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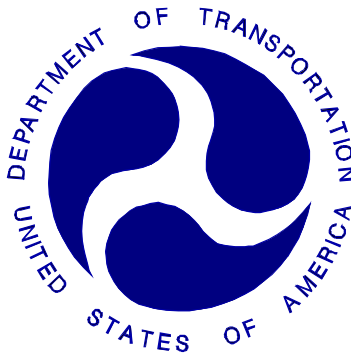
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

TOYOTA MOTOR MANUFACTURING, KENTUCKY, INC.
2003 TOYOTA AVALON
4-DOOR SEDAN

NHTSA NUMBER: M35108

VERIDIAN TEST NUMBER: 8642-NCAP-30

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



February 12, 2003

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
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16. Abstract A frontal load cell barrier test of a 2003 Toyota Avalon 4-Door Sedan was performed at Veridian Engineering crash test facility in Buffalo, New York, on February 12, 2003. The impact velocity was 56.65 kph and the temperature at the barrier face was 21.1°C. The maximum post-test vehicle crush was 572 mm. The test vehicle was equipped with pretensioning / load limiting 3-point restraint systems, knee bolsters, and airbags at both the driver and right outboard passenger seating positions. With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements.					
ATD Position	HIC	Clip (g's)	Chest Disp (mm)	Left Femur (N)	Right Femur (N)
Driver (150)	526.4	43.0	26.2	4592.2	3670.8
Passenger (245)	547.0	39.6	32.8	1810.7	2035.7
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TABLE OF CONTENTS

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

SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.65 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-01-D-32005. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

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

1.2 TEST PROCEDURE

This 56.65 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated December 1999. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301 "Fuel System Integrity" performance. Procedures for receiving, inspection testing and reporting of test results are described in the test procedures and are not repeated in this report.

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

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

Both ATDs were fully instrumented with nine accelerometer array head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also installed on the driver's and passenger's lap belts to measure dummy pelvic section loading. The driver (position 1) ATD (Serial No. 150) and the right-front passenger (position 2) ATD (Serial No.245) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The vehicle, occupant, camera and measurement data are presented in Section 2. Appendix A contains the still photograph prints. The 139 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Appendix C contains the dummy calibration data and Appendix D contains the transducer calibration dates.

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 36 load cells was impacted by a 2003 Toyota Avalon 4-Door Sedan at a velocity of 56.65 kph. The test was performed at Veridian Engineering on February 12, 2003. 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	526.4	43.0	26.2	4592.2	3670.8	-	-
Passenger ATD	547.0	39.6	32.8	1810.7	2035.7	-	-

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

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

The 2003 Toyota Avalon 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.:	M35108	Test Mode:	56.3 kph Frontal Barrier
Test Date:	February 12, 2003	Time:	16:06
		Temperature:	21.1 °C
Vehicle Make/Model/Body Style:	2003 Toyota Avalon 4-Door Sedan		
Vehicle Test Weight:	1752.5	kg	
Vehicle/Barrier Impact Angle:	0	°	
Impact Velocity:	56.65	kph	
Maximum Static Crush:	572	mm	
Vehicle Rebound:	911	mm	
 <u>DUMMIES:</u>			
		<u>DRIVER</u>	<u>PASSENGER</u>
Type:		572E	572E
Restraint System:		Seatbelt, Airbag, Knee Bolster	Seatbelt, Airbag, Knee Bolster
Number of Data Channels:	139		
Number of Cameras:	1	Real Time	
	16	High Speed	
 <u>DOOR OPENING DATA:</u>			
	Door remained closed and latched, door opened without tools - Left Front		
	Door remained closed and latched, door opened without tools - Right Front		
 <u>Front Seat(s) Data:</u>			
		<u>DRIVER</u>	<u>PASSENGER</u>
Seat Track Failure: (mm of shift)		0	0
Seat Back Failure:		None	None
 <u>VISIBLE DUMMY CONTACT POINTS:</u>			
		<u>DRIVER</u>	<u>PASSENGER</u>
Head:		Face to center of airbag; Back of head to outboard half of head restraint.	Face to center of airbag; Back of head to outboard half of head restraint.
Abdomen:		None	None
Chest:		Airbag	Airbag
Knees:		Left knee to knee bolster left of steering column; Right knee to knee bolster right of steering column.	Left knee to left quarter of glove compartment door; Right knee to right third of glove compartment door.

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2003 Toyota Avalon 4-Door Sedan

NHTSA No. : M35108 ; VIN: 4T1BF28B33U276660 ; Color: White

Engine Data: 6 cylinders; - CID; 3.0 Liters; - cc

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

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

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

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

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

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

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

Date Received: 1/31/2003 ; Odometer Reading 143.2 km

Selling Dealer: West Herr Toyota

& Address: S-4141 Southwestern Blvd., Orchard Park NY 14127

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Toyota Motor Manufacturing, Kentucky, Inc.

Date of Manufacture 07/02

GVWR: 4550 kg; GAWR: 2665 kg FRONT; 2665 kg REAR

DATA FROM TIRE PLACARD:

Recommended Tire Size: P205/65R15 92H or P205/60R16 91H

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

DATA FROM TIRE SIDEWALL:

Size of Tires on Test Vehicle: P205/65R15 92H ; Manufacturer: Dunlop

Tire Pressure with Maximum Capacity Vehicle Load: Front: 350 kPa; Rear: 350 kPa

Treadwear: 340 ; Traction: A ; Temperature: A

VEHICLE CAPACITY DATA:

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

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

Vehicle Capacity Weight (VCW) = 410 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 69.8 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>469.0</u>	kg	Right Rear	=	<u>294.5</u>	kg
Left Front	=	<u>472.0</u>	kg	Left Rear	=	<u>301.0</u>	kg
TOTAL FRONT	=	<u>941.0</u>	kg	TOTAL REAR	=	<u>595.5</u>	kg
TOTAL DELIVERED WEIGHT	=	<u>1536.5</u>	kg				
% of Total Front of Vehicle Weight	=	<u>61.2%</u>		% of Total Rear Weight	=	<u>38.8%</u>	%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW)	=	<u>1536.5</u>	kg
Rated Cargo/Luggage Weight (RCLW)	=	<u>69.8</u>	kg
Weight of 2 p.572 Dummies @ 76 each	=	<u>152</u>	kg
TARGET TEST WEIGHT	=	<u>1758.3</u>	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND

64.0

KG OF CARGO WEIGHT:

Right Front	=	<u>507.5</u>	kg	Right Rear	=	<u>361.0</u>	kg
Left Front	=	<u>502.5</u>	kg	Left Rear	=	<u>381.5</u>	kg
TOTAL FRONT	=	<u>1010.0</u>	kg	TOTAL REAR	=	<u>742.5</u>	kg
TOTAL TEST WEIGHT	=	<u>1752.5</u>	kg				
% of Total Front Weight	=	<u>57.6%</u>	%	% of Total Rear Weight	=	<u>42.4%</u>	%
Weight of Ballast Secured in Vehicle Trunk Area	=	<u>0</u>	kg				

Vehicle Components Removed for Weight Reduction:

Tail lights, trunk interior trim, muffler, rear door glass / power window motors.

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED:	RF	<u>697</u>	LF	<u>694</u>	RR	<u>719</u>	LR	<u>721</u>
FULLY LOADED:	RF	<u>684</u>	LF	<u>683</u>	RR	<u>680</u>	LR	<u>685</u>
AS TESTED:	RF	<u>684</u>	LF	<u>684</u>	RR	<u>680</u>	LR	<u>685</u>
Vehicle's Wheel Base:		<u>2709</u>	mm					
Location of Vehicle's C.G.:		<u>1148</u>	mm rearward of front wheel center.					

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual	=	<u>70</u>	liters
Usable Capacity Figure Furnished by COTR	=	<u>70.01</u>	liters
Test Volume Range (92 to 94% of Usable Capacity)	=	<u>64.41</u>	to <u>65.81</u> liters
ACTUAL TEST VOLUME=	<u>22.7 H</u>	liters (with entire fuel system filled)	
Test Fluid Type:	<u>Stoddard Solution</u>	Spec. Grav. =	<u>0.764</u>
Kinematic Viscosity	=	<u>0.96</u>	centistokes; Color = <u>Orange</u>
Type of Fuel Pump: Electric-	<u>X</u>	Mechanical-	<u>-</u>
Does Electric Pump operate with ignition switch "ON" & engine "OFF"	Yes- <u>X</u>	No- <u>-</u>	
Details of Fuel System:	<u>Fuel Tank – Located on the vehicle underbody between the rear wheels; Fuel Lines - Routed along the vehicle underbody inboard of the left body stiffener; Fuel Filler – Located on the left rear quarter panel rear of the rear wheel.</u>		

H Stoddard volume was reduced to achieve target test weight and was approved by the COTR.

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°
Test Date: February 12, 2003 Time: 16:06 Temperature: 21.1 °C
Vehicle NHTSA No.: M35108
Required Impact Velocity Range: 55.5 to 57.1 kph

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

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

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

Vehicle Length:

Pre-Test	Left = <u>4837</u> ; C/L = <u>4887</u> ; Right = <u>4847</u>
Post-Test	Left = <u>4379</u> ; C/L = <u>4315</u> ; Right = <u>4366</u>
Crush	Left = <u>458</u> ; C/L = <u>572</u> ; Right = <u>481</u>
AVERAGE	= <u>504</u> mm

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

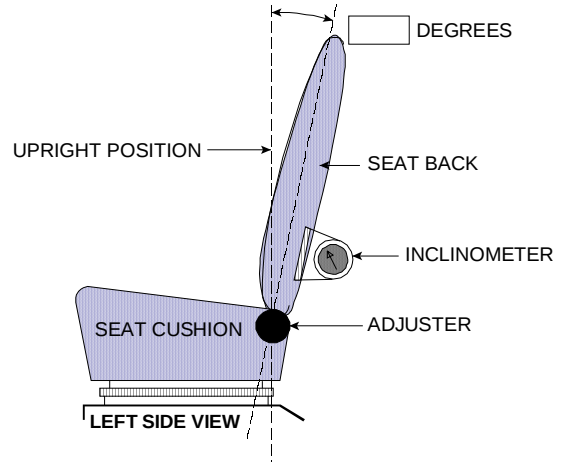
	Left = <u>907</u> ; C/L = <u>942</u> ; Right = <u>883</u>
AVERAGE	= <u>911</u> mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2003 Vehicle Model: Toyota Avalon 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: 10.5 (on head restraint post)

Measurement instructions: _____

Seat back angle for passenger's seat: 10.7 (on head restraint post)

Measurement instructions: Where the most-upright position is defined as detent 0, seat back was placed in detent 5 (for manual seats)

2. Seat Fore and Aft Positioning

Positioning of the driver's seat: Where the forward-most detent is defined as 0, the seat was placed in detent 8.

Positioning of the passenger's seat: Where the forward-most detent is defined as 0, the seat was placed in detent 8.

3. Fuel Tank Capacity Data

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 70 liters

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

C. "Usable Capacity" of the vehicle(s) used for certification testing to requirements of FMVSS 301 = 70.01 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 22.7 liters

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

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

The fuel pump operates briefly when the ignition is turned on and the engine is not started. The fuel pump operates continuously while the engine is running.

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

4. STEERING COLUMN ADJUSTMENTS:

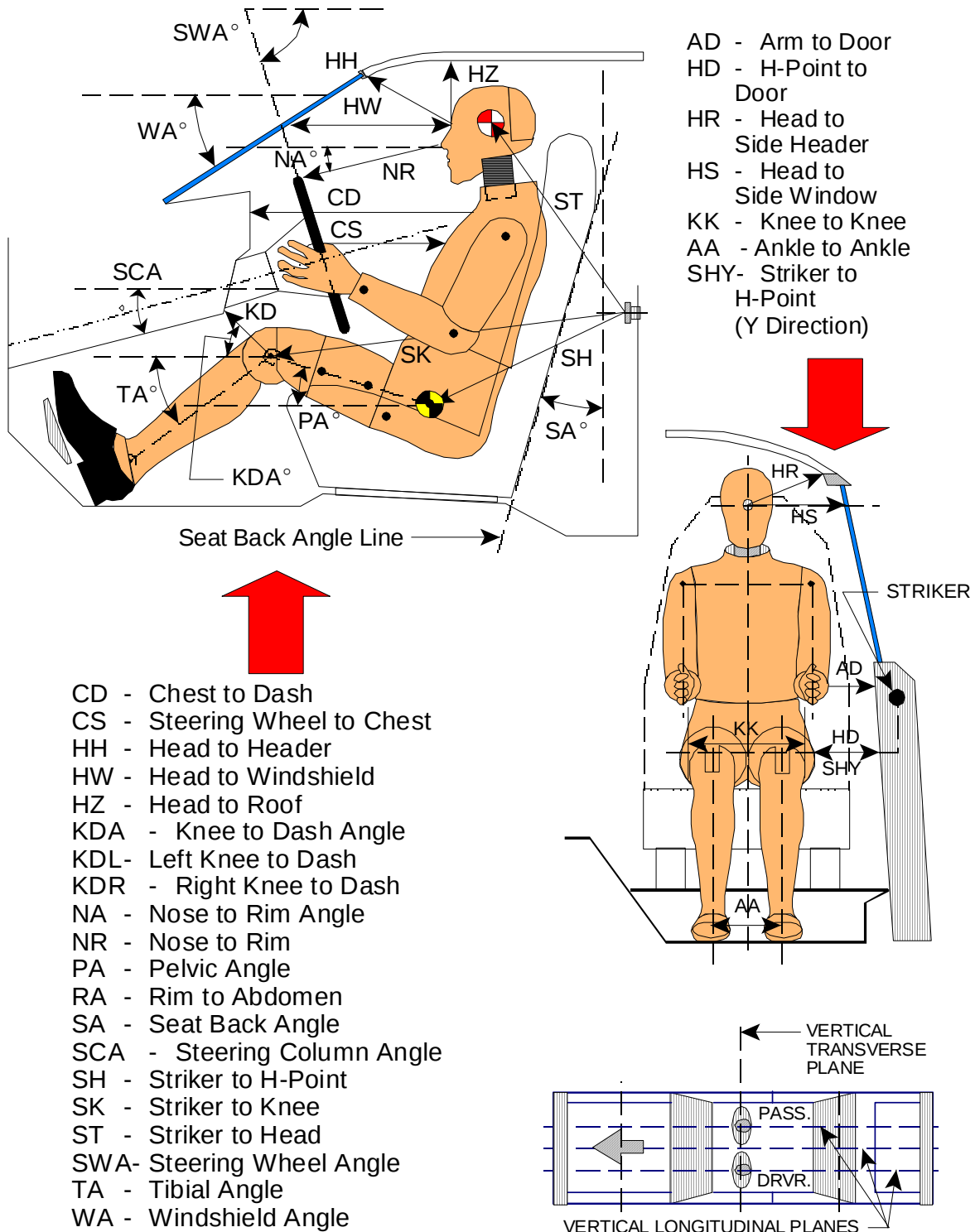
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine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

Operational Instructions: Where the lower-most detent is defined as 0, the steering column was placed in detent 2 (mid-point, column is 27.2 relative to the rocker panel).

5. SEAT BELT UPPER ANCHORAGE

Nominal design riding position: Where the upper-most detent is defined as 0, the shoulder belt adjustable anchorage was placed in detent 2 (mid-position).

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



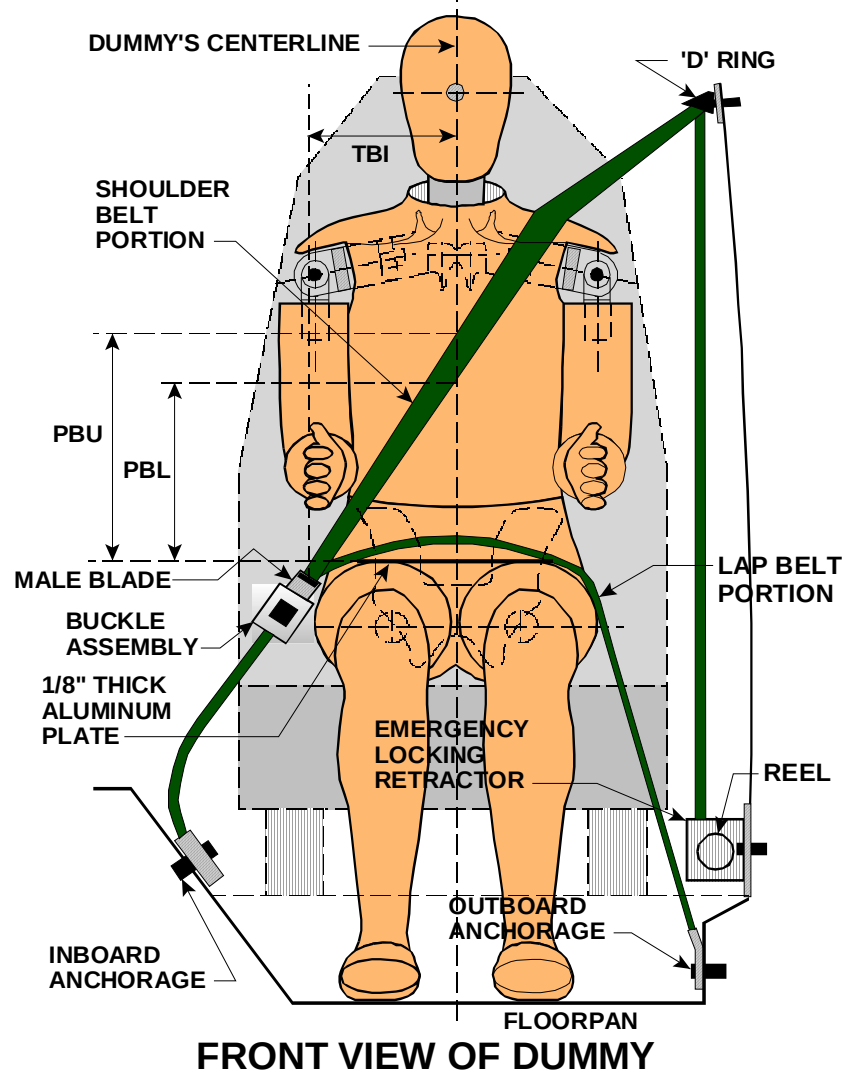
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #150)			PASS. (Serial #245)		
WA ^o	29 deg.			N/A		
SWA ^o	63 deg.			N/A		
SCA ^o	27 deg.			N/A		
SA ^o	10.5 deg.			10.7 deg.		
HZ	219			175		
HH	388			356		
HW	710			585		
HR	235			226		
NR	440	Angle	8 deg.	N/A		
CD	692			577		
CS	341			N/A		
RA	206			N/A		
KDL	176	Angle (KDA)	31 deg.	170		
KDR	166			181	Angle (KDA)	30 deg.
PA ^o	21.6 deg.			21.0 deg.		
TA ^o	37.0 deg.			40.6 deg.		
KK	360			270		
AA	335			225		
ST	435	Angle	10 deg.	460	Angle	7 deg.
SK	604	Angle	102 deg.	586	Angle	110 deg.
SH	302	Angle	138 deg.	269	Angle	131 deg.
SHY	248			240		
HS	347			356		
HD	184			172		
AD	105			138		

Dimensions in millimeters

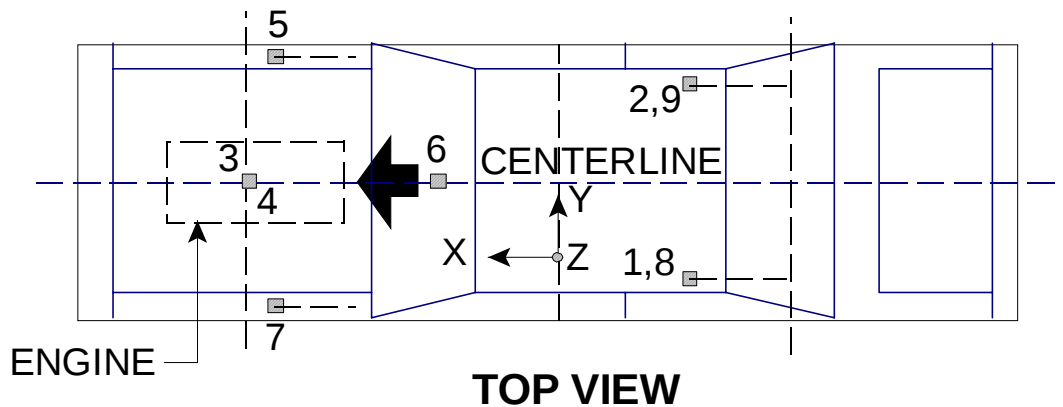
DATA SHEET NO. 6 SEAT BELT POSITIONING DATA

SEAT BELT POSITIONING DATA

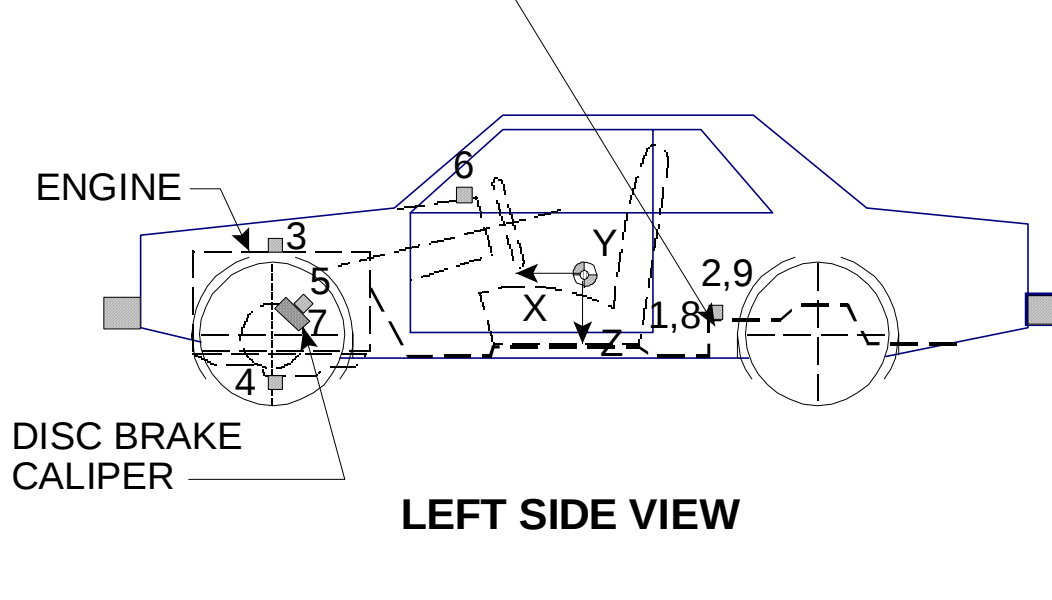


	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	362	344
PBL-- Top surface of alum. plate to belt lower edge	290	270
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

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	2008	-626	-296
2	Right Rear Seat Cross Member X	2003	585	-268
3	Top of Engine Block	4008	272	-749
4	Bottom of Engine	3682	11	-179
5	Disc Brake Caliper @ Right Side	4059	827	-335
6	Instrument Panel	3107	-9	-729
7	Disc Brake Caliper @Left Side	4068	-850	-368
8	Left Rear Seat Cross Member Z	2008	-626	-296
9	Right Rear Seat Cross Member Z	2003	585	-268

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Left Rear Seat Cross Member X	2.3	131.9	-33.3	44.6
2	Right Rear Seat Cross Member X	1.8	133.5	-31.5	43.3
3	Top of Engine Block	33.7	48.5	-134.8	29.7
4	Bottom of Engine	H	-	-116.1	34.0
5	Disc Brake Caliper @ Right Side	HH	-	-53.7	28.5
6	Instrument Panel	8.4	74.8	-72.2	43.9
7	Disc Brake Caliper @Left Side	25.7	28.1	-108.0	42.9
8	Left Rear Seat Cross Member Z	4.9	85.9	-8.5	43.5
9	Right Rear Seat Cross Member Z	4.8	54.8	-11.1	28.4

H Data spike at 66ms

HH Wire cut at 32ms

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

Vehicle Year/Make/Model/Body Style: 2003 Toyota Avalon 4-Door Sedan

NHTSA Test No.: M35108 Test Date: February 12, 2003

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head 9 Array X Arm Y	g	4.4	54.9	-10.6	67.3	15.6	50.2	-11.2	60.0
Head 9 Array X Arm Z	g	25.6	53.5	-11.6	122.1	22.1	53.6	-7.1	86.0
Head 9 Array Y Arm X	g	6.5	281.4	-62.7	73.9	13.8	223.2	-63.2	79.6
Head 9 Array Y Arm Z	g	19.3	50.1	-5.2	87.3	17.1	55.4	-9.9	94.3
Head 9 Array Z Arm X	g	8.4	282.2	-78.3	67.2	19.1	221.2	-67.6	72.2
Head 9 Array Z Arm Y	g	5.0	106.3	-7.3	60.7	10.0	77.9	-4.5	118.2
Head X	g	7.0	286.2	-63.9	74.0	14.8	223.6	-61.3	80.2
Head Y	g	3.2	96.0	-8.1	67.1	7.5	78.1	-4.5	60.2
Head Z	g	20.6	49.9	-5.5	85.6	17.6	53.3	-8.4	94.8
Head Resultant	g	64.2	74.0	-	-	61.5	80.2	-	-
Redundant Head X	g	7.1	285.7	-64.3	73.9	14.7	223.3	-60.0	80.2
Redundant Head Y	g	3.0	96.9	-8.0	67.2	7.8	78.1	-4.0	60.2
Redundant Head Z	g	20.6	49.9	-5.1	86.2	17.2	53.4	-8.5	94.4
Redundant Head Resultant	g	64.5	73.9	-	-	60.1	80.3	-	-
Upper Neck Fx	N	618.7	65.8	-401.2	50.7	83.0	222.4	-447.6	56.7
Upper Neck Fy	N	123.6	97.5	-55.0	30.4	106.6	77.5	-75.3	144.2
Upper Neck Fz	N	1196.4	50.5	-68.7	124.2	1002.2	72.3	-347.6	253.4
Upper Neck F Resultant	N	1260.9	50.5	-	-	1090.2	58.3	-	-
Upper Neck Mx	N-m	11.5	66.6	-6.7	40.1	12.4	98.7	-11.3	69.4
Upper Neck My	N-m	50.7	64.3	-29.1	92.4	15.7	155.8	-44.3	80.5
Upper Neck Mz	N-m	6.3	70.7	-4.3	290.5	5.7	100.5	-7.2	67.9
Upper Neck M Resultant	N-m	51.3	64.3	-	-	44.3	80.5	-	-
Chest X	g	2.7	129.5	-42.9	72.6	4.3	249.5	-42.4	74.7
Chest Y	g	7.1	89.6	-3.1	45.2	2.1	52.0	-7.0	92.5
Chest Z	g	9.1	49.2	-7.3	83.3	5.0	57.5	-4.0	109.0
Chest Resultant	g	43.5	72.6	-	-	42.4	74.7	-	-

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

Vehicle Year/Make/Model/Body Style: 2003 Toyota Avalon 4-Door Sedan

NHTSA Test No.: M35108 Test Date: February 12, 2003

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Redundant Chest X	g	2.7	278.7	-42.7	66.8	4.5	248.1	-42.5	74.6
Redundant Chest Y	g	7.2	88.7	-3.0	45.1	2.4	52.1	-6.6	92.3
Redundant Chest Z	g	9.1	49.3	-7.5	83.1	5.1	57.5	-4.0	108.7
Redundant Chest Resultant	g	43.2	67.0	-	-	42.5	74.6	-	-
Chest Displacement	mm	0.0	-9.2	-26.2	91.5	0.0	7.2	-32.8	90.7
Pelvic X	g	2.8	247.4	-66.6	57.1	H	-	H	-
Pelvic Y	g	14.2	57.9	-6.0	60.2	7.1	48.8	-6.0	72.8
Pelvic Z	g	2.8	224.6	-31.7	57.9	2.7	249.2	-19.1	73.6
Pelvic Resultant	g	71.7	57.2	-	-	H	-	-	-
Left Femur	N	939.9	50.5	-4592.2	57.3	553.1	75.8	-1810.7	49.5
Right Femur	N	982.8	51.9	-3670.8	58.5	623.3	49.4	-2035.7	62.1
Left Upper Tibia Mx	N-m	52.3	59.4	-19.2	30.8	14.0	74.5	-14.1	44.9
Left Upper Tibia My	N-m	16.5	133.0	-123.8	61.0	11.0	136.3	-152.6	49.1
Left Lower Tibia Fz	N	101.4	165.2	-2471.8	28.6	106.8	193.1	-4031.7	47.2
Left Lower Tibia Mx	N-m	100.6	68.9	-7.9	28.1	27.0	65.0	-6.4	103.7
Left Lower Tibia My	N-m	38.4	34.0	-43.7	52.8	78.7	82.3	-32.0	49.6
Right Upper Tibia Mx	N-m	49.4	60.5	-36.6	37.1	3.6	138.2	-36.0	60.0
Right Upper Tibia My	N-m	27.0	57.7	-190.9	47.7	15.3	147.4	-161.4	52.8
Right Lower Tibia Fz	N	102.9	150.2	-5817.2	47.3	89.7	181.5	-3744.8	34.3
Right Lower Tibia Mx	N-m	85.8	47.3	-15.5	34.2	30.4	77.6	-15.1	54.3
Right Lower Tibia My	N-m	53.3	32.7	-67.3	46.9	75.6	72.7	-41.0	49.6
Left Foot Aft Ax	g	16.9	34.8	-55.3	56.9	20.4	78.9	-91.1	51.4
Left Foot Aft Az	g	6.0	79.9	-43.9	25.9	21.1	63.2	-61.7	47.2
Left Foot Fore Az	g	29.7	67.9	-85.1	66.7	56.7	35.6	-96.6	27.2
Right Foot Aft Ax	g	31.5	30.6	-122.3	47.0	27.9	65.3	-93.4	52.6
Right Foot Aft Az	g	26.6	56.1	-103.7	46.5	20.7	72.3	-70.5	51.5
Right Foot Fore Az	g	40.3	66.5	-174.3	40.0	1728.9	58.6	-293.4	230.0
Lap Belt Load	N	7084.7	57.1	-13.8	251.5	6103.4	59.8	-14.7	255.1

H Pelvic X acceleration data is meaningless.

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

Vehicle Year/Make/Model/Body Style: 2003 Toyota Avalon 4-Door Sedan

NHTSA Test No.: M35108 Test Date: February 12, 2003

HEAD INJURY CRITERIA (HIC)				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	526.4	52.5	88.0	46.6
Position #2 - Passenger	547.0	59.2	95.2	47.1

** 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	43.0	71.5	74.5	419.2
Position #2 - Passenger	39.6	73.2	76.2	348.8

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

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

Vehicle Year/Make/Model/Body Style: 2003 Toyota Avalon 4-Door Sedan

NHTSA Test No.: M35108 Test Date: February 12, 2003

HEAD INJURY CRITERIA (HIC) REDUNDANT				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	527.3	52.5	87.9	46.7
Position #2 - Passenger	519.6	59.4	95.4	46.1

** 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	42.6	71.8	74.8	417.8
Position #2 - Passenger	39.7	73.2	76.2	352.5

* 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:

	<u>Driver</u>	<u>Passenger</u>
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	<u>1696</u>	<u>1785</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>866</u>	<u>915</u>
Lap belt length as measured on Part 572 Dummy.	<u>830</u>	<u>870</u>

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis.	<u>H</u>	<u>H</u>
As determined mechanically.	<u>HH</u>	<u>HH</u>
As determined electronically.	<u>HH</u>	<u>HH</u>

BELT STRETCH DATA:

Measured electronically between shoulder belt load cell and the "D" ring.	<u>HH mm/m</u>	<u>HH mm/m</u>
Measured mechanically.	<u>0 mm/m</u>	<u>0 mm/m</u>

H Onboard camera was used for CRS views. Close-up high speed camera view of shoulder belts is not available.
 HH Vehicle was equipped with pretensioning seatbelts. Device was not installed to prevent potential interference with system.

 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 14 mm molding.

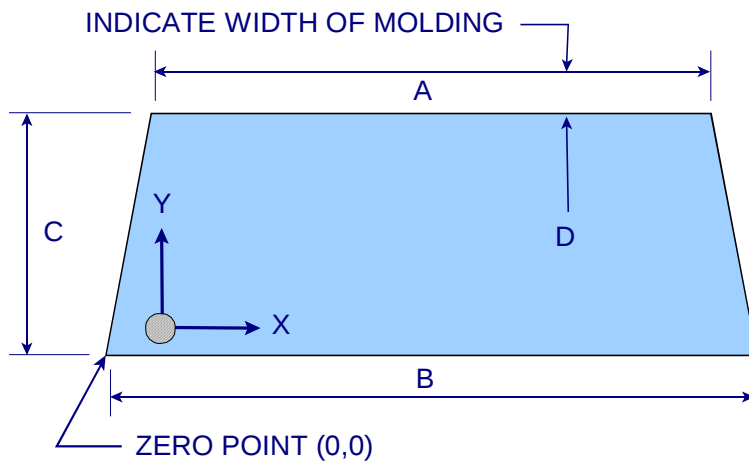
FMVSS 212 REQUIREMENTS:

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	2038	2038	100.0%
LEFT SIDE	2038	2038	100.0%
TOTAL	4076	4076	100.0%

AREA OF RETENTION FAILURE: None



DIMENSIONS (mm)	
A	1124
B	1500
C	726
D	14

FRONT VIEW OF WINDSHIELD

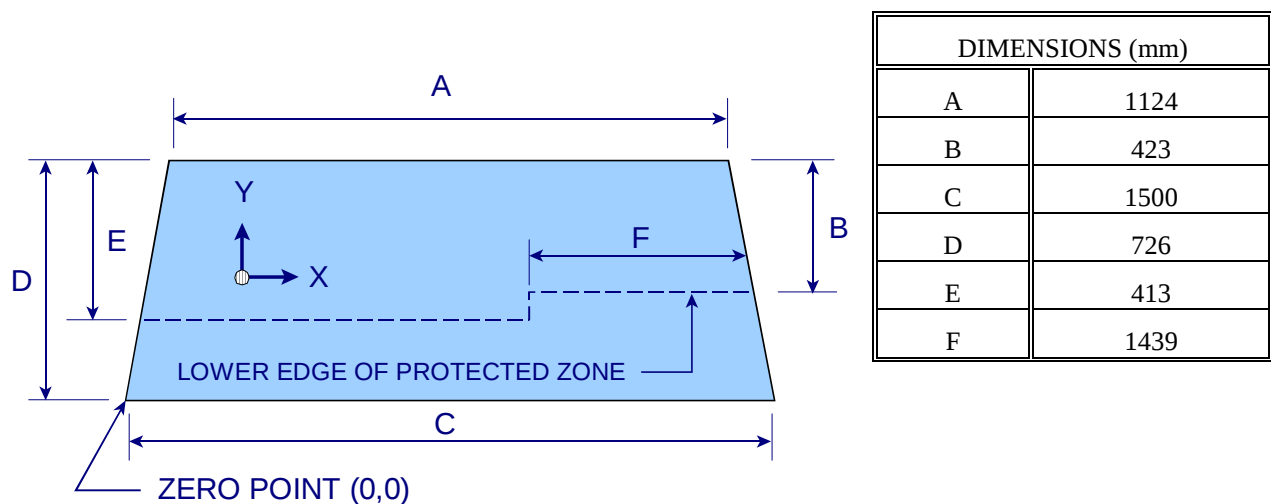
FAILURE DETAILS: None

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

PROTECTED ZONE LOWER EDGE REQUIREMENT:

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

FMVSS 219 TEST DATA:



FRONT VIEW OF WINDSHIELD

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

(Show location of penetration on the above sketch)

COORDINATES		
	X	Y
1.	-	-
2.	-	-
3.	-	-
4.	-	-

NHTSA TEST No.: M35108 TEST DATE: February 12, 2003

VEHICLE MAKE/MODEL: 2003 Toyota Avalon 4-Door Sedan

=====

TEST VEHICLE IMPACT TYPE:	
<u>X</u>	Frontal (56 kph)
	Oblique (48 kph) with _____ deg. barrier face first contacting _____
<u>-</u>	(driver/passenger) side
<u>-</u>	Rear Moving Barrier (48 kph)
<u>-</u>	Lateral Moving Barrier (32 kph)

1. From impact until vehicle motion ceases
2. For 5 minute period after vehicle motion ceases
3. For next 25 minutes

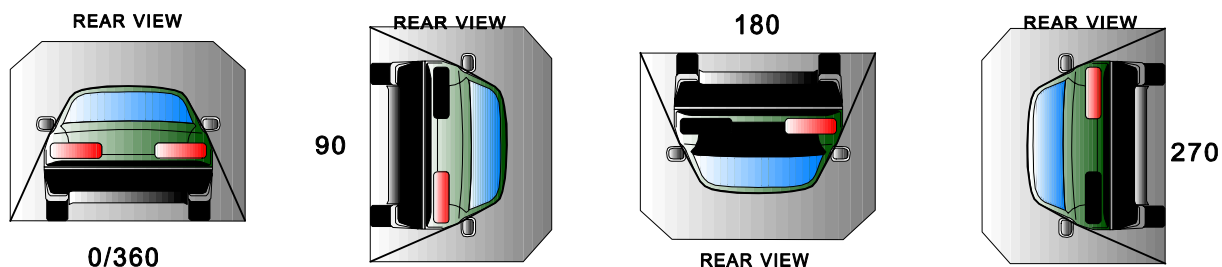
ACTUAL	MAX ALLOWED
0	28 g
0	141 g
0	28 g/min.

8642-NCAP-30

DATA SHEET NO. 13 - ROLLOVER DATA

Vehicle: 2003 Toyota Avalon 4-Door Sedan

NHTSA No.: M35108



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	23	seconds	5	minutes	6	minutes	23	seconds	7	minutes
90° - 180°	1	minutes	18	seconds	5	minutes	6	minutes	18	seconds	7	minutes
180°-270°	1	minutes	17	seconds	5	minutes	6	minutes	17	seconds	7	minutes
270°-360°	1	minutes	20	seconds	5	minutes	6	minutes	20	seconds	7	minutes

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

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

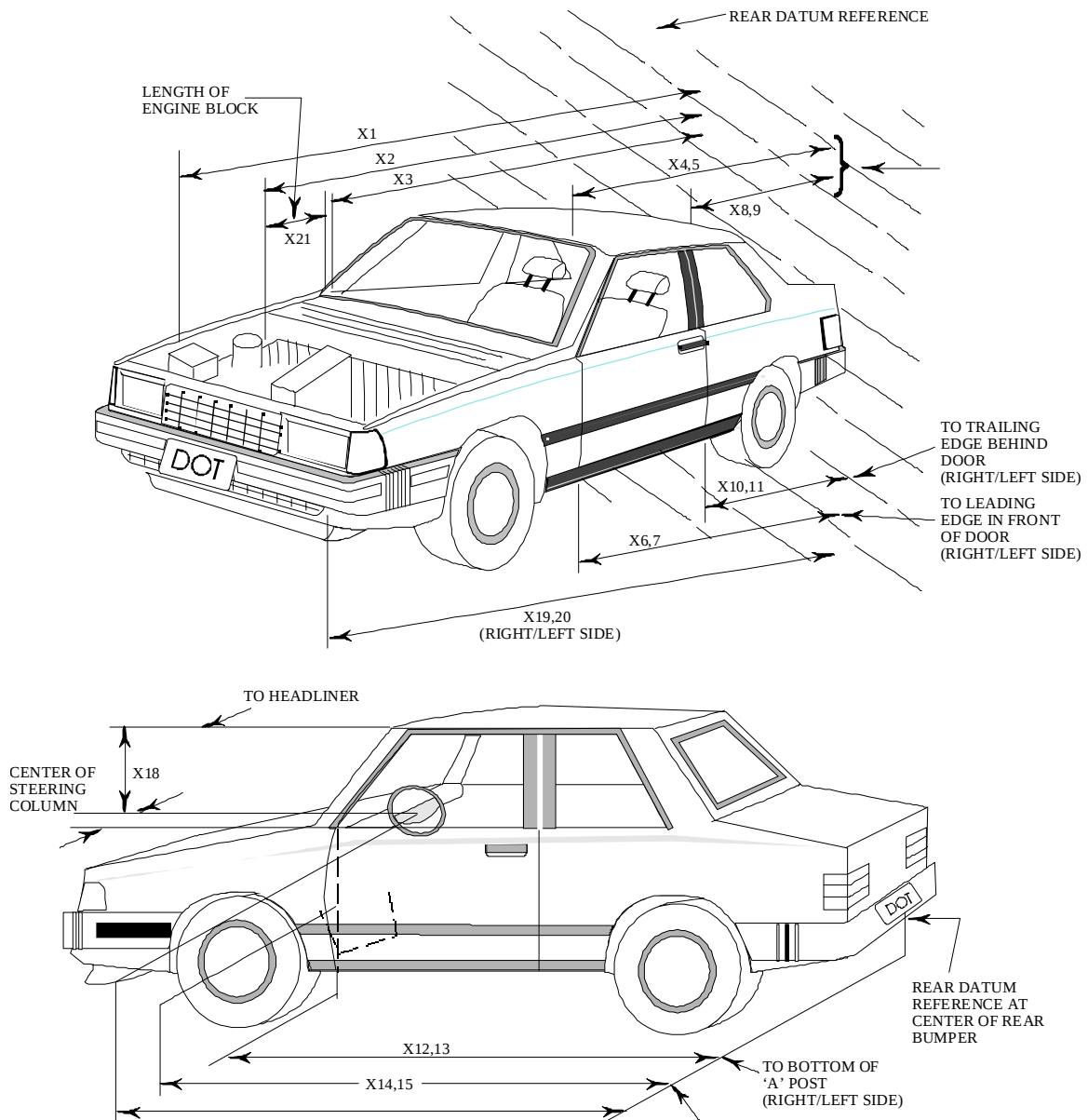
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	-
90° - 180°	0	0	0	-
180°-270°	0	0	0	-
270°-360°	0	0	0	-

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

IV. SOLVENT SPILLAGE LOCATION(S):

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

DATA SHEET NO. 14 TEST VEHICLE MEASUREMENTS

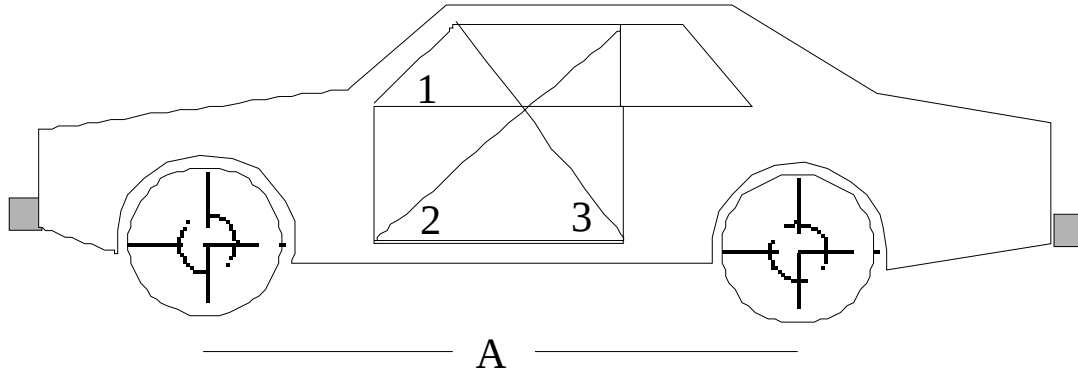


DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4887	4315	572
X2	Rear Surface of Vehicle to Front of Engine	4307	4148	159
X3	Rear Surface of Vehicle to Firewall	3761	3575	186
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3461	3465	-4
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3460	3465	-5
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3418	3425	-7
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3423	3432	-9
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2327	2325	2
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2324	2326	-2
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2297	2297	0
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2295	2305	-10
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3455	3453	2
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3460	3464	-4
X14	Rear Surface of Vehicle to Firewall, Right Side	3739	3640	99
X15	Rear Surface of Vehicle to Firewall, Left Side	3722	3625	97
X16	Rear Surface of Vehicle to Steering Column	2961	2953	8
X17	Center of Steering Column to "A" Post	295	278	17
X18	Center of Steering Column to Headliner	421	412	9
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4847	4366	481
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4837	4379	458
X21	Length of Engine Block	475	470	5
RD	Rear Surface of Vehicle to Right Side of Dash Panel	3112	3109	3
CD	Rear Surface of Vehicle to Center of Dash Panel	3211	3179	32
LD	Rear Surface of Vehicle to Left Side of Dash Panel	3118	3112	6

All Dimensions in mm

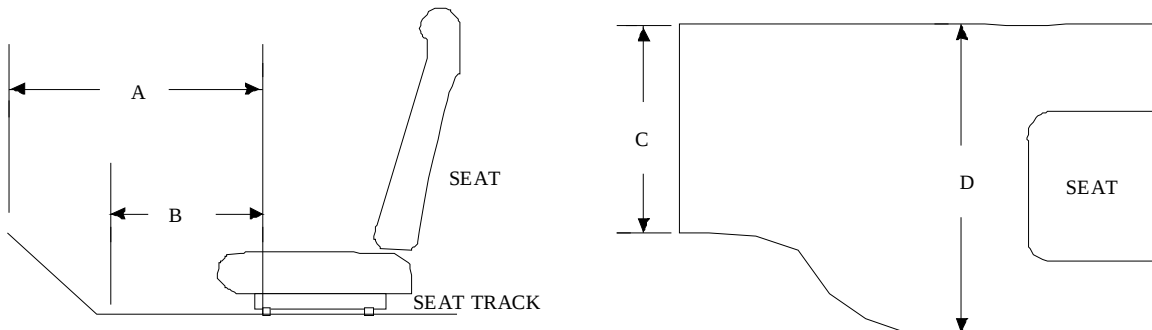
DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
 VEHICLE INTRUSION MEASUREMENTS
 DOOR OPENING WIDTH



UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	1056	1454	936	1058	1444	936
AFTER TEST	1055	1454	935	1055	1458	938
DIFFERENCE	1	0	1	3	-14	-2

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2709	2709
AFTER TEST	2623	2618
DIFFERENCE	86	91

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



DRIVER

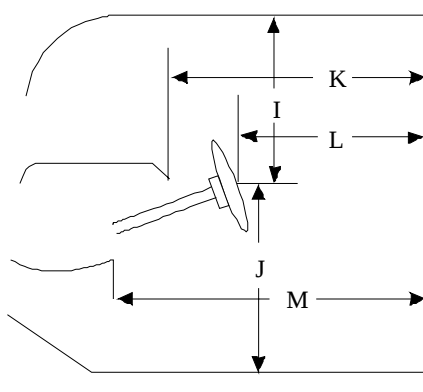
Measurement	Pre-Test	Post-Test	Difference
A	785	703	82
B	599	524	75
C	499	494	5
D	497	483	14

PASSENGER

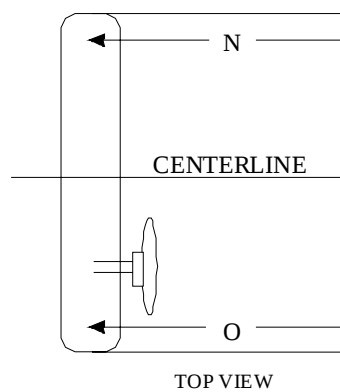
Measurement	Pre-Test	Post-Test	Difference
A	715	633	82
B	501	464	37
C	419	453	-34
D	496	504	-8

Units = mm

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

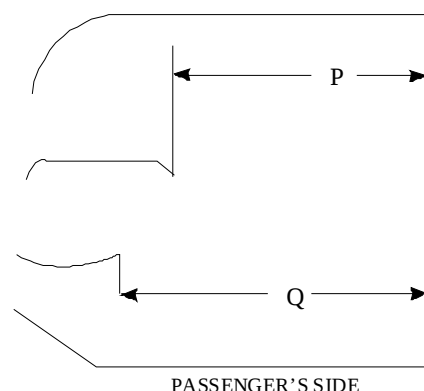


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE

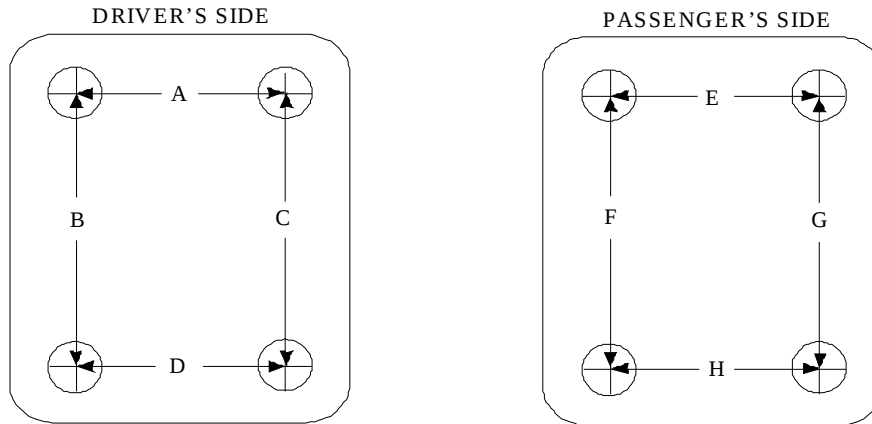


PASSENGER'S SIDE

Measurement	Pre-Test	Post-Test	Difference
I	421	412	9
J	673	698	-25
K	2179	2175	4
L	1937	1925	12
M	2227	2224	3
N	2079	2074	5
O	2094	2085	9
P = K (PASS.)	2244	2245	-1
Q = M (PASS.)	2190	2181	9

Units = mm

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

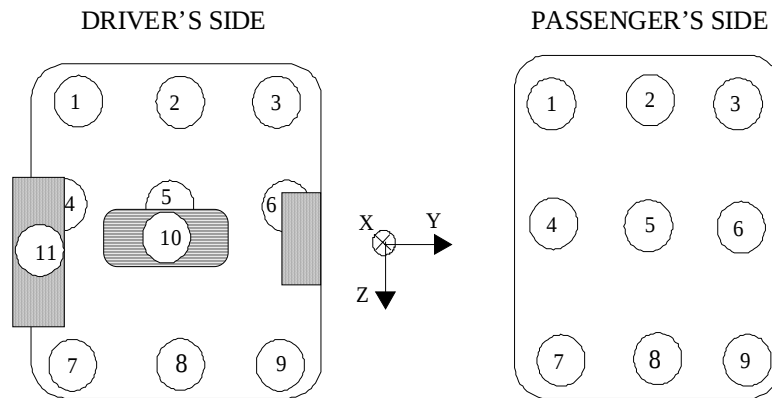


TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	499	494	5
B	316	322	-6
C	333	286	47
D	497	483	14
E	419	453	-34
F	502	487	15
G	532	373	159
H	496	504	-8

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	3587	3566	21	-509	-513	4
2	3655	3575	80	-499	-504	5
3	3660	3604	56	-481	-506	25
4	3562	3530	32	-364	-386	22
5	3572	3514	58	-358	-383	25
6	3573	3497	76	-353	-363	10
7	3449	3430	19	-257	-269	12
8	3469	3395	74	-264	-283	19
9	3463	3387	76	-258	-262	4
10	3466	3472	-6	-438	-433	-5
11	3517	3488	29	-391	-396	5

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	3629	3493	136	-400	-407	7
2	3603	3509	94	-423	-421	-2
3	3576	3520	56	-430	-450	20
4	3365	3410	-45	-272	-328	56
5	3499	3424	75	-303	-326	23
6	3508	3422	86	-298	-322	24
7	3350	3341	9	-226	-206	-20
8	3389	3340	49	-231	-204	-27
9	3381	3389	-8	-227	-203	-24

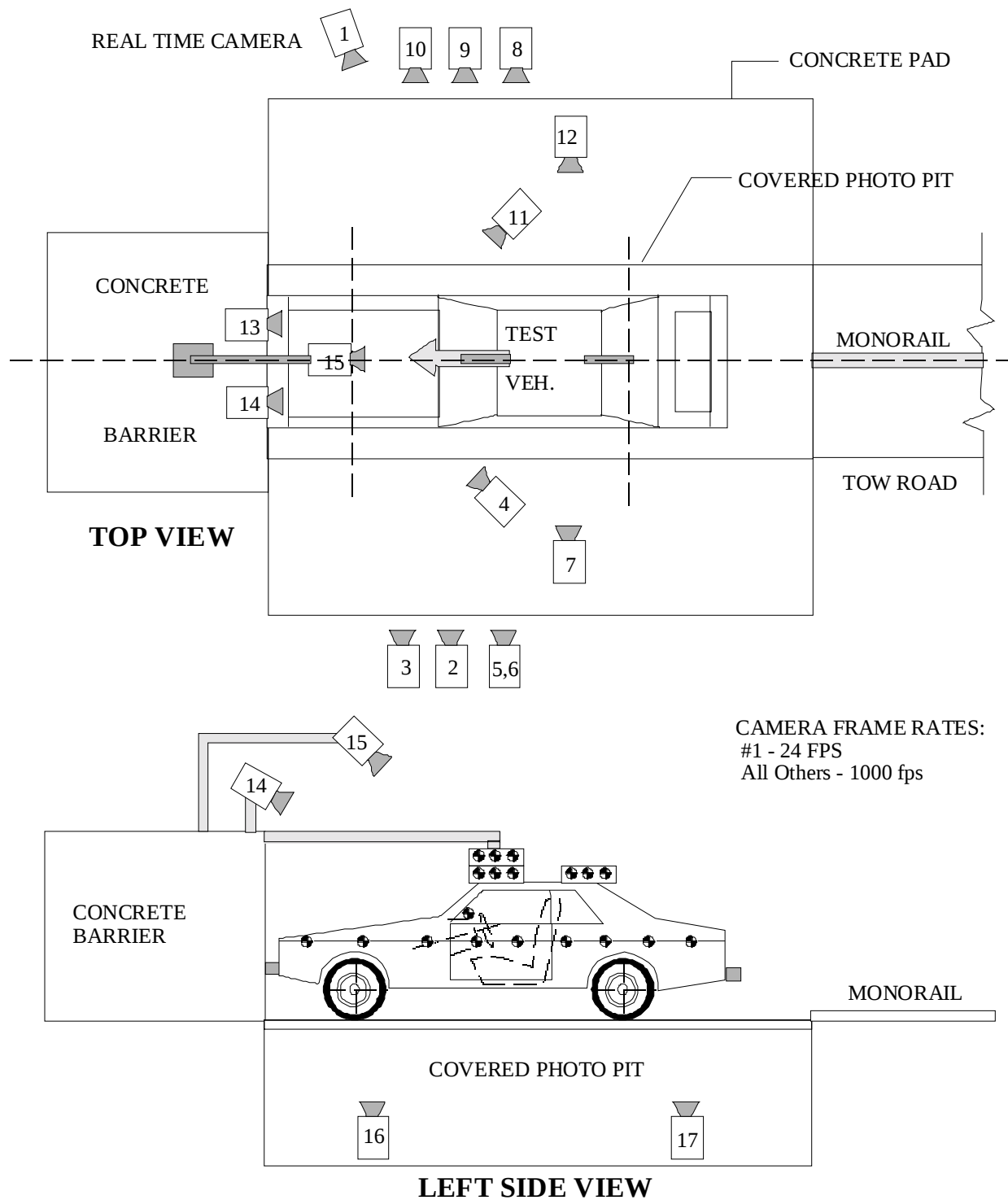
Reference: SAE: X = Rear Bumper (Positive: forward); Z = Ground (Positive: down)

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

	Elements	Pre-Test (mm)
1	Total length	4887
2	Total Width	1820
3	Bumper Top Height	575
4	Bumper Bottom Height	405
5	Longitudinal Member Top Height	530
6	Distance Between Longitudinal Members	1060
7	Longitudinal Member Width	70
8	Engine top height	875
9	Engine bottom height	186
10	Engine and gearbox width	900
11	Front bumper-engine distance	445
12	Front shock absorber fixing height	865
13	Bonnet leading edge height	753
14	Front shock absorber fixing width	1155
15	Front bumper – front axle distance	964
16	Front axle – a pillar distance	435
17	A-pillar – B pillar distance	1130
18	B-pillar – rear axle distance	1068
19	B-pillar – C Pillar distance	1300
20	Roof sill bottom height	1270
21	Roof sill top height	1430
22	Floor sill bottom height	212
23	Floor sill top height	370

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.: M35108 Vehicle: 2003 Toyota Avalon 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	7066	1620	1070	-1.8	6724	12.5	1020
3	Left Side View	8028	775	1068	-2.8	7686	25	1010
4	Driver and Interior View	7481	2550	1980	-9.3	-	25	1055
5	Steering Column (Bottom)	7589	1960	1178	-3.5	7247	25	130
6	Steering Column (Top)	7589	1960	1785	-8.8	7247	25	1025
7	CRS View Left	3390	2920	-2550	-26.8	-	25	1030
8	Overall Right Side	7018	1952	1082	-3.9	7342	12.5	1025
9	Right Side View	7998	1323	1082	-2.9	8322	25	1005
10	Right Passenger View	7962	1378	1380	-3.5	8286	35	1035
11	Passenger and Interior View	7356	2790	1975	-7.6	-	25	1015
12	CRS View Right	3410	2455	-2466	-28.5	-	25	1030
13	Passenger Front View	620	-92	1987	-33.8	-	13	1005
14	Driver Front View	620	-92	1987	-35.0	-	13	1010
15	Windshield View	0	-530	3374	-55.1	-	13	1000
16	Pit View of Engine	0	615	-3048	90	-	13	1005
17	Pit View of Fuel Tank	0	2895	-3048	90	-	13	1030

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

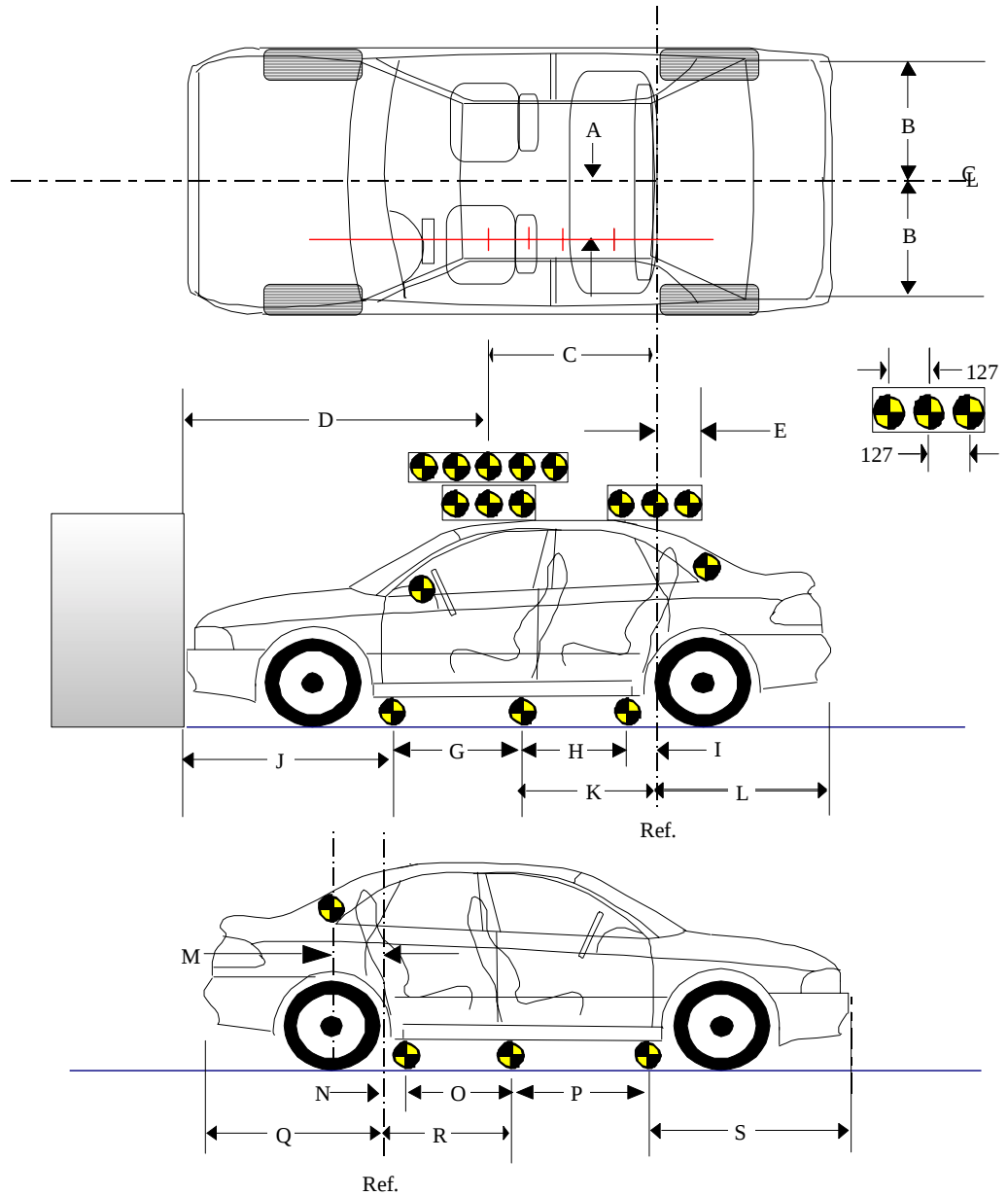
Y = film plane to impact location N.T. indicates No Timing

Z = film plane to ground

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

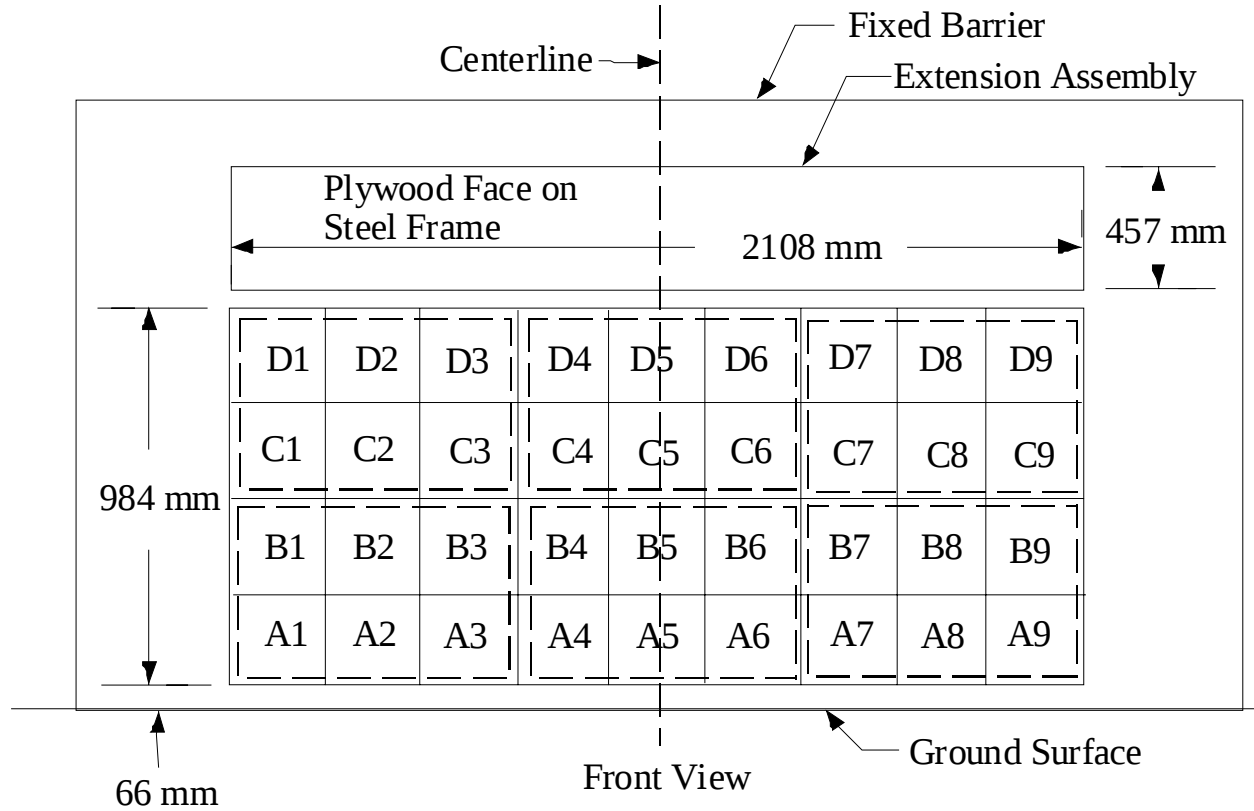
(Dimensions in millimeters)

A	400
B	666
C	1222
D	2127
E	512
F	1594
G	927
H	930
I	97
J	1390
K	1027
L	1544
M	503
N	99
O	936
P	921
Q	1540
R	1035
S	1391



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.: M35108; Test Date: February 12, 2003; Technician: Lawrence Q. Valvo

Vehicle Model Year/Make/Model: 2003 Toyota Avalon 4-Door Sedan

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

B. Size of vent holes: (mm²) 804 -Driver 1256 -Passenger

C. Total vent area: (mm²) 1608 -Driver 2512 -Passenger

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

Driver: 630 -Height; 630 -Width; 280 -Depth

Passenger: 680 -Height; 420 -Width; 420 -Depth

E. Is the air bag tethered?

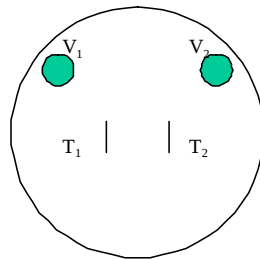
Driver: X -Yes; - -No; If yes, record length of tether- 295

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

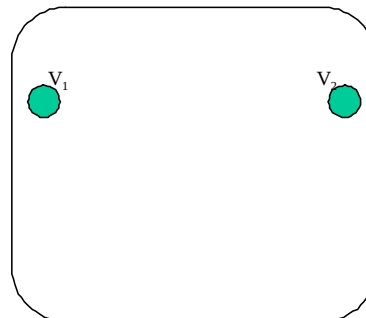
Sketch the air bag showing the location of the vent holes, how the bag is tethered, and where the bag is tethered. Also describe how the tethers are attached to the bag and the steering wheel.

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

Driver



Passenger



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

Driver: Air bag: GA120-04150 CC2 008391

Generator: Not Legible

Passenger: Air bag: 601443300A; TLPN7302ACC

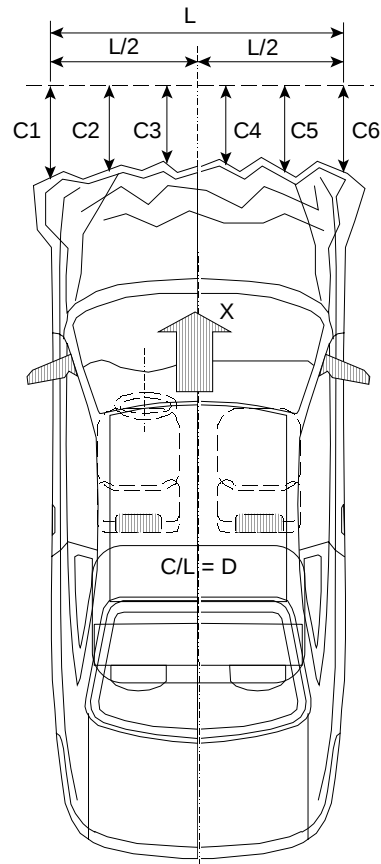
Generator: AEJN7KB02PNU

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

Vehicle Make/Model/Body Style: Toyota Avalon 4-Door Sedan
 NHTSA Test No.: M35108 VIN: 4T1BF28B33U276660
 Model Year: 2003 Build Date: 07/02 Test Date: February 12, 2003
 Vehicle Size Category: Passenger Car Test Weight: 1752.5 kg
 Vehicle Wheelbase: 2709 mm; Front Overhang: 964 mm; Overall Width: 1820 mm
 Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4700	4330	370
C2 =	4843	4372	471
C3 =	4886	4336	550
C4 =	4887	4328	559
C5 =	4850	4366	484
C6 =	4705	4348	357



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region: L1= 1509 mm
 L2= 754.5 mm
 L5= 301.8 mm

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

<u>Figure</u>	<u>Title</u>	<u>Page</u>
A-1	Load Cell Locations	A-4
A-2	Vehicle Placard	A-5
A-3	Tire Placard	A-6
A-4	Right Front, As Received	A-7
A-5	Left Rear, As Received	A-8
A-6	Pre-Test Front View	A-9
A-7	Post-Test Front View	A-10
A-8	Pre-Test Left Side View	A-11
A-9	Post-Test Left Side View	A-12
A-10	Pre-Test Right Side View	A-13
A-11	Post-Test Right Side View	A-14
A-12	Pre-Test Right Front Three-Quarter View	A-15
A-13	Post-Test Right Front Three-Quarter View	A-16
A-14	Pre-Test Left Rear Three-Quarter View	A-17
A-15	Post-Test Left Rear Three-Quarter View	A-18
A-16	Left Rear Three-Quarter View Of Doors After Impact	A-19
A-17	Right Rear Three-Quarter View Of Doors After Impact	A-20
A-18	Pre-Test Windshield View	A-21
A-19	Post-Test Windshield View	A-22
A-20	Pre-Test Engine Compartment View	A-23
A-21	Post-Test Engine Compartment View	A-24
A-22	Pre-Test Fuel Cap View	A-25
A-23	Post-Test Fuel Cap View	A-26
A-24	Pre-Test Front Underbody View	A-27
A-25	Post-Test Front Underbody View	A-28
A-26	Pre-Test Mid Underbody View	A-29
A-27	Post-Test Mid Underbody View	A-30
A-28	Pre-Test Rear Underbody View	A-31
A-29	Post-Test Rear Underbody View	A-32
A-30	Pre-Test Driver Head Location	A-33
A-31	Post-Test Driver Head Location	A-34
A-32	Pre-Test Driver Position View	A-35
A-33	Post-Test Driver Position View	A-36
A-34	Pre-Test Driver And Interior View	A-37
A-35	Post-Test Driver And Interior View	A-38
A-36	Pre-Test Driver Feet View	A-39
A-37	Post-Test Driver Feet View	A-40
A-38	Pre-Test Driver Knee Bolster View	A-41
A-39	Post-Test Driver Knee Bolster View	A-42
A-40	Pre-Test Driver Floor Pan View	A-43
A-41	Post-Test Driver Floor Pan View	A-44
A-42	Post-Test Driver Head View	A-45
A-43	Post-Test Driver Contact To Airbag	A-46

TABLE OF PHOTOGRAPHS (CONTINUED)

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

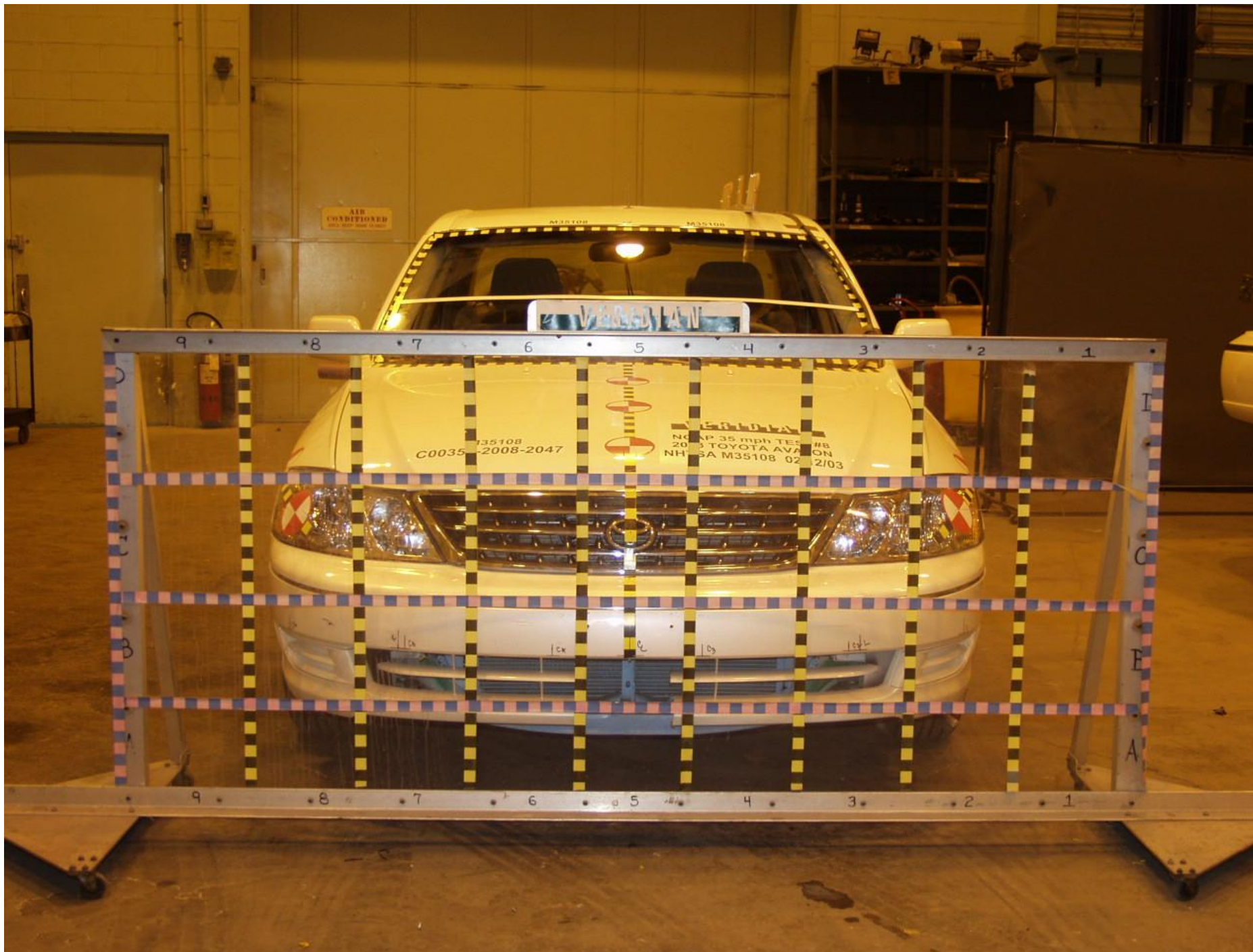


Figure A-1 LOAD CELL LOCATIONS

MFD. BY: TOYOTA MOTOR MANUFACTURING,
 KENTUCKY, INC. 07/02
 GVWR 4550LB GAWR FR 2665LB RR 2665LB
 THIS VEHICLE CONFORMS TO ALL APPLICABLE
 FEDERAL MOTOR VEHICLE SAFETY BUMPER AND
 THEFT PREVENTION STANDARDS IN EFFECT ON
 THE DATE OF MANUFACTURE SHOWN ABOVE
 4T1BF28B33U276660 PASS. CAR



C/TR: 051/FG01 MODEL: MCX20L-AEPNKA
 A/TM: -01A/A541E 10483 BA05

Figure A-2 VEHICLE CERTIFICATION PLACARD

TOYOTA

VEHICLE CAPACITY WEIGHT: 410 kg (902 lbs)

OCCUPANT: TOTAL 5 (FRONT 2, REAR 3)

RECOMMENDED COLD TIRE INFLATION PRESSURE : kPa (psi)

TIRE SIZE	P205/65R15 92H	P205/60R16 91H
UP TO 4 OCCUPANTS	Frnt 210 (31), Rr 210 (31)	Frnt 220 (32), Rr 220 (32)
VEHICLE CAPACITY WEIGHT	Frnt 210 (31), Rr 210 (31)	Frnt 220 (32), Rr 220 (32)

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

CHARGE MAXIMALE DU VEHICULE: 410 kg (902 LIVRES)

PERSONNES: TOTAL 5 (AVANT 2, ARRIERE 3)

PRESSION DE PNEUS: kPa (LB/PO²)

DIMENSION DES PNEUS	P205/65R15 92H	P205/60R16 91H
AVEC 4 PERSONNES A BORD	AVANT 210 (31), ARRIERE 210 (31)	AVANT 220 (32), ARRIERE 220 (32)
A CHARGE MAXIMALE	AVANT 210 (31), ARRIERE 210 (31)	AVANT 220 (32), ARRIERE 220 (32)

POUR DE PLUS AMPLES DETAILS, VOIR LE MANUEL DU PROPRIETAIRE

07060

2 H

Figure A-3 VEHICLE TIRE PLACARD



Figure A-4 RIGHT FRONT, AS RECEIVED



Figure A-5 LEFT REAR, AS RECEIVED



Figure A-6 PRE-TEST FRONT VIEW



Figure A-7 POST-TEST FRONT VIEW



Figure A-8 PRE-TEST LEFT SIDE VIEW



Figure A-9 POST-TEST LEFT SIDE VIEW



Figure A-10 PRE-TEST RIGHT SIDE VIEW



Figure A-11 POST-TEST RIGHT SIDE VIEW



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



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



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

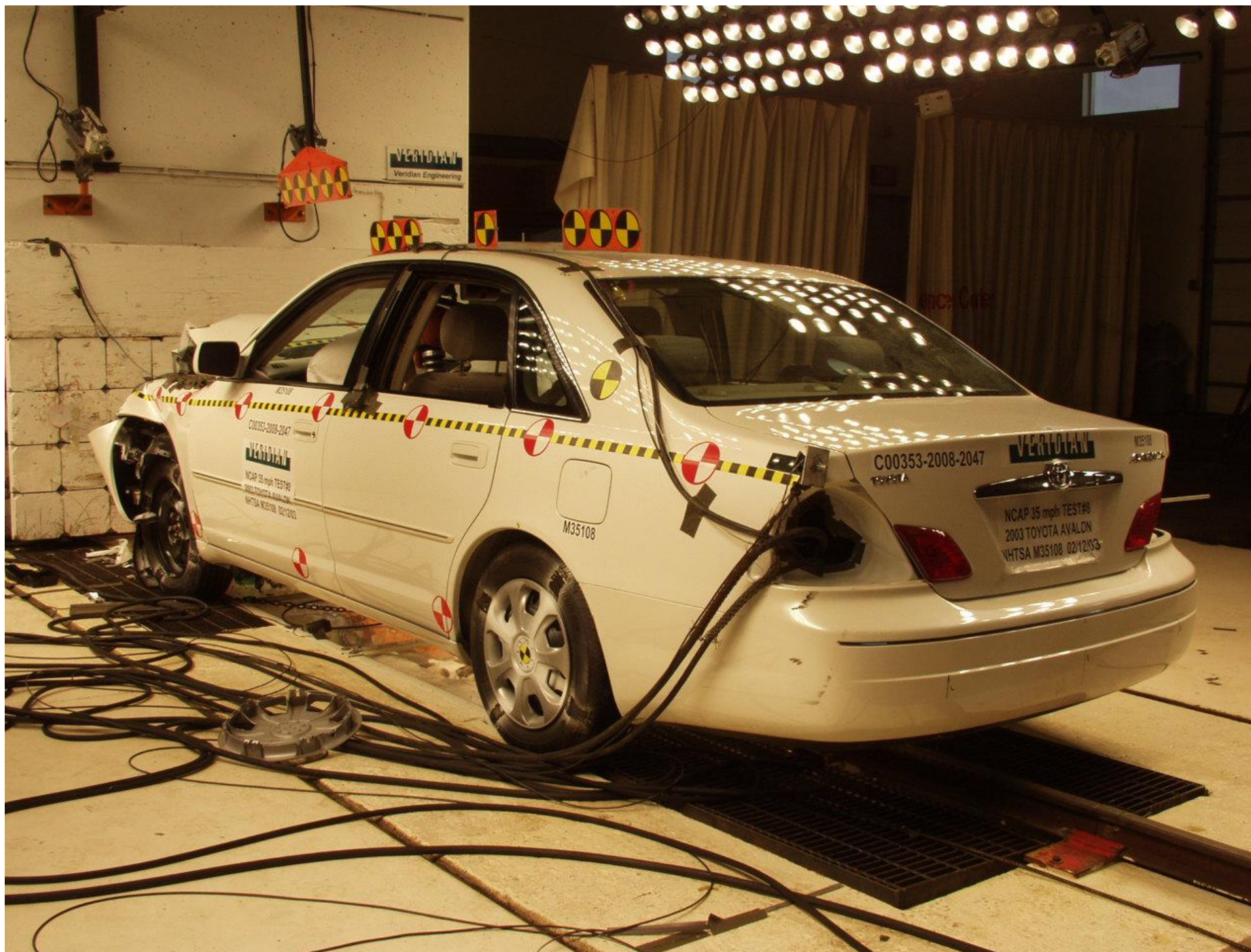


Figure A-15 POST-TEST LEFT REAR THREE-QUARTER VIEW



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



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



Figure A-18 PRE-TEST WINDSHIELD VIEW



Figure A-19 POST-TEST WINDSHIELDVIEW

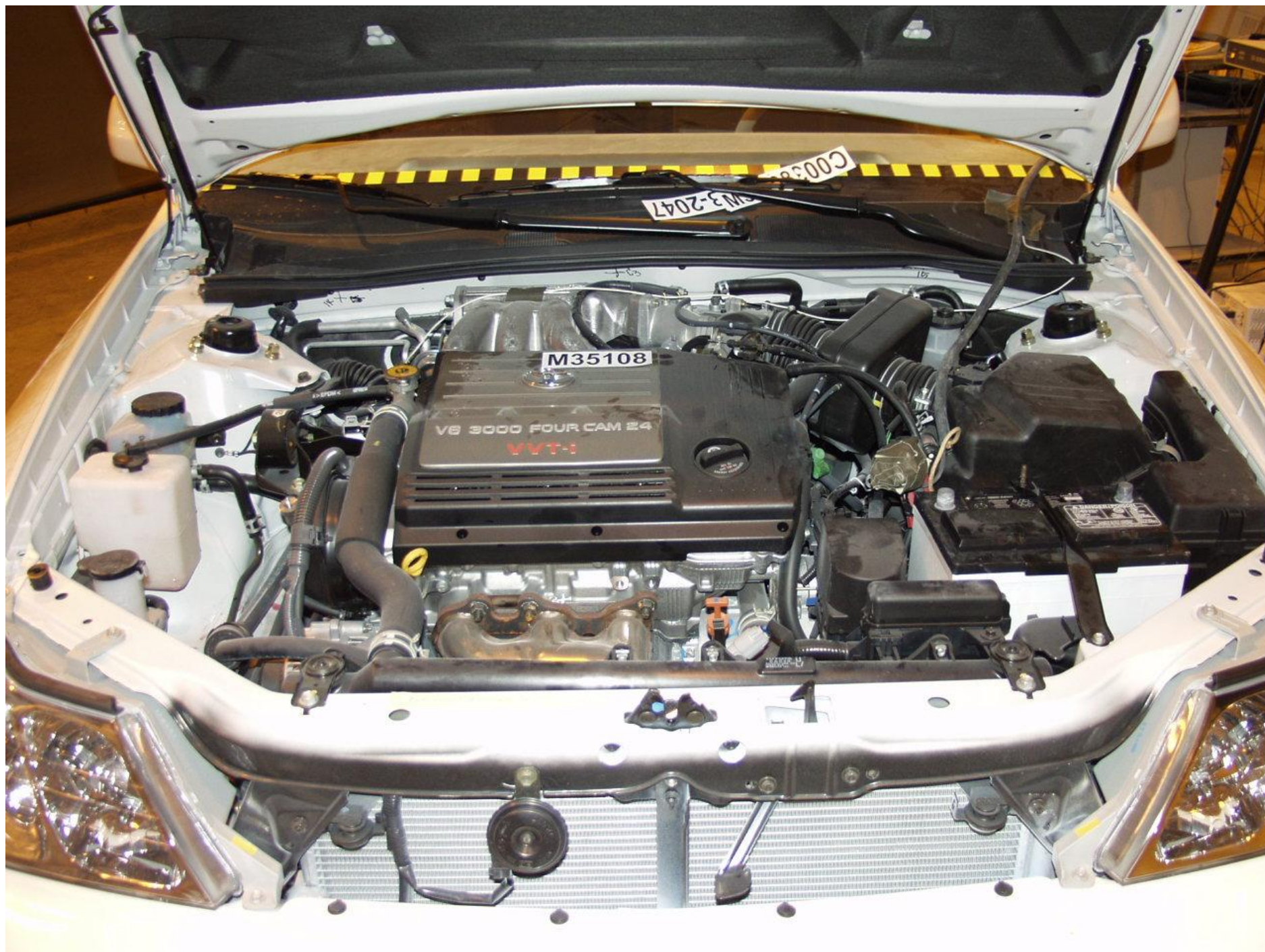


Figure A-20 PRE-TEST ENGINE COMPARTMENT VIEW



Figure A-21 POST-TEST ENGINE COMPARTMENT VIEW



Figure A-22 PRE-TEST FUEL CAP VIEW



Figure A-23 POST-TEST FUEL CAP VIEW



Figure A-24 PRE-TEST FRONT UNDERBODY VIEW



Figure A-25 POST-TEST FRONT UNDERBODY VIEW



Figure A-26 PRE-TEST MID UNDERBODY VIEW



Figure A-27 POST-TEST MID UNDERBODY VIEW



Figure A-28 PRE-TEST REAR UNDERBODY VIEW



Figure A-29 POST-TEST REAR UNDERBODY VIEW



Figure A-30 PRE-TEST DRIVER HEAD LOCATION



A-34

8642-NCAP-30

Figure A-31 POST-TEST DRIVER HEAD LOCATION



Figure A-32 PRE-TEST DRIVER POSITION VIEW



Figure A-33 POST-TEST DRIVER POSITION VIEW



Figure A-34 PRE-TEST DRIVER AND INTERIOR VIEW



Figure A-35 POST-TEST DRIVER AND INTERIOR VIEW



Figure A-36 PRE-TEST DRIVER FEET VIEW



A-40

8642-NCAP-30

Figure A-37 POST-TEST DRIVER FEET VIEW



A-42

8642-NCAP-30

Figure A-39 POST-TEST DRIVER KNEE BOLSTER VIEW



Figure A-40 PRE-TEST DRIVER FLOOR PAN VIEW



Figure A-41 POST-TEST DRIVER FLOOR PAN VIEW



Figure A-42 POST-TEST DRIVER HEAD VIEW



Figure A-43 POST-TEST DRIVER CONTACT TO AIRBAG



Figure A-44 PRE-TEST PASSENGER HEAD LOCATION



Figure A-45 POST-TEST PASSENGER HEAD LOCATION



Figure A-46 PRE-TEST PASSENGER POSITION VIEW



Figure A-47 POST-TEST PASSENGER POSITION VIEW



Figure A-48 PRE-TEST PASSENGER AND INTERIOR VIEW



Figure A-49 POST-TEST PASSENGER AND INTERIOR VIEW



Figure A-50 PRE- TEST PASSENGER FEET VIEW



Figure A-51 POST-TEST PASSENGER FEET VIEW



Figure A-52 PRE-TEST PASSENGER KNEE BOLSTER VIEW



Figure A-53 POST-TEST PASSENGER KNEE BOLSTER VIEW



Figure A-54 PRE-TEST PASSENGER FLOOR PAN VIEW



Figure A-55 POST-TEST PASSENGER FLOOR PAN VIEW



Figure A-56 POST-TEST PASSENGER HEAD VIEW



Figure A-57 POST-TEST PASSENGER CONTACT TO AIRBAG



Figure A-58 ROLLOVER VIEW



Figure A-59 IMPACT VIEW

APPENDIX B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

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

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. M35108

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

TABLE OF DATA PLOTS

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

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

90	V1P2 Left Femur [N, CFC_600]	B-97
91	V1P2 Right Femur [N, CFC_600]	B-98
92	V1P2 Left Upper Tibia Mx [N-m, CFC_600]	B-99
93	V1P2 Left Upper Tibia My [N-m, CFC_600]	B-100
94	V1P2 Left Lower Tibia Fz [N, CFC_600]	B-101
95	V1P2 Left Lower Tibia Mx [N-m, CFC_600]	B-102
96	V1P2 Left Lower Tibia My [N-m, CFC_600]	B-103
97	V1P2 Right Upper Tibia Mx [N-m, CFC_600]	B-104
98	V1P2 Right Upper Tibia My [N-m, CFC_600]	B-105
99	V1P2 Right Lower Tibia Fz [N, CFC_600]	B-106
100	V1P2 Right Lower Tibia Mx [N-m, CFC_600]	B-107
101	V1P2 Right Lower Tibia My [N-m, CFC_600]	B-108
102	V1P2 Left foot Aft x [g, CFC_600]	B-109
103	V1P2 Left Foot Aft z [g, CFC_600]	B-110
104	V1P2 Left Foot Fore z [g, CFC_600]	B-111
105	V1P2 Right Foot Aft x [g, CFC_600]	B-112
106	V1P2 Right Foot Aft z [g, CFC_600]	B-113
107	V1P2 Right Foot Fore z [g, CFC_600]	B-114
108	V1P2 Lap Belt [N, CFC_60]	B-115
109	V1 Left Rear #1x [g, CFC_60]	B-116
110	V1 Left Rear #1x Velocity [kph, CFC_180]	B-117
111	V1 Left Rear #1x Displacement [mm, CFC_180]	B-118
112	V1 Right Rear #2x [g, CFC_60]	B-119
113	V1 Right Rear #2x Velocity [kph, CFC_180]	B-120
114	V1 Right Rear #2x Displacement [mm, CFC_180]	B-121
115	V1 Engine Top #3x [g, CFC_60]	B-122
116	V1 Engine Top #3x Velocity [kph, CFC_180]	B-123
117	V1 Engine Top #3x Displacement [mm, CFC_180]	B-124
118	V1 Engine Bottom #4x [g, CFC_60]	B-125
119	V1 Engine Bottom #4x Velocity [kph, CFC_180]	B-126
120	V1 Engine Bottom #4x Displacement [mm, CFC_180]	B-127
121	V1 Right Caliper #5x [g, CFC_60]	B-128
122	V1 Right Caliper #5x Velocity [kph, CFC_180]	B-129
123	V1 Right Caliper #5x Displacement [mm, CFC_180]	B-130
124	V1 Instrument Panel #6x [g, CFC_60]	B-131
125	V1 Instrument Panel #6x Velocity [kph, CFC_180]	B-132
126	V1 Instrument Panel #6x Displacement [mm, CFC_180]	B-133
127	V1 Left Caliper #7x [g, CFC_60]	B-134
128	V1 Left Caliper #7x Velocity [kph, CFC_180]	B-135
129	V1 Left Caliper #7x Displacement [mm, CFC_180]	B-136
130	V1 Left Rear #8z [g, CFC_60]	B-137
131	V1 Left Rear #8z Velocity [kph, CFC_180]	B-138
132	V1 Left Rear #8z Displacement [mm, CFC_180]	B-139
133	V1 Right Rear #9z [g, CFC_60]	B-140
134	V1 Right Rear #9z Velocity [kph, CFC_180]	B-141
135	V1 Right Rear #9z Displacement [mm, CFC_180]	B-142
136	Barrier Load Cell A1 Fx [N, CFC_60]	B-143

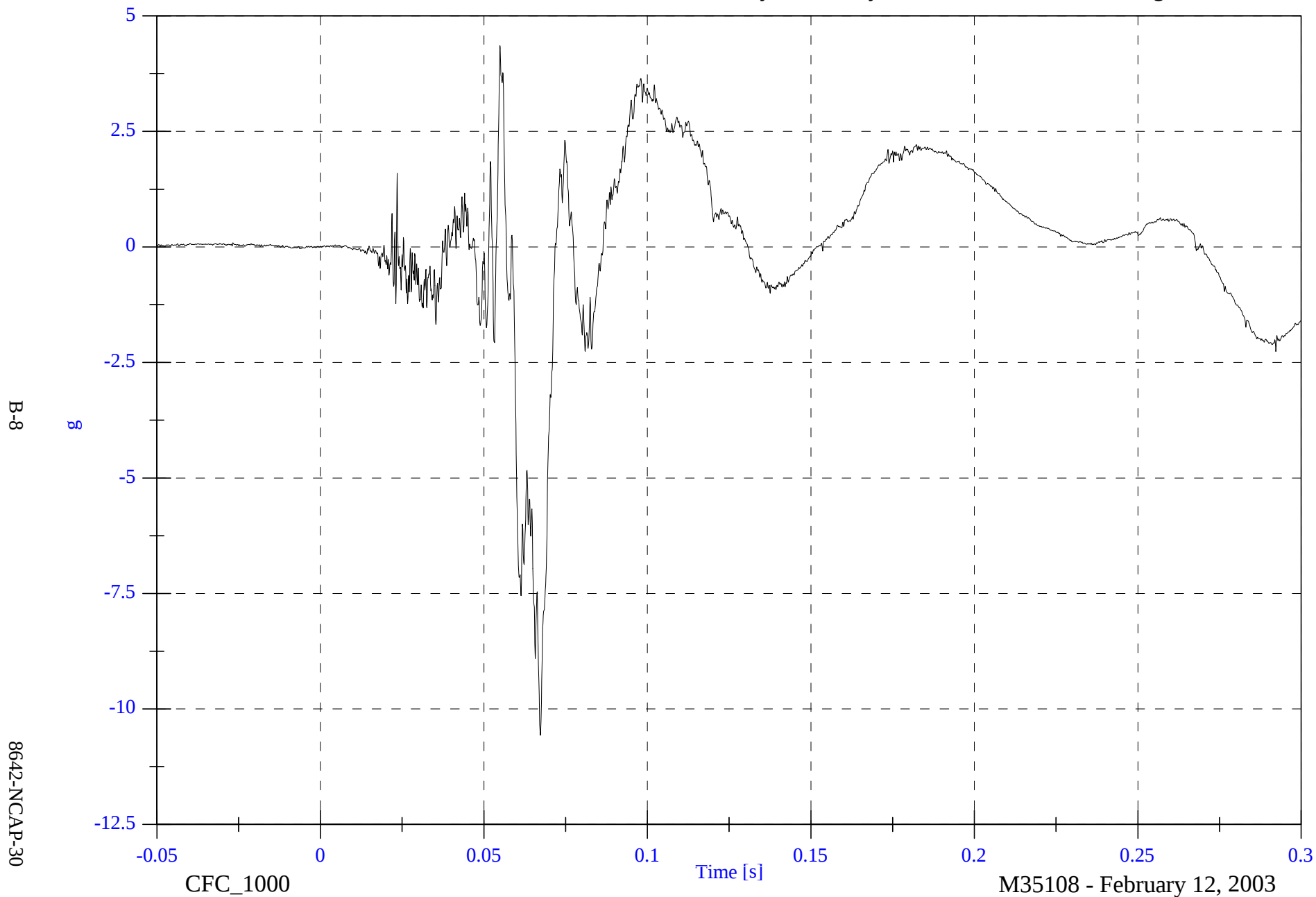
137	Barrier Load Cell A2 Fx [N, CFC_60]	B-144
138	Barrier Load Cell A3 Fx [N, CFC_60]	B-145
139	Barrier Load Cell A4 Fx [N, CFC_60]	B-146
140	Barrier Load Cell A5 Fx [N, CFC_60]	B-147
141	Barrier Load Cell A6 Fx [N, CFC_60]	B-148
142	Barrier Load Cell A7 Fx [N, CFC_60]	B-149
143	Barrier Load Cell A8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

NCAP Test #8 - 2003 Toyota Avalon

V1P1 Head 9 Array X Arm Ay

Max: 4.4 [g] at 0.055 [s]

Min: -10.6 [g] at 0.067 [s]

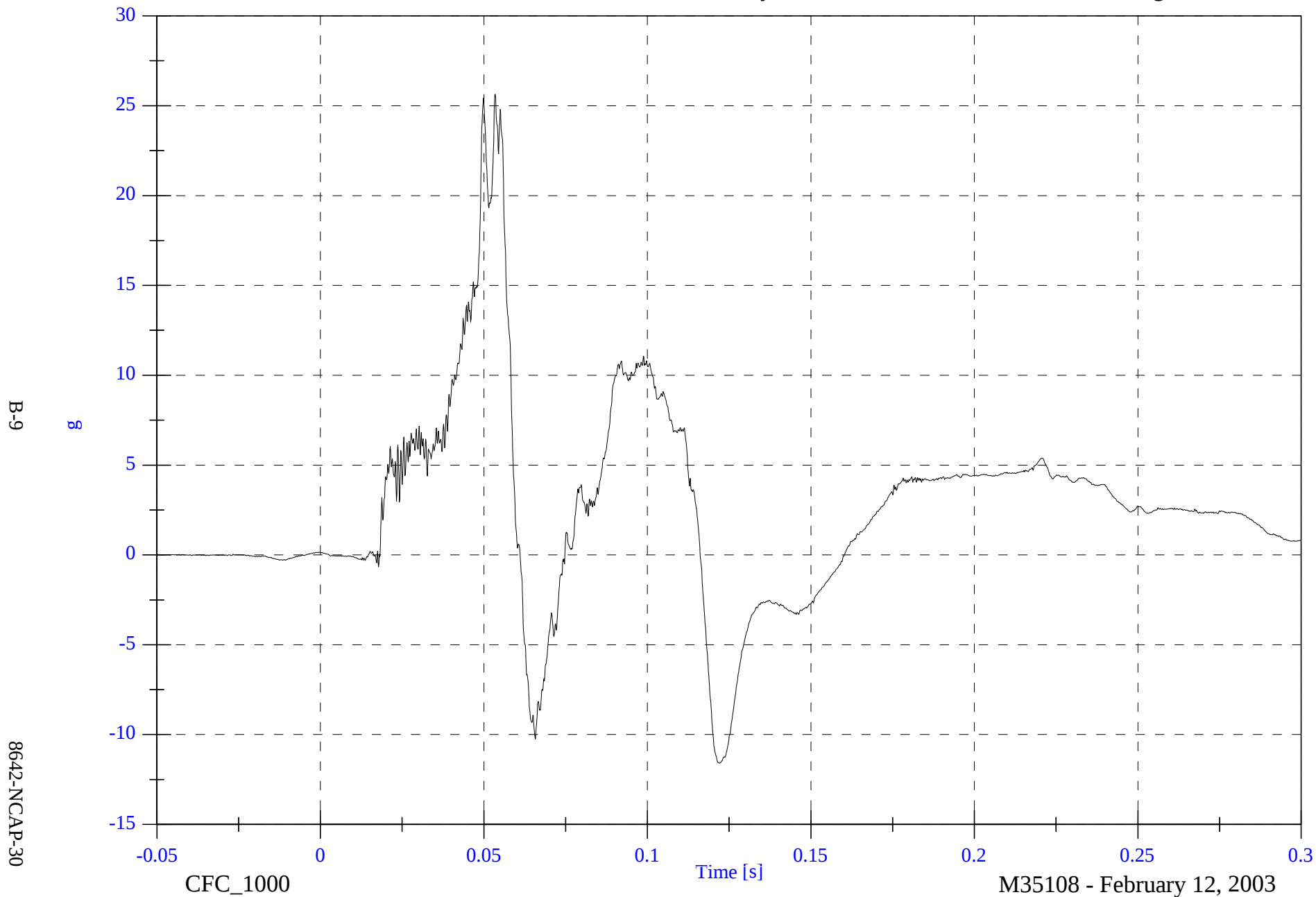


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Head 9 Array X Arm Az

Max: 25.6 [g] at 0.053 [s]

Min: -11.6 [g] at 0.122 [s]

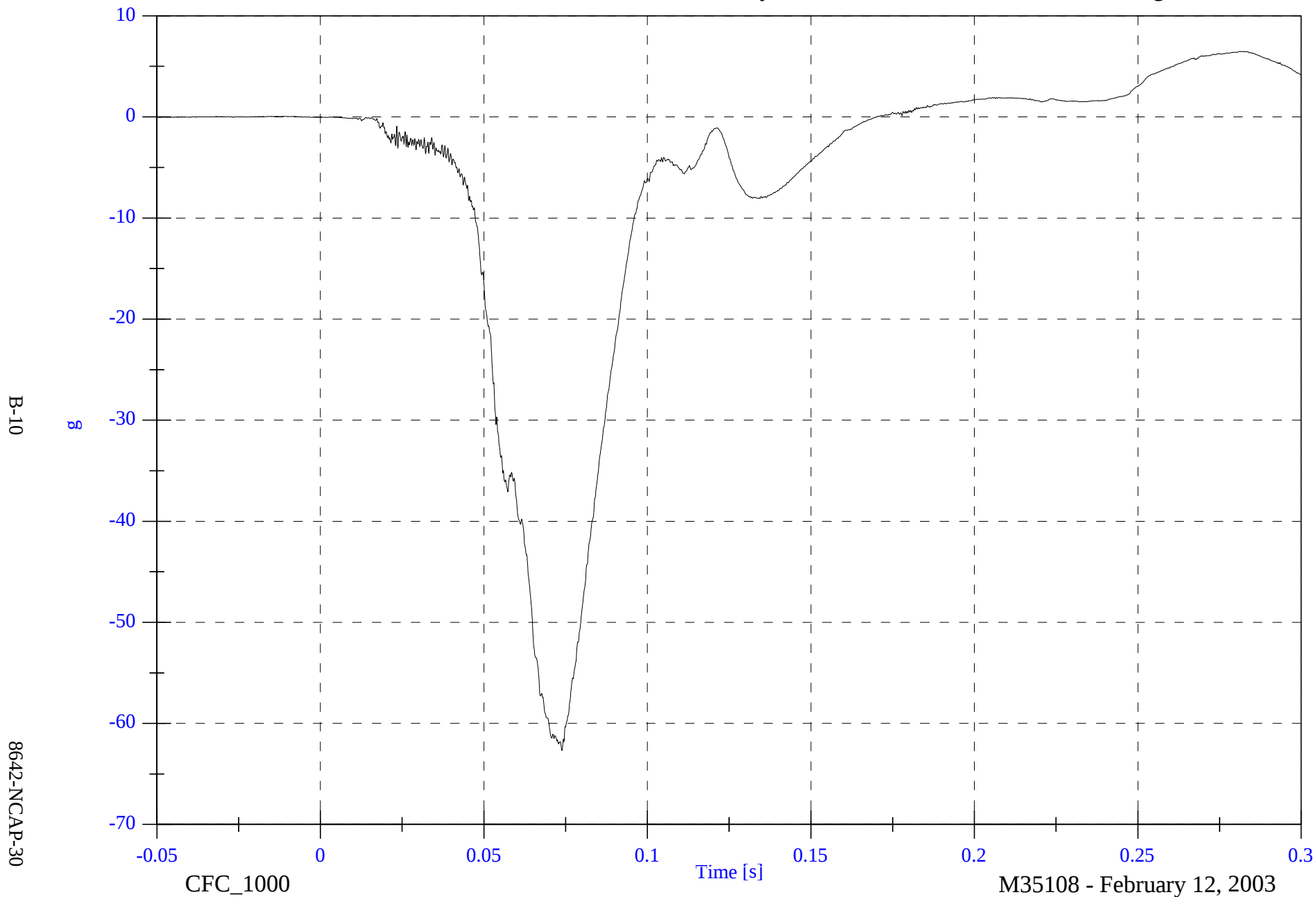


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Head 9 Array Y Arm Ax

Max: 6.5 [g] at 0.281 [s]

Min: -62.7 [g] at 0.074 [s]



NCAP Test #8 - 2003 Toyota Avalon

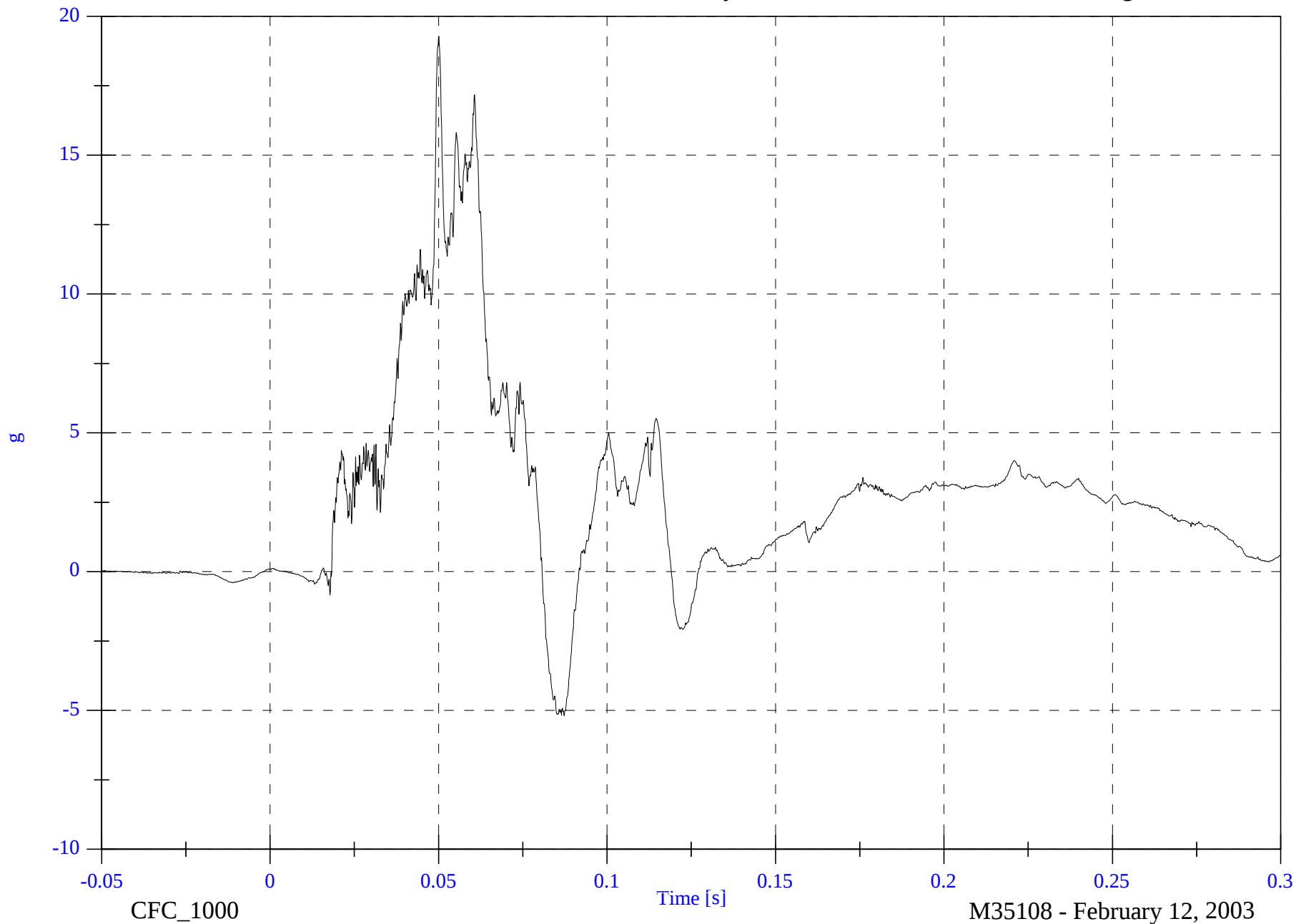
V1P1 Head 9 Array Y Arm Az

Max: 19.3 [g] at 0.050 [s]

Min: -5.2 [g] at 0.087 [s]

B-11

8642-NCAP-30

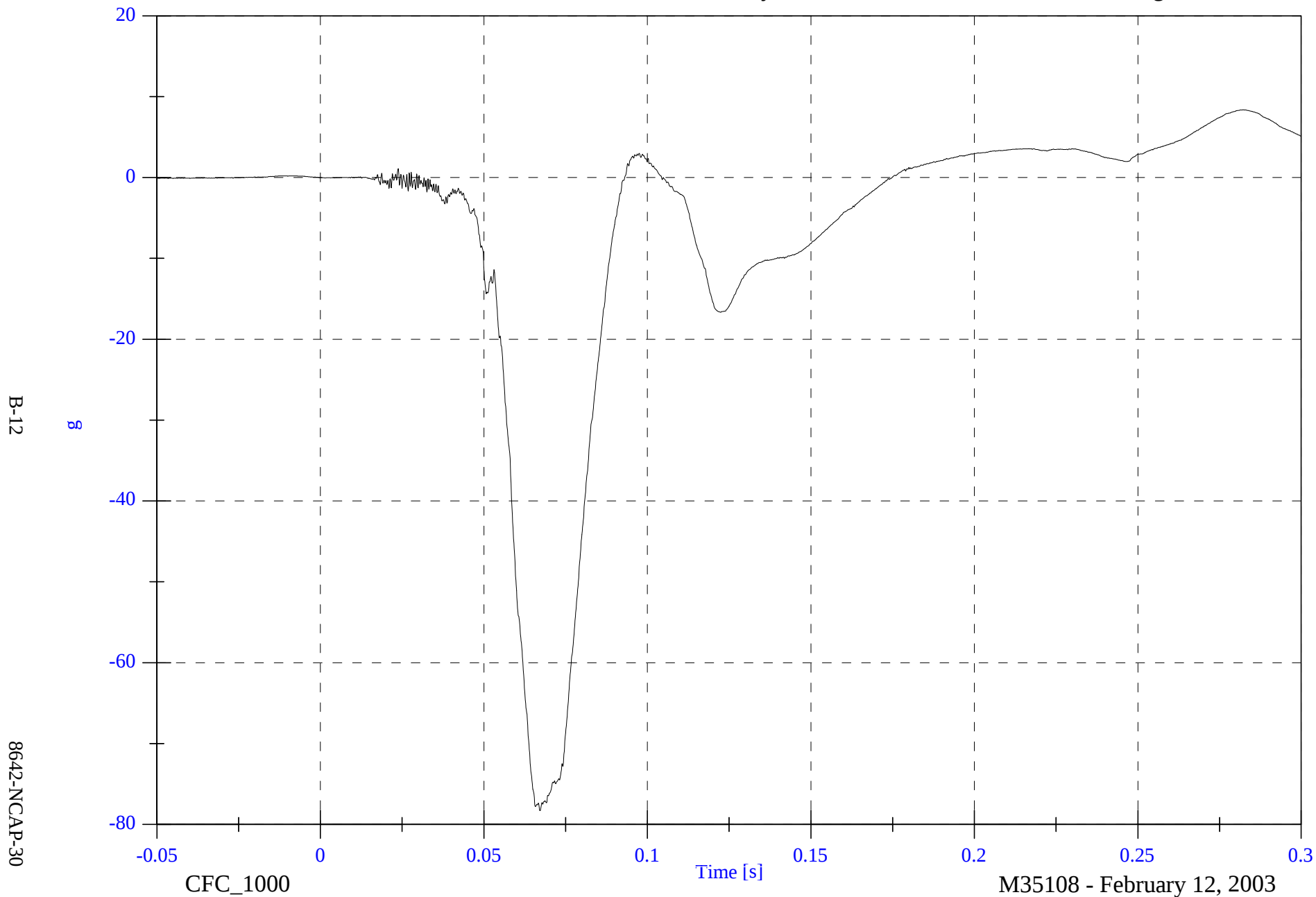


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Head 9 Array Z Arm Ax

Max: 8.4 [g] at 0.282 [s]

Min: -78.3 [g] at 0.067 [s]

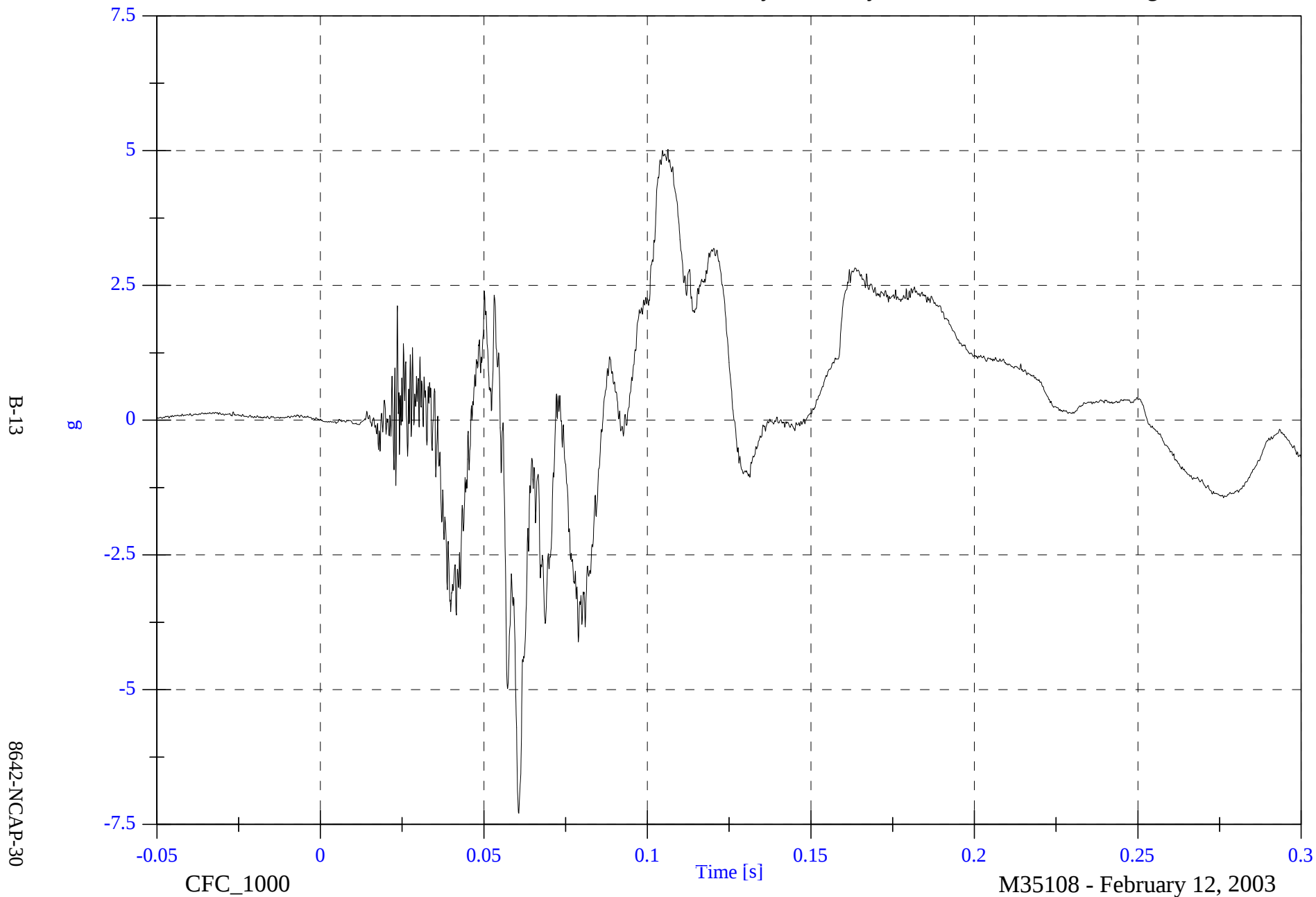


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Head 9 Array Z Arm Ay

Max: 5.0 [g] at 0.106 [s]

Min: -7.3 [g] at 0.061 [s]

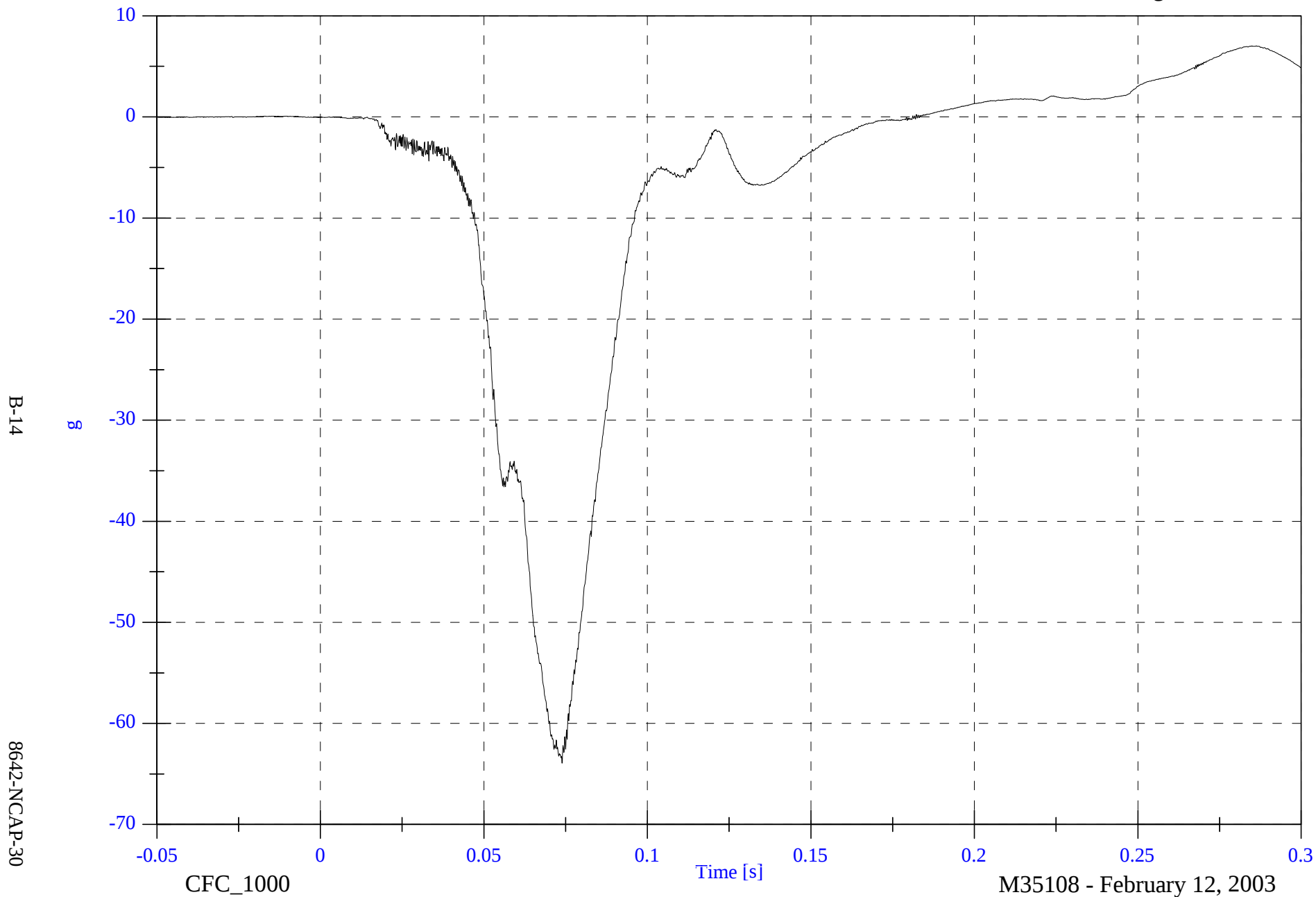


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Head CG x

Max: 7.0 [g] at 0.286 [s]

Min: -63.9 [g] at 0.074 [s]

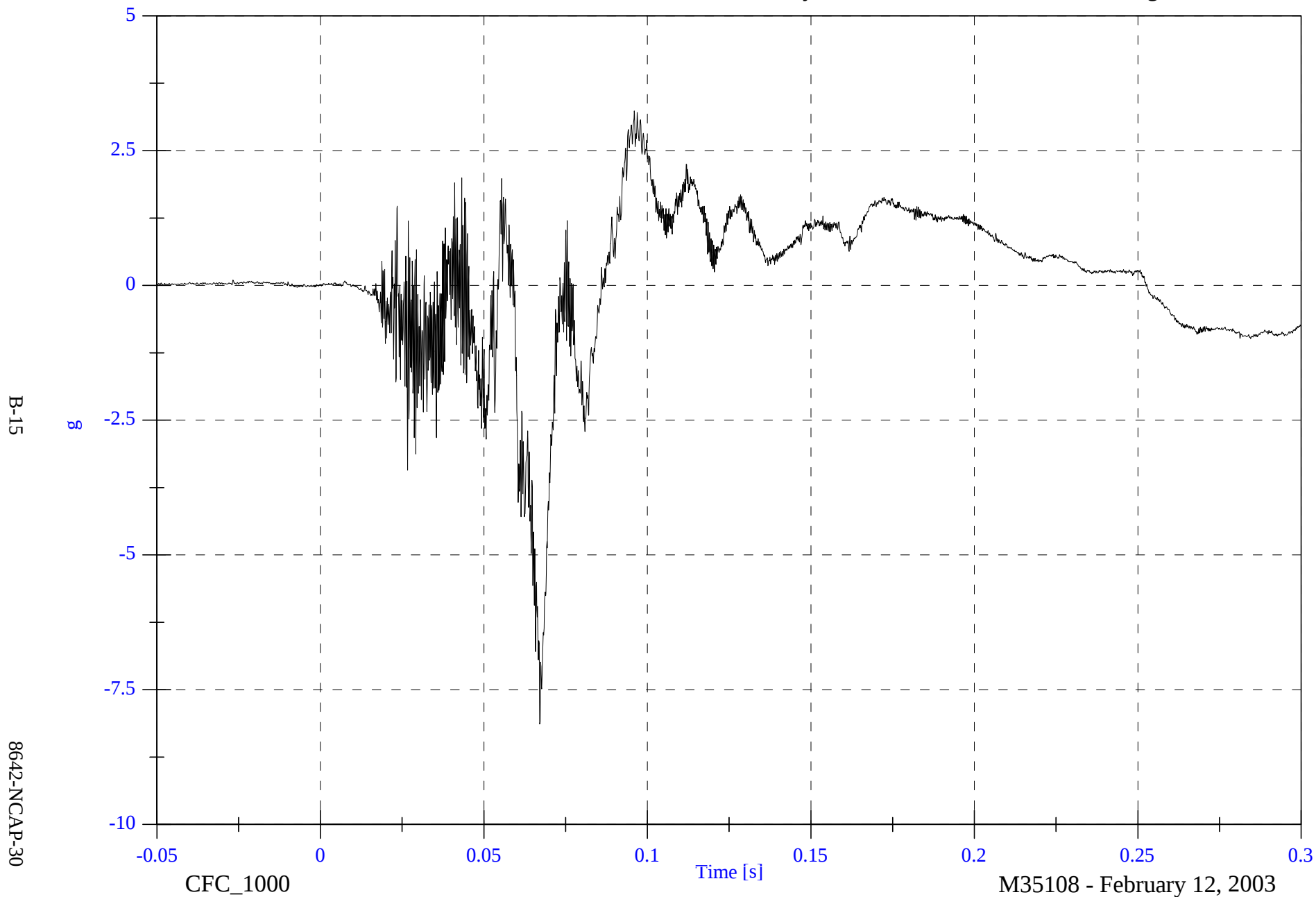


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Head CG y

Max: 3.2 [g] at 0.096 [s]

Min: -8.1 [g] at 0.067 [s]

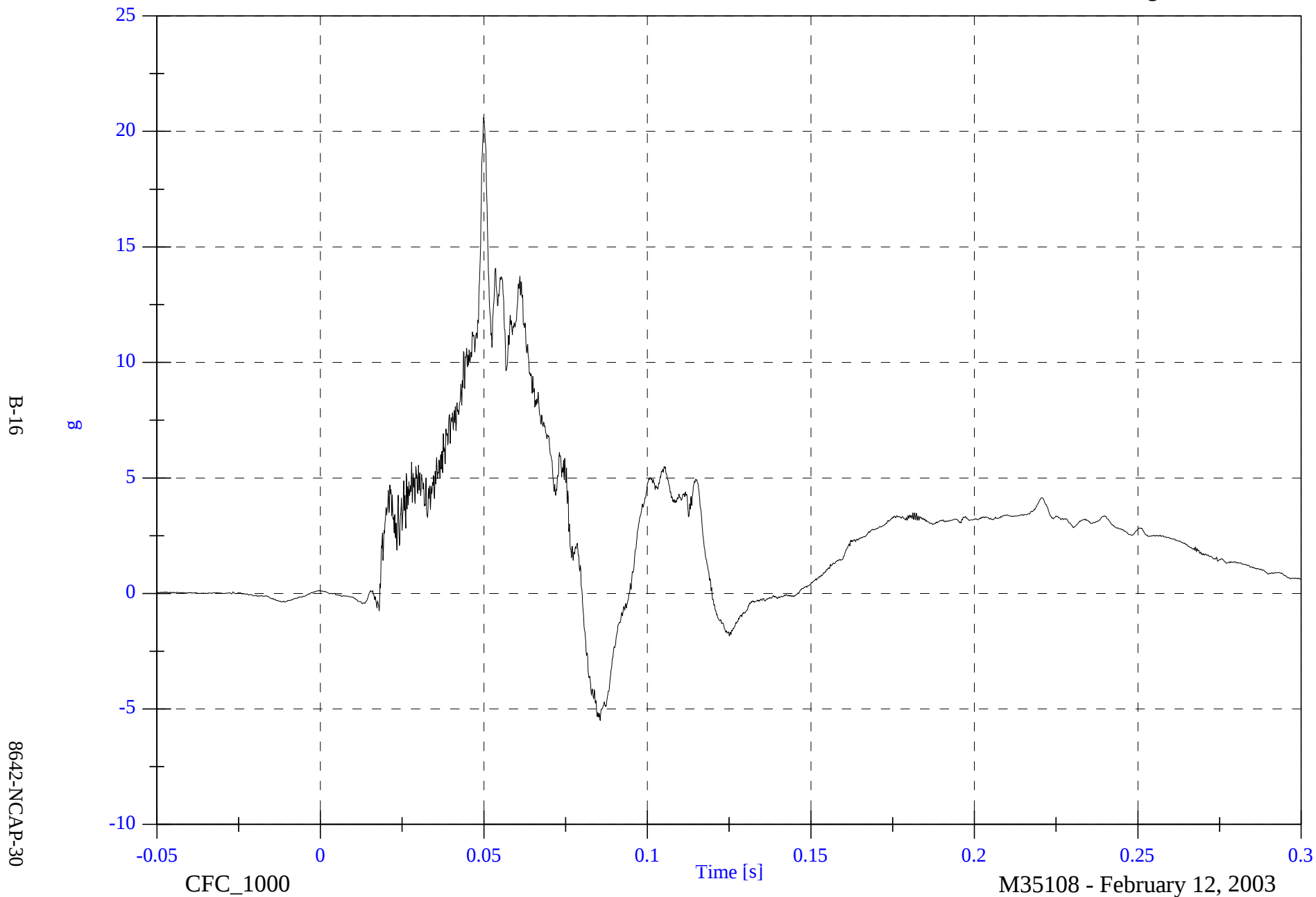


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Head CG z

Max: 20.6 [g] at 0.050 [s]

Min: -5.5 [g] at 0.086 [s]



NCAP Test #8 - 2003 Toyota Avalon

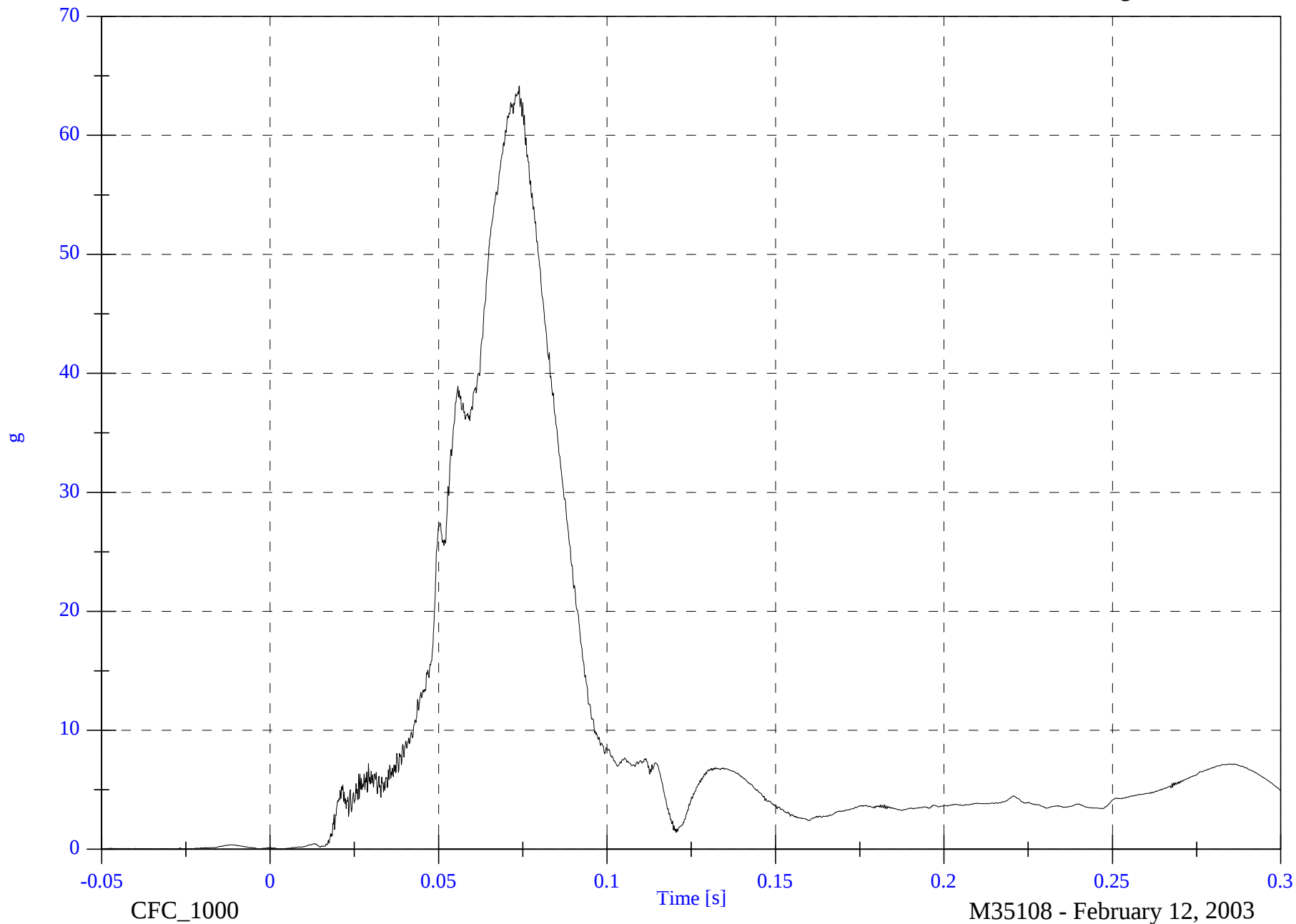
V1P1 Head CG Resultant

Max: 64.2 [g] at 0.074 [s]

Min: 0.0 [g] at 0.003 [s]

B-17

8642-NCAP-30

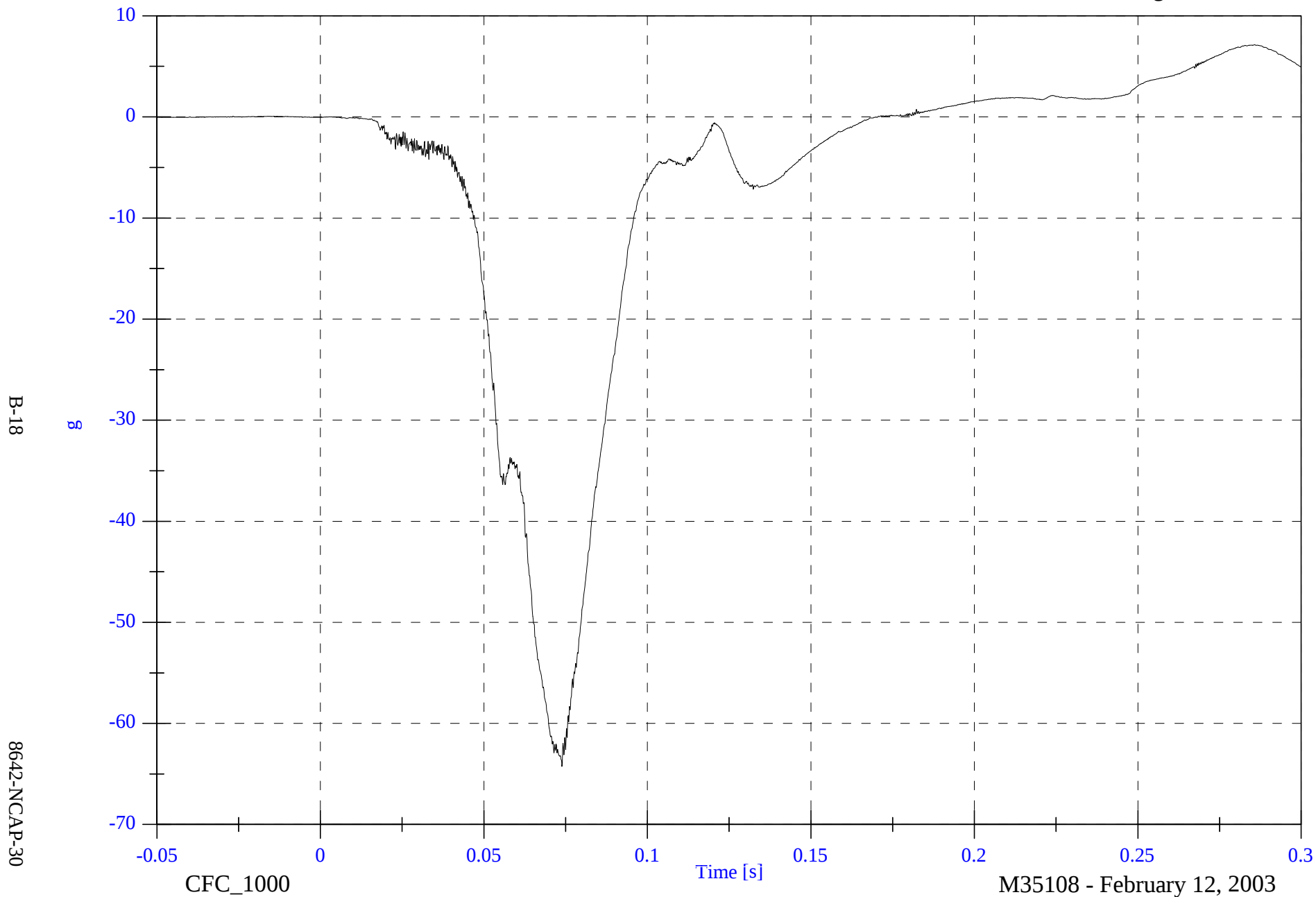


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Head CG Red x

Max: 7.1 [g] at 0.286 [s]

Min: -64.3 [g] at 0.074 [s]

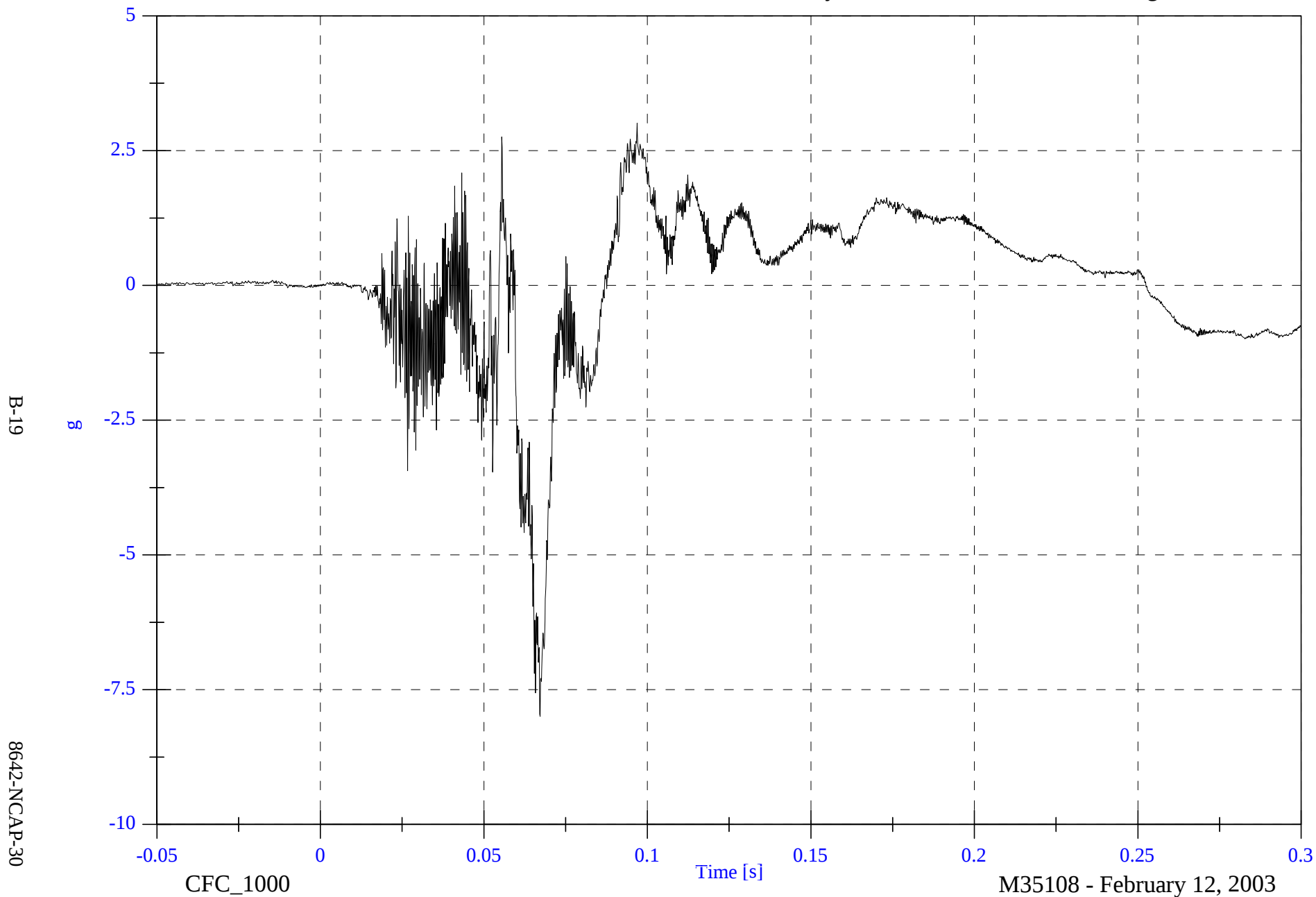


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Head CG Red y

Max: 3.0 [g] at 0.097 [s]

Min: -8.0 [g] at 0.067 [s]

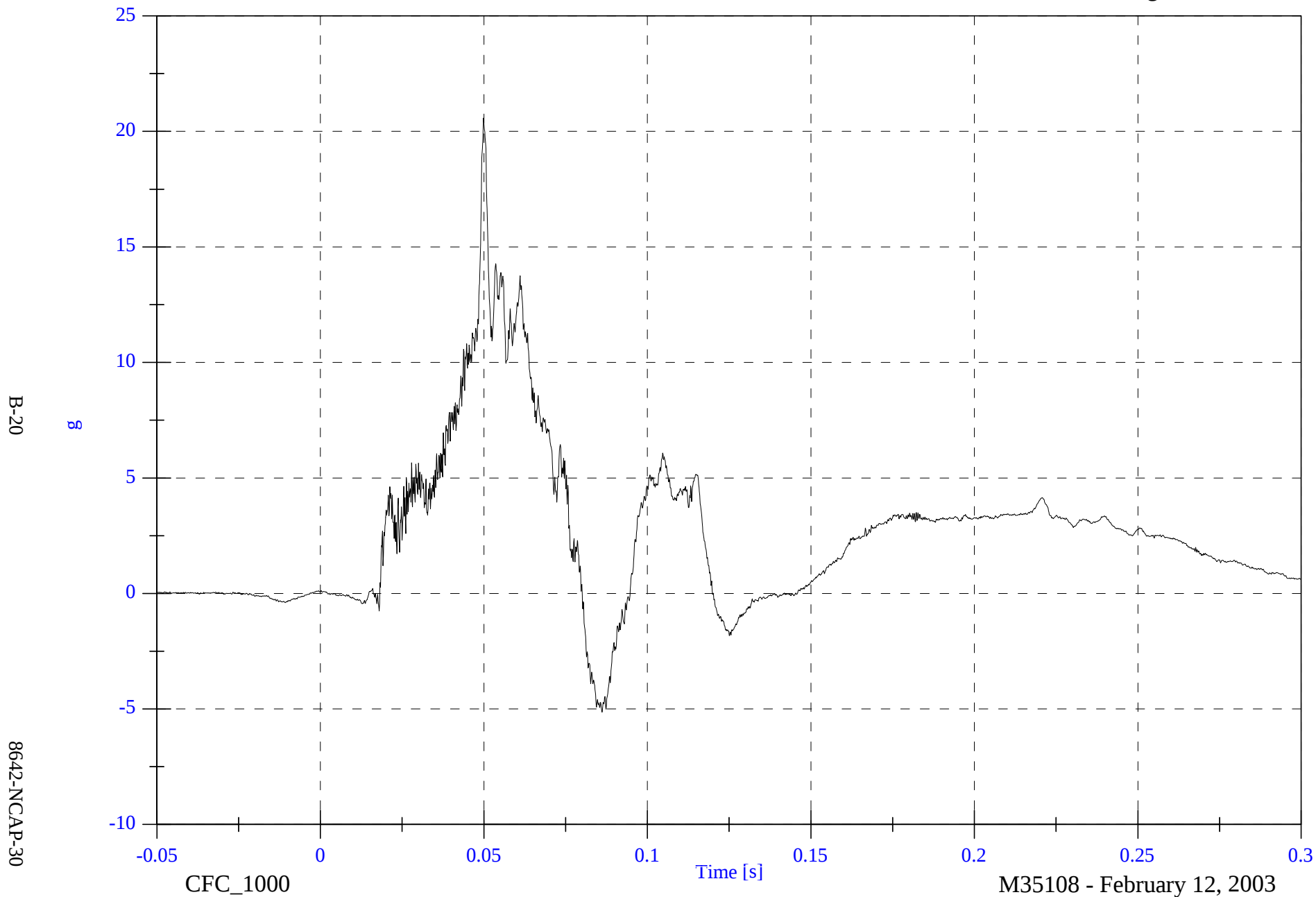


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Head CG Red z

Max: 20.6 [g] at 0.050 [s]

Min: -5.1 [g] at 0.086 [s]



NCAP Test #8 - 2003 Toyota Avalon

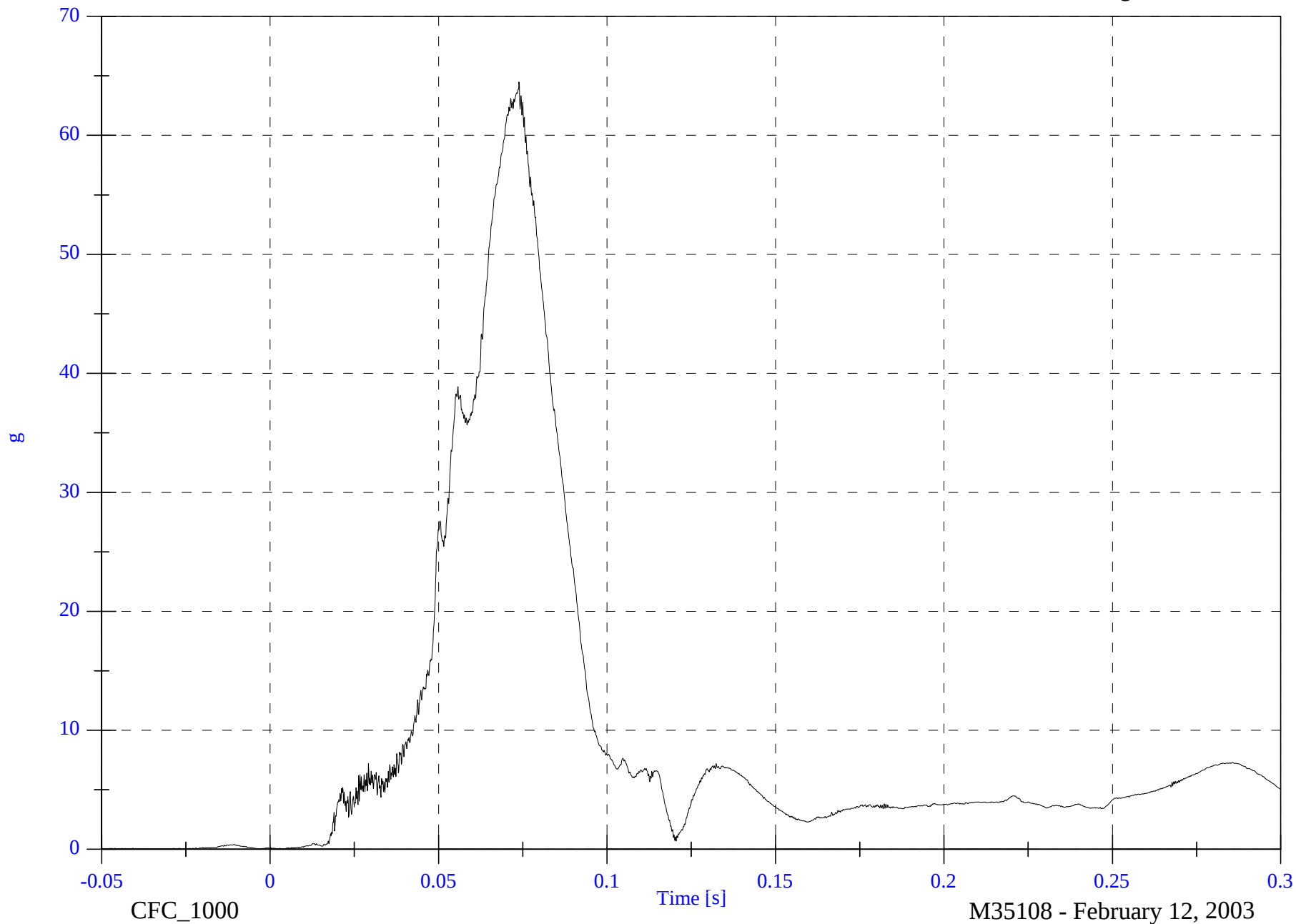
V1P1 Head CG Red Resultant

Max: 64.5 [g] at 0.074 [s]

Min: 0.0 [g] at 0.003 [s]

B-21

8642-NCAP-30

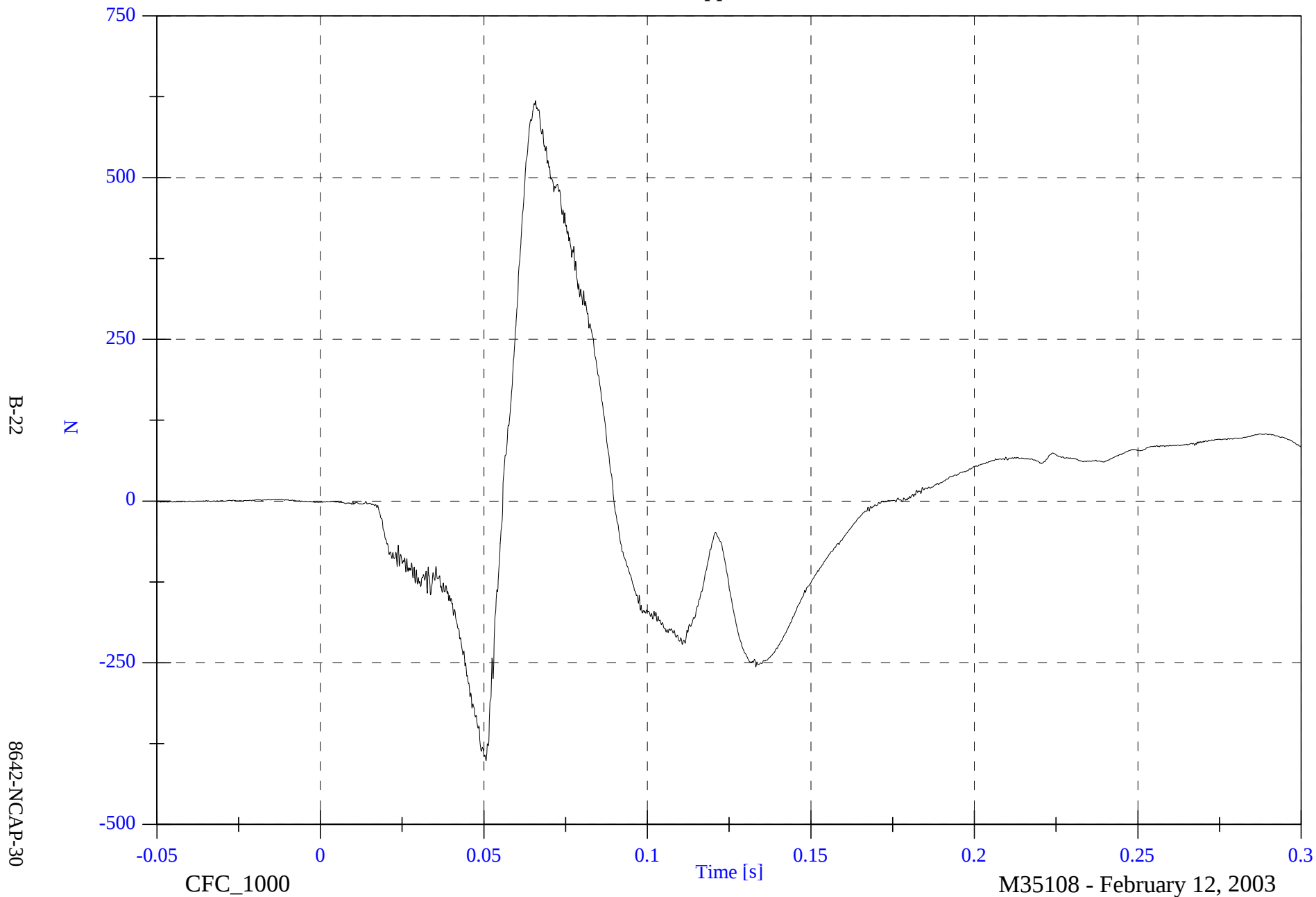


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Upper Neck Fx

Max: 618.7 [N] at 0.066 [s]

Min: -401.2 [N] at 0.051 [s]

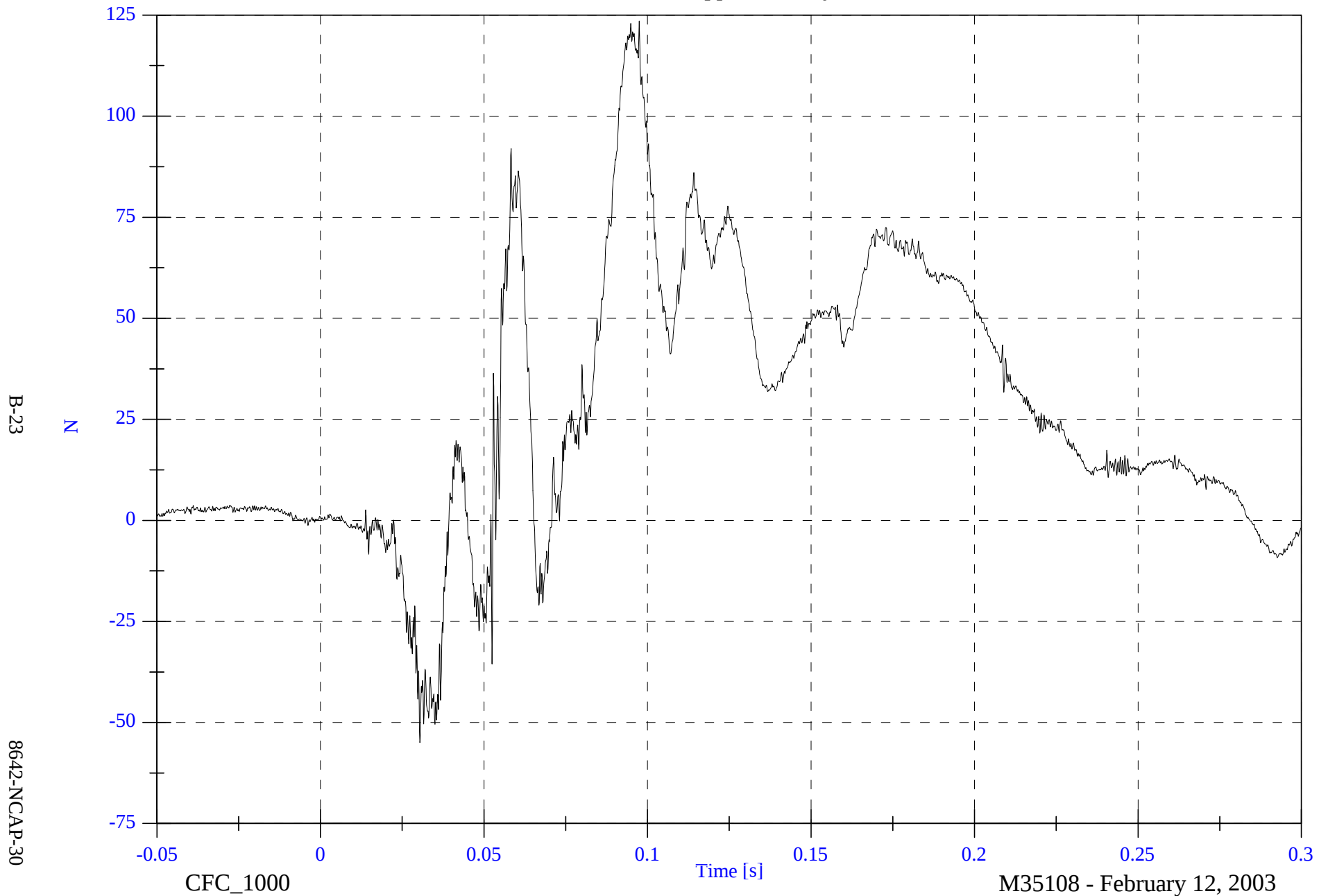


NCAP Test #8 - 2003 Toyota Avalon

Max: 123.6 [N] at 0.097 [s]

Min: -55.0 [N] at 0.030 [s]

V1P1 Upper Neck Fy



NCAP Test #8 - 2003 Toyota Avalon

V1P1 Upper Neck Fz

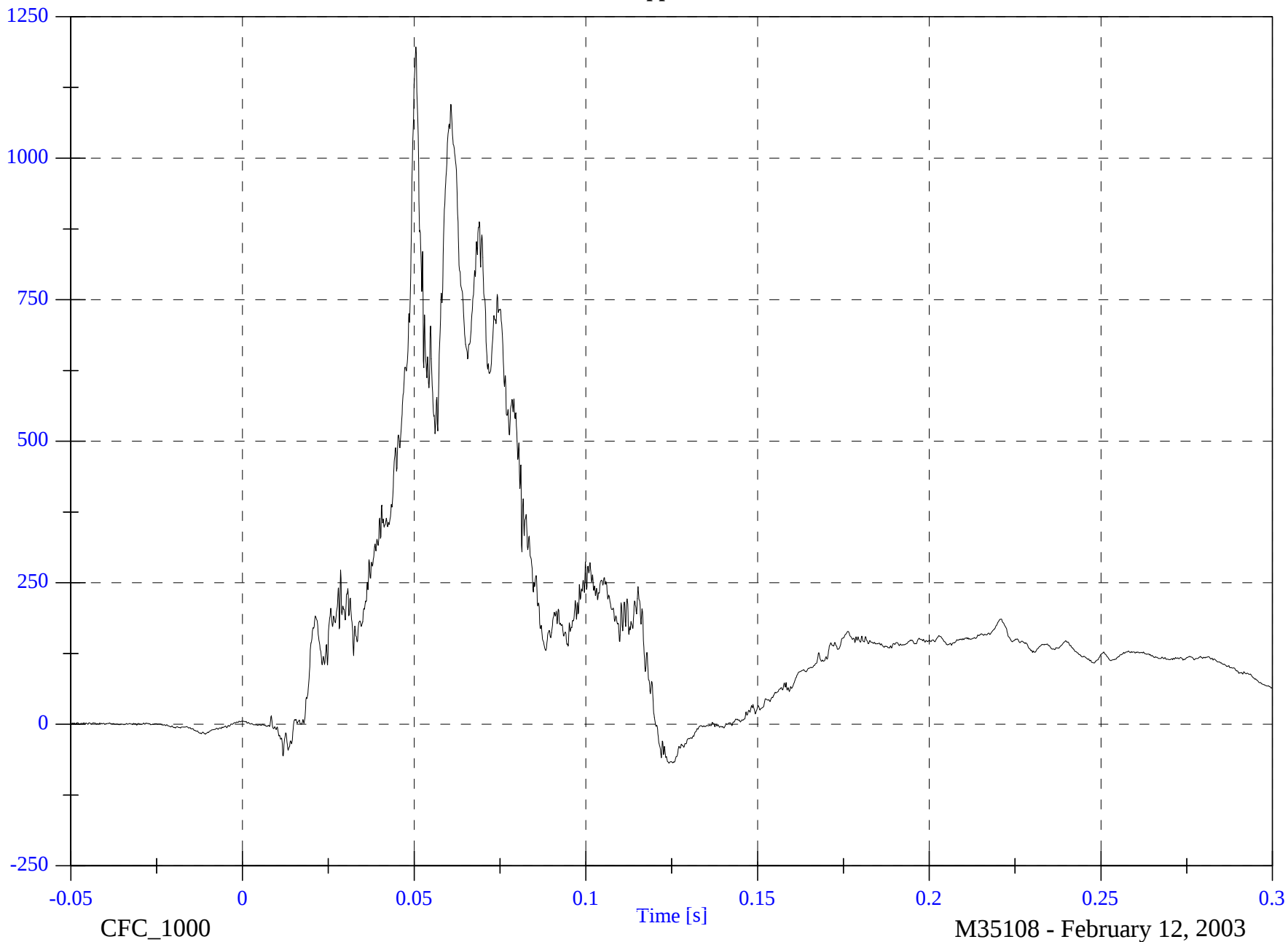
Max: 1196.4 [N] at 0.050 [s]

Min: -68.7 [N] at 0.124 [s]

B-24

N

8642-NCAP-30

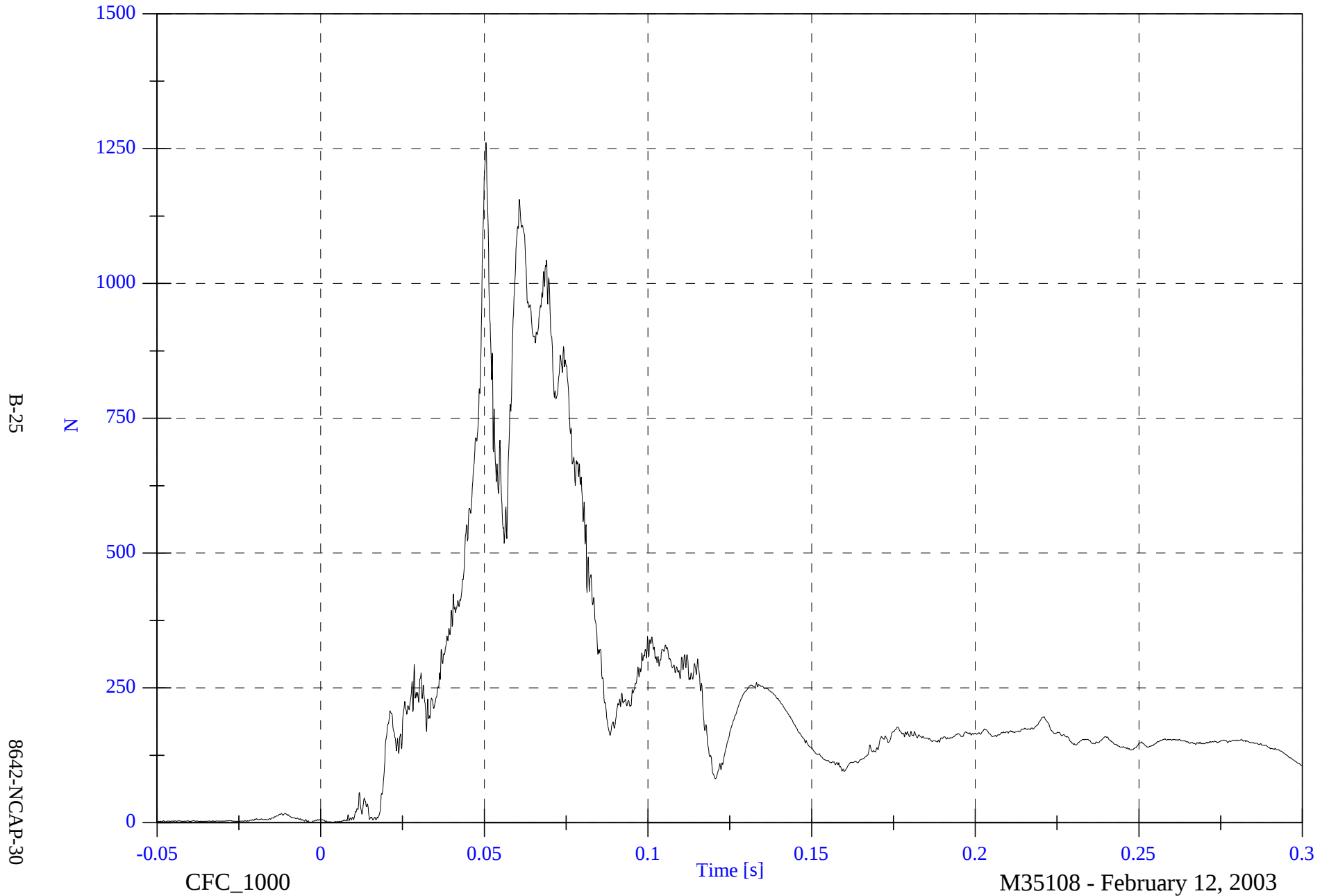


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Upper Neck F Resultant

Max: 1260.9 [N] at 0.050 [s]

Min: 0.4 [N] at -0.003 [s]



NCAP Test #8 - 2003 Toyota Avalon

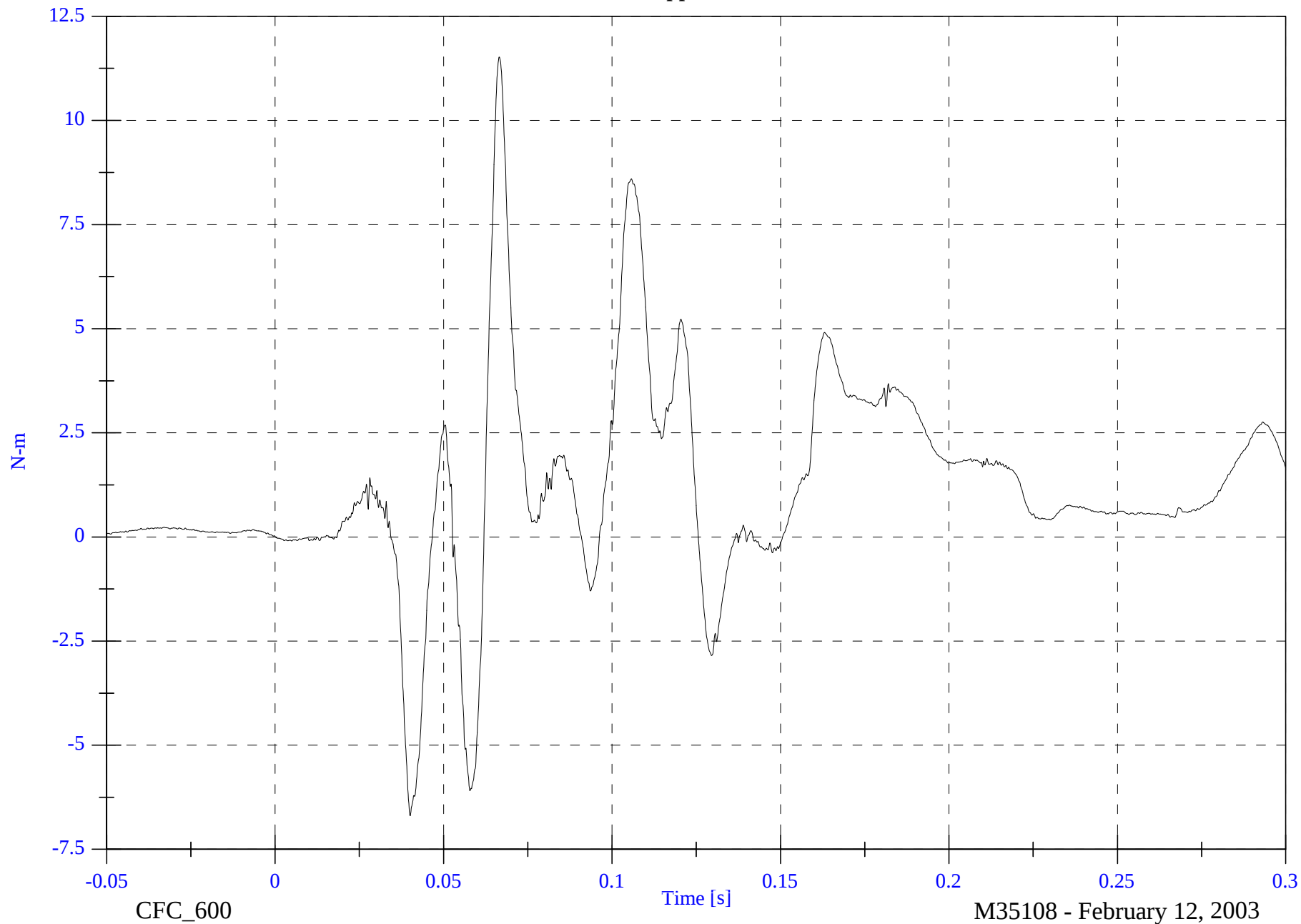
V1P1 Upper Neck Mx

Max: 11.5 [N-m] at 0.067 [s]

Min: -6.7 [N-m] at 0.040 [s]

B-26

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

V1P1 Upper Neck My

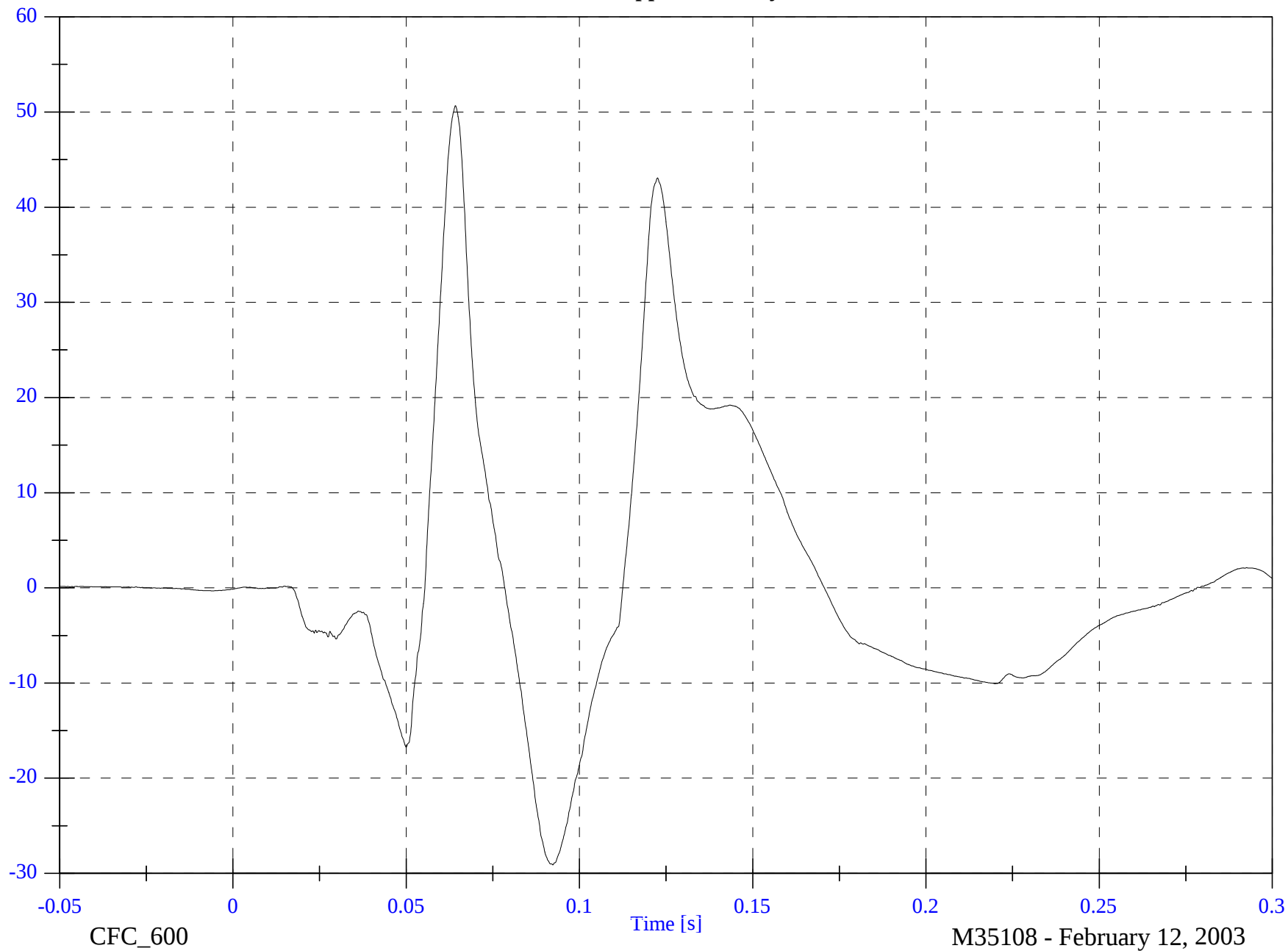
Max: 50.7 [N-m] at 0.064 [s]

Min: -29.1 [N-m] at 0.092 [s]

B-27

N-m

8642-NCAP-30

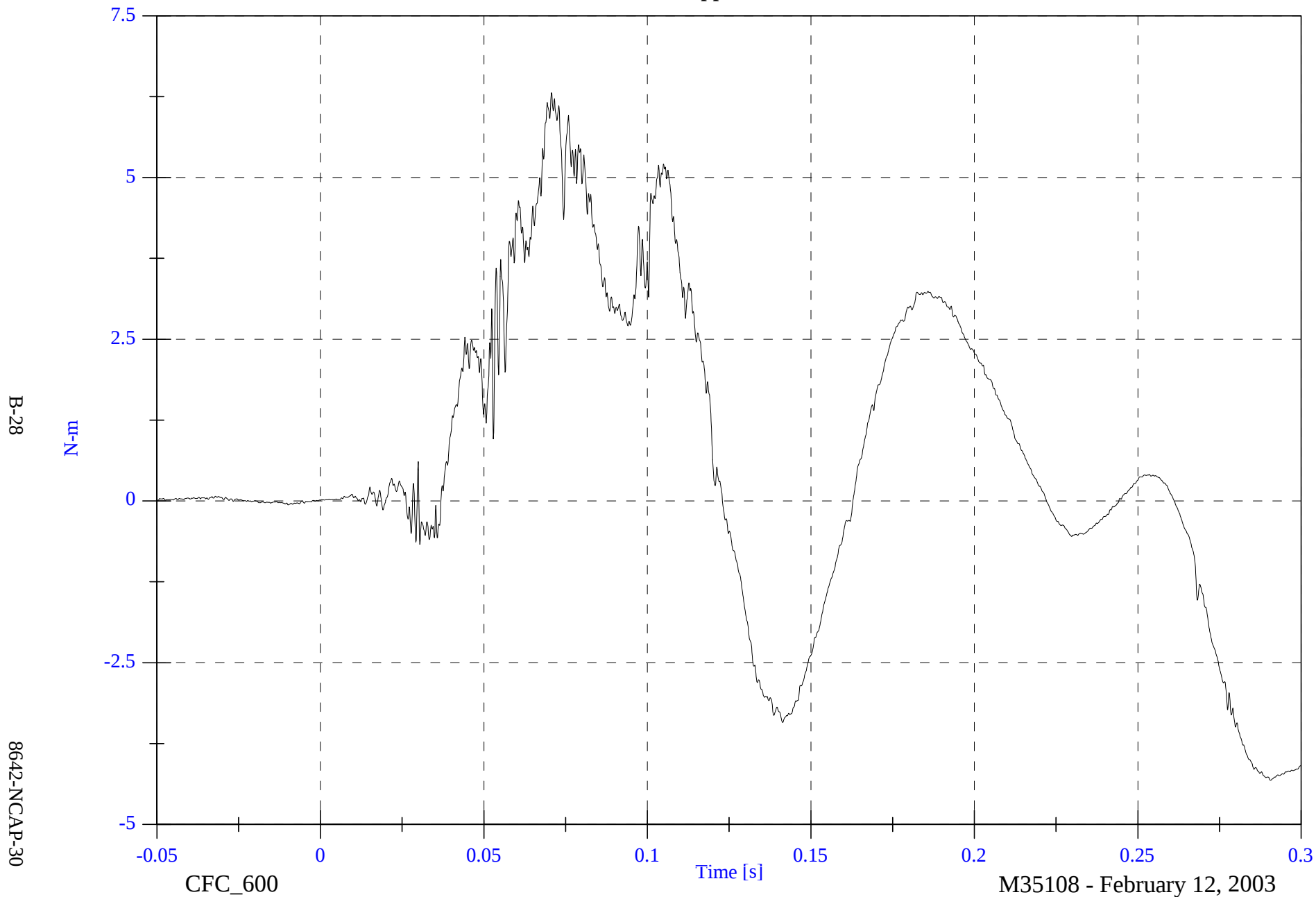


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Upper Neck Mz

Max: 6.3 [N-m] at 0.071 [s]

Min: -4.3 [N-m] at 0.290 [s]

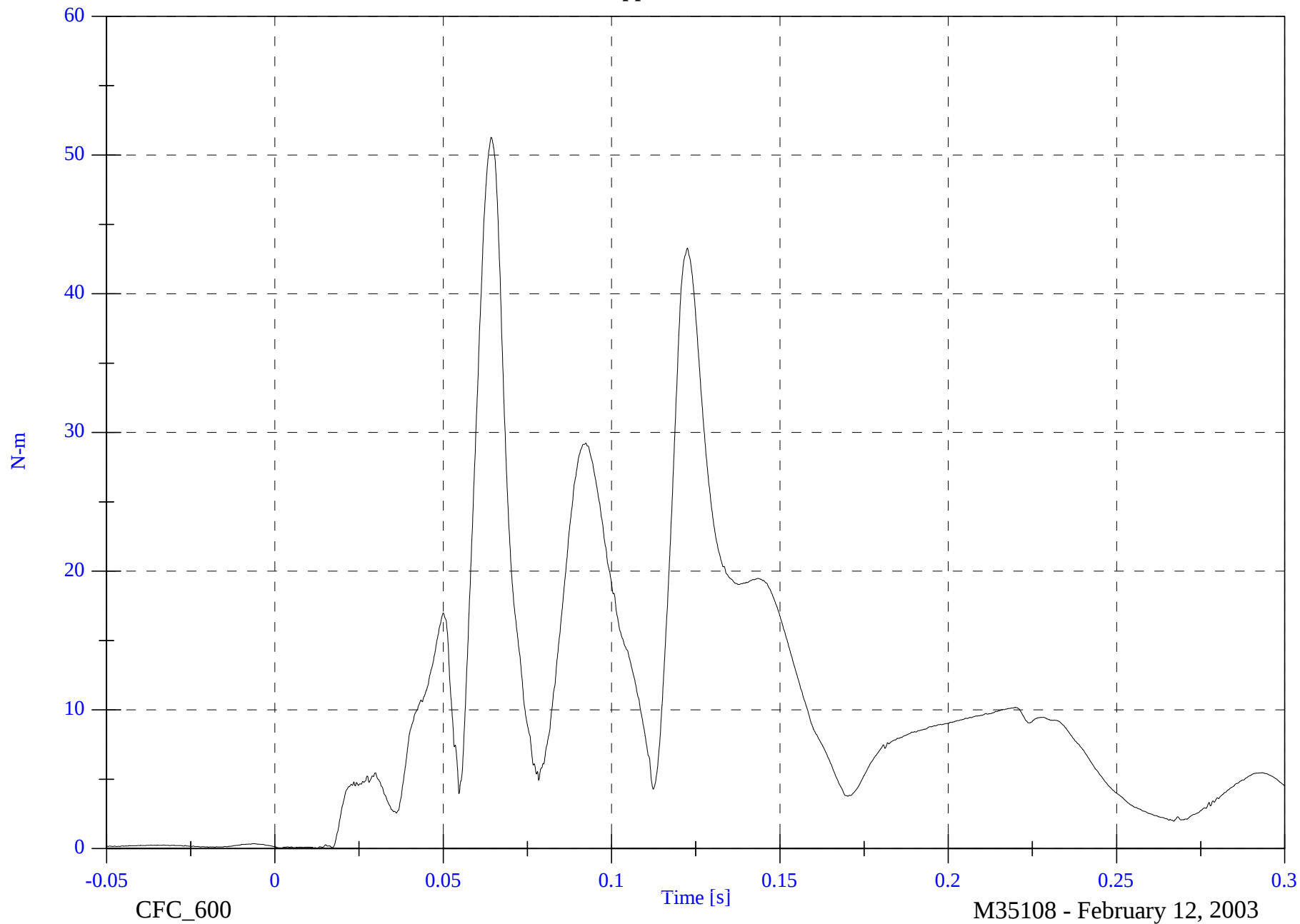


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Upper Neck M Resultant

Max: 51.3 [N-m] at 0.064 [s]

Min: 0.0 [N-m] at 0.012 [s]



B-29

8642-NCAP-30

CFC_600

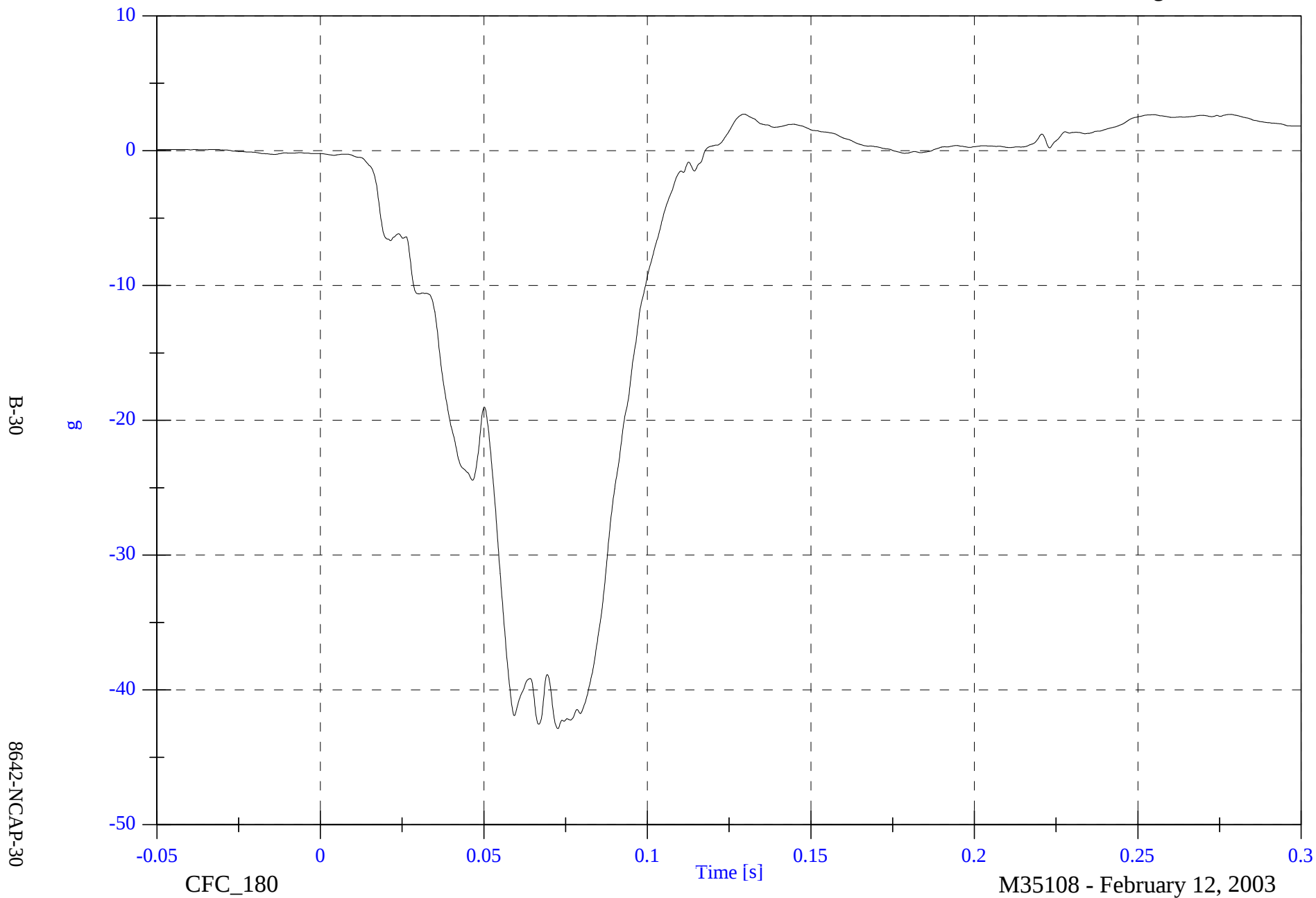
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1P1 Chest x

Max: 2.7 [g] at 0.129 [s]

Min: -42.9 [g] at 0.073 [s]



NCAP Test #8 - 2003 Toyota Avalon

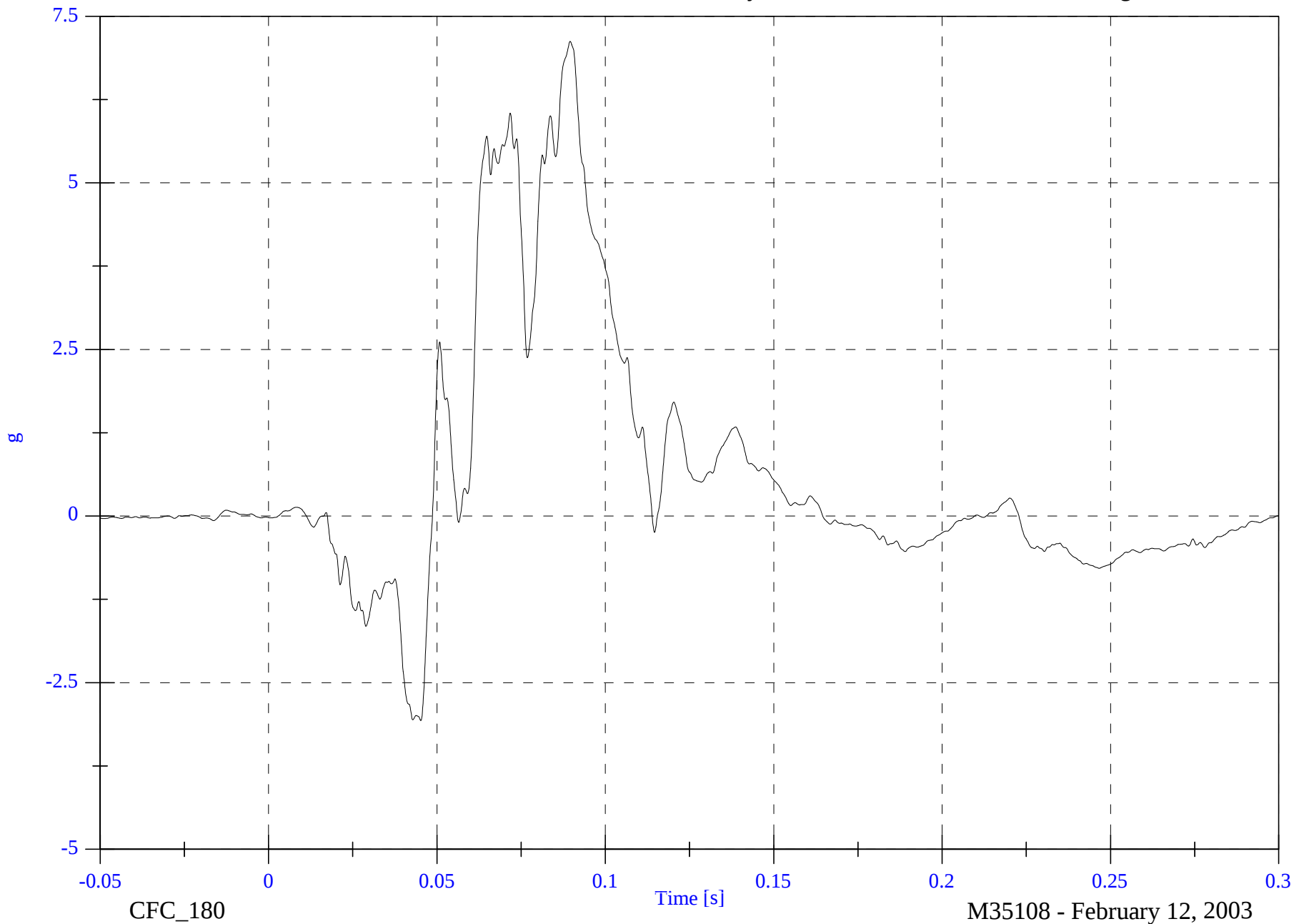
V1P1 Chest y

Max: 7.1 [g] at 0.090 [s]

Min: -3.1 [g] at 0.045 [s]

B-31

8642-NCAP-30

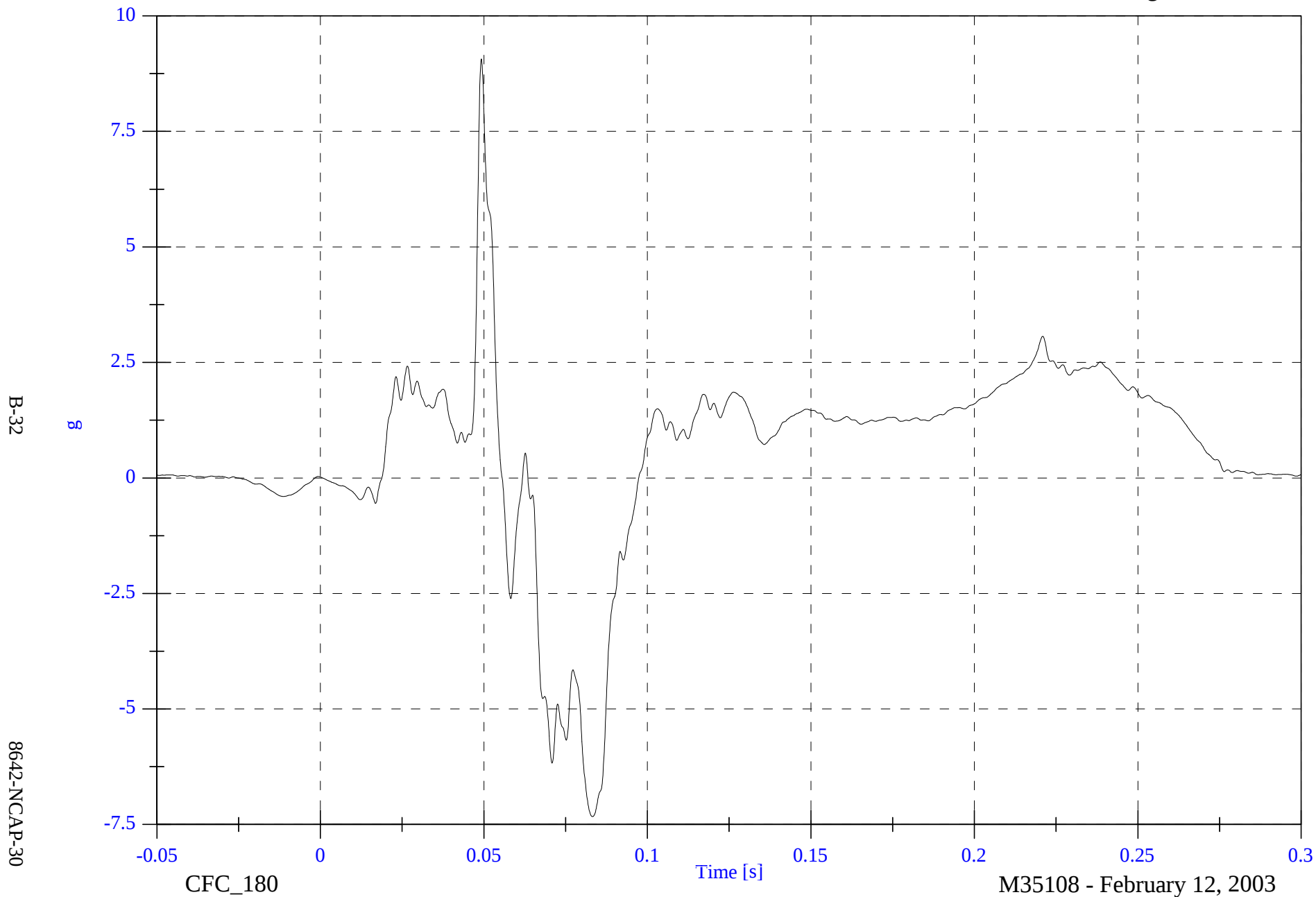


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Chest z

Max: 9.1 [g] at 0.049 [s]

Min: -7.3 [g] at 0.083 [s]



NCAP Test #8 - 2003 Toyota Avalon

V1P1 Chest Resultant

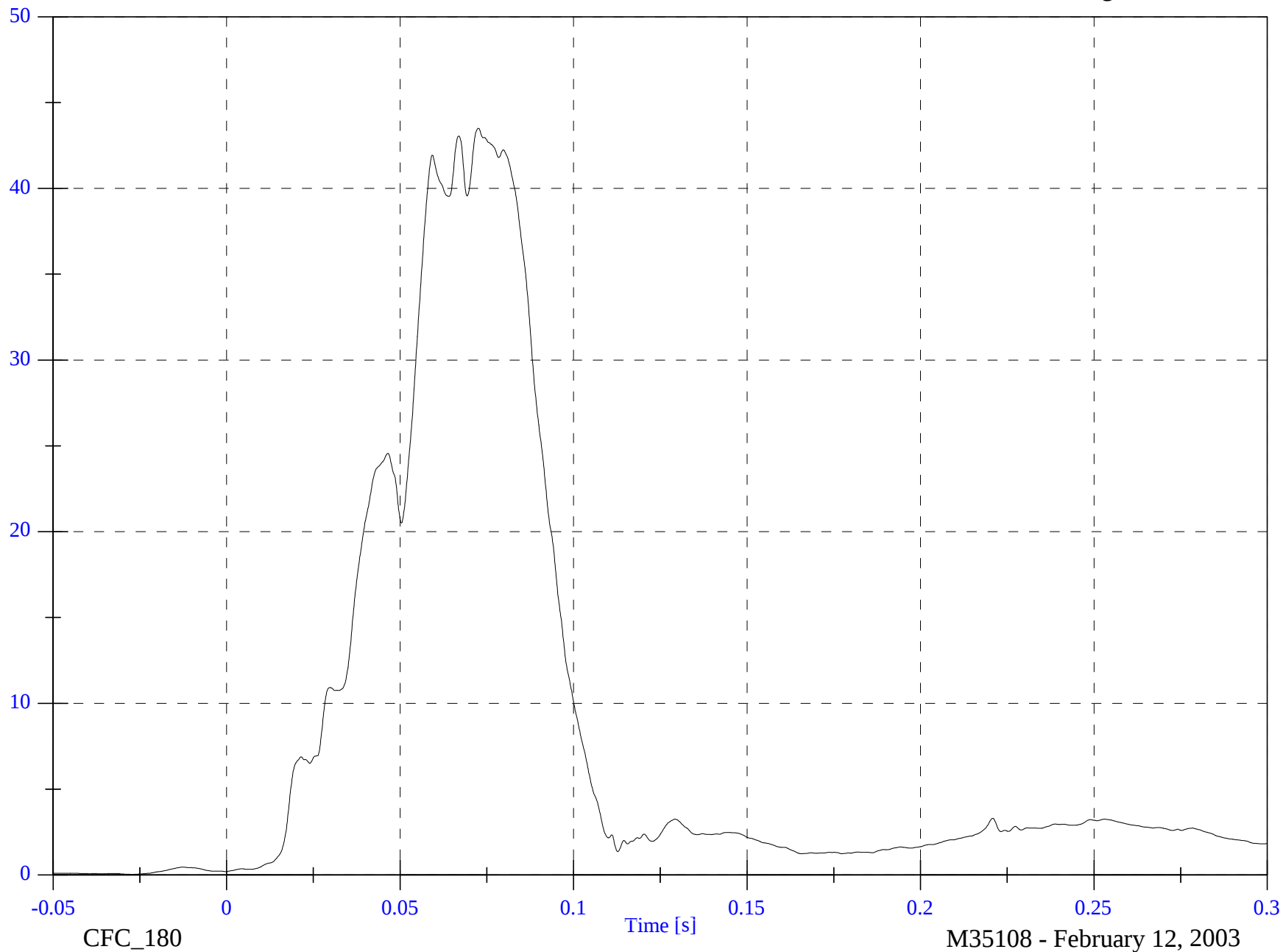
Max: 43.5 [g] at 0.073 [s]

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

B-33

8642-NCAP-30

g



CFC_180

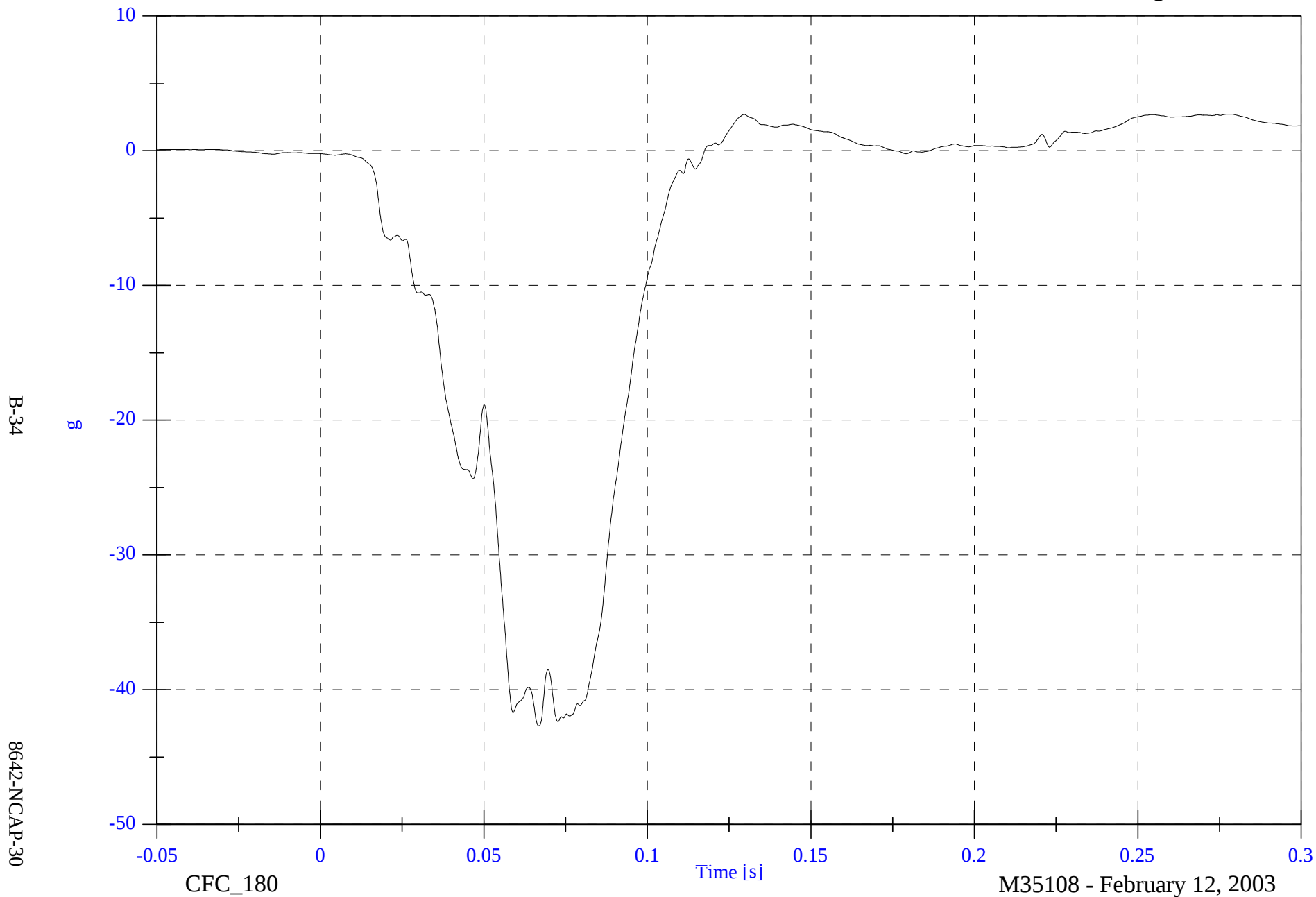
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1P1 Chest Red x

Max: 2.7 [g] at 0.279 [s]

Min: -42.7 [g] at 0.067 [s]

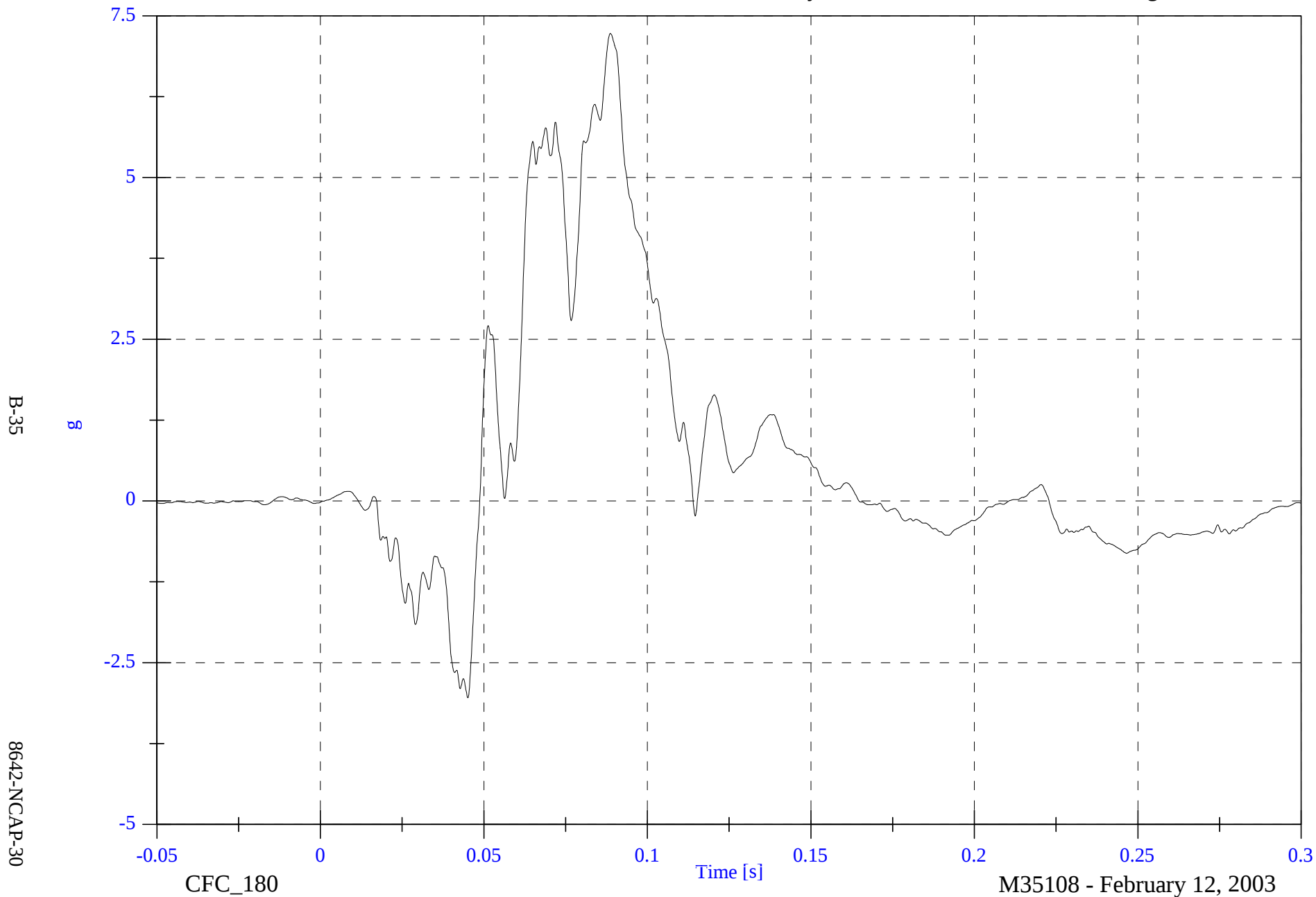


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Chest Red y

Max: 7.2 [g] at 0.089 [s]

Min: -3.0 [g] at 0.045 [s]

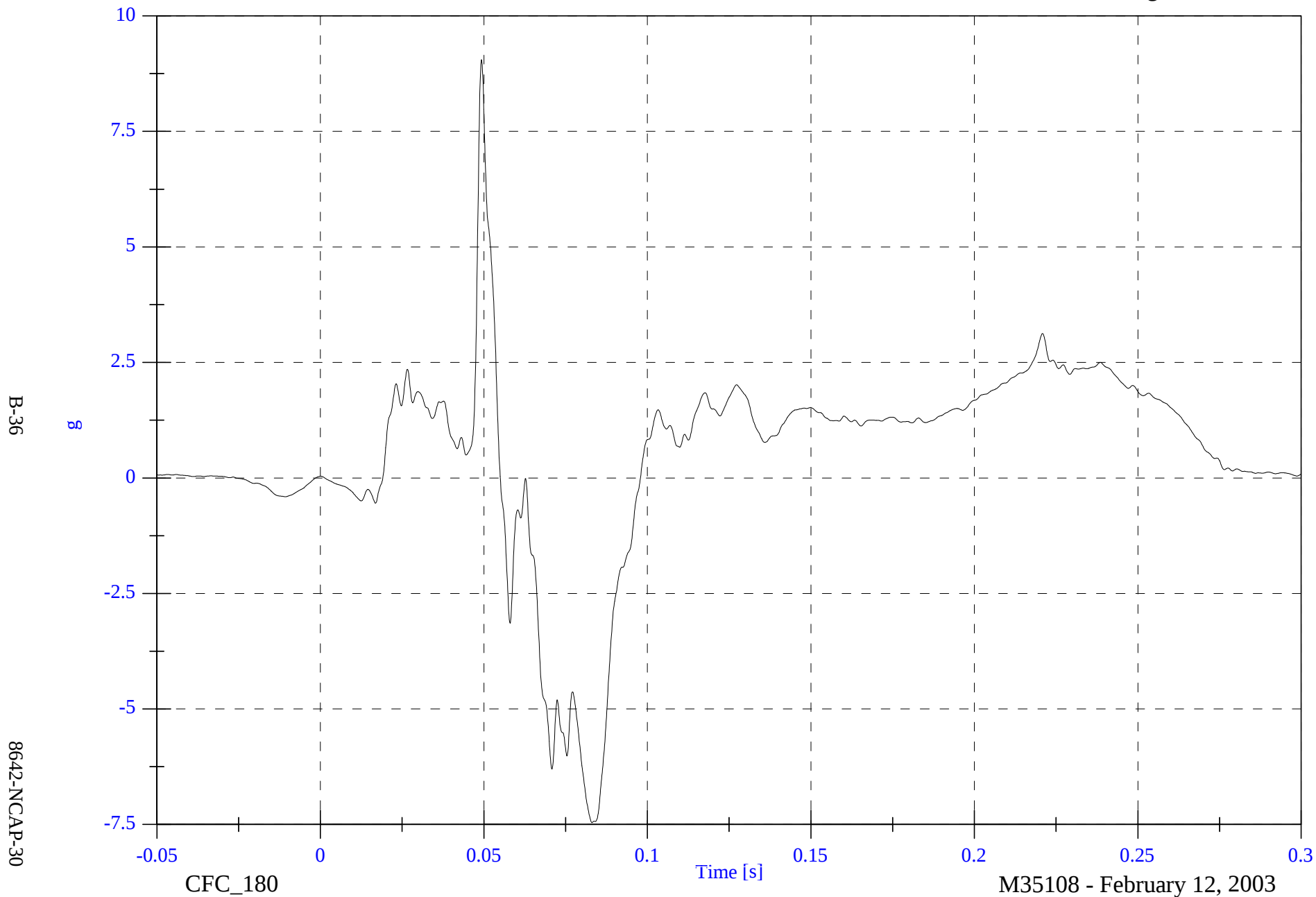


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Chest Red z

Max: 9.1 [g] at 0.049 [s]

Min: -7.5 [g] at 0.083 [s]



NCAP Test #8 - 2003 Toyota Avalon

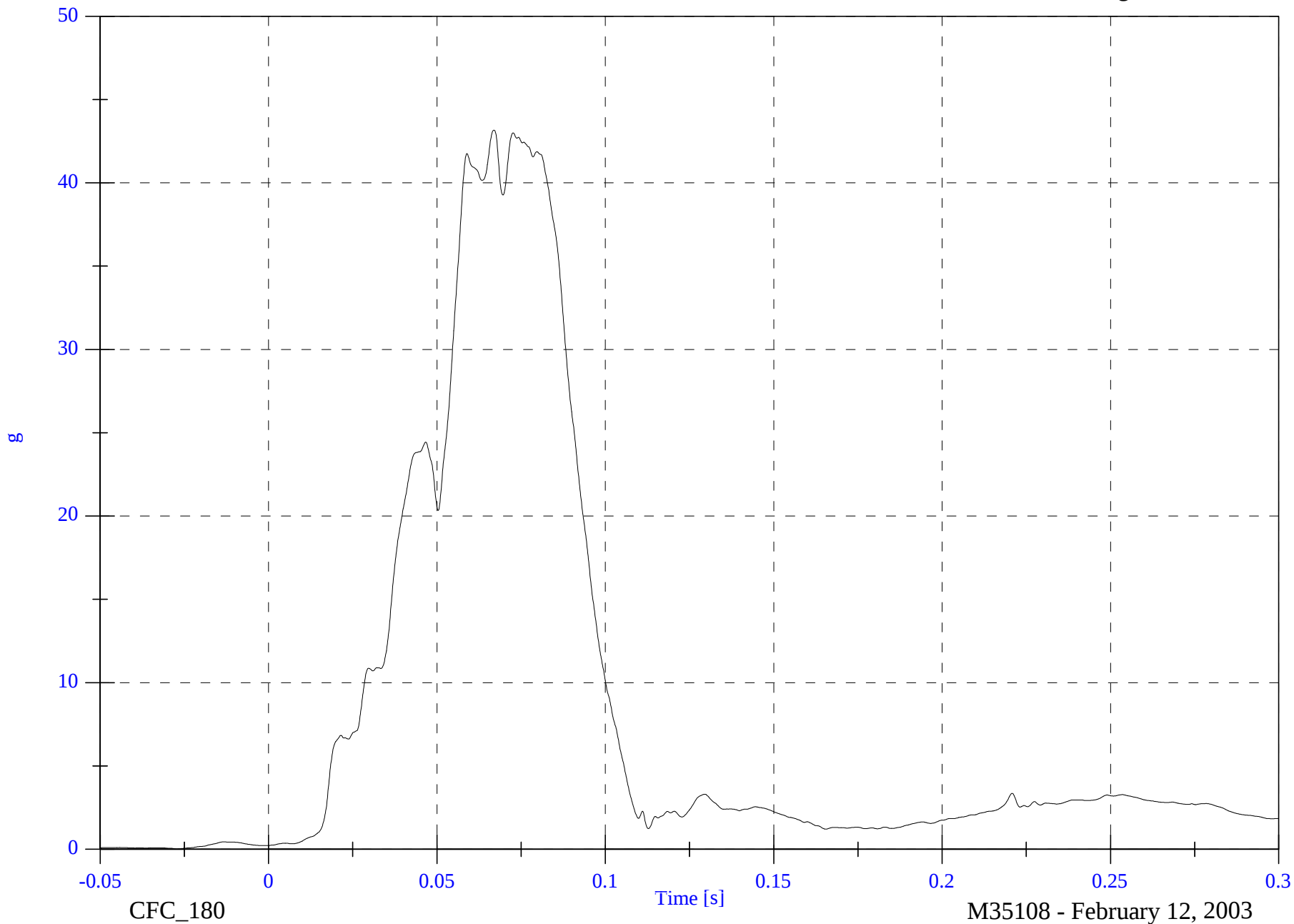
V1P1 Chest Red Resultant

Max: 43.2 [g] at 0.067 [s]

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

B-37

8642-NCAP-30

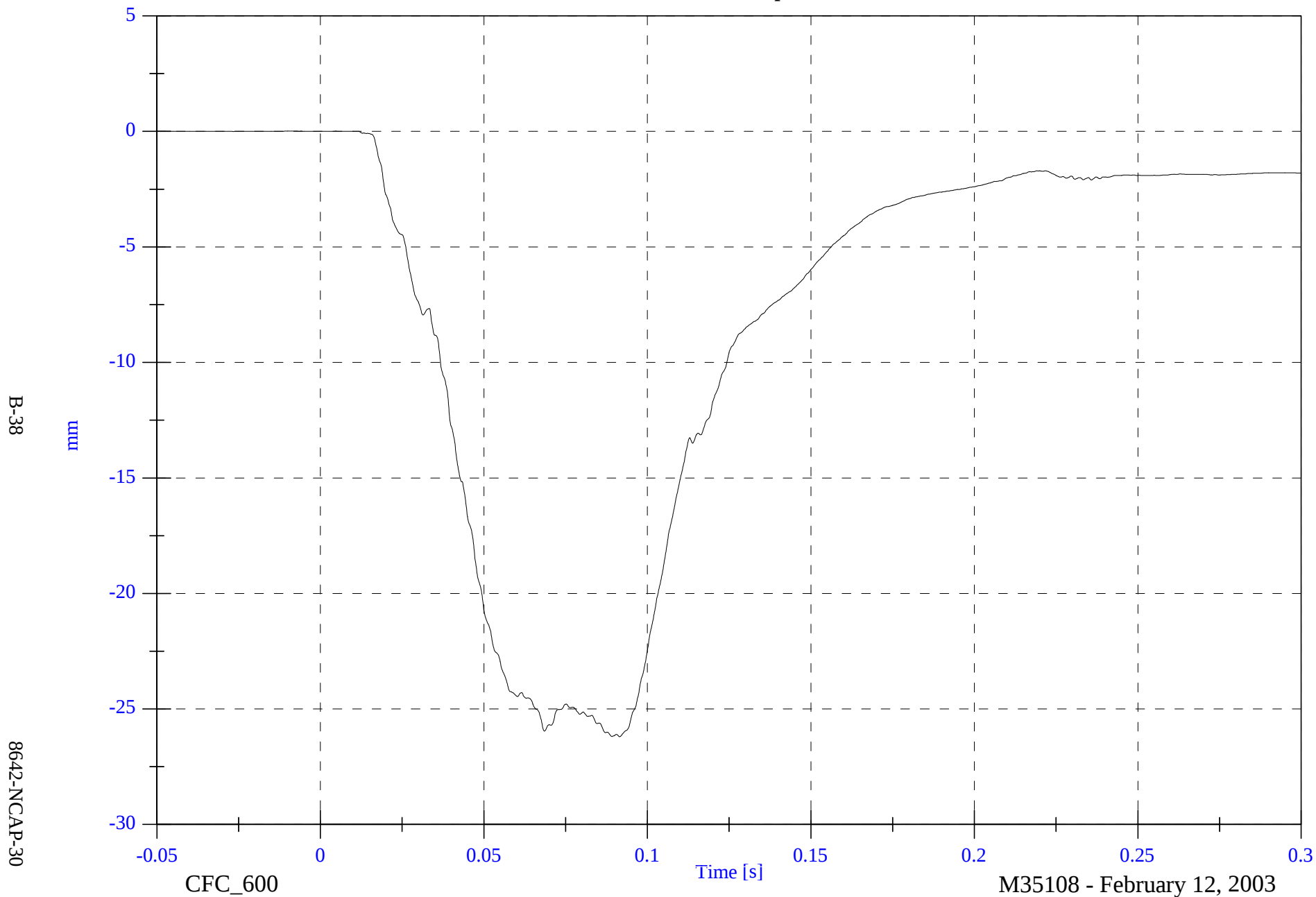


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Chest Compression

Max: 0.0 [mm] at -0.009 [s]

Min: -26.2 [mm] at 0.091 [s]



NCAP Test #8 - 2003 Toyota Avalon

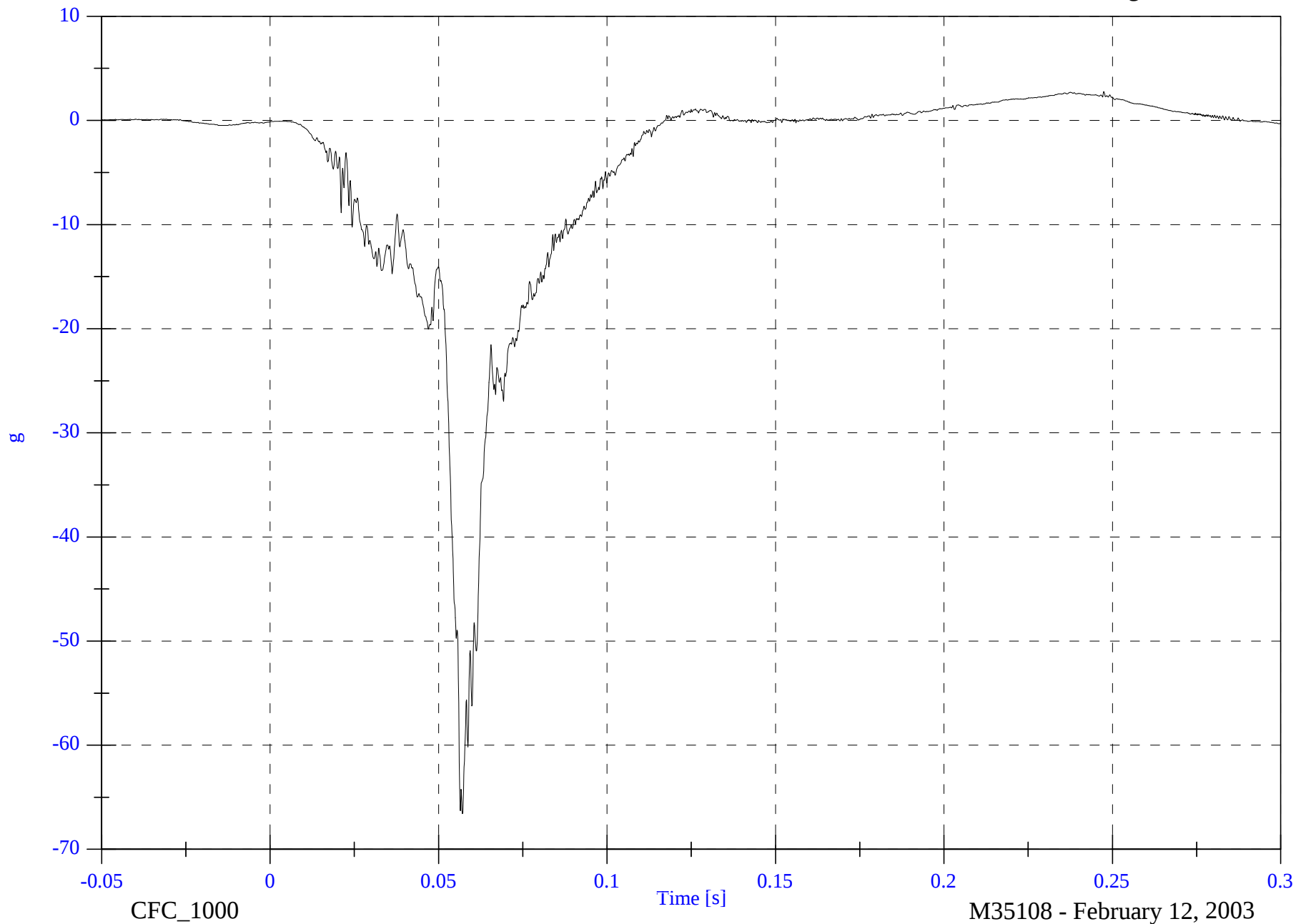
V1P1 Pelvic x

Max: 2.8 [g] at 0.247 [s]

Min: -66.6 [g] at 0.057 [s]

B-39

8642-NCAP-30

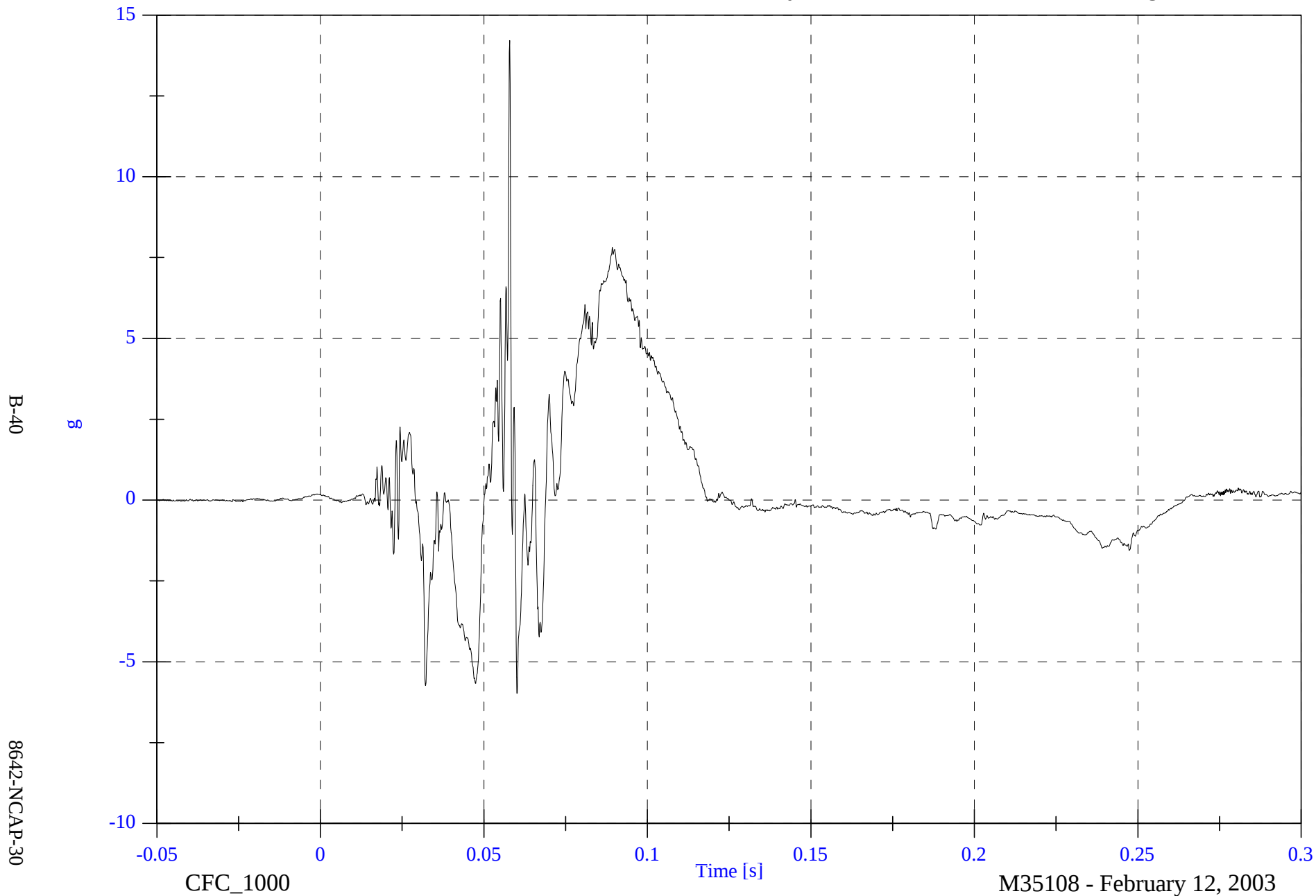


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Pelvic y

Max: 14.2 [g] at 0.058 [s]

Min: -6.0 [g] at 0.060 [s]



NCAP Test #8 - 2003 Toyota Avalon

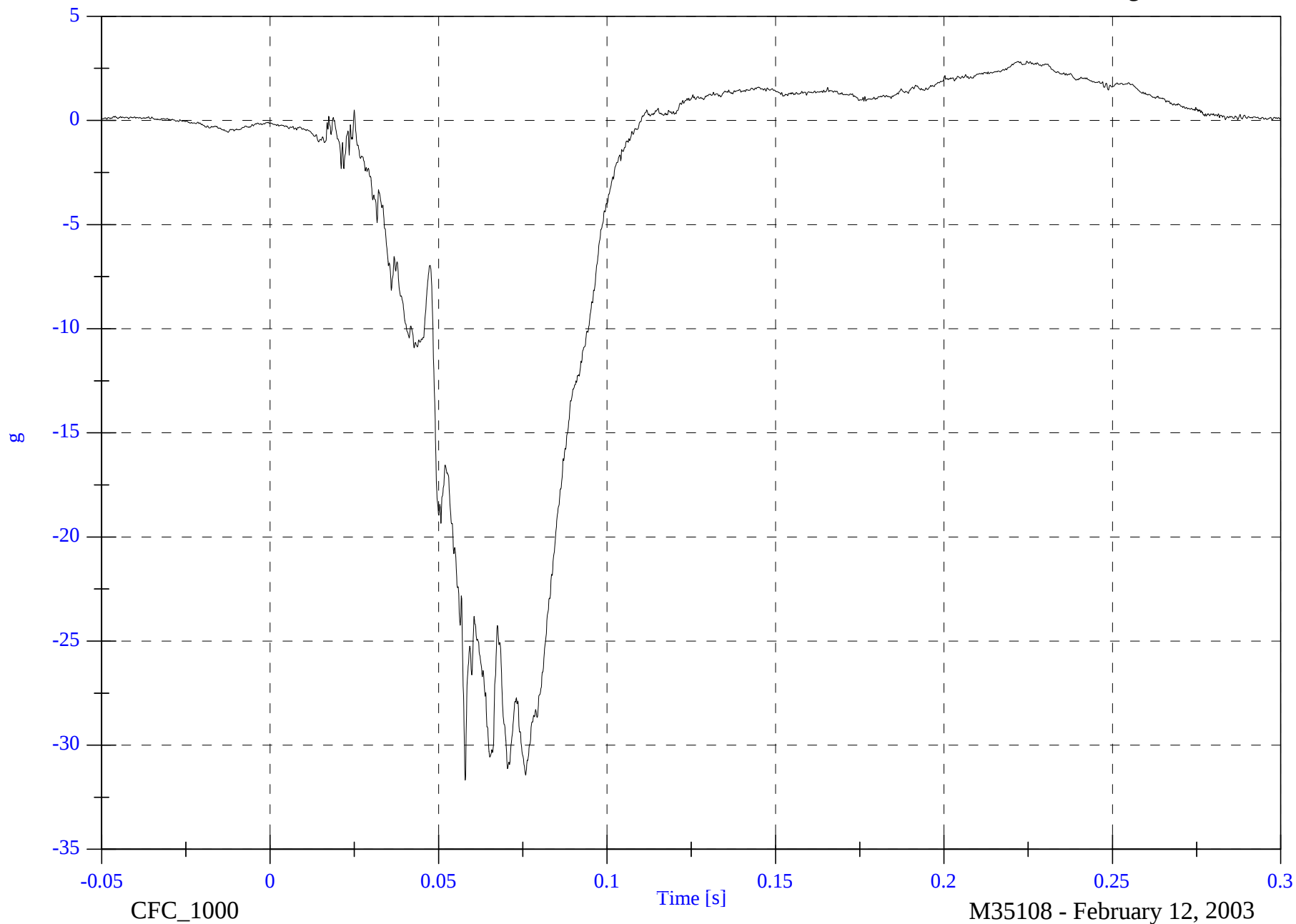
V1P1 Pelvic z

Max: 2.8 [g] at 0.225 [s]

Min: -31.7 [g] at 0.058 [s]

B-41

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

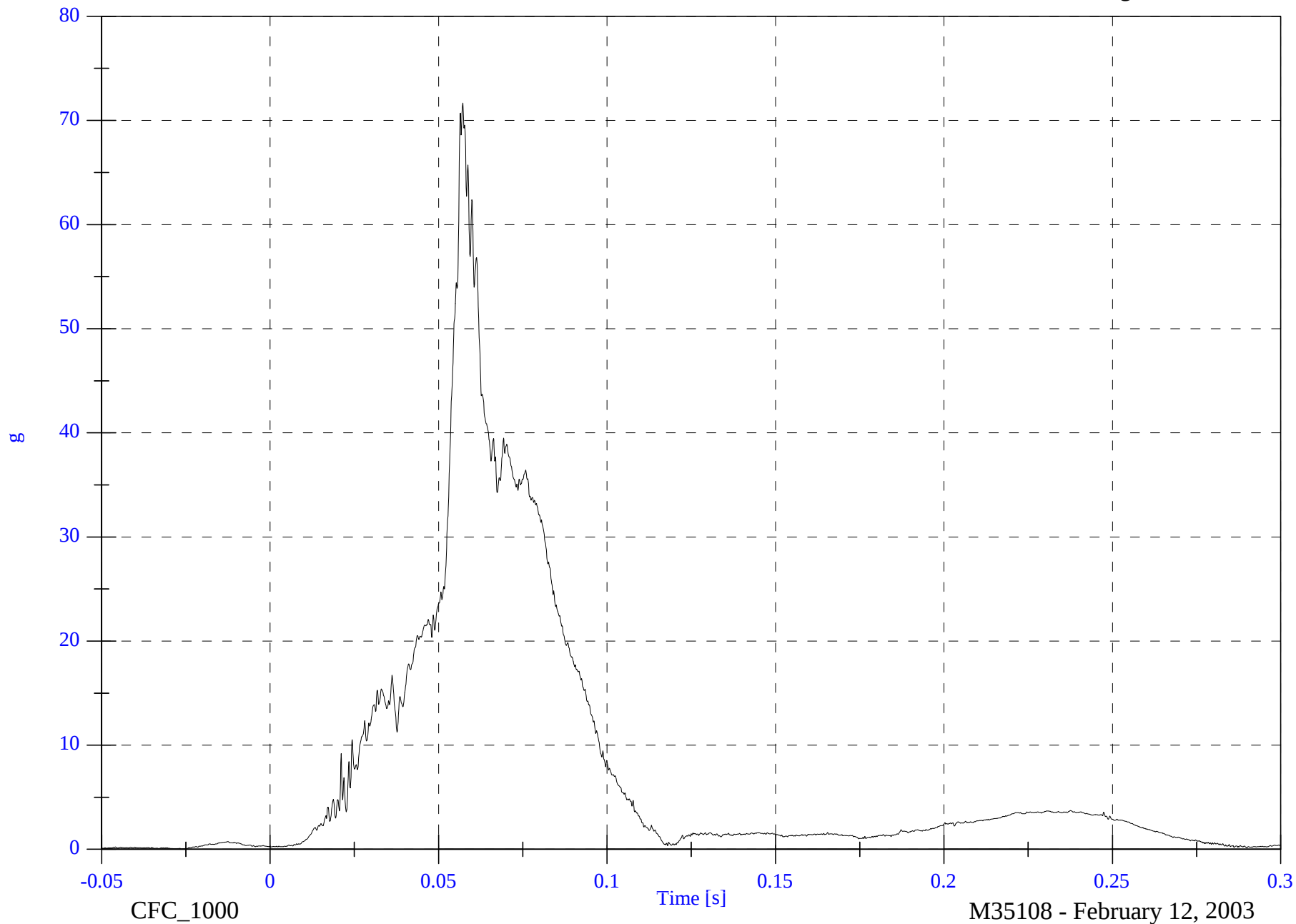
V1P1 Pelvic Resultant

Max: 71.7 [g] at 0.057 [s]

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

B-42

8642-NCAP-30

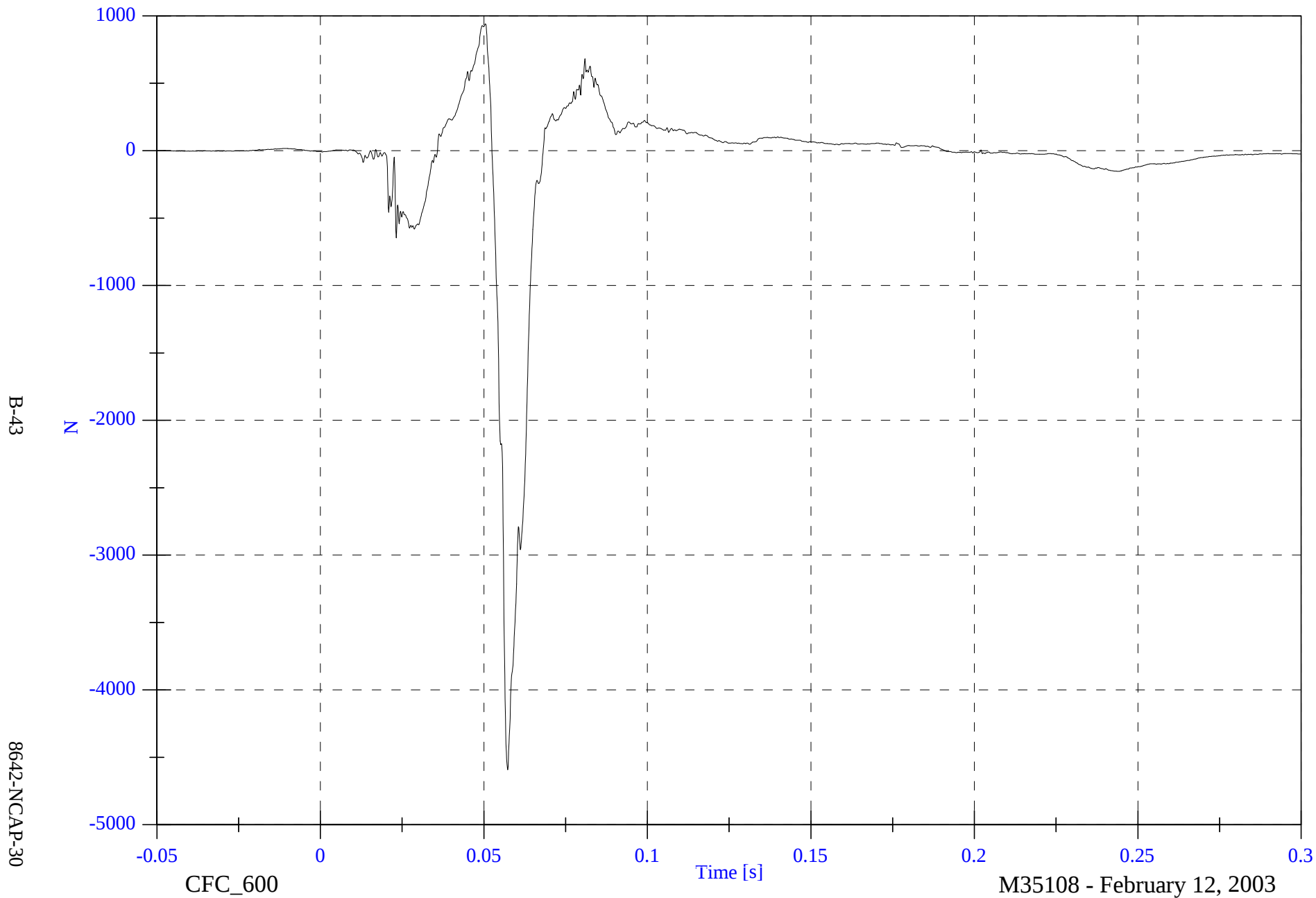


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Left Femur

Max: 939.9 [N] at 0.050 [s]

Min: -4592.2 [N] at 0.057 [s]

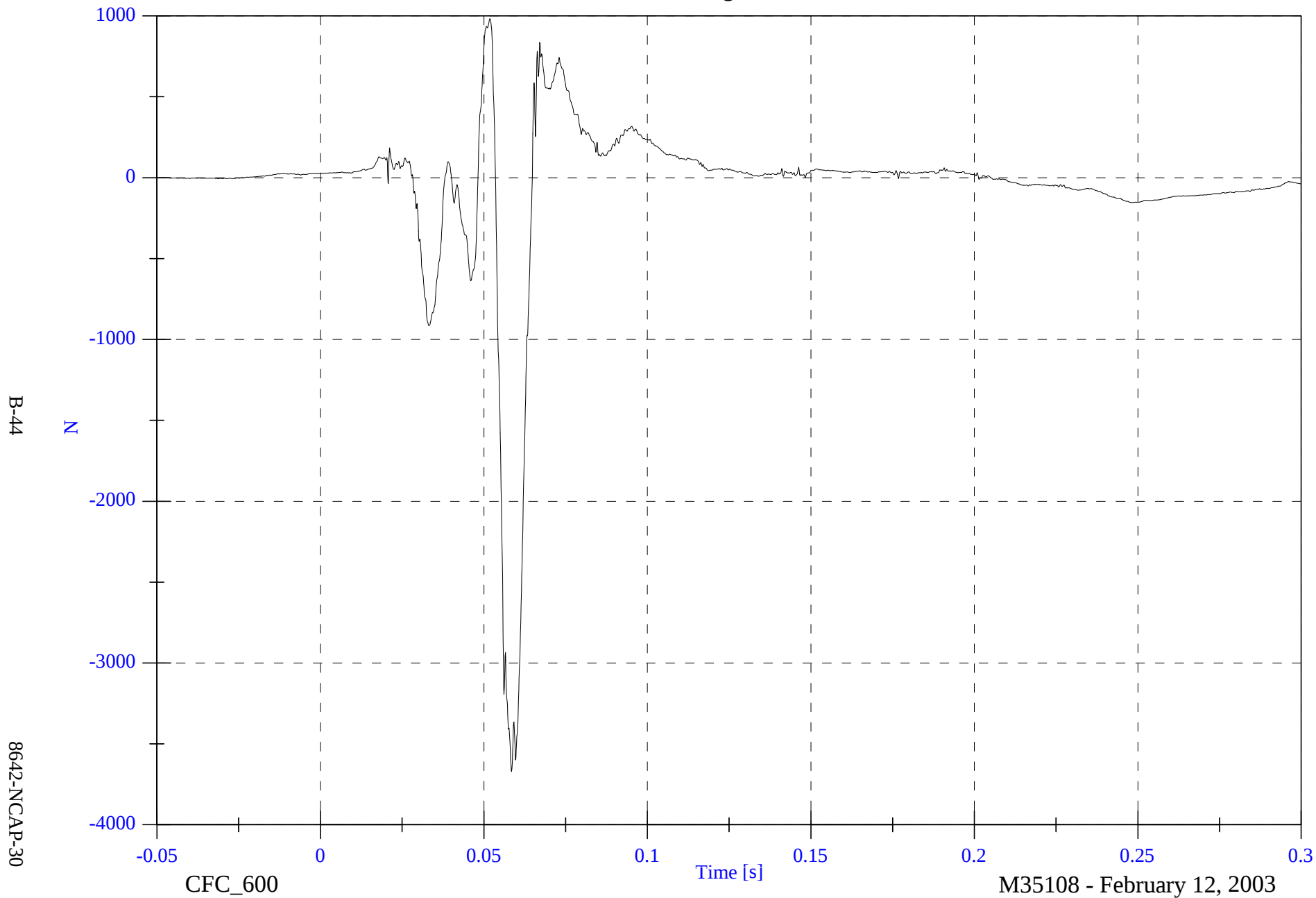


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Right Femur

Max: 982.8 [N] at 0.052 [s]

Min: -3670.8 [N] at 0.058 [s]

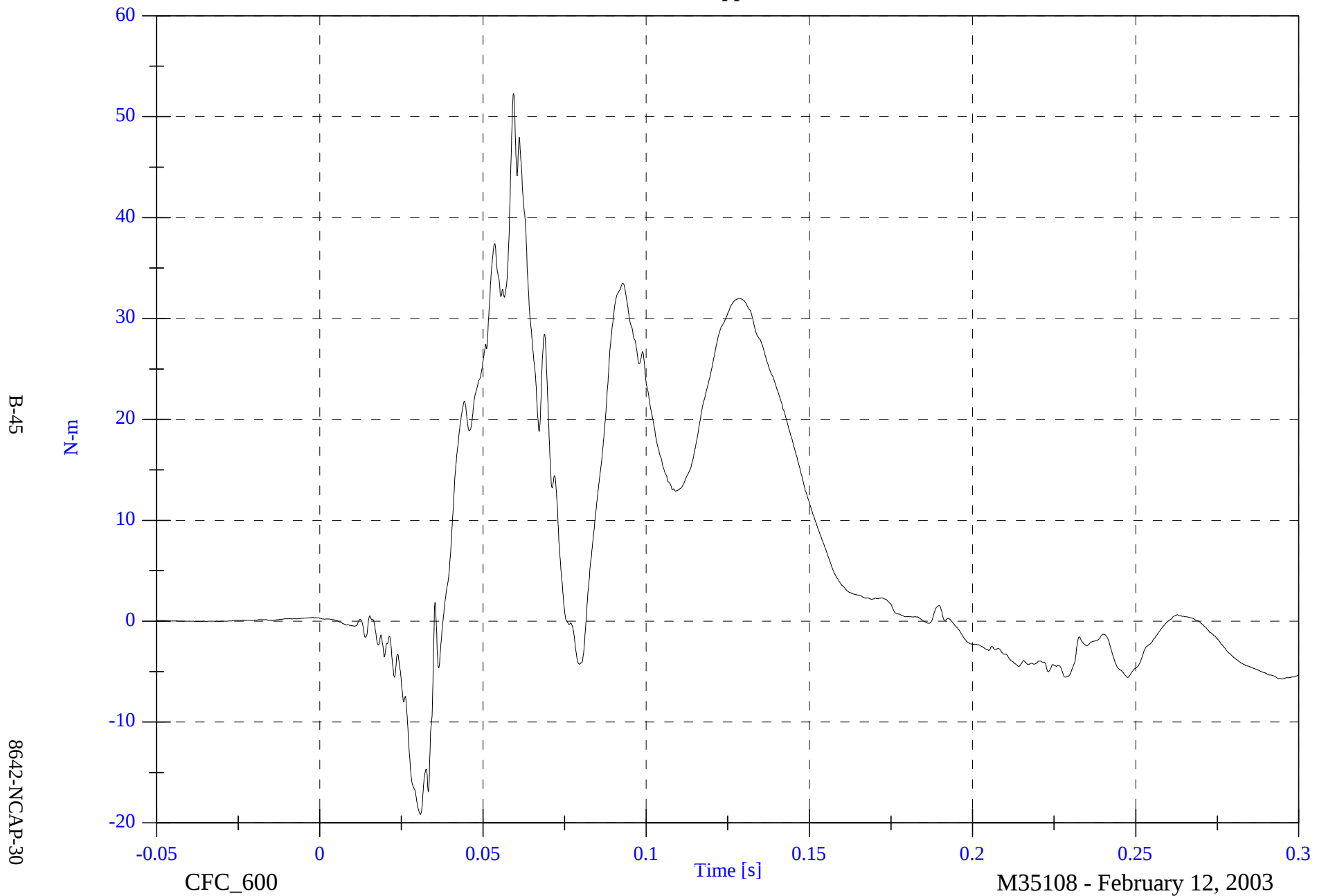


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Left Upper Tibia Mx

Max: 52.3 [N-m] at 0.059 [s]

Min: -19.2 [N-m] at 0.031 [s]

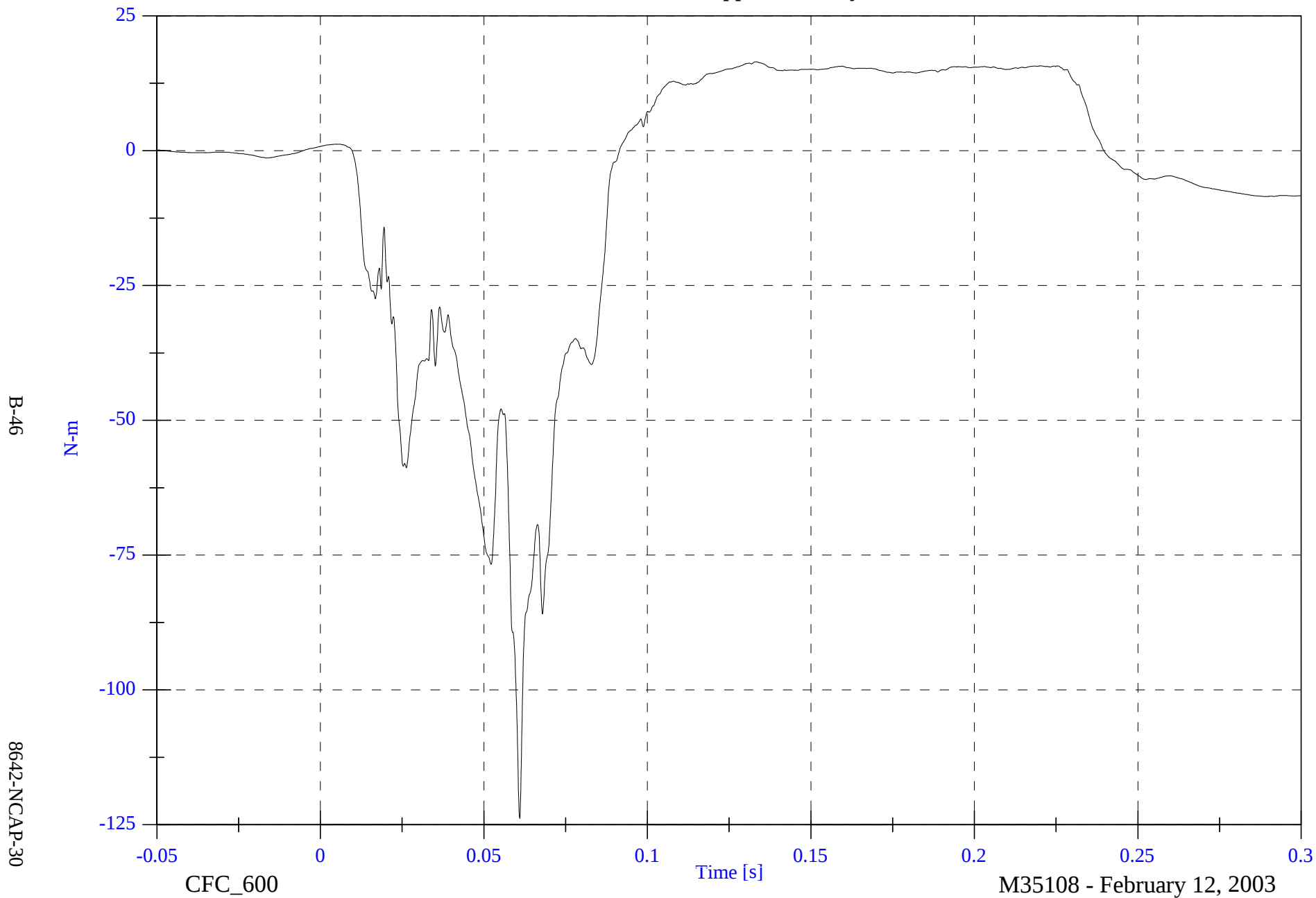


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Left Upper Tibia My

Max: 16.5 [N-m] at 0.133 [s]

Min: -123.8 [N-m] at 0.061 [s]

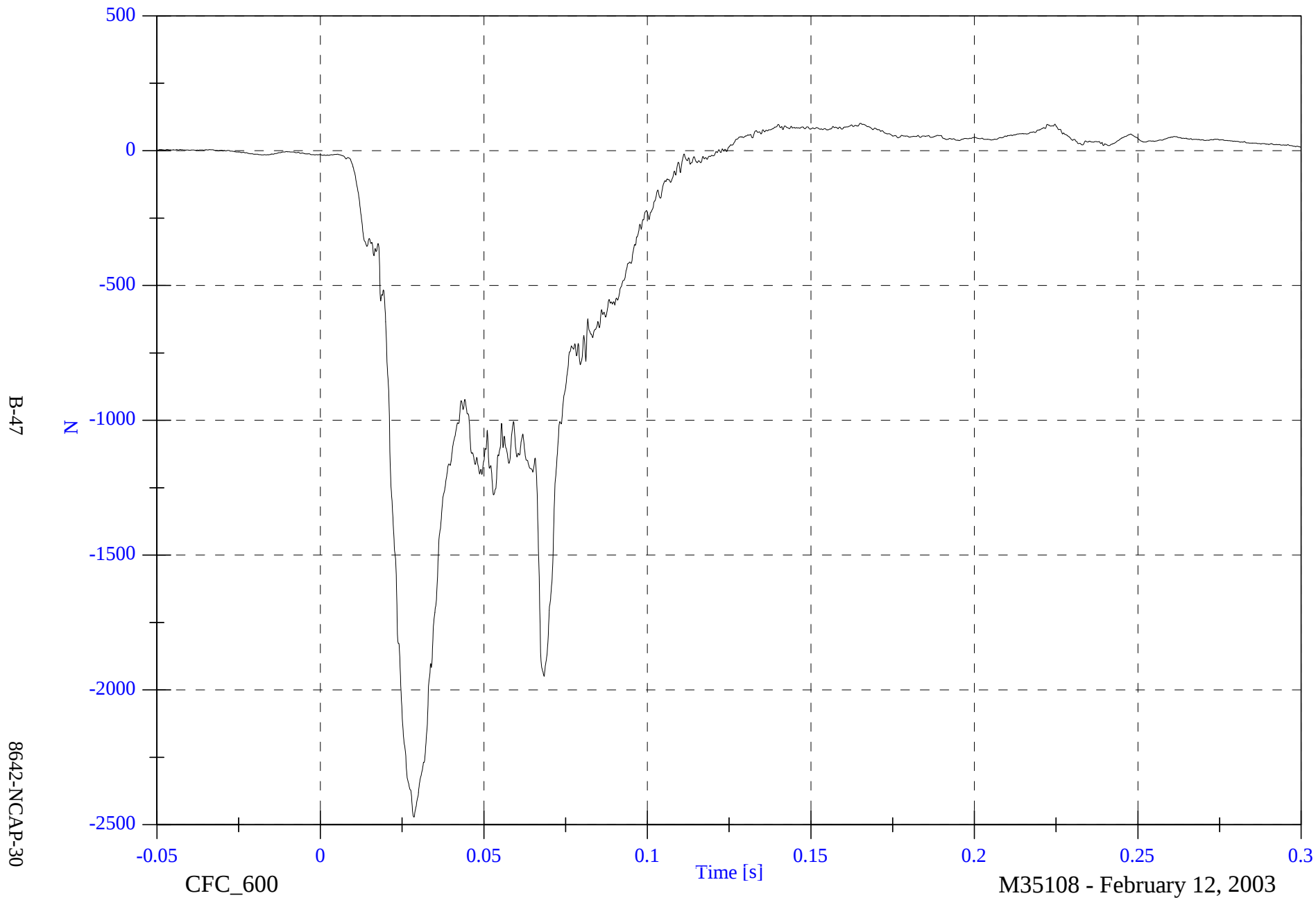


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Left Lower Tibia Fz

Max: 101.4 [N] at 0.165 [s]

Min: -2471.8 [N] at 0.029 [s]



NCAP Test #8 - 2003 Toyota Avalon

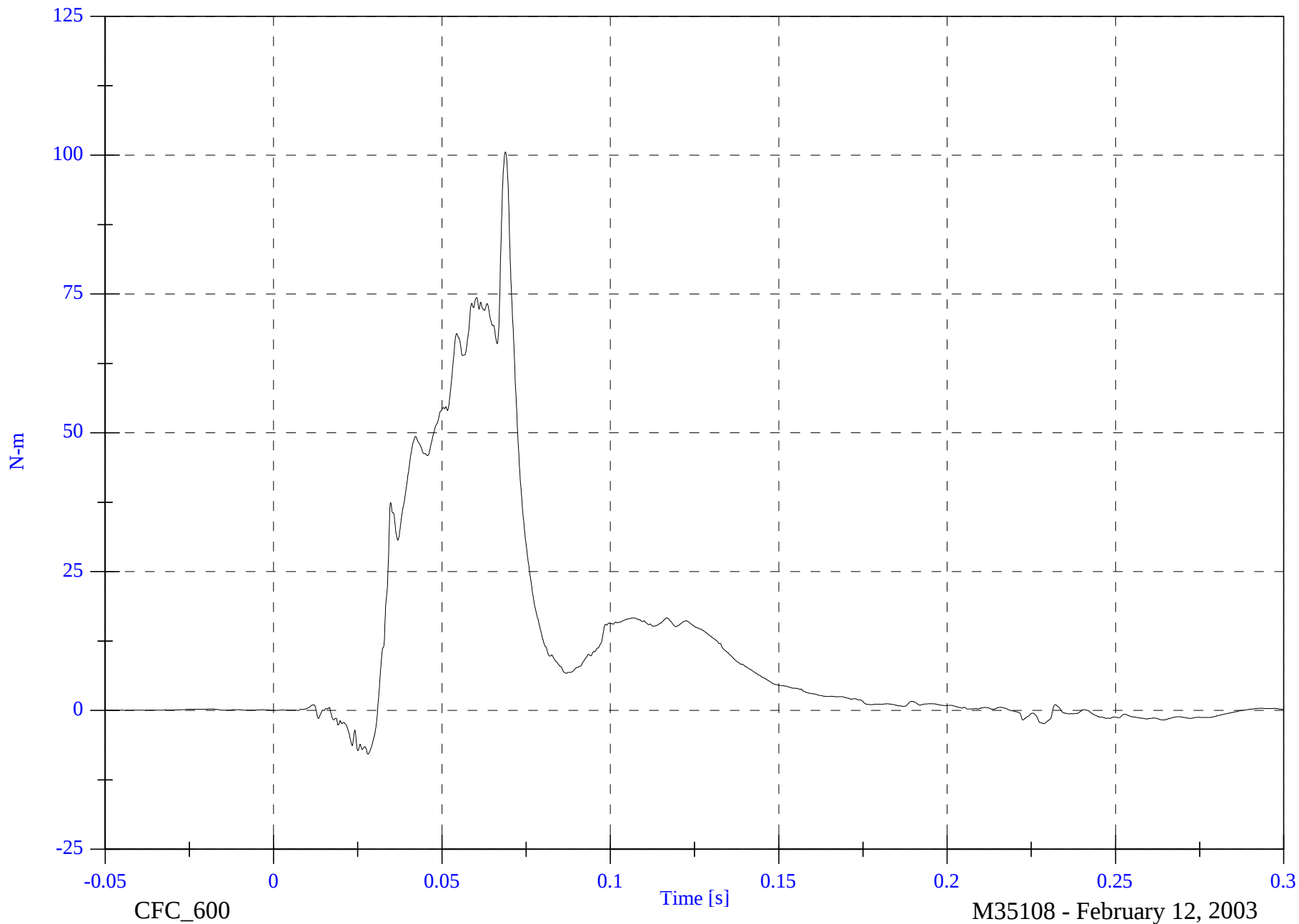
V1P1 Left Lower Tibia Mx

Max: 100.6 [N-m] at 0.069 [s]

Min: -7.9 [N-m] at 0.028 [s]

B-48

8642-NCAP-30



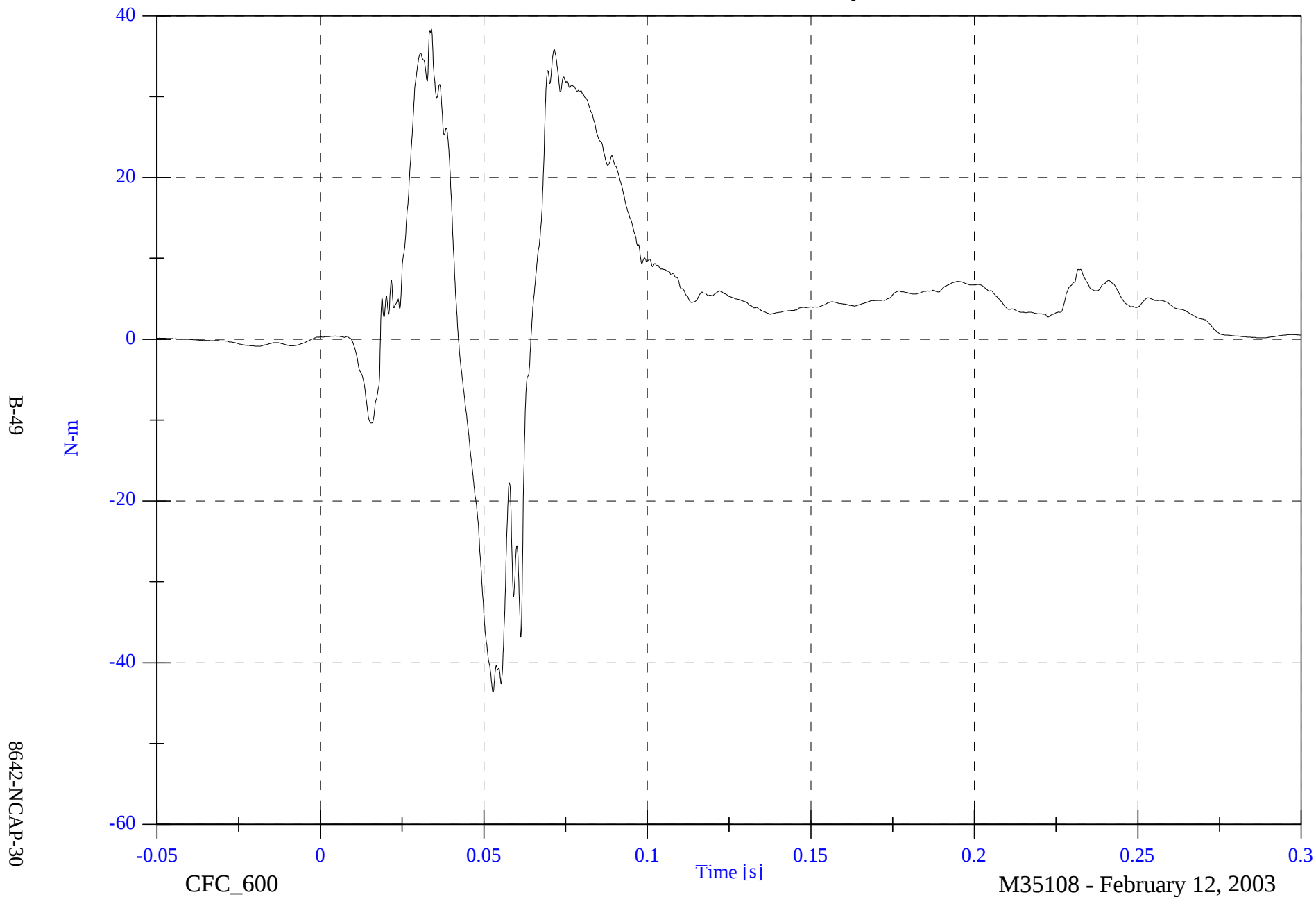
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1P1 Left Lower Tibia My

Max: 38.4 [N-m] at 0.034 [s]

Min: -43.7 [N-m] at 0.053 [s]

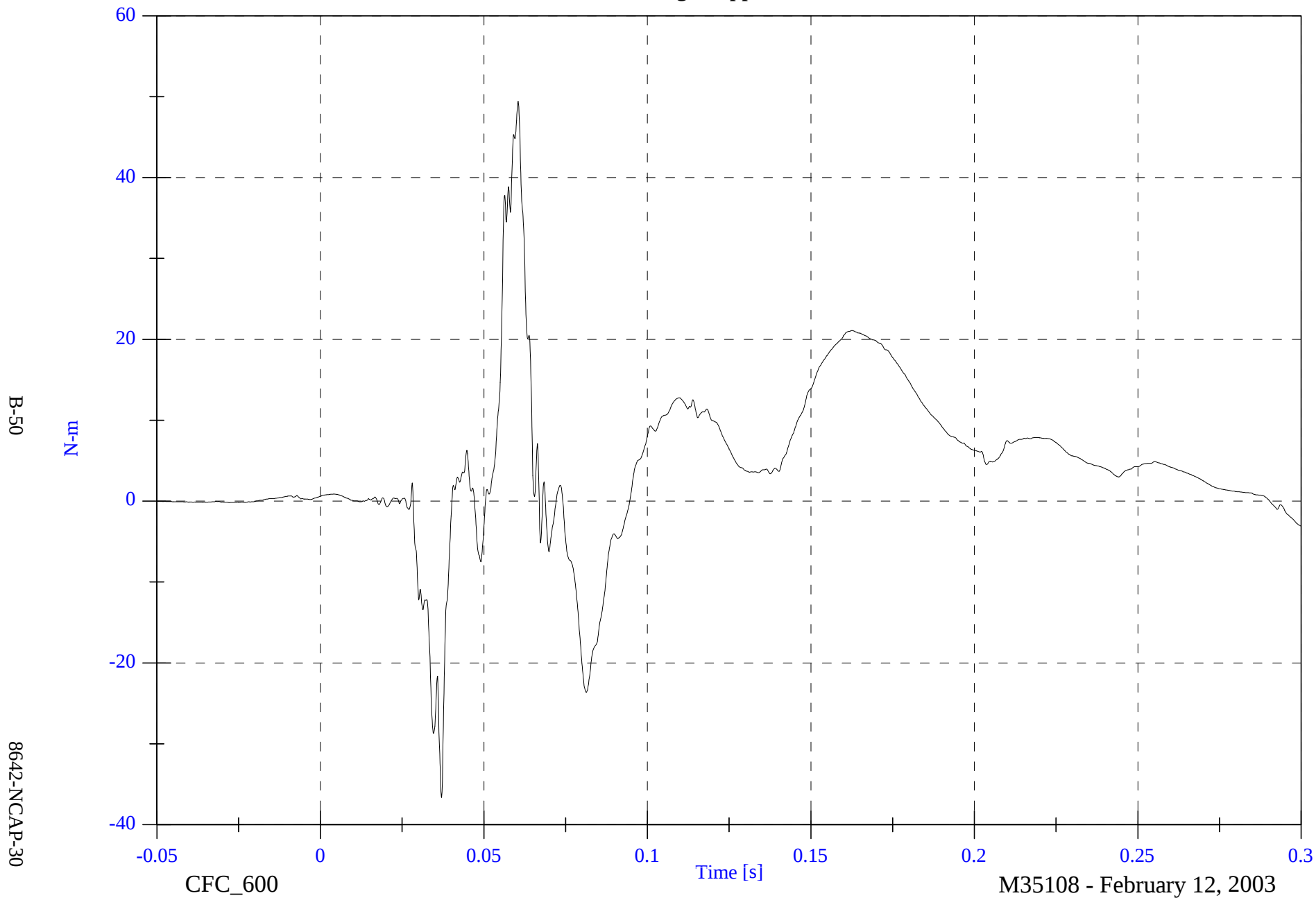


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Right Upper Tibia Mx

Max: 49.4 [N-m] at 0.060 [s]

Min: -36.6 [N-m] at 0.037 [s]

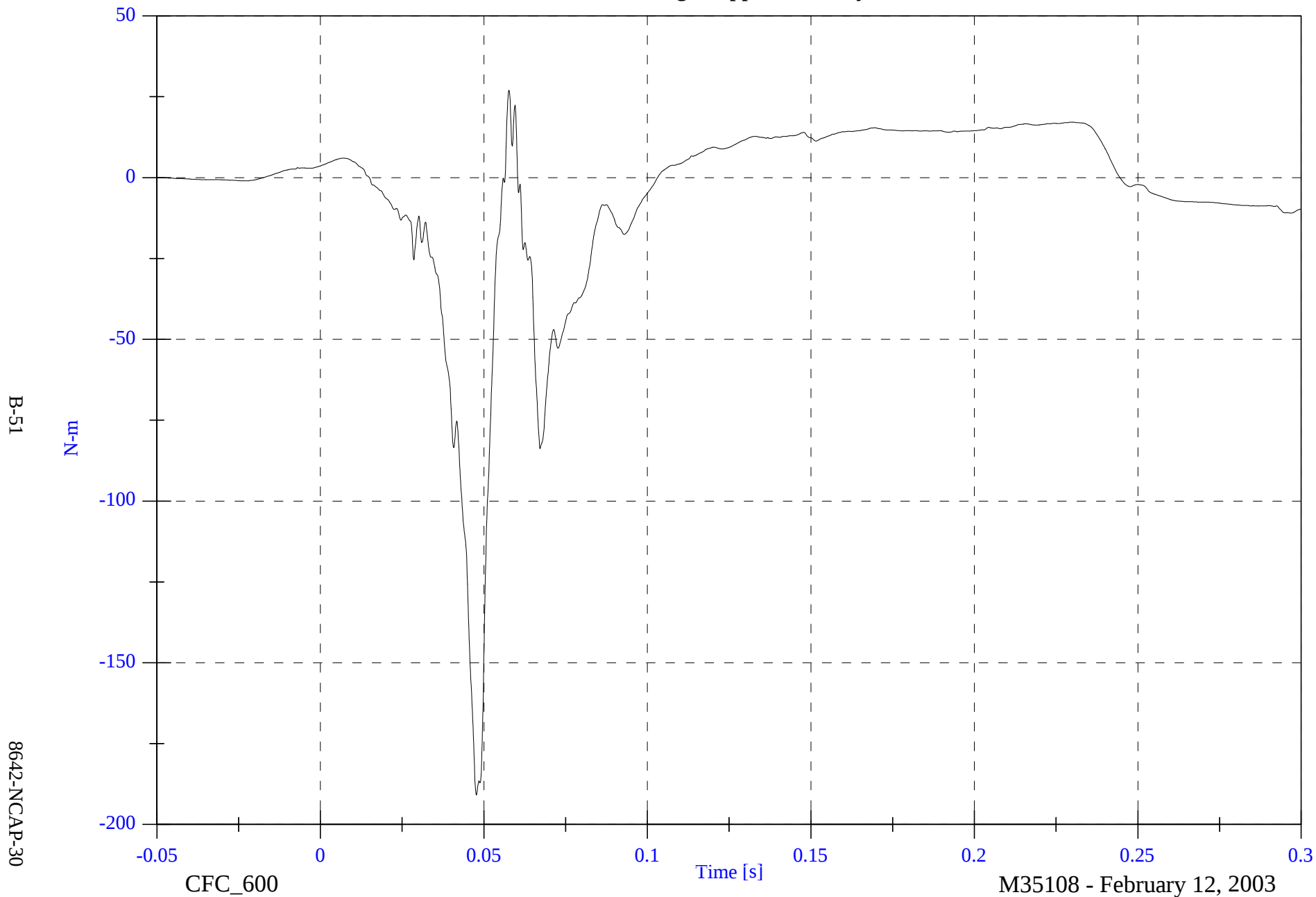


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Right Upper Tibia My

Max: 27.0 [N-m] at 0.058 [s]

Min: -190.9 [N-m] at 0.048 [s]

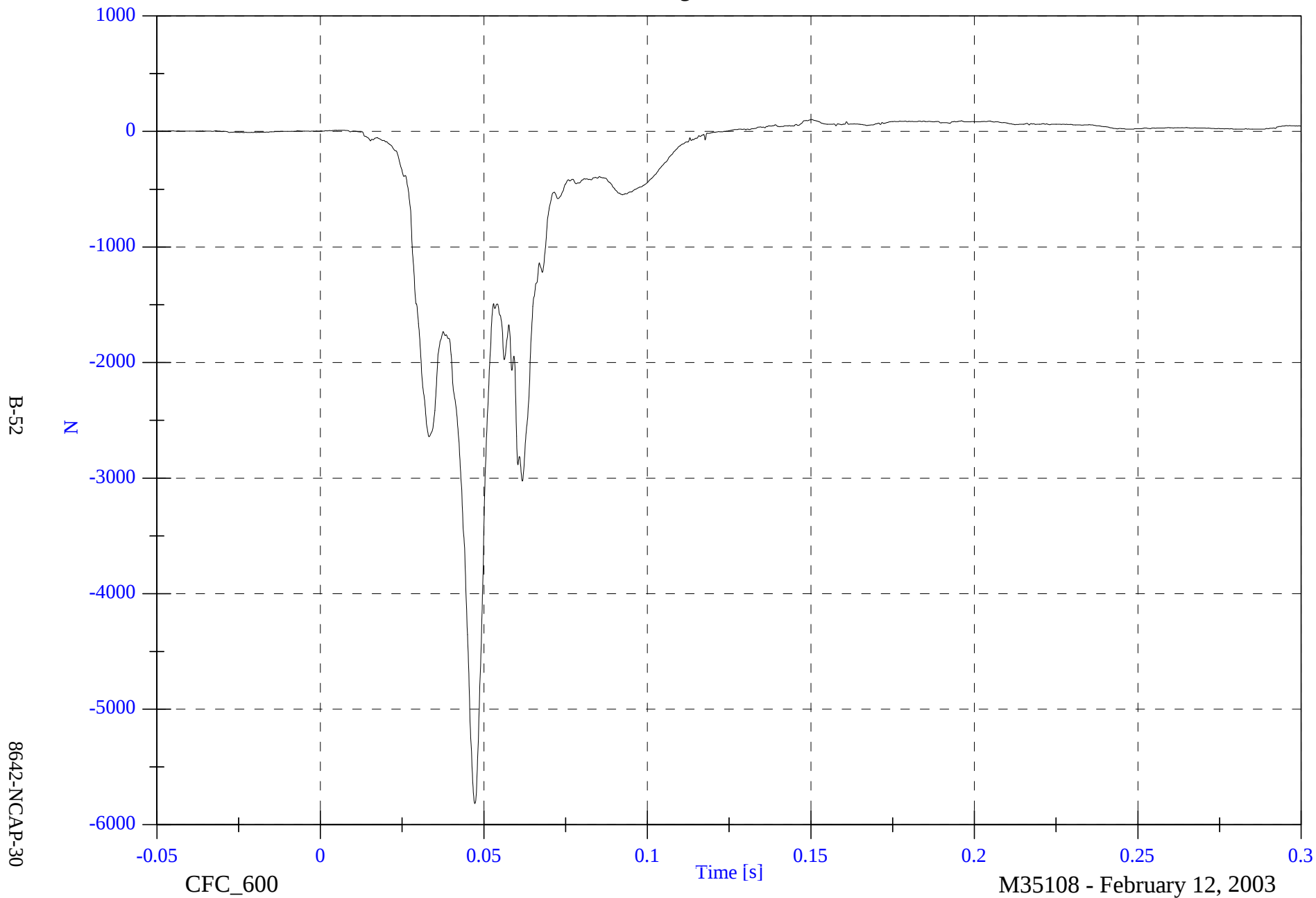


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Right Lower Tibia Fz

Max: 102.9 [N] at 0.150 [s]

Min: -5817.2 [N] at 0.047 [s]



NCAP Test #8 - 2003 Toyota Avalon

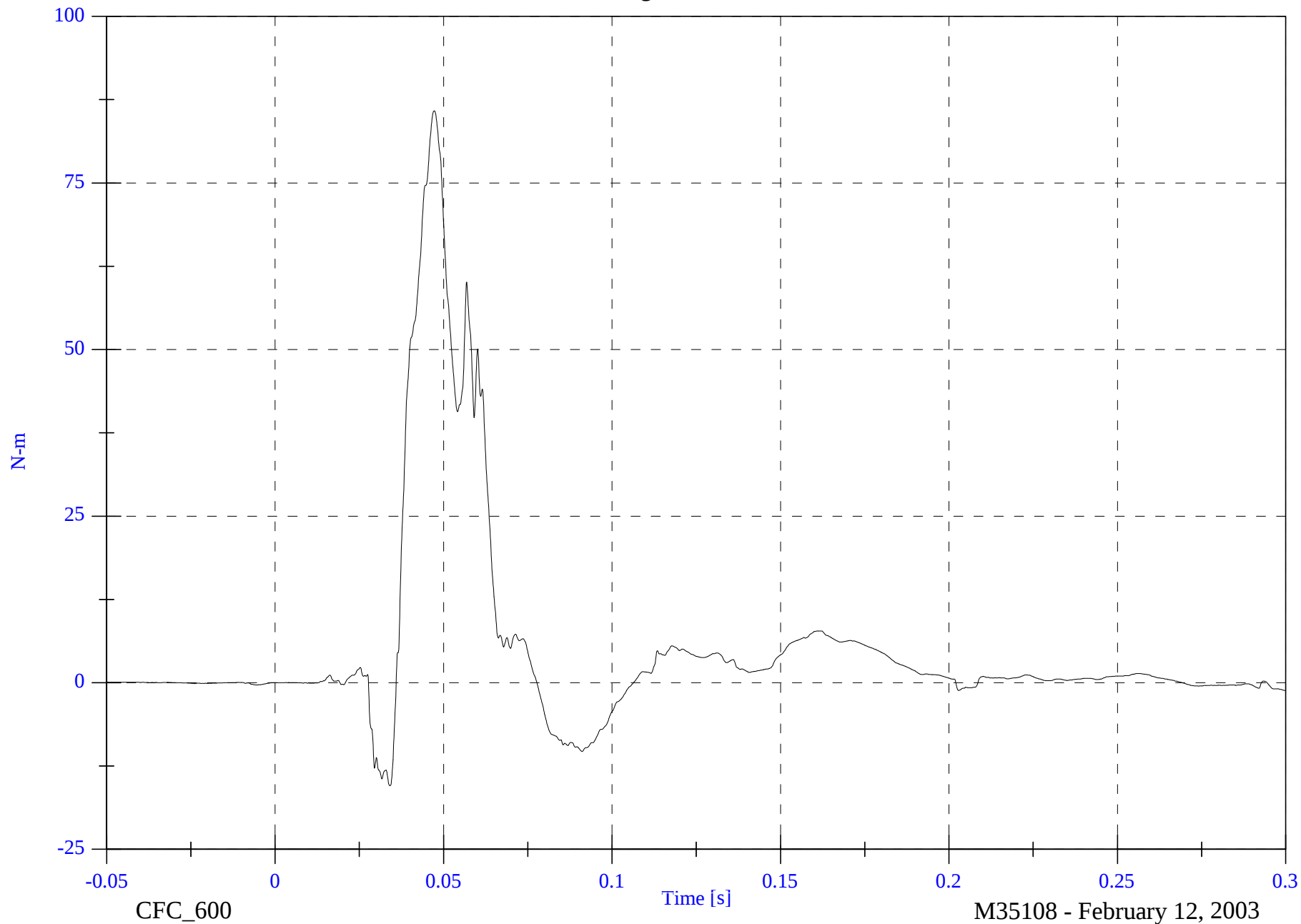
V1P1 Right Lower Tibia Mx

Max: 85.8 [N-m] at 0.047 [s]

Min: -15.5 [N-m] at 0.034 [s]

B-53

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

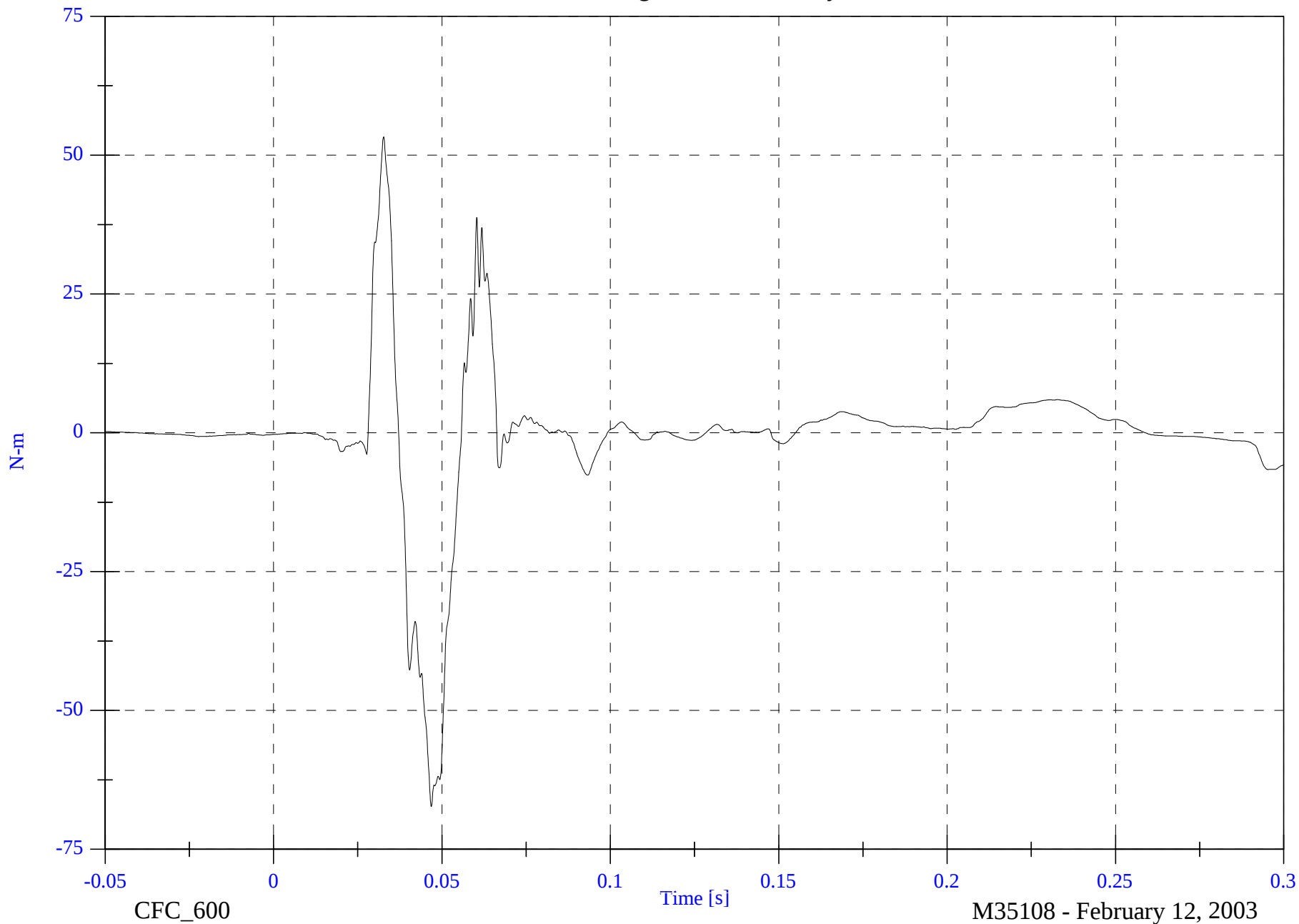
V1P1 Right Lower Tibia My

Max: 53.3 [N-m] at 0.033 [s]

Min: -67.3 [N-m] at 0.047 [s]

B-54

8642-NCAP-30

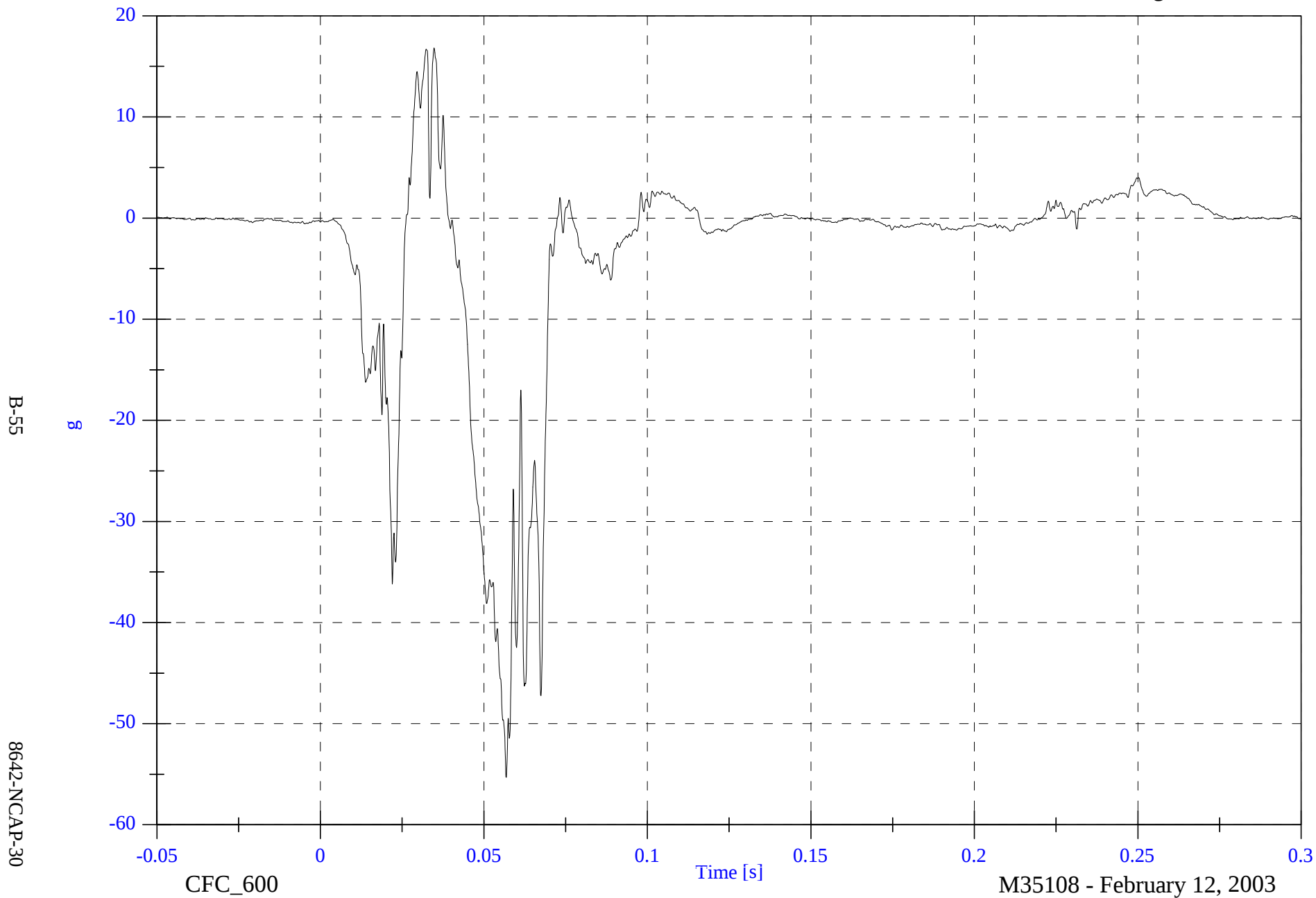


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Left Foot Aft Ax

Max: 16.9 [g] at 0.035 [s]

Min: -55.3 [g] at 0.057 [s]

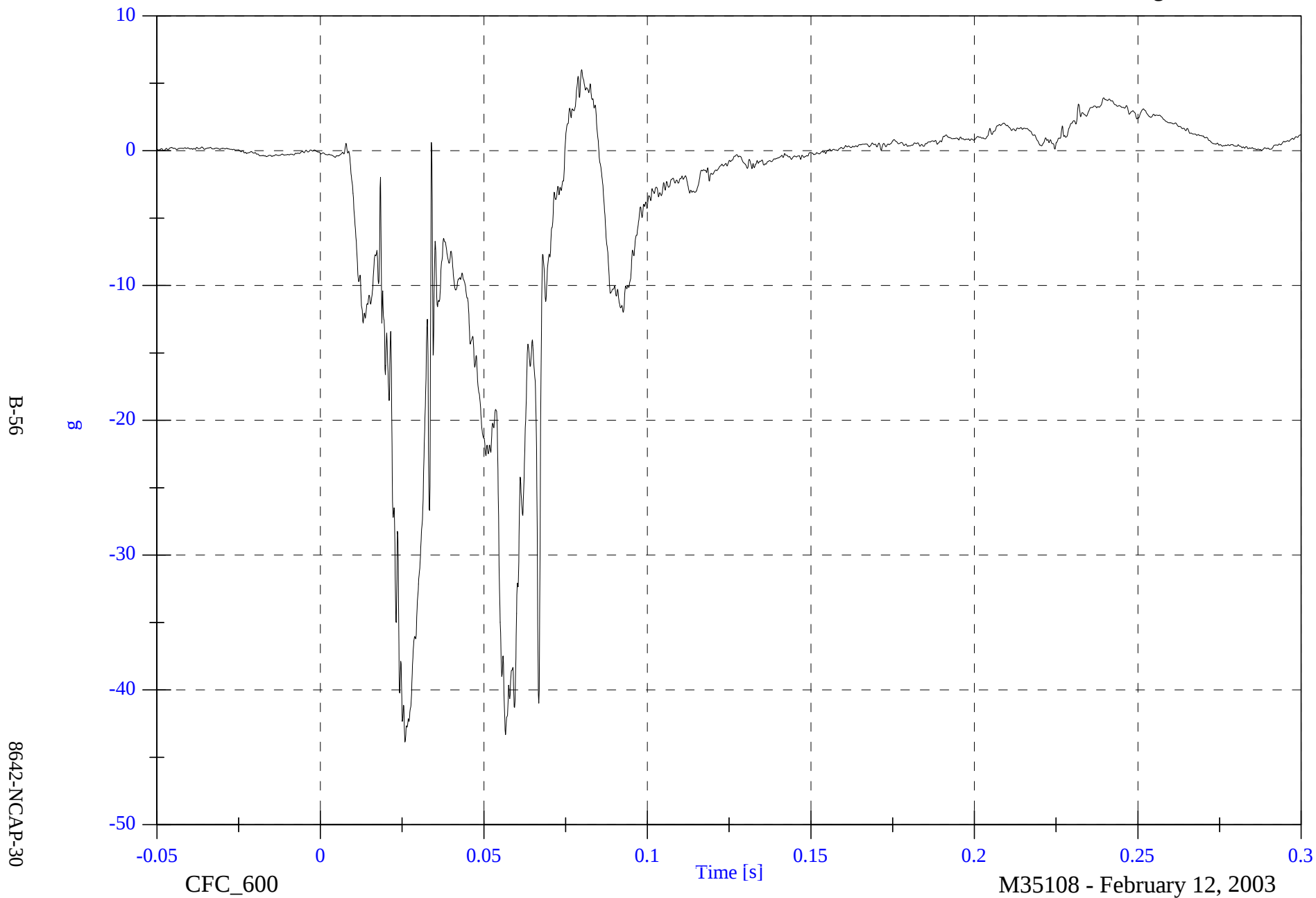


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Left Foot Aft Az

Max: 6.0 [g] at 0.080 [s]

Min: -43.9 [g] at 0.026 [s]

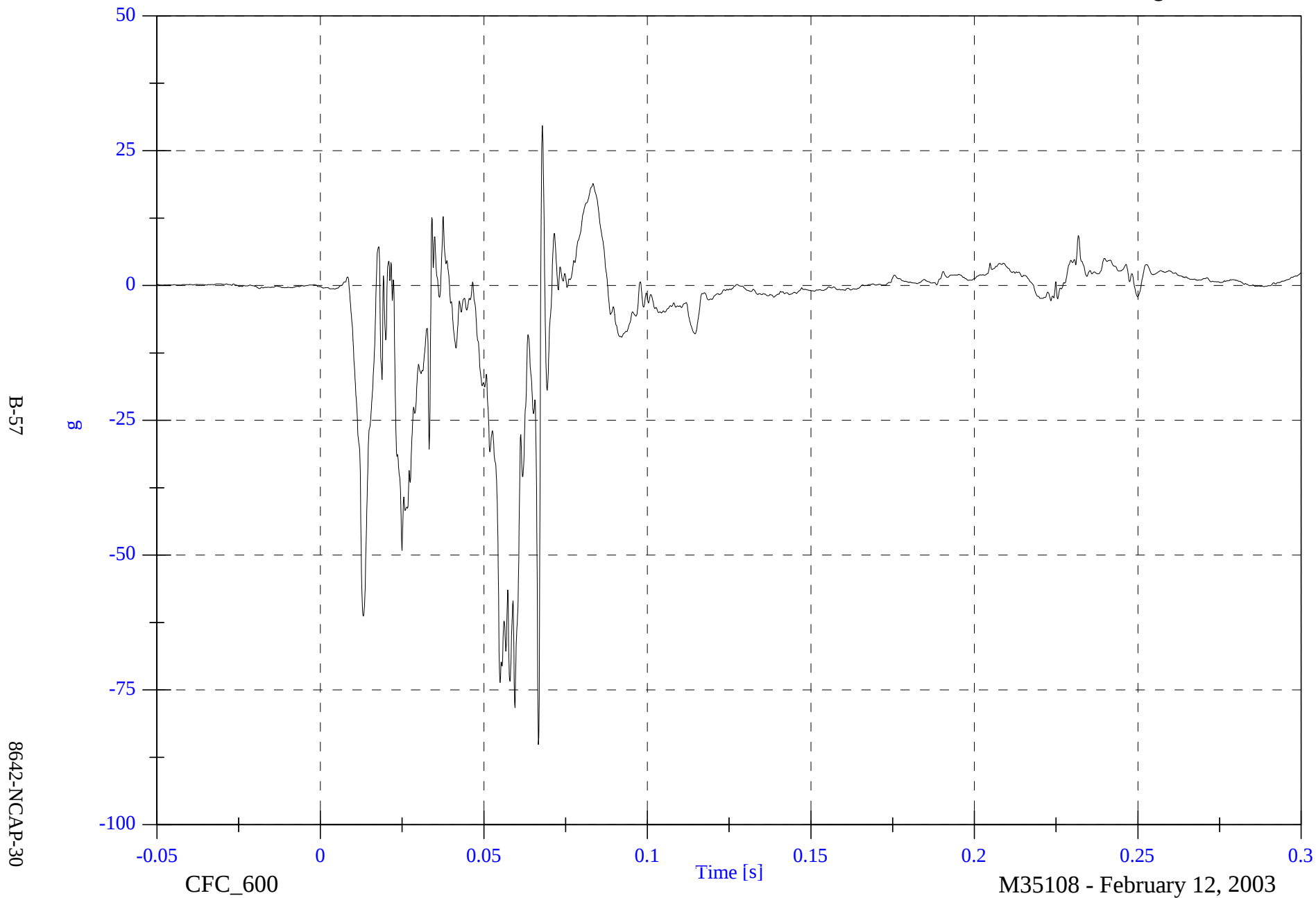


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Left Foot Fore Az

Max: 29.7 [g] at 0.068 [s]

Min: -85.1 [g] at 0.067 [s]

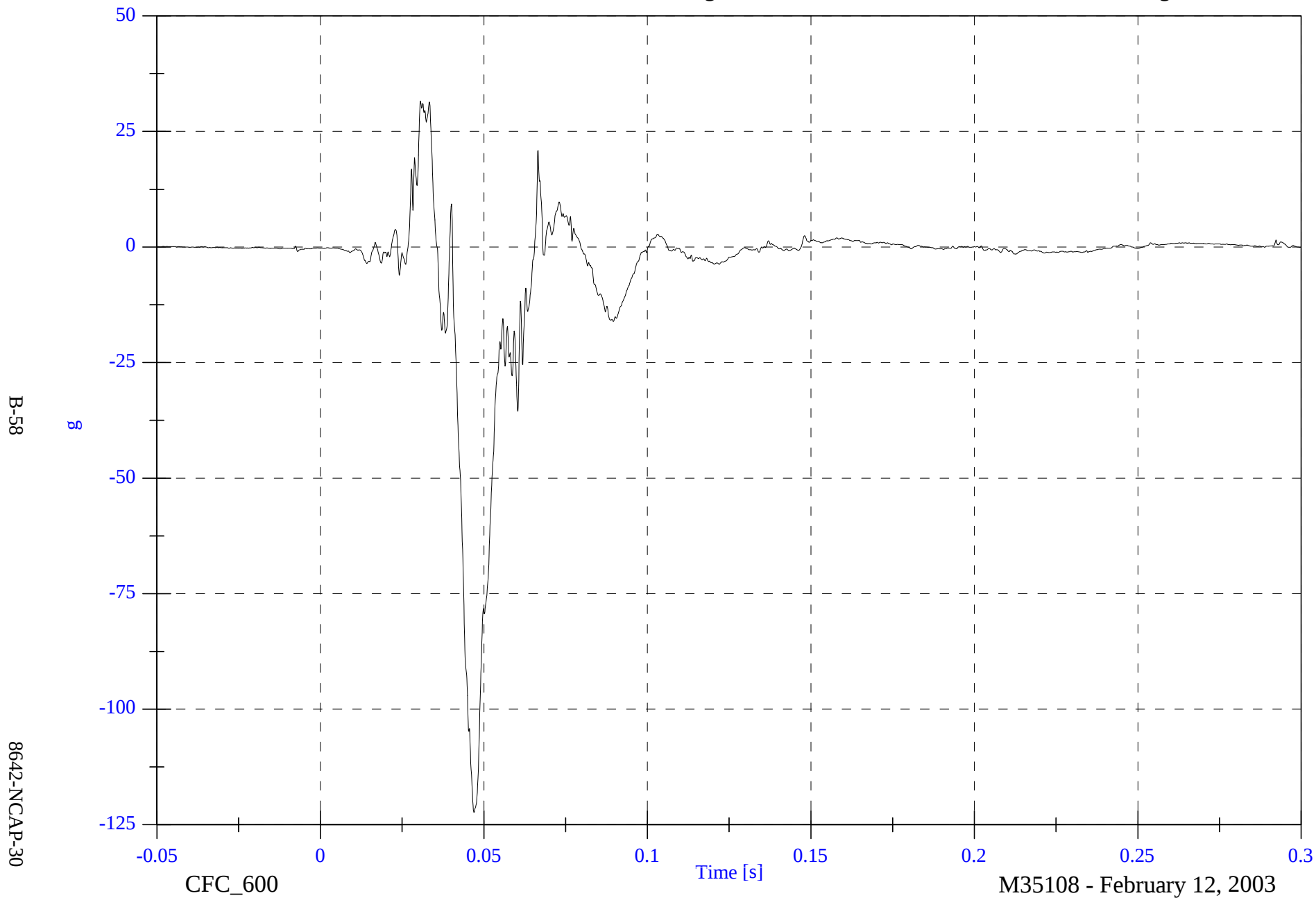


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Right Foot Aft x

Max: 31.5 [g] at 0.031 [s]

Min: -122.3 [g] at 0.047 [s]

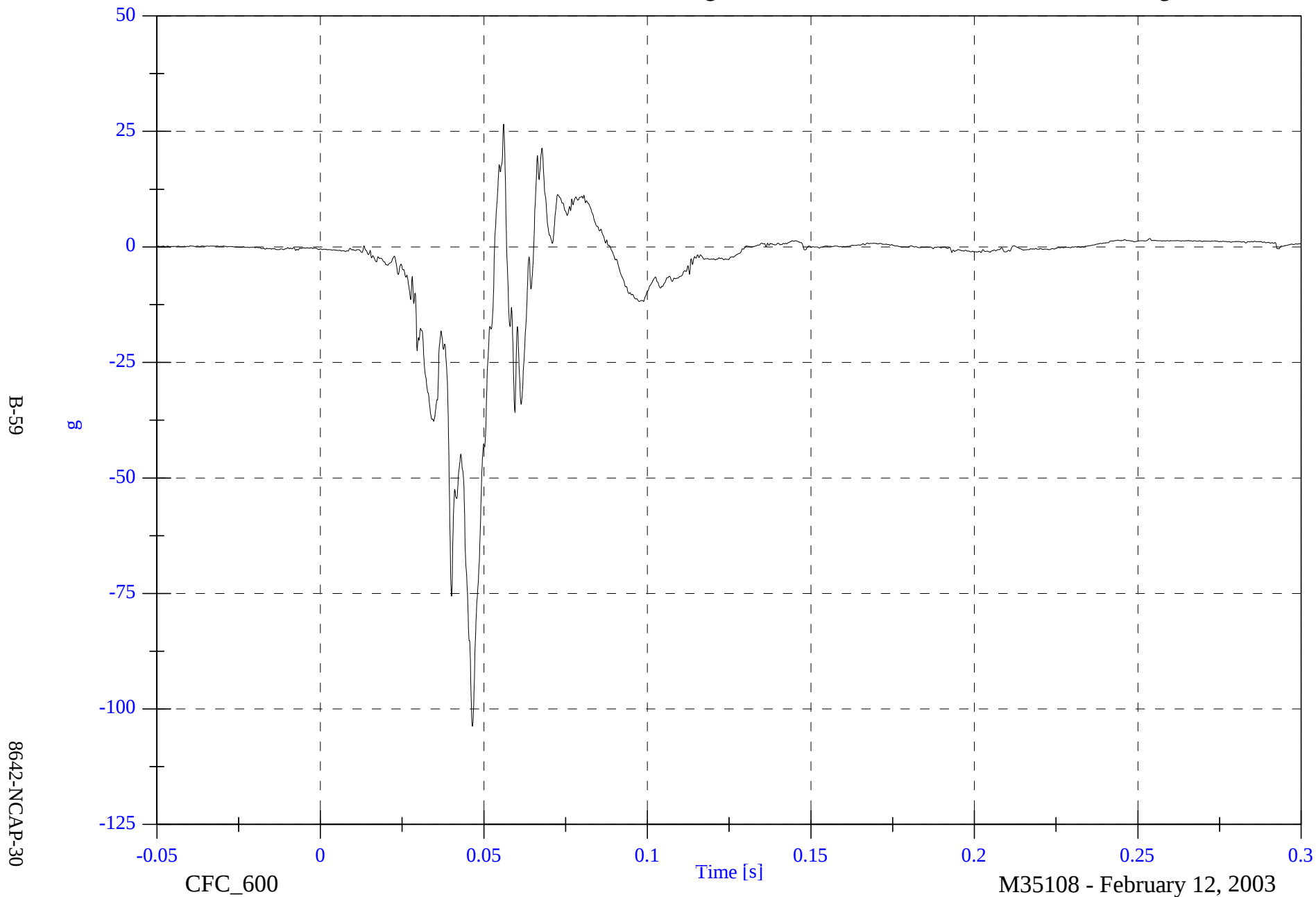


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Right Foot Aft z

Max: 26.6 [g] at 0.056 [s]

Min: -103.7 [g] at 0.046 [s]

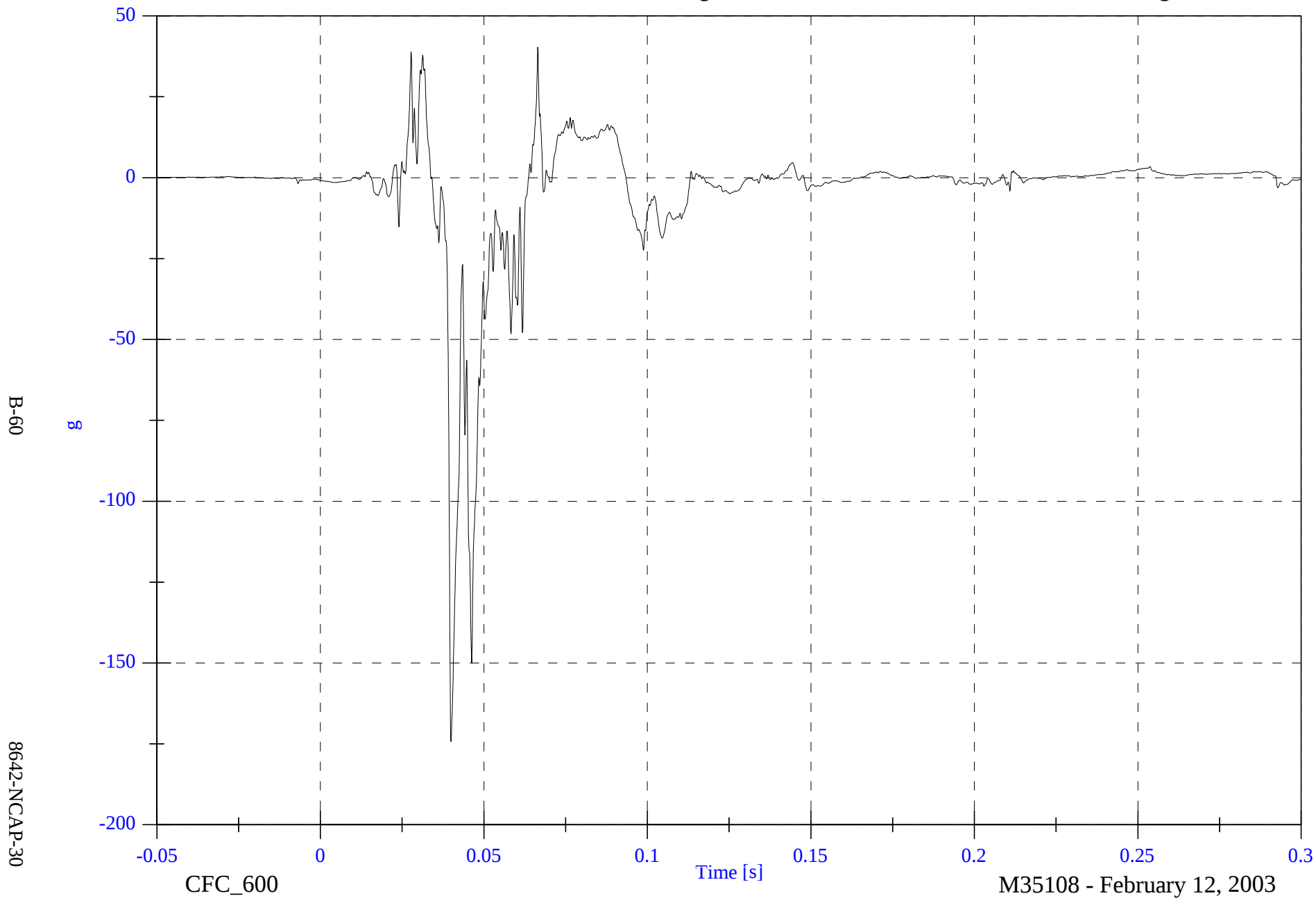


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Right Foot Fore z

Max: 40.3 [g] at 0.067 [s]

Min: -174.3 [g] at 0.040 [s]

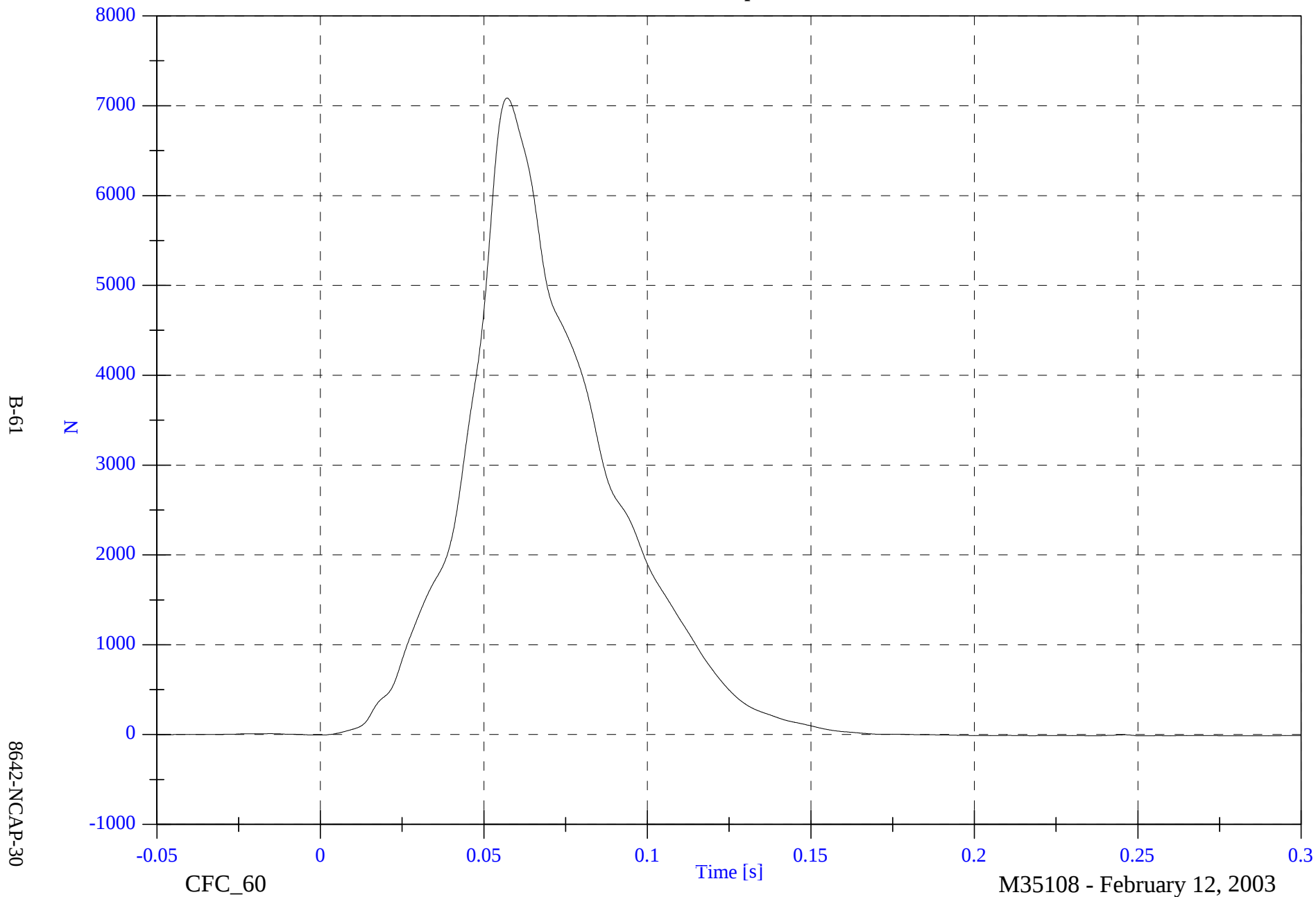


NCAP Test #8 - 2003 Toyota Avalon

V1P1 Lap Belt

Max: 7084.7 [N] at 0.057 [s]

Min: -13.8 [N] at 0.251 [s]

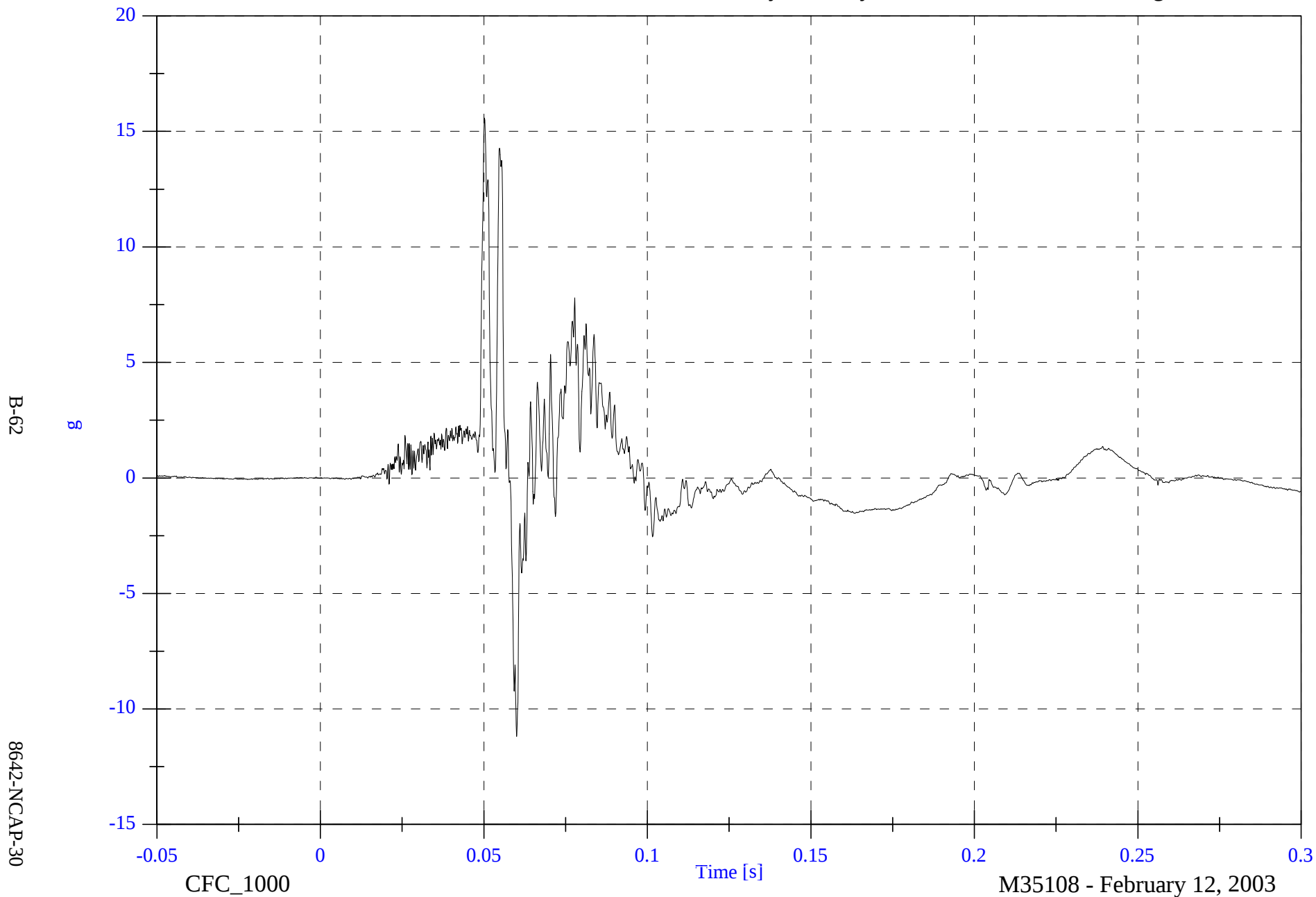


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head 9 Array X Arm y

Max: 15.6 [g] at 0.050 [s]

Min: -11.2 [g] at 0.060 [s]

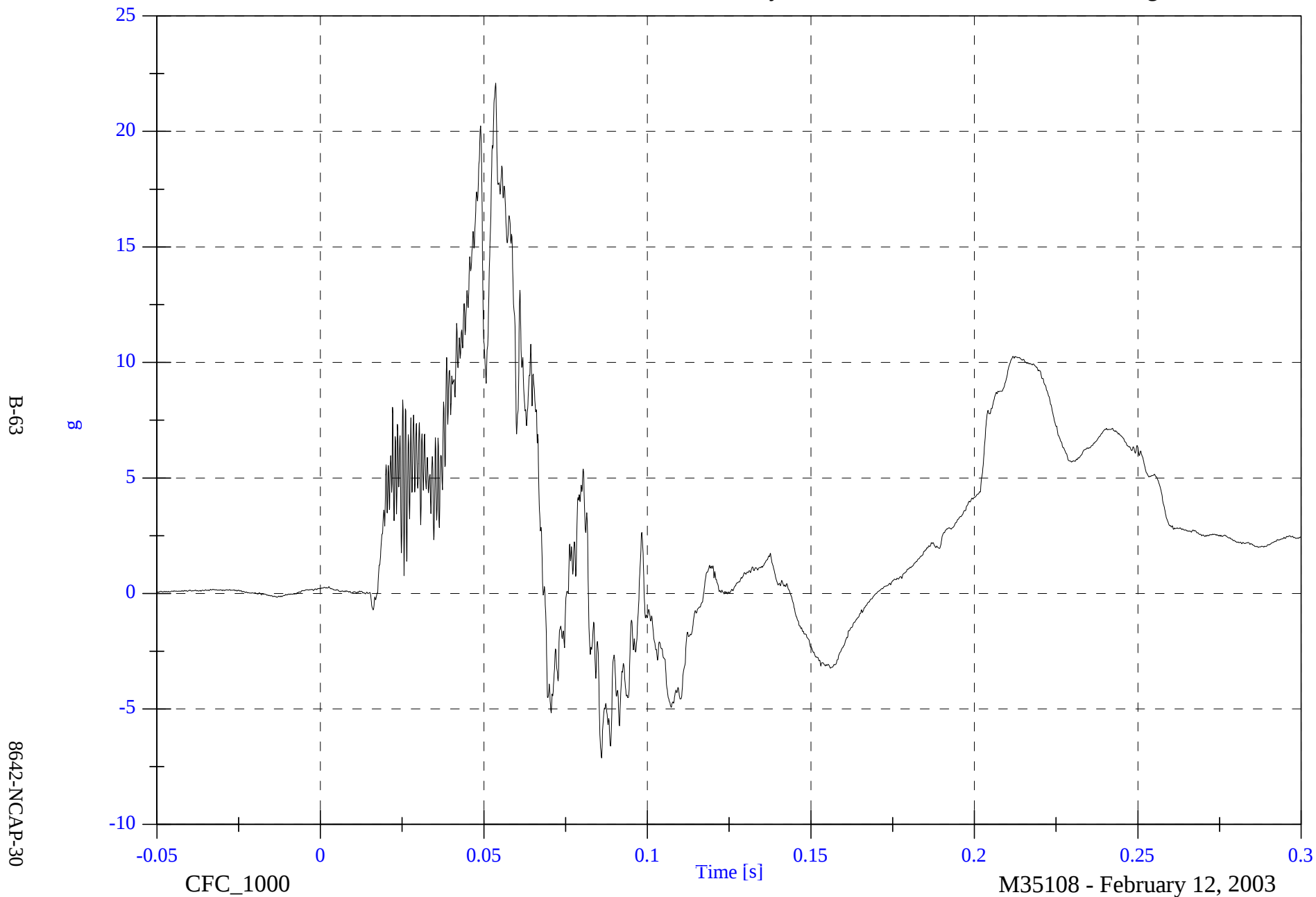


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head 9 Array X Arm z

Max: 22.1 [g] at 0.054 [s]

Min: -7.1 [g] at 0.086 [s]

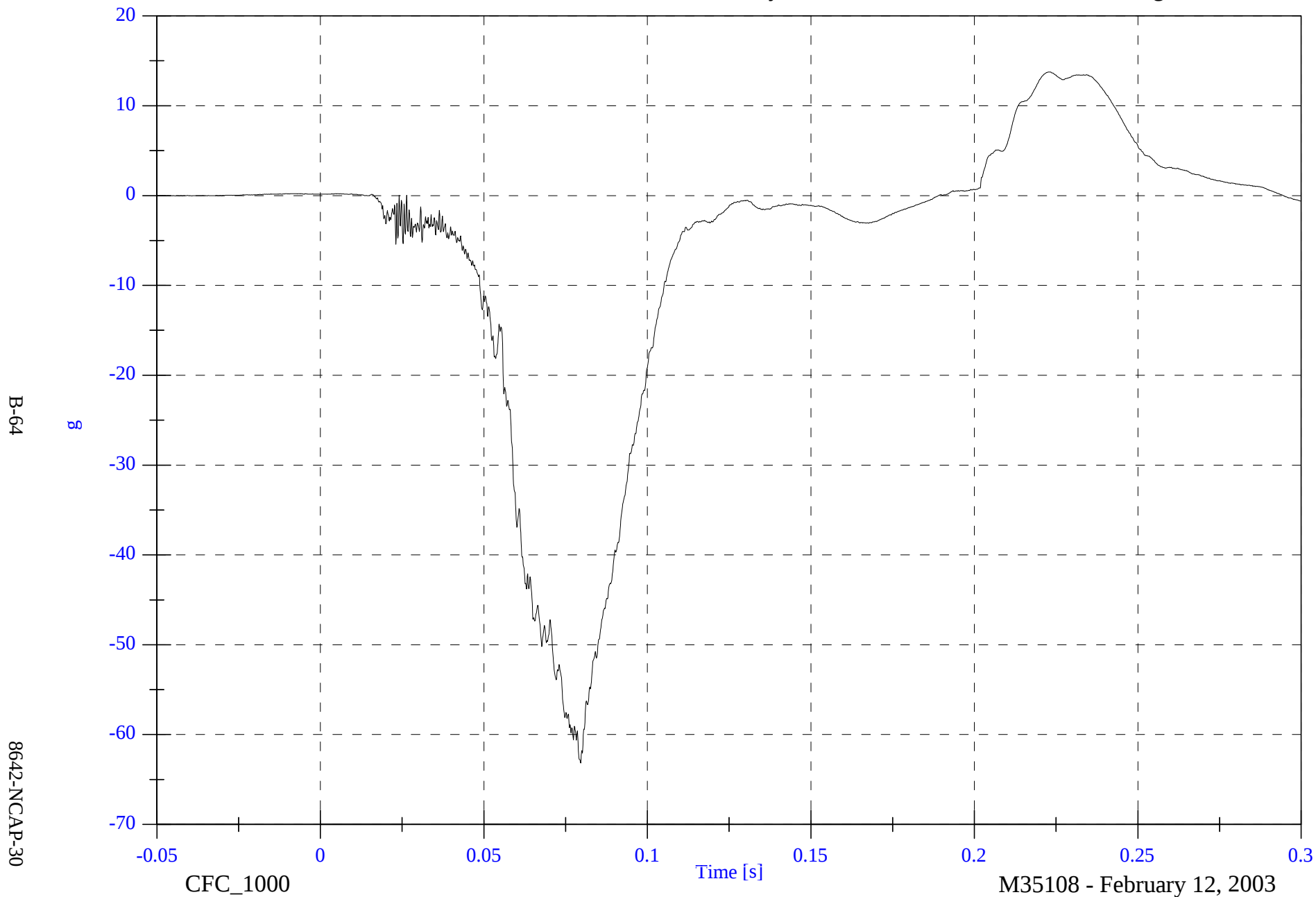


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head 9 Array Y Arm x

Max: 13.8 [g] at 0.223 [s]

Min: -63.2 [g] at 0.080 [s]

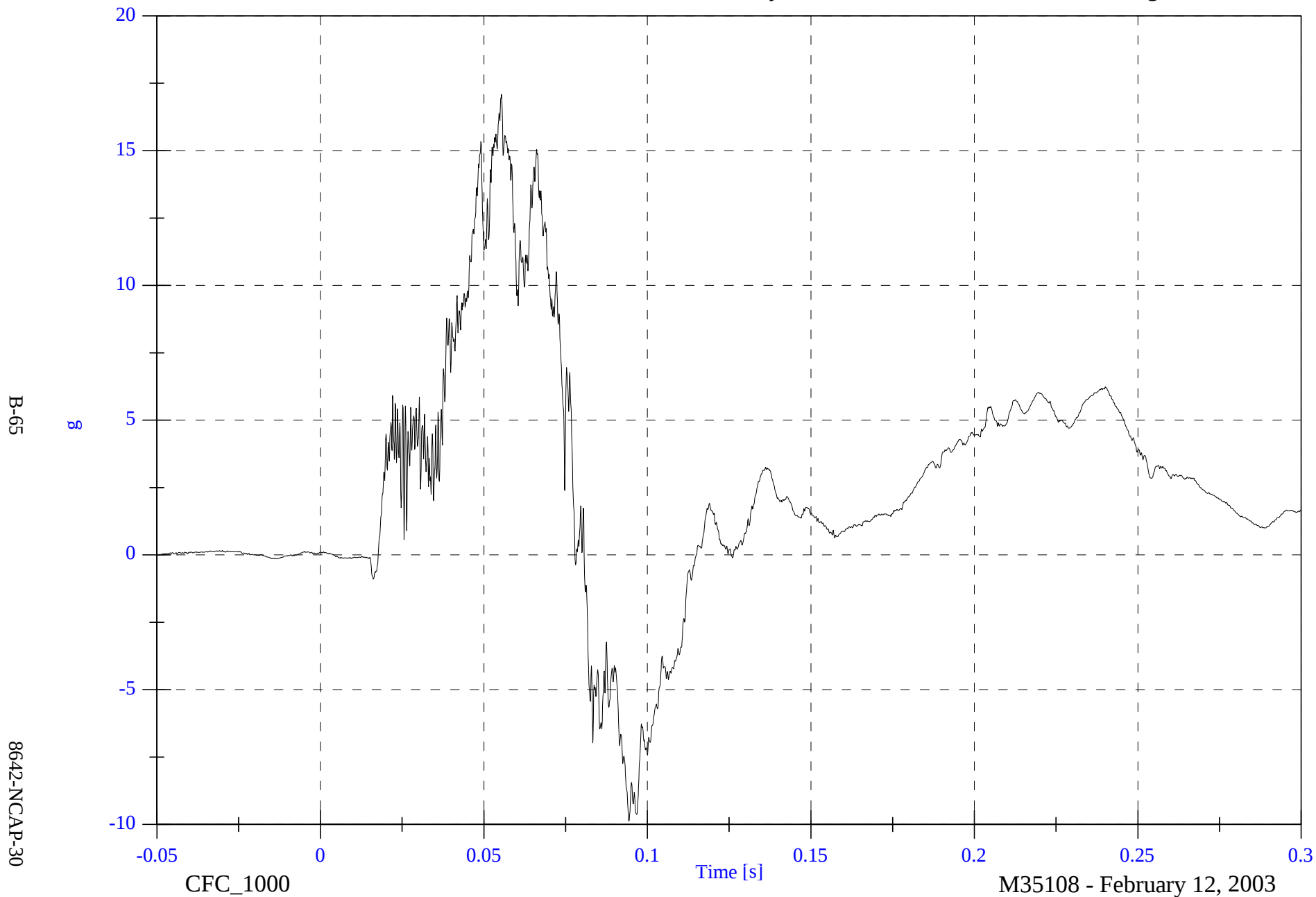


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head 9 Array Y Arm z

Max: 17.1 [g] at 0.055 [s]

Min: -9.9 [g] at 0.094 [s]

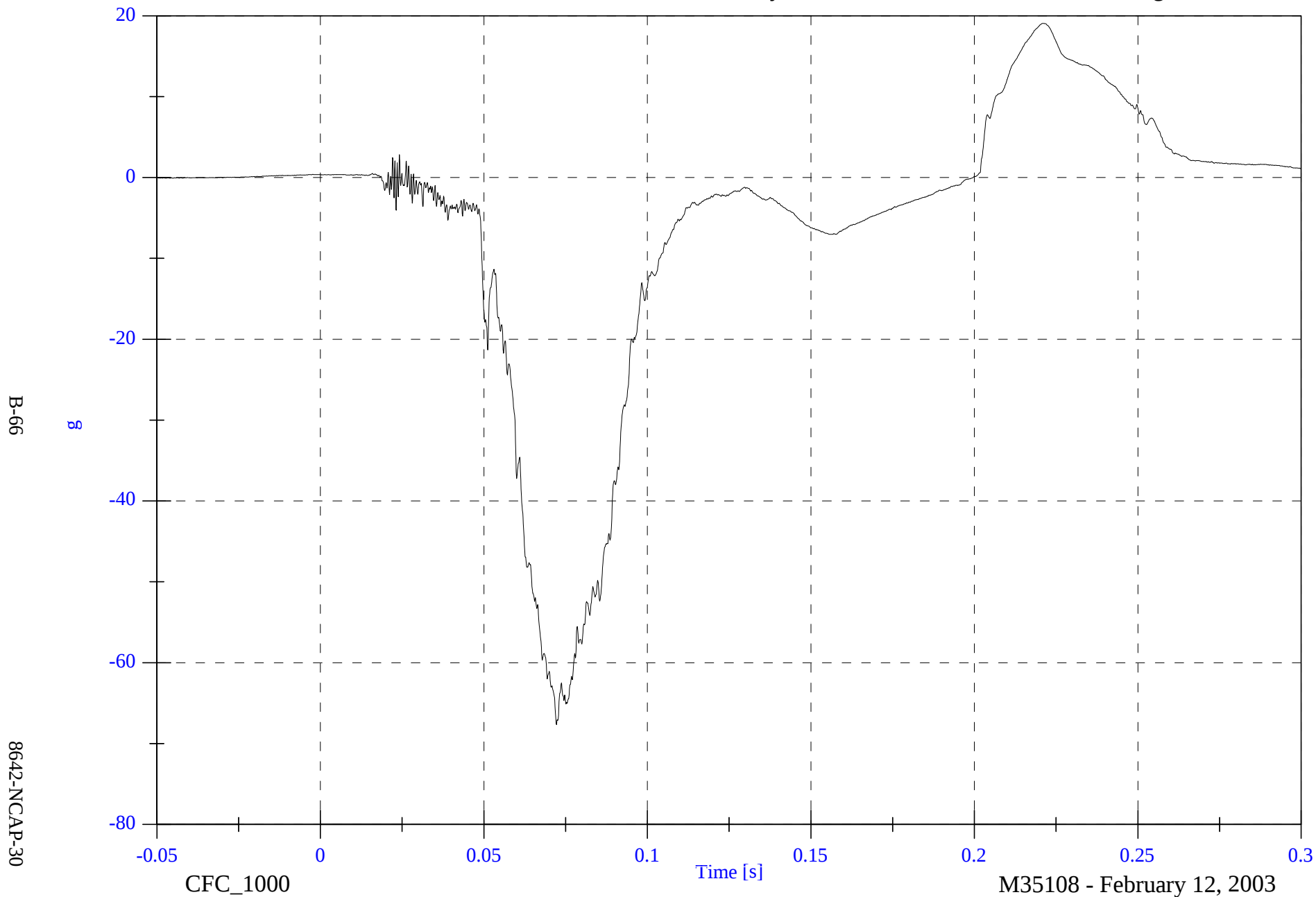


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head 9 Array Z Arm x

Max: 19.1 [g] at 0.221 [s]

Min: -67.6 [g] at 0.072 [s]

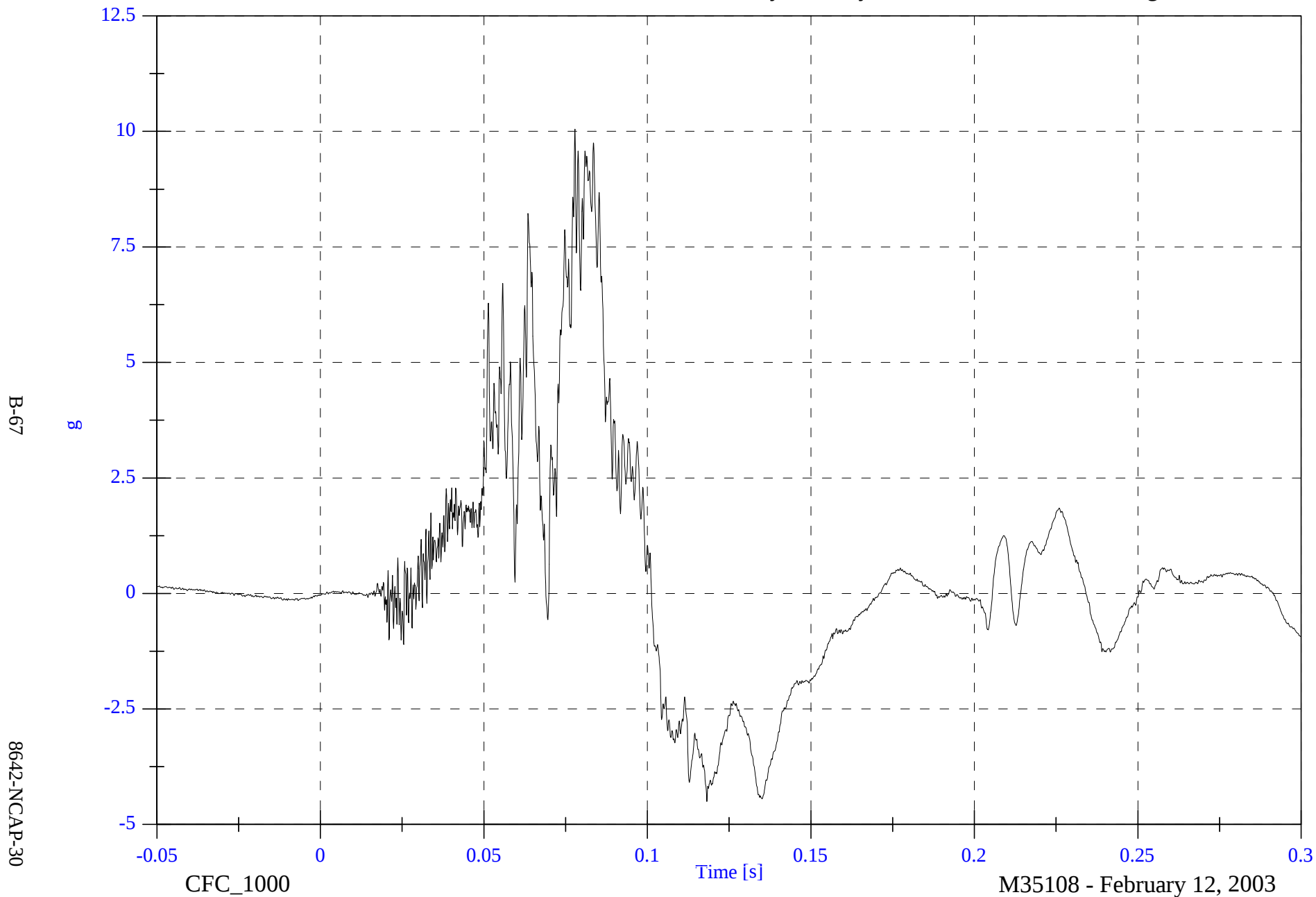


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head 9 Array Z Arm y

Max: 10.0 [g] at 0.078 [s]

Min: -4.5 [g] at 0.118 [s]

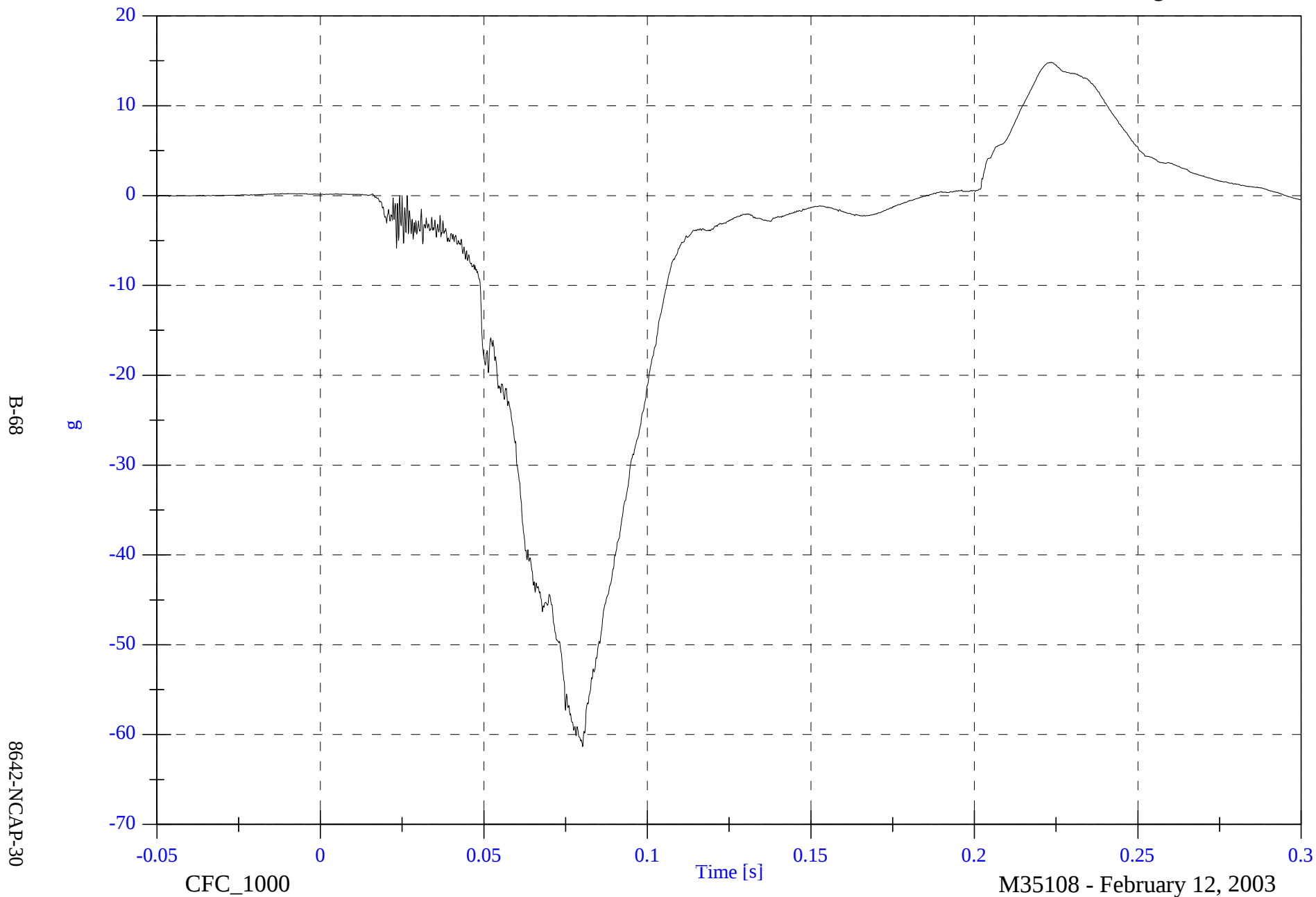


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head CG x

Max: 14.8 [g] at 0.224 [s]

Min: -61.3 [g] at 0.080 [s]

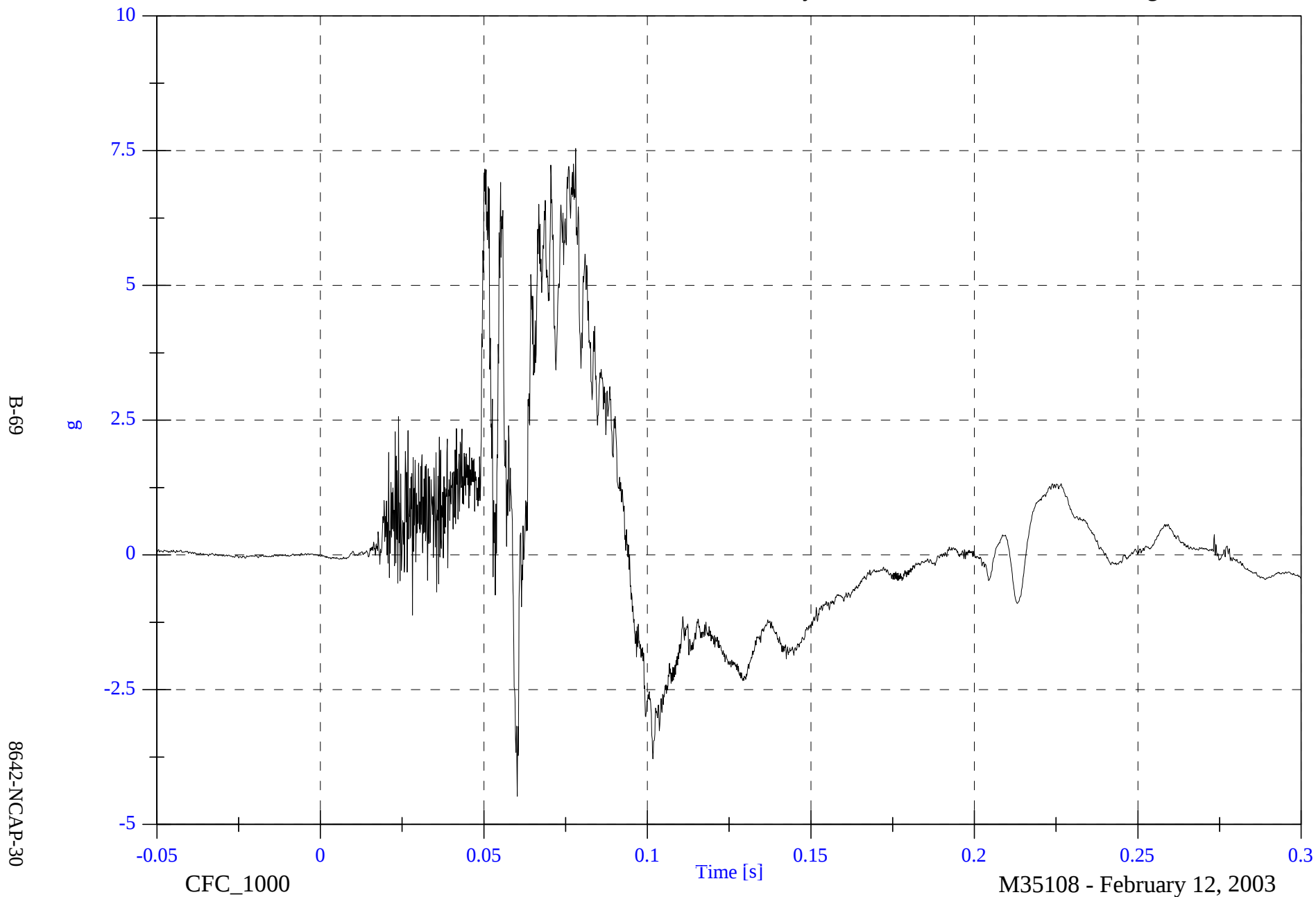


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head CG y

Max: 7.5 [g] at 0.078 [s]

Min: -4.5 [g] at 0.060 [s]

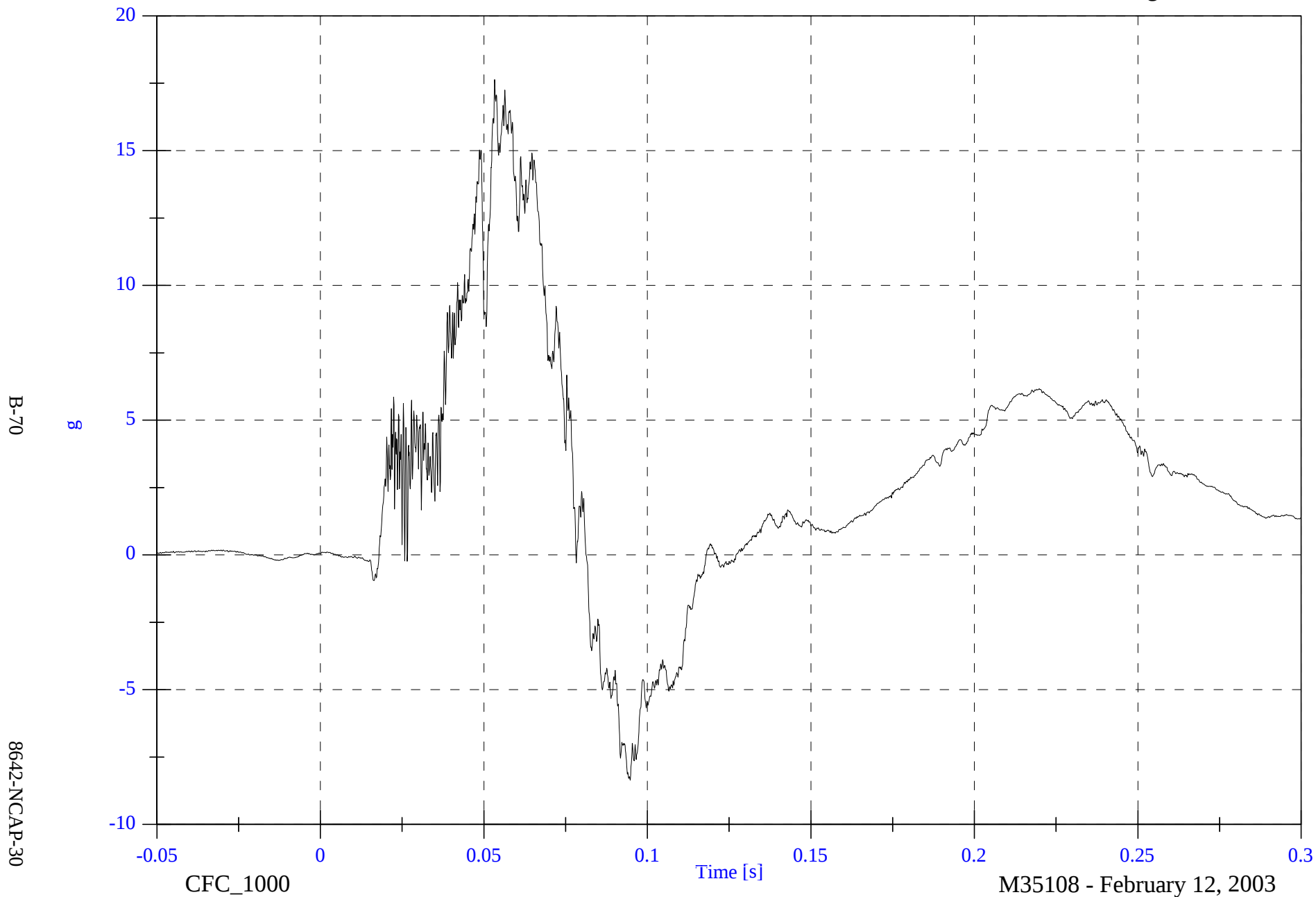


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head CG z

Max: 17.6 [g] at 0.053 [s]

Min: -8.4 [g] at 0.095 [s]



NCAP Test #8 - 2003 Toyota Avalon

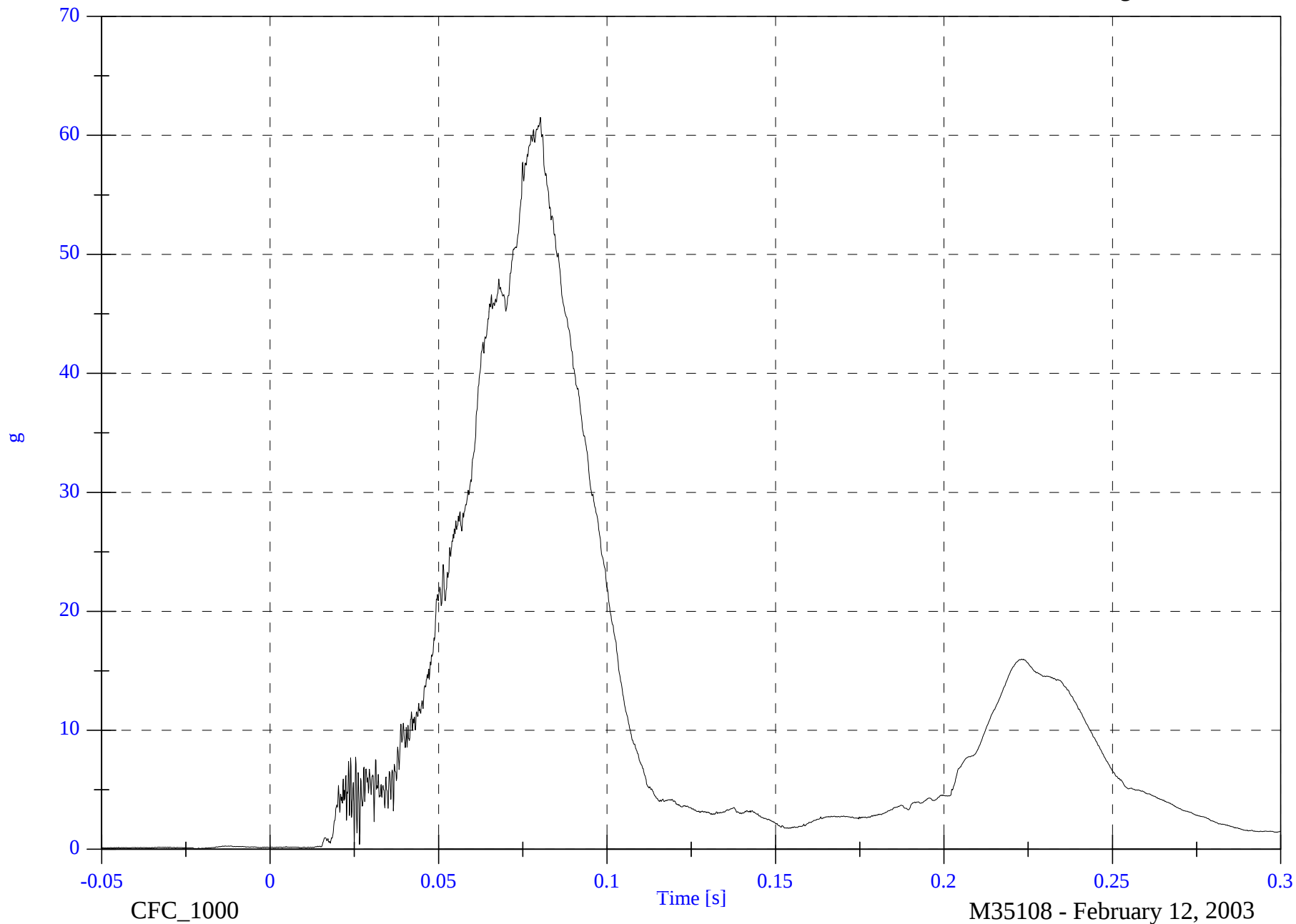
V1P2 Head CG Resultant

Max: 61.5 [g] at 0.080 [s]

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

B-71

8642-NCAP-30

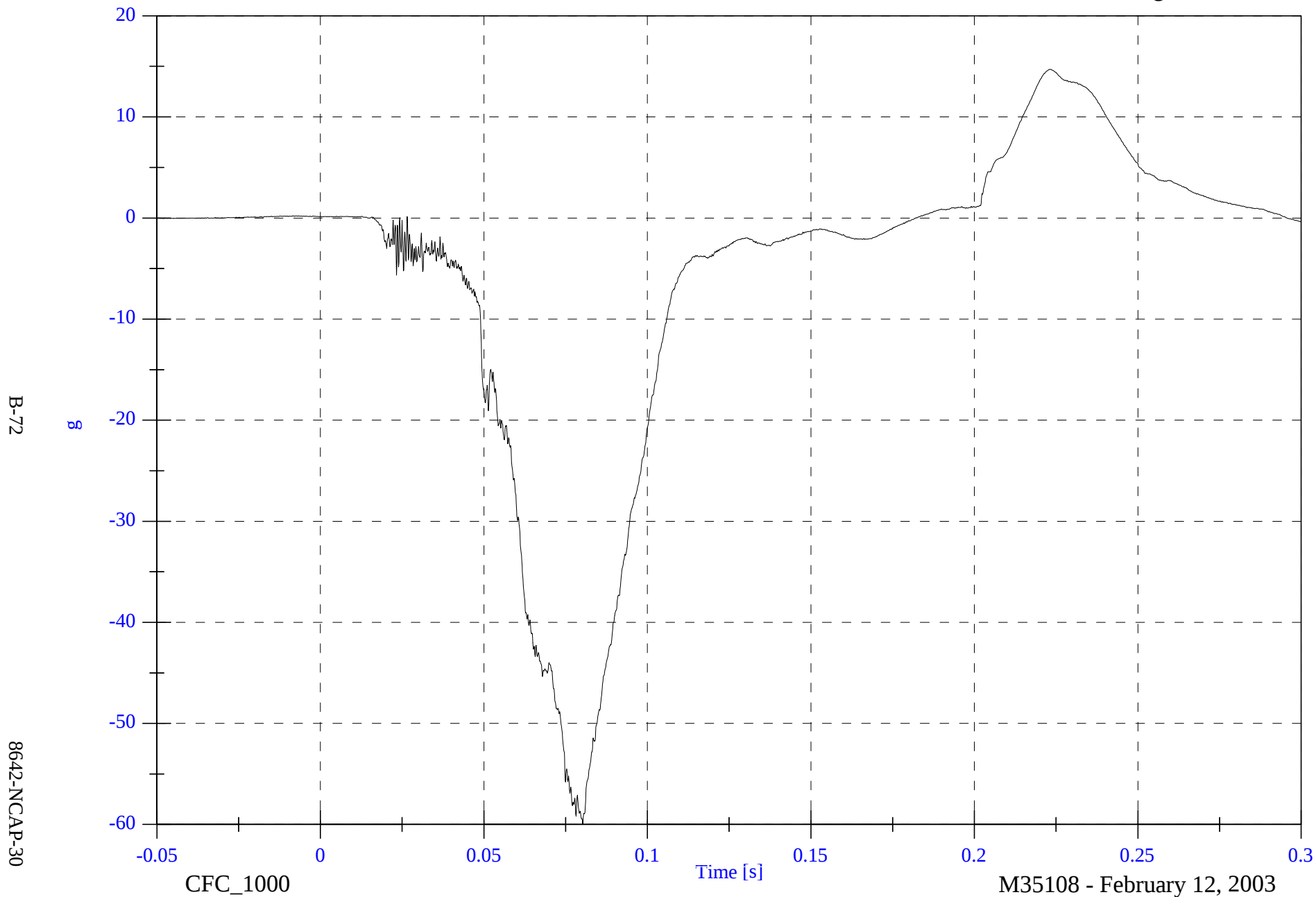


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head CG Red x

Max: 14.7 [g] at 0.223 [s]

Min: -60.0 [g] at 0.080 [s]

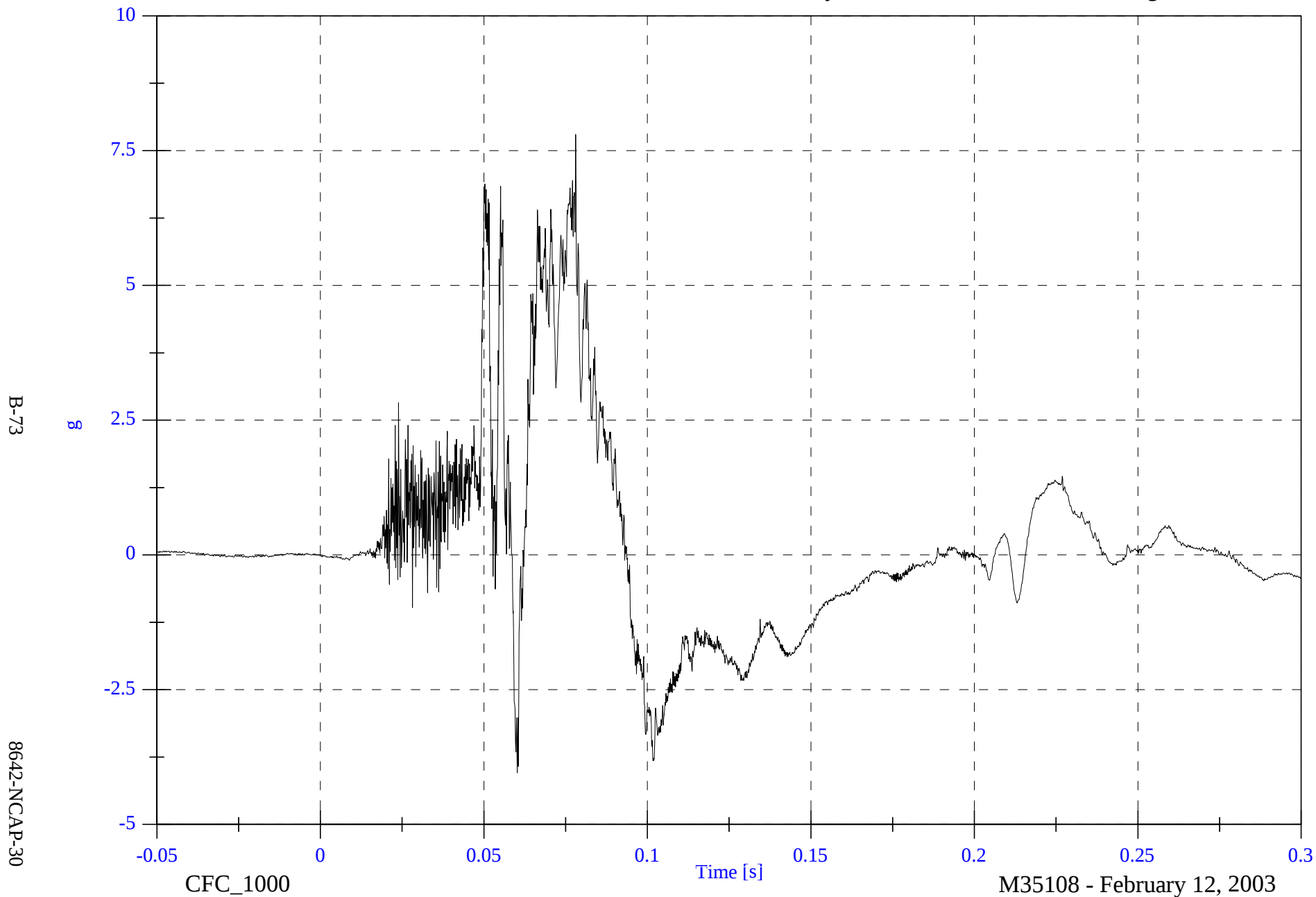


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head CG Red y

Max: 7.8 [g] at 0.078 [s]

Min: -4.0 [g] at 0.060 [s]

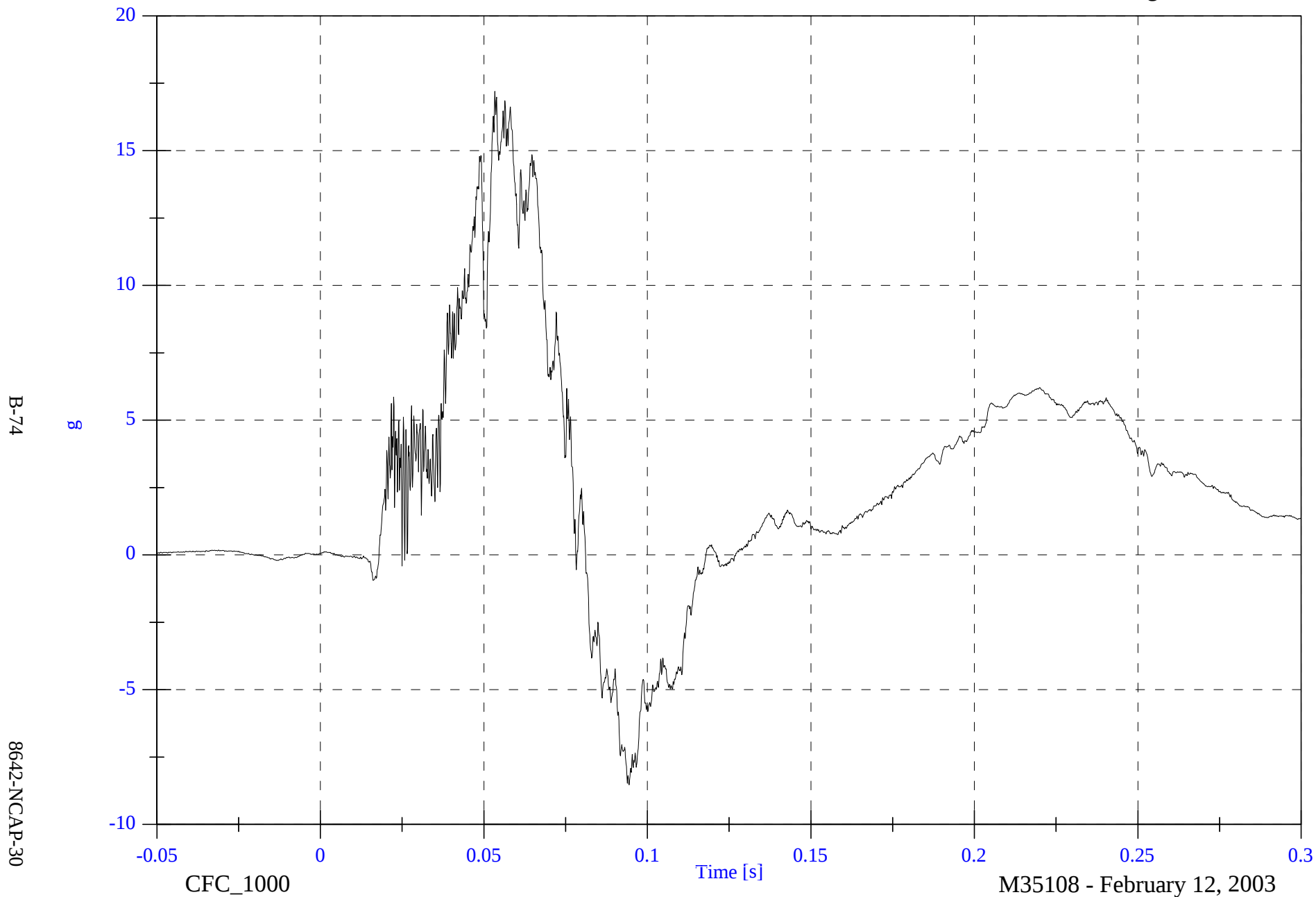


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head CG Red z

Max: 17.2 [g] at 0.053 [s]

Min: -8.5 [g] at 0.094 [s]

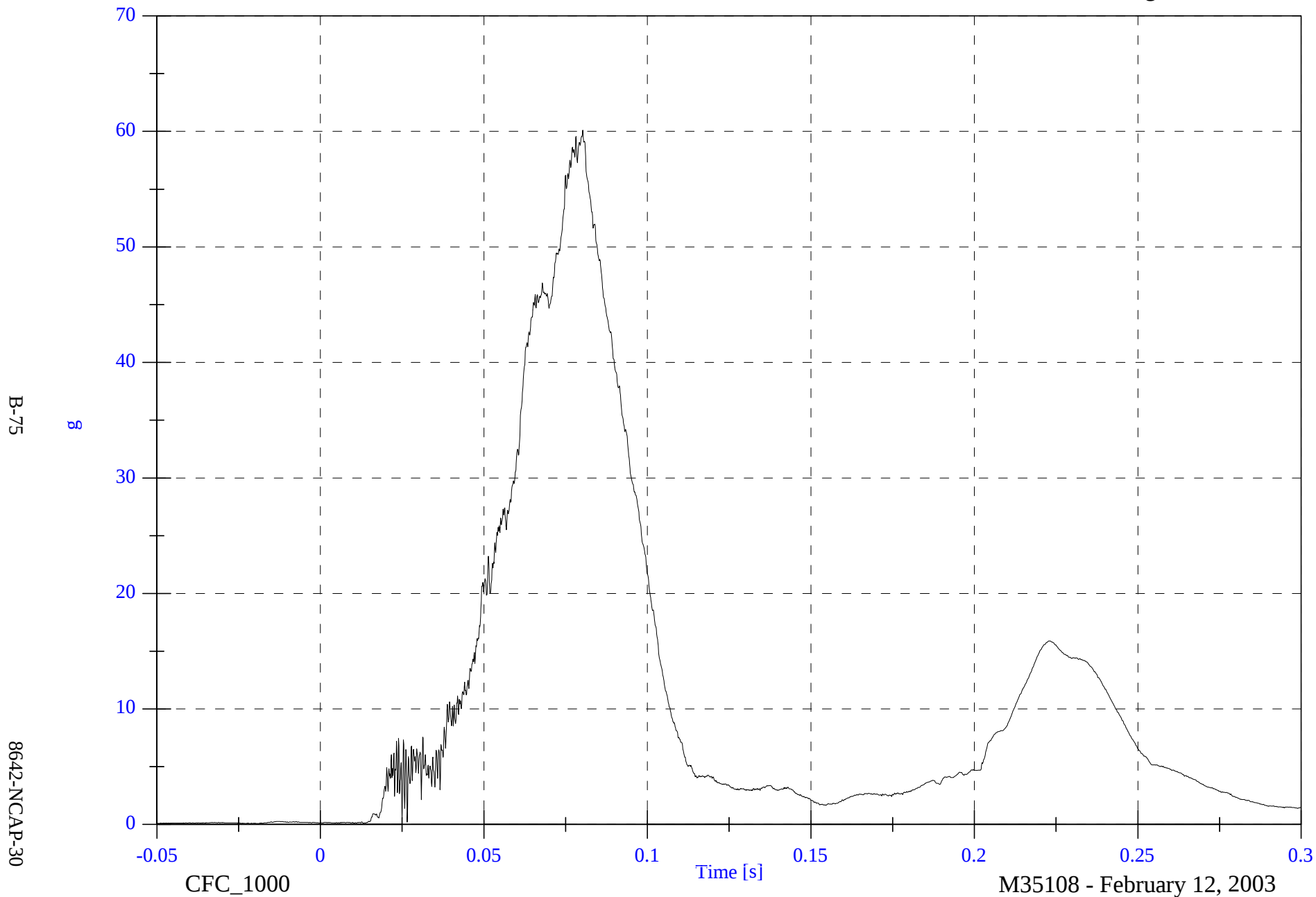


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Head CG Red Resultant

Max: 60.1 [g] at 0.080 [s]

Min: 0.1 [g] at -0.020 [s]

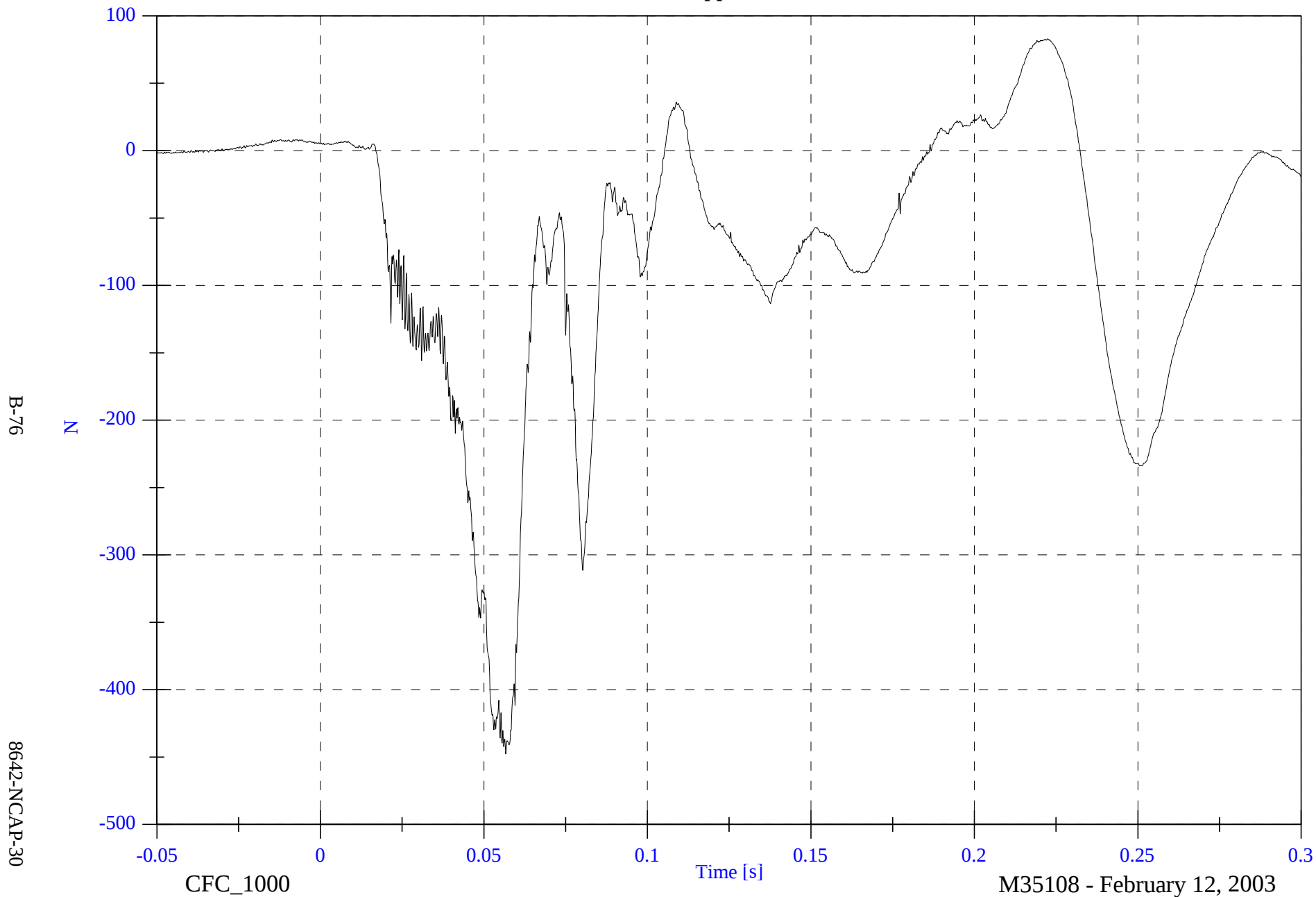


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Upper Neck Fx

Max: 83.0 [N] at 0.222 [s]

Min: -447.6 [N] at 0.057 [s]

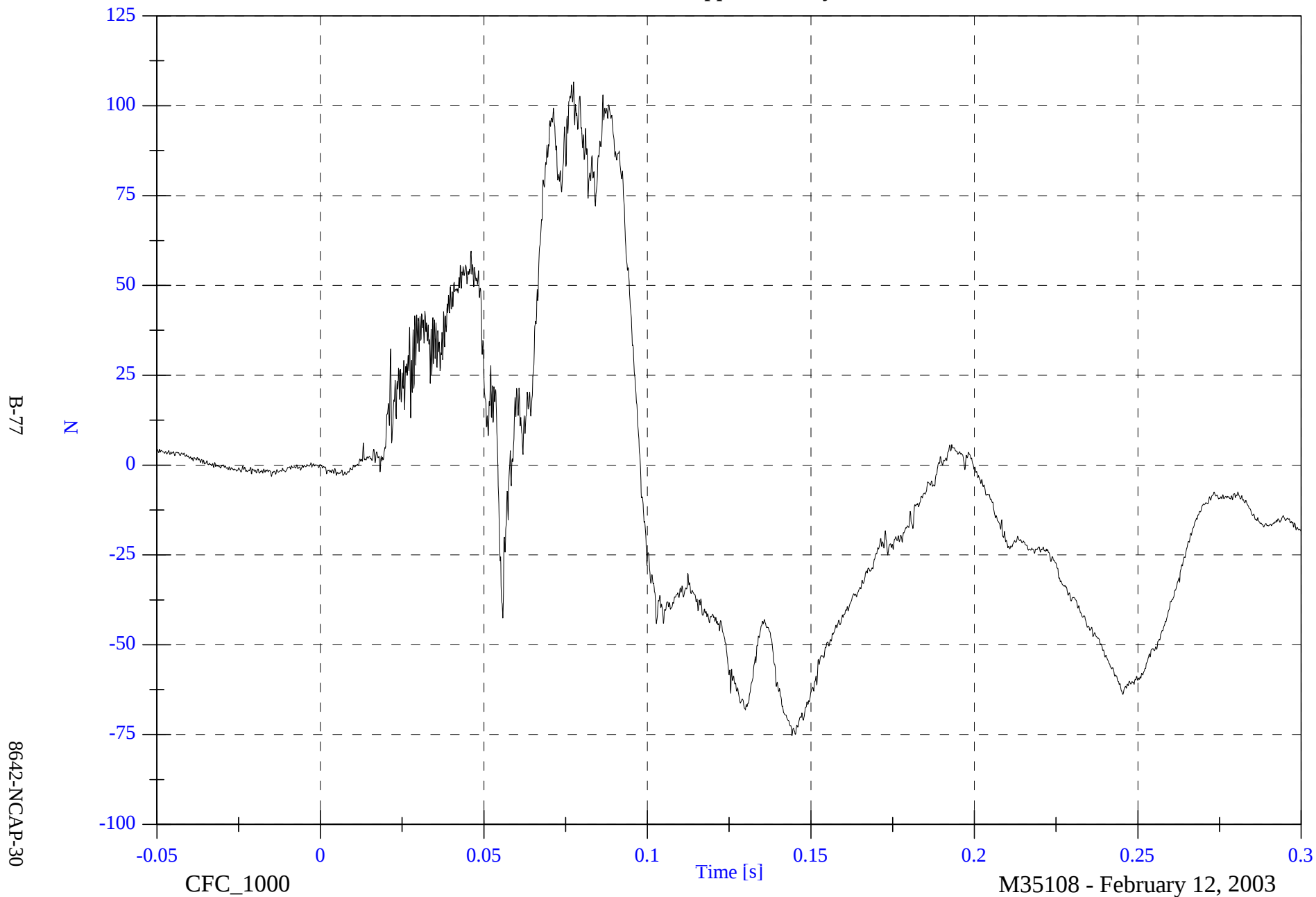


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Upper Neck Fy

Max: 106.6 [N] at 0.077 [s]

Min: -75.3 [N] at 0.144 [s]

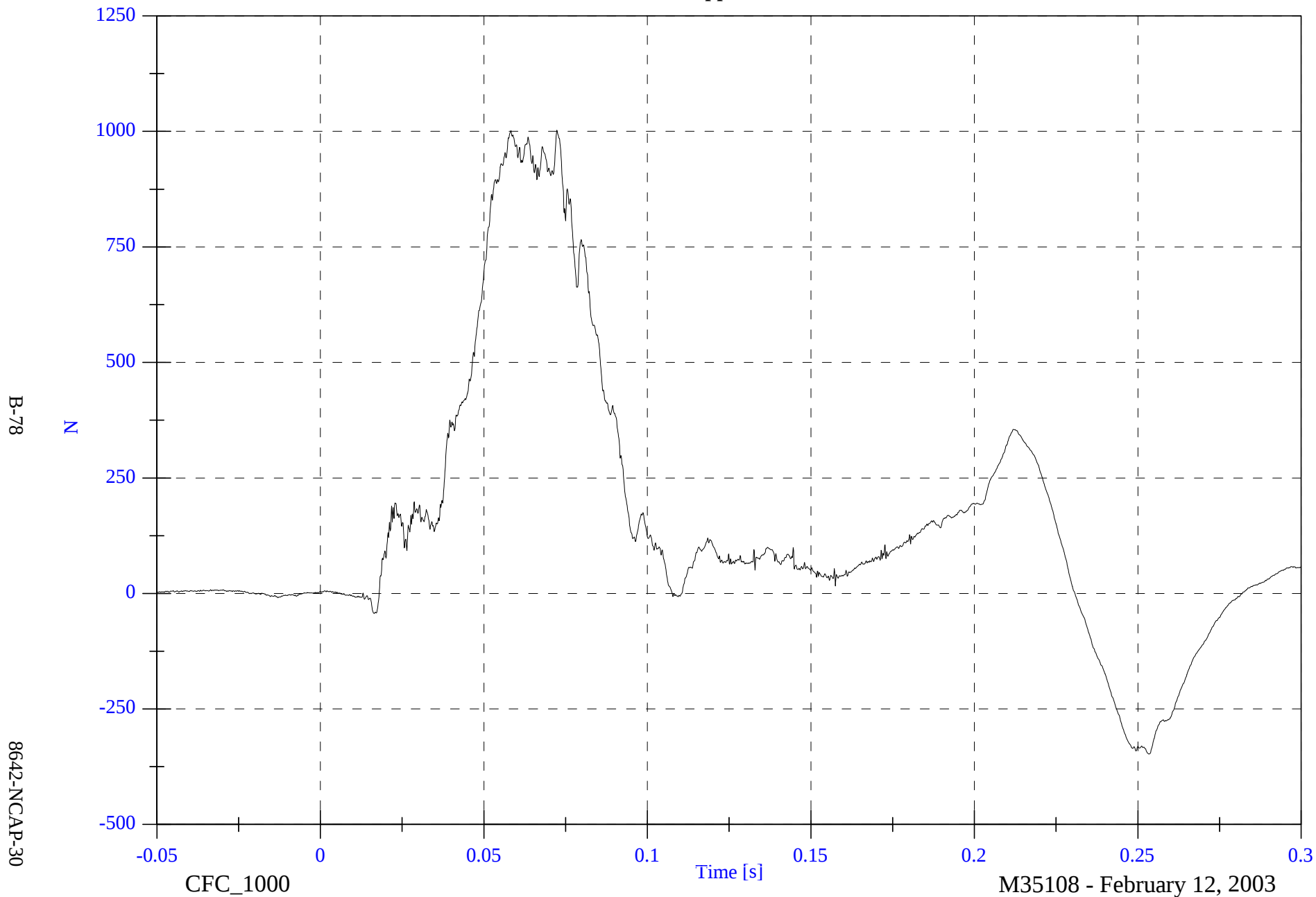


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Upper Neck Fz

Max: 1002.2 [N] at 0.072 [s]

Min: -347.6 [N] at 0.253 [s]

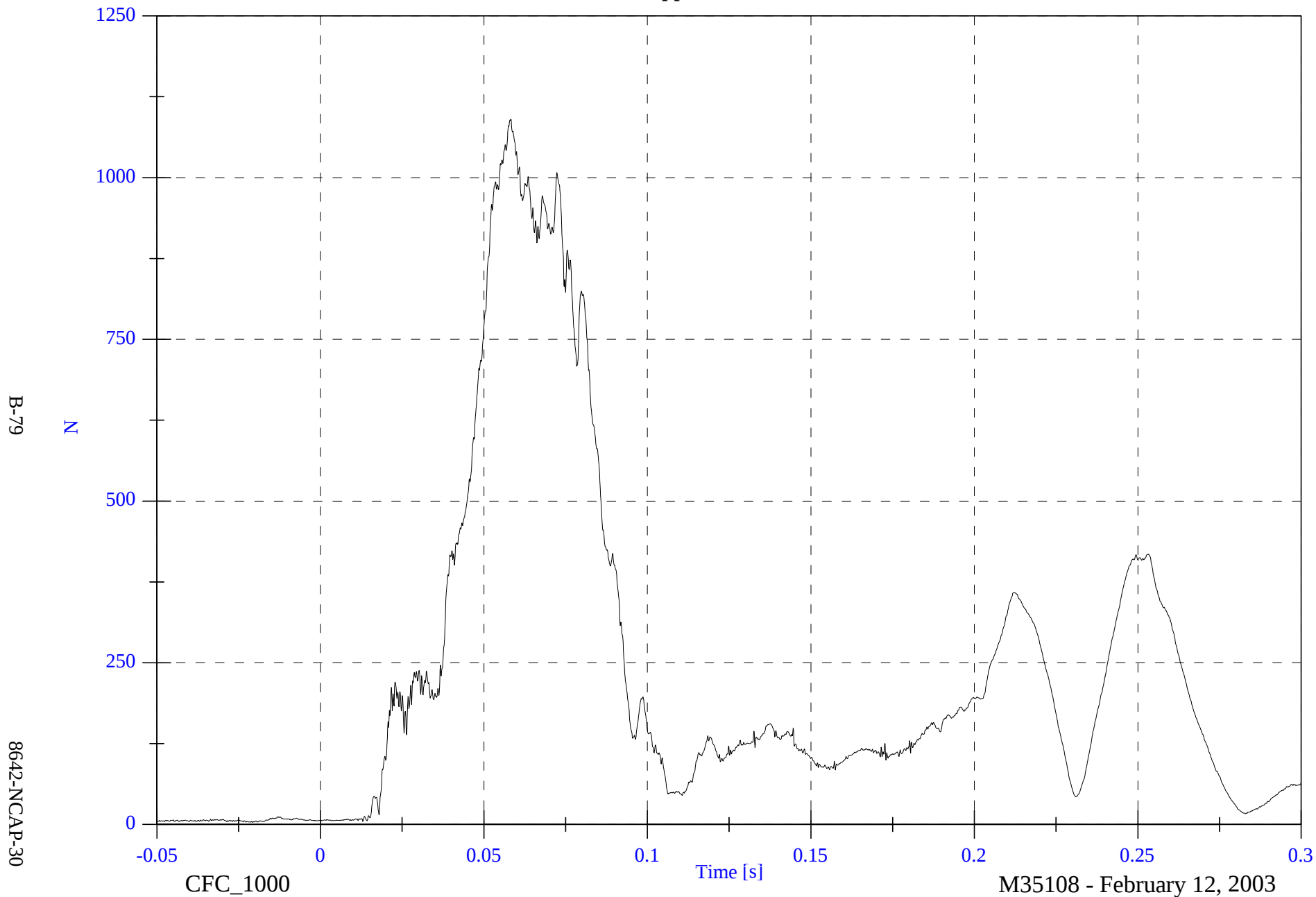


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Upper Neck F Resultant

Max: 1090.2 [N] at 0.058 [s]

Min: 3.4 [N] at -0.021 [s]

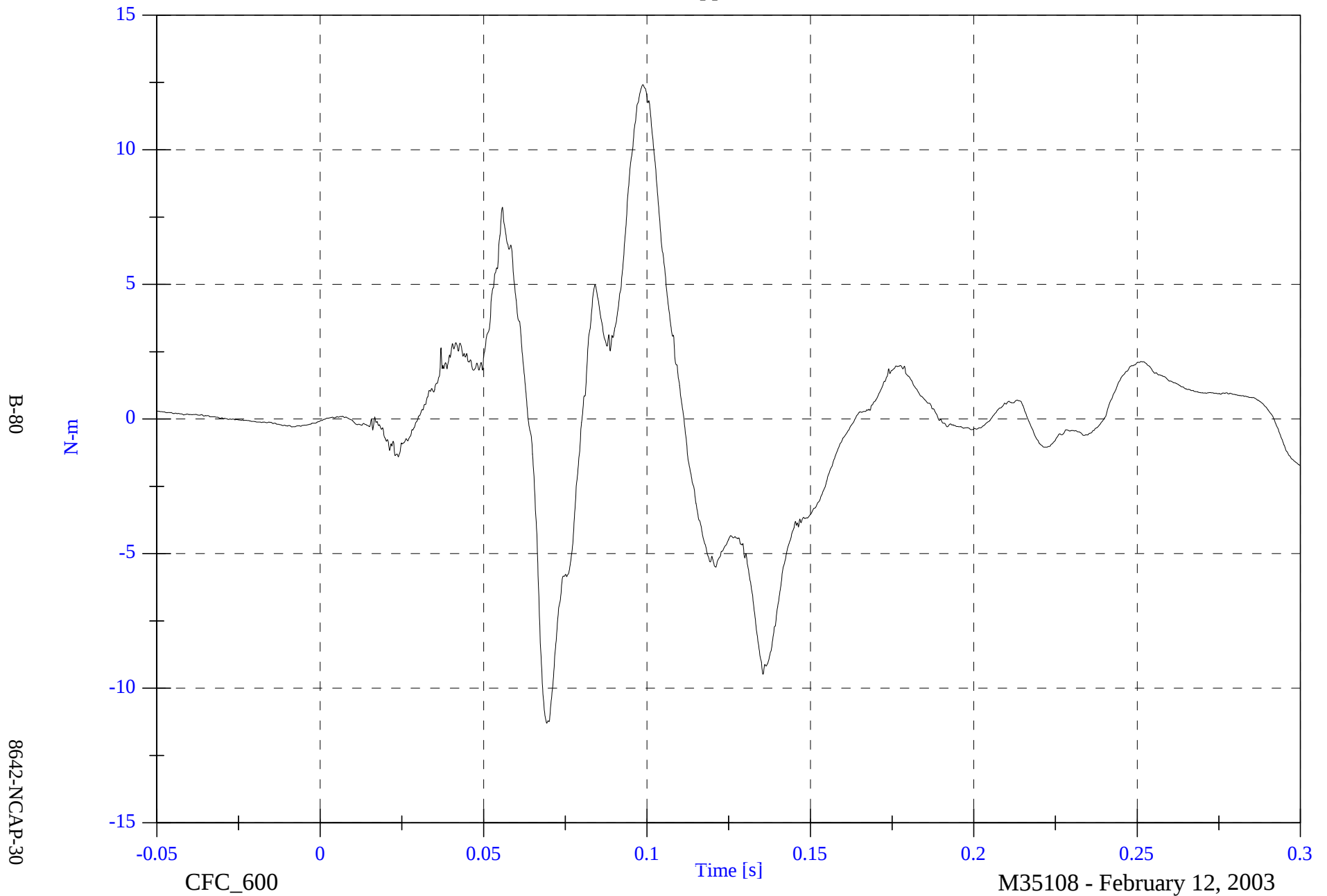


NCAP Test #8 - 2003 Toyota Avalon

Max: 12.4 [N-m] at 0.099 [s]

Min: -11.3 [N-m] at 0.069 [s]

V1P2 Upper Neck Mx

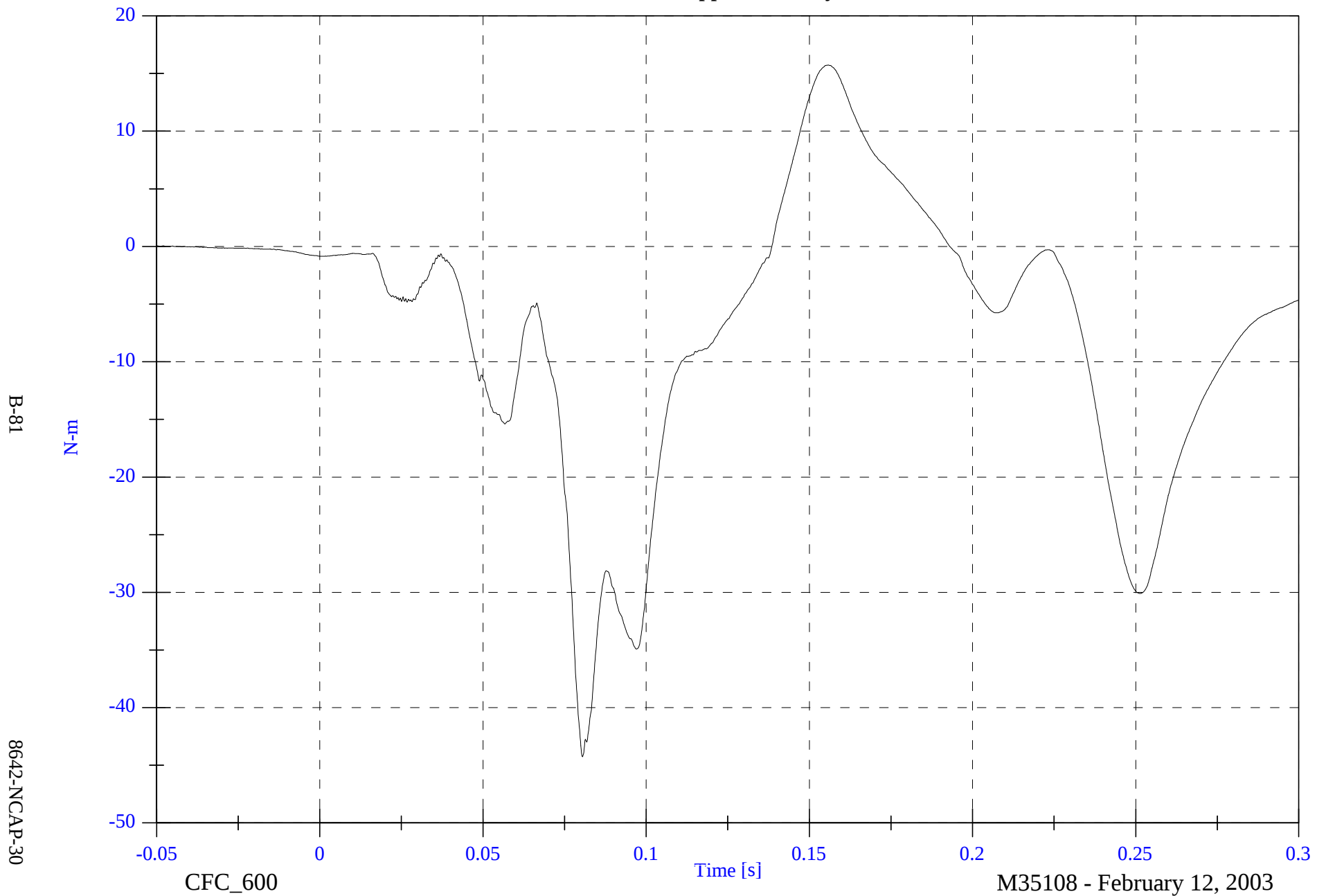


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Upper Neck My

Max: 15.7 [N-m] at 0.156 [s]

Min: -44.3 [N-m] at 0.081 [s]

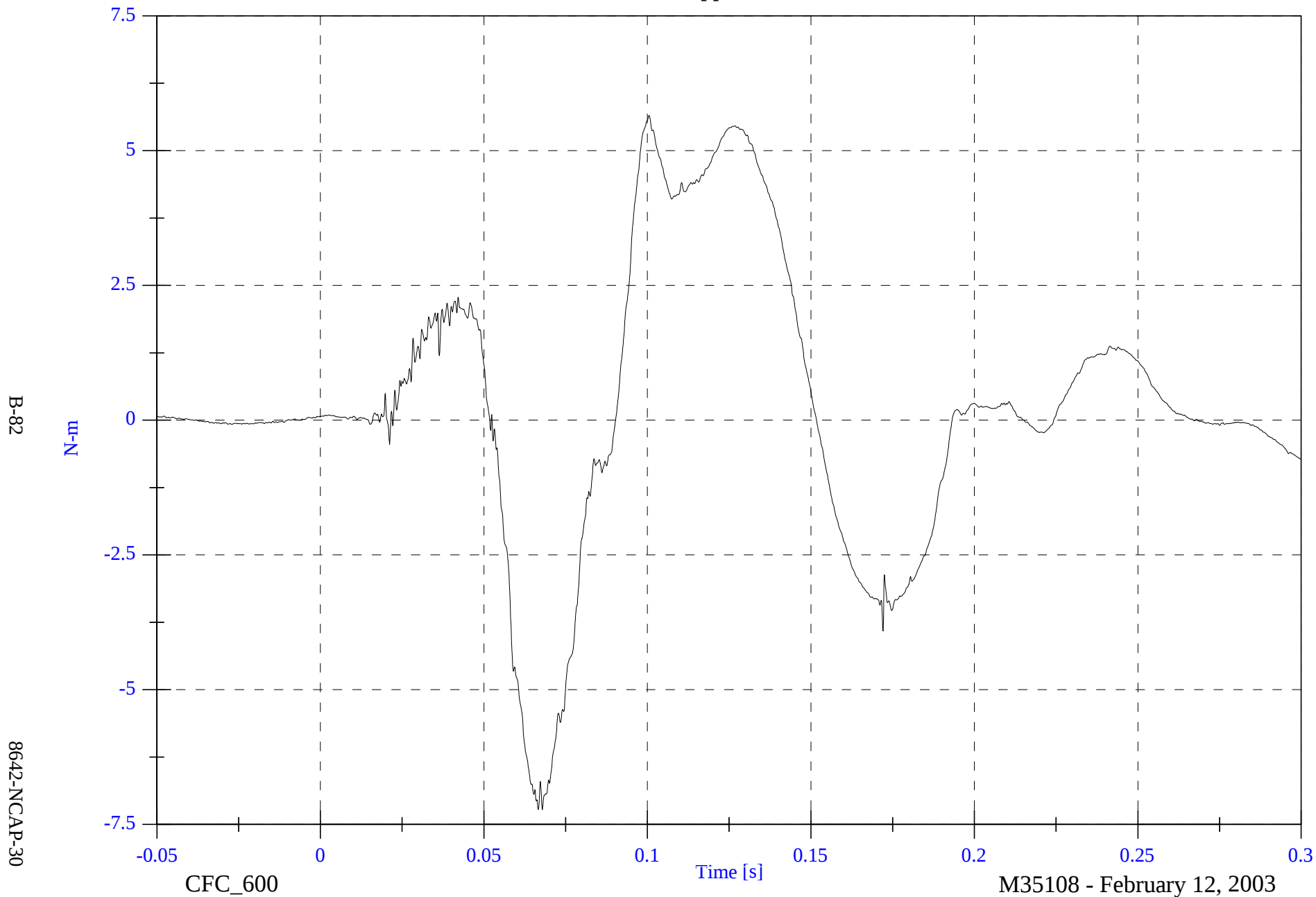


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Upper Neck Mz

Max: 5.7 [N-m] at 0.100 [s]

Min: -7.2 [N-m] at 0.068 [s]



NCAP Test #8 - 2003 Toyota Avalon

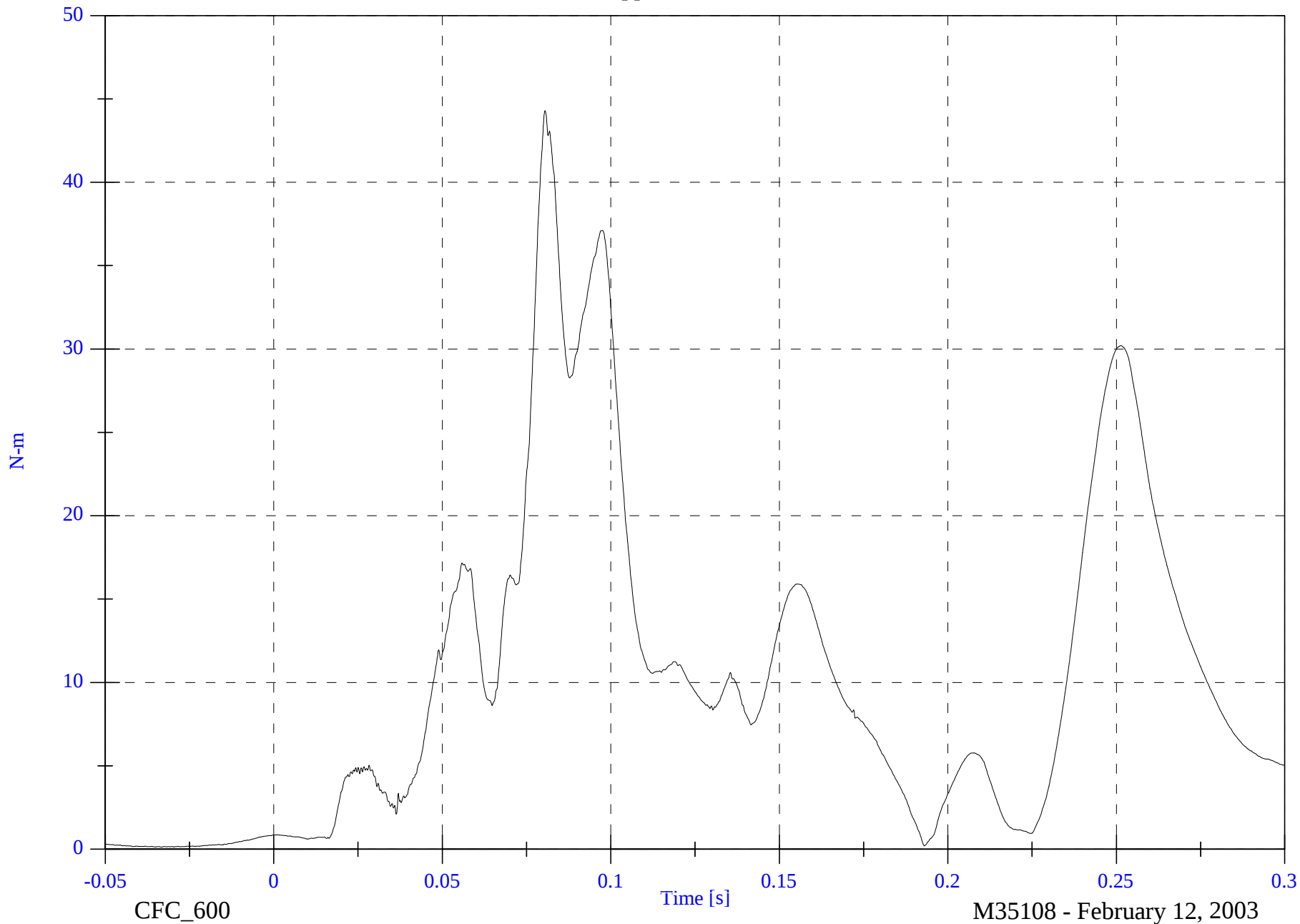
V1P2 Upper Neck M Resultant

Max: 44.3 [N-m] at 0.081 [s]

Min: 0.1 [N-m] at -0.033 [s]

B-83

8642-NCAP-30

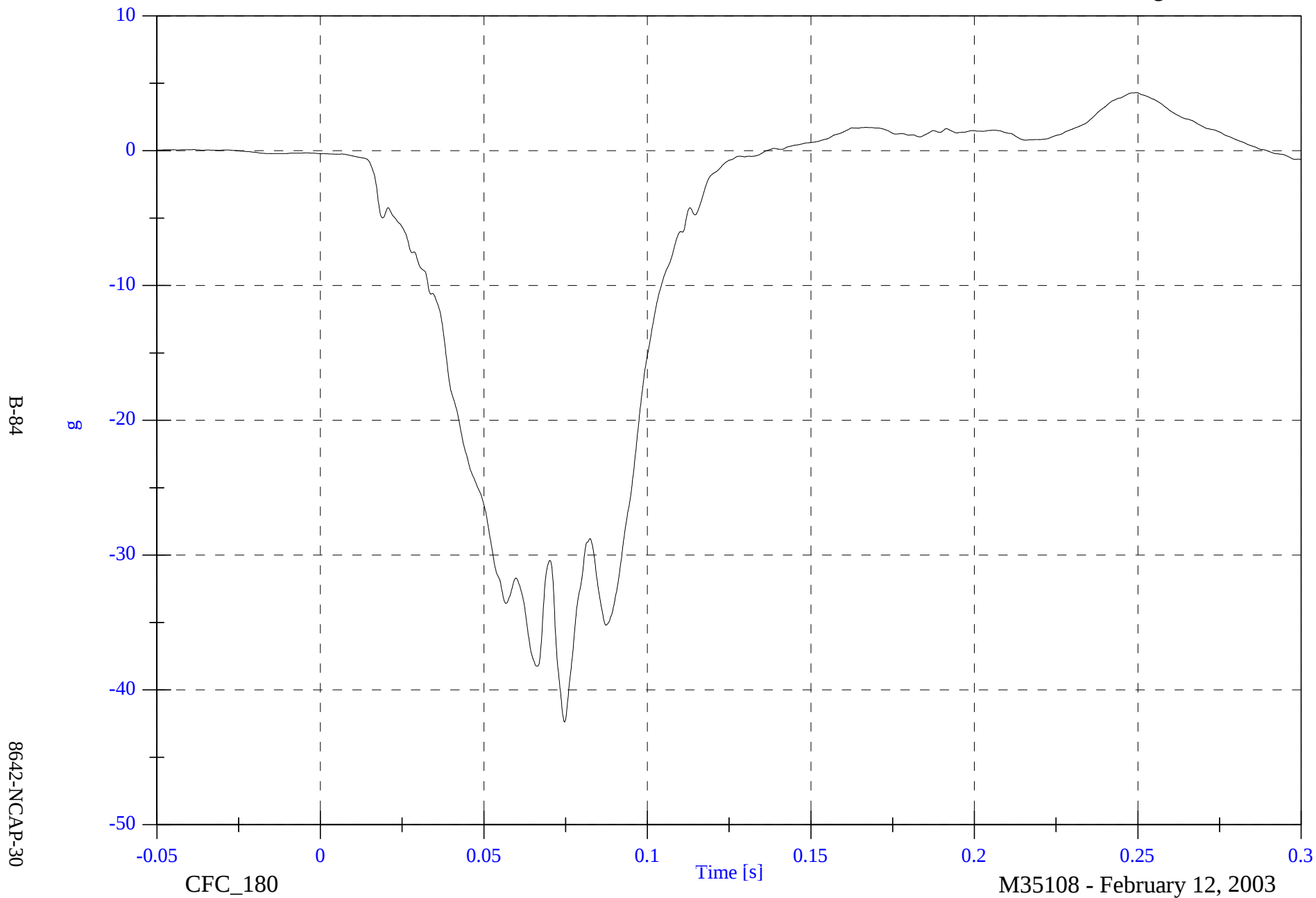


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Chest x

Max: 4.3 [g] at 0.250 [s]

Min: -42.4 [g] at 0.075 [s]



NCAP Test #8 - 2003 Toyota Avalon

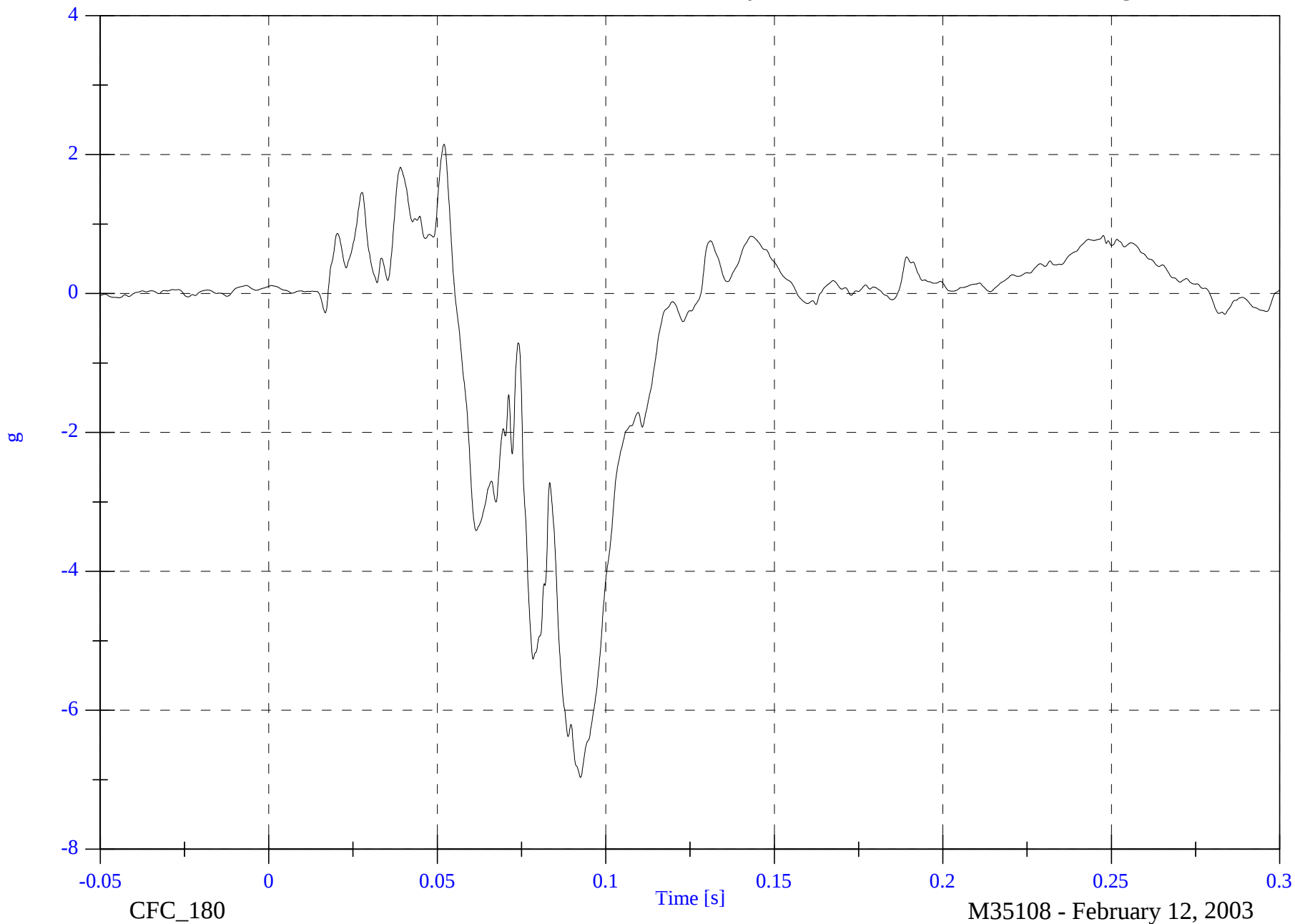
V1P2 Chest y

Max: 2.1 [g] at 0.052 [s]

Min: -7.0 [g] at 0.092 [s]

B-85

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

V1P2 Chest z

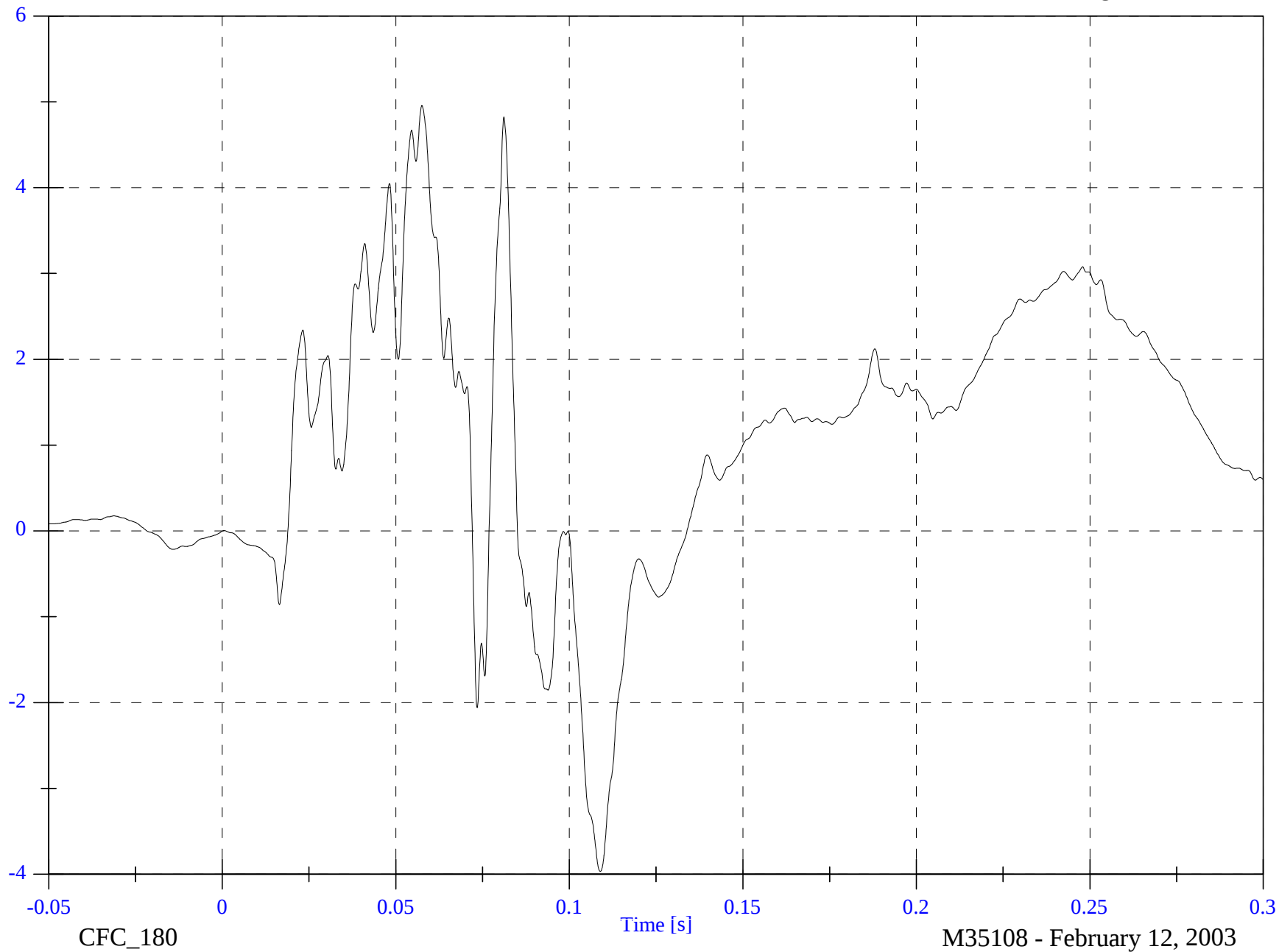
Max: 5.0 [g] at 0.057 [s]

Min: -4.0 [g] at 0.109 [s]

B-86

8642-NCAP-30

g



CFC_180

Time [s]

M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

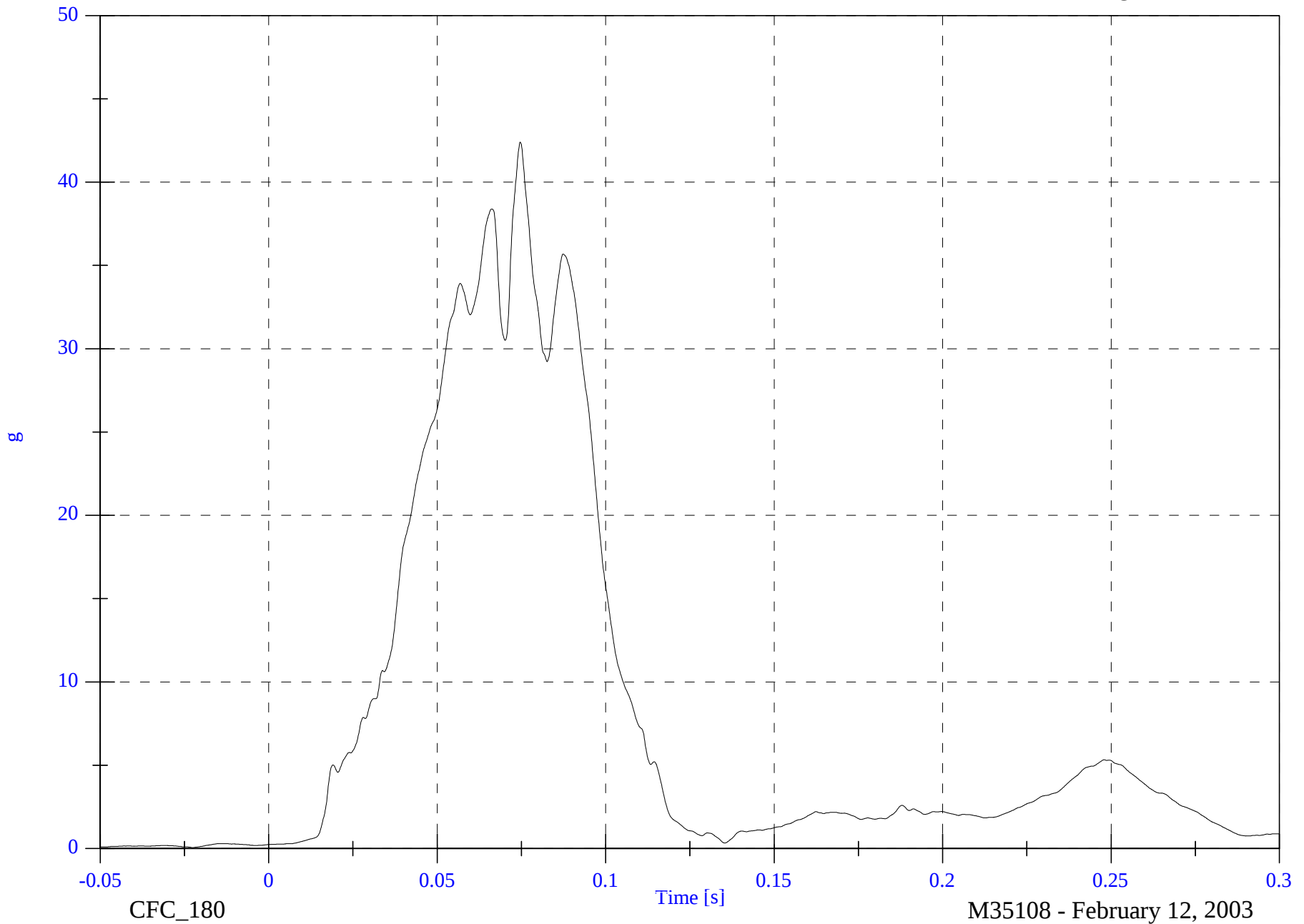
V1P2 Chest Resultant

Max: 42.4 [g] at 0.075 [s]

Min: 0.1 [g] at -0.022 [s]

B-87

8642-NCAP-30

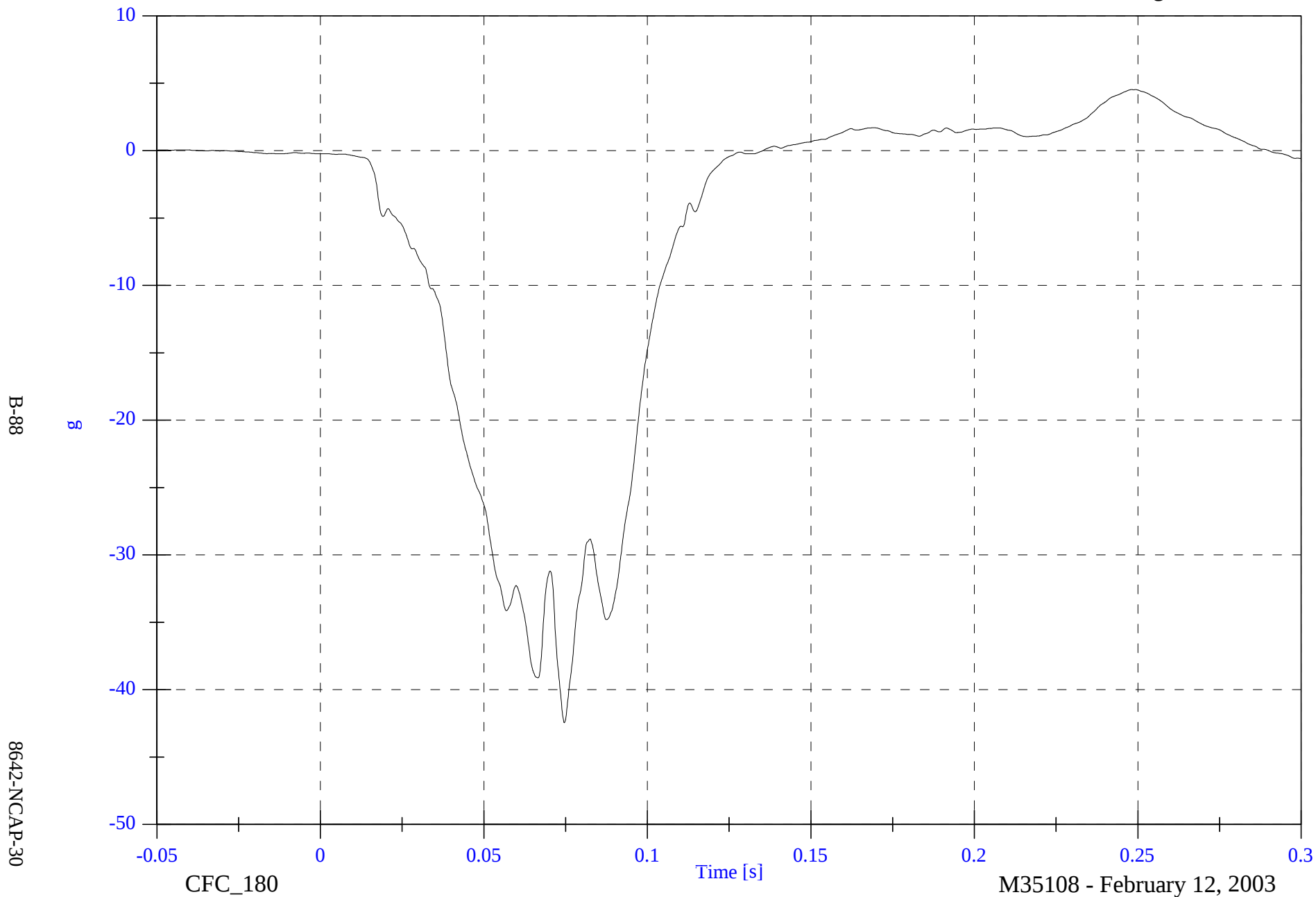


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Chest Red x

Max: 4.5 [g] at 0.248 [s]

Min: -42.5 [g] at 0.075 [s]

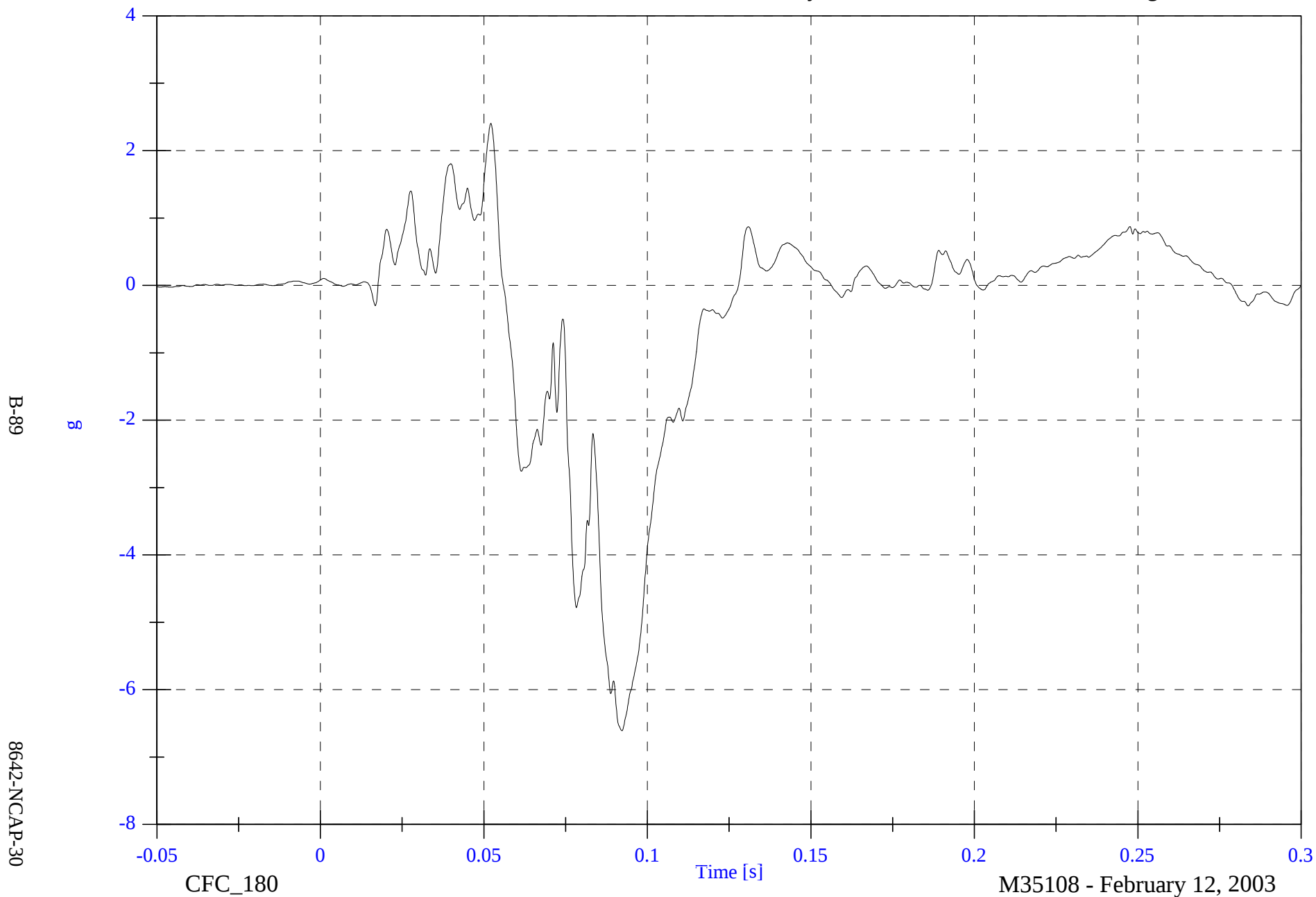


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Chest Red y

Max: 2.4 [g] at 0.052 [s]

Min: -6.6 [g] at 0.092 [s]

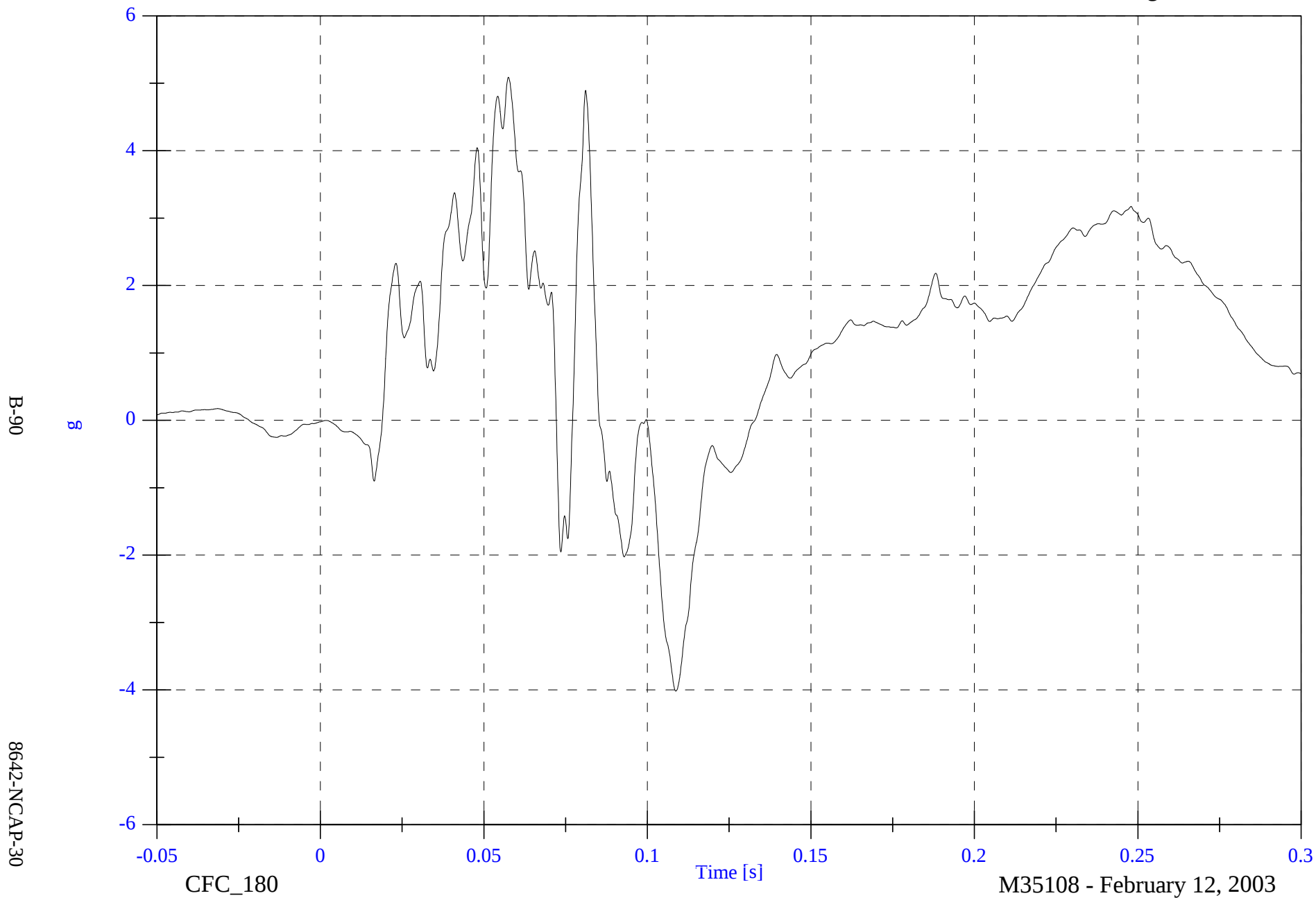


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Chest Red z

Max: 5.1 [g] at 0.057 [s]

Min: -4.0 [g] at 0.109 [s]



NCAP Test #8 - 2003 Toyota Avalon

V1P2 Chest Red Resultant

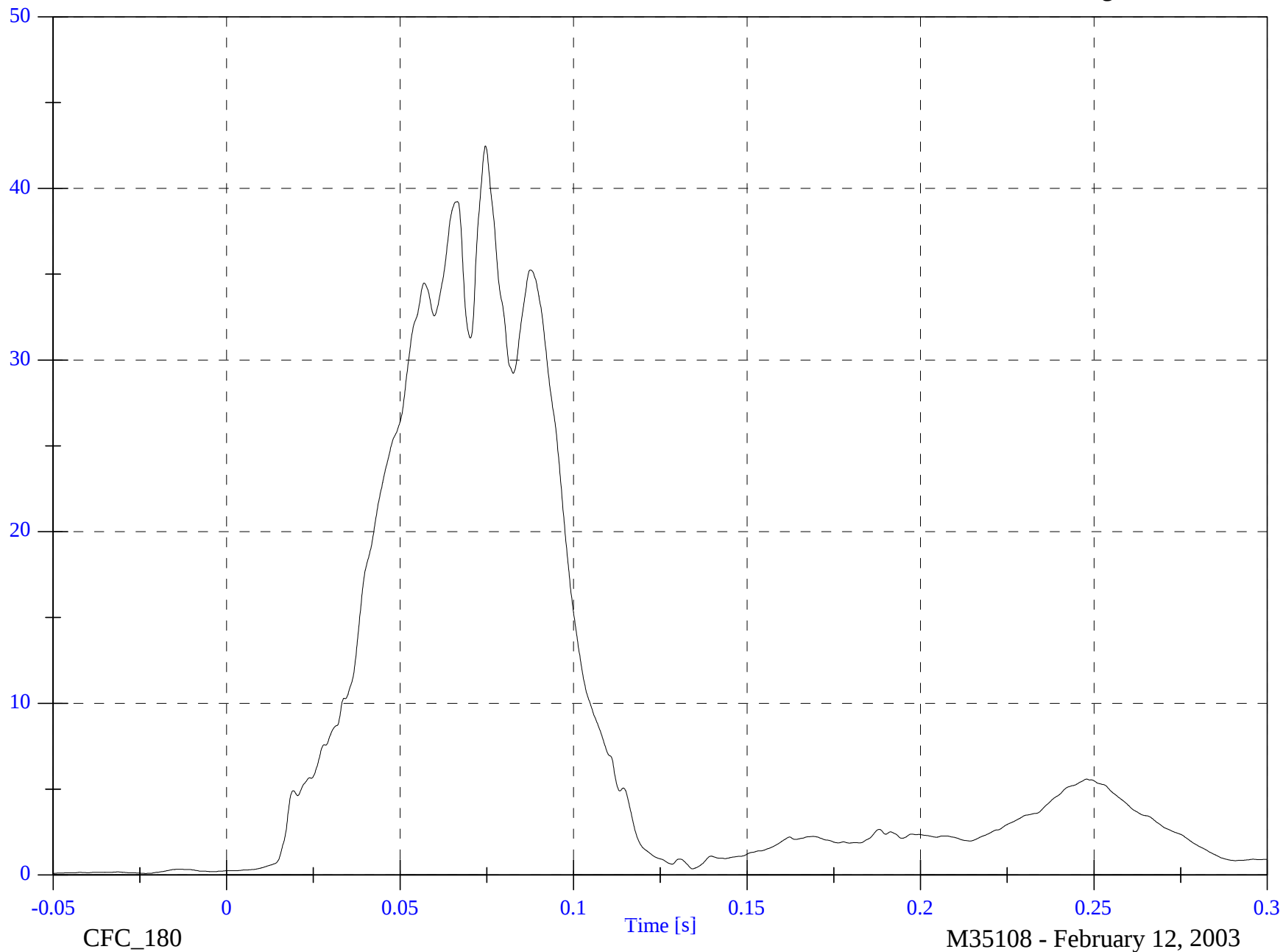
Max: 42.5 [g] at 0.075 [s]

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

B-91

8642-NCAP-30

g



CFC_180

Time [s]

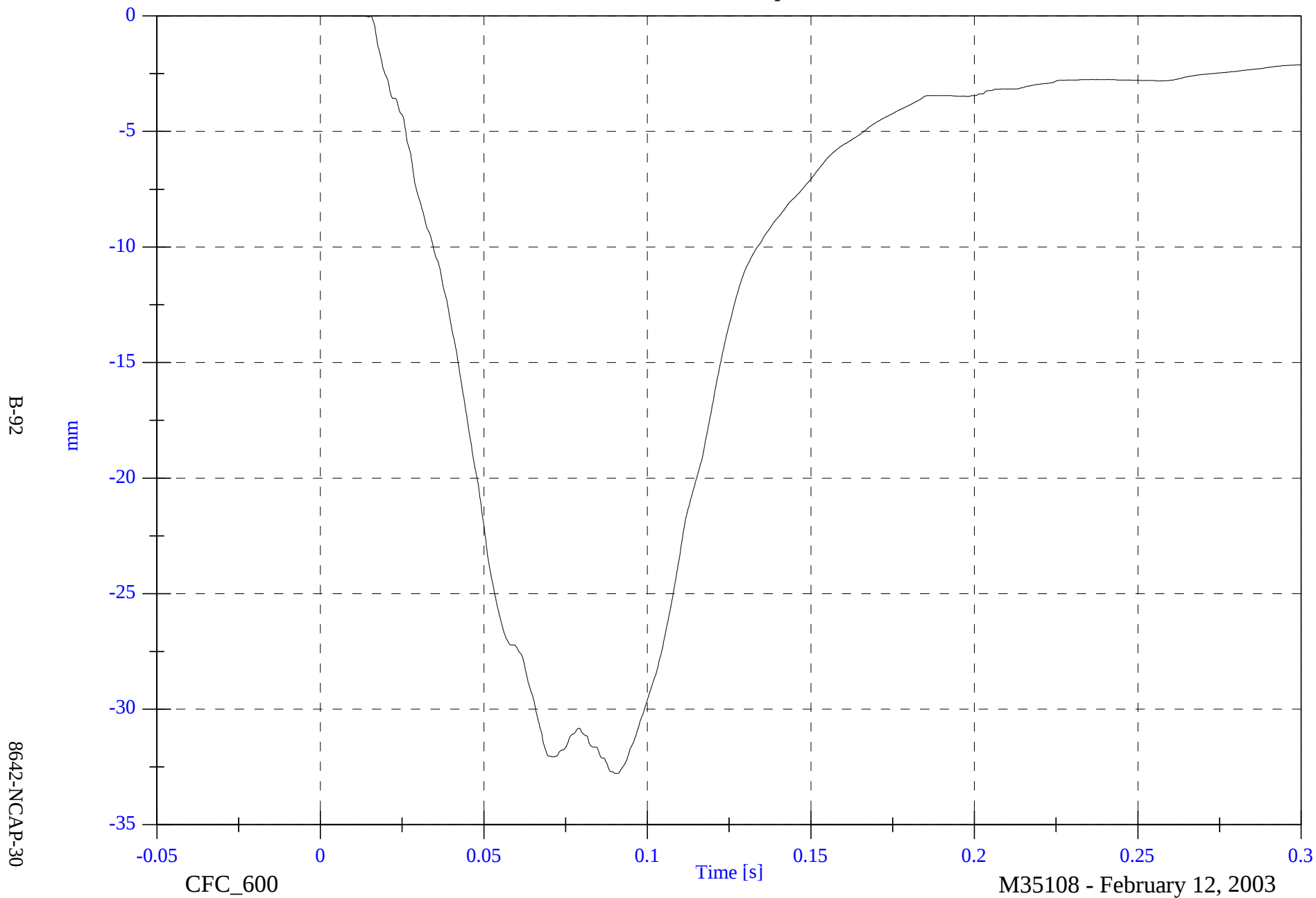
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1P2 Chest Compression

Max: 0.0 [mm] at 0.007 [s]

Min: -32.8 [mm] at 0.091 [s]

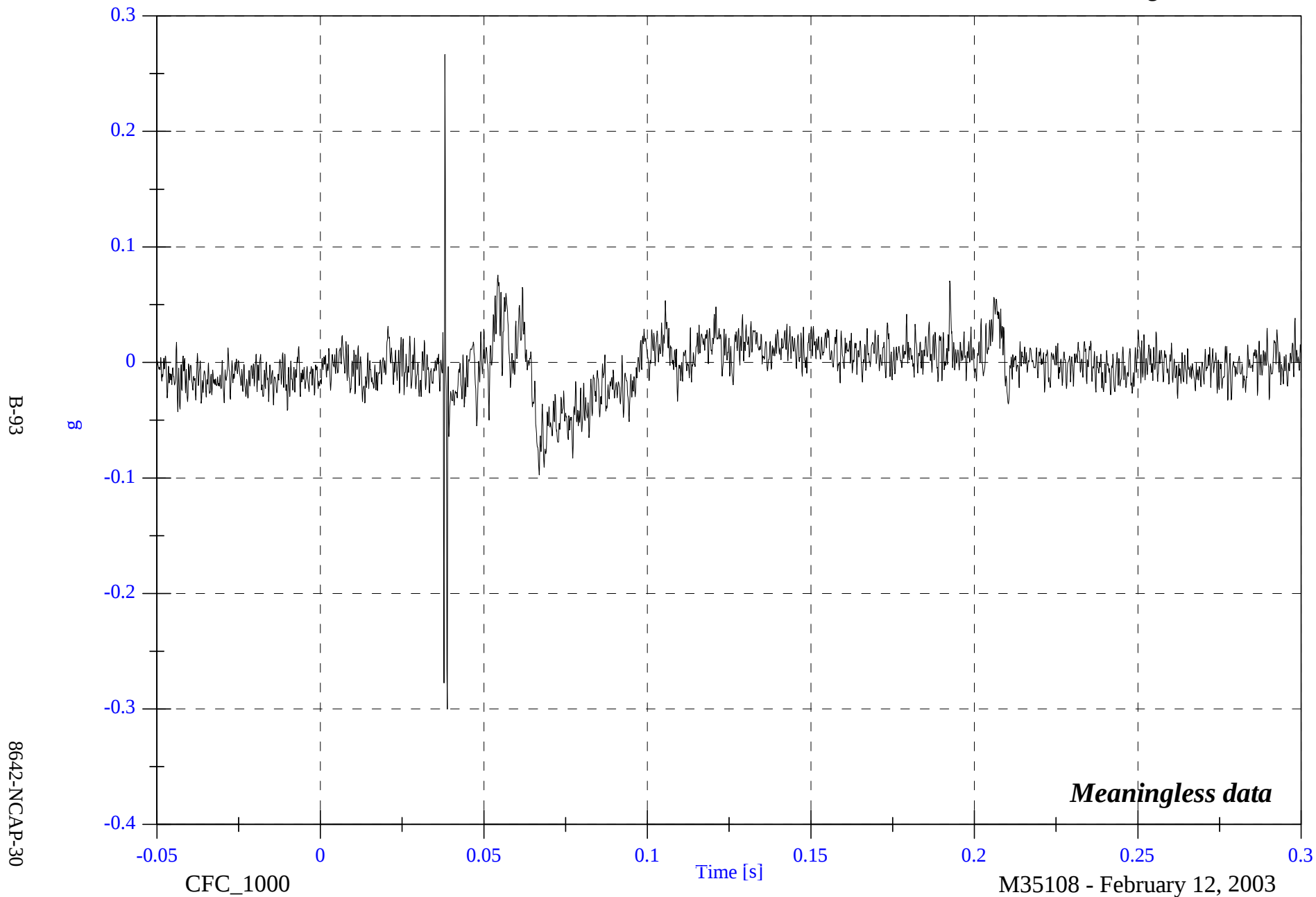


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Pelvic x

Max: 0.3 [g] at 0.038 [s]

Min: -0.3 [g] at 0.039 [s]



B-93

8642-NCAP-30

CFC_1000

M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

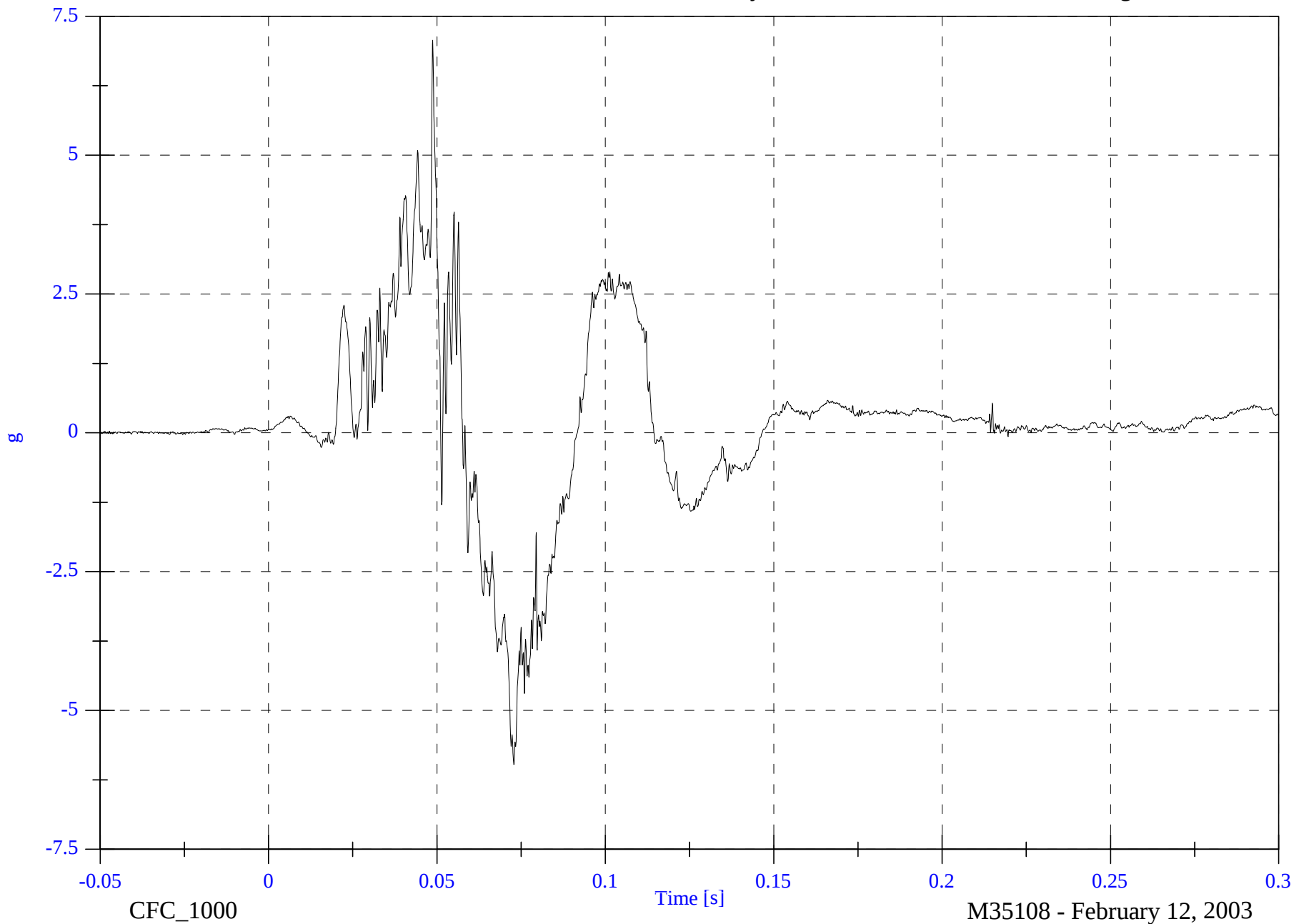
V1P2 Pelvic y

Max: 7.1 [g] at 0.049 [s]

Min: -6.0 [g] at 0.073 [s]

B-94

8642-NCAP-30

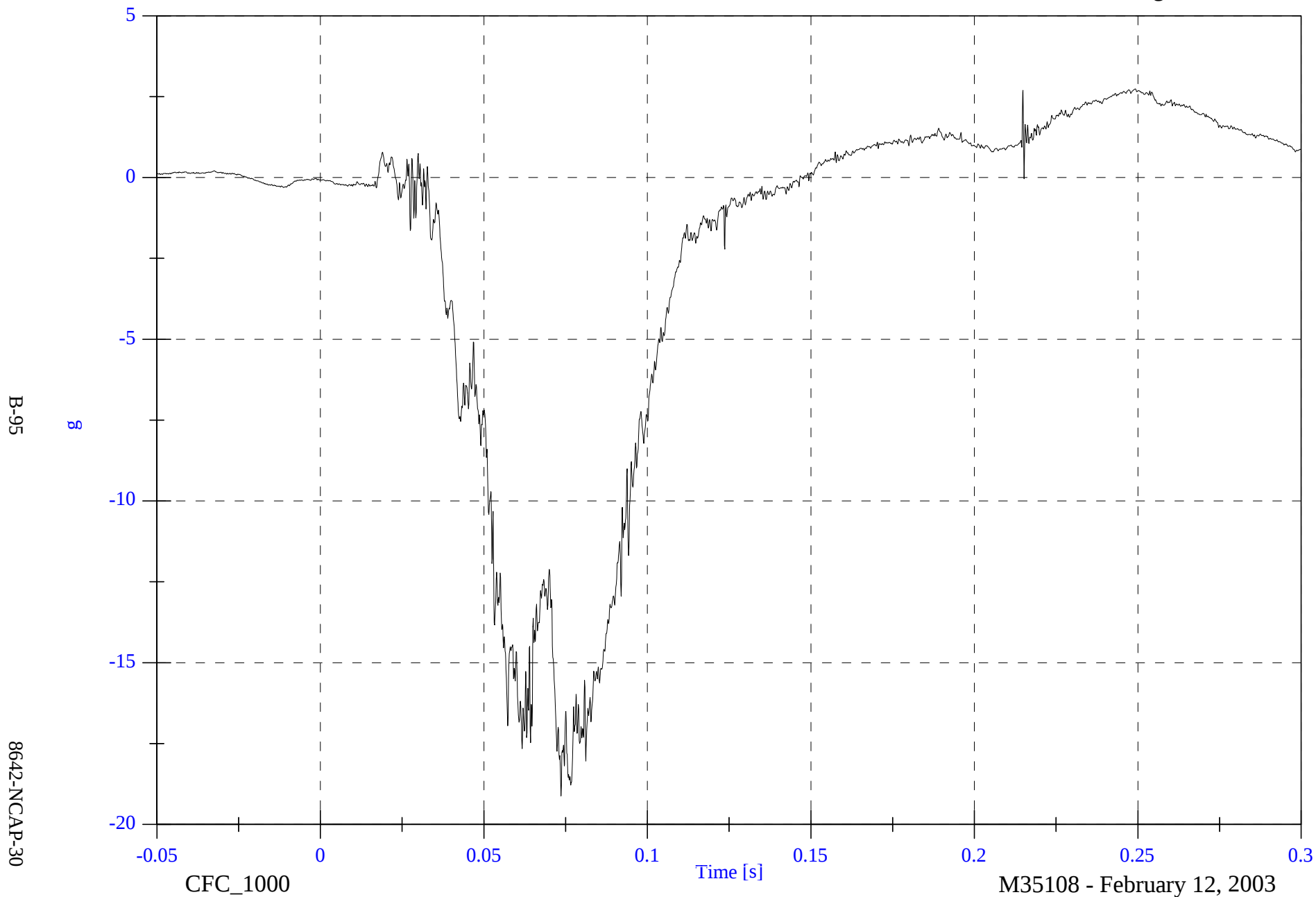


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Pelvic z

Max: 2.7 [g] at 0.249 [s]

Min: -19.1 [g] at 0.074 [s]



NCAP Test #8 - 2003 Toyota Avalon

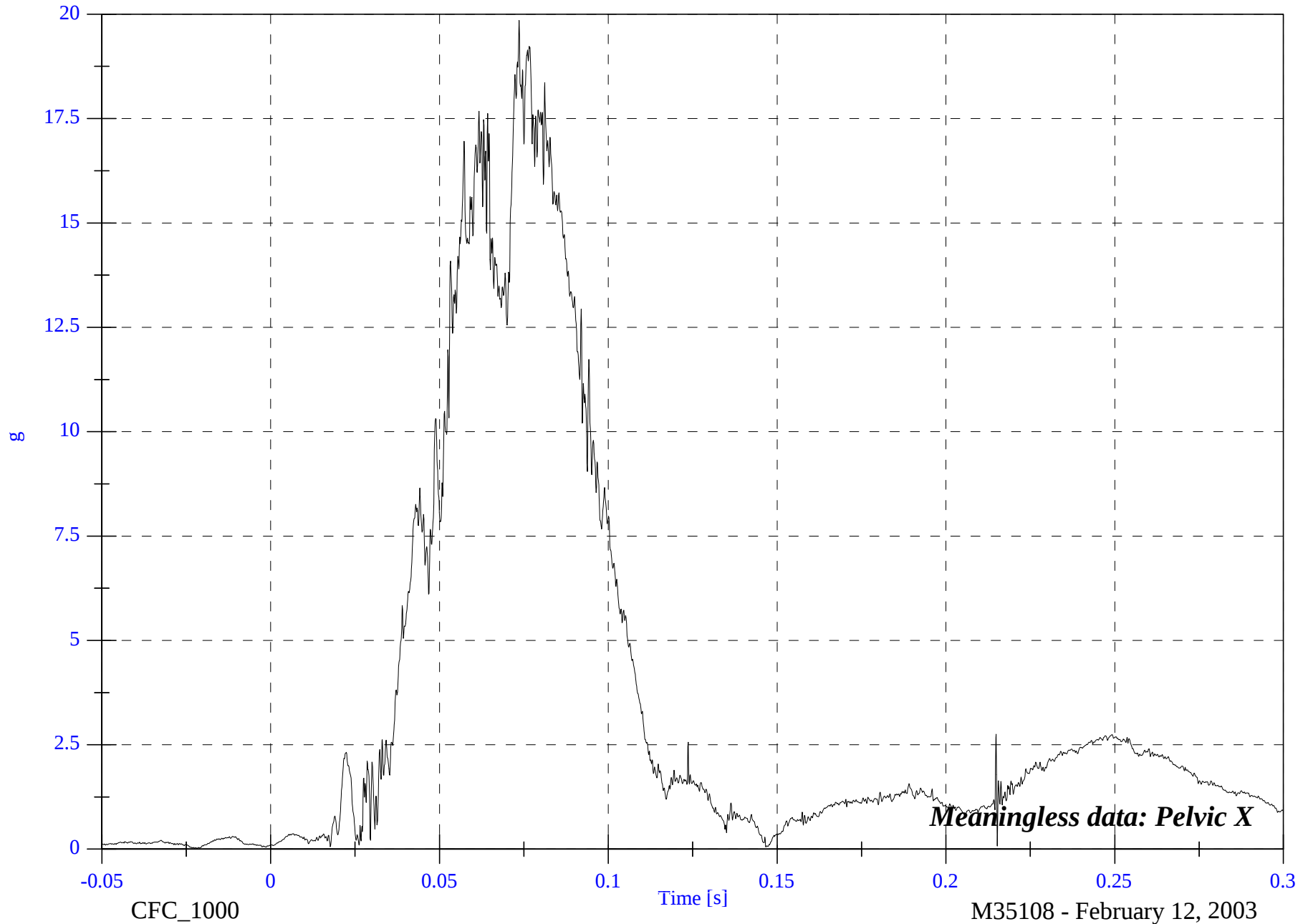
V1P2 Pelvic Resultant

Max: 19.9 [g] at 0.074 [s]

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

B-96

8642-NCAP-30

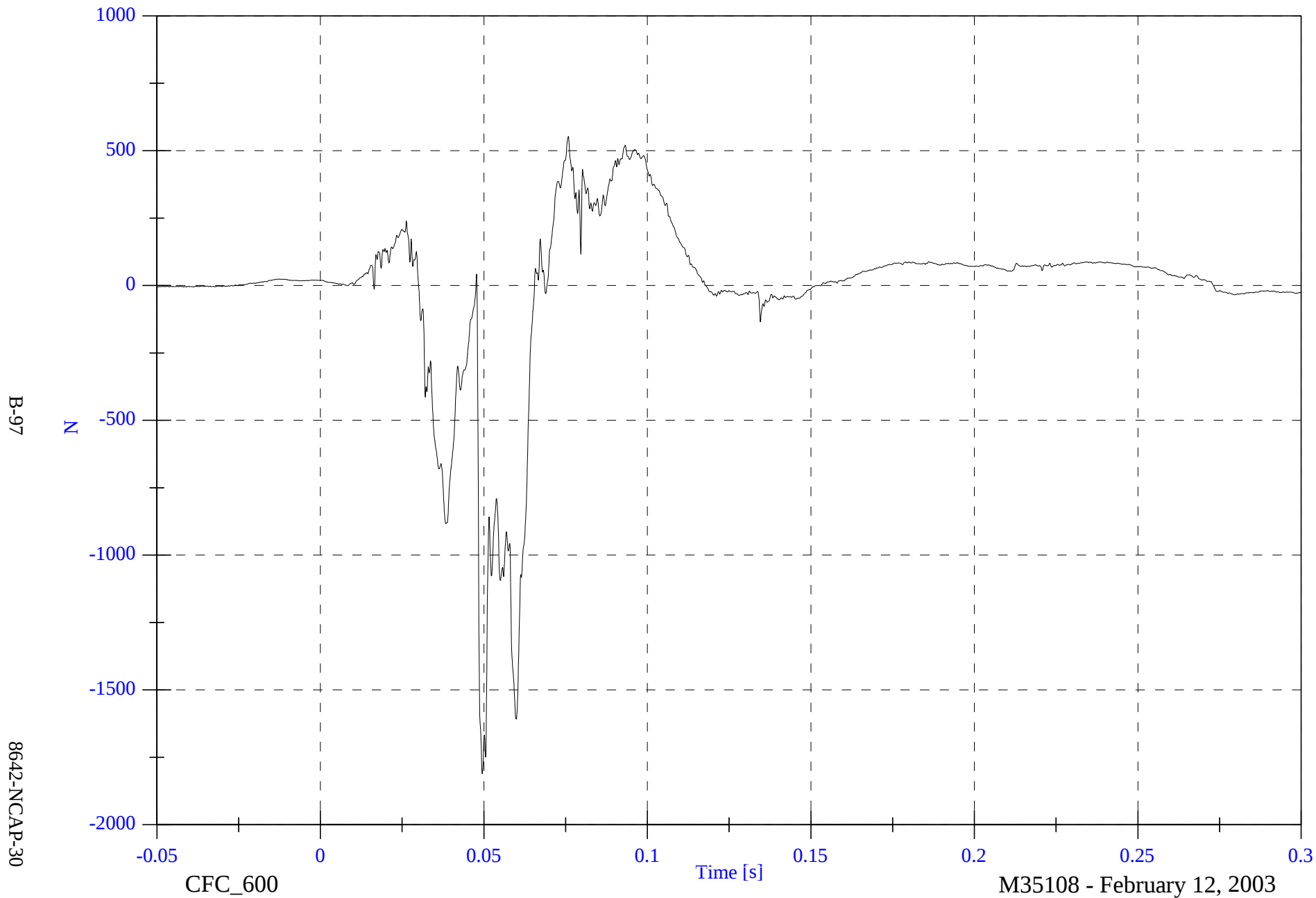


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Left Femur

Max: 553.1 [N] at 0.076 [s]

Min: -1810.7 [N] at 0.049 [s]

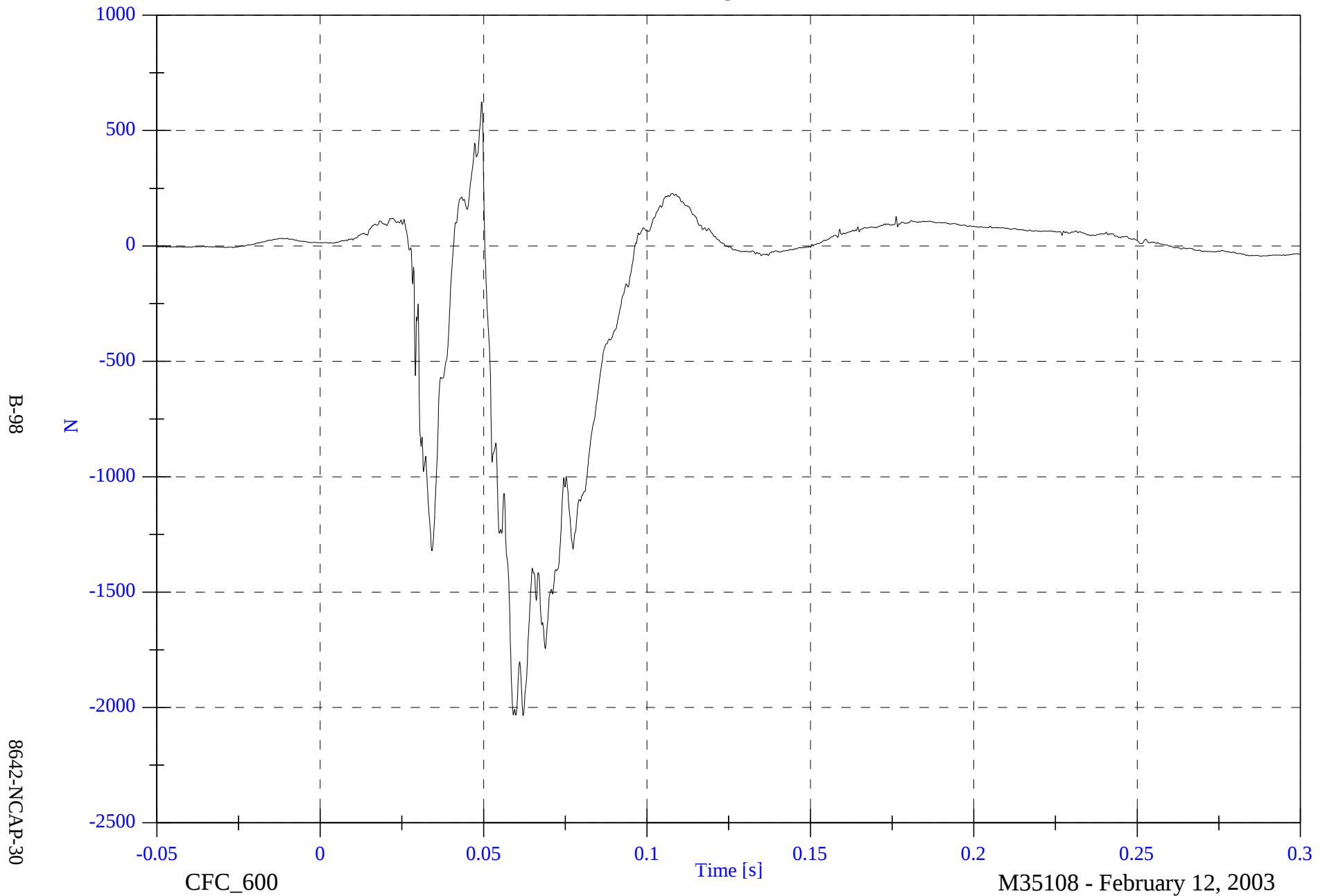


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Right Femur

Max: 623.3 [N] at 0.049 [s]

Min: -2035.7 [N] at 0.062 [s]



NCAP Test #8 - 2003 Toyota Avalon

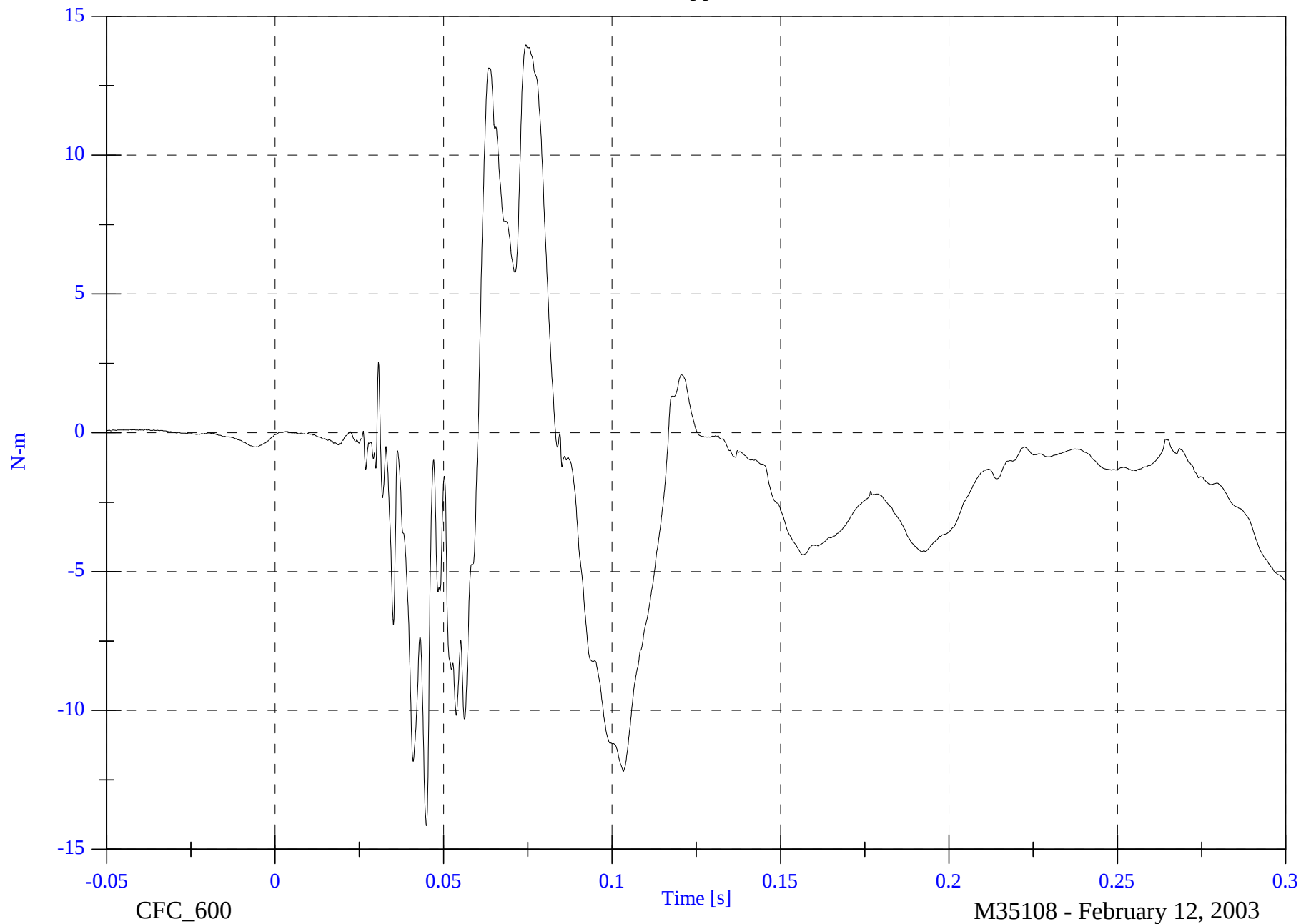
V1P2 Left Upper Tibia Mx

Max: 14.0 [N-m] at 0.074 [s]

Min: -14.1 [N-m] at 0.045 [s]

B-99

8642-NCAP-30

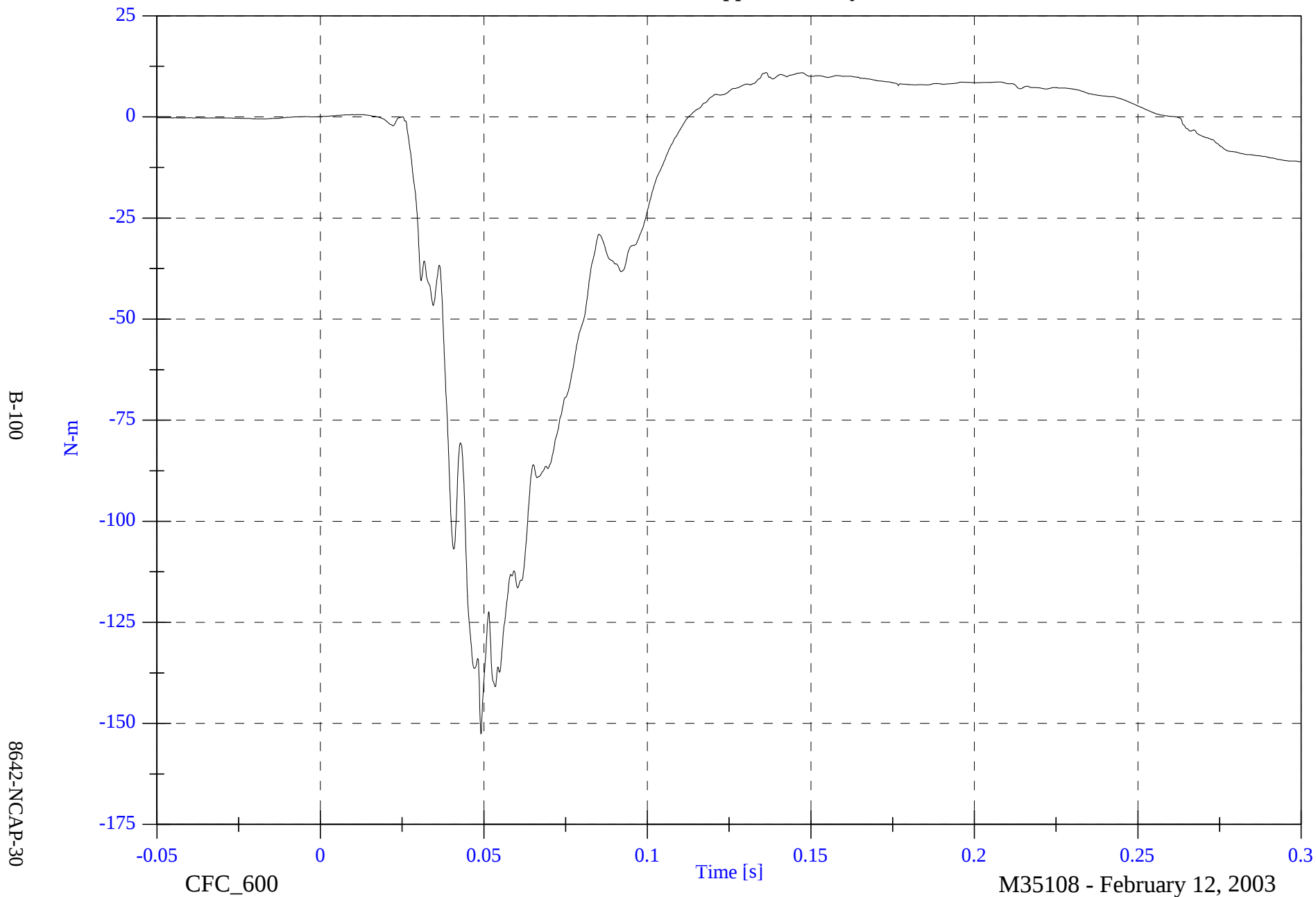


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Left Upper Tibia My

Max: 11.0 [N-m] at 0.136 [s]

Min: -152.6 [N-m] at 0.049 [s]

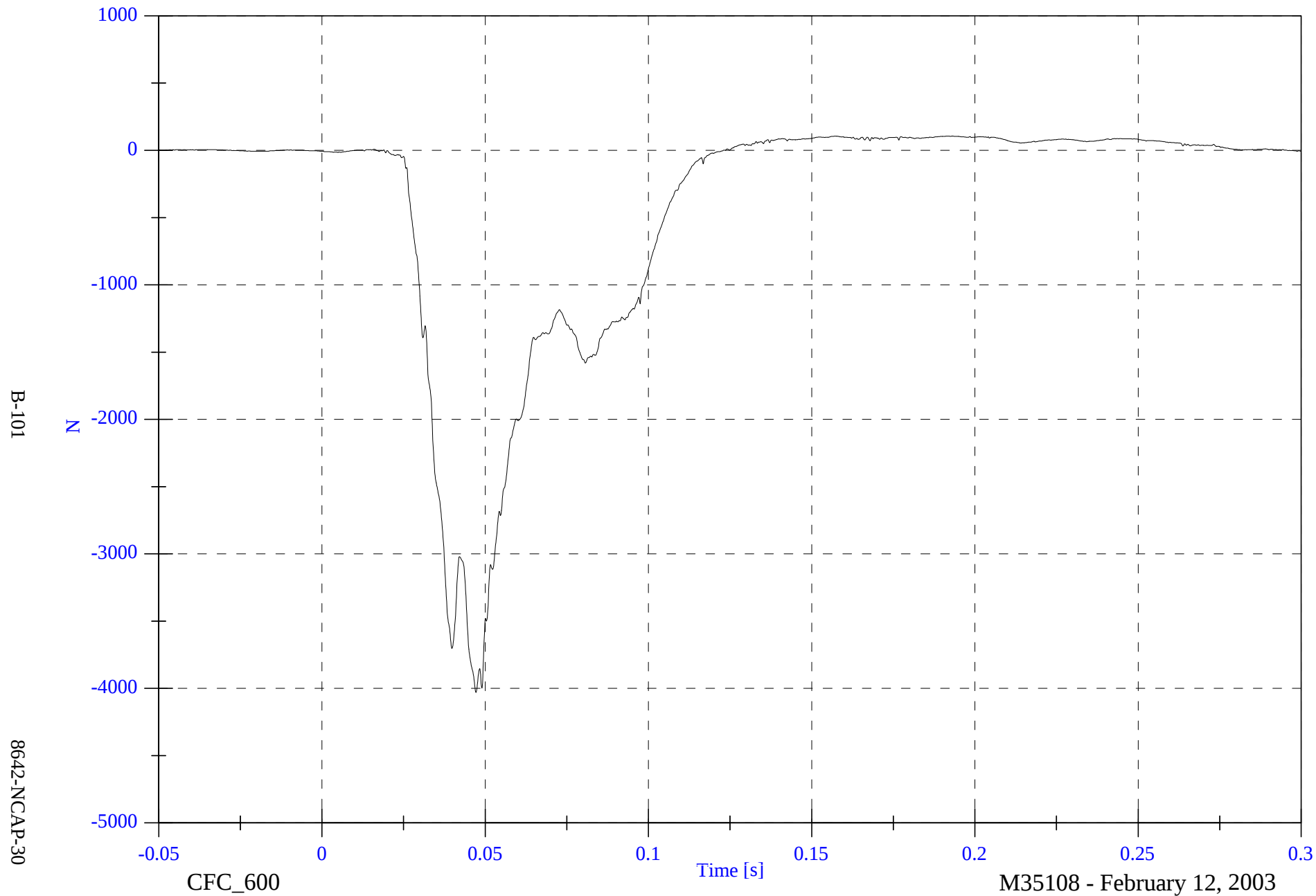


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Left Lower Tibia Fz

Max: 106.8 [N] at 0.193 [s]

Min: -4031.7 [N] at 0.047 [s]



NCAP Test #8 - 2003 Toyota Avalon

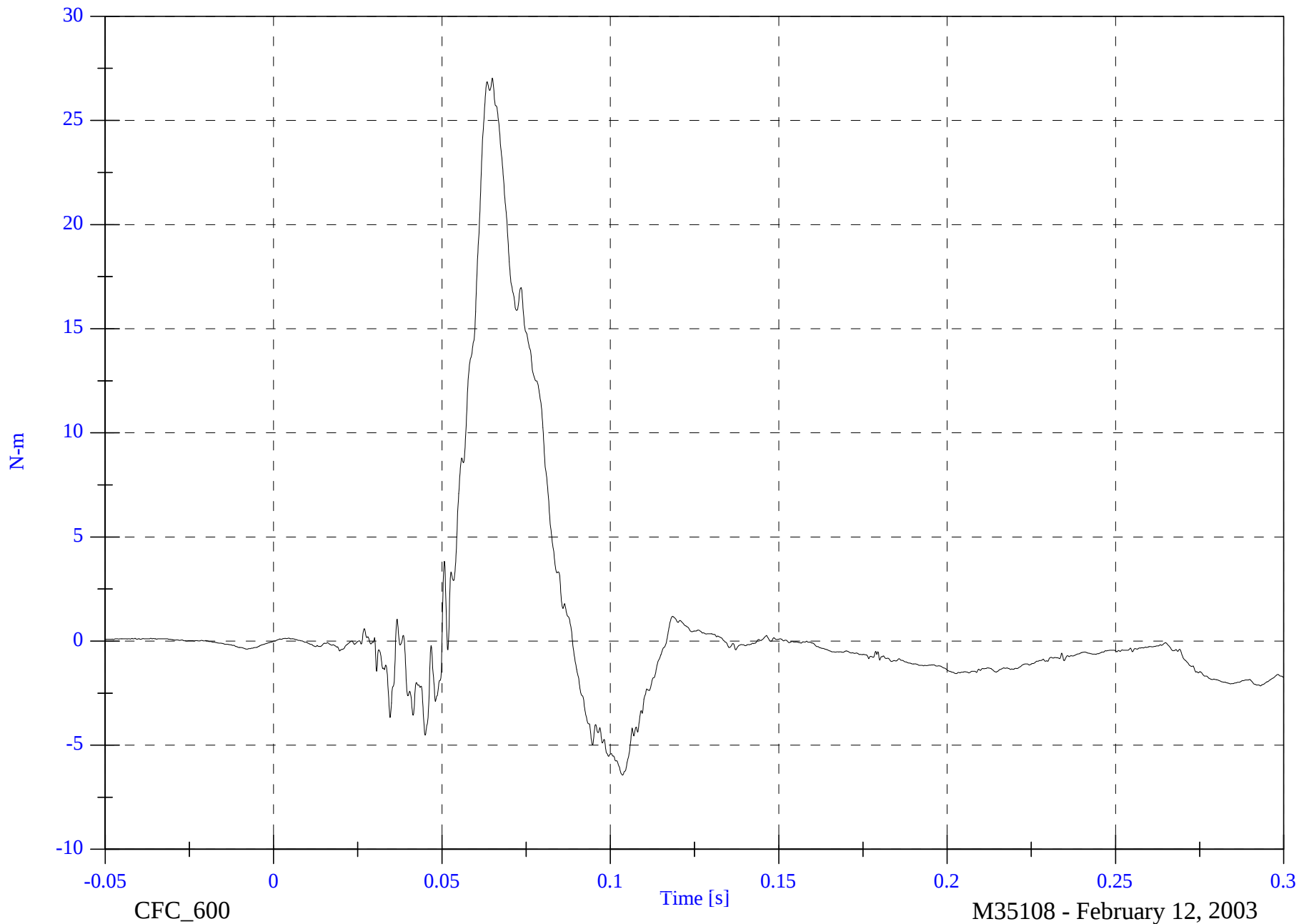
V1P2 Left Lower Tibia Mx

Max: 27.0 [N-m] at 0.065 [s]

Min: -6.4 [N-m] at 0.104 [s]

B-102

8642-NCAP-30

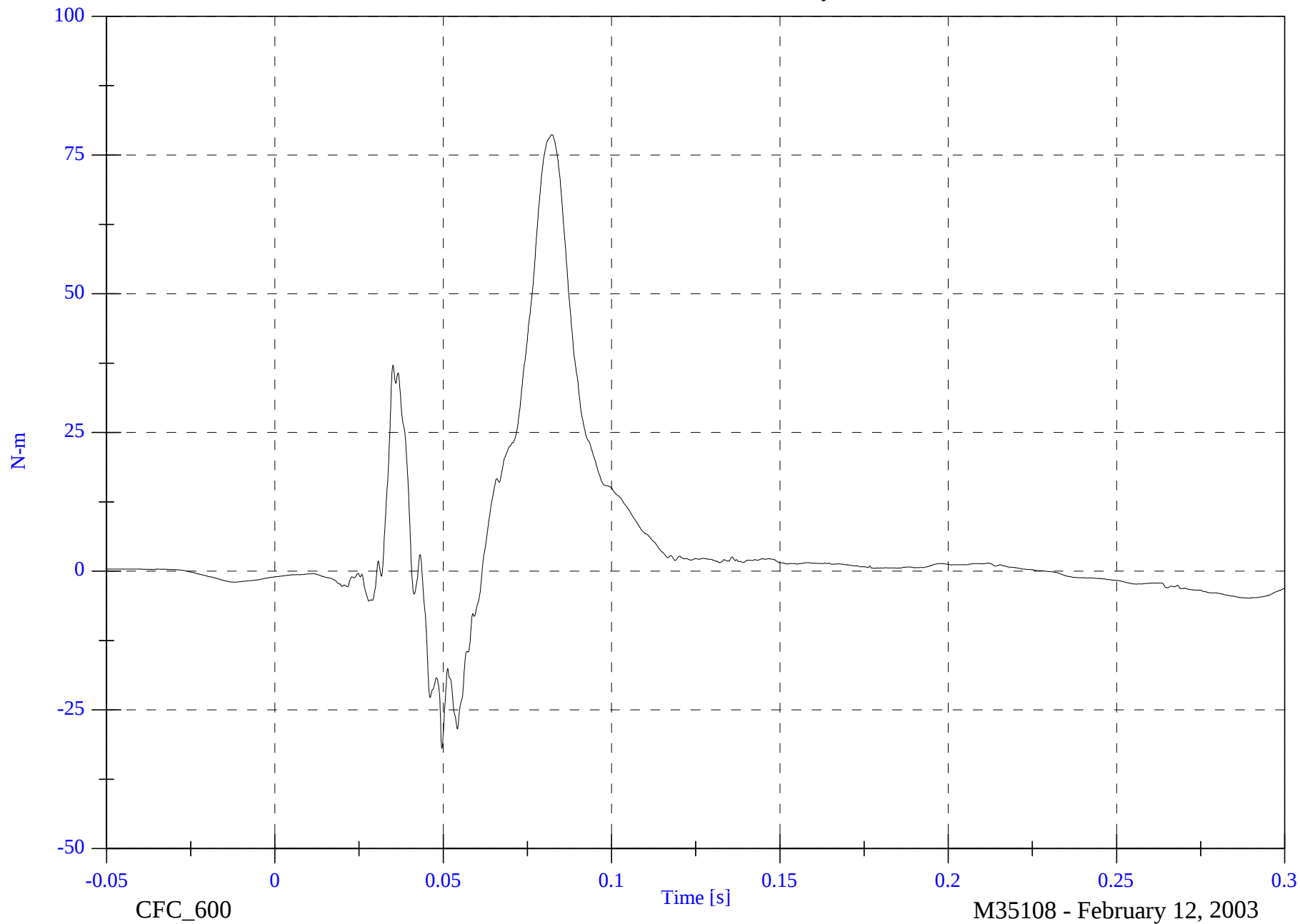


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Left Lower Tibia My

Max: 78.7 [N-m] at 0.082 [s]

Min: -32.0 [N-m] at 0.050 [s]



NCAP Test #8 - 2003 Toyota Avalon

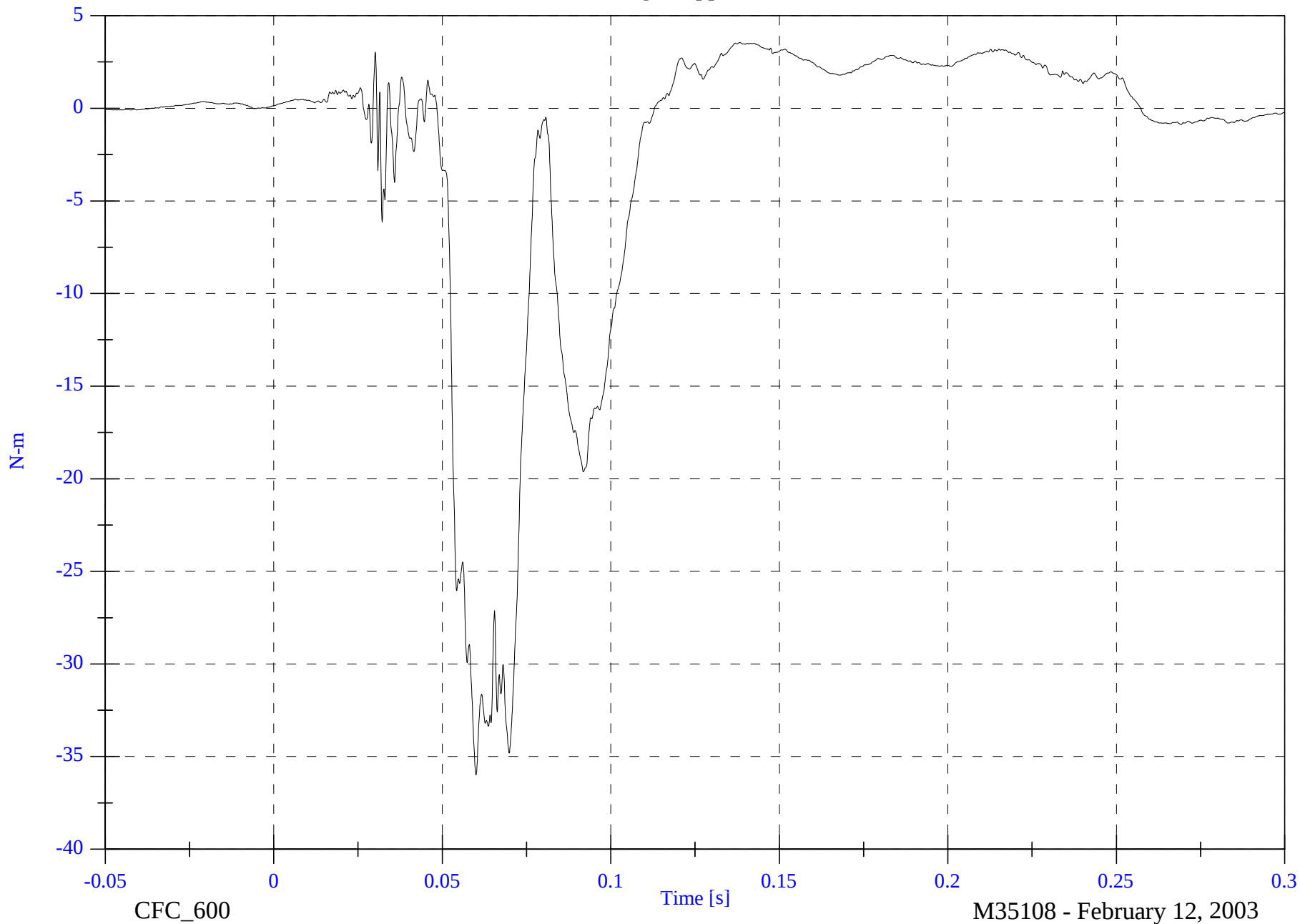
V1P2 Right Upper Tibia Mx

Max: 3.6 [N-m] at 0.138 [s]

Min: -36.0 [N-m] at 0.060 [s]

B-104

8642-NCAP-30

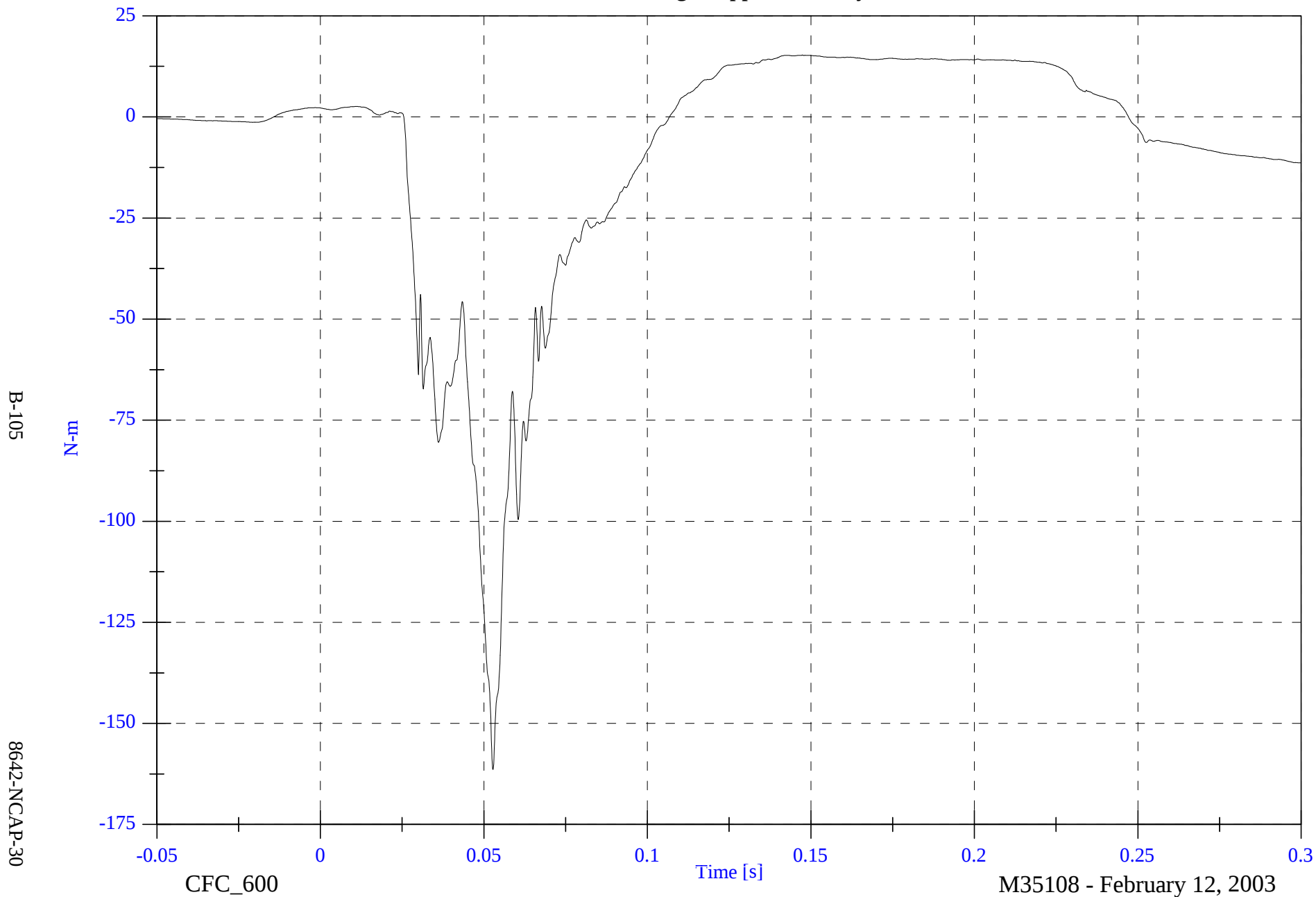


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Right Upper Tibia My

Max: 15.3 [N-m] at 0.147 [s]

Min: -161.4 [N-m] at 0.053 [s]

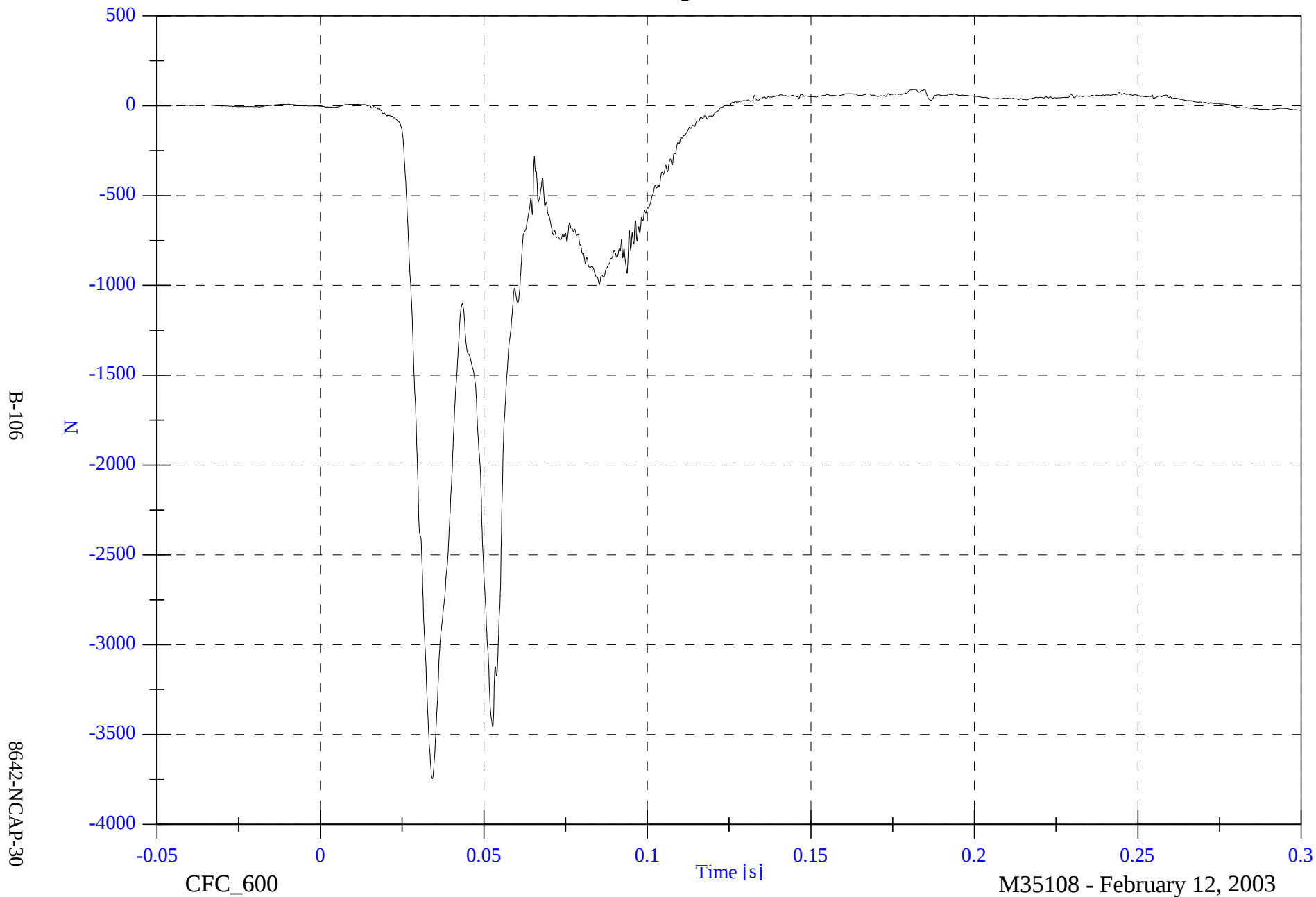


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Right Lower Tibia Fz

Max: 89.7 [N] at 0.181 [s]

Min: -3744.8 [N] at 0.034 [s]

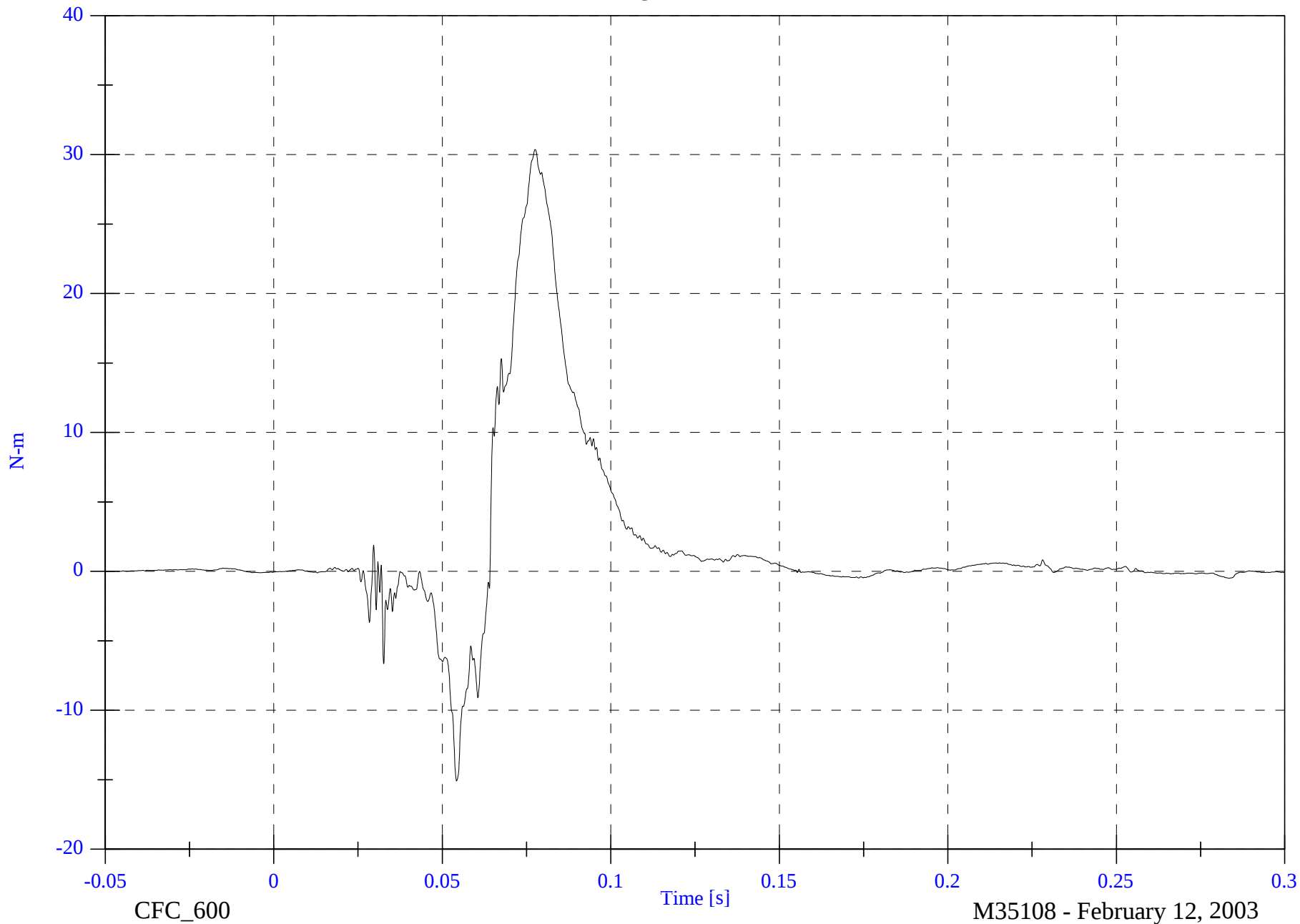


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Right Lower Tibia Mx

Max: 30.4 [N-m] at 0.078 [s]

Min: -15.1 [N-m] at 0.054 [s]

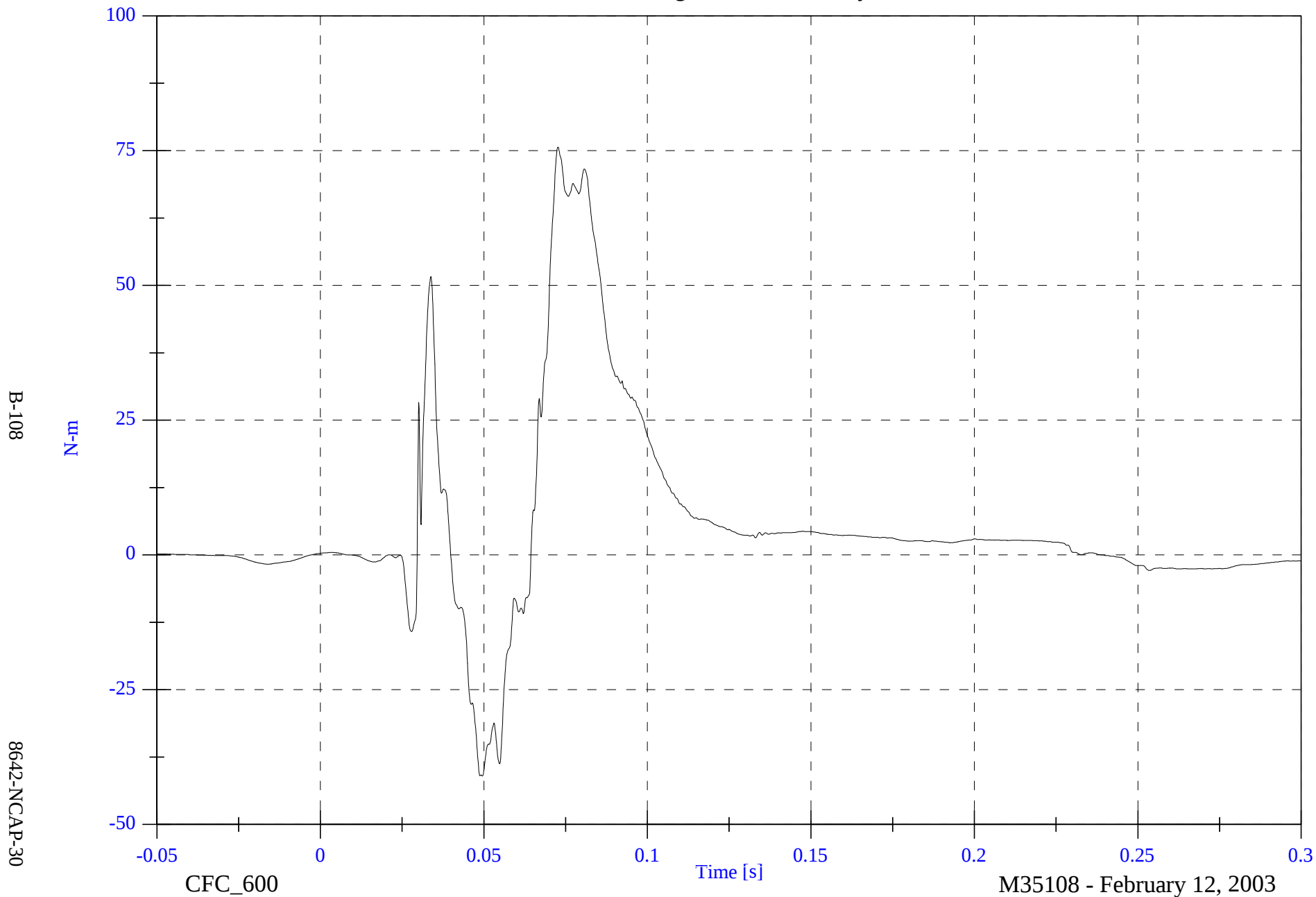


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Right Lower Tibia My

Max: 75.6 [N-m] at 0.073 [s]

Min: -41.0 [N-m] at 0.050 [s]

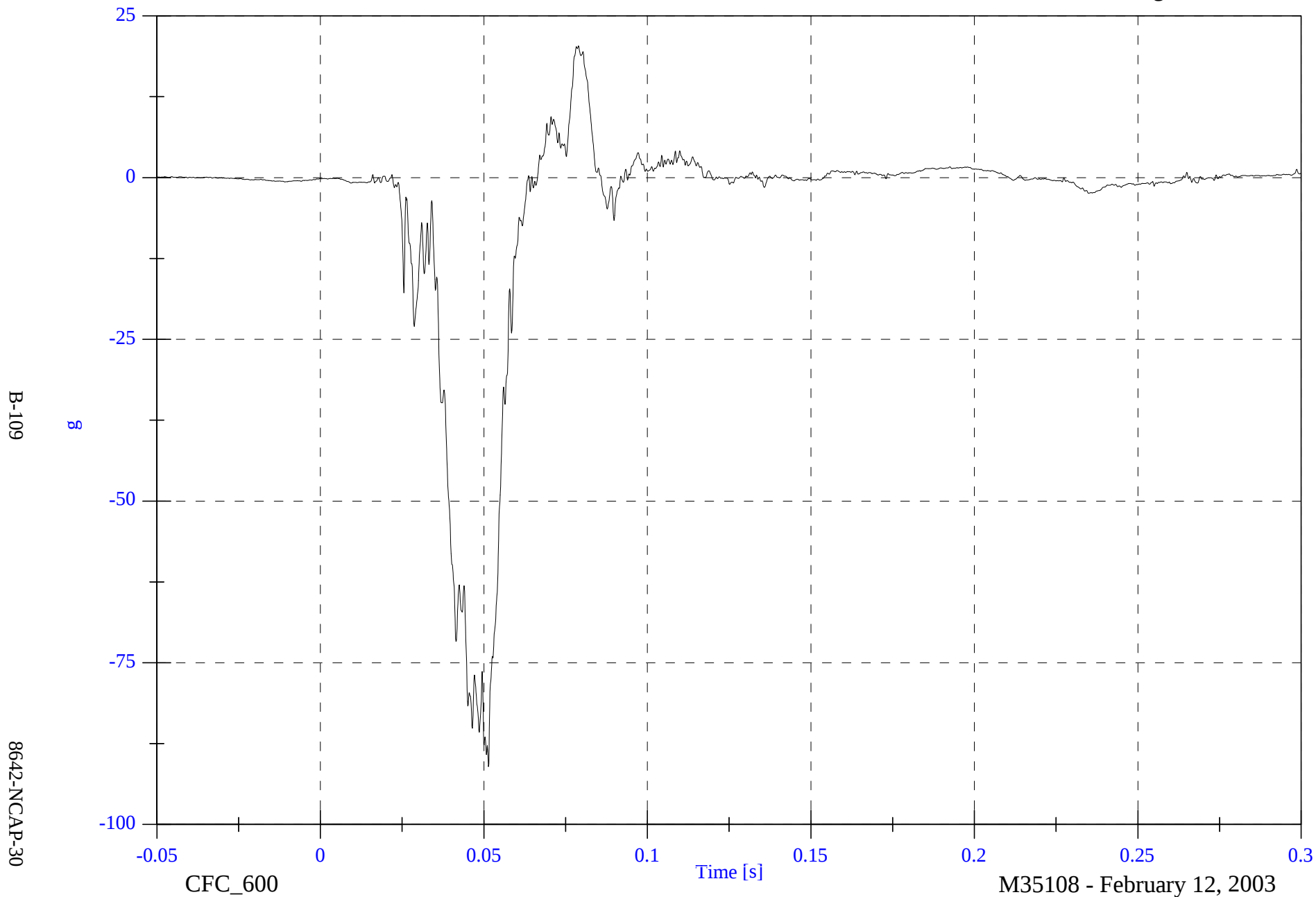


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Left foot Aft x

Max: 20.4 [g] at 0.079 [s]

Min: -91.1 [g] at 0.051 [s]

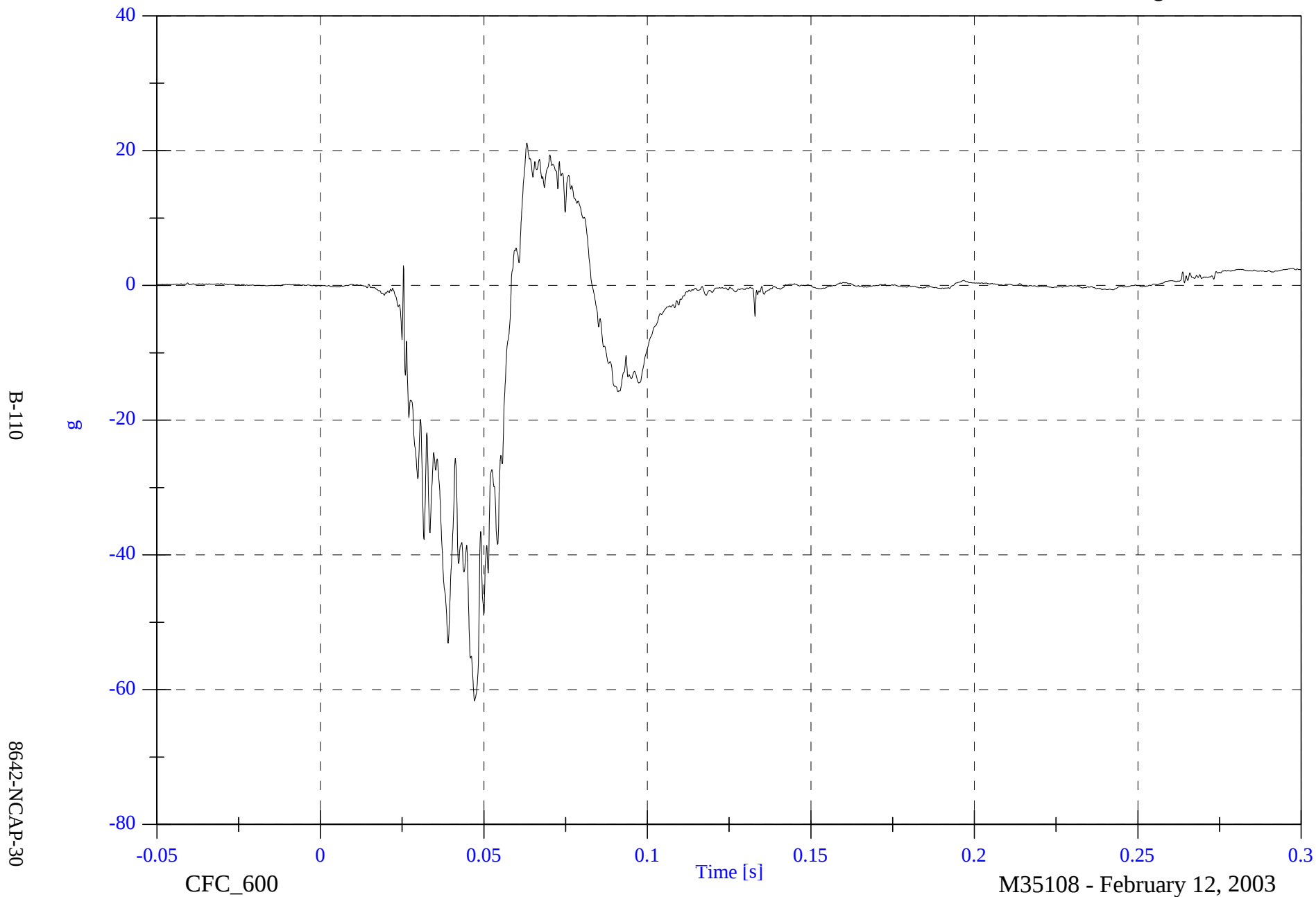


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Left Foot Aft z

Max: 21.1 [g] at 0.063 [s]

Min: -61.7 [g] at 0.047 [s]

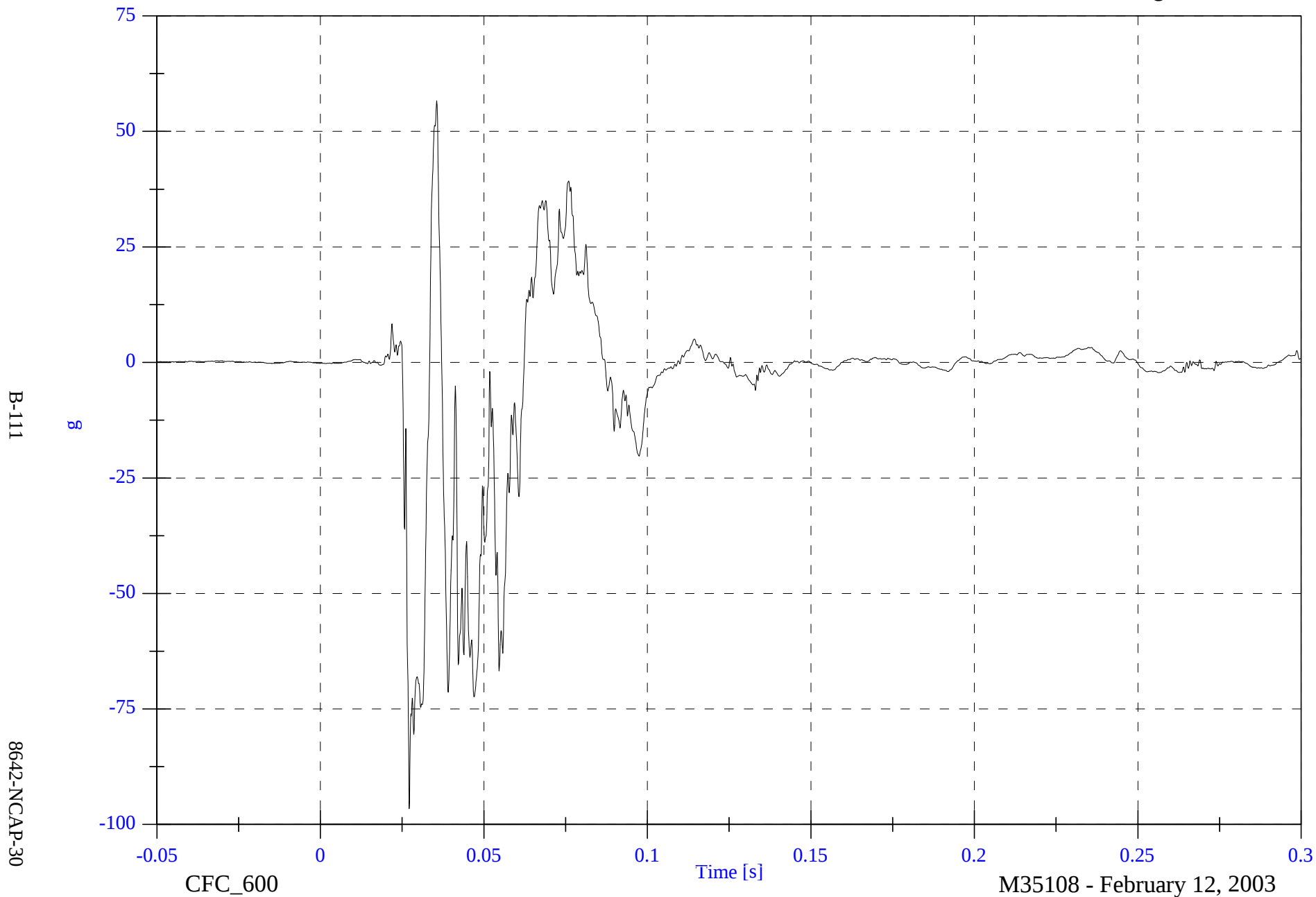


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Left Foot Fore z

Max: 56.7 [g] at 0.036 [s]

Min: -96.6 [g] at 0.027 [s]



NCAP Test #8 - 2003 Toyota Avalon

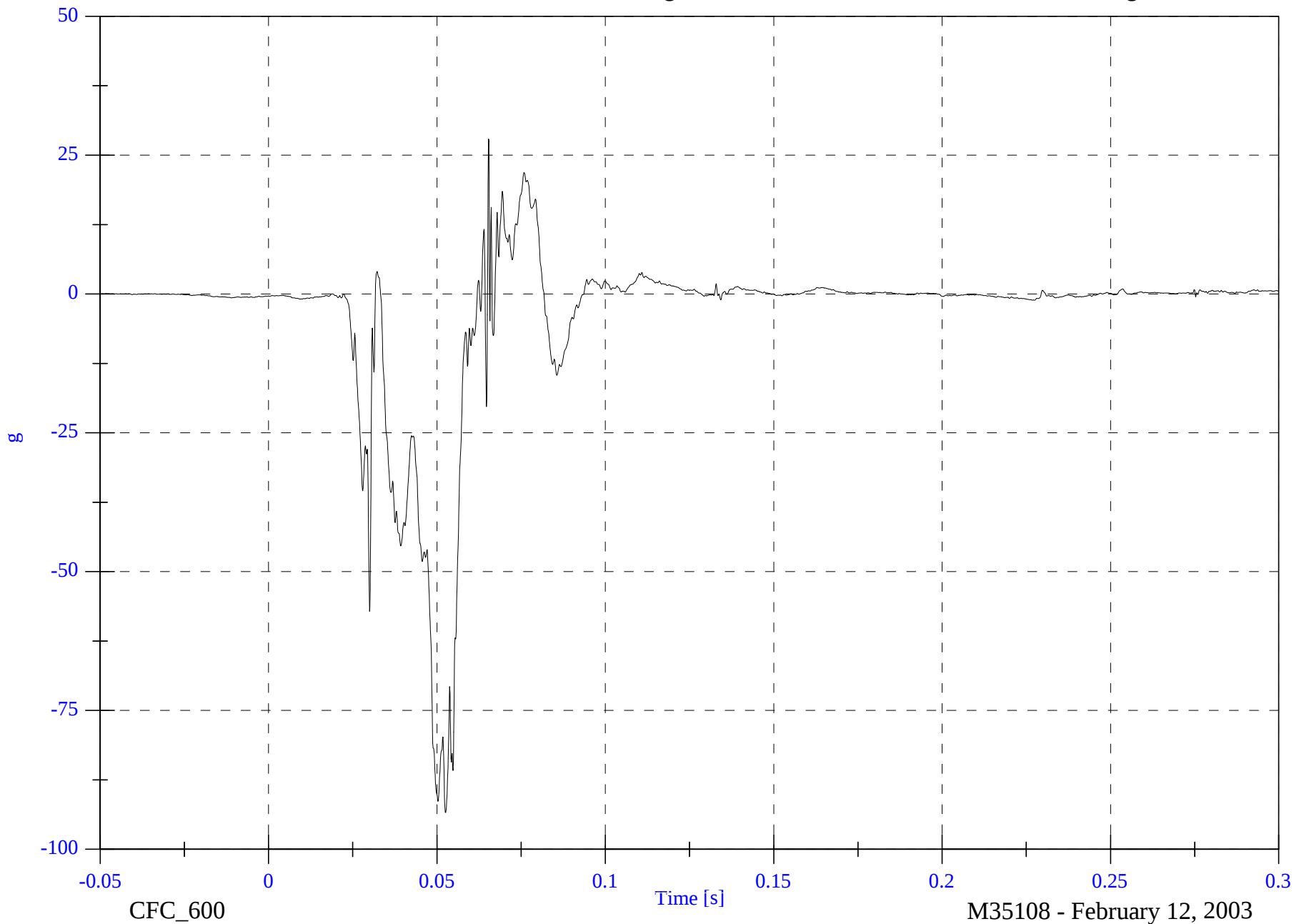
V1P2 Right Foot Aft x

Max: 27.9 [g] at 0.065 [s]

Min: -93.4 [g] at 0.053 [s]

B-112

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

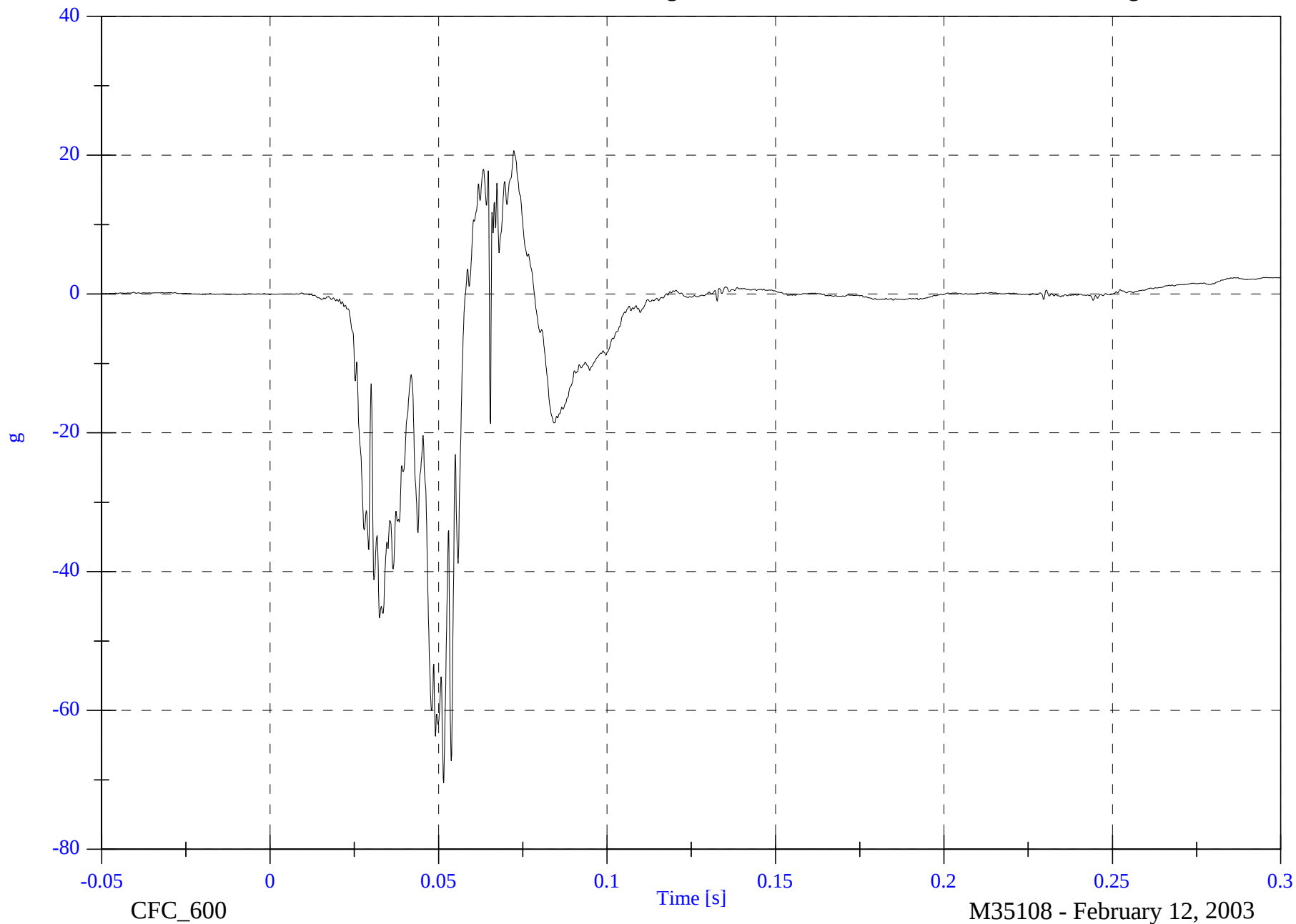
V1P2 Right Foot Aft z

Max: 20.7 [g] at 0.072 [s]

Min: -70.5 [g] at 0.051 [s]

B-113

8642-NCAP-30

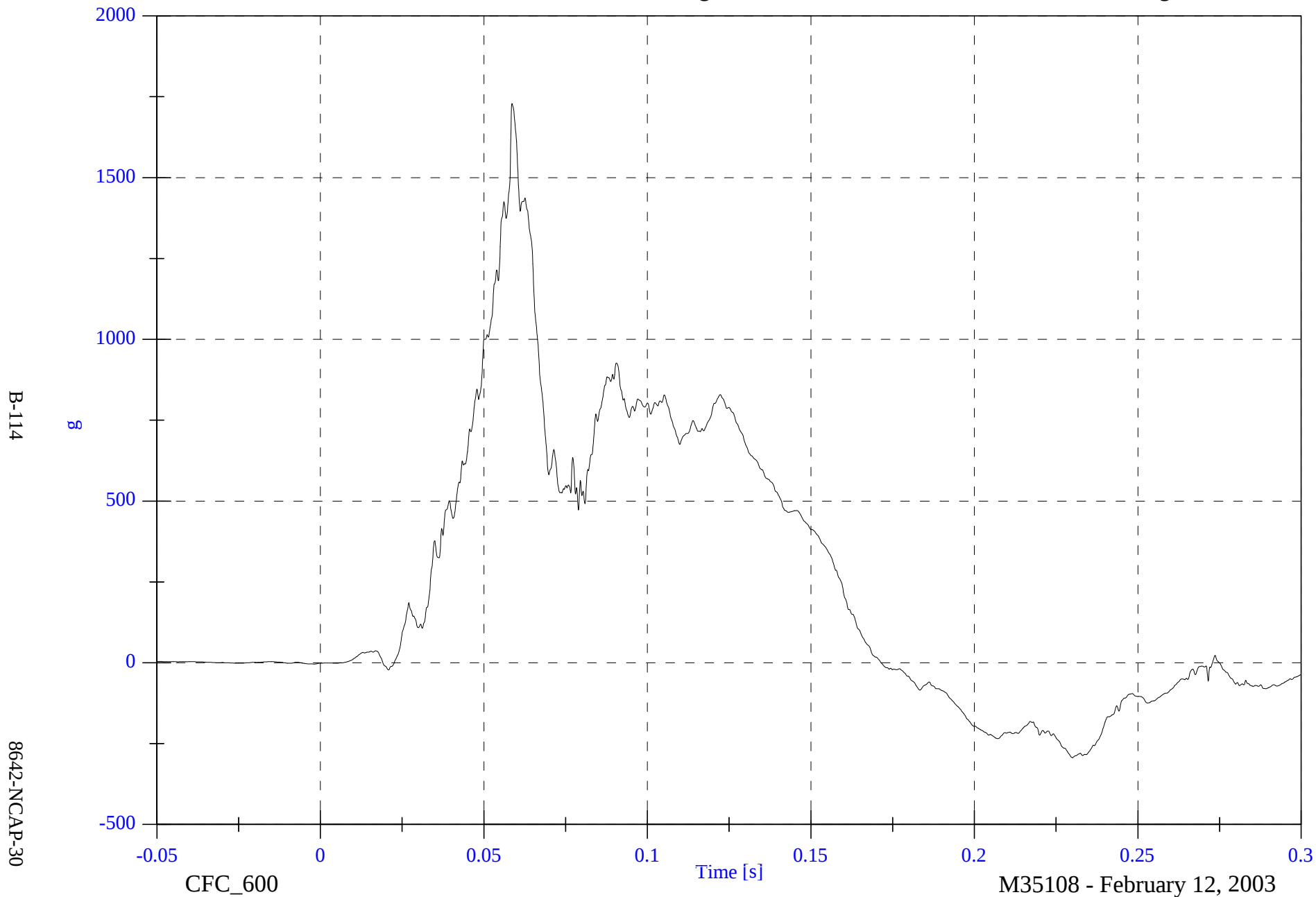


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Right Foot Fore z

Max: 1728.9 [g] at 0.059 [s]

Min: -293.4 [g] at 0.230 [s]

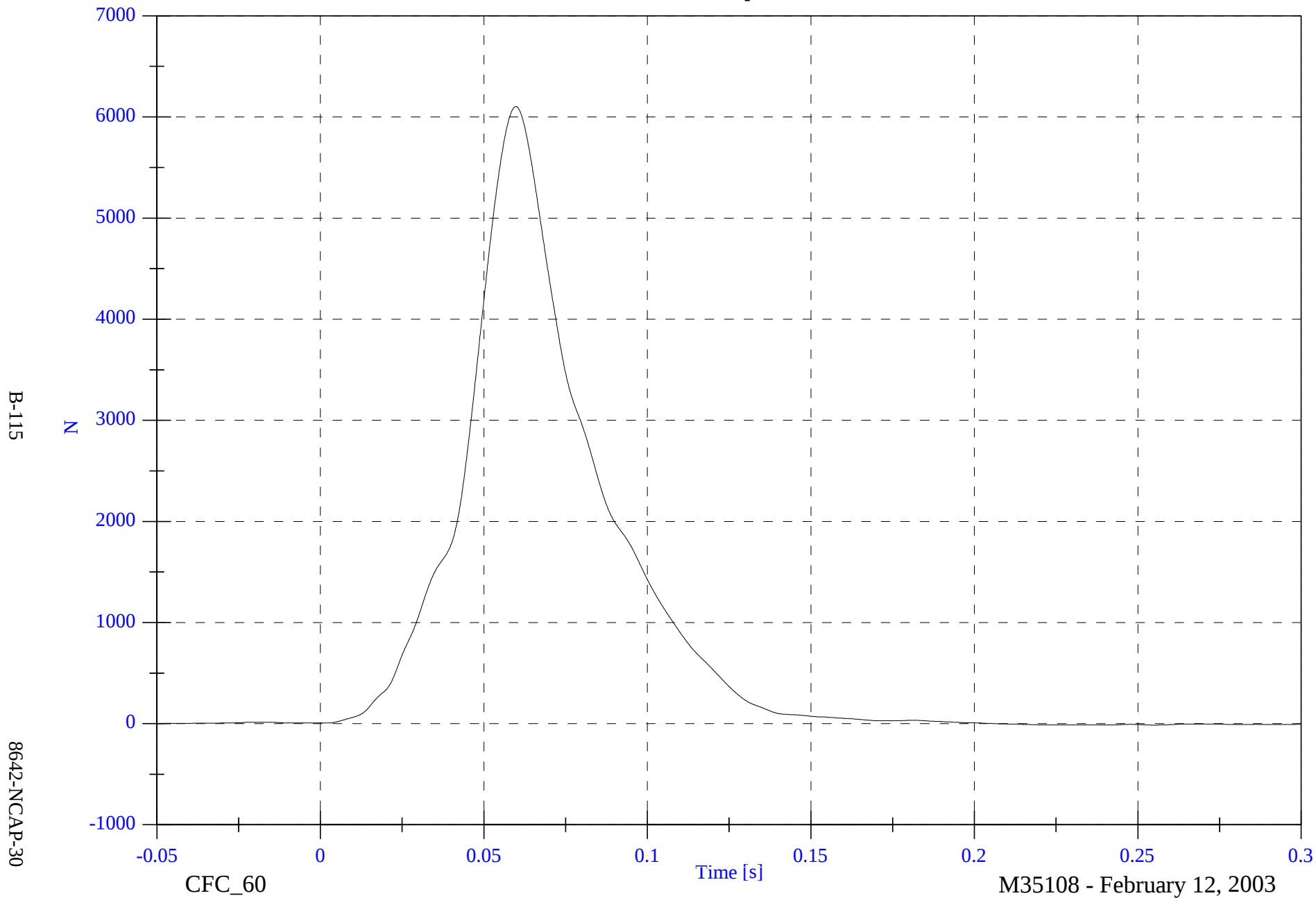


NCAP Test #8 - 2003 Toyota Avalon

V1P2 Lap Belt

Max: 6103.4 [N] at 0.060 [s]

Min: -14.7 [N] at 0.255 [s]



NCAP Test #8 - 2003 Toyota Avalon

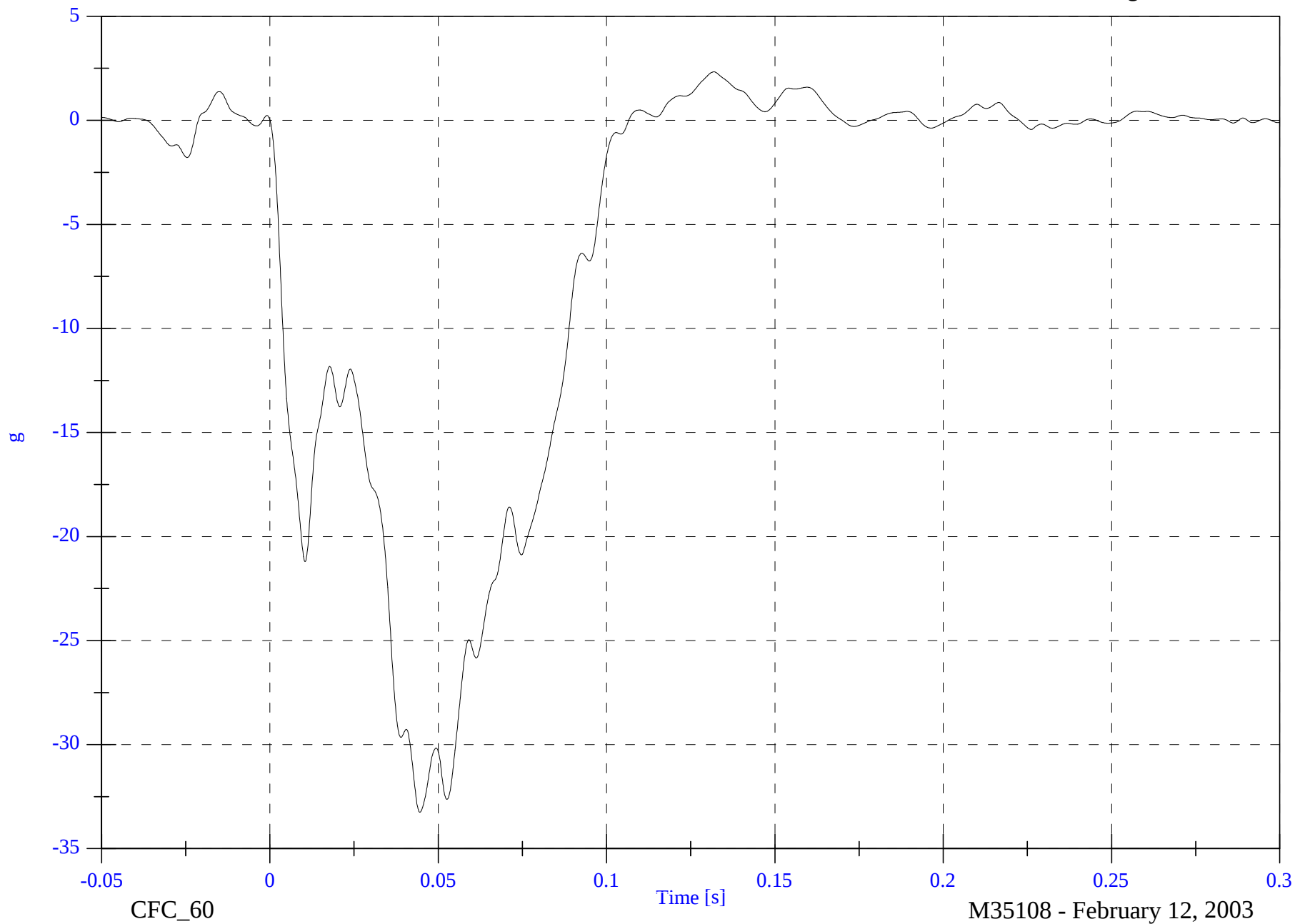
V1 Left Rear #1x

Max: 2.3 [g] at 0.132 [s]

Min: -33.3 [g] at 0.045 [s]

B-116

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

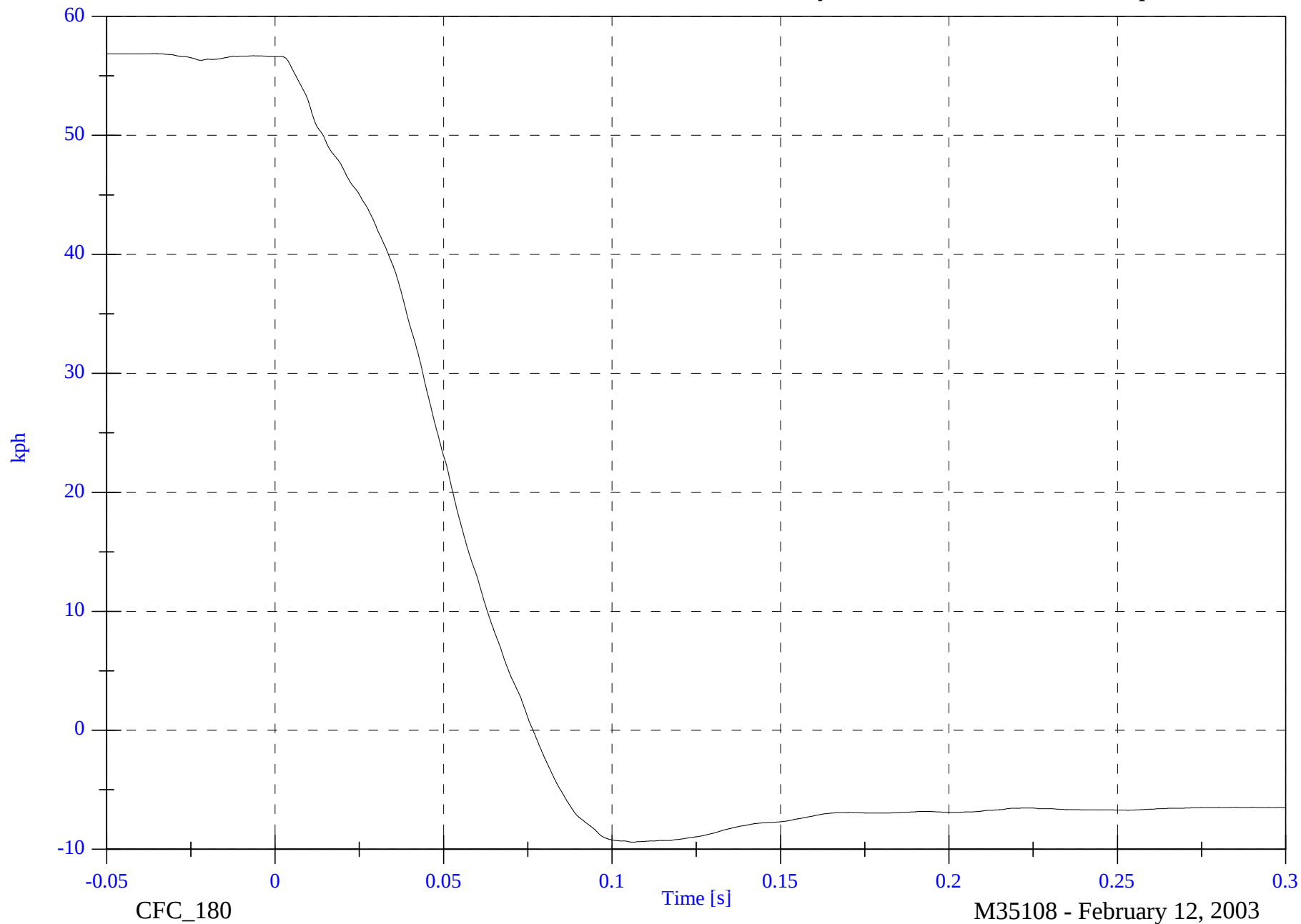
V1 Left Rear #1x Velocity

Max: 56.9 [kph] at -0.036 [s]

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

B-117

8642-NCAP-30

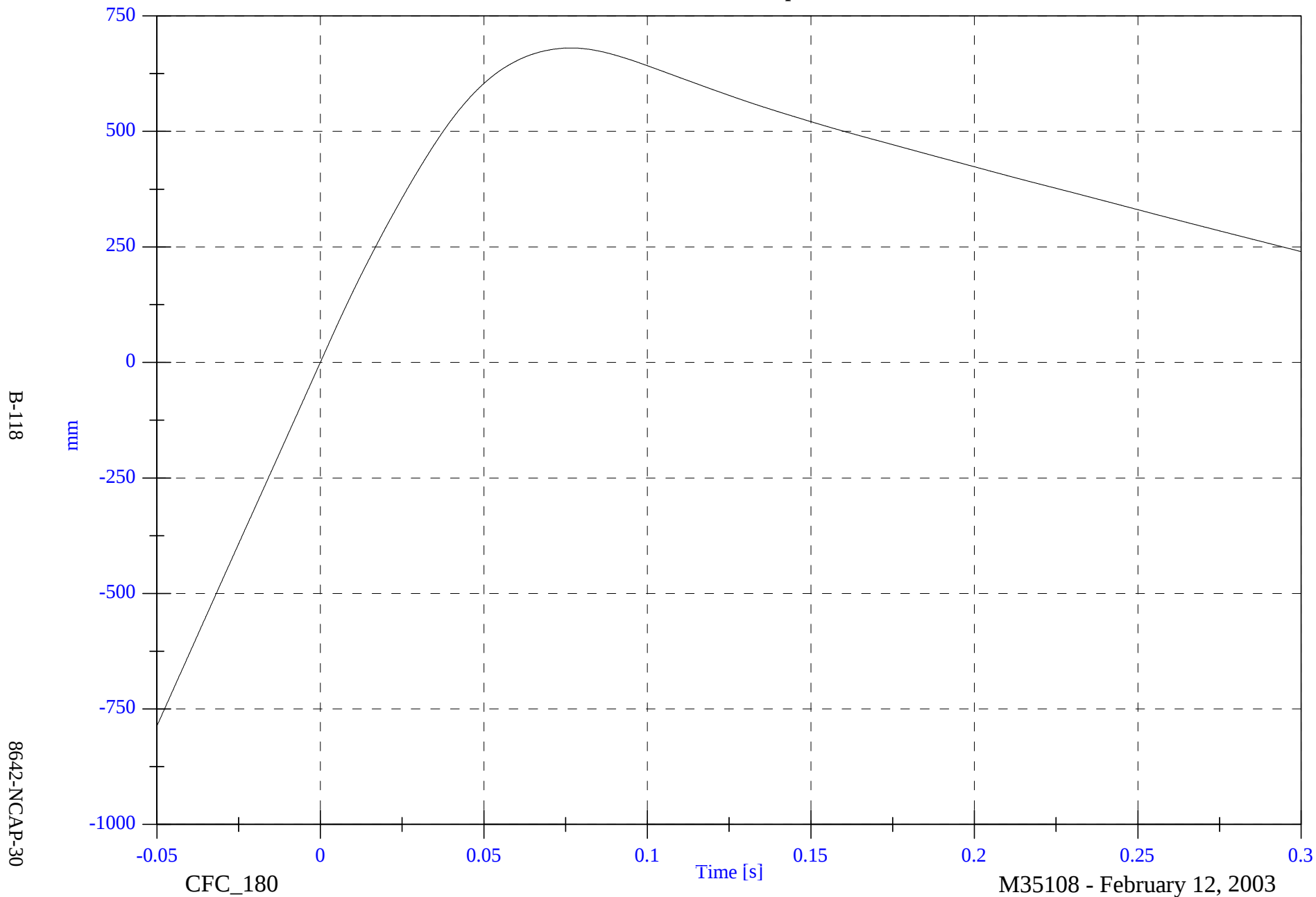


NCAP Test #8 - 2003 Toyota Avalon

V1 Left Rear #1x Displacement

Max: 680.5 [mm] at 0.077 [s]

Min: -787.1 [mm] at -0.050 [s]



NCAP Test #8 - 2003 Toyota Avalon

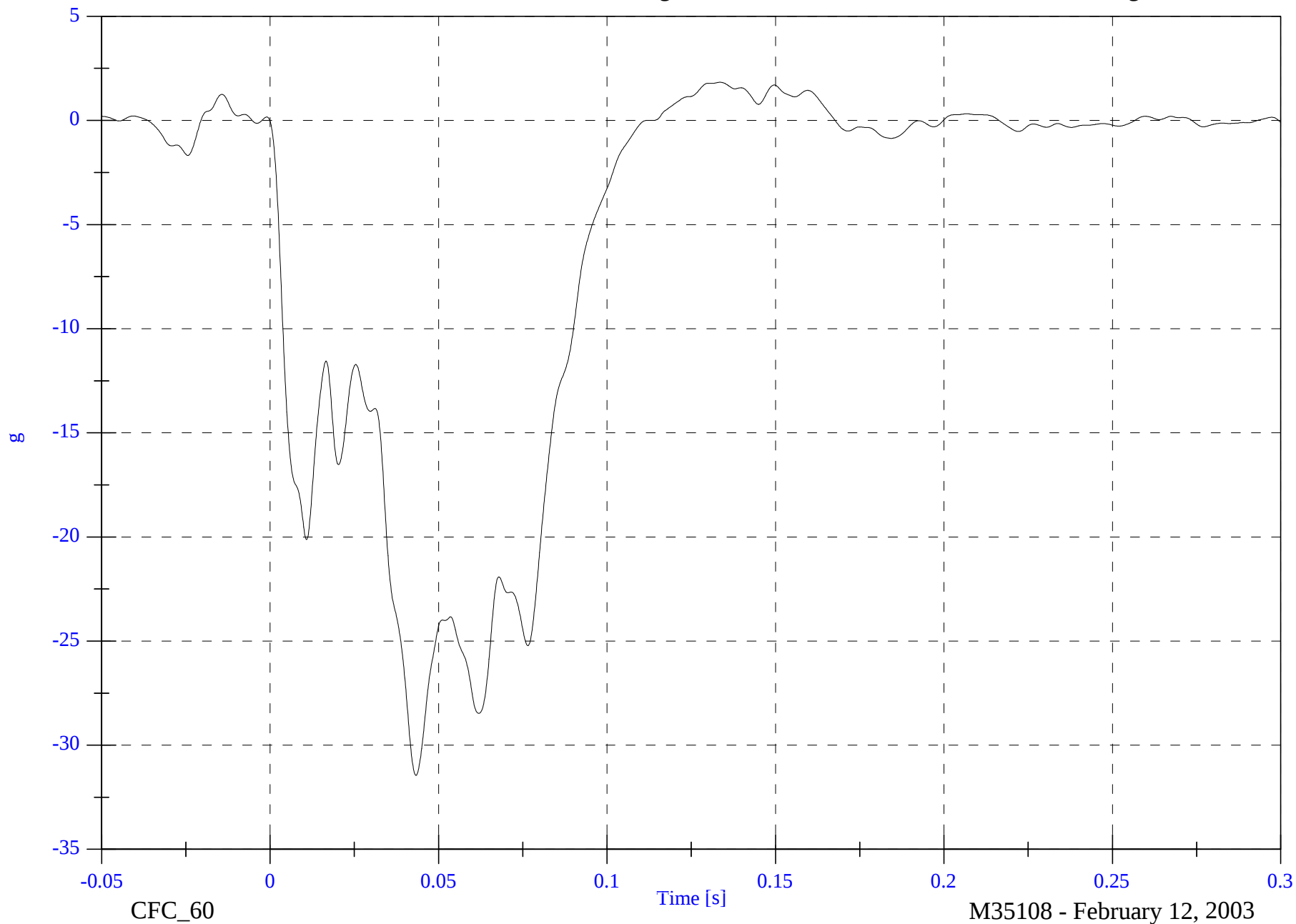
V1 Right Rear #2x

Max: 1.8 [g] at 0.133 [s]

Min: -31.5 [g] at 0.043 [s]

B-119

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

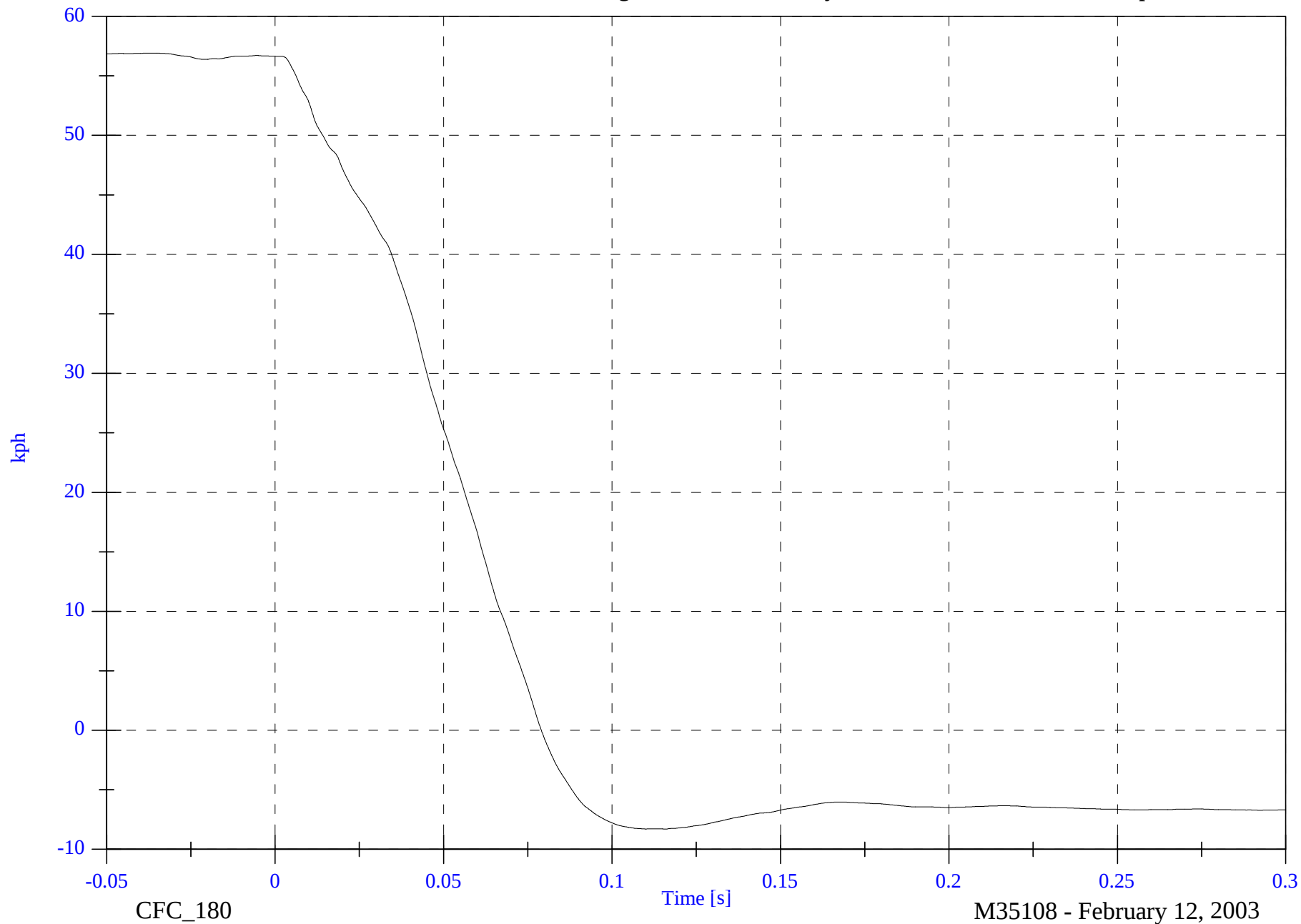
V1 Right Rear #2x Velocity

Max: 56.9 [kph] at -0.036 [s]

Min: -8.3 [kph] at 0.116 [s]

B-120

8642-NCAP-30

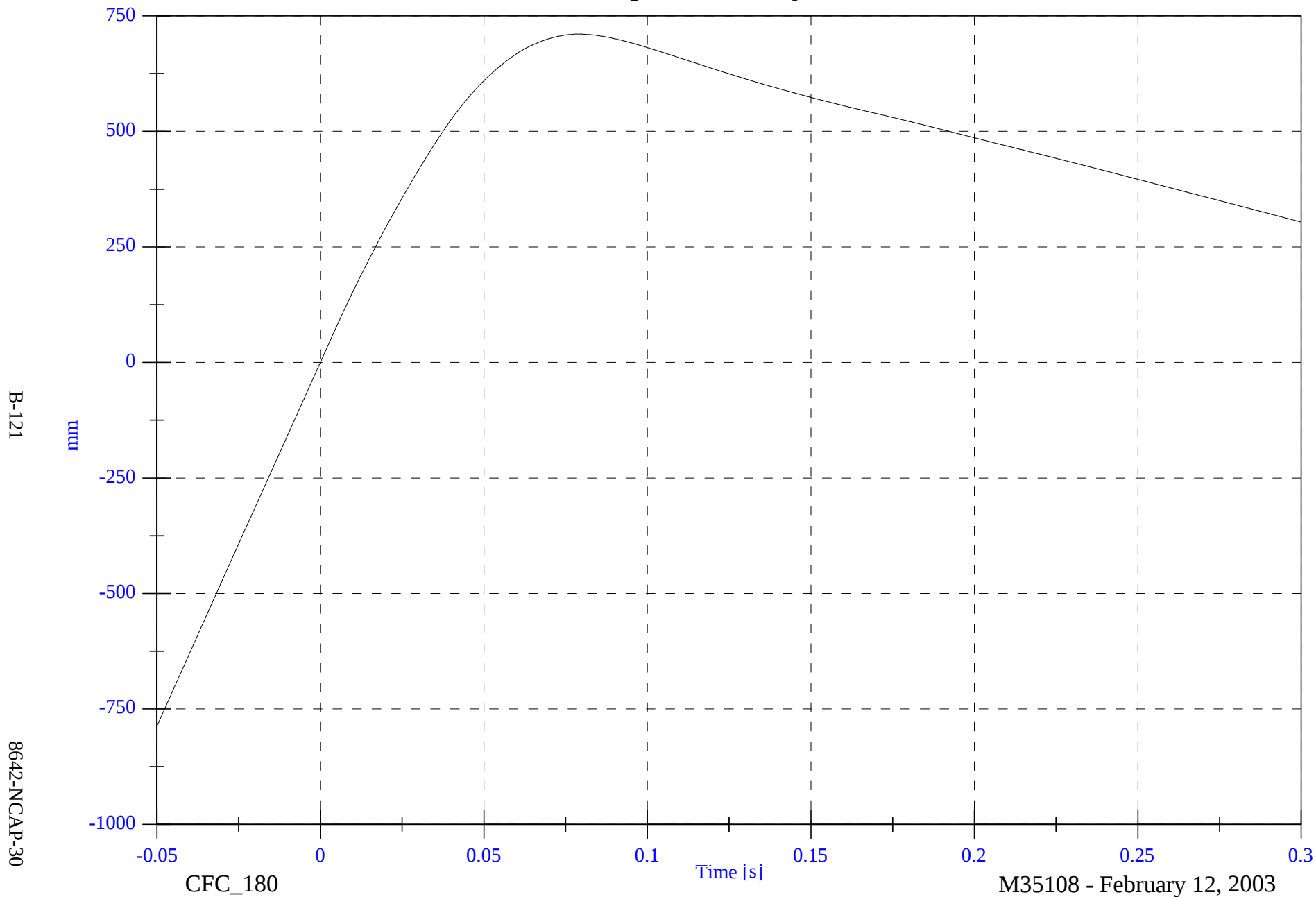


NCAP Test #8 - 2003 Toyota Avalon

V1 Right Rear #2x Displacement

Max: 710.5 [mm] at 0.079 [s]

Min: -787.5 [mm] at -0.050 [s]

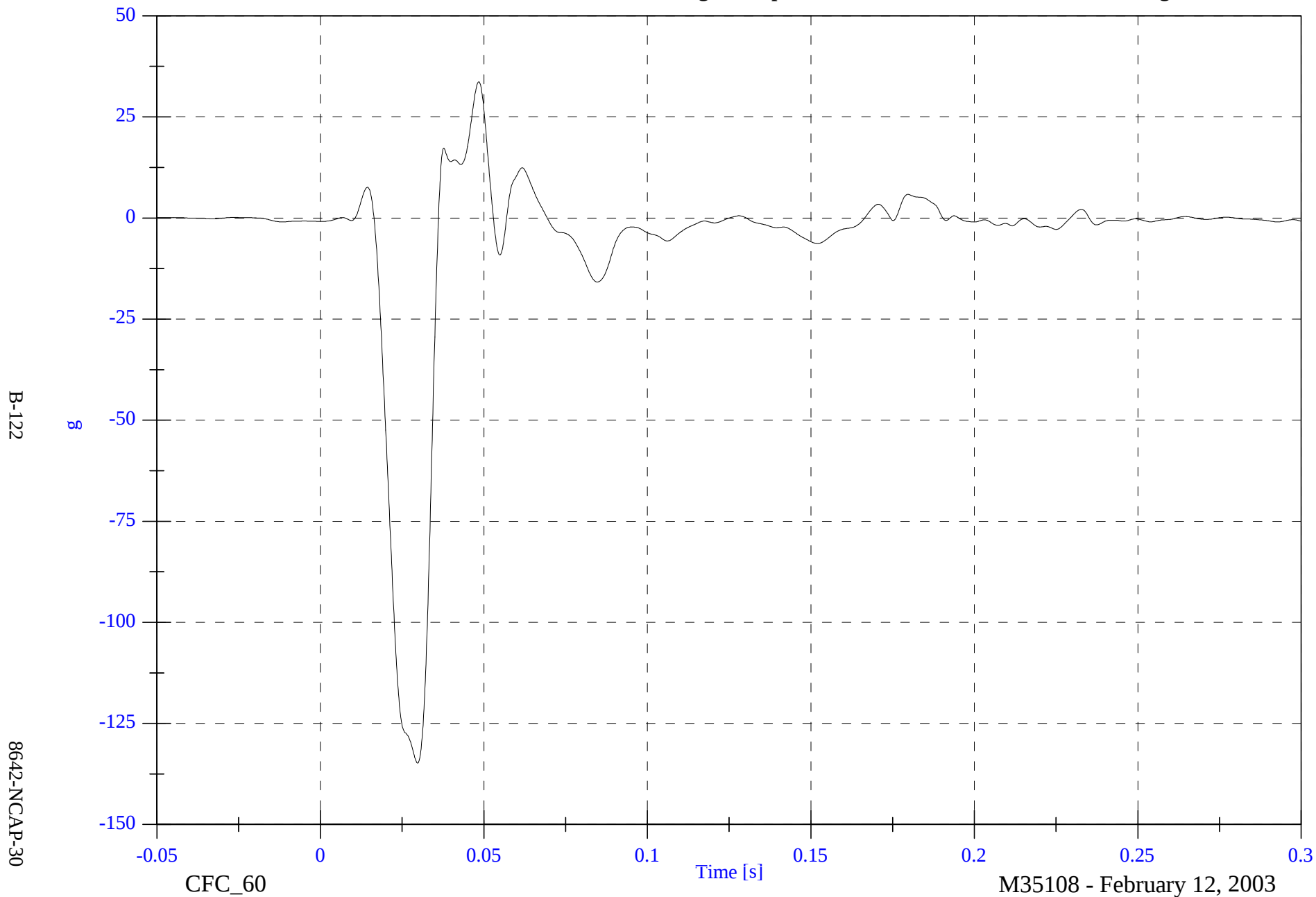


NCAP Test #8 - 2003 Toyota Avalon

V1 Engine Top #3x

Max: 33.7 [g] at 0.048 [s]

Min: -134.8 [g] at 0.030 [s]



NCAP Test #8 - 2003 Toyota Avalon

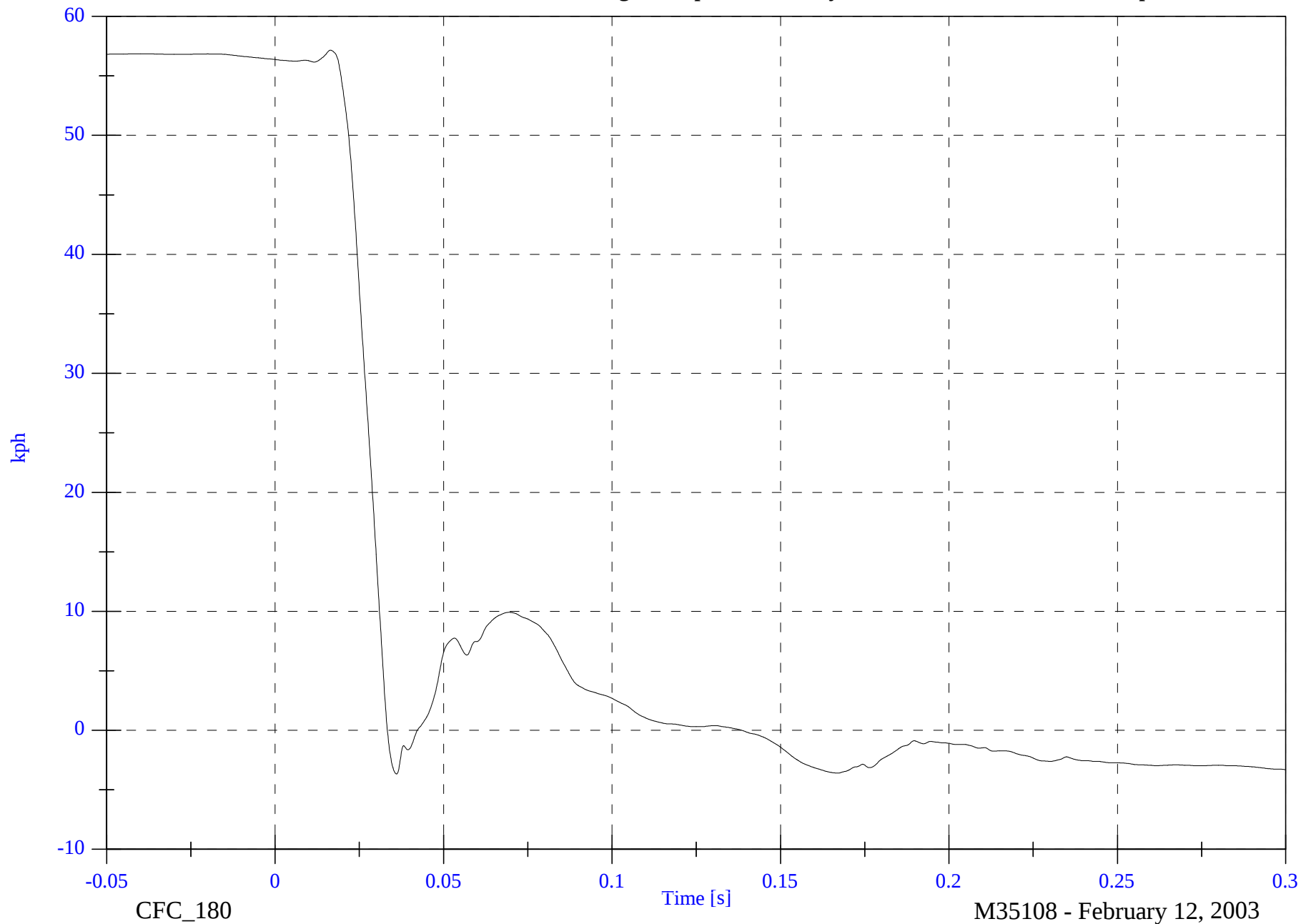
V1 Engine Top #3x Velocity

Max: 57.2 [kph] at 0.016 [s]

Min: -3.7 [kph] at 0.036 [s]

B-123

8642-NCAP-30

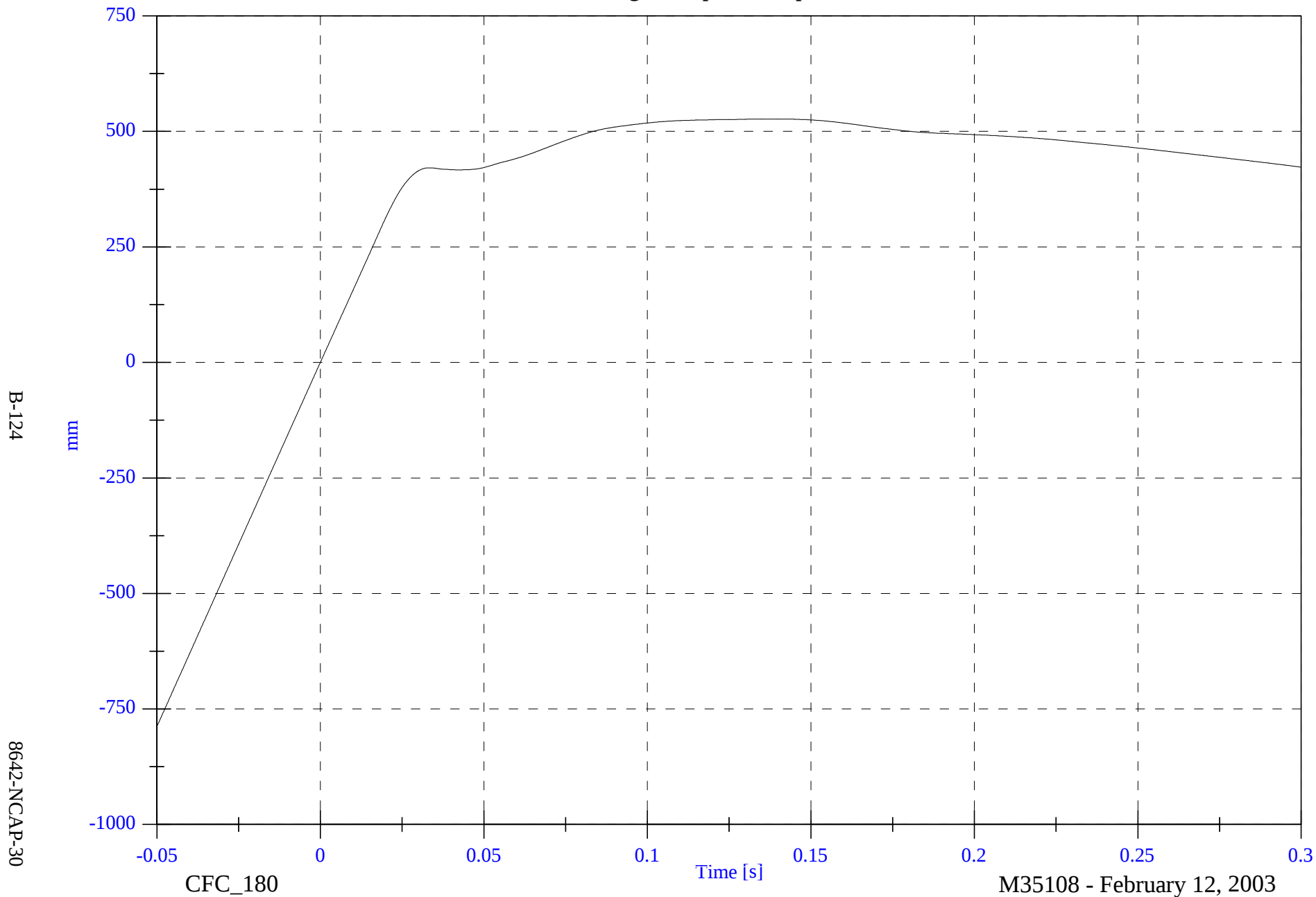


NCAP Test #8 - 2003 Toyota Avalon

V1 Engine Top #3x Displacement

Max: 526.7 [mm] at 0.138 [s]

Min: -788.2 [mm] at -0.050 [s]



B-124

8642-NCAP-30

CFC_180

Time [s]

M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

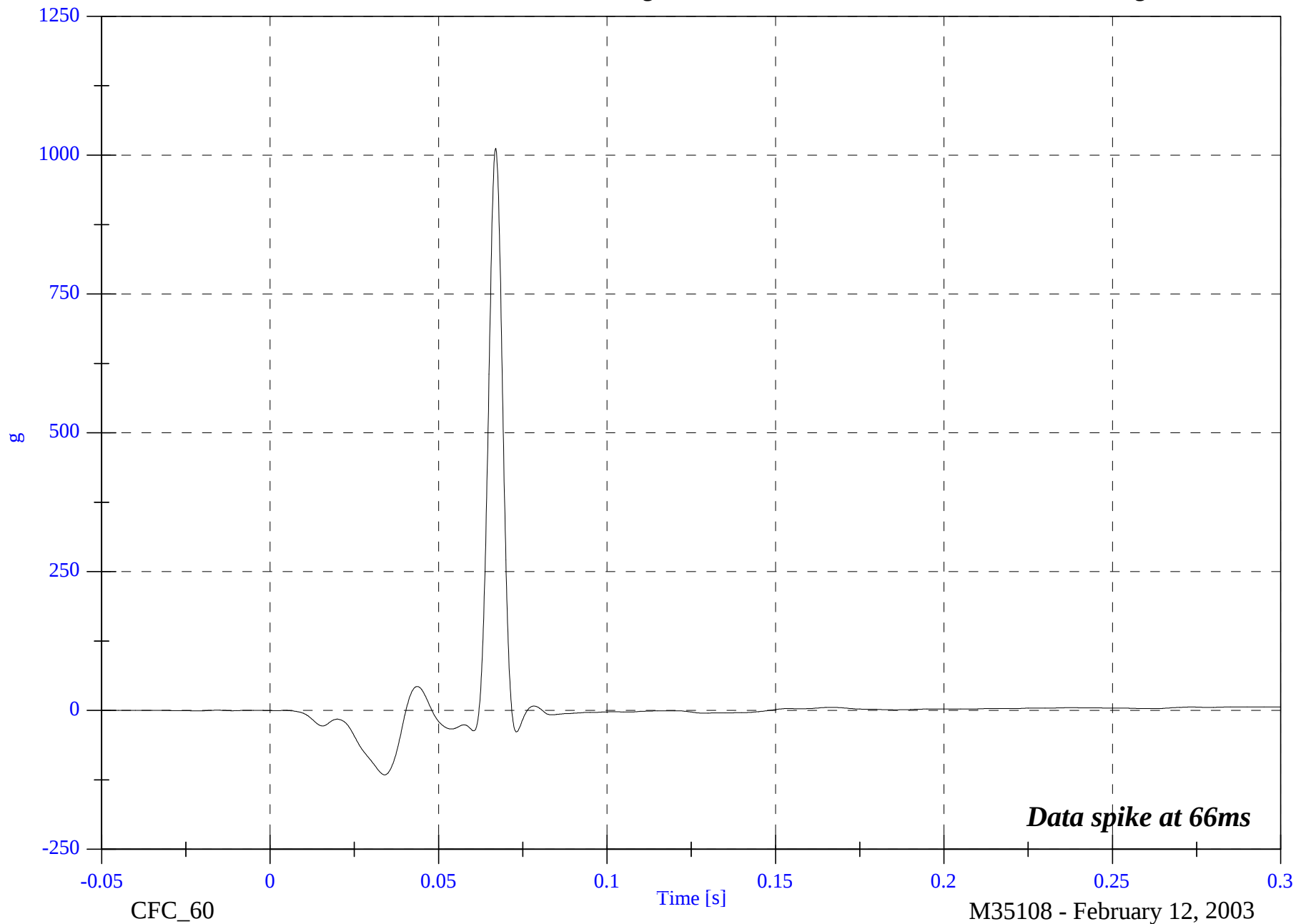
V1 Engine Bottom #4x

Max: 1012.3 [g] at 0.067 [s]

Min: -116.1 [g] at 0.034 [s]

B-125

8642-NCAP-30

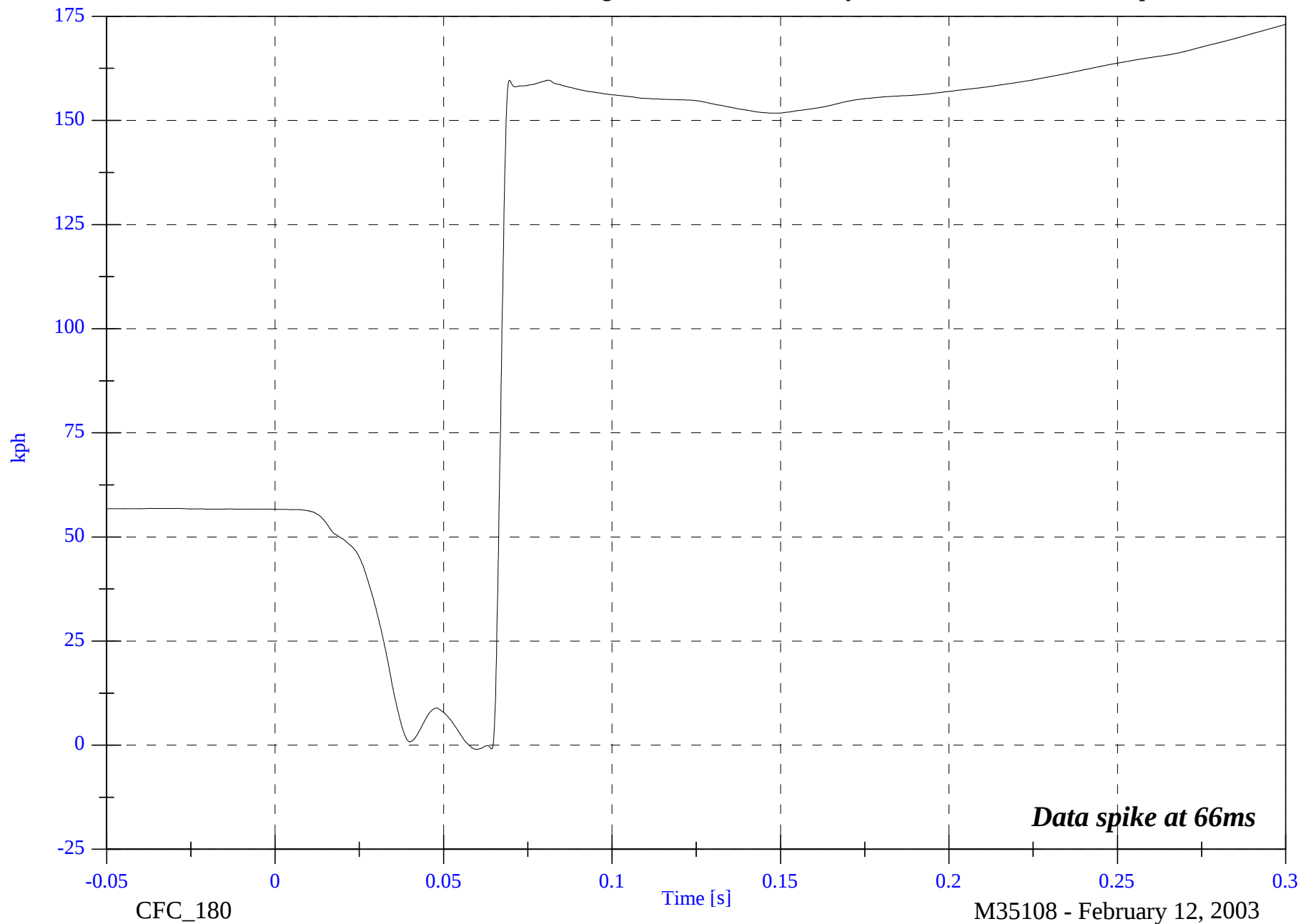


NCAP Test #8 - 2003 Toyota Avalon

V1 Engine Bottom #4x Velocity

Max: 173.1 [kph] at 0.300 [s]

Min: -1.0 [kph] at 0.060 [s]



B-126

8642-NCAP-30

NCAP Test #8 - 2003 Toyota Avalon

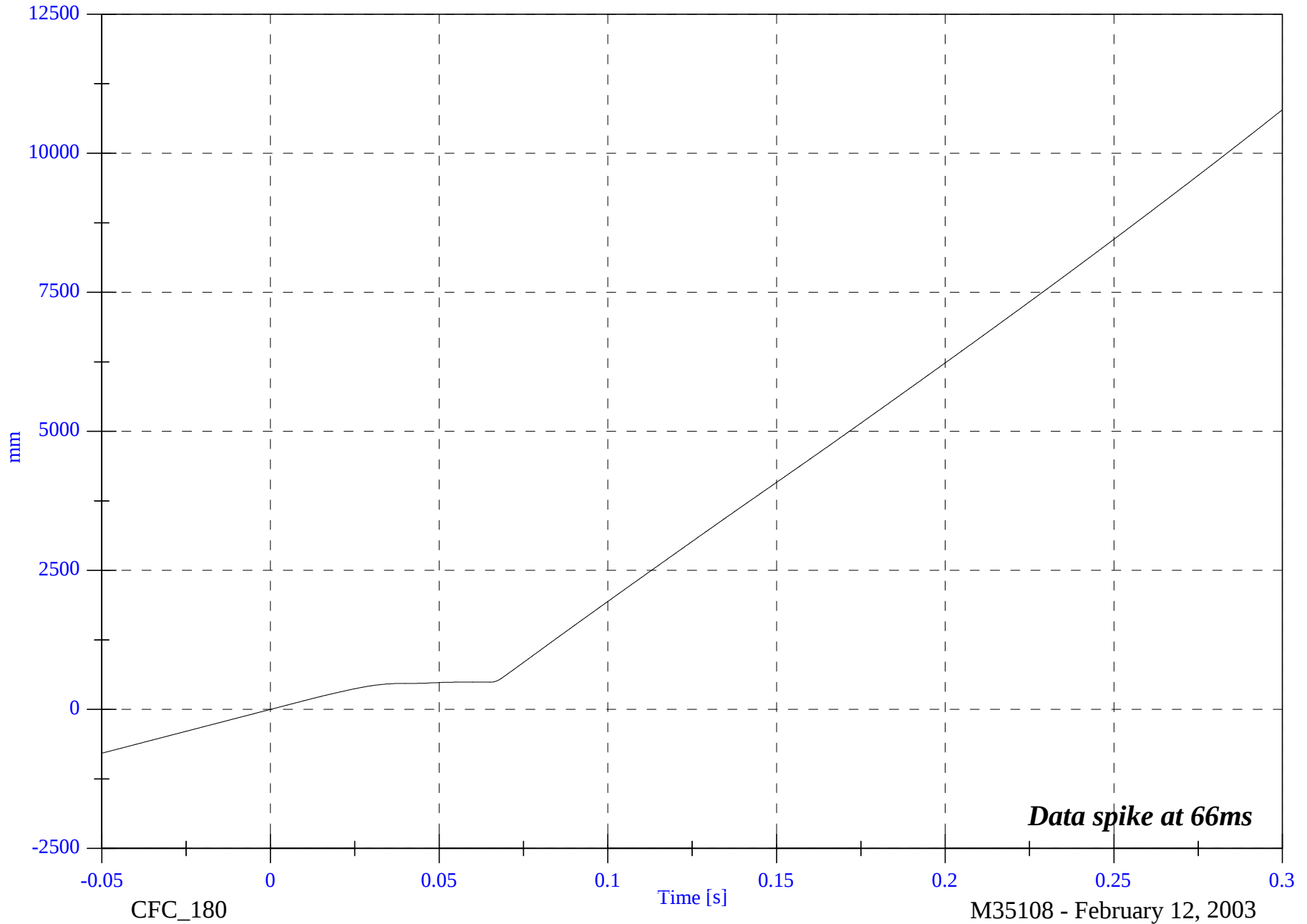
V1 Engine Bottom #4x Displacement

Max: 10779.3 [mm] at 0.300 [s]

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

B-127

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

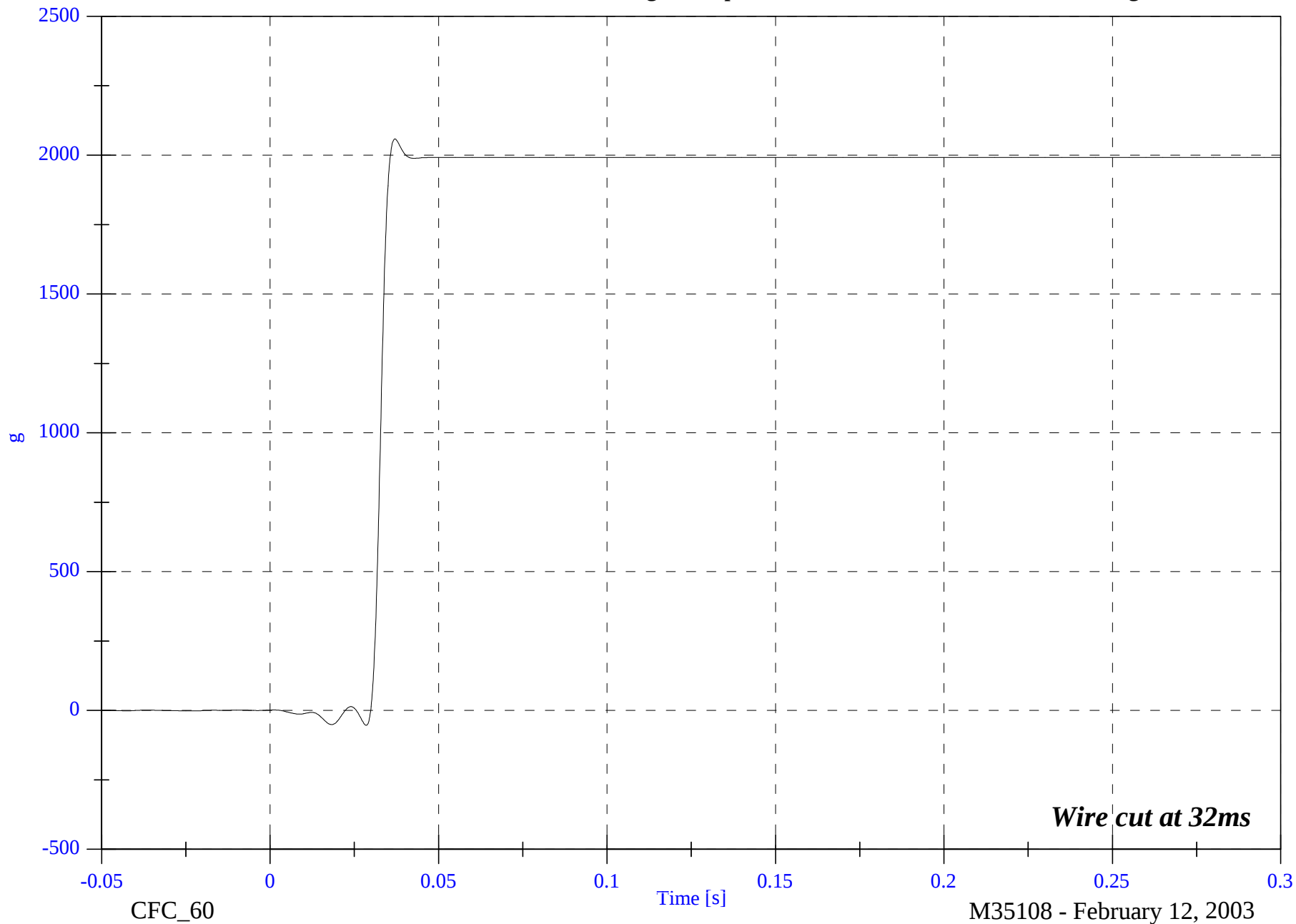
V1 Right Caliper #5x

Max: 2058.1 [g] at 0.037 [s]

Min: -53.7 [g] at 0.029 [s]

B-128

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

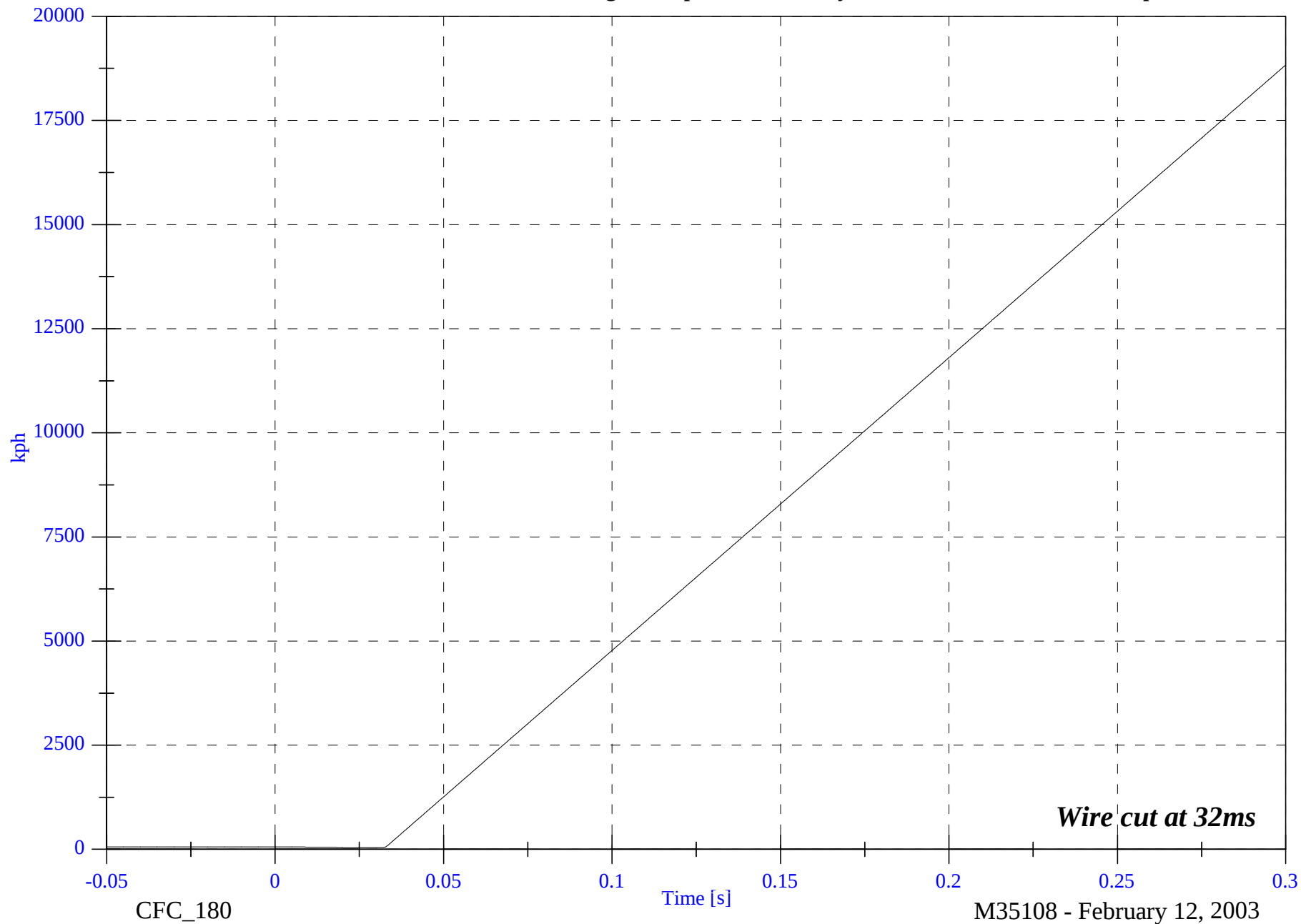
V1 Right Caliper #5x Velocity

Max: 18827.8 [kph] at 0.300 [s]

Min: 43.7 [kph] at 0.022 [s]

B-129

8642-NCAP-30



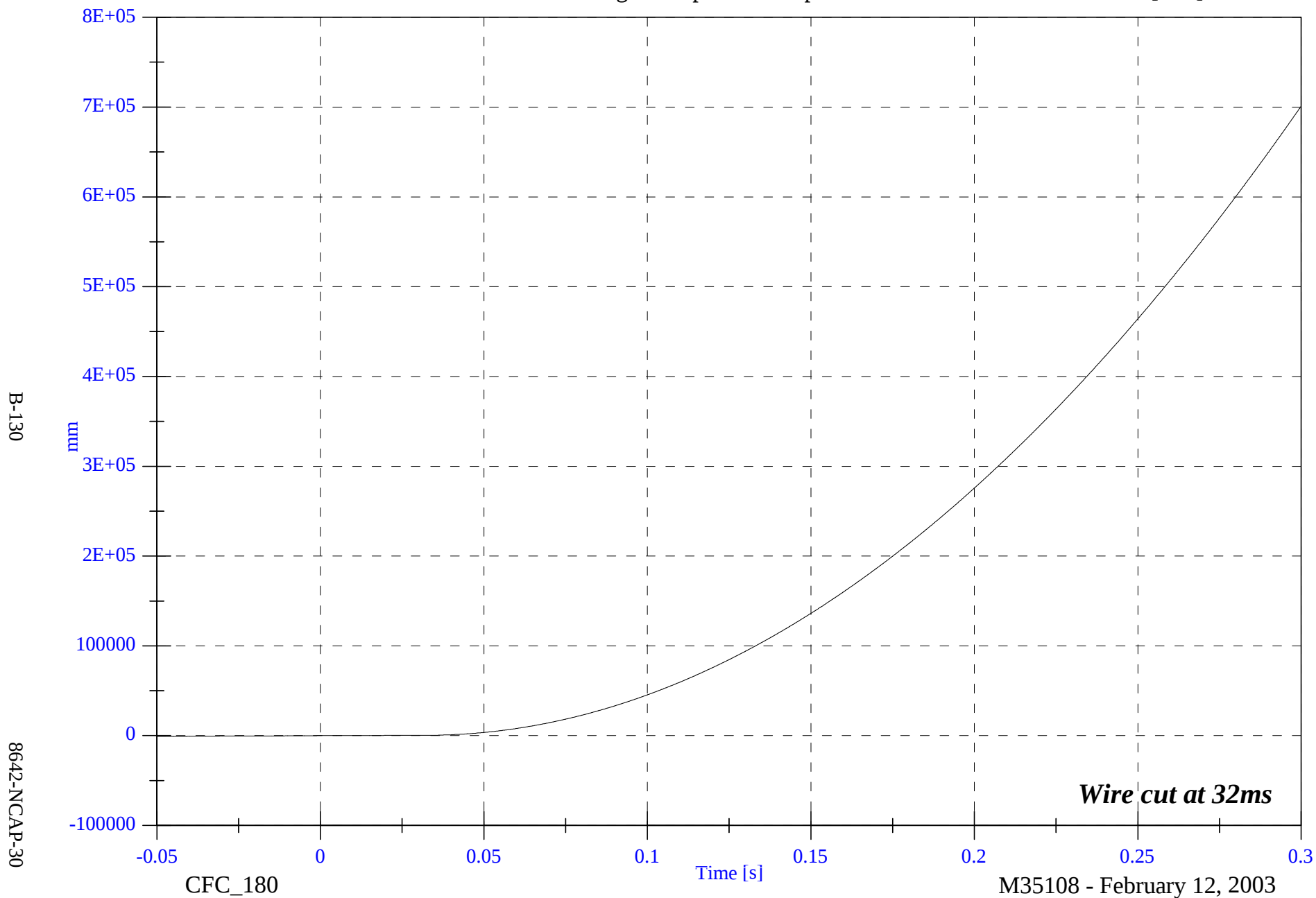
Wire cut at 32ms

NCAP Test #8 - 2003 Toyota Avalon

V1 Right Caliper #5x Displacement

Max: 700690.2 [mm] at 0.300 [s]

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

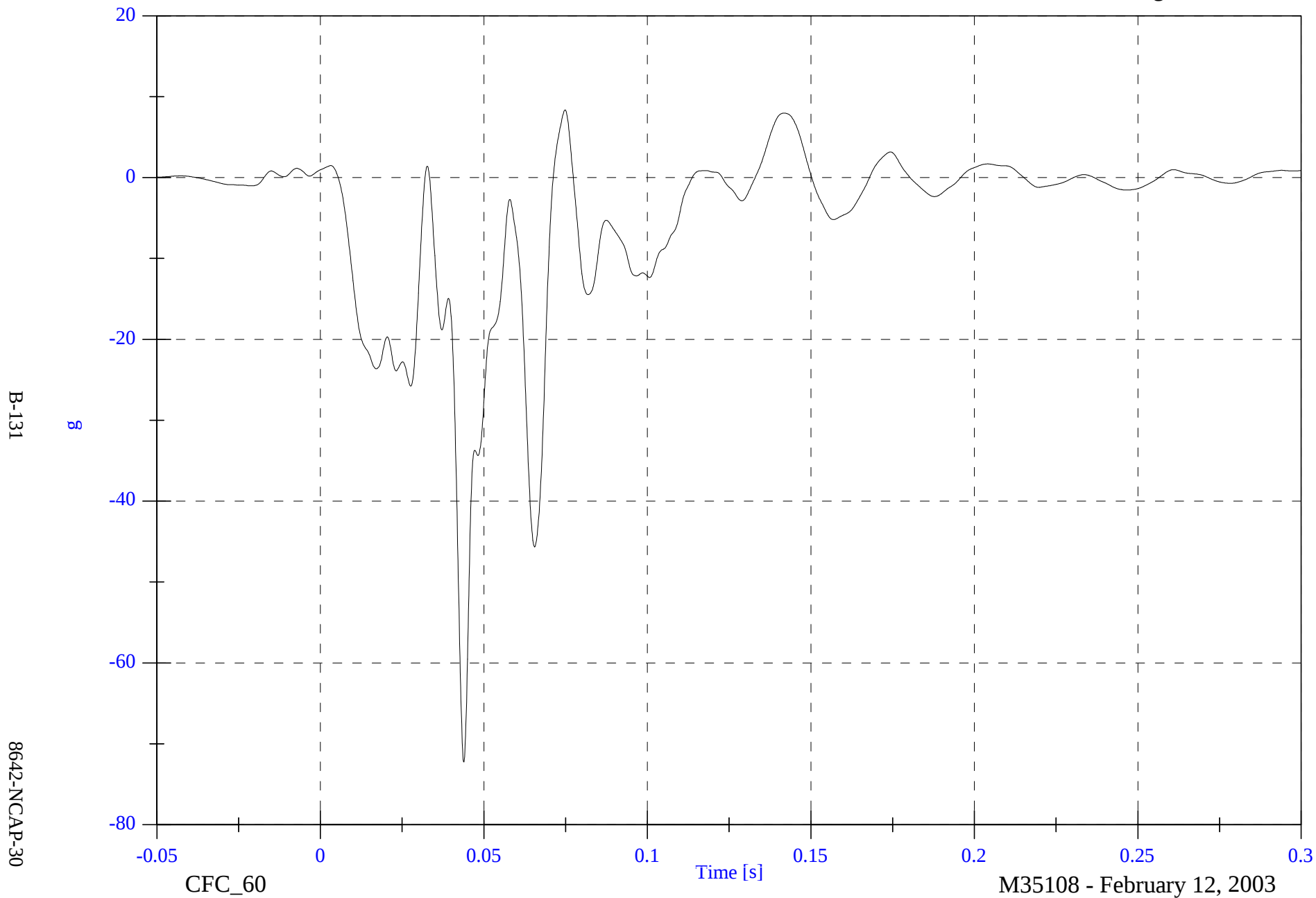


NCAP Test #8 - 2003 Toyota Avalon

V1 Instrument Panel #6x

Max: 8.4 [g] at 0.075 [s]

Min: -72.2 [g] at 0.044 [s]



NCAP Test #8 - 2003 Toyota Avalon

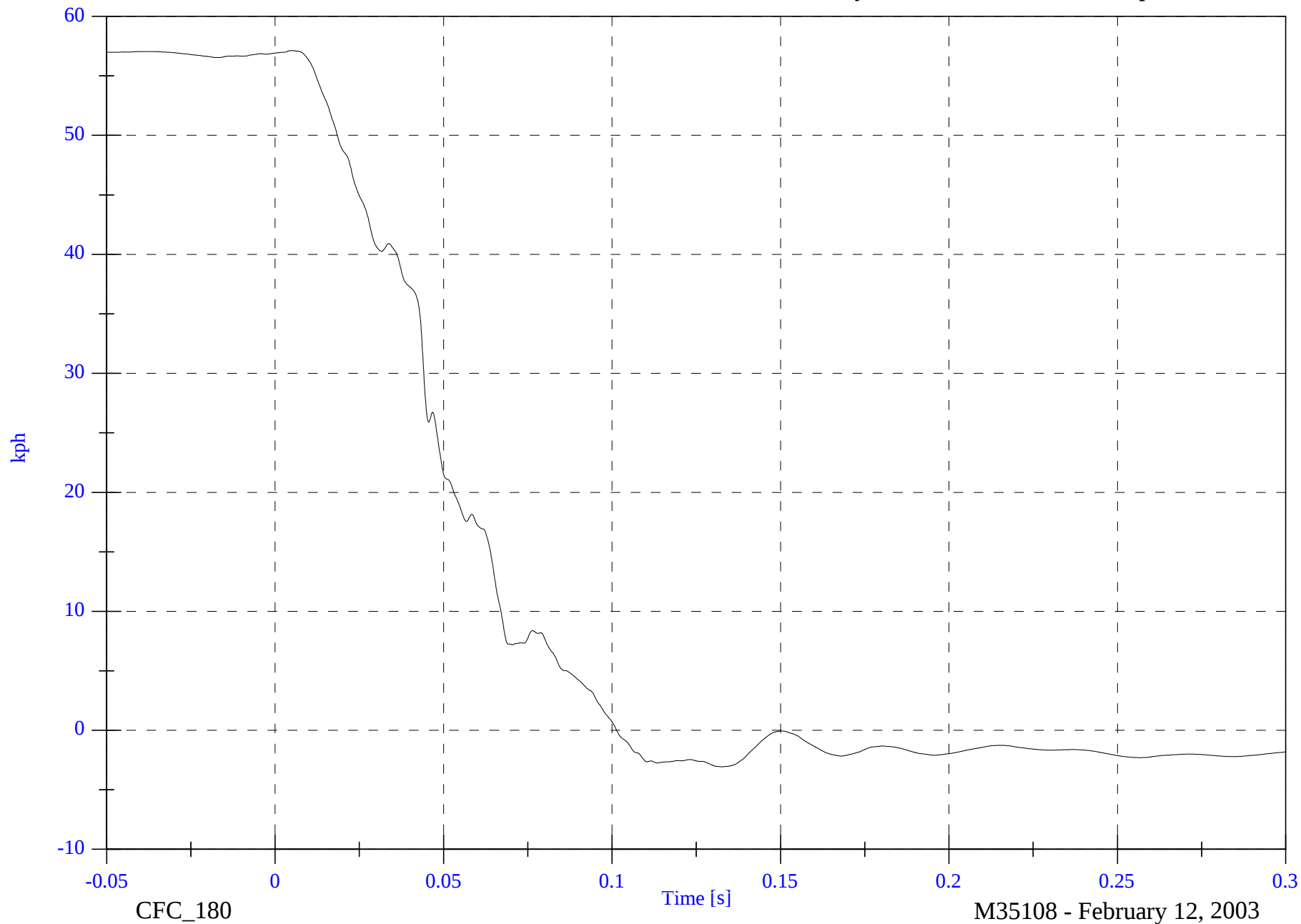
V1 Instrument Panel #6x Velocity

Max: 57.1 [kph] at 0.005 [s]

Min: -3.1 [kph] at 0.133 [s]

B-132

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

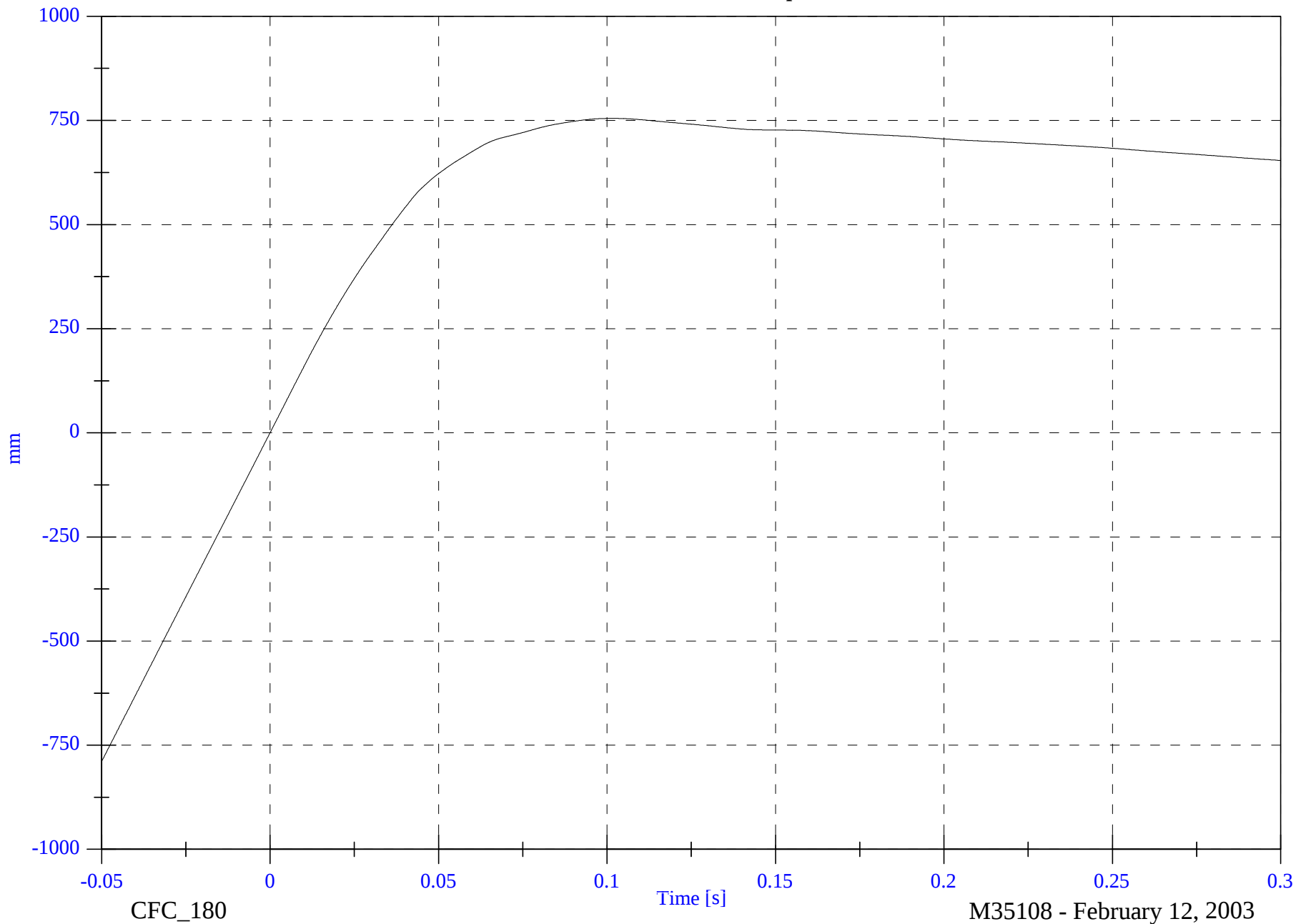
V1 Instrument Panel #6x Displacement

Max: 755.2 [mm] at 0.101 [s]

Min: -789.5 [mm] at -0.050 [s]

B-133

8642-NCAP-30

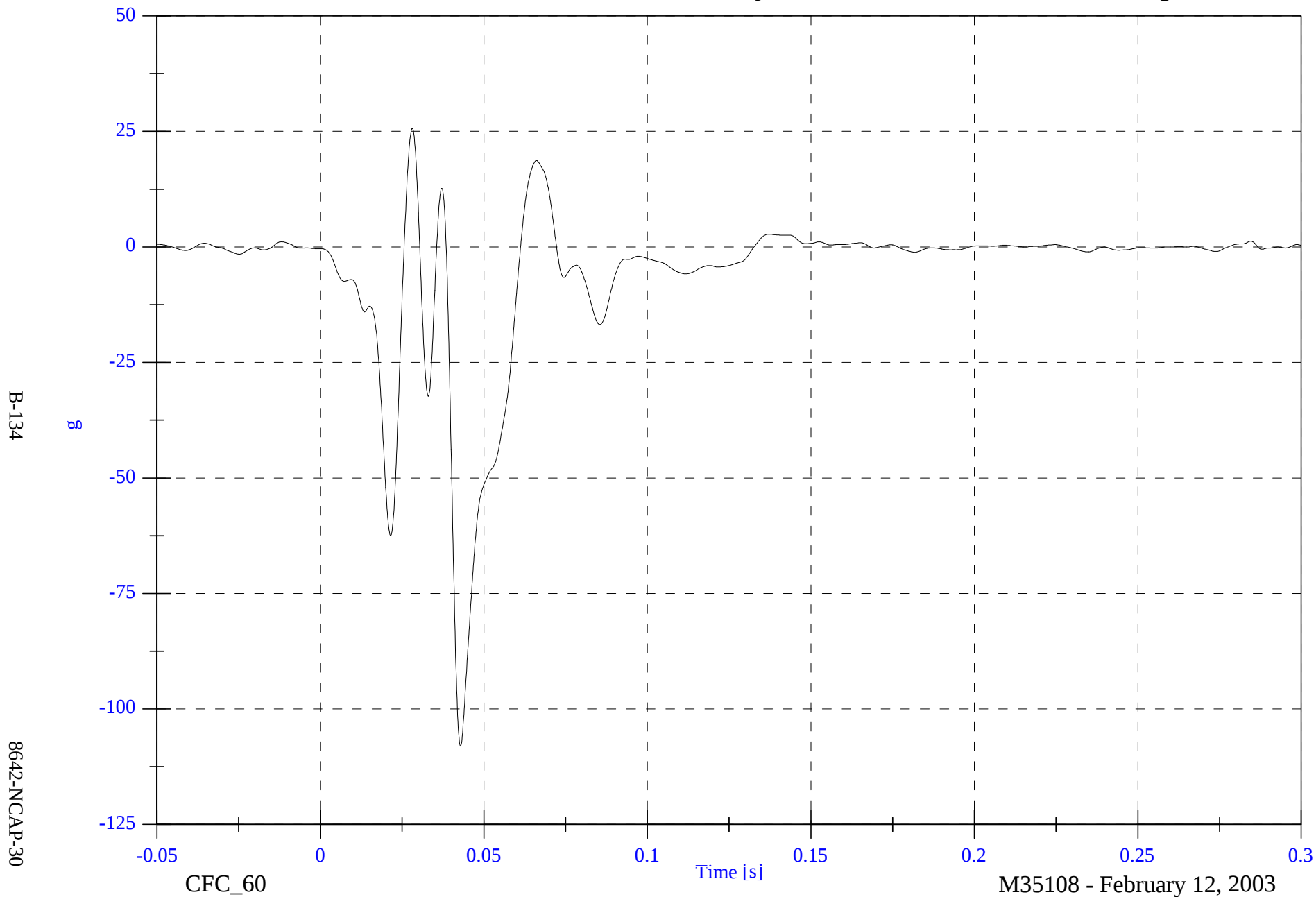


NCAP Test #8 - 2003 Toyota Avalon

V1 Left Caliper #7x

Max: 25.7 [g] at 0.028 [s]

Min: -108.0 [g] at 0.043 [s]



NCAP Test #8 - 2003 Toyota Avalon

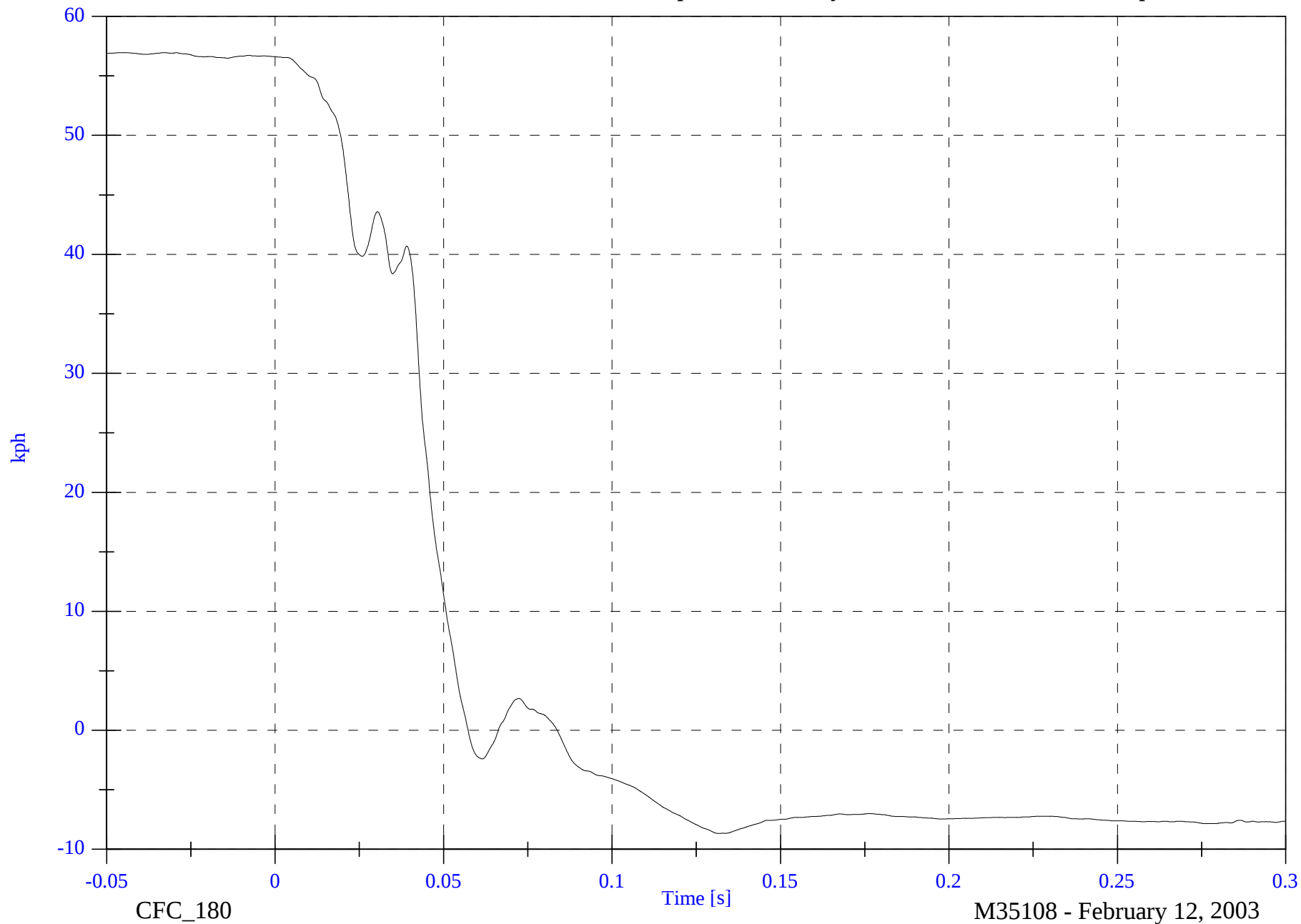
V1 Left Caliper #7x Velocity

Max: 56.9 [kph] at -0.033 [s]

Min: -8.7 [kph] at 0.132 [s]

B-135

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

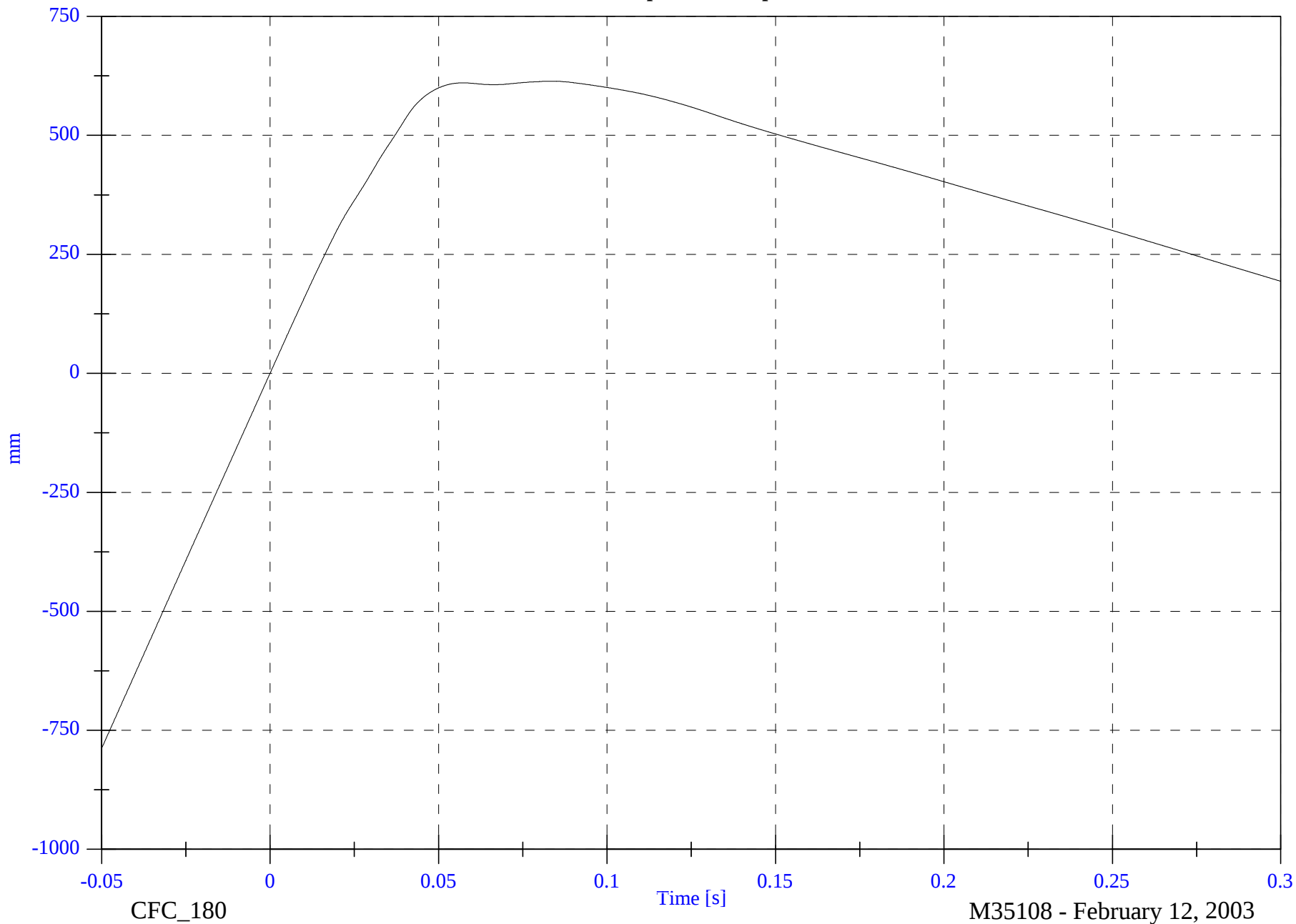
V1 Left Caliper #7x Displacement

Max: 613.7 [mm] at 0.084 [s]

Min: -788.3 [mm] at -0.050 [s]

B-136

8642-NCAP-30



CFC_180

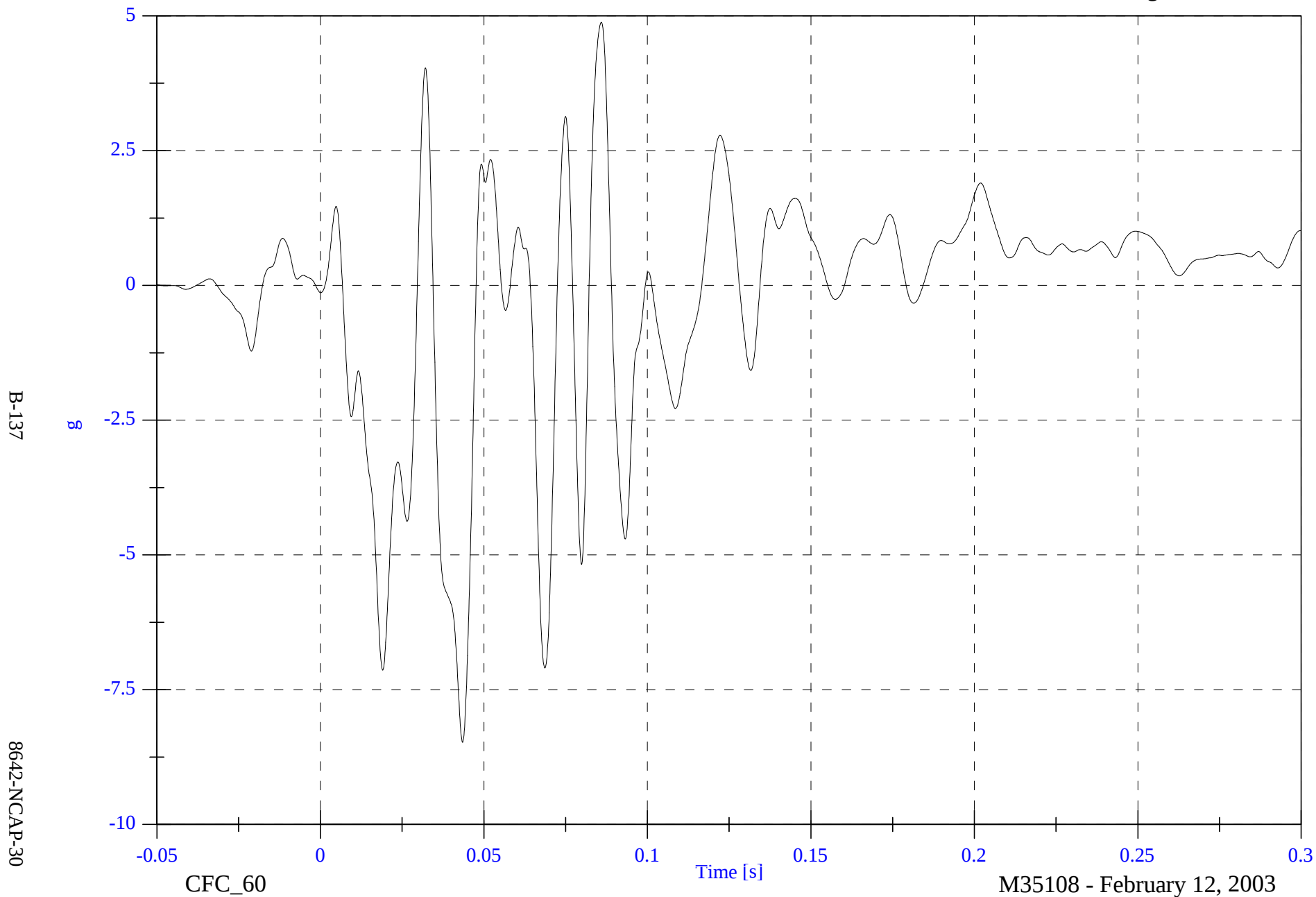
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1 Left Rear #8z

Max: 4.9 [g] at 0.086 [s]

Min: -8.5 [g] at 0.043 [s]



B-137

8642-NCAP-30

CFC_60

Time [s]

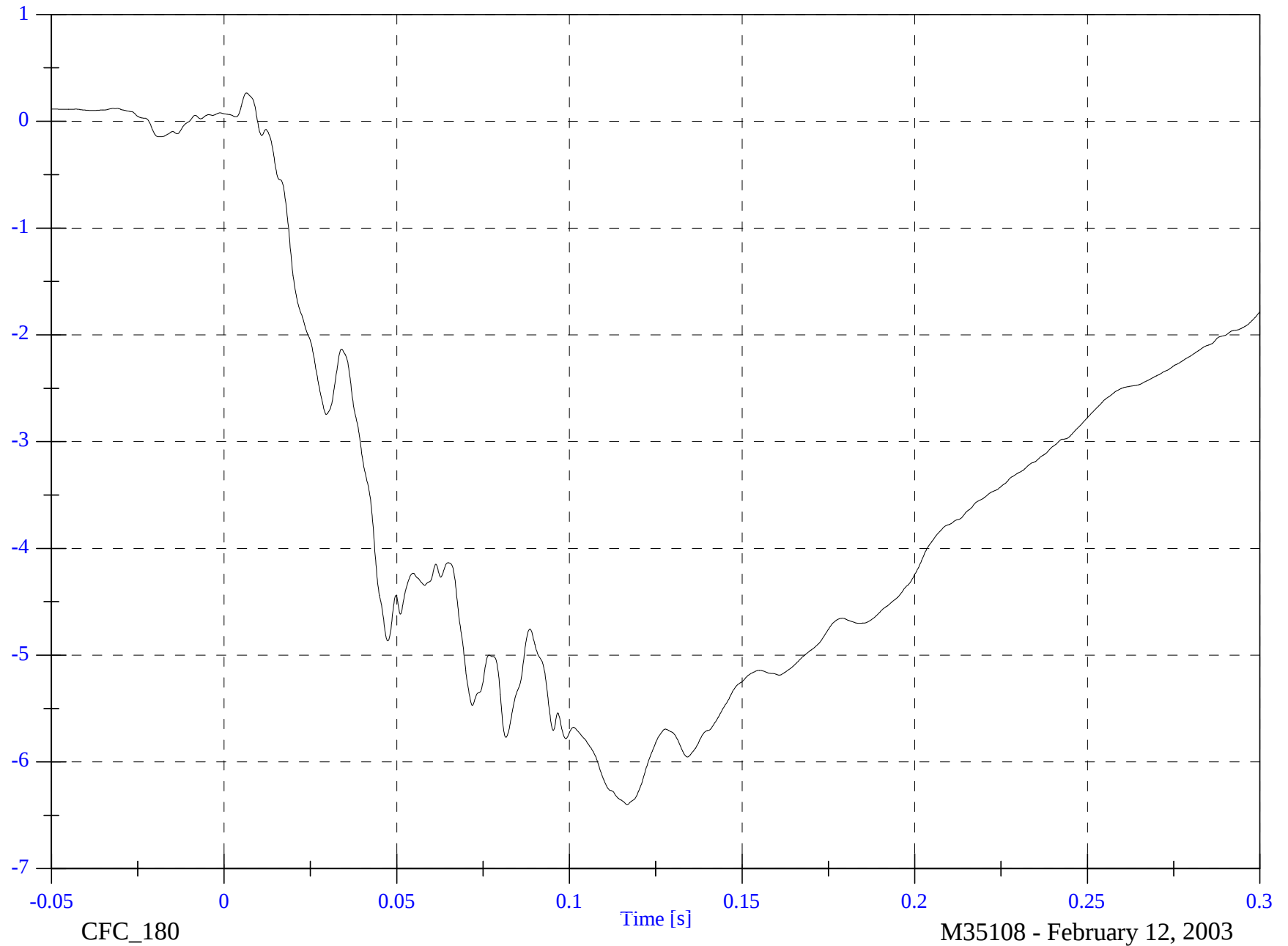
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1 Left Rear #8z Velocity

Max: 0.3 [kph] at 0.006 [s]

Min: -6.4 [kph] at 0.117 [s]



B-138

8642-NCAP-30

CFC_180

M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

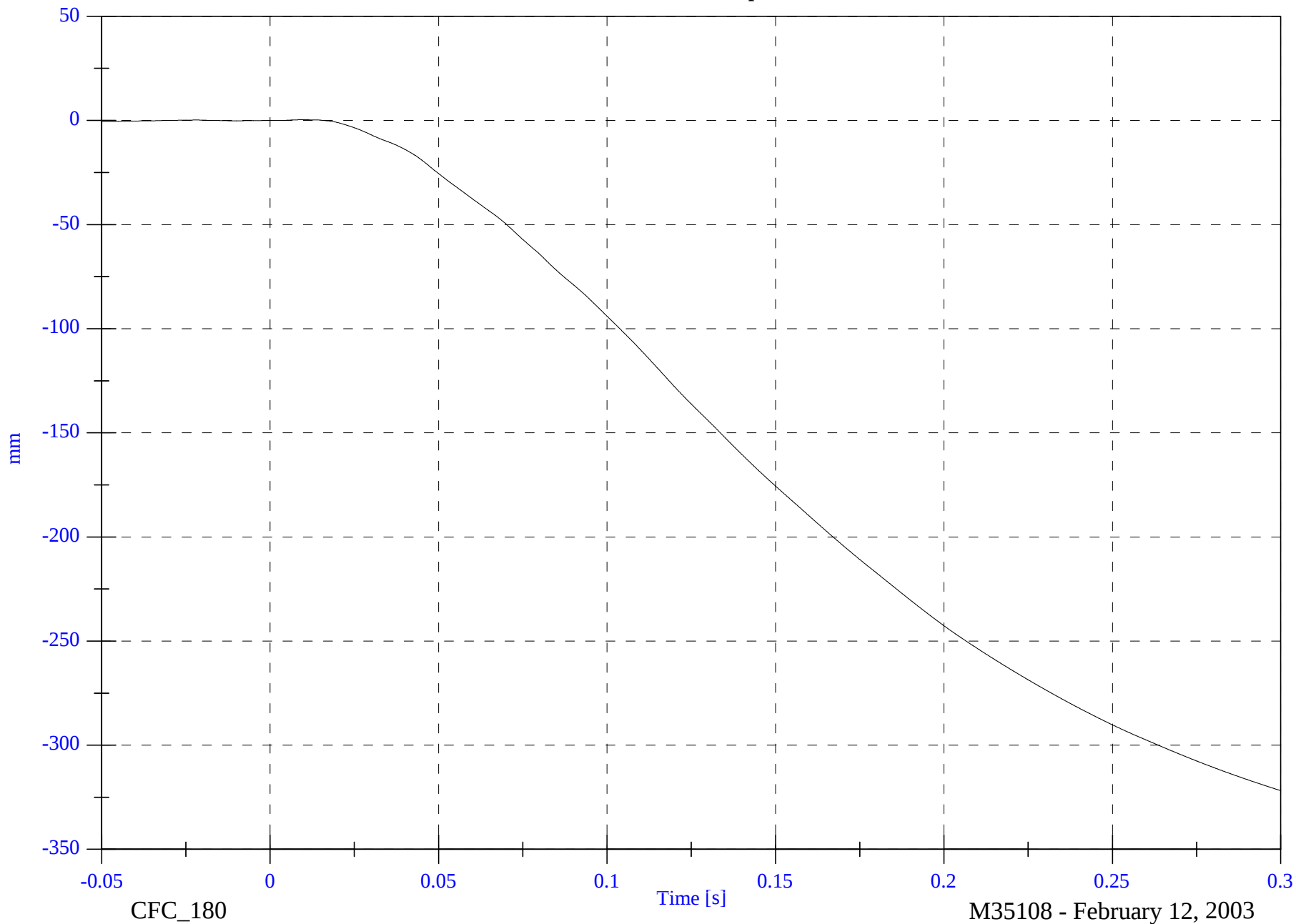
V1 Left Rear #8z Displacement

Max: 0.3 [mm] at 0.010 [s]

Min: -321.8 [mm] at 0.300 [s]

B-139

8642-NCAP-30



CFC_180

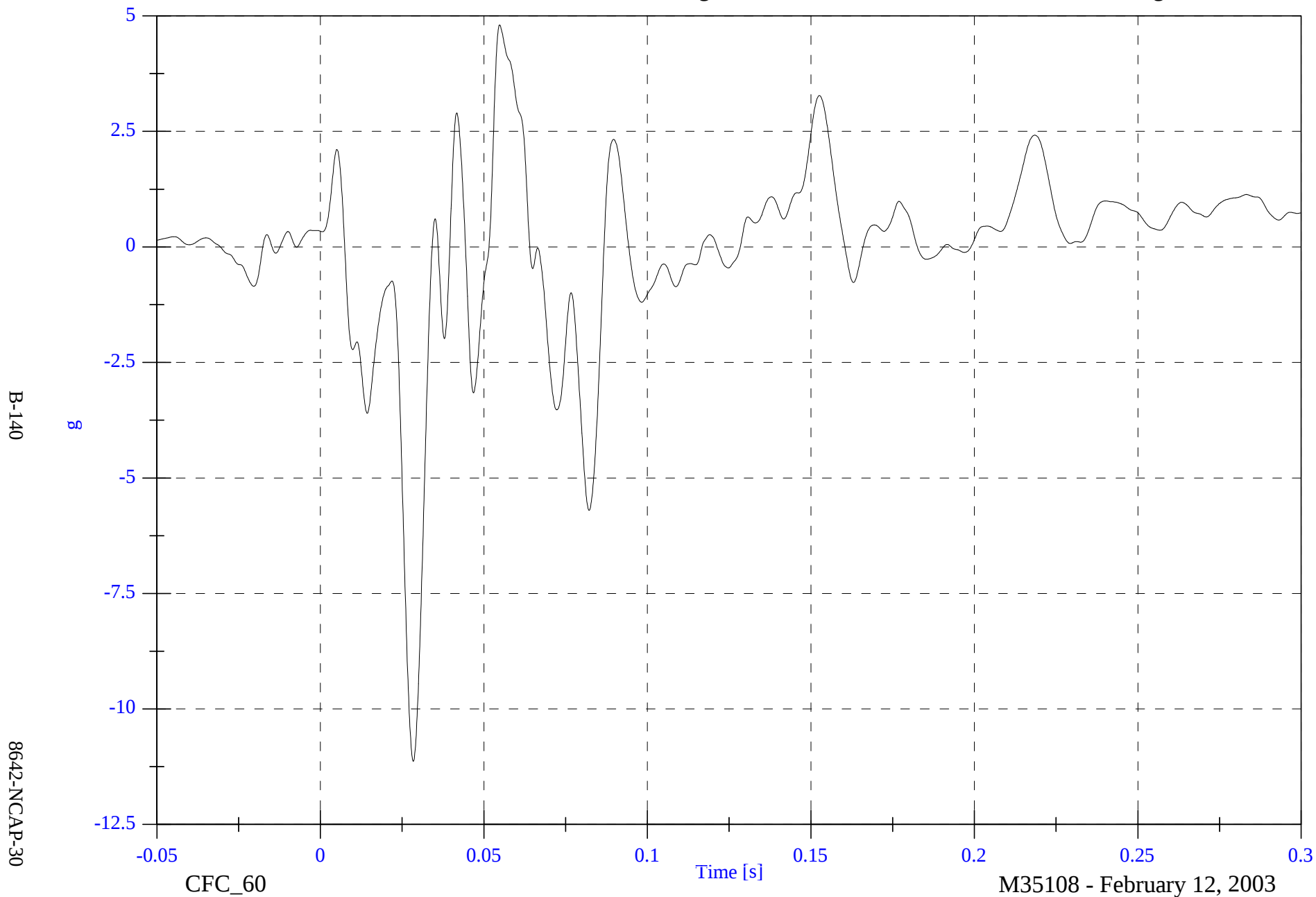
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1 Right Rear #9z

Max: 4.8 [g] at 0.055 [s]

Min: -11.1 [g] at 0.028 [s]

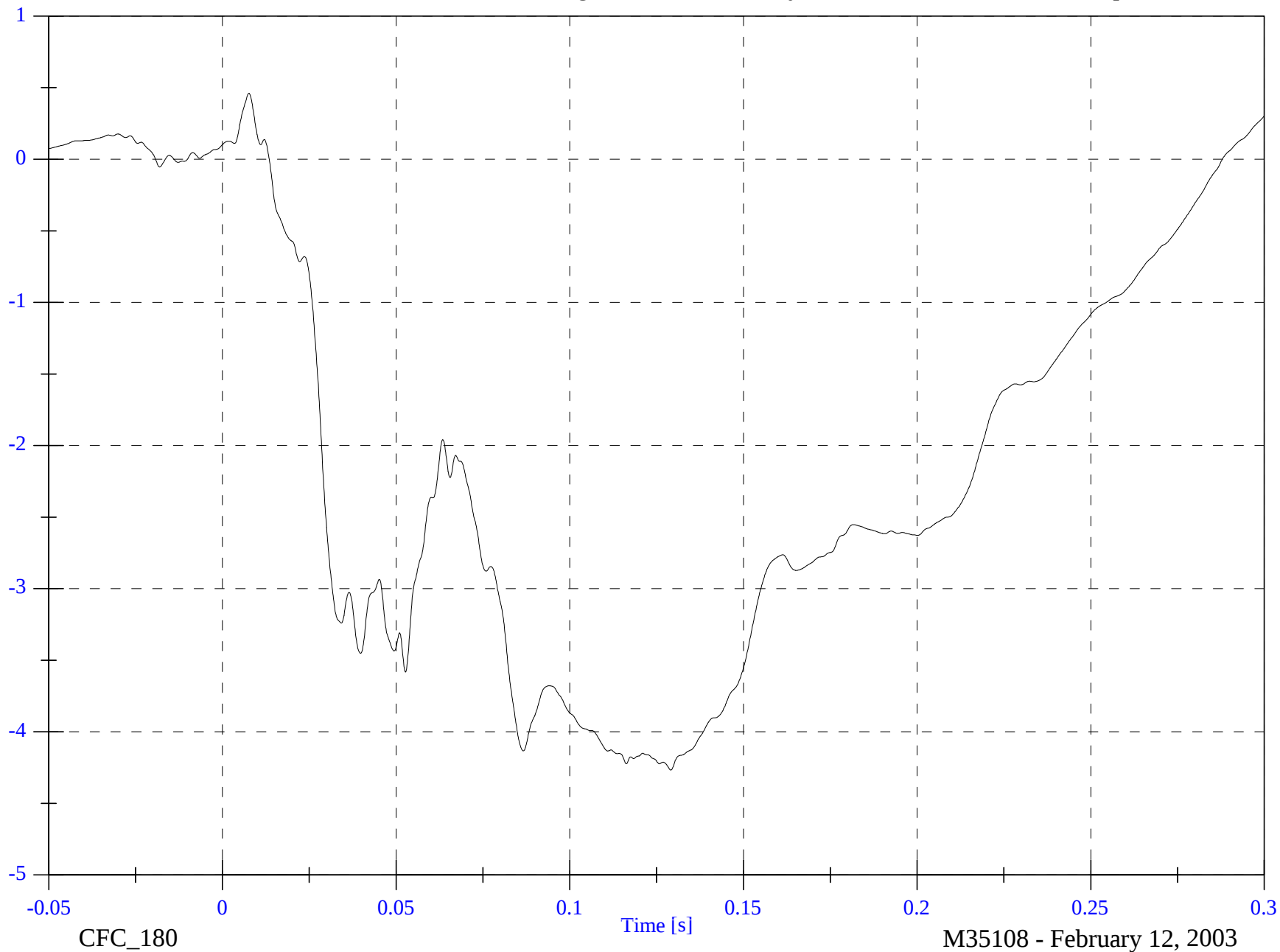


NCAP Test #8 - 2003 Toyota Avalon

V1 Right Rear #9z Velocity

Max: 0.5 [kph] at 0.008 [s]

Min: -4.3 [kph] at 0.129 [s]



B-141

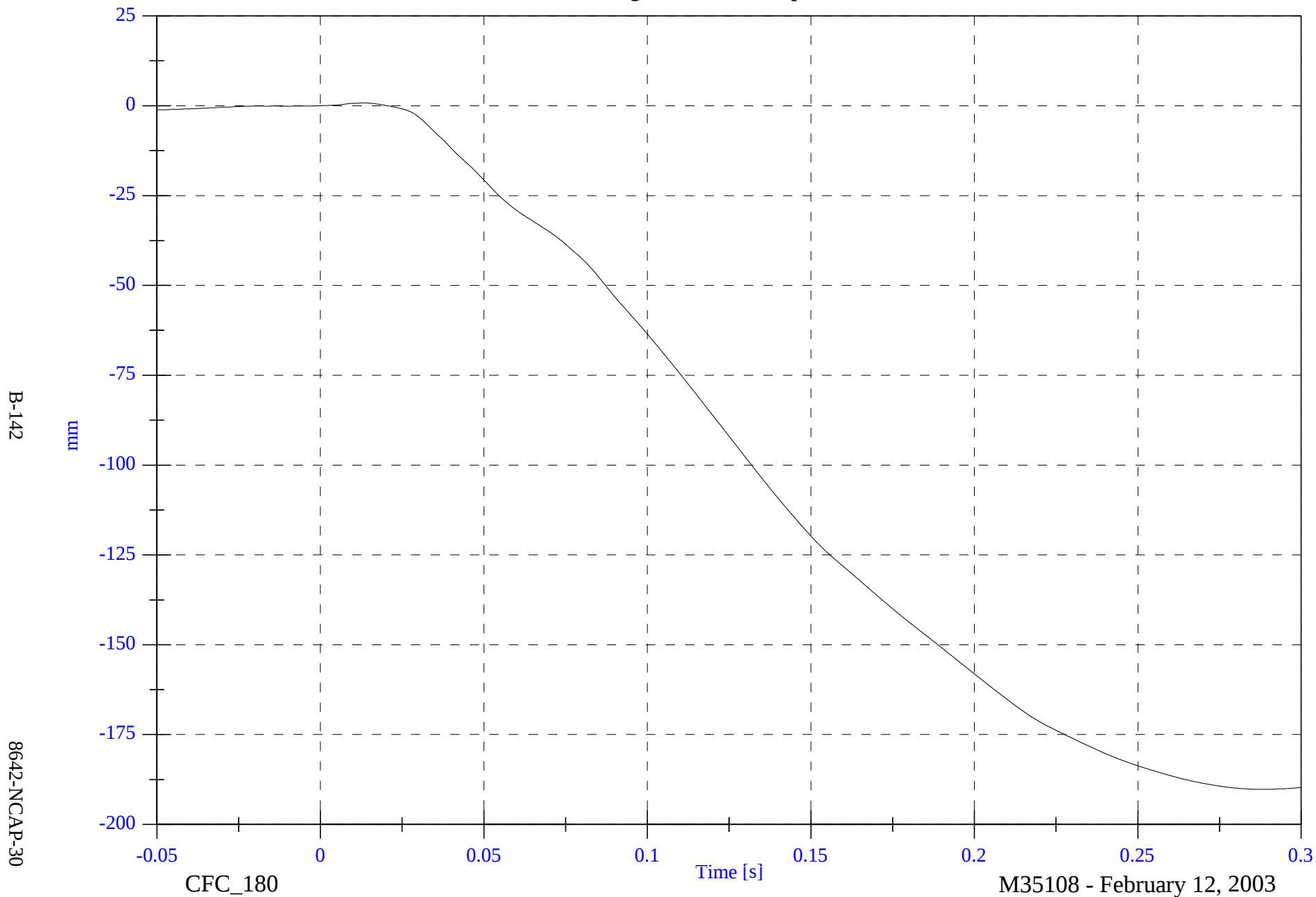
8642-NCAP-30

NCAP Test #8 - 2003 Toyota Avalon

V1 Right Rear #9z Displacement

Max: 0.8 [mm] at 0.013 [s]

Min: -190.2 [mm] at 0.288 [s]

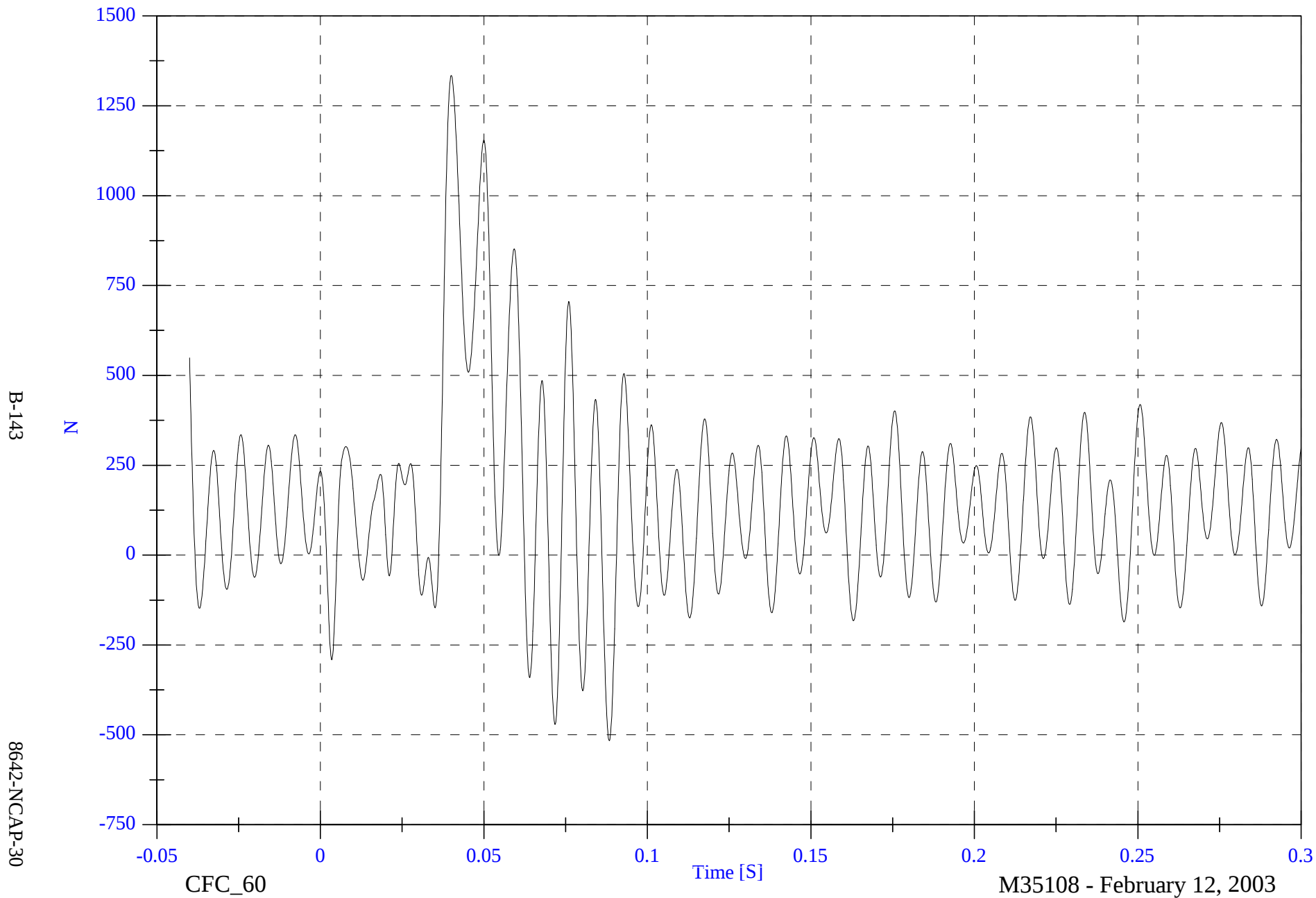


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell A1 Fx

Max: 1334.2 [N] at 0.040 [S]

Min: -516.0 [N] at 0.088 [S]



B-143

8642-NCAP-30

CFC_60

Time [S]

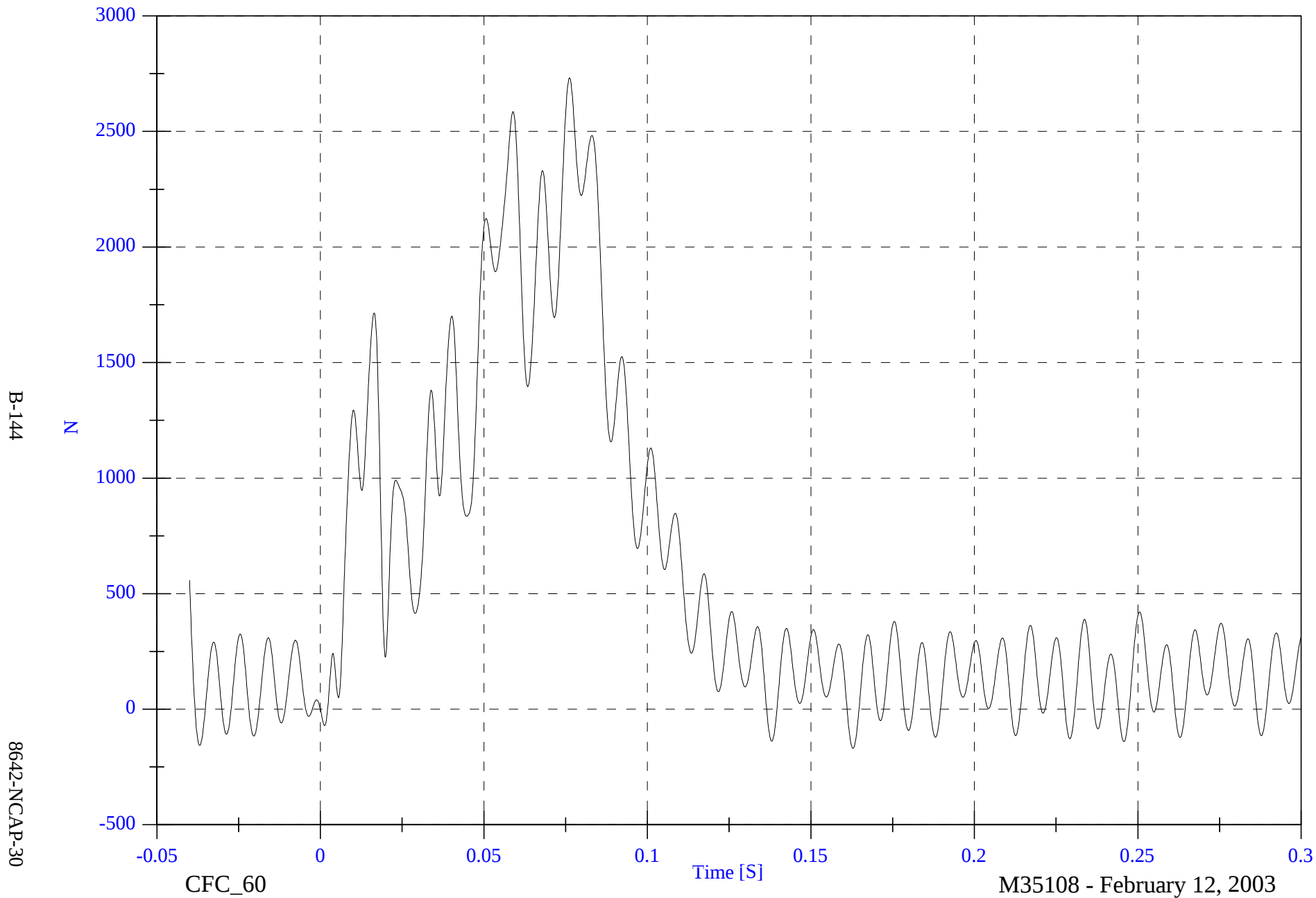
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell A2 Fx

Max: 2732.1 [N] at 0.076 [S]

Min: -169.4 [N] at 0.163 [S]

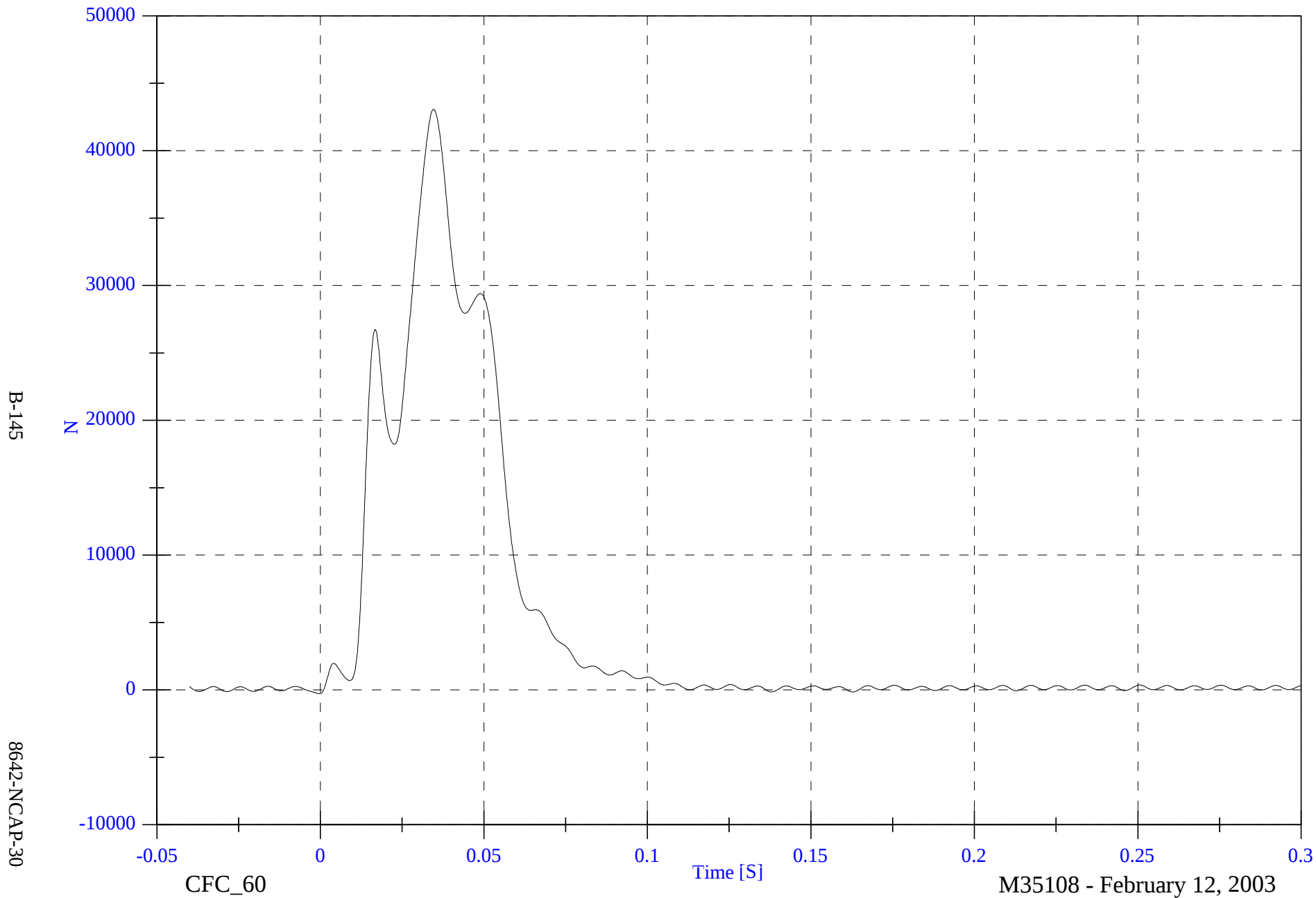


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell A3 Fx

Max: 43073.7 [N] at 0.035 [S]

Min: -276.4 [N] at -0.000 [S]

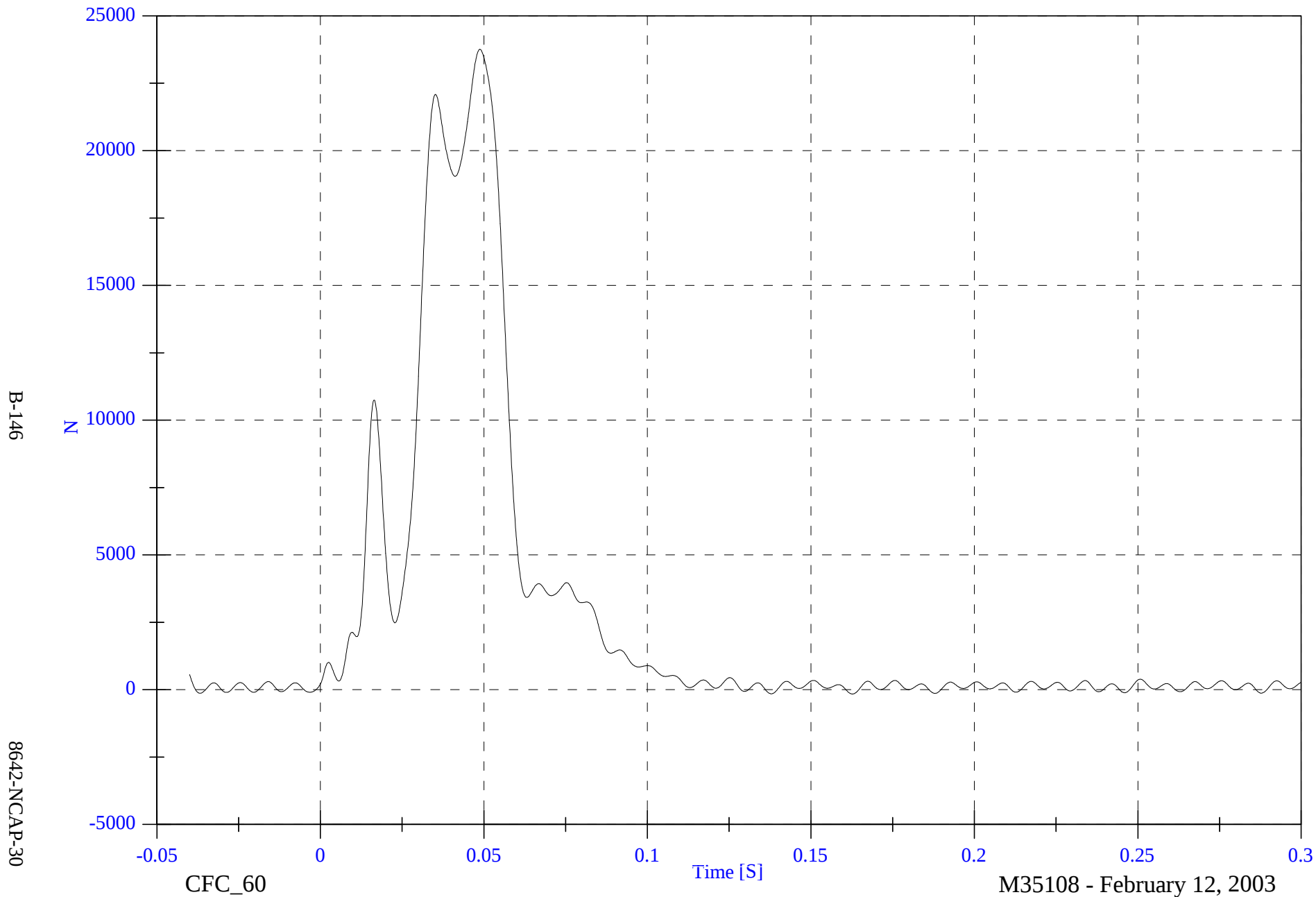


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell A4 Fx

Max: 23759.6 [N] at 0.049 [S]

Min: -160.5 [N] at 0.163 [S]

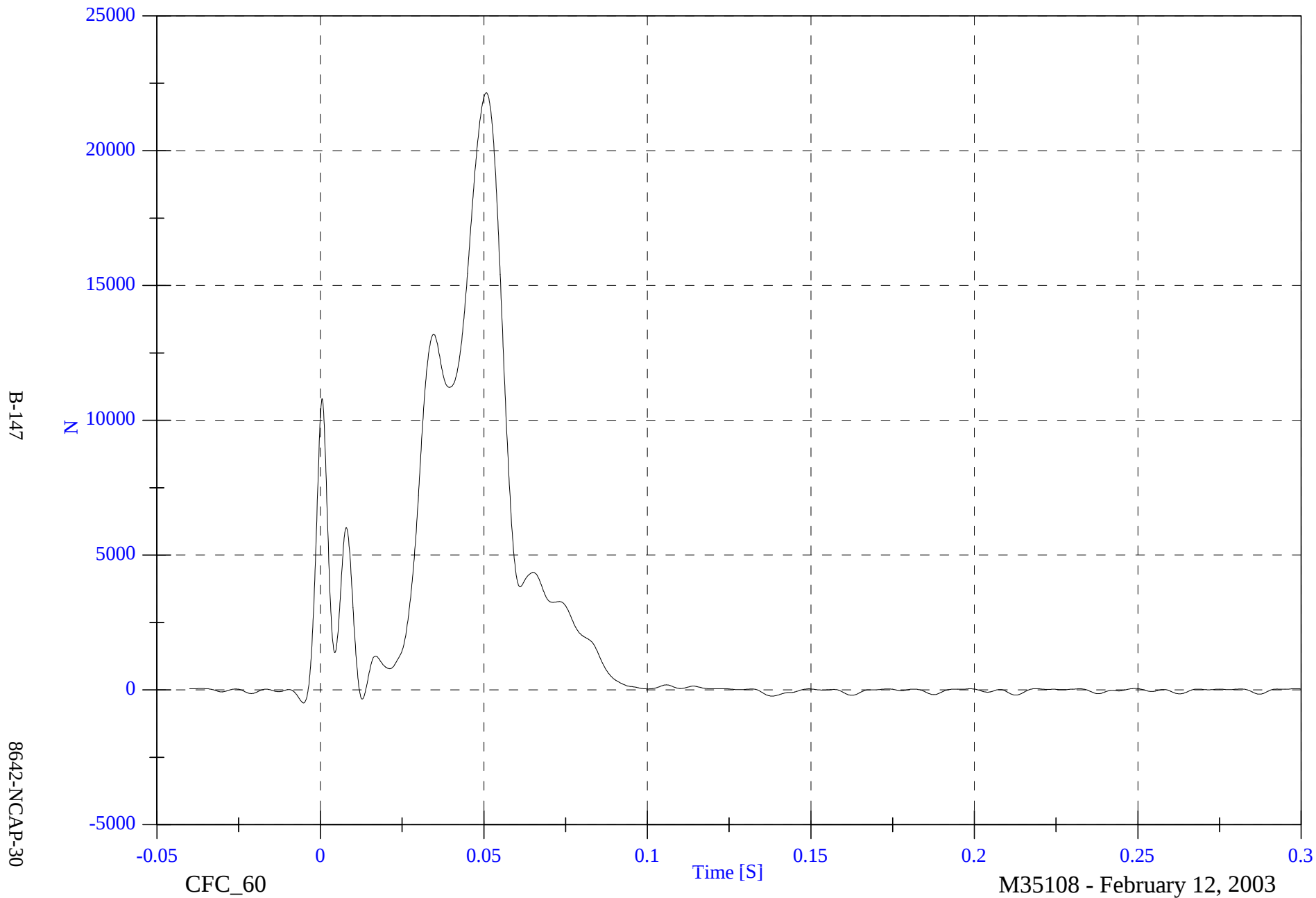


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell A5 Fx

Max: 22146.6 [N] at 0.051 [S]

Min: -478.7 [N] at -0.005 [S]

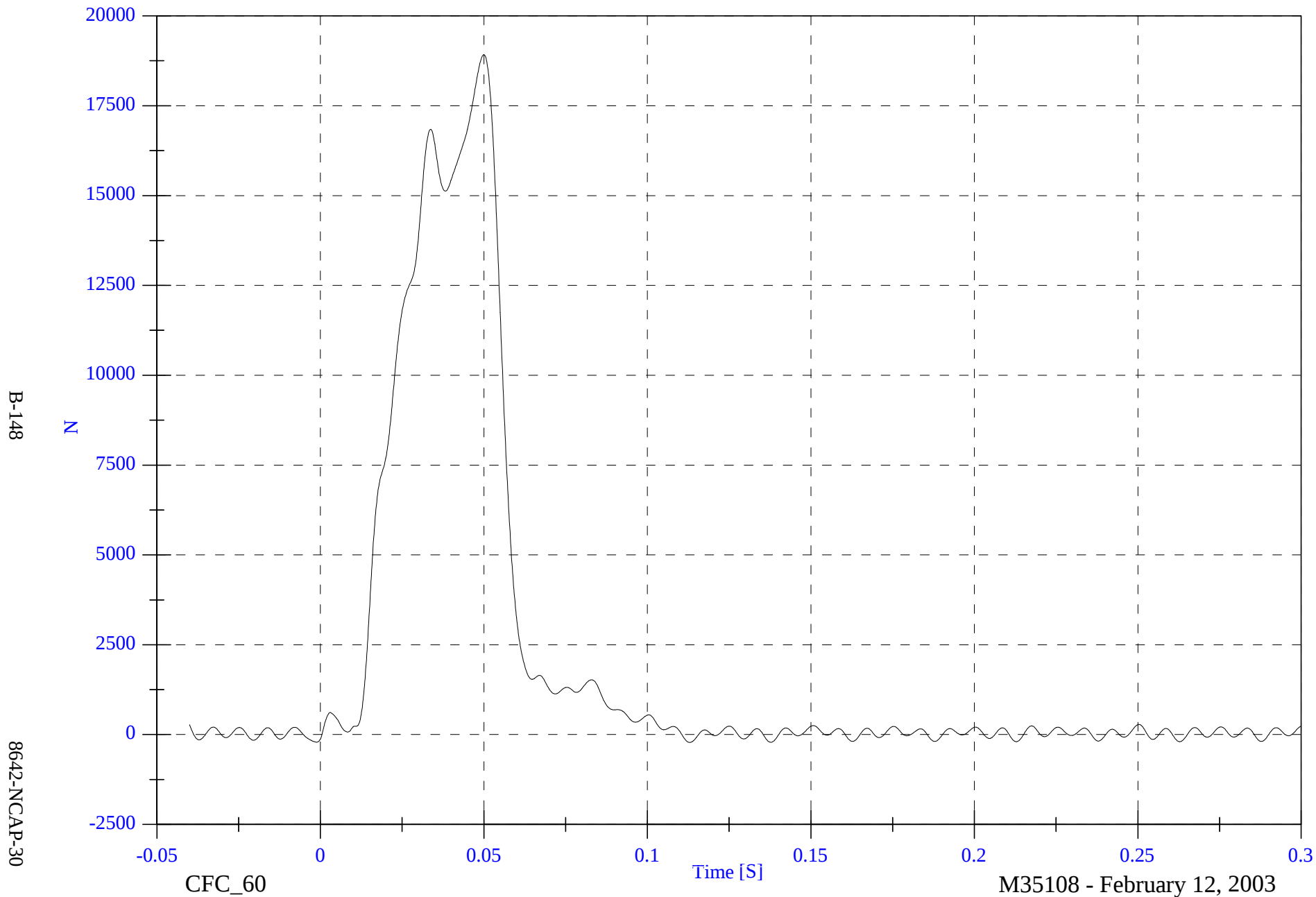


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell A6 Fx

Max: 18921.5 [N] at 0.050 [S]

Min: -217.6 [N] at 0.113 [S]

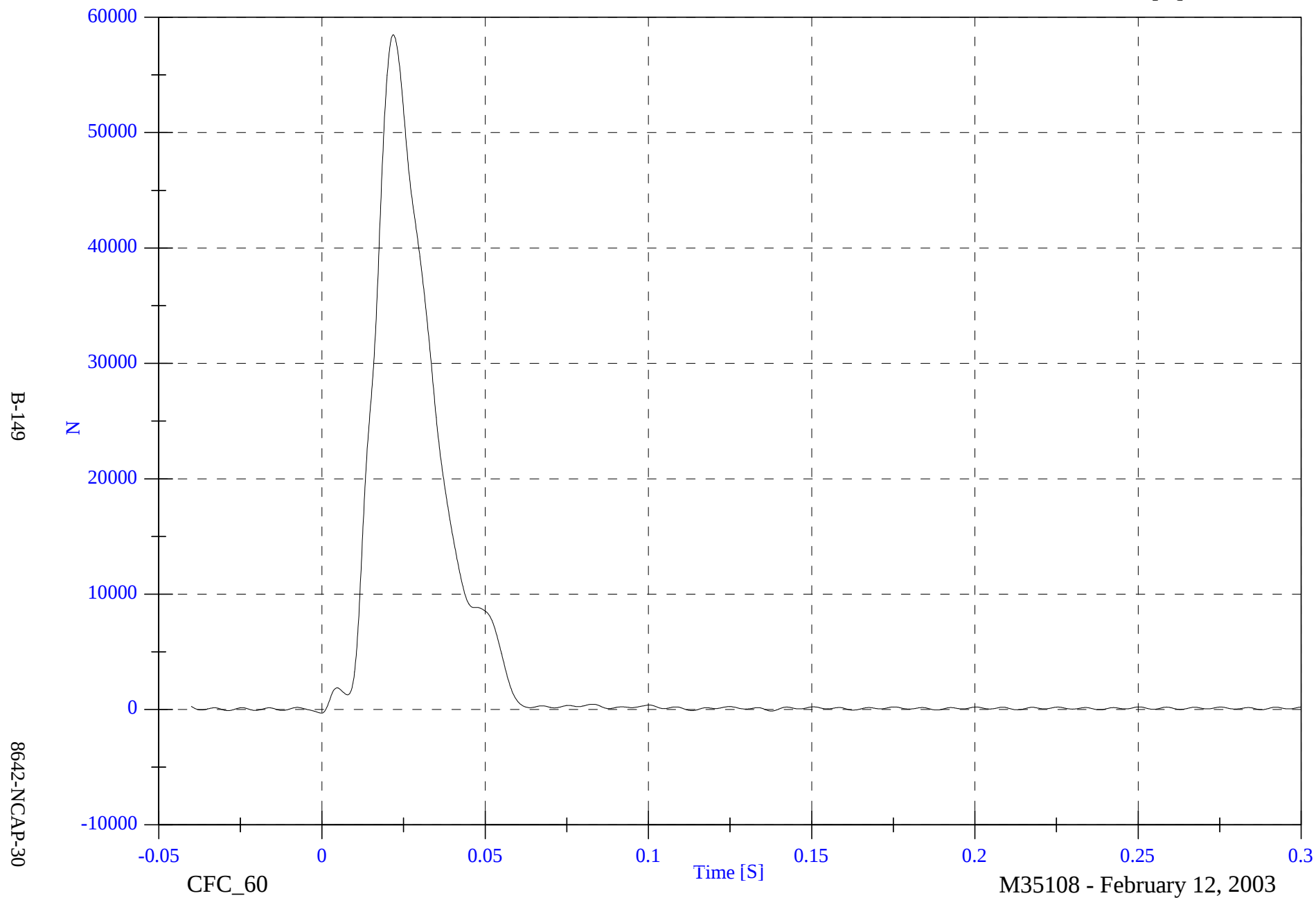


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell A7 Fx

Max: 58472.9 [N] at 0.022 [S]

Min: -314.1 [N] at -0.000 [S]

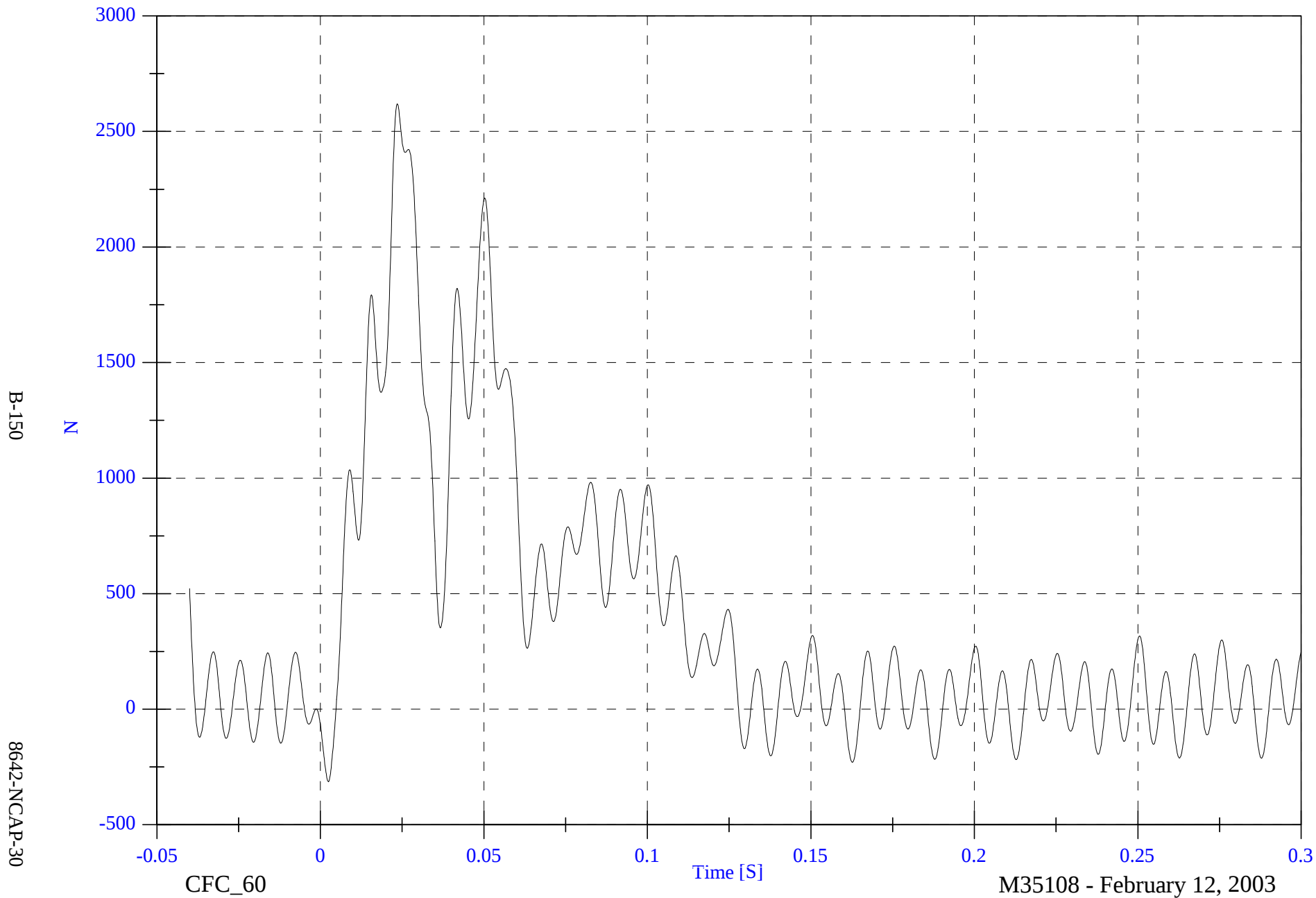


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell A8 Fx

Max: 2619.5 [N] at 0.023 [S]

Min: -313.9 [N] at 0.002 [S]

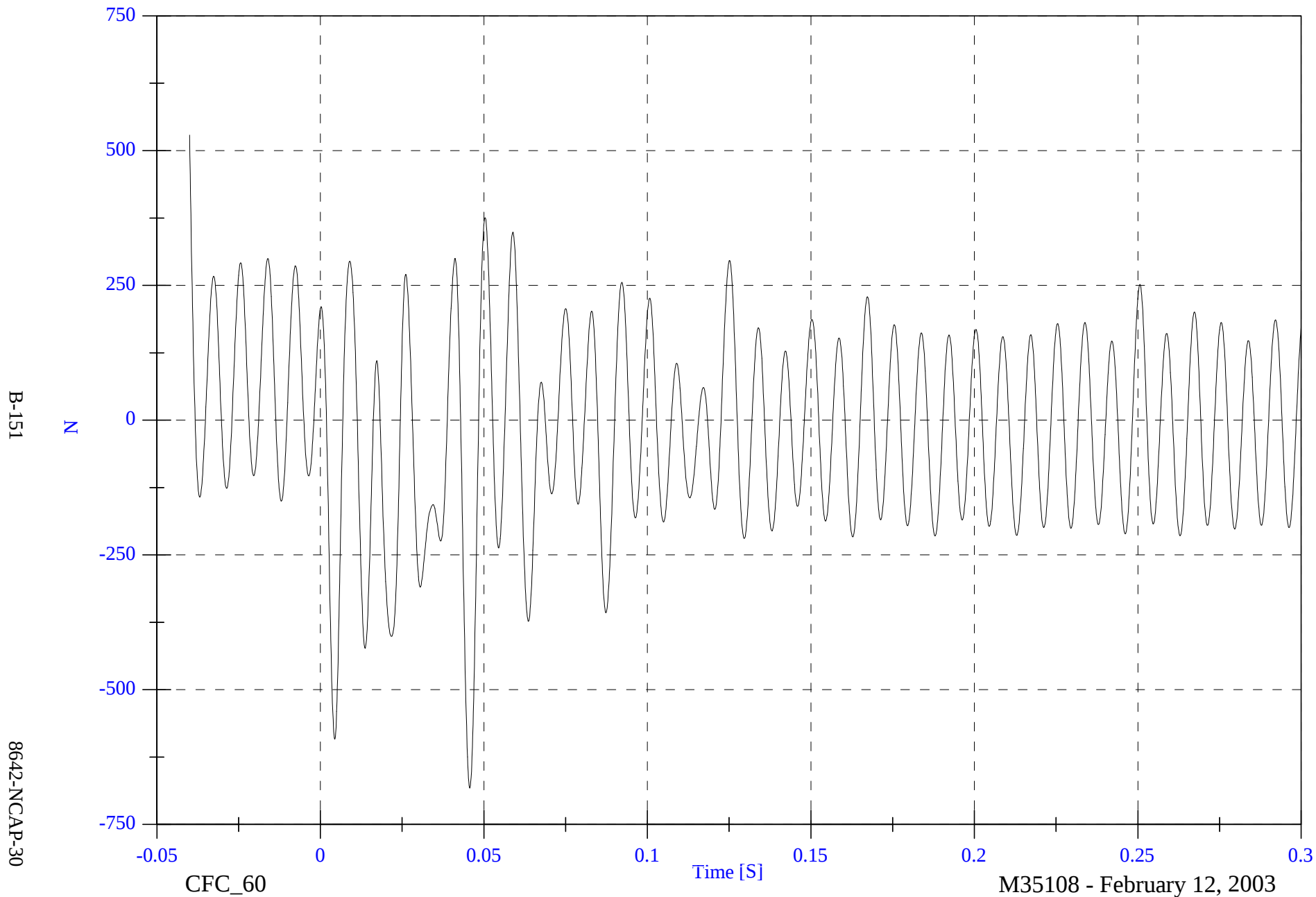


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell A9 Fx

Max: 529.0 [N] at -0.040 [S]

Min: -682.7 [N] at 0.046 [S]

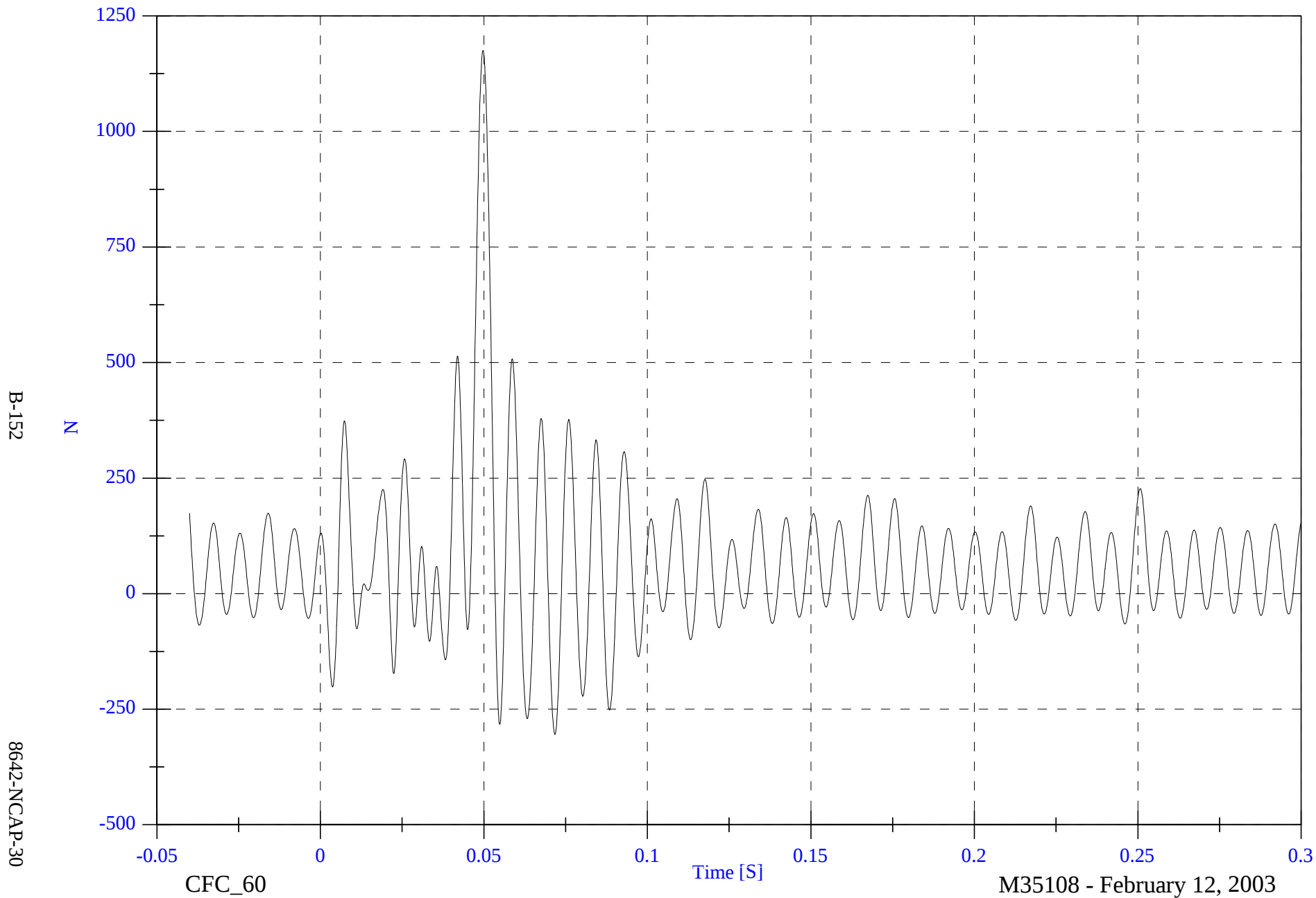


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell B1 Fx

Max: 1175.1 [N] at 0.050 [S]

Min: -304.4 [N] at 0.072 [S]

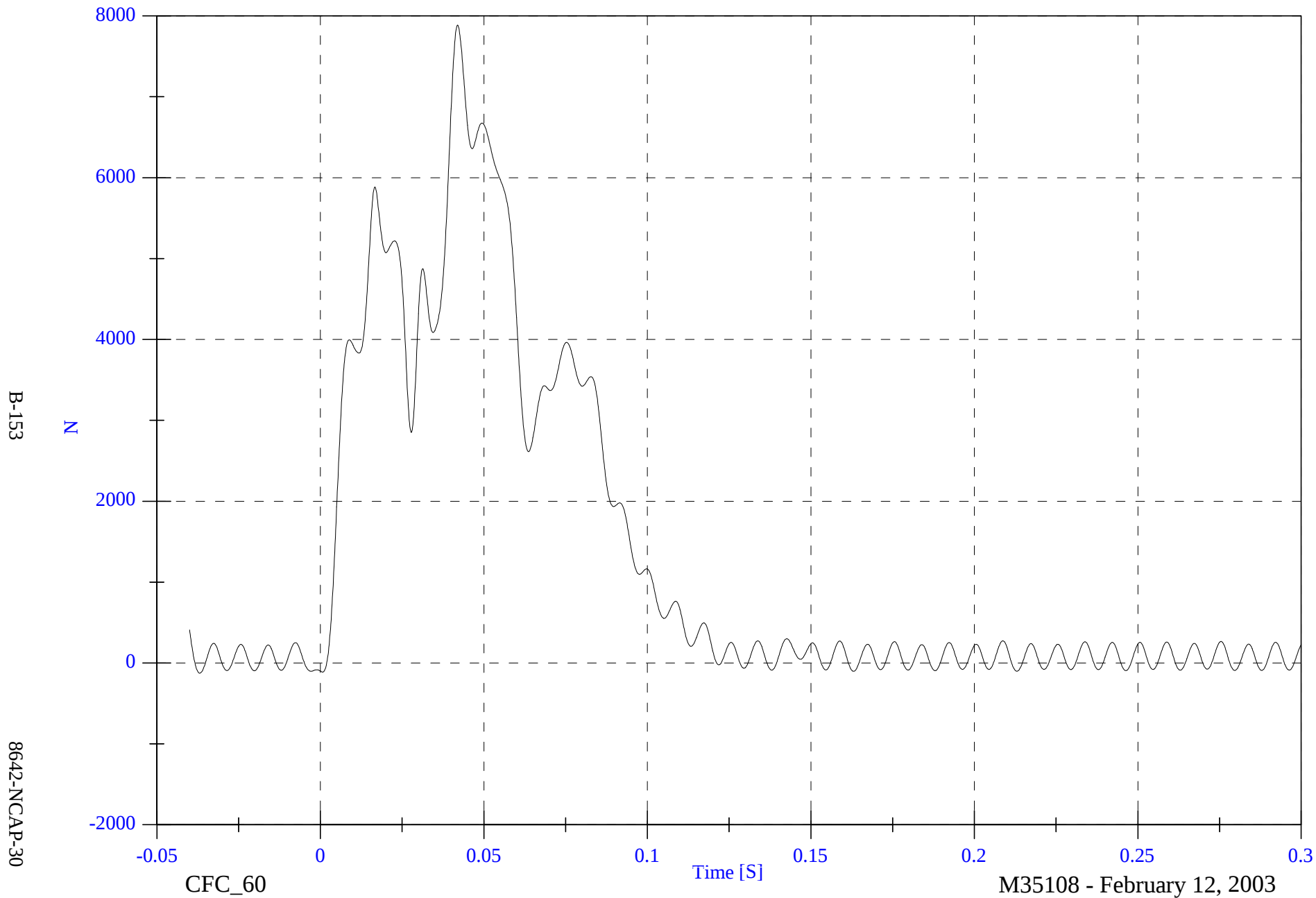


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell B2 Fx

Max: 7886.1 [N] at 0.042 [S]

Min: -125.9 [N] at -0.037 [S]

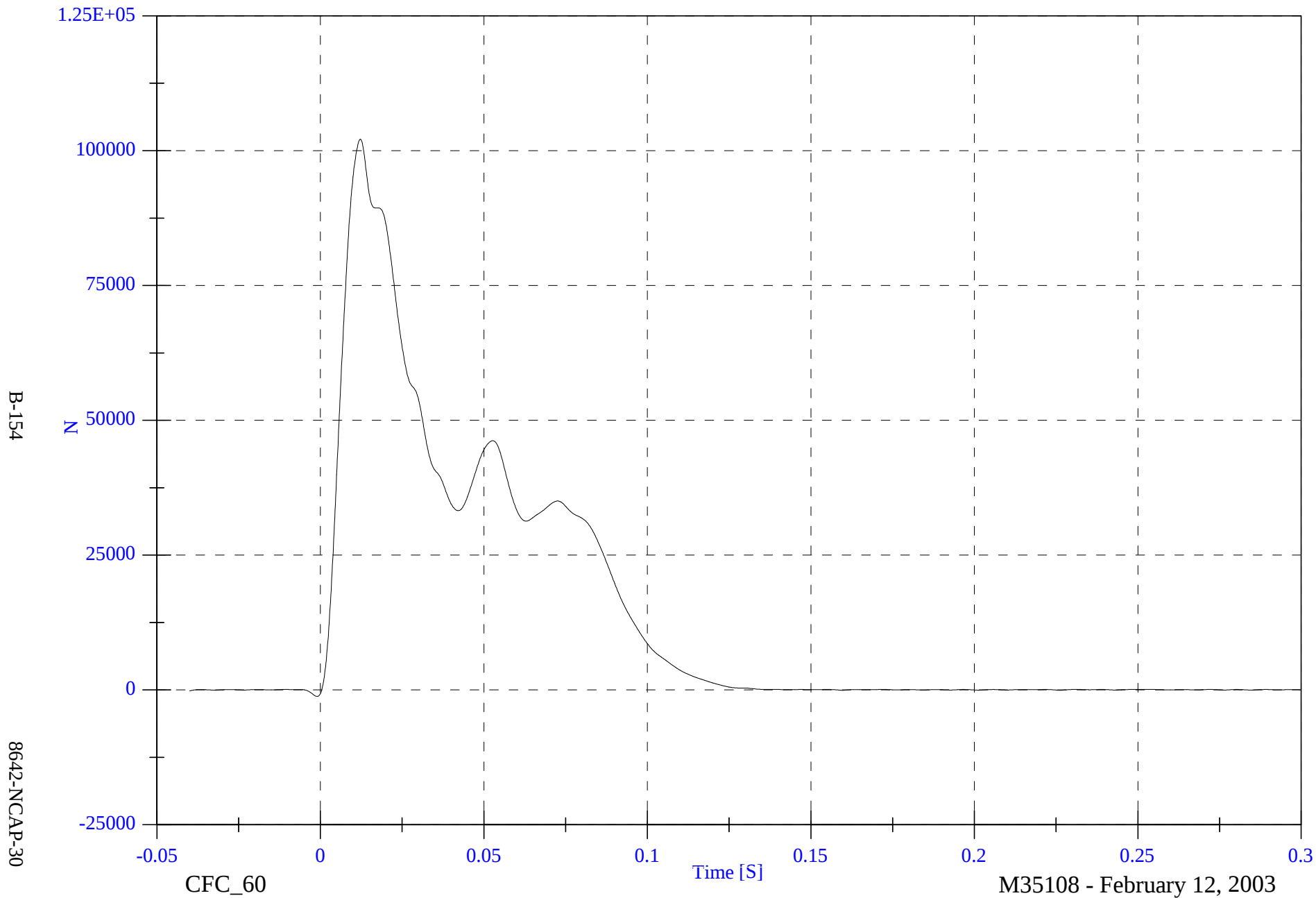


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell B3 Fx

Max: 102123.8 [N] at 0.012 [S]

Min: -1211.2 [N] at -0.001 [S]

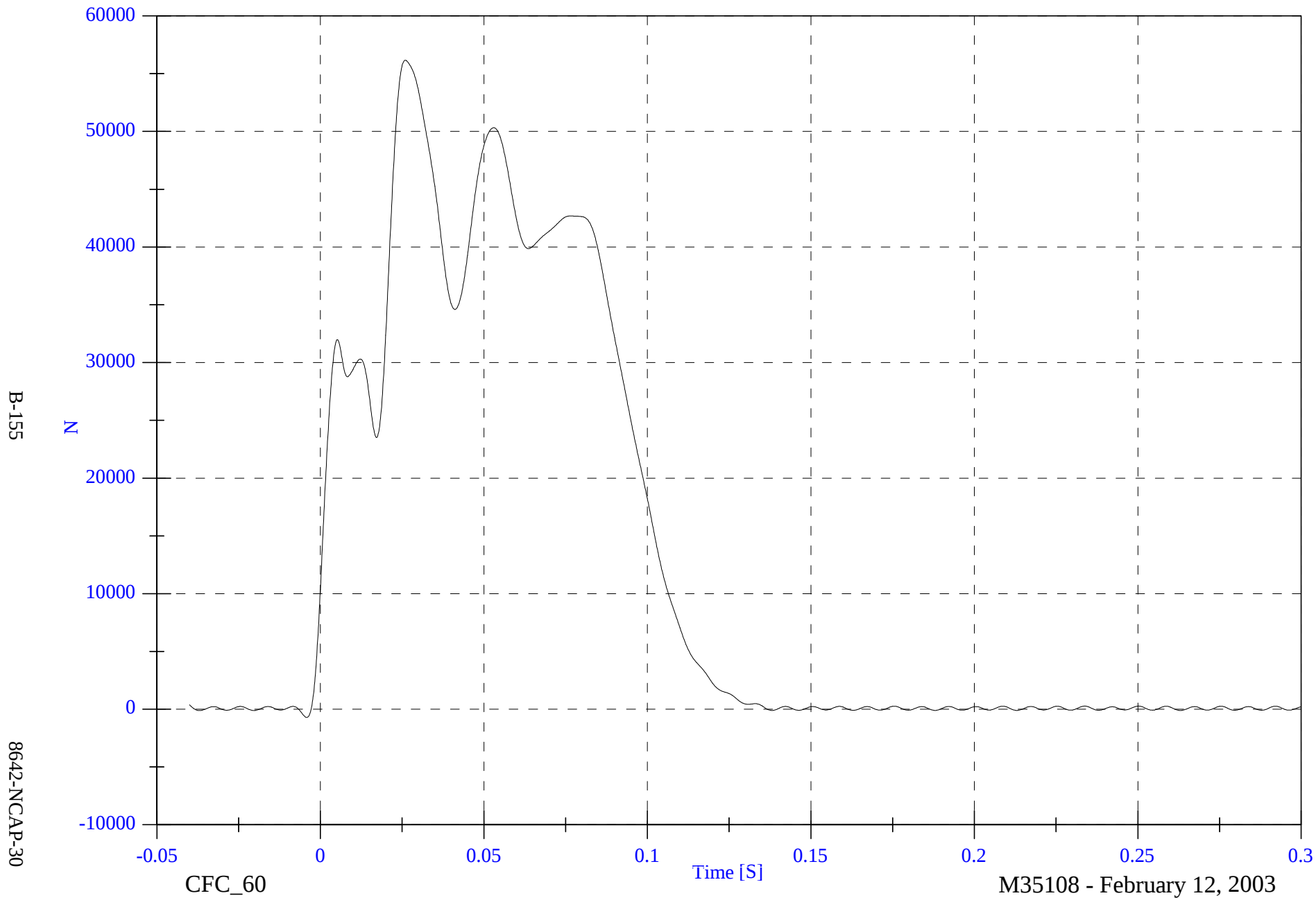


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell B4 Fx

Max: 56159.4 [N] at 0.026 [S]

Min: -711.4 [N] at -0.004 [S]

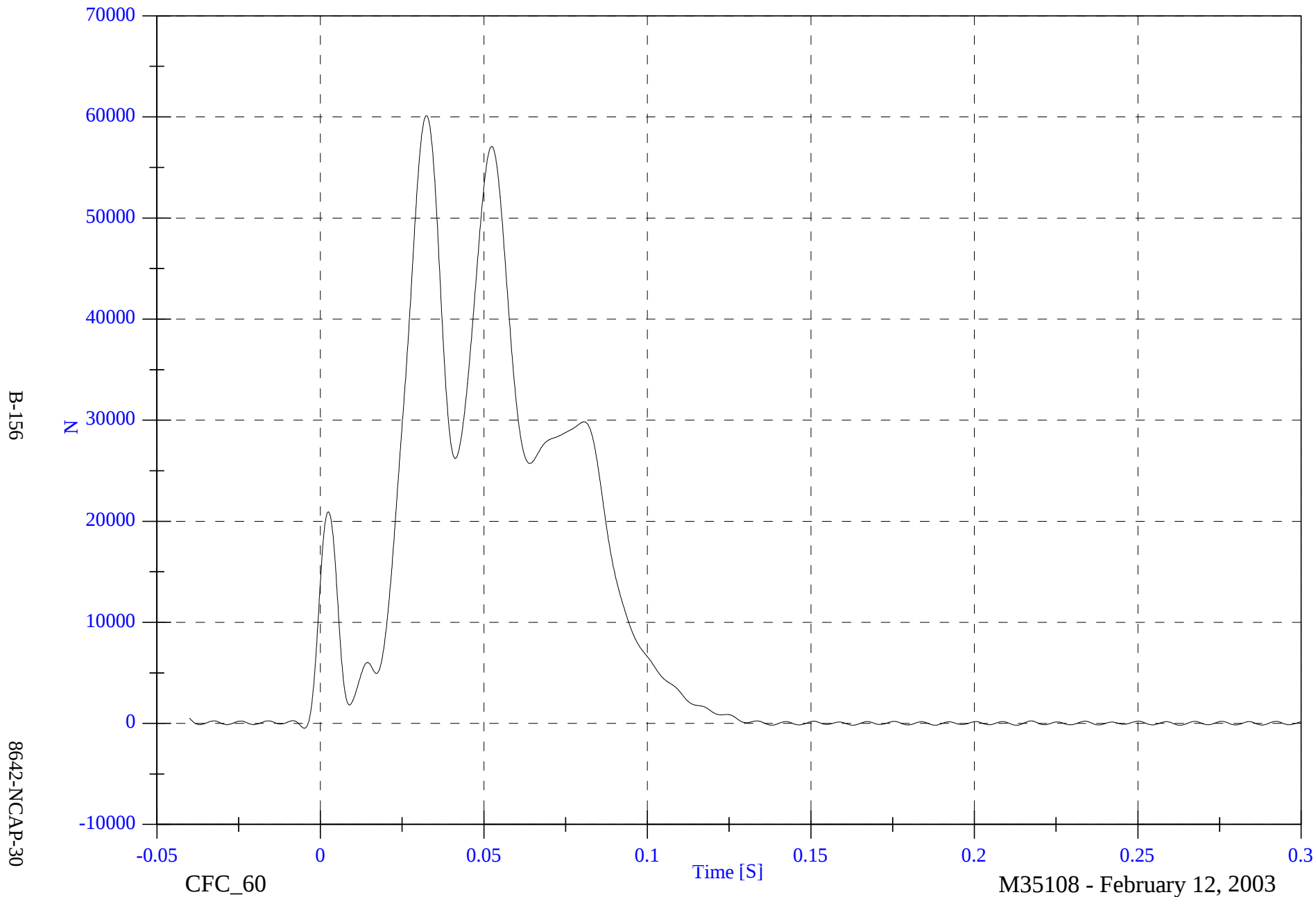


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell B5 Fx

Max: 60120.6 [N] at 0.032 [S]

Min: -478.6 [N] at -0.005 [S]

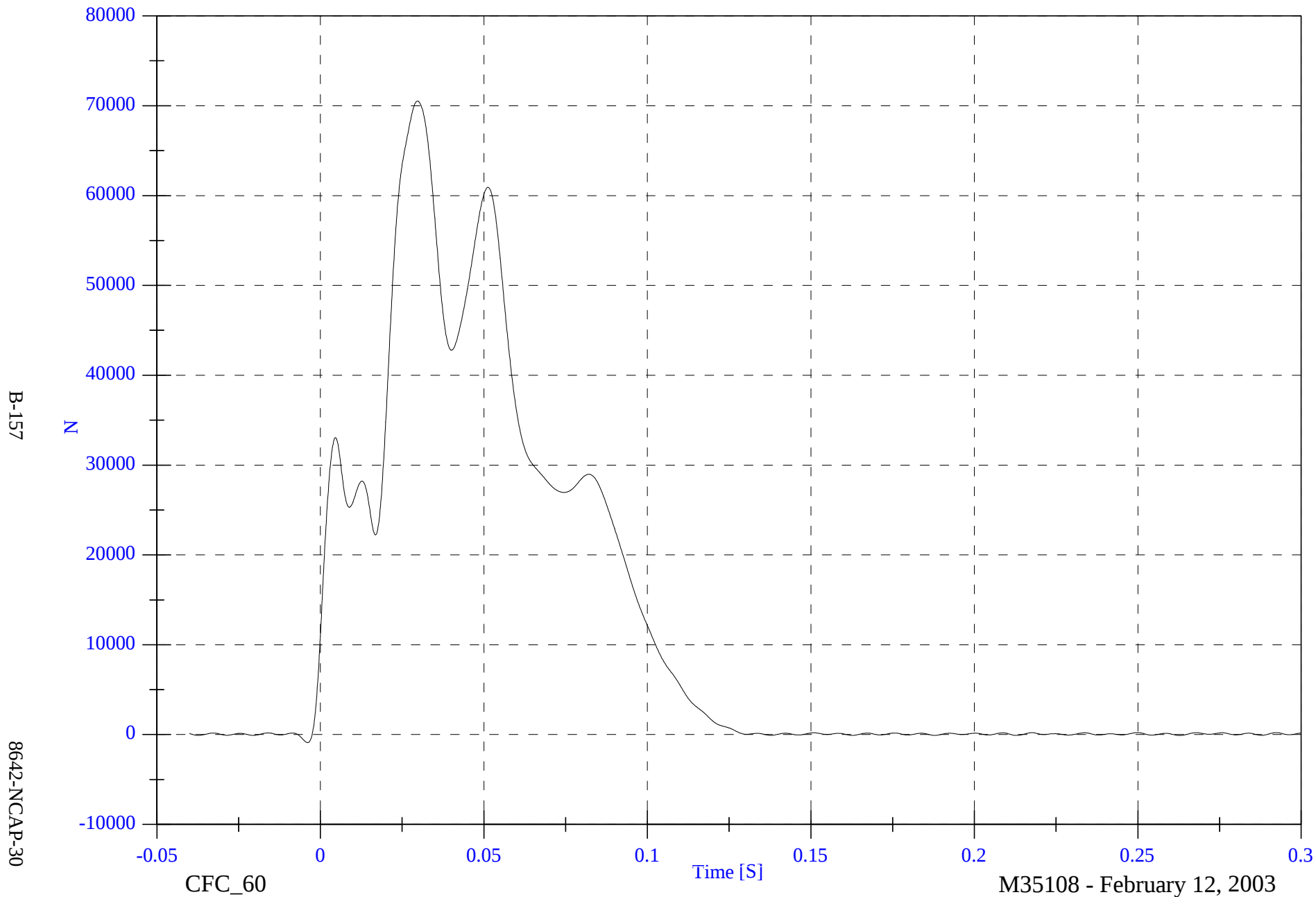


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell B6 Fx

Max: 70512.1 [N] at 0.030 [S]

Min: -892.1 [N] at -0.004 [S]

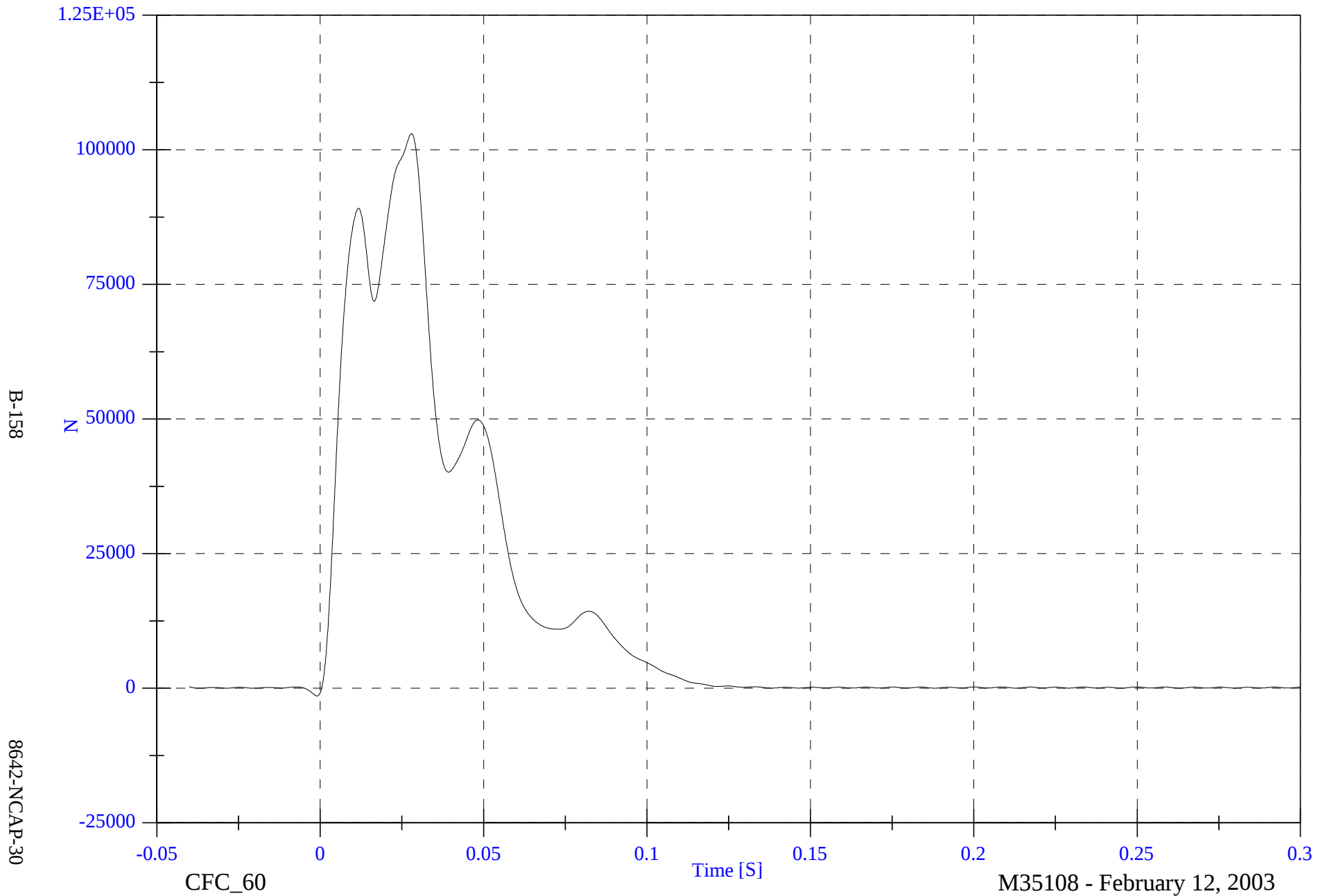


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell B7 Fx

Max: 102996.9 [N] at 0.028 [S]

Min: -1433.2 [N] at -0.001 [S]

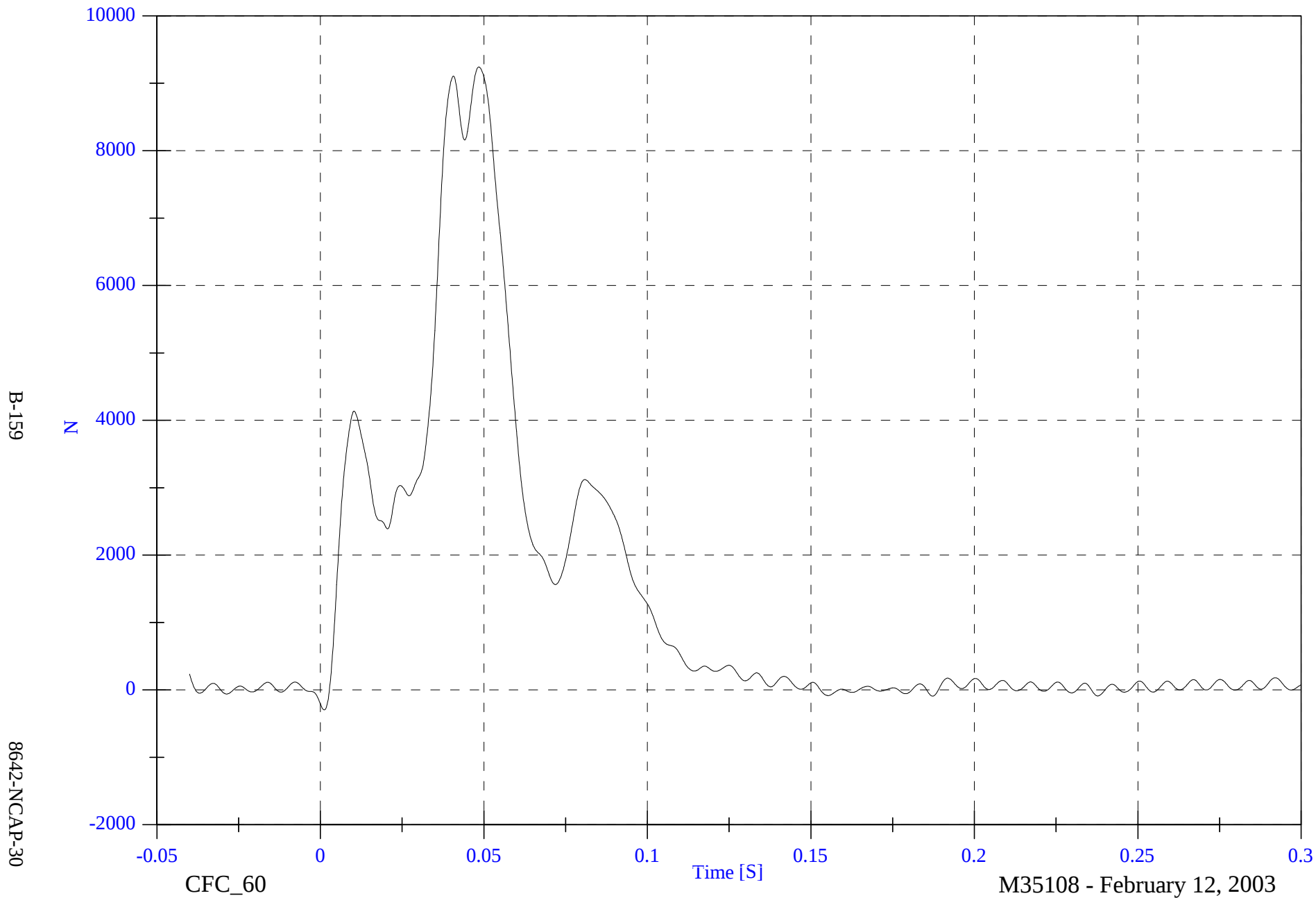


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell B8 Fx

Max: 9242.2 [N] at 0.048 [S]

Min: -296.1 [N] at 0.001 [S]

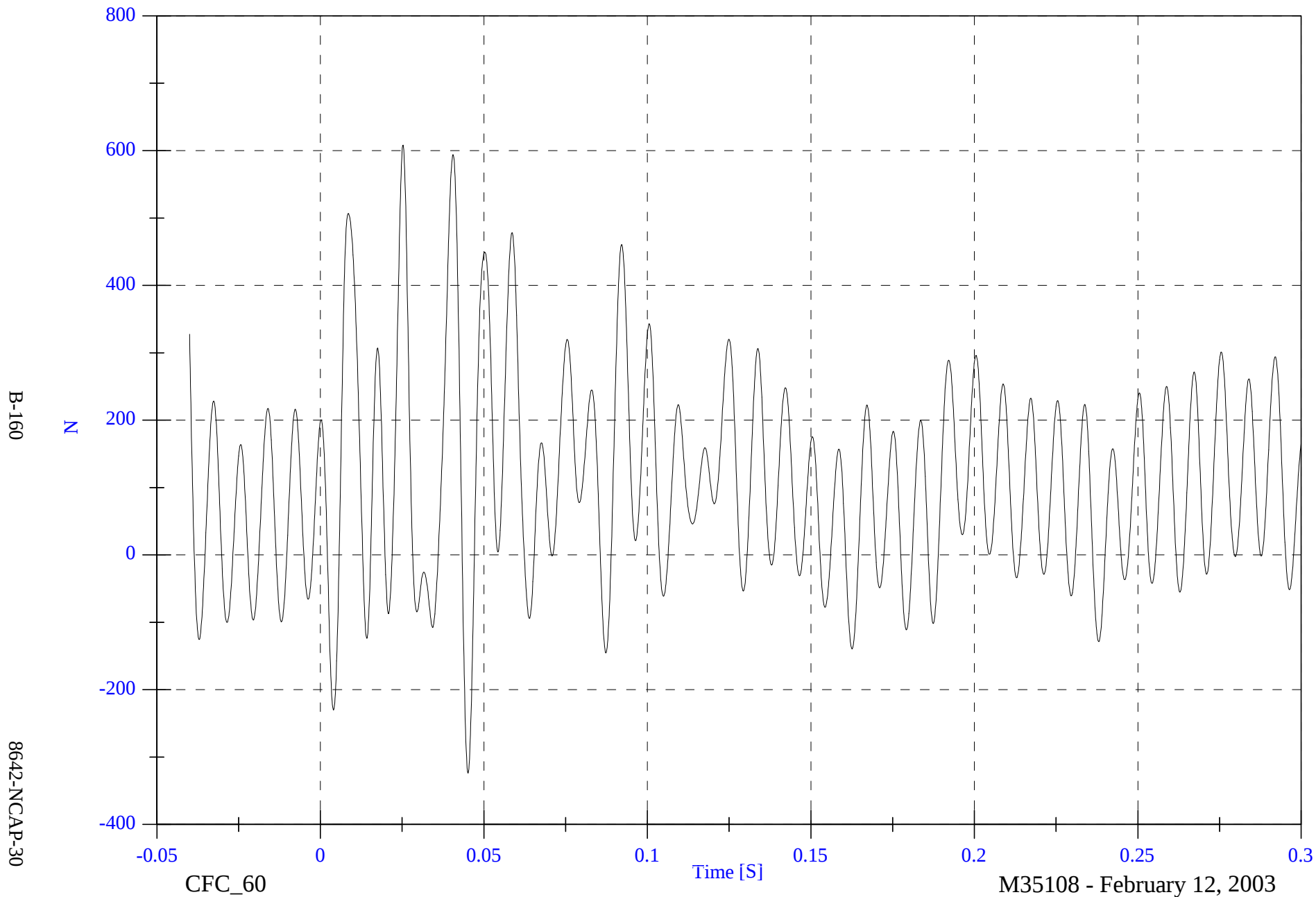


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell B9 Fx

Max: 608.3 [N] at 0.025 [S]

Min: -323.7 [N] at 0.045 [S]

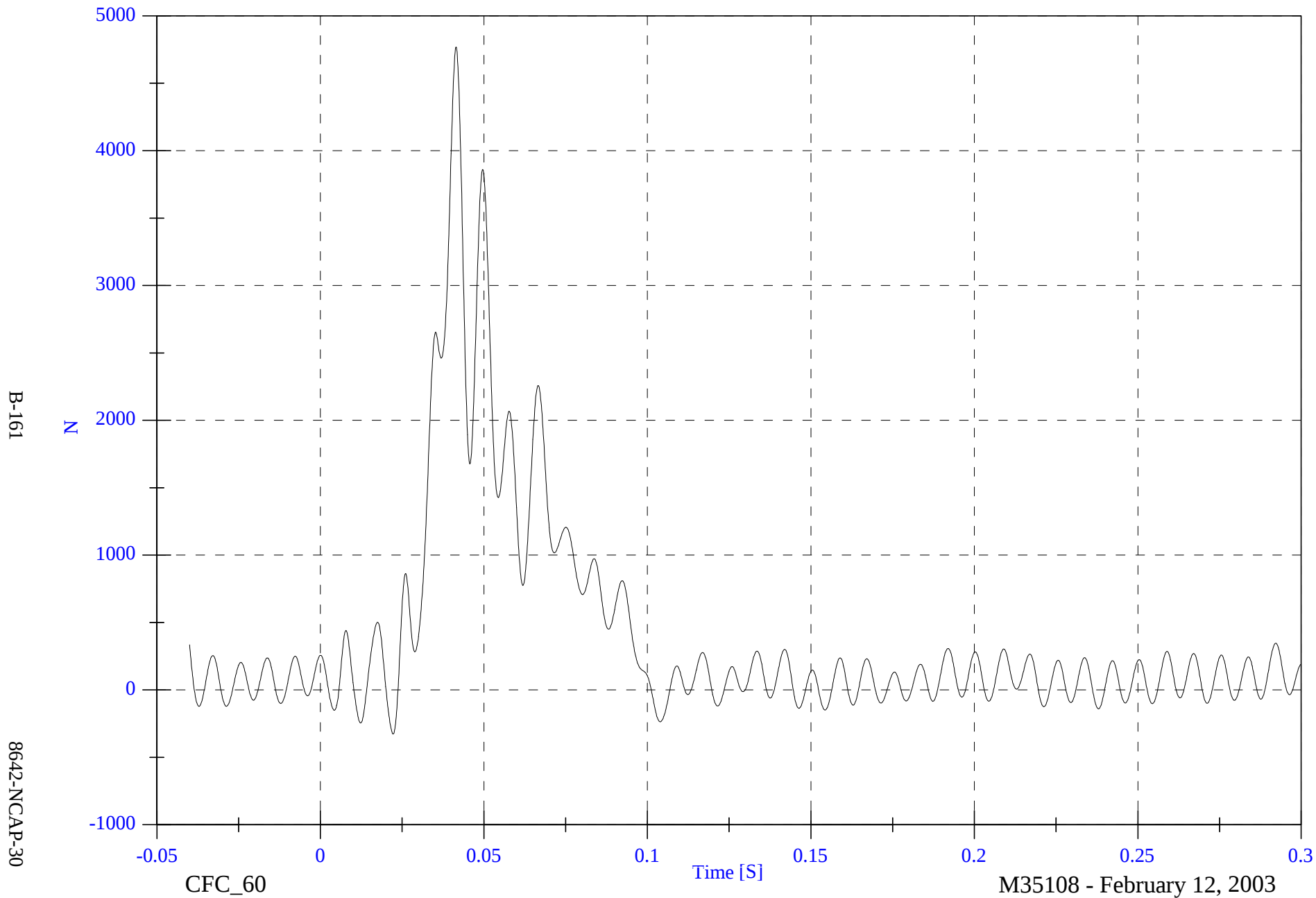


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell C1 Fx

Max: 4768.7 [N] at 0.041 [S]

Min: -327.4 [N] at 0.022 [S]

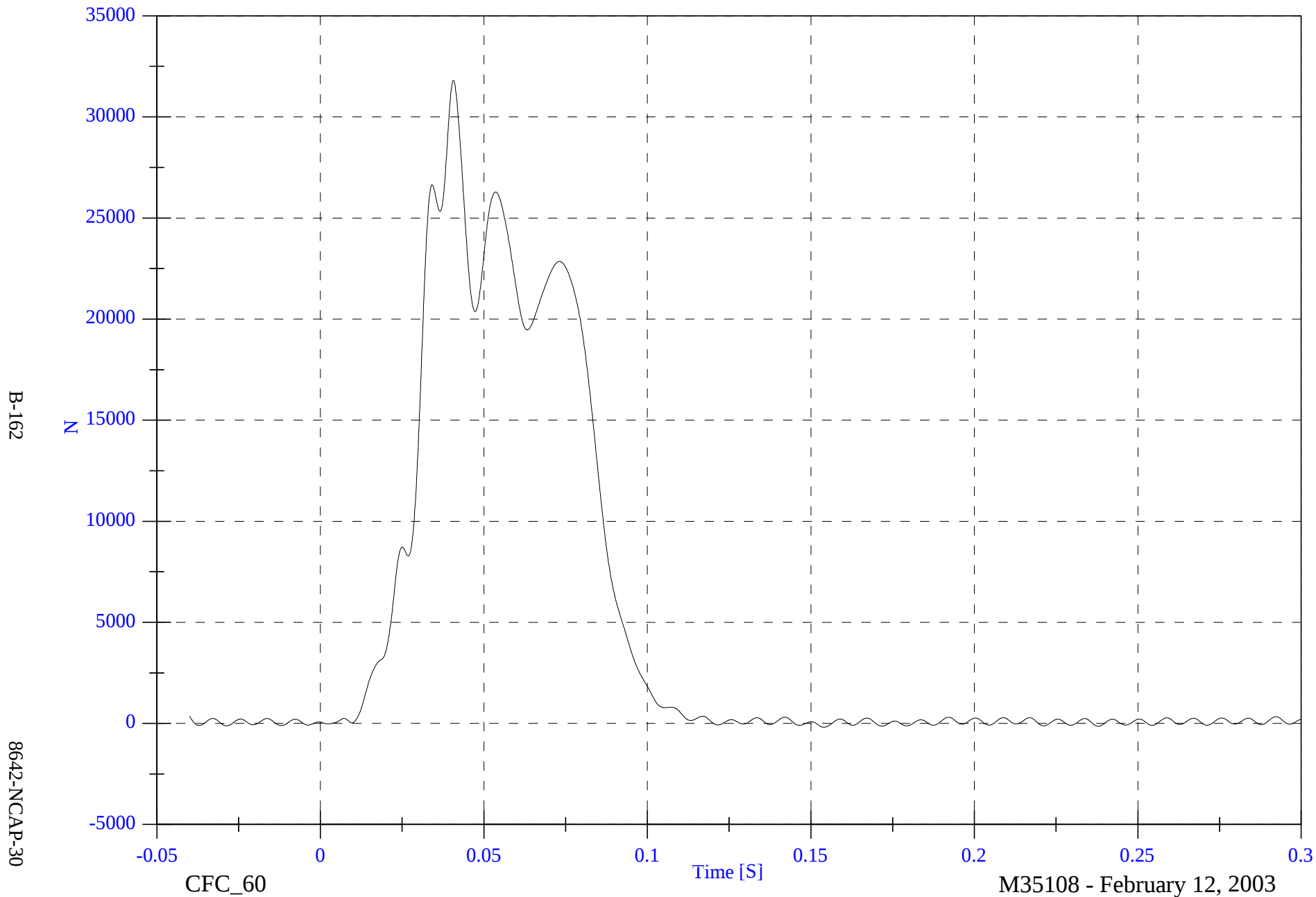


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell C2 Fx

Max: 31809.9 [N] at 0.041 [S]

Min: -190.3 [N] at 0.154 [S]

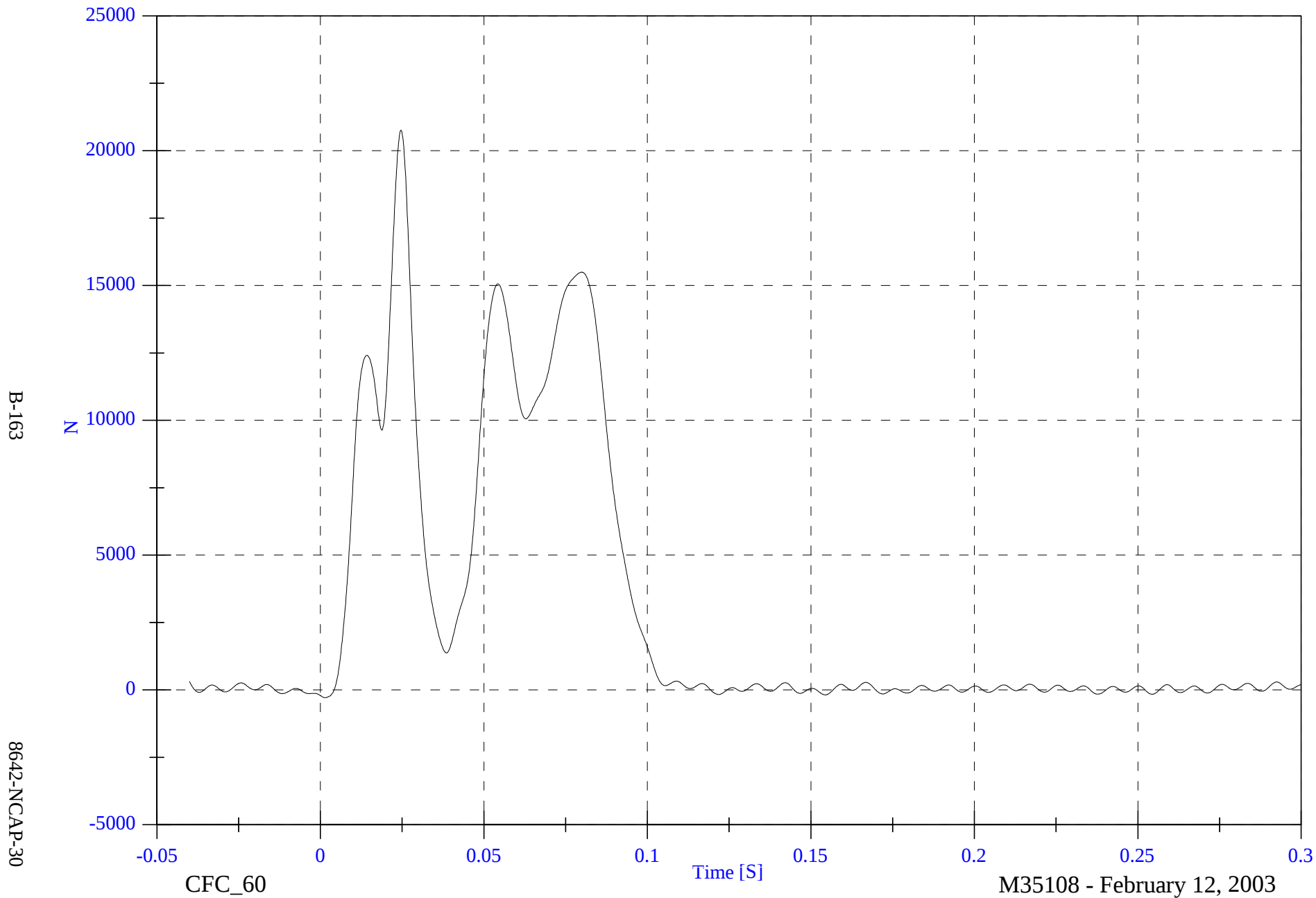


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell C3 Fx

Max: 20756.3 [N] at 0.025 [S]

Min: -287.1 [N] at 0.001 [S]

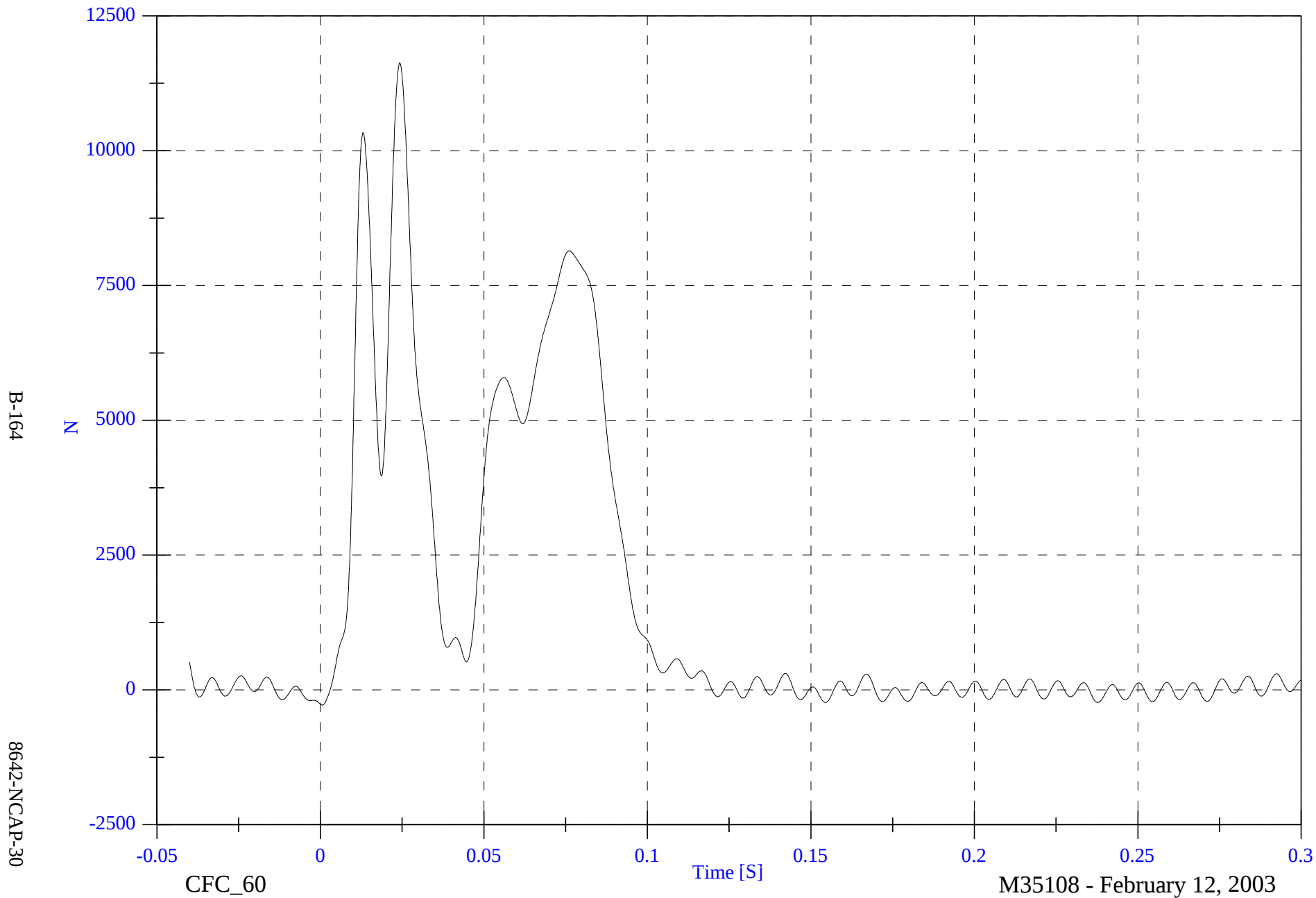


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell C4 Fx

Max: 11627.3 [N] at 0.024 [S]

Min: -281.0 [N] at 0.001 [S]

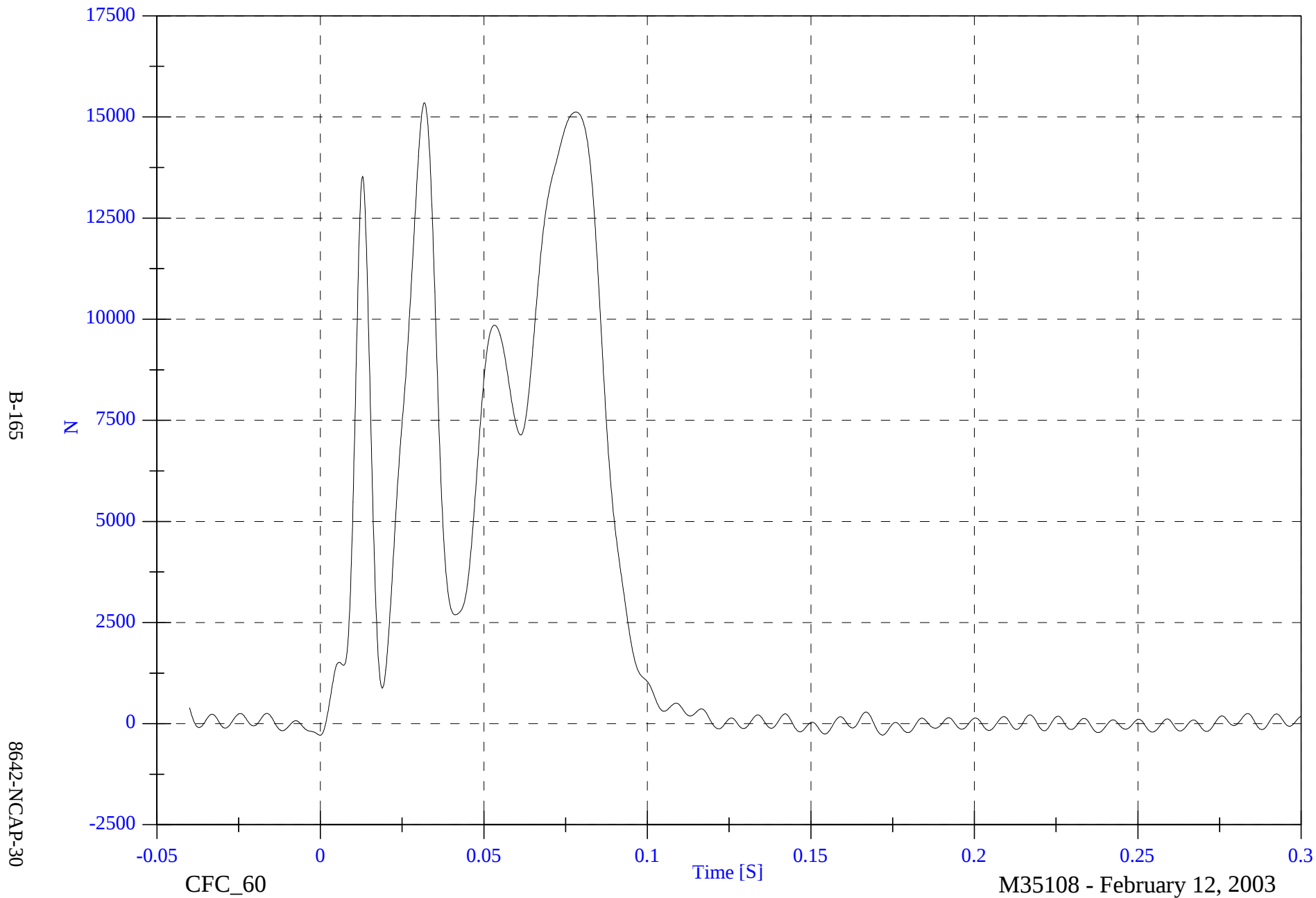


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell C5 Fx

Max: 15351.3 [N] at 0.032 [S]

Min: -286.5 [N] at -0.000 [S]

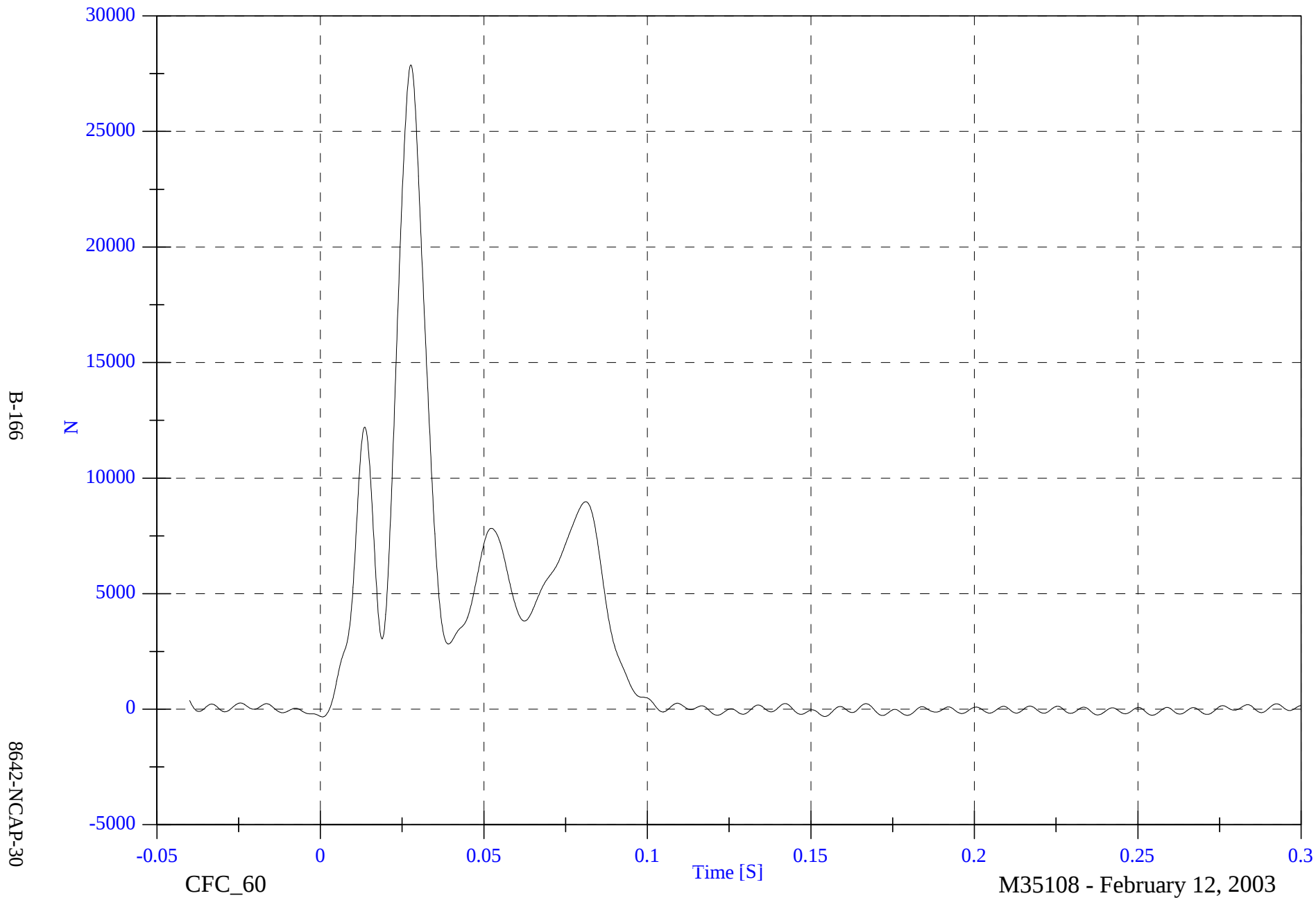


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell C6 Fx

Max: 27881.5 [N] at 0.028 [S]

Min: -330.4 [N] at 0.001 [S]

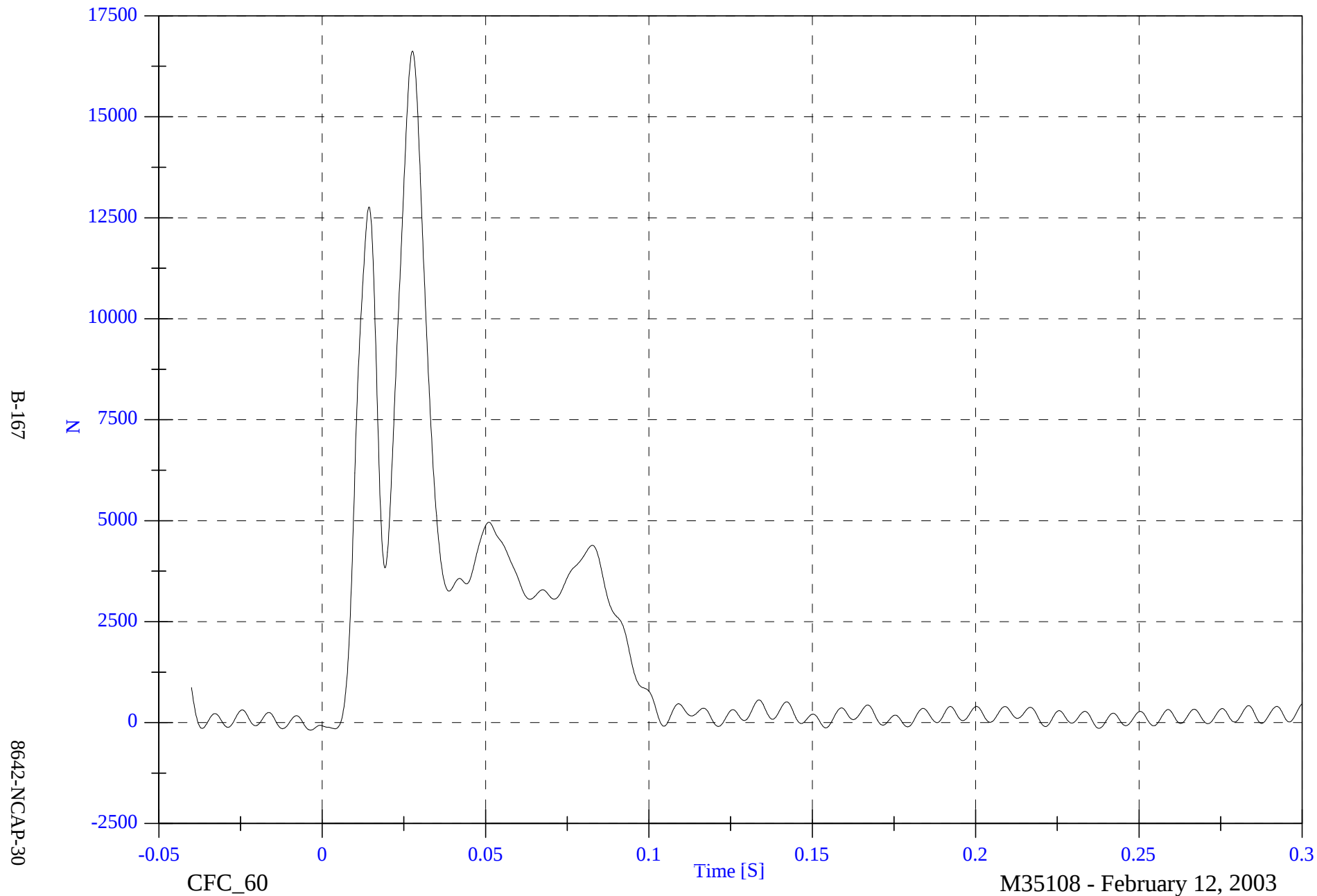


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell C7 Fx

Max: 16626.7 [N] at 0.028 [S]

Min: -186.1 [N] at -0.004 [S]

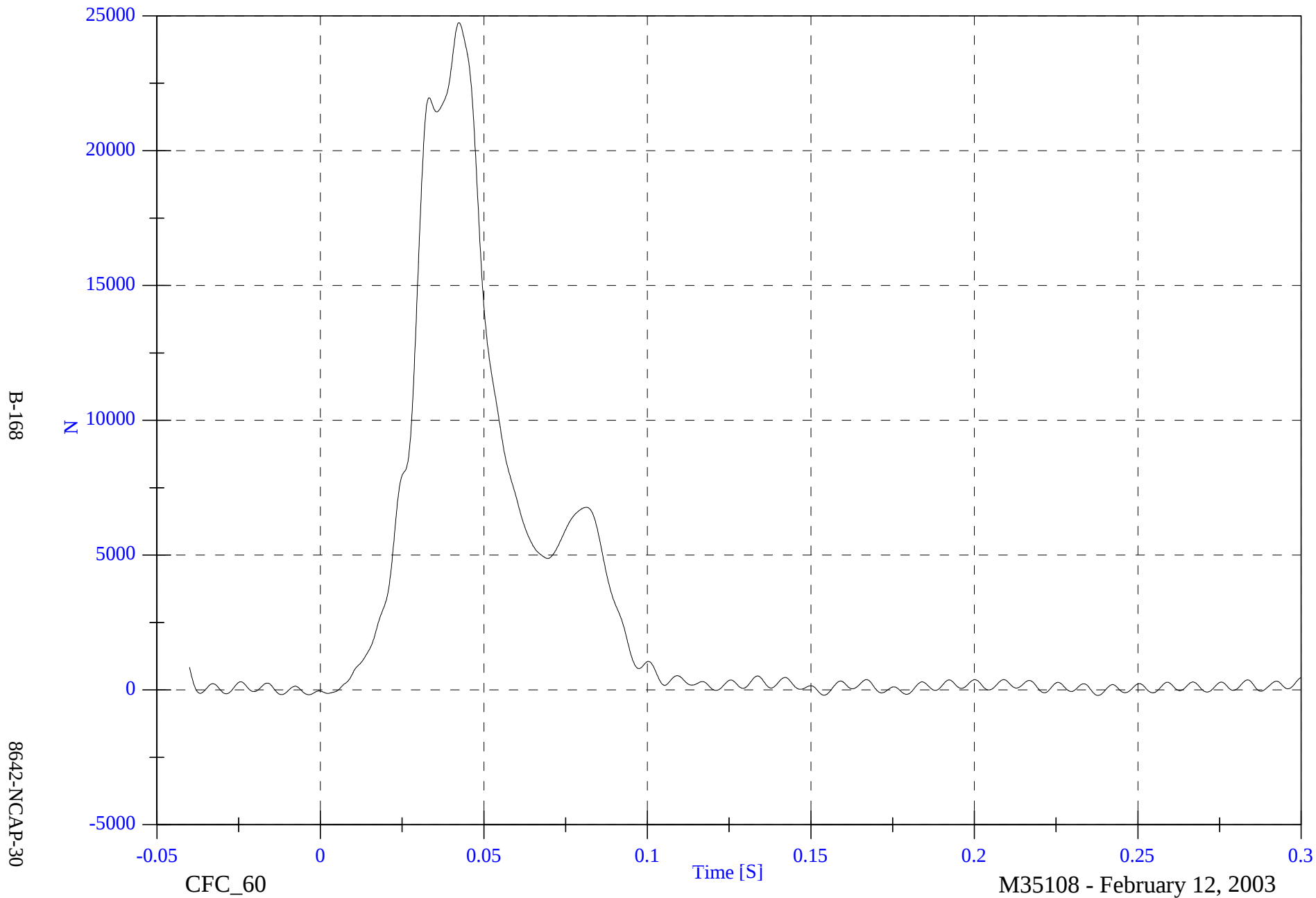


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell C8 Fx

Max: 24750.4 [N] at 0.042 [S]

Min: -205.0 [N] at 0.238 [S]

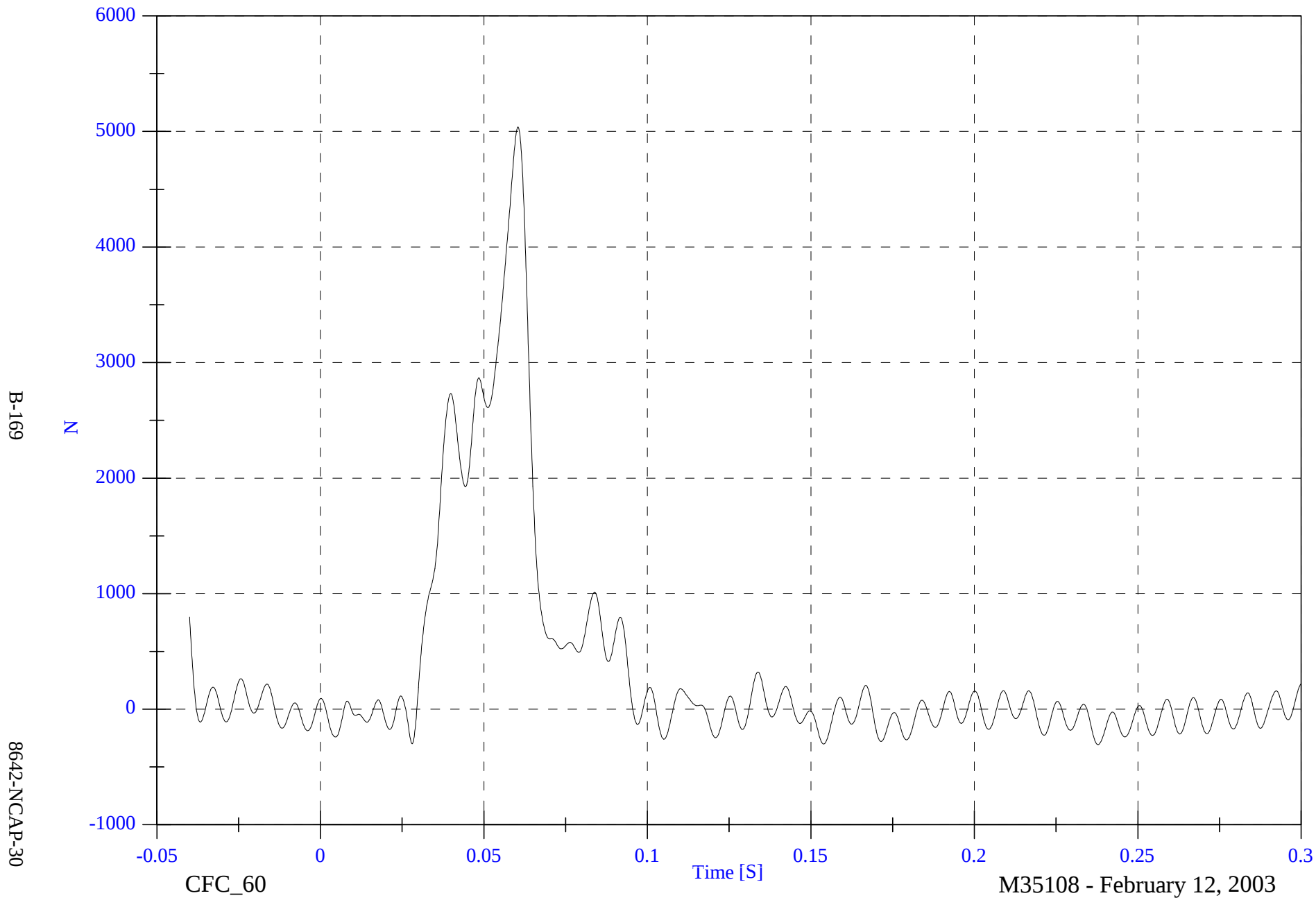


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell C9 Fx

Max: 5038.4 [N] at 0.060 [S]

Min: -306.4 [N] at 0.238 [S]

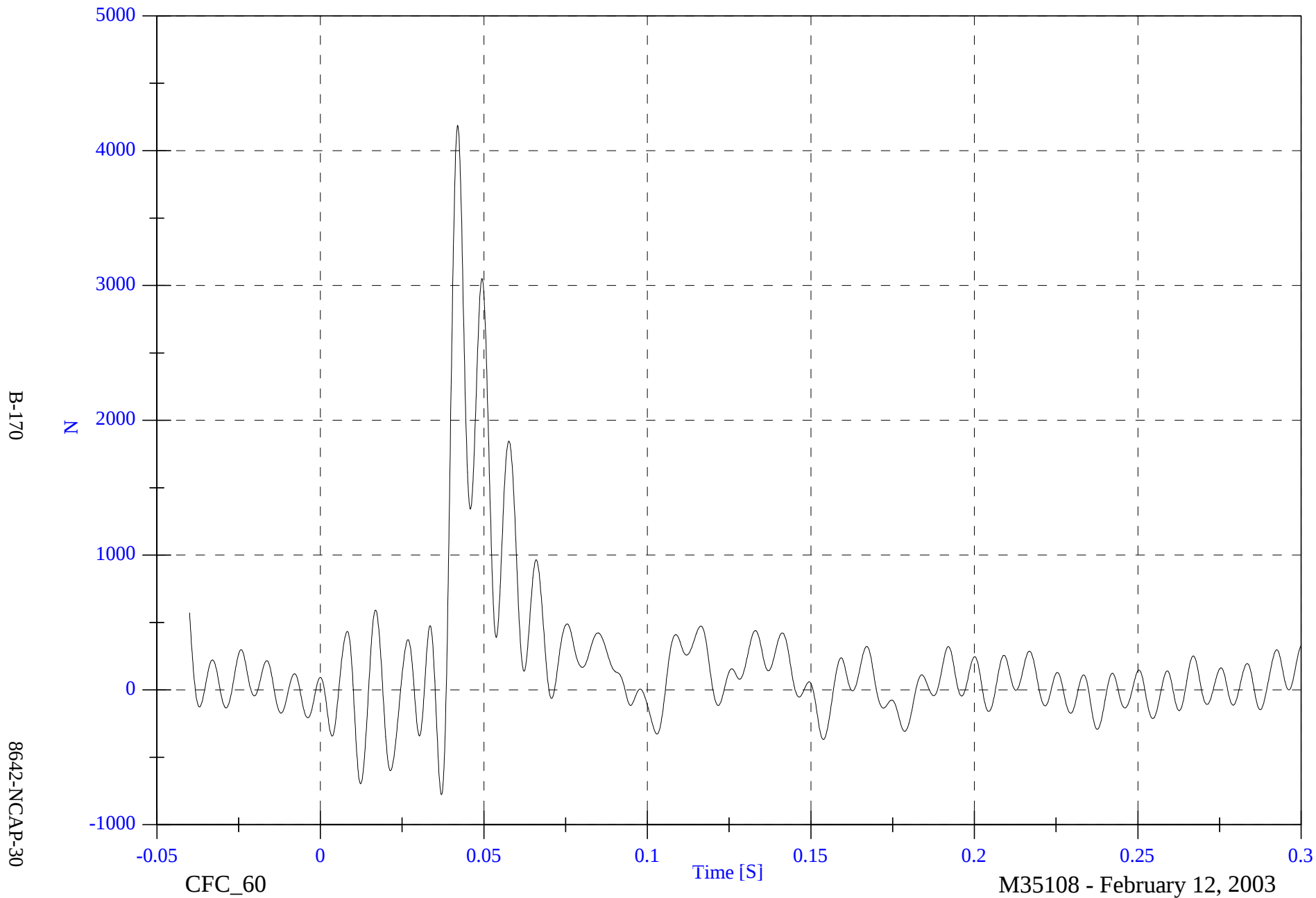


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell D1 Fx

Max: 4188.7 [N] at 0.042 [S]

Min: -776.9 [N] at 0.037 [S]

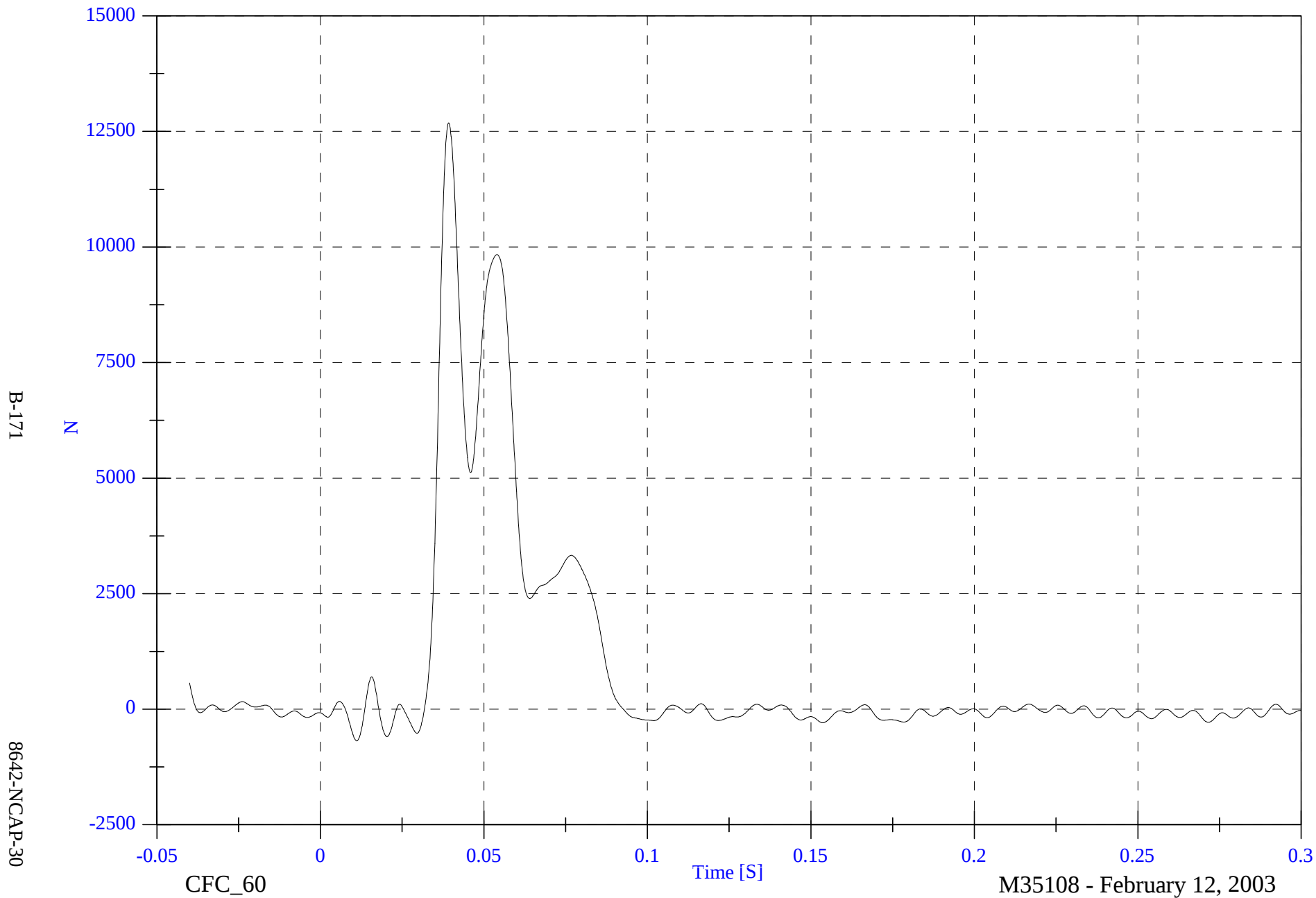


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell D2 Fx

Max: 12684.1 [N] at 0.039 [S]

Min: -683.5 [N] at 0.011 [S]

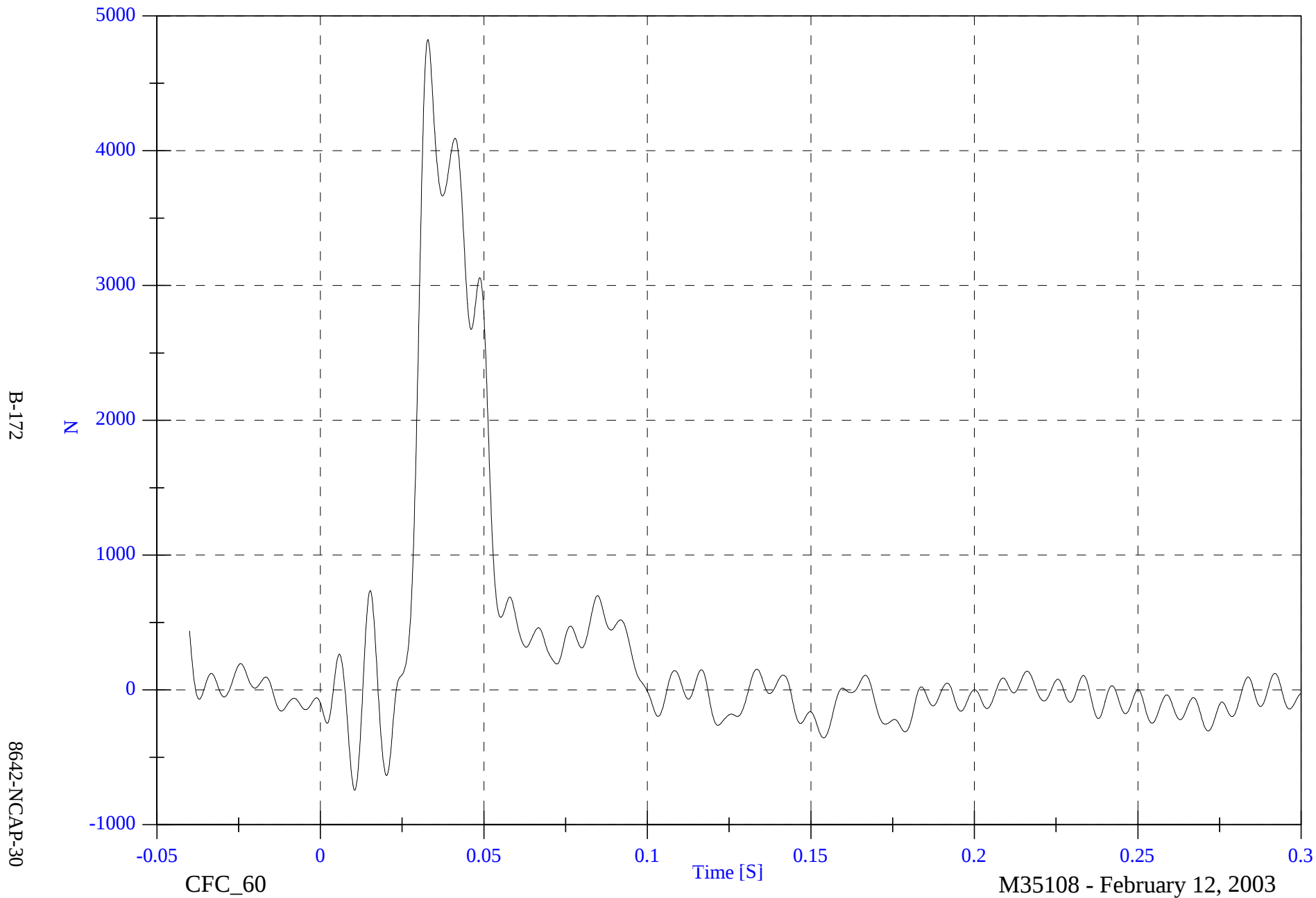


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell D3 Fx

Max: 4824.4 [N] at 0.033 [S]

Min: -743.9 [N] at 0.010 [S]

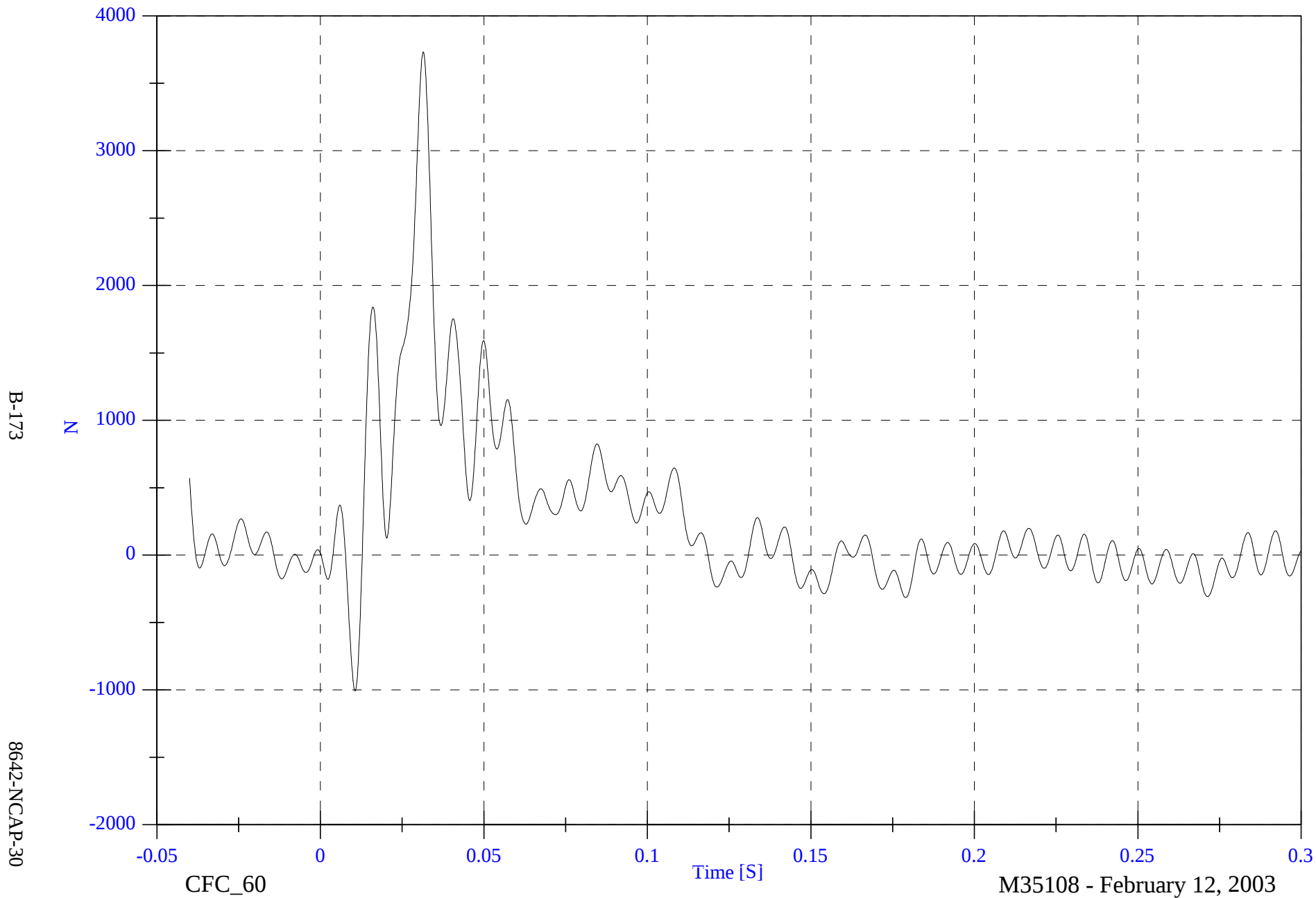


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell D4 Fx

Max: 3732.6 [N] at 0.031 [S]

Min: -1006.9 [N] at 0.011 [S]

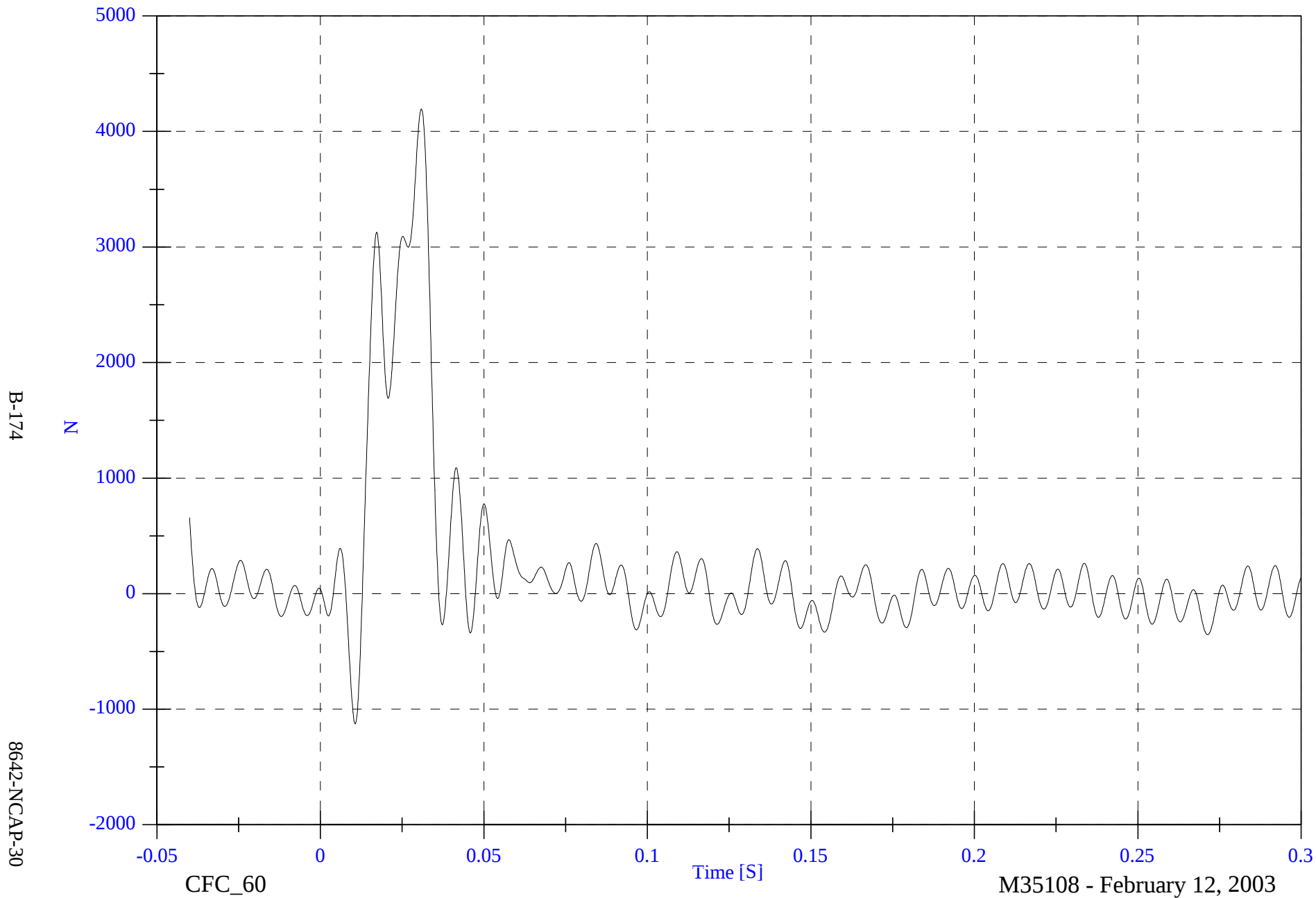


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell D5 Fx

Max: 4194.0 [N] at 0.031 [S]

Min: -1126.9 [N] at 0.011 [S]

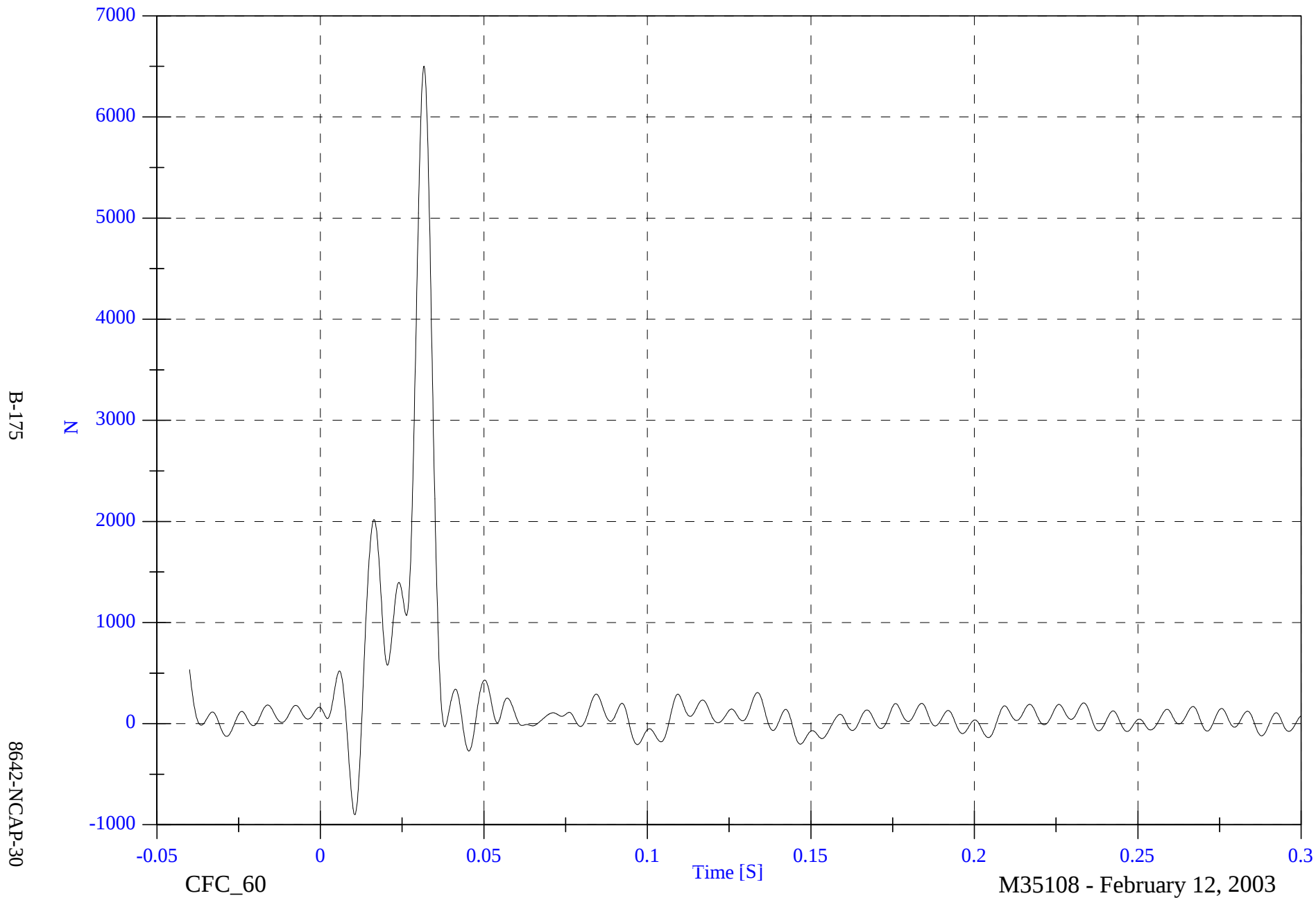


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell D6 Fx

Max: 6502.4 [N] at 0.032 [S]

Min: -900.9 [N] at 0.010 [S]

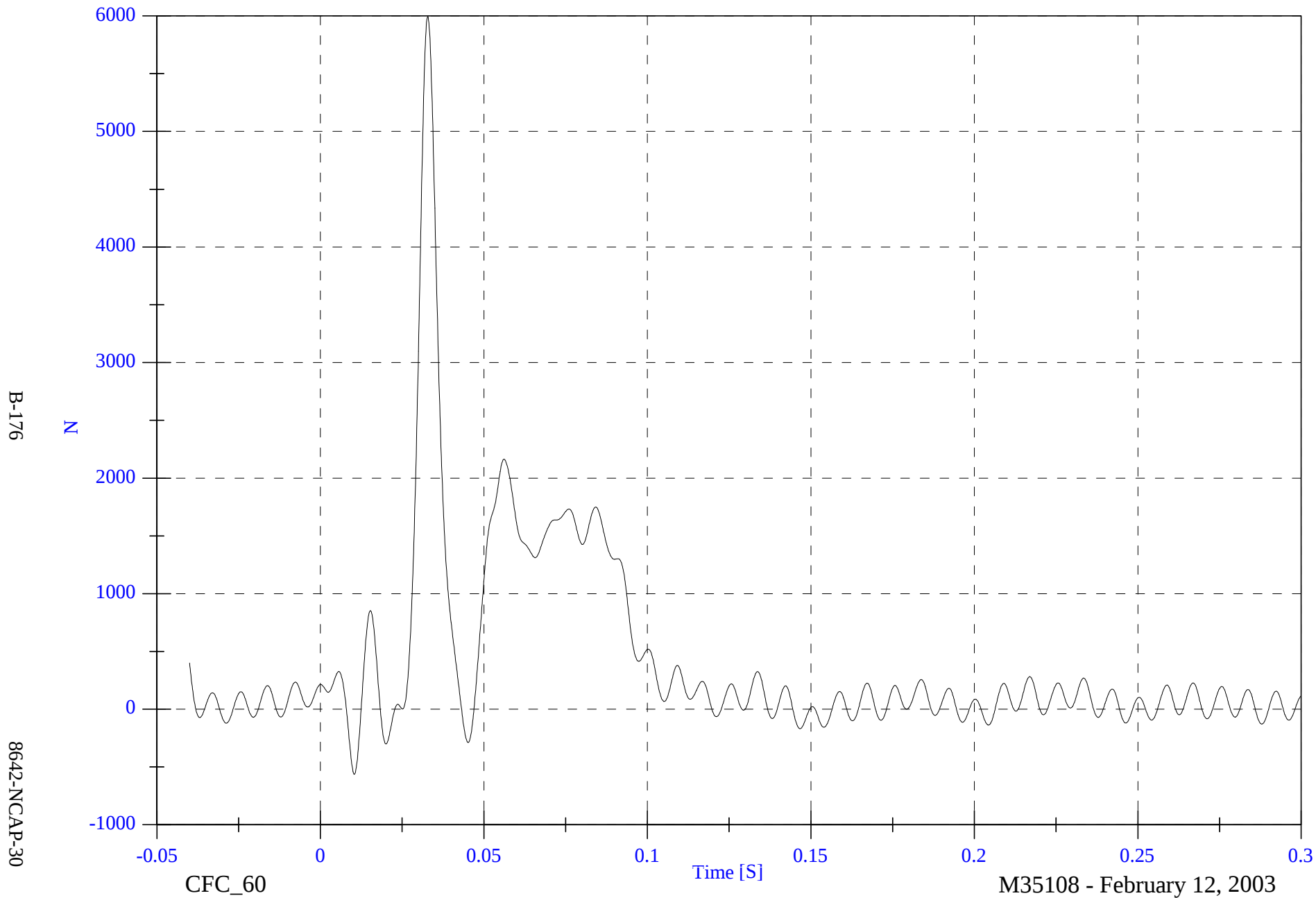


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell D7 Fx

Max: 5994.8 [N] at 0.033 [S]

Min: -563.4 [N] at 0.010 [S]

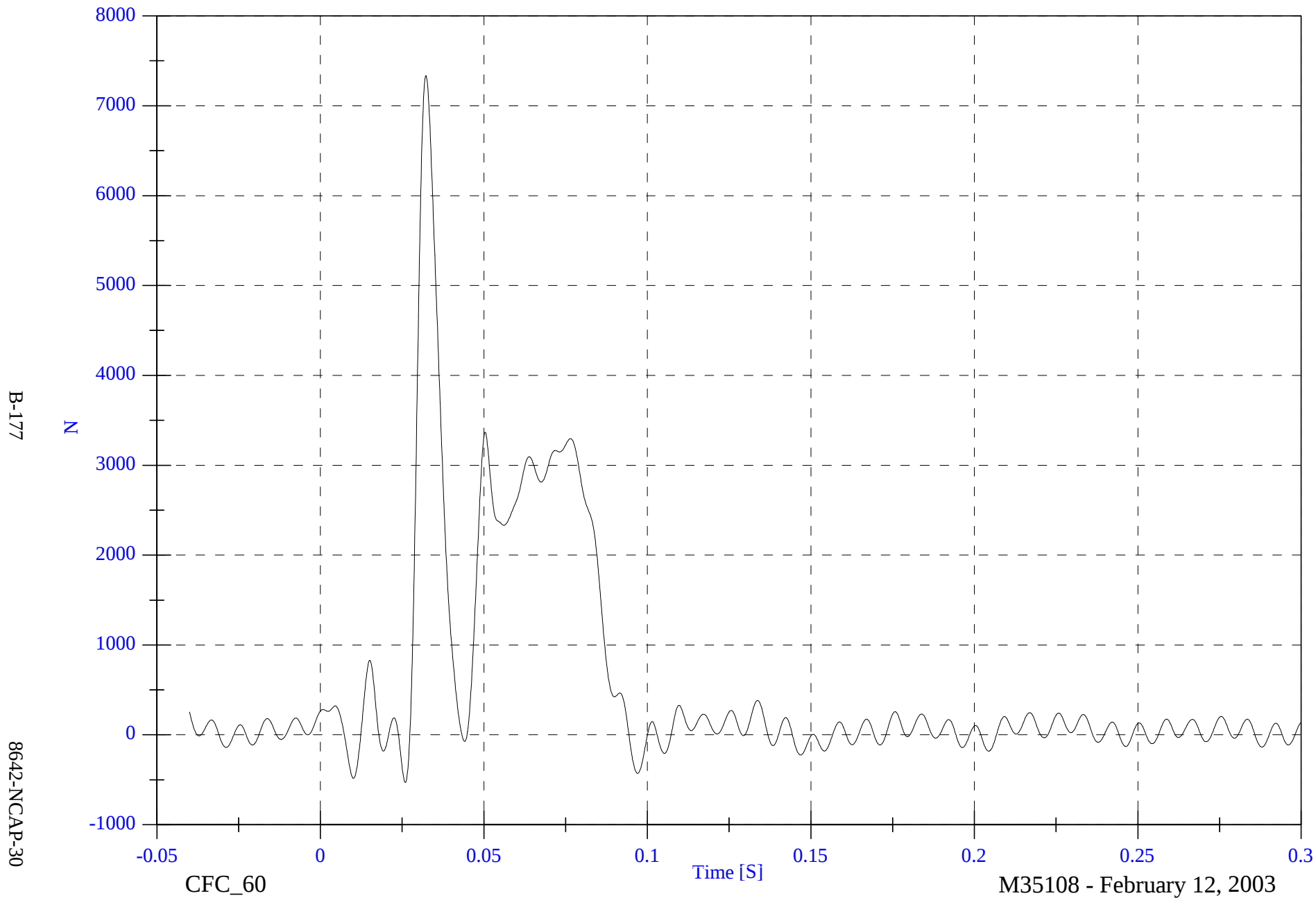


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell D8 Fx

Max: 7336.8 [N] at 0.032 [S]

Min: -530.1 [N] at 0.026 [S]

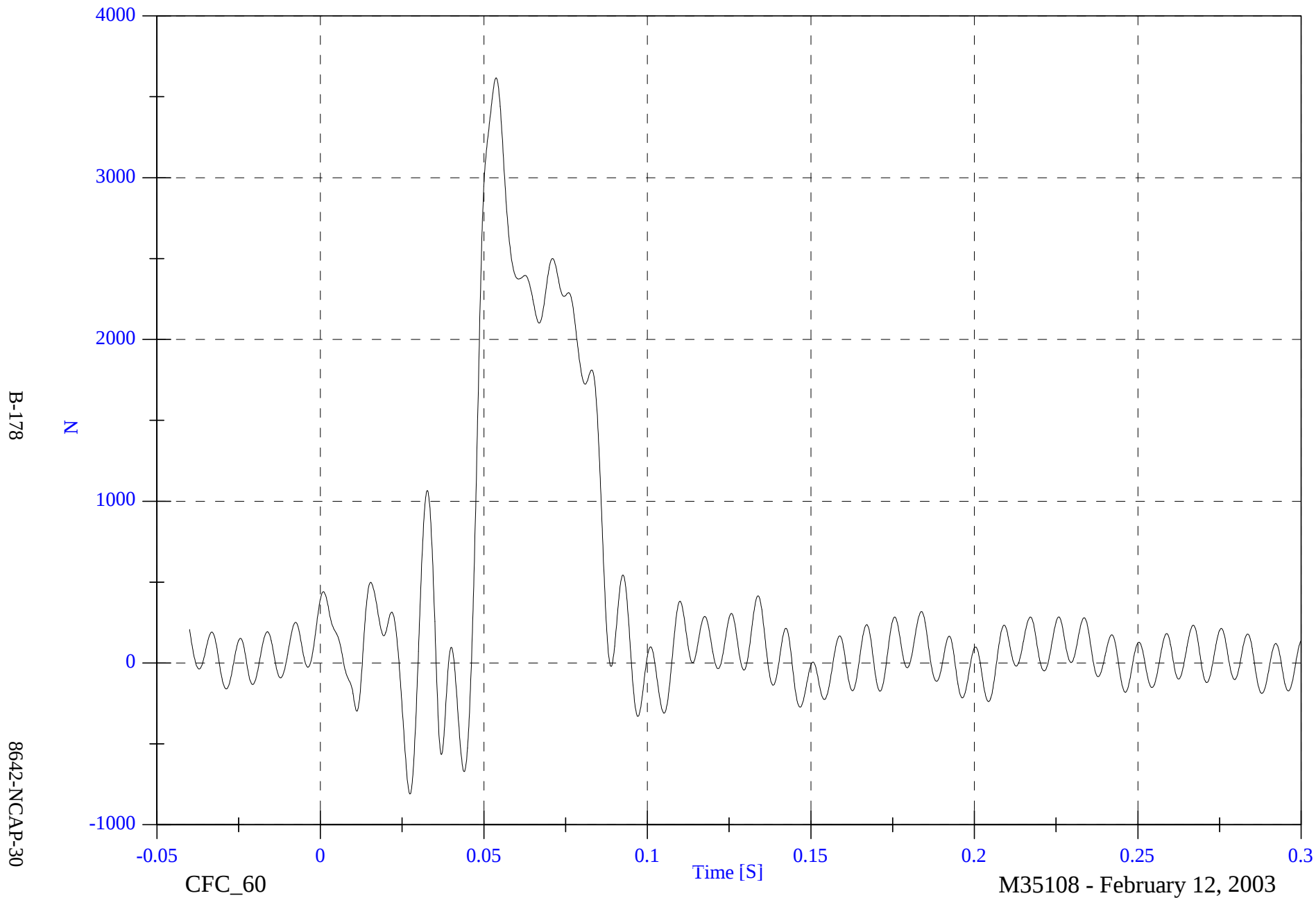


NCAP Test #8 - 2003 Toyota Avalon

Barrier Load Cell D9 Fx

Max: 3616.4 [N] at 0.054 [S]

Min: -809.8 [N] at 0.027 [S]

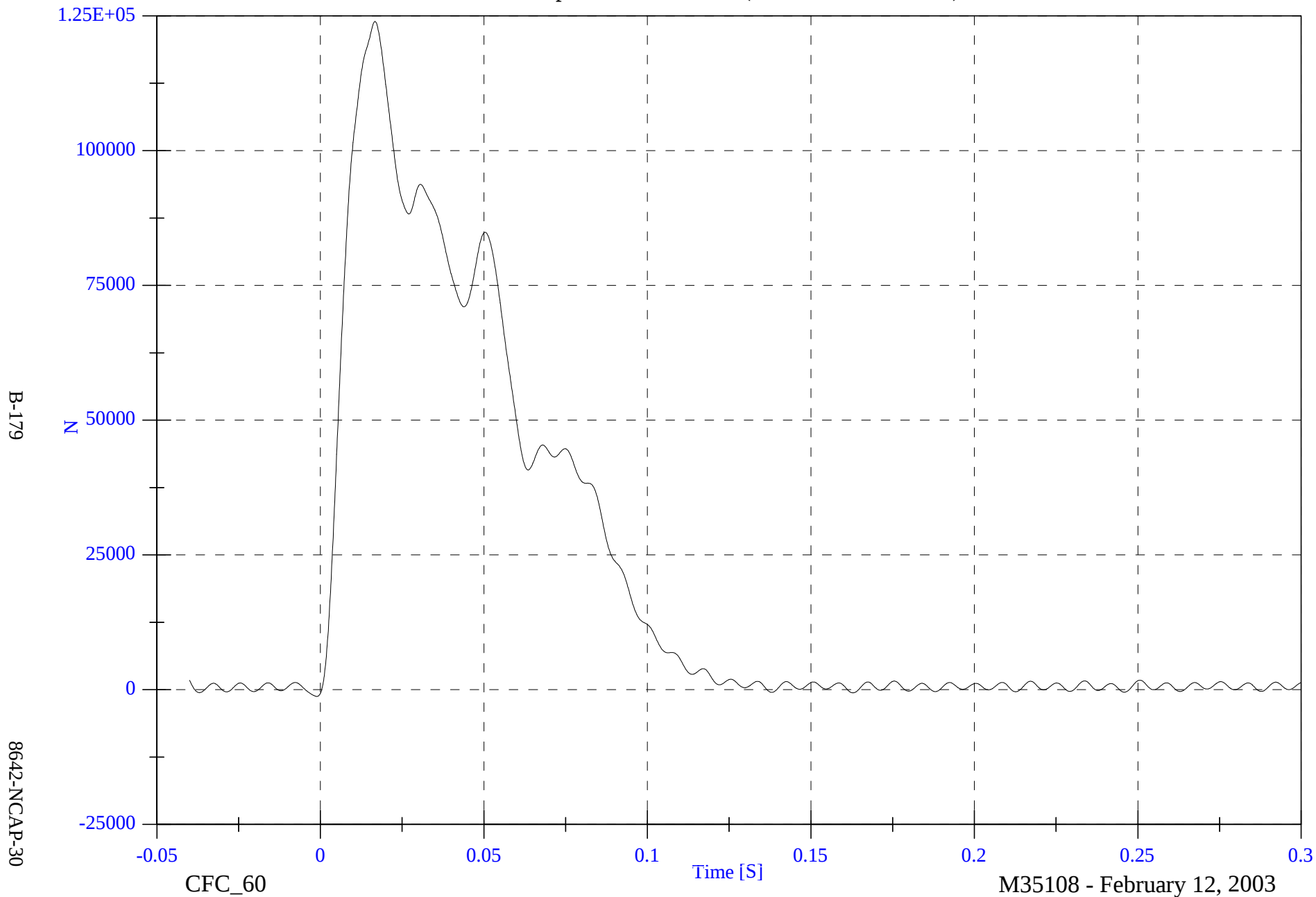


NCAP Test #8 - 2003 Toyota Avalon

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

Max: 123959.4 [N] at 0.017 [S]

Min: -1242.8 [N] at -0.001 [S]

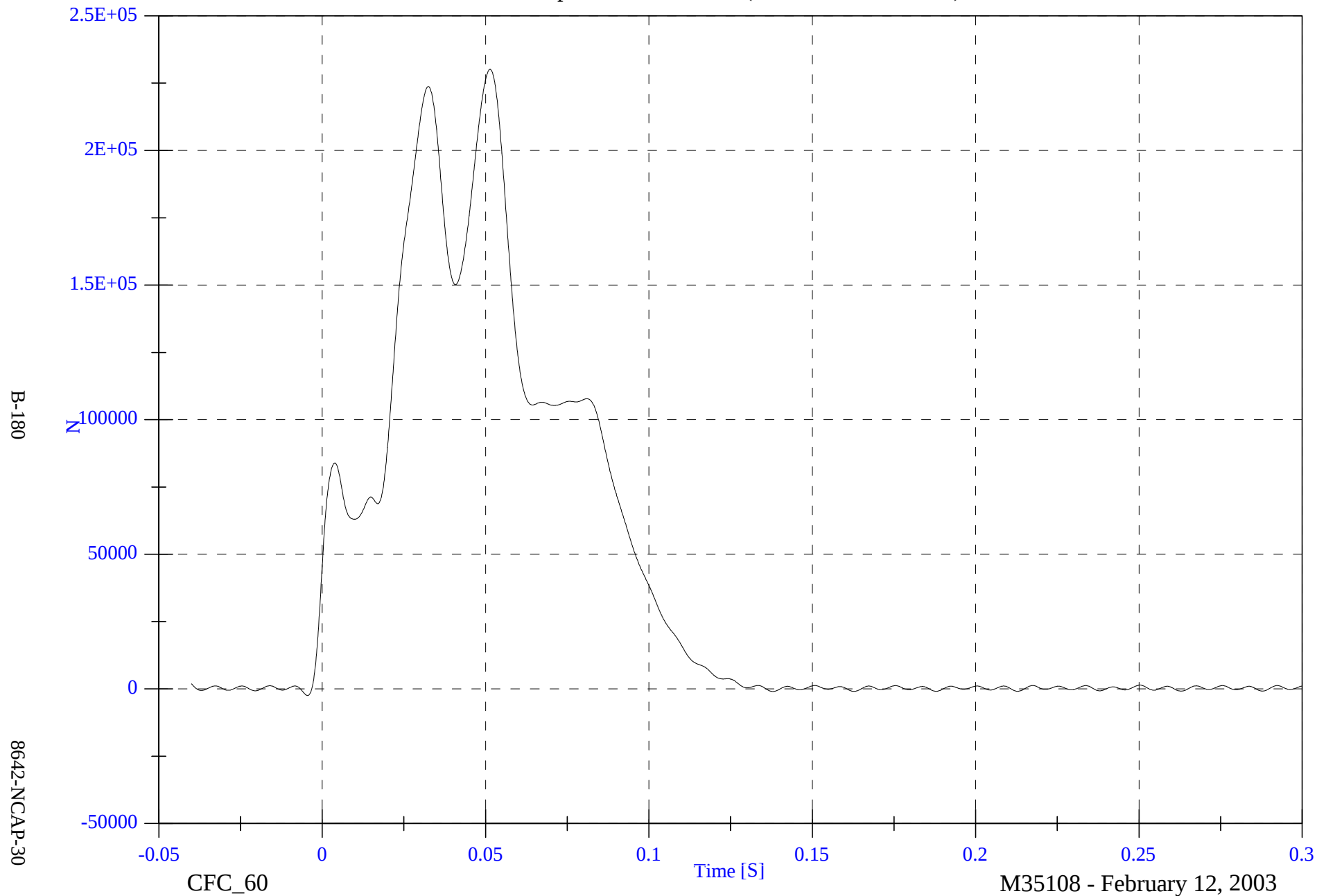


NCAP Test #8 - 2003 Toyota Avalon

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

Max: 230125.8 [N] at 0.051 [S]

Min: -2431.5 [N] at -0.005 [S]

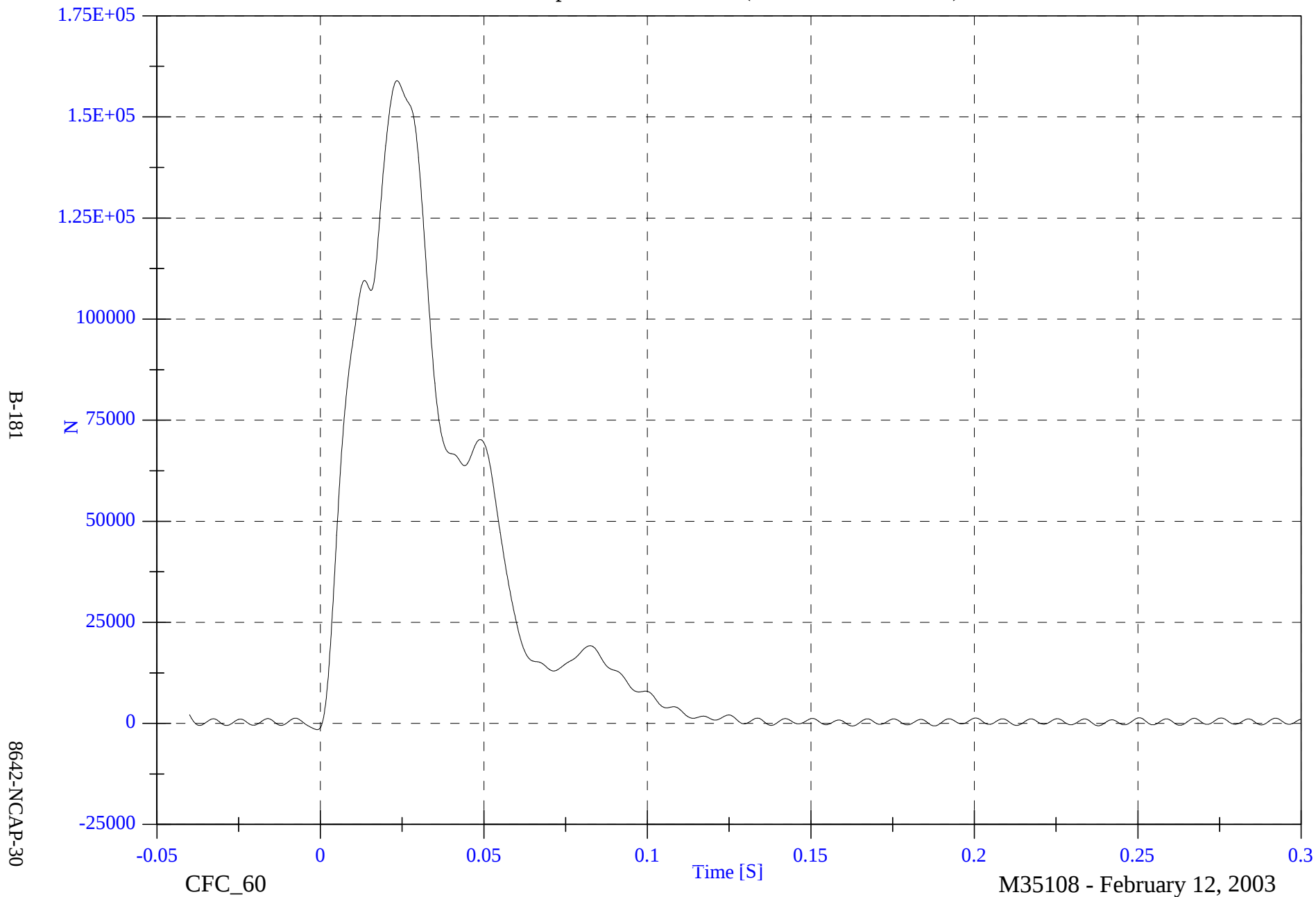


NCAP Test #8 - 2003 Toyota Avalon

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

Max: 158959.0 [N] at 0.023 [S]

Min: -1539.1 [N] at -0.001 [S]

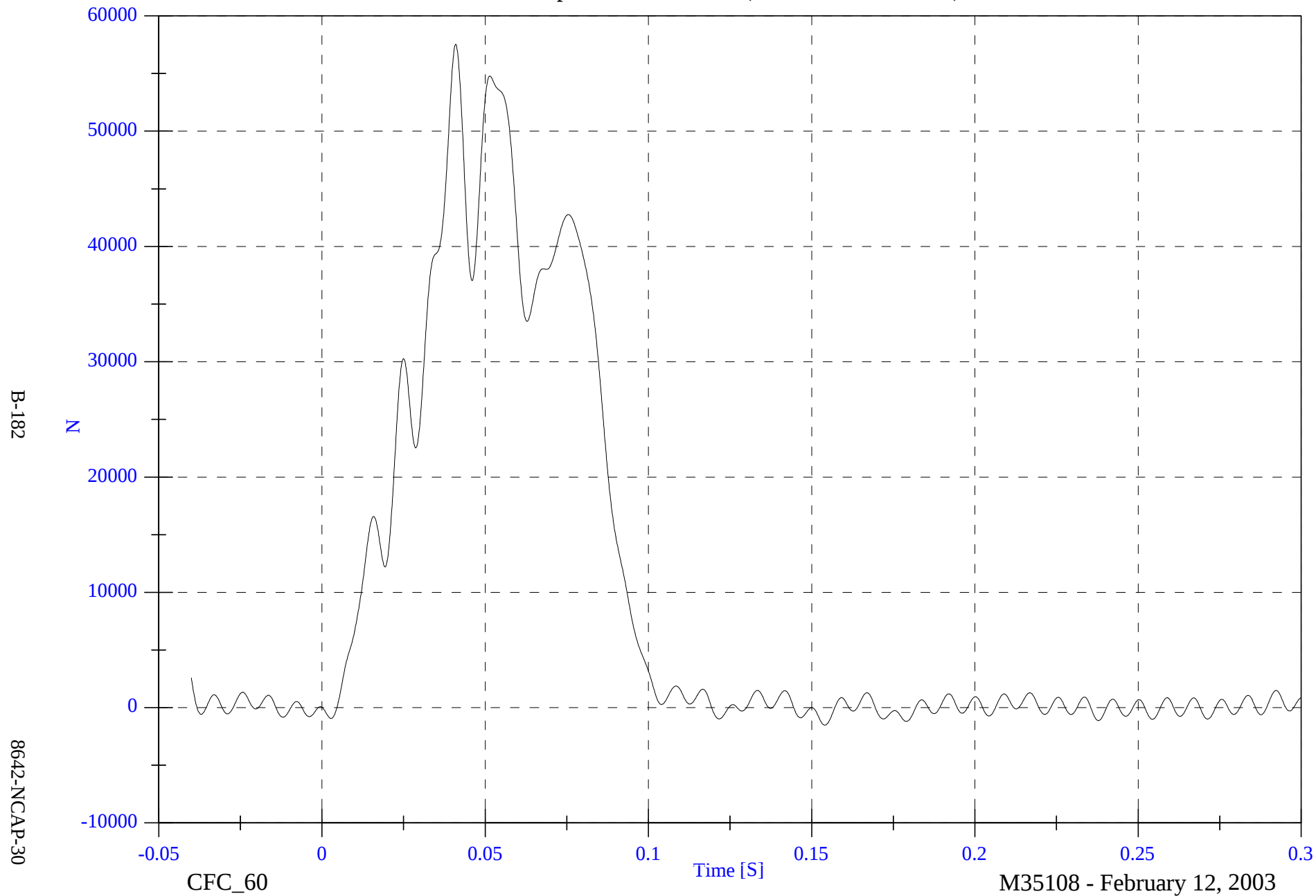


NCAP Test #8 - 2003 Toyota Avalon

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

Max: 57535.0 [N] at 0.041 [S]

Min: -1519.9 [N] at 0.154 [S]

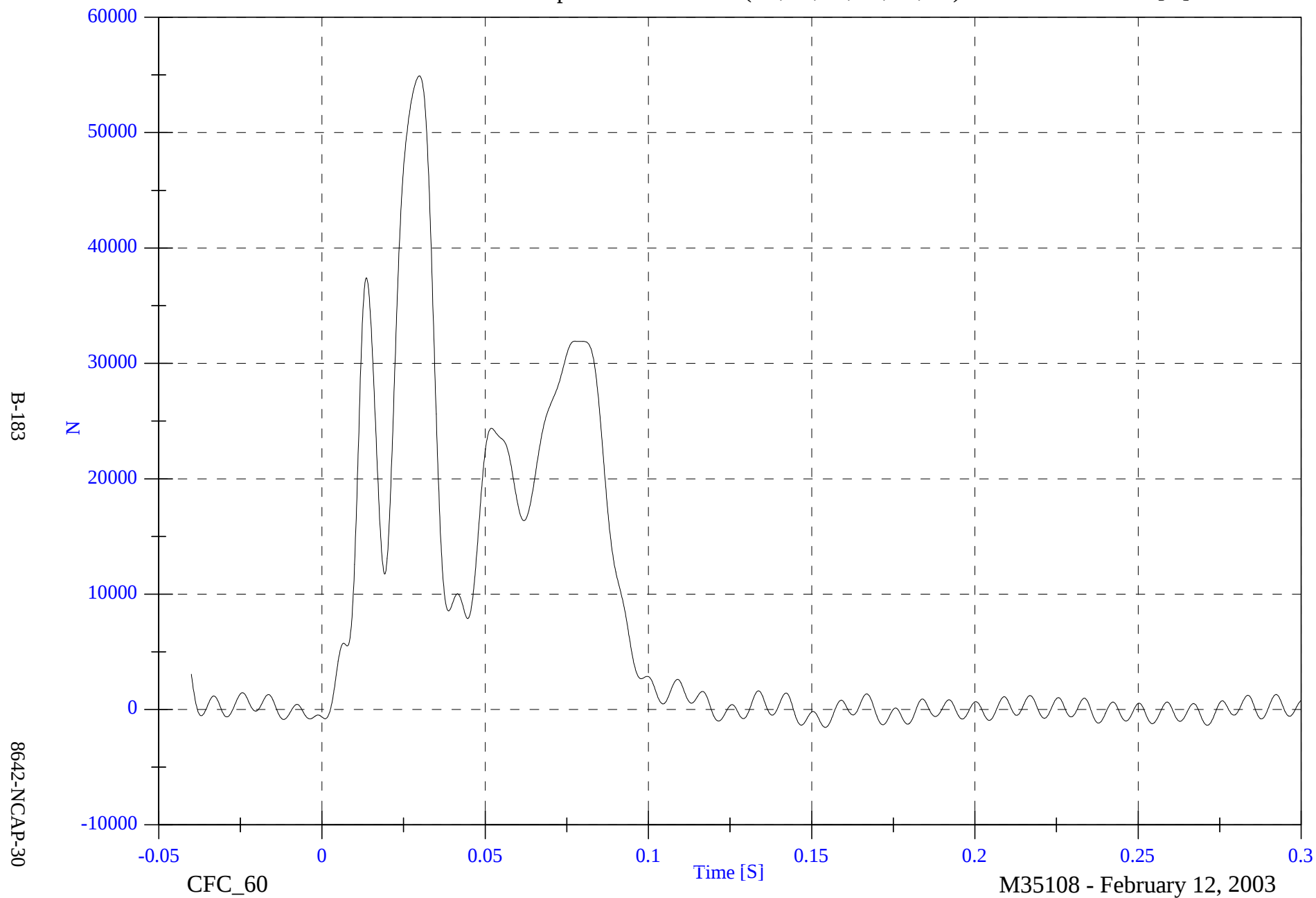


NCAP Test #8 - 2003 Toyota Avalon

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

Max: 54907.2 [N] at 0.030 [S]

Min: -1550.8 [N] at 0.154 [S]

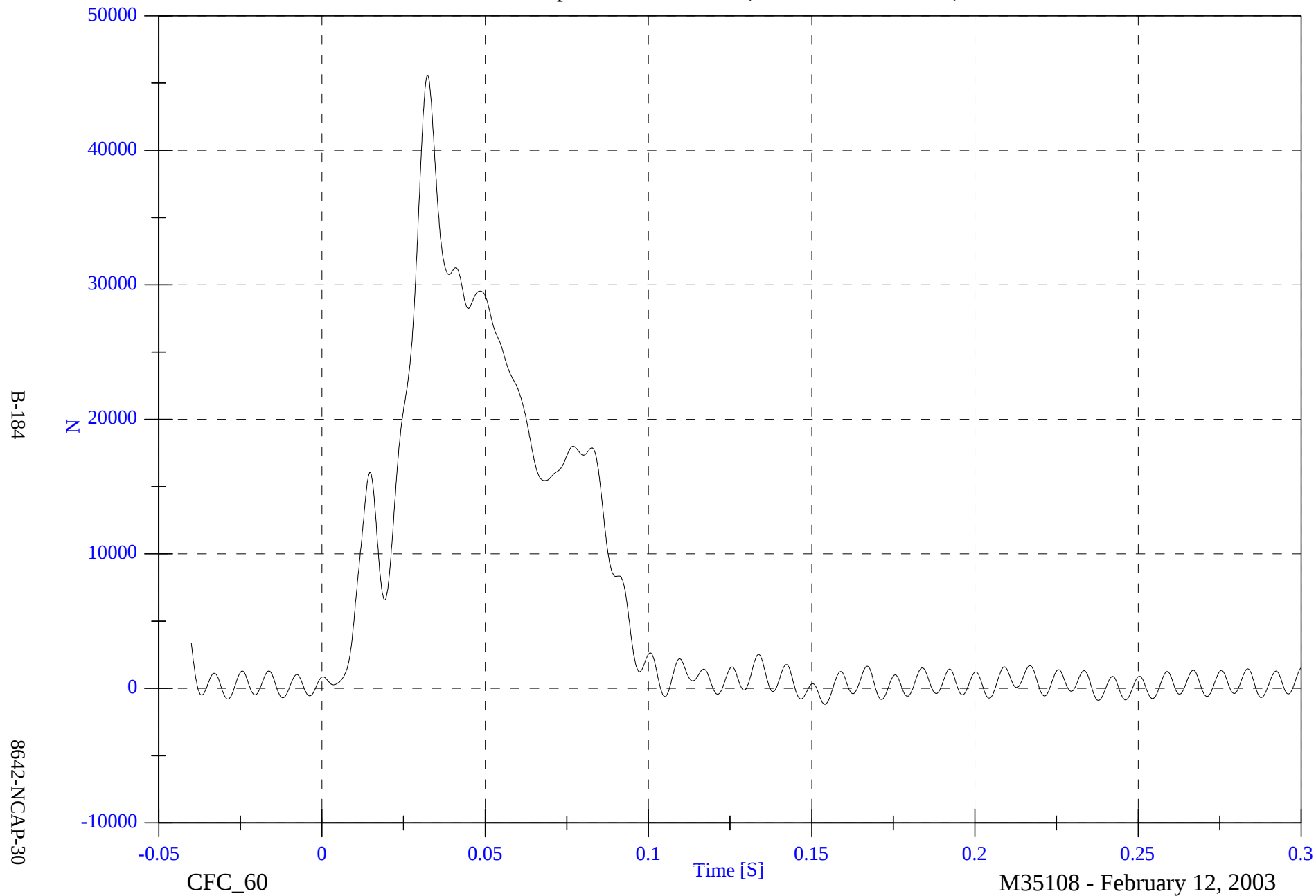


NCAP Test #8 - 2003 Toyota Avalon

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

Max: 45589.7 [N] at 0.032 [S]

Min: -1187.5 [N] at 0.154 [S]

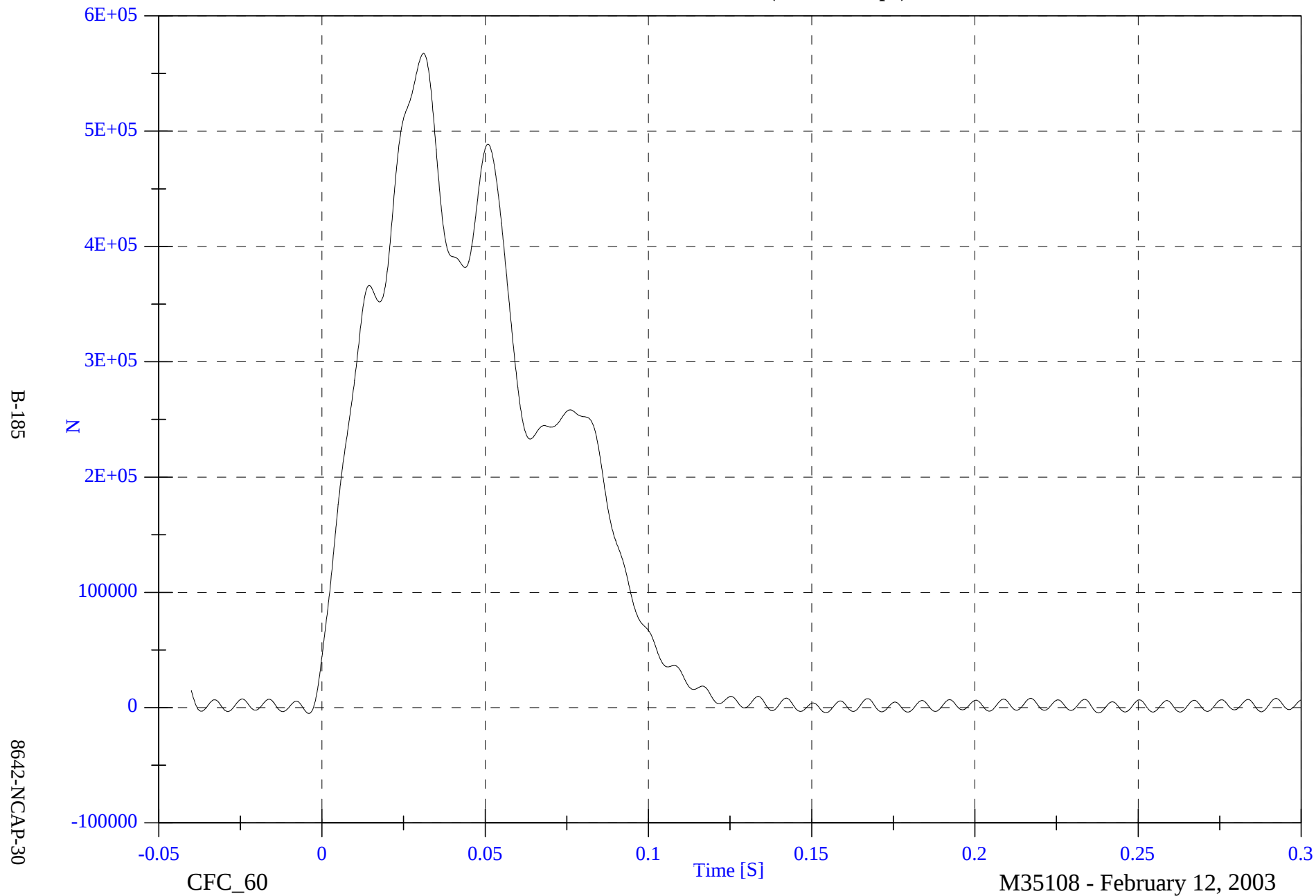


NCAP Test #8 - 2003 Toyota Avalon

Total Load Cell Sum (All 6 Groups)

Max: 567395.6 [N] at 0.031 [S]

Min: -5060.8 [N] at -0.004 [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.

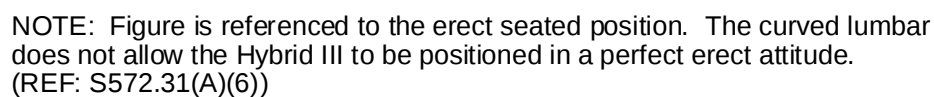
Dummy serial numbers and certification dates are:

<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	150	February 11, 2003
#2/Right Front Passenger	245	February 11, 2003

Electronic Test Equipment

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

EXTERNAL DIMENSIONS SPECIFICATIONS



PART 572E
HEAD DROP TEST

Dummy Serial Number 150
Sequential Test Number 1
Date February 4, 2003
Workfile 150H 2-04-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.0
Relative Humidity	10% - 70%	33.00
Peak Resultant Acceleration	225-275 G's	270.50
Peak Lateral Acceleration	15 G's Max	6.53
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	February 6, 2003	6 Axis Neck Transducer
Workfile	150Flx 2-06-03	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.00
Relative Humidity		10% - 70%	37.00
Impact Velocity		22.60 - 23.40 Ft/s	22.70
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	23.60
	20 ms	17.60 - 22.60 G's	21.77
	30 ms	12.50 - 18.50 G's	16.93
Max Pendulum G's Above 30 ms		29 G's Max	16.93
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	37.50
D Plane Rotation	Max	64 - 78 Deg	67.66
	Time	57 - 64 ms	58.80
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	79.55
	Time	47 - 58 ms	50.50
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	113.10
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	102.20

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	150	
Sequential Test Number	1	
Date	February 6, 2003	6 Axis Neck Transducer
Workfile	150Ext 2-06-03	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.00
Relative Humidity		10% - 70%	37.00
Impact Velocity		19.50 - 20.30 Ft/s	19.55
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.85
	20 ms	14.00 - 19.00 G's	16.46
	30 ms	11.00 - 16.00 G's	13.99
Max Pendulum G's Above 30 ms		22 G's Max	14.01
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	40.80
D Plane Rotation	Max	81 - 106 Deg	91.85
	Time	72 - 82 ms	77.80
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-58.27
	Time	65 - 79 ms	73.80
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	155.80
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	138.90

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 150
Sequential Test Number 1
Date February 10, 2003
Workfile 150T 02-10-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.0
Relative Humidity	10% - 70%	33.00
Pendulum Velocity	21.6 - 22.4 Ft/s	22.23
Maximum Deflection	2.50 - 2.86 in	2.56
Maximum Resistive Force	1160 - 1325 Lbs	1299.78
Internal Hysteresis	69 - 85 %	71.95

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 150
Sequential Test Number 1
Date February 11, 2003
Workfile 150LF 2-11-03 / 150RF 2-11-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	33.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1225.95
RIGHT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	33.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1229.79

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 150
Sequential Test Number 1
Date February 10, 2003

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			33
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.2
Waist Circumference	Z	32.9 - 34.1 in	34.0
Chest Depth	O	8.4 - 9.0 in	8.4
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.8
Thigh Clearance	F	5.5 - 6.1 in	5.8
Buttock Knee Length	K	22.8 - 23.8 in	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.8
Knee Pivot Height	M	19.1 - 19.7 in	19.6
Foot Length	P	9.9 - 10.5 in	10.1
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 February 04, 2003
Workfile 245H1 2-04-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.0
Relative Humidity	10% - 70%	33.00
Peak Resultant Acceleration	225-275 G's	234.54
Peak Lateral Acceleration	15 G's Max	3.08
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	February 11, 2003	6 Axis Neck Transducer
Workfile	245Flx 02-11-03	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.00
Relative Humidity		10% - 70%	33.00
Impact Velocity		22.60 - 23.40 Ft/s	22.82
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	24.20
	20 ms	17.60 - 22.60 G's	21.42
	30 ms	12.50 - 18.50 G's	15.92
Max Pendulum G's Above 30 ms		29 G's Max	15.92
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	41.70
D Plane Rotation	Max	64 - 78 Deg	67.04
	Time	57 - 64 ms	57.70
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	68.89
	Time	47 - 58 ms	53.50
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	113.10
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	102.40

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	245	
Sequential Test Number	1	
Date	February 11, 2003	6 Axis Neck Transducer
Workfile	245Ext 02-11-03	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70.0
Relative Humidity		10% - 70%	33.0
Impact Velocity		19.50 - 20.30 Ft/s	19.79
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.46
	20 ms	14.00 - 19.00 G's	15.36
	30 ms	11.00 - 16.00 G's	12.59
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	42.70
D Plane Rotation	Max	81 - 106 Deg	94.24
	Time	72 - 82 ms	76.10
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-56.16
	Time	65 - 79 ms	140.50
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	155.40
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	71.80

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 245
Sequential Test Number 1
Date February 10, 2003
Workfile 245T 02-10-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.0
Relative Humidity	10% - 70%	33.00
Pendulum Velocity	21.6 - 22.4 Ft/s	22.40
Maximum Deflection	2.50 - 2.86 in	2.51
Maximum Resistive Force	1160 - 1325 Lbs	1313.68
Internal Hysteresis	69 - 85 %	70.84

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 245
Sequential Test Number 1
Date February 11, 2003
Workfile 245LF 02-11-03 / 245LF 02-11-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	33.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1239.82
RIGHT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	33.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1310.03

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 245
Sequential Test Number 1
Date February 10, 2003

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70.0
Relative Humidity			33.0
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.4
Waist Circumference	Z	32.9 - 34.1 in	34.0
Chest Depth	O	8.4 - 9.0 in	8.4
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.8
Thigh Clearance	F	5.5 - 6.1 in	6.0
Buttock Knee Length	K	22.8 - 23.8 in	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.5
Knee Pivot Height	M	19.1 - 19.7 in	19.2
Foot Length	P	9.9 - 10.5 in	10.2
Foot Breadth	W	3.6 - 4.2 in	3.8
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.6
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.2
Elbow Rest Height	J	7.5 - 8.3 in	8.0
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6

Remarks:

Laboratory Technician:

B. Swiecicki

APPENDIX D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 150)		Manufacturer	Serial #	Calibration	
				Last	Next
Head 9 Array	X Arm Y	ENDEVCO	AC-P17531	08/22/02	02/20/03
	X Arm Z	ENDEVCO	AC-P14965	08/22/02	02/20/03
	Y Arm X	ENDEVCO	AC-P17563	08/22/02	02/20/03
	Y Arm Z	ENDEVCO	AC-P18551	08/22/02	02/20/03
	Z Arm X	ENDEVCO	AC-P17539	08/22/02	02/20/03
	Z Arm Y	ENDEVCO	AC-P18718	08/22/02	02/20/03
	Z Arm Z	ENDEVCO	AC-P17539	08/22/02	02/20/03
Head	X	ENDEVCO	AC-P16832	08/22/02	02/20/03
	Y	ENDEVCO	AC-P16591	08/22/02	02/20/03
	Z	ENDEVCO	AC-P16286	08/22/02	02/20/03
Head	X (R)	ENDEVCO	AC-P17141	08/22/02	02/20/03
	Y (R)	ENDEVCO	AC-P17242	08/22/02	02/20/03
	Z (R)	ENDEVCO	AC-P17152	08/22/02	02/20/03
Neck Load Cell	X	DENTON	LC-441FX	10/14/02	04/14/03
	Y	DENTON	LC-441FY	10/14/02	04/14/03
	Z	DENTON	LC-441FZ	10/14/02	04/14/03
Neck Moment	X	DENTON	LC-441MX	10/14/02	04/14/03
	Y	DENTON	LC-441MY	10/14/02	04/14/03
	Z	DENTON	LC-441MZ	10/14/02	04/14/03
Chest	X	ENDEVCO	AC-P17235	08/22/02	02/20/03
	Y	ENDEVCO	AC-P14393	08/22/02	02/20/03
	Z	ENDEVCO	AC-P17285	08/22/02	02/20/03
Chest	X (R)	ENDEVCO	AC-P16863	08/22/02	02/20/03
	Y (R)	ENDEVCO	AC-P17248	08/22/02	02/20/03
	Z (R)	ENDEVCO	AC-P17283	08/22/02	02/20/03
Chest Deflection	X	SERVO	DS-150	09/24/02	03/25/03
Pelvic	X	ENDEVCO	AC-J30041	08/22/02	02/20/03
	Y	ENDEVCO	AC-P13355	08/22/02	02/20/03
	Z	ENDEVCO	AC-P13329	08/22/02	02/20/03

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	09/25/02	03/26/03
Right Femur Load Cell	Fz	GSE	LC-419	09/25/02	03/26/03
Left Upper Tibia	Mx	DENTON	LC-265MX	10/24/02	04/24/03
	My	DENTON	LC-265MY	10/24/02	04/24/03
Left Lower Tibia	Fz	DENTON	LC-178FZ	10/24/02	04/24/03
	Mx	DENTON	LC-178MX	10/24/02	04/24/03
	My	DENTON	LC-178MY	10/24/02	04/24/03
Right Upper Tibia	Mx	DENTON	LC-199MX	10/24/02	04/24/03
	My	DENTON	LC-199MY	10/24/02	04/24/03
Right Lower Tibia	Fz	DENTON	LC-128FZ	10/24/02	04/24/03
	Mx	DENTON	LC-128MX	10/24/02	04/24/03
	My	DENTON	LC-128MY	10/24/02	04/24/03
Left Foot Rear	X	ENDEVCO	AC-J19868	08/22/02	02/20/03
	Z	ENDEVCO	AC-AJ8C0	08/22/02	02/20/03
Left Foot Front	Z	ENDEVCO	AC-J34378	08/22/02	02/20/03
Right Foot Rear	X	ENDEVCO	AC-AJ7F6	08/22/02	02/20/03
	Z	ENDEVCO	AC-J27079	08/22/02	02/20/03
Right Foot Front	Z	ENDEVCO	AC-J23997	08/22/02	02/20/03
Lap Belt Load Cell		LEBOW	LC-706	11/12/02	05/13/03

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	08/27/02	02/25/03
	X Arm Z	ENDEVCO	AC-P19212	08/27/02	02/25/03
	Y Arm X	ENDEVCO	AC-P19197	08/27/02	02/25/03
	Y Arm Z	ENDEVCO	AC-P18738	08/27/02	02/25/03
	Z Arm X	ENDEVCO	AC-P19217	08/27/02	02/25/03
	Z Arm Y	ENDEVCO	AC-P18739	08/27/02	02/25/03
Head	X	ENDEVCO	AC-P19216	09/06/02	03/07/03
	Y	ENDEVCO	AC-P15534	09/06/02	03/07/03
	Z	ENDEVCO	AC-P23303	09/06/02	03/07/03
Head	X (R)	ENDEVCO	AC-P16576	09/06/02	03/07/03
	Y (R)	ENDEVCO	AC-P15526	09/06/02	03/07/03
	Z (R)	ENDEVCO	AC-P19255	09/06/02	03/07/03
Neck Load Cell	X	DENTON	LC-076FX	10/15/02	04/15/03
	Y	DENTON	LC-076FY	10/15/02	04/15/03
	Z	DENTON	LC-076FZ	10/15/02	04/15/03
Neck Moment	X	DENTON	LC-076MX	10/15/02	04/15/03
	Y	DENTON	LC-076MY	10/15/02	04/15/03
	Z	DENTON	LC-076MZ	10/15/02	04/15/03
Chest	X	ENTRAN	AC-01G18-F03	08/23/02	02/21/03
	Y	ENTRAN	AC-01G18-F07	08/23/02	02/21/03
	Z	ENTRAN	AC-01J02-F09	08/23/02	02/21/03
Chest	X (R)	ENTRAN	AC-01G18-F18	08/23/02	02/21/03
	Y (R)	ENTRAN	AC-01G18-F10	08/23/02	02/21/03
	Z (R)	ENTRAN	AC-01G18-F09	08/23/02	02/21/03
Chest Deflection	X	SERVO	DS-245	10/11/02	04/11/03
Pelvic	X	ENDEVCO	AC-J31034	08/28/02	02/26/03
	Y	ENDEVCO	AC-P17258	08/28/02	02/26/03
	Z	ENDEVCO	AC-J31010	08/28/02	02/26/03

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	09/25/02	03/26/03
Right Femur Load Cell	Fz	GSE	LC-951	09/25/02	03/26/03
Left Knee Shear	Dx	DENTON	LC-200MX	10/24/02	04/24/03
Right Knee Shear	Dx	DENTON	LC-200MY	10/24/02	04/24/03
Left Upper Tibia	Mx	DENTON	LC-129FZ	10/24/02	04/24/03
	My	DENTON	LC-129MX	10/24/02	04/24/03
Left Lower Tibia	Fz	DENTON	LC-129MY	10/24/02	04/24/03
	Mx	DENTON	LC-264MX	10/24/02	04/24/03
	My	DENTON	LC-264MY	10/24/02	04/24/03
Right Upper Tibia	Mx	DENTON	LC-177FZ	10/24/02	04/24/03
	My	DENTON	LC-177MX	10/24/02	04/24/03
Right Lower Tibia	Fz	DENTON	LC-177MY	10/24/02	04/24/03
	Mx	ENDEVCO	AC-J18059	08/27/02	02/25/03
	My	ENDEVCO	AC-J18662	08/27/02	02/25/03
Left Foot Rear	X	ENDEVCO	AC-J36176	08/27/02	02/25/03
	Z	ENDEVCO	AC-J20084	08/27/02	02/25/03
Left Foot Front	Z	ENDEVCO	AC-AGRP4	01/16/03	07/17/03
Right Foot Rear	X	ENDEVCO	AC-J18738	08/27/02	02/25/03
	Z	LEBOW	LC-707	11/12/02	05/13/03
Right Foot Front	Z	GSE	LC-551	09/25/02	03/26/03
Lap Belt Load Cell		GSE	LC-951	09/25/02	03/26/03

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ICS	AC-8083-028	11/11/02	05/12/03
Right Rear Seat Crossmember X	ICS	AC-8084-023	11/20/02	05/21/03
Top of Engine	ICS	AC-8084-024	11/11/02	05/12/03
Bottom of Engine	ICS	AC-8086-048	11/20/02	05/21/03
Right Disc Brake Caliper	ICS	AC-8084-022	11/20/02	05/21/03
Instrument Panel	ICS	AC-8083-037	11/21/02	05/22/03
Left Disc Brake Caliper	ICS	AC-6917-020	11/20/02	05/21/03
Left Seat Rear Crossmember Z	ICS	AC-8062-003	11/11/02	05/12/03
Right Seat Rear Crossmember Z	ICS	AC-8086-047	11/20/02	05/21/03

REPORT NUMBER: CAL-03-08

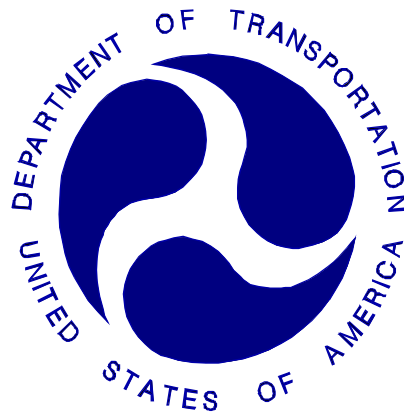
NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

EVENFLO VANGUARD 5 COMFORT TOUCH
FORWARD FACING CONVERTIBLE
SECURED WITH THE LATCH SYSTEM AND THE TOP TETHER
AND
GRACO MY CARGO HIGHBACK BOOSTER

NHTSA NUMBER: M35108

VERIDIAN ENGINEERING REPORT NUMBER: 8642-NCAP-30

VERIDIAN ENGINEERING
TRANSPORTATION SCIENCES CENTER
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February 12, 2003

FINAL REPORT

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

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				6. Performing Organization Code CAL	
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16. Abstract This CRS test was performed in conjunction with a New Car Assessment Program (NCAP) load cell barrier test. An Evenflo Vanguard 5 Comfort Touch forward facing convertible CRS was secured in position 3 (P3) with the LATCH system and top tether. A Graco My Cargo Highback Booster was placed in Position 4 (P4). This test was conducted at the Veridian Engineering Crash Test Facility in Buffalo, New York, on February 12, 2003.					
ATD Position		HIC 15		HIC 36	
P3 (Right Rear) (044)		340.0		613.7	
P4 (Left Rear) (144)		887.4		1241.0	
				Clip (3 ms)	
				49.6	
				54.4	
17. Key Words New Car Assessment Program (NCAP)				18. Distribution Statement	
				<u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Reference Division Room 5108 (NAD-52) 400 Seventh St., S.W. Washington, D.C. 20590 Telephone No. (202) 366-4946 ATTN: Robert Hornicle	
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TABLE OF CONTENTS

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

SECTION 1

PURPOSE AND SUMMARY OF TEST M35108

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

SUMMARY

A forward facing convertible CRS and a 3 year old child dummy (serial no. 044) were secured in the right rear occupant position (Position 3 or P3). A booster CRS and a 6 year old child dummy (serial no. 144) were secured in the left rear occupant position (Position 4 or P4). Both child dummies were instrumented with head, chest, and pelvic triaxial accelerometers, a chest displacement sensor, and an upper six axial neck force and moment load cell. In addition, Position 3 was equipped with six axial lower neck force and moment load cell. The dummies were calibrated previous to this test and the certification information is found in section 5.

The right rear child dummy's HIC was 340.0, maximum chest deceleration over 3 ms was 49.6 g's. The left rear child dummy's HIC was 887.4, maximum chest deceleration over 3 ms was 54.4 g's.

TEST DUMMY INFORMATION:

<u>Number of Data Channels</u>	47	
<u>Number of Cameras:</u>	1	<u>Real Time</u>
	2	<u>High Speed</u>

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	-	-

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

	Position #3 CRS	Position #4 CRS
Head Contact:	Chin to chest and back of head to child restraint seat back	Top of head to right thigh, face to right hand, back of head to child restraint seat back, back of head to vehicle seat (P4) head restraint
Upper Torso Contact:	None	None
Lower Torso Contact:	None	None
Left Knee Contact:	None	None
Right Knee Contact:	None	None

DATA SHEET NO. 2

CRS PARAMETER DATA

CRS: Evenflo Vangaurd 5 Forward Facing Convertible Secured with LATCH and Top Tether
and Graco My CarGo Highback Booster

NHTSA No. M35108

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Delivered Weight of Vehicle with Maximum Fluids = 1536.5 kg (A)

AS TESTED WEIGHT OF VEHICLE

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

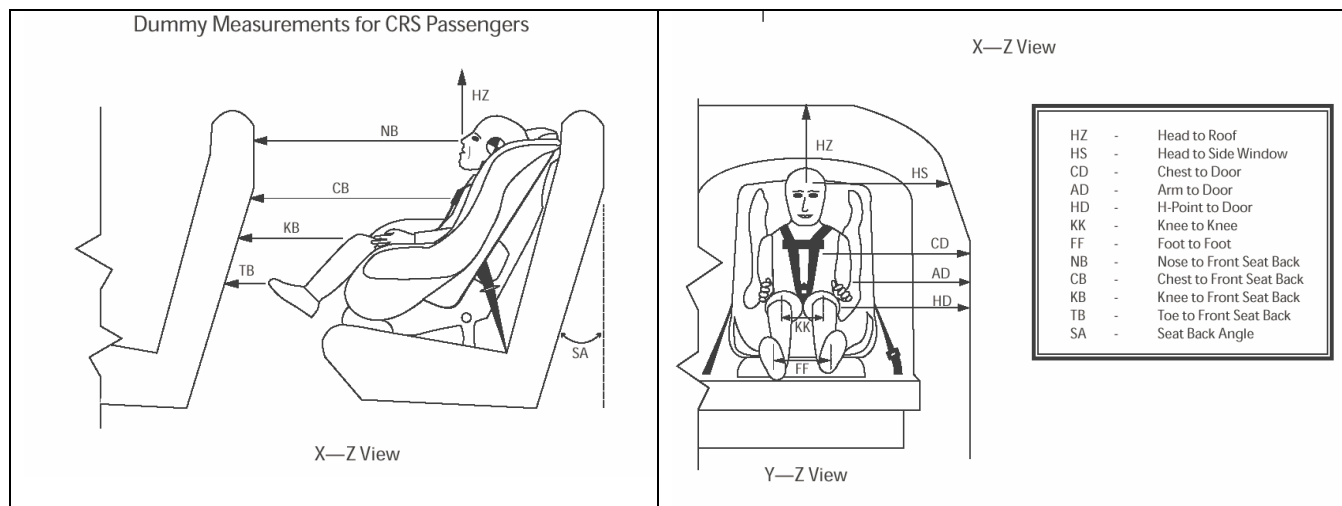
Left Front	=	<u>502.5</u>	kg	Left Rear	=	<u>381.5</u>	kg
Right Front	=	<u>507.5</u>	kg	Right Rear	=	<u>361.0</u>	kg
TOTAL FRONT	=	<u>502.5</u>	kg	TOTAL REAR	=	<u>381.5</u>	kg
TOTAL TEST WEIGHT =		<u>868.5</u>	kg				

DATA SHEET NO. 3

CHILD DUMMY POSITIONING IN VEHICLE

CRS: Evenflo Vangaurd 5 Forward Facing Convertible Secured with LATCH and Top Tether
and Graco My CarGo Highback Booster

NHTSA No. M35108



Measurement	Pre-Test (mm)		Post Test (mm)	
	P3 CRS (044)	P4 CRS (144)	P3 CRS (044)	P4 CRS (144)
SA	26	28	26	26
HS	395	374	401	389
CD	372	330	363	355
AD	223	200	225	196
HD	289	175	280	184
HZ	357	317	351	338
NB	644	652	663	694
CB	670	687	662	70
KK	140	148	150	115
FF	135	141	162	110
KB – LEFT	492	425	508	450
KB – RIGHT	491	432	505	428
TB – LEFT	203	184	196	183
TB – RIGHT	197	190	194	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: Evenflo Vangaurd 5 Forward Facing Convertible Secured with LATCH and Top Tether
and Graco My CarGo Highback Booster

NHTSA No. M35108

DESCRIPTION	Unit	MAXIMUM VALUE							
		Position #3				Position #4			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head X	g	42.8	209.5	-30.1	104.3	15.6	227.6	-41.4	102.2
Head Y	g	3.5	210.2	-10.5	104.0	5.0	232.4	-21.7	102.1
Head Z	g	52.5	71.0	-7.4	37.7	82.0	84.6	-4.5	28.8
Head Resultant	g	57.2	80.3	-	-	86.6	84.6	-	-
Head Rear Z	g	-	-	-	-	-	-	-	-
Upper Neck Fx	N	48.7	246.7	-658.1	81.0	8.9	182.6	-760.5	69.7
Upper Neck Fy	N	28.2	116.3	-39.8	100.2	150.6	102.7	-153.3	84.8
Upper Neck Fz	N	1854.9	81.0	-193.0	39.0	2911.7	83.2	-568.9	244.6
Upper Neck F Resultant	N	1968.2	81.0	-	-	3005.9	83.1	-	-
Upper Neck Mx	N-m	1.4	299.9	-4.5	103.4	9.2	247.7	-19.1	104.5
Upper Neck My	N-m	4.7	143.8	-13.9	61.0	31.8	97.2	-36.7	67.2
Upper Neck Mz	N-m	1.5	101.6	-1.0	44.2	5.0	104.5	-3.1	59.9
Upper Neck M Resultant	N-m	13.9	61.0	-	-	37.1	67.2	-	-
Lower Neck Fx	N	165.2	207.4	-597.1	82.5	-	-	-	-
Lower Neck Fy	N	21.7	299.4	-144.7	96.7	-	-	-	-
Lower Neck Fz	N	1231.3	74.5	-224.6	39.4	-	-	-	-
Lower Neck F Resultant	N	1300.2	82.4	-	-	-	-	-	-
Lower Neck Mx	N-m	4.4	299.9	-12.3	98.7	-	-	-	-
Lower Neck My	N-m	88.4	81.4	-11.4	207.4	-	-	-	-
Lower Neck Mz	N-m	1.2	230.6	-4.3	89.2	-	-	-	-
Lower Neck M Resultant	N-m	88.7	81.4	-	-	-	-	-	-
Chest X	g	10.3	225.7	-36.1	77.0	5.0	248.3	-48.6	70.9
Chest Y	g	0.9	253.1	-2.8	63.0	4.5	85.0	-8.1	61.3
Chest Z	g	19.6	215.2	-36.1	58.3	9.7	101.1	-28.4	70.0
Chest Resultant	g	50.3	58.0	-	-	56.0	70.7	-	-
Chest Displacement	g	0.1	-6.1	-22.6	105.6	0.0	-6.3	-23.6	109.1

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Evenflo Vangaurd 5 Forward Facing Convertible Secured with LATCH and Top Tether
and Graco My CarGo Highback Booster

NHTSA No. M35108

		MAXIMUM VALUE							
		Position #3				Position #4			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Pelvic X	g	5.1	248.2	-39.8	57.8	13.1	121.5	-43.6	64.8
Pelvic Y	g	3.1	89.4	-6.5	55.1	8.3	91.8	-39.6	82.3
Pelvic Z	g	16.0	214.6	-40.3	58.3	6.2	237.4	-42.0	70.7
Pelvic Resultant	g	56.7	58.3	-	-	59.5	70.8	-	-
Tether Belt Load	N	4171.5	58.4	-173.0	242.3	-	-	-	-
Lap Belt Load	N	-	-	-	-	3259.0	65.9	-38.0	129.6
Torso Belt Load	N	-	-	-	-	3396.0	68.0	-14.5	20.3

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Evenflo Vangaurd 5 Forward Facing Convertible Secured with LATCH and Top Tether
and Graco My CarGo Highback Booster

NHTSA No. M35108

	HEAD INJURY CRITERIA (HIC)						
	HIC15				HIC36		
	HIC	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂	HIC	t ₁ (msec)	Average Acceleration t ₁ to t ₂
Position #3 - Right	340.0	69.9	84.9	55.2	613.7	63.7	49.3
Position #4 - Left	887.4	75.9	90.9	81.1	1241.0	68.0	65.3

	CLIP SUMMARY*			
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #3 - Right	49.6	56.1	59.1	452.6
Position #4 - Left	54.4	69.1	72.1	503.1

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

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

Nij V10	Nij	Time (ms)	Z Force (N)	X Force (N)	Y Moment (N-m)
Ntf	0.68	74.1	1577.1	-424.2	0.5
Nte	1.10	82.3	1840.0	-652.8	-9.5
Ncf	0.01	22.4	-18.0	-14.0	0.1
Nce	0.48	224.1	-111.5	-202.8	-12.8

Peak Tension (CFC1000) 1854.9 N

Peak Compression (CFC1000) 193.0 N

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

Condyle Offset 0

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

Nij V10	Nij	Time (ms)	Z Force (N)	X Force (N)	Y Moment (N-m)
Ntf	0.97	99.3	1763.3	-431.0	37.3
Nte	0.98	68.8	1388.6	-748.4	-22.3
Ncf	0.01	15.4	-21.6	-3.3	0.6
Nce	0.89	247.7	-551.5	-151.4	-29.0

Peak Tension (CFC1000) 2911.7 N

Peak Compression (CFC1000) 568.9 N

Critical Values

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

Condyle Offset -0.01778

DATA SHEET NO. 5

CRS PERFORMANCE DATA

CRS: Evenflo Vangaurd 5 Forward Facing Convertible Secured with LATCH and Top Tether
and Graco My CarGo Highback Booster

NHTSA No. M35108

		MAXIMUM VALUE			
DESCRIPTION	Unit	Positive	Time (ms)	Negative	Time (ms)
P3 CRS X	g	8.3	229.2	-50.4	52.2
P3 CRS Y	g	2.6	216.6	-4.8	51.3
P3 CRS Z	g	14.7	231.1	-16.6	70.1
P3 CRS Resultant	g	50.9	52.3	-	-
P4 CRS X	g	9.7	226.1	-59.2	68.2
P4 CRS Y	g	17.7	78.0	-8.3	242.2
P4 CRS Z	g	24.9	228.0	-34.0	219.6
P4 CRS Resultant	g	60.2	68.0	-	-

DATA SHEET NO. 5

CRS PERFORMANCE DATA (CONTINUED)

CRS: Evenflo Vangaurd 5 Forward Facing Convertible Secured with LATCH and Top Tether
and Graco My CarGo Highback Booster

NHTSA No. M35108

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

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

POSITION #4 CRS POST-TEST INSPECTION (Serial No. 8481LAN)

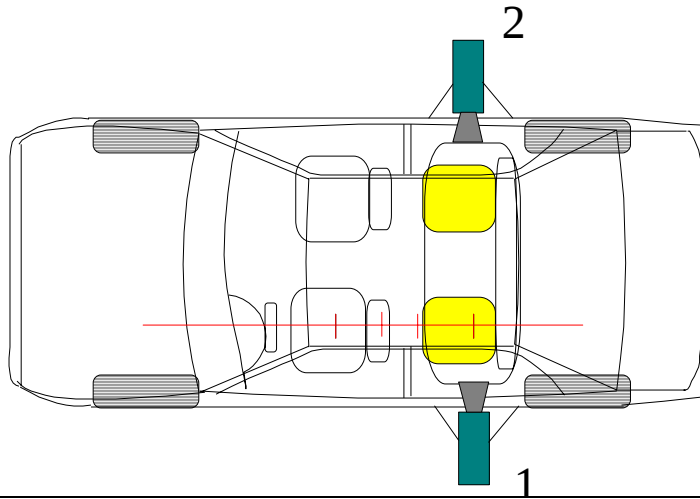
LOCATION	DAMAGE	REMARKS
Upper Tether Strap	NA	NA
Upper Tether Buckle	NA	NA
Upper Tether Hook	NA	NA
Vehicle Upper Tether Anchor	NA	NA
Lower Anchor Strap	NA	NA
Lower Anchor Buckle	NA	NA
Lower Anchor Hooks	NA	NA
Vehicle Lower CRS Anchors	NA	NA
Five Point Harness Connections	NA	NA
Cracks on CRS	Yes	The shoulder belt comfort guide (located on the left upper bolster of the CRS) cracked during the test due to shoulder belt tension. This guide is attached to the CRS fabric and is not part of the CRS shell.
Fabric Tears on CRS	No	None
Vehicle Seat Structure	No	None
Vehicle Seat Fabric Tears	No	None
Child Dummy	No	None

DATA SHEET NO. 6

CRS CAMERA DATA

CRS: Evenflo Vangaurd 5 Forward Facing Convertible Secured with LATCH and Top Tether
and Graco My CarGo Highback Booster

NHTSA No. M35108



Camera No.	View	Coordinates (millimeters)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Left side CRS lateral view	3390	2920	-2550	-26.8	13	1030
2	Right side CRS lateral view	3410	2455	-2466	-28.5	13	1030

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

X = + Forward

Y = + To Right

Z = + Down

SECTION 3

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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

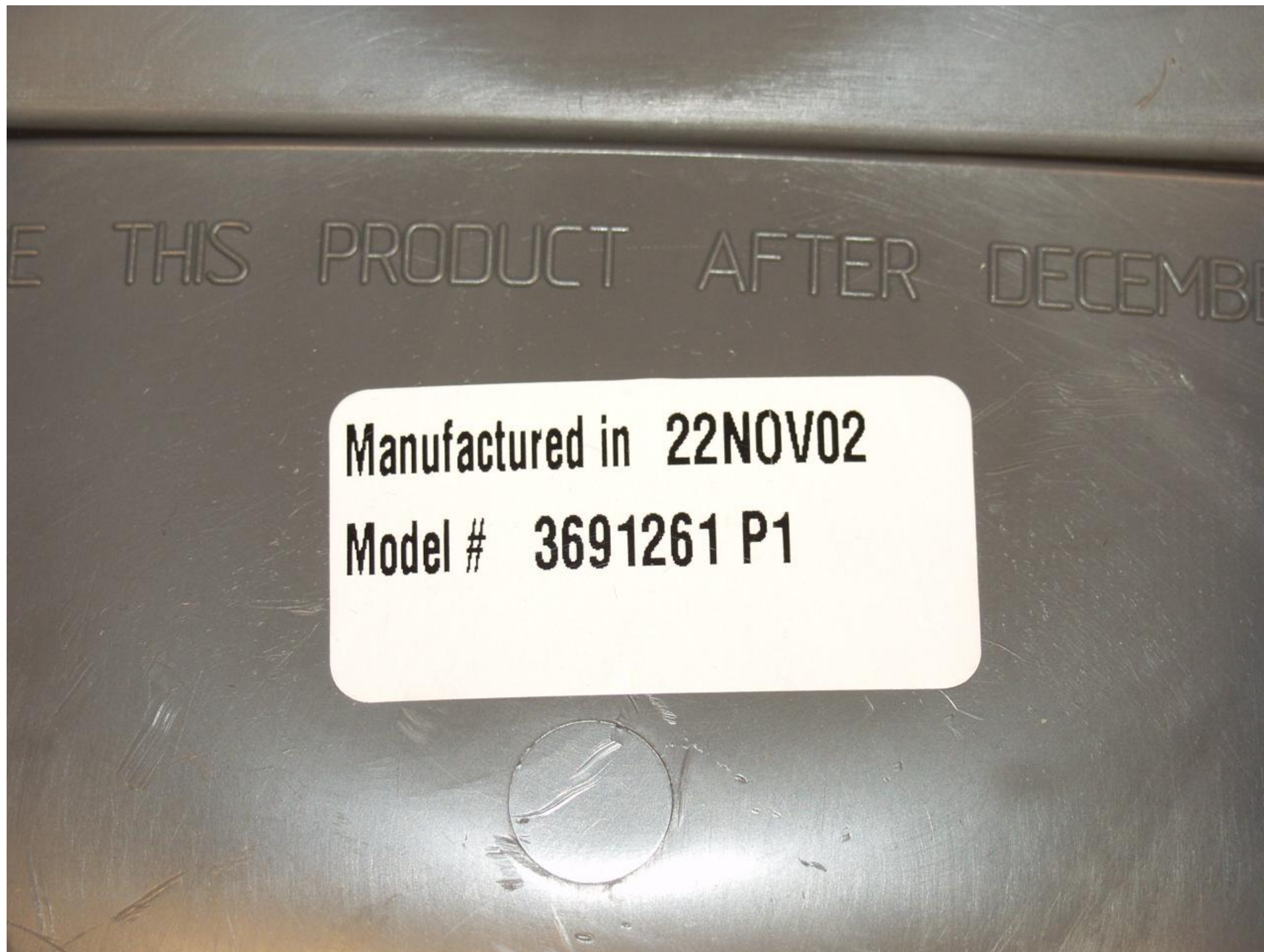


Figure 3-1 CLOSE-UP VIEW OF POSITION 3 CRS LABEL



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



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



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



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



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



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



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



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

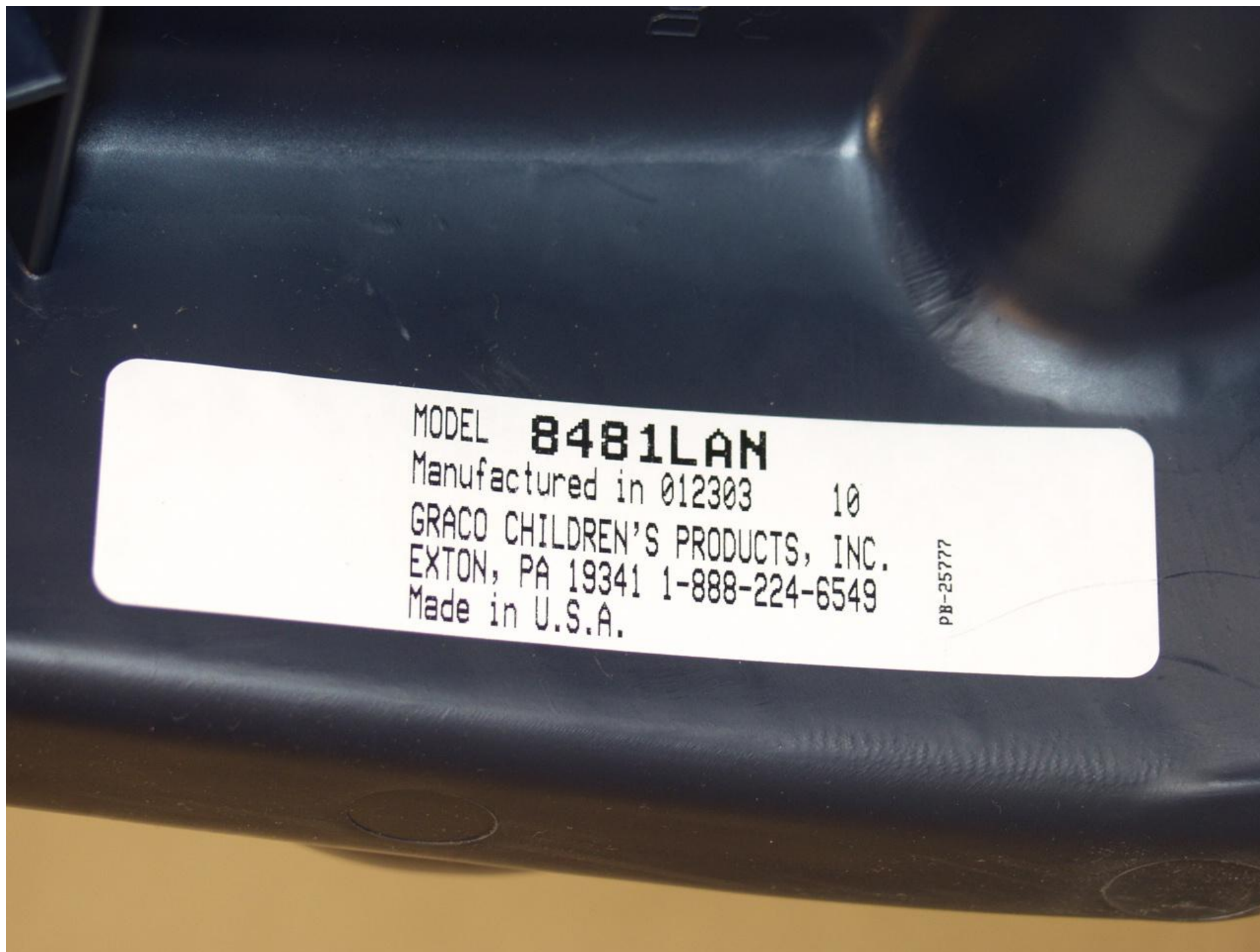


Figure 3-10 CLOSE-UP VIEW OF POSITION 4 CRS LABEL



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



Figure 3-27 PRE-TEST POSITION 3 FRONT VIEW



Figure 3-28 POST-TEST POSITION 3 FRONT VIEW



Figure 3-29 PRE-TEST POSITION 4 FRONT VIEW



Figure 3-30 POST-TEST POSITION 4 FRONT VIEW

SECTION 4

CHILD DUMMY RESPONSE AND CRS DATA TRACES

TABLE OF DATA PLOTS

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

TABLE OF DATA PLOTS (Continued)

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
50	V1P4 Upper Neck My [N-m, CFC_600]	4-53
51	V1P4 Upper Neck Mz [N-m, CFC_600]	4-54
52	V1P4 Upper Neck M Resultant [N-m, CFC_600]	4-55
53	V1P4 Chest x [g, CFC_180]	4-56
54	V1P4 Chest y [g, CFC_180]	4-57
55	V1P4 Chest z [g, CFC_180]	4-58
56	V1P4 Chest Resultant [g, CFC_180]	4-59
57	V1P4 Chest Compression [mm, CFC_600]	4-60
58	V1P4 Pelvic x [g, CFC_1000]	4-61
59	V1P4 Pelvic y [g, CFC_1000]	4-62
60	V1P4 Pelvic z [g, CFC_1000]	4-63
61	V1P4 Pelvic Resultant [g, CFC_1000]	4-64
62	V1P4 Lap Belt [N, CFC_60]	4-65
63	V1P4 Torso Belt [N, CFC_60]	4-66
64	V1P4 CRS x [g, CFC_60]	4-67
65	V1P4 CRS x Velocity [kph, CFC_180]	4-68
66	V1P4 CRS x Displacement [mm, CFC_180]	4-69
67	V1P4 CRS y [g, CFC_60]	4-70
68	V1P4 CRS y Velocity [kph, CFC_180]	4-71
69	V1P4 CRS y Displacement [mm, CFC_180]	4-72
70	V1P4 CRS z [g, CFC_60]	4-73
71	V1P4 CRS z Velocity [kph, CFC_180]	4-74
72	V1P4 CRS z Displacement [mm, CFC_180]	4-75
73	V1P4 CRS Resultant [g, CFC_60]	4-76

NCAP Test #8 - 2003 Toyota Avalon

V1P3 Head x

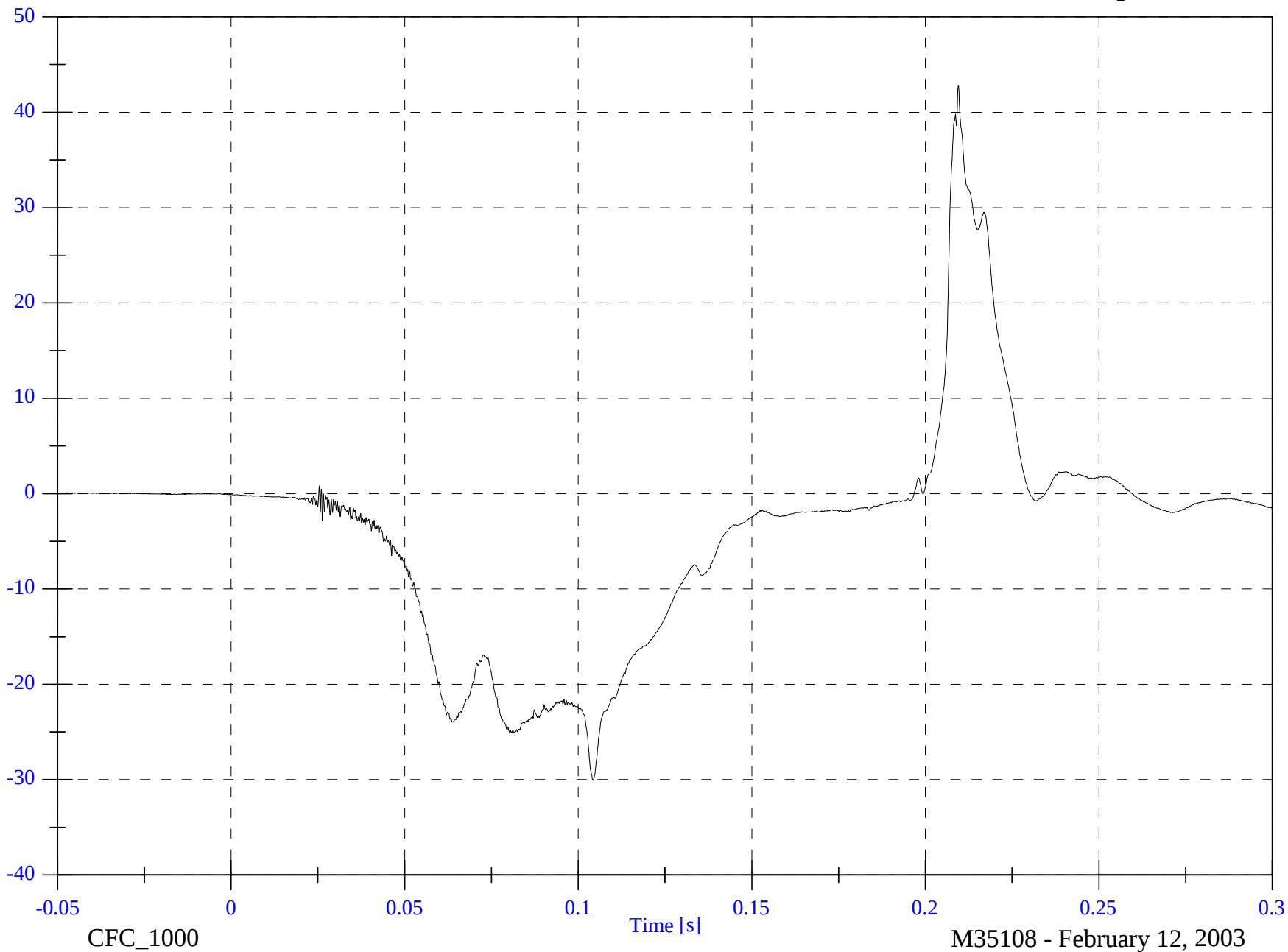
Max: 42.8 [g] at 0.209 [s]

Min: -30.1 [g] at 0.104 [s]

4-4

g

8642-NCAP-30

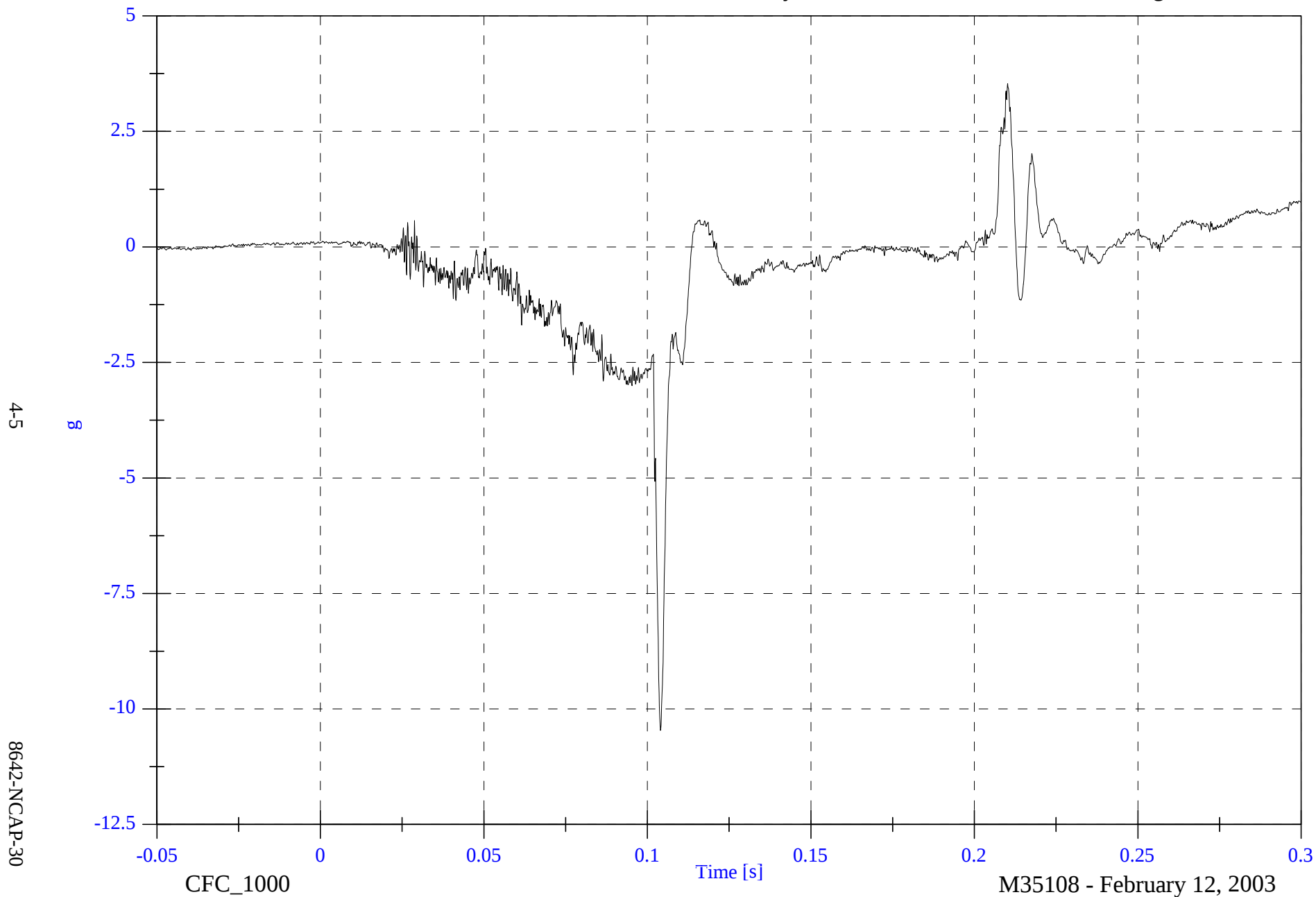


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Head y

Max: 3.5 [g] at 0.210 [s]

Min: -10.5 [g] at 0.104 [s]

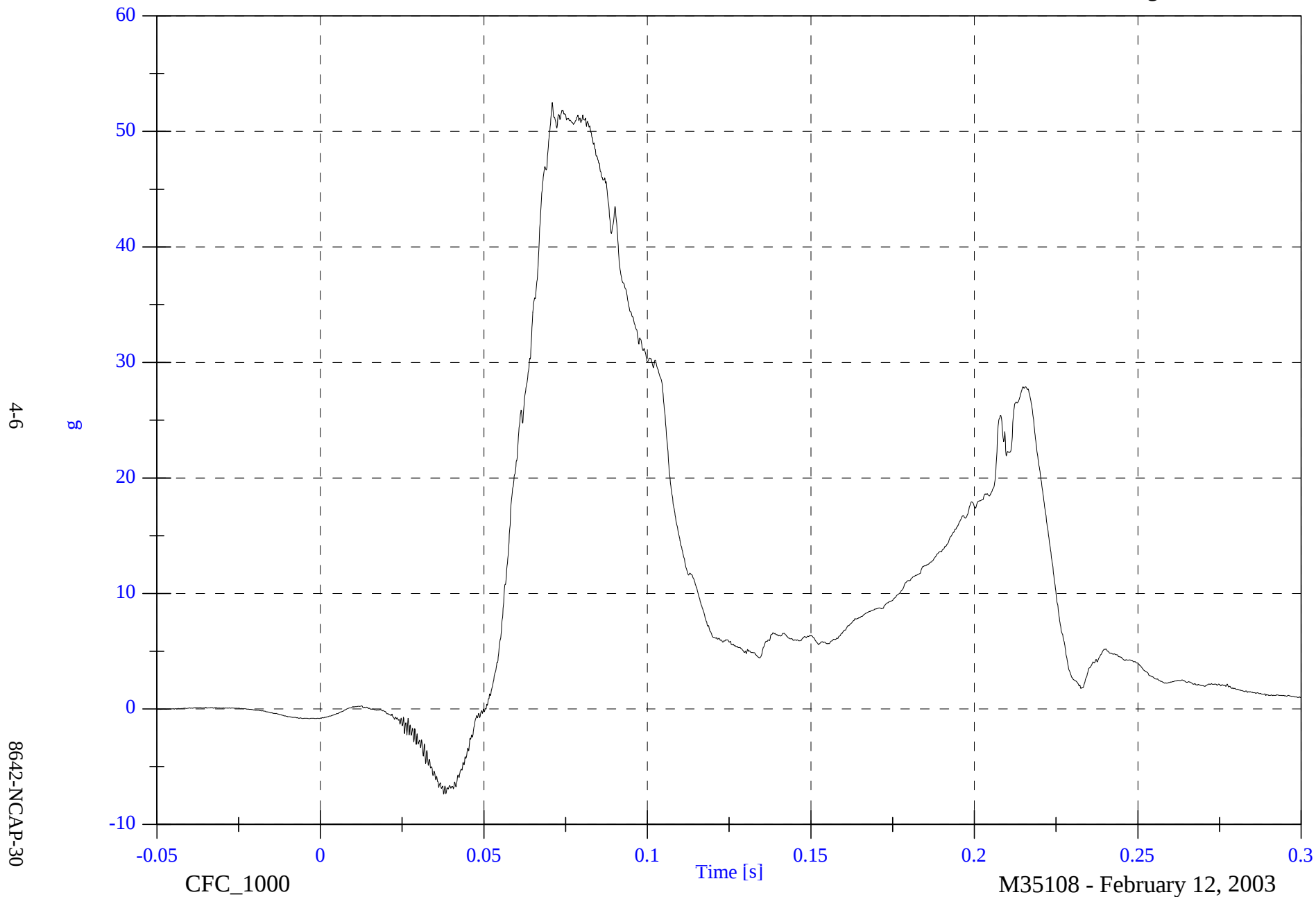


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Head z

Max: 52.5 [g] at 0.071 [s]

Min: -7.4 [g] at 0.038 [s]



NCAP Test #8 - 2003 Toyota Avalon

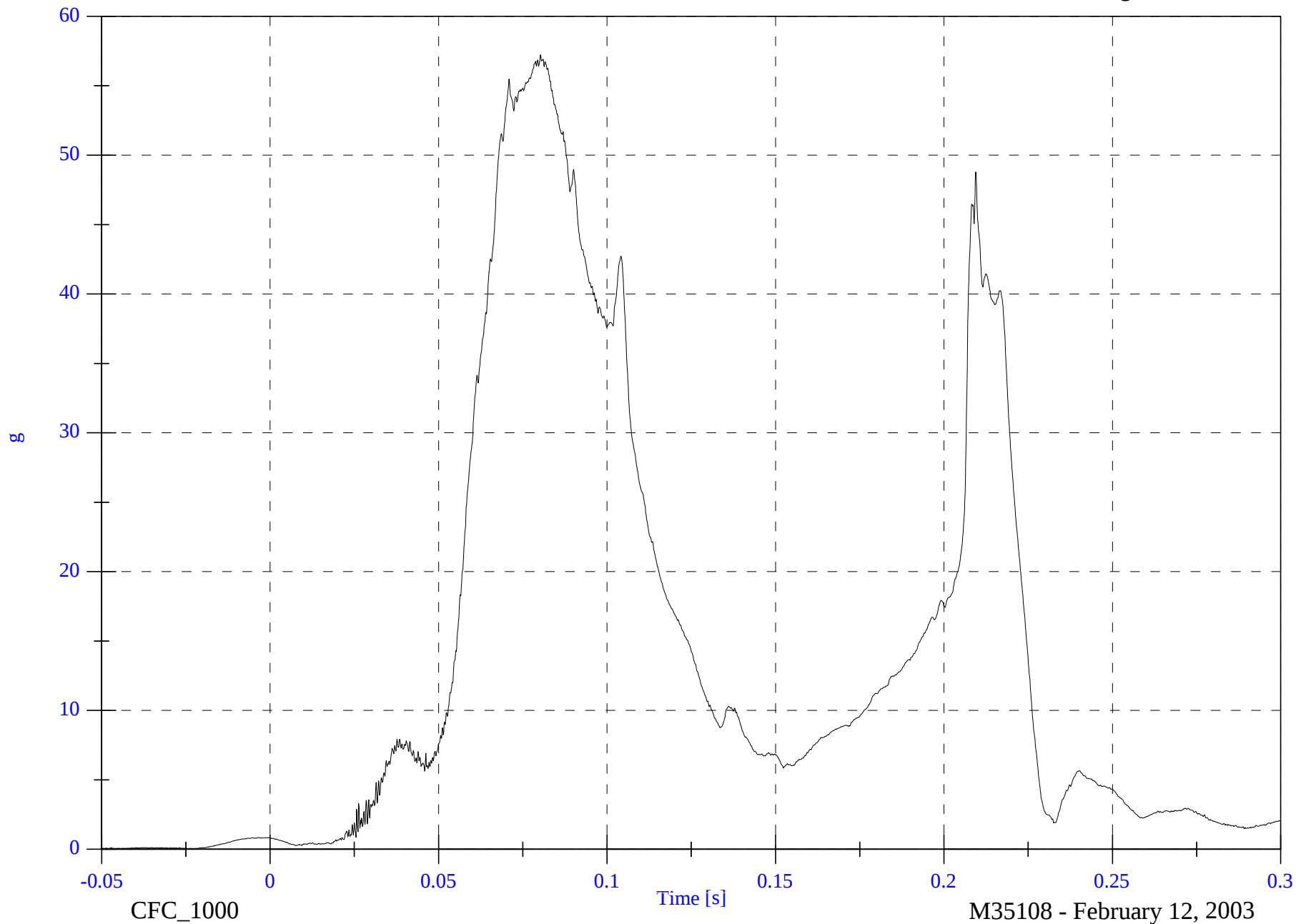
V1P3 Head Resultant

Max: 57.2 [g] at 0.080 [s]

Min: 0.0 [g] at -0.023 [s]

4-7

8642-NCAP-30

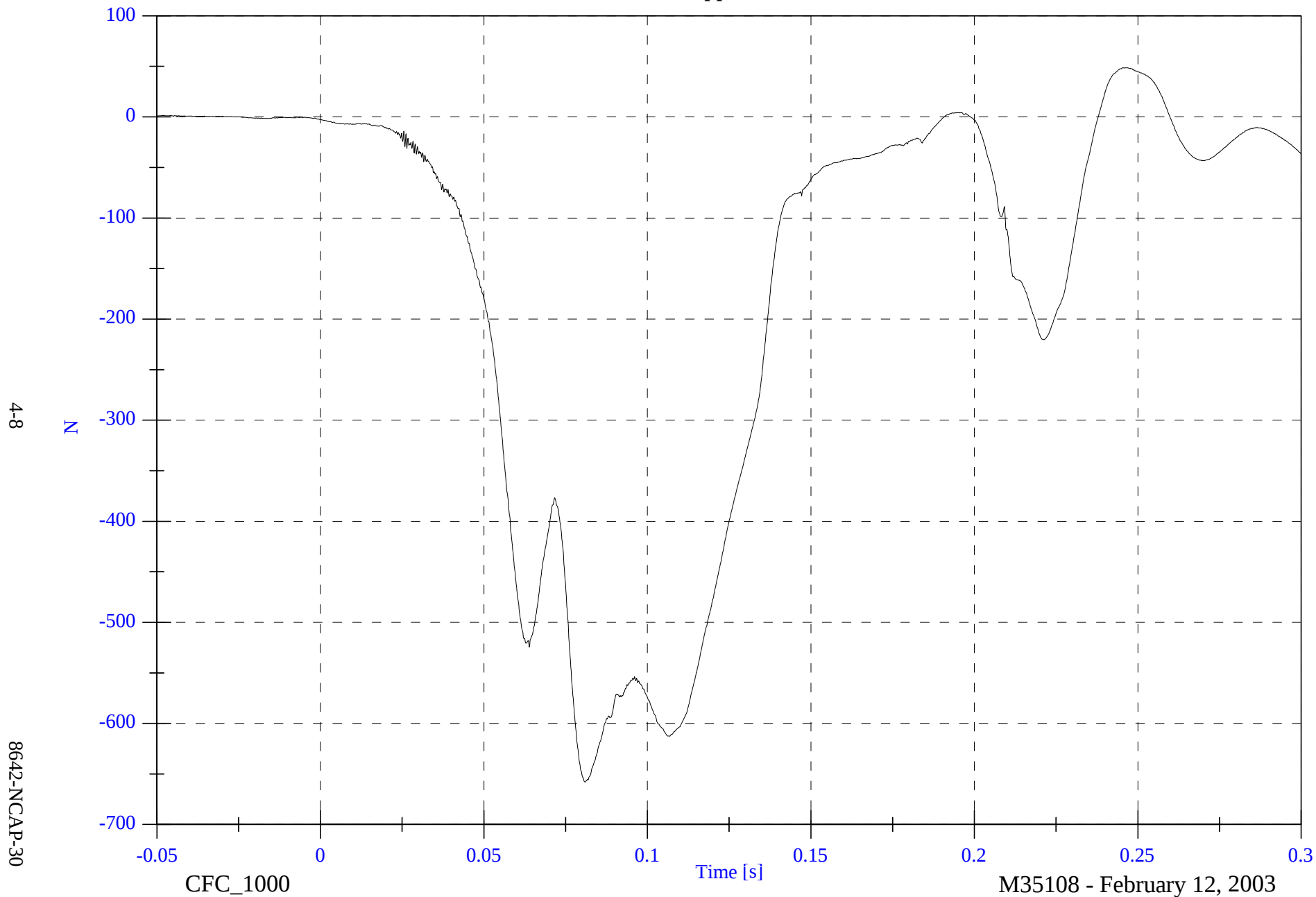


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Upper Neck Fx

Max: 48.7 [N] at 0.247 [s]

Min: -658.1 [N] at 0.081 [s]

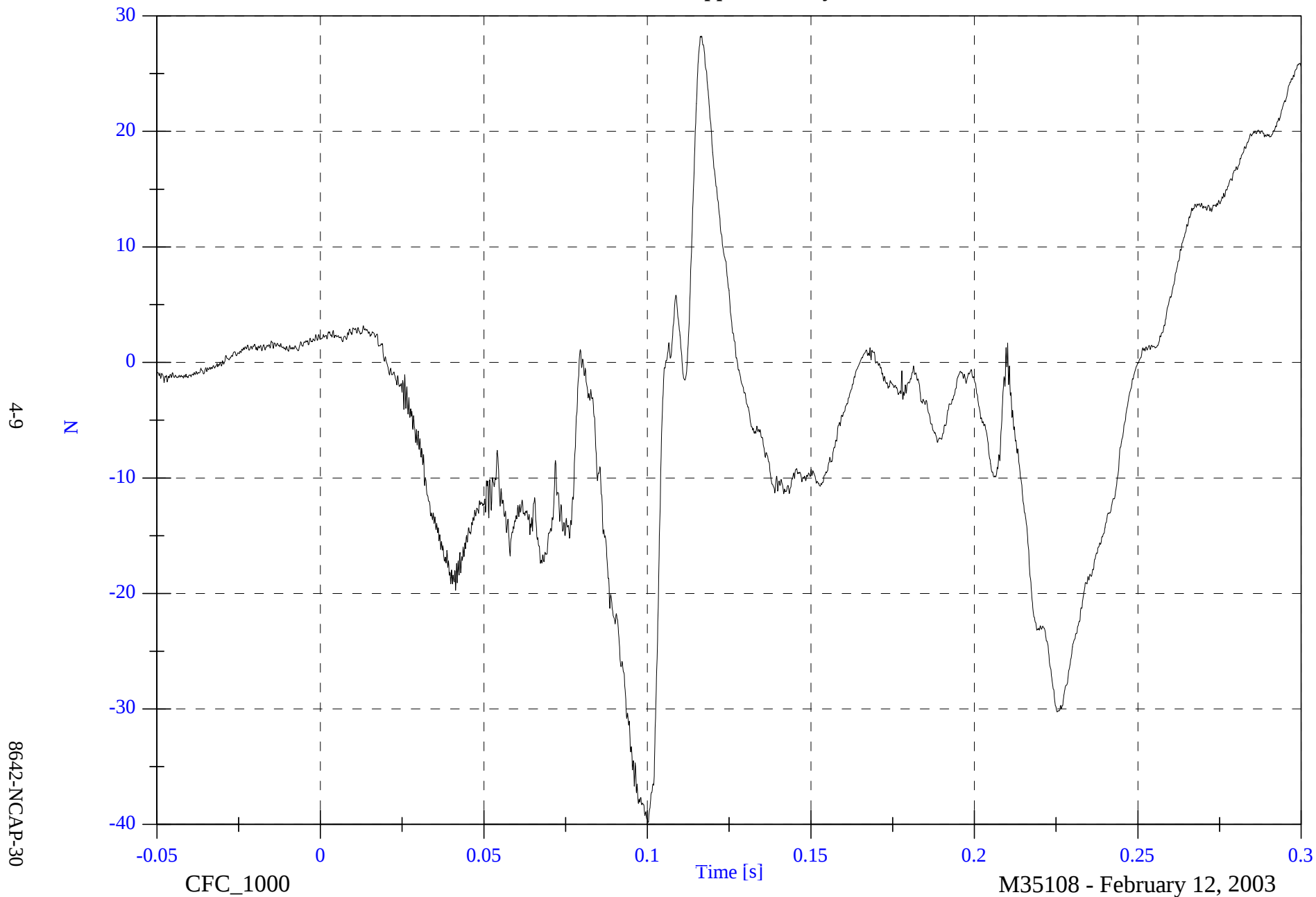


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Upper Neck Fy

Max: 28.2 [N] at 0.116 [s]

Min: -39.8 [N] at 0.100 [s]

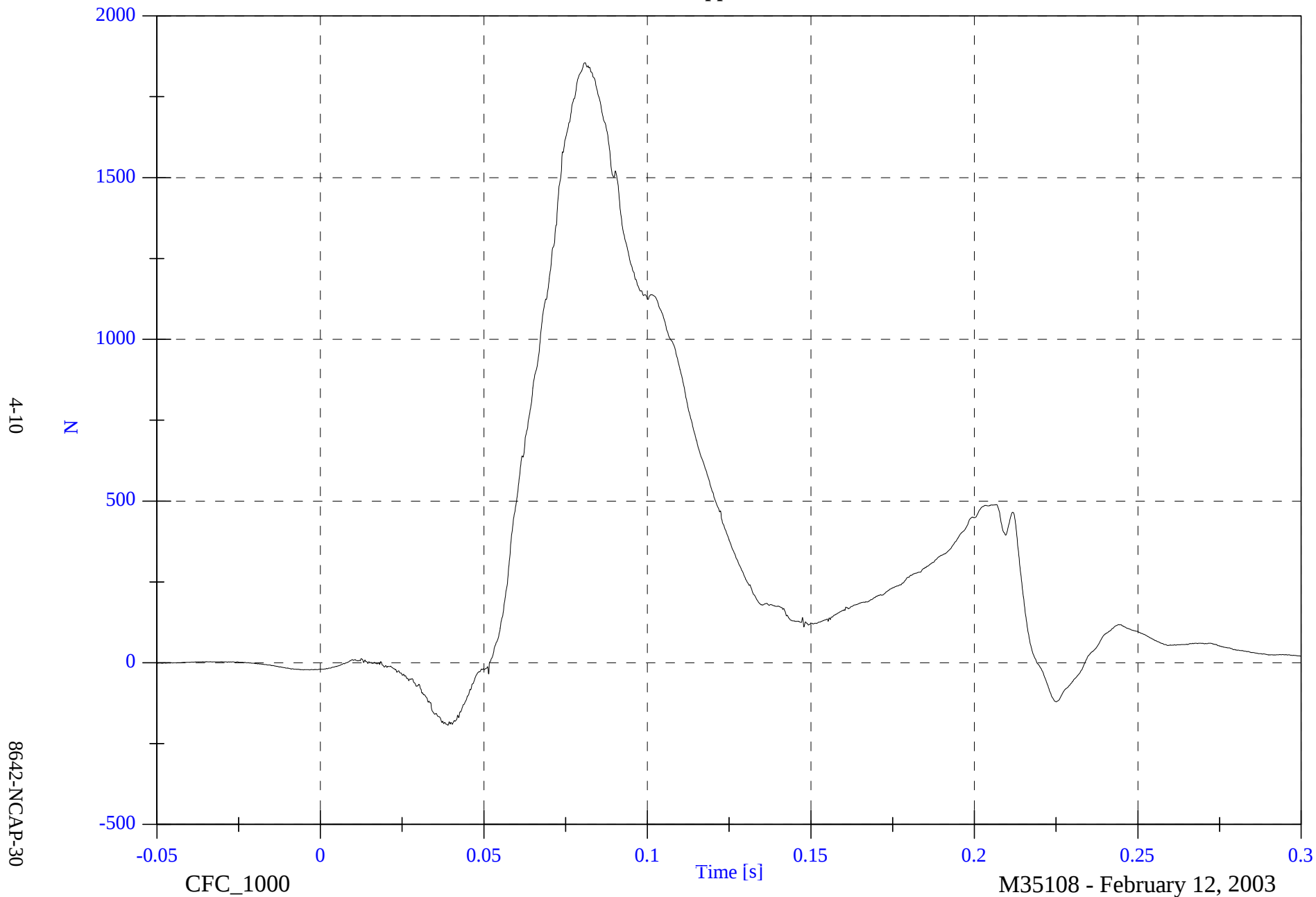


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Upper Neck Fz

Max: 1854.9 [N] at 0.081 [s]

Min: -193.0 [N] at 0.039 [s]



NCAP Test #8 - 2003 Toyota Avalon

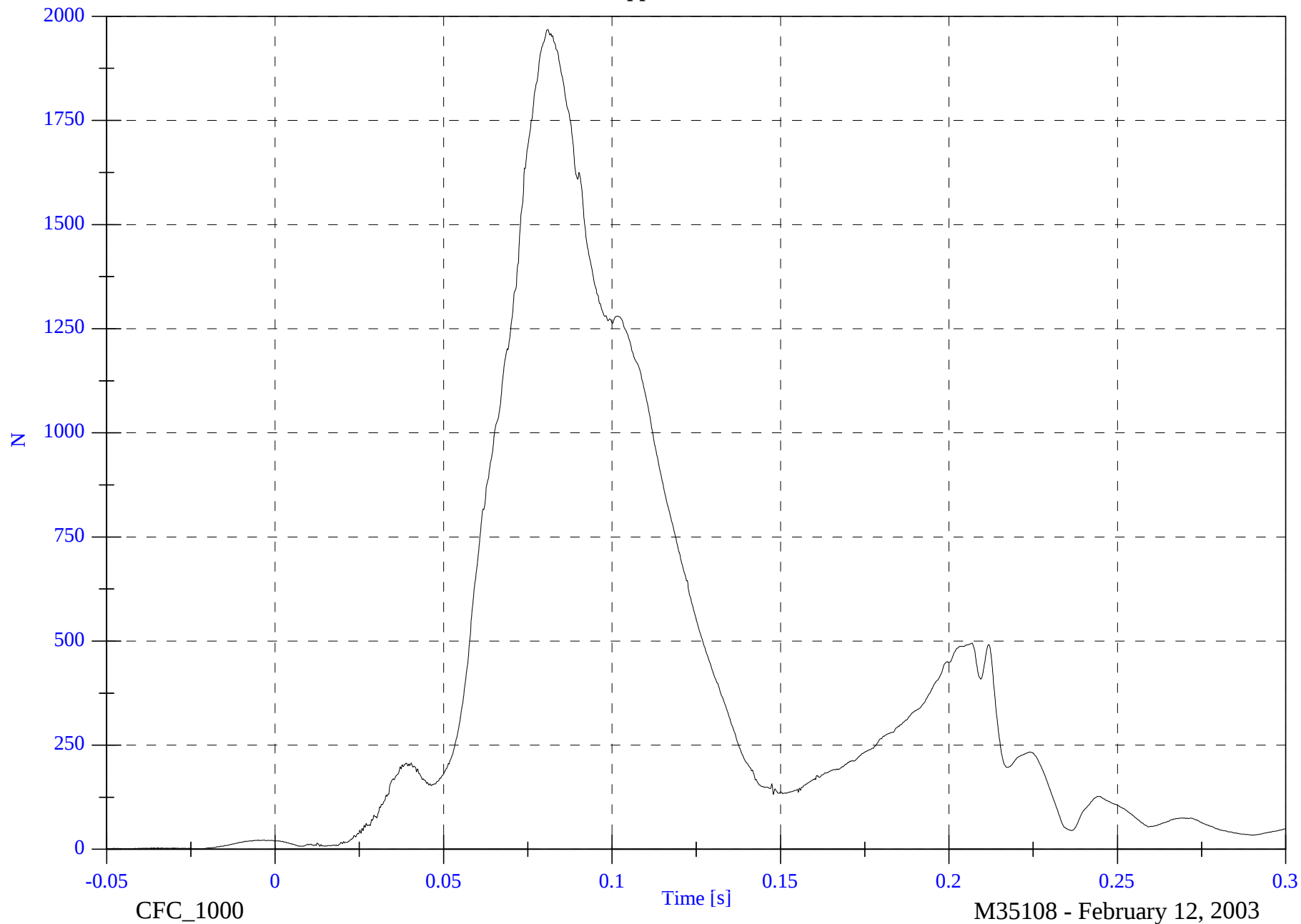
V1P3 Upper Neck F Resultant

Max: 1968.2 [N] at 0.081 [s]

Min: 1.2 [N] at -0.023 [s]

4-11

8642-NCAP-30

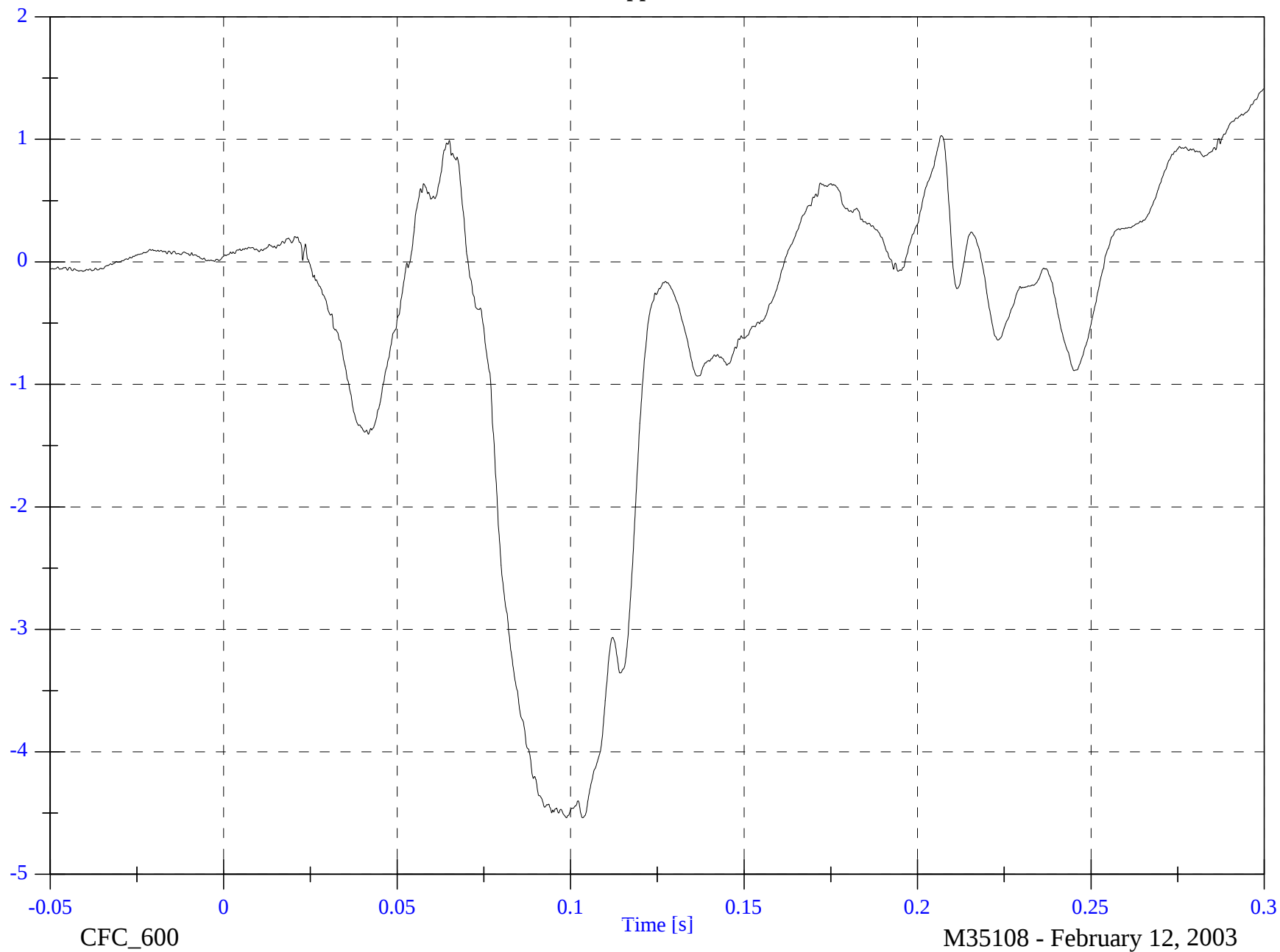


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Upper Neck Mx

Max: 1.4 [N-m] at 0.300 [s]

Min: -4.5 [N-m] at 0.103 [s]



4-12

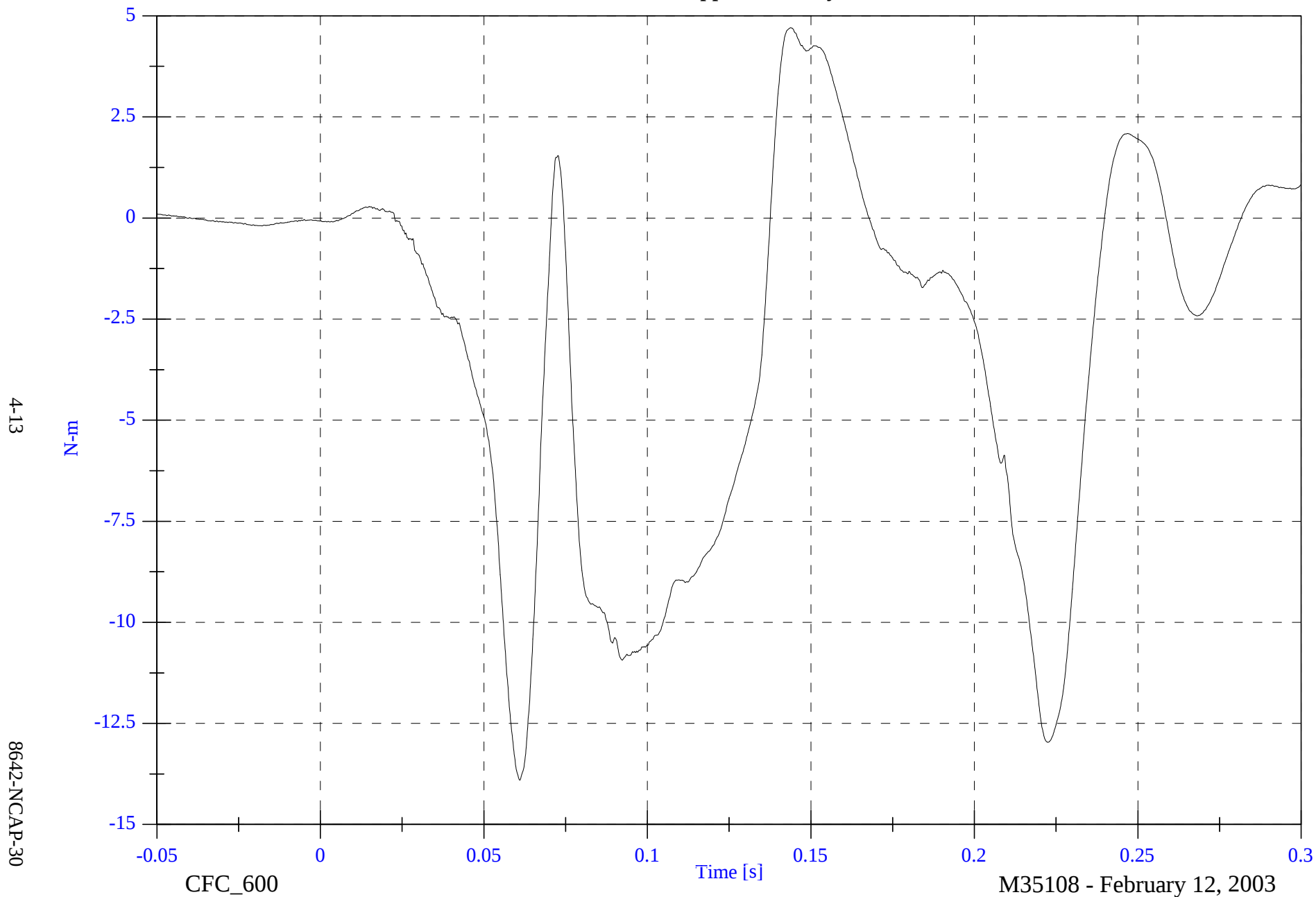
8642-NCAP-30

NCAP Test #8 - 2003 Toyota Avalon

V1P3 Upper Neck My

Max: 4.7 [N-m] at 0.144 [s]

Min: -13.9 [N-m] at 0.061 [s]

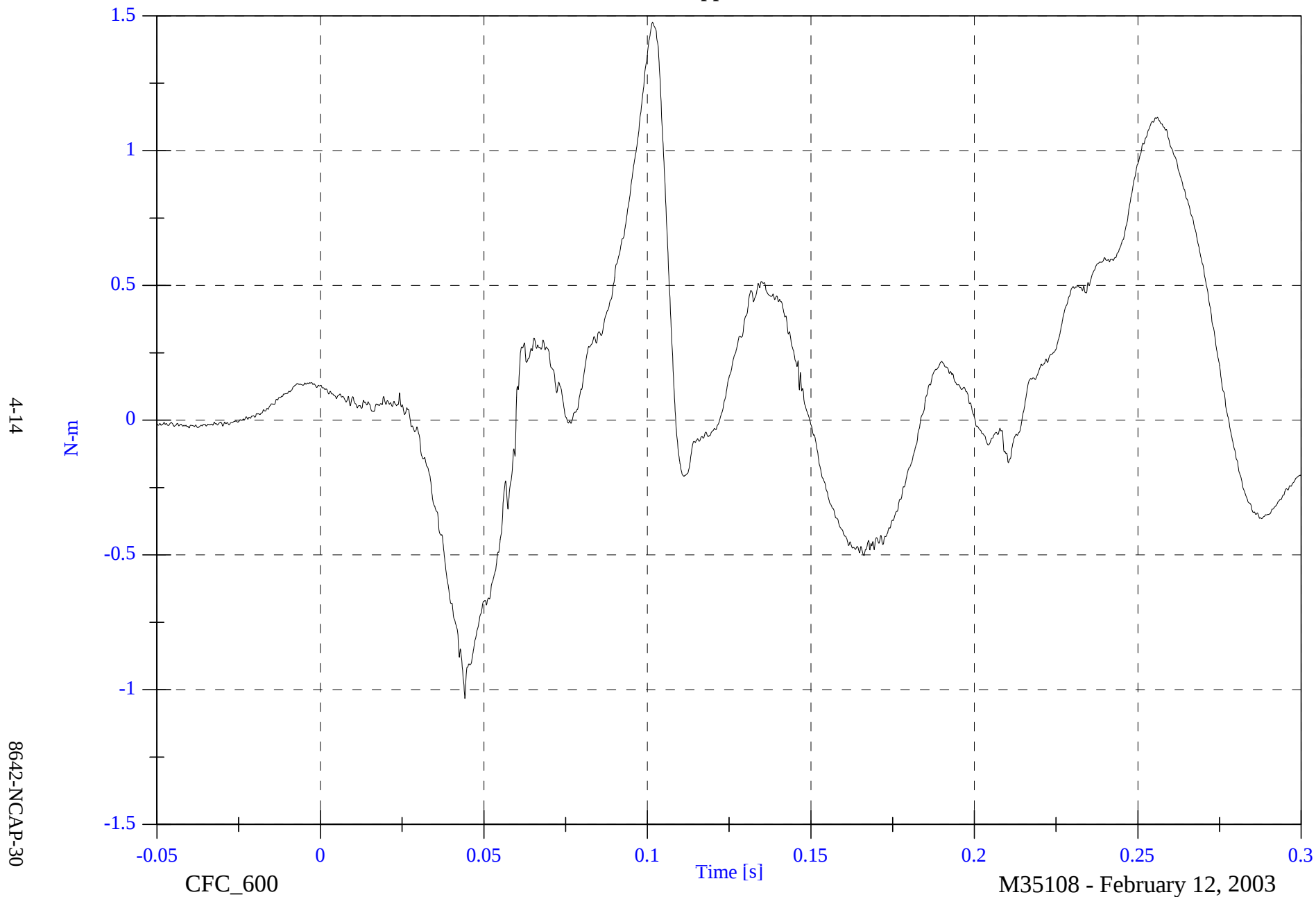


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Upper Neck Mz

Max: 1.5 [N-m] at 0.102 [s]

Min: -1.0 [N-m] at 0.044 [s]

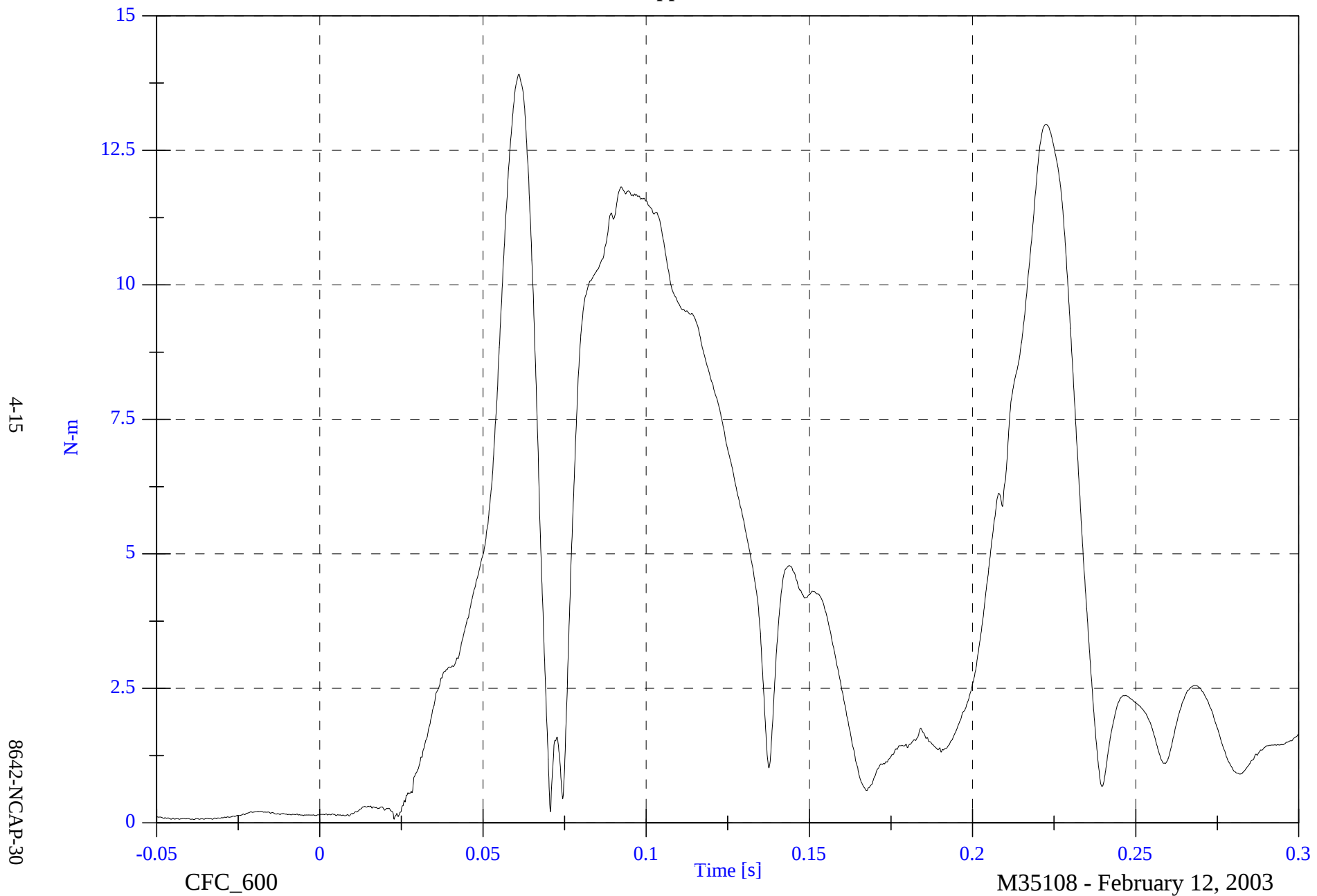


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Upper Neck M Resultant

Max: 13.9 [N-m] at 0.061 [s]

Min: 0.1 [N-m] at -0.039 [s]



4-15

8642-NCAP-30

CFC_600

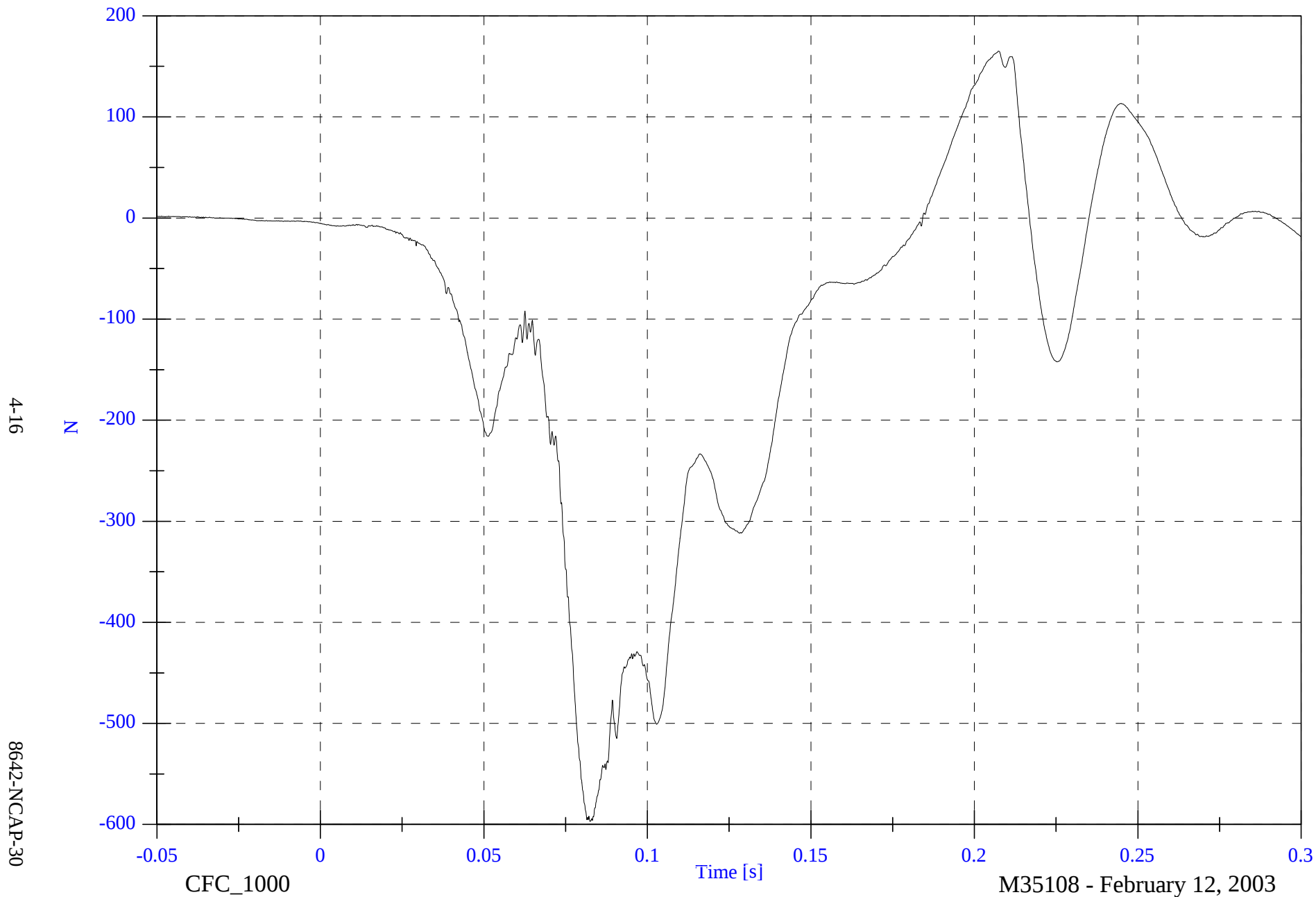
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1P3 Lower Neck Fx

Max: 165.2 [N] at 0.207 [s]

Min: -597.1 [N] at 0.082 [s]

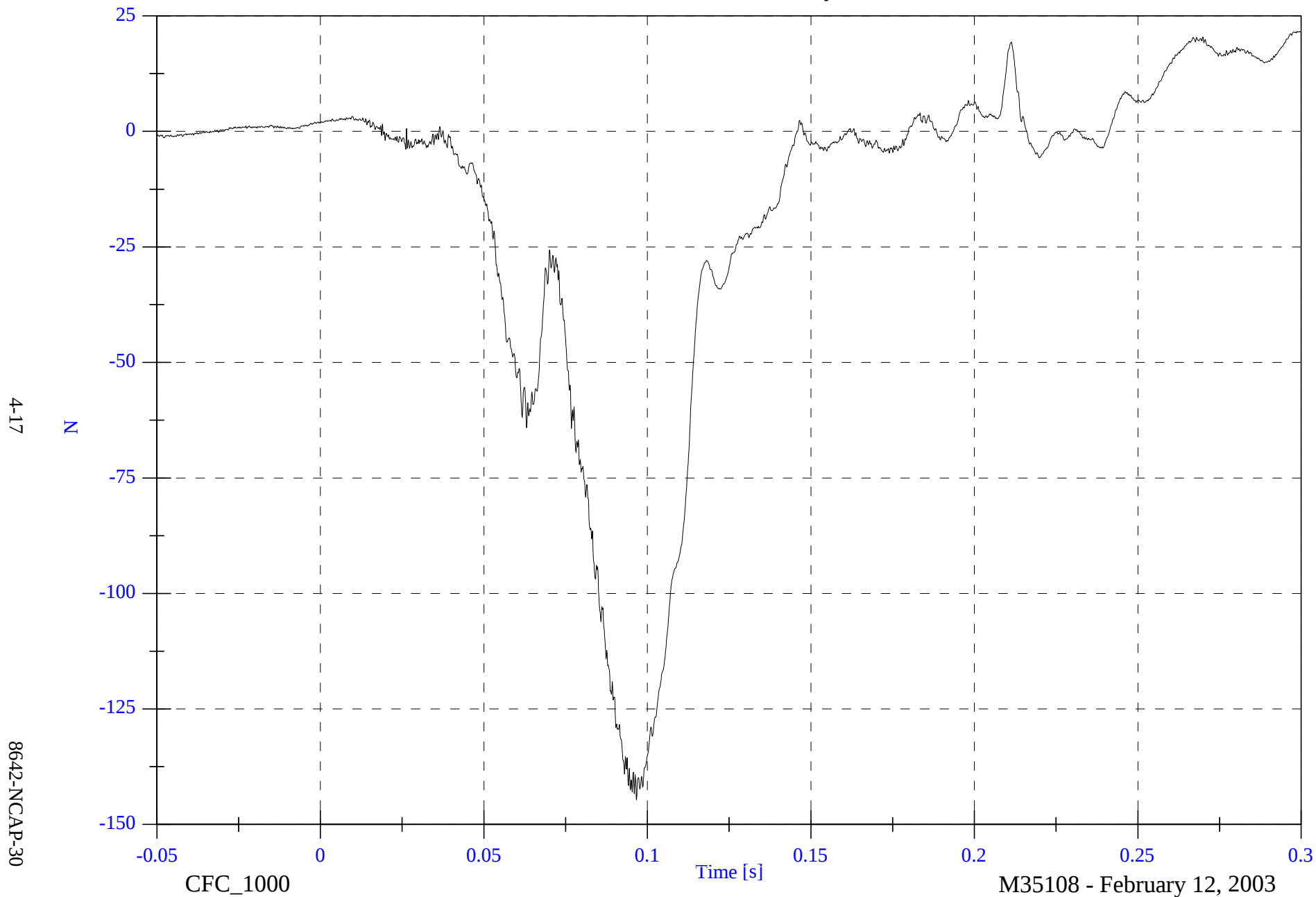


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Lower Neck Fy

Max: 21.7 [N] at 0.299 [s]

Min: -144.7 [N] at 0.097 [s]

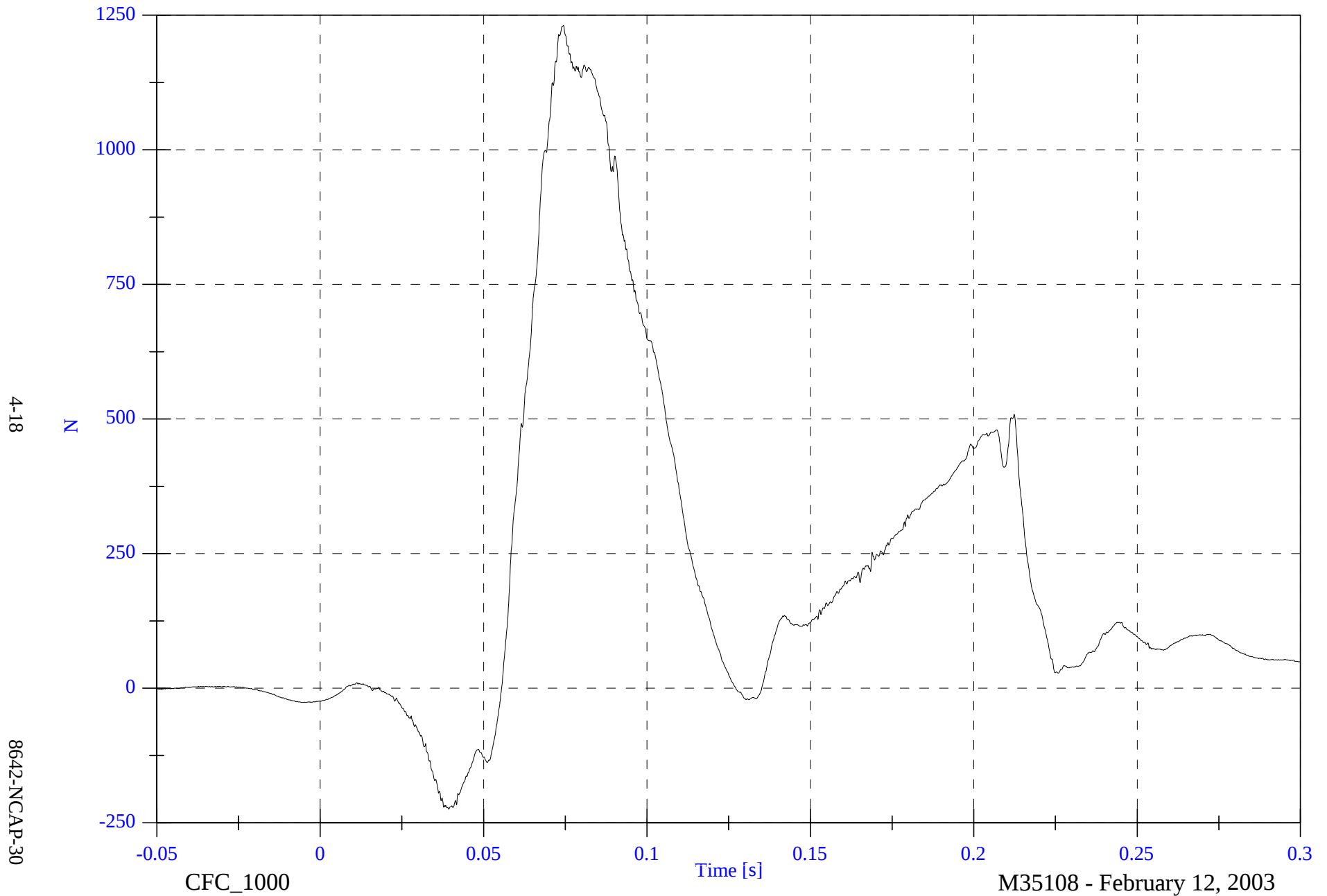


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Lower Neck Fz

Max: 1231.3 [N] at 0.074 [s]

Min: -224.6 [N] at 0.039 [s]



NCAP Test #8 - 2003 Toyota Avalon

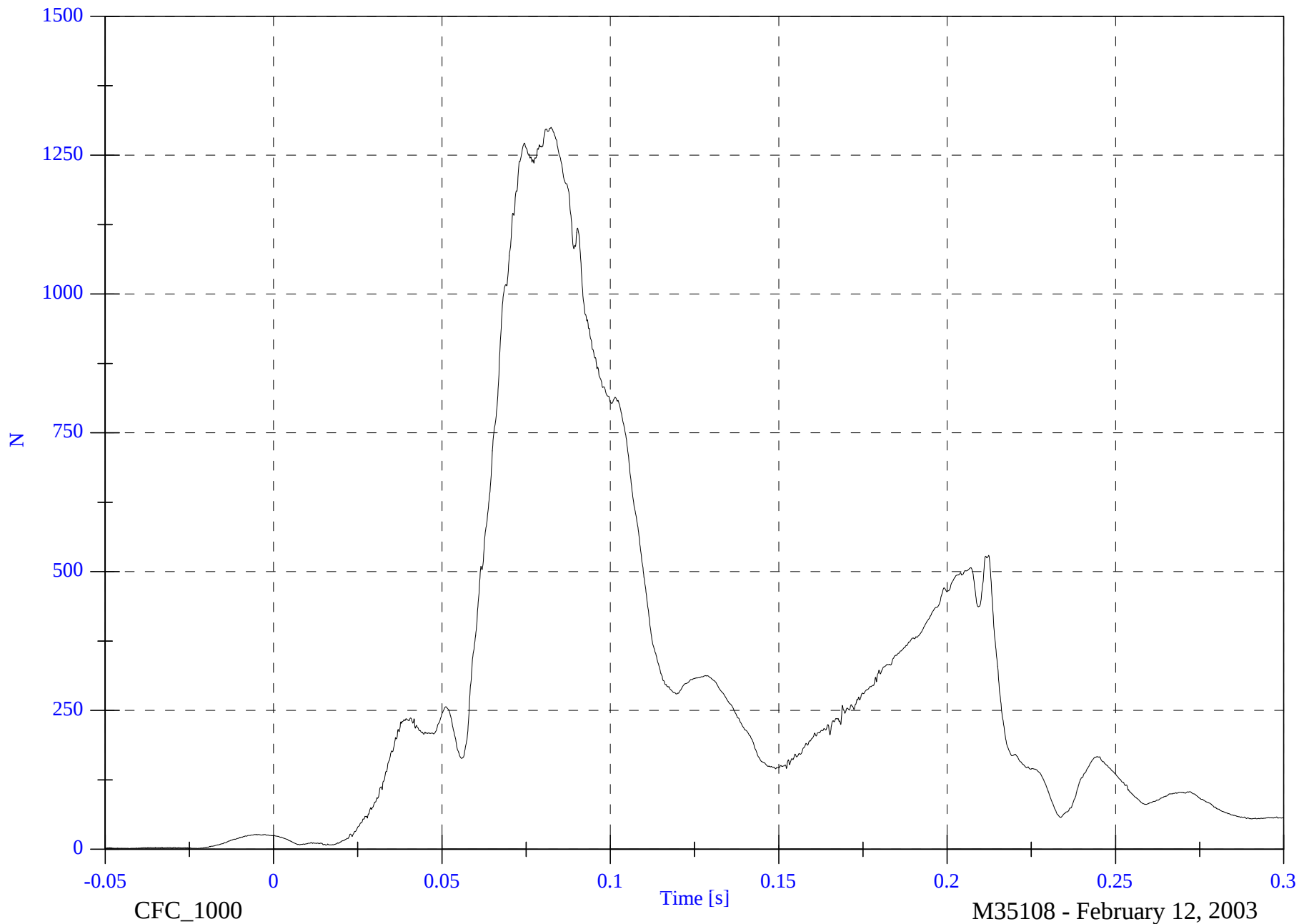
V1P3 Lower Neck F Resultant

Max: 1300.2 [N] at 0.082 [s]

Min: 1.3 [N] at -0.043 [s]

4-19

8642-NCAP-30

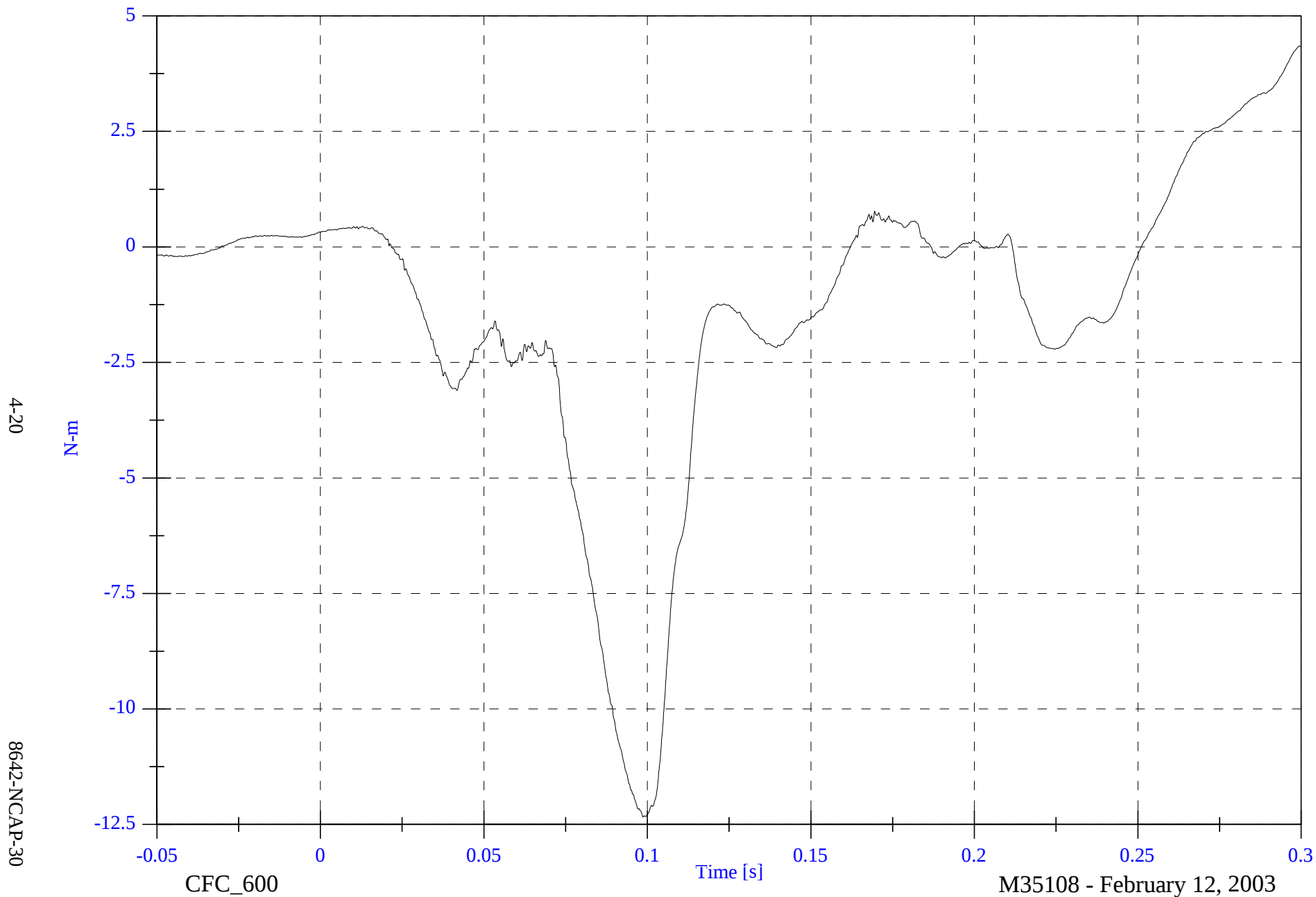


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Lower Neck Mx

Max: 4.4 [N-m] at 0.300 [s]

Min: -12.3 [N-m] at 0.099 [s]

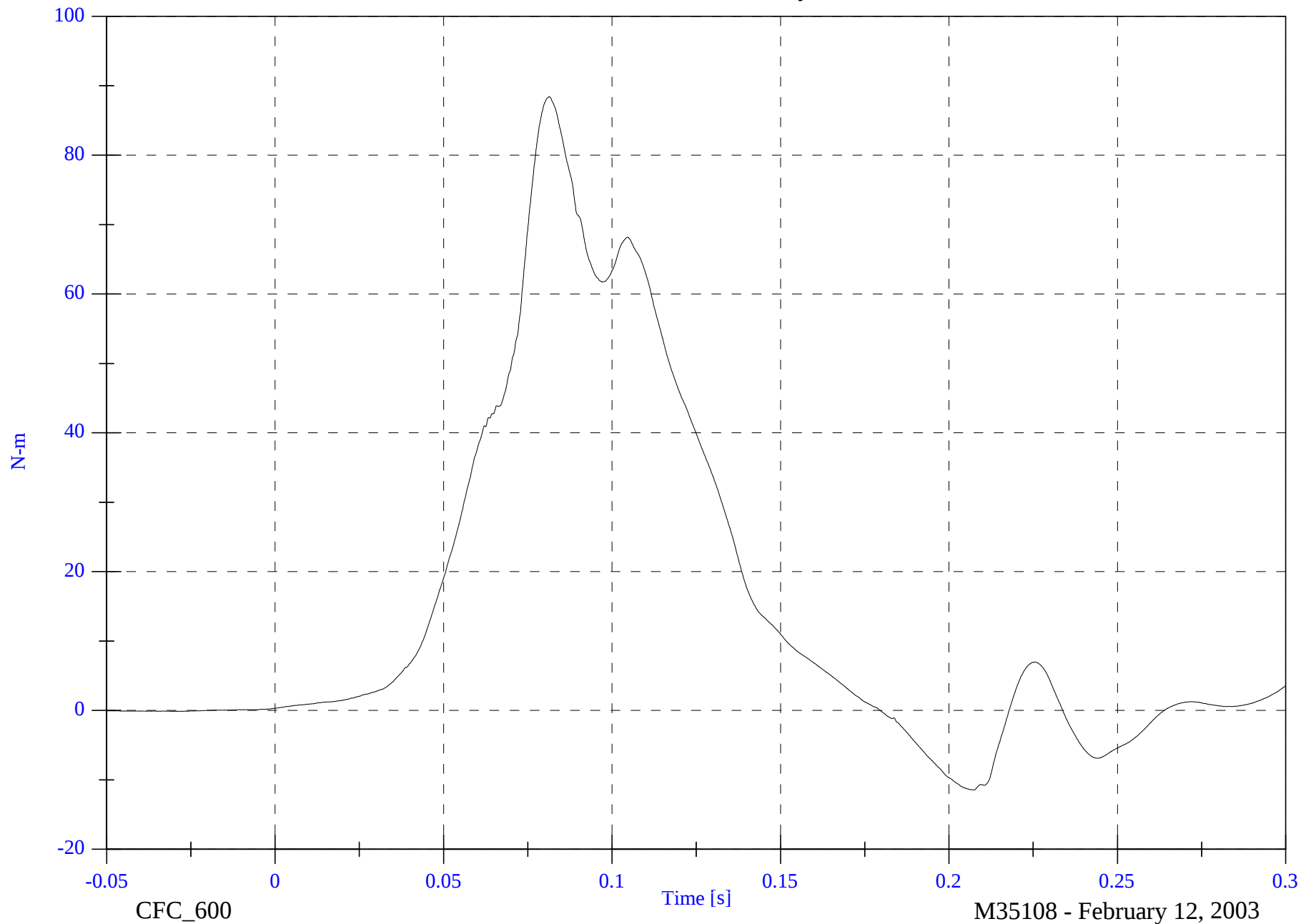


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Lower Neck My

Max: 88.4 [N-m] at 0.081 [s]

Min: -11.4 [N-m] at 0.207 [s]



4-21

8642-NCAP-30

CFC_600

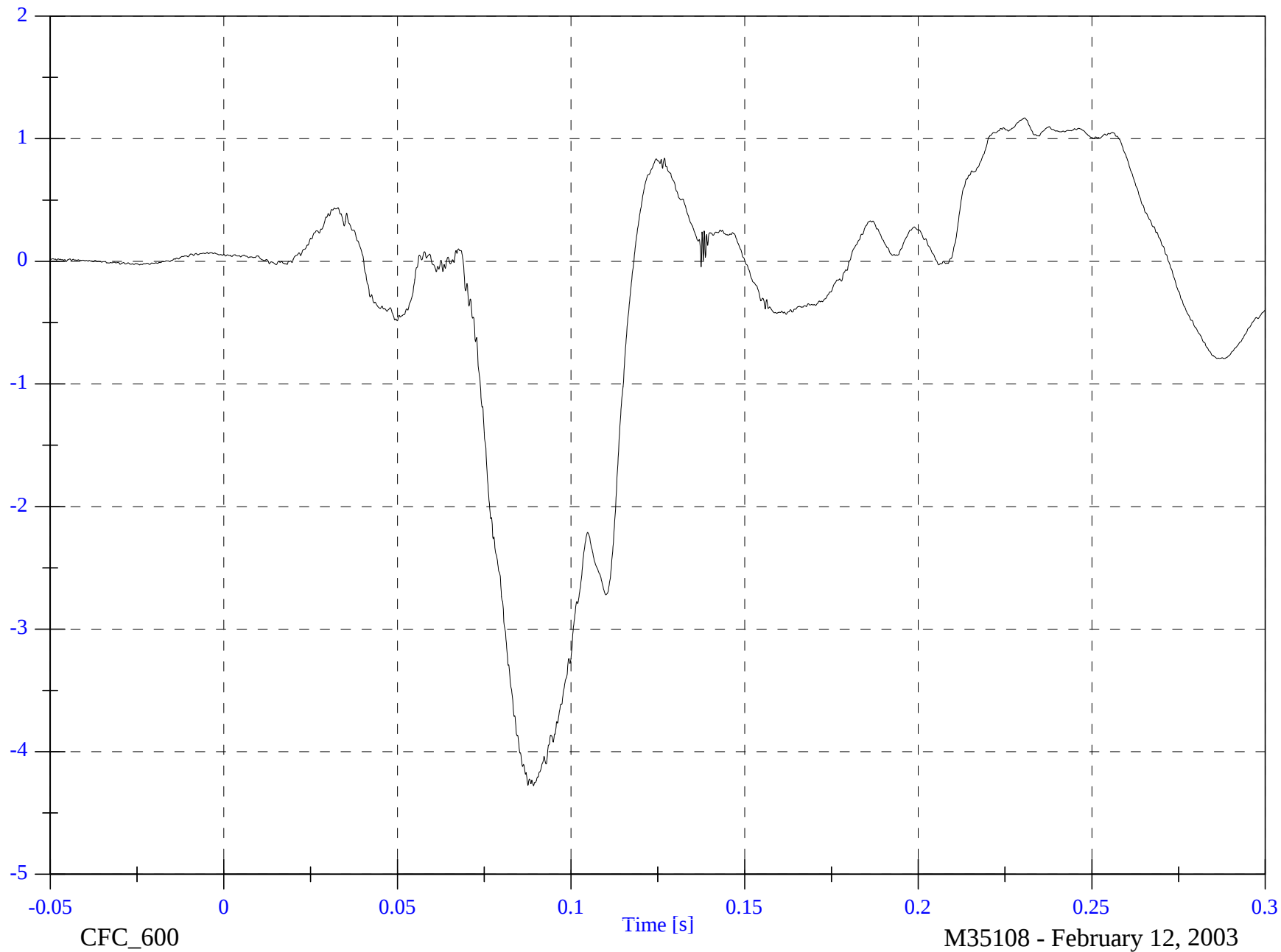
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1P3 Lower Neck Mz

Max: 1.2 [N-m] at 0.231 [s]

Min: -4.3 [N-m] at 0.089 [s]



4-22

8642-NCAP-30

CFC_600

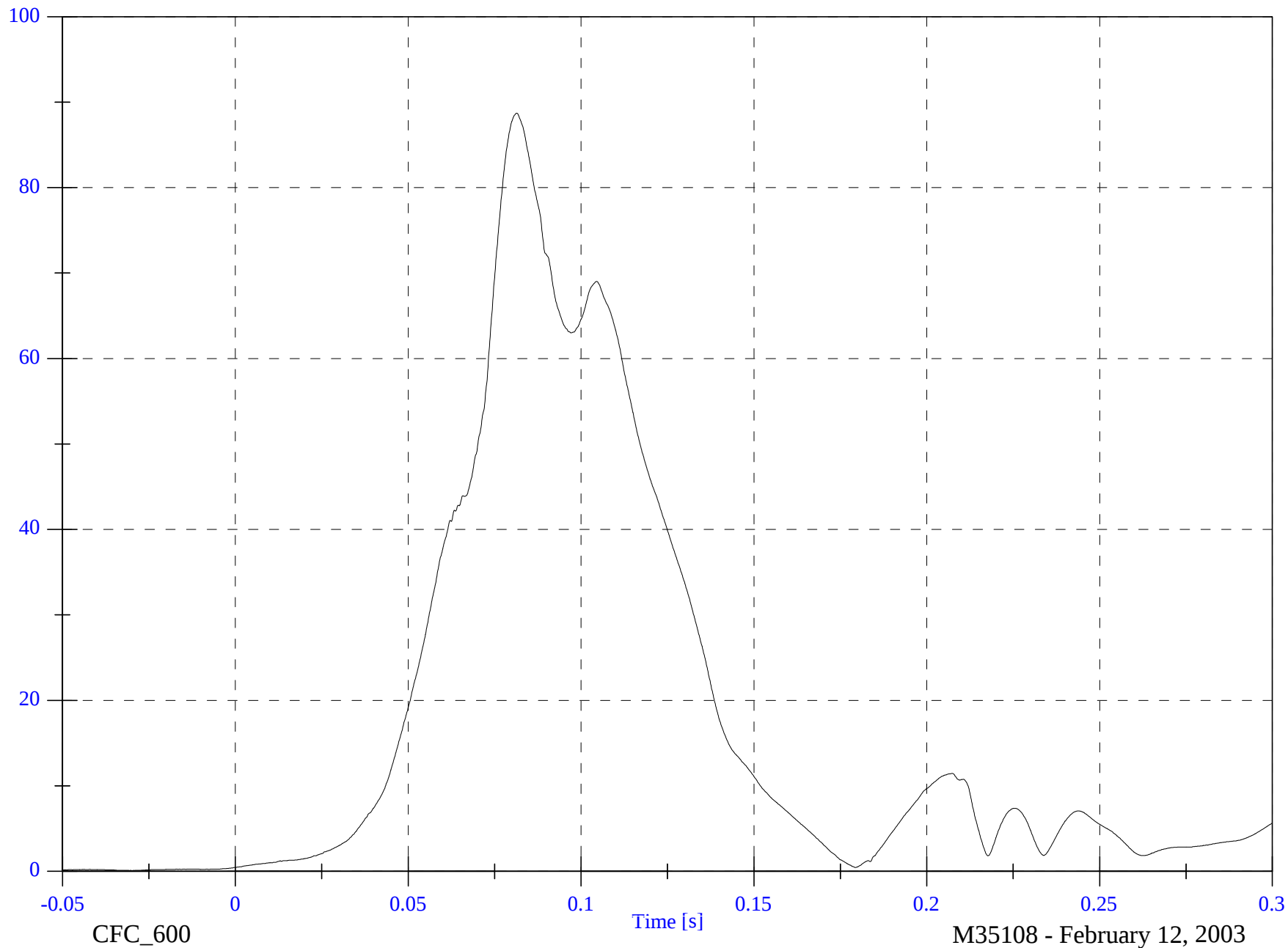
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1P3 Lower Neck M Resultant

Max: 88.7 [N-m] at 0.081 [s]

Min: 0.1 [N-m] at -0.030 [s]



4-23

8642-NCAP-30

CFC_600

M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

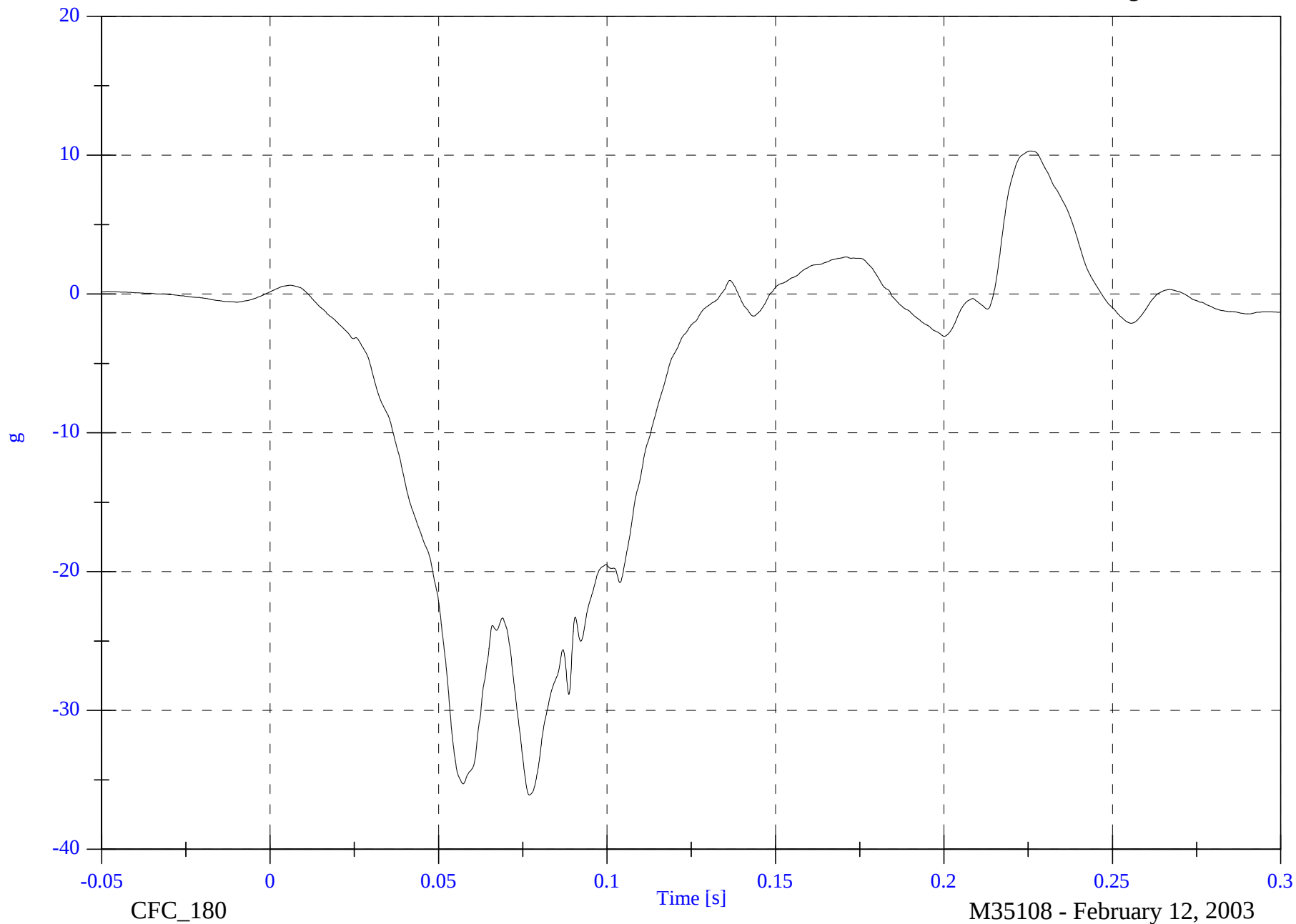
V1P3 Chest x

Max: 10.3 [g] at 0.226 [s]

Min: -36.1 [g] at 0.077 [s]

4-24

8642-NCAP-30

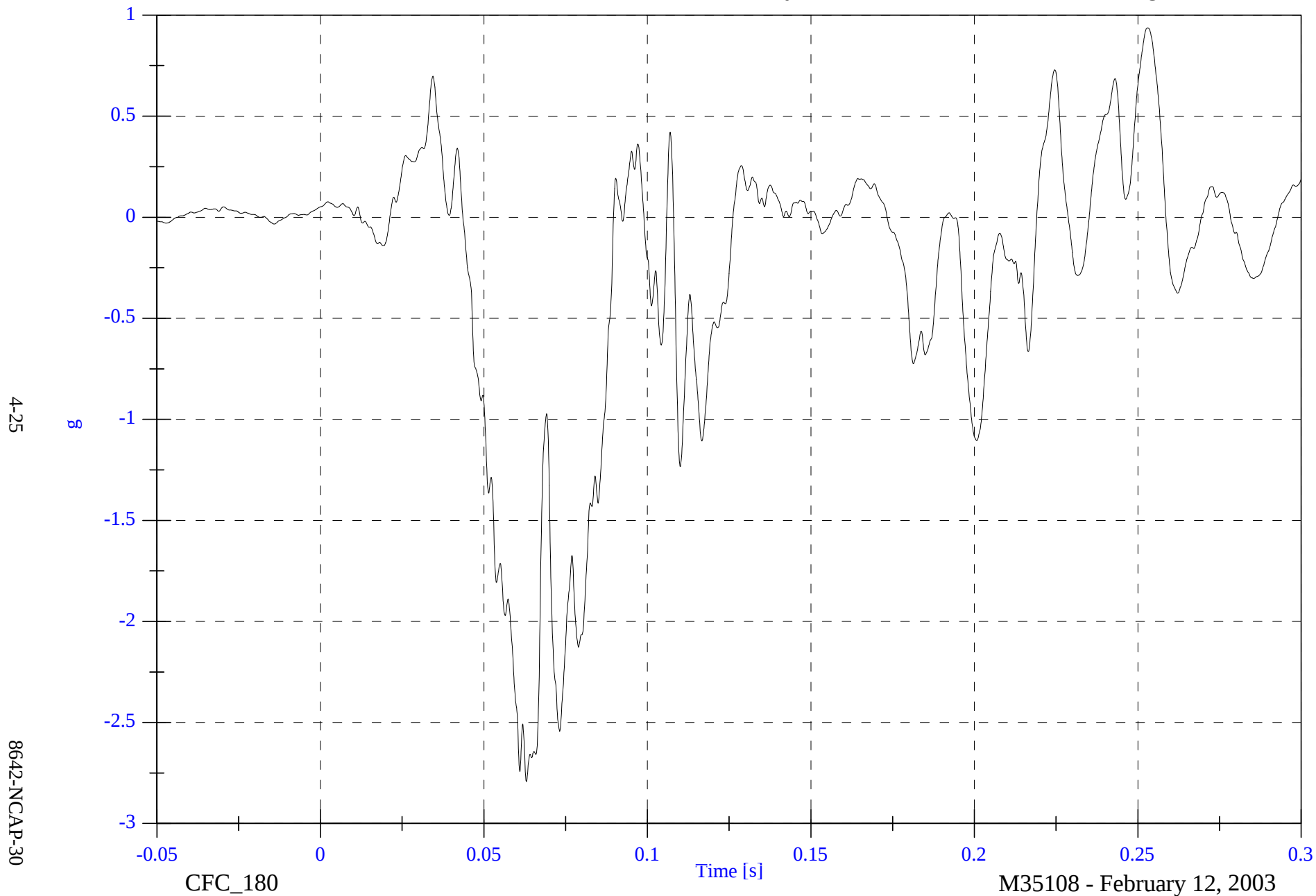


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Chest y

Max: 0.9 [g] at 0.253 [s]

Min: -2.8 [g] at 0.063 [s]



NCAP Test #8 - 2003 Toyota Avalon

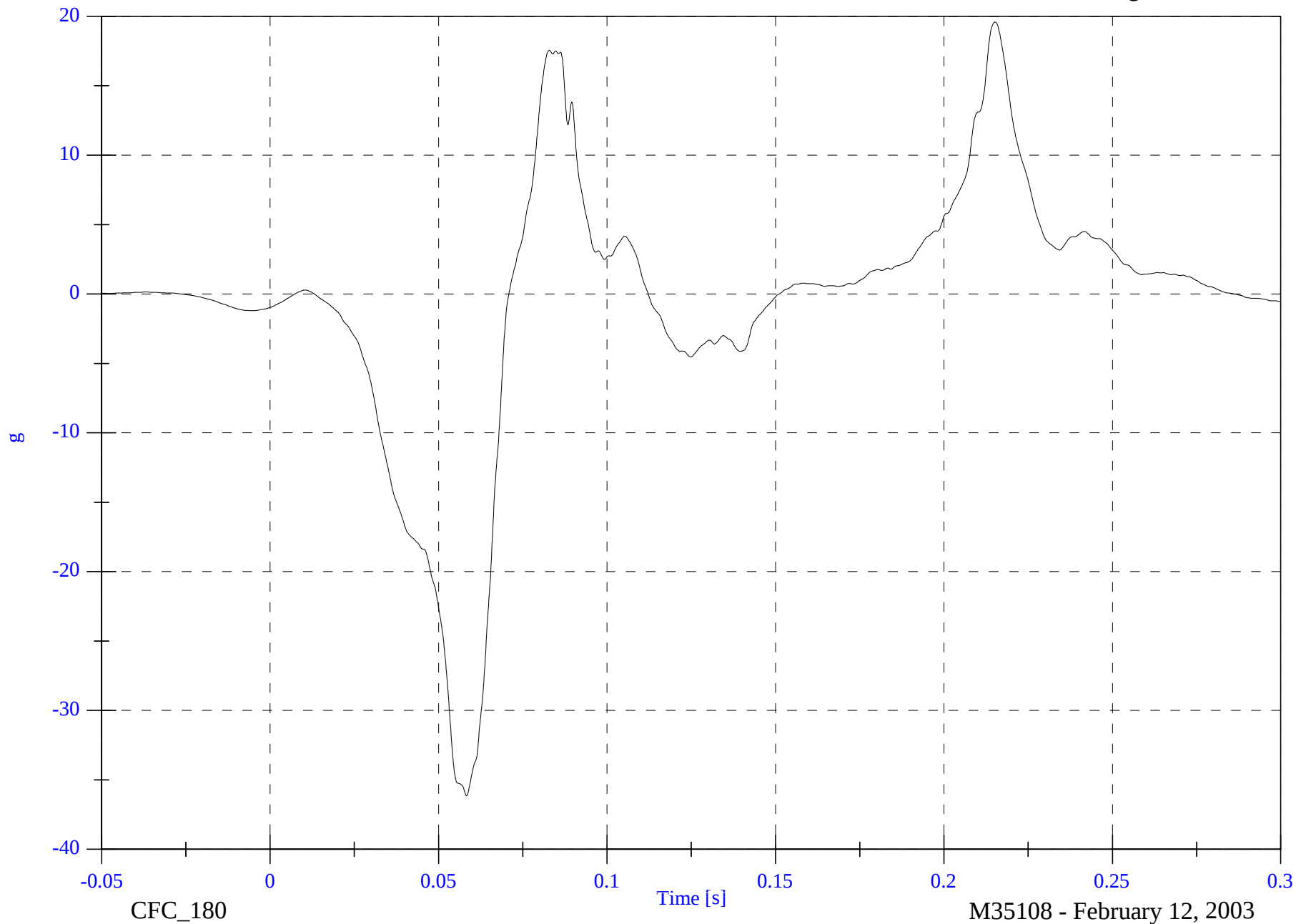
V1P3 Chest z

Max: 19.6 [g] at 0.215 [s]

Min: -36.1 [g] at 0.058 [s]

4-26

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

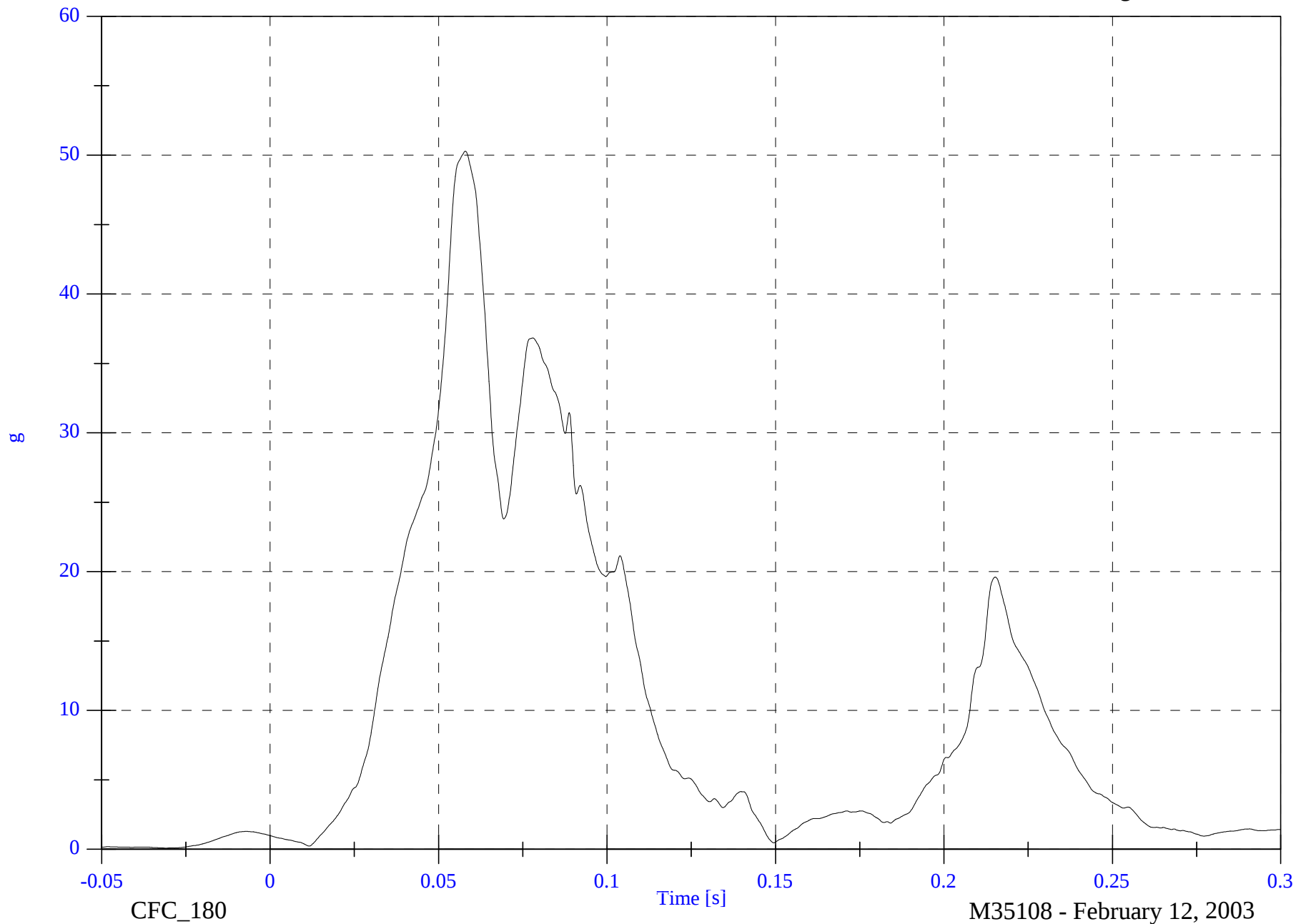
V1P3 Chest Resultant

Max: 50.3 [g] at 0.058 [s]

Min: 0.1 [g] at -0.031 [s]

4-27

8642-NCAP-30

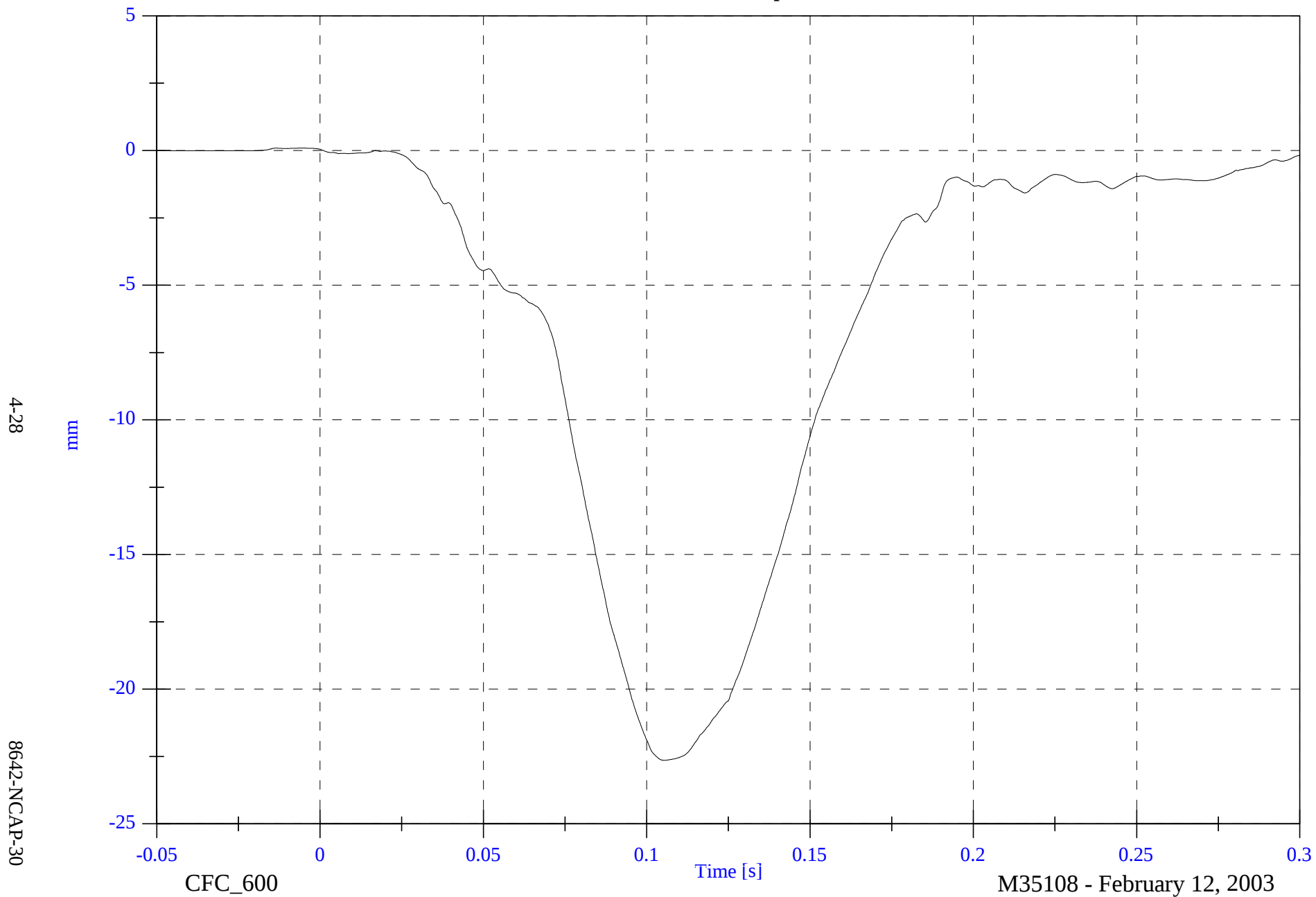


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Chest Compression

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

Min: -22.6 [mm] at 0.106 [s]

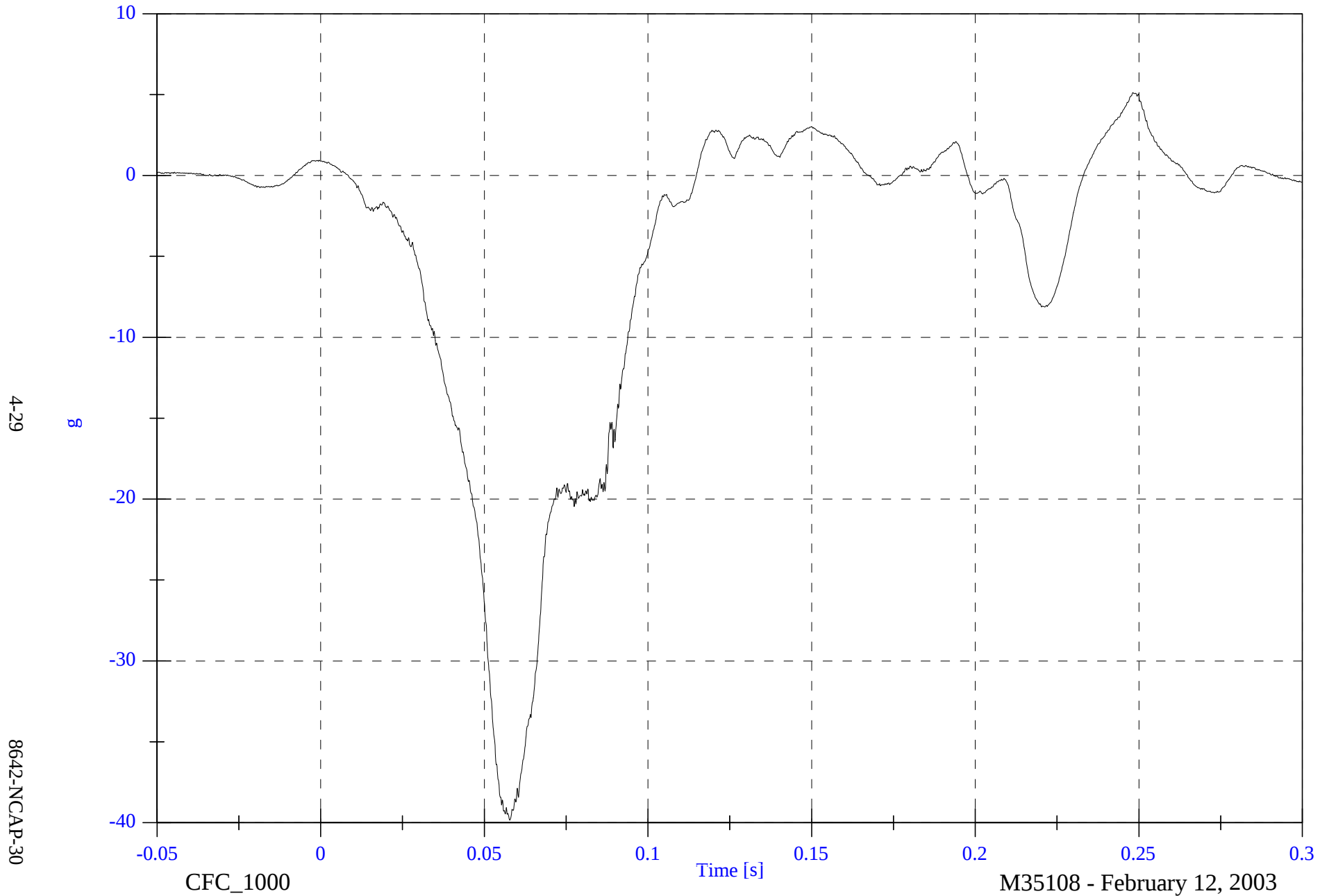


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Pelvic x

Max: 5.1 [g] at 0.248 [s]

Min: -39.8 [g] at 0.058 [s]

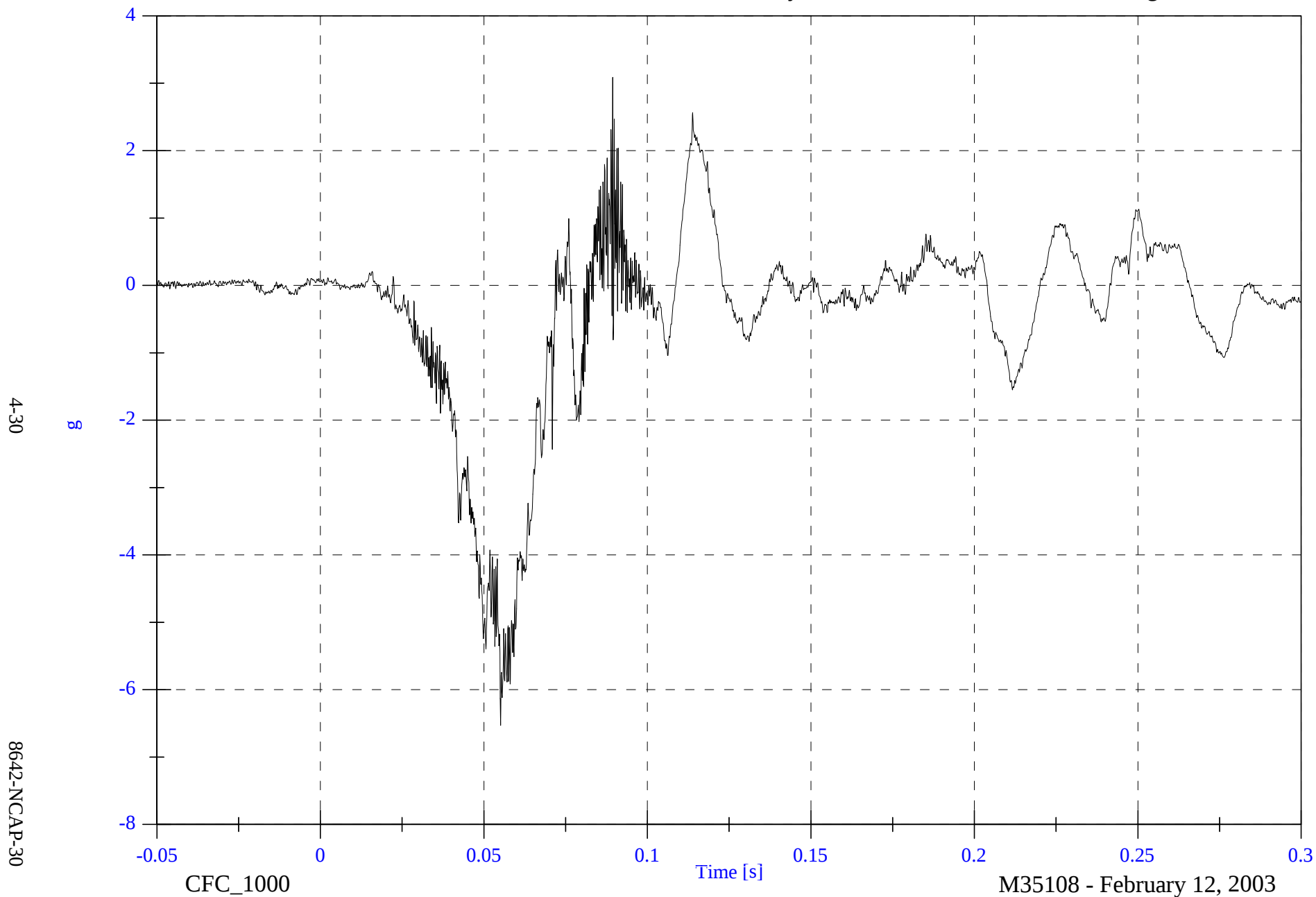


NCAP Test #8 - 2003 Toyota Avalon

Max: 3.1 [g] at 0.089 [s]

Min: -6.5 [g] at 0.055 [s]

V1P3 Pelvic y

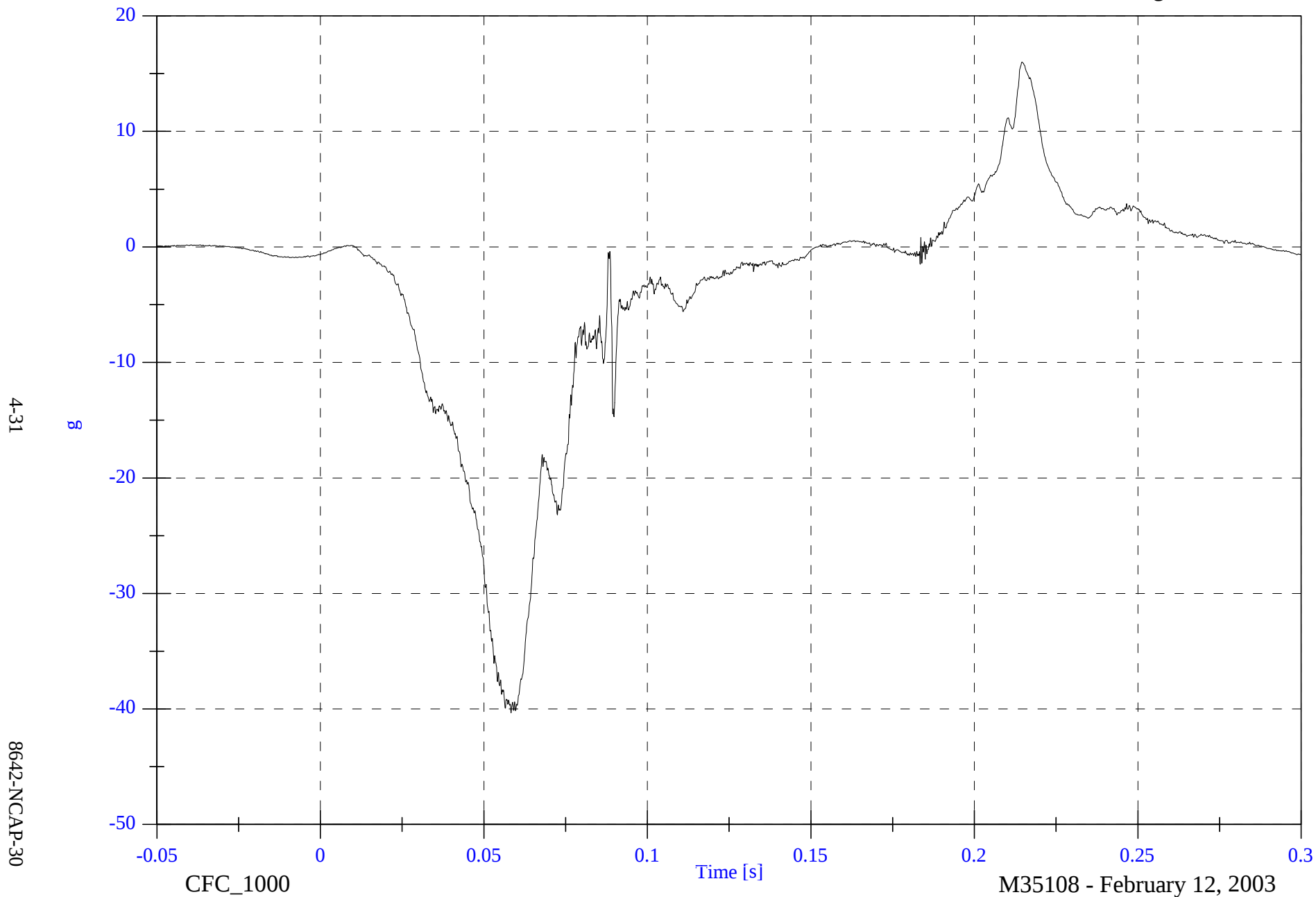


NCAP Test #8 - 2003 Toyota Avalon

V1P3 Pelvic z

Max: 16.0 [g] at 0.215 [s]

Min: -40.3 [g] at 0.058 [s]



NCAP Test #8 - 2003 Toyota Avalon

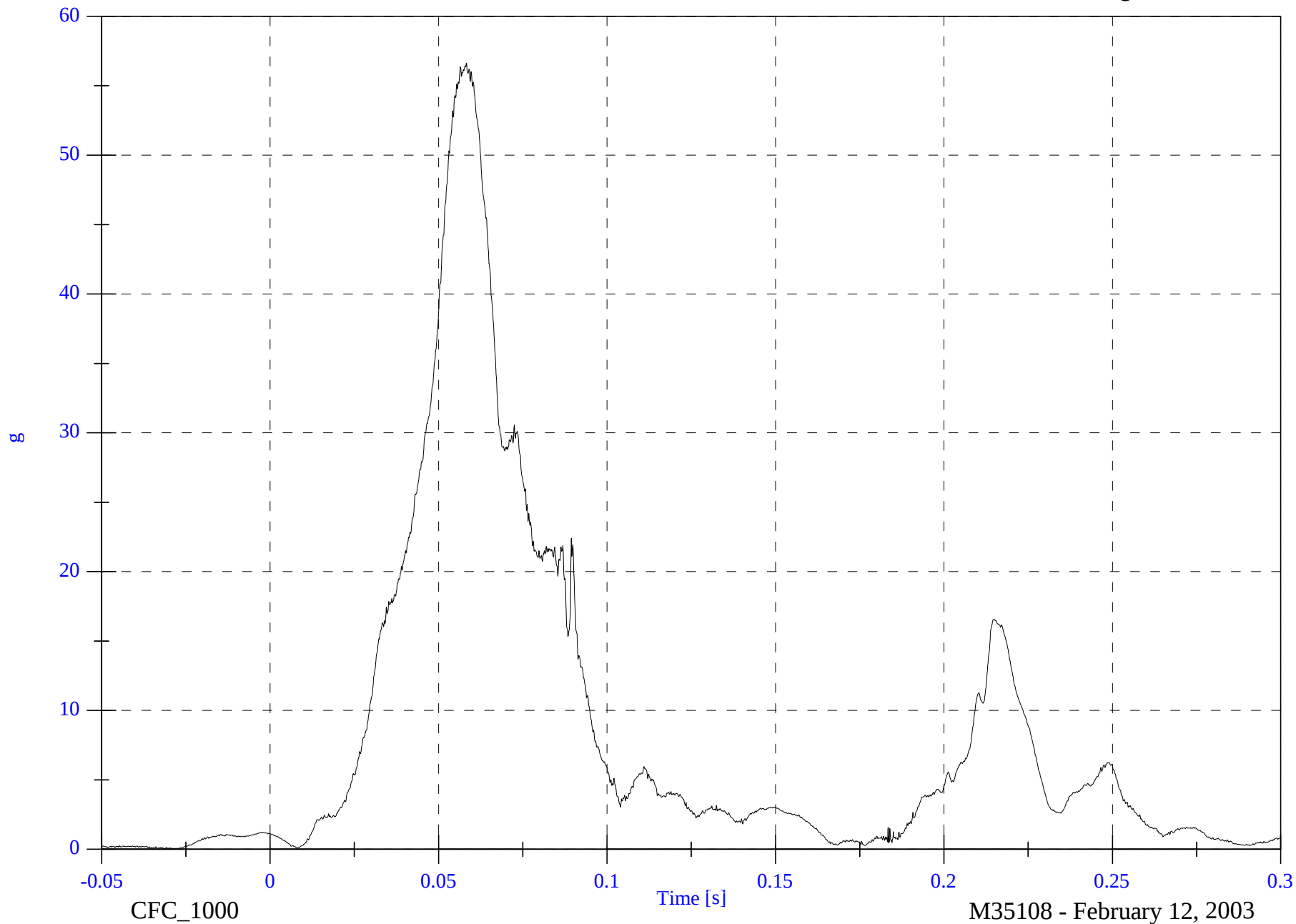
V1P3 Pelvic Resultant

Max: 56.7 [g] at 0.058 [s]

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

4-32

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

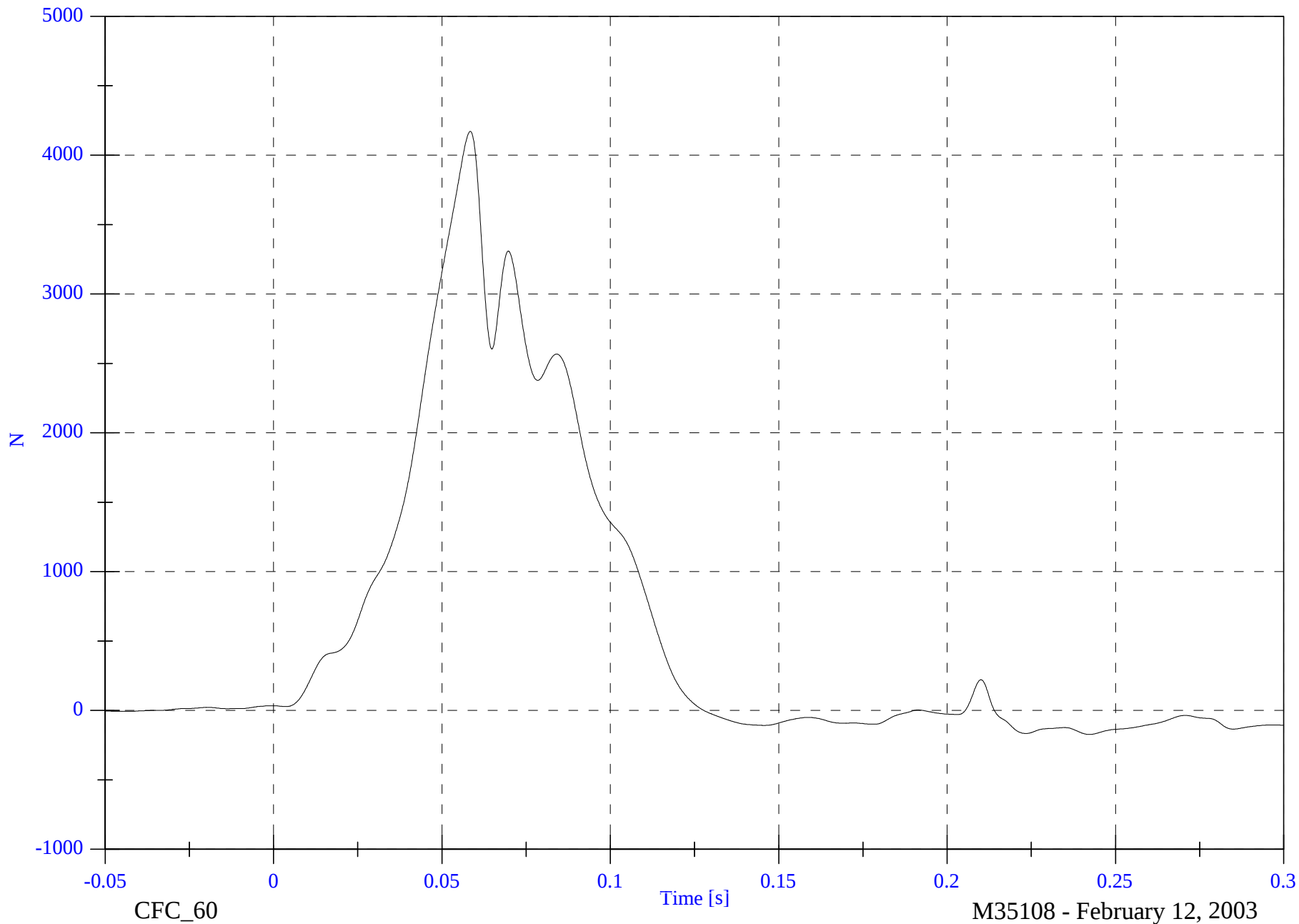
V1P3 Tether Belt

Max: 4171.5 [N] at 0.058 [s]

Min: -173.0 [N] at 0.242 [s]

4-33

8642-NCAP-30

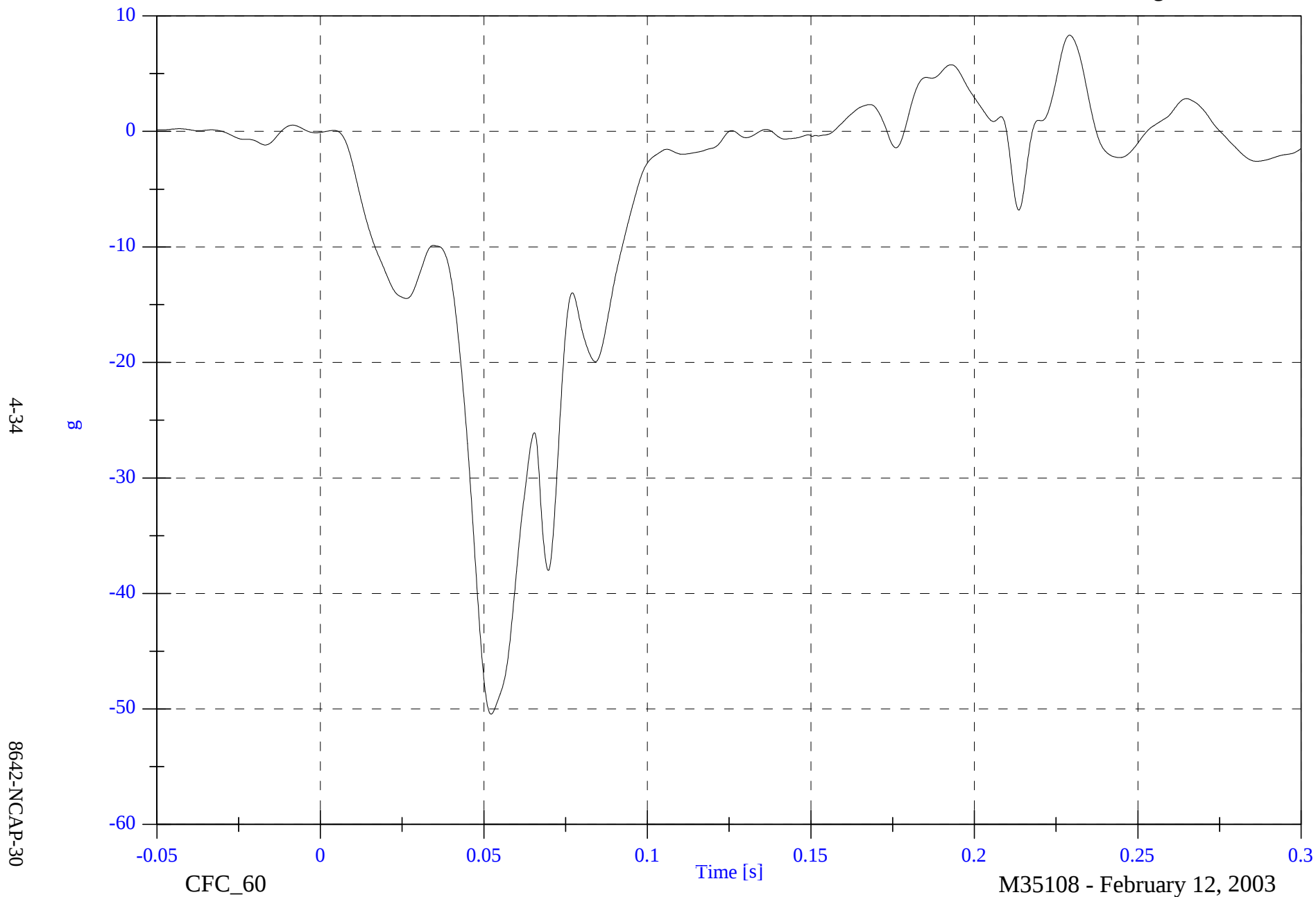


NCAP Test #8 - 2003 Toyota Avalon

V1P3 CRS x

Max: 8.3 [g] at 0.229 [s]

Min: -50.4 [g] at 0.052 [s]



NCAP Test #8 - 2003 Toyota Avalon

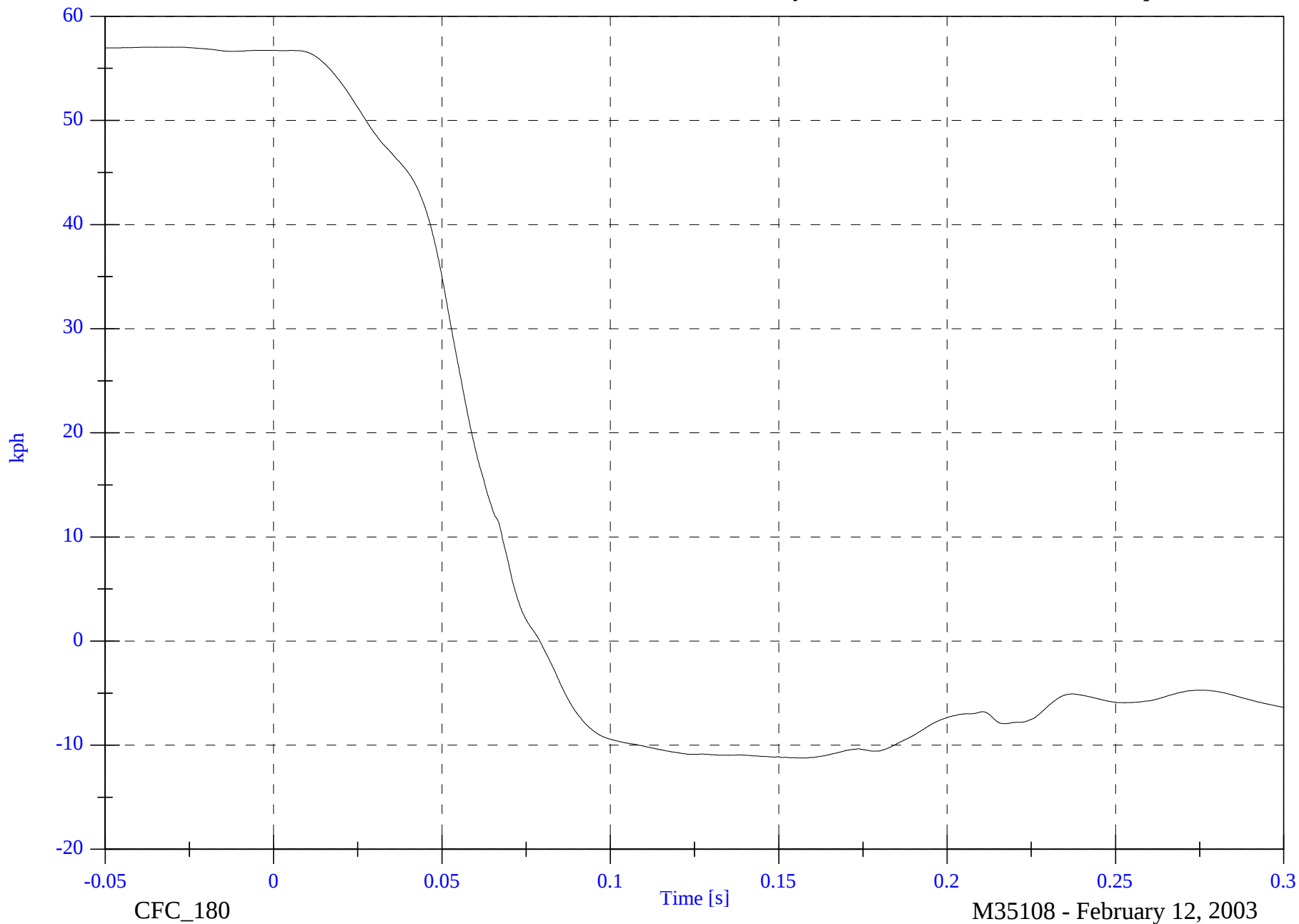
V1P3 CRS x Velocity

Max: 57.0 [kph] at -0.030 [s]

Min: -11.2 [kph] at 0.158 [s]

4-35

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

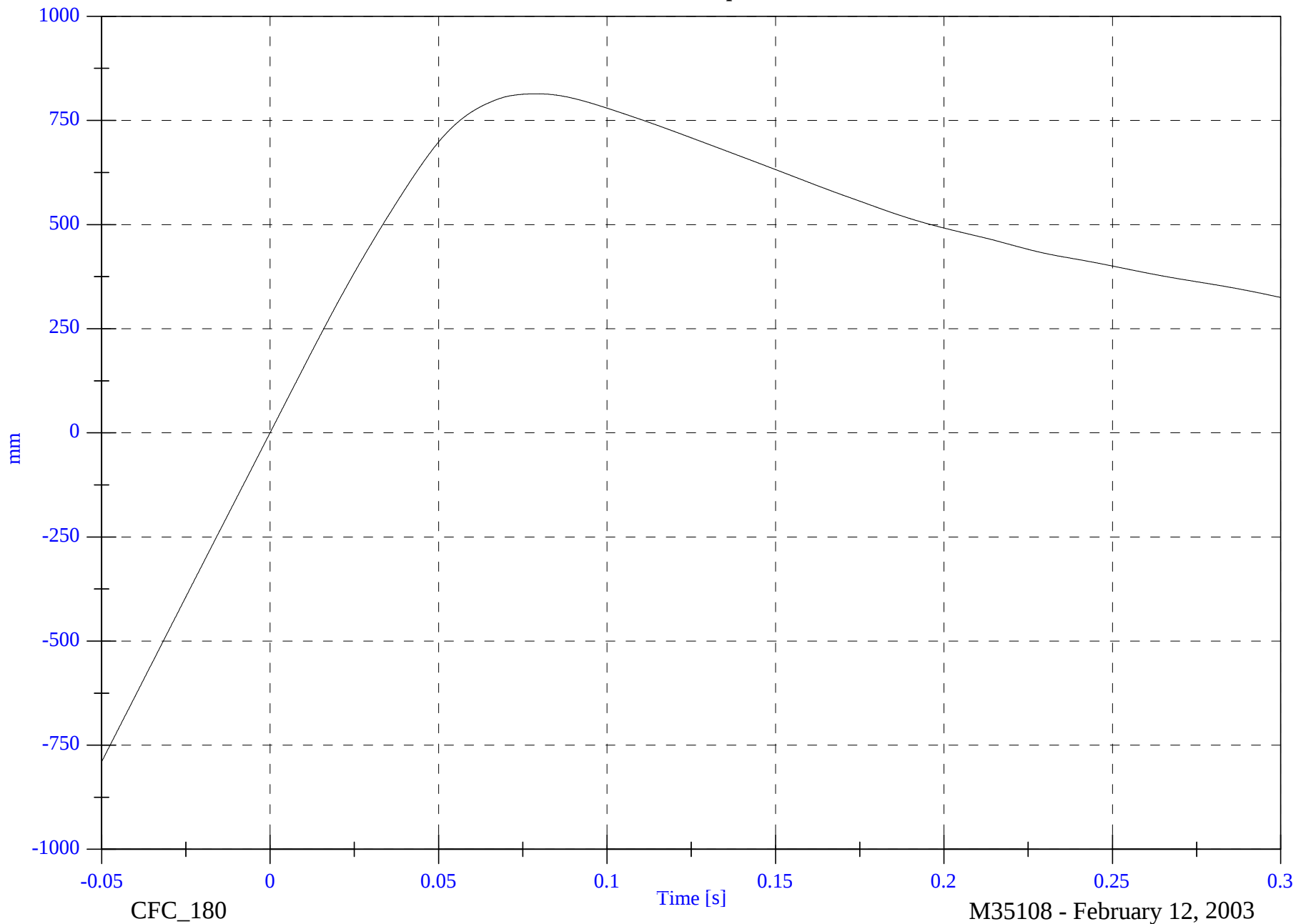
V1P3 CRS x Displacement

Max: 814.0 [mm] at 0.079 [s]

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

4-36

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

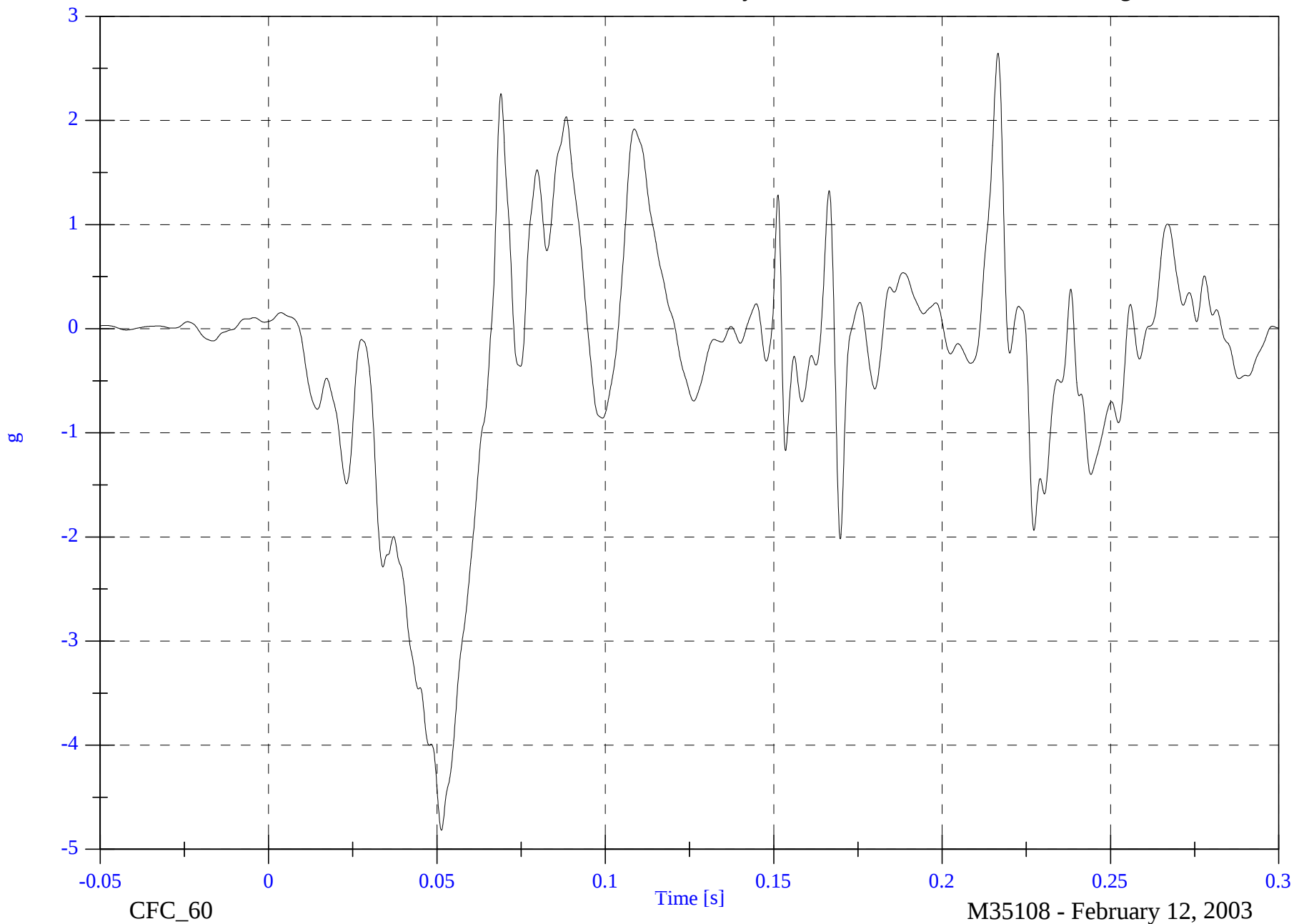
Max: 2.6 [g] at 0.217 [s]

Min: -4.8 [g] at 0.051 [s]

V1P3 CRS y

4-37

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

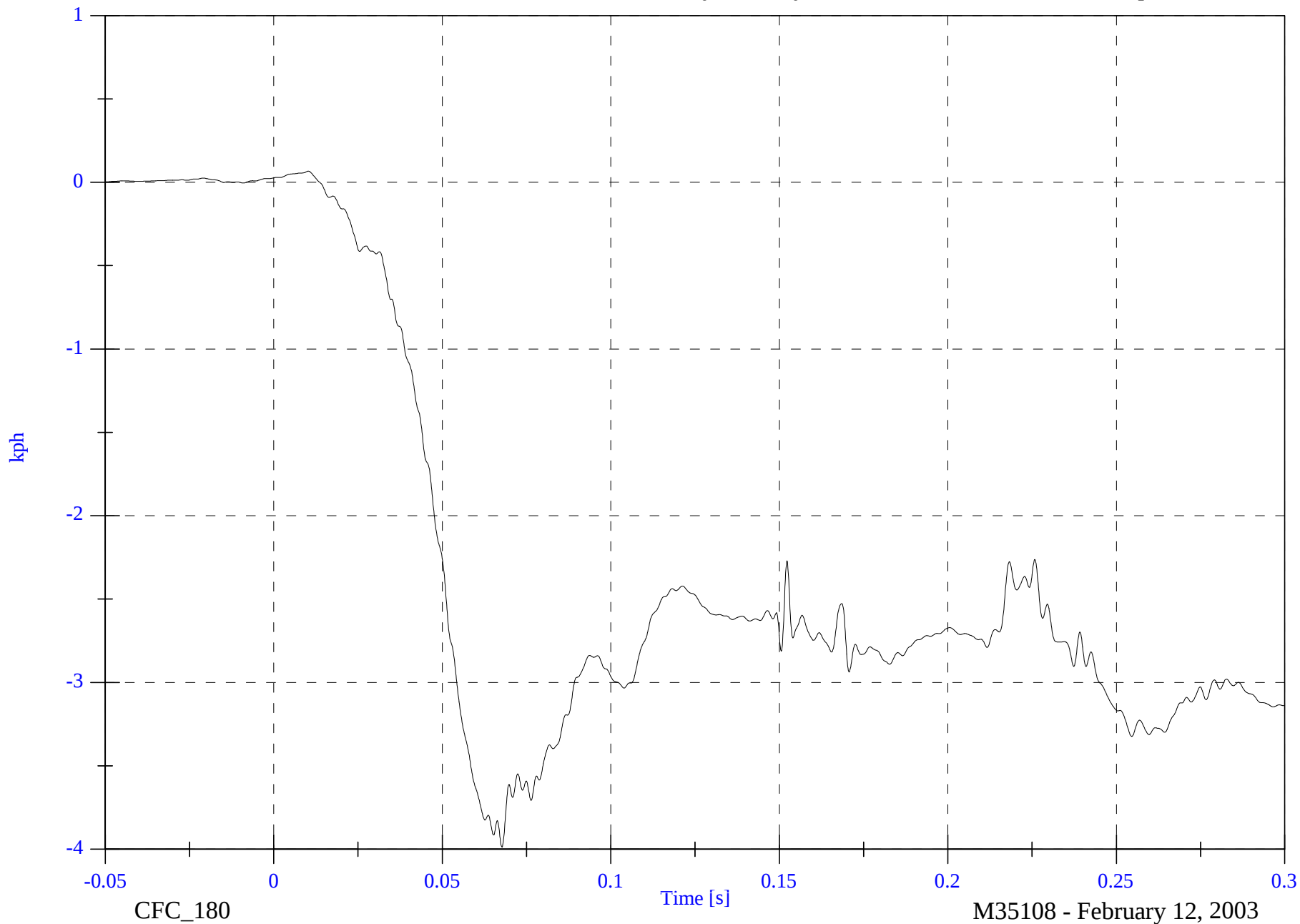
V1P3 CRS y Velocity

Max: 0.1 [kph] at 0.010 [s]

Min: -4.0 [kph] at 0.068 [s]

4-38

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

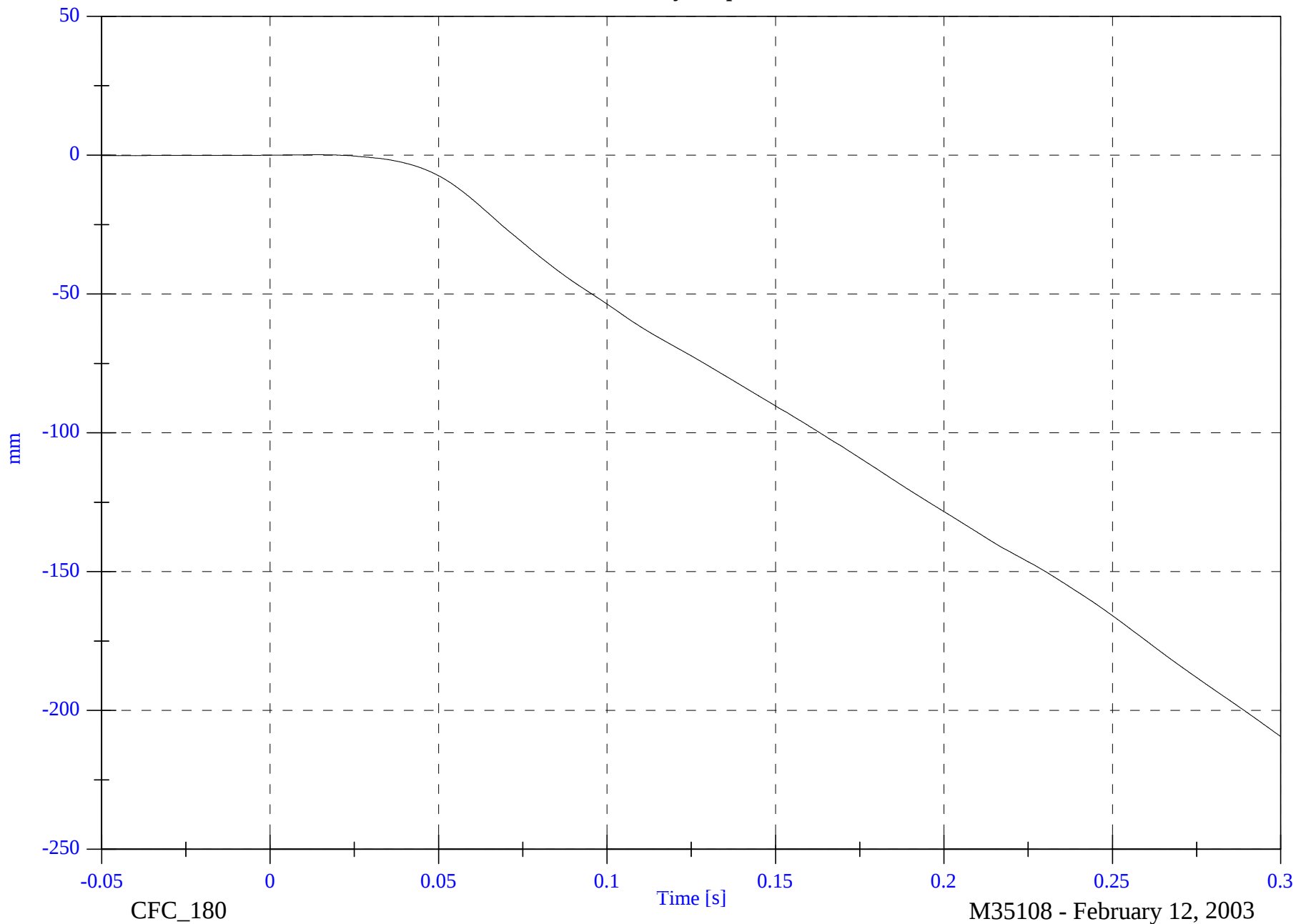
V1P3 CRS y Displacement

Max: 0.2 [mm] at 0.014 [s]

Min: -209.3 [mm] at 0.300 [s]

4-39

8642-NCAP-30

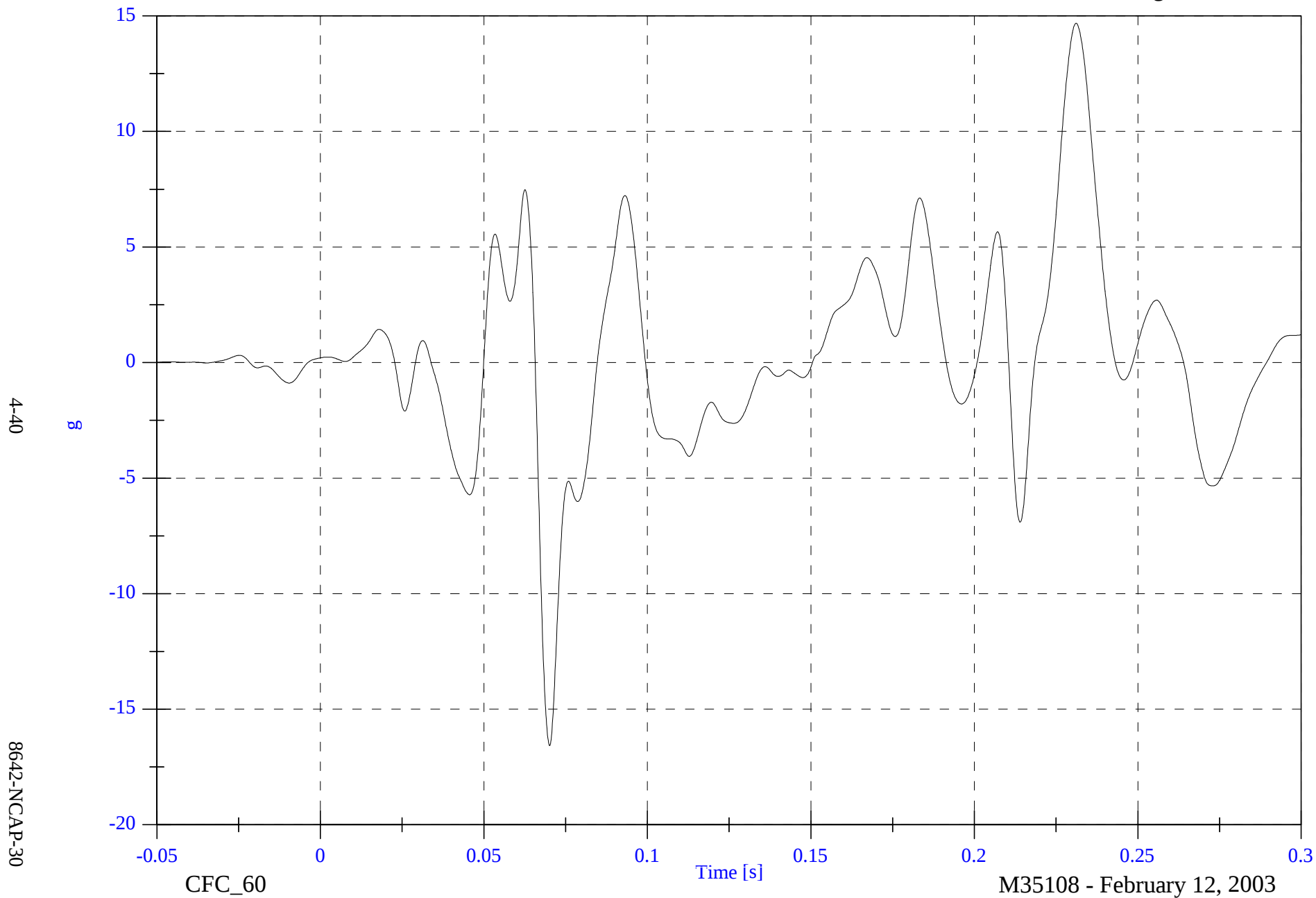


NCAP Test #8 - 2003 Toyota Avalon

V1P3 CRS z

Max: 14.7 [g] at 0.231 [s]

Min: -16.6 [g] at 0.070 [s]

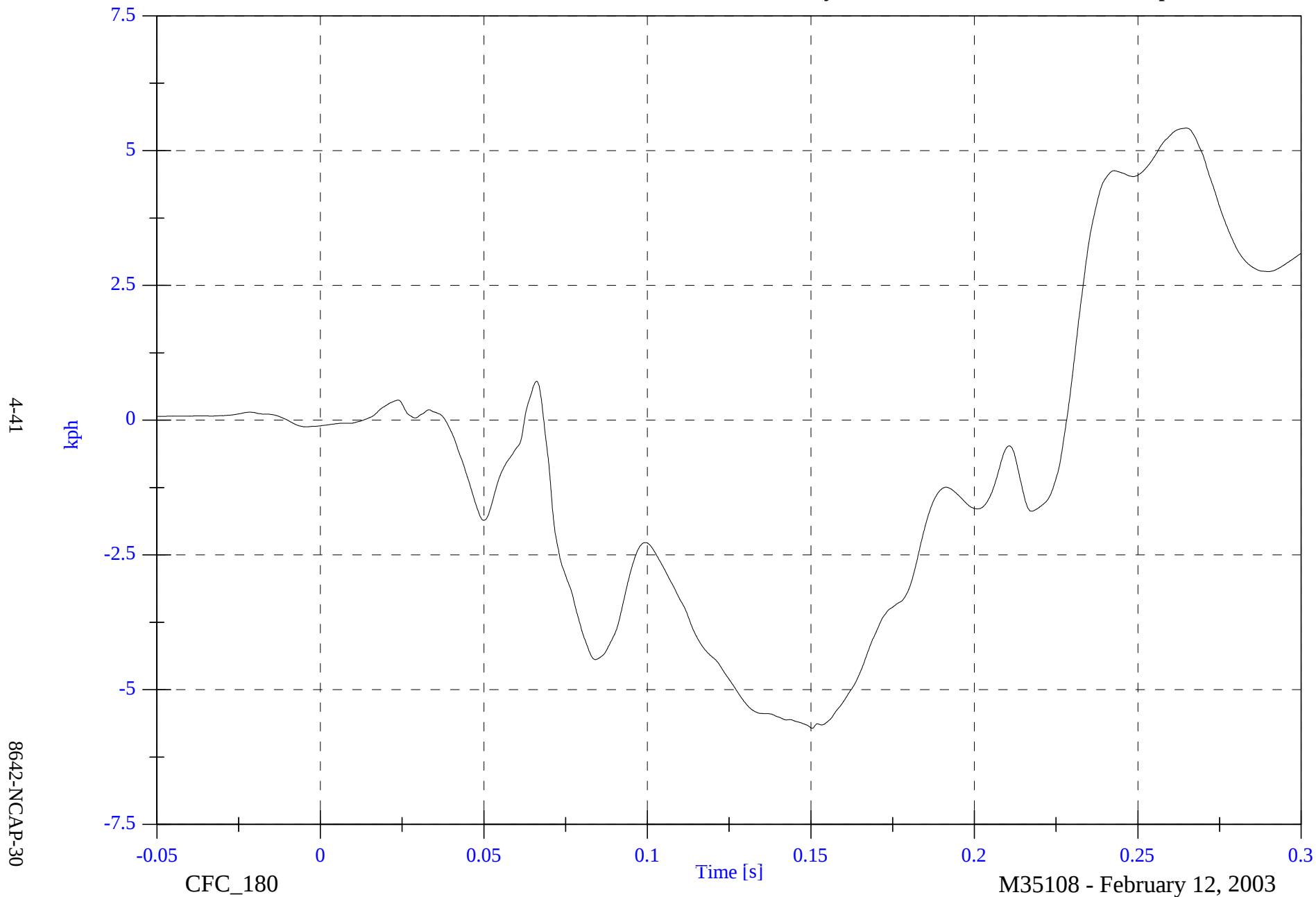


NCAP Test #8 - 2003 Toyota Avalon

V1P3 CRS z Velocity

Max: 5.4 [kph] at 0.265 [s]

Min: -5.7 [kph] at 0.150 [s]

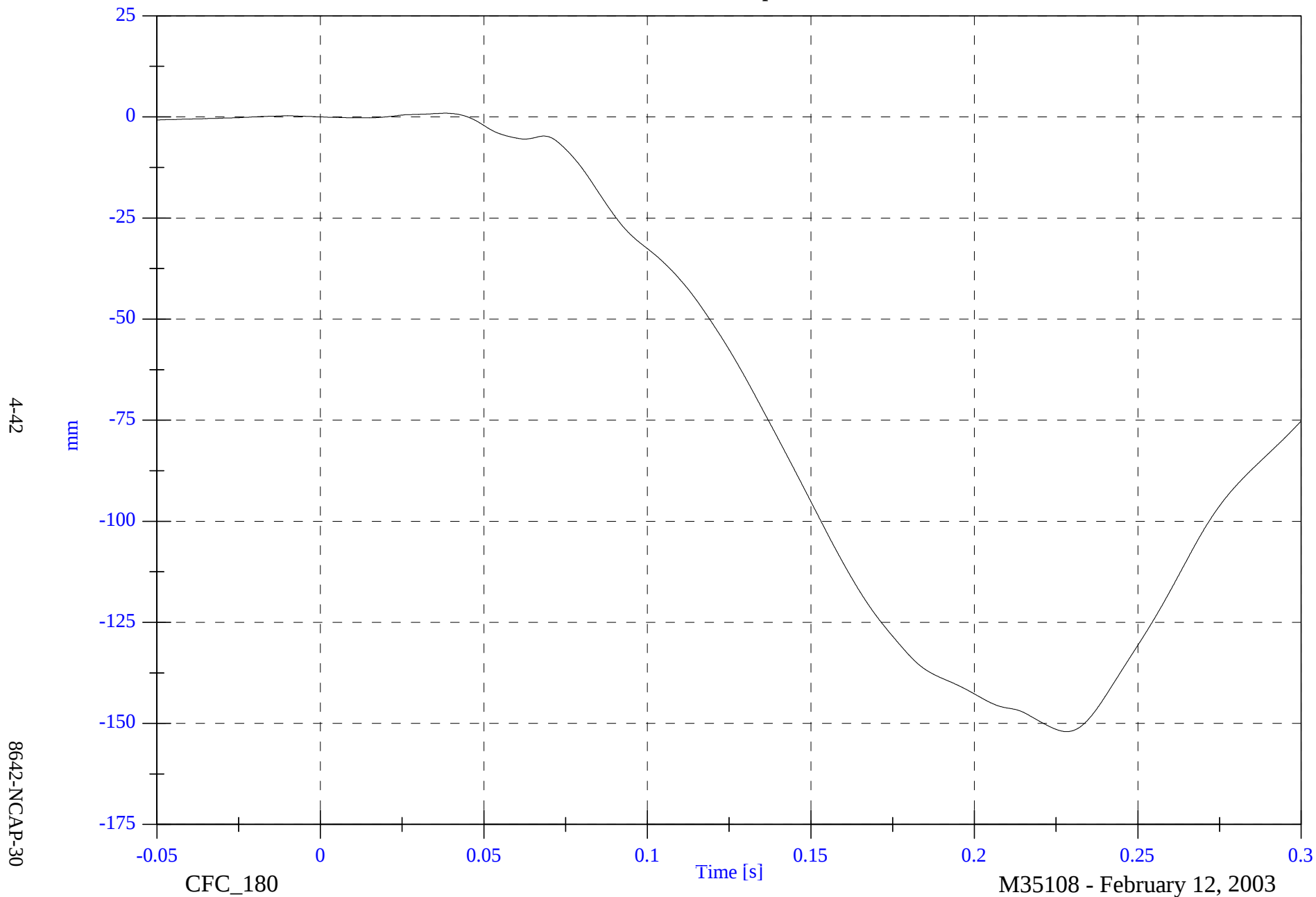


NCAP Test #8 - 2003 Toyota Avalon

V1P3 CRS z Displacement

Max: 0.9 [mm] at 0.038 [s]

Min: -152.0 [mm] at 0.228 [s]



NCAP Test #8 - 2003 Toyota Avalon

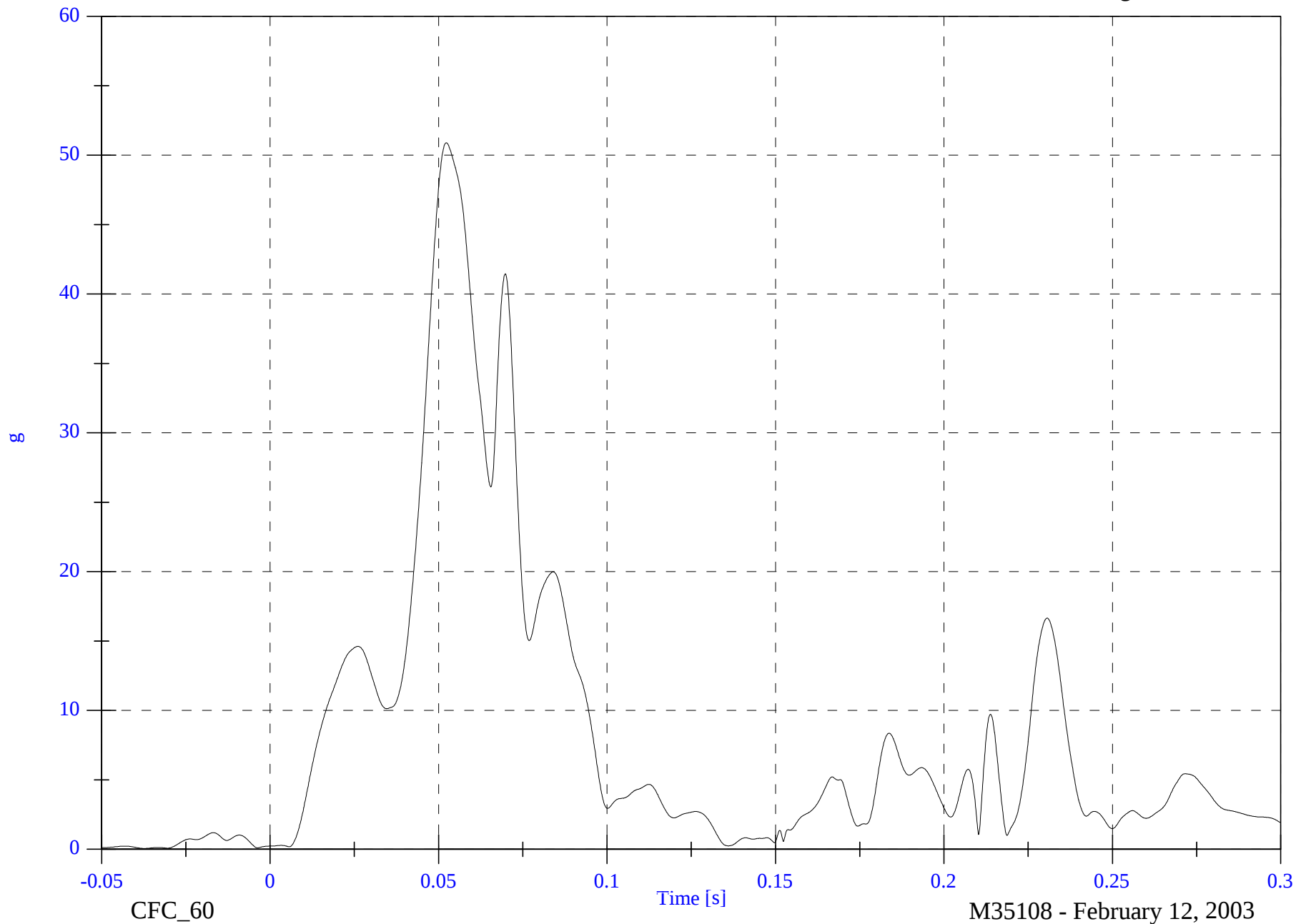
V1P3 CRS Resultant

Max: 50.9 [g] at 0.052 [s]

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

4-43

8642-NCAP-30

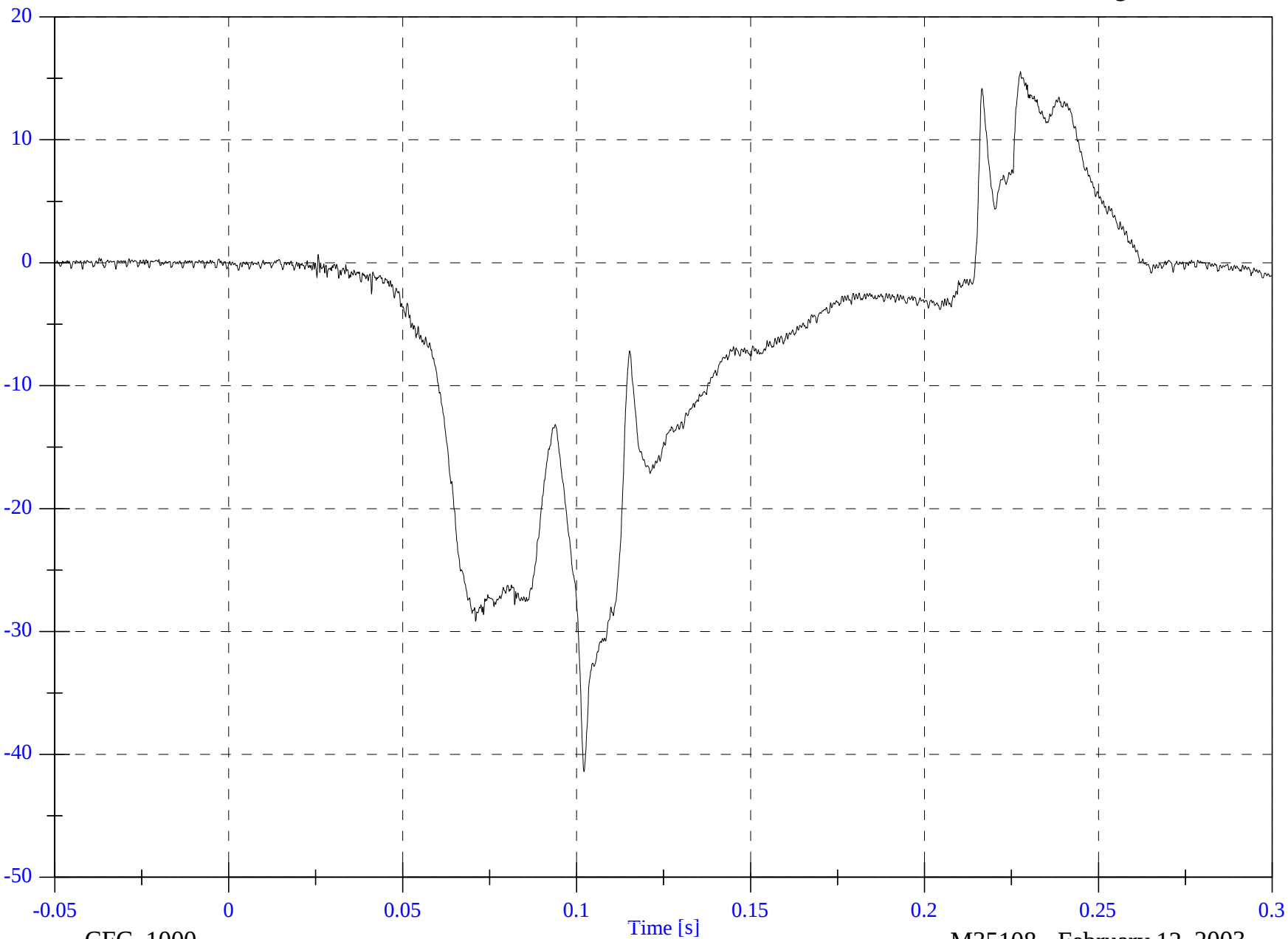


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Head x

Max: 15.6 [g] at 0.228 [s]

Min: -41.4 [g] at 0.102 [s]



4-44

8642-NCAP-30

CFC_1000

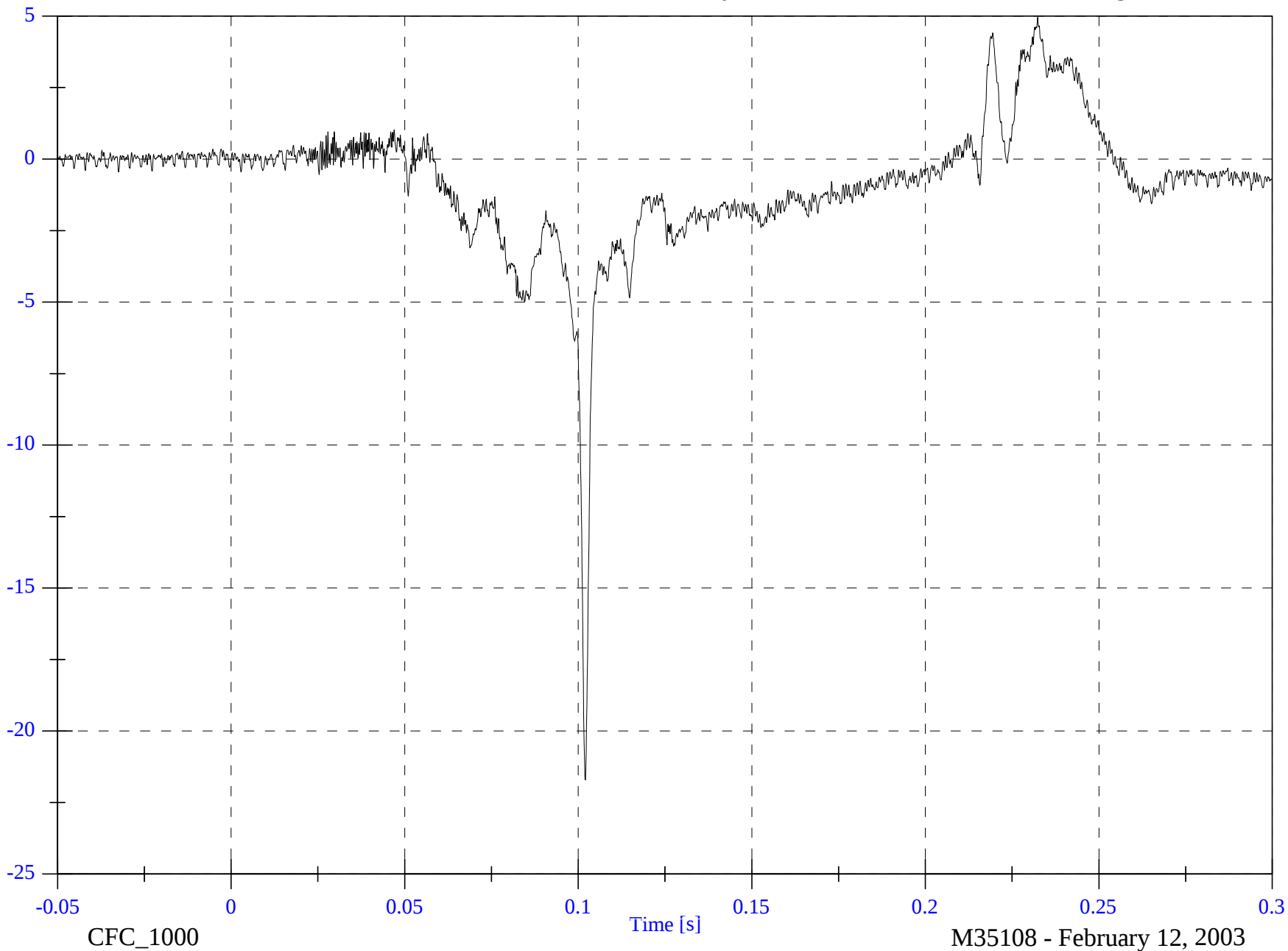
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1P4 Head y

Max: 5.0 [g] at 0.232 [s]

Min: -21.7 [g] at 0.102 [s]



4-45

8642-NCAP-30

NCAP Test #8 - 2003 Toyota Avalon

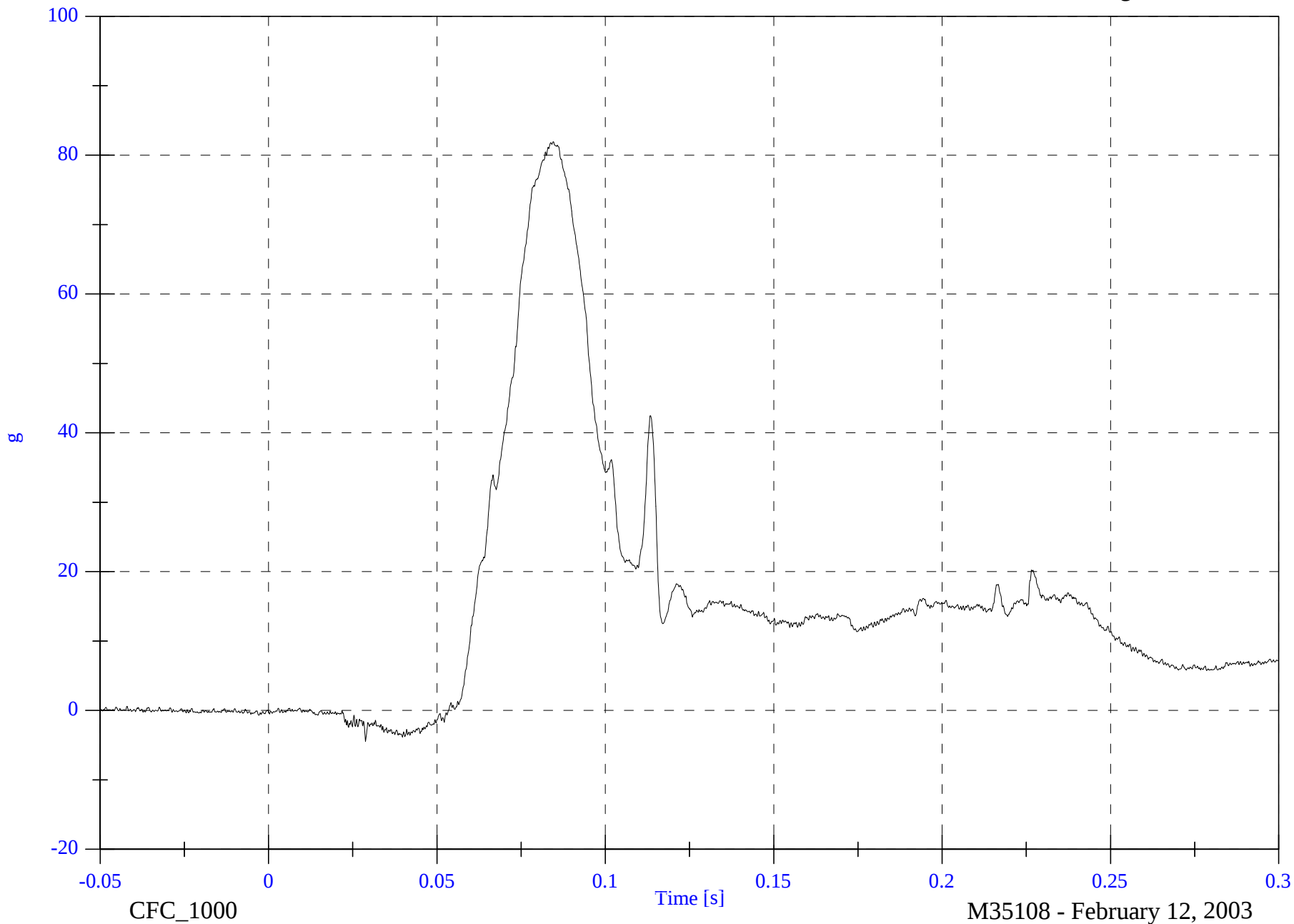
V1P4 Head z

Max: 82.0 [g] at 0.085 [s]

Min: -4.5 [g] at 0.029 [s]

4-46

8642-NCAP-30

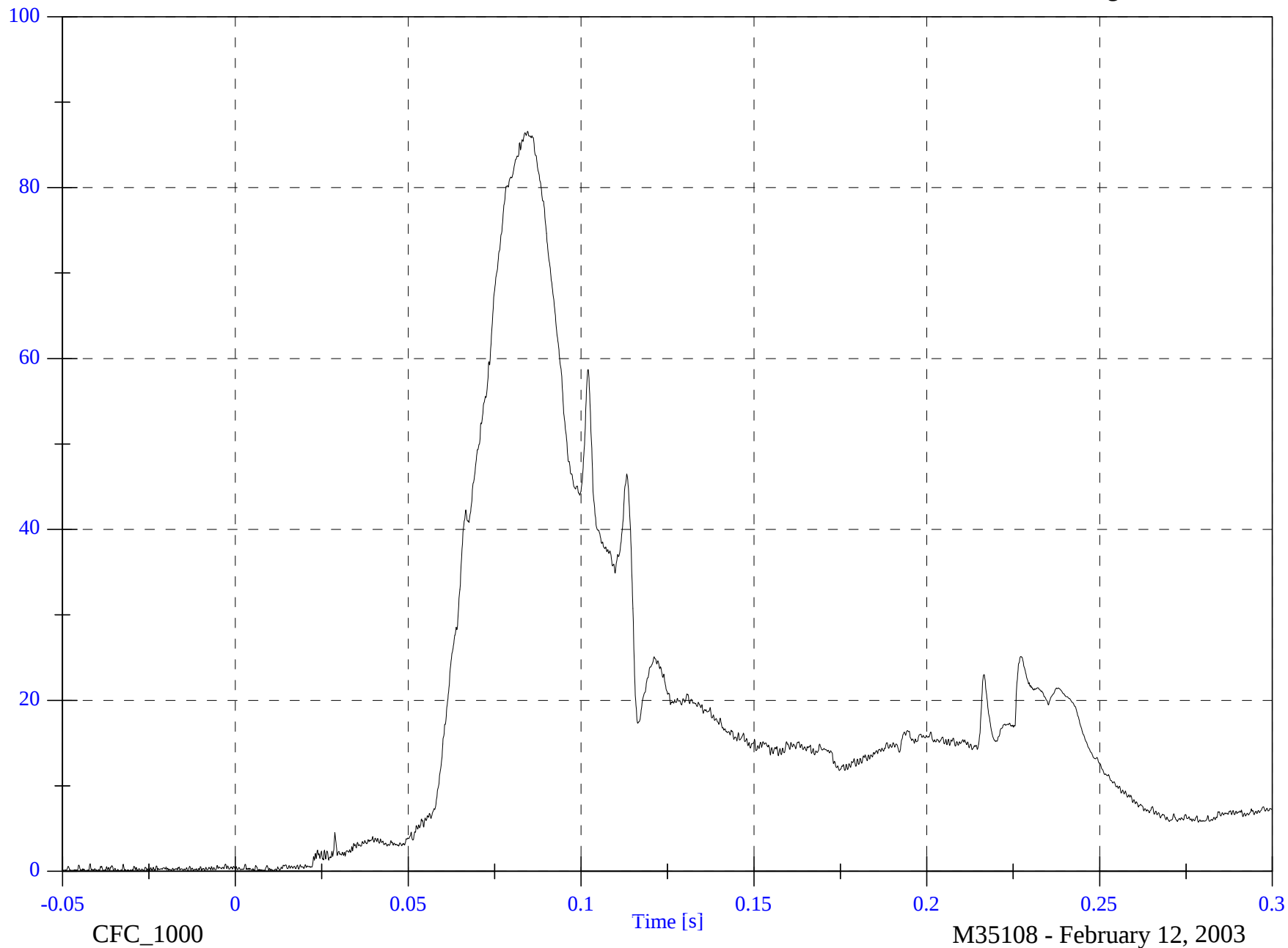


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Head Resultant

Max: 86.6 [g] at 0.085 [s]

Min: 0.0 [g] at -0.011 [s]



4-47

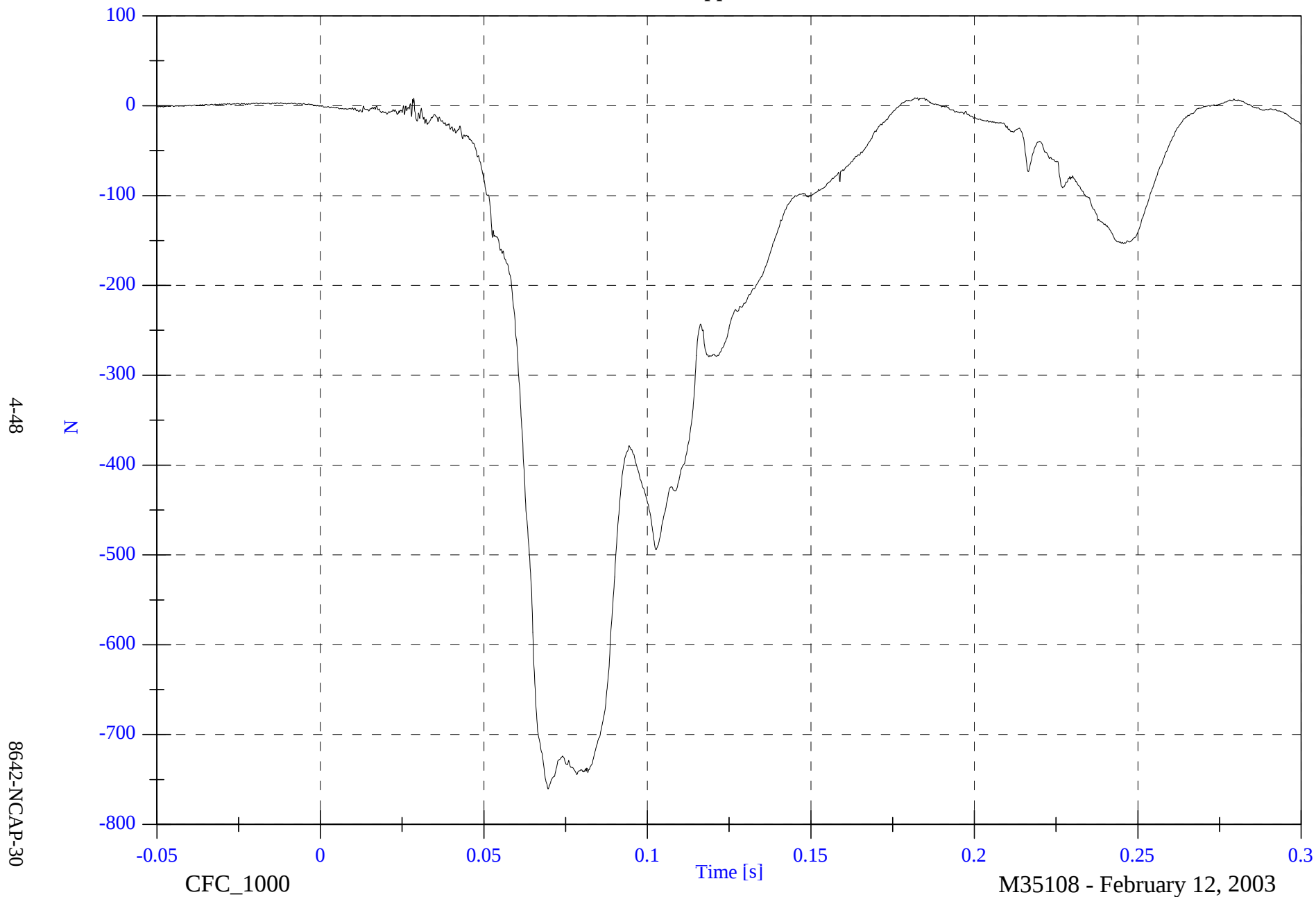
8642-NCAP-30

NCAP Test #8 - 2003 Toyota Avalon

V1P4 Upper Neck Fx

Max: 8.9 [N] at 0.183 [s]

Min: -760.5 [N] at 0.070 [s]

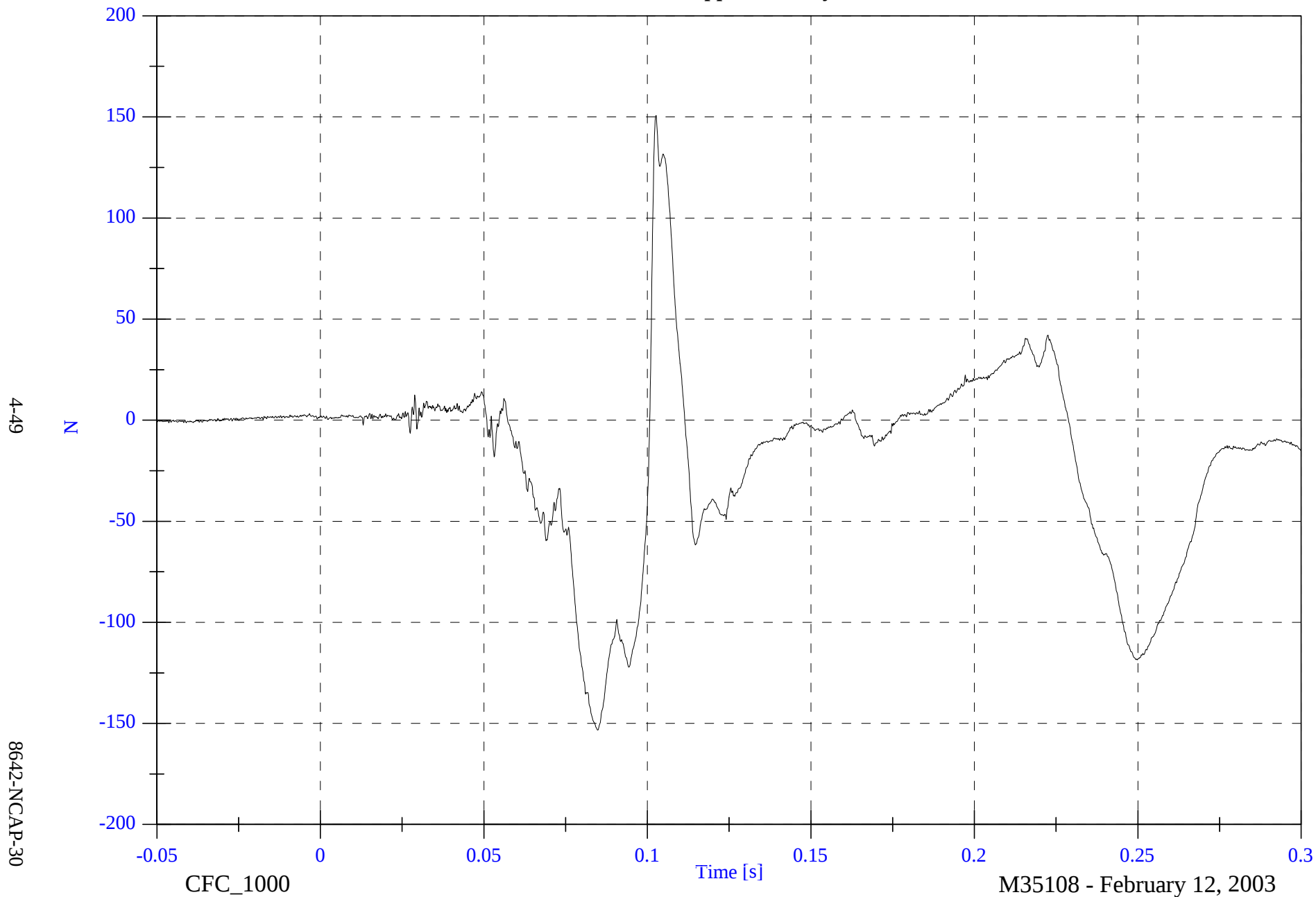


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Upper Neck Fy

Max: 150.6 [N] at 0.103 [s]

Min: -153.3 [N] at 0.085 [s]

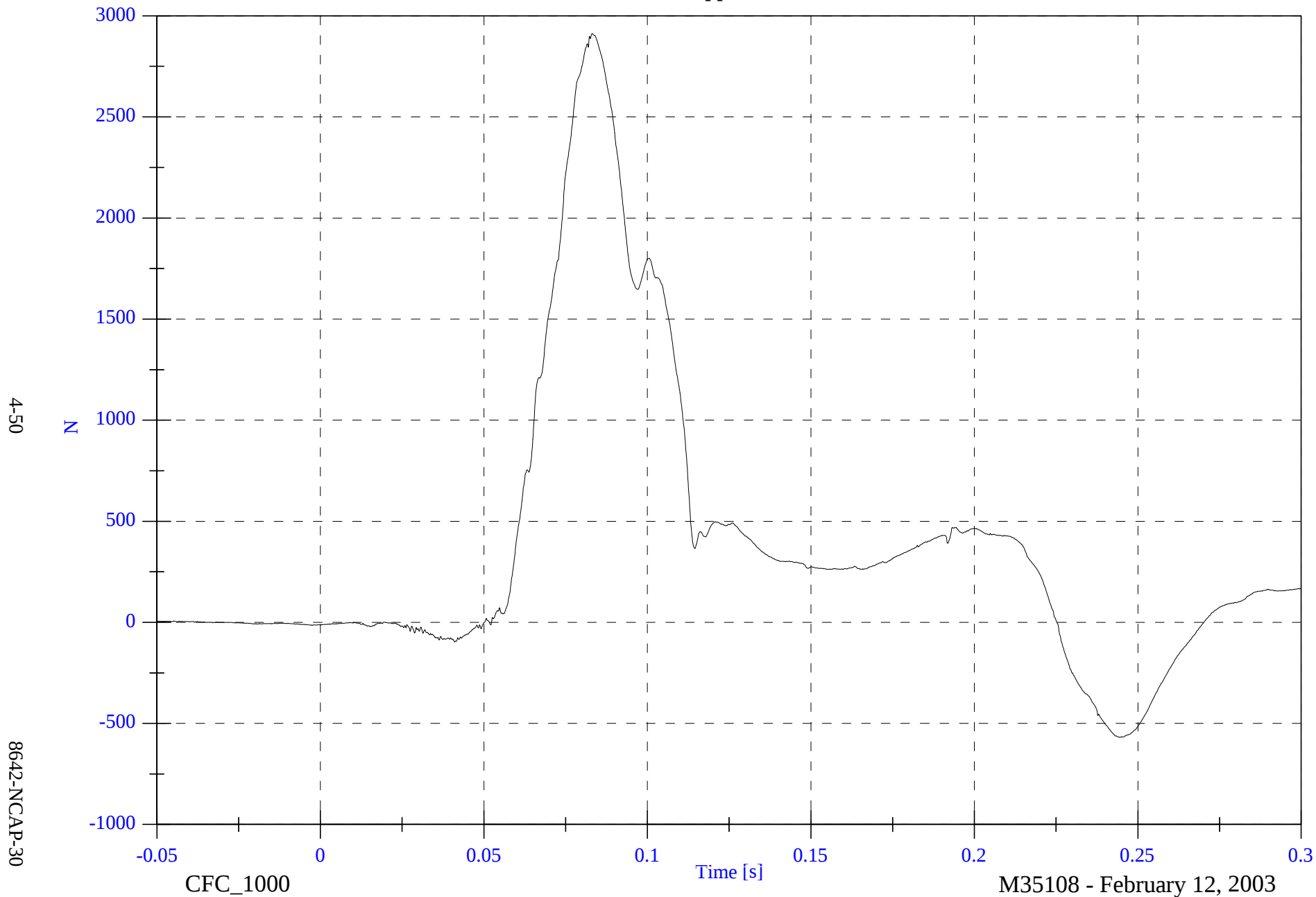


NCAP Test #8 - 2003 Toyota Avalon

Max: 2911.7 [N] at 0.083 [s]

Min: -568.9 [N] at 0.245 [s]

V1P4 Upper Neck Fz



4-50

8642-NCAP-30

CFC_1000

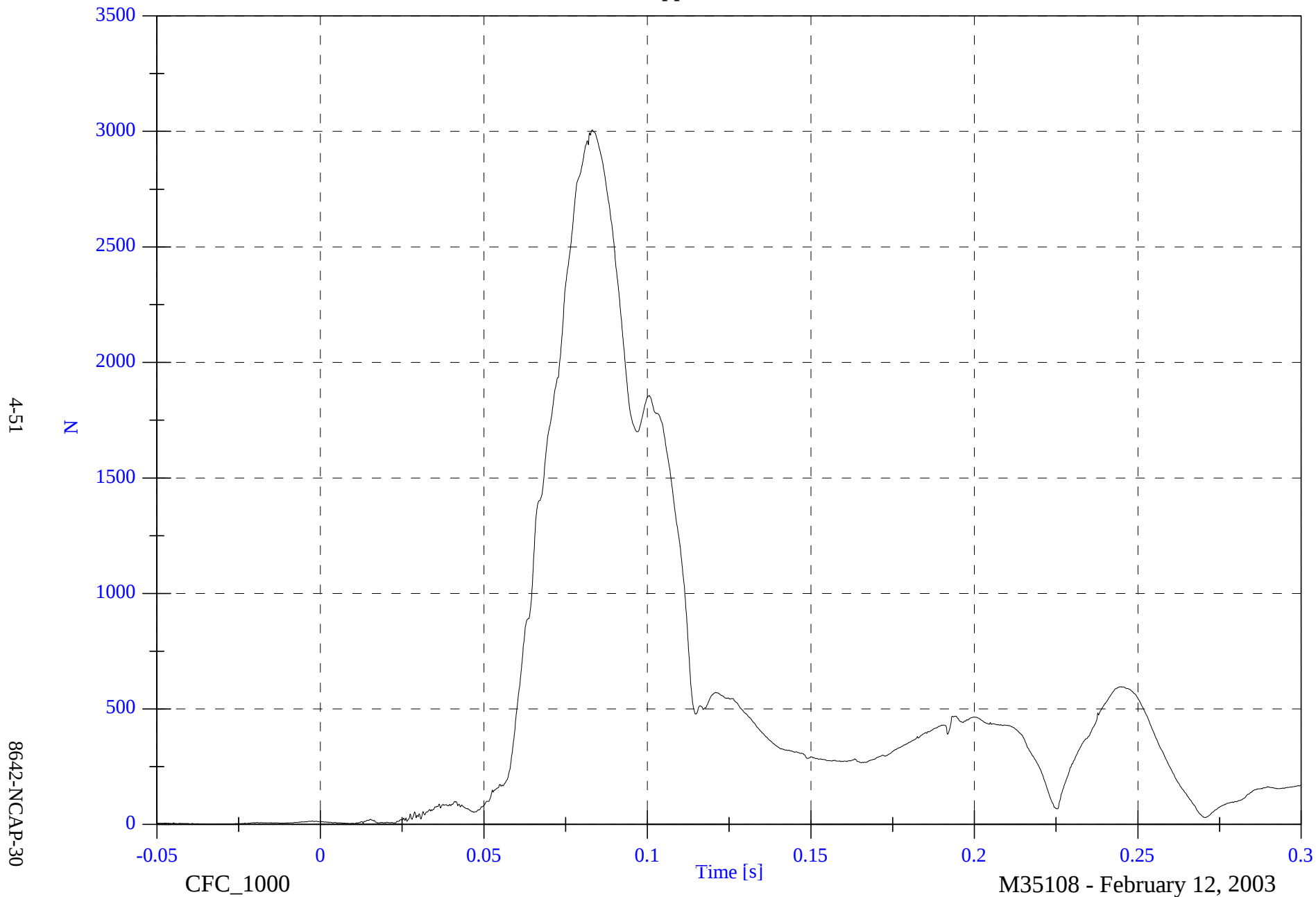
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1P4 Upper Neck F Resultant

Max: 3005.9 [N] at 0.083 [s]

Min: 0.6 [N] at -0.036 [s]

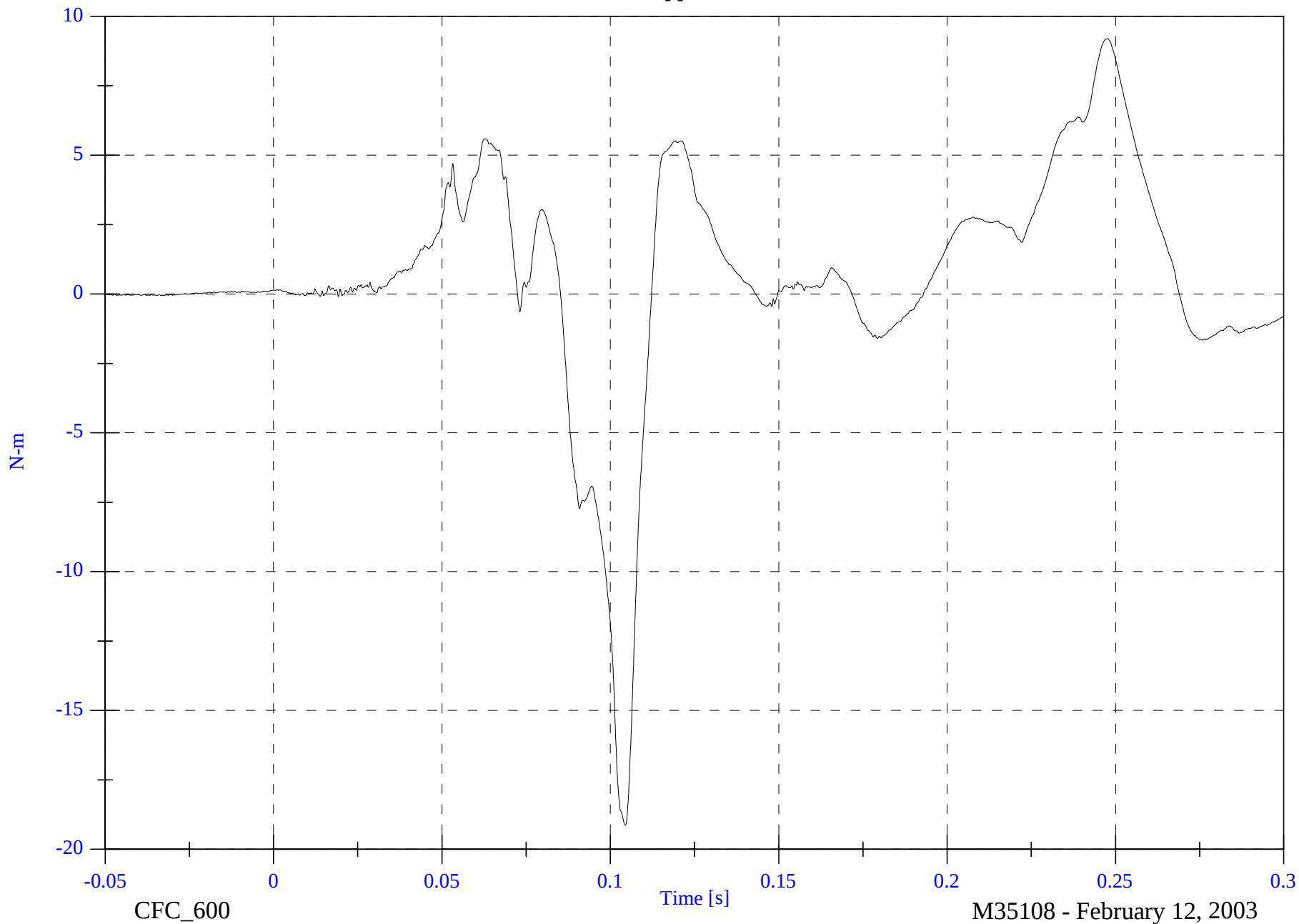


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Upper Neck Mx

Max: 9.2 [N-m] at 0.248 [s]

Min: -19.1 [N-m] at 0.105 [s]

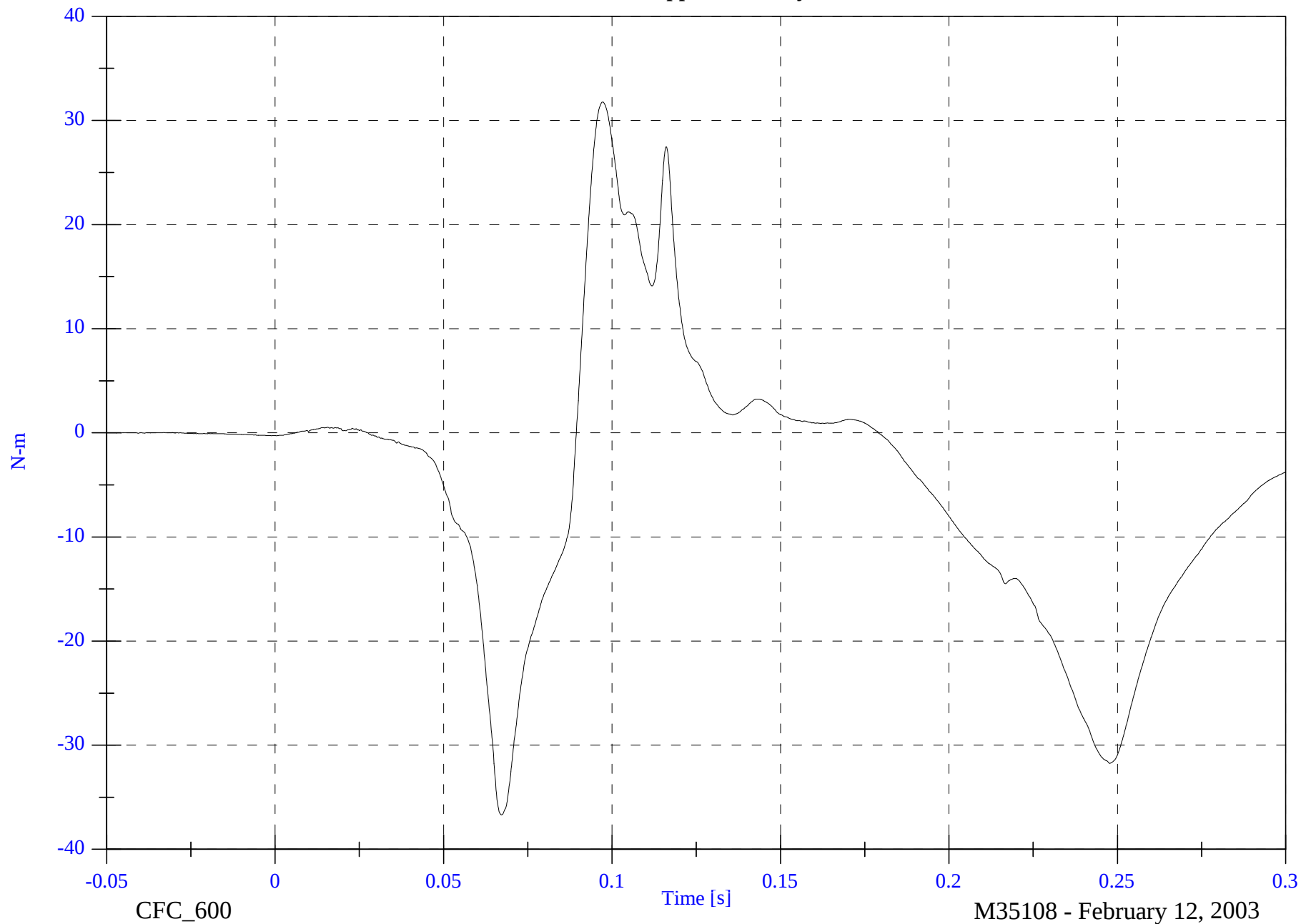


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Upper Neck My

Max: 31.8 [N-m] at 0.097 [s]

Min: -36.7 [N-m] at 0.067 [s]



4-53

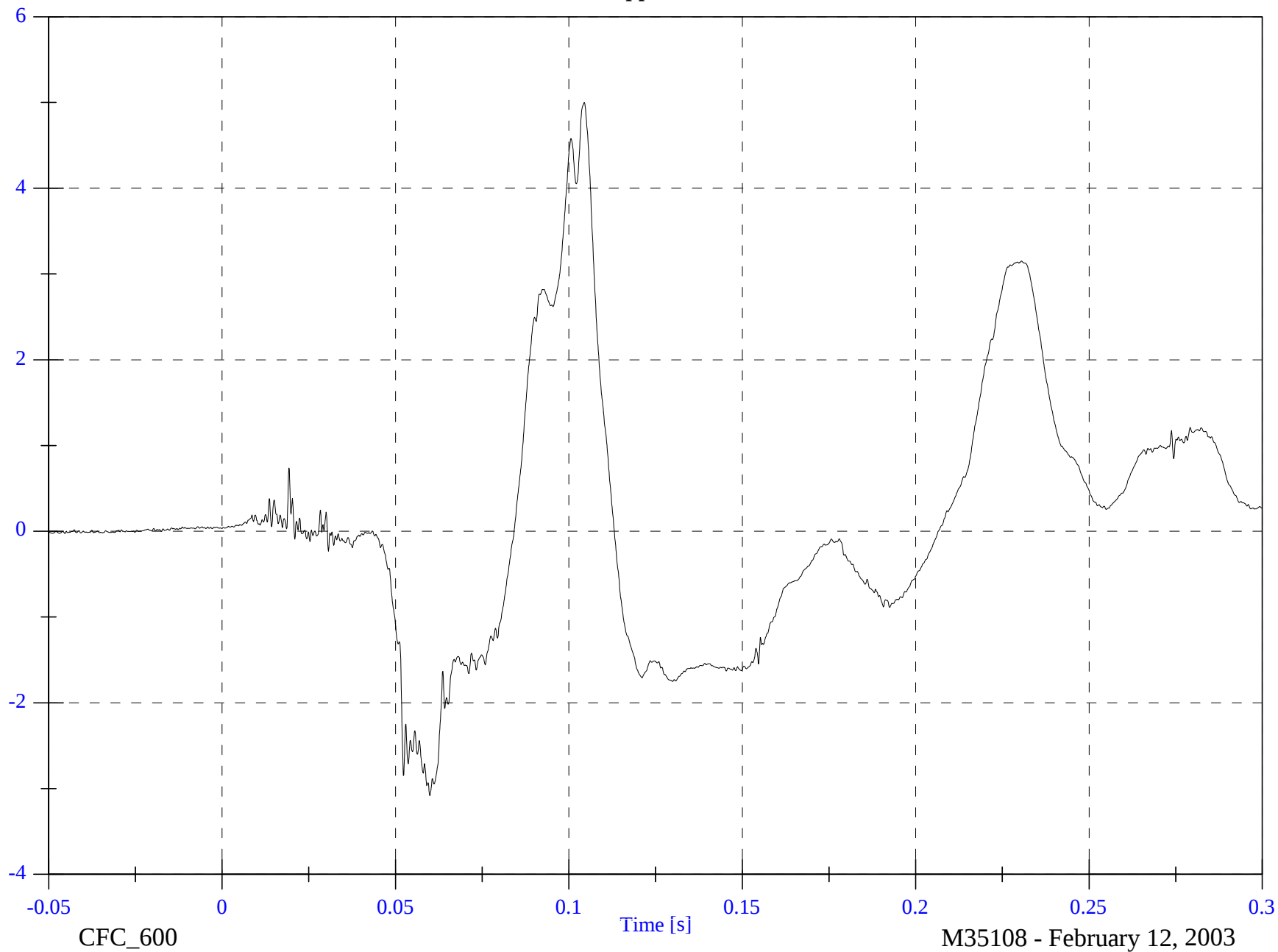
8642-NCAP-30

NCAP Test #8 - 2003 Toyota Avalon

V1P4 Upper Neck Mz

Max: 5.0 [N-m] at 0.105 [s]

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



4-54

8642-NCAP-30

NCAP Test #8 - 2003 Toyota Avalon

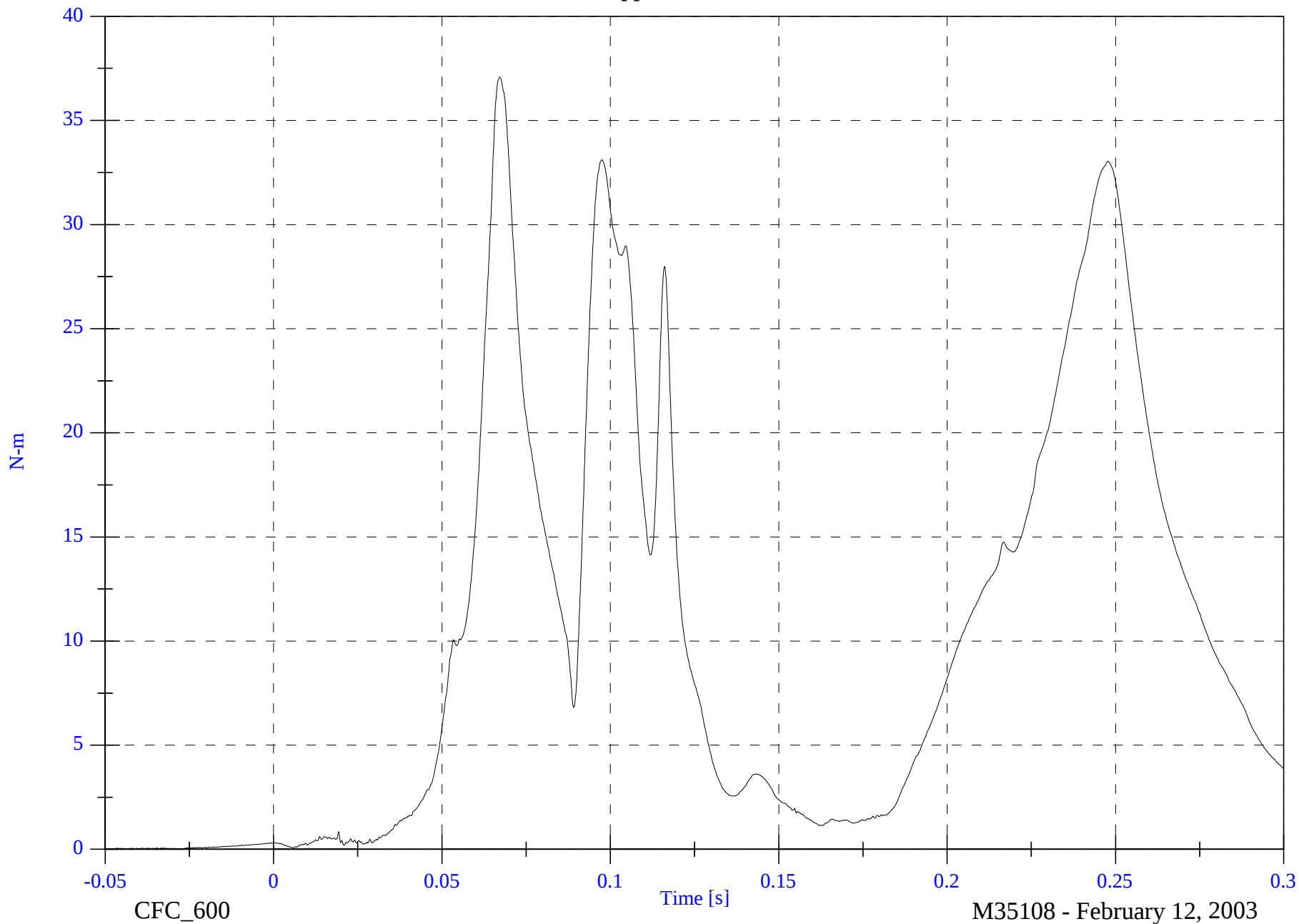
V1P4 Upper Neck M Resultant

Max: 37.1 [N-m] at 0.067 [s]

Min: 0.0 [N-m] at -0.028 [s]

4-55

8642-NCAP-30



CFC_600

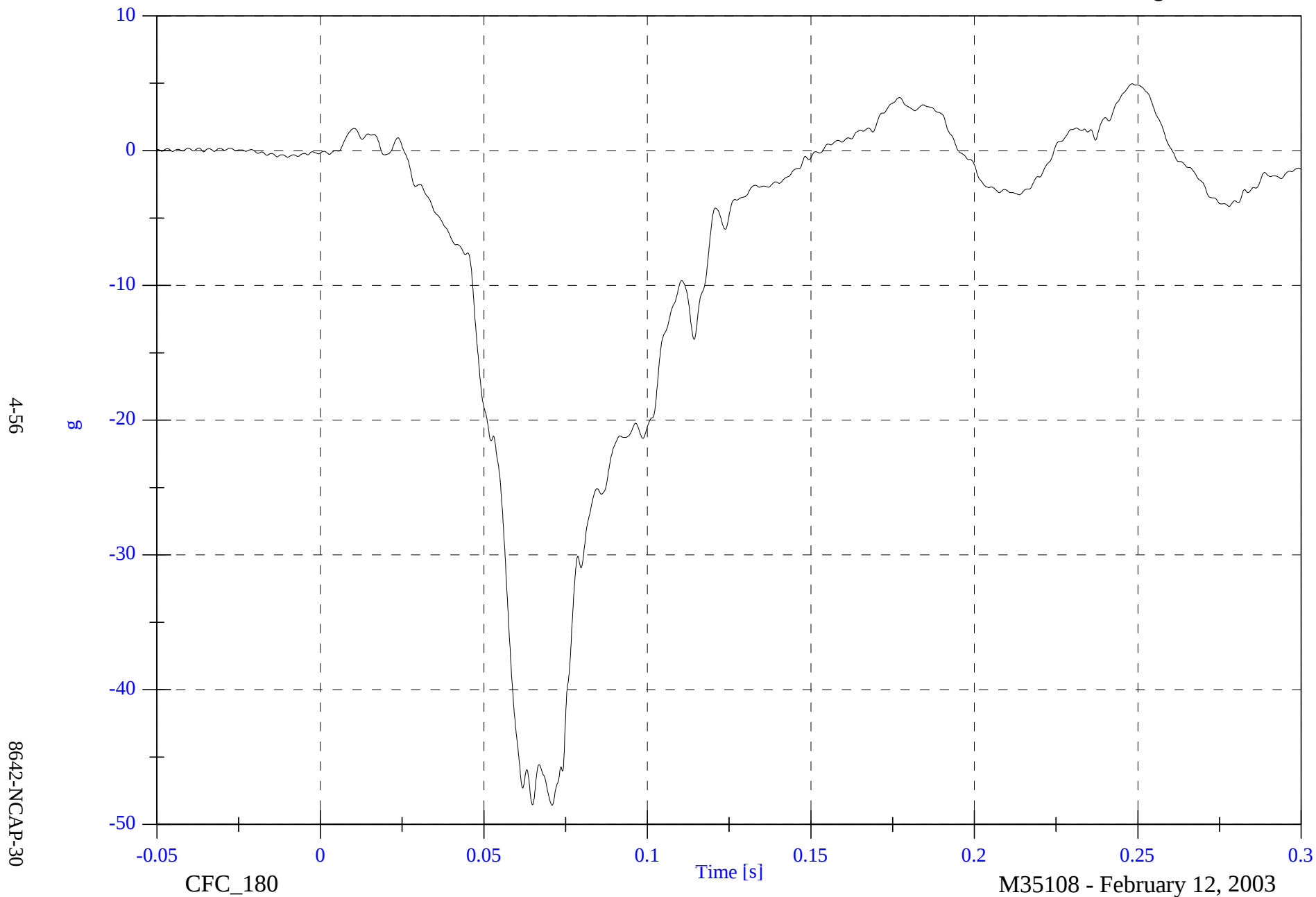
M35108 - February 12, 2003

NCAP Test #8 - 2003 Toyota Avalon

V1P4 Chest x

Max: 5.0 [g] at 0.248 [s]

Min: -48.6 [g] at 0.071 [s]

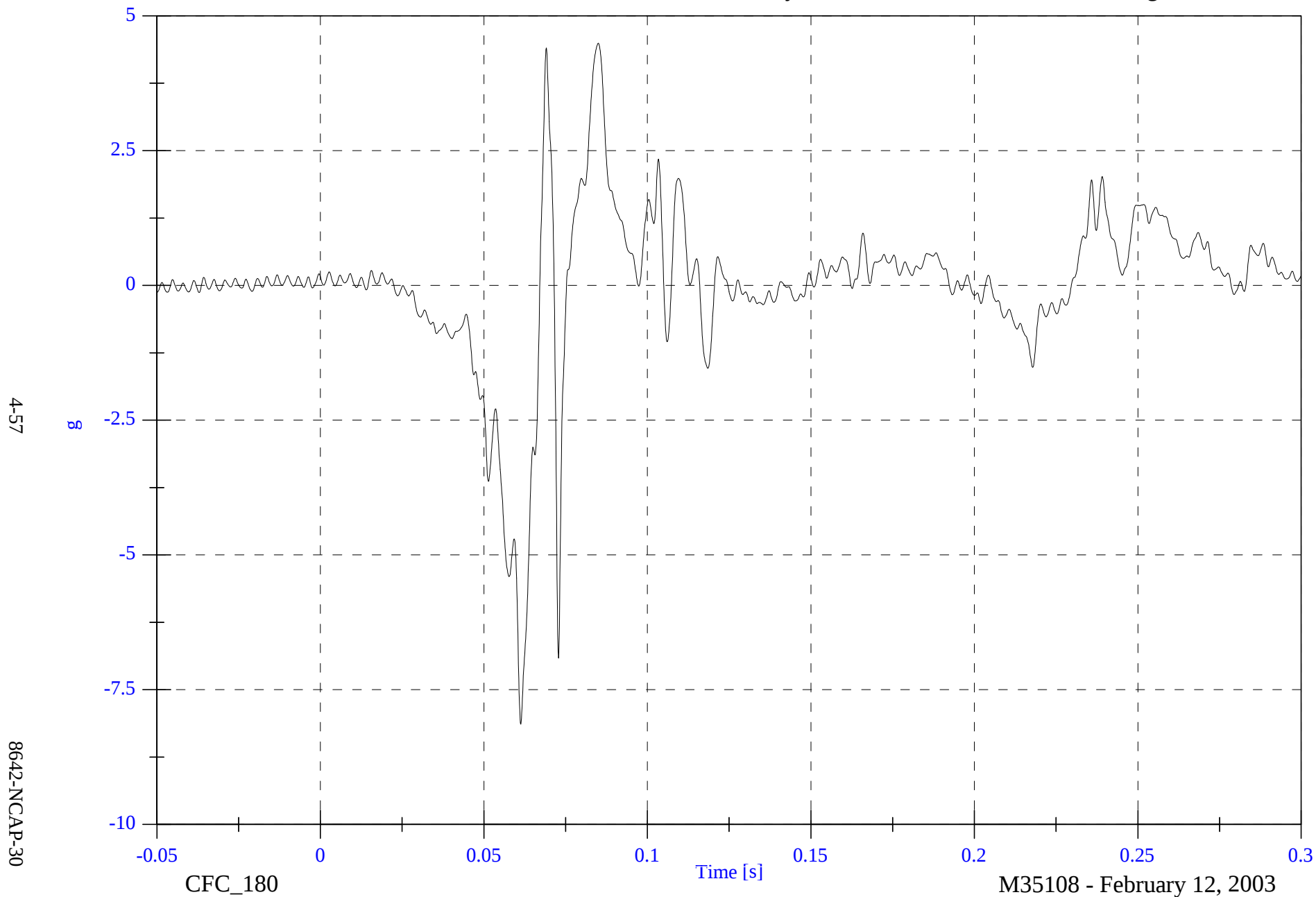


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Chest y

Max: 4.5 [g] at 0.085 [s]

Min: -8.1 [g] at 0.061 [s]



NCAP Test #8 - 2003 Toyota Avalon

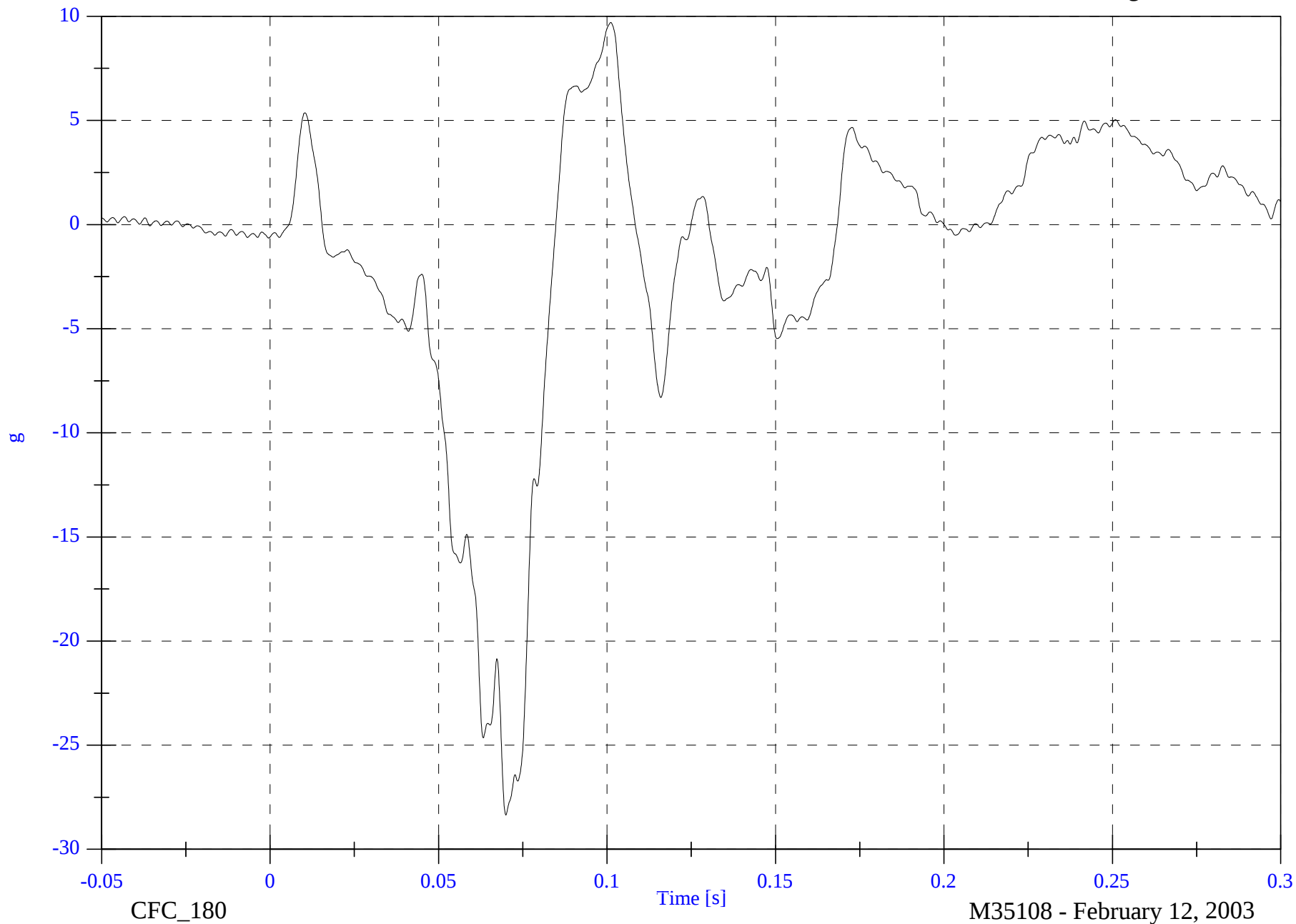
V1P4 Chest z

Max: 9.7 [g] at 0.101 [s]

Min: -28.4 [g] at 0.070 [s]

4-58

8642-NCAP-30



NCAP Test #8 - 2003 Toyota Avalon

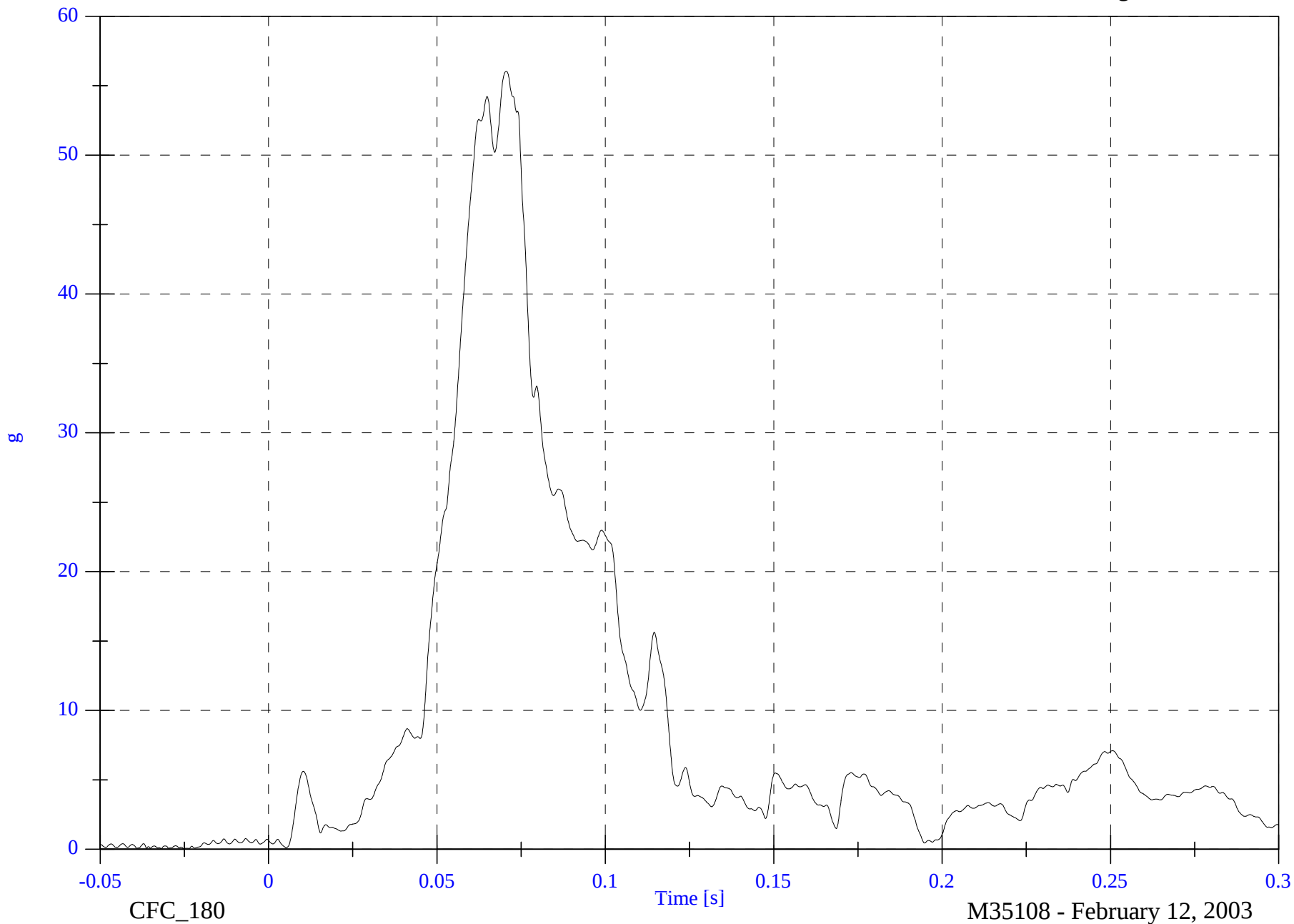
V1P4 Chest Resultant

Max: 56.0 [g] at 0.071 [s]

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

4-59

8642-NCAP-30

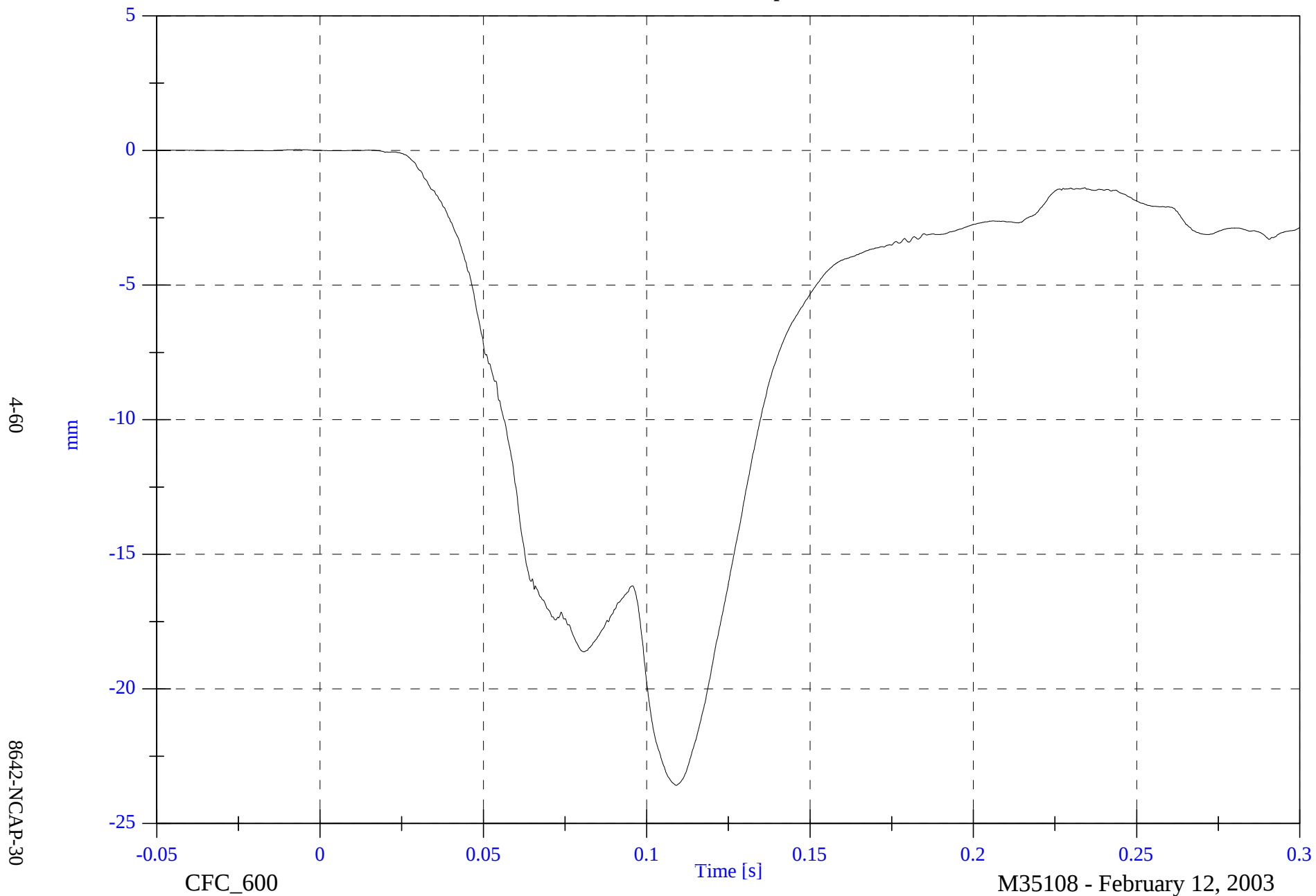


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Chest Compression

Max: 0.0 [mm] at -0.006 [s]

Min: -23.6 [mm] at 0.109 [s]

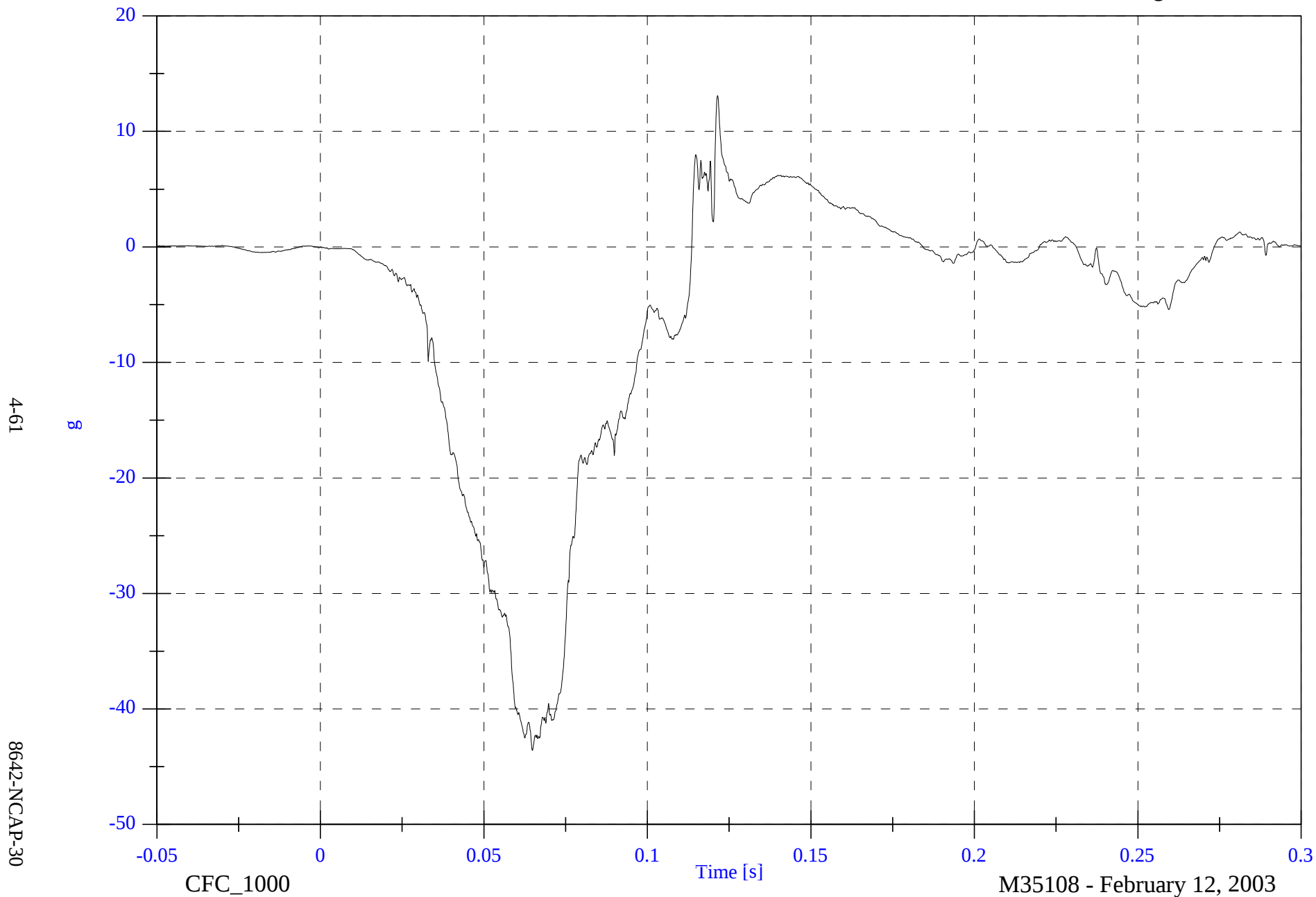


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Pelvic x

Max: 13.1 [g] at 0.121 [s]

Min: -43.6 [g] at 0.065 [s]

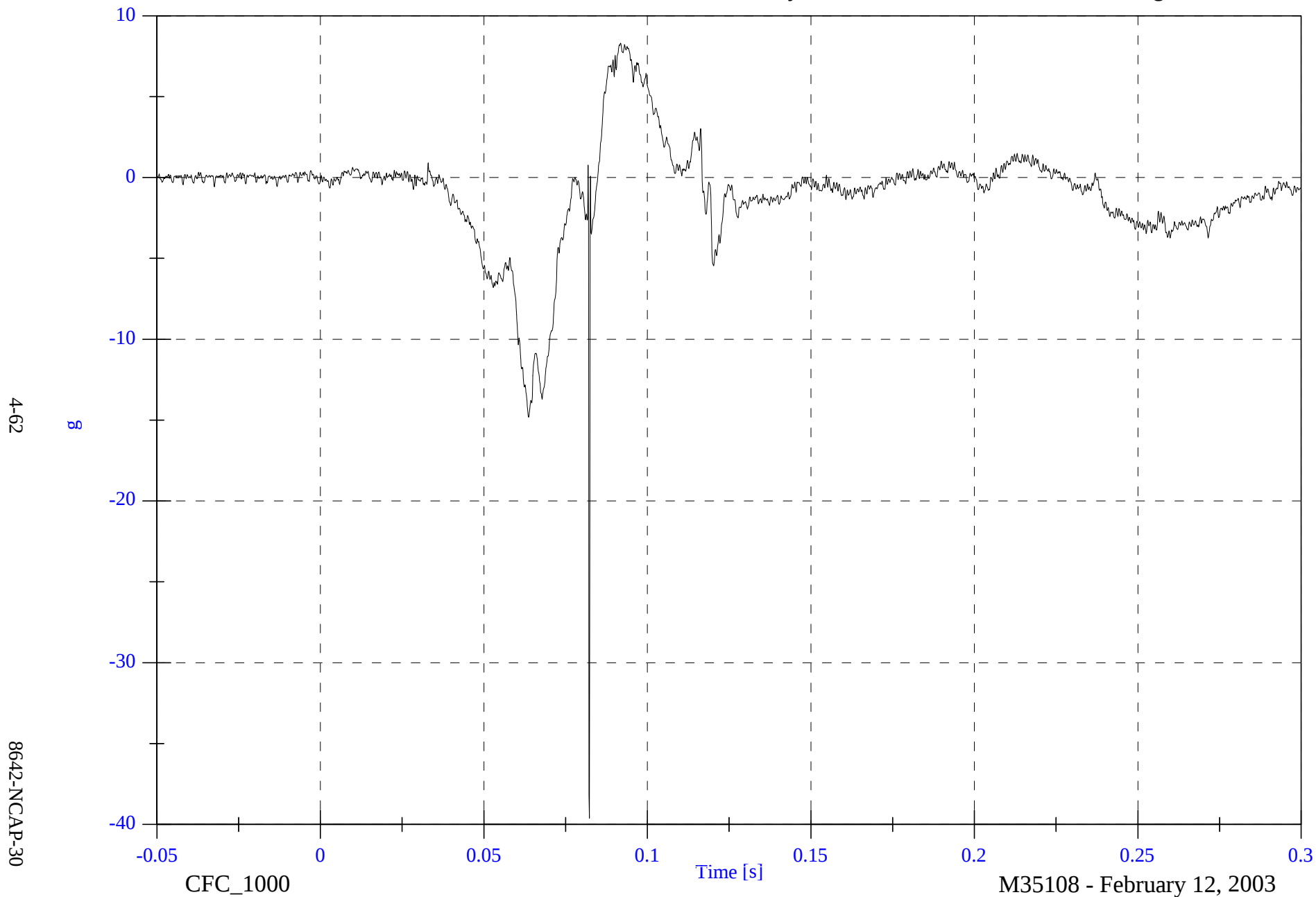


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Pelvic y

Max: 8.3 [g] at 0.092 [s]

Min: -39.6 [g] at 0.082 [s]

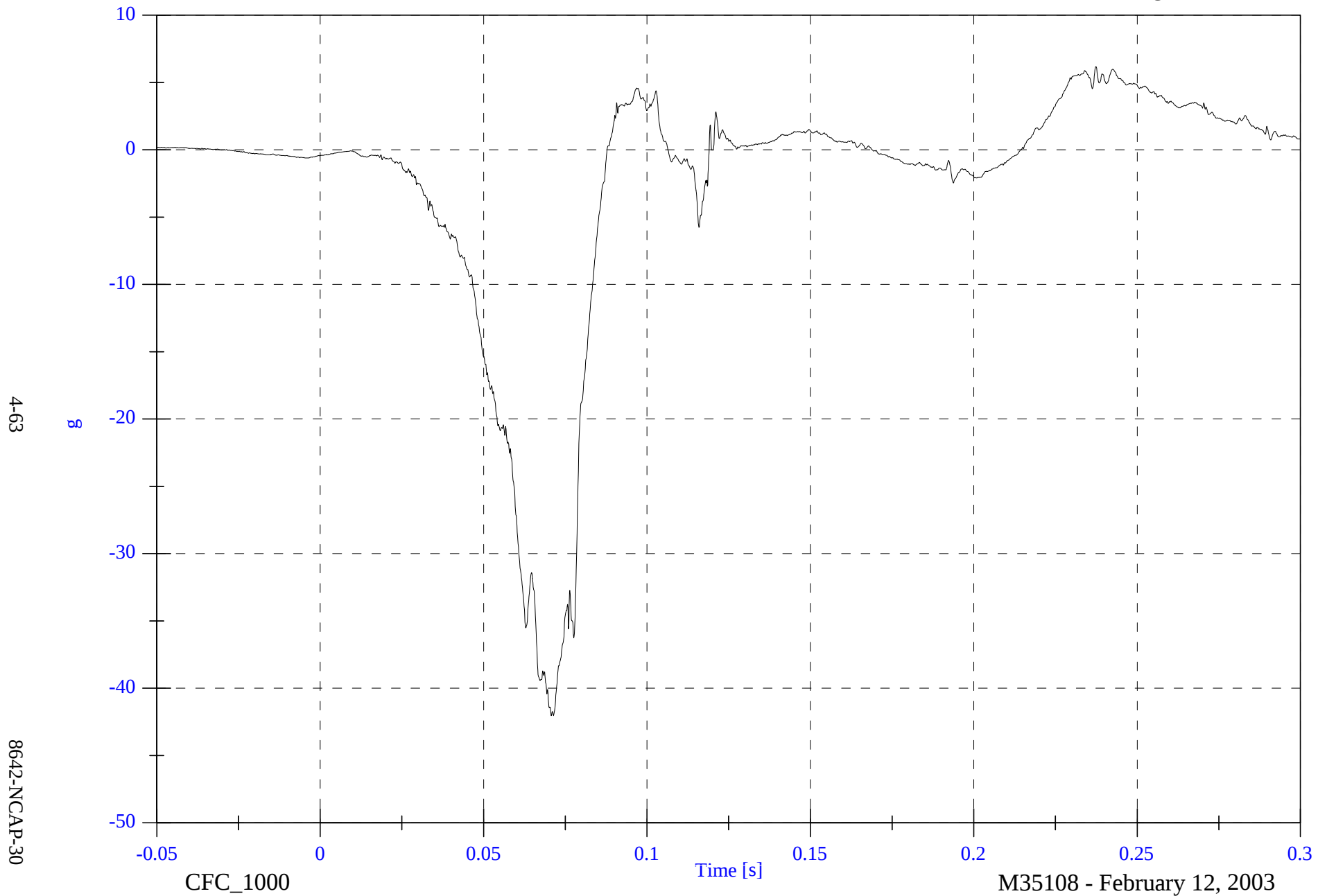


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Pelvic z

Max: 6.2 [g] at 0.237 [s]

Min: -42.0 [g] at 0.071 [s]



NCAP Test #8 - 2003 Toyota Avalon

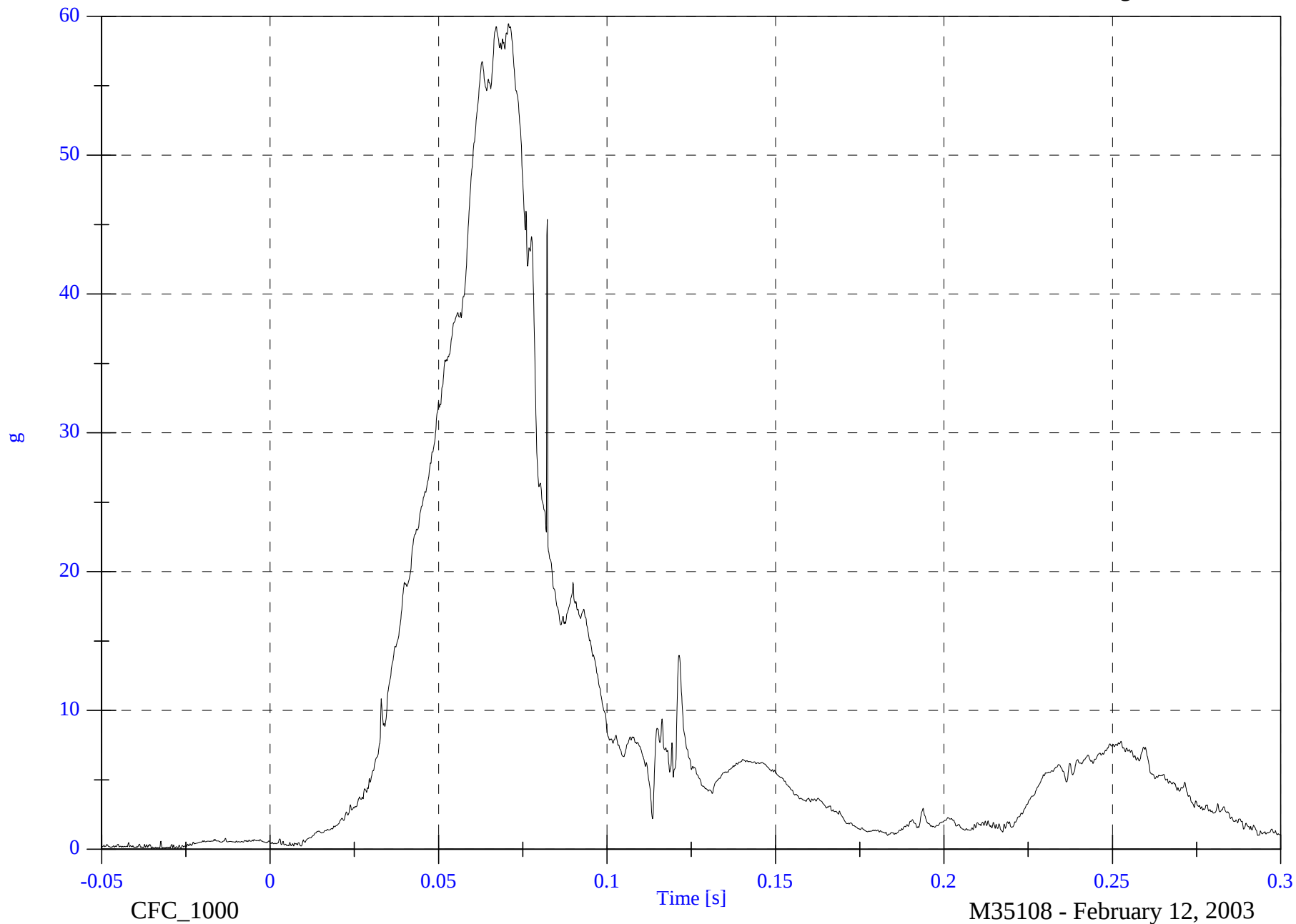
V1P4 Pelvic Resultant

Max: 59.5 [g] at 0.071 [s]

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

4-64

8642-NCAP-30

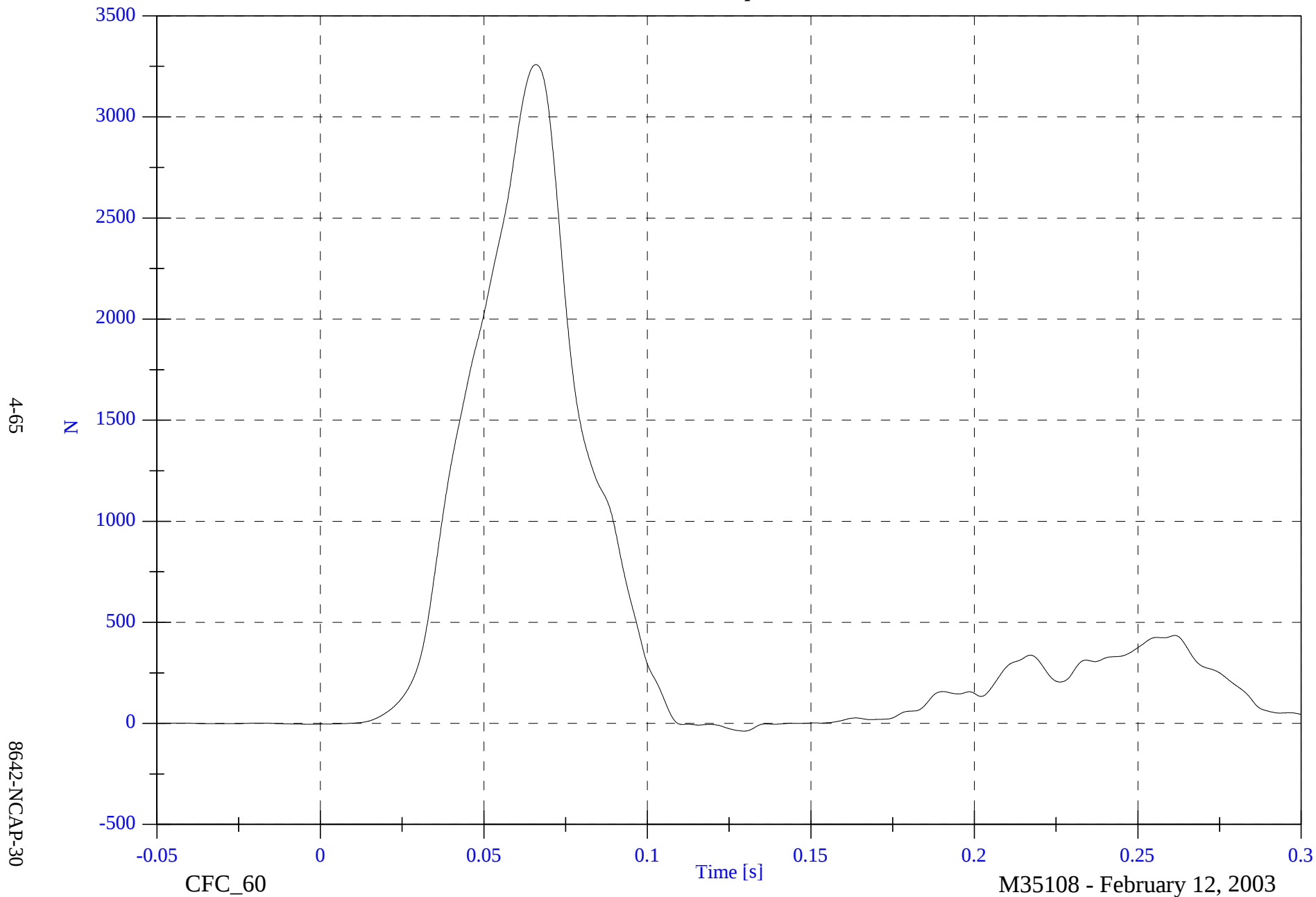


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Lap Belt

Max: 3259.0 [N] at 0.066 [s]

Min: -38.0 [N] at 0.130 [s]

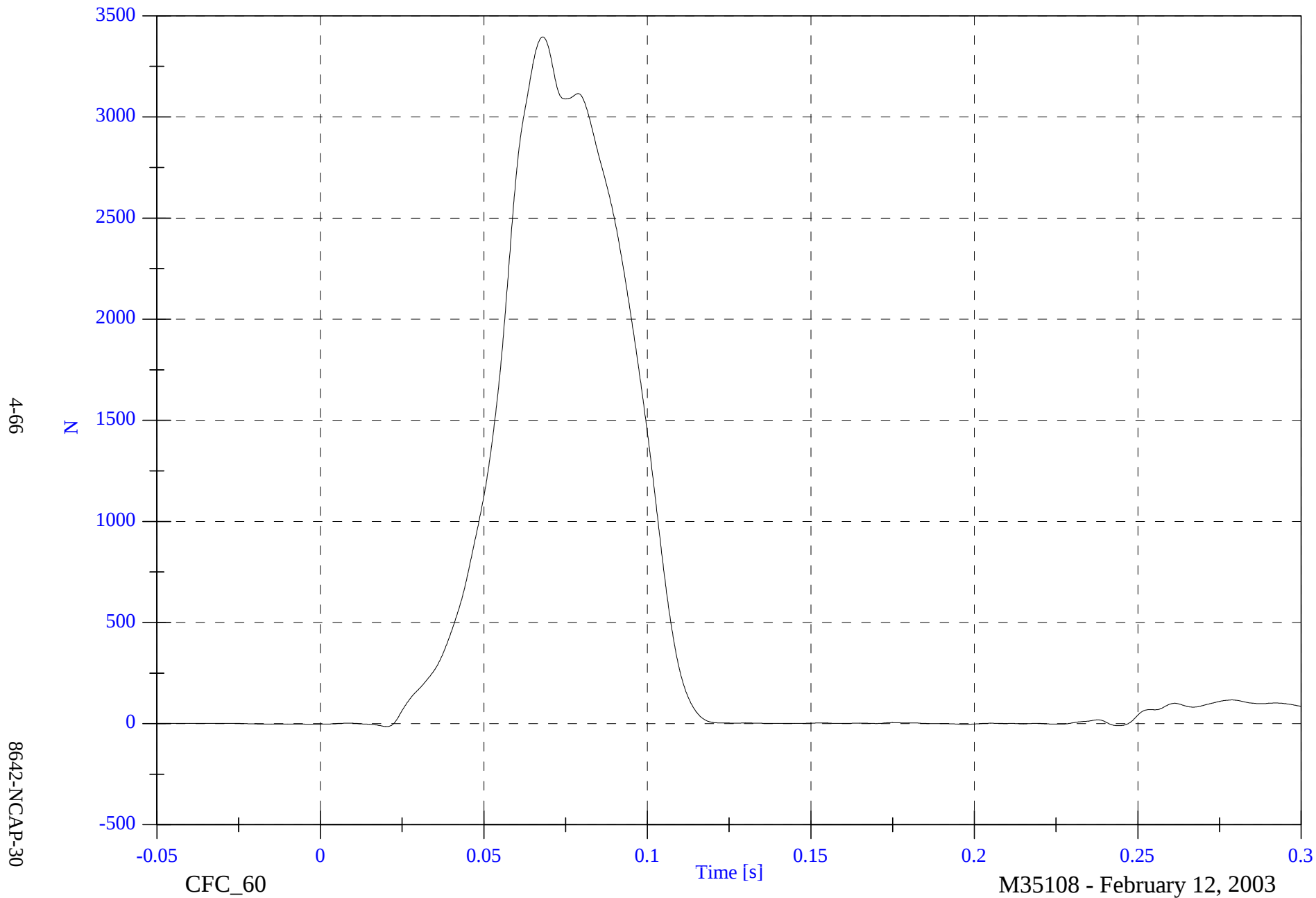


NCAP Test #8 - 2003 Toyota Avalon

V1P4 Torso Belt

Max: 3396.0 [N] at 0.068 [s]

Min: -14.5 [N] at 0.020 [s]

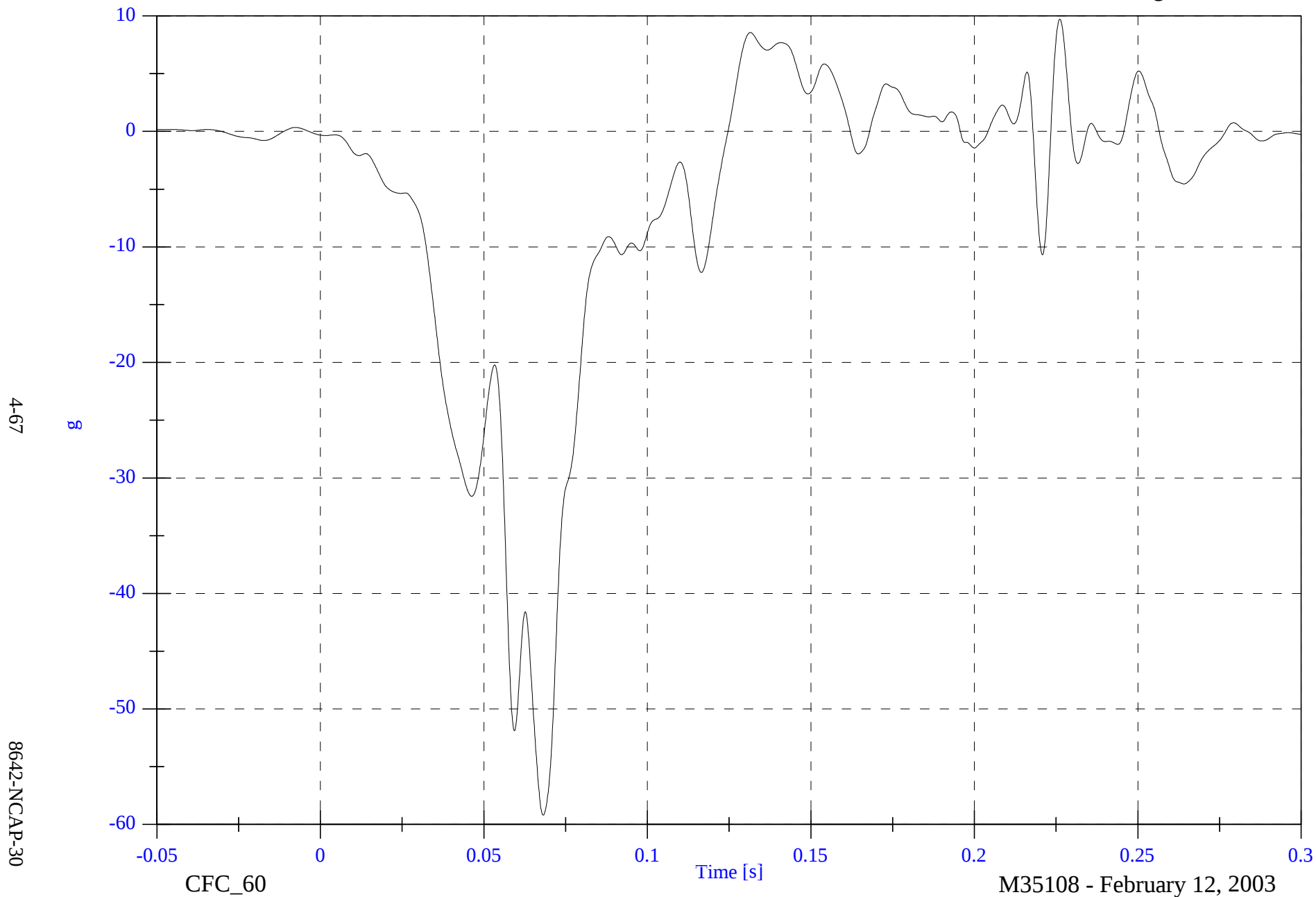


NCAP Test #8 - 2003 Toyota Avalon

V1P4 CRS x

Max: 9.7 [g] at 0.226 [s]

Min: -59.2 [g] at 0.068 [s]



NCAP Test #8 - 2003 Toyota Avalon

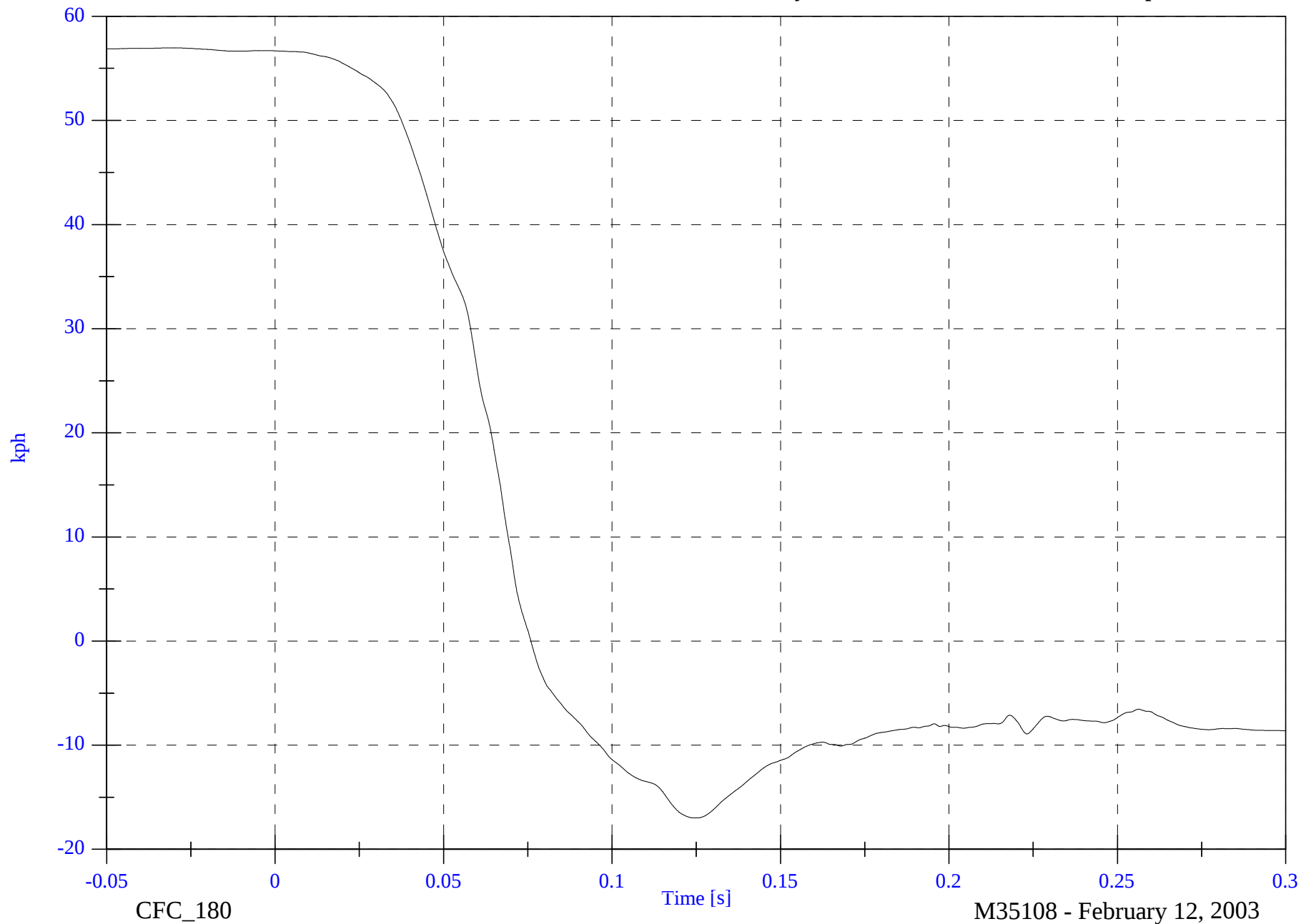
V1P4 CRS x Velocity

Max: 57.0 [kph] at -0.030 [s]

Min: -17.0 [kph] at 0.125 [s]

4-68

8642-NCAP-30

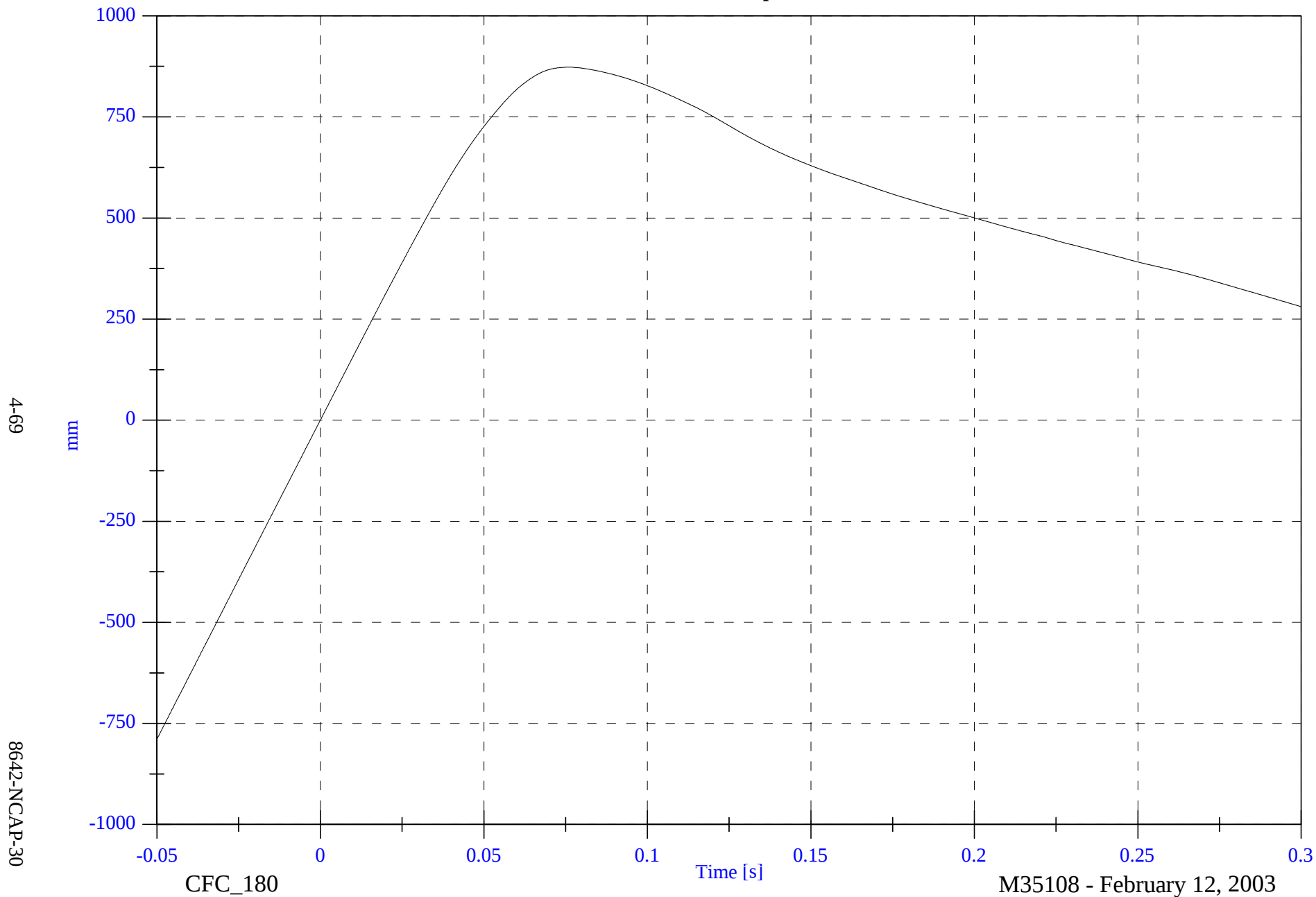


NCAP Test #8 - 2003 Toyota Avalon

V1P4 CRS x Displacement

Max: 873.0 [mm] at 0.076 [s]

Min: -789.3 [mm] at -0.050 [s]

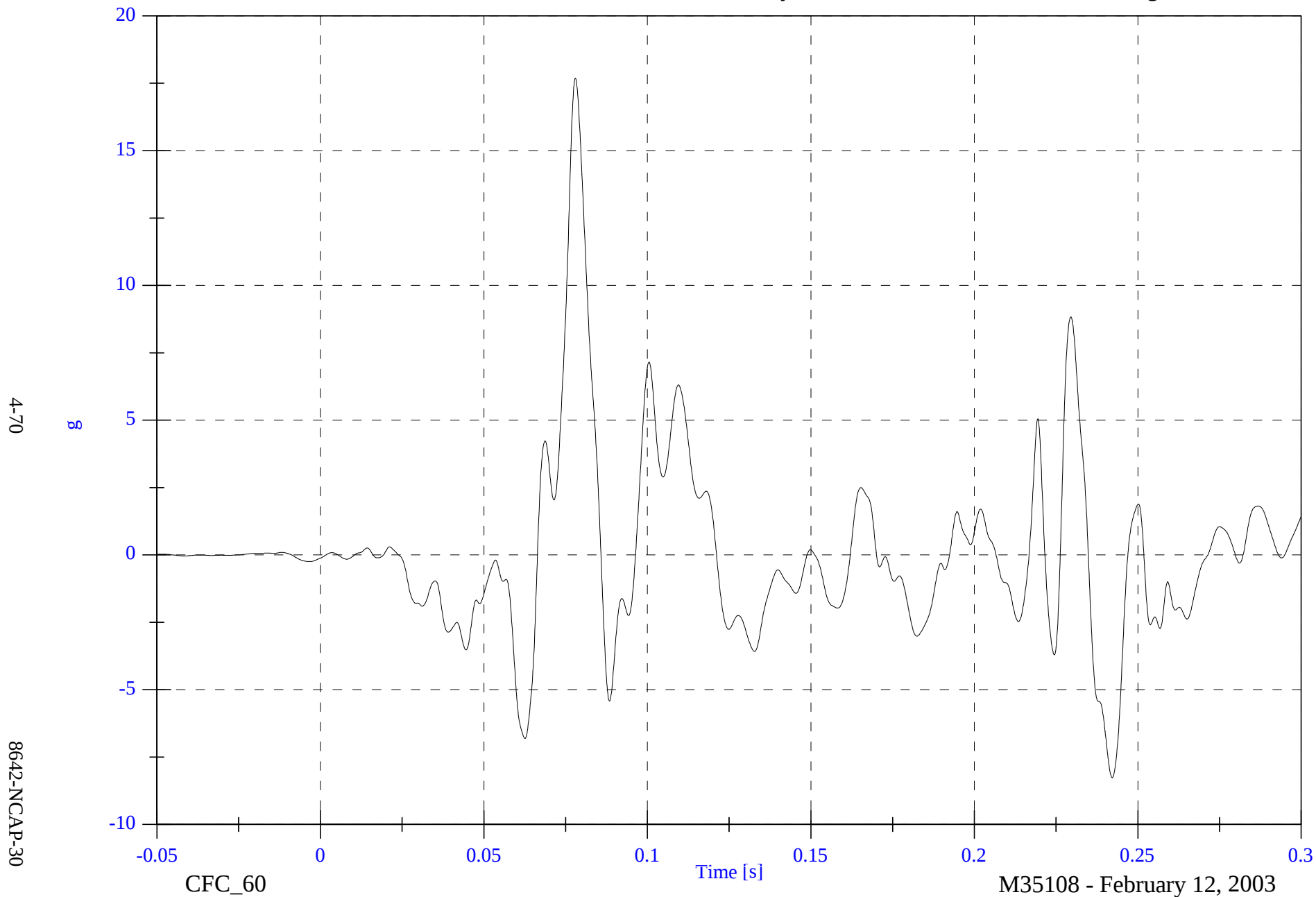


NCAP Test #8 - 2003 Toyota Avalon

V1P4 CRS y

Max: 17.7 [g] at 0.078 [s]

Min: -8.3 [g] at 0.242 [s]



NCAP Test #8 - 2003 Toyota Avalon

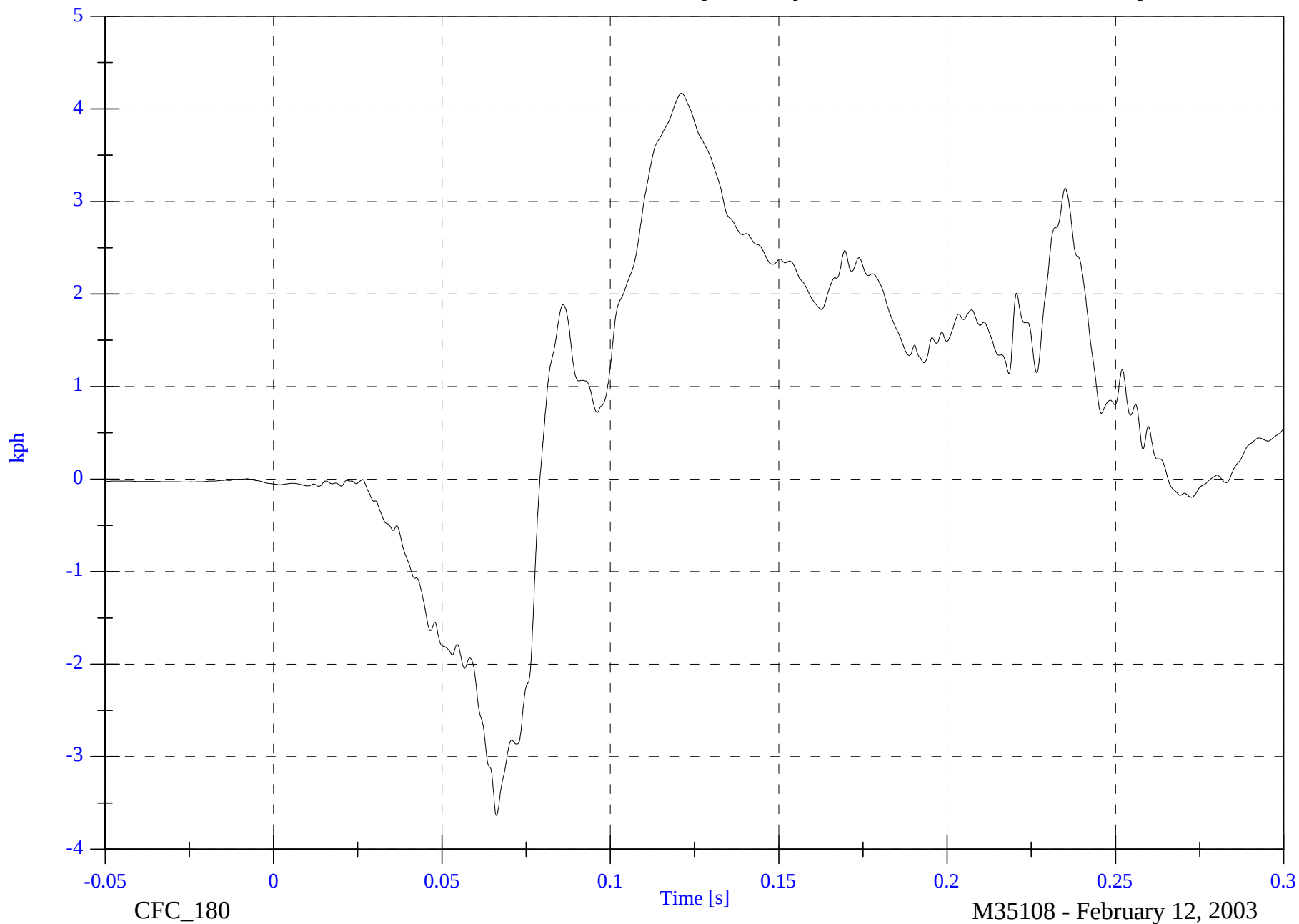
V1P4 CRS y Velocity

Max: 4.2 [kph] at 0.121 [s]

Min: -3.6 [kph] at 0.066 [s]

4-71

8642-NCAP-30

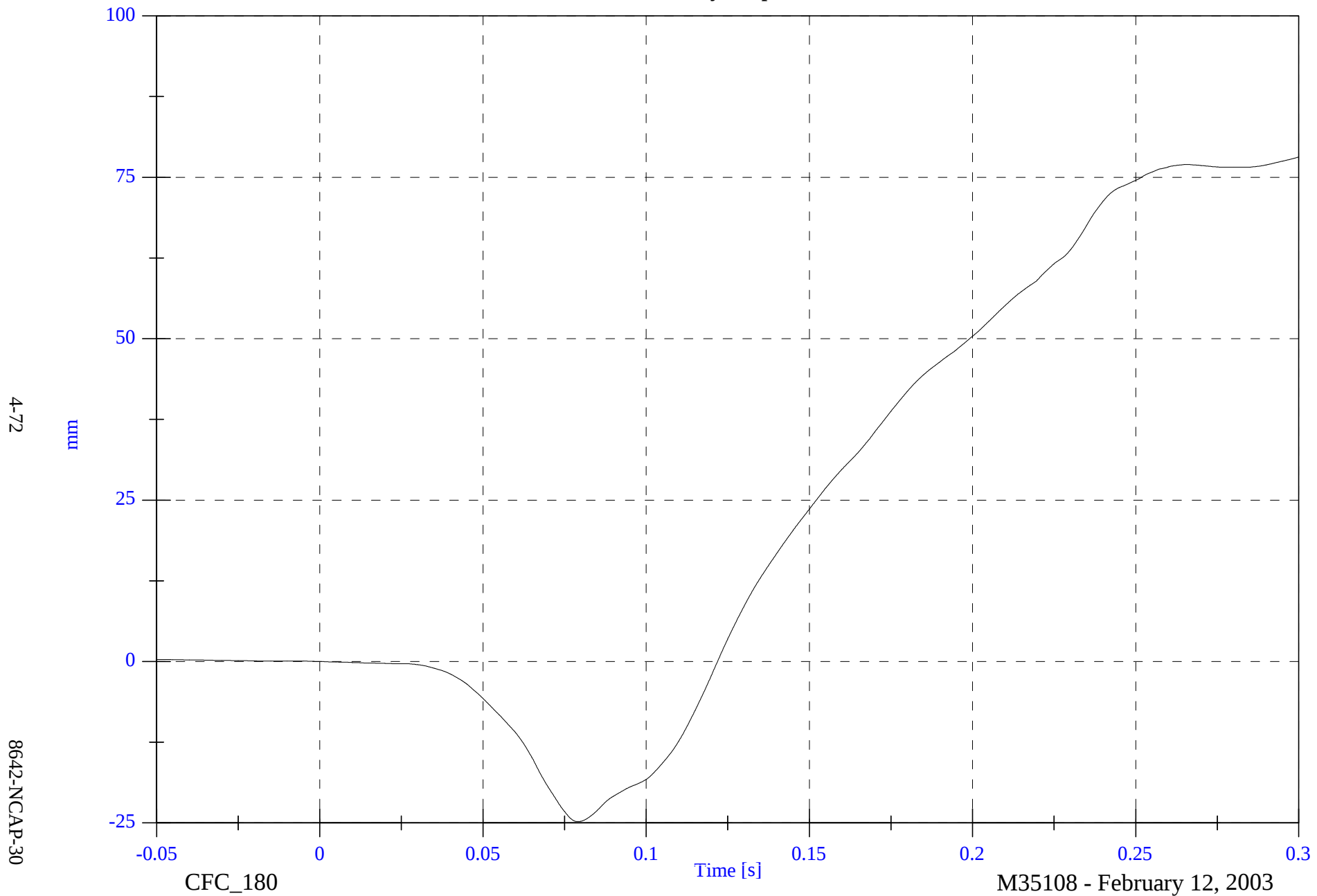


NCAP Test #8 - 2003 Toyota Avalon

V1P4 CRS y Displacement

Max: 78.1 [mm] at 0.300 [s]

Min: -24.8 [mm] at 0.079 [s]

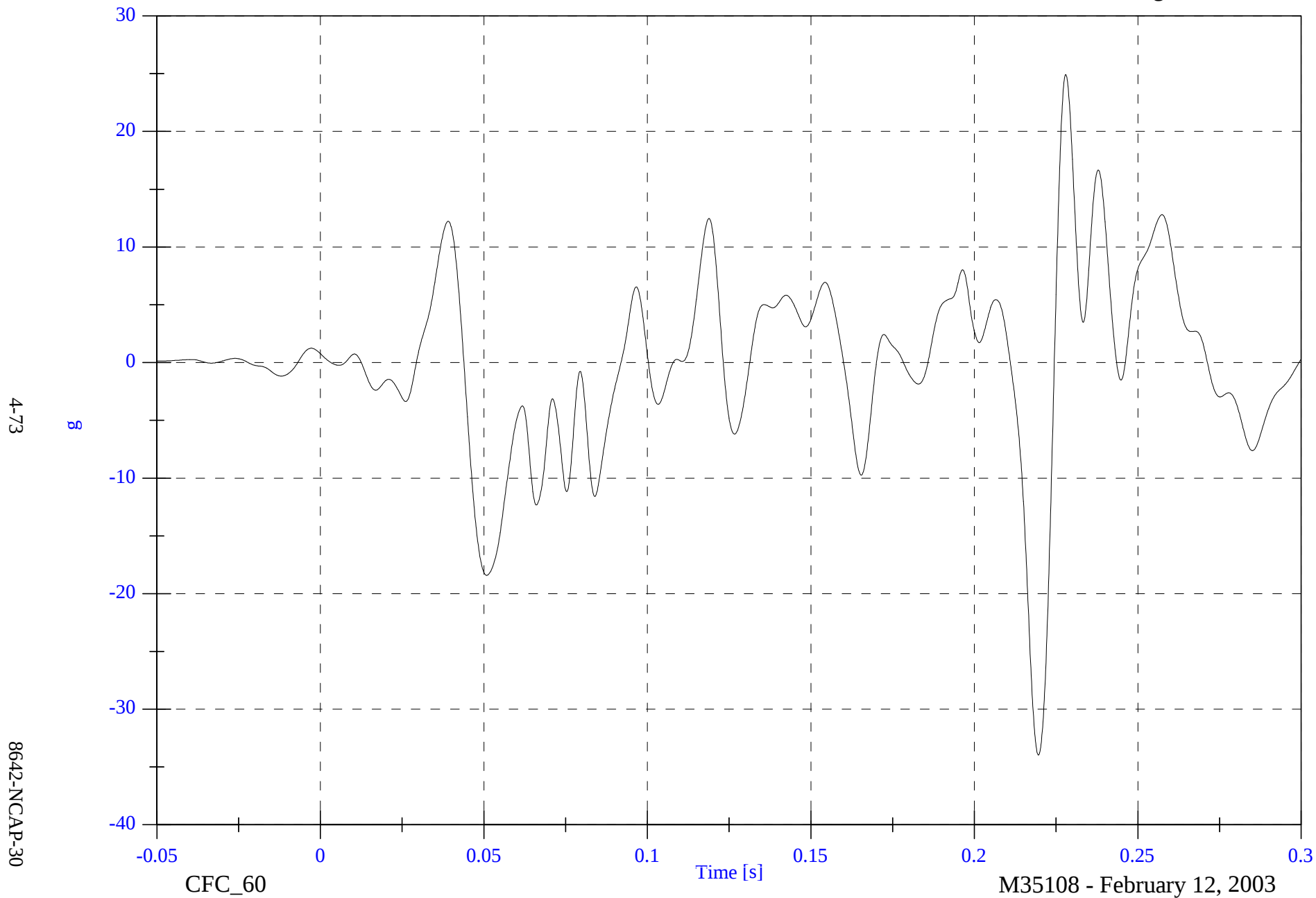


NCAP Test #8 - 2003 Toyota Avalon

V1P4 CRS z

Max: 24.9 [g] at 0.228 [s]

Min: -34.0 [g] at 0.220 [s]

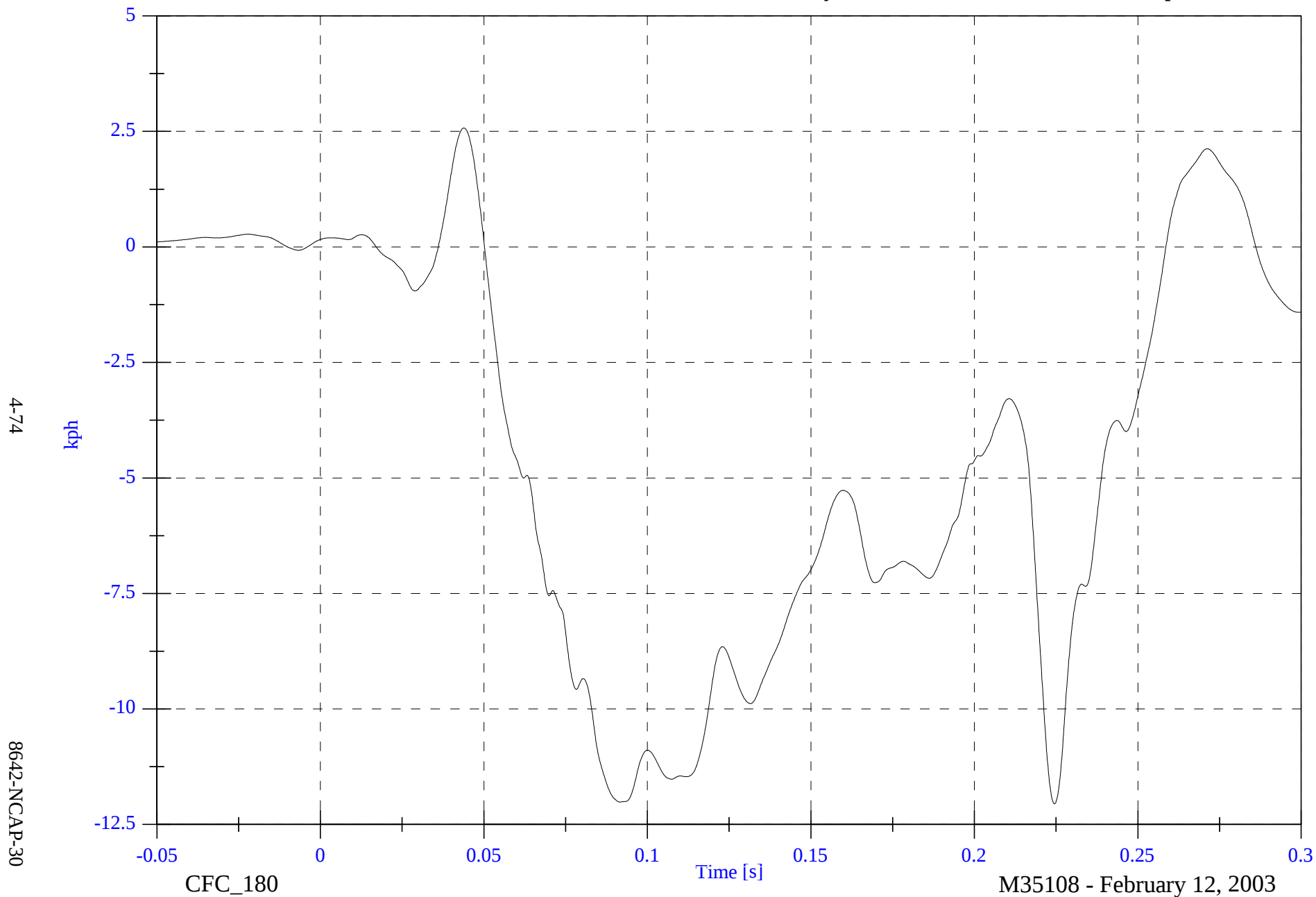


NCAP Test #8 - 2003 Toyota Avalon

V1P4 CRS z Velocity

Max: 2.6 [kph] at 0.044 [s]

Min: -12.1 [kph] at 0.224 [s]

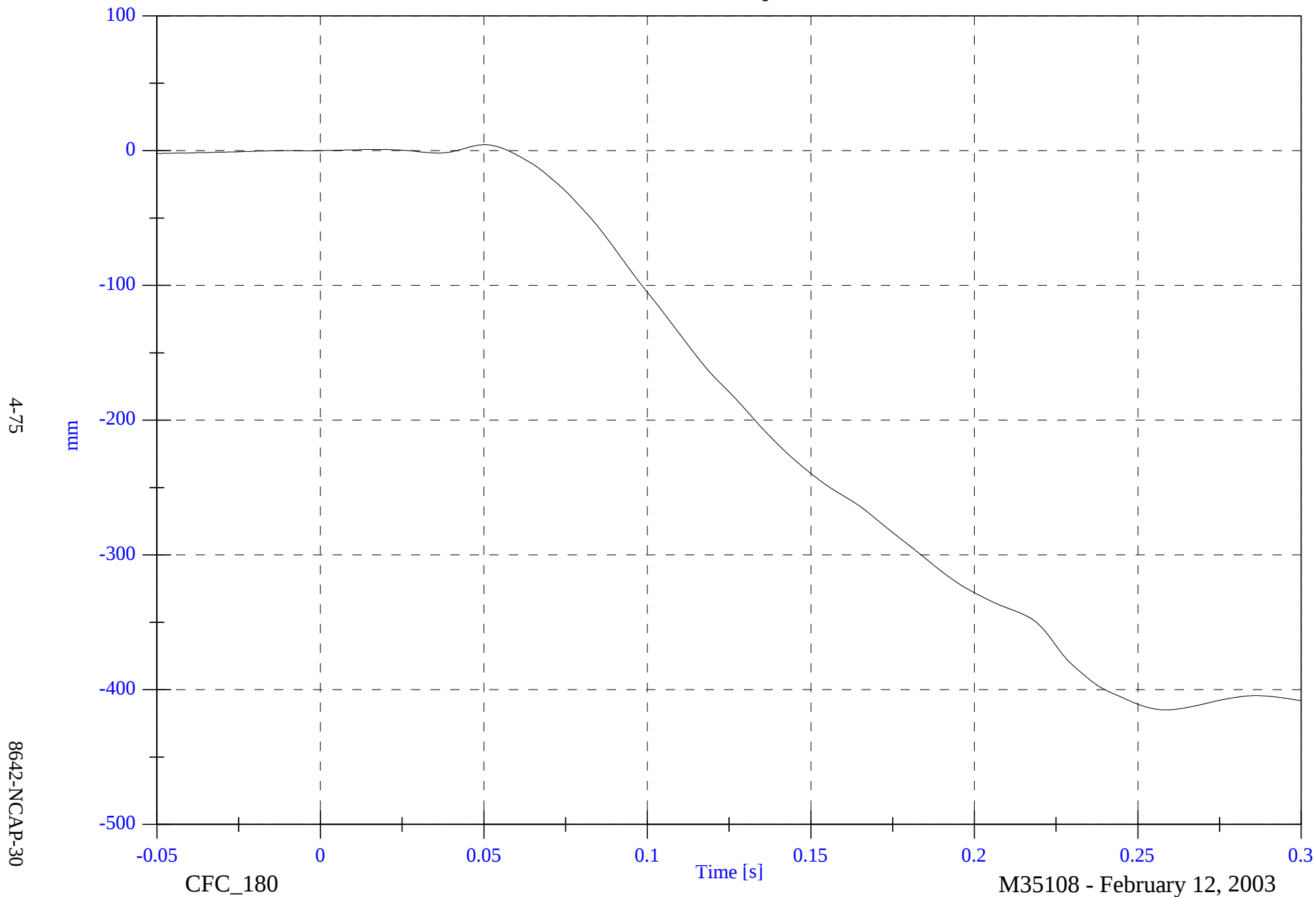


NCAP Test #8 - 2003 Toyota Avalon

V1P4 CRS z Displacement

Max: 4.4 [mm] at 0.050 [s]

Min: -415.0 [mm] at 0.259 [s]

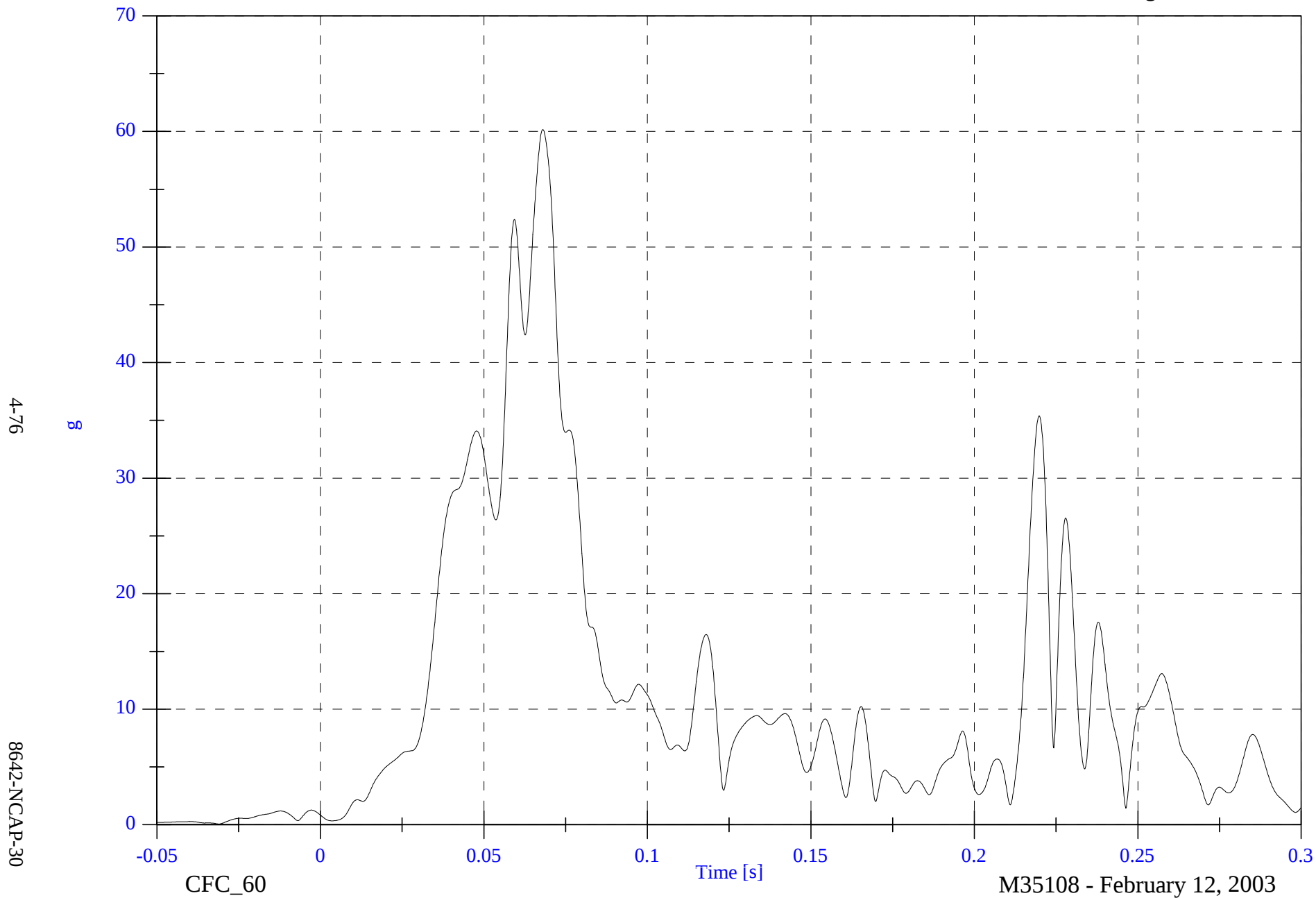


NCAP Test #8 - 2003 Toyota Avalon

V1P4 CRS Resultant

Max: 60.2 [g] at 0.068 [s]

Min: 0.1 [g] at -0.031 [s]



SECTION 5

CHILD DUMMY CALIBRATION INFORMATION

044 Head Drop

Part 572P Head Drop

Calibration Date: 01-27-03

Serial No: 044

Work File: 044H 01-27-03

-----TEST RESULTS-----

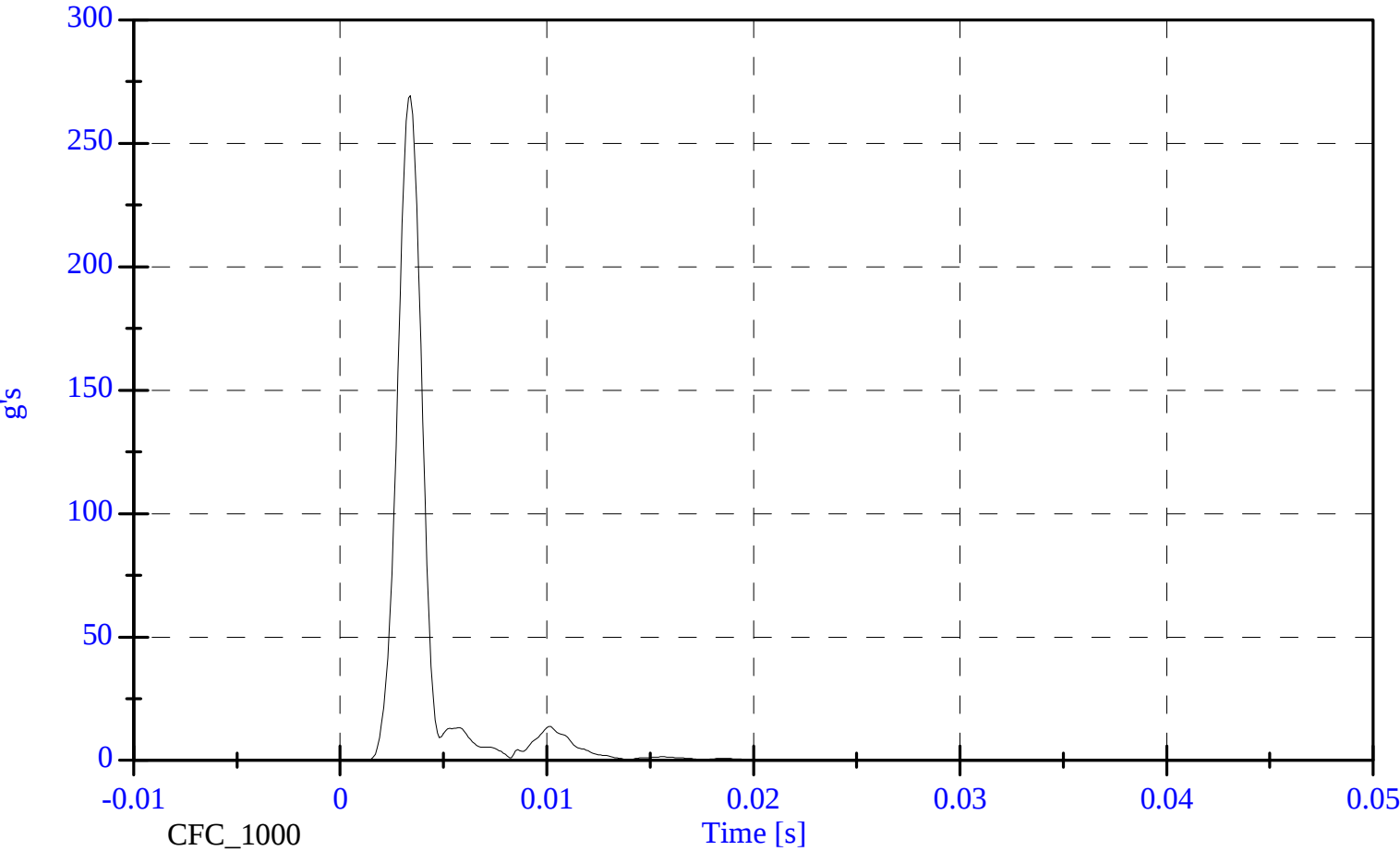
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	66.0-78.0 F	70.0 F	Passed
Lab Humidity:	10-70 %	37.00 %	Passed
Peak Resultant Accel.:	250-280 Gs	269.30 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	3.21 Gs	Passed
Curve PerCent NonModal:	< 10%	5.12 %	Passed

044 Head Drop

Head Resultant

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

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



044 Chest Impact

Part 572P Thorax Impact

Calibration Date: 01-28-03

Serial No: 044

Work File: 044T1 01-28-03

-----TEST RESULTS-----

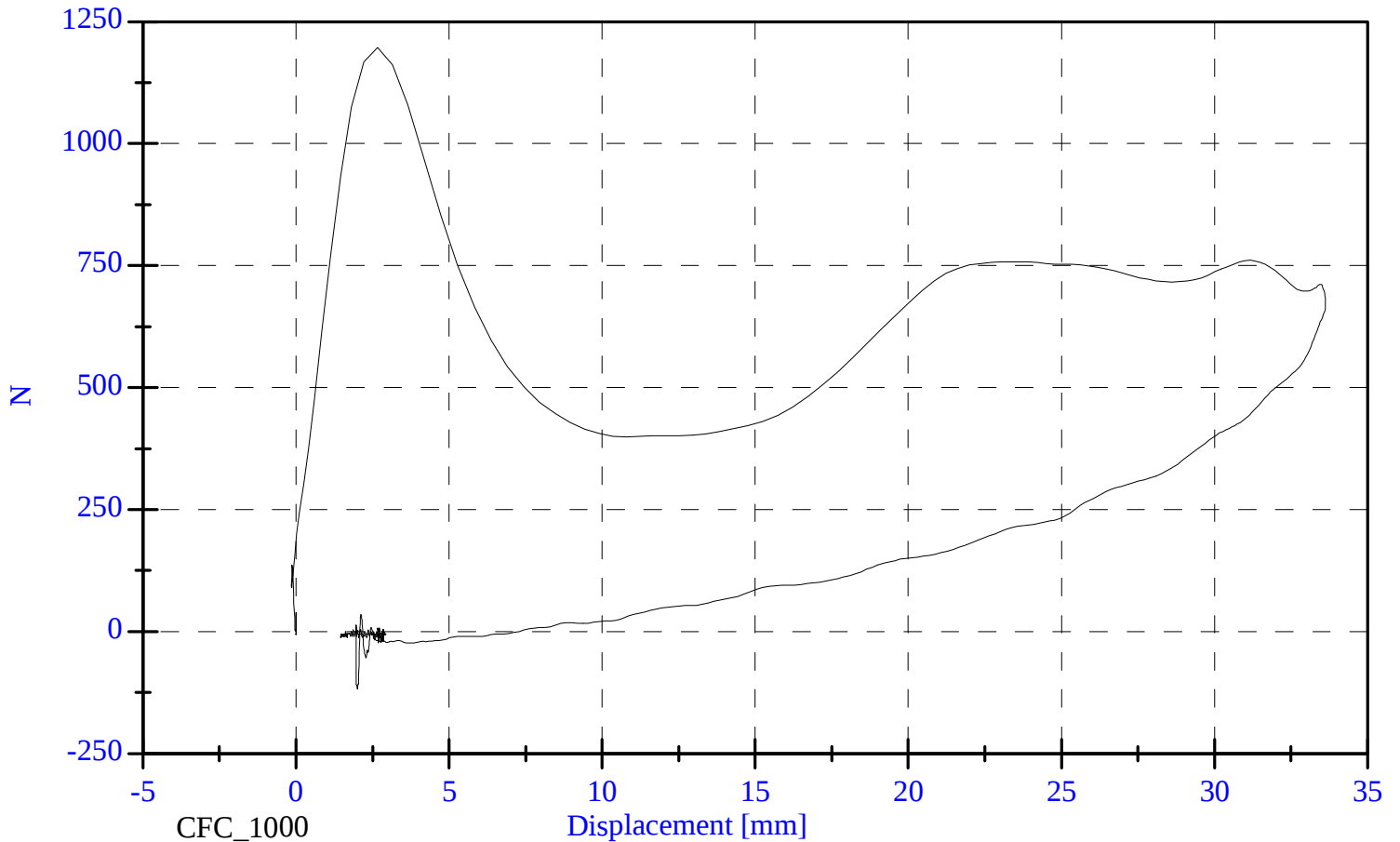
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.1 C	Passed
Lab Humidity:	10-70 %	33.00 %	Passed
Pendulum Velocity:	5.90- 6.10 m/s	5.94 m/s	Passed
Maximum Deflection:	32.00-38.00 mm	33.62 mm	Passed
Maximum Res. Force:	680.00- 810.00 N	740.30 N	Passed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

044 Chest Impact

Probe Force vs. Displacement

Max: 1196.8 [N] at 2.669 [mm]

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



044 Neck Flexion

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

-----TEST RESULTS-----

<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.11 C	Passed
Lab Humidity:	10-70 %	37.00 %	Passed
Test Pendulum Speed:	5.40- 5.60 m/s	5.43 m/s	Passed

-----PENDULUM PULSE-----

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

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

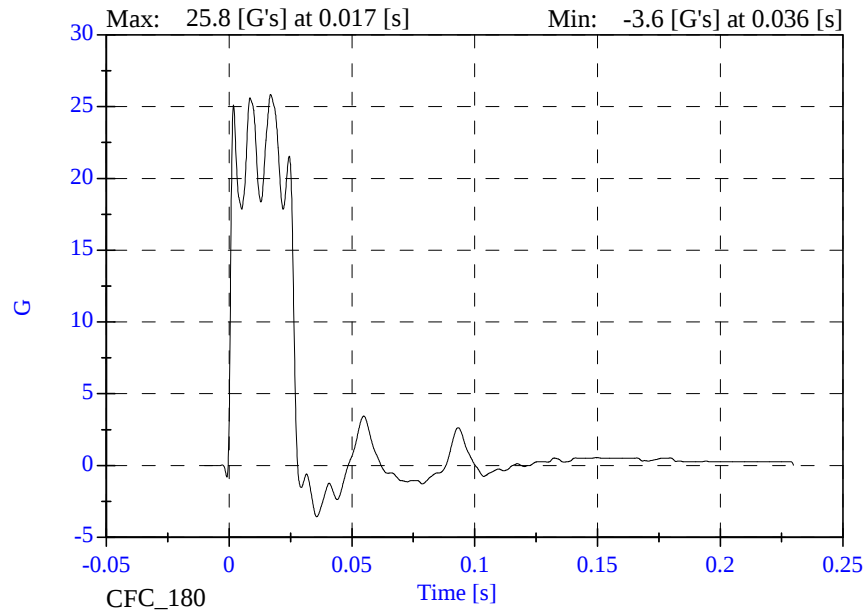
Maximum Rotation:	70.0-82.0 Deg	75.22 Deg	Passed
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-----MOMENT ABOUT THE OCCIPITAL CONDYLE-----

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

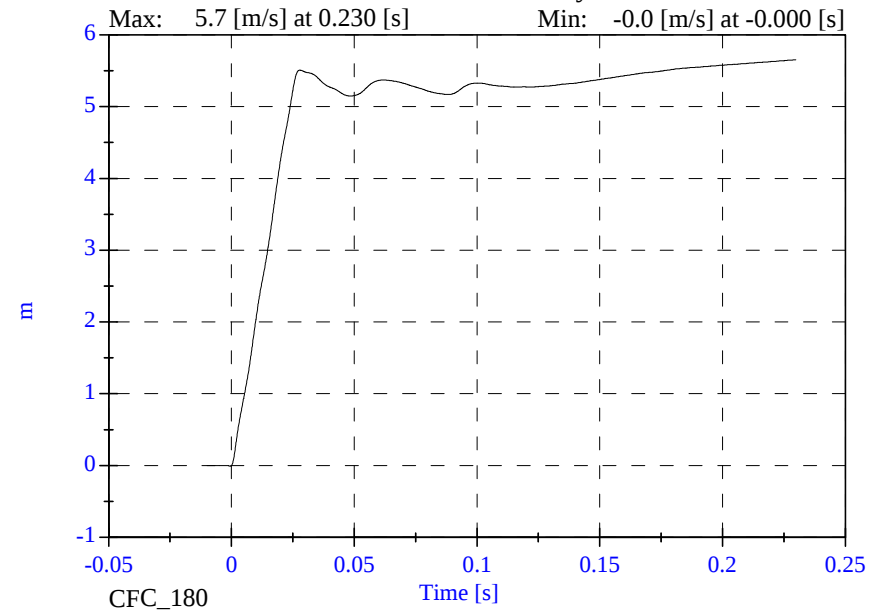
044 Neck Flexion

Pendulum Acceleration

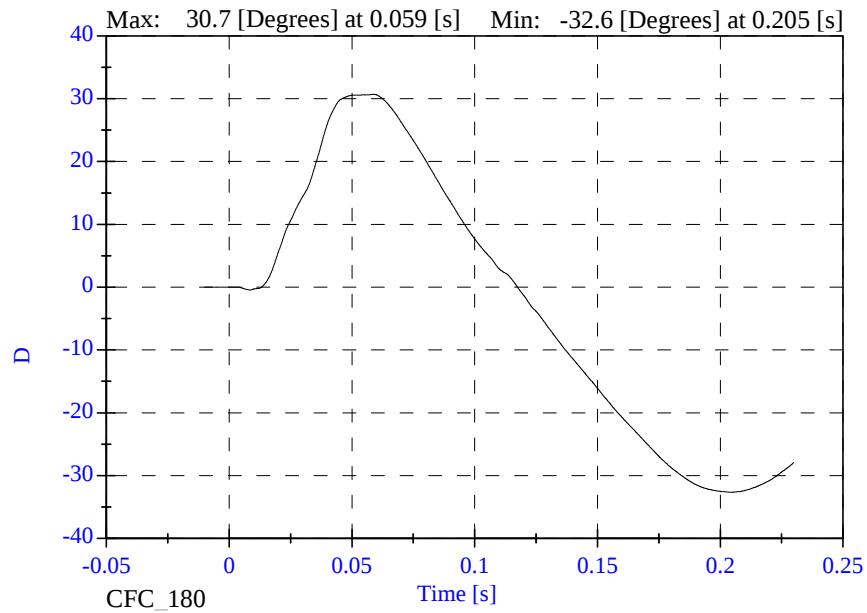


70 - 01-27-03

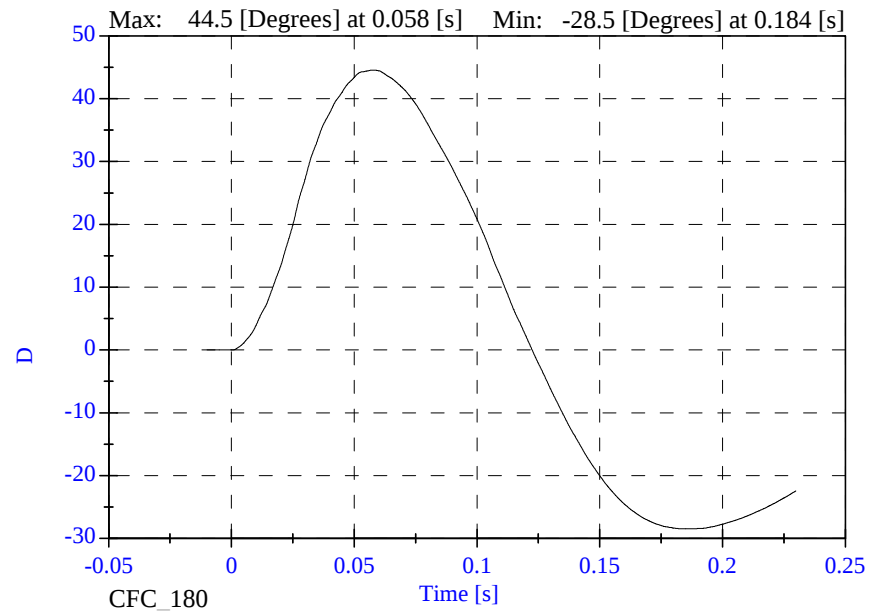
Pendulum Velocity



Head Rotation

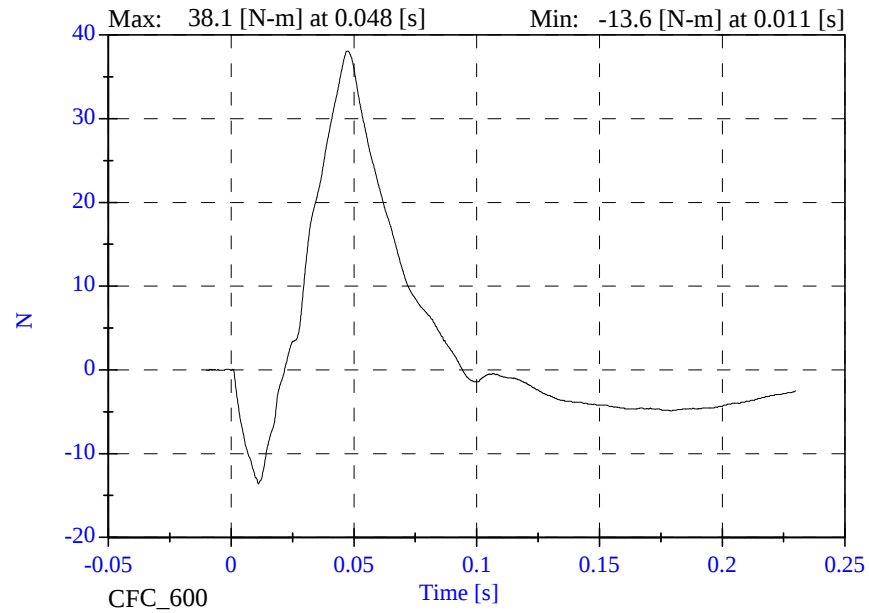


Arm Rotation



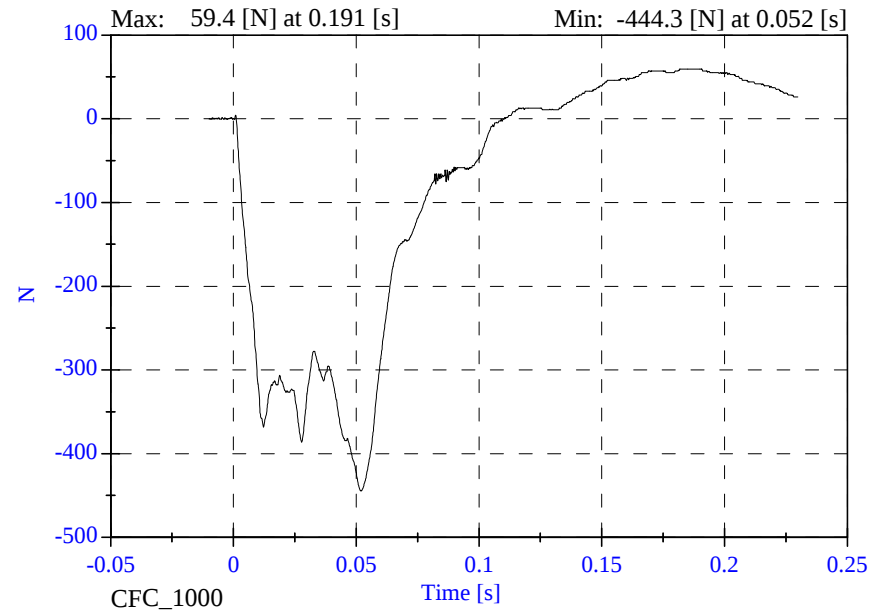
044 Neck Flexion

Neck Moment Y

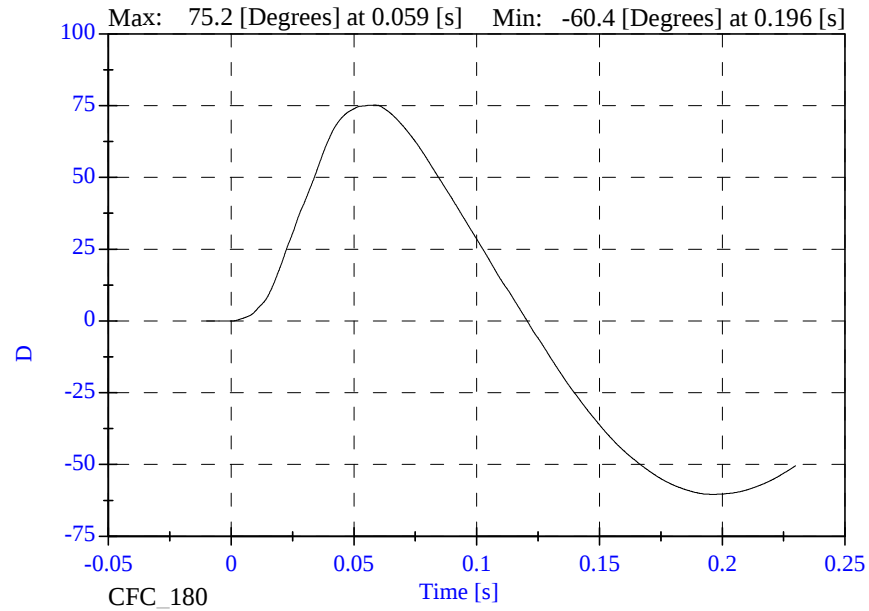


70 - 01-27-03

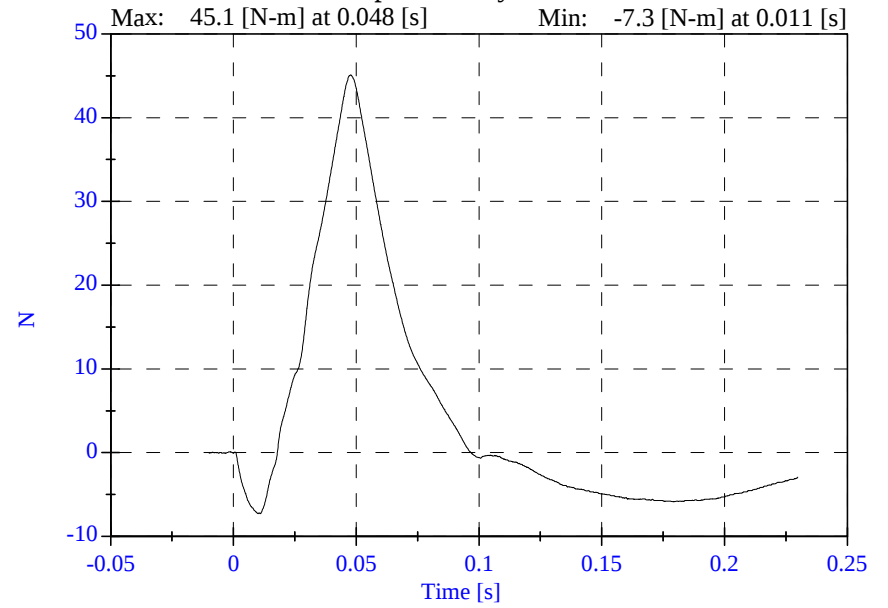
Neck Force X



Total Rotation



Occipital Condyle Moment



044 Neck Extension

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

-----TEST RESULTS-----

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

-----PENDULUM PULSE-----

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

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

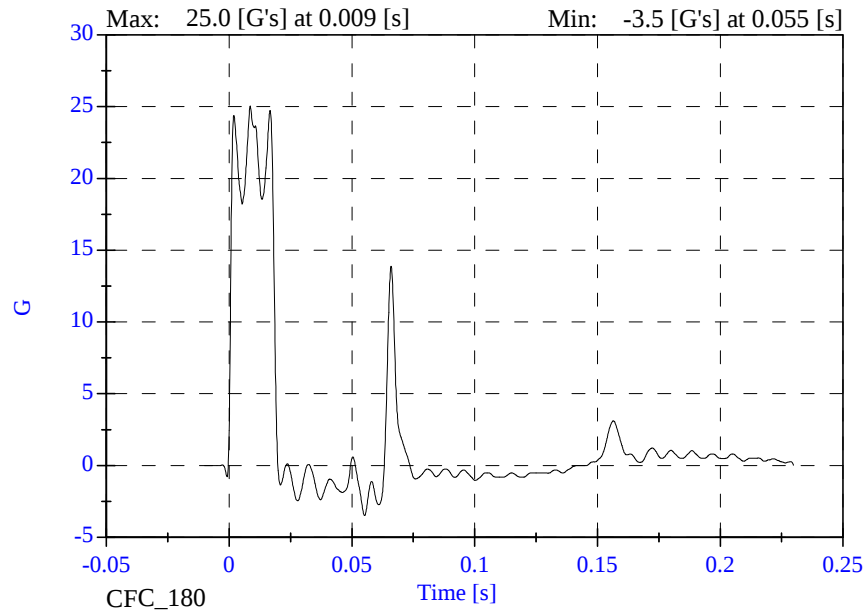
Maximum Rotation:	83.0-93.0 Deg	83.96 Deg	Passed
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-----MOMENT ABOUT THE OCCIPITAL CONDYLE-----

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

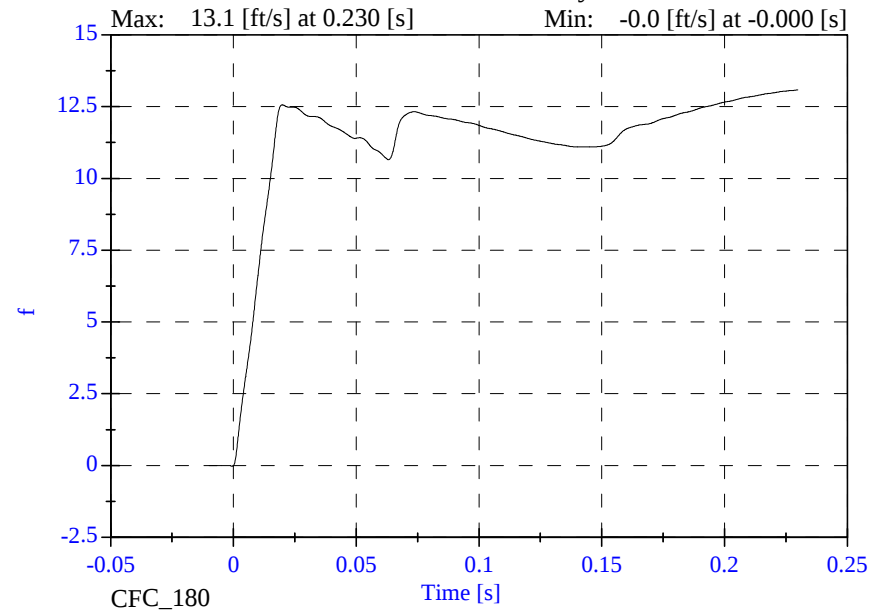
044 Neck Extension

Pendulum Acceleration

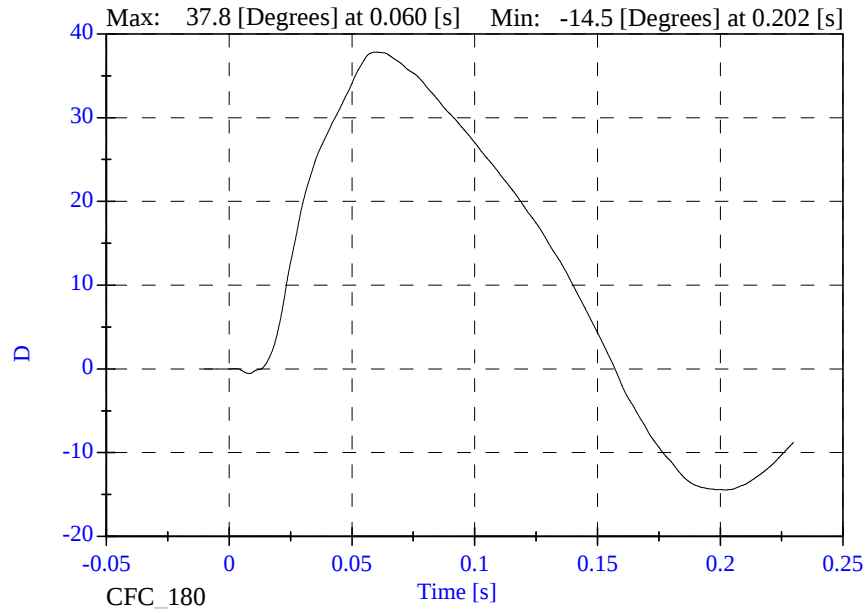


71 - 01-28-03

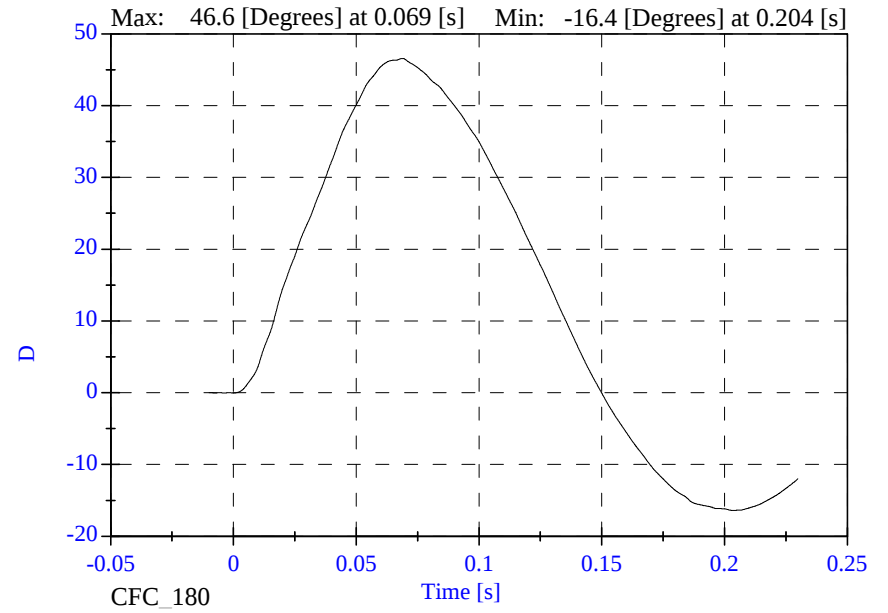
Pendulum Velocity



Head Rotation

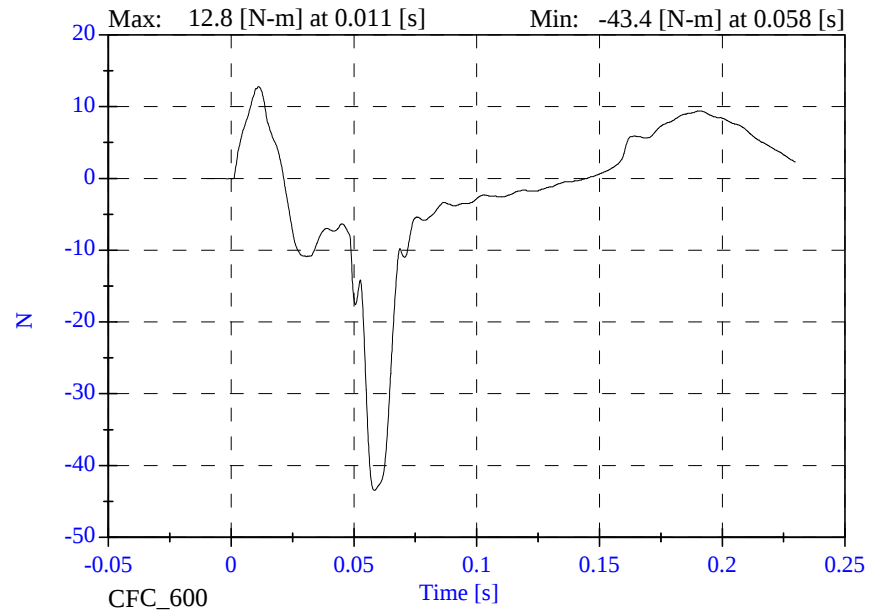


Arm Rotation



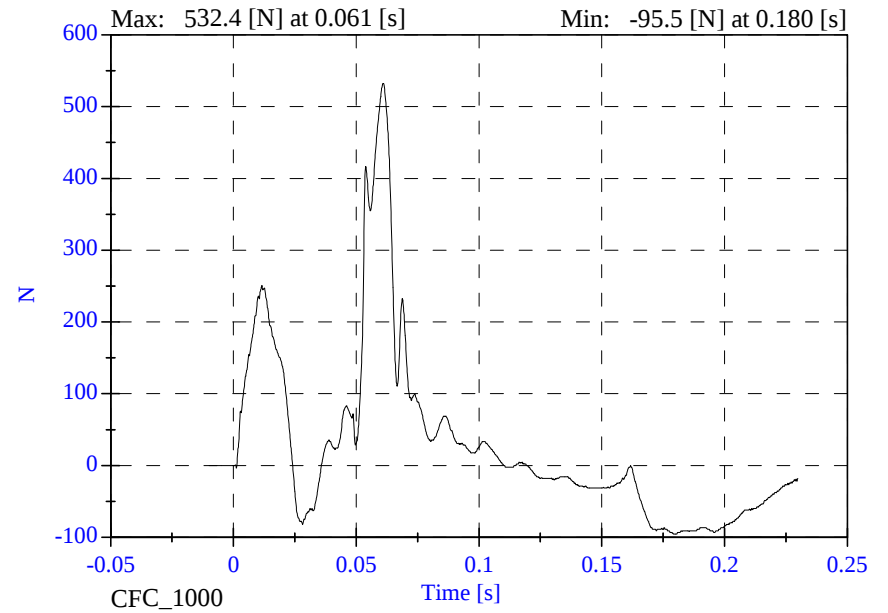
044 Neck Extension

Neck Moment Y

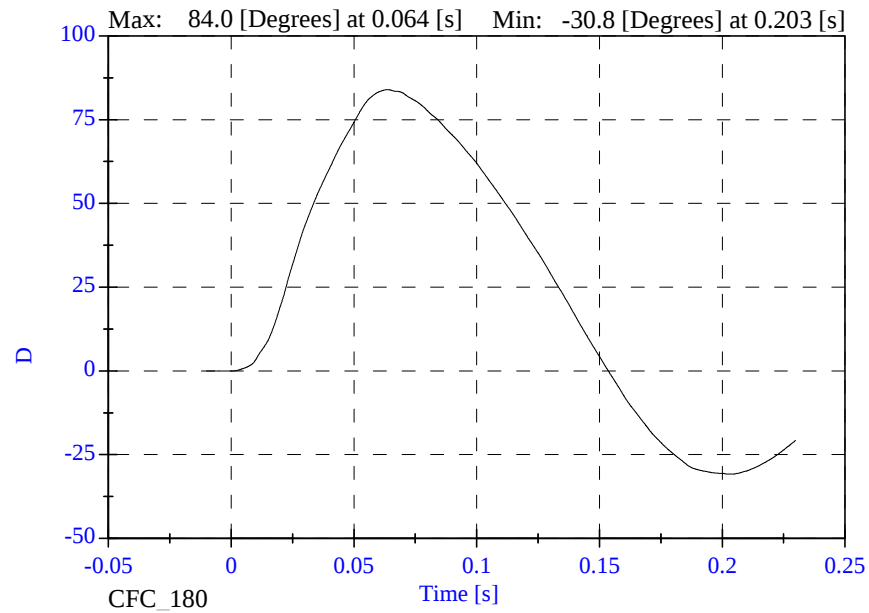


71 - 01-28-03

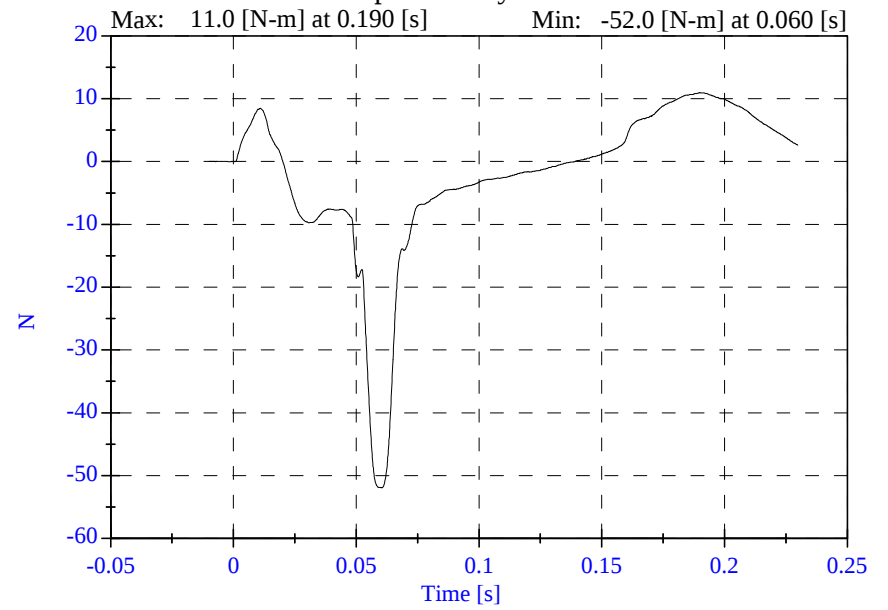
Neck Force X



Total Rotation



Occipital Condyle Moment



Spine_Flexion_test.txt

044 Lumbar Spine Flexion

Date: 1-28-03

Result: 45 degrees - 38.8 lbf

Certified By: B.Swiecicki Date: 01-28-03

HIII 6 Year Old Serial No. 144

Calibrated by Transportation Research Center Inc. (TRC)

Calibration No. 03
December 24, 2002

SECTION 6

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

HYBRID III INSTRUMENTATION

	POSITION #3 (RIGHT) SERIAL NO.: 3691261 P1		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	ENDEVCO	AC-P17912	11/11/02
HEAD AY	ENDEVCO	AC-P17743	11/11/02
HEAD AZ	ENDEVCO	AC-P15319	11/11/02
UPPER NECK FX	DENTON	LC-248-FX	10/15/02
UPPER NECK FY	DENTON	LC-248-FY	10/15/02
UPPER NECK FZ	DENTON	LC-248-FZ	10/15/02
UPPER NECK MX	DENTON	LC-248-MX	10/15/02
UPPER NECK MY	DENTON	LC-248-MY	10/15/02
UPPER NECK MZ	DENTON	LC-248-MZ	10/15/02
LOWER NECK FX	DENTON	LC-249-FX	10/15/02
LOWER NECK FY	DENTON	LC-249-FY	10/15/02
LOWER NECK FZ	DENTON	LC-249-FZ	10/15/02
LOWER NECK MX	DENTON	LC-249-MX	10/15/02
LOWER NECK MY	DENTON	LC-249-MY	10/15/02
LOWER NECK MZ	DENTON	LC-249-MZ	10/15/02
CHEST AX	ENDEVCO	AC-P15334	11/11/02
CHEST AY	ENDEVCO	AC-P15321	11/11/02
CHEST AZ	ENDEVCO	AC-P17758	11/11/02
CHEST DISPLACEMENT X	SERVO	DS-044	11/12/02
PELVIS AX	ENDEVCO	AC-P16755	11/11/02
PELVIS AY	ENDEVCO	AC-P15591	11/11/02
PELVIS AZ	ENDEVCO	AC-P16155	11/11/02
TETHER BELT LOAD	LEBOW	LC-712	11/12/02

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

HYBRID III INSTRUMENTATION

	POSITION #4 (LEFT) SERIAL NO.: 8481LAN		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	ENTRAN	AC-02I02I10-N25	11/13/02
HEAD AY	ENTRAN	AC-02I02I10-N09	11/13/02
HEAD AZ	ENTRAN	AC-02I02I10-N17	11/13/02
UPPER NECK FX	DENTON	LC-1037FX	12/05/02
UPPER NECK FY	DENTON	LC-1037FY	12/05/02
UPPER NECK FZ	DENTON	LC-1037FZ	12/05/02
UPPER NECK MX	DENTON	LC-1037MX	12/05/02
UPPER NECK MY	DENTON	LC-1037MY	12/05/02
UPPER NECK MZ	DENTON	LC-1037MZ	12/05/02
CHEST AX	ENTRAN	AC-02I02I10-N04	11/14/02
CHEST AY	ENTRAN	AC-02I02I10-N15	11/14/02
CHEST AZ	ENTRAN	AC-02I02I24-N07	11/14/02
CHEST DISPLACEMENT X	SERVO	DS-144	01/22/03
PELVIS AX	ENTRAN	AC-02I02I10-N01	11/13/02
PELVIS AY	ENTRAN	AC-02I02I10-N02	11/13/02
PELVIS AZ	ENTRAN	AC-02A16-A28	12/12/02
LAP BELT LOAD	LEBOW	LC-711	11/12/02
TORSO BELT LOAD	LEBOW	LC-635	11/12/02

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

CRS INSTRUMENTATION

	CRS Accelerometers		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
P3 CRS AX	ENDEVCO	AC-J32383	01/21/03
P3 CRS AY	ENDEVCO	AC-J25745	01/21/03
P3 CRS AZ	ENDEVCO	AC-J29805	01/21/03
P4 CRS AX	ENDEVCO	AC-BB51	02/11/03
P4 CRS AY	ENDEVCO	AC-J32791	02/11/03
P4 CRS AZ	ENDEVCO	AC-J31042	02/10/03