

REPORT NUMBER: CAL-04-13

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

KIA MOTORS CORPORATION
2004.5 KIA SPECTRA EX
4-DOOR SEDAN

NHTSA NUMBER: M40515

GENERAL DYNAMICS TEST NUMBER: 8642-NCAP-49

GENERAL DYNAMICS
ADVANCED INFORMATION ENGINEERING SERVICES
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FINAL REPORT

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16. <i>Abstract</i> A frontal load cell barrier test of a 2004.5 Kia Spectra EX 4-Door Sedan was performed at General Dynamics crash test facility in Buffalo, New York, on May 11, 2004. The impact velocity was 56.17 kph and the temperature at the barrier face was 21.1 °C. The maximum post-test vehicle crush was 481 mm. The test vehicle was equipped with 3-point restraint systems, knee bolsters, and airbags at both the driver and right outboard passenger seating positions. With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements.					
ATD Position	HIC	Clip (g's)	Chest Disp (mm)	Left Femur (N)	Right Femur (N)
Driver (150)	337.1	46.0	-23.3	-304.5	-2286.4
Passenger (245)	368.8	54.5	-26.5	-2281.0	-674.6
17. <i>Key Words</i> 56 kph Frontal Barrier Impact test New Car Assessment Program (NCAP)				18. <i>Distribution Statement</i> Copies of this report are available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 400 Seventh St., SW, Room 5111 Washington, DC 20590	
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.17 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 56.17 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

1.2 TEST PROCEDURE

This 56.17 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated December 1999. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301 "Fuel System Integrity" performance. Procedures for receiving, inspection testing and reporting of test results are described in the test procedures and are not repeated in this report.

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

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

Both ATDs were fully instrumented with nine accelerometer array heads, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, 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. 150) and the right-front passenger (position 2) ATD (Serial No.245) 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 168 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 2004.5 Kia Spectra EX 4-Door Sedan at a velocity of 56.17 kph. The test was performed at General Dynamics on May 11, 2004. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The occupant data is summarized below.

	HIC	Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)	Belt Spool (mm)	Belt Stretch (mm/50 mm)
Driver ATD	337.1	46.0	-23.3	-304.5	-2286.4	†	0
Passenger ATD	368.8	54.5	-26.5	-2281.0	-674.6	†	0

† Cameras could not be installed to view the seat belt upper anchorages. Instrumentation to measure belt spool-out could not be added due to the seat belt configuration.

AUTOMATIC DOOR LOCK SUMMARY

ADL Equipped Test Vehicle:	No
ADL Activation Status:	Not Applicable
Door Lock Condition:	Unlocked

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 481 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 outboard half of head restraint, chest to airbag. Left and right knees to knee bolster. 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 edge of glove compartment door, right knee to center of glove compartment door.

The 2004.5 Kia Spectra EX 4-Door Sedan did not exceed the requirements of FMVSS 208, FMVSS 212, FMVSS 219, and FMVSS 301. Data pertaining to these standards are presented in the data sheets.

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA

DATA SHEET NO. 1 CRASH TEST SUMMARY

Vehicle NHTSA No.: M40515 Test Mode: 56.3 kph Frontal Barrier
Test Date: May 11, 2004 Time: 14:22 Temperature: 21.1 °C
Vehicle Make/Model/Body Style: 2004.5 Kia Spectra EX 4-Door Sedan
Vehicle Test Weight: 1505.0 kg
Vehicle/Barrier Impact Angle: 0 °
Impact Velocity: 56.17 kph
Maximum Static Crush: 481 mm
Vehicle Rebound: 433 mm

DUMMIES:

	<u>DRIVER</u>	<u>PASSENGER</u>
Type:	<u> 572E </u>	<u> 572E </u>
Restraint System:	<u> Seatbelt, Airbag, Knee Bolster </u>	<u> Seatbelt, Airbag, Knee Bolster </u>
Number of Data Channels:	<u> 168 </u>	
Number of Cameras:	<u> 1 </u> Real Time	
	<u> 16 </u> 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>

VISIBLE DUMMY CONTACT POINTS:

	<u>DRIVER</u>	<u>PASSENGER</u>
Head:	<u> Face to center of airbag; Back of head to outboard half of 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 edge of glove compartment door; Right knee to center of glove compartment door </u>

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2004.5 Kia Spectra EX 4-Door Sedan

NHTSA No. : M40515 ; VIN: KNAFE122045027592 ; Color: Beige

Engine Data: 4 cylinders; - CID; 2.0 Liters; - cc

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

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

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

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

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

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

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

Date Received: 4/21/2004 ; Odometer Reading 43.5 km

Selling Dealer: West-Herr Kia

& Address: 4995 Southwestern Blvd., S-5052 Camp Road (P/S), Hamburg NY 14075

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Kia Motors Corporation

Date of Manufacture 03/04

GVWR: 1722 kg; GAWR: 970 kg FRONT; 900 kg REAR

DATA FROM TIRE PLACARD:

Recommended Tire Size: P195/60R15 87H or P205/50R16 86H

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

DATA FROM TIRE SIDEWALL:

Size of Tires on Test Vehicle: P195/60R15 ; Manufacturer: Eagle LS

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

Treadwear: 360 ; Traction: A ; Temperature: A

VEHICLE CAPACITY DATA:

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

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

Vehicle Capacity Weight (VCW) = 385 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 44.8 kg

*Tire pressure used for test

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

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

Right Front =	<u>415.0</u> kg	Right Rear =	<u>236.0</u> kg
Left Front =	<u>419.0</u> kg	Left Rear =	<u>246.0</u> kg
TOTAL FRONT =	<u>834.0</u> kg	TOTAL REAR =	<u>482.0</u> kg
TOTAL DELIVERED WEIGHT =	<u>1316.0</u> kg		
% of Total Front of Vehicle Weight =	<u>63.4</u> %	% of Total Rear Weight =	<u>36.6</u> %

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW) =	<u>1316.0</u> kg
Rated Cargo/Luggage Weight (RCLW) =	<u>44.8</u> kg
Weight of 2 p.572 Dummies @ 76 each =	<u>152</u> kg
TARGET TEST WEIGHT =	<u>1512.8</u> kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND

37.0 KG OF CARGO WEIGHT:

Right Front =	<u>459.0</u> kg	Right Rear =	<u>292.0</u> kg
Left Front =	<u>452.0</u> kg	Left Rear =	<u>302.0</u> kg
TOTAL FRONT =	<u>911.0</u> kg	TOTAL REAR =	<u>594.0</u> kg
TOTAL TEST WEIGHT =	<u>1505.0</u> kg		
% of Total Front Weight =	<u>60.5</u> %	% of Total Rear Weight =	<u>39.5</u> %
Weight of Ballast Secured in Vehicle Trunk Area =	<u>0</u> kg		
Vehicle Components Removed for Weight Reduction:	<u>Trunk trim, trunk lid, rear bumper, rear door windows, tail lights, side mirrors</u>		

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED:	RF <u>684</u>	LF <u>680</u>	RR <u>682</u>	LR <u>678</u>
FULLY LOADED:	RF <u>668</u>	LF <u>664</u>	RR <u>650</u>	LR <u>645</u>
AS TESTED:	RF <u>671</u>	LF <u>668</u>	RR <u>650</u>	LR <u>646</u>
Vehicle's Wheel Base:	<u>2608</u> mm			
Location of Vehicle's C.G.:	<u>1029</u> mm rearward of front wheel center.			

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual =	<u>55</u> liters
Usable Capacity Figure Furnished by COTR =	<u>54.9</u> liters
Test Volume Range (92 to 94% of Usable Capacity) =	<u>50.51</u> to <u>51.61</u> liters
ACTUAL TEST VOLUME=	<u>18.2</u> † liters (with entire fuel system filled)
Test Fluid Type:	<u>Stoddard Solution</u> ; Spec. Grav. = <u>0.764</u>
Kinematic Viscosity =	<u>0.96</u> centistokes; Color = <u>Orange</u>
Type of Fuel Pump: Electric-	<u>X</u> ; Mechanical- <u>-</u>
Does Electric Pump operate with ignition switch "ON" & engine "OFF"	Yes- <u>X</u> No- <u>-</u>
<u>Details of Fuel System: Tank – Center of underbody ahead of the rear axle; Lines – Along the vehicle underbody inboard of the left frame stiffener; Filler - Left side aft of the rear axle.</u>	

† With COTR approval, the fuel tank was filled with Stoddard solvent to 1/3 of its useable capacity. The reduced capacity was necessary to achieve target test weight

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°
Test Date: May 11, 2004 Time: 14:22 Temperature: 21.1 °C
Vehicle NHTSA No.: M40515
Required Impact Velocity Range: 55.5 to 57.1 kph

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

Trap No. 1 = 56.17 kph; Trap No. 2 = 56.17 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 = 4423 ; C/L = 4499 ; Right = 4426
Post-Test Left = 3965 ; C/L = 4020 ; Right = 3970
Crush Left = 458 ; C/L = 479 ; Right = 456
AVERAGE = 464 mm

VEHICLE REBOUND: (From rigid barrier only.)

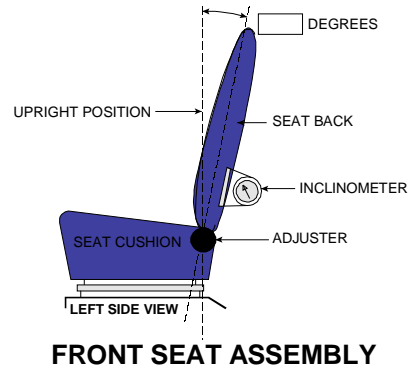
Distance from front of test vehicle to impact point:
Left = 473 ; C/L = 401 ; Right = 425
AVERAGE = 433 mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2004 Vehicle Model: Kia Spectra EX Body Style : 4-Door Sedan

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



Seat back angle for driver's seat: 24 (measured along the rear edge of the seatback frame)

Measurement instructions: Where the most upright position is defined as detent 0, the seat was positioned in detent 12 (23.2 degrees back from the most upright position).

Seat back angle for passenger's seat: 24 (measured along the rear edge of the seatback frame)

Measurement instructions: Where the most upright position is defined as detent 0, the seat was positioned in detent 12 (23.2 degrees back from the most upright position).

2. SEAT FORE AND AFT POSITIONING:

Positioning of the driver's seat: Where the forward most seat track detent is defined as 0 and the most rearward detent is 16, the seat was positioned in detent 8 (120 mm forward of most rearward position, 240 mm total travel)

Positioning of the passenger's seat: Where the forward most seat track detent is defined as 0 and the most rearward detent is 16, the seat was positioned in detent 8 (120 mm forward of most rearward position, 240 mm total travel)

3. FUEL TANK CAPACITY DATA:

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 55 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 = 54.9 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 18.2† 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 is turned to the "ON" position and the engine is not started.

The fuel pump operates continuously while the engine is running.

† With COTR approval, the fuel tank was filled with Stoddard solvent to 1/3 of its useable capacity. The reduced capacity was necessary to achieve target test weight

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

4. STEERING COLUMN ADJUSTMENTS:

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

Operational Instructions: The steering column was positioned at the mid-angle of its full tilt range.

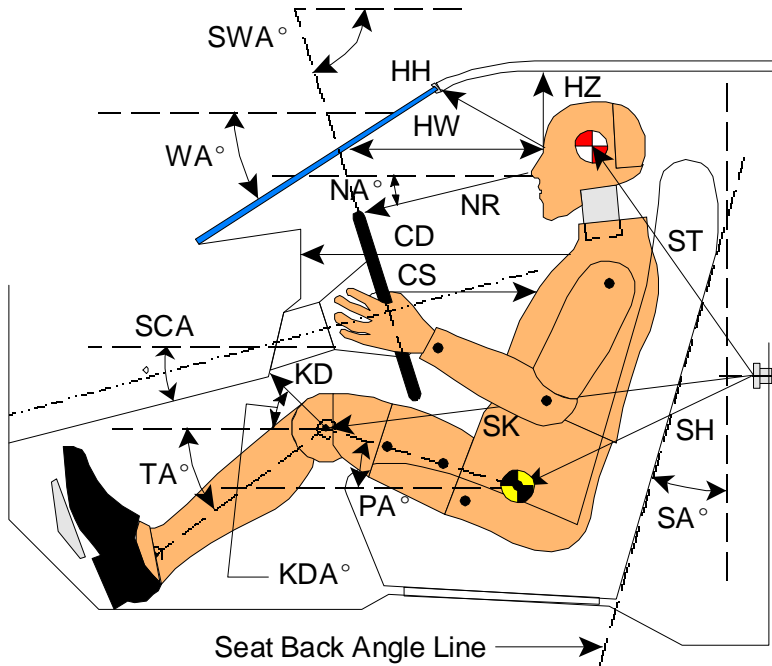
5. SEAT BELT UPPER ANCHORAGE:

Nominal design riding position: Where the top position is defined as detent 0 and the bottom position is detent 3, the adjustable anchorage was positioned in detent 1.

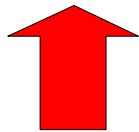
6. AUTOMATIC DOOR LOCKS: Is test vehicle equipped with ADLs? - Yes; X No;
Does vehicle owner's manual describe how to deactivate ADLs? - Yes; - No; X N/A

Comments: None

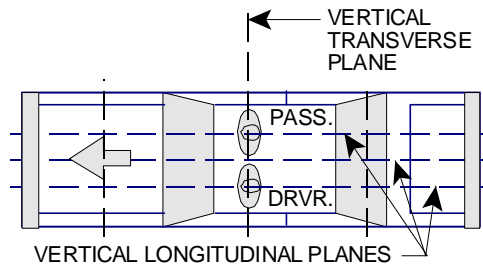
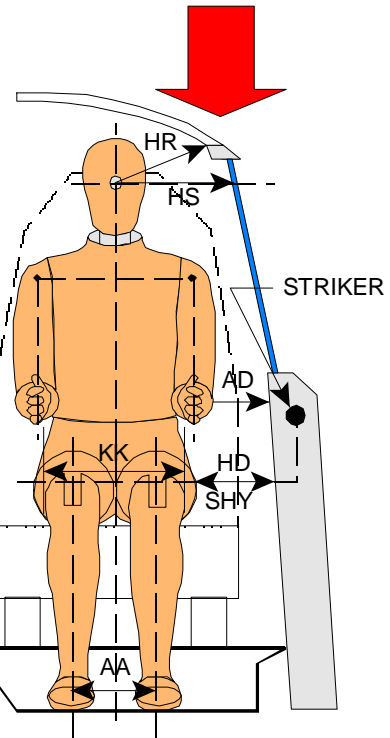
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE
DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



- 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

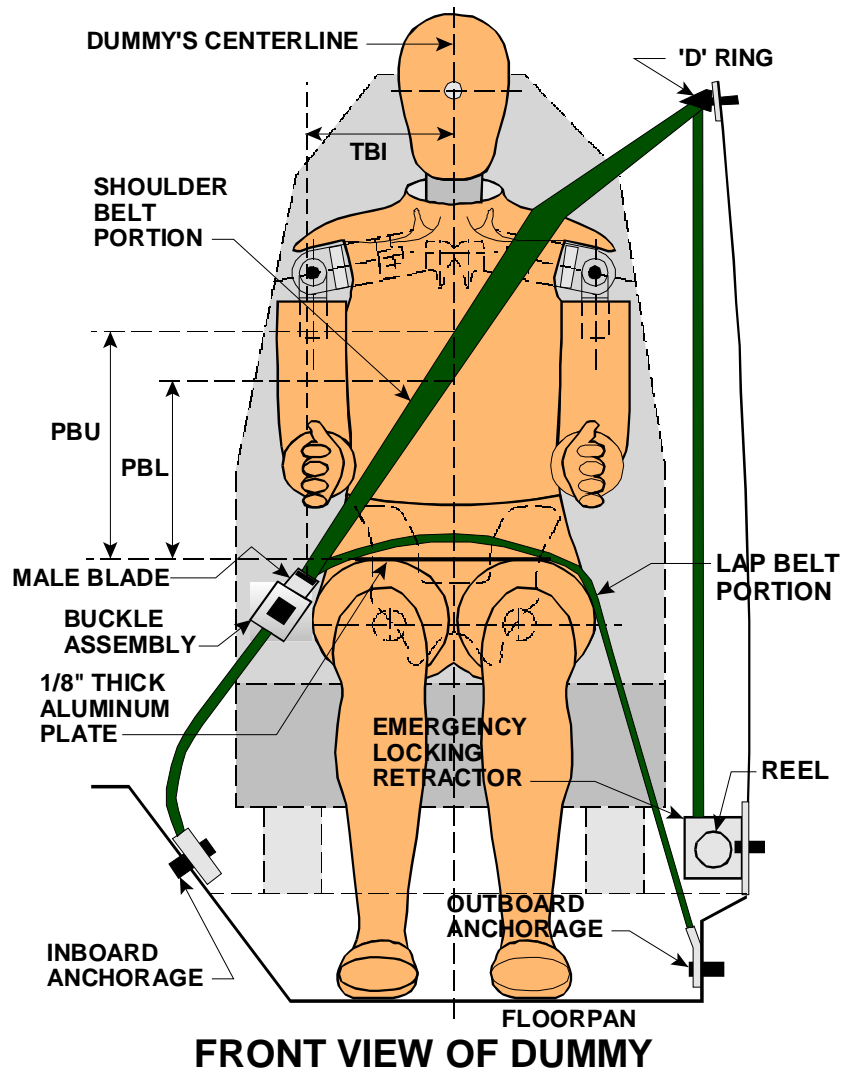


DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #150)			PASS. (Serial #245)		
WA ^o	28.8 deg.			N/A		
SWA ^o	64.5 deg.			N/A		
SCA ^o	25.5 deg.			N/A		
SA ^o	24 deg. (on seat frame)			24 deg. (on seat frame)		
HZ	190			159		
HH	338			322		
HW	660			610		
HR	228			213		
NR	415	Angle	8 deg.	N/A		
CD	546			564		
CS	324			N/A		
RA	195			N/A		
KDL	189	Angle (KDA)	23 deg.	164		
KDR	167			186	Angle (KDA)	30 deg.
PA ^o	24.7 deg.			24.5 deg.		
TA ^o	46.0 deg.			36.0 deg.		
KK	425			320		
AA	394			222		
ST	512	Angle	8 deg.	507	Angle	8 deg.
SK	584	Angle	92 deg.	600	Angle	93 deg.
SH	257	Angle	122 deg.	252	Angle	118 deg.
SHY	227			229		
HS	345			328		
HD	150			138		
AD	126			122		

Dimensions in millimeters

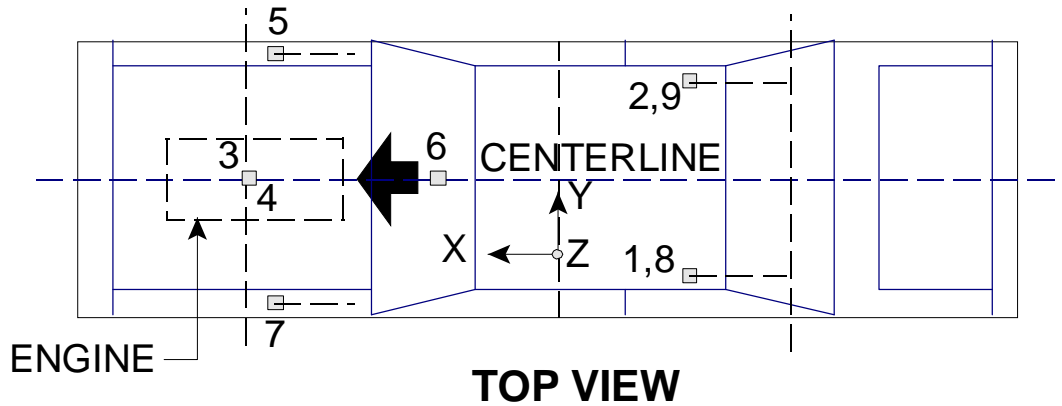
SEAT BELT POSITIONING DATA



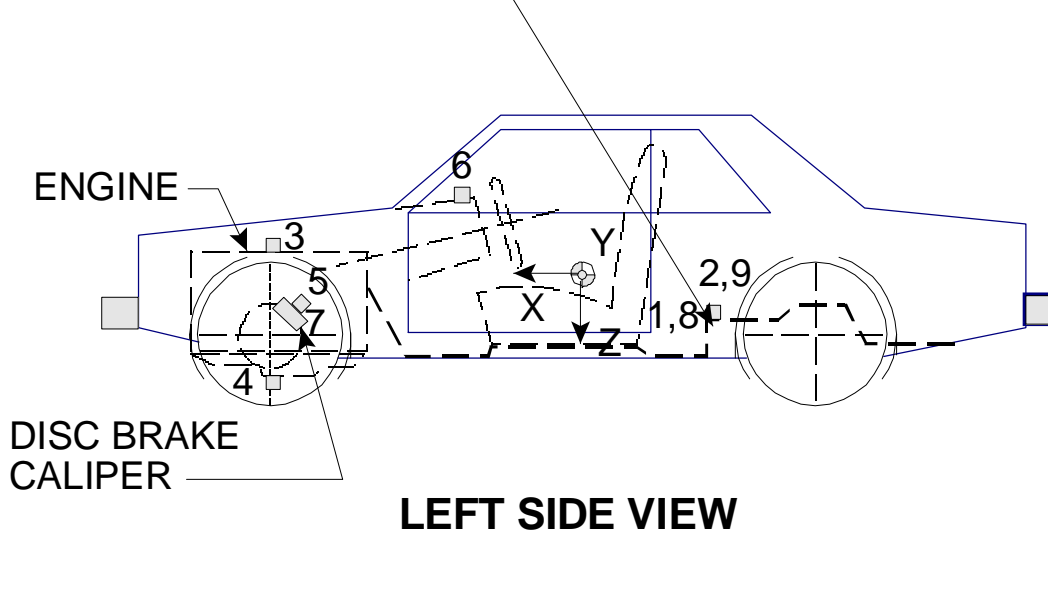
FRONT VIEW OF DUMMY

	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	345	345
PBL-- Top surface of alum. plate to belt lower edge	264	262
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



REAR SEAT CUSHION
ASSY. FRONT ATTACHMENT
BRACKET SUPPORT



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

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

LOCATION		PRE-TEST LENGTH (mm)		
		X	Y	Z
1	Left Rear Seat Cross Member X	1682	-651	-349
2	Right Rear Seat Cross Member X	1682	651	-349
3	Top of Engine Block	3584	-41	-861
4	Bottom of Engine	3497	-45	-238
5	Disc Brake Caliper @ Right Side	3707	804	-235
6	Instrument Panel	2854	0	-751
7	Disc Brake Caliper @Left Side	3713	-807	-238
8	Left Rear Seat Cross Member Z	1682	-651	-349
9	Right Rear Seat Cross Member Z	1682	651	-349

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Left Rear Seat Cross Member X	2.3	133.9	-37.7	39.1
2	Right Rear Seat Cross Member X	2.9	139.1	-39.4	49.8
3	Top of Engine Block	68.8	39.6	-205.7	31.2
4	Bottom of Engine	†	-	-115.3	24.0
5	Disc Brake Caliper @ Right Side	44.1	32.4	-95.6	42.2
6	Instrument Panel	31.2	72.0	-56.7	41.1
7	Disc Brake Caliper @Left Side	21.2	66.1	-108.7	40.0
8	Left Rear Seat Cross Member Z	5.7	58.2	-18.6	44.7
9	Right Rear Seat Cross Member Z	10.1	78.0	-15.7	41.1

† Channel Opened: 49 ms

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

Vehicle Year/Make/Model/Body Style: 2004.5 Kia Spectra EX 4-Door Sedan

NHTSA Test No.: M40515 Test Date: May 11, 2004

DESCRIPTION	Unit	MAXIMUM VALUE							
		Driver				Passenger			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head 9 Array X Arm Y	g	7.7	89.7	-18.2	72.7	6.5	58.0	-6.0	65.8
Head 9 Array X Arm Z	g	28.5	47.3	-22.0	60.8	26.0	97.3	-7.3	143.2
Head 9 Array Y Arm X	g	4.7	92.4	-54.4	63.4	0.9	199.9	-55.1	78.6
Head 9 Array Y Arm Z	g	26.4	104.6	-22.5	86.5	18.3	108.3	-11.3	87.0
Head 9 Array Z Arm X	g	24.0	88.3	-77.2	62.3	2.0	197.4	-49.4	75.5
Head 9 Array Z Arm Y	g	†	-	†	-	11.2	61.1	-7.2	112.1
Head X	g	0.3	187.7	-49.9	66.3	0.5	199.7	-54.6	78.9
Head Y	g	2.4	45.4	-17.3	73.6	5.9	74.4	-4.2	122.6
Head Z	g	17.3	101.8	-15.8	86.3	17.0	108.1	-7.9	87.0
Head Resultant	g	51.3	66.3	-	-	54.6	78.9	-	-
Redundant Head X	g	1.5	188.9	-49.4	63.8	1.2	199.7	-54.1	78.9
Redundant Head Y	g	2.2	48.4	-18.5	74.3	5.1	75.7	-4.7	100.7
Redundant Head Z	g	18.1	105.4	-15.5	86.3	14.8	108.1	-6.4	87.0
Redundant Head Resultant	g	50.9	65.0	-	-	54.1	78.9	-	-
Upper Neck Fx	N	785.4	61.9	-543.4	137.8	17.6	199.9	-570.3	132.3
Upper Neck Fy	N	228.8	71.3	-73.1	121.1	103.5	72.5	-188.2	123.0
Upper Neck Fz	N	897.9	55.0	-798.4	86.5	1209.3	62.5	-55.3	143.2
Upper Neck F Resultant	N	1037.0	86.5	-	-	1229.9	62.5	-	-
Upper Neck Mx	N-m	21.5	91.0	-18.5	104.2	10.0	85.5	-14.9	69.9
Upper Neck My	N-m	55.9	126.6	-21.0	96.9	49.5	118.1	-46.8	84.4
Upper Neck Mz	N-m	28.3	85.2	-15.4	139.6	5.5	108.4	-4.8	66.7
Upper Neck M Resultant	N-m	56.9	126.7	-	-	50.4	118.0	-	-
Chest X	g	4.6	174.7	-45.6	80.4	2.4	176.8	-58.0	76.6
Chest Y	g	4.5	68.8	-4.9	44.9	4.5	34.6	-6.4	92.1
Chest Z	g	4.9	27.6	-9.4	70.5	9.5	95.8	-4.8	67.6
Chest Resultant	g	46.1	70.2	-	-	58.1	76.6	-	-

† Channel Opened: 50 ms

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

Vehicle Year/Make/Model/Body Style: 2004.5 Kia Spectra EX 4-Door Sedan

NHTSA Test No.: M40515 Test Date: May 11, 2004

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Redundant Chest X	g	4.7	174.5	-45.9	80.4	2.3	176.6	-57.4	76.6
Redundant Chest Y	g	4.7	68.8	-5.0	44.4	4.7	34.7	-6.5	92.1
Redundant Chest Z	g	4.8	27.8	-9.5	70.5	9.3	98.0	-4.7	67.7
Redundant Chest Resultant	g	46.6	70.0	-	-	57.5	76.6	-	-
Chest Displacement	mm	0.0	4.0	-23.3	59.4	0.0	-26.3	-26.5	93.7
Pelvic X	g	4.4	182.4	-50.9	59.0	††	-	††	-
Pelvic Y	g	8.0	63.0	-9.1	37.7	9.7	51.2	-9.4	78.5
Pelvic Z	g	3.9	175.5	-42.3	70.5	2.8	180.6	-38.6	73.7
Pelvic Resultant	g	59.6	59.0	-	-	††	-	-	-
Left Femur	N	1104.9	47.9	-304.5	24.8	1055.6	47.6	-2281.0	53.8
Right Femur	N	568.5	70.2	-2286.4	52.0	1308.7	54.7	-674.6	38.2
Left Upper Tibia Mx	N-m	54.6	43.8	-22.3	82.7	38.0	77.6	-31.9	55.5
Left Upper Tibia My	N-m	14.0	199.9	-91.0	60.9	10.3	198.8	-160.3	56.6
Left Lower Tibia Fz	N	75.2	154.1	-1920.3	25.1	66.1	18.9	-5369.7	55.7
Left Lower Tibia Mx	N-m	26.8	42.9	-53.2	54.0	23.8	70.2	-89.2	55.3
Left Lower Tibia My	N-m	104.3	64.8	-21.1	43.7	28.6	53.5	-11.6	63.1
Right Upper Tibia Mx	N-m	25.6	53.7	-57.5	40.5	20.7	27.8	-35.7	61.6
Right Upper Tibia My	N-m	20.0	181.9	-183.0	44.5	23.1	189.5	-117.6	64.5
Right Lower Tibia Fz	N	151.8	173.7	†	-	57.9	165.3	-3467.0	40.3
Right Lower Tibia Mx	N-m	70.2	52.8	-41.6	40.1	11.5	26.1	-87.9	60.1
Right Lower Tibia My	N-m	45.0	40.8	-46.7	47.9	29.3	102.0	-27.0	49.5
Left Foot Aft Ax	g	15.7	54.0	-37.8	21.7	10.0	73.7	-56.2	41.9
Left Foot Aft Az	g	3.5	68.6	-62.3	43.1	27.7	74.1	-72.2	55.2
Left Foot Fore Az	g	23.5	48.4	-90.0	39.3	31.7	73.4	-79.0	56.3
Right Foot Aft Ax	g	11.5	28.7	-73.1	38.2	9.6	104.2	-43.5	48.3
Right Foot Aft Az	g	25.4	52.1	-151.3	37.2	22.1	74.6	-58.5	58.4
Right Foot Fore Az	g	112.8	38.6	-206.1	36.1	27.7	30.3	-86.9	55.9
Lap Belt Load	N	6731.2	59.4	-32.1	189.5	6677.6	61.0	-20.6	199.9
Torso Belt	N	4244.0	42.7	-46.5	151.8	4850.6	41.2	-72.3	152.4

† Data Spike: 40-42 and 62-64 ms

†† Pelvic Ax: Questionable Data: After 62 ms

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

Vehicle Year/Make/Model/Body Style: 2004.5 Kia Spectra EX 4-Door Sedan

NHTSA Test No.: M40515 Test Date: May 11, 2004

HEAD INJURY CRITERIA (HIC)				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	337.1	46.6	80.8	39.6
Position #2 - Passenger	368.8	63.2	99.2	40.2

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

CLIP SUMMARY*				
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #1 - Driver	46.0	68.2	71.8	454.1
Position #2 - Passenger	54.5	75.1	78.1	442.1

* 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: 2004.5 Kia Spectra EX 4-Door Sedan

NHTSA Test No.: M40515 Test Date: May 11, 2004

HEAD INJURY CRITERIA (HIC) REDUNDANT				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	329.2	46.8	80.3	39.5
Position #2 - Passenger	347.6	62.7	98.7	39.3

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

CLIP SUMMARY* REDUNDANT				
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #1 - Driver	46.2	68.3	71.3	460.4
Position #2 - Passenger	54.1	75.2	78.2	429.3

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

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.

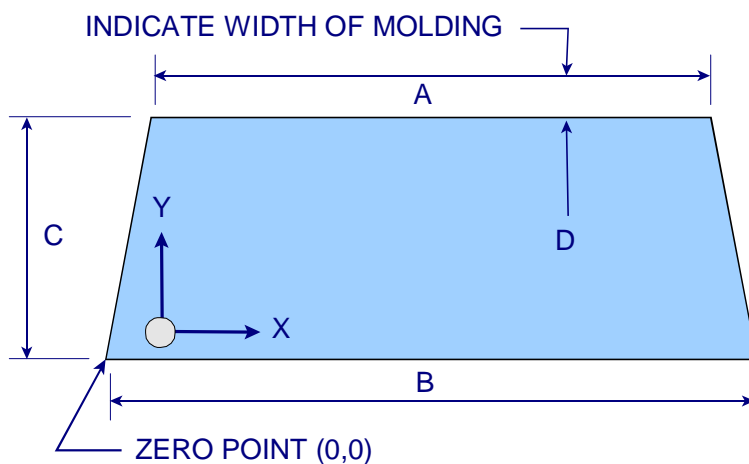
FMVSS 212 REQUIREMENTS:

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	2050	2050	100.0%
LEFT SIDE	2050	2050	100.0%
TOTAL	4100	4100	100.0%

AREA OF RETENTION FAILURE: None



DIMENSIONS (mm)	
A	1090
B	1410
C	800
D	15

FRONT VIEW OF WINDSHIELD

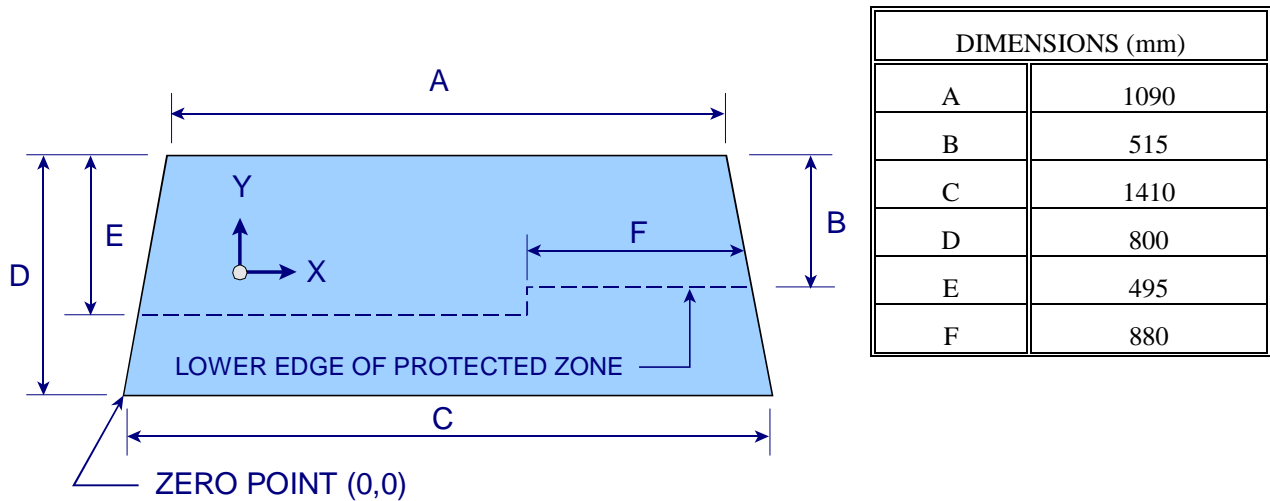
FAILURE DETAILS: None

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

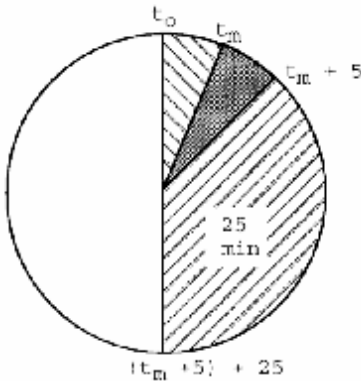
NHTSA TEST No.: M40515 TEST DATE: May 11, 2004
VEHICLE MAKE/MODEL: 2004.5 Kia Spectra EX 4-Door Sedan

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

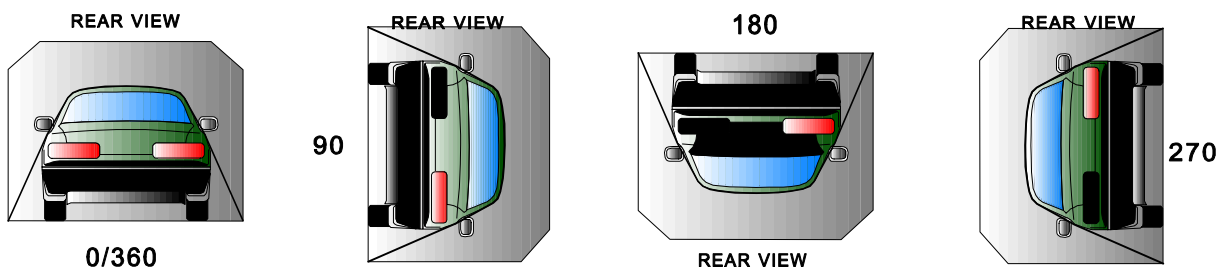
ACTUAL	MAX ALLOWED
0	28 g
0	141 g
0	28 g/min.

SOLVENT SPILLAGE DETAILS: None

DATA SHEET NO. 13 - ROLLOVER DATA

Vehicle: 2004.5 Kia Spectra EX 4-Door Sedan

NHTSA No.: M40515



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	10	seconds	5	minutes	6	minutes	10	seconds	7	minutes
0° - 90°	1	minutes	8	seconds	5	minutes	6	minutes	8	seconds	7	minutes
90° - 180°	1	minutes	2	seconds	5	minutes	6	minutes	2	seconds	7	minutes
180°-270°	1	minutes	10	seconds	5	minutes	6	minutes	10	seconds	7	minutes
270°-360°	1	minutes										

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

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

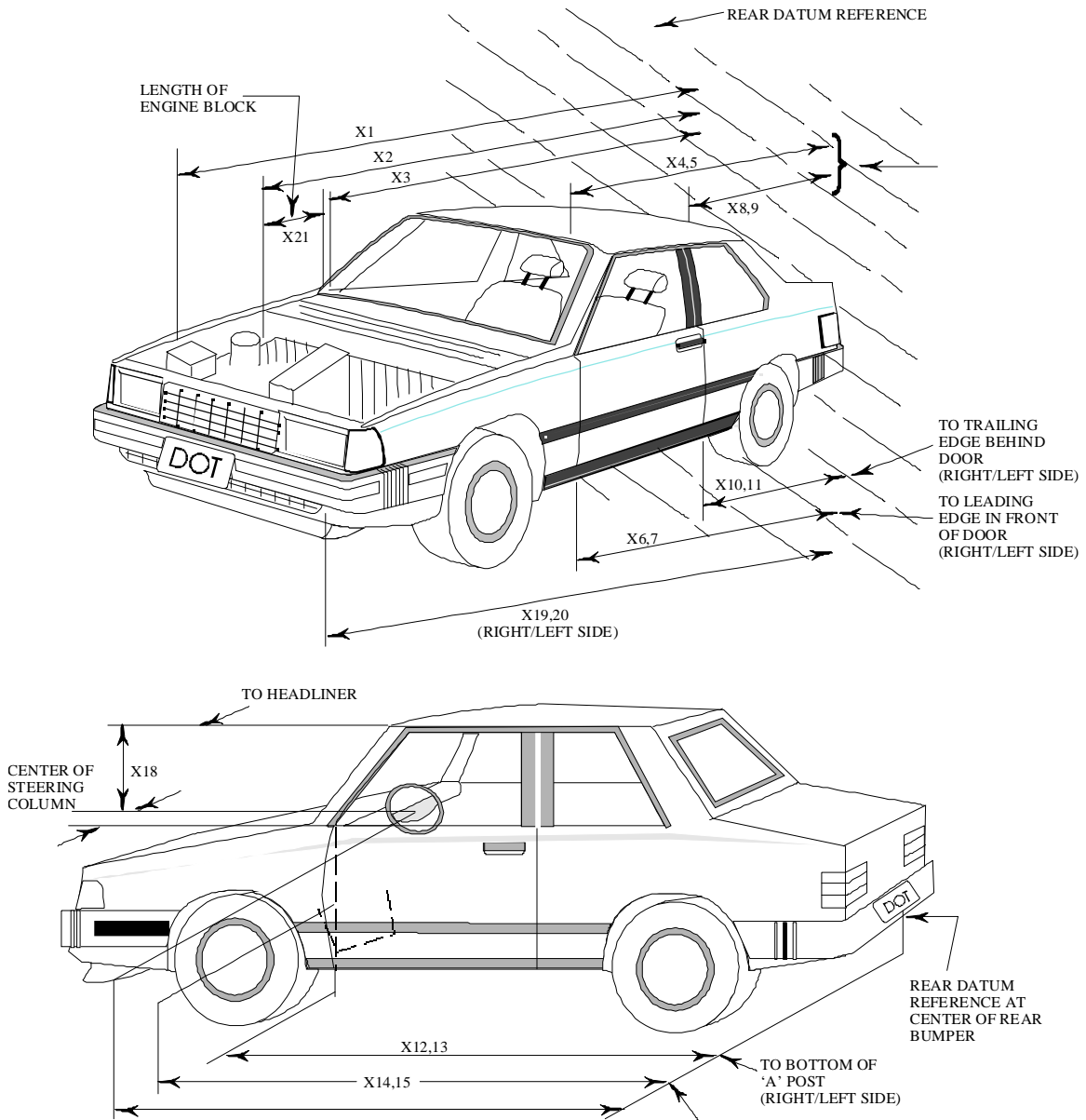
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	-
90° - 180°	0	0	0	-
180°-270°	0	0	0	-
270°-360°	0	0	0	-

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

IV. SOLVENT SPILLAGE LOCATION(S):

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

DATA SHEET NO. 14 TEST VEHICLE MEASUREMENTS

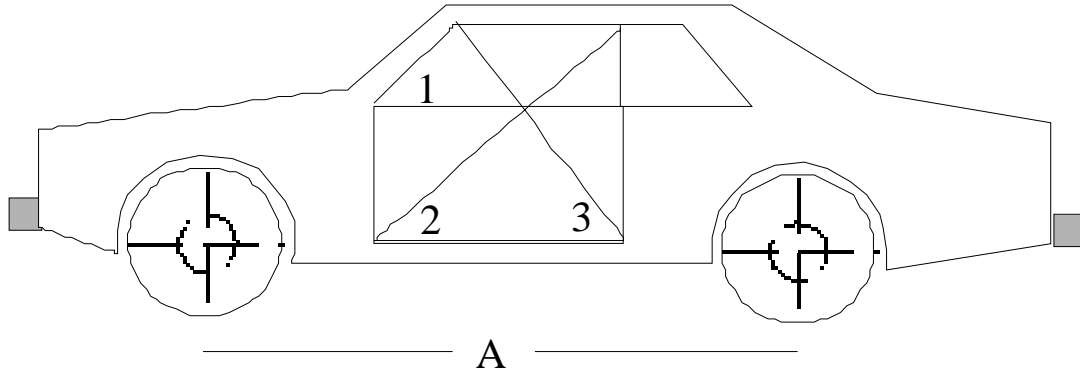


DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4499	4020	479
X2	Rear Surface of Vehicle to Front of Engine	3913	3743	170
X3	Rear Surface of Vehicle to Firewall	3457	3371	86
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3111	3107	4
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3114	3109	5
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3089	3083	6
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3085	3085	0
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2034	2030	4
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2036	2029	7
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2040	2036	4
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2038	2034	4
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3177	3175	2
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3183	3175	8
X14	Rear Surface of Vehicle to Firewall, Right Side	3454	3402	52
X15	Rear Surface of Vehicle to Firewall, Left Side	3460	3436	24
X16	Rear Surface of Vehicle to Steering Column	2669	2647	22
X17	Center of Steering Column to "A" Post	309	284	25
X18	Center of Steering Column to Headliner	436	389	47
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4426	3970	456
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4423	3965	458
X21	Length of Engine Block	219	219	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2869	2837	32
CD	Rear Surface of Vehicle to Center of Dash Panel	2900	2896	4
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2866	2856	10

All Dimensions in mm

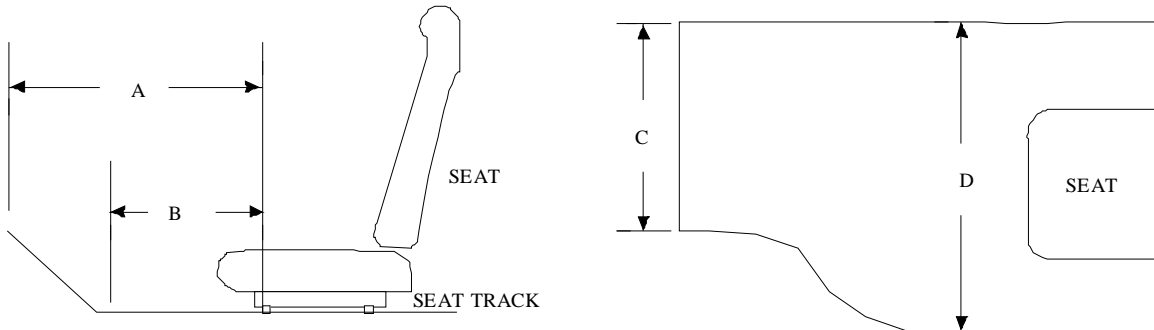
DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
 VEHICLE INTRUSION MEASUREMENTS
 DOOR OPENING WIDTH



UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	973	1465	889	976	1457	903
AFTER TEST	969	1466	891	969	1460	903
DIFFERENCE	4	-1	-2	7	-3	0

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2608	2608
AFTER TEST	2505	2521
DIFFERENCE	103	87

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



DRIVER

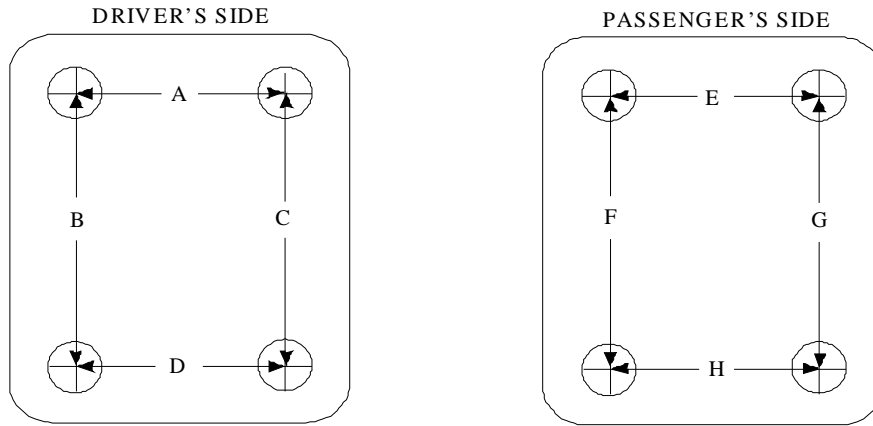
Measurement	Pre-Test	Post-Test	Difference
A	781	613	168
B	556	473	83
C	483	473	10
D	497	488	9

PASSENGER

Measurement	Pre-Test	Post-Test	Difference
A	749	675	74
B	541	525	16
C	431	430	1
D	483	451	32

Units = mm

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

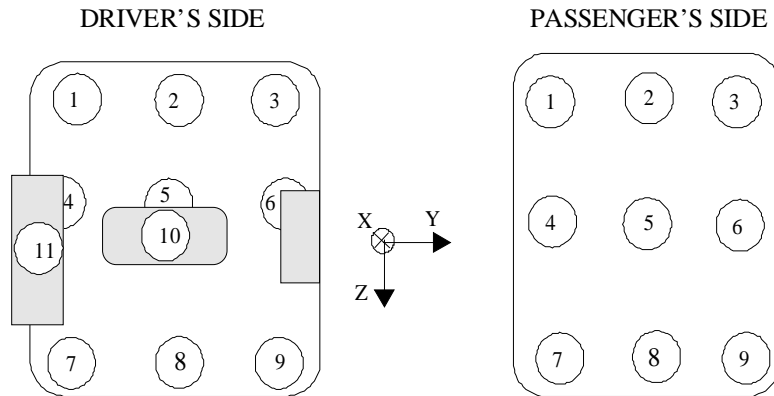


TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	483	473	10
B	385	380	5
C	387	308	79
D	497	488	9
E	431	430	1
F	355	358	-3
G	332	296	36
H	483	451	32

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	3338	3170	168	-487	-538	51
2	3356	3189	167	-477	-533	56
3	3369	3215	154	-430	-479	49
4	3255	3100	155	-347	-417	70
5	3296	3127	169	-346	-399	53
6	3284	3137	147	-347	-367	20
7	3135	3093	42	-257	-275	18
8	3131	3049	82	-257	-273	16
9	3117	3010	107	-253	-252	-1
10	3142	3049	93	-430	-473	43
11	3144	3098	46	-342	-361	19

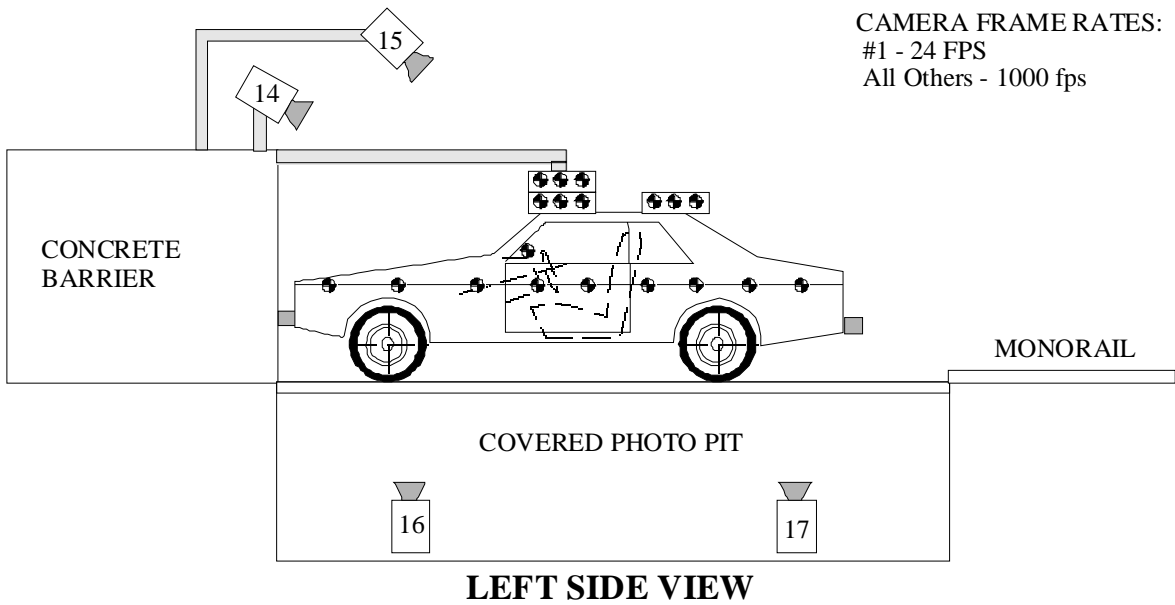
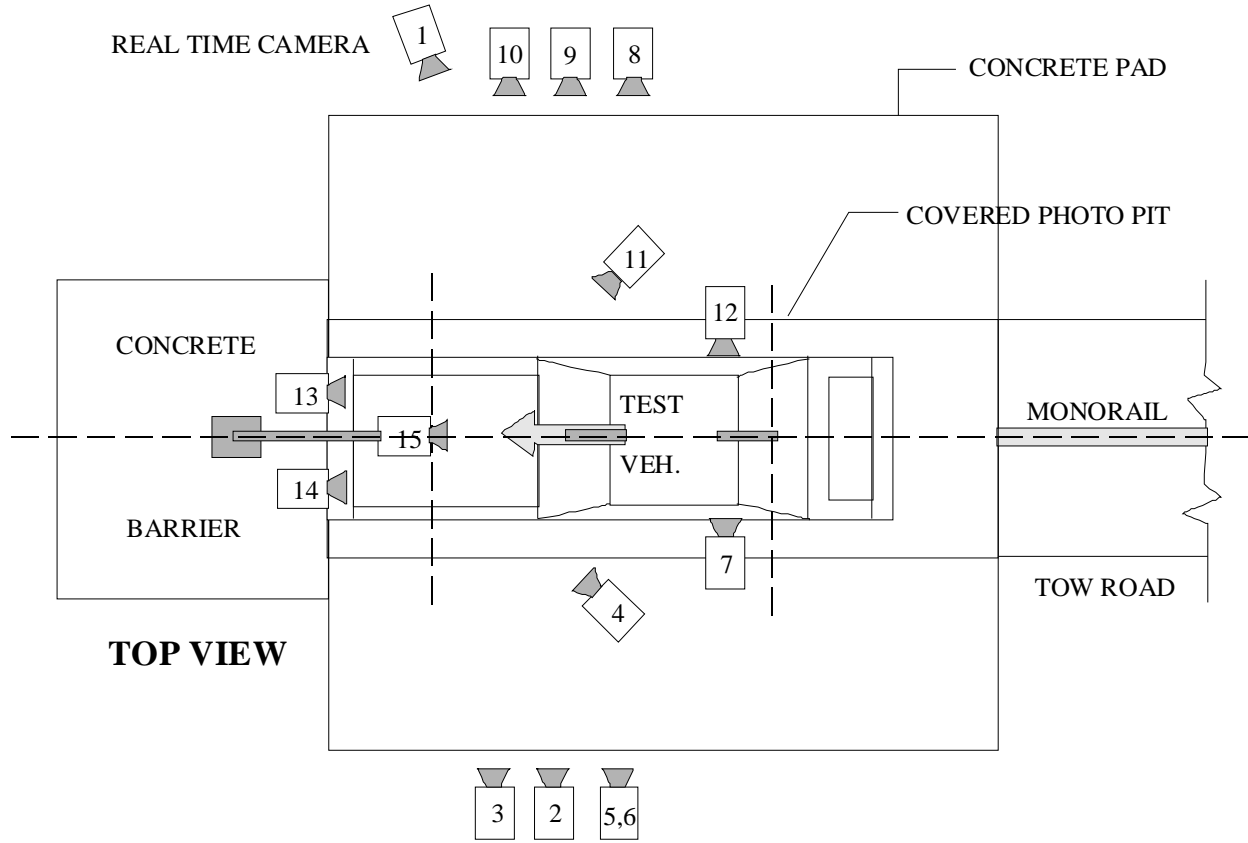
Passenger Side Toe-pan Measurements

Toe-pan Location	X Deformation (mm)			Z Deformation (mm)		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3329	3246	83	-443	-491	48
2	3328	3242	86	-462	-518	56
3	3234	3168	66	-465	-499	34
4	3213	3137	76	-335	-354	19
5	3240	3172	68	-345	-365	20
6	3182	3143	39	-339	-354	15
7	3111	3067	44	-256	-259	3
8	3121	3092	29	-254	-250	-4
9	3077	3064	13	-254	-230	-24

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

DATA SHEET NO.15 HIGH-SPEED CAMERA LOCATIONS

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



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

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

NHTSA Test No.: M40515 Vehicle: 2004.5 Kia Spectra EX 4-Door Sedan

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)*			ANGLE (deg)**	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	6276	1595	1092	-5.7	5990	12.5	1010
3	Left Side View	7430	900	1046	-3.4	7144	25	1005
4	Driver and Interior View	6955	2585	2056	-9.9	-	25	1055
5	Steering Column (Bottom)	7430	1884	1168	-3.6	7144	25	1010
6	Steering Column (Top)	7430	1884	1792	-8.5	7144	25	1015
7	Left CRS Lateral View	-970	3185	-2288	-24.0	-	28-70	1000
8	Overall Right Side	6466	2071	1102	-1.5	6764	12.5	1010
9	Right Side View	7806	1280	1100	-2.6	8104	25	1025
10	Right Passenger View	7930	1915	1398	-3.8	8228	35	1000
11	Passenger and Interior View	7152	2510	1989	-8.6	-	25	1015
12	Right CRS Lateral View	970	3280	2345	-24.0	-	28-70	1000
13	Passenger Front View	620	-92	1987	-37.0	-	13	1010
14	Driver Front View	620	-92	1987	-37.0	-	13	1005
15	Windshield View	0	-530	3374	-54.1	-	13	1005
16	Pit View of Engine	0	615	-3048	90	-	13	1000
17	Pit View of Fuel Tank	0	2775	-3048	90	-	13	1025

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

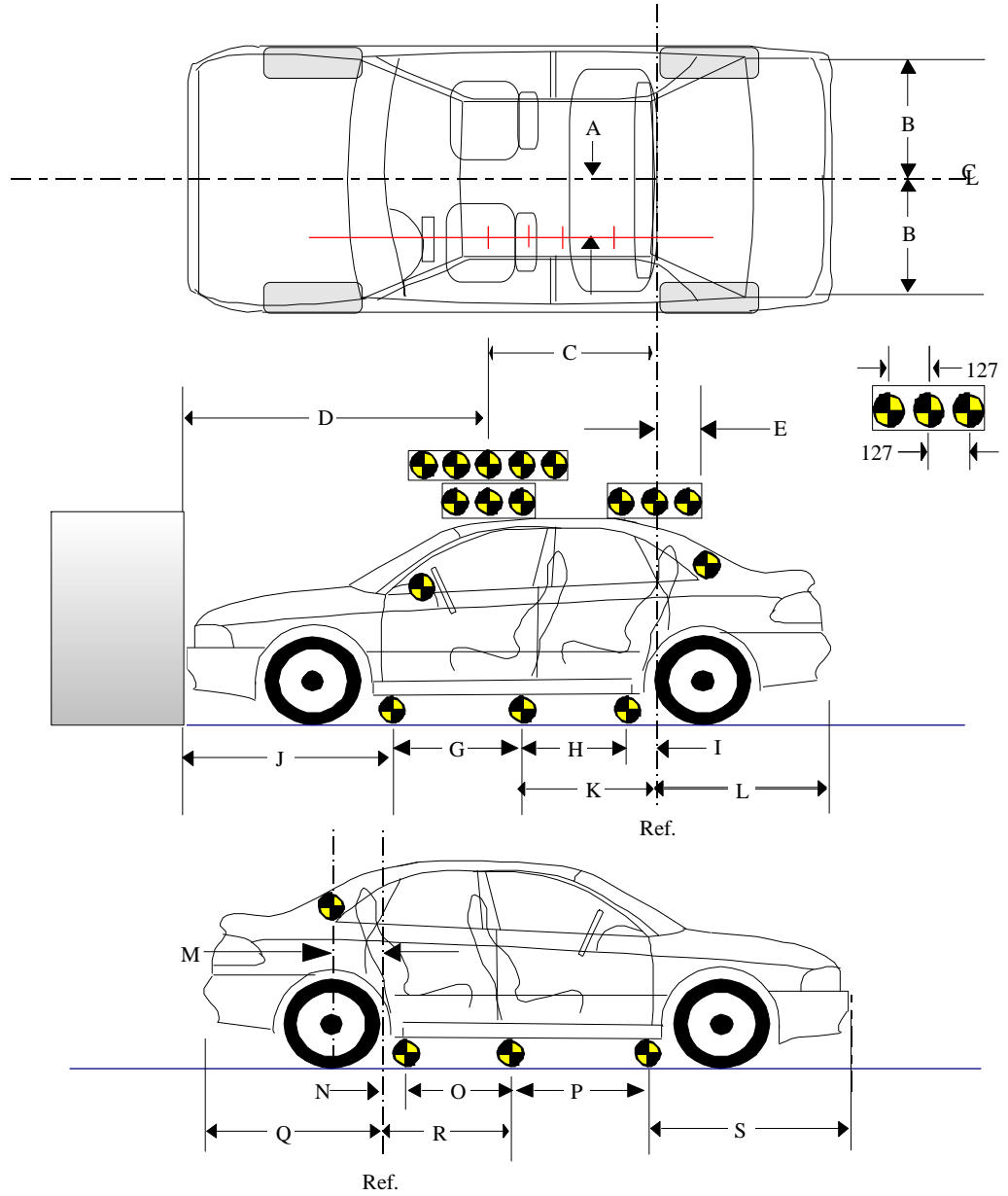
Y = film plane to impact location N.T. indicates No Timing

Z = film plane to ground

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

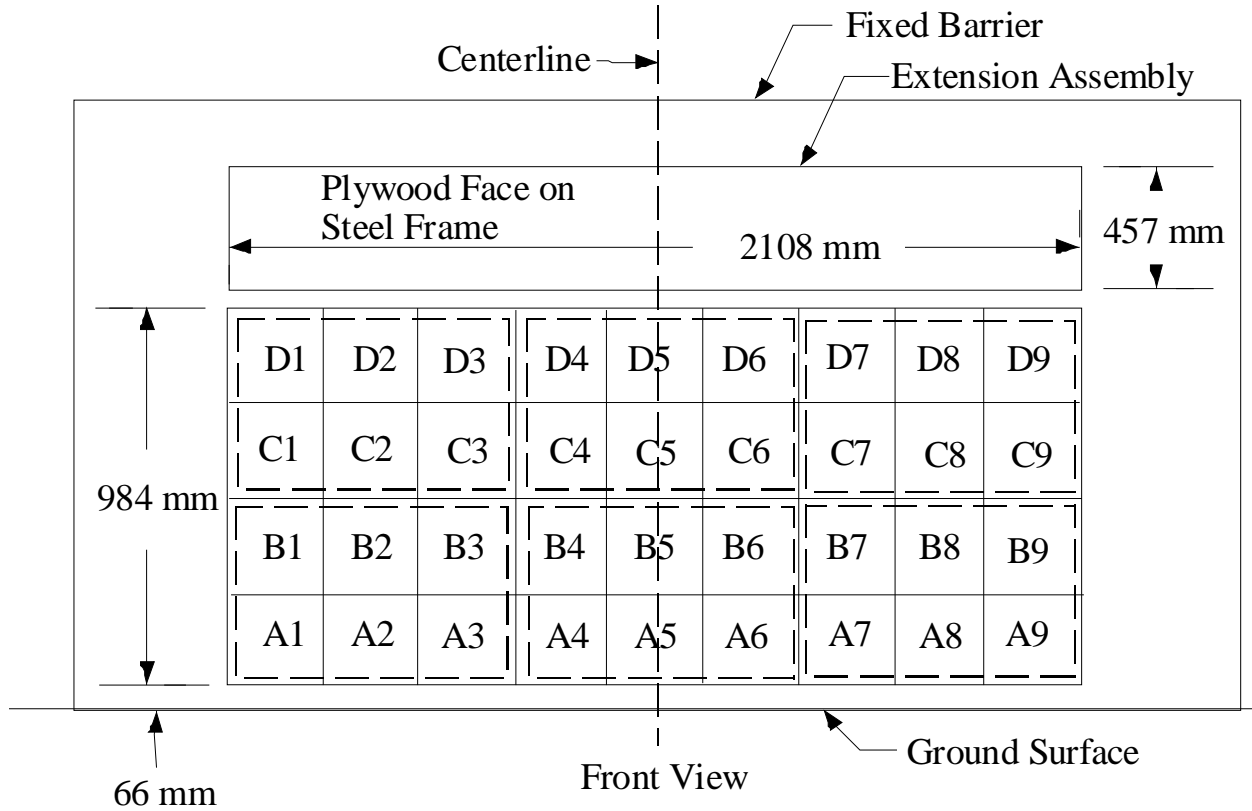
(Dimensions in millimeters)

A	374
B	584
C	1221
D	1954
E	240
F	1490
G	1007
H	751
I	120
J	1338
K	871
L	1282
M	237
N	116
O	883
P	884
Q	1280
R	999
S	1336



DATA SHEET NO. 17 LOAD CELL LOCATIONS ON FIXED BARRIER

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



6 GROUPS OF 6 LOAD CELLS EACH

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

The following data is presented in Appendix B:

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

DATA SHEET NO. 18 POST TEST AIR BAG DATA

NHTSA No.: M40515; Test Date: May 11, 2004; Technician: Lawrence Q. Valvo

Vehicle Model Year/Make/Model: 2004.5 Kia Spectra EX 4-Door Sedan

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

B. Size of vent holes: (mm²) 1257 -Driver 1963 -Passenger

C. Total vent area: (mm²) 2514 -Driver 3926 -Passenger

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

Driver: 630 -Height; 630 -Width; 240 -Depth

Passenger: 530 -Height; 430 -Width; 350 -Depth

E. Is the air bag tethered?

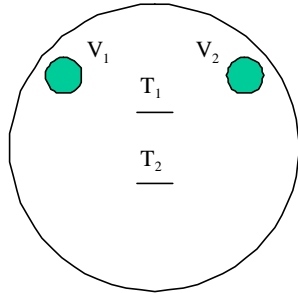
Driver: X -Yes; - -No; If yes, record length of tether- 280

Passenger: X -Yes; - -No; If yes, record length of tether- 410

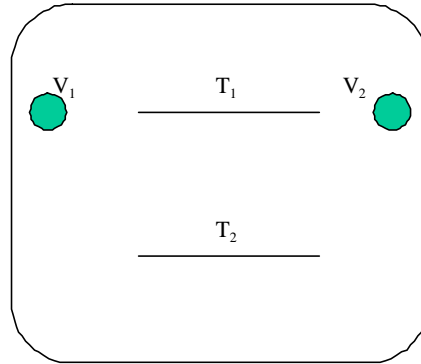
Sketch the air bag showing the location of the vent holes, how the bag is tethered, and where the bag is tethered. Also describe how the tethers are attached to the bag and the steering wheel.

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

Driver



Passenger



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

Driver: Air bag: N/A

 Generator: N/A

Passenger: Air bag: N/A

 Generator: N/A

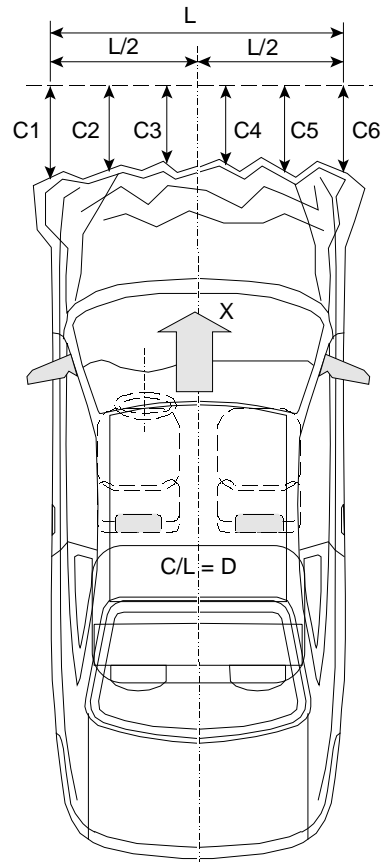
DATA SHEET NO. 19 ACCIDENT INVESTIGATION DIVISION DATA

FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Kia Spectra EX 4-Door Sedan
 NHTSA Test No.: M40515 VIN: KNAFE122045027592
 Model Year: 2004 Build Date: 03/04 Test Date: May 11, 2004
 Vehicle Size Category: Compact Passenger Car Test Weight: 1505.0 kg
 Vehicle Wheelbase: 2608 mm; Front Overhang: 913 mm; Overall Width: 1735 mm
 Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4313	3935	378
C2 =	4441	3962	479
C3 =	4492	4011	481
C4 =	4499	4018	481
C5 =	4452	3984	468
C6 =	4341	3928	413



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region: L1= 1347 mm
 L2= 673.5 mm
 L5= 269.4 mm

APPENDIX A
PHOTOGRAPHS

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A-54	Pre-Test Passenger Floor Pan View	A-57
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A-56	Post-Test Passenger Head View	A-59
A-57	Post-Test Passenger Contact To Airbag	A-60
A-58	Rollover View	A-61
A-59	Impact View	A-62



Figure A-1 LOAD CELL LOCATIONS


 MANUFACTURED IN KOREA BY
KIA MOTORS CORPORATION
 03/04 GVWR 3796 LB PAINT 4Y
 GAWR FRONT 2138 LB GAWR REAR 1984 LB TRIM NZ
 THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S.A. FEDERAL
 MOTOR VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS
 IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE
 V.I.N KNAFE122045027592
 TYPE PASSENGER CAR

Figure A-2 VEHICLE CERTIFICATION PLACARD

SPECTRA**RECOMMENDED TIRE SIZE AND INFLATION PRESSURE (COLD)**
DIMENSIONS DES PNEUS et PRESSIONS DE GONFLAGE RECOMMANDÉES (à froid)**A**

LOAD RANGE CHARGE NOMINALE	TIRE SIZE (LOAD RANGE C&D NOT PERMISSIBLE) DIMENSIONS DES PNEUS (CHARGES NOMINALES C ET D NON PERMISES)	PRESSURE PRESSION	
		FRONT AVANT	REAR ARRIÈRE
STD	P195/60R15 87H P205/50R16 86H	30 psi 210 kPa	30 psi 210 kPa
T	T125/70D15 T125/70R15 TEMPORARY SPARE PNEU DE SECOURS PROVISOIRE	60 psi 415 kPa	

TOTAL LOAD = OCCUPANTS PLUS LUGGAGE

CHARGE GLOBALE = OCCUPANTS PLUS BAGAGES

MODEL MODÈLE	MAXIMUM LOAD CHARGE MAXIMALE	OCCUPANTS OCCUPANTS	DISTRIBUTION RÉPARTITION		
			FRONT AVANT	REAR ARRIÈRE	LUGGAGE BAGAGES
ALL TOUS	849 lb/385 kg	5	2	3	99 lb/45 kg

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

VOIR MANUEL DE CONDUCTEUR POUR DES INFORMATIONS SUPPLÉMENTAIRES

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Figure A-3 VEHICLE TIRE PLACARD

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Figure A-4 RIGHT FRONT, AS RECEIVED



Figure A-5 LEFT REAR, AS RECEIVED



Figure A-6 PRE-TEST FRONT VIEW



Figure A-7 POST-TEST FRONT VIEW



Figure A-8 PRE-TEST LEFT SIDE VIEW



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Figure A-9 POST-TEST LEFT SIDE VIEW



Figure A-10 PRE-TEST RIGHT SIDE VIEW



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Figure A-11 POST-TEST RIGHT SIDE VIEW



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



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



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



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



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



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



Figure A-18 PRE-TEST WINDSHIELD VIEW



Figure A-19 POST-TEST WINDSHIELDVIEW



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Figure A-20 PRE-TEST ENGINE COMPARTMENT VIEW



Figure A-21 POST-TEST ENGINE COMPARTMENT VIEW



Figure A-22 PRE-TEST FUEL CAP VIEW



M40515

WARNING
REMOVE SLOWLY
Lightweight Cap Closure
Do Not Use Force
To Remove

Figure A-23 POST-TEST FUEL CAP VIEW



Figure A-24 PRE-TEST FRONT UNDERBODY VIEW



Figure A-25 POST-TEST FRONT UNDERBODY VIEW



Figure A-26 PRE-TEST MID UNDERBODY VIEW



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Figure A-27 POST-TEST MID UNDERBODY VIEW



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Figure A-28 PRE-TEST REAR UNDERBODY VIEW



Figure A-29 POST-TEST REAR UNDERBODY VIEW



Figure A-30 PRE-TEST DRIVER HEAD LOCATION



Figure A-31 POST-TEST DRIVER HEAD LOCATION



Figure A-32 PRE-TEST DRIVER POSITION VIEW



Figure A-33 POST-TEST DRIVER POSITION VIEW



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Figure A-34 PRE-TEST DRIVER AND INTERIOR VIEW



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Figure A-35 POST-TEST DRIVER AND INTERIOR VIEW



Figure A-36 PRE-TEST DRIVER FEET VIEW



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Figure A-37 POST-TEST DRIVER FEET VIEW



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Figure A-38 PRE-TEST DRIVER KNEE BOLSTER VIEW



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Figure A-39 POST-TEST DRIVER KNEE BOLSTER VIEW



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Figure A-40 PRE-TEST DRIVER FLOOR PAN VIEW



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Figure A-41 POST-TEST DRIVER FLOOR PAN VIEW



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Figure A-42 POST-TEST DRIVER HEAD VIEW



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Figure A-43 POST-TEST DRIVER CONTACT TO AIRBAG



Figure A-44 PRE-TEST PASSENGER HEAD LOCATION

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Figure A-45 POST-TEST PASSENGER HEAD LOCATION



Figure A-46 PRE-TEST PASSENGER POSITION VIEW

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Figure A-47 POST-TEST PASSENGER POSITION VIEW



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Figure A-48 PRE-TEST PASSENGER AND INTERIOR VIEW



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Figure A-49 POST-TEST PASSENGER AND INTERIOR VIEW



Figure A-50 PRE- TEST PASSENGER FEET VIEW



Figure A-51 POST-TEST PASSENGER FEET VIEW



Figure A-52 PRE-TEST PASSENGER KNEE BOLSTER VIEW



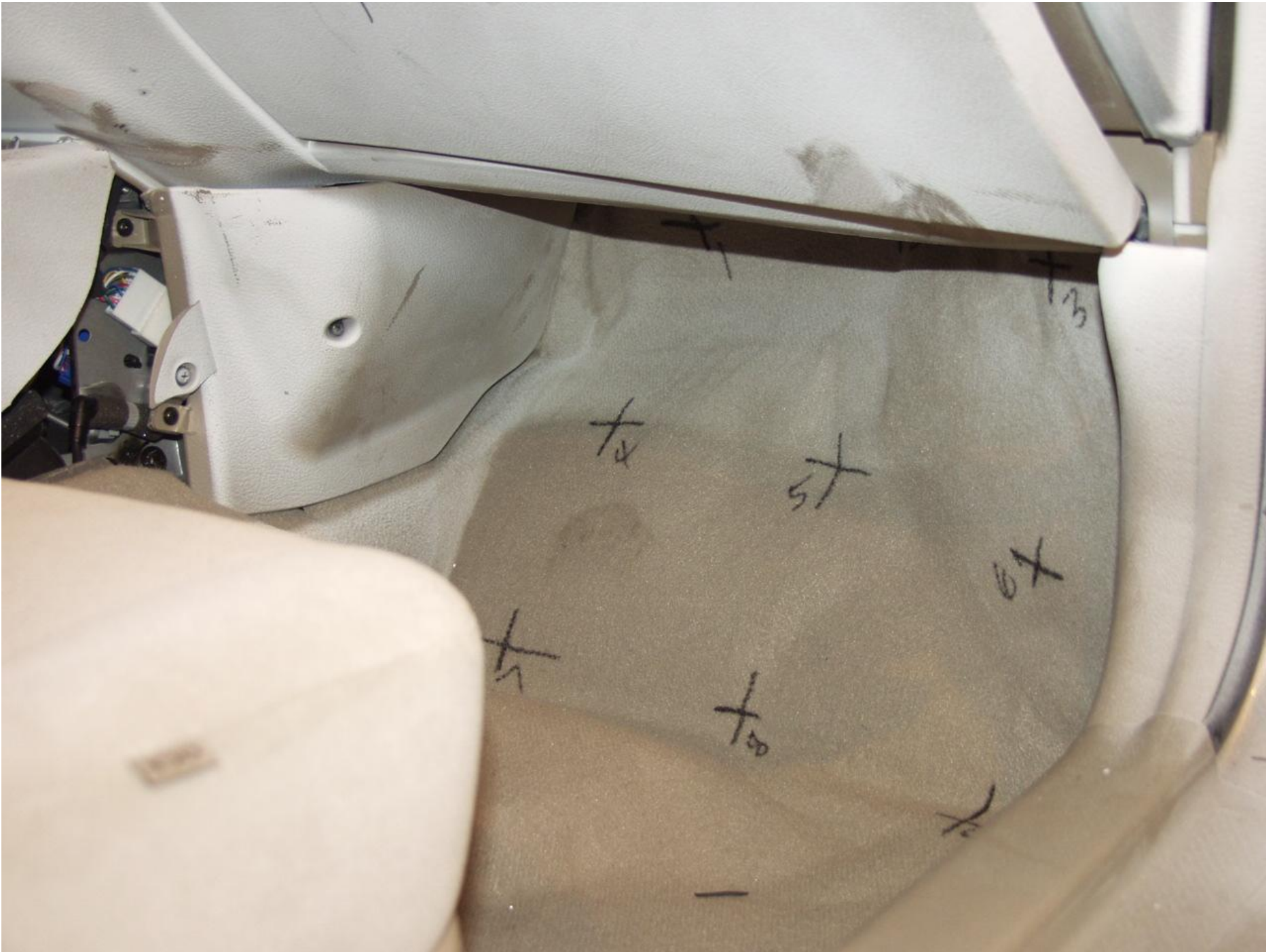
Figure A-53 POST-TEST PASSENGER KNEE BOLSTER VIEW



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Figure A-54 PRE-TEST PASSENGER FLOOR PAN VIEW



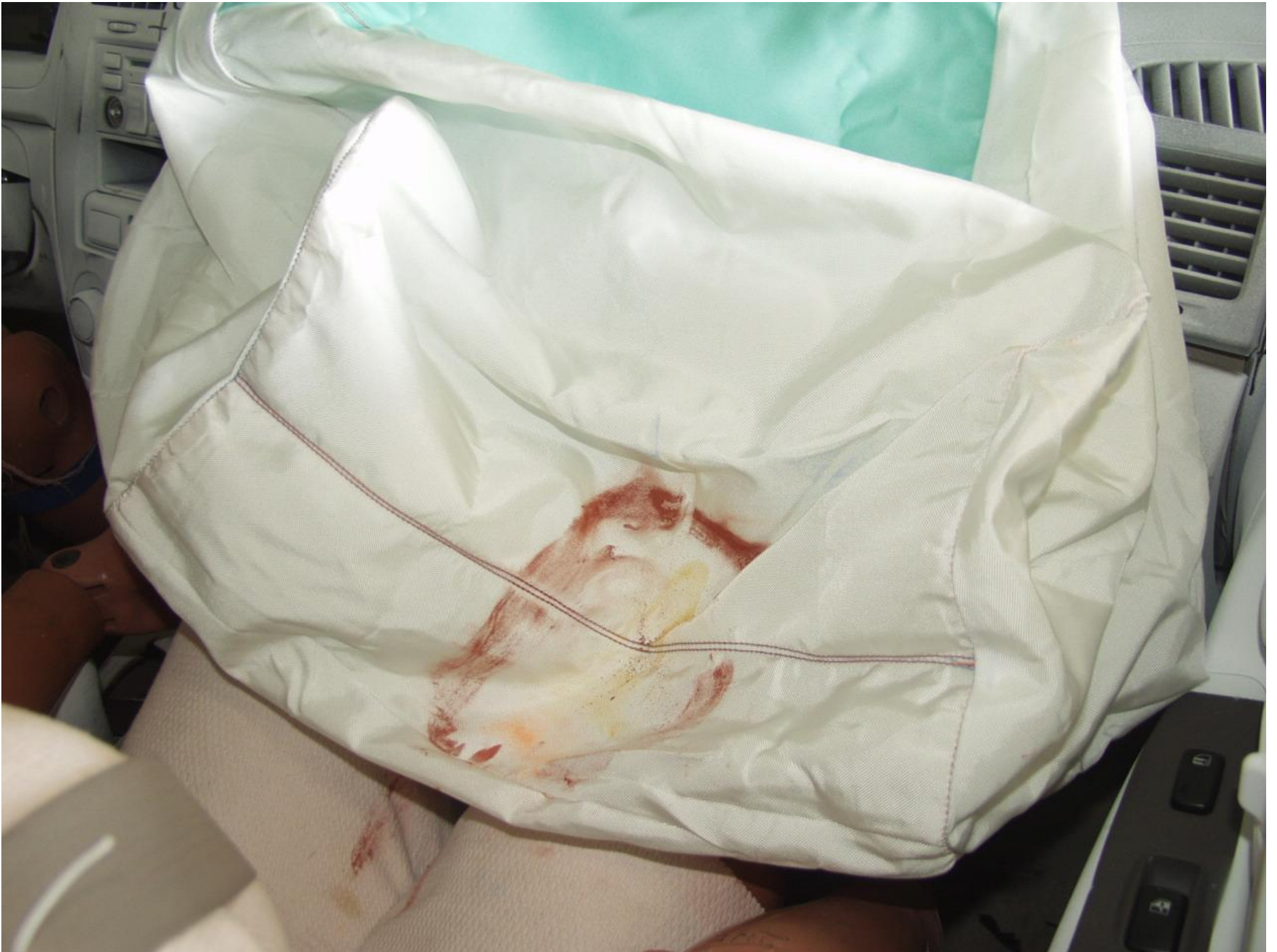
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Figure A-55 POST-TEST PASSENGER FLOOR PAN VIEW



Figure A-56 POST-TEST PASSENGER HEAD VIEW



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Figure A-57 POST-TEST PASSENGER CONTACT TO AIRBAG



Figure A-58 ROLLOVER VIEW



Figure A-59 IMPACT VIEW

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APPENDIX B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

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

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

DATA CHANNEL FILTER CLASS SUMMARY

NHTSA TEST NO.: M40515

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

Table of Data Plots

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
1	V1P1 Head 9 Array X Arm Ay [g, CFC_1000]	B-8
2	V1P1 Head 9 Array X Arm Az [g, CFC_1000]	B-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 [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 [N, CFC_600]	B-43
37	V1P1 Right Femur [N, CFC_600]	B-44
38	V1P1 Left Upper Tibia Mx [N-m, CFC_600]	B-45
39	V1P1 Left Upper Tibia My [N-m, CFC_600]	B-46
40	V1P1 Left Lower Tibia Fz [N, CFC_600]	B-47
41	V1P1 Left Lower Tibia Mx [N-m, CFC_600]	B-48
42	V1P1 Left Lower Tibia My [N-m, CFC_600]	B-49
43	V1P1 Right Upper Tibia Mx [N-m, CFC_600]	B-50
44	V1P1 Right Upper Tibia My [N-m, CFC_600]	B-51
45	V1P1 Right Lower Tibia Fz [N, CFC_600]	B-52
46	V1P1 Right Lower Tibia Mx [N-m, CFC_600]	B-53

Table of Data Plots (Continued)

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
47	V1P1 Right Lower Tibia My [N-m, CFC_600]	B-54
48	V1P1 Left Foot Aft Ax [g, CFC_600]	B-55
49	V1P1 Left Foot Aft Az [g, CFC_600]	B-56
50	V1P1 Left Foot Fore Az [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	V1 Driver Lap Belt [N, CFC_60]	B-61
55	V1 Driver Torso Belt [N, CFC_60]	B-62
56	V1P2 Head 9 Array X Arm y [g, CFC_1000]	B-63
57	V1P2 Head 9 Array X Arm z [g, CFC_1000]	B-64
58	V1P2 Head 9 Array Y Arm x [g, CFC_1000]	B-65
59	V1P2 Head 9 Array Y Arm z [g, CFC_1000]	B-66
60	V1P2 Head 9 Array Z Arm x [g, CFC_1000]	B-67
61	V1P2 Head 9 Array Z Arm y [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 [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 [N, CFC_600]	B-98
92	V1P2 Right Femur [N, CFC_600]	B-99

Table of Data Plots (Continued)

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
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	V1 Passenger Lap Belt [N, CFC_60]	B-116
110	V1 Passenger Torso Belt [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
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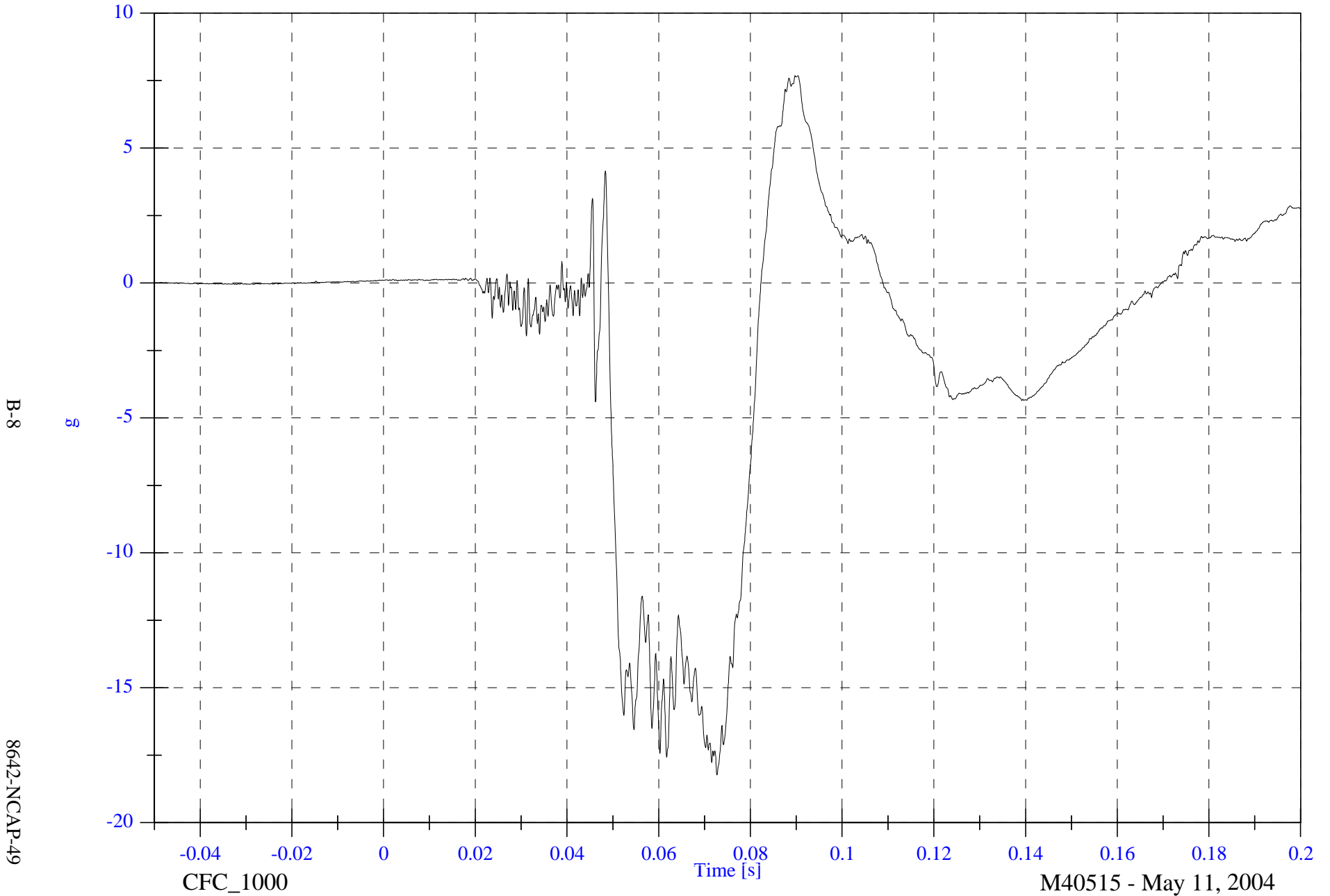
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2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Head 9 Array X Arm Ay

Max: 7.7 [g] at 0.090 [s]

Min: -18.2 [g] at 0.073 [s]

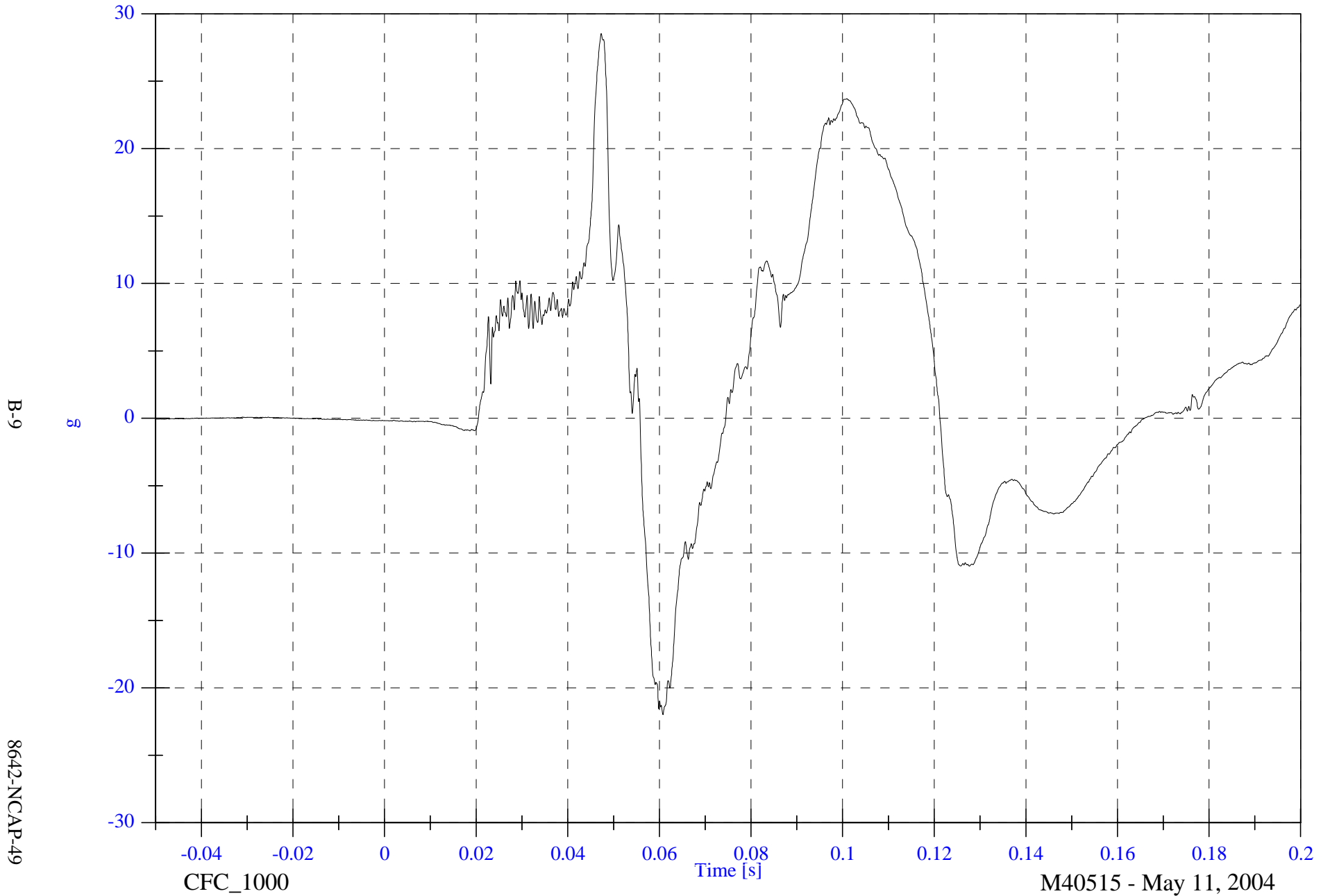


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Head 9 Array X Arm Az

Max: 28.5 [g] at 0.047 [s]

Min: -22.0 [g] at 0.061 [s]

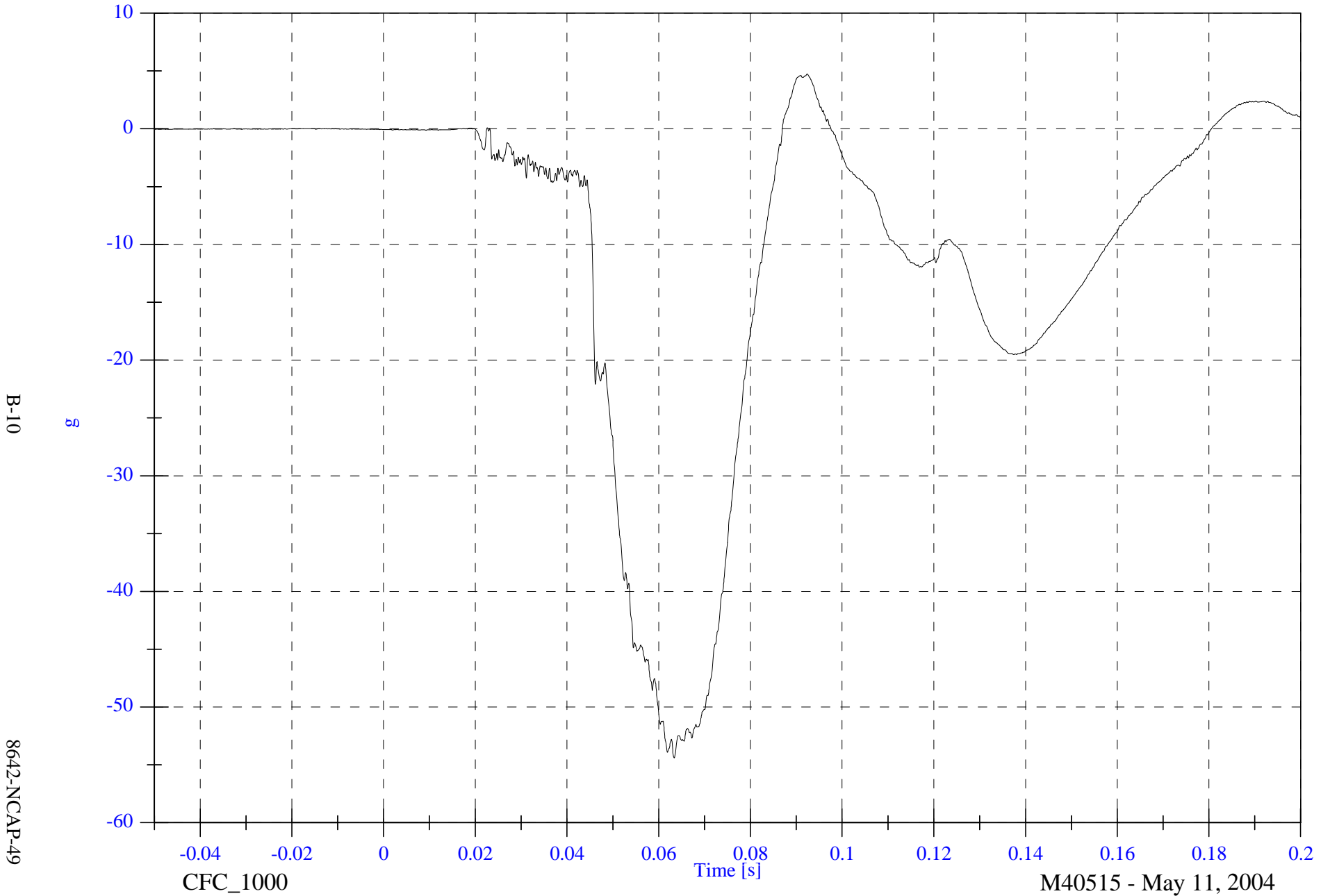


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Head 9 Array Y Arm Ax

Max: 4.7 [g] at 0.092 [s]

Min: -54.4 [g] at 0.063 [s]

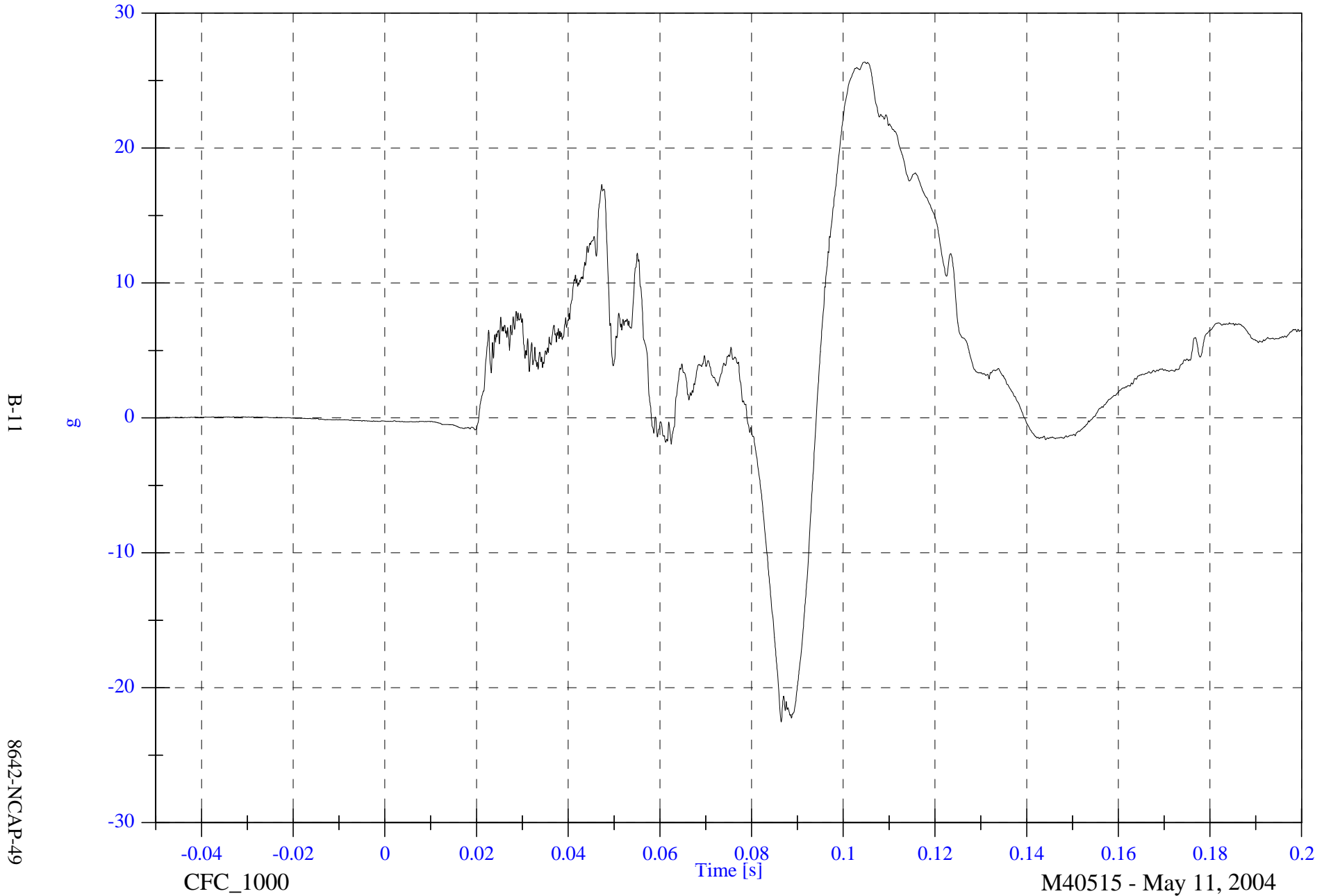


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Head 9 Array Y Arm Az

Max: 26.4 [g] at 0.105 [s]

Min: -22.5 [g] at 0.086 [s]



B-11

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CFC_1000

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

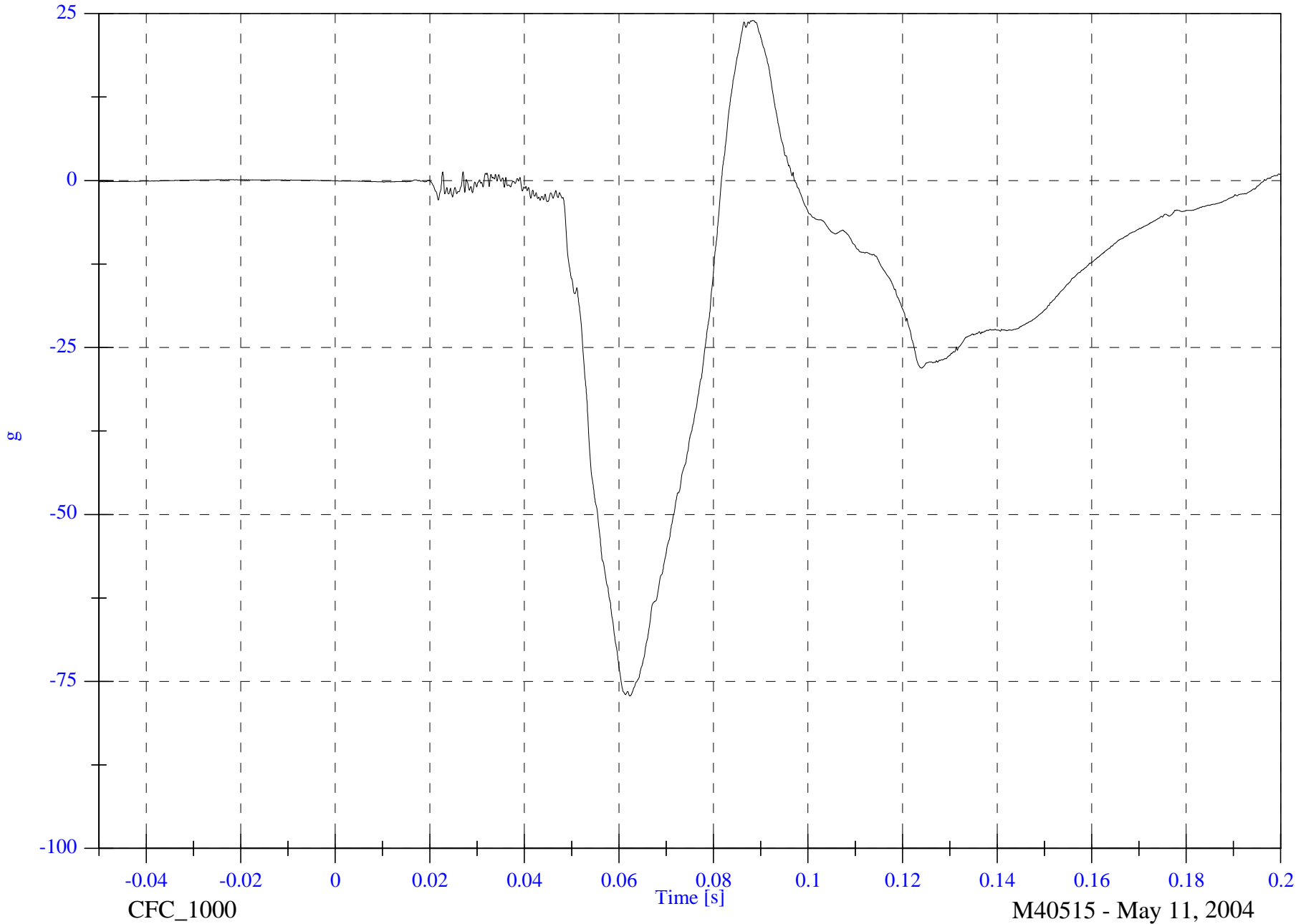
V1P1 Head 9 Array Z Arm Ax

Max: 24.0 [g] at 0.088 [s]

Min: -77.2 [g] at 0.062 [s]

B-12

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

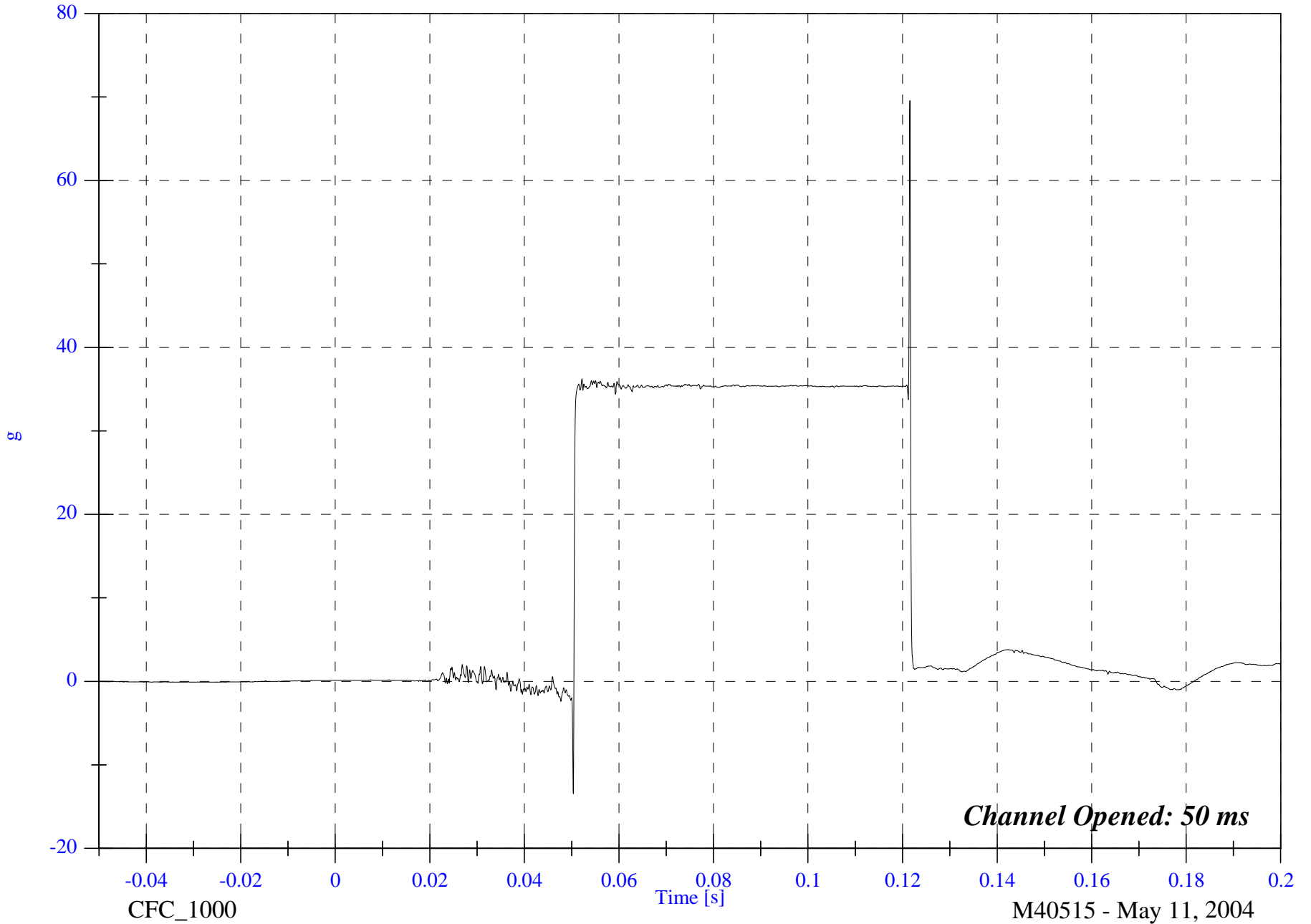
V1P1 Head 9 Array Z Arm Ay

Max: 69.6 [g] at 0.122 [s]

Min: -13.5 [g] at 0.050 [s]

B-13

8642-NCAP-49



CFC_1000

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

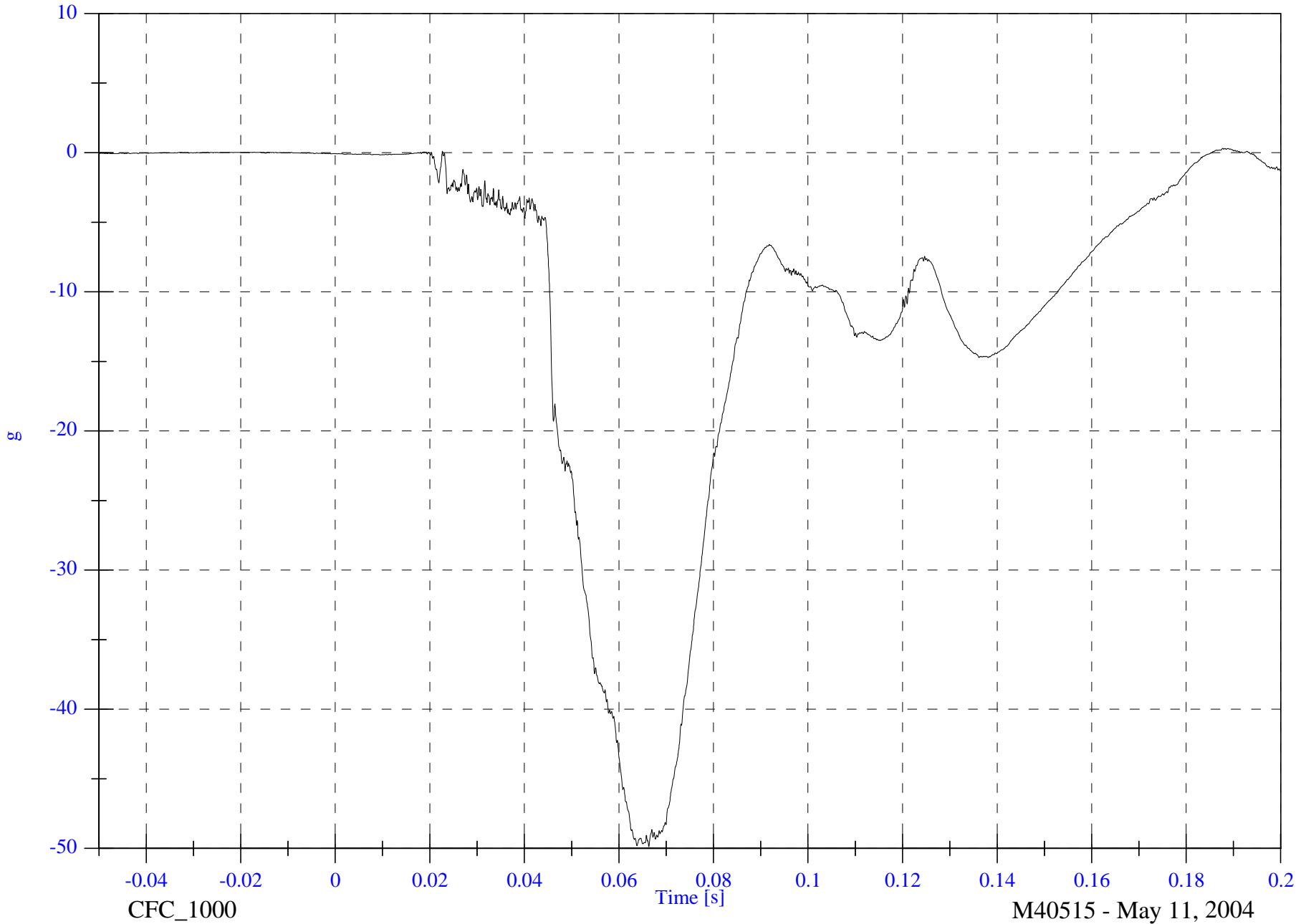
V1P1 Head CG x

Max: 0.3 [g] at 0.188 [s]

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

B-14

8642-NCAP-49



CFC_1000

Time [s]

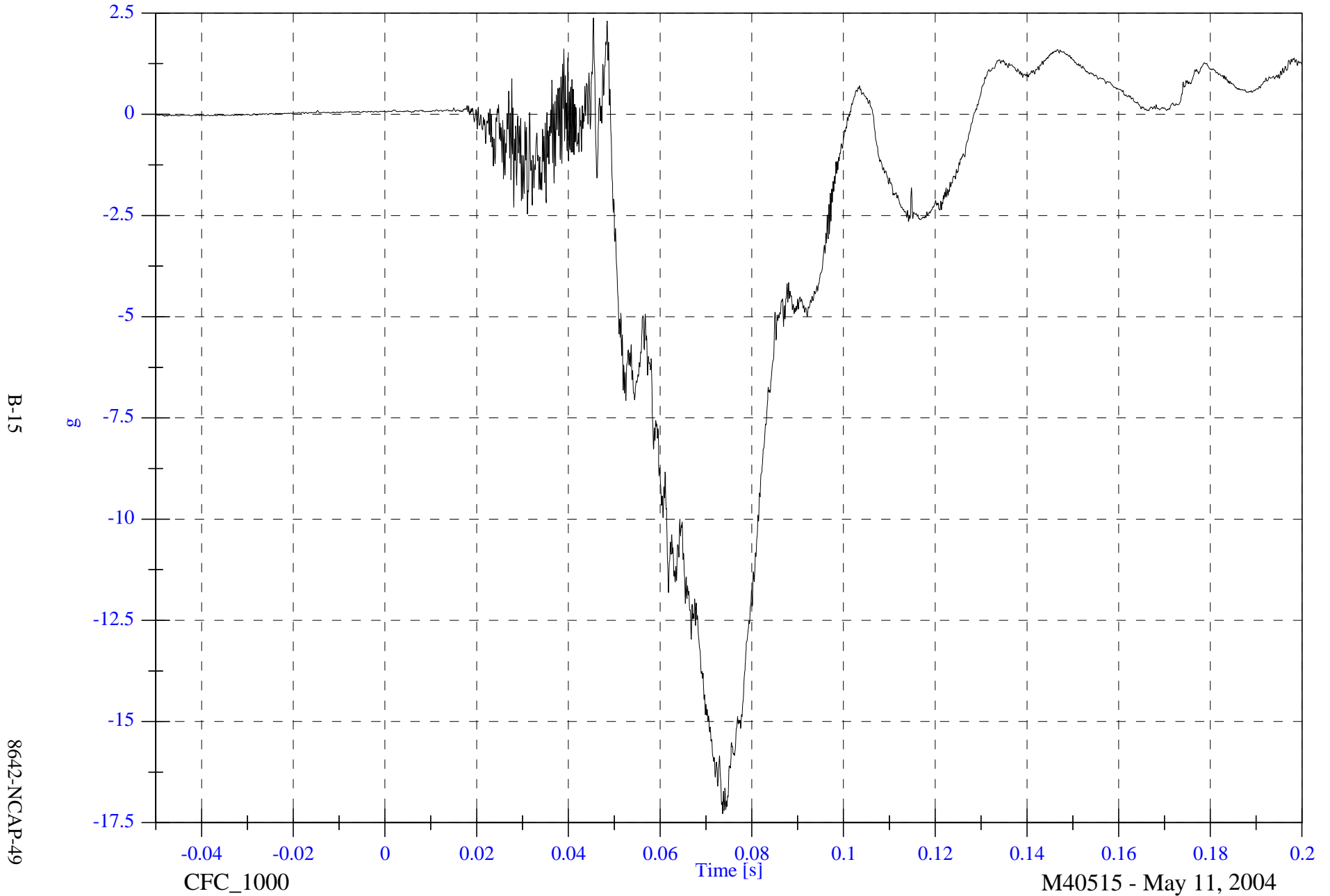
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Head CG y

Max: 2.4 [g] at 0.045 [s]

Min: -17.3 [g] at 0.074 [s]



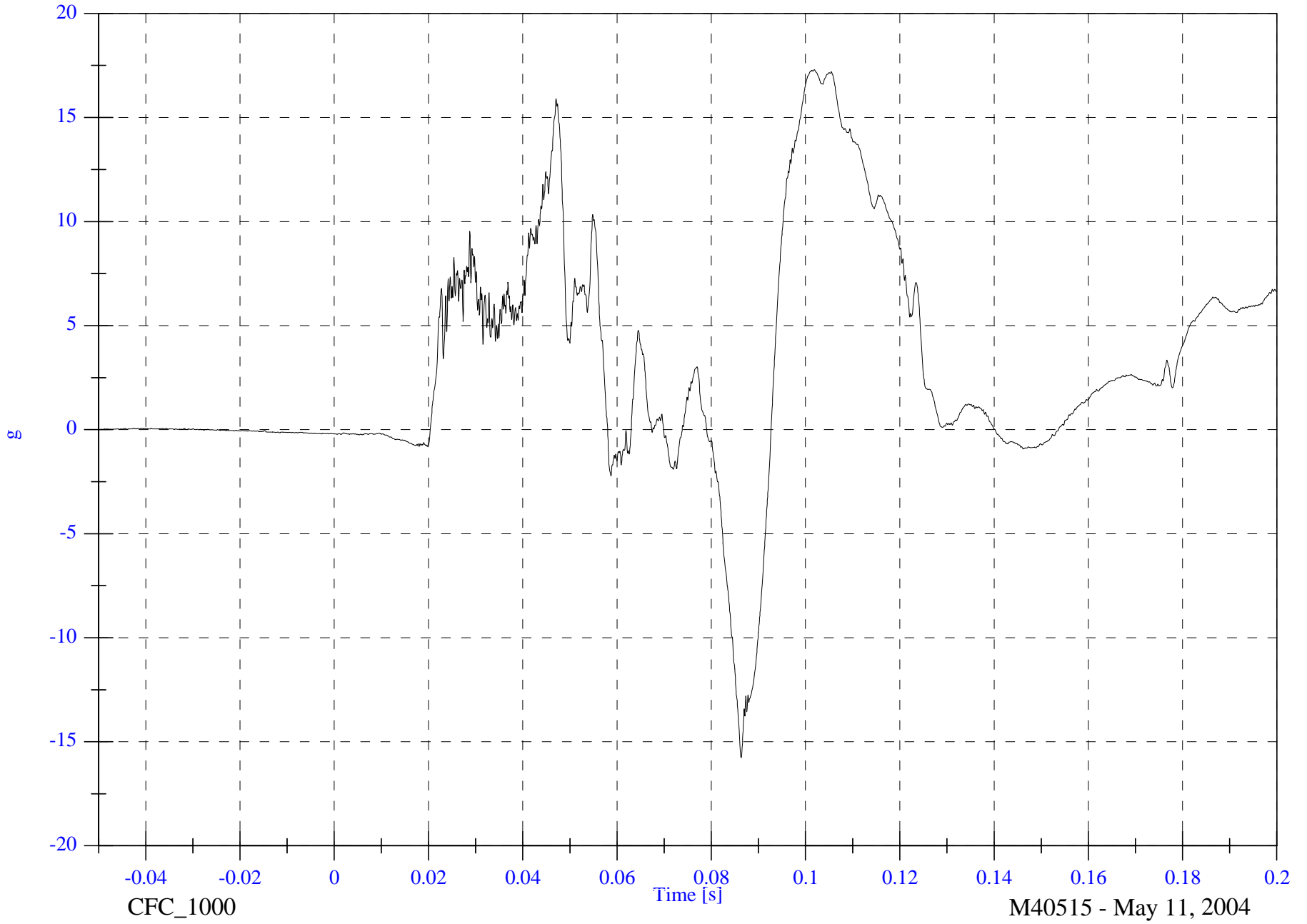
2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Head CG z

Max: 17.3 [g] at 0.102 [s]
Min: -15.8 [g] at 0.086 [s]

B-16

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

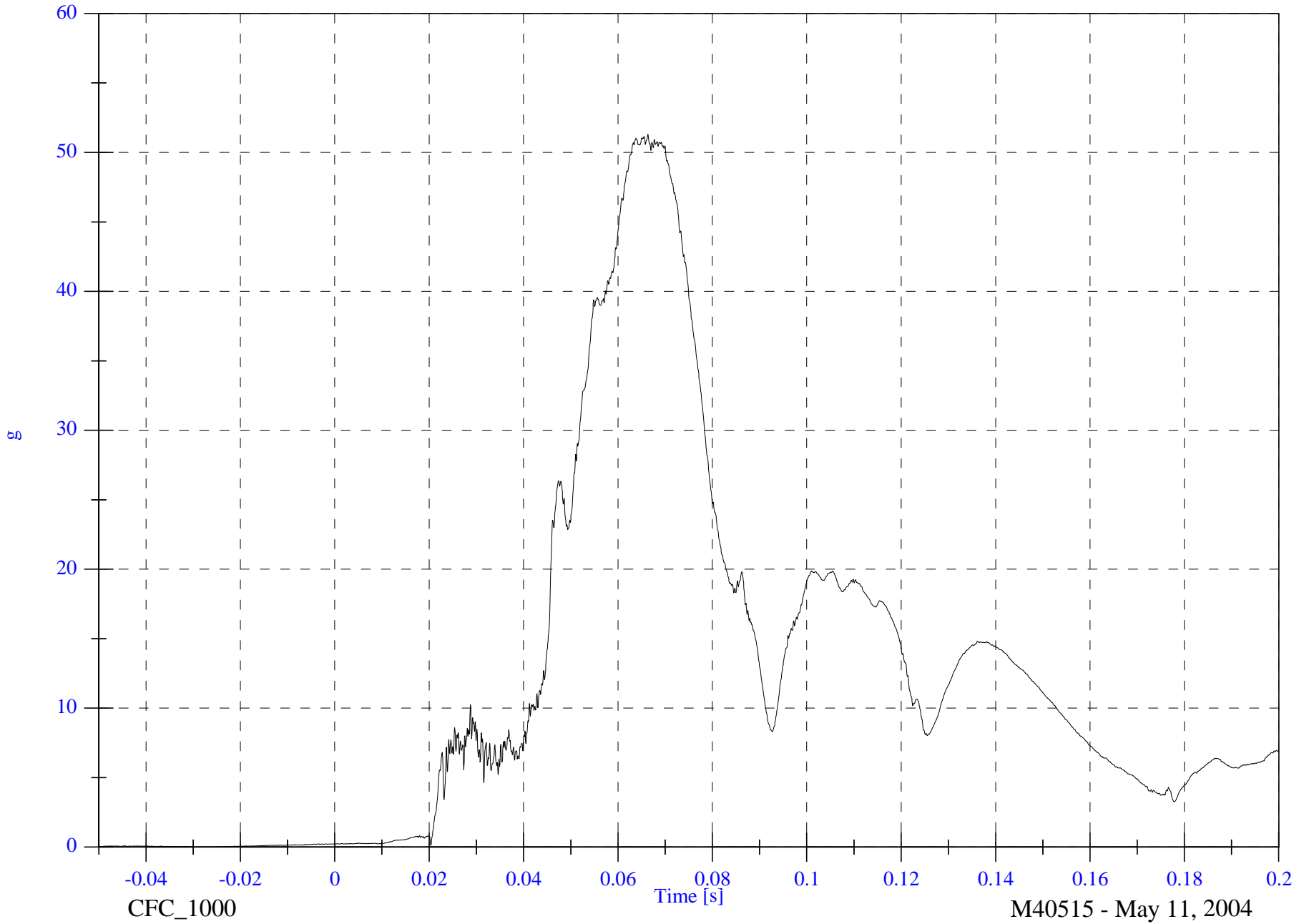
V1P1 Head CG Resultant

Max: 51.3 [g] at 0.066 [s]

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

B-17

8642-NCAP-49

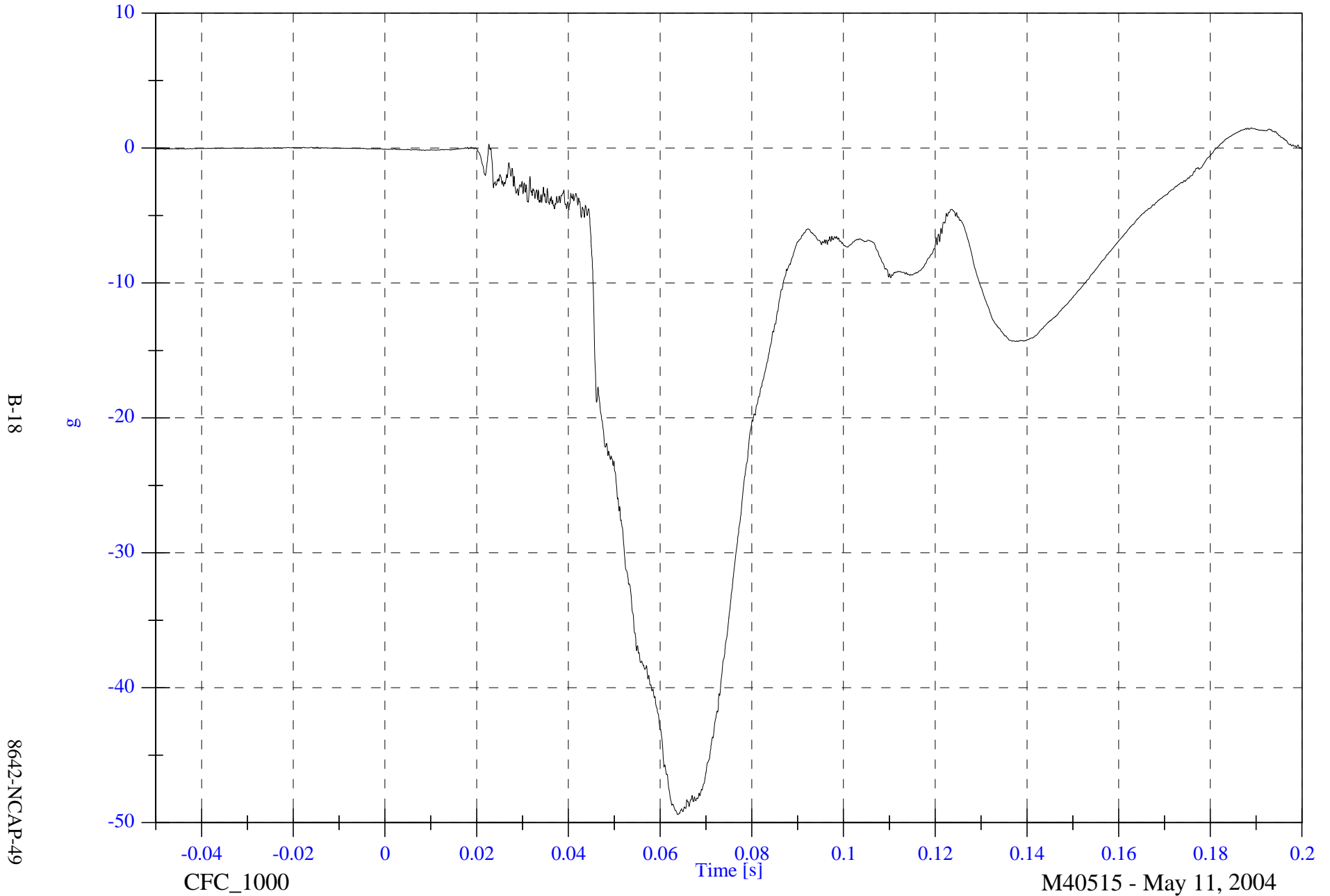


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Head CG Red x

Max: 1.5 [g] at 0.189 [s]

Min: -49.4 [g] at 0.064 [s]

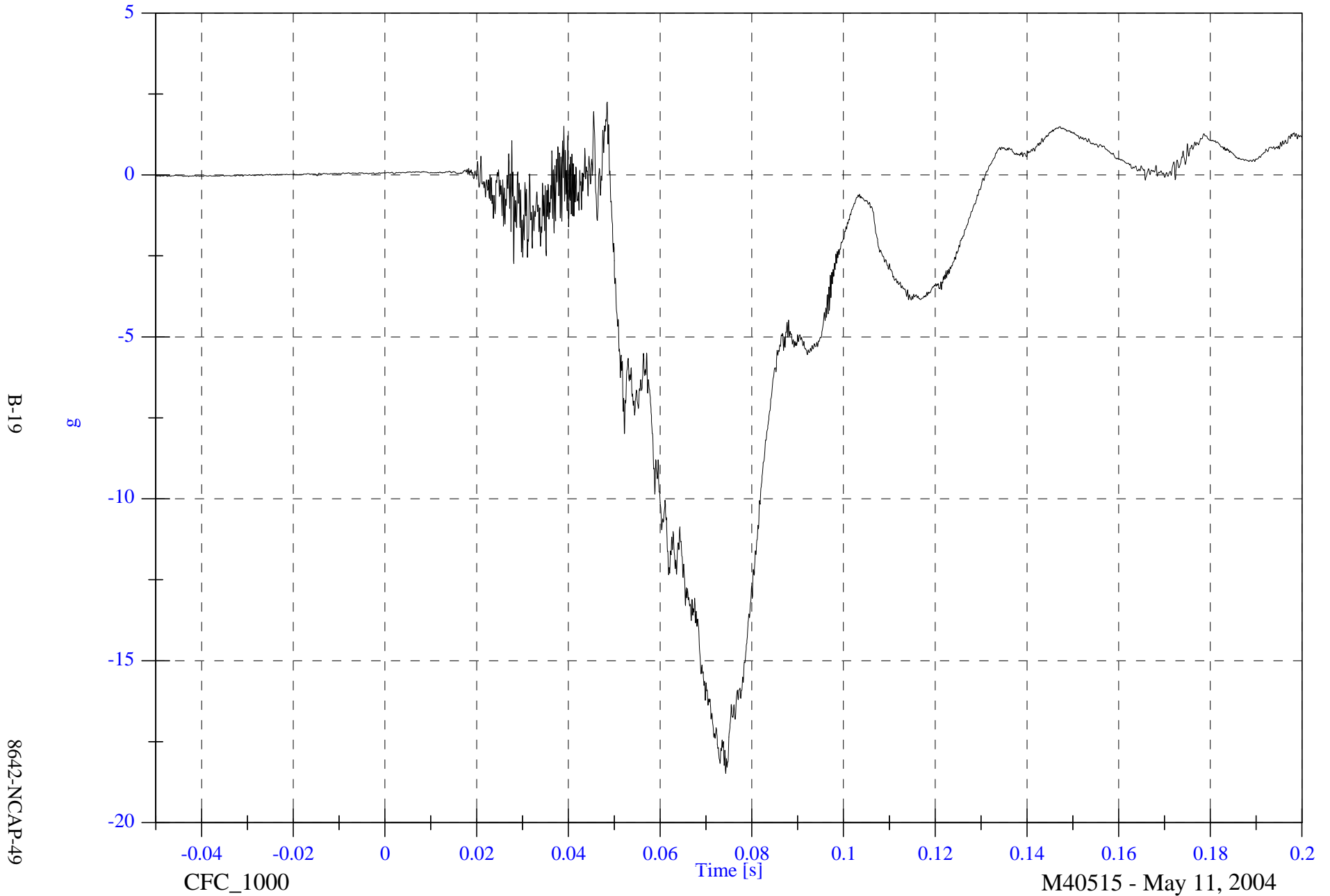


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Head CG Red y

Max: 2.2 [g] at 0.048 [s]

Min: -18.5 [g] at 0.074 [s]



2004 NCAP Test 13 - 2004.5 Kia Spectra

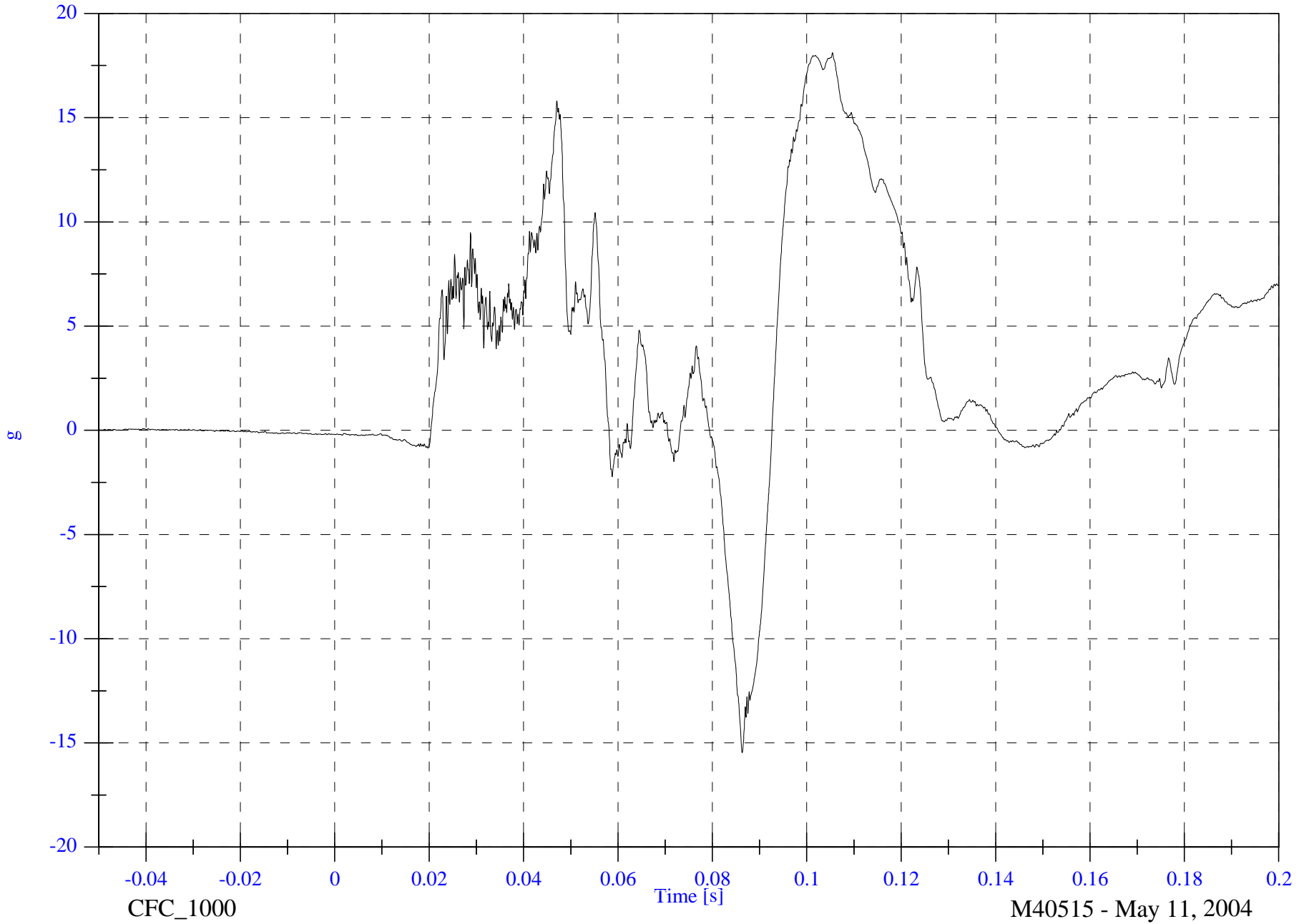
V1P1 Head CG Red z

Max: 18.1 [g] at 0.105 [s]

Min: -15.5 [g] at 0.086 [s]

B-20

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

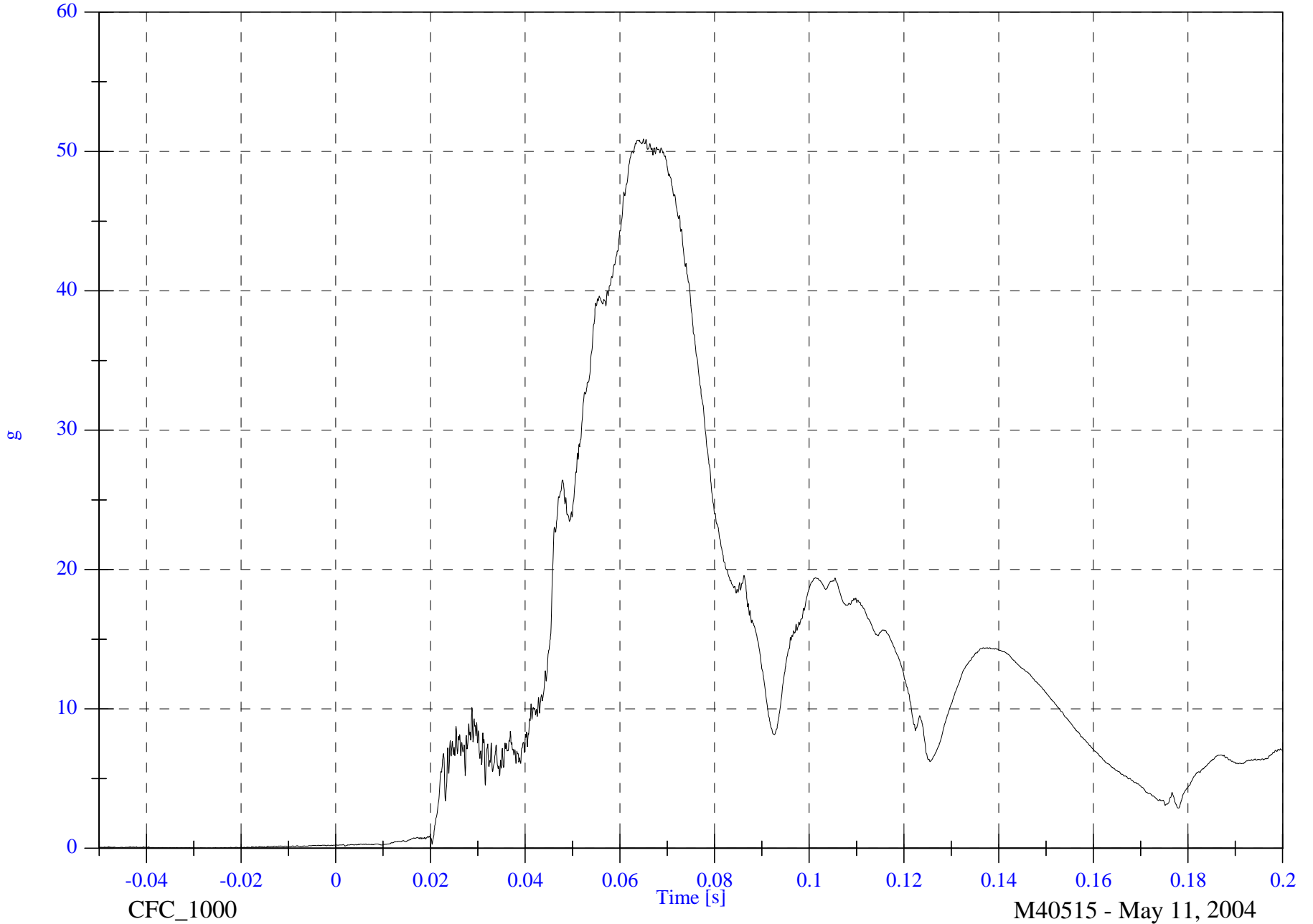
V1P1 Head CG Red Resultant

Max: 50.9 [g] at 0.065 [s]

Min: 0.0 [g] at -0.026 [s]

B-21

8642-NCAP-49

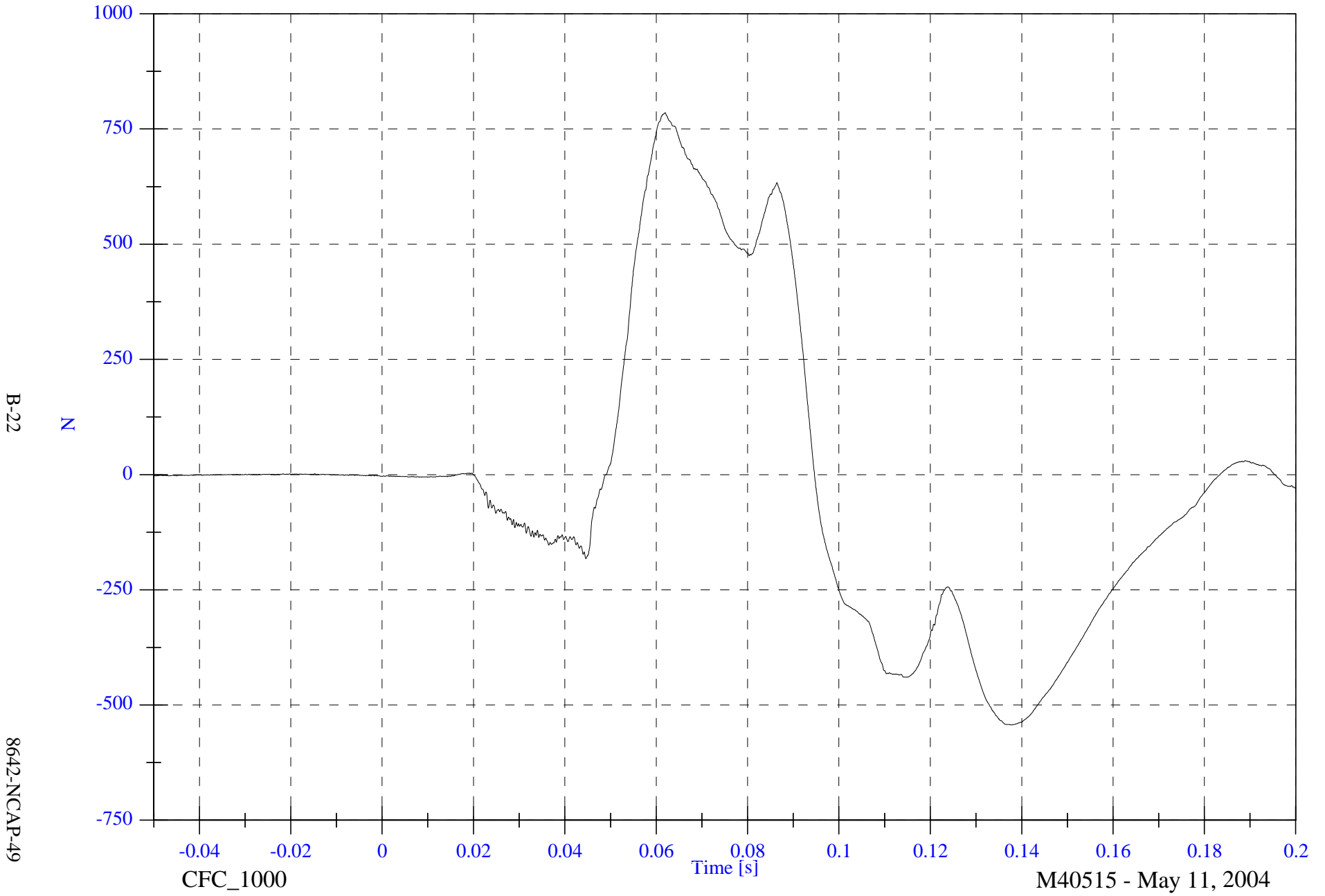


2004 NCAP Test 13 - 2004.5 Kia Spectra

Max: 785.4 [N] at 0.062 [s]

Min: -543.4 [N] at 0.138 [s]

V1P1 Upper Neck Fx



2004 NCAP Test 13 - 2004.5 Kia Spectra

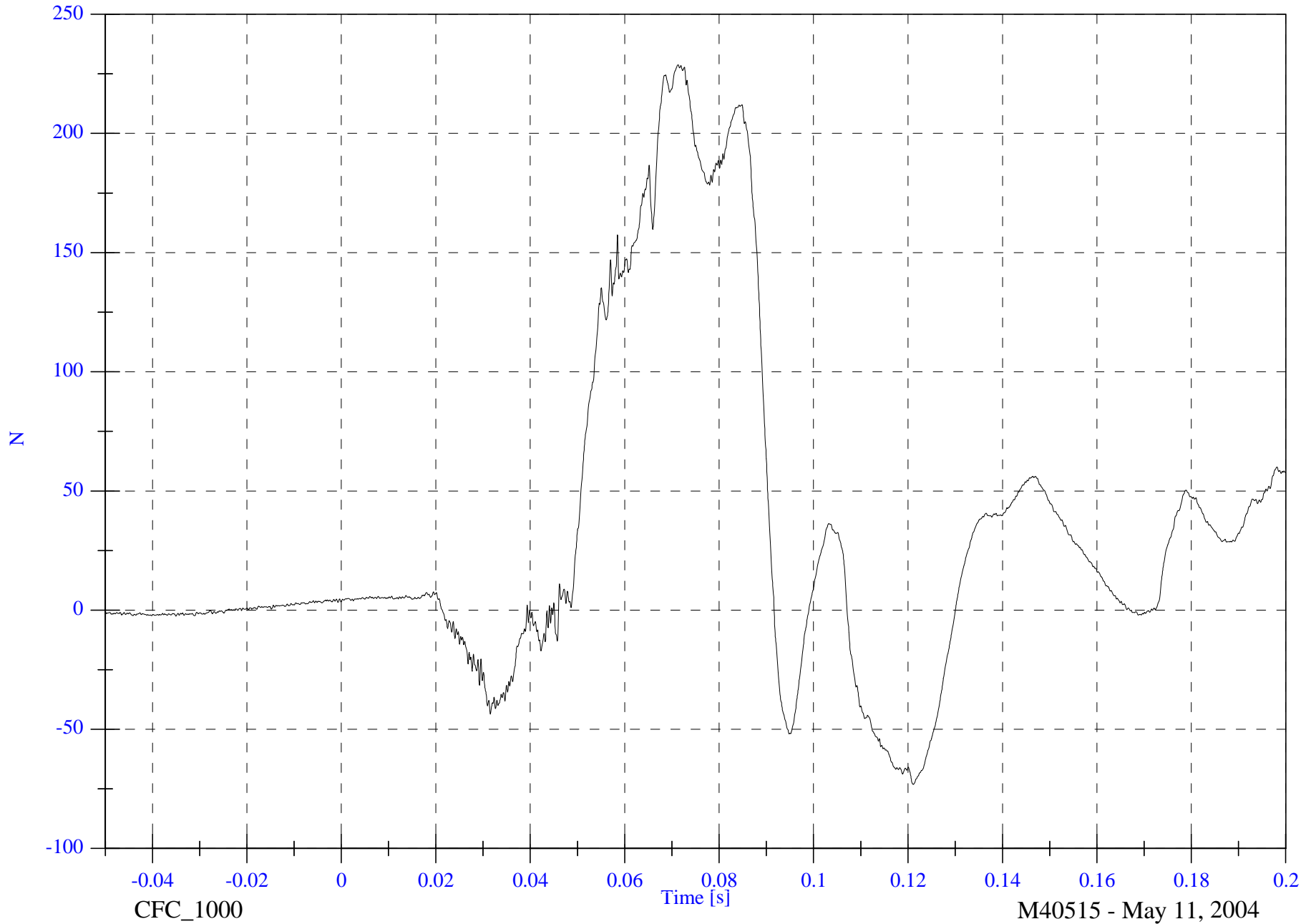
Max: 228.8 [N] at 0.071 [s]

Min: -73.1 [N] at 0.121 [s]

V1P1 Upper Neck Fy

B-23

8642-NCAP-49



CFC_1000

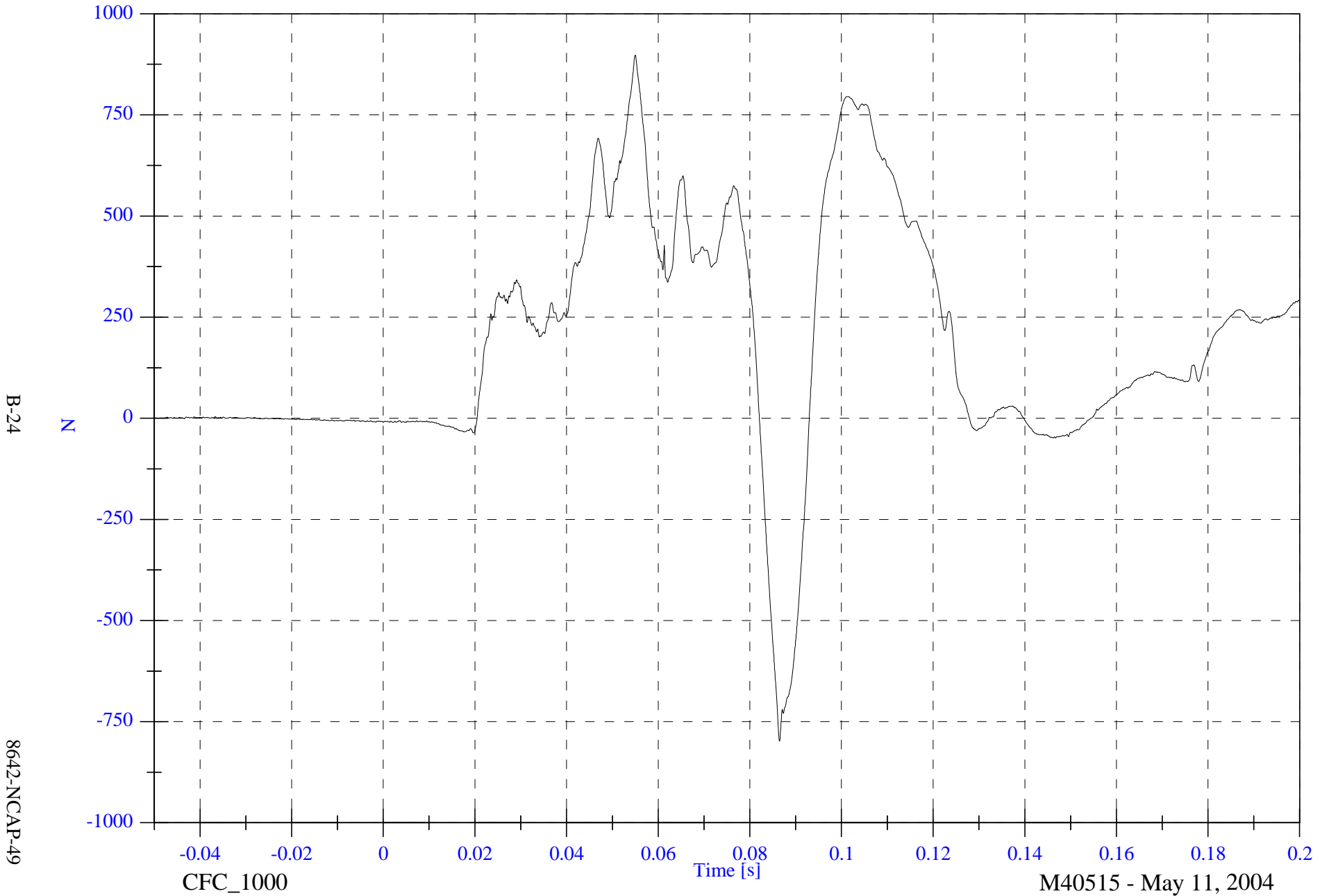
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Max: 897.9 [N] at 0.055 [s]

Min: -798.4 [N] at 0.086 [s]

V1P1 Upper Neck Fz



B-24

8642-NCAP-49

CFC_1000

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

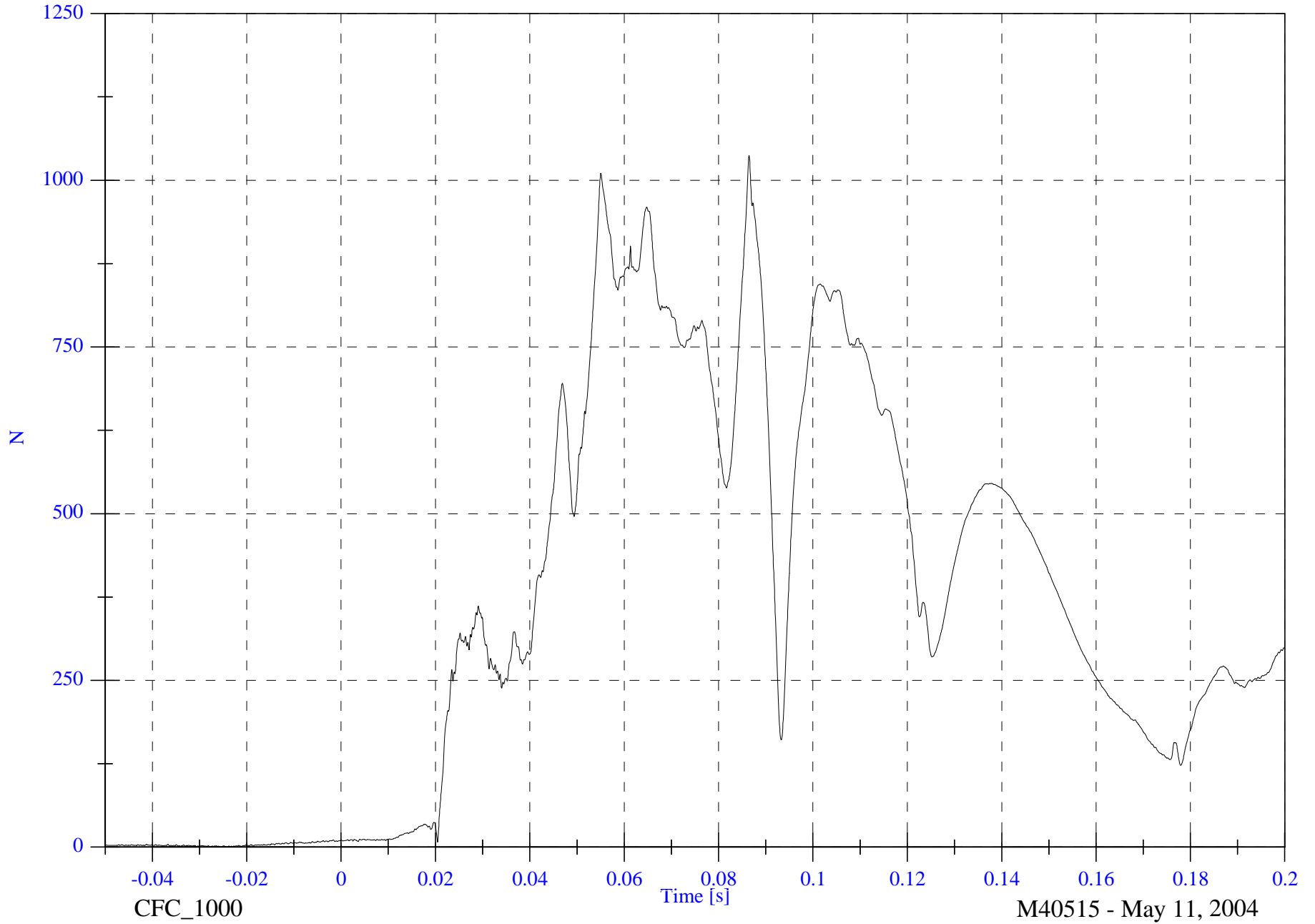
V1P1 Upper Neck F Resultant

Max: 1037.0 [N] at 0.086 [s]

Min: 0.2 [N] at -0.028 [s]

B-25

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

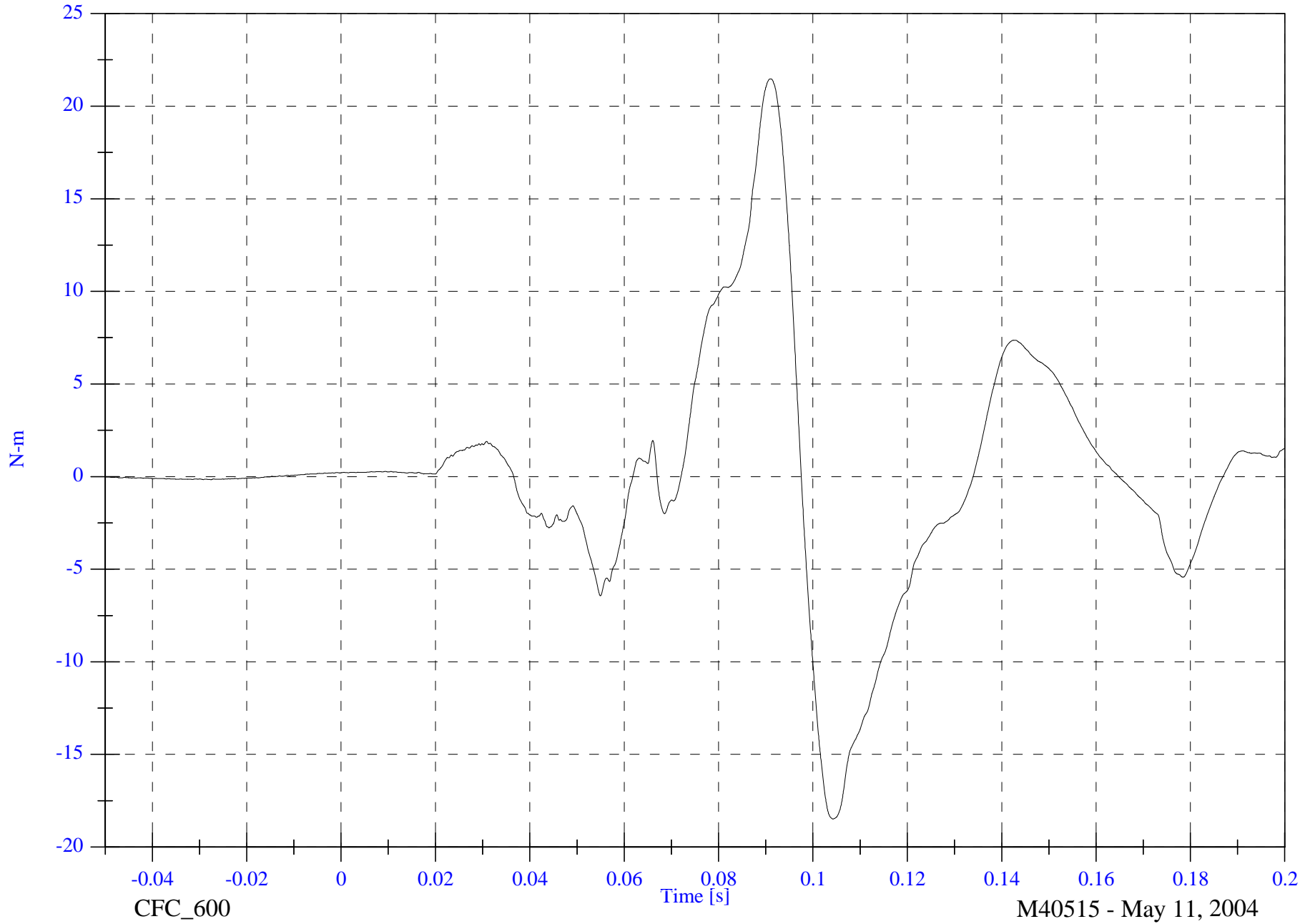
V1P1 Upper Neck Mx

Max: 21.5 [N-m] at 0.091 [s]

Min: -18.5 [N-m] at 0.104 [s]

B-26

8642-NCAP-49



CFC_600

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

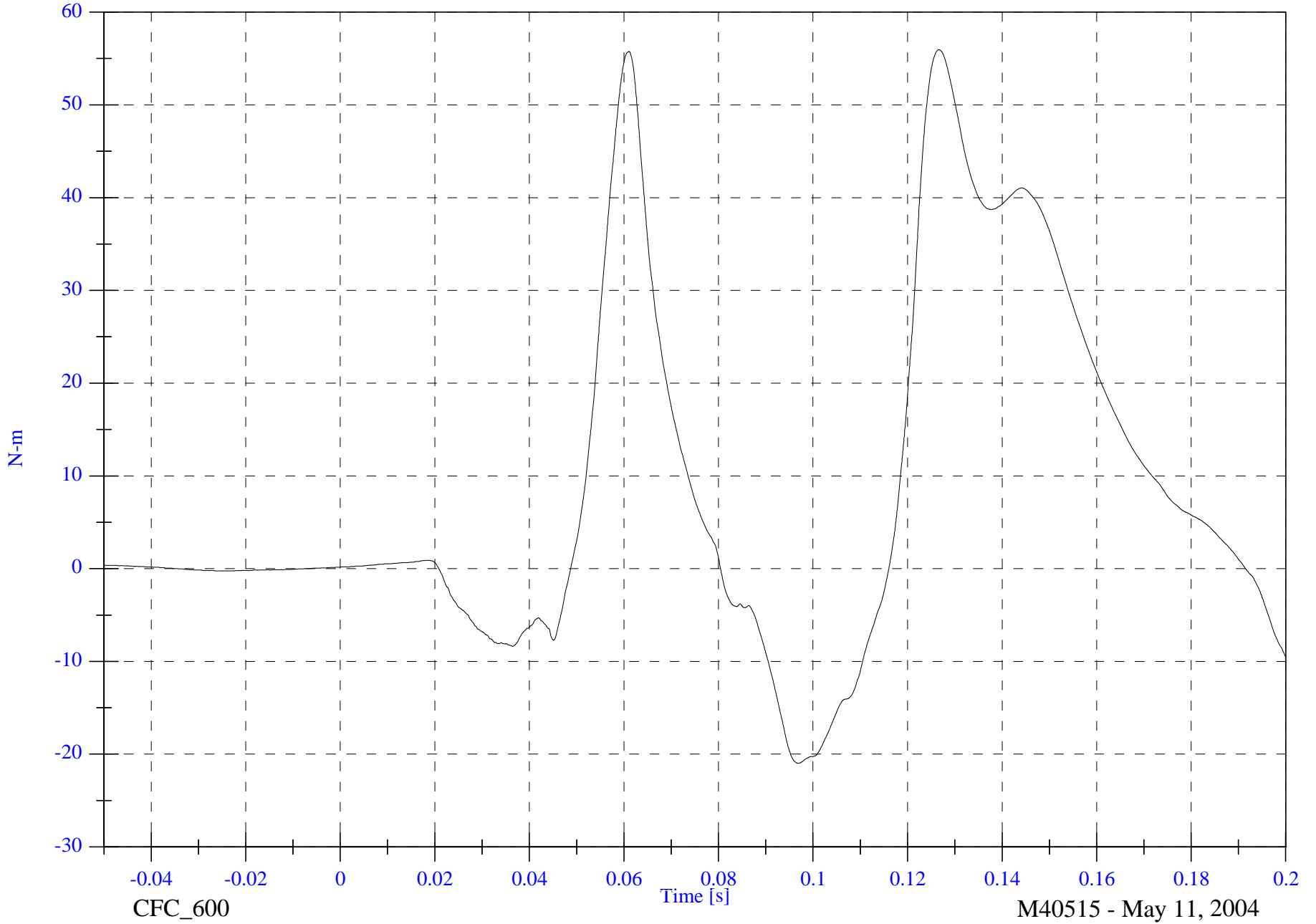
V1P1 Upper Neck My

Max: 55.9 [N-m] at 0.127 [s]

Min: -21.0 [N-m] at 0.097 [s]

B-27

8642-NCAP-49



CFC_600

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

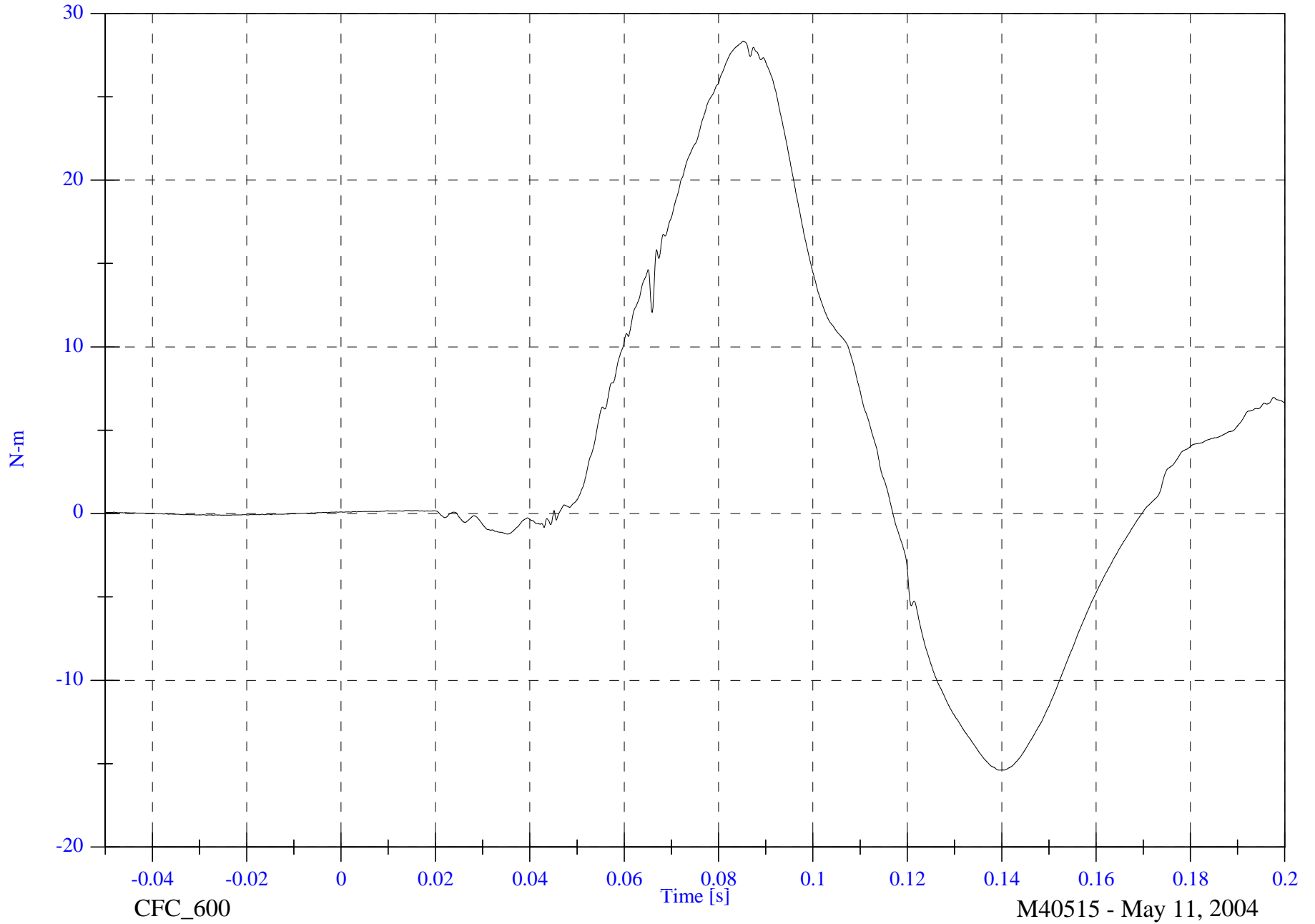
V1P1 Upper Neck Mz

Max: 28.3 [N-m] at 0.085 [s]

Min: -15.4 [N-m] at 0.140 [s]

B-28

8642-NCAP-49



CFC_600

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

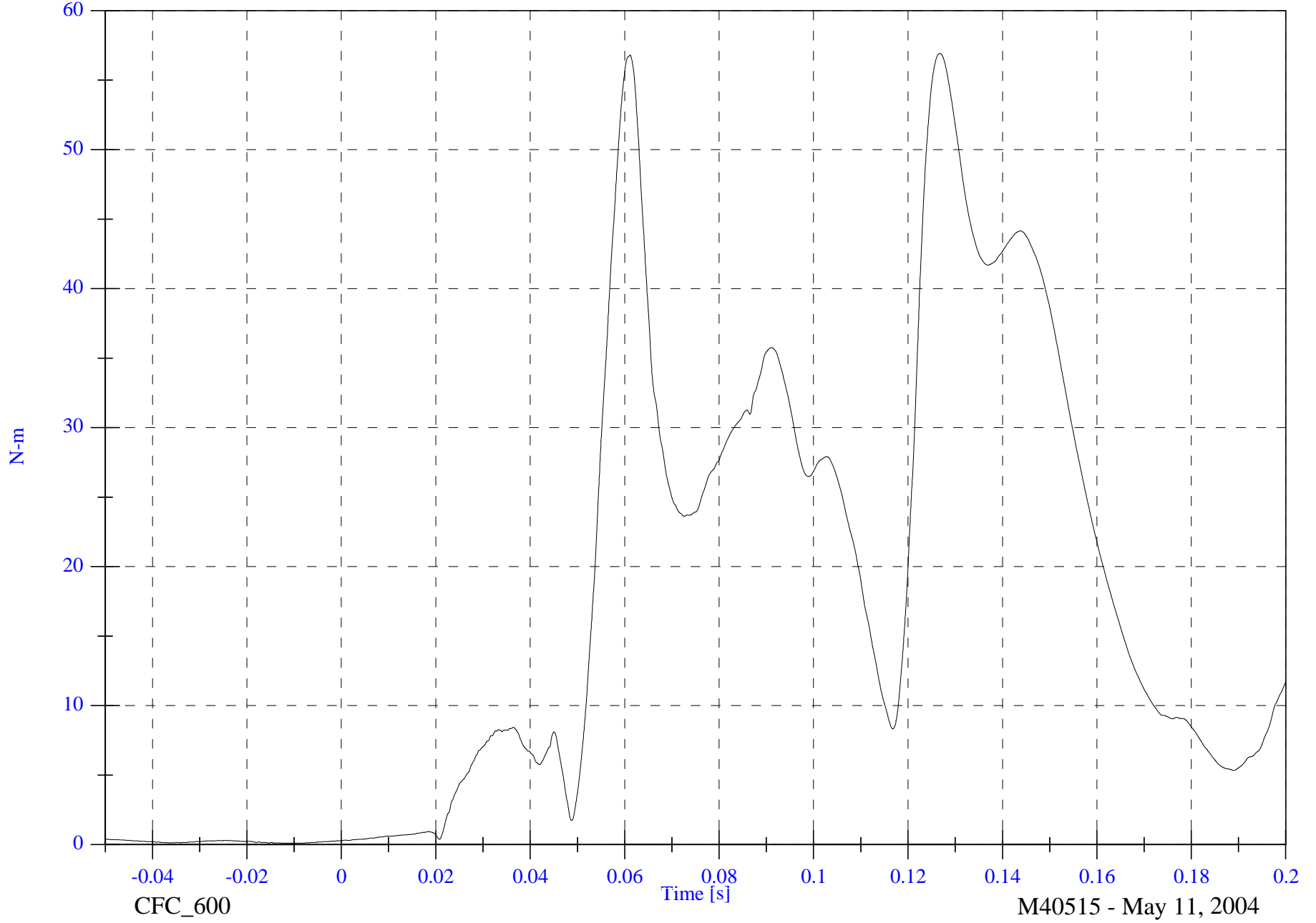
V1P1 Upper Neck M Resultant

Max: 56.9 [N-m] at 0.127 [s]

Min: 0.1 [N-m] at -0.010 [s]

B-29

8642-NCAP-49



CFC_600

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

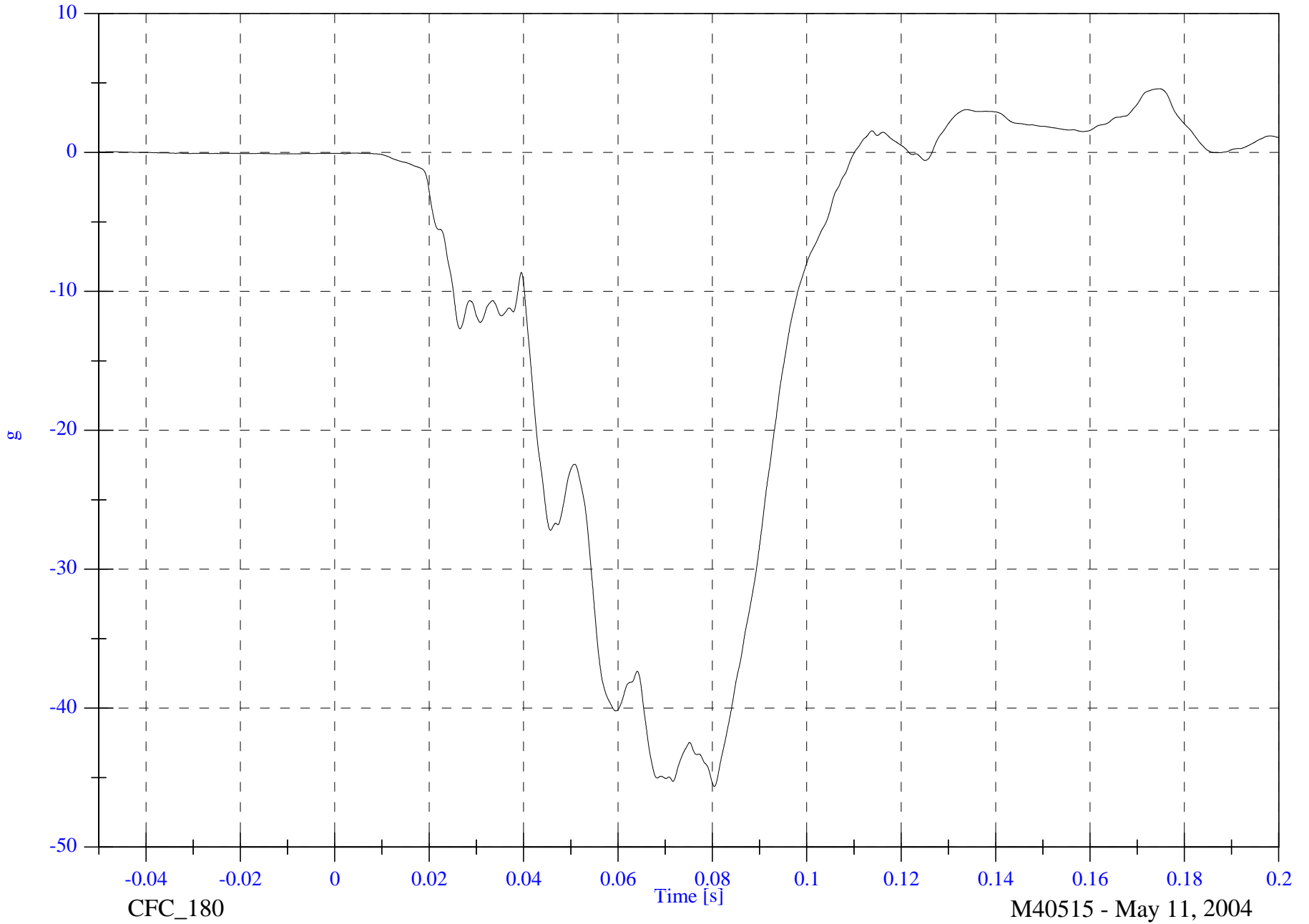
VIP1 Chest x

Max: 4.6 [g] at 0.175 [s]

Min: -45.6 [g] at 0.080 [s]

B-30

8642-NCAP-49



CFC_180

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

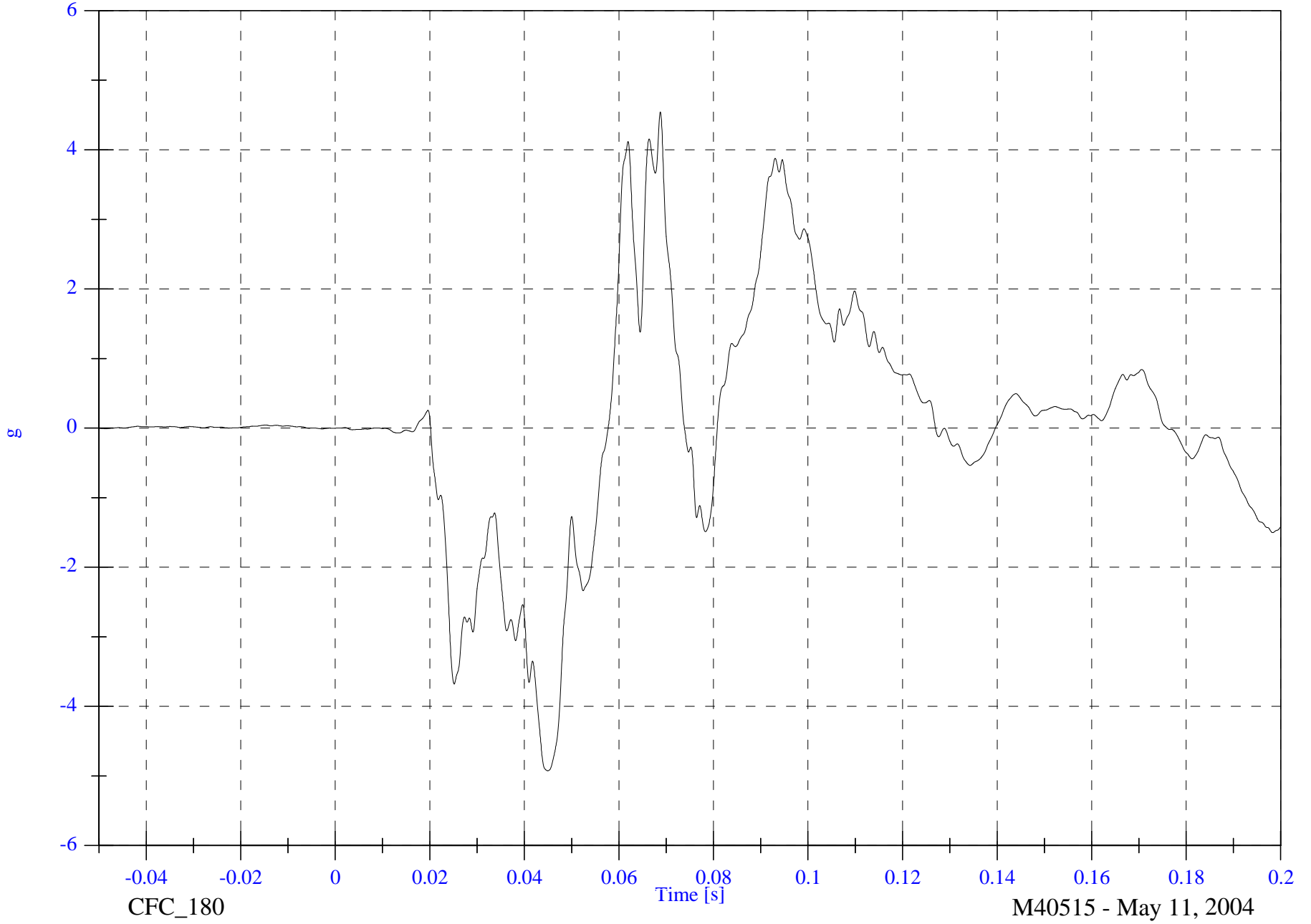
Max: 4.5 [g] at 0.069 [s]

Min: -4.9 [g] at 0.045 [s]

VIP1 Chest y

B-31

8642-NCAP-49



M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

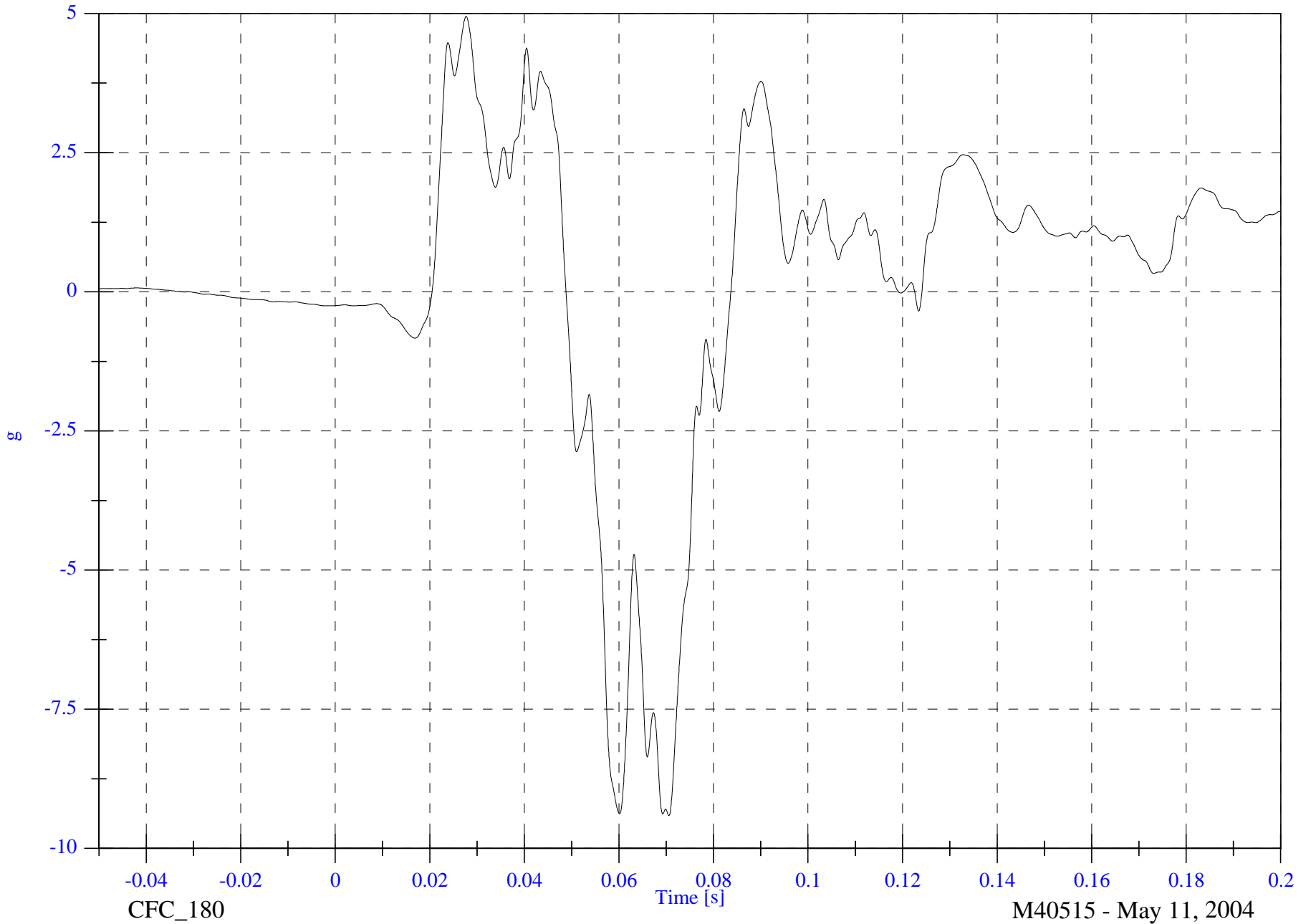
VIP1 Chest z

Max: 4.9 [g] at 0.028 [s]

Min: -9.4 [g] at 0.071 [s]

B-32

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

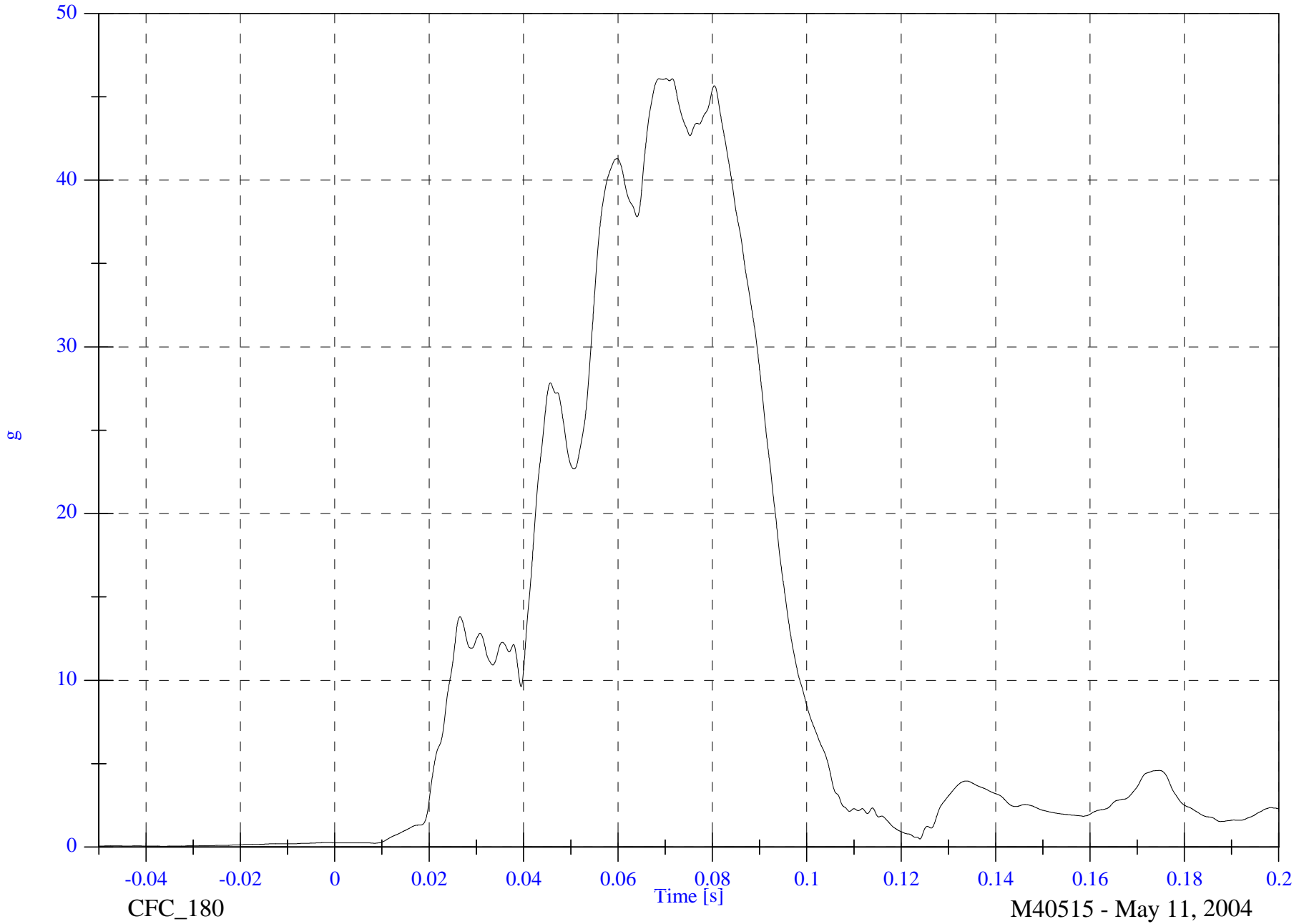
V1P1 Chest Resultant

Max: 46.1 [g] at 0.070 [s]

Min: 0.0 [g] at -0.036 [s]

B-33

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

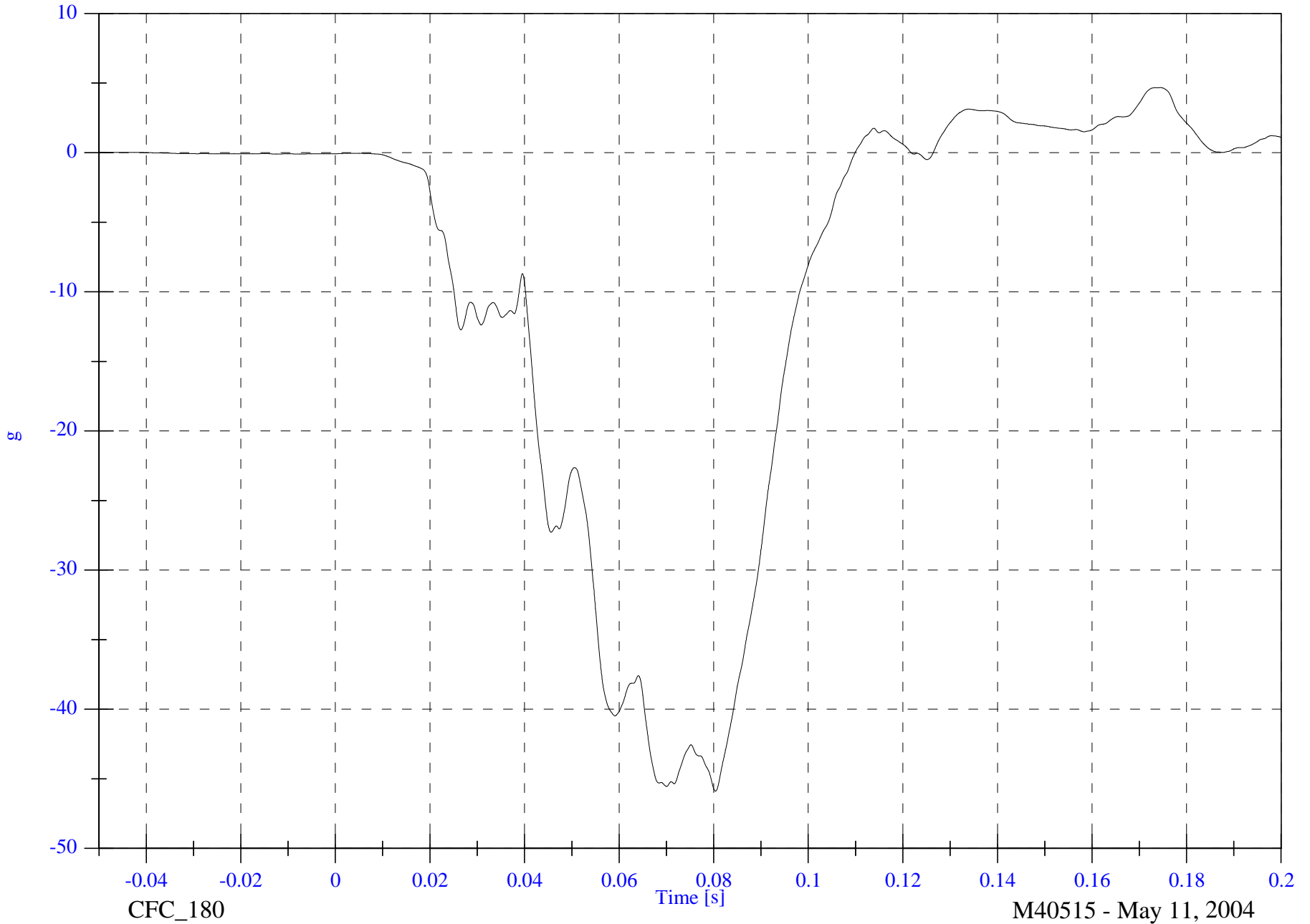
VIP1 Chest Red x

Max: 4.7 [g] at 0.174 [s]

Min: -45.9 [g] at 0.080 [s]

B-34

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

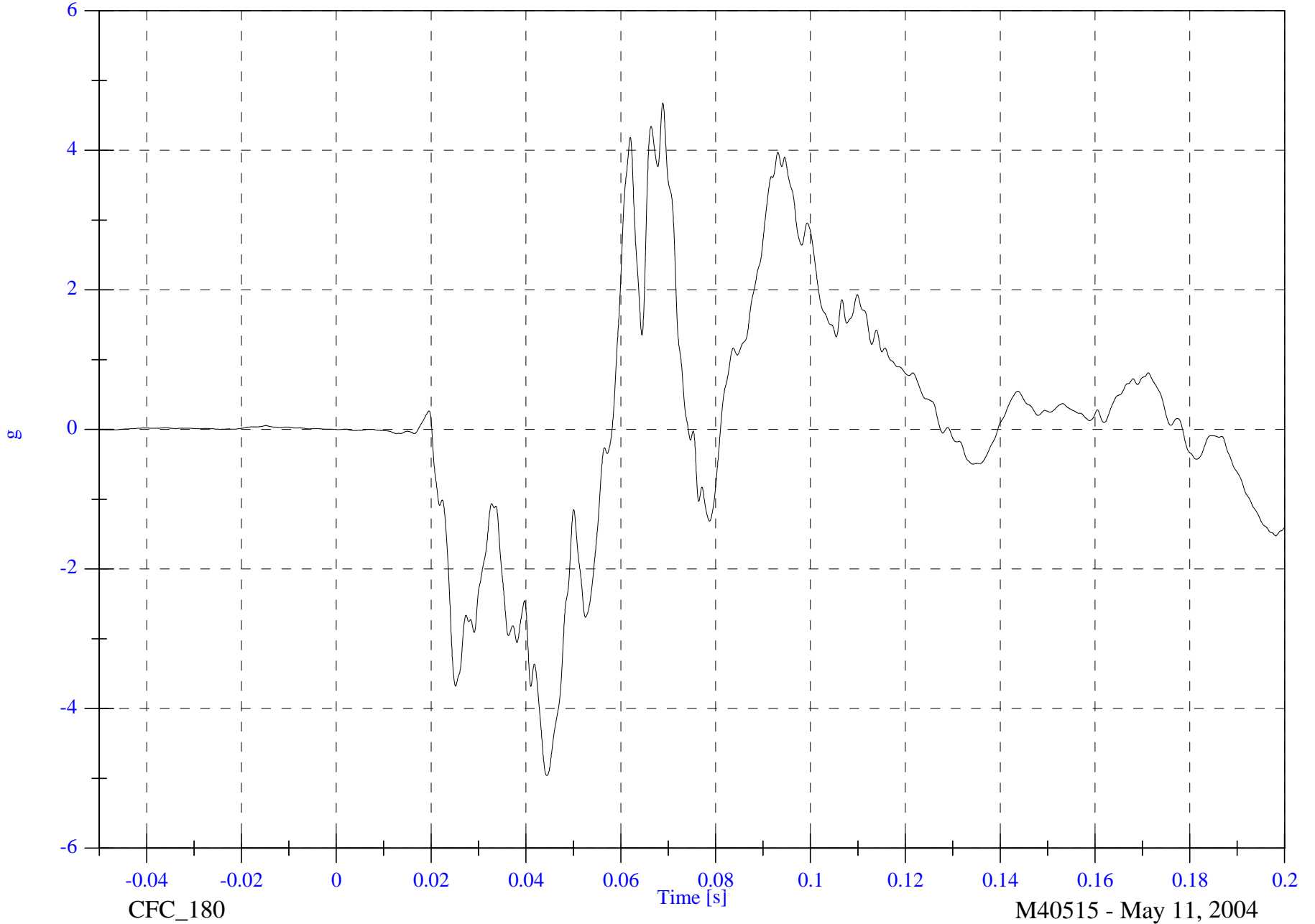
VIP1 Chest Red y

Max: 4.7 [g] at 0.069 [s]

Min: -5.0 [g] at 0.044 [s]

B-35

8642-NCAP-49



M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

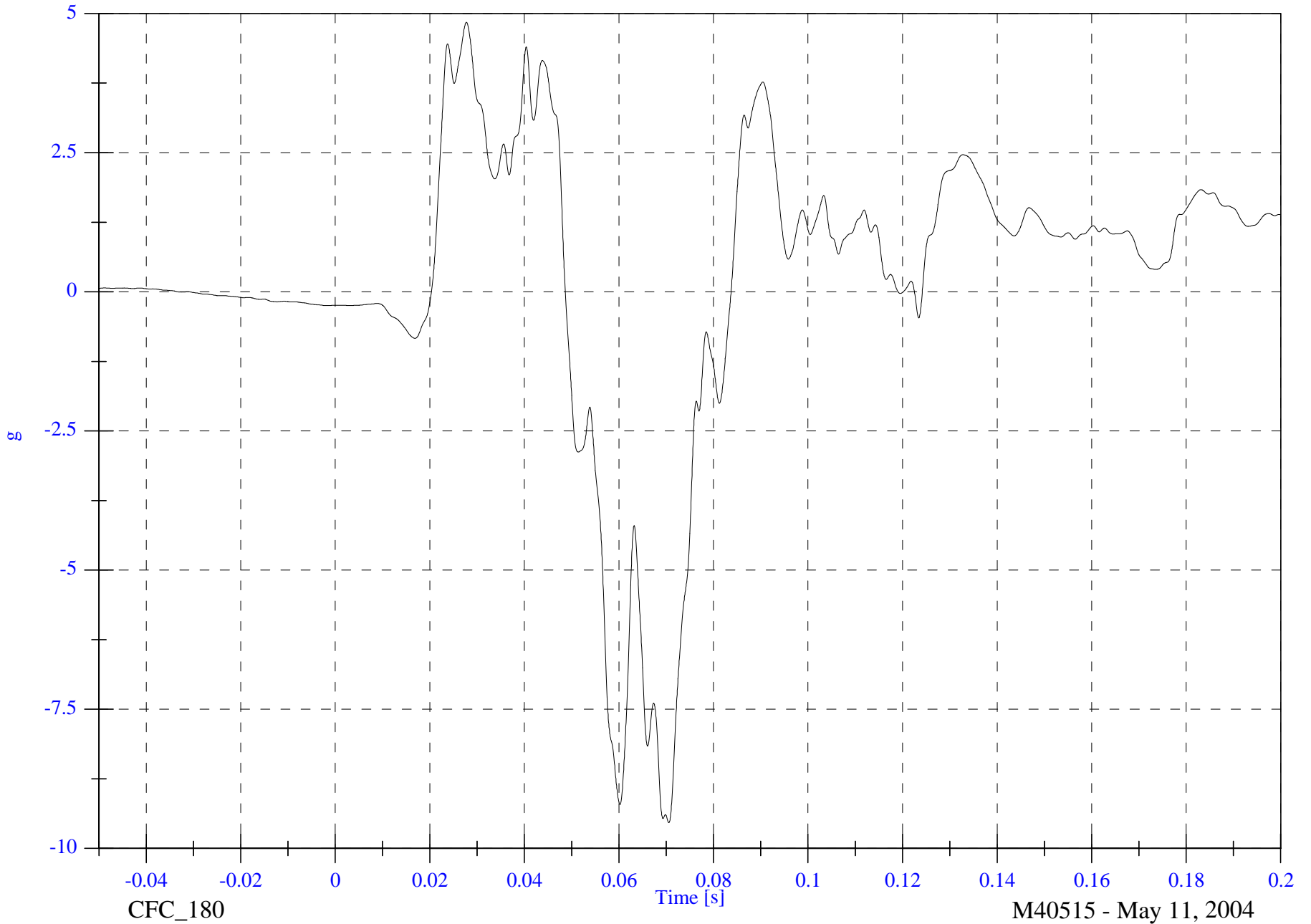
VIP1 Chest Red z

Max: 4.8 [g] at 0.028 [s]

Min: -9.5 [g] at 0.071 [s]

B-36

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

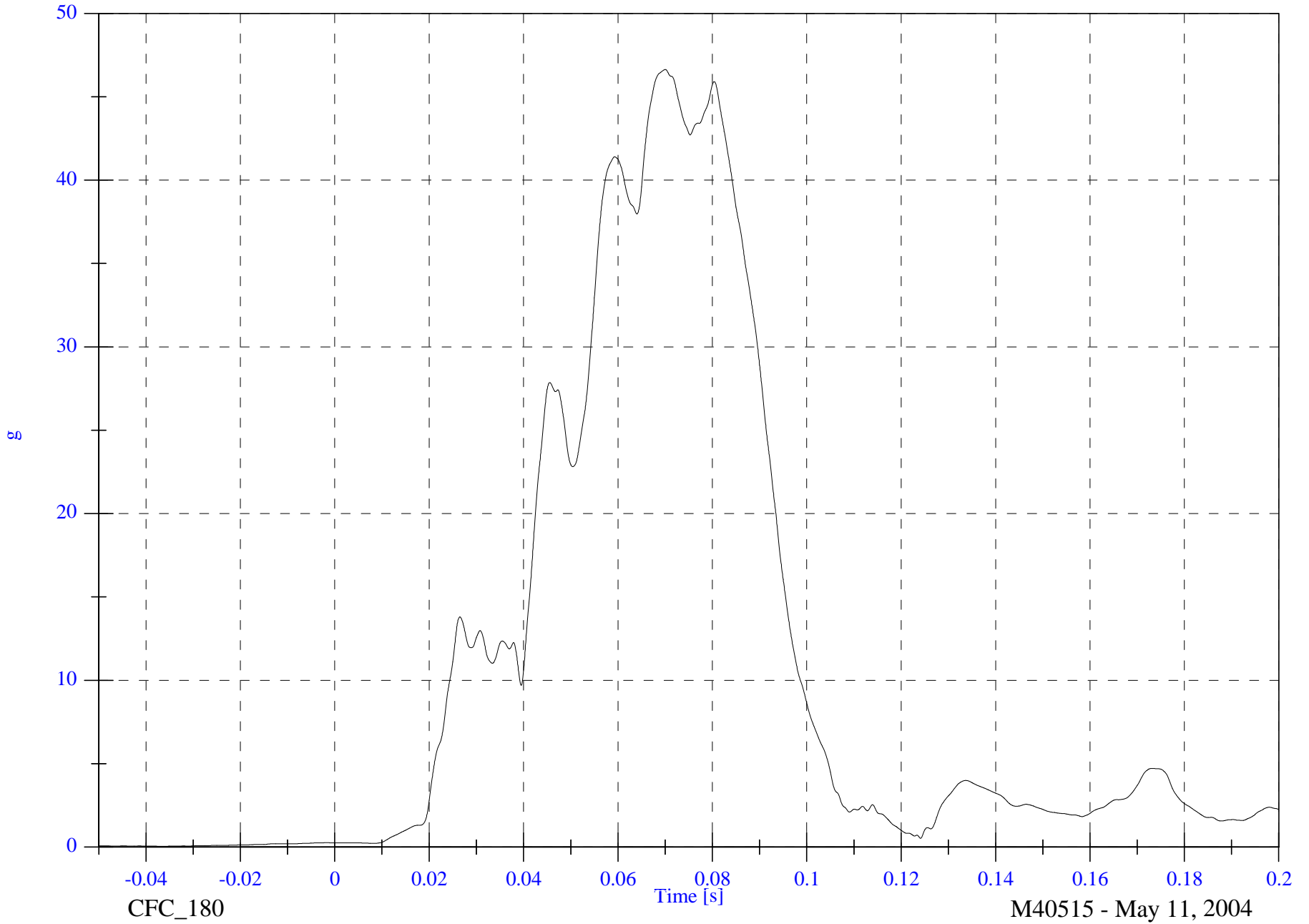
V1P1 Chest Red Resultant

Max: 46.6 [g] at 0.070 [s]

Min: 0.0 [g] at -0.037 [s]

B-37

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

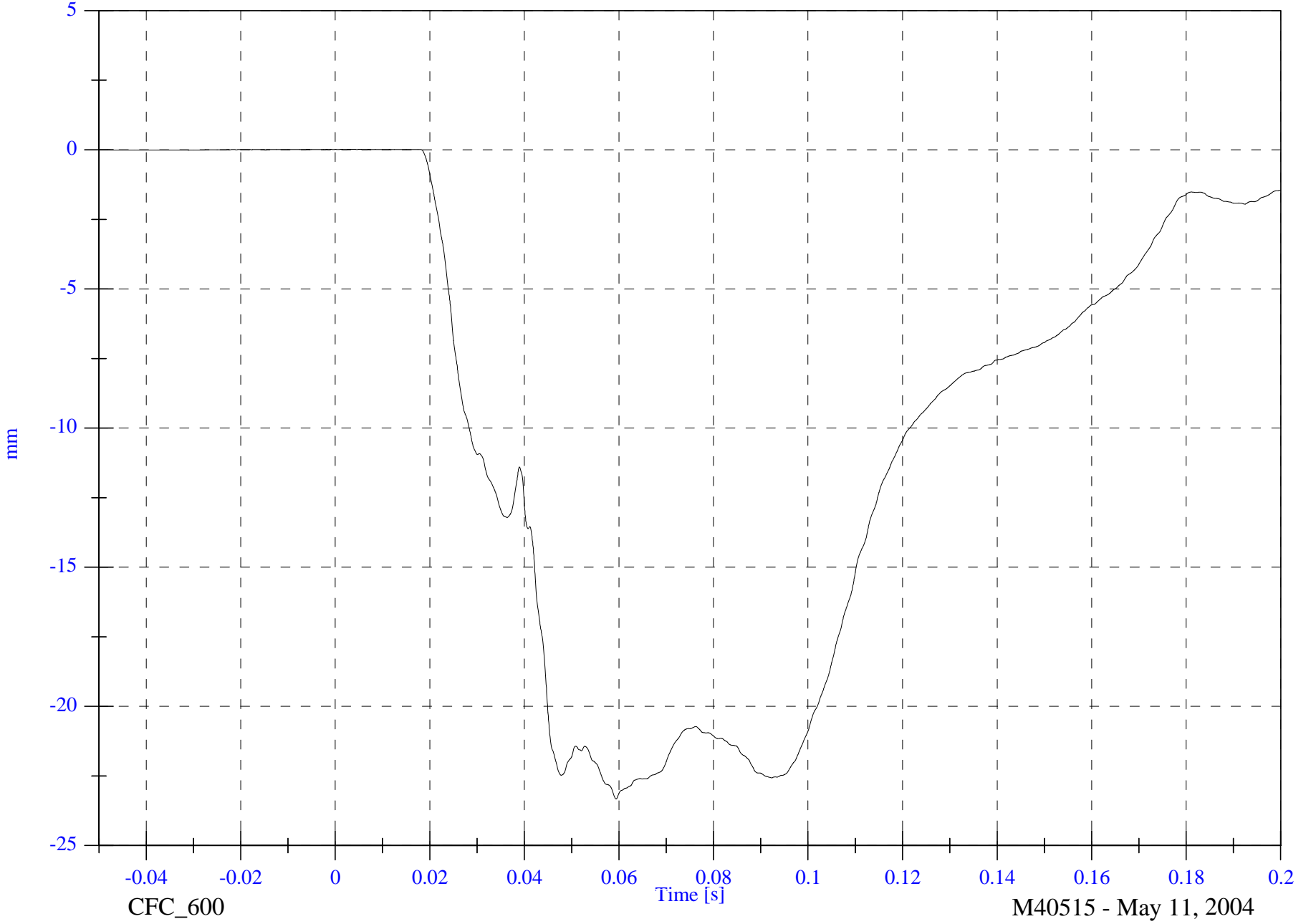
V1P1 Chest Compression

Max: 0.0 [mm] at 0.004 [s]

Min: -23.3 [mm] at 0.059 [s]

B-38

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

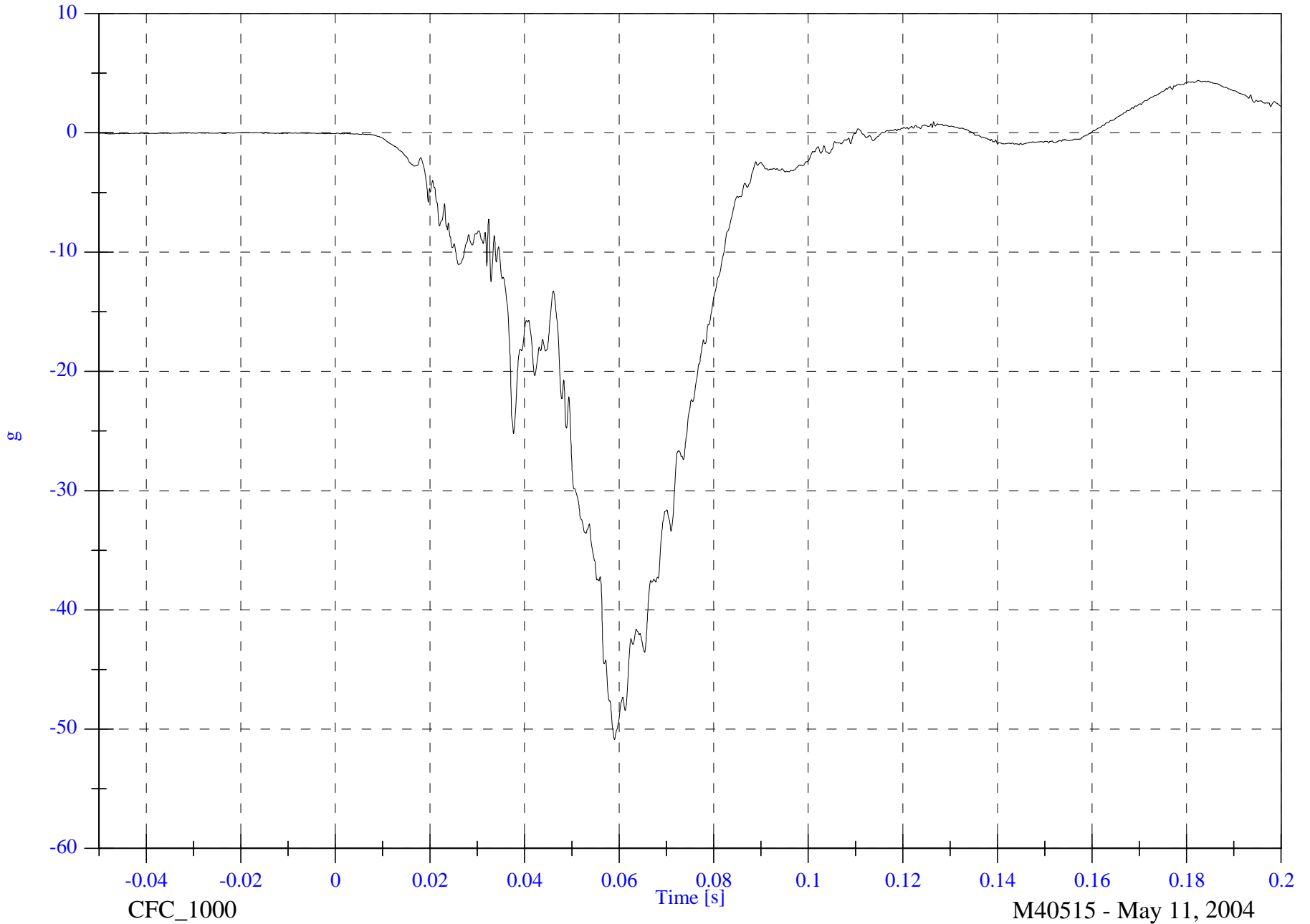
V1P1 Pelvic x

Max: 4.4 [g] at 0.182 [s]

Min: -50.9 [g] at 0.059 [s]

B-39

8642-NCAP-49



CFC_1000

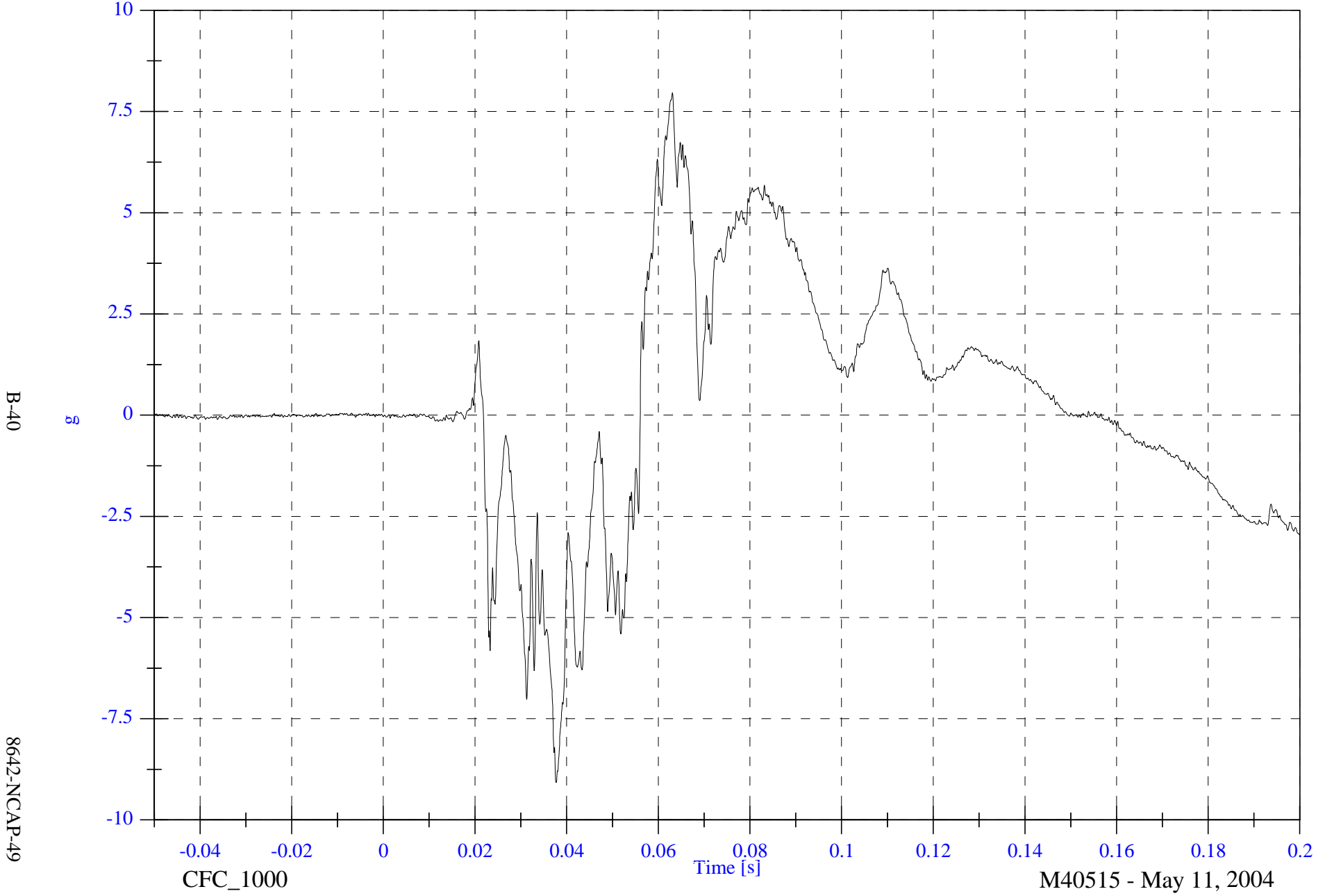
Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Max: 8.0 [g] at 0.063 [s]
Min: -9.1 [g] at 0.038 [s]

V1P1 Pelvic y



B-40

8642-NCAP-49

CFC_1000

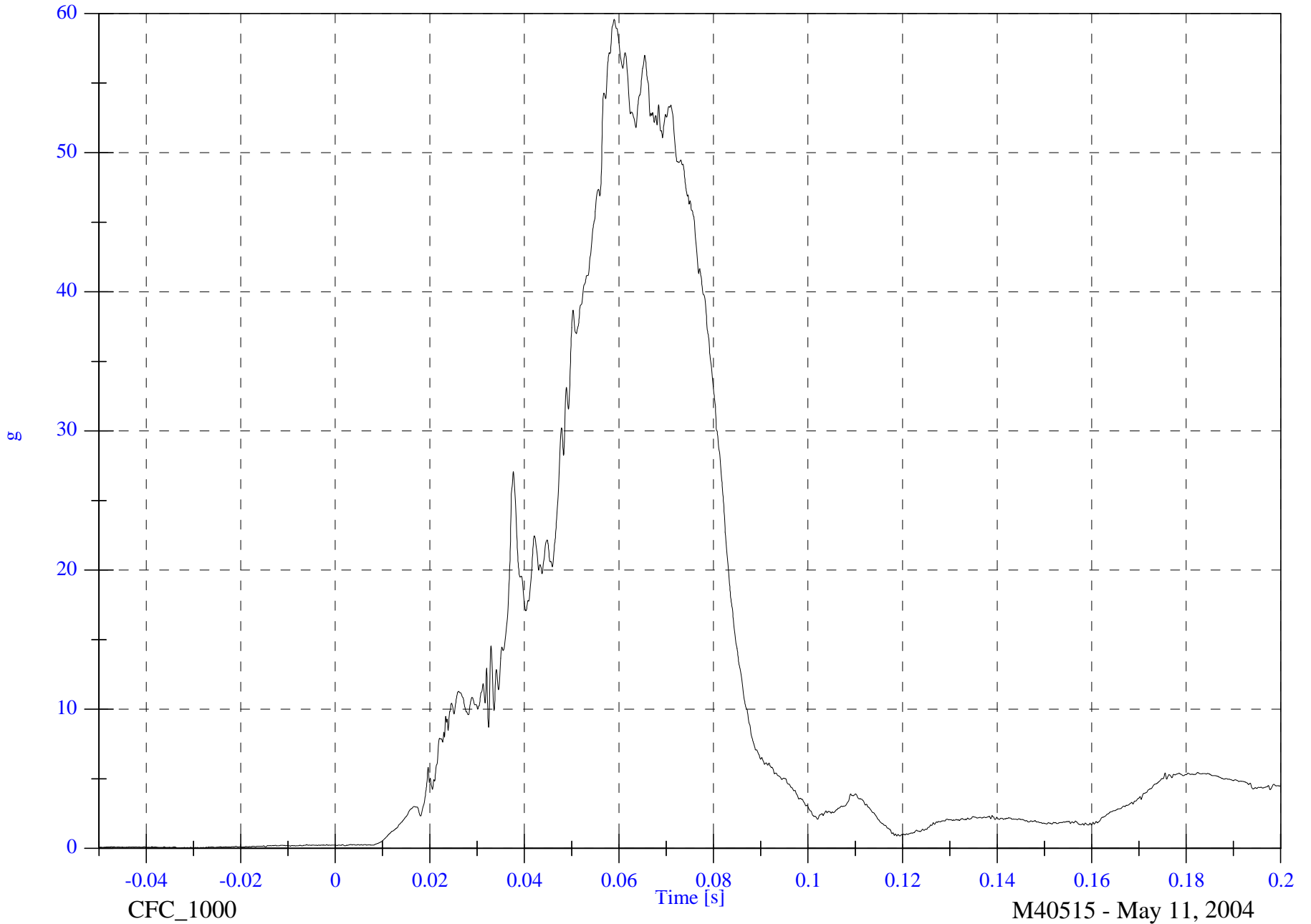
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Pelvic Resultant

Max: 59.6 [g] at 0.059 [s]

Min: 0.0 [g] at -0.031 [s]



B-42

8642-NCAP-49

CFC_1000

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

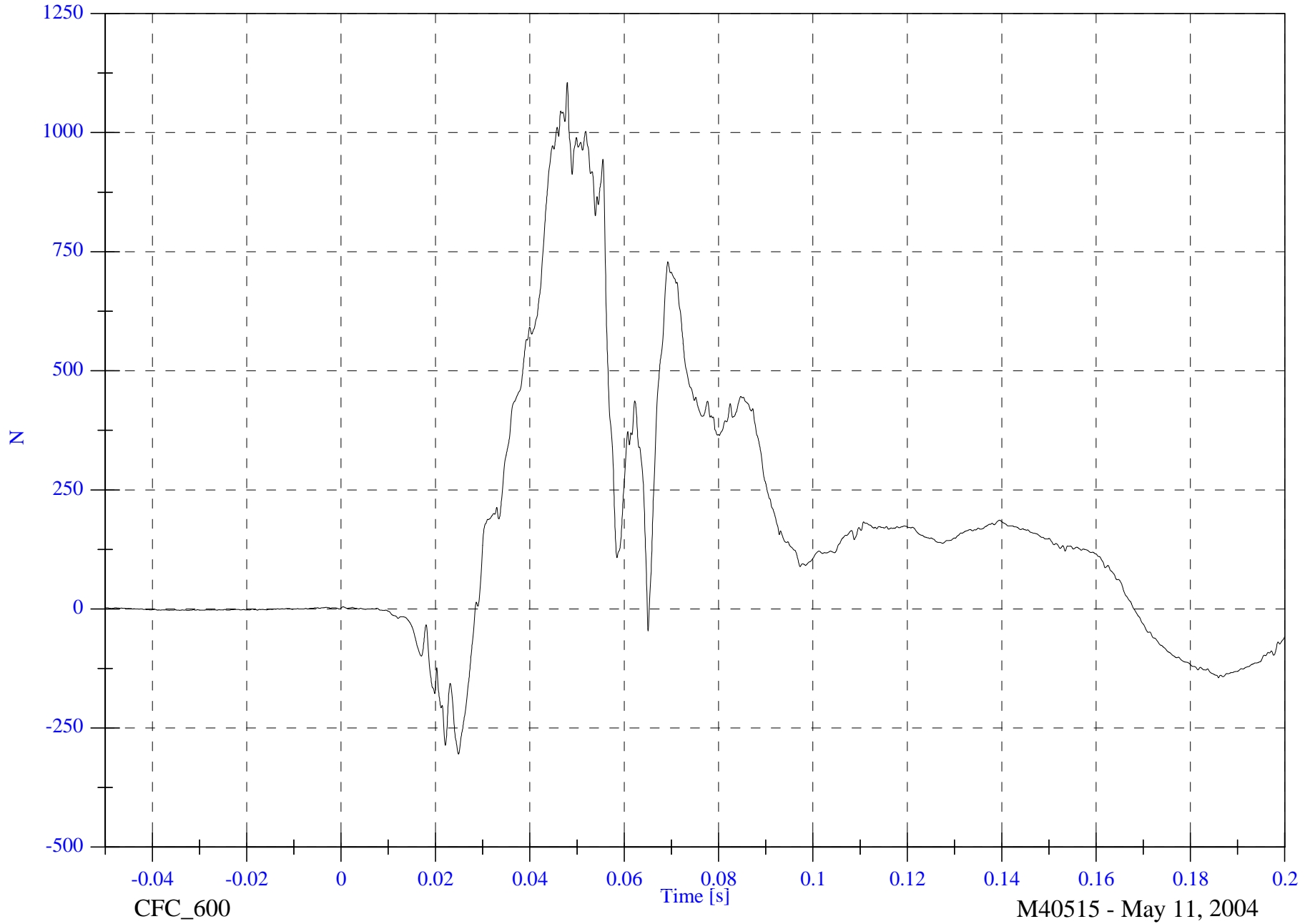
V1P1 Left Femur

Max: 1104.9 [N] at 0.048 [s]

Min: -304.5 [N] at 0.025 [s]

B-43

8642-NCAP-49



CFC_600

Time [s]

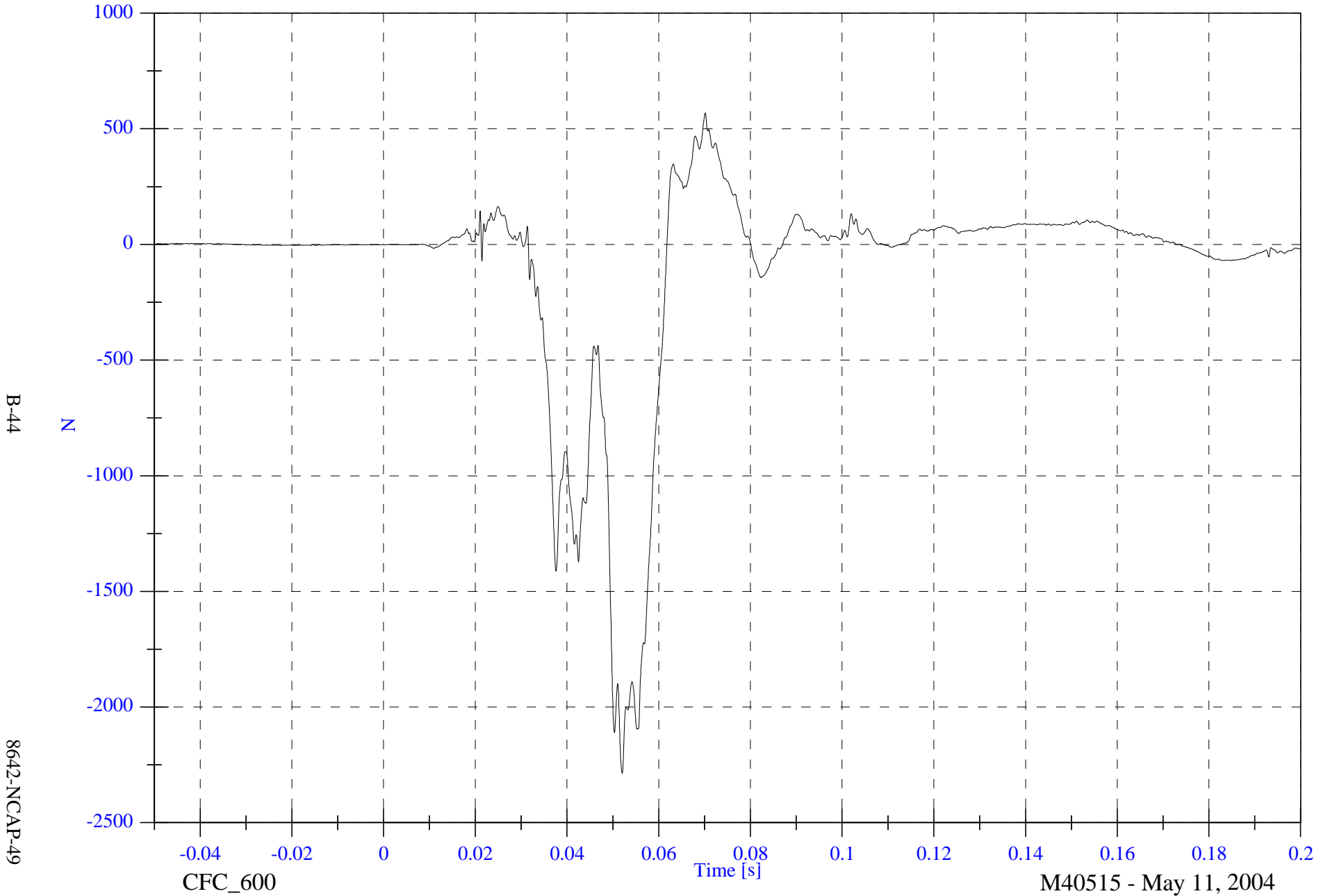
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Right Femur

Max: 568.5 [N] at 0.070 [s]

Min: -2286.4 [N] at 0.052 [s]



2004 NCAP Test 13 - 2004.5 Kia Spectra

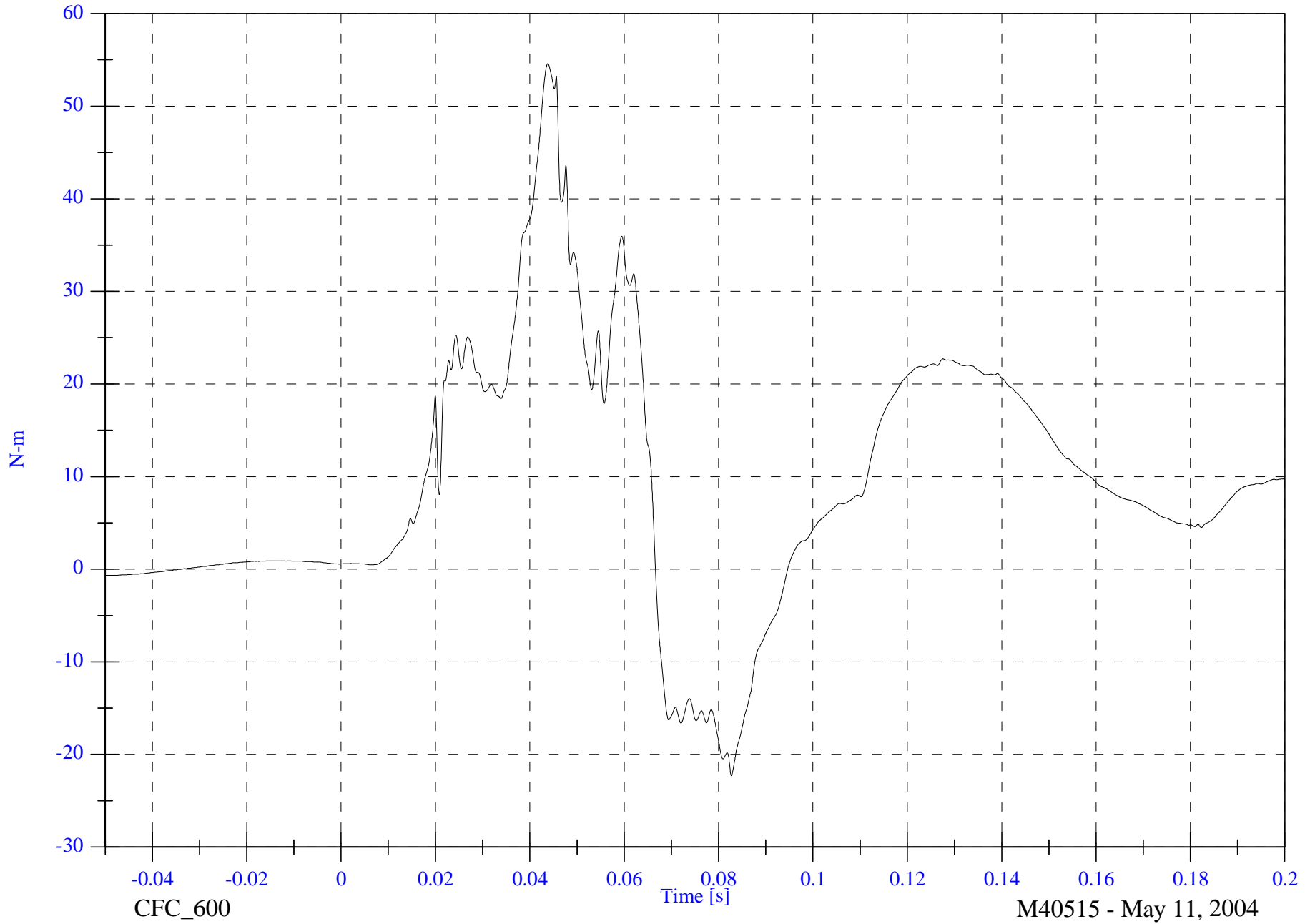
V1P1 Left Upper Tibia Mx

Max: 54.6 [N-m] at 0.044 [s]

Min: -22.3 [N-m] at 0.083 [s]

B-45

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

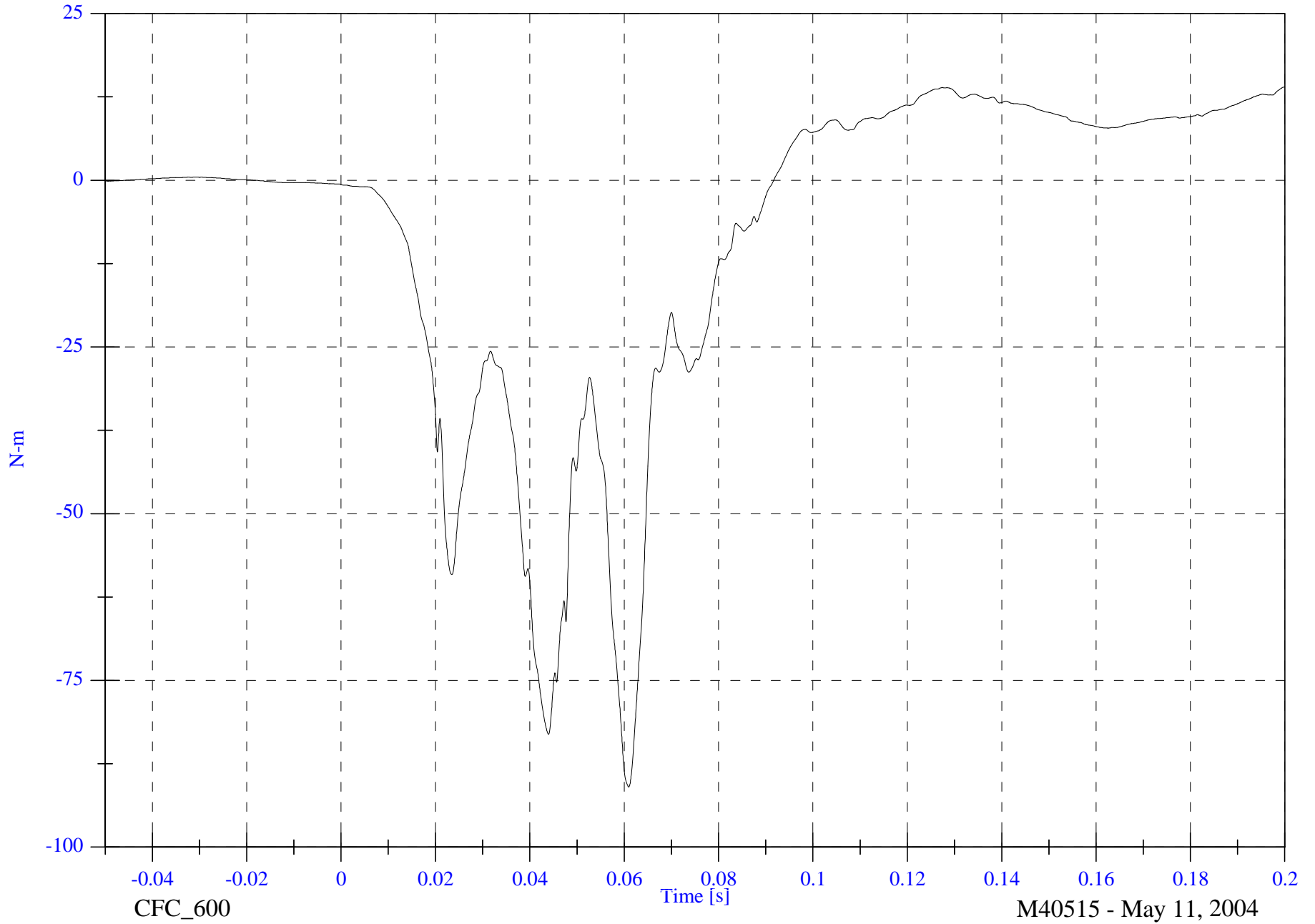
V1P1 Left Upper Tibia My

Max: 14.0 [N-m] at 0.200 [s]

Min: -91.0 [N-m] at 0.061 [s]

B-46

8642-NCAP-49



M40515 - May 11, 2004

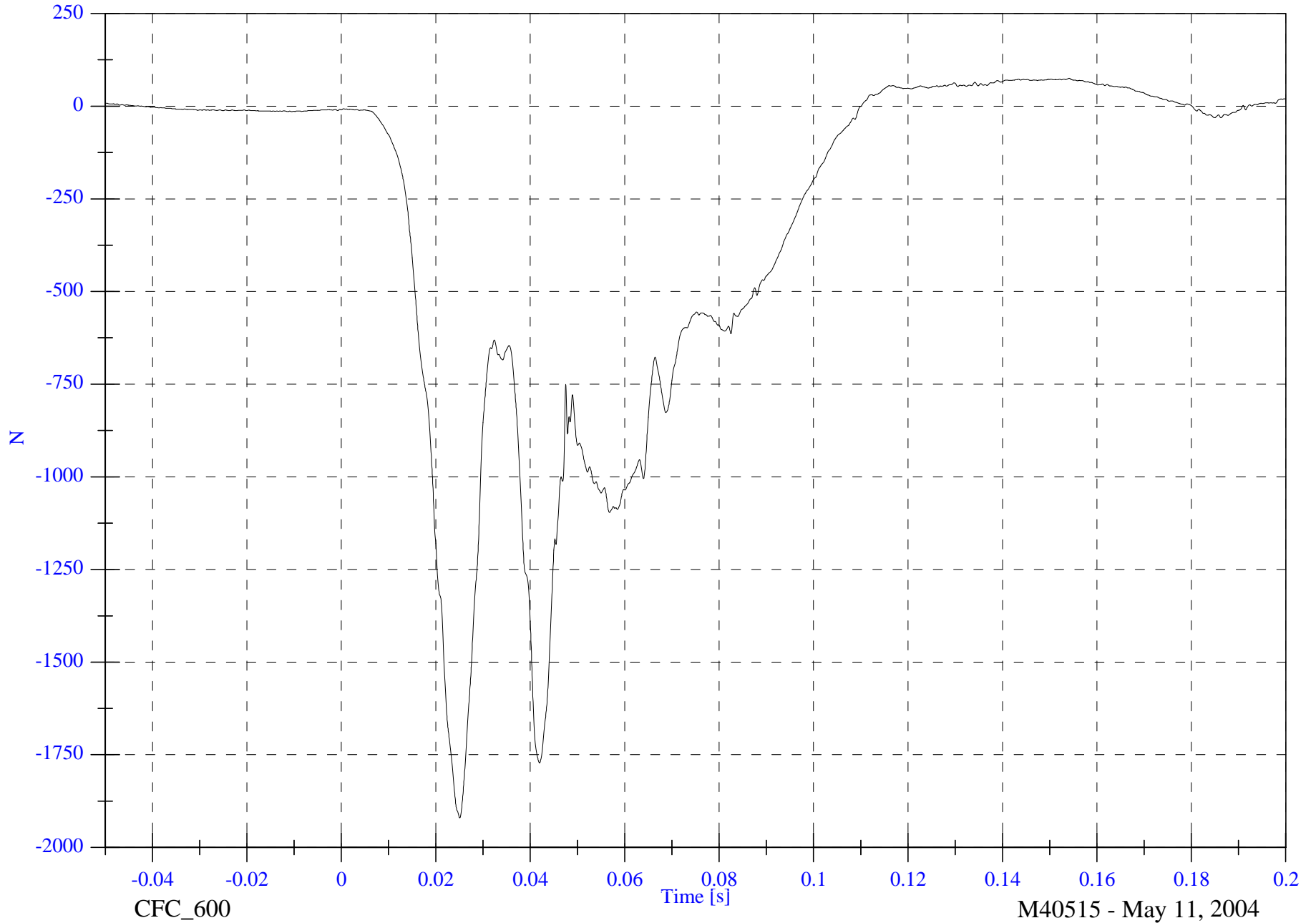
2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Left Lower Tibia Fz

Max: 75.2 [N] at 0.154 [s]
Min: -1920.3 [N] at 0.025 [s]

B-47

8642-NCAP-49



M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

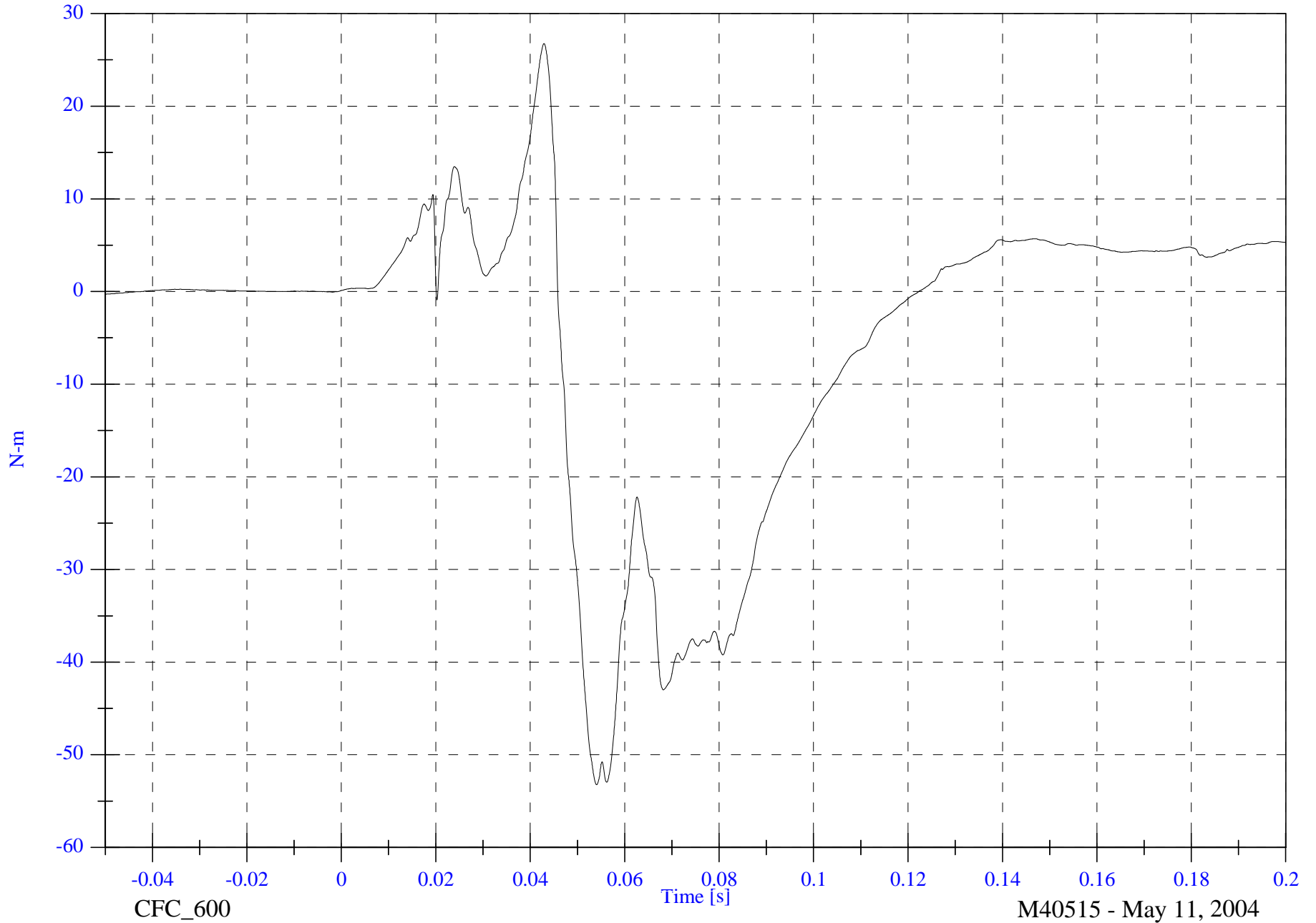
V1P1 Left Lower Tibia Mx

Max: 26.8 [N-m] at 0.043 [s]

Min: -53.2 [N-m] at 0.054 [s]

B-48

8642-NCAP-49



CFC_600

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

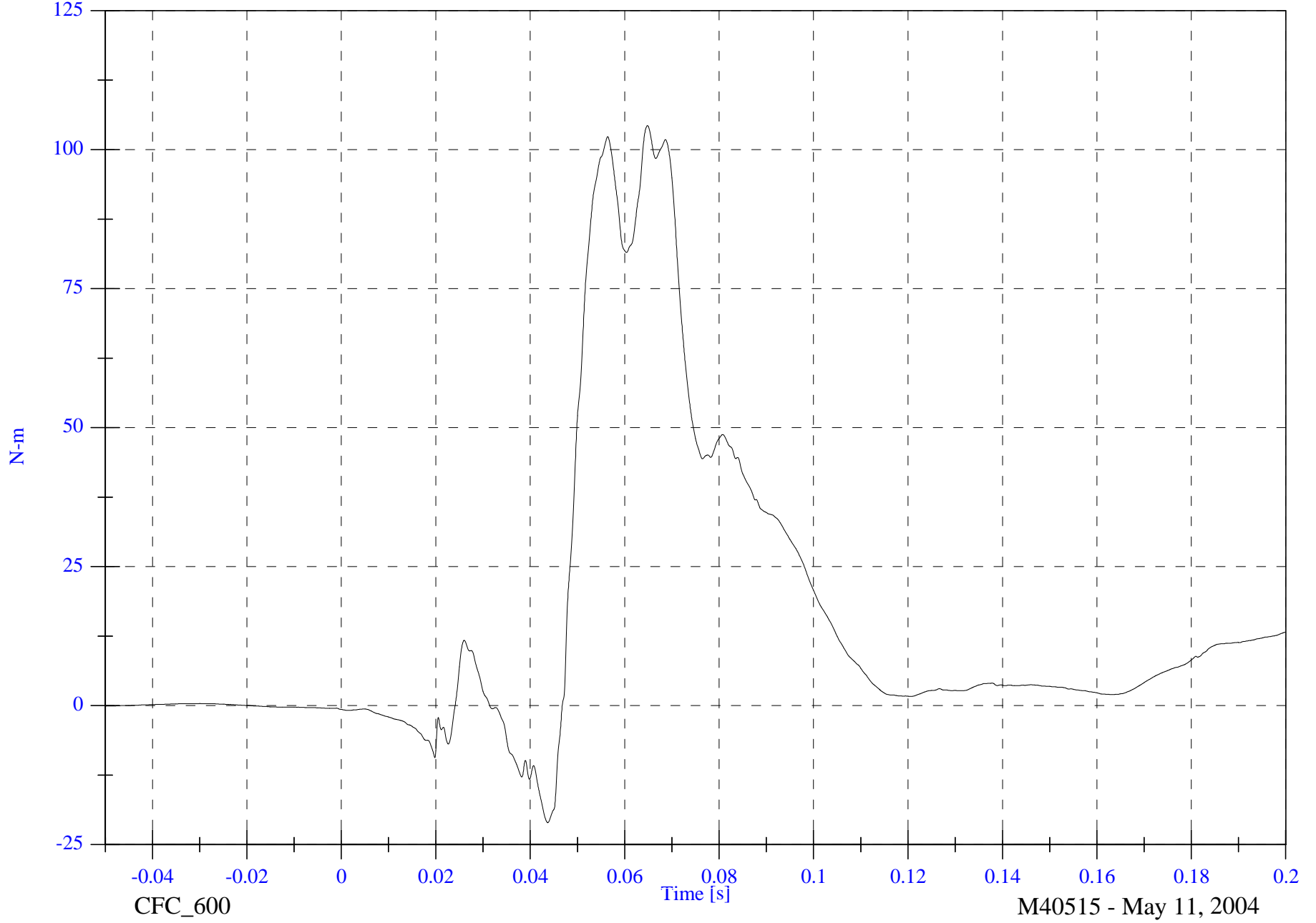
V1P1 Left Lower Tibia My

Max: 104.3 [N-m] at 0.065 [s]

Min: -21.1 [N-m] at 0.044 [s]

B-49

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

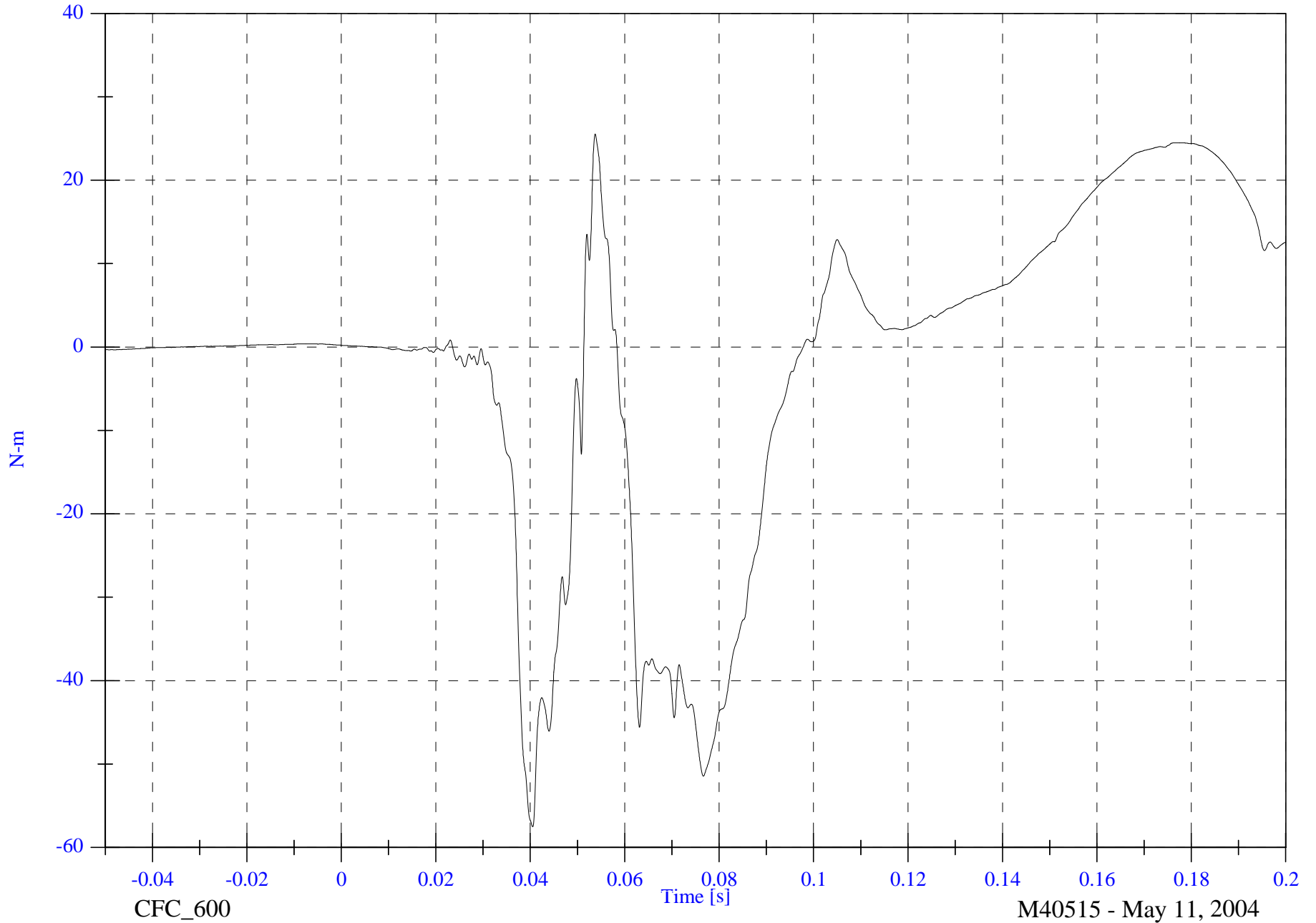
V1P1 Right Upper Tibia Mx

Max: 25.6 [N-m] at 0.054 [s]

Min: -57.5 [N-m] at 0.040 [s]

B-50

8642-NCAP-49



M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

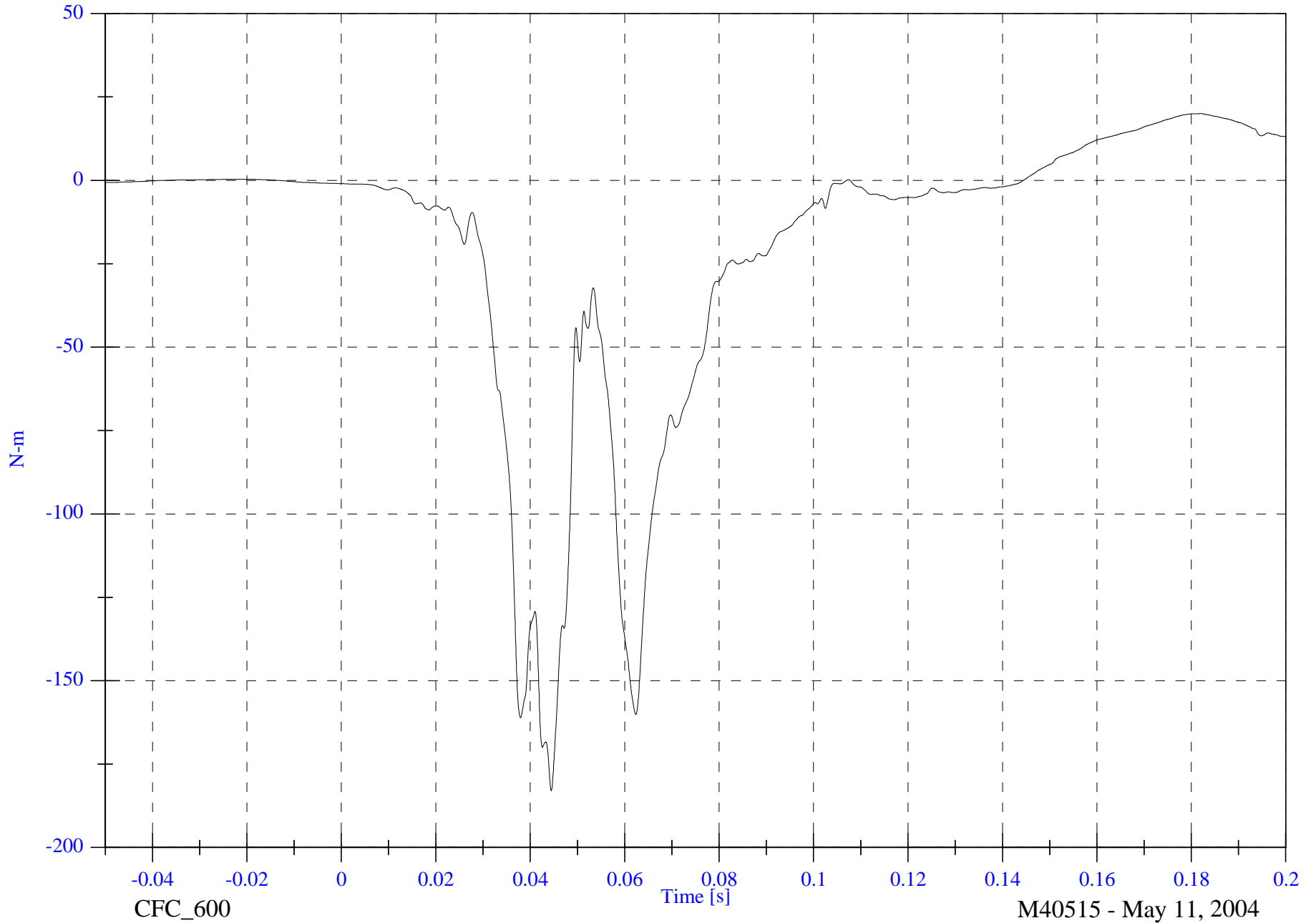
V1P1 Right Upper Tibia My

Max: 20.0 [N-m] at 0.182 [s]

Min: -183.0 [N-m] at 0.044 [s]

B-51

8642-NCAP-49



CFC_600

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

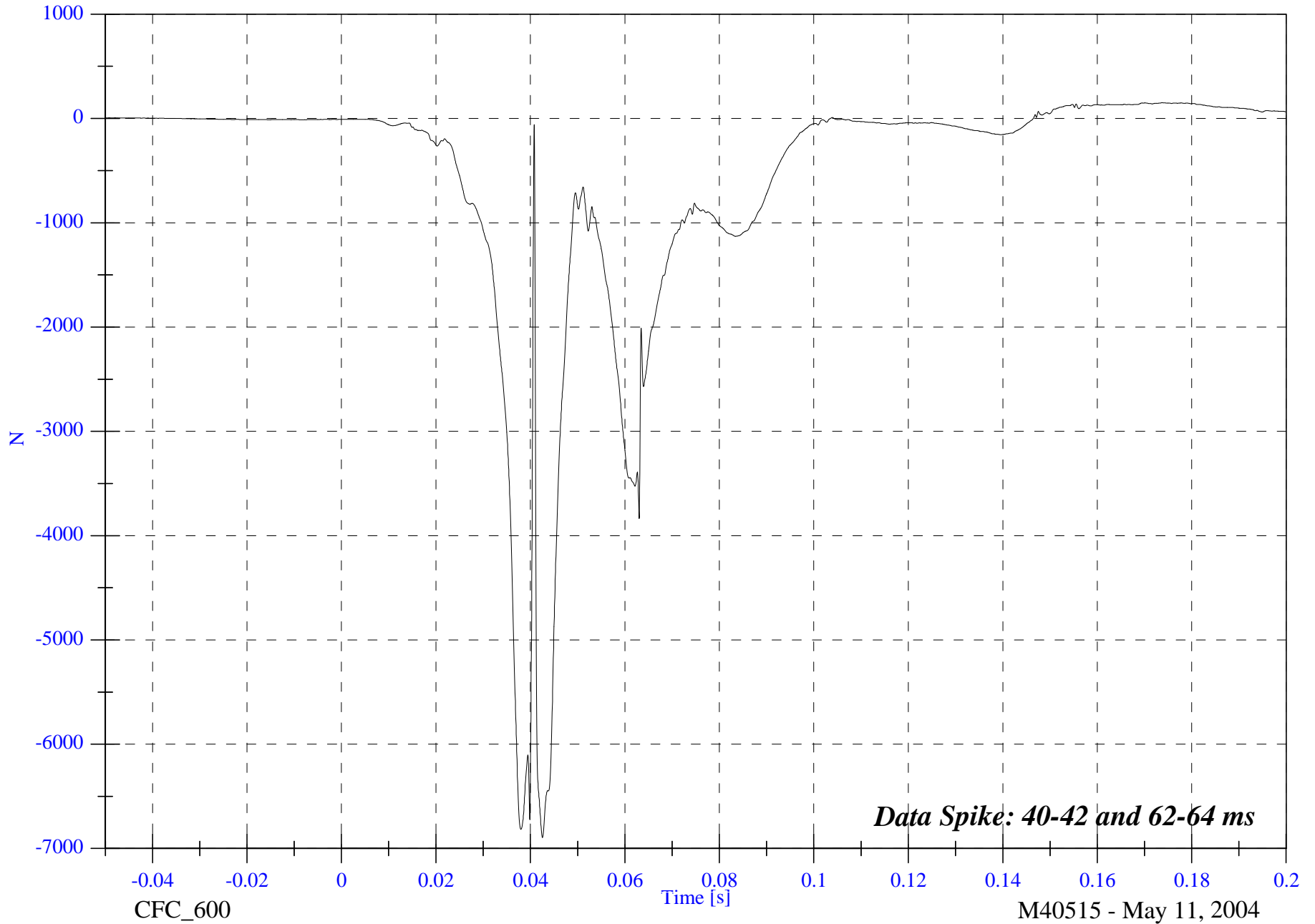
VIP1 Right Lower Tibia Fz

Max: 151.8 [N] at 0.174 [s]

Min: -6896.0 [N] at 0.043 [s]

B-52

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

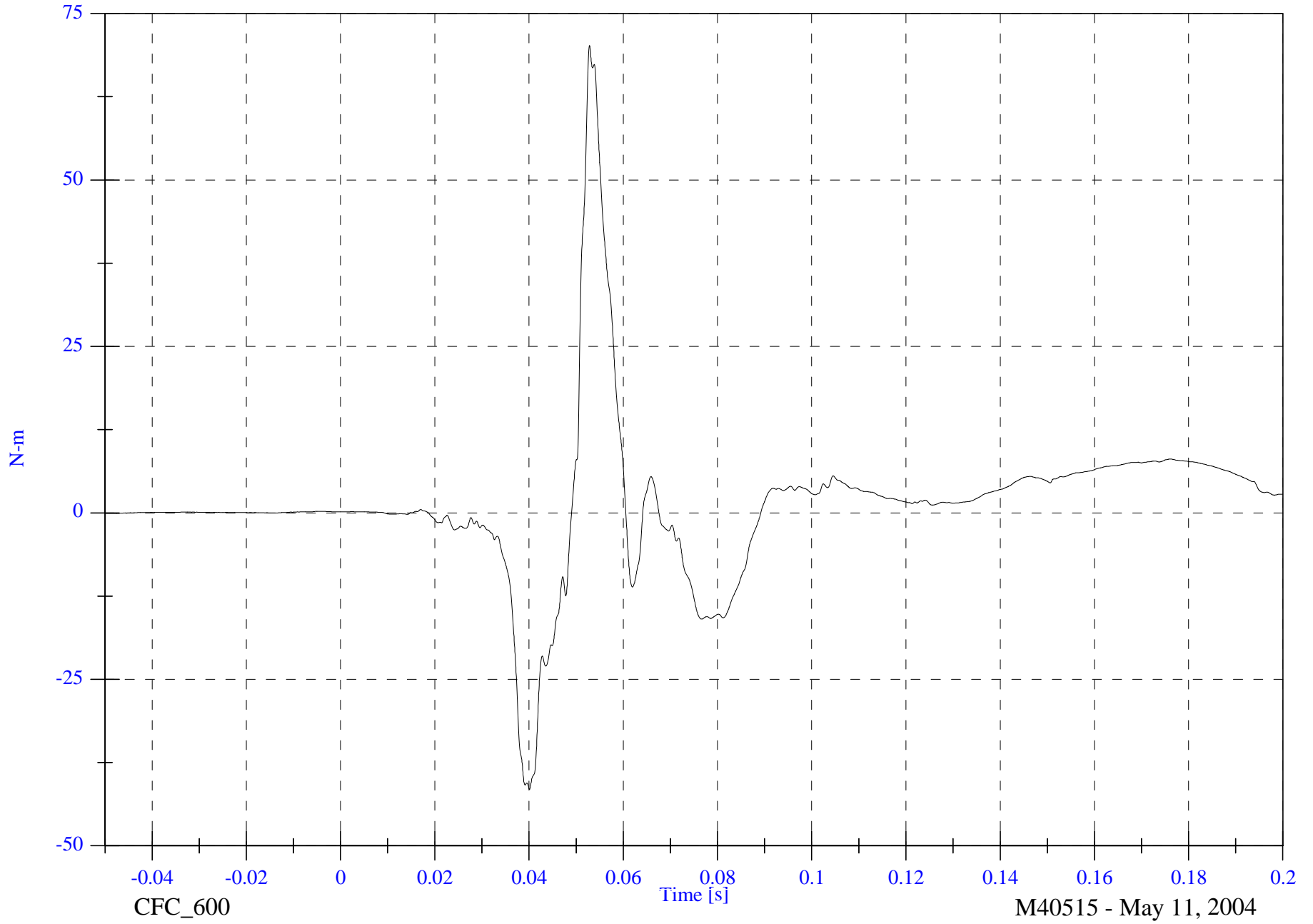
V1P1 Right Lower Tibia Mx

Max: 70.2 [N-m] at 0.053 [s]

Min: -41.6 [N-m] at 0.040 [s]

B-53

8642-NCAP-49



CFC_600

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

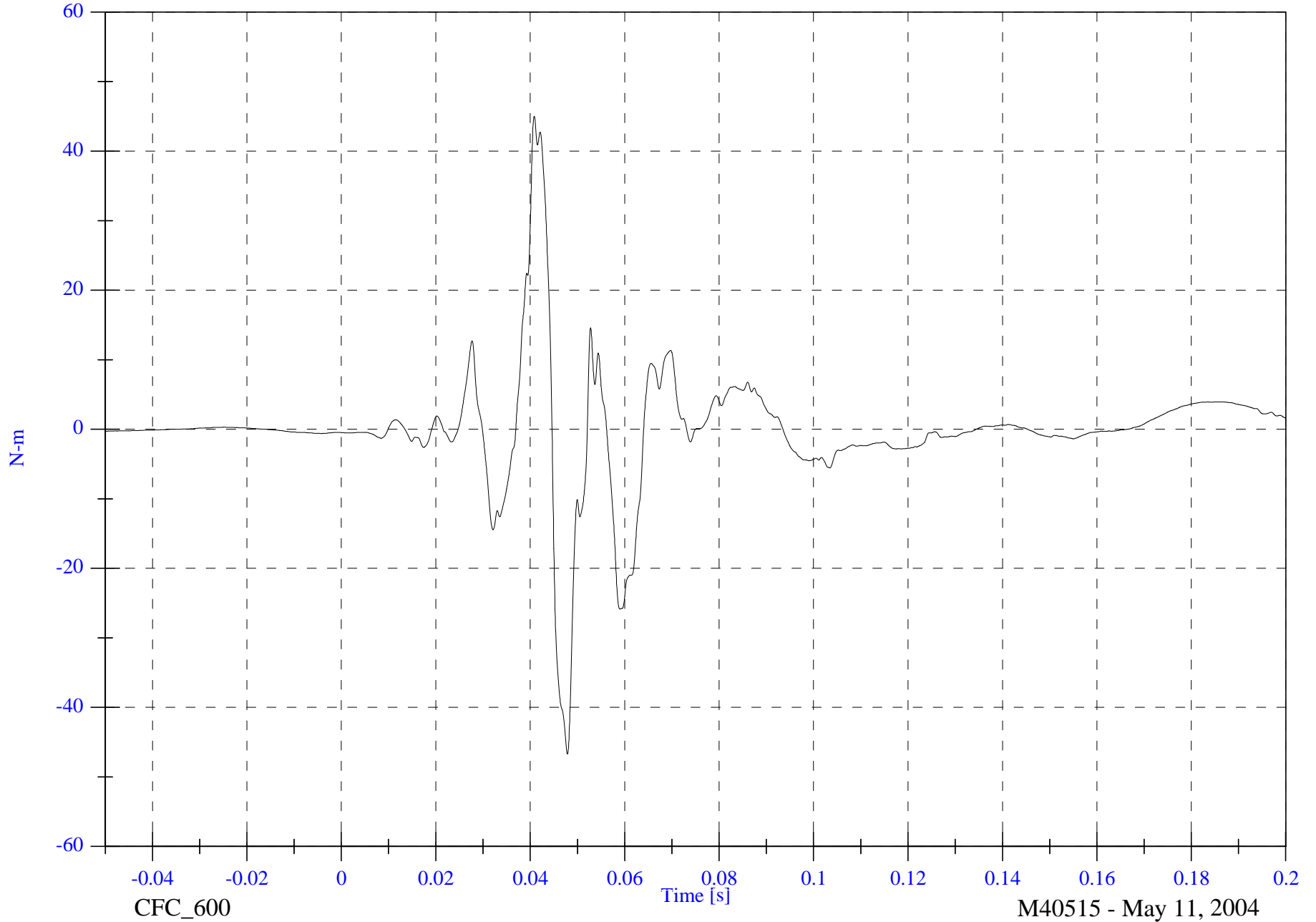
Max: 45.0 [N-m] at 0.041 [s]

V1P1 Right Lower Tibia My

Min: -46.7 [N-m] at 0.048 [s]

B-54

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

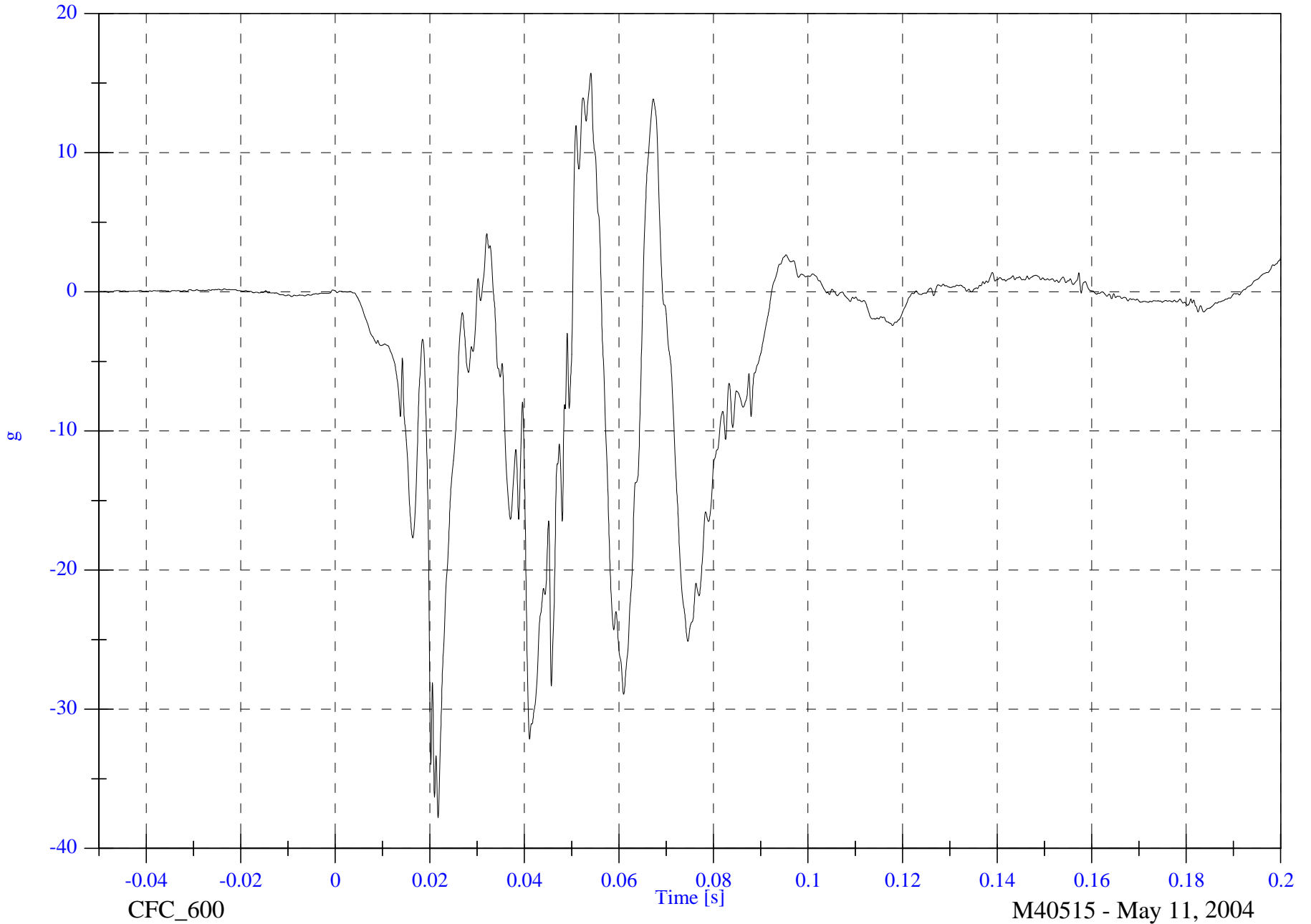
V1P1 Left Foot Aft Ax

Max: 15.7 [g] at 0.054 [s]

Min: -37.8 [g] at 0.022 [s]

B-55

8642-NCAP-49



CFC_600

Time [s]

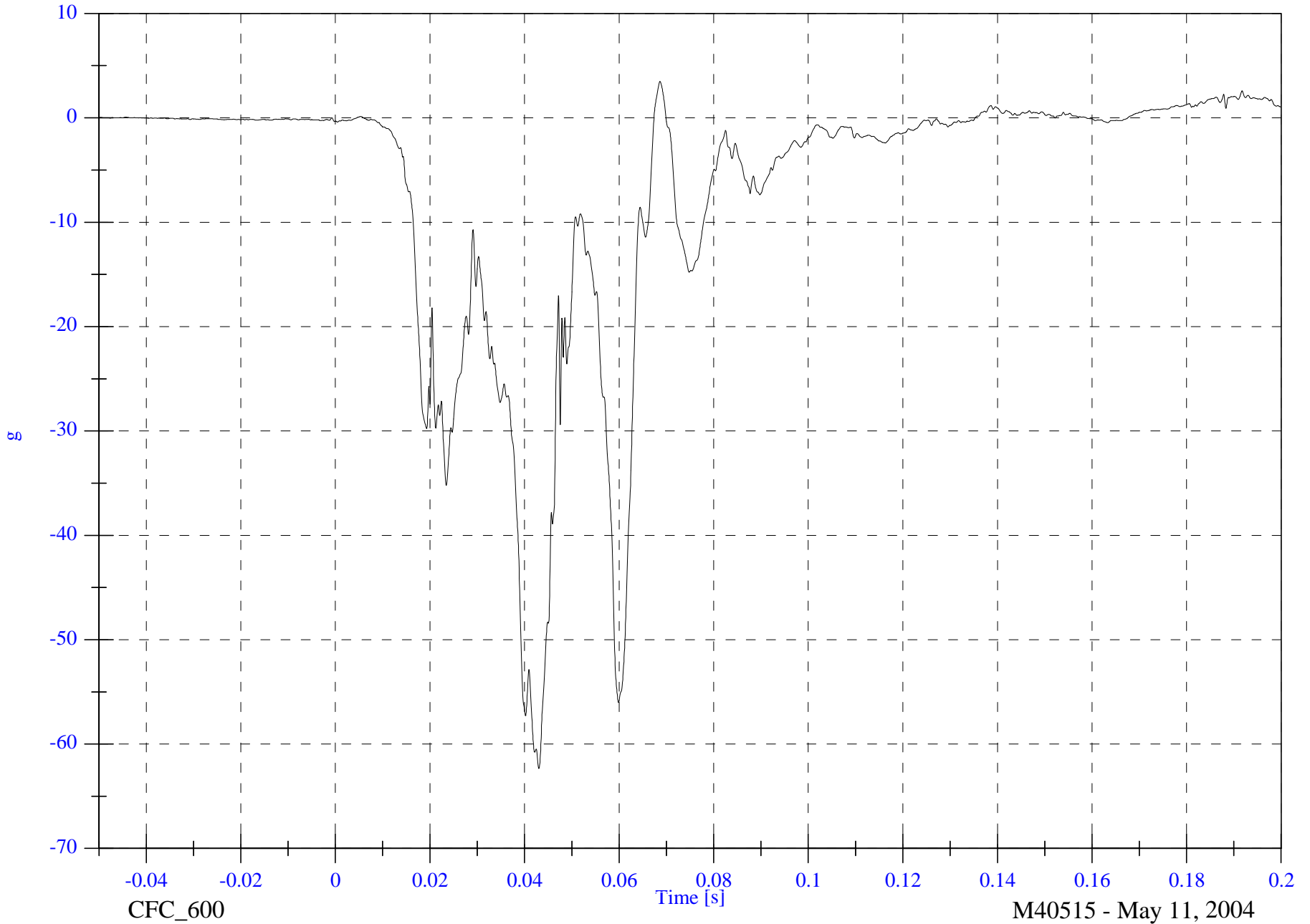
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

VIP1 Left Foot Aft Az

Max: 3.5 [g] at 0.069 [s]

Min: -62.3 [g] at 0.043 [s]



B-56

8642-NCAP-49

CFC_600

Time [s]

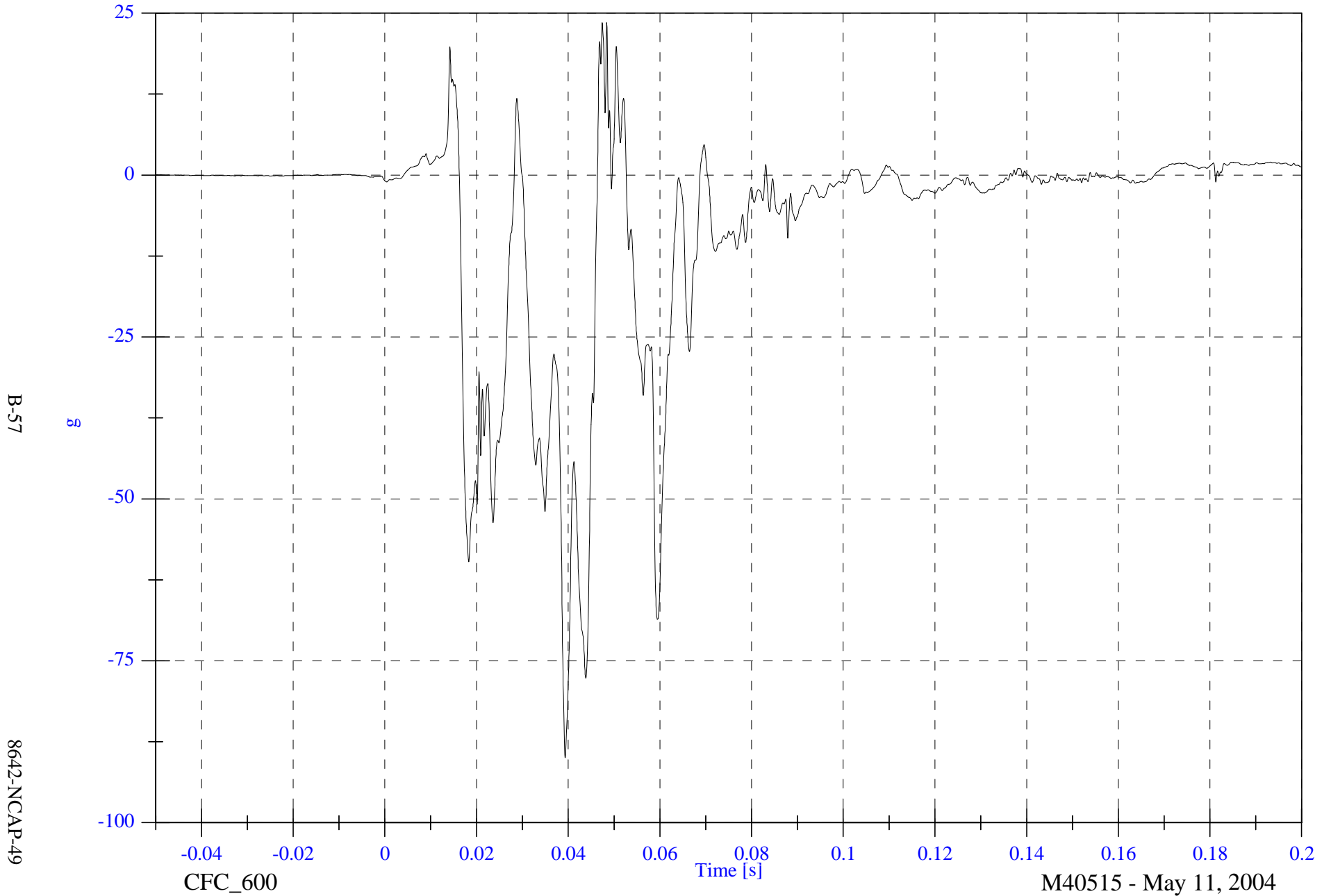
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Left Foot Fore Az

Max: 23.5 [g] at 0.048 [s]

Min: -90.0 [g] at 0.039 [s]



2004 NCAP Test 13 - 2004.5 Kia Spectra

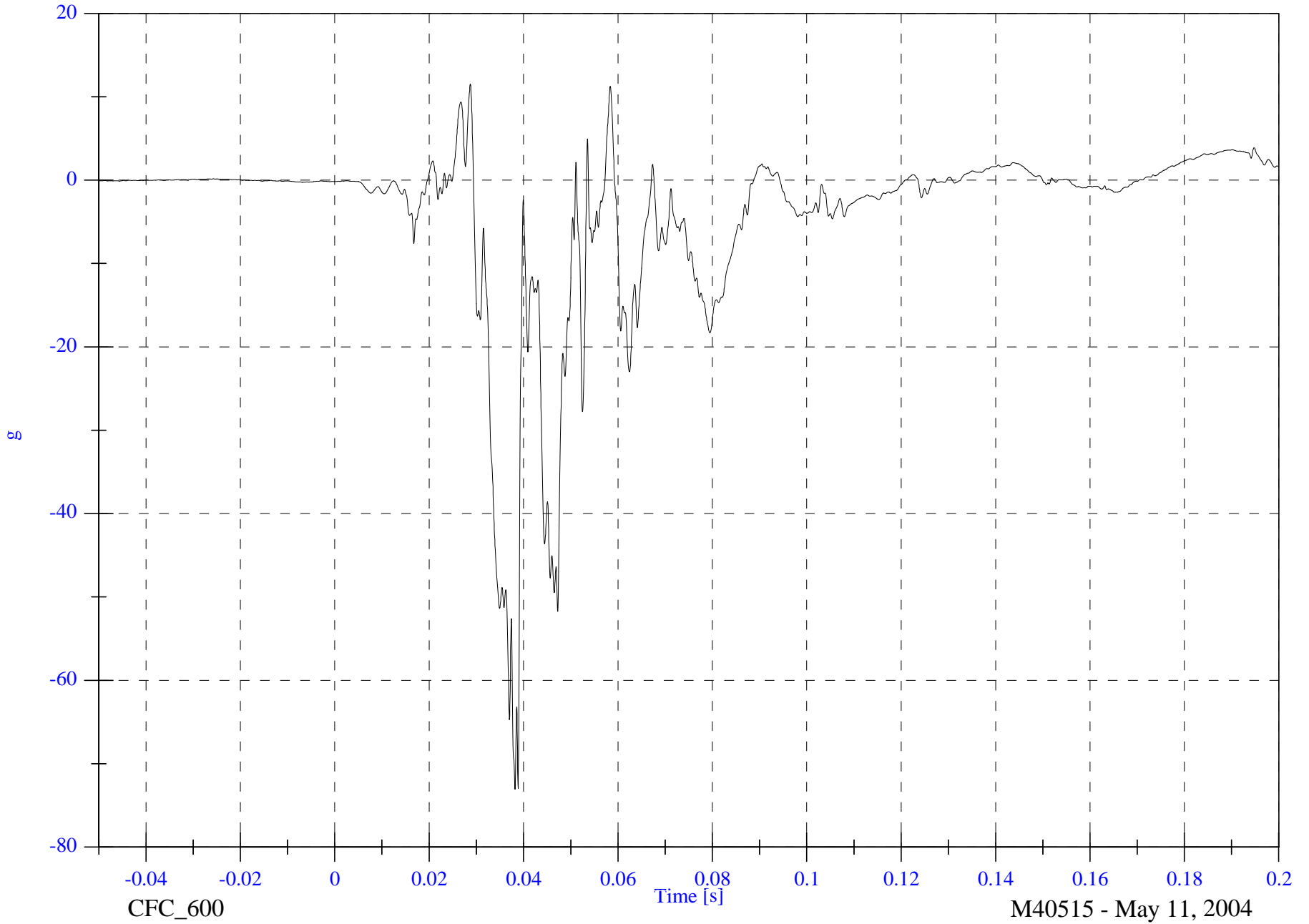
V1P1 Right Foot Aft x

Max: 11.5 [g] at 0.029 [s]

Min: -73.1 [g] at 0.038 [s]

B-58

8642-NCAP-49



CFC_600

M40515 - May 11, 2004

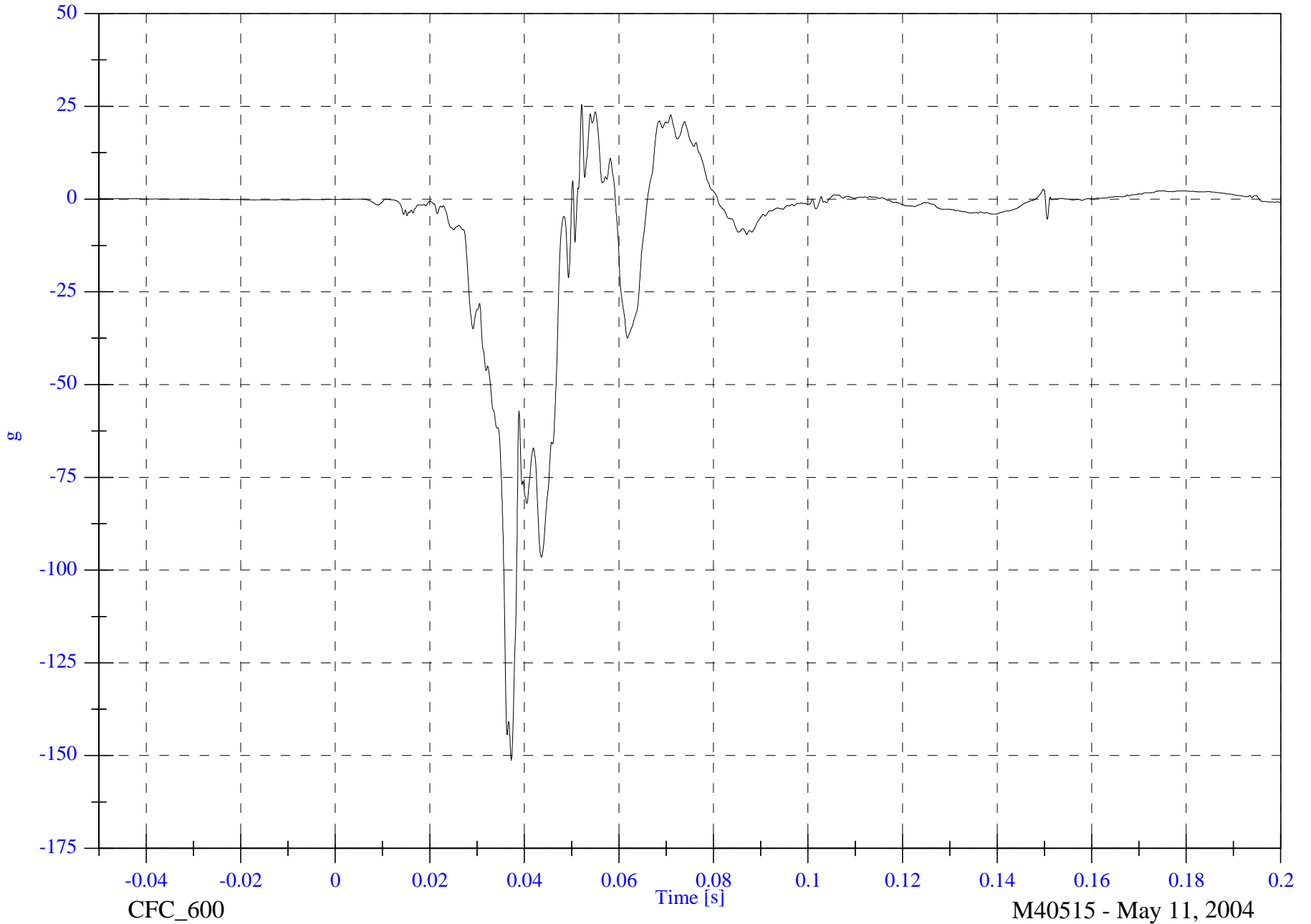
2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P1 Right Foot Aft z

Max: 25.4 [g] at 0.052 [s]
Min: -151.3 [g] at 0.037 [s]

B-59

8642-NCAP-49



CFC_600

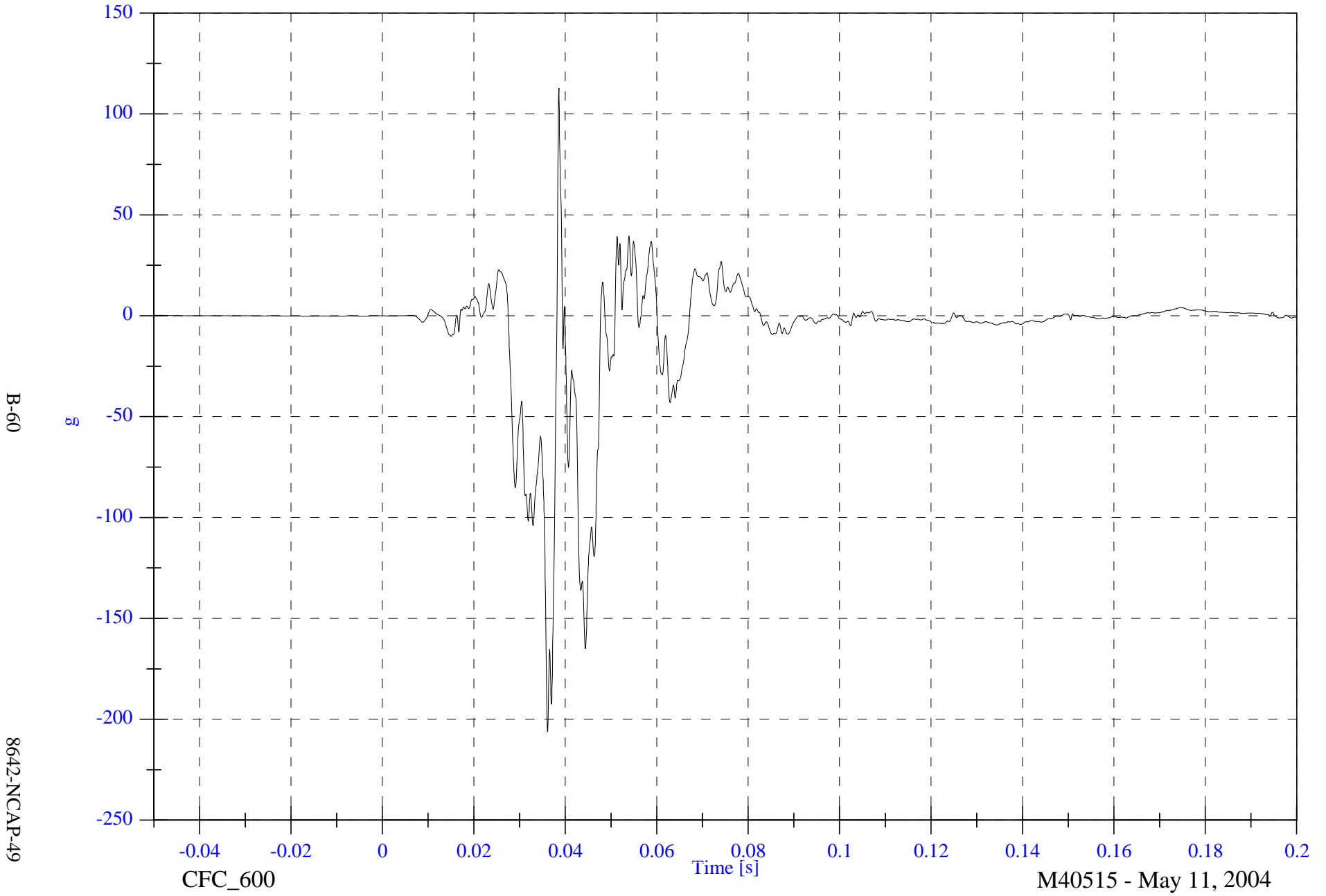
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Max: 112.8 [g] at 0.039 [s]

Min: -206.1 [g] at 0.036 [s]

V1P1 Right Foot Fore z

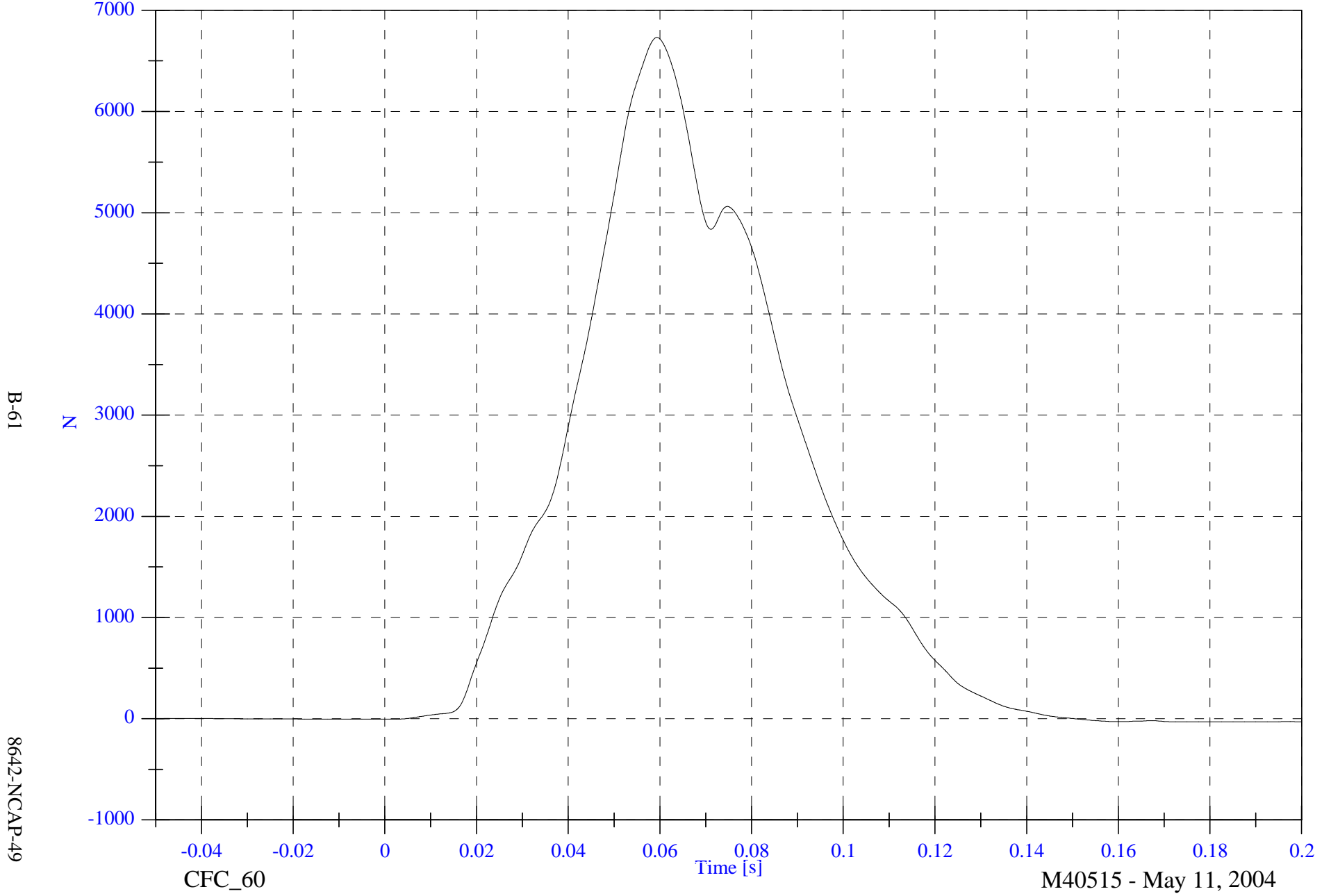


2004 NCAP Test 13 - 2004.5 Kia Spectra

Max: 6731.2 [N] at 0.059 [s]

Min: -32.1 [N] at 0.190 [s]

V1 Driver Lap Belt



B-61

8642-NCAP-49

CFC_60

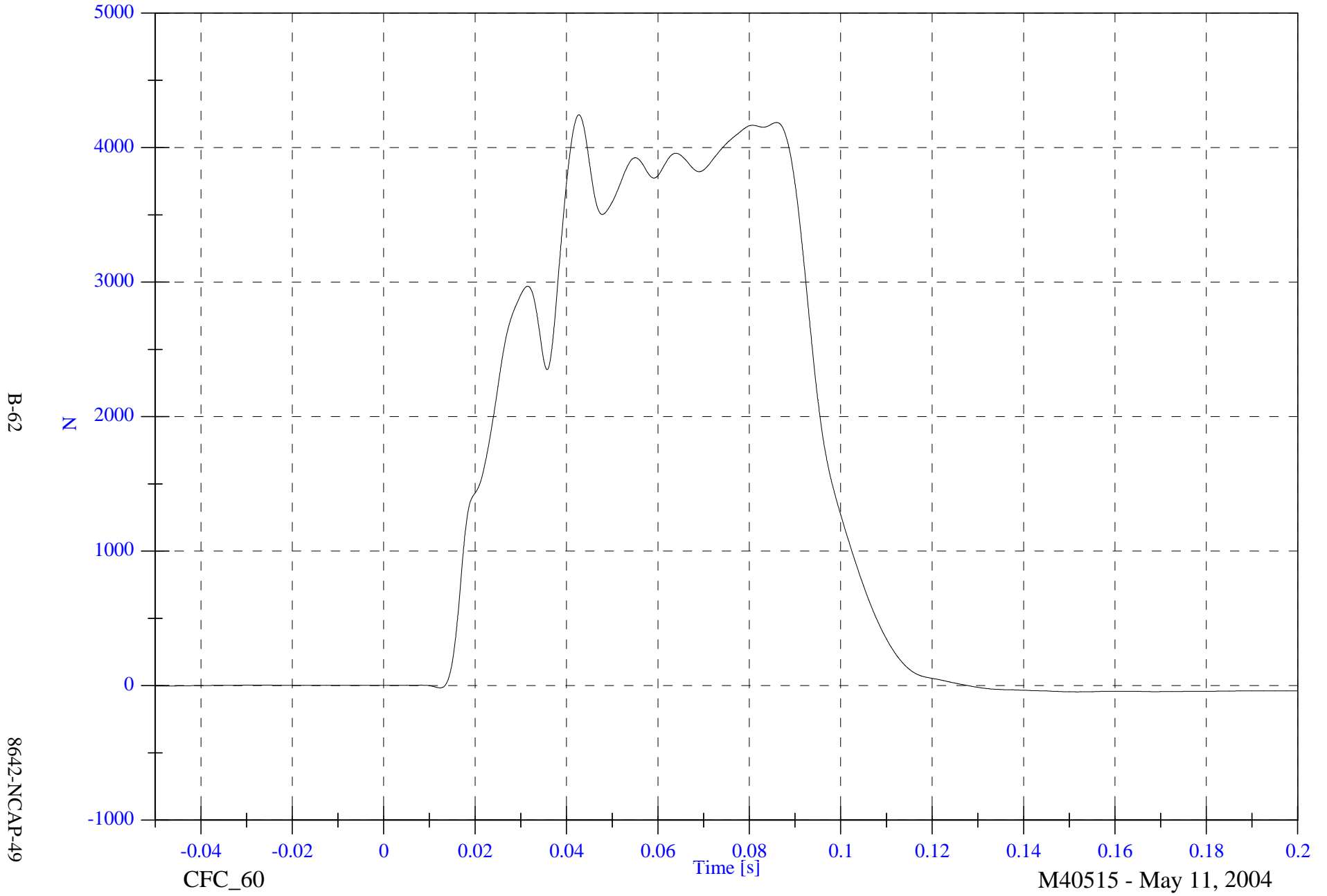
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Max: 4244.0 [N] at 0.043 [s]

V1 Driver Torso Belt

Min: -46.5 [N] at 0.152 [s]



B-62

8642-NCAP-49

CFC_60

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

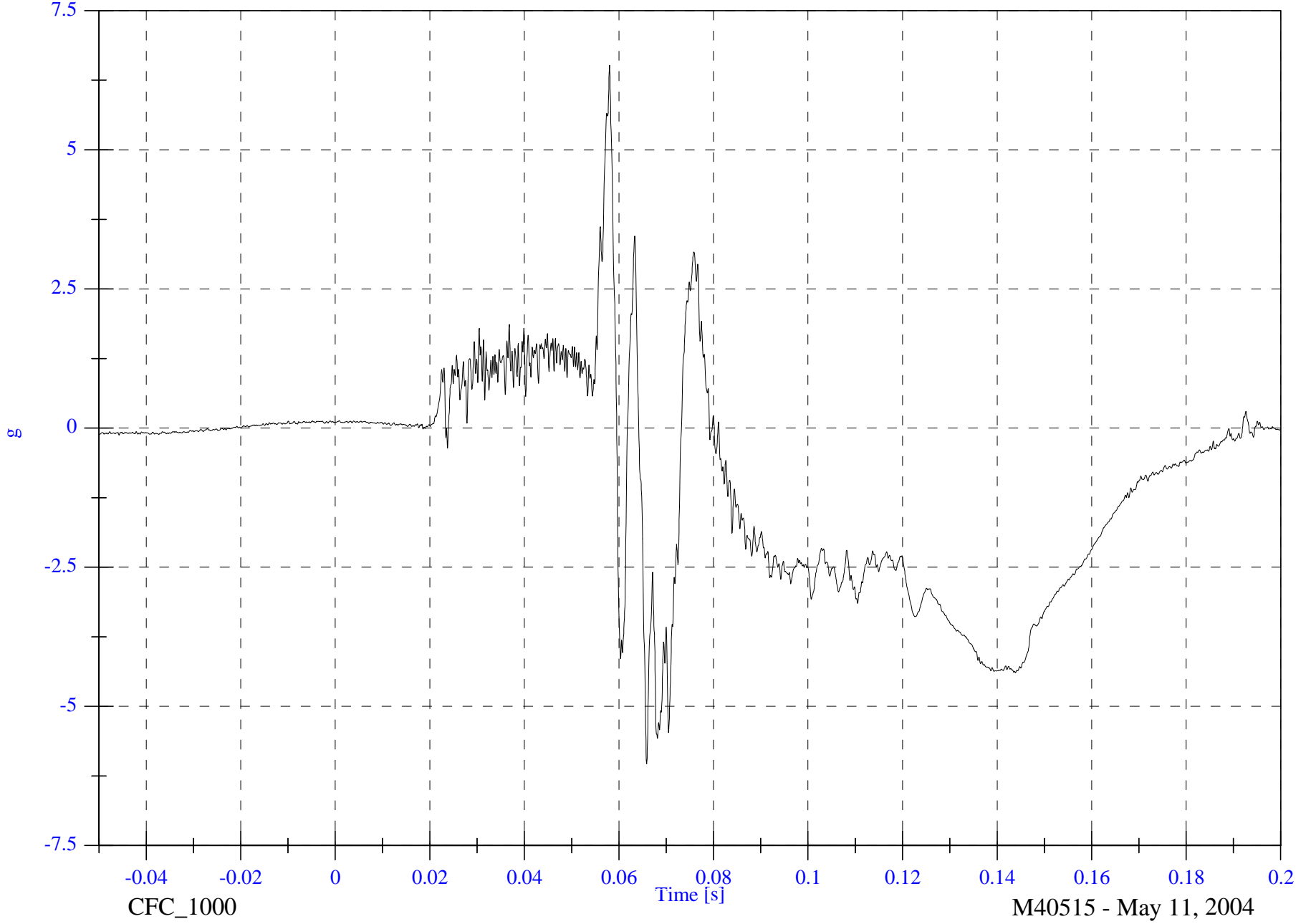
V1P2 Head 9 Array X Arm y

Max: 6.5 [g] at 0.058 [s]

Min: -6.0 [g] at 0.066 [s]

B-63

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

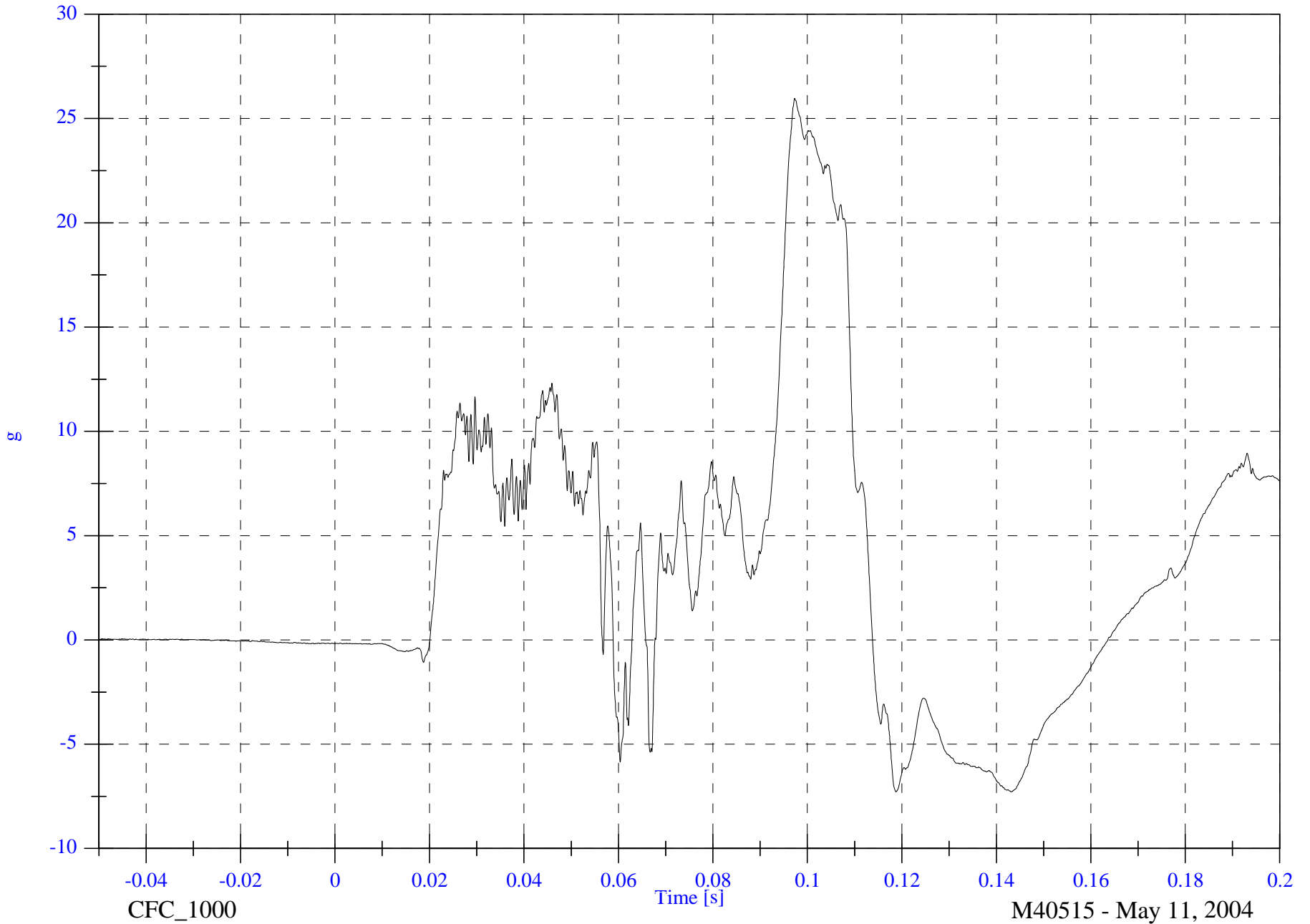
V1P2 Head 9 Array X Arm z

Max: 26.0 [g] at 0.097 [s]

Min: -7.3 [g] at 0.143 [s]

B-64

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

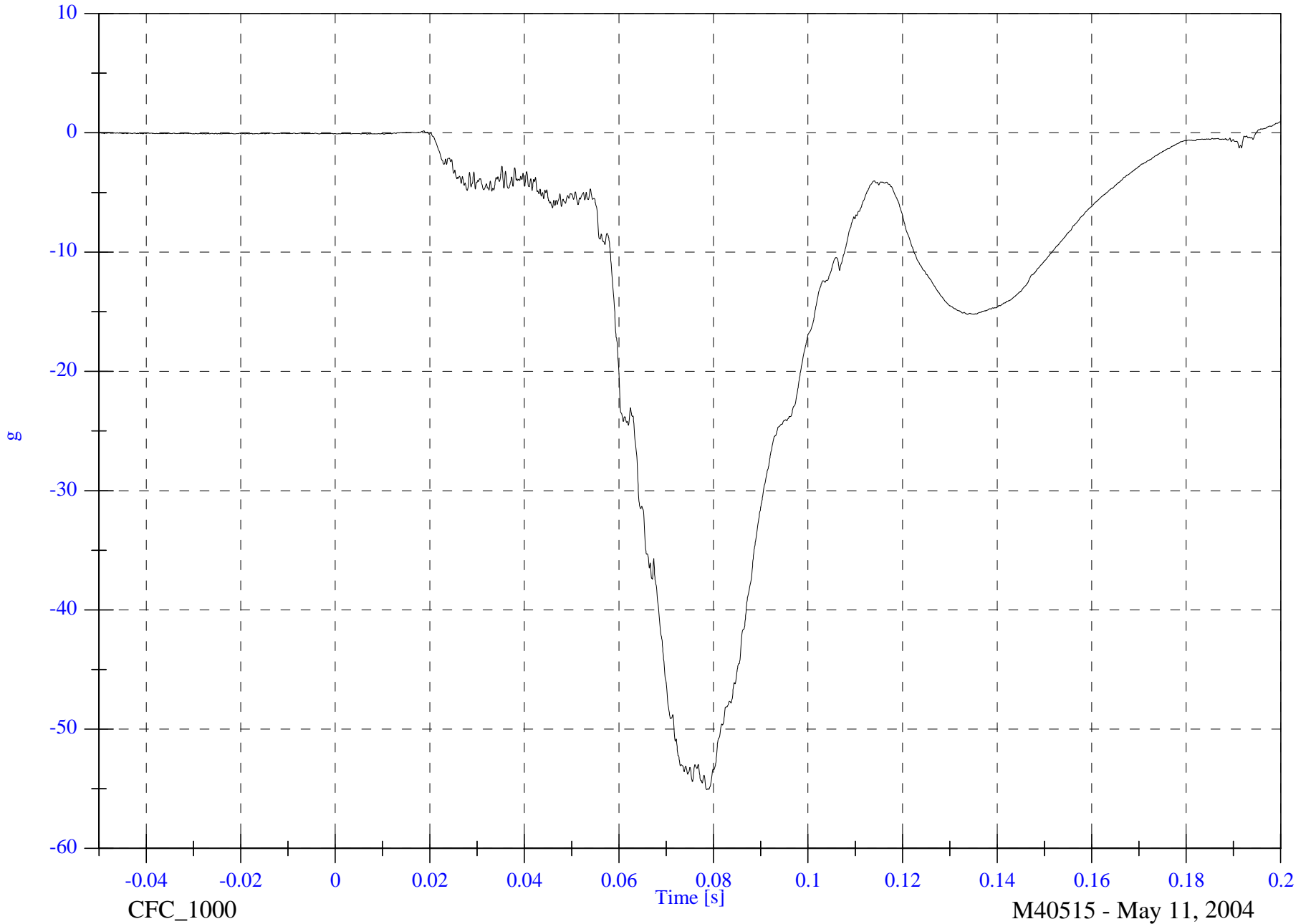
V1P2 Head 9 Array Y Arm x

Max: 0.9 [g] at 0.200 [s]

Min: -55.1 [g] at 0.079 [s]

B-65

8642-NCAP-49



CFC_1000

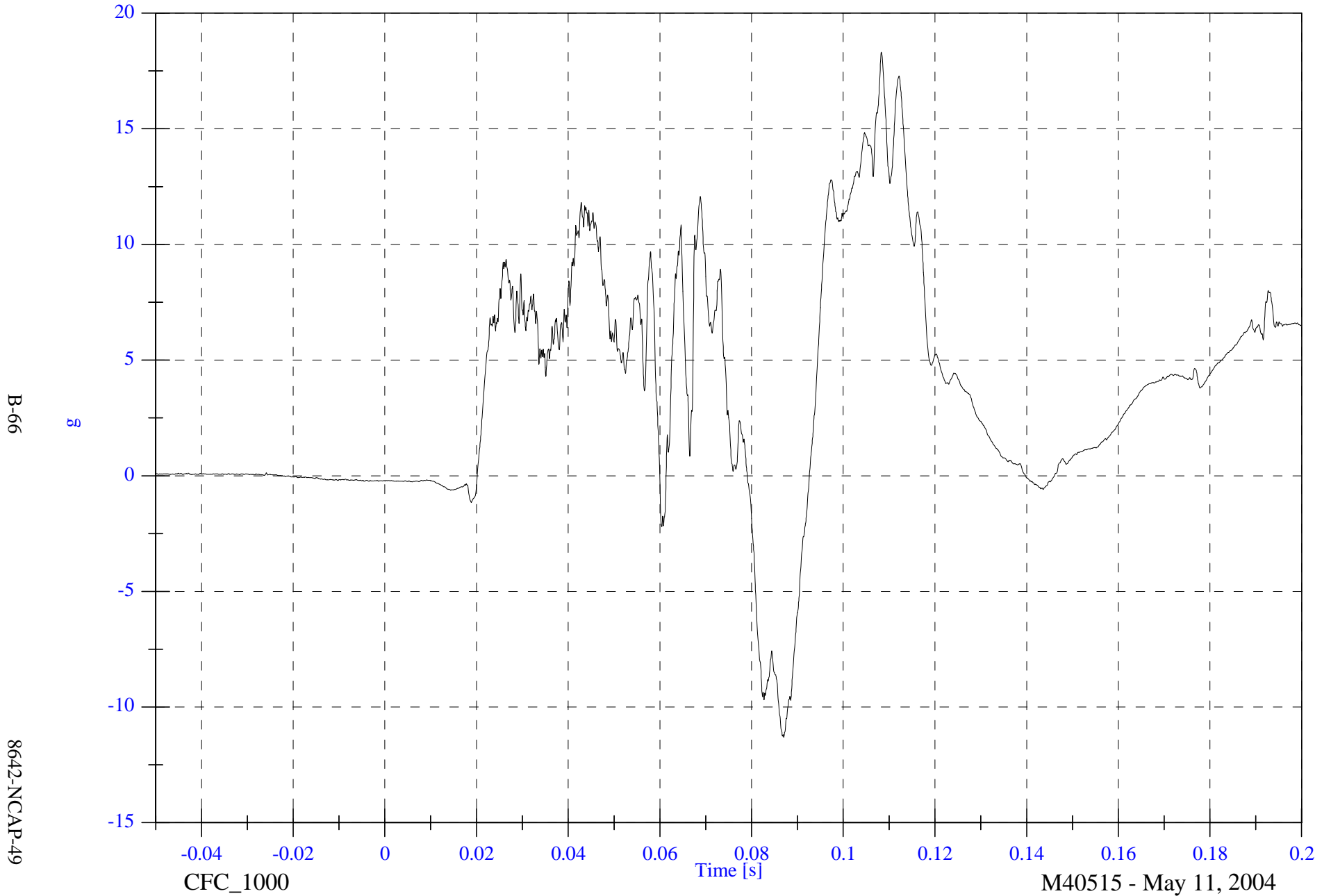
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Head 9 Array Y Arm z

Max: 18.3 [g] at 0.108 [s]

Min: -11.3 [g] at 0.087 [s]



2004 NCAP Test 13 - 2004.5 Kia Spectra

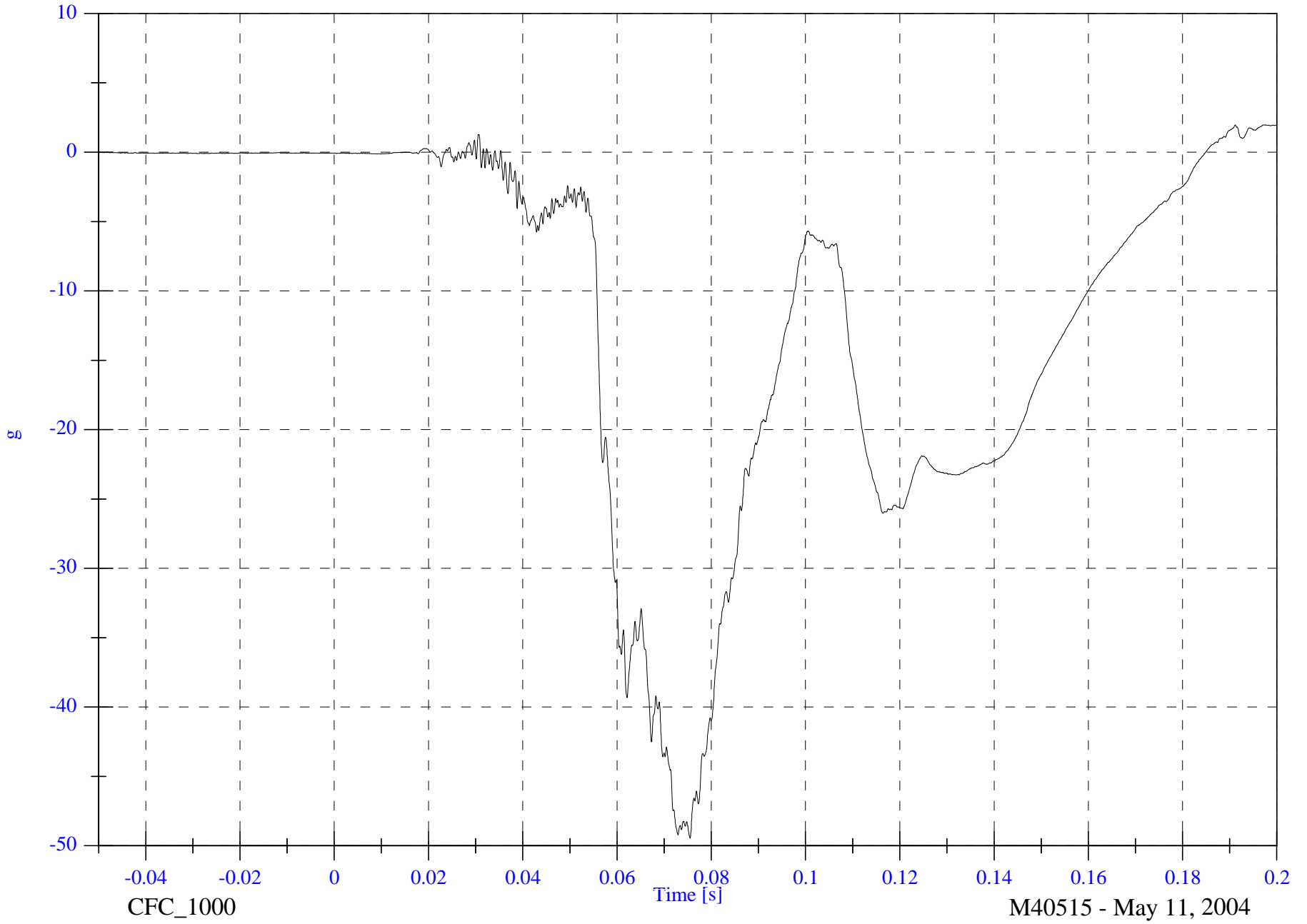
V1P2 Head 9 Array Z Arm x

Max: 2.0 [g] at 0.197 [s]

Min: -49.4 [g] at 0.076 [s]

B-67

8642-NCAP-49



M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

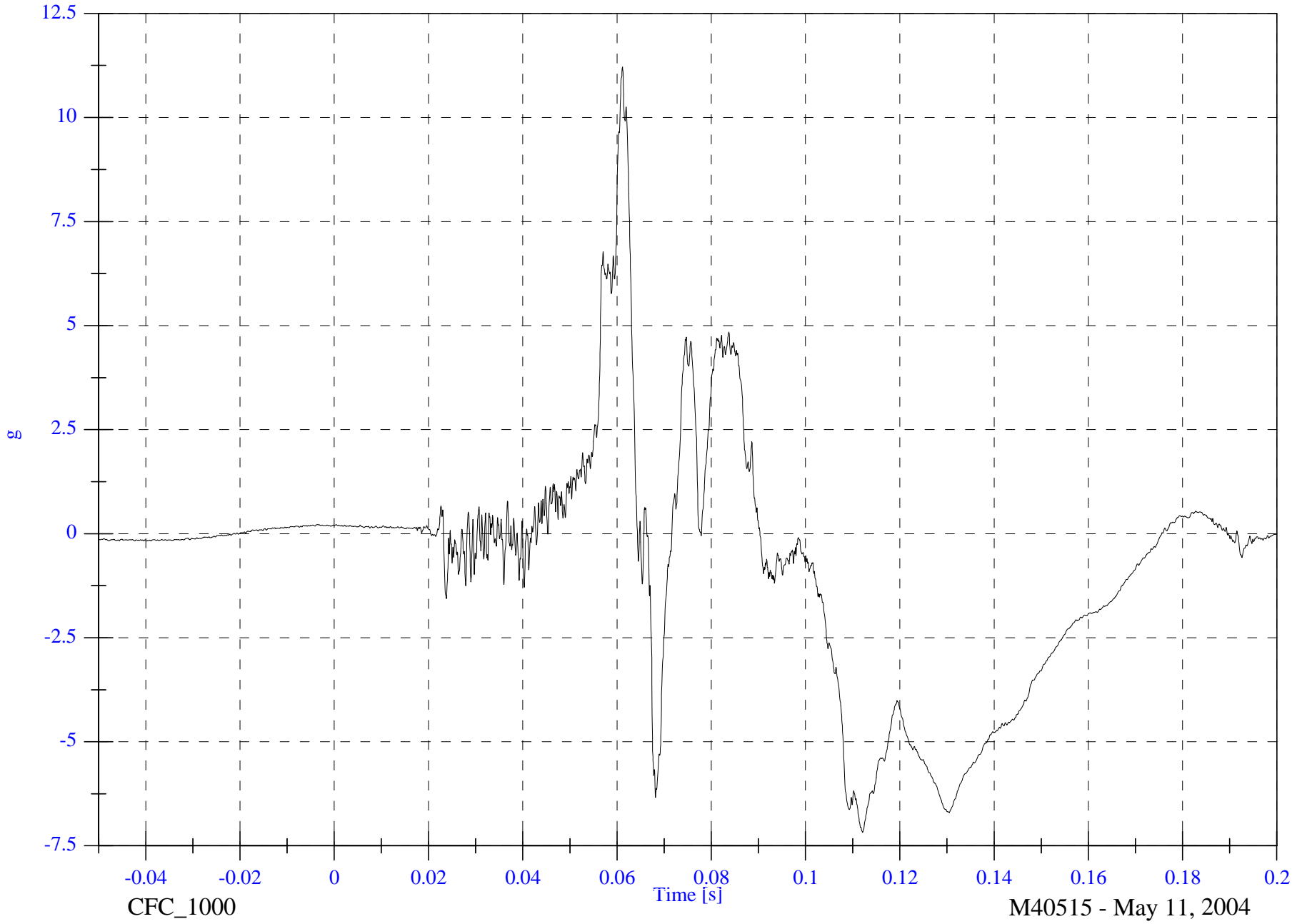
V1P2 Head 9 Array Z Arm y

Max: 11.2 [g] at 0.061 [s]

Min: -7.2 [g] at 0.112 [s]

B-68

8642-NCAP-49

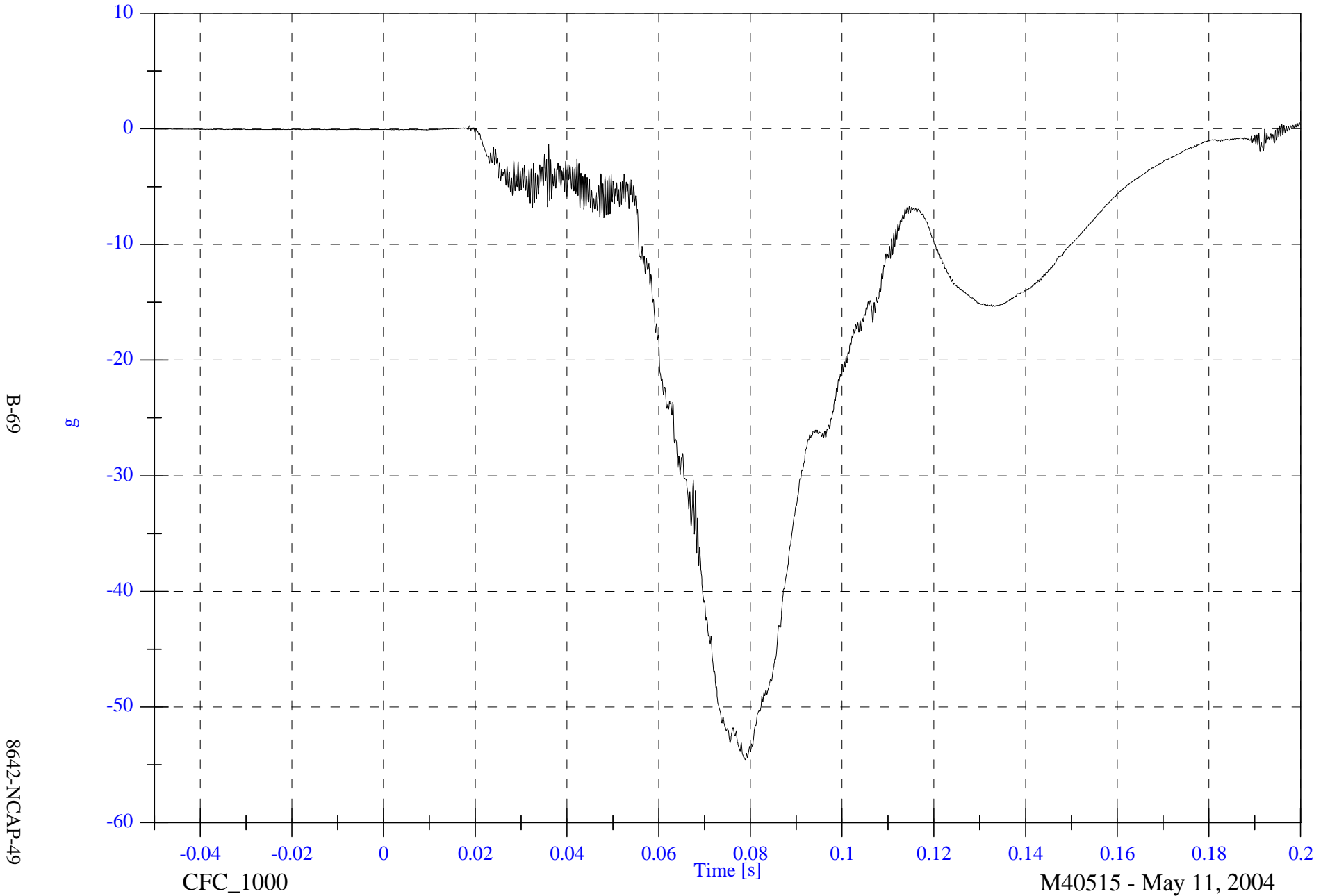


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Head CG x

Max: 0.5 [g] at 0.200 [s]

Min: -54.6 [g] at 0.079 [s]

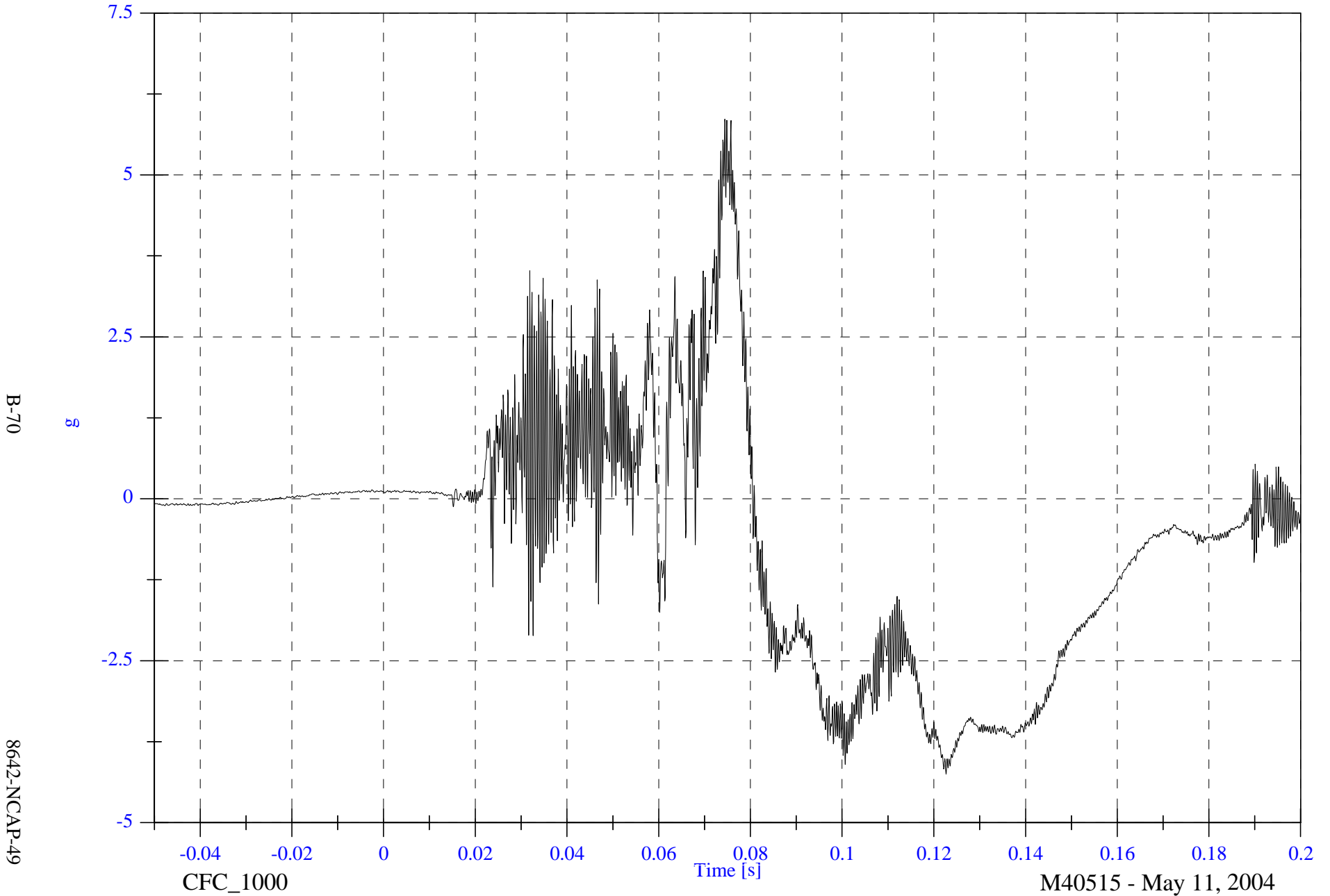


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Head CG y

Max: 5.9 [g] at 0.074 [s]

Min: -4.2 [g] at 0.123 [s]



2004 NCAP Test 13 - 2004.5 Kia Spectra

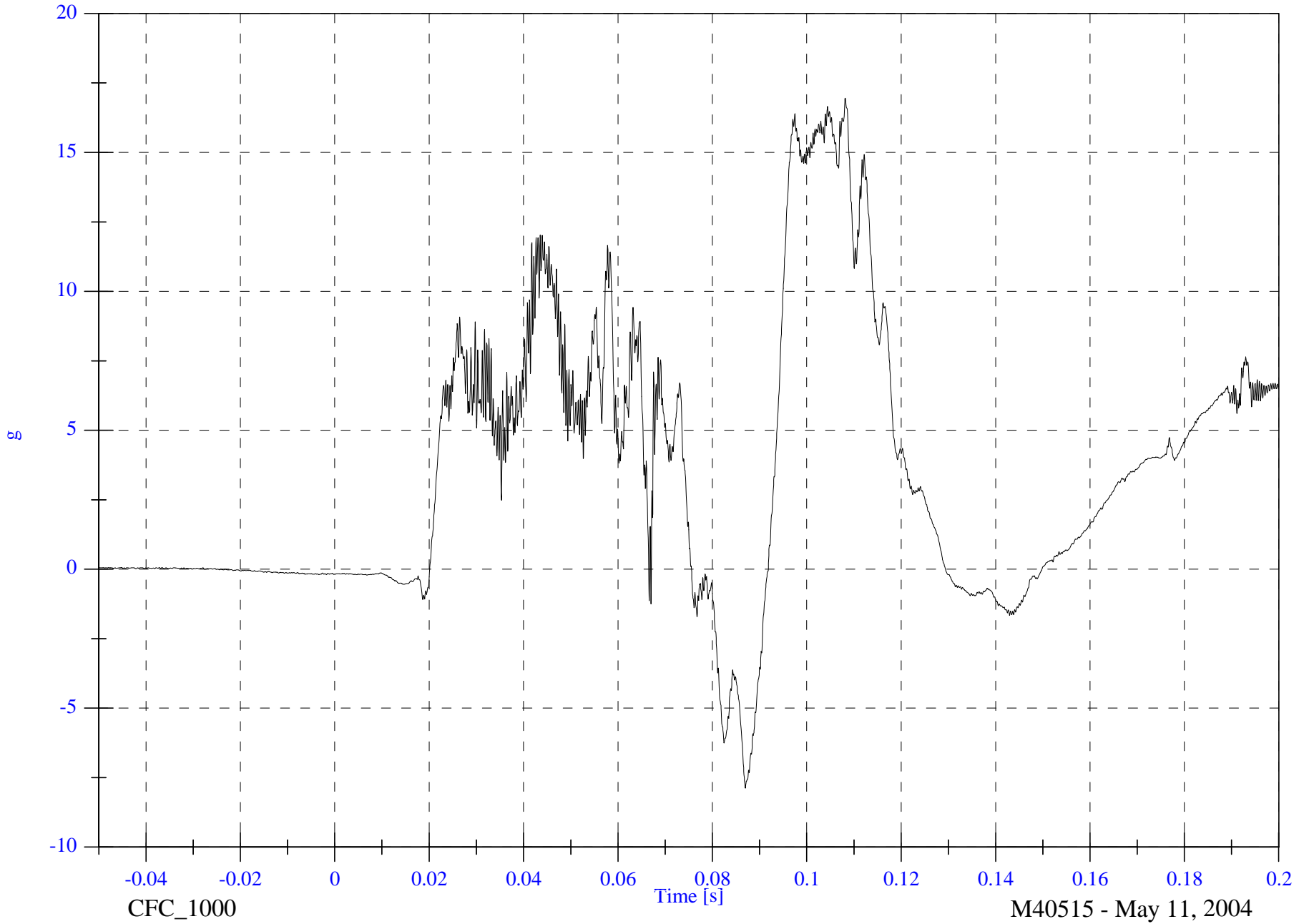
V1P2 Head CG z

Max: 17.0 [g] at 0.108 [s]

Min: -7.9 [g] at 0.087 [s]

B-71

8642-NCAP-49



M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

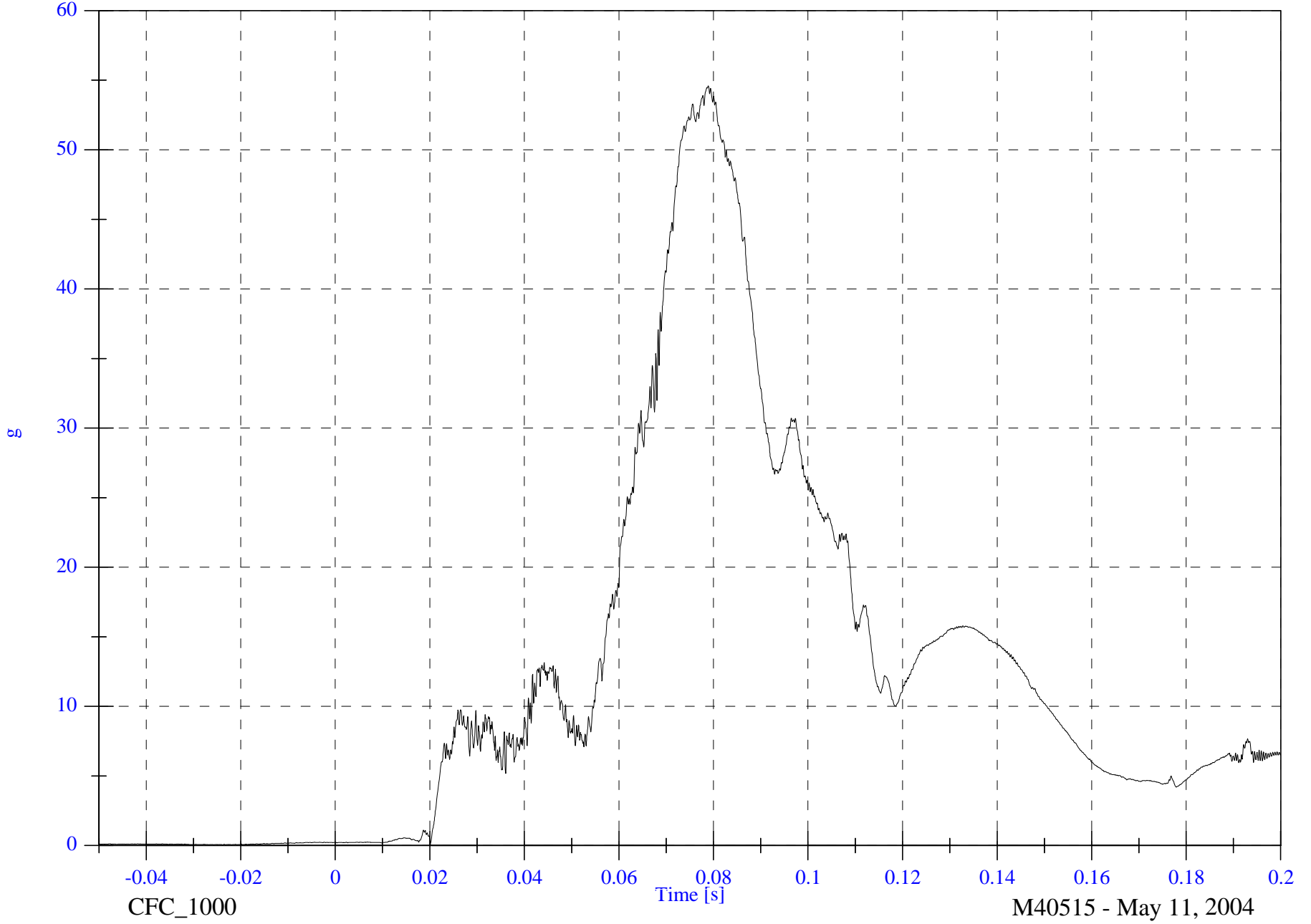
V1P2 Head CG Resultant

Max: 54.6 [g] at 0.079 [s]

Min: 0.1 [g] at -0.024 [s]

B-72

8642-NCAP-49



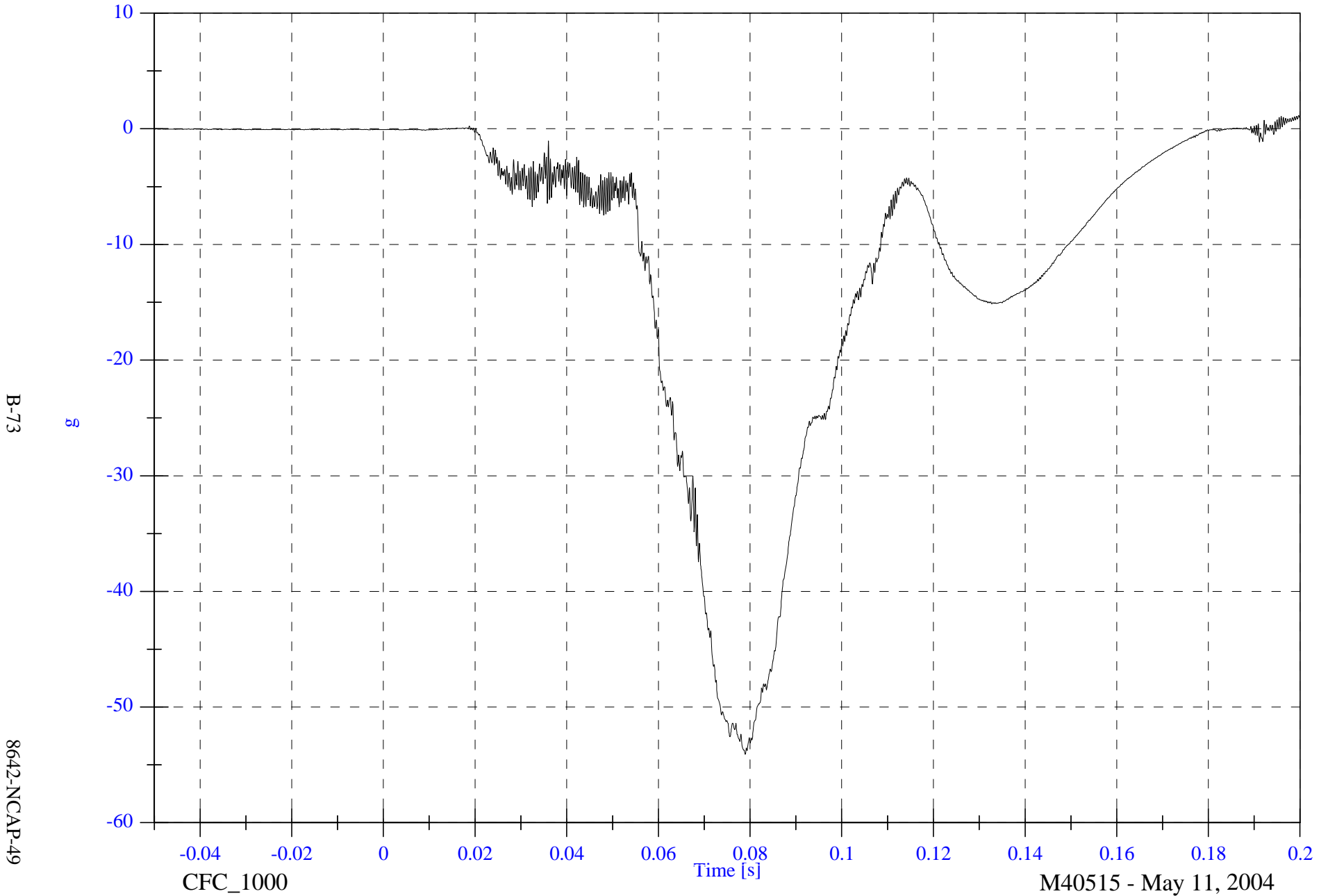
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Head CG Red x

Max: 1.2 [g] at 0.200 [s]

Min: -54.1 [g] at 0.079 [s]



2004 NCAP Test 13 - 2004.5 Kia Spectra

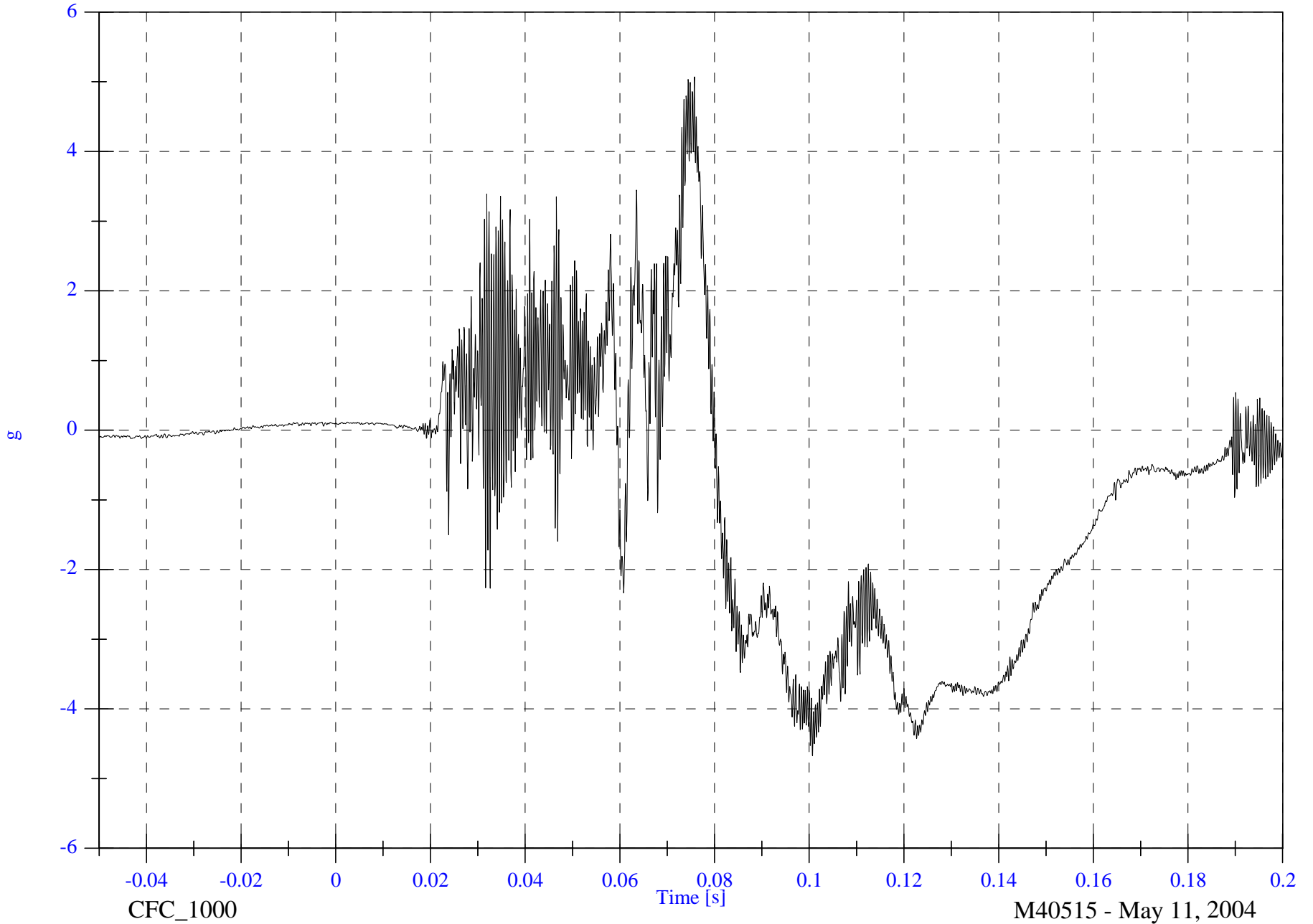
V1P2 Head CG Red y

Max: 5.1 [g] at 0.076 [s]

Min: -4.7 [g] at 0.101 [s]

B-74

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

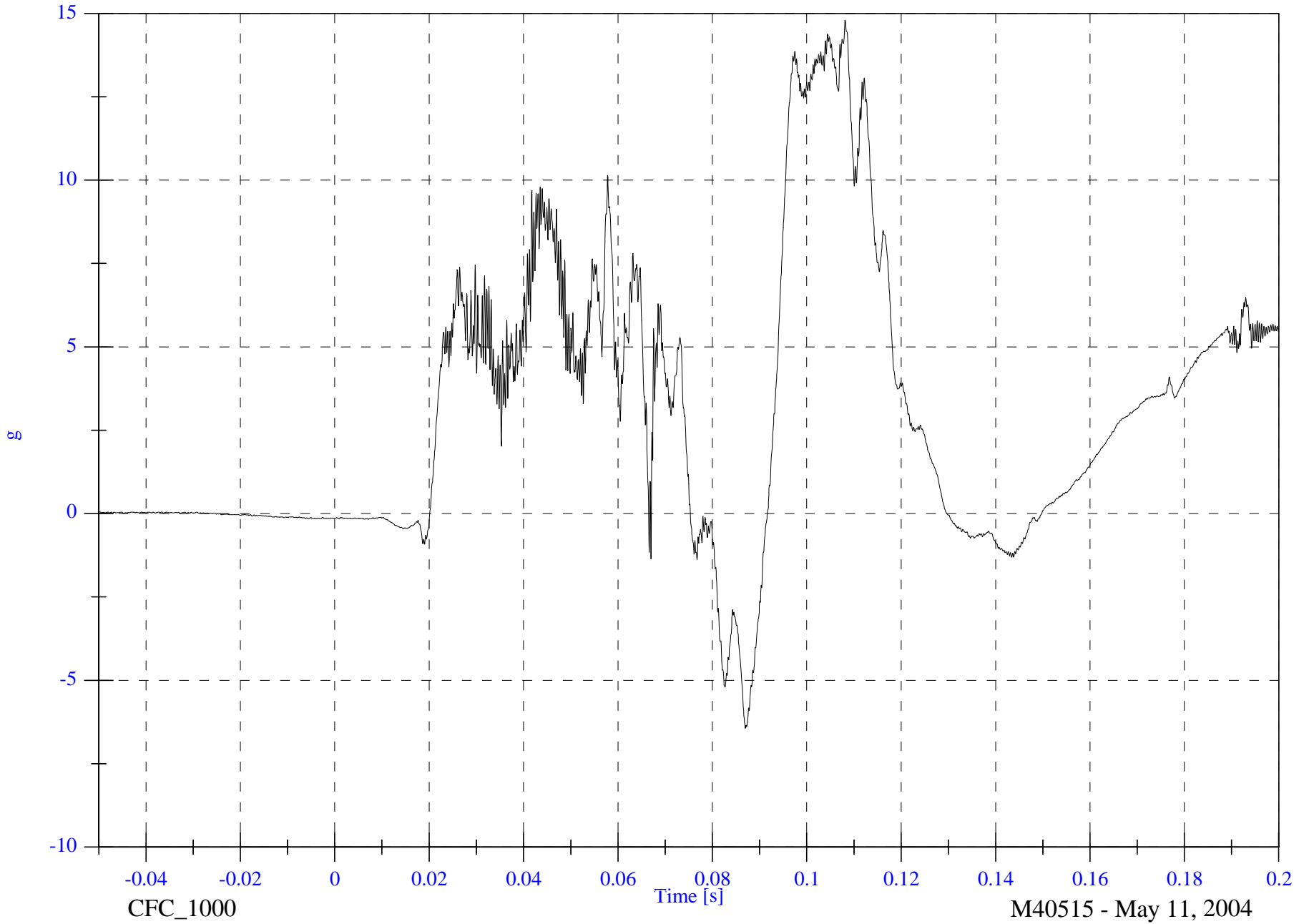
V1P2 Head CG Red z

Max: 14.8 [g] at 0.108 [s]

Min: -6.4 [g] at 0.087 [s]

B-75

8642-NCAP-49



CFC_1000

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

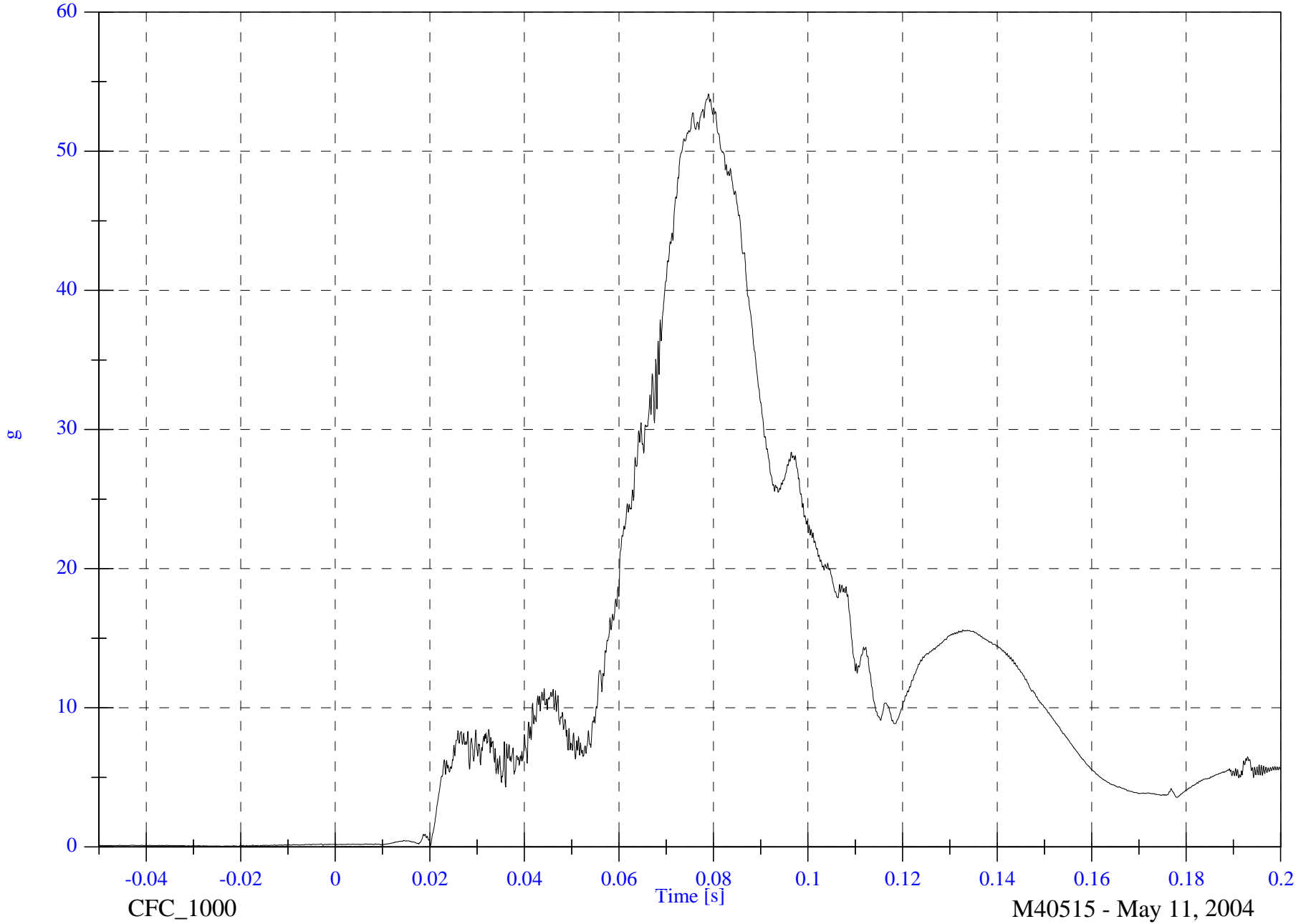
V1P2 Head CG Red Resultant

Max: 54.1 [g] at 0.079 [s]

Min: 0.0 [g] at -0.021 [s]

B-76

8642-NCAP-49



CFC_1000

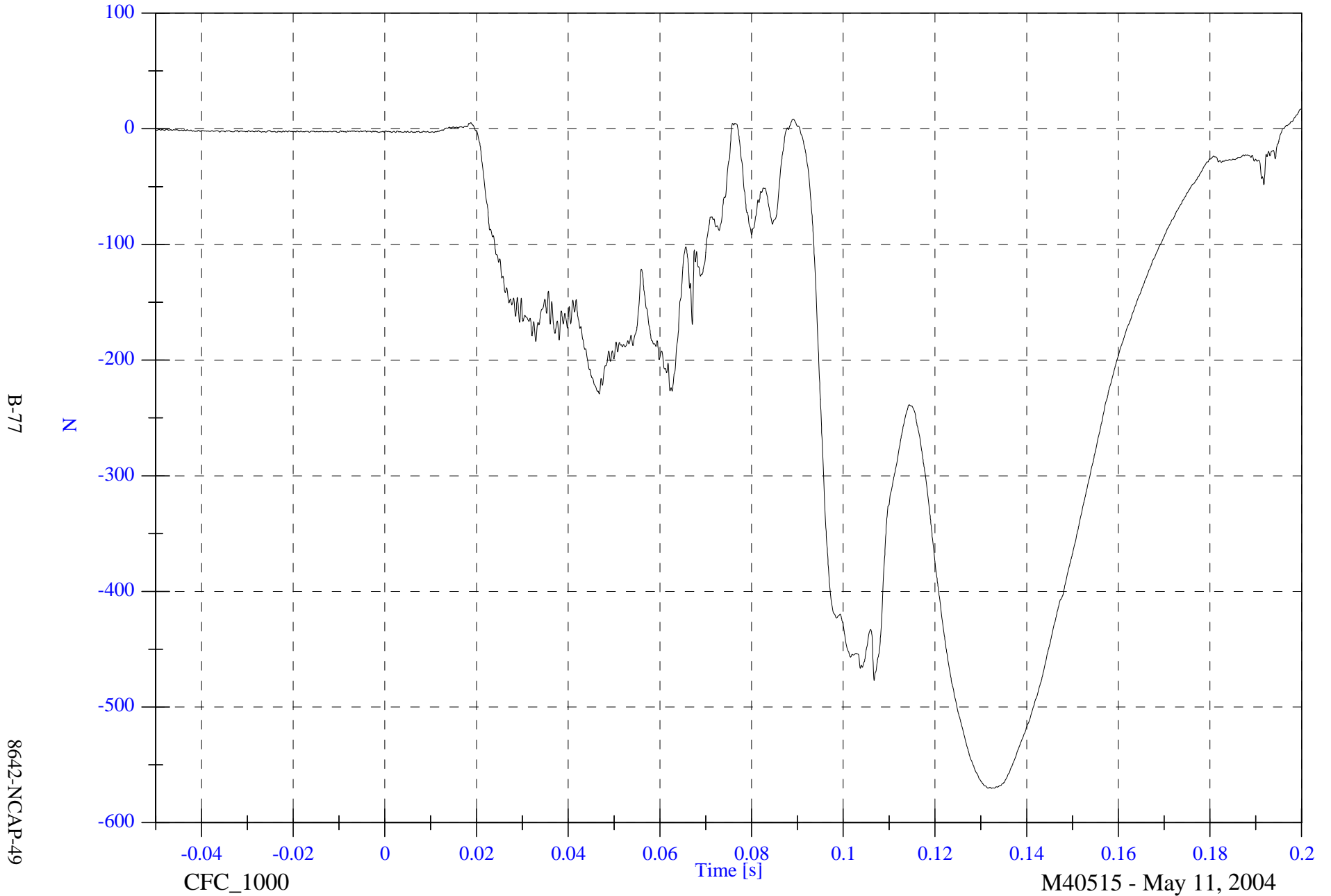
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Upper Neck Fx

Max: 17.6 [N] at 0.200 [s]

Min: -570.3 [N] at 0.132 [s]



B-77

8642-NCAP-49

CFC_1000

Time [s]

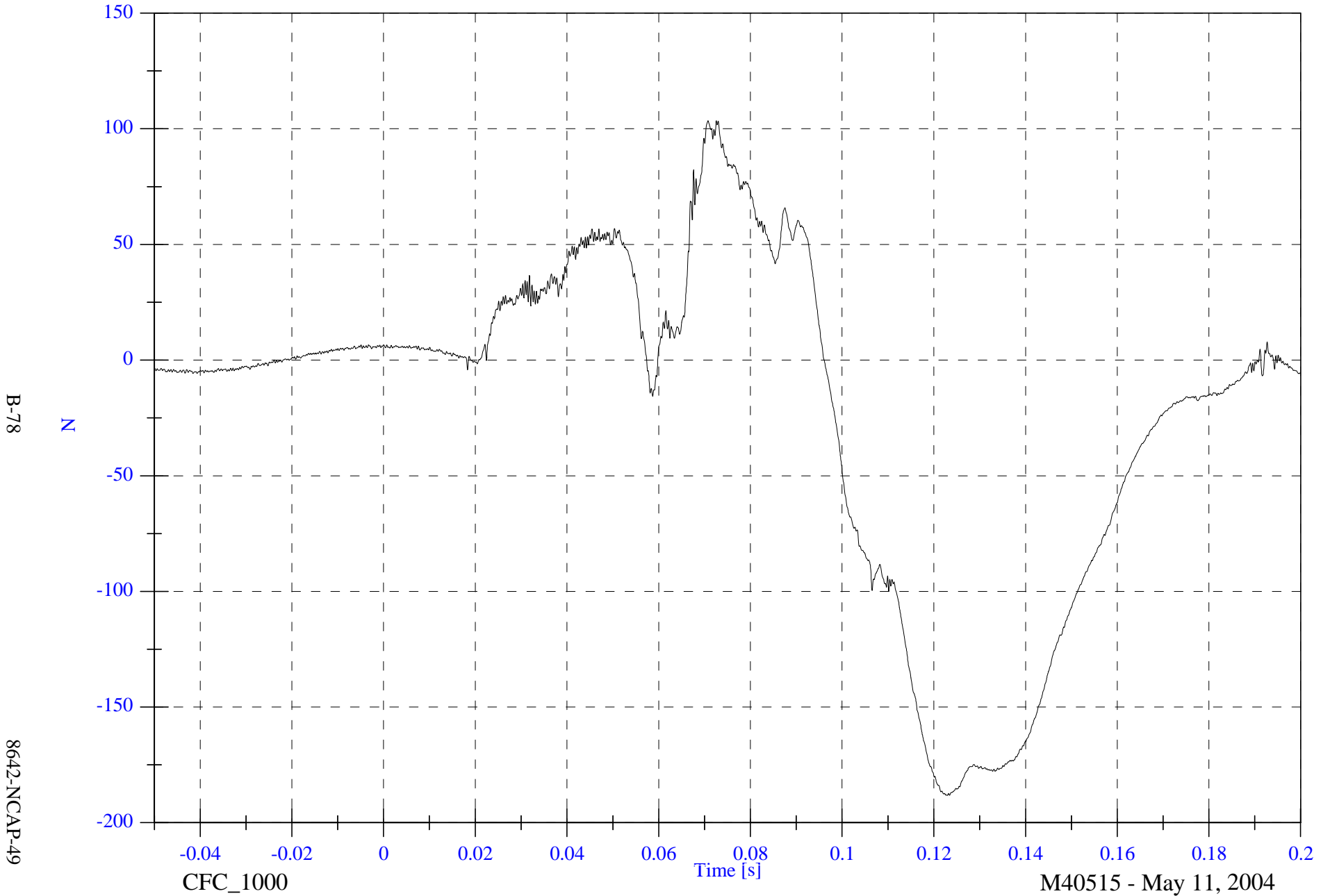
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Upper Neck Fy

Max: 103.5 [N] at 0.073 [s]

Min: -188.2 [N] at 0.123 [s]

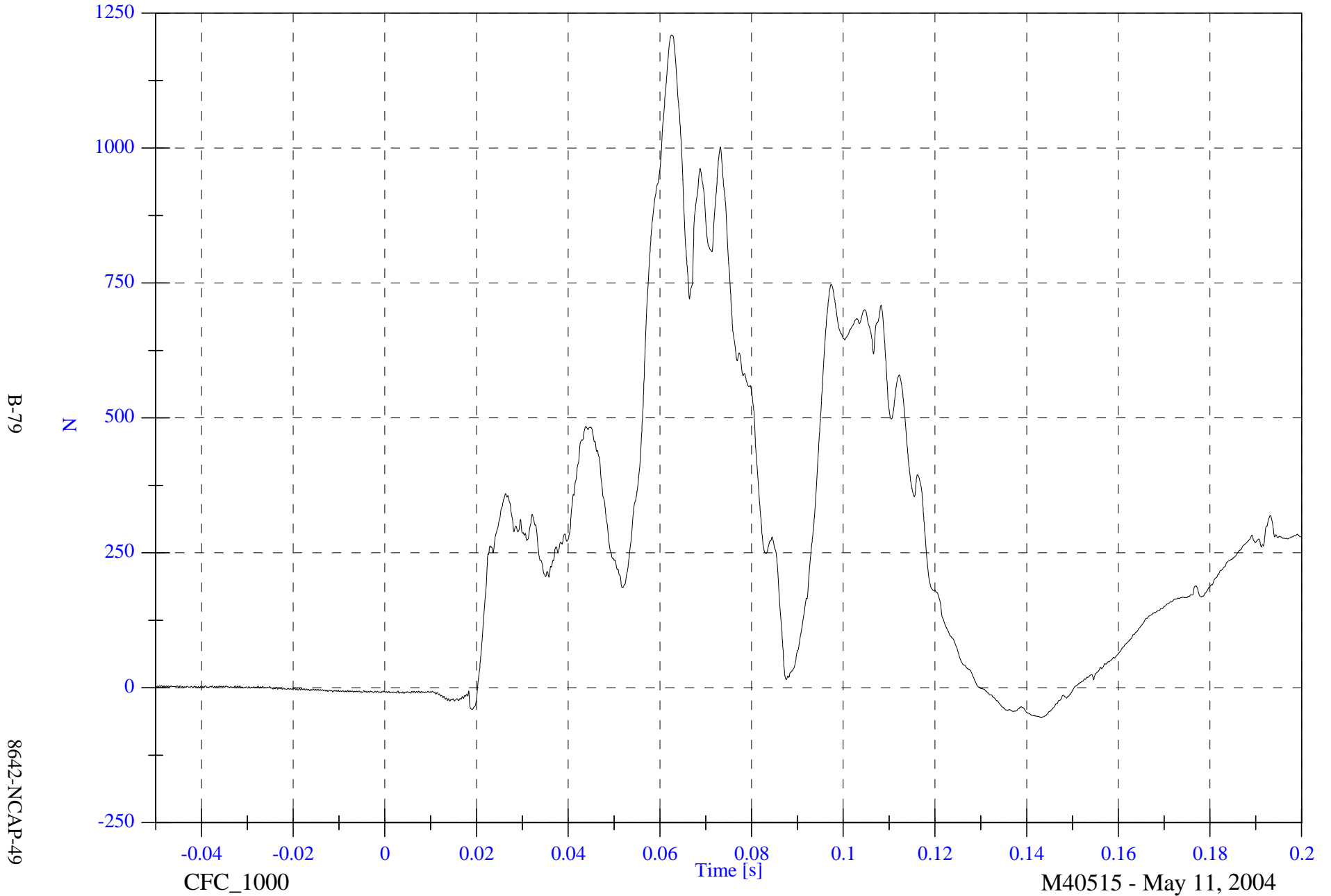


2004 NCAP Test 13 - 2004.5 Kia Spectra

Max: 1209.3 [N] at 0.062 [s]

V1P2 Upper Neck Fz

Min: -55.3 [N] at 0.143 [s]



B-79

8642-NCAP-49

CFC_1000

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

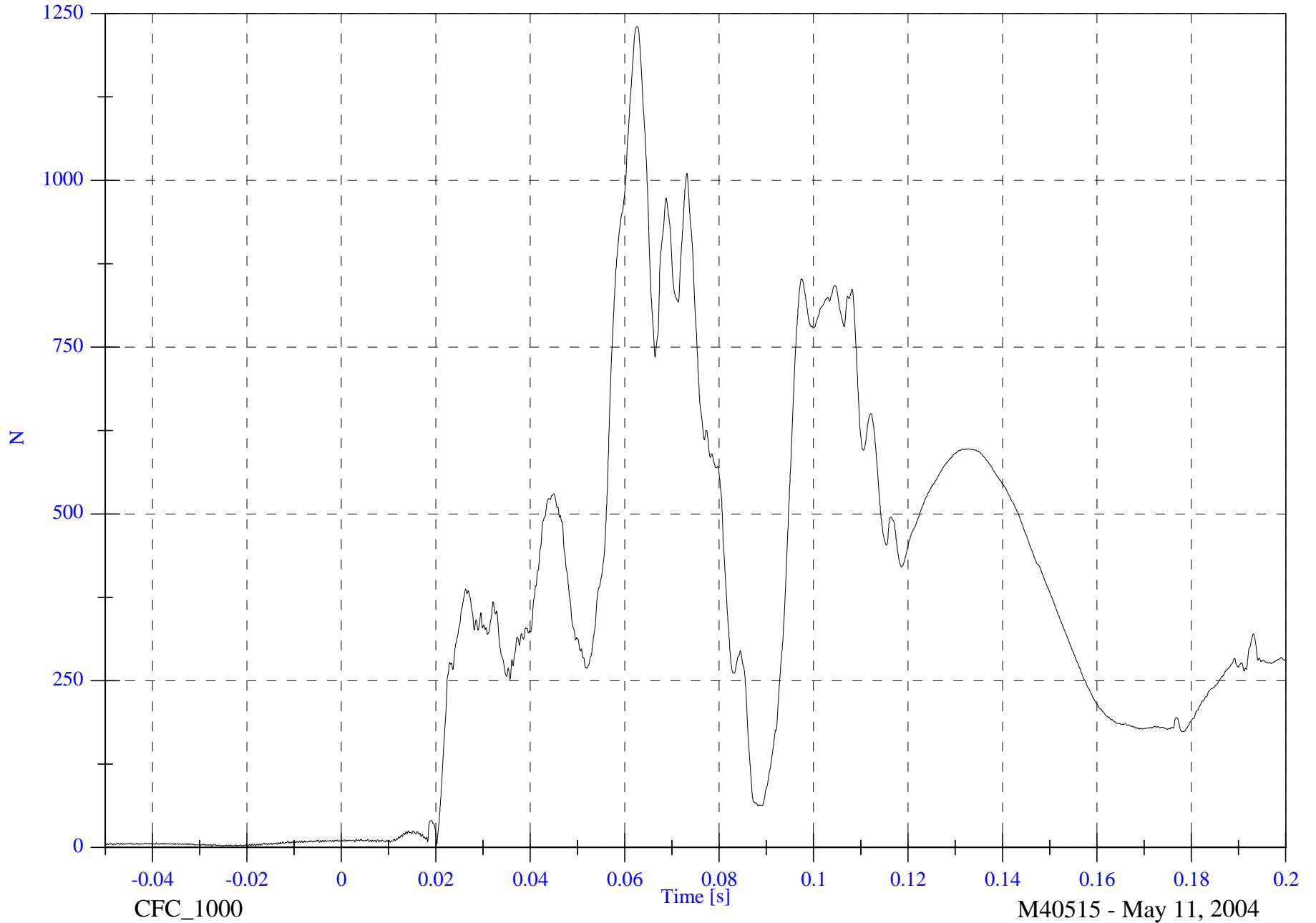
V1P2 Upper Neck F Resultant

Max: 1229.9 [N] at 0.062 [s]

Min: 2.1 [N] at -0.022 [s]

B-80

8642-NCAP-49



CFC_1000

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

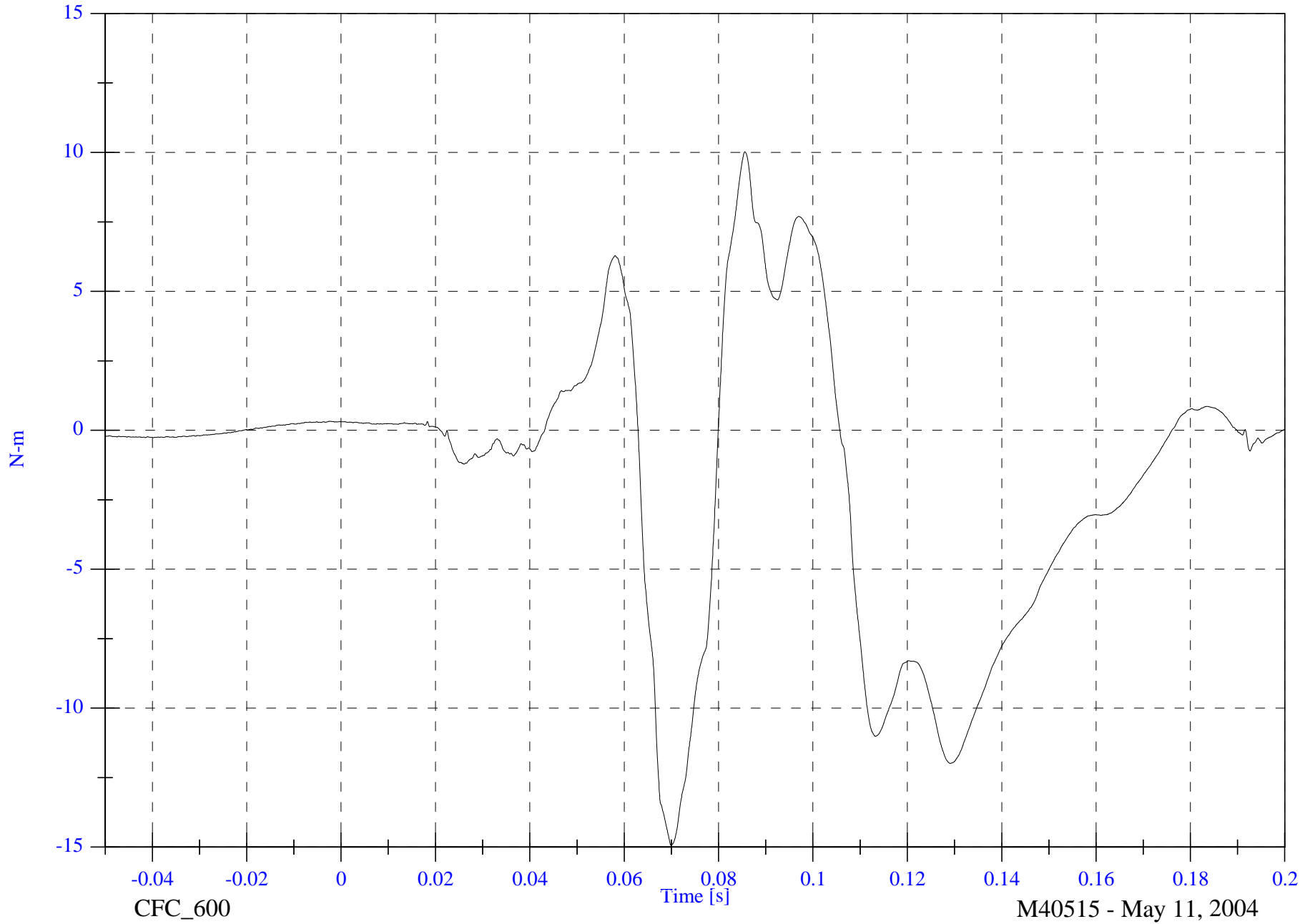
V1P2 Upper Neck Mx

Max: 10.0 [N-m] at 0.086 [s]

Min: -14.9 [N-m] at 0.070 [s]

B-81

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

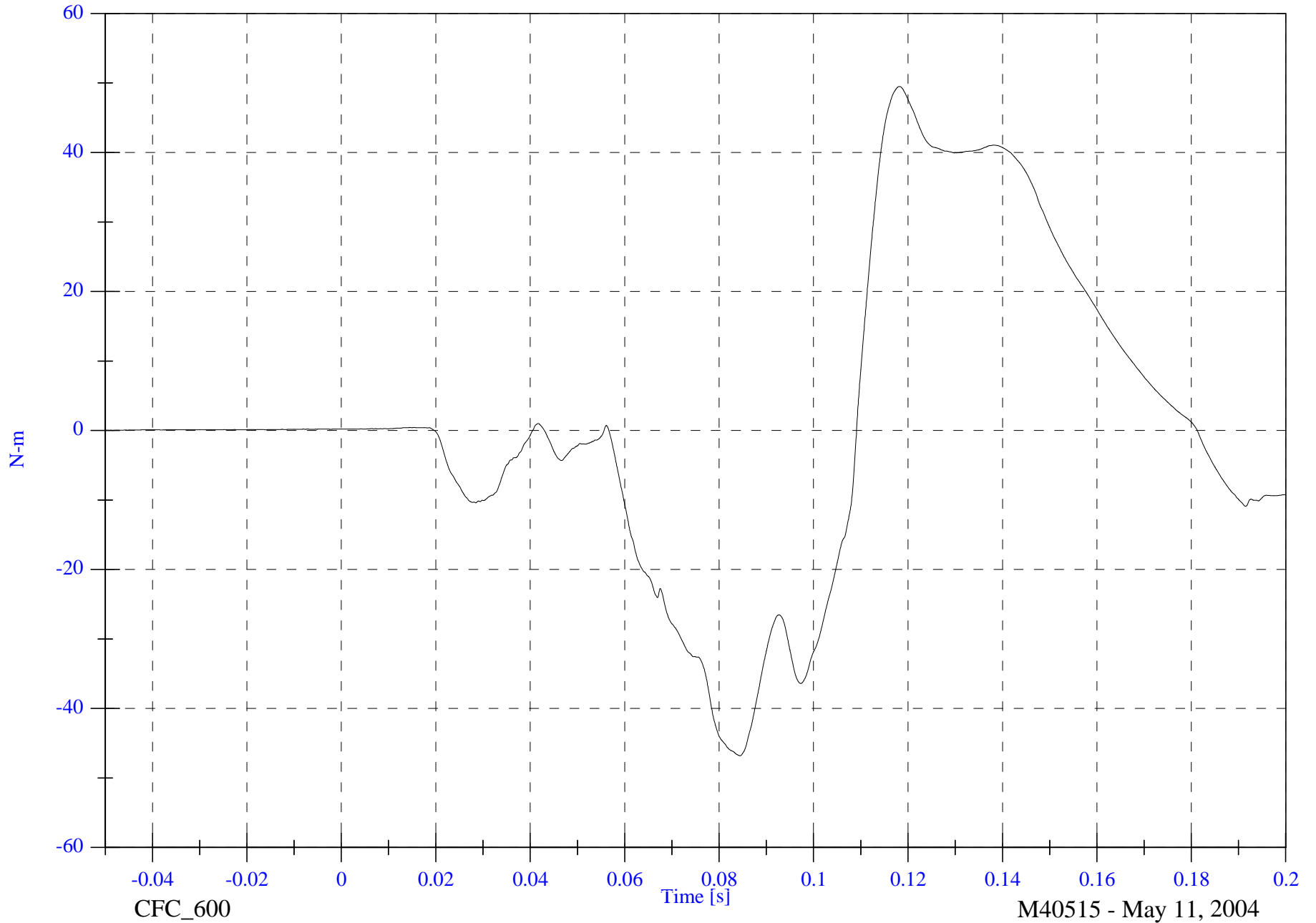
V1P2 Upper Neck My

Max: 49.5 [N-m] at 0.118 [s]

Min: -46.8 [N-m] at 0.084 [s]

B-82

8642-NCAP-49



CFC_600

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

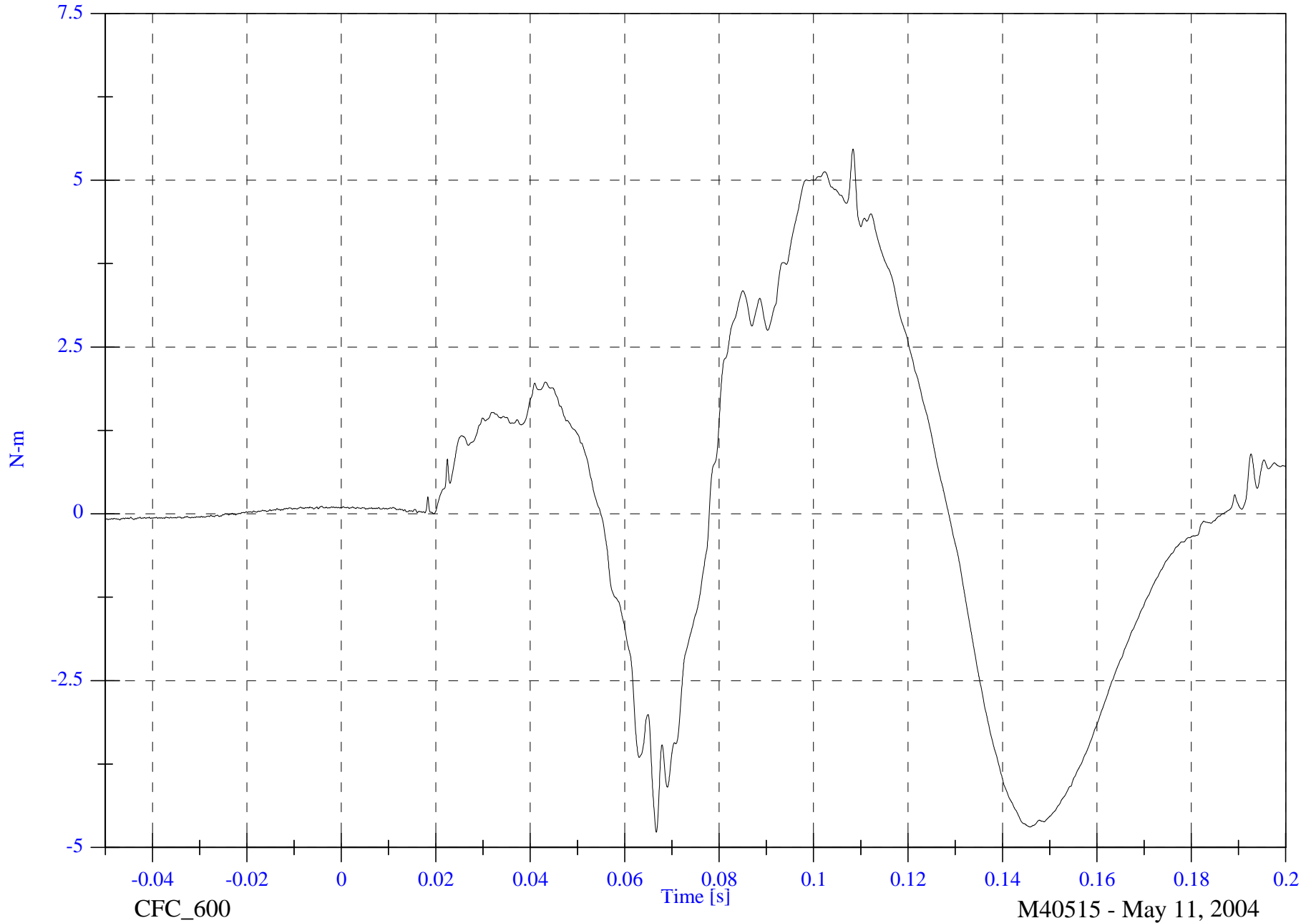
V1P2 Upper Neck Mz

Max: 5.5 [N-m] at 0.108 [s]

Min: -4.8 [N-m] at 0.067 [s]

B-83

8642-NCAP-49



CFC_600

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

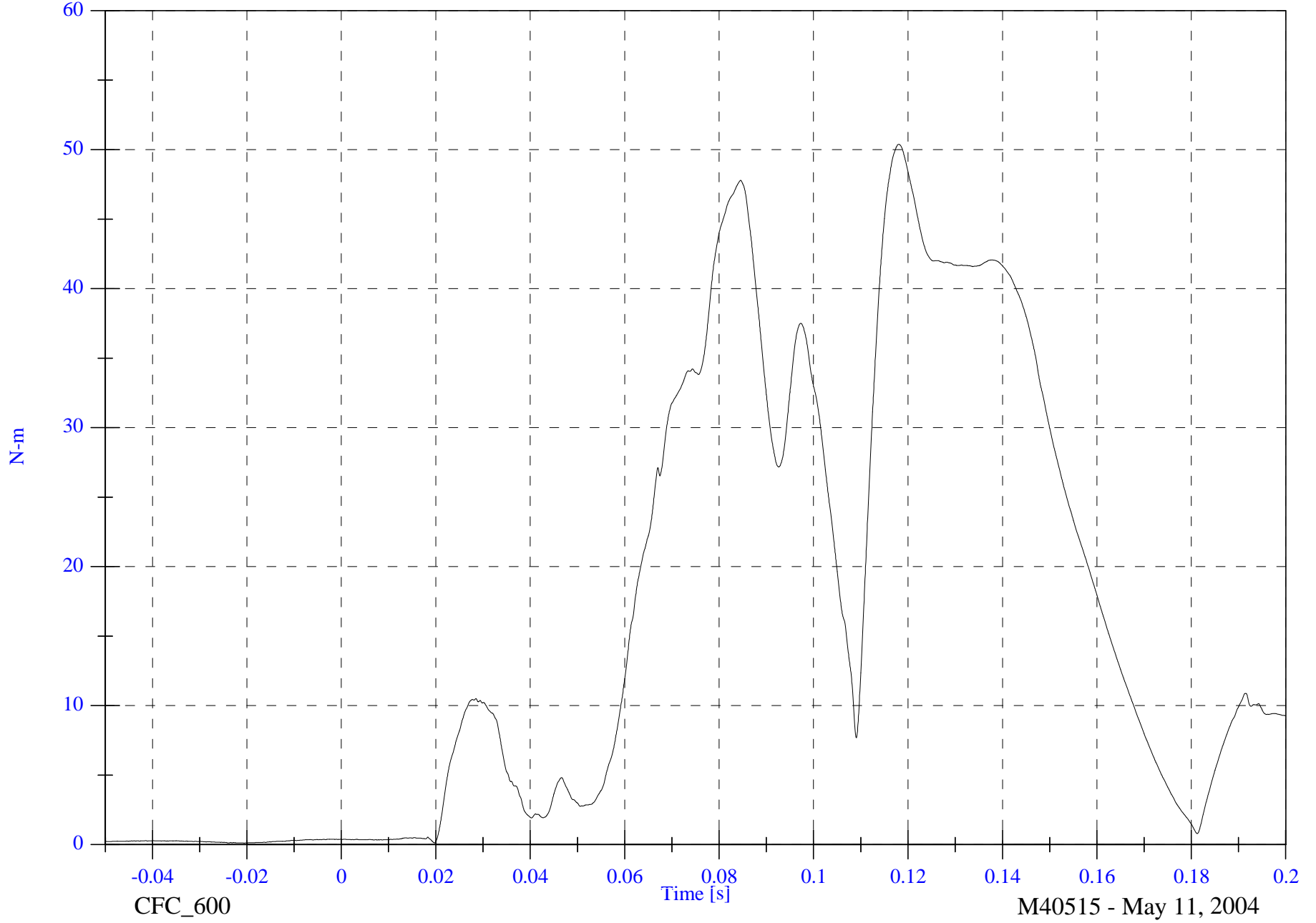
V1P2 Upper Neck M Resultant

Max: 50.4 [N-m] at 0.118 [s]

Min: 0.1 [N-m] at -0.021 [s]

B-84

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Chest x

Max: 2.4 [g] at 0.177 [s]

Min: -58.0 [g] at 0.077 [s]

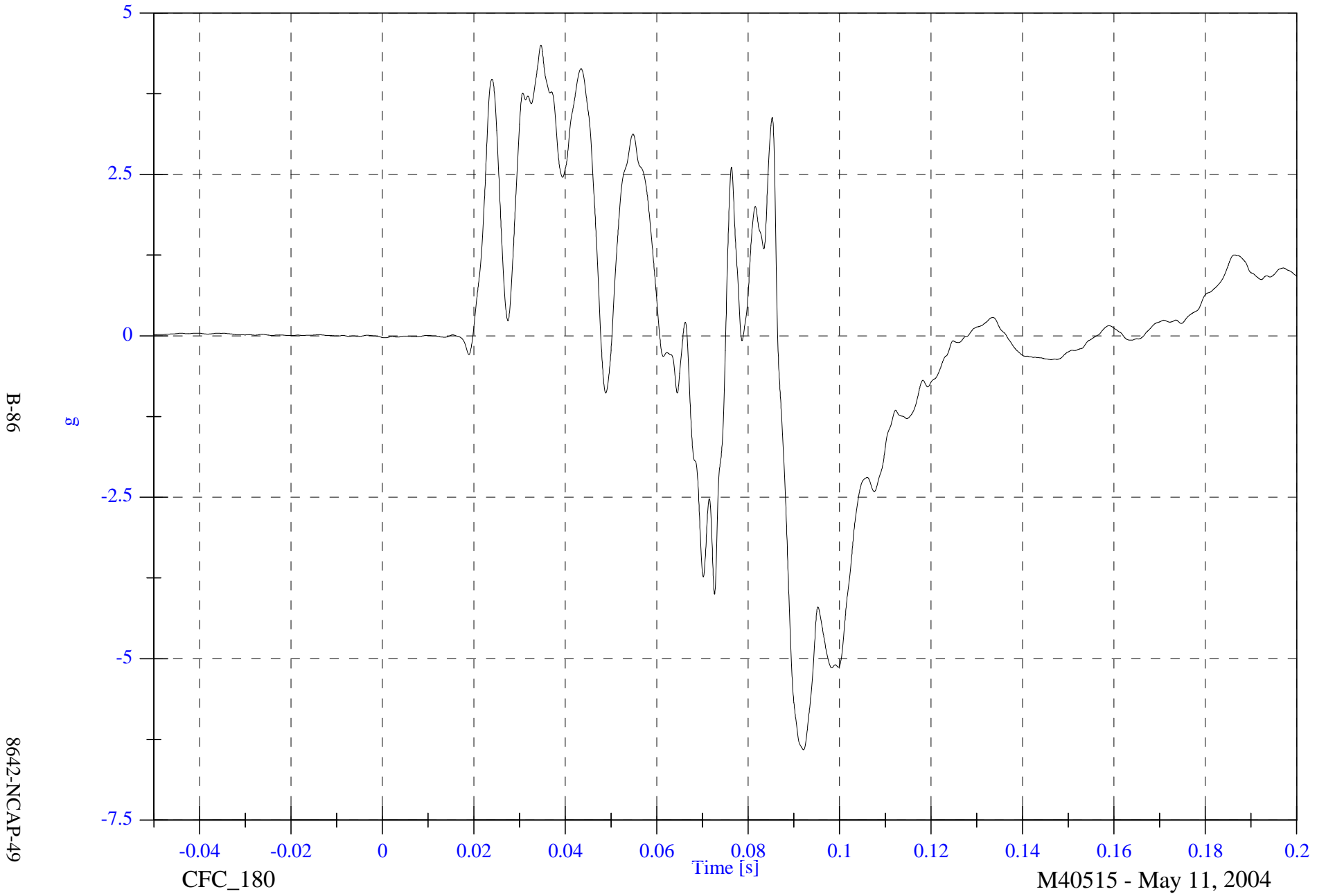


2004 NCAP Test 13 - 2004.5 Kia Spectra

VIP2 Chest y

Max: 4.5 [g] at 0.035 [s]

Min: -6.4 [g] at 0.092 [s]

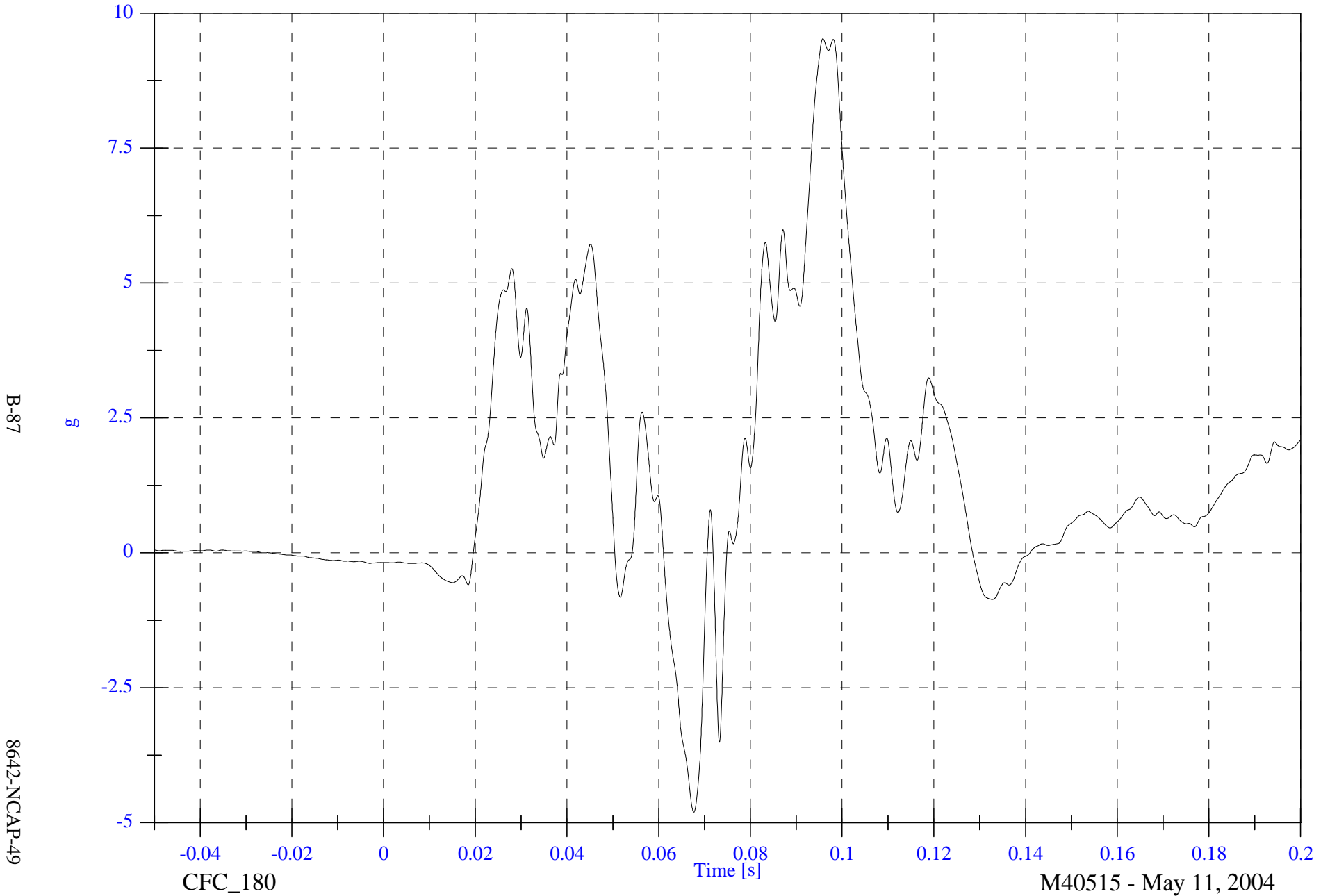


2004 NCAP Test 13 - 2004.5 Kia Spectra

VIP2 Chest z

Max: 9.5 [g] at 0.096 [s]

Min: -4.8 [g] at 0.068 [s]



B-87

8642-NCAP-49

2004 NCAP Test 13 - 2004.5 Kia Spectra

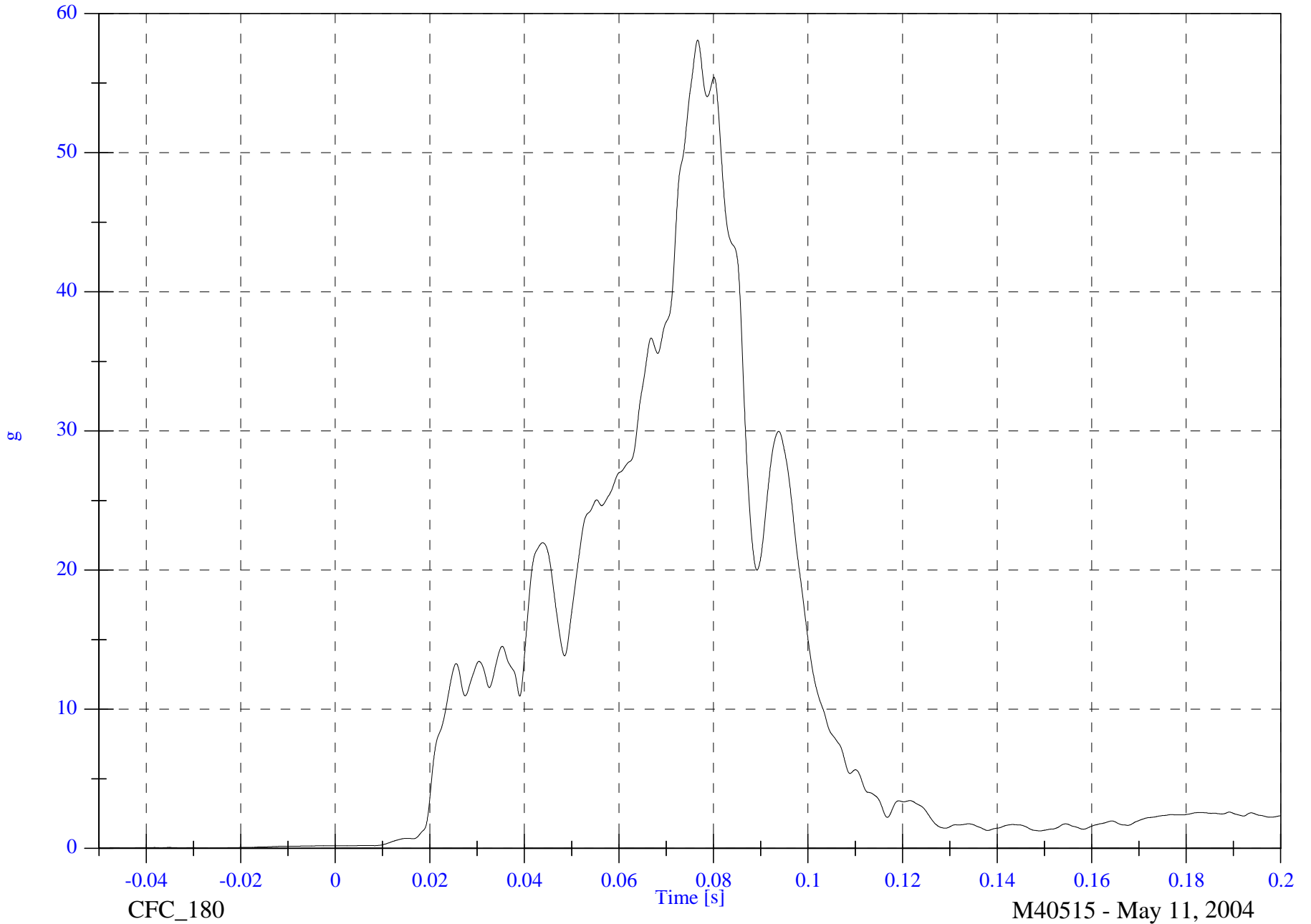
V1P2 Chest Resultant

Max: 58.1 [g] at 0.077 [s]

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

B-88

8642-NCAP-49



CFC_180

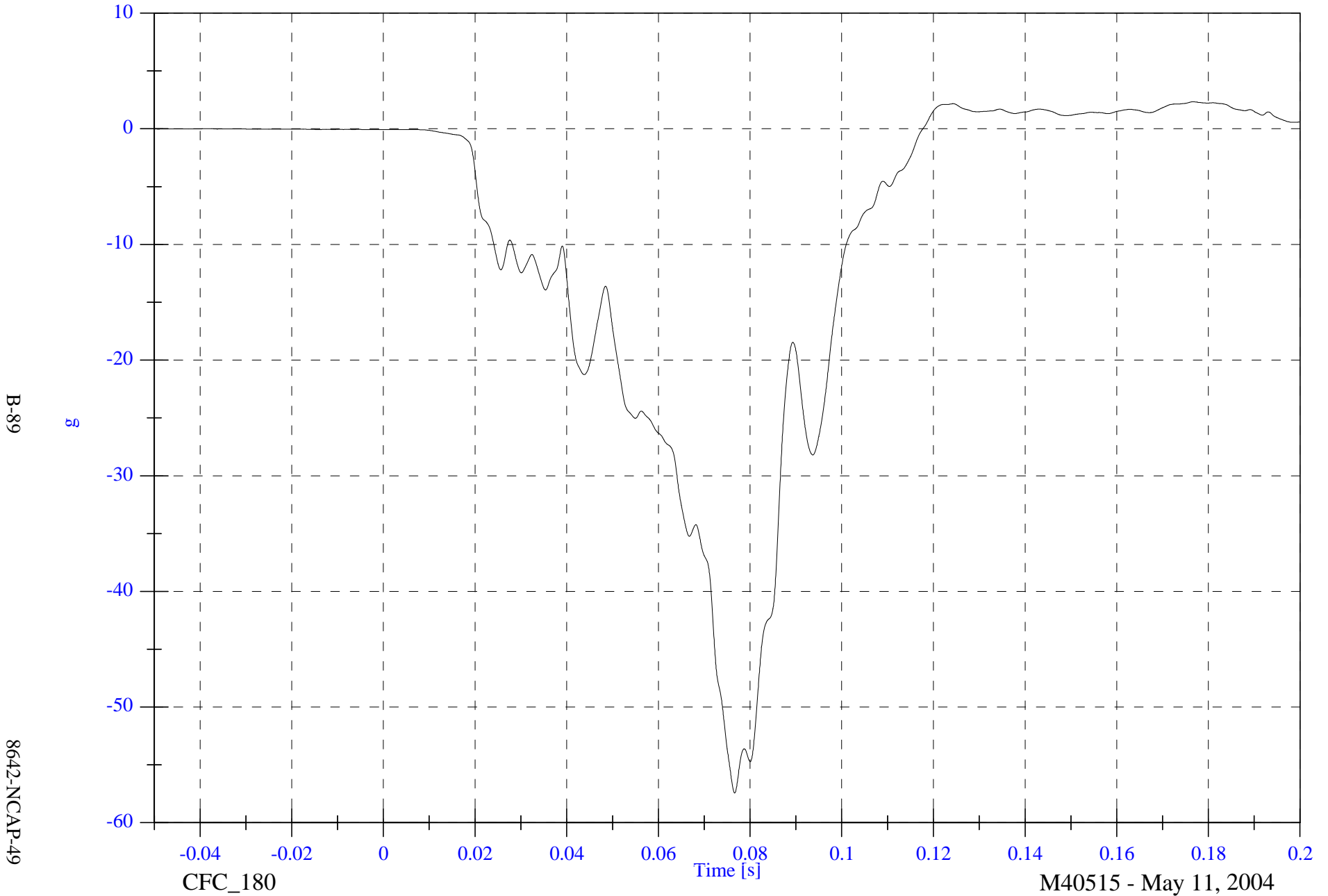
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

VIP2 Chest Red x

Max: 2.3 [g] at 0.177 [s]

Min: -57.4 [g] at 0.077 [s]

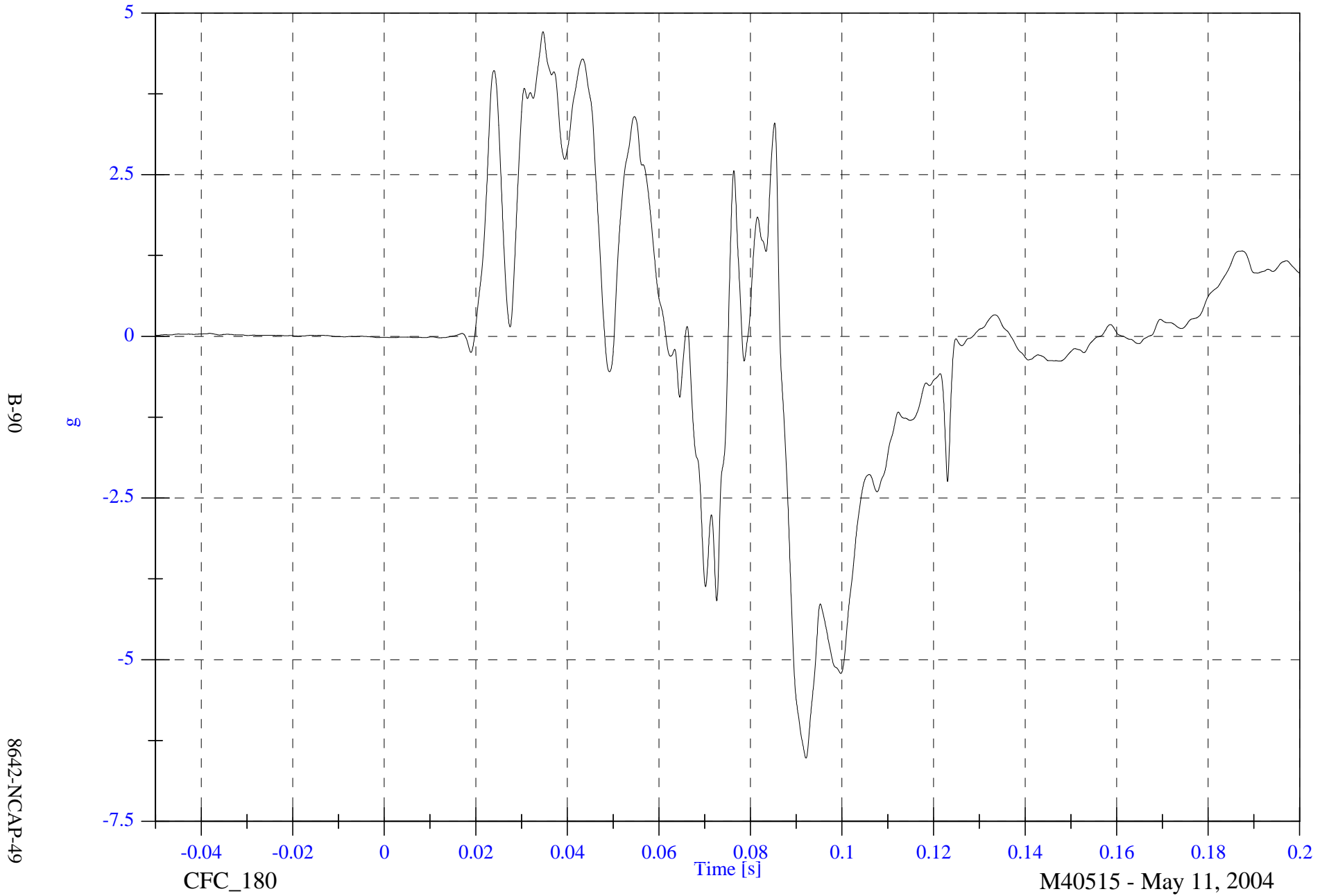


2004 NCAP Test 13 - 2004.5 Kia Spectra

VIP2 Chest Red y

Max: 4.7 [g] at 0.035 [s]

Min: -6.5 [g] at 0.092 [s]



B-90

8642-NCAP-49

CFC_180

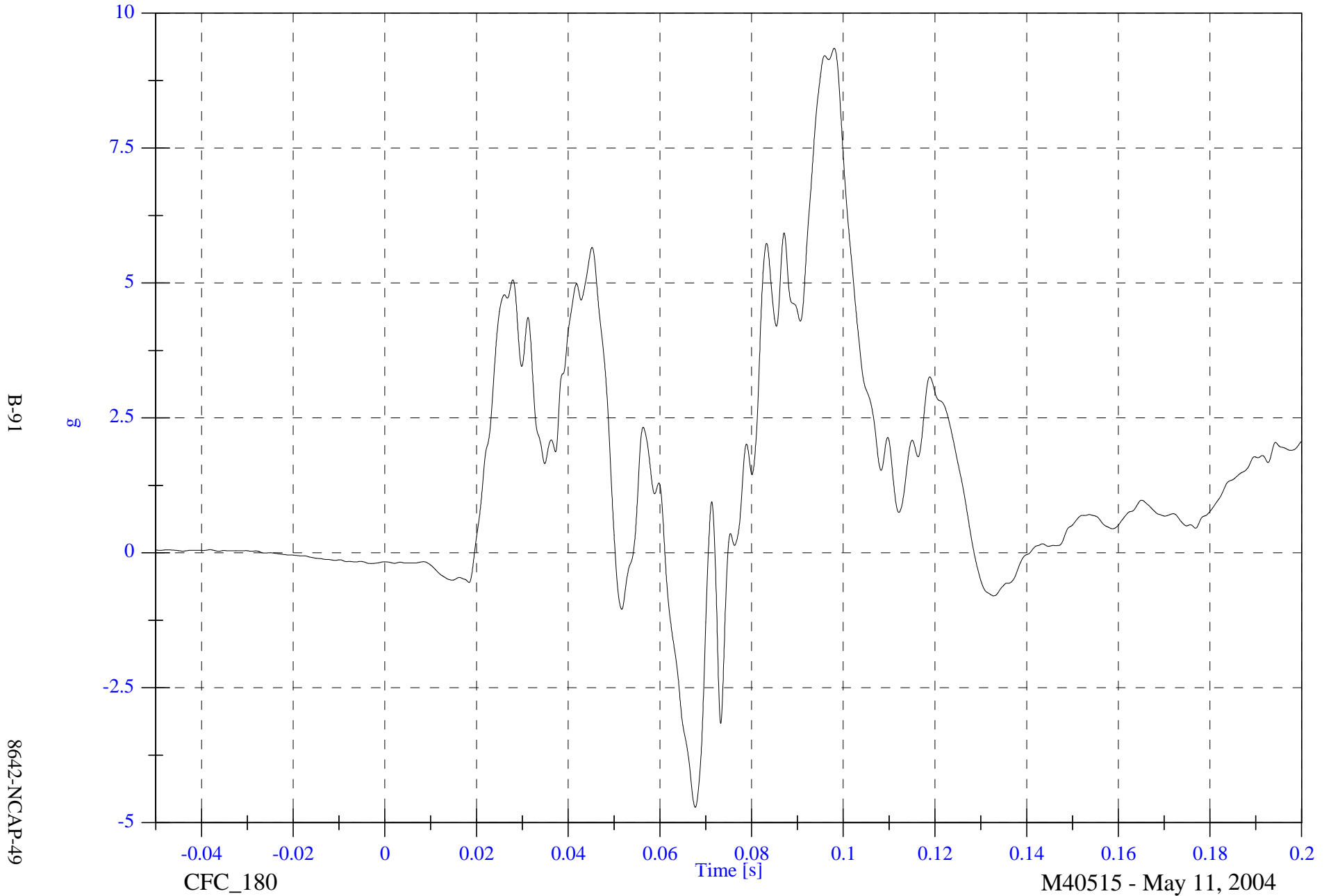
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

VIP2 Chest Red z

Max: 9.3 [g] at 0.098 [s]

Min: -4.7 [g] at 0.068 [s]



B-91

8642-NCAP-49

CFC_180

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

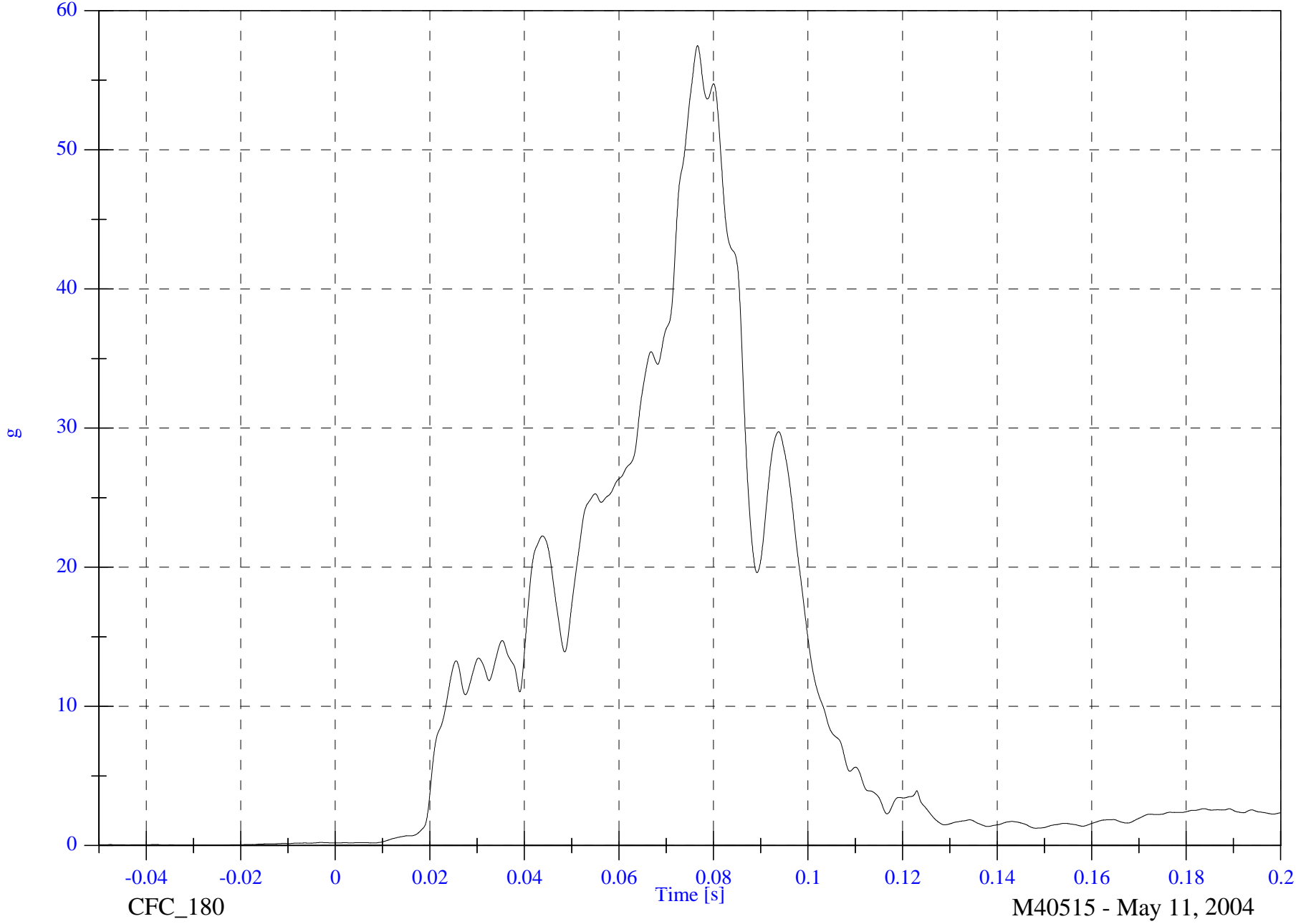
V1P2 Chest Red Resultant

Max: 57.5 [g] at 0.077 [s]

Min: 0.0 [g] at -0.026 [s]

B-92

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

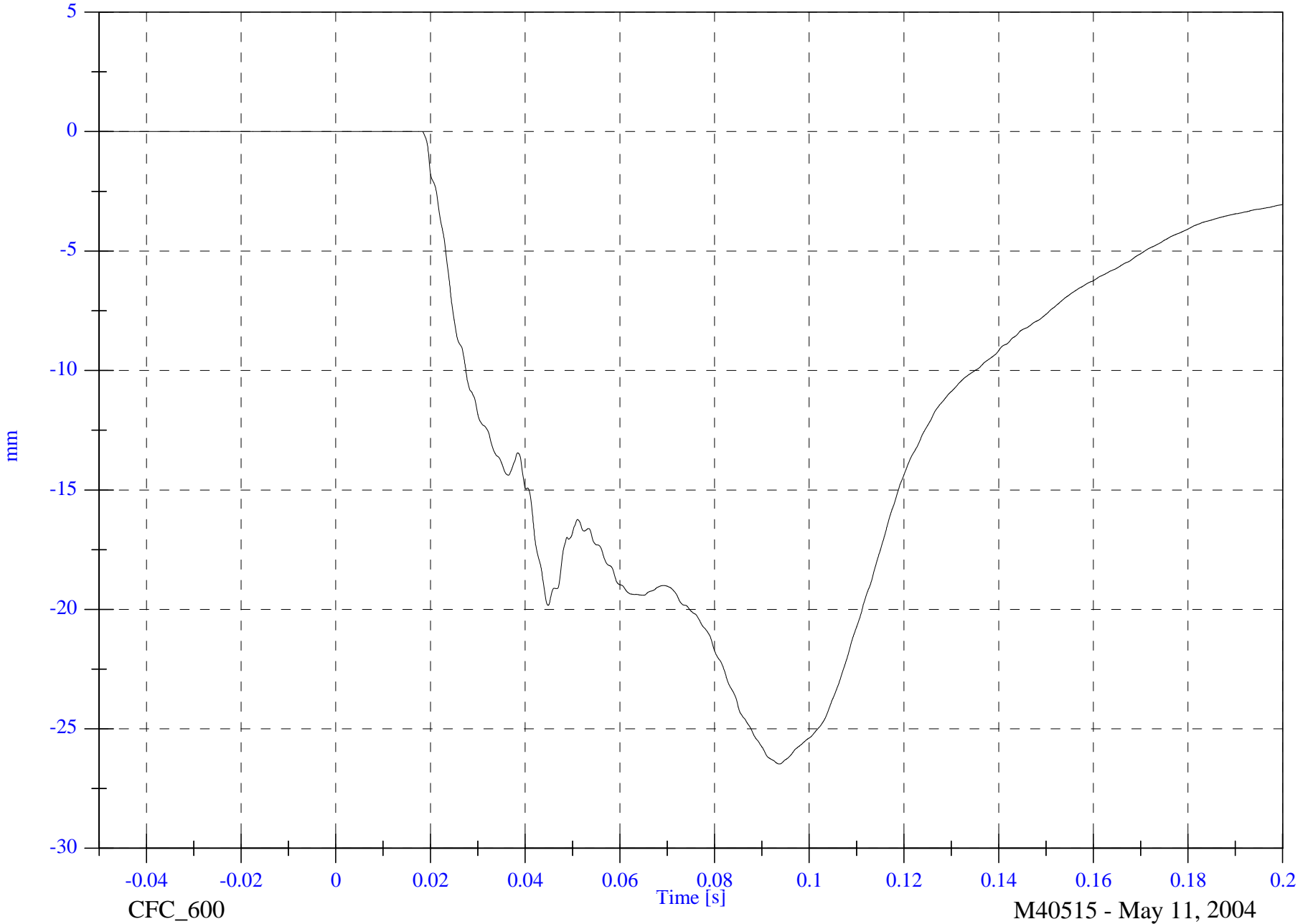
V1P2 Chest Compression

Max: 0.0 [mm] at -0.026 [s]

Min: -26.5 [mm] at 0.094 [s]

B-93

8642-NCAP-49



CFC_600

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

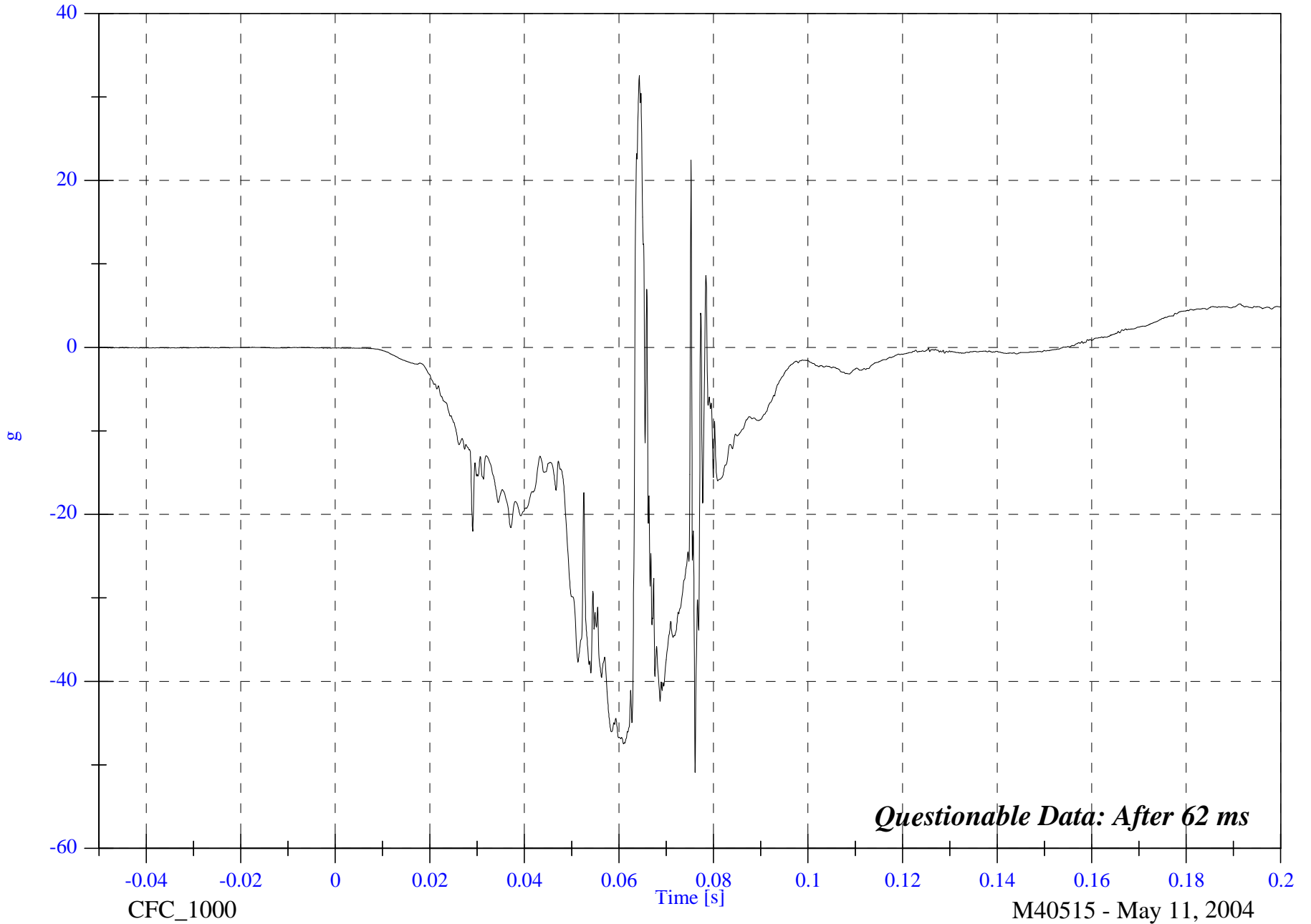
V1P2 Pelvic x

Max: 32.6 [g] at 0.064 [s]

Min: -50.9 [g] at 0.076 [s]

B-94

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

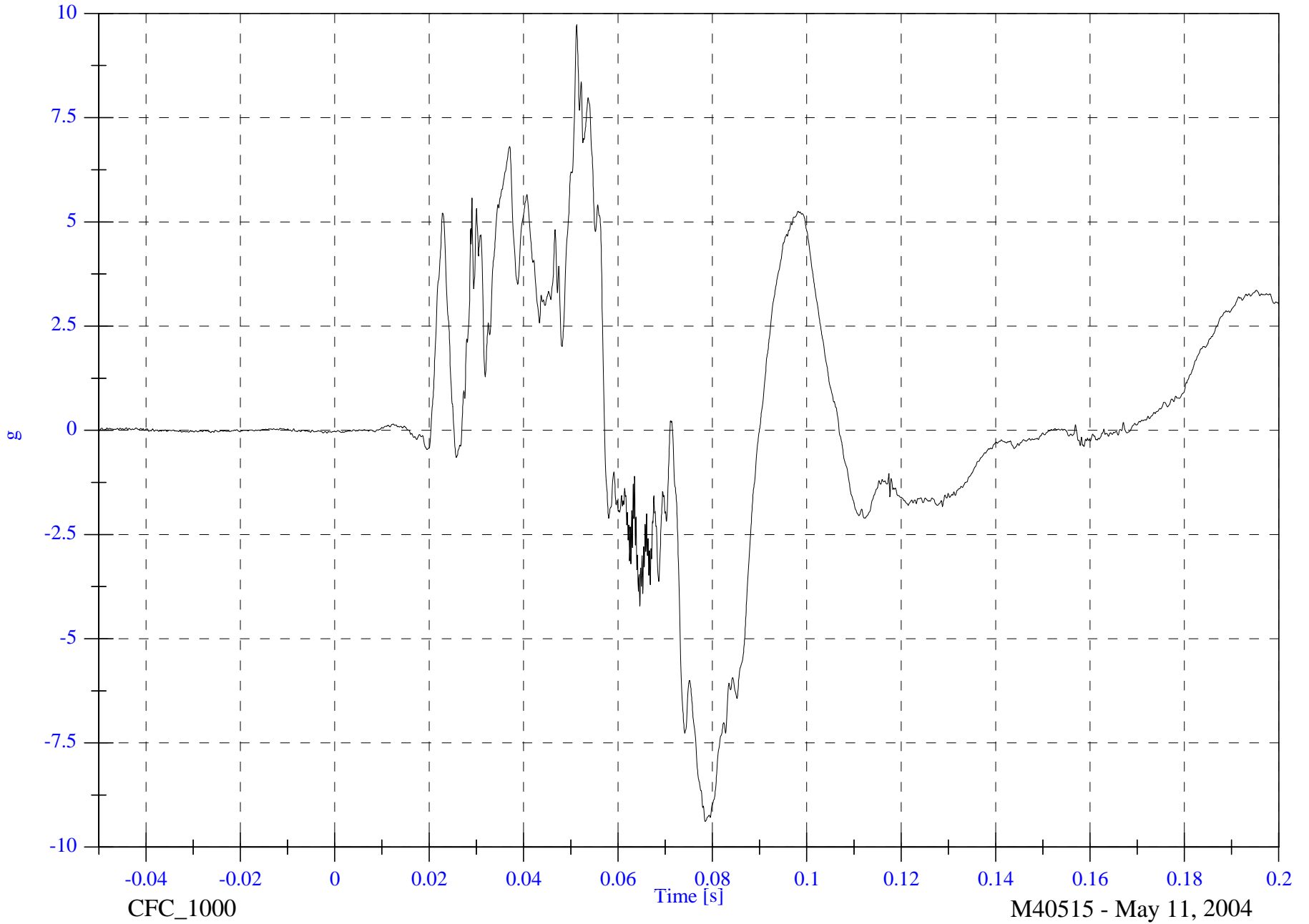
V1P2 Pelvic y

Max: 9.7 [g] at 0.051 [s]

Min: -9.4 [g] at 0.078 [s]

B-95

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

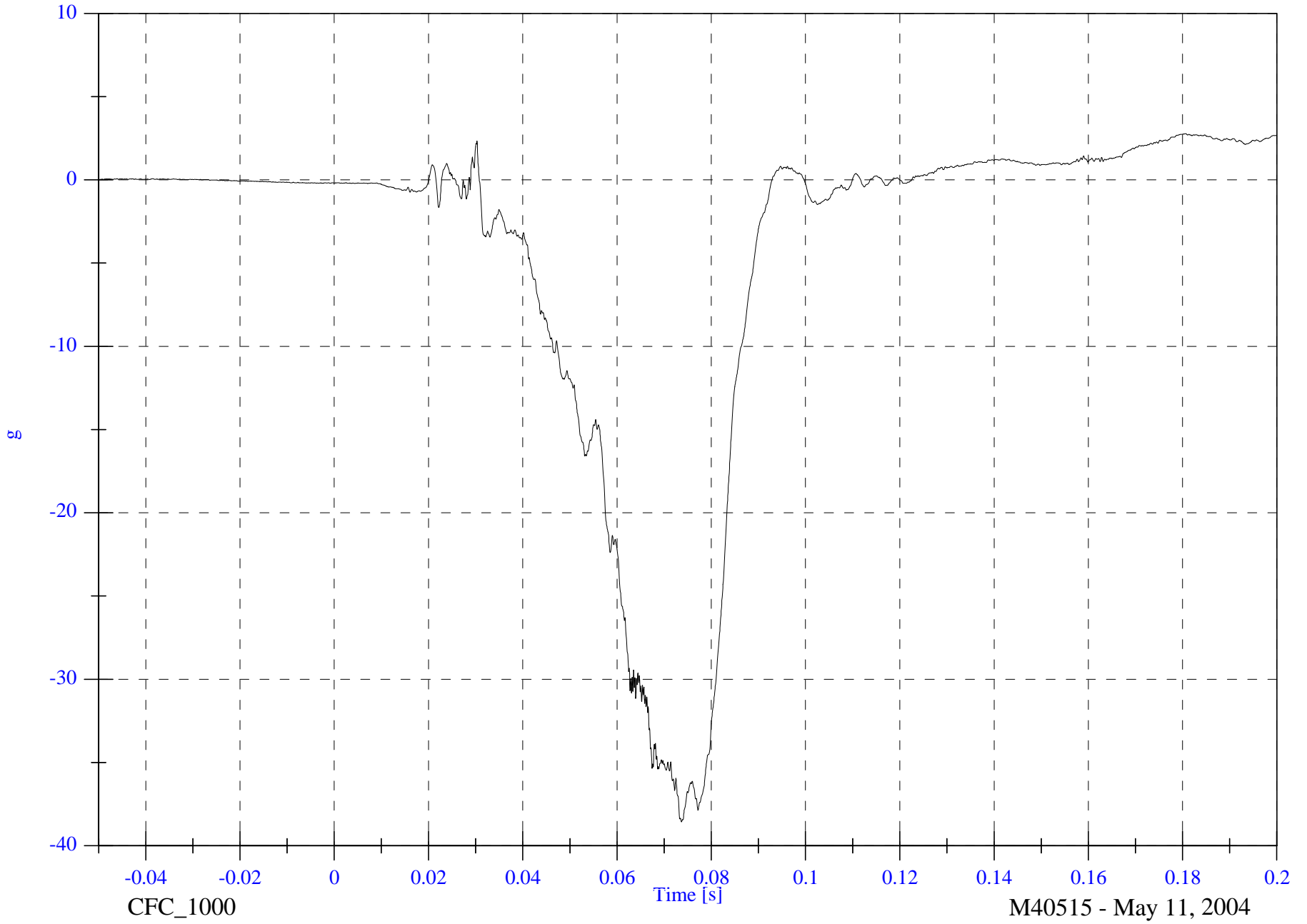
V1P2 Pelvic z

Max: 2.8 [g] at 0.181 [s]

Min: -38.6 [g] at 0.074 [s]

B-96

8642-NCAP-49



M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

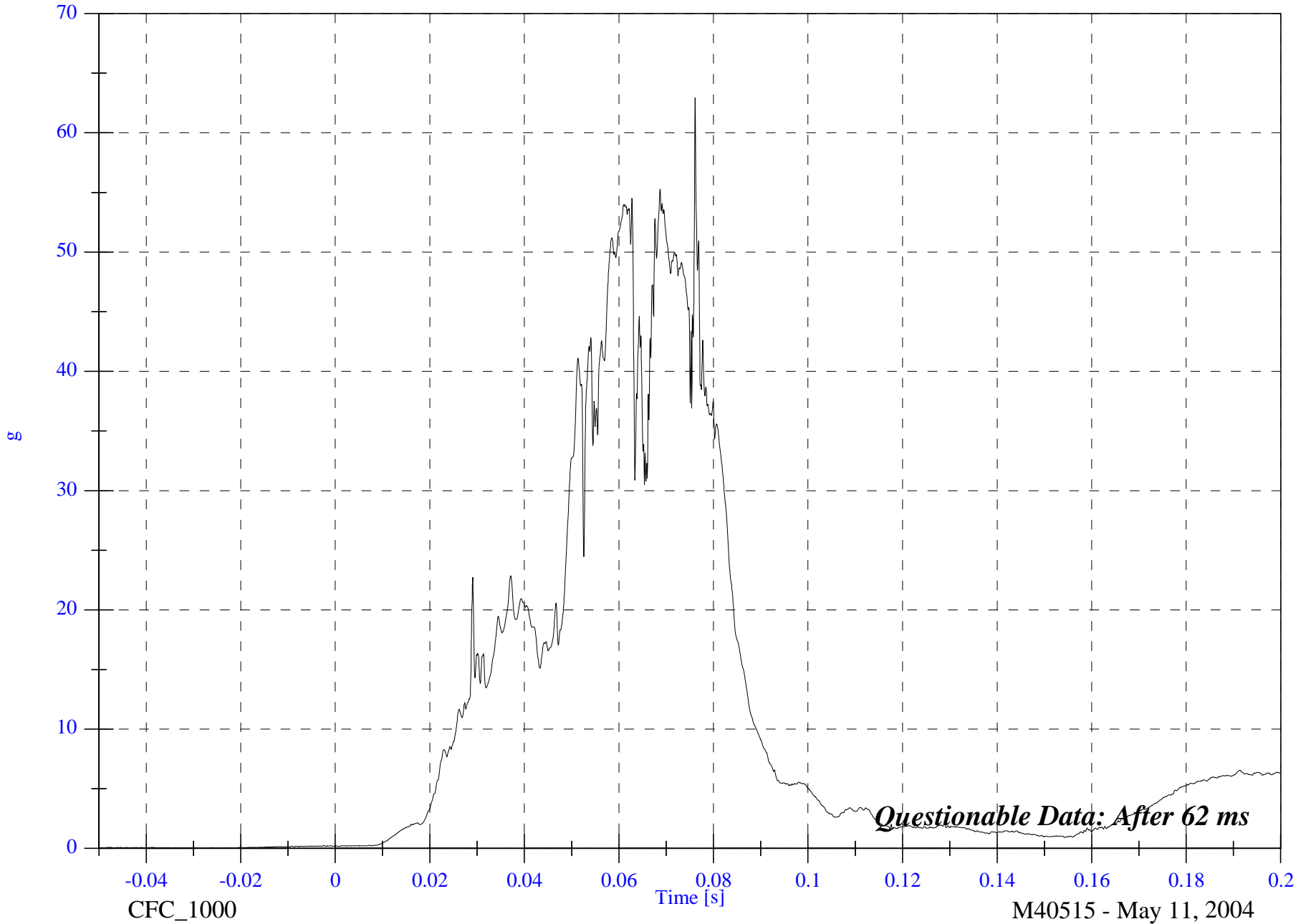
V1P2 Pelvic Resultant

Max: 62.9 [g] at 0.076 [s]

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

B-97

8642-NCAP-49



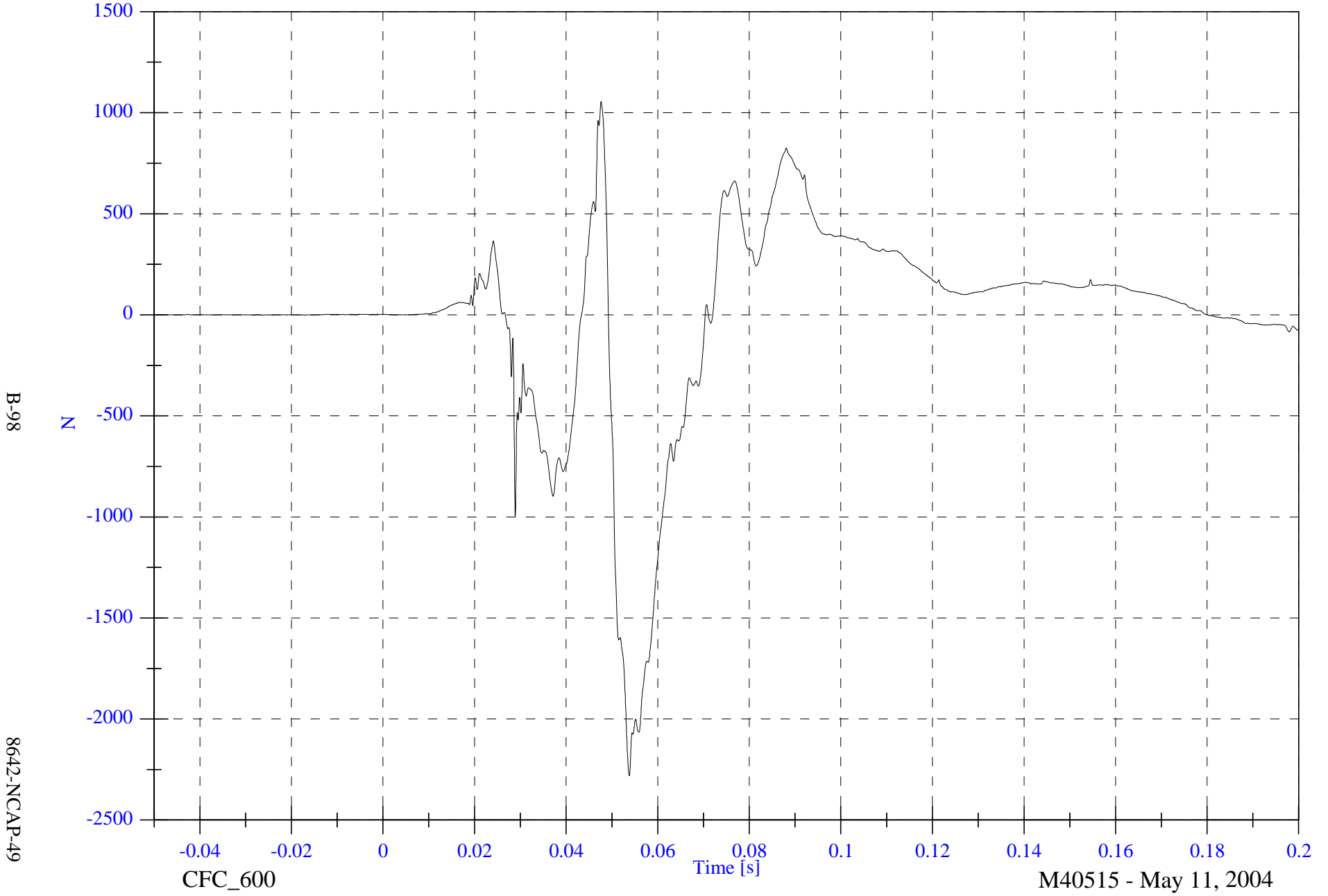
Questionable Data: After 62 ms

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Left Femur

Max: 1055.6 [N] at 0.048 [s]

Min: -2281.0 [N] at 0.054 [s]



B-98

8642-NCAP-49

CFC_600

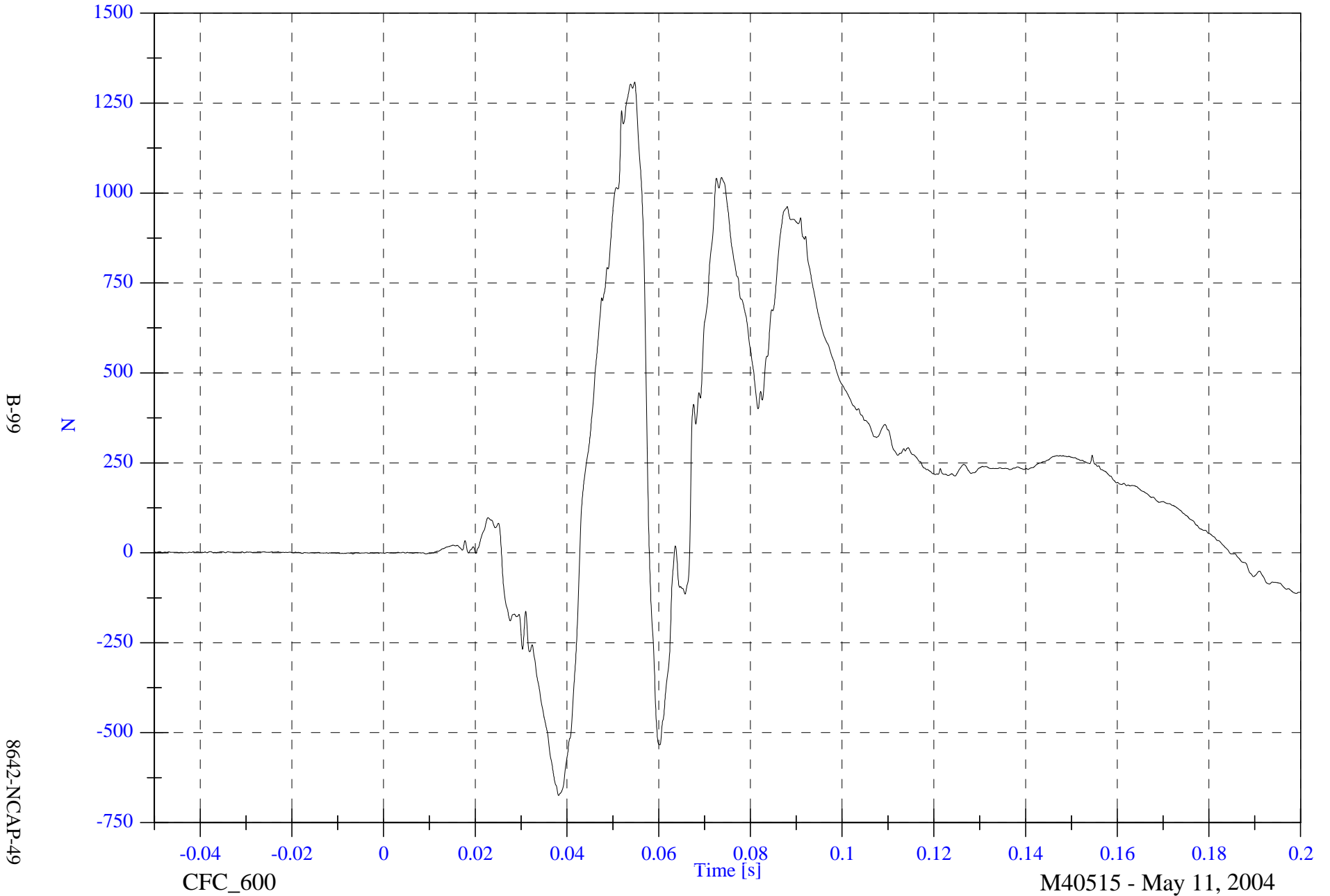
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Right Femur

Max: 1308.7 [N] at 0.055 [s]

Min: -674.6 [N] at 0.038 [s]



B-99

8642-NCAP-49

CFC_600

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

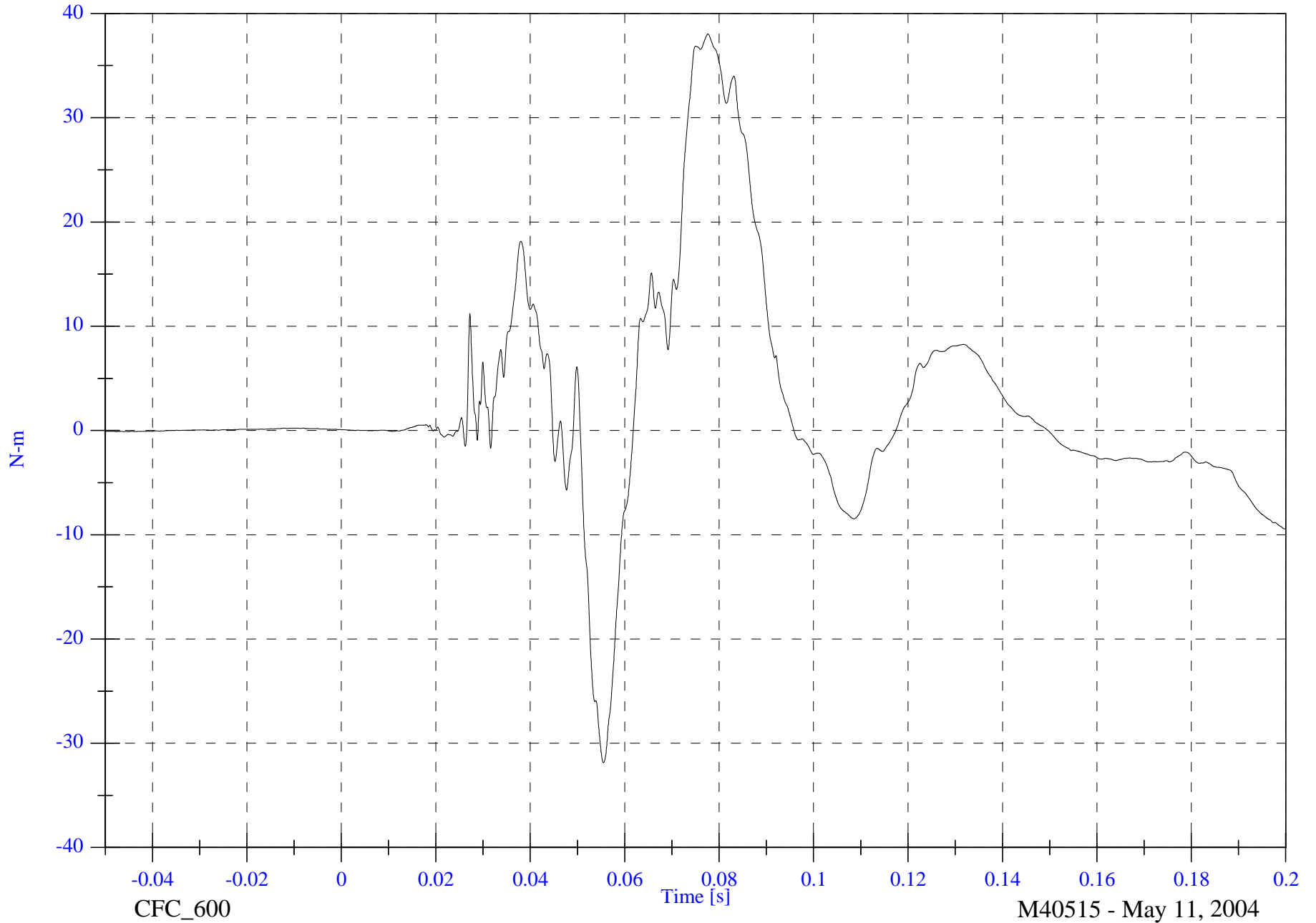
V1P2 Left Upper Tibia Mx

Max: 38.0 [N-m] at 0.078 [s]

Min: -31.9 [N-m] at 0.055 [s]

B-100

8642-NCAP-49



M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

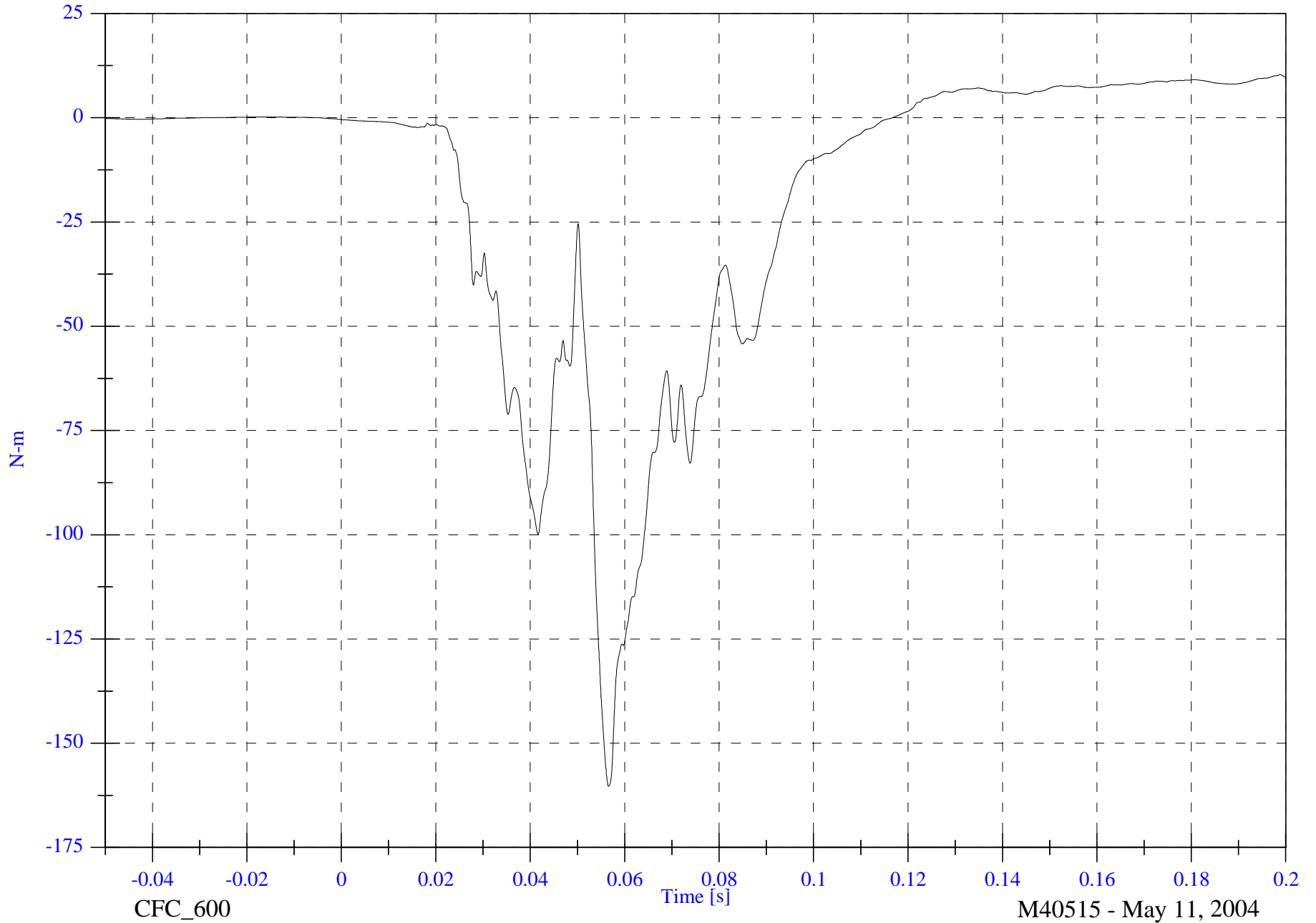
V1P2 Left Upper Tibia My

Max: 10.3 [N-m] at 0.199 [s]

Min: -160.3 [N-m] at 0.057 [s]

B-101

8642-NCAP-49



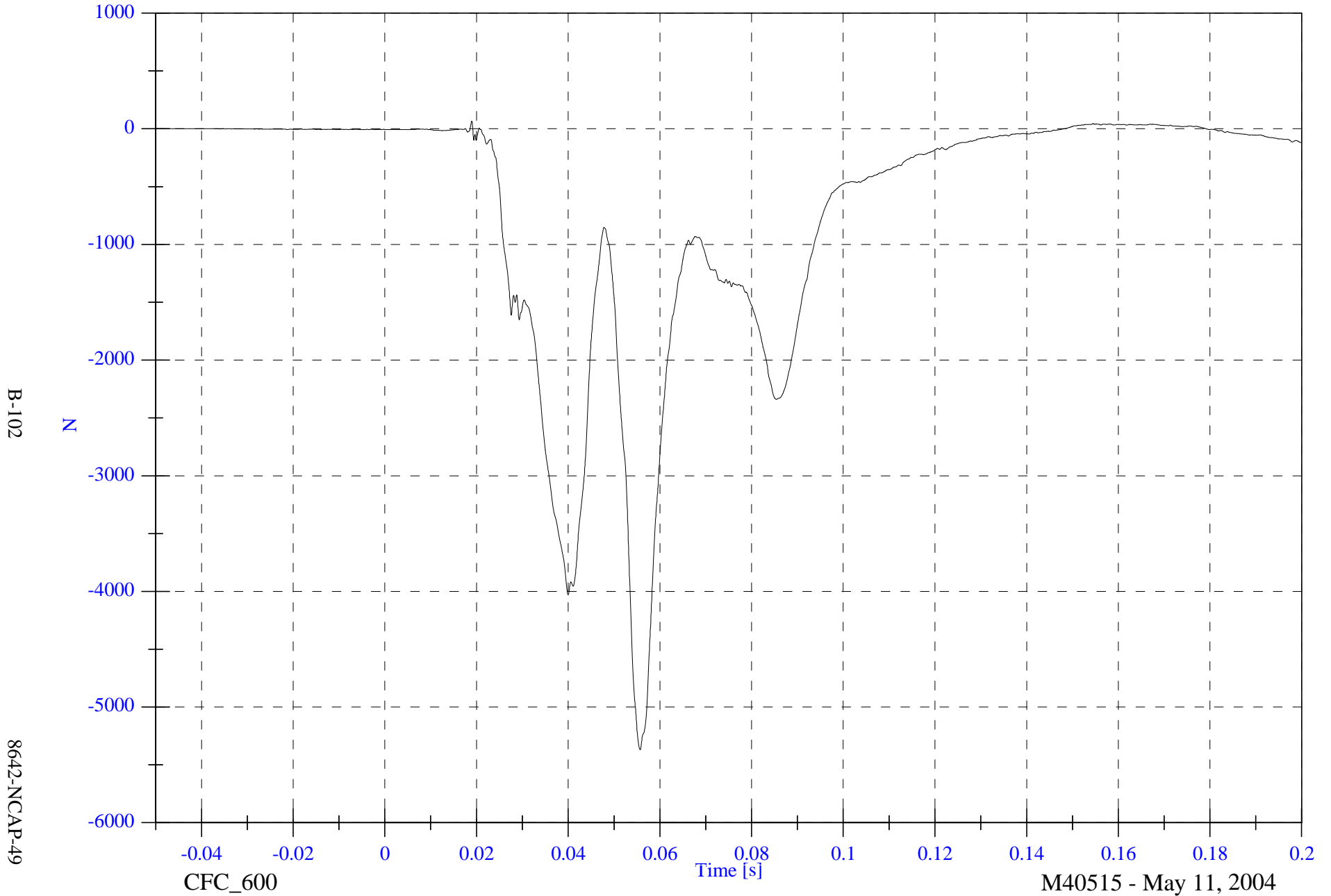
CFC_600

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Left Lower Tibia Fz

Max: 66.1 [N] at 0.019 [s]
Min: -5369.7 [N] at 0.056 [s]



2004 NCAP Test 13 - 2004.5 Kia Spectra

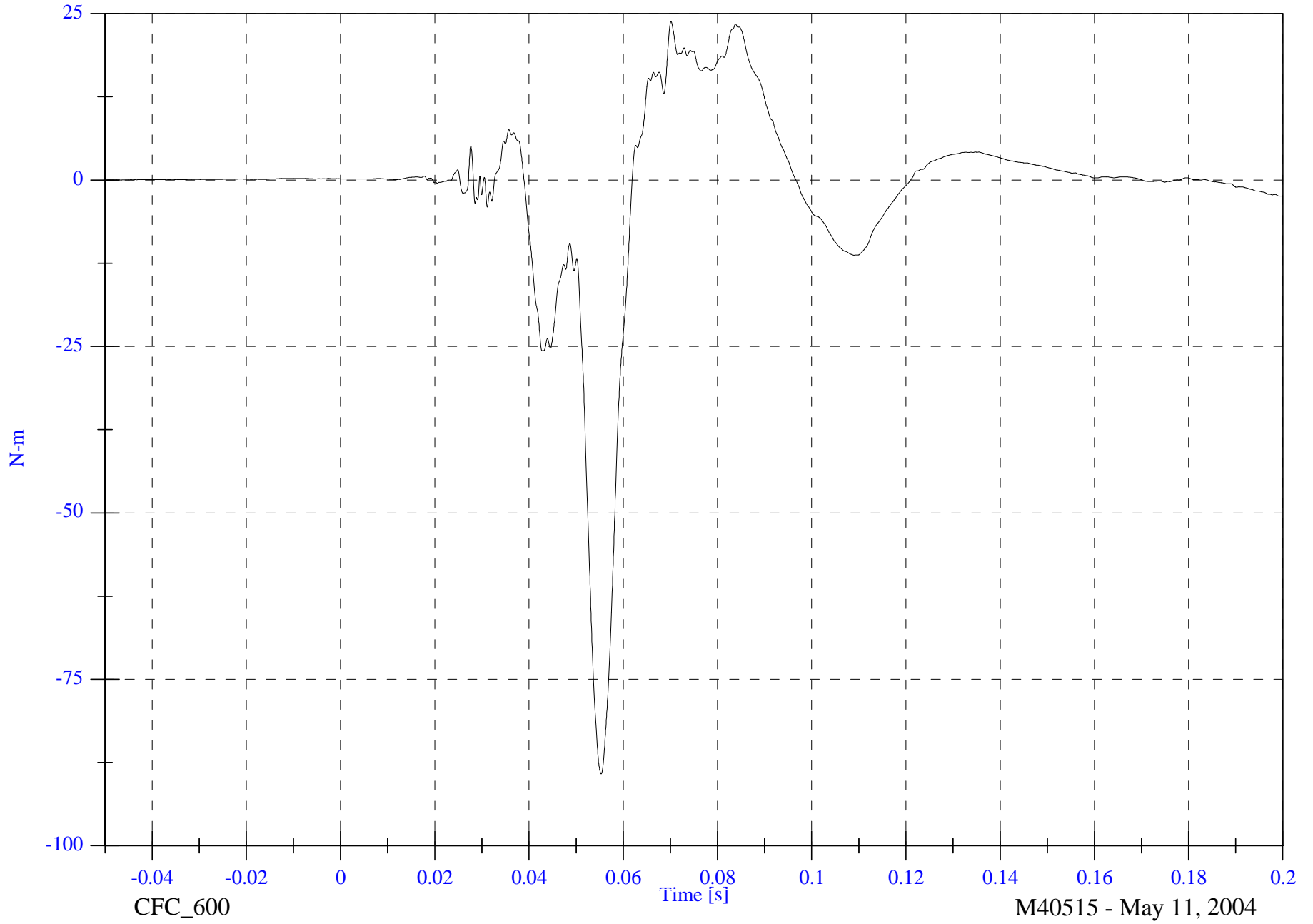
V1P2 Left Lower Tibia Mx

Max: 23.8 [N-m] at 0.070 [s]

Min: -89.2 [N-m] at 0.055 [s]

B-103

8642-NCAP-49



M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

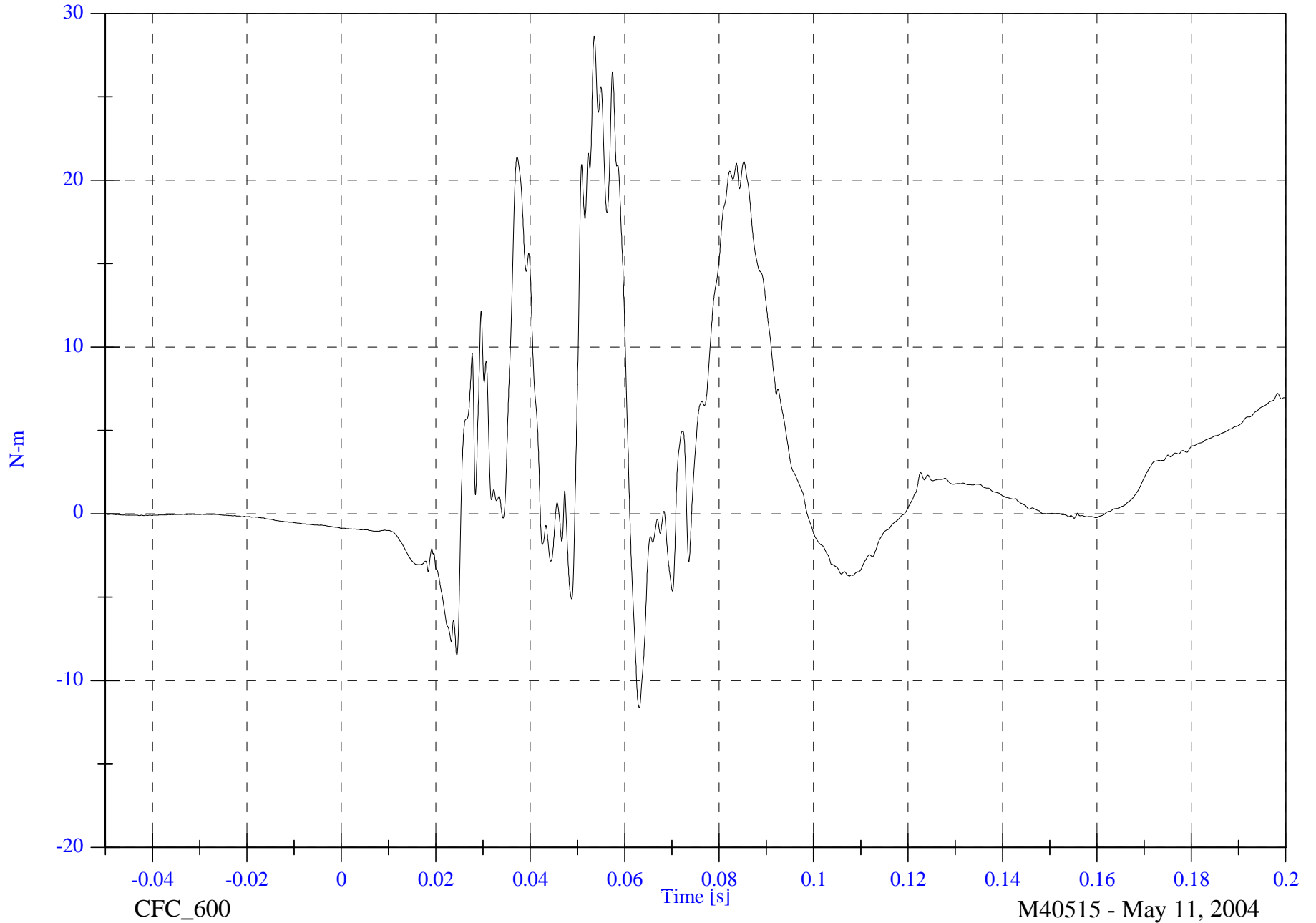
V1P2 Left Lower Tibia My

Max: 28.6 [N-m] at 0.054 [s]

Min: -11.6 [N-m] at 0.063 [s]

B-104

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

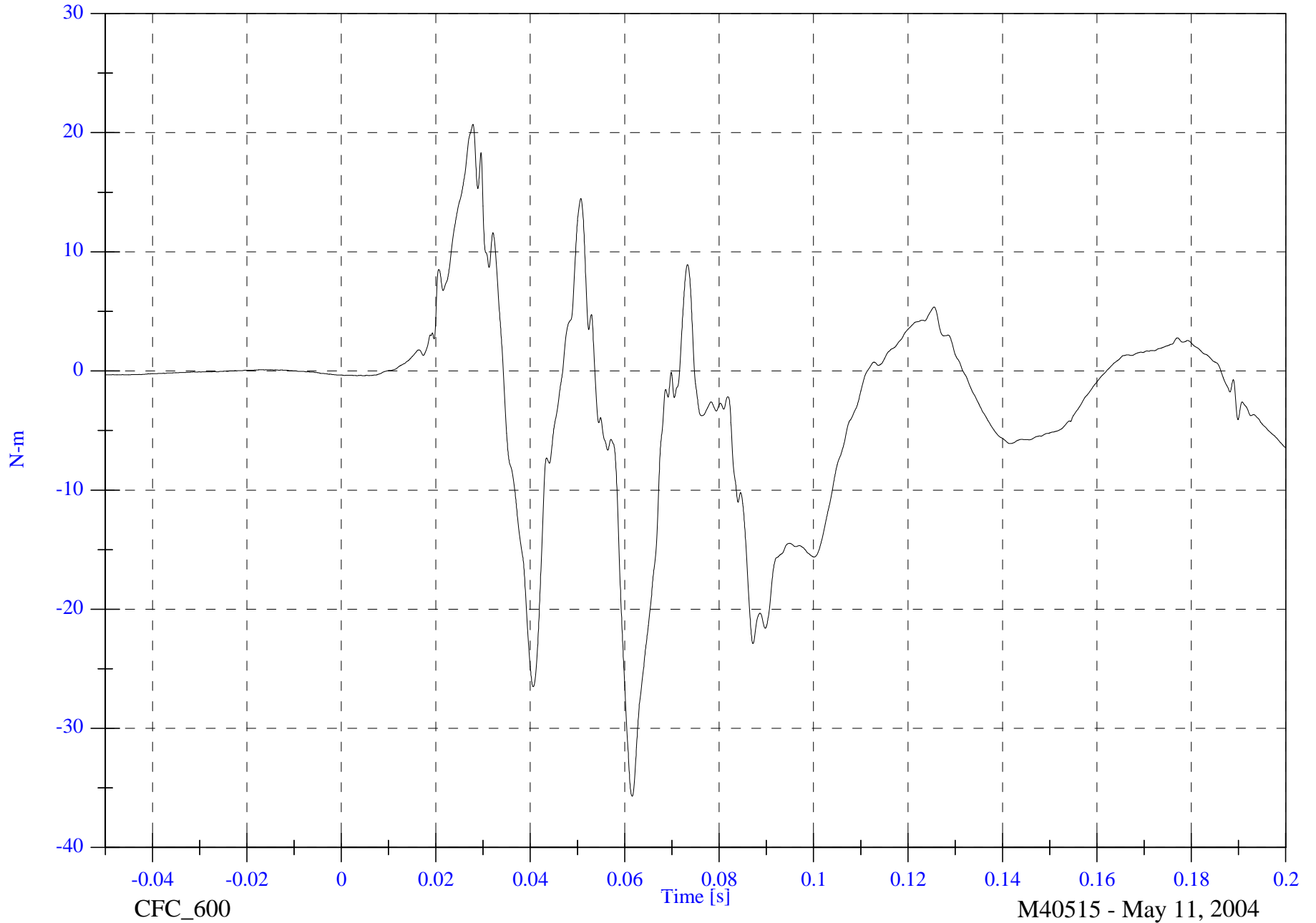
V1P2 Right Upper Tibia Mx

Max: 20.7 [N-m] at 0.028 [s]

Min: -35.7 [N-m] at 0.062 [s]

B-105

8642-NCAP-49



CFC_600

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

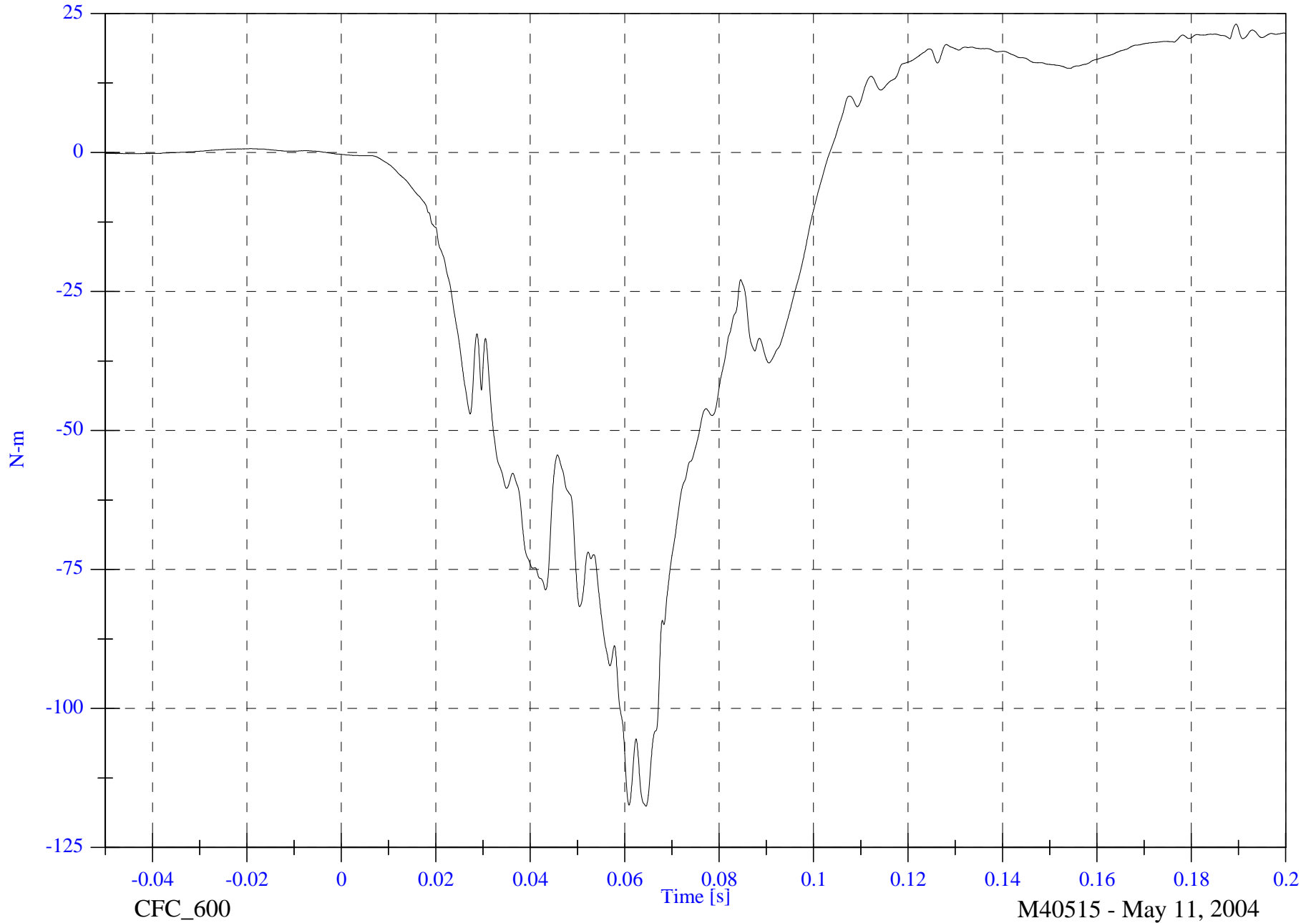
V1P2 Right Upper Tibia My

Max: 23.1 [N-m] at 0.189 [s]

Min: -117.6 [N-m] at 0.064 [s]

B-106

8642-NCAP-49



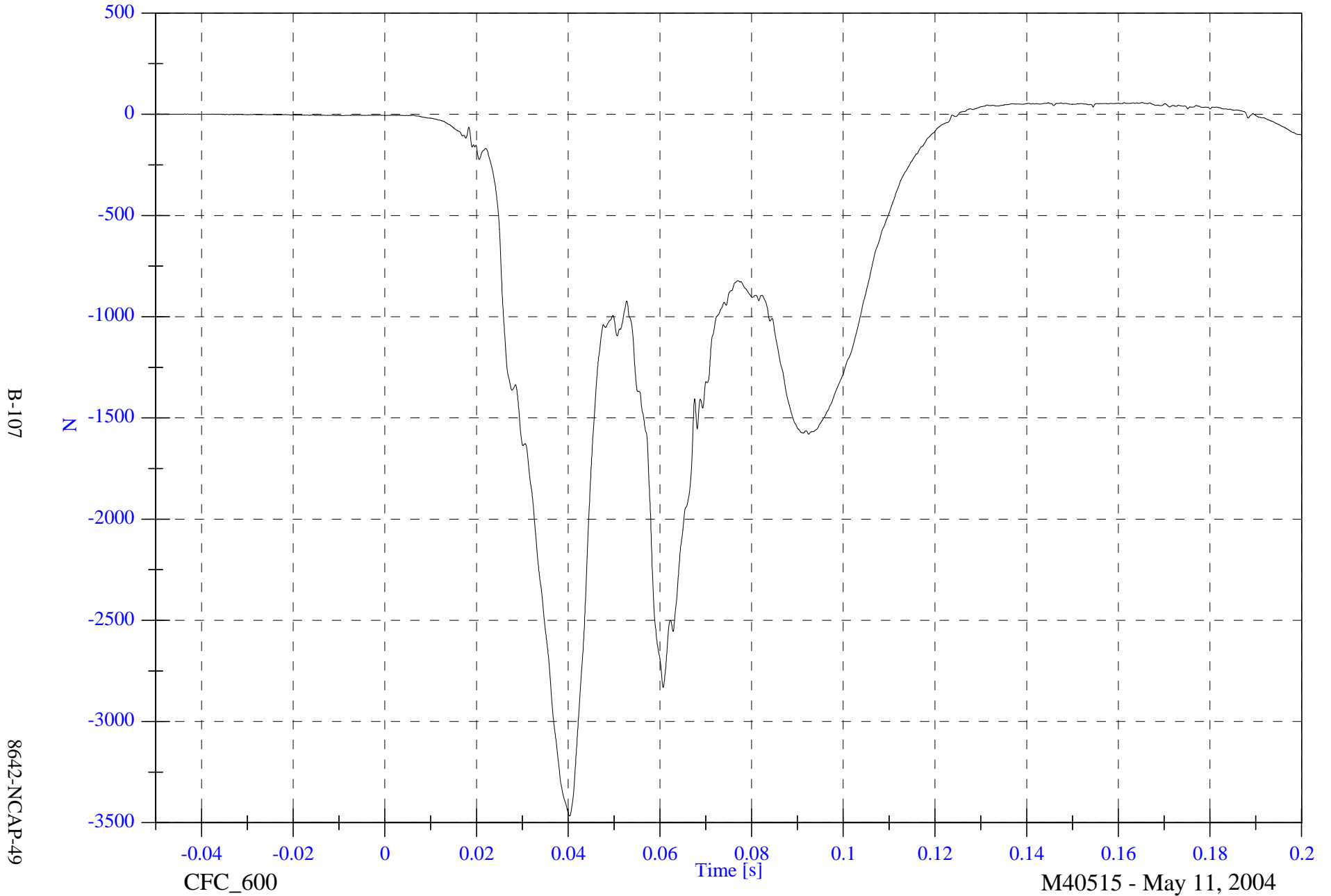
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Right Lower Tibia Fz

Max: 57.9 [N] at 0.165 [s]

Min: -3467.0 [N] at 0.040 [s]



B-107

8642-NCAP-49

CFC_600

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

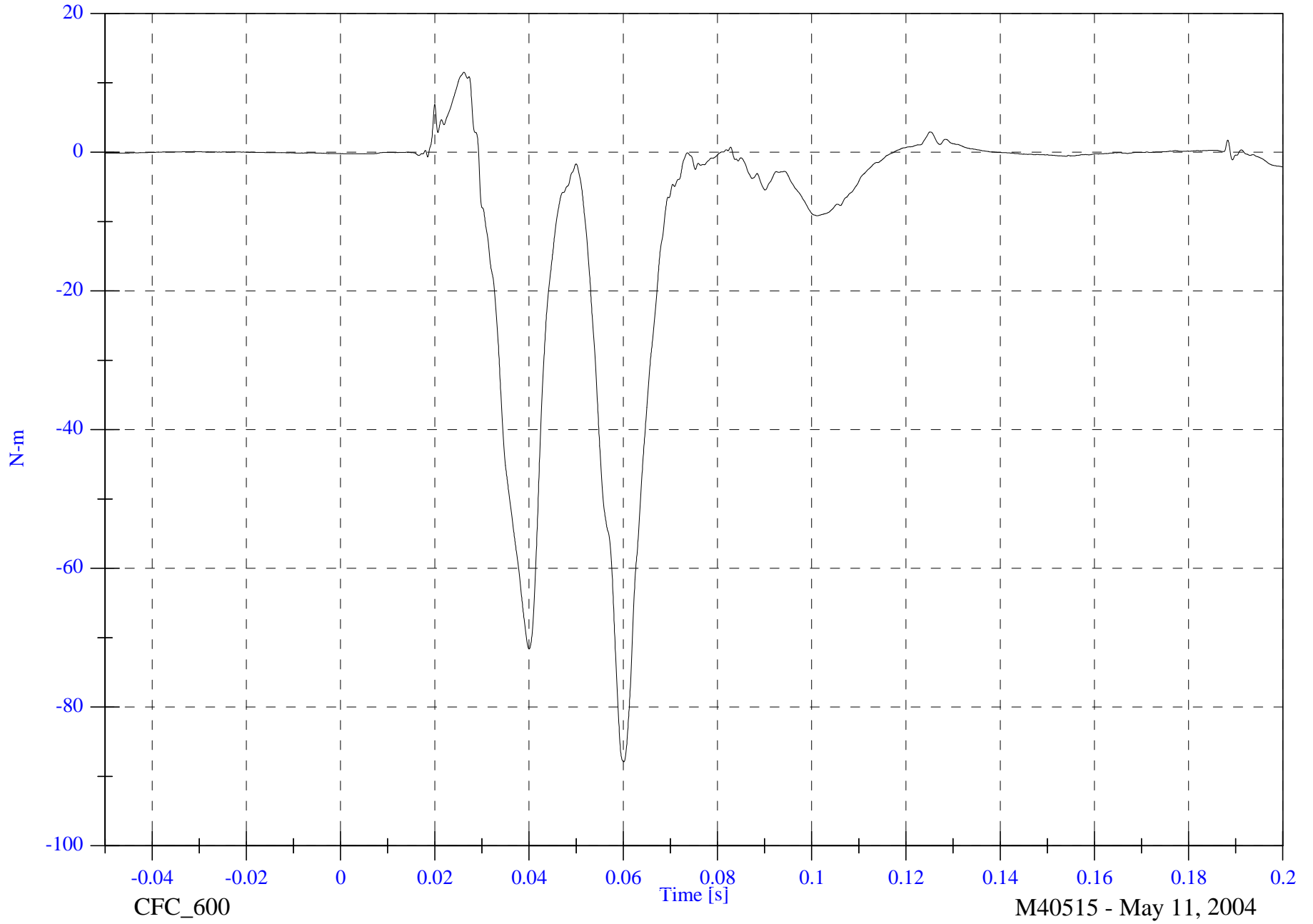
V1P2 Right Lower Tibia Mx

Max: 11.5 [N-m] at 0.026 [s]

Min: -87.9 [N-m] at 0.060 [s]

B-108

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

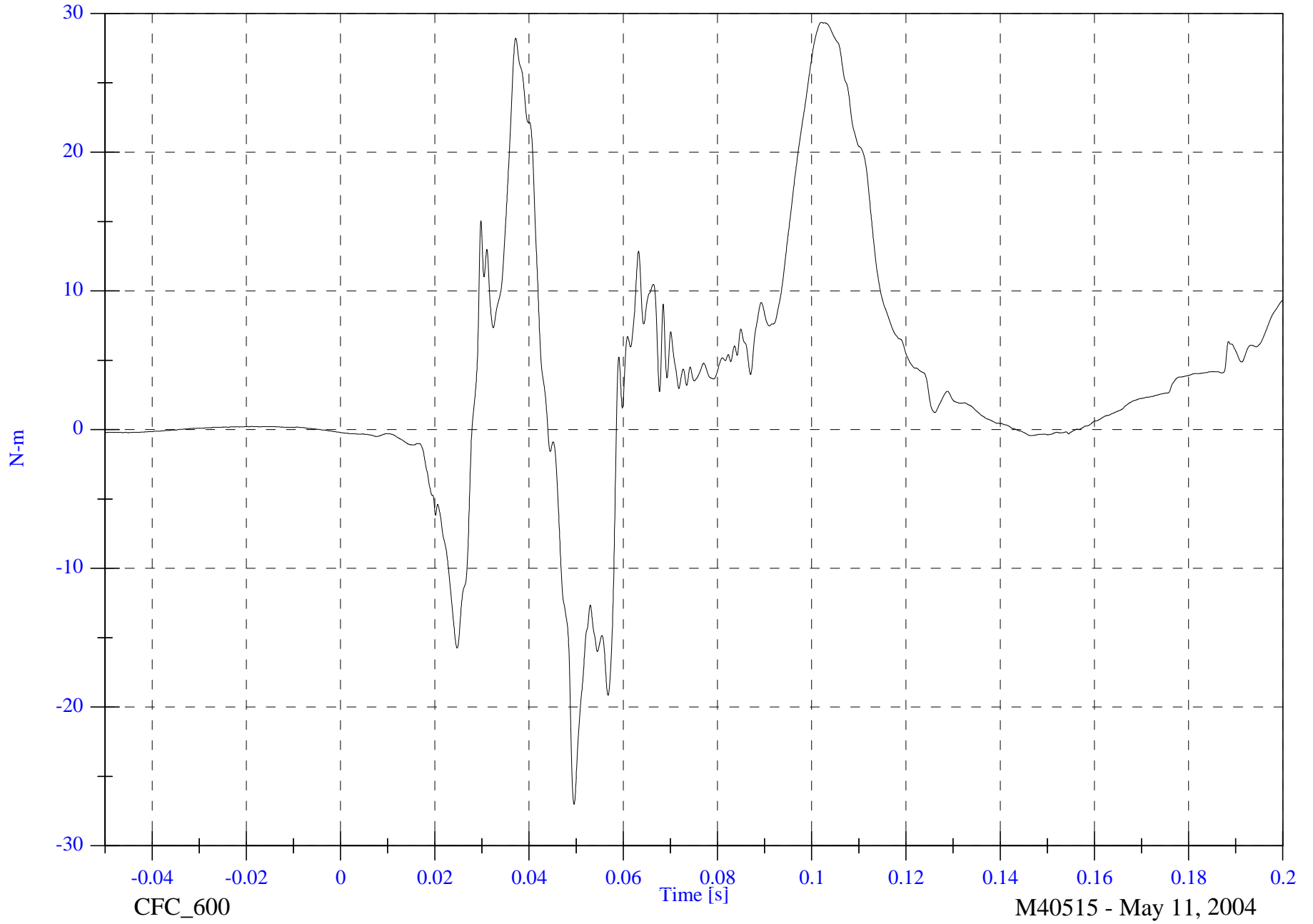
V1P2 Right Lower Tibia My

Max: 29.3 [N-m] at 0.102 [s]

Min: -27.0 [N-m] at 0.050 [s]

B-109

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

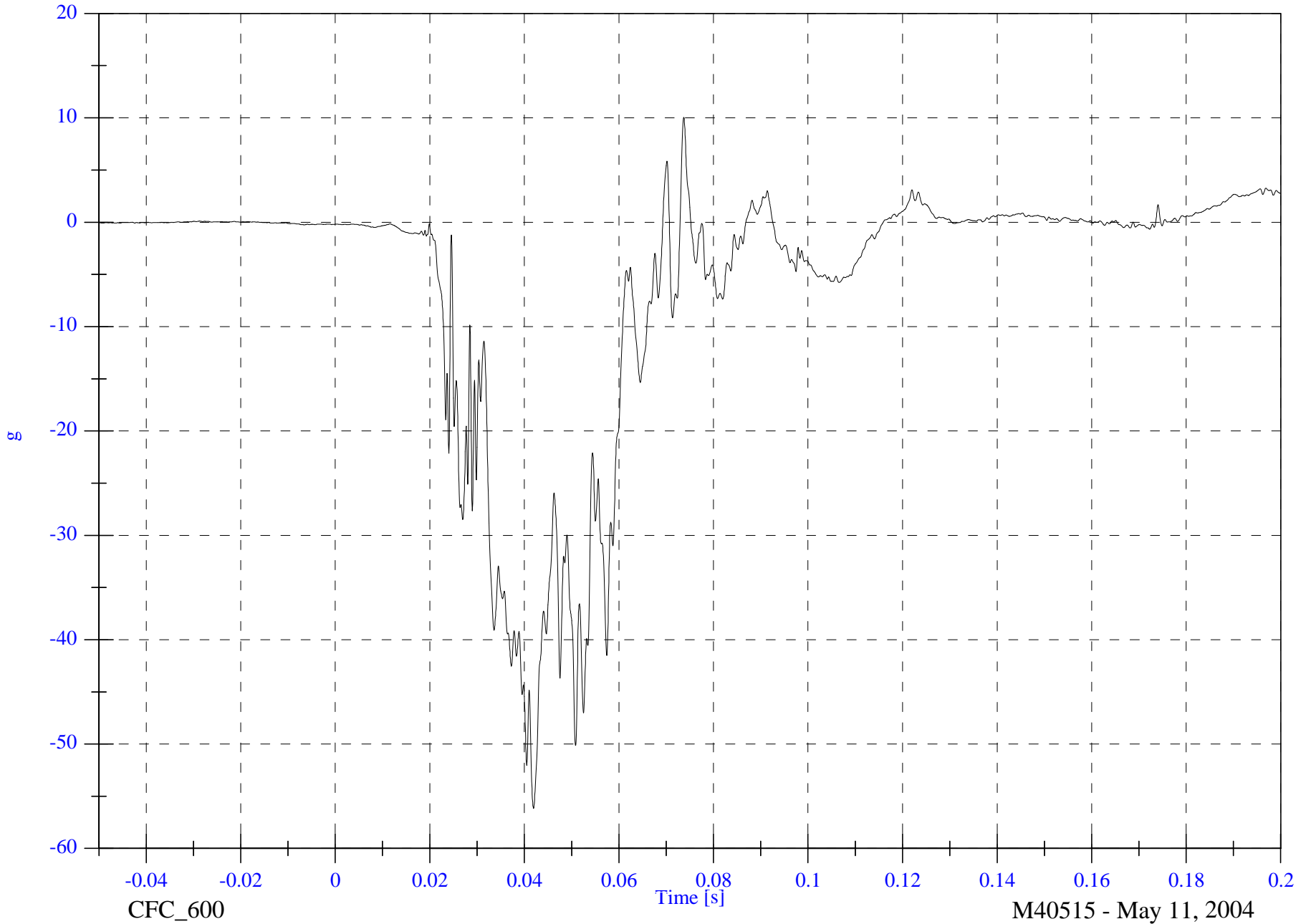
V1P2 Left Foot Aft x

Max: 10.0 [g] at 0.074 [s]

Min: -56.2 [g] at 0.042 [s]

B-110

8642-NCAP-49



CFC_600

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

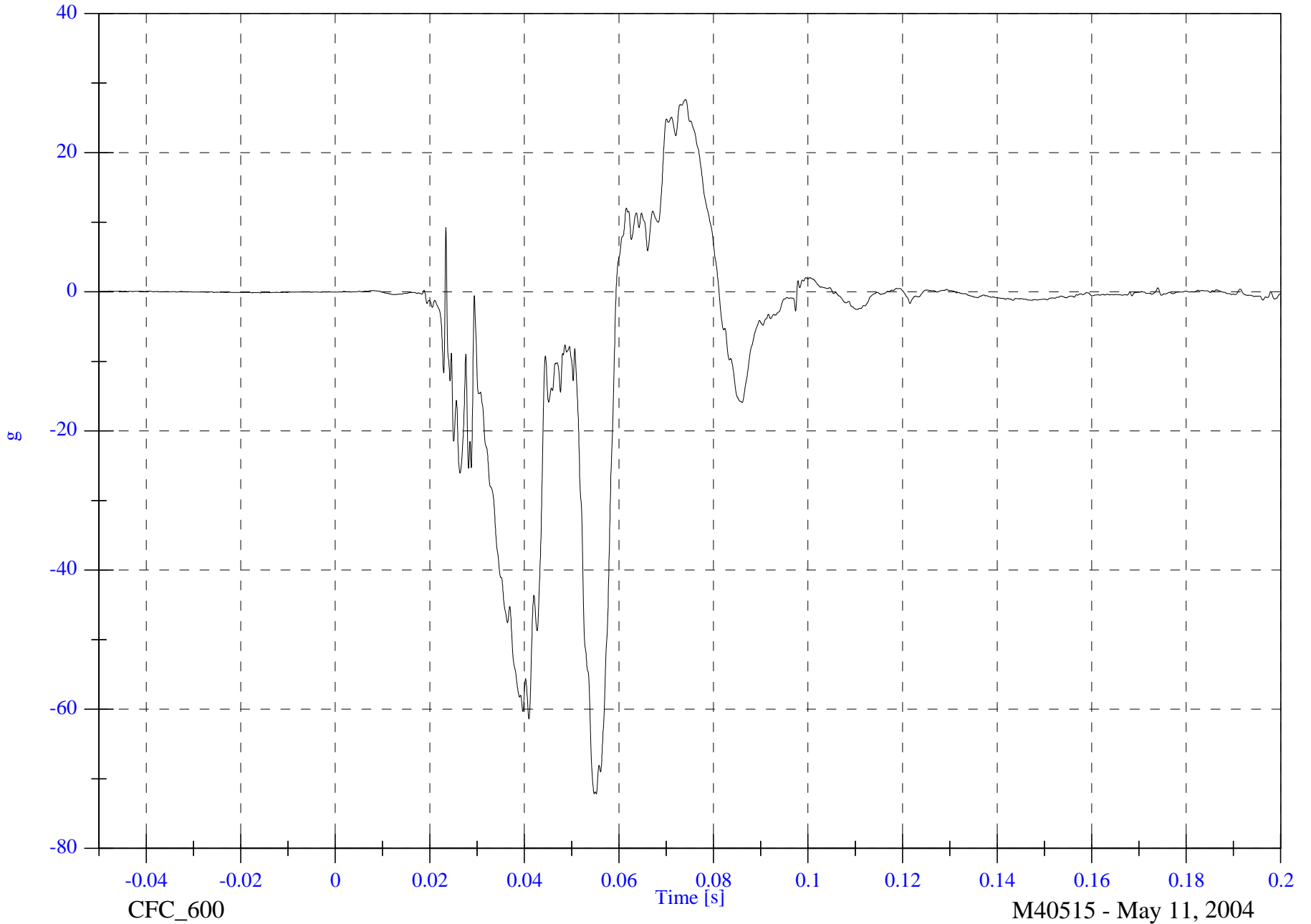
V1P2 Left Foot Aft z

Max: 27.7 [g] at 0.074 [s]

Min: -72.2 [g] at 0.055 [s]

B-111

8642-NCAP-49



CFC_600

Time [s]

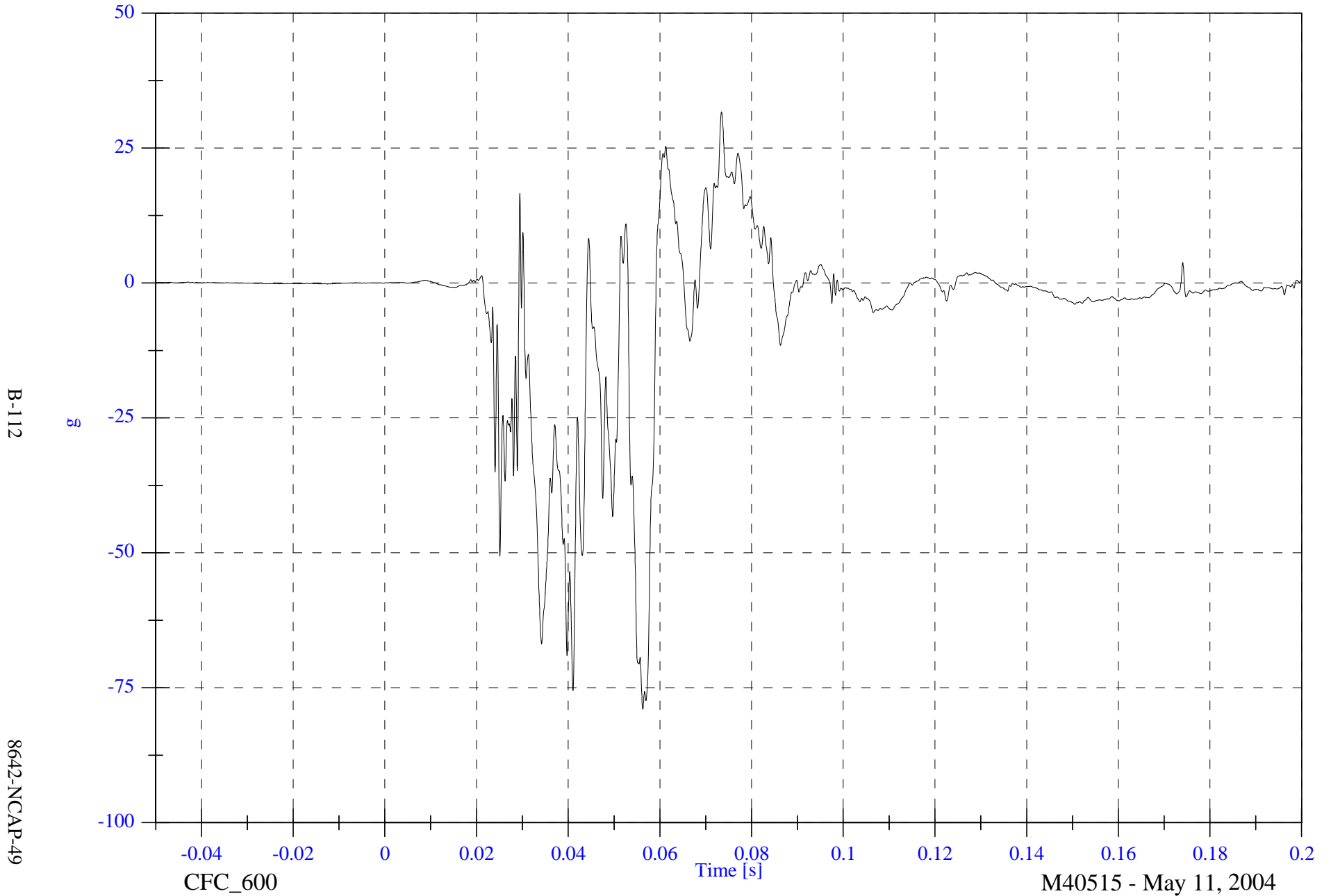
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Left Foot Fore z

Max: 31.7 [g] at 0.073 [s]

Min: -79.0 [g] at 0.056 [s]



2004 NCAP Test 13 - 2004.5 Kia Spectra

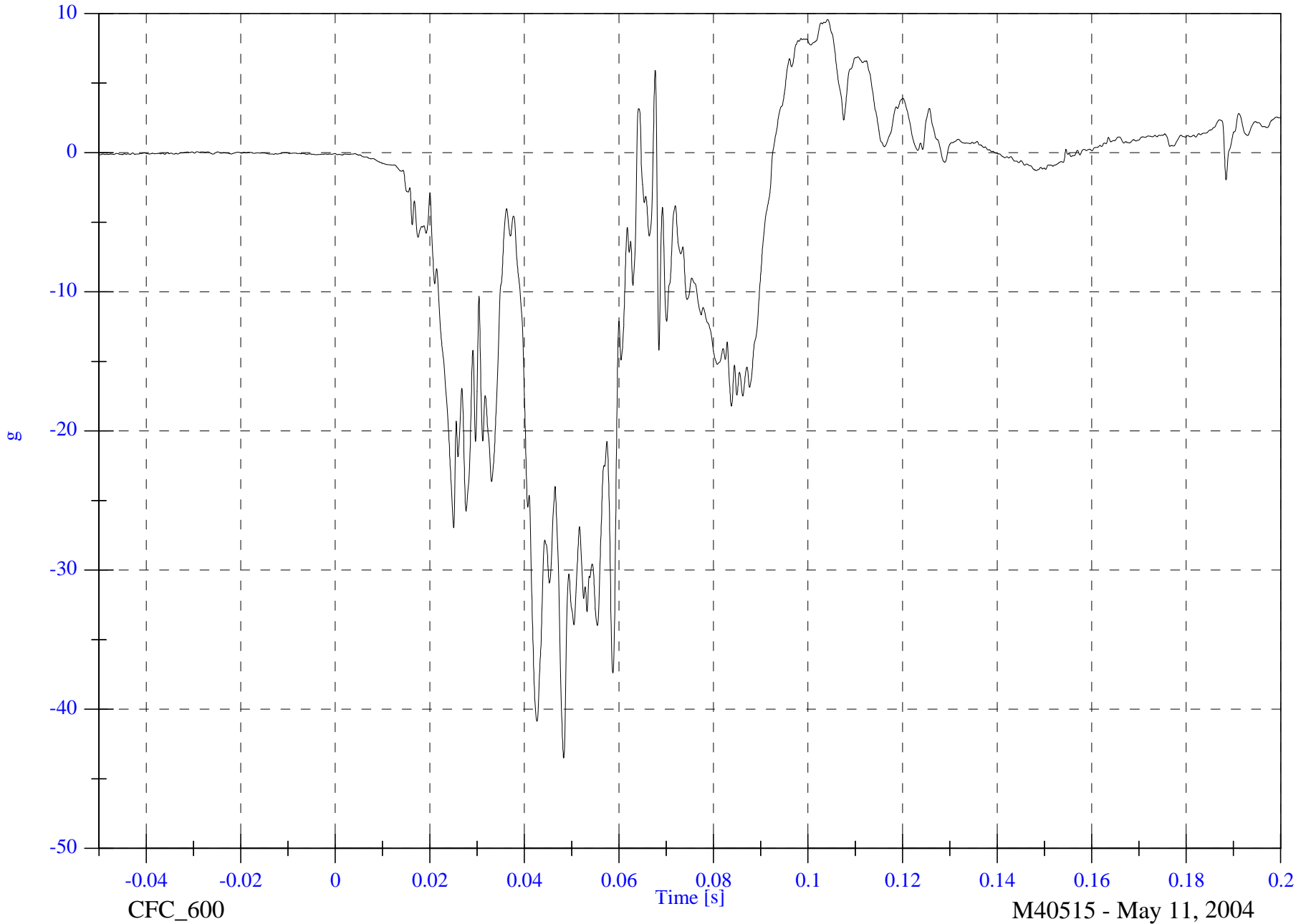
V1P2 Right Foot Aft x

Max: 9.6 [g] at 0.104 [s]

Min: -43.5 [g] at 0.048 [s]

B-113

8642-NCAP-49



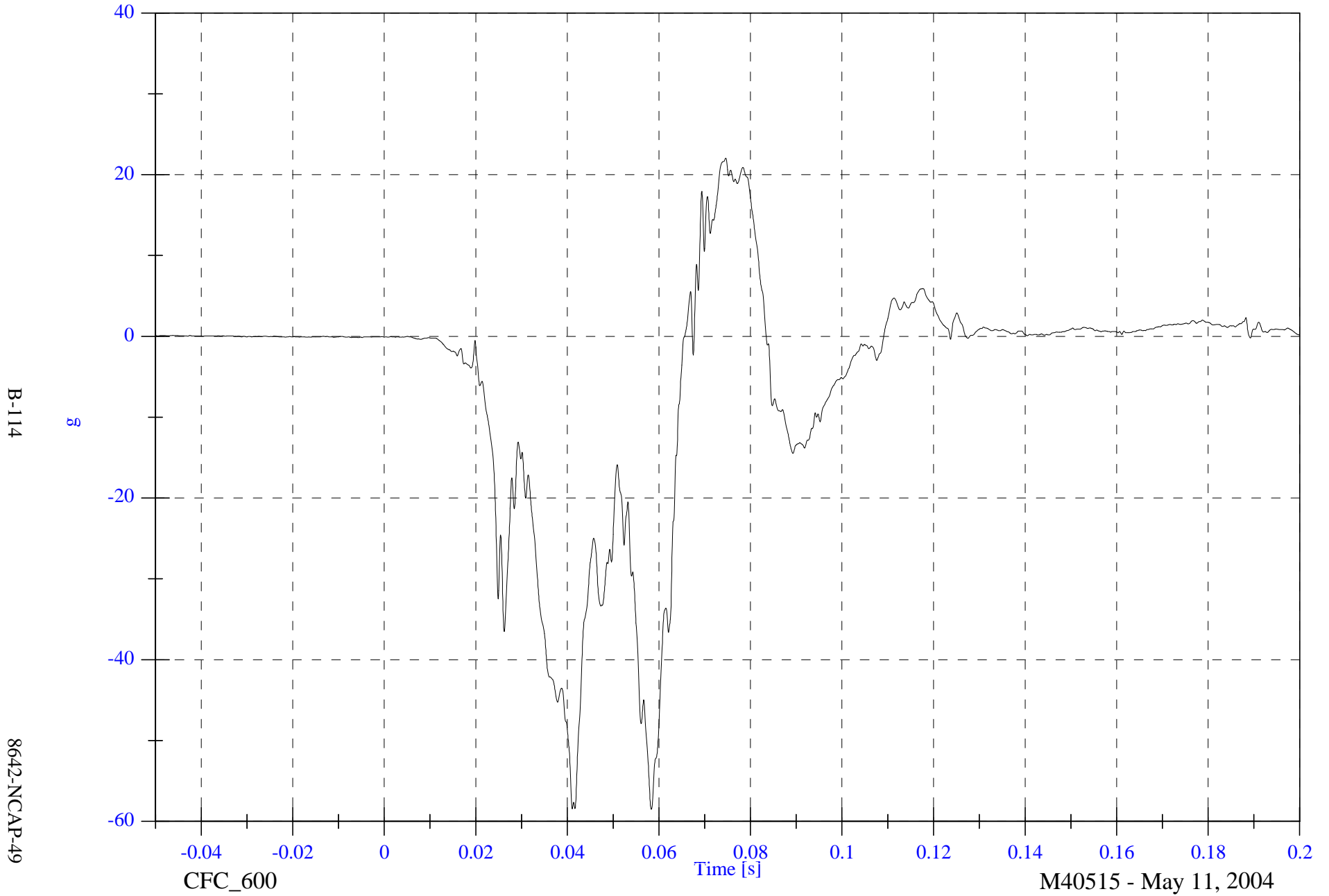
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Right Foot Aft z

Max: 22.1 [g] at 0.075 [s]

Min: -58.5 [g] at 0.058 [s]

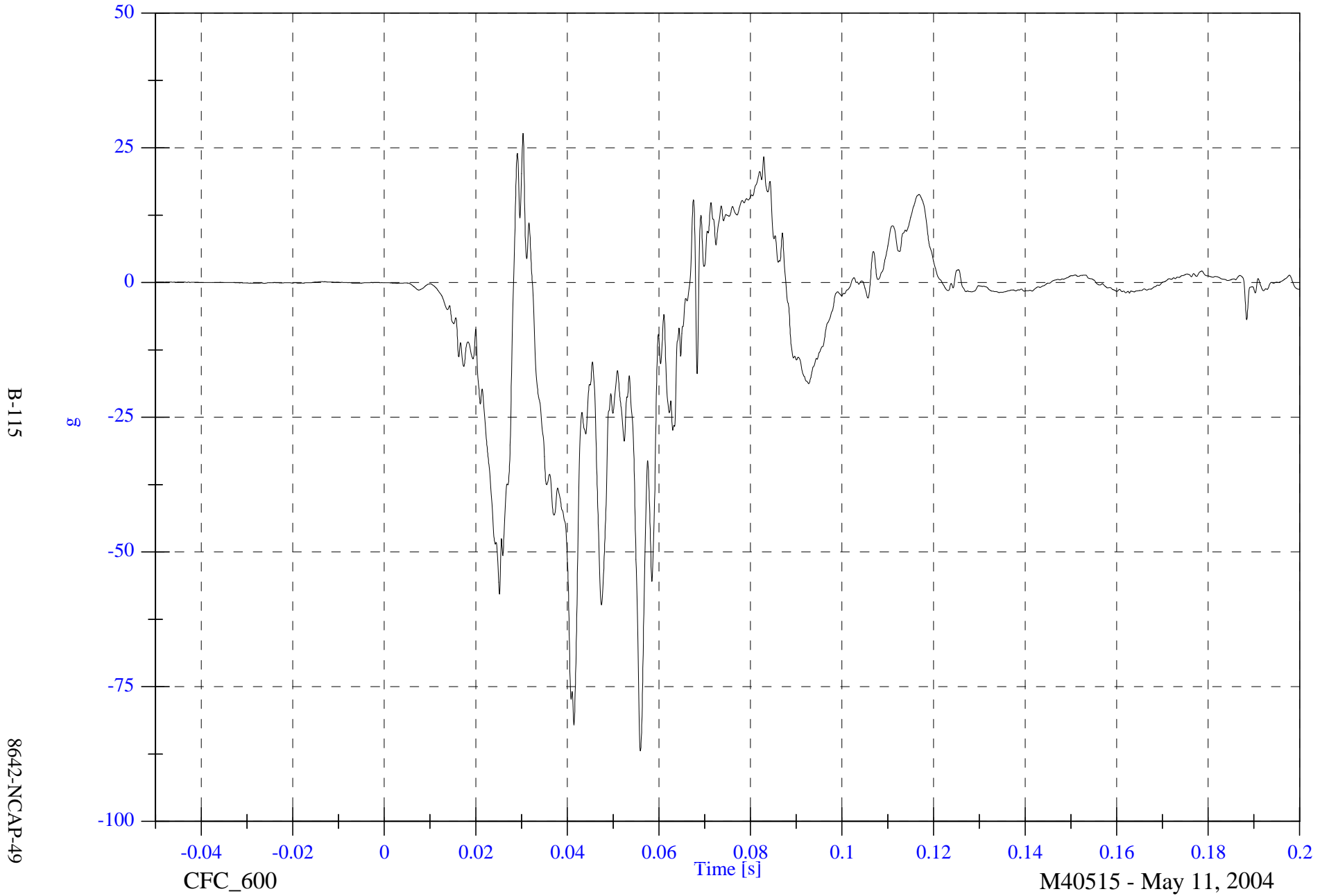


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P2 Right Foot Fore z

Max: 27.7 [g] at 0.030 [s]

Min: -86.9 [g] at 0.056 [s]

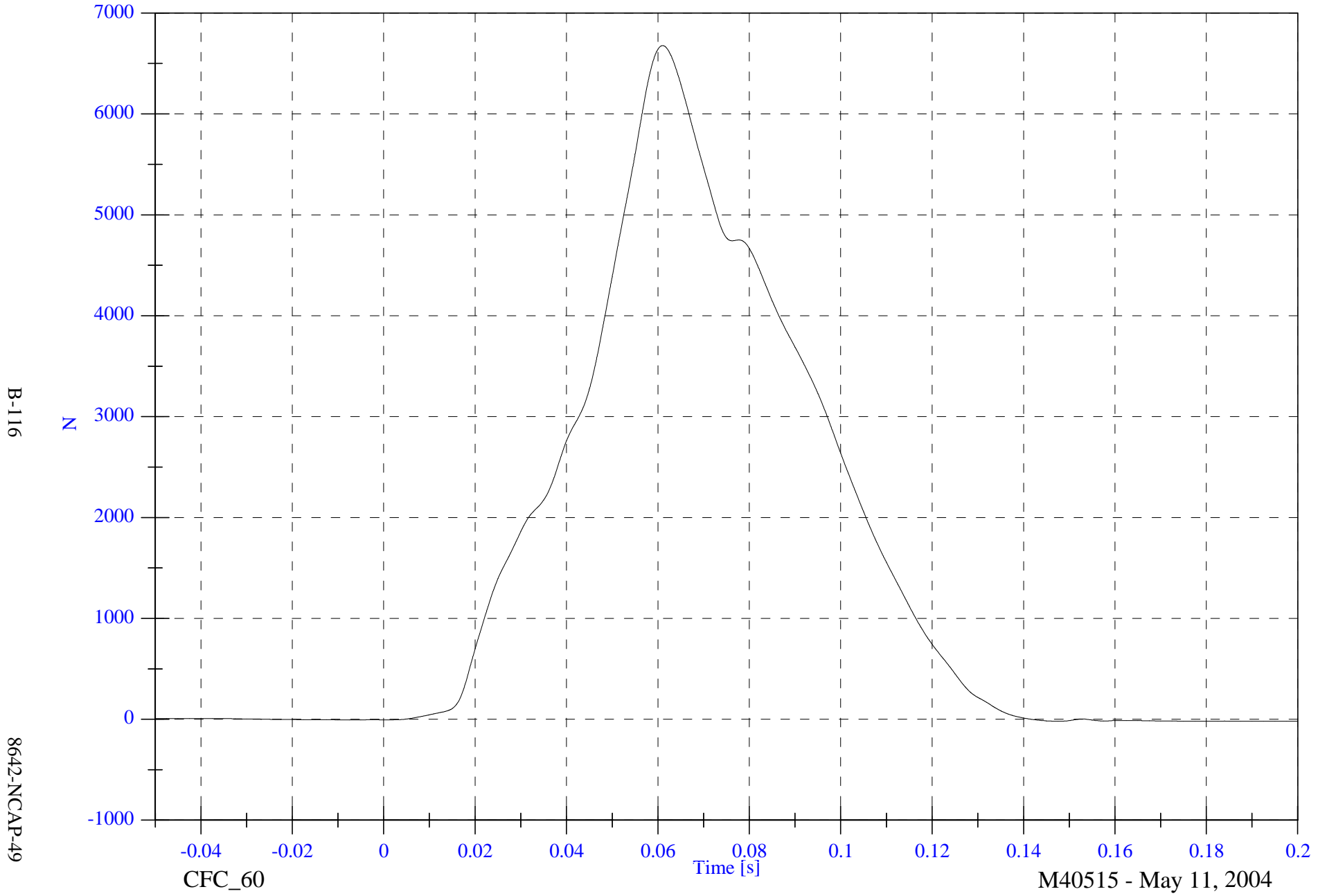


2004 NCAP Test 13 - 2004.5 Kia Spectra

Max: 6677.6 [N] at 0.061 [s]

Min: -20.6 [N] at 0.200 [s]

V1 Passenger Lap Belt



B-116

8642-NCAP-49

CFC_60

Time [s]

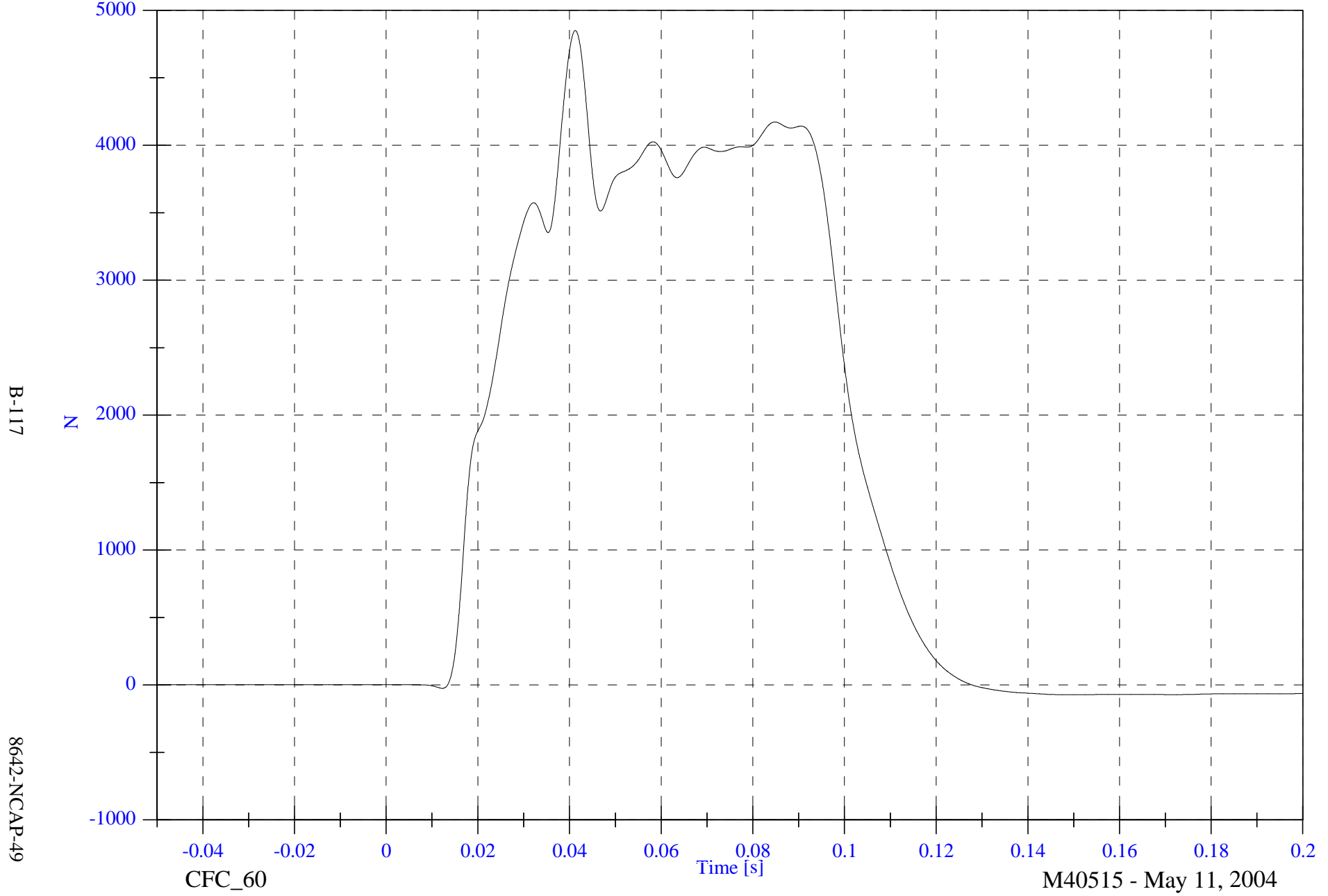
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Max: 4850.6 [N] at 0.041 [s]

V1 Passenger Torso Belt

Min: -72.3 [N] at 0.152 [s]



B-117

8642-NCAP-49

CFC_60

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

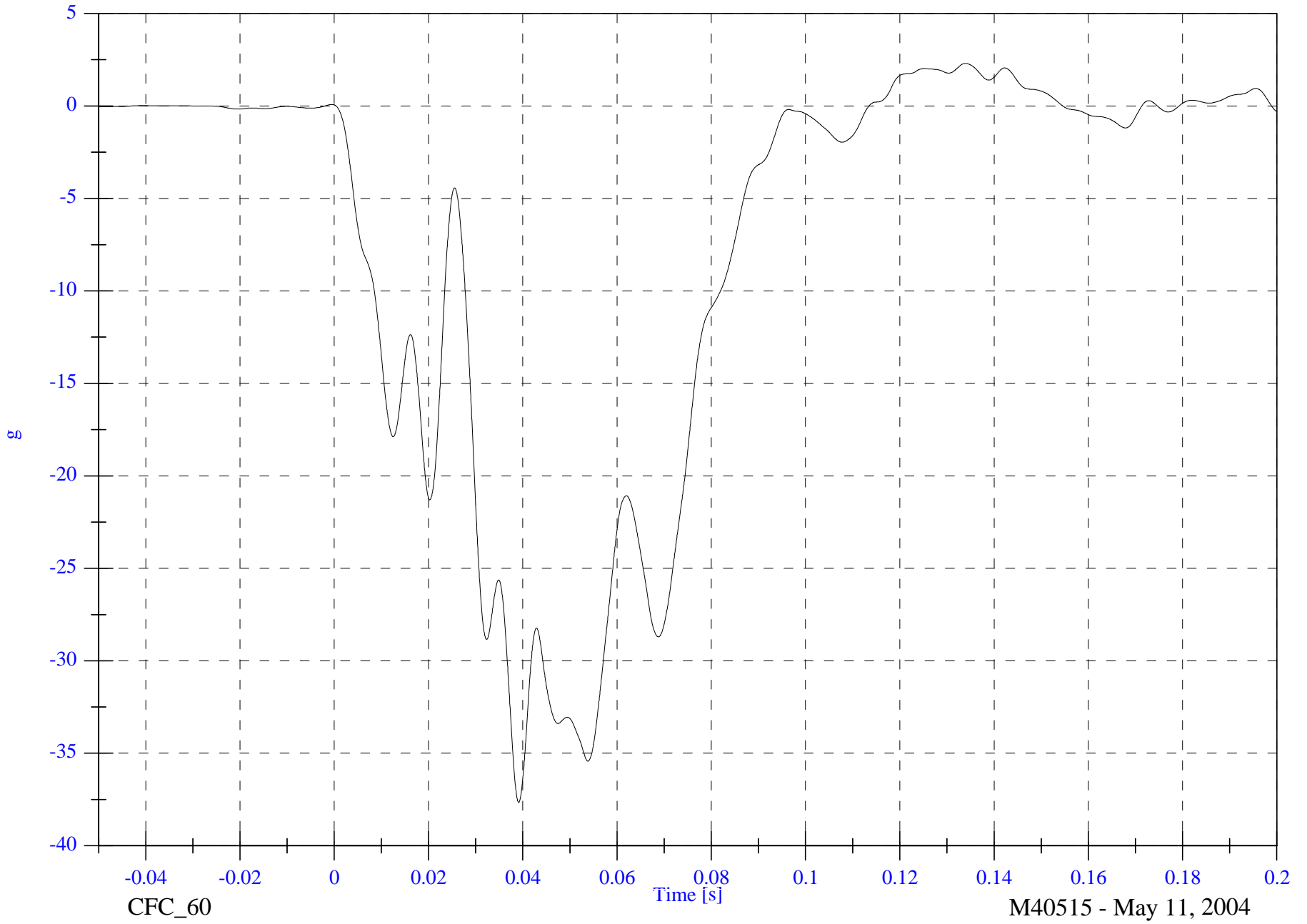
V1 Left Rear #1x

Max: 2.3 [g] at 0.134 [s]

Min: -37.7 [g] at 0.039 [s]

B-118

8642-NCAP-49



M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

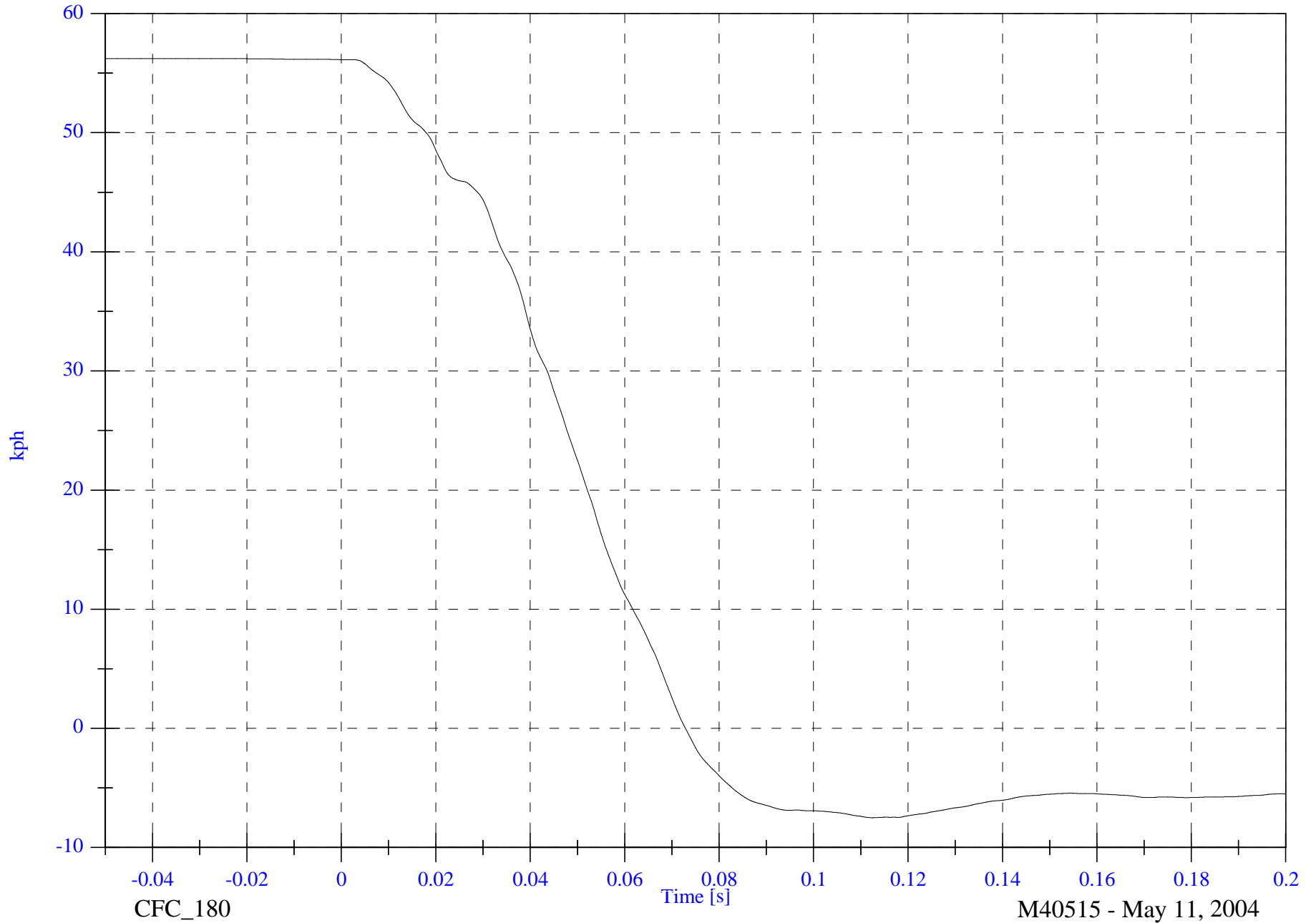
Max: 56.2 [kph] at -0.050 [s]

V1 Left Rear #1x Velocity

Min: -7.5 [kph] at 0.112 [s]

B-119

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

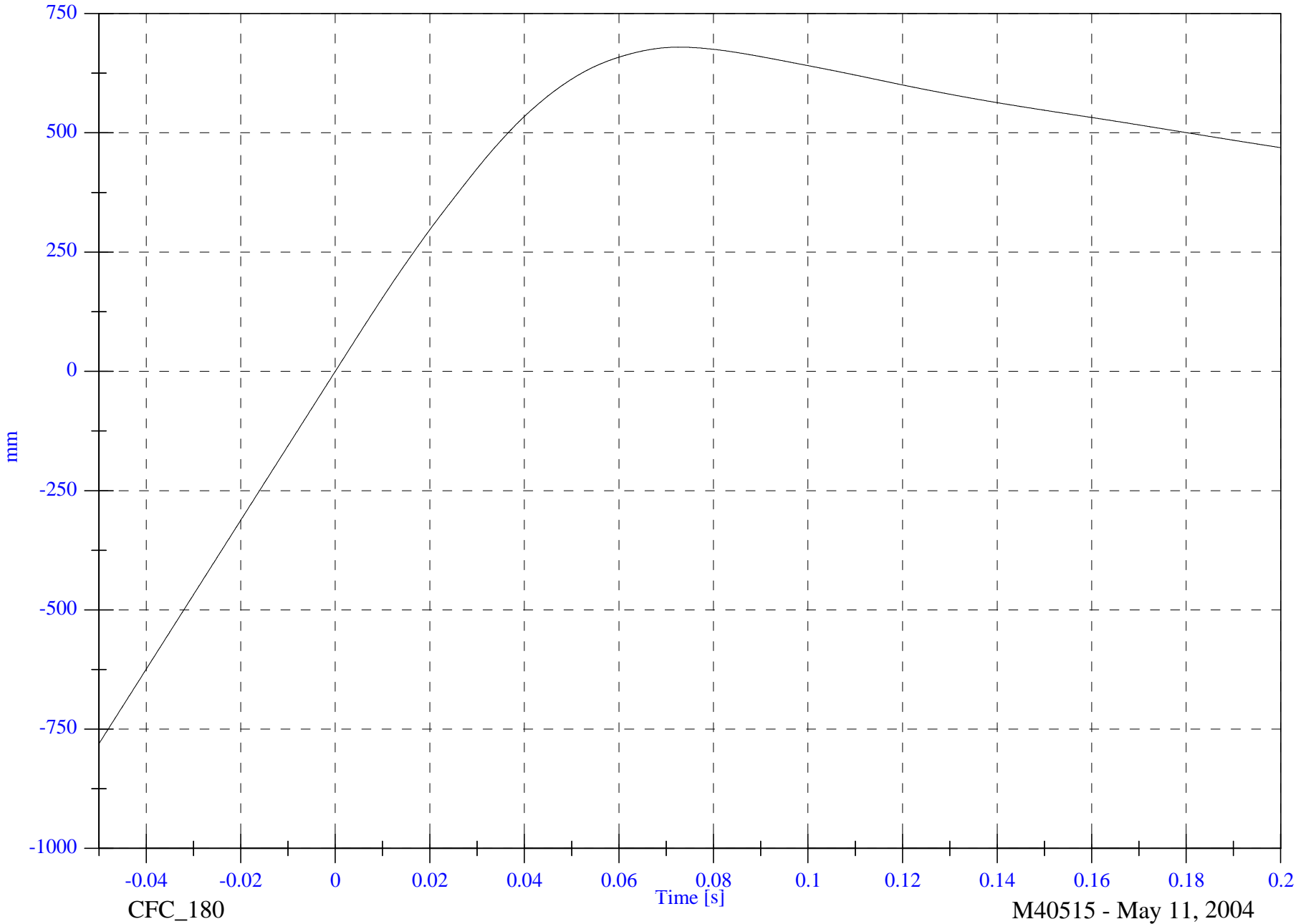
V1 Left Rear #1x Displacement

Max: 679.5 [mm] at 0.073 [s]

Min: -780.5 [mm] at -0.050 [s]

B-120

8642-NCAP-49



CFC_180

Time [s]

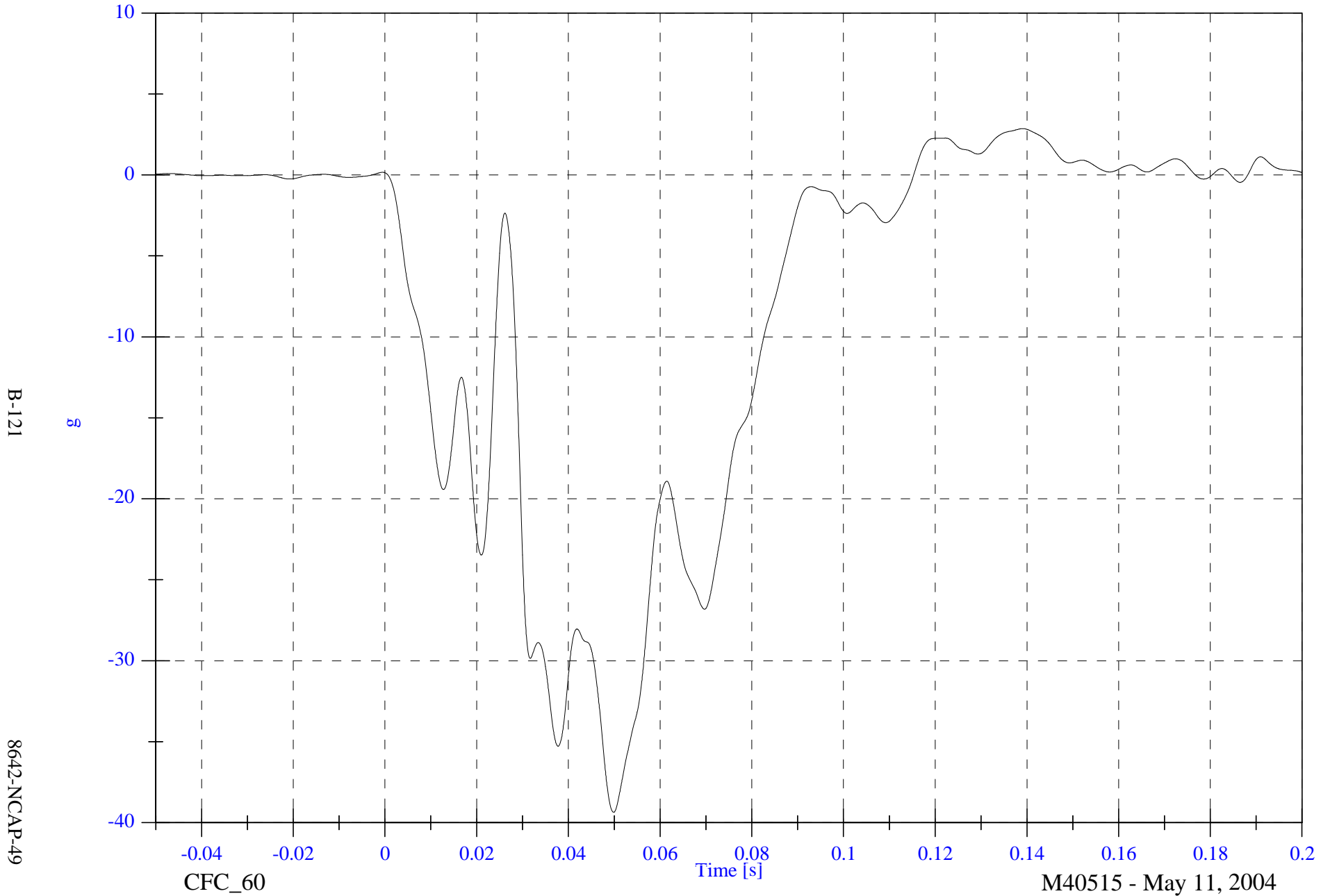
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1 Right Rear #2x

Max: 2.9 [g] at 0.139 [s]

Min: -39.4 [g] at 0.050 [s]



2004 NCAP Test 13 - 2004.5 Kia Spectra

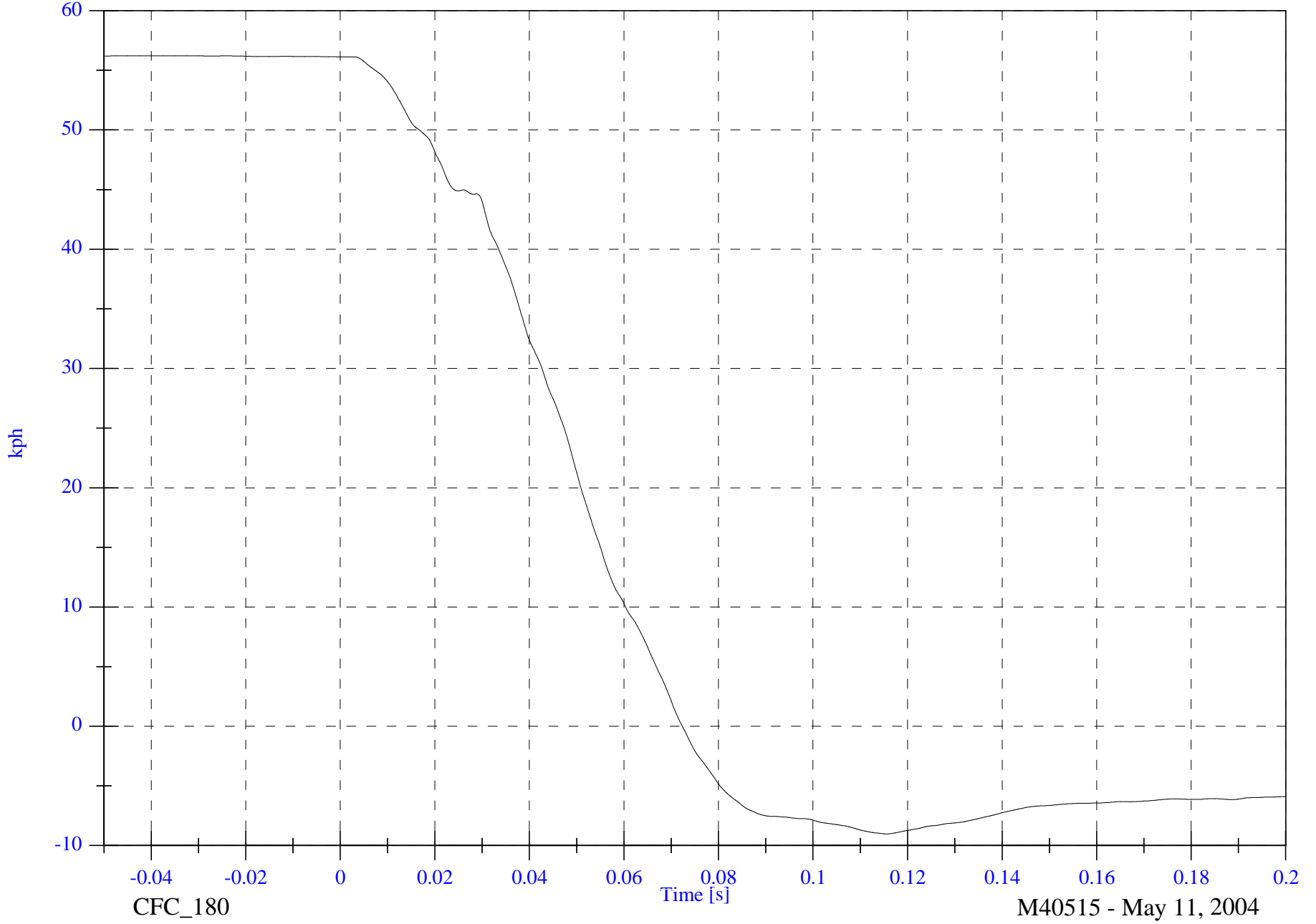
V1 Right Rear #2x Velocity

Max: 56.2 [kph] at -0.042 [s]

Min: -9.0 [kph] at 0.116 [s]

B-122

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

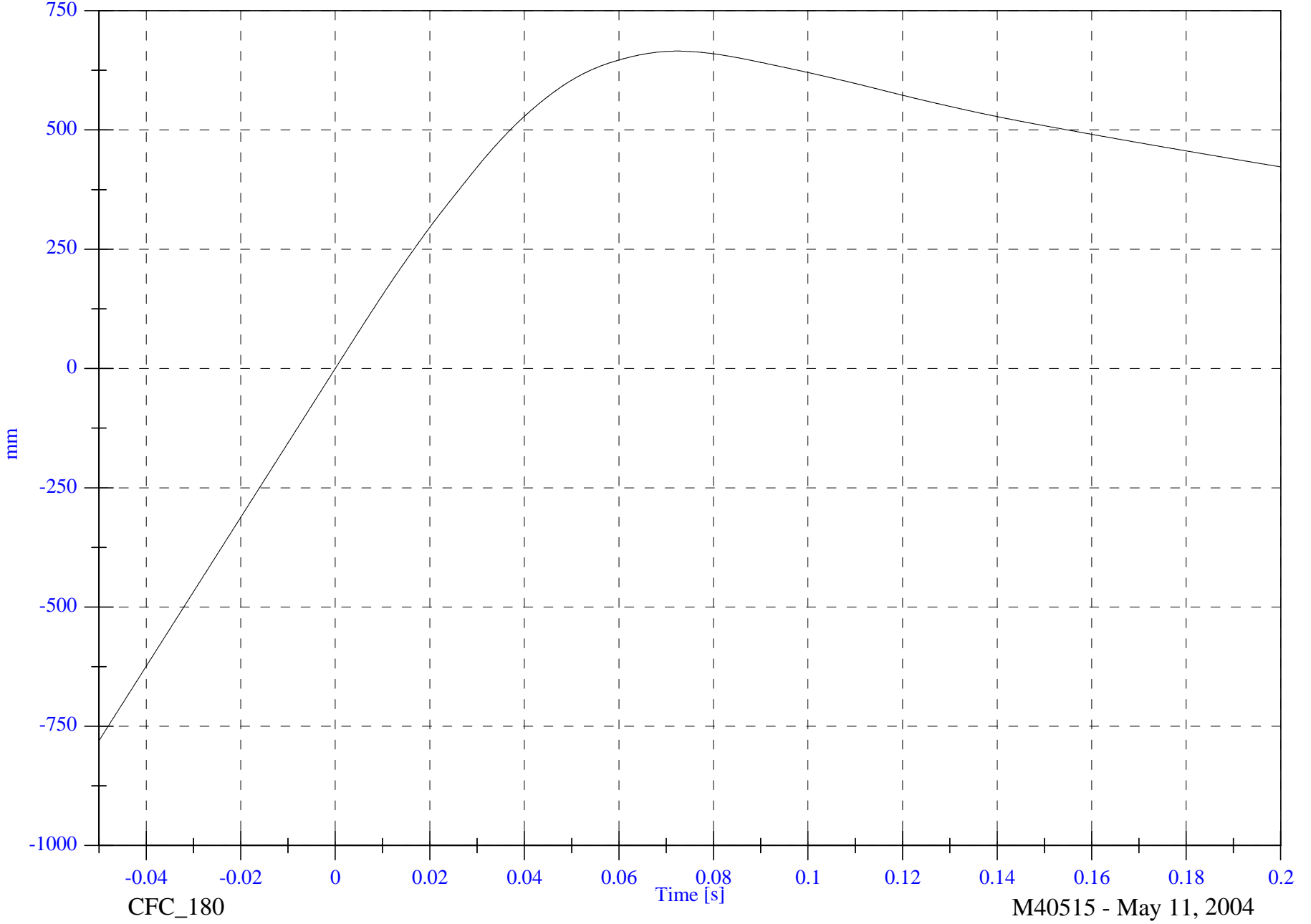
V1 Right Rear #2x Displacement

Max: 665.1 [mm] at 0.072 [s]

Min: -780.4 [mm] at -0.050 [s]

B-123

8642-NCAP-49



CFC_180

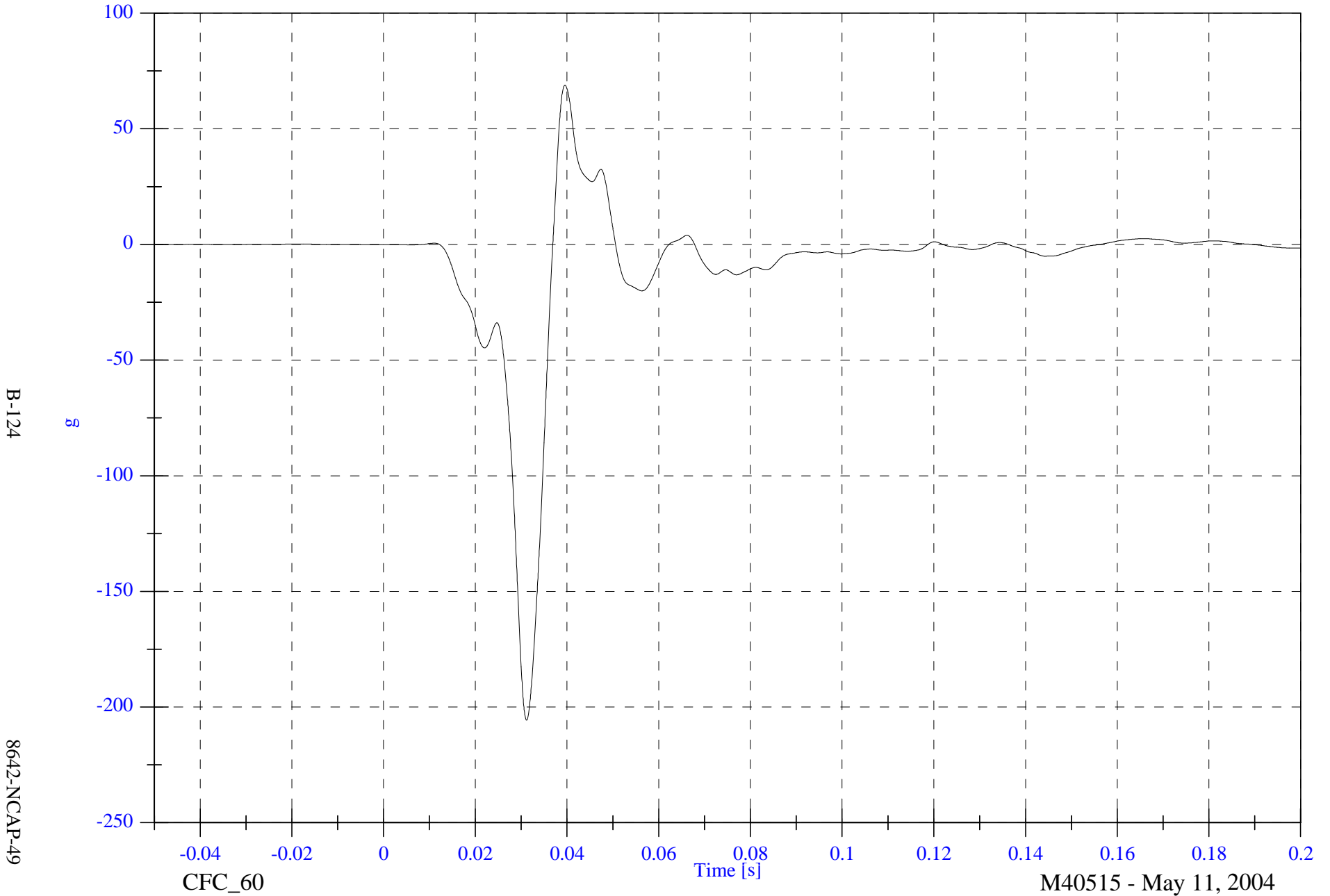
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1 Engine Top #3x

Max: 68.8 [g] at 0.040 [s]

Min: -205.7 [g] at 0.031 [s]



2004 NCAP Test 13 - 2004.5 Kia Spectra

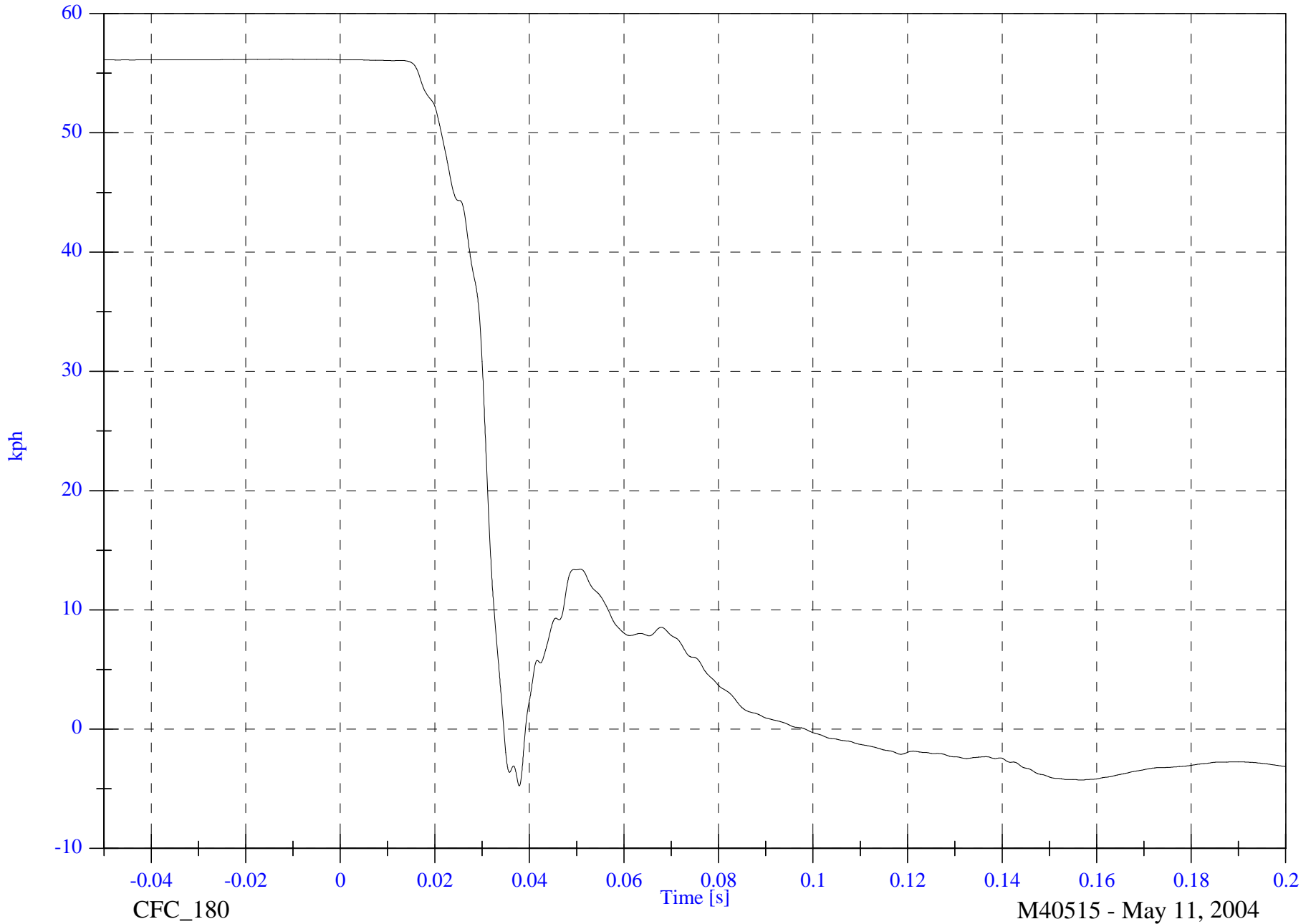
V1 Engine Top #3x Velocity

Max: 56.2 [kph] at -0.014 [s]

Min: -4.8 [kph] at 0.038 [s]

B-125

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

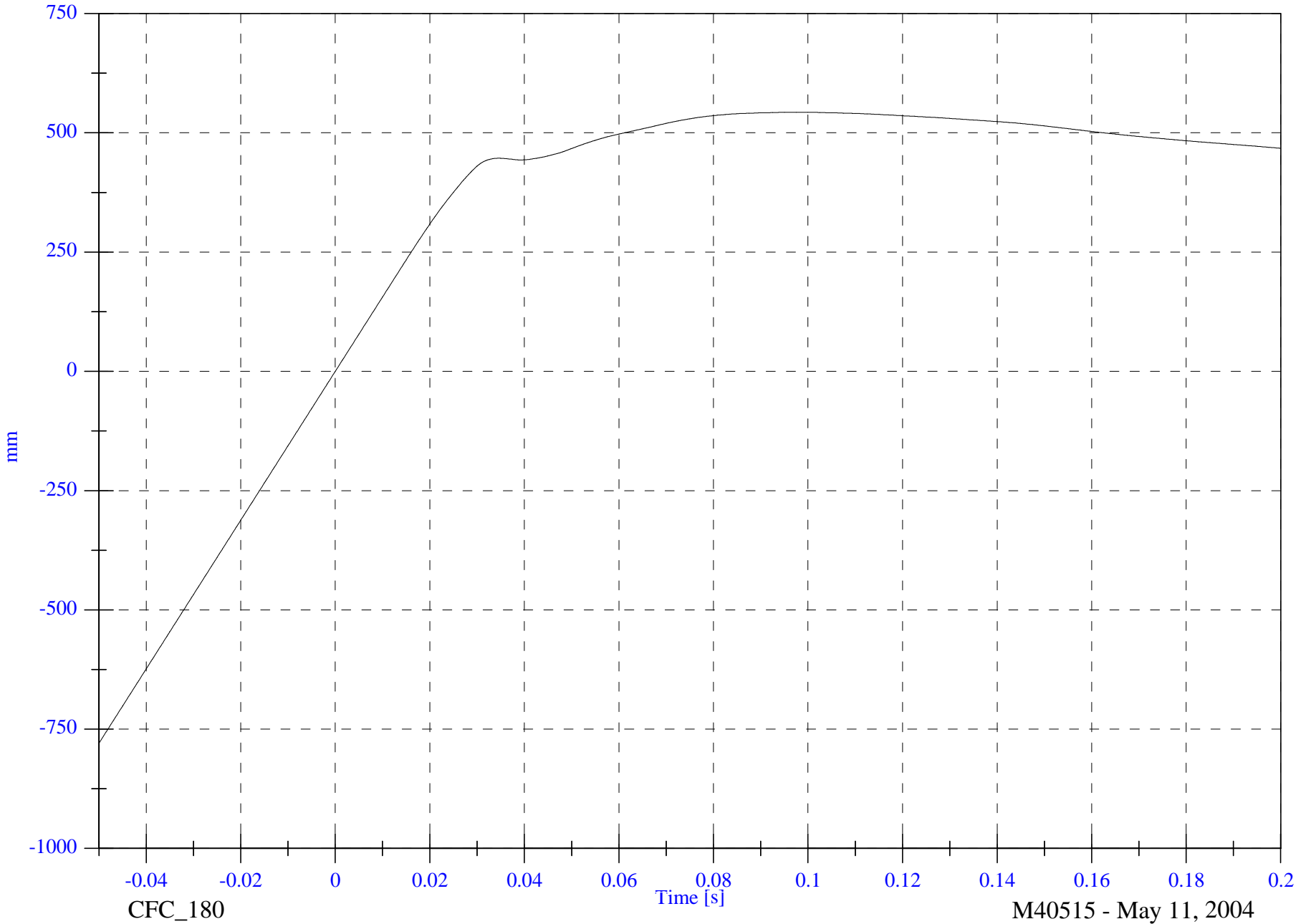
V1 Engine Top #3x Displacement

Max: 542.9 [mm] at 0.098 [s]

Min: -779.6 [mm] at -0.050 [s]

B-126

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

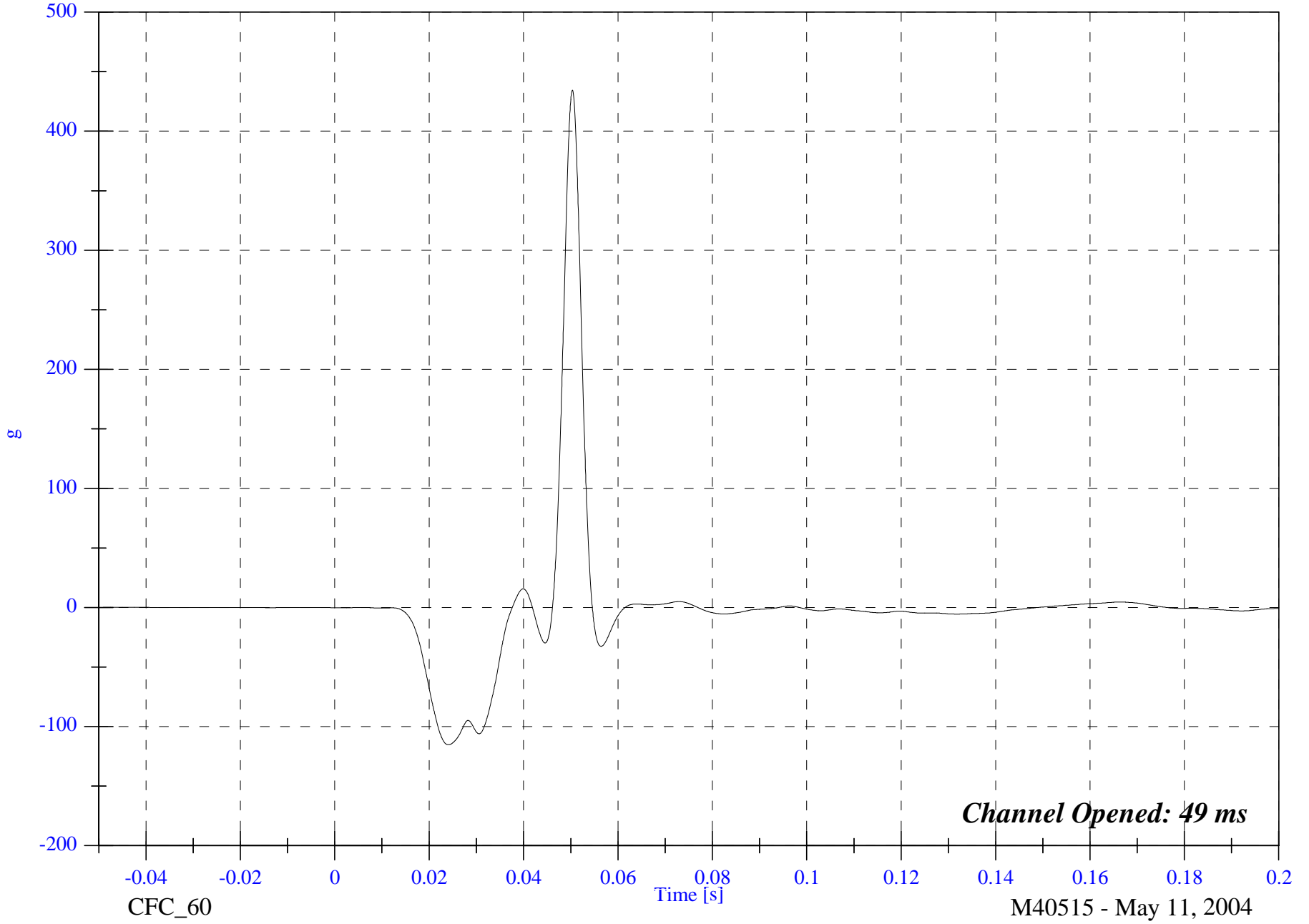
V1 Engine Bottom #4x

Max: 434.4 [g] at 0.050 [s]

Min: -115.3 [g] at 0.024 [s]

B-127

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

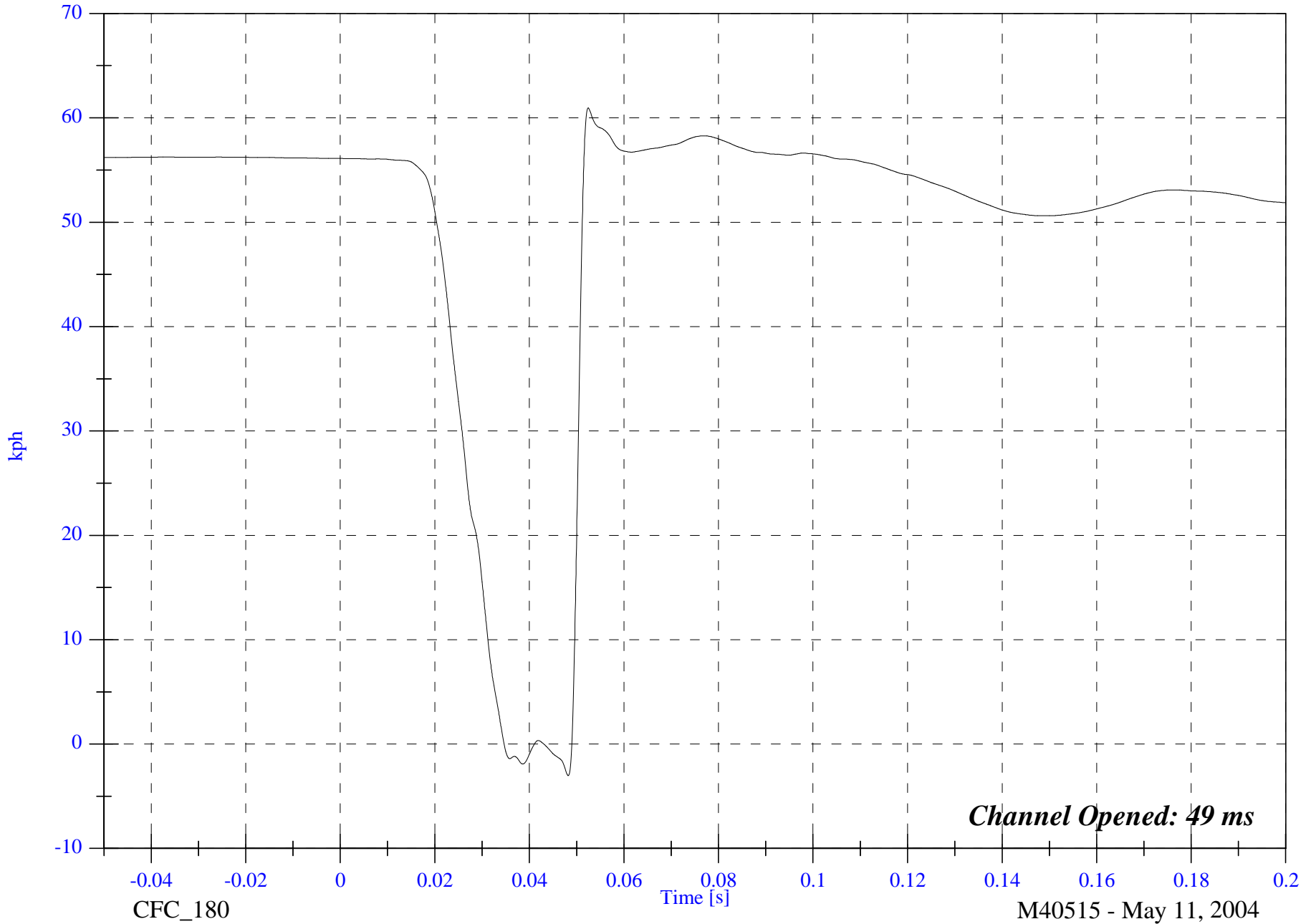
V1 Engine Bottom #4x Velocity

Max: 60.9 [kph] at 0.052 [s]

Min: -3.0 [kph] at 0.048 [s]

B-128

8642-NCAP-49



Channel Opened: 49 ms

CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

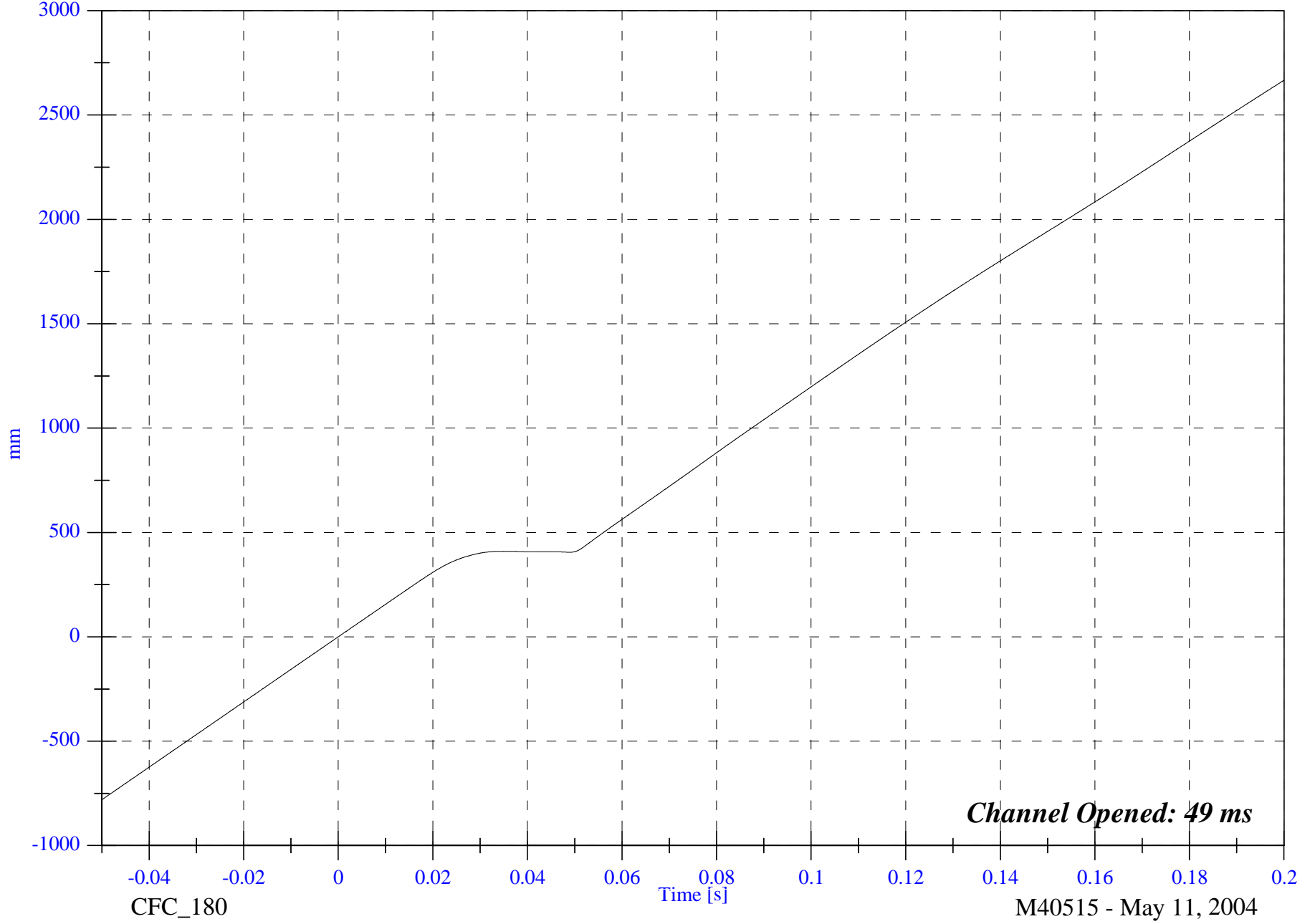
V1 Engine Bottom #4x Displacement

Max: 2666.0 [mm] at 0.200 [s]

Min: -780.6 [mm] at -0.050 [s]

B-129

8642-NCAP-49



Channel Opened: 49 ms

CFC_180

Time [s]

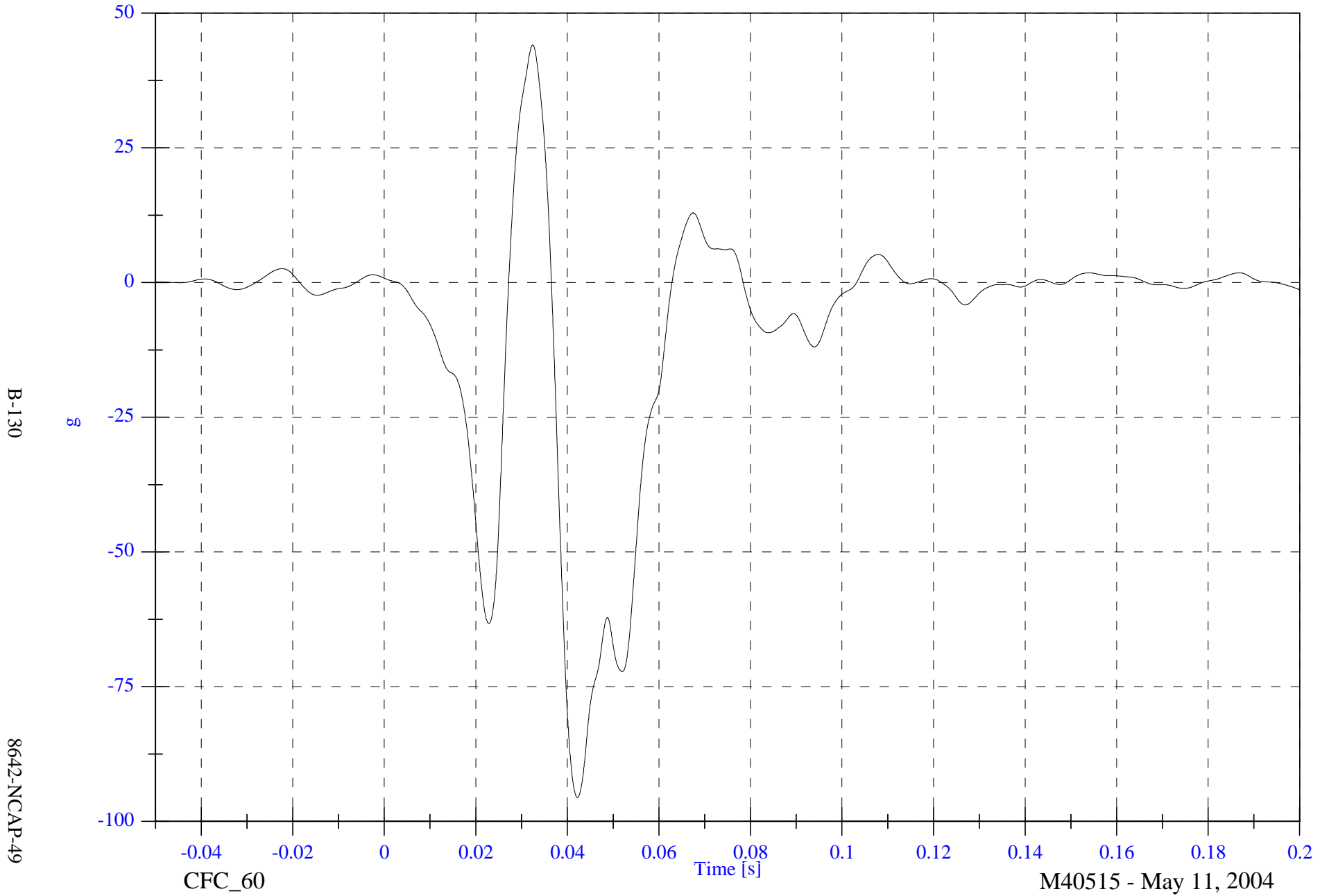
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1 Right Caliper #5x

Max: 44.1 [g] at 0.032 [s]

Min: -95.6 [g] at 0.042 [s]



B-130

8642-NCAP-49

CFC_60

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

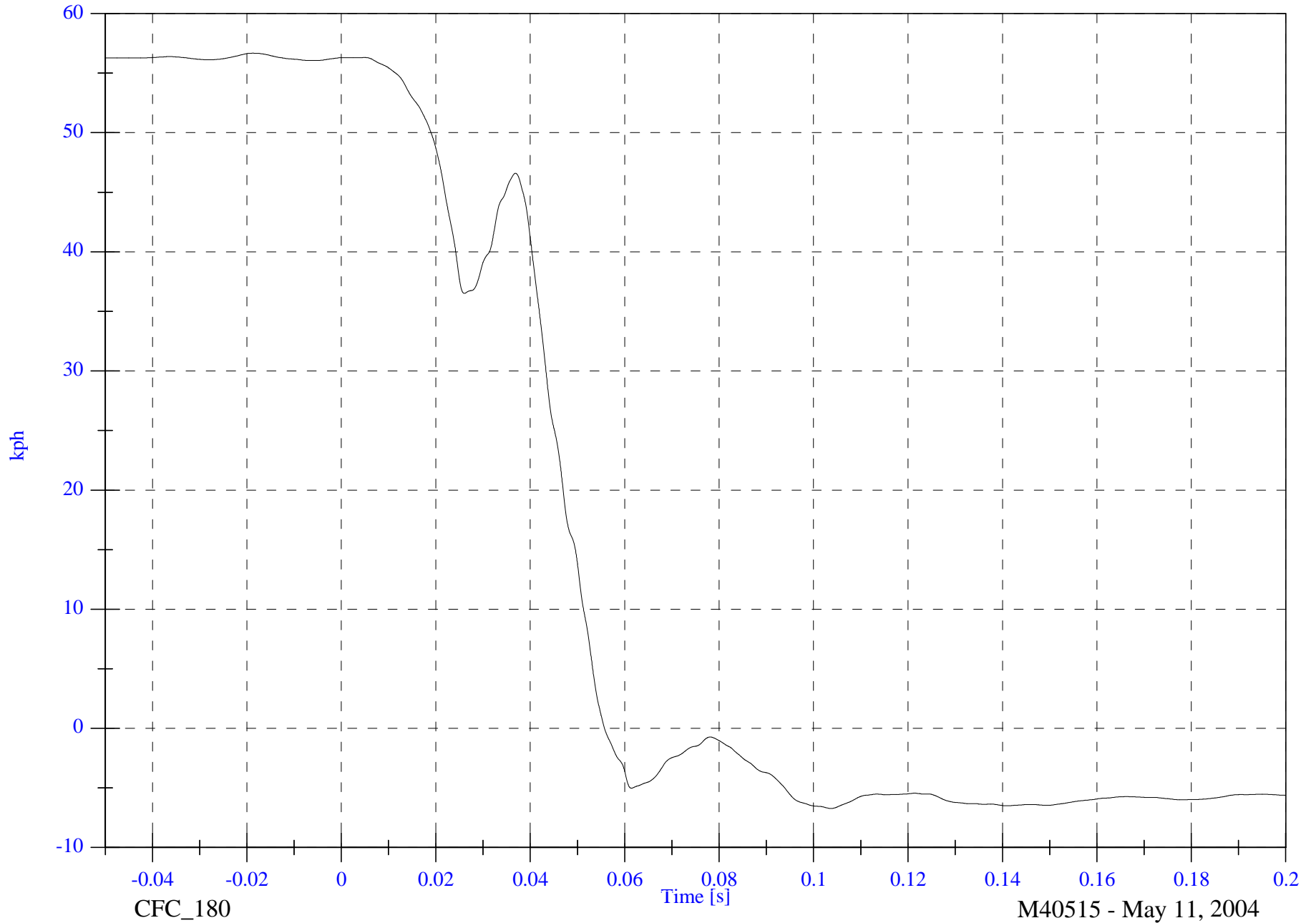
V1 Right Caliper #5x Velocity

Max: 56.7 [kph] at -0.019 [s]

Min: -6.7 [kph] at 0.104 [s]

B-131

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

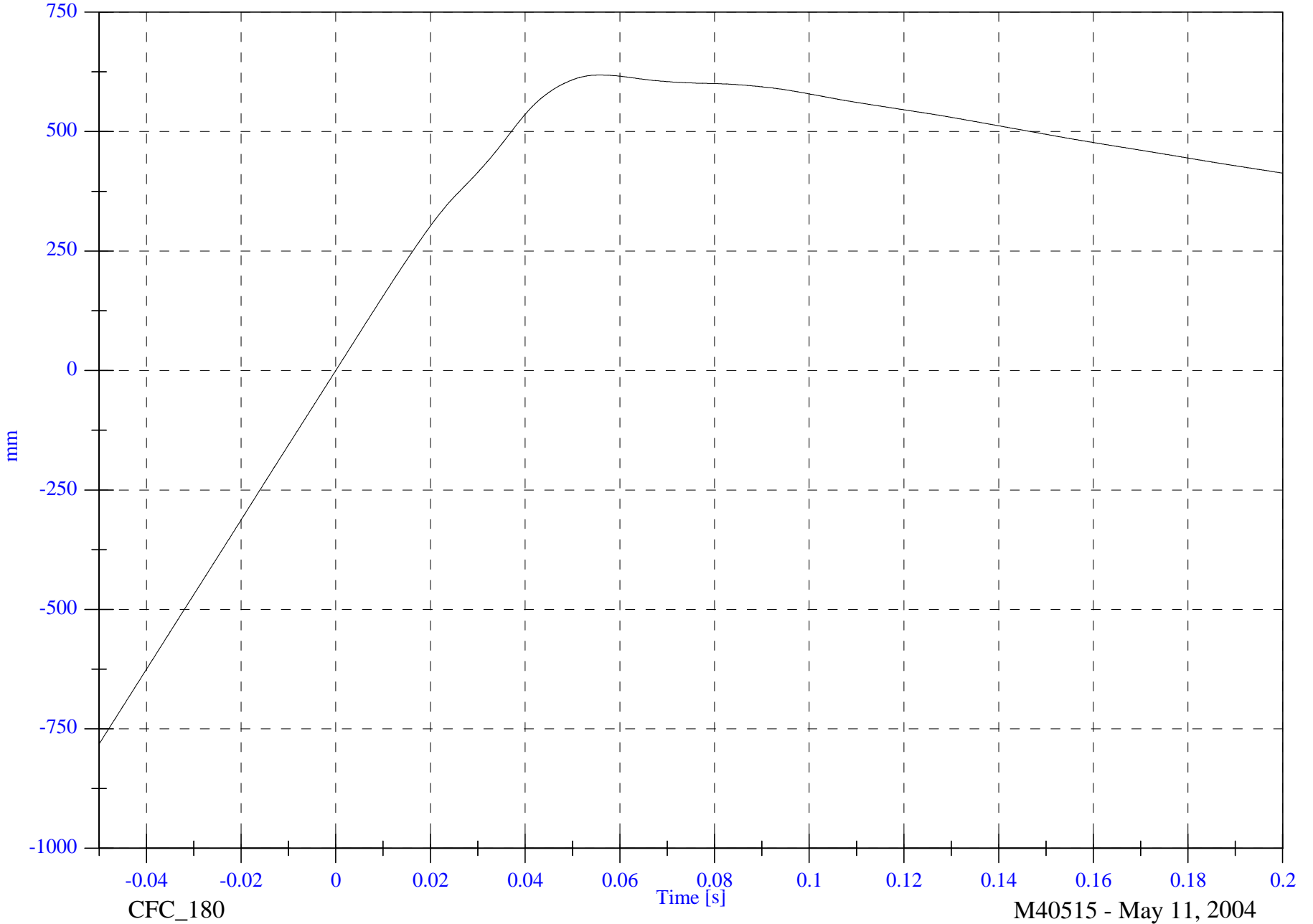
V1 Right Caliper #5x Displacement

Max: 618.2 [mm] at 0.056 [s]

Min: -781.7 [mm] at -0.050 [s]

B-132

8642-NCAP-49



CFC_180

Time [s]

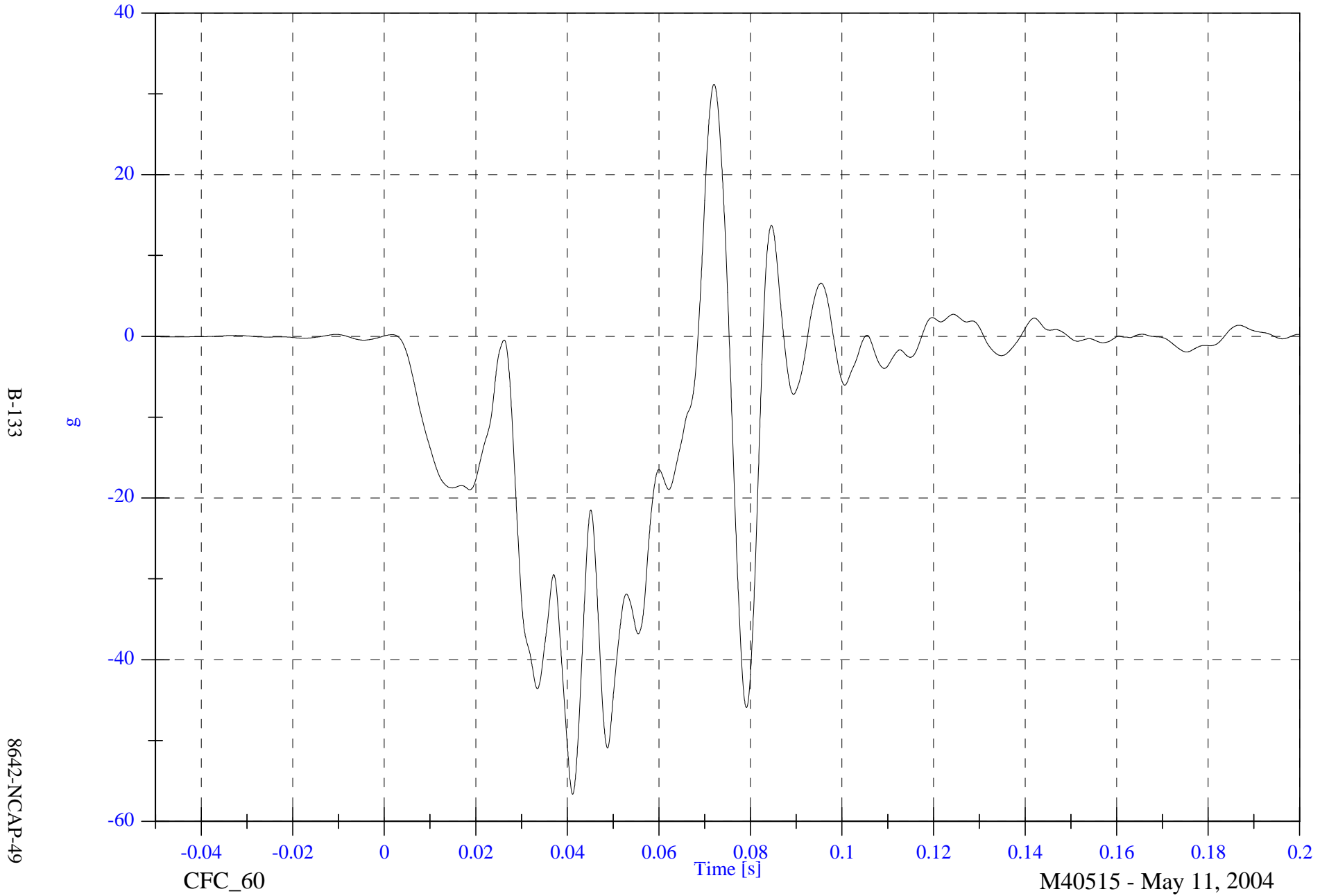
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1 Instrument Panel #6x

Max: 31.2 [g] at 0.072 [s]

Min: -56.7 [g] at 0.041 [s]



B-133

8642-NCAP-49

2004 NCAP Test 13 - 2004.5 Kia Spectra

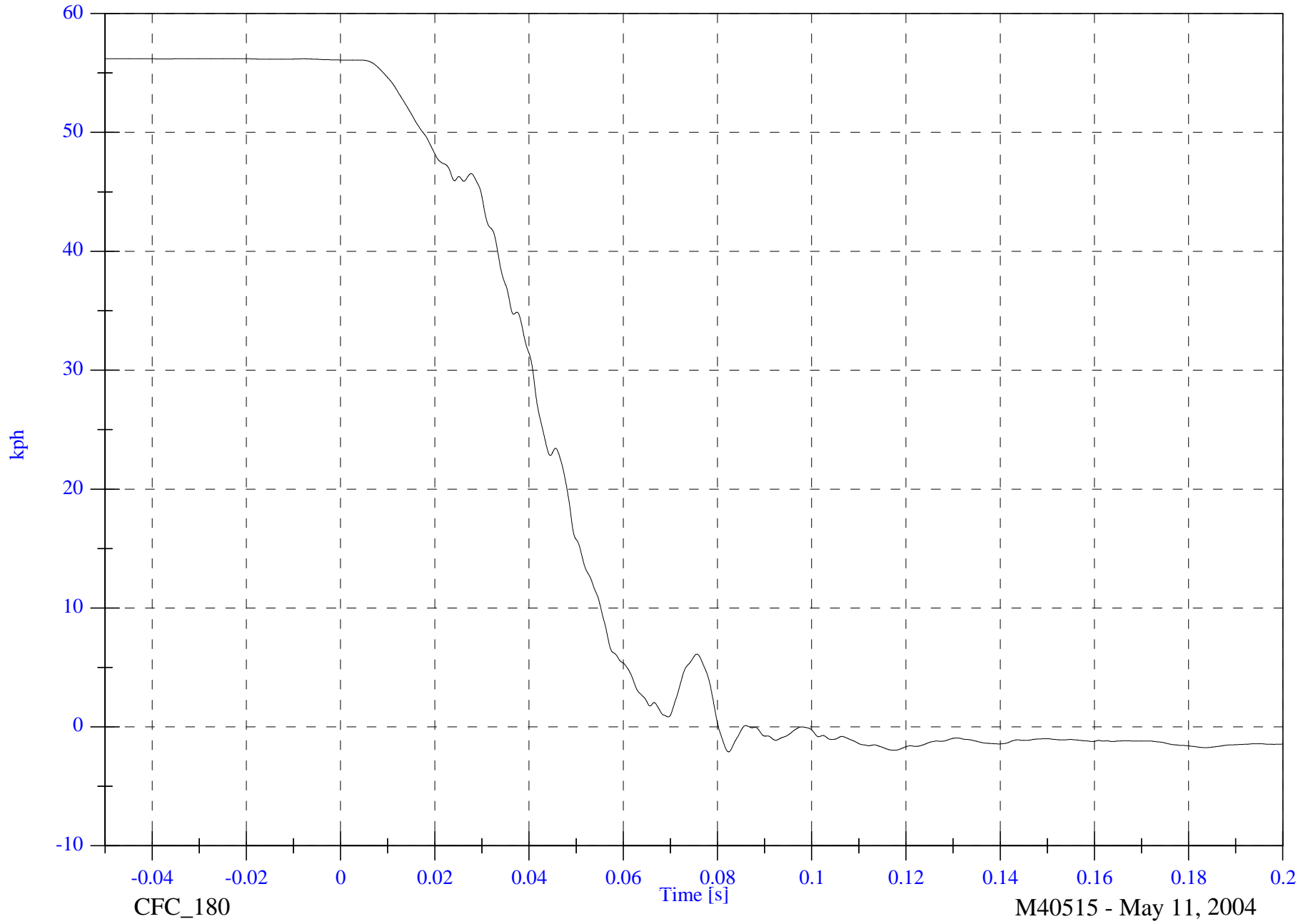
V1 Instrument Panel #6x Velocity

Max: 56.2 [kph] at -0.029 [s]

Min: -2.1 [kph] at 0.082 [s]

B-134

8642-NCAP-49



CFC_180

Time [s]

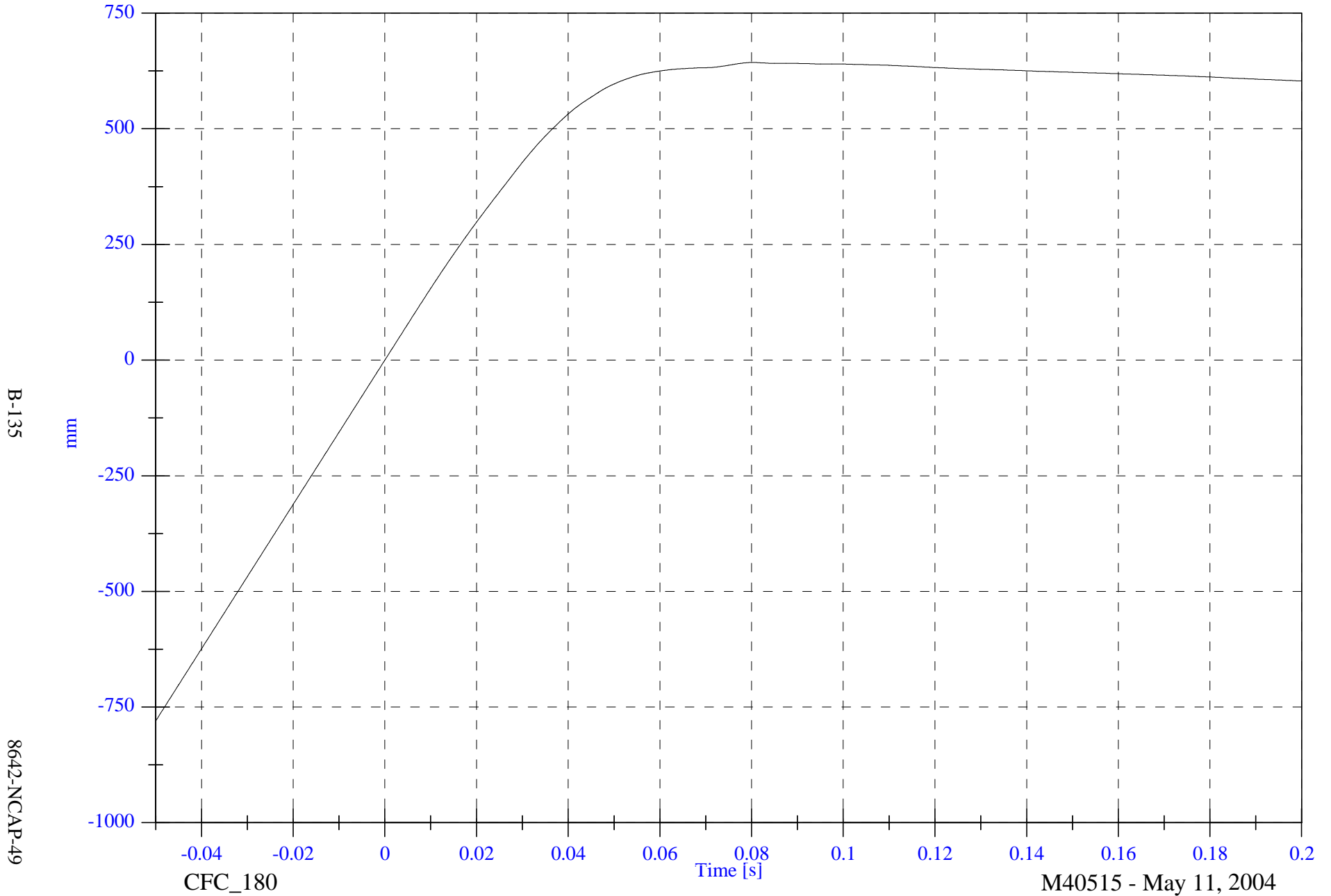
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1 Instrument Panel #6x Displacement

Max: 643.1 [mm] at 0.080 [s]

Min: -780.2 [mm] at -0.050 [s]



B-135

8642-NCAP-49

CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

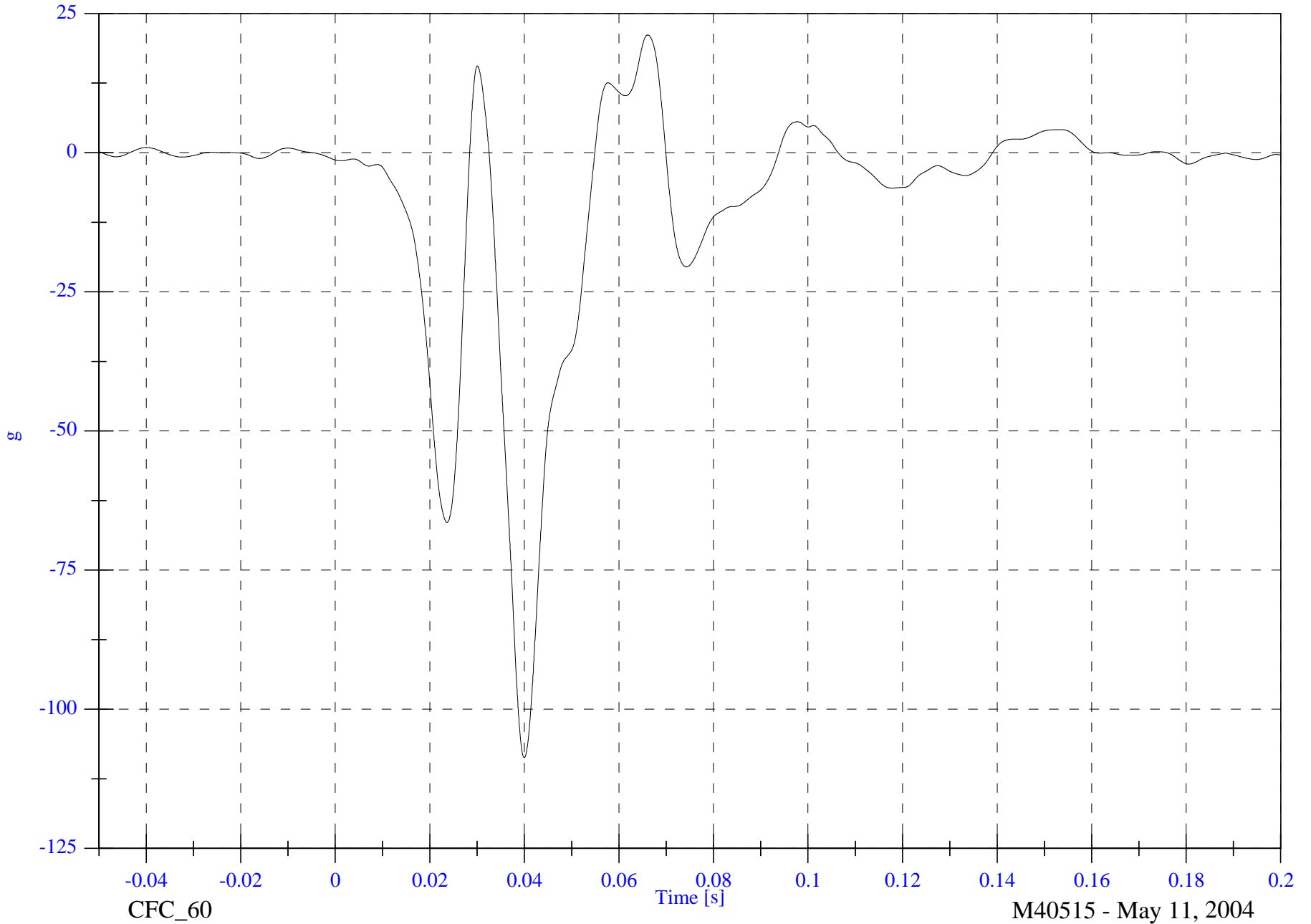
V1 Left Caliper #7x

Max: 21.2 [g] at 0.066 [s]

Min: -108.7 [g] at 0.040 [s]

B-136

8642-NCAP-49



CFC_60

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1 Left Caliper #7x Velocity

Max: 56.4 [kph] at -0.036 [s]

Min: -8.3 [kph] at 0.139 [s]

B-137

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

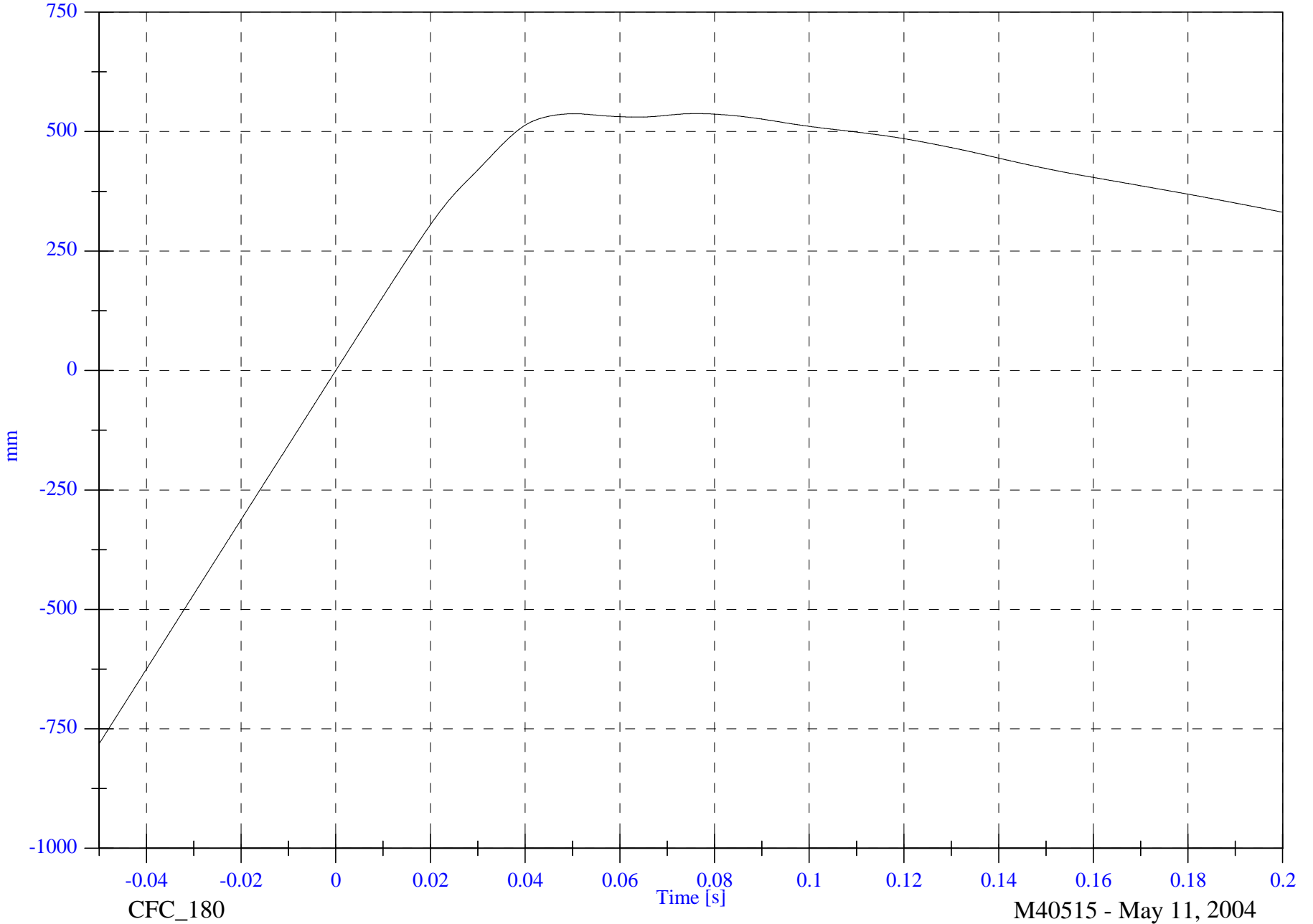
V1 Left Caliper #7x Displacement

Max: 537.6 [mm] at 0.076 [s]

Min: -781.5 [mm] at -0.050 [s]

B-138

8642-NCAP-49



CFC_180

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

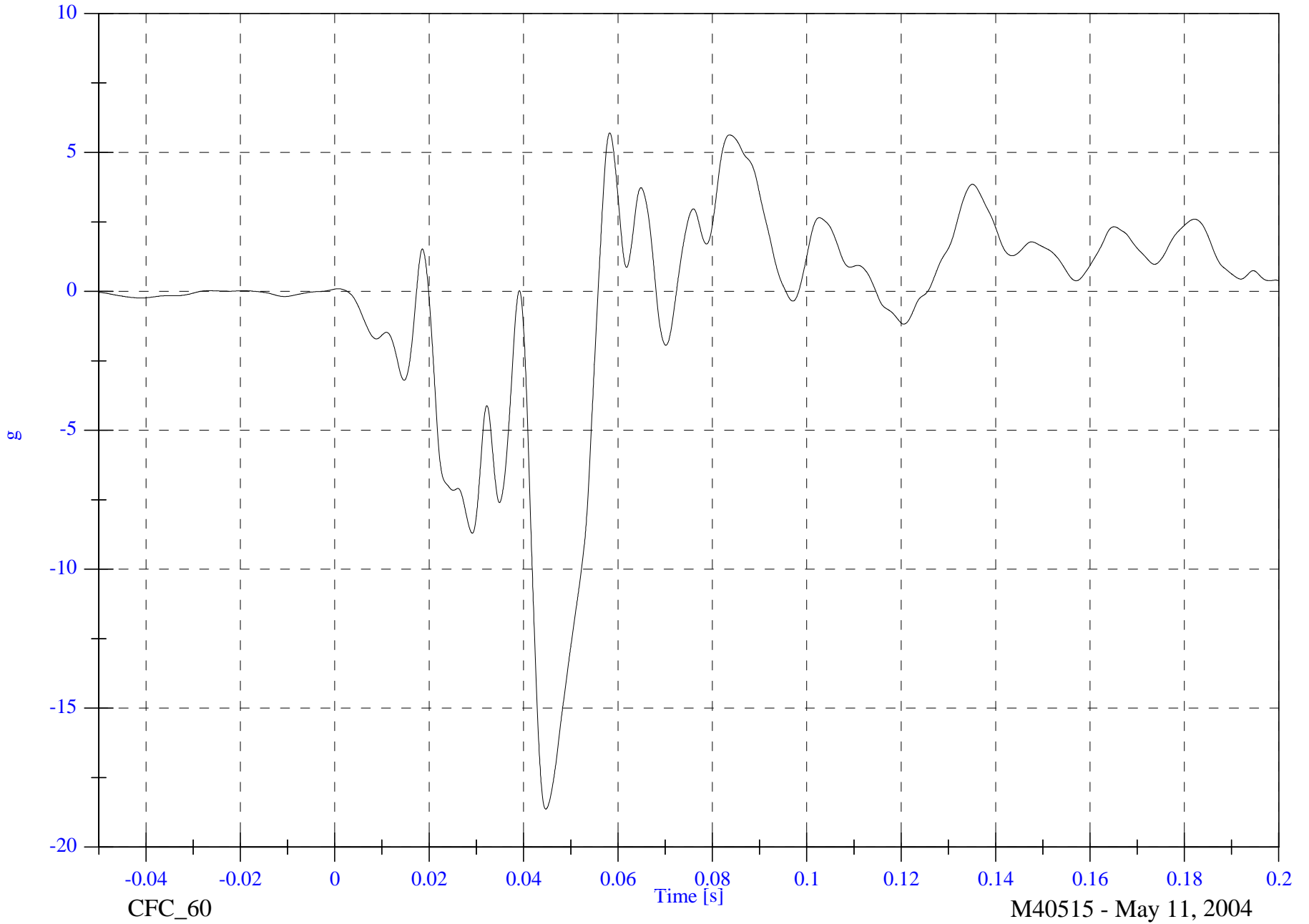
V1 Left Rear #8z

Max: 5.7 [g] at 0.058 [s]

Min: -18.6 [g] at 0.045 [s]

B-139

8642-NCAP-49



CFC_60

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

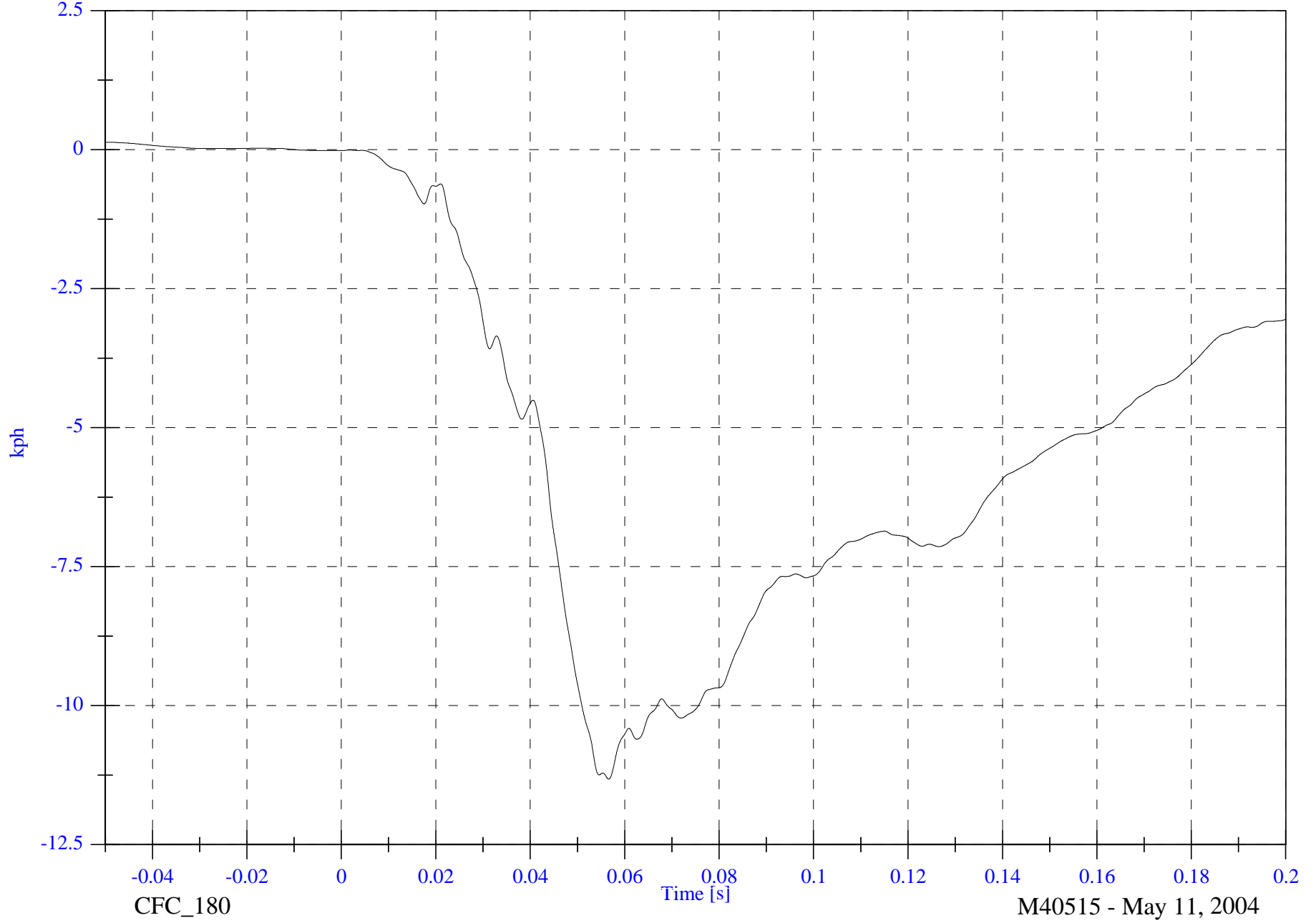
Max: 0.1 [kph] at -0.050 [s]

V1 Left Rear #8z Velocity

Min: -11.3 [kph] at 0.057 [s]

B-140

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

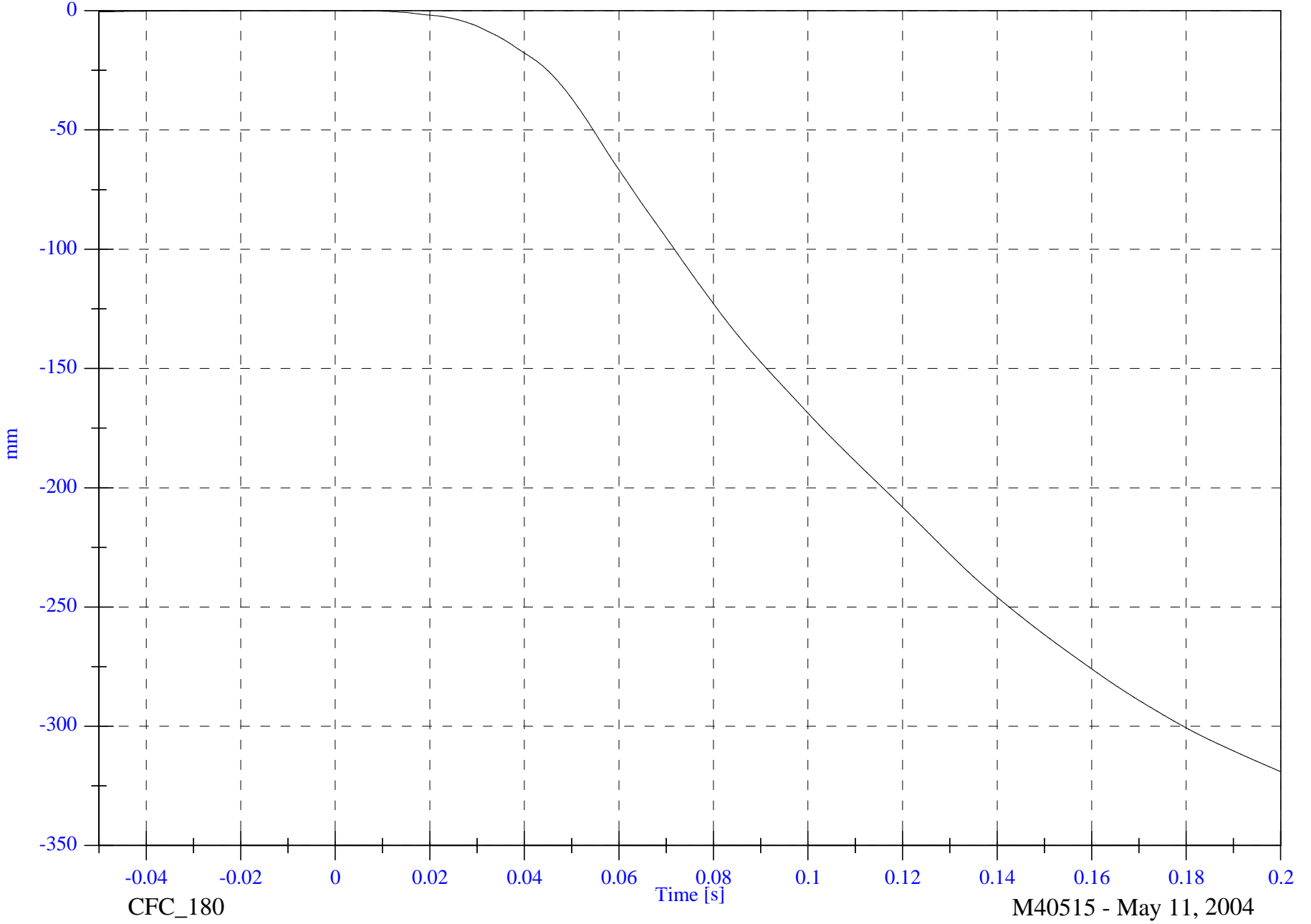
V1 Left Rear #8z Displacement

Max: 0.0 [mm] at -0.010 [s]

Min: -319.0 [mm] at 0.200 [s]

B-141

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

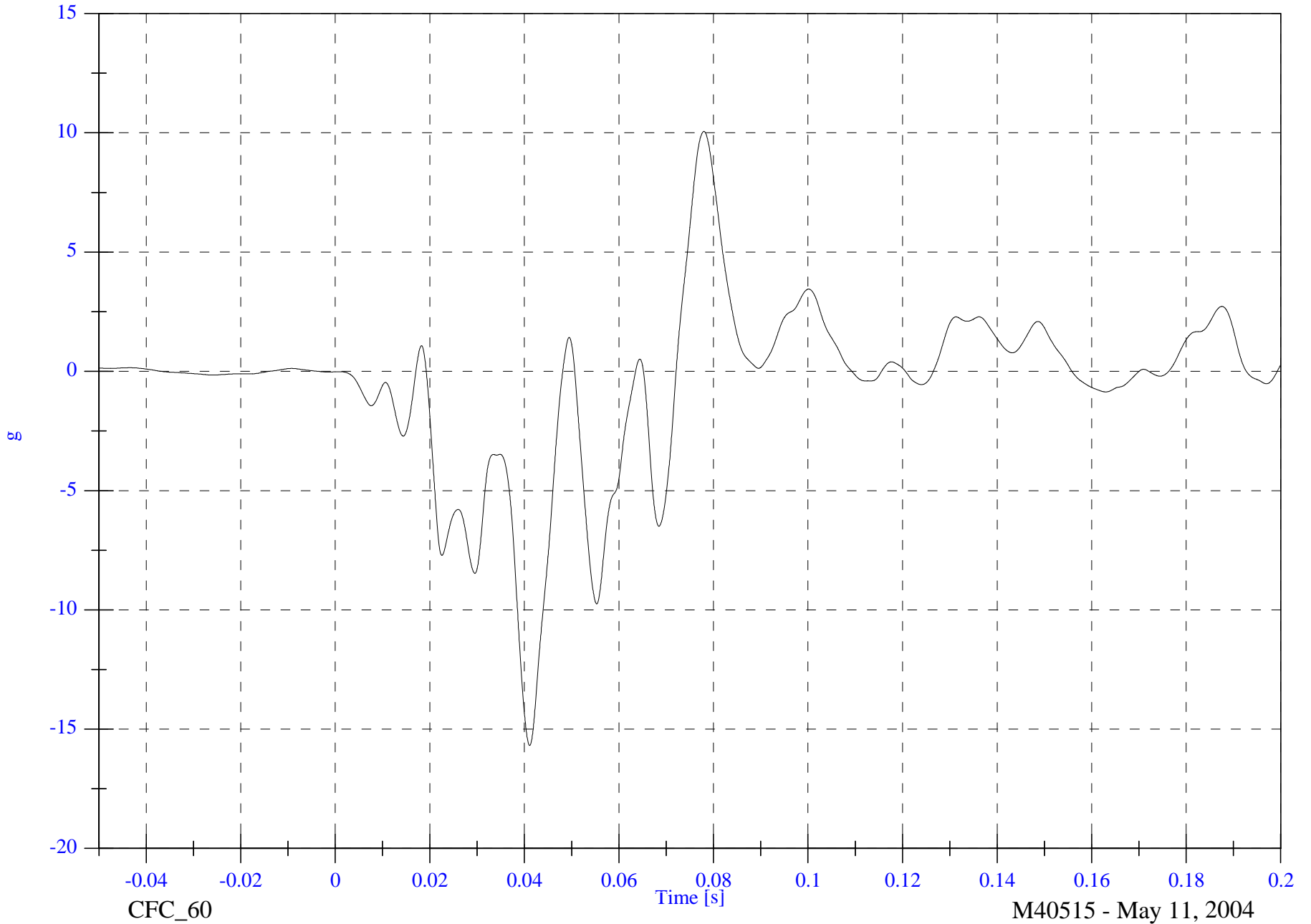
V1 Right Rear #9z

Max: 10.1 [g] at 0.078 [s]

Min: -15.7 [g] at 0.041 [s]

B-142

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

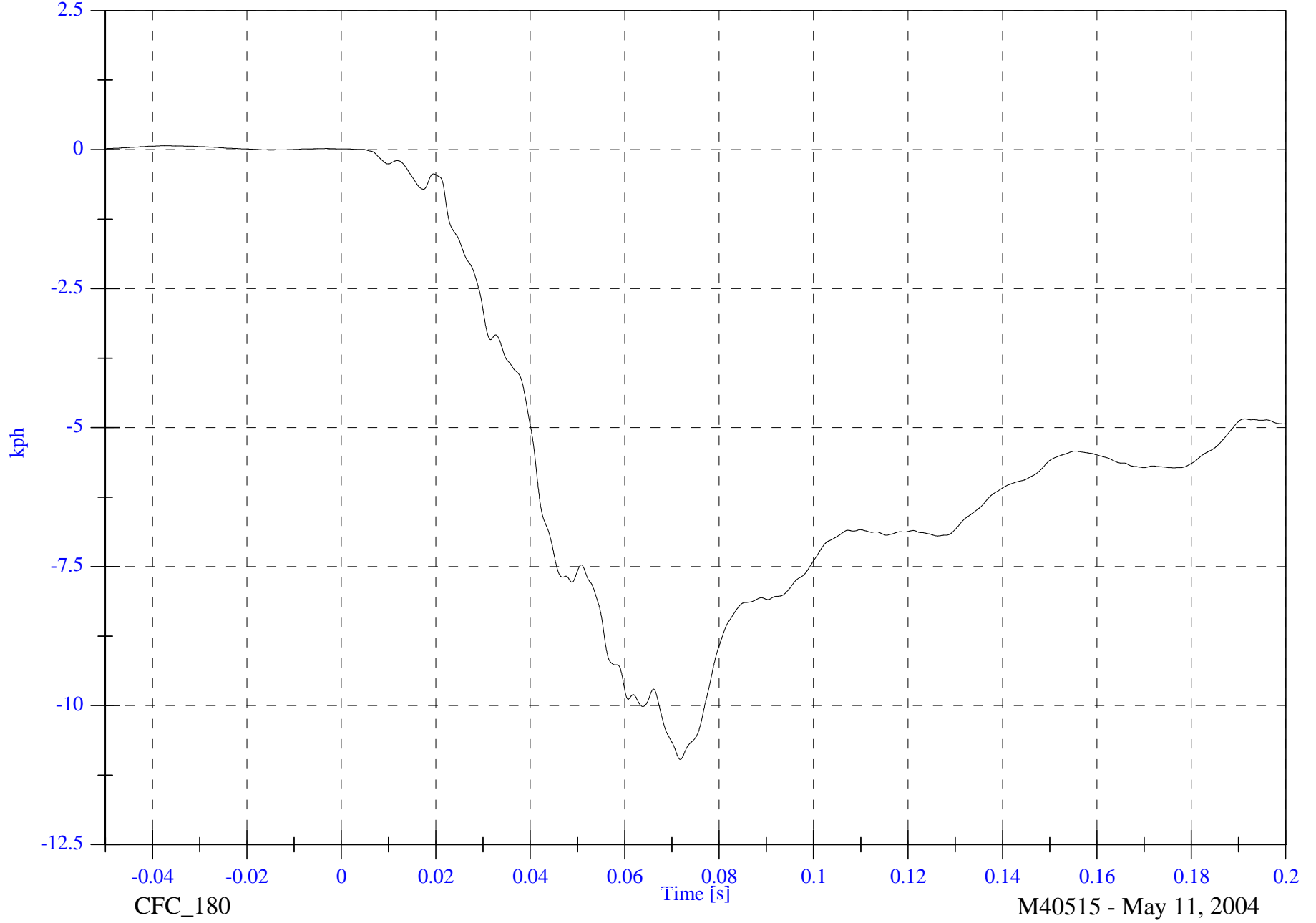
V1 Right Rear #9z Velocity

Max: 0.1 [kph] at -0.037 [s]

Min: -11.0 [kph] at 0.072 [s]

B-143

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

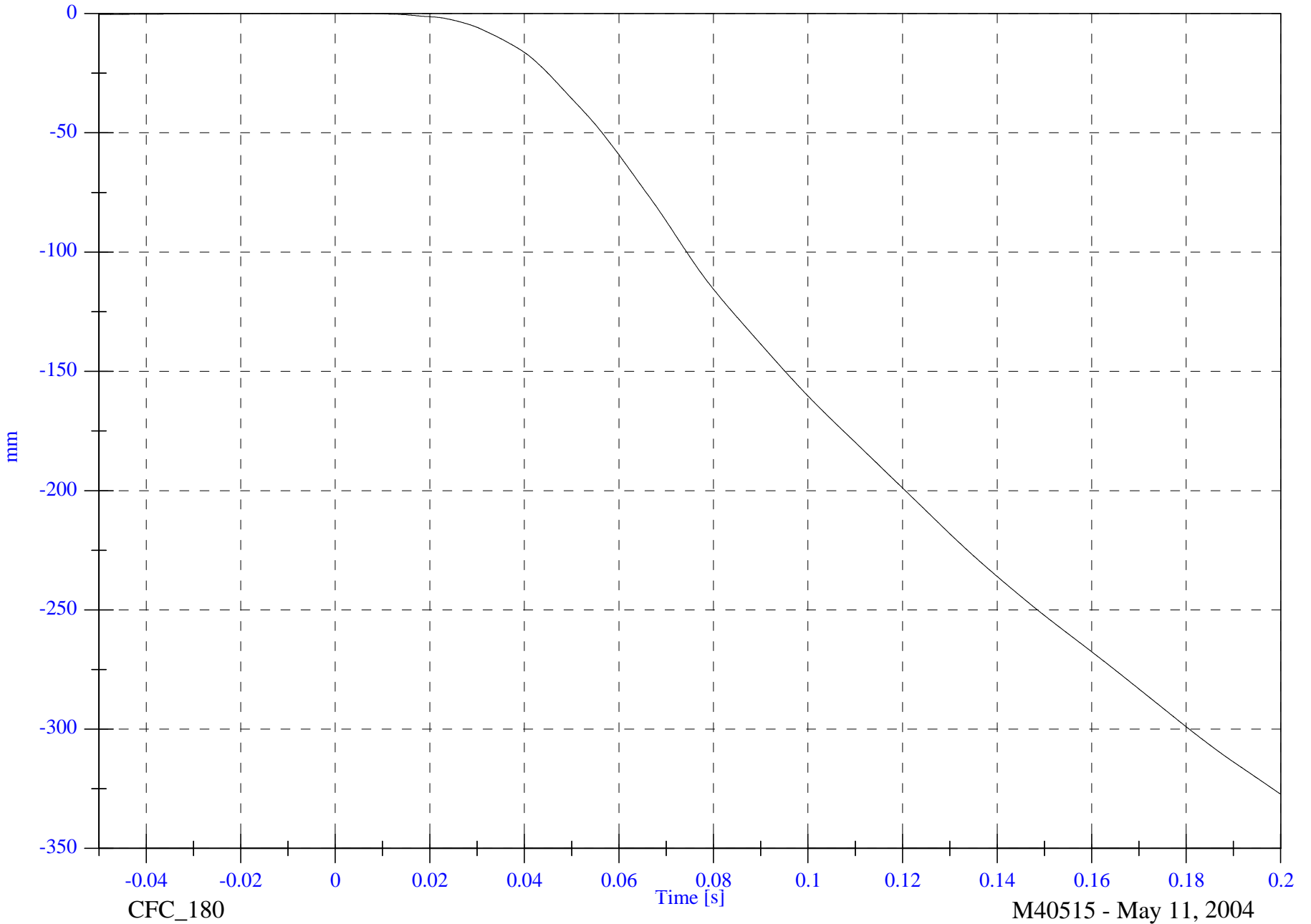
Max: 0.0 [mm] at 0.005 [s]

V1 Right Rear #9z Displacement

Min: -327.3 [mm] at 0.200 [s]

B-144

8642-NCAP-49



CFC_180

Time [s]

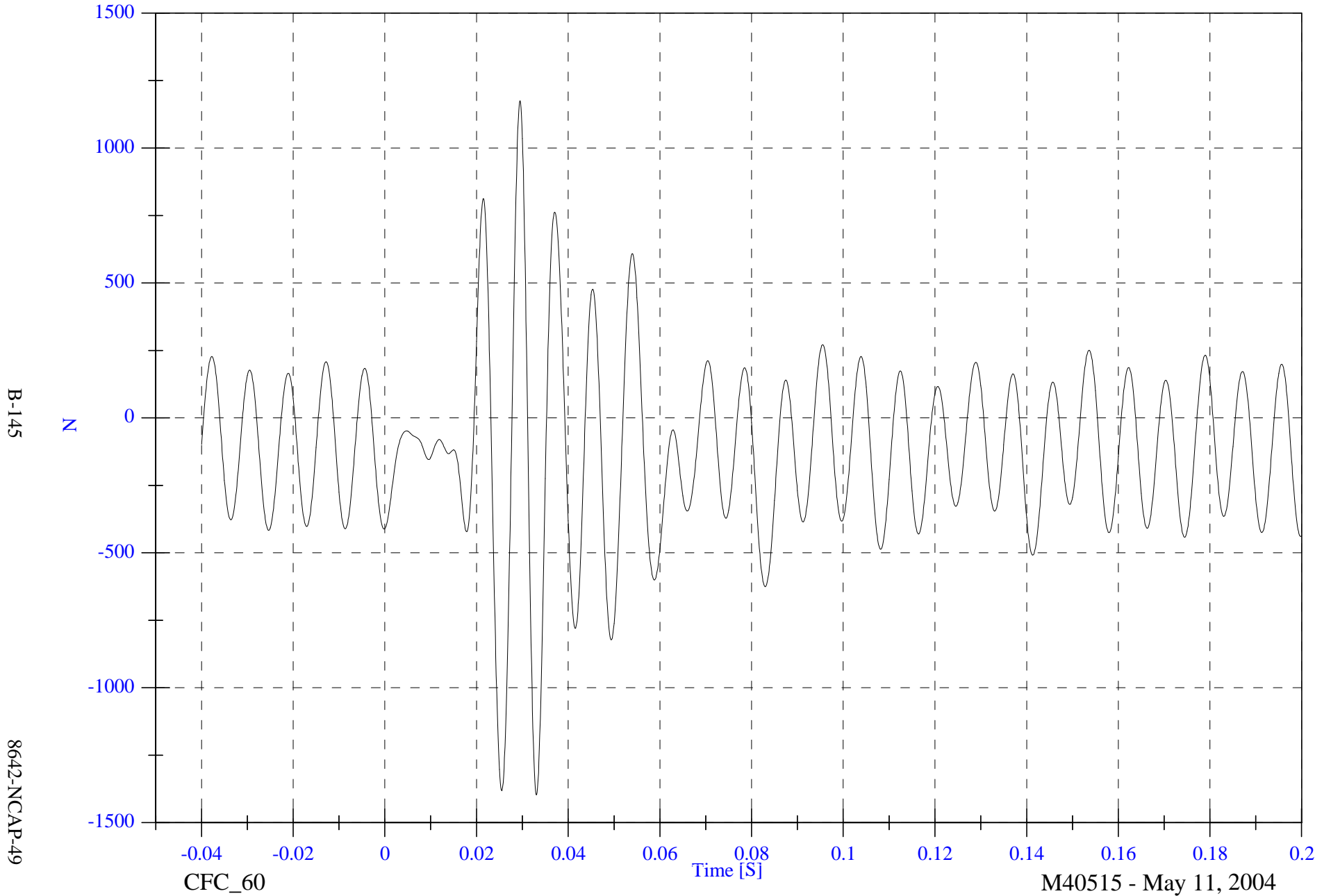
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell A1 Fx

Max: 1175.4 [N] at 0.029 [S]

Min: -1397.0 [N] at 0.033 [S]

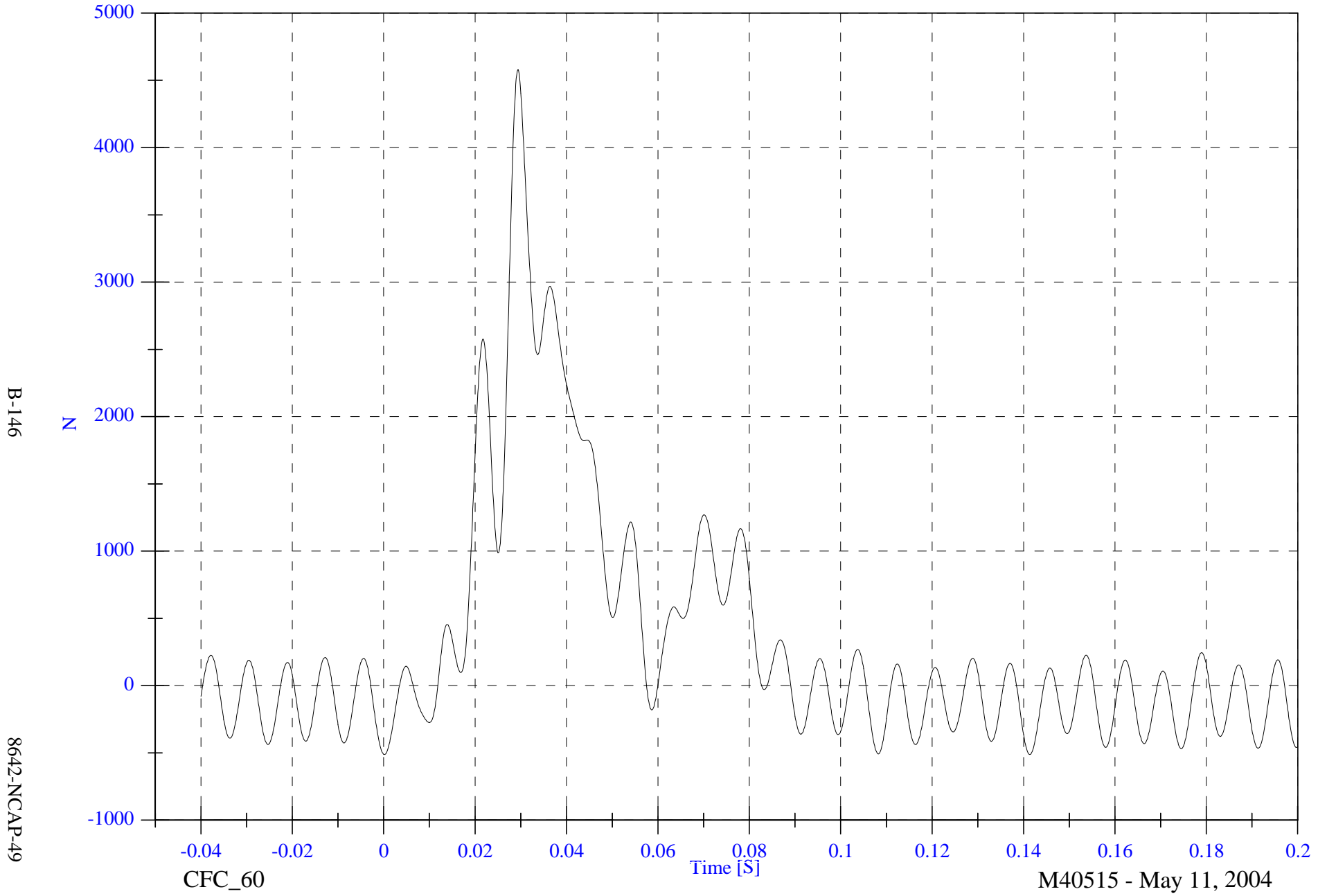


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell A2 Fx

Max: 4578.9 [N] at 0.029 [S]

Min: -512.2 [N] at 0.000 [S]



B-146

8642-NCAP-49

CFC_60

Time [S]

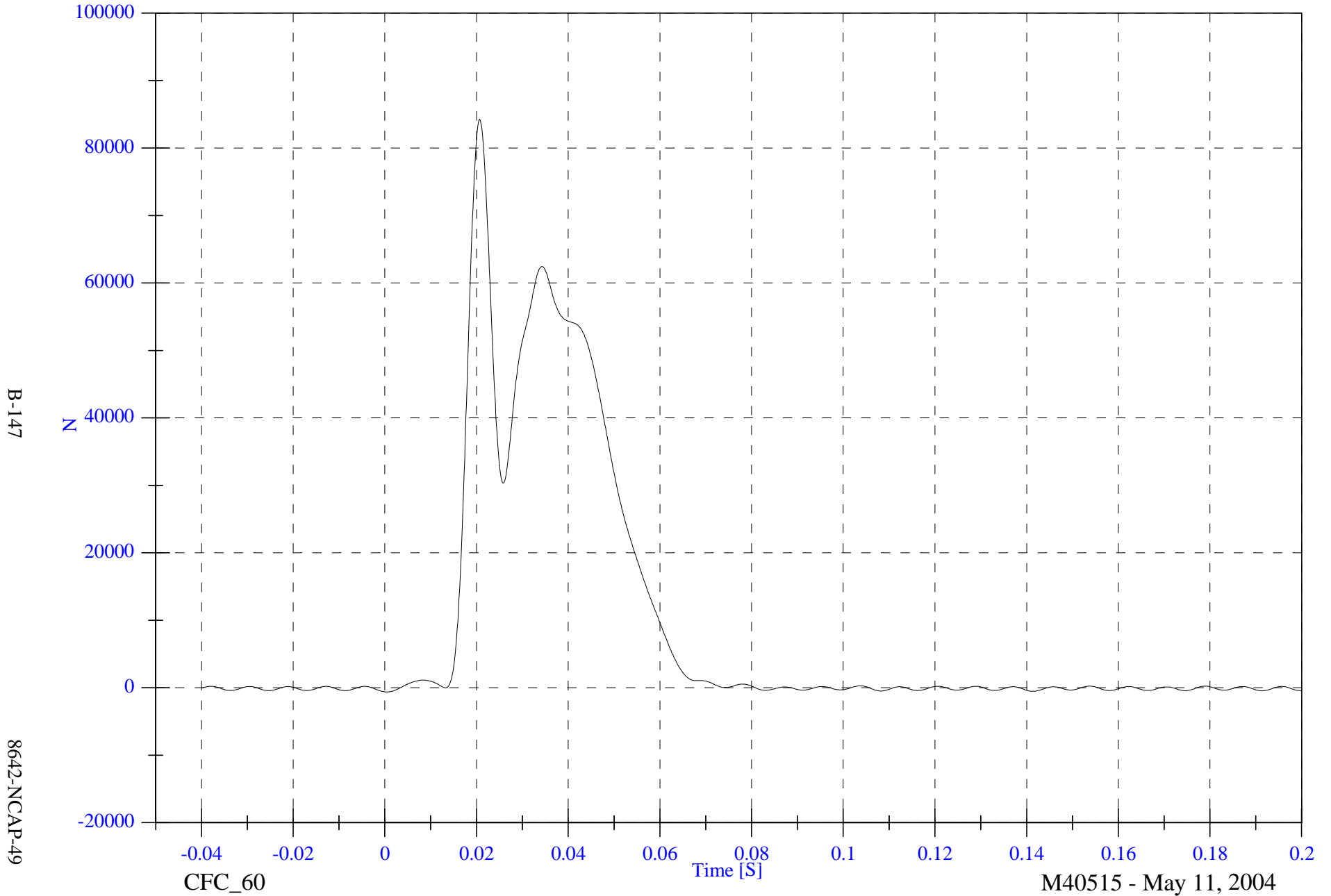
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell A3 Fx

Max: 84242.6 [N] at 0.021 [S]

Min: -623.4 [N] at 0.000 [S]



B-147

8642-NCAP-49

CFC_60

Time [S]

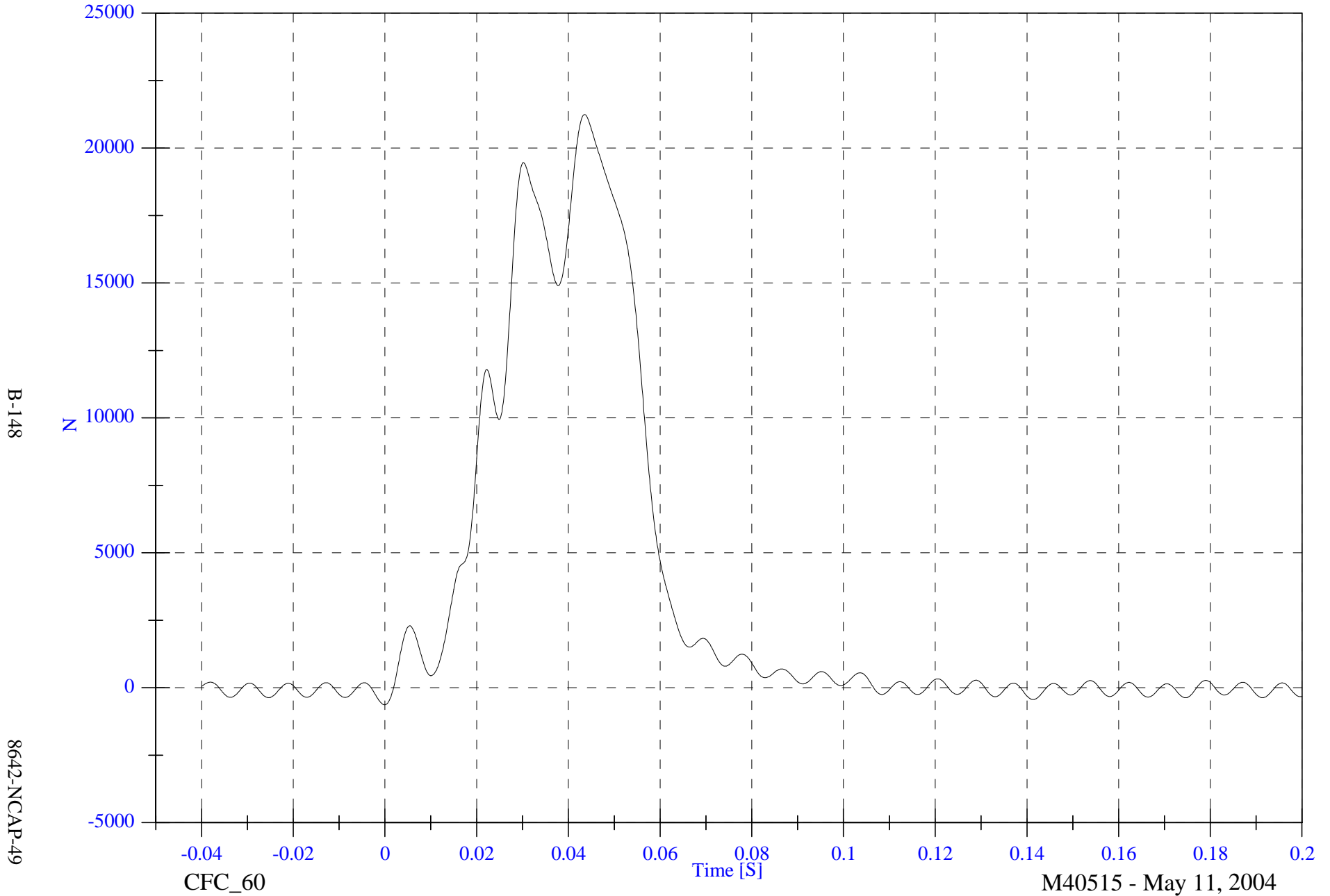
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell A4 Fx

Max: 21242.1 [N] at 0.043 [S]

Min: -631.0 [N] at -0.000 [S]

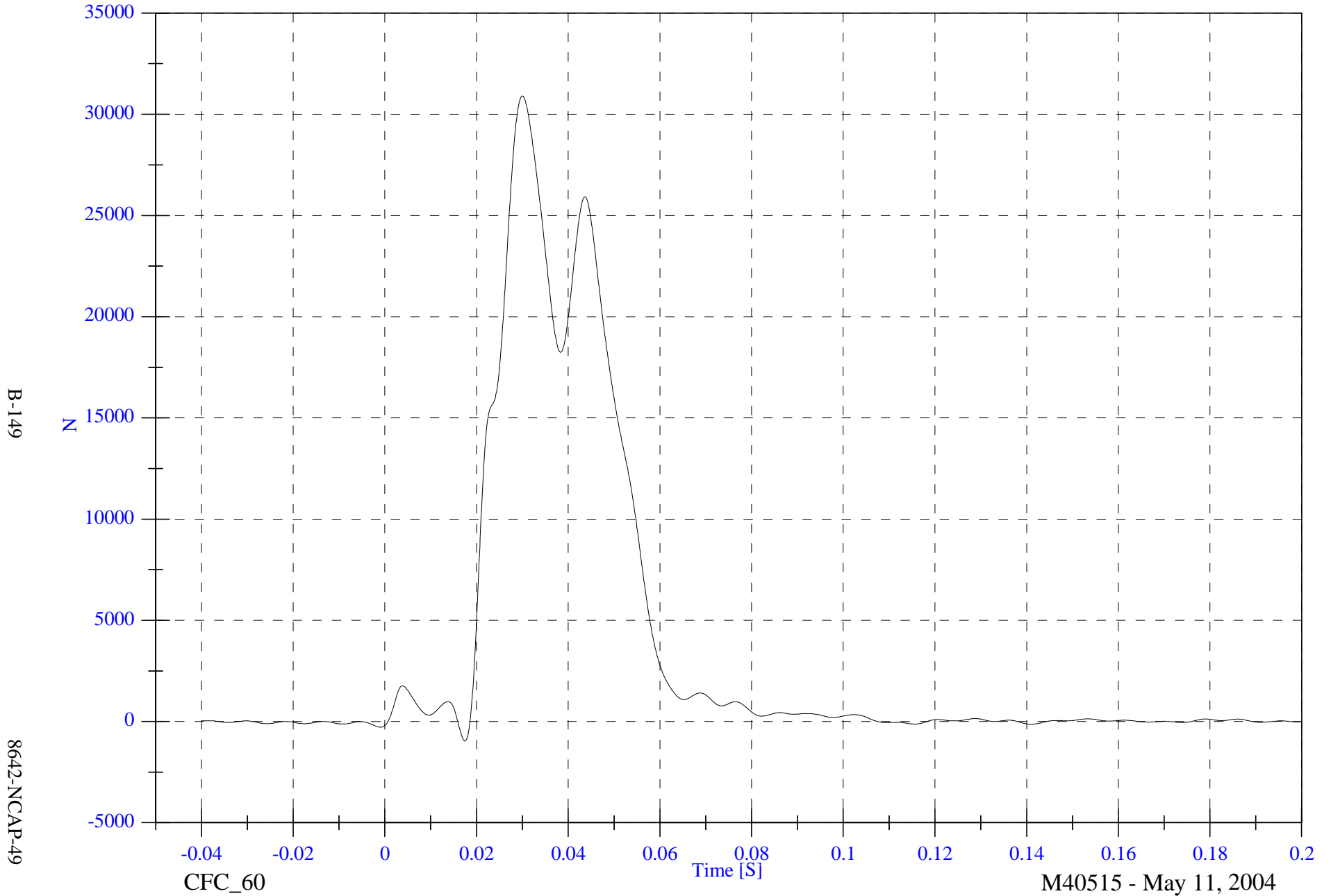


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell A5 Fx

Max: 30906.8 [N] at 0.030 [S]

Min: -965.7 [N] at 0.017 [S]



B-149

8642-NCAP-49

CFC_60

Time [S]

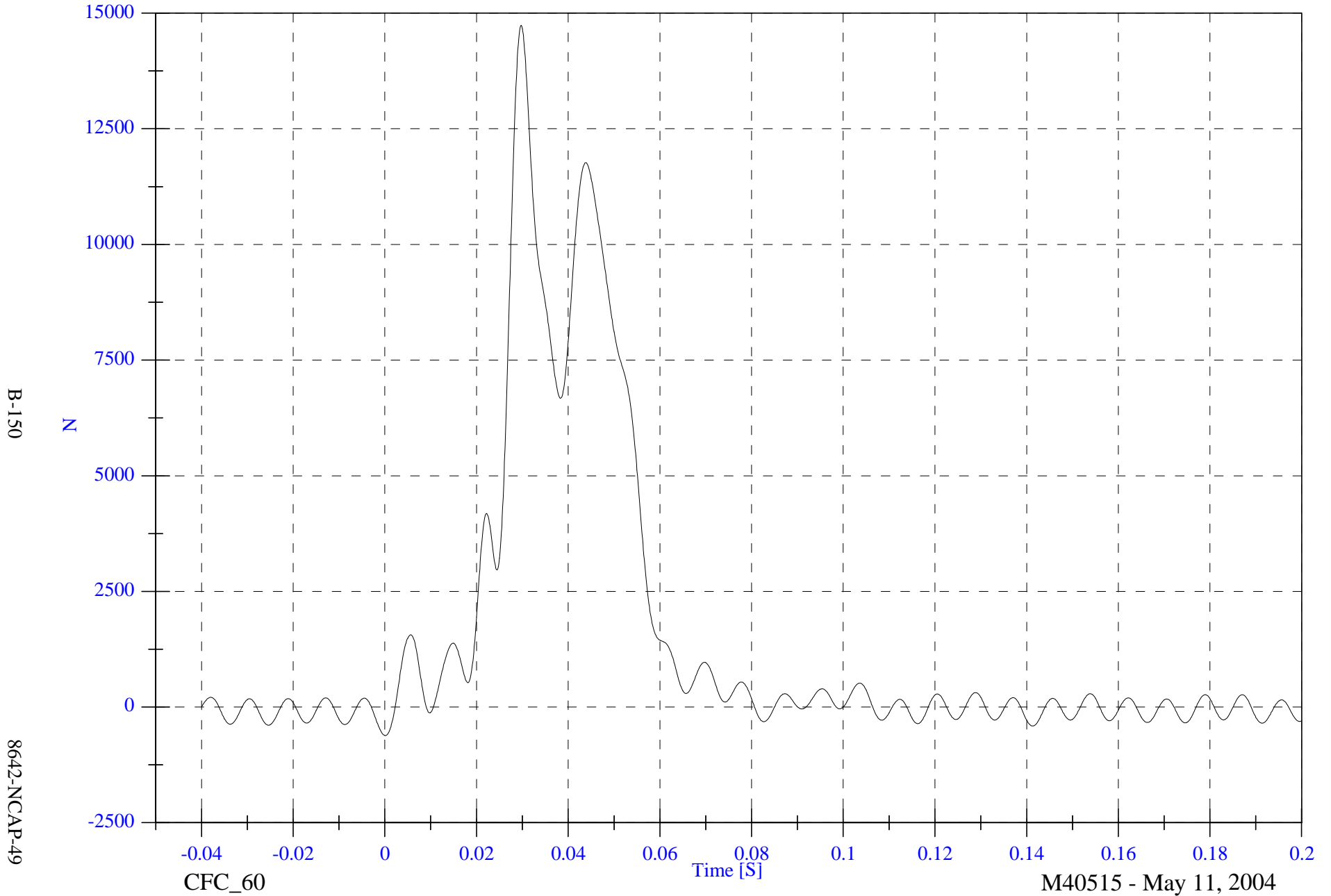
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell A6 Fx

Max: 14737.4 [N] at 0.030 [S]

Min: -617.6 [N] at 0.000 [S]



B-150

8642-NCAP-49

CFC_60

Time [S]

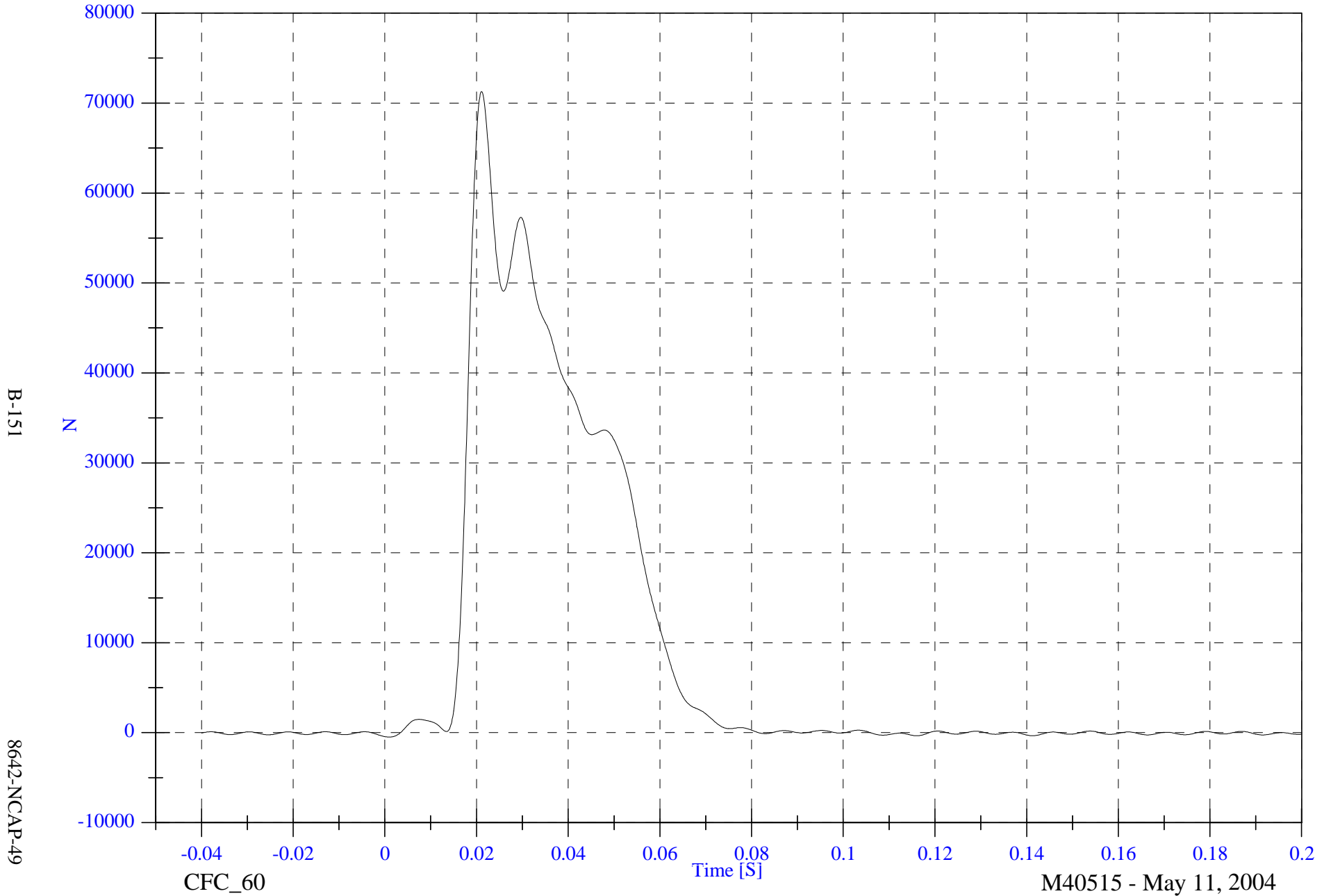
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell A7 Fx

Max: 71273.7 [N] at 0.021 [S]

Min: -484.8 [N] at 0.001 [S]



B-151

8642-NCAP-49

CFC_60

Time [S]

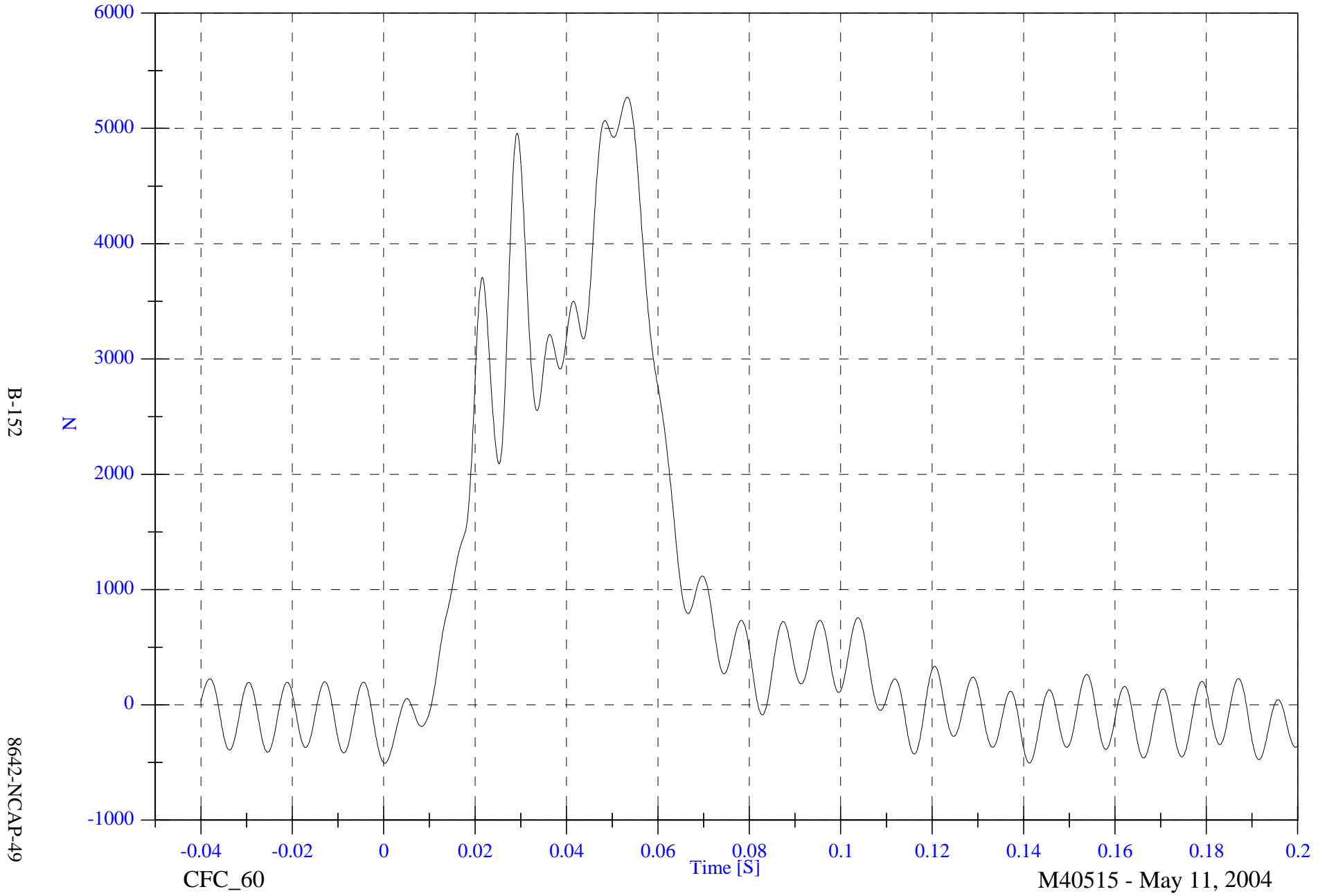
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell A8 Fx

Max: 5271.2 [N] at 0.053 [S]

Min: -505.9 [N] at 0.000 [S]



B-152

8642-NCAP-49

CFC_60

Time [S]

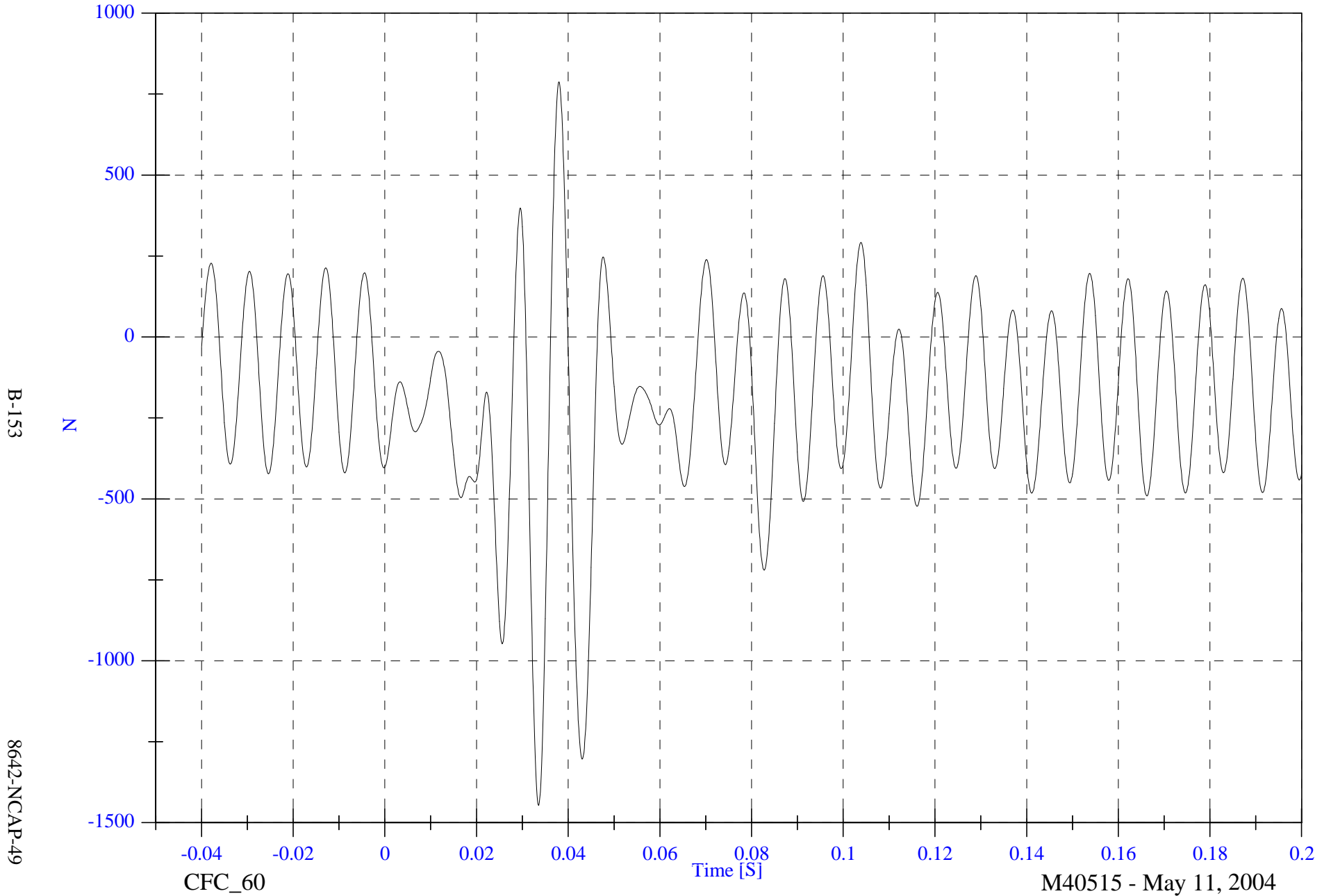
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell A9 Fx

Max: 787.9 [N] at 0.038 [S]

Min: -1446.8 [N] at 0.033 [S]

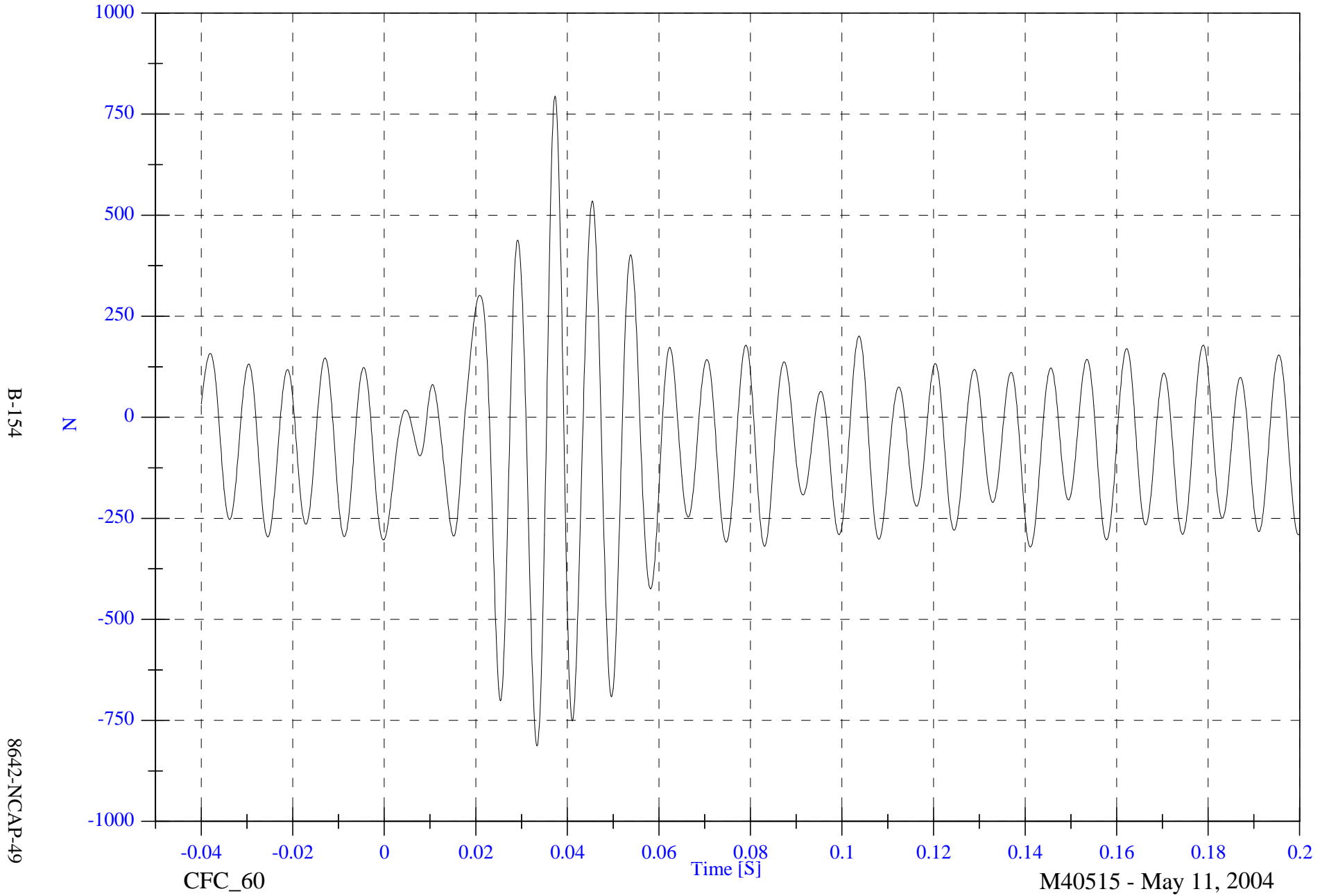


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell B1 Fx

Max: 794.5 [N] at 0.037 [S]

Min: -813.2 [N] at 0.033 [S]

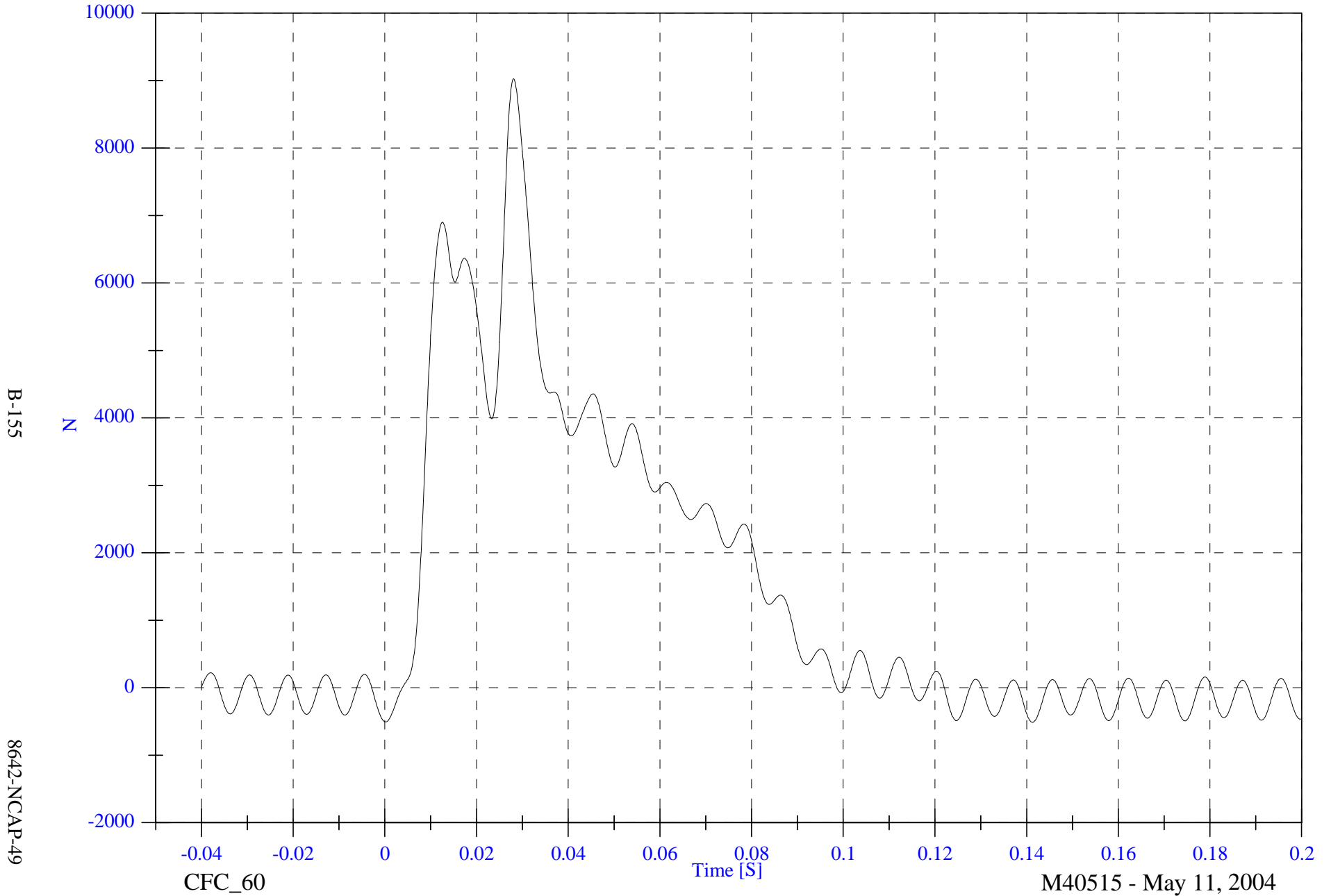


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell B2 Fx

Max: 9027.1 [N] at 0.028 [S]

Min: -512.7 [N] at 0.141 [S]



B-155

8642-NCAP-49

CFC_60

Time [S]

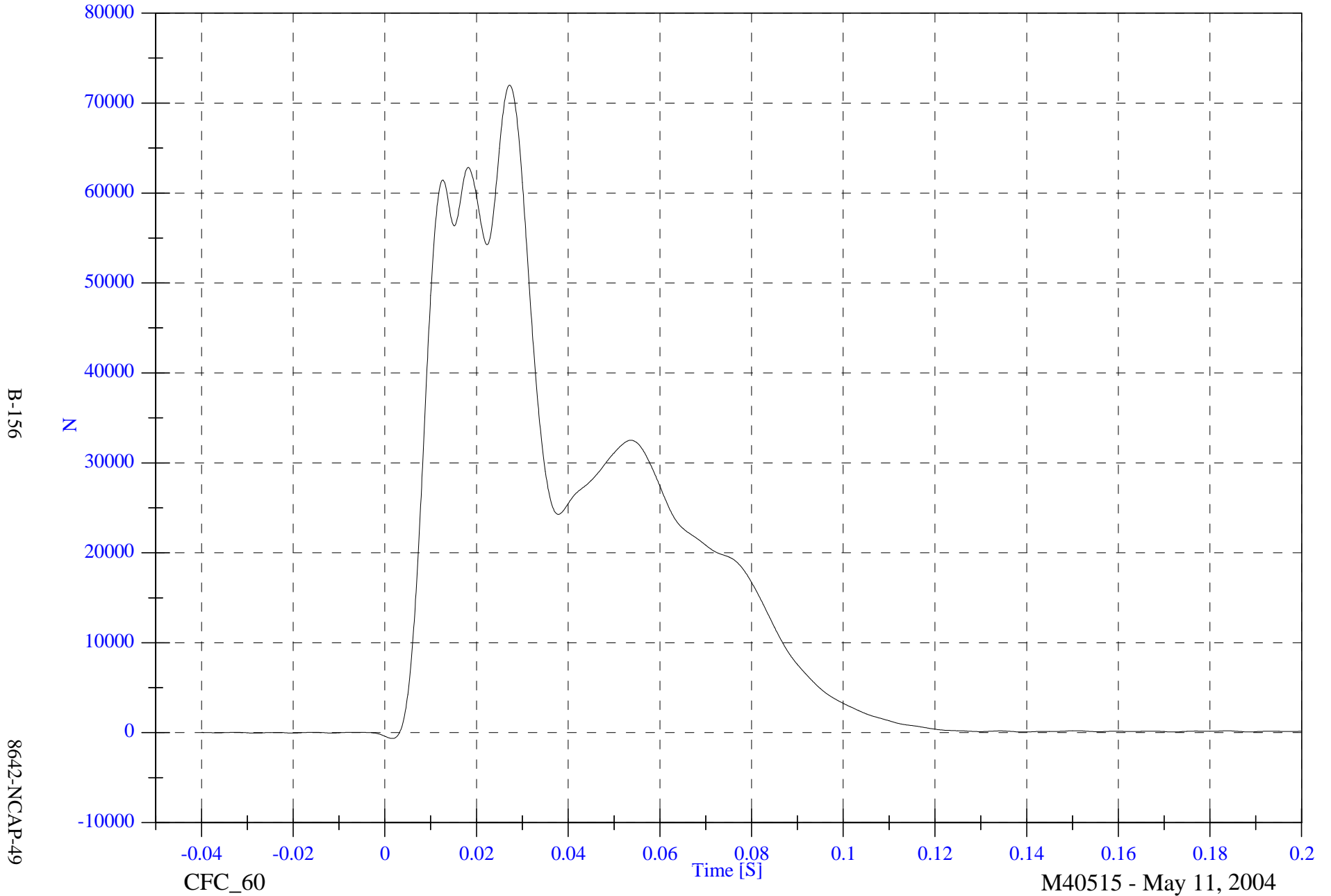
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell B3 Fx

Max: 71992.2 [N] at 0.027 [S]

Min: -638.9 [N] at 0.002 [S]



B-156

8642-NCAP-49

CFC_60

Time [S]

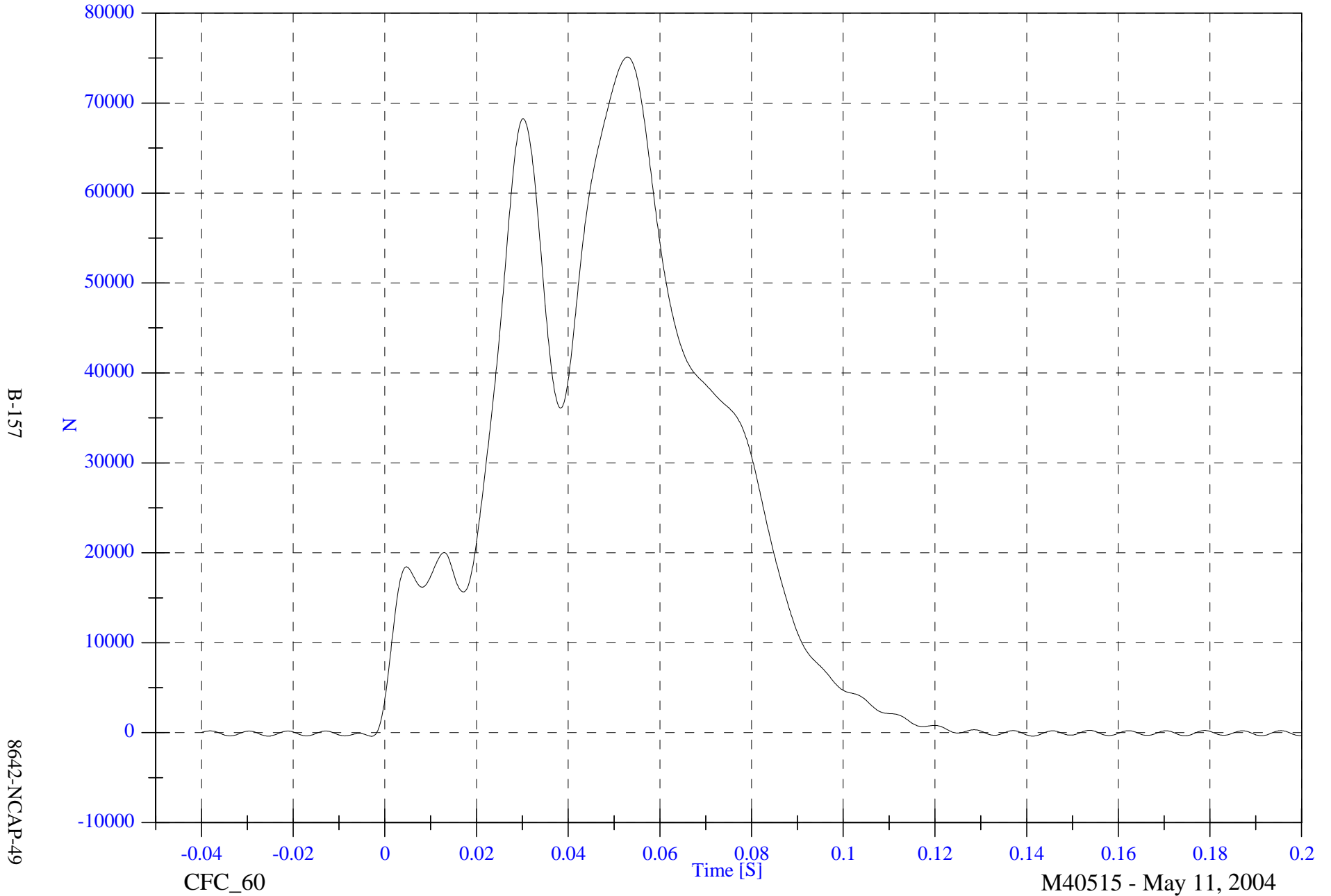
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell B4 Fx

Max: 75109.8 [N] at 0.053 [S]

Min: -397.2 [N] at -0.003 [S]



B-157

8642-NCAP-49

CFC_60

Time [S]

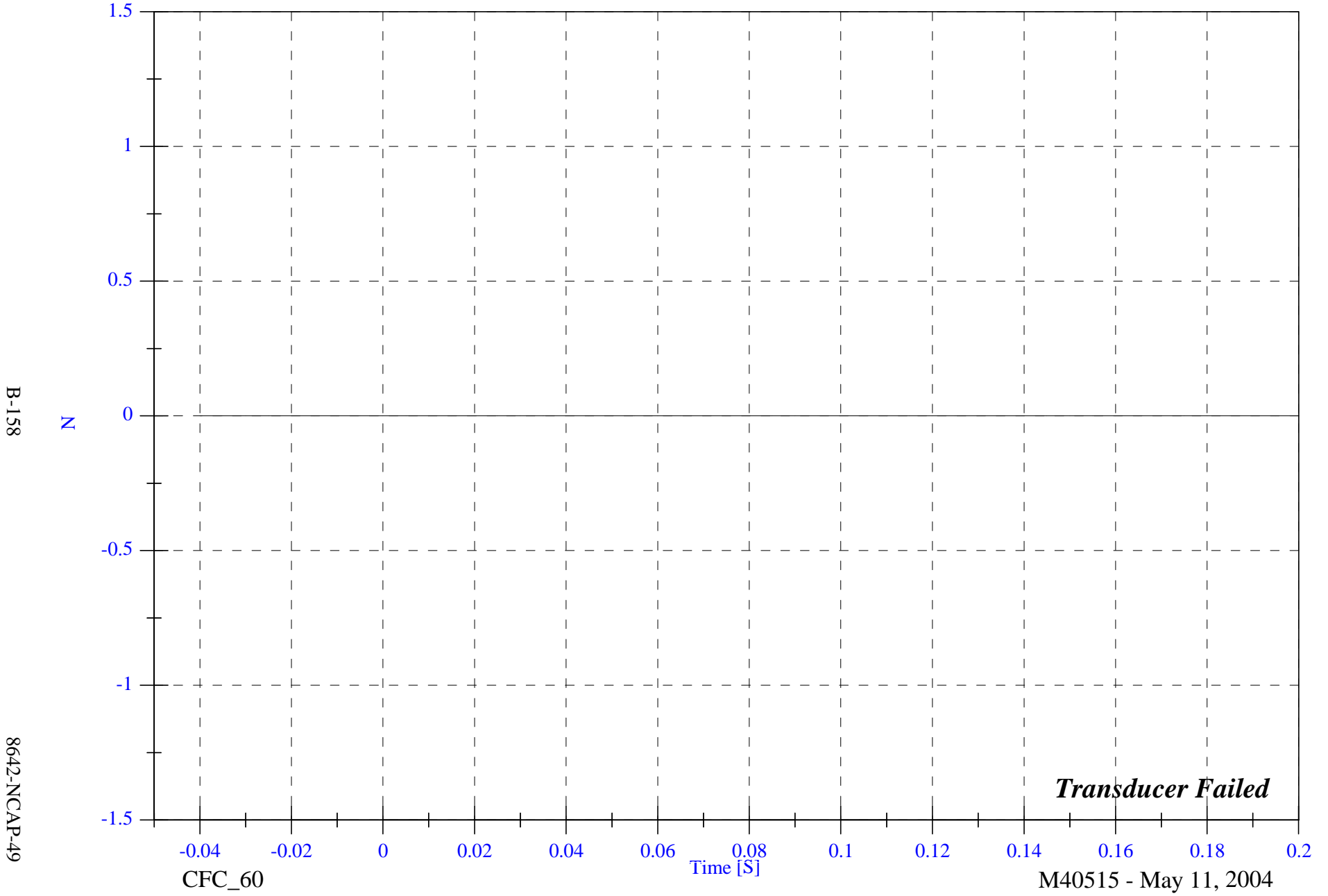
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell B5 Fx

Max: 0.0 [N] at -0.040 [S]

Min: 0.0 [N] at -0.040 [S]

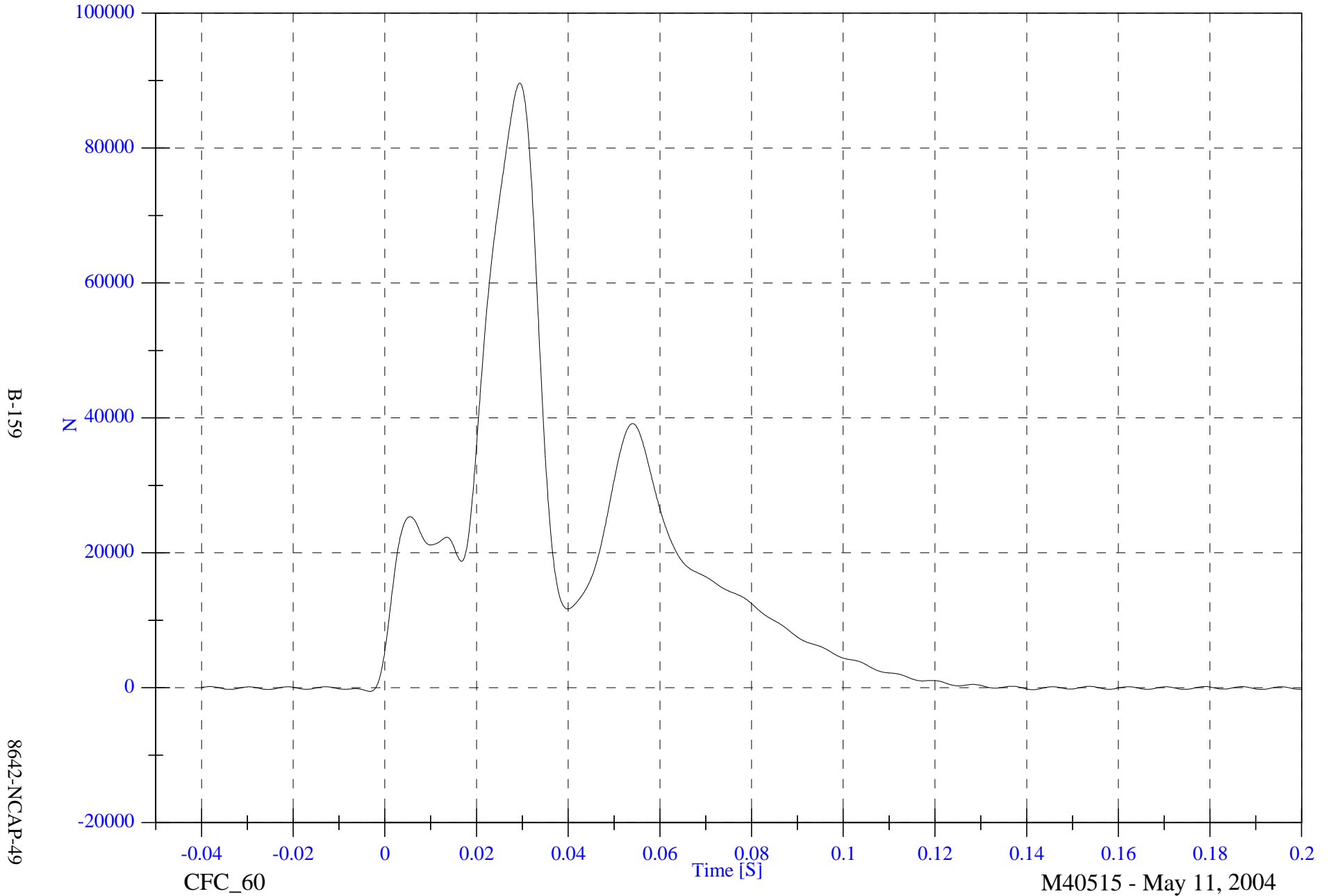


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell B6 Fx

Max: 89614.6 [N] at 0.029 [S]

Min: -540.0 [N] at -0.003 [S]



B-159

8642-NCAP-49

CFC_60

Time [S]

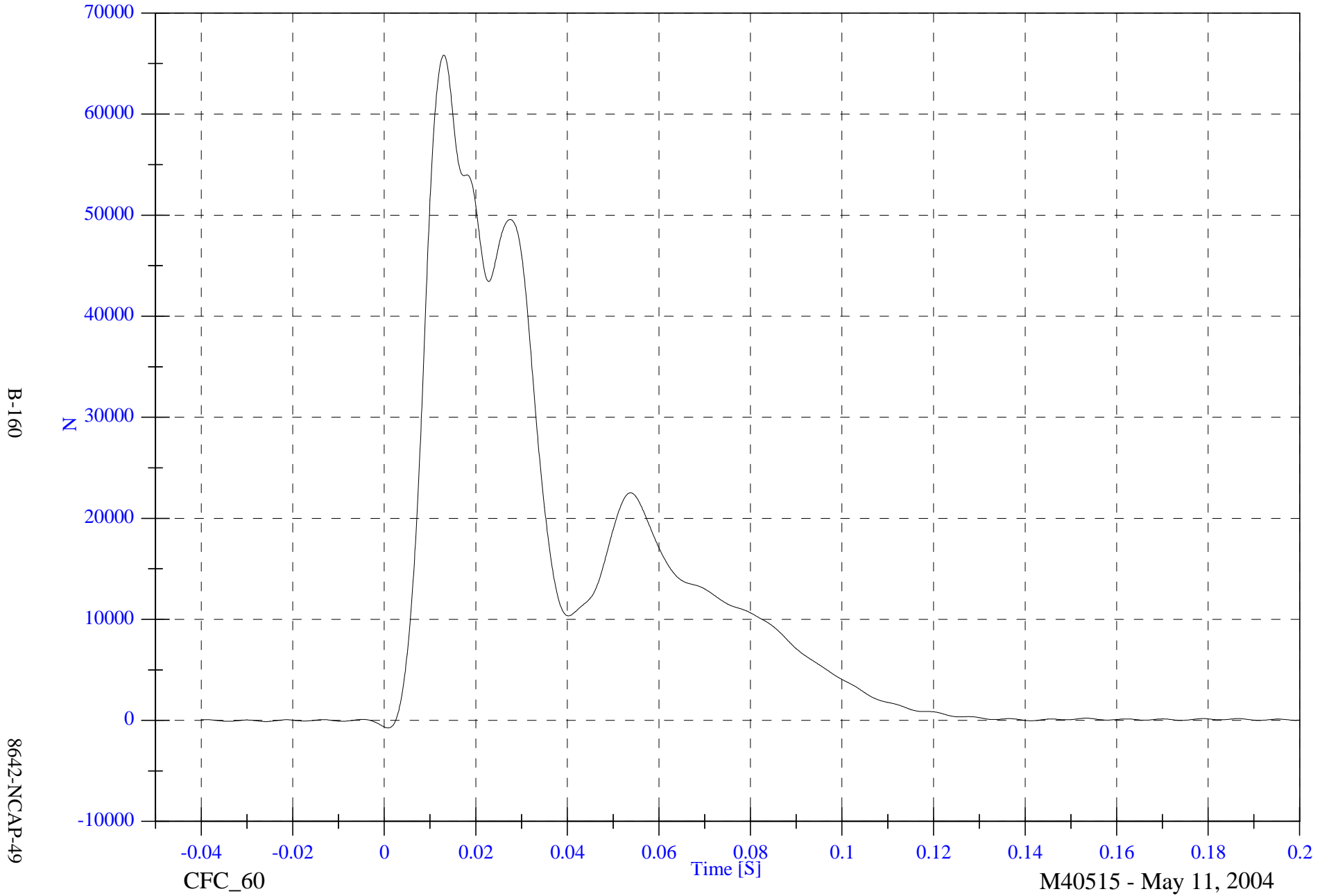
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell B7 Fx

Max: 65834.1 [N] at 0.013 [S]

Min: -749.0 [N] at 0.001 [S]



B-160

8642-NCAP-49

CFC_60

Time [S]

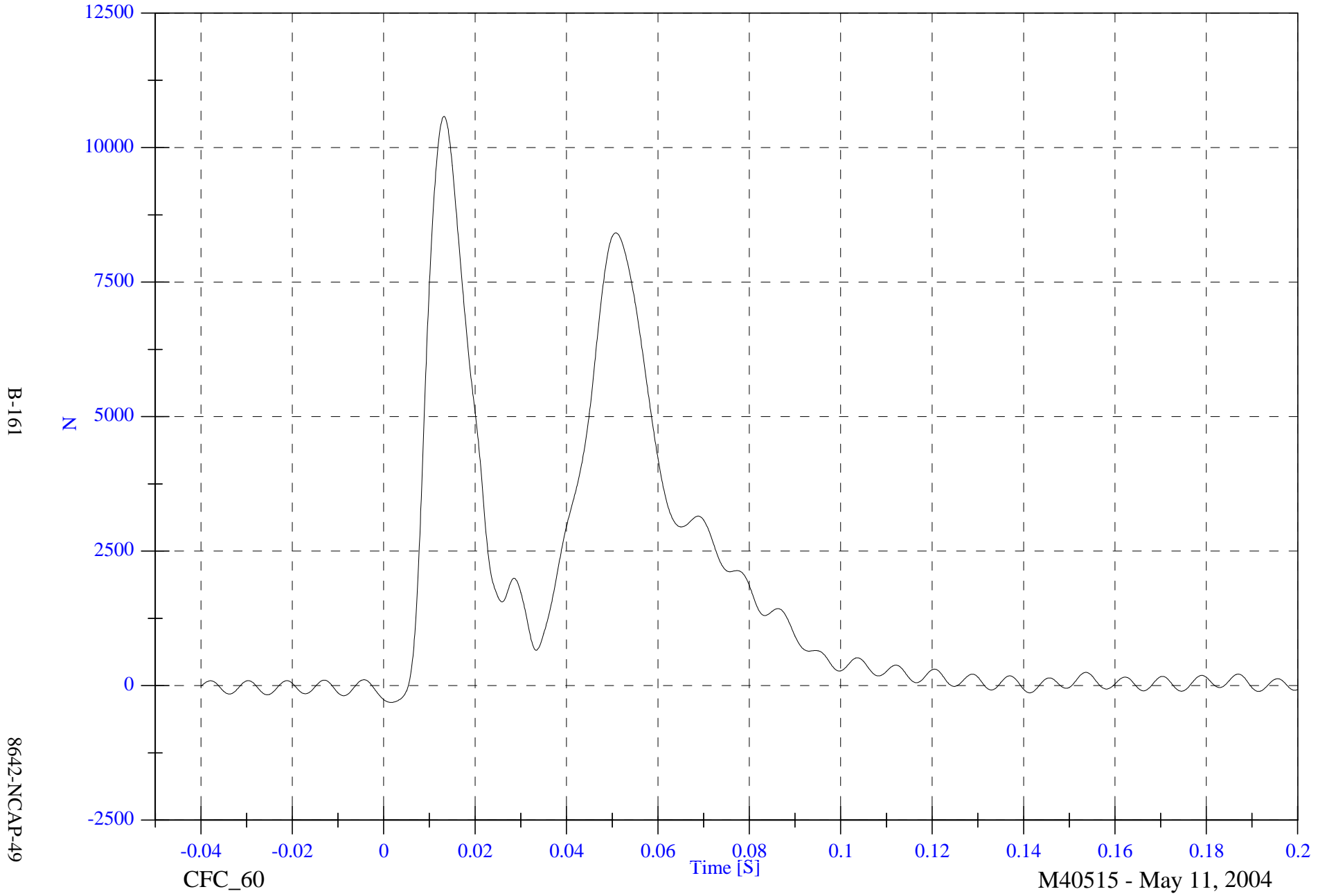
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell B8 Fx

Max: 10579.2 [N] at 0.013 [S]

Min: -310.7 [N] at 0.002 [S]



B-161

8642-NCAP-49

CFC_60

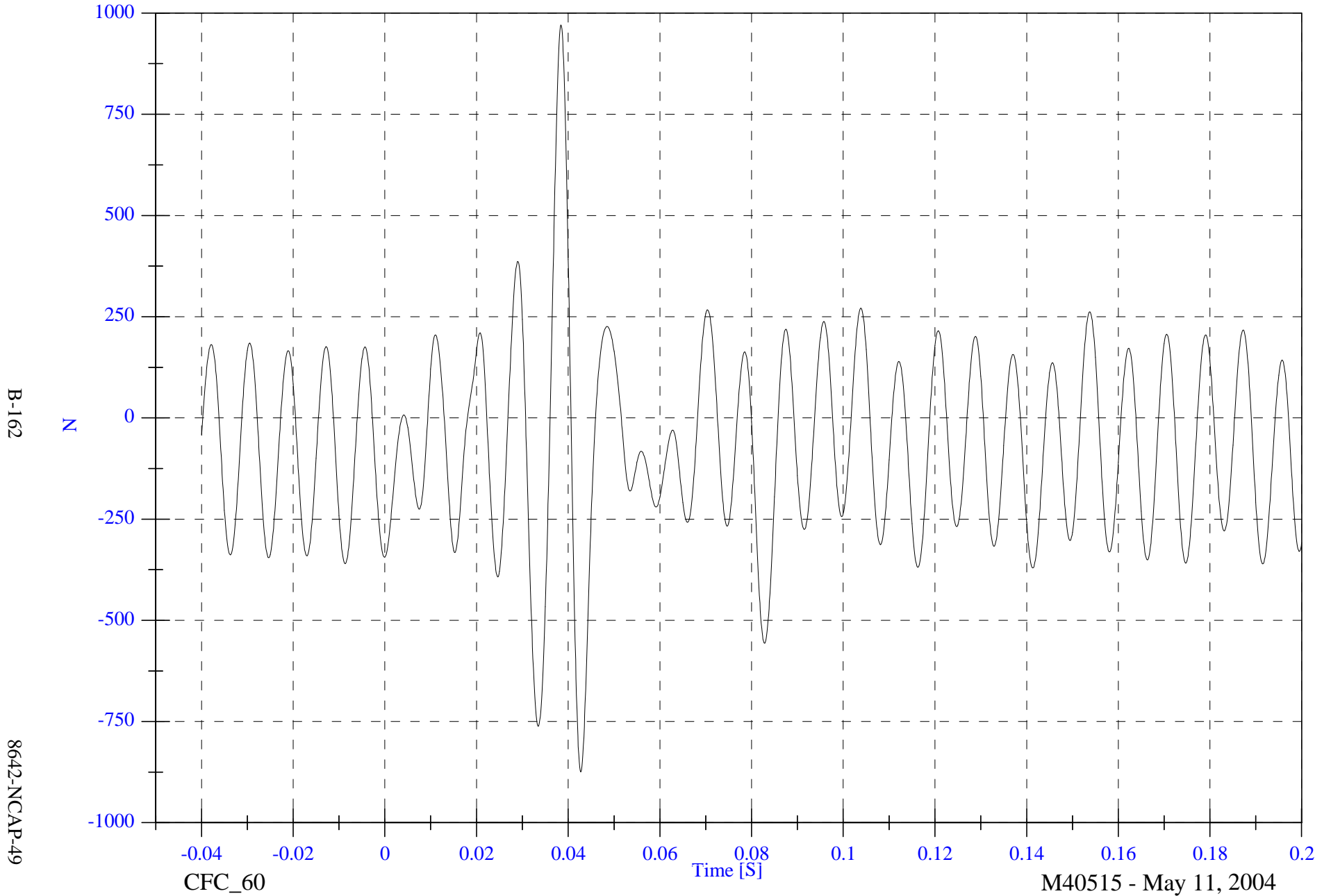
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell B9 Fx

Max: 970.5 [N] at 0.038 [S]

Min: -874.5 [N] at 0.043 [S]

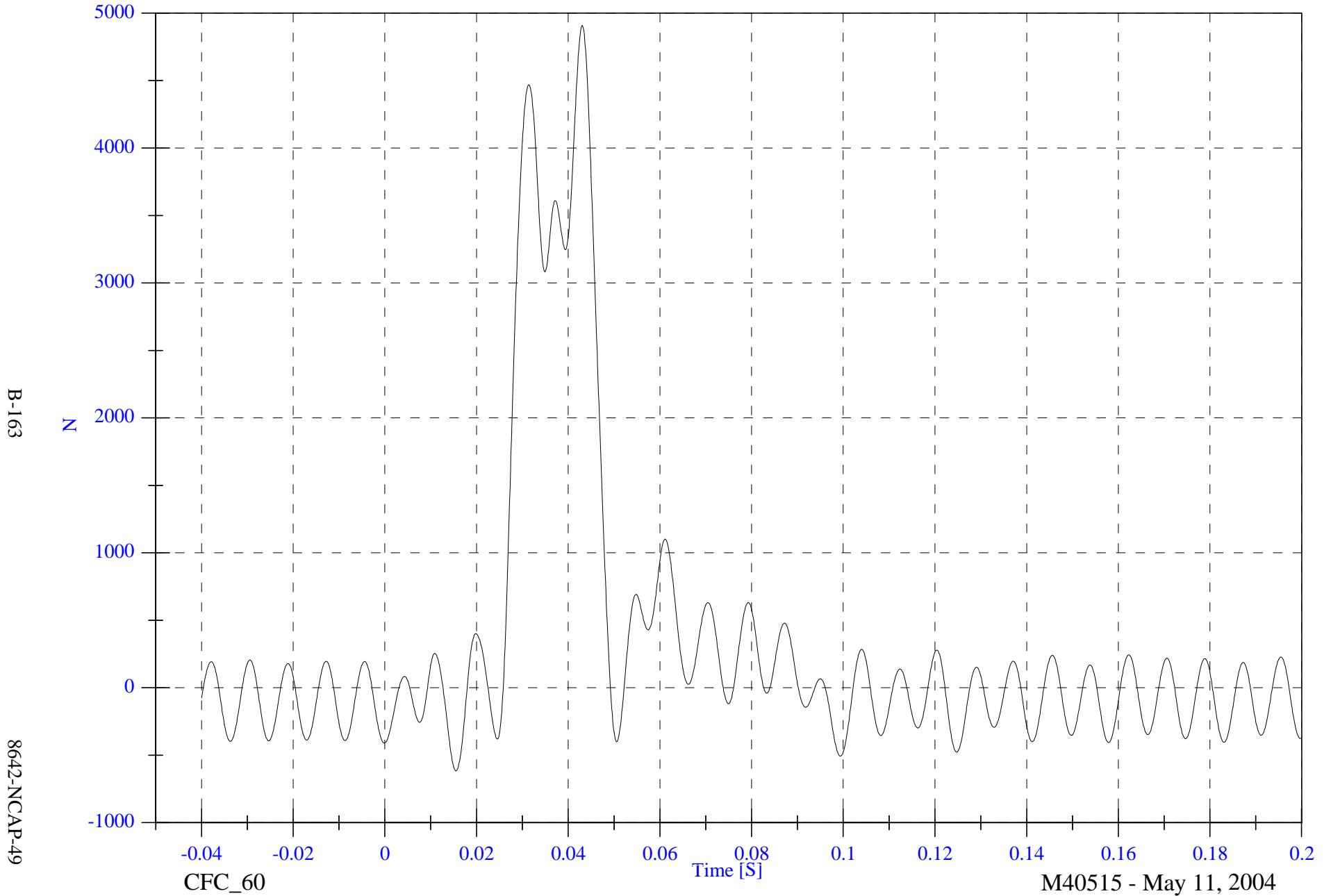


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell C1 Fx

Max: 4907.3 [N] at 0.043 [S]

Min: -616.1 [N] at 0.015 [S]

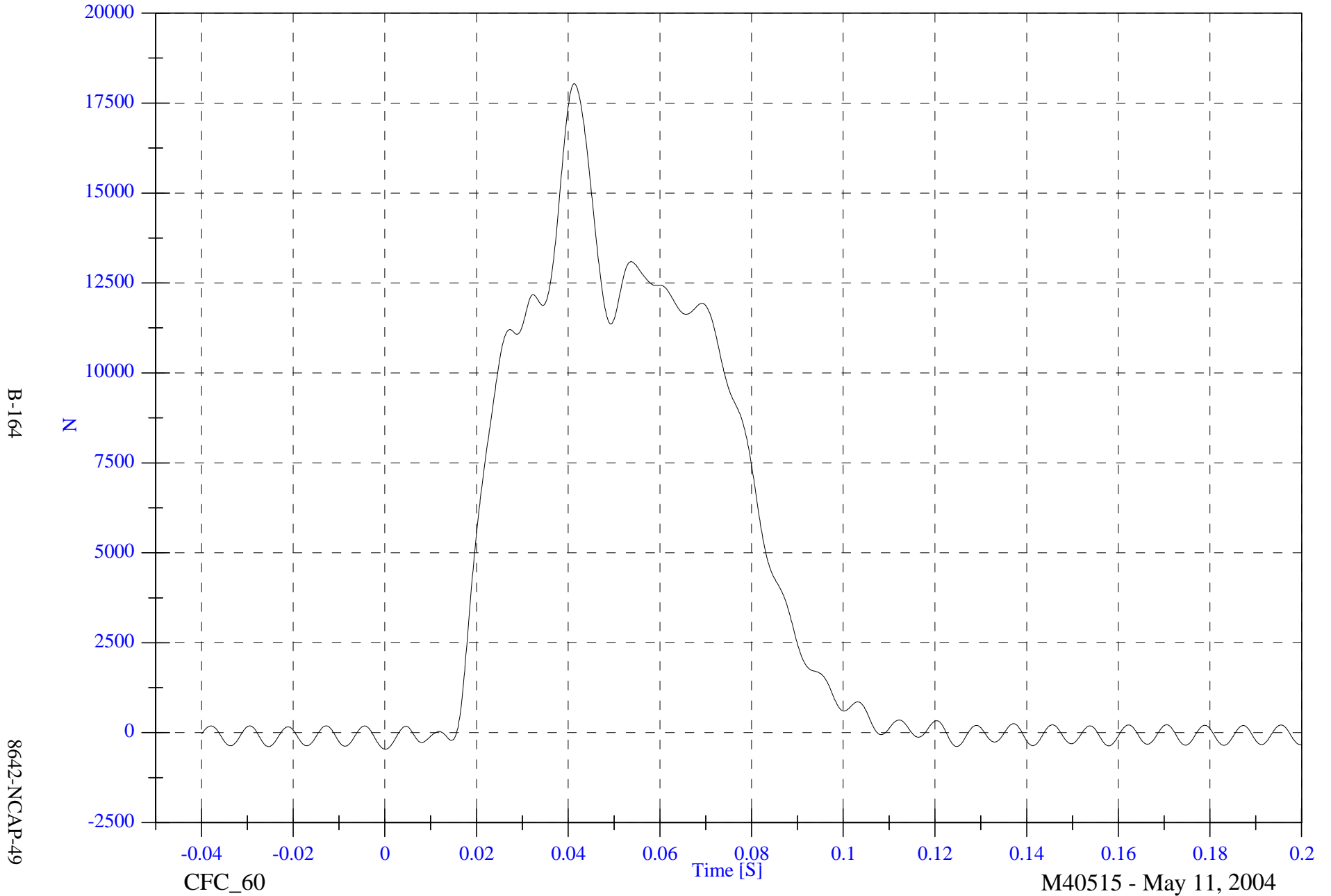


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell C2 Fx

Max: 18039.6 [N] at 0.041 [S]

Min: -458.1 [N] at 0.000 [S]



B-164

8642-NCAP-49

CFC_60

Time [S]

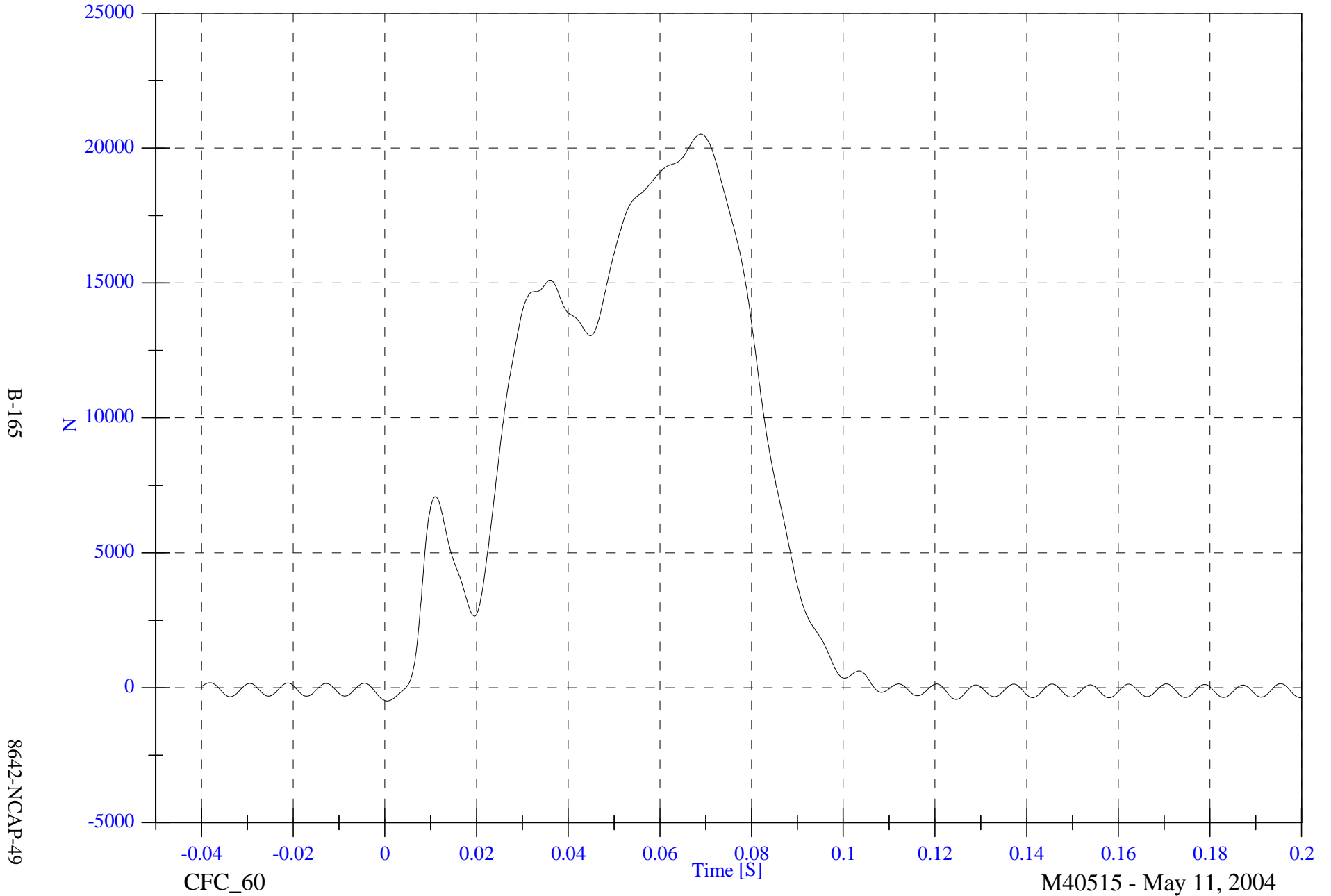
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell C3 Fx

Max: 20513.3 [N] at 0.069 [S]

Min: -489.7 [N] at 0.000 [S]

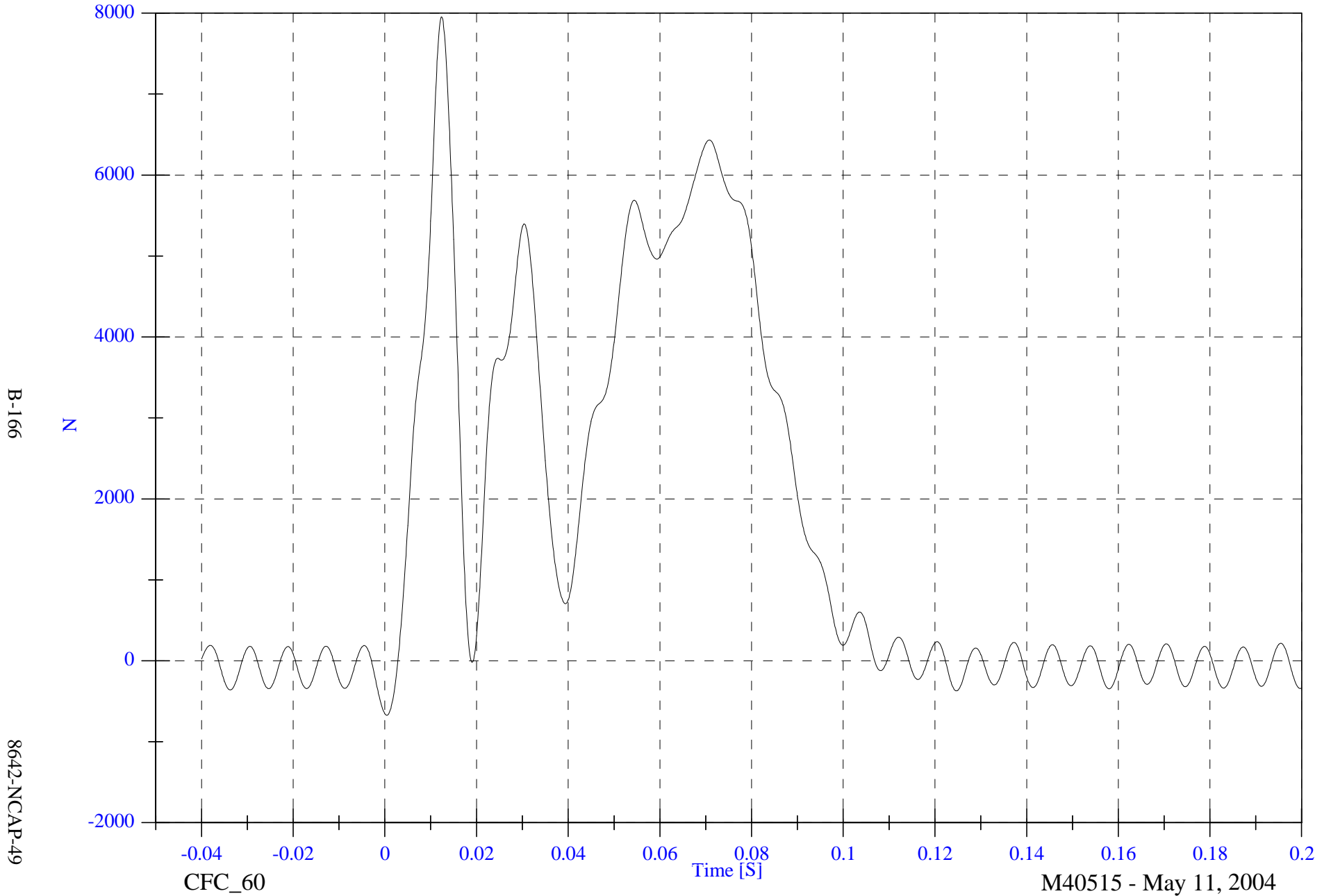


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell C4 Fx

Max: 7954.8 [N] at 0.012 [S]

Min: -672.5 [N] at 0.000 [S]



B-166

8642-NCAP-49

CFC_60

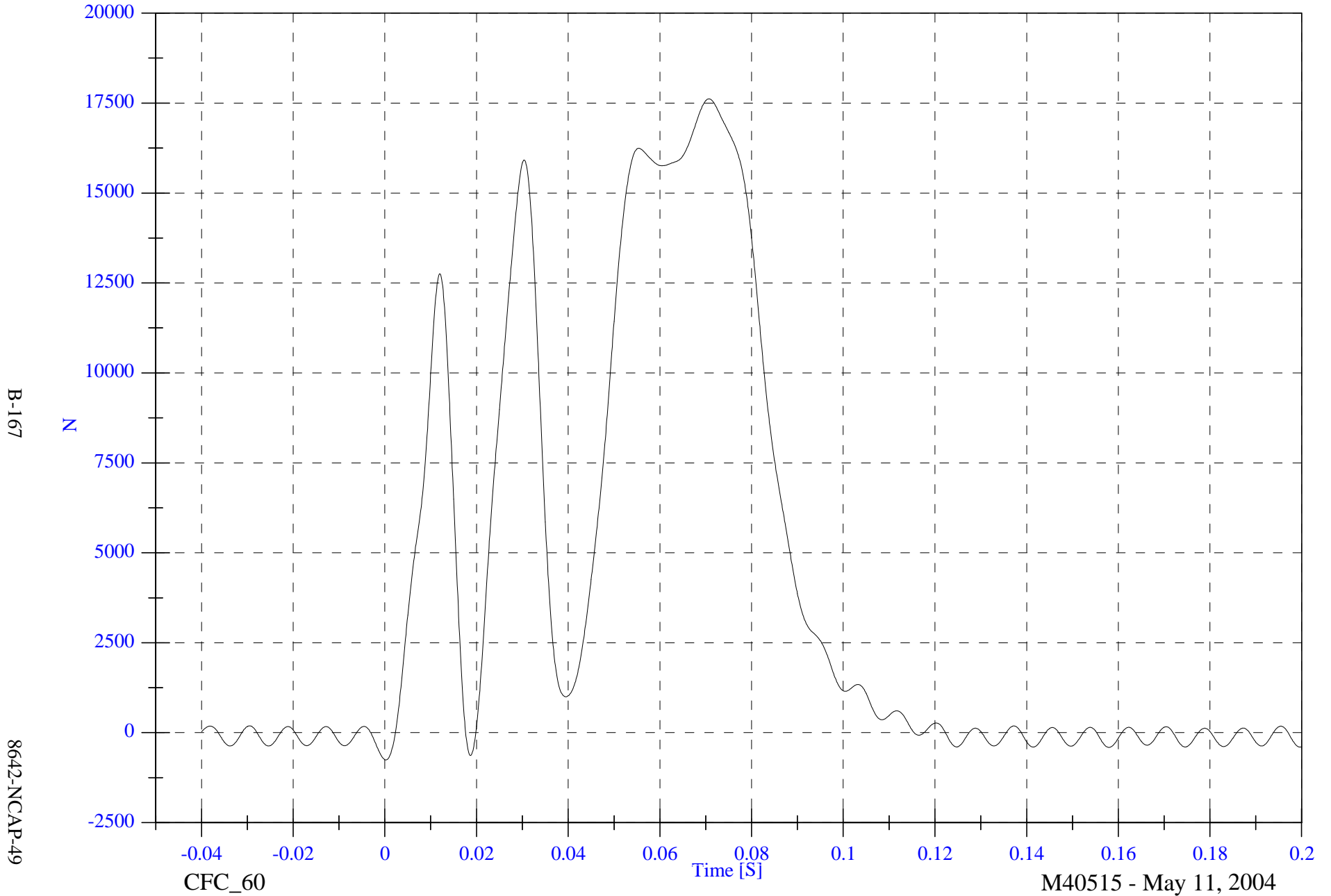
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell C5 Fx

Max: 17614.9 [N] at 0.071 [S]

Min: -756.0 [N] at 0.000 [S]



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8642-NCAP-49

CFC_60

Time [S]

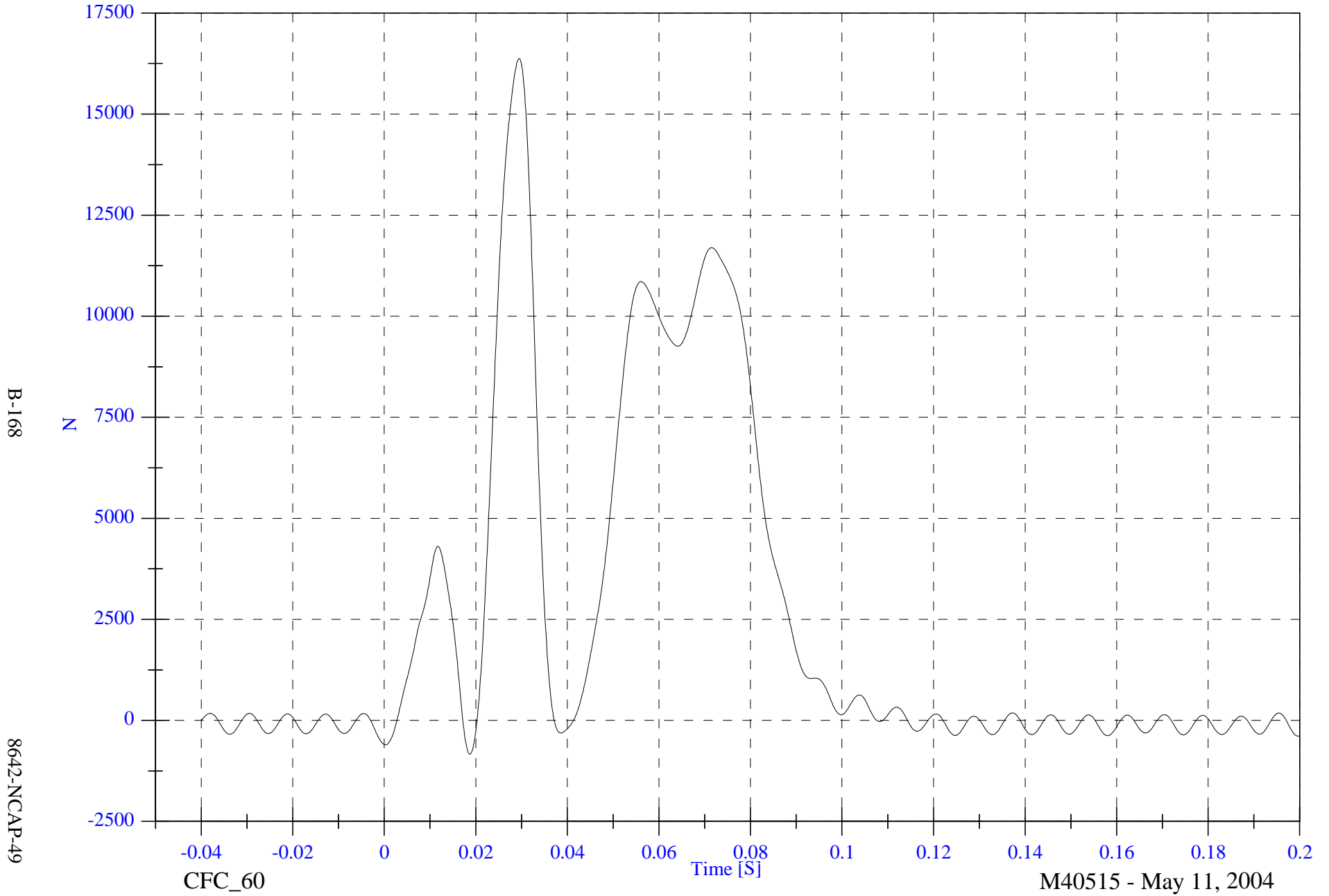
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell C6 Fx

Max: 16374.1 [N] at 0.029 [S]

Min: -837.4 [N] at 0.019 [S]

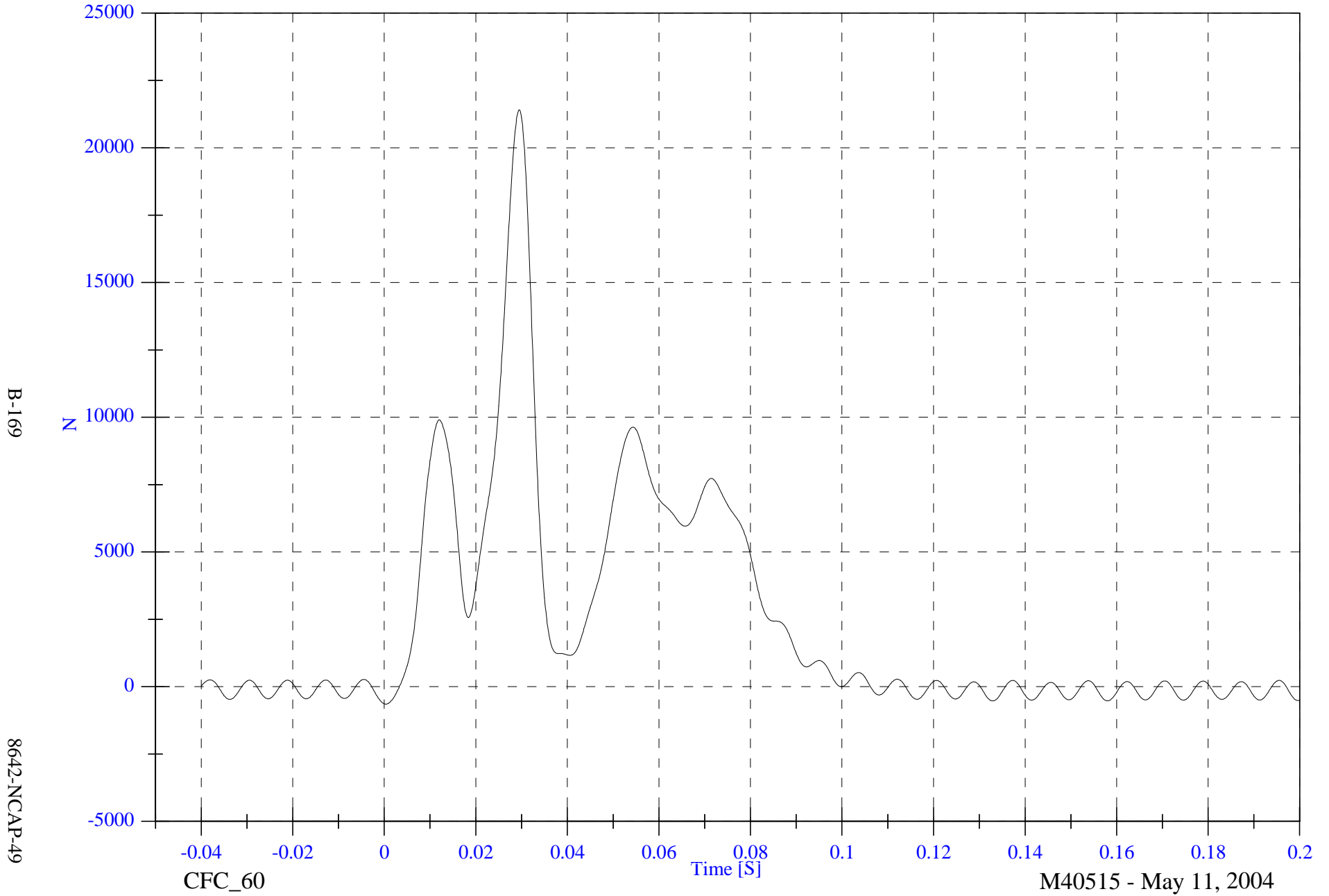


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell C7 Fx

Max: 21410.4 [N] at 0.029 [S]

Min: -646.0 [N] at 0.000 [S]



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8642-NCAP-49

CFC_60

Time [S]

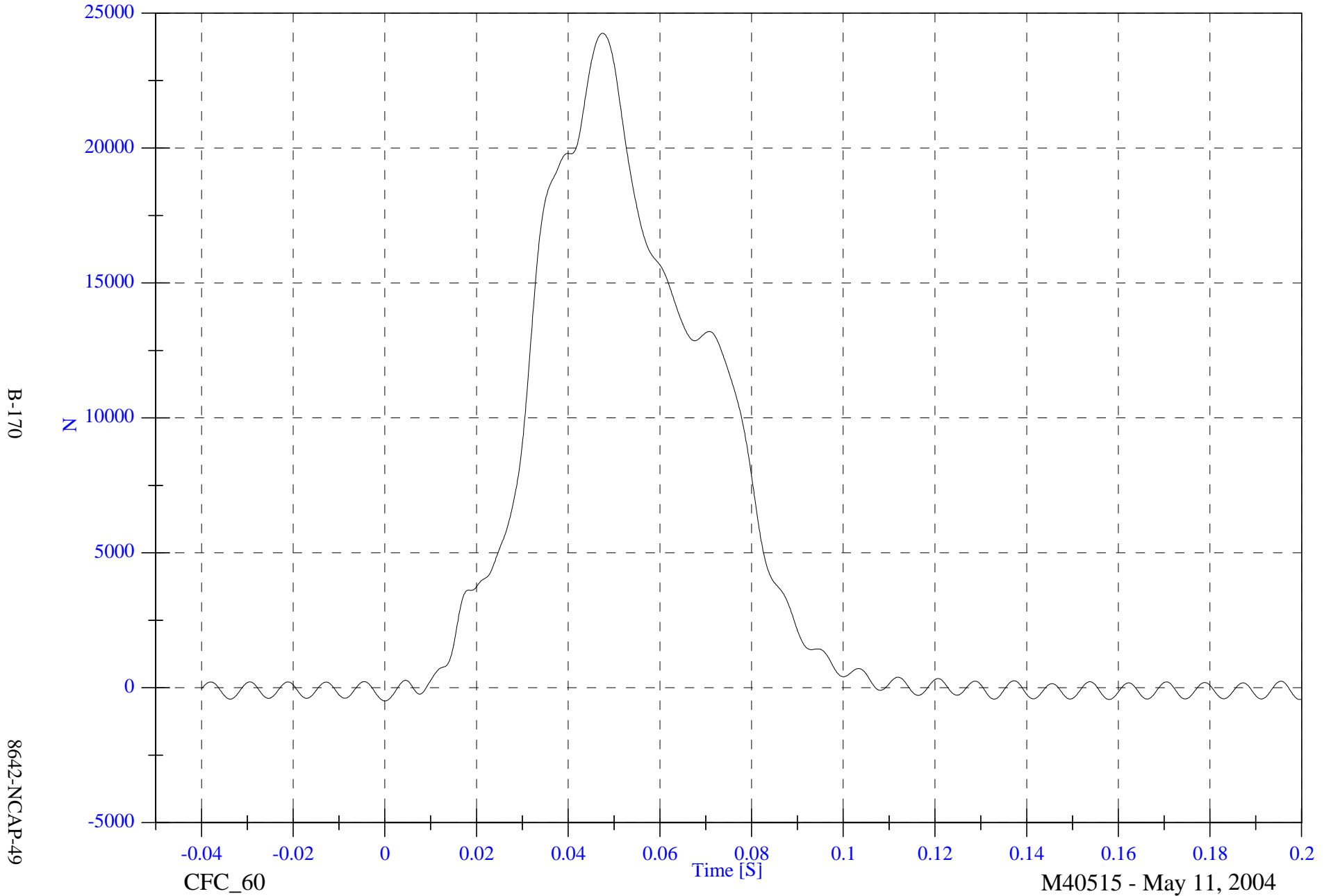
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell C8 Fx

Max: 24255.6 [N] at 0.047 [S]

Min: -485.8 [N] at -0.000 [S]

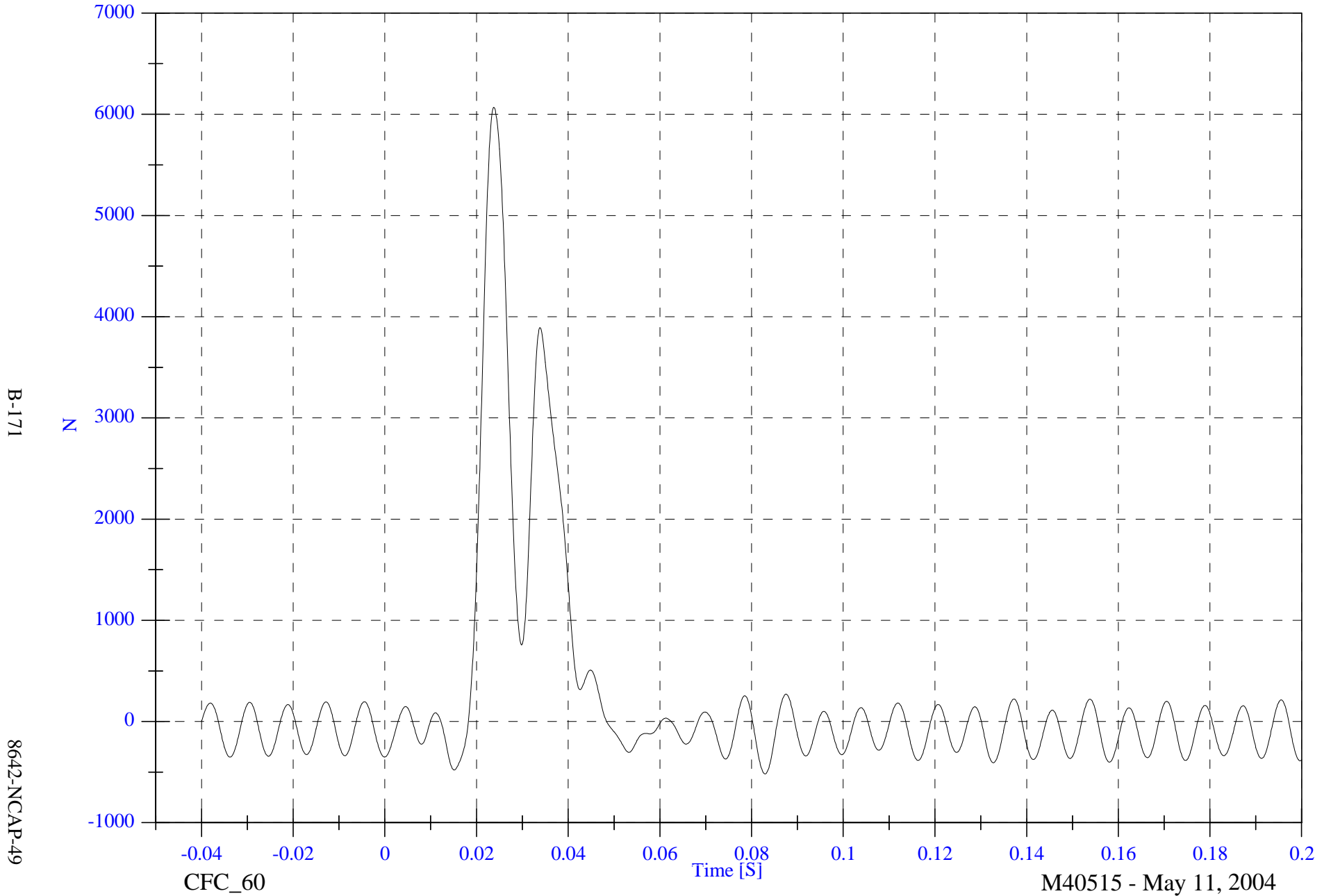


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell C9 Fx

Max: 6069.1 [N] at 0.024 [S]

Min: -517.8 [N] at 0.083 [S]



2004 NCAP Test 13 - 2004.5 Kia Spectra

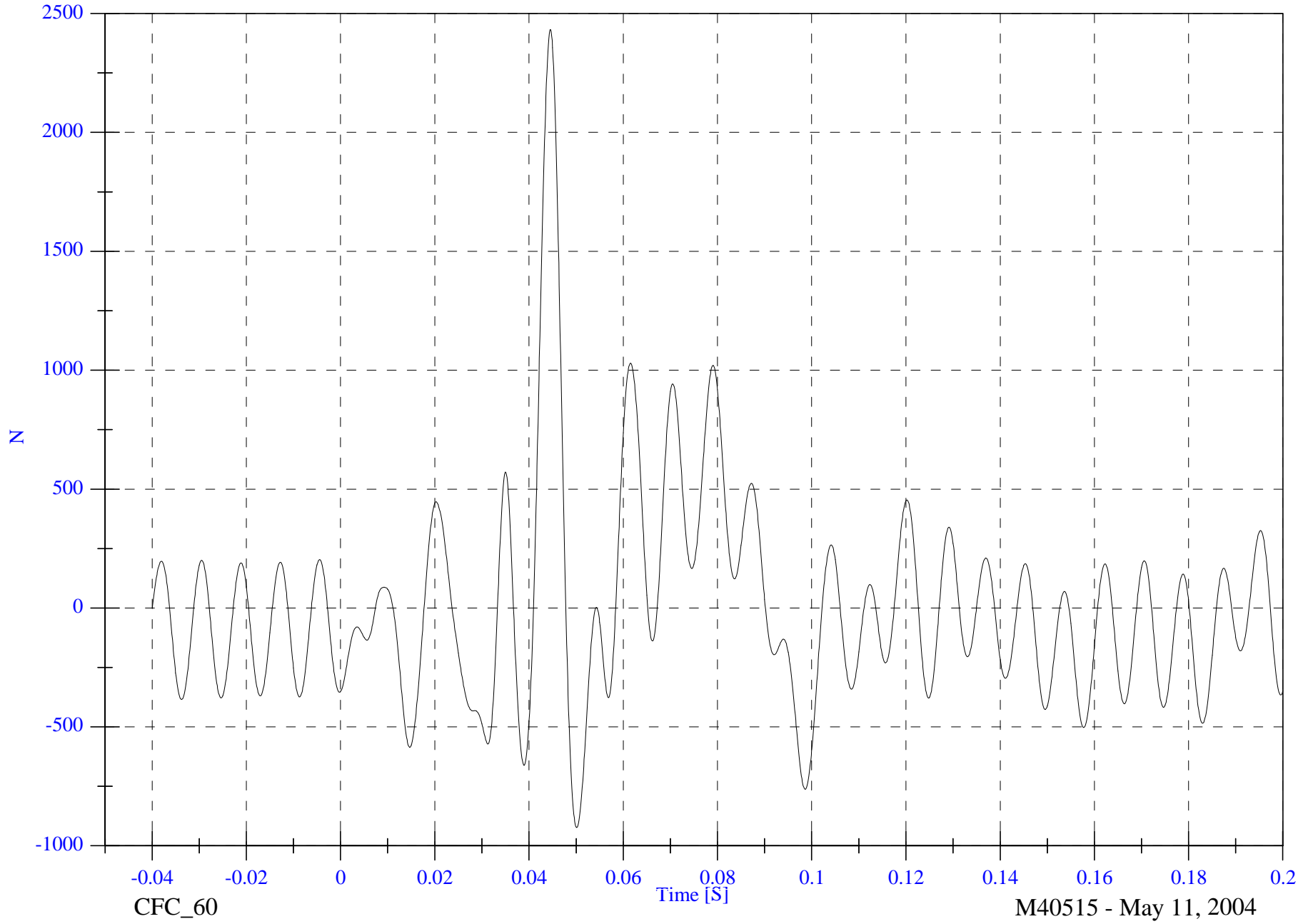
Barrier Load Cell D1 Fx

Max: 2432.8 [N] at 0.044 [S]

Min: -923.1 [N] at 0.050 [S]

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8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

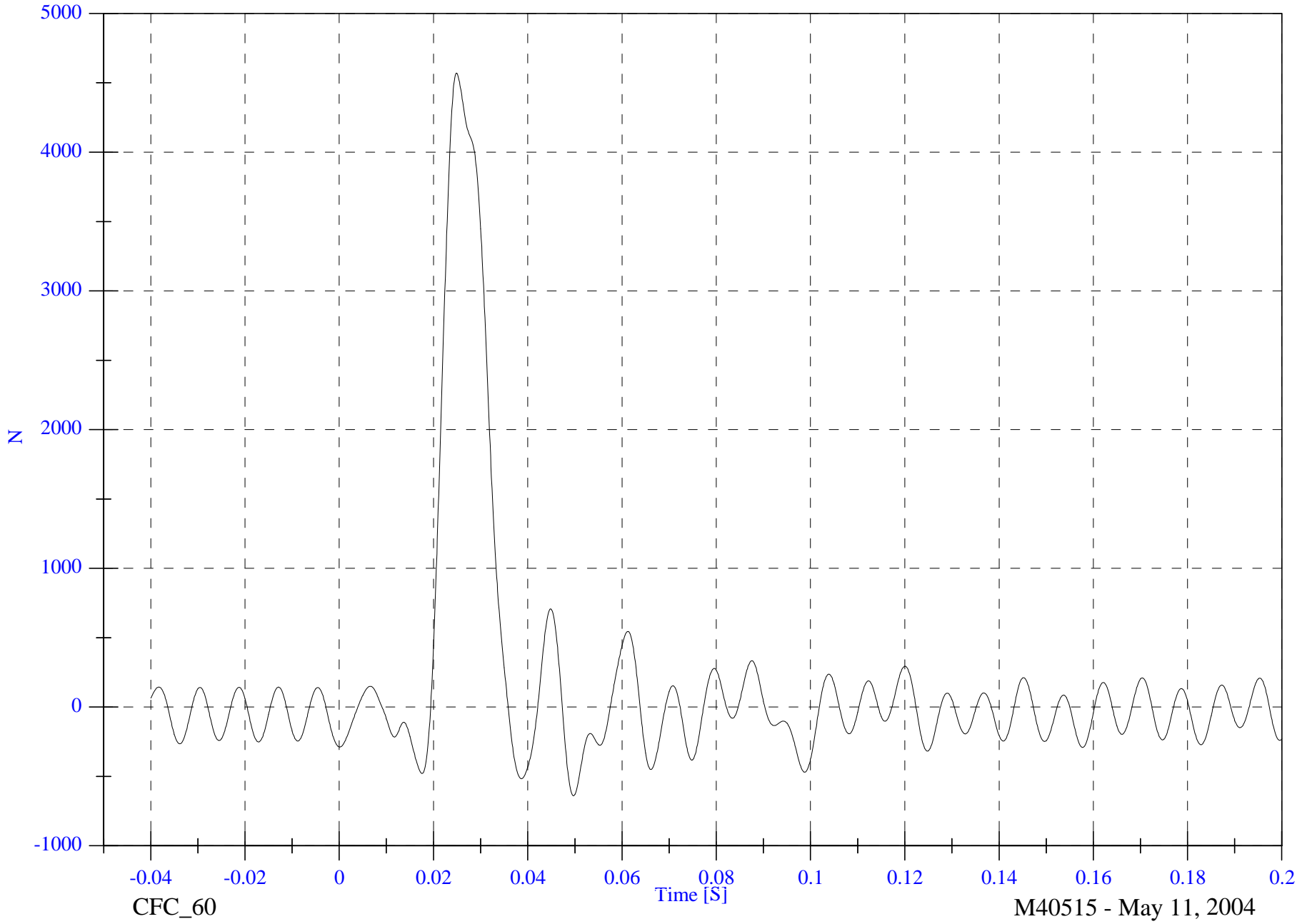
Barrier Load Cell D2 Fx

Max: 4570.3 [N] at 0.025 [S]

Min: -640.0 [N] at 0.050 [S]

B-173

8642-NCAP-49

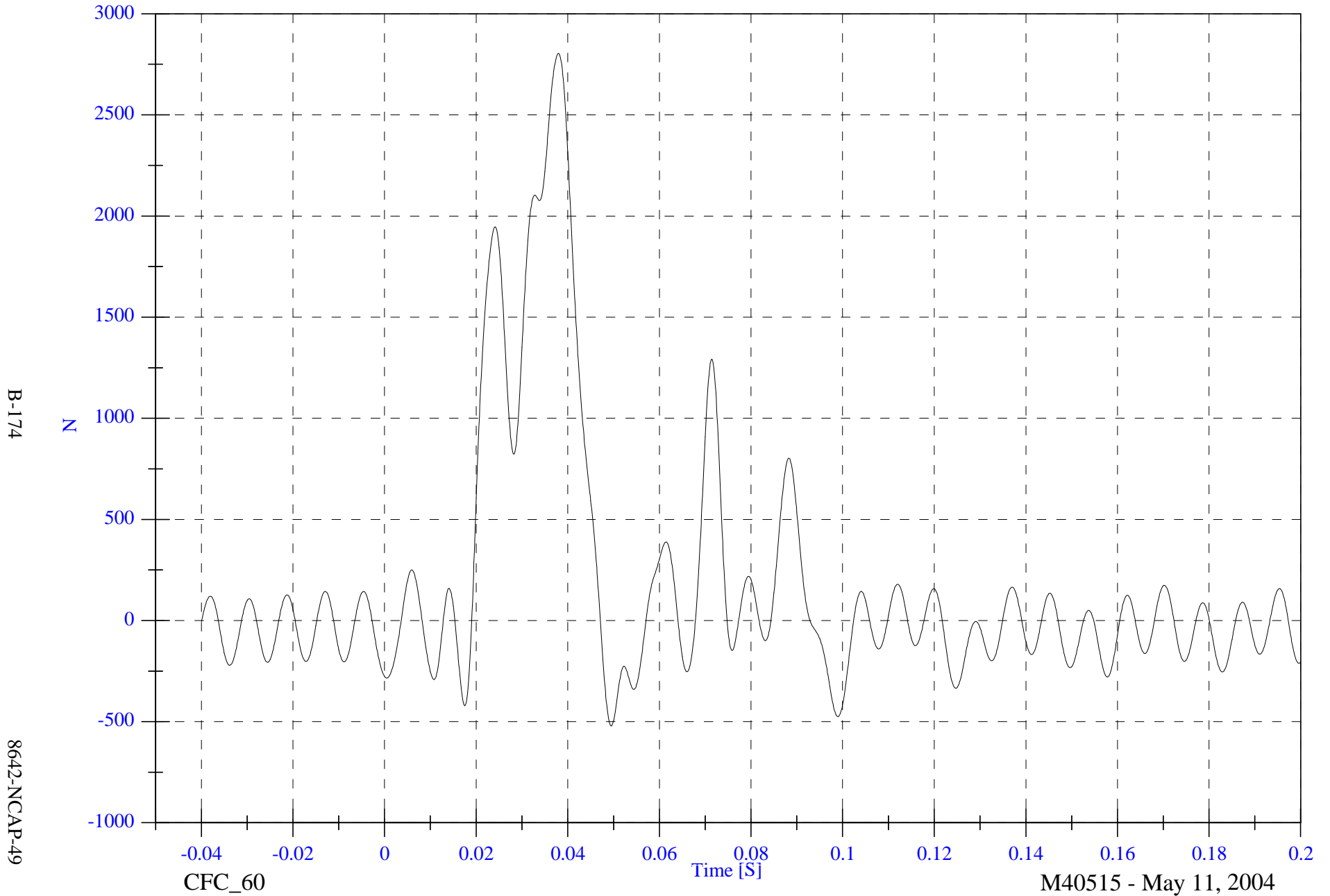


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell D3 Fx

Max: 2803.8 [N] at 0.038 [S]

Min: -521.2 [N] at 0.049 [S]

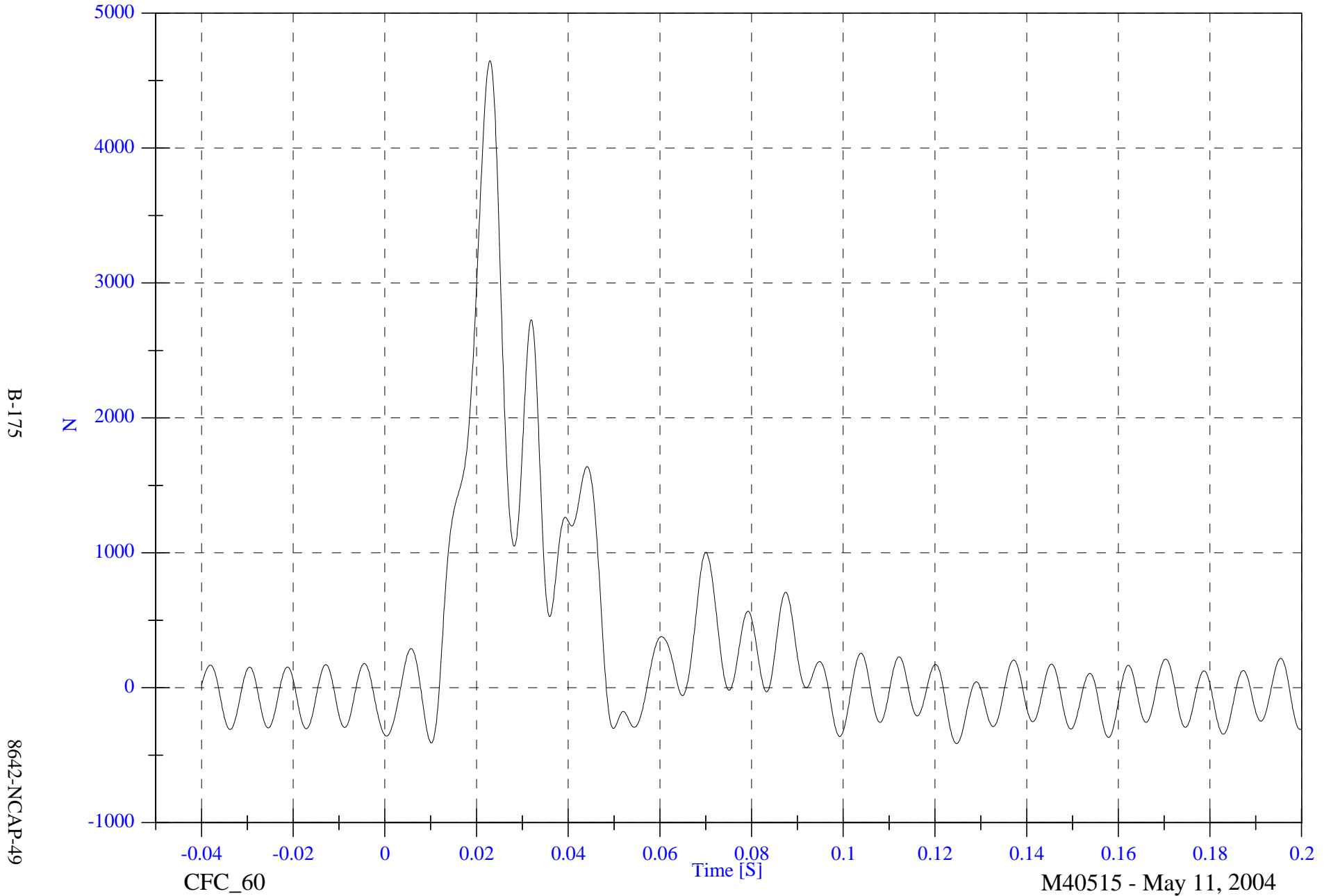


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell D4 Fx

Max: 4646.8 [N] at 0.023 [S]

Min: -413.6 [N] at 0.125 [S]



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8642-NCAP-49

CFC_60

Time [S]

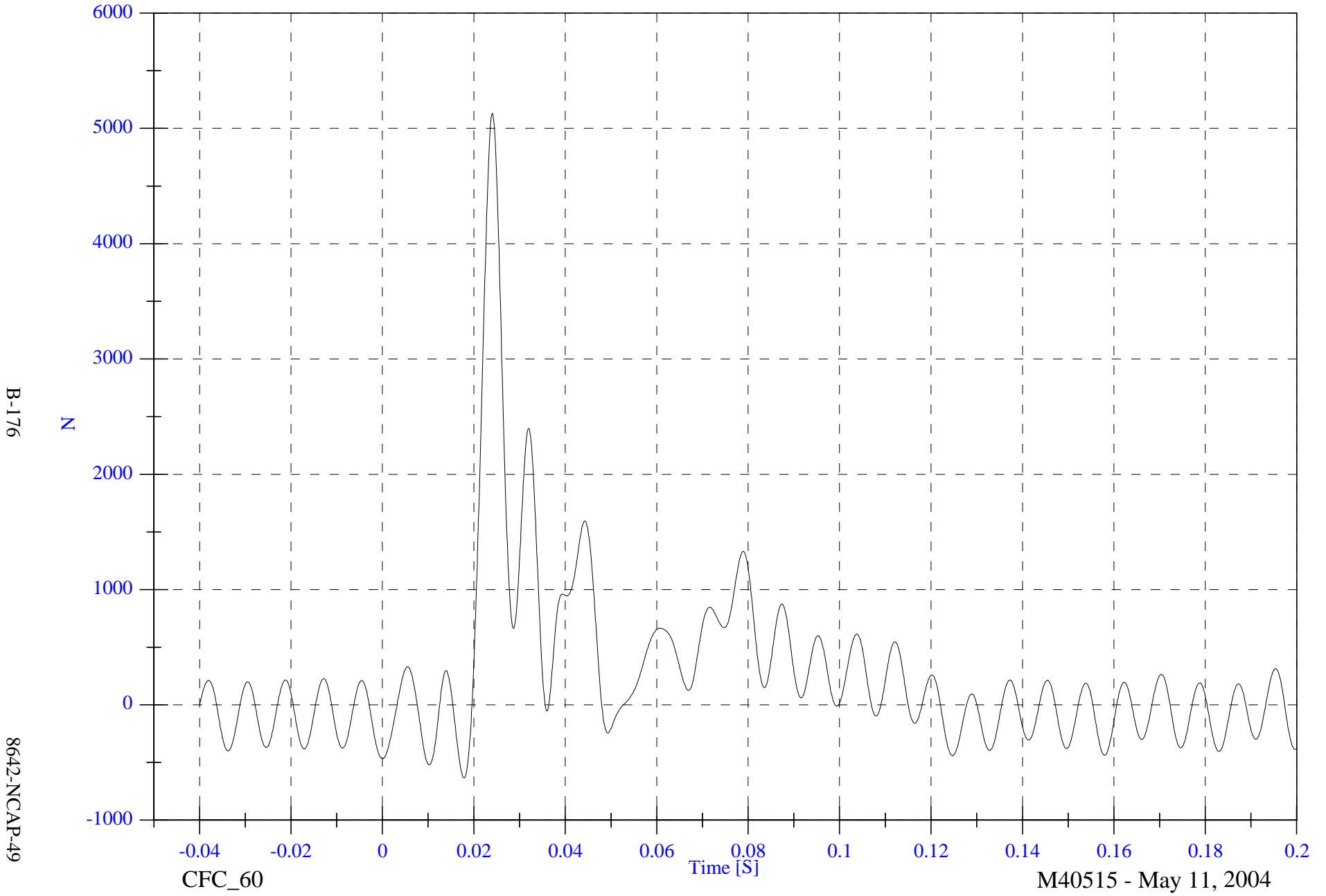
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell D5 Fx

Max: 5129.3 [N] at 0.024 [S]

Min: -634.2 [N] at 0.018 [S]

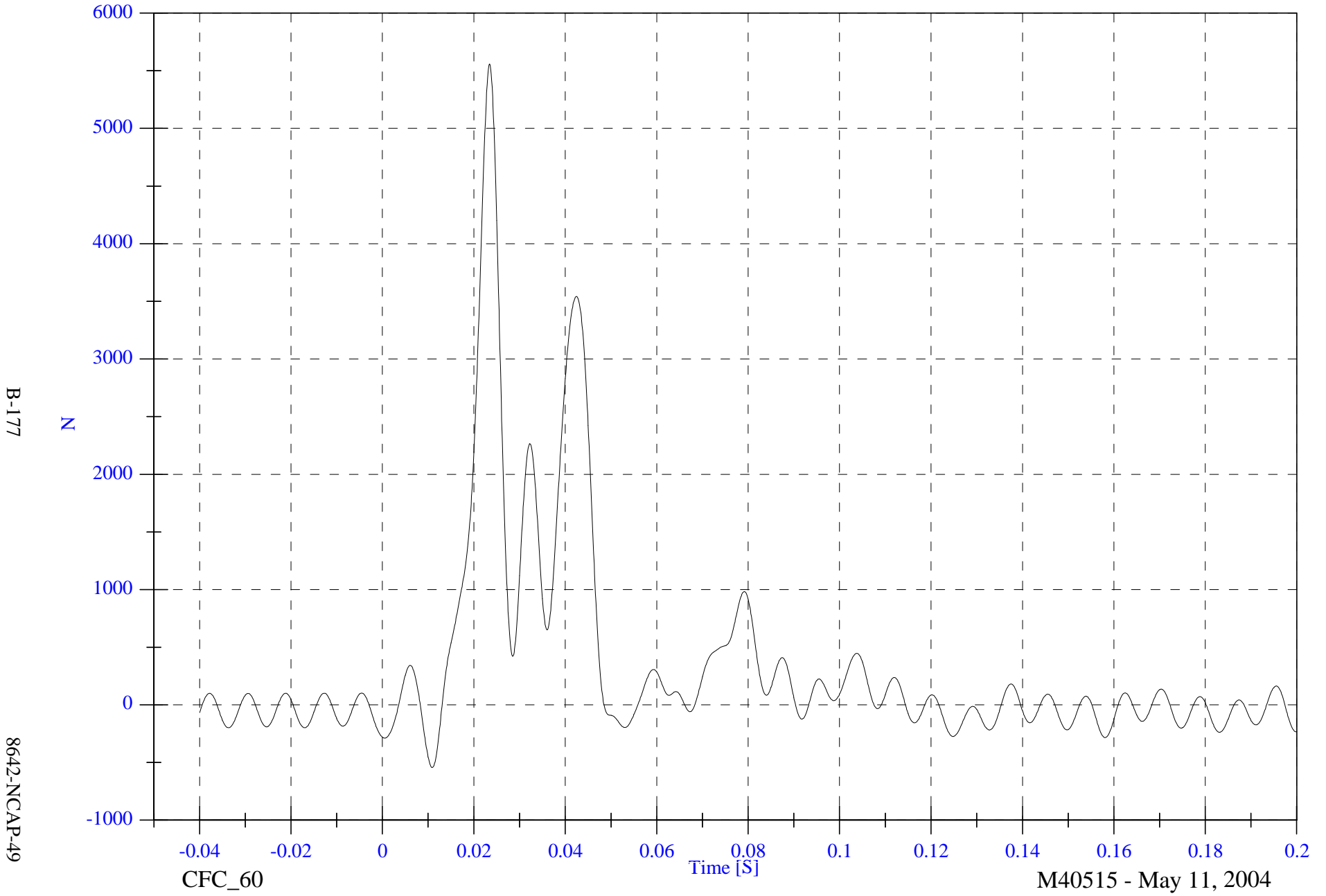


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell D6 Fx

Max: 5558.3 [N] at 0.023 [S]

Min: -543.7 [N] at 0.011 [S]



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8642-NCAP-49

CFC_60

Time [S]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

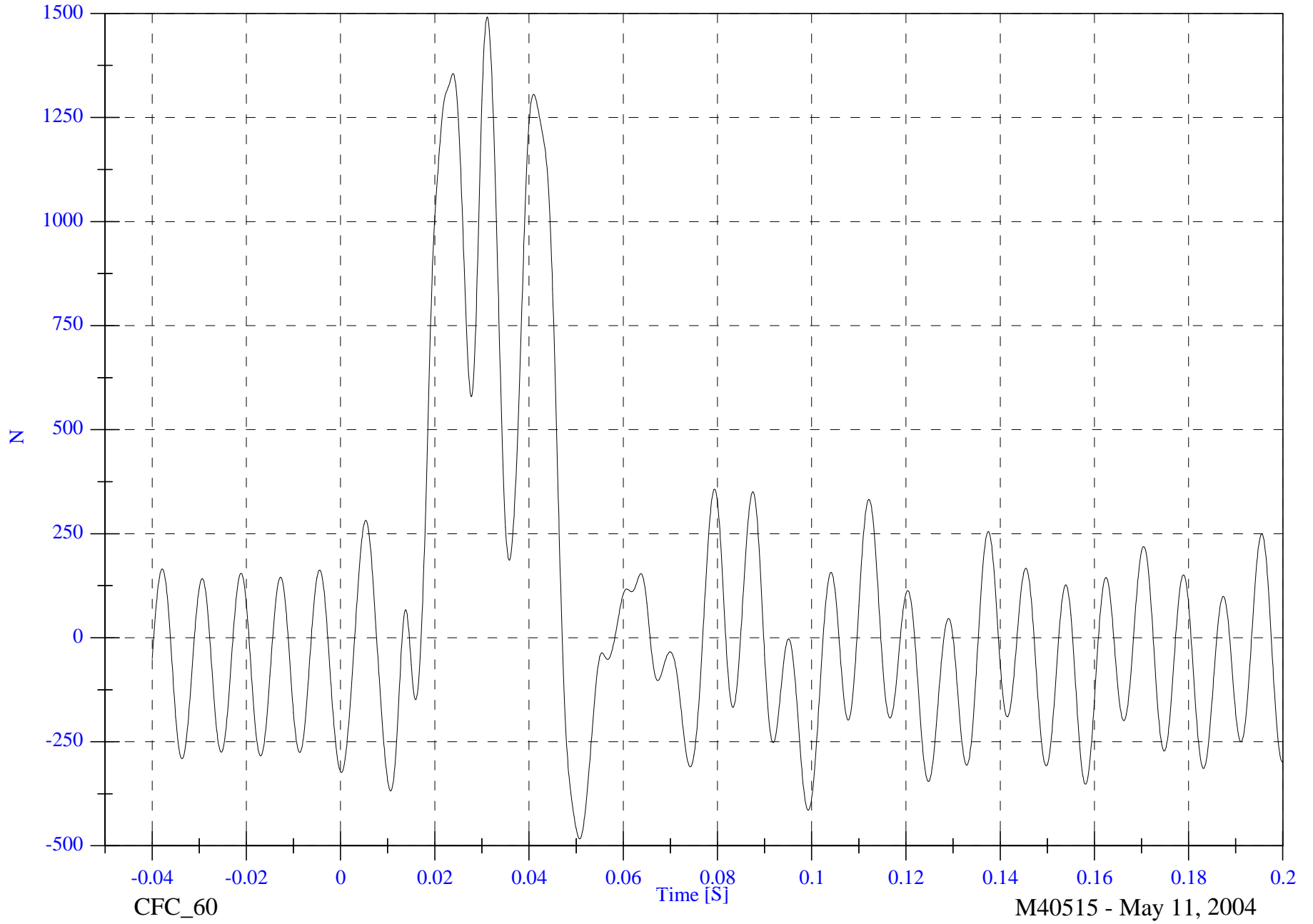
Barrier Load Cell D7 Fx

Max: 1491.4 [N] at 0.031 [S]

Min: -483.4 [N] at 0.051 [S]

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8642-NCAP-49



CFC_60

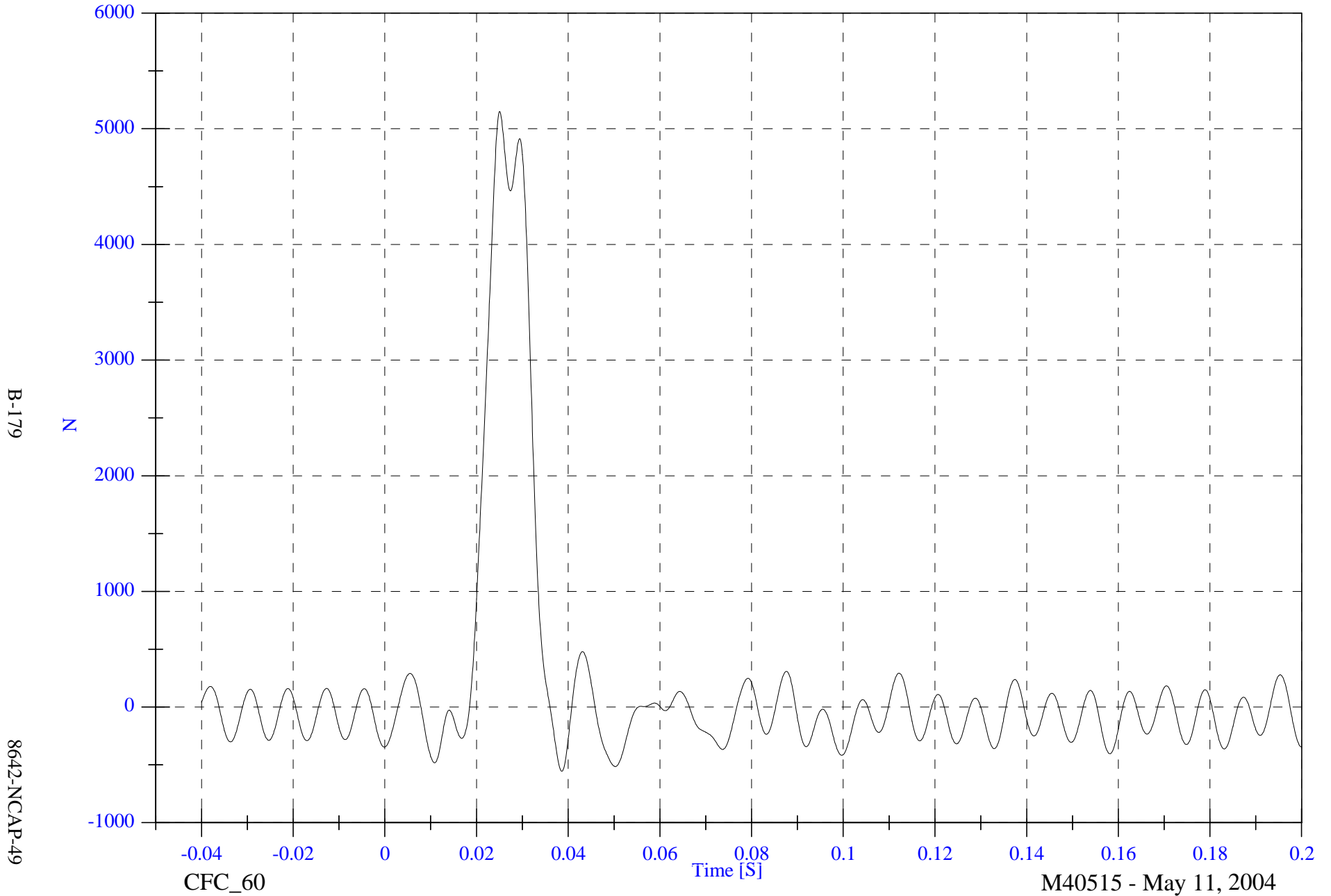
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell D8 Fx

Max: 5148.9 [N] at 0.025 [S]

Min: -555.6 [N] at 0.039 [S]

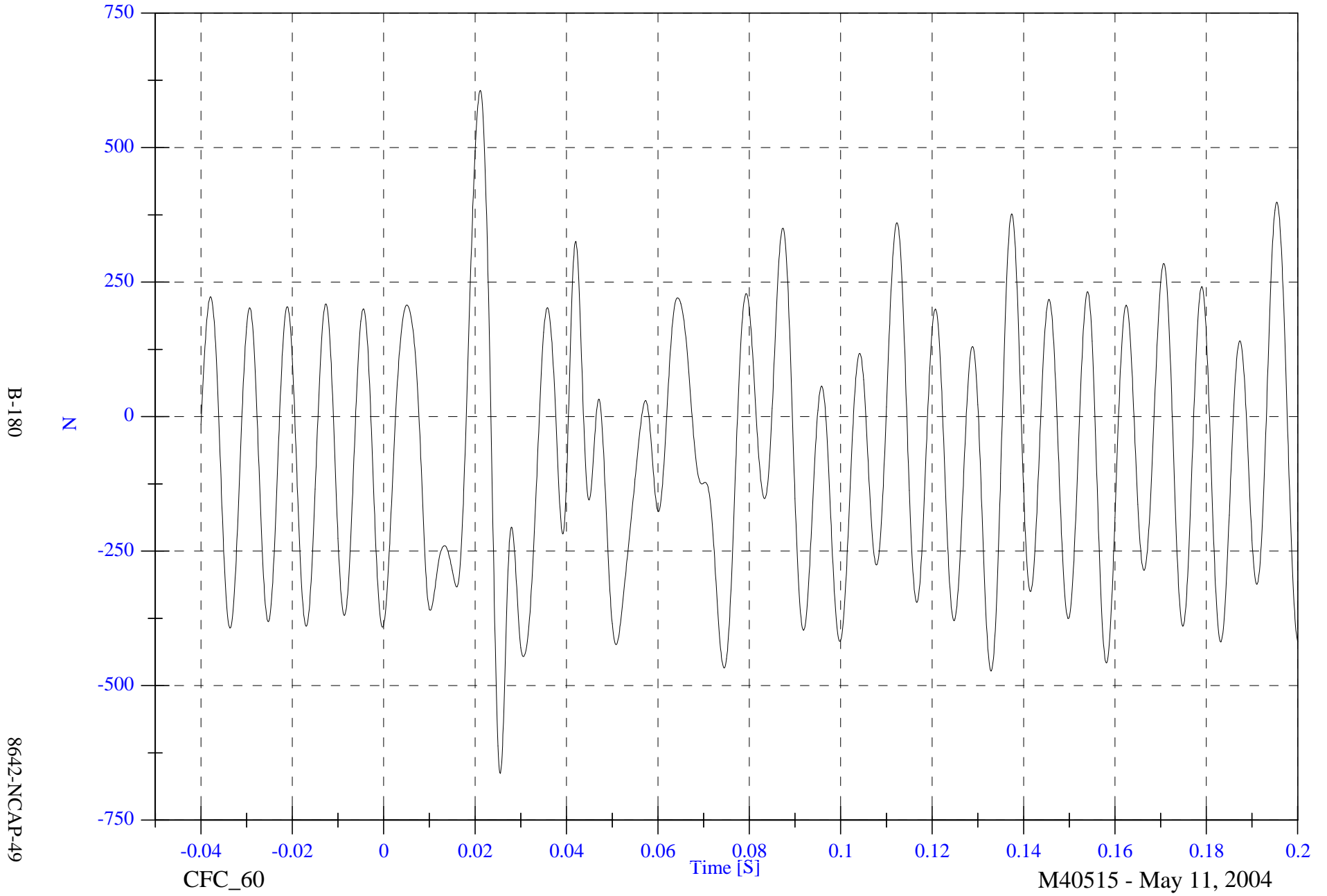


2004 NCAP Test 13 - 2004.5 Kia Spectra

Barrier Load Cell D9 Fx

Max: 606.1 [N] at 0.021 [S]

Min: -663.2 [N] at 0.025 [S]



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8642-NCAP-49

CFC_60

Time [S]

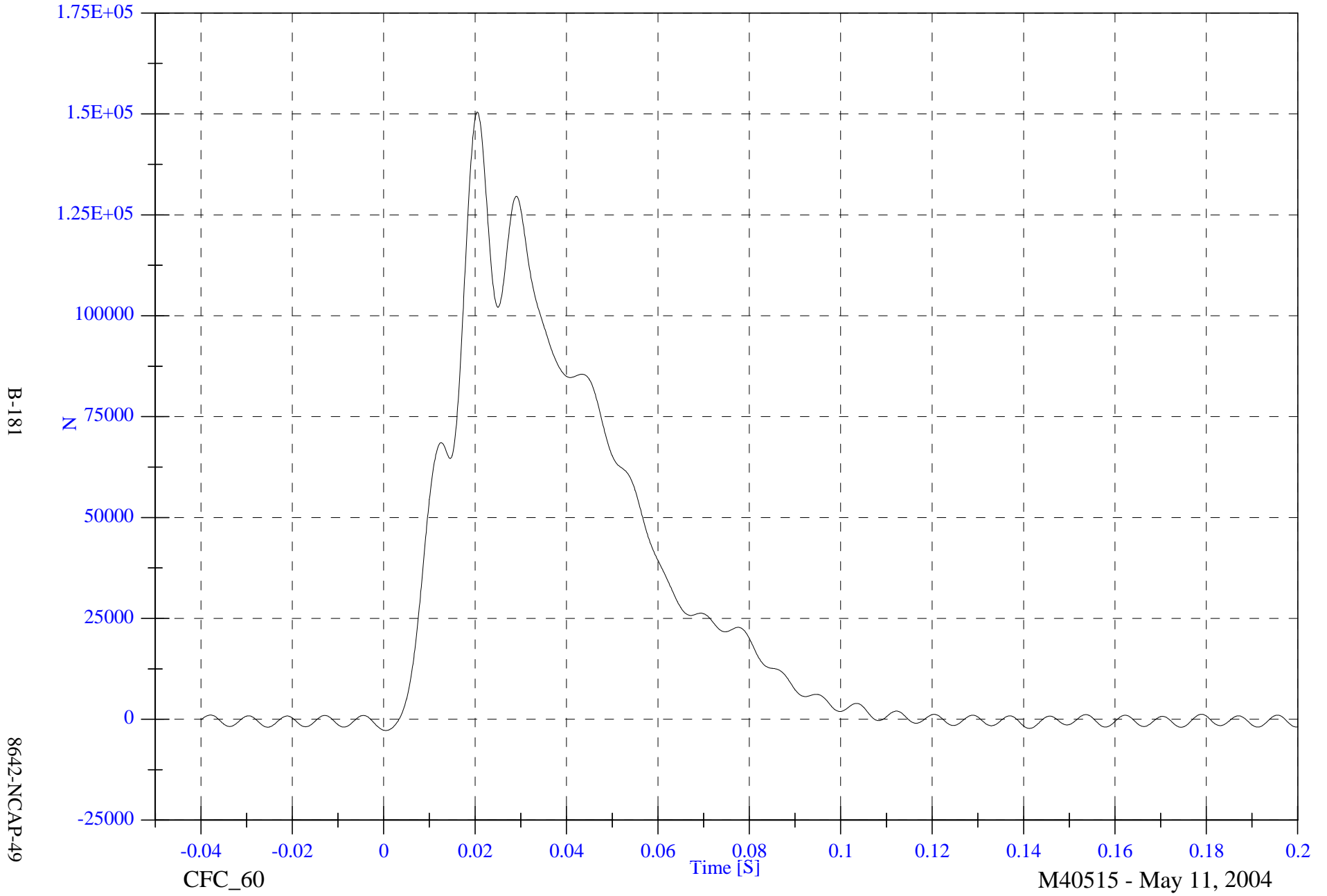
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

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

Max: 150476.1 [N] at 0.020 [S]

Min: -2792.9 [N] at 0.000 [S]



B-181

8642-NCAP-49

CFC_60

Time [S]

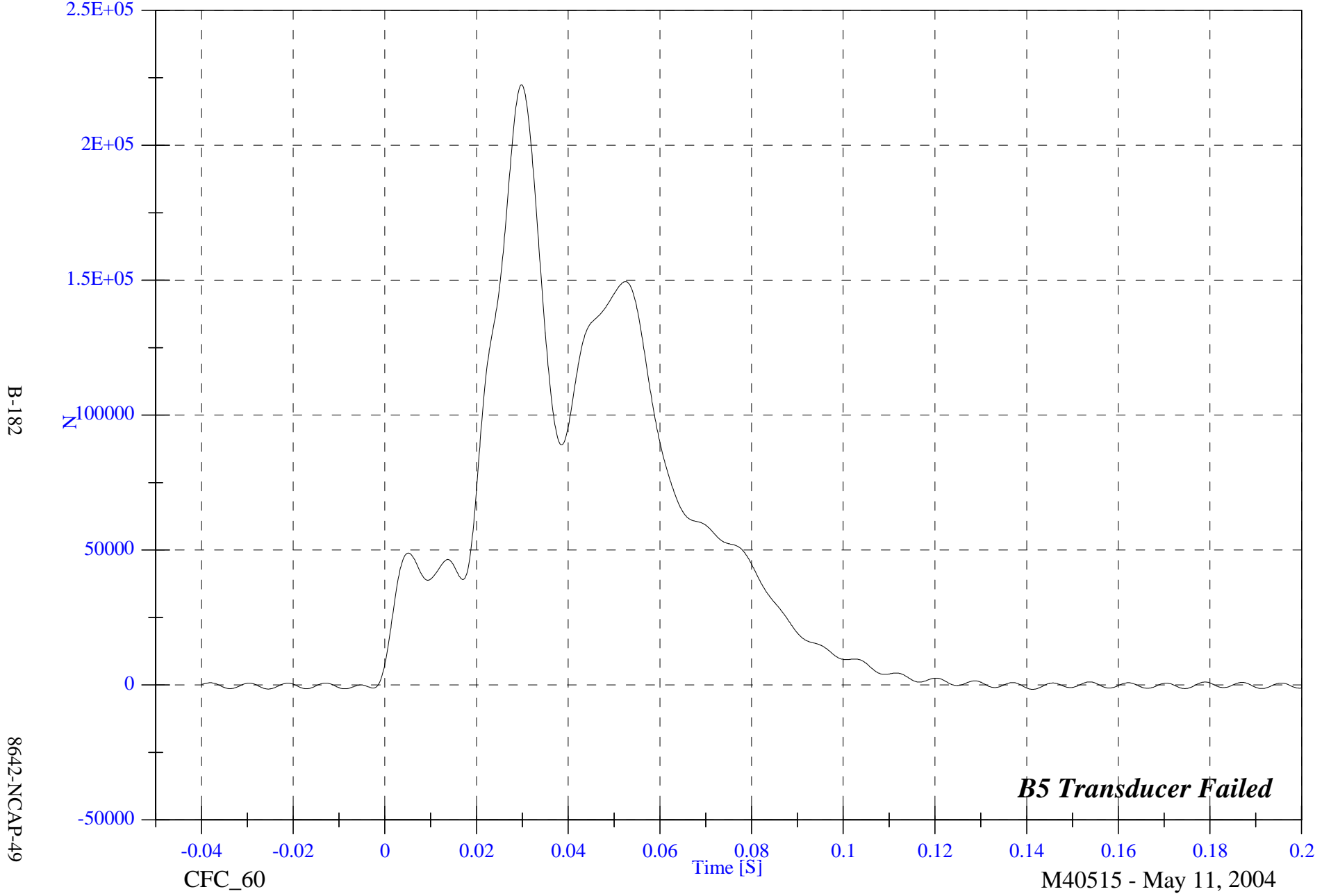
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

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

Max: 222434.8 [N] at 0.030 [S]

Min: -1632.3 [N] at 0.141 [S]



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8642-NCAP-49

CFC_60

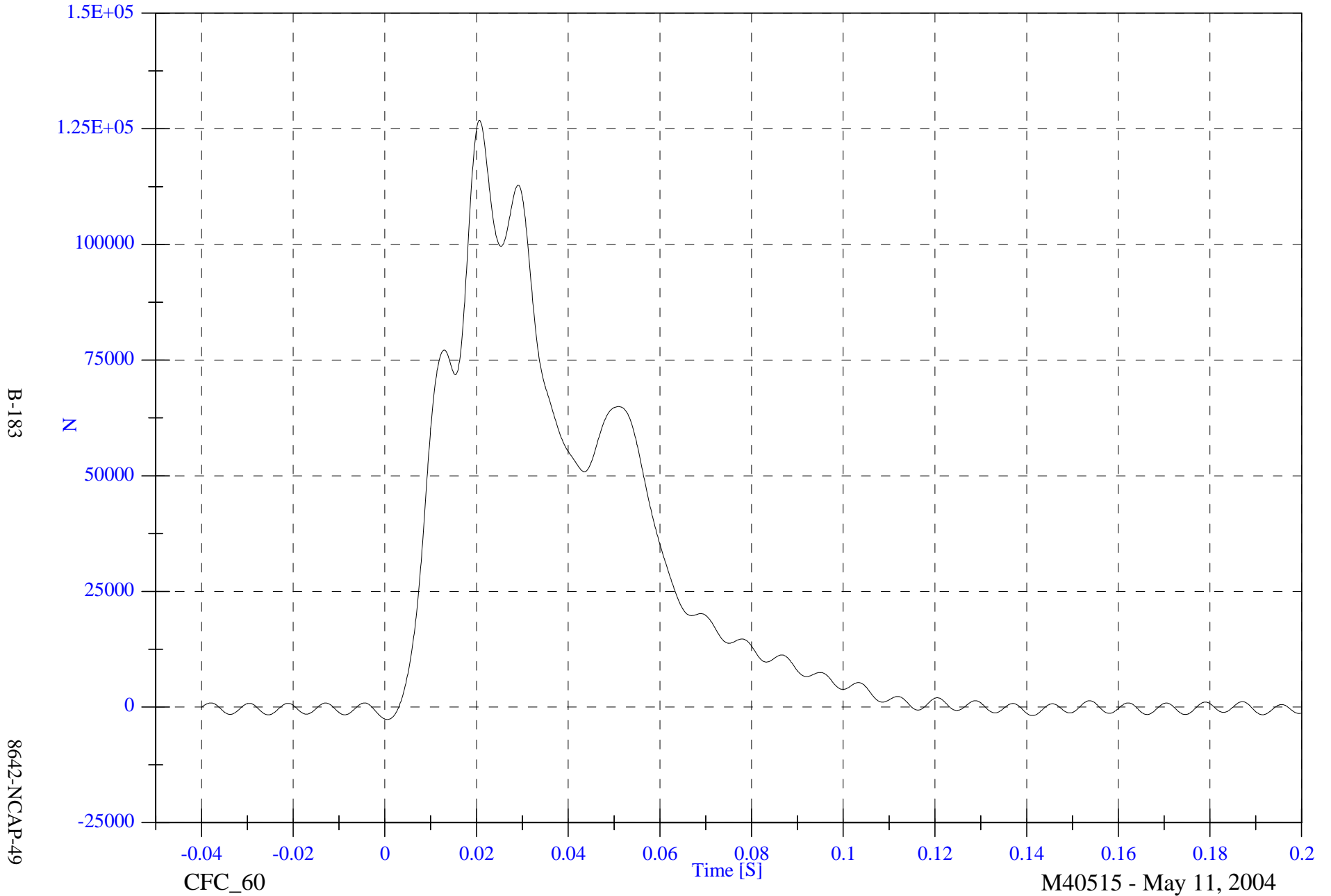
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

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

Max: 126823.3 [N] at 0.021 [S]

Min: -2694.8 [N] at 0.000 [S]



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8642-NCAP-49

CFC_60

Time [S]

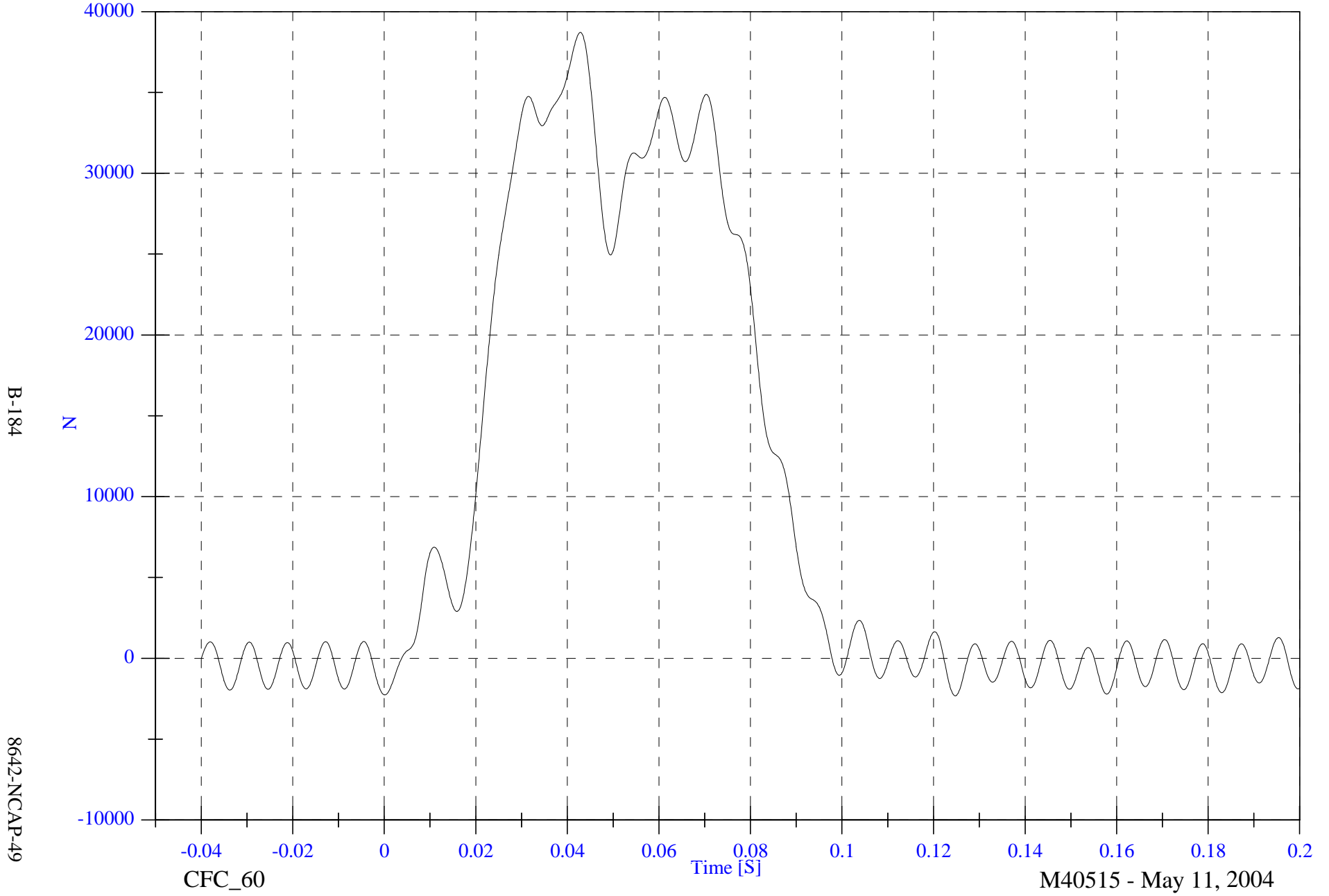
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

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

Max: 38719.4 [N] at 0.043 [S]

Min: -2321.6 [N] at 0.125 [S]



B-184

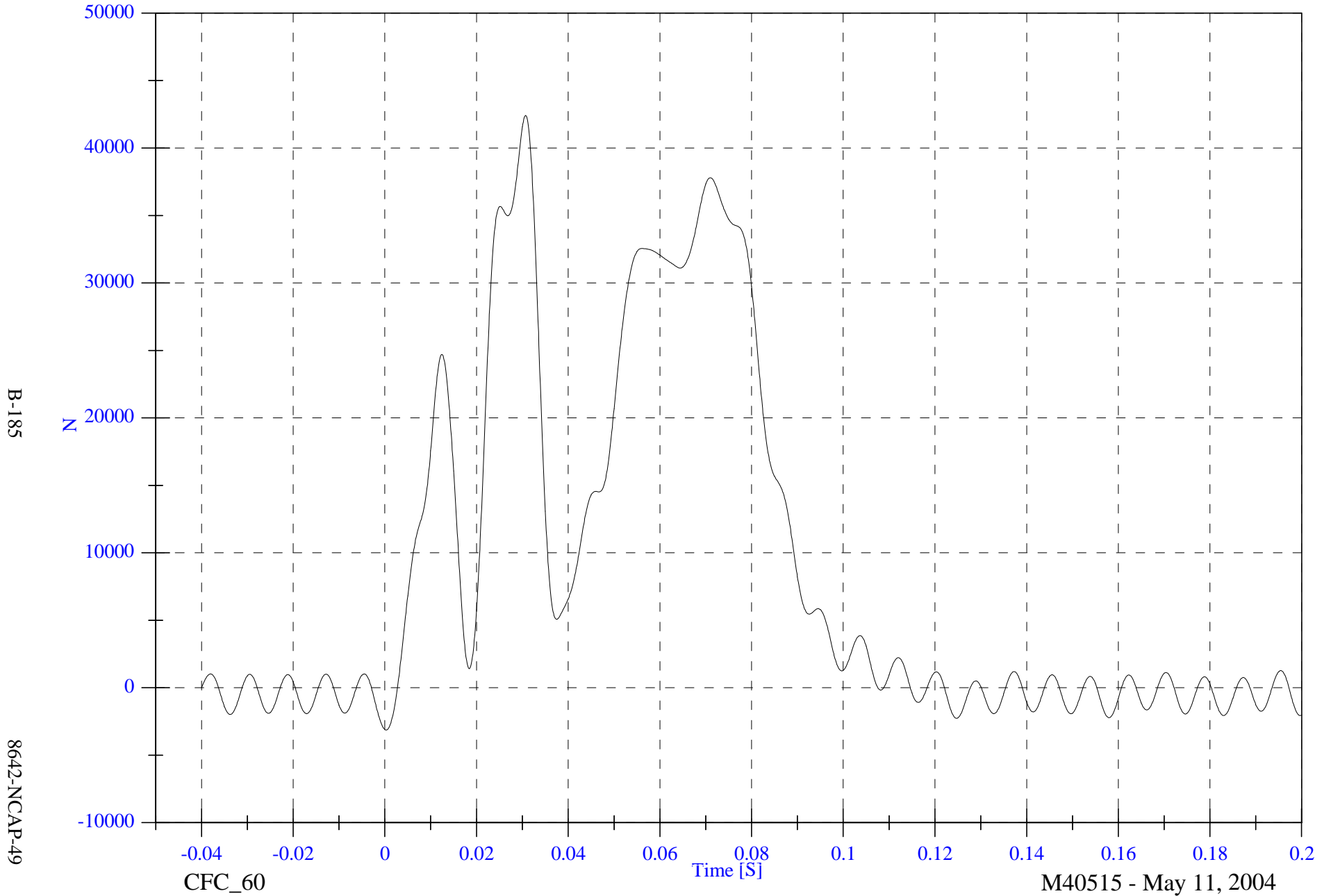
8642-NCAP-49

2004 NCAP Test 13 - 2004.5 Kia Spectra

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

Max: 42411.6 [N] at 0.031 [S]

Min: -3137.8 [N] at 0.000 [S]

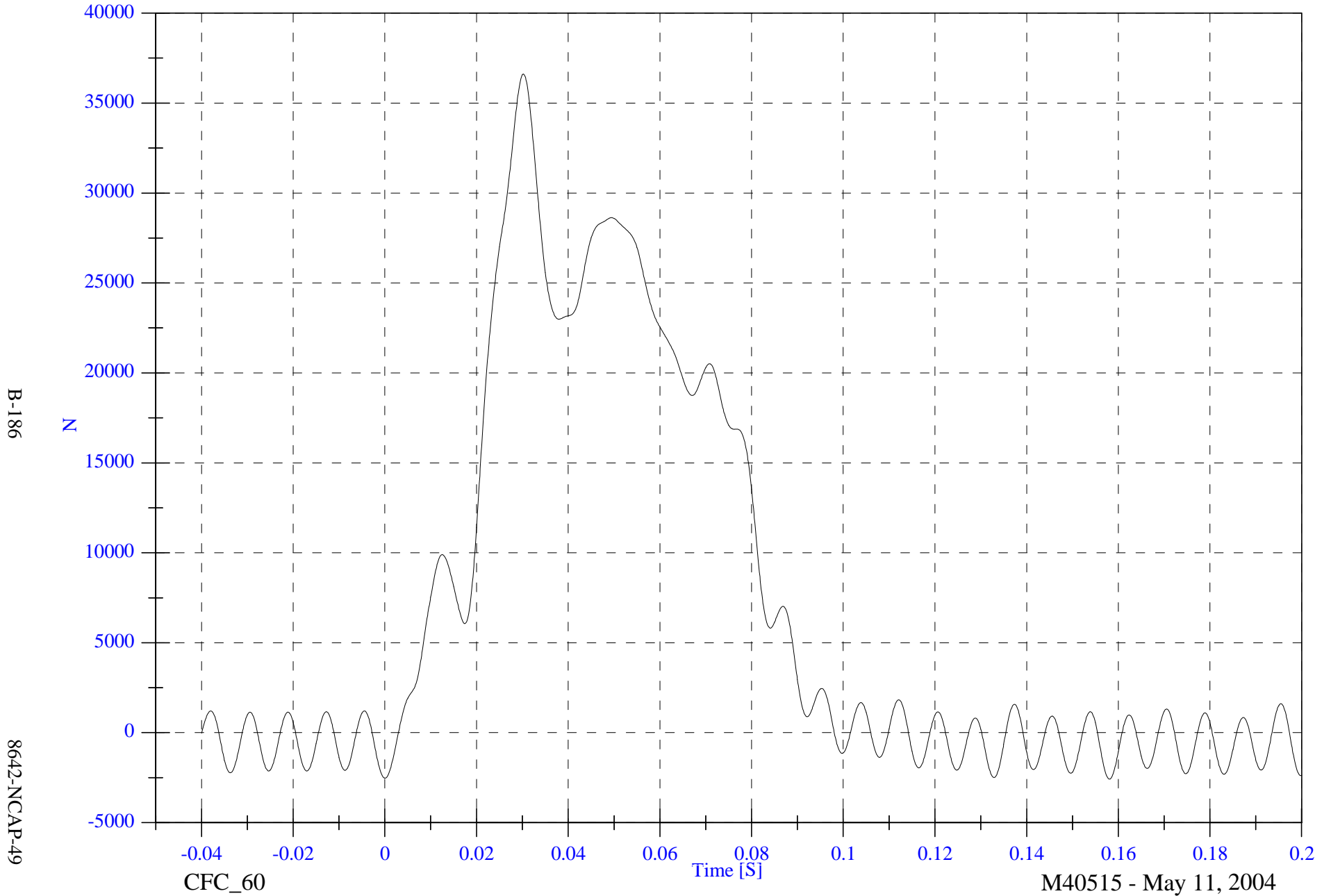


2004 NCAP Test 13 - 2004.5 Kia Spectra

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

Max: 36614.1 [N] at 0.030 [S]

Min: -2574.9 [N] at 0.158 [S]



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8642-NCAP-49

CFC_60

Time [S]

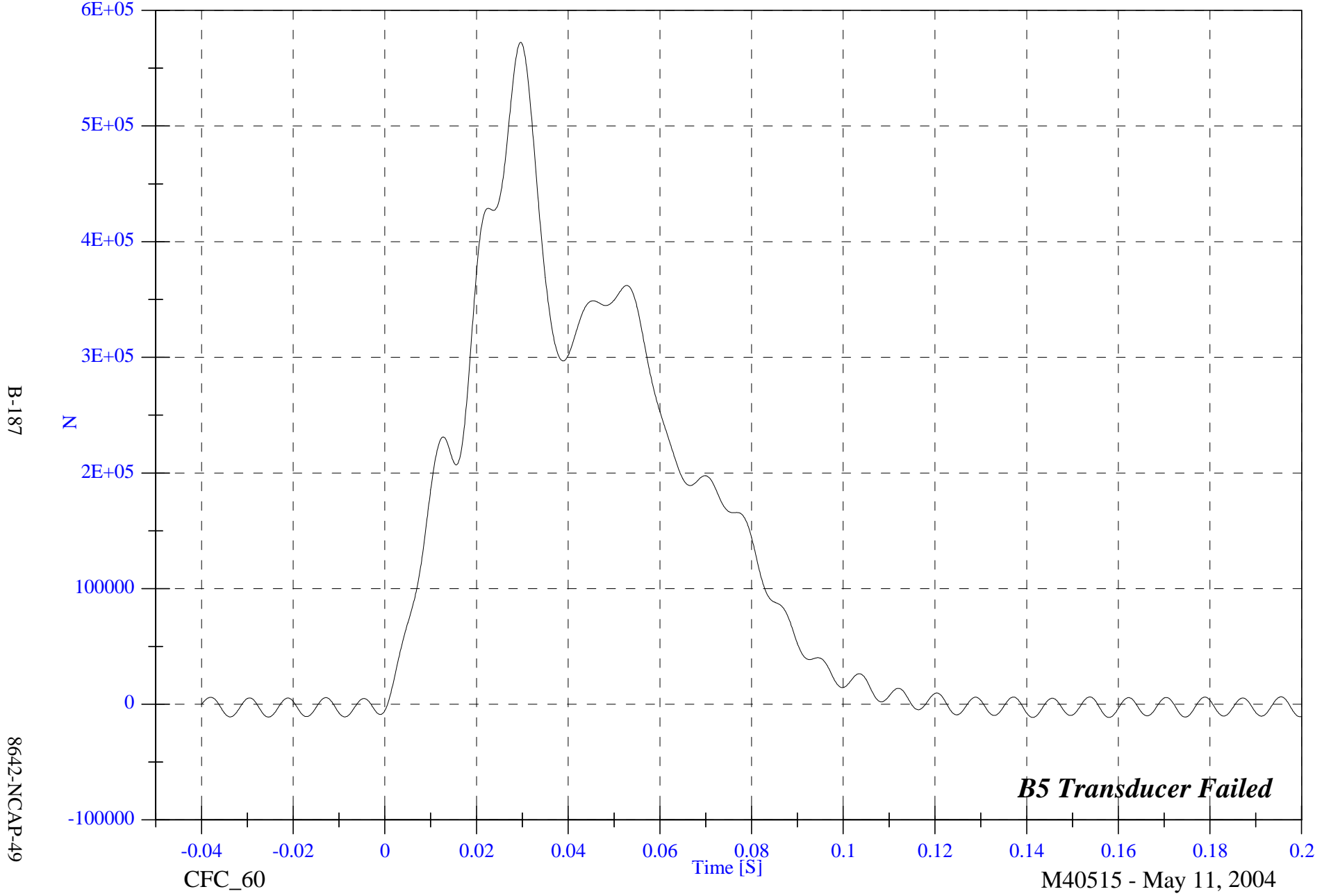
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Max: 572377.4 [N] at 0.030 [S]

Total Load Cell Sum (All 6 Groups)

Min: -11425.6 [N] at 0.158 [S]



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8642-NCAP-49

CFC_60

B5 Transducer Failed

M40515 - May 11, 2004

APPENDIX C

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

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

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

Dummy serial numbers and certification dates are:

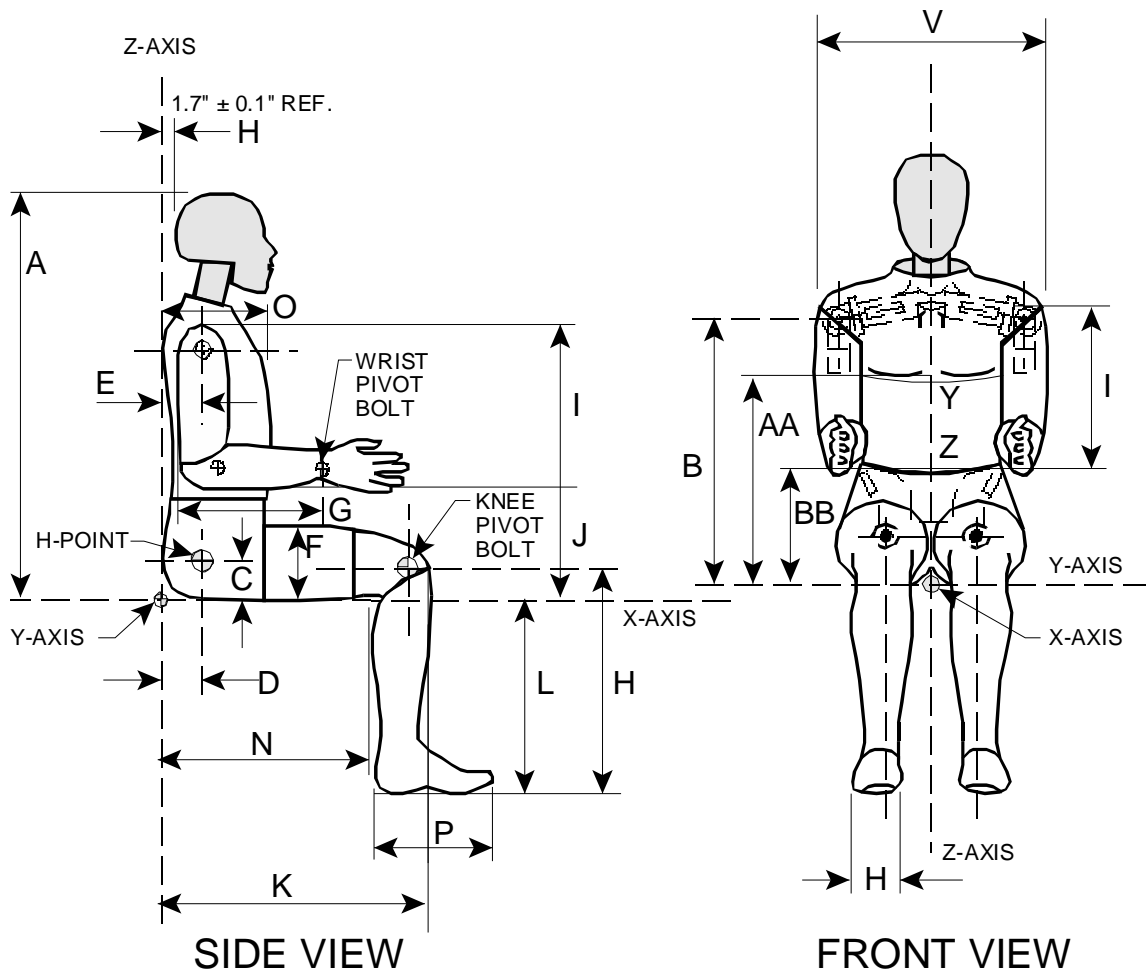
<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	150	3/25/2004
#2/Right Front Passenger	245	3/25/2004

Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards 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 150
Sequential Test Number 3
Date 03-10-04
Workfile 150H 03-10-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.0
Relative Humidity	10% - 70%	37.0
Peak Resultant Acceleration	225-275 G's	246.14
Peak Lateral Acceleration	15 G's Max	11.13
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	150	
Sequential Test Number	3	
Date	03-11-04	6 Axis Neck Transducer
Workfile	150NE 03-11-04	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.0
Relative Humidity	10% - 70%	33.0
Impact Velocity	19.50 - 20.30 Ft/s	19.67
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	14.22
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	155.80
Positive Moment - Time Curve Decay Time to Zero	120 - 148 ms	140.30

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 150
Sequential Test Number 3
Date 03-25-04
Workfile 150T 03-25-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.0
Relative Humidity	10% - 70%	28.0
Pendulum Velocity	21.6 - 22.4 Ft/s	22.23
Maximum Deflection	2.50 - 2.86 in	2.53
Maximum Resistive Force	1160 - 1325 Lbs	1317.01
Internal Hysteresis	69 - 85 %	72.78

Remarks:

Laboratory Technician:

_____ B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 150
 Sequential Test Number 3
 Date 03-25-04
 Workfile 150LF 03-25-04 / 150RF 03-25-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	29.0
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1135.37
RIGHT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	29.0
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1121.02

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 150
 Sequential Test Number 3
 Date 03-25-04

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			29
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.2
Waist Circumference	Z	32.9 - 34.1 in	34.0
Chest Depth	O	8.4 - 9.0 in	8.5
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	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.8
Knee Pivot Height	M	19.1 - 19.7 in	19.6
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	3.7
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	8.1
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
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 245
Sequential Test Number 3
Date 03-10-04
Workfile 245H2 03-10-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.0
Relative Humidity	10% - 70%	37.0
Peak Resultant Acceleration	225-275 G's	242.28
Peak Lateral Acceleration	15 G's Max	4.87
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	245	
Sequential Test Number	3	
Date	03-12-04	6 Axis Neck Transducer
Workfile	245NE 03-12-04	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.0
Relative Humidity		10% - 70%	36.0
Impact Velocity		19.50 - 20.30 Ft/s	19.66
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	20.69
	20 ms	14.00 - 19.00 G's	18.79
	30 ms	11.00 - 16.00 G's	14.68
Max Pendulum G's Above 30 ms		22 G's Max	14.68
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	38.10
D Plane Rotation	Max	81 - 106 Deg	88.52
	Time	72 - 82 ms	72.70
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-593.01
	Time	65 - 79 ms	67.80
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	149.70
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	130.80

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 245
Sequential Test Number 3
Date 03-24-04
Workfile 245T2 03-24-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	72.0
Relative Humidity	10% - 70%	26.0
Pendulum Velocity	21.6 - 22.4 Ft/s	22.01
Maximum Deflection	2.50 - 2.86 in	2.62
Maximum Resistive Force	1160 - 1325 Lbs	1238.66
Internal Hysteresis	69 - 85 %	72.69

Remarks:

Laboratory Technician:

_____ B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 245
 Sequential Test Number 3
 Date 03-25-04
 Workfile 245LF 03-25-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	29.0
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1106.67
RIGHT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	29.0
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1079.96

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 245
 Sequential Test Number 3
 Date 03-25-04

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			29
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.2
Waist Circumference	Z	32.9 - 34.1 in	34.0
Chest Depth	O	8.4 - 9.0 in	8.5
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	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.5
Knee Pivot Height	M	19.1 - 19.7 in	19.2
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	20.2
Elbow Rest Height	J	7.5 - 8.3 in	8.0
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
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 150)	Manufacturer	Serial #	Calibration		
			Last	Next	
Head 9 Array	X Arm Y	ENDEVCO	AC-P17531	11/21/2003	5/21/2004
	X Arm Z	ENDEVCO	AC-P14965	11/21/2003	5/21/2004
	Y Arm X	ENDEVCO	AC-P17563	11/21/2003	5/21/2004
	Y Arm Z	ENDEVCO	AC-P18551	11/21/2003	5/21/2004
	Z Arm X	ENDEVCO	AC-P32218	2/17/2004	8/17/2004
	Z Arm Y	ENDEVCO	AC-P18718	11/21/2003	5/21/2004
Head	X	ENDEVCO	AC-P16832	11/20/2003	5/20/2004
	Y	ENDEVCO	AC-P16591	11/20/2003	5/20/2004
	Z	ENDEVCO	AC-P16286	11/20/2003	5/20/2004
Head	X (R)	ENDEVCO	AC-P17141	11/20/2003	5/20/2004
	Y (R)	ENDEVCO	AC-P17242	11/20/2003	5/20/2004
	Z (R)	ENDEVCO	AC-P17152	11/20/2003	5/20/2004
Neck Load Cell	X	DENTON	LC-1633FX	8/13/2003	2/11/2004
	Y	DENTON	LC-1633FY	8/13/2003	2/11/2004
	Z	DENTON	LC-1633FZ	8/13/2003	2/11/2004
Neck Moment	X	DENTON	LC-1633MX	8/13/2003	2/11/2004
	Y	DENTON	LC-1633MY	8/13/2003	2/11/2004
	Z	DENTON	LC-1633MZ	8/13/2003	2/11/2004
Chest	X	ENDEVCO	AC-P19216	11/26/2003	5/26/2004
	Y	ENDEVCO	AC-P16576	12/1/2003	5/31/2004
	Z	ENDEVCO	AC-P15534	11/26/2003	5/26/2004
Chest	X (R)	ENDEVCO	AC-P23303	11/26/2003	5/26/2004
	Y (R)	ENDEVCO	AC-P15526	12/1/2003	5/31/2004
	Z (R)	ENDEVCO	AC-P19255	12/1/2003	5/31/2004
Chest Deflection	X	SERVO	DS-150	12/19/2003	6/18/2004
Pelvic	X	ENDEVCO	AC-P21393	12/4/2003	6/3/2004
	Y	ENDEVCO	AC-P23788	12/4/2003	6/3/2004
	Z	ENDEVCO	AC-P16845	12/4/2003	6/3/2004

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 150)	Manufacturer	Serial #	Calibration		
			Last	Next	
Left Femur Load Cell	Fz	DENTON	LC-255	12/3/2003	6/2/2004
Right Femur Load Cell	Fz	GSE	LC-420	12/3/2003	6/2/2004
Left Upper Tibia	Mx	DENTON	LC-199MX	9/26/2003	3/26/2004
	My	DENTON	LC-199MY	9/26/2003	3/26/2004
Left Lower Tibia	Fz	DENTON	LC-128FZ	9/26/2003	3/26/2004
	Mx	DENTON	LC-128MX	9/26/2003	3/26/2004
	My	DENTON	LC-128MY	9/26/2003	3/26/2004
Right Upper Tibia	Mx	DENTON	LC-200MX	9/26/2003	3/26/2004
	My	DENTON	LC-200MY	9/26/2003	3/26/2004
Right Lower Tibia	Fz	DENTON	LC-129FZ	9/26/2003	3/26/2004
	Mx	DENTON	LC-129MX	9/26/2003	3/26/2004
	My	DENTON	LC-129MY	9/26/2003	3/26/2004
Left Foot Rear	X	ENDEVCO	AC-J30491	1/16/2004	7/16/2004
	Z	ENDEVCO	AC-J31026	1/16/2004	7/16/2004
Left Foot Front	Z	ENDEVCO	AC-J32831	1/16/2004	7/16/2004
Right Foot Rear	X	ENDEVCO	AC-J32838	1/16/2004	7/16/2004
	Z	ENDEVCO	AC-J32174	11/24/2003	5/24/2004
Right Foot Front	Z	ENDEVCO	AC-J32143	11/24/2003	5/24/2004
Lap Belt Load Cell		FIRST TECHNOLOGY	LC-175	10/10/2003	4/9/2004
Shoulder Belt Load Cell		FIRST TECHNOLOGY	LC-180	10/10/2003	4/9/2004

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 245)	Manufacturer	Serial #	Calibration		
			Last	Next	
Head 9 Array	X Arm Y	ENDEVCO	AC-P32453	1/22/2004	7/22/2004
	X Arm Z	ENDEVCO	AC-P32289	1/22/2004	7/22/2004
	Y Arm X	ENDEVCO	AC-P32146	1/23/2004	7/23/2004
	Y Arm Z	ENDEVCO	AC-P32225	1/23/2004	7/23/2004
	Z Arm X	ENDEVCO	AC-P32217	1/23/2004	7/23/2004
	Z Arm Y	ENDEVCO	AC-P32276	1/23/2004	7/23/2004
Head	X	ENDEVCO	AC-P32464	1/22/2004	7/22/2004
	Y	ENDEVCO	AC-P32295	1/22/2004	7/22/2004
	Z	ENDEVCO	AC-P32227	1/22/2004	7/22/2004
Head	X (R)	ENDEVCO	AC-P32139	1/22/2004	7/22/2004
	Y (R)	ENDEVCO	AC-P32197	1/22/2004	7/22/2004
	Z (R)	ENDEVCO	AC-P32455	11/12/2003	5/12/2004
Neck Load Cell	X	DENTON	LC-1634FX	8/18/2003	2/16/2004
	Y	DENTON	LC-1634FY	8/18/2003	2/16/2004
	Z	DENTON	LC-1634FZ	8/18/2003	2/16/2004
Neck Moment	X	DENTON	LC-1634MX	8/18/2003	2/16/2004
	Y	DENTON	LC-1634MY	8/18/2003	2/16/2004
	Z	DENTON	LC-1634MZ	8/18/2003	2/16/2004
Chest	X	ENDEVCO	AC-P17235	11/26/2003	5/26/2004
	Y	ENDEVCO	AC-P23640	11/24/2003	5/24/2004
	Z	ENDEVCO	AC-P17285	11/26/2003	5/26/2004
Chest	X (R)	ENDEVCO	AC-P17283	11/26/2003	5/26/2004
	Y (R)	ENDEVCO	AC-P16863	11/24/2003	5/24/2004
	Z (R)	ENDEVCO	AC-P14393	11/26/2003	5/26/2004
Chest Deflection	X	SERVO	DS-245	12/19/2003	6/18/2004
Pelvic	X	ENDEVCO	AC-P18739	11/26/2003	5/26/2004
	Y	ENDEVCO	AC-P19212	11/26/2003	5/26/2004
	Z	ENDEVCO	AC-P18738	11/26/2003	5/26/2004

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 245)	Manufacturer	Serial #	Calibration		
			Last	Next	
Left Femur Load Cell	Fz	GSE	LC-657	12/3/2003	6/2/2004
Right Femur Load Cell	Fz	GSE	LC-653	12/3/2003	6/2/2004
Left Upper Tibia	Mx	DENTON	LC-265MX	9/26/2003	3/26/2004
	My	DENTON	LC-265MY	9/26/2003	3/26/2004
Left Lower Tibia	Fz	DENTON	LC-178FZ	9/26/2003	3/26/2004
	Mx	DENTON	LC-178MX	9/26/2003	3/26/2004
	My	DENTON	LC-178MY	9/26/2003	3/26/2004
Right Upper Tibia	Mx	DENTON	LC-264MX	9/26/2003	3/26/2004
	My	DENTON	LC-264MY	9/26/2003	3/26/2004
Right Lower Tibia	Fz	DENTON	LC-177FZ	9/26/2003	3/26/2004
	Mx	DENTON	LC-177MX	9/26/2003	3/26/2004
	My	DENTON	LC-177MY	9/26/2003	3/26/2004
Left Foot Rear	X	ENDEVCO	AC-J20084	1/30/2004	7/30/2004
	Z	ENDEVCO	AC-AGRP4	1/30/2004	7/30/2004
Left Foot Front	Z	ENDEVCO	AC-J28727	1/30/2004	7/30/2004
Right Foot Rear	X	ENDEVCO	AC-AJ7F6	1/30/2004	7/30/2004
	Z	ENDEVCO	AC-J27079	1/30/2004	7/30/2004
Right Foot Front	Z	ENDEVCO	AC-J23997	1/30/2004	7/30/2004
Lap Belt Load Cell		FIRST TECHNOLOGY	LC-155	9/16/2003	3/16/2004
Shoulder Belt Load Cell		FIRST TECHNOLOGY	LC-156	9/16/2003	3/16/2004

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	GS SENSORS	AC-9444-038	12/3/2003	6/2/2004
Right Rear Seat Crossmember X	GS SENSORS	AC-9440-023	12/3/2003	6/2/2004
Top of Engine	GS SENSORS	AC-9440-032	1/19/2004	7/19/2004
Bottom of Engine	GS SENSORS	AC-9450-039	4/16/2004	10/15/2004
Right Disc Brake Caliper	GS SENSORS	AC-9440-011	12/1/2003	5/31/2004
Instrument Panel	GS SENSORS	AC-9440-017	12/1/2003	5/31/2004
Left Disc Brake Caliper	GS SENSORS	AC-9440-039	12/3/2003	6/2/2004
Left Seat Rear Crossmember Z	GS SENSORS	AC-9440-029	12/3/2003	6/2/2004
Right Seat Rear Crossmember Z	GS SENSORS	AC-9440-046	12/3/2003	6/2/2004

REPORT NUMBER: CAL-04-13

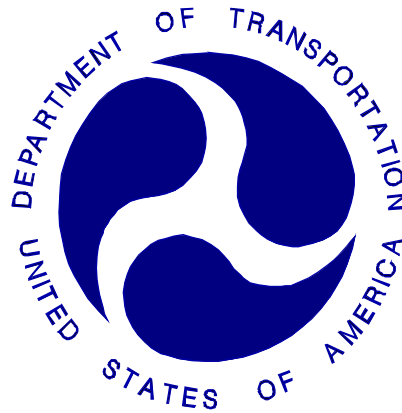
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

EVENFLO TITAN 5 WITH LATCH AND TOP TETHER

NHTSA NUMBER: M40515

GENERAL DYNAMICS REPORT NUMBER: 8642-NCAP-49

GENERAL DYNAMICS
ADVANCED INFORMATION ENGINEERING SERVICES
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225



May 11, 2004

FINAL REPORT

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

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

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TECHNICAL REPORT STANDARD TITLE PAGE

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				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-49	
9. Performing Organization Name and Address General Dynamics Advance Information Engineering Services Transportation Sciences Center P.O. Box 400 Buffalo, New York 14225				10. Work Unit No.	
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				14. Sponsoring Agency Code NVS-111	
15. Supplementary Notes					
16. Abstract This CRS test was performed in conjunction with a New Car Assessment Program (NCAP) load cell barrier test. An Evenflo Titan 5 forward facing convertible CRS was secured in Position 3 (P3) with the LATCH system and top tether. This test was conducted at the General Dynamics Crash Test Facility in Buffalo, New York, on May 11, 2004.					
ATD Position		HIC 15		HIC 36	
P3 (Right Rear) (044)		534.7		782.9	
				Clip (3 ms)	
				59.3	
17. Key Words New Car Assessment Program (NCAP)				18. Distribution Statement	
				Copies of this report are available from: National Highway Traffic Safety Administration Technical Reference Division Room 5111 (NAD-52) 400 Seventh St., S.W. Washington, D.C. 20590 Telephone No. (202) 366-4946 ATTN: Robert Hornicle	
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SECTION 1

PURPOSE AND SUMMARY OF TEST M40515

The purpose of this test was to obtain CRS performance data in a frontal impact NCAP condition. The 56.17 kph NCAP frontal impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

SUMMARY

An Evenflo Titan 5 (5-point belt) forward facing convertible CRS and a 3 year old child dummy (serial no. 044) was secured in the right rear occupant position (Position 3 or P3) with the LATCH system and top tether. The 3 Year Old Hybrid III (P572 P) child dummy was instrumented with head, chest, and pelvic triaxial accelerometers, a head rear Z-direction accelerometer, a chest displacement sensor, and upper and lower six axial neck load cells. The dummy was calibrated previous to this test and the certification information is found in section 5.

The right rear child dummy's HIC (15 ms) was 534.7, maximum chest deceleration over 3 ms was 59.3 g's.

DATA SHEET NO. 2

CRS PARAMETER DATA

CRS: Evenflo Titan 5 Forward Facing Convertible with LATCH and Top Tether

NHTSA No. M40515

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Delivered Weight of Vehicle with Maximum Fluids = 1316.0 kg (A)

AS TESTED WEIGHT OF VEHICLE

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

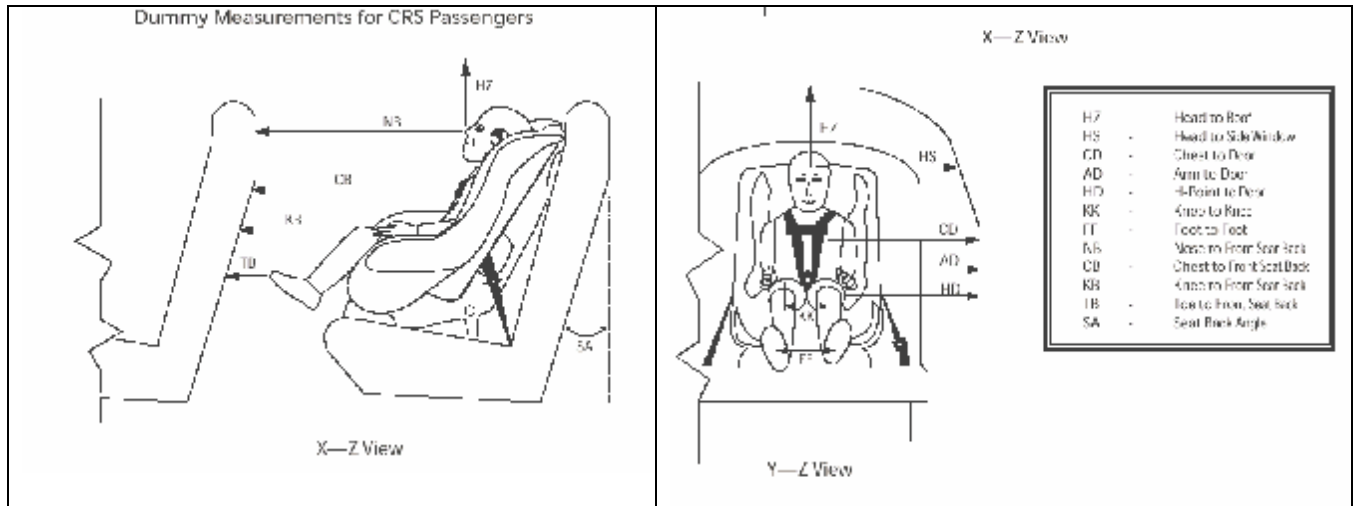
Left Front	=	<u>452.0</u>	kg	Left Rear	=	<u>292.0</u>	kg
Right Front	=	<u>459.0</u>	kg	Right Rear	=	<u>302.0</u>	kg
TOTAL FRONT	=	<u>911.0</u>	kg	TOTAL REAR	=	<u>594.0</u>	kg
TOTAL TEST WEIGHT	=	<u>1505.0</u>	kg				

DATA SHEET NO. 3

CHILD DUMMY POSITIONING IN VEHICLE

CRS: Evenflo Titan 5 Forward Facing Convertible with LATCH and Top Tether

NHTSA No. M40515



Measurement	P3 CRS (044)
SA	23.8
HS	391
CD	363
AD	228
HD	192 (to arm rest)
HZ	337
NB	578
CB	569
KK	144
FF	110
KB – LEFT	388
KB – RIGHT	394
TB – LEFT	112
TB – RIGHT	112

All dimensions in mm (unless noted)

P3 – Right Rear Passenger (CRS #1)

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES

CRS: Evenflo Titan 5 Forward Facing Convertible with LATCH and Top Tether

NHTSA No. M40515

		MAXIMUM VALUE			
		Position #3			
DESCRIPTION	Unit	Pos	msec	Neg	msec
Head X	g	65.7	185.3	-39.9	79.6
Head Y	g	4.7	185.4	-2.4	191.1
Head Z	g	62.2	83.5	-6.9	42.2
Head Resultant	g	70.6	82.7	-	-
Head Rear Z	g	205.7	82.2	-49.2	183.1
Upper Neck Fx	N	165.1	178.5	-894.0	79.2
Upper Neck Fy	N	52.0	65.3	-48.3	196.4
Upper Neck Fz	N	2460.2	81.9	-366.3	194.6
Upper Neck F Resultant	N	2604.2	80.9	-	-
Upper Neck Mx	N-m	5.3	70.3	-3.6	104.9
Upper Neck My	N-m	9.2	177.8	-14.1	64.4
Upper Neck Mz	N-m	1.4	157.8	-1.0	94.3
Upper Neck M Resultant	N-m	14.4	65.0	-	-
Lower Neck Fx	N	299.5	177.8	-1700.0	80.7
Lower Neck Fy	N	65.6	190.1	-126.8	76.3
Lower Neck Fz	N	1251.3	84.8	-302.5	195.1
Lower Neck F Resultant	N	2070.2	82.7	-	-
Lower Neck Mx	N-m	9.4	65.7	-5.3	116.5
Lower Neck My	N-m	149.3	79.9	-17.5	178.4
Lower Neck Mz	N-m	5.3	77.3	-3.5	103.6
Lower Neck M Resultant	N-m	149.5	79.9	-	-
Chest X	g	33.2	193.1	-38.1	59.6
Chest Y	g	6.2	192.6	-9.7	194.2
Chest Z	g	32.4	193.1	-51.6	62.9
Chest Resultant	g	63.6	63.0	-	-
Chest Displacement	mm	0.0	-32.9	-20.4	101.0

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Evenflo Titan 5 Forward Facing Convertible with LATCH and Top Tether

NHTSA No. M40515

		MAXIMUM VALUE			
		Position #3			
DESCRIPTION	Unit	Pos	msec	Neg	msec
Pelvic X	g	9.8	132.0	-59.1	65.8
Pelvic Y	g	13.9	70.0	-7.8	90.9
Pelvic Z	g	22.1	193.7	-68.5	59.9
Pelvic Resultant	g	85.0	60.0	-	-
LATCH Belt Load	N	4364.3	70.3	-170.8	135.8

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Evenflo Titan 5 Forward Facing Convertible with LATCH and Top Tether

NHTSA No. M40515

	HEAD INJURY CRITERIA (HIC)							
	HIC15				HIC36			
	HIC	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂	HIC	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #3 - Right	534.7	74.1	89.1	66.2	782.9	64.6	100.6	54.3

	CLIP SUMMARY*			
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #3 - Right	59.3	61.4	64.4	635.7

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

DATA SHEET NO. 5

CRS PERFORMANCE DATA

CRS: Evenflo Titan 5 Forward Facing Convertible with LATCH and Top Tether

NHTSA No. M40515

		MAXIMUM VALUE			
DESCRIPTION	Unit	Positive	Time (ms)	Negative	Time (ms)
P3 CRS X	g	16.4	198.8	-71.2	54.7
P3 CRS Y	g	9.2	65.0	-2.5	197.7
P3 CRS Z	g	16.7	130.1	-18.0	78.5
P3 CRS Resultant	g	71.9	54.6	-	-

DATA SHEET NO. 5

CRS PERFORMANCE DATA (CONTINUED)

CRS: Evenflo Titan 5 Forward Facing Convertible with LATCH and Top Tether

NHTSA No. M40515

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

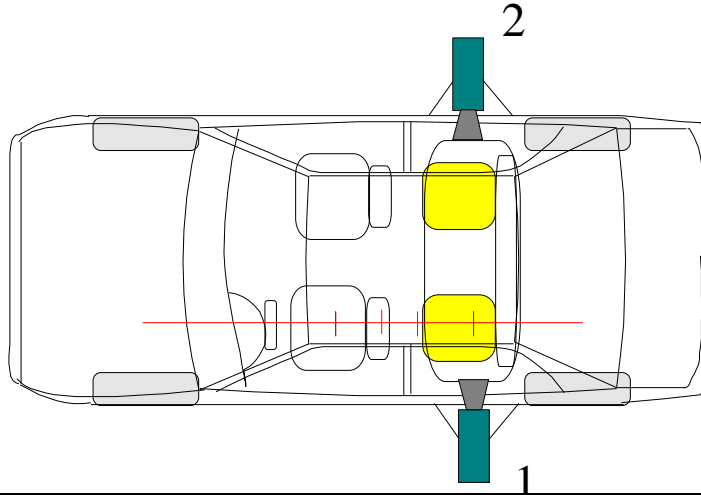
LOCATION	DAMAGE	REMARKS
Upper Tether Strap	No	None
Upper Tether Buckle	No	None
Upper Tether Hook	No	None
Vehicle Upper Tether Anchor	No	None
Lower Anchor Strap	No	None
Lower Anchor Buckle	No	None
Lower Anchor Hooks	No	None
Vehicle Lower CRS Anchors	No	None
Five Point Harness Connections	No	None
Cracks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

DATA SHEET NO. 6

CRS CAMERA DATA

CRS: Evenflo Titan 5 Forward Facing Convertible with LATCH and Top Tether

NHTSA No. M40515



Camera No.	View	Coordinates (millimeters)			Angle** (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Left side CRS lateral view	-970	3185	-2288	-24.0	28-70	1000
2	Right side CRS lateral view	970	3280	2345	-24.0	28-70	1000

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

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



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



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



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



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



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



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



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



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



Figure 3-10: PRE-TEST POSITION 3 LEFT SIDE VIEW



Figure 3-11: POST-TEST POSITION 3 LEFT SIDE VIEW



Figure 3-12: PRE-TEST POSITION 3 RIGHT SIDE VIEW



Figure 3-13: POST-TEST POSITION 3 RIGHT SIDE VIEW



Figure 3-14: PRE-TEST POSITION 3 FRONT VIEW



Figure 3-15: POST-TEST POSITION 3 FRONT VIEW

SECTION 4

CHILD DUMMY RESPONSE AND CRS DATA TRACES

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24	V1P3 Chest z [g, CFC_180]	4-26
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2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P3 Head x

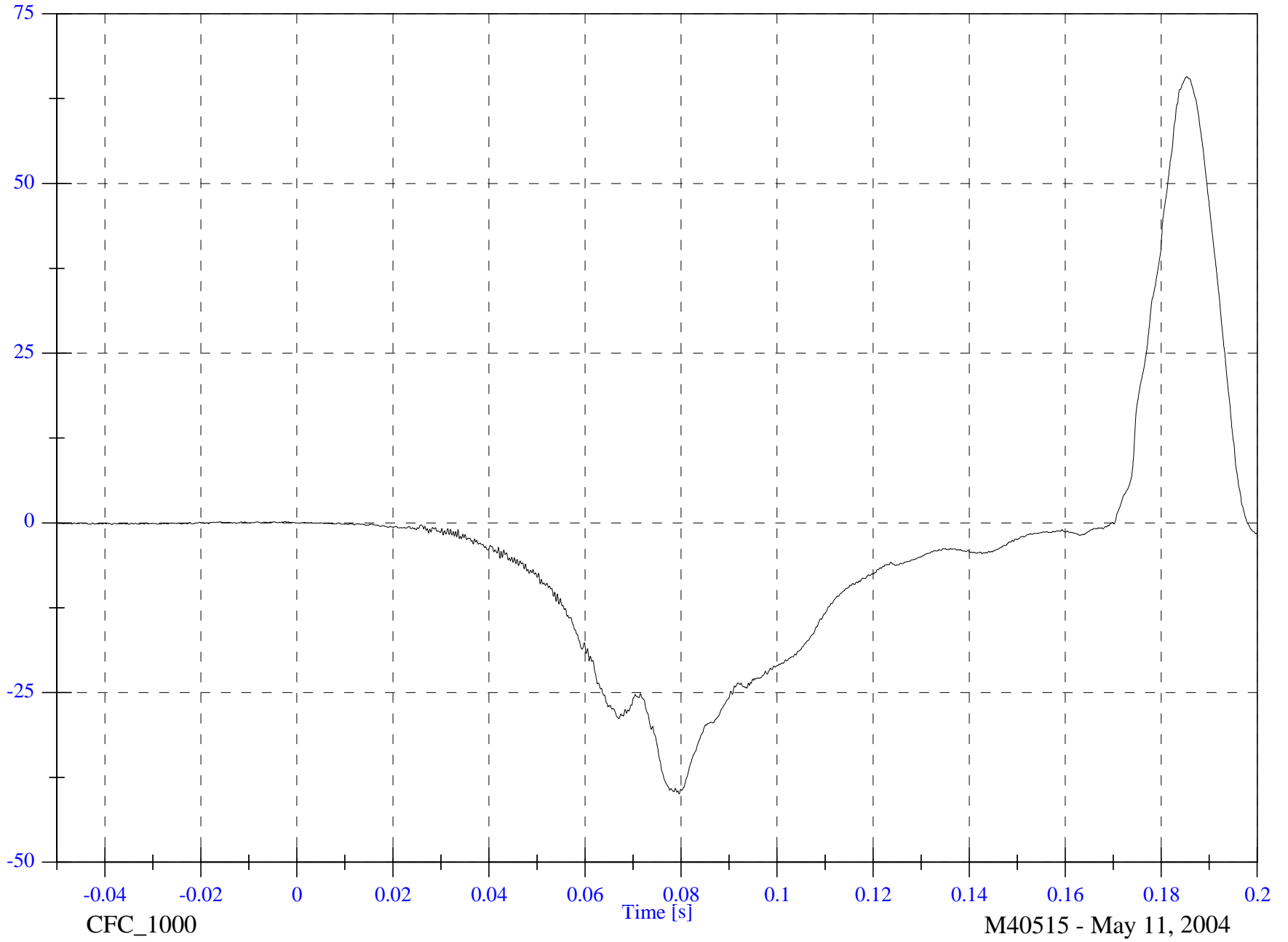
Max: 65.7 [g] at 0.185 [s]

Min: -39.9 [g] at 0.080 [s]

4-3

g

8642-NCAP-49

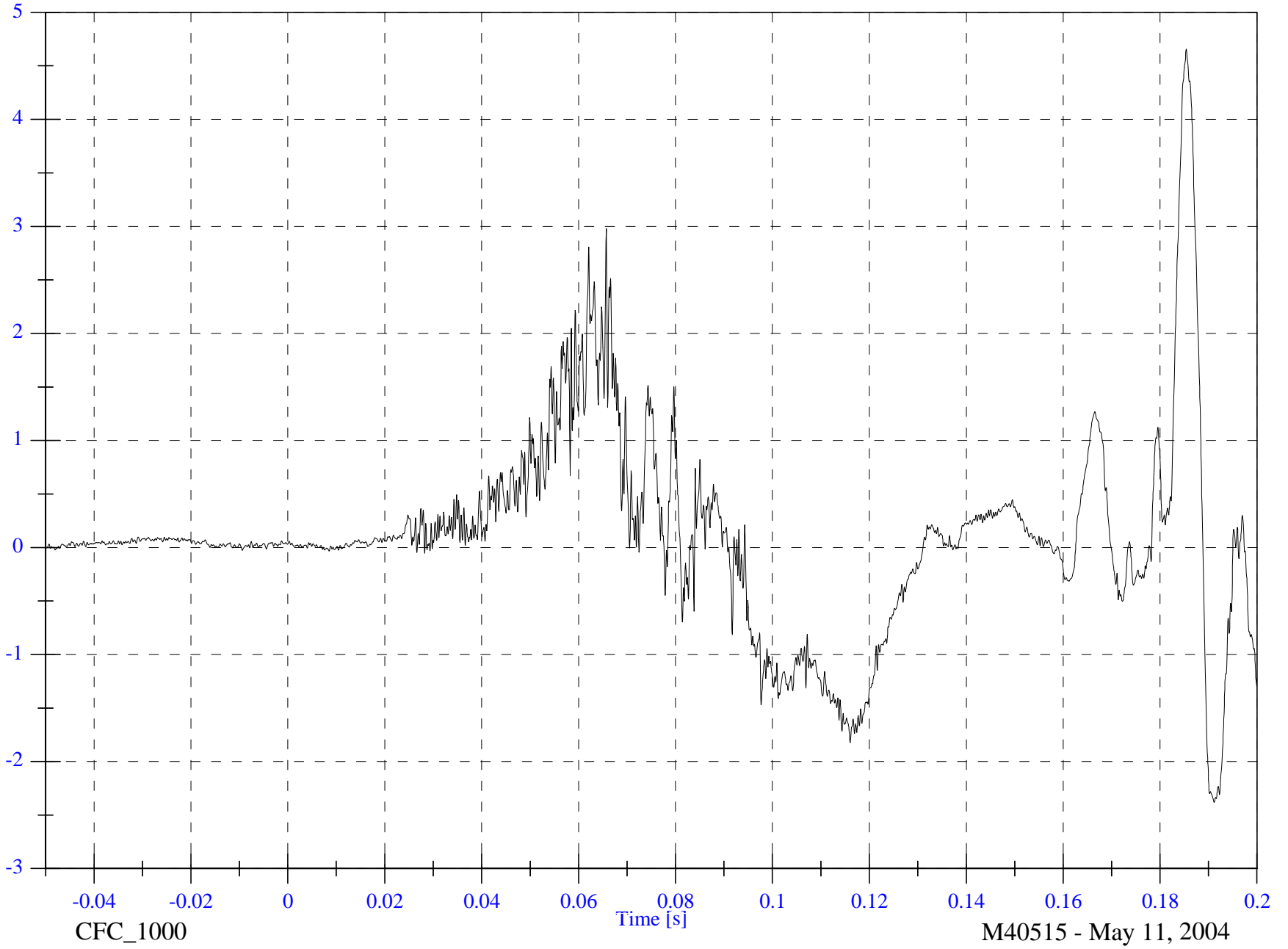


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P3 Head y

Max: 4.7 [g] at 0.185 [s]

Min: -2.4 [g] at 0.191 [s]



4-4

g

8642-NCAP-49

CFC_1000

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

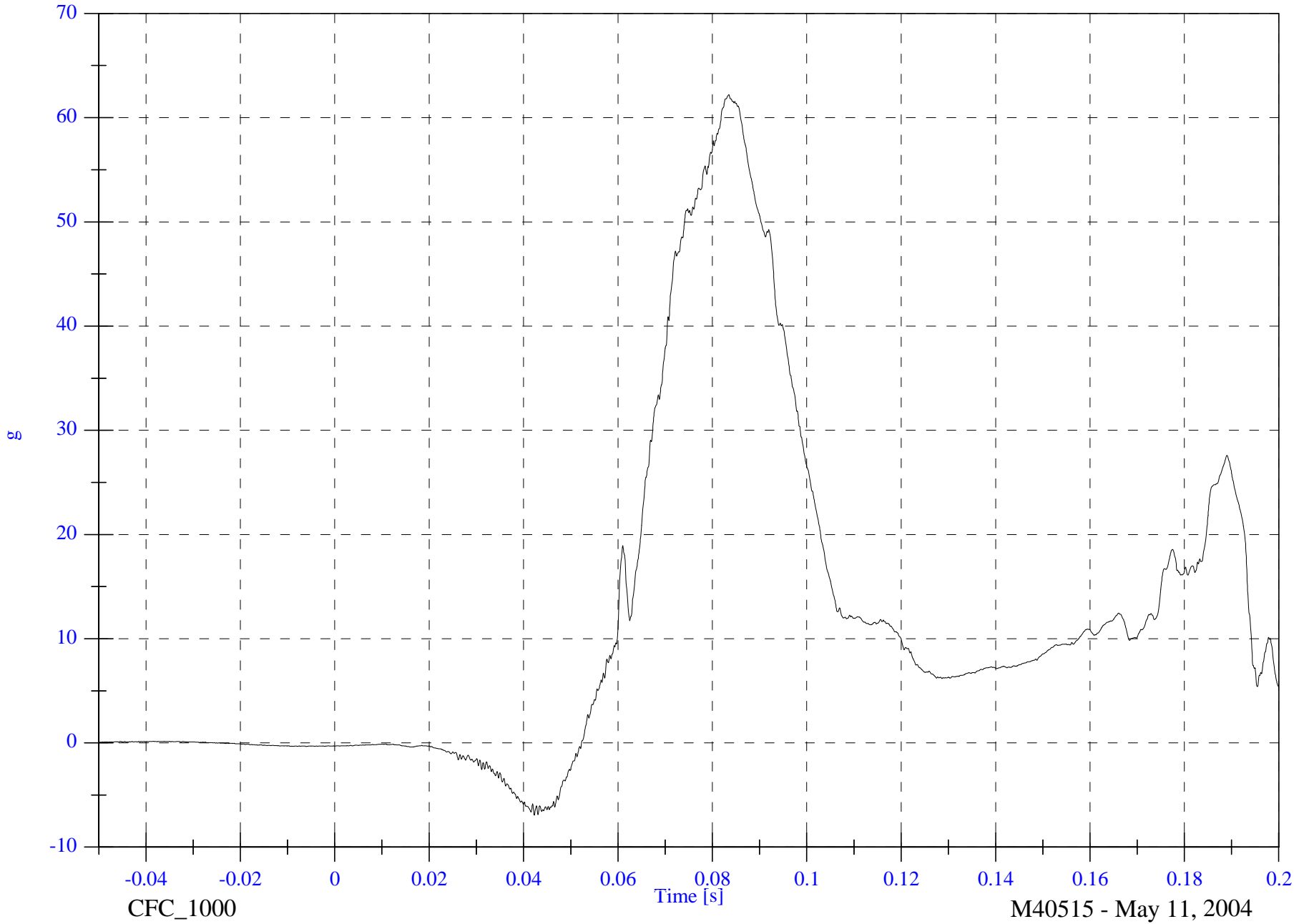
V1P3 Head z

Max: 62.2 [g] at 0.084 [s]

Min: -6.9 [g] at 0.042 [s]

4-5

8642-NCAP-49



CFC_1000

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

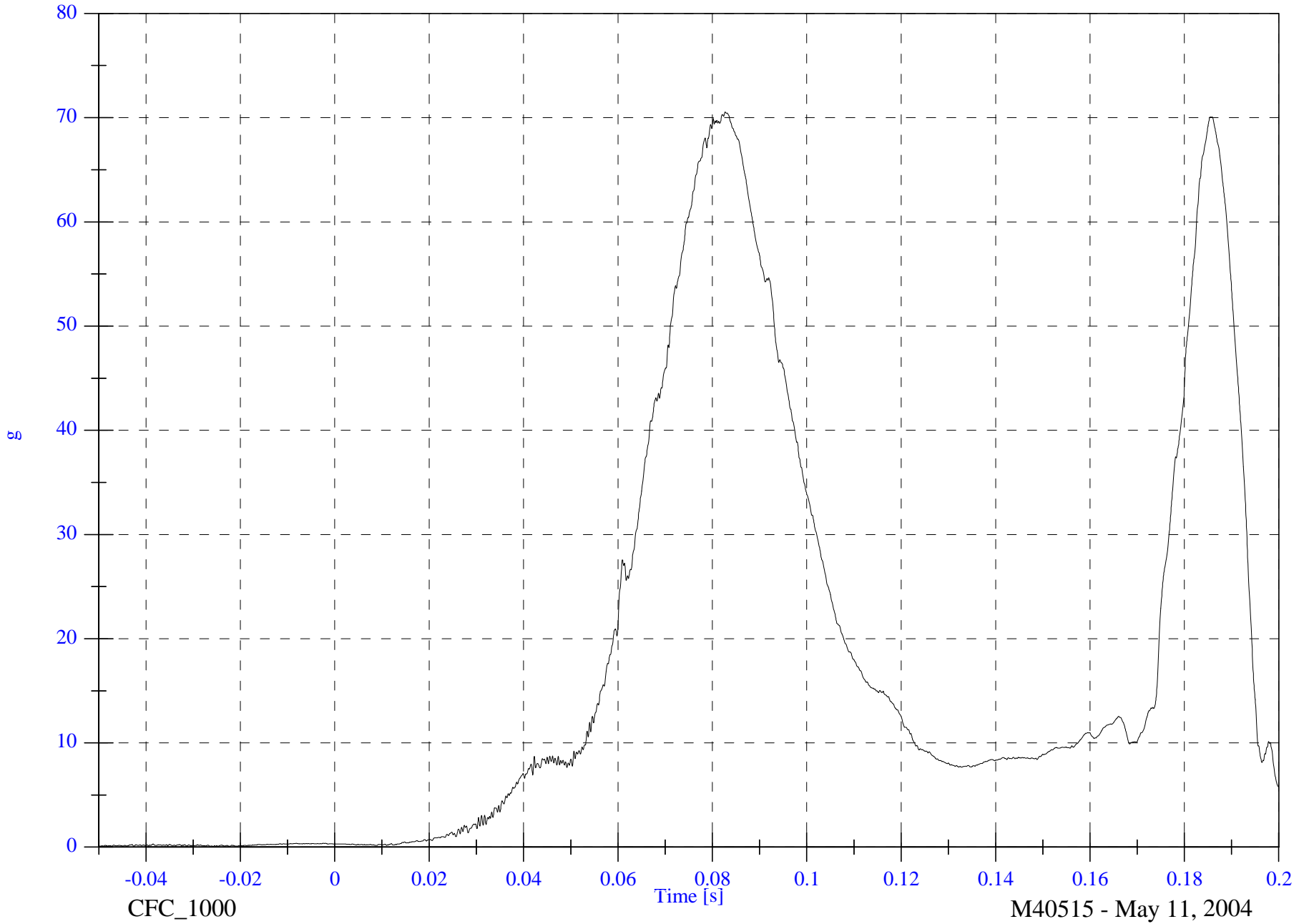
V1P3 Head Resultant

Max: 70.6 [g] at 0.083 [s]

Min: 0.1 [g] at -0.026 [s]

4-6

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

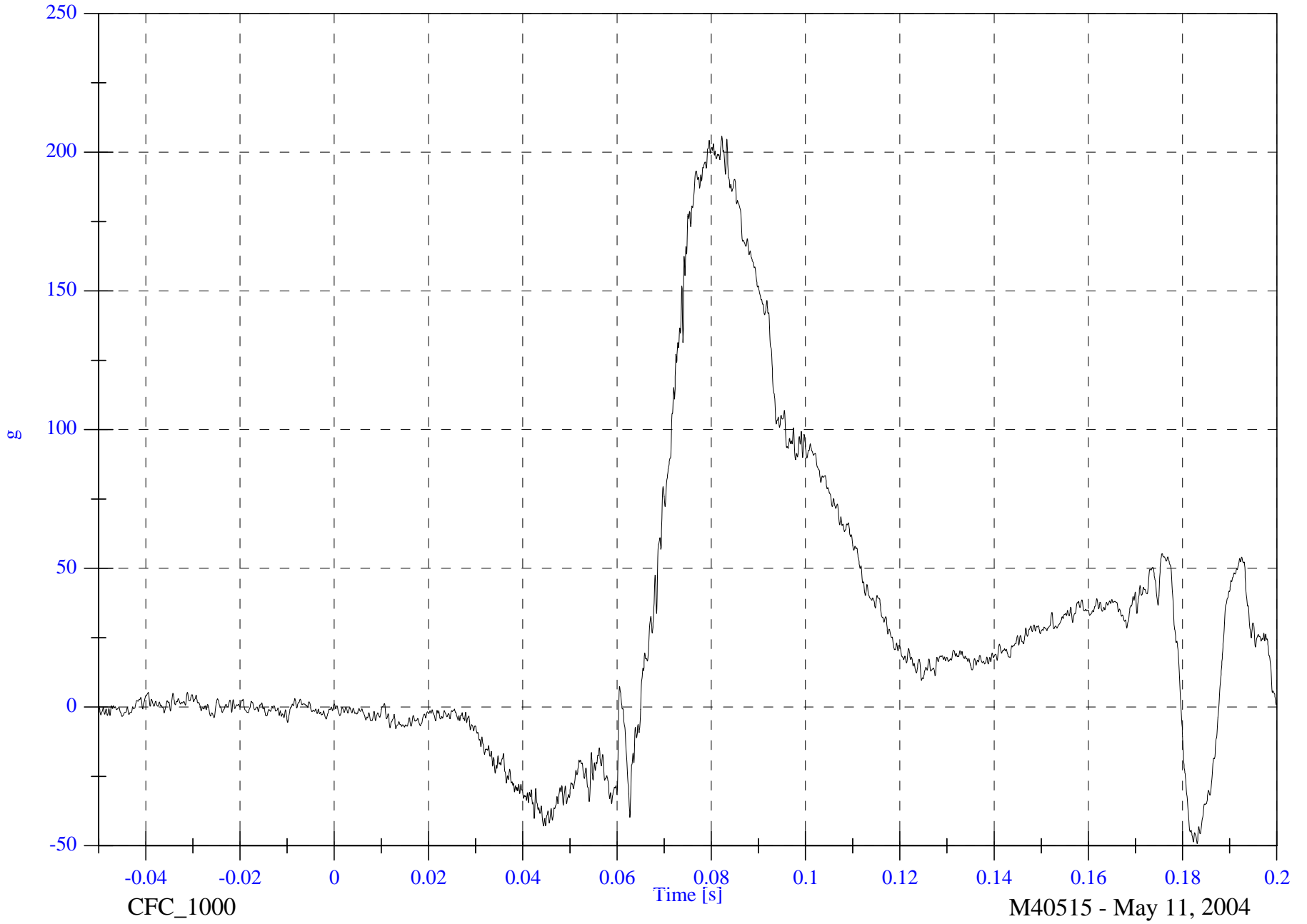
VIP3 Head Rear z

Max: 205.7 [g] at 0.082 [s]

Min: -49.2 [g] at 0.183 [s]

4-7

8642-NCAP-49

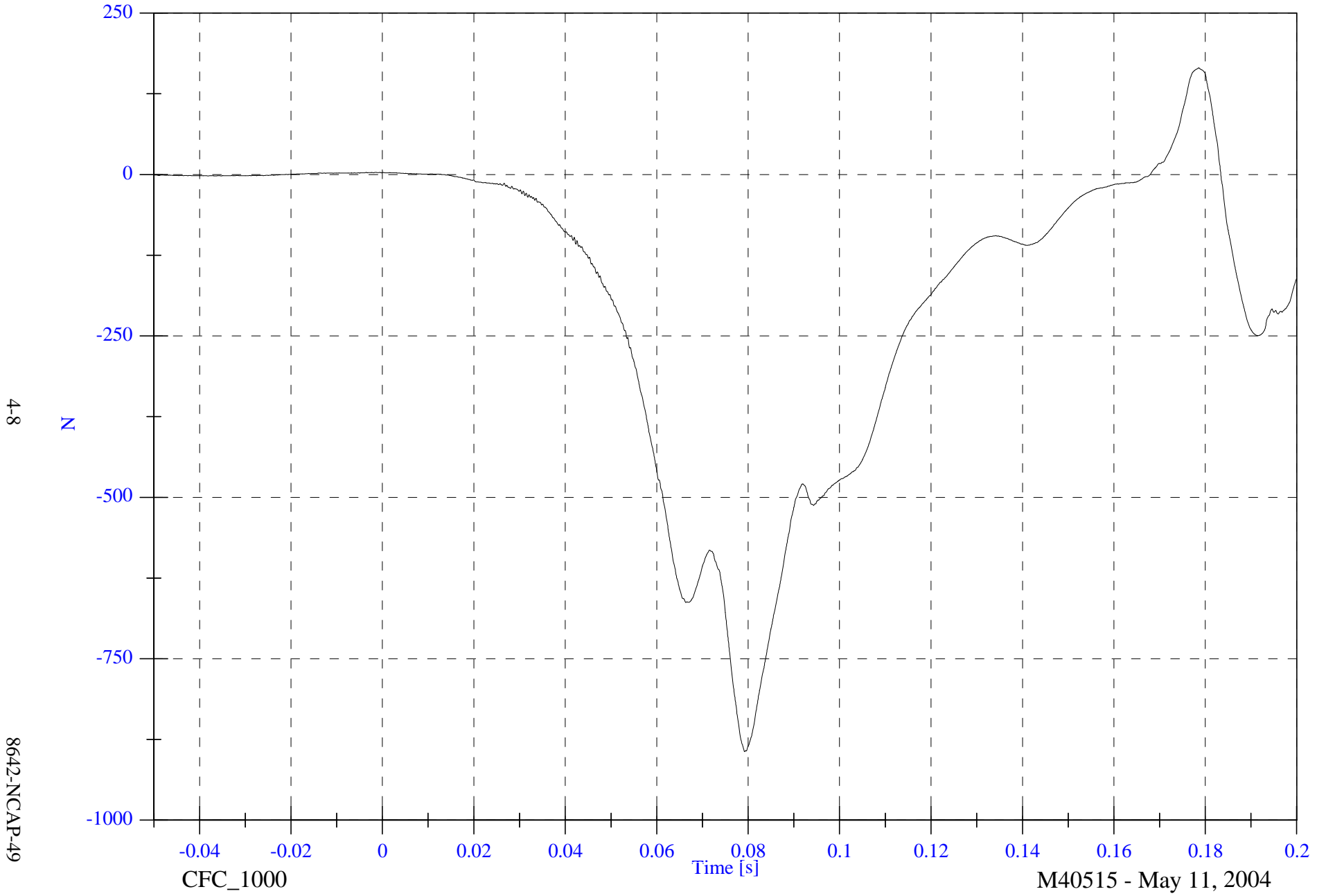


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P3 Upper Neck Fx

Max: 165.1 [N] at 0.179 [s]

Min: -894.0 [N] at 0.079 [s]



4-8

8642-NCAP-49

CFC_1000

Time [s]

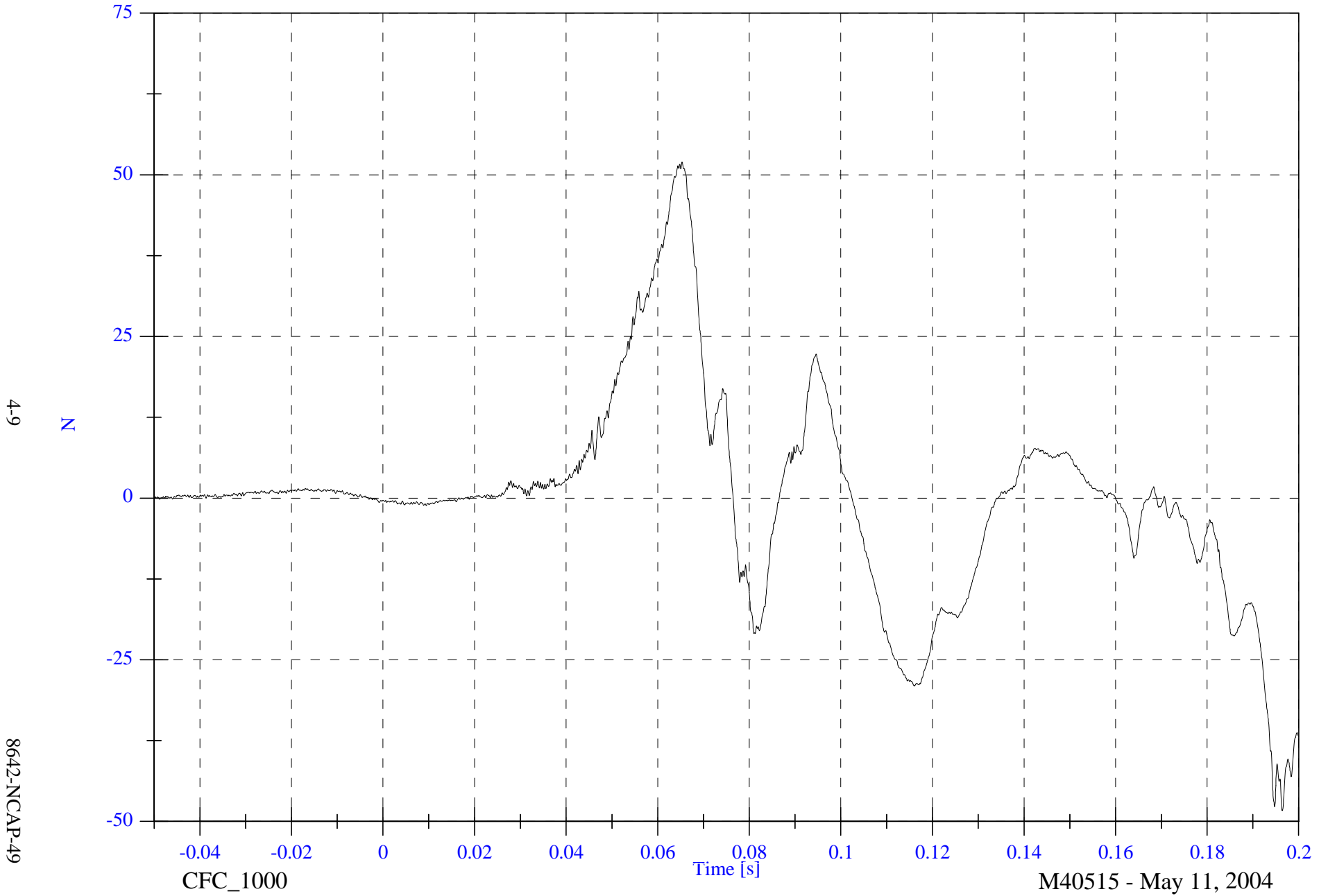
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P3 Upper Neck Fy

Max: 52.0 [N] at 0.065 [s]

Min: -48.3 [N] at 0.196 [s]

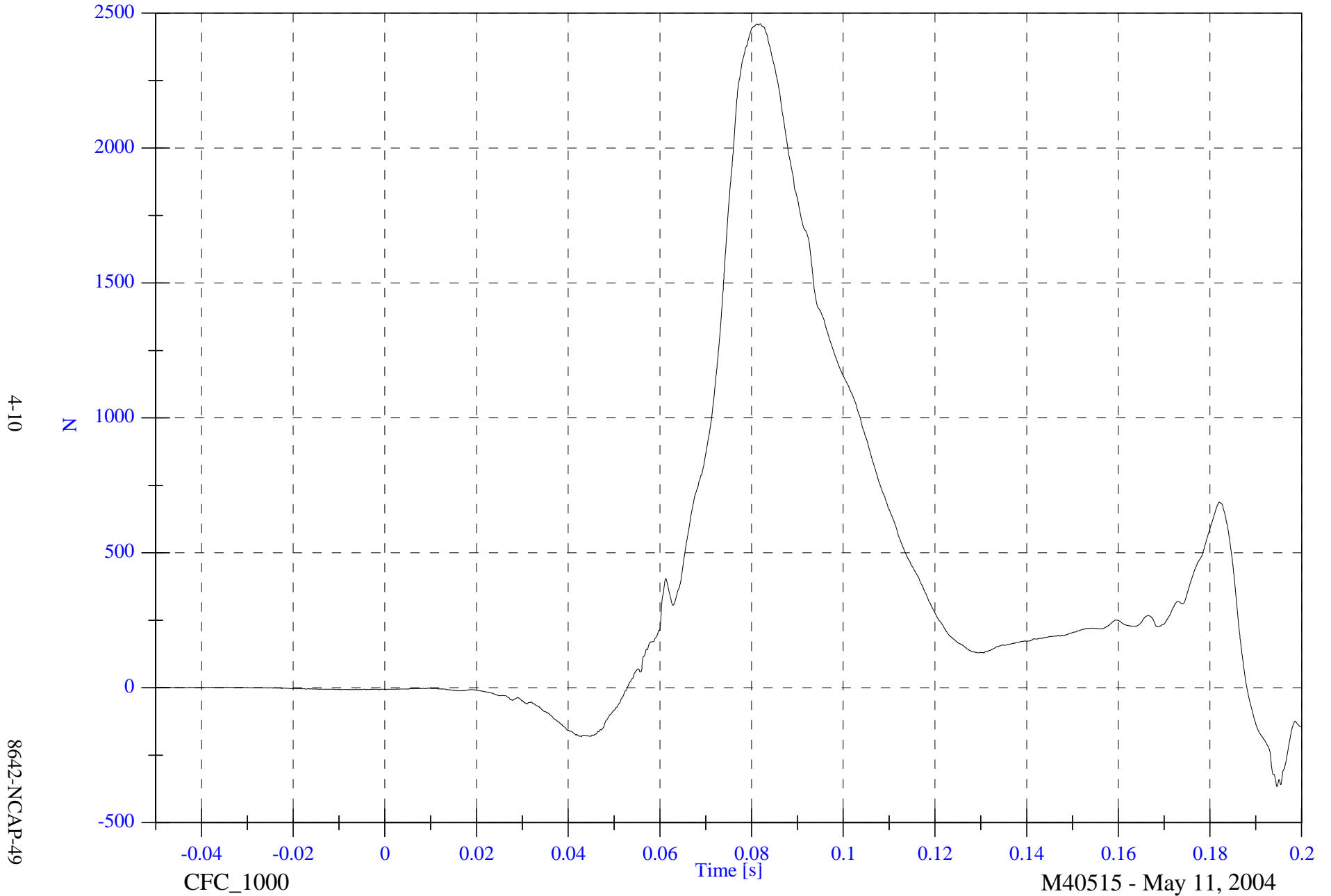


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P3 Upper Neck Fz

Max: 2460.2 [N] at 0.082 [s]

Min: -366.3 [N] at 0.195 [s]



4-10

8642-NCAP-49

CFC_1000

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

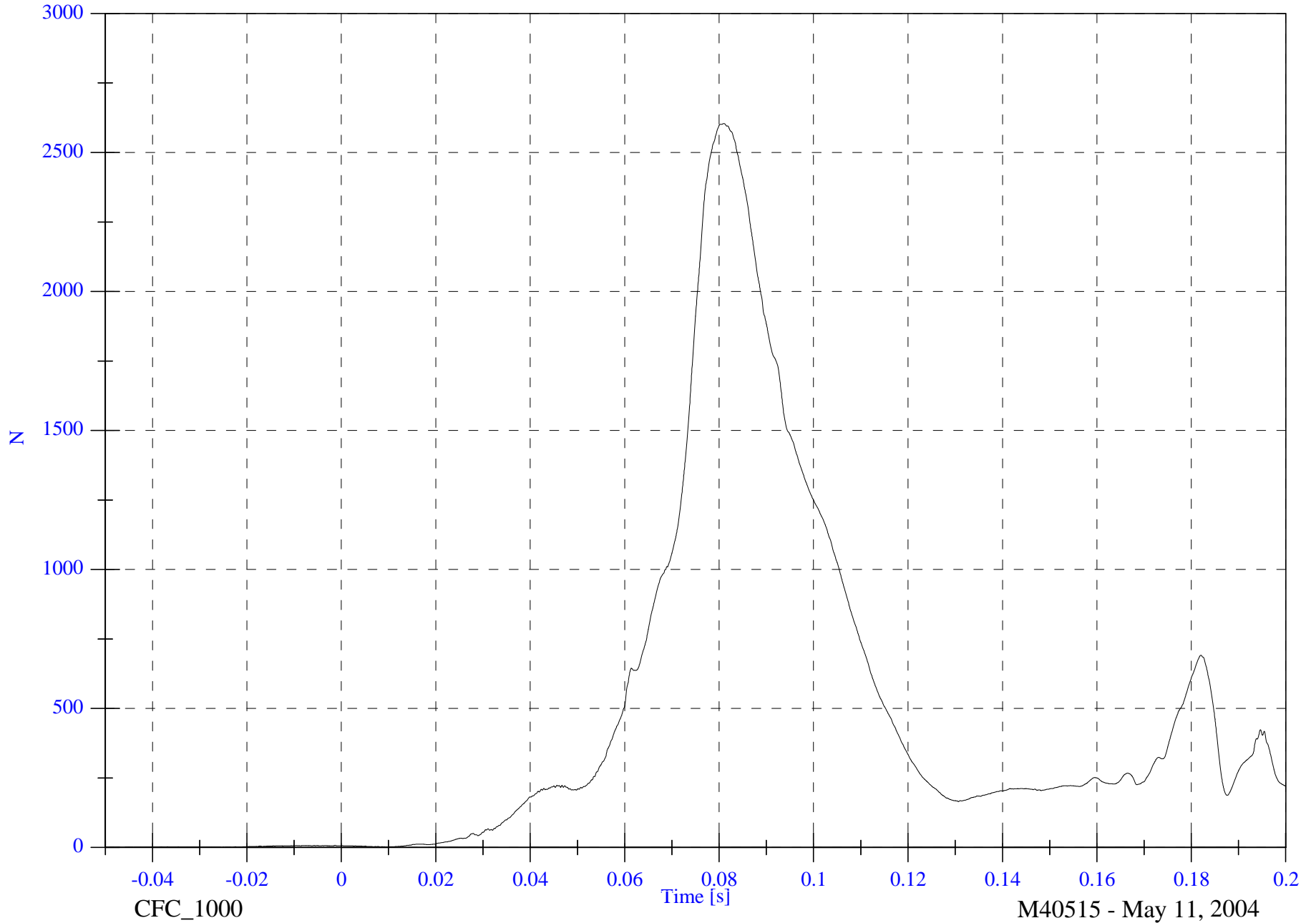
V1P3 Upper Neck F Resultant

Max: 2604.2 [N] at 0.081 [s]

Min: 1.2 [N] at -0.049 [s]

4-11

8642-NCAP-49



CFC_1000

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

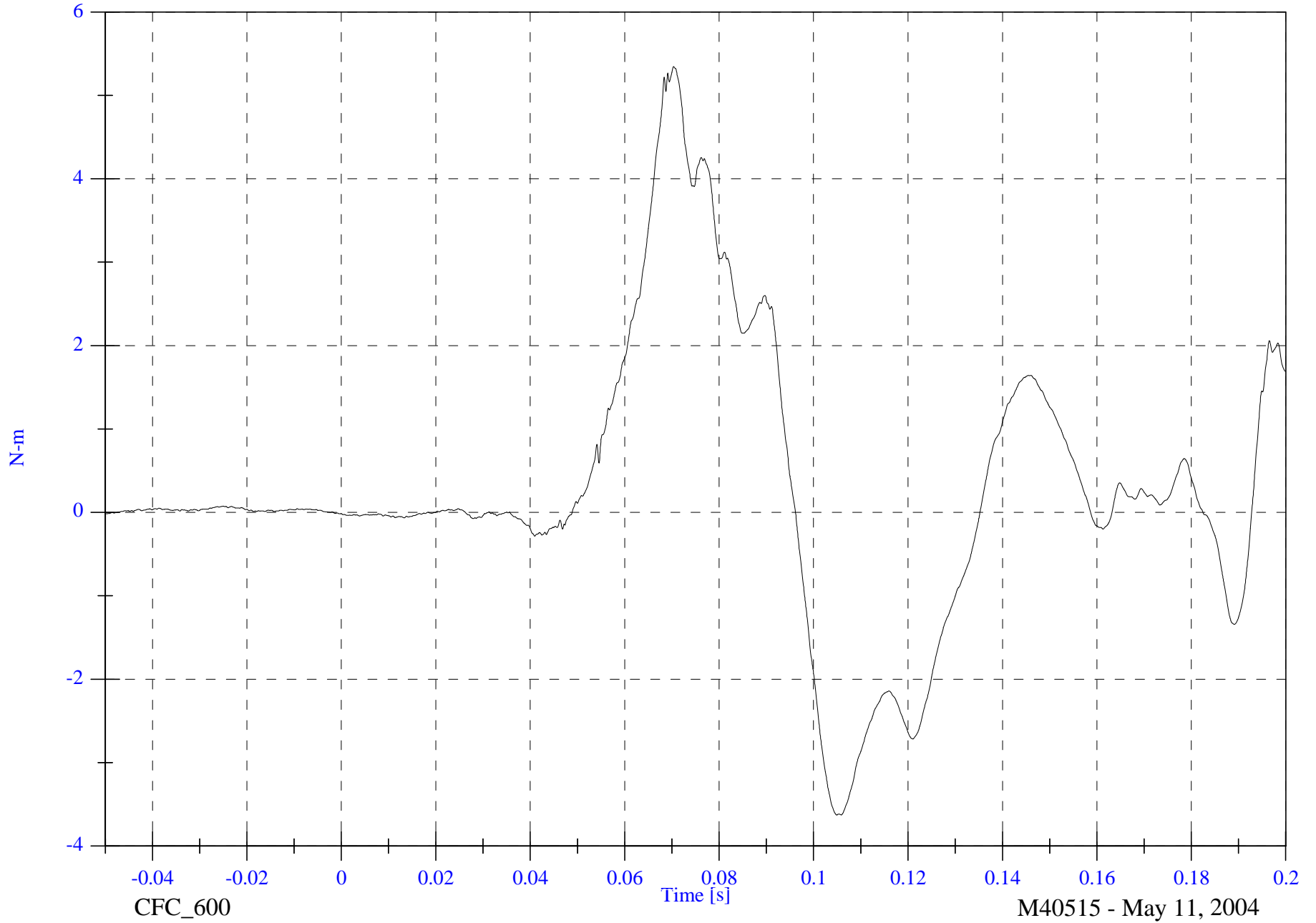
V1P3 Upper Neck Mx

Max: 5.3 [N-m] at 0.070 [s]

Min: -3.6 [N-m] at 0.105 [s]

4-12

8642-NCAP-49



CFC_600

M40515 - May 11, 2004

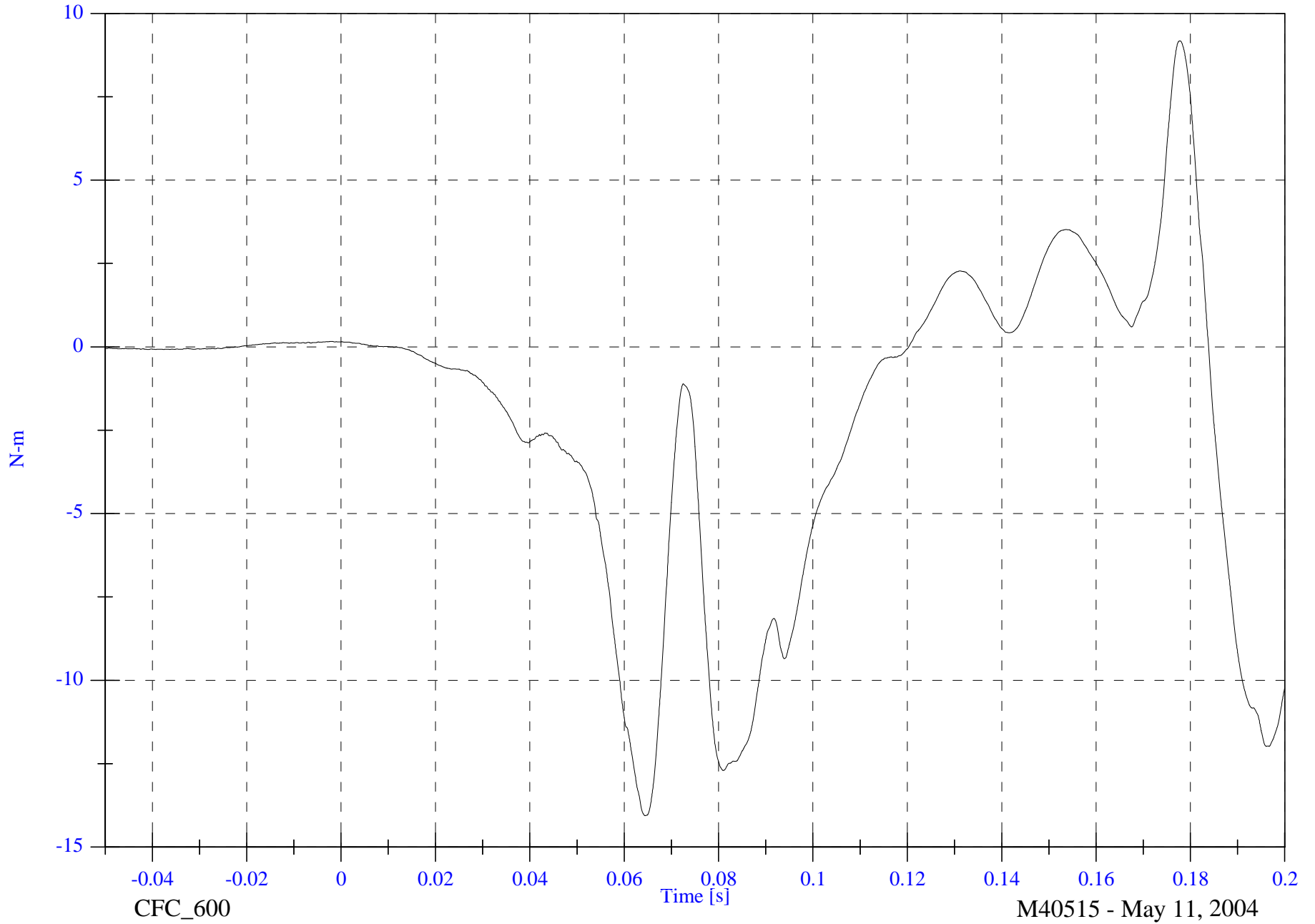
2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P3 Upper Neck My

Max: 9.2 [N-m] at 0.178 [s]
Min: -14.1 [N-m] at 0.064 [s]

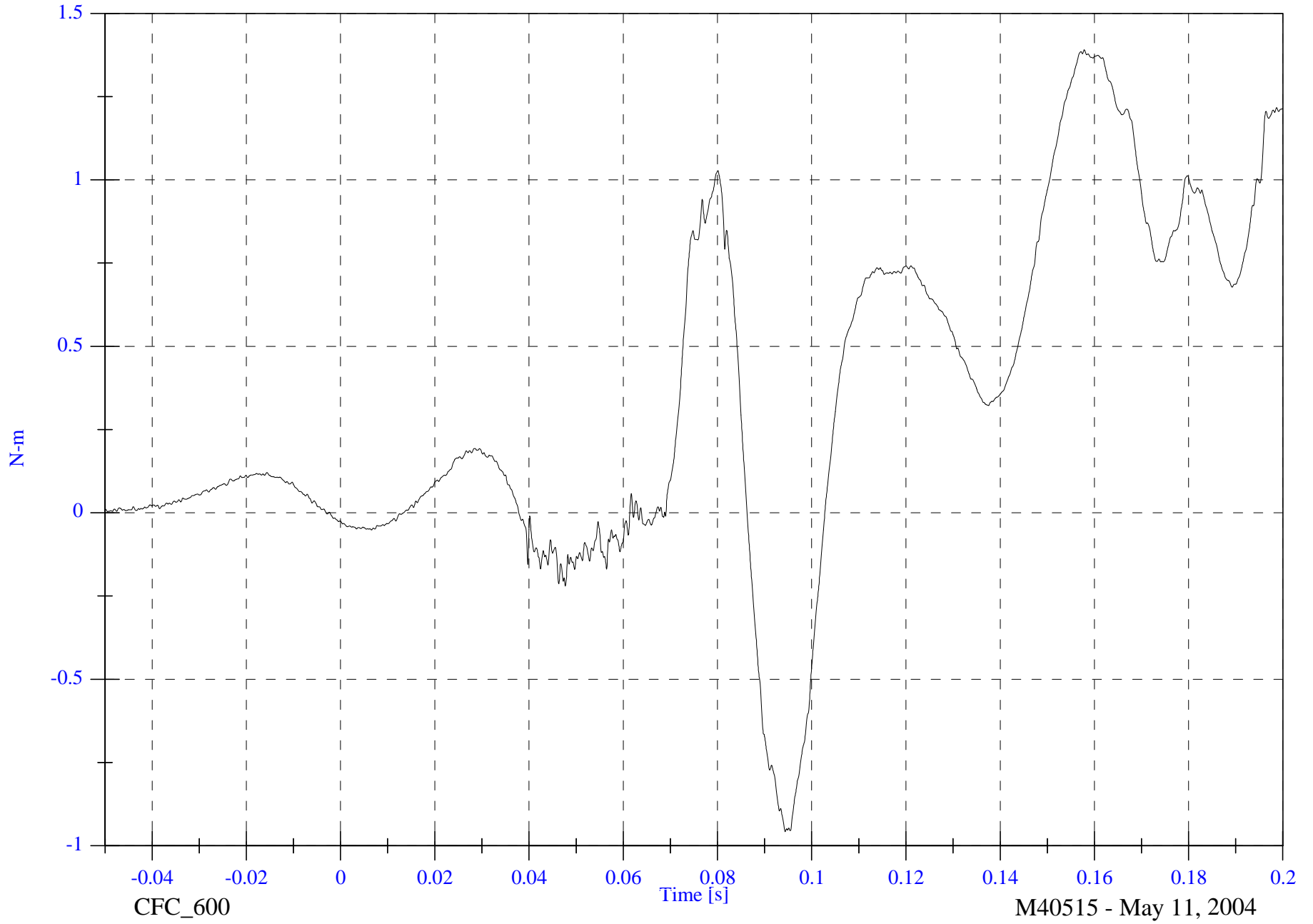
4-13

8642-NCAP-49



4-14

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

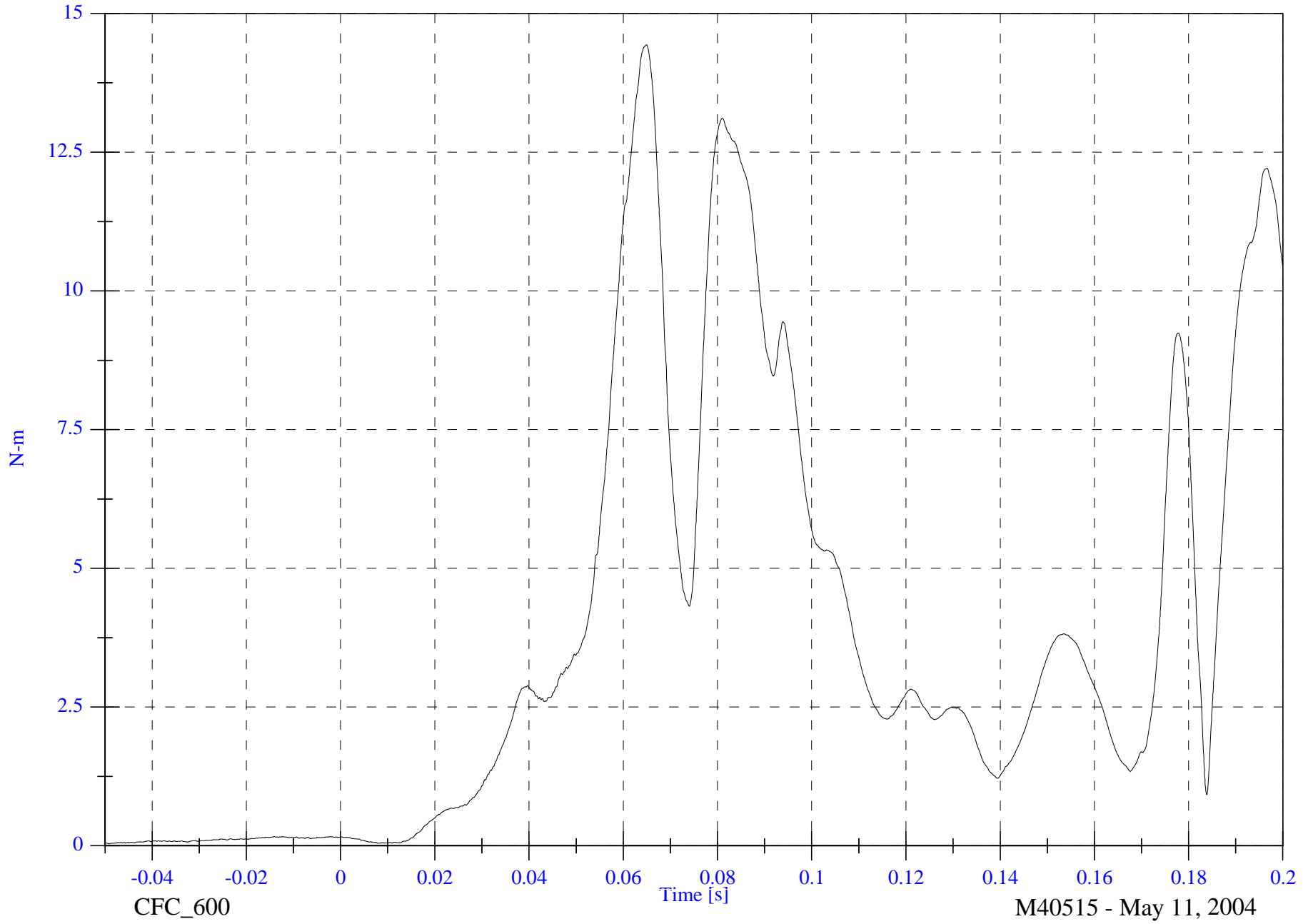
V1P3 Upper Neck M Resultant

Max: 14.4 [N-m] at 0.065 [s]

Min: 0.0 [N-m] at -0.049 [s]

4-15

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

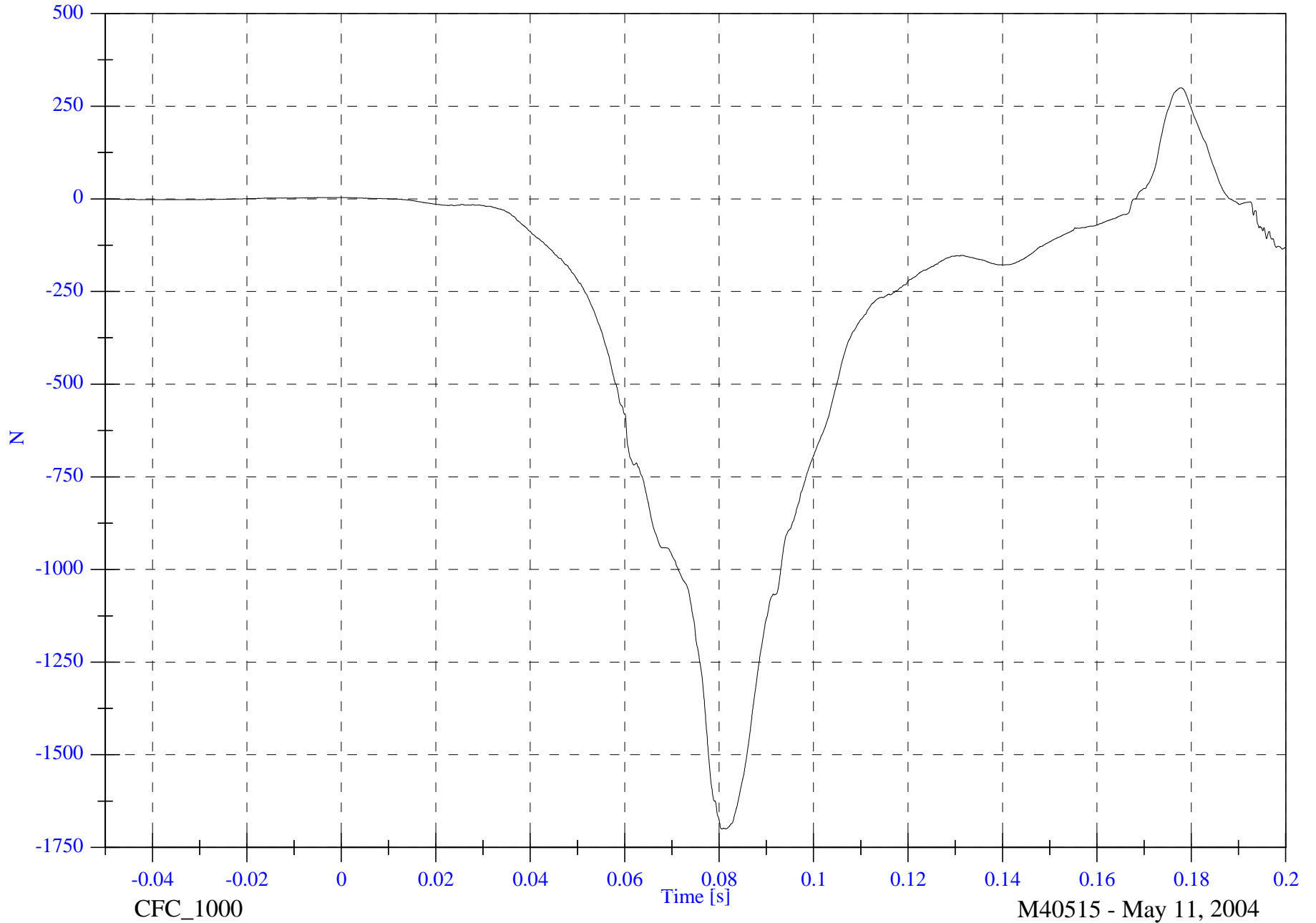
V1P3 Lower Neck Fx

Max: 299.5 [N] at 0.178 [s]

Min: -1700.0 [N] at 0.081 [s]

4-16

8642-NCAP-49



CFC_1000

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

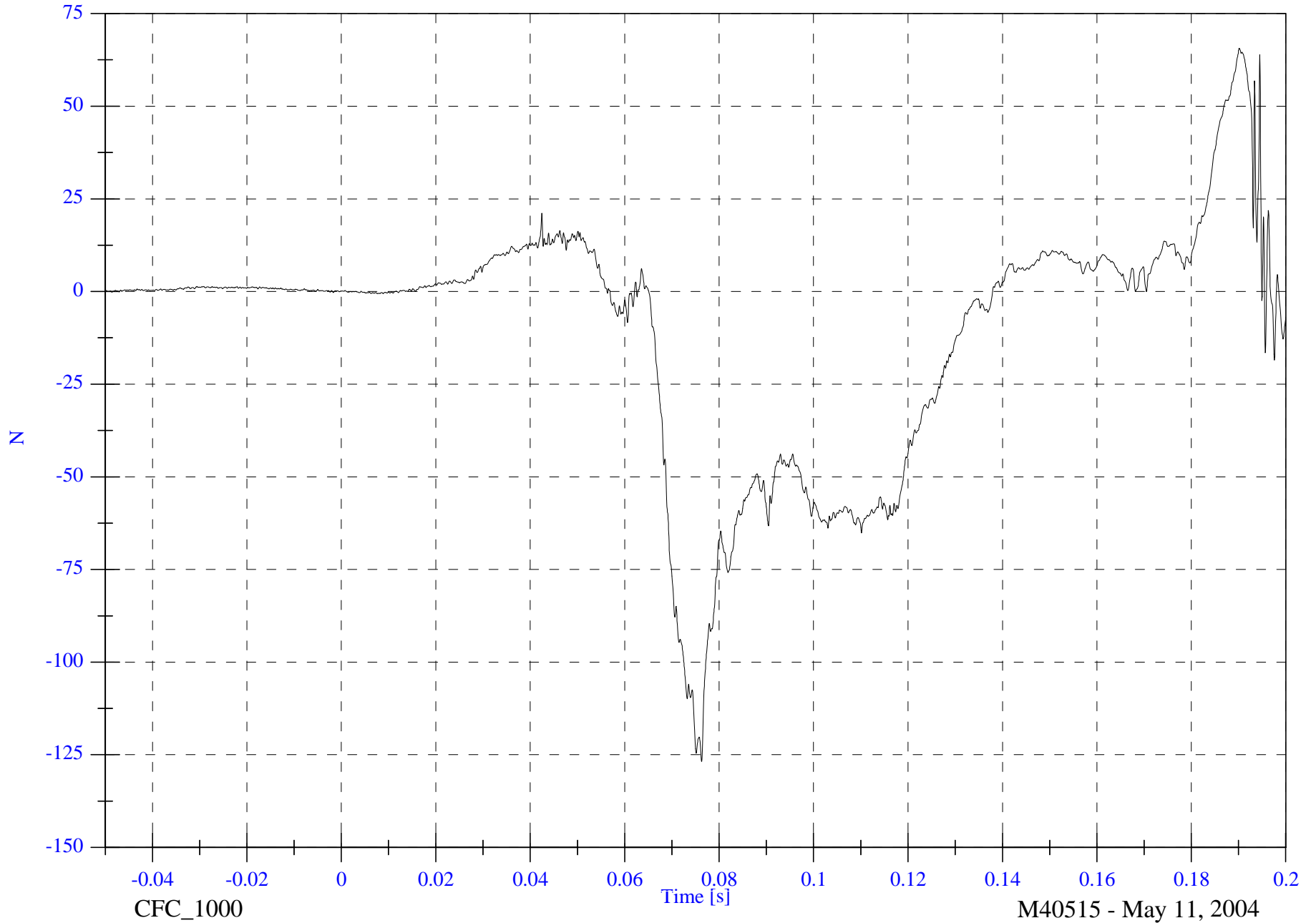
V1P3 Lower Neck Fy

Max: 65.6 [N] at 0.190 [s]

Min: -126.8 [N] at 0.076 [s]

4-17

8642-NCAP-49



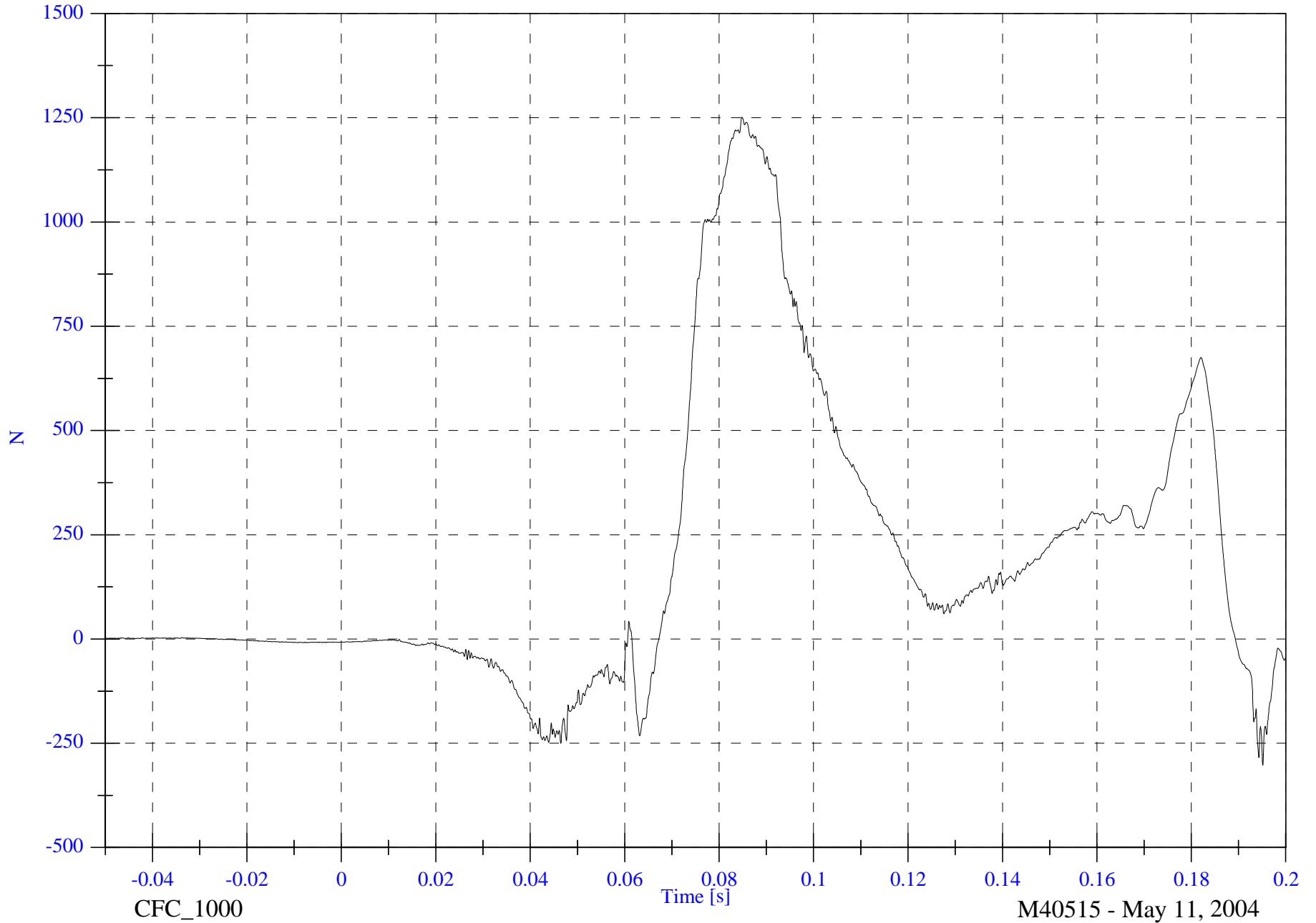
CFC_1000

M40515 - May 11, 2004

V1P3 Lower Neck Fz

4-18

8642-NCAP-49

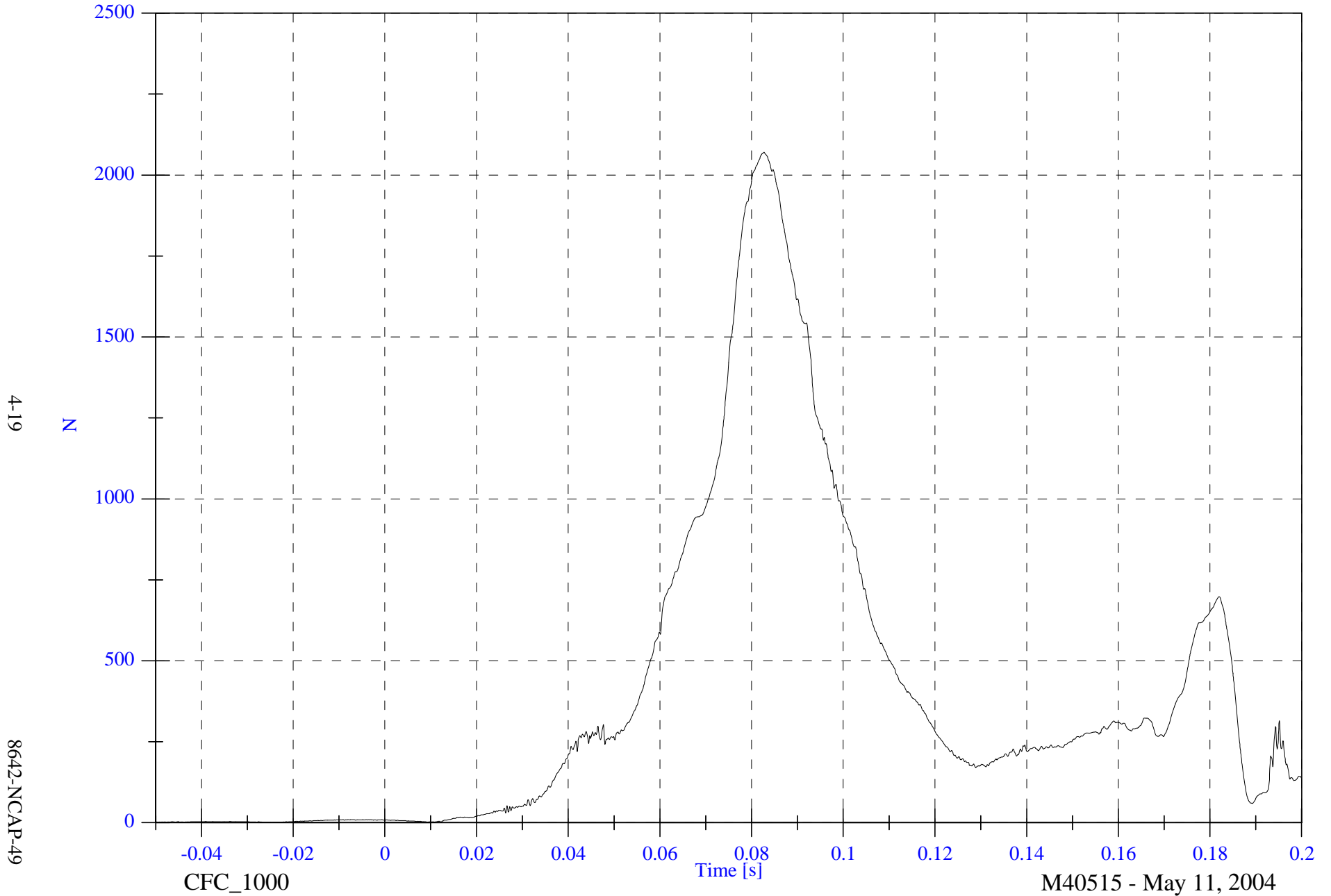


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P3 Lower Neck F Resultant

Max: 2070.2 [N] at 0.083 [s]

Min: 1.5 [N] at -0.023 [s]



4-19

8642-NCAP-49

2004 NCAP Test 13 - 2004.5 Kia Spectra

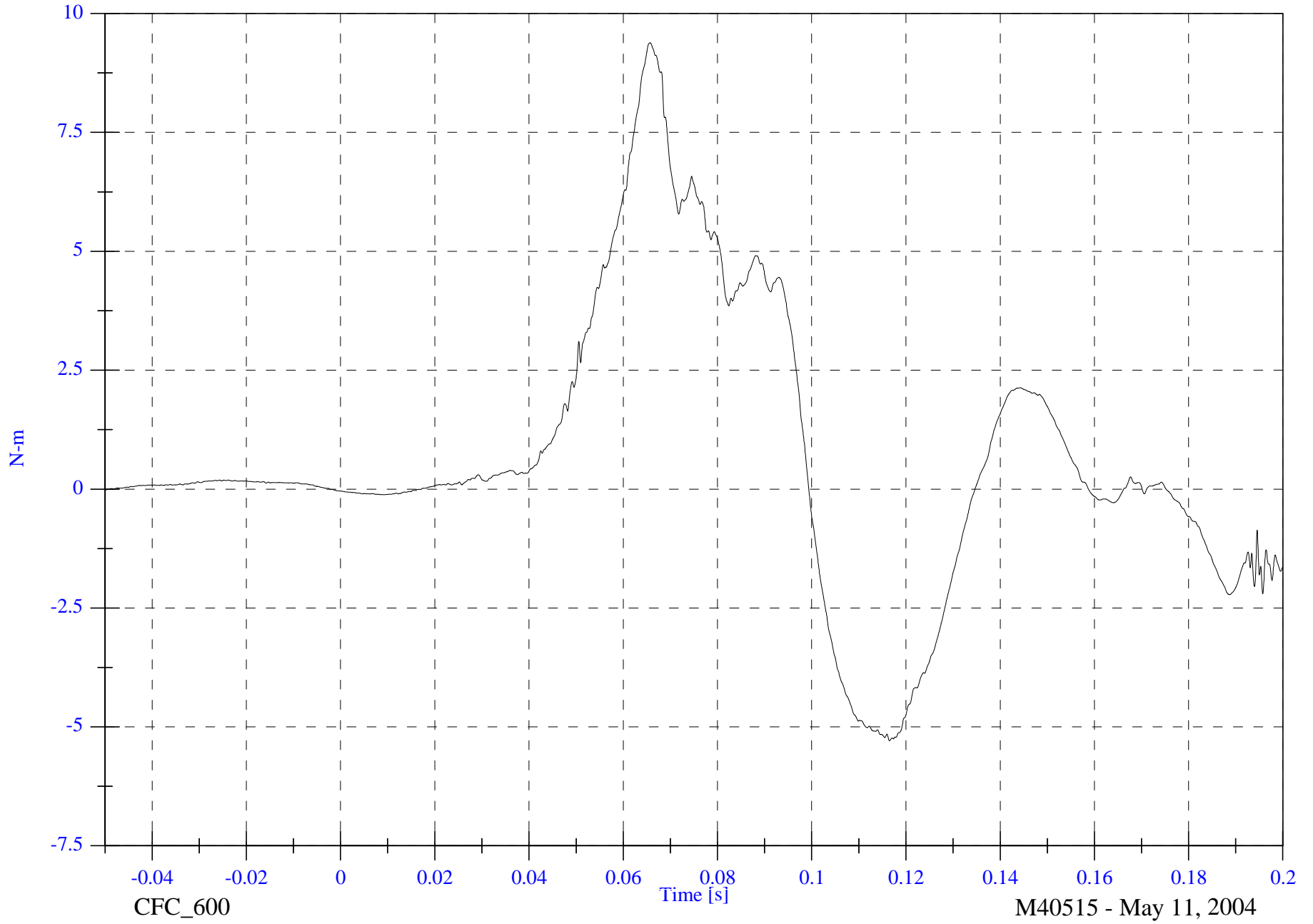
V1P3 Lower Neck Mx

Max: 9.4 [N-m] at 0.066 [s]

Min: -5.3 [N-m] at 0.117 [s]

4-20

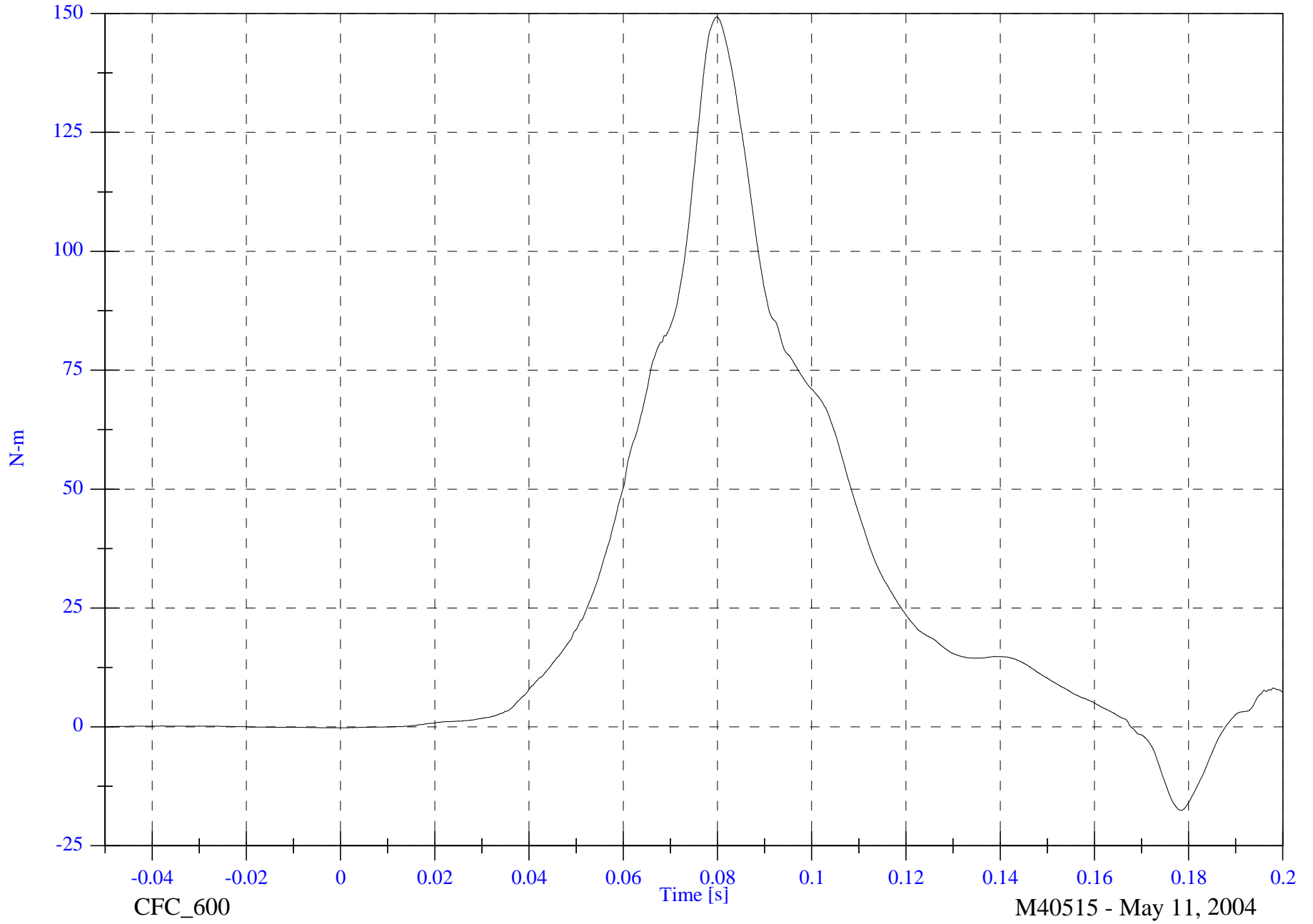
8642-NCAP-49



V1P3 Lower Neck My

4-21

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

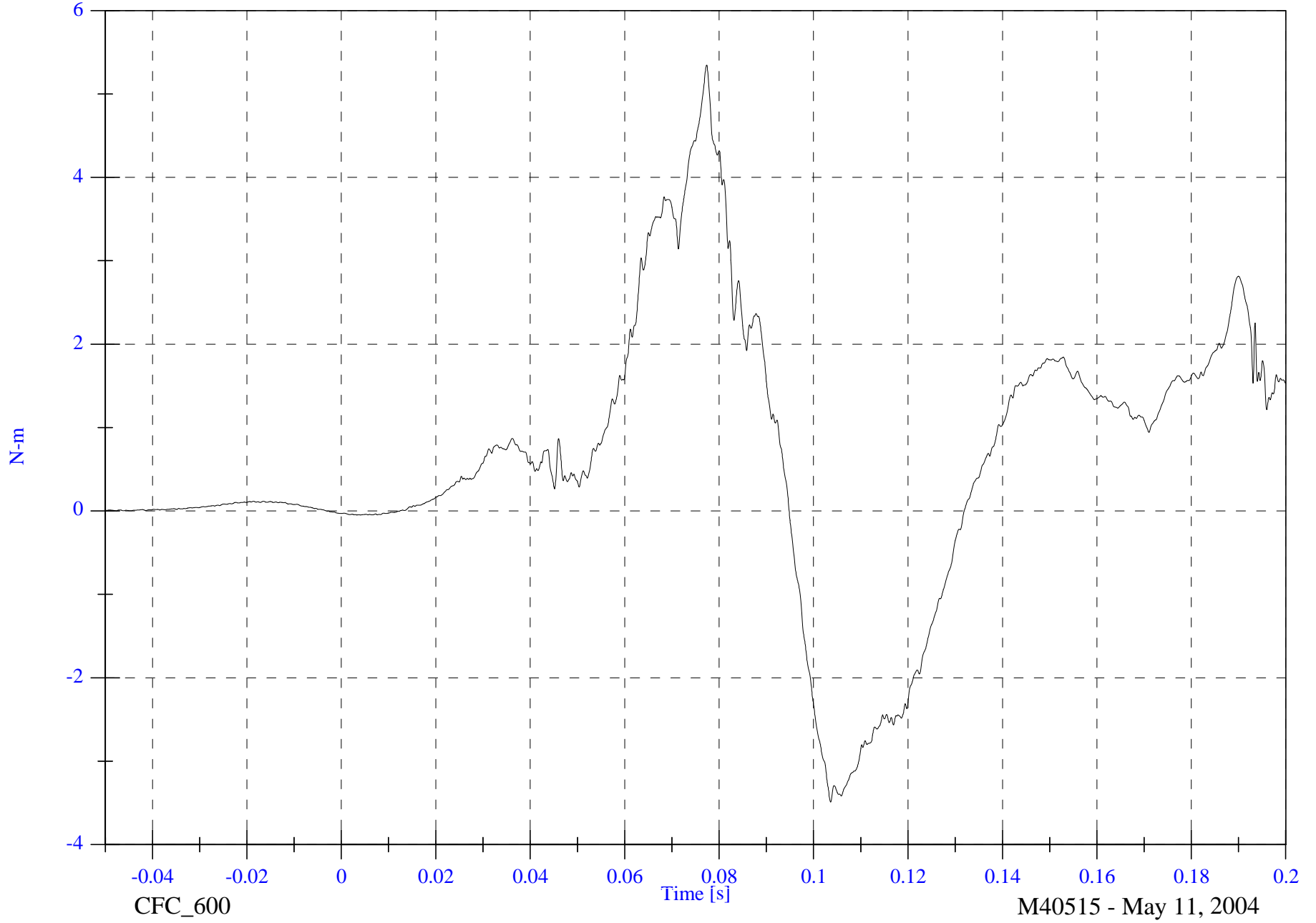
V1P3 Lower Neck Mz

Max: 5.3 [N-m] at 0.077 [s]

Min: -3.5 [N-m] at 0.104 [s]

4-22

8642-NCAP-49



CFC_600

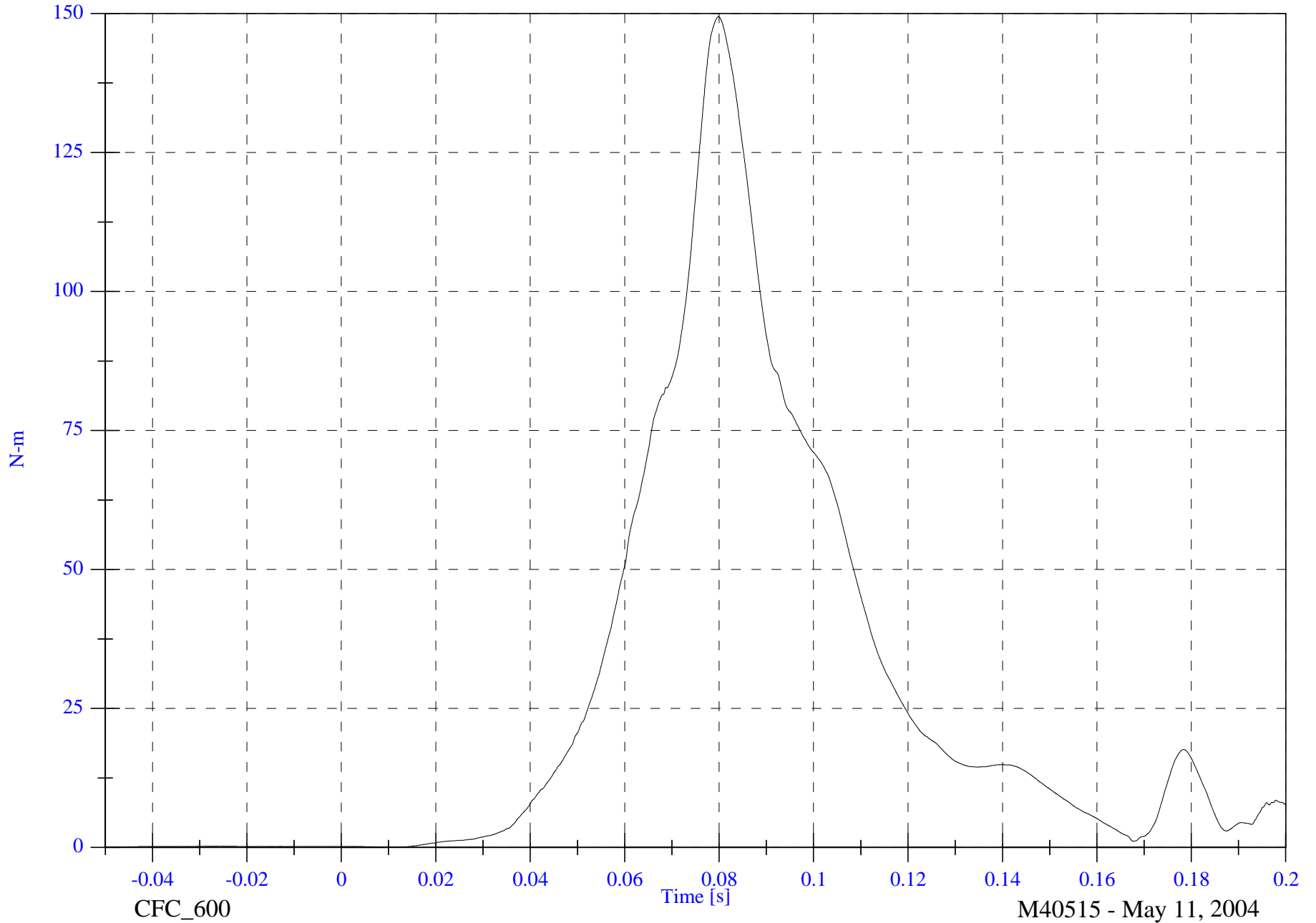
M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P3 Lower Neck M Resultant

Max: 149.5 [N-m] at 0.080 [s]

Min: 0.1 [N-m] at -0.050 [s]



4-23

8642-NCAP-49

CFC_600

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

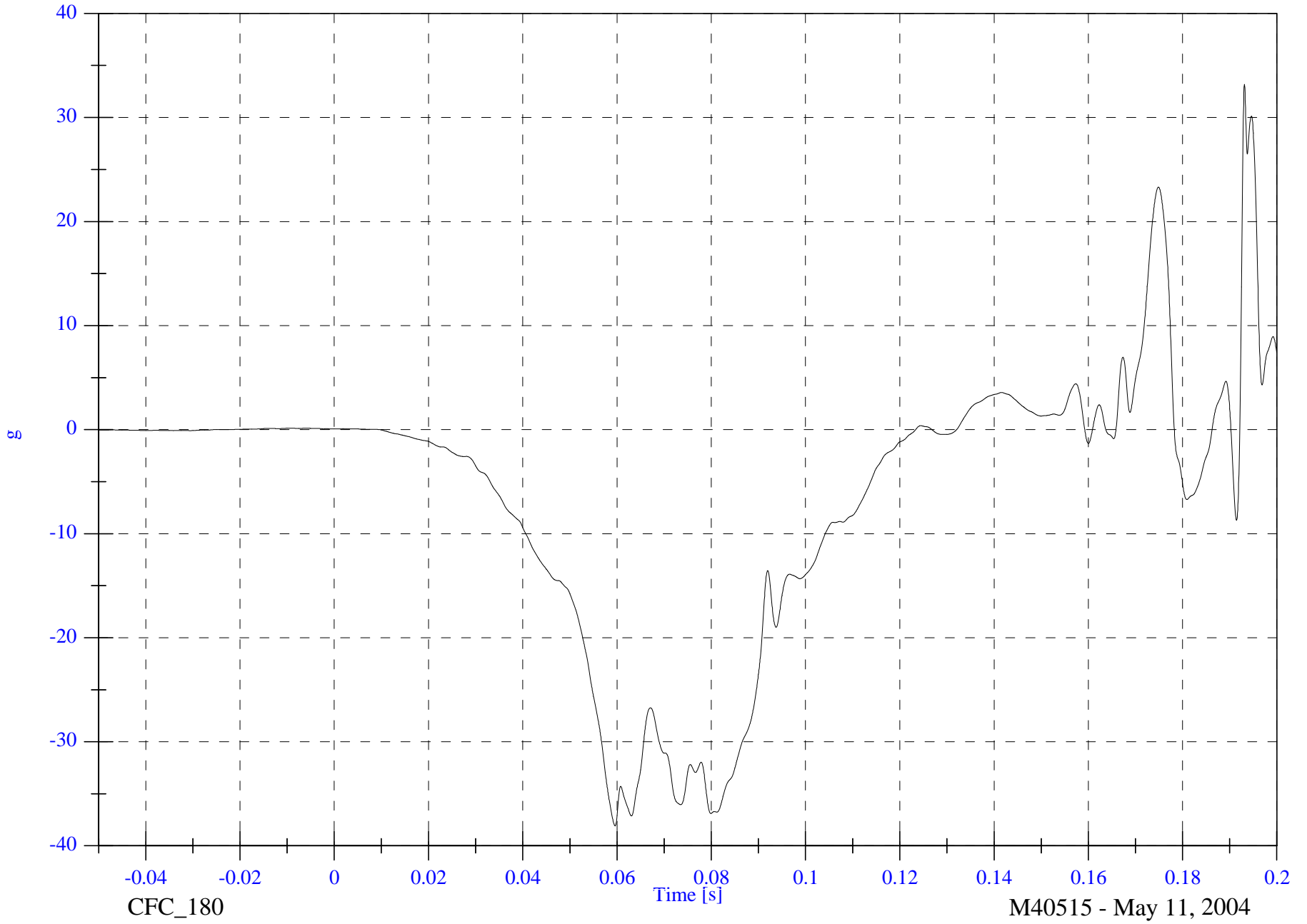
VIP3 Chest x

Max: 33.2 [g] at 0.193 [s]

Min: -38.1 [g] at 0.060 [s]

4-24

8642-NCAP-49

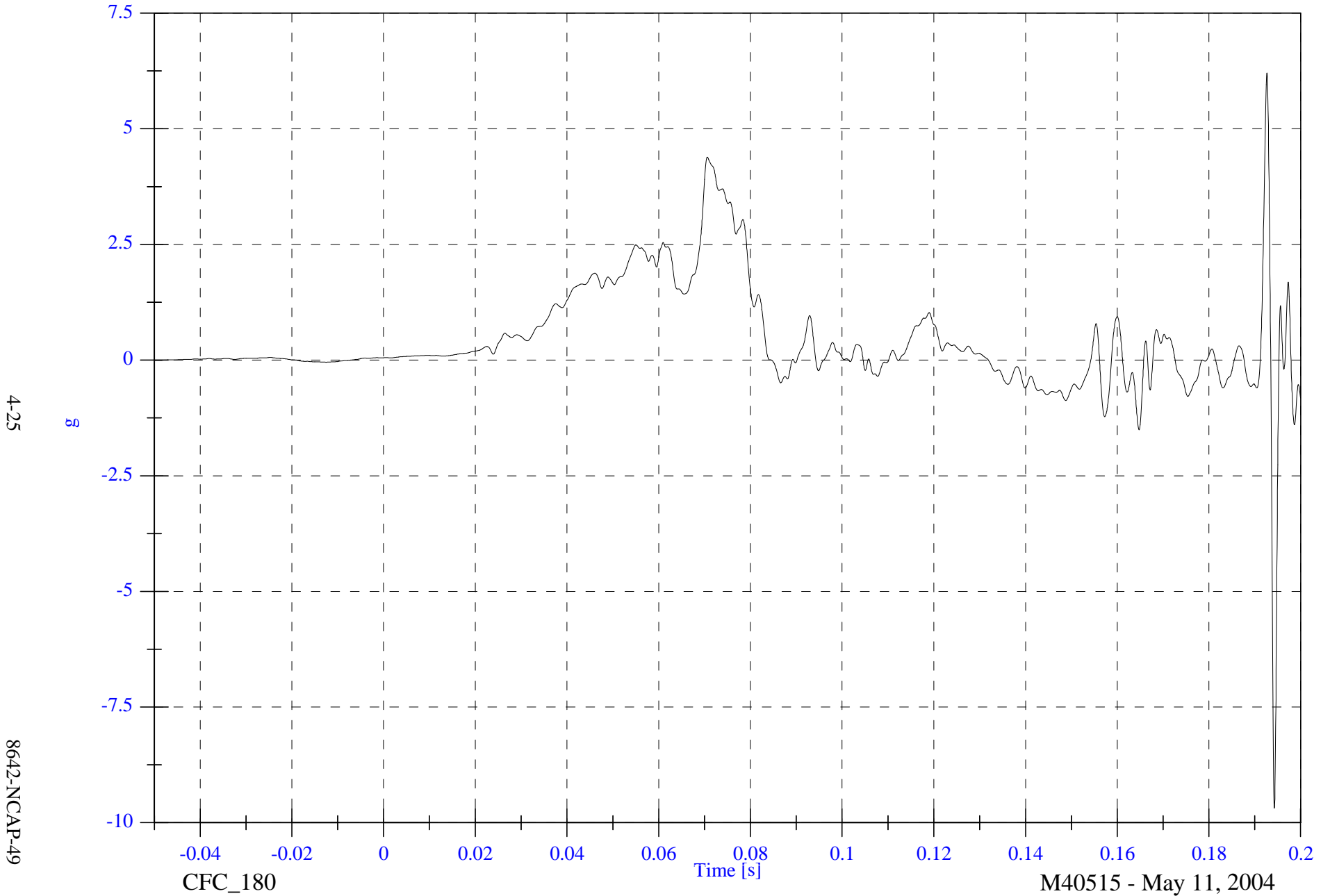


2004 NCAP Test 13 - 2004.5 Kia Spectra

VIP3 Chest y

Max: 6.2 [g] at 0.193 [s]

Min: -9.7 [g] at 0.194 [s]



4-25

8642-NCAP-49

CFC_180

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

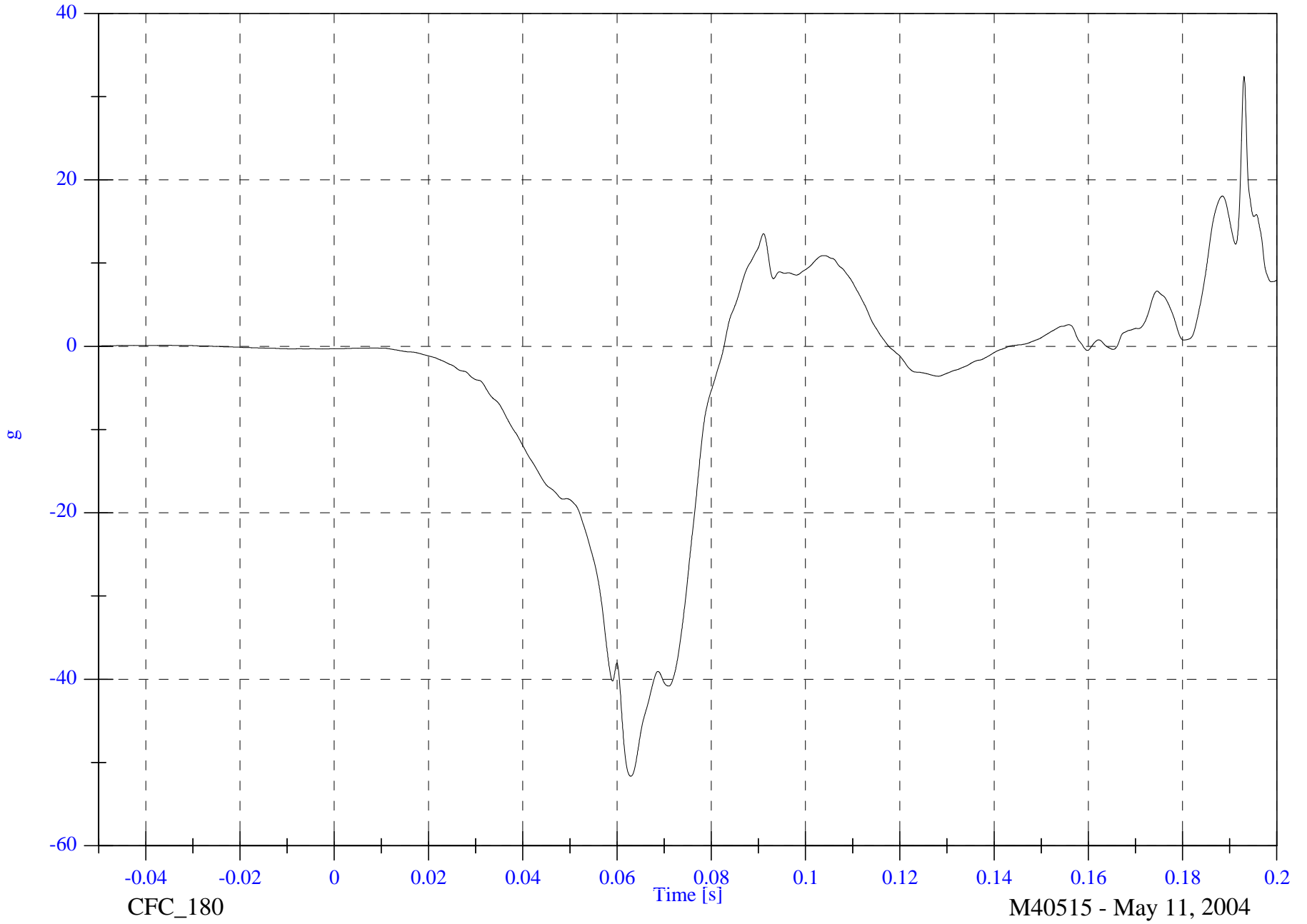
VIP3 Chest z

Max: 32.4 [g] at 0.193 [s]

Min: -51.6 [g] at 0.063 [s]

4-26

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

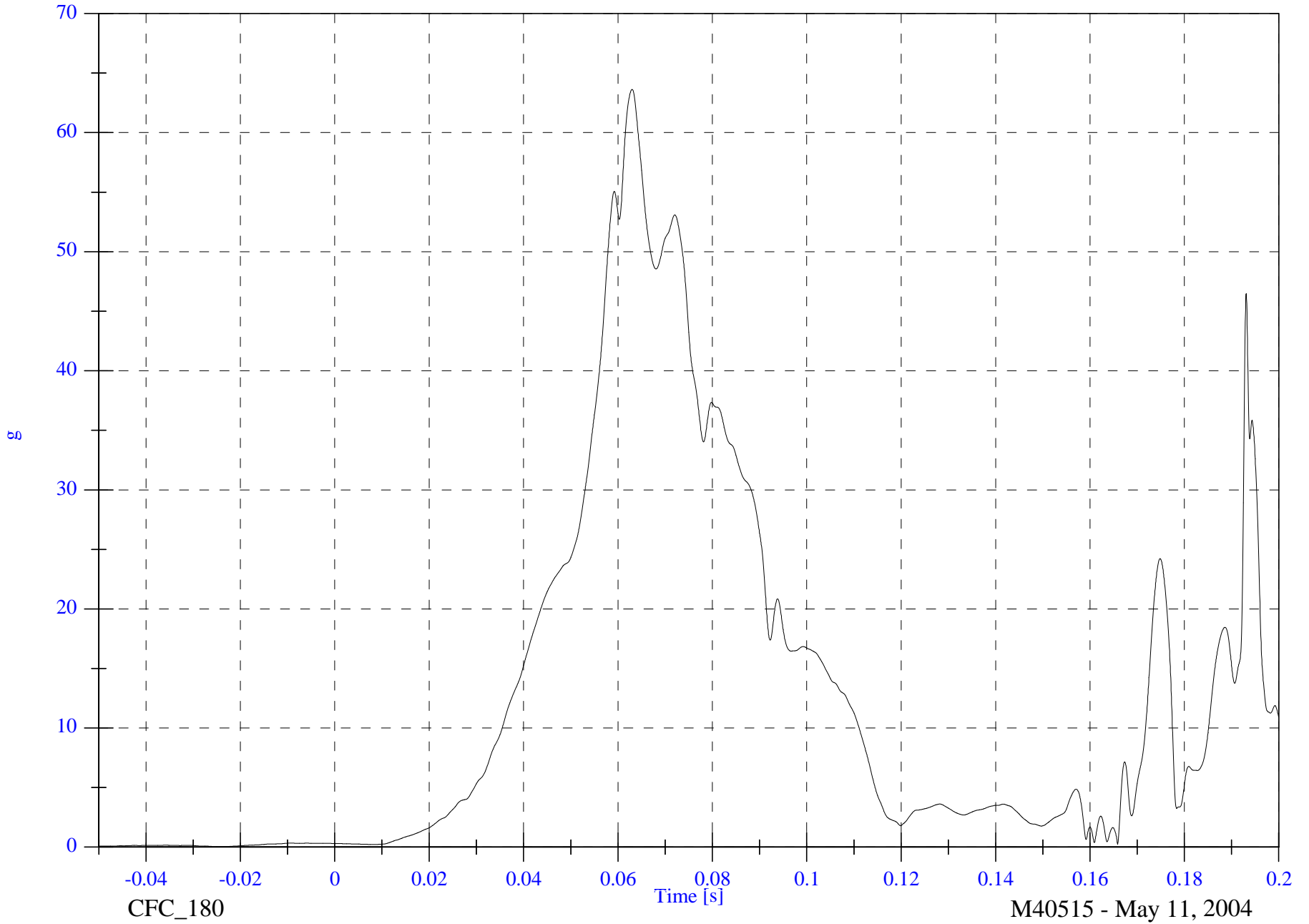
V1P3 Chest Resultant

Max: 63.6 [g] at 0.063 [s]

Min: 0.1 [g] at -0.025 [s]

4-27

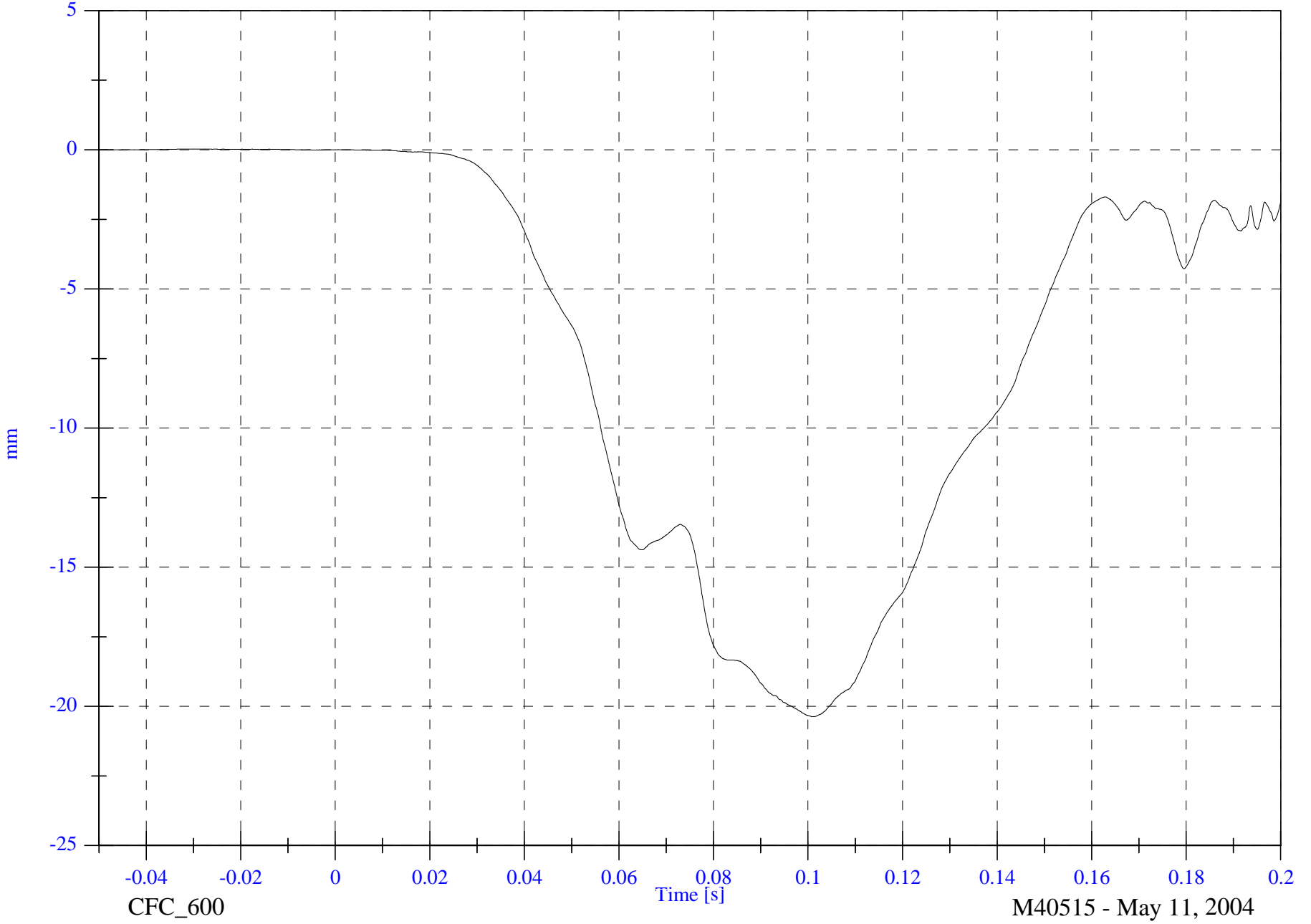
8642-NCAP-49



V1P3 Chest Compression

4-28

8642-NCAP-49



CFC_600

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

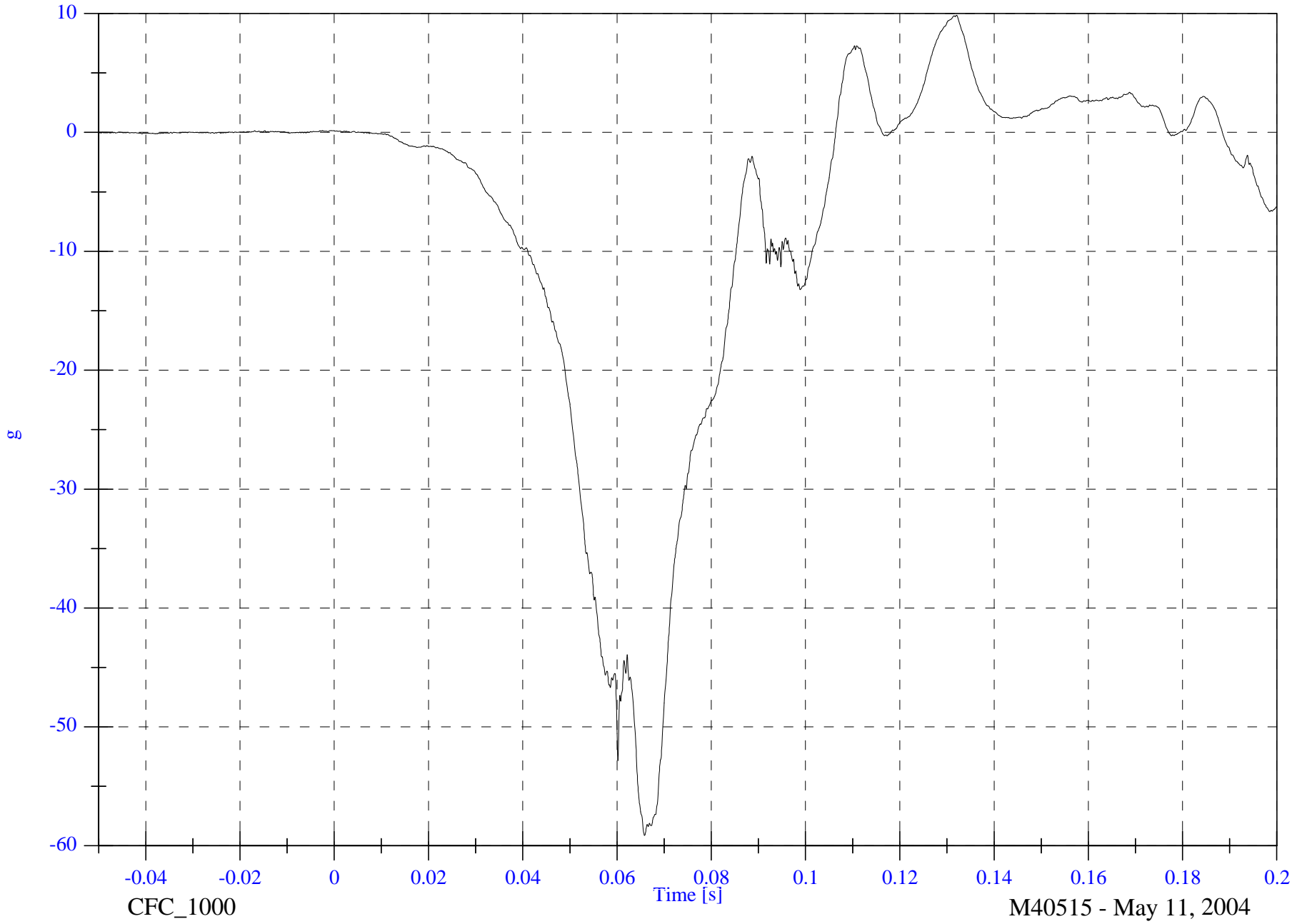
V1P3 Pelvic x

Max: 9.8 [g] at 0.132 [s]

Min: -59.1 [g] at 0.066 [s]

4-29

8642-NCAP-49



CFC_1000

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

Max: 13.9 [g] at 0.070 [s]

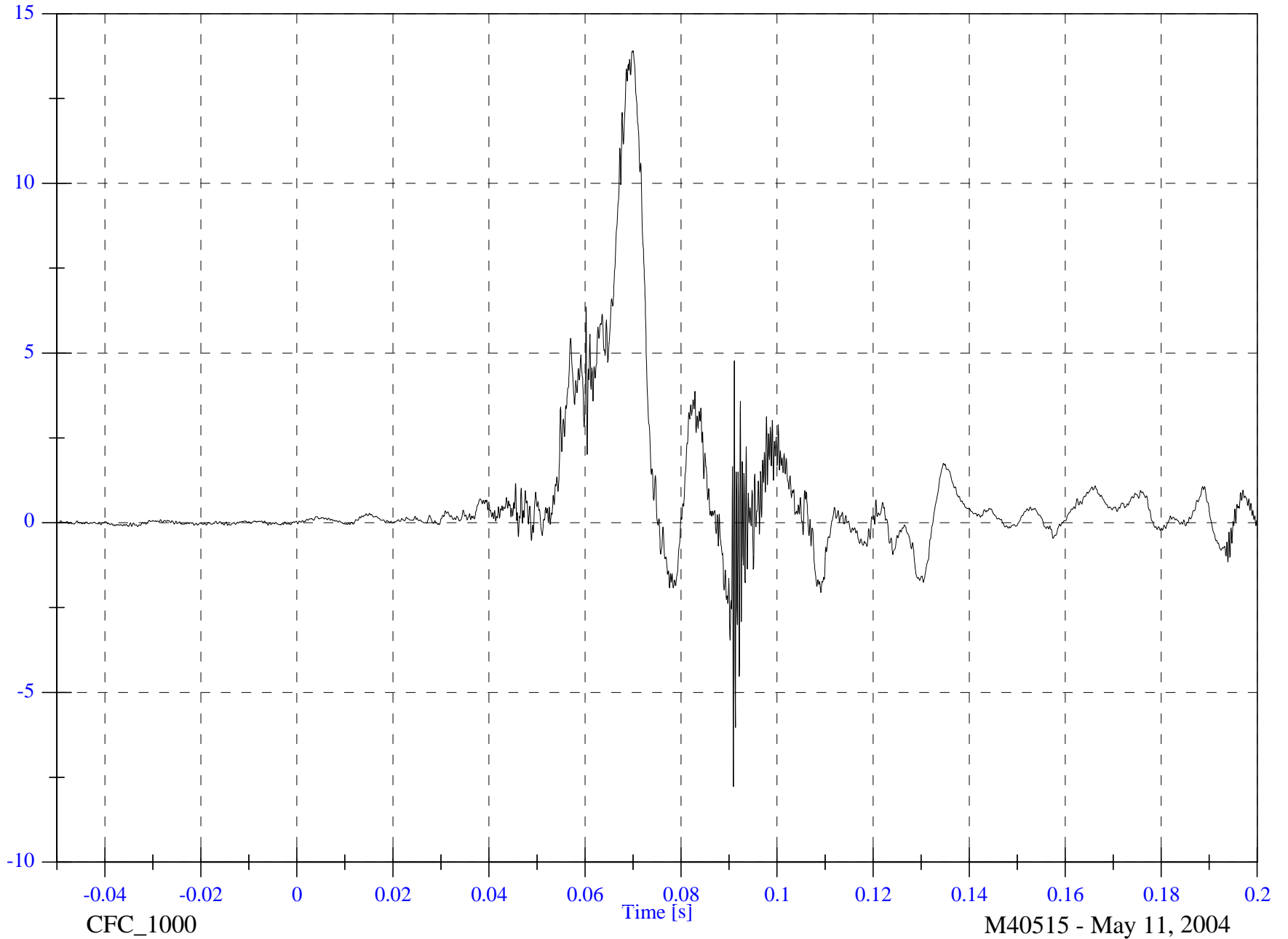
Min: -7.8 [g] at 0.091 [s]

V1P3 Pelvic y

4-30

g

8642-NCAP-49



M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

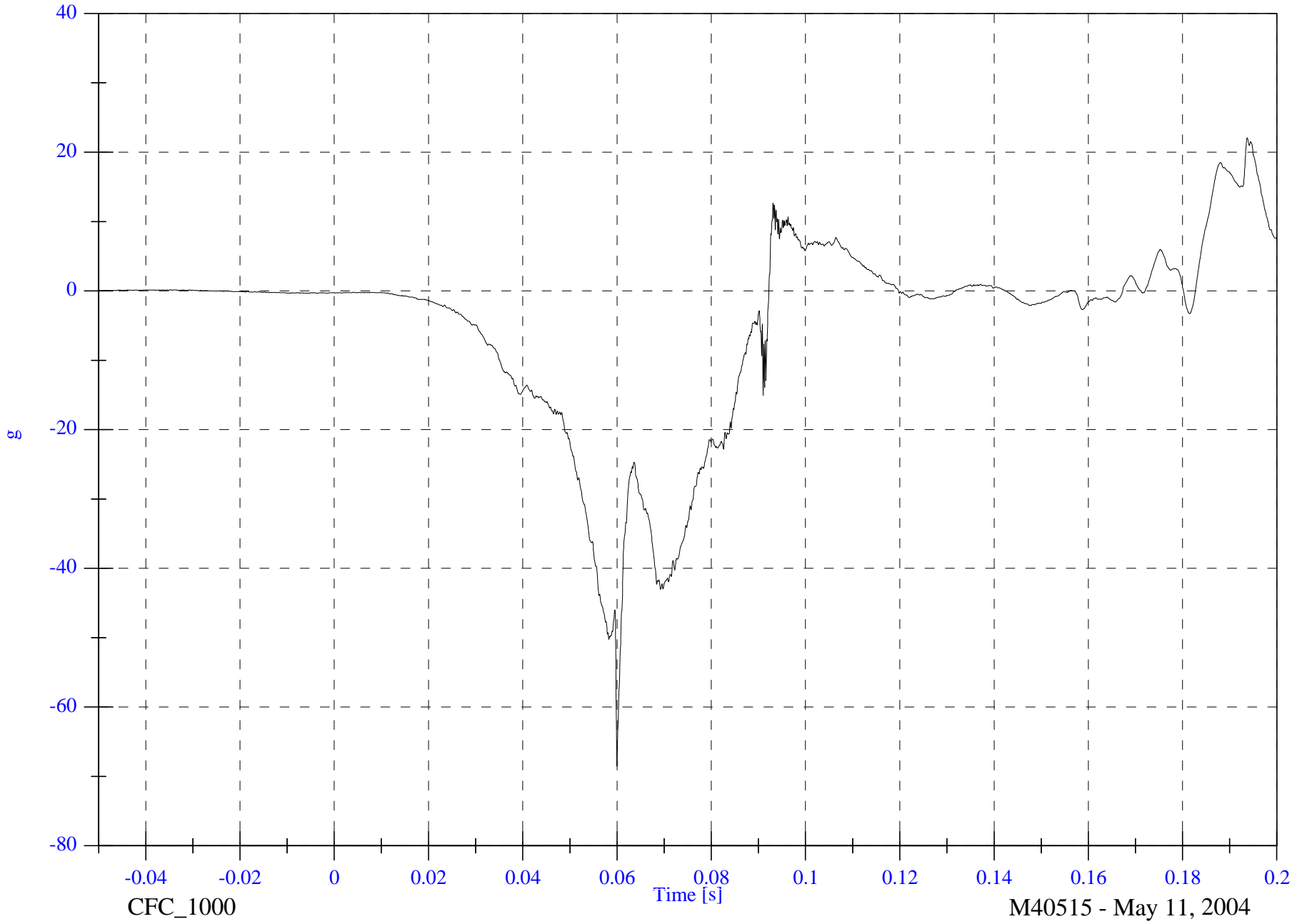
V1P3 Pelvic z

Max: 22.1 [g] at 0.194 [s]

Min: -68.5 [g] at 0.060 [s]

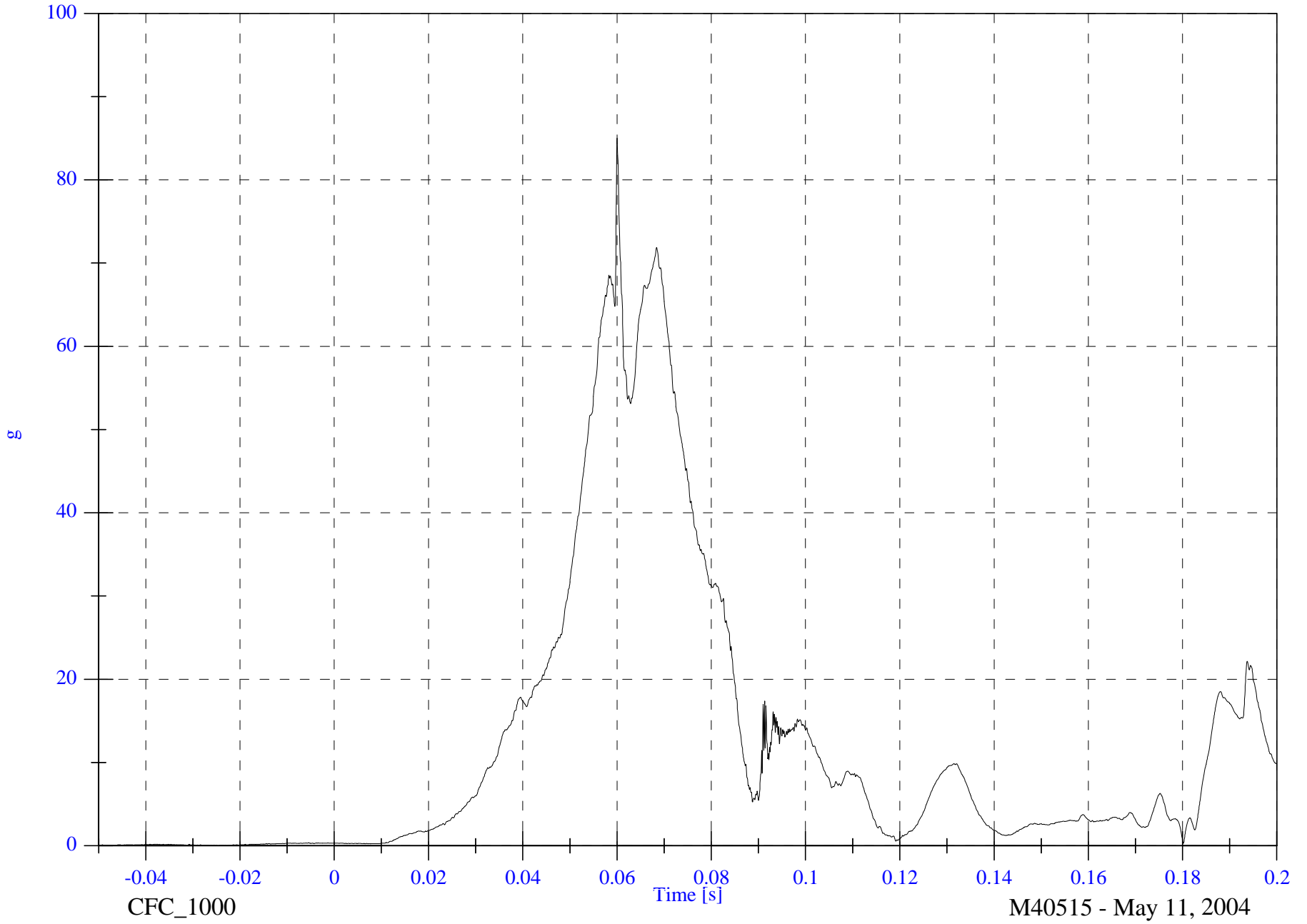
4-31

8642-NCAP-49



4-32

8642-NCAP-49

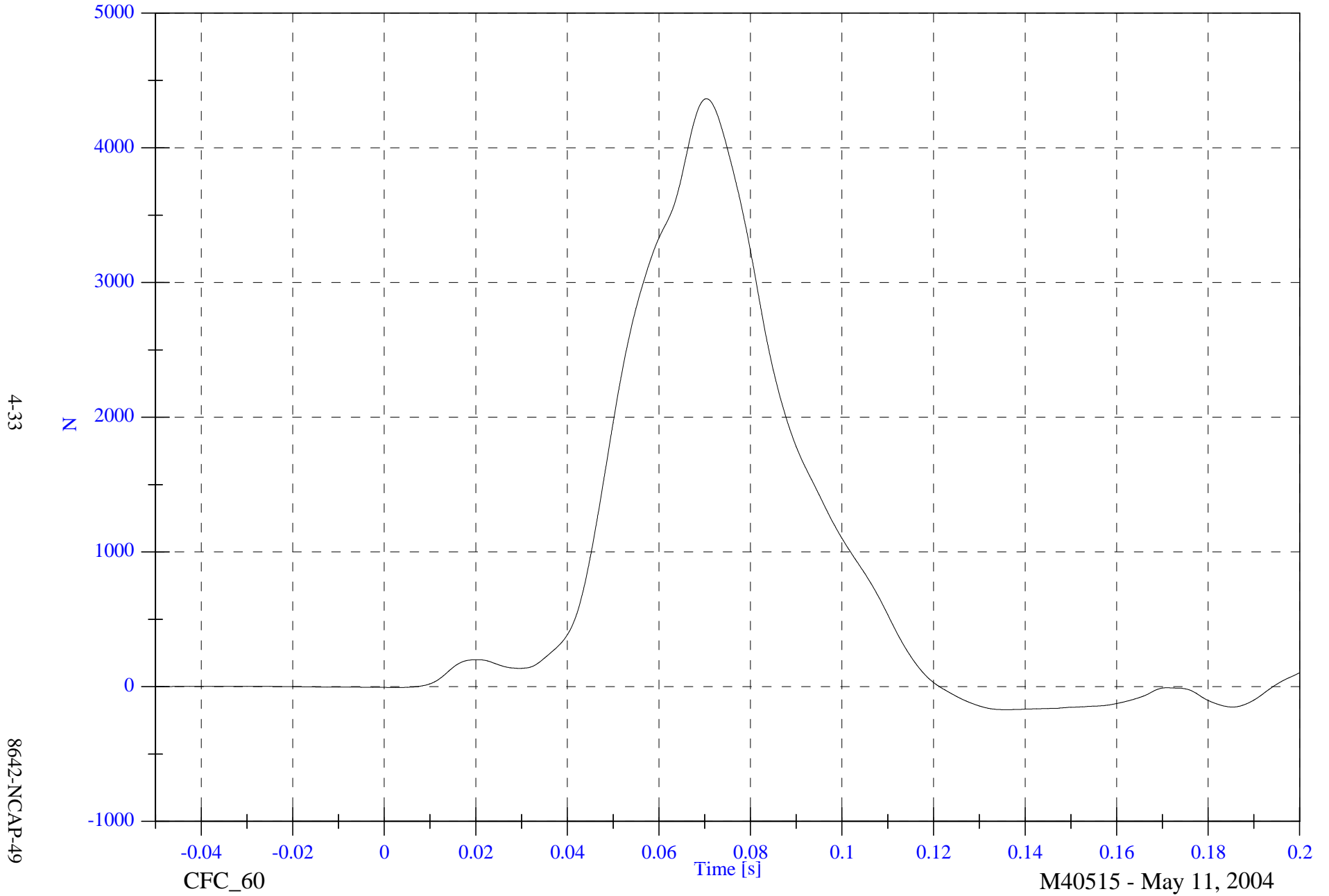


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P3 Latch Belt

Max: 4364.3 [N] at 0.070 [s]

Min: -170.8 [N] at 0.136 [s]



4-33

8642-NCAP-49

CFC_60

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

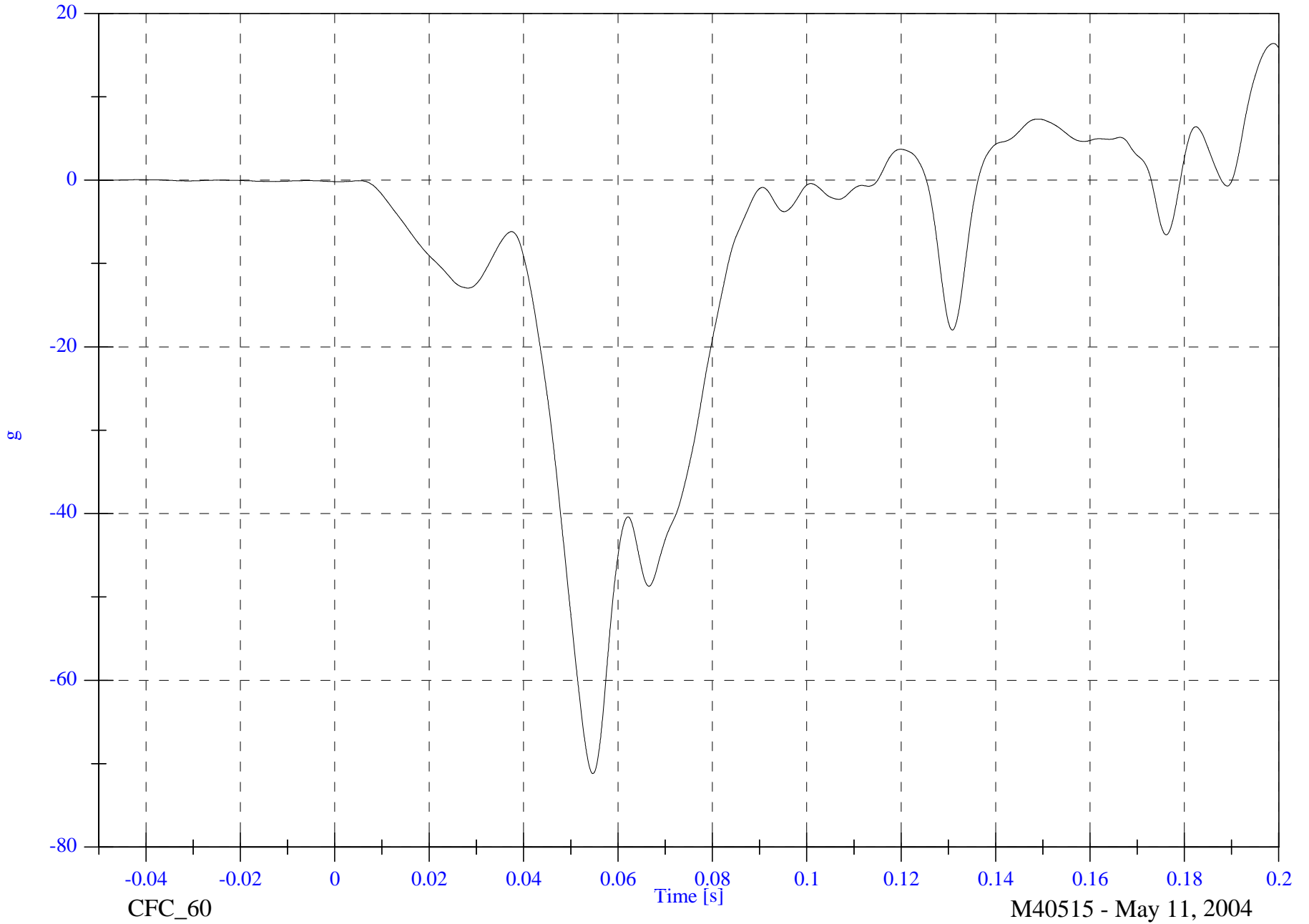
V1P3 CRS x

Max: 16.4 [g] at 0.199 [s]

Min: -71.2 [g] at 0.055 [s]

4-34

8642-NCAP-49



2004 NCAP Test 13 - 2004.5 Kia Spectra

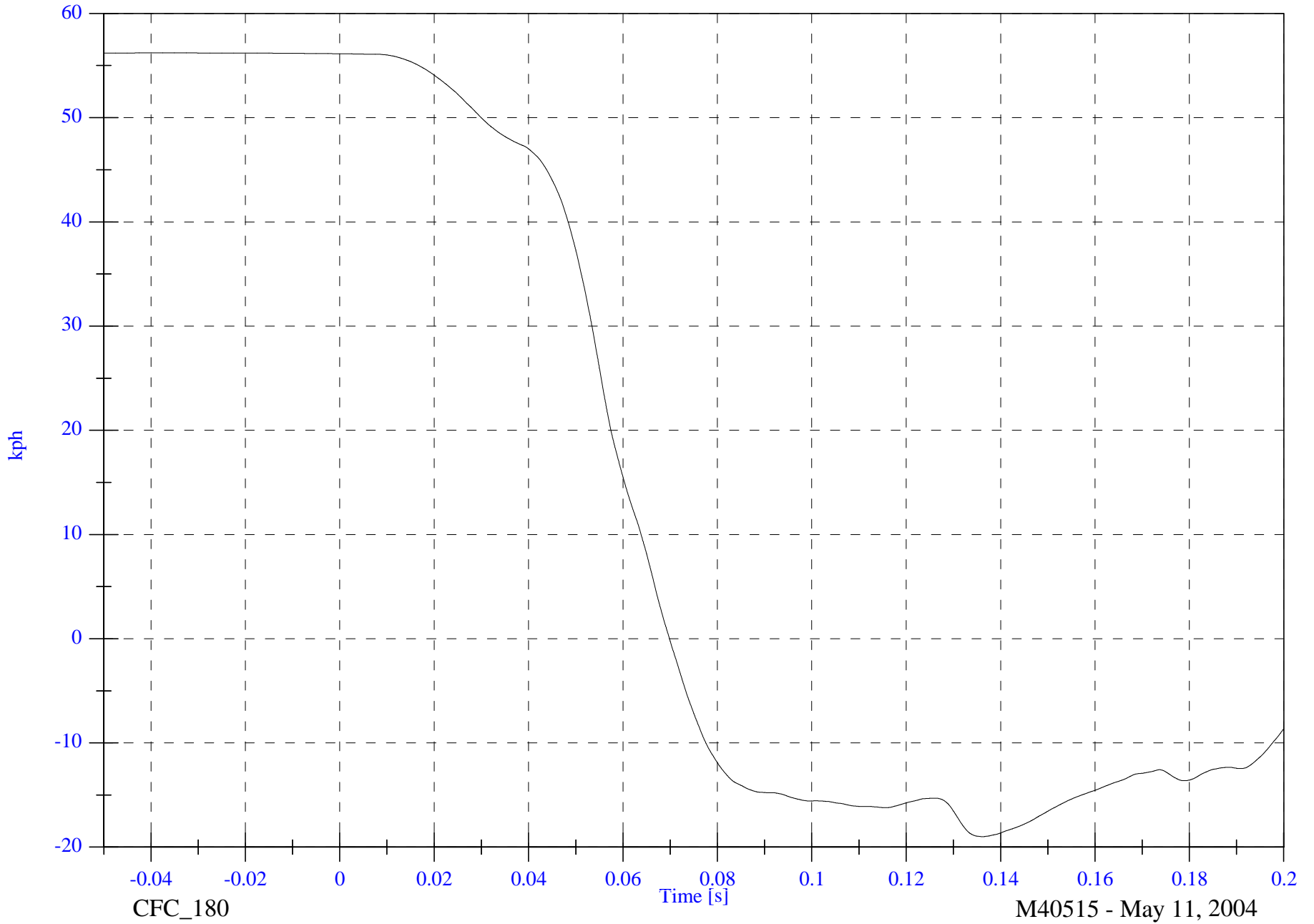
V1P3 CRS x Velocity

Max: 56.2 [kph] at -0.035 [s]

Min: -19.0 [kph] at 0.136 [s]

4-35

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

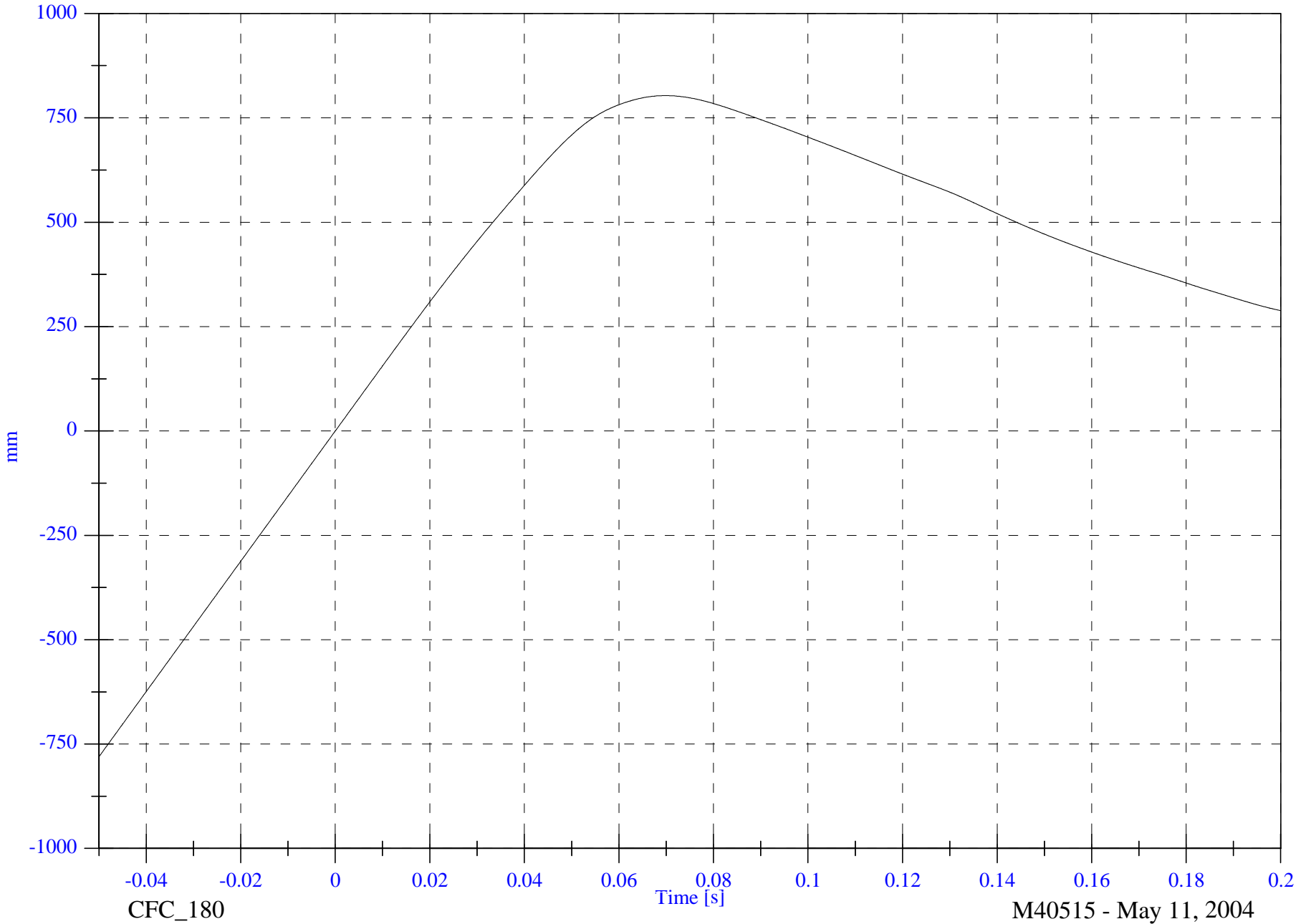
V1P3 CRS x Displacement

Max: 803.2 [mm] at 0.070 [s]

Min: -780.5 [mm] at -0.050 [s]

4-36

8642-NCAP-49



CFC_180

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

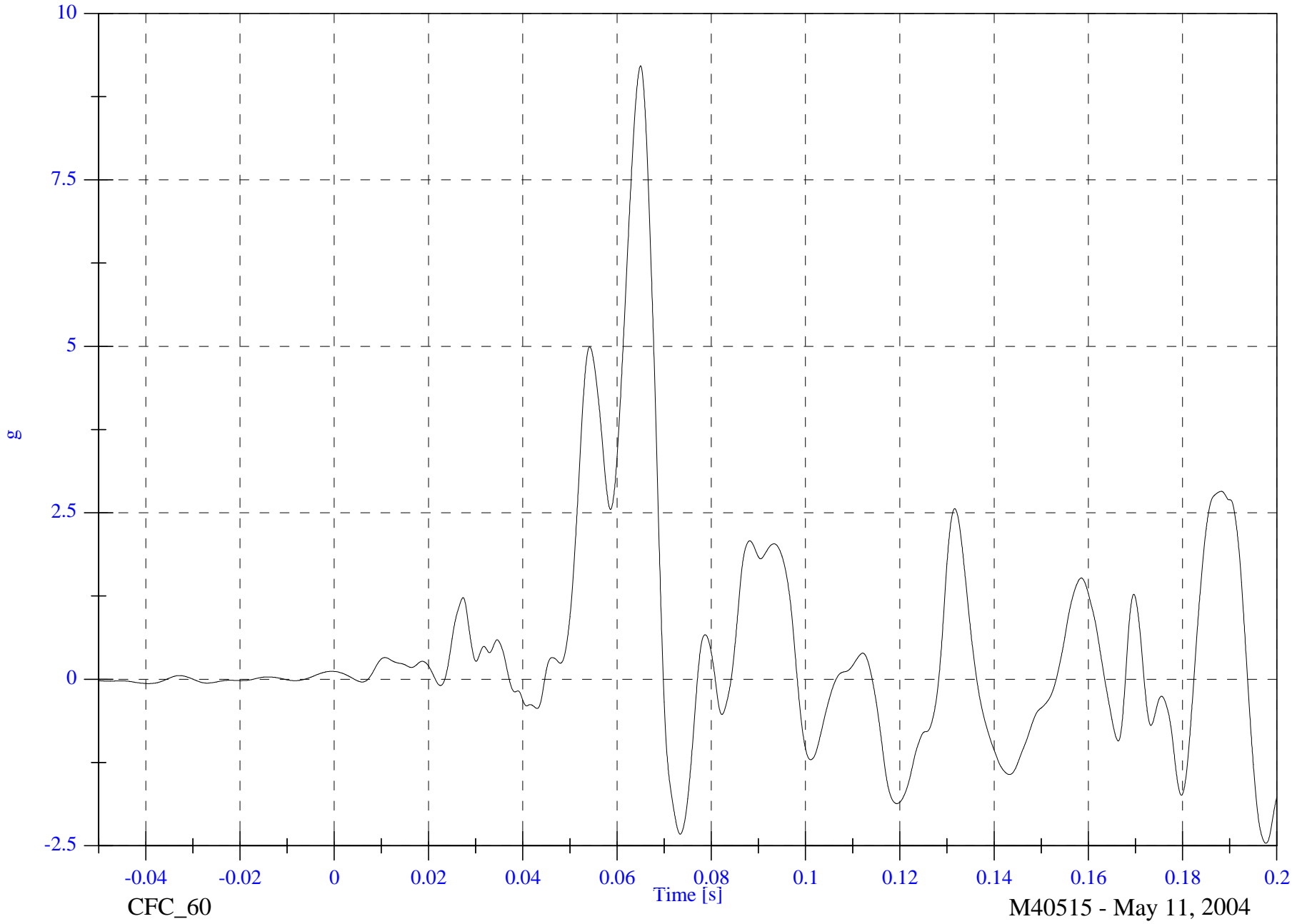
Max: 9.2 [g] at 0.065 [s]

Min: -2.5 [g] at 0.198 [s]

V1P3 CRS y

4-37

8642-NCAP-49



CFC_60

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

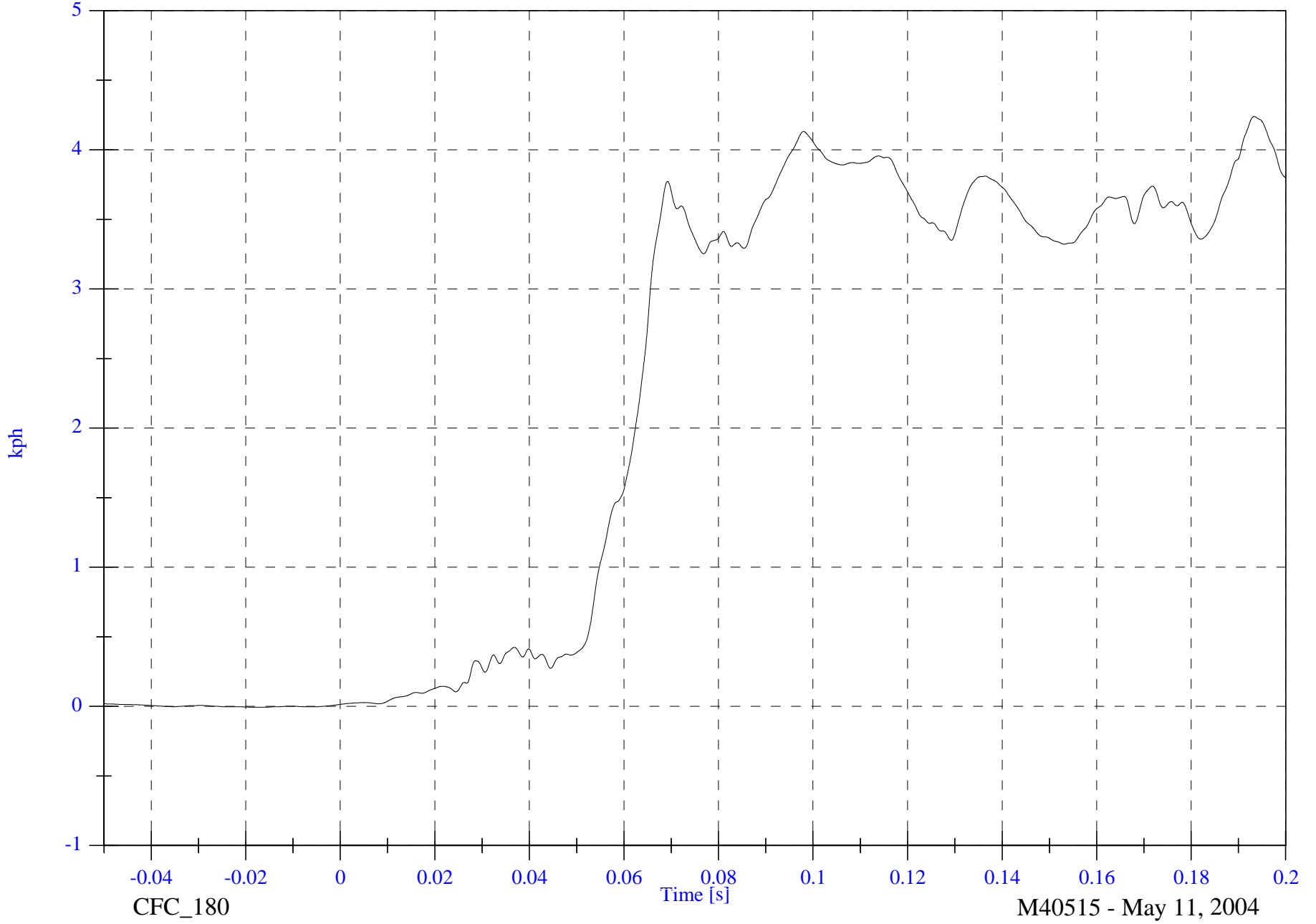
V1P3 CRS y Velocity

Max: 4.2 [kph] at 0.193 [s]

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

4-38

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

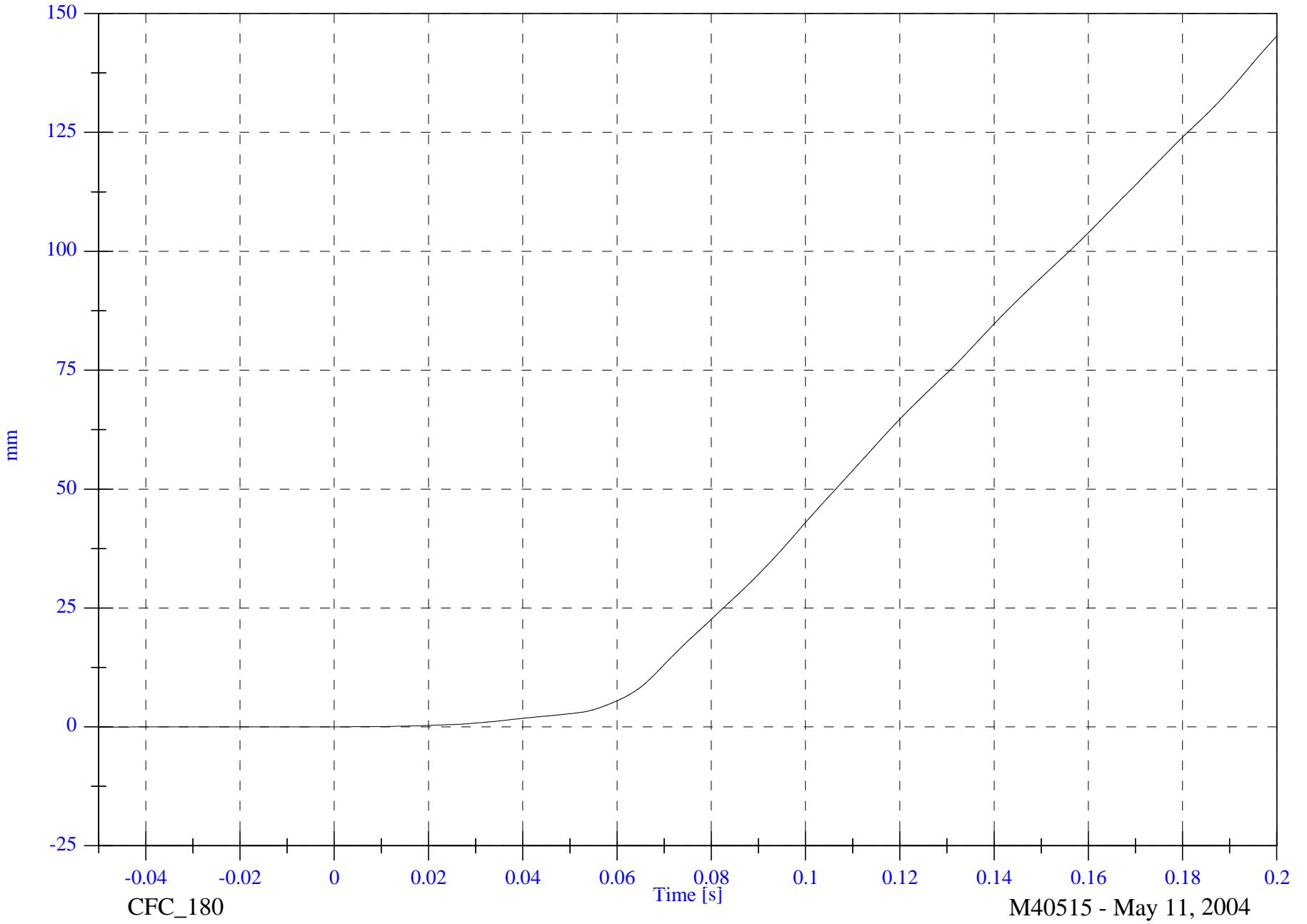
V1P3 CRS y Displacement

Max: 145.2 [mm] at 0.200 [s]

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

4-39

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

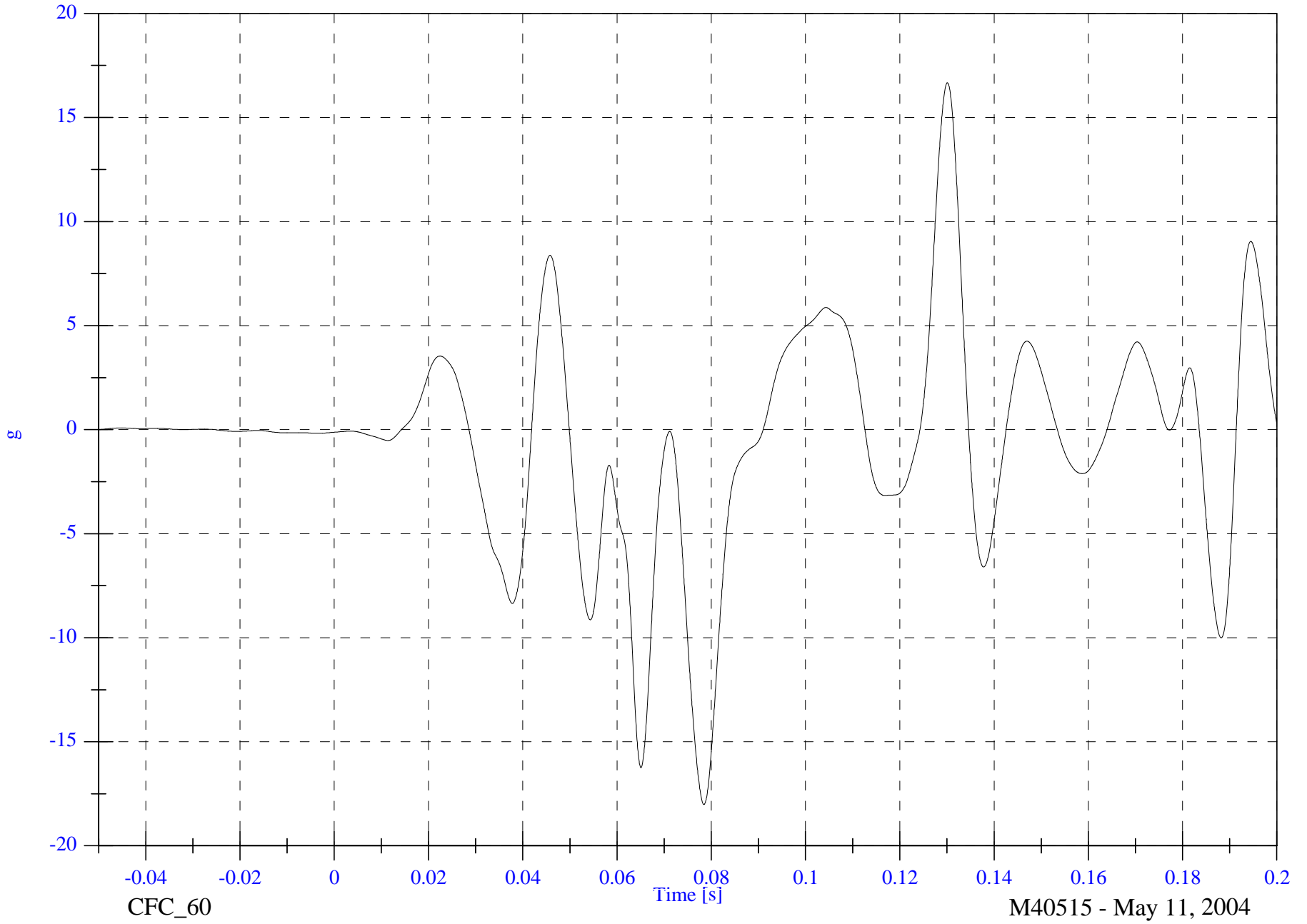
V1P3 CRS z

Max: 16.7 [g] at 0.130 [s]

Min: -18.0 [g] at 0.078 [s]

4-40

8642-NCAP-49

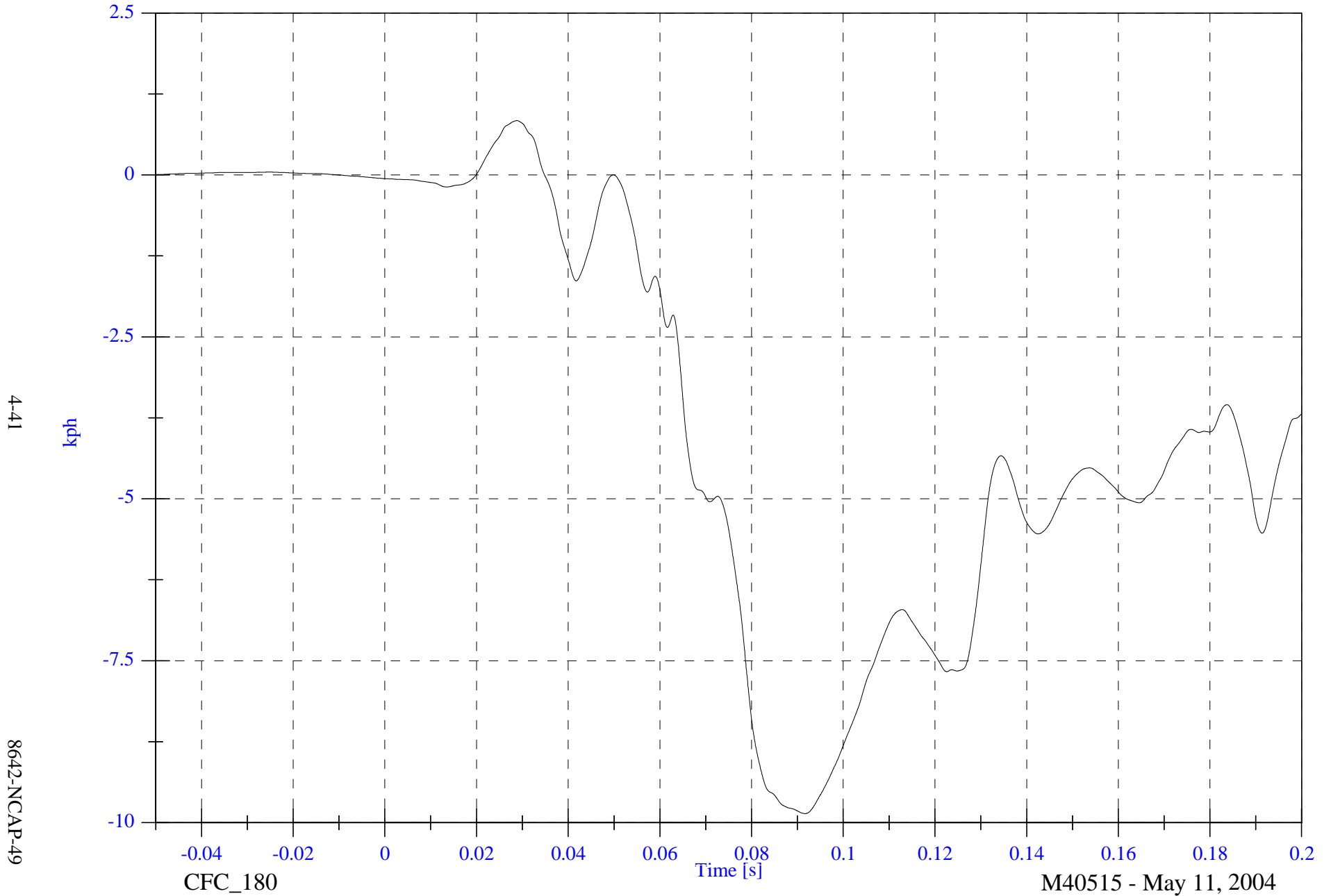


2004 NCAP Test 13 - 2004.5 Kia Spectra

V1P3 CRS z Velocity

Max: 0.8 [kph] at 0.029 [s]

Min: -9.9 [kph] at 0.092 [s]



4-41

8642-NCAP-49

CFC_180

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

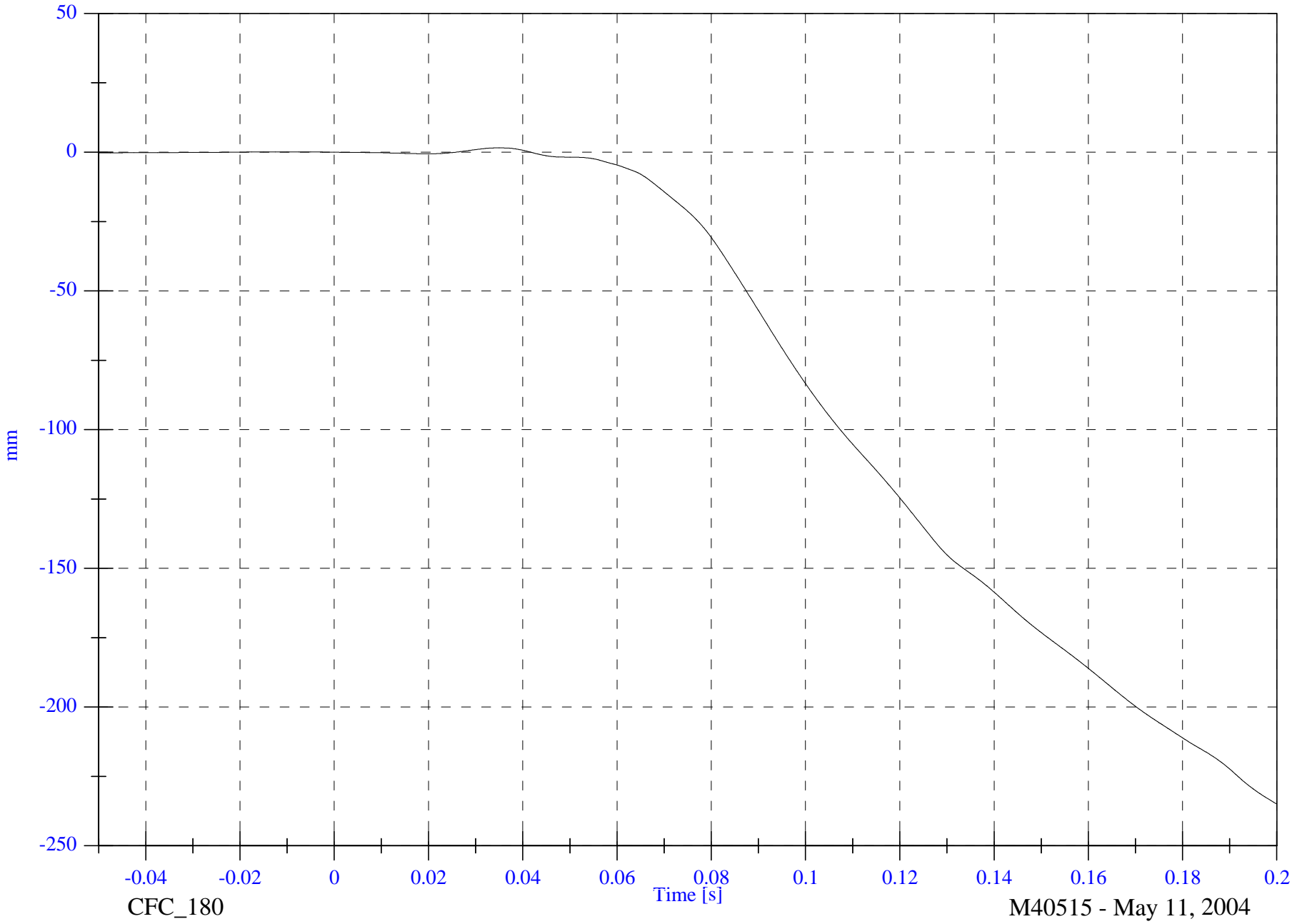
V1P3 CRS z Displacement

Max: 1.6 [mm] at 0.035 [s]

Min: -235.0 [mm] at 0.200 [s]

4-42

8642-NCAP-49



CFC_180

Time [s]

M40515 - May 11, 2004

2004 NCAP Test 13 - 2004.5 Kia Spectra

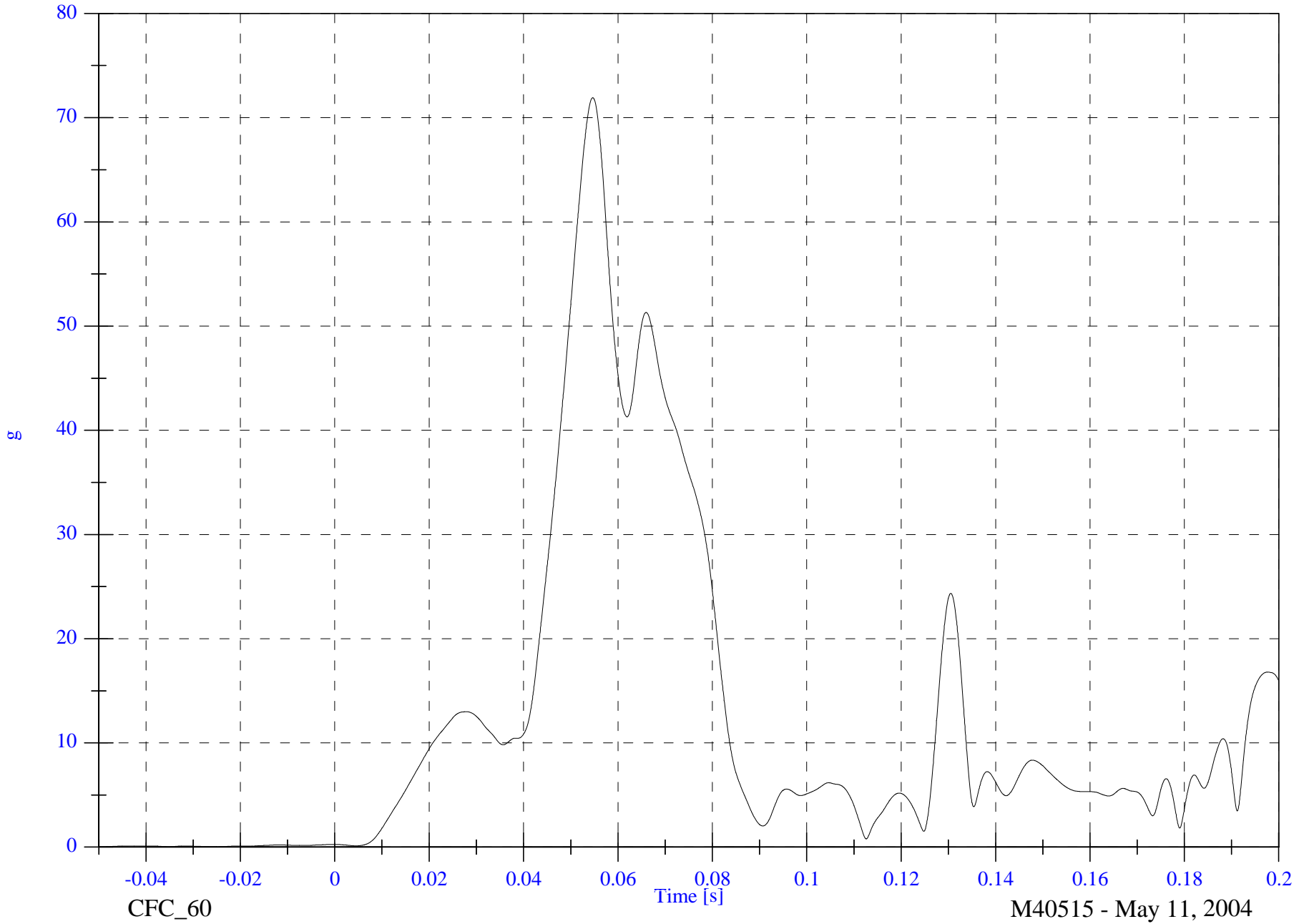
V1P3 CRS Resultant

Max: 71.9 [g] at 0.055 [s]

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

4-43

8642-NCAP-49



CFC_60

M40515 - May 11, 2004

SECTION 5

CHILD DUMMY CALIBRATION INFORMATION

PART 572P
HEAD DROP TEST

Dummy Serial Number 044
Sequential Test Number 1
Date 01-21-2004
Workfile 044H 01-21-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.0 F
Relative Humidity	10% - 70%	35.00 %
Peak Resultant Acceleration	250-280 G's	271.45 Gs
Peak Lateral Acceleration	15 G's Max	6.74 Gs
Is Acceleration Curve Unimodal?	<10%	4.71 %

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572P
NECK FLEXION TEST

Dummy Serial Number 044
 Sequential Test Number 1
 Date 10-22-03
 Workfile 044NF 10-22-03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.11
Relative Humidity		10% - 70%	38.00
Pendulum Speed		5.40-5.60 m/s	5.46
Pendulum Pulse	10 ms	2.00 – 2.70 m/s	2.14
	15 ms	3.00 – 4.00 m/s	3.13
	20 ms	4.00 – 5.10 m/s	4.30
D Plane Rotation	Max	70.0 – 82.0 Deg	75.72
Maximum Occipital Moment		42.00 - 53.00 N-m	52.40
Occipital Moment Decay		60.0 - 80.0 ms	74.60

Remarks:

Laboratory Technician:

_____ B. Swiecicki

PART 572P
NECK EXTENSION TEST

Dummy Serial Number 044
 Sequential Test Number 2
 Date 10-22-03
 Workfile 044NE2 10-22-03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.11
Relative Humidity		10% - 70%	38.00
Pendulum Speed		3.55 – 3.75 m/s	3.72
Pendulum Pulse	10 ms	1.00 – 1.40 m/s	1.05
	15 ms	1.90 – 2.50 m/s	1.98
	20 ms	2.80 – 3.50 m/s	2.82
D Plane Rotation	Max	83.0 – 93.0 Deg	85.02
Maximum Occipital Moment		-53.30 - -43.70 N-m	-45.28
Occipital Moment Decay		60.0 - 80.0 ms	67.60

Remarks:

Laboratory Technician:

_____ B. Swiecicki

PART 572P
THORAX IMPACT TEST

Dummy Serial Number 044
Sequential Test Number 3
Date 01-22-2004
Workfile 044T3 01-22-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.0 F
Relative Humidity	10% - 70%	35.00 %
Pendulum Velocity	19.40 – 20.00 Ft/s	19.67 ft/s
Maximum Deflection	1.30 – 1.50 in	1.35 in
Maximum Resistive Force	152.90 – 182.10 Lbs	168.03 lbf
Internal Hysteresis	65 - 85 %	72.89 %
Sternum Force Criteria	193.30 lbf	186.73 lbf

Remarks:

Laboratory Technician:

_____ B. Swiecicki

PART 572P
EXTERNAL DIMENSIONS

Dummy Serial Number 044
Sequential Test Number 2
Date 10/23/03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Total Sitting Height	A	21.2 – 21.8 in	21.38
Shoulder Pivot Height	B	12.1 - 12.7 in	12.40
H-Point Height	C	1.35 – 1.75 in	1.57
H-Point from Backline	D	2.24 – 2.64 in	2.76
Shoulder Pivot from Backline	E	2.40 – 2.80 in	2.76
Thigh Clearance	F	3.19 – 3.59 in	3.27
Back of Elbow to Fingertip	G	9.74 – 10.34 in	10.04
Head back from Backline	H	1.9 – 2.3 in	2.17
Shoulder - Elbow Length	I	7.3 – 7.9 in	7.87
Elbow Rest Height	J	5.26 – 5.86 in	5.31
Buttock to Knee Length	K	11.21 – 11.81 in	11.42
Popliteal Height	L	8.60 – 9.20 in	8.86
Knee Pivot Height	M	9.51 – 10.11 in	9.84
Buttock Popliteal Length	N	8.58 - 9.18 in	8.86
Chest Depth with Jacket	O	5.45 - 6.05 in	5.98
Foot Length	P	5.42 – 5.82 in	5.47
Stature	Q	36.7 – 37.7 in	37.00
Buttock to Knee Pivot Length	R	9.9 - 10.3 in	10.04
Head Breadth	S	5.15 – 5.55 in	5.16
Head Depth	T	6.59 -7.19 in	6.81
Hip Breadth	U	7.9 – 8.5 in	8.14
Shoulder Breadth	V	9.31 – 9.91in	9.49
Foot Breadth	W	2.11 – 2.51 in	2.32
Head Circumference	X	19.7 – 20.3 in	20.00
Chest Circumference (With Jacket)	Y	20.75 – 21.75 in	21.65
Waist Circumference	Z	20.75 – 21.75 in	21.69
Location for Chest Circumference	AA	9.8 – 10.2 in	10.04
Location for Waist Circumference	BB	6.3 – 6.7 in	6.50

Remarks:

Laboratory Technician:

B. Swiecicki

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	ENTRAN	AC-01G18-F20	5/3/2004
HEAD AY	ENDEVCO	AC-P17743	5/4/2004
HEAD AZ	ENDEVCO	AC-P15319	5/4/2004
HEAD REAR AZ	ENTRAN	AC-02I02I110-N06	5/4/2004
UPPER NECK FX	DENTON	LC-248-FX	10/1/2003
UPPER NECK FY	DENTON	LC-248-FY	10/1/2003
UPPER NECK FZ	DENTON	LC-248-FZ	10/1/2003
UPPER NECK MX	DENTON	LC-248-MX	10/1/2003
UPPER NECK MY	DENTON	LC-248-MY	10/1/2003
UPPER NECK MZ	DENTON	LC-248-MZ	10/1/2003
LOWER NECK FX	DENTON	LC-249FX	10/1/2003
LOWER NECK FY	DENTON	LC-249FY	10/1/2003
LOWER NECK FZ	DENTON	LC-249FZ	10/1/2003
LOWER NECK MX	DENTON	LC-249MX	10/1/2003
LOWER NECK MY	DENTON	LC-249MY	10/1/2003
LOWER NECK MZ	DENTON	LC-249MZ	10/1/2003
CHEST AX	ENDEVCO	AC-P15334	5/4/2004
CHEST AY	ENDEVCO	AC-P15321	5/4/2004
CHEST AZ	ENDEVCO	AC-P17758	5/4/2004
CHEST DISPLACEMENT X	SERVO	DS-044	11/22/2003
PELVIS AX	ENDEVCO	AC-P16755	5/4/2004
PELVIS AY	ENDEVCO	AC-P15591	5/4/2004
PELVIS AZ	ENDEVCO	AC-P16155	5/4/2004
LATCH BELT LOAD	FIRST TECHNOLOGY	LC-170	10/10/2003

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

CRS INSTRUMENTATION

	CRS ACCELEROMETERS		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
P3 CRS AX	ENDEVCO	AC-P23993	3/22/2004
P3 CRS AY	ENDEVCO	AC-P23999	3/22/2004
P3 CRS AZ	ENDEVCO	AC-P23939	3/22/2004