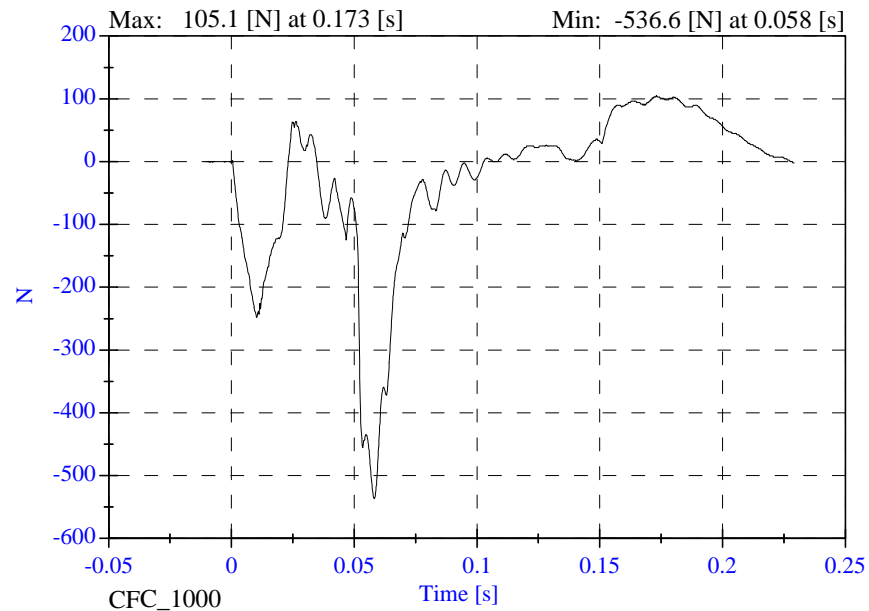
### 142 Neck Ext.

Neck Moment Y

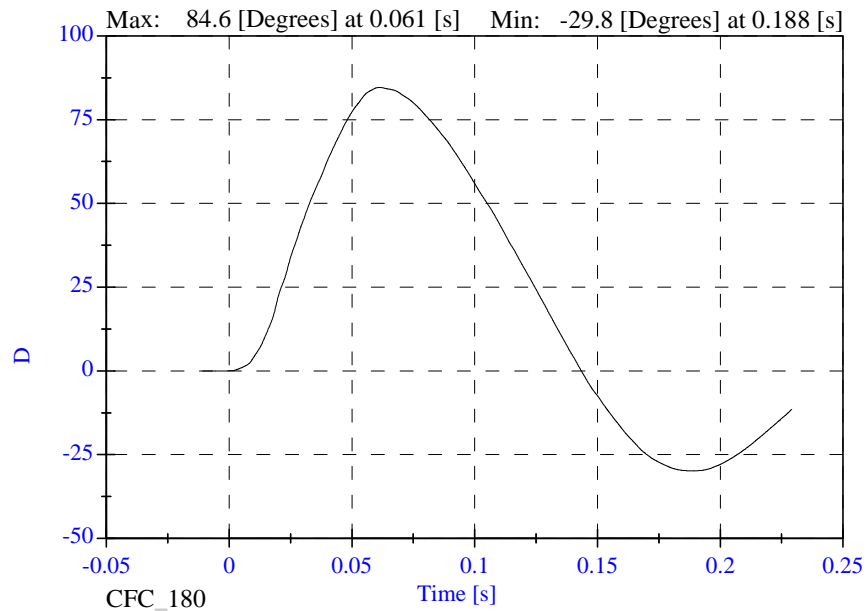


### 11-20-02

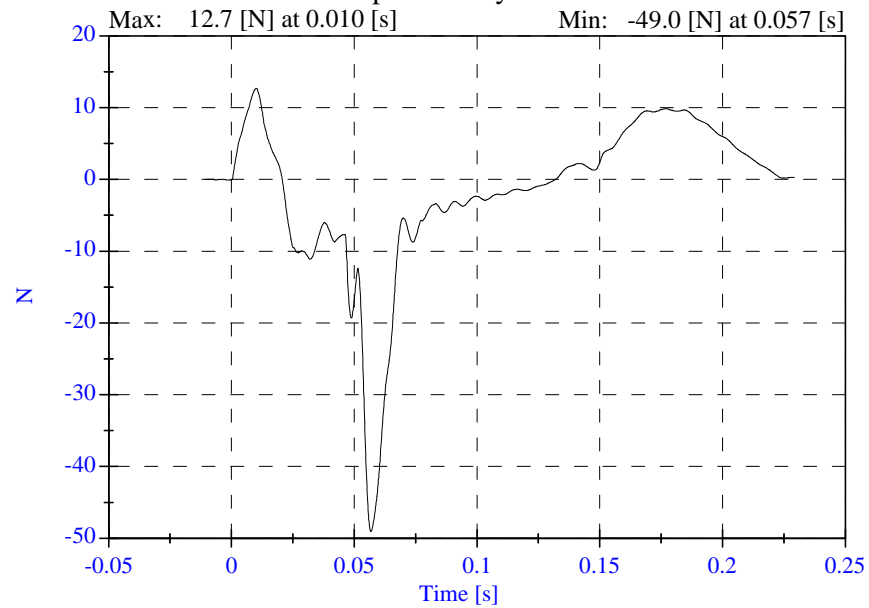
Neck Force X



Total Rotation



Occipital Condyle Moment



Spine\_Flexion\_test.txt

142 Lumbar Spine Flexion

Date: 11-21-02

Result: 45 degrees - 40.8 lbf

Certified By: B. Swiecicki Date: 11-21-02

**SECTION 6**

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**HYBRID III INSTRUMENTATION**

	POSITION #3 (RIGHT) SERIAL NO.: 044		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	AC-P17912	ENDEVCO	11/11/02
HEAD AY	AC-P17743	ENDEVCO	11/11/02
HEAD AZ	AC-P15319	ENDEVCO	11/11/02
HEAD REAR AZ	-	-	-
UPPER NECK FX	LC-248-FX	DENTON	10/15/02
UPPER NECK FY	LC-248-FY	DENTON	10/15/02
UPPER NECK FZ	LC-248-FZ	DENTON	10/15/02
UPPER NECK MX	LC-248-MX	DENTON	10/15/02
UPPER NECK MY	LC-248-MY	DENTON	10/15/02
UPPER NECK MZ	LC-248-MZ	DENTON	10/15/02
LOWER NECK FX	LC-249-FX	DENTON	10/15/02
LOWER NECK FY	LC-249-FY	DENTON	10/15/02
LOWER NECK FZ	LC-249-FZ	DENTON	10/15/02
LOWER NECK MX	LC-249-MX	DENTON	10/15/02
LOWER NECK MY	LC-249-MY	DENTON	10/15/02
LOWER NECK MZ	LC-249-MZ	DENTON	10/15/02
CHEST AX	AC-P15334	ENDEVCO	11/11/02
CHEST AY	AC-P15321	ENDEVCO	11/11/02
CHEST AZ	AC-P17758	ENDEVCO	11/11/02
CHEST DISPLACEMENT X	DS-044	SERVO	11/12/02
PELVIS AX	AC-P16755	ENDEVCO	11/11/02
PELVIS AY	AC-P15591	ENDEVCO	11/11/02
PELVIS AZ	AC-P16155	ENDEVCO	11/11/02
TETHER BELT LOAD	LC-635	LEBOW	11/12/02

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**HYBRID III INSTRUMENTATION**

	POSITION #4 (LEFT) SERIAL NO.: 142		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	AC-99108-F29	ENTRAN	11/11/02
HEAD AY	AC-99102-F12	ENTRAN	11/11/02
HEAD AZ	AC-00L13-F03	ENTRAN	11/11/02
HEAD REAR AZ	AC-98G18-F18	ENTRAN	11/11/02
UPPER NECK FX	LC-213-FX	DENTON	10/14/02
UPPER NECK FY	LC-213-FY	DENTON	10/14/02
UPPER NECK FZ	LC-213-FZ	DENTON	10/14/02
UPPER NECK MX	LC-213-MX	DENTON	10/14/02
UPPER NECK MY	LC-213-MY	DENTON	10/14/02
UPPER NECK MZ	LC-213-MZ	DENTON	10/14/02
LOWER NECK FX	LC-214FX	DENTON	10/14/02
LOWER NECK FY	LC-214-FY	DENTON	10/14/02
LOWER NECK FZ	LC-214-FZ	DENTON	10/15/02
LOWER NECK MX	LC-214-MX	DENTON	10/15/02
LOWER NECK MY	LC-214-MY	DENTON	10/15/02
LOWER NECK MZ	LC-214-MZ	DENTON	10/15/02
CHEST AX	AC-99108-F30	ENTRAN	11/11/02
CHEST AY	AC-99108-F28	ENTRAN	11/11/02
CHEST AZ	AC-99H30-Z04	ENTRAN	11/11/02
CHEST DISPLACEMENT X	DS-142	SERVO	11/13/02
PELVIS AX	AC-99102-F06	ENTRAN	11/11/02
PELVIS AY	AC-99102-F15	ENTRAN	11/11/02
PELVIS AZ	AC-99G29-Q13	ENTRAN	11/11/02
TETHER BELT LOAD	LC-775	LEBOW	02/12/03

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**CRS INSTRUMENTATION**

	CRS ACCELEROMETERS		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
P3 CRS AX	AC-B11408	ENDEVCO	02/10/03
P3 CRS AY	AC-A13513	ENDEVCO	02/10/03
P3 CRS AZ	AC-B10827	ENDEVCO	02/10/03
P4 CRS AX	AC-BB51	ENDEVCO	02/11/03
P4 CRS AY	AC-J32791	ENDEVCO	02/11/03
P4 CRS AZ	AC-J31042	ENDEVCO	02/10/03