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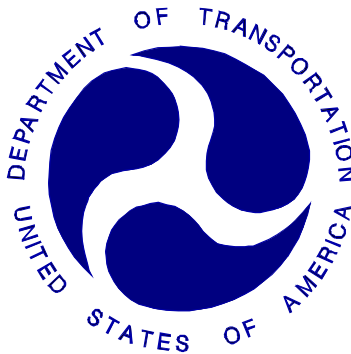
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

FUJI HEAVY INDUSTRIES LTD.
2002 SUBARU LEGACY
4-DOOR SEDAN

NHTSA NUMBER: M25502

VERIDIAN TEST NUMBER: 8462-NCAP-16

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



May 22, 2002

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Performance Standards
Office of Crashworthiness Standards
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16. Abstract A frontal load cell barrier test of a 2002 Subaru Legacy 4-door Sedan was performed at Veridian Engineering crash test facility in Buffalo, New York, on May 22, 2002. The impact velocity was 56.8 kph and the temperature at the barrier face was 21 °C. The maximum post-test vehicle crush was 571 mm. The test vehicle was equipped with 3-point pretensioning / load limiting seatbelt 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)	560.4	47.0	36.4	2566.4	3866.9
Passenger (245)	364.7	41.7	26.0	5090.3	4822.3
17. Key Words 56 kph Frontal Barrier Impact test New Car Assessment Program (NCAP)				18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 400 Seventh St., SW, Room 5108 Washington, DC 20590	
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.8 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 56.8 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

1.2 TEST PROCEDURE

This 56.8 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated December 1999. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301 "Fuel System Integrity" performance. Procedures for receiving, inspection testing and reporting of test results are described in the test procedures and are not repeated in this report.

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

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

Both ATDs were fully instrumented with nine accelerometer array head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, left and right knee sliders, and lower leg instrumentation. 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 198 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 2002 Subaru Legacy 4-door Sedan at a velocity of 56.8 kph. The test was performed at Veridian Engineering on May 22, 2002. 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	560.4	47.0	36.4	2566.4	3866.9	-	-
Passenger ATD	364.7	41.7	26.0	5090.3	4822.3	-	-

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

The 2002 Subaru Legacy 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.:	<u>M25502</u>	Test Mode:	<u>56.3 kph Frontal Barrier</u>
Test Date:	<u>May 22, 2002</u>	Time:	<u>11:30</u> Temperature: <u>21</u> °C
Vehicle Make/Model/Body Style:	<u>2002 Subaru Legacy 4-door Sedan</u>		
Vehicle Test Weight:	<u>1670</u>	kg	
Vehicle/Barrier Impact Angle:	<u>0</u>	°	
Impact Velocity:	<u>56.8</u>	kph	
Maximum Static Crush:	<u>571</u>	mm	
Vehicle Rebound:	<u>117</u>	mm	
<u>DUMMIES:</u>	<u>DRIVER</u>	<u>PASSENGER</u>	
Type:	<u>572E</u>	<u>572E</u>	
Restraint System:	<u>Seatbelt (pretensioning / load limitng), Airbag, Knee Bolster</u>	<u>Seatbelt (pretensioning / load limitng), Airbag, Knee Bolster</u>	
Number of Data Channels:	<u>198</u>		
Number of Cameras:	<u>1</u>	Real Time	
	<u>16</u>	High Speed	
<u>DOOR OPENING DATA:</u>	<u>Door remained closed and latched; Door opened without tools - Left Front</u>		
	<u>Door remained closed and latched; Door opened without tools - Right Front</u>		
Front Seat(s) Data:	<u>DRIVER</u>	<u>PASSENGER</u>	
Seat Track Failure: (mm of shift)	<u>0</u>	<u>0</u>	
Seat Back Failure:	<u>None</u>	<u>None</u>	
<u>VISIBLE DUMMY CONTACT POINTS:</u>	<u>DRIVER</u>	<u>PASSENGER</u>	
Head:	<u>Airbag with back of head to headrest and B-pillar trim</u>	<u>Airbag with back of head to headrest</u>	
Abdomen:	<u>-</u>	<u>-</u>	
Chest:	<u>Airbag</u>	<u>Airbag</u>	
Knees:	<u>Knee Bolster</u>	<u>Knee Bolster</u>	

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2002 Subaru Legacy 4-door Sedan

NHTSA No. : M25502 ; VIN: 4S3BE635526213823 ; Color: Green

Engine Data: 4 cylinders; - CID; 2.5 Liters; - cc

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

Transmission Data: 5 speeds; X Manual; - Automatic; - Overdrive

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

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

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

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

Date Received: 5/9/02 ; Odometer Reading 43.5 km

Selling Dealer: West Herr Oldsmobile Inc.

& Address: 3565 Southwestern Blvd. Orchard Park, N.Y. 14127

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Fuji Heavy Industries LTD.

Date of Manufacture 03/02

GVWR: 1996 kg; GAWR: 1007 kg FRONT; 989 kg REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load: 220 kpa FRONT

210 kpa REAR

Recommended Tire Size: P205/60R15

* Recommended Cold Tire Pressure: 220 kpa FRONT; 210 kpa REAR

Size of Tires on Test Vehicle: P205/60R15 ; Manufacturer: Bridgestone

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) = 386 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 45.8 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>403.5</u>	kg	Right Rear =	<u>327.0</u>	kg
Left Front =	<u>419.5</u>	kg	Left Rear =	<u>327.5</u>	kg
TOTAL FRONT =	<u>823.0</u>	kg	TOTAL REAR =	<u>654.5</u>	kg
TOTAL DELIVERED WEIGHT =	<u>1477.5</u>	kg			
% of Total Front of Vehicle Weight =	<u>55.7%</u>		% of Total Rear Weight =	<u>44.3%</u>	%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW) =	<u>1477.5</u>	kg
Rated Cargo/Luggage Weight (RCLW) =	<u>45.8</u>	kg
Weight of 2 p.572 Dummies @ 76 each =	<u>152</u>	kg
TARGET TEST WEIGHT =	<u>1675.3</u>	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 41.0 KG OF CARGO WEIGHT:

Right Front =	<u>451.0</u>	kg	Right Rear =	<u>378.0</u>	kg
Left Front =	<u>468.5</u>	kg	Left Rear =	<u>373.0</u>	kg
TOTAL FRONT =	<u>919.5</u>	kg	TOTAL REAR =	<u>751.0</u>	kg
TOTAL TEST WEIGHT =	<u>1670.5</u>	kg			
% of Total Front Weight =	<u>55.0%</u>	%	% of Total Rear Weight =	<u>45.0%</u>	%
Weight of Ballast Secured in Vehicle Trunk Area =	<u>0</u>	kg			
Vehicle Components Removed for Weight Reduction:	<u>Trunk lid, bumper system, muffler, wheel covers</u>				

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED:	RF	<u>676</u>	LF	<u>682</u>	RR	<u>675</u>	LR	<u>677</u>
FULLY LOADED:	RF	<u>658</u>	LF	<u>660</u>	RR	<u>649</u>	LR	<u>653</u>
AS TESTED:	RF	<u>665</u>	LF	<u>665</u>	RR	<u>664</u>	LR	<u>656</u>
Vehicle's Wheel Base:	<u>2654</u> mm							
Location of Vehicle's C.G.:	<u>1193</u> mm rearward of front wheel center.							

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual =	<u>64.0</u>	liters
Usable Capacity Figure Furnished by COTR =	<u>64.0</u>	liters
Test Volume Range (92 to 94% of Usable Capacity) =	<u>58.88</u>	to <u>60.16</u> liters
ACTUAL TEST VOLUME=	<u>28.4*</u>	liters (with entire fuel system filled)
Test Fluid Type:	<u>Stoddard Solution</u>	Spec. Grav. = <u>0.764</u>
Kinematic Viscosity =	<u>0.96</u>	centistokes; Color = <u>Orange</u>
Type of Fuel Pump: Electric-	<u>X</u>	Mechanical- <u>-</u>
Does Electric Pump operate with ignition switch "ON" & engine "OFF"	Yes- <u>X</u>	No- <u>-</u>
<u>Details of Fuel System: Fuel filler on passenger side aft or rear axle, fuel line run along right frame rail and fuel tank is centered fore of rear axle.</u>		

* - amount of Stoddard put into vehicle to make weight

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°
Test Date: May 22, 2002 Time: 11:30 Temperature: 21 °C
Vehicle NHTSA No.: M25502
Required Impact Velocity Range: 55.5 to 57.1 kph

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

Trap No. 1 = 56.8 kph; Trap No. 2 = 56.8 kph
Distance from vehicle to barrier: (1) entering trap = 813 mm
(2) exiting trap = 305 mm

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

Vehicle Length:

Pre-Test	Left = <u>4553</u> ; C/L = <u>4690</u> ; Right = <u>4552</u>
Post-Test	Left = <u>4153</u> ; C/L = <u>4141</u> ; Right = <u>4183</u>
Crush	Left = <u>400</u> ; C/L = <u>549</u> ; Right = <u>369</u>
AVERAGE	= <u>439.33</u> mm

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

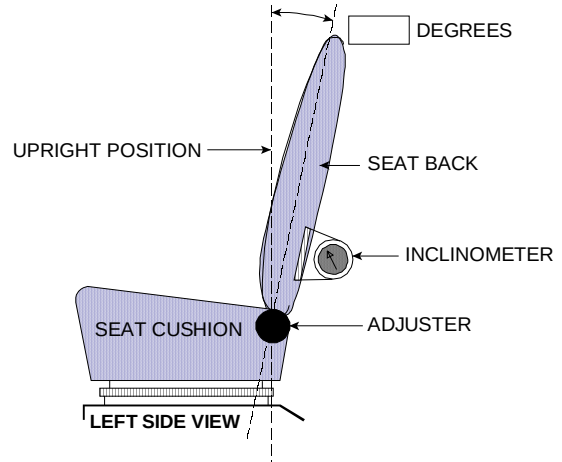
	Left = <u>140</u> ; C/L = <u>120</u> ; Right = <u>90</u>
AVERAGE	= <u>117</u> mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2002 Vehicle Model: Subaru Legacy 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.



FRONT SEAT ASSEMBLY

Seat back angle for driver's seat: 25

Measurement instructions: Placed seat in 4th position with 1st locking position being 0.

Seat back angle for passenger's seat: 25

Measurement instructions: Placed seat in 4th position with 1st locking position being 0.

2. Seat Fore and Aft Positioning

Positioning of the driver's seat: Identified 18 detents, placed seat at mechanical middle which is 10th detent.

Positioning of the passenger's seat: Identified 18 detents, placed seat at mechanical middle which is 10th detent.

3. Fuel Tank Capacity Data

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 64 liters

B. "Usable Capacity" of the optional equipment fuel tank is 0 liters

C. "Usable Capacity" of the vehicle(s) used for certification testing to requirements of FMVSS 301 = 64 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 60 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.

With vehicle ignition placed in the "on" position.

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

4. STEERING COLUMN ADJUSTMENTS:

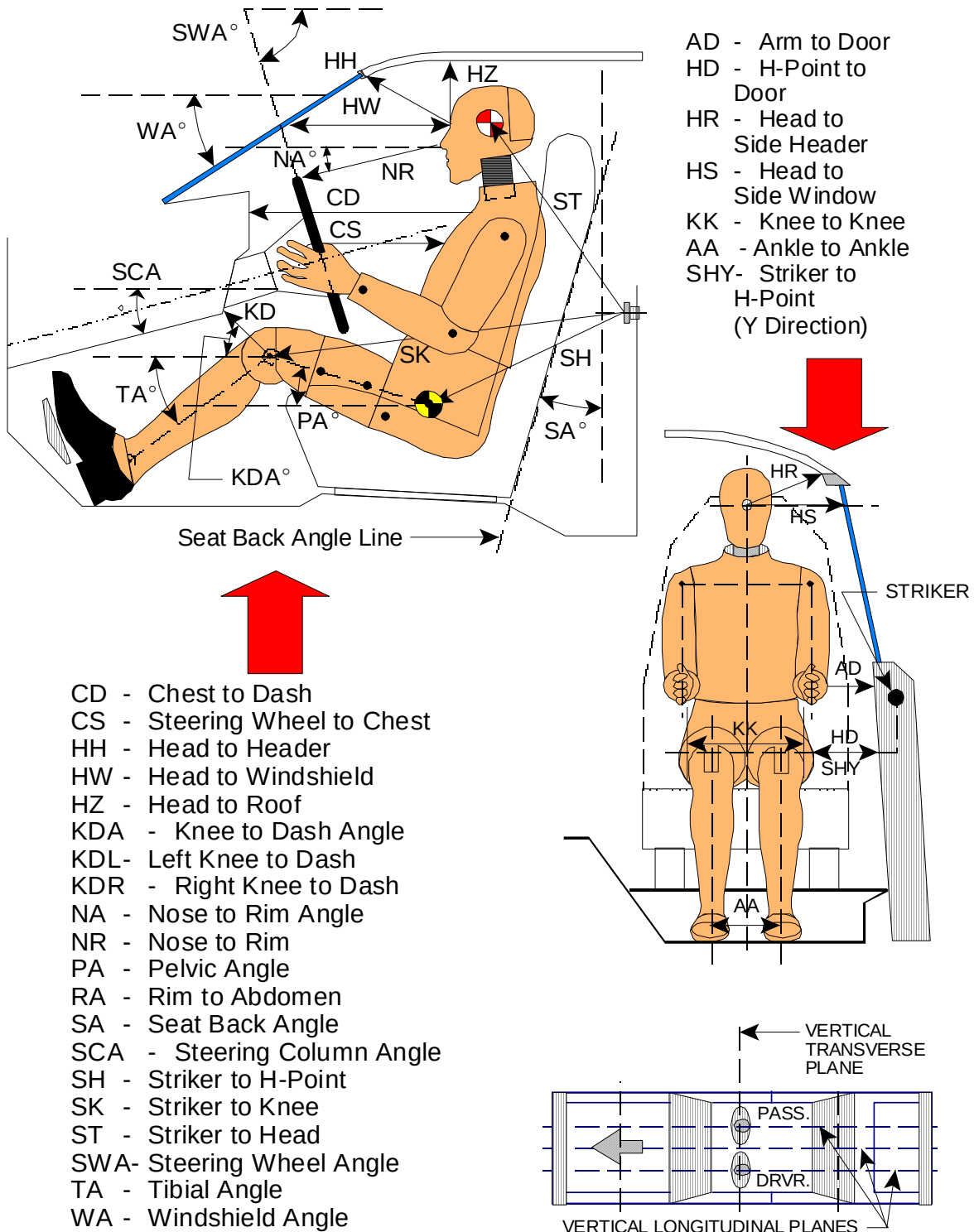
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine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

Operational Instructions: Found upper and lower column height, then placed column at mechanical
middle which is a bisection of the column total height.

5. SEAT BELT UPPER ANCHORAGE

Nominal design riding position: Located 5 positions and placed anchorage in 2nd detent.

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



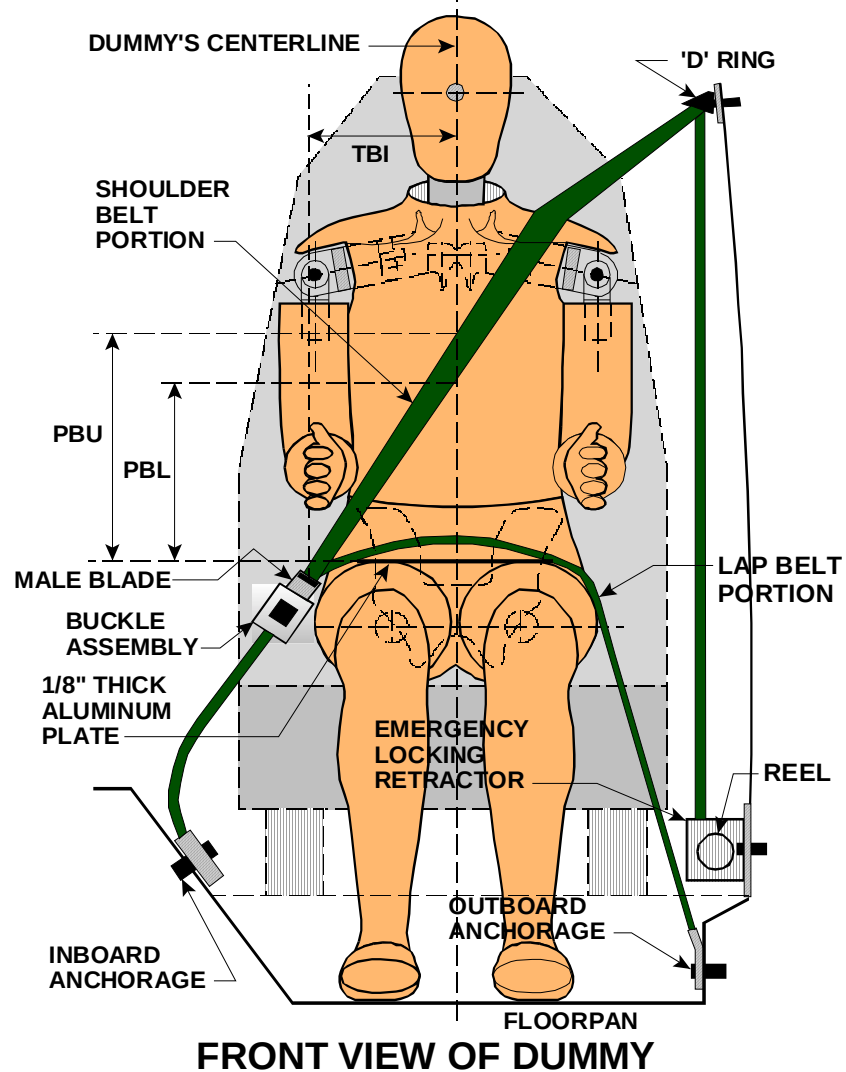
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #150)			PASS. (Serial #245)		
WA ⁰	30 deg.			N/A		
SWA ⁰	67 deg.			N/A		
SCA ⁰	23 deg.			N/A		
SA ⁰	25 deg.			25 deg.		
HZ	170			173		
HH	269			262		
HW	521			515		
HR	205			218		
NR	371	Angle	13 deg.	N/A		
CD	481			515		
CS	235			N/A		
RA	165			N/A		
KDL	145	Angle (KDA)	29 deg.	155		
KDR	135			145	Angle (KDA)	26 deg.
PA ⁰	21 deg.			24 deg.		
TA ⁰	42 deg.			47 deg.		
KK	290			270		
AA	270			260		
ST	535	Angle	170 deg.	541	Angle	170 deg.
SK	589	Angle	93 deg.	581	Angle	94 deg.
SH	238	Angle	110 deg.	235	Angle	109 deg.
SHY	255			237		
HS	147			151		
HD	305			301		
AD	105			100		

Dimensions in millimeters

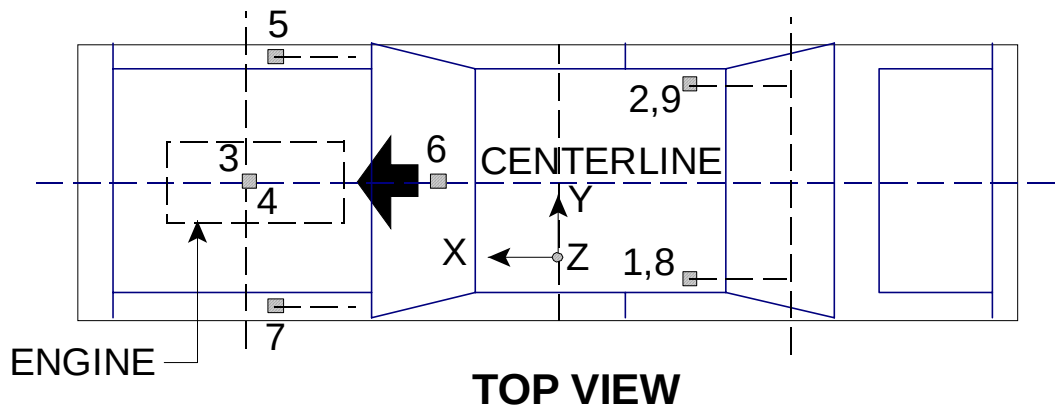
DATA SHEET NO. 6 SEAT BELT POSITIONING DATA

SEAT BELT POSITIONING DATA

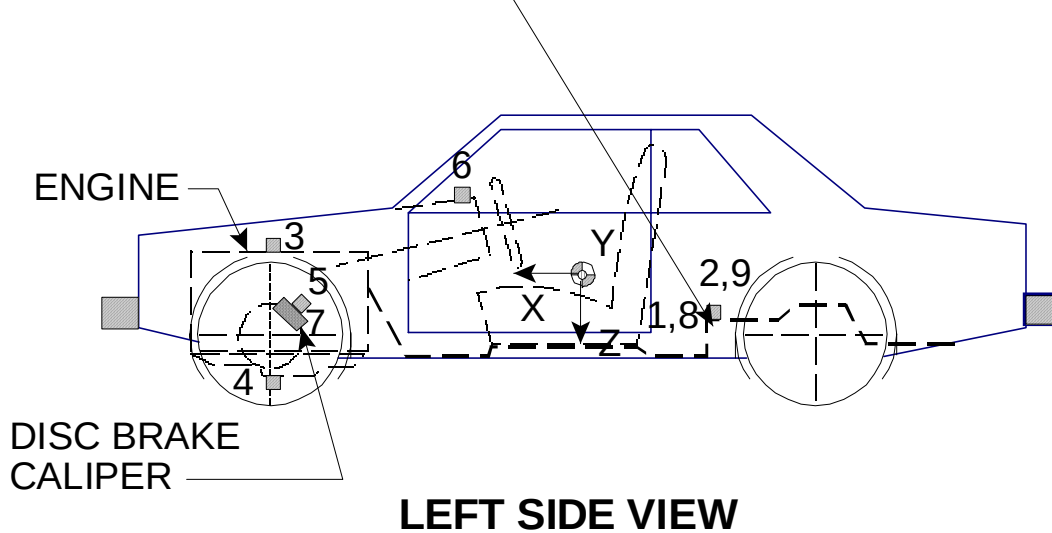


	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	310	310
PBL-- Top surface of alum. plate to belt lower edge	220	220
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

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	2017	-697	-340
2	Right Rear Seat Cross Member X	1977	596	-349
3	Top of Engine Block	3821	-136	-615
4	Bottom of Engine	3733	335	-238
5	Disc Brake Caliper @ Right Side	3599	784	-371
6	Instrument Panel	2922	72	-752
7	Disc Brake Caliper @Left Side	3598	-797	-372
8	Left Rear Seat Cross Member Z	2017	-697	-340
9	Right Rear Seat Cross Member Z	1977	596	-349

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Left Rear Seat Cross Member X	1.1	120.7	-40.9	40.6
2	Right Rear Seat Cross Member X	1.9	123.0	-39.1	41.6
3	Top of Engine Block	*	-	*	-
4	Bottom of Engine	108.0	71.2	-117.0	31.0
5	Disc Brake Caliper @ Right Side	23.3	73.7	-53.3	57.3
6	Instrument Panel	35.3	67.4	-78.9	64.3
7	Disc Brake Caliper @Left Side	20.6	74.0	-99.8	49.0
8	Left Rear Seat Cross Member Z	3.8	111.5	-10.9	22.6
9	Right Rear Seat Cross Member Z	6.6	44.1	-9.9	78.9

* Wire cut at 30 ms.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

Vehicle Year/Make/Model/Body Style: 2002 Subaru Legacy 4-door Sedan

NHTSA Test No.: M25502 Test Date: May 22, 2002

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head 9 Array X Arm Y	g	20.9	214.4	-6.7	74.4	8.2	51.0	-18.6	61.0
Head 9 Array X Arm Z	g	31.2	51.3	-13.4	102.8	31.1	86.5	-9.0	134.6
Head 9 Array Y Arm X	g	31.2	214.6	-57.0	83.4	3.0	247.7	-49.9	75.4
Head 9 Array Y Arm Z	g	21.4	68.7	-7.0	103.2	26.0	67.0	-1.4	19.8
Head 9 Array Z Arm X	g	41.9	214.6	-59.9	61.2	6.7	251.7	-50.2	70.3
Head 9 Array Z Arm Y	g	16.3	212.2	-10.1	84.2	6.3	59.7	-16.9	119.8
Head X	g	24.2	214.6	-54.2	82.8	3.2	250.9	-42.2	75.6
Head Y	g	13.1	213.0	-4.9	76.5	5.8	50.9	-17.0	85.9
Head Z	g	18.6	55.1	-6.6	109.4	24.1	67.0	-1.3	19.8
Head Resultant	g	55.0	75.0	0.0	-47.6	48.1	76.7	0.1	-20.5
Redundant Head X	g	24.5	214.6	-54.3	82.3	3.3	247.5	-41.2	76.7
Redundant Head Y	g	13.0	213.0	-5.6	76.5	5.8	51.3	-18.4	86.8
Redundant Head Z	g	18.6	55.1	-6.5	109.0	24.6	67.0	-1.3	19.8
Redundant Head Resultant	g	55.5	81.4	0.0	-48.5	48.6	76.7	0.0	18.4
Upper Neck Fx	N	461.9	61.8	-312.7	120.8	369.7	72.3	-667.4	125.1
Upper Neck Fy	N	67.4	274.4	-231.5	76.9	114.2	70.8	-321.6	113.8
Upper Neck Fz	N	1566.9	68.7	-776.6	226.3	1316.2	56.9	-50.4	20.1
Upper Neck F Resultant	N	1606.8	68.7	1.5	-48.7	1359.2	56.5	3.3	-23.7
Upper Neck Mx	N-m	9.3	228.7	-7.8	86.1	36.2	86.8	-30.5	121.9
Upper Neck My	N-m	46.3	60.0	-20.9	241.5	54.2	133.8	-36.4	88.9
Upper Neck Mz	N-m	2.0	210.4	-7.0	243.5	23.8	93.5	-13.4	142.9
Upper Neck M Resultant	N-m	46.5	60.0	0.0	-46.2	57.8	133.5	0.1	-41.0
Chest X	g	3.8	242.1	-47.3	61.5	1.3	139.2	-43.0	71.7
Chest Y	g	3.5	93.4	-6.5	51.1	1.5	26.2	-12.0	83.4
Chest Z	g	12.7	81.2	-8.0	111.2	11.0	75.6	-9.0	100.3
Chest Resultant	g	48.2	76.4	0.0	-28.1	44.3	71.8	0.1	-24.5

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

Vehicle Year/Make/Model/Body Style: 2002 Subaru Legacy 4-door Sedan

NHTSA Test No.: M25502 Test Date: May 22, 2002

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Redundant Chest X	g	3.7	243.0	-47.9	61.4	1.9	159.9	-43.1	58.9
Redundant Chest Y	g	3.2	90.0	-6.6	51.3	1.6	35.5	-12.6	83.4
Redundant Chest Z	g	12.1	81.3	-8.0	111.4	10.1	75.6	-9.0	100.2
Redundant Chest Resultant	g	48.3	61.4	0.0	-32.1	44.4	71.8	0.1	-24.6
Chest Displacement	mm	0.0	6.8	-36.4	79.8	0.0	11.6	-26.0	69.2
Pelvic X	g	6.1	100.3	-58.9	55.1	6.0	88.1	-79.4	54.2
Pelvic Y	g	12.0	57.0	-8.1	35.1	7.1	85.1	-5.2	96.9
Pelvic Z	g	4.5	254.1	-26.2	65.2	2.5	137.9	-32.1	65.9
Pelvic Resultant	g	62.4	55.1	0.0	-27.5	81.6	54.2	0.1	-26.3
Left Femur	N	686.7	46.2	-2566.4	52.2	679.4	45.8	-5090.3	54.3
Right Femur	N	290.5	27.3	-3866.9	48.3	596.6	45.6	-4822.3	54.2
Left Knee Slider Dx	mm	-	-	-	-	-	-	-	-
Right Knee Slider Dx	mm	-	-	-	-	-	-	-	-
Left Upper Tibia Mx	N-m	19.1	121.1	-35.0	58.9	13.2	61.1	-35.5	97.0
Left Upper Tibia My	N-m	136.0	57.0	-80.0	45.9	75.0	54.5	-86.0	45.8
Left Lower Tibia Fz	N	105.0	121.3	-2065.0	47.2	89.5	126.9	-2551.8	45.4
Left Lower Tibia Mx	N-m	80.9	52.5	-17.0	21.6	4.2	19.6	-74.0	47.4
Left Lower Tibia My	N-m	49.6	57.3	-40.1	47.2	101.6	95.1	-14.5	71.7
Right Upper Tibia Mx	N-m	44.9	53.2	-25.4	37.7	16.4	34.7	-28.5	163.2
Right Upper Tibia My	N-m	85.9	54.8	-99.7	39.3	68.4	54.6	-52.7	45.9
Right Lower Tibia Fz	N	187.0	118.6	-4590.4	39.3	151.9	126.8	-2209.5	80.4
Right Lower Tibia Mx	N-m	19.3	38.8	-25.6	91.8	8.5	25.9	-65.5	47.6
Right Lower Tibia My	N-m	59.5	91.3	-11.6	28.3	59.9	89.7	-4.5	18.8
Left Foot Aft Ax	g	19.2	88.3	-104.5	49.0	38.8	92.7	-43.2	70.4
Left Foot Aft Az	g	6.1	145.5	-66.2	46.7	9.9	62.3	-40.3	44.8
Left Foot Fore Az	g	18.7	54.5	-127.1	46.2	17.2	56.8	-68.0	17.2
Right Foot Aft Ax	g	16.5	90.3	-79.7	47.9	26.6	87.9	-42.9	53.5
Right Foot Aft Az	g	4.2	64.5	-71.2	38.8	8.6	66.9	-32.0	52.6
Right Foot Fore Az	g	27.4	58.9	-113.3	44.3	14.0	67.1	-35.9	50.1
Lap Belt Load	N	-	-	-	-	-	-	-	-
Torso Belt	N	-	-	-	-	-	-	-	-

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

Vehicle Year/Make/Model/Body Style: 2002 Subaru Legacy 4-door Sedan

NHTSA Test No.: M25502 Test Date: May 22, 2002

HEAD INJURY CRITERIA (HIC)				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	560.4	57.6	93.6	47.5
Position #2 - Passenger	364.7	55.7	91.7	40.0

** 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	47.0	74.8	77.8	512.7
Position #2 - Passenger	41.7	70.3	73.3	414.6

* 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: 2002 Subaru Legacy 4-door Sedan

NHTSA Test No.: M25502 Test Date: May 22, 2002

HEAD INJURY CRITERIA (HIC) REDUNDANT				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	560.8	57.7	93.7	47.5
Position #2 - Passenger	345.6	55.6	91.6	39.2

** 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	47.2	74.9	77.9	519.4
Position #2 - Passenger	42.4	66.8	69.8	426.4

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

DATA SHEET NO. 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

Belt length from trim panel exit
to bolt hole anchor point for
continuous webbing systems.

Driver

Passenger

1750

1746

Shoulder belt length as measured
on Part 572 Dummy.

830

820

Lap belt length as measured
on Part 572 Dummy.

735

740

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis.

-

-

As determined mechanically.

-

-

As determined electronically.

-

-

BELT STRETCH DATA:

Measured electronically between shoulder
belt load cell and the "D" ring.

- mm/m

- mm/m

Measured mechanically.

-

-

Dimensions in millimeters

DATA SHEET NO.10 SUMMARY OF FMVSS 212 DATA

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place and covered with a 20 mm molding.

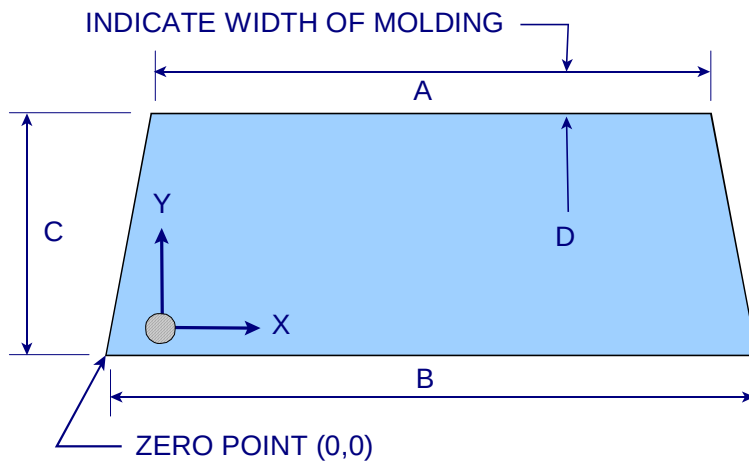
FMVSS 212 REQUIREMENTS:

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants,

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		% OF RETENTION
	PRE-TEST (mm)	POST-TEST (mm)	
RIGHT SIDE	2070	2070	100.0%
LEFT SIDE	2070	2070	100.0%
TOTAL	4140	4140	100.0%

AREA OF RETENTION FAILURE:



DIMENSIONS (mm)	
A	1165
B	1515
C	730
D	20

FRONT VIEW OF WINDSHIELD

FAILURE DETAILS:

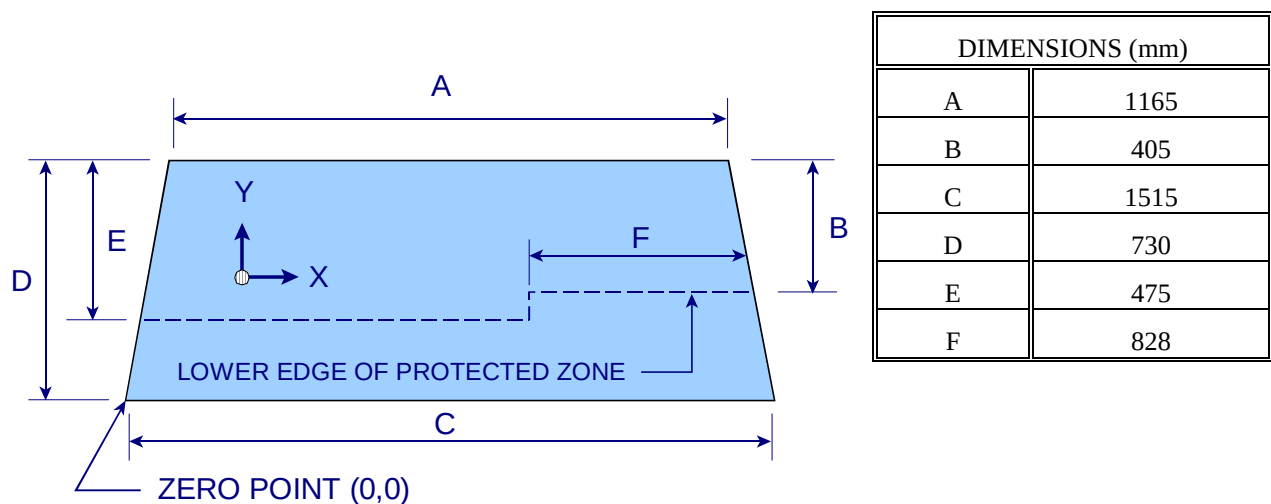
None

DATA SHEET NO. 11 FMVSS NO. 219 (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 165 mm diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. The locus of points is drawn on the inner surface of the windshield contacted by the sphere across the width of the instrument panel. From the outermost contactable points extend the locus line horizontally to the edges of the windshield, then draw a line on the inner surface of the windshield below and 13 mm distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection of this line onto the outer surface of the windshield.

FMVSS 219 TEST DATA:



FRONT VIEW OF WINDSHIELD

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm:

(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

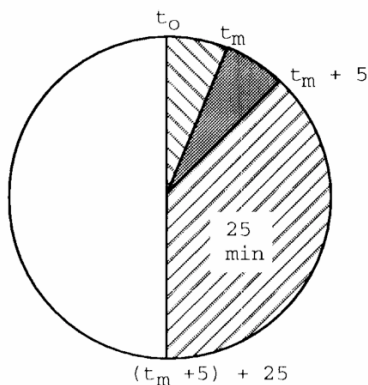
NHTSA TEST No.: M25502 TEST DATE: May 22, 2002
VEHICLE MAKE/MODEL: 2002 Subaru Legacy 4-door Sedan

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

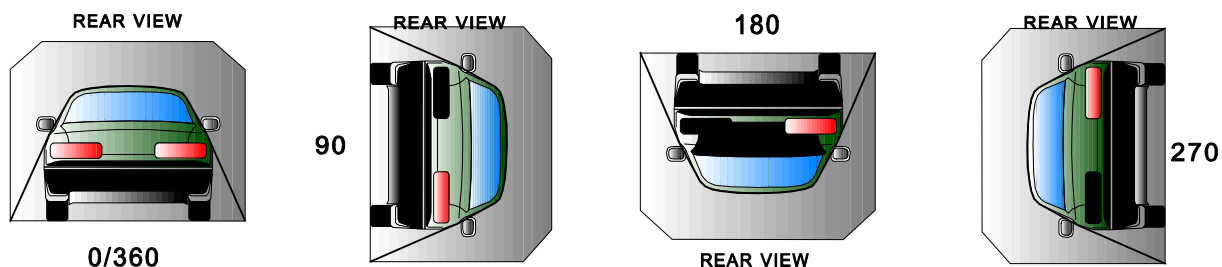
ACTUAL	MAX ALLOWED
0	28 g
0	141 g
0	28 g/min.

SOLVENT SPILLAGE DETAILS: None

DATA SHEET NO. 13 - ROLLOVER DATA

Vehicle: 2002 Subaru Legacy 4-door Sedan

NHTSA No.: M25502



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	
0° - 90°	1	minutes	07	seconds	5	minutes	6	minutes	7	seconds	7	minutes
90° - 180°	1	minutes	05	seconds	5	minutes	6	minutes	5	seconds	7	minutes
180°-270°	1	minutes	12	seconds	5	minutes	6	minutes	12	seconds	7	minutes
270°-360°	1	minutes	08	seconds	5	minutes	6	minutes	8	seconds	7	minutes

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

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

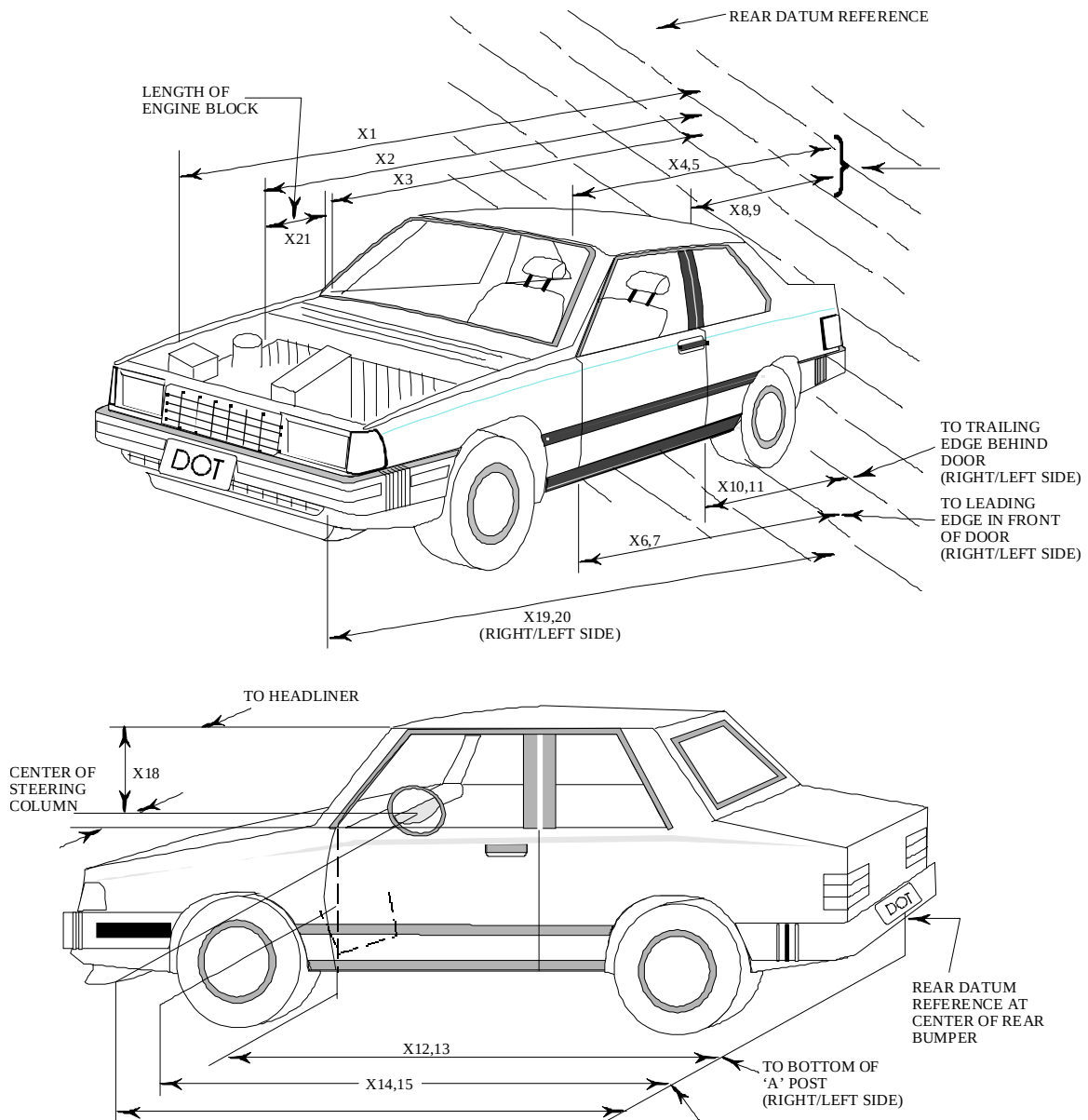
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	-
90° - 180°	0	0	0	-
180°-270°	0	0	0	-
270°-360°	0	0	0	-

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

IV. SOLVENT SPILLAGE LOCATION(S):

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

DATA SHEET NO. 14 TEST VEHICLE MEASUREMENTS

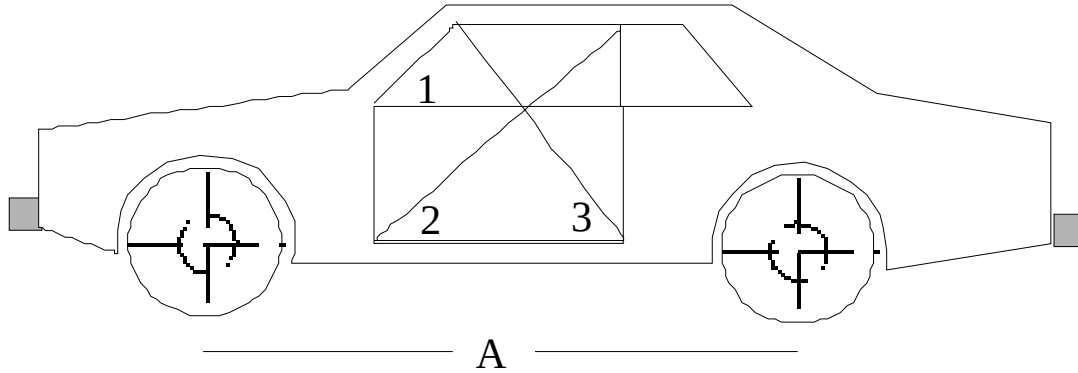


DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4689	4118	571
X2	Rear Surface of Vehicle to Front of Engine	4220	3936	284
X3	Rear Surface of Vehicle to Firewall	3530	3464	66
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3194	3192	2
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3199	3199	0
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3198	3198	0
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3206	3207	-1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2169	2166	3
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2172	2176	-4
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2174	2171	3
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2178	2180	-2
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3242	3243	-1
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3250	3257	-7
X14	Rear Surface of Vehicle to Firewall, Right Side	3570	3506	64
X15	Rear Surface of Vehicle to Firewall, Left Side	3567	3478	89
X16	Rear Surface of Vehicle to Steering Column	2750	2764	-14
X17	Center of Steering Column to "A" Post	312	299	13
X18	Center of Steering Column to Headliner	452	420	32
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4609	4246	363
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4612	4213	399
X21	Length of Engine Block	367	352	15
RD	Rear Surface of Vehicle to Right Side of Dash Panel	3038	3034	4
CD	Rear Surface of Vehicle to Center of Dash Panel	3008	3008	0
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2999	2994	5

All Dimensions in mm

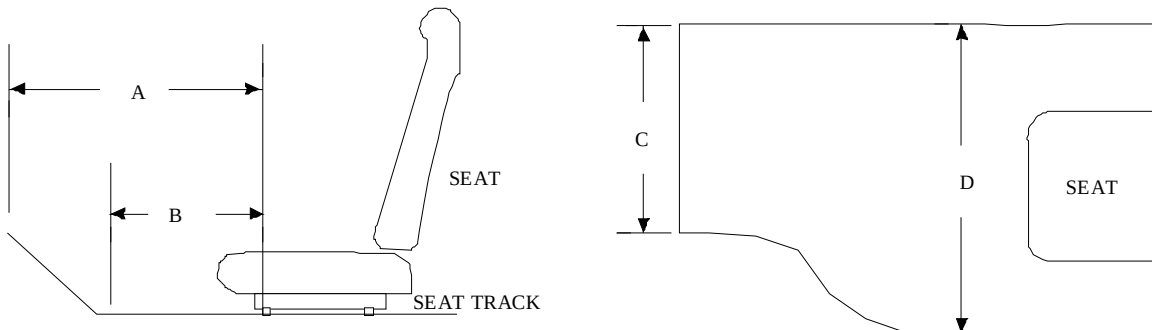
DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
 VEHICLE INTRUSION MEASUREMENTS
 DOOR OPENING WIDTH



UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	975	1430	908	971	1450	951
AFTER TEST	973	1433	907	971	1448	952
DIFFERENCE	2	-3	1	0	2	-1

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2659	2657
AFTER TEST	2635	2591
DIFFERENCE	24	66

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



DRIVER

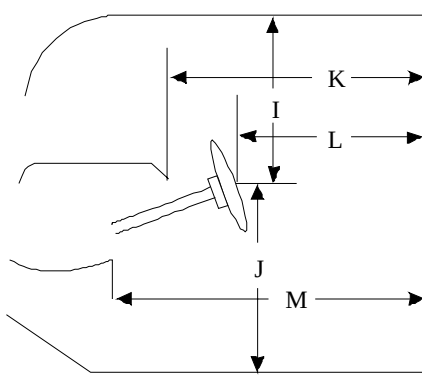
Measurement	Pre-Test	Post-Test	Difference
A	695	629	66
B	541	522	19
C	419	359	60
D	416	419	-3

PASSENGER

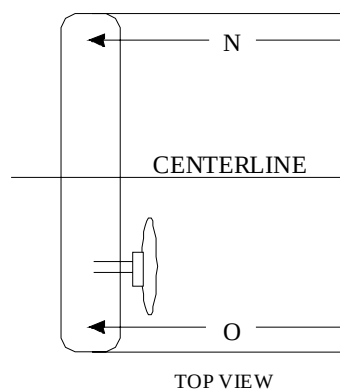
Measurement	Pre-Test	Post-Test	Difference
A	632	567	65
B	502	495	7
C	376	416	-40
D	429	431	-2

Units = mm

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

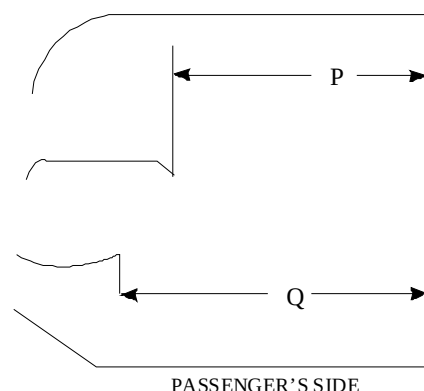


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE

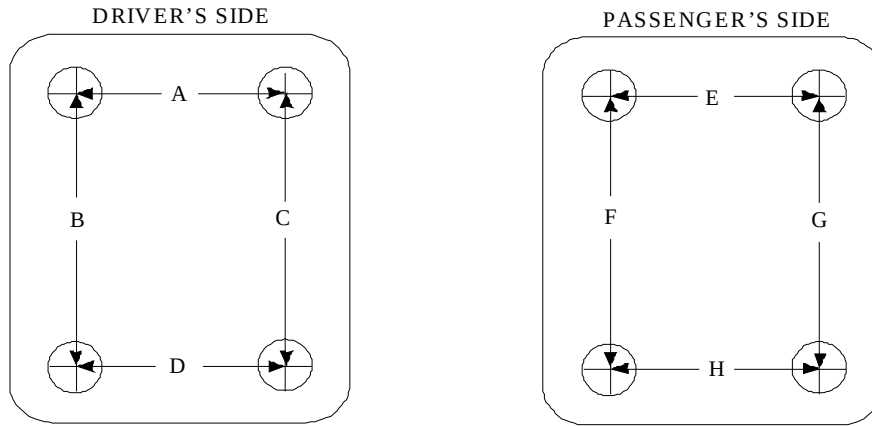


PASSENGER'S SIDE

Measurement	Pre-Test	Post-Test	Difference
I	452	420	32
J	571	613	-42
K	1671	1619	52
L	1469	1486	-17
M	1793	1796	-3
N	1761	1760	1
O	1718	1716	2
P = K (PASS.)	1815	1810	5
Q = M (PASS.)	1762	1750	12

Units = mm

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

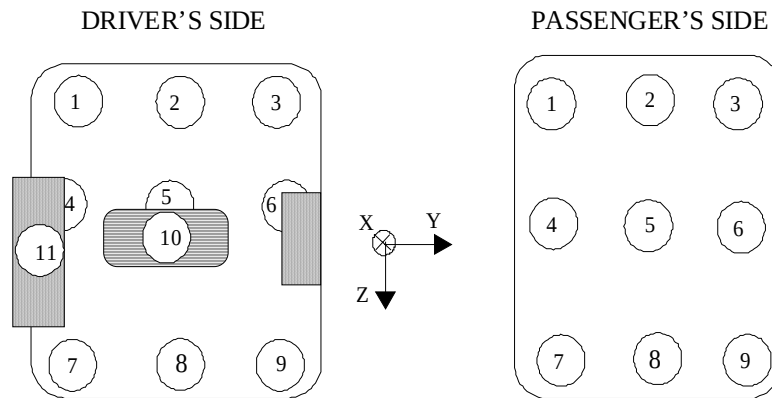


TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	419	359	60
B	315	319	-4
C	289	330	-41
D	416	419	-3
E	376	416	-40
F	358	368	-10
G	386	316	70
H	429	431	-2

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	3398	3347	51	-433	-459	26
2	3419	3349	70	-397	-449	52
3	3425	3334	91	-405	-441	36
4	3360	3316	44	-361	-383	22
5	3353	3288	65	-349	-369	20
6	3348	3303	45	-331	-359	28
7	3276	3255	21	-290	-289	-1
8	3265	3242	23	-277	-272	-5
9	3282	3259	23	-270	-280	10
10	3296	3205	91	-460	-504	44
11	3293	3266	27	-377	-385	8

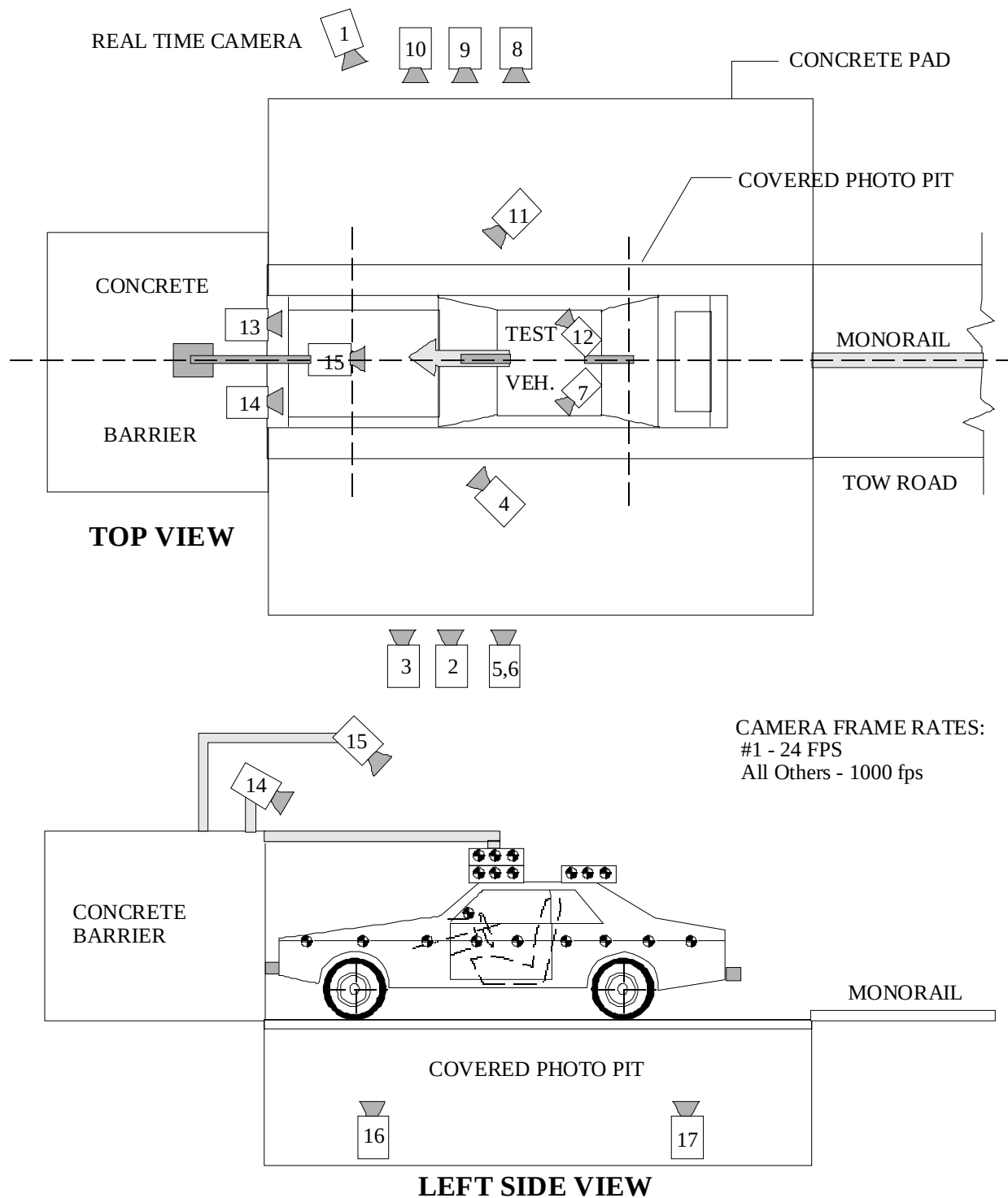
Passenger Side Toe-pan Measurements

Toe-pan Location	X Deformation (mm)			Z Deformation (mm)		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3339	3254	85	-417	-444	27
2	3352	3284	68	-418	-451	33
3	3344	3300	44	-410	-434	24
4	3285	3236	49	-346	-362	16
5	3288	3251	37	-347	-362	15
6	3289	3265	24	-353	-367	14
7	3223	3209	14	-276	-280	4
8	3222	3212	10	-281	-281	0
9	3225	3218	7	-285	-285	0

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.



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

NHTSA Test No.: M25502 Vehicle: 2002 Subaru Legacy 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	6657	1064	1071	2.4	6308	12.5	1005
3	Left Side View	8077	891	1109	3.5	7728	25	1005
4	Driver and Interior View	7001	1403	1981	9.8	-	25	1055
5	Steering Column (Bottom)	7202	1937	1774	4.0	6853	25	1005
6	Steering Column (Top)	7202	1937	1166	8.7	6853	25	1015
7	Left Belt View	-	-	-	-	-	13	500
8	Overall Right Side	6682	1888	1077	2.0	6955	12.5	1005
9	Right Side View	8083	1265	1084	2.5	8356	25	1015
10	Right Passenger View	7620	1561	1421	4.1	7893	35	1000
11	Passenger and Interior View	6360	2135	1965	8.5	-	25	1000
12	Right Belt View	-	-	-	-	-	13	500
13	Passenger Front View	620	-92	1987	29	-	13	1010
14	Driver Front View	620	-92	1987	29	-	13	1000
15	Windshield View	0	-530	3374	51	-	13	1000
16	Pit View of Engine	0	615	-3048	90	-	13	1015
17	Pit View of Fuel Tank	0	2940	-3048	90	-	13	1005

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

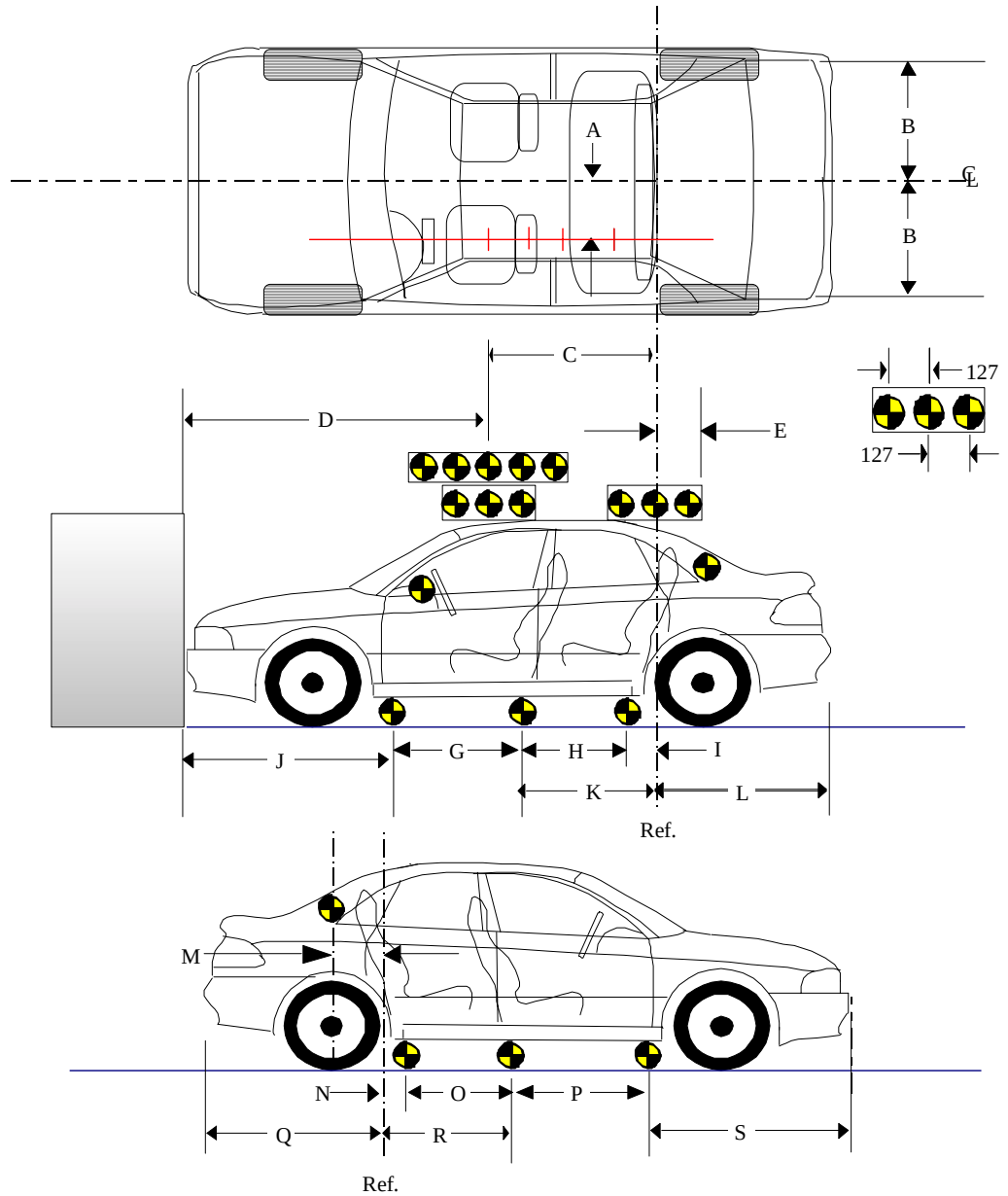
Y = film plane to impact location N.T. indicates No Timing

Z = film plane to ground

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

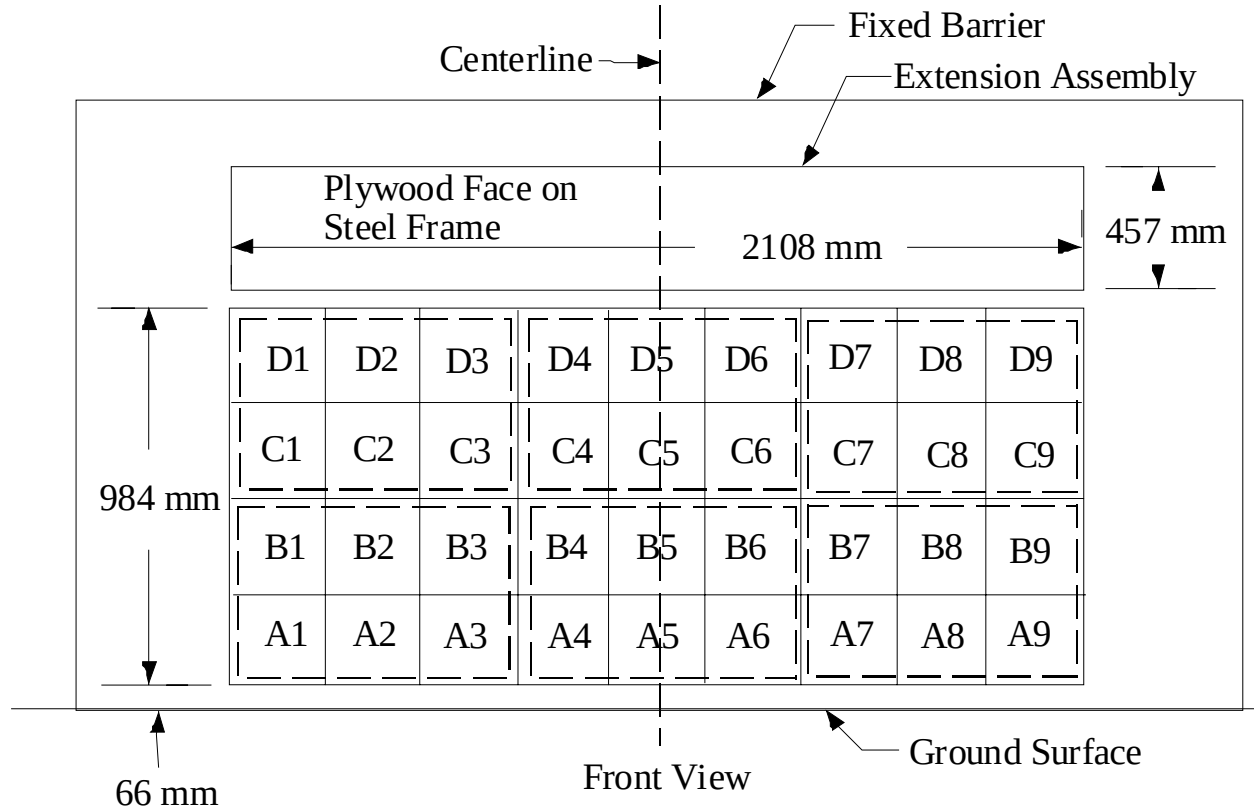
(Dimensions in millimeters)

A	349
B	622
C	1225
D	2104
E	312
F	1539
G	870
H	866
I	121
J	1459
K	987
L	1374
M	316
N	147
O	864
P	862
Q	1345
R	1011
S	1472



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.: M25502; Test Date: May 22, 2002; Technician: James Czarnecki

Vehicle Model Year/Make/Model: 2002 Subaru Legacy 4-door Sedan

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

B. Size of vent holes: (mm²) 25 -Driver 60 -Passenger

C. Total vent area: (mm²) 50 -Driver 120 -Passenger

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

Driver: - -Height; - -Width; 550 -Depth

Passenger: 650 -Height; 525 -Width; 400 -Depth

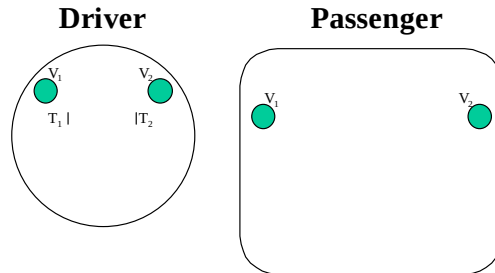
E. Is the air bag tethered?

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

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

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).



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

Driver: Air bag: 65420-33090ILUOC

Generator: -

Passenger: Air bag: 0007770 201201

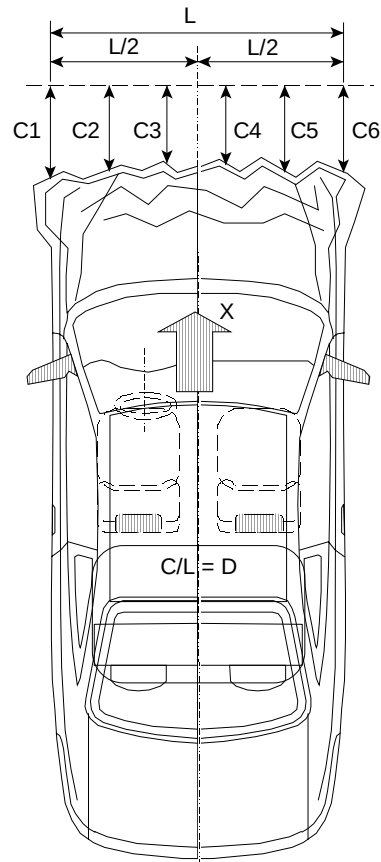
Generator: -

DATA SHEET NO. 19 ACCIDENT INVESTIGATION DIVISION DATA
FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Subaru Legacy 4-door Sedan
 NHTSA Test No.: M25502 VIN: 4S3BE635526213823
 Model Year: 2002 Build Date: 03/02 Test Date: May 22, 2002
 Vehicle Size Category: Sedan Test Weight: 1670 kg
 Vehicle Wheelbase: 2654 mm; Front Overhang: 976 mm; Overall Width: 1745 mm
 Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4506	4180	326
C2 =	4625	4216	409
C3 =	4676	4187	489
C4 =	4676	4204	472
C5 =	4626	4244	382
C6 =	4511	4222	289



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region: L1= 1424 mm
 L2= 712.0 mm
 L5= 284.8 mm

APPENDIX A
PHOTOGRAPHS

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Figure A-1 LOAD CELL LOCATIONS



Figure A-2 PRE-TEST FRONT VIEW



Figure A-3 POST-TEST FRONT VIEW



Figure A-4 PRE-TEST LEFT SIDE VIEW



Figure A-5 POST-TEST LEFT SIDE VIEW



Figure A-6 PRE-TEST RIGHT SIDE VIEW



Figure A-7 POST-TEST RIGHT SIDE VIEW



Figure A-8 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-9 POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-10 PRE-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-11 POST-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-12 PRE-TEST WINDSHIELD VIEW

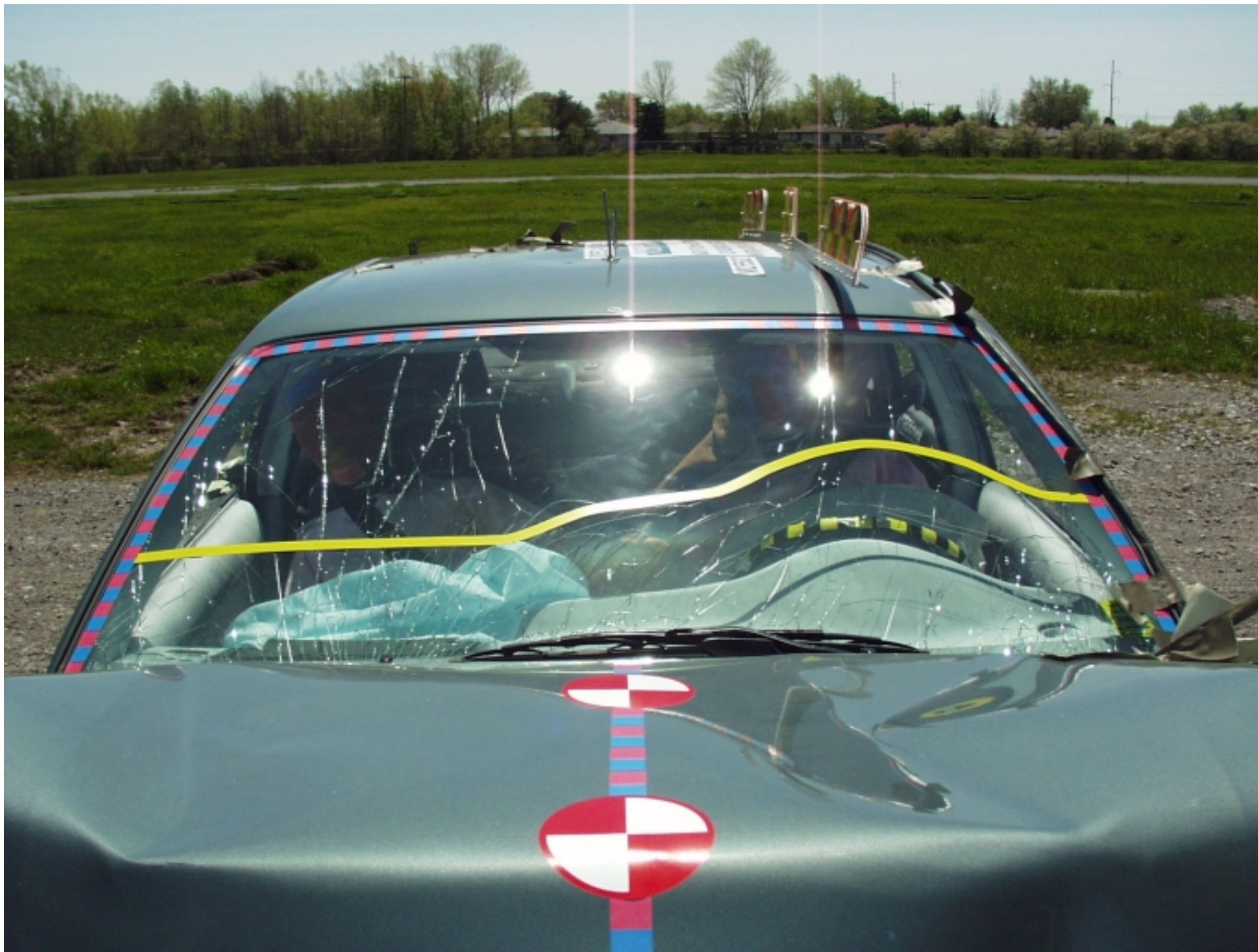


Figure A-13 POST-TEST WINDSHIELD VIEW



Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW



Figure A-15 FUEL CAP VIEW

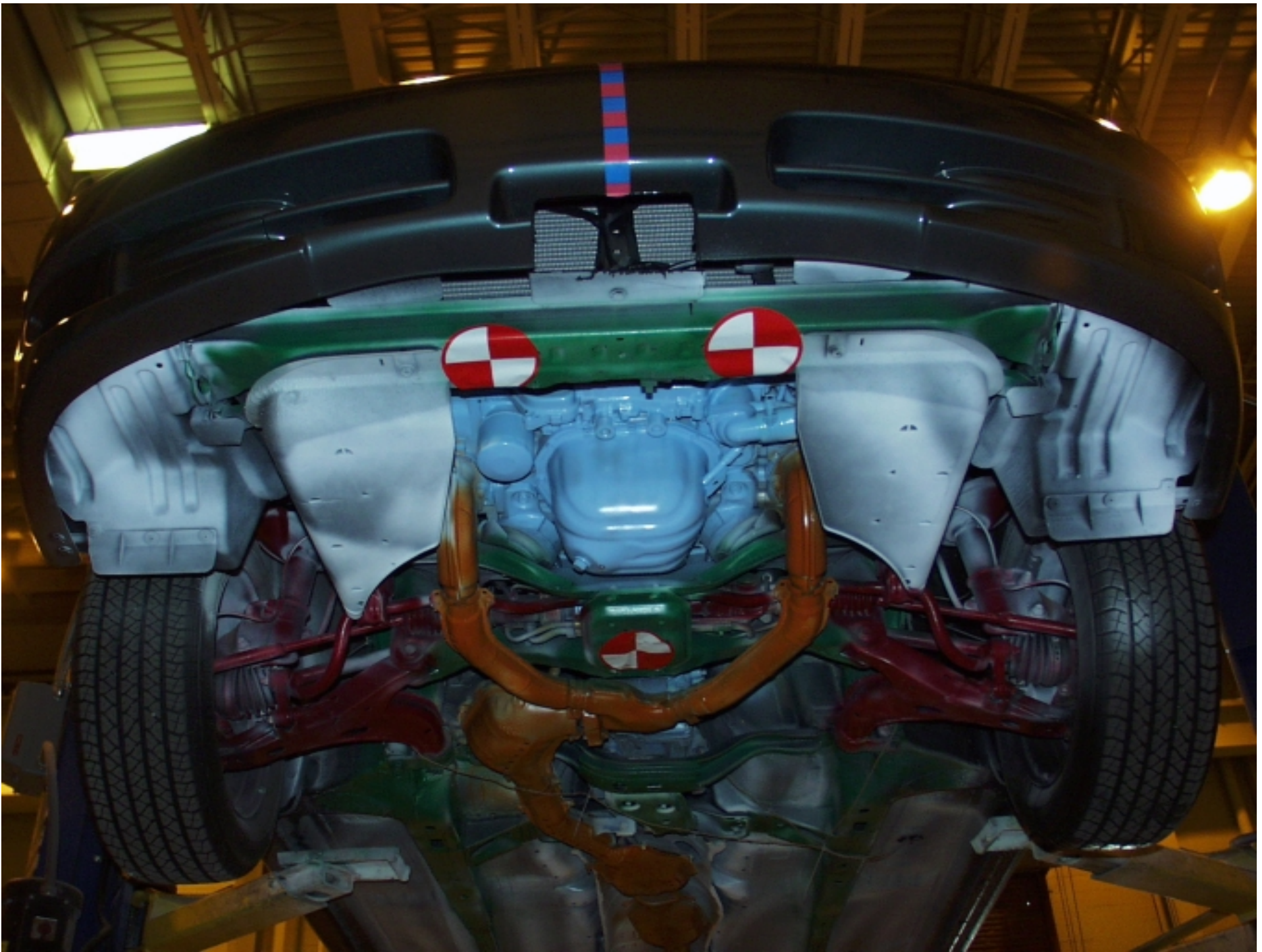


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW



Figure A-17 POST-TEST FRONT UNDERBODY VIEW



Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW



Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW



Figure A-20 PRE-TEST REAR UNDERBODY VIEW



Figure A-21 POST-TEST REAR UNDERBODY VIEW



Figure A-22 PRE-TEST DRIVER POSITION VIEW



Figure A-23 POST-TEST DRIVER POSITION VIEW



Figure A-24 PRE-TEST PASSENGER POSITION VIEW



Figure A-25 POST-TEST PASSENGER POSITION VIEW



Figure A-26 PRE-TEST DRIVER AND INTERIOR VIEW



Figure A-27 POST-TEST DRIVER AND INTERIOR VIEW



Figure A-28 PRE-TEST PASSENGER AND INTERIOR VIEW



Figure A-29 POST-TEST PASSENGER AND INTERIOR VIEW

Photograph not available

Figure A-30 PRE-TEST DRIVER HEAD LOCATION



Figure A-31 POST-TEST DRIVER HEAD LOCATION



Figure A-32 PRE-TEST PASSENGER HEAD LOCATION



Figure A-33 POST-TEST PASSENGER HEAD LOCATION



Figure A-34 PRE-TEST DRIVER FLOOR PAN VIEW



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Figure A-35 POST-TEST DRIVER FLOOR PAN VIEW



Figure A-36 PRE-TEST PASSENGER FLOOR PAN VIEW



Figure A-37 POST-TEST PASSENGER FLOOR PAN VIEW



Figure A-38 ROLLOVER VIEW



Figure A-39 IMPACT VIEW



Figure A-40 CERTIFICATION PLACARD

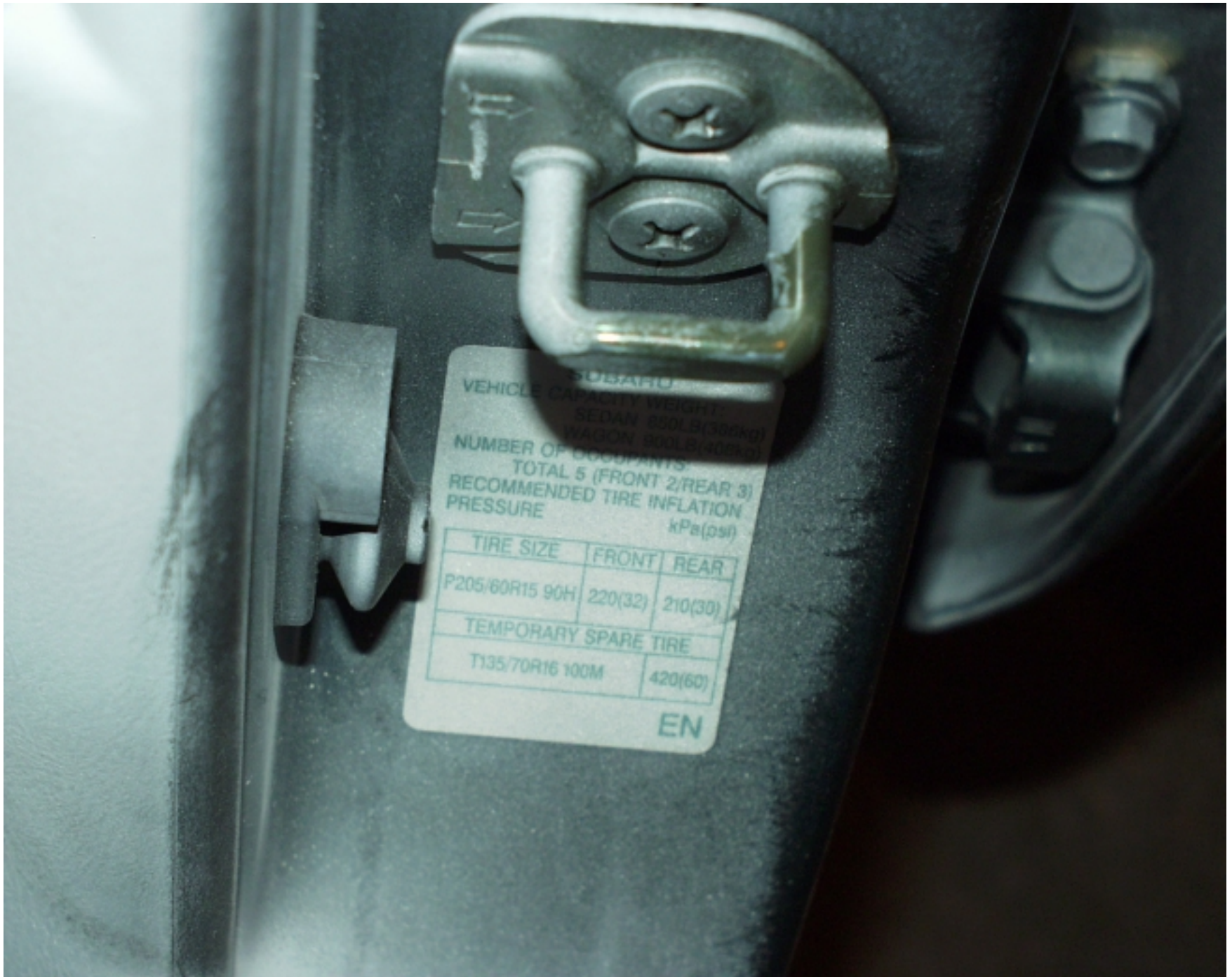


Figure A-41 TIRE PLACARD

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.M25502

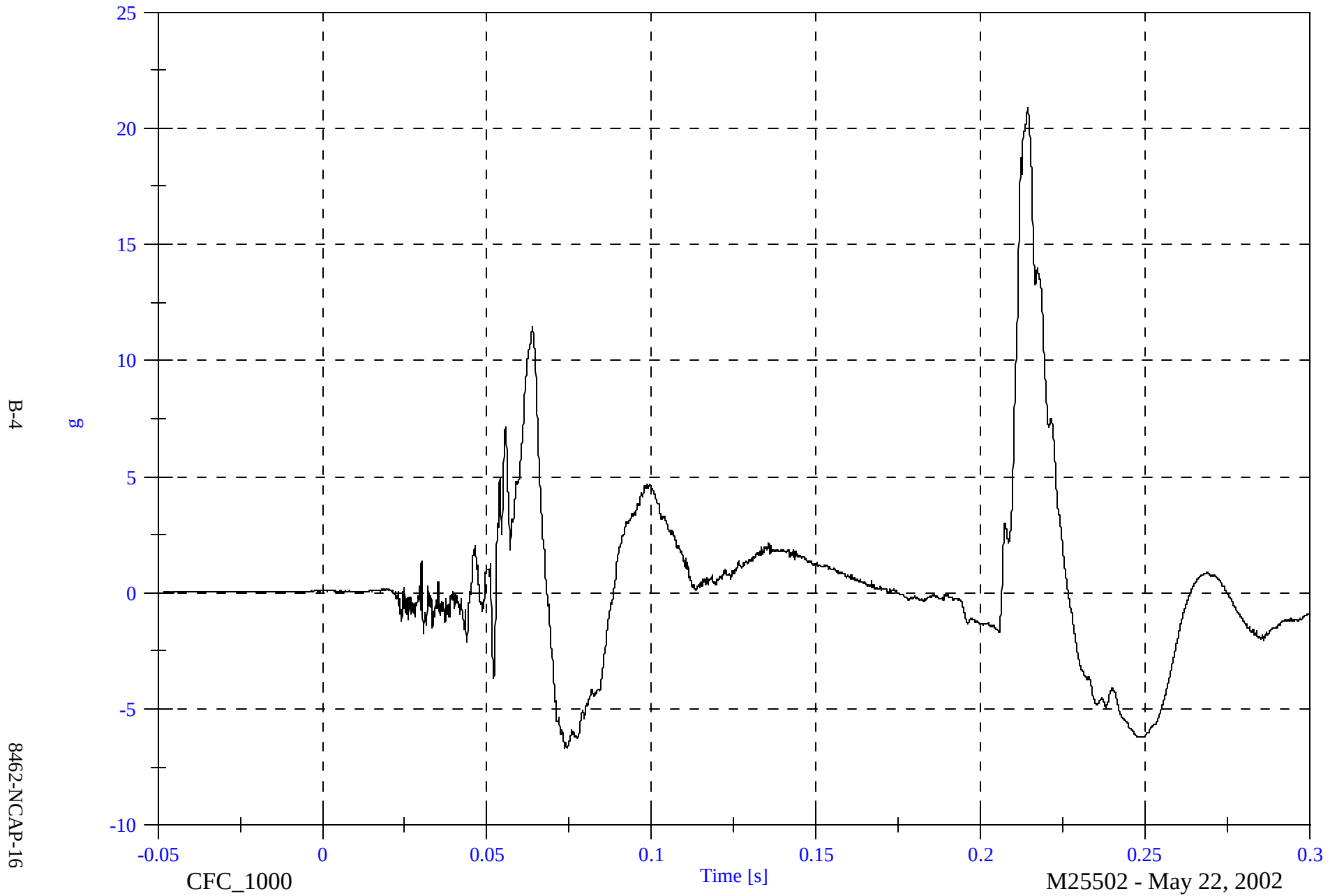
DATA TYPE	SAE FILTER CLASS (Hz)
Dummy Head Accelerations	1000
Dummy Chest Accelerations	180
Dummy Chest Displacements	600
Dummy Femur Forces	600
Dummy Belt Loads	60
Dummy Belt Displacements	180
Dummy Neck Forces	1000
Dummy Neck Moments	600
Vehicle Accelerations	60
Vehicle Velocity Integrations	180
Vehicle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

2002 NCAP Test 16 2002 Subaru Legacy

P1 Head 9 Array X Arm Ay

Max: 20.9 [g] at 0.214 [s]

Min: -6.7 [g] at 0.074 [s]

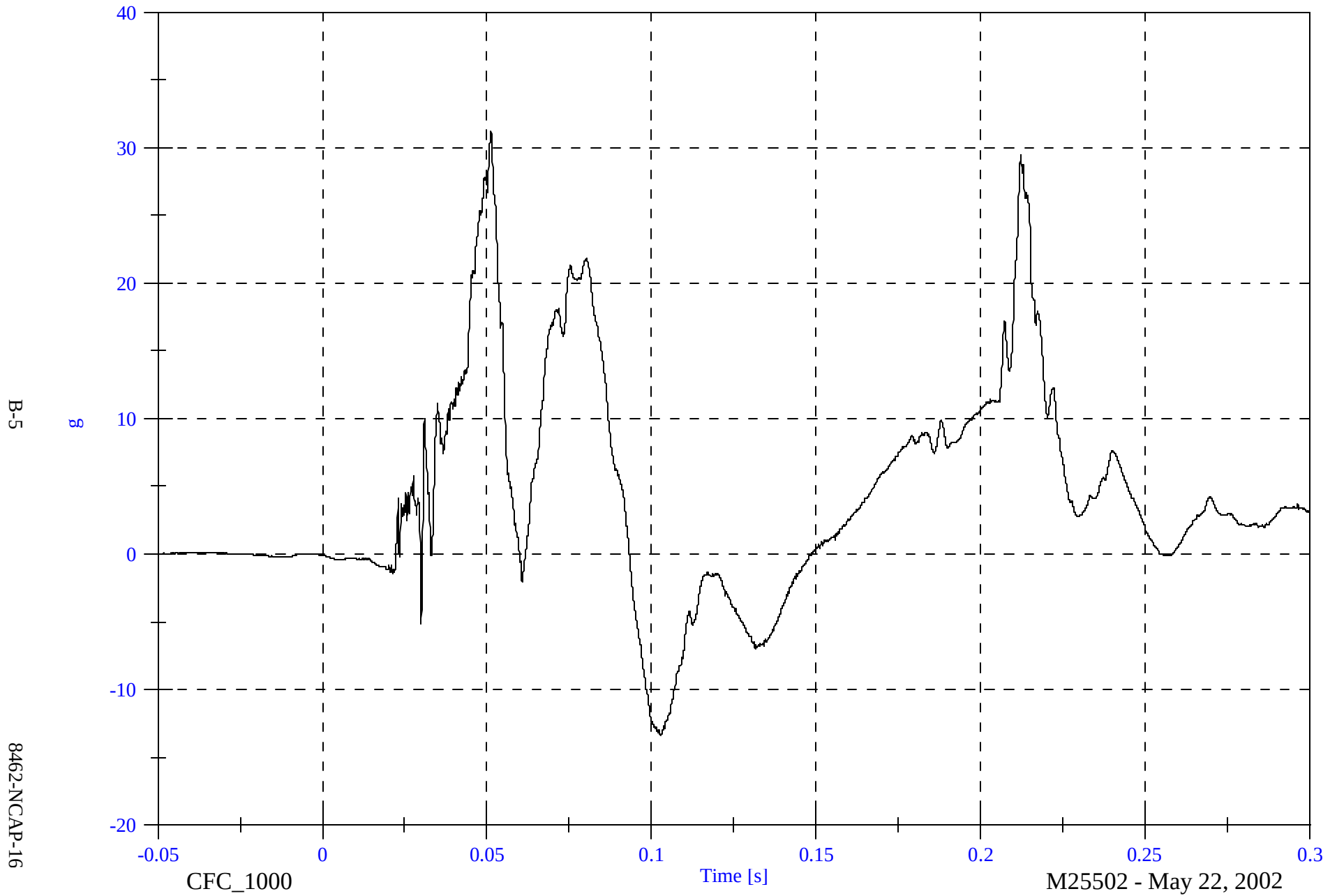


2002 NCAP Test 16 2002 Subaru Legacy

P1 Head 9 Array X Arm Az

Max: 31.2 [g] at 0.051 [s]

Min: -13.4 [g] at 0.103 [s]

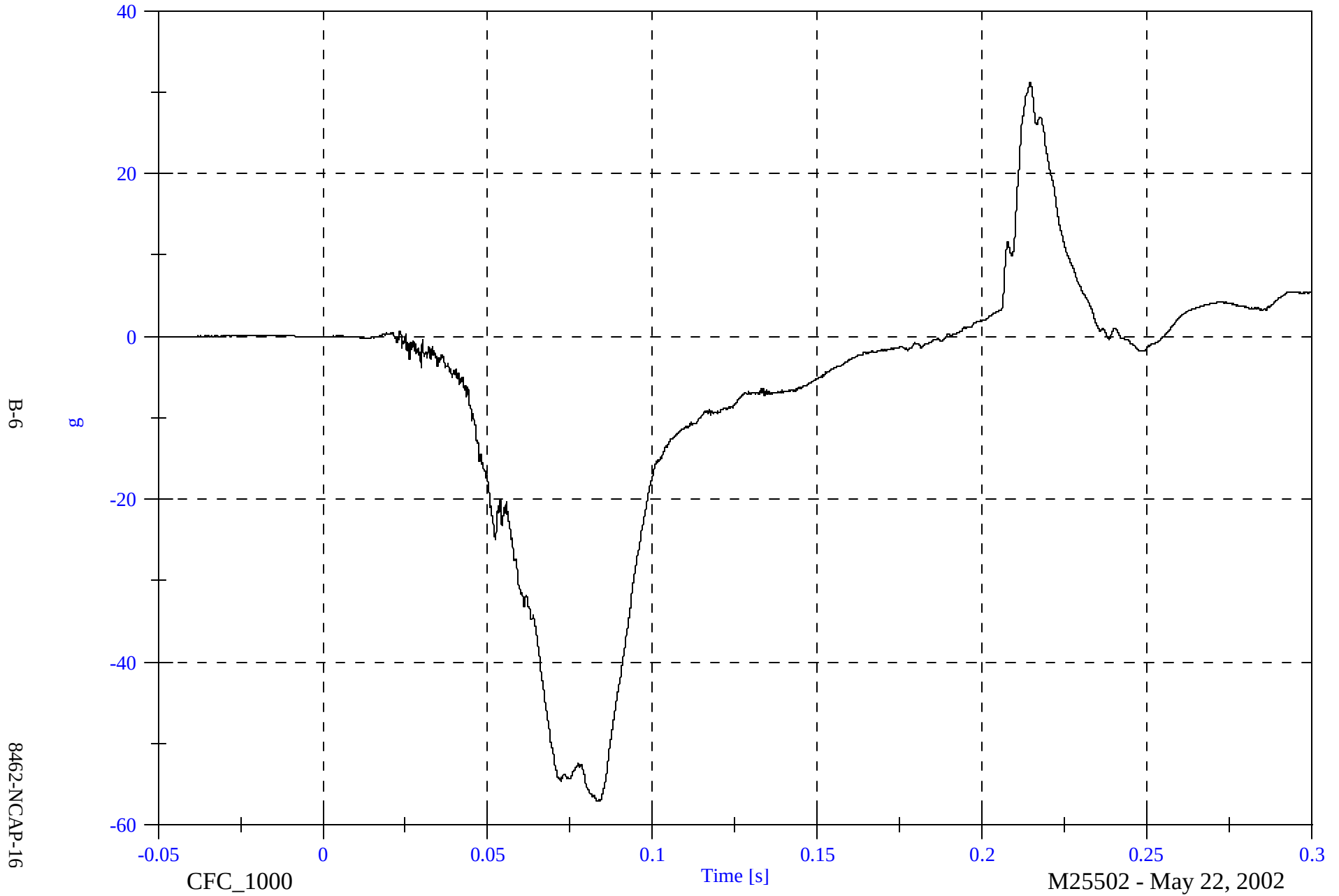


2002 NCAP Test 16 2002 Subaru Legacy

P1 Head 9 Array Y Arm Ax

Max: 31.2 [g] at 0.215 [s]

Min: -57.0 [g] at 0.083 [s]

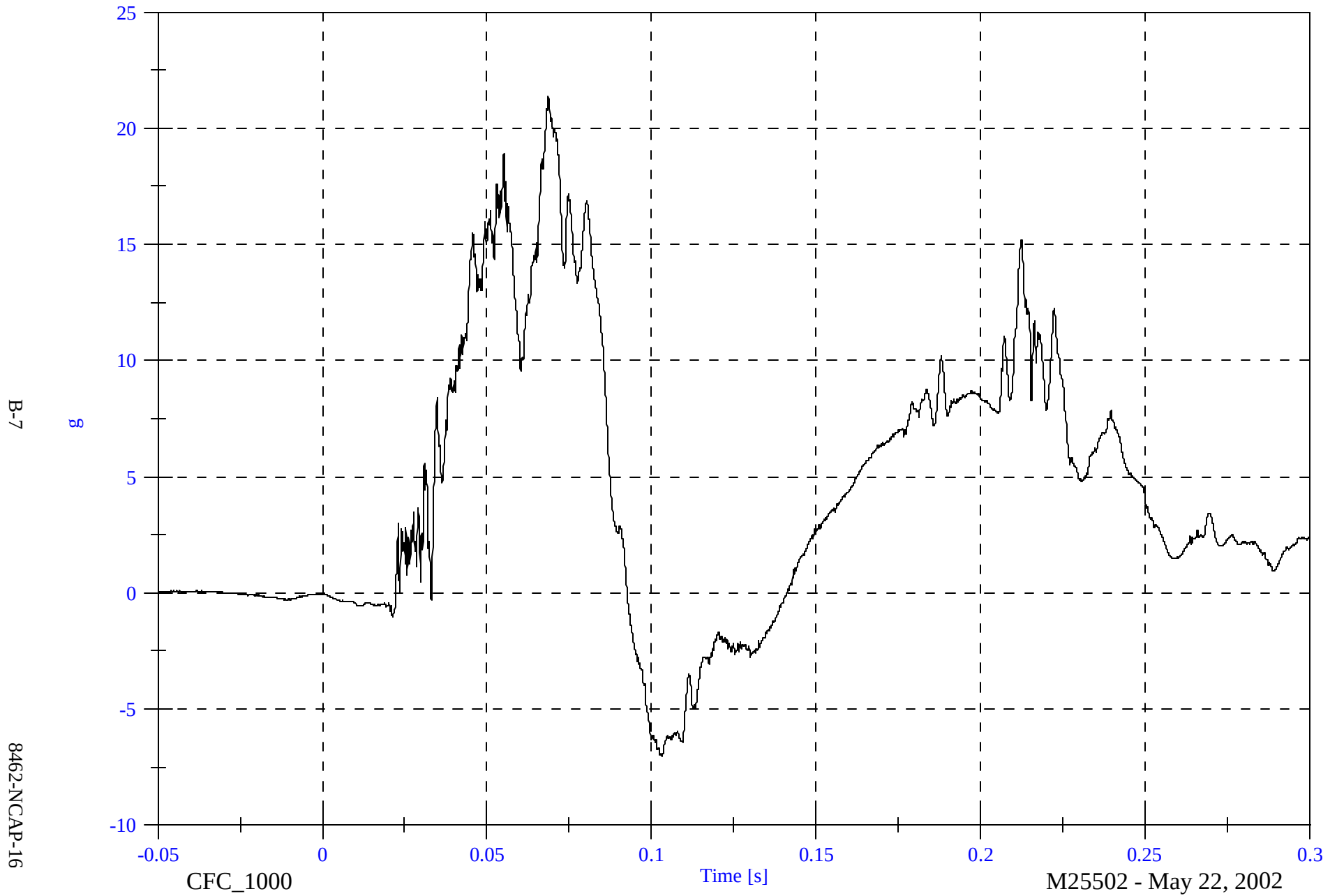


2002 NCAP Test 16 2002 Subaru Legacy

Max: 21.4 [g] at 0.069 [s]

P1 Head 9 Array Y Arm Az

Min: -7.0 [g] at 0.103 [s]

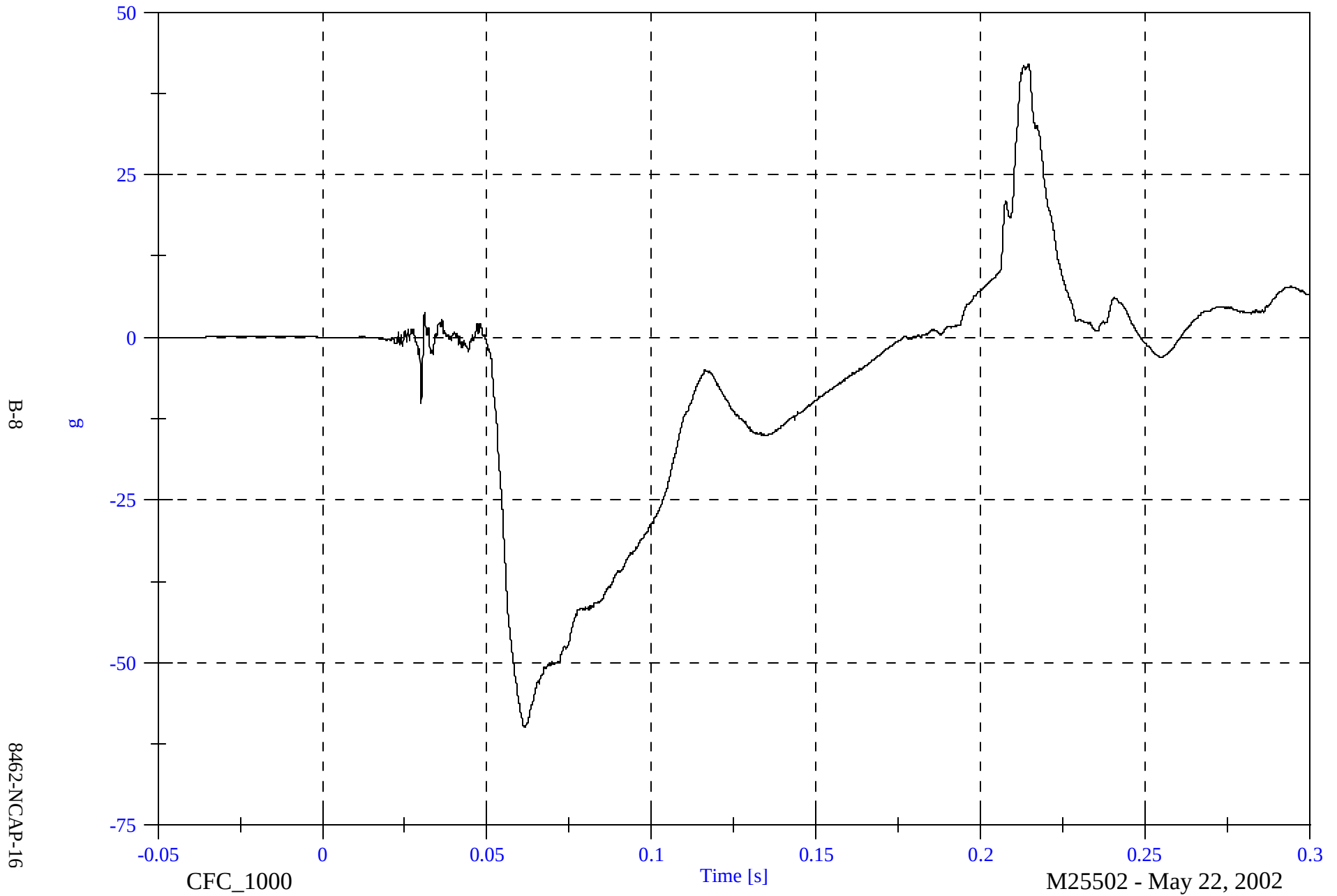


2002 NCAP Test 16 2002 Subaru Legacy

P1 Head 9 Array Z Arm Ax

Max: 41.9 [g] at 0.215 [s]

Min: -59.9 [g] at 0.061 [s]

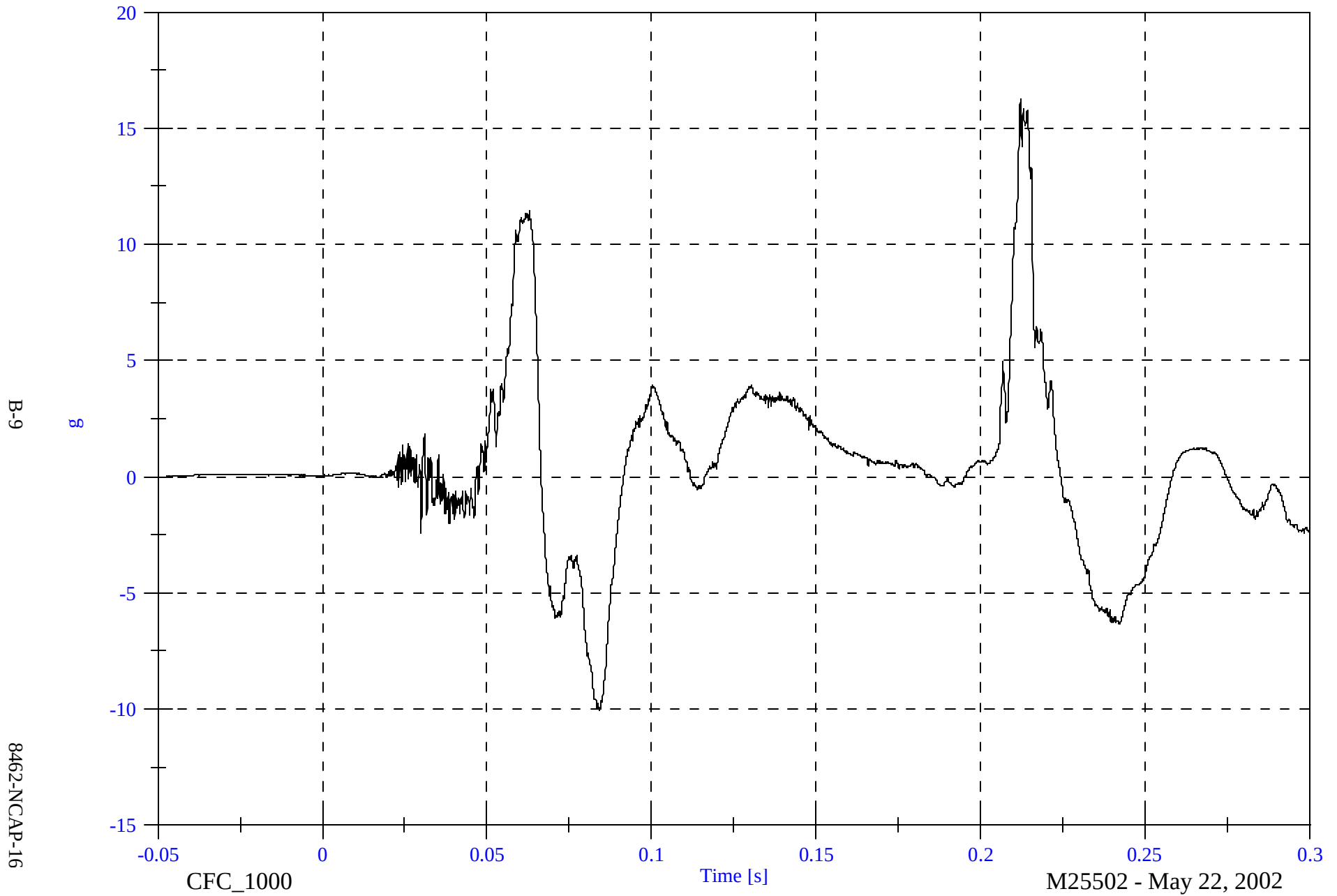


2002 NCAP Test 16 2002 Subaru Legacy

P1 Head 9 Array Z Arm Ay

Max: 16.3 [g] at 0.212 [s]

Min: -10.1 [g] at 0.084 [s]

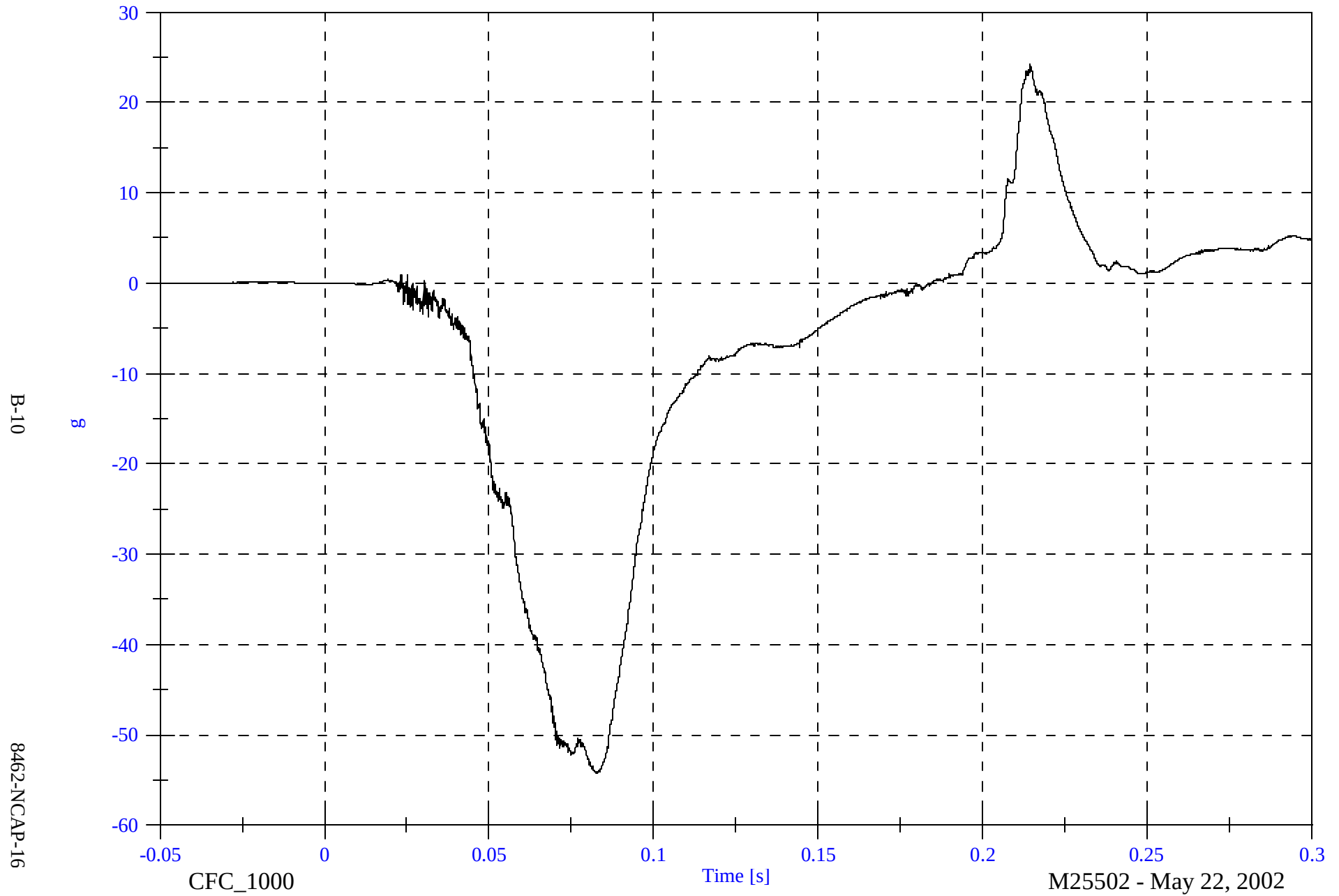


2002 NCAP Test 16 2002 Subaru Legacy

P1 Head CG x

Max: 24.2 [g] at 0.215 [s]

Min: -54.2 [g] at 0.083 [s]

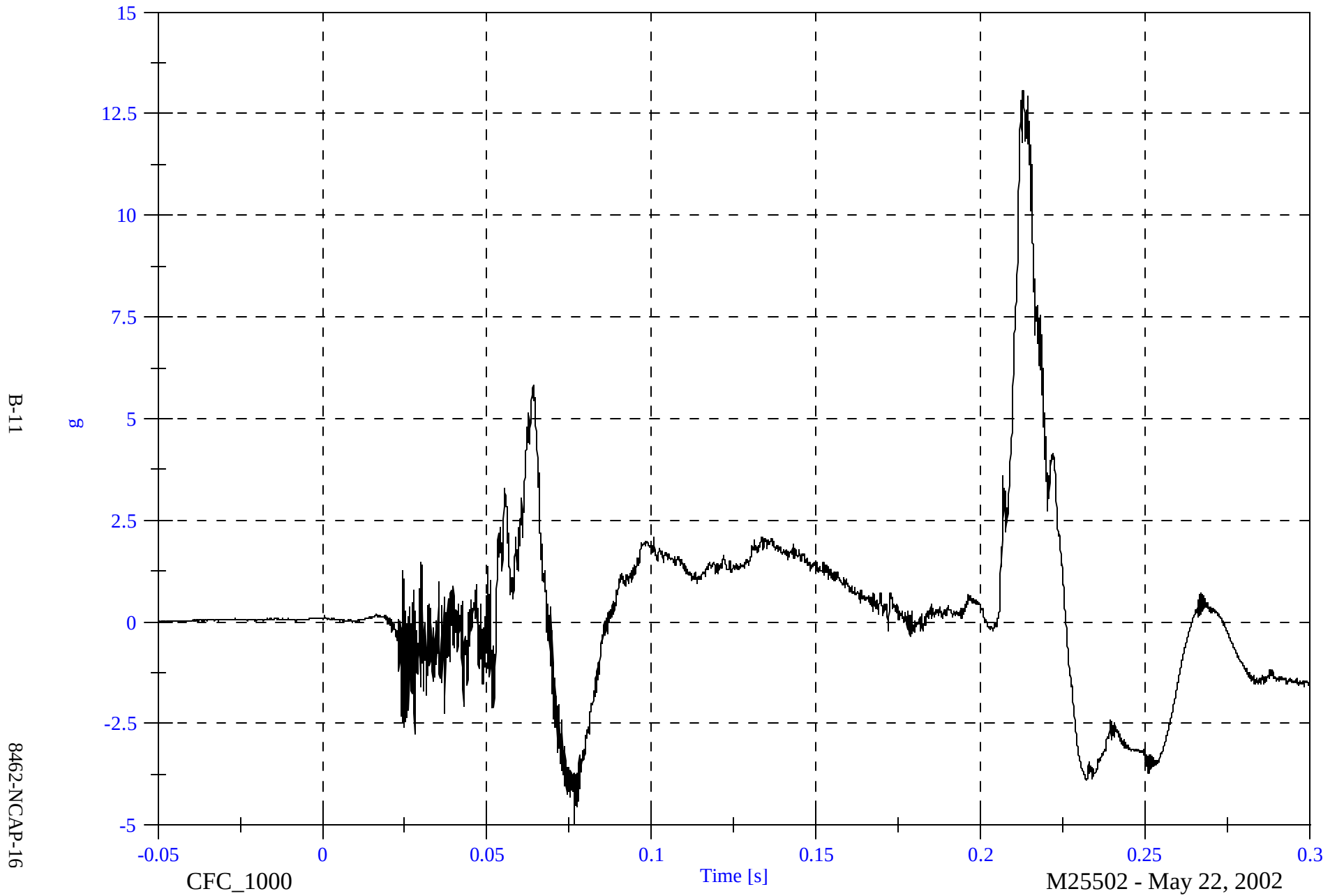


2002 NCAP Test 16 2002 Subaru Legacy

Max: 13.1 [g] at 0.213 [s]

Min: -4.9 [g] at 0.077 [s]

P1 Head CG y

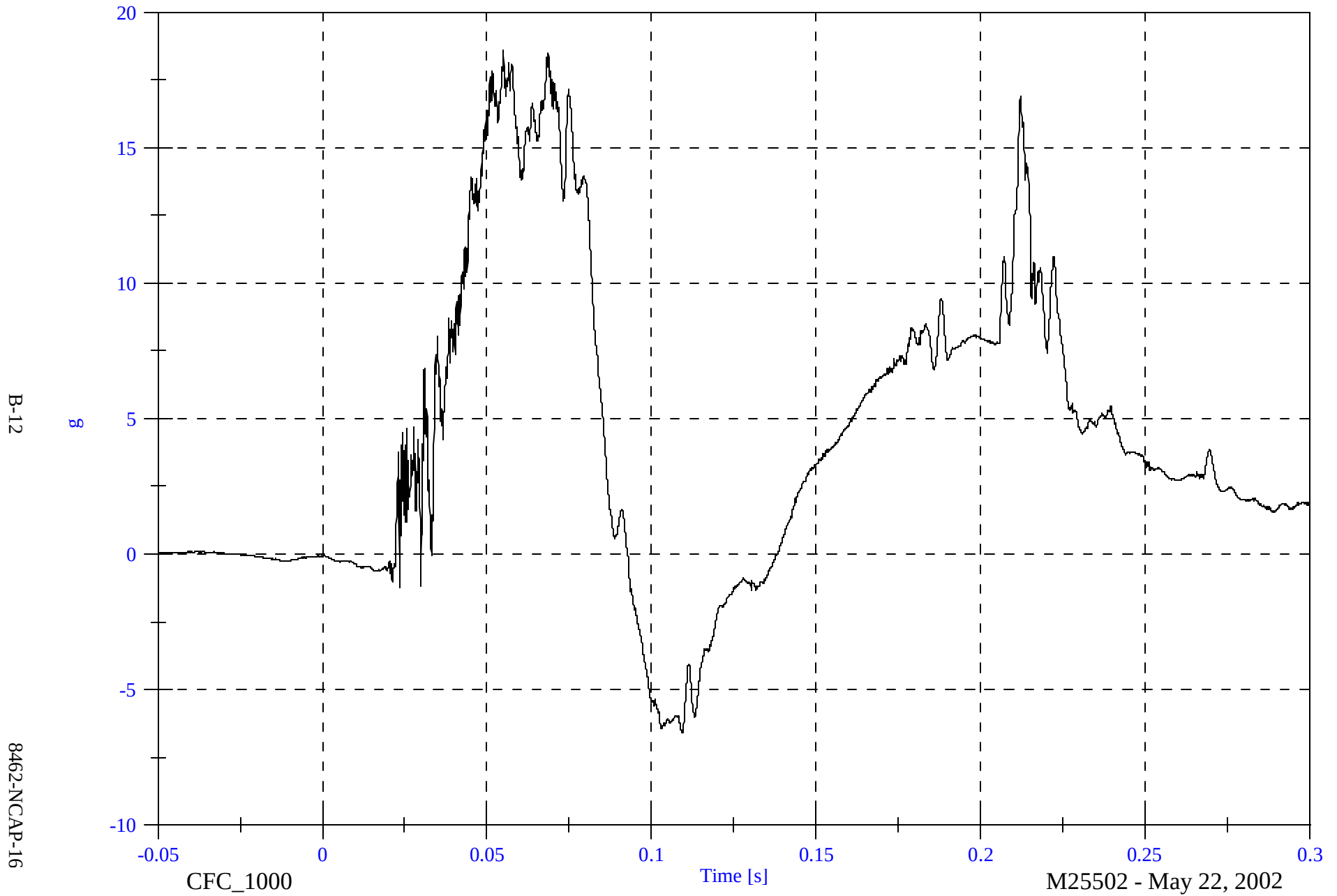


2002 NCAP Test 16 2002 Subaru Legacy

Max: 18.6 [g] at 0.055 [s]

Min: -6.6 [g] at 0.109 [s]

P1 Head CG z



2002 NCAP Test 16 2002 Subaru Legacy

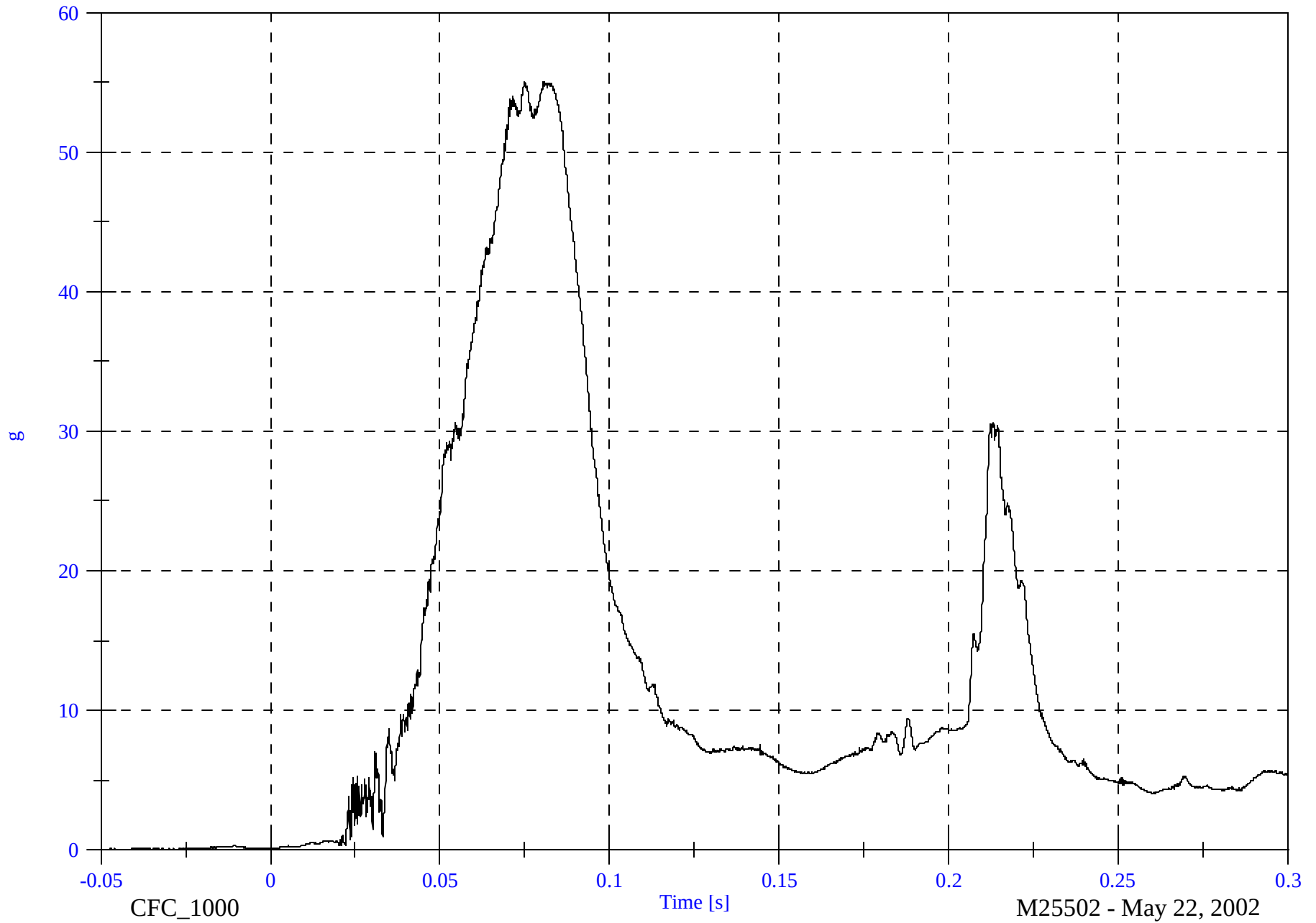
P1 Head CG Resultant

Max: 55.0 [g] at 0.075 [s]

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

B-13

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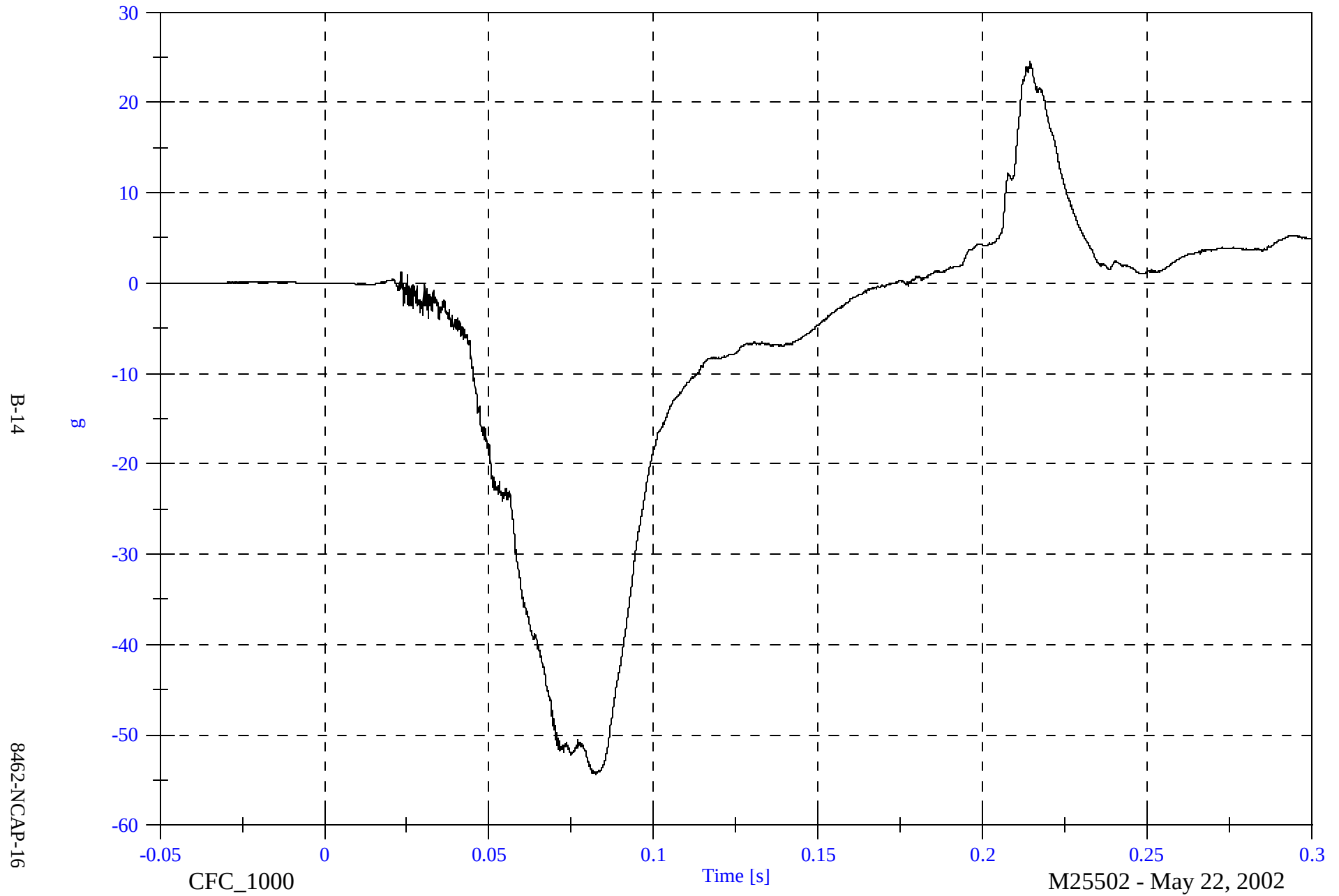


2002 NCAP Test 16 2002 Subaru Legacy

P1 Head CG Red x

Max: 24.5 [g] at 0.215 [s]

Min: -54.3 [g] at 0.082 [s]

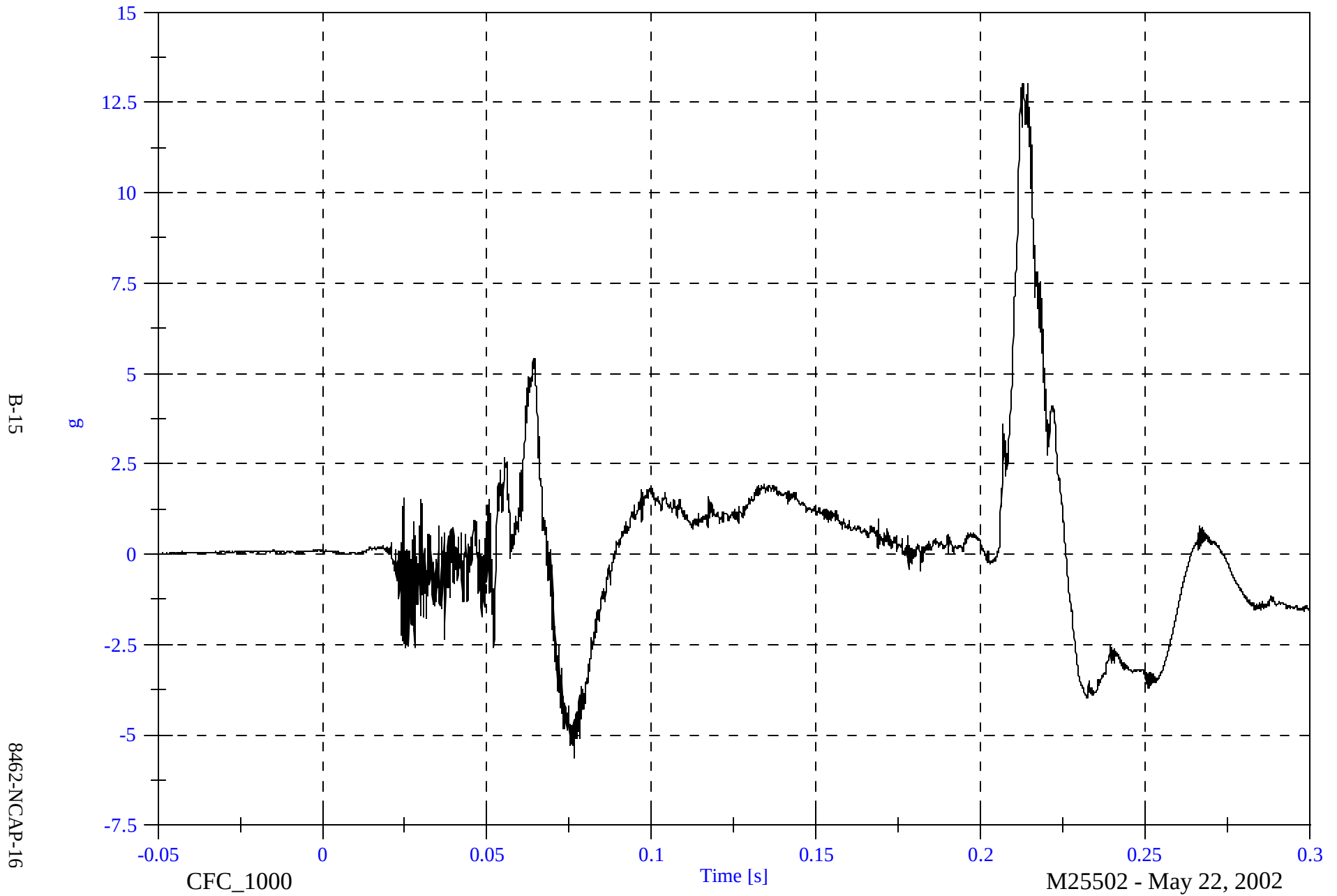


2002 NCAP Test 16 2002 Subaru Legacy

Max: 13.0 [g] at 0.213 [s]

Min: -5.6 [g] at 0.077 [s]

P1 Head CG Red y

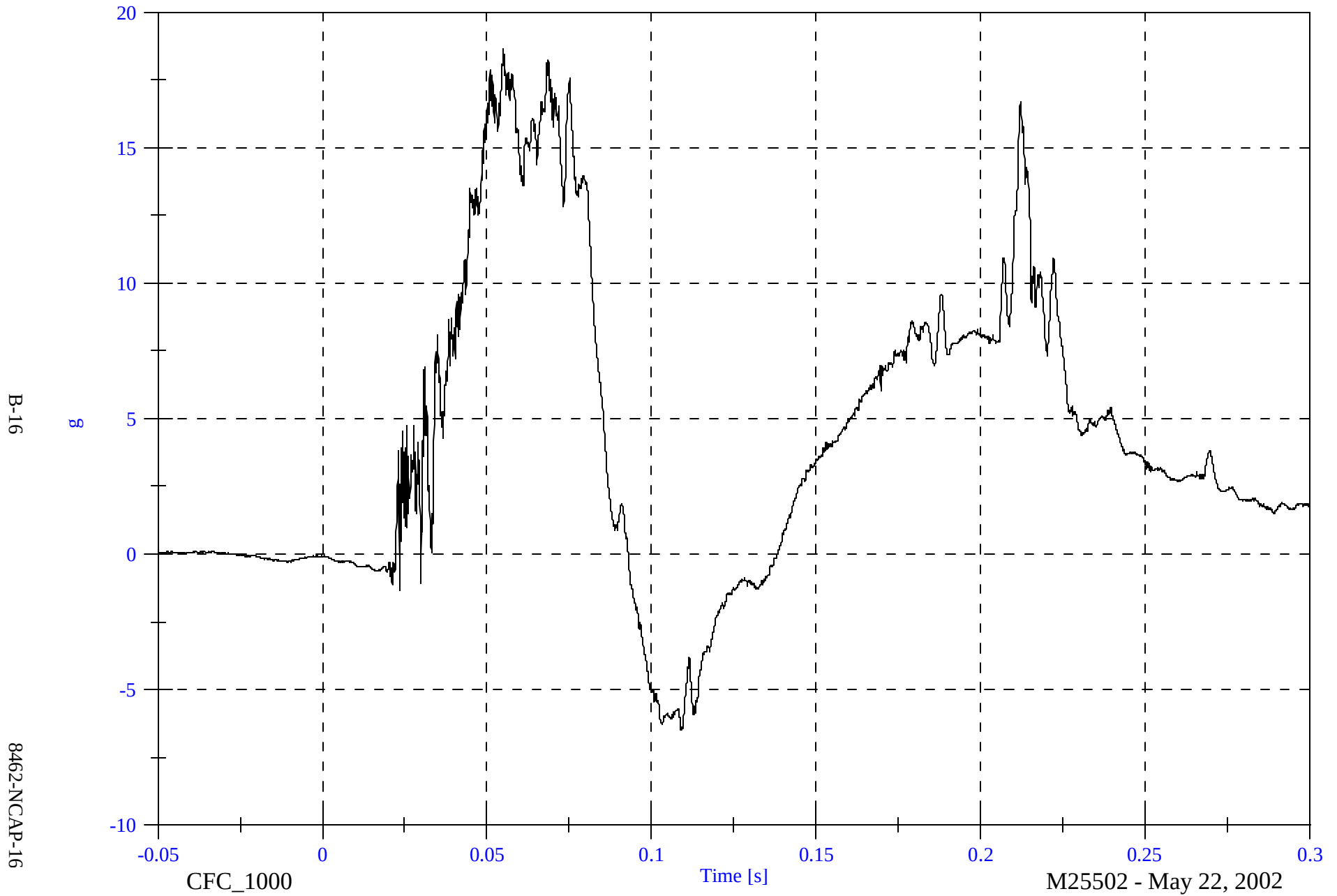


2002 NCAP Test 16 2002 Subaru Legacy

P1 Head CG Red z

Max: 18.6 [g] at 0.055 [s]

Min: -6.5 [g] at 0.109 [s]



2002 NCAP Test 16 2002 Subaru Legacy

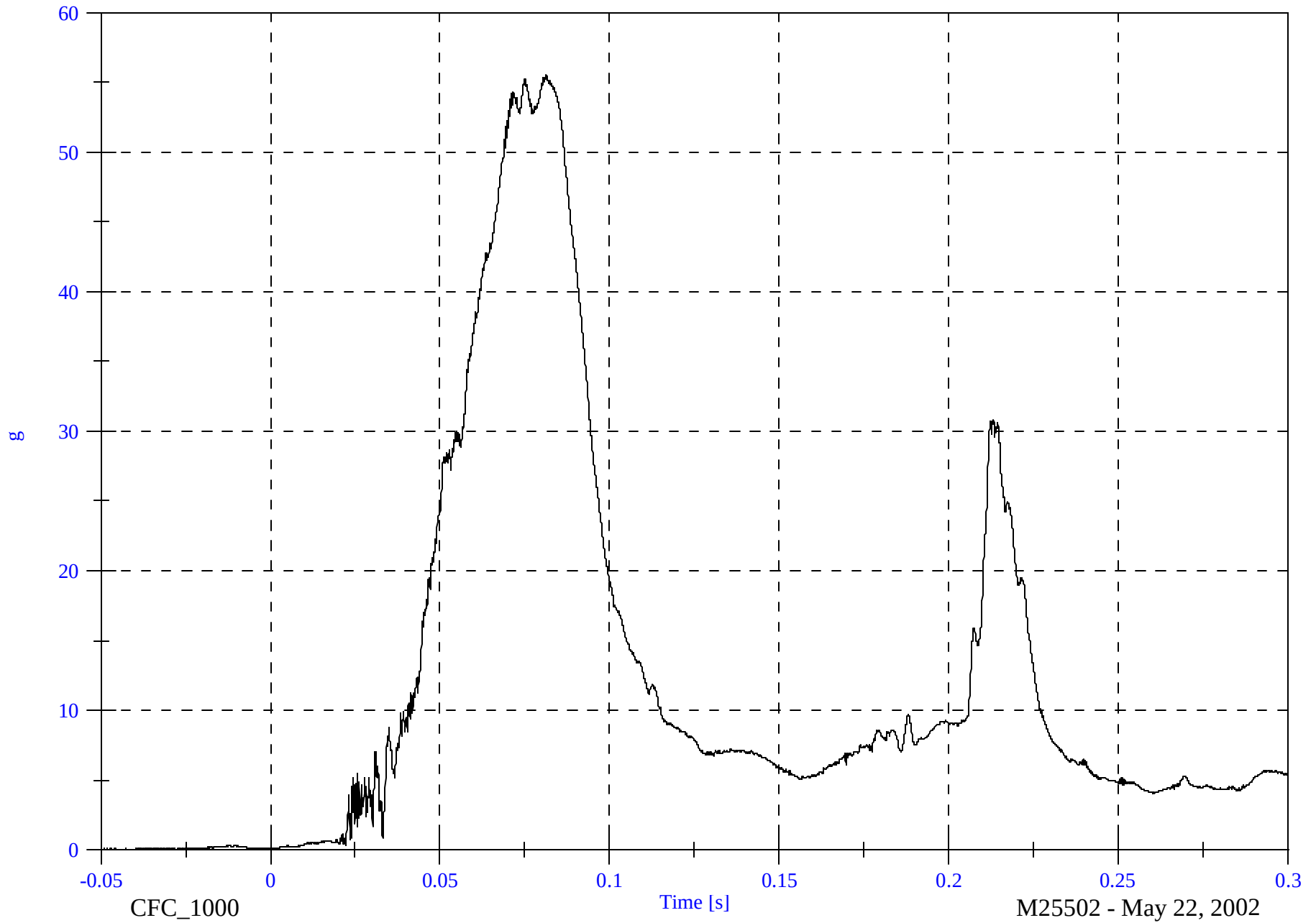
P1 Head CG Red Resultant

Max: 55.5 [g] at 0.081 [s]

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

B-17

8462-NCAP-16

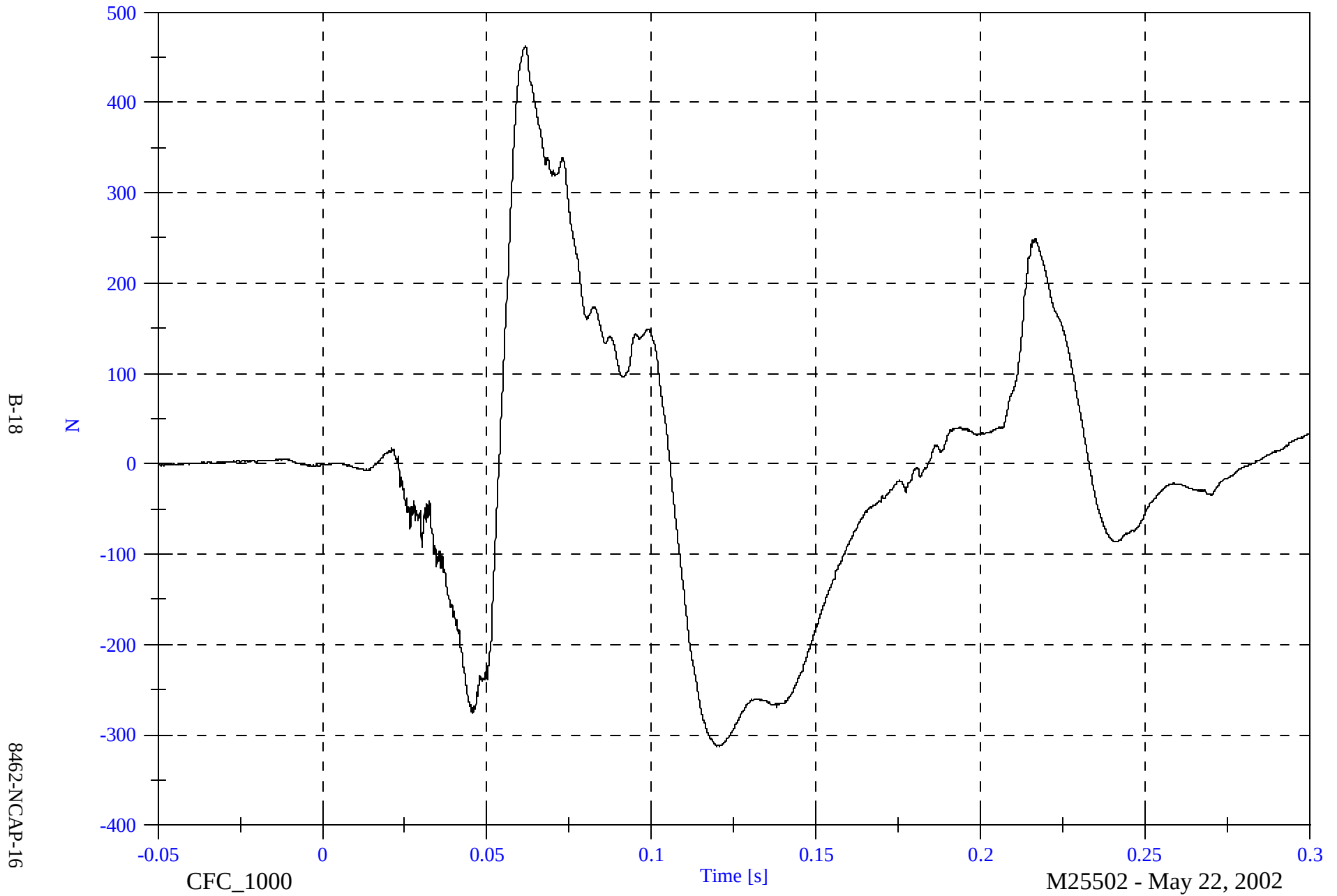


2002 NCAP Test 16 2002 Subaru Legacy

Max: 461.9 [N] at 0.062 [s]

Min: -312.7 [N] at 0.121 [s]

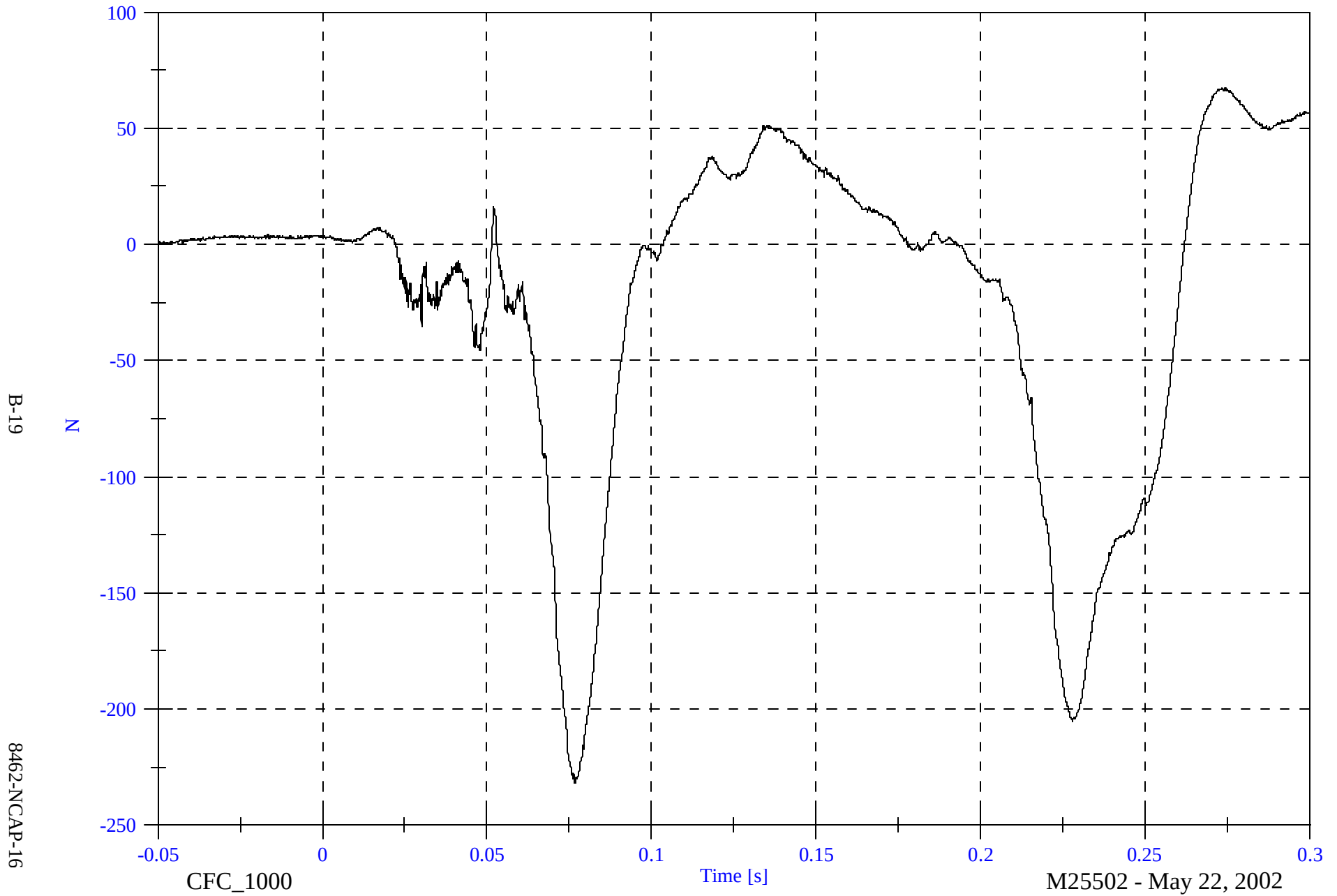
P1 Upper Neck Fx



2002 NCAP Test 16 2002 Subaru Legacy

Max: 67.4 [N] at 0.274 [s]
Min: -231.5 [N] at 0.077 [s]

P1 Upper Neck Fy

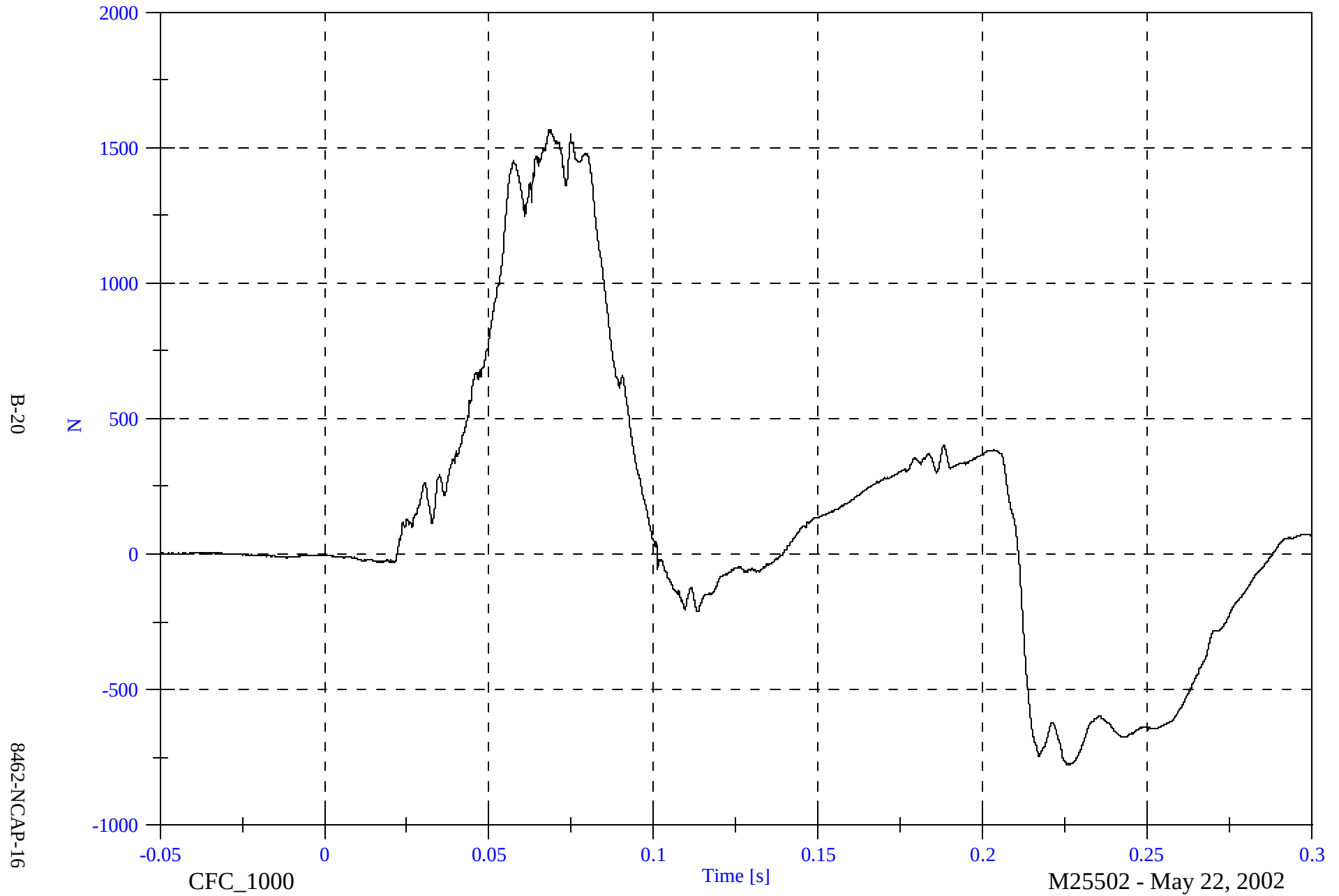


2002 NCAP Test 16 2002 Subaru Legacy

Max: 1566.9 [N] at 0.069 [s]

Min: -776.6 [N] at 0.226 [s]

P1 Upper Neck Fz



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CFC_1000

Time [s]

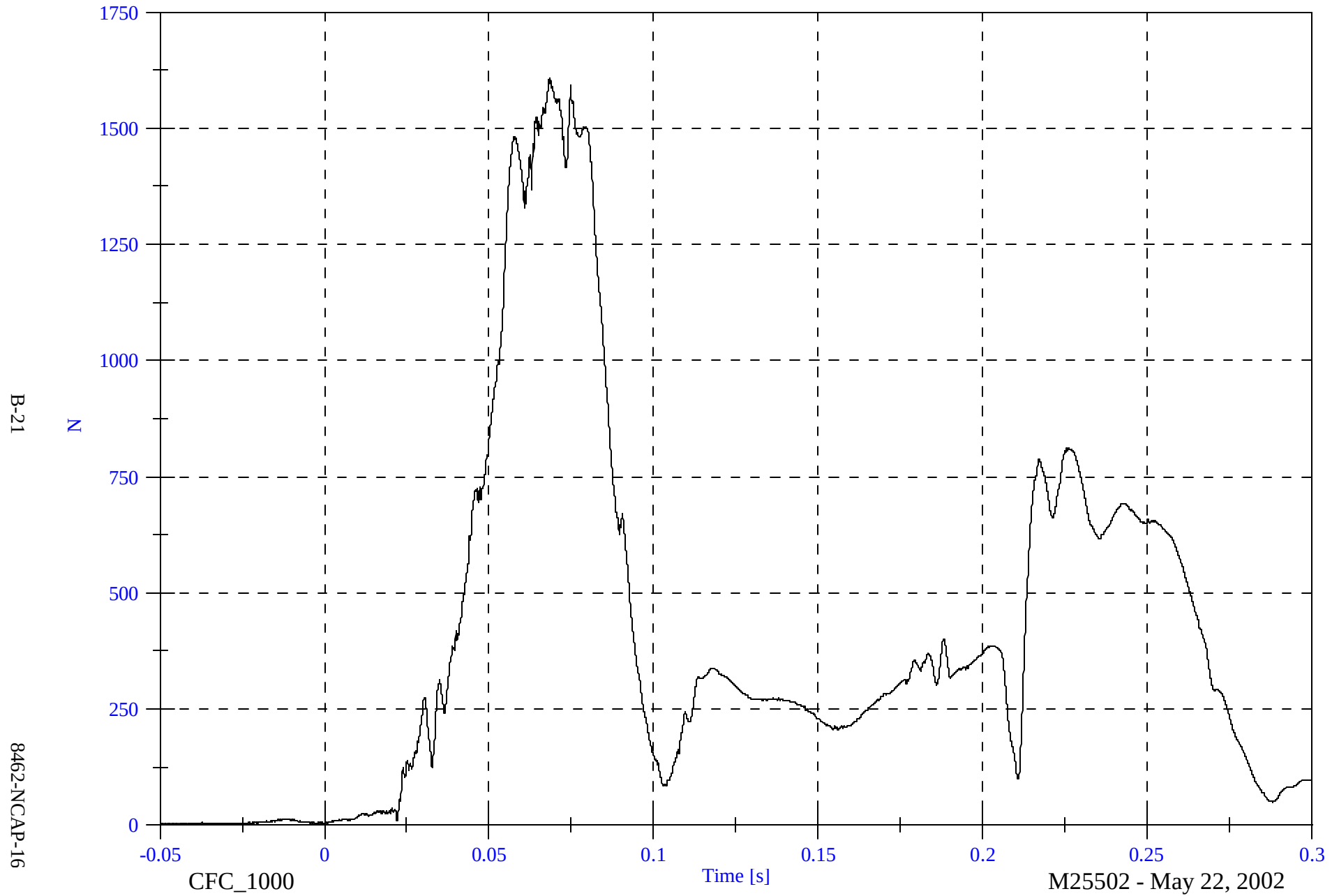
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Max: 1606.8 [N] at 0.069 [s]

Min: 1.5 [N] at -0.049 [s]

P1 Upper Neck F Resultant

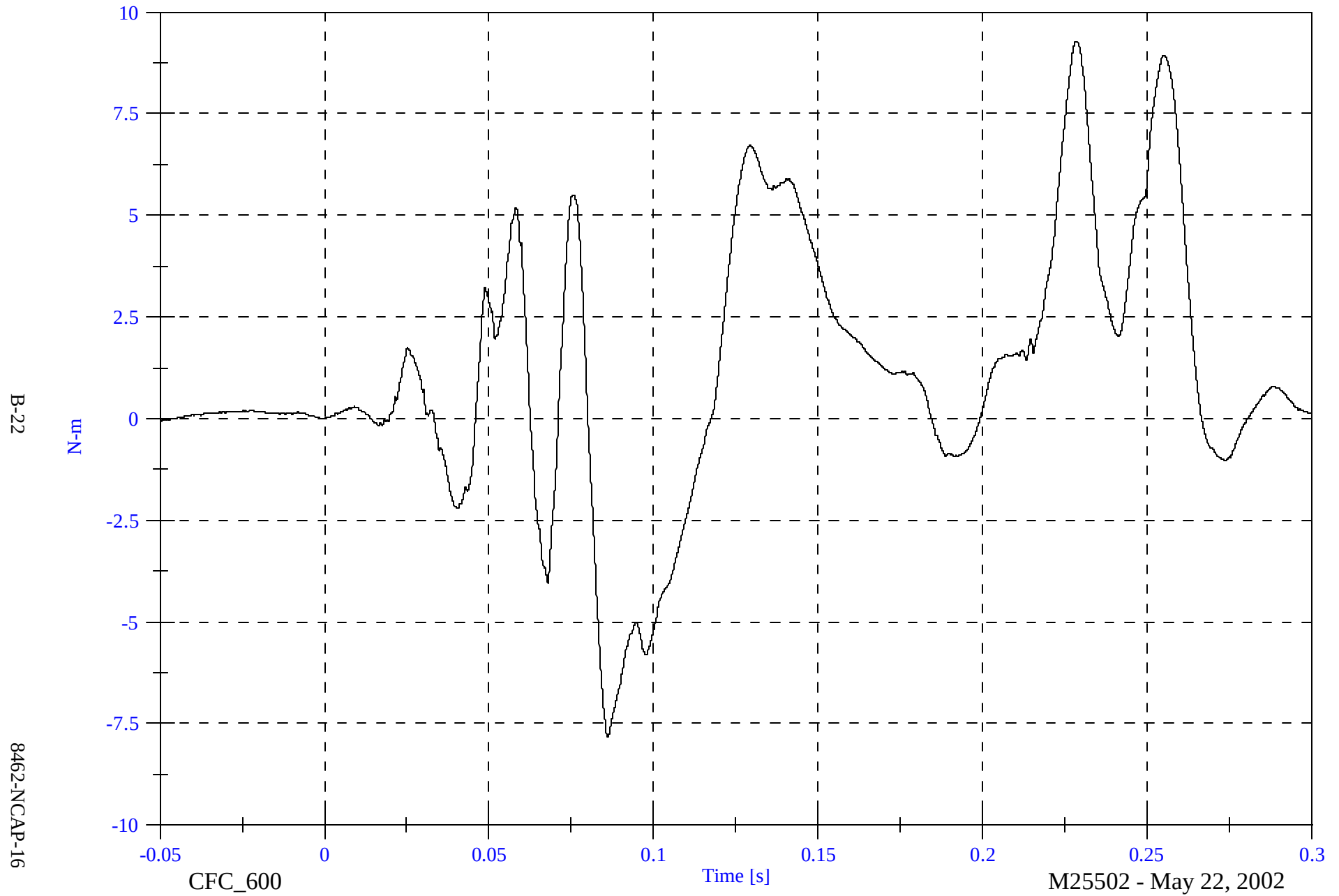


2002 NCAP Test 16 2002 Subaru Legacy

P1 Upper Neck Mx

Max: 9.3 [N-m] at 0.229 [s]

Min: -7.8 [N-m] at 0.086 [s]



2002 NCAP Test 16 2002 Subaru Legacy

Max: 46.3 [N-m] at 0.060 [s]

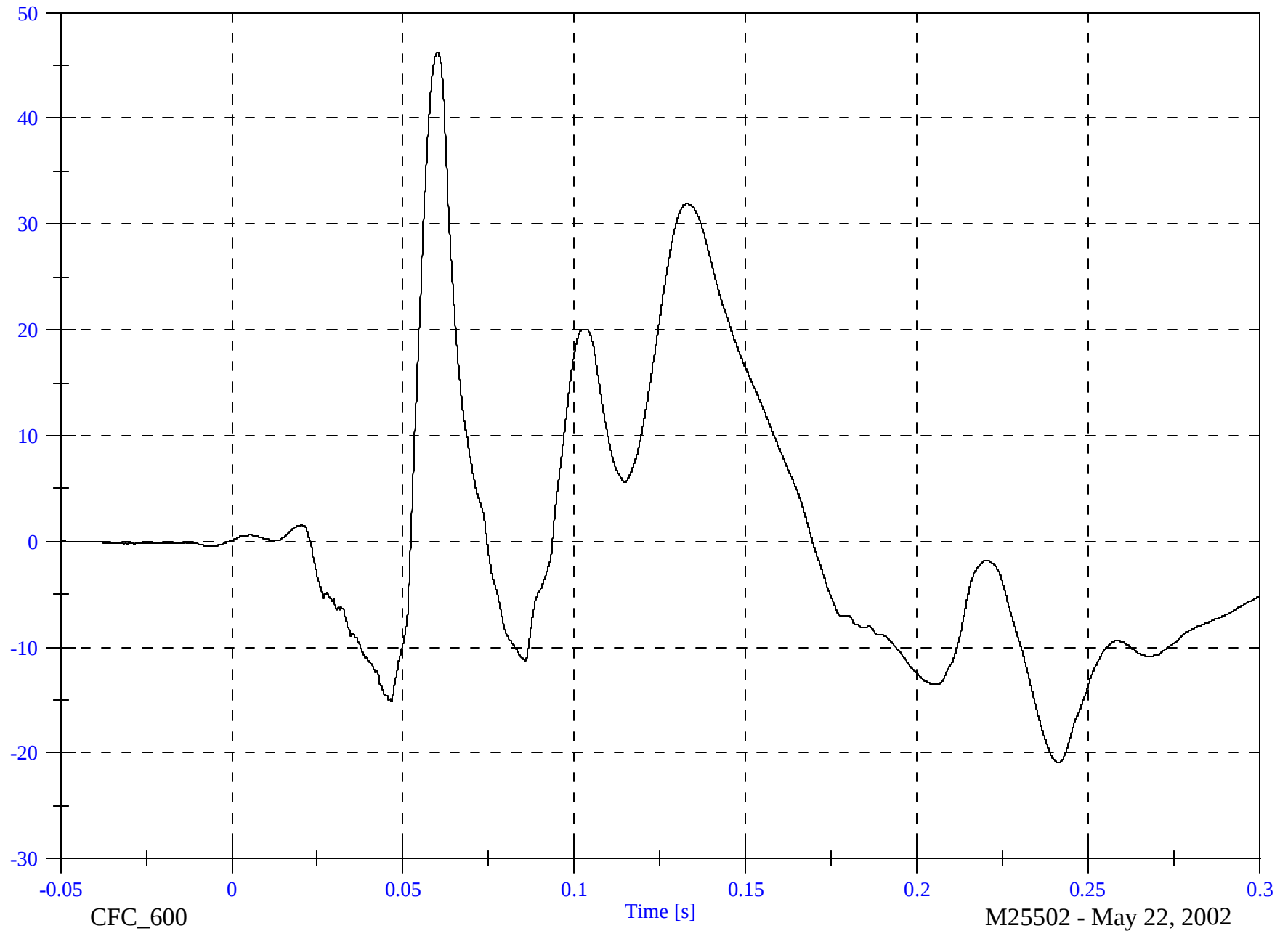
Min: -20.9 [N-m] at 0.242 [s]

P1 Upper Neck My

B-23

N-m

8462-NCAP-16

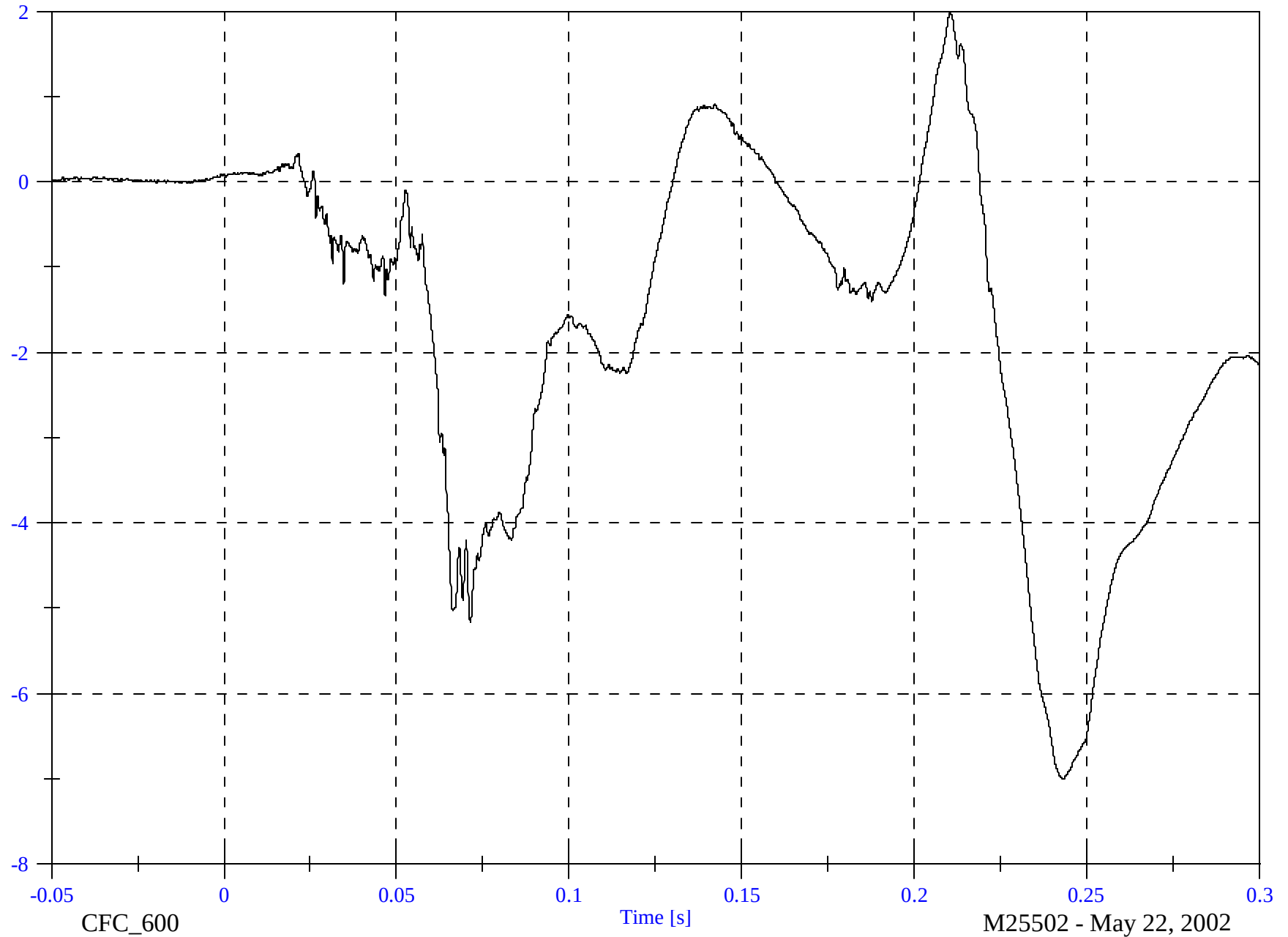


2002 NCAP Test 16 2002 Subaru Legacy

Max: 2.0 [N-m] at 0.210 [s]

Min: -7.0 [N-m] at 0.244 [s]

P1 Upper Neck Mz



B-24

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CFC_600

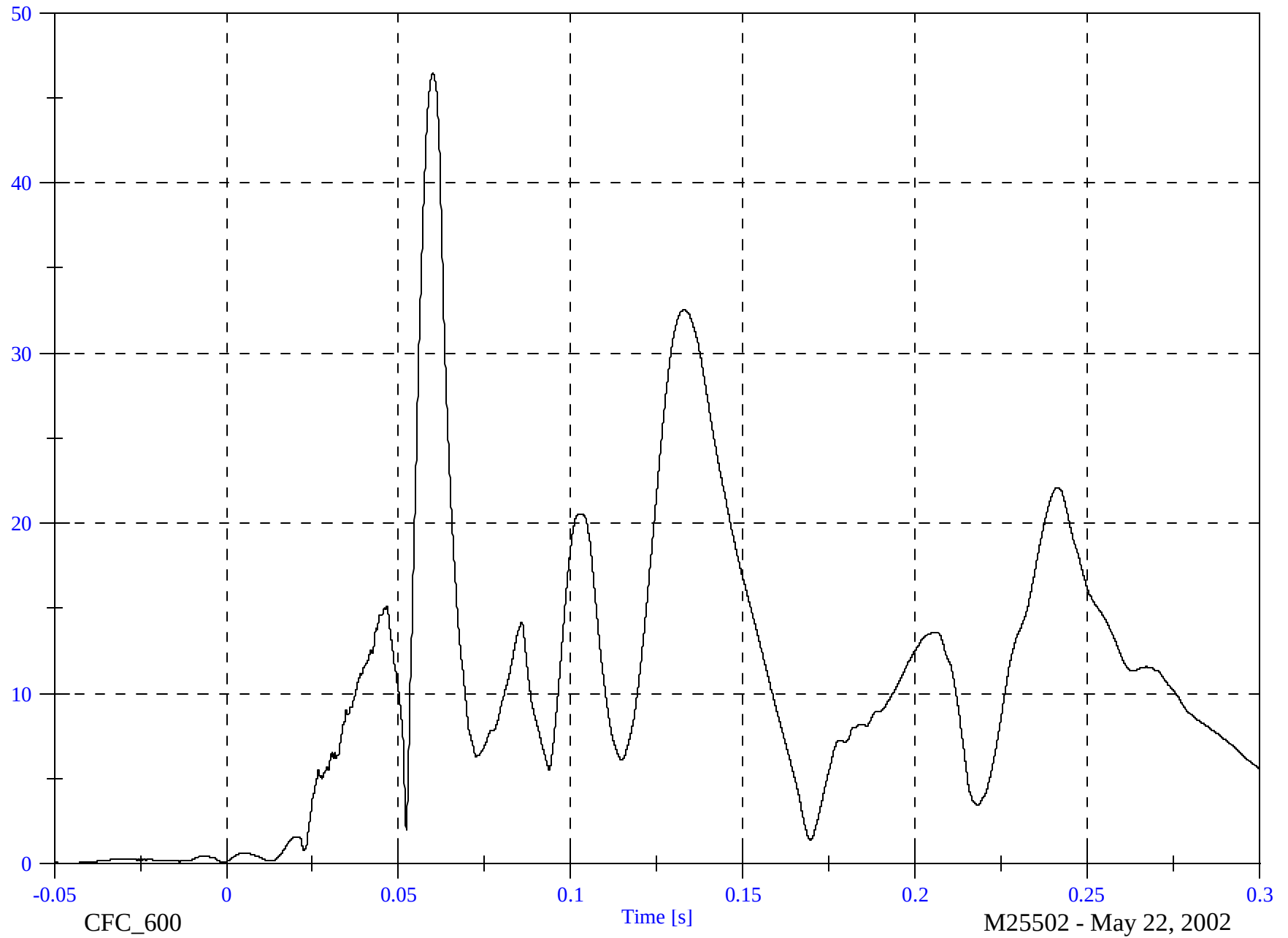
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

P1 Upper Neck M Resultant

Max: 46.5 [N-m] at 0.060 [s]

Min: 0.0 [N-m] at -0.046 [s]



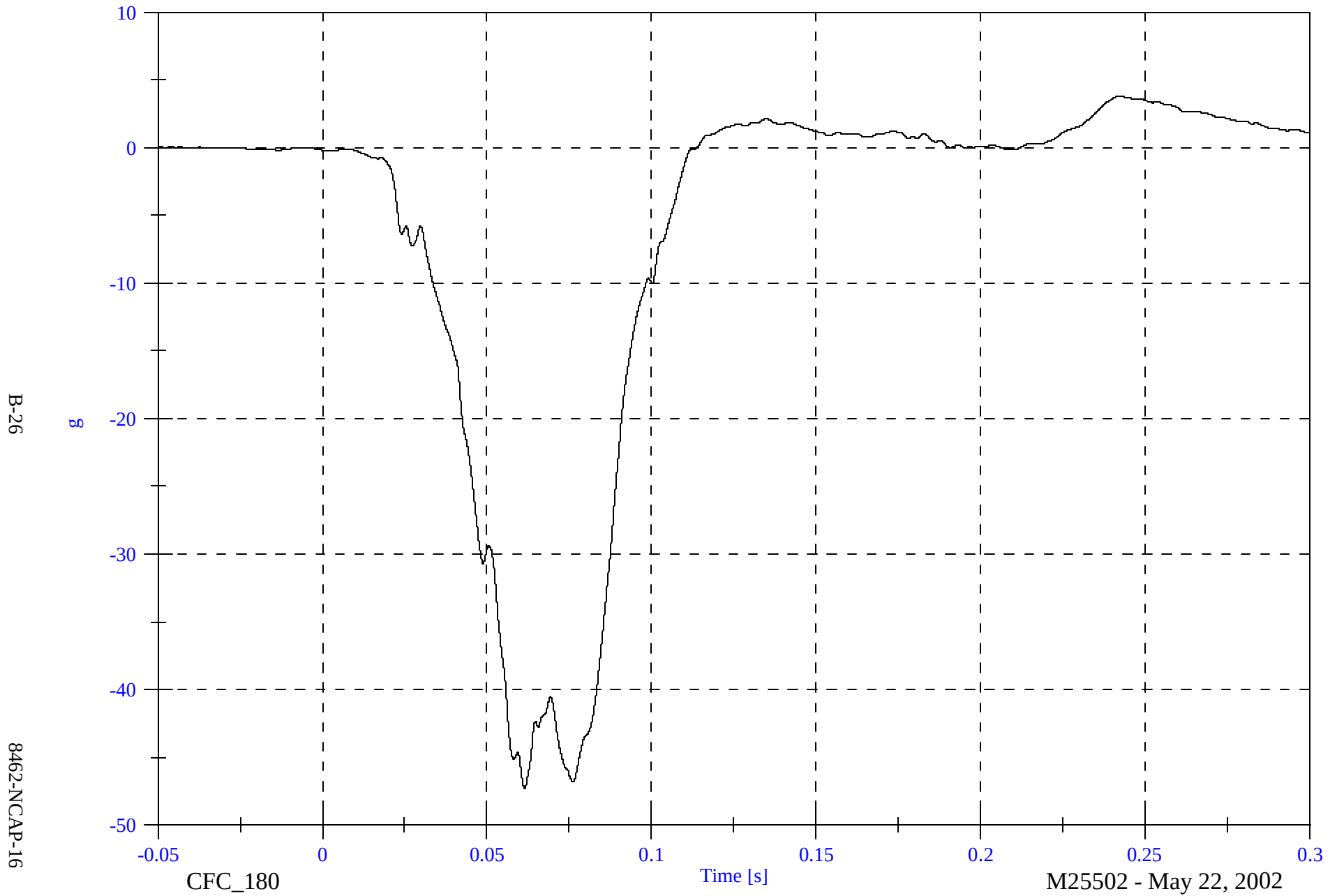
B-25

8462-NCAP-16

2002 NCAP Test 16 2002 Subaru Legacy

Max: 3.8 [g] at 0.242 [s]
Min: -47.3 [g] at 0.061 [s]

P1 Chest x

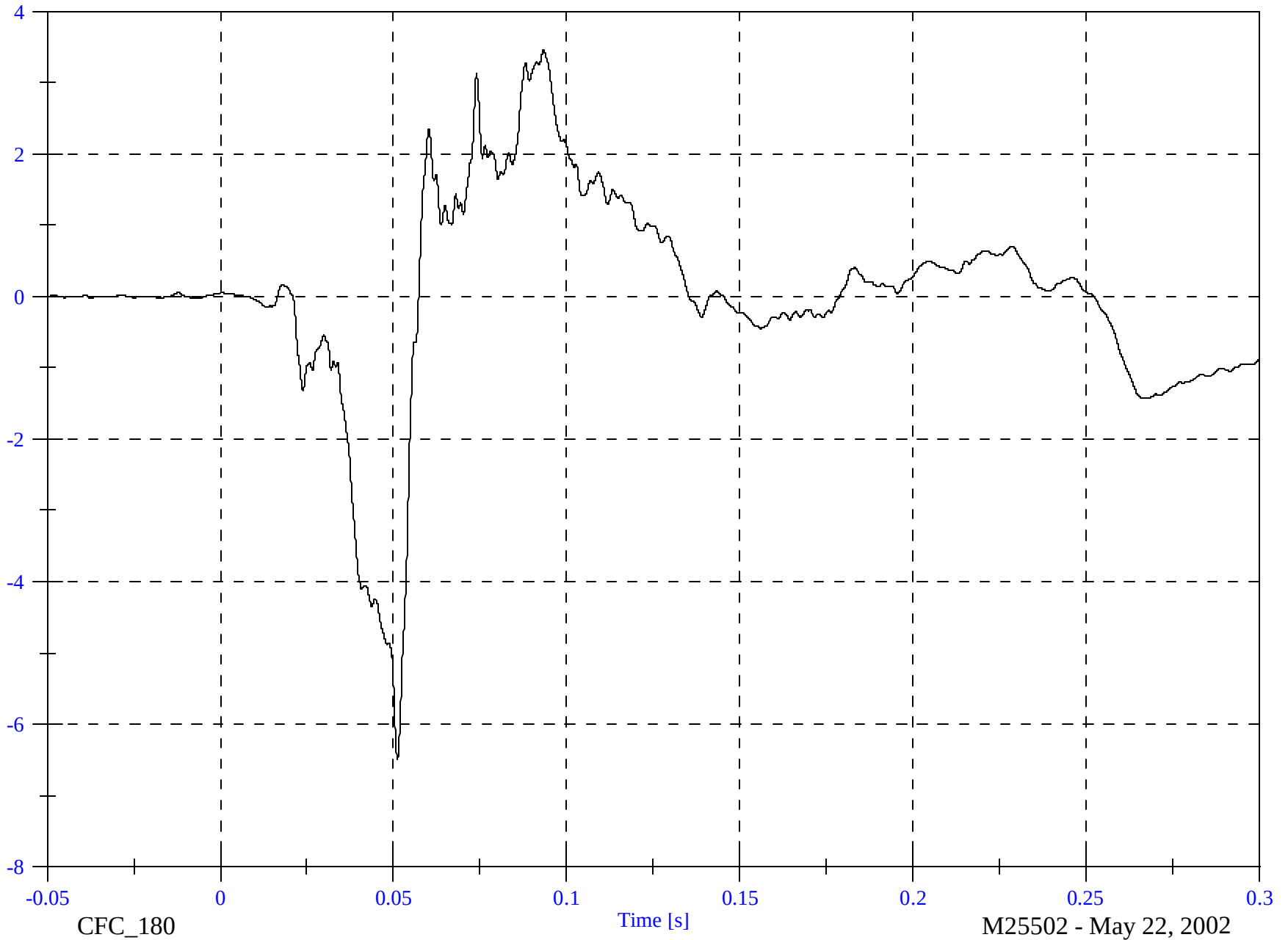


2002 NCAP Test 16 2002 Subaru Legacy

Max: 3.5 [g] at 0.093 [s]

Min: -6.5 [g] at 0.051 [s]

P1 Chest y



B-27

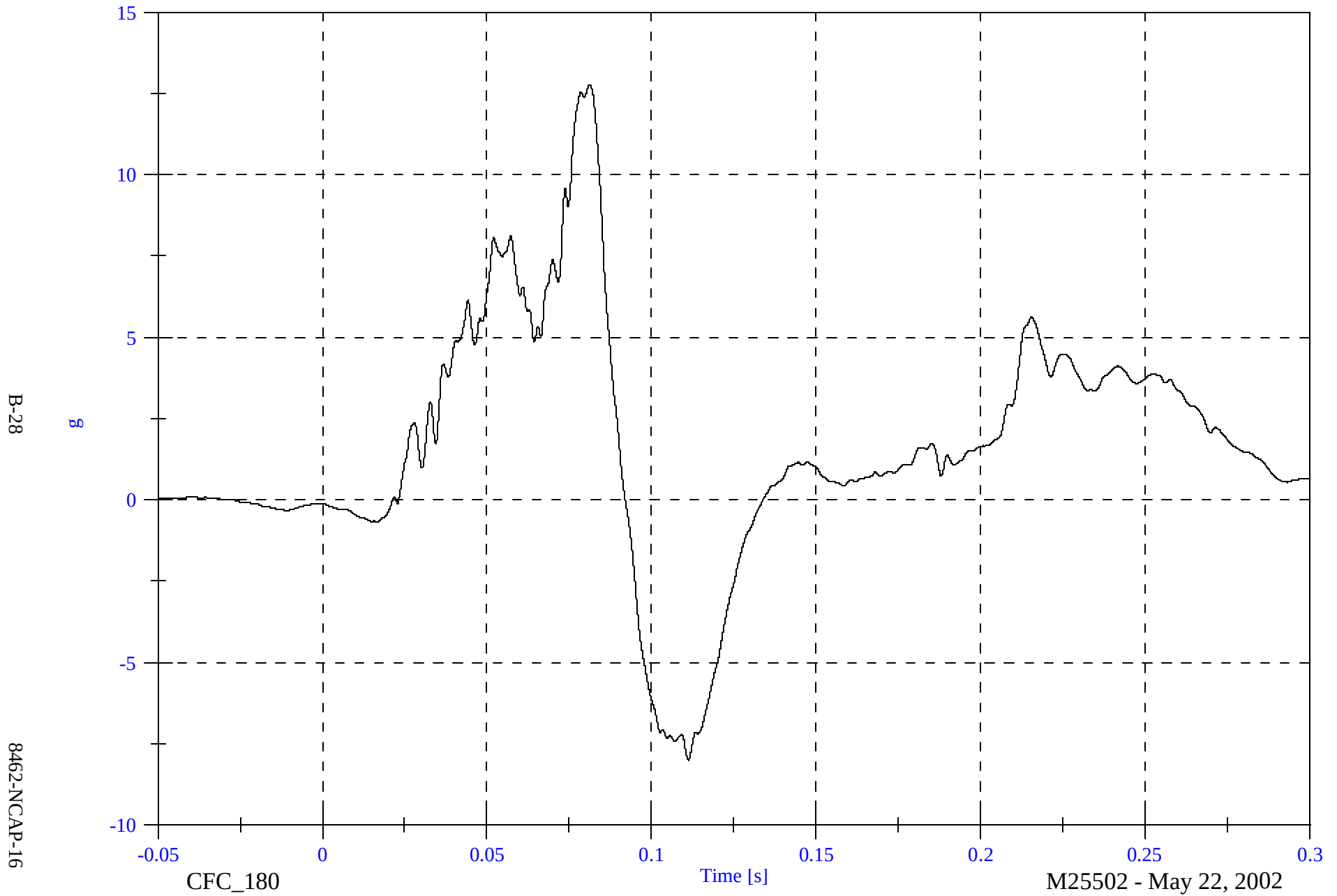
8462-NCAP-16

2002 NCAP Test 16 2002 Subaru Legacy

Max: 12.7 [g] at 0.081 [s]

Min: -8.0 [g] at 0.111 [s]

P1 Chest z



2002 NCAP Test 16 2002 Subaru Legacy

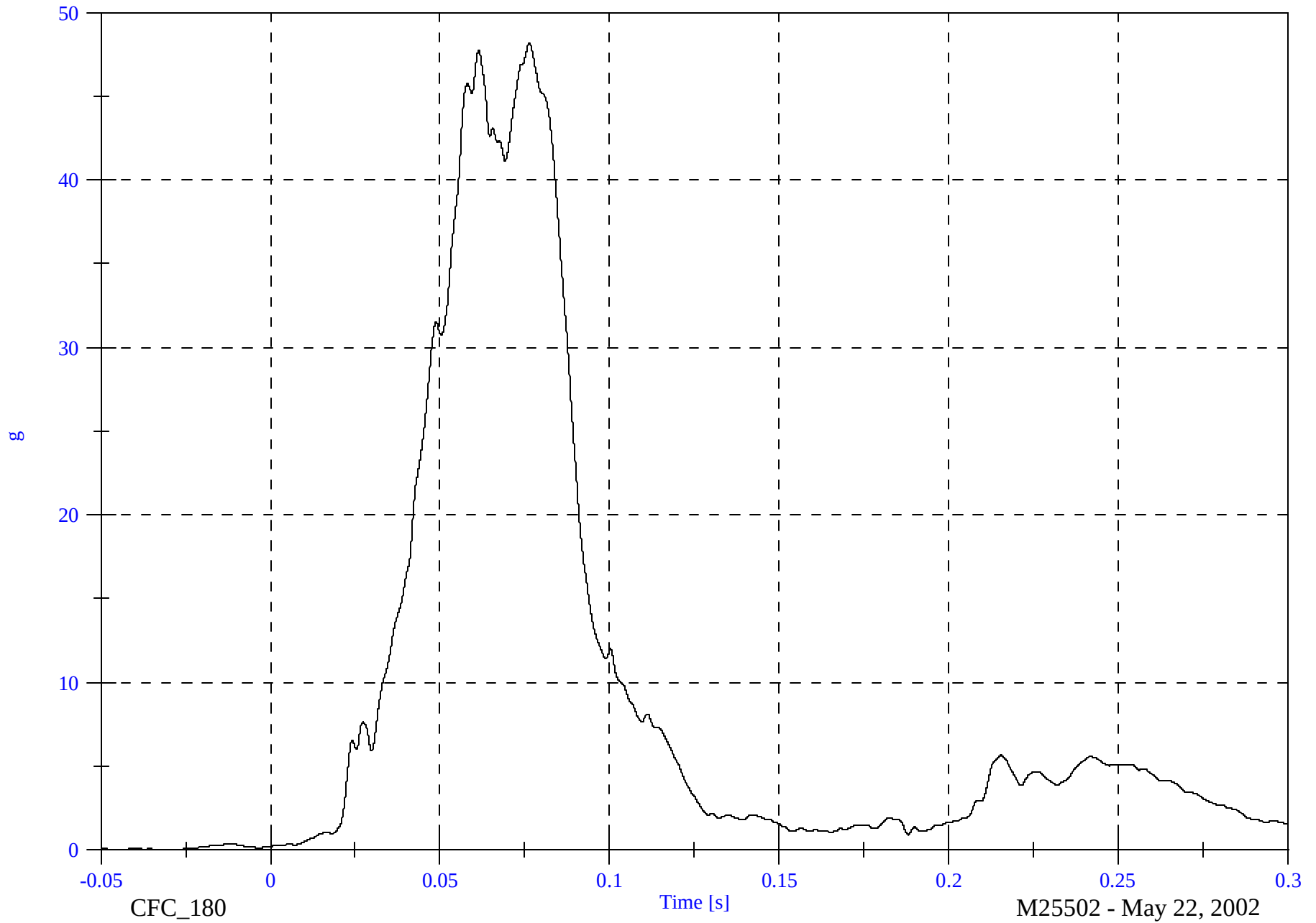
P1 Chest Resultant

Max: 48.2 [g] at 0.076 [s]

Min: 0.0 [g] at -0.028 [s]

B-29

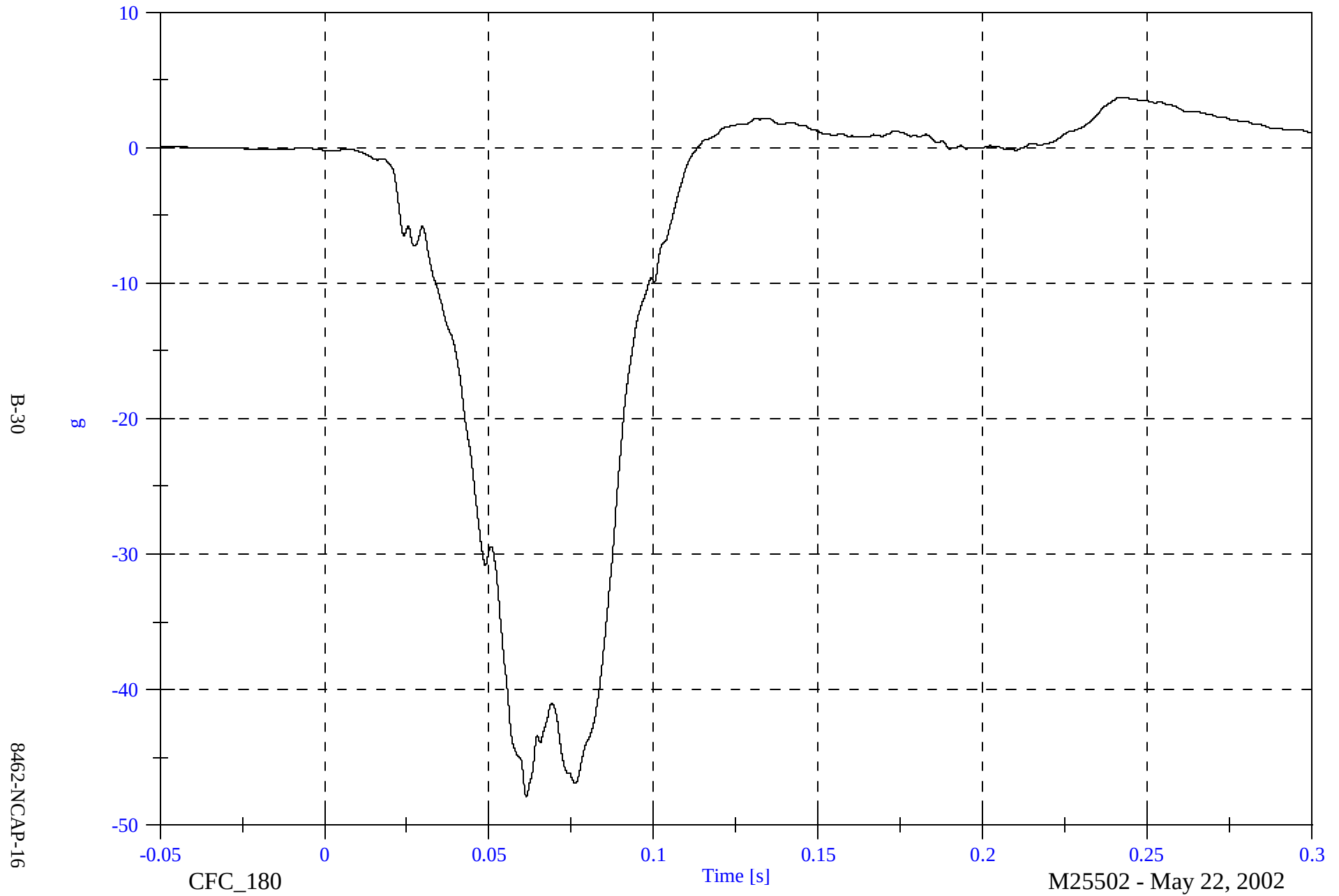
8462-NCAP-16



2002 NCAP Test 16 2002 Subaru Legacy

Max: 3.7 [g] at 0.243 [s]
Min: -47.9 [g] at 0.061 [s]

P1 Chest Red x

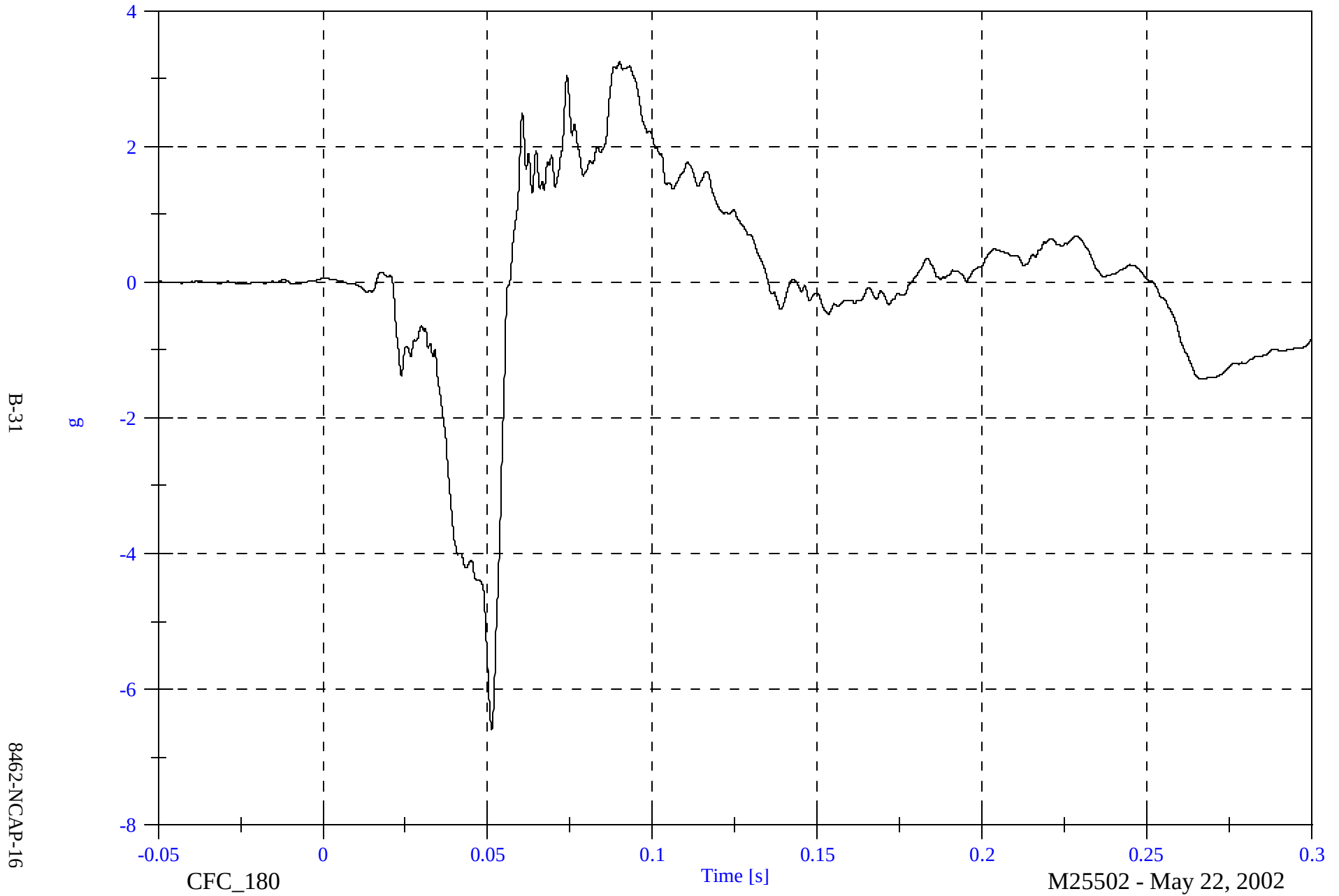


2002 NCAP Test 16 2002 Subaru Legacy

Max: 3.2 [g] at 0.090 [s]

Min: -6.6 [g] at 0.051 [s]

P1 Chest Red y

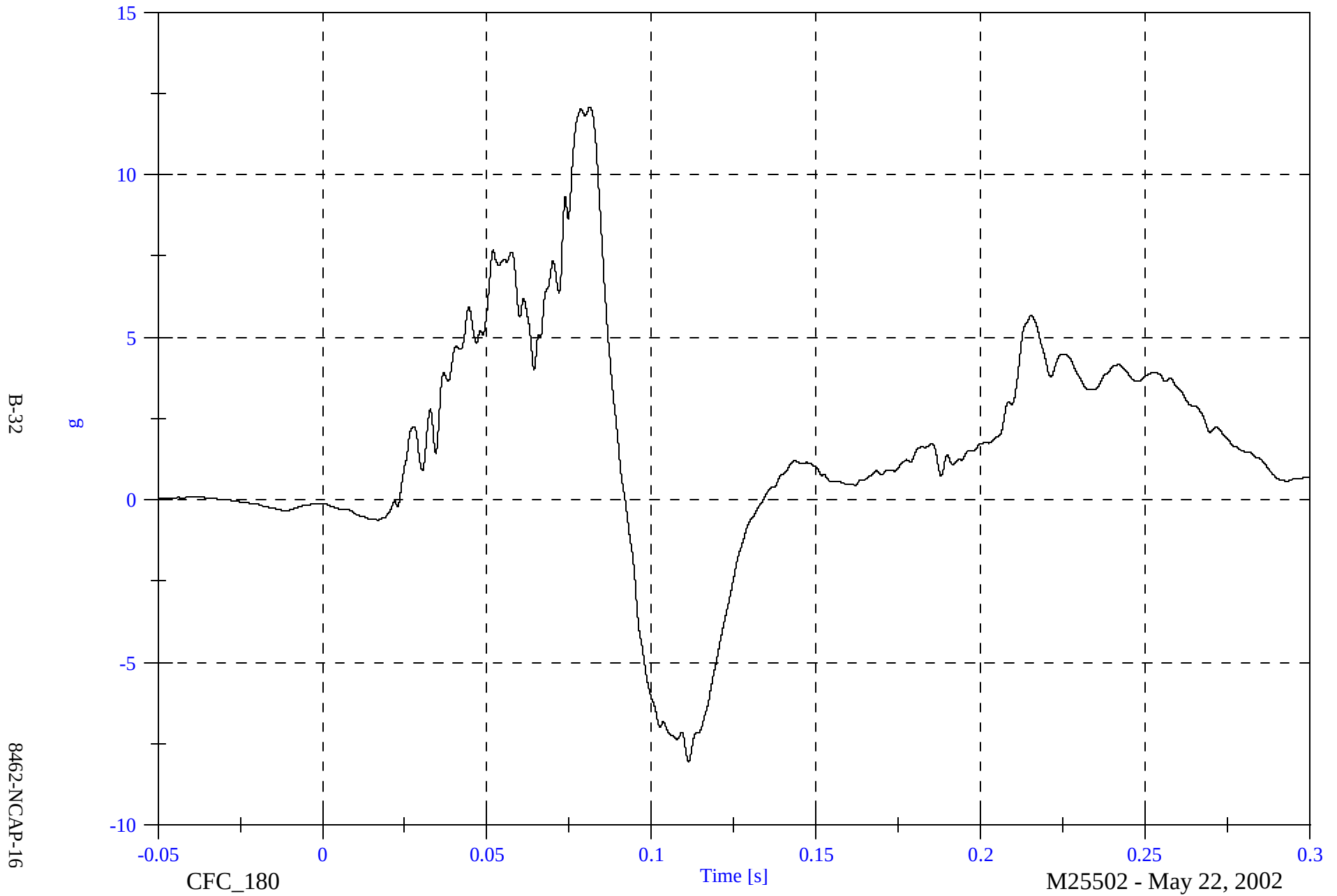


2002 NCAP Test 16 2002 Subaru Legacy

Max: 12.1 [g] at 0.081 [s]

Min: -8.0 [g] at 0.111 [s]

P1 Chest Red z



2002 NCAP Test 16 2002 Subaru Legacy

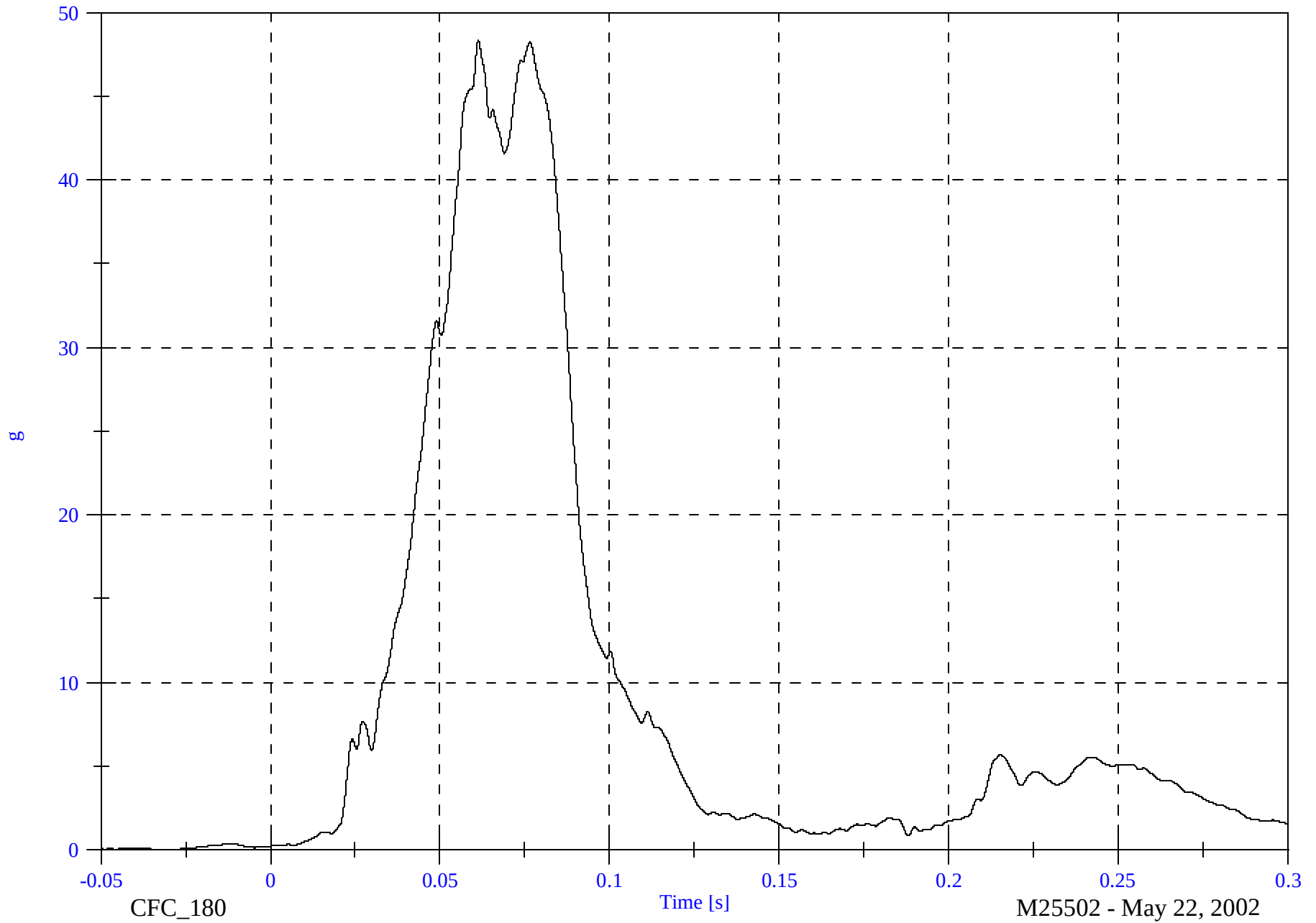
P1 Chest Red Resultant

Max: 48.3 [g] at 0.061 [s]

Min: 0.0 [g] at -0.032 [s]

B-33

8462-NCAP-16



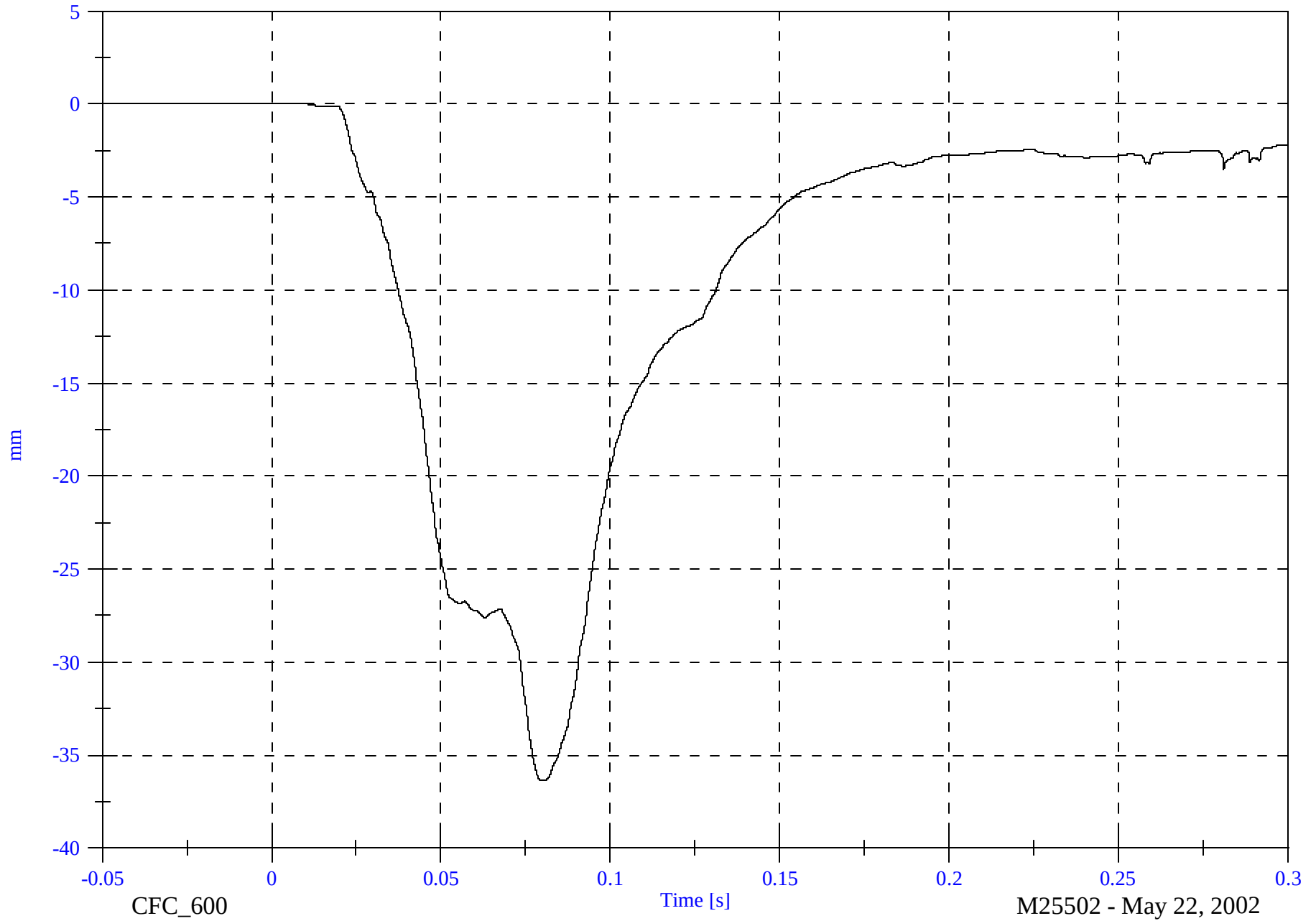
2002 NCAP Test 16 2002 Subaru Legacy

P1 Chest Compression

Max: 0.0 [mm] at 0.007 [s]
Min: -36.4 [mm] at 0.080 [s]

B-34

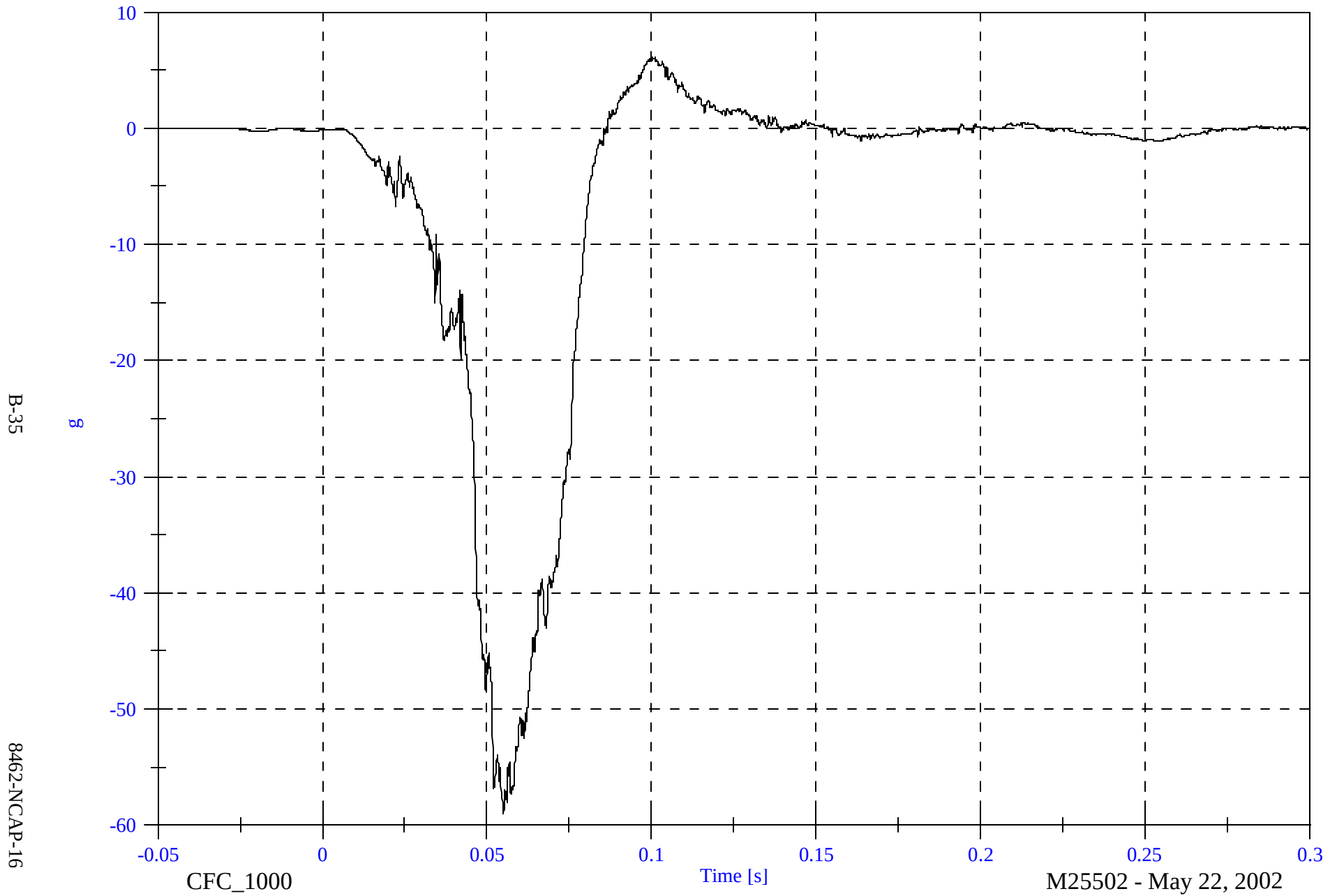
8462-NCAP-16



2002 NCAP Test 16 2002 Subaru Legacy

Max: 6.1 [g] at 0.100 [s]
Min: -58.9 [g] at 0.055 [s]

P1 Pelvic x

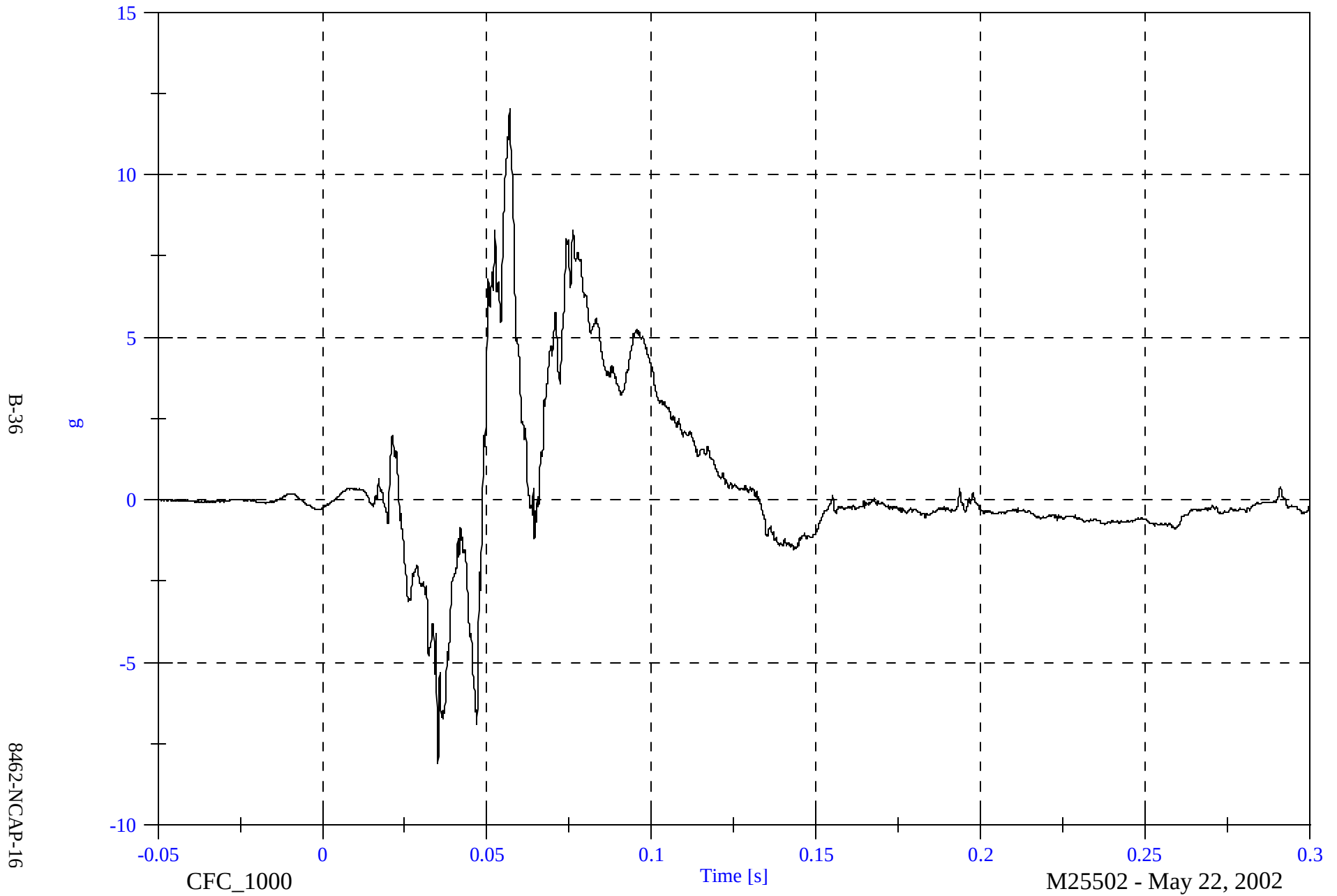


2002 NCAP Test 16 2002 Subaru Legacy

Max: 12.0 [g] at 0.057 [s]

Min: -8.1 [g] at 0.035 [s]

P1 Pelvic y

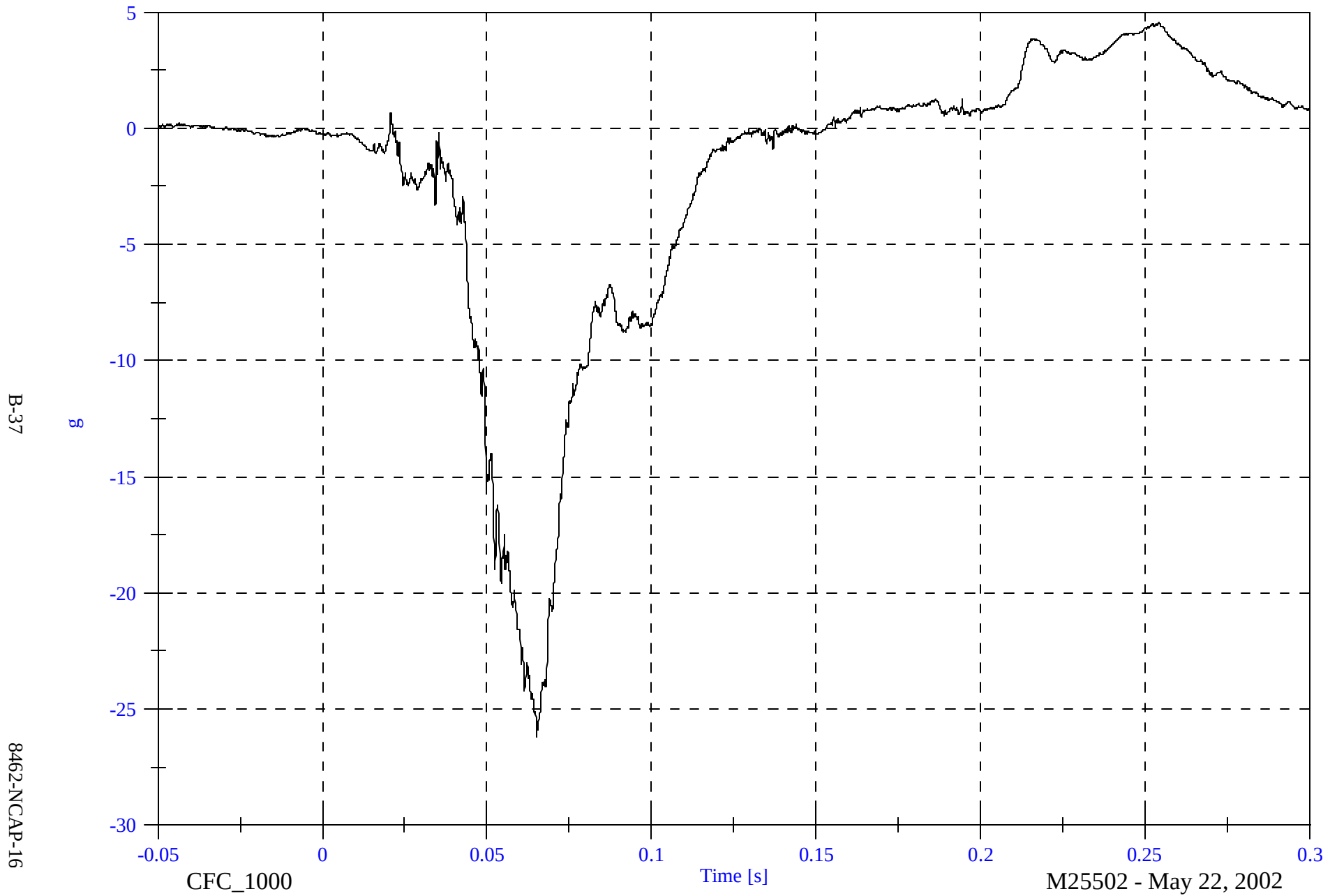


2002 NCAP Test 16 2002 Subaru Legacy

Max: 4.5 [g] at 0.254 [s]

Min: -26.2 [g] at 0.065 [s]

P1 Pelvic z



2002 NCAP Test 16 2002 Subaru Legacy

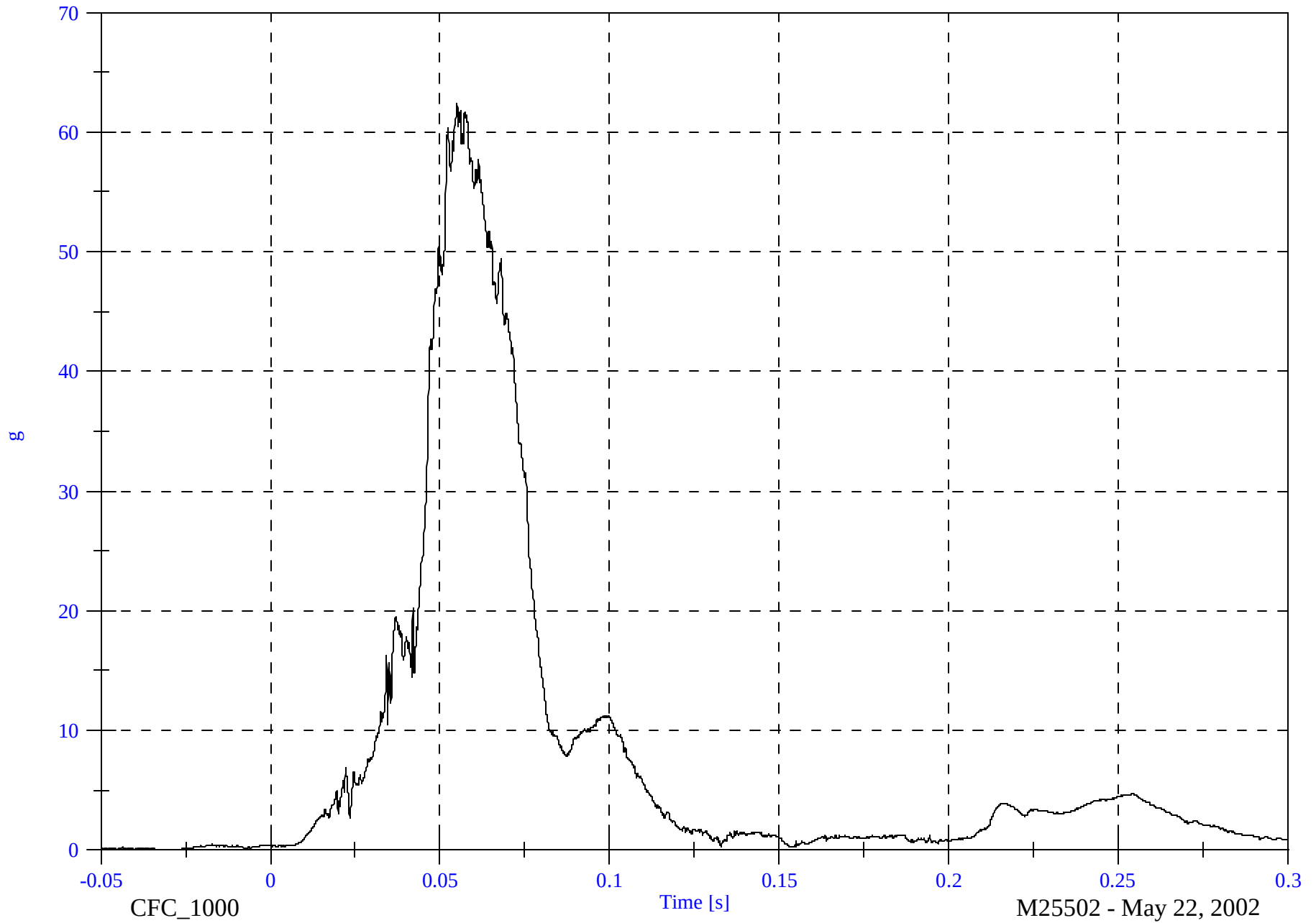
P1 Pelvic Resultant

Max: 62.4 [g] at 0.055 [s]

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

B-38

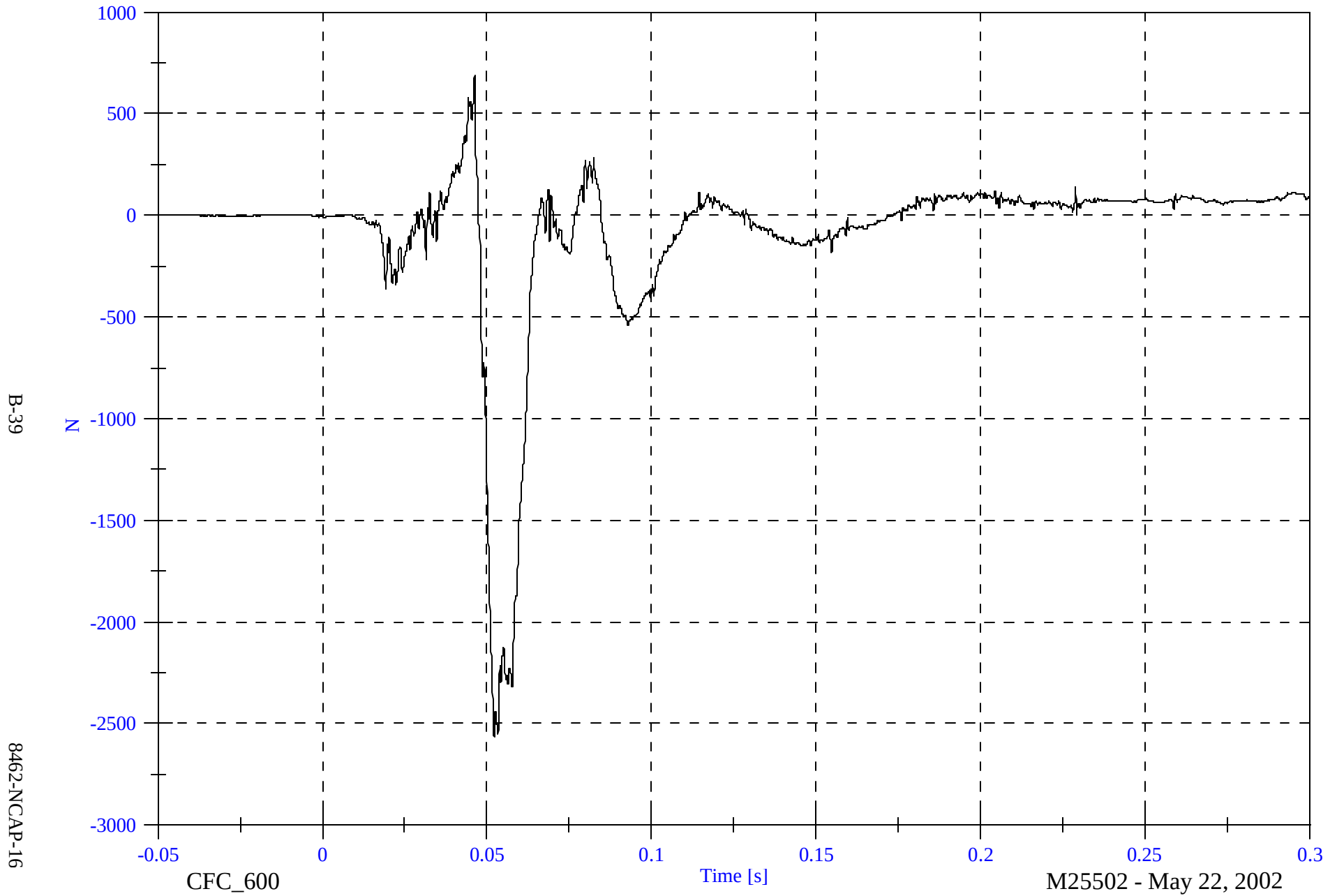
8462-NCAP-16



2002 NCAP Test 16 2002 Subaru Legacy

P1 Left Femur

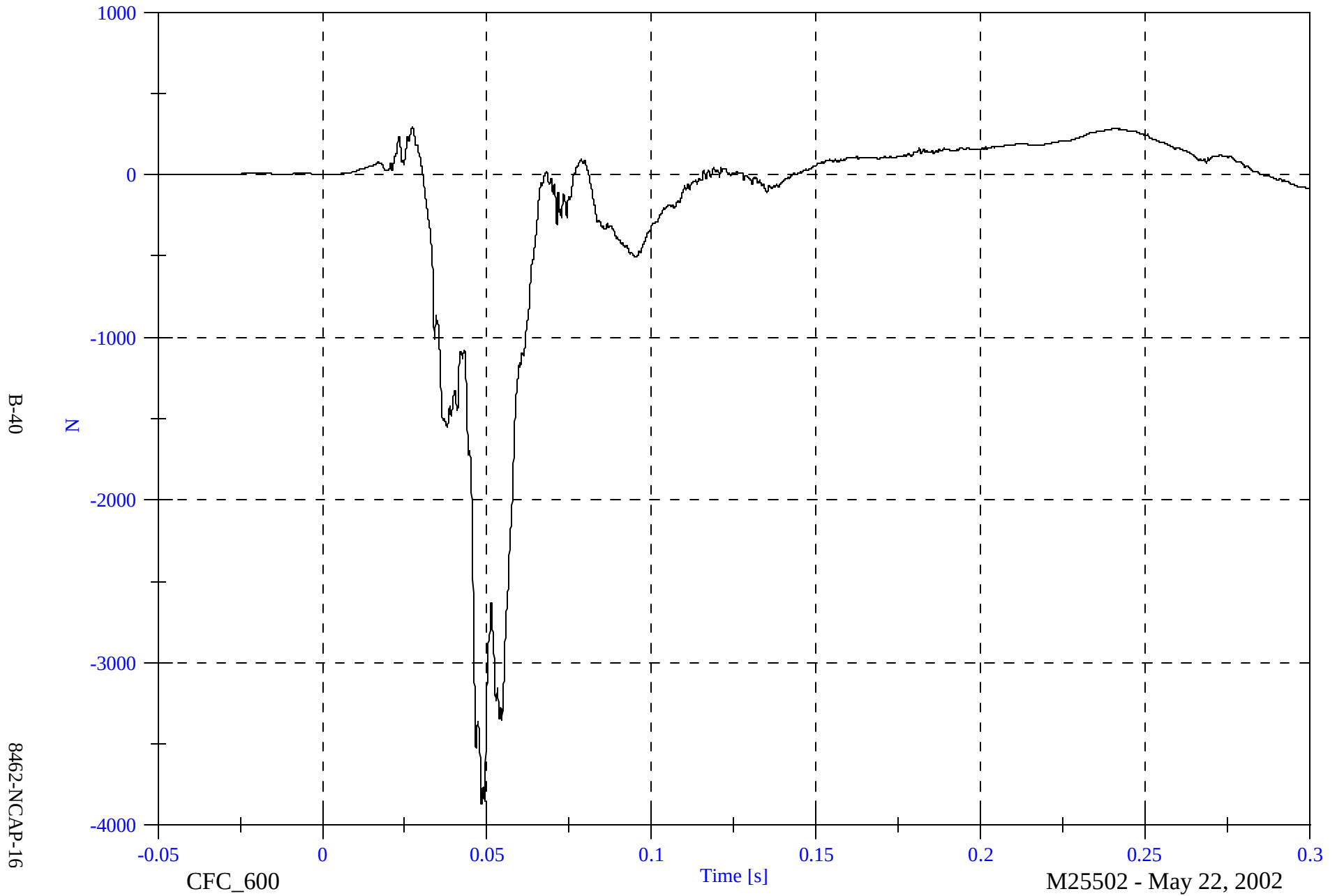
Max: 686.7 [N] at 0.046 [s]
Min: -2566.4 [N] at 0.052 [s]



2002 NCAP Test 16 2002 Subaru Legacy

P1 Right Femur

Max: 290.5 [N] at 0.027 [s]
Min: -3866.9 [N] at 0.048 [s]

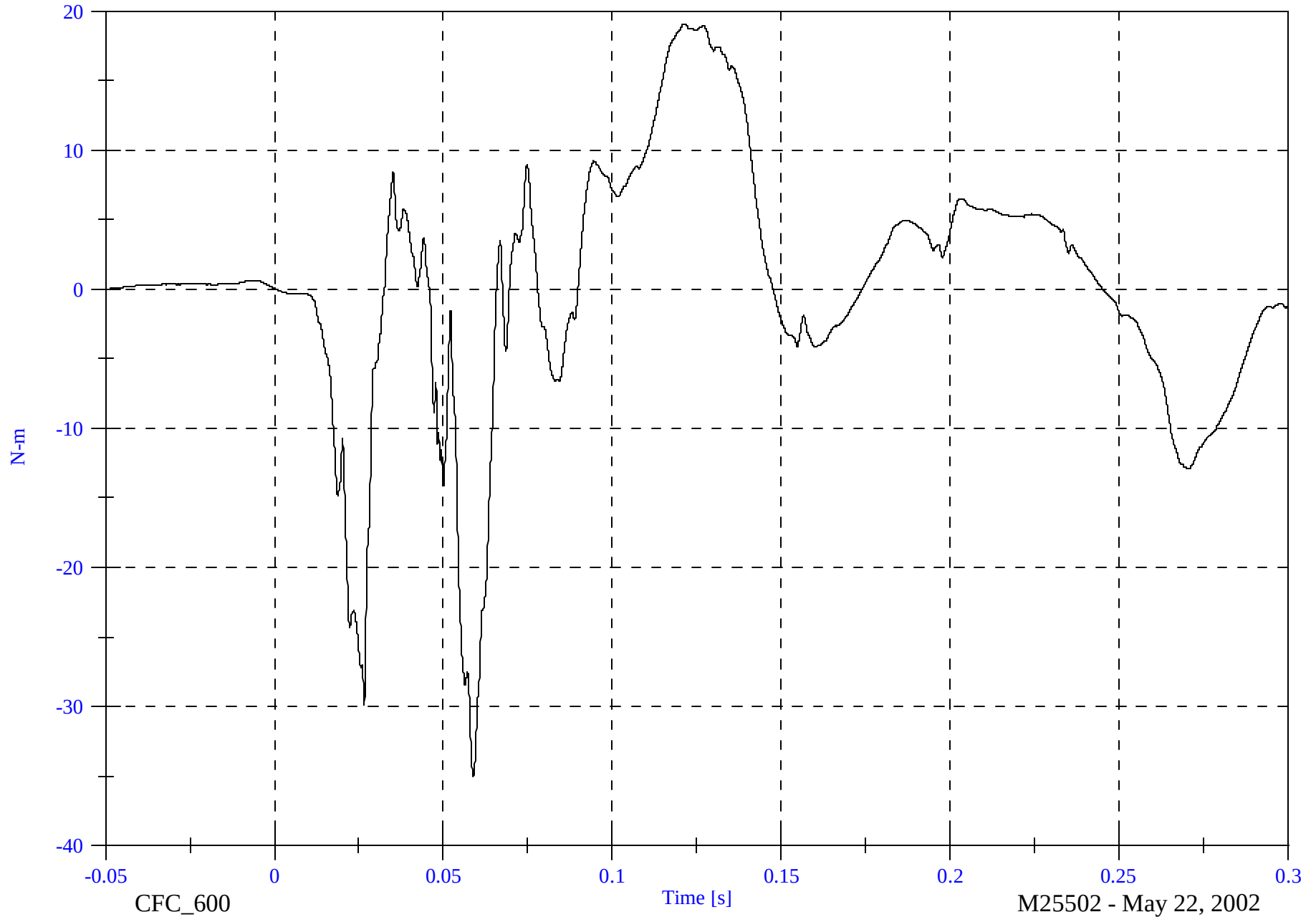


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P1 Left Upper Tibia Mx

Max: 19.1 [N-m] at 0.121 [s]

Min: -35.0 [N-m] at 0.059 [s]



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CFC_600

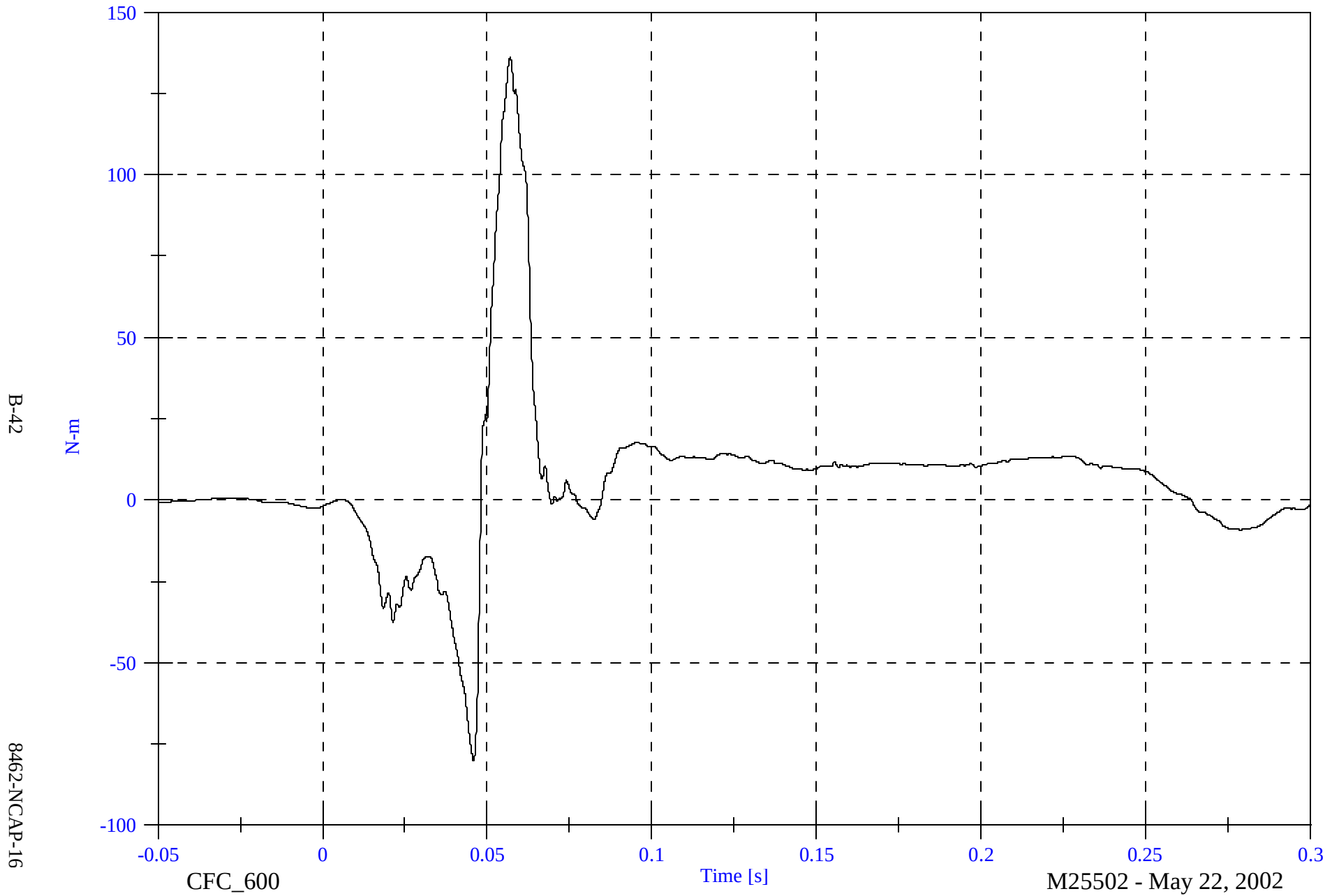
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Max: 136.0 [N-m] at 0.057 [s]

Min: -80.0 [N-m] at 0.046 [s]

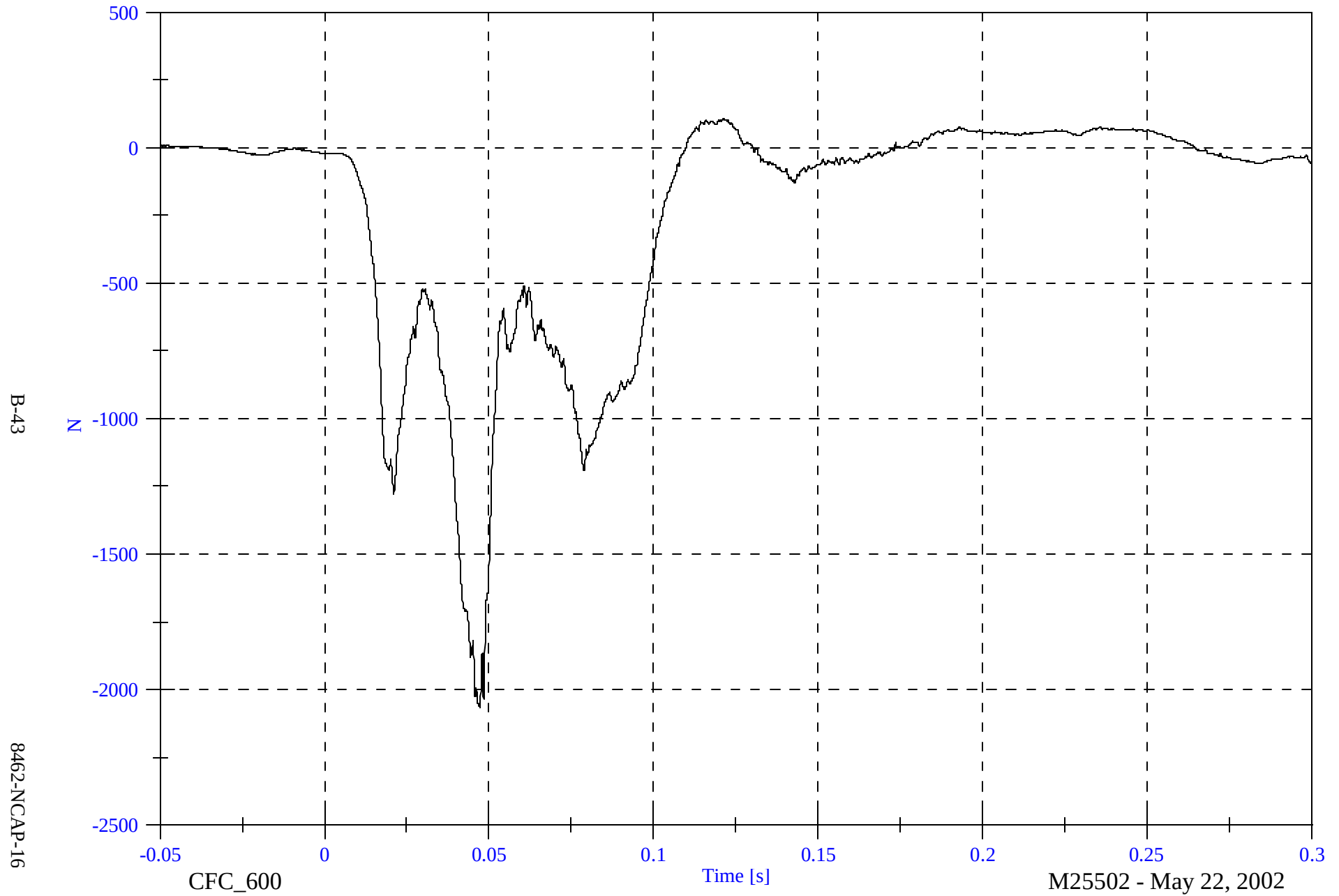
P1 Left upper Tibia My



2002 NCAP Test 16 2002 Subaru Legacy

Max: 105.0 [N] at 0.121 [s]
Min: -2065.0 [N] at 0.047 [s]

P1 Left Lower Tibia Fz

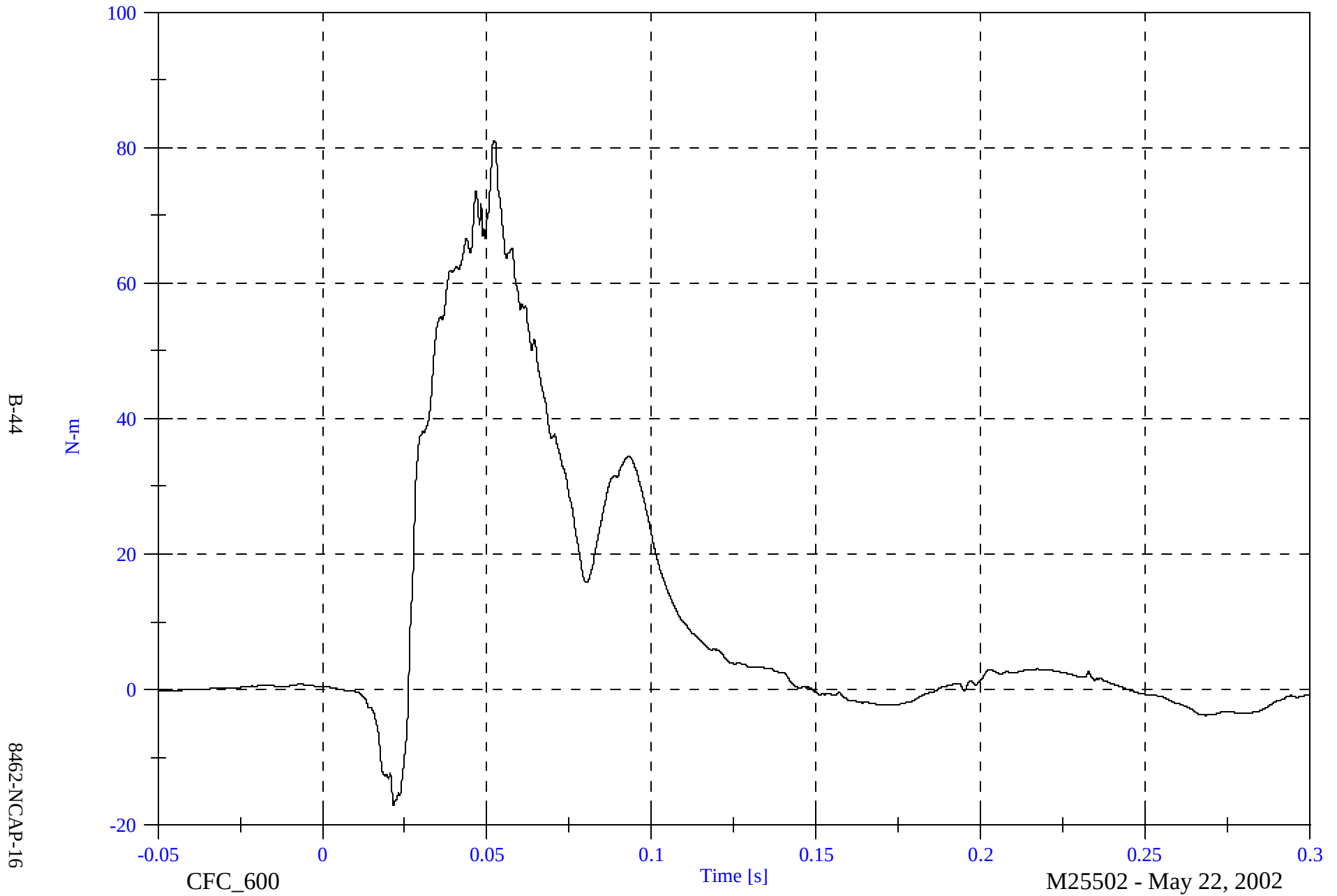


2002 NCAP Test 16 2002 Subaru Legacy

P1 Left Lower Tibia Mx

Max: 80.9 [N-m] at 0.052 [s]

Min: -17.0 [N-m] at 0.022 [s]

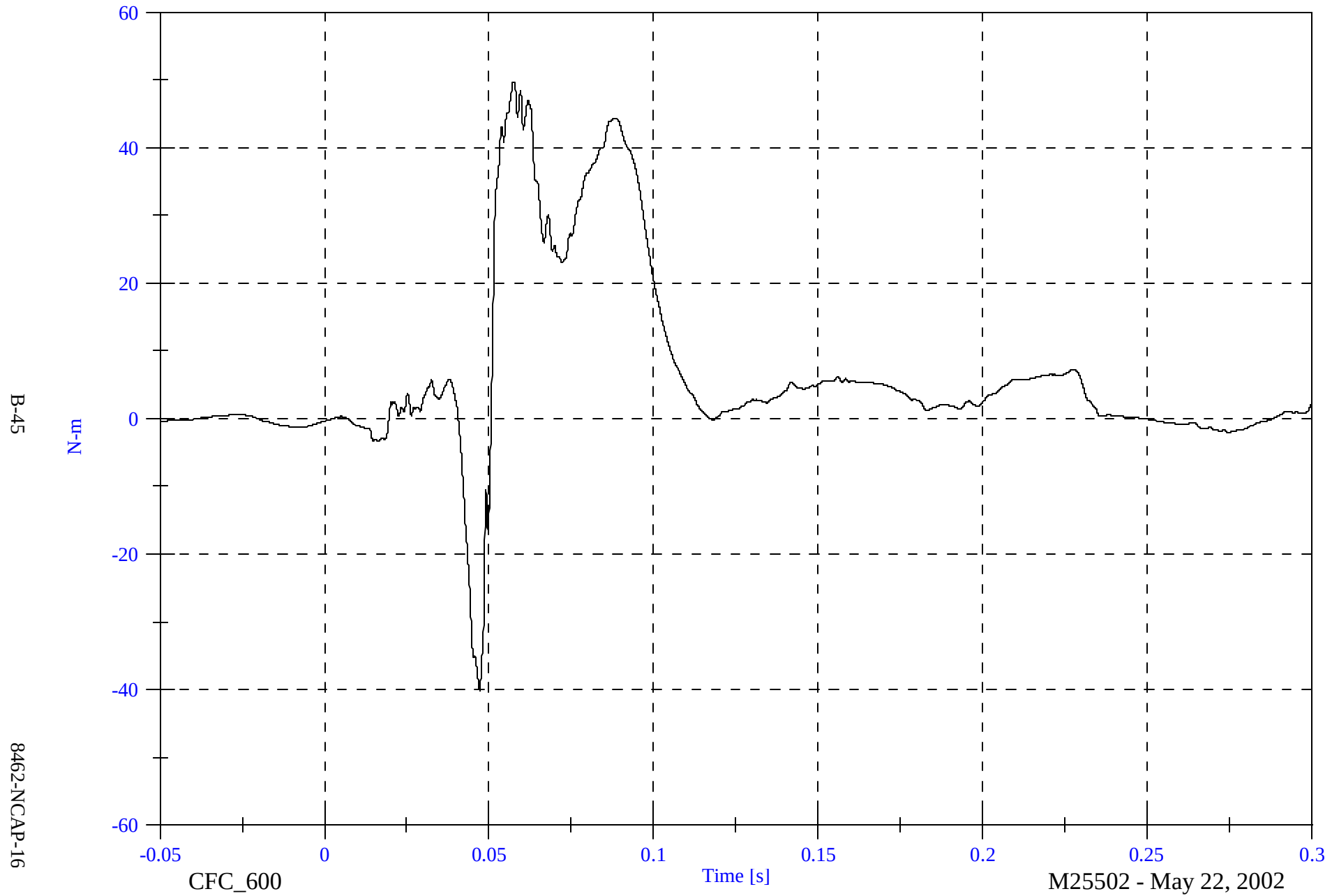


2002 NCAP Test 16 2002 Subaru Legacy

Max: 49.6 [N-m] at 0.057 [s]

Min: -40.1 [N-m] at 0.047 [s]

P1 Left Lower tibia My



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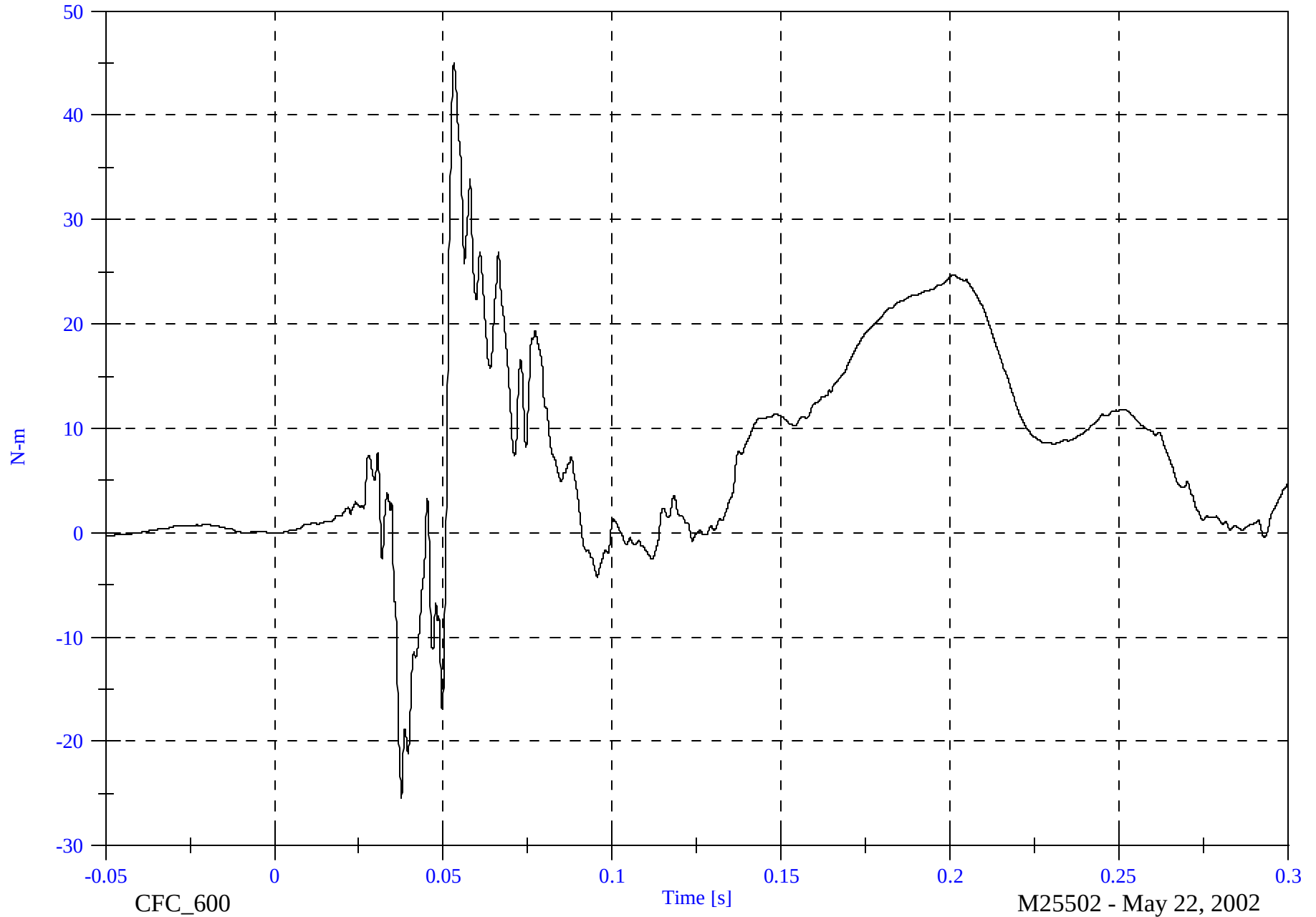
P1 Right Upper Tibia Mx

Max: 44.9 [N-m] at 0.053 [s]

Min: -25.4 [N-m] at 0.038 [s]

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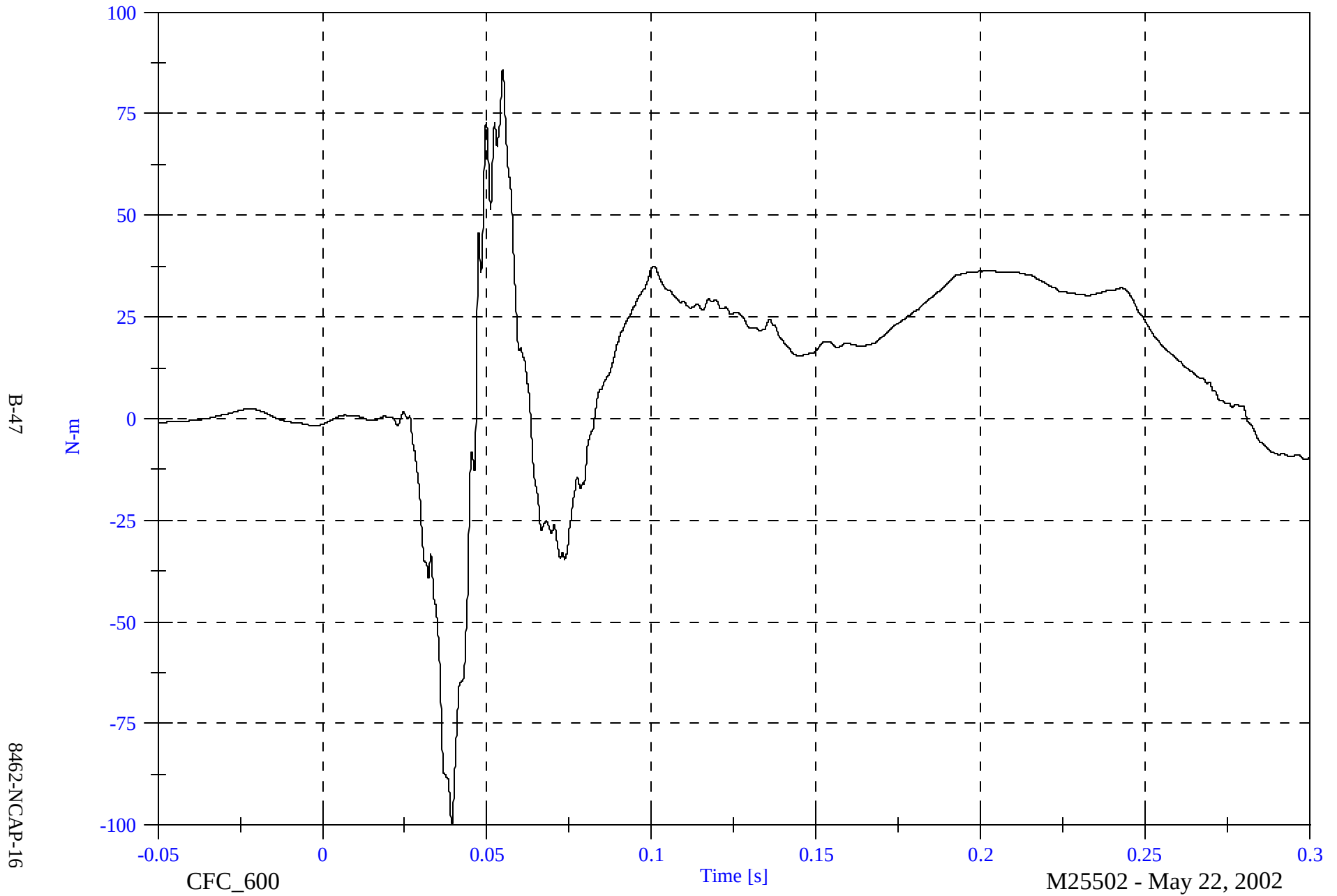


2002 NCAP Test 16 2002 Subaru Legacy

Max: 85.9 [N-m] at 0.055 [s]

Min: -99.7 [N-m] at 0.039 [s]

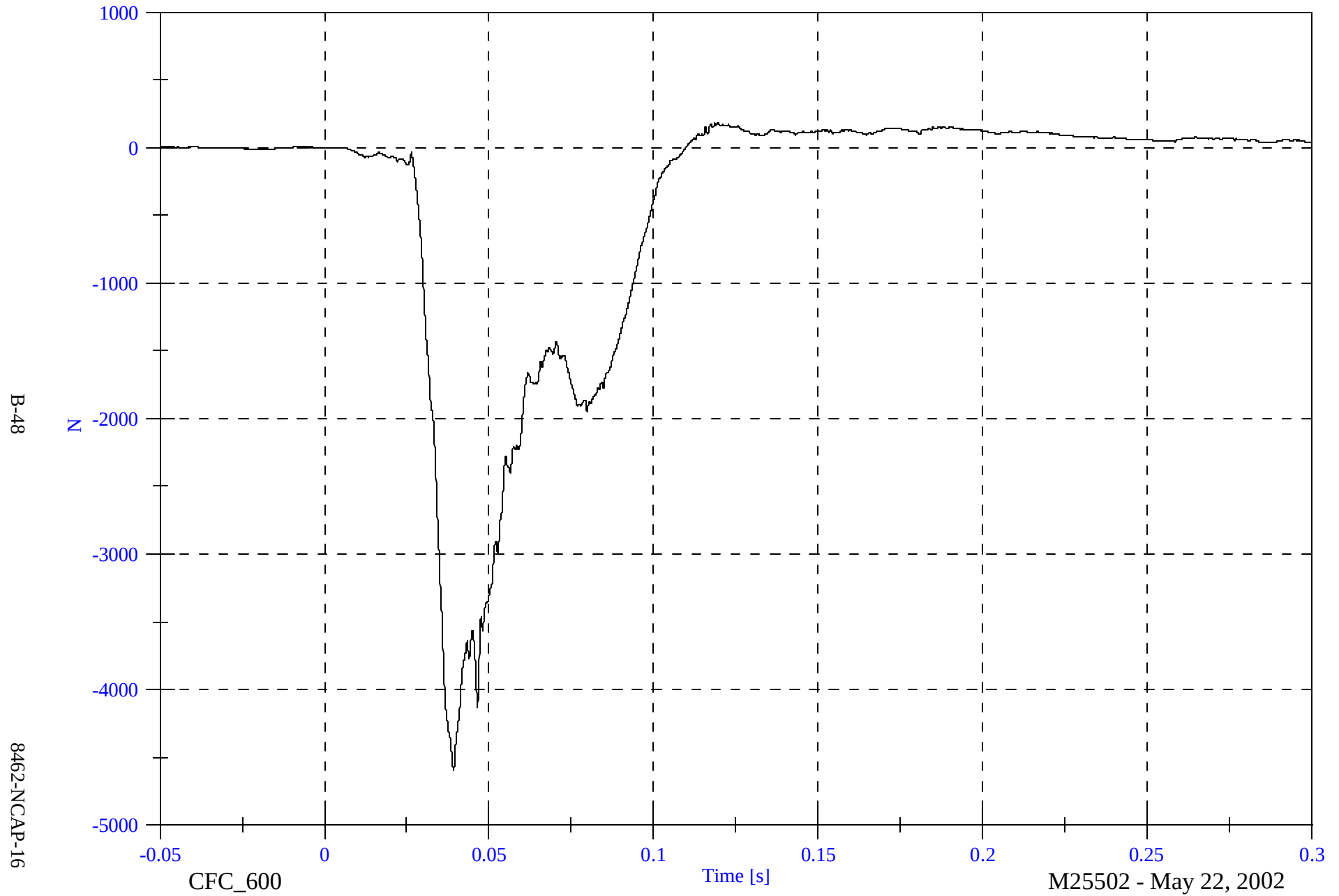
P1 Right Upper Tibia My



2002 NCAP Test 16 2002 Subaru Legacy

Max: 187.0 [N] at 0.119 [s]
Min: -4590.4 [N] at 0.039 [s]

P1 Right Lower Tibia Fz

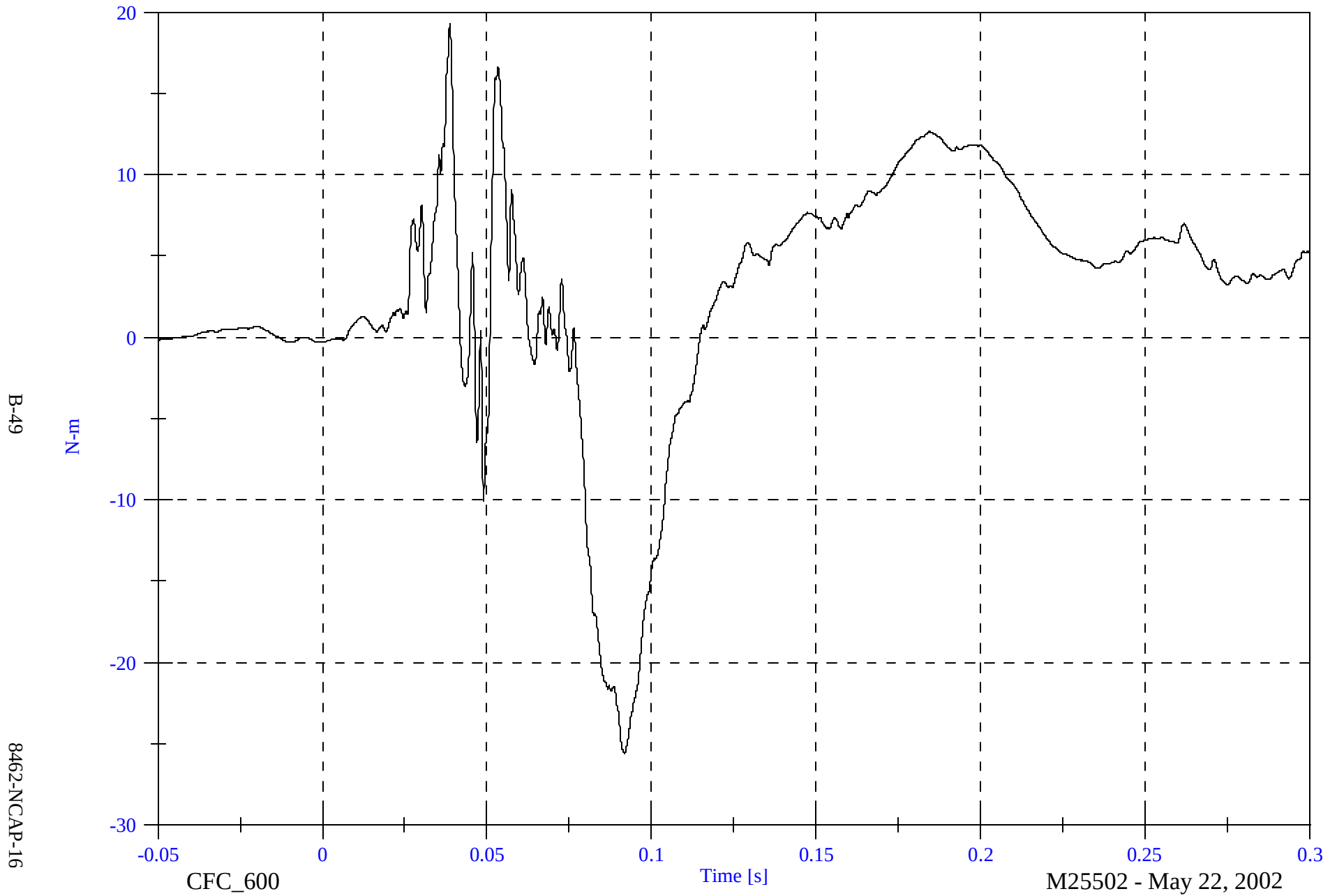


2002 NCAP Test 16 2002 Subaru Legacy

P1 Right Lower tibia Mx

Max: 19.3 [N-m] at 0.039 [s]

Min: -25.6 [N-m] at 0.092 [s]

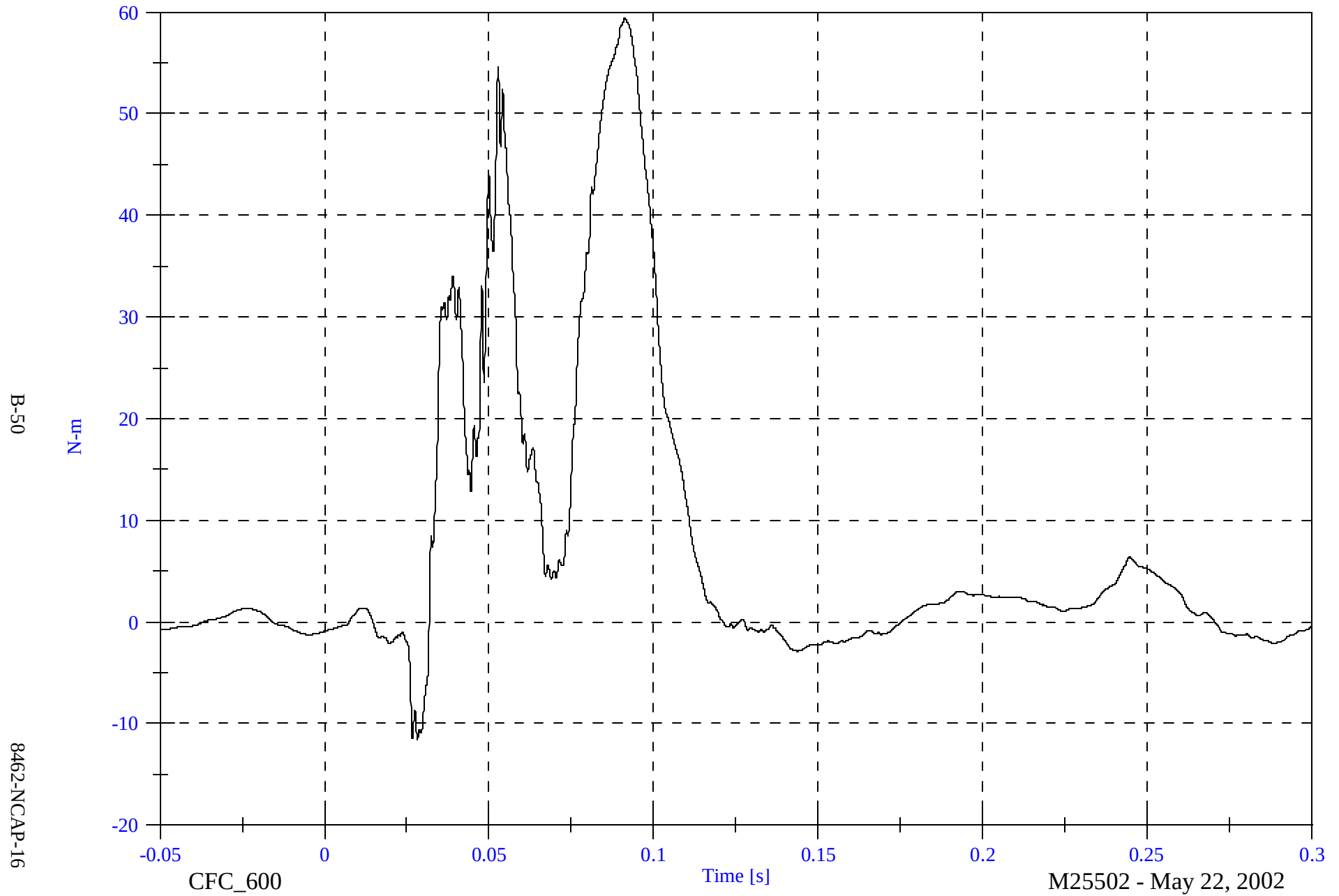


2002 NCAP Test 16 2002 Subaru Legacy

Max: 59.5 [N-m] at 0.091 [s]

Min: -11.6 [N-m] at 0.028 [s]

P1 Right Lower Tibia My

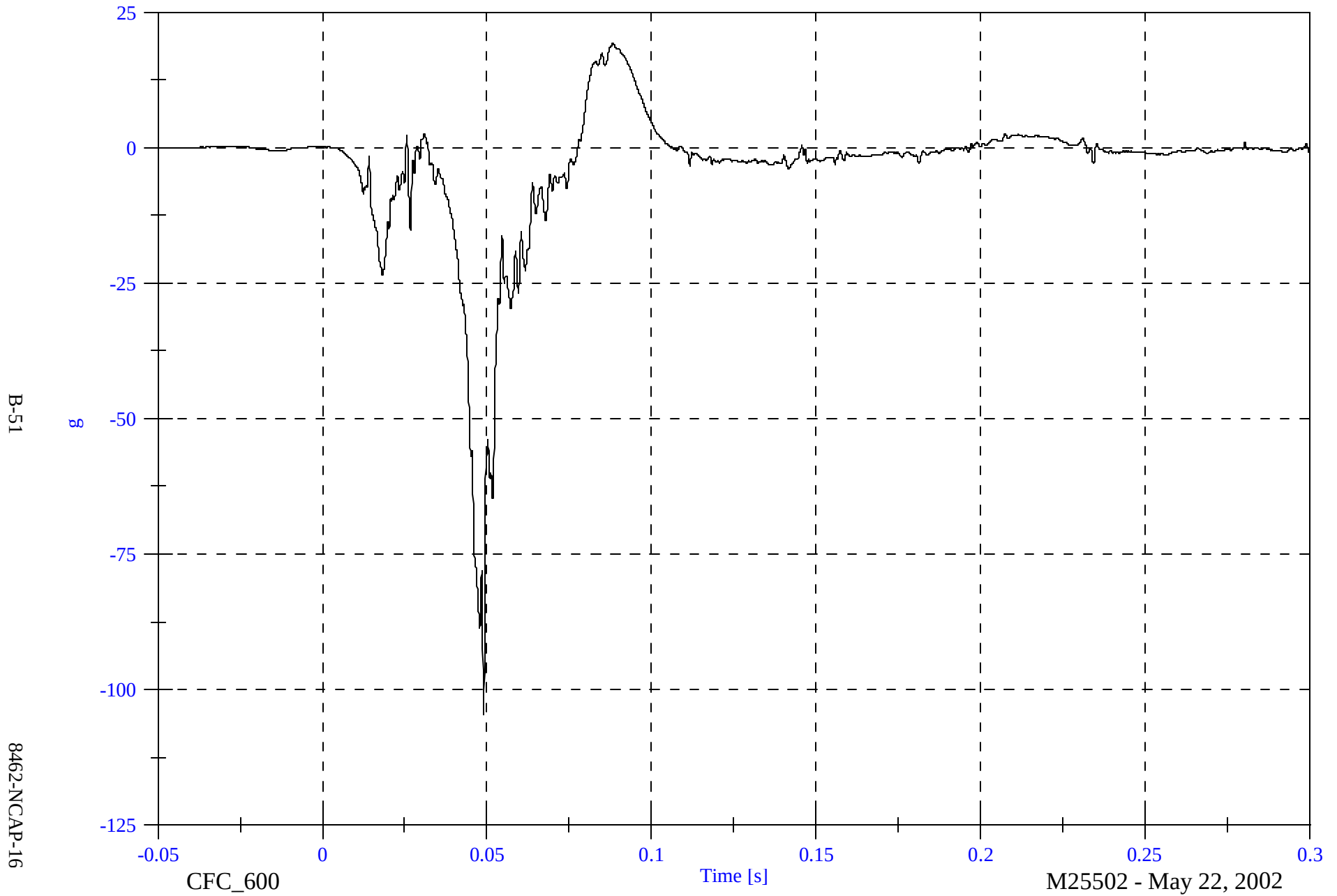


2002 NCAP Test 16 2002 Subaru Legacy

Max: 19.2 [g] at 0.088 [s]

Min: -104.5 [g] at 0.049 [s]

P1 Left Foot Aft Ax

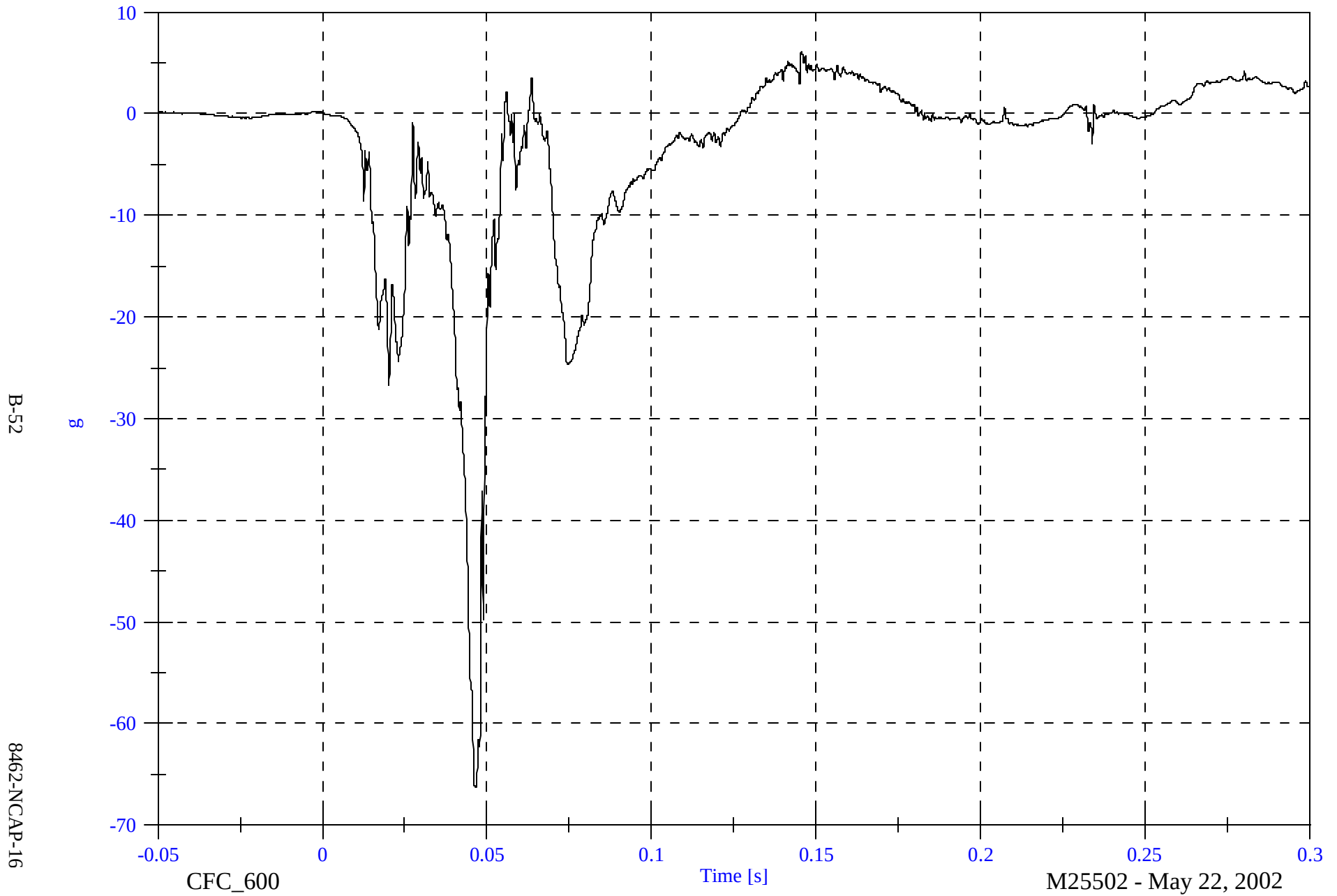


2002 NCAP Test 16 2002 Subaru Legacy

Max: 6.1 [g] at 0.146 [s]

Min: -66.2 [g] at 0.047 [s]

P1 Left Foot Aft Az

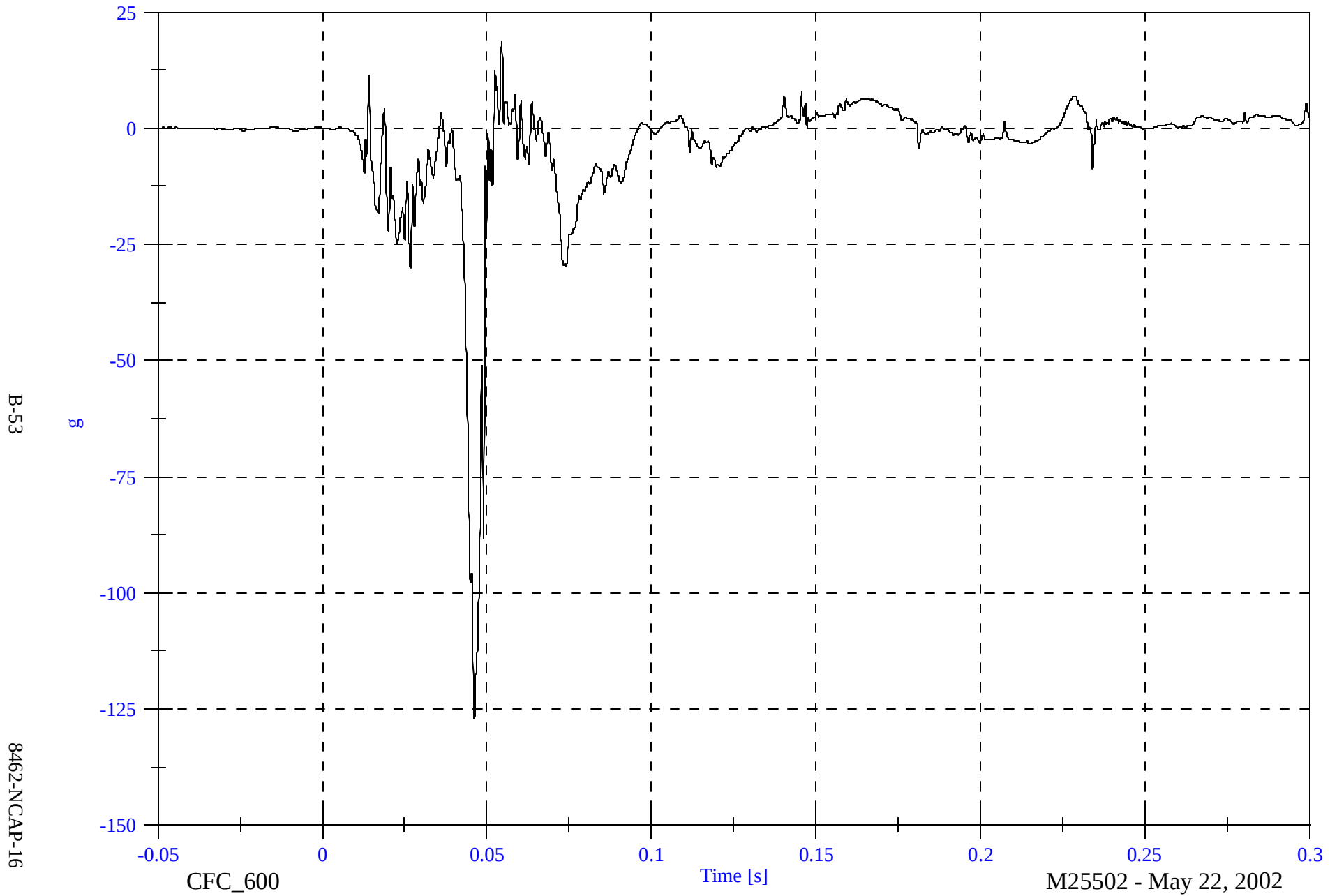


2002 NCAP Test 16 2002 Subaru Legacy

Max: 18.7 [g] at 0.055 [s]

Min: -127.1 [g] at 0.046 [s]

P1 Left Foot Fore Az

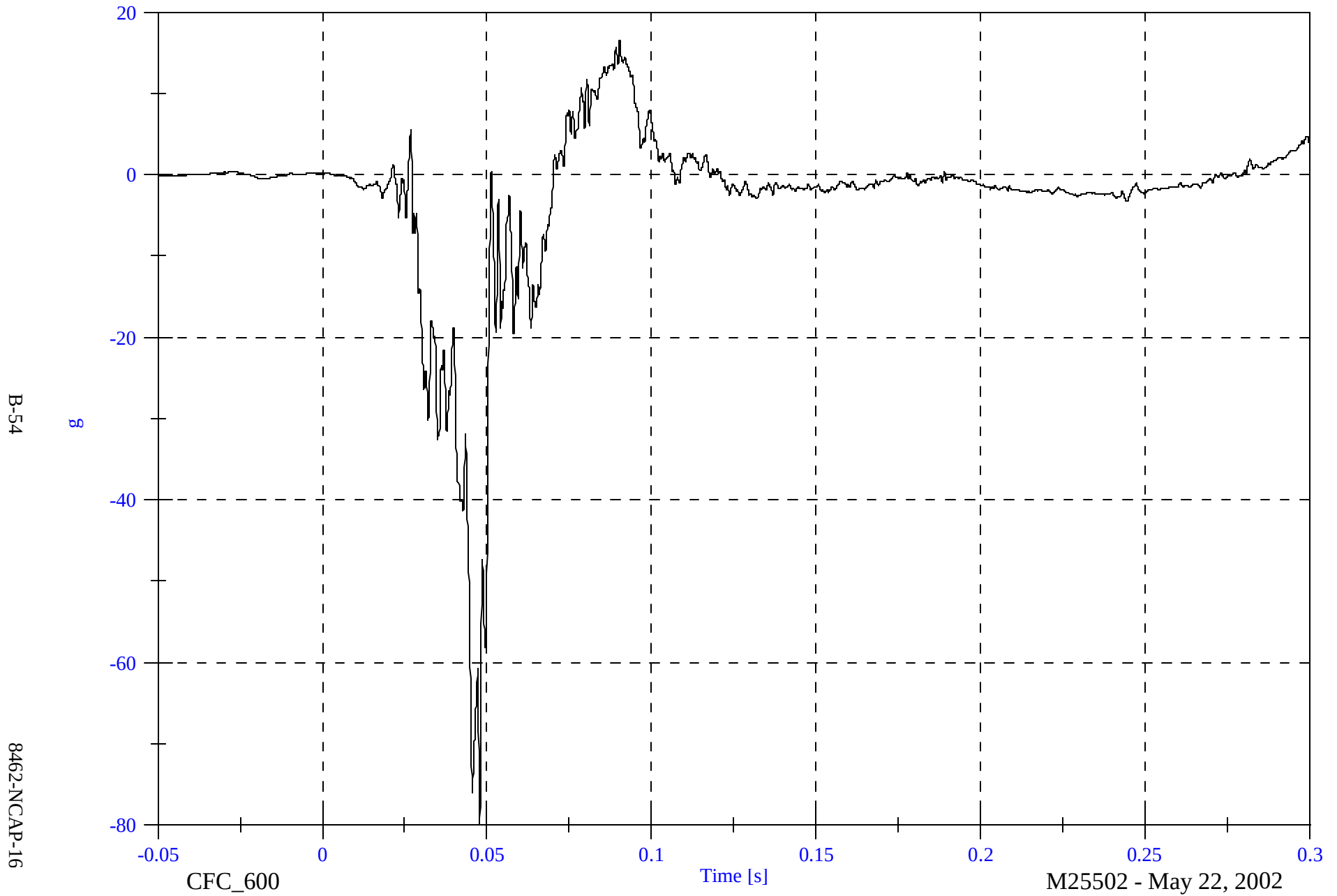


2002 NCAP Test 16 2002 Subaru Legacy

Max: 16.5 [g] at 0.090 [s]

Min: -79.7 [g] at 0.048 [s]

P1 Right Foot Aft x

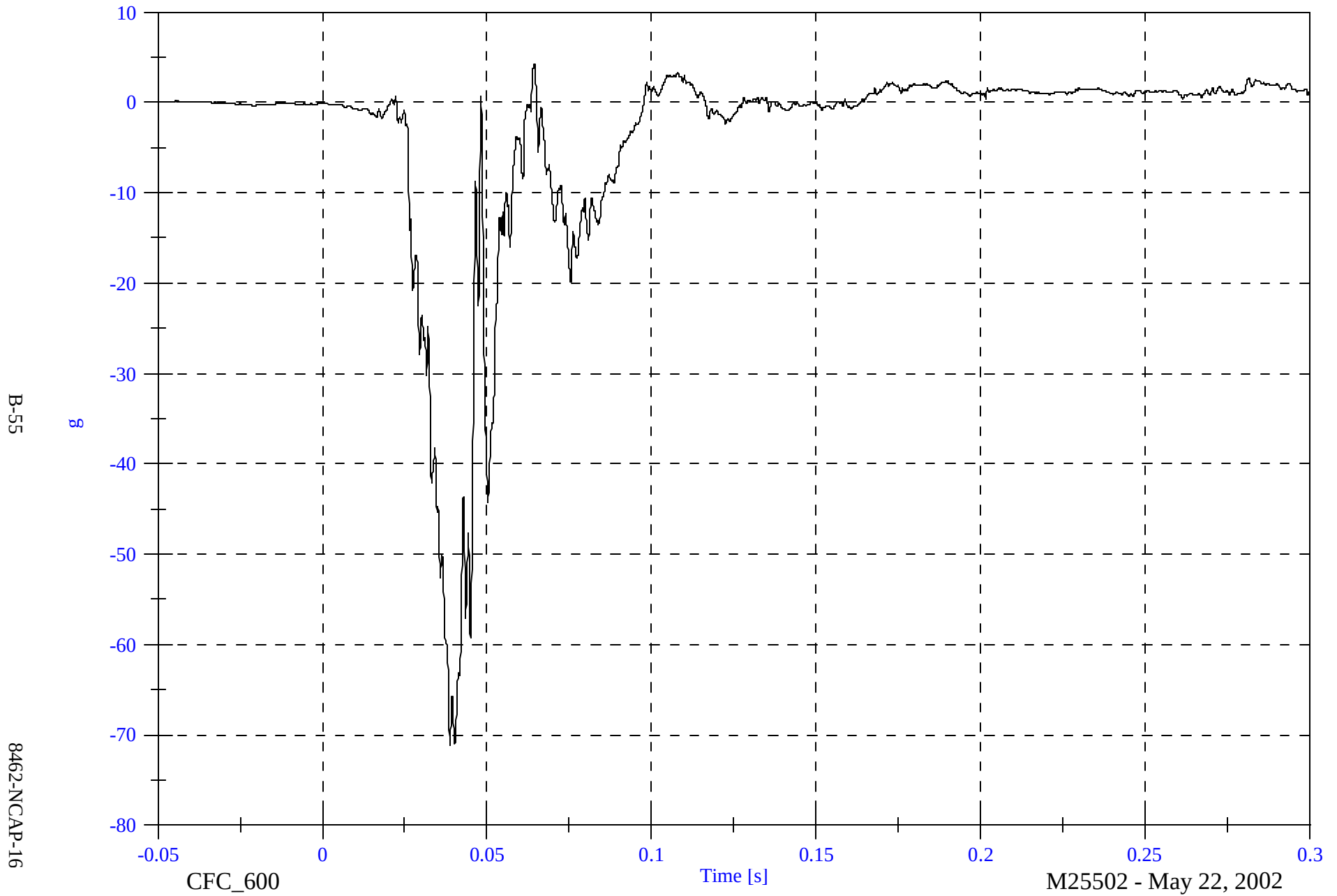


2002 NCAP Test 16 2002 Subaru Legacy

Max: 4.2 [g] at 0.064 [s]

Min: -71.2 [g] at 0.039 [s]

P1 Right Foot Aft z

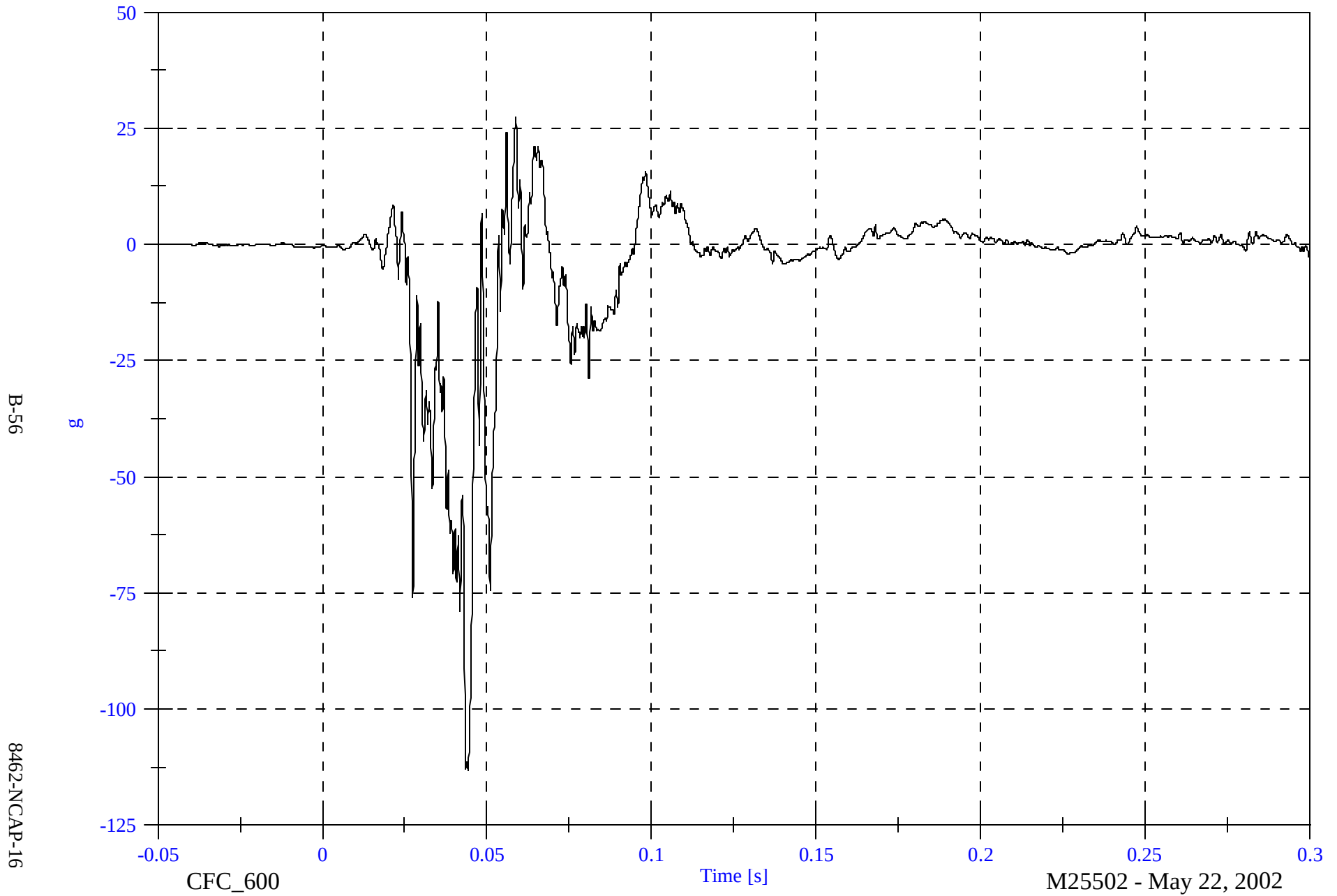


2002 NCAP Test 16 2002 Subaru Legacy

Max: 27.4 [g] at 0.059 [s]

Min: -113.3 [g] at 0.044 [s]

P1 Right Foot Fore z

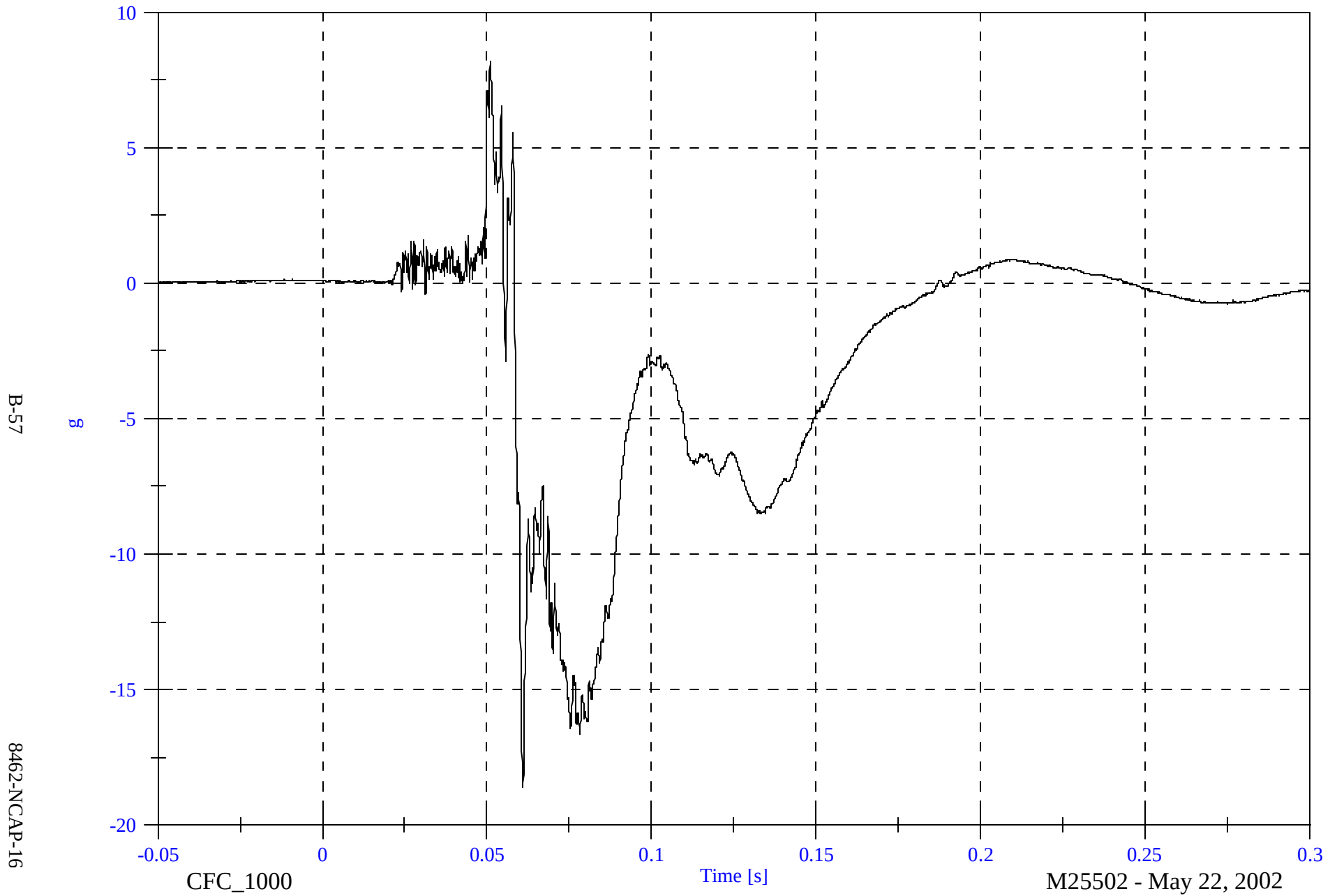


2002 NCAP Test 16 2002 Subaru Legacy

P2 Head 9 Array X Arm y

Max: 8.2 [g] at 0.051 [s]

Min: -18.6 [g] at 0.061 [s]

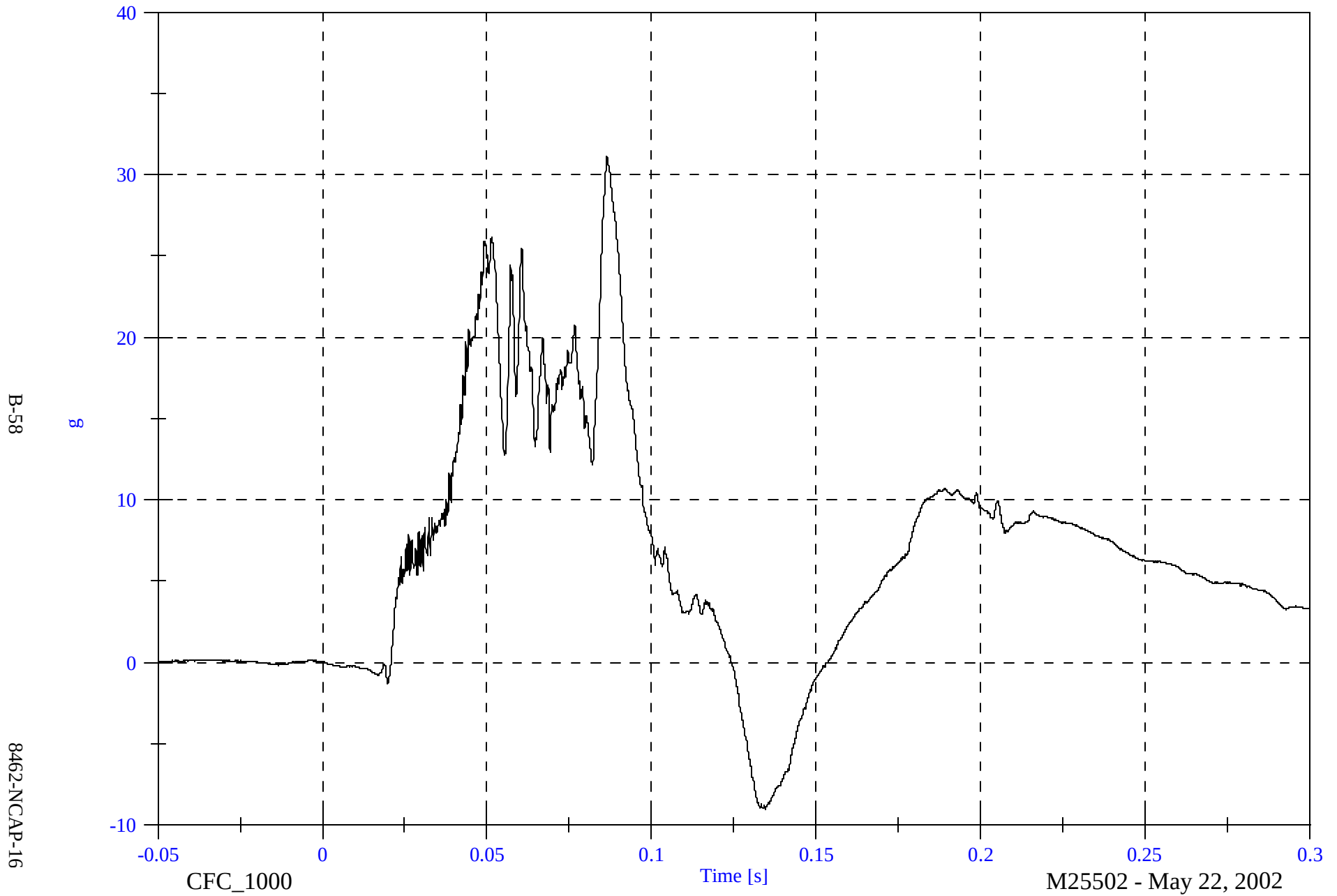


2002 NCAP Test 16 2002 Subaru Legacy

Max: 31.1 [g] at 0.086 [s]

Min: -9.0 [g] at 0.135 [s]

P2 Head 9 Array X Arm z

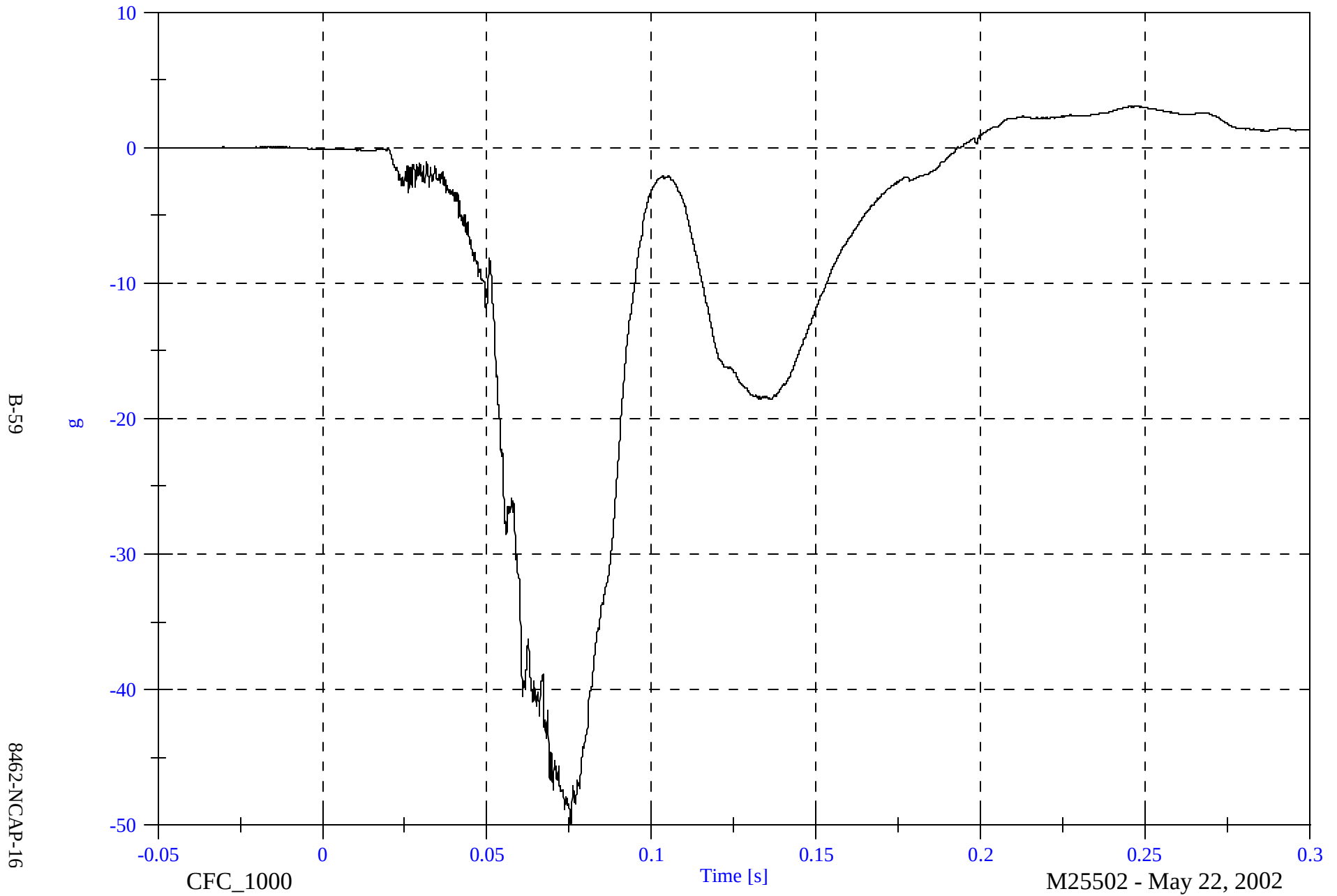


2002 NCAP Test 16 2002 Subaru Legacy

P2 Head 9 Array Y Arm x

Max: 3.0 [g] at 0.248 [s]

Min: -49.9 [g] at 0.075 [s]

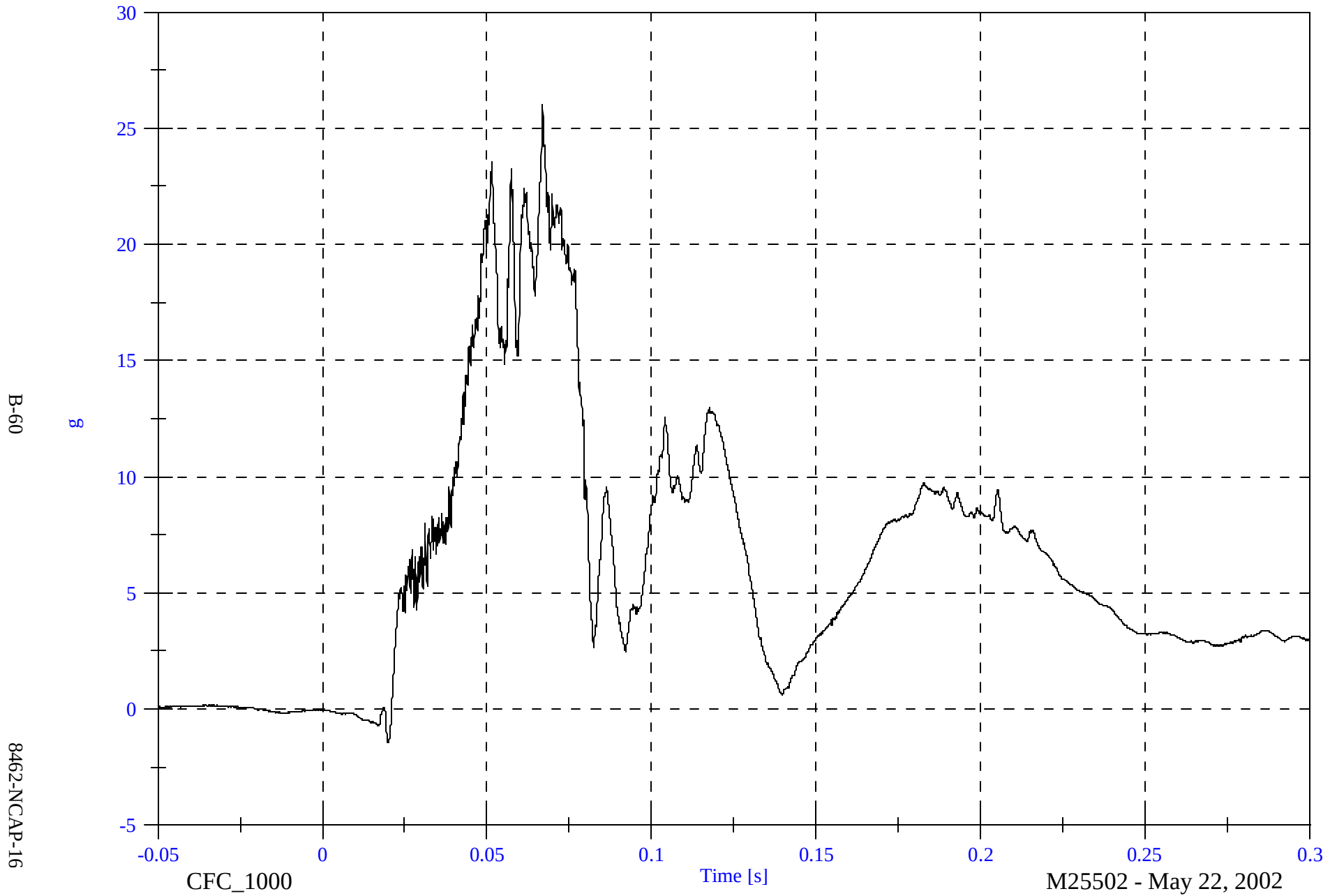


2002 NCAP Test 16 2002 Subaru Legacy

P2 Head 9 Array Y Arm z

Max: 26.0 [g] at 0.067 [s]

Min: -1.4 [g] at 0.020 [s]

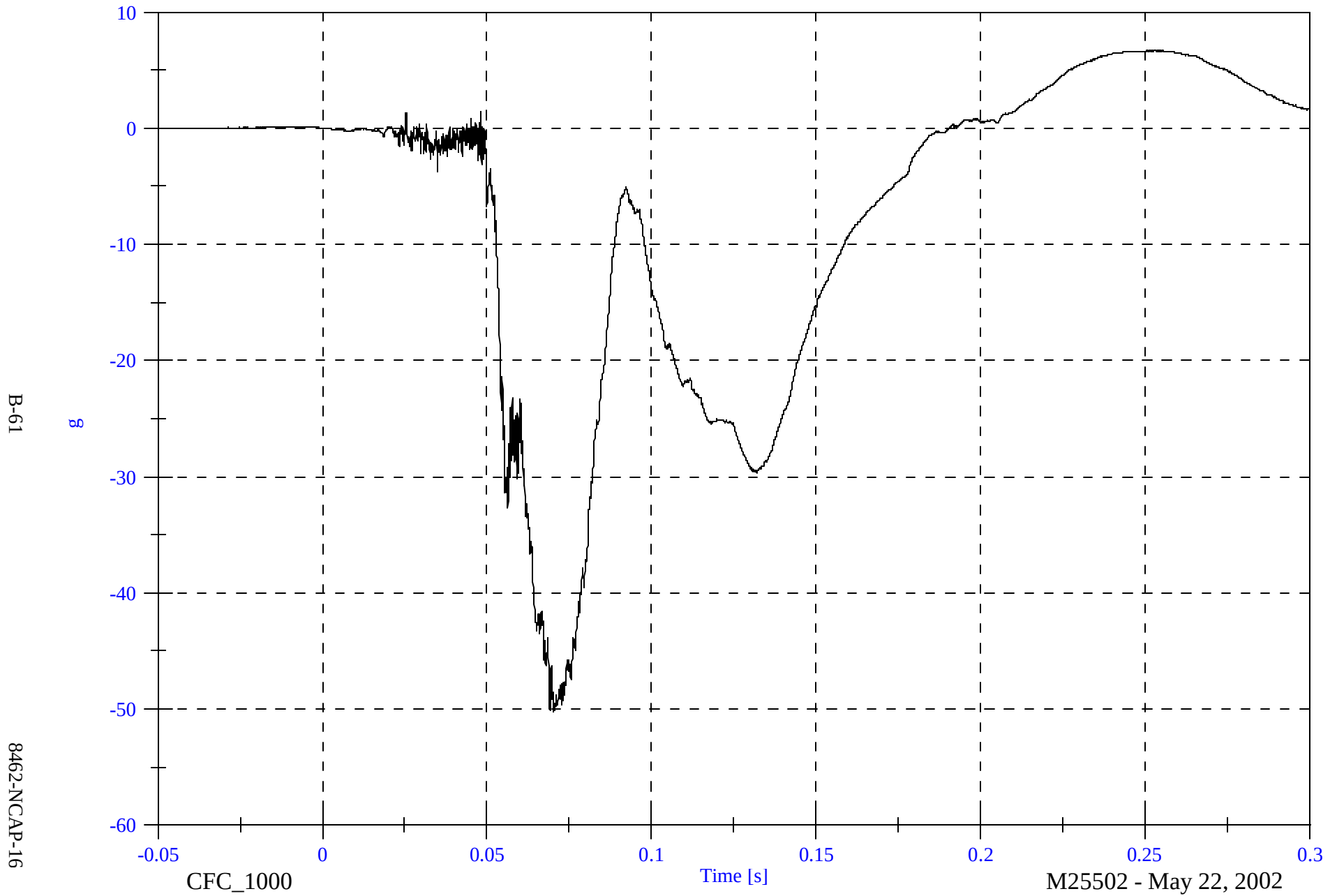


2002 NCAP Test 16 2002 Subaru Legacy

P2 Head 9 Array Z Arm x

Max: 6.7 [g] at 0.252 [s]

Min: -50.2 [g] at 0.070 [s]

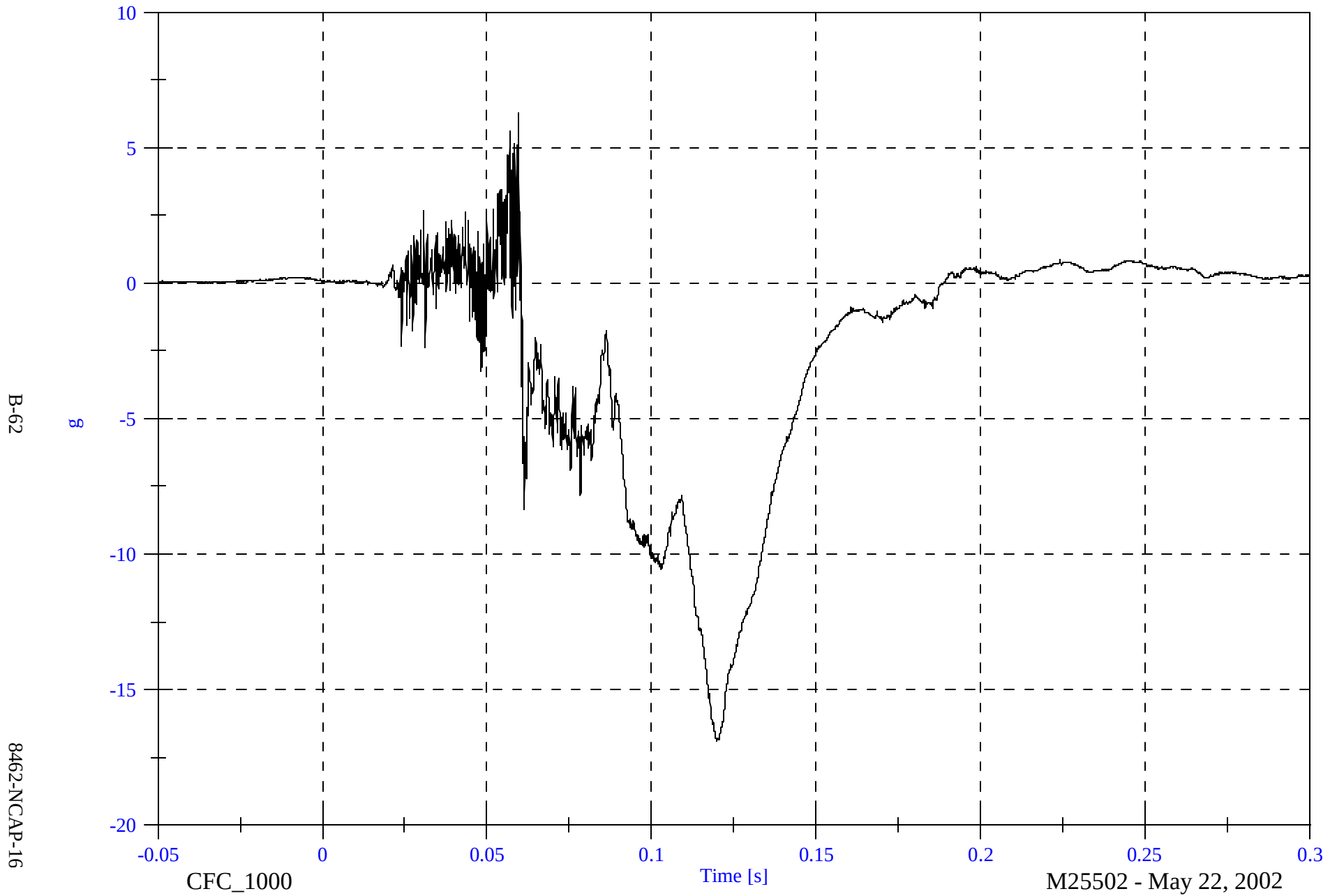


2002 NCAP Test 16 2002 Subaru Legacy

P2 Head 9 Array Z Arm y

Max: 6.3 [g] at 0.060 [s]

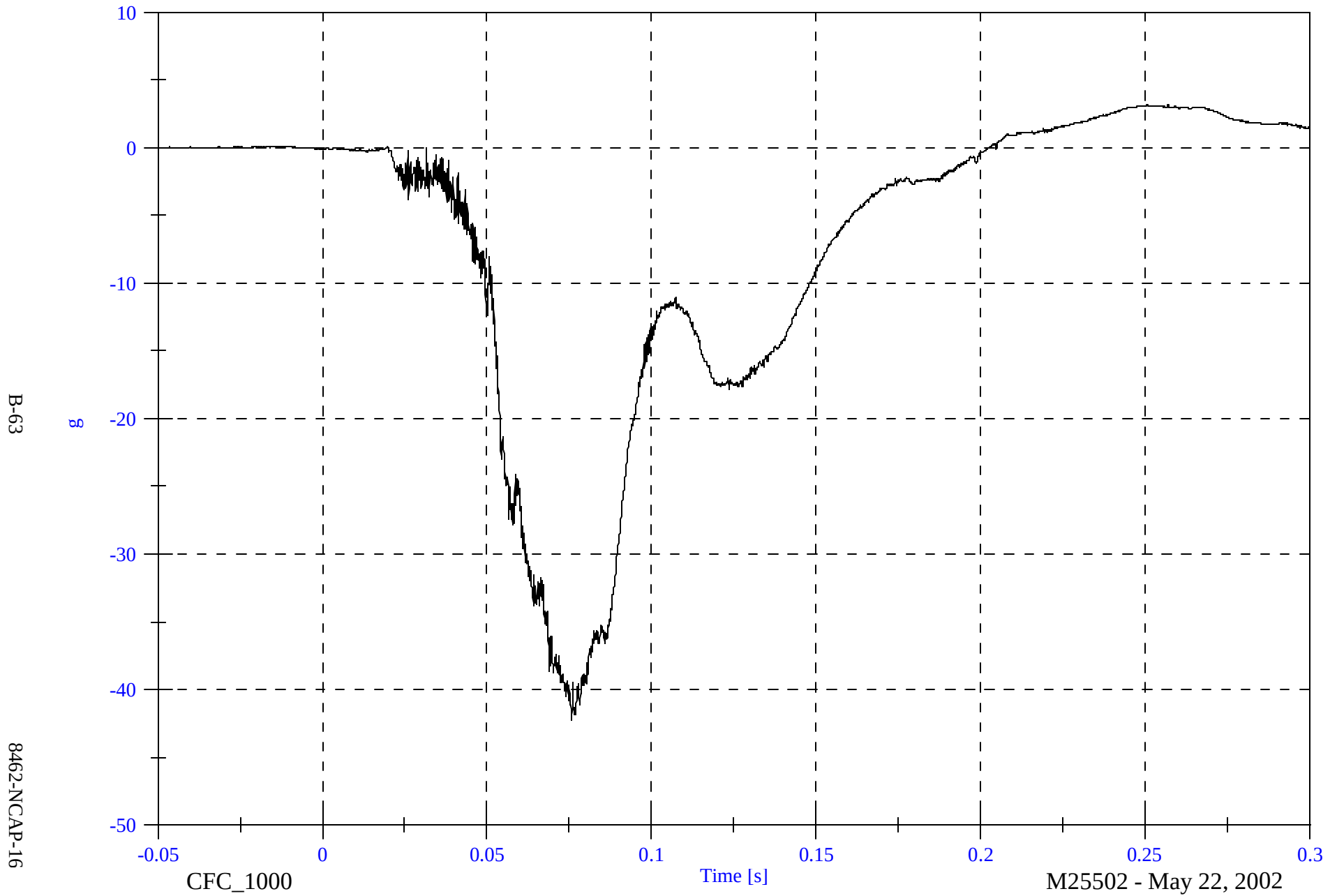
Min: -16.9 [g] at 0.120 [s]



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Max: 3.2 [g] at 0.251 [s]
Min: -42.2 [g] at 0.076 [s]

P2 Head CG x

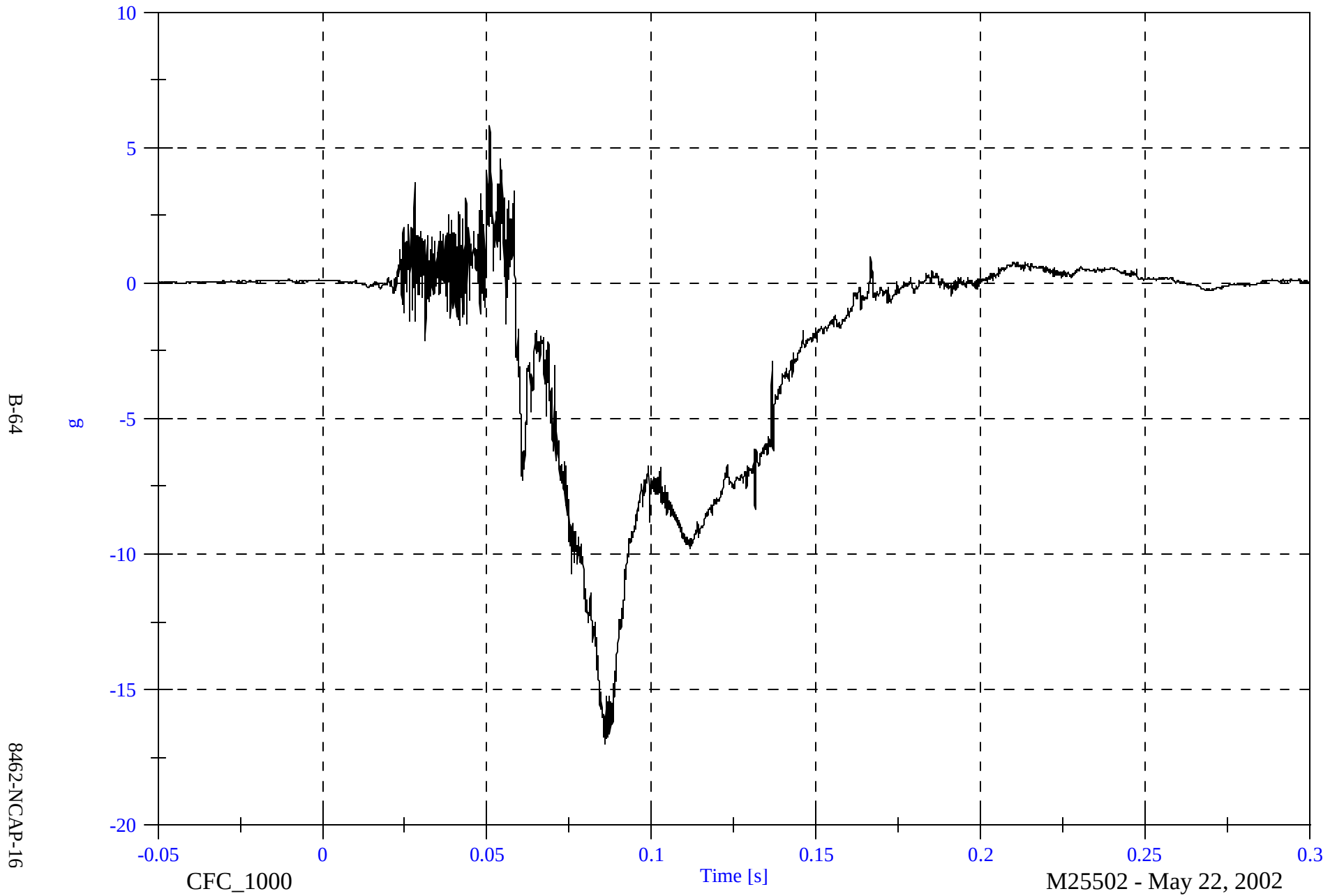


2002 NCAP Test 16 2002 Subaru Legacy

P2 Head CG y

Max: 5.8 [g] at 0.051 [s]

Min: -17.0 [g] at 0.086 [s]

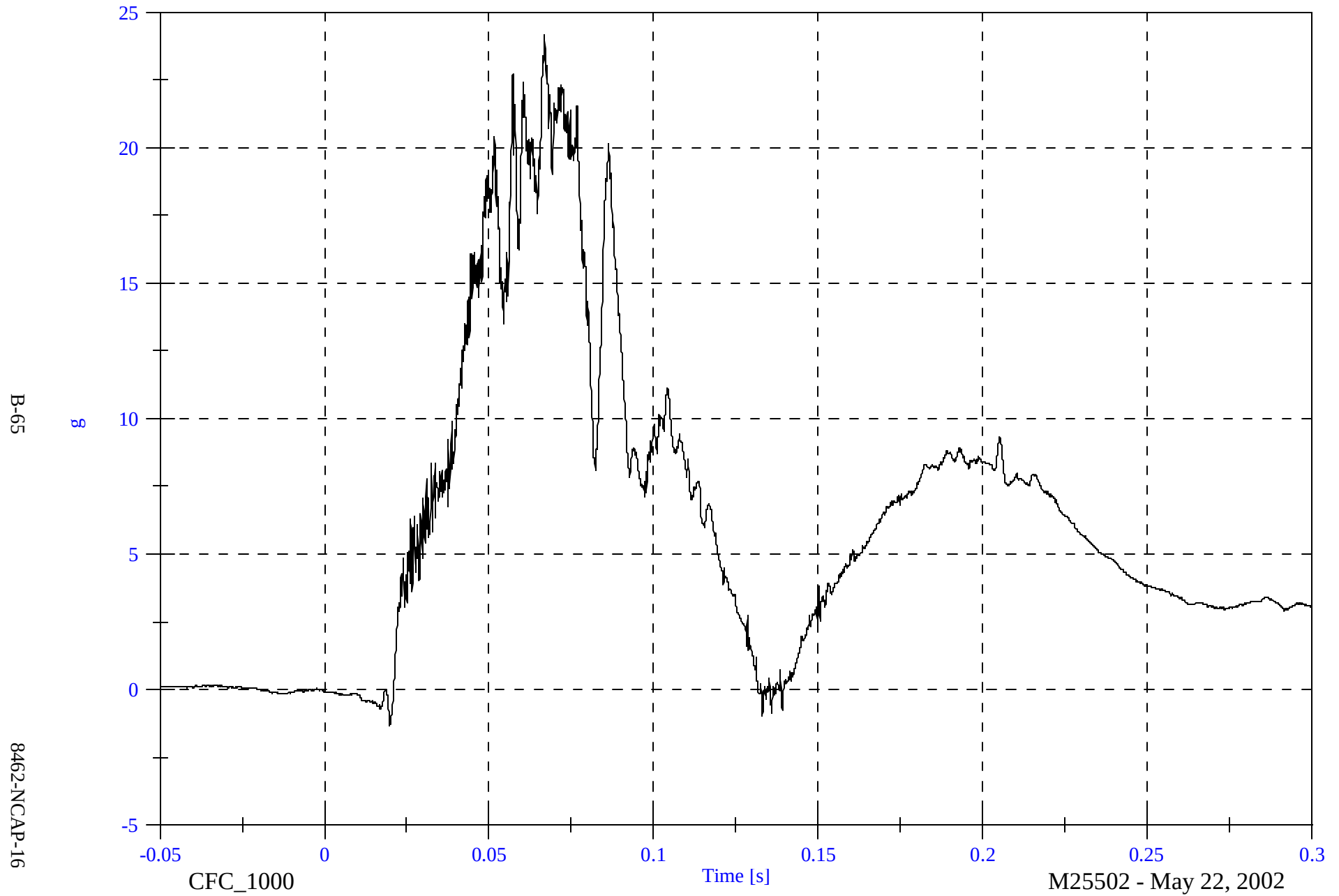


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Max: 24.1 [g] at 0.067 [s]

Min: -1.3 [g] at 0.020 [s]

P2 Head CG z



2002 NCAP Test 16 2002 Subaru Legacy

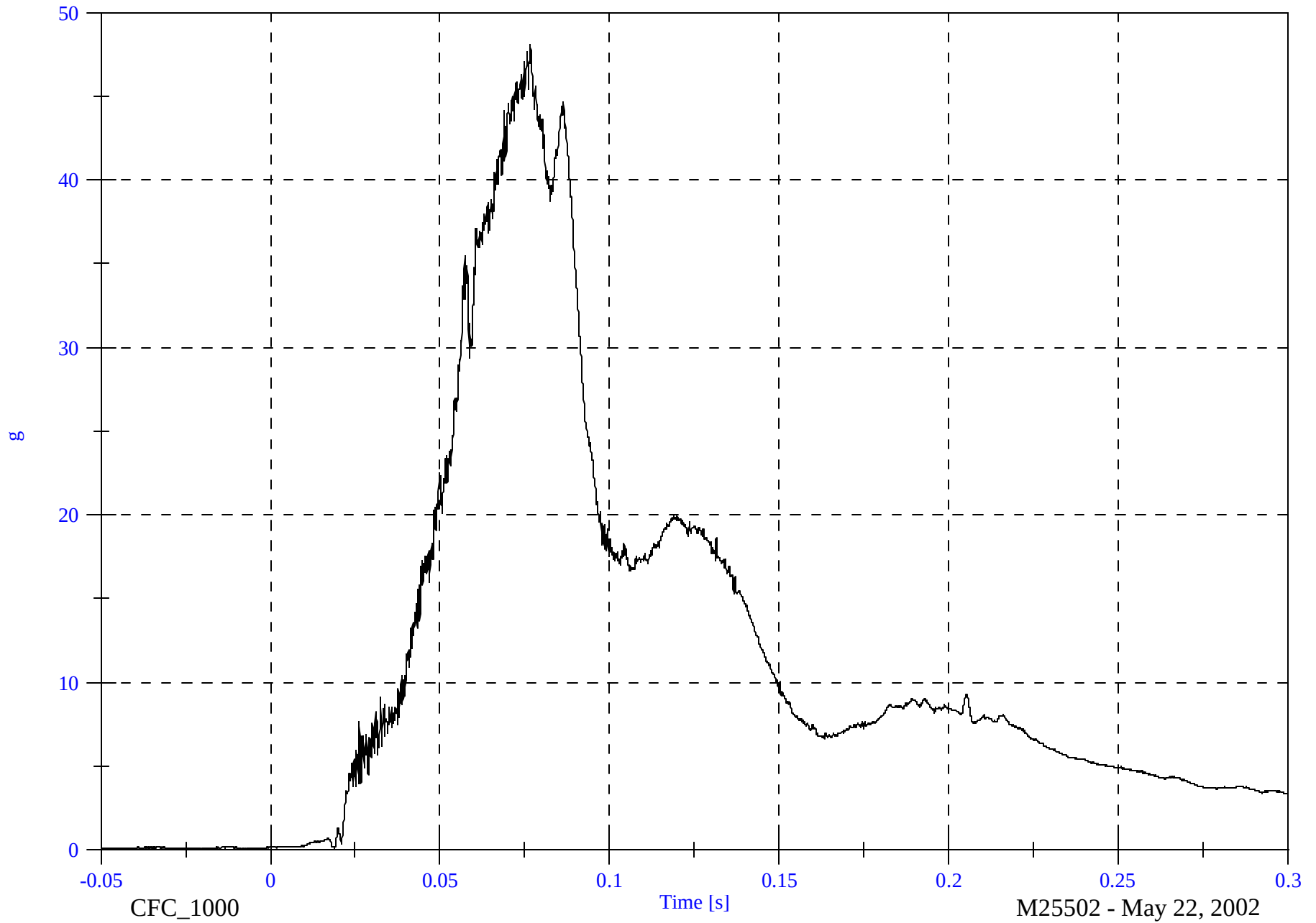
P2 Head CG Resultant

Max: 48.1 [g] at 0.077 [s]

Min: 0.1 [g] at -0.021 [s]

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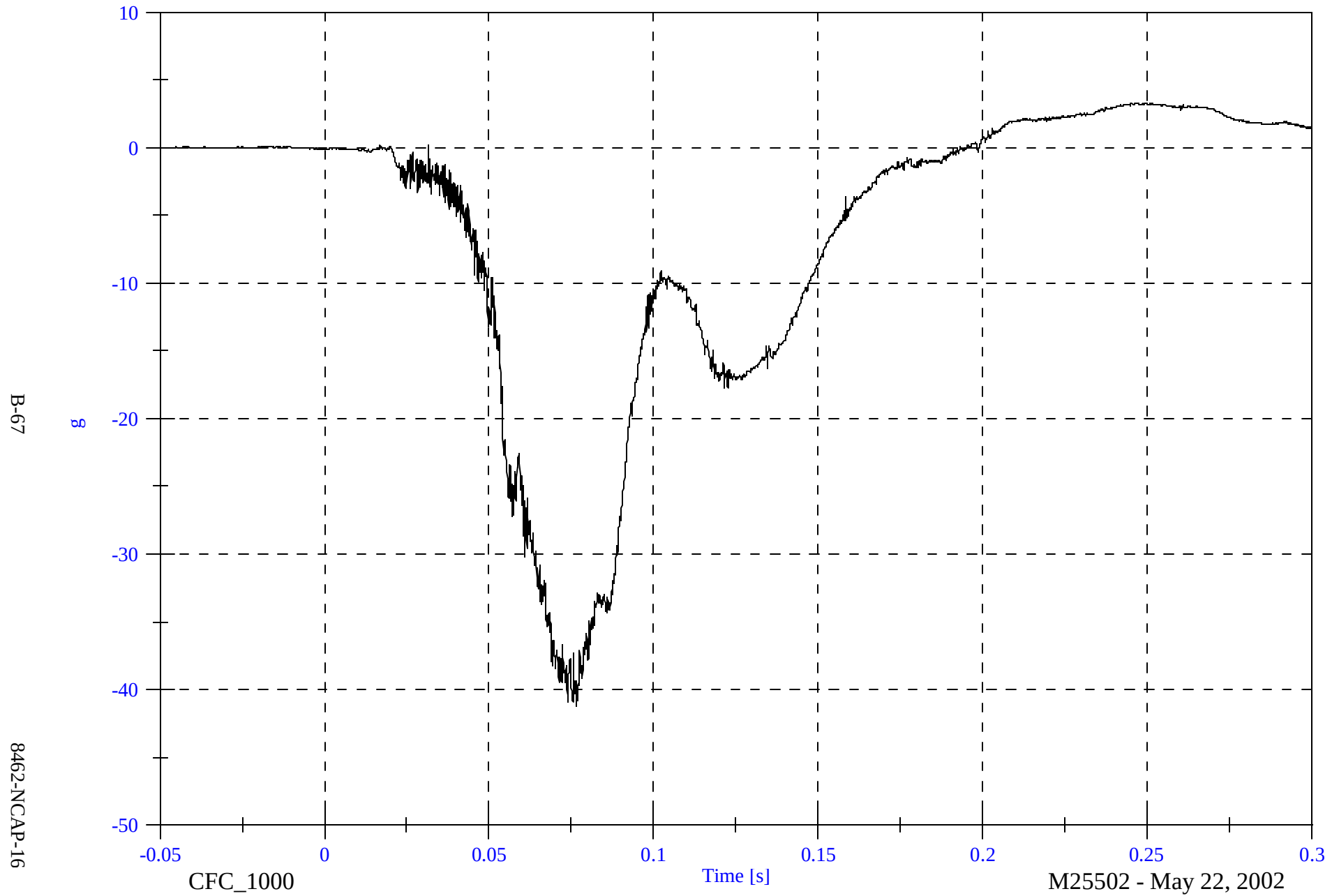


2002 NCAP Test 16 2002 Subaru Legacy

P2 Head CG Red x

Max: 3.3 [g] at 0.247 [s]

Min: -41.2 [g] at 0.077 [s]

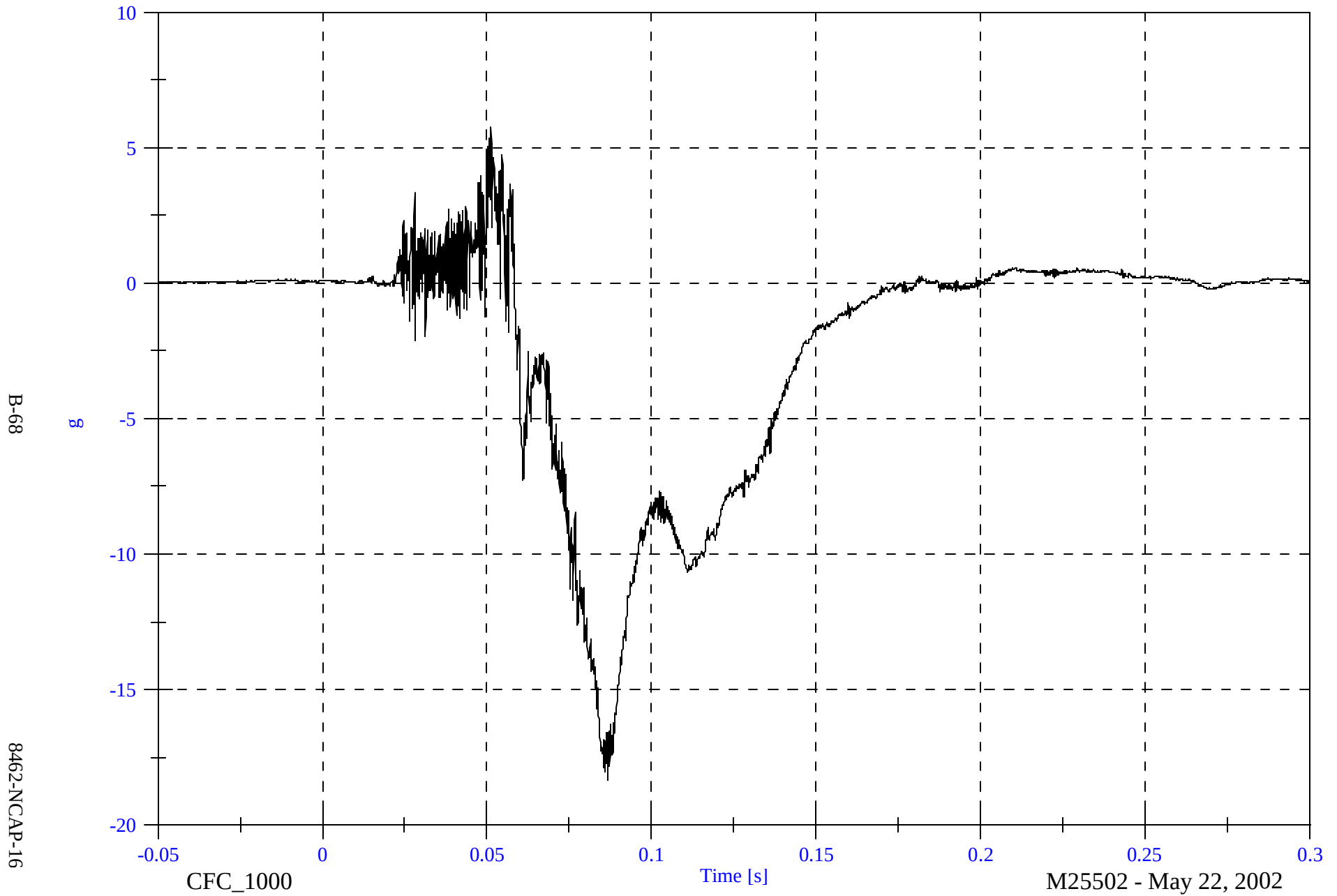


2002 NCAP Test 16 2002 Subaru Legacy

P2 Head CG Red y

Max: 5.8 [g] at 0.051 [s]

Min: -18.4 [g] at 0.087 [s]

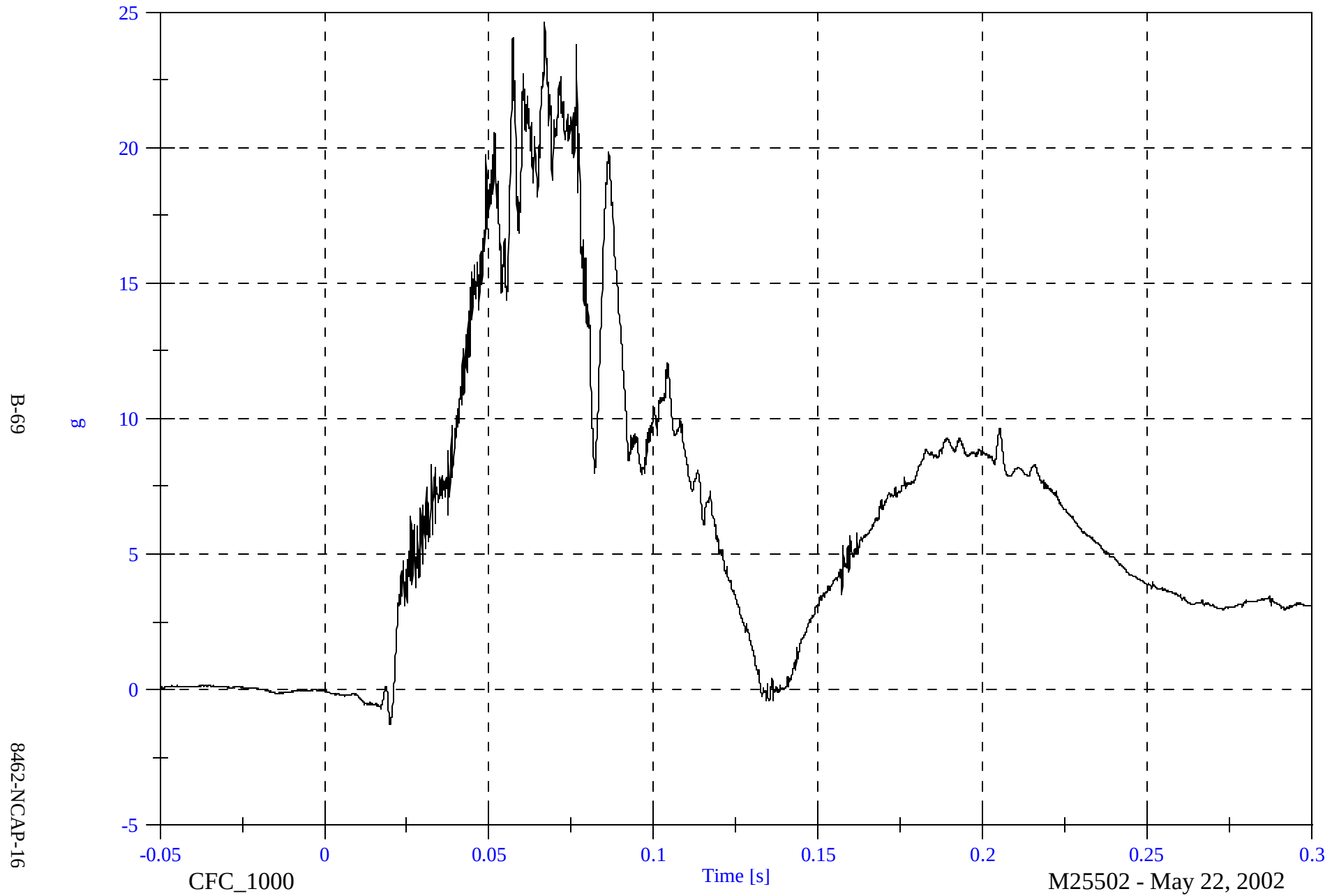


2002 NCAP Test 16 2002 Subaru Legacy

P2 Head CG Red z

Max: 24.6 [g] at 0.067 [s]

Min: -1.3 [g] at 0.020 [s]

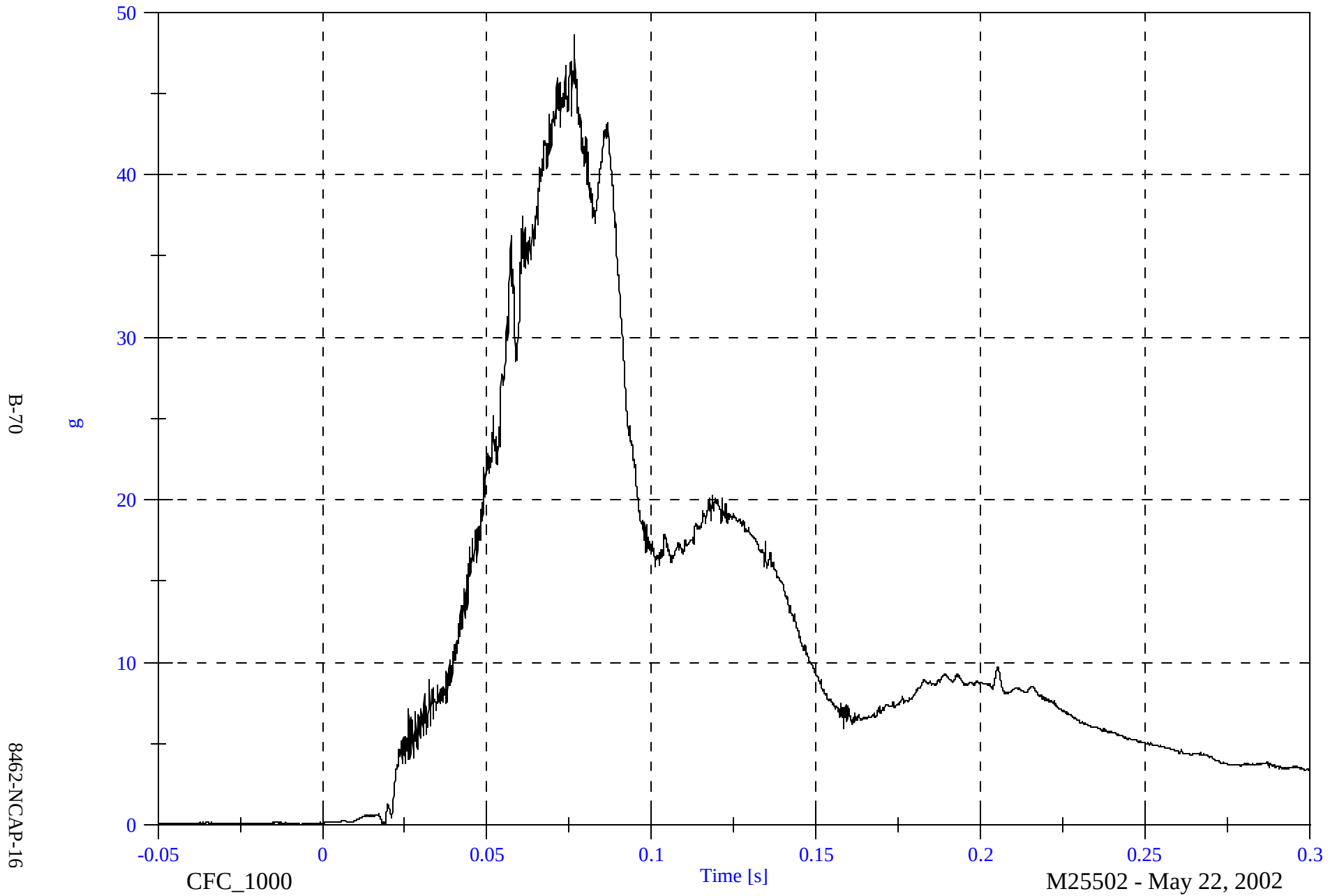


2002 NCAP Test 16 2002 Subaru Legacy

P2 Head CG Red Resultant

Max: 48.6 [g] at 0.077 [s]

Min: 0.0 [g] at 0.018 [s]

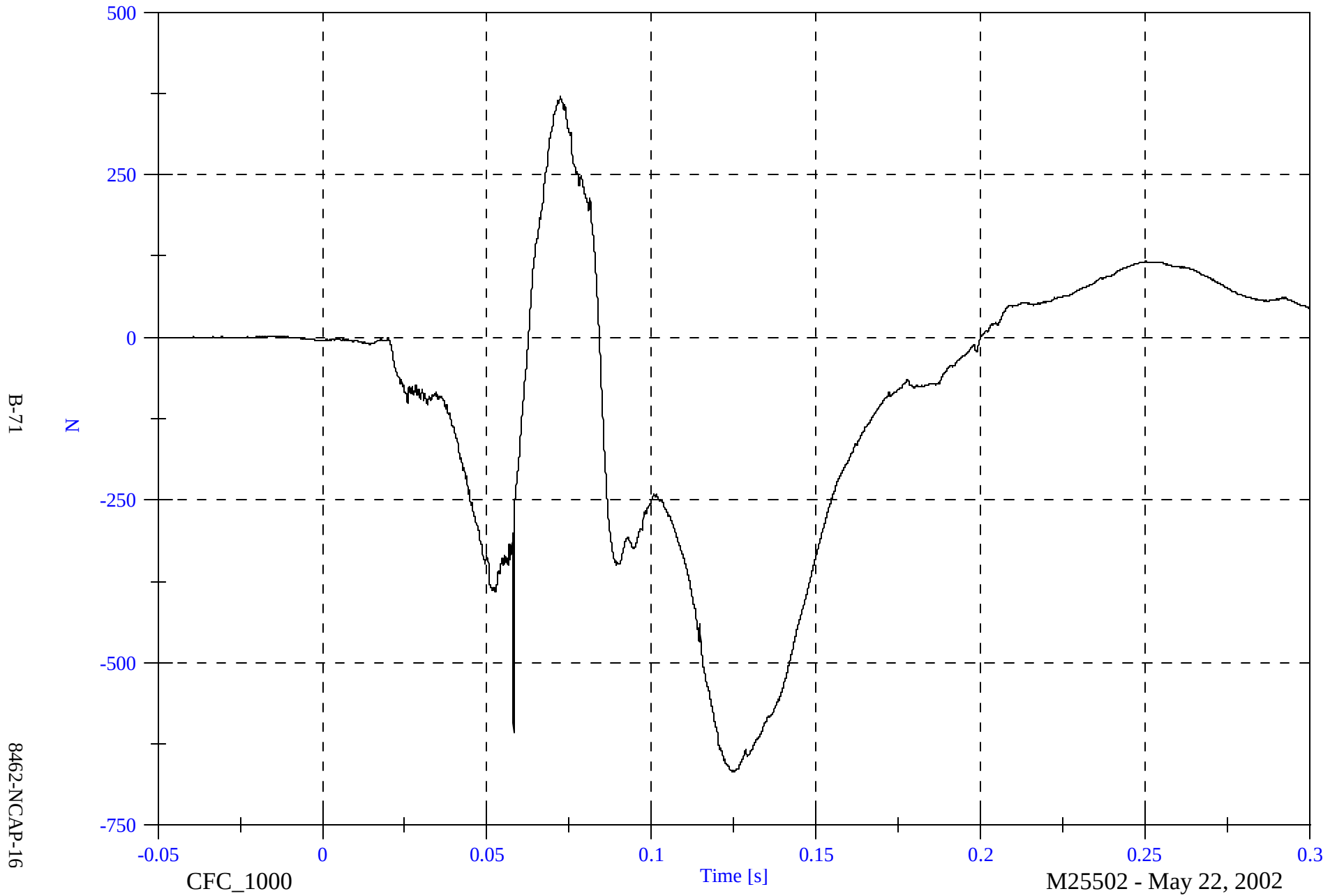


2002 NCAP Test 16 2002 Subaru Legacy

Max: 369.7 [N] at 0.072 [s]

Min: -667.4 [N] at 0.125 [s]

P2 Upper Neck Fx

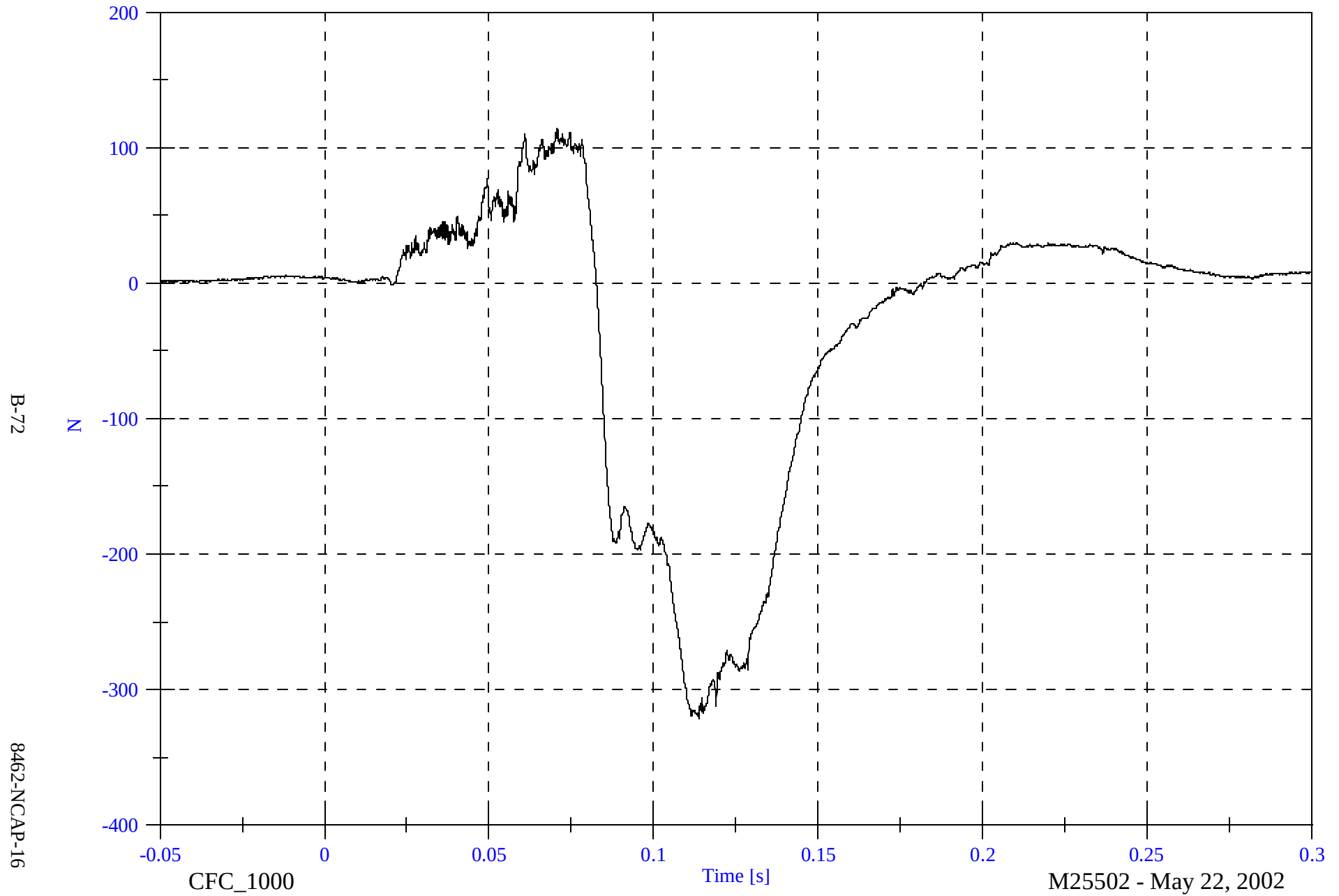


2002 NCAP Test 16 2002 Subaru Legacy

P2 Upper Neck Fy

Max: 114.2 [N] at 0.071 [s]

Min: -321.6 [N] at 0.114 [s]

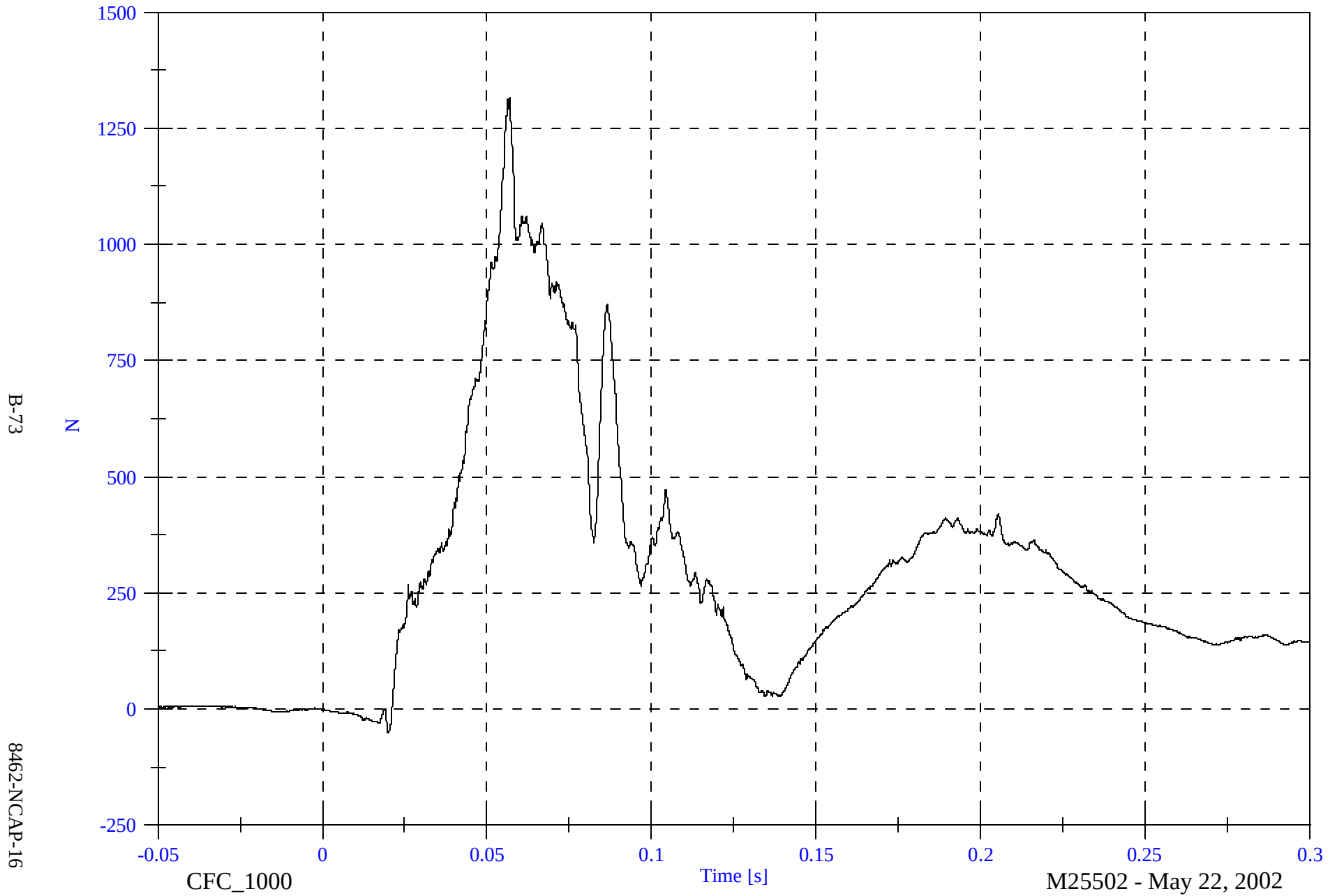


2002 NCAP Test 16 2002 Subaru Legacy

Max: 1316.2 [N] at 0.057 [s]

Min: -50.4 [N] at 0.020 [s]

P2 Upper Neck Fz

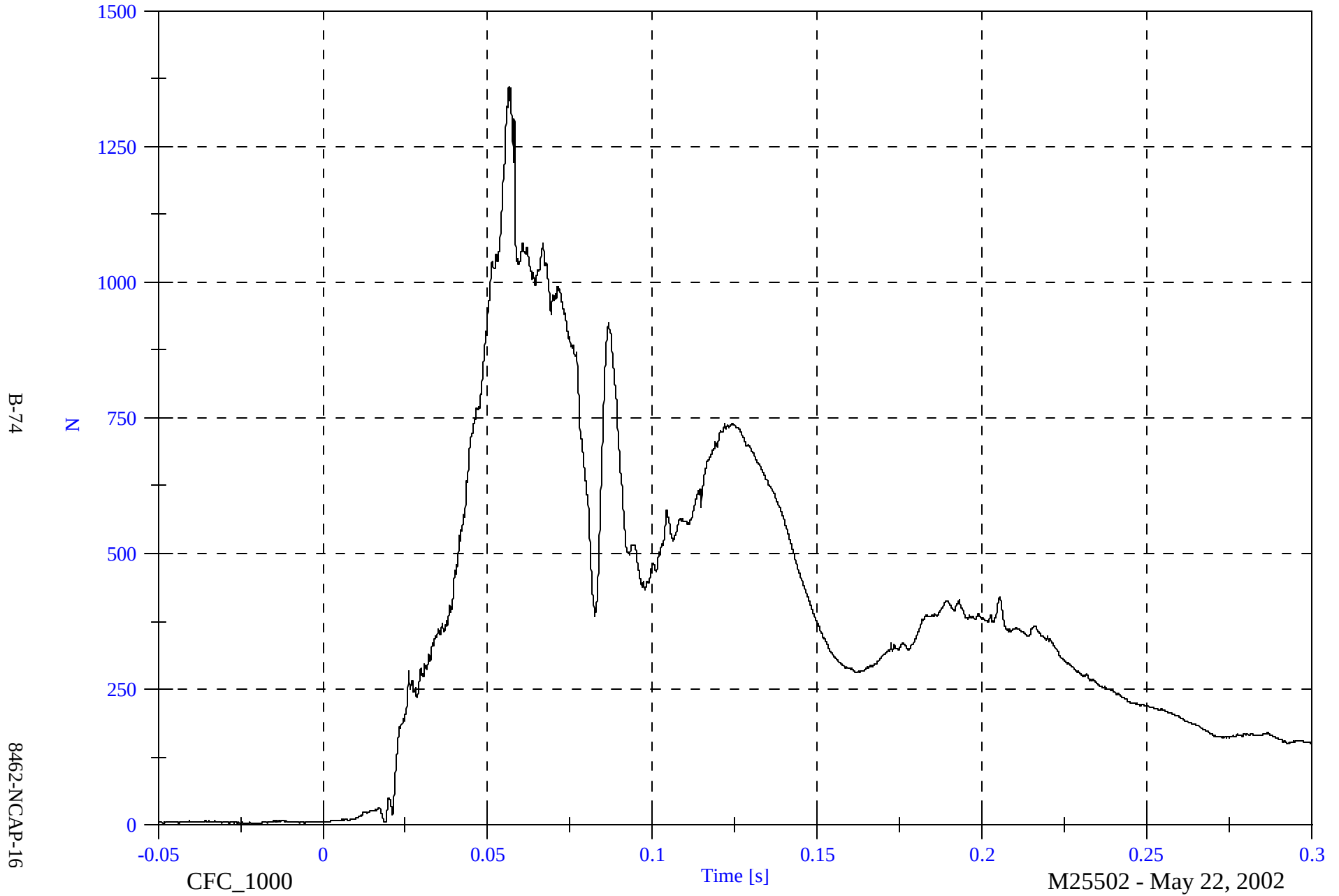


2002 NCAP Test 16 2002 Subaru Legacy

Max: 1359.2 [N] at 0.056 [s]

P2 Upper Neck F Resultant

Min: 3.3 [N] at -0.024 [s]

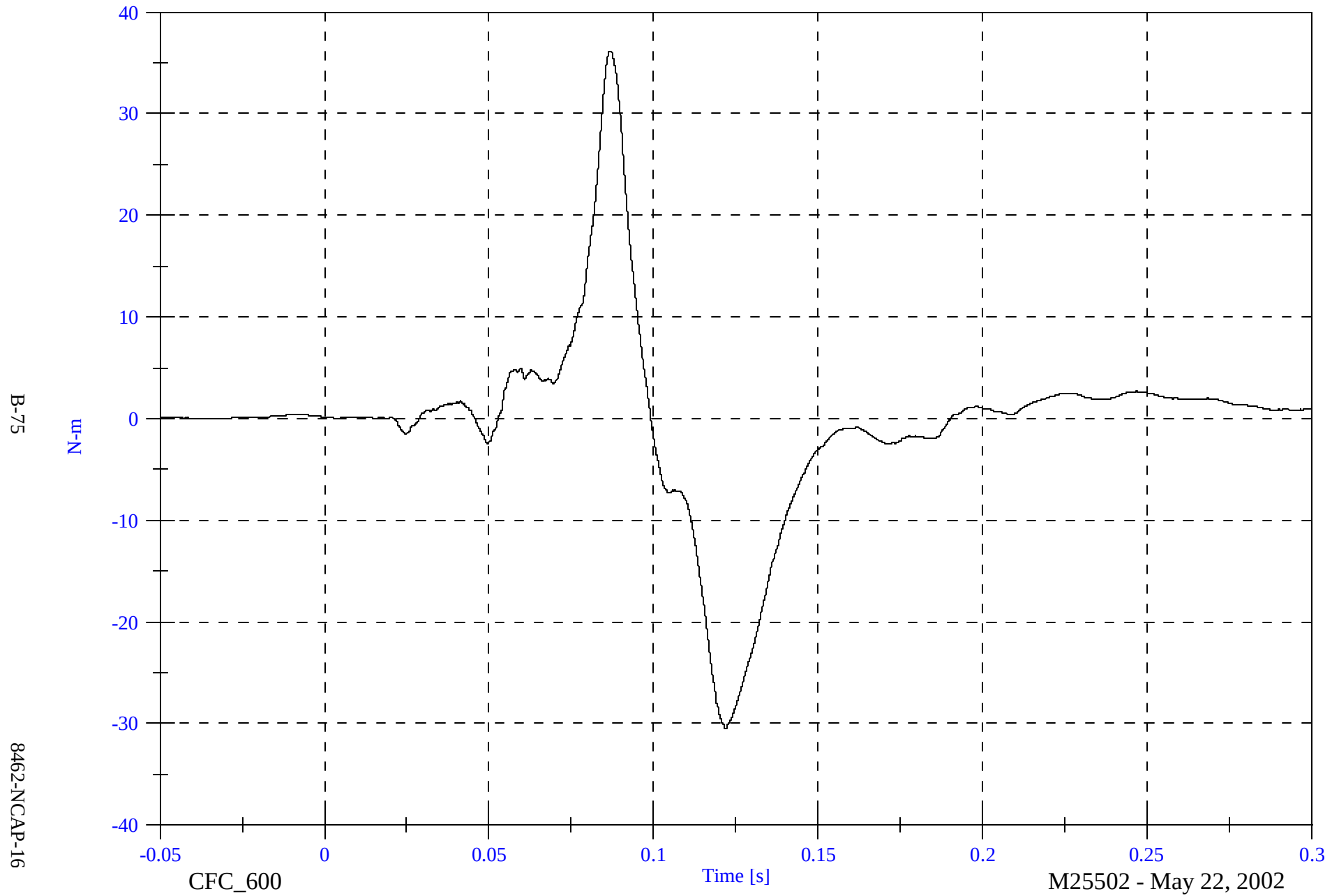


2002 NCAP Test 16 2002 Subaru Legacy

P2 Upper Neck Mx

Max: 36.2 [N-m] at 0.087 [s]

Min: -30.5 [N-m] at 0.122 [s]

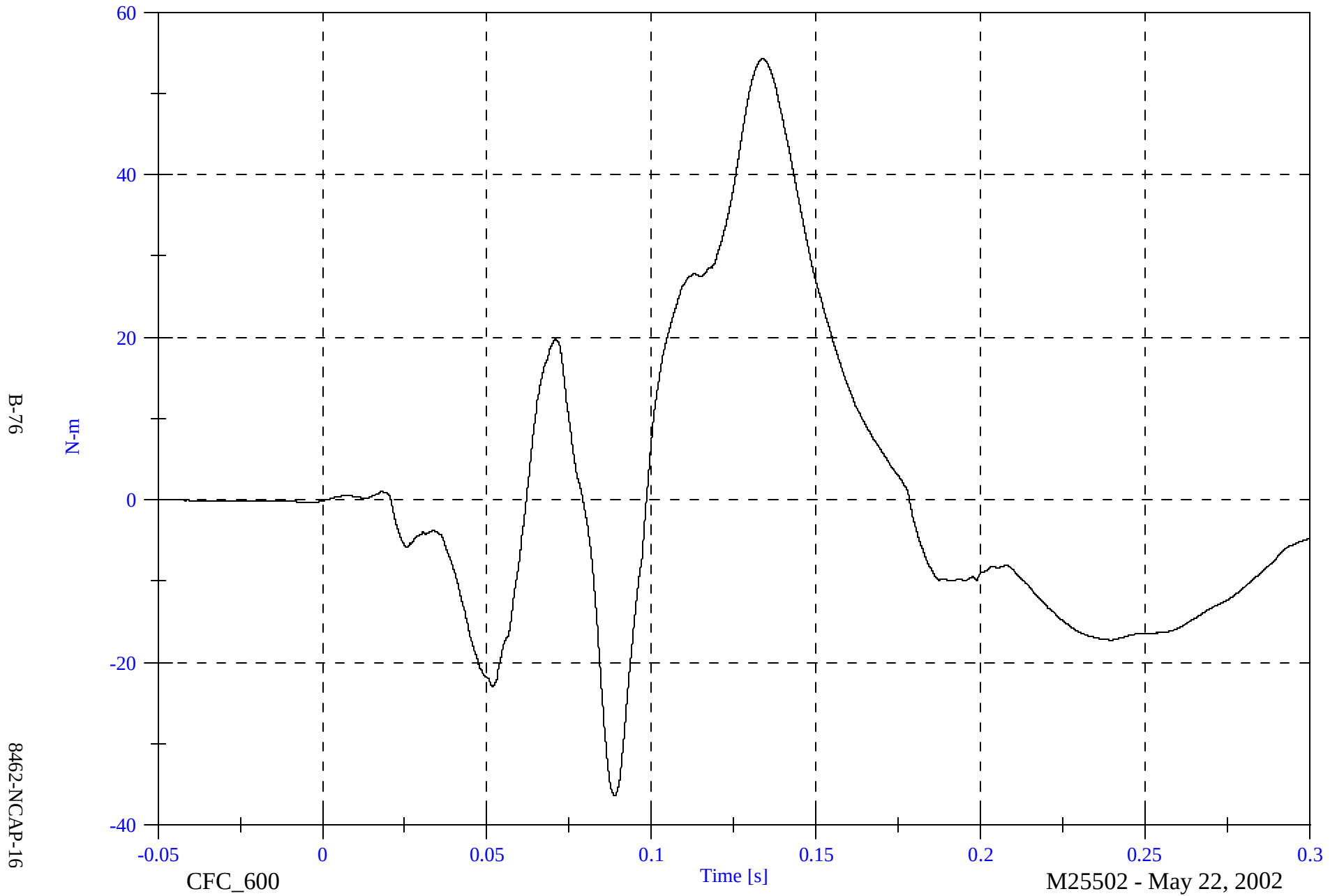


2002 NCAP Test 16 2002 Subaru Legacy

Max: 54.2 [N-m] at 0.134 [s]

Min: -36.4 [N-m] at 0.089 [s]

P2 Upper Neck My



2002 NCAP Test 16 2002 Subaru Legacy

P2 Upper Neck Mz

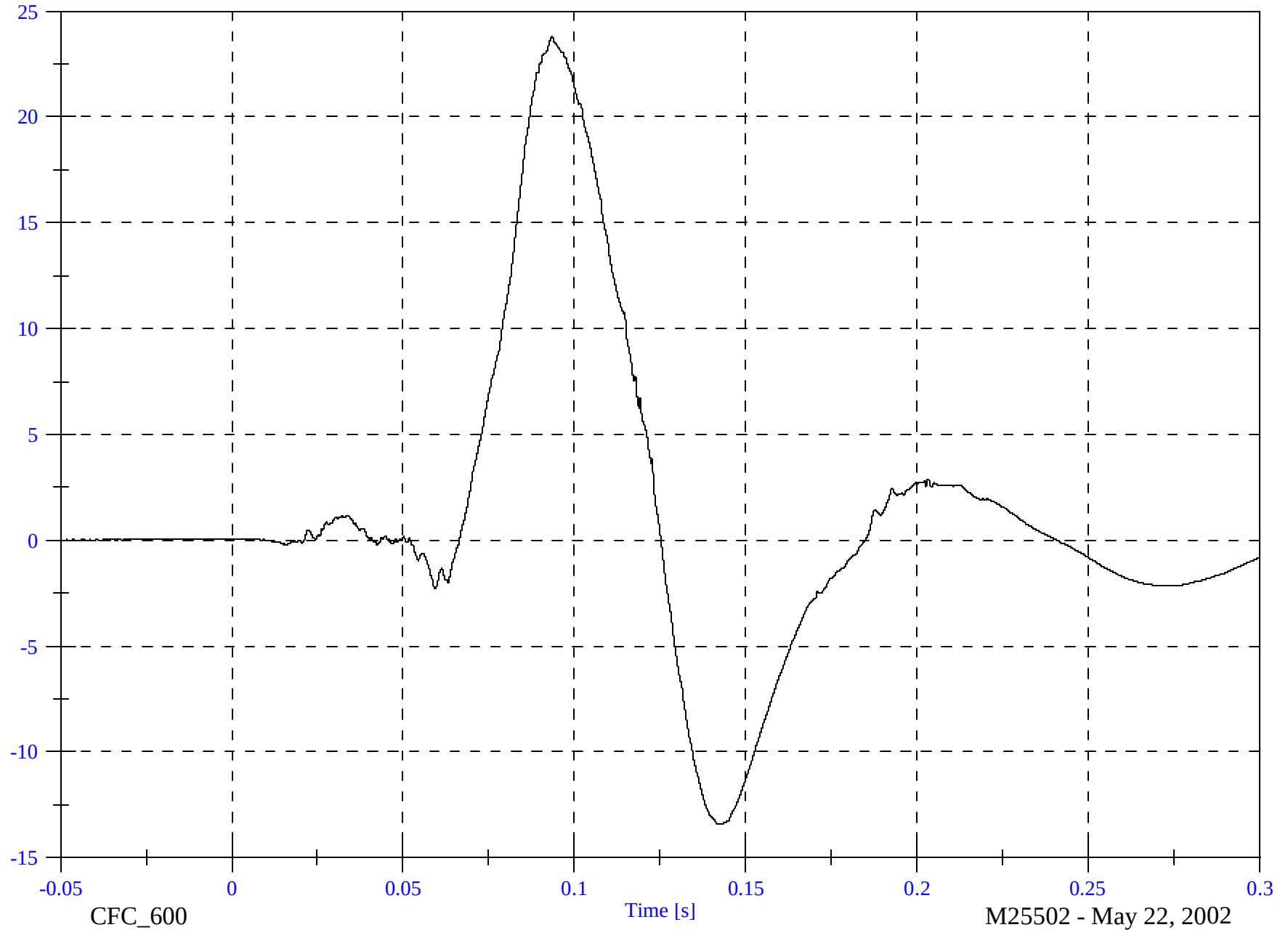
Max: 23.8 [N-m] at 0.094 [s]

Min: -13.4 [N-m] at 0.143 [s]

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m-N

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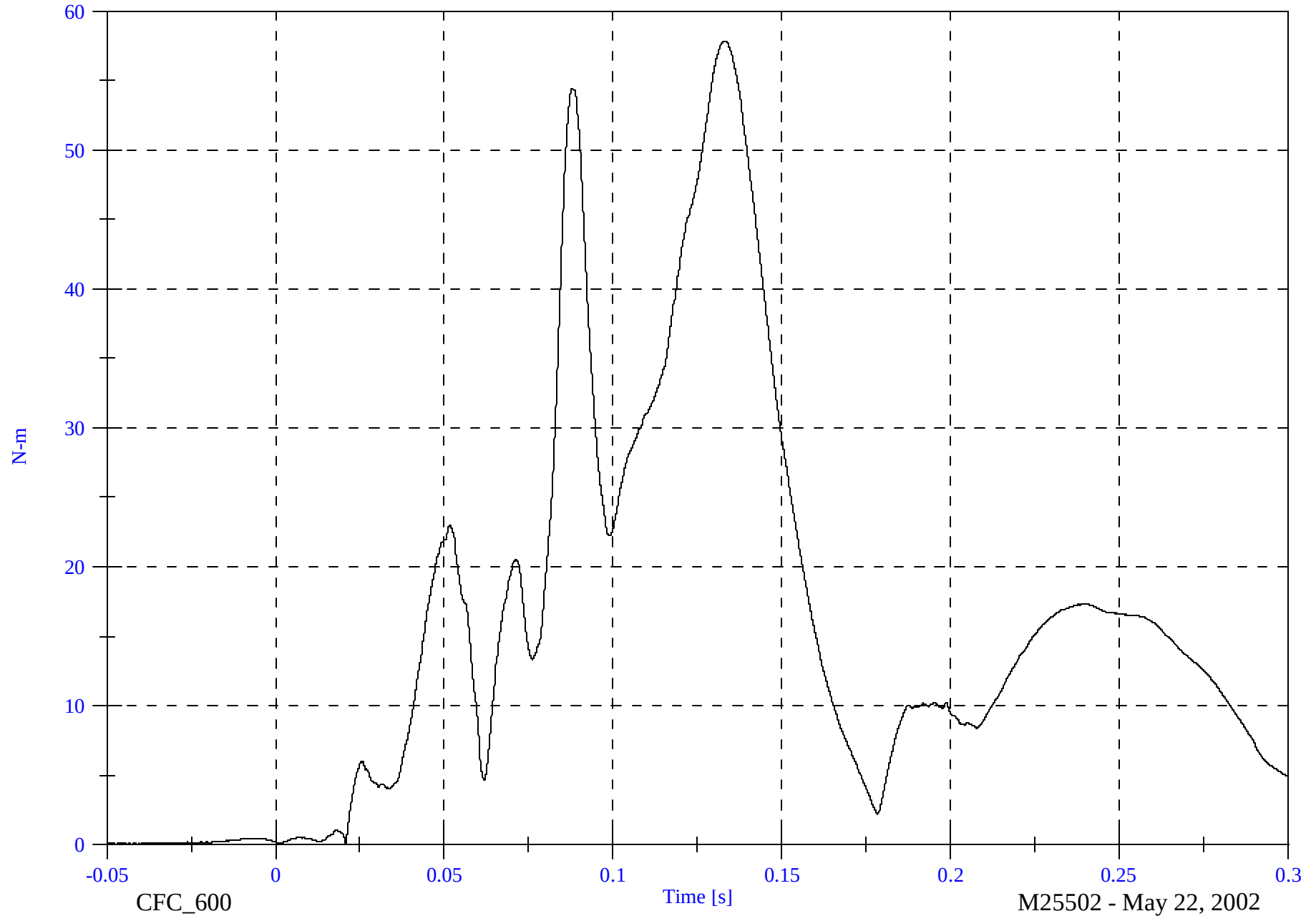
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

P2 Upper Neck M Resultant

Max: 57.8 [N-m] at 0.134 [s]

Min: 0.1 [N-m] at -0.041 [s]



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CFC_600

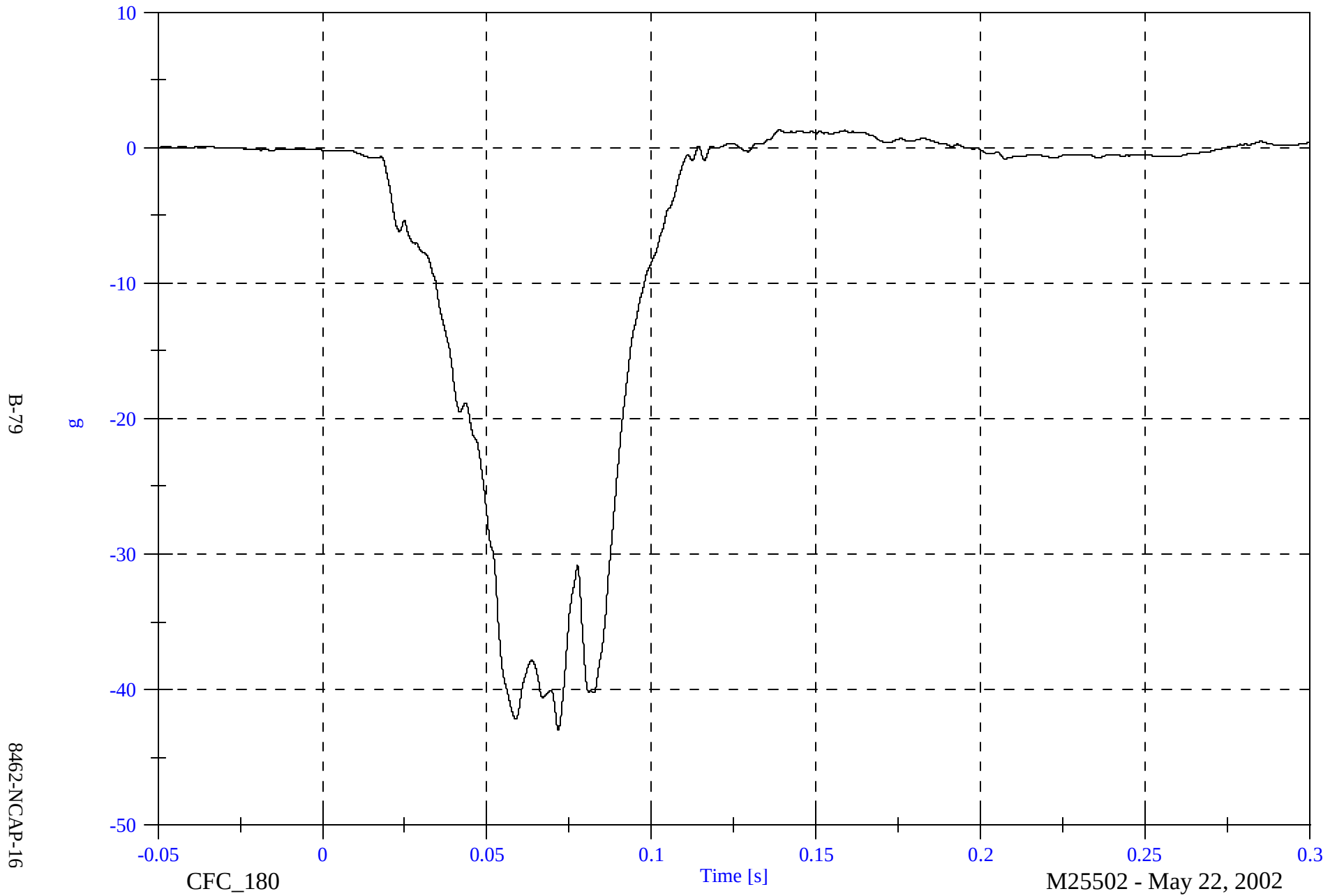
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Max: 1.3 [g] at 0.139 [s]

Min: -43.0 [g] at 0.072 [s]

P2 Chest x

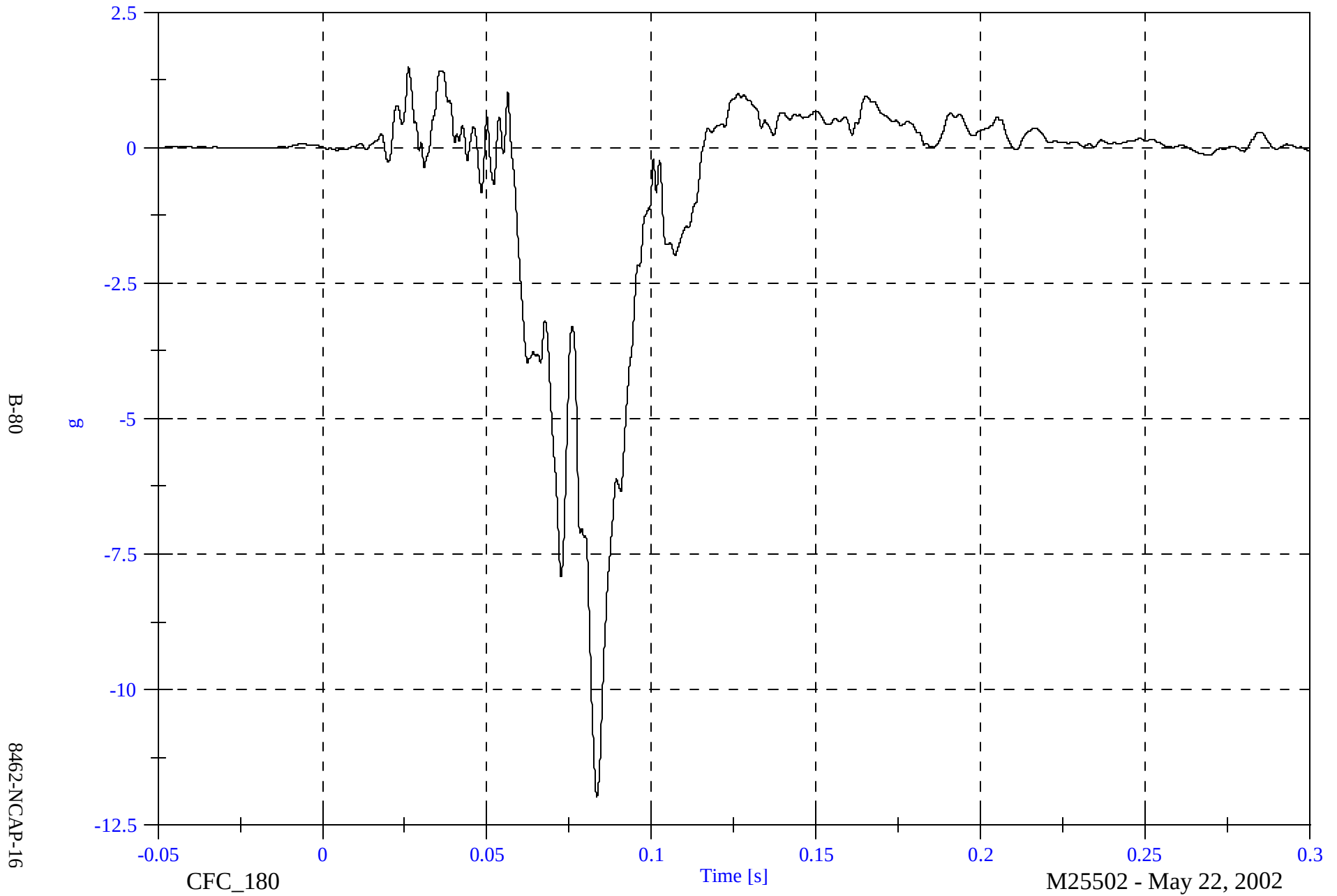


2002 NCAP Test 16 2002 Subaru Legacy

Max: 1.5 [g] at 0.026 [s]

Min: -12.0 [g] at 0.083 [s]

P2 Chest y

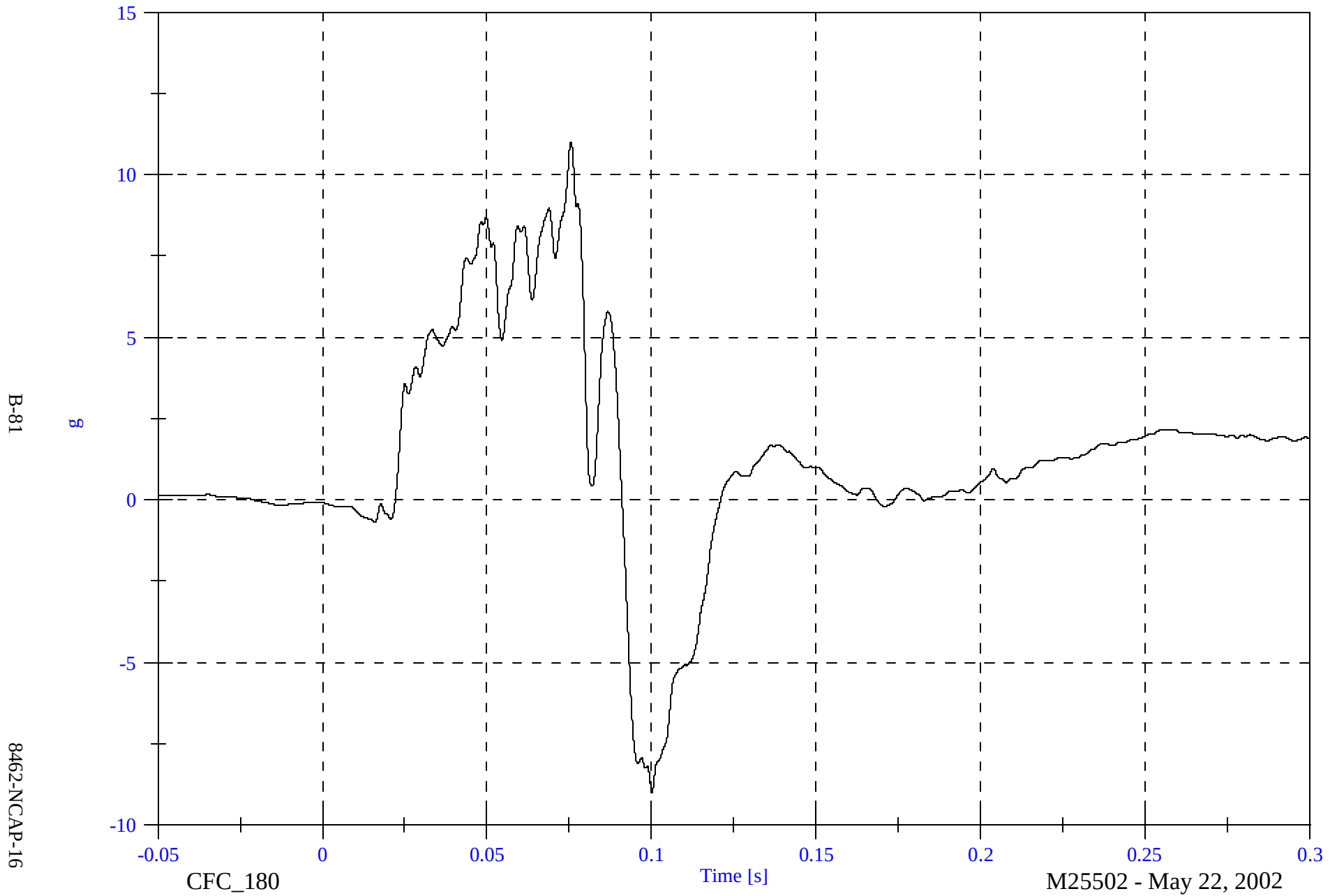


2002 NCAP Test 16 2002 Subaru Legacy

Max: 11.0 [g] at 0.076 [s]

Min: -9.0 [g] at 0.100 [s]

P2 Chest z

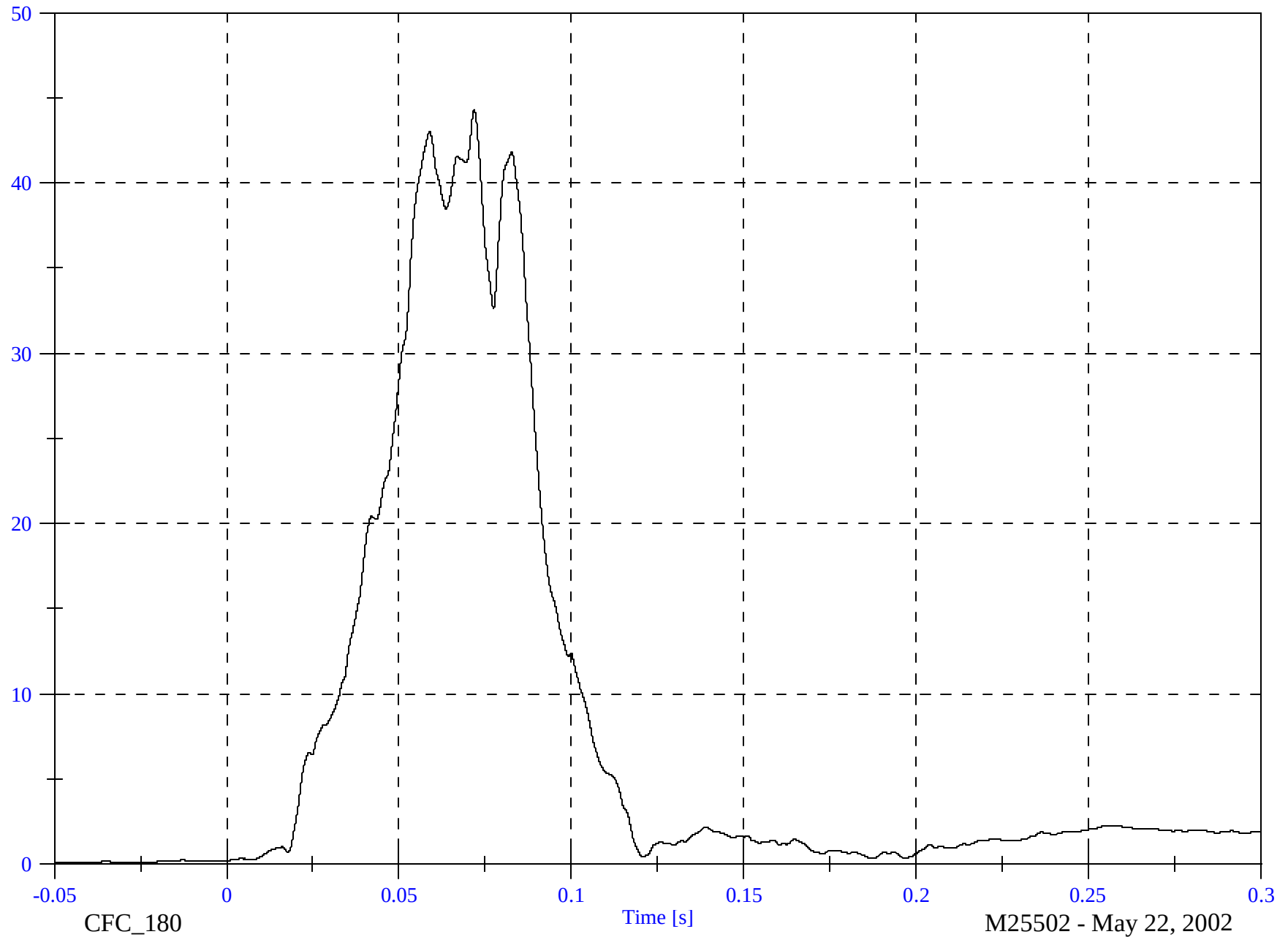


2002 NCAP Test 16 2002 Subaru Legacy

P2 Chest Resultant

Max: 44.3 [g] at 0.072 [s]

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



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CFC_180

Time [s]

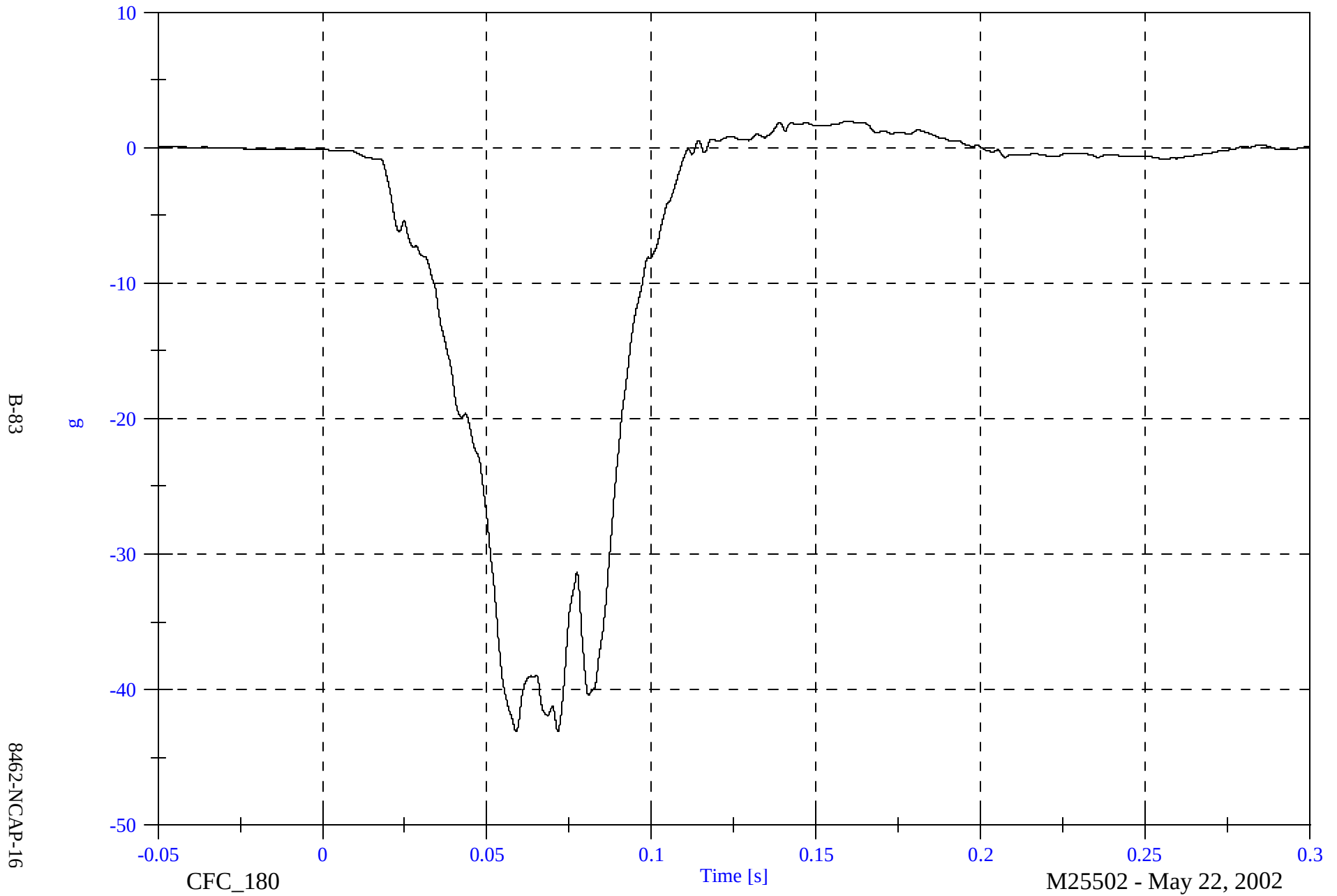
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Max: 1.9 [g] at 0.160 [s]

Min: -43.1 [g] at 0.059 [s]

P2 Chest Red x

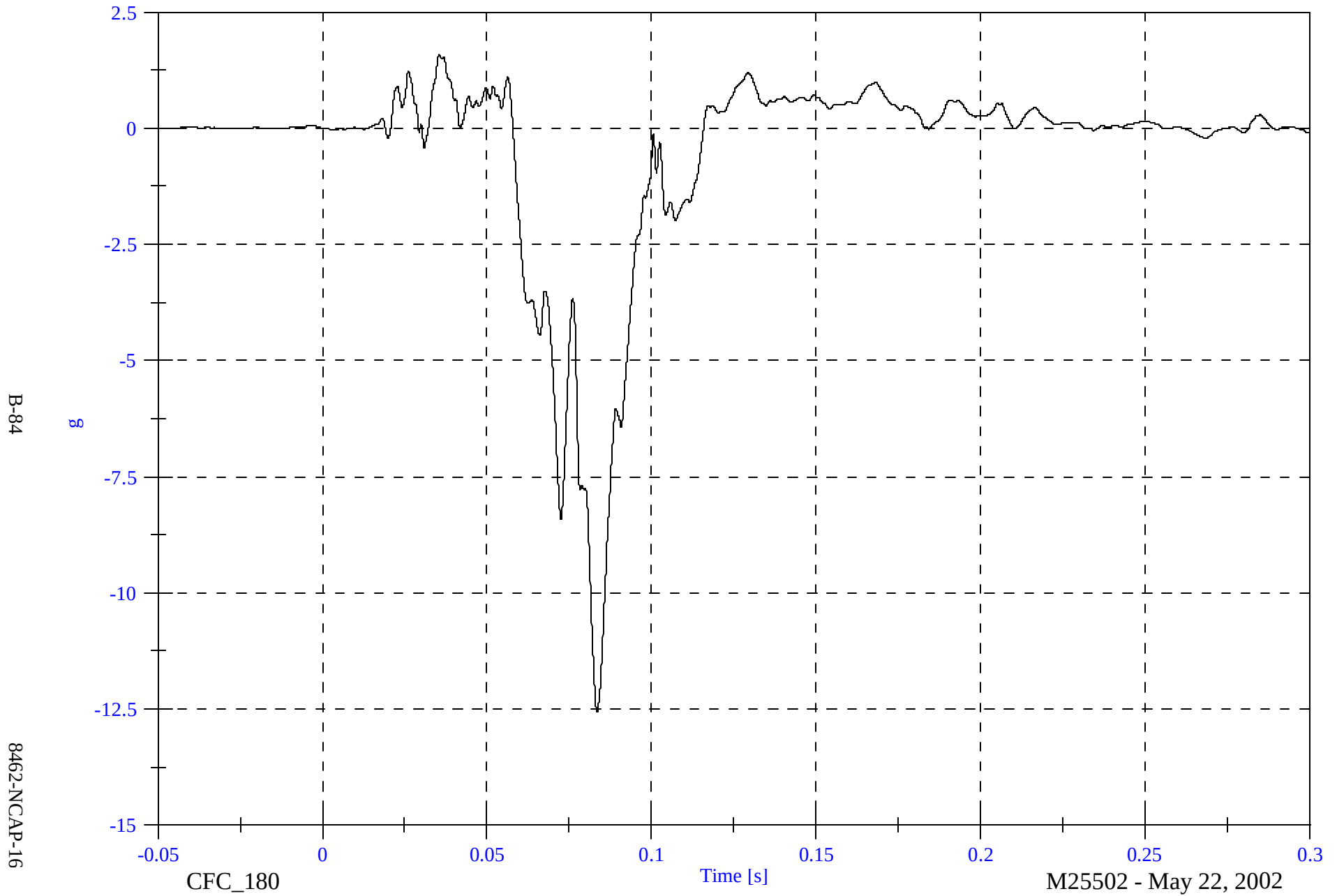


2002 NCAP Test 16 2002 Subaru Legacy

Max: 1.6 [g] at 0.036 [s]

Min: -12.6 [g] at 0.083 [s]

P2 Chest Red y

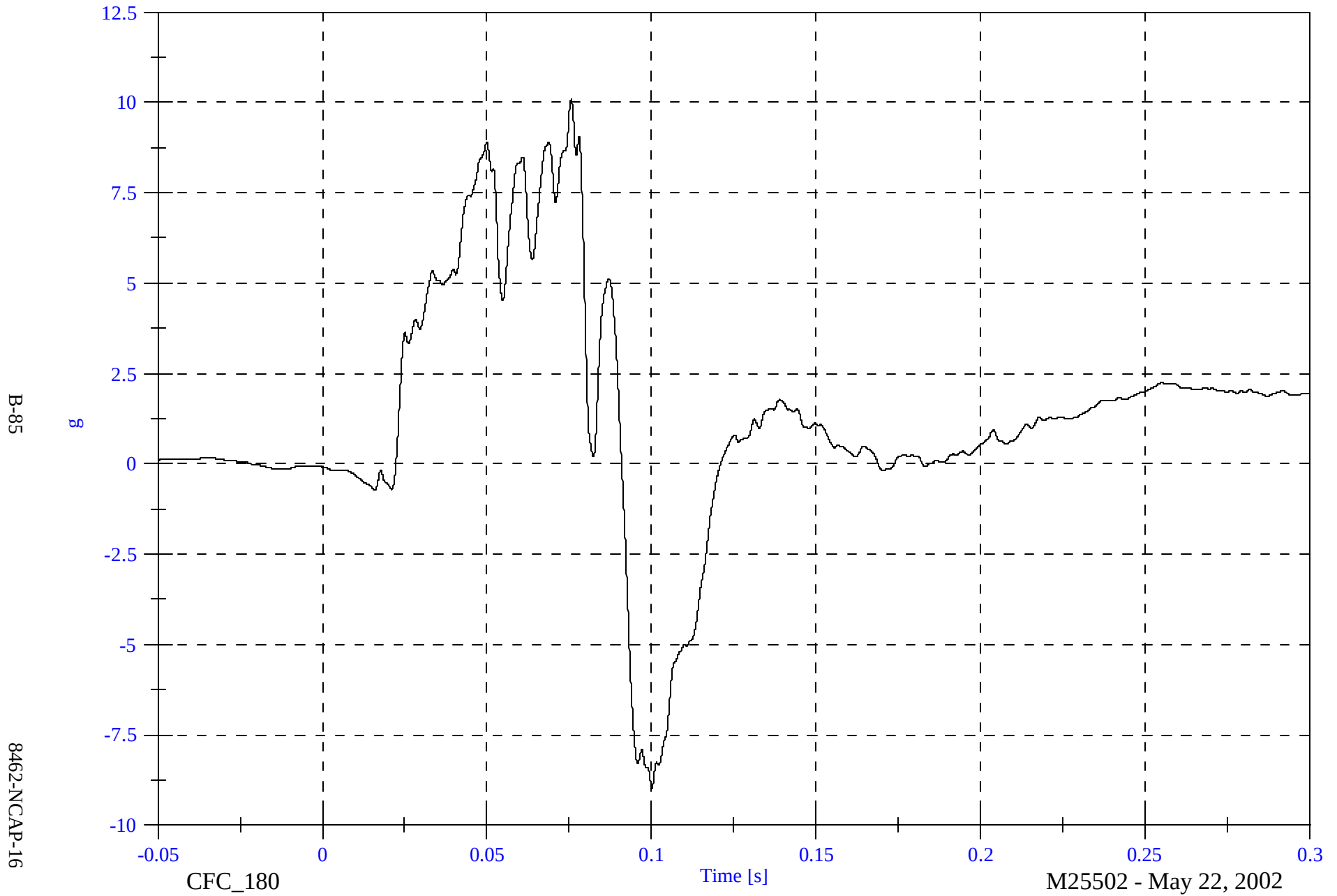


2002 NCAP Test 16 2002 Subaru Legacy

P2 Chest Red z

Max: 10.1 [g] at 0.076 [s]

Min: -9.0 [g] at 0.100 [s]



2002 NCAP Test 16 2002 Subaru Legacy

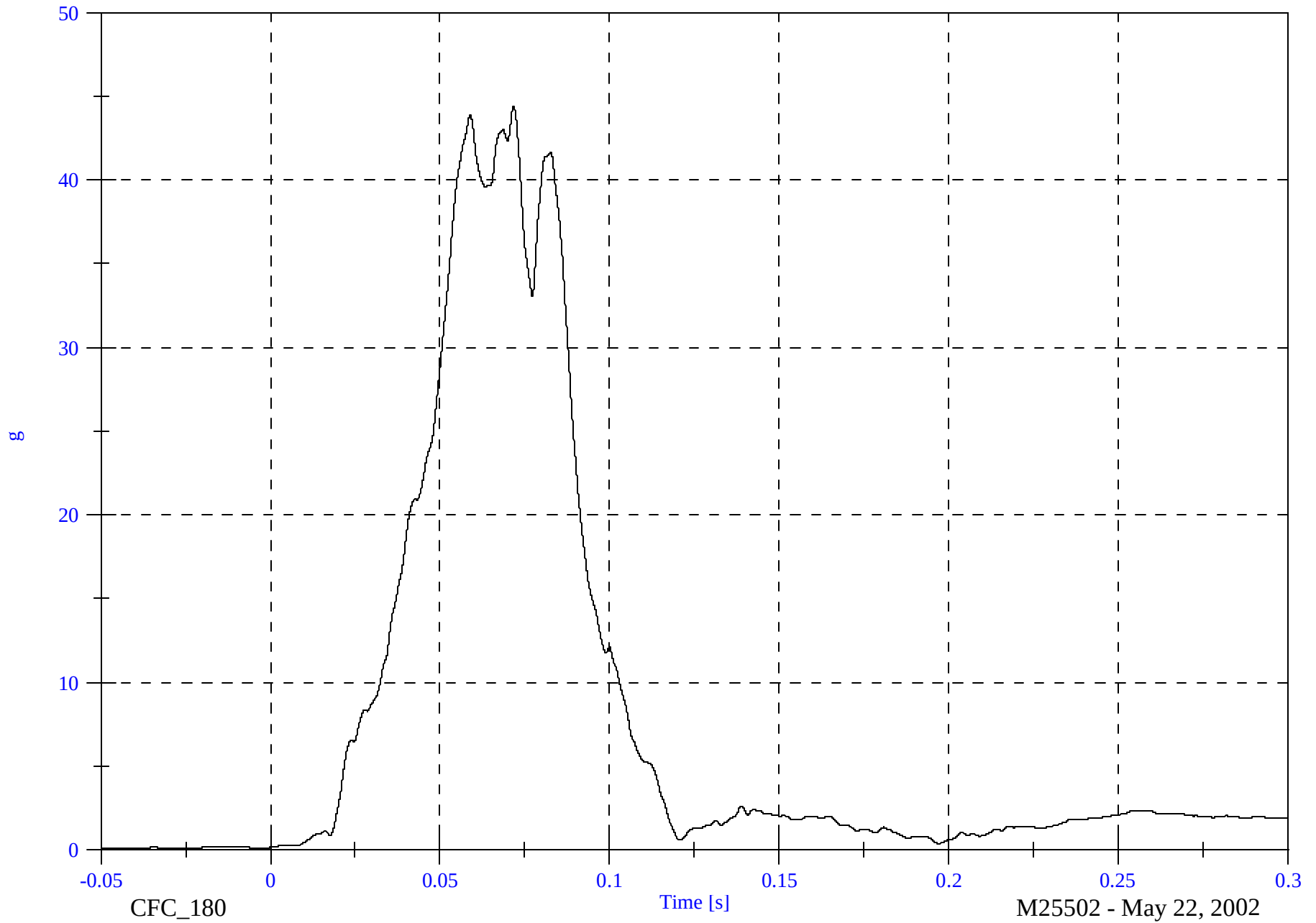
P2 Chest Red Resultant

Max: 44.4 [g] at 0.072 [s]

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

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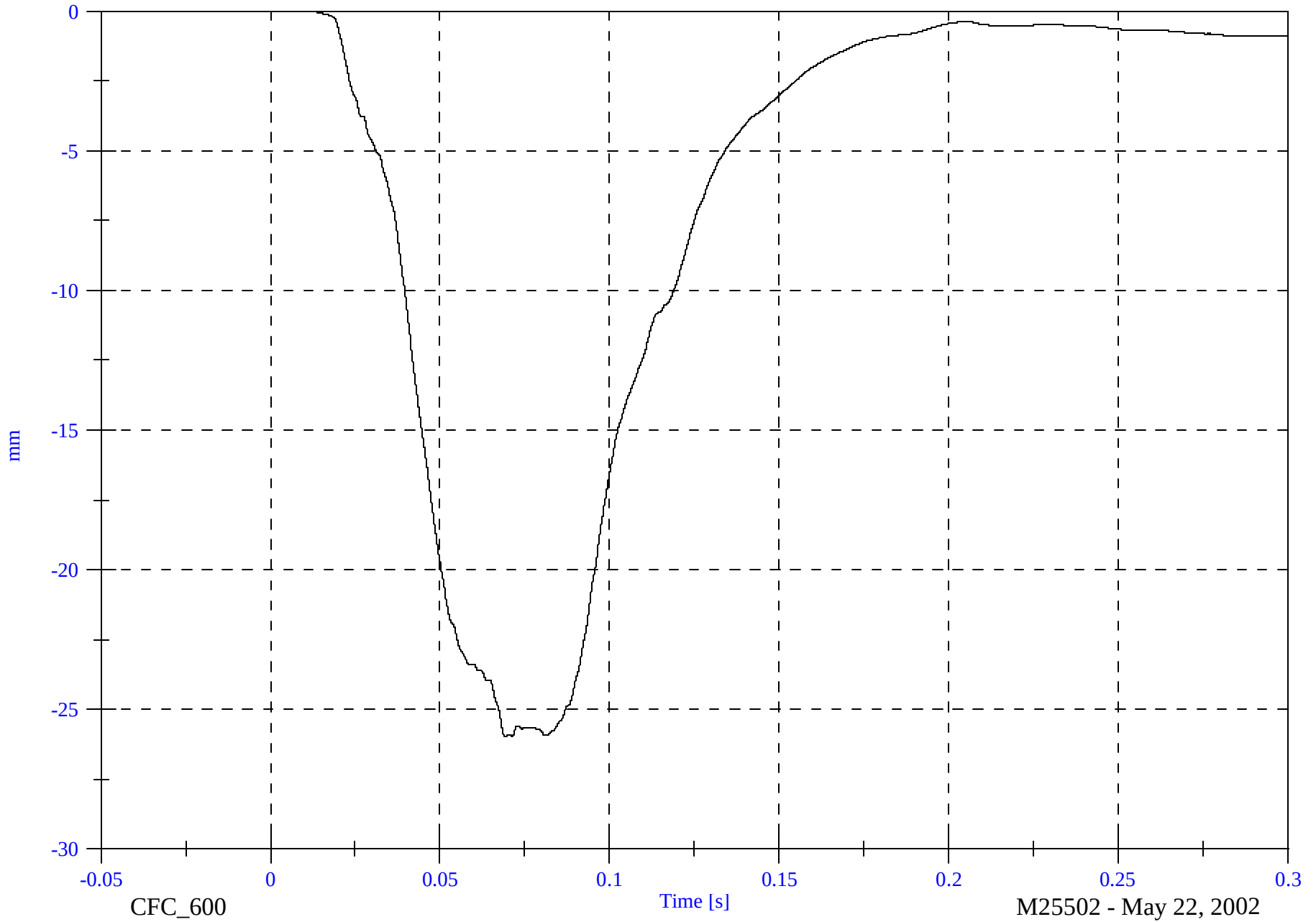
2002 NCAP Test 16 2002 Subaru Legacy

P2 Chest Compression

Max: 0.0 [mm] at 0.012 [s]
Min: -26.0 [mm] at 0.069 [s]

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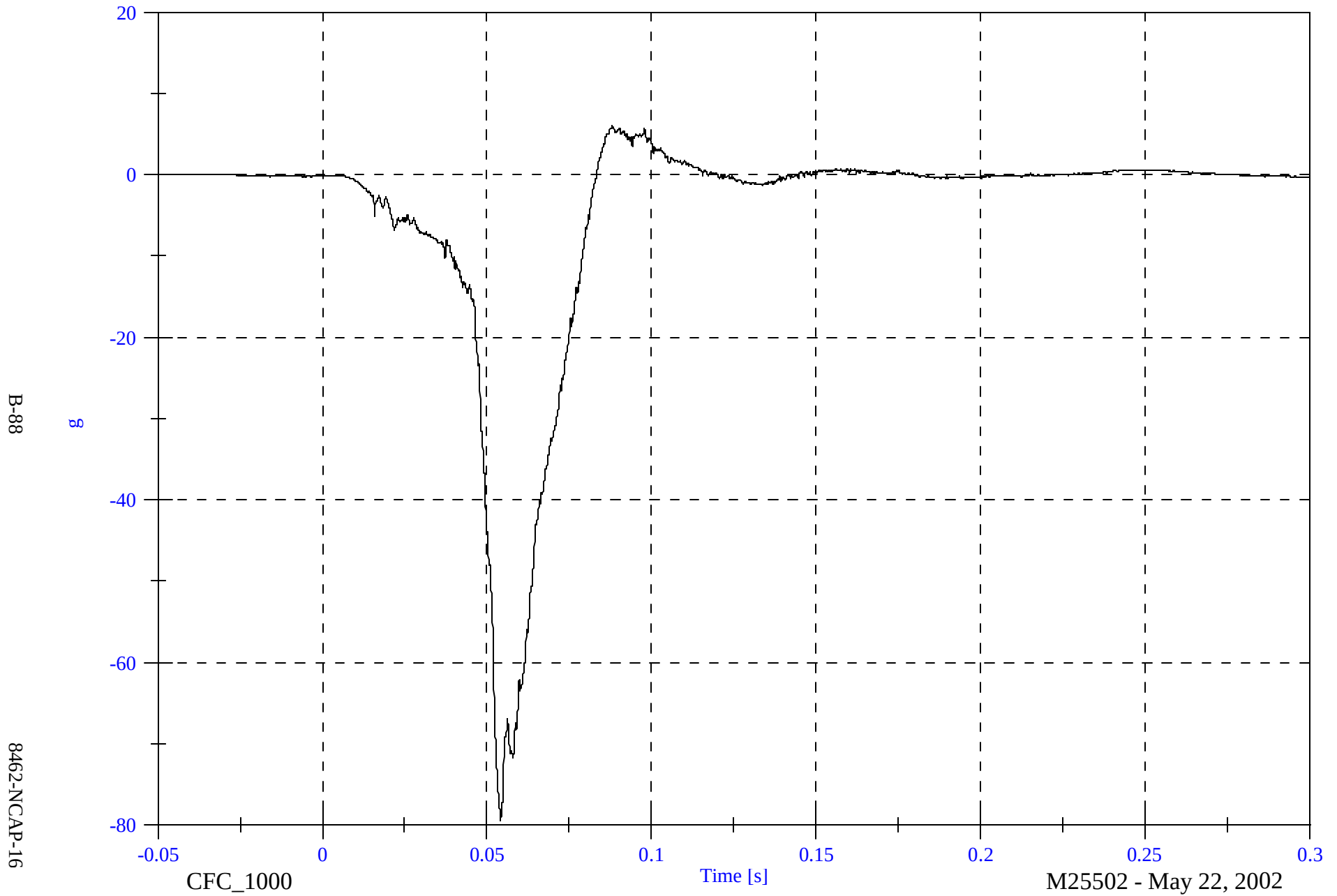


2002 NCAP Test 16 2002 Subaru Legacy

Max: 6.0 [g] at 0.088 [s]

Min: -79.4 [g] at 0.054 [s]

P2 Pelvic x

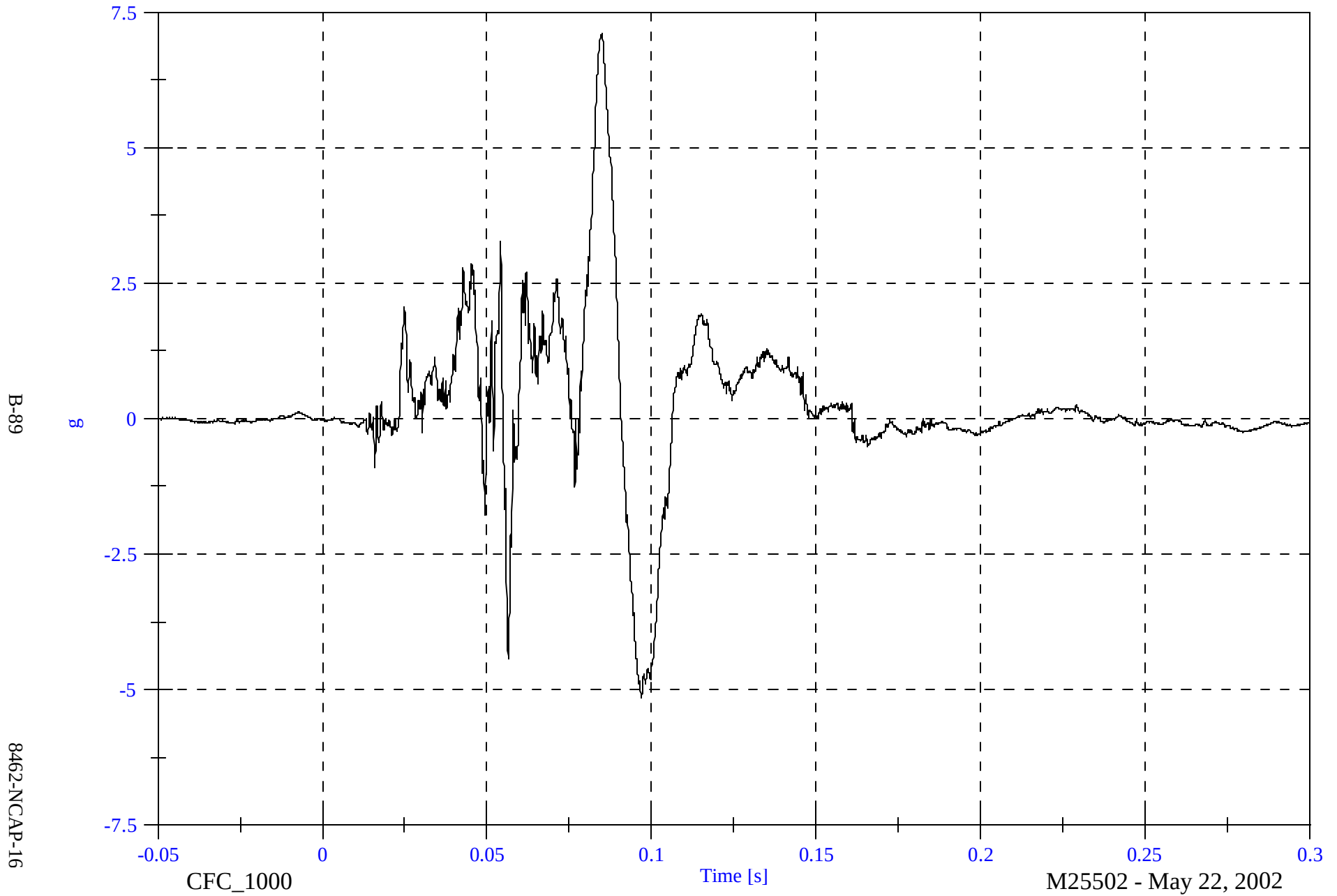


2002 NCAP Test 16 2002 Subaru Legacy

Max: 7.1 [g] at 0.085 [s]

Min: -5.2 [g] at 0.097 [s]

P2 Pelvic y

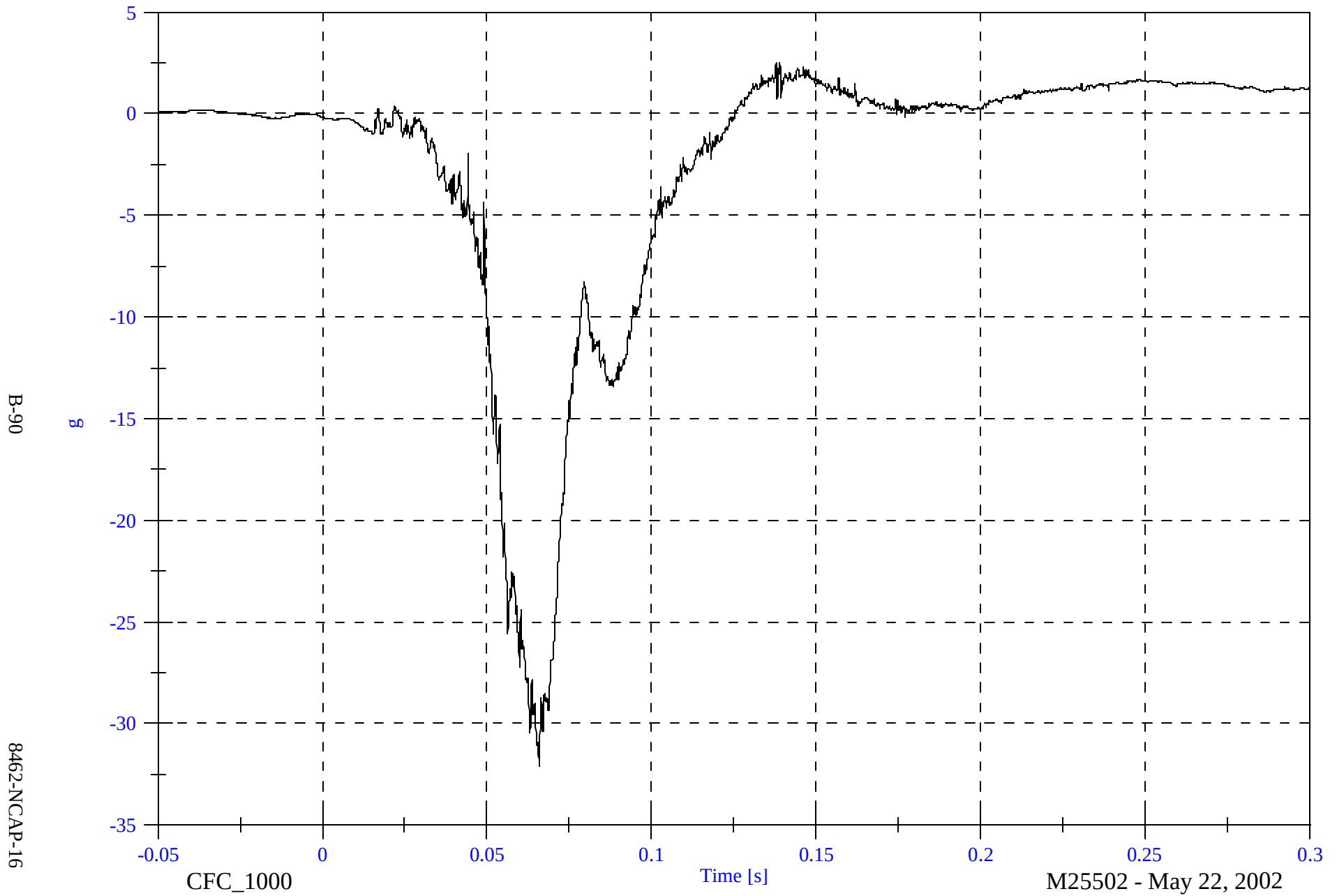


2002 NCAP Test 16 2002 Subaru Legacy

Max: 2.5 [g] at 0.138 [s]

Min: -32.1 [g] at 0.066 [s]

P2 Pelvic z



2002 NCAP Test 16 2002 Subaru Legacy

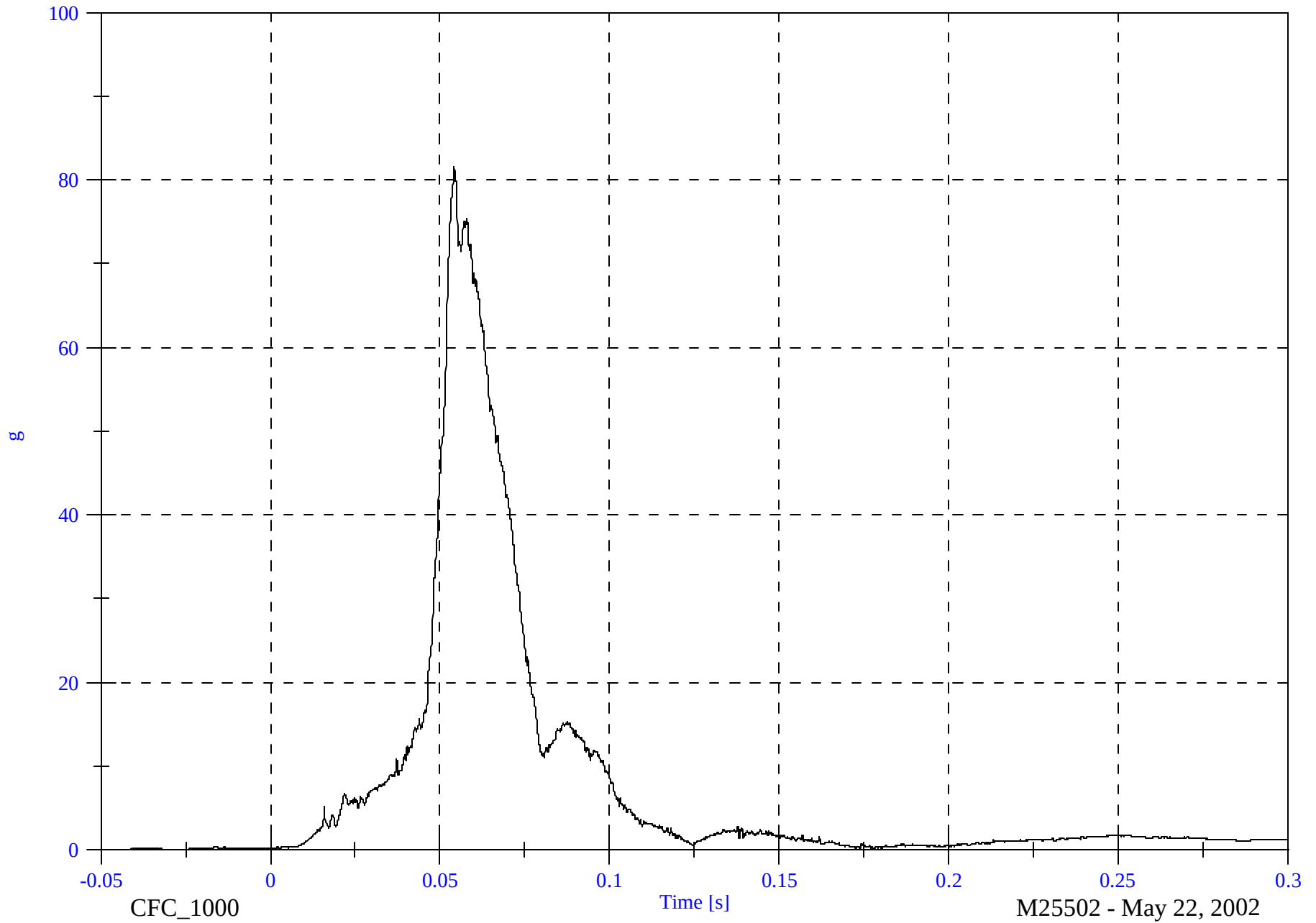
P2 Pelvic Resultant

Max: 81.6 [g] at 0.054 [s]

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

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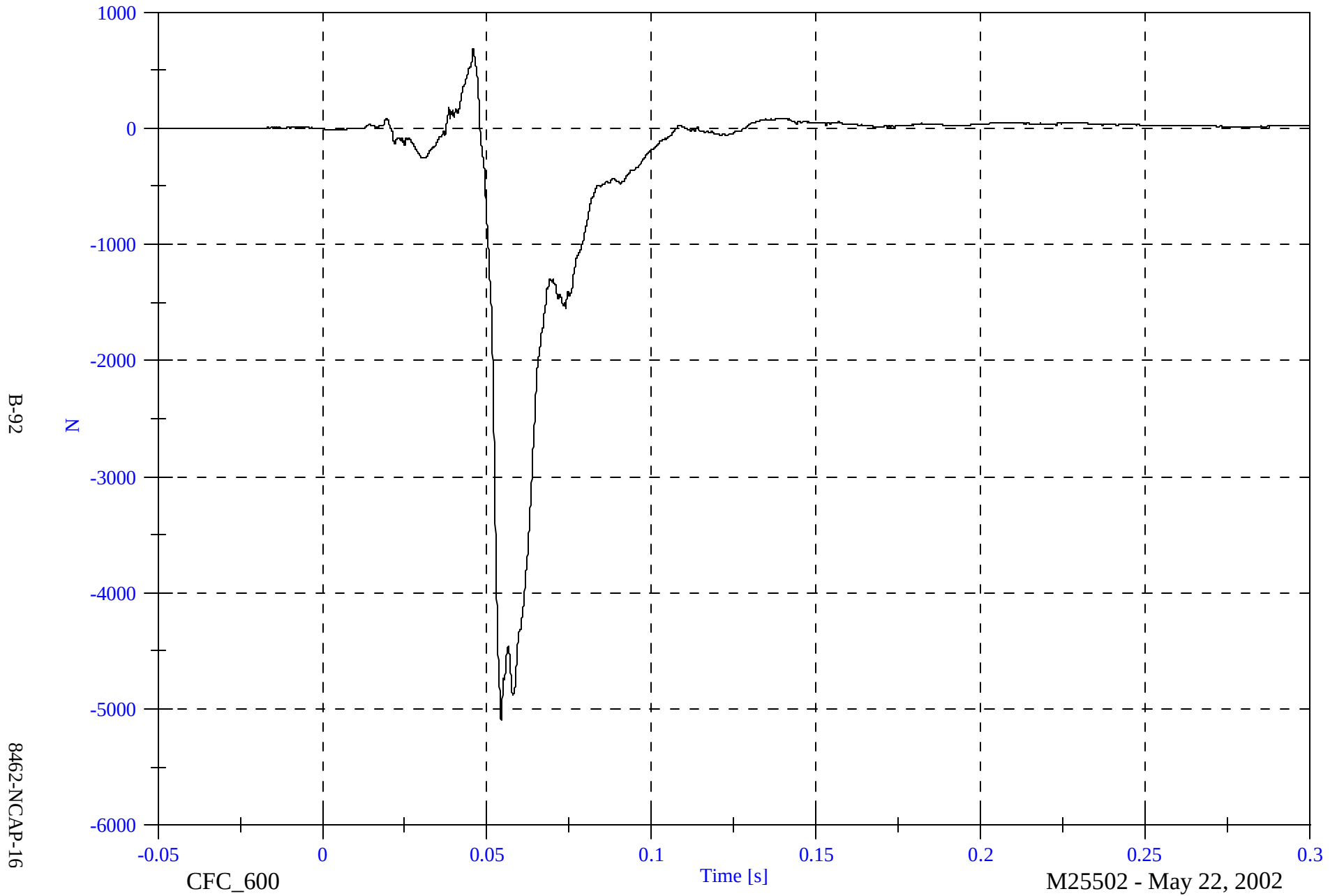
8462-NCAP-16



2002 NCAP Test 16 2002 Subaru Legacy

P2 Left Femur

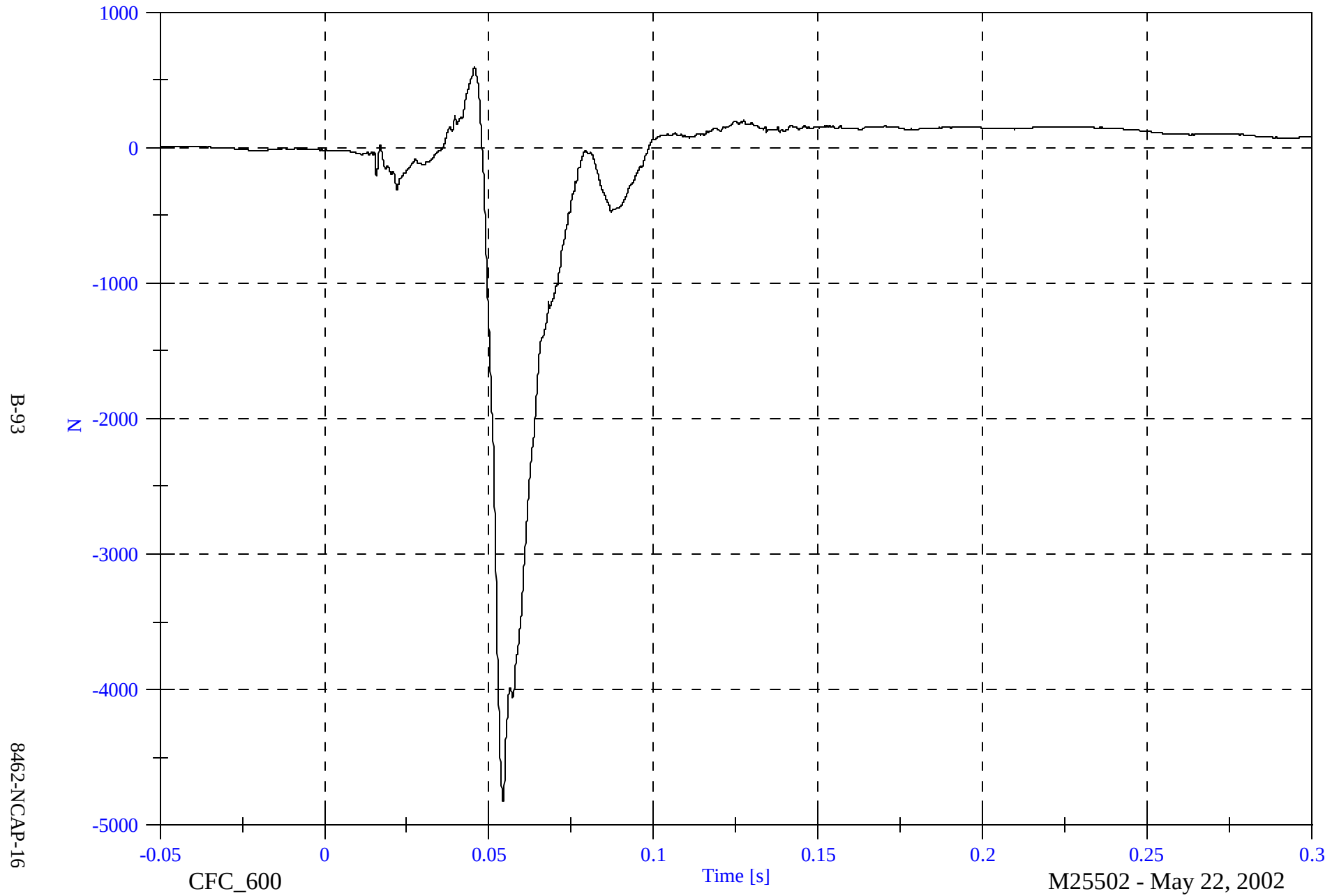
Max: 679.4 [N] at 0.046 [s]
Min: -5090.3 [N] at 0.054 [s]



2002 NCAP Test 16 2002 Subaru Legacy

P2 Right Femur

Max: 596.6 [N] at 0.046 [s]
Min: -4822.3 [N] at 0.054 [s]

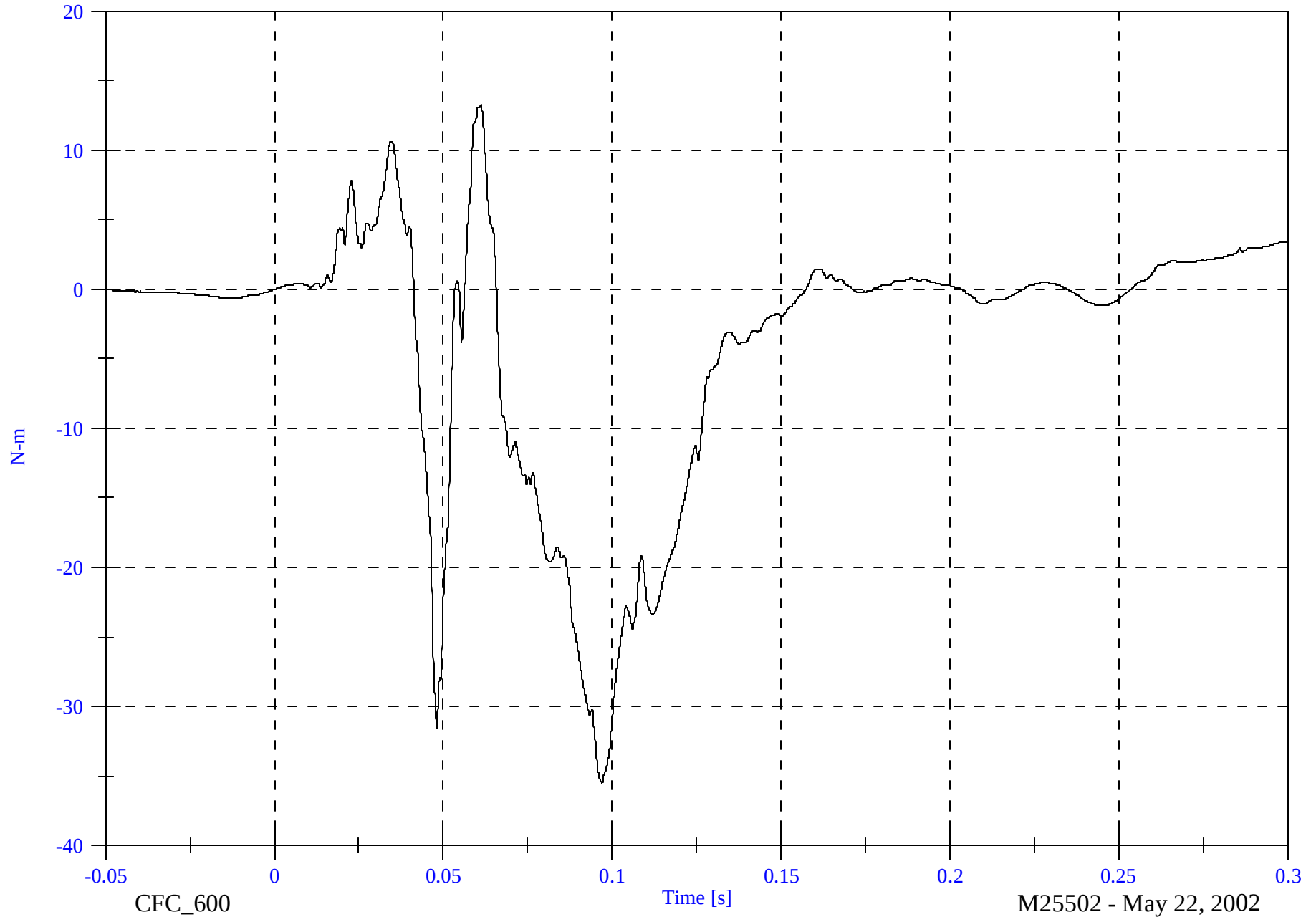


2002 NCAP Test 16 2002 Subaru Legacy

P2 Left Upper Tibia Mx

Max: 13.2 [N-m] at 0.061 [s]

Min: -35.5 [N-m] at 0.097 [s]



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CFC_600

Time [s]

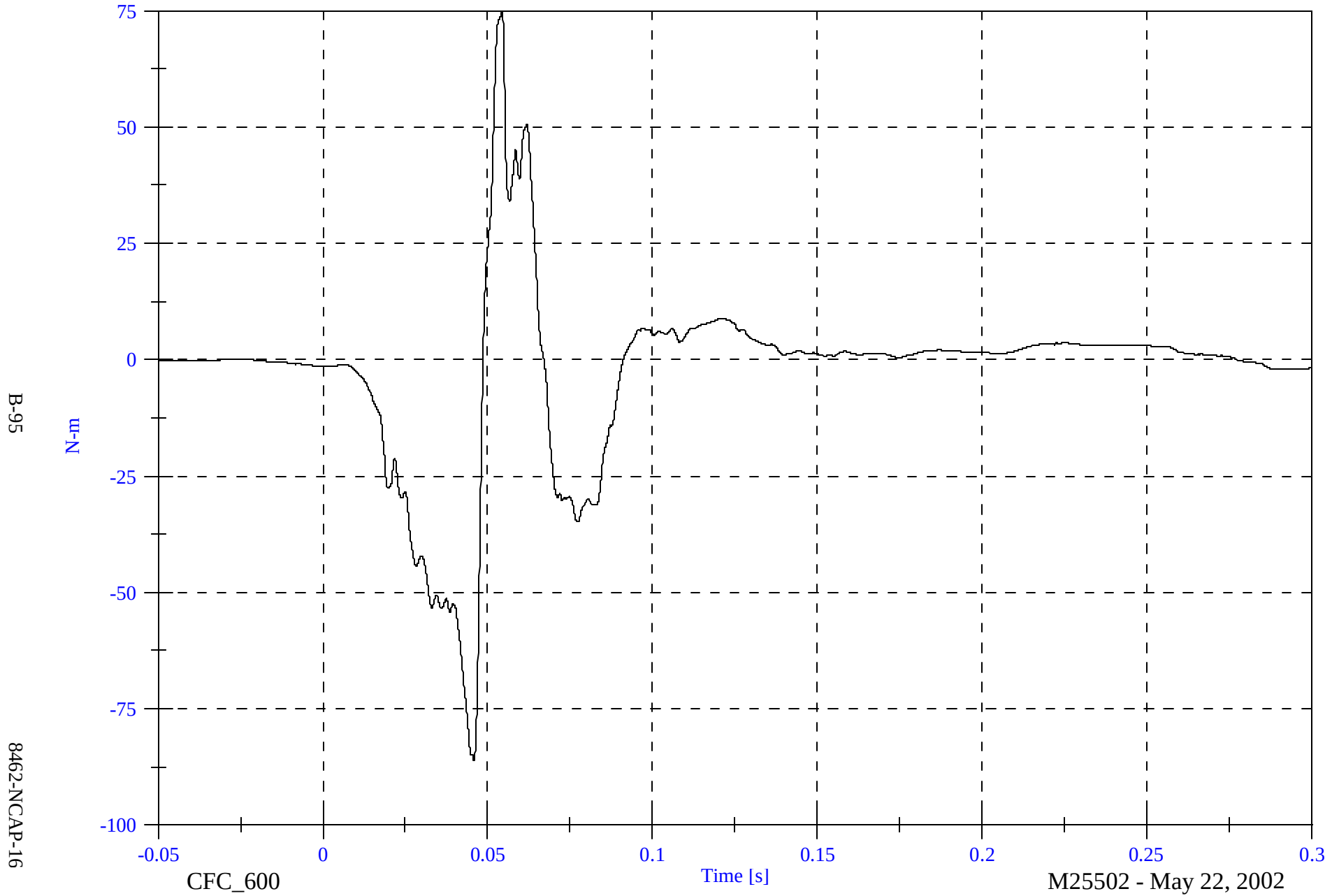
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Max: 75.0 [N-m] at 0.054 [s]

Min: -86.0 [N-m] at 0.046 [s]

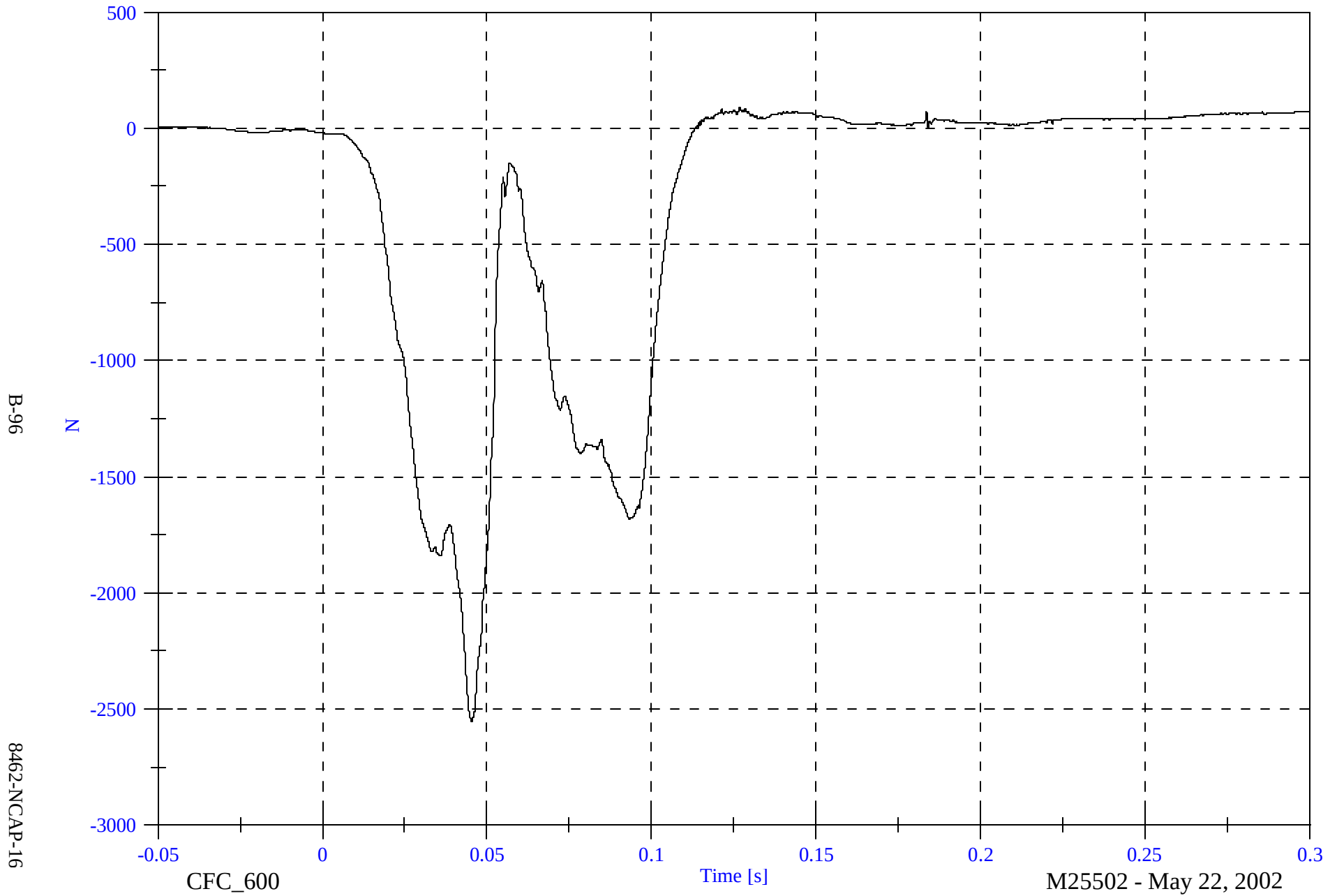
P2 Left Upper Tibia My



2002 NCAP Test 16 2002 Subaru Legacy

P2 Left Lower Tibia Fz

Max: 89.5 [N] at 0.127 [s]
Min: -2551.8 [N] at 0.045 [s]

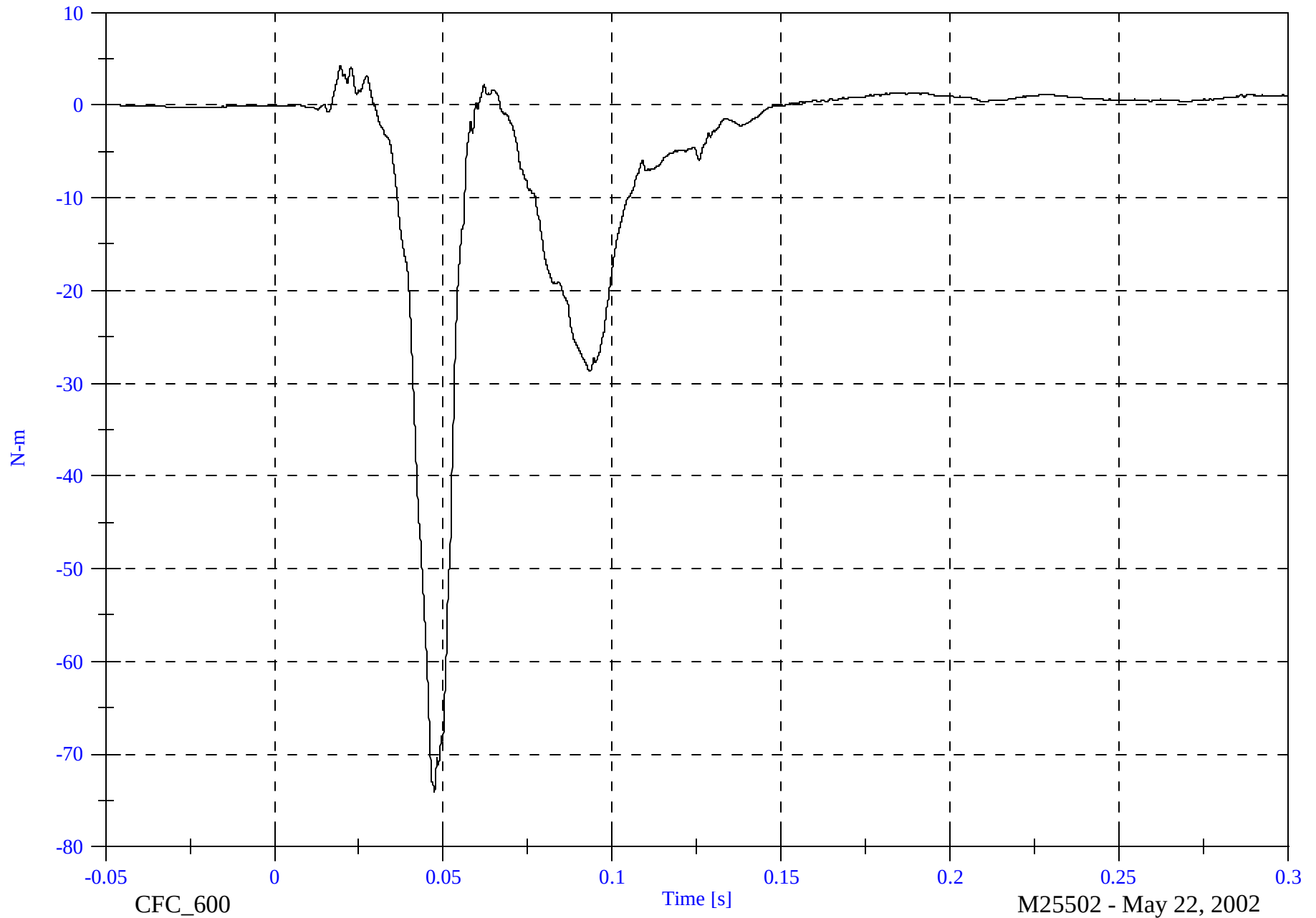


2002 NCAP Test 16 2002 Subaru Legacy

P2 Left Lower Tibia Mx

Max: 4.2 [N-m] at 0.020 [s]

Min: -74.0 [N-m] at 0.047 [s]



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CFC_600

Time [s]

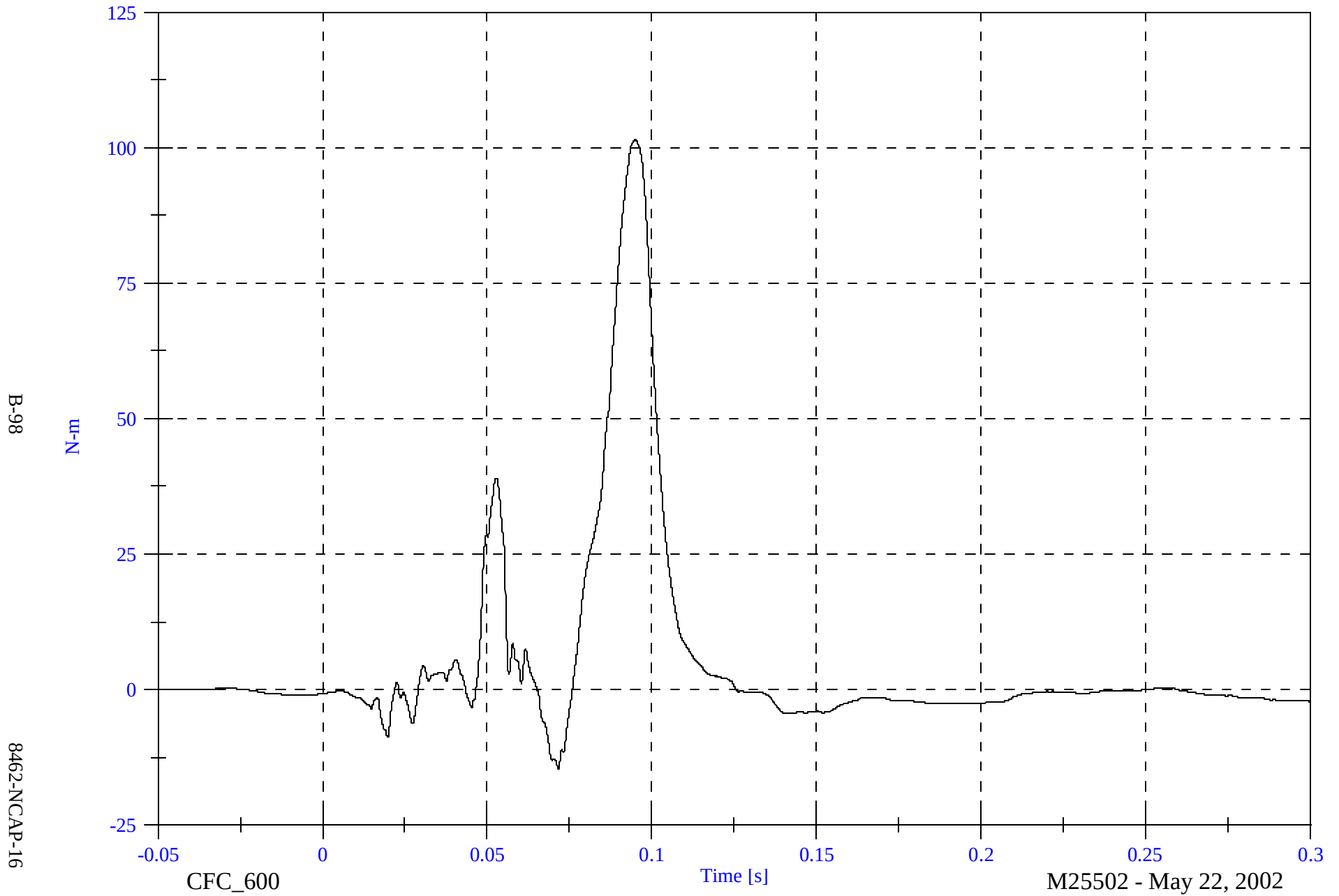
M25502 - May 22, 2002

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Max: 101.6 [N-m] at 0.095 [s]

Min: -14.5 [N-m] at 0.072 [s]

P2 Left Lower Tibia My

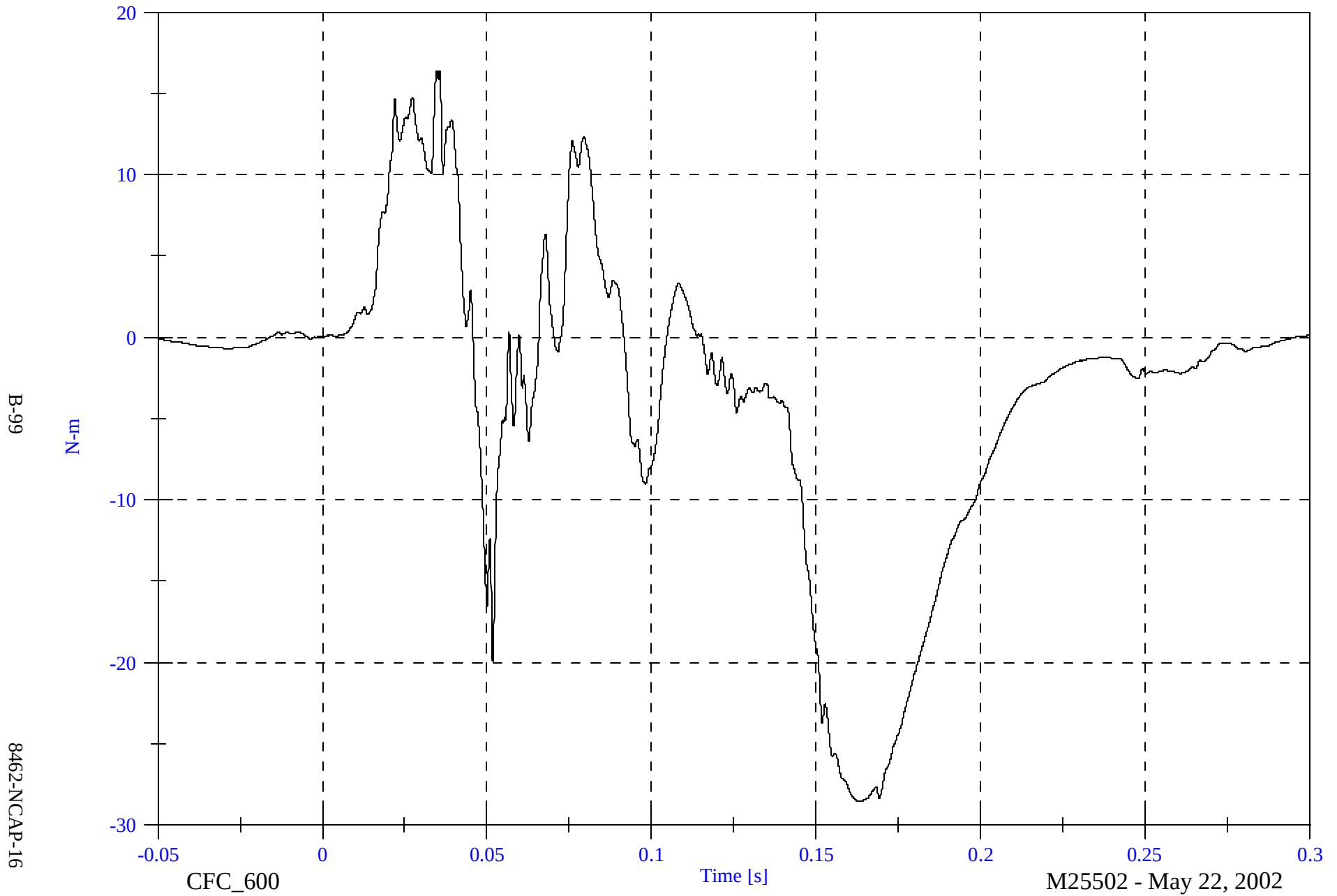


2002 NCAP Test 16 2002 Subaru Legacy

P2 Right Upper Tibia Mx

Max: 16.4 [N-m] at 0.035 [s]

Min: -28.5 [N-m] at 0.163 [s]

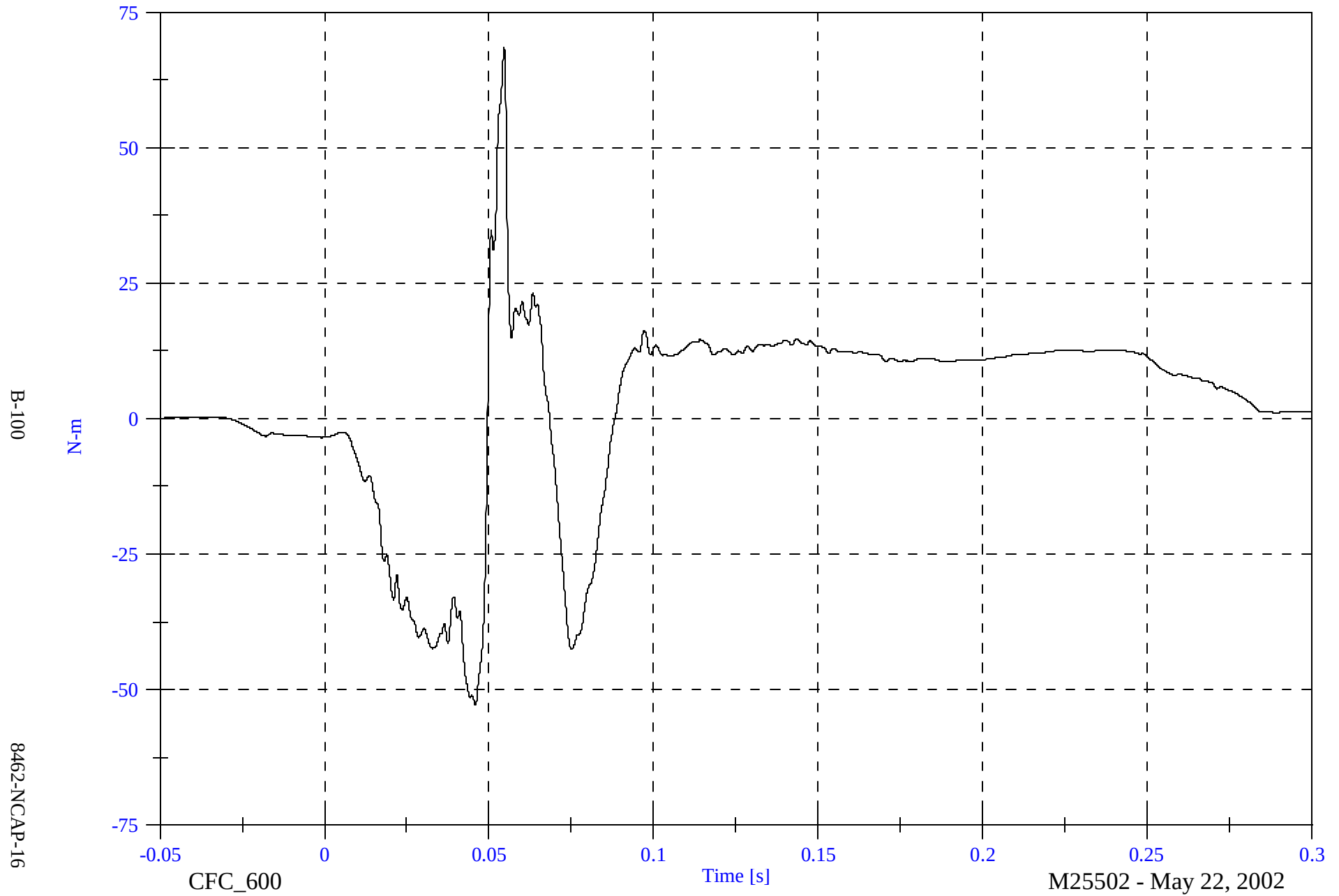


2002 NCAP Test 16 2002 Subaru Legacy

Max: 68.4 [N-m] at 0.055 [s]

Min: -52.7 [N-m] at 0.046 [s]

P2 Right Upper Tibia My

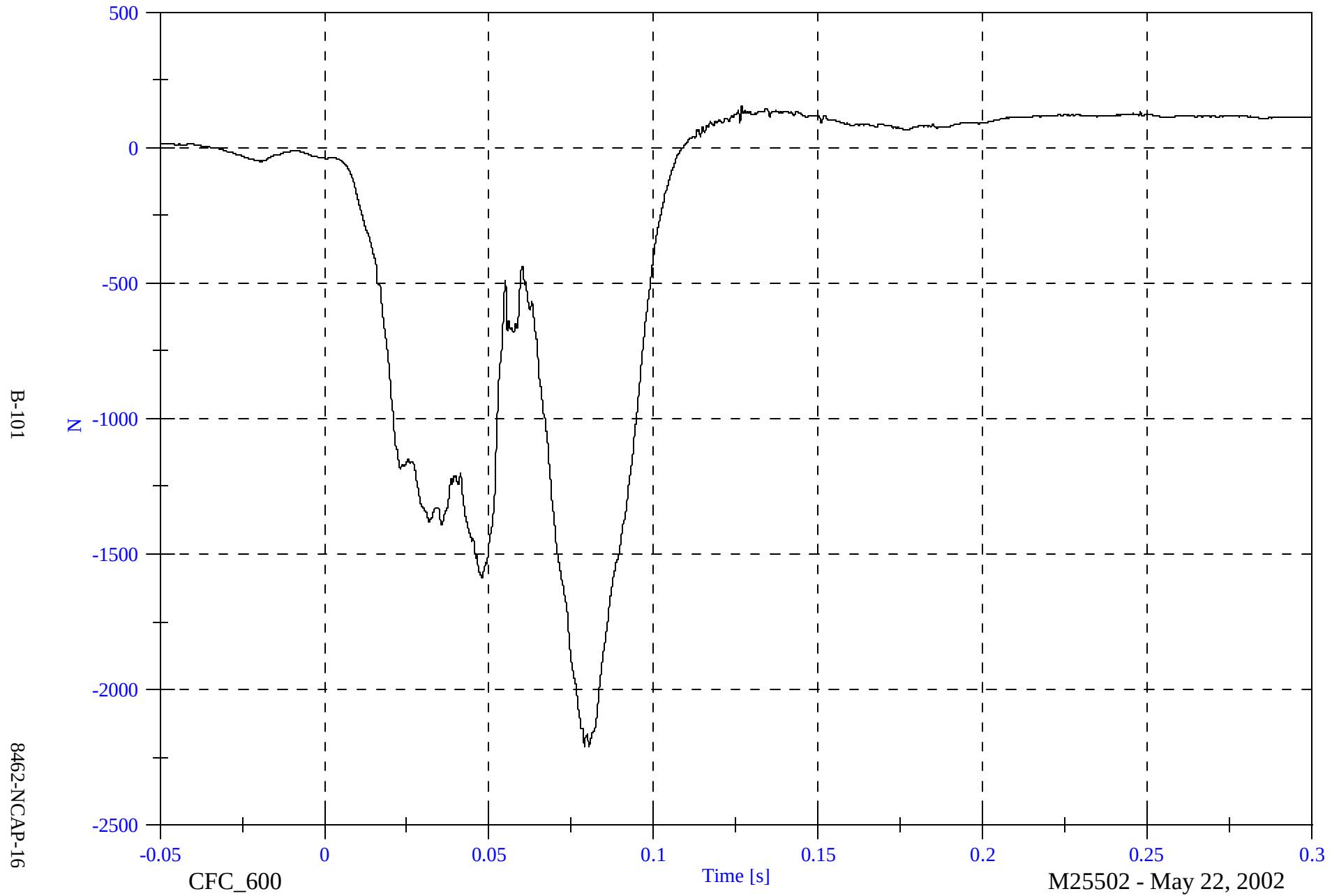


2002 NCAP Test 16 2002 Subaru Legacy

P2 Right Lower Tibia Fz

Max: 151.9 [N] at 0.127 [s]

Min: -2209.5 [N] at 0.080 [s]

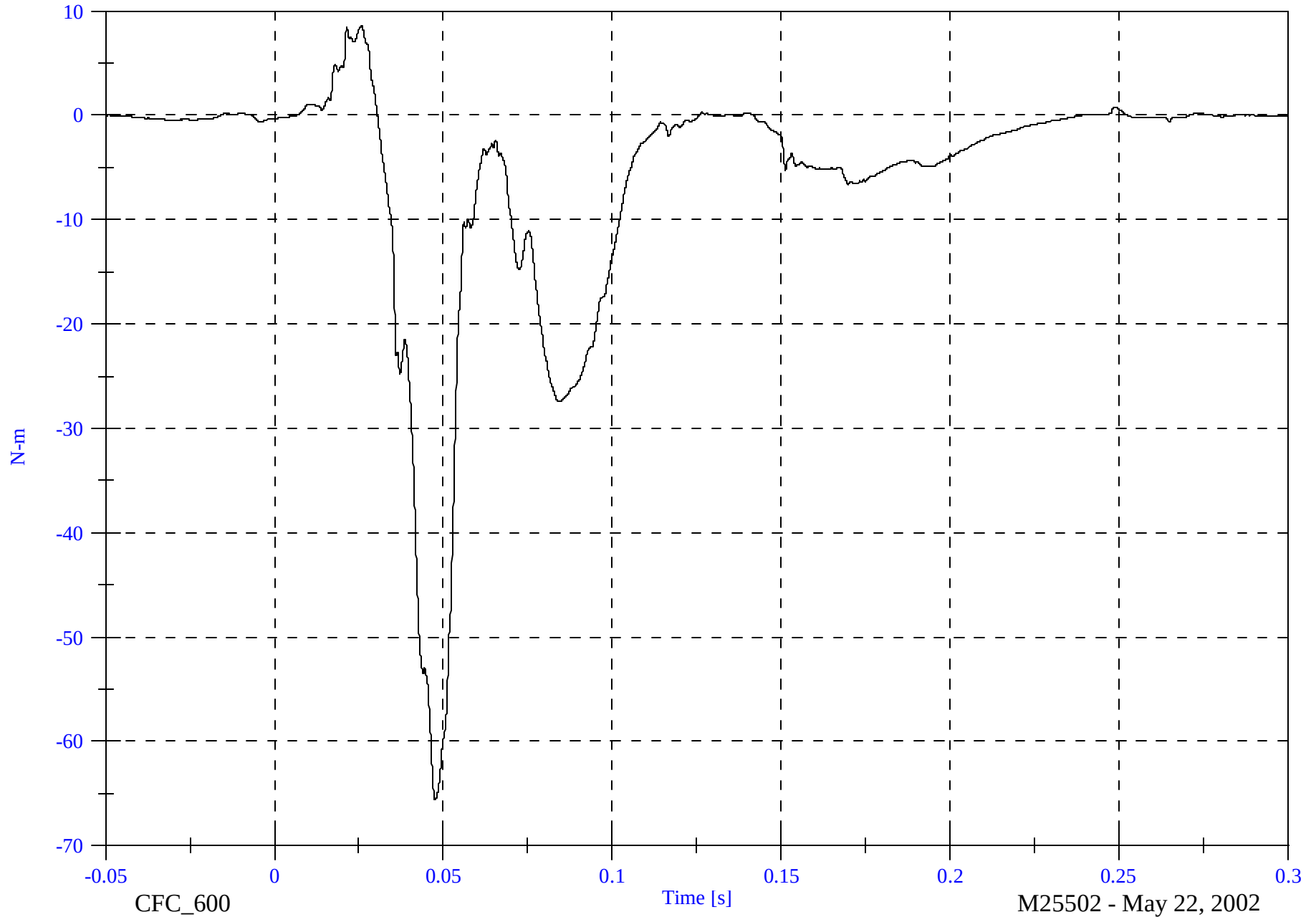


2002 NCAP Test 16 2002 Subaru Legacy

P2 Right Lower Tibia Mx

Max: 8.5 [N-m] at 0.026 [s]

Min: -65.5 [N-m] at 0.048 [s]



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CFC_600

Time [s]

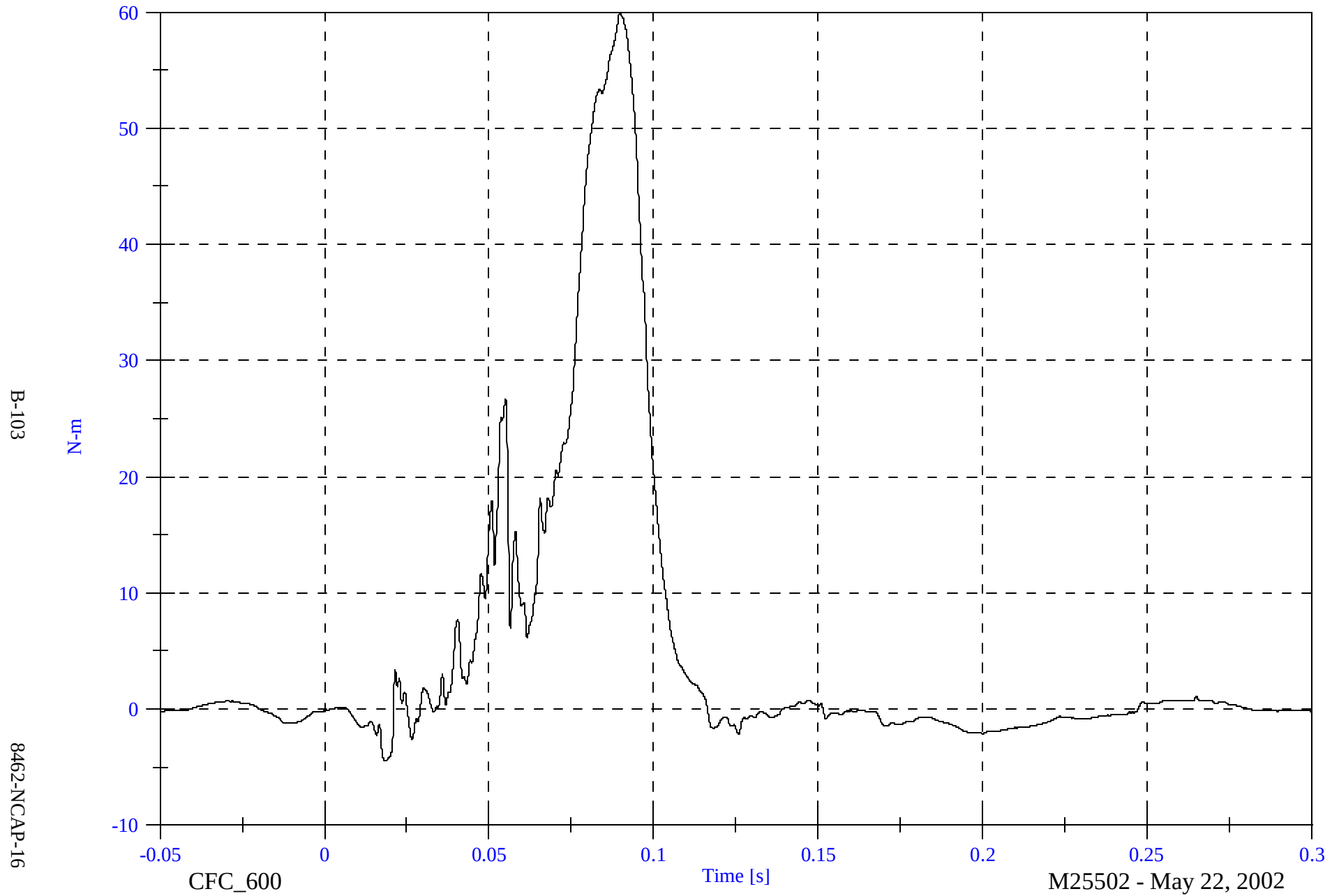
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Max: 59.9 [N-m] at 0.090 [s]

Min: -4.5 [N-m] at 0.019 [s]

P2 Right Lower Tibia My

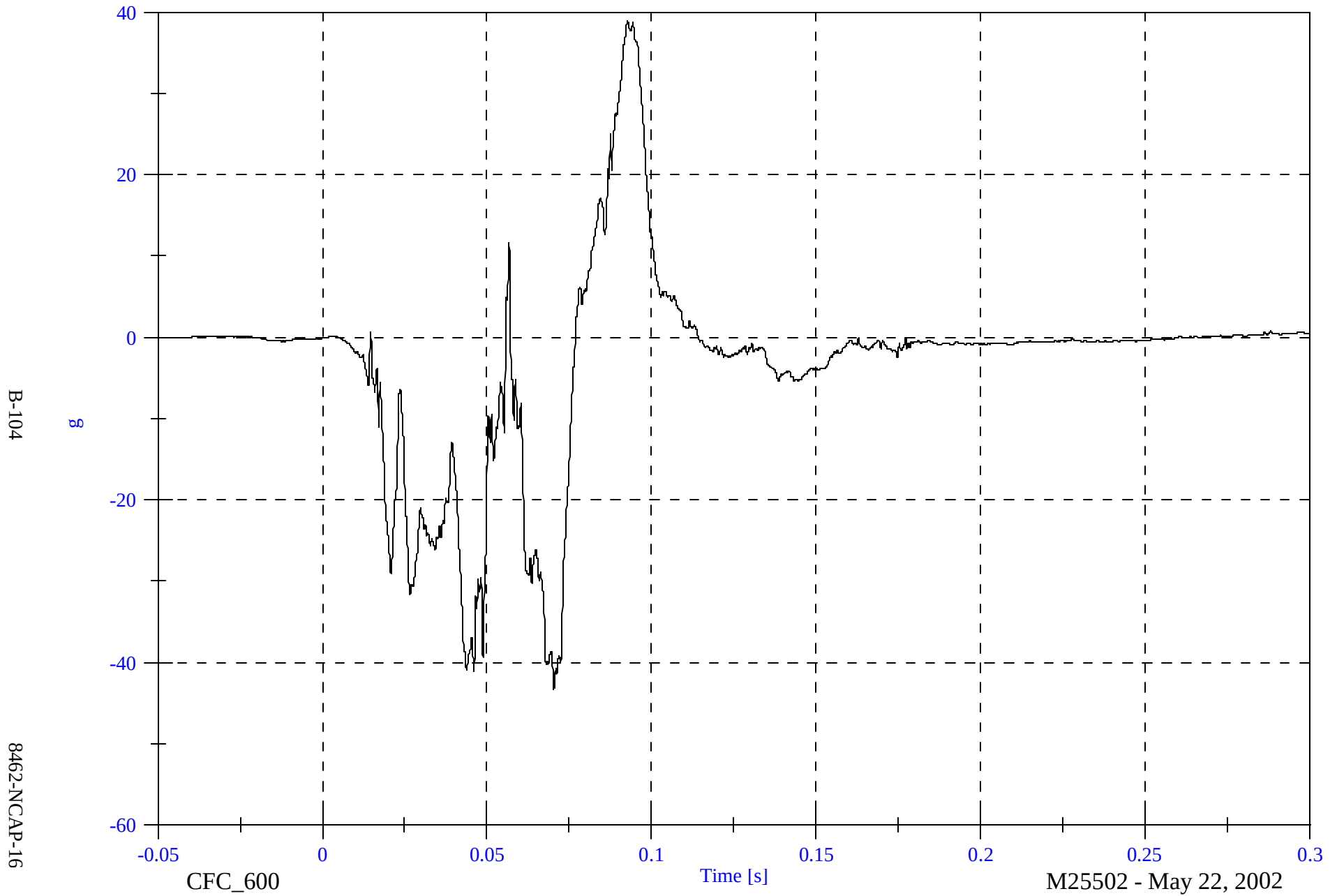


2002 NCAP Test 16 2002 Subaru Legacy

Max: 38.8 [g] at 0.093 [s]

Min: -43.2 [g] at 0.070 [s]

P2 Left foot Aft x

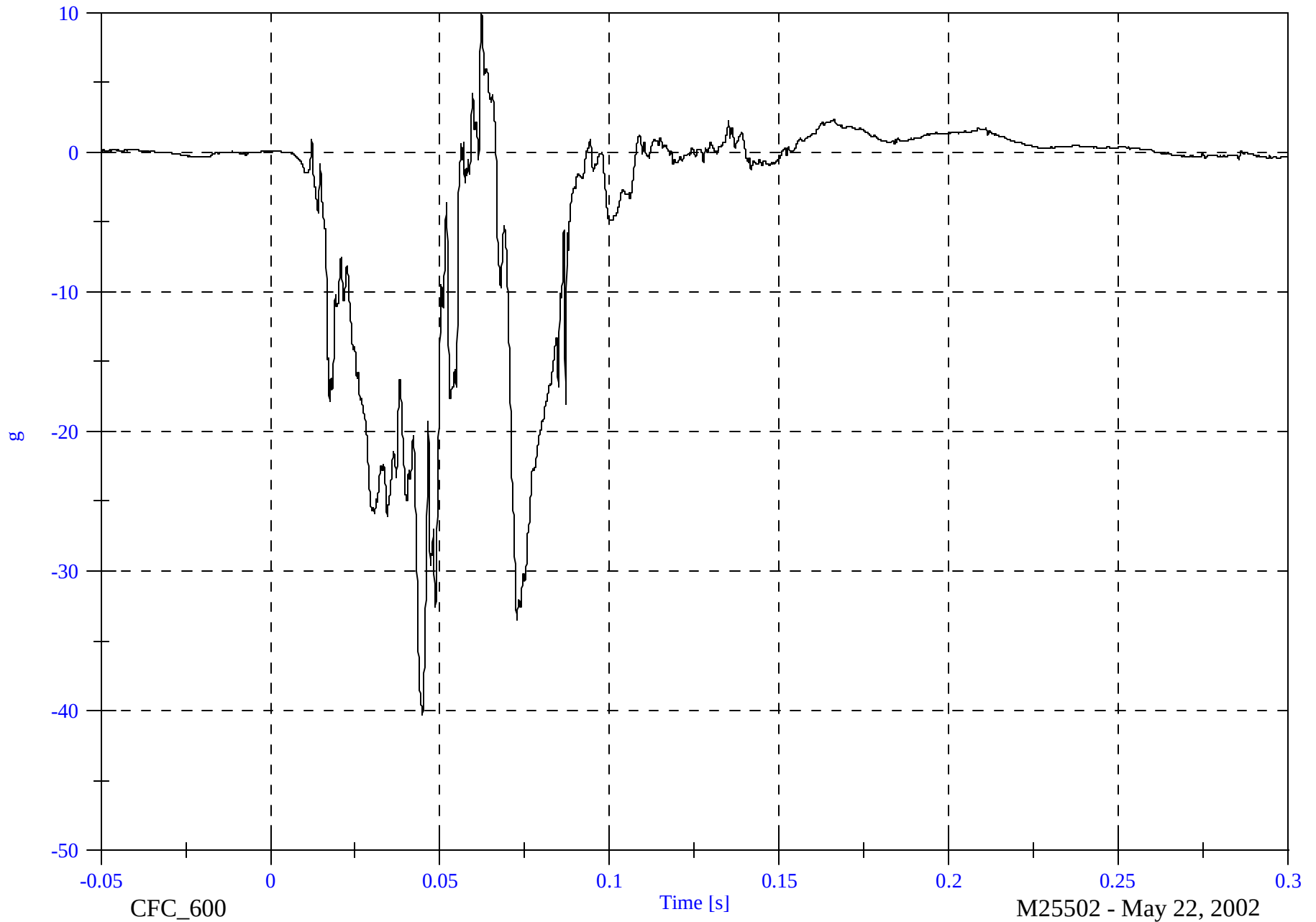


2002 NCAP Test 16 2002 Subaru Legacy

P2 Left Foot Aft z

Max: 9.9 [g] at 0.062 [s]

Min: -40.3 [g] at 0.045 [s]



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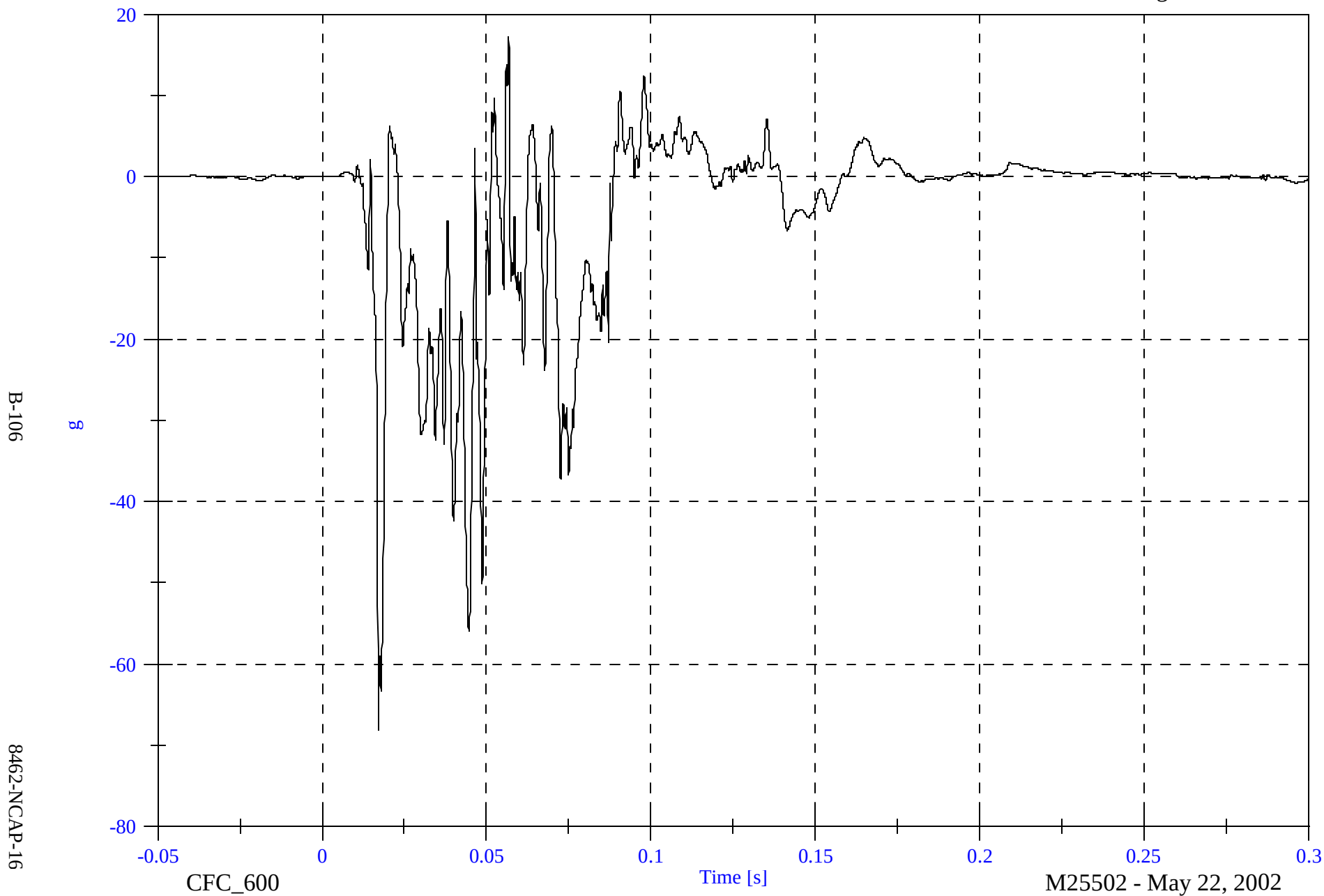
8462-NCAP-16

2002 NCAP Test 16 2002 Subaru Legacy

Max: 17.2 [g] at 0.057 [s]

Min: -68.0 [g] at 0.017 [s]

P2 Left Foot Fore z

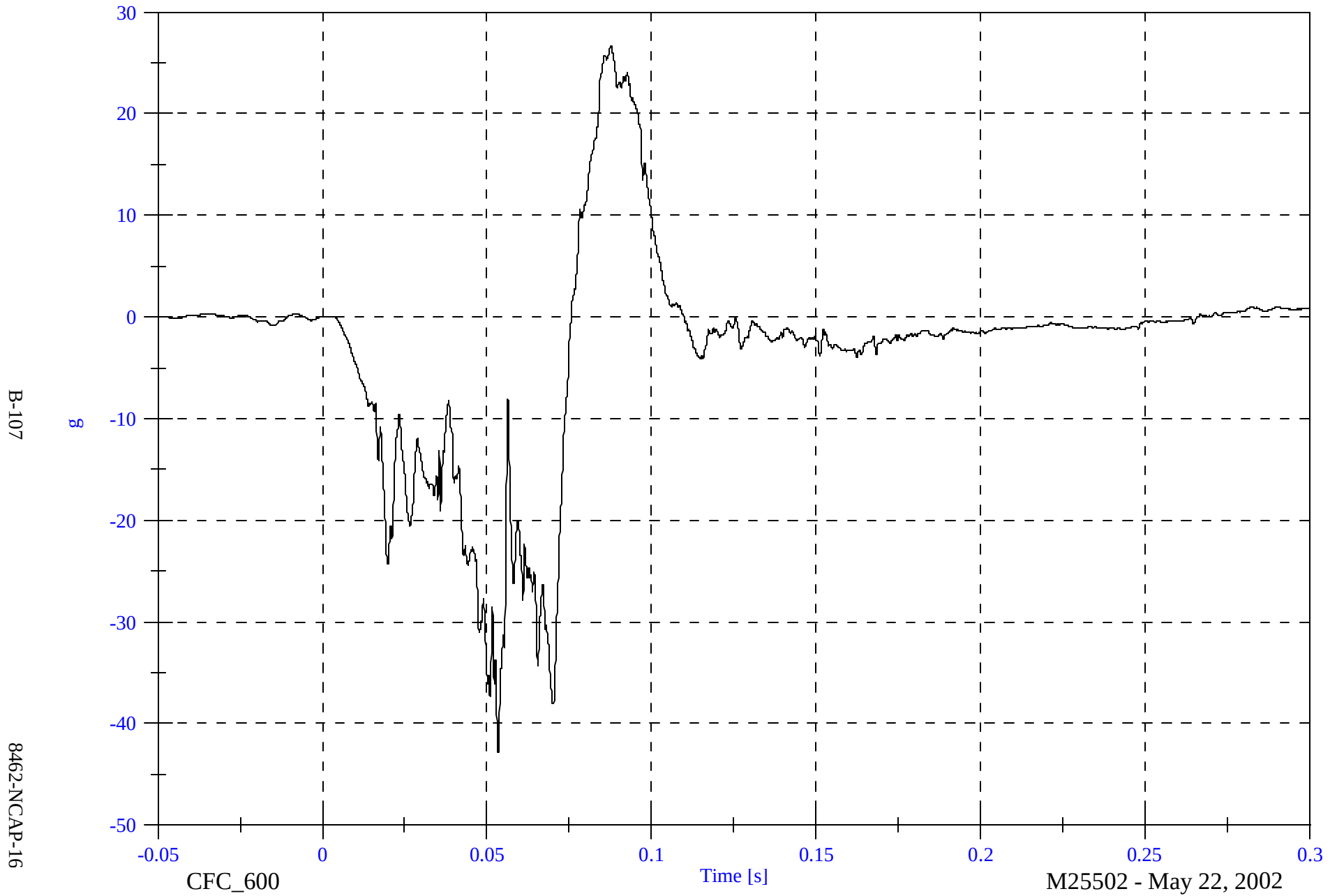


2002 NCAP Test 16 2002 Subaru Legacy

Max: 26.6 [g] at 0.088 [s]

Min: -42.9 [g] at 0.053 [s]

P2 Right Foot Aft x

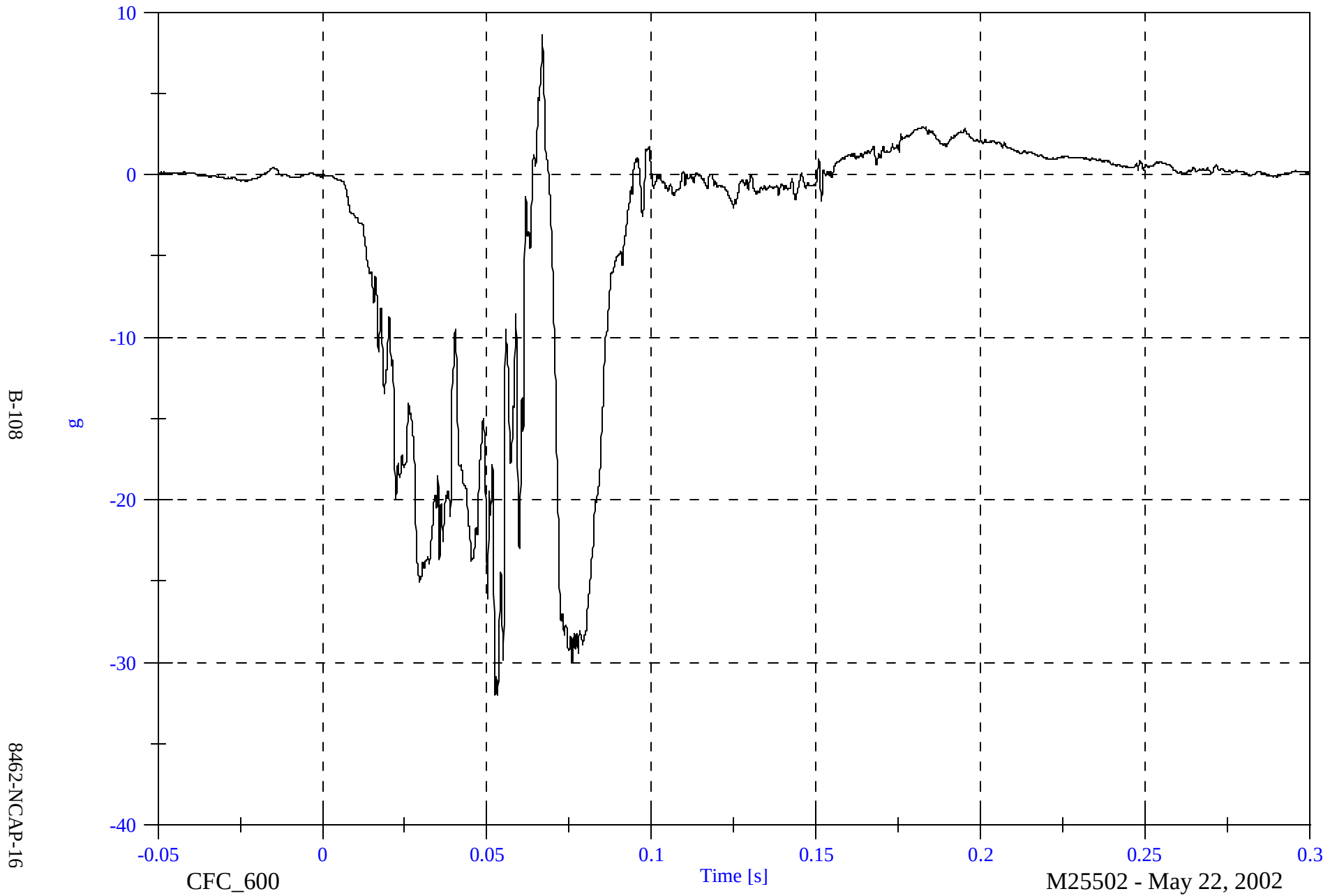


2002 NCAP Test 16 2002 Subaru Legacy

Max: 8.6 [g] at 0.067 [s]

Min: -32.0 [g] at 0.053 [s]

P2 Right Foot Aft z

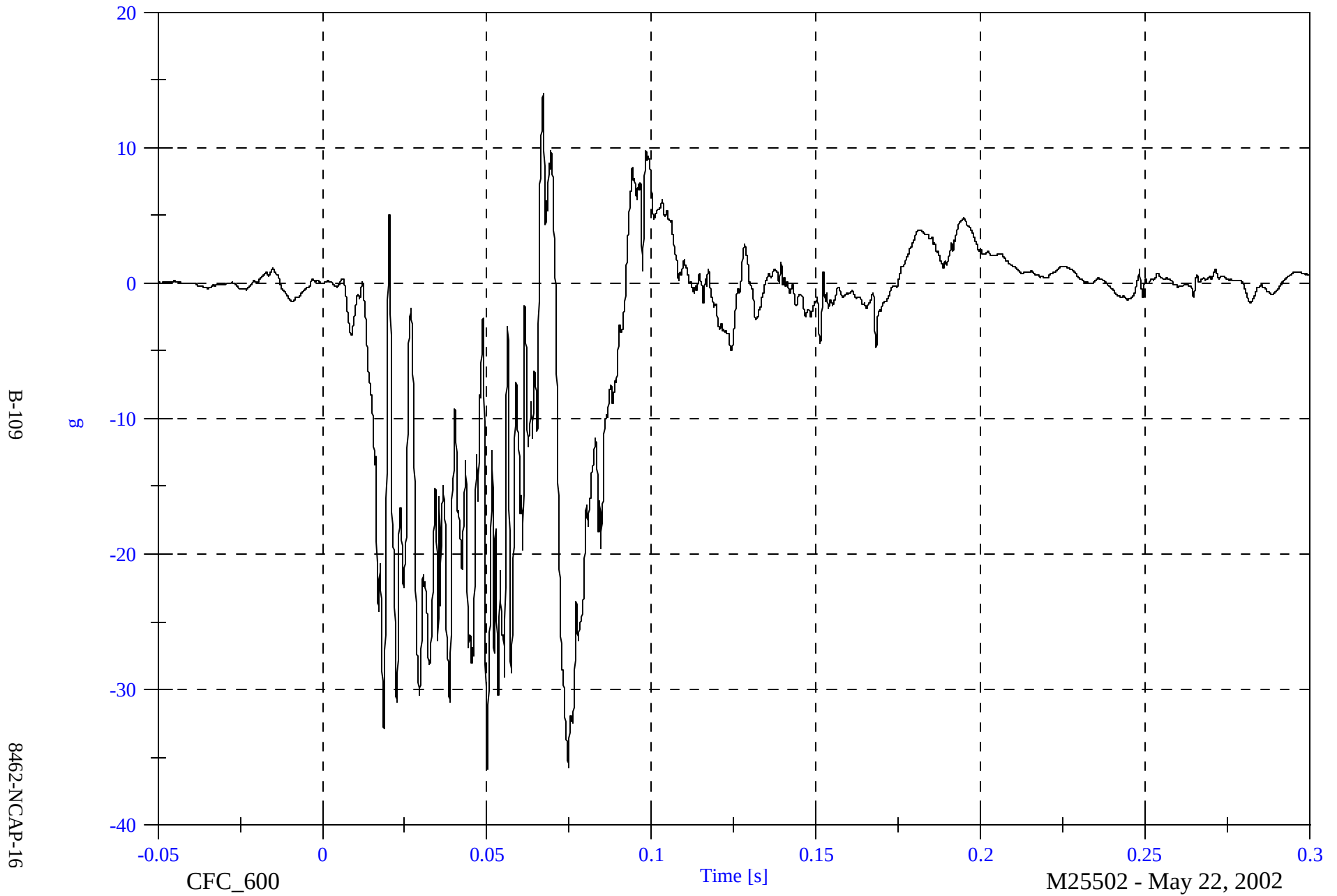


2002 NCAP Test 16 2002 Subaru Legacy

Max: 14.0 [g] at 0.067 [s]

Min: -35.9 [g] at 0.050 [s]

P2 Right Foot Fore z

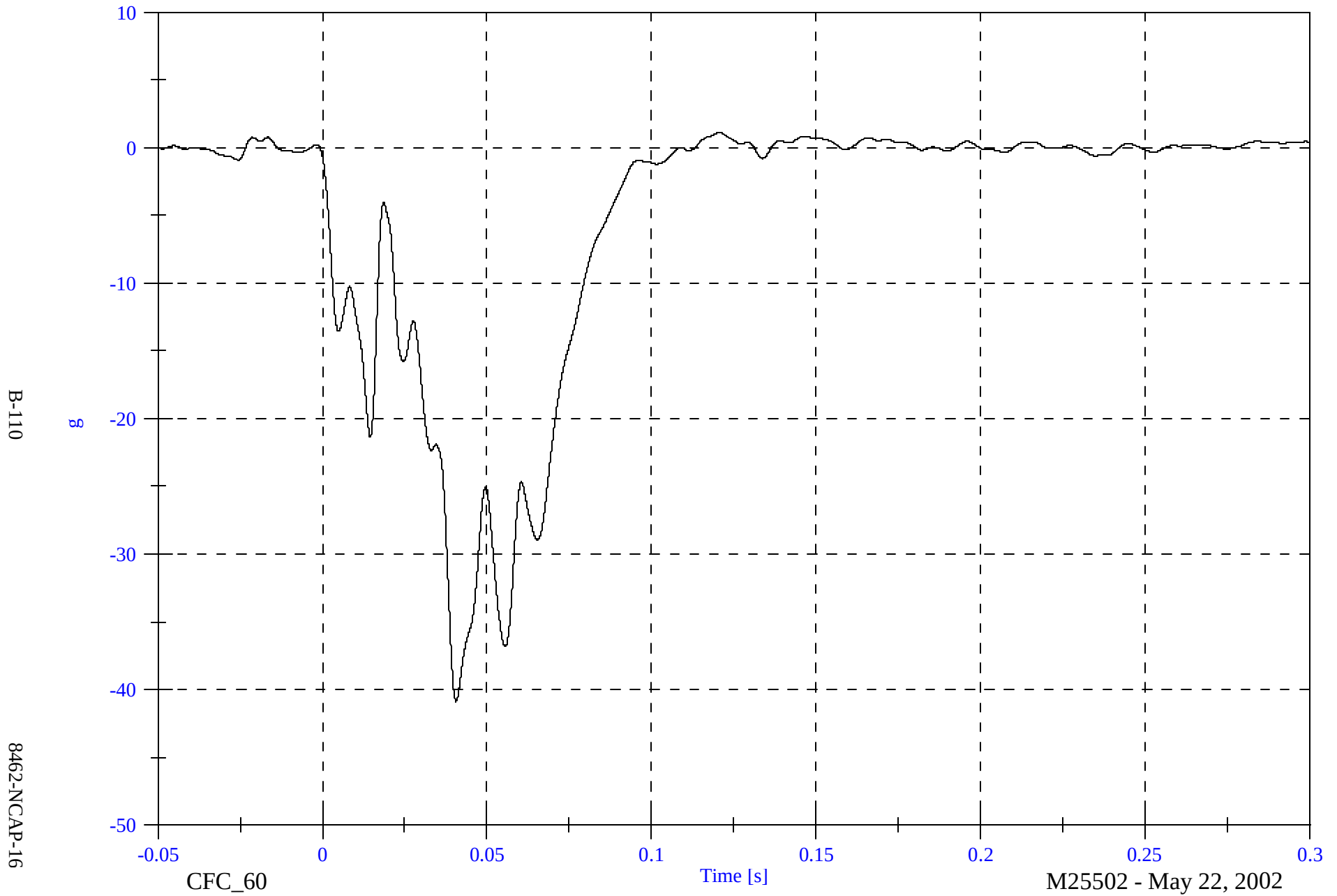


2002 NCAP Test 16 2002 Subaru Legacy

Left Rear #1x

Max: 1.1 [g] at 0.121 [s]

Min: -40.9 [g] at 0.041 [s]

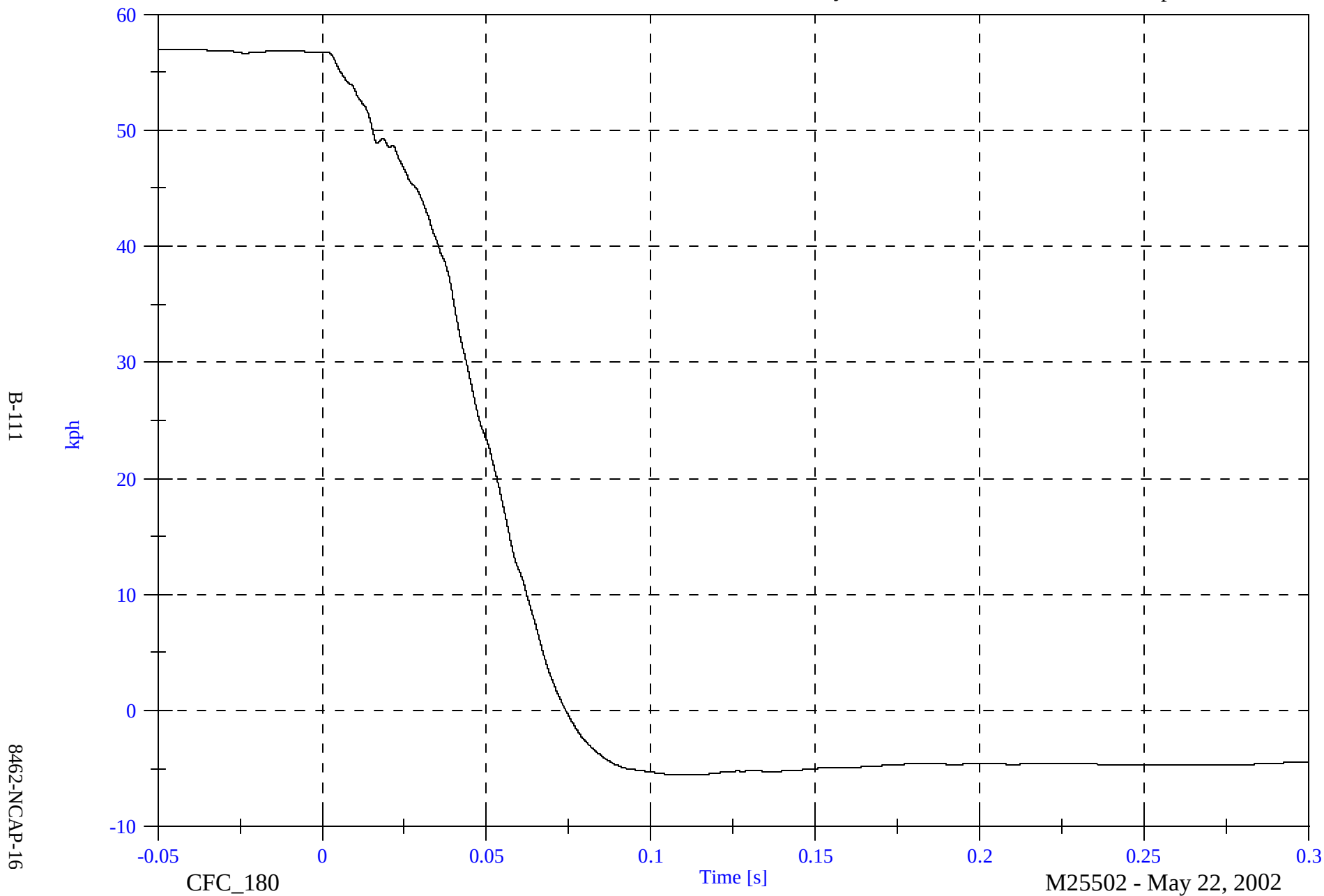


2002 NCAP Test 16 2002 Subaru Legacy

Max: 56.9 [kph] at -0.044 [s]

Min: -5.6 [kph] at 0.113 [s]

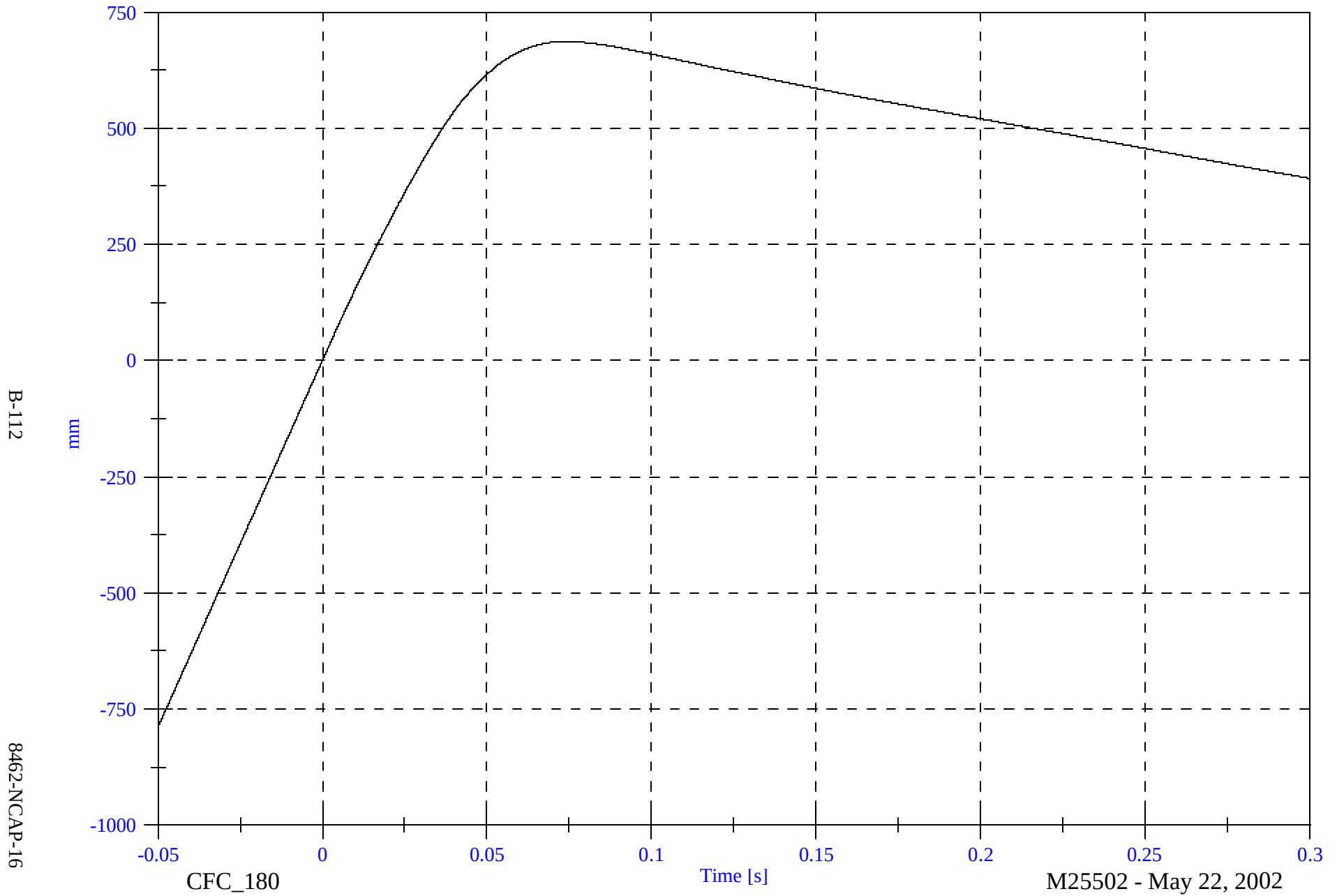
Left Rear #1x Velocity



2002 NCAP Test 16 2002 Subaru Legacy

Max: 686.3 [mm] at 0.074 [s]
Min: -789.1 [mm] at -0.050 [s]

Left Rear #1x Displacement

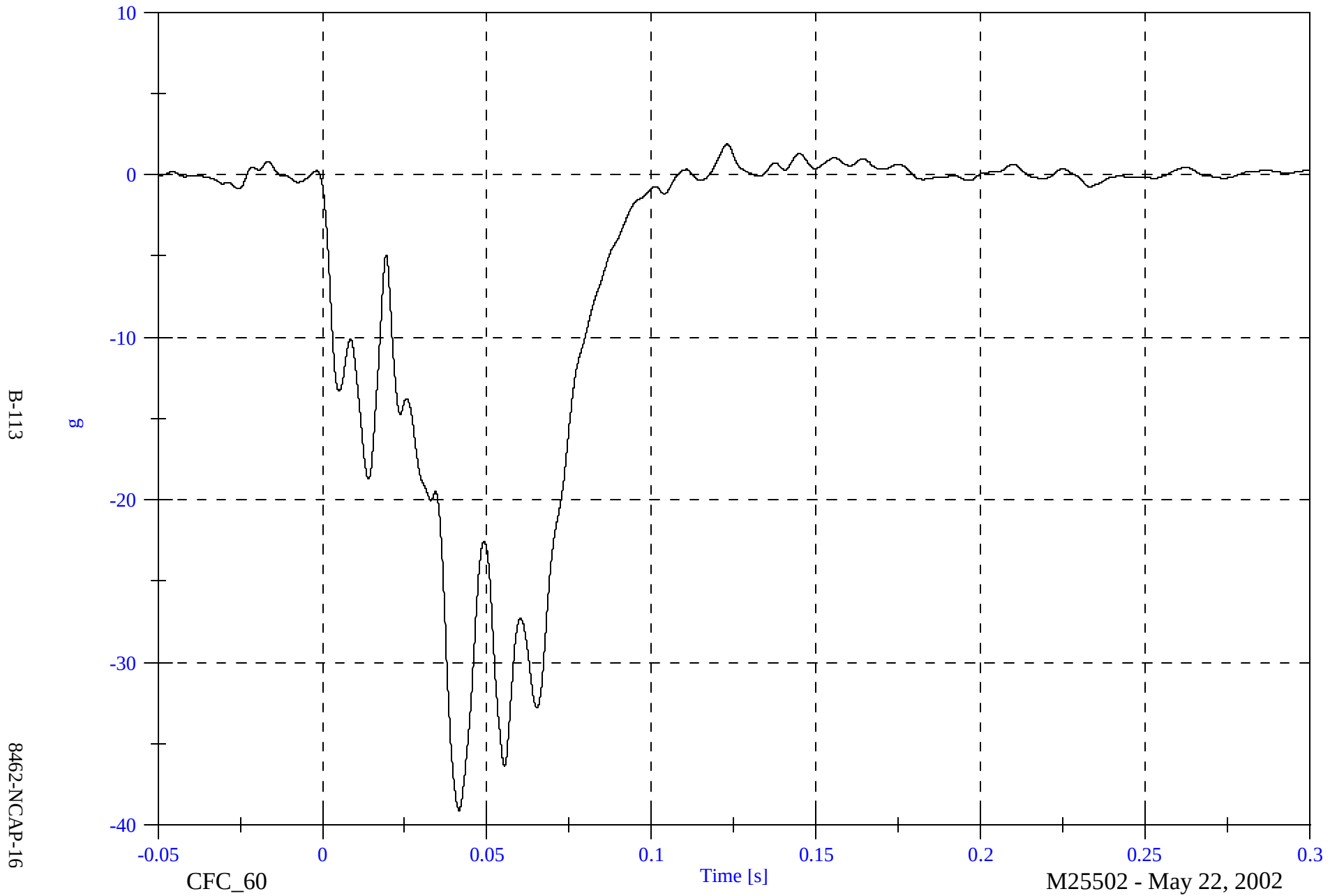


2002 NCAP Test 16 2002 Subaru Legacy

Max: 1.9 [g] at 0.123 [s]

Min: -39.1 [g] at 0.042 [s]

Right Rear #2x

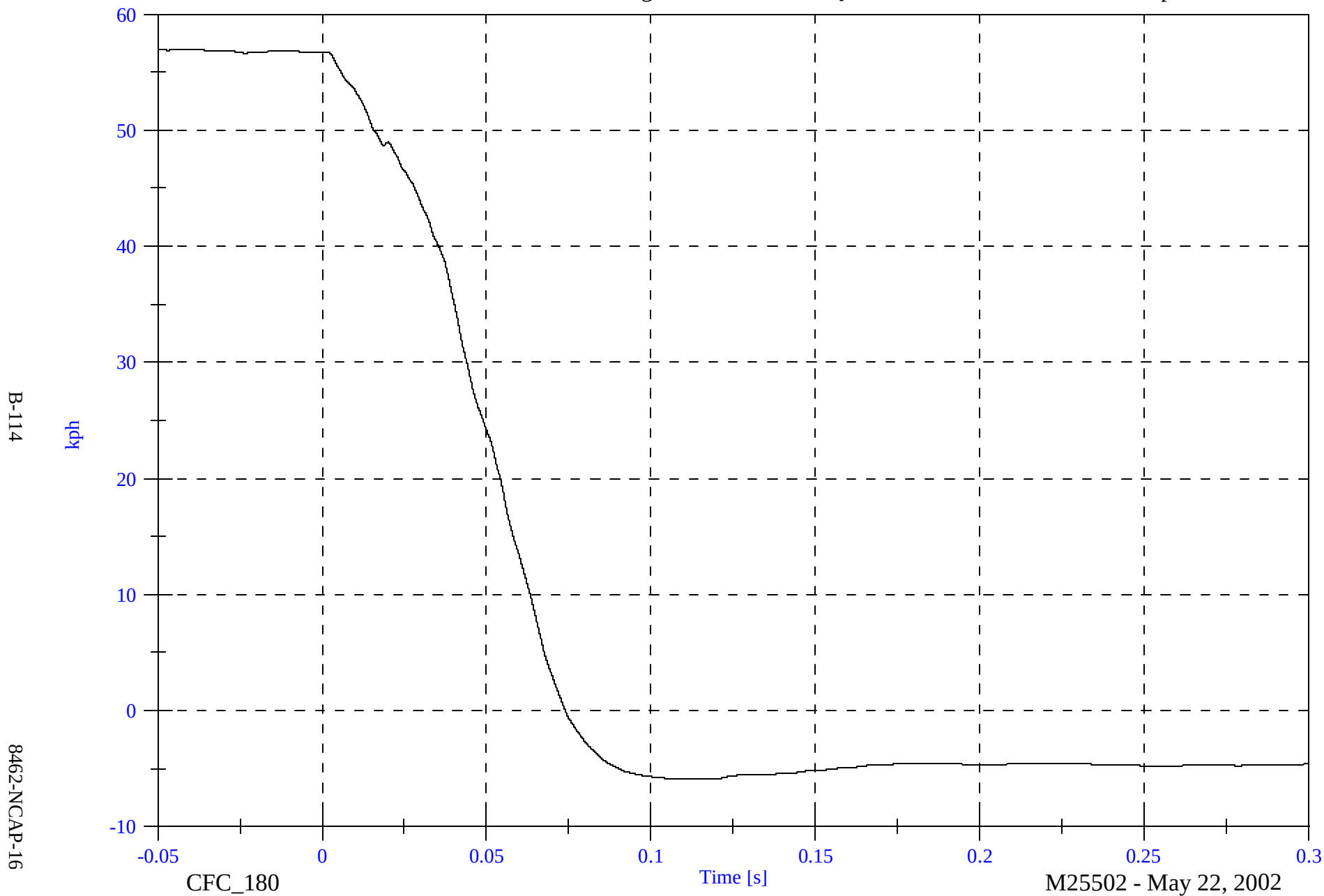


2002 NCAP Test 16 2002 Subaru Legacy

Max: 56.9 [kph] at -0.044 [s]

Min: -5.9 [kph] at 0.117 [s]

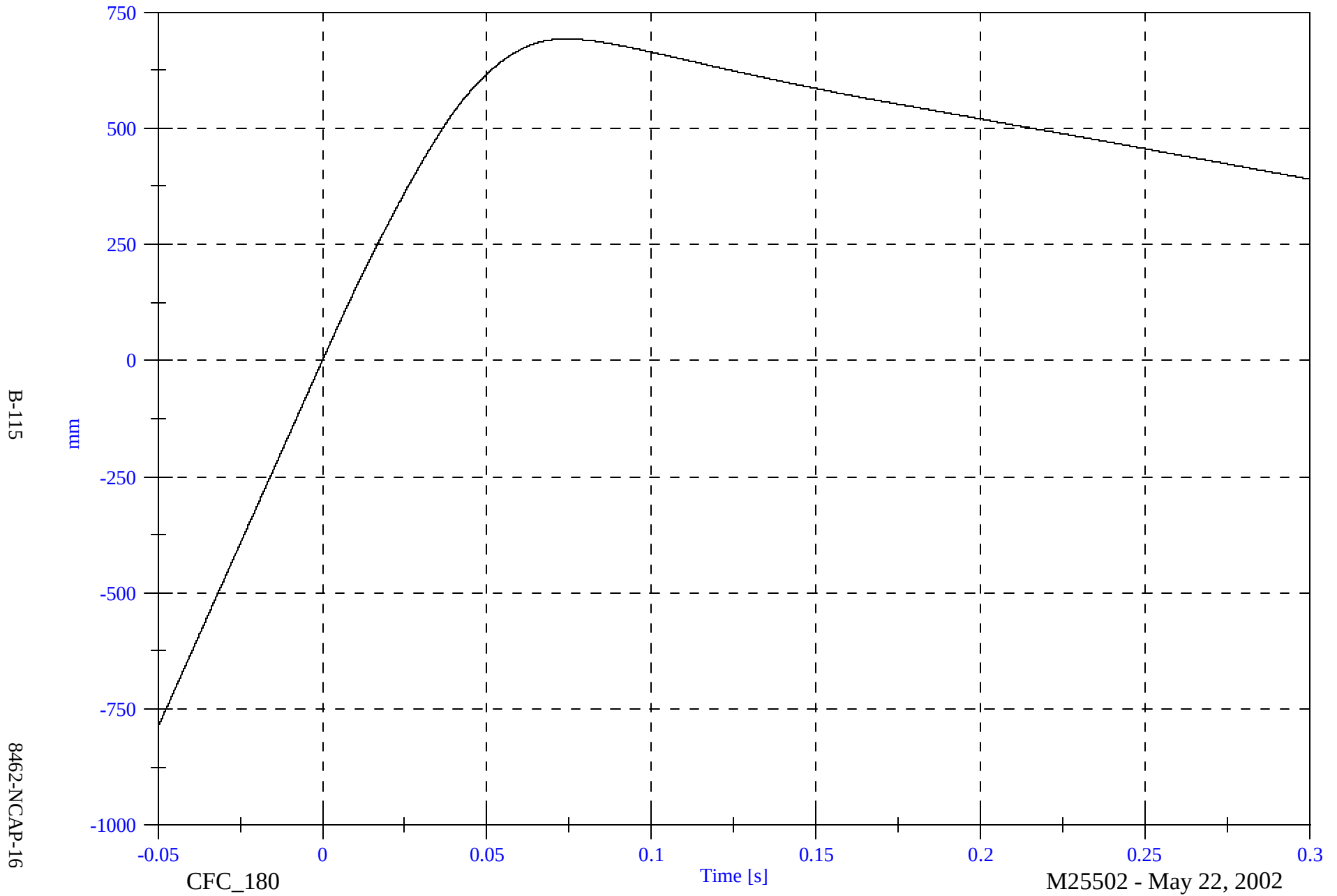
Right Rear #2x Velocity



2002 NCAP Test 16 2002 Subaru Legacy

Max: 692.1 [mm] at 0.074 [s]
Min: -788.9 [mm] at -0.050 [s]

Right Rear #2x Displacement



2002 NCAP Test 16 2002 Subaru Legacy

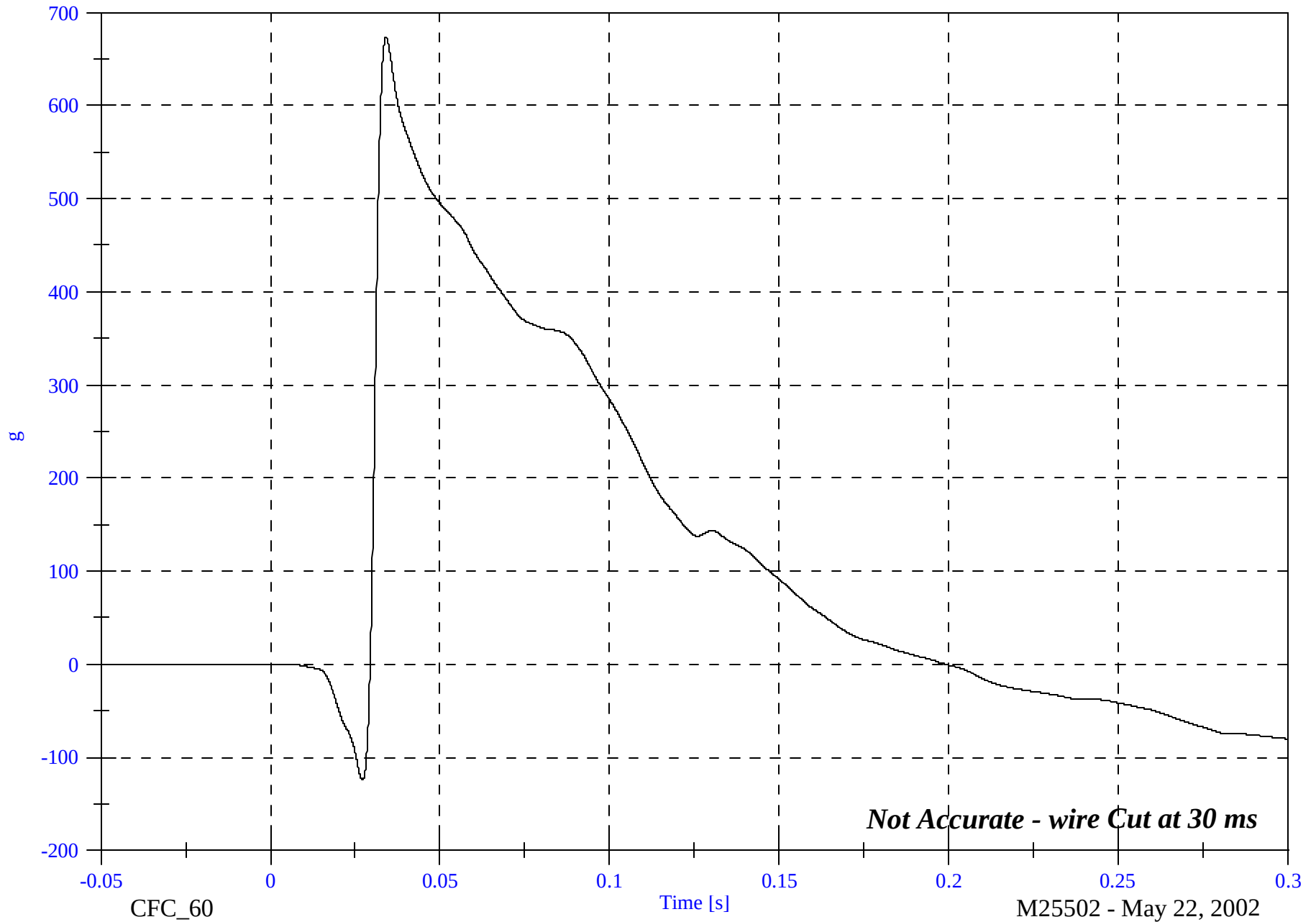
Engine Top #3x

Max: 673.4 [g] at 0.034 [s]

Min: -124.2 [g] at 0.027 [s]

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Not Accurate - wire Cut at 30 ms

CFC_60

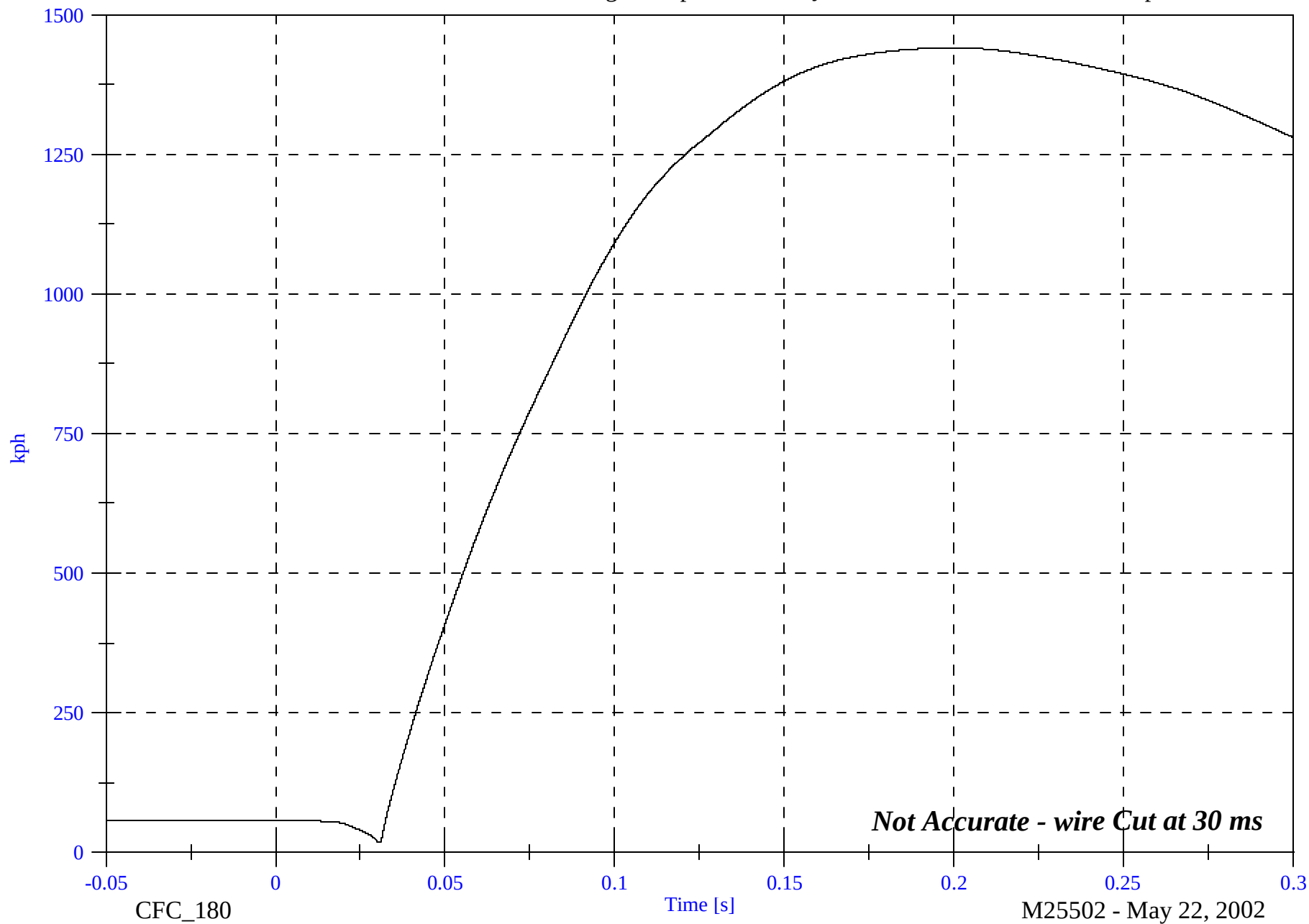
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Max: 1440.2 [kph] at 0.199 [s]

Min: 18.2 [kph] at 0.031 [s]

Engine Top #3x Velocity



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CFC_180

Time [s]

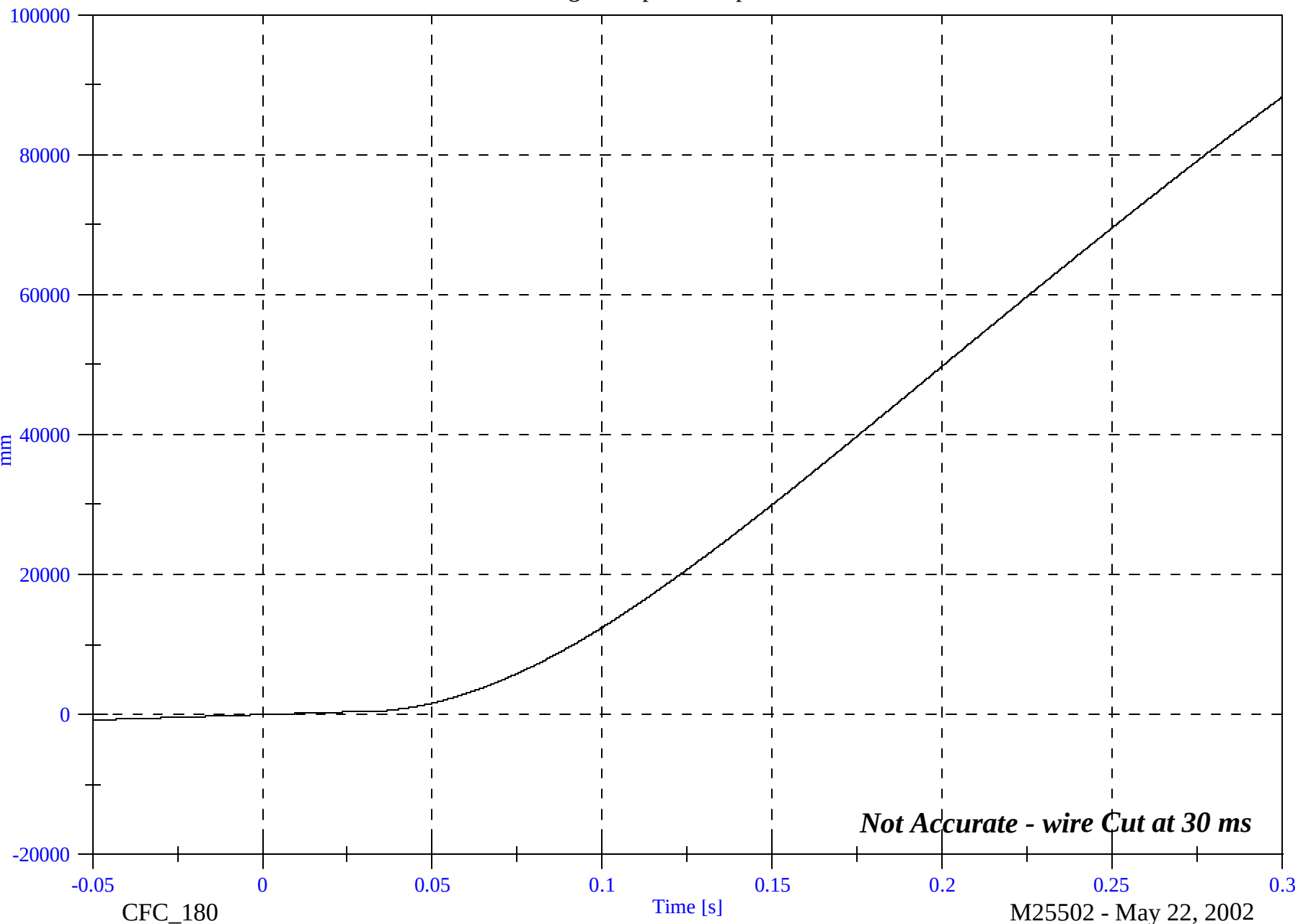
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Max: 88103.0 [mm] at 0.300 [s]

Engine Top #3x Displacement

Min: -790.7 [mm] at -0.050 [s]



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CFC_180

Time [s]

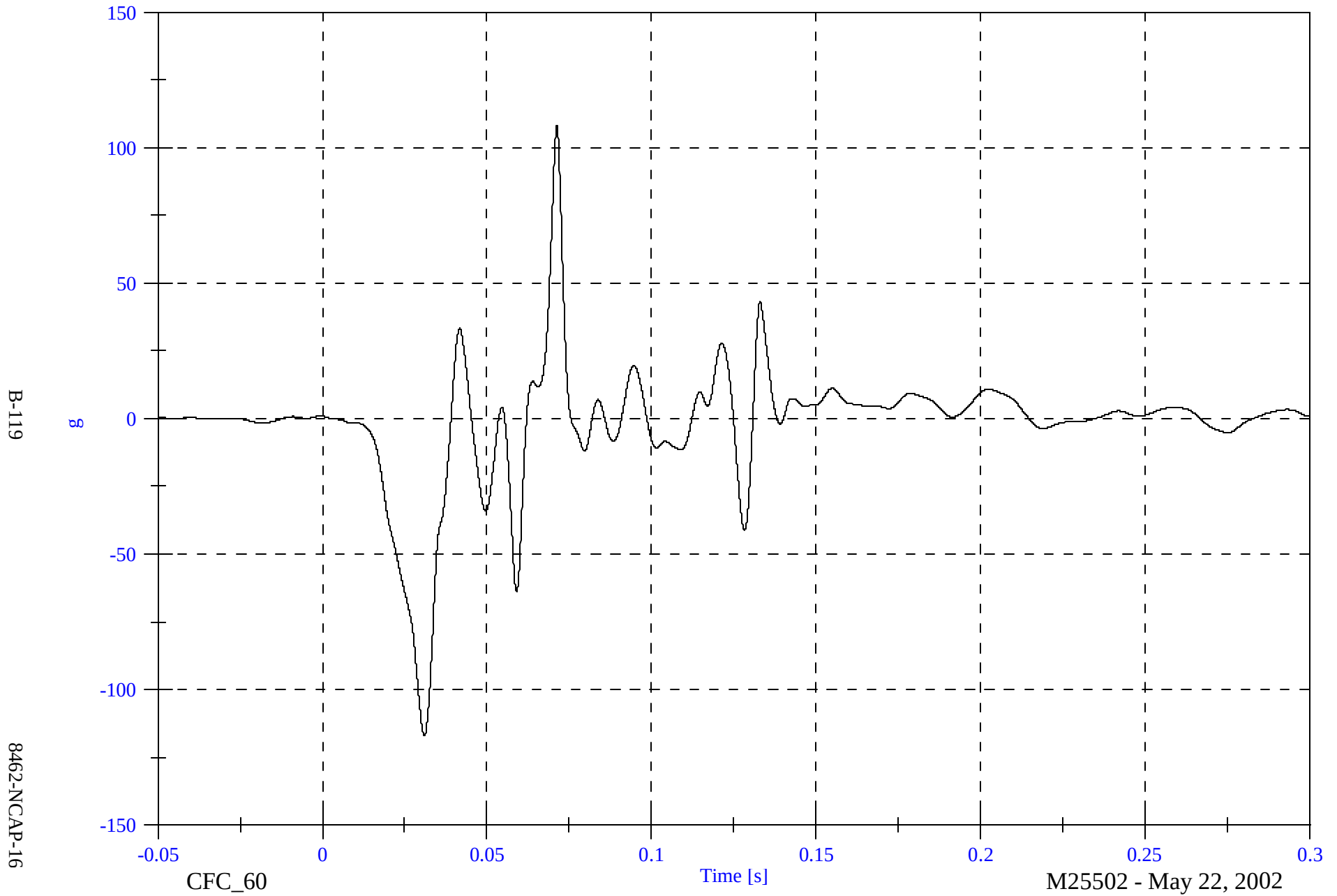
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Max: 108.0 [g] at 0.071 [s]

Min: -117.0 [g] at 0.031 [s]

Engine Bottom #4x

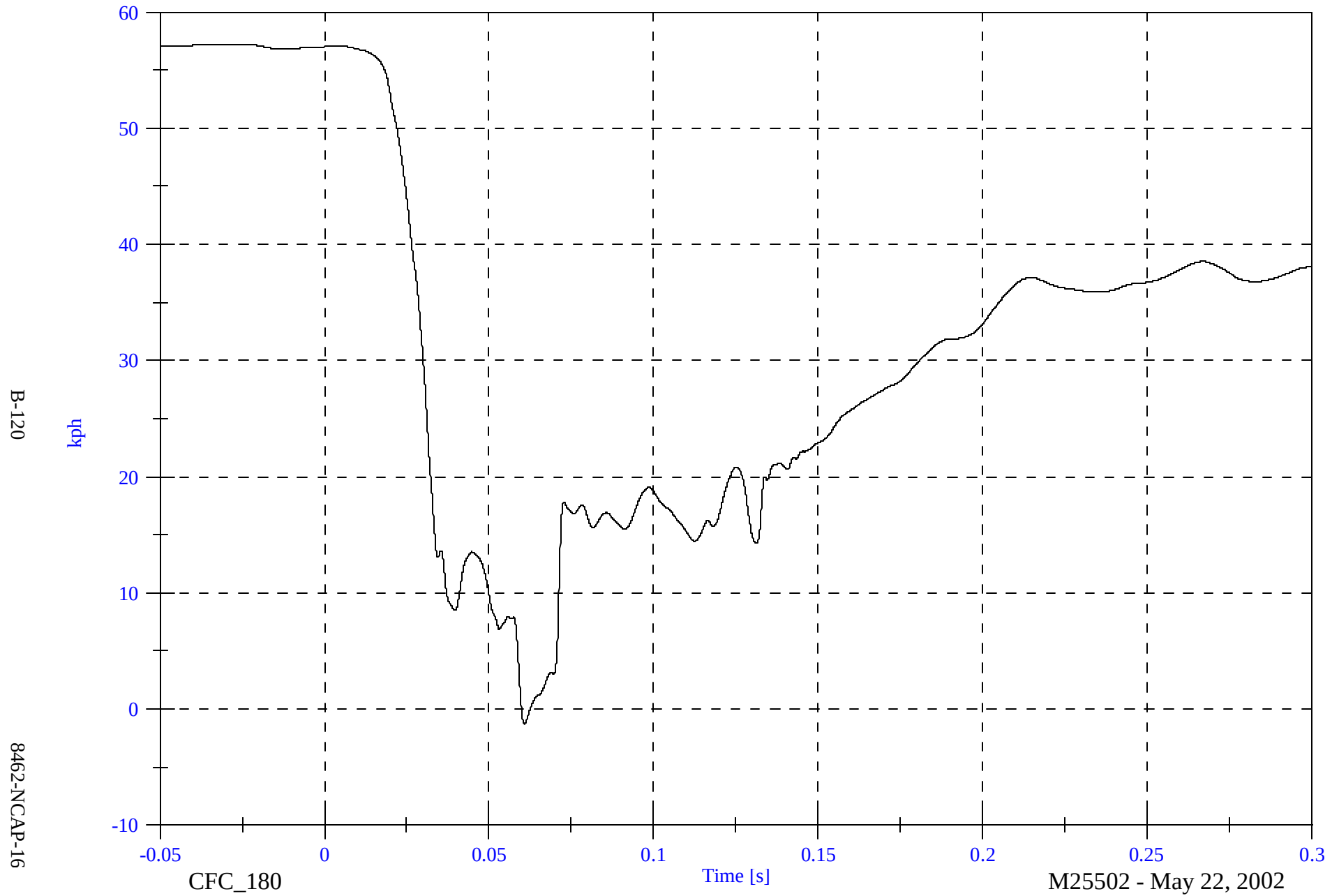


2002 NCAP Test 16 2002 Subaru Legacy

Max: 57.2 [kph] at -0.027 [s]

Engine Bottom #4x Velocity

Min: -1.3 [kph] at 0.061 [s]

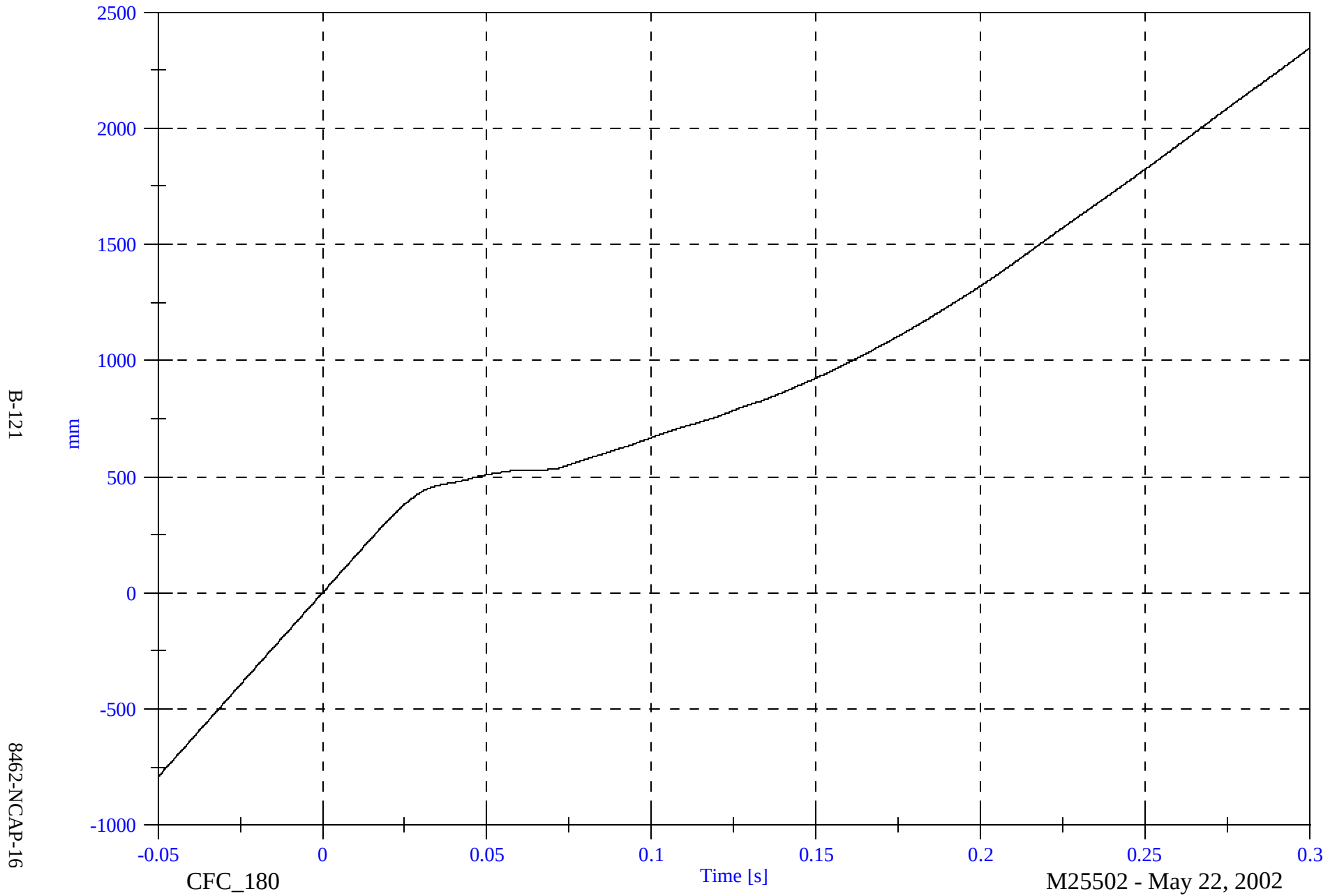


2002 NCAP Test 16 2002 Subaru Legacy

Max: 2342.2 [mm] at 0.300 [s]

Engine Bottom #4x Displacement

Min: -792.3 [mm] at -0.050 [s]

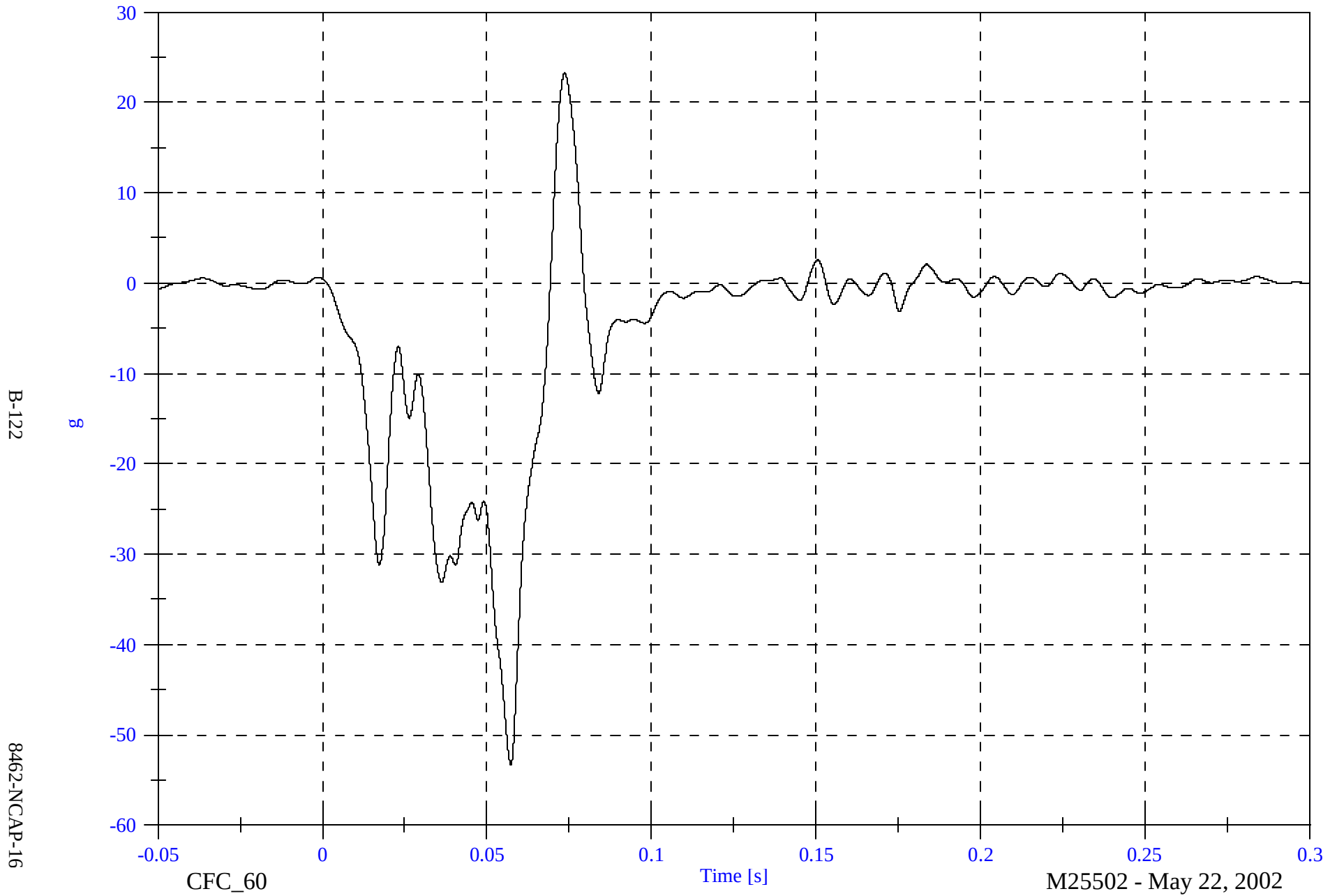


2002 NCAP Test 16 2002 Subaru Legacy

Right Caliper #5x

Max: 23.3 [g] at 0.074 [s]

Min: -53.3 [g] at 0.057 [s]

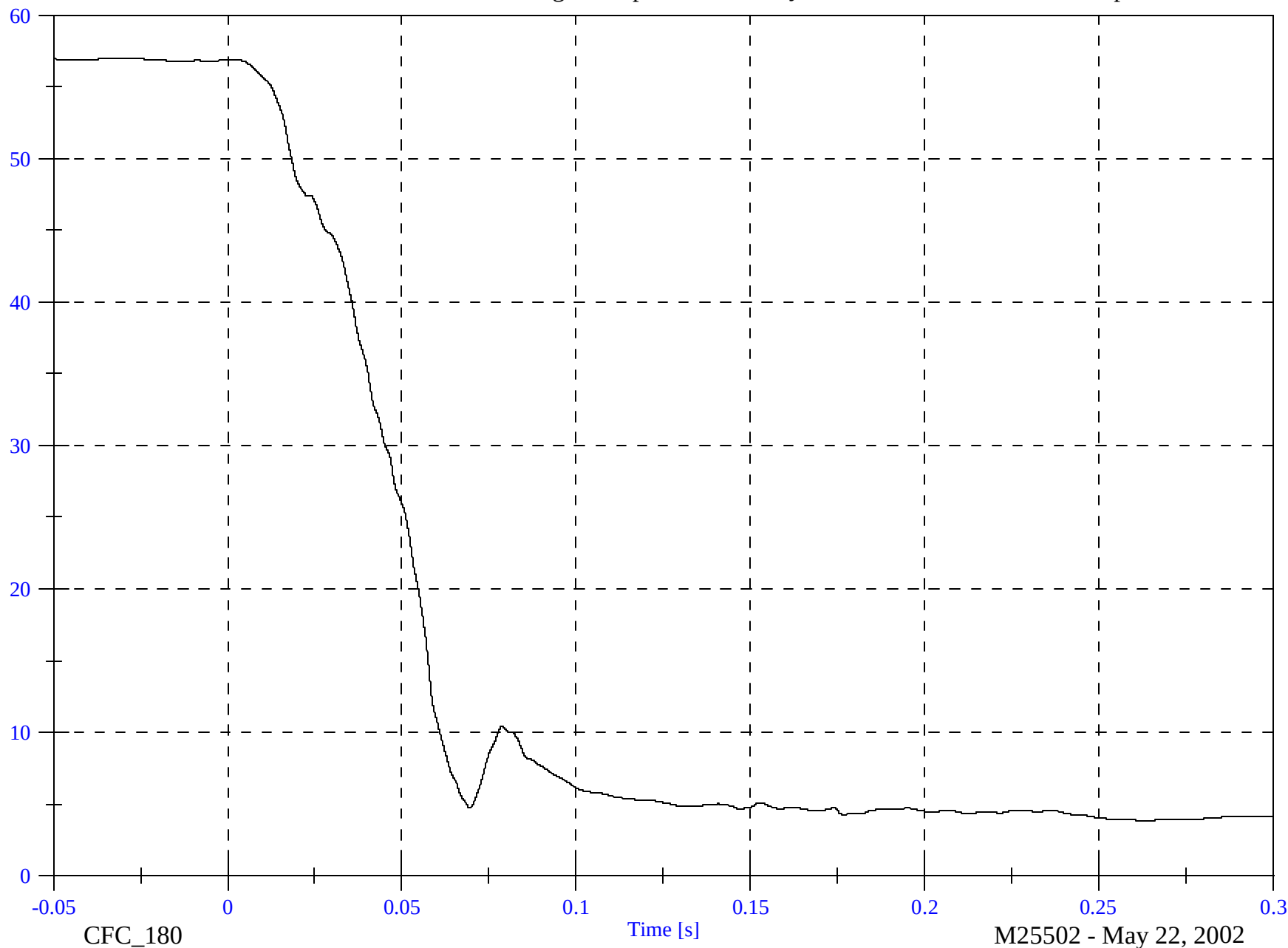


2002 NCAP Test 16 2002 Subaru Legacy

Max: 57.0 [kph] at -0.031 [s]

Right Caliper #5x Velocity

Min: 3.9 [kph] at 0.264 [s]



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CFC_180

Time [s]

M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

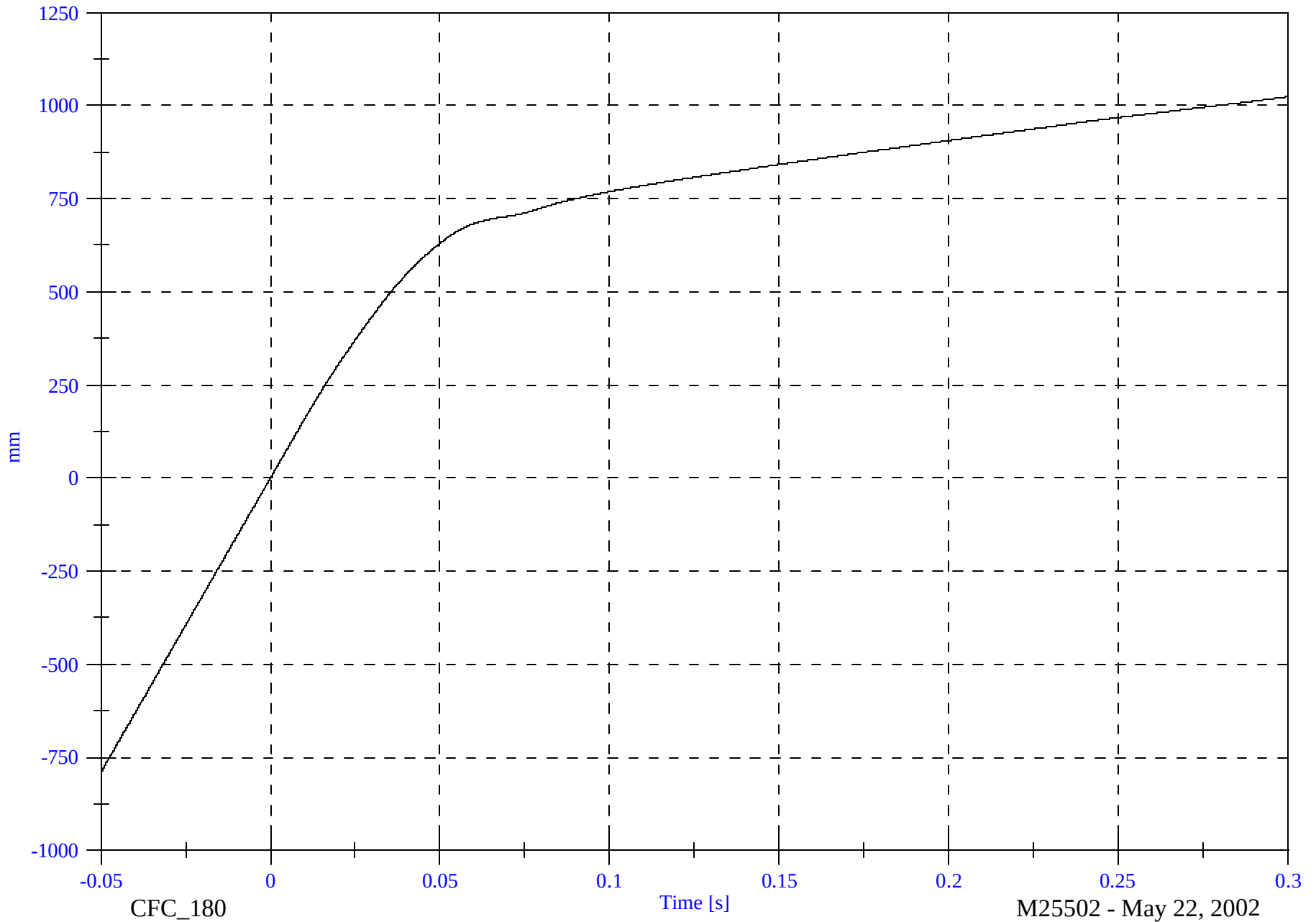
Right Caliper #5x Displacement

Max: 1023.1 [mm] at 0.300 [s]

Min: -790.0 [mm] at -0.050 [s]

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CFC_180

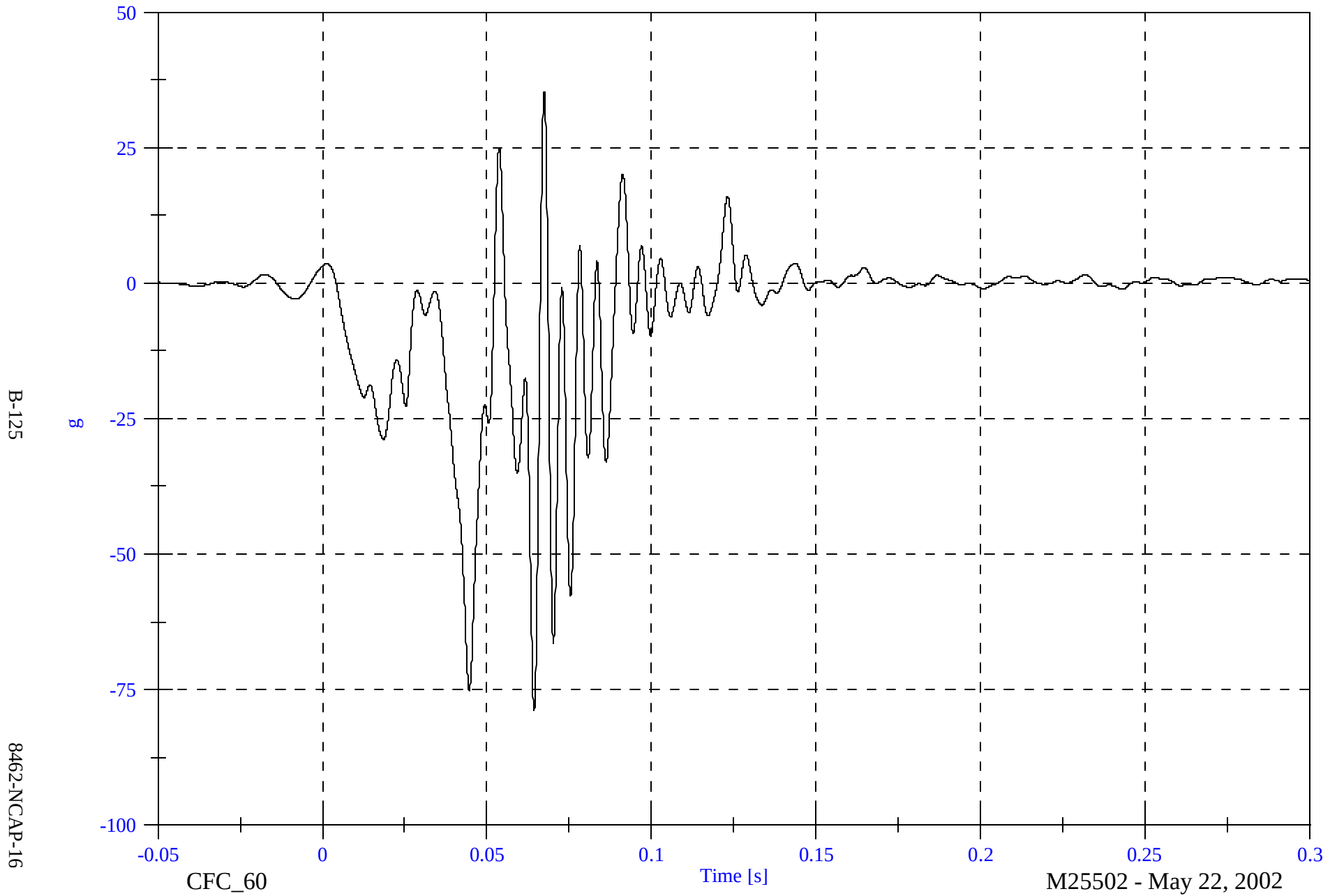
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Instrument Panel #6x

Max: 35.3 [g] at 0.067 [s]

Min: -78.9 [g] at 0.064 [s]

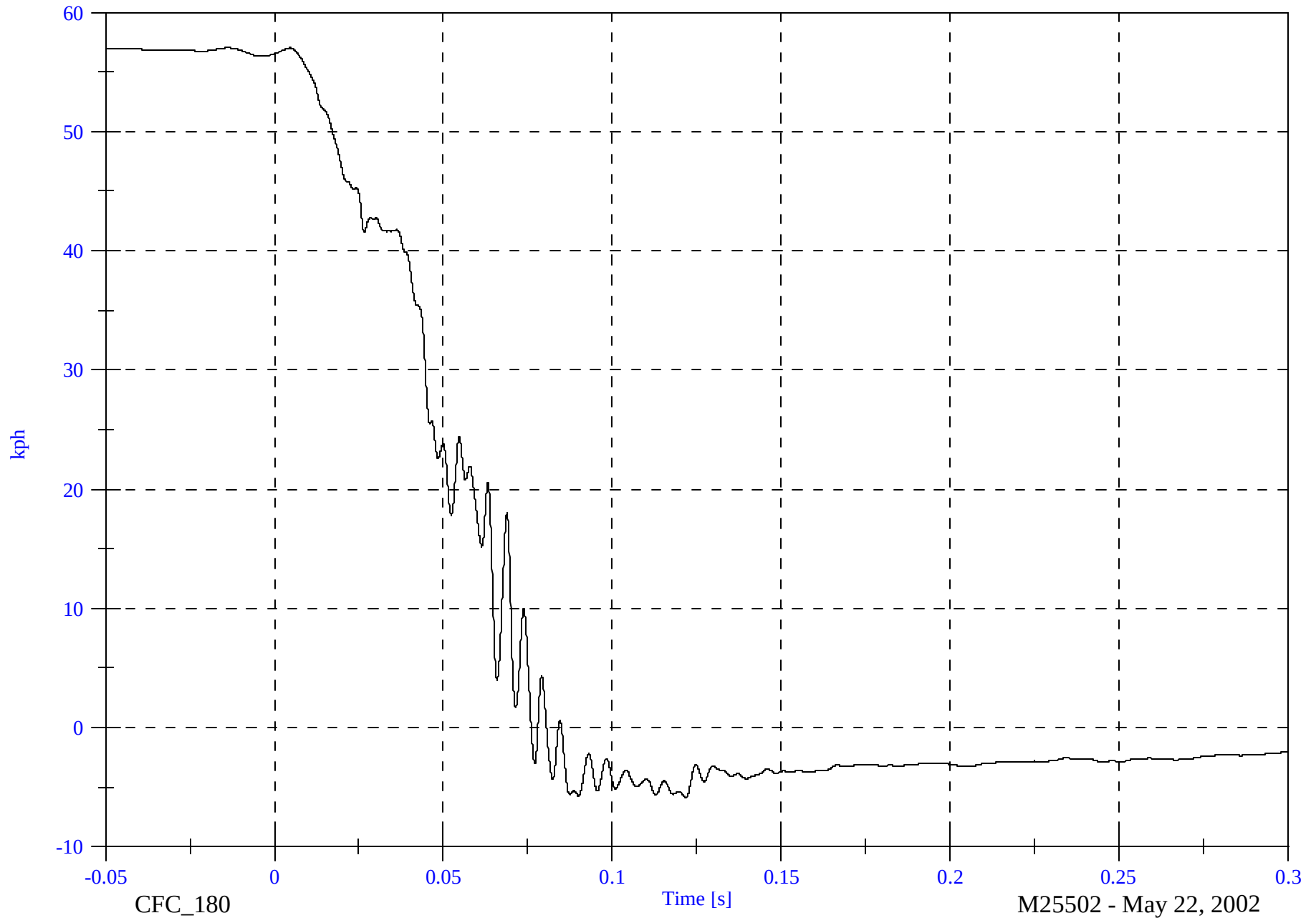


2002 NCAP Test 16 2002 Subaru Legacy

Instrument Panel #6x Velocity

Max: 57.0 [kph] at -0.014 [s]

Min: -5.9 [kph] at 0.122 [s]



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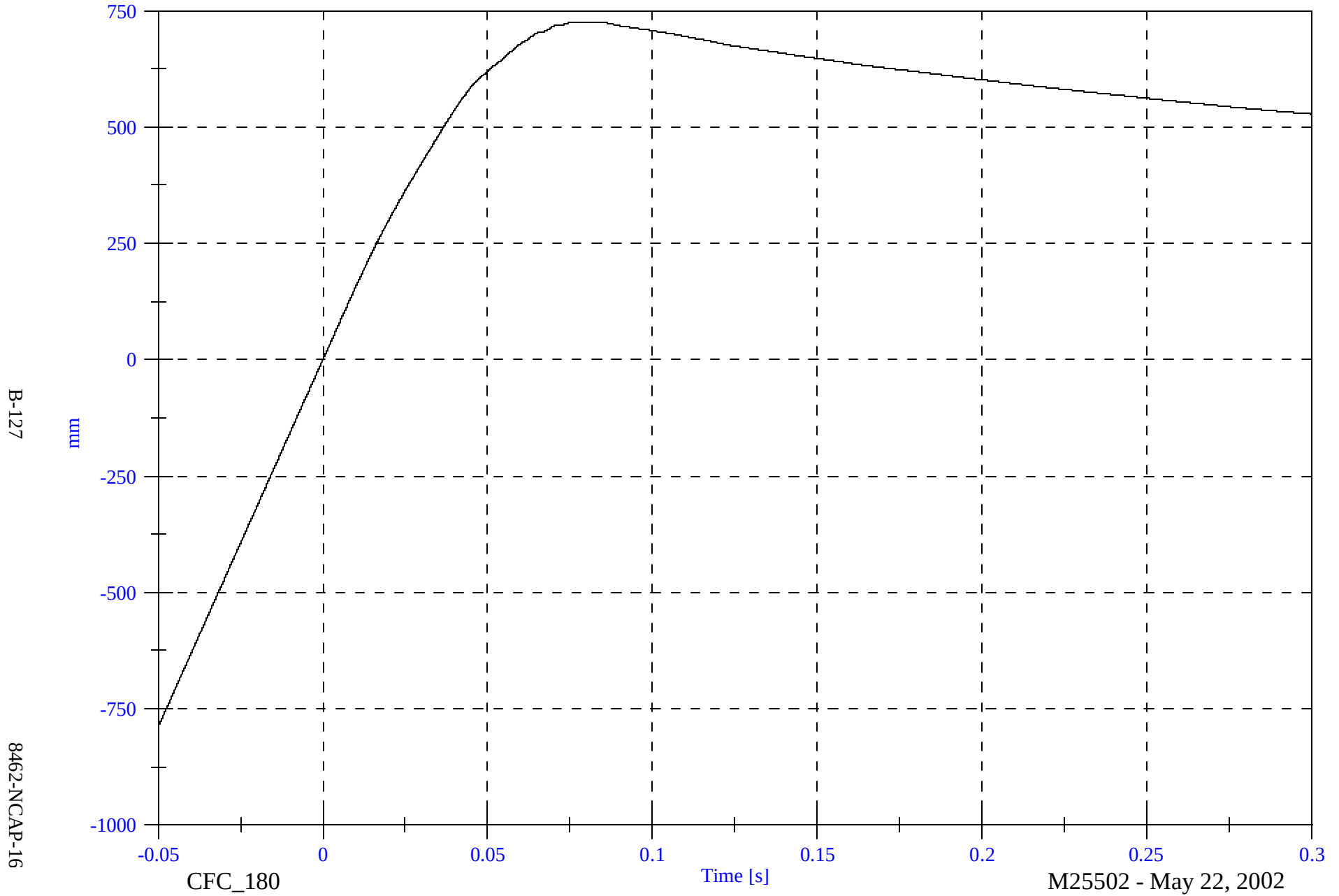
CFC_180

M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Max: 726.3 [mm] at 0.081 [s]
Min: -788.7 [mm] at -0.050 [s]

Instrument Panel #6x Displacement

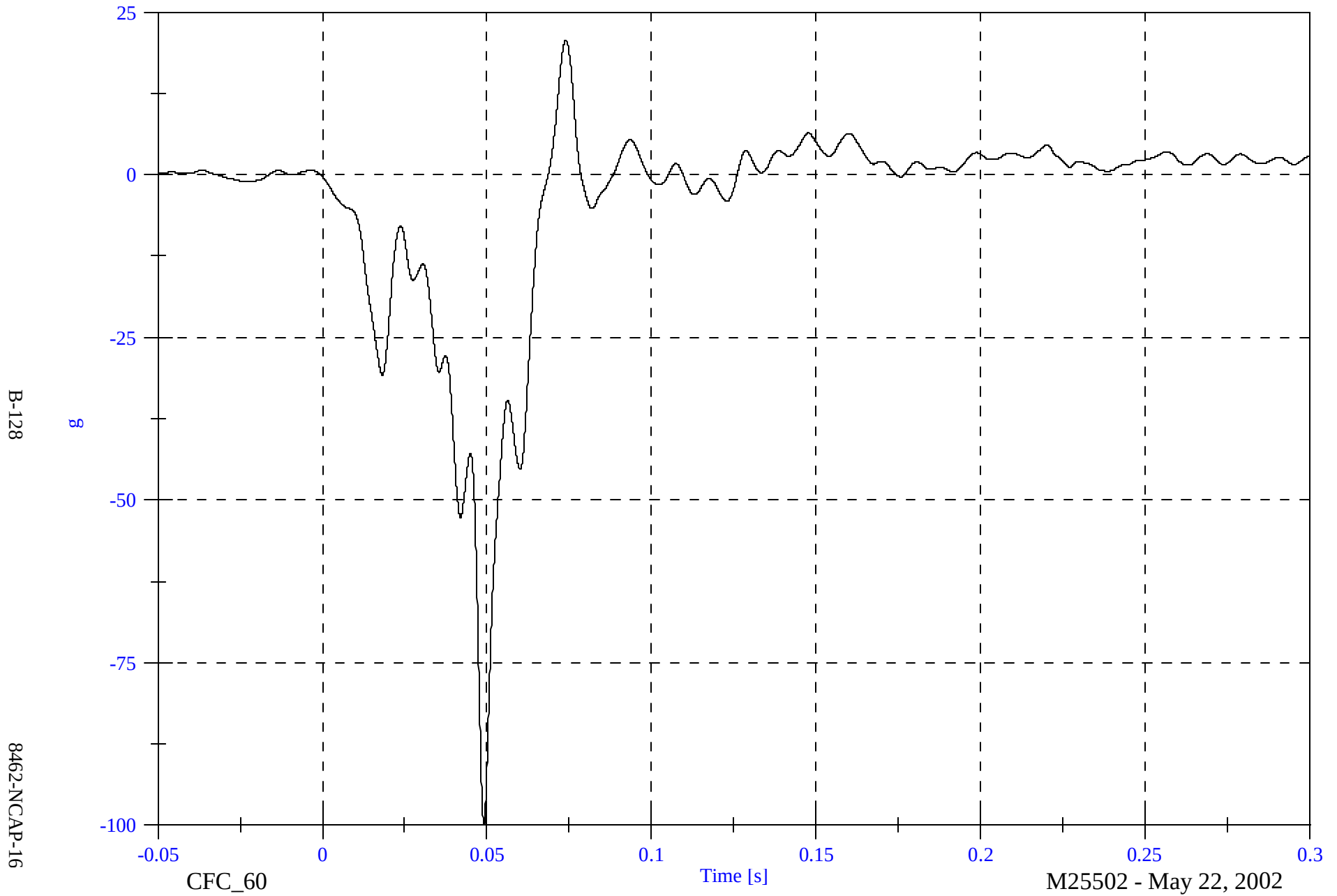


2002 NCAP Test 16 2002 Subaru Legacy

Left Caliper #7x

Max: 20.6 [g] at 0.074 [s]

Min: -99.8 [g] at 0.049 [s]



2002 NCAP Test 16 2002 Subaru Legacy

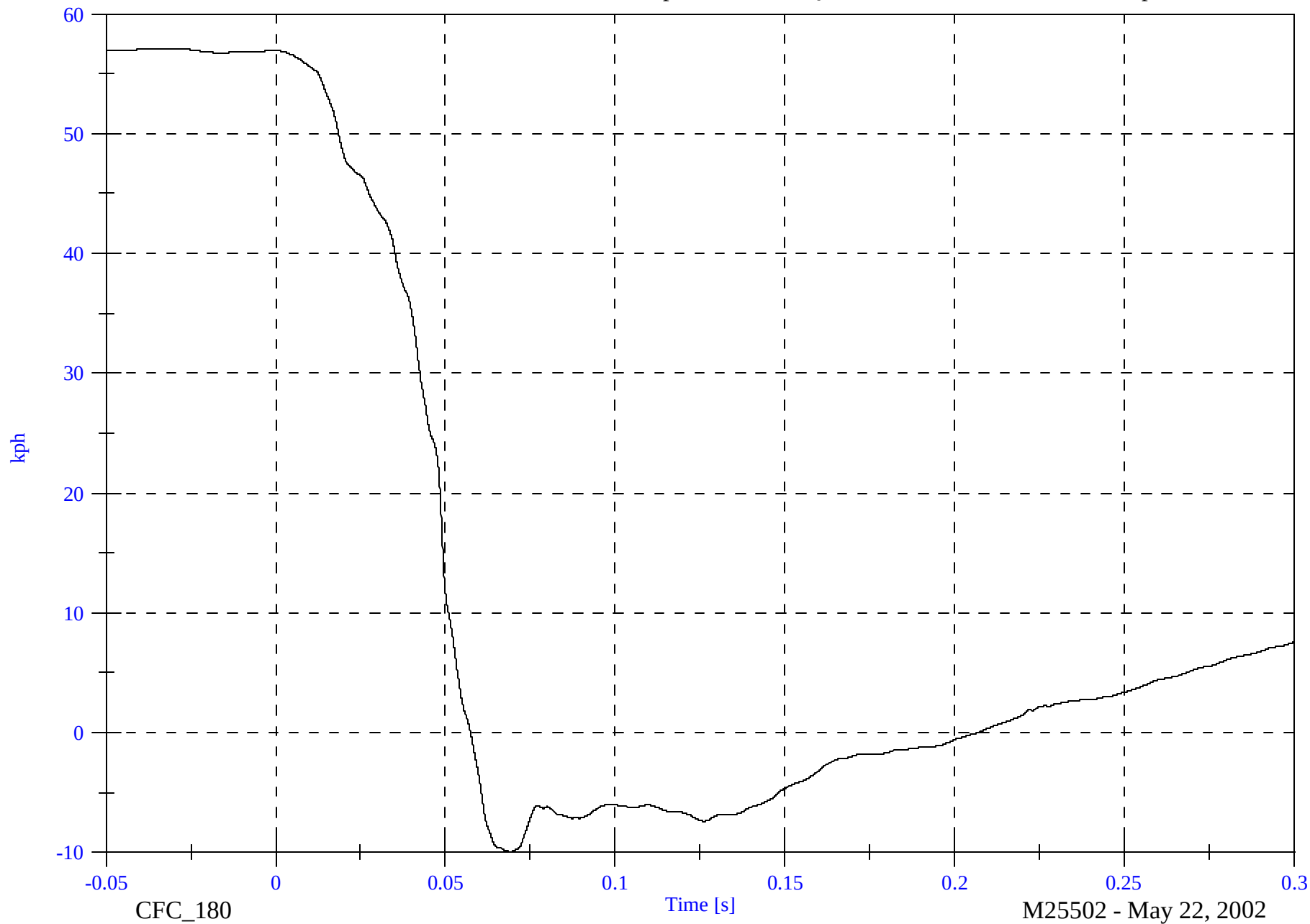
Max: 57.1 [kph] at -0.031 [s]

Left Caliper #7x Velocity

Min: -9.9 [kph] at 0.069 [s]

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CFC_180

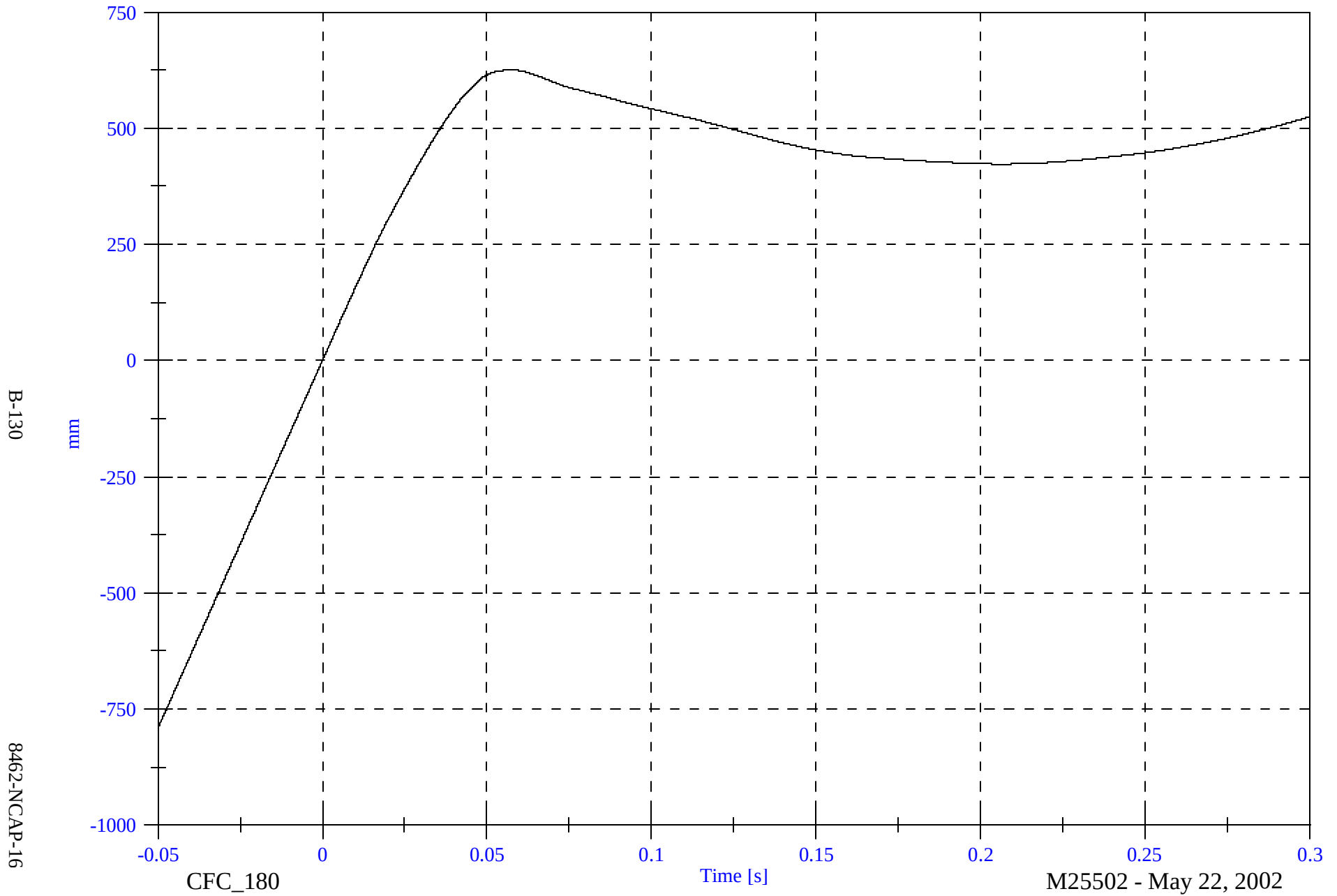
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Left Caliper #7x Displacement

Max: 625.1 [mm] at 0.057 [s]

Min: -790.7 [mm] at -0.050 [s]

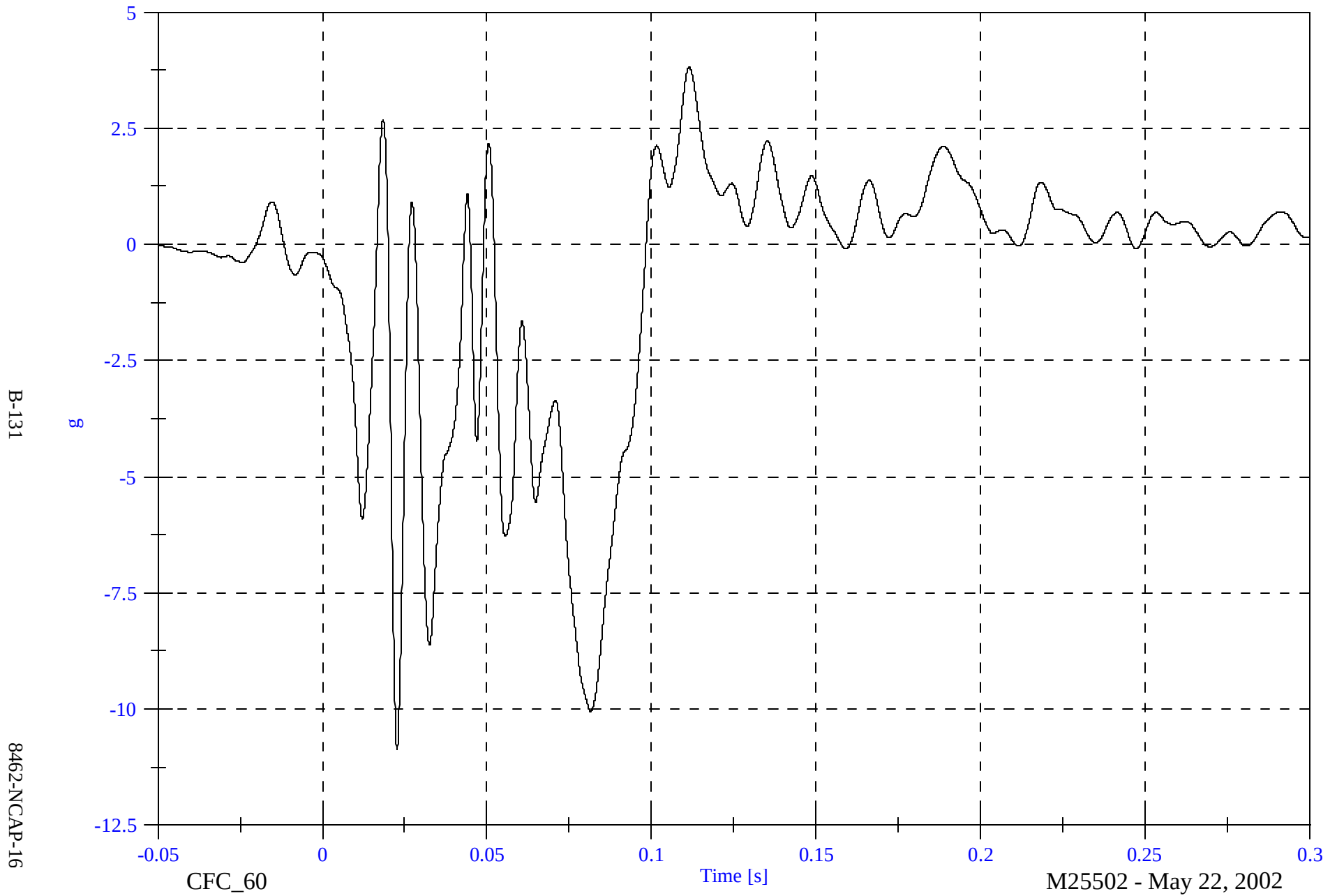


2002 NCAP Test 16 2002 Subaru Legacy

Left Rear #8z

Max: 3.8 [g] at 0.112 [s]

Min: -10.9 [g] at 0.023 [s]



2002 NCAP Test 16 2002 Subaru Legacy

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

Min: -14.2 [kph] at 0.099 [s]

Left Rear #8z Velocity

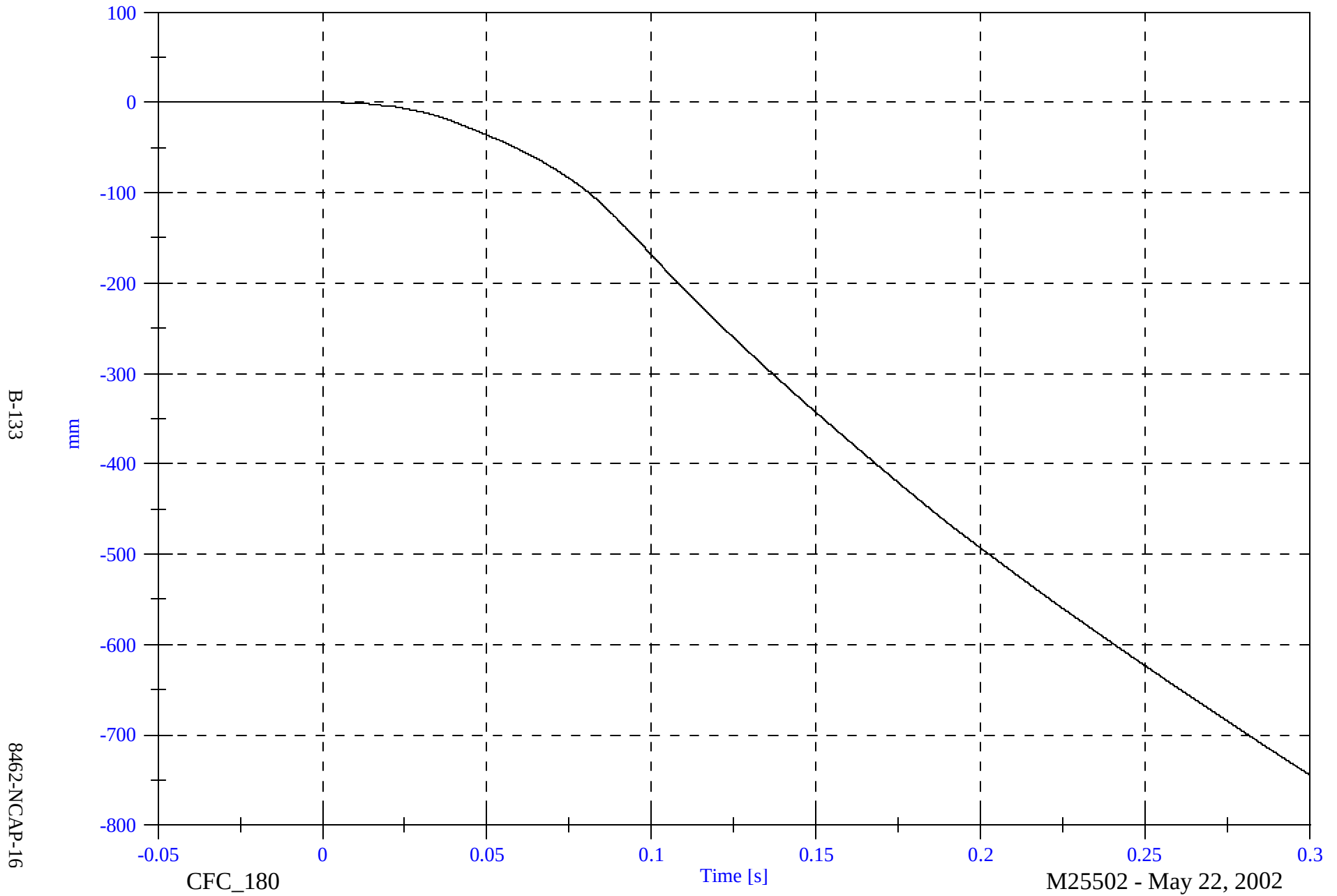


2002 NCAP Test 16 2002 Subaru Legacy

Left Rear #8z Displacement

Max: 0.7 [mm] at -0.036 [s]

Min: -743.8 [mm] at 0.300 [s]

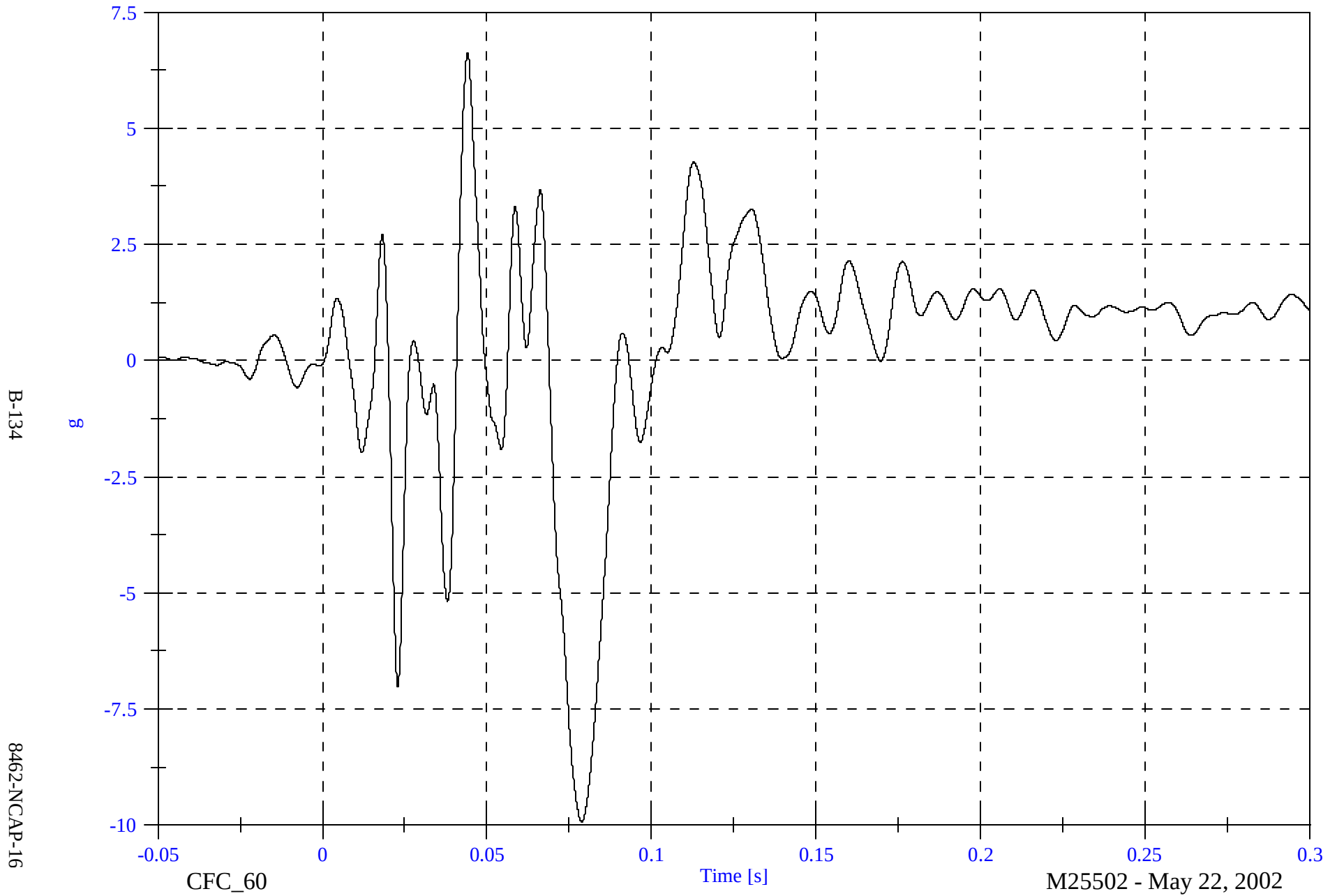


2002 NCAP Test 16 2002 Subaru Legacy

Max: 6.6 [g] at 0.044 [s]

Min: -9.9 [g] at 0.079 [s]

Right Rear #9z



2002 NCAP Test 16 2002 Subaru Legacy

Right Rear #9z Velocity

Max: 4.2 [kph] at 0.300 [s]

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

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kph

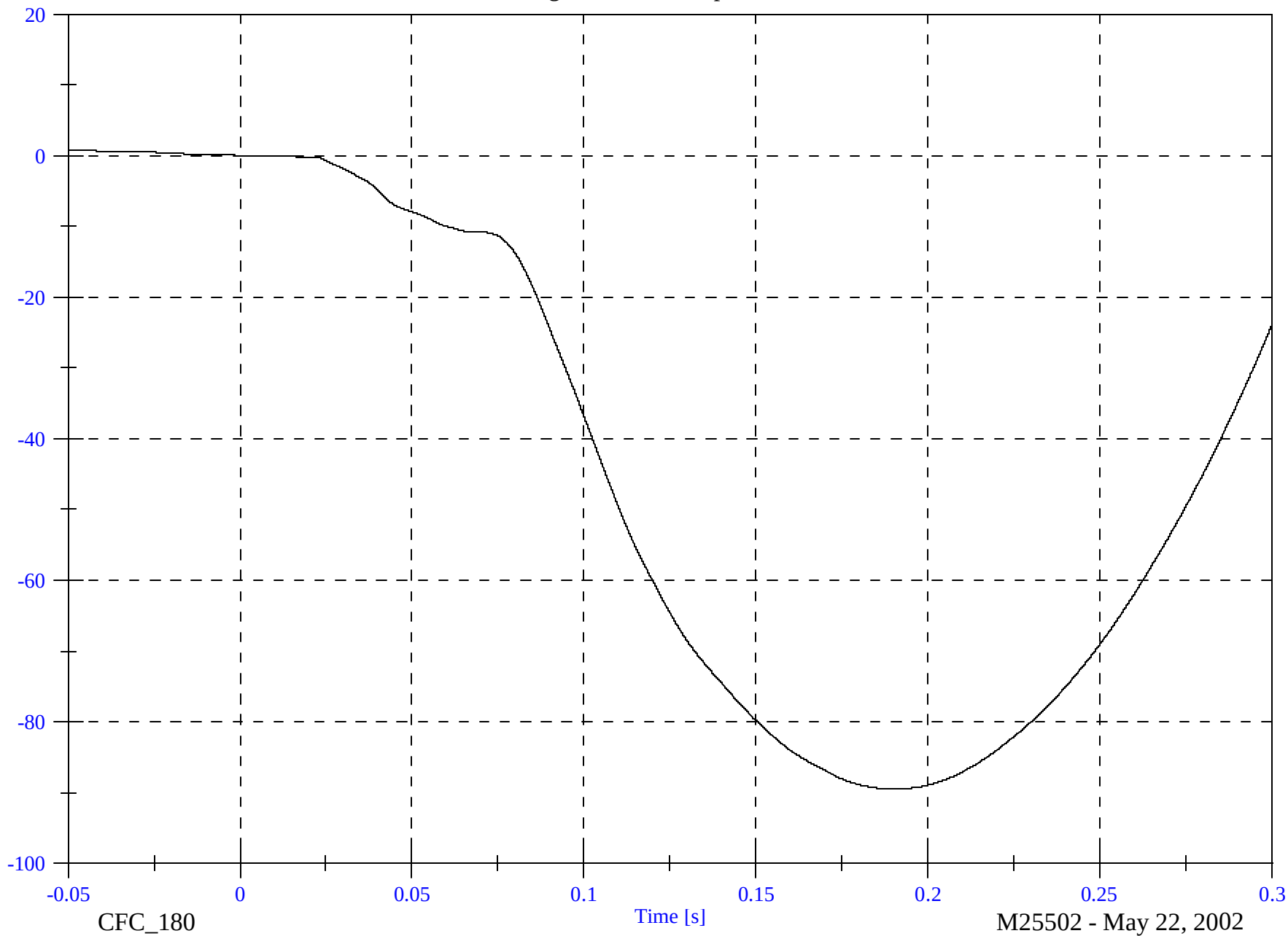


2002 NCAP Test 16 2002 Subaru Legacy

Right Rear #9z Displacement

Max: 0.8 [mm] at -0.050 [s]

Min: -89.5 [mm] at 0.190 [s]



B-136

8462-NCAP-16

CFC_180

Time [s]

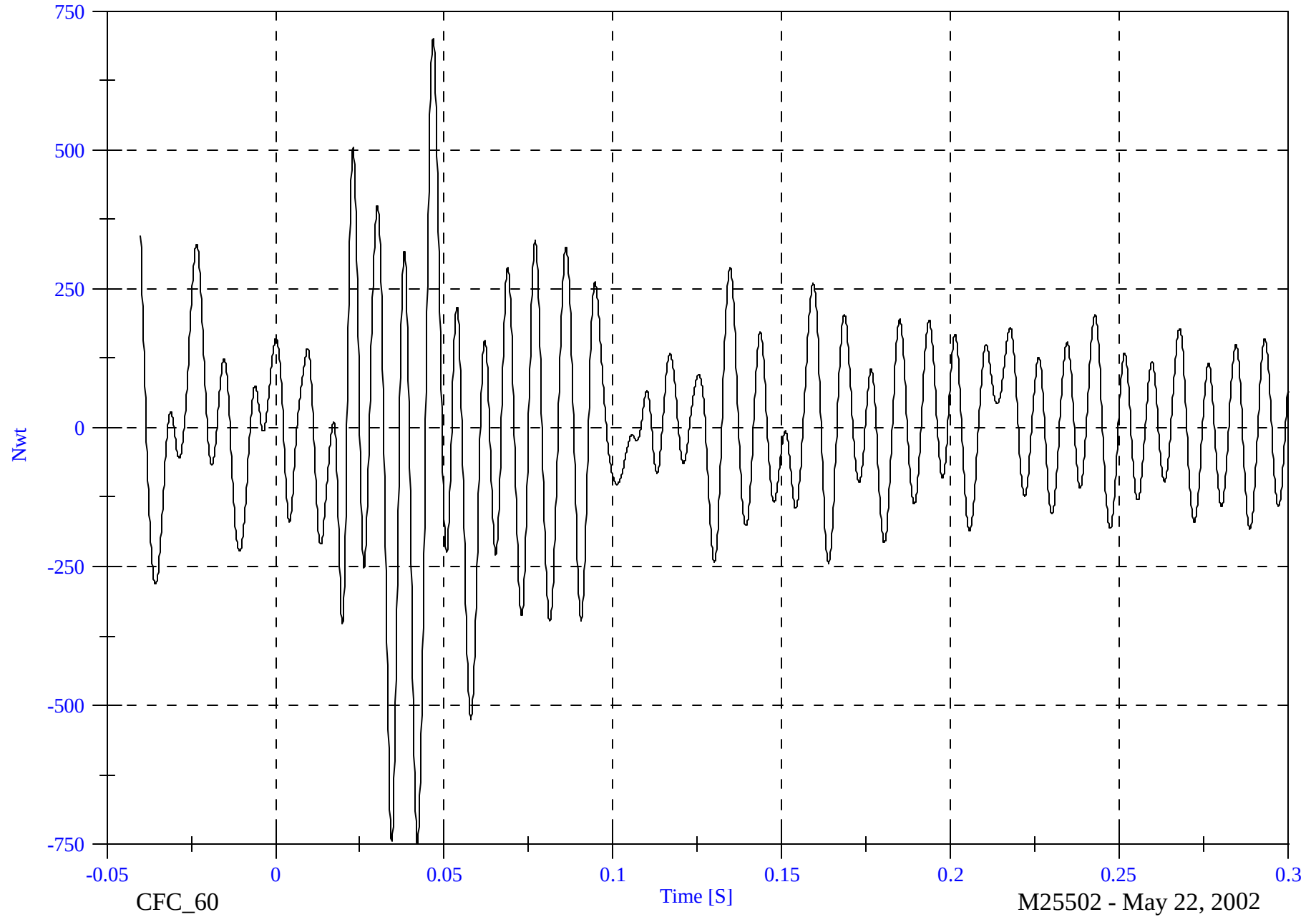
M25502 - May 22, 2002

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BLC A1 Fx

Max: 699.9 [Nwt] at 0.047 [S]

Min: -748.0 [Nwt] at 0.042 [S]



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NCAP TEST #16 2002 Subaru Legacy

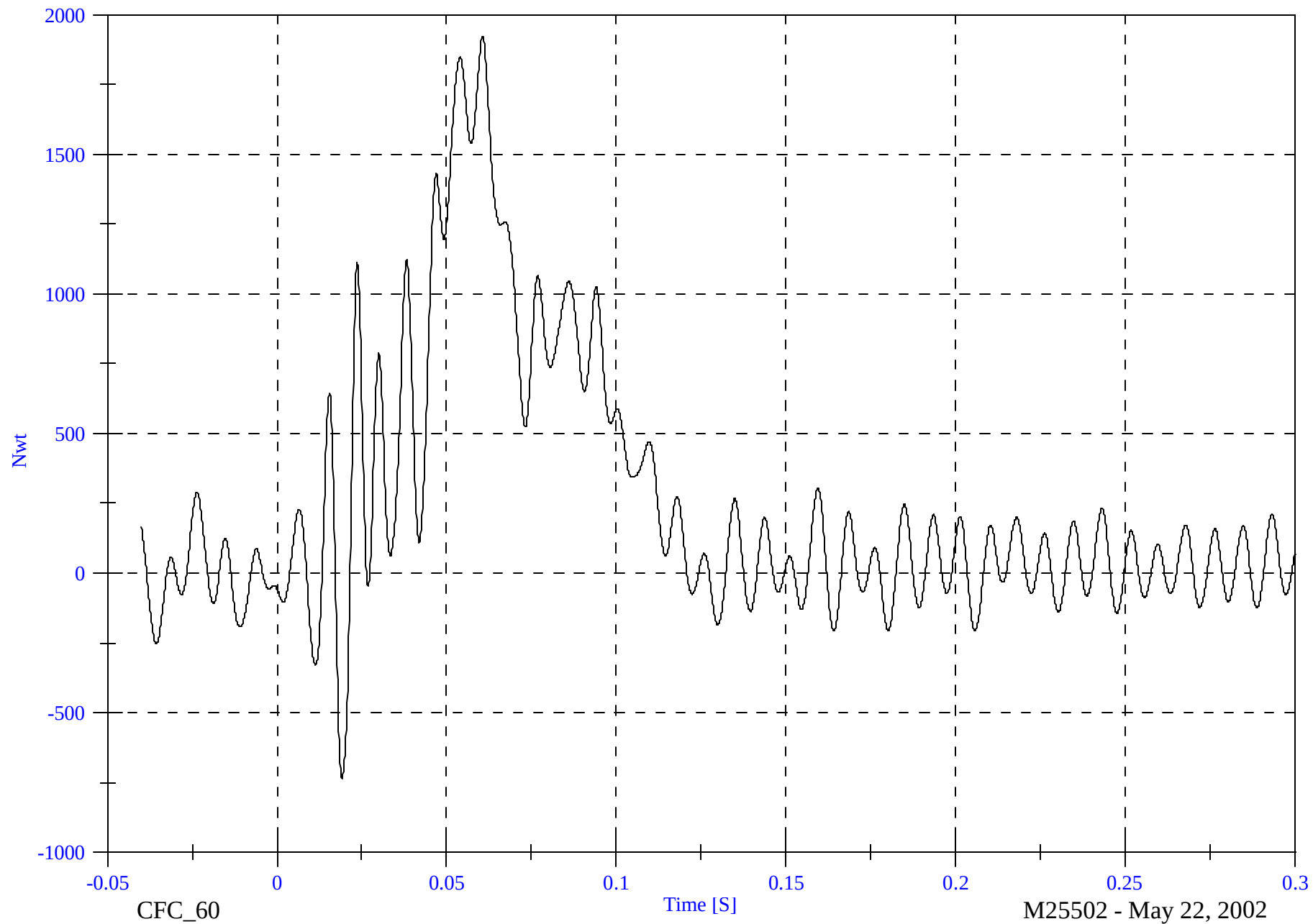
BLC A2 Fx

Max: 1921.6 [Nwt] at 0.061 [S]

Min: -734.1 [Nwt] at 0.019 [S]

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8462-NCAP-16

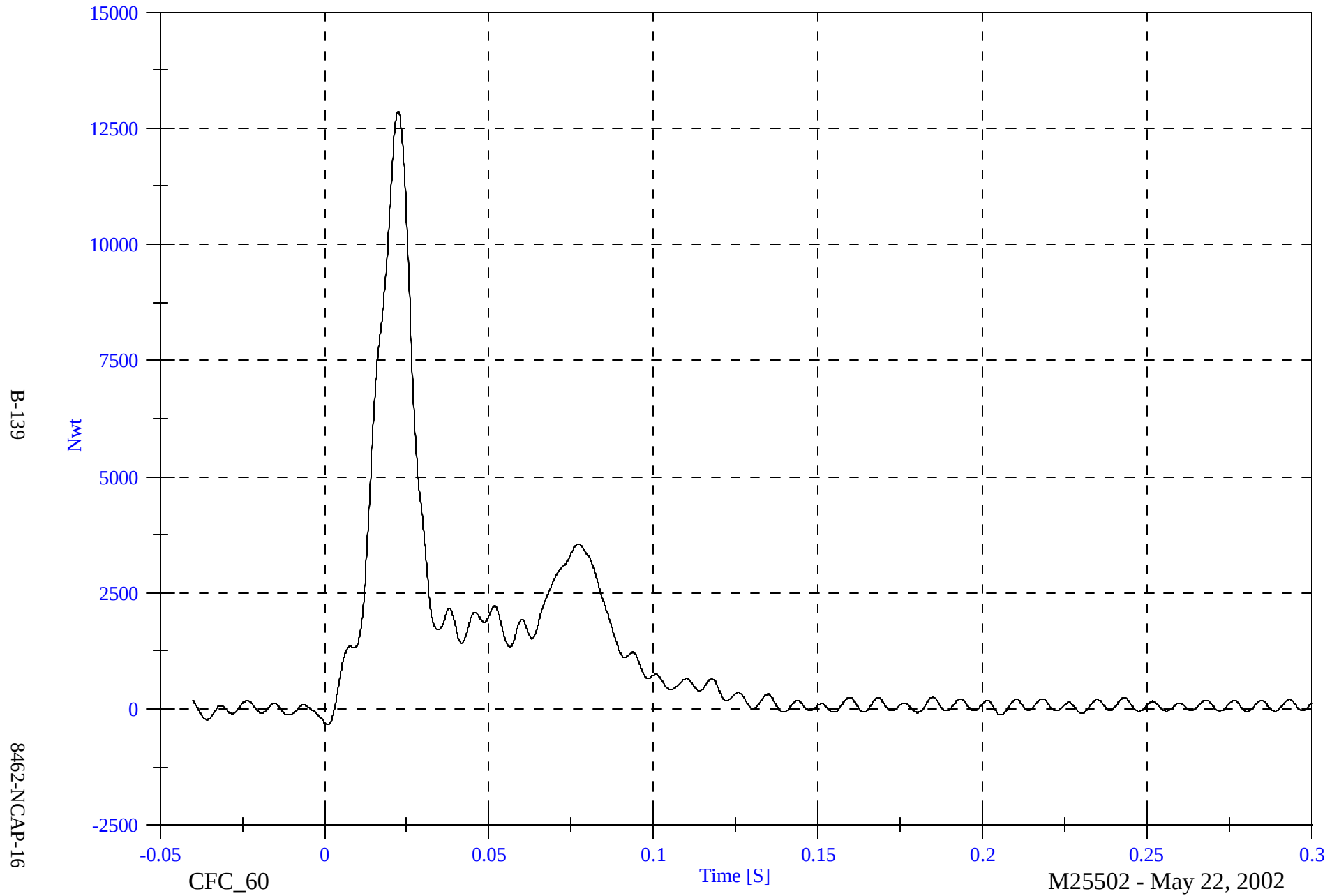


NCAP TEST #16 2002 Subaru Legacy

BLC A3 Fx

Max: 12865.6 [Nwt] at 0.022 [S]

Min: -339.6 [Nwt] at 0.001 [S]



NCAP TEST #16 2002 Subaru Legacy

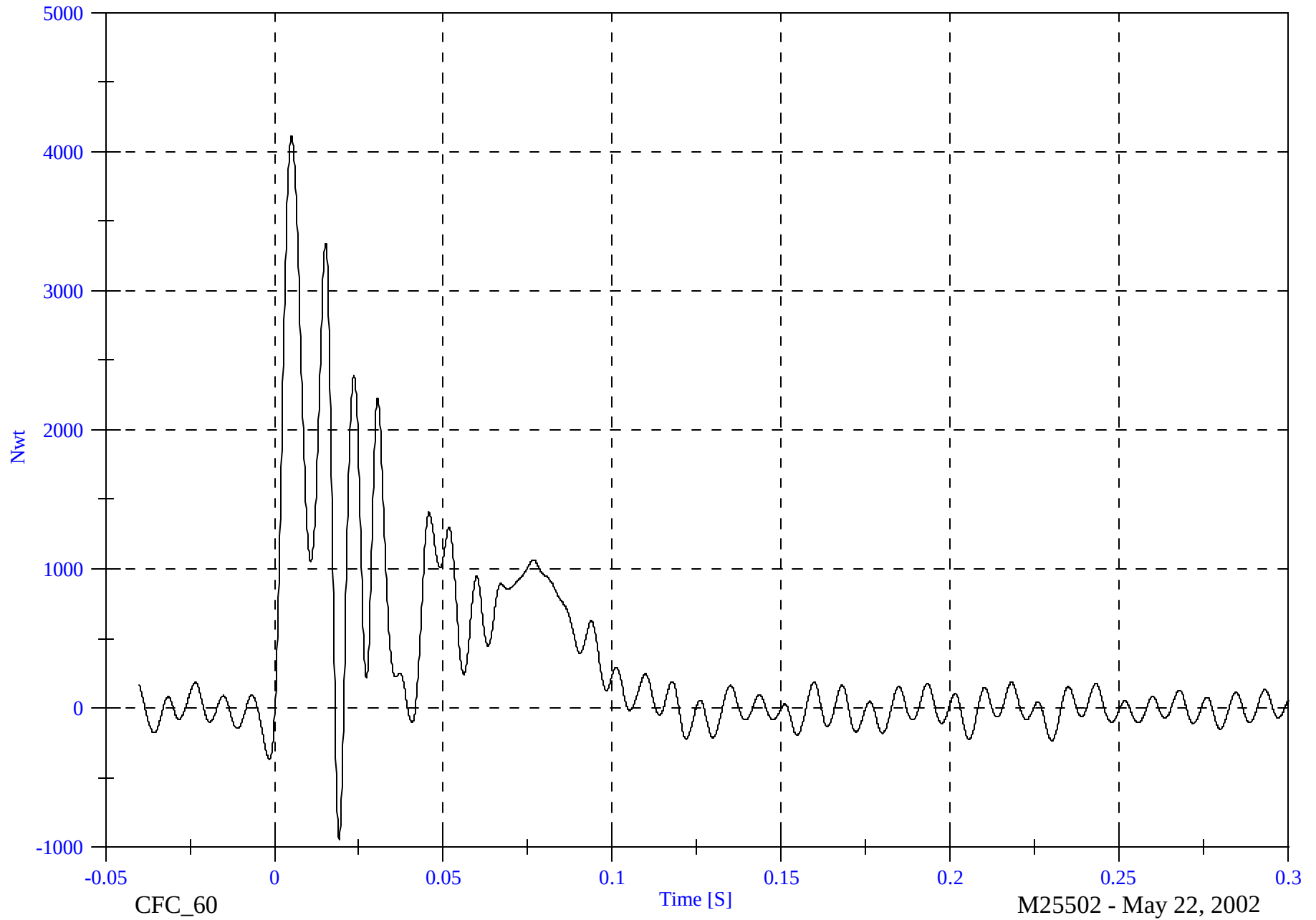
BLC A4 Fx

Max: 4112.4 [Nwt] at 0.005 [S]

Min: -949.8 [Nwt] at 0.019 [S]

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NCAP TEST #16 2002 Subaru Legacy

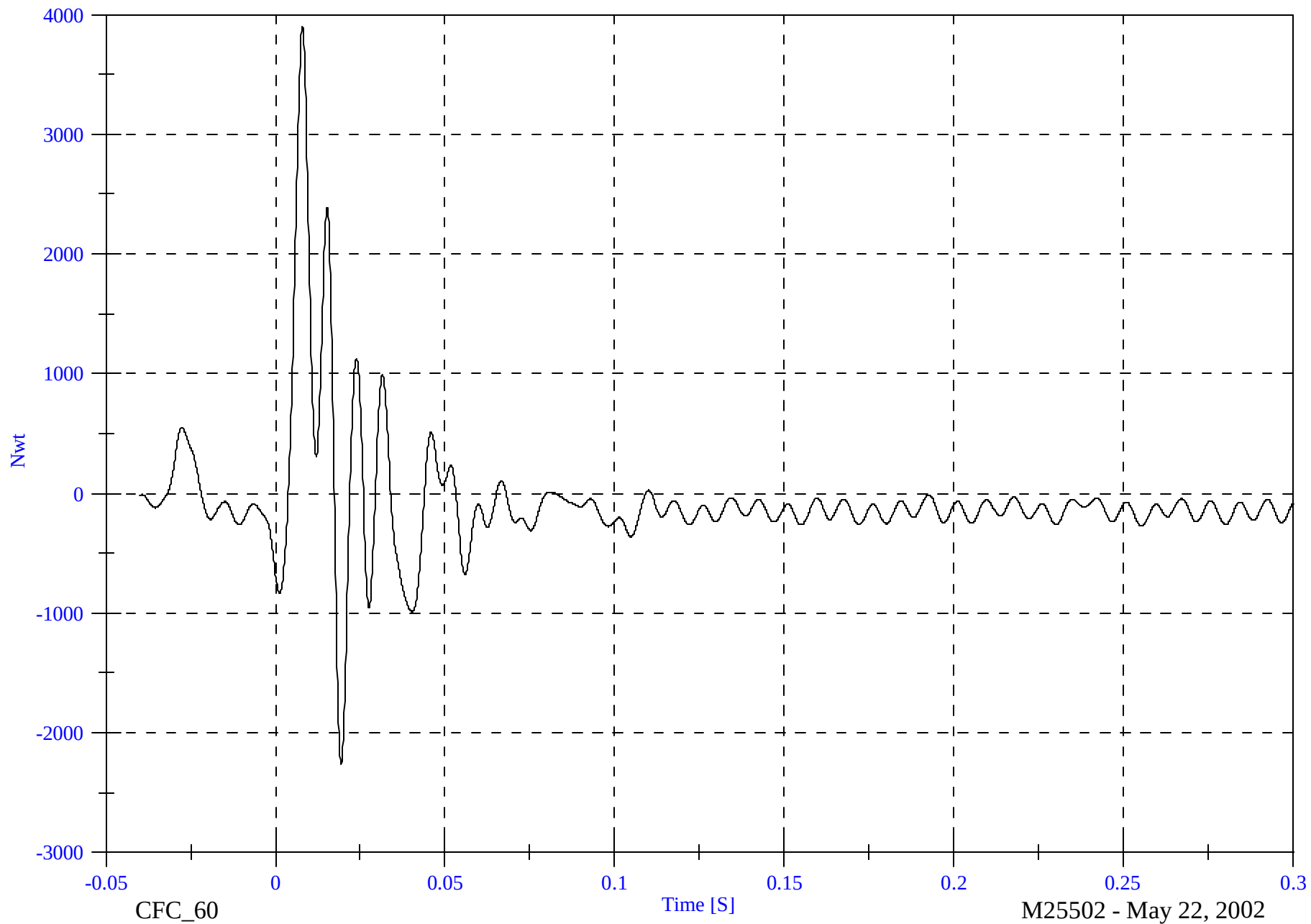
BLC A5 Fx

Max: 3902.4 [Nwt] at 0.008 [S]

Min: -2267.6 [Nwt] at 0.019 [S]

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CFC_60

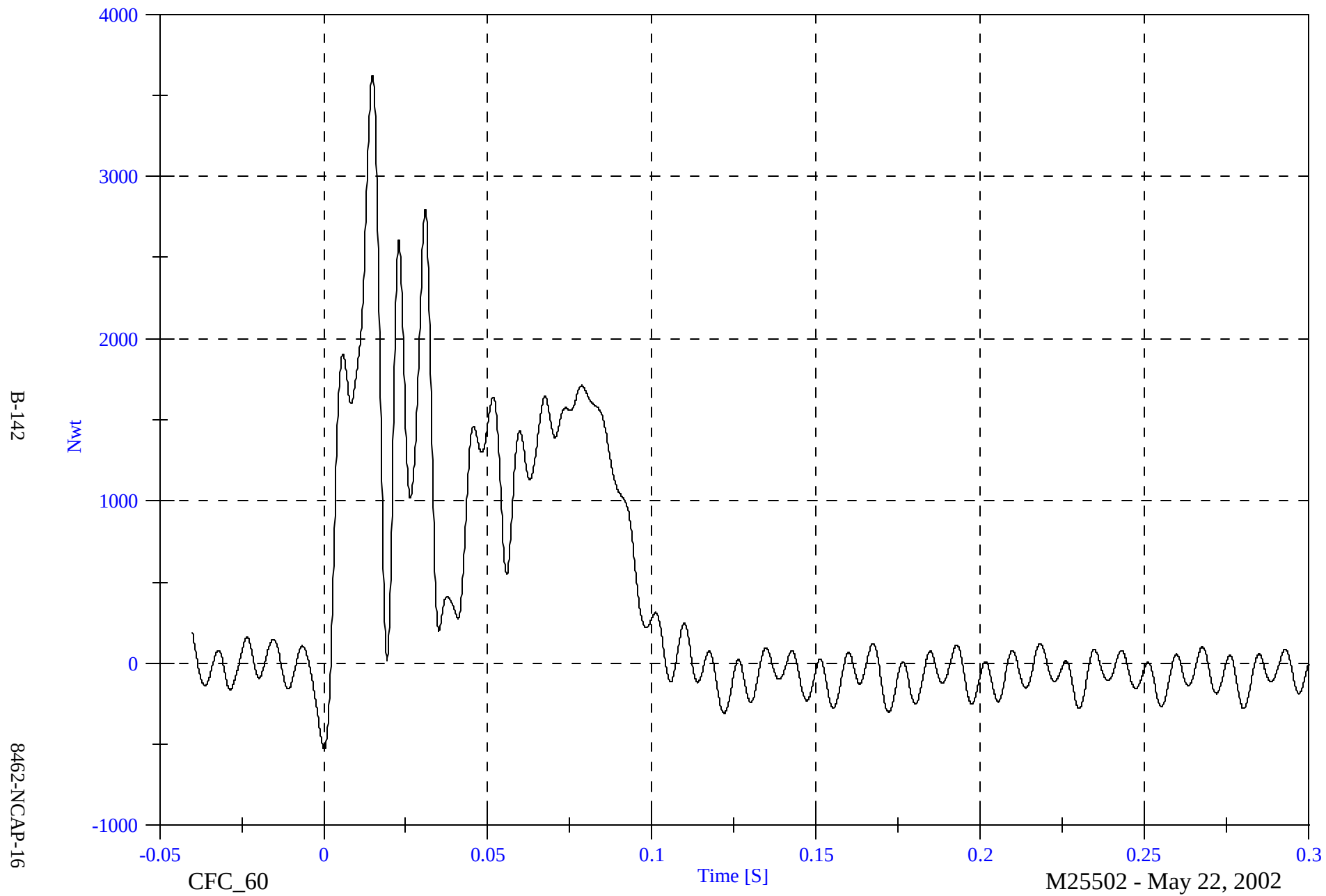
M25502 - May 22, 2002

NCAP TEST #16 2002 Subaru Legacy

BLC A6 Fx

Max: 3622.2 [Nwt] at 0.015 [S]

Min: -526.4 [Nwt] at 0.000 [S]



NCAP TEST #16 2002 Subaru Legacy

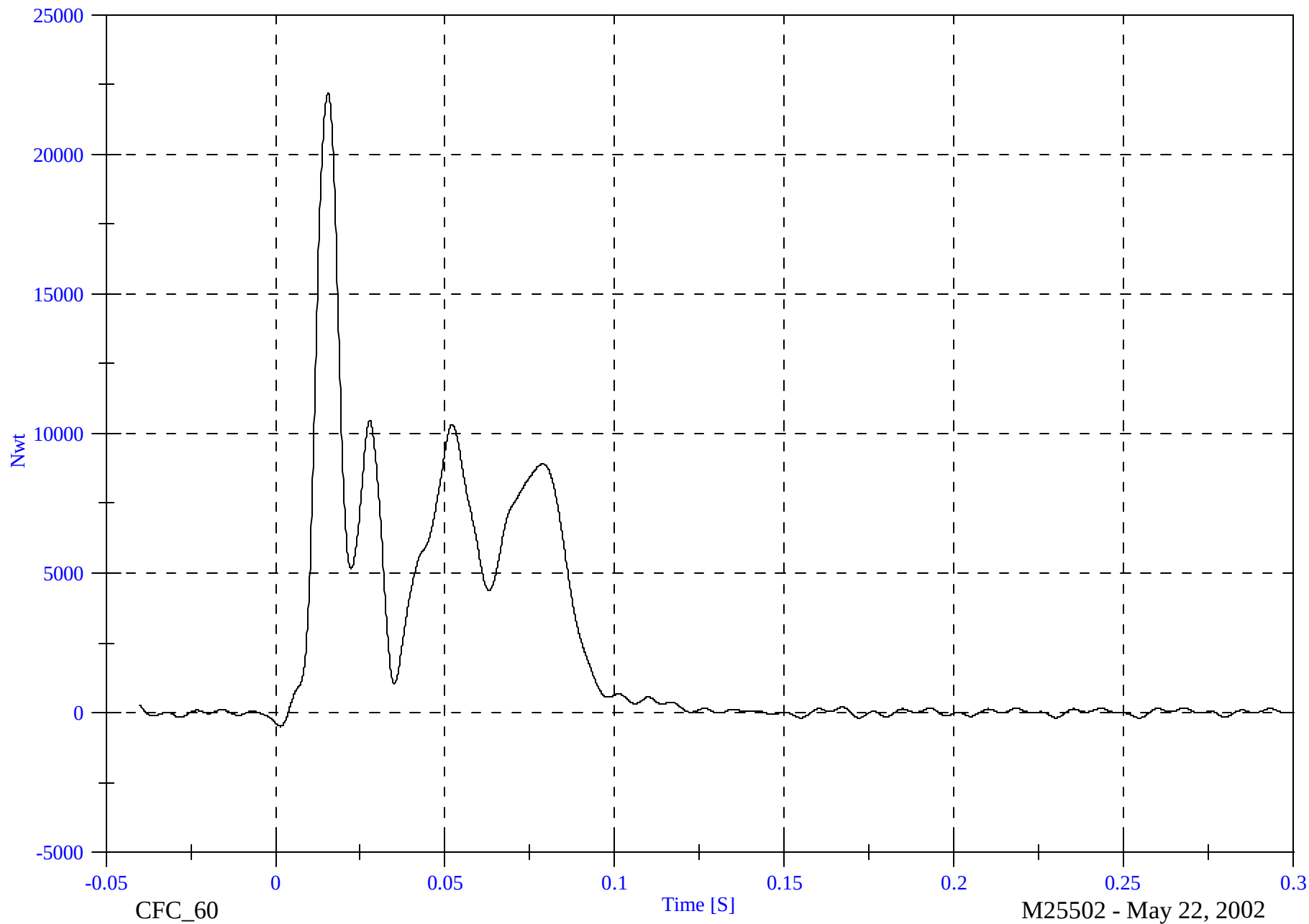
BLC A7 Fx

Max: 22187.1 [Nwt] at 0.015 [S]

Min: -477.2 [Nwt] at 0.001 [S]

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NCAP TEST #16 2002 Subaru Legacy

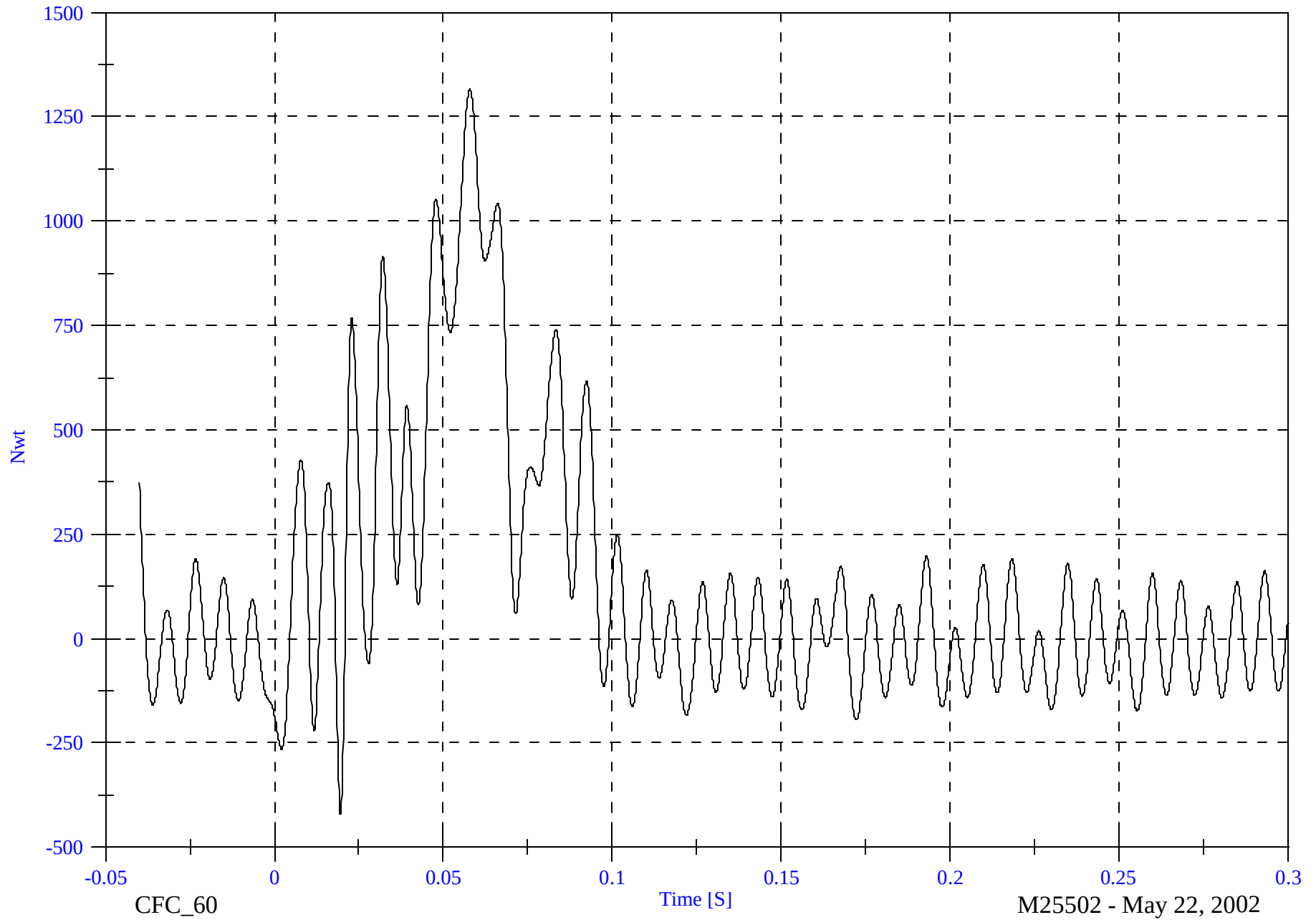
BLC A8 Fx

Max: 1316.1 [Nwt] at 0.058 [S]

Min: -421.4 [Nwt] at 0.020 [S]

B-144

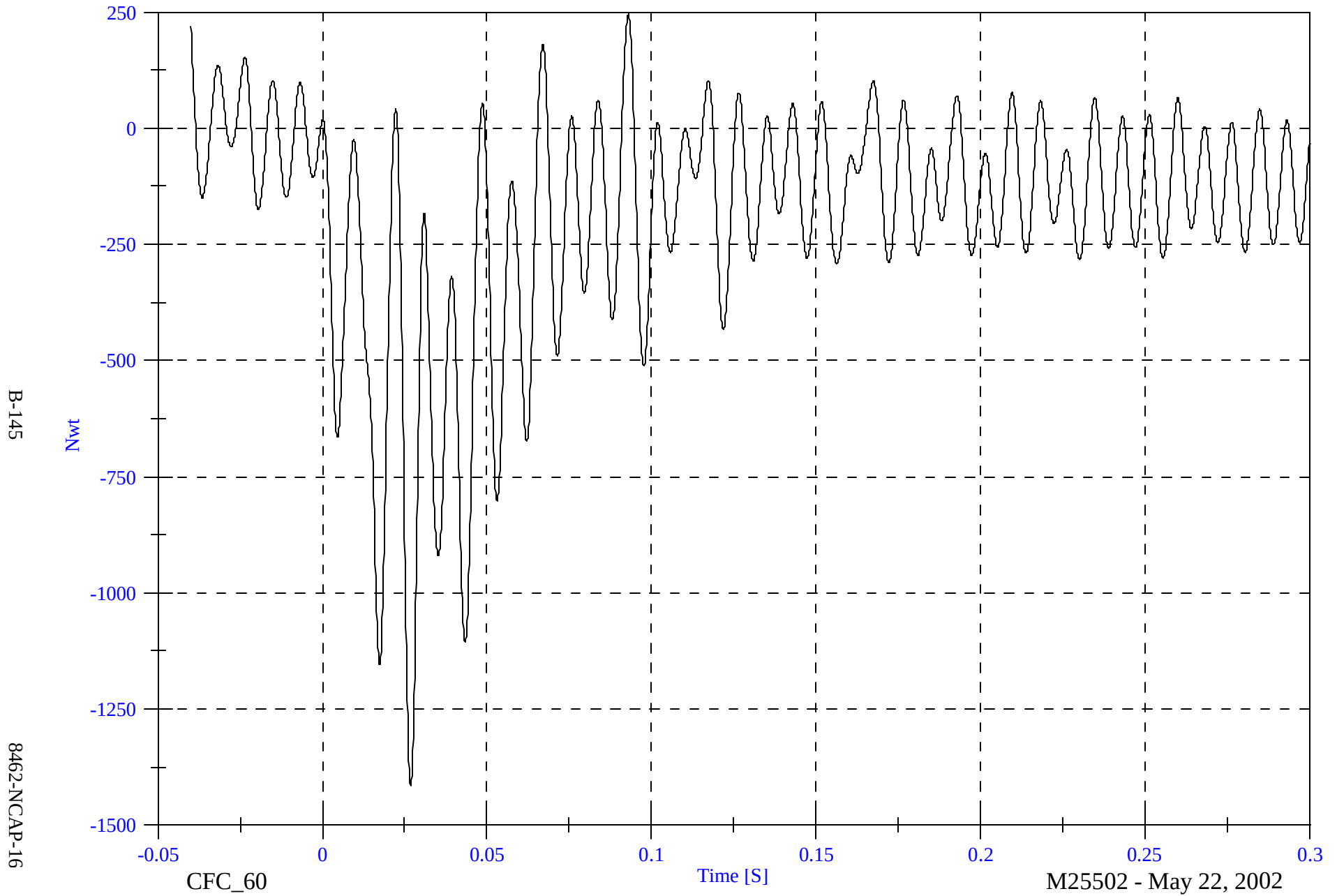
8462-NCAP-16



NCAP TEST #16 2002 Subaru Legacy

BLC A9 Fx

Max: 244.5 [Nwt] at 0.093 [S]
Min: -1413.9 [Nwt] at 0.027 [S]

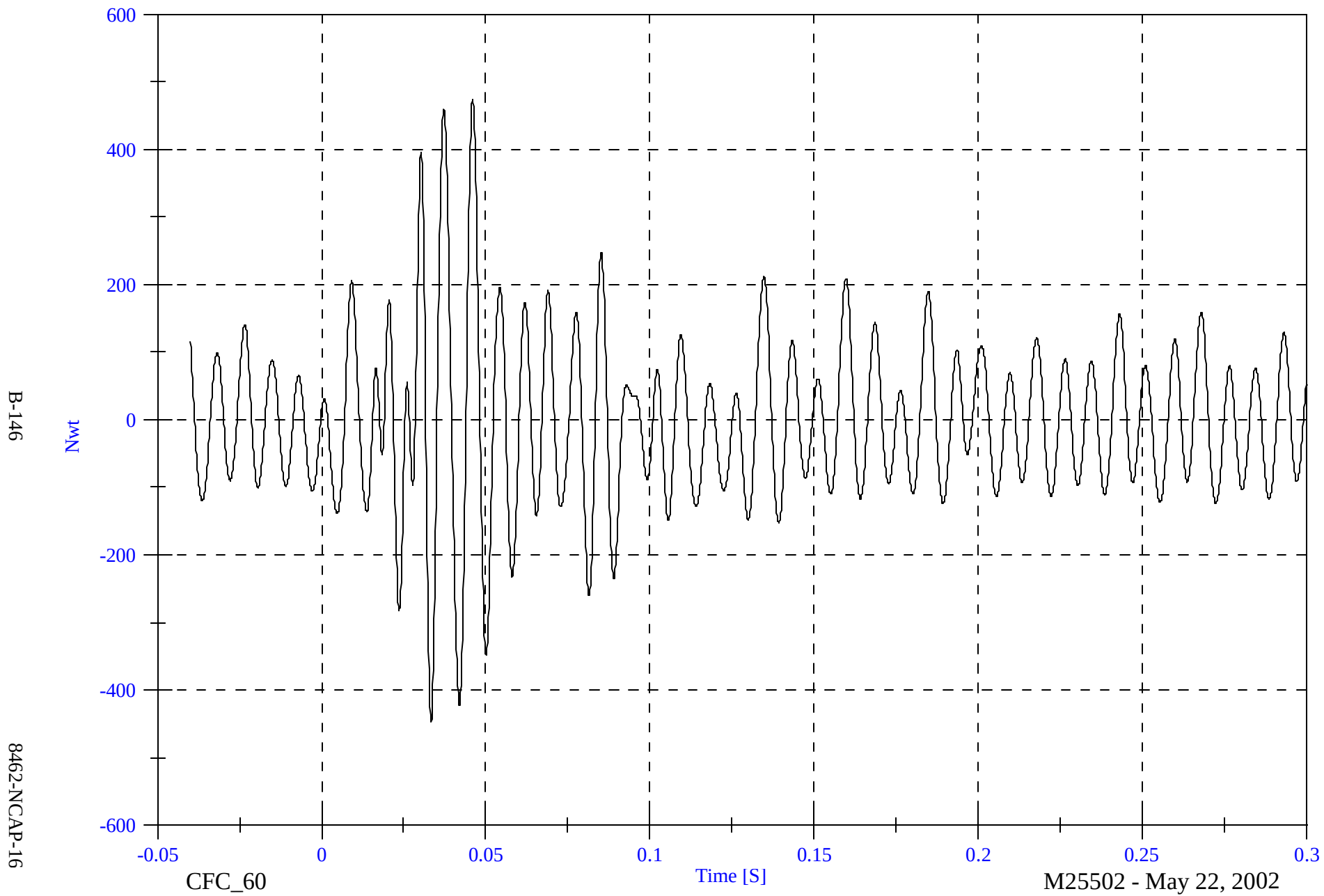


NCAP TEST #16 2002 Subaru Legacy

BLC B1 Fx

Max: 473.2 [Nwt] at 0.046 [S]

Min: -447.3 [Nwt] at 0.033 [S]

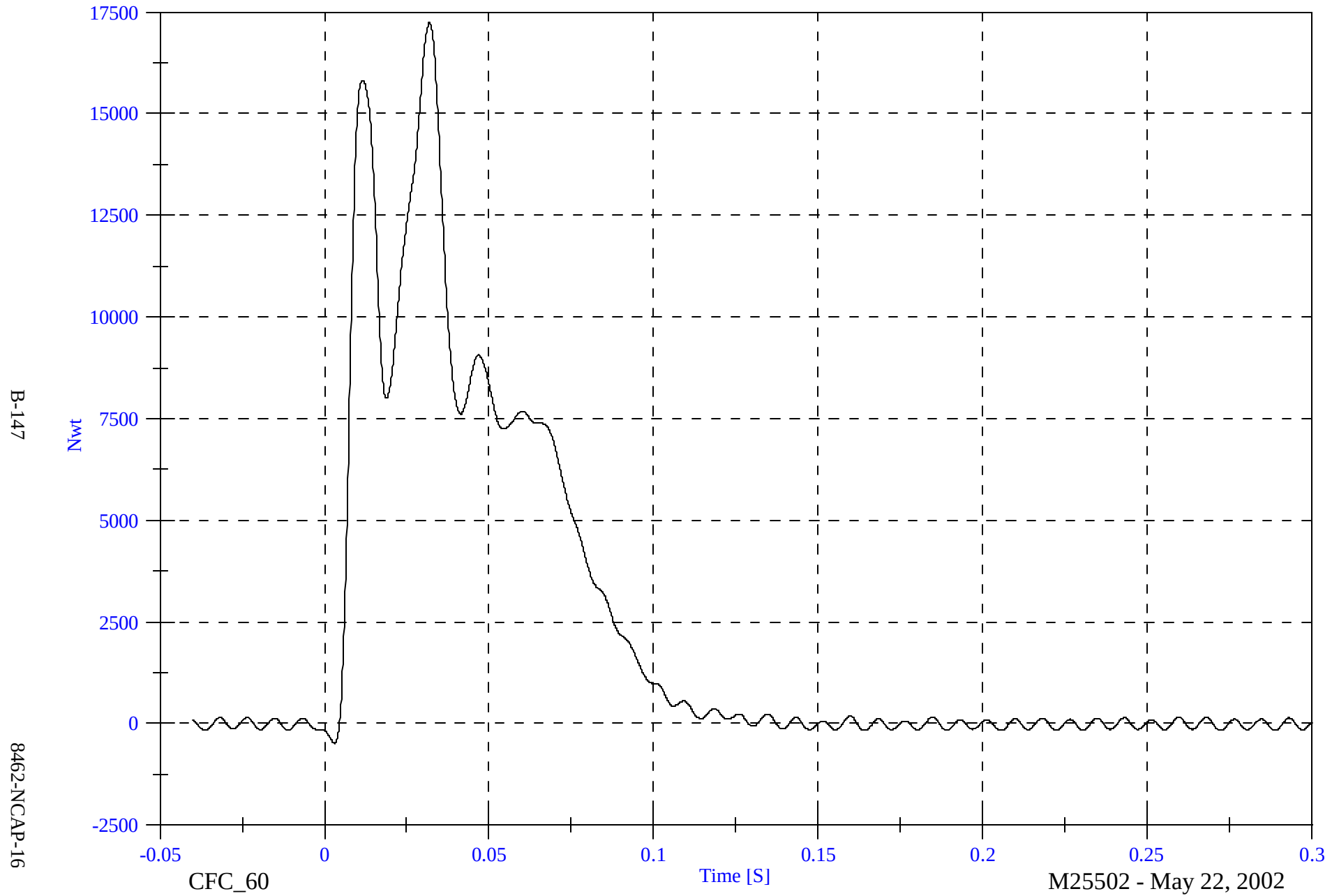


NCAP TEST #16 2002 Subaru Legacy

BLC B2 Fx

Max: 17238.3 [Nwt] at 0.032 [S]

Min: -482.6 [Nwt] at 0.003 [S]

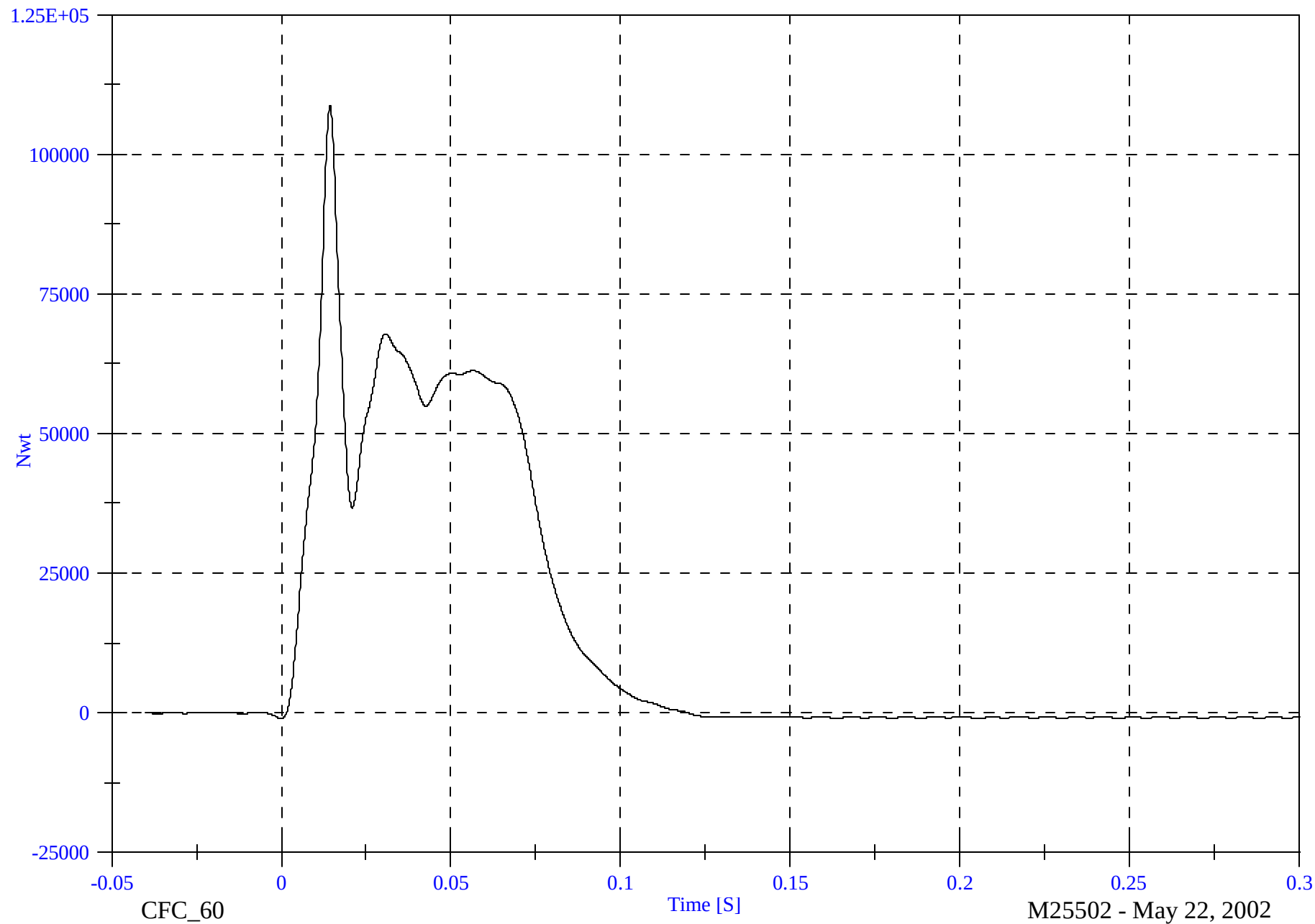


NCAP TEST #16 2002 Subaru Legacy

BLC B3 Fx

Max: 108753.5 [Nwt] at 0.014 [S]

Min: -1005.7 [Nwt] at -0.000 [S]



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CFC_60

Time [S]

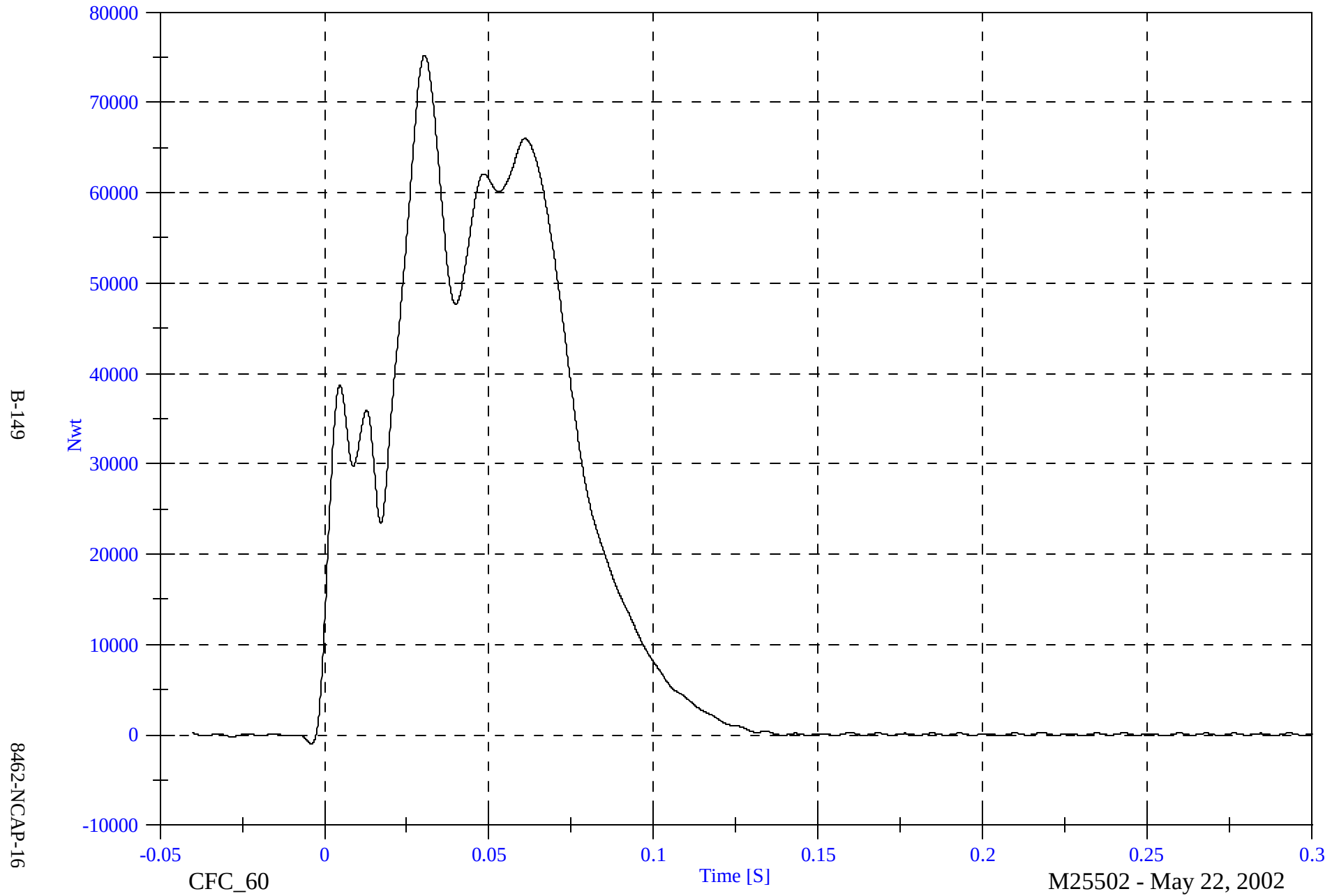
M25502 - May 22, 2002

NCAP TEST #16 2002 Subaru Legacy

BLC B4 Fx

Max: 75191.6 [Nwt] at 0.030 [S]

Min: -984.9 [Nwt] at -0.004 [S]

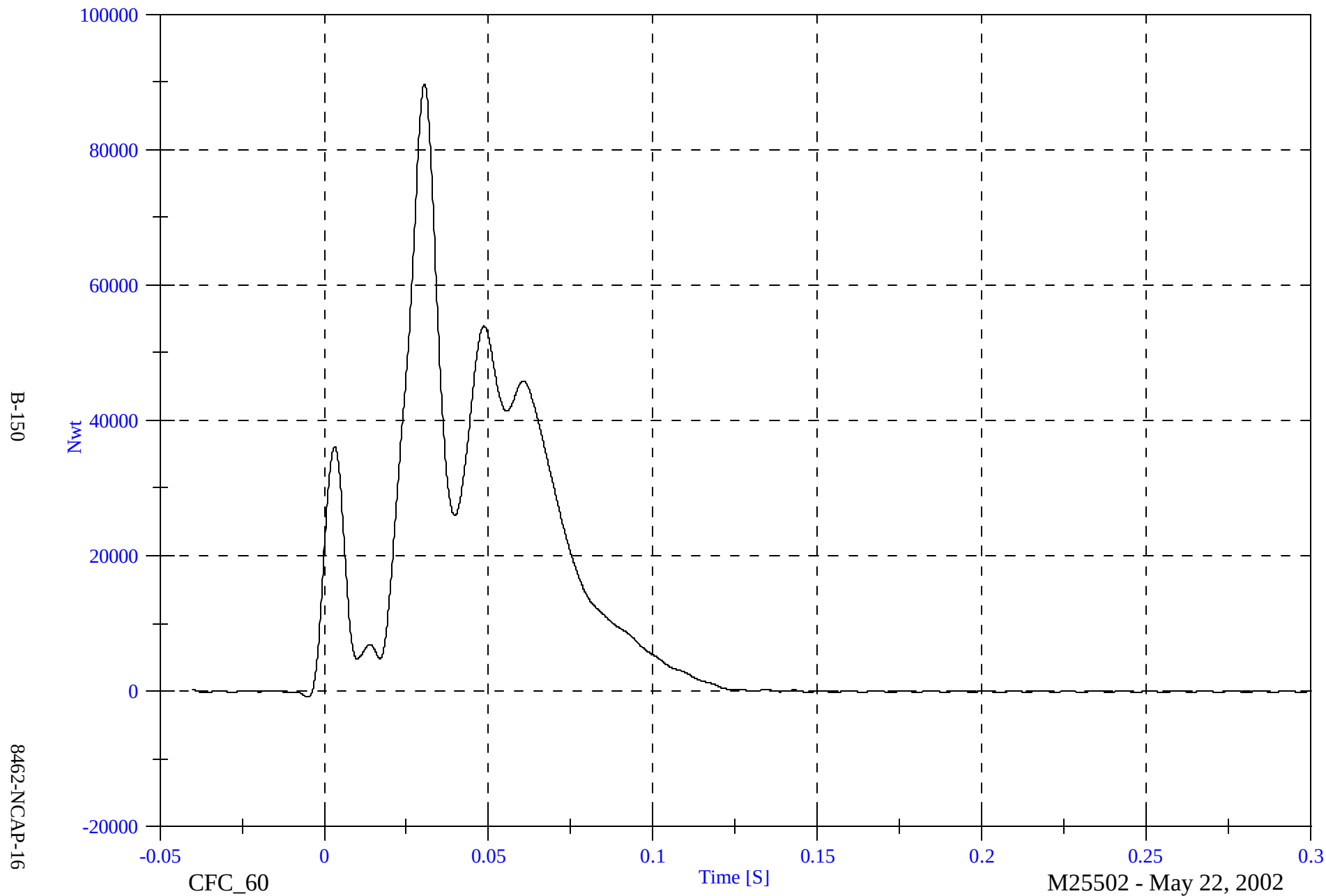


NCAP TEST #16 2002 Subaru Legacy

BLC B5 Fx

Max: 89705.2 [Nwt] at 0.030 [S]

Min: -875.7 [Nwt] at -0.005 [S]

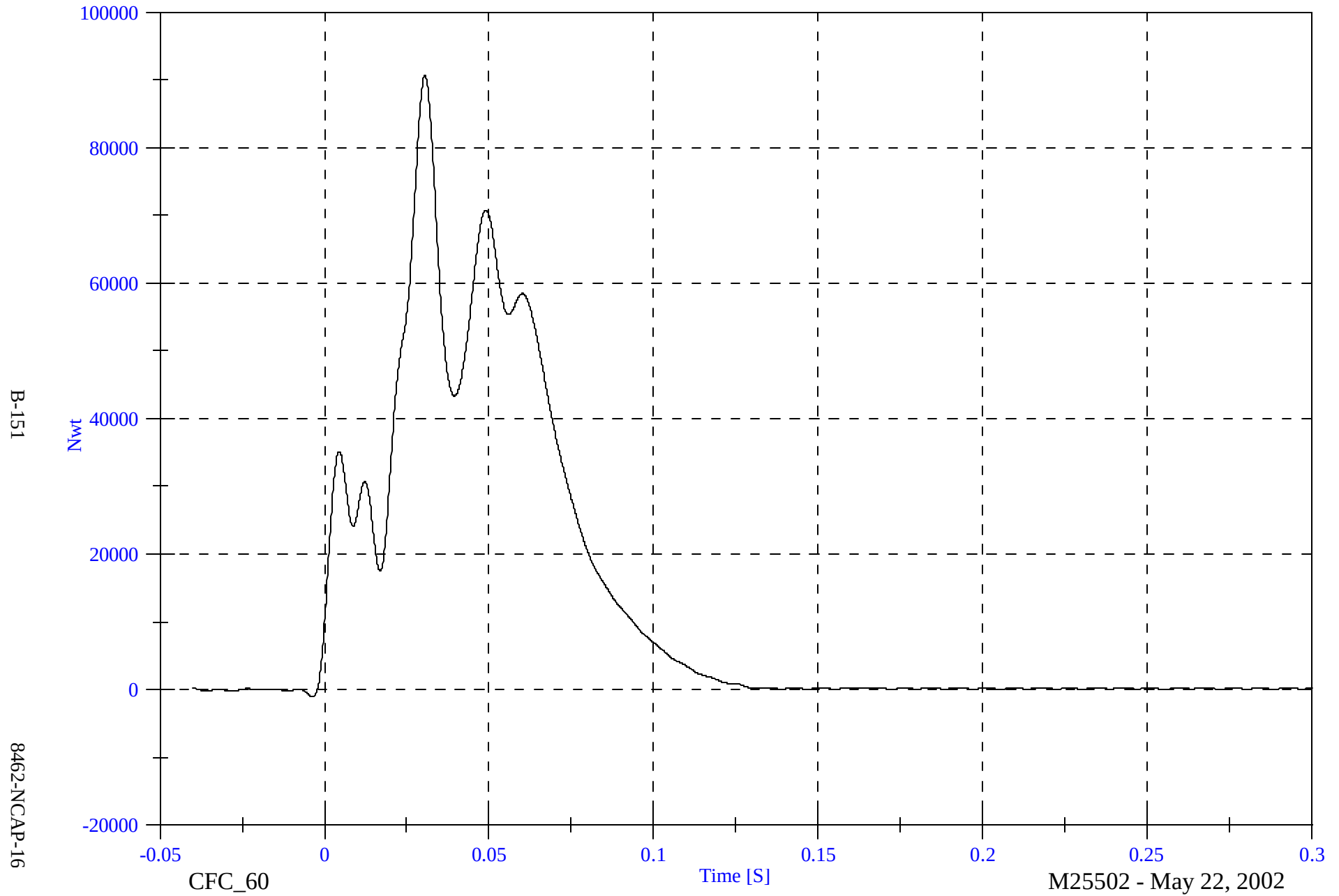


NCAP TEST #16 2002 Subaru Legacy

BLC B6 Fx

Max: 90621.7 [Nwt] at 0.030 [S]

Min: -1059.2 [Nwt] at -0.004 [S]

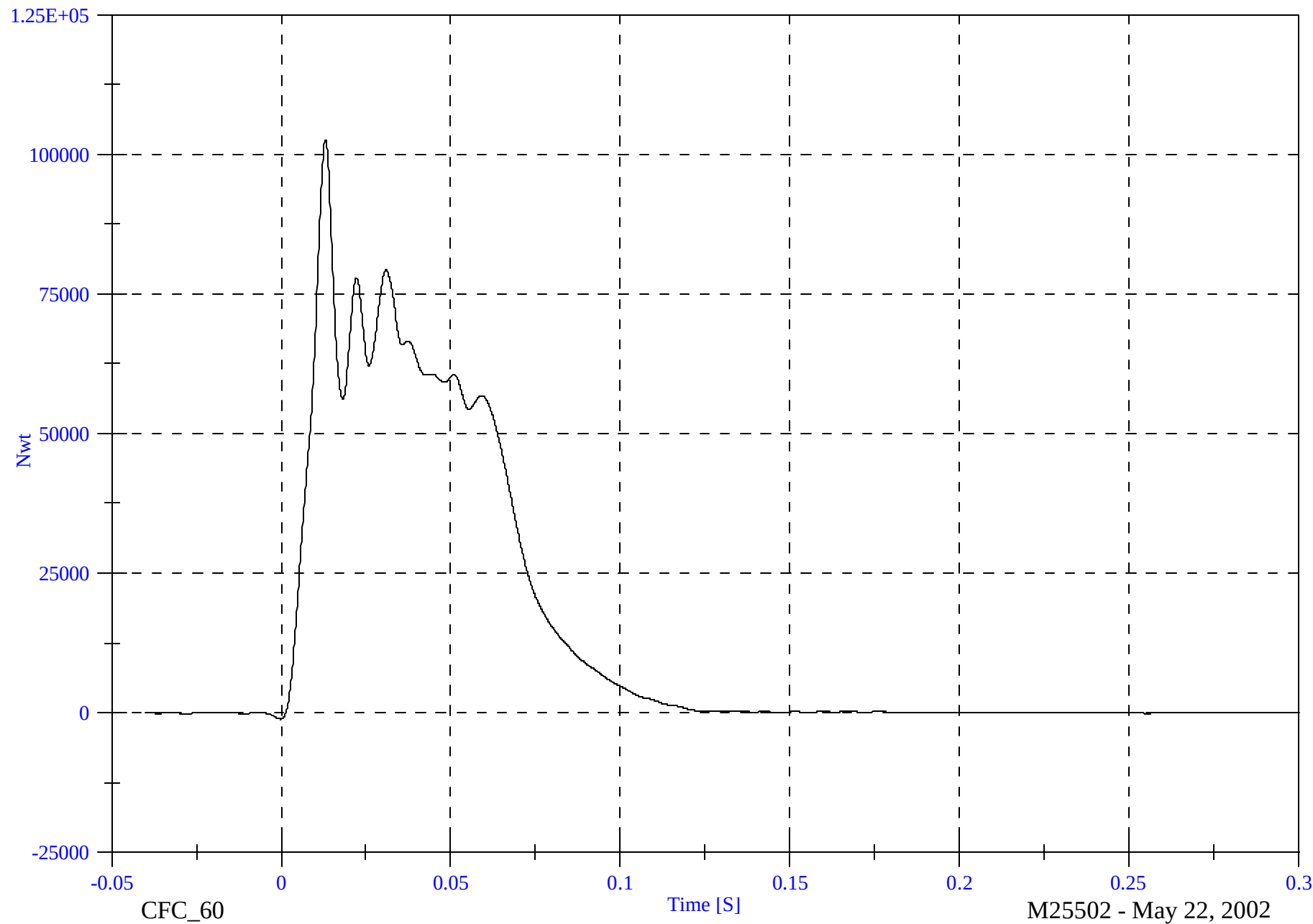


NCAP TEST #16 2002 Subaru Legacy

BLC B7 Fx

Max: 102590.6 [Nwt] at 0.013 [S]

Min: -1122.0 [Nwt] at -0.000 [S]



B-152

8462-NCAP-16

CFC_60

Time [S]

M25502 - May 22, 2002

NCAP TEST #16 2002 Subaru Legacy

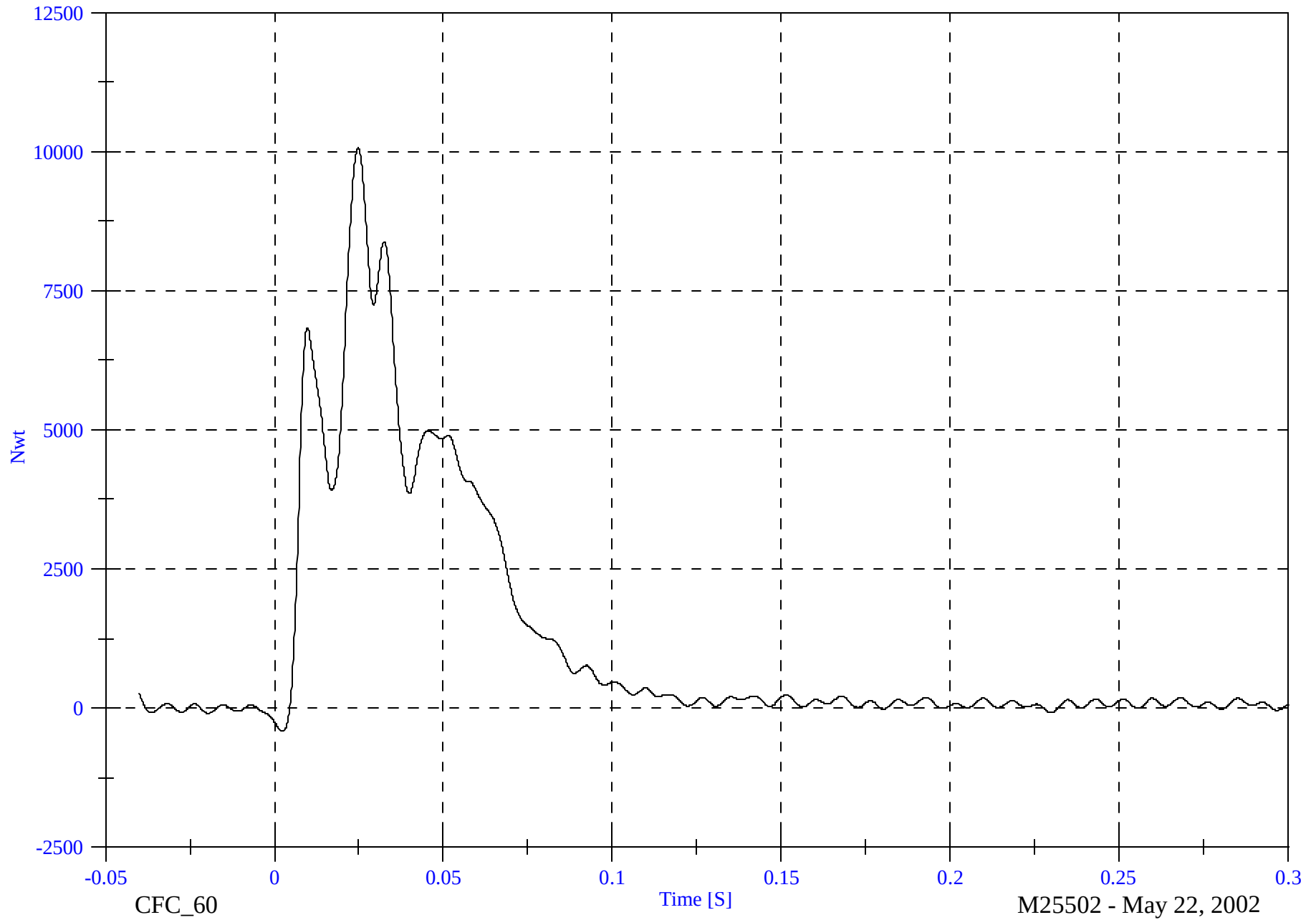
BLC B8 Fx

Max: 10062.9 [Nwt] at 0.025 [S]

Min: -417.2 [Nwt] at 0.002 [S]

B-153

8462-NCAP-16



NCAP TEST #16 2002 Subaru Legacy

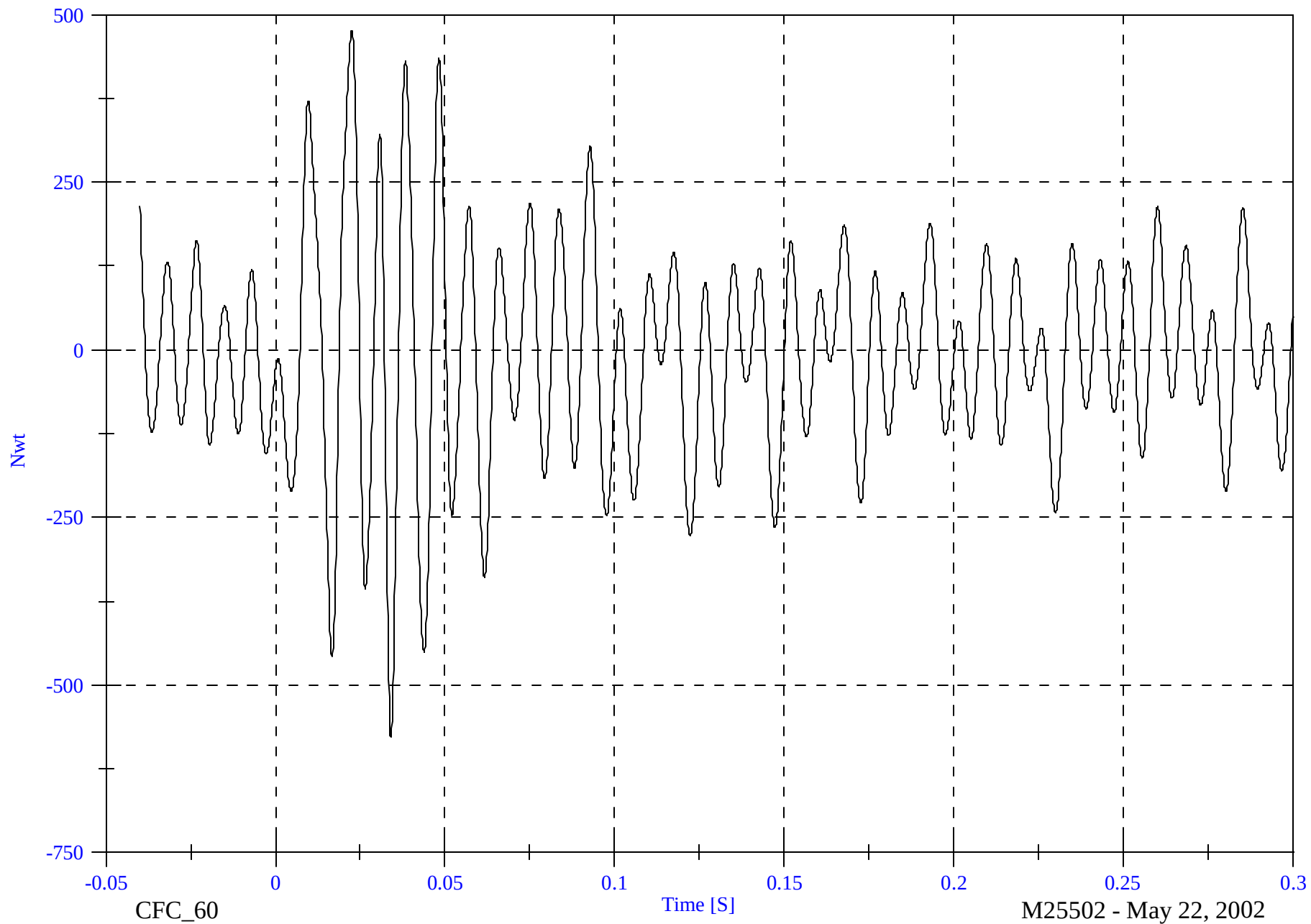
BLC B9 Fx

Max: 475.4 [Nwt] at 0.022 [S]

Min: -578.3 [Nwt] at 0.034 [S]

B-154

8462-NCAP-16

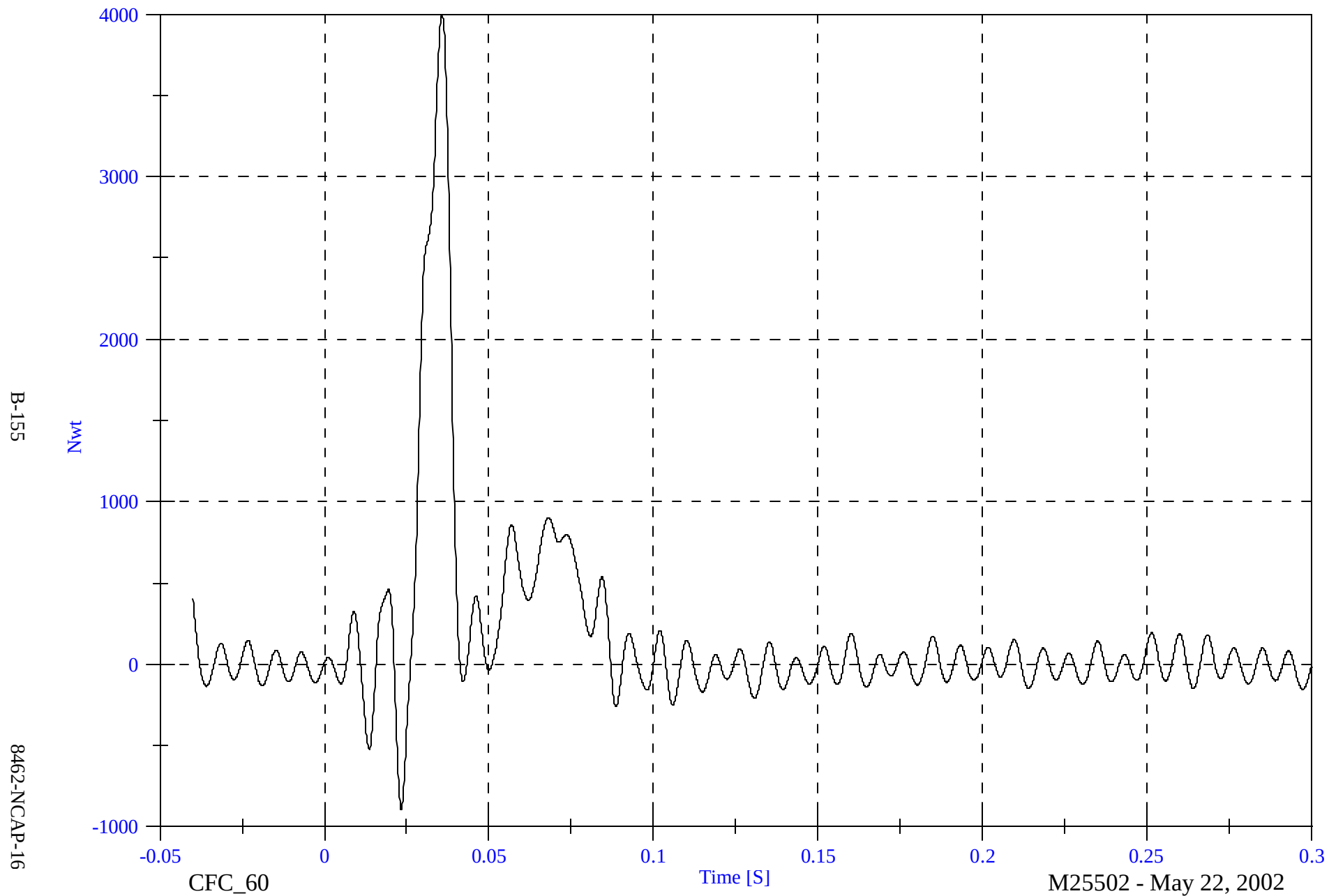


NCAP TEST #16 2002 Subaru Legacy

Max: 3990.7 [Nwt] at 0.036 [S]

Min: -895.0 [Nwt] at 0.023 [S]

BLC C1 Fx

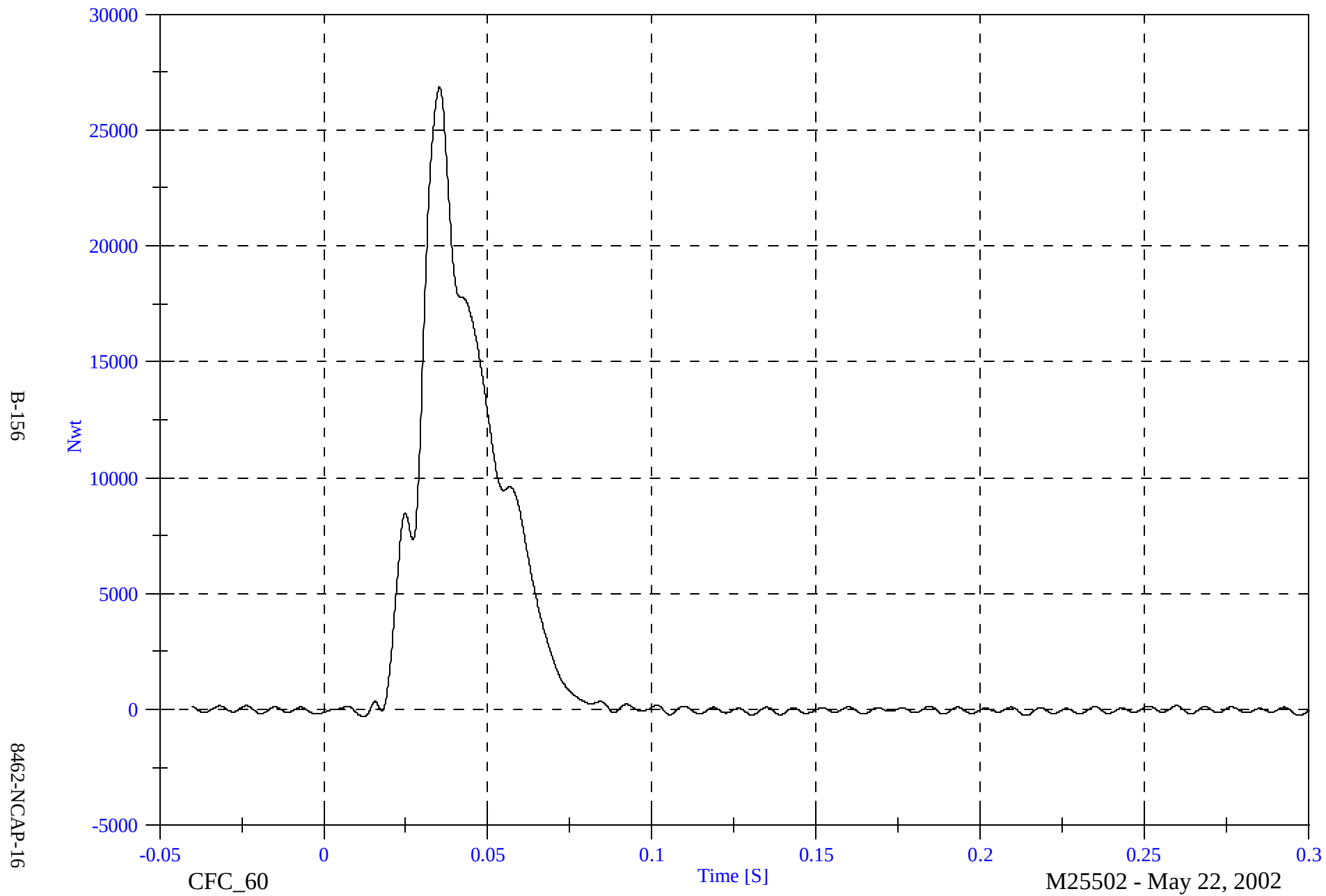


NCAP TEST #16 2002 Subaru Legacy

BLC C2 Fx

Max: 26872.2 [Nwt] at 0.035 [S]

Min: -319.0 [Nwt] at 0.012 [S]

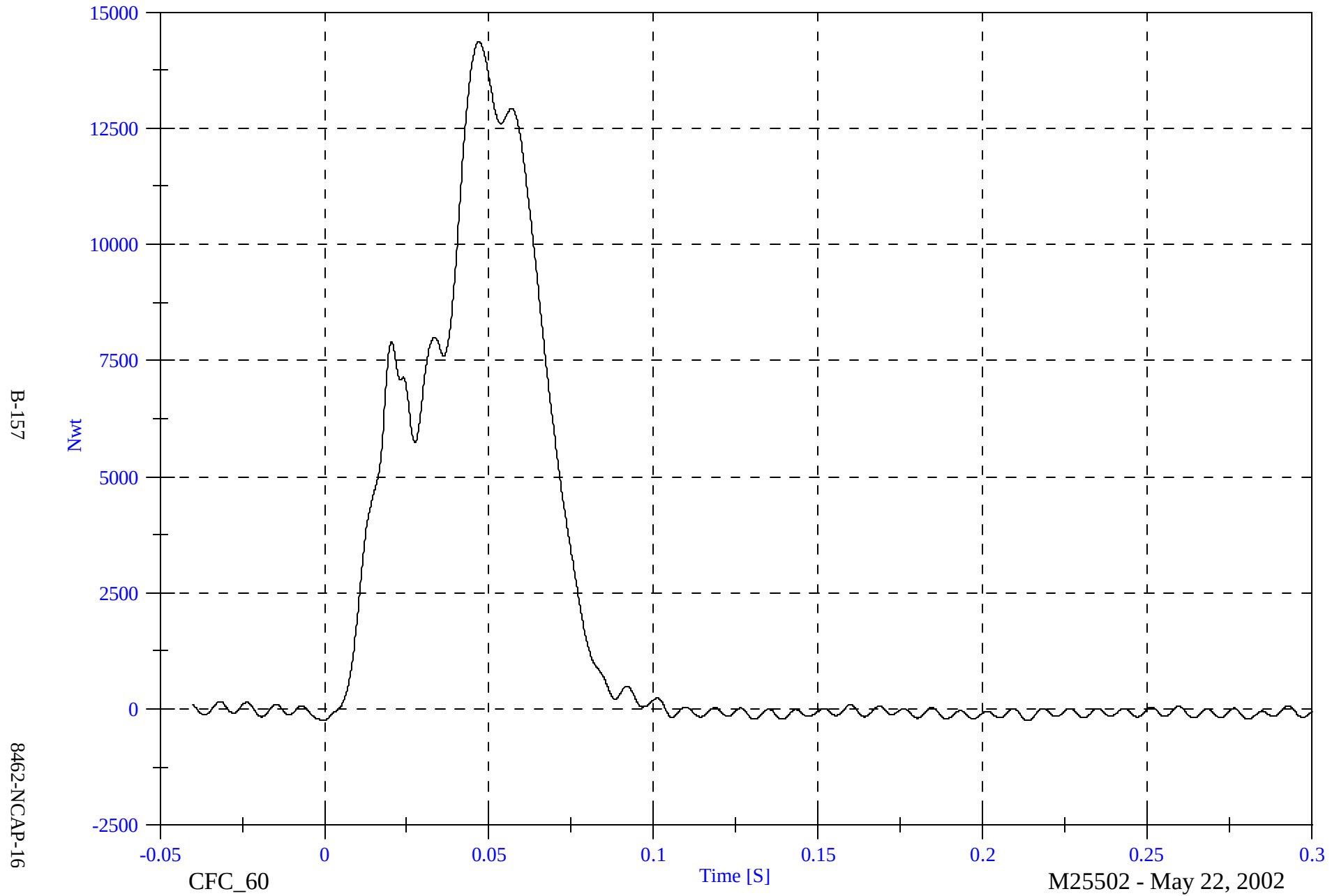


NCAP TEST #16 2002 Subaru Legacy

BLC C3 Fx

Max: 14365.5 [Nwt] at 0.047 [S]

Min: -246.8 [Nwt] at 0.214 [S]

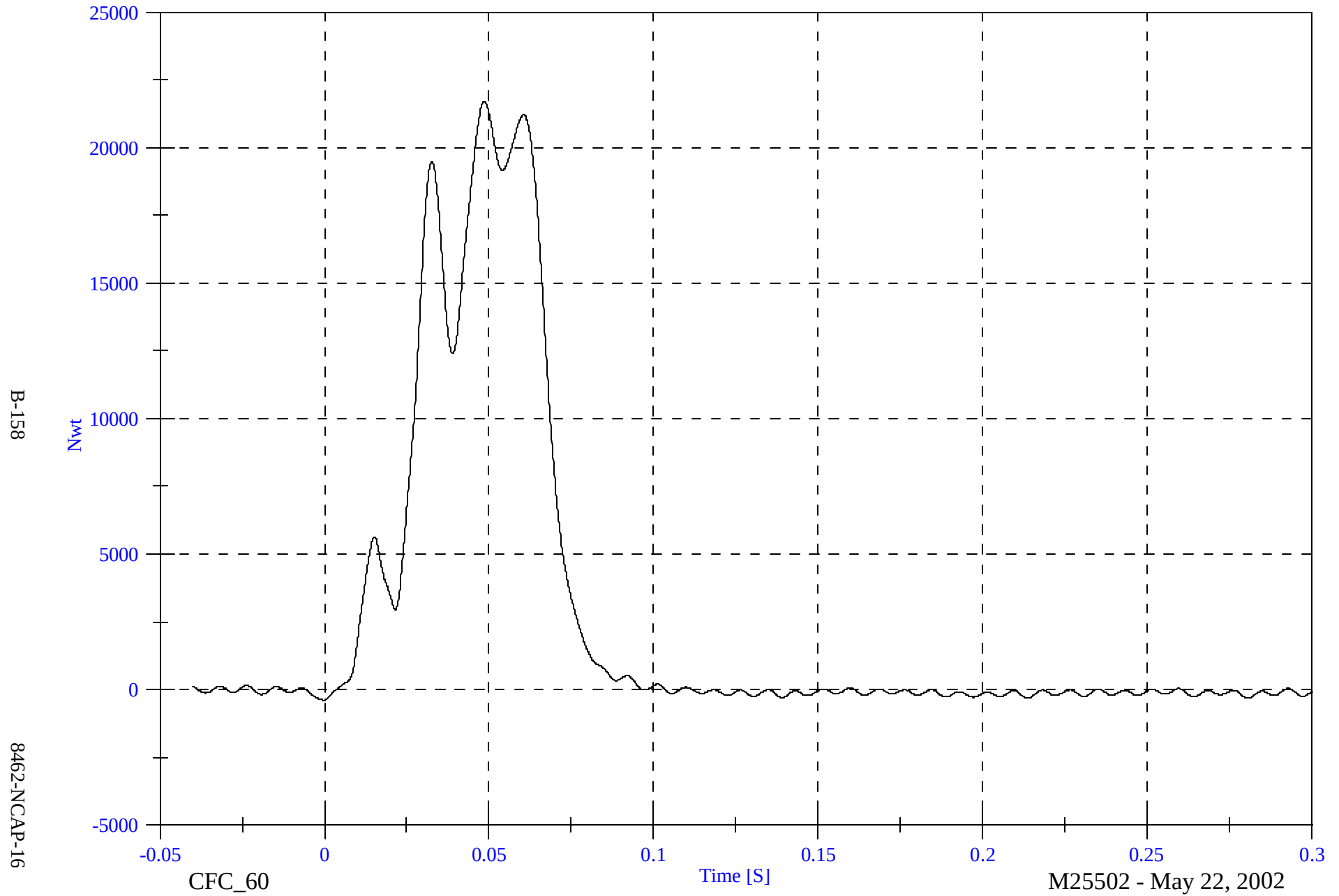


NCAP TEST #16 2002 Subaru Legacy

BLC C4 Fx

Max: 21686.3 [Nwt] at 0.049 [S]

Min: -379.1 [Nwt] at -0.000 [S]



NCAP TEST #16 2002 Subaru Legacy

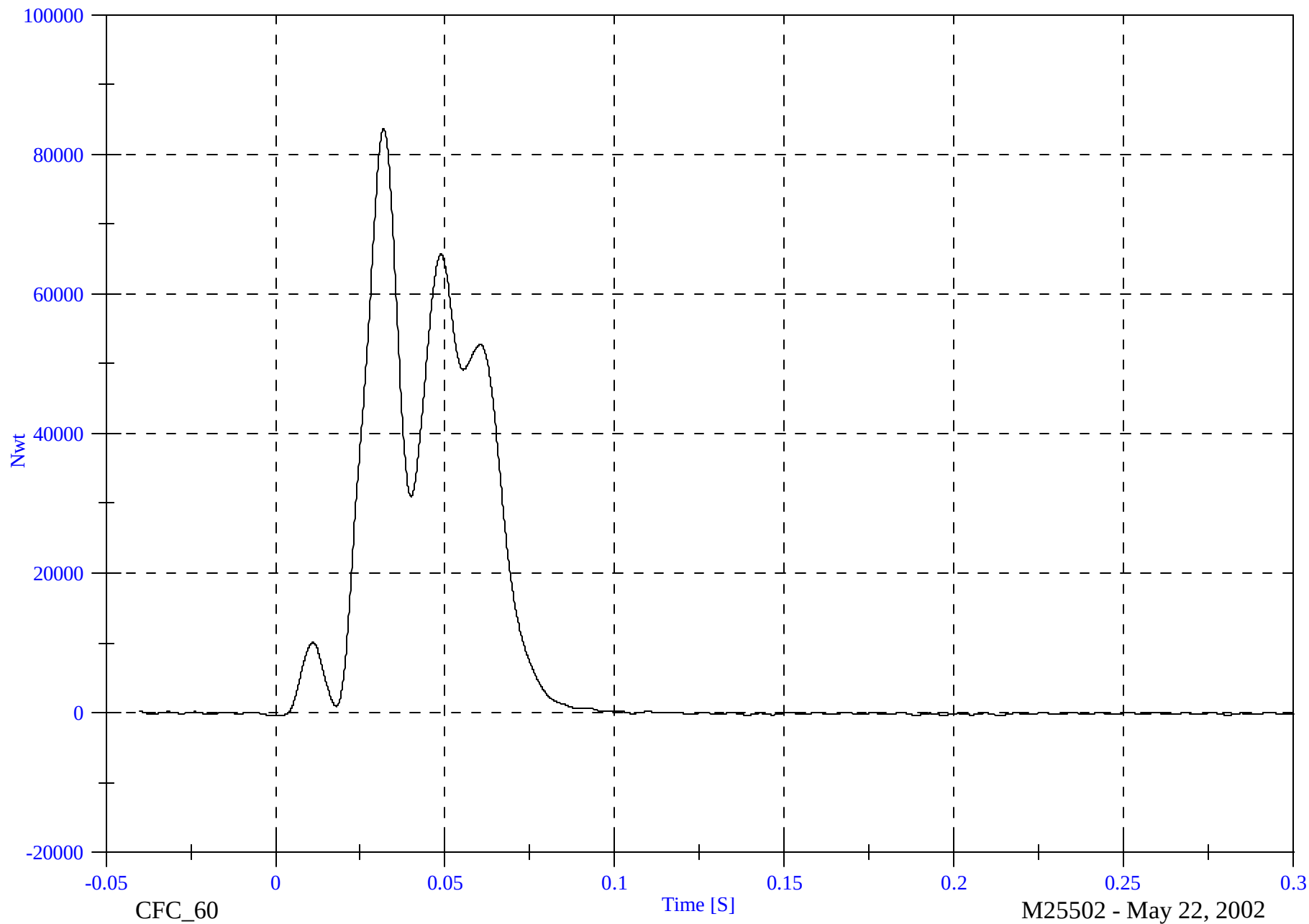
BLC C5 Fx

Max: 83737.5 [Nwt] at 0.032 [S]

Min: -471.4 [Nwt] at 0.001 [S]

B-159

8462-NCAP-16

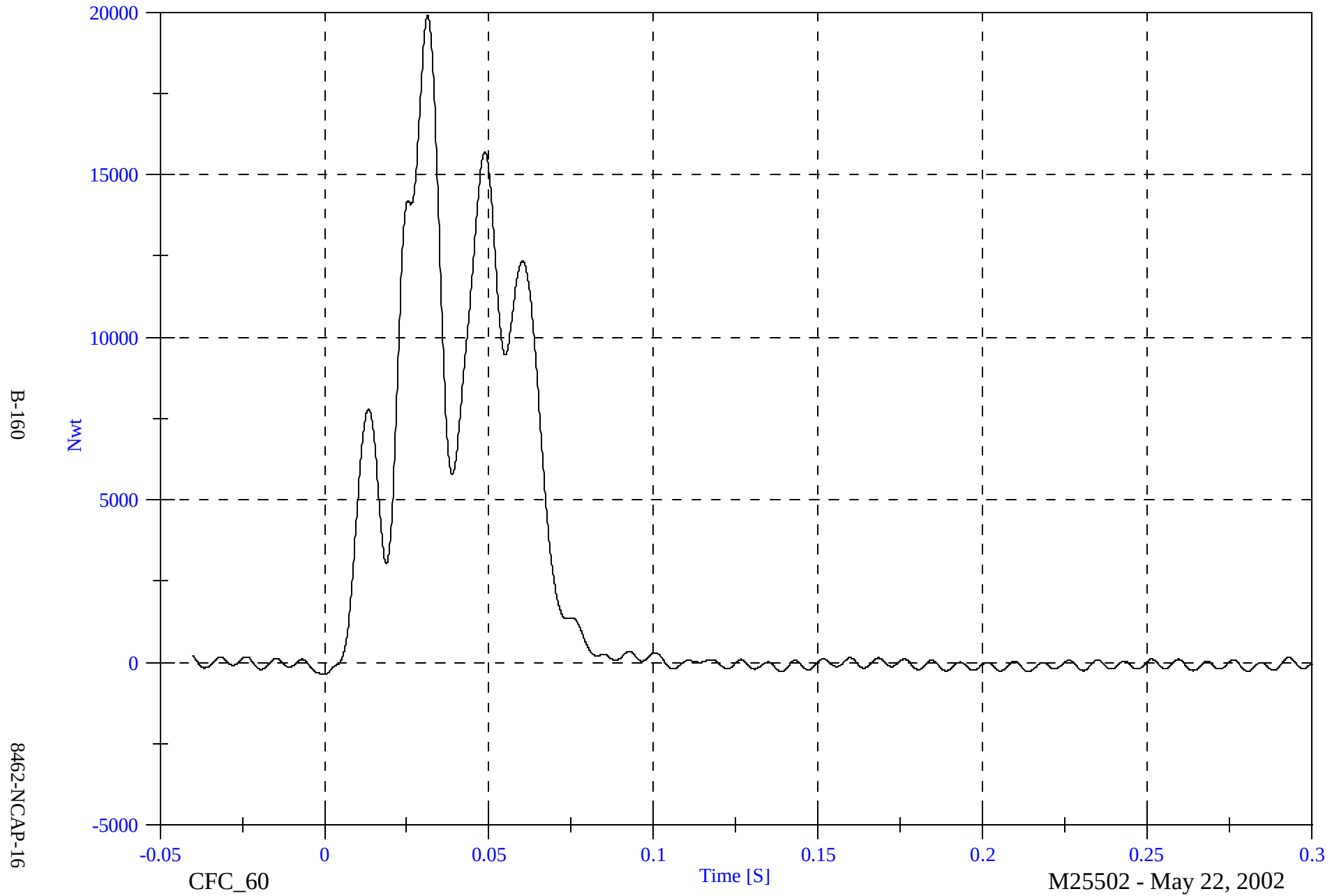


NCAP TEST #16 2002 Subaru Legacy

BLC C6 Fx

Max: 19897.6 [Nwt] at 0.031 [S]

Min: -359.5 [Nwt] at -0.000 [S]



NCAP TEST #16 2002 Subaru Legacy

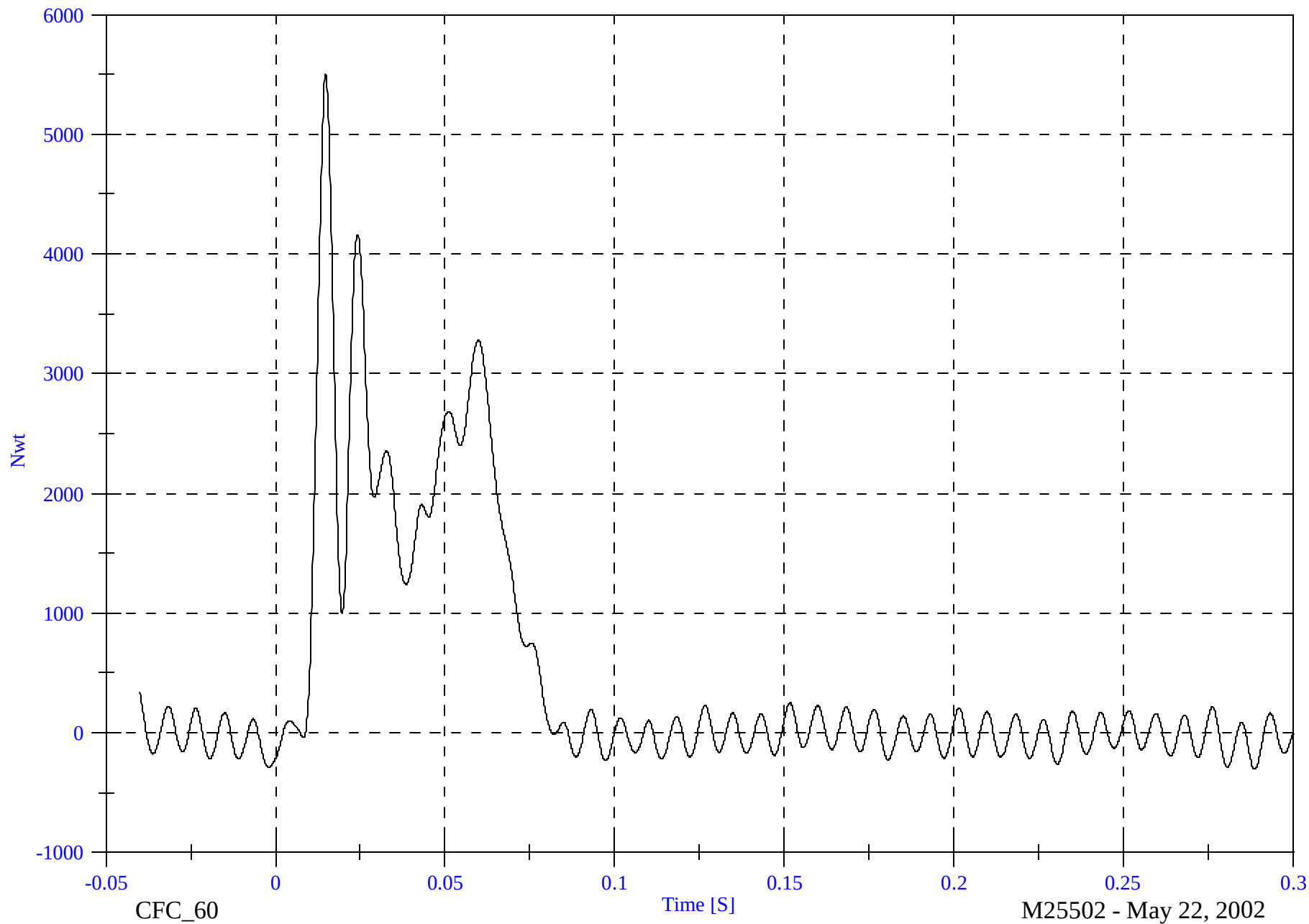
BLC C7 Fx

Max: 5499.6 [Nwt] at 0.015 [S]

Min: -374.4 [Nwt] at 0.305 [S]

B-161

8462-NCAP-16



NCAP TEST #16 2002 Subaru Legacy

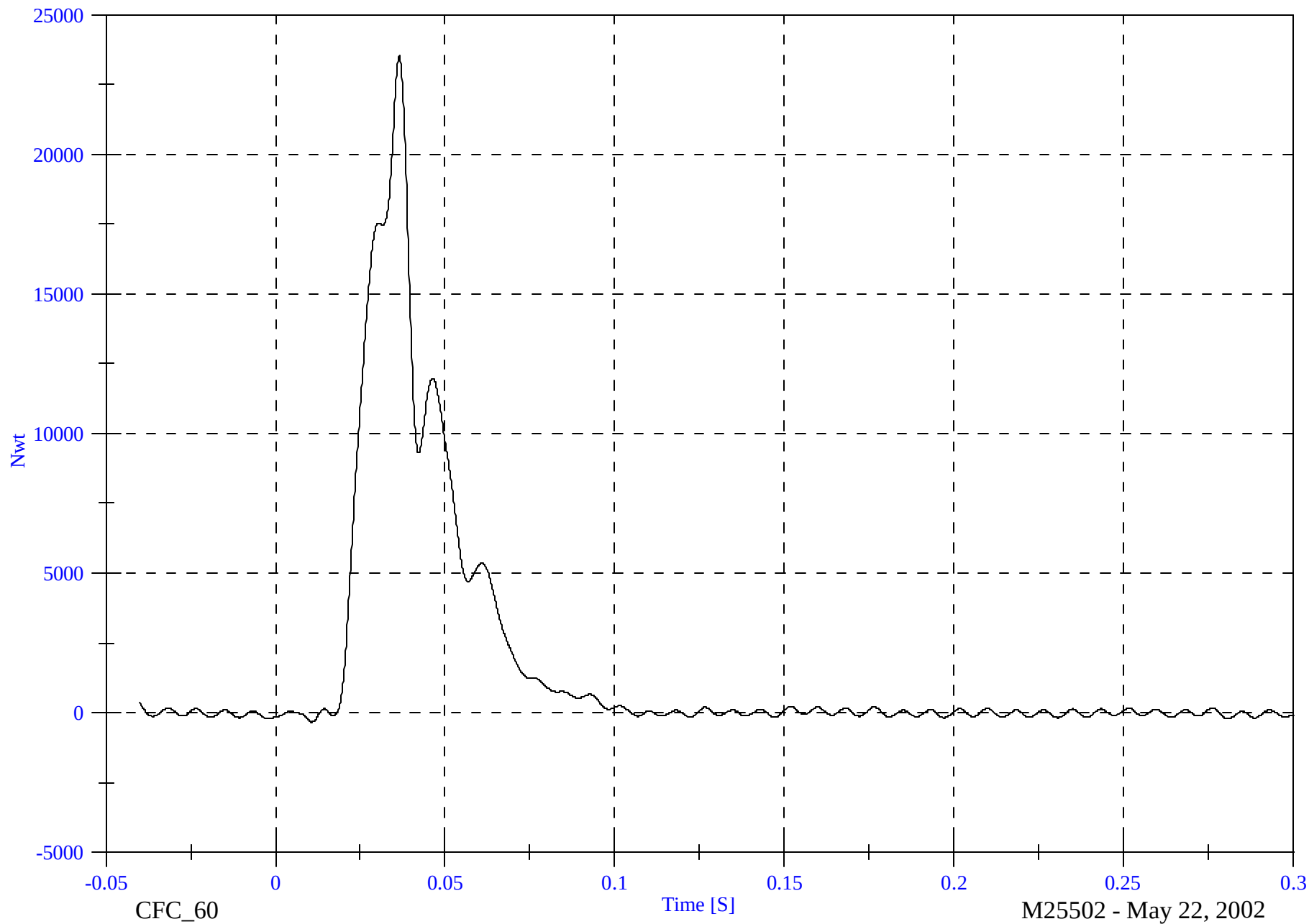
BLC C8 Fx

Max: 23520.3 [Nwt] at 0.036 [S]

Min: -328.6 [Nwt] at 0.011 [S]

B-162

8462-NCAP-16



NCAP TEST #16 2002 Subaru Legacy

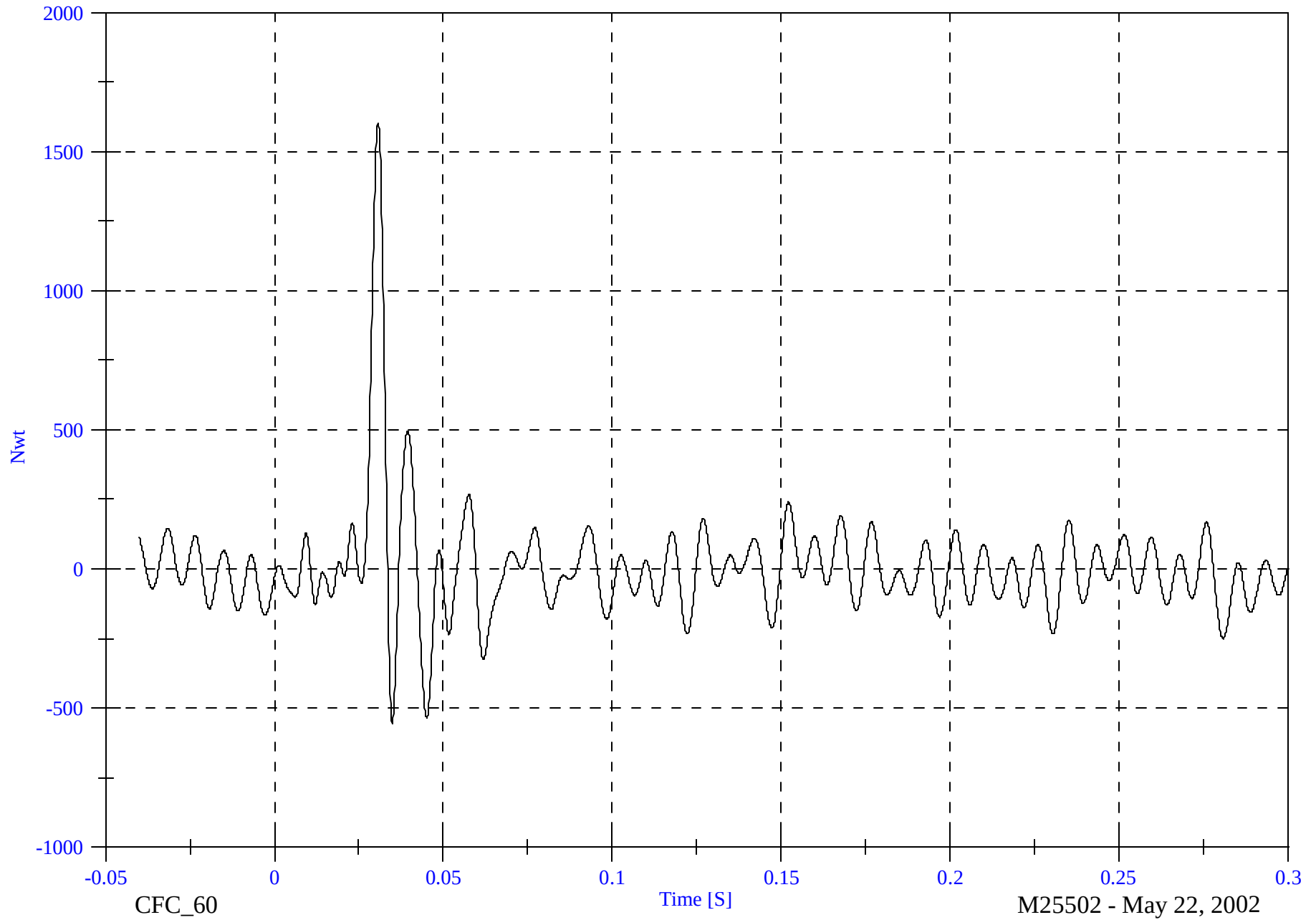
BLC C9 Fx

Max: 1602.7 [Nwt] at 0.031 [S]

Min: -556.9 [Nwt] at 0.035 [S]

B-163

8462-NCAP-16

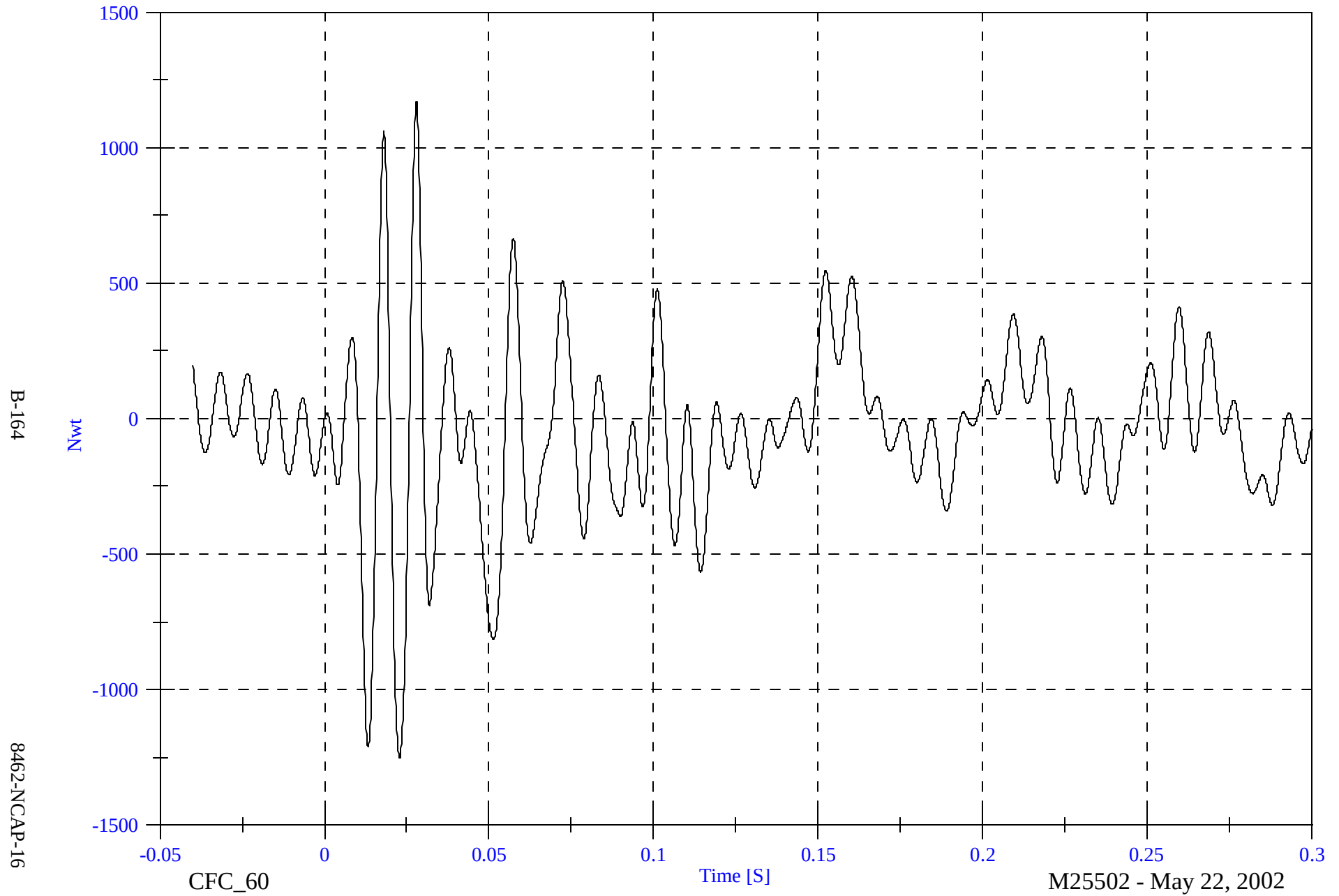


NCAP TEST #16 2002 Subaru Legacy

BLC D1 Fx

Max: 1170.7 [Nwt] at 0.028 [S]

Min: -1251.4 [Nwt] at 0.023 [S]



NCAP TEST #16 2002 Subaru Legacy

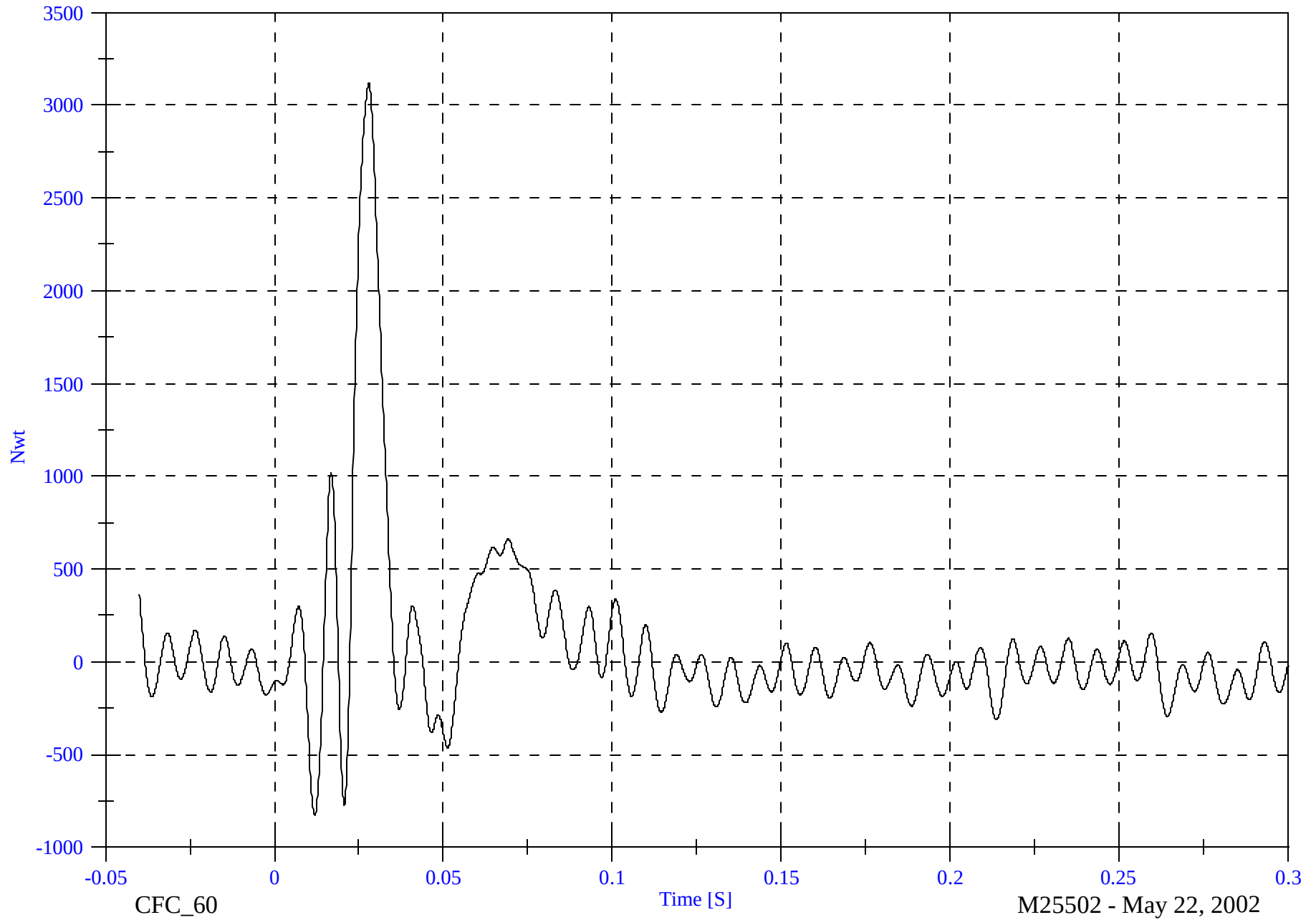
BLC D2 Fx

Max: 3117.5 [Nwt] at 0.028 [S]

Min: -824.7 [Nwt] at 0.012 [S]

B-165

8462-NCAP-16



NCAP TEST #16 2002 Subaru Legacy

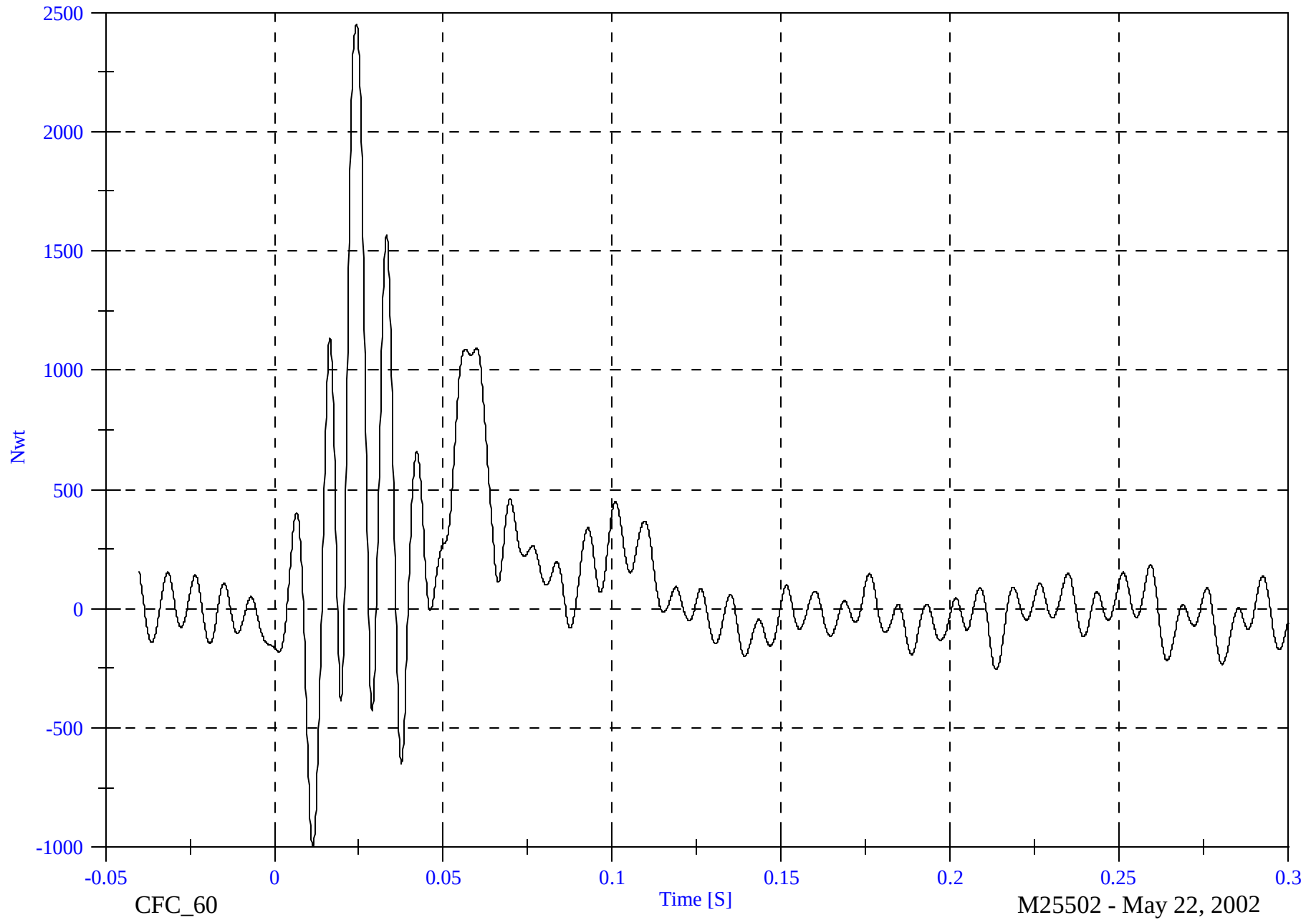
BLC D3 Fx

Max: 2450.5 [Nwt] at 0.024 [S]

Min: -992.9 [Nwt] at 0.011 [S]

B-166

8462-NCAP-16

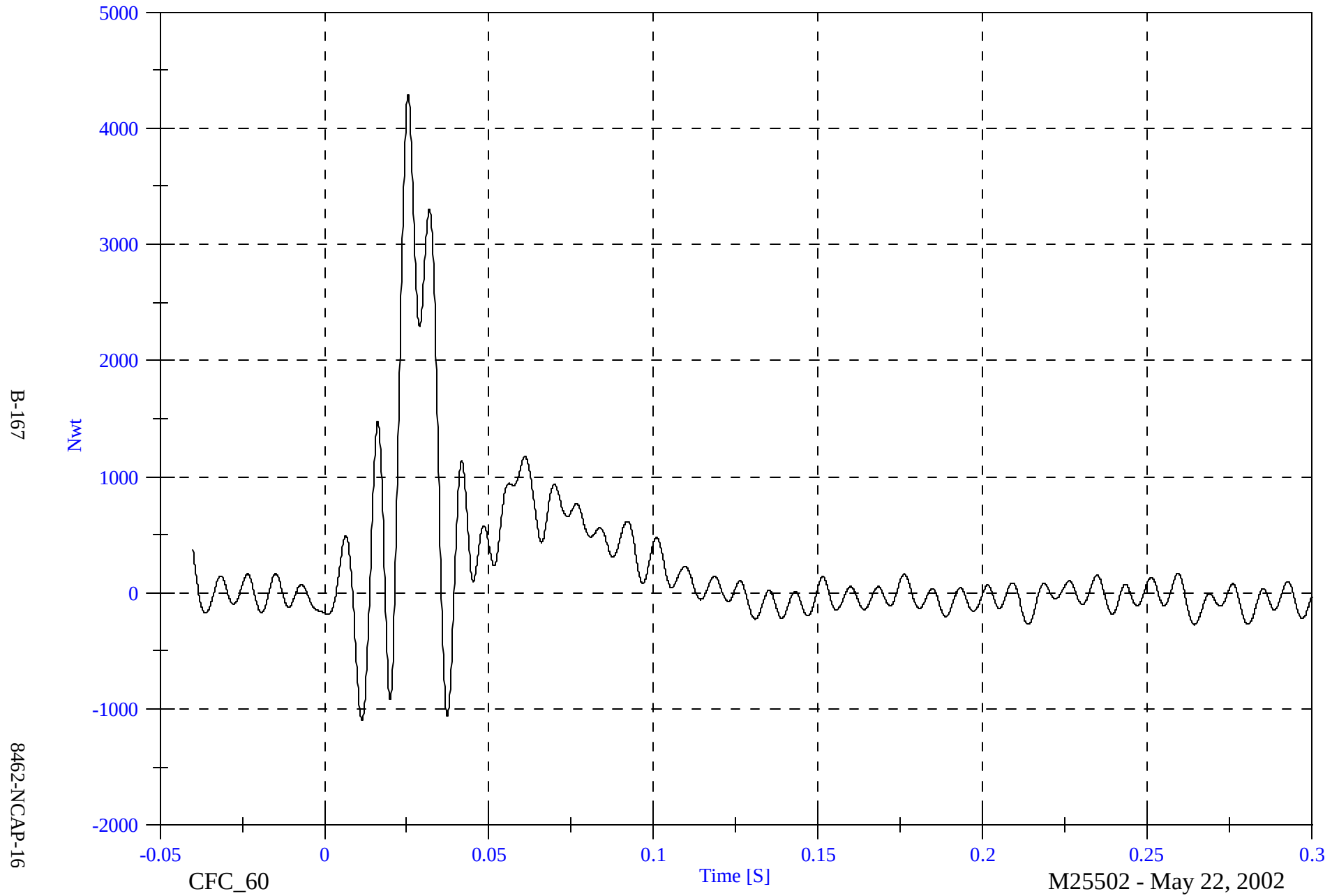


NCAP TEST #16 2002 Subaru Legacy

BLC D4 Fx

Max: 4284.7 [Nwt] at 0.025 [S]

Min: -1095.2 [Nwt] at 0.011 [S]

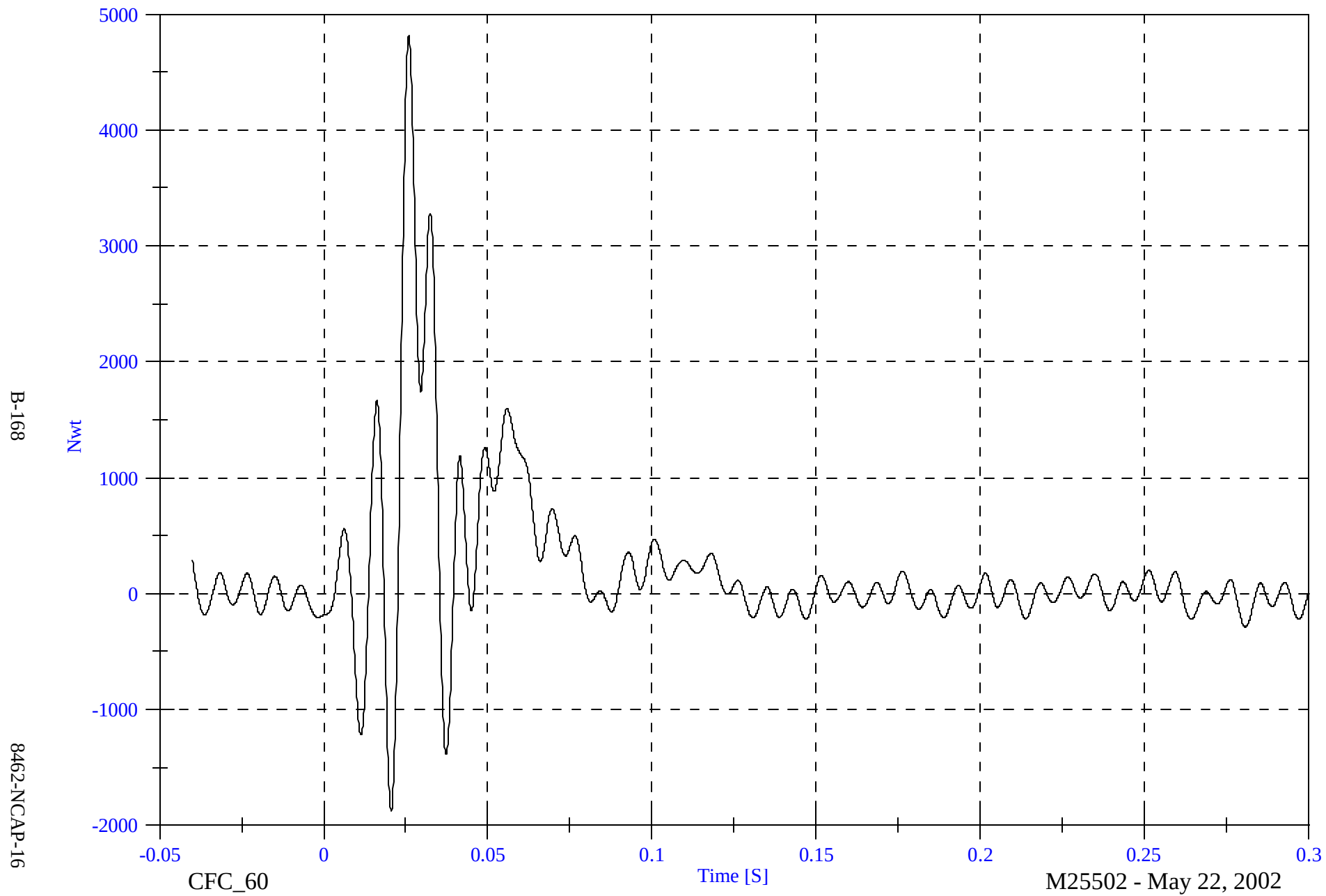


NCAP TEST #16 2002 Subaru Legacy

BLC D5 Fx

Max: 4819.4 [Nwt] at 0.026 [S]

Min: -1880.9 [Nwt] at 0.021 [S]

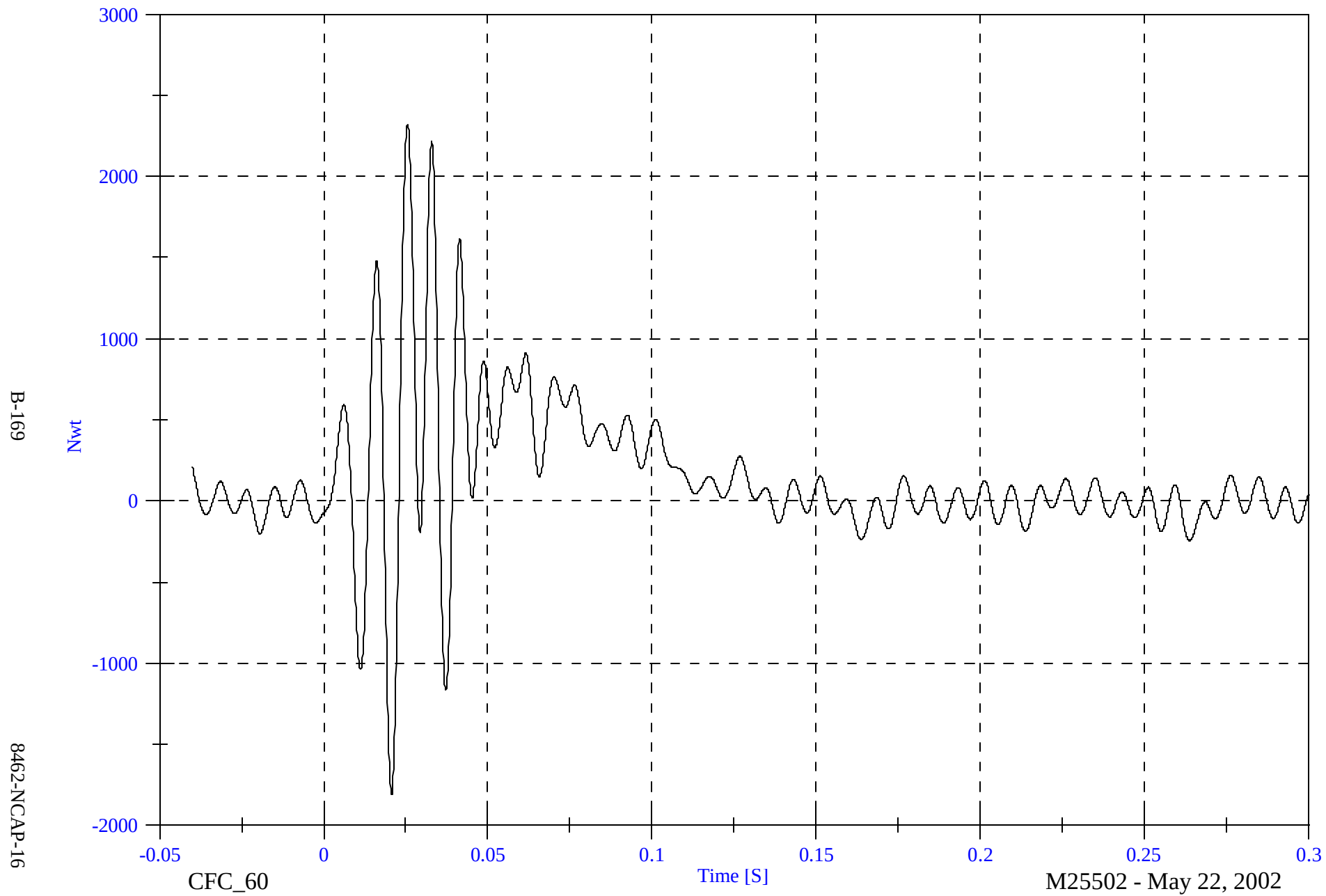


NCAP TEST #16 2002 Subaru Legacy

BLC D6 Fx

Max: 2322.9 [Nwt] at 0.026 [S]

Min: -1809.5 [Nwt] at 0.021 [S]

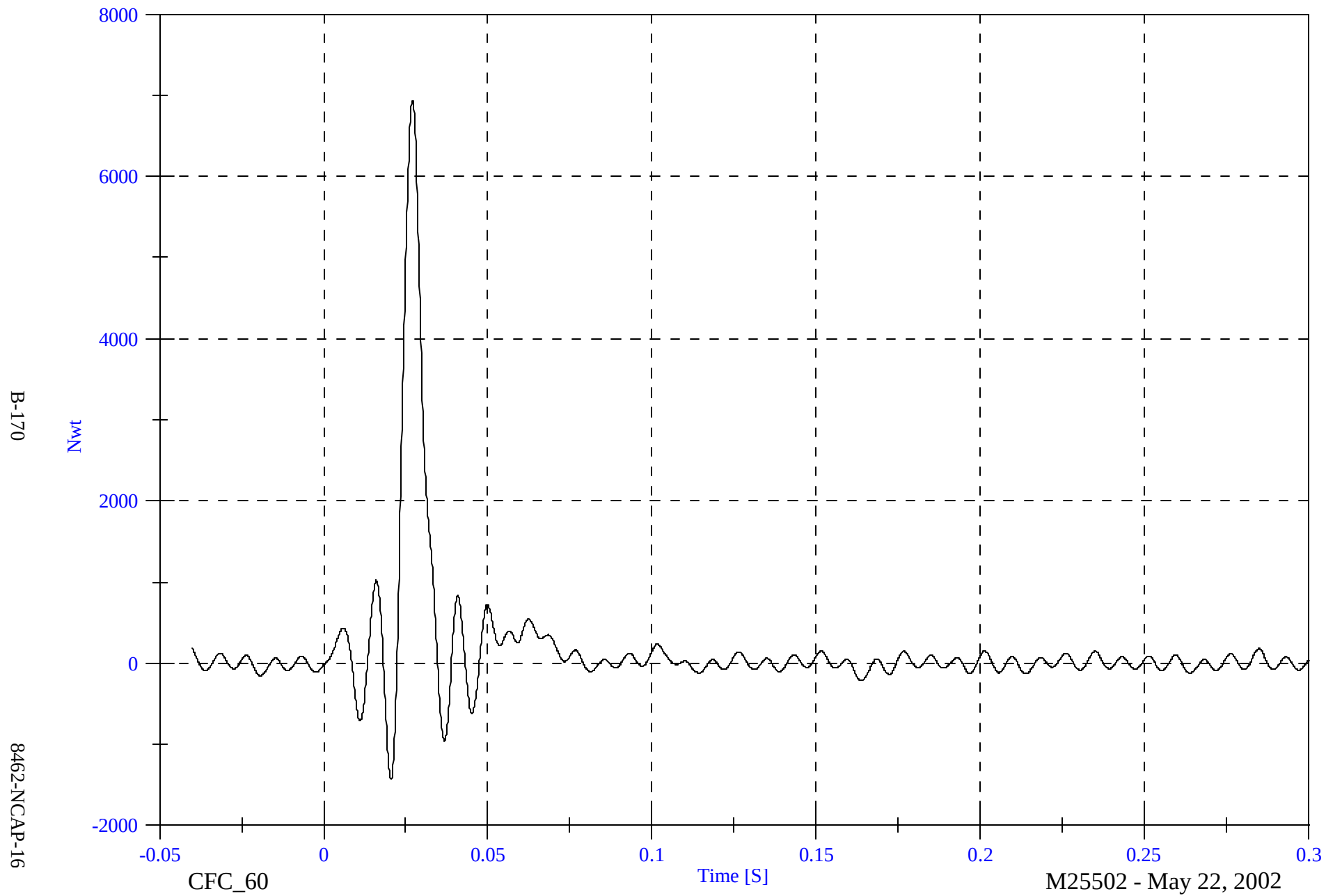


NCAP TEST #16 2002 Subaru Legacy

BLC D7 Fx

Max: 6936.8 [Nwt] at 0.027 [S]

Min: -1434.5 [Nwt] at 0.020 [S]



NCAP TEST #16 2002 Subaru Legacy

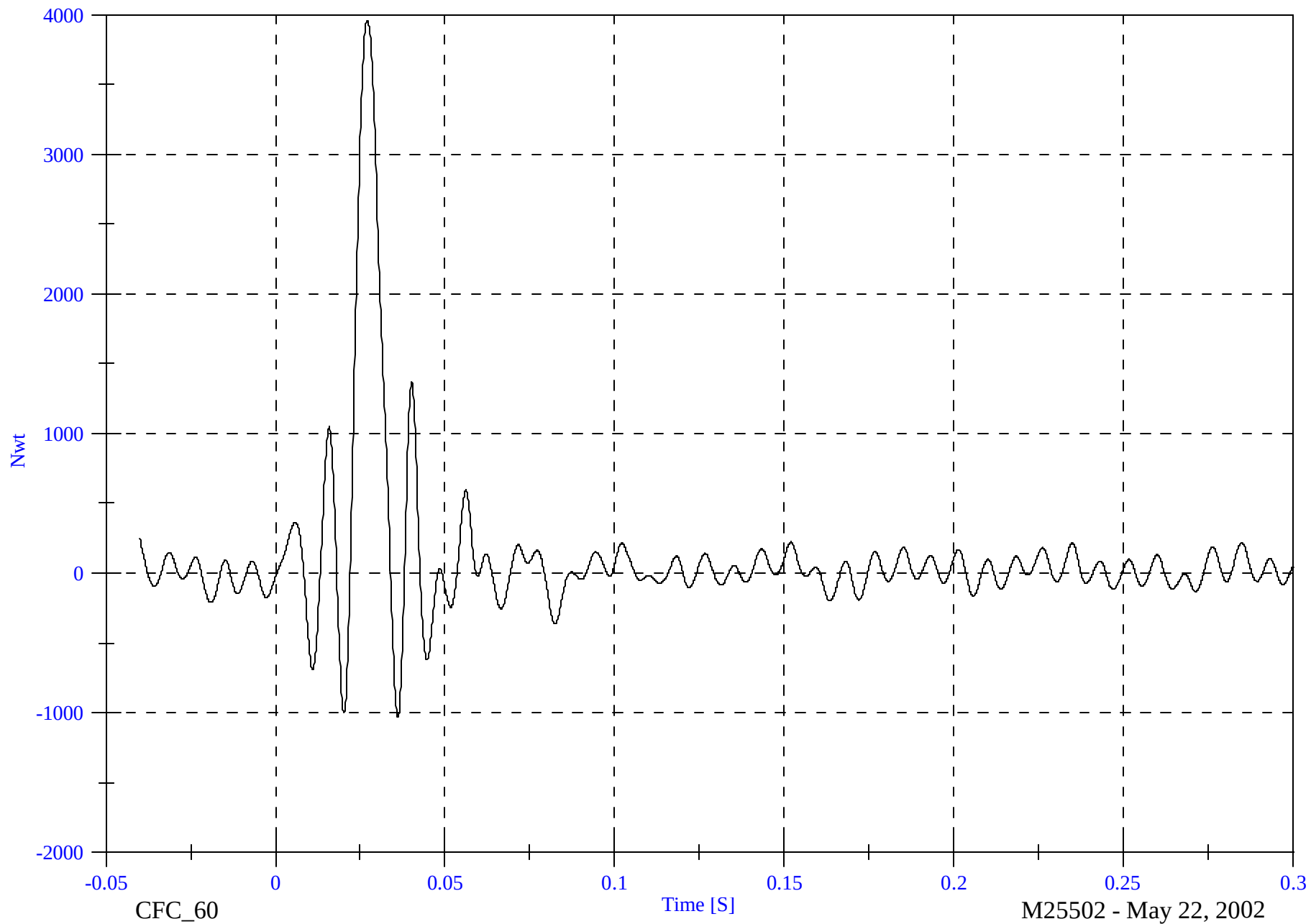
BLC D8 Fx

Max: 3953.9 [Nwt] at 0.027 [S]

Min: -1029.2 [Nwt] at 0.036 [S]

B-171

8462-NCAP-16

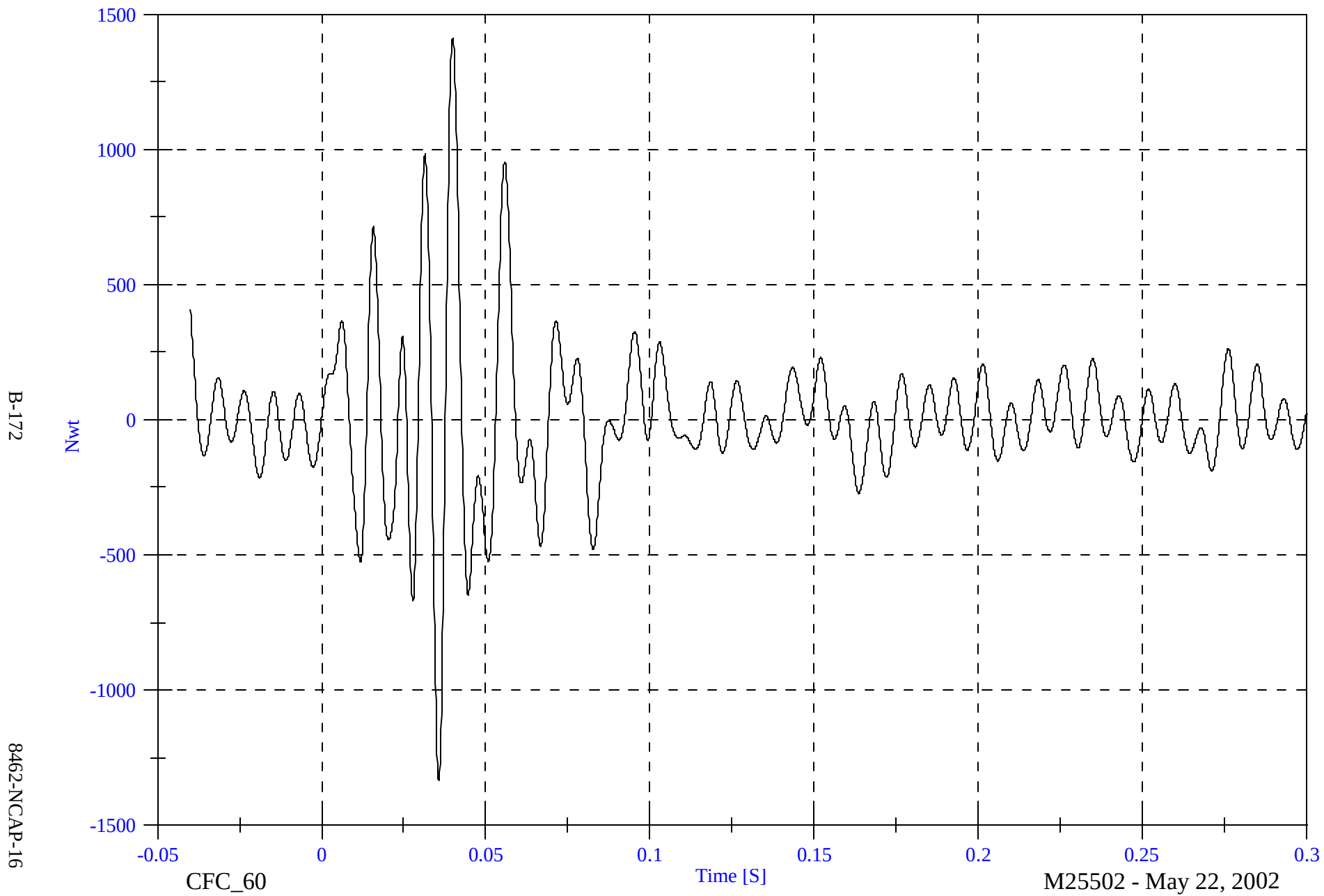


NCAP TEST #16 2002 Subaru Legacy

BLC D9 Fx

Max: 1410.3 [Nwt] at 0.040 [S]

Min: -1334.7 [Nwt] at 0.036 [S]

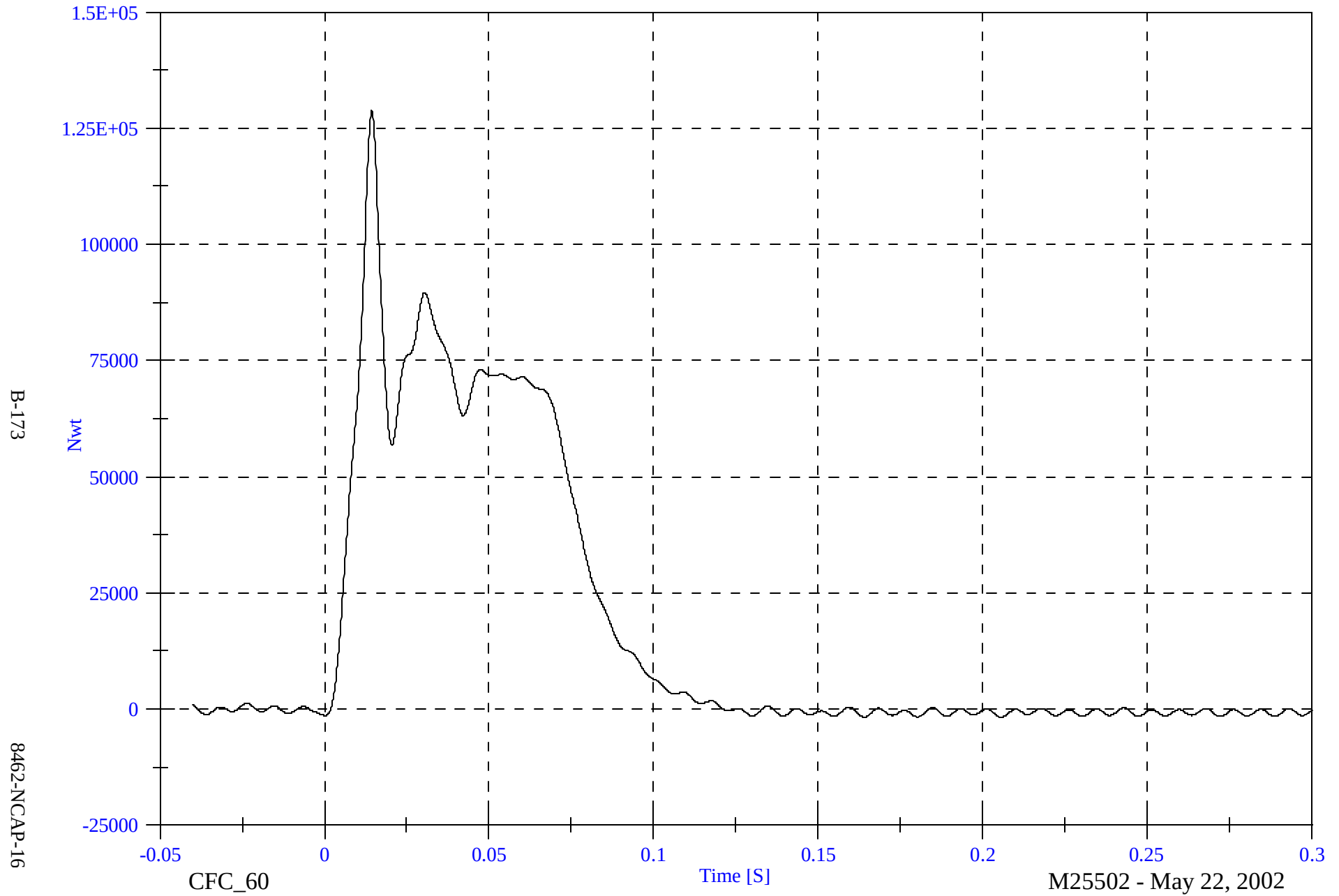


NCAP TEST #16 2002 Subaru Legacy

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

Max: 128717.4 [Nwt] at 0.014 [S]

Min: -1733.6 [Nwt] at 0.206 [S]

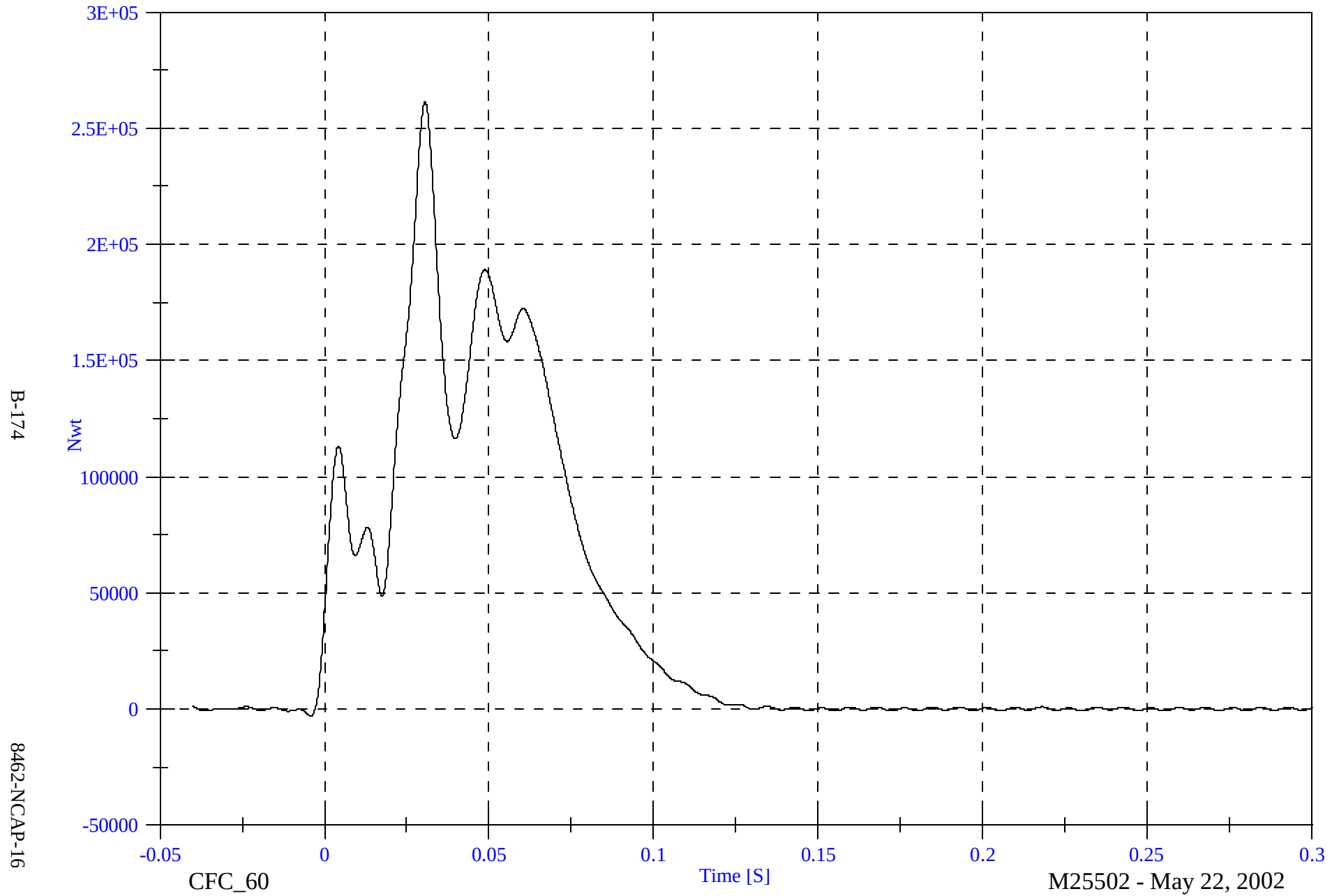


NCAP TEST #16 2002 Subaru Legacy

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

Max: 261163.5 [Nwt] at 0.031 [S]

Min: -2843.3 [Nwt] at -0.004 [S]

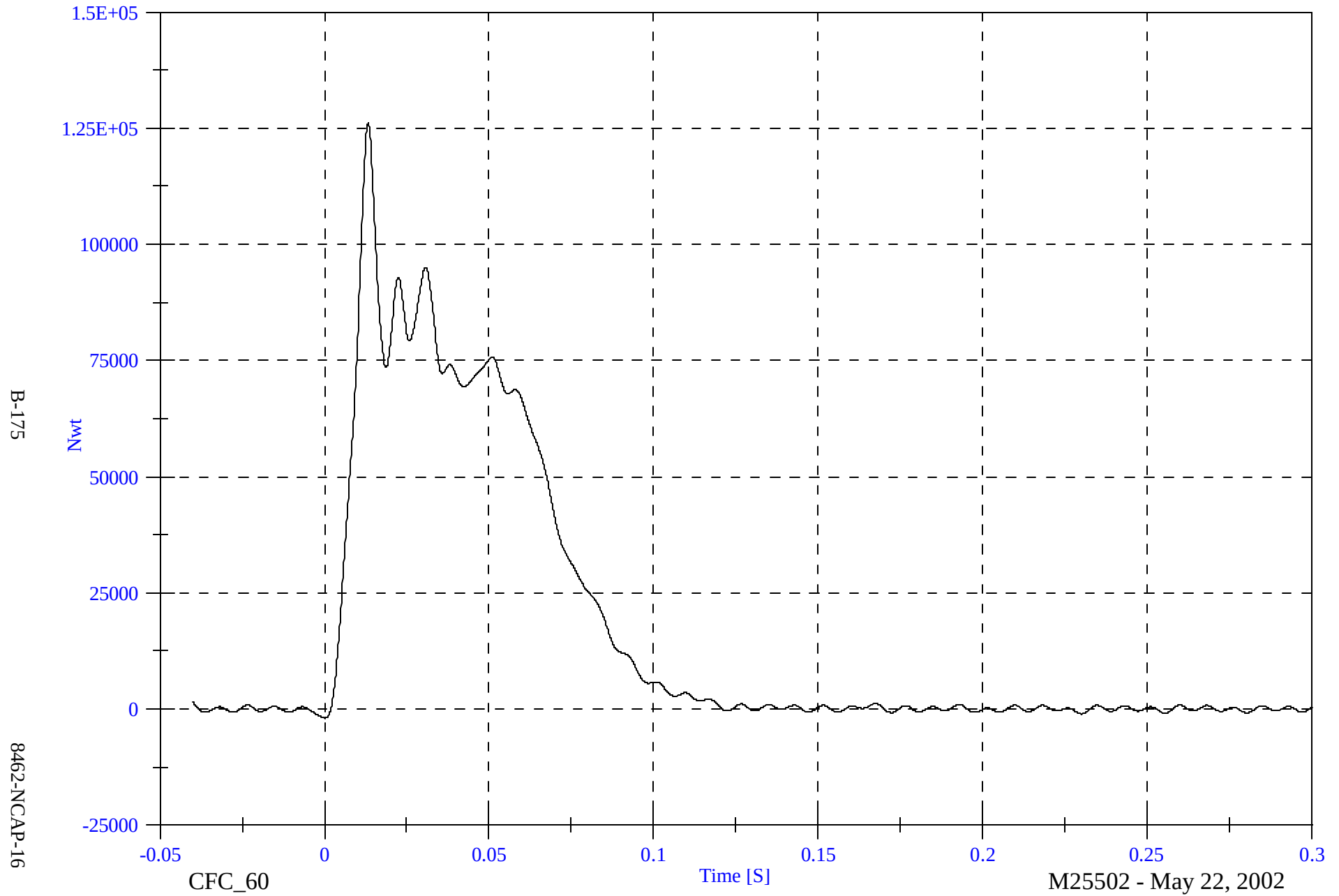


NCAP TEST #16 2002 Subaru Legacy

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

Max: 126018.5 [Nwt] at 0.013 [S]

Min: -1920.8 [Nwt] at 0.000 [S]

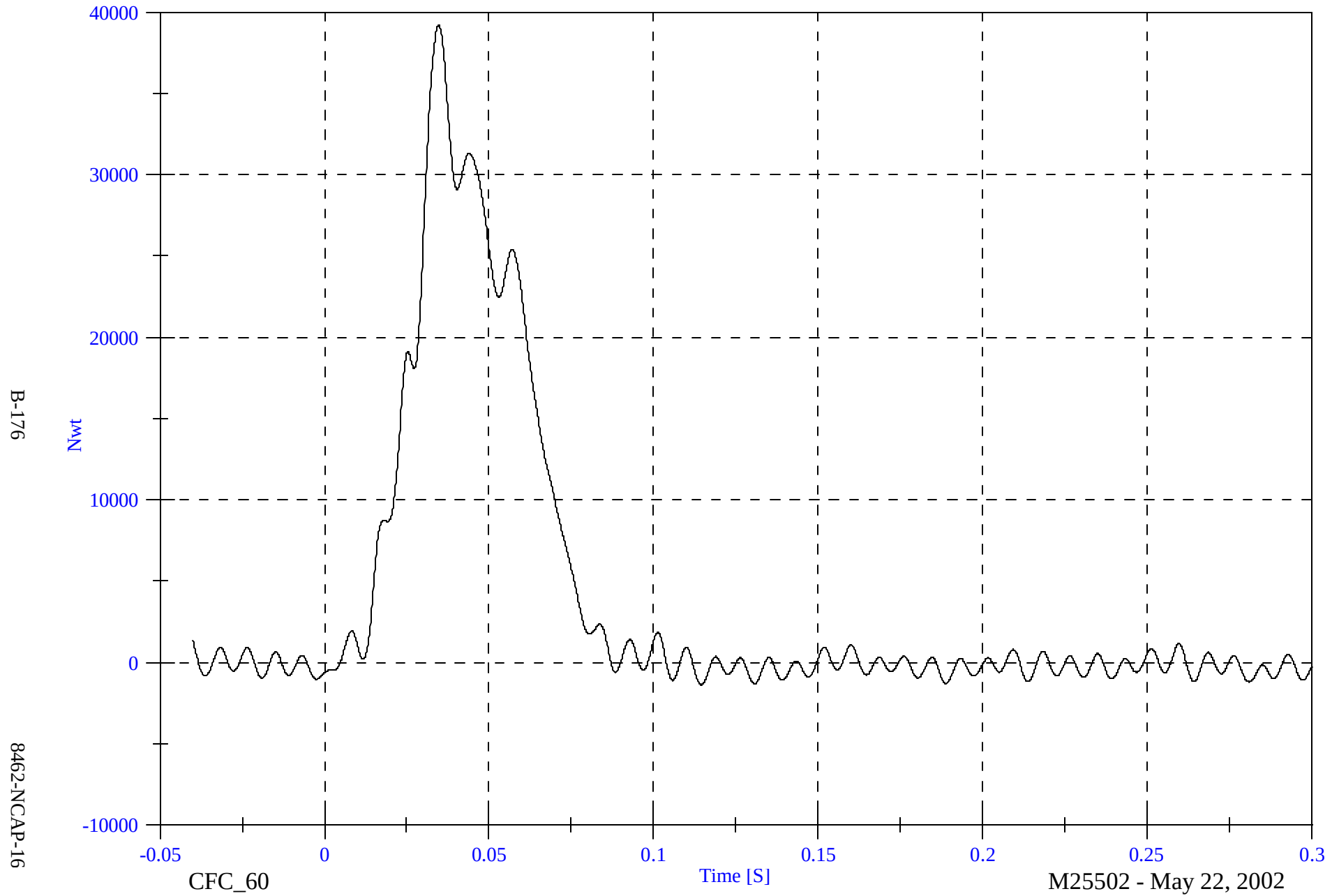


NCAP TEST #16 2002 Subaru Legacy

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

Max: 39219.0 [Nwt] at 0.035 [S]

Min: -1355.9 [Nwt] at 0.115 [S]

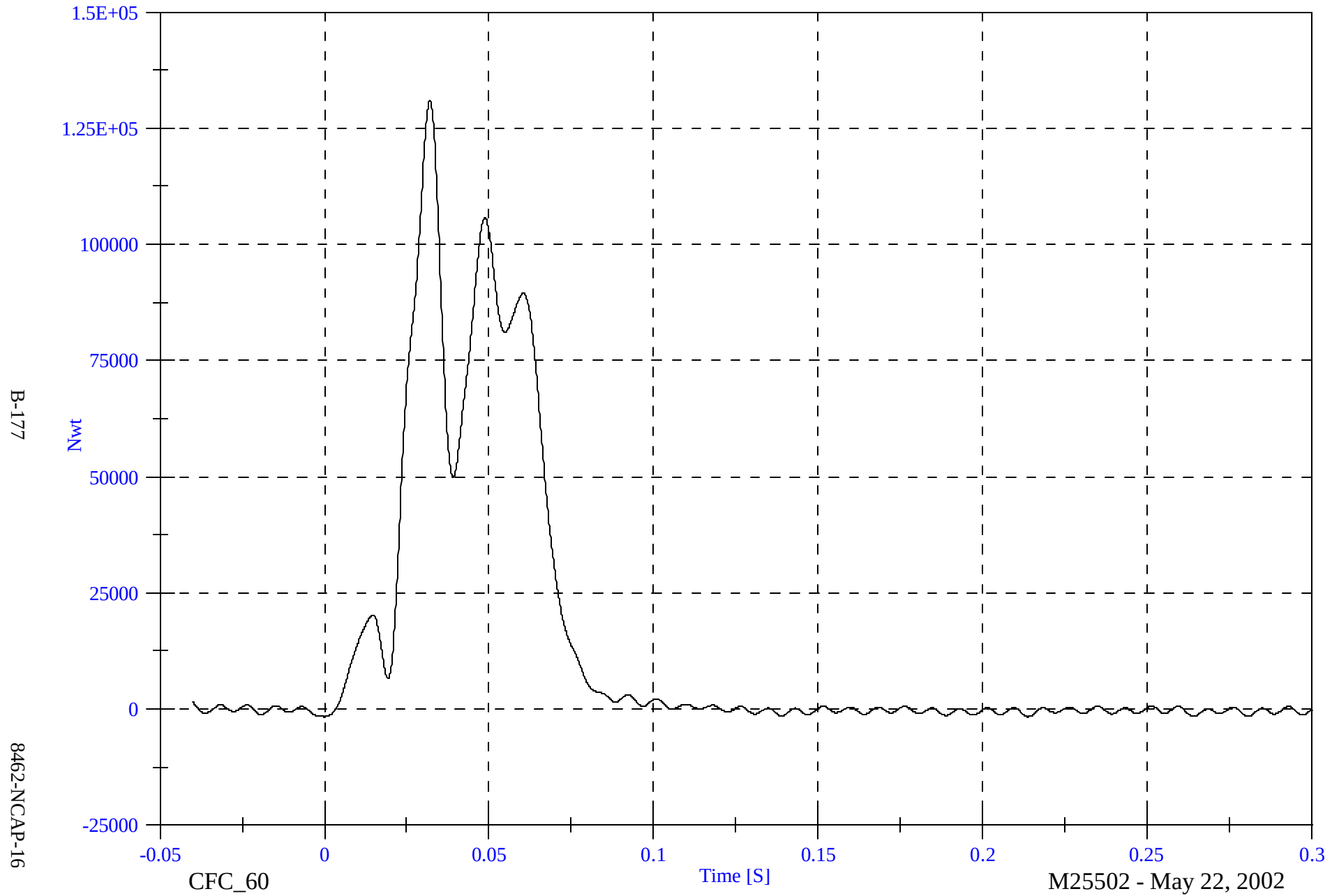


NCAP TEST #16 2002 Subaru Legacy

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

Max: 130956.2 [Nwt] at 0.032 [S]

Min: -1623.4 [Nwt] at 0.214 [S]

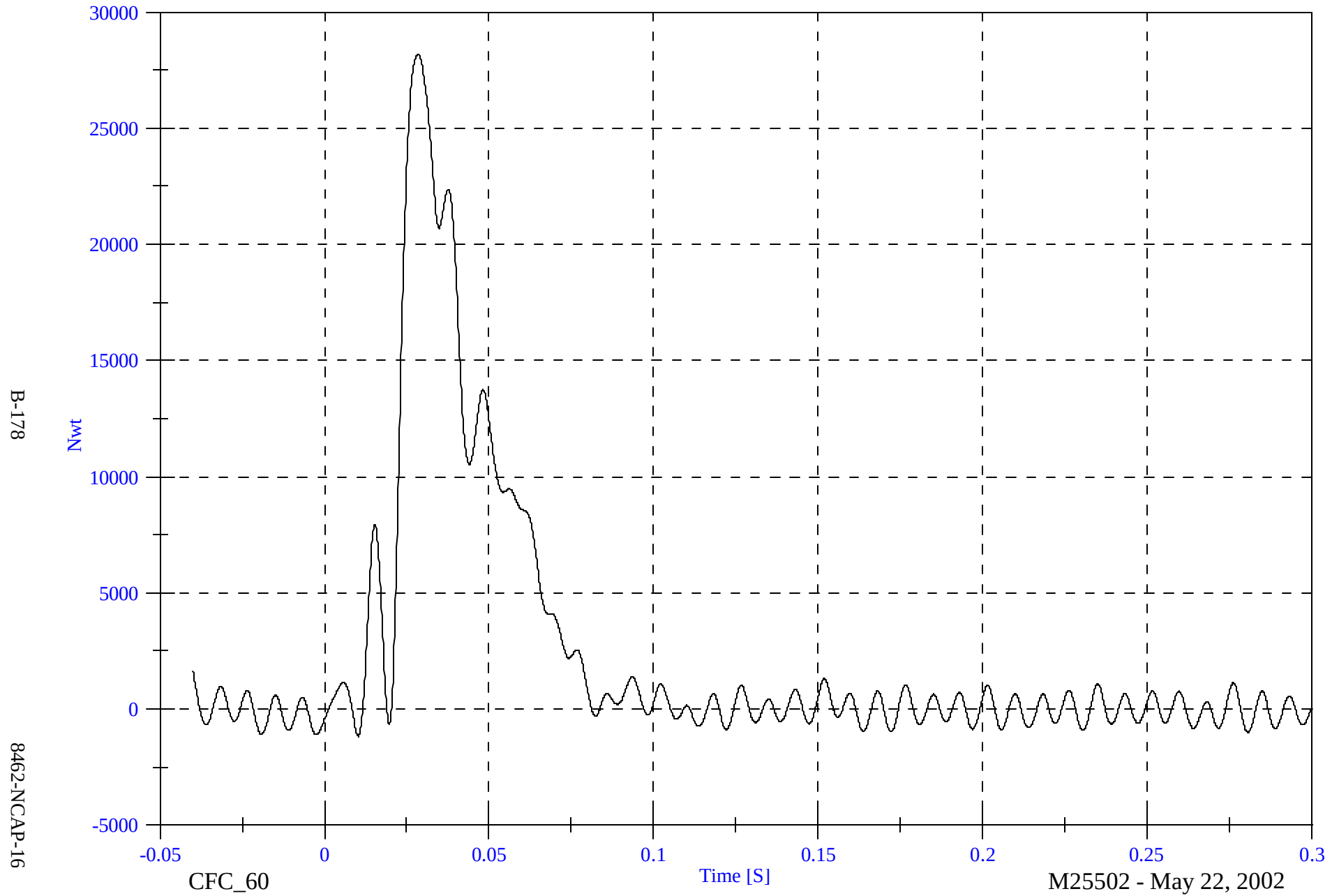


NCAP TEST #16 2002 Subaru Legacy

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

Max: 28186.5 [Nwt] at 0.028 [S]

Min: -1167.0 [Nwt] at 0.010 [S]

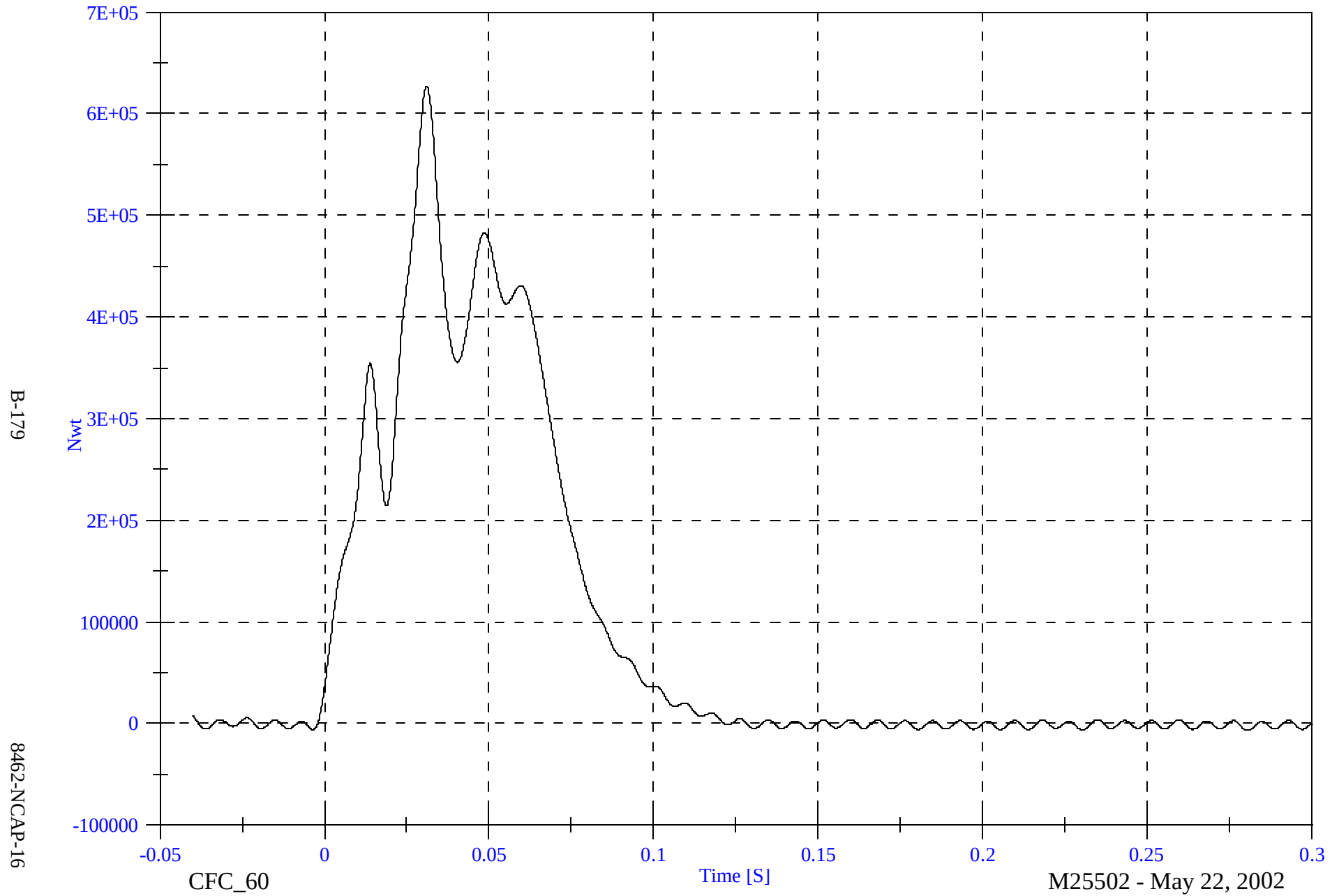


NCAP TEST #16 2002 Subaru Legacy

Max: 627207.7 [Nwt] at 0.031 [S]

Total Load Cell Sum (All 6 Groups)

Min: -6689.2 [Nwt] at 0.281 [S]



APPENDIX C

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

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

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

Dummy serial numbers and certification dates are:

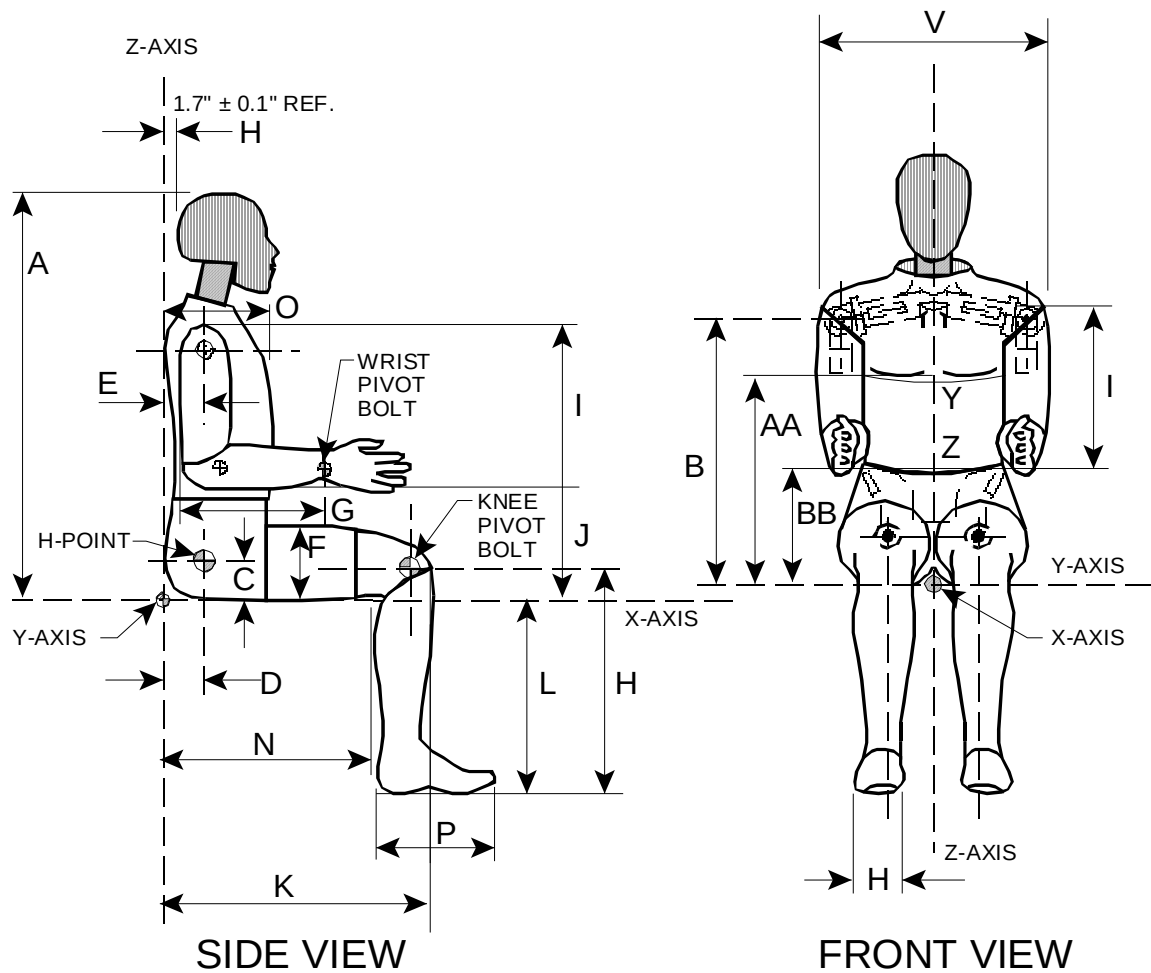
<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	150	5/16/02
#2/Right Front Passenger	245	5/16/02

Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Inducant Testing Final Report No. 6525-V-1.

DUMMY CONFIGURATION DIMENSIONS

EXTERNAL DIMENSIONS SPECIFICATIONS



NOTE: Figure is referenced to the erect seated position. The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude.
(REF: S572.31(A)(6))

PART 572E
HEAD DROP TEST

Dummy Serial Number 150
Sequential Test Number 1
Date May 9, 2002
Workfile 150H

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.0
Relative Humidity	10% - 70%	33.0
Peak Resultant Acceleration	225-275 G's	237.55
Peak Lateral Acceleration	15 G's Max	5.23
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	150	
Sequential Test Number	1	
Date	May 15, 2002	6 Axis Neck Transducer
Workfile	150Flx	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	71.0
Relative Humidity		10% - 70%	42.0
Impact Velocity		22.60 - 23.40 Ft/s	23.11
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	24.97
	20 ms	17.60 - 22.60 G's	21.83
	30 ms	12.50 - 18.50 G's	17.03
Max Pendulum G's Above 30 ms		29 G's Max	17.03
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	39.40
D Plane Rotation	Max	64 - 78 Deg	66.36
	Time	57 - 64 ms	58.50
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	77.07
	Time	47 - 58 ms	51.80
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	113.30
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	98.50

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	150	
Sequential Test Number	1	
Date	May 14, 2002	6 Axis Neck Transducer
Workfile	150Ext	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.0
Relative Humidity		10% - 70%	42.0
Impact Velocity		19.50 - 20.30 Ft/s	19.84
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	19.02
	20 ms	14.00 - 19.00 G's	16.34
	30 ms	11.00 - 16.00 G's	13.32
Max Pendulum G's Above 30 ms		22 G's Max	14.20
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	40.10
D Plane Rotation	Max	81 - 106 Deg	96.09
	Time	72 - 82 ms	77.60
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-44.80
	Time	65 - 79 ms	74.0
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	156.50
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	145.70

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 150
Sequential Test Number 1
Date May 16, 2002
Workfile 150T

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	71.0
Relative Humidity	10% - 70%	36.0
Pendulum Velocity	21.6 - 22.4 Ft/s	22.01
Maximum Deflection	2.50 - 2.86 in	2.58
Maximum Resistive Force	1160 - 1325 Lbs	1297.31
Internal Hysteresis	69 - 85 %	72.32

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 150
Sequential Test Number 1
Date May 16, 2002
Workfile 150LF/150RF

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	71.0
Relative Humidity	10% - 70%	41.0
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1166.09
RIGHT KNEE		
Temperature	66 - 78 Deg F	71.0
Relative Humidity	10% - 70%	41.0
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1177.25

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 150
Sequential Test Number 1
Date May 16, 2002

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			71
Relative Humidity			40
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	39.1
Waist Circumference	Z	32.9 - 34.1 in	34.0
Chest Depth	O	8.4 - 9.0 in	8.4
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.6
Thigh Clearance	F	5.5 - 6.1 in	5.8
Buttock Knee Length	K	22.8 - 23.8 in	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.5
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	10.1
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	20.2
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	11.5

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
HEAD DROP TEST

Dummy Serial Number 245
Sequential Test Number 1
Date May 10, 2002
Workfile 245H

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	71.0
Relative Humidity	10% - 70%	40.0
Peak Resultant Acceleration	225-275 G's	264.25
Peak Lateral Acceleration	15 G's Max	13.14
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	245	
Sequential Test Number	1	
Date	May 10, 2002	6 Axis Neck Transducer
Workfile	245Flx	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.0
Relative Humidity		10% - 70%	40.0
Impact Velocity		22.60 - 23.40 Ft/s	23.05
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	25.02
	20 ms	17.60 - 22.60 G's	21.81
	30 ms	12.50 - 18.50 G's	16.65
Max Pendulum G's Above 30 ms		29 G's Max	16.65
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	35.90
D Plane Rotation	Max	64 - 78 Deg	73.42
	Time	57 - 64 ms	62.70
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	72.75
	Time	47 - 58 ms	51.0
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	122.70
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	103.00

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	245	
Sequential Test Number	1	
Date	May 14, 2002	6 Axis Neck Transducer
Workfile	245Ext	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	69.0
Relative Humidity		10% - 70%	41.0
Impact Velocity		19.50 - 20.30 Ft/s	19.84
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	19.02
	20 ms	14.00 - 19.00 G's	16.22
	30 ms	11.00 - 16.00 G's	13.25
Max Pendulum G's Above 30 ms		22 G's Max	13.52
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	39.80
D Plane Rotation	Max	81 - 106 Deg	100.89
	Time	72 - 82 ms	77.50
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-41.99
	Time	65 - 79 ms	72.10
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	164.60
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	144.20

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 245
Sequential Test Number 1
Date May 16, 2002
Workfile 245T

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.0
Relative Humidity	10% - 70%	35.0
Pendulum Velocity	21.6 - 22.4 Ft/s	22.12
Maximum Deflection	2.50 - 2.86 in	2.54
Maximum Resistive Force	1160 - 1325 Lbs	1266.06
Internal Hysteresis	69 - 85 %	73.50

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 245
Sequential Test Number 1
Date May 16, 2002
Workfile 245LF/245RF

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	71.0
Relative Humidity	10% - 70%	41.0
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1197.12
RIGHT KNEE		
Temperature	66 - 78 Deg F	71.0
Relative Humidity	10% - 70%	41.0
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1280.43

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 245
Sequential Test Number 1
Date May 16, 2002

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			71
Relative Humidity			40
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.2
Waist Circumference	Z	32.9 - 34.1 in	33.8
Chest Depth	O	8.4 - 9.0 in	8.4
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.7
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	18.5
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	25-Mar-02	25-Sep-02
	X Arm Z	ENDEVCO	AC-P14965	25-Mar-02	25-Sep-02
	Y Arm X	ENDEVCO	AC-P17563	25-Mar-02	25-Sep-02
	Y Arm Z	ENDEVCO	AC-P18551	25-Mar-02	25-Sep-02
	Z Arm X	ENDEVCO	AC-P17539	25-Mar-02	25-Sep-02
	Z Arm Y	ENDEVCO	AC-P18718	25-Mar-02	25-Sep-02
Head	X	ENDEVCO	AC-P16832	26-Mar-02	26-Sep-02
	Y	ENDEVCO	AC-P16591	26-Mar-02	26-Sep-02
	Z	ENDEVCO	AC-P16286	26-Mar-02	26-Sep-02
Head	X (R)	ENDEVCO	AC-P17141	26-Mar-02	26-Sep-02
	Y (R)	ENDEVCO	AC-P17242	26-Mar-02	26-Sep-02
	Z (R)	ENDEVCO	AC-P17152	26-Mar-02	26-Sep-02
Neck Load Cell	X	DENTON	LC-269Fx	17-Jan-02	17-Jul-02
	Y	DENTON	LC-269Fy	17-Jan-02	17-Jul-02
	Z	DENTON	LC-269Fz	17-Jan-02	17-Jul-02
Neck Moment	X	DENTON	LC-269Mx	17-Jan-02	17-Jul-02
	Y	DENTON	LC-269My	17-Jan-02	17-Jul-02
	Z	DENTON	LC-269Mz	17-Jan-02	17-Jul-02
Chest	X	ENDEVCO	AC-P17235	04-Apr-02	04-Oct-02
	Y	ENDEVCO	AC-P14393	04-Apr-02	04-Oct-02
	Z	ENDEVCO	AC-P17285	04-Apr-02	04-Oct-02
Chest	X (R)	ENDEVCO	AC-P16863	04-Apr-02	04-Oct-02
	Y (R)	ENDEVCO	AC-P17248	04-Apr-02	04-Oct-02
	Z (R)	ENDEVCO	AC-P17283	04-Apr-02	04-Oct-02
Chest Deflection	X	SERVO	DS-150	22-Mar-02	22-Sep-02
Pelvic	X	ENDEVCO	AC-J30041	25-Mar-02	25-Sep-02
	Y	ENDEVCO	AC-P13355	25-Mar-02	25-Sep-02
	Z	ENDEVCO	AC-P13329	25-Mar-02	25-Sep-02

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 150)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	GSE	LC-418	24-Jan-02	24-Jul-02
Right Femur Load Cell	Fz	GSE	LC-419	24-Jan-02	24-Jul-02
Left Knee Shear	Dx	-	-	-	-
Right Knee Shear	Dx	-	-	-	-
Left Upper Tibia	Mx	DENTON	LC-265Mx	16-May-02	16-Nov-02
	My	DENTON	LC-265My	16-May-02	16-Nov-02
Left Lower Tibia	Fz	DENTON	LC-178Fz	16-May-02	16-Nov-02
	Mx	DENTON	LC-178Mx	16-May-02	16-Nov-02
	My	DENTON	LC-178My	16-May-02	16-Nov-02
Right Upper Tibia	Mx	DENTON	LC-199Mx	16-May-02	16-Nov-02
	My	DENTON	LC-199My	16-May-02	16-Nov-02
Right Lower Tibia	Fz	DENTON	LC-128Fz	16-May-02	16-Nov-02
	Mx	DENTON	LC-128Mx	16-May-02	16-Nov-02
	My	DENTON	LC-128My	16-May-02	16-Nov-02
Left Foot Rear	X	ENDEVCO	AC-J19868	17-May-02	17-Nov-02
	Z	ENDEVCO	AC-AJ8C0	17-May-02	17-Nov-02
Left Foot Front	Z	ENDEVCO	AC-J34378	17-May-02	17-Nov-02
Right Foot Rear	X	ENDEVCO	AC-AJ7F6	17-May-02	17-Nov-02
	Z	ENDEVCO	AC-J27079	17-May-02	17-Nov-02
Right Foot Front	Z	ENDEVCO	AC-J23997	17-May-02	17-Nov-02
Lap Belt Load Cell		-	-	-	-
Shoulder Belt Load Cell		-	-	-	-
Belt Stretch Transducer		-	-	-	-

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-P18558	21-Mar-02	21-Sep-02
	X Arm Z	ENDEVCO	AC-P19212	21-Mar-02	21-Sep-02
	Y Arm X	ENDEVCO	AC-P19197	21-Mar-02	21-Sep-02
	Y Arm Z	ENDEVCO	AC-P18738	21-Mar-02	21-Sep-02
	Z Arm X	ENDEVCO	AC-P19217	21-Mar-02	21-Sep-02
	Z Arm Y	ENDEVCO	AC-P18739	21-Mar-02	21-Sep-02
Head	X	ENDEVCO	AC-J32184	22-Mar-02	22-Sep-02
	Y	ENDEVCO	AC-J32185	22-Mar-02	22-Sep-02
	Z	ENDEVCO	AC-J31011	22-Mar-02	22-Sep-02
Head	X (R)	ENDEVCO	AC-J31020	24-Mar-02	24-Mar-02
	Y (R)	ENDEVCO	AC-J31101	22-Mar-02	22-Sep-02
	Z (R)	ENDEVCO	AC-J31059	22-Mar-02	22-Sep-02
Neck Load Cell	X	DENTON	LC-076Fx	17-Jan-02	17-Jul-02
	Y	DENTON	LC-076Fy	17-Jan-02	17-Jul-02
	Z	DENTON	LC-076Fz	17-Jan-02	17-Jul-02
Neck Moment	X	DENTON	LC-076Mx	17-Jan-02	17-Jul-02
	Y	DENTON	LC-076My	17-Jan-02	17-Jul-02
	Z	DENTON	LC-076Mz	17-Jan-02	17-Jul-02
Chest	X	ENDEVCO	AC-J34019	21-Mar-02	21-Sep-02
	Y	ENDEVCO	AC-J33018	21-Mar-02	21-Sep-02
	Z	ENDEVCO	AC-J32783	21-Mar-02	21-Sep-02
Chest	X (R)	ENDEVCO	AC-J31066	21-Mar-02	21-Sep-02
	Y (R)	ENDEVCO	AC-P16979	21-Mar-02	21-Sep-02
	Z (R)	ENDEVCO	AC-J31022	21-Mar-02	21-Sep-02
Chest Deflection	X	SERVO	DS-245	22-Mar-02	22-Sep-02
Pelvic	X	ENDEVCO	AC-J31034	21-Mar-02	21-Sep-02
	Y	ENDEVCO	AC-P17258	21-Mar-02	21-Sep-02
	Z	ENDEVCO	AC-J31010	21-Mar-02	21-Sep-02

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-551	24-Jan-02	24-Jul-02
Right Femur Load Cell	Fz	GSE	LC-951	24-Jan-02	24-Jul-02
Left Knee Shear	Dx	-	-	-	-
Right Knee Shear	Dx	-	-	-	-
Left Upper Tibia	Mx	DENTON	LC-200Mx	16-May-02	16-Nov-02
	My	DENTON	LC-200My	16-May-02	16-Nov-02
Left Lower Tibia	Fz	DENTON	LC-129Fz	16-May-02	16-Nov-02
	Mx	DENTON	LC-129Mx	16-May-02	16-Nov-02
	My	DENTON	LC-129My	16-May-02	16-Nov-02
Right Upper Tibia	Mx	DENTON	LC-264Mx	16-May-02	16-Nov-02
	My	DENTON	LC-264My	16-May-02	16-Nov-02
Right Lower Tibia	Fz	DENTON	LC-177Fz	16-May-02	16-Nov-02
	Mx	DENTON	LC-177Mx	16-May-02	16-Nov-02
	My	DENTON	LC-177My	16-May-02	16-Nov-02
Left Foot Rear	X	ENDEVCO	AC-J18059	17-May-02	17-Nov-02
	Z	ENDEVCO	AC-J18662	17-May-02	17-Nov-02
Left Foot Front	Z	ENDEVCO	AC-J36176	17-May-02	17-Nov-02
Right Foot Rear	X	ENDEVCO	AC-J20084	17-May-02	17-Nov-02
	Z	ENDEVCO	AC-J28727	17-May-02	17-Nov-02
Right Foot Front	Z	ENDEVCO	AC-J18738	17-May-02	17-Nov-02
Lap Belt Load Cell		-	-	-	-
Shoulder Belt Load Cell		-	-	-	-
Belt Stretch Transducer		-	-	-	-

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ICS	X86	4/25/2002	10/25/02
Right Rear Seat Crossmember X	ICS	X33	1/15/2002	7/15/02
Top of Engine	ENDEVCO	J26604	4/25/2002	10/25/02
Bottom of Engine	ENDEVCO	J32383	2/14/2002	8/14/02
Right Disc Brake Caliper	ENDEVCO	J32787	2/14/2002	8/14/02
Instrument Panel	ENDEVCO	P18792	2/27/2002	8/27/02
Left Disc Brake Caliper	ENDEVCO	J32098	2/14/2002	8/14/02
Left Seat Rear Crossmember Z	ICS	Y13	2/11/2002	8/11/02
Right Seat Rear Crossmember Z	ICS	D82	4/4/2002	10/4/02

REPORT NUMBER: CAL-02-16

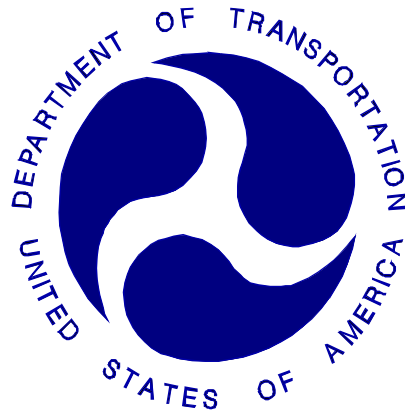
NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

SAFETY FIRST FORERUNNER SECURED WITH THE LATCH SYSTEM
GRACO SNUGRIDE SECURED WITH THE LATCH SYSTEM

NHTSA NUMBER: M25502

VERIDIAN ENGINEERING TEST NUMBER: 8462-NCAP-16

VERIDIAN ENGINEERING
TRANSPORTATION SCIENCES CENTER
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May 22, 2002

FINAL REPORT

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Performance Standards
Office of Crashworthiness Standards
Mail Code: NPS-10
400 Seventh Street, SW, Room No. 5313
Washington, DC 20590

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16. Abstract A frontal load cell barrier test was conducted on the subject CRS's, Safety First Forerunner with LATCH and GRACO Snugride with LATCH in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the determination of CRS crashworthiness. This test was conducted at the Veridian Engineering Crash Test Facility in Buffalo, New York, on May 22, 2002.					
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SECTION 1

PURPOSE AND SUMMARY OF TEST M25502

The purpose of this test was to obtain CRS performance data in a frontal impact NCAP condition. The 56.8 kph NCAP frontal impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

SUMMARY

Both child dummies were instrumented with head, chest, and pelvic triaxial accelerometers. In addition, redundant head z acceleration, upper and lower six axial neck and lower lumbar force and moment load cell sensors were utilized.

The right rear (Position 3) child dummy (serial no. 017) and left rear (Position 4) child dummy (serial no. 090) were calibrated previous to this test. Child dummy certification information is found in section 5.

The right rear child dummy's HIC was 283.1, maximum chest deceleration over 3 ms was 47.5 g's. The left rear child dummy's HIC was 521.5, maximum chest deceleration over 3 ms was 58.5 g's.

SECTION 2
DATA SHEET NO. 1
CRASH TEST SUMMARY

TEST DUMMY INFORMATION:

DESCRIPTION	Position #3 CRS	Position #4 CRS
ATD Type/Serial No.	CRABI (P572 R) / 017	CRABI (P572 R) / 090
Restraint System:	Safety First Forerunner Secured With Latch System	GRACO Snugride Secured With Latch System

Number of Data Channels 76
Number of Cameras: 1 Real Time
2 High Speed

POST TEST DOOR OPENING

DESCRIPTION	FRONT	REAR
Left Side Doors	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Right Side Doors	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Hatch/Other Door	N/A	N/A

POST TEST SEAT DATA

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

VISIBLE DUMMY CONTACT POINTS

	Position #3 CRS	Position #4 CRS
Head Contact:	Back of head to CRS	Back of head to CRS
Upper Torso Contact:	Back to CRS	Back to CRS
Lower Torso Contact:	-	-
Left Knee Contact:	-	-
Right Knee Contact:	-	-

DATA SHEET NO. 2

CRS PARAMETER DATA

CRS: Safety First Forerunner with LATCH and GRACO Snugride with LATCH

NHTSA No. M25502

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Delivered Weight of Vehicle with Maximum Fluids = 1477.5 kg (A)

AS TESTED WEIGHT OF VEHICLE (2 ATDs + 2 CRABI w/ CRS +CARGO + EQUIPMENT & INSTRUMENTATION):

Left Front	=	<u>468</u>	kg	Left Rear	=	<u>373</u>	kg
Right Front	=	<u>451</u>	kg	Right Rear	=	<u>378</u>	kg
TOTAL FRONT	=	<u>919.0</u>	kg	TOTAL REAR	=	<u>751.0</u>	kg
TOTAL TEST WEIGHT =		<u>1670.0</u>	kg				

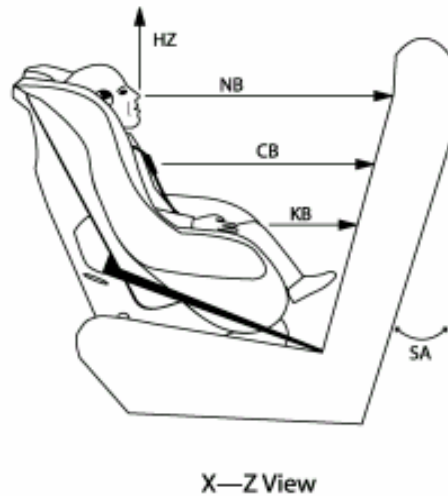
DATA SHEET NO. 3

CHILD DUMMY POSITIONING IN VEHICLE

CRS: Safety First Forerunner with LATCH and GRACO Snugride with LATCH

NHTSA No. M25502

Dummy Measurements for Rear-facing CRS Passengers



HZ	-	Head to Roof
NB	-	Nose to Front of Back Seat
CB	-	Chest to Front of Back Seat
KB	-	Knee to Front of Back Seat
SA	-	Seat Back Angle

Measurement	Pre-Test (mm)		Post Test (mm)	
	P3 CRS (017)	P4 CRS (090)	P3 CRS (017)	P4 CRS (090)
SA	45°	45°	45°	45°
HZ	465	460	491	431
NB	560	515	590	515
CB	405	358	410	410
KB – LEFT	228	170	240	150
KB – RIGHT	230	180	250	160

All dimensions in mm (unless noted)

P3 – Right Rear Passenger (CRS #1)

P4 – Left Rear Passenger (CRS #2)

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES

CRS: Safety First Forerunner with LATCH and GRACO Snugride with LATCH

NHTSA No. M25502

DESCRIPTION	Unit	MAXIMUM VALUE							
		Position #3				Position #4			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head X	g	28.4	75.1	-6.1	246.9	50.2	75.1	-4.6	131.3
Head Y	g	7.3	92.7	-4.6	57.0	10.6	131.1	-22.7	83.8
Head Z	g	50.8	53.1	-1.0	-3.3	56.6	77.9	-24.6	102.8
Head Resultant	g	53.4	61.0	0.1	-36.3	74.9	76.4	0.0	-9.9
Redundant Head Z	g	51.2	50.4	-3.2	109.0	47.4	77.5	-16.2	102.5
Upper Neck Fx	N	49.9	113.0	-393.3	55.9	13.8	271.6	-430.6	79.9
Upper Neck Fy	N	80.3*	92.9	-60.2	56.6	65.1	134.9	-121.3	89.6
Upper Neck Fz	N	1292.9	53.1	-18.6	-3.0	833.7	75.0	-698.5	101.9
Upper Neck F Resultant	N	1348.9	53.2	1.3	-34.9	924.1	75.0	0.9	-9.4
Upper Neck Mx	N-m	2.4	55.9	-2.2	117.1	13.6	103.8	-8.6	138.6
Upper Neck My	N-m	3.2	266.2	-6.0	53.4	8.4	104.5	-13.4	79.9
Upper Neck Mz	N-m	1.1	120.0	-1.0	190.0	1.2	244.4	-4.1	106.3
Upper Neck M Resultant	N-m	6.3	56.6	0.0	-10.8	16.4	103.9	0.0	-35.6
Lower Neck Fx	N	385.0	62.7	-151.6	228.1	238.1	105.3	-117.7	135.8
Lower Neck Fy	N	87.3	90.0	-92.6	59.1	76.1	99.0	-178.3	81.6
Lower Neck Fz	N	1496.3	52.8	-20.2	-2.9	902.9	74.7	-567.2	101.3
Lower Neck F Resultant	N	1529.2	55.6	0.6	-35.1	913.6	74.7	0.5	-23.6
Lower Neck Mx	N-m	4.9	90.5	-4.6	238.2	3.6	100.3	-6.5	145.4
Lower Neck My	N-m	16.5	250.9	-10.8	62.0	4.1	49.6	-3.8	112.7
Lower Neck Mz	N-m	0.8	119.9	-1.0	249.3	0.9	68.6	-1.6	131.9
Lower Neck M Resultant	N-m	17.0	247.8	0.0	21.8	7.2	146.2	0.0	-1.7
Chest X	g	41.1	67.5	-5.6	218.3	47.3	80.9	-9.3	146.2
Chest Y	g	6.3	69.7	-3.5	47.5	7.9	146.7	-10.4	95.1
Chest Z	g	37.1	57.5	-3.0	89.6	43.5	78.2	-14.4	100.7
Chest Resultant	g	47.7	66.9	0.1	-37.2	61.1	80.1	0.0	3.3
Lumbar Fx	N	39.0	257.8	-87.4	54.1	125.0	96.6	-53.6	149.7
Lumbar Fy	N	61.2	79.2	-9.1	225.4	19.6	147.2	-39.5	87.3
Lumbar Fz	N	289.0	54.5	-80.7	244.3	119.3	115.8	-210.6	97.9
Lumbar F Resultant	N	302.1	54.4	0.1	-34.4	244.9	97.9	0.2	-25.1
Lumbar Mx	N-m	2.3	79.6	-0.9	144.4	2.5	72.6	-2.2	87.8
Lumbar My	N-m	2.3	53.8	-0.7	97.3	0.4	273.4	-3.1	75.7
Lumbar Mz	N-m	0.6	96.8	-0.5	127.7	2.2	54.6	-1.4	100.7
Lumbar M Resultant	N-m	3.1	79.6	0.0	-49.8	3.9	75.7	0.0	-8.4
Pelvic X	g	24.3	53.5	-5.4	160.3	38.2	91.0	-7.5	156.7
Pelvic Y	g	7.1	55.7	-3.7	47.9	14.9	85.8	-7.5	70.1
Pelvic Z	g	43.6	51.7	-2.9	112.3	56.0	80.5	-9.4	106.1
Pelvic Resultant	g	49.3	51.7	0.0	-36.2	59.9	75.9	0.0	-28.8

* Transducer connector was loose. Maximum value is from valid portion of the data curve.

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Safety First Forerunner with LATCH and GRACO Snugride with LATCH

NHTSA No. M25502

	HEAD INJURY CRITERIA (HIC15)			
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration (g's) t ₁ to t ₂
Position #3 - Right	283.1	50.2	65.2	51.3
Position #4 - Left	521.5	69.9	84.9	65.5

** HIC is as defined in FMVSS 208. The maximum time interval from t₁ to t₂ is 15 milliseconds.

	CLIP SUMMARY*			
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #3 - Right	47.5	645	67.5	441.9
Position #4 - Left	58.5	78.6	81.6	593.4

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

Position 3 Neck Injury Summary (CRABI 12 month old – In Position)

Nij V10	Nij	Time (ms)	Z Force (N)	X Force (N)	Y Moment (N-m)
Ntf	0.22	86.6	314.5	-21.0	0.0
Nte	1.10	53.4	1291.4	-384.0	-3.7
Ncf	0.01	-3.0	-18.5	6.4	0.1
Nce	0.00	-8.8	-3.4	5.2	0.0

Peak Tension (CFC1000) **1293.28 N**

Peak Compression (CFC1000) **31.51 N**

Critical Values

Nij Intercepts				Peak Limits	
Tension (CVt)	1460 N	Extension (mCVe)	17 N-m	Tension	780 N
Compression (CVc)	1460 N	Flexion (mCVf)	43 N-m	Compression	-960 N

Condyle Offset -0.0058

Position 4 Neck Injury Summary (CRABI 12 month old – In Position)

Nij V10	Nij	Time (ms)	Z Force (N)	X Force (N)	Y Moment (N-m)
Ntf	0.03	195.9	31.9	-4.7	0.5
Nte	1.19	80.0	806.5	-430.2	-10.9
Ncf	0.67	103.2	-691.6	-34.5	8.5
Nce	0.25	92.8	-216.3	-60.0	-1.7

Peak Tension (CFC1000) **835.56 N**

Peak Compression (CFC1000) **699.44 N**

Critical Values

Nij Intercepts				Peak Limits	
Tension (CVt)	1460 N	Extension (mCVe)	17 N-m	Tension	780 N
Compression (CVc)	1460 N	Flexion (mCVf)	43 N-m	Compression	-960 N

Condyle Offset -0.0058

DATA SHEET NO. 5

CRS PERFORMANCE DATA

CRS: Safety First Forerunner with LATCH and GRACO Snugride with LATCH

NHTSA No. M25502

		MAXIMUM VALUE			
DESCRIPTION	Unit	Positive	Time (ms)	Negative	Time (ms)
P3 Tether Load	N	-	-	-	-
P3 CRS X	g	4.8	195.8	-39.7	65.9
P3 CRS Y	g	5.0	108.0	-8.6	99.0
P3 CRS Z	g	25.6	42.7	-13.0	81.5
P3 CRS Resultant	g	43.5	43.6	0.0	-46.6
P4 Tether Load	N	-	-	-	-
P4 CRS X	g	-	-	-	-
P4 CRS Y	g	-	-	-	-
P4 CRS Z	g	-	-	-	-
P4 CRS Resultant	g	-	-	-	-

DATA SHEET NO. 5**CRS PERFORMANCE DATA (CONTINUED)**CRS: Safety First Forerunner with LATCH and GRACO Snugride with LATCHNHTSA No. M25502**POSITION #3 CRS POST-TEST INSPECTION (Model No. 02 925 BRD)**

LOCATION	DAMAGE	REMARKS
Upper Tether Strap	None	-
Upper Tether Buckle	None	-
Upper Tether Hook	None	-
Vehicle Upper Tether Anchor	None	-
Lower Anchor Strap	None	-
Lower Anchor Buckle	None	-
Lower Anchor Hooks	None	-
Vehicle Lower CRS Anchors	None	-
Five Point Harness Connections	None	-
Cracks on CRS	None	-
Fabric Tears on CRS	None	-
Vehicle Seat Structure	None	-
Vehicle Seat Fabric Tears	None	-
Child Dummy	None	-

POSITION #4 CRS POST-TEST INSPECTION (Model No. 8466VIN)

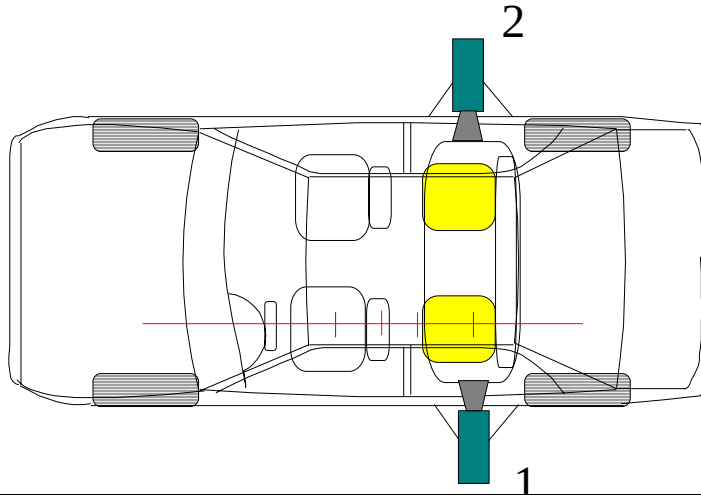
LOCATION	DAMAGE	REMARKS
Upper Tether Strap	None	-
Upper Tether Buckle	None	-
Upper Tether Hook	None	-
Vehicle Upper Tether Anchor	None	-
Lower Anchor Strap	None	-
Lower Anchor Buckle	None	-
Lower Anchor Hooks	None	-
Vehicle Lower CRS Anchors	None	-
Five Point Harness Connections	None	-
Cracks on CRS	None	-
Fabric Tears on CRS	None	-
Vehicle Seat Structure	None	-
Vehicle Seat Fabric Tears	None	-
Child Dummy	None	-

DATA SHEET NO. 6

CRS CAMERA DATA

CRS: Safety First Forerunner with LATCH and GRACO Snugride with LATCH

NHTSA No. M25502



Camera No.	View	Coordinates (millimeters)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Left side CRS lateral view	2955	2812	2539	-26	25	500
2	Right side CRS lateral view	2961	2717	2540	-25	25	500

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

X = + Forward

Y = + To Right

Z = + Down

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 CLOSE-UP VIEW OF POSITION 4 CRS LABEL



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



Figure 3-27 PRE-TEST POSITION 3 REAR VIEW



Figure 3-28 POST-TEST POSITION 3 REAR VIEW



Figure 3-29 PRE-TEST POSITION 4 REAR VIEW

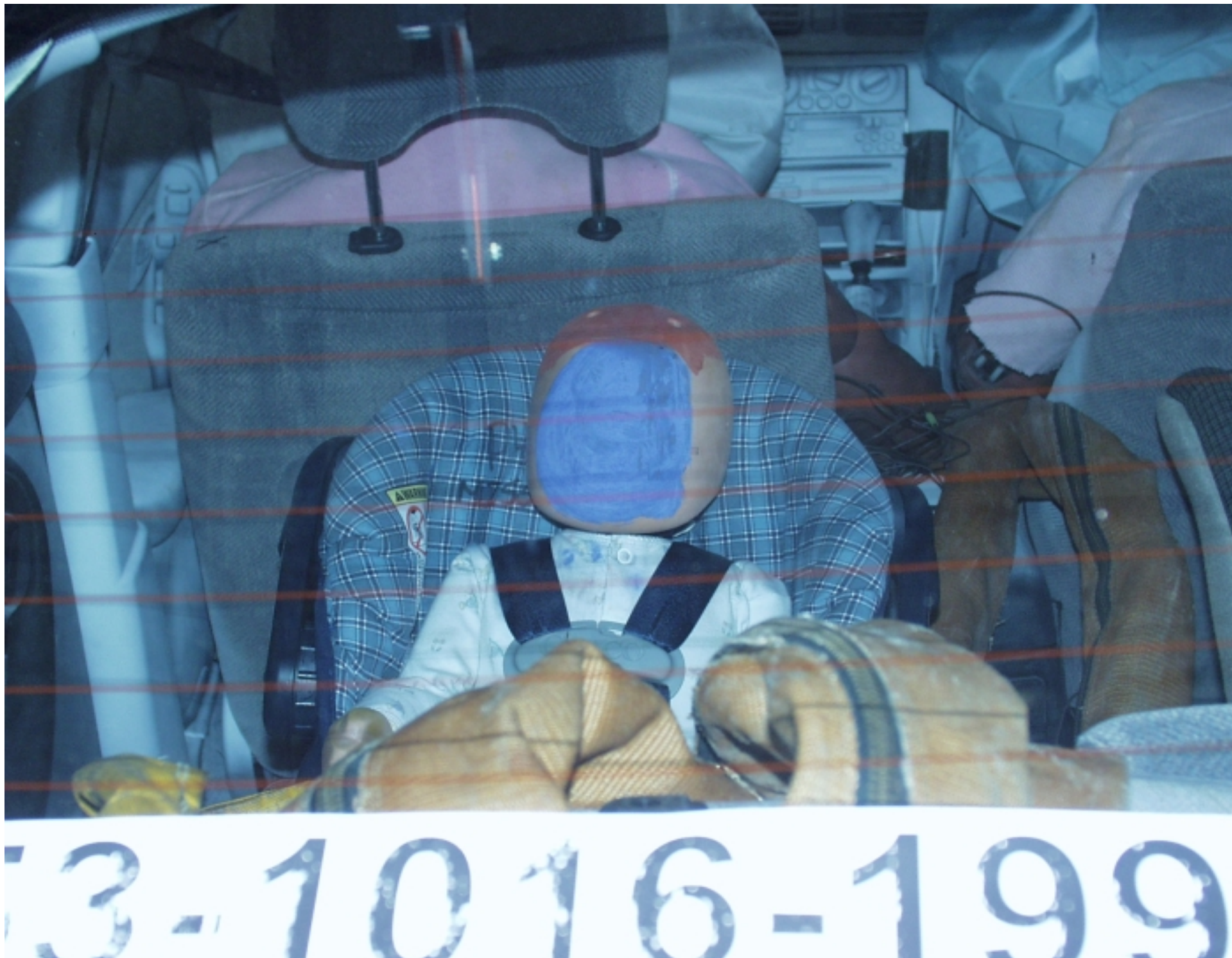


Figure 3-30 POST-TEST POSITION 4 REAR VIEW

SECTION 4

CHILD DUMMY RESPONSE AND CRS DATA TRACES

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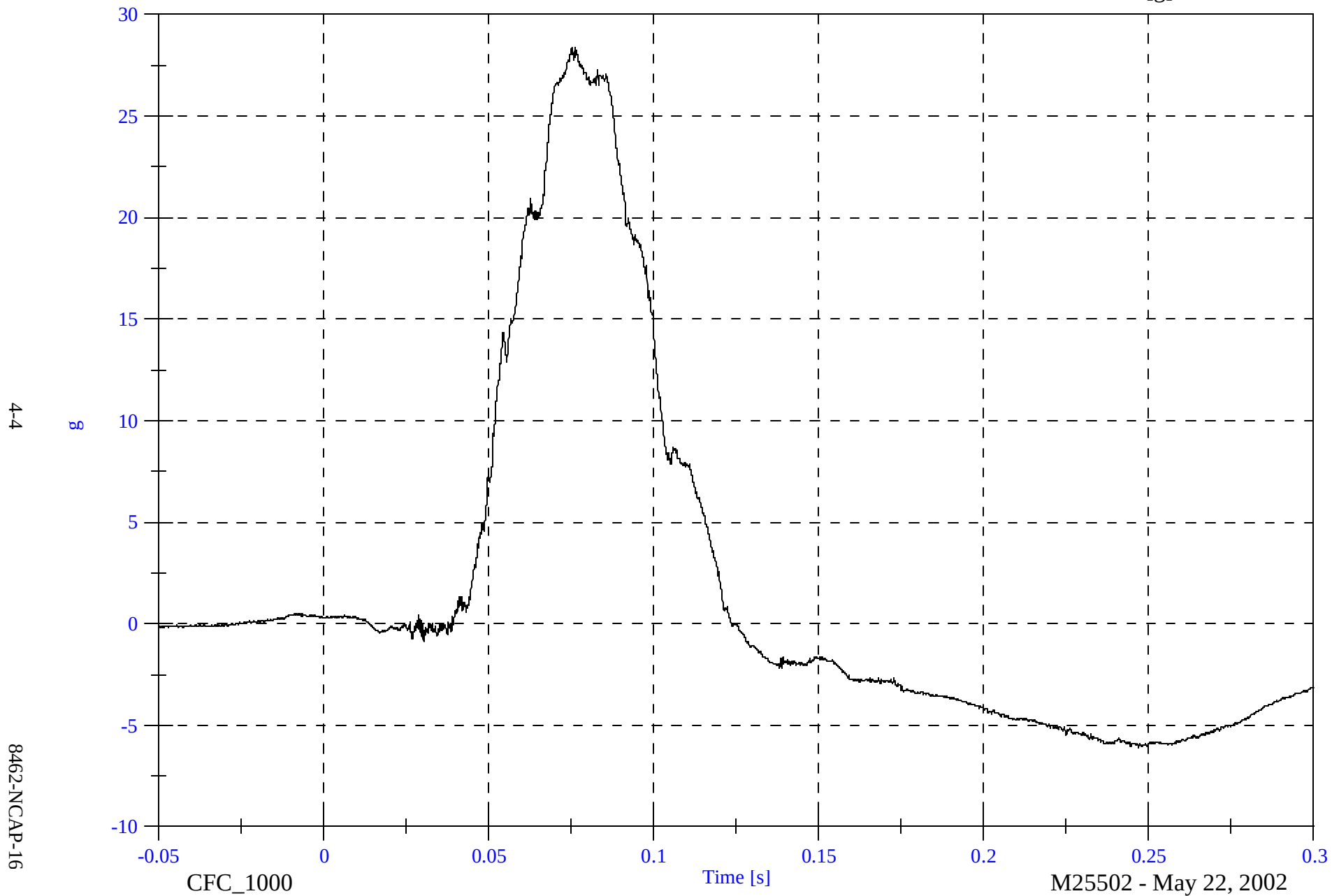
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Max: 28.4 [g] at 0.075 [s]

Min: -6.1 [g] at 0.247 [s]

P3 Head x

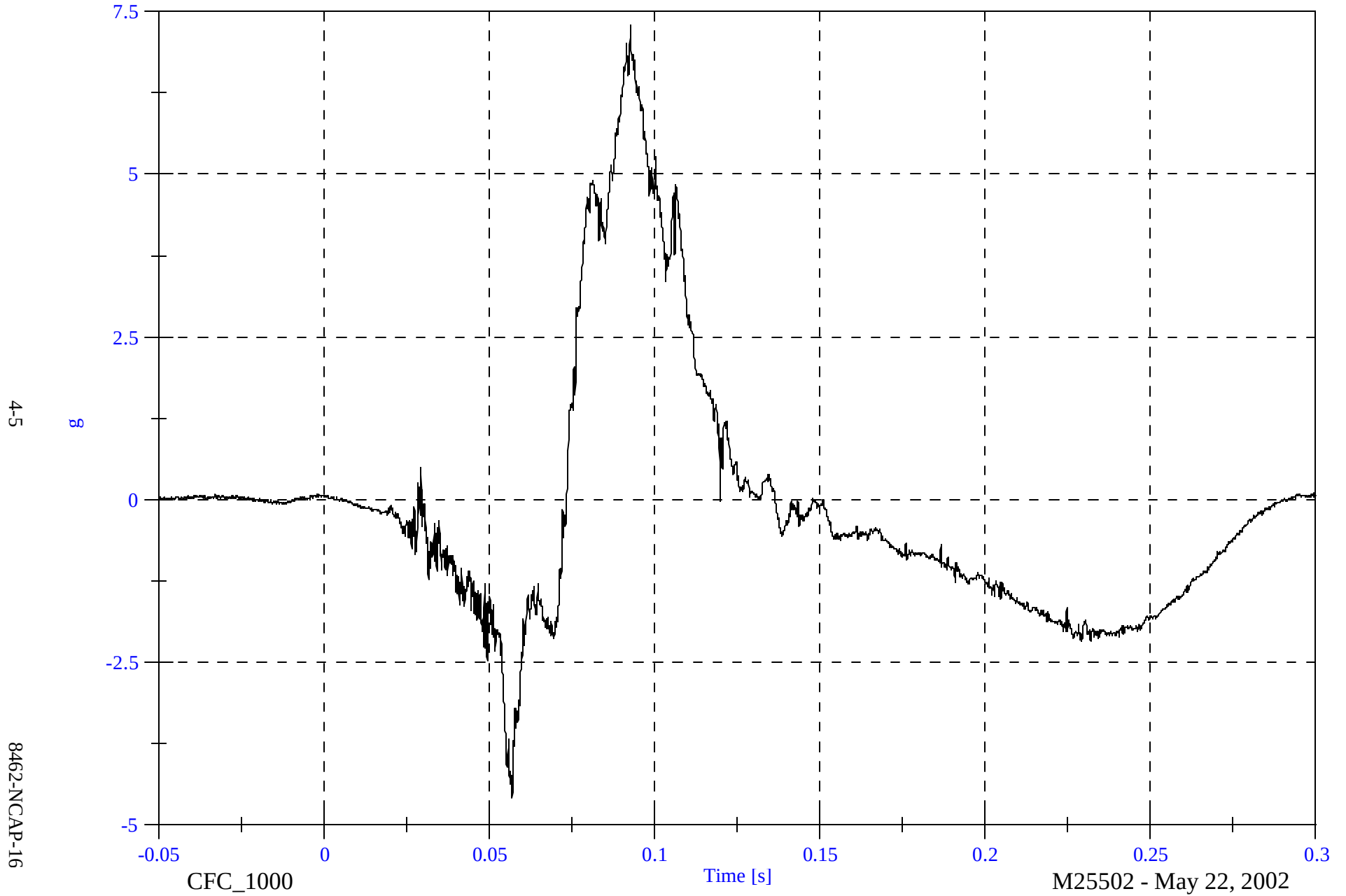


2002 NCAP Test 16 2002 Subaru Legacy

Max: 7.3 [g] at 0.093 [s]

Min: -4.6 [g] at 0.057 [s]

P3 Head y

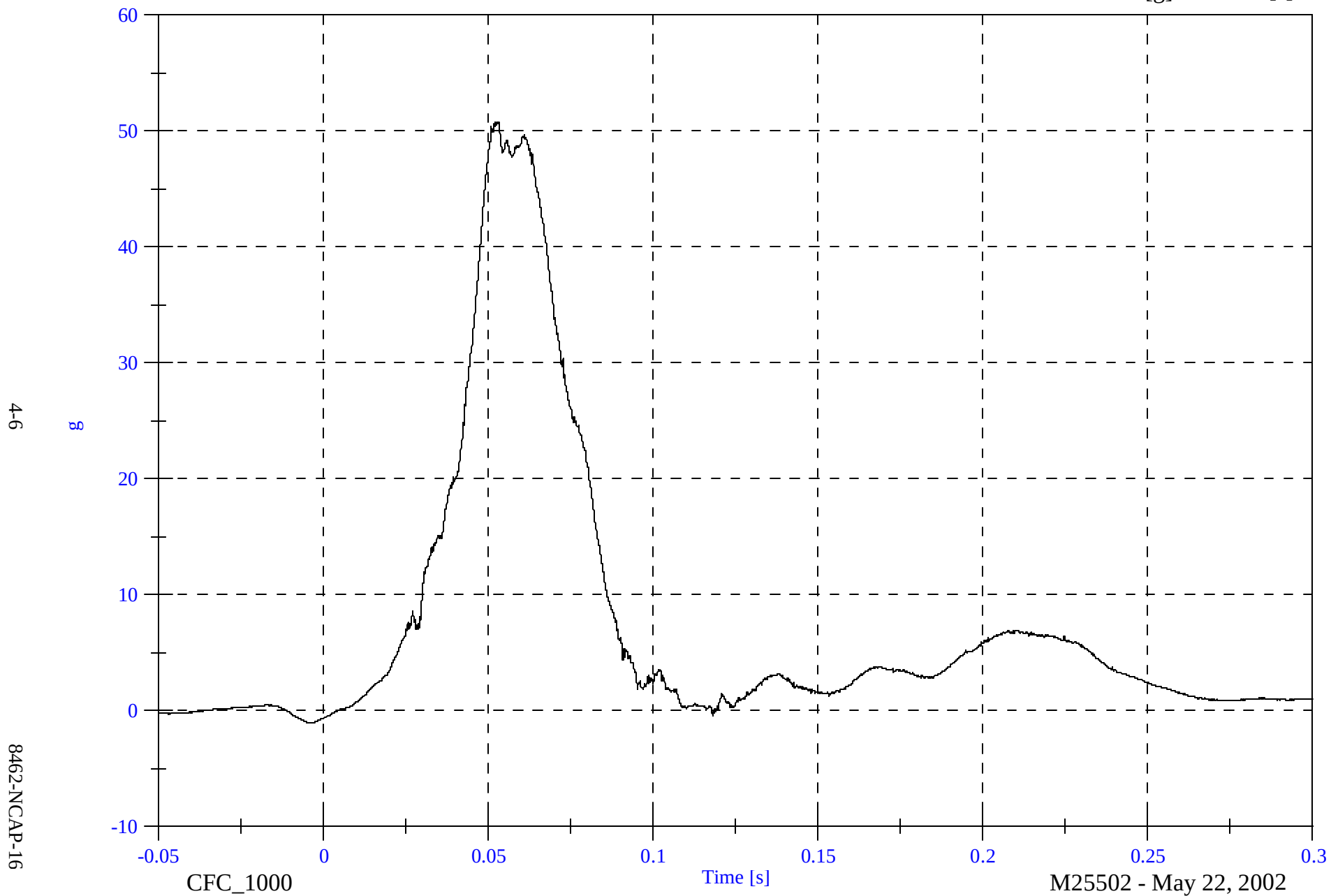


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Max: 50.8 [g] at 0.053 [s]

Min: -1.0 [g] at -0.003 [s]

P3 Head z



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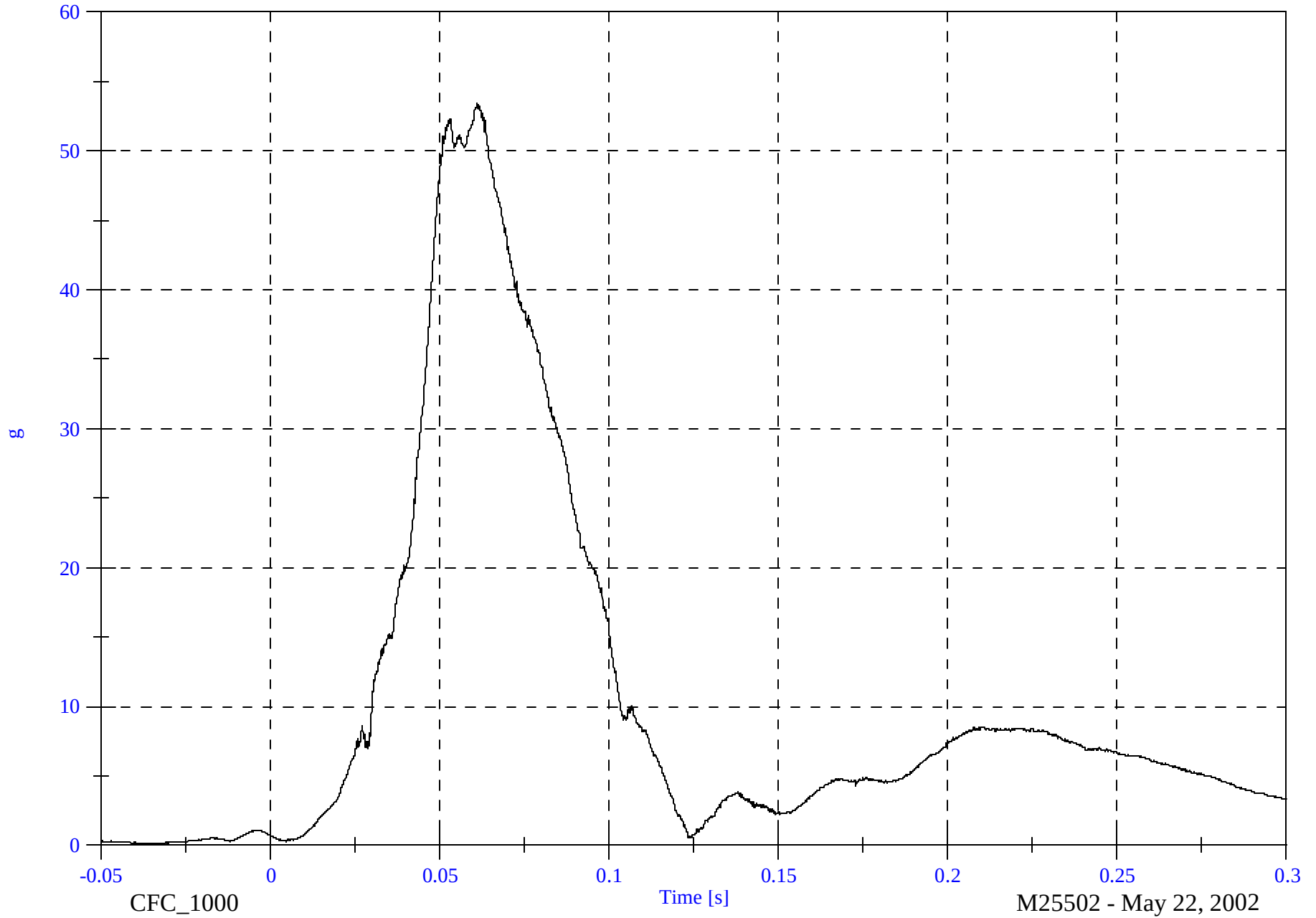
P3 Head Resultant

Max: 53.4 [g] at 0.061 [s]

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

4-7

8462-NCAP-16

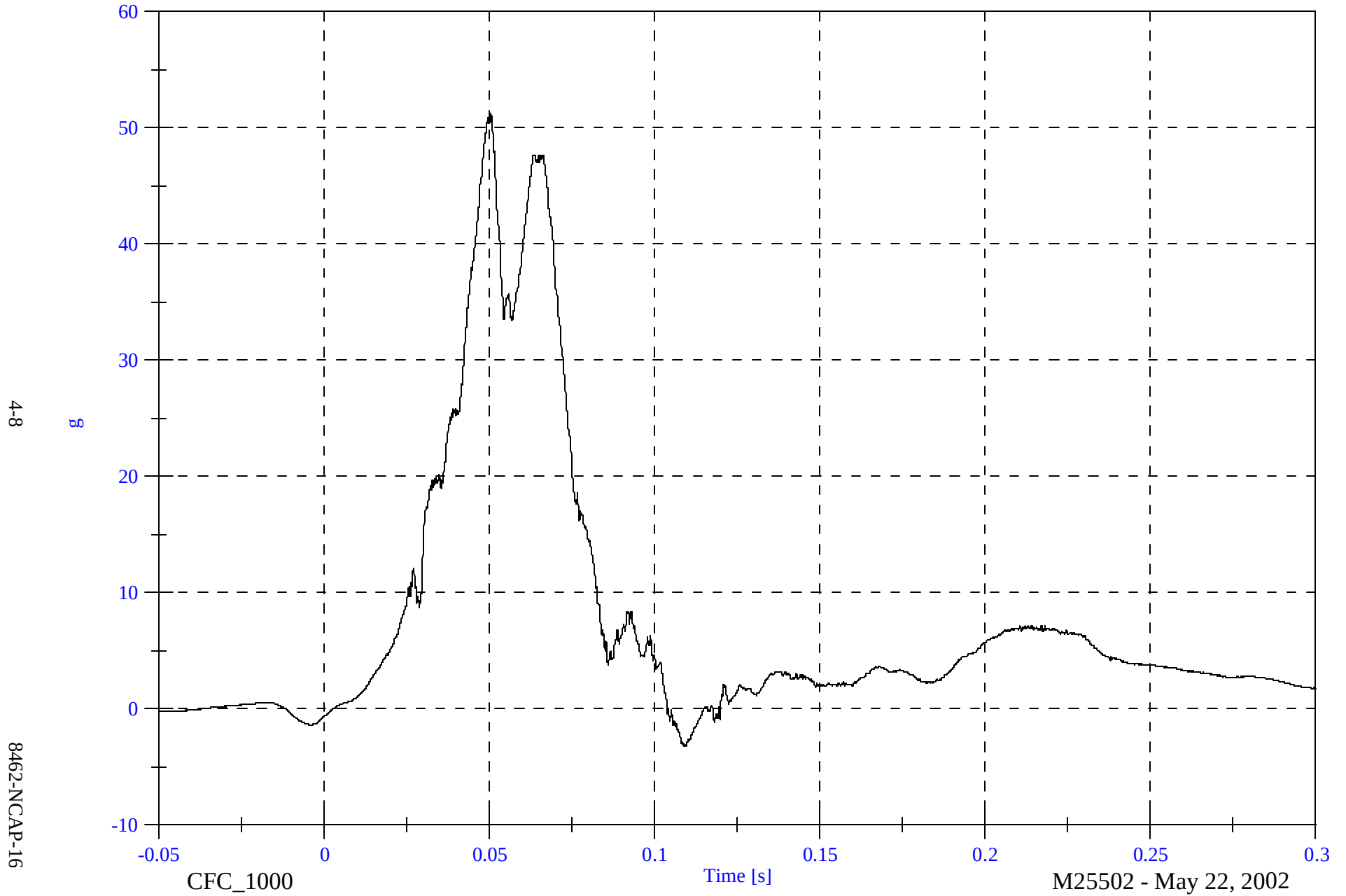


2002 NCAP Test 16 2002 Subaru Legacy

Max: 51.2 [g] at 0.050 [s]

Min: -3.2 [g] at 0.109 [s]

P3 Head Red z

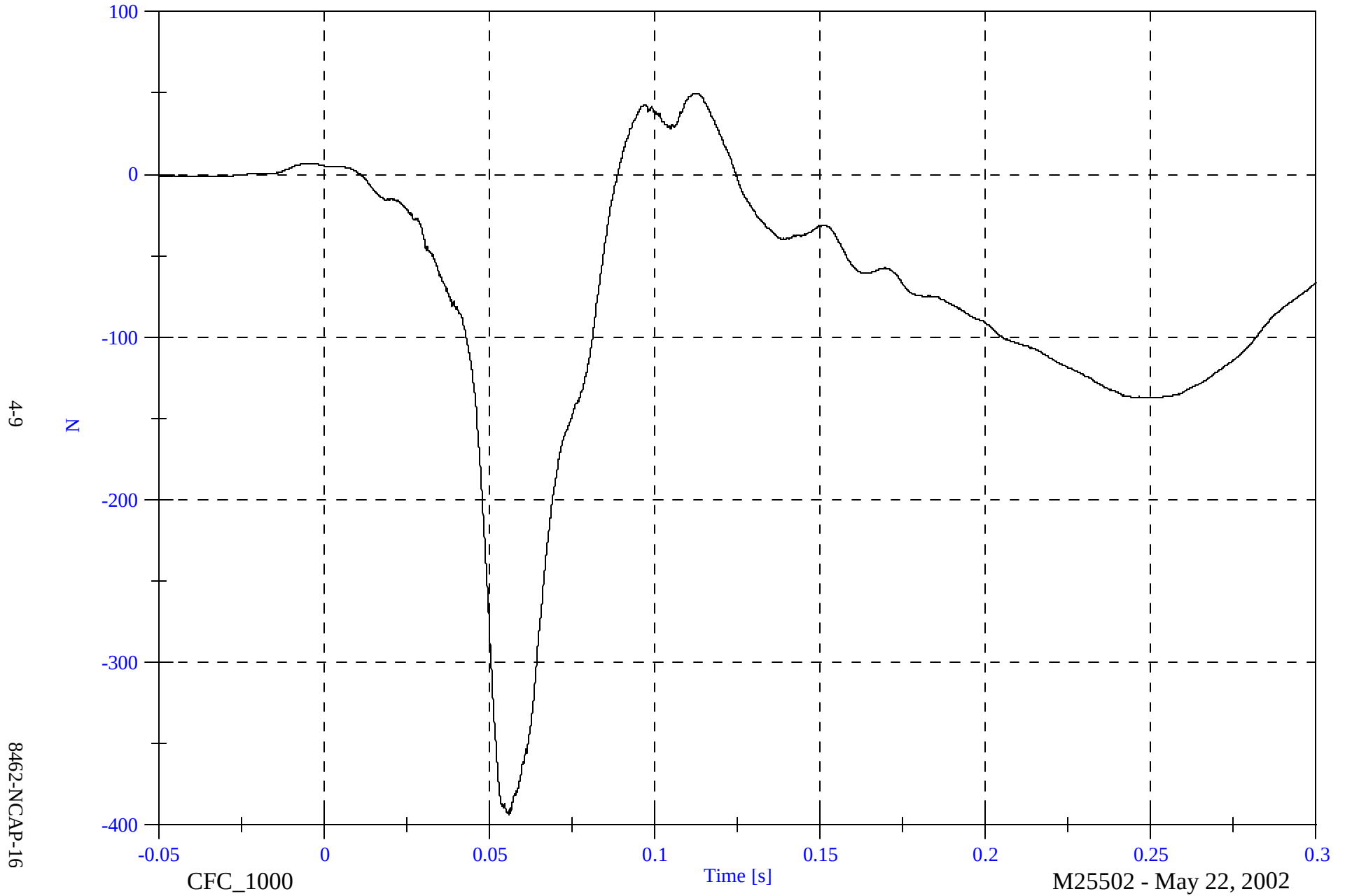


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Max: 49.9 [N] at 0.113 [s]

Min: -393.3 [N] at 0.056 [s]

P3 Upper Neck Fx



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Max: 100.1 [N] at 0.185 [s]

Min: -60.2 [N] at 0.057 [s]

P3 Upper Neck Fy



2002 NCAP Test 16 2002 Subaru Legacy

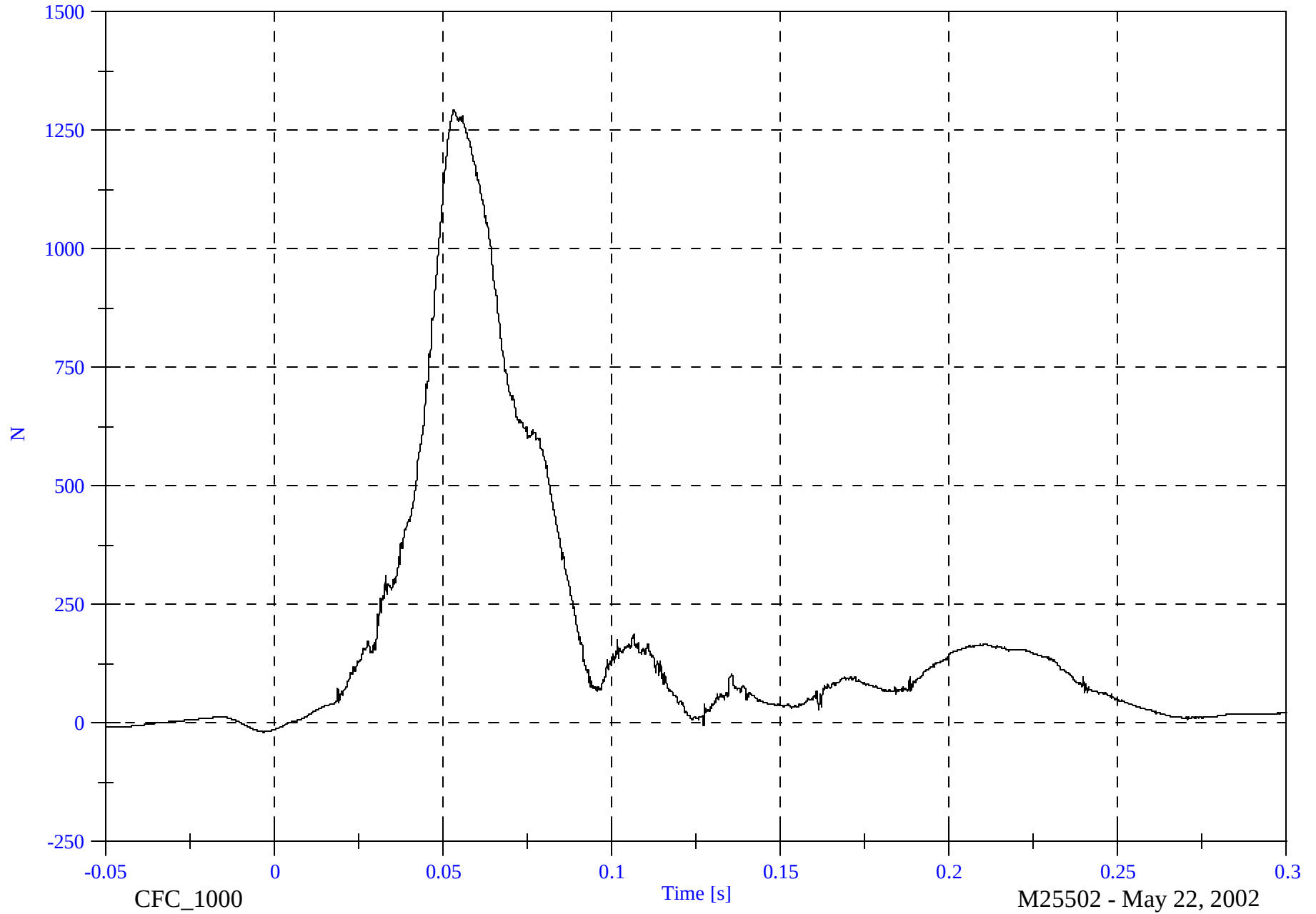
Max: 1292.9 [N] at 0.053 [s]

Min: -18.6 [N] at -0.003 [s]

P3 Upper Neck Fz

4-11

8462-NCAP-16



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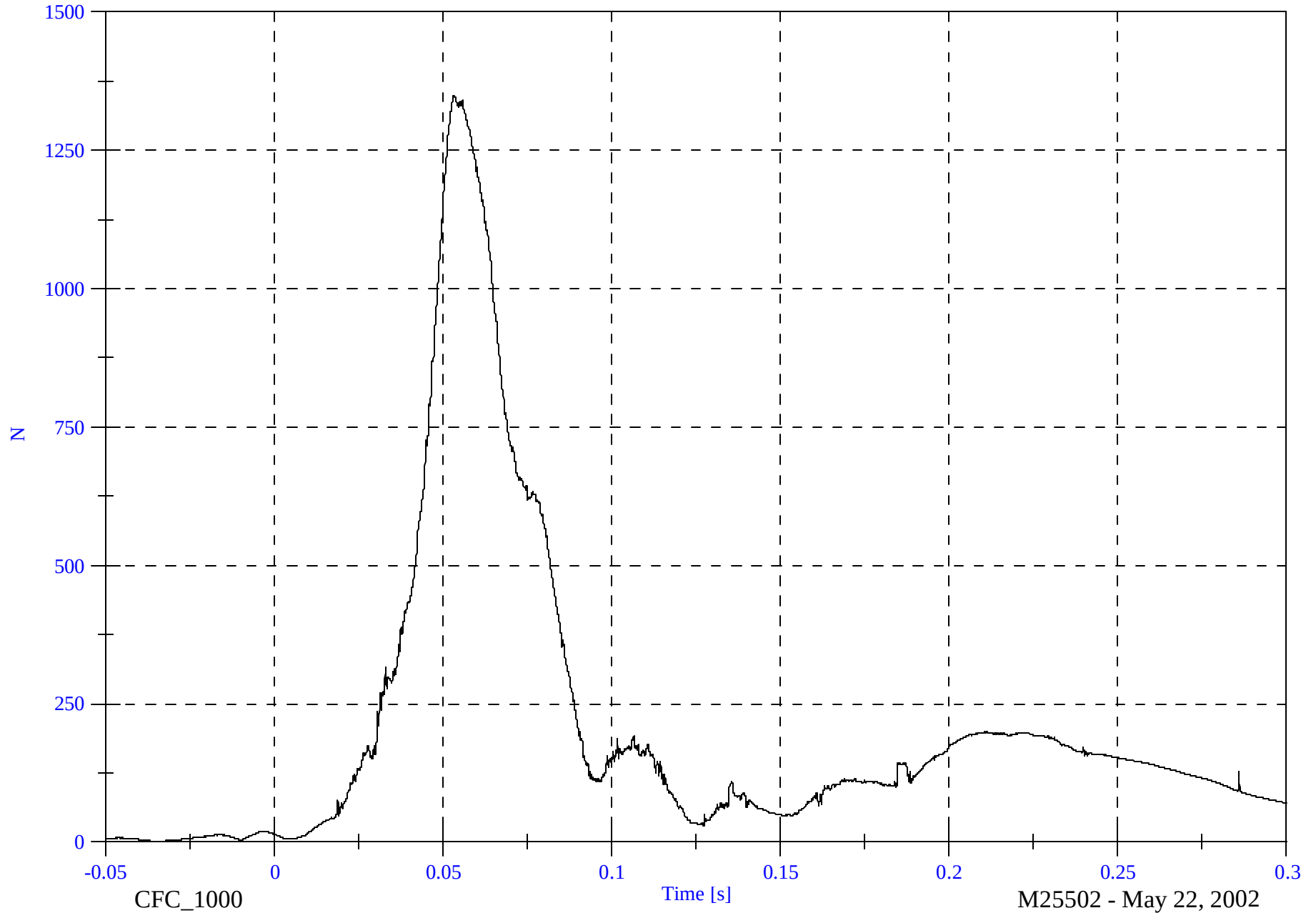
P3 Upper Neck F Resultant

Max: 1348.9 [N] at 0.053 [s]

Min: 1.3 [N] at -0.035 [s]

4-12

8462-NCAP-16



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P3 Upper Neck Mx

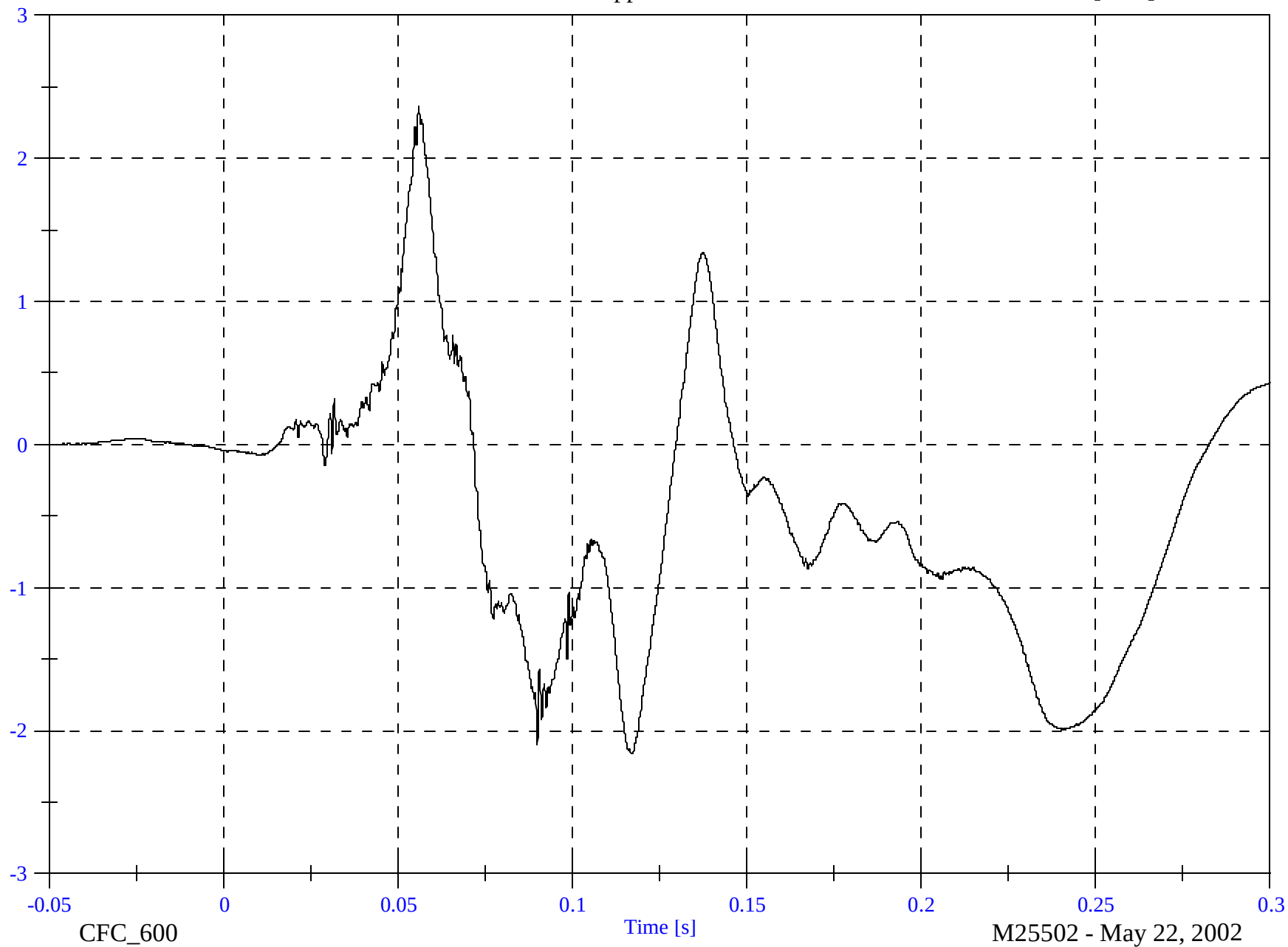
Max: 2.4 [N-m] at 0.056 [s]

Min: -2.2 [N-m] at 0.117 [s]

4-13

N-m

8462-NCAP-16

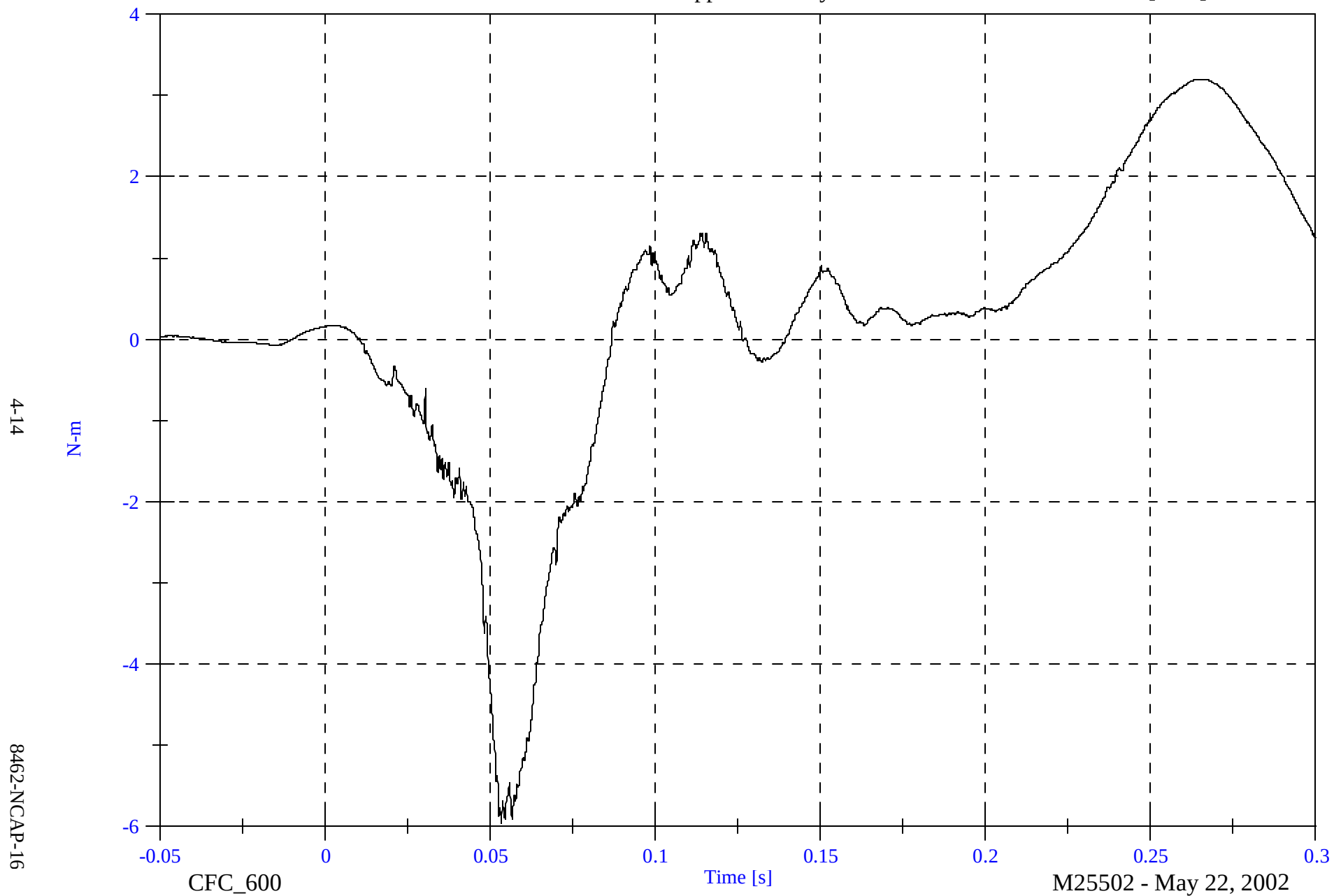


2002 NCAP Test 16 2002 Subaru Legacy

Max: 3.2 [N-m] at 0.266 [s]

Min: -6.0 [N-m] at 0.053 [s]

P3 Upper Neck My



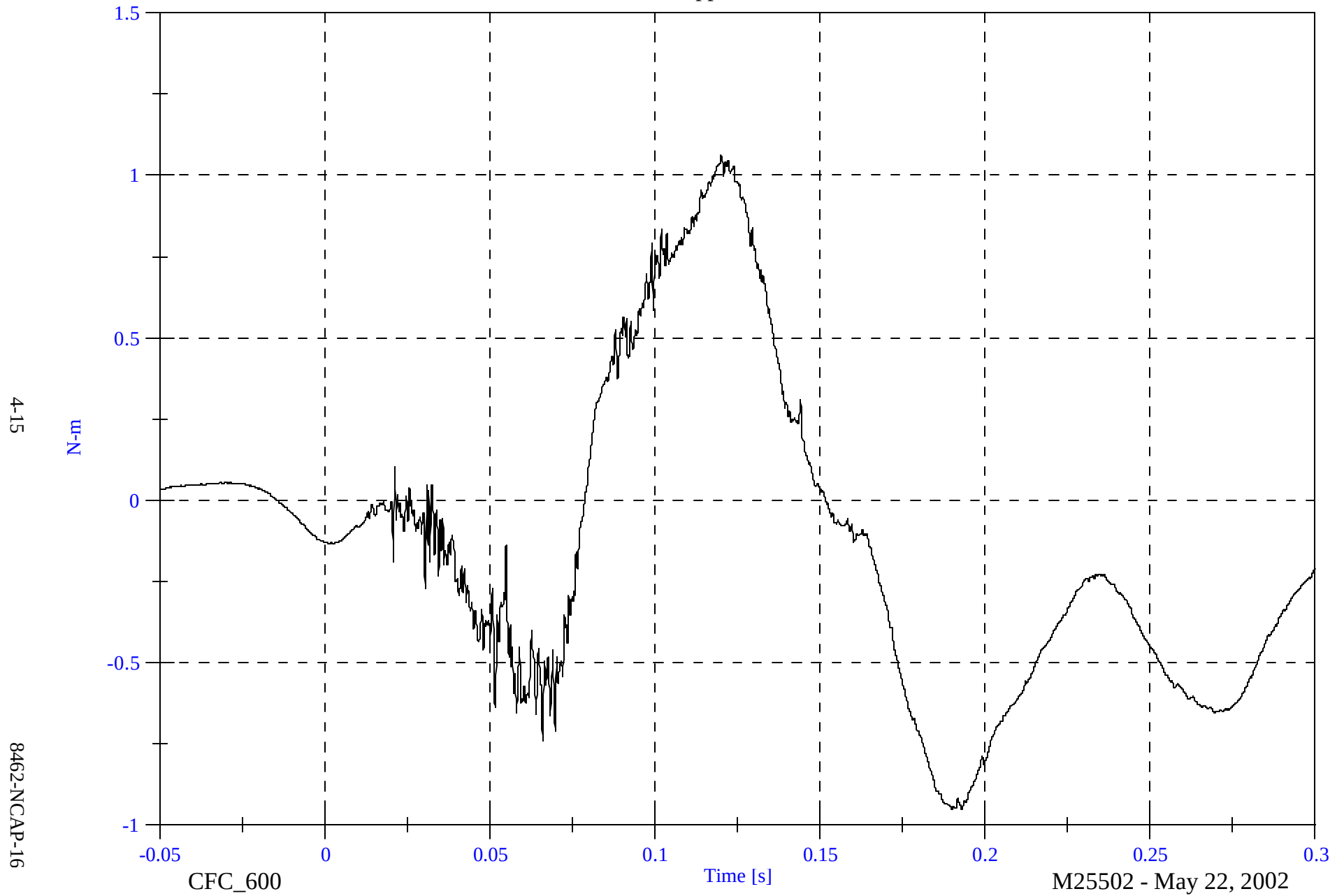
8462-NCAP-16

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P3 Upper Neck Mz

Max: 1.1 [N-m] at 0.120 [s]

Min: -1.0 [N-m] at 0.190 [s]



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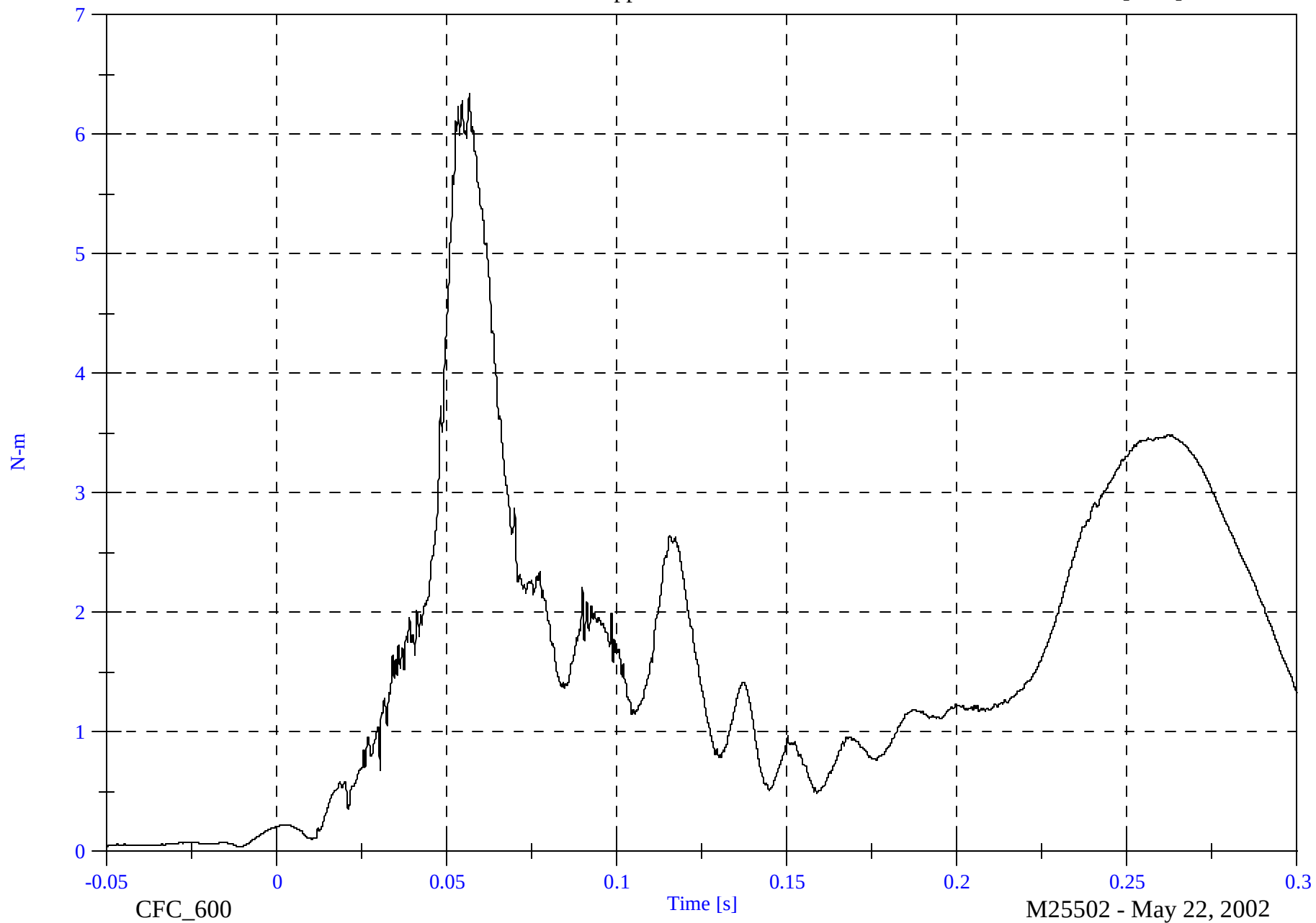
P3 Upper Neck M Resultant

Max: 6.3 [N-m] at 0.057 [s]

Min: 0.0 [N-m] at -0.011 [s]

4-16

8462-NCAP-16

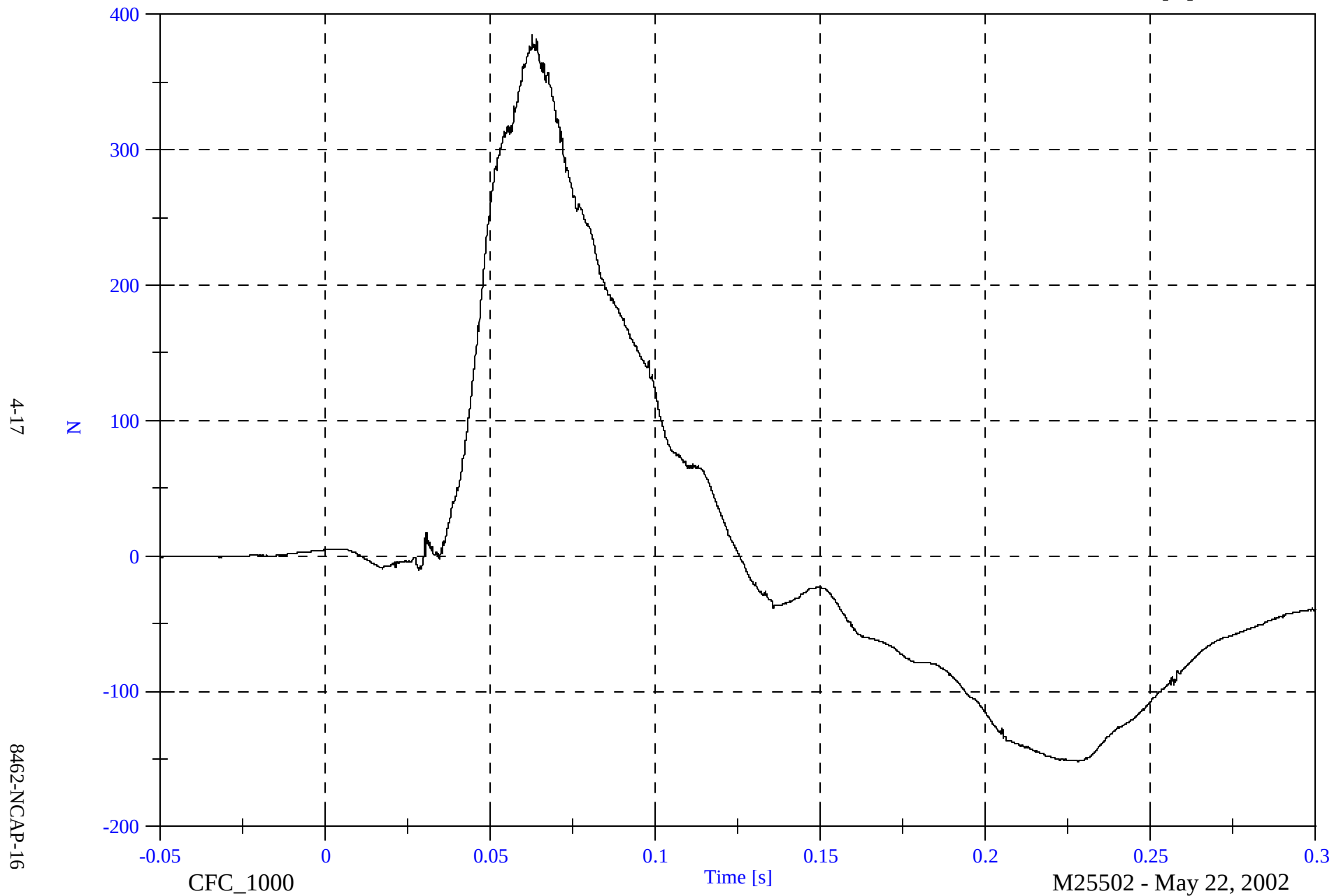


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Max: 385.0 [N] at 0.063 [s]

Min: -151.6 [N] at 0.228 [s]

P3 Lower Neck Fx



4-17

8462-NCAP-16

CFC_1000

Time [s]

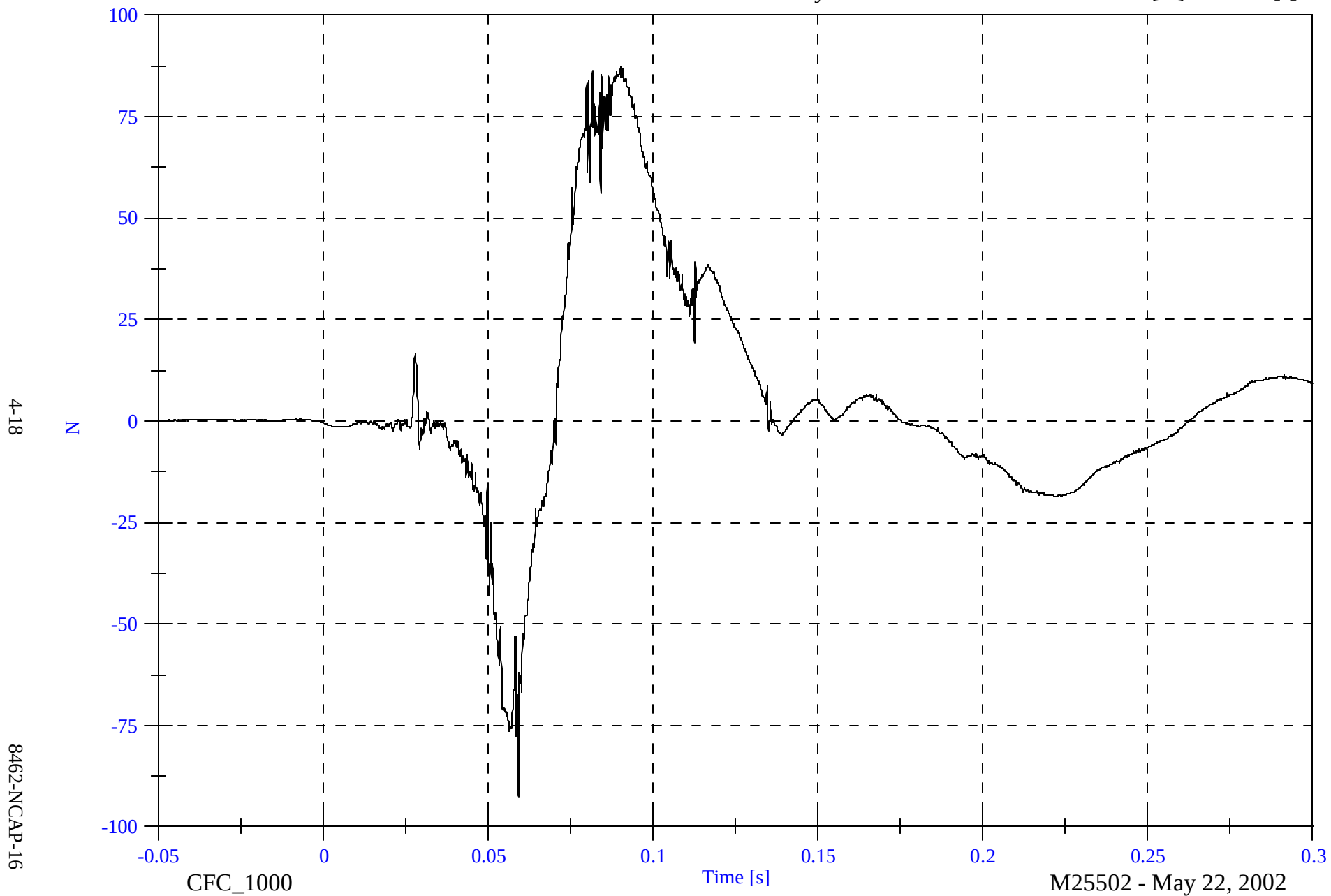
M25502 - May 22, 2002

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Max: 87.3 [N] at 0.090 [s]

Min: -92.6 [N] at 0.059 [s]

P3 Lower Neck Fy

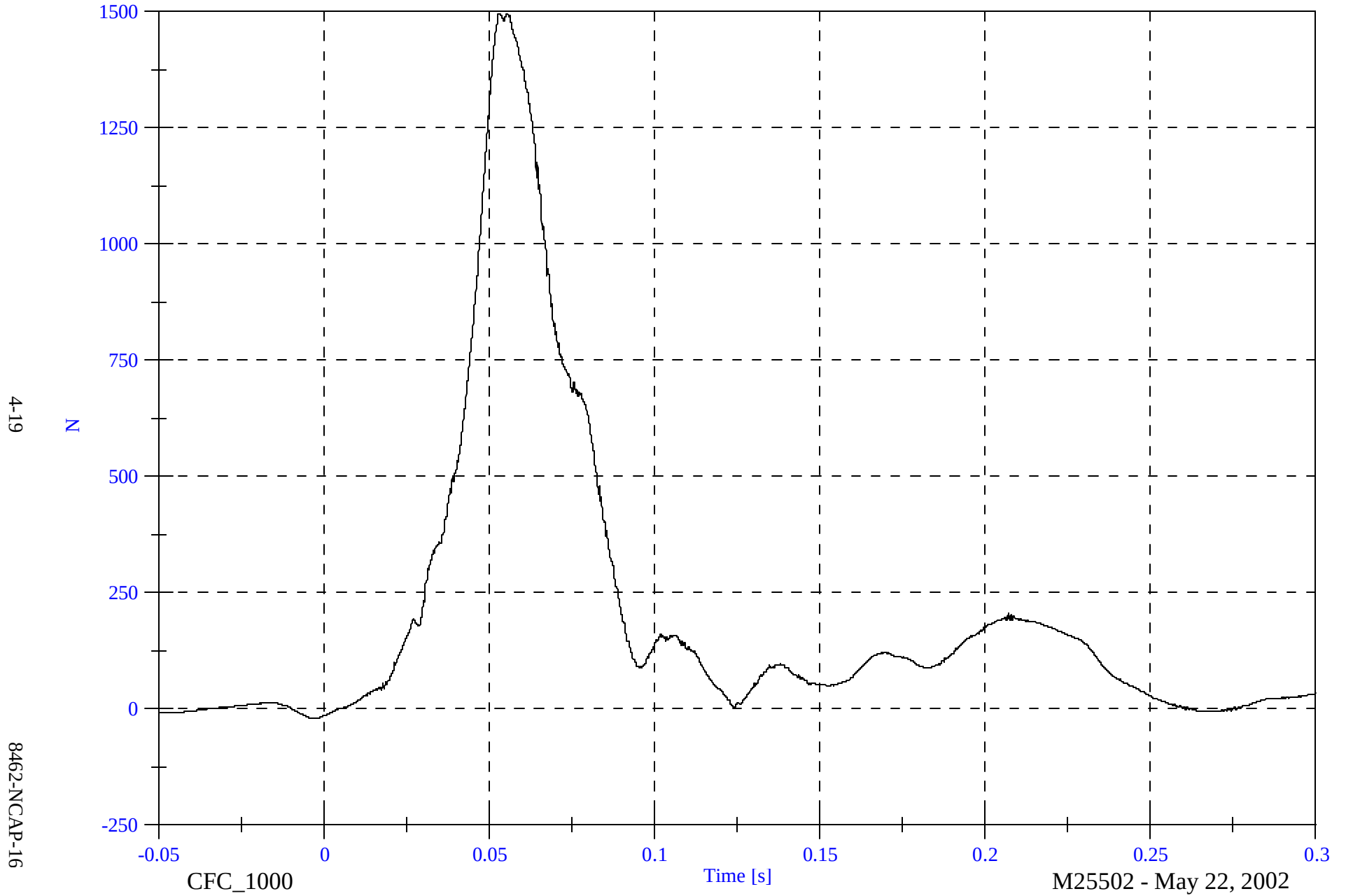


2002 NCAP Test 16 2002 Subaru Legacy

Max: 1496.3 [N] at 0.053 [s]

Min: -20.2 [N] at -0.003 [s]

P3 Lower Neck Fz

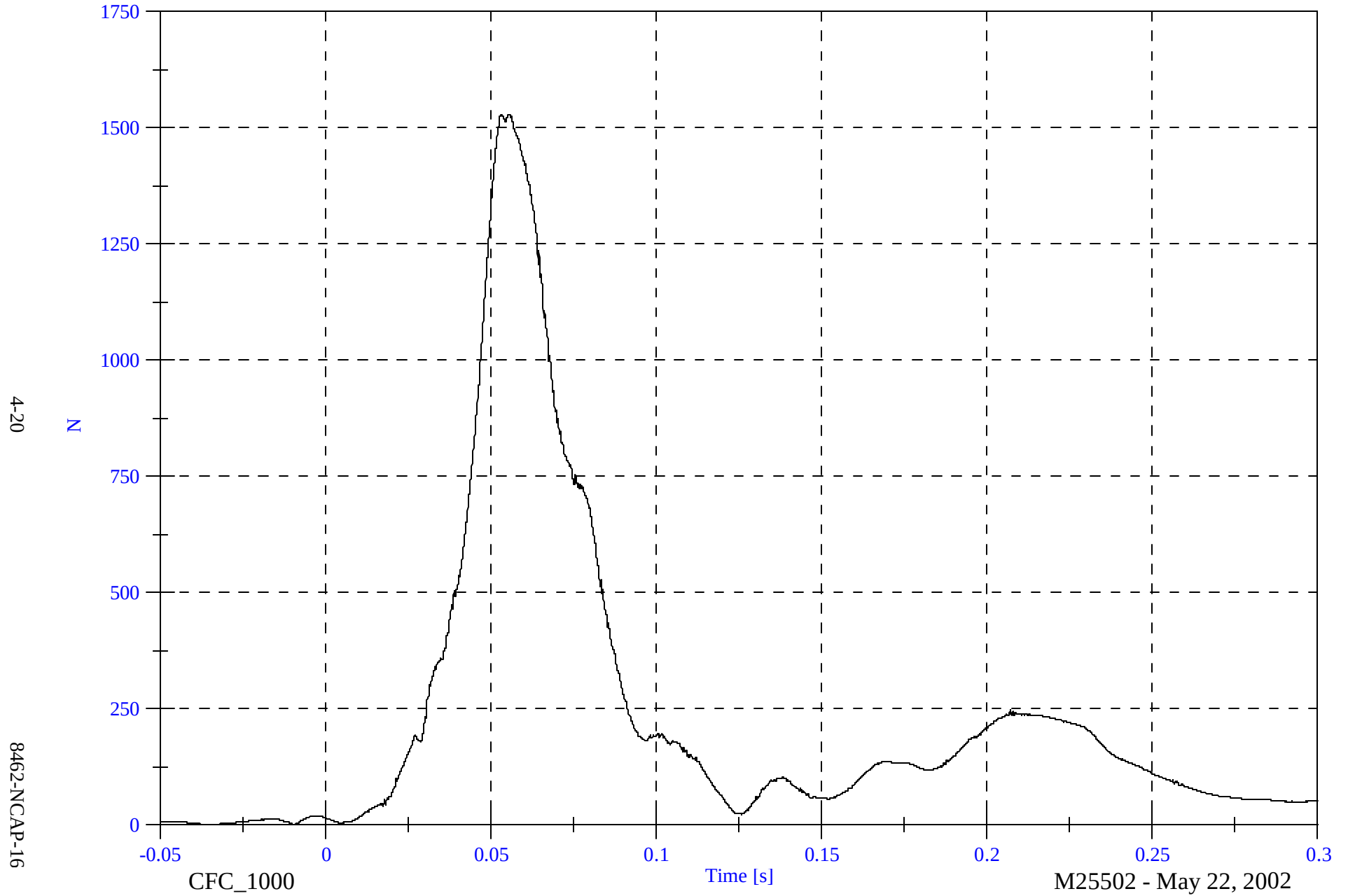


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P3 Lower Neck F Resultant

Max: 1529.2 [N] at 0.056 [s]

Min: 0.6 [N] at -0.035 [s]



2002 NCAP Test 16 2002 Subaru Legacy

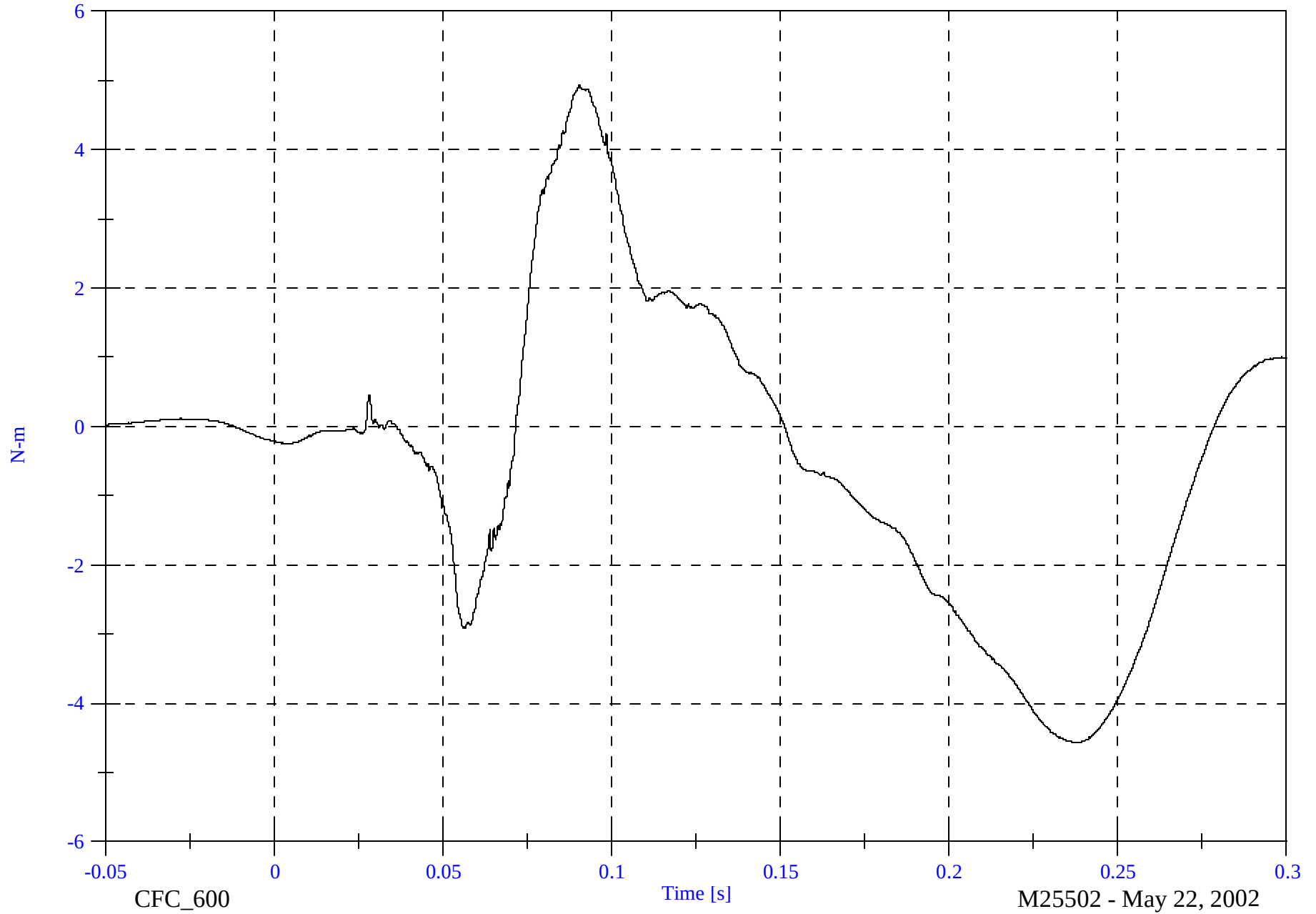
Max: 4.9 [N-m] at 0.090 [s]

Min: -4.6 [N-m] at 0.238 [s]

P3 Lower Neck Mx

4-21

8462-NCAP-16



2002 NCAP Test 16 2002 Subaru Legacy

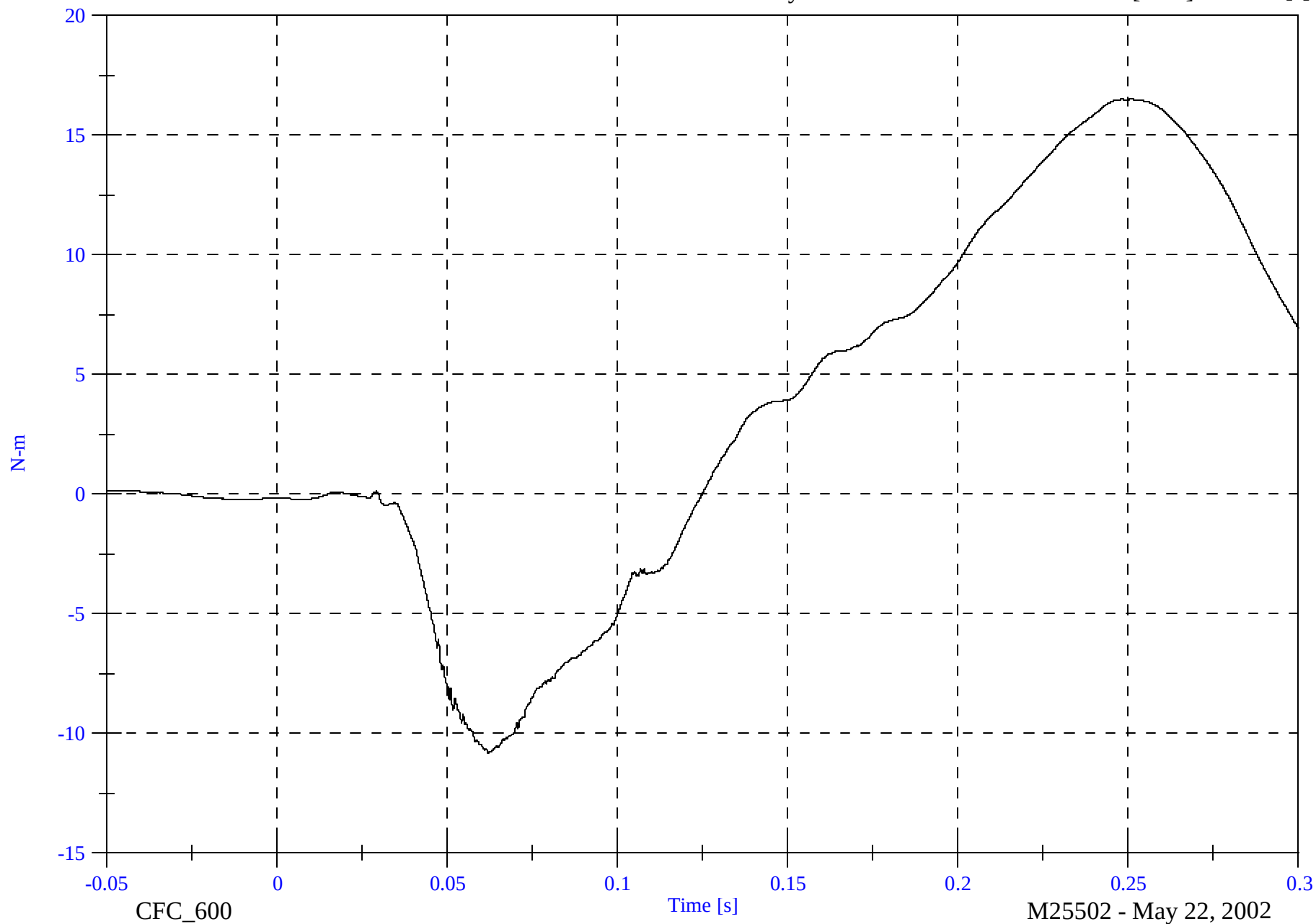
P3 Lower Neck My

Max: 16.5 [N-m] at 0.251 [s]

Min: -10.8 [N-m] at 0.062 [s]

4-22

8462-NCAP-16

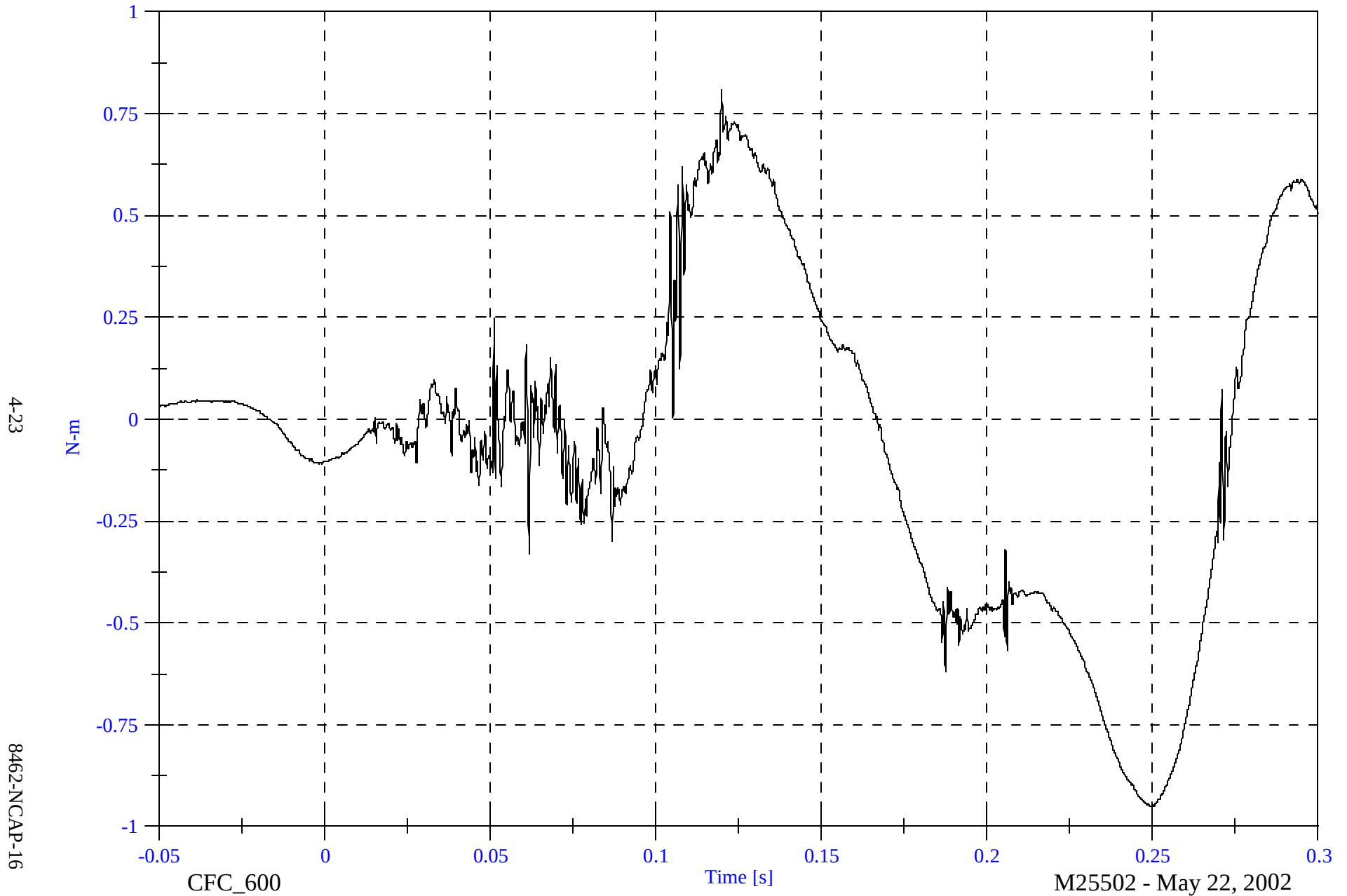


2002 NCAP Test 16 2002 Subaru Legacy

Max: 0.8 [N-m] at 0.120 [s]

Min: -1.0 [N-m] at 0.249 [s]

P3 Lower Neck Mz



2002 NCAP Test 16 2002 Subaru Legacy

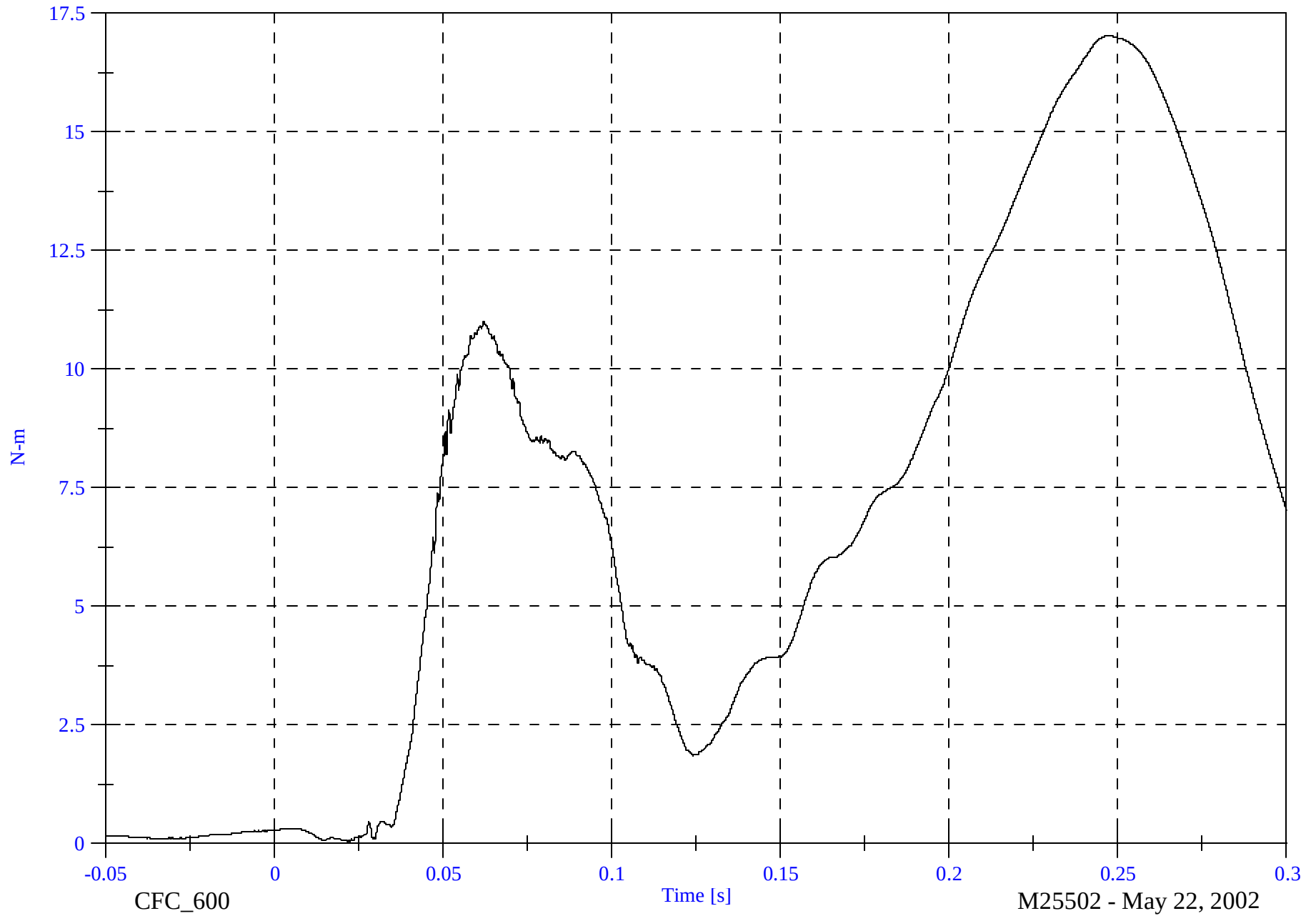
P3 Lower Neck M Resultant

Max: 17.0 [N-m] at 0.248 [s]

Min: 0.0 [N-m] at 0.022 [s]

4-24

8462-NCAP-16

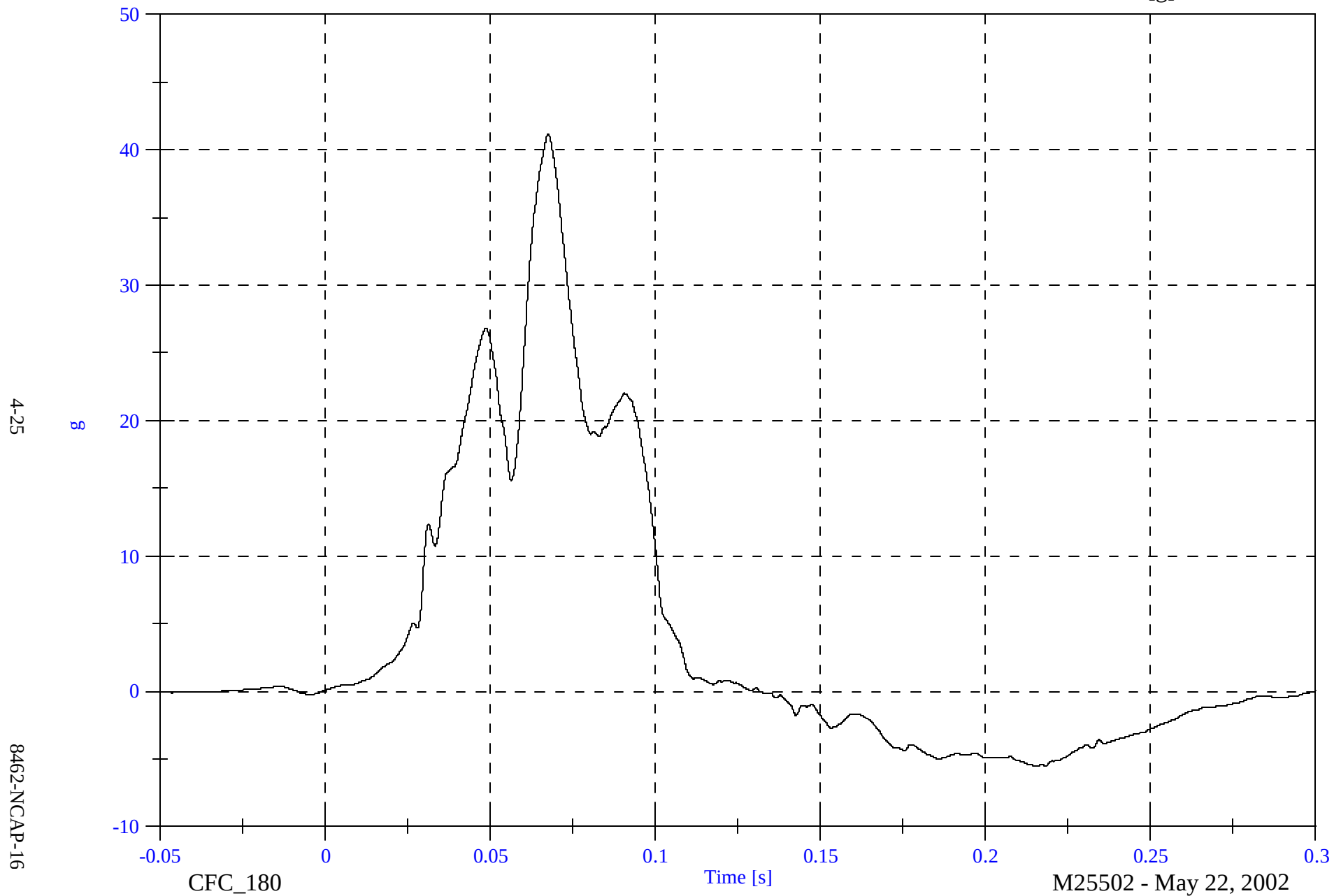


2002 NCAP Test 16 2002 Subaru Legacy

Max: 41.1 [g] at 0.068 [s]

Min: -5.6 [g] at 0.218 [s]

P3 Chest x



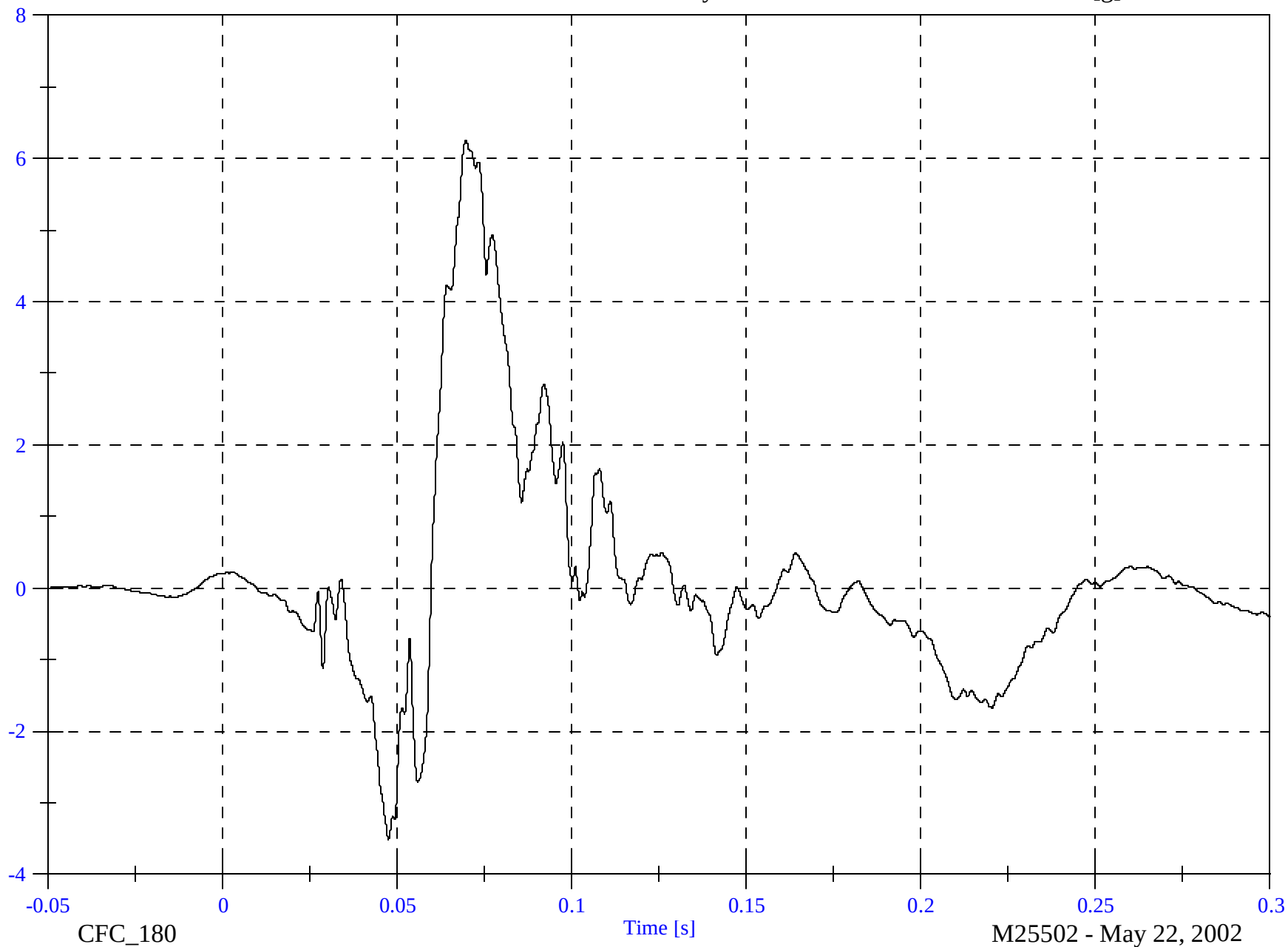
8462-NCAP-16

2002 NCAP Test 16 2002 Subaru Legacy

Max: 6.3 [g] at 0.070 [s]

Min: -3.5 [g] at 0.047 [s]

P3 Chest y



4-26

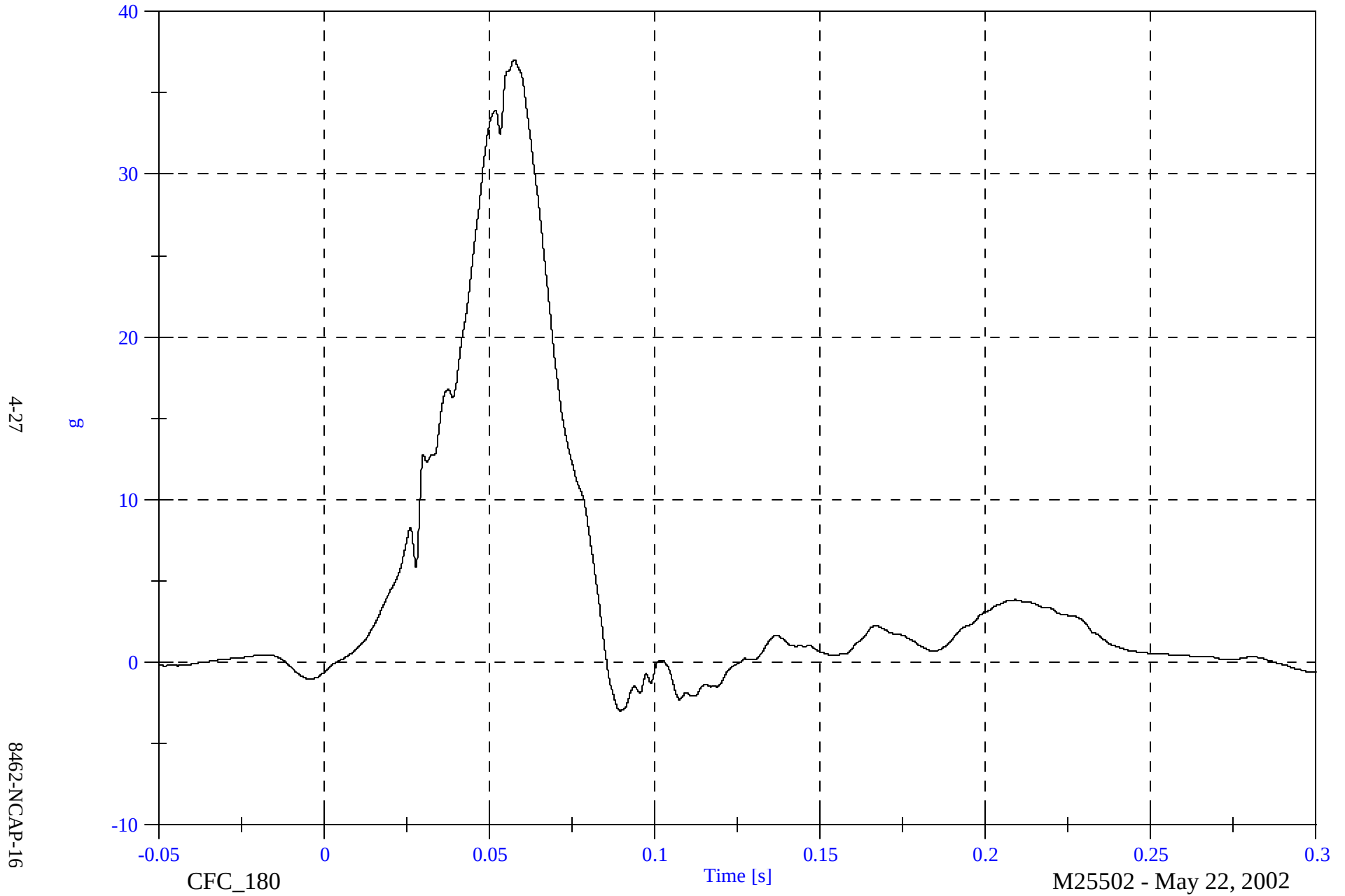
8462-NCAP-16

2002 NCAP Test 16 2002 Subaru Legacy

Max: 37.1 [g] at 0.057 [s]

Min: -3.0 [g] at 0.090 [s]

P3 Chest z



2002 NCAP Test 16 2002 Subaru Legacy

P3 Chest Resultant

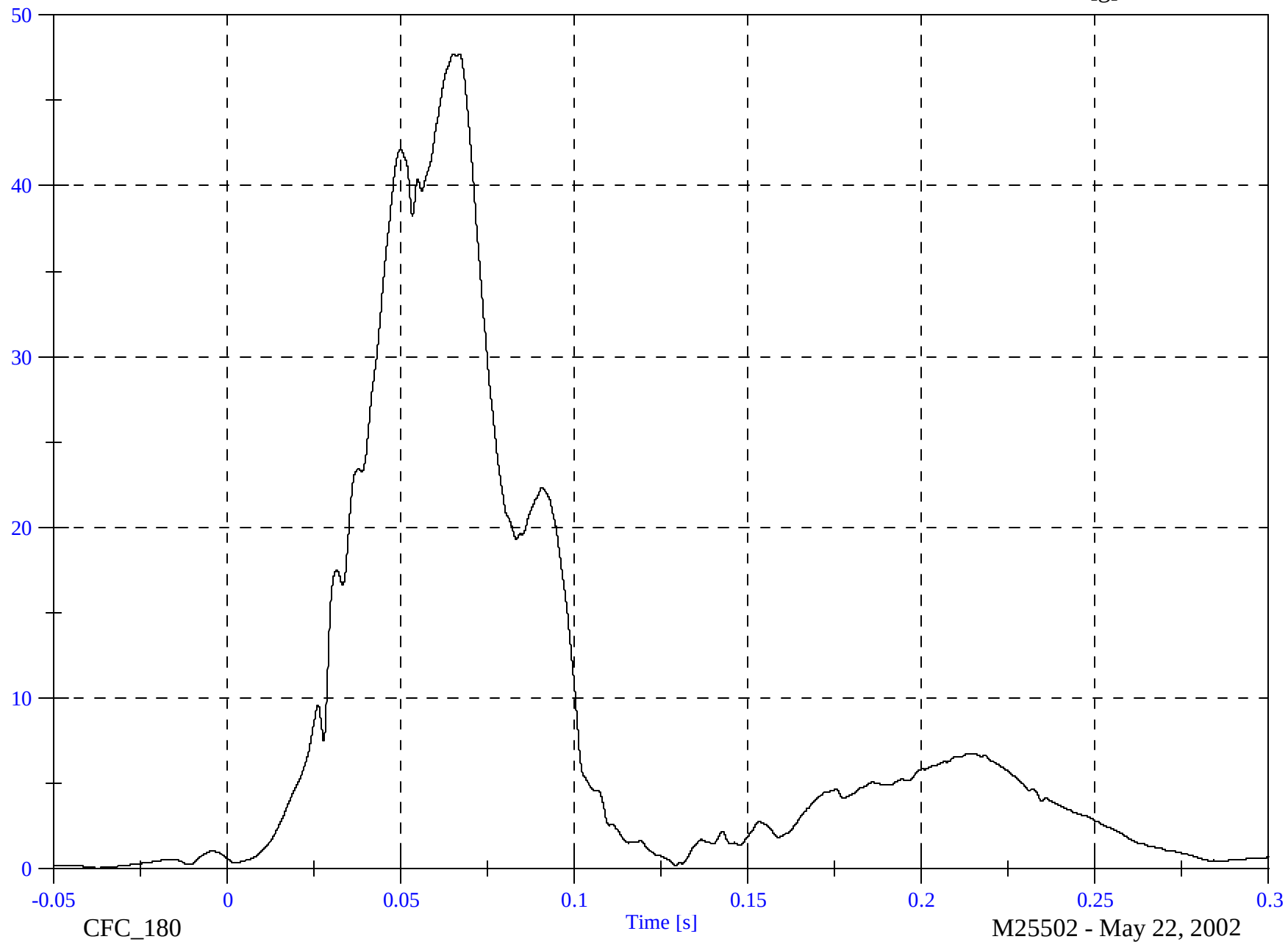
Max: 47.7 [g] at 0.067 [s]

Min: 0.1 [g] at -0.037 [s]

4-28

8462-NCAP-16

g



CFC_180

Time [s]

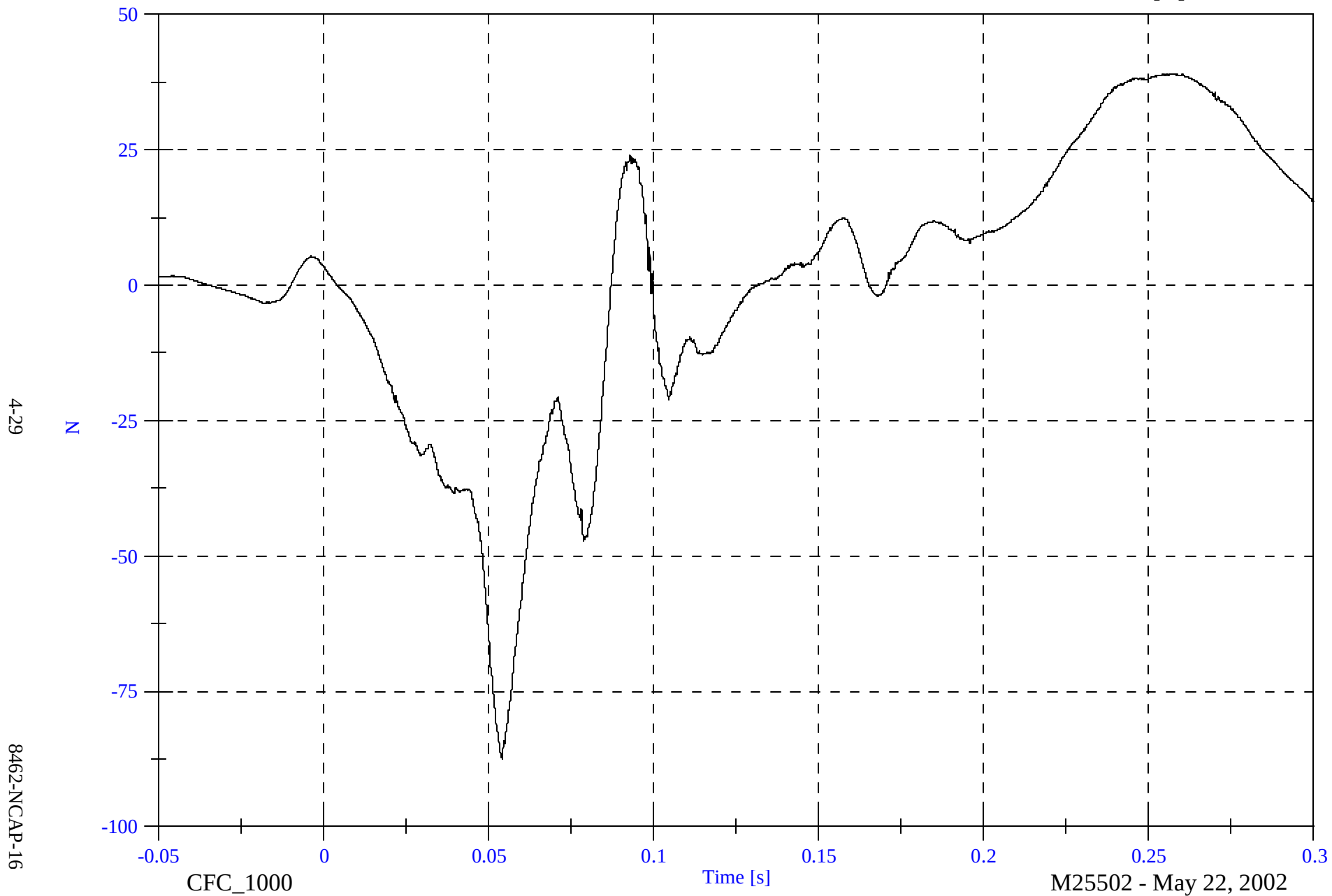
M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

Max: 39.0 [N] at 0.258 [s]

Min: -87.4 [N] at 0.054 [s]

P3 Lumbar Fx

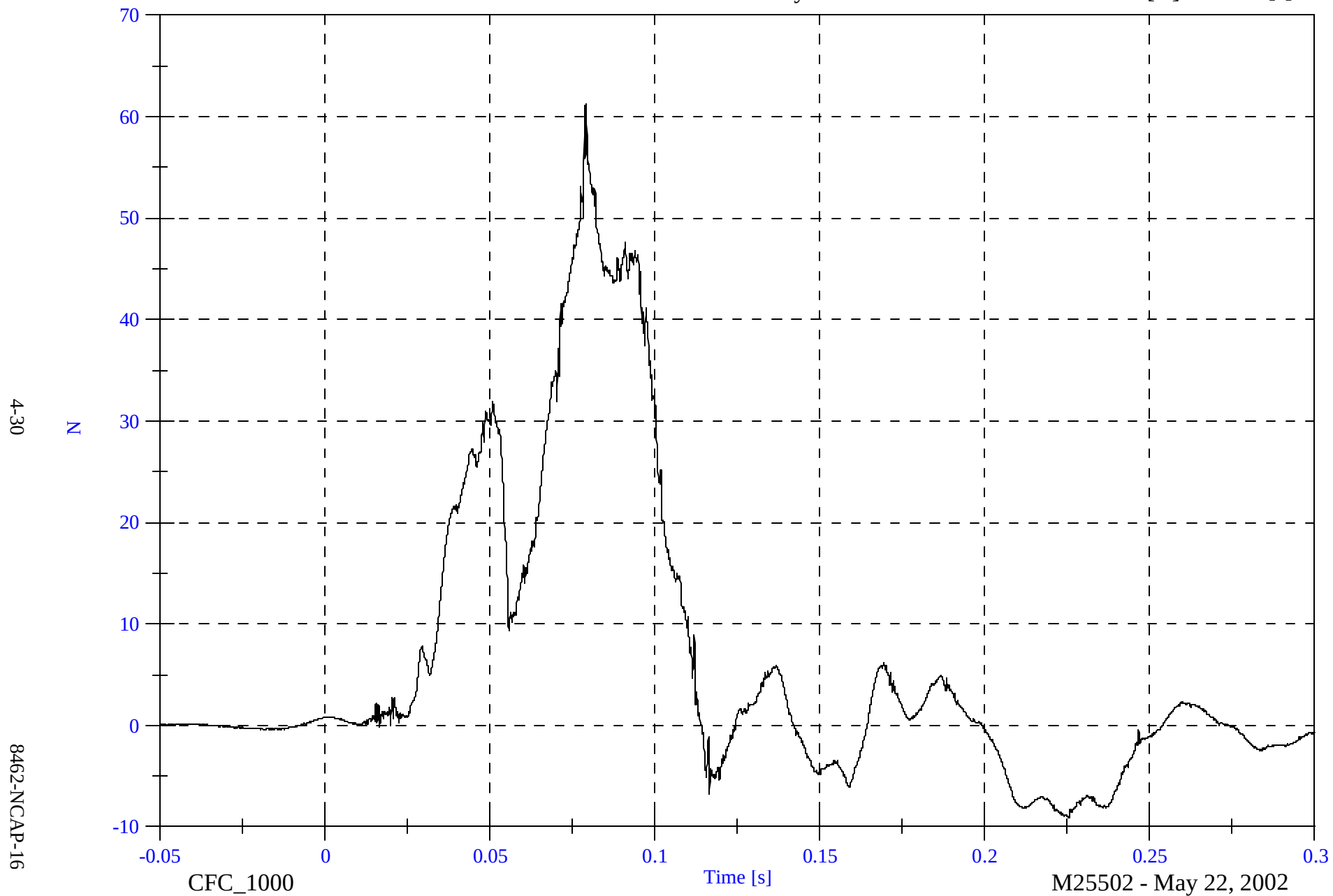


2002 NCAP Test 16 2002 Subaru Legacy

Max: 61.2 [N] at 0.079 [s]

Min: -9.1 [N] at 0.225 [s]

P3 Lumbar Fy



2002 NCAP Test 16 2002 Subaru Legacy

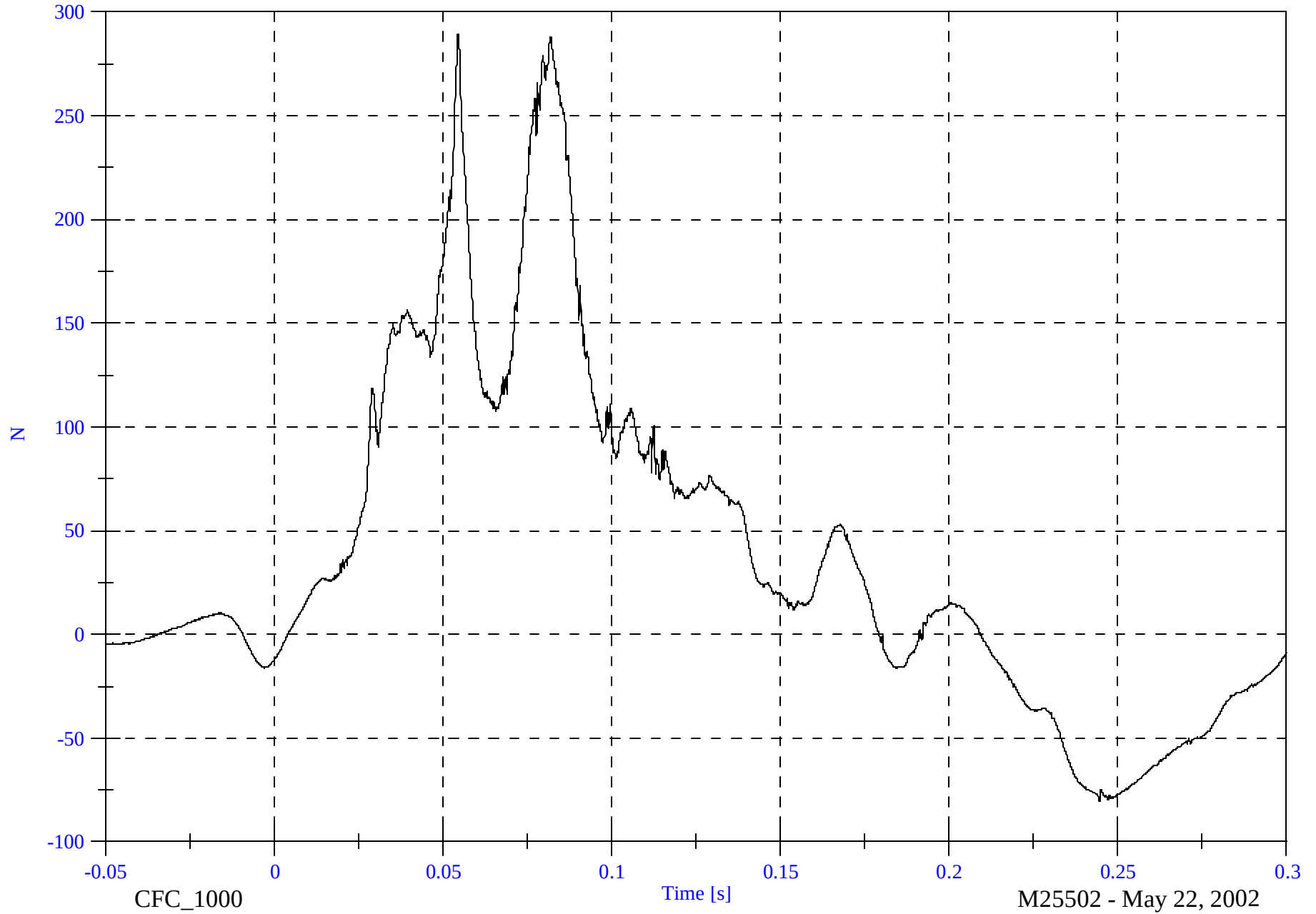
Max: 289.0 [N] at 0.054 [s]

P3 Lumbar Fz

Min: -80.7 [N] at 0.244 [s]

4-31

8462-NCAP-16



2002 NCAP Test 16 2002 Subaru Legacy

Max: 302.1 [N] at 0.054 [s]

Min: 0.1 [N] at -0.034 [s]

P3 Lumbar F Resultant



2002 NCAP Test 16 2002 Subaru Legacy

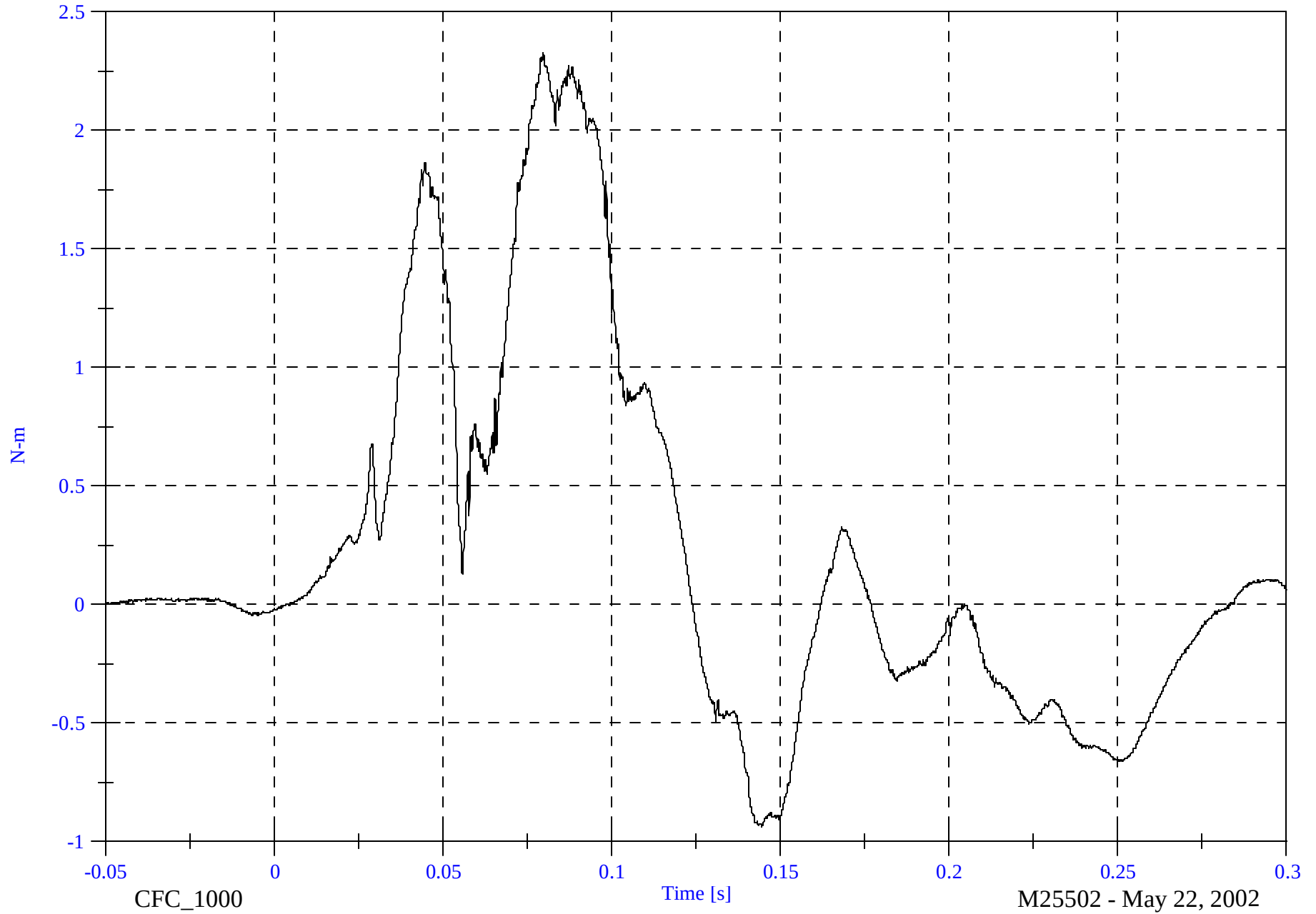
Max: 2.3 [N-m] at 0.080 [s]

Min: -0.9 [N-m] at 0.144 [s]

P3 Lumbar Mx

4-33

8462-NCAP-16



2002 NCAP Test 16 2002 Subaru Legacy

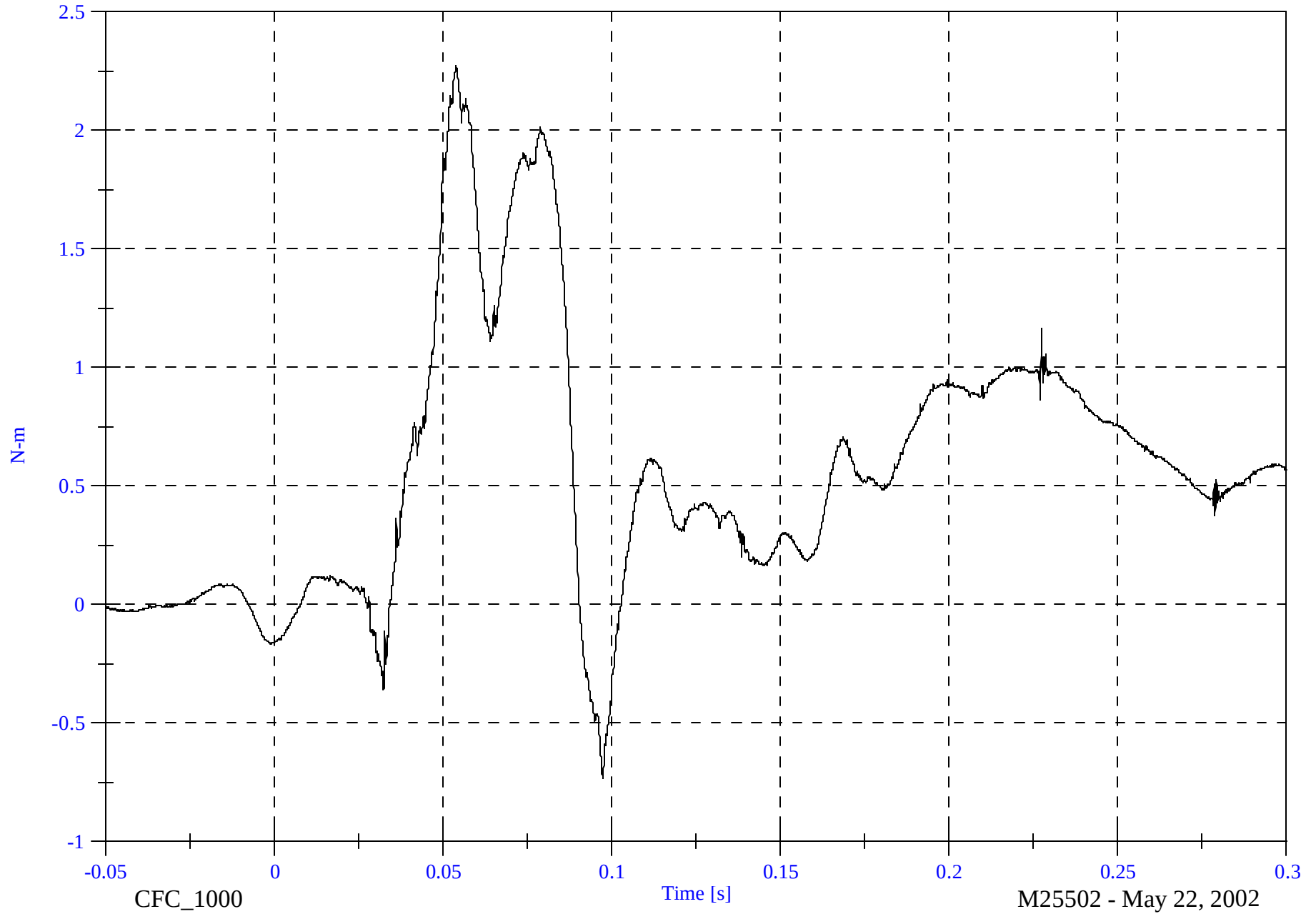
Max: 2.3 [N-m] at 0.054 [s]

Min: -0.7 [N-m] at 0.097 [s]

P3 Lumbar My

4-34

8462-NCAP-16

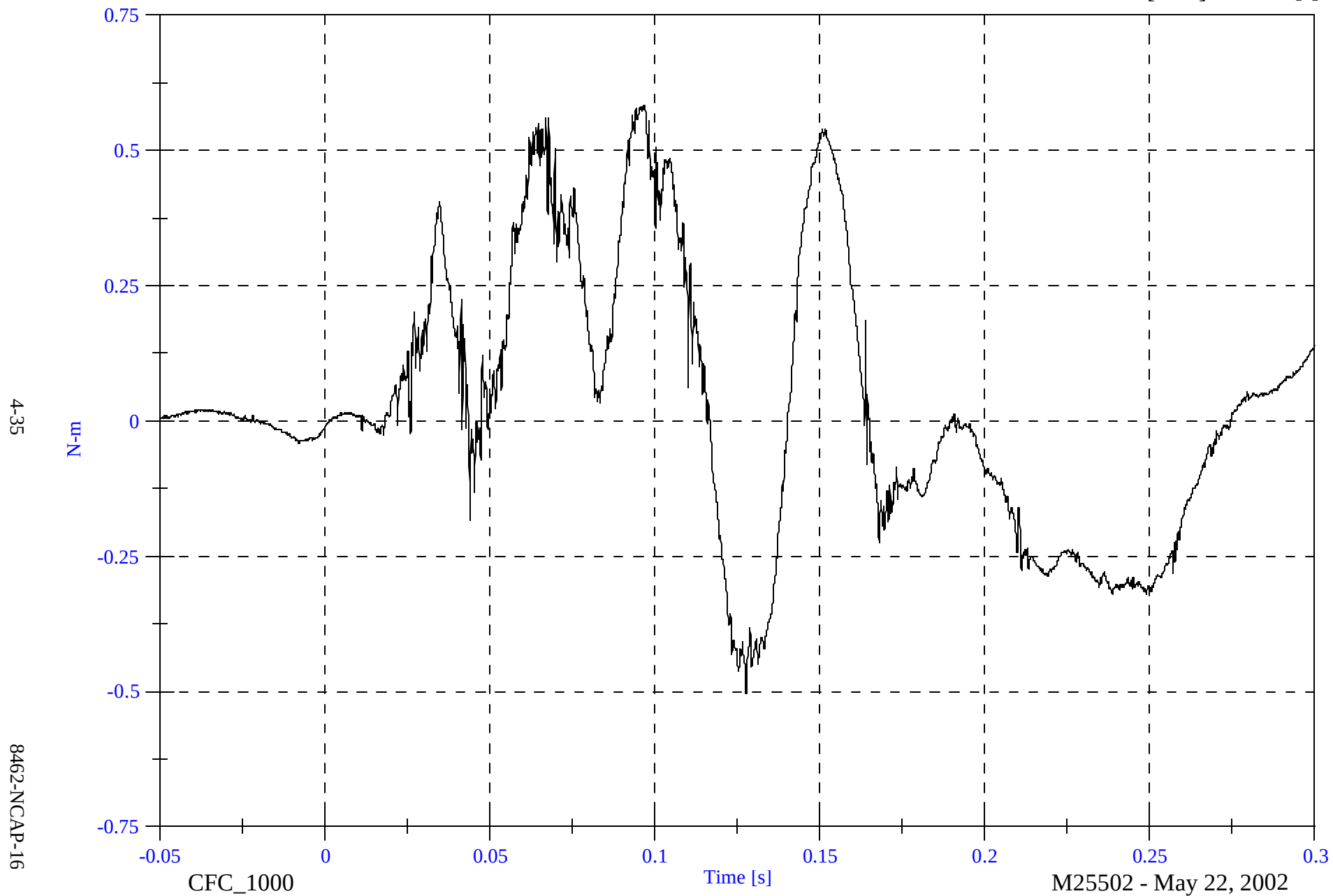


2002 NCAP Test 16 2002 Subaru Legacy

Max: 0.6 [N-m] at 0.097 [s]

Min: -0.5 [N-m] at 0.128 [s]

P3 Lumbar Mz



2002 NCAP Test 16 2002 Subaru Legacy

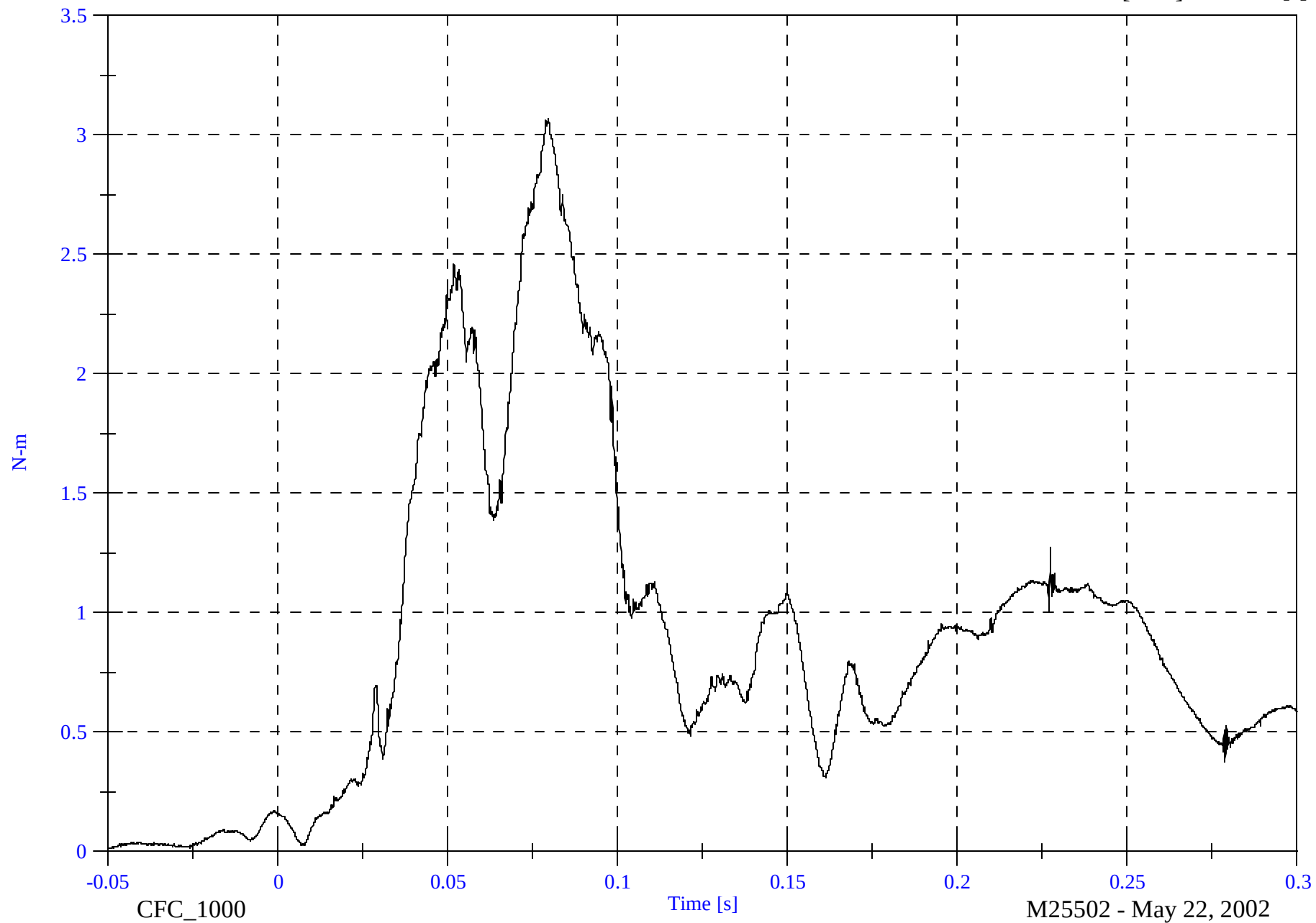
P3 Lumbar M Resultant

Max: 3.1 [N-m] at 0.080 [s]

Min: 0.0 [N-m] at -0.050 [s]

4-36

8462-NCAP-16

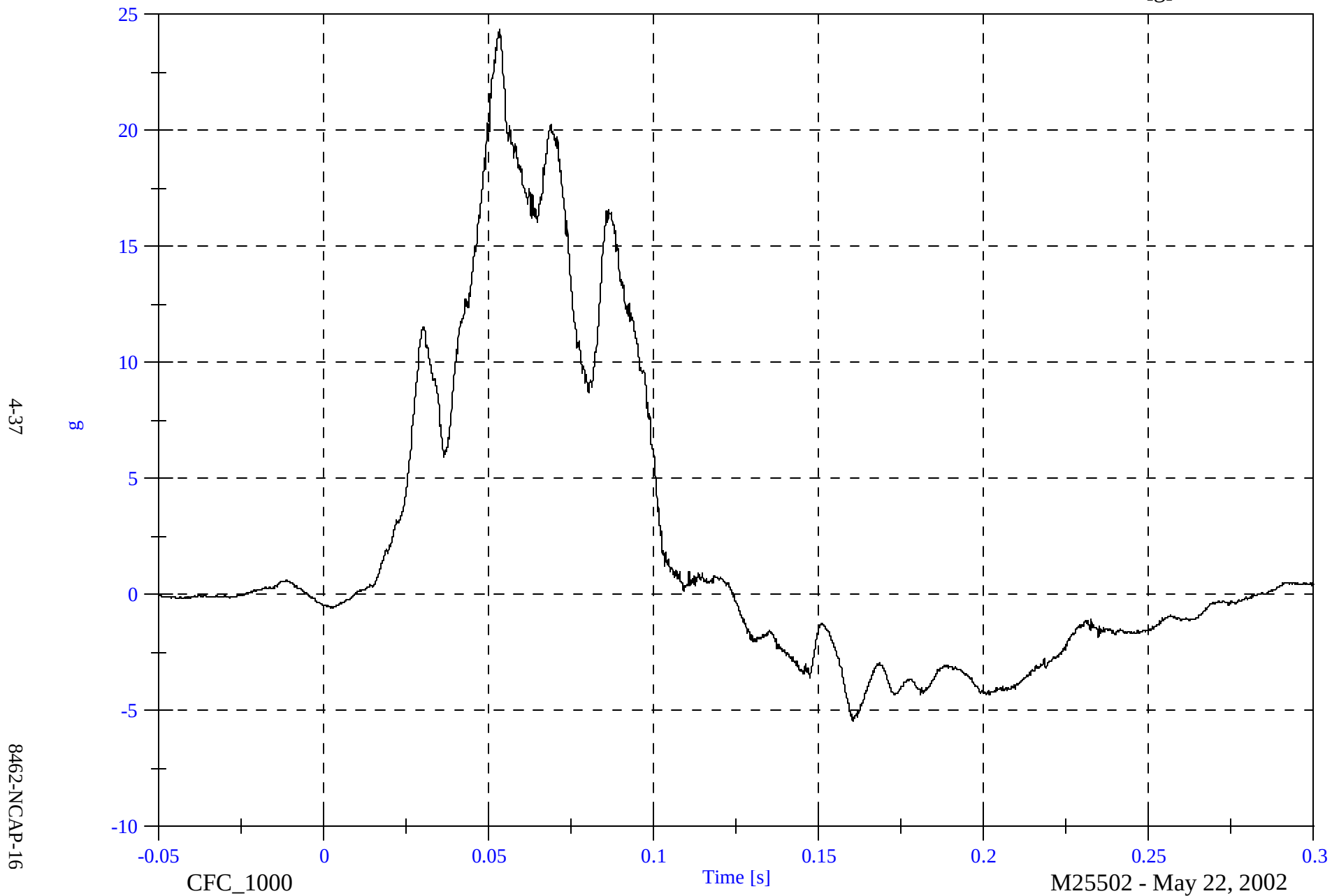


2002 NCAP Test 16 2002 Subaru Legacy

Max: 24.3 [g] at 0.053 [s]

Min: -5.4 [g] at 0.160 [s]

P3 Pelvic x

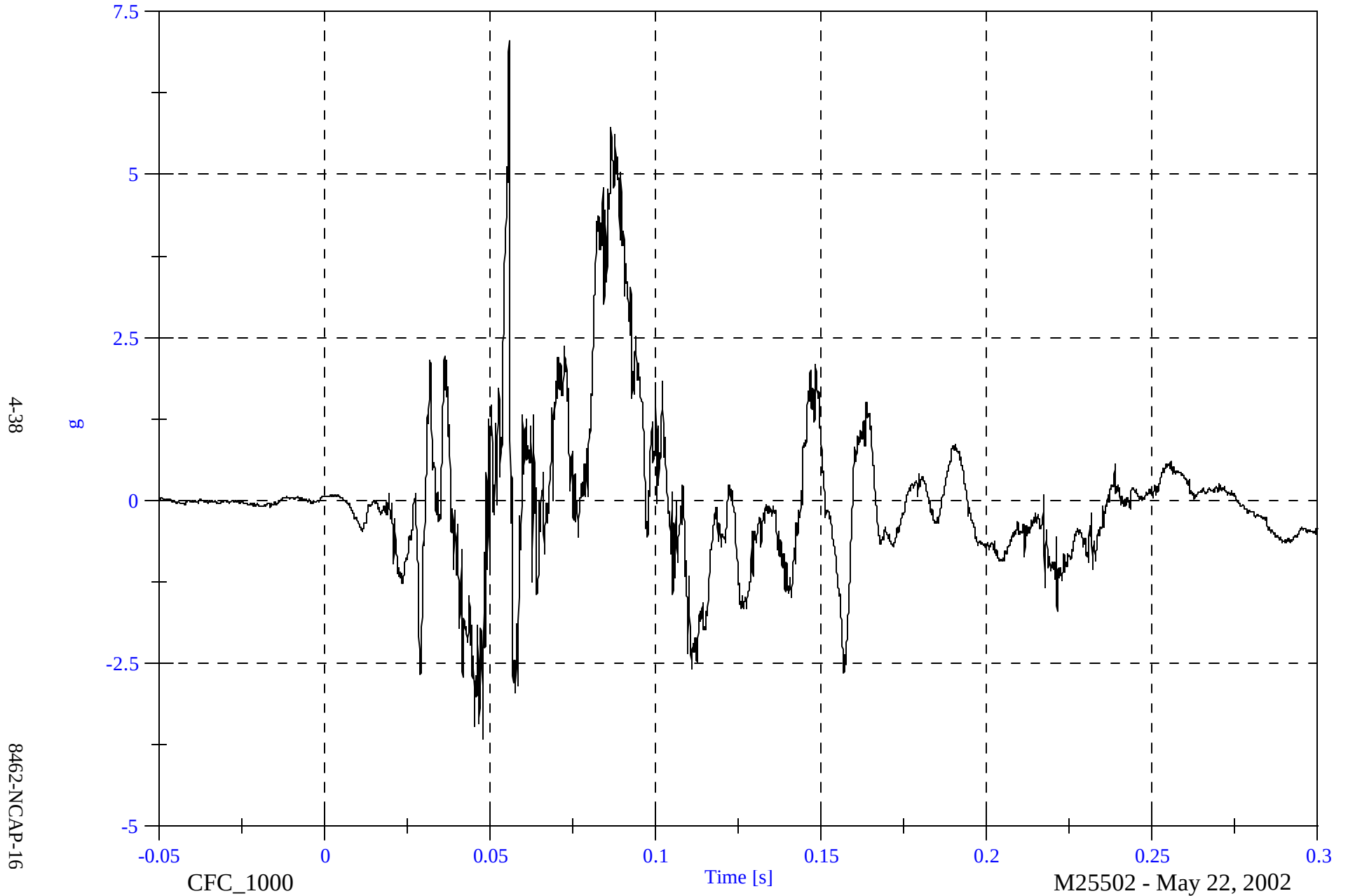


2002 NCAP Test 16 2002 Subaru Legacy

Max: 7.1 [g] at 0.056 [s]

Min: -3.7 [g] at 0.048 [s]

P3 Pelvic y

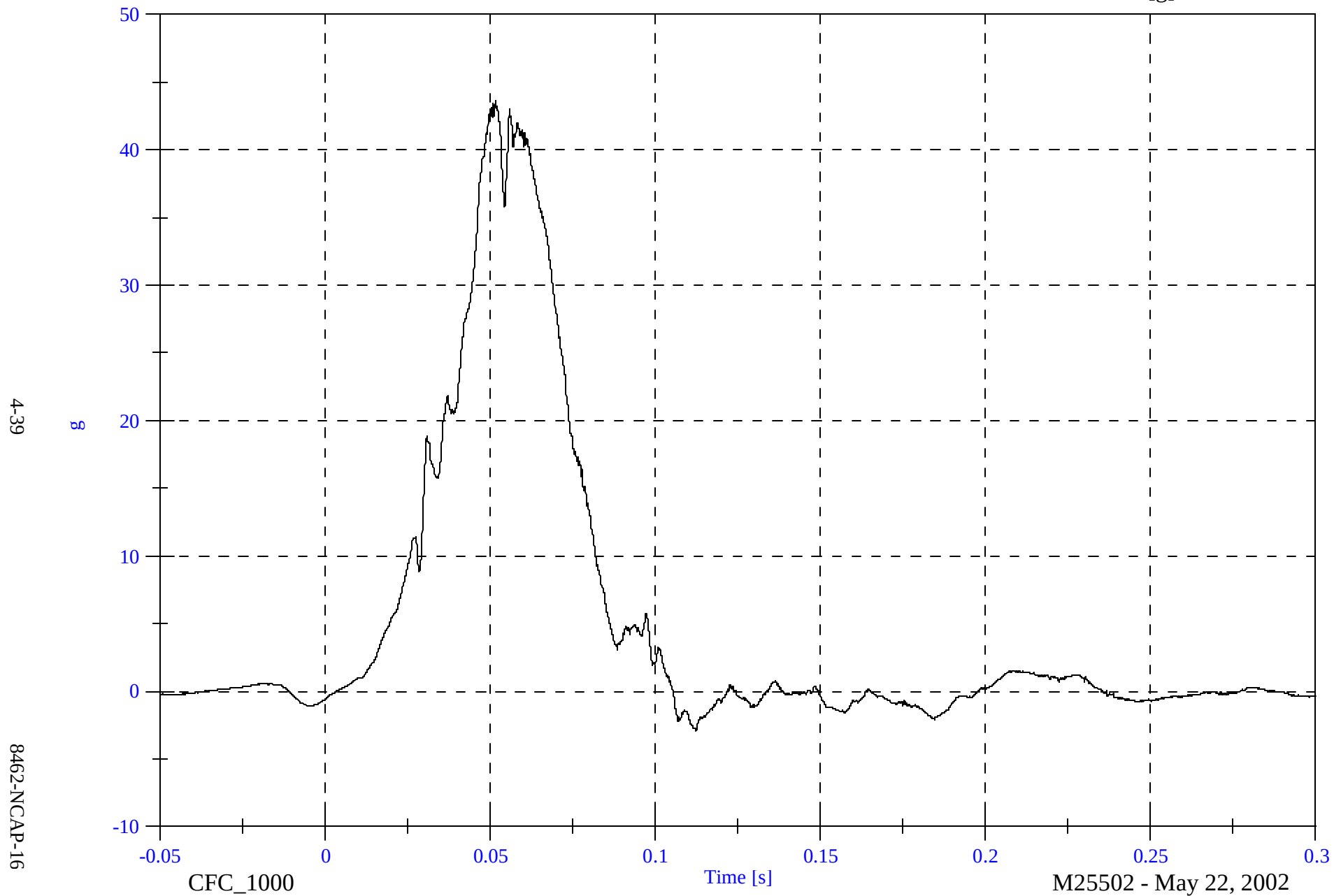


2002 NCAP Test 16 2002 Subaru Legacy

Max: 43.6 [g] at 0.052 [s]

Min: -2.9 [g] at 0.112 [s]

P3 Pelvic z



2002 NCAP Test 16 2002 Subaru Legacy

P3 Pelvic Resultant

Max: 49.3 [g] at 0.052 [s]

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

4-40

g

8462-NCAP-16

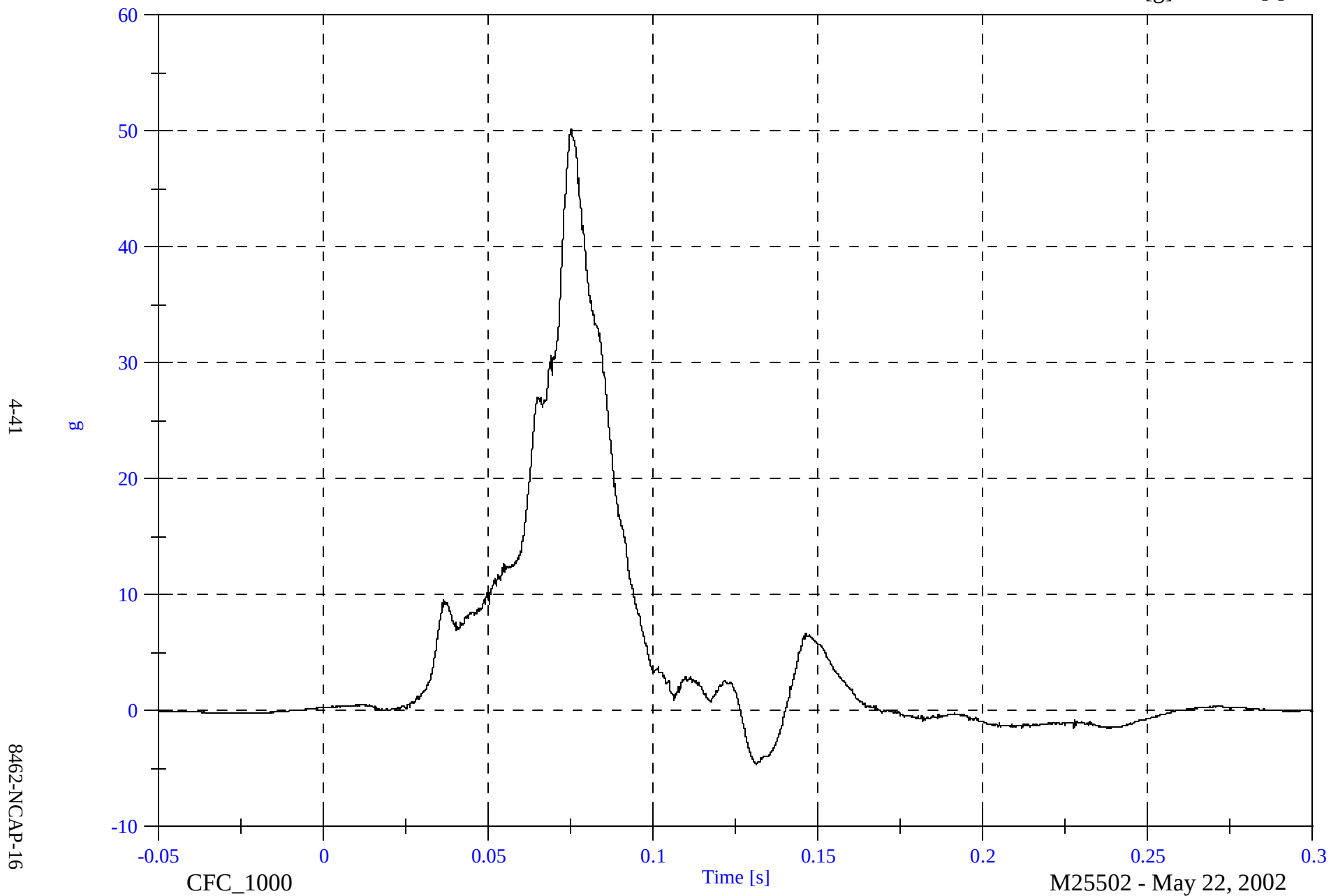


2002 NCAP Test 16 2002 Subaru Legacy

Max: 50.2 [g] at 0.075 [s]

Min: -4.6 [g] at 0.131 [s]

P4 Head x

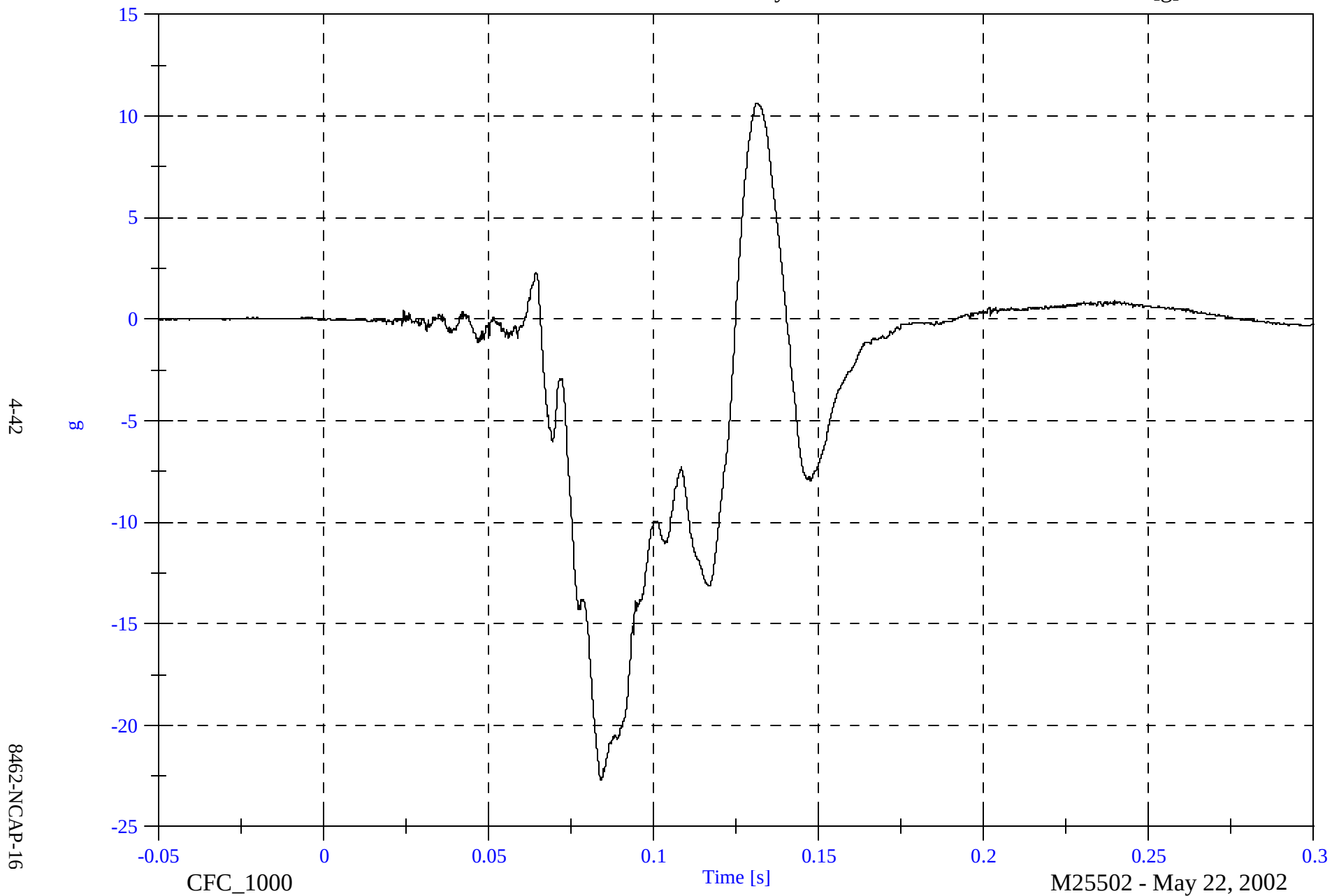


2002 NCAP Test 16 2002 Subaru Legacy

Max: 10.6 [g] at 0.131 [s]

Min: -22.7 [g] at 0.084 [s]

P4 Head y



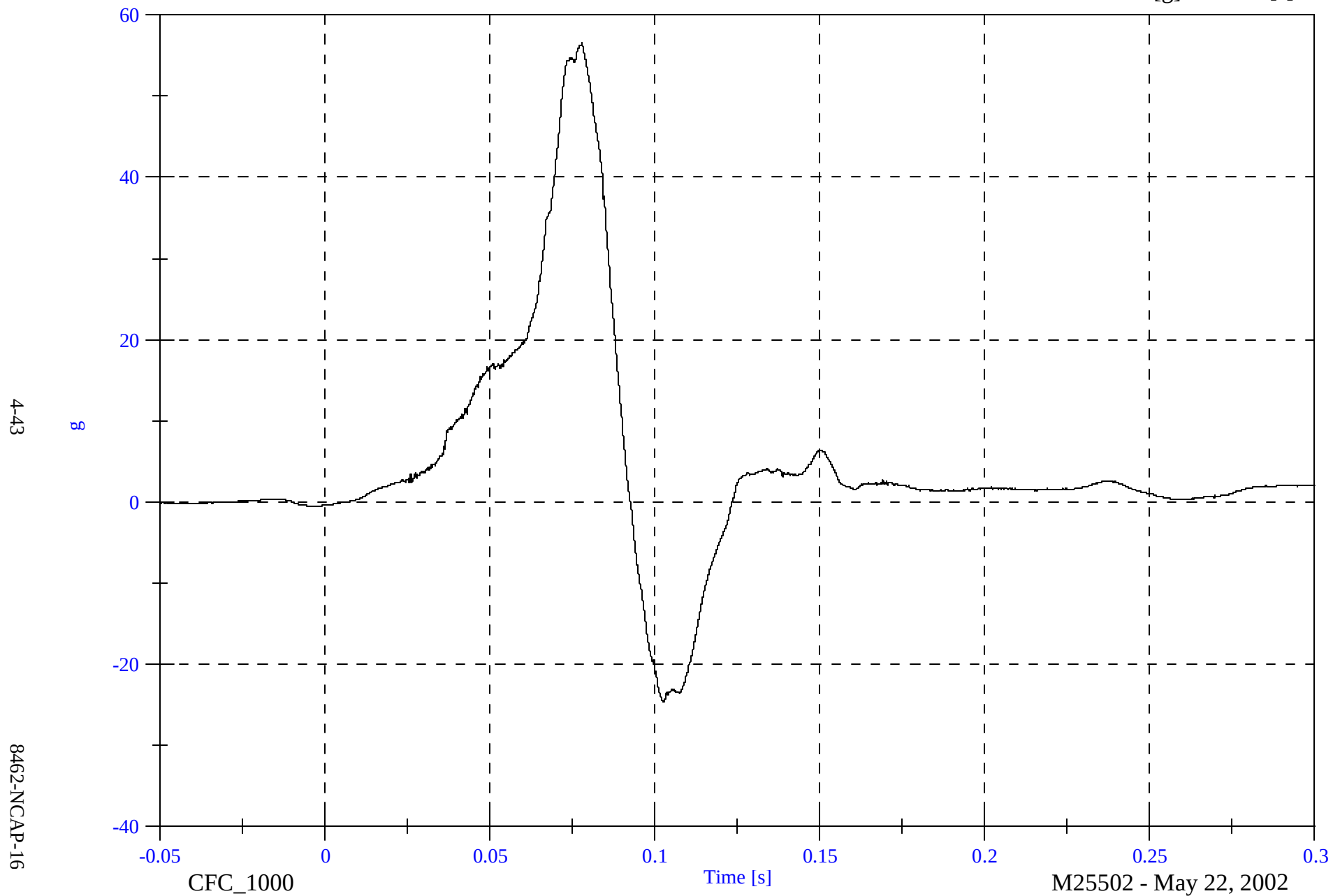
8462-NCAP-16

2002 NCAP Test 16 2002 Subaru Legacy

Max: 56.6 [g] at 0.078 [s]

Min: -24.6 [g] at 0.103 [s]

P4 Head z



2002 NCAP Test 16 2002 Subaru Legacy

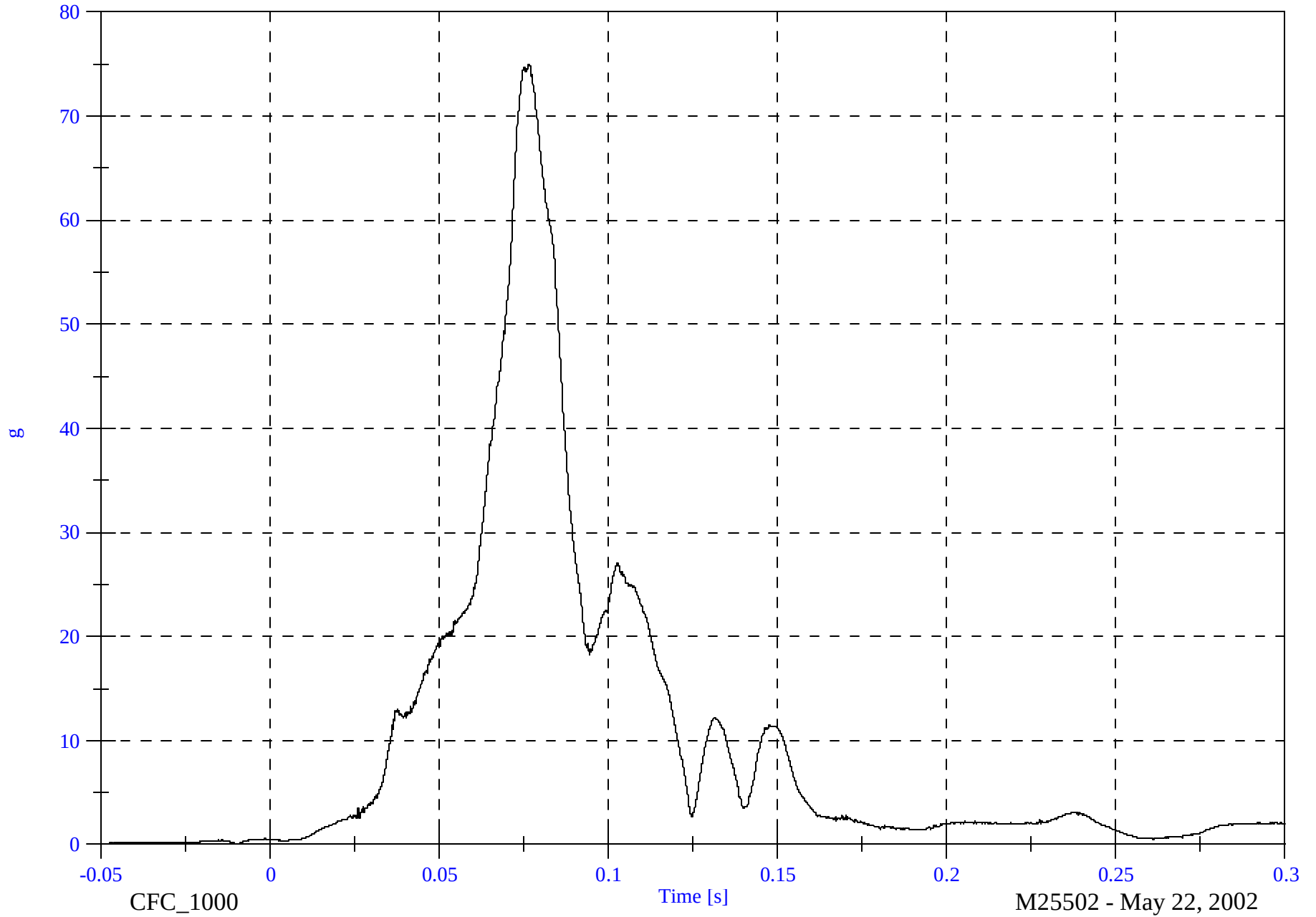
Max: 74.9 [g] at 0.076 [s]

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

P4 Head Resultant

4-44

8462-NCAP-16

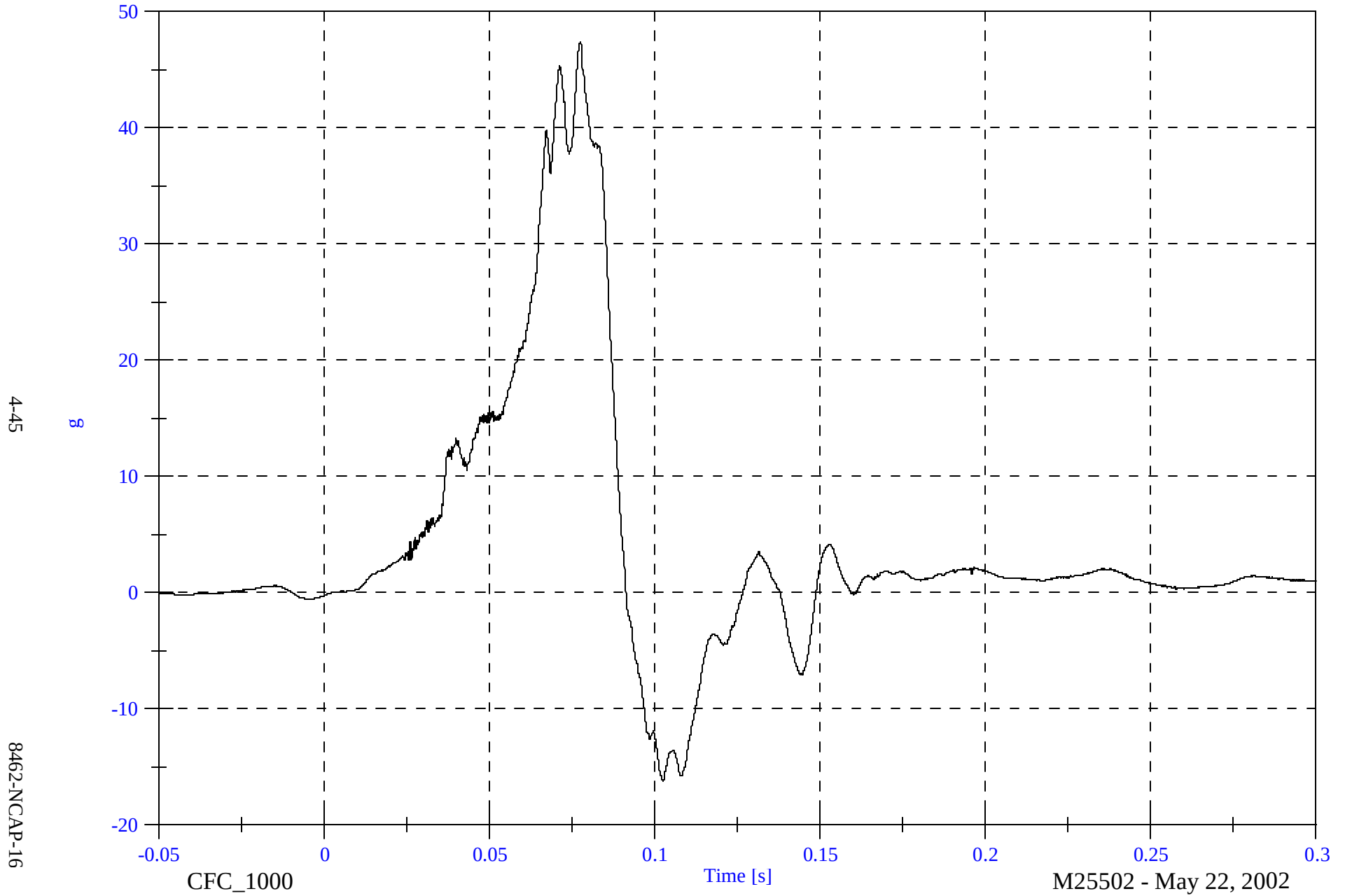


2002 NCAP Test 16 2002 Subaru Legacy

Max: 47.4 [g] at 0.078 [s]

Min: -16.2 [g] at 0.103 [s]

P4 Head Red z

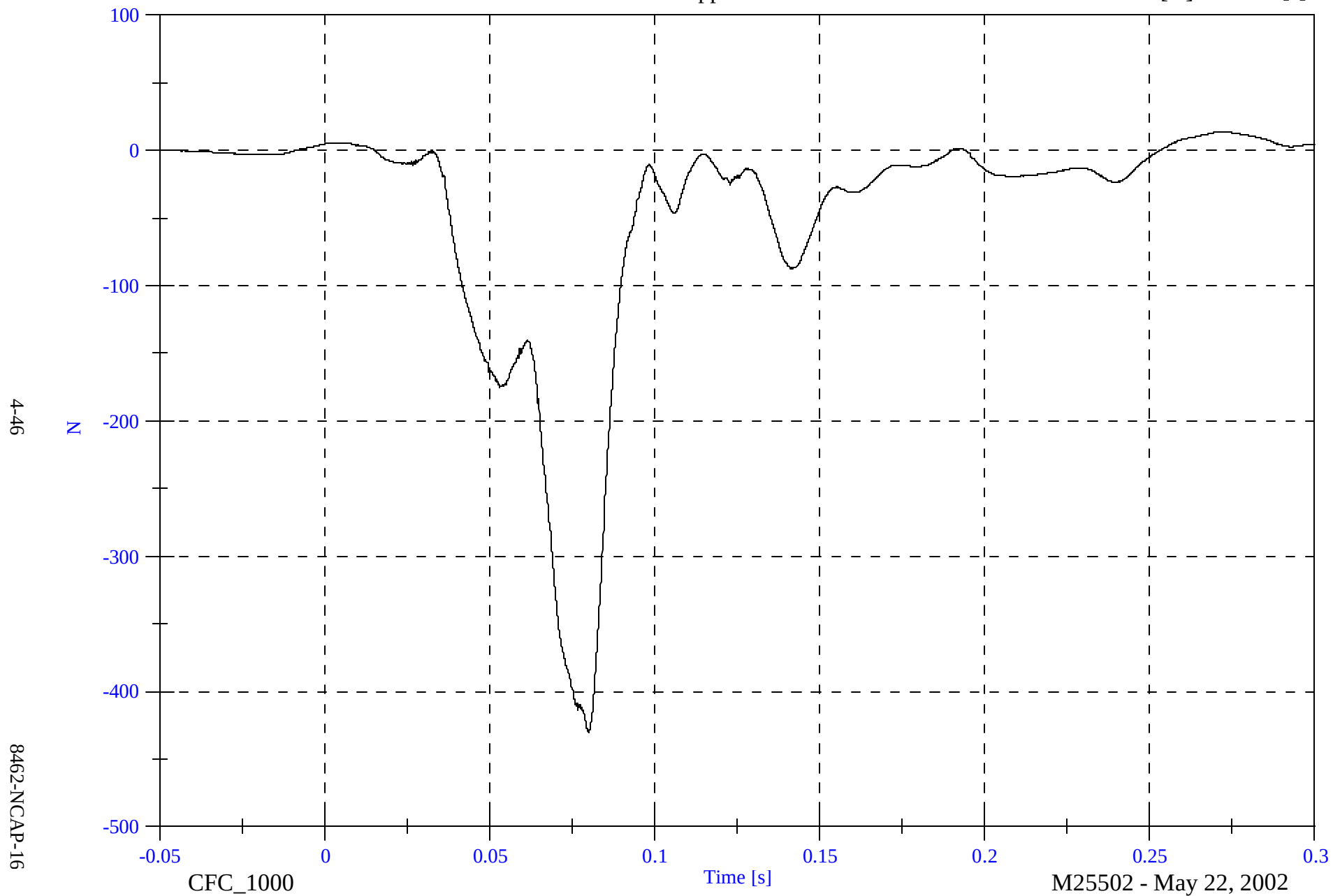


2002 NCAP Test 16 2002 Subaru Legacy

Max: 13.8 [N] at 0.272 [s]

Min: -430.6 [N] at 0.080 [s]

P4 Upper Neck Fx



2002 NCAP Test 16 2002 Subaru Legacy

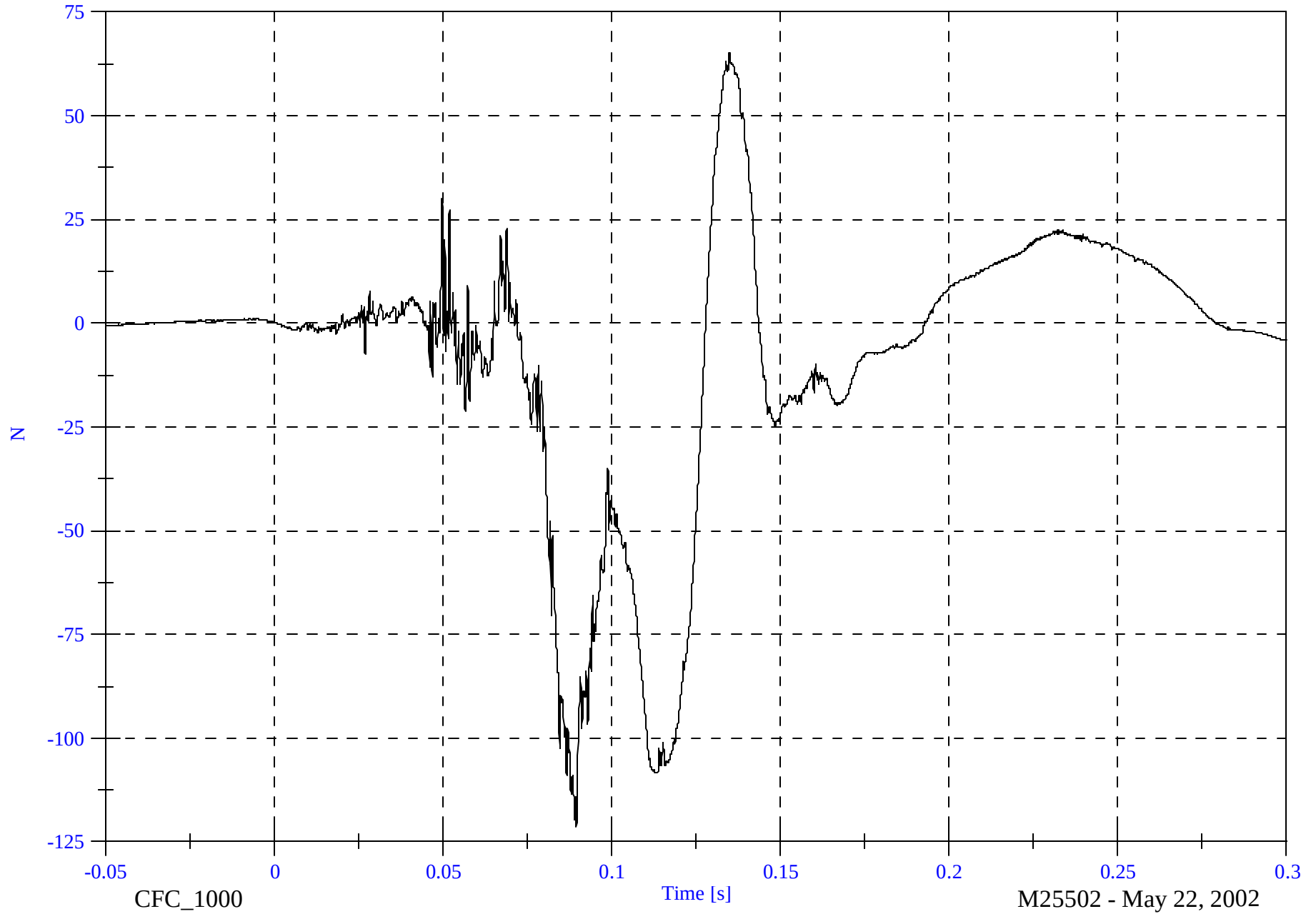
P4 Upper Neck Fy

Max: 65.1 [N] at 0.135 [s]

Min: -121.3 [N] at 0.090 [s]

4-47

8462-NCAP-16

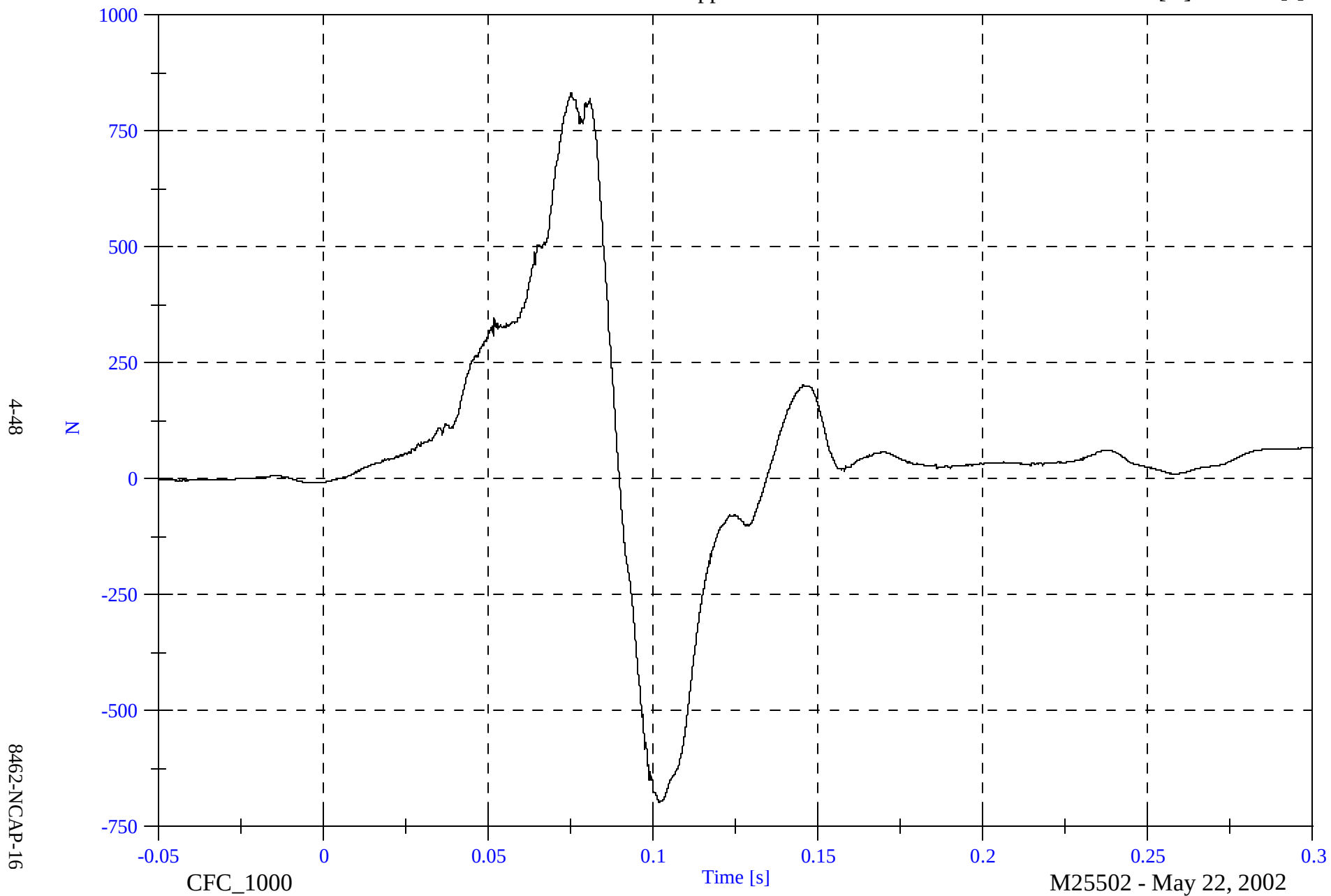


2002 NCAP Test 16 2002 Subaru Legacy

Max: 833.7 [N] at 0.075 [s]

Min: -698.5 [N] at 0.102 [s]

P4 Upper Neck Fz



2002 NCAP Test 16 2002 Subaru Legacy

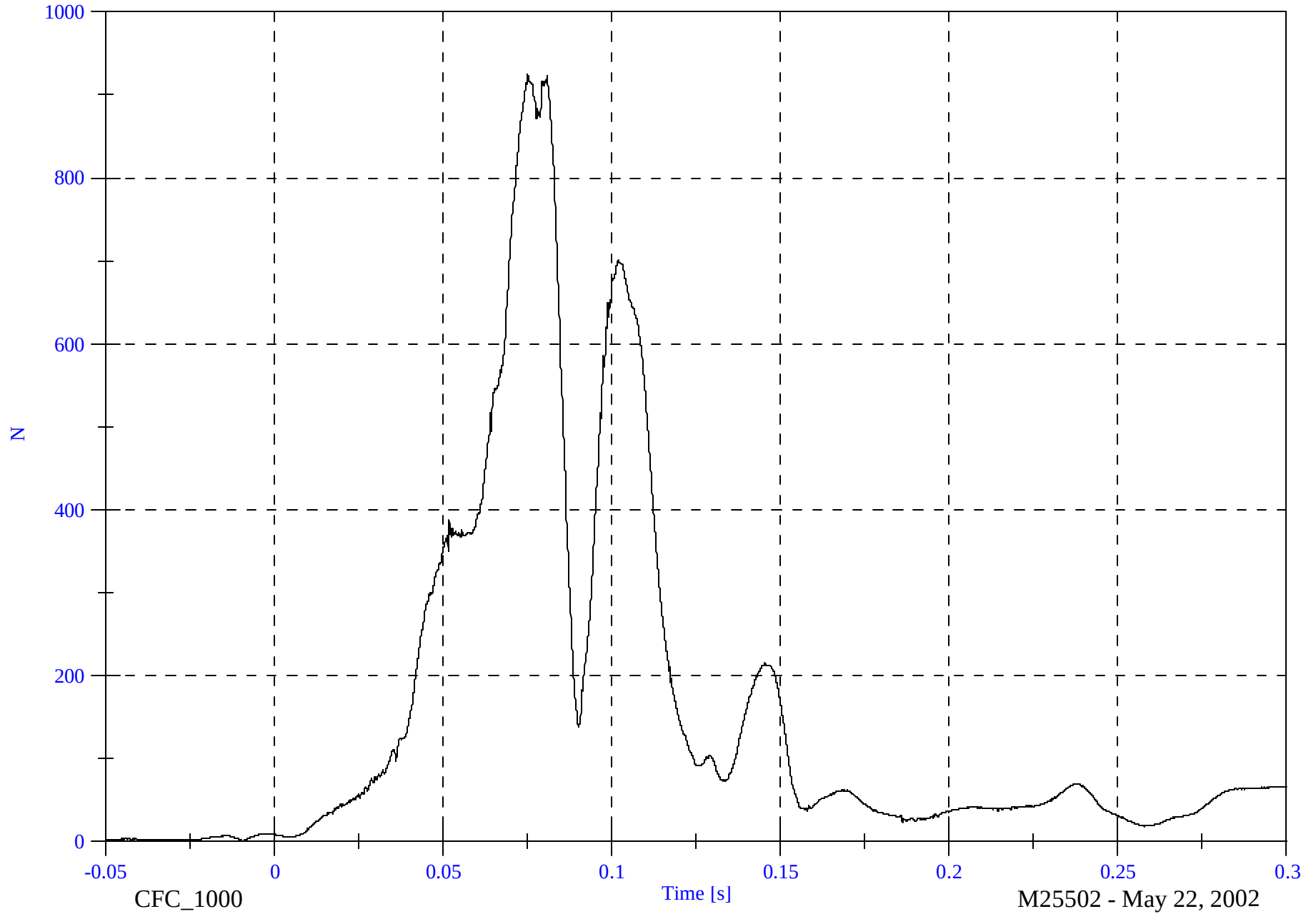
Max: 924.1 [N] at 0.075 [s]

P4 Upper Neck F Resultant

Min: 0.9 [N] at -0.009 [s]

4-49

8462-NCAP-16

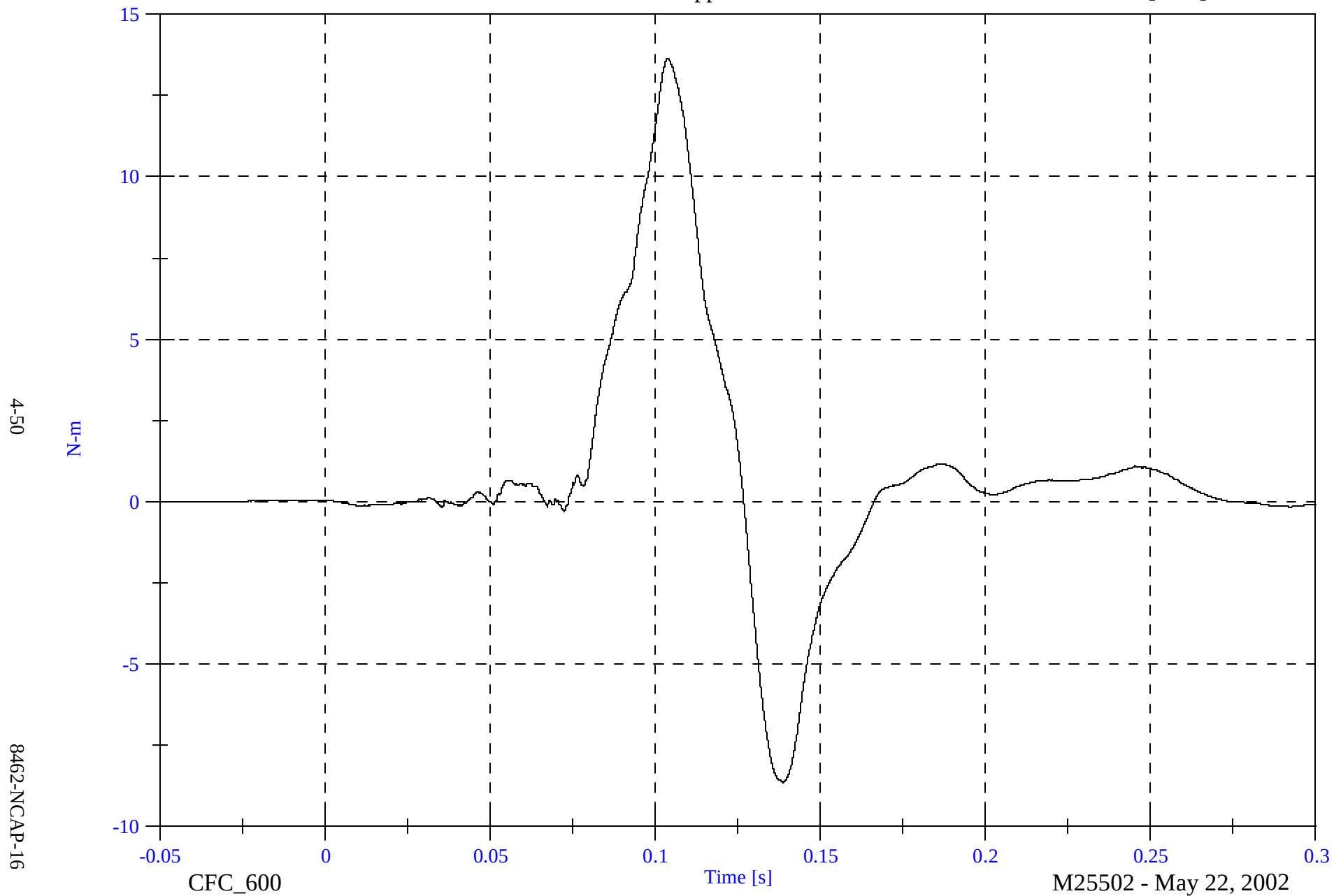


2002 NCAP Test 16 2002 Subaru Legacy

Max: 13.6 [N-m] at 0.104 [s]

Min: -8.6 [N-m] at 0.139 [s]

P4 Upper Neck Mx

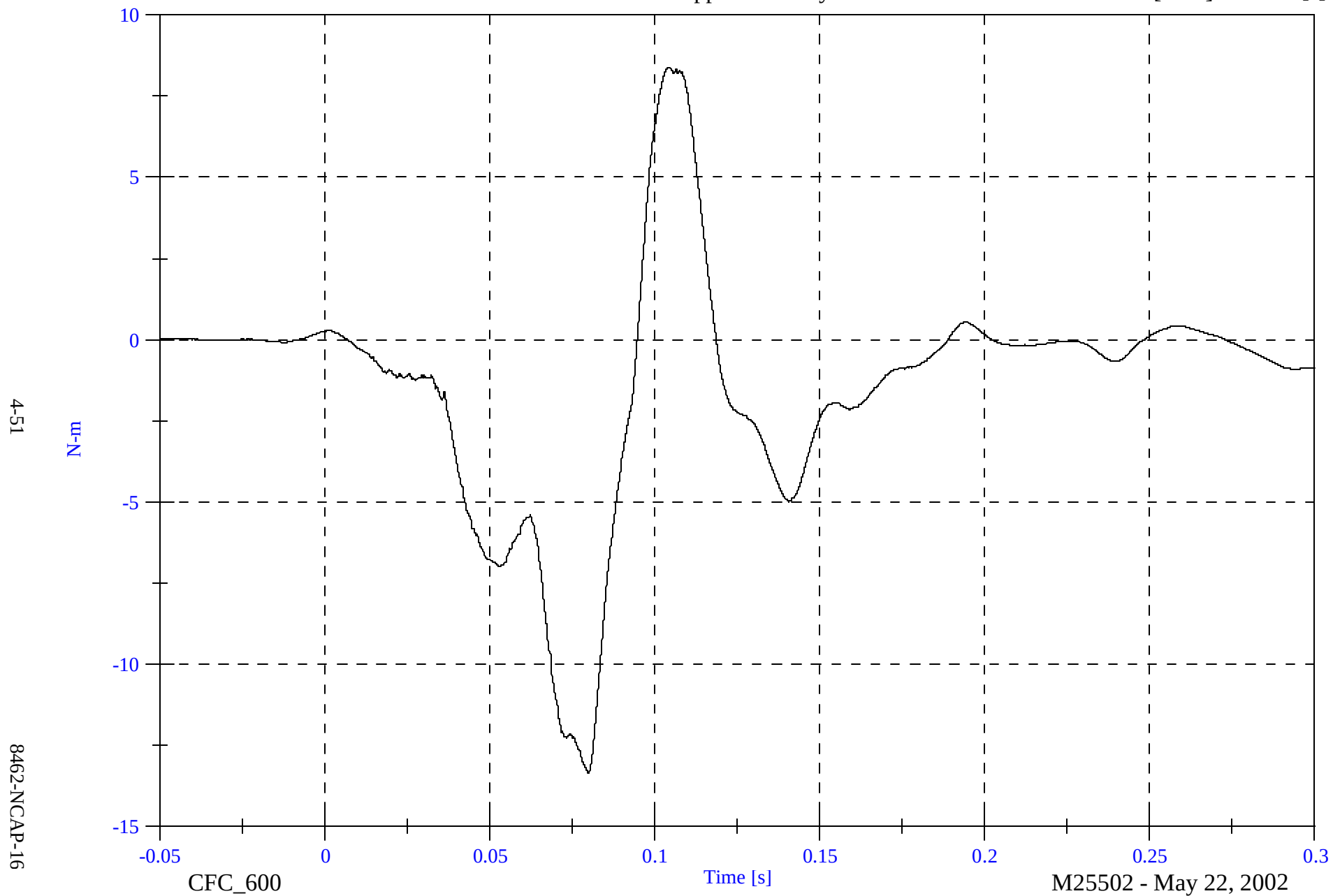


2002 NCAP Test 16 2002 Subaru Legacy

Max: 8.4 [N-m] at 0.105 [s]

Min: -13.4 [N-m] at 0.080 [s]

P4 Upper Neck My



2002 NCAP Test 16 2002 Subaru Legacy

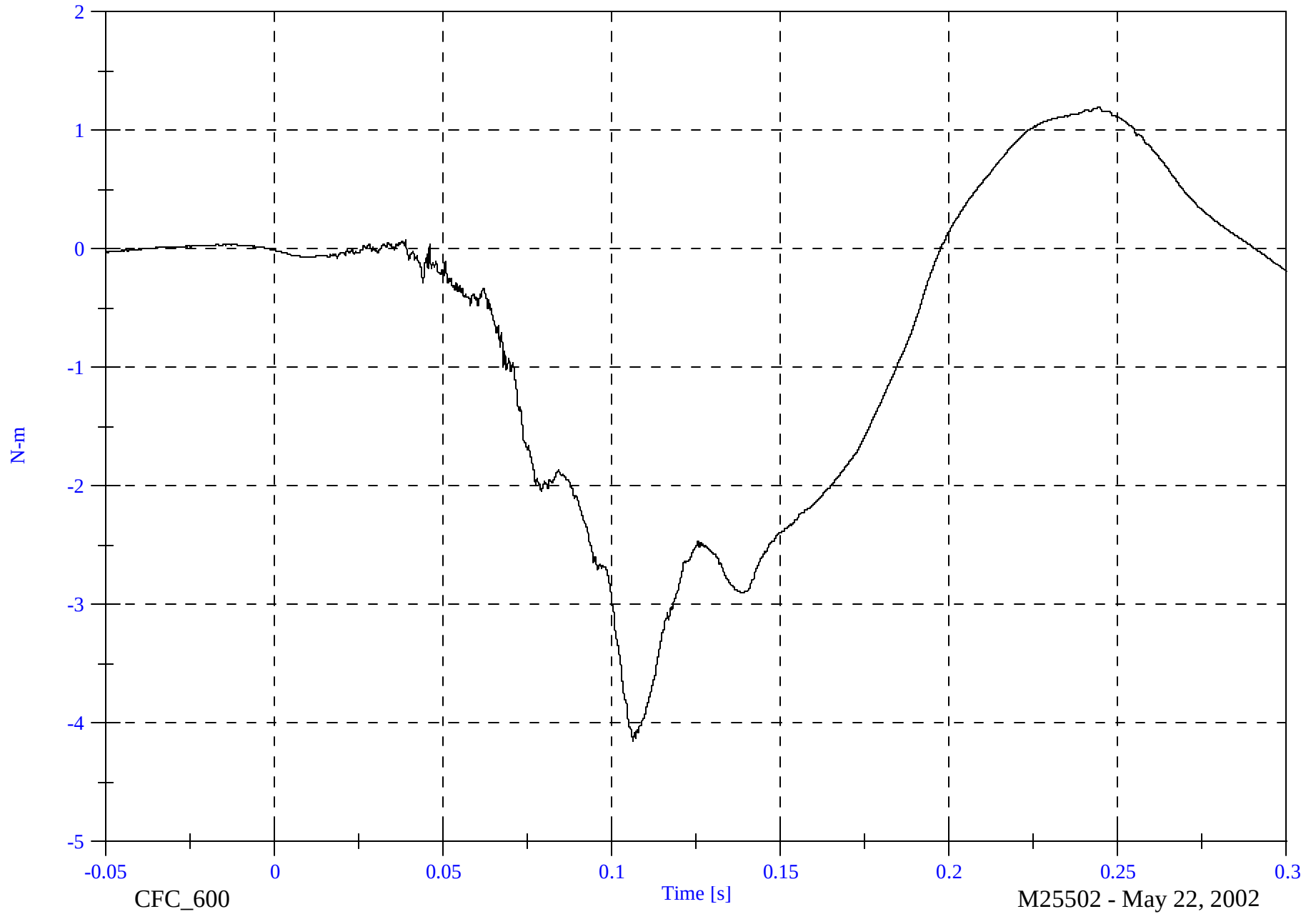
P4 Upper Neck Mz

Max: 1.2 [N-m] at 0.244 [s]

Min: -4.1 [N-m] at 0.106 [s]

4-52

8462-NCAP-16



2002 NCAP Test 16 2002 Subaru Legacy

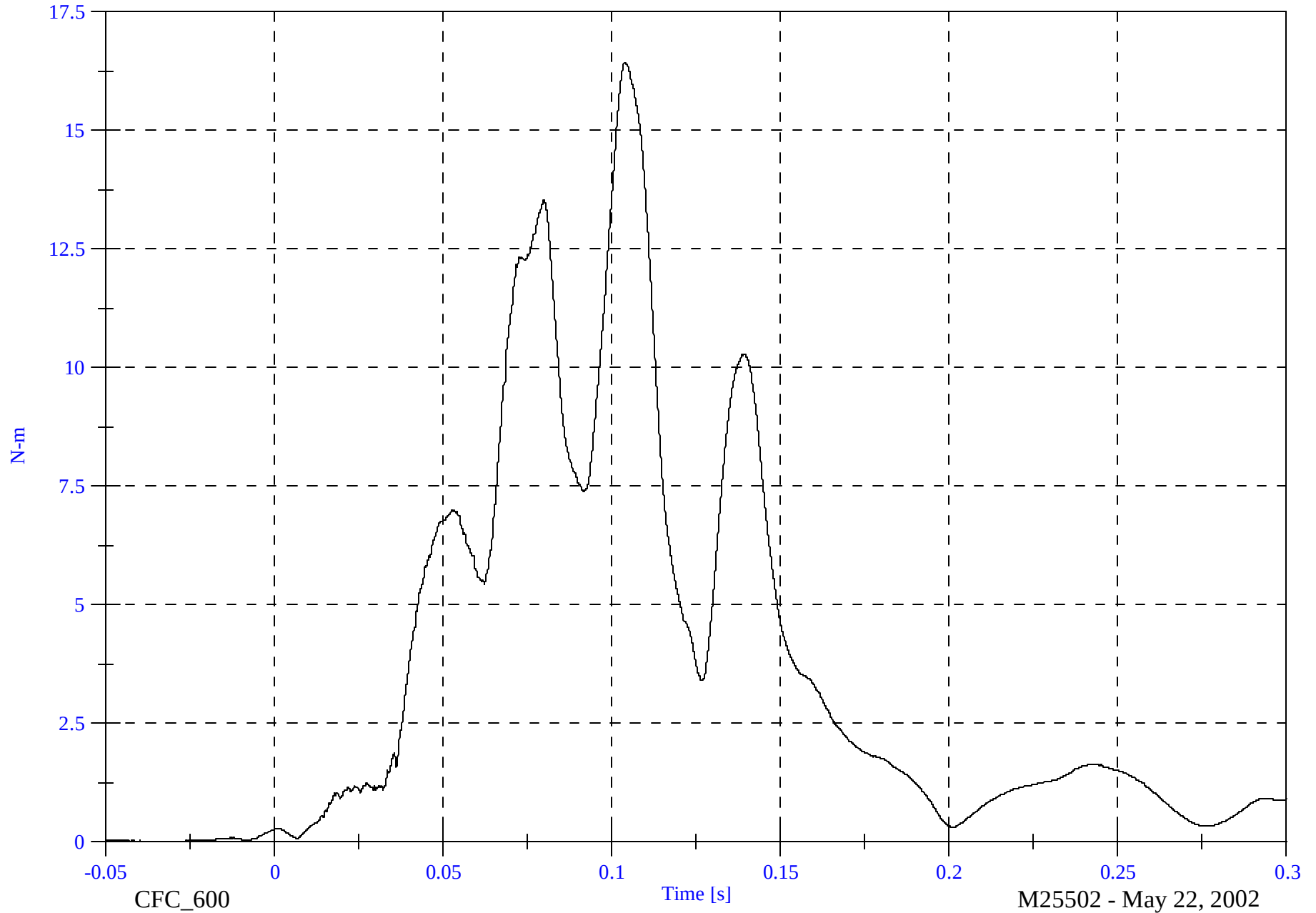
Max: 16.4 [N-m] at 0.104 [s]

Min: 0.0 [N-m] at -0.036 [s]

P4 Upper Neck M Resultant

4-53

8462-NCAP-16

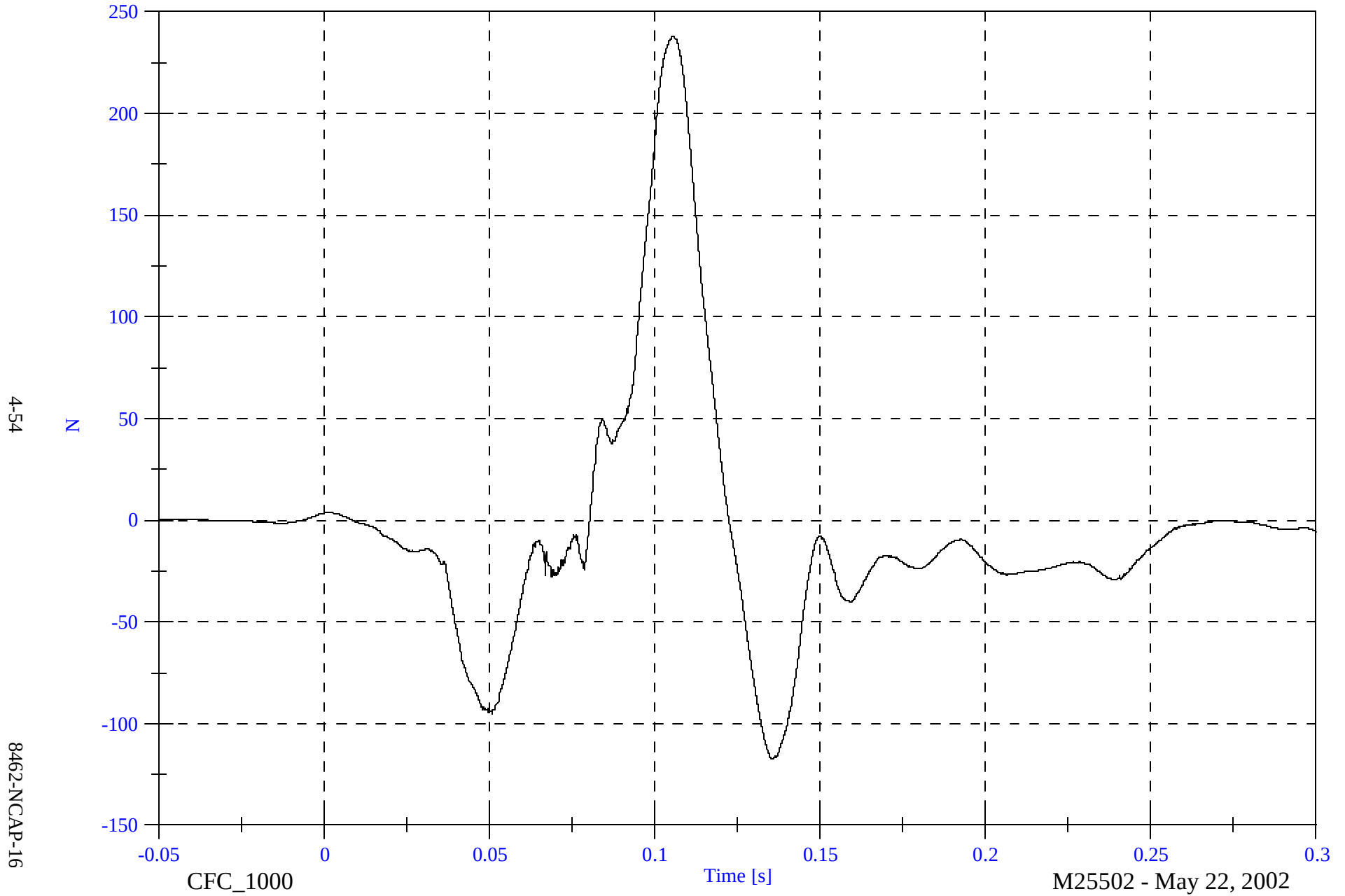


2002 NCAP Test 16 2002 Subaru Legacy

Max: 238.1 [N] at 0.105 [s]

Min: -117.7 [N] at 0.136 [s]

P4 Lower Neck Fx

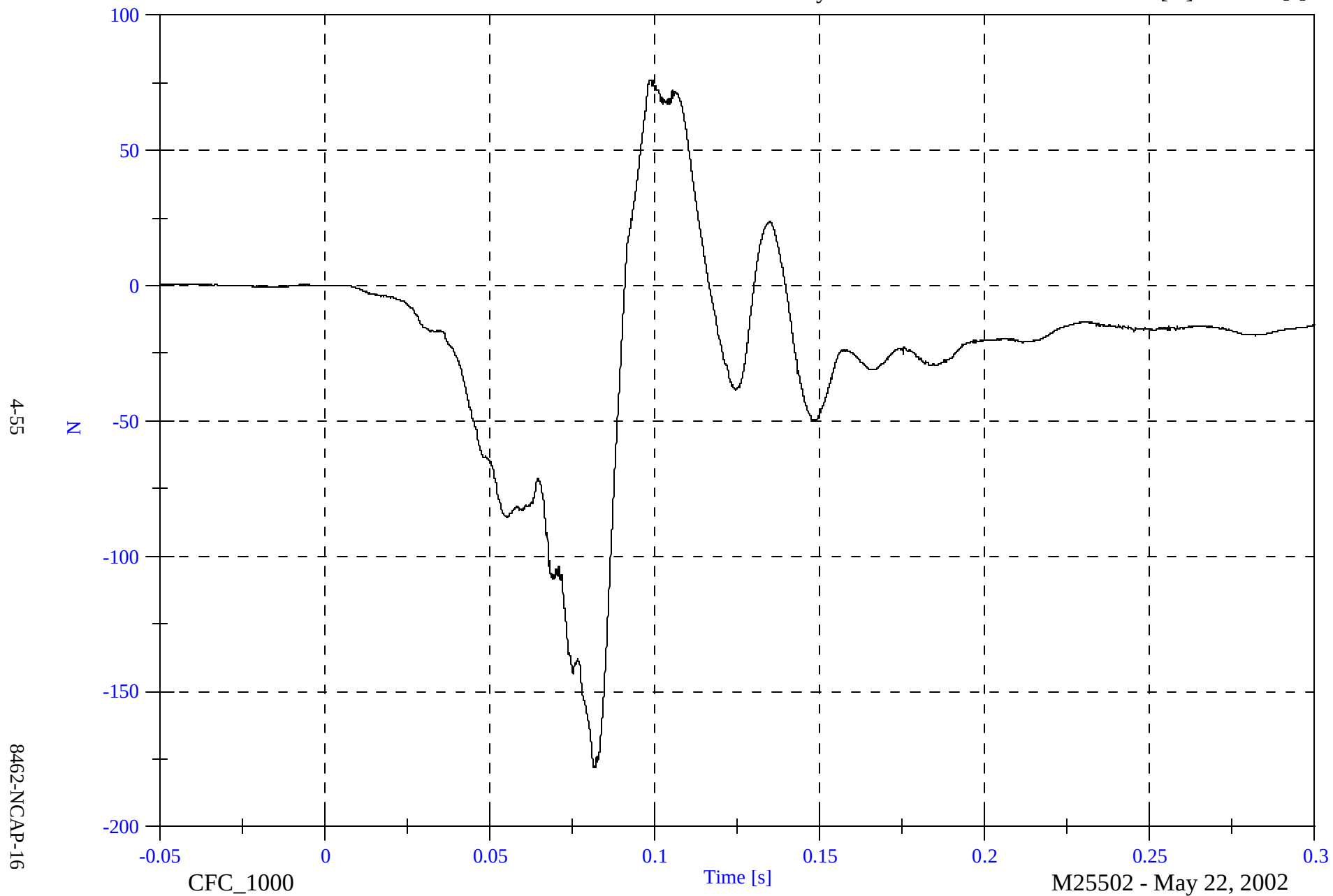


2002 NCAP Test 16 2002 Subaru Legacy

Max: 76.1 [N] at 0.099 [s]

Min: -178.3 [N] at 0.082 [s]

P4 Lower Neck Fy

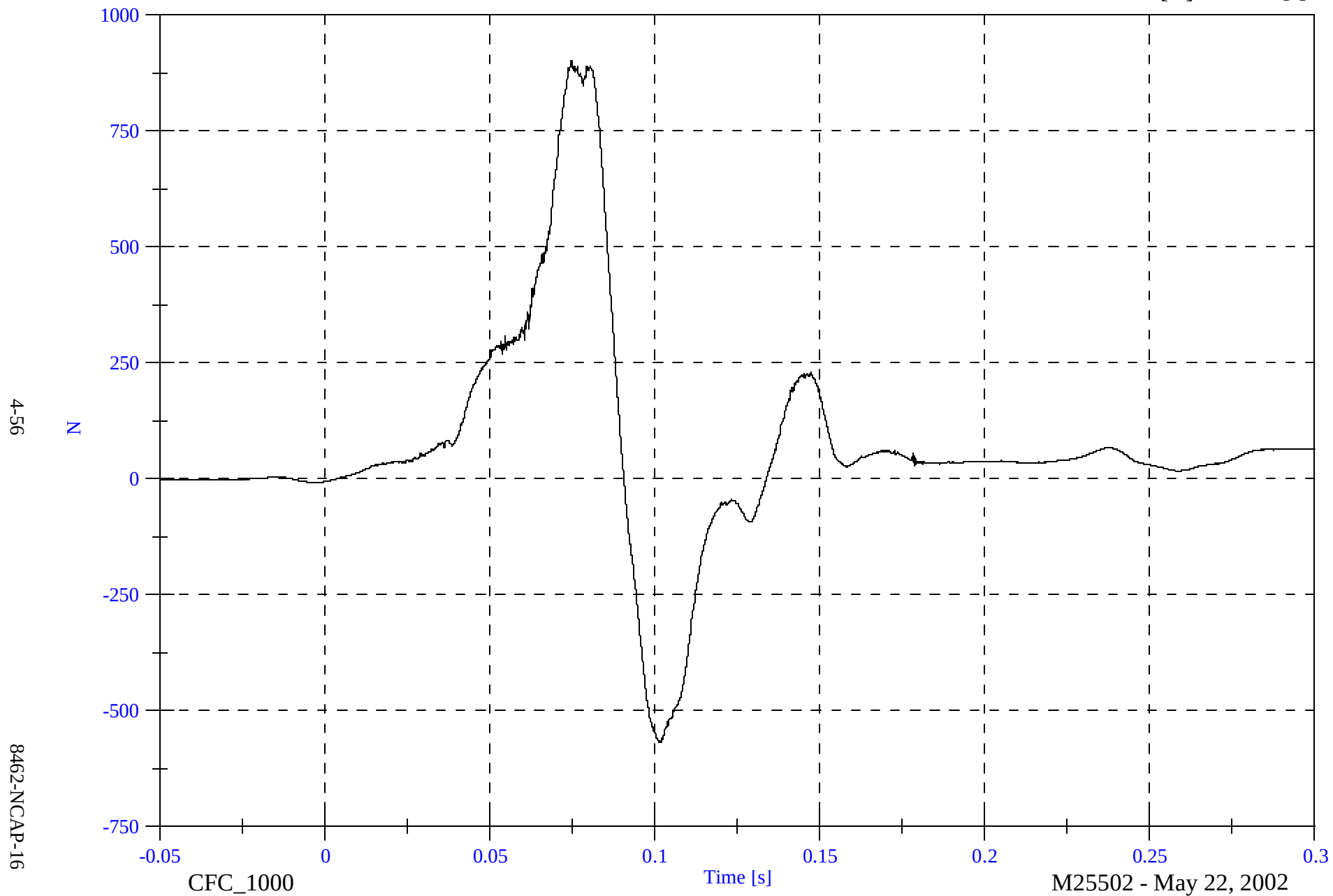


2002 NCAP Test 16 2002 Subaru Legacy

Max: 902.9 [N] at 0.075 [s]

Min: -567.2 [N] at 0.101 [s]

P4 Lower Neck Fz



2002 NCAP Test 16 2002 Subaru Legacy

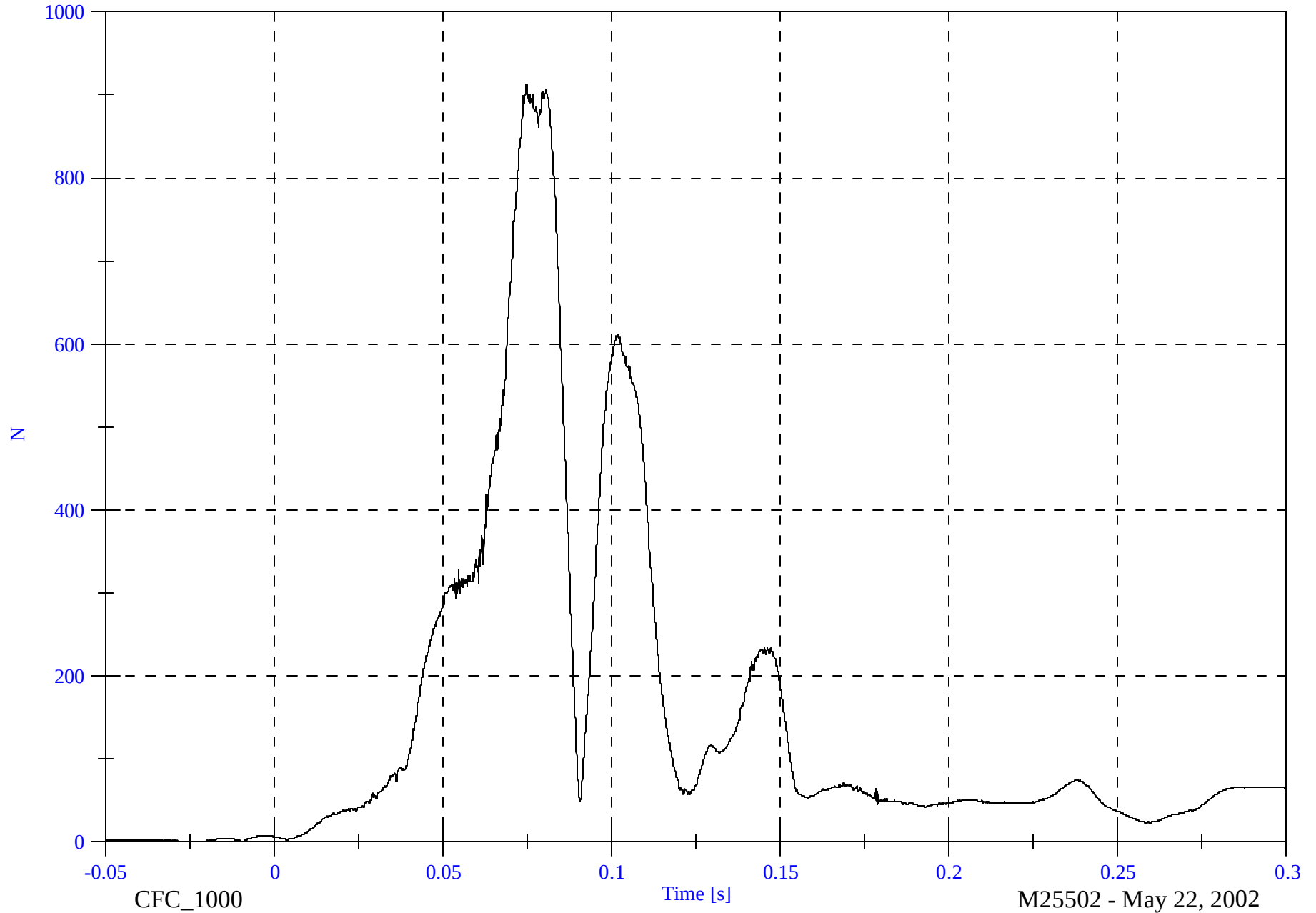
P4 Lower Neck F Resultant

Max: 913.6 [N] at 0.075 [s]

Min: 0.5 [N] at -0.024 [s]

4-57

8462-NCAP-16

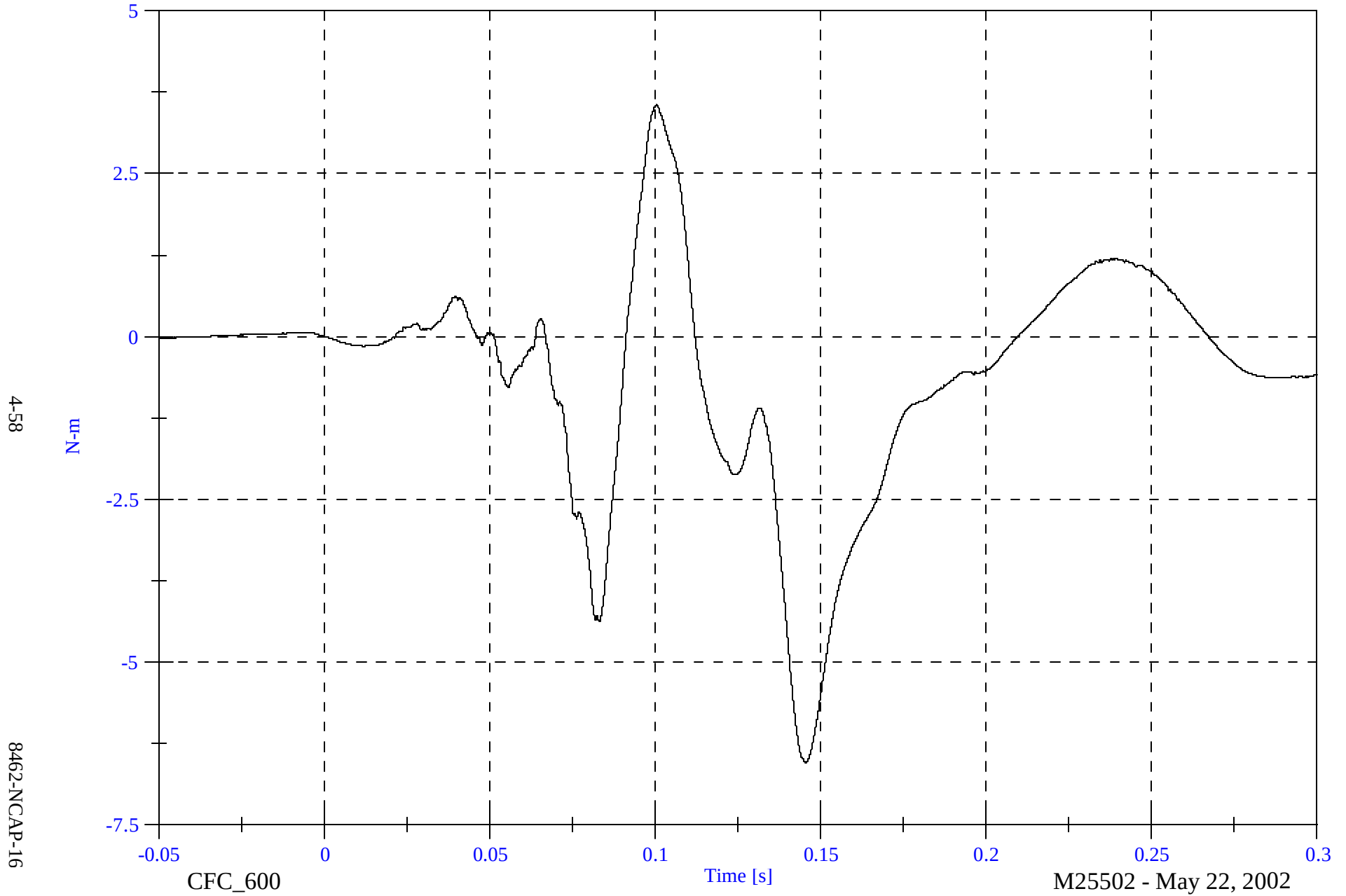


2002 NCAP Test 16 2002 Subaru Legacy

Max: 3.6 [N-m] at 0.100 [s]

Min: -6.5 [N-m] at 0.145 [s]

P4 Lower Neck Mx

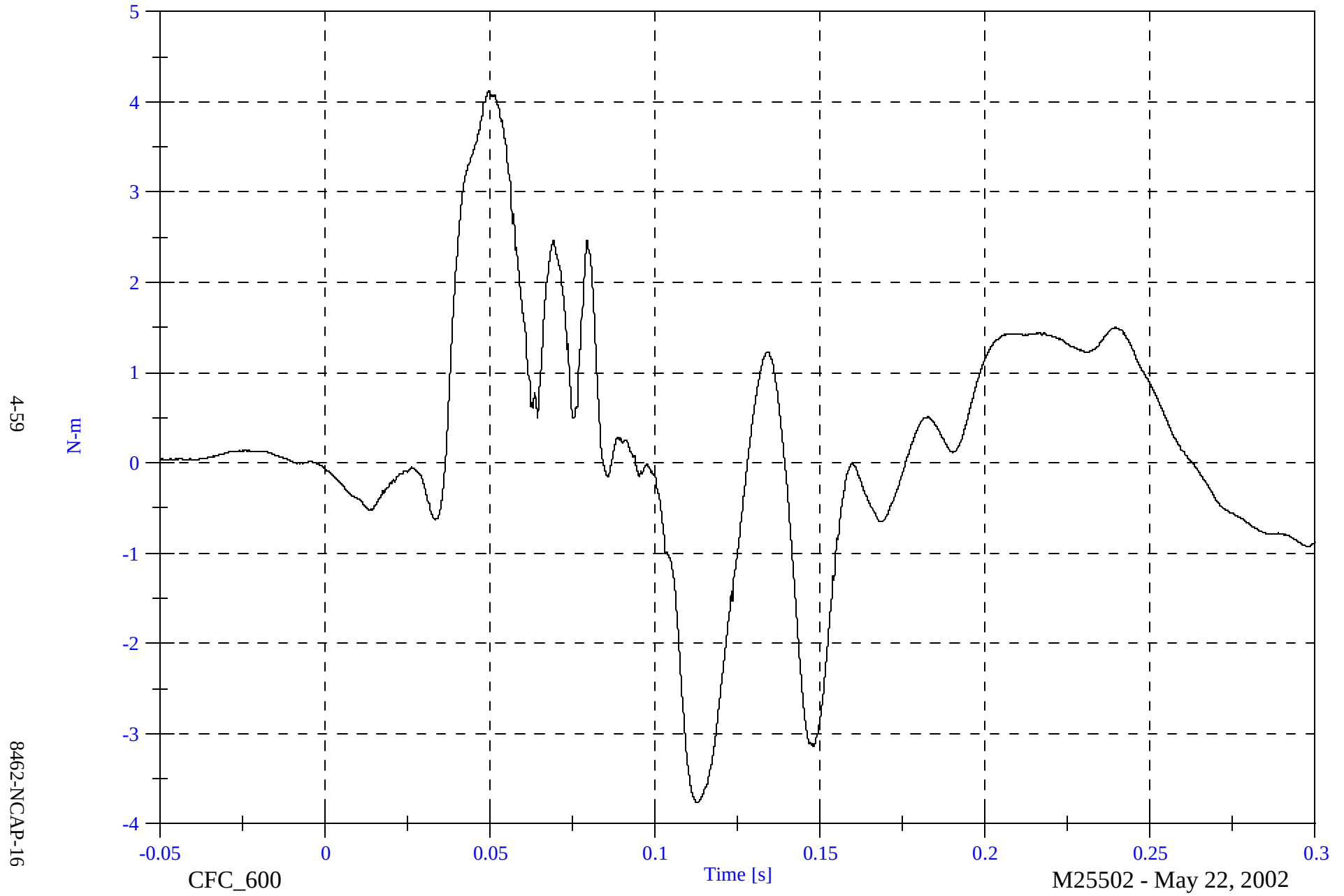


2002 NCAP Test 16 2002 Subaru Legacy

P4 Lower Neck My

Max: 4.1 [N-m] at 0.050 [s]

Min: -3.8 [N-m] at 0.113 [s]

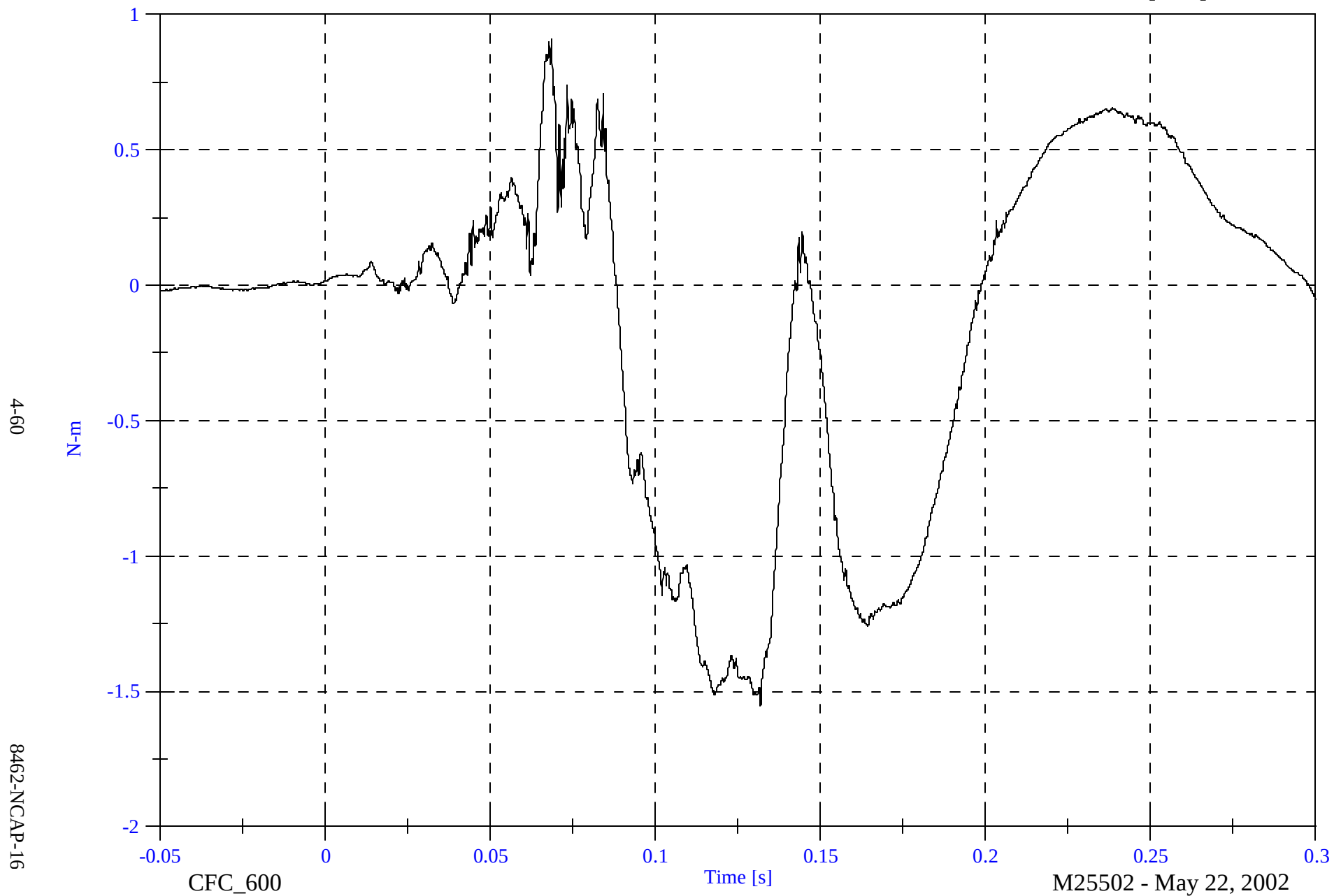


2002 NCAP Test 16 2002 Subaru Legacy

P4 Lower Neck Mz

Max: 0.9 [N-m] at 0.069 [s]

Min: -1.6 [N-m] at 0.132 [s]



2002 NCAP Test 16 2002 Subaru Legacy

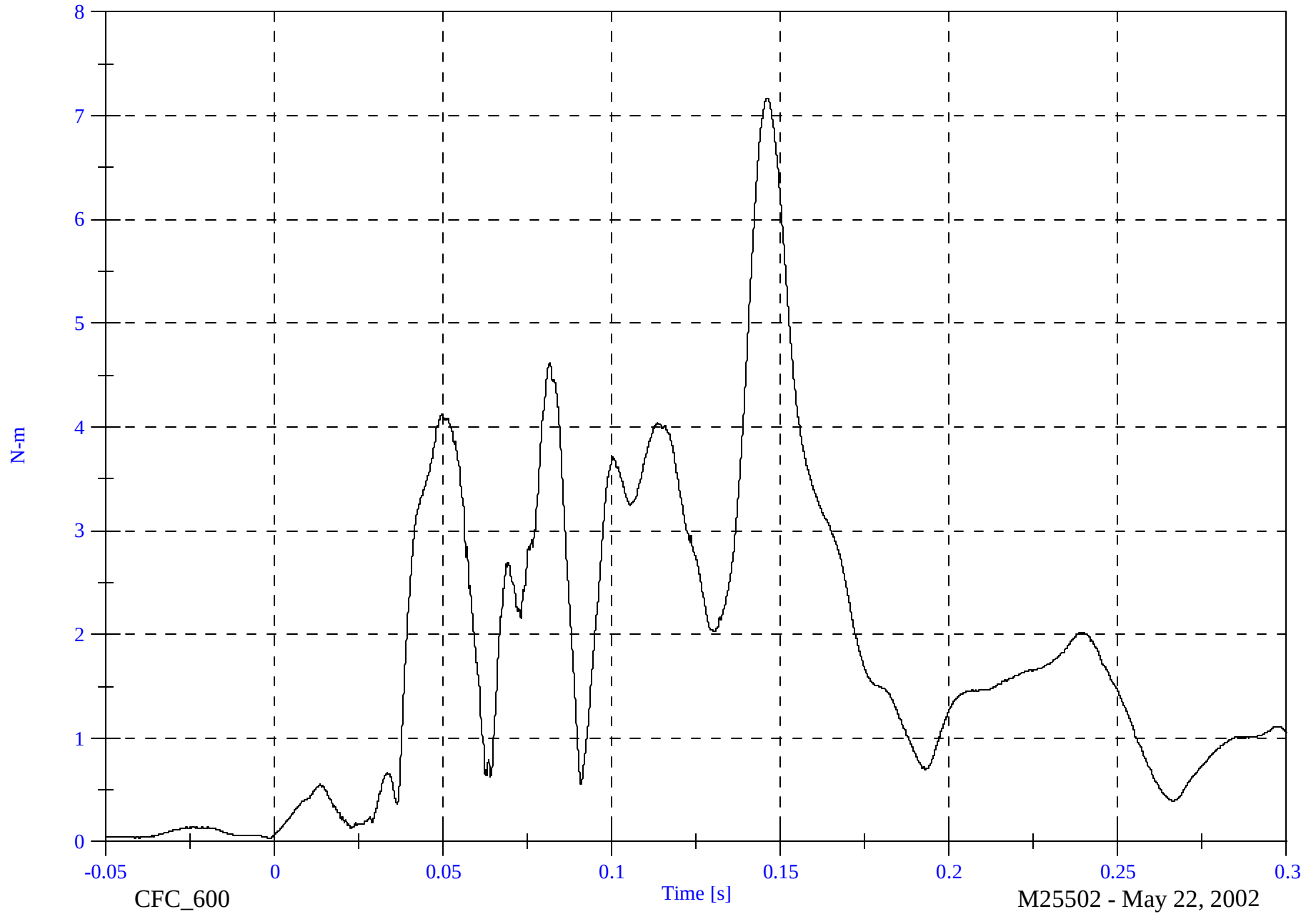
P4 Lower Neck M Resultant

Max: 7.2 [N-m] at 0.146 [s]

Min: 0.0 [N-m] at -0.002 [s]

4-61

8462-NCAP-16

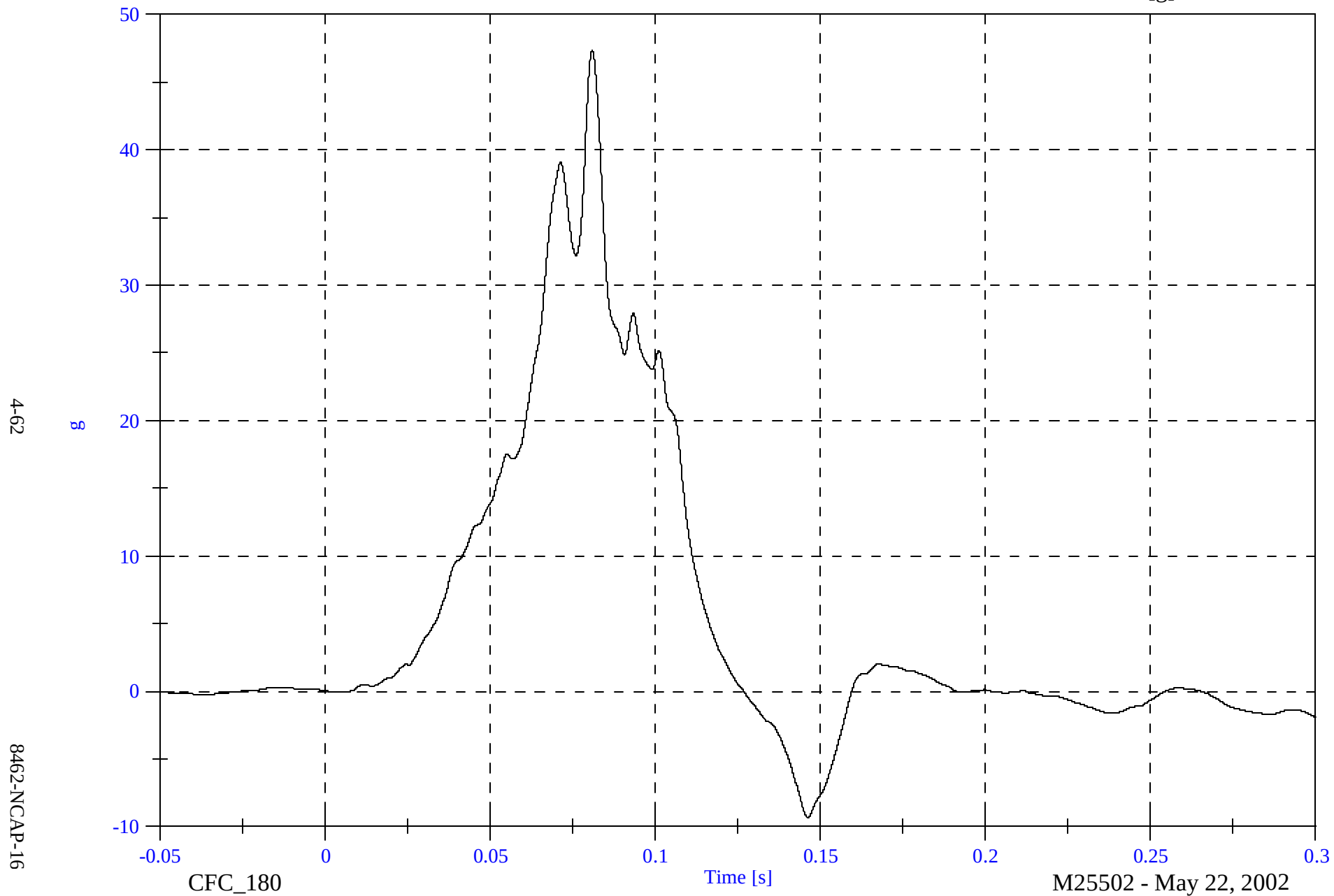


2002 NCAP Test 16 2002 Subaru Legacy

Max: 47.3 [g] at 0.081 [s]

Min: -9.3 [g] at 0.146 [s]

P4 Chest x

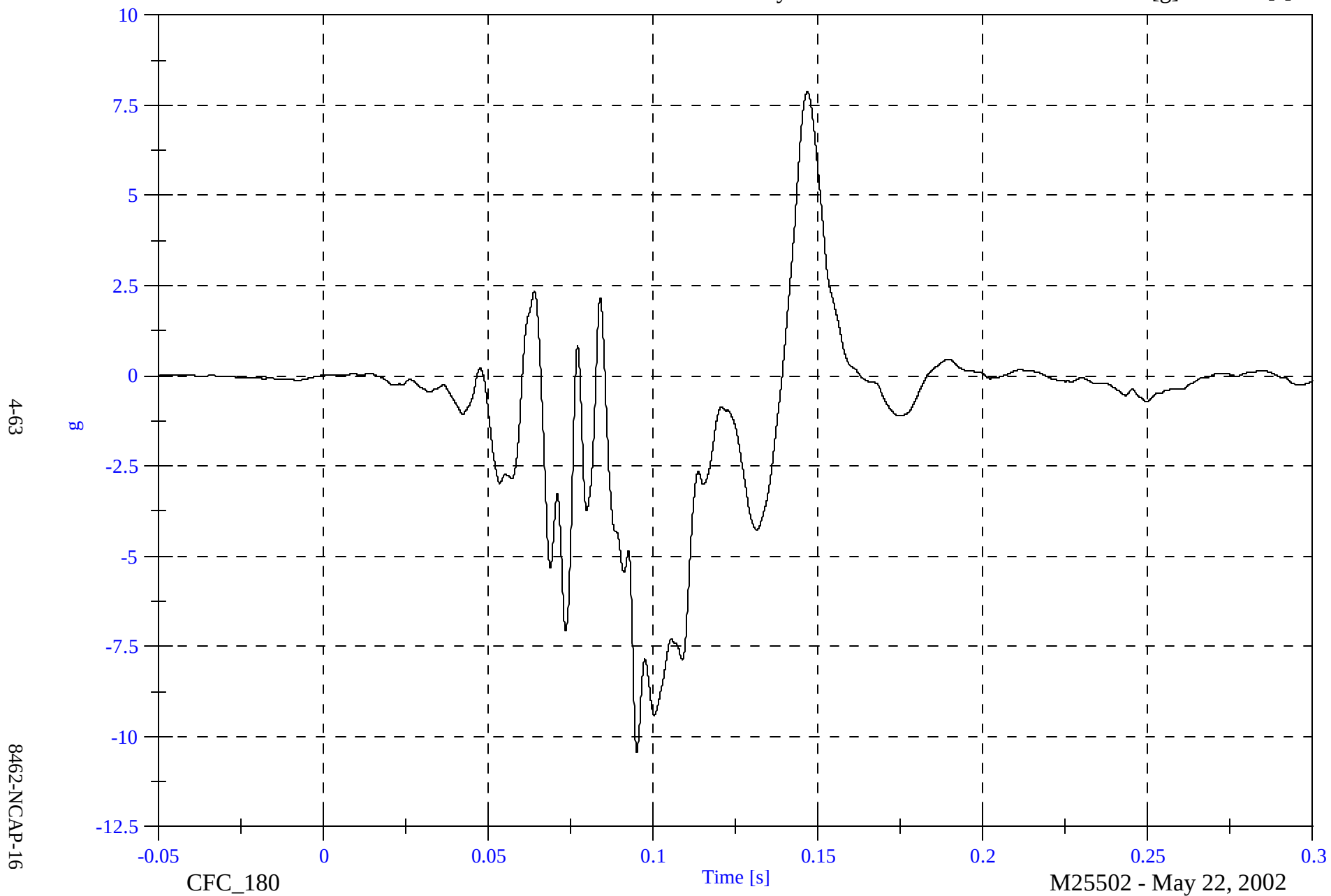


2002 NCAP Test 16 2002 Subaru Legacy

Max: 7.9 [g] at 0.147 [s]

Min: -10.4 [g] at 0.095 [s]

P4 Chest y

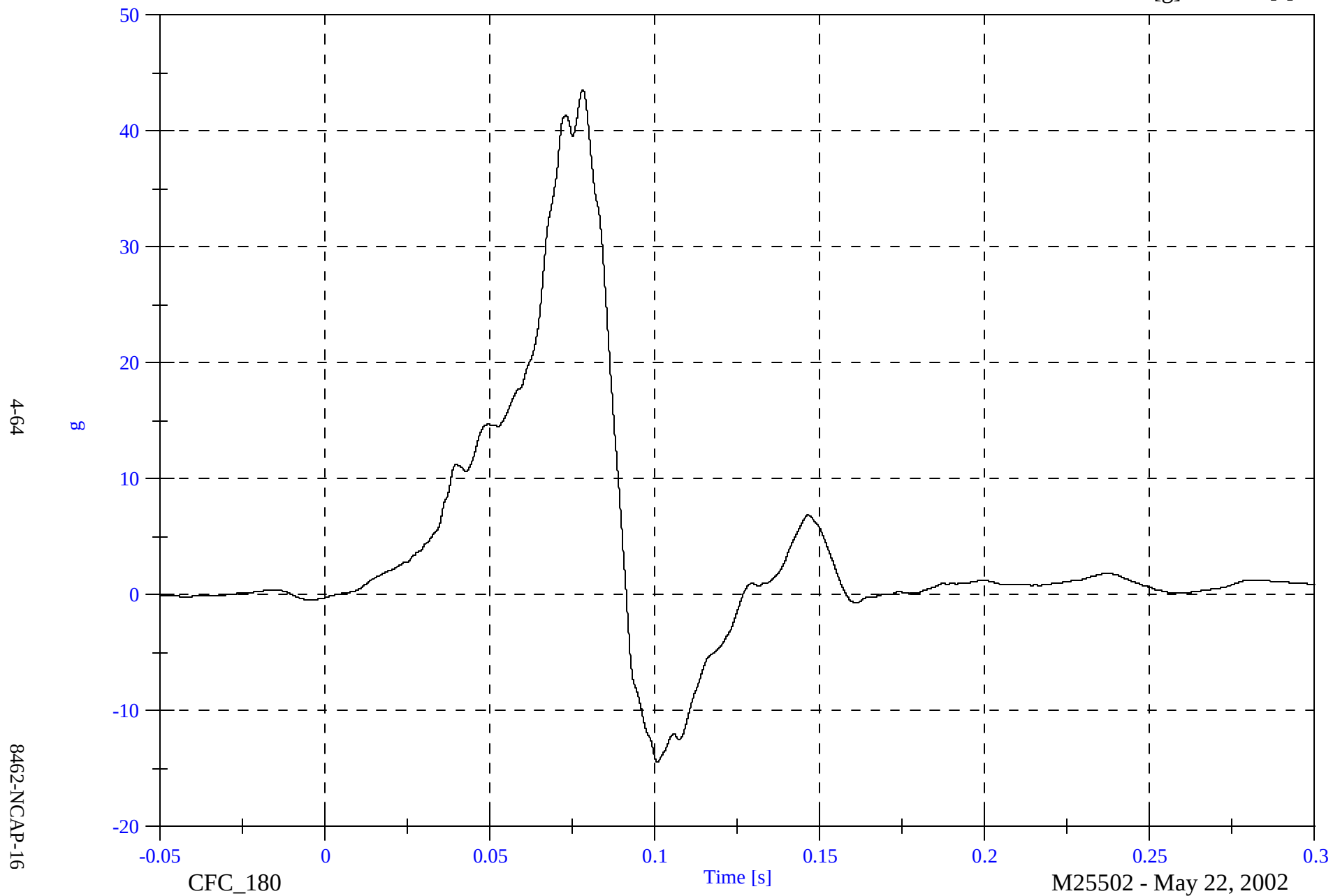


2002 NCAP Test 16 2002 Subaru Legacy

Max: 43.5 [g] at 0.078 [s]

P4 Chest z

Min: -14.4 [g] at 0.101 [s]

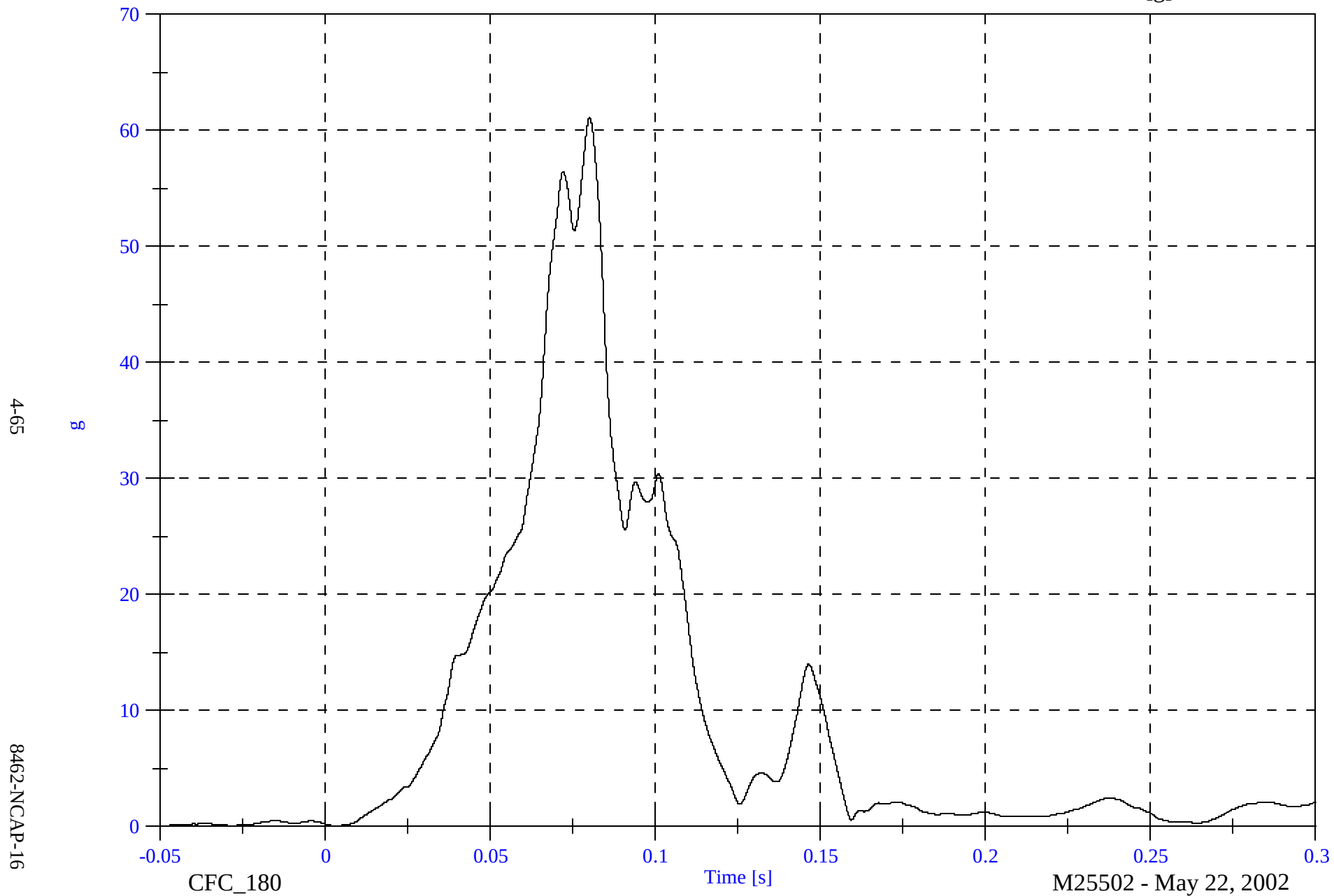


2002 NCAP Test 16 2002 Subaru Legacy

Max: 61.1 [g] at 0.080 [s]

Min: 0.0 [g] at 0.003 [s]

P4 Chest Resultant

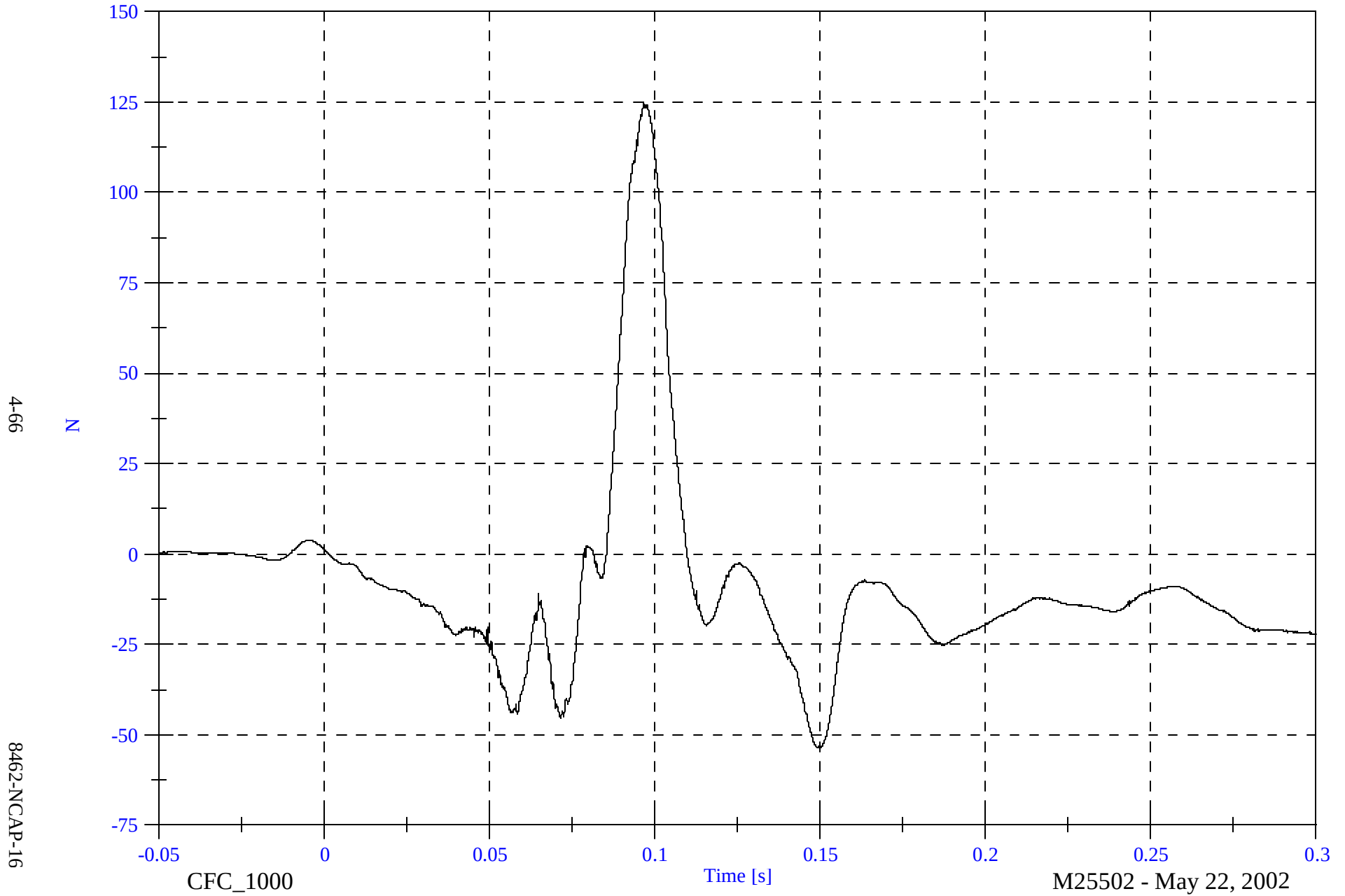


2002 NCAP Test 16 2002 Subaru Legacy

Max: 125.0 [N] at 0.097 [s]

Min: -53.6 [N] at 0.150 [s]

P4 Lumbar Fx

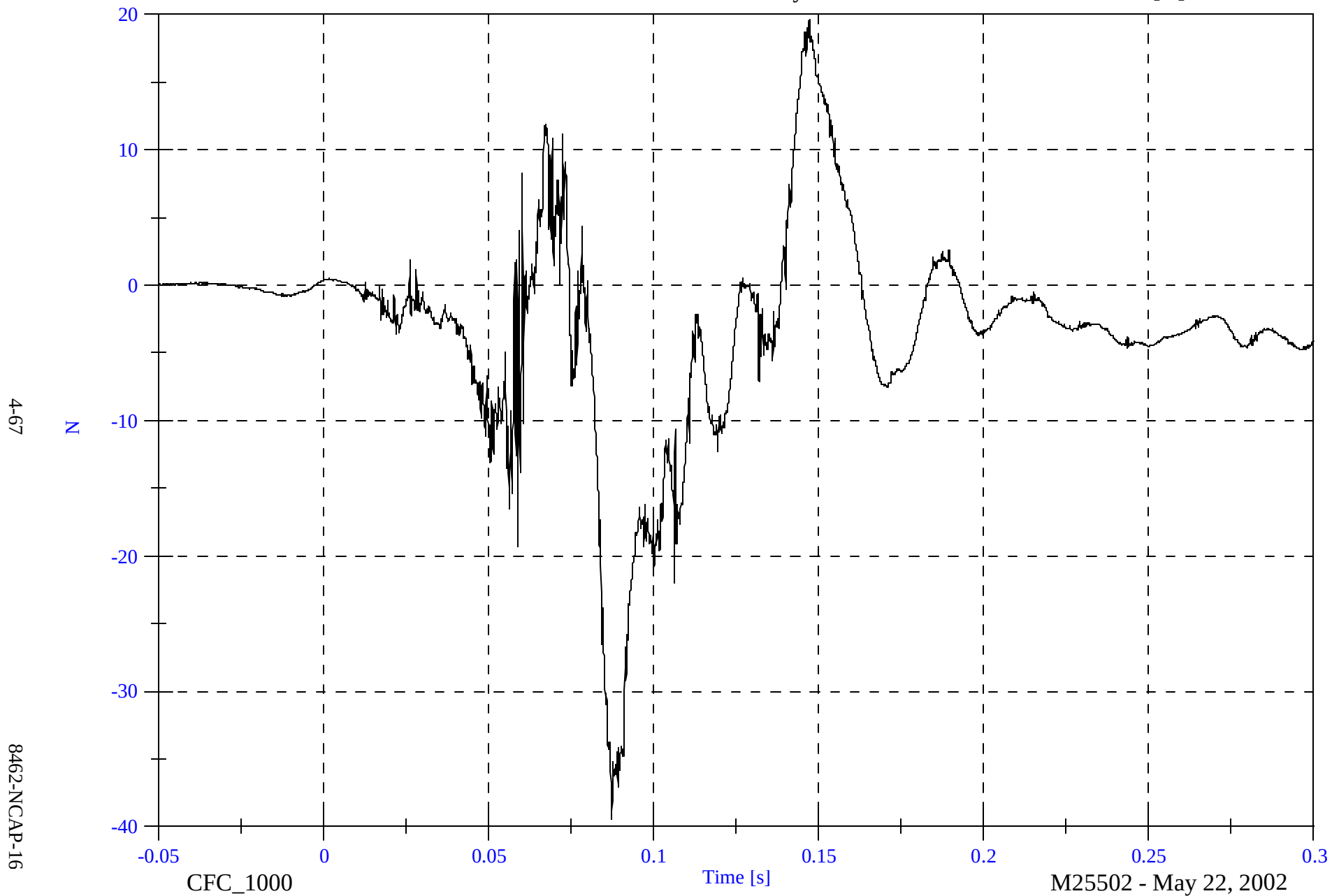


2002 NCAP Test 16 2002 Subaru Legacy

Max: 19.6 [N] at 0.147 [s]

Min: -39.5 [N] at 0.087 [s]

P4 Lumbar Fy

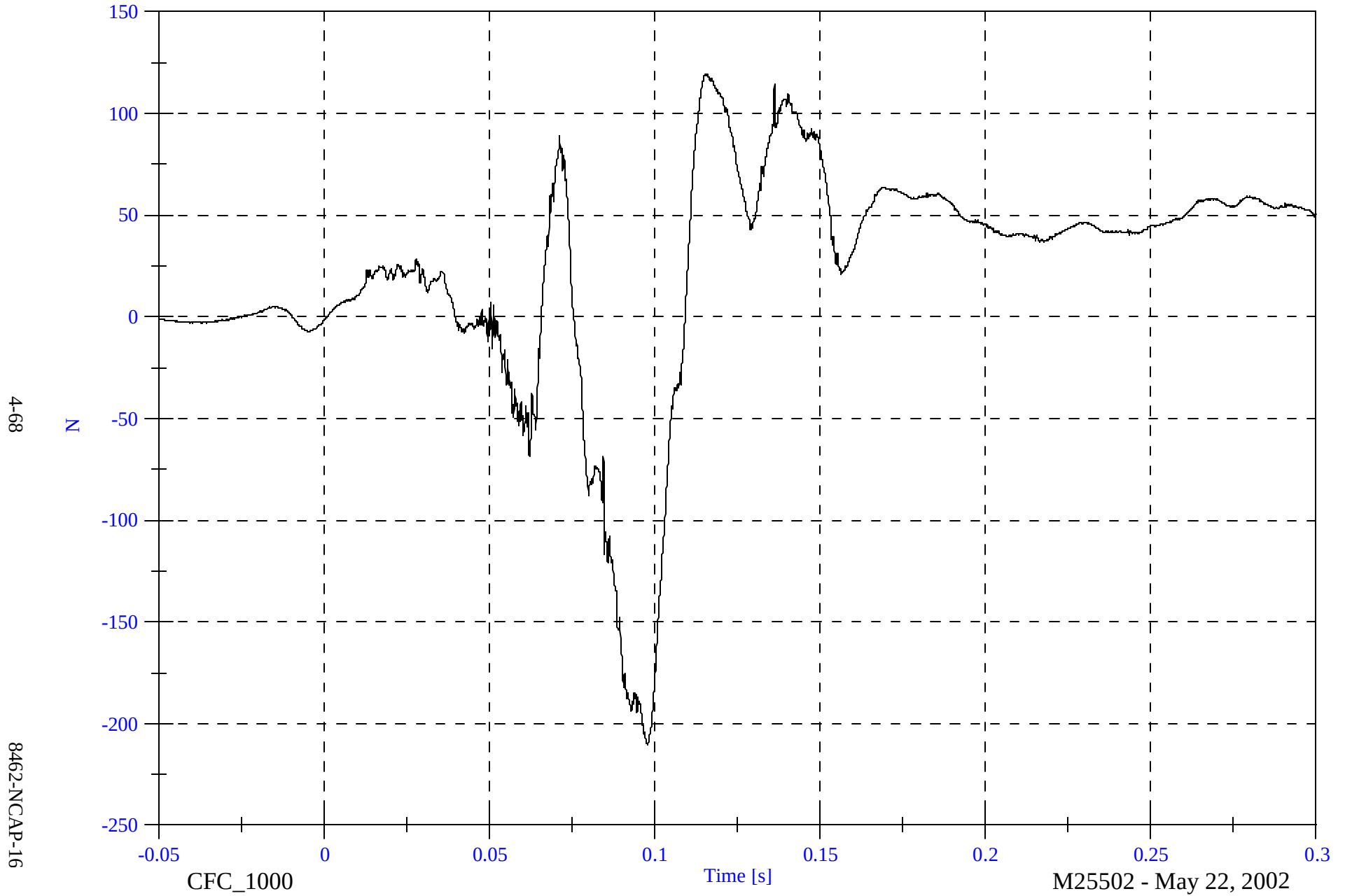


2002 NCAP Test 16 2002 Subaru Legacy

Max: 119.3 [N] at 0.116 [s]

Min: -210.6 [N] at 0.098 [s]

P4 Lumbar Fz

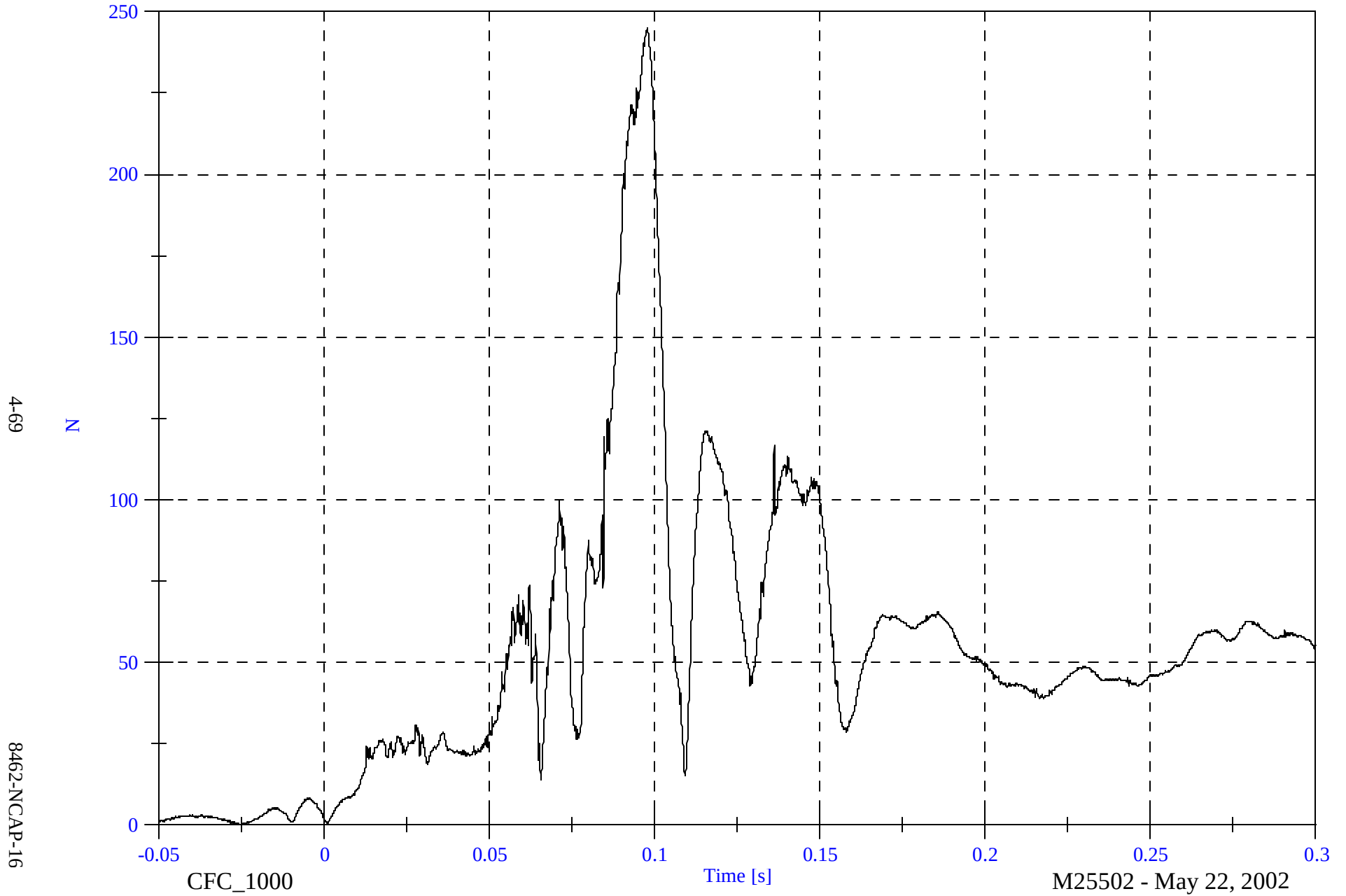


2002 NCAP Test 16 2002 Subaru Legacy

Max: 244.9 [N] at 0.098 [s]

Min: 0.2 [N] at -0.025 [s]

P4 Lumbar F Resultant

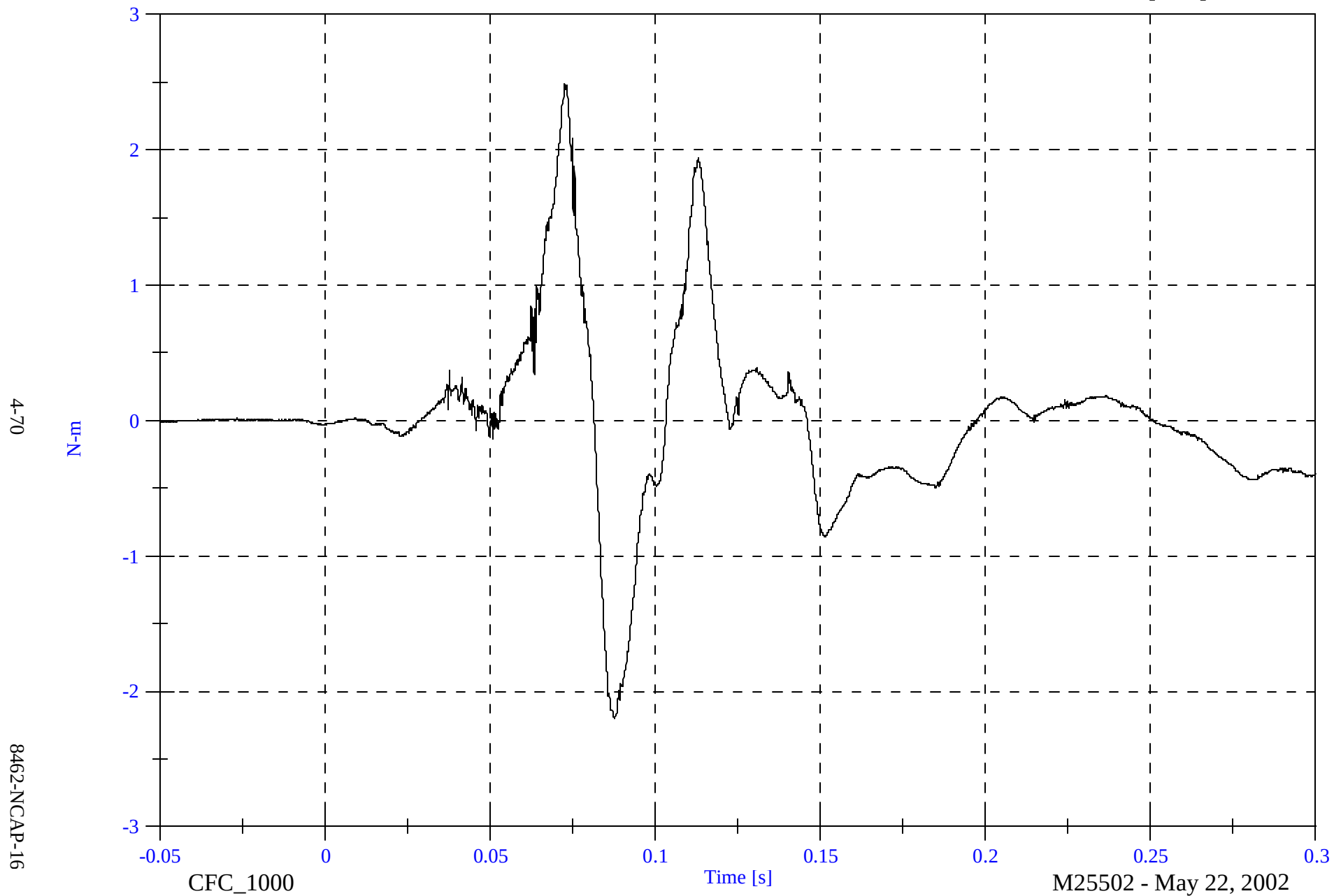


2002 NCAP Test 16 2002 Subaru Legacy

Max: 2.5 [N-m] at 0.073 [s]

Min: -2.2 [N-m] at 0.088 [s]

P4 Lumbar Mx



2002 NCAP Test 16 2002 Subaru Legacy

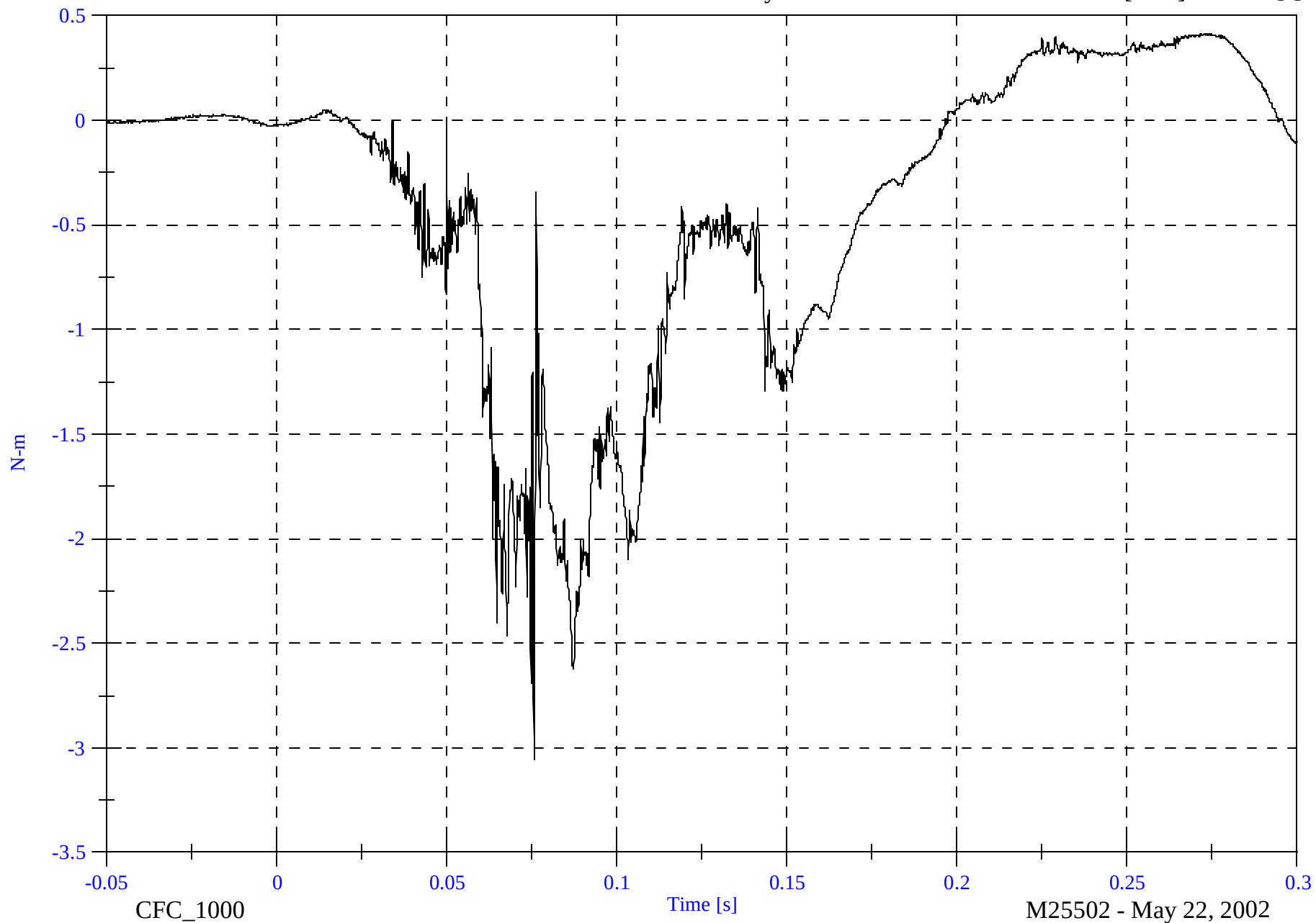
Max: 0.4 [N-m] at 0.273 [s]

P4 Lumbar My

Min: -3.1 [N-m] at 0.076 [s]

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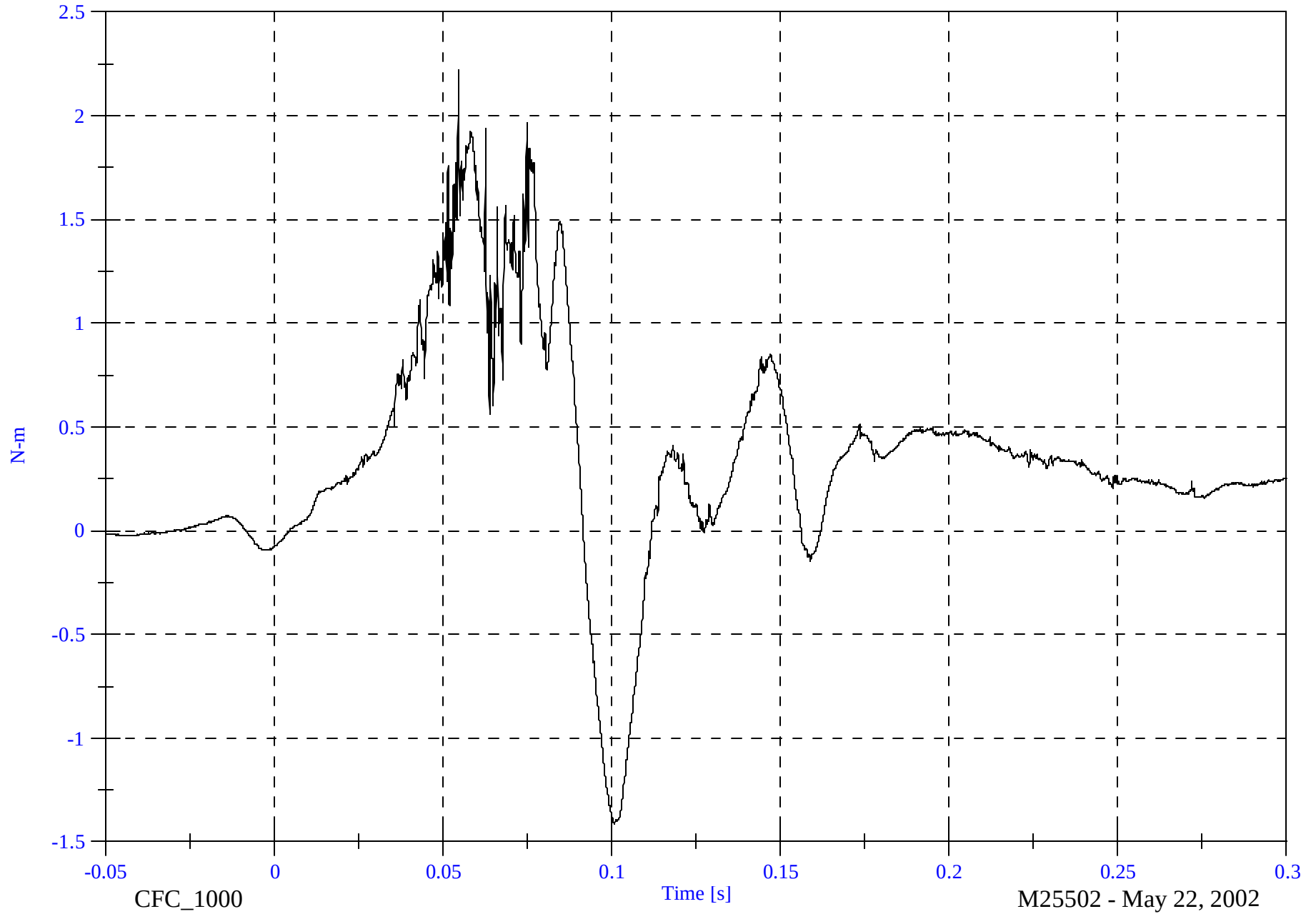
Max: 2.2 [N-m] at 0.055 [s]

P4 Lumbar Mz

Min: -1.4 [N-m] at 0.101 [s]

4-72

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P4 Lumbar M Resultant

Max: 3.9 [N-m] at 0.076 [s]

Min: 0.0 [N-m] at -0.008 [s]

4-73

8462-NCAP-16

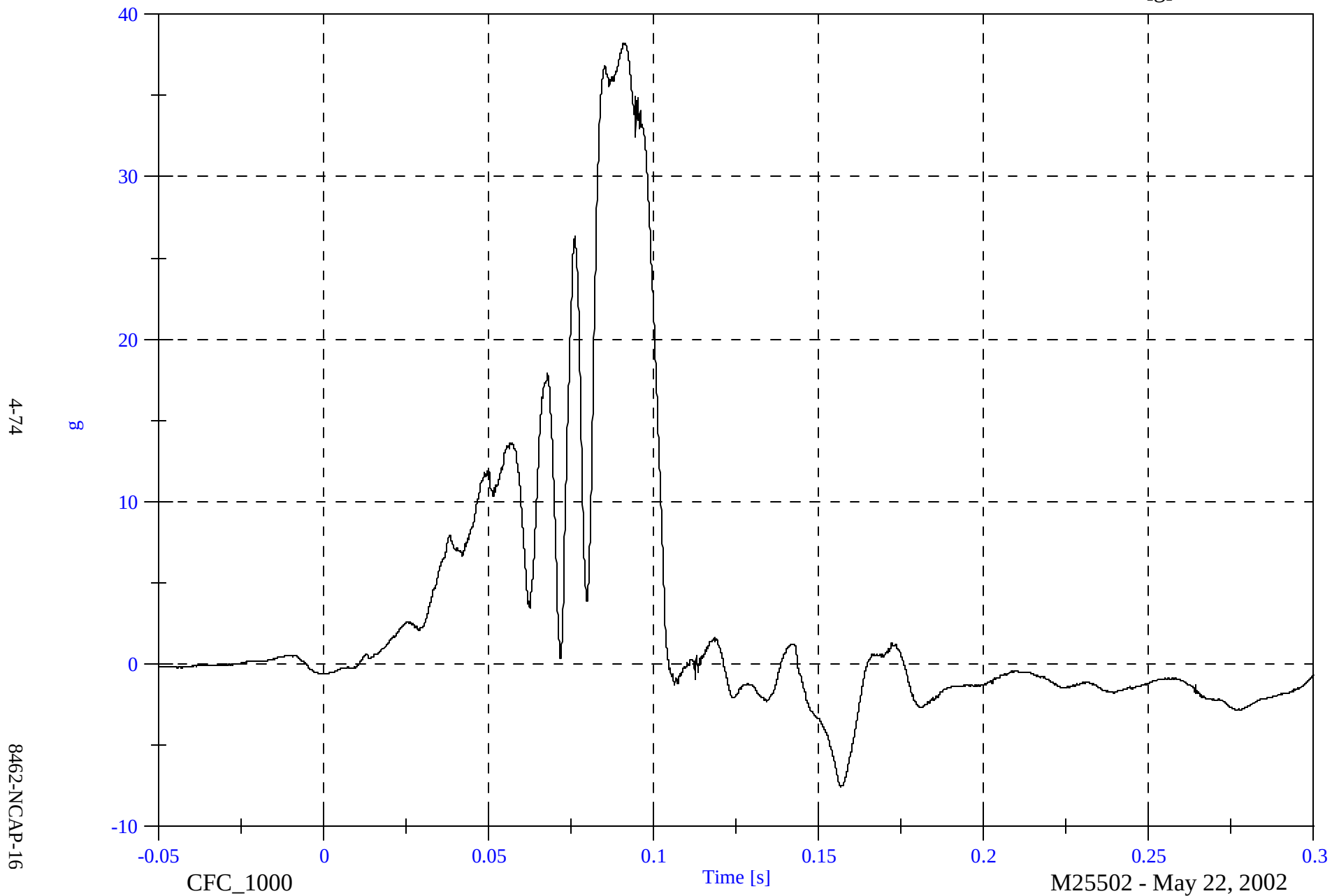


2002 NCAP Test 16 2002 Subaru Legacy

Max: 38.2 [g] at 0.091 [s]

Min: -7.5 [g] at 0.157 [s]

P4 Pelvic x

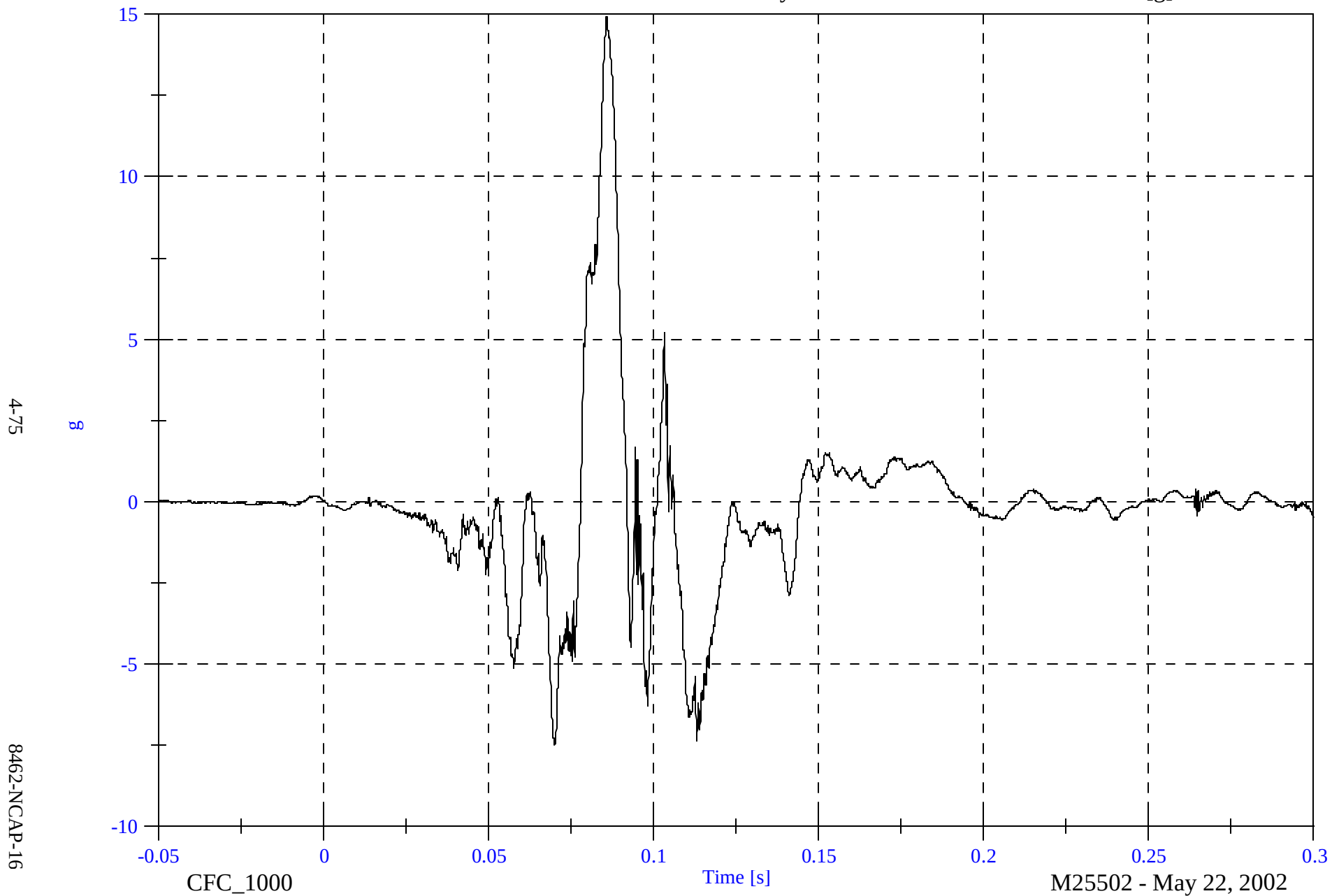


2002 NCAP Test 16 2002 Subaru Legacy

Max: 14.9 [g] at 0.086 [s]

Min: -7.5 [g] at 0.070 [s]

P4 Pelvic y

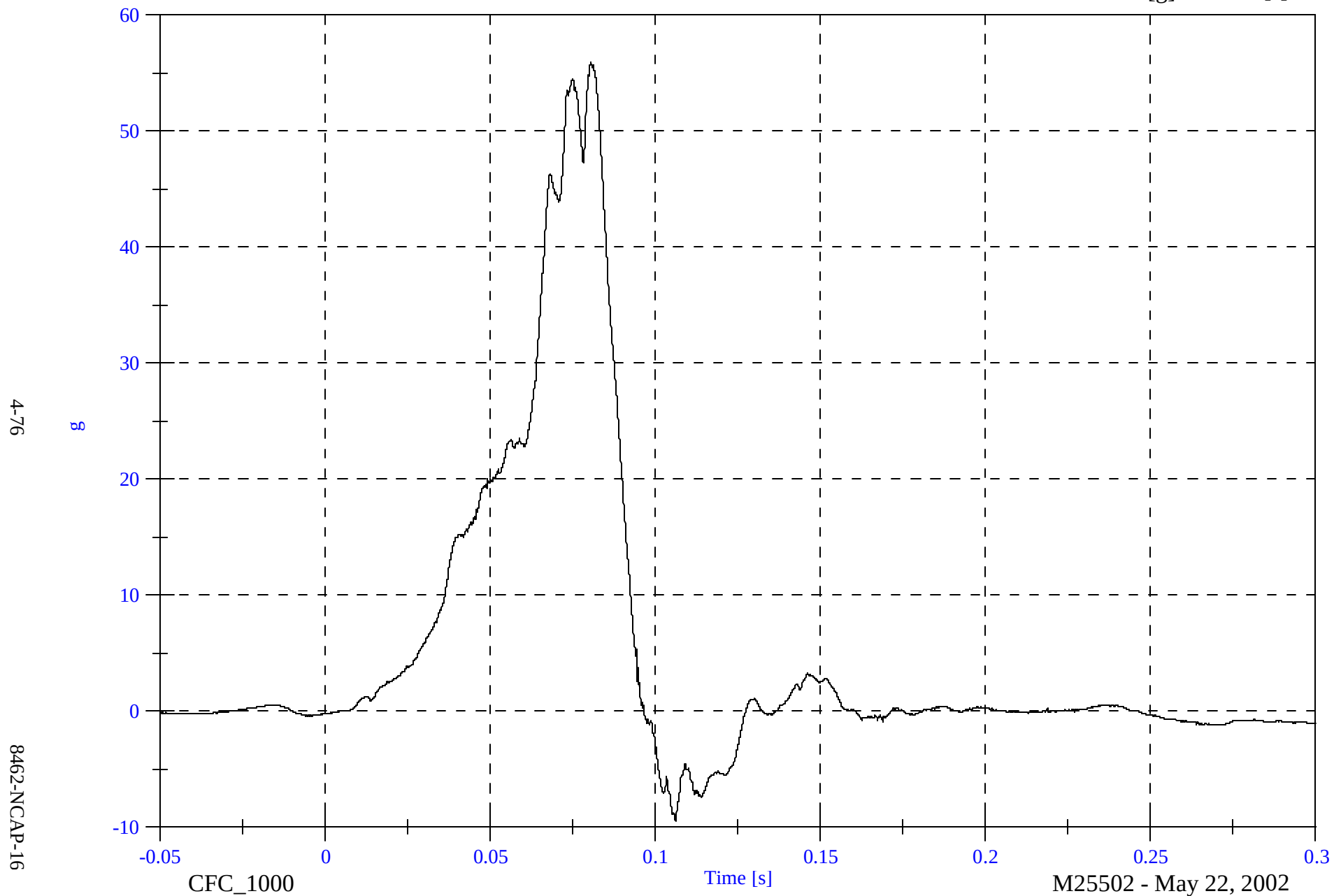


2002 NCAP Test 16 2002 Subaru Legacy

Max: 56.0 [g] at 0.080 [s]

Min: -9.4 [g] at 0.106 [s]

P4 Pelvic z



4-76

8462-NCAP-16

CFC_1000

M25502 - May 22, 2002

2002 NCAP Test 16 2002 Subaru Legacy

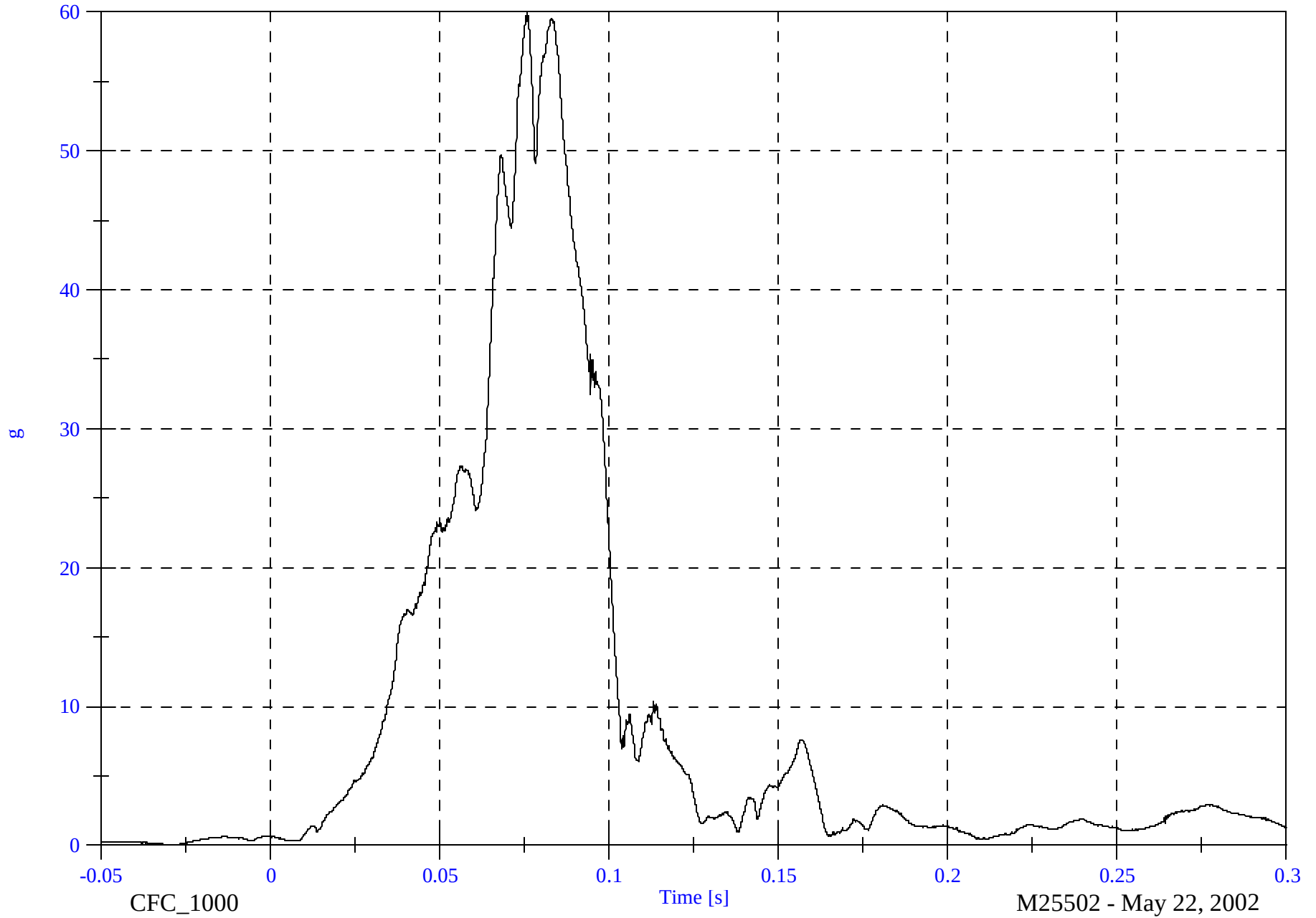
P4 Pelvic Resultant

Max: 59.9 [g] at 0.076 [s]

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

4-77

8462-NCAP-16

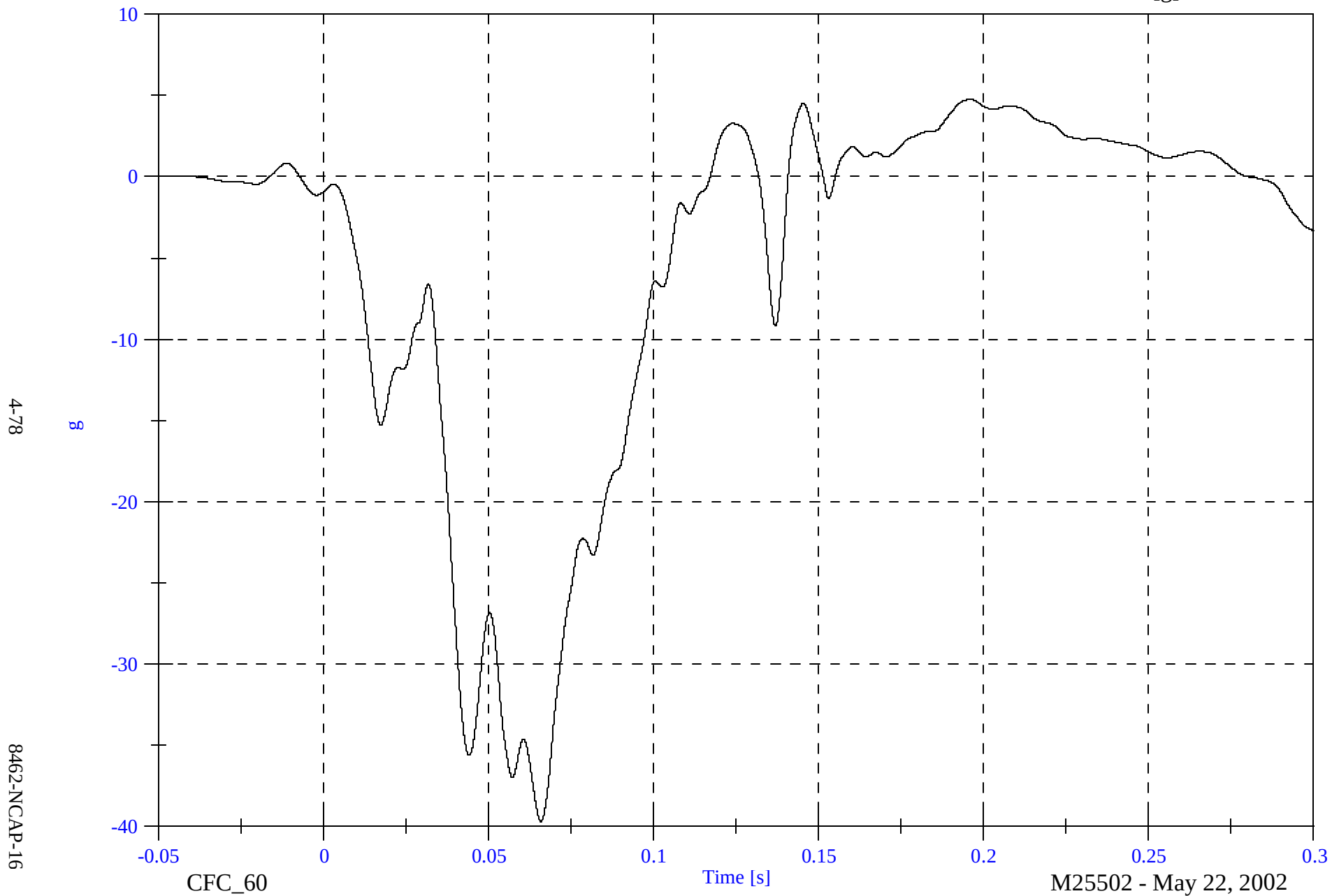


2002 NCAP Test 16 2002 Subaru Legacy

Max: 4.8 [g] at 0.196 [s]

Min: -39.7 [g] at 0.066 [s]

P3 Child Seat x



2002 NCAP Test 16 2002 Subaru Legacy

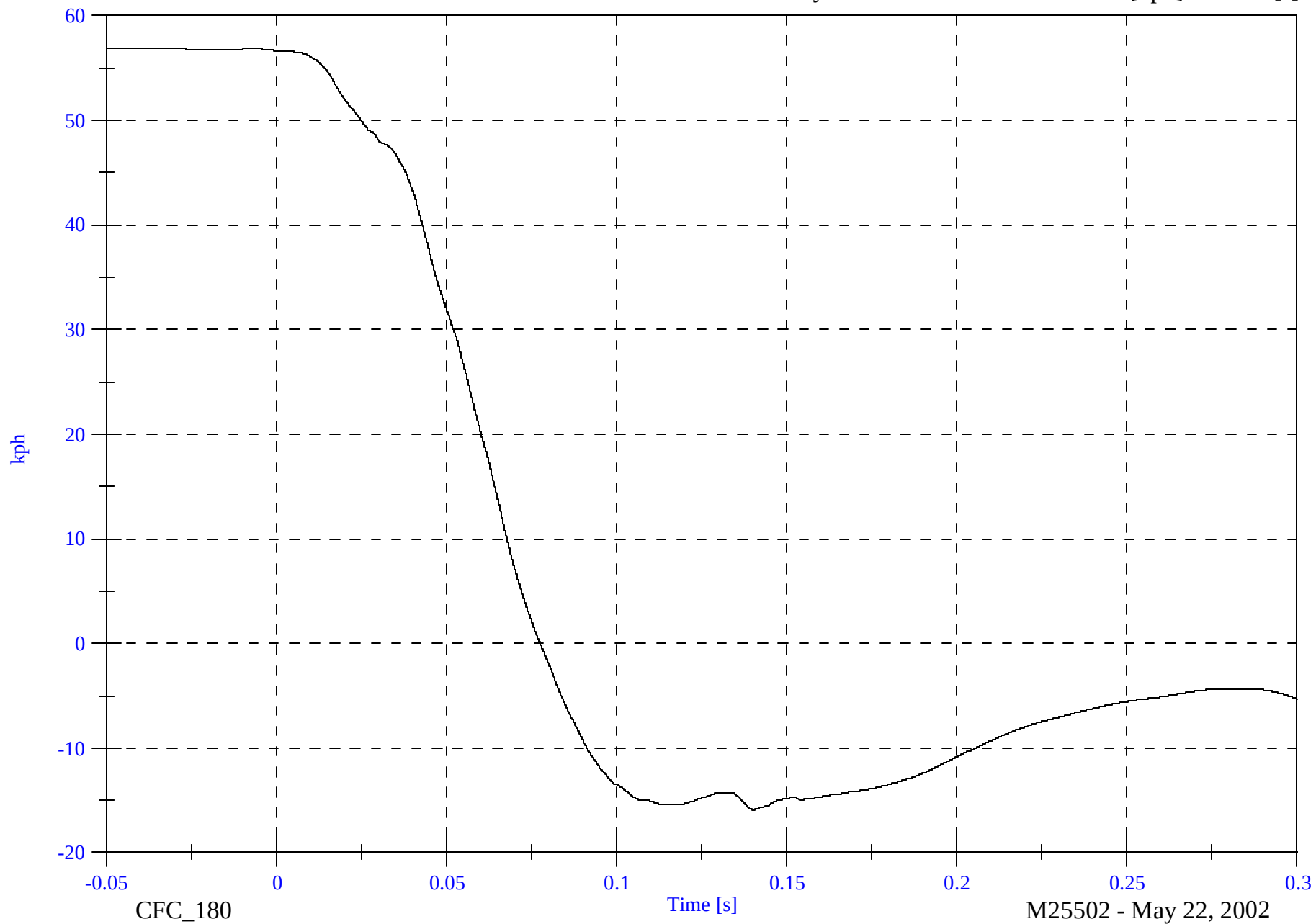
Max: 56.9 [kph] at -0.038 [s]

P3 Child Seat x Velocity

Min: -15.9 [kph] at 0.140 [s]

4-79

8462-NCAP-16

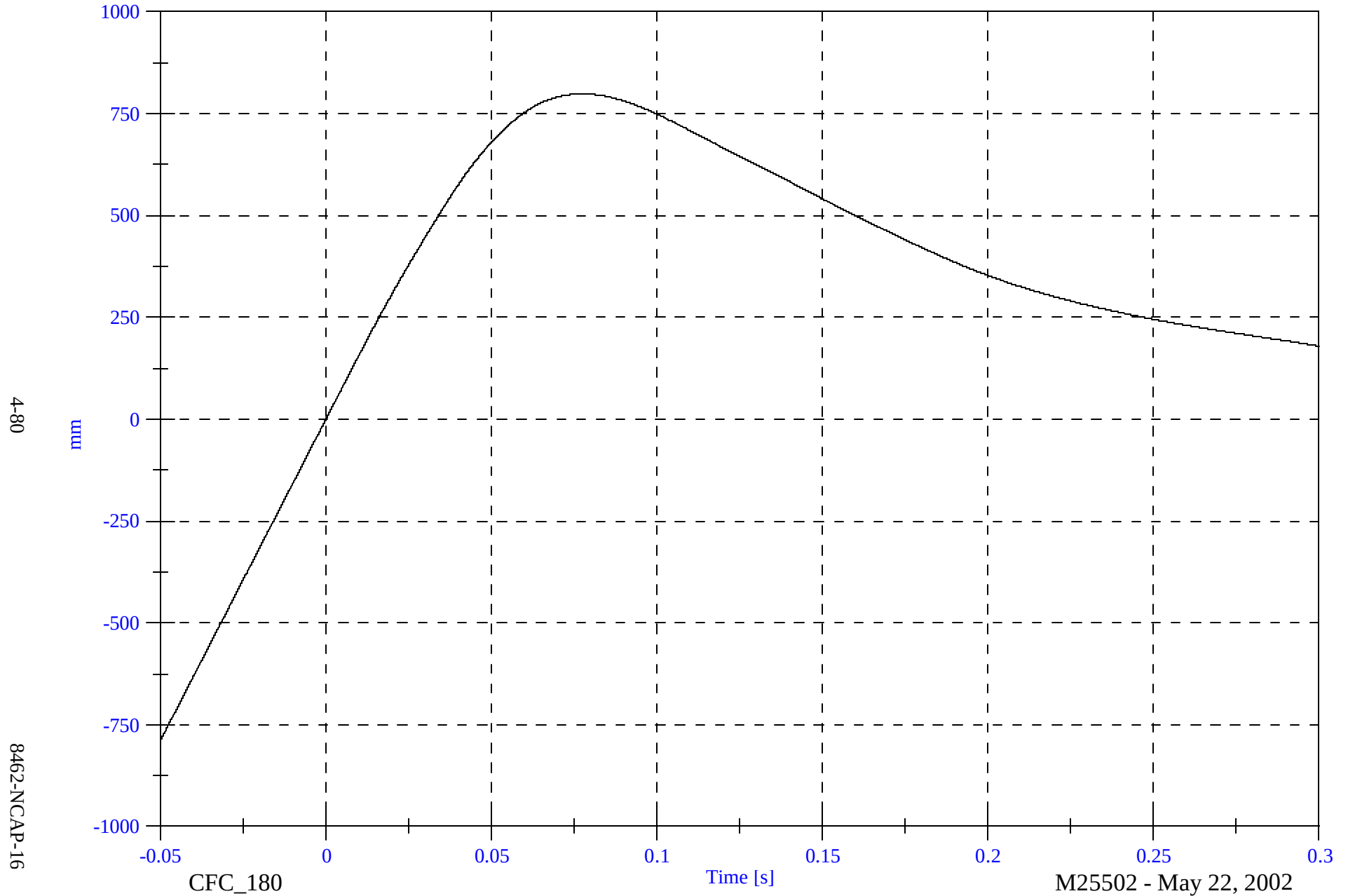


2002 NCAP Test 16 2002 Subaru Legacy

P3 Child Seat x Displacement

Max: 797.6 [mm] at 0.077 [s]

Min: -789.0 [mm] at -0.050 [s]

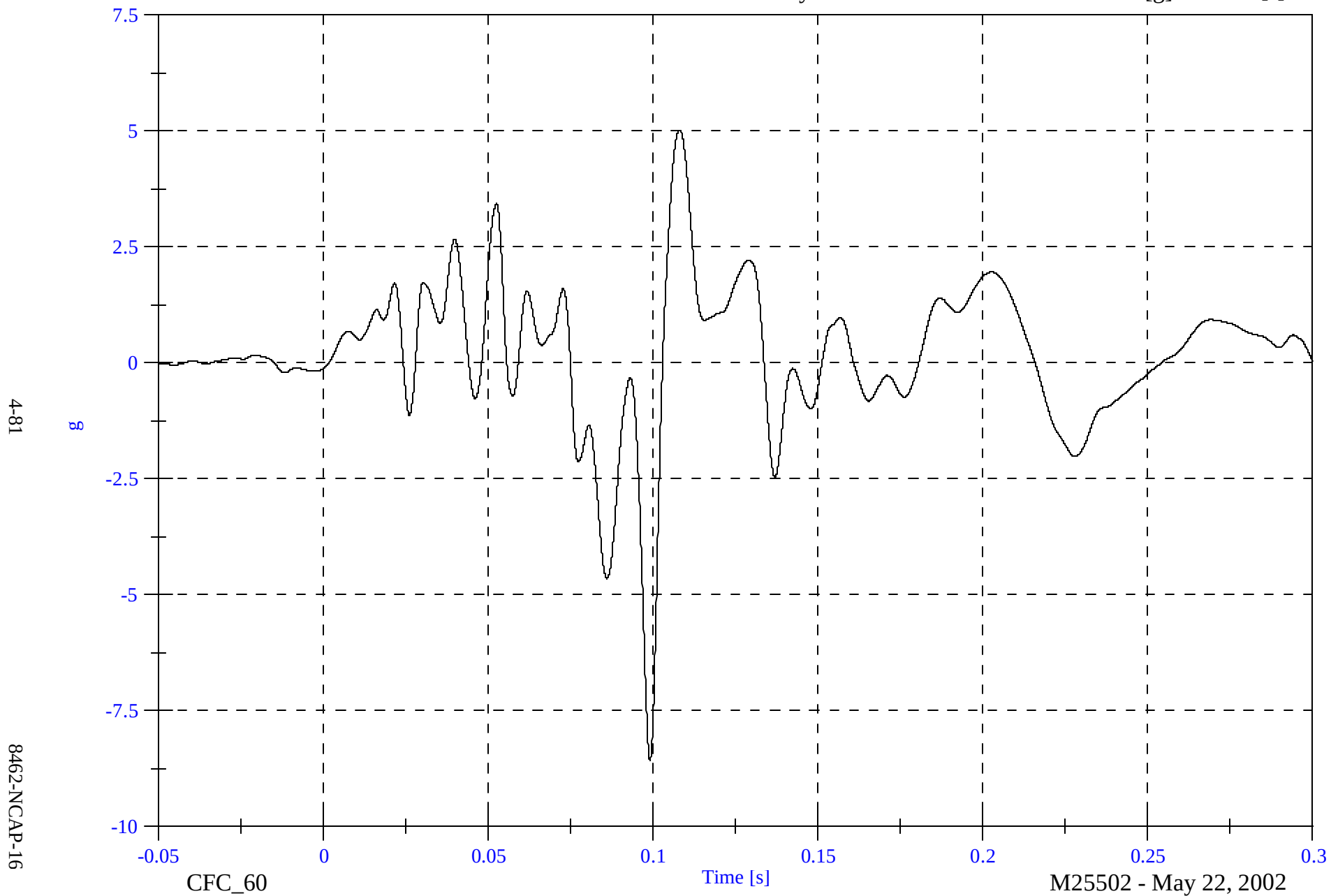


2002 NCAP Test 16 2002 Subaru Legacy

Max: 5.0 [g] at 0.108 [s]

Min: -8.6 [g] at 0.099 [s]

P3 Child Seat y



2002 NCAP Test 16 2002 Subaru Legacy

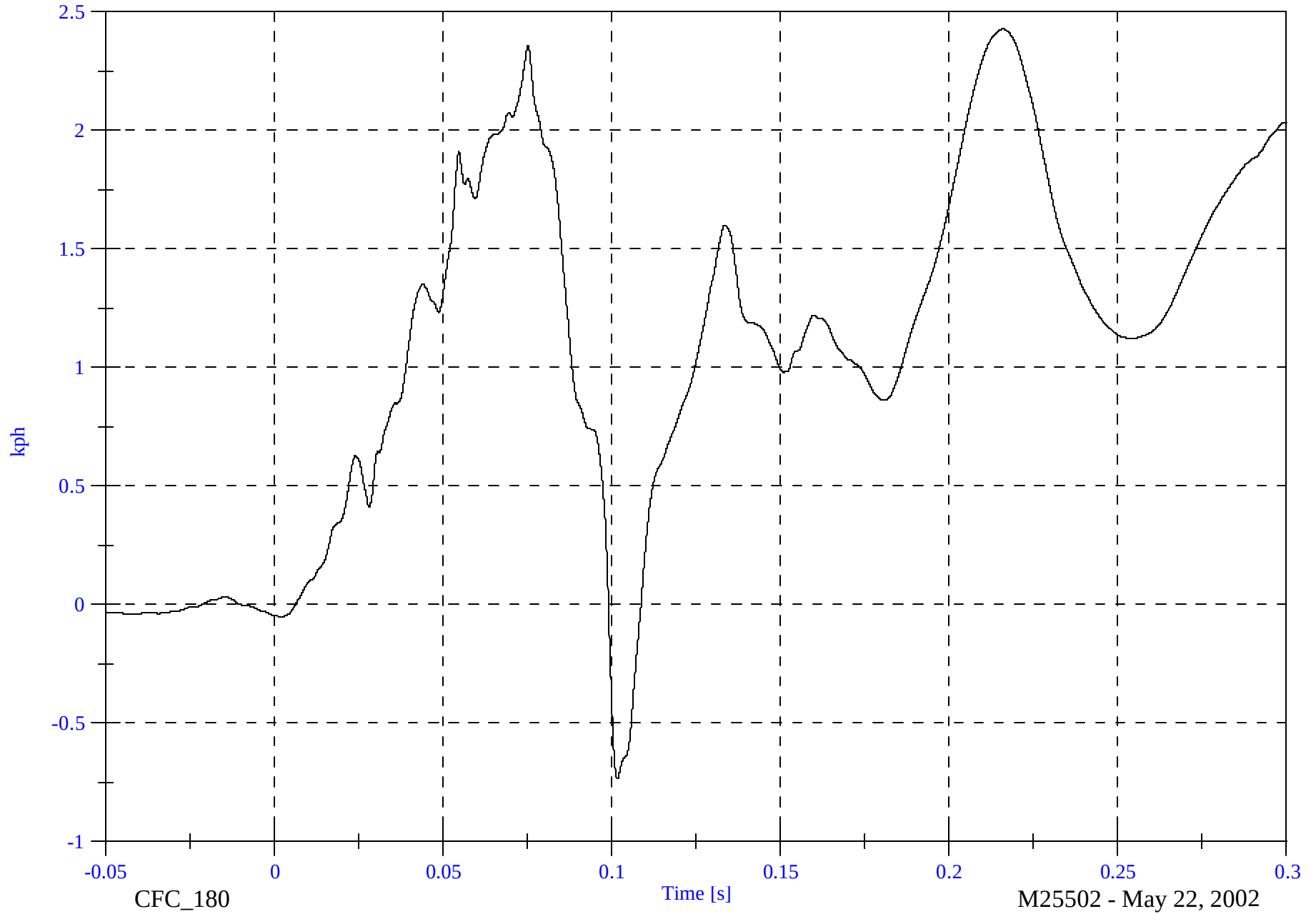
P3 Child Seat y Velocity

Max: 2.4 [kph] at 0.216 [s]

Min: -0.7 [kph] at 0.102 [s]

4-82

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2002 NCAP Test 16 2002 Subaru Legacy

Max: 102.6 [mm] at 0.300 [s]

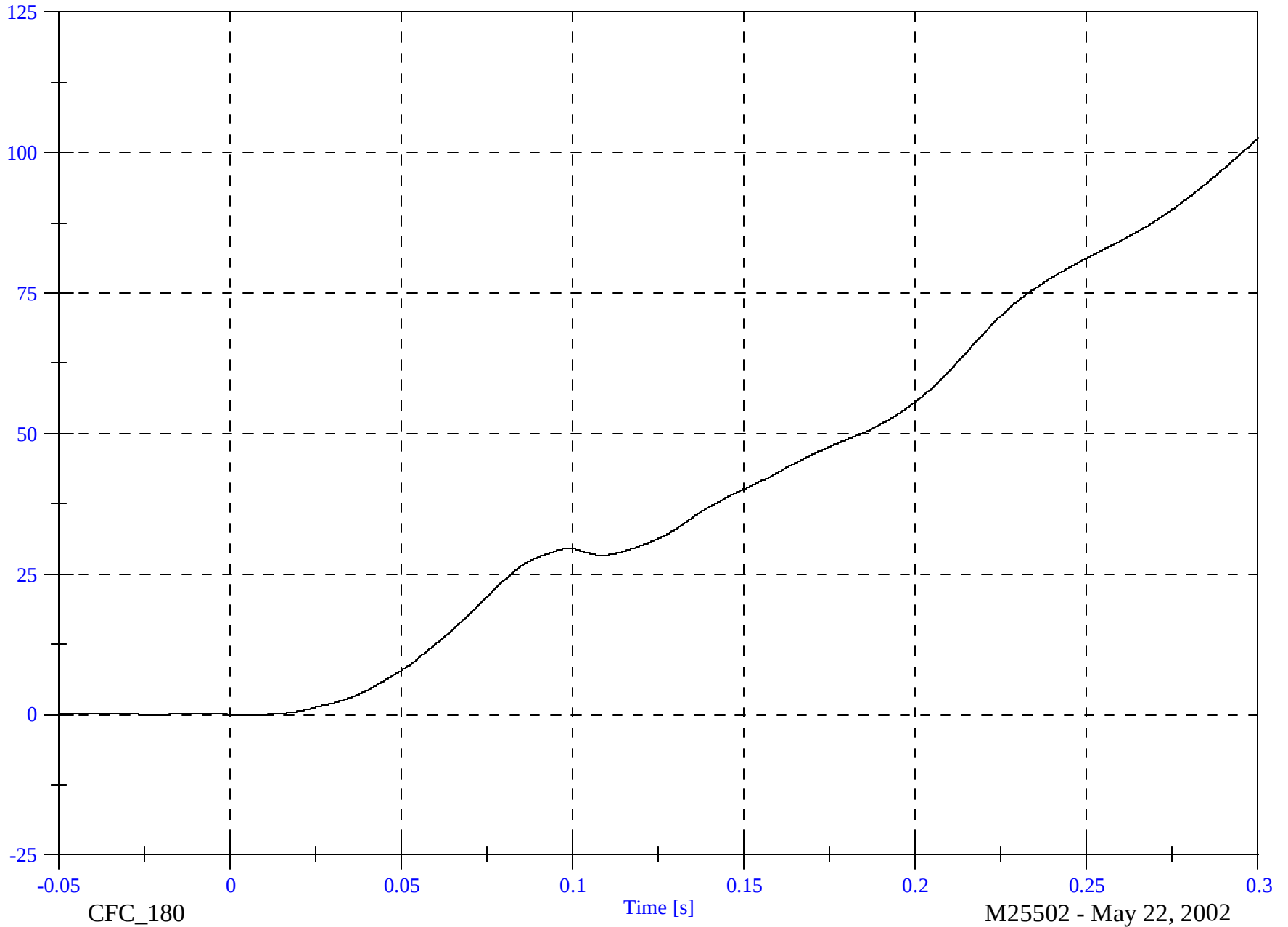
P3 Child Seat y Displacement

Min: -0.1 [mm] at 0.006 [s]

4-83

mm

8462-NCAP-16

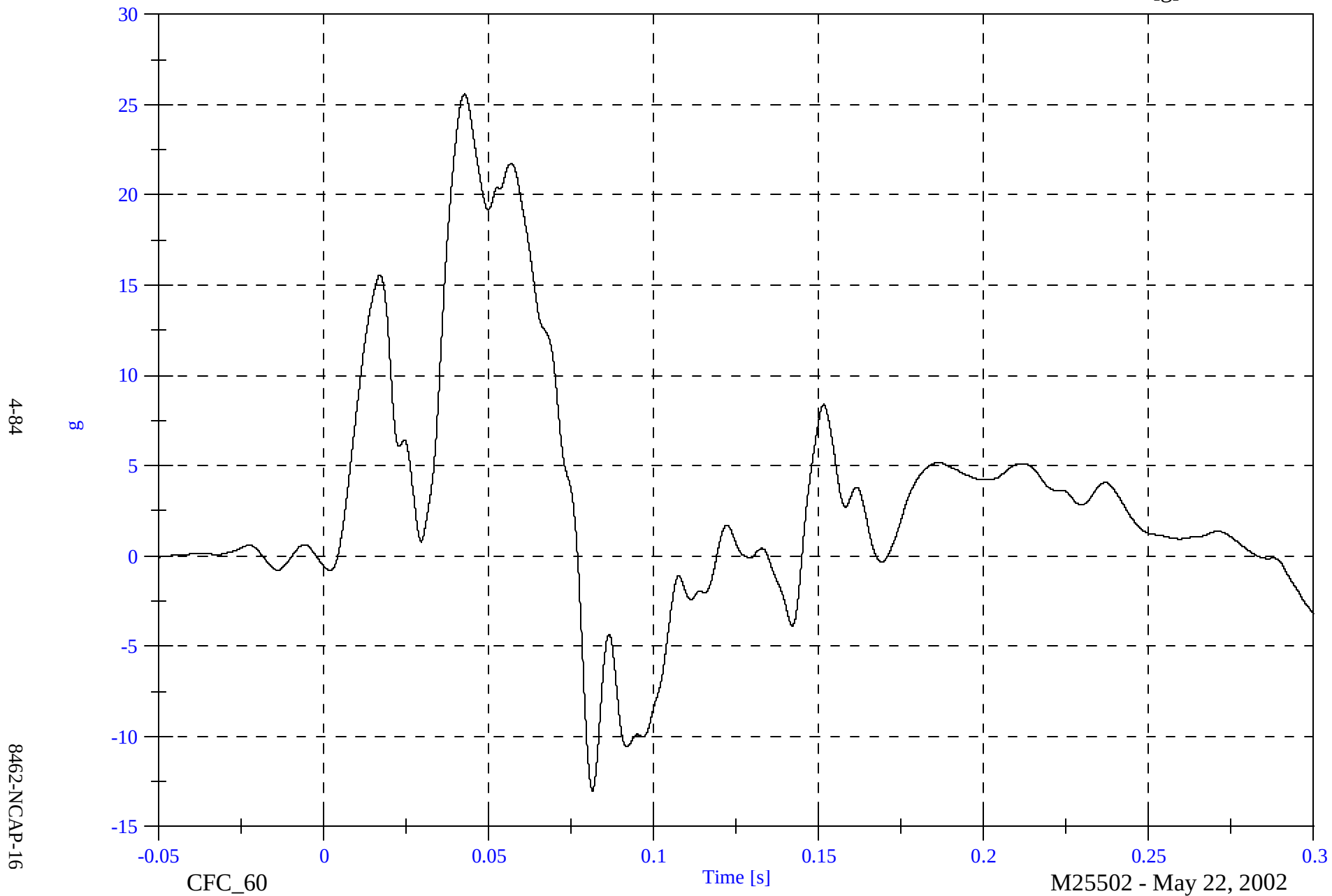


2002 NCAP Test 16 2002 Subaru Legacy

Max: 25.6 [g] at 0.043 [s]

Min: -13.0 [g] at 0.081 [s]

P3 Child Seat z



2002 NCAP Test 16 2002 Subaru Legacy

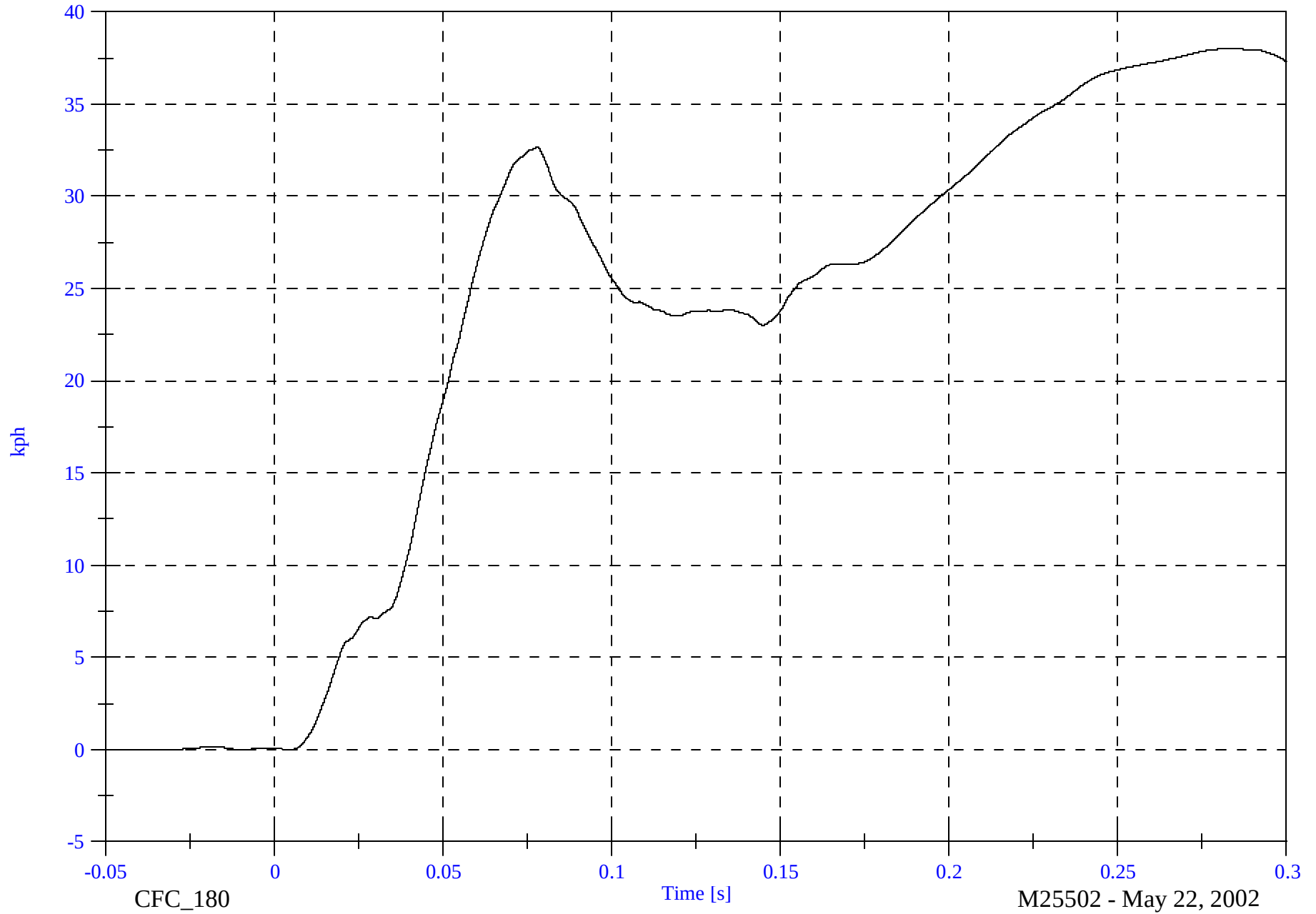
P3 Child Seat z Velocity

Max: 38.0 [kph] at 0.283 [s]

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

4-85

8462-NCAP-16

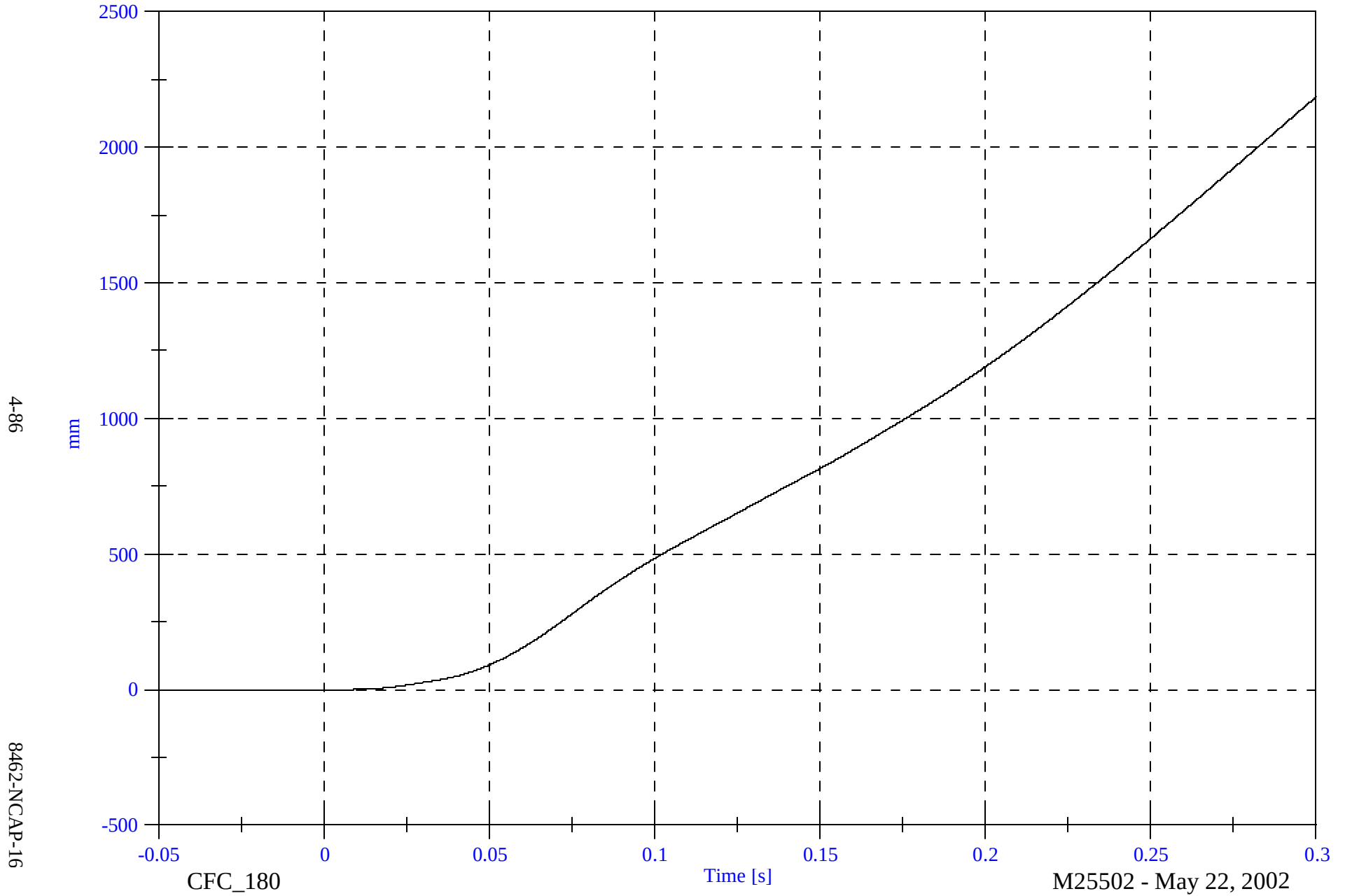


2002 NCAP Test 16 2002 Subaru Legacy

Max: 2185.2 [mm] at 0.300 [s]

P3 Child Seat z Displacement

Min: -0.6 [mm] at -0.033 [s]



2002 NCAP Test 16 2002 Subaru Legacy

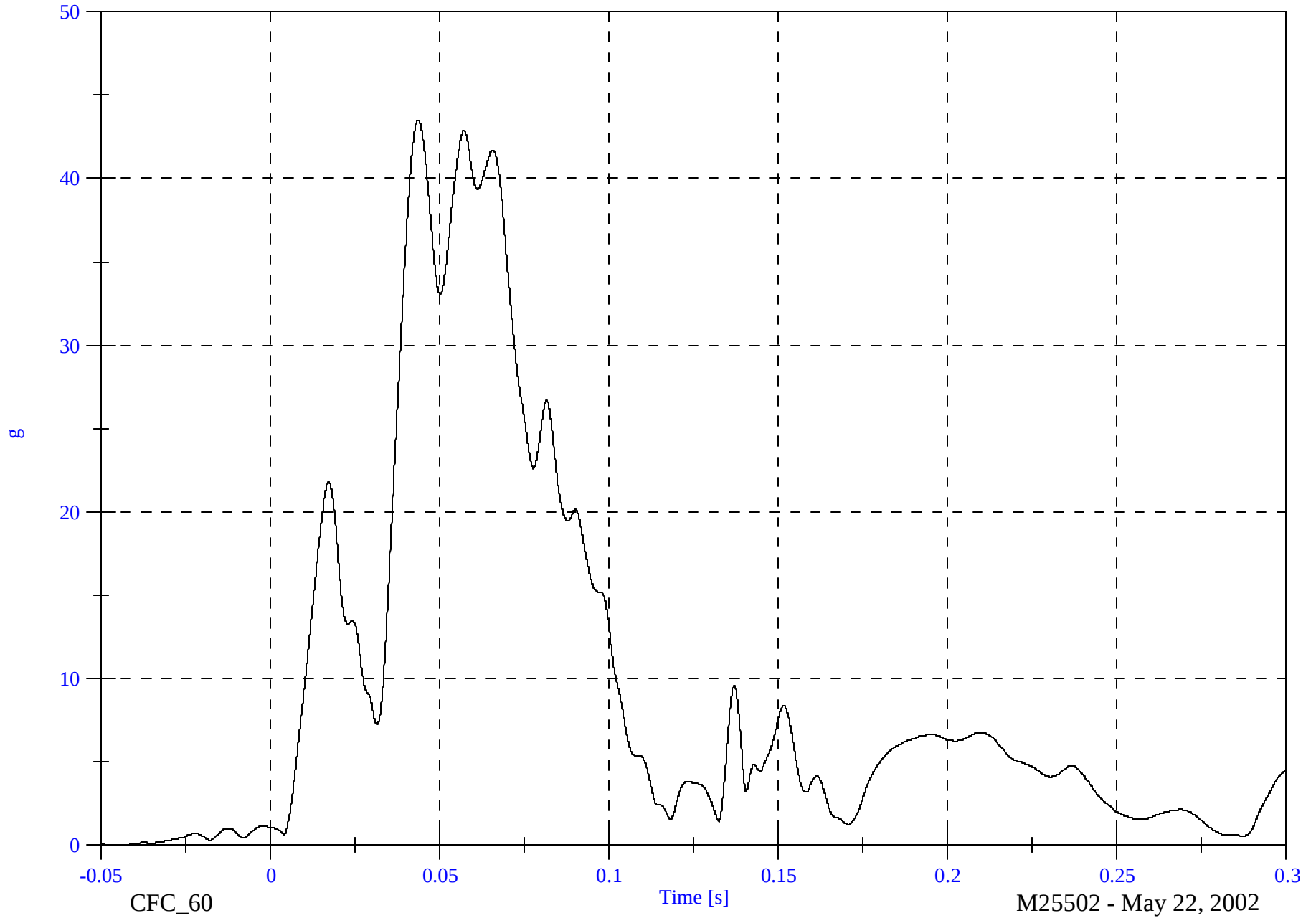
P3 Child Seat Resultant

Max: 43.5 [g] at 0.044 [s]

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

4-87

8462-NCAP-16



SECTION 5

CHILD DUMMY CALIBRATION INFORMATION

ATD's certified by VRTC prior to test program, data is included in bound test report.

SECTION 6

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

P572R INSTRUMENTATION

	POSITION #3 (RIGHT) SERIAL NO.: 017		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	AC-99H12-F18	ENTRAN	03-Apr-02
HEAD AY	AC-J35770	ENDEVCO	03-Apr-02
HEAD AZ	AC-P18545	ENDEVCO	27-Feb-02
HEAD RAZ	LC-274Fx	DENTON	06-Sep-01
UPPER NECK FX	LC-274Fy	DENTON	06-Sep-01
UPPER NECK FY	LC-274Fz	DENTON	06-Sep-01
UPPER NECK FZ	LC-274Mx	DENTON	06-Sep-01
UPPER NECK MX	LC-274My	DENTON	06-Sep-01
UPPER NECK MY	LC-274Mz	DENTON	06-Sep-01
UPPER NECK MZ	LC-139Fx	DENTON	05-Apr-02
LOWER NECK FX	LC-139Fy	DENTON	05-Apr-02
LOWER NECK FY	LC-139Fz	GSE	05-Apr-02
LOWER NECK FZ	LC-139Mx	DENTON	05-Apr-02
LOWER NECK MX	LC-139My	DENTON	05-Apr-02
LOWER NECK MY	LC-139Mz	DENTON	05-Apr-02
LOWER NECK MZ	AC-J36744	ENDEVCO	03-Apr-02
CHEST AX	AC-J35847	ENDEVCO	03-Apr-02
CHEST AY	AC-J35718	ENDEVCO	03-Apr-02
CHEST AZ	DS-144	SERVO	10-Apr-02
LUMBAR FX	-	-	-
LUMBAR FY	-	-	-
LUMBAR FZ	-	-	-
LUMBAR MX	-	-	-
LUMBAR MY	-	-	-
LUMBAR MZ	-	-	-
PELVIS AX	AC-J36724	ENDEVCO	03-Apr-02
PELVIS AY	AC-J36719	ENDEVCO	03-Apr-02
PELVIS AZ	AC-J34363	ENDEVCO	03-Apr-02
TETHER	-	-	-

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

P572R INSTRUMENTATION

	POSITION #4 (LEFT) SERIAL NO.: 090		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	AC-98H10-F10	ENTRAN	27-Dec-01
HEAD AY	AC-98H10-F12	ENTRAN	26-Dec-01
HEAD AZ	AC-AJ4L1	ENDEVCO	27-Dec-01
HEAD RAZ	AC-ADAT0	ENDEVCO	27-Dec-01
UPPER NECK FX	LC-213-Fx	ENDEVCO	07-Jan-02
UPPER NECK FY	LC-213-Fy	DENTON	07-Jan-02
UPPER NECK FZ	LC-213-Fz	DENTON	07-Jan-02
UPPER NECK MX	LC-213-Mx	DENTON	07-Jan-02
UPPER NECK MY	LC-213-My	DENTON	07-Jan-02
UPPER NECK MZ	LC-213-Mz	DENTON	07-Jan-02
LOWER NECK FX	LC-215-Fx	DENTON	05-Jan-02
LOWER NECK FY	LC-215-Fy	DENTON	05-Jan-02
LOWER NECK FZ	LC-215-Fz	DENTON	05-Jan-02
LOWER NECK MX	LC-215-Mx	DENTON	05-Jan-02
LOWER NECK MY	LC-215-My	DENTON	05-Jan-02
LOWER NECK MZ	LC-215-Mz	DENTON	05-Jan-02
CHEST AX	AC-P23138	ENDEVCO	13-May-02
CHEST AY	AC-P19253	ENDEVCO	13-May-02
CHEST AZ	AC-P21392	ENDEVCO	13-May-02
PELVIS AX	AC-BE95J	ENDEVCO	27-Dec-01
PELVIS AY	AC-DE54J	ENDEVCO	27-Dec-01
PELVIS AZ	AC-99H12-F30	ENTRAN	27-Dec-01
LUMBAR FX	-	-	-
LUMBAR FY	-	-	-
LUMBAR FZ	-	-	-
LUMBAR MX	-	-	-
LUMBAR MY	-	-	-
LUMBAR MZ	-	-	-
TETHER	-	-	-

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

VEHICLE AND MDB INSTRUMENTATION

	VEHICLE AND MDB INSTRUMENTS		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
P3 CRS (X)	ENDEVCO	P17237	2/27/2002
P3 CRS (Y)	ENDEVCO	P14438	2/27/2002
P3 CRS (Z)	ENDEVCO	P15747	2/27/2002
P4 CRS (X)	-	-	-
P4 CRS (Y)	-	-	-
P4 CRS (Z)	-	-	-

REMARKS: None