

REPORT NUMBER: CAL-04-05

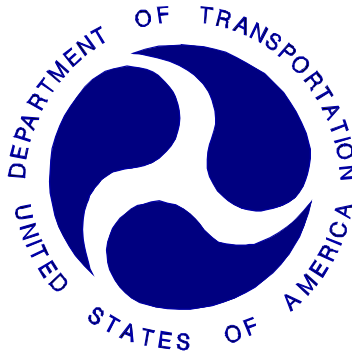
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

TOYOTA MOTOR CORPORATION
2004 TOYOTA RAV4 4X4
SUV

NHTSA NUMBER: M45108

GENERAL DYNAMICS TEST NUMBER: 8642-NCAP-41

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



January 27, 2004

FINAL REPORT

PREPARED FOR:

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

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

Prepared by:

Lawrence Q. Valvo, Project Engineer

Approved by:

David J. Travale, Program Manager
Transportation Science Center

Approval Date:

FINAL REPORT ACCEPTANCE BY OCS:

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

Date of Report Acceptance

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

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. CAL-04-05		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of NEW CAR ASSESSMENT PROGRAM (NCAP) Testing of a 2004 Toyota RAV4 4X4 SUV NHTSA No. M45108				5. Report Date January 27, 2004	
				6. Performing Organization Code CAL	
7. Author(s) David J. Travale, Program Manager Lawrence Q. Valvo, Project Engineer				8. Performing Organization Report No. 8642-NCAP-41	
9. Performing Organization Name and Address General Dynamics Advanced Information Engineering Services 4455 Genesee Street Buffalo, New York 14225				10. Work Unit No.	
				11. Contract or Grant No. DTNH22-01-D-32005	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NVS-111 400 Seventh, SW, Room 5313 Washington, D.C. 20590				13. Type of Report and Period Covered Final Report January 2004 – February 2004	
				14. Sponsoring Agency Code NVS-111	
15. Supplementary Notes					
16. Abstract A frontal load cell barrier test of a 2004 Toyota RAV4 4X4 SUV was performed at General Dynamics crash test facility in Buffalo, New York, on January 27, 2004. The impact velocity was 56.81 kph and the temperature at the barrier face was 21.1 °C. The maximum post-test vehicle crush was 482 mm. The test vehicle was equipped with 3-point restraint systems, knee bolsters, and airbags at both the driver and right outboard passenger seating positions. With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements.					
ATD Position	HIC	Clip (g's)	Chest Disp (mm)	Left Femur (N)	Right Femur (N)
Driver (061)	636.8	51.6	-31.8	-1912.1	-2557.1
Passenger (064)	248.6	56.3	-34.8	-1669.6	-1589.7
17. Key Words 56 kph Frontal Barrier Impact test New Car Assessment Program (NCAP)				18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 400 Seventh St., SW, Room 5111 Washington, DC 20590	
19. Security Classif. (of this report) UNCLASSIFIED		20. Security Classif. (of this page) UNCLASSIFIED		21. No. of Pages 307	22. Price

Form DOT F1700.7 (8-69)

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	PURPOSE AND SUMMARY OF NCAP TEST	1-1
2	OCCUPANT AND VEHICLE INFORMATION	2-1
<u>Data Sheet</u>	<u>Description</u>	
1.	CRASH TEST SUMMARY	2-1
2.	GENERAL TEST AND VEHICLE PARAMETER DATA	2-2
3.	POST IMPACT DATA	2-4
4.	TEST VEHICLE INFORMATION	2-5
5.	DUMMY POSITIONING IN VEHICLE	2-7
6.	SEAT BELT POSITIONING DATA	2-9
7.	VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY	2-10
8.	DUMMY INJURY CRITERIA VALUES	2-12
9.	SEAT BELT PERFORMANCE DATA	2-16
10.	SUMMARY OF FMVSS 212 DATA	2-17
11.	WINDSHIELD ZONE INTRUSION FMVSS 219 DATA	2-18
12.	FMVSS 301 FUEL SYSTEM INTEGRITY DATA	2-19
13.	FMVSS 301 ROLLOVER DATA	2-20
14.	VEHICLE MEASUREMENTS	2-21
15.	CAMERA DATA	2-28
16.	REFERENCE PHOTO TARGETS	2-30
17.	LOAD CELL LOCATIONS ON FIXED BARRIER	2-31
18.	POST TEST AIR BAG DATA	2-32
19.	ACCIDENT INVESTIGATION DIVISION DATA	2-33
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 56.81 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 56.81 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

1.2 TEST PROCEDURE

This 56.81 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated December 1999. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301 "Fuel System Integrity" performance. Procedures for receiving, inspection testing and reporting of test results are described in the test procedures and are not repeated in this report.

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

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

Both ATDs were fully instrumented with nine accelerometer array heads, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were installed on the driver's and passenger's lap belts to measure dummy pelvic section loading. The driver (position 1) ATD (Serial No. 061) and the right-front passenger (position 2) ATD (Serial No.064) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The vehicle, occupant, camera and measurement data are presented in Section 2. Appendix A contains the still photograph prints. The 168 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Appendix C contains the dummy calibration data and Appendix D contains the transducer calibration dates.

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 36 load cells was impacted by a 2004 Toyota RAV4 4X4 SUV at a velocity of 56.81 kph. The test was performed at General Dynamics on January 27, 2004. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The occupant data is summarized below.

	HIC	Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)	Belt Spool (mm)	Belt Stretch (mm/50 mm)
Driver ATD	636.8	51.6	-31.8	-1912.1	-2557.1	N/A	N/A
Passenger ATD	248.6	56.3	-34.8	-1669.6	-1589.7	N/A	N/A

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 482 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 the center of the airbag, back of head to outboard half of the head restraint, back of the head to the B-pillar, left and right knees to the knee bolster. The passenger's visible contact points were as follows: Face to the upper right section of the airbag, back of the head to the outboard half of the head restraint, left knee to the left edge of the glove compartment door, right knee to the center of the glove compartment door.

The 2004 Toyota RAV4 4X4 SUV 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.:	M45108	Test Mode:	56.3 kph Frontal Barrier
Test Date:	January 27, 2004	Time:	14:13
		Temperature:	21.1 °C
Vehicle Make/Model/Body Style:	2004 Toyota RAV4 4X4 SUV		
Vehicle Test Weight:	1601.5	kg	
Vehicle/Barrier Impact Angle:	0	°	
Impact Velocity:	56.81	kph	
Maximum Static Crush:	482	mm	
Vehicle Rebound:	659	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:	168		
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		
Front Seat(s) Data:		<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 the airbag; Back of head to outboard half of head restraint; Back of head to the B-pillar	Face to upper right section 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 centerline; Right knee to knee bolster right of steering column centerline	Left knee to left edge of the glove compartment door; Right knee to center of the glove compartment door

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2004 Toyota RAV4 4X4 SUV

NHTSA No. : M45108 ; VIN: JTEHD20V746004754 ; Color: Black

Engine Data: 4 cylinders; - CID; 2.4 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; - Front Wheel Drive; X 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: 1/19/2004 ; Odometer Reading 61.2 km

Selling Dealer: West-Herr Toyota

& Address: S4141 Southwestern Blvd. Orchard Park NY 14127

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Toyota Motor Corporation

Date of Manufacture 10/03

GVWR: 1854 kg; GAWR: 930 kg FRONT; 1010 kg REAR

DATA FROM TIRE PLACARD:

Recommended Tire Size: 235/60R16

* Recommended Cold Tire Pressure: 200 kpa FRONT; 200 kpa REAR

DATA FROM TIRE SIDEWALL:

Size of Tires on Test Vehicle: 235/60R16 ; Manufacturer: Toyo Tranpath

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

Treadwear: 300 ; Traction: A ; Temperature: A

VEHICLE CAPACITY DATA:

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

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

Vehicle Capacity Weight (VCW) = 345 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 4.8 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>419.5</u>	kg	Right Rear	=	<u>314</u>	kg
Left Front	=	<u>399.5</u>	kg	Left Rear	=	<u>319</u>	kg
TOTAL FRONT	=	<u>819.0</u>	kg	TOTAL REAR	=	<u>633.0</u>	kg
TOTAL DELIVERED WEIGHT	=	<u>1452.0</u>	kg				
% of Total Front of Vehicle Weight	=	<u>56.4%</u>		% of Total Rear Weight	=	<u>43.6%</u>	%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW)	=	<u>1452.0</u>	kg
Rated Cargo/Luggage Weight (RCLW)	=	<u>4.8</u>	kg
Weight of 2 p.572 Dummies @ 76 each	=	<u>152</u>	kg
TARGET TEST WEIGHT	=	<u>1608.8</u>	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND

-2.5 KG OF CARGO WEIGHT:

Right Front	=	<u>443.5</u>	kg	Right Rear	=	<u>363.0</u>	kg
Left Front	=	<u>448.0</u>	kg	Left Rear	=	<u>347.0</u>	kg
TOTAL FRONT	=	<u>891.5</u>	kg	TOTAL REAR	=	<u>710.0</u>	kg
TOTAL TEST WEIGHT	=	<u>1601.5</u>	kg				
% of Total Front Weight	=	<u>55.7%</u>	%	% of Total Rear Weight	=	<u>44.3%</u>	%
Weight of Ballast Secured in Vehicle Trunk Area	=	<u>0</u>	kg				

Vehicle Components Removed for Weight Reduction:

Muffler, tail lights, spare tire, P4 seat, rear carpeting, left rear interior trim and spoiler.

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED:	RF	<u>794</u>	LF	<u>795</u>	RR	<u>791</u>	LR	<u>789</u>
FULLY LOADED:	RF	<u>778</u>	LF	<u>781</u>	RR	<u>774</u>	LR	<u>774</u>
AS TESTED:	RF	<u>784</u>	LF	<u>787</u>	RR	<u>774</u>	LR	<u>780</u>
Vehicle's Wheel Base:		<u>2489</u>	mm					
Location of Vehicle's C.G.:		<u>1103</u>	mm rearward of front wheel center.					

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual	=	<u>56</u>	liters
Usable Capacity Figure Furnished by COTR	=	<u>57.2</u>	liters
Test Volume Range (92 to 94% of Usable Capacity)	=	<u>52.62</u>	to <u>53.77</u> liters
ACTUAL TEST VOLUME	=	<u>18.9</u>	liters (with entire fuel system filled)*
Test Fluid Type:	<u>Stoddard Solution</u>	; Spec. Grav. =	<u>0.764</u>
Kinematic Viscosity	=	<u>0.96</u>	centistokes; Color = <u>Orange</u>
Type of Fuel Pump:	Electric- <u>X</u>	; Mechanical- <u>-</u>	
Does Electric Pump operate with ignition switch "ON" & engine "OFF"		Yes- <u>X</u>	No- <u>-</u>
<u>Details of Fuel System: The fuel tank is located on the vehicle underbody forward of the rear axle; The fuel filler is located on the left rear quarter panel rearward of the rear axle; The fuel lines are routed along the vehicle underbody inboard of the left body stiffener.</u>			

* Reduced stoddard volume was necessary to achieve target test weight.

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°
Test Date: January 27, 2004 Time: 14:13 Temperature: 21.1 °C
Vehicle NHTSA No.: M45108
Required Impact Velocity Range: 55.5 to 57.1 kph

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

Trap No. 1 = 56.81 kph; Trap No. 2 = 56.81 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>4022</u> ; C/L = <u>4067</u> ; Right = <u>4031</u>
Post-Test	Left = <u>3608</u> ; C/L = <u>3585</u> ; Right = <u>3570</u>
Crush	Left = <u>414</u> ; C/L = <u>482</u> ; Right = <u>461</u>
AVERAGE	= <u>452</u> mm

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

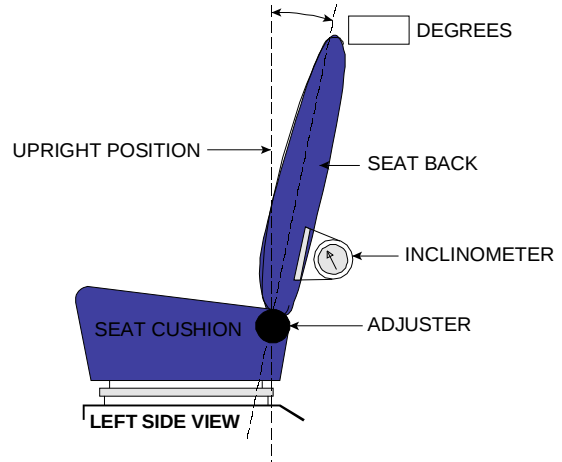
	Left = <u>688</u> ; C/L = <u>645</u> ; Right = <u>643</u>
AVERAGE	= <u>659</u> mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2004 Vehicle Model: Toyota RAV4 4X4 Body Style : SUV

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: 6.0 (measured on the head restraint post)

Measurement instructions: Where the most upright position is defined as 0, position the seat back in detent 4.

This position is 8.0 degrees from its most upright position.

Seat back angle for passenger's seat: 4.0 (measured on the head restraint post)

Measurement instructions: Where the most upright position is defined as 0, position the seat back in detent 5.

This is 10.0 degrees from the most upright position.

2. Seat Fore and Aft Positioning

Positioning of the driver's seat: Where the most forward position is defined as 0, position the seat in detent 8. There are a total of 17 detents.

Positioning of the passenger's seat: Where the most forward position is defined as 0, position the seat in detent 8. There are a total of 17 detents.

3. Fuel Tank Capacity Data

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 56 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 = 57.2 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 18.9 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 vehicle fuel pump operates briefly when the ignition is placed in the 'on' position and the engine is not started.

The vehicle fuel pump operates continuously while the engine is running.

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

4. STEERING COLUMN ADJUSTMENTS:

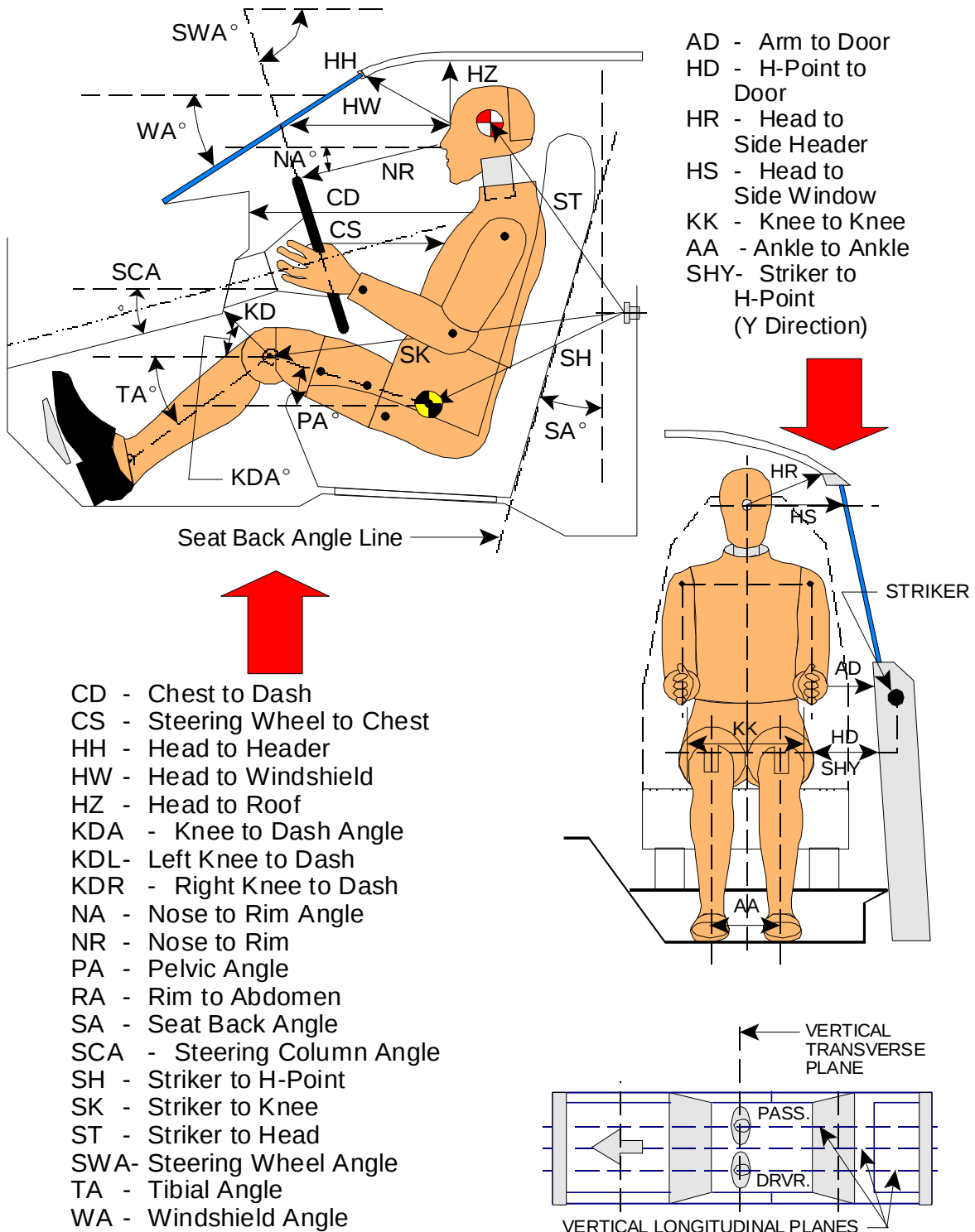
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine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

Operational Instructions: Steering column is positioned 1.8 degrees upward from its lowermost
position (mid position). The steering column angle is 28 degrees relative to the rocker panel.

5. SEAT BELT UPPER ANCHORAGE

Nominal design riding position: Where the upper most position is defined as 0, the shoulder belt anchor
is positioned in detent 1 (5 detents total).

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



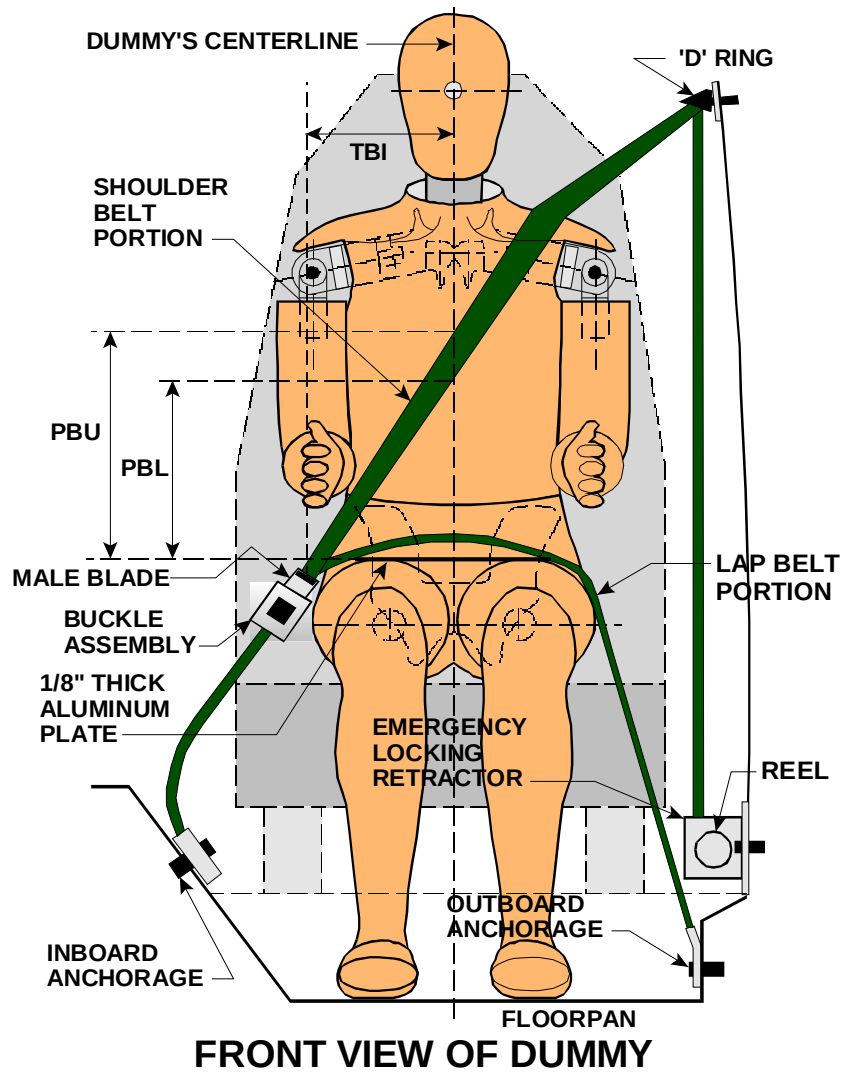
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #061)			PASS. (Serial #064)		
WA ^o	34.0 deg.			N/A		
SWA ^o	61.7 deg.			N/A		
SCA ^o	28.3 deg.			N/A		
SA ^o	6.0 deg. (head rest post)			4.0 deg. (head rest post)		
HZ	242			215		
HH	398			366		
HW	660			595		
HR	229			206		
NR	440	Angle	12 deg.	N/A		
CD	538			554		
CS	315			N/A		
RA	200			N/A		
KDL	154	Angle (KDA)	27 deg.	134		
KDR	130			135	Angle (KDA)	27 deg.
PA ^o	24.9 deg.			21.5 deg.		
TA ^o	52.3 deg.			47.3 deg.		
KK	410			322		
AA	334			211		
ST	531	Angle	4 deg.	548	Angle	7 deg.
SK	554	Angle	90 deg.	575	Angle	92 deg.
SH	202	Angle	123 deg.	204	Angle	118 deg.
SHY	220			216		
HS	334			320		
HD	190			182		
AD	84			97		

Dimensions in millimeters

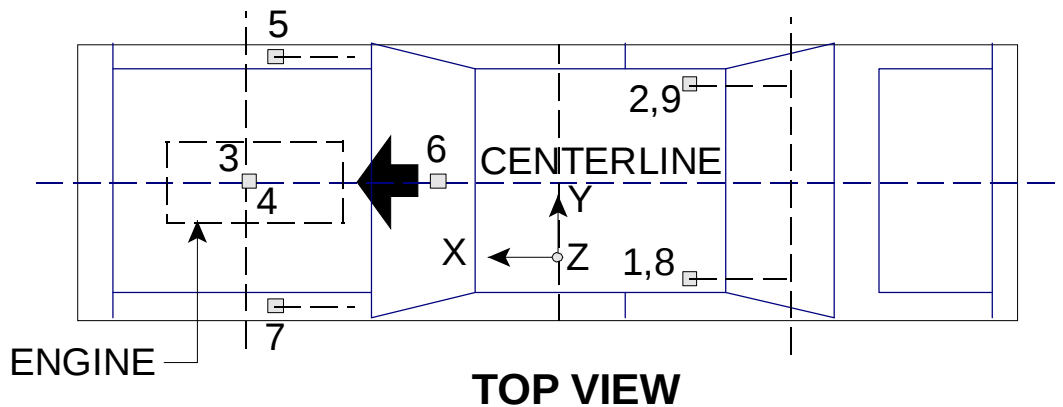
DATA SHEET NO. 6 SEAT BELT POSITIONING DATA

SEAT BELT POSITIONING DATA

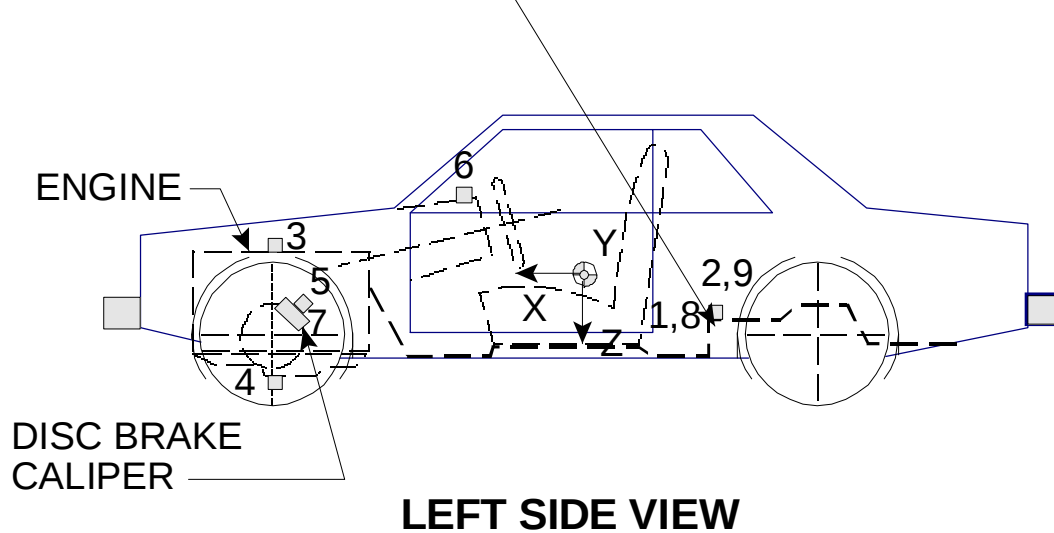


	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	346	363
PBL-- Top surface of alum. plate to belt lower edge	264	279
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

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	1661	-679	-383
2	Right Rear Seat Cross Member X	1665	659	-389
3	Top of Engine Block	3385	281	-821
4	Bottom of Engine	3057	-110	-181
5	Disc Brake Caliper @ Right Side	3442	808	-309
6	Instrument Panel	2611	-7	-1091
7	Disc Brake Caliper @Left Side	3440	-802	-304
8	Left Rear Seat Cross Member Z	1661	-679	-383
9	Right Rear Seat Cross Member Z	1665	659	-389

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Left Rear Seat Cross Member X	2.9	97.2	-45.6	31.1
2	Right Rear Seat Cross Member X	2.6	-22.5	-48.1	32.6
3	Top of Engine Block	39.4	31.3	-144.9	19.8
4	Bottom of Engine	22.0	38.8	-139.2	23.5
5	Disc Brake Caliper @ Right Side	65.5	53.4	-128.1	36.0
6	Instrument Panel	63.1	64.3	-102.9	69.5
7	Disc Brake Caliper @Left Side	33.3	58.0	-131.1	35.3
8	Left Rear Seat Cross Member Z	9.3	31.6	-15.6	48.7
9	Right Rear Seat Cross Member Z	10.2	29.4	-11.1	48.6

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

Vehicle Year/Make/Model/Body Style: 2004 Toyota RAV4 4X4 SUV

NHTSA Test No.: M45108 Test Date: January 27, 2004

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head 9 Array X Arm Y	g	10.0	56.1	-5.4	247.3	10.9	53.9	-2.4	28.9
Head 9 Array X Arm Z	g	23.4	53.4	-14.7	85.9	27.5	84.8	-12.6	124.1
Head 9 Array Y Arm X	g	23.3	208.6	-71.4	75.7	5.0	226.1	-41.6	75.4
Head 9 Array Y Arm Z	g	21.0	52.4	-16.5	91.2	22.3	84.9	-1.5	13.8
Head 9 Array Z Arm X	g	29.5	203.7	-66.0	73.3	11.1	34.9	-49.2	124.0
Head 9 Array Z Arm Y	g	10.7	58.8	-6.4	240.4	10.7	106.3	-2.0	24.3
Head X	g	21.4	208.8	-70.2	75.8	4.2	225.1	-40.0	74.0
Head Y	g	11.7	75.9	-4.8	250.3	11.1	78.8	-4.8	24.1
Head Z	g	19.3	58.4	-15.6	92.0	19.3	45.5	-1.2	13.7
Head Resultant	g	71.1	75.8	0.1	-31.6	40.9	73.9	0.1	-24.6
Redundant Head X	g	21.3	208.8	-69.8	75.8	4.4	227.8	-38.9	70.2
Redundant Head Y	g	11.4	75.9	-4.8	249.8	10.2	76.1	-5.2	35.2
Redundant Head Z	g	18.7	57.5	-15.2	91.9	19.3	57.7	-1.2	13.7
Redundant Head Resultant	g	70.6	75.8	0.1	-37.7	40.4	70.2	0.1	-21.7
Upper Neck Fx	N	166.9	265.6	-350.5	131.3	227.4	65.0	-1163.1	124.5
Upper Neck Fy	N	203.6	266.5	-83.3	89.2	179.7	114.4	-128.6	53.9
Upper Neck Fz	N	1824.8	68.2	-568.3	218.8	1507.9	55.5	-196.0	299.5
Upper Neck F Resultant	N	1825.8	68.2	3.1	-29.5	1511.8	55.5	5.3	-49.3
Upper Neck Mx	N-m	22.2	216.4	-9.9	78.0	19.8	106.3	-13.1	73.3
Upper Neck My	N-m	42.4	121.3	-54.0	220.8	88.5	121.6	-23.1	216.7
Upper Neck Mz	N-m	6.0	126.6	-13.3	81.5	6.2	121.0	-17.5	74.2
Upper Neck M Resultant	N-m	57.1	220.2	0.1	-21.8	89.0	121.6	0.1	-14.0
Chest X	g	3.0	134.4	-53.1	69.2	4.3	107.4	-57.2	68.1
Chest Y	g	5.6	81.7	-4.9	28.9	3.5	28.4	-10.3	78.9
Chest Z	g	13.0	94.3	-7.6	42.9	10.8	45.2	-13.7	98.3
Chest Resultant	g	53.2	69.1	0.0	-38.2	57.2	68.1	0.1	-24.8

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

Vehicle Year/Make/Model/Body Style: 2004 Toyota RAV4 4X4 SUV

NHTSA Test No.: M45108 Test Date: January 27, 2004

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Redundant Chest X	g	3.1	134.4	-52.1	69.0	4.3	107.0	-55.7	67.9
Redundant Chest Y	g	5.9	81.9	-4.9	28.8	40.7††	112.9	-10.5	75.6
Redundant Chest Z	g	12.9	92.8	-8.7	43.3	10.3	45.2	-13.9	98.4
Redundant Chest Resultant	g	52.2	69.0	0.0	-38.1	55.7	67.9	0.1	-25.5
Chest Displacement	mm	0.0	-34.3	-31.8	69.6	0.0	-14.8	-34.8	67.6
Pelvic X	g	7.0	97.3	-61.6	48.4	8.1	99.4	-78.2	63.3
Pelvic Y	g	10.7	91.4	-10.8	48.9	11.2	60.9	-13.0	86.9
Pelvic Z	g	3.7	244.7	-32.5	77.6	4.8	38.8	-26.8	77.8
Pelvic Resultant	g	64.4	48.5	0.0	-37.5	80.7	63.3	0.1	-26.2
Left Femur	N	832.0	42.1	-1912.1	51.9	561.0	44.5	-1669.6	49.8
Right Femur	N	1164.1	39.3	-2557.1	48.5	1015.8	78.7	-1589.7	57.7
Left Upper Tibia Mx	N-m	34.2	56.9	-9.2	46.6	16.8	85.1	-38.6	56.6
Left Upper Tibia My	N-m	11.7	120.7	-141.8	57.0	42.5	50.4	-104.6	42.9
Left Lower Tibia Fz	N	76.8	137.2	-1724.3†	65.5	122.9	111.6	-2631.1	40.5
Left Lower Tibia Mx	N-m	14.0	56.4	-27.6	73.7	11.8	40.7	-12.8	53.5
Left Lower Tibia My	N-m	46.3	83.0	-51.3	57.1	32.2	51.4	-84.9	43.5
Right Upper Tibia Mx	N-m	18.7	56.6	-24.2	47.6	30.9	65.1	-22.7	53.0
Right Upper Tibia My	N-m	32.2	79.0	-103.5	40.0	31.5	62.0	-89.0	37.2
Right Lower Tibia Fz	N	360.7	43.5	-857.4	46.0	159.2	115.4	-2857.1	78.3
Right Lower Tibia Mx	N-m	34.8	56.7	-35.7	41.9	9.3	44.7	-11.1	65.4
Right Lower Tibia My	N-m	122.6	54.9	-106.0	40.1	52.9	76.2	-35.9	35.5
Left Foot Aft Ax	g	18.1	84.9	-53.6	58.5	495.4‡	82.7	-234.7‡	37.6
Left Foot Aft Az	g	3.7	47.8	-34.2	61.5	27.3	36.3	-70.1	41.9
Left Foot Fore Az	g	10.4	12.0	-48.4	58.4	130.5	49.1	-235.5	42.0
Right Foot Aft Ax	g	54.4	58.2	-173.9	40.8	22.4	73.1	-101.7	39.6
Right Foot Aft Az	g	9.8	60.1	-146.2	44.5	5.4	193.6	-35.3	41.8
Right Foot Fore Az	g	109.3	52.4	-246.3	44.3	29.6	67.0	-58.7	34.1
Lap Belt Load	N	9015.2	58.3	-16.3	4.4	9122.7	59.8	-14.3	3.2

† Data Questionable: 61-68 ms

†† Data Questionable: 111-115 ms

‡ Data is Questionable

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

Vehicle Year/Make/Model/Body Style: 2004 Toyota RAV4 4X4 SUV

NHTSA Test No.: M45108 Test Date: January 27, 2004

HEAD INJURY CRITERIA (HIC)				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	636.8	60.5	91.0	53.4
Position #2 - Passenger	248.6	53.8	89.8	34.3

** 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	51.6	67.4	70.4	558.0
Position #2 - Passenger	56.3	65.6	68.7	565.9

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

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

Vehicle Year/Make/Model/Body Style: 2004 Toyota RAV4 4X4 SUV

NHTSA Test No.: M45108 Test Date: January 27, 2004

HEAD INJURY CRITERIA (HIC) REDUNDANT				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	615.9	60.4	91.3	52.5
Position #2 - Passenger	246.4	53.5	89.5	34.2

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

CLIP SUMMARY* REDUNDANT				
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #1 - Driver	51.2	67.1	70.1	554.9
Position #2 - Passenger	54.7	65.6	68.6	540.7

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

DATA SHEET NO. 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

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

Driver

Passenger

1874

1895

Shoulder belt length as measured
on Part 572 Dummy.

822

843

Lap belt length as measured
on Part 572 Dummy.

822

822

BELT STRETCH DATA:

Measured mechanically.

0 mm/m

0 mm/m

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 9 mm molding.

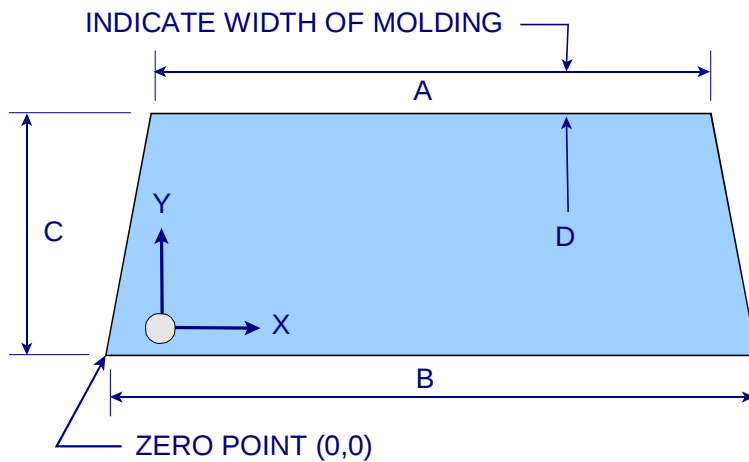
FMVSS 212 REQUIREMENTS:

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	2062.5	2062.5	100.0%
LEFT SIDE	2062.5	2062.5	100.0%
TOTAL	4125	4125	100.0%

AREA OF RETENTION FAILURE: None



DIMENSIONS (mm)	
A	1175
B	1470
C	740
D	9

FRONT VIEW OF WINDSHIELD

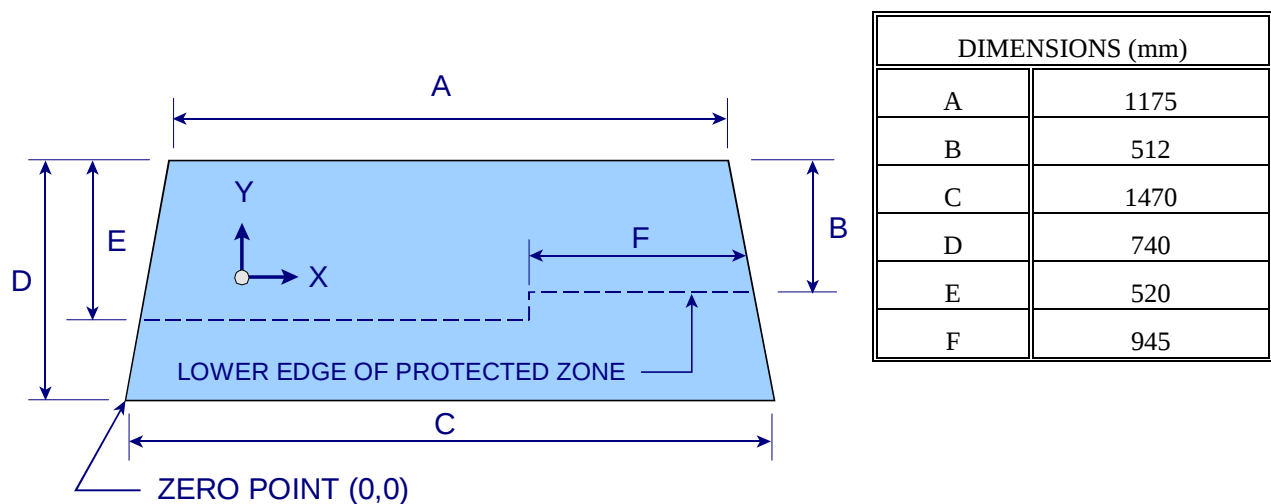
FAILURE DETAILS: None

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

PROTECTED ZONE LOWER EDGE REQUIREMENT:

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

FMVSS 219 TEST DATA:



FRONT VIEW OF WINDSHIELD

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

(Show location of penetration on the above sketch)

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

DATA SHEET NO. 12 FMVSS NO. 301-75 "FUEL SYSTEM INTEGRITY" POST IMPACT TEST DATA

NHTSA TEST No.: M45108 TEST DATE: January 27, 2004

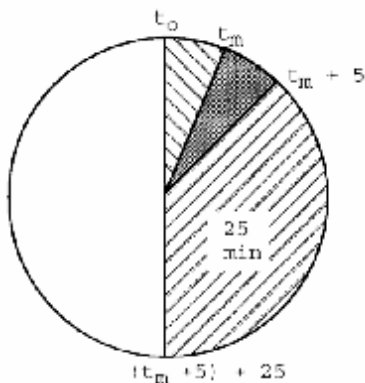
VEHICLE MAKE/MODEL: 2004 Toyota RAV4 4X4 SUV

The test vehicle was filled from 92% to 94% of the manufacture's "usable" capacity. The electric fuel pump was operating if it will operate without engine operation. Two Part 572 anthropomorphic test devices were located at each of the front designated seating positions.

=====

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

FUEL SPILLAGE MEASUREMENT:



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

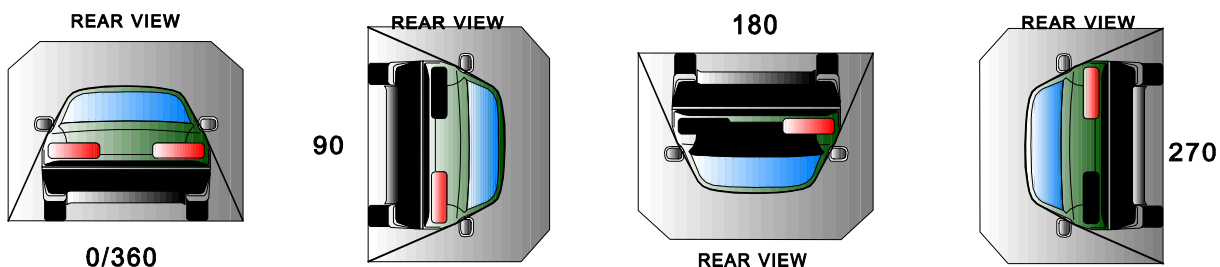
ACTUAL	MAX ALLOWED
0	28 g
0	141 g
0	28 g/min.

SOLVENT SPILLAGE DETAILS: None

DATA SHEET NO. 13 - ROLLOVER DATA

Vehicle: 2004 Toyota RAV4 4X4 SUV

NHTSA No.: M45108



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	20	seconds	5	minutes	6	minutes	20	seconds	7	minutes
90° - 180°	1	minutes	6	seconds	5	minutes	6	minutes	6	seconds	7	minutes
180°-270°	1	minutes	2	seconds	5	minutes	6	minutes	2	seconds	7	minutes
270°-360°	1	minutes	5	seconds	5	minutes	6	minutes	5	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:

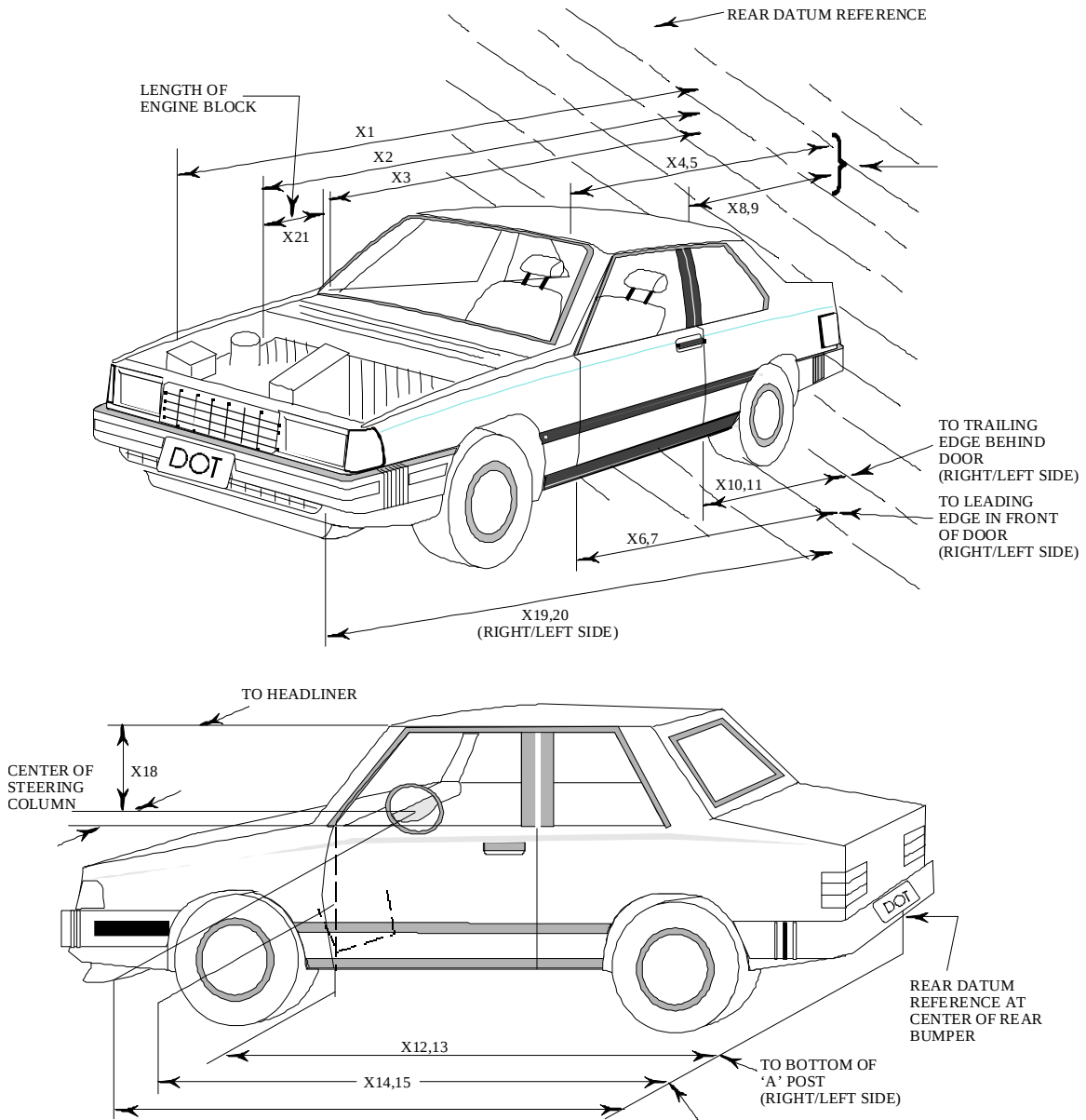
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	N/A
90° - 180°	0	0	0	N/A
180°-270°	0	0	0	N/A
270°-360°	0	0	0	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S):

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

DATA SHEET NO. 14 TEST VEHICLE MEASUREMENTS

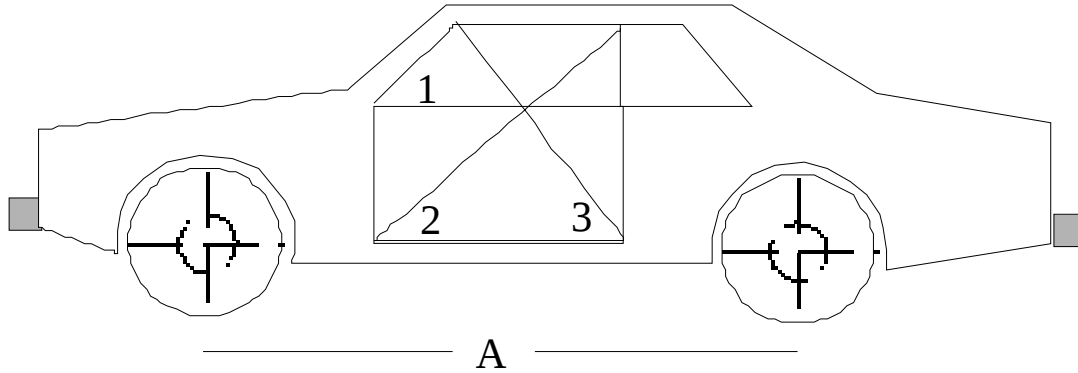


DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4067	3585	482
X2	Rear Surface of Vehicle to Front of Engine	3558	3272	286
X3	Rear Surface of Vehicle to Firewall	3205	3136	69
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	2776	2776	0
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	2783	2781	2
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	2779	2776	3
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	2781	2782	-1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	1789	1785	4
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	1796	1793	3
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	1772	1772	0
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	1779	1782	-3
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	2788	2788	0
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	2794	2796	-2
X14	Rear Surface of Vehicle to Firewall, Right Side	3357	3265	92
X15	Rear Surface of Vehicle to Firewall, Left Side	3151	3119	32
X16	Rear Surface of Vehicle to Steering Column	2367	2399	-32
X17	Center of Steering Column to "A" Post	304	303	1
X18	Center of Steering Column to Headliner	464	443	21
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4031	3570	461
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4022	3608	414
X21	Length of Engine Block	336	336	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2561	2560	1
CD	Rear Surface of Vehicle to Center of Dash Panel	2632	2621	11
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2562	2561	1

All Dimensions in mm

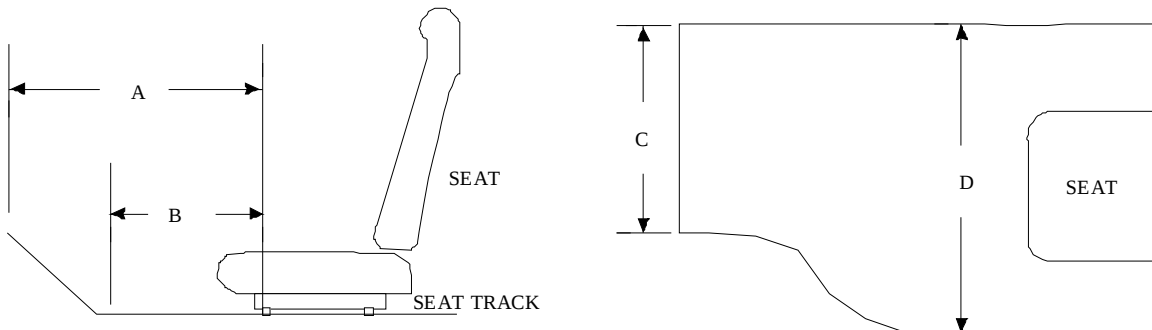
DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
 VEHICLE INTRUSION MEASUREMENTS
 DOOR OPENING WIDTH



UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	937	1494	1083	938	1497	1093
AFTER TEST	928	1493	1083	932	1496	1102
DIFFERENCE	9	1	0	6	1	-9

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2489	2489
AFTER TEST	2392	2391
DIFFERENCE	97	98

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



DRIVER

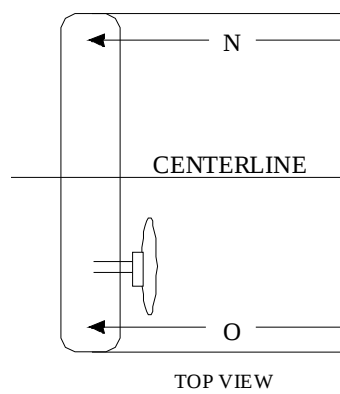
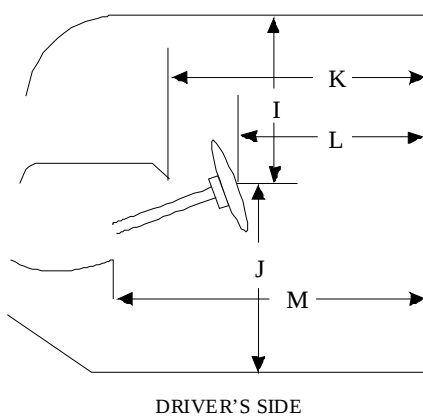
Measurement	Pre-Test	Post-Test	Difference
A	729	605	124
B	486	471	15
C	507	490	17
D	523	519	4

PASSENGER

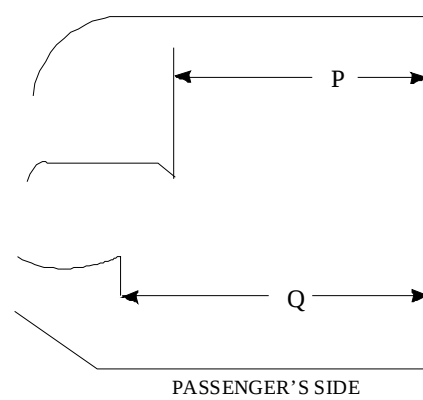
Measurement	Pre-Test	Post-Test	Difference
A	680	577	103
B	419	394	25
C	474	469	5
D	522	499	23

Units = mm

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



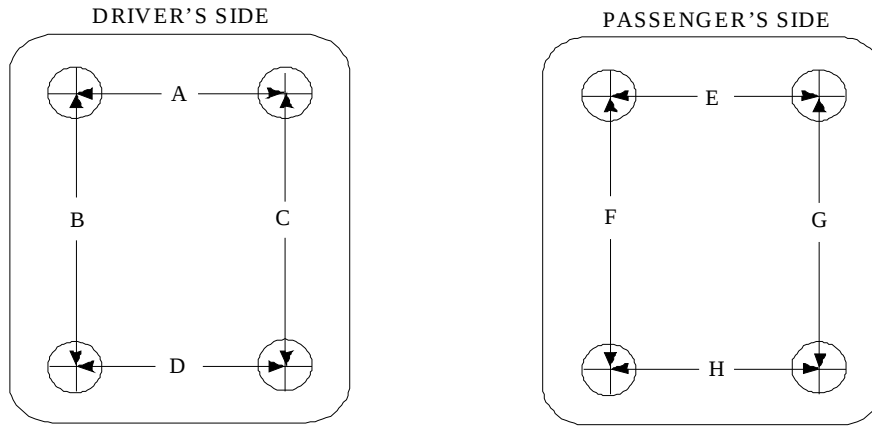
MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



Measurement	Pre-Test	Post-Test	Difference
I	464	443	21
J	691	716	-25
K	1662	1655	7
L	1467	1495	-28
M	1761	1770	-9
N	1649	1664	-15
O	1662	1657	5
P = K (PASS.)	1811	1814	-3
Q = M (PASS.)	1691	1731	-40

Units = mm

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

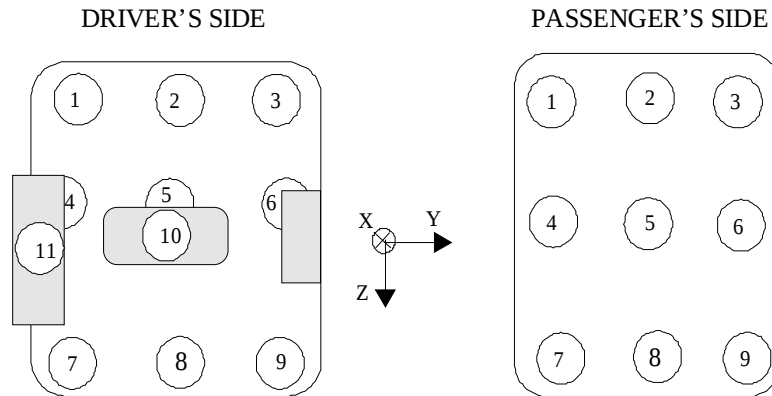


TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	507	490	17
B	244	228	16
C	228	213	15
D	523	519	4
E	474	469	5
F	270	281	-11
G	223	199	24
H	522	499	23

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	3001	2899	102	-566	-576	10
2	3053	2925	128	-505	-572	67
3	3061	2889	172	-535	-561	26
4	2915	2894	21	-406	-428	22
5	2959	2896	63	-425	-436	11
6	2964	2859	105	-425	-434	9
7	2779	2776	3	-348	-357	9
8	2810	2790	20	-357	-328	-29
9	2799	2778	21	-361	-325	-36
10	2824	2728	96	-525	-541	16
11	2809	2793	16	-433	-443	10

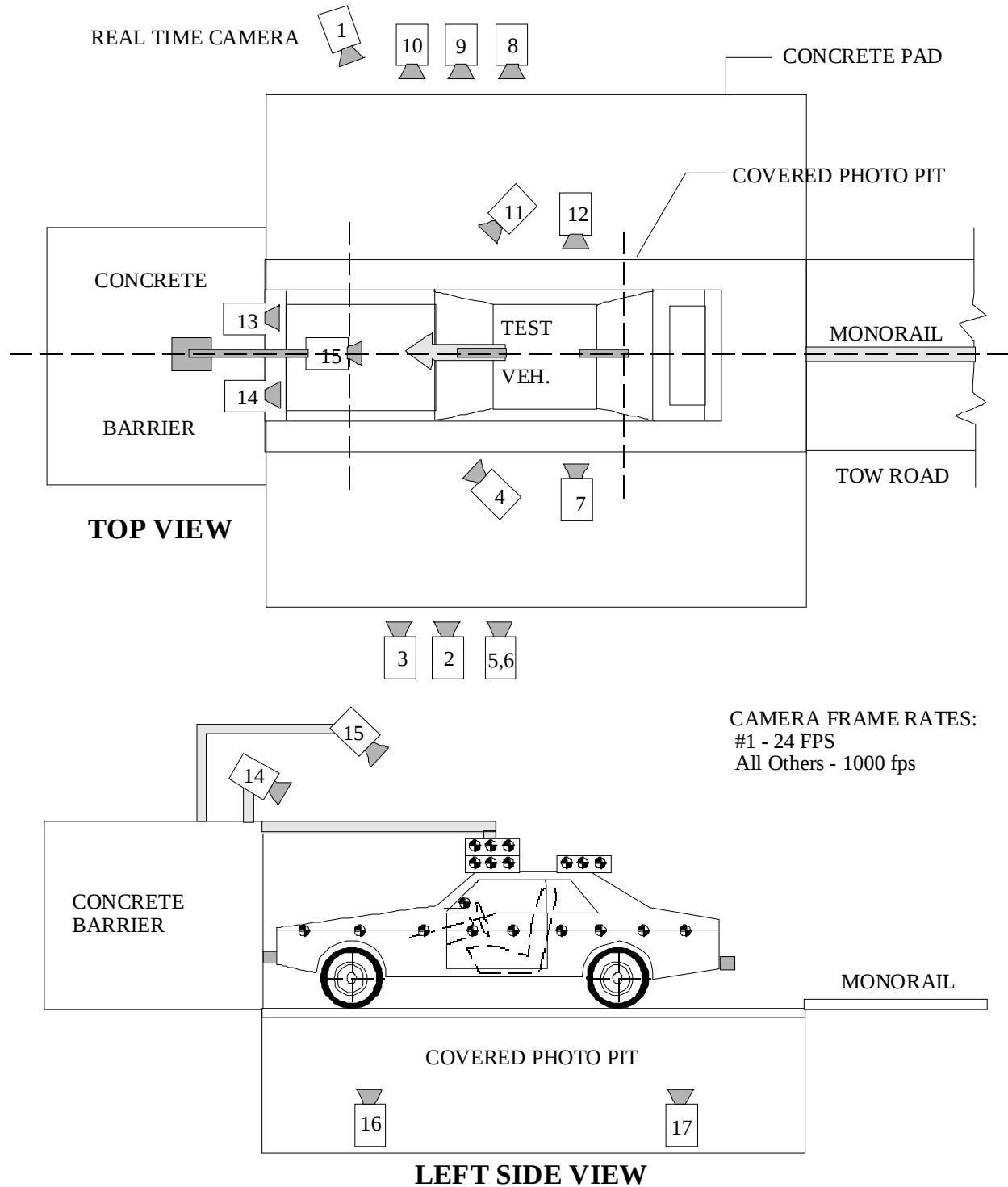
Passenger Side Toe-pan Measurements

Toe-pan Location	X Deformation (mm)			Z Deformation (mm)		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3014	2887	127	-498	-535	37
2	3002	2889	113	-492	-533	41
3	2949	2879	70	-552	-568	16
4	2876	2830	46	-431	-420	-11
5	2877	2840	37	-428	-421	-7
6	2886	2858	28	-426	-433	7
7	2739	2704	35	-368	-358	-10
8	2740	2706	34	-365	-359	-6
9	2738	2719	19	-363	-365	2

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

DATA SHEET NO.15 HIGH-SPEED CAMERA LOCATIONS

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



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

NHTSA Test No.: M45108 Vehicle: 2004 Toyota RAV4 4X4 SUV

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	6096	1555	1098	-1.7	5732	12.5	1020
3	Left Side View	7690	939	1110	-2.6	7326	25	1030
4	Driver and Interior View	6841	2485	2000	-9.0	-	25	1055
5	Steering Column (Bottom)	6886	1845	1170	-2.8	6522	25	1025
6	Steering Column (Top)	6886	1845	1780	-7.7	6522	25	1030
7	Left Lateral CRS View	3240	2760	2315	-22.0	-	28-70	1000
8	Overall Right Side	6146	1729	1065	-3.8	6429	12.5	1020
9	Right Side View	7620	1085	1128	-2.3	7903	25	1015
10	Right Passenger View	7461	1665	1325	-2.0	7744	35	1020
11	Passenger and Interior View	6771	2405	1975	-7.4	-	25	1005
12	Right Lateral CRS View	3235	2670	2365	-25.0	-	28-70	1000
13	Passenger Front View	620	-92	1987	-36.8	-	13	1025
14	Driver Front View	620	-92	1987	-37.5	-	13	1025
15	Windshield View	0	-530	3374	-51.7	-	13	1010
16	Pit View of Engine	0	615	-3048	90	-	13	1005
17	Pit View of Fuel Tank	0	2310	-3048	90	-	13	1000

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

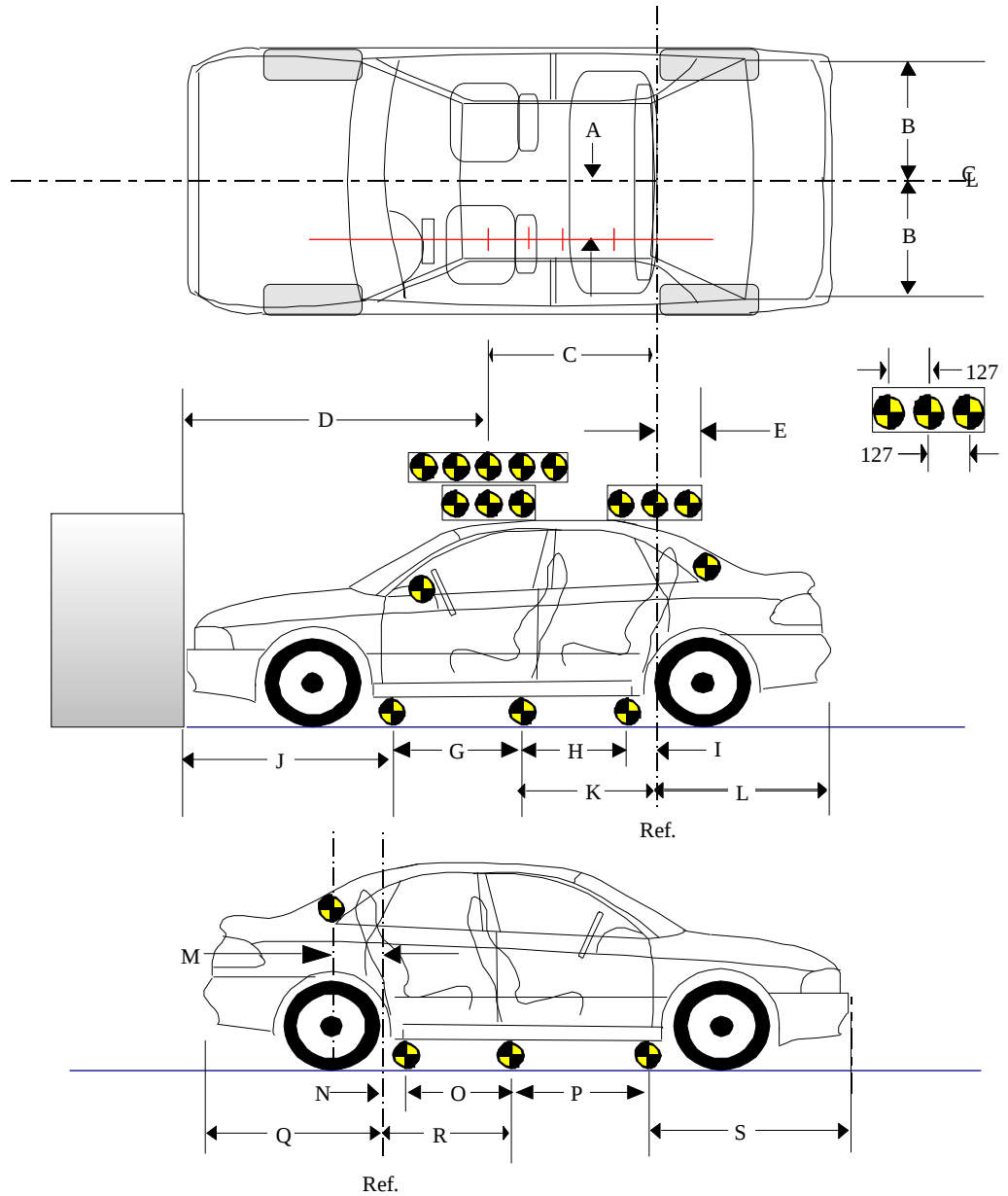
Y = film plane to impact location N.T. indicates No Timing

Z = film plane to ground

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

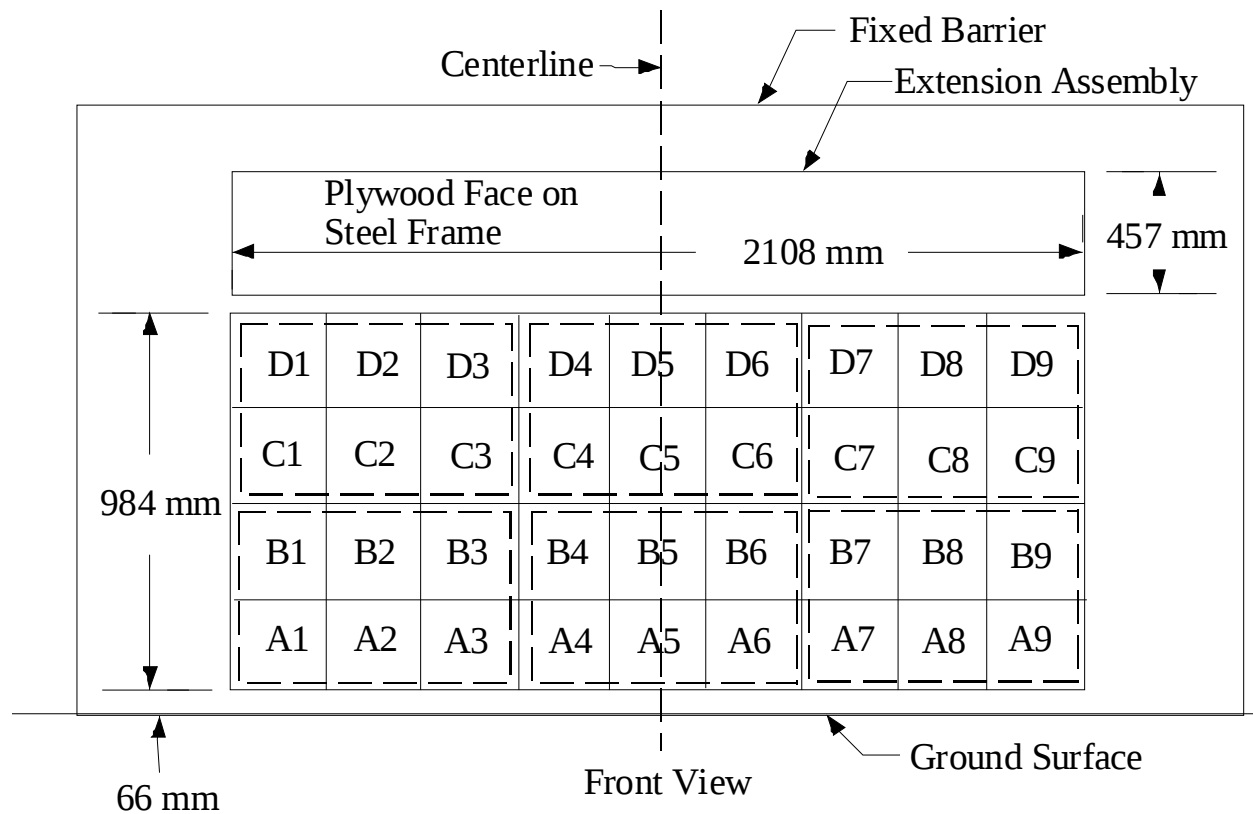
(Dimensions in millimeters)

A	359
B	647
C	916
D	1947
E	297
F	1319
G	801
H	739
I	122
J	1243
K	861
L	1162
M	309
N	1110
O	808
P	743
Q	1161
R	918
S	1245



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.: M45108; Test Date: January 27, 2004; Technician: Lawrence Q. Valvo

Vehicle Model Year/Make/Model: 2004 Toyota RAV4 4X4 SUV

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

B. Size of vent holes: (mm²) 450 -Driver 3318 -Passenger

C. Total vent area: (mm²) 900 -Driver 6636 -Passenger

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

Driver: 550 -Height; 550 -Width; 310 -Depth

Passenger: 600 -Height; 640 -Width; 520 -Depth

E. Is the air bag tethered?

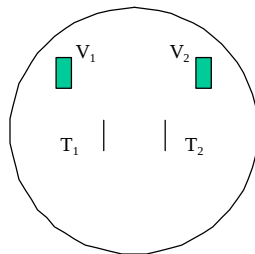
Driver: X -Yes; - -No; If yes, record length of tether- 360

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

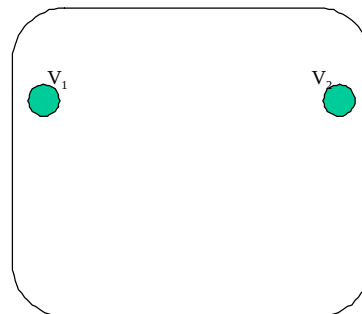
Sketch the air bag showing the location of the vent holes, how the bag is tethered, and where the bag is tethered. Also describe how the tethers are attached to the bag and the steering wheel.

(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: GA120-05600, 05603060209

Generator: ZARP064317

Passenger: Air bag: GA220-00580, 8F3064684

Generator: H04694503P 1N

DATA SHEET NO. 19 ACCIDENT INVESTIGATION DIVISION DATA

FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Toyota RAV4 4X4 SUV

NHTSA Test No.: M45108 VIN: JTEHD20V746004754

Model Year: 2004 Build Date: 10/03 Test Date: January 27, 2004

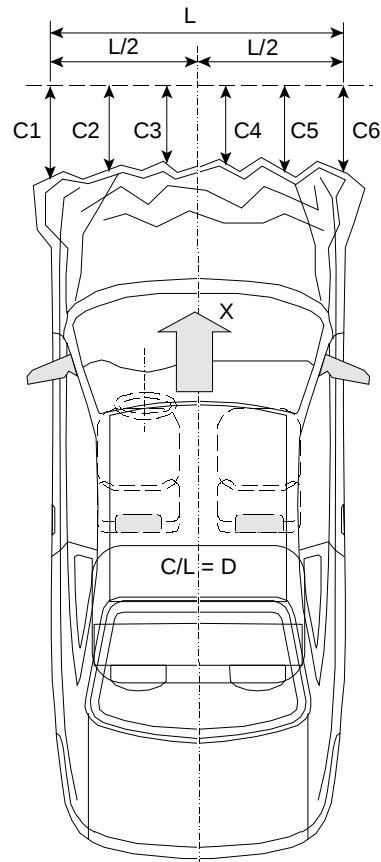
Vehicle Size Category: MPV Test Weight: 1601.5 kg

Vehicle Wheelbase: 2489 mm; Front Overhang: 764 mm; Overall Width: 1785 mm

Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	3859	3604	255
C2 =	4027	3601	426
C3 =	4061	3589	472
C4 =	4064	3582	482
C5 =	4031	3570	461
C6 =	3860	3628	232



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region:

L1=	<u>1546</u>	mm
L2=	<u>773</u>	mm
L5=	<u>309</u>	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

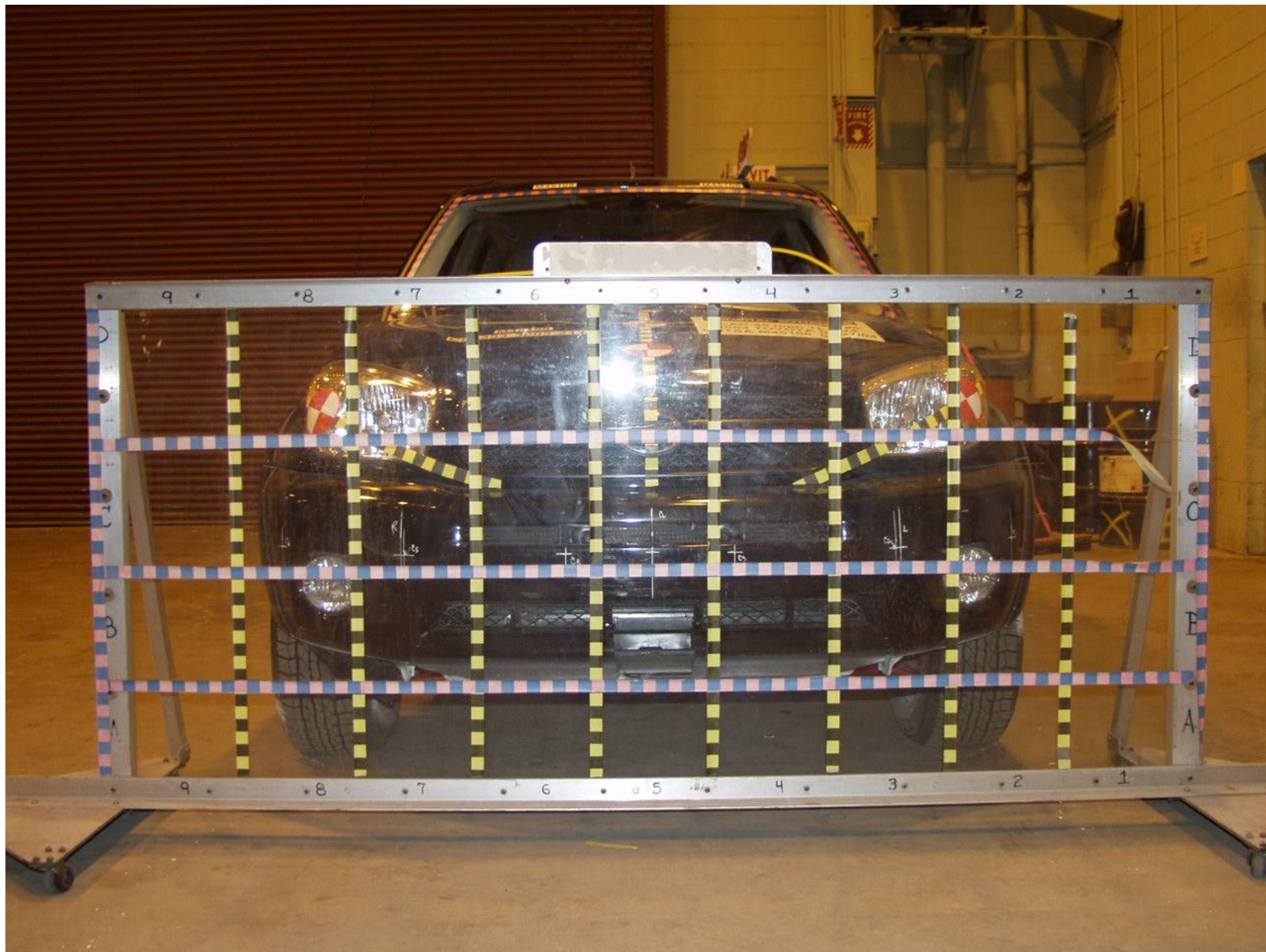


Figure A-1 LOAD CELL LOCATIONS

* MFD. BY: TOYOTA MOTOR CORPORATION

DATE 10/03

GVWR: 1854KG (4087LB)

GAWR: FRT. 930KG (2050LB) WITH 235/60R16 TIRES.

16X7JJ RIMS. AT 200KPA (29PSI) COLD.

RR. 1010KG (2227LB) WITH 235/60R16 TIRES.

16X7JJ RIMS. AT 200KPA (29PSI) COLD.

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

JTEHD20V746004754

MPV

ACA23L-AWPNKA

C/TR 202/FB41

A/TM -07A/

U140F

MADE IN JAPAN

NO. 768



*

Figure A-2 VEHICLE CERTIFICATION PLACARD

CAUTION
 4WD VEHICLE



TIRE AND LOADING INFORMATION

SEATING CAPACITY: TOTAL 5
FRONT 2: REAR 3

The combined weight of occupants and cargo should never exceed 345 kg or 760 lbs.

ORIGINAL TIRE SIZE	COLD TIRE INFLATION PRESSURE	
235/60R16	FRONT	200kPa, 29PSI
	REAR	200kPa, 29PSI

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

42191

INFORMATION SUR LES PNEUS ET LE CHARGEMENT

NOMBRE DE PLACES ASSISES : TOTAL 5
AVANT 2 : ARRIÈRE 3

Le poids total des occupants et du chargement ne doit jamais être supérieur à 345 kg ou 760 lb.

DIMENSION DES PNEUS D'ORIGINE	PRESSION DE GONFLAGE À FROID	
235/60R16	AVANT	200kPa, 29PSI
	ARRIÈRE	200kPa, 29PSI

POUR DE PLUS AMPLES INFORMATIONS, VOIR LE MANUEL DU PROPRIÉTAIRE

KS

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

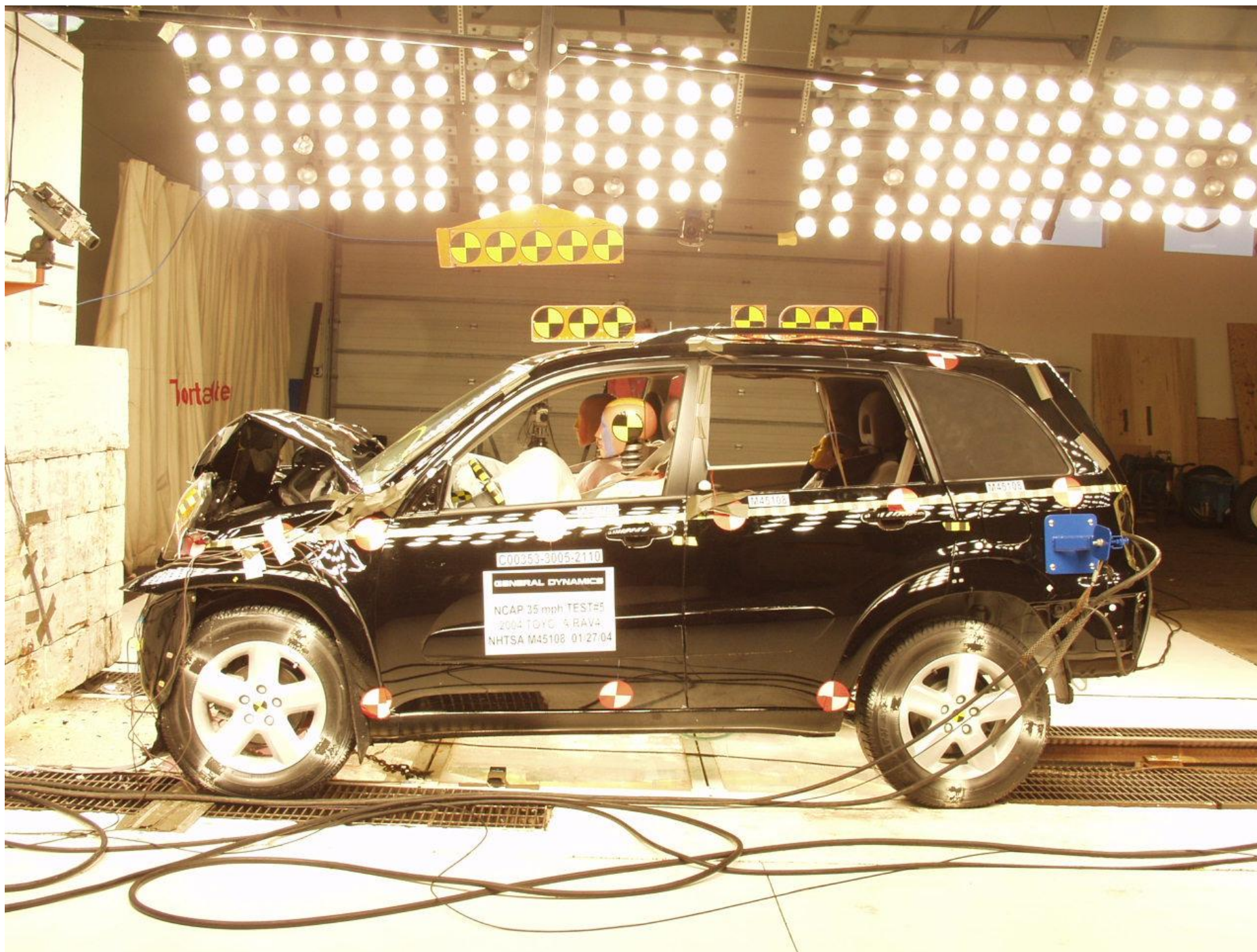


Figure A-9 POST-TEST LEFT SIDE VIEW



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

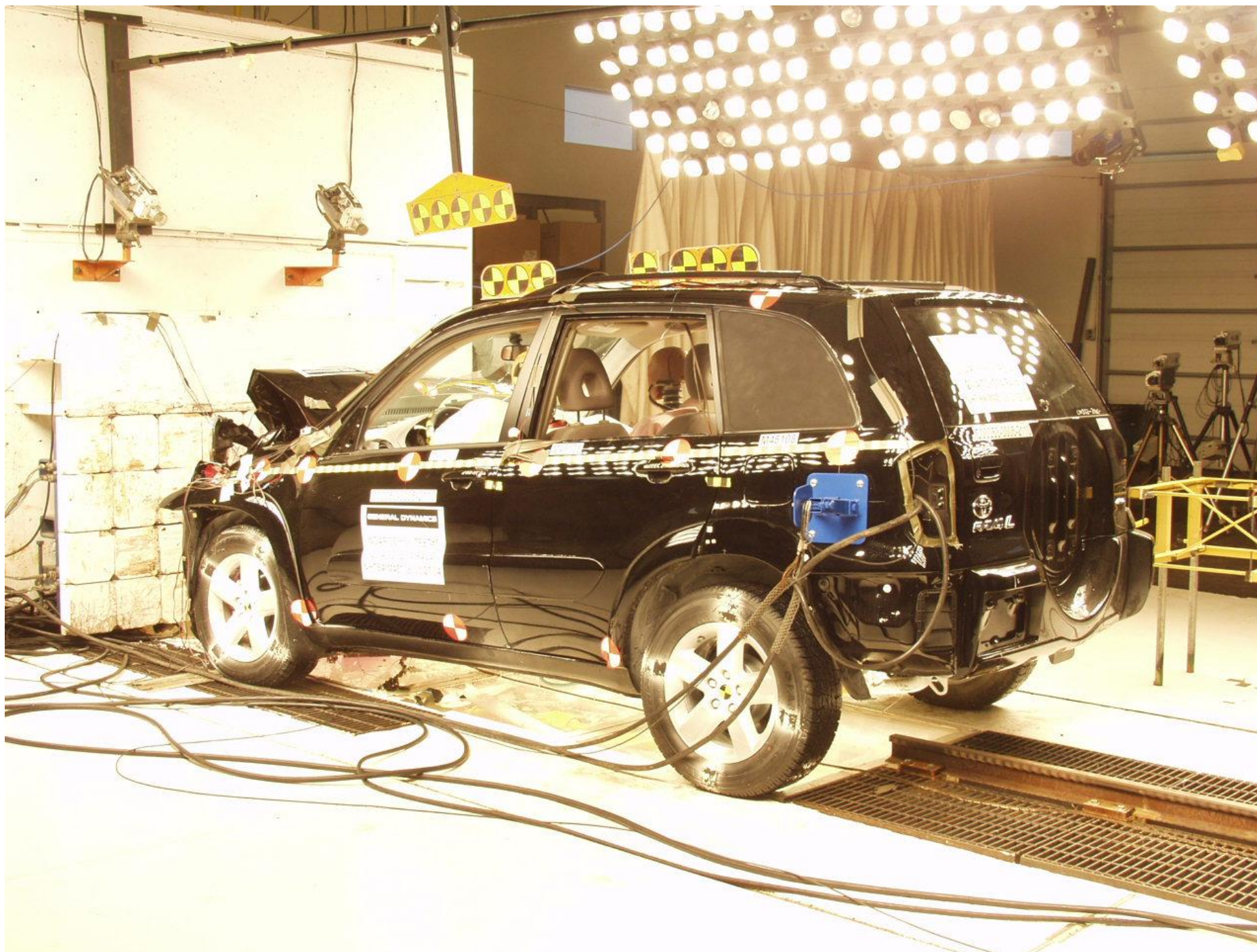


Figure A-15 POST-TEST LEFT REAR THREE-QUARTER VIEW



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

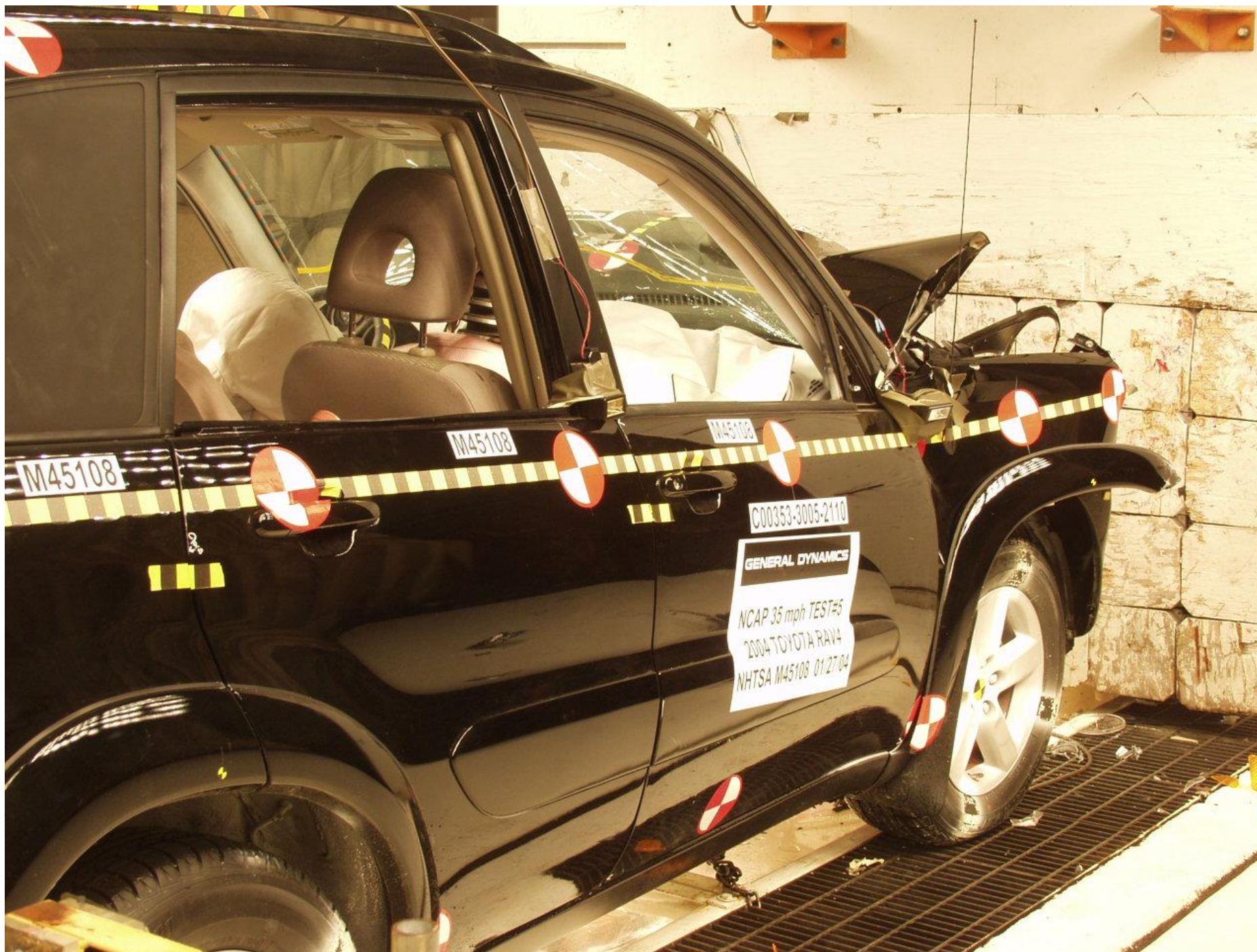


Figure A-17 RIGHT REAR THREE-QUARTER VIEW OF DOORS AFTER IMPACT



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

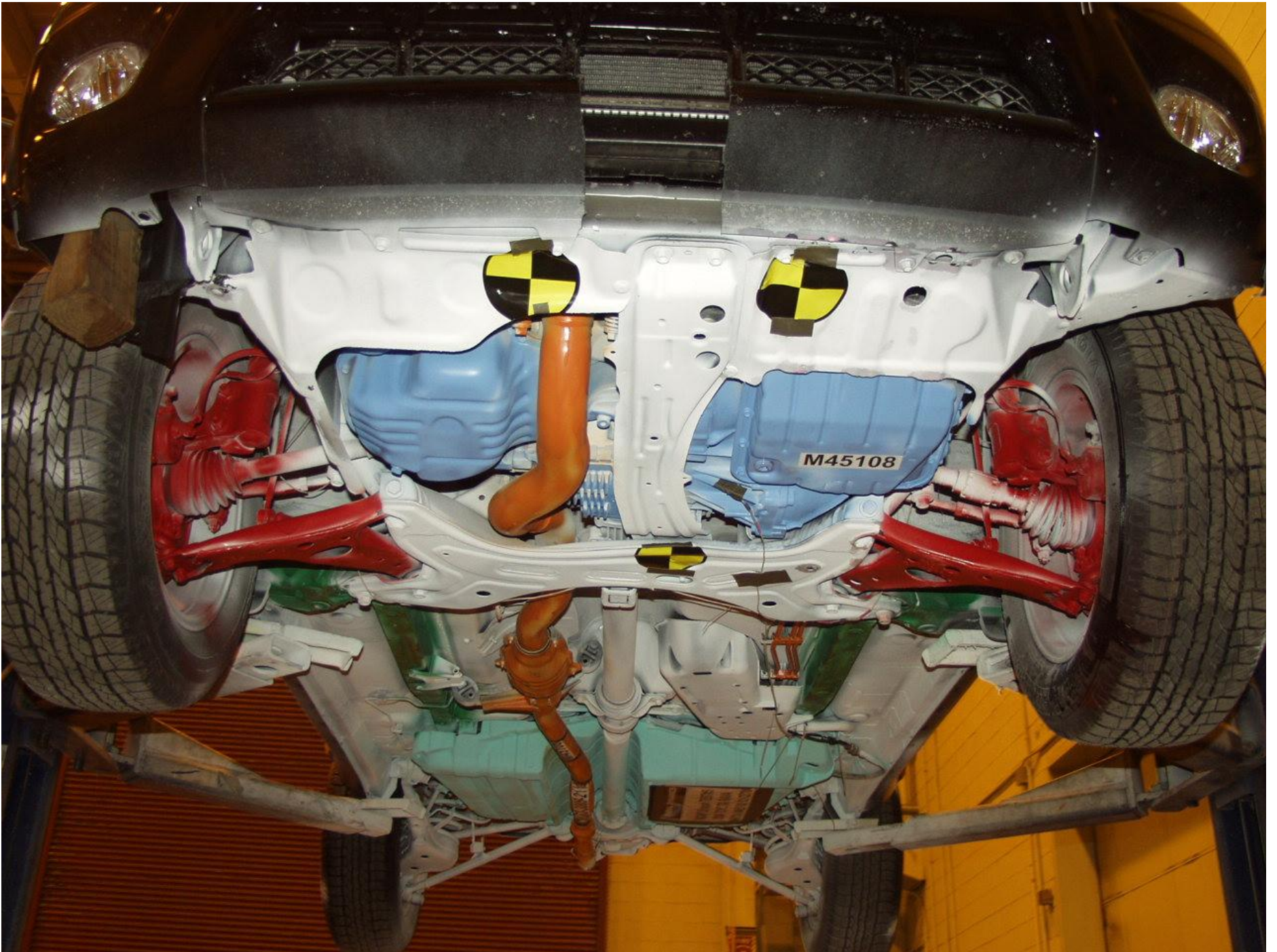


Figure A-24 PRE-TEST FRONT UNDERBODY VIEW

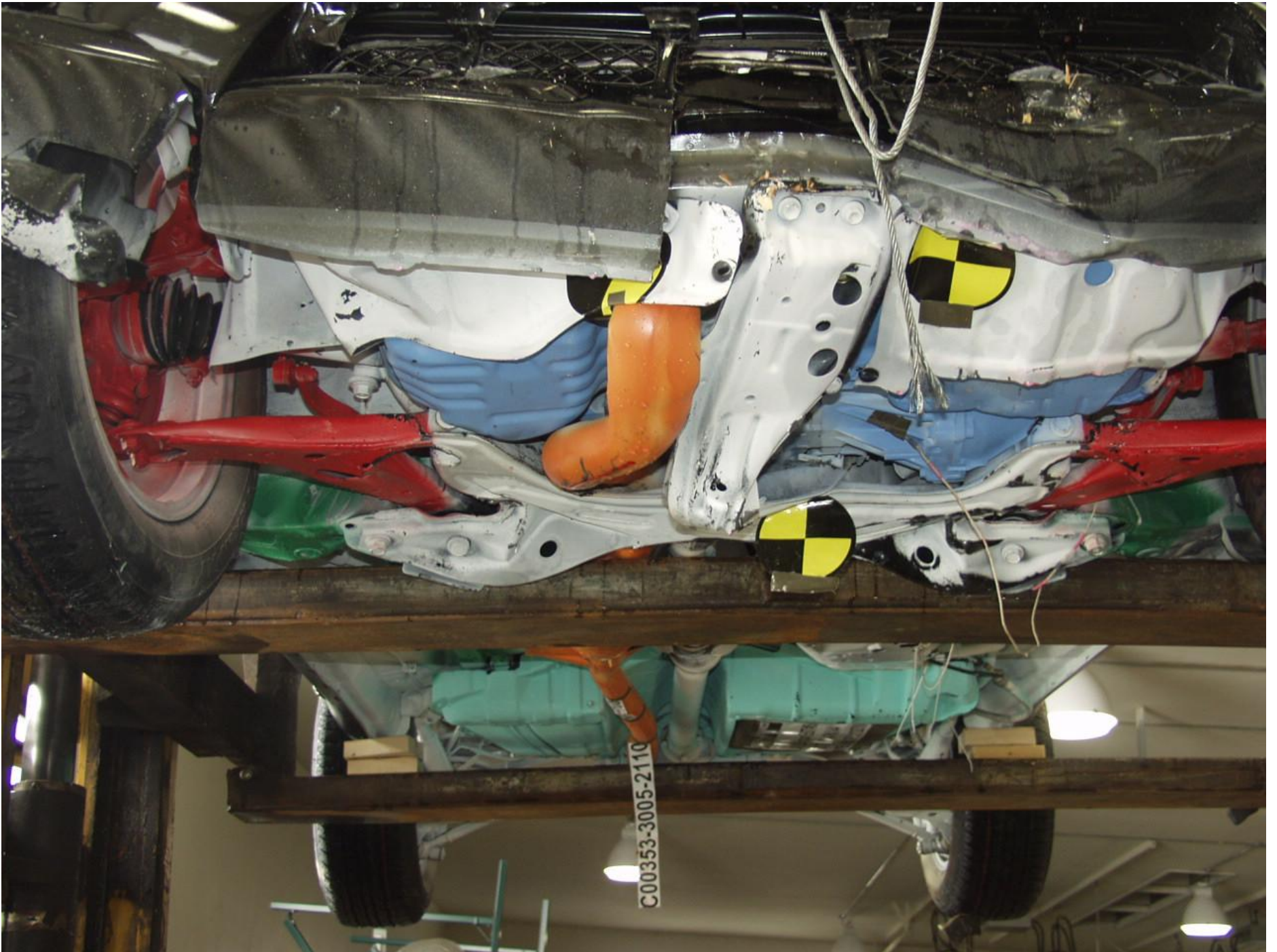


Figure A-25 POST-TEST FRONT UNDERBODY VIEW

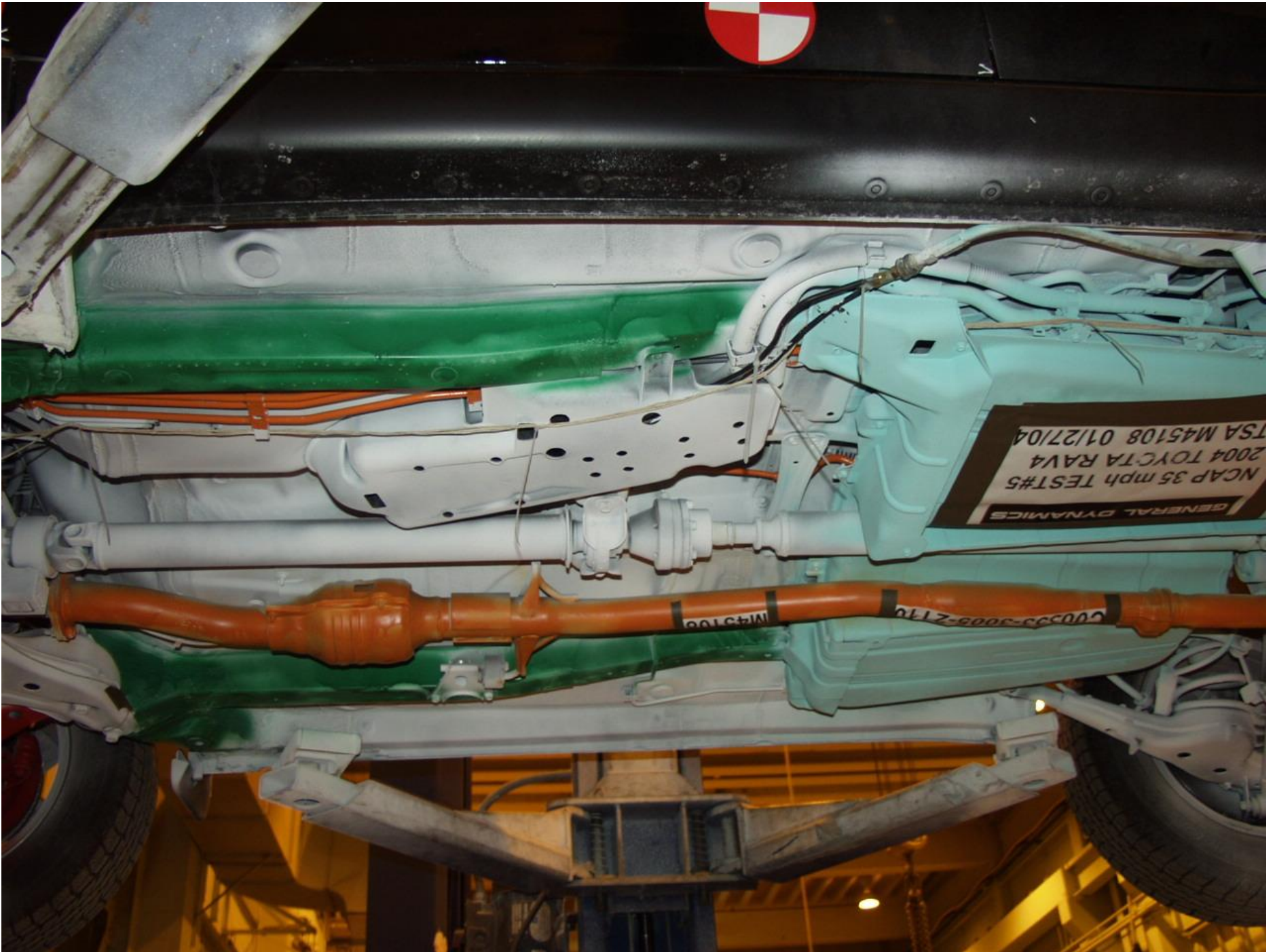


Figure A-26 PRE-TEST MID UNDERBODY VIEW



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



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



Figure A-37 POST-TEST DRIVER FEET VIEW



Figure A-38 PRE-TEST DRIVER KNEE BOLSTER VIEW



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



A-45

8642-NCAP-41

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



A-51

8642-NCAP-41

Figure A-48 PRE-TEST PASSENGER AND INTERIOR VIEW



A-52

8642-NCAP-41

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

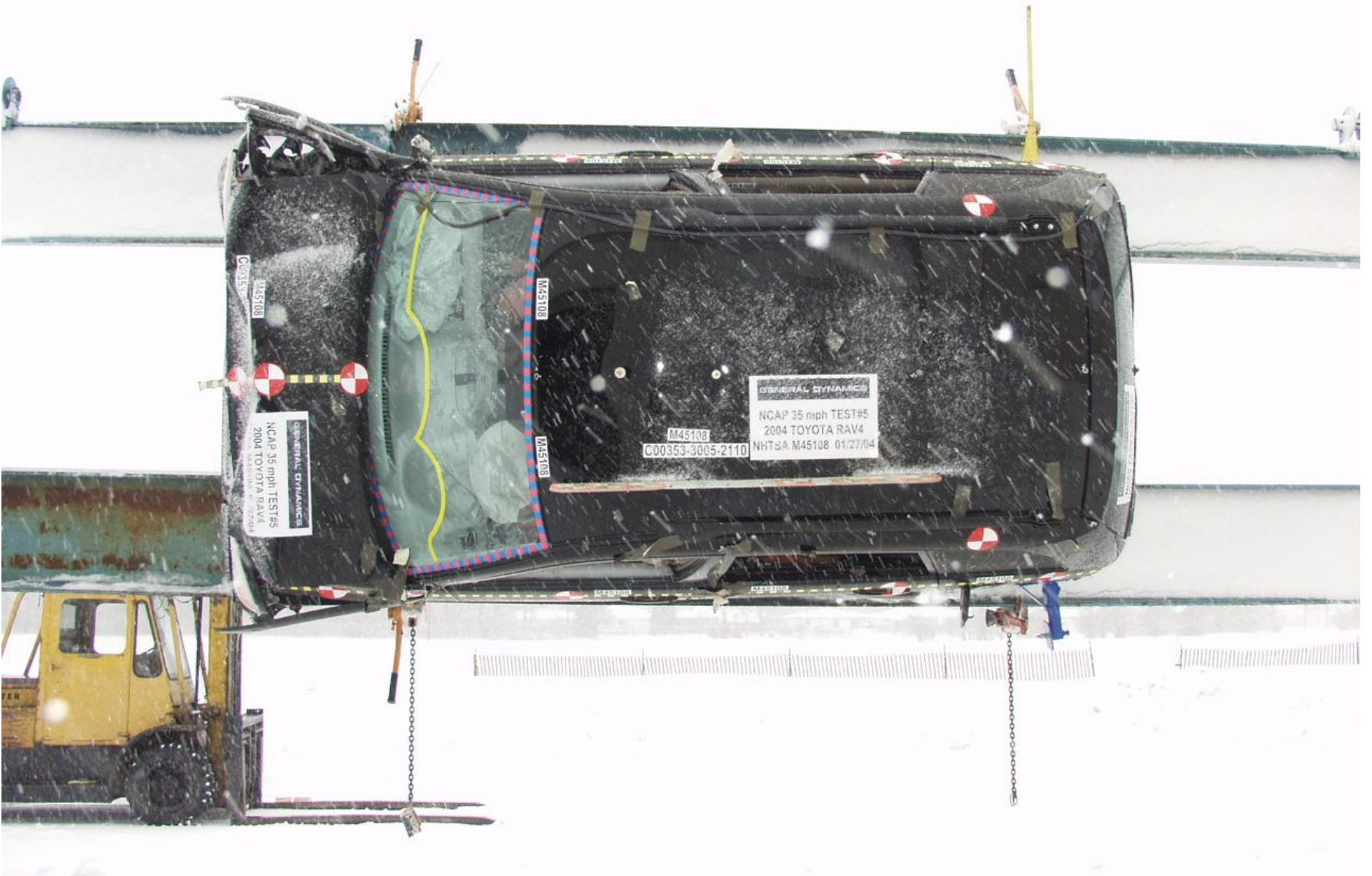


Figure A-58 ROLLOVER VIEW



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. M45108

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 x [mm, CFC_600]	B-38
32	V1P1 Pelvic x [g, CFC_1000]	B-39
33	V1P1 Pelvic y [g, CFC_1000]	B-40
34	V1P1 Pelvic z [g, CFC_1000]	B-41
35	V1P1 Pelvic Resultant [g, CFC_1000]	B-42
36	V1P1 Left Femur z [N, CFC_600]	B-43
37	V1P1 Right Femur z [N, CFC_600]	B-44
38	V1P1 Left Upper Tibia Mx [N-m, CFC_600]	B-45
39	V1P1 Left Upper Tibia My [N-m, CFC_600]	B-46
40	V1P1 Left Lower Tibia Fz [N, CFC_600]	B-47
41	V1P1 Left Lower Tibia Mx [N-m, CFC_600]	B-48
42	V1P1 Left Lower Tibia My [N-m, CFC_600]	B-49
43	V1P1 Right Upper Tibia Mx [N-m, CFC_600]	B-50
44	V1P1 Right Upper Tibia My [N-m, CFC_600]	B-51
45	V1P1 Right Lower Tibia Fz [N, CFC_600]	B-52
46	V1P1 Right Lower Tibia Mx [N-m, CFC_600]	B-53

Table of Data Plots (Continued)

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
47	V1P1 Right Lower Tibia My [N-m, CFC_600]	B-54
48	V1P1 Left Foot Aft x [g, CFC_600]	B-55
49	V1P1 Left Foot Aft z [g, CFC_600]	B-56
50	V1P1 Left Foot Fore z [g, CFC_600]	B-57
51	V1P1 Right Foot Aft x [g, CFC_600]	B-58
52	V1P1 Right Foot Aft z [g, CFC_600]	B-59
53	V1P1 Right Foot Fore z [g, CFC_600]	B-60
54	V1 Driver Lap Belt [N, CFC_60]	B-61
55	V1P2 Head 9 Array X Arm Ay [g, CFC_1000]	B-62
56	V1P2 Head 9 Array X Arm Az [g, CFC_1000]	B-63
57	V1P2 Head 9 Array Y Arm Ax [g, CFC_1000]	B-64
58	V1P2 Head 9 Array Y Arm Az [g, CFC_1000]	B-65
59	V1P2 Head 9 Array Z Arm Ax [g, CFC_1000]	B-66
60	V1P2 Head 9 Array Z Arm Ay [g, CFC_1000]	B-67
61	V1P2 Head CG x [g, CFC_1000]	B-68
62	V1P2 Head CG y [g, CFC_1000]	B-69
63	V1P2 Head CG z [g, CFC_1000]	B-70
64	V1P2 Head CG Resultant [g, CFC_1000]	B-71
65	V1P2 Head CG Red x [g, CFC_1000]	B-72
66	V1P2 Head CG Red y [g, CFC_1000]	B-73
67	V1P2 Head CG Red z [g, CFC_1000]	B-74
68	V1P2 Head CG Red Resultant [g, CFC_1000]	B-75
69	V1P2 Upper Neck Fx [N, CFC_1000]	B-76
70	V1P2 Upper Neck Fy [N, CFC_1000]	B-77
71	V1P2 Upper Neck Fz [N, CFC_1000]	B-78
72	V1P2 Upper Neck F Resultant [N, CFC_1000]	B-79
73	V1P2 Upper Neck Mx [N-m, CFC_600]	B-80
74	V1P2 Upper Neck My [N-m, CFC_600]	B-81
75	V1P2 Upper Neck Mz [N-m, CFC_600]	B-82
76	V1P2 Upper Neck M Resultant [N-m, CFC_600]	B-83
77	V1P2 Chest x [g, CFC_180]	B-84
78	V1P2 Chest y [g, CFC_180]	B-85
79	V1P2 Chest z [g, CFC_180]	B-86
80	V1P2 Chest Resultant [g, CFC_180]	B-87
81	V1P2 Chest Red x [g, CFC_180]	B-88
82	V1P2 Chest Red y [g, CFC_180]	B-89
83	V1P2 Chest Red z [g, CFC_180]	B-90
84	V1P2 Chest Red Resultant [g, CFC_180]	B-91
85	V1P2 Chest Compression x [mm, CFC_600]	B-92
86	V1P2 Pelvic x [g, CFC_1000]	B-93
87	V1P2 Pelvic y [g, CFC_1000]	B-94
88	V1P2 Pelvic z [g, CFC_1000]	B-95
89	V1P2 Pelvic Resultant [g, CFC_1000]	B-96
90	V1P2 Left Femur z [N, CFC_600]	B-97
91	V1P2 Right Femur z [N, CFC_600]	B-98
92	V1P2 Left Upper Tibia Mx [N-m, CFC_600]	B-99

Table of Data Plots (Continued)

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
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	V1 RFP 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

Table of Data Plots (Continued)

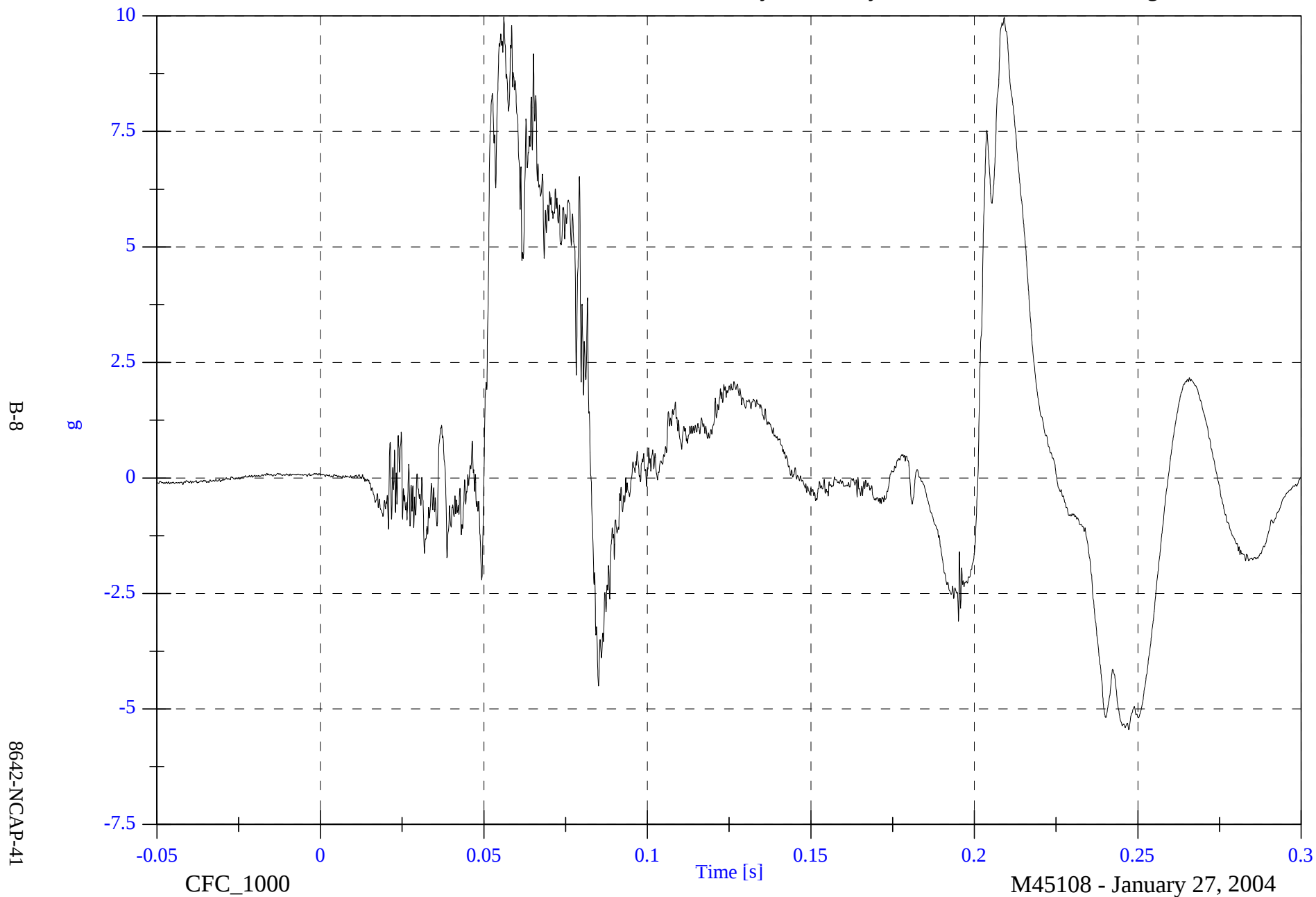
PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
139	Barrier Load Cell A4 Fx [N, CFC_60]	B-146
140	Barrier Load Cell A5 Fx [N, CFC_60]	B-147
141	Barrier Load Cell A6 Fx [N, CFC_60]	B-148
142	Barrier Load Cell A7 Fx [N, CFC_60]	B-149
143	Barrier Load Cell A8 Fx [N, CFC_60]	B-150
144	Barrier Load Cell 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

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head 9 Array X Arm Ay

Max: 10.0 [g] at 0.056 [s]

Min: -5.4 [g] at 0.247 [s]

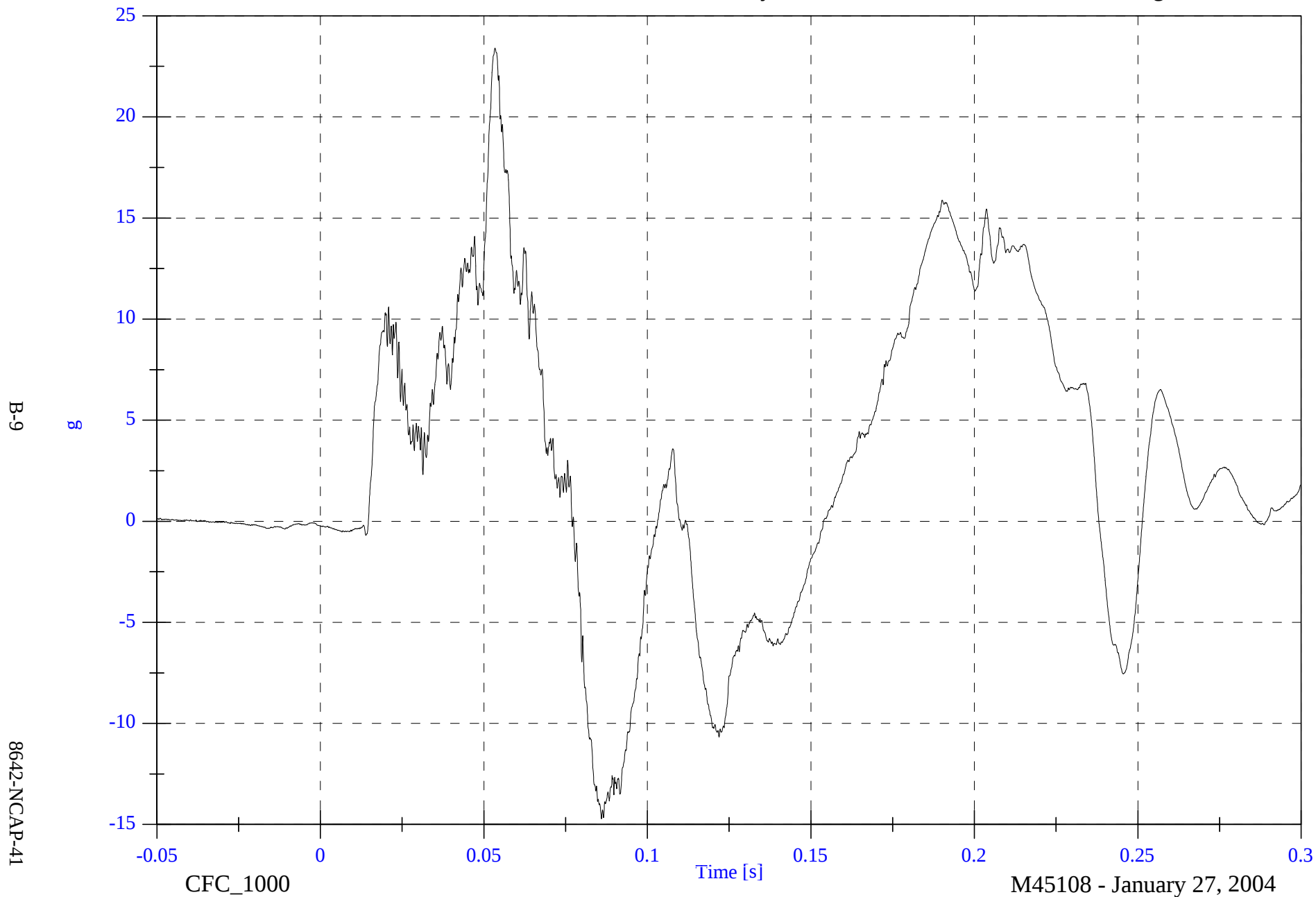


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head 9 Array X Arm Az

Max: 23.4 [g] at 0.053 [s]

Min: -14.7 [g] at 0.086 [s]

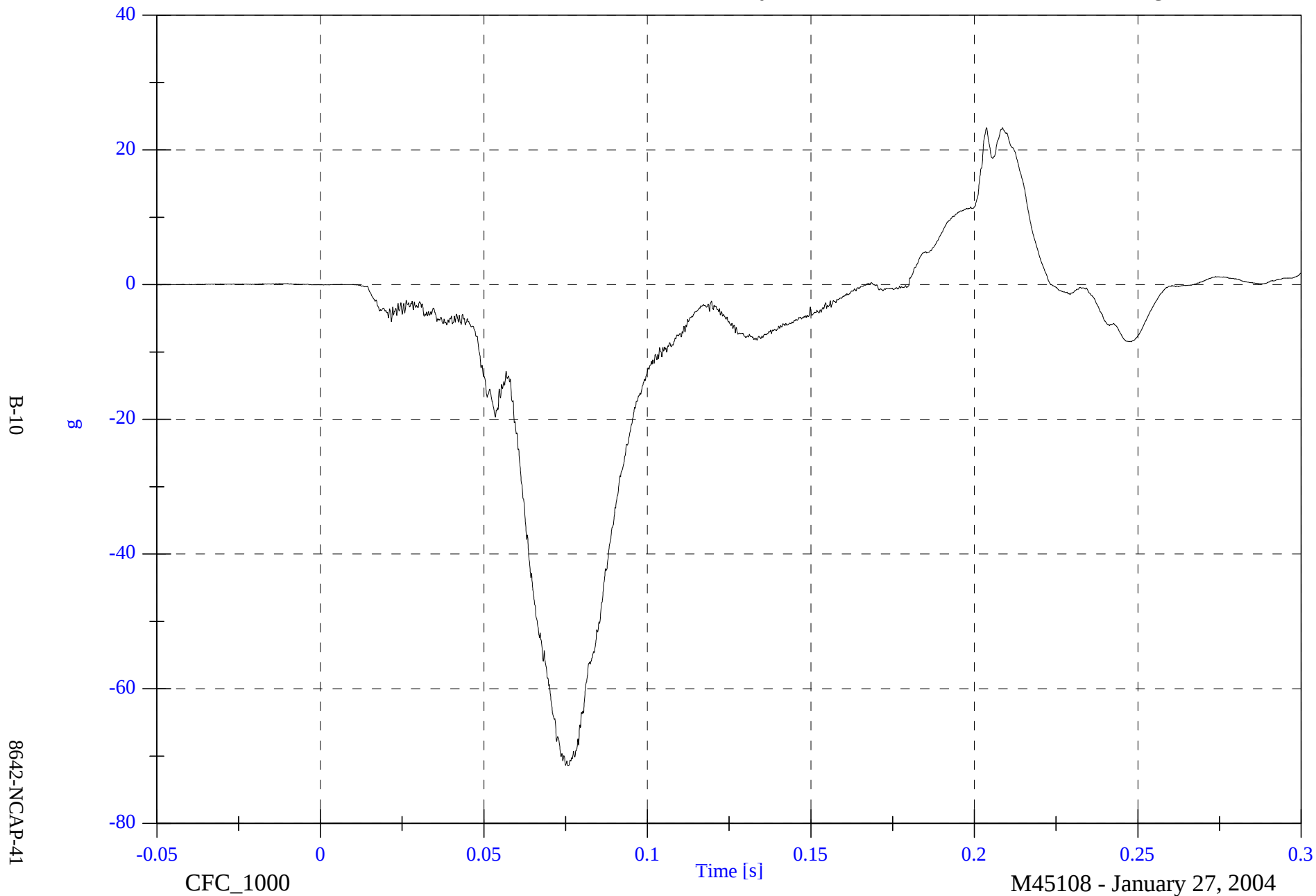


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head 9 Array Y Arm Ax

Max: 23.3 [g] at 0.209 [s]

Min: -71.4 [g] at 0.076 [s]

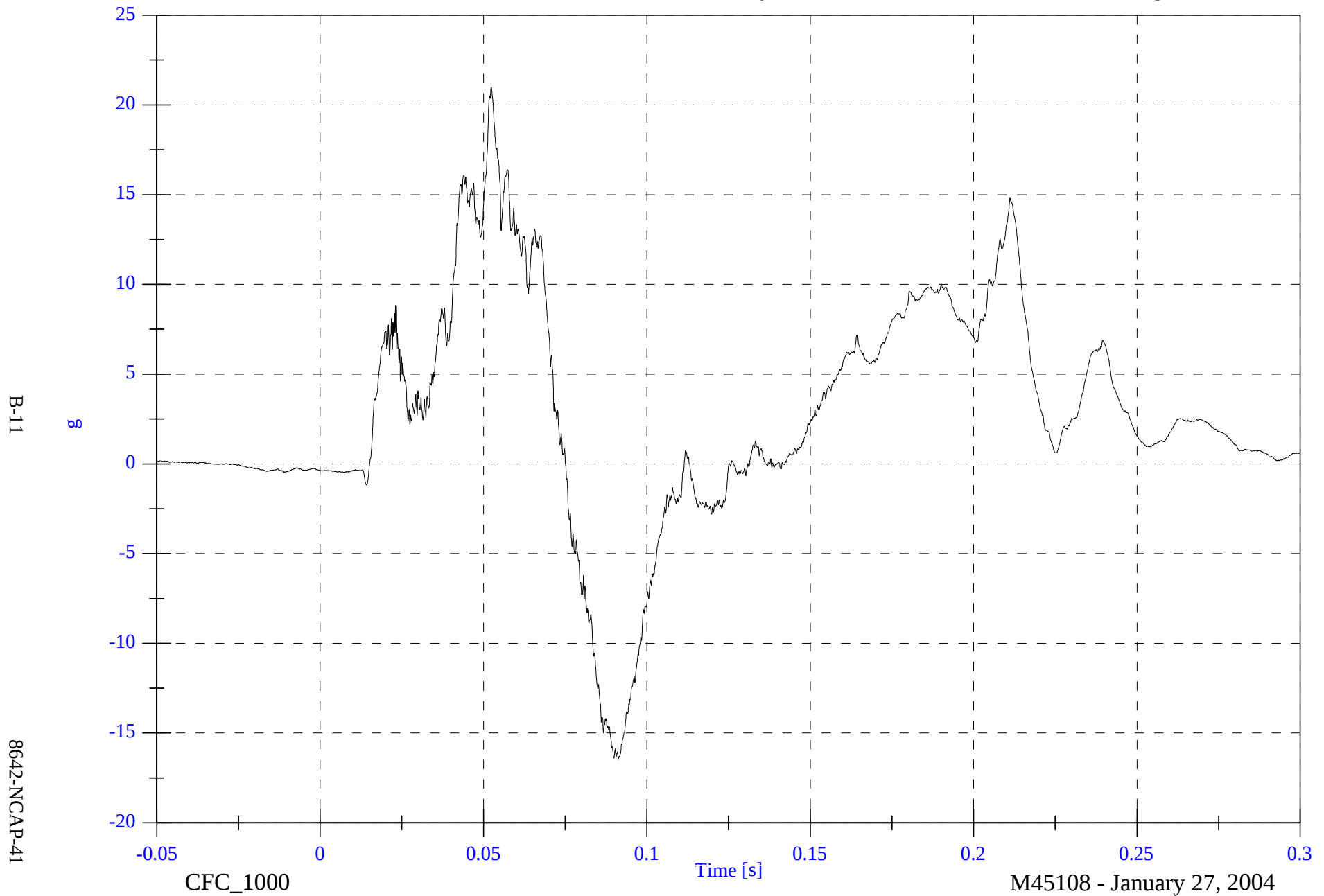


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head 9 Array Y Arm Az

Max: 21.0 [g] at 0.052 [s]

Min: -16.5 [g] at 0.091 [s]

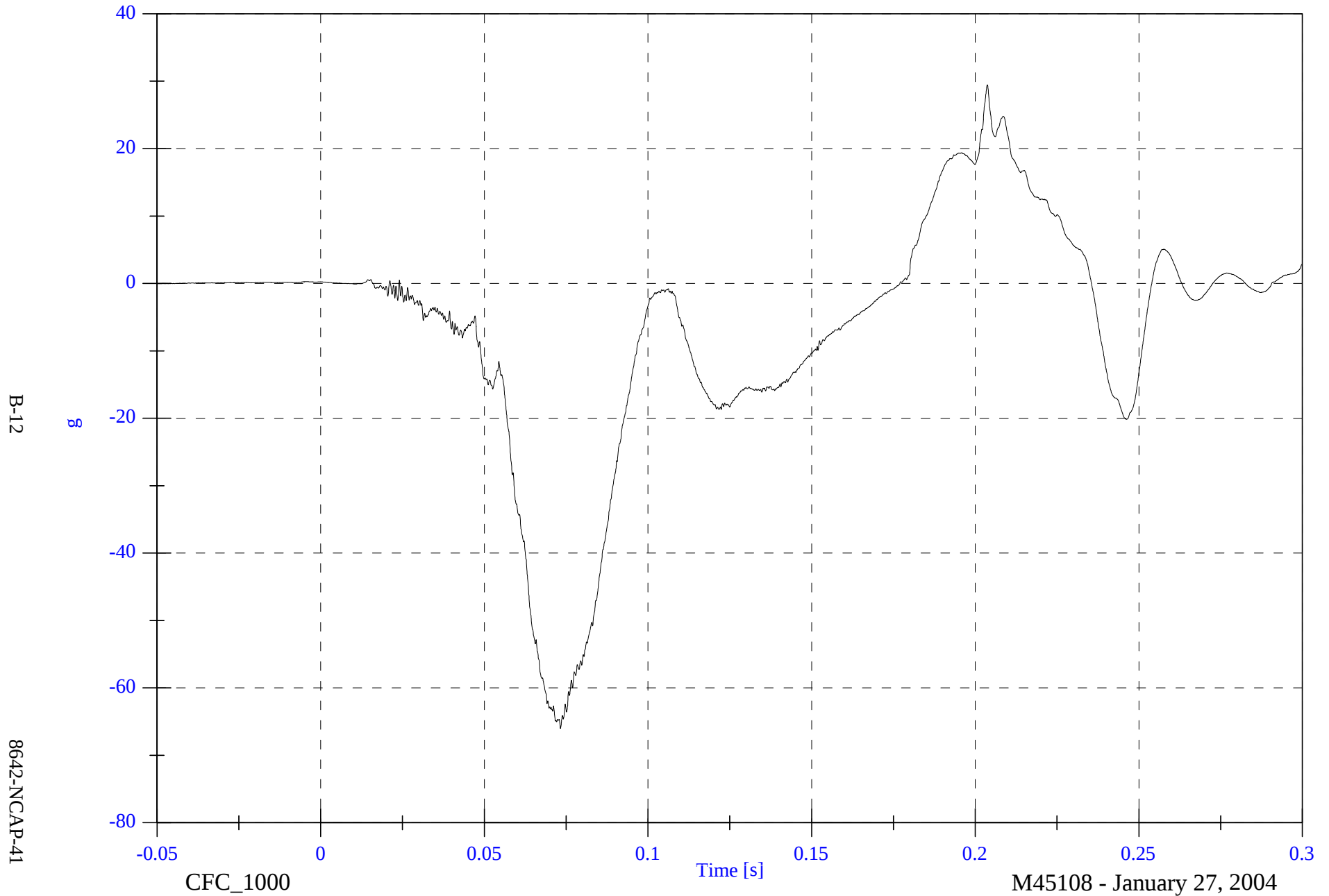


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head 9 Array Z Arm Ax

Max: 29.5 [g] at 0.204 [s]

Min: -66.0 [g] at 0.073 [s]

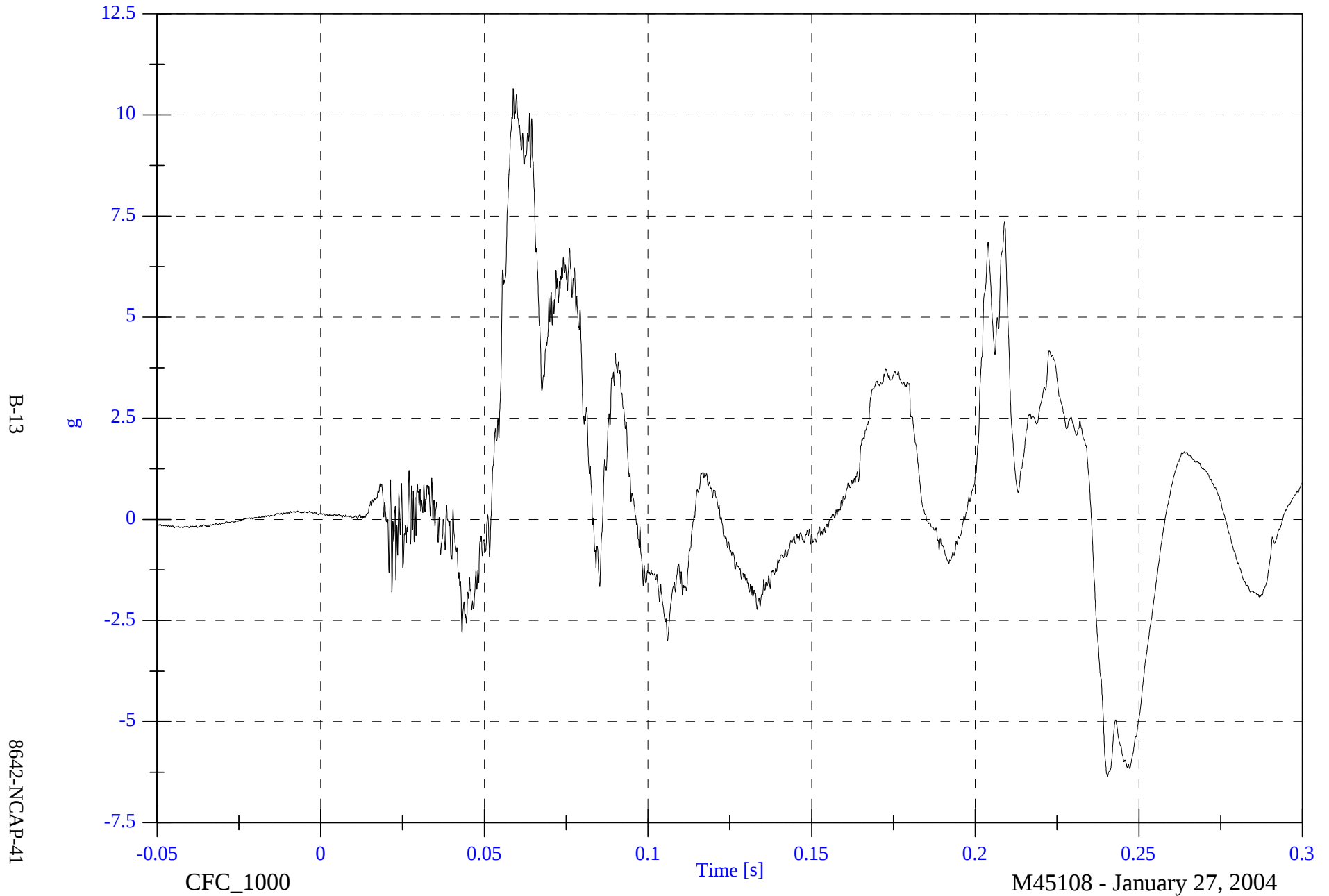


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head 9 Array Z Arm Ay

Max: 10.7 [g] at 0.059 [s]

Min: -6.4 [g] at 0.240 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

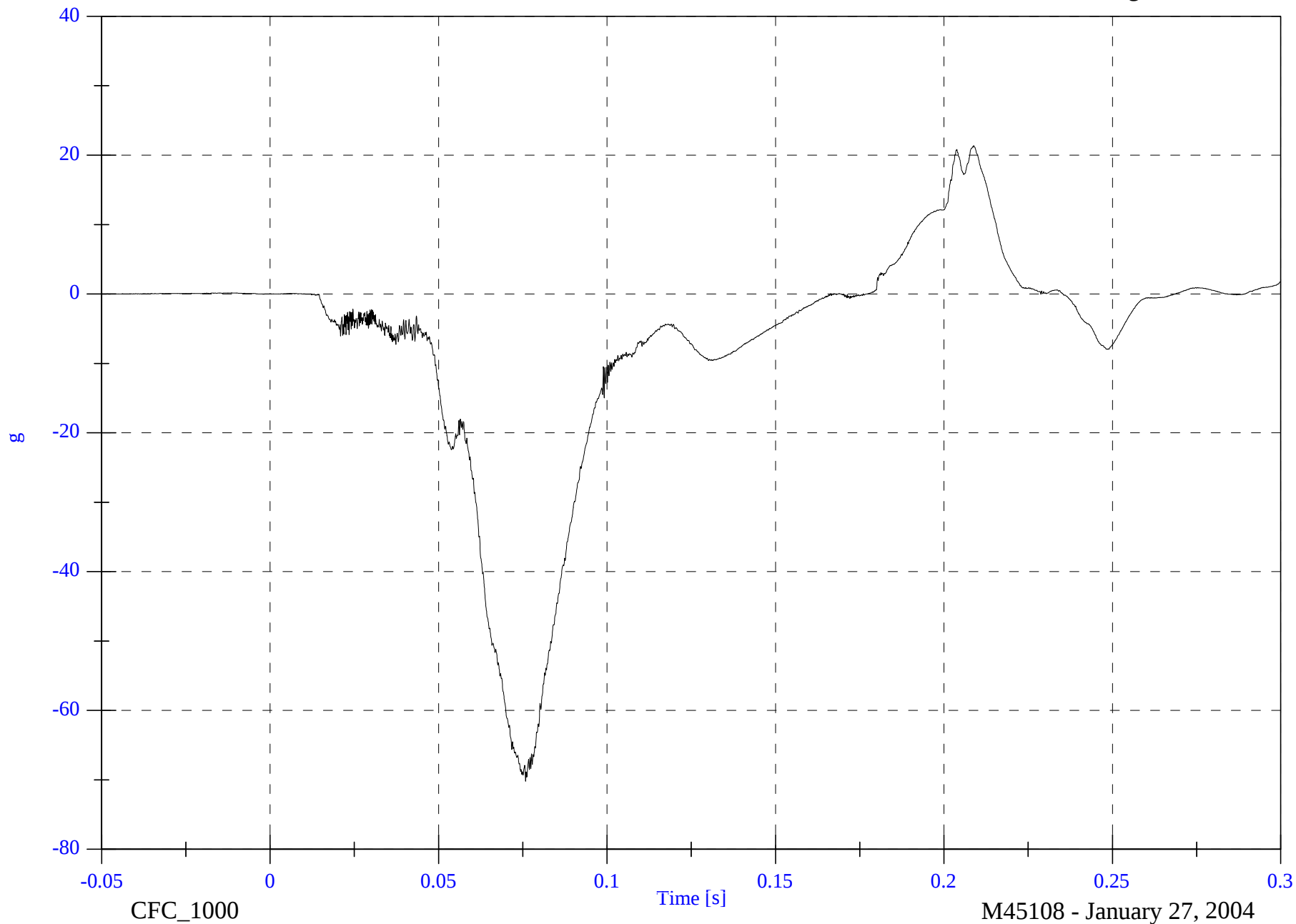
V1P1 Head CG x

Max: 21.4 [g] at 0.209 [s]

Min: -70.2 [g] at 0.076 [s]

B-14

8642-NCAP-41

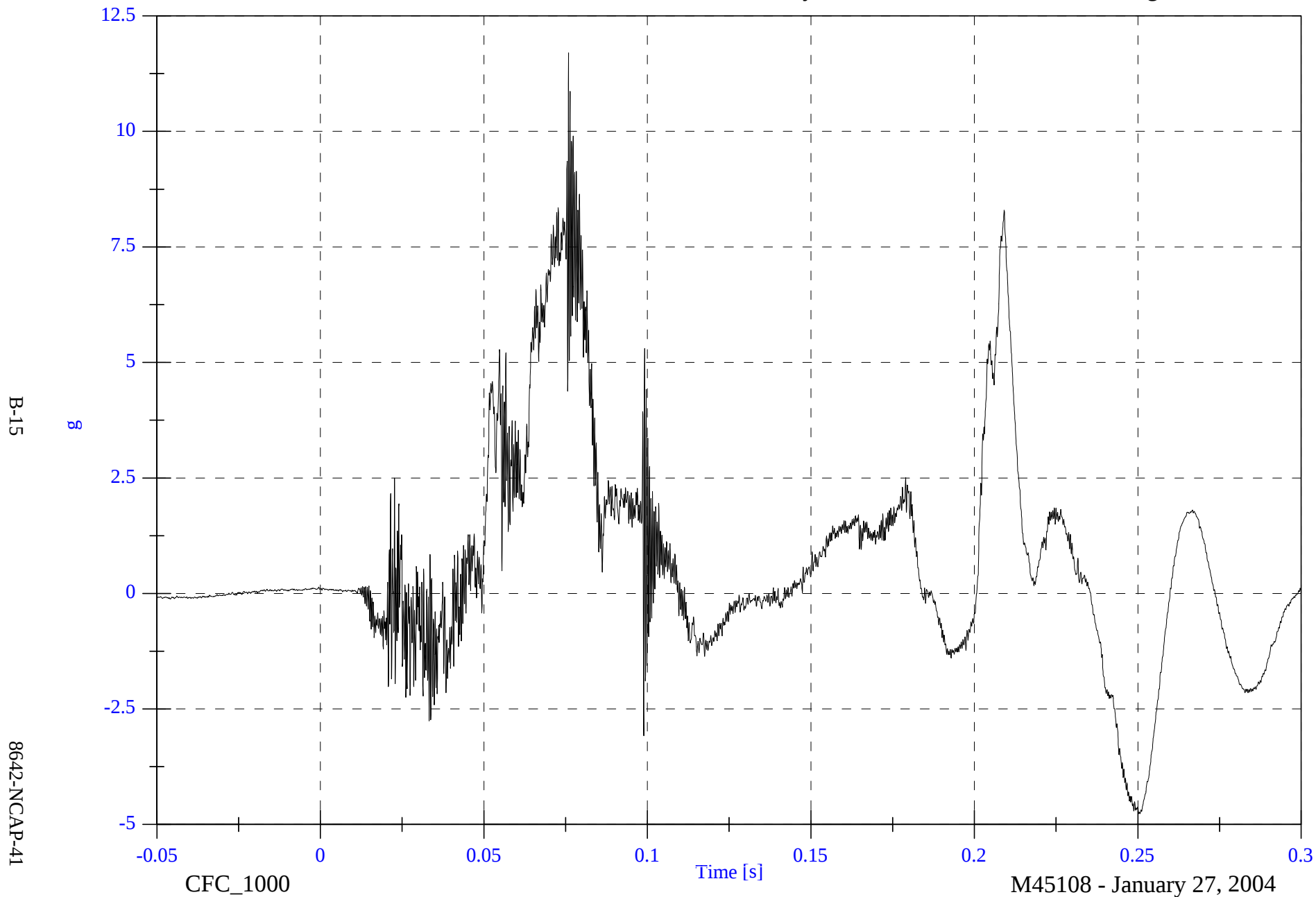


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head CG y

Max: 11.7 [g] at 0.076 [s]

Min: -4.8 [g] at 0.250 [s]

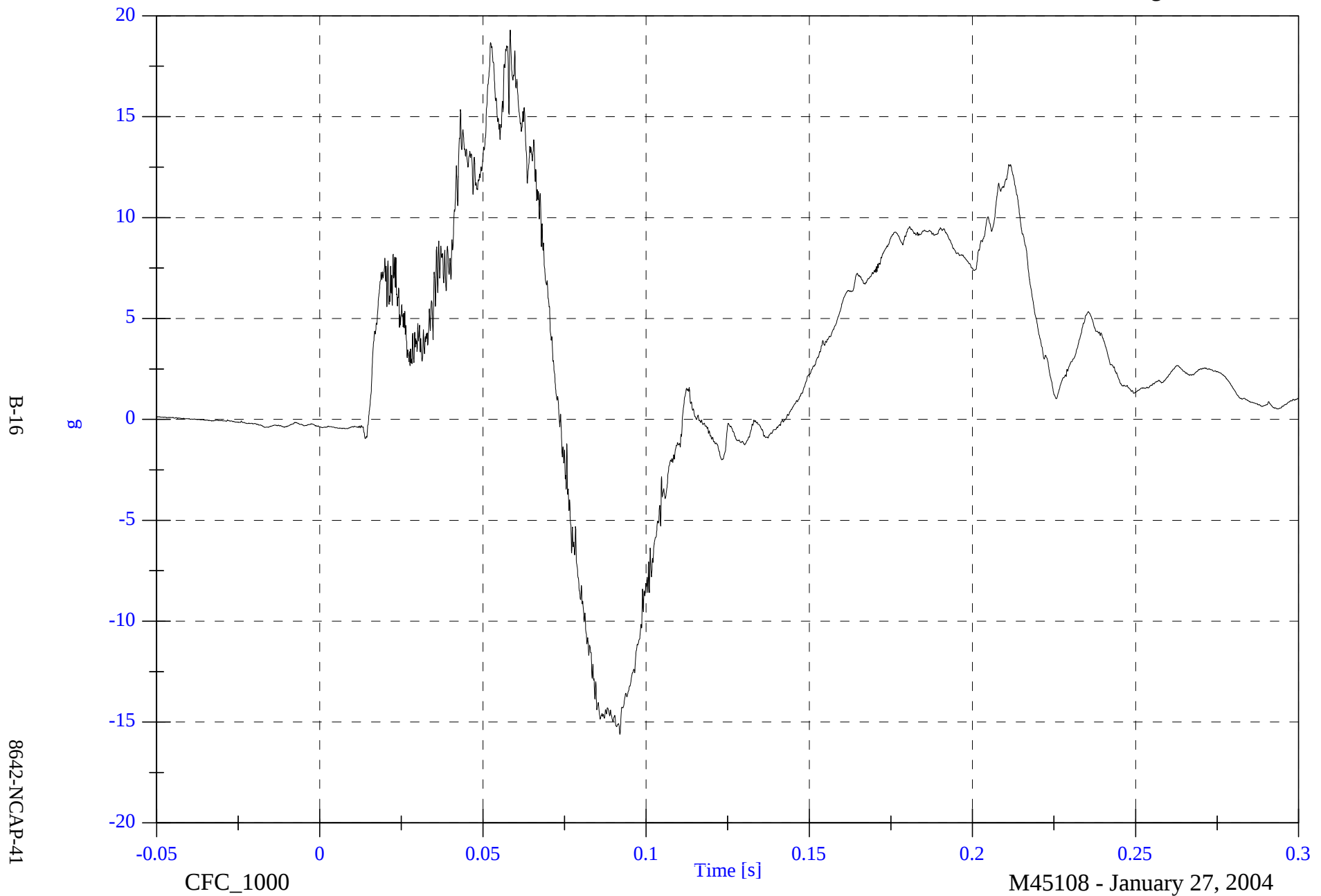


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head CG z

Max: 19.3 [g] at 0.058 [s]

Min: -15.6 [g] at 0.092 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

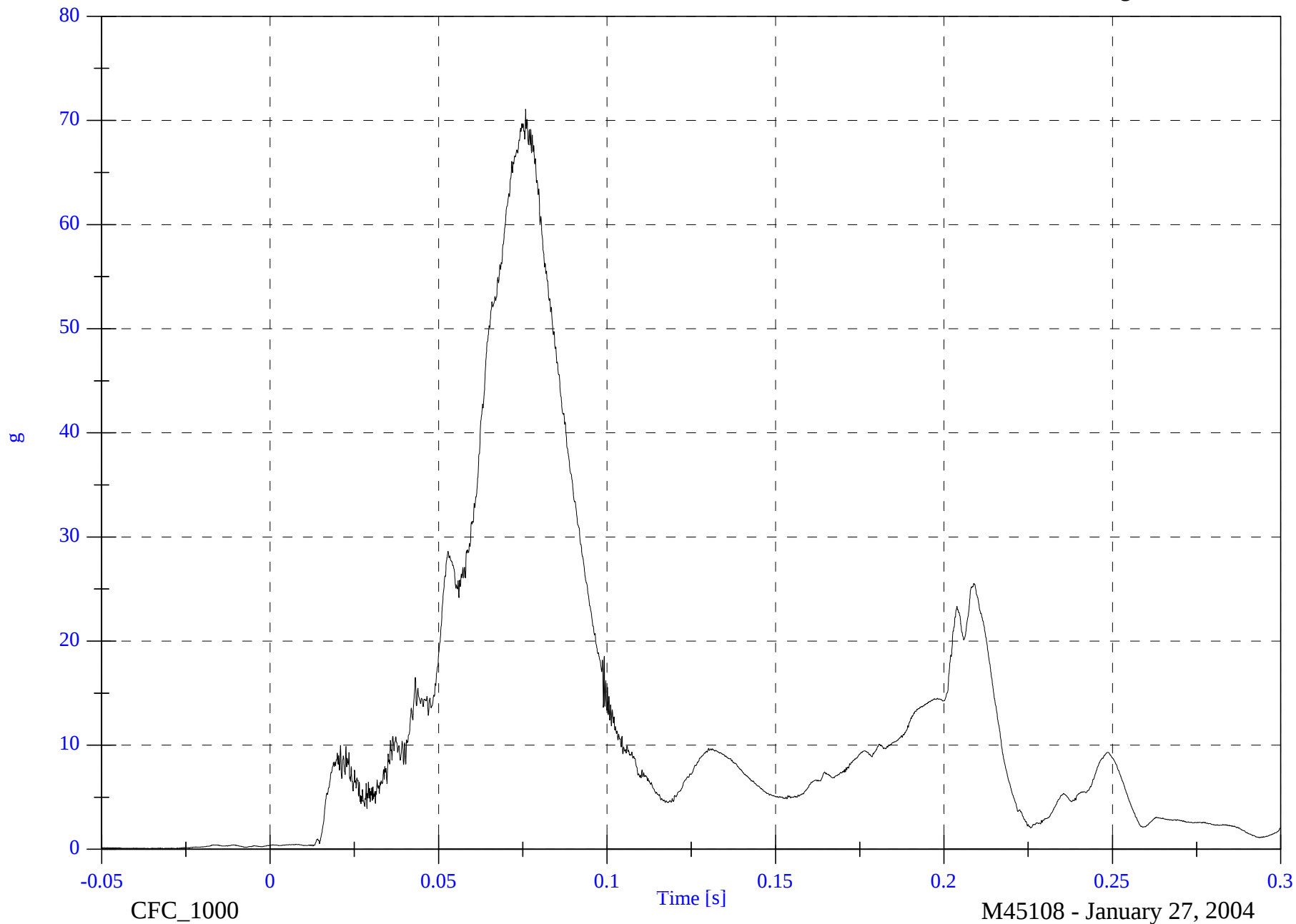
V1P1 Head CG Resultant

Max: 71.1 [g] at 0.076 [s]

Min: 0.1 [g] at -0.032 [s]

B-17

8642-NCAP-41

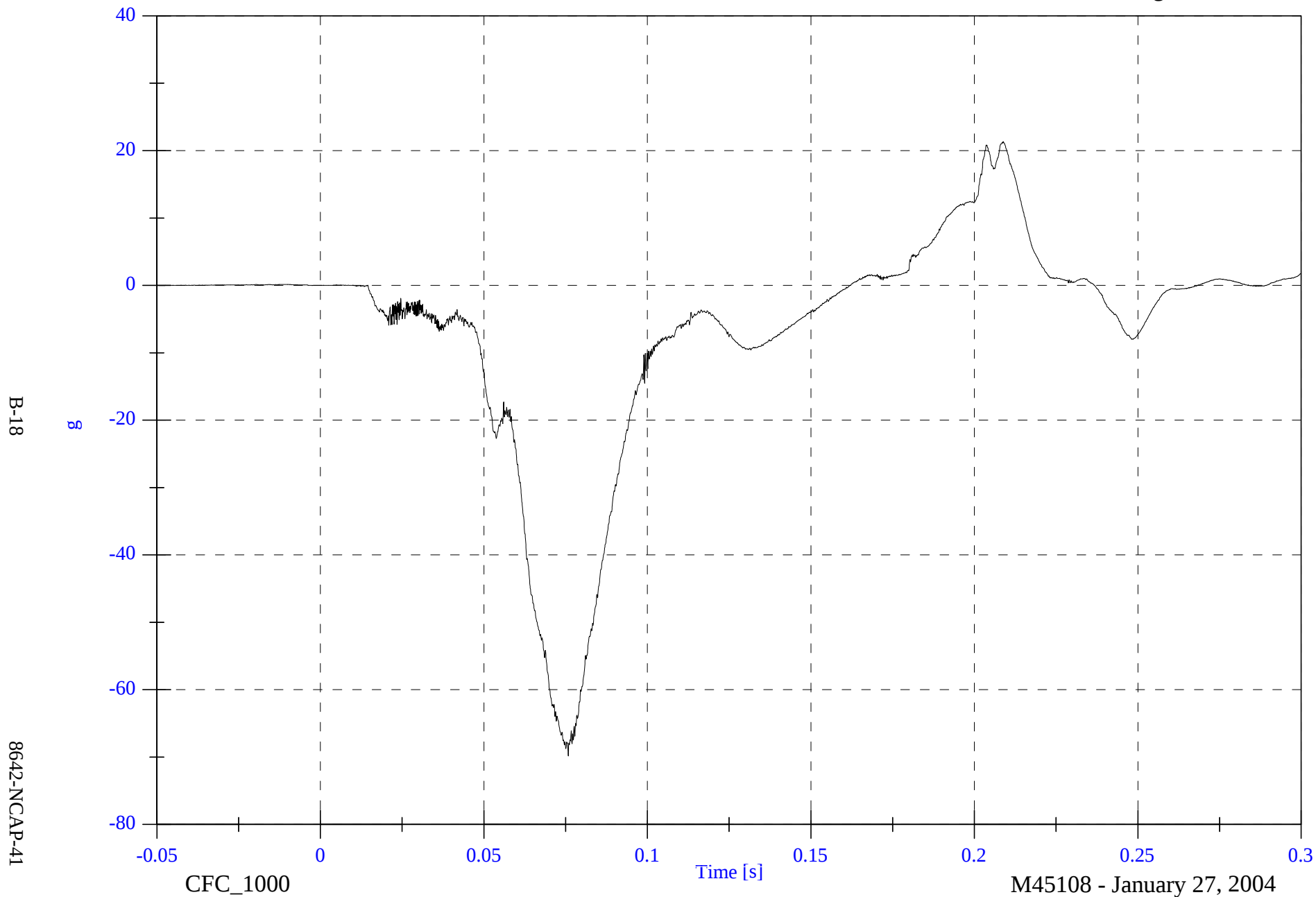


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head CG Red x

Max: 21.3 [g] at 0.209 [s]

Min: -69.8 [g] at 0.076 [s]

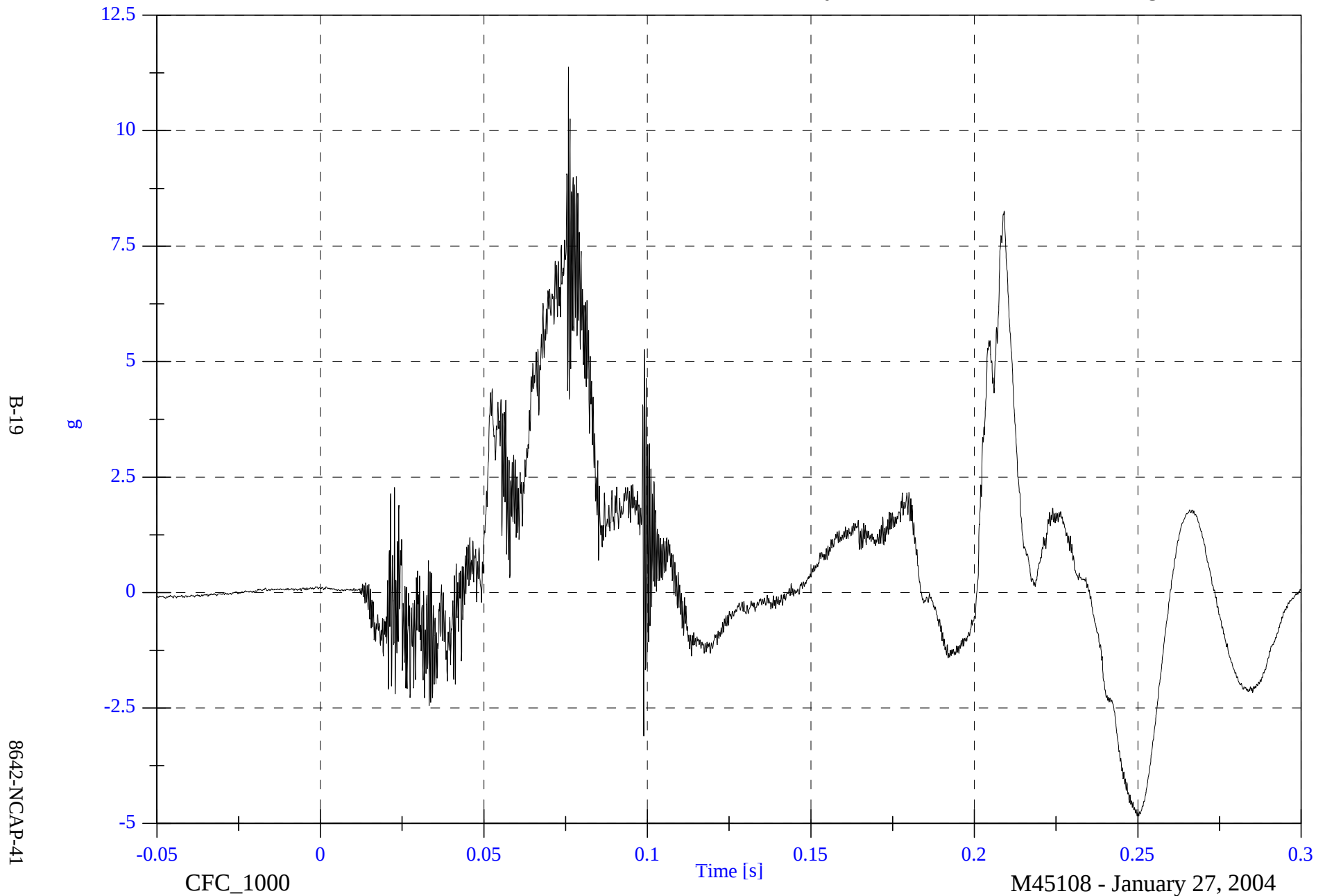


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head CG Red y

Max: 11.4 [g] at 0.076 [s]

Min: -4.8 [g] at 0.250 [s]

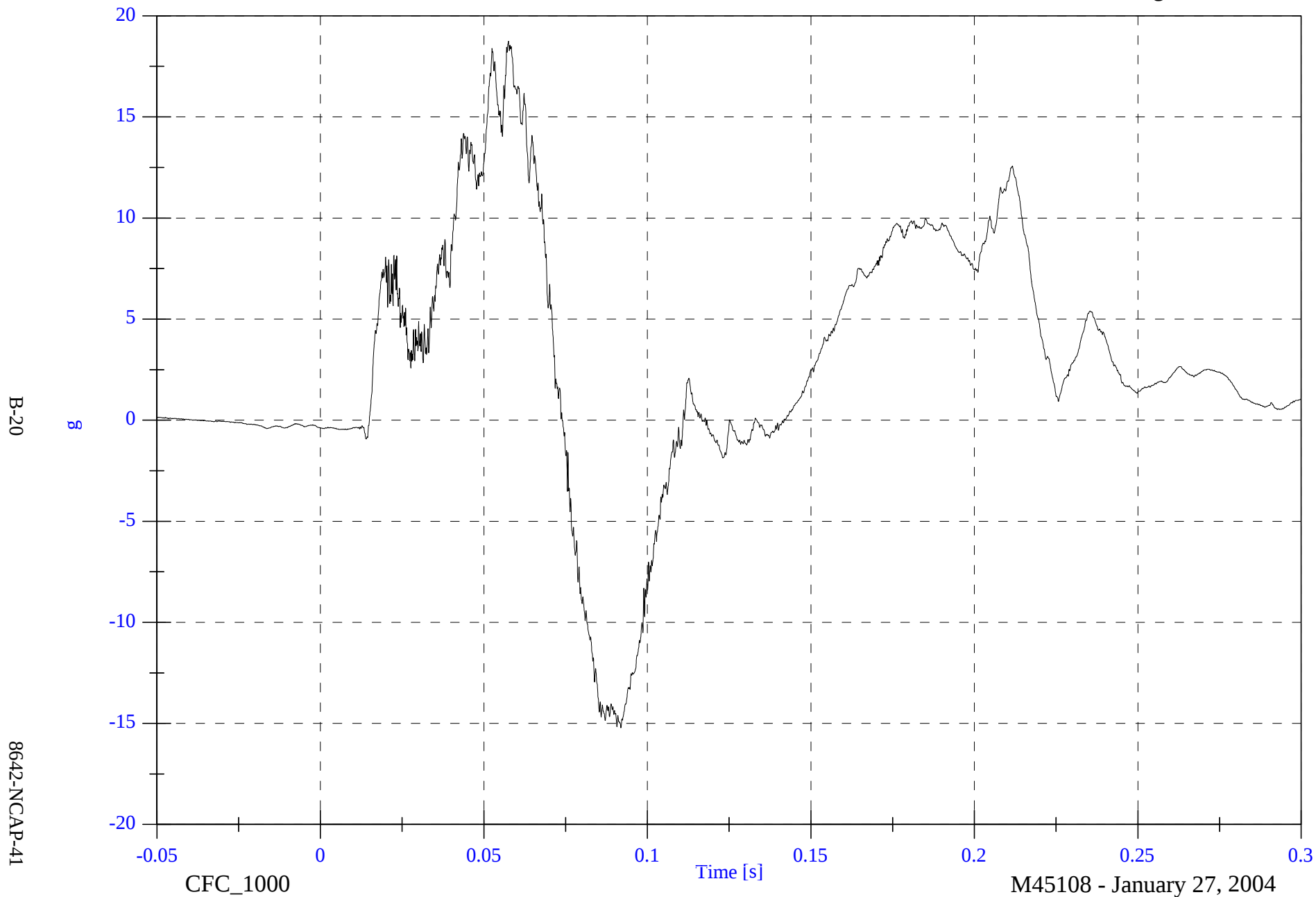


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head CG Red z

Max: 18.7 [g] at 0.058 [s]

Min: -15.2 [g] at 0.092 [s]

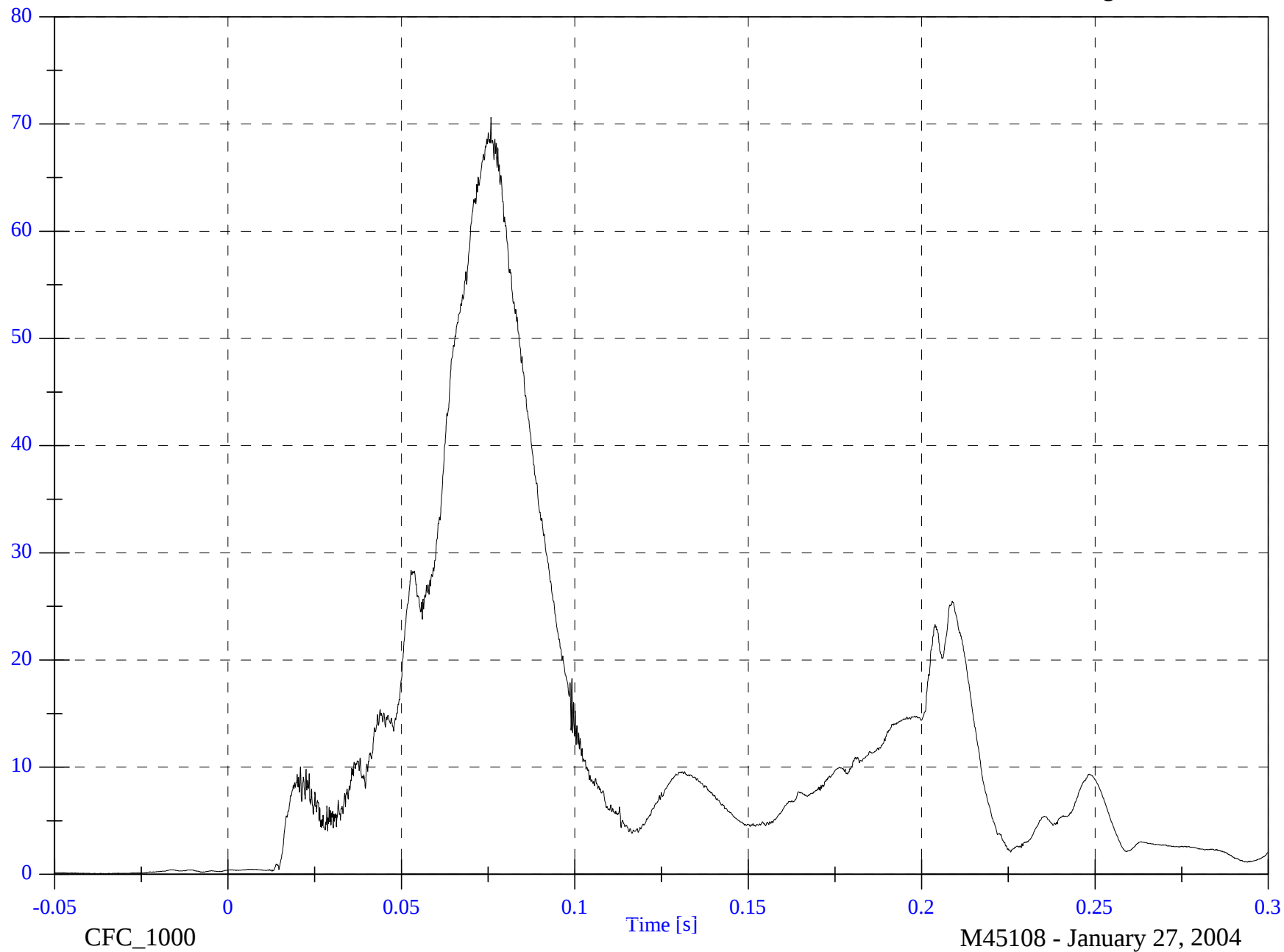


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Head CG Red Resultant

Max: 70.6 [g] at 0.076 [s]

Min: 0.1 [g] at -0.038 [s]



B-21

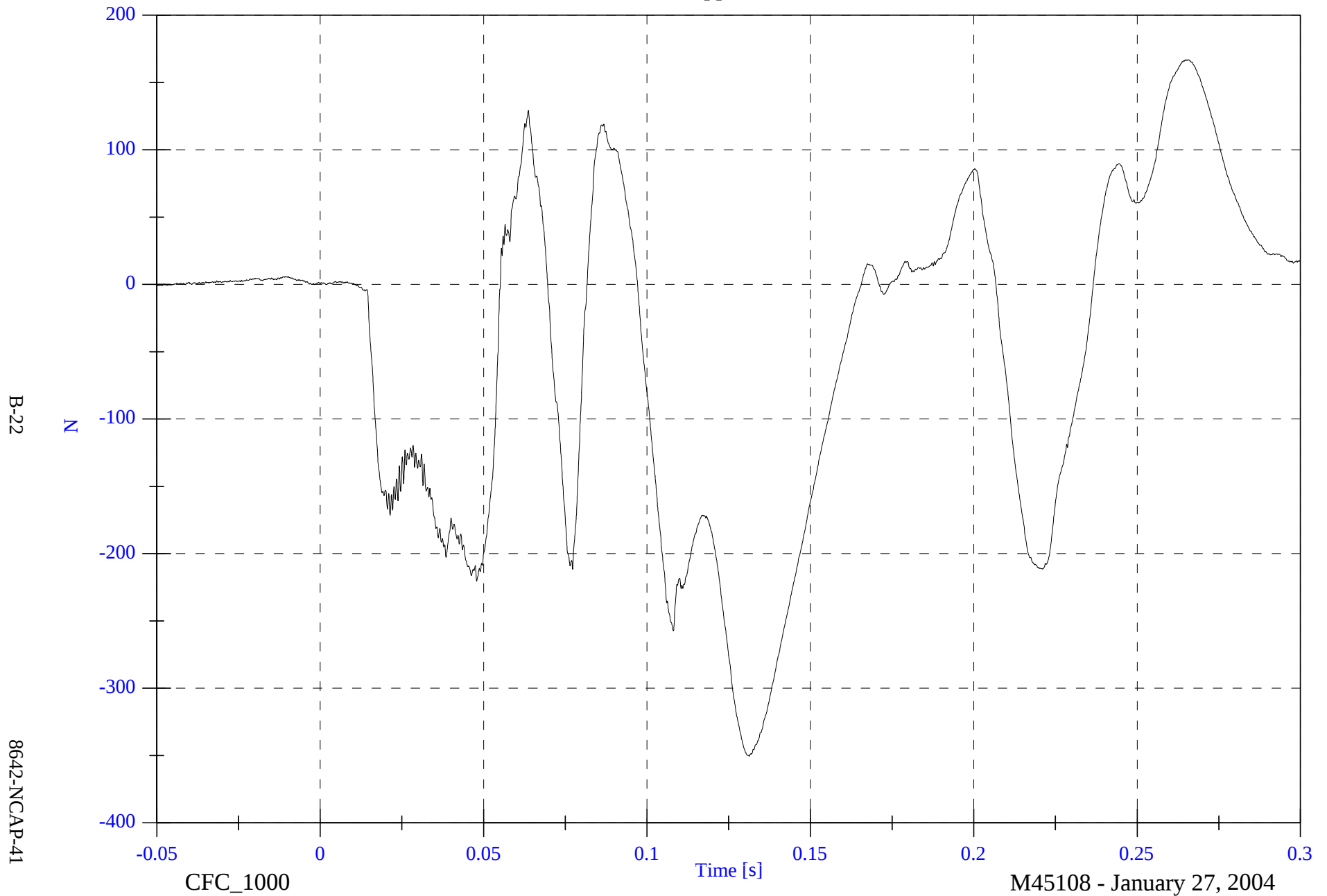
8642-NCAP-41

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Upper Neck Fx

Max: 166.9 [N] at 0.266 [s]

Min: -350.5 [N] at 0.131 [s]

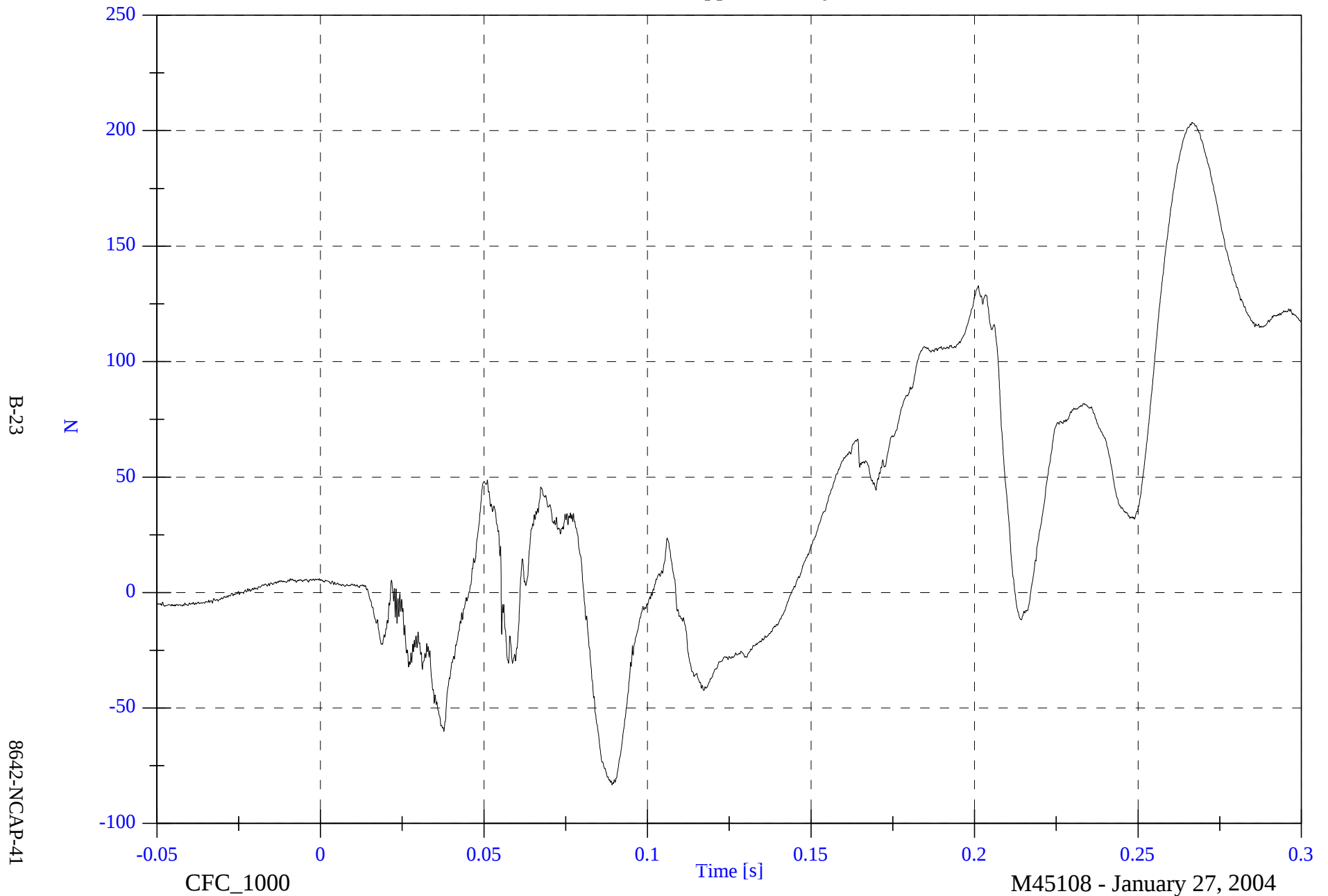


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Upper Neck Fy

Max: 203.6 [N] at 0.267 [s]

Min: -83.3 [N] at 0.089 [s]

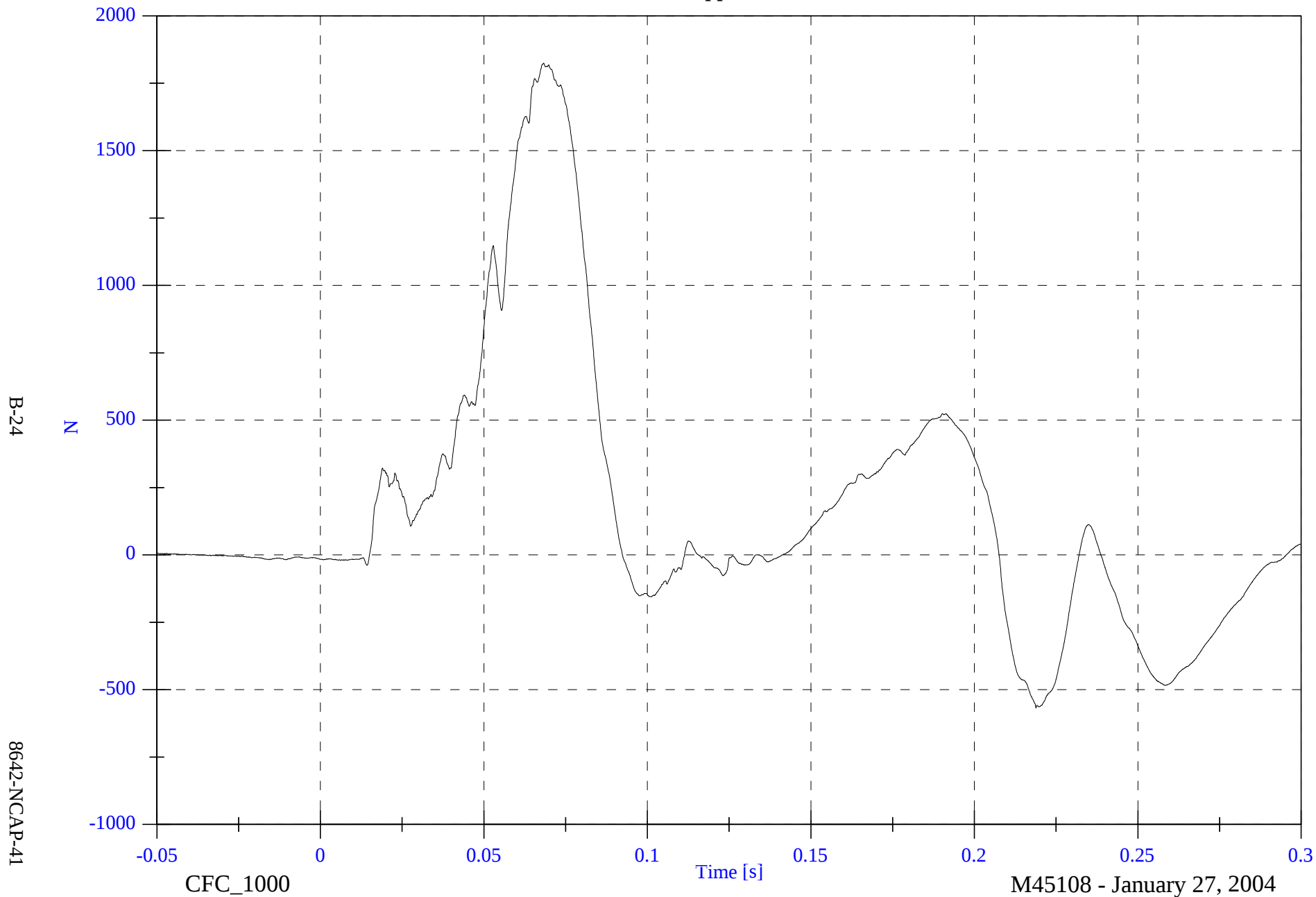


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Upper Neck Fz

Max: 1824.8 [N] at 0.068 [s]

Min: -568.3 [N] at 0.219 [s]

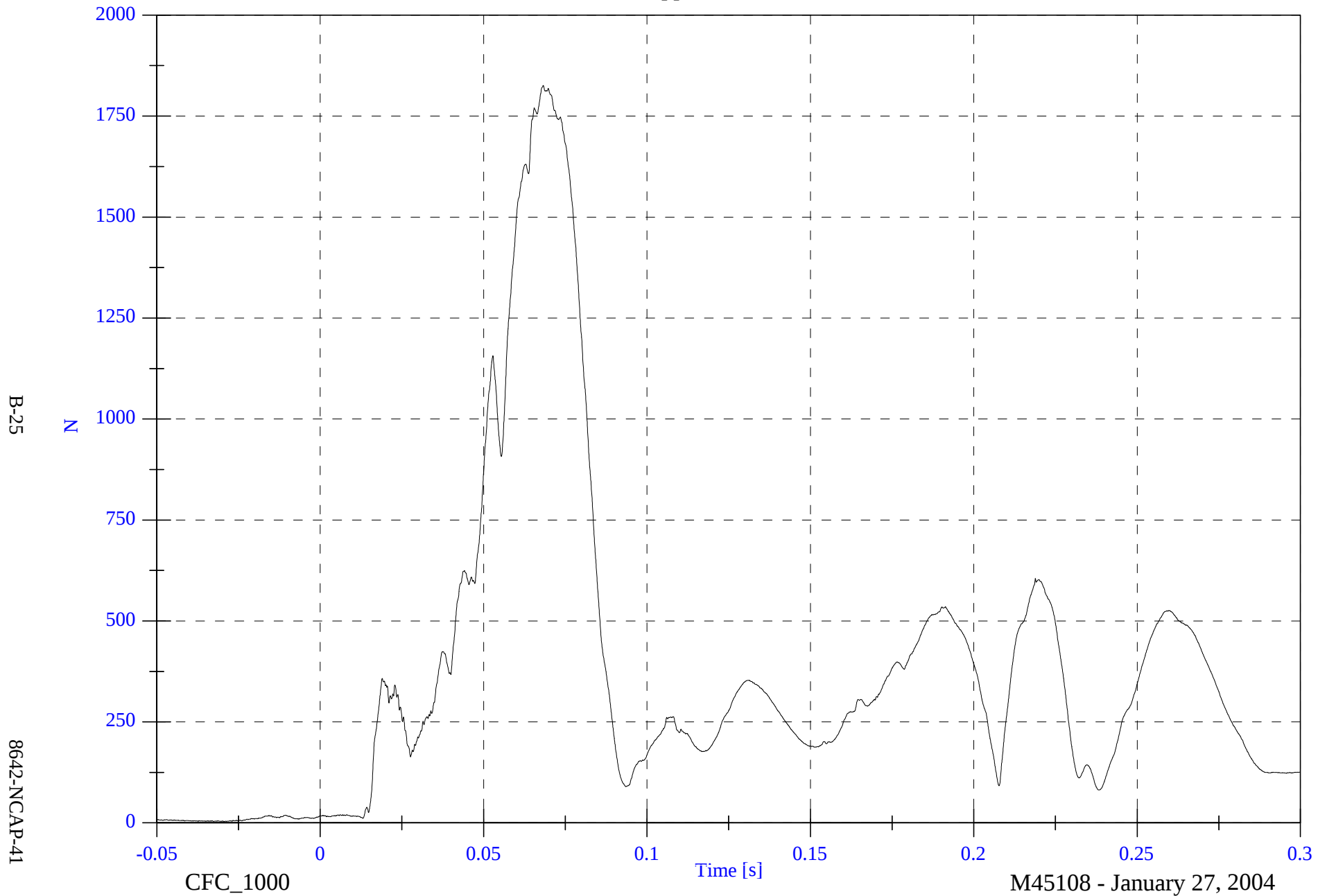


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Upper Neck F Resultant

Max: 1825.8 [N] at 0.068 [s]

Min: 3.1 [N] at -0.030 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

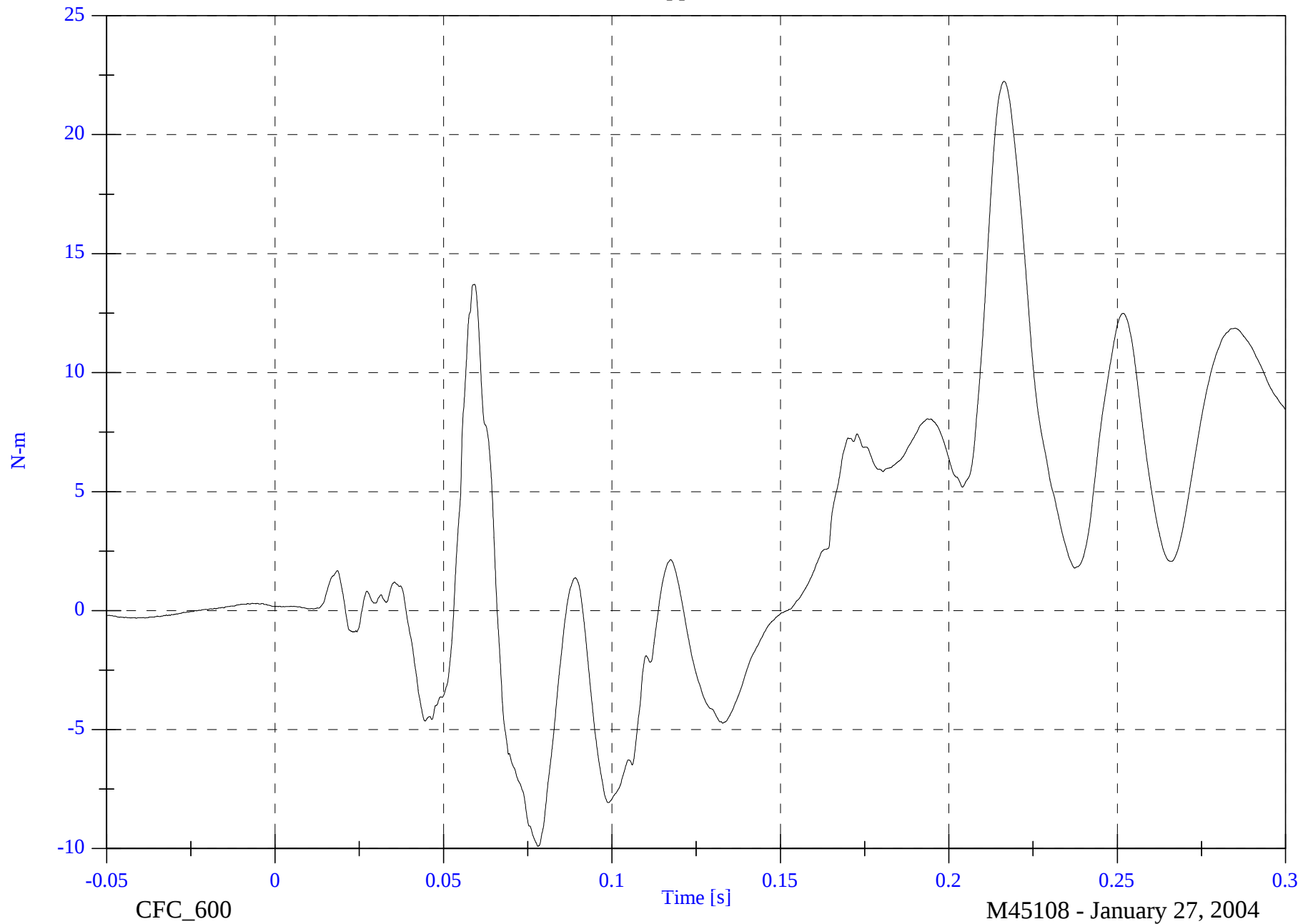
V1P1 Upper Neck Mx

Max: 22.2 [N-m] at 0.216 [s]

Min: -9.9 [N-m] at 0.078 [s]

B-26

8642-NCAP-41

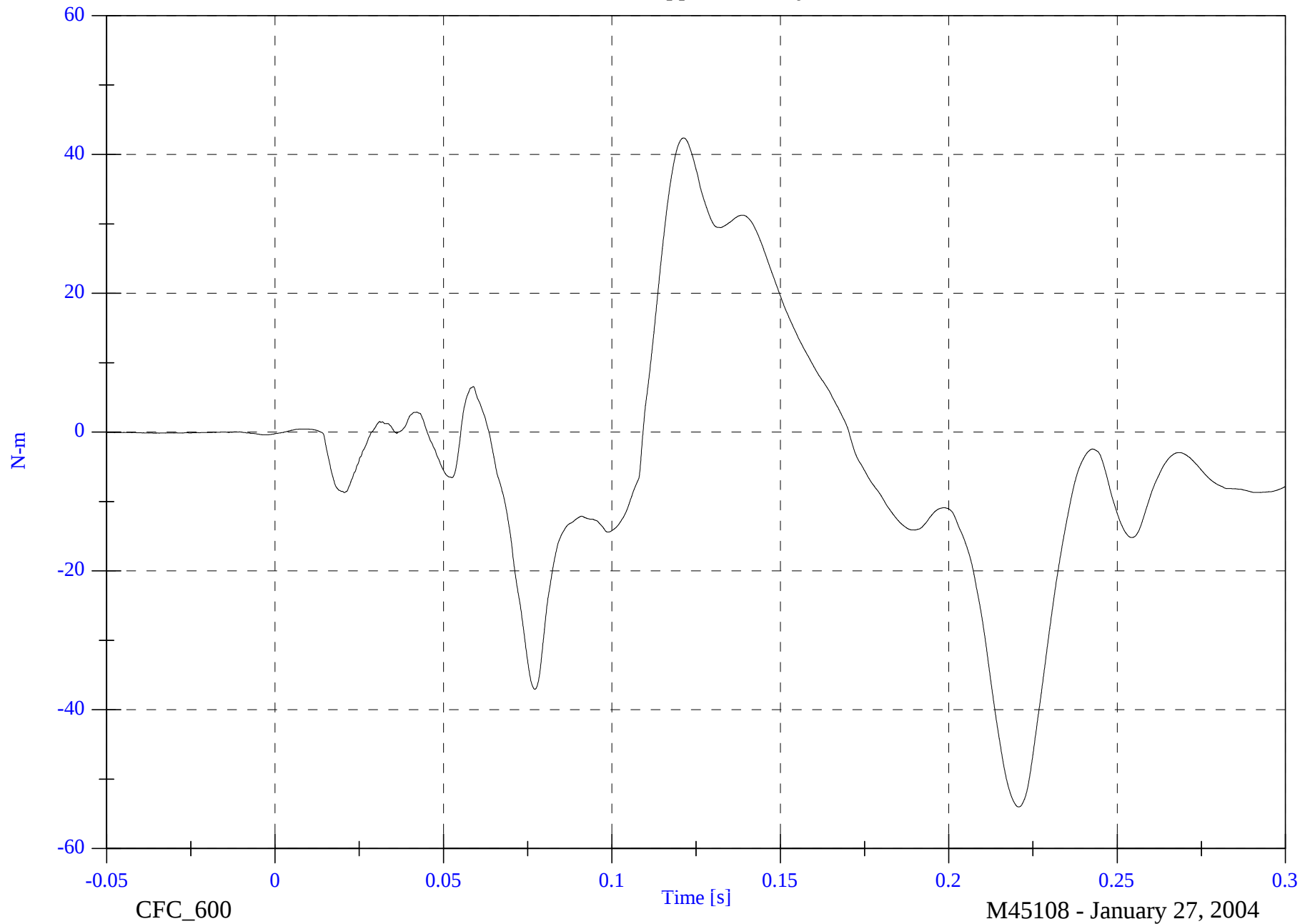


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Upper Neck My

Max: 42.4 [N-m] at 0.121 [s]

Min: -54.0 [N-m] at 0.221 [s]



B-27

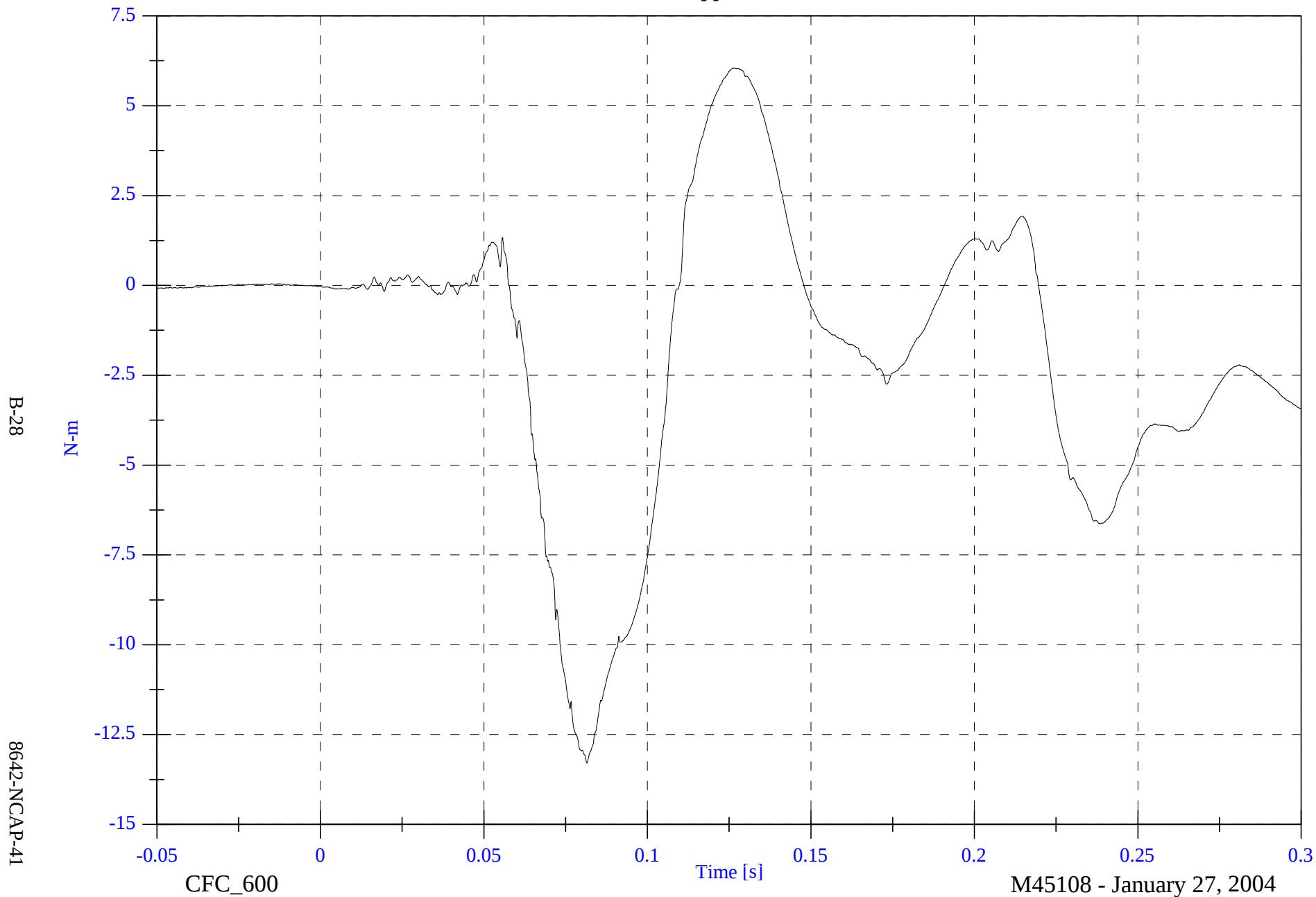
8642-NCAP-41

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Upper Neck Mz

Max: 6.0 [N-m] at 0.127 [s]

Min: -13.3 [N-m] at 0.082 [s]

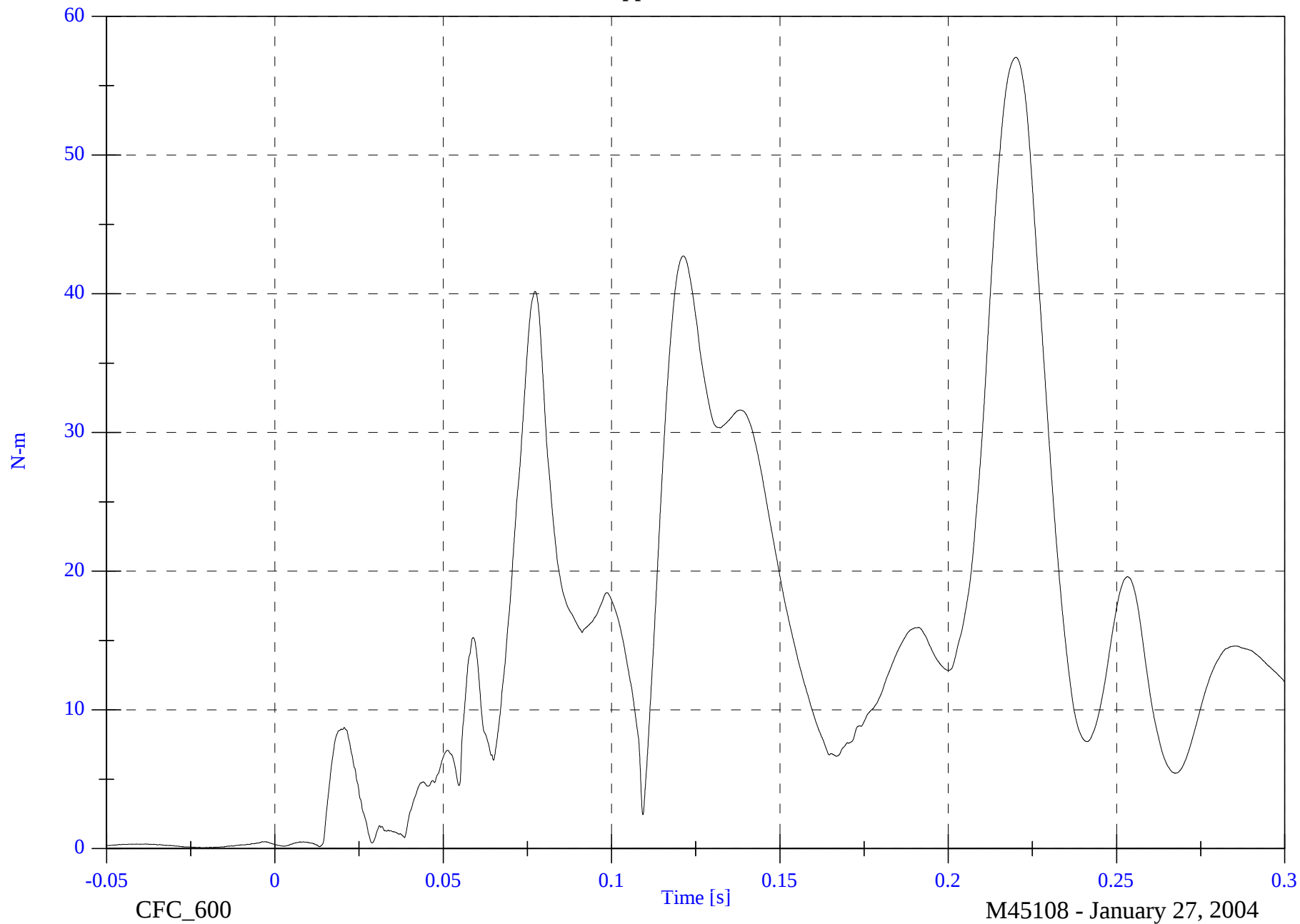


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Upper Neck M Resultant

Max: 57.1 [N-m] at 0.220 [s]

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



B-29

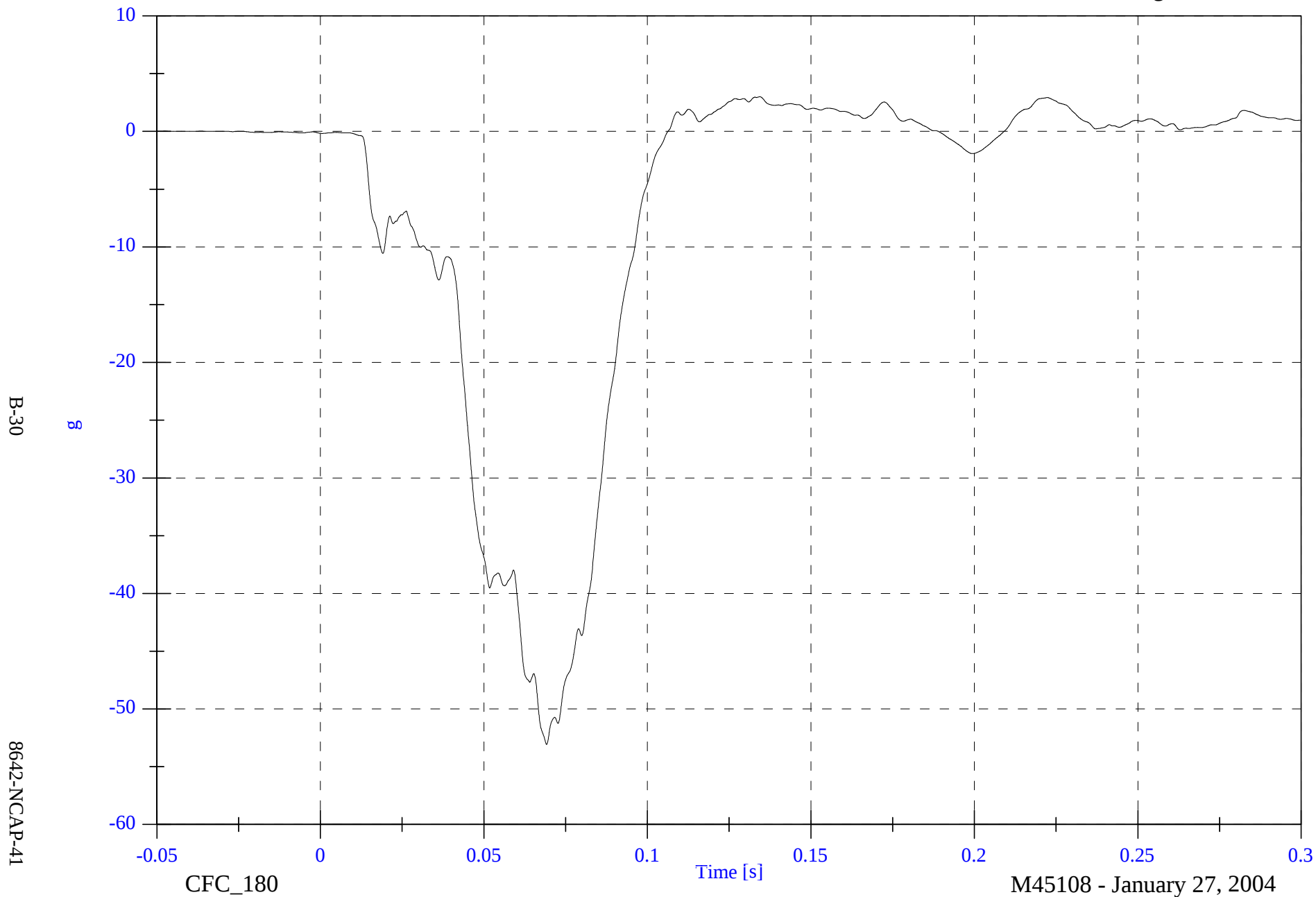
8642-NCAP-41

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Chest x

Max: 3.0 [g] at 0.134 [s]

Min: -53.1 [g] at 0.069 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

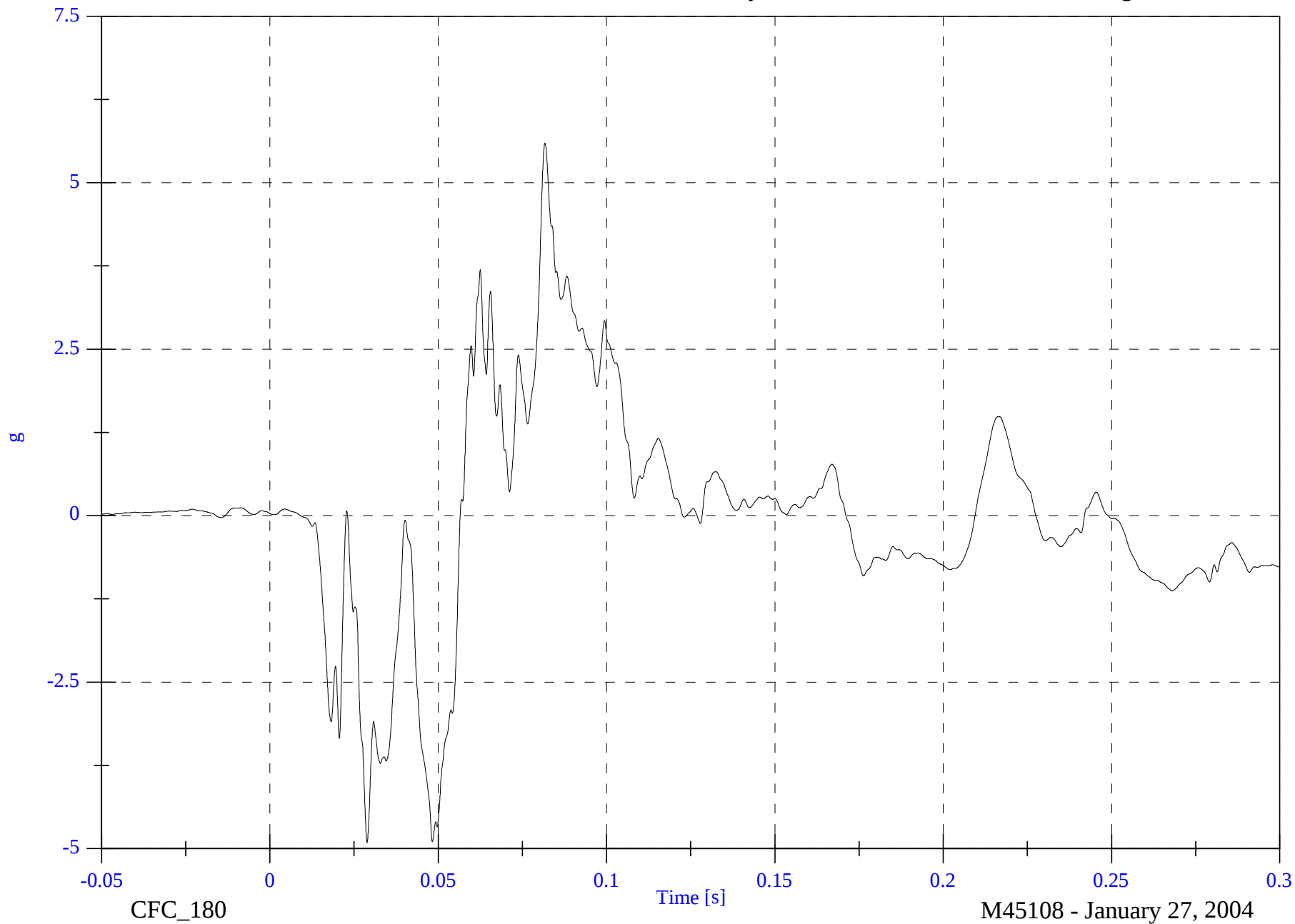
V1P1 Chest y

Max: 5.6 [g] at 0.082 [s]

Min: -4.9 [g] at 0.029 [s]

B-31

8642-NCAP-41

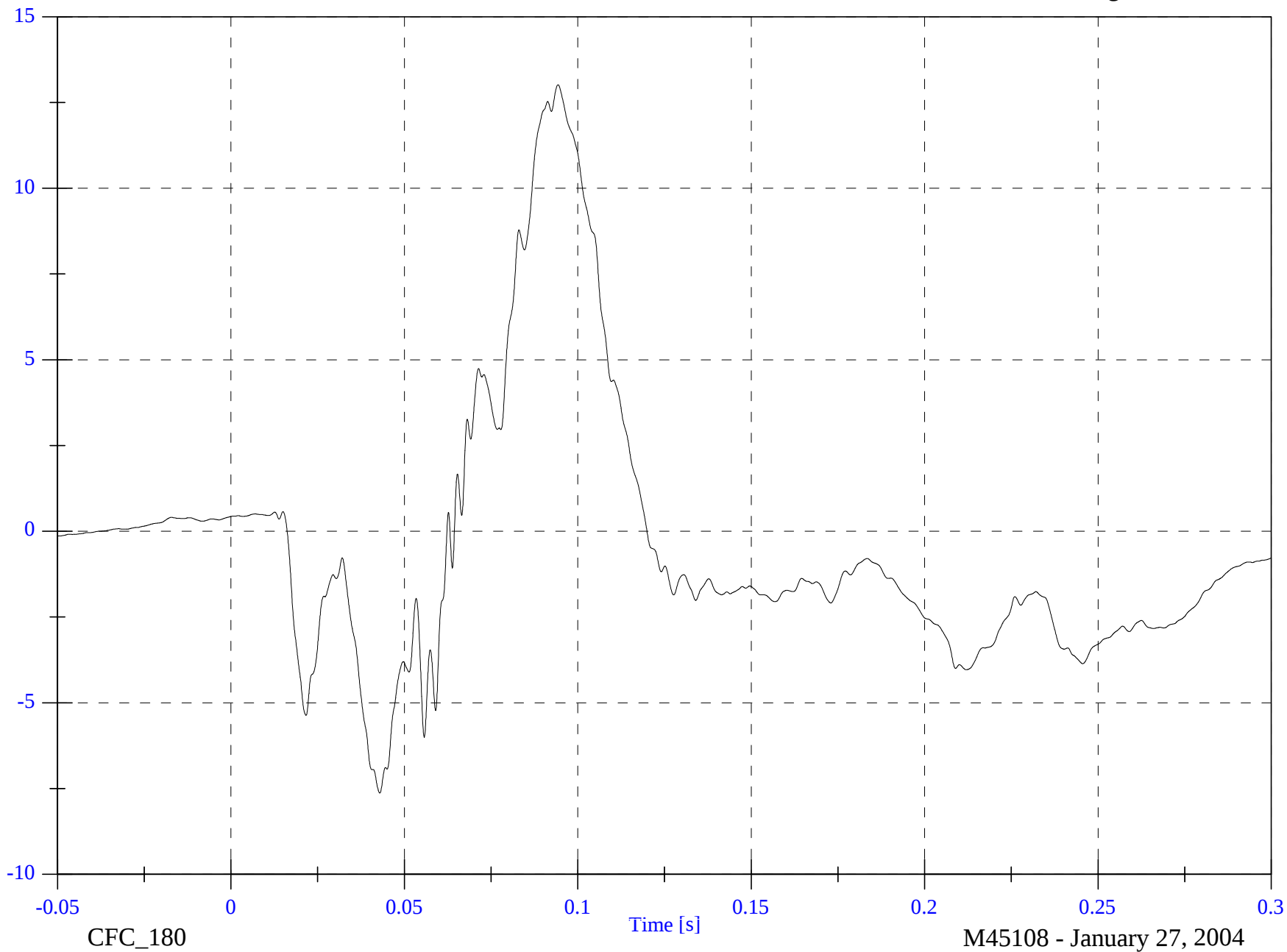


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Chest z

Max: 13.0 [g] at 0.094 [s]

Min: -7.6 [g] at 0.043 [s]



B-32

8642-NCAP-41

2004 NCAP Test 5 - 2004 Toyota RAV4

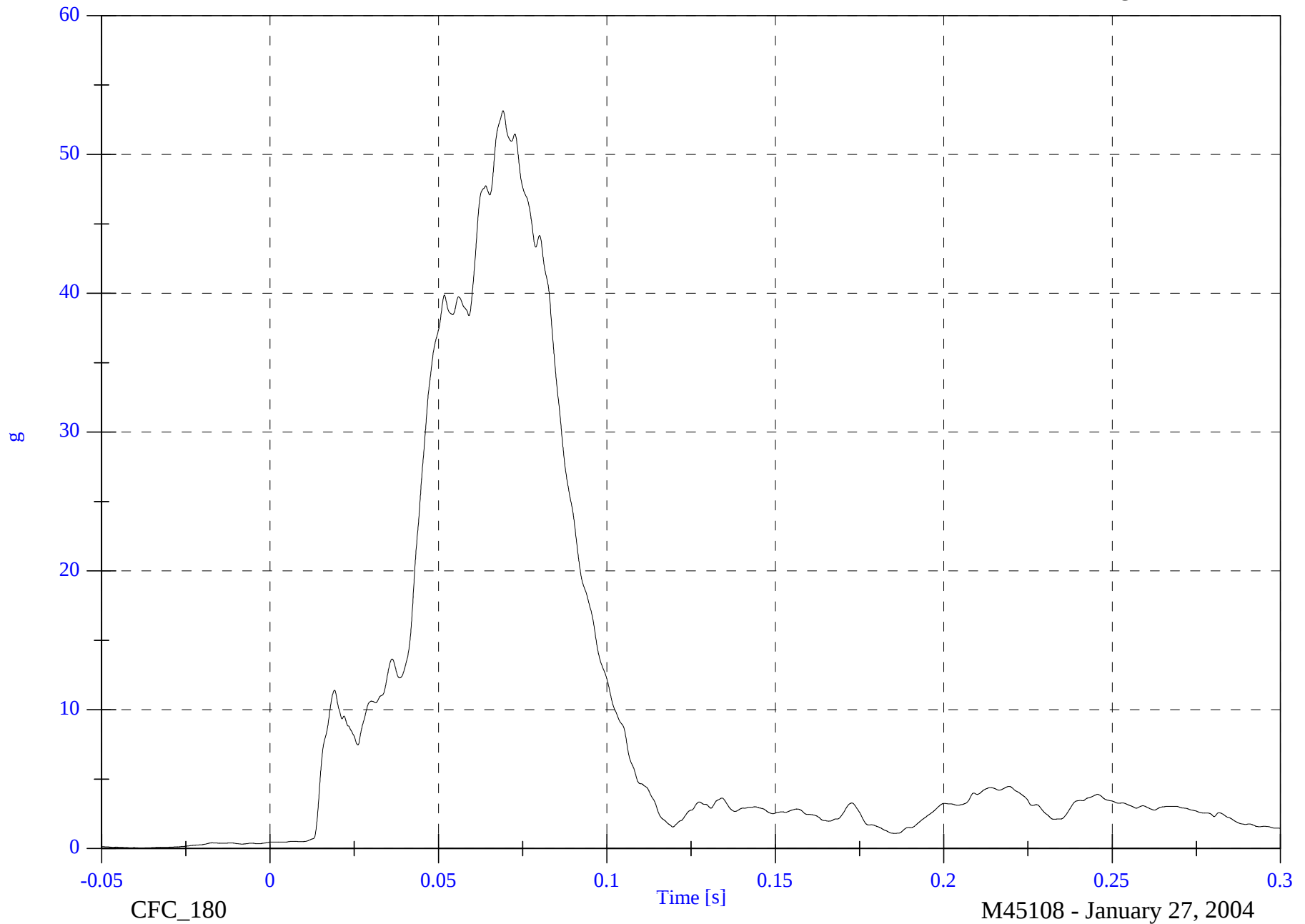
V1P1 Chest Resultant

Max: 53.2 [g] at 0.069 [s]

Min: 0.0 [g] at -0.038 [s]

B-33

8642-NCAP-41

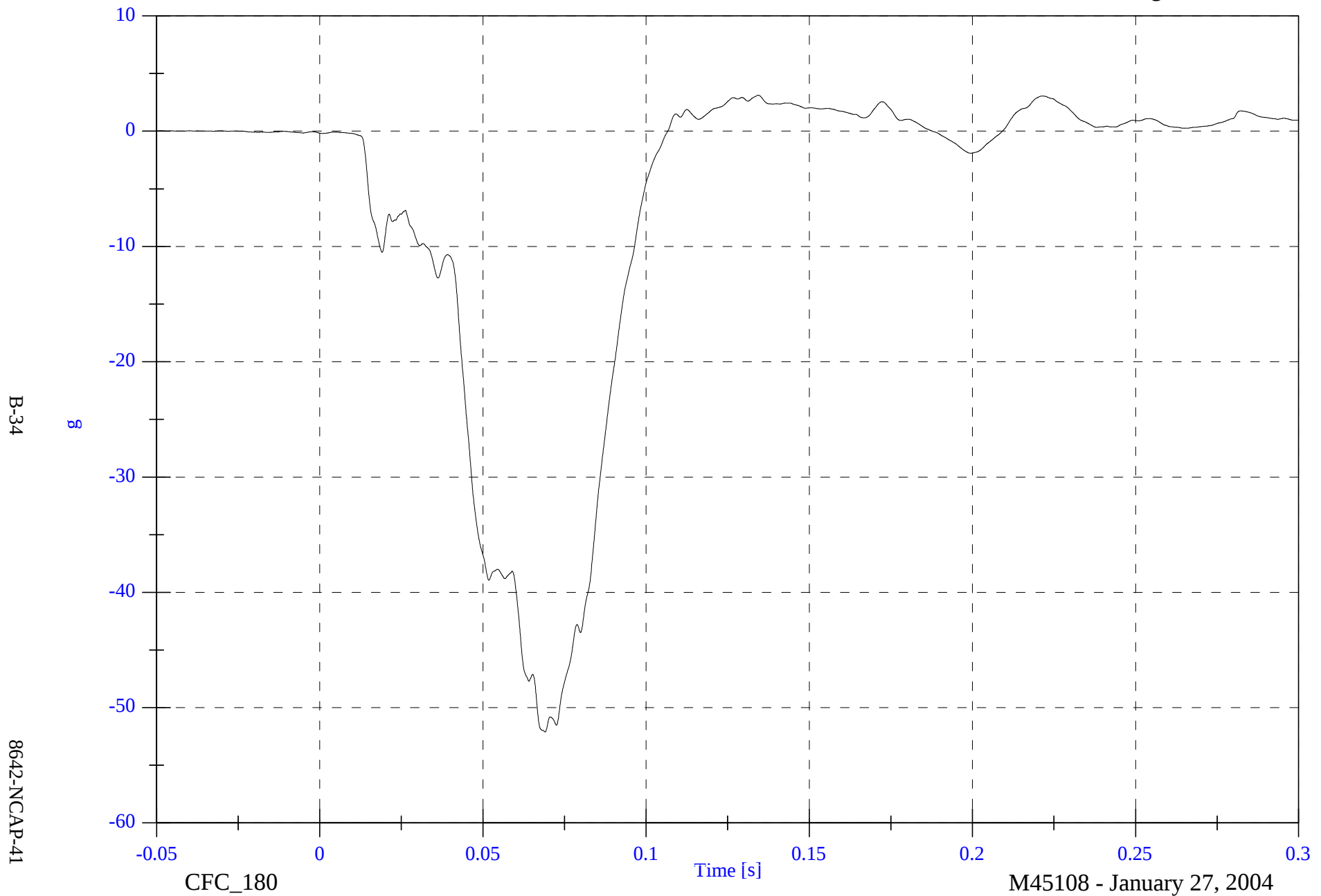


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Chest Red x

Max: 3.1 [g] at 0.134 [s]

Min: -52.1 [g] at 0.069 [s]

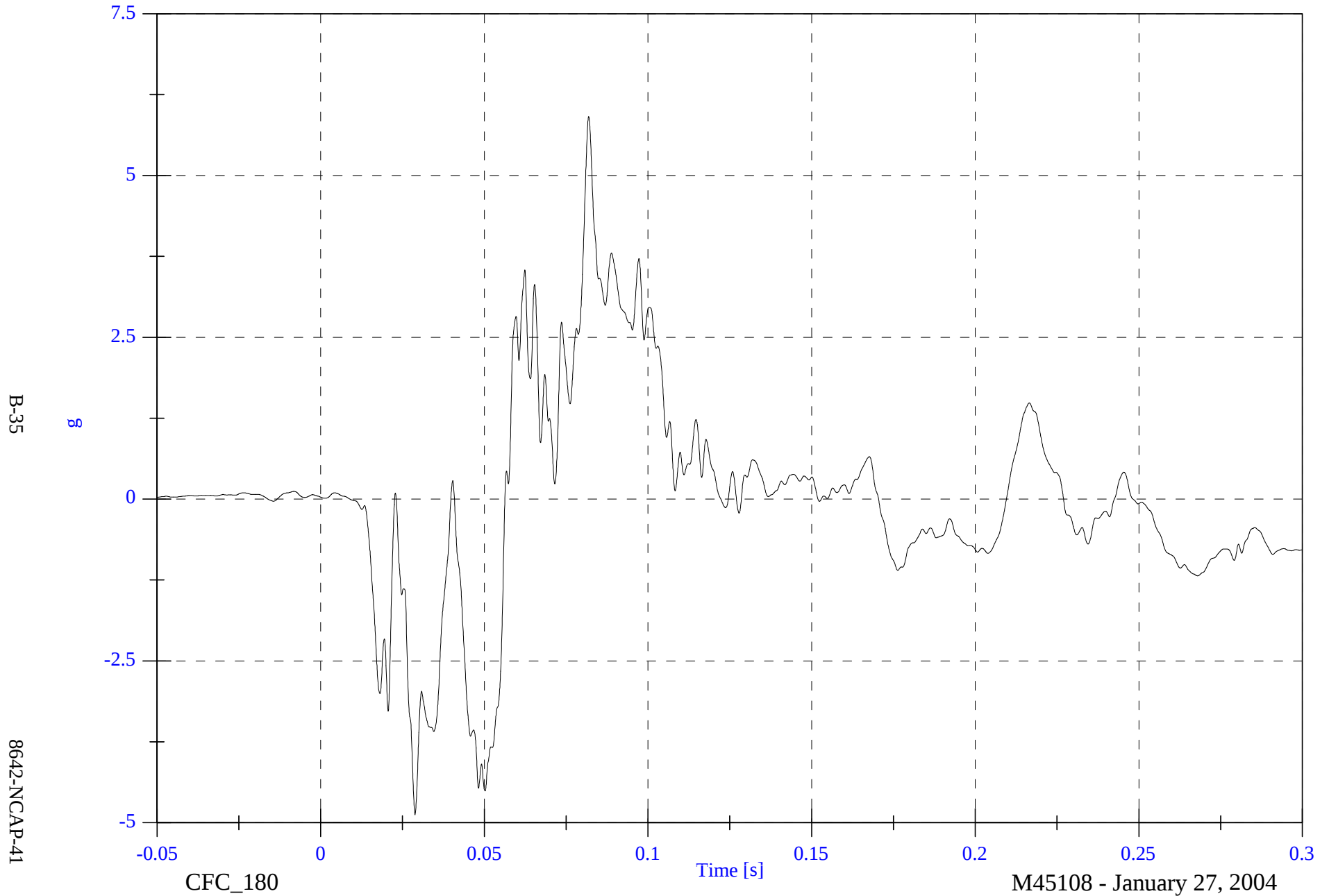


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Chest Red y

Max: 5.9 [g] at 0.082 [s]

Min: -4.9 [g] at 0.029 [s]

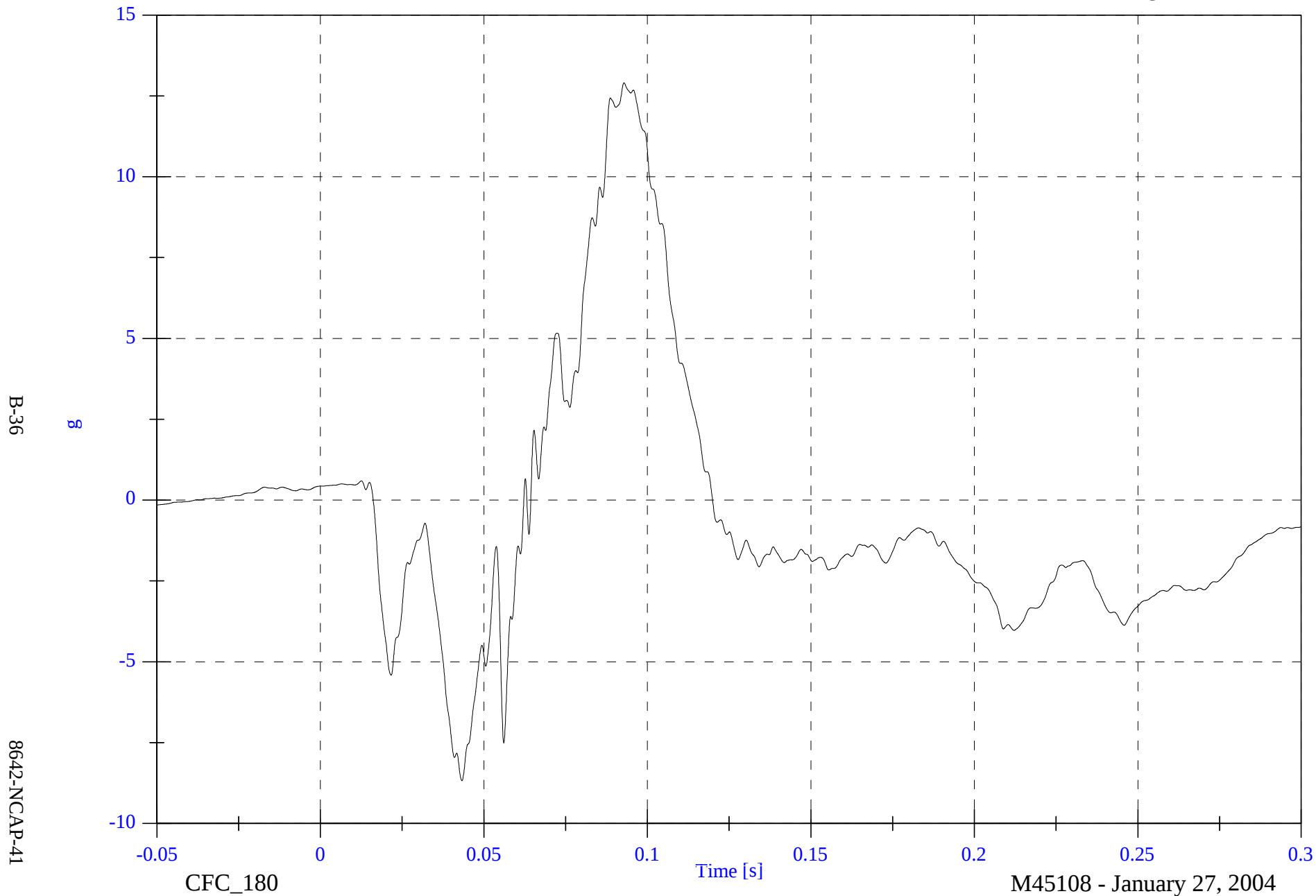


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Chest Red z

Max: 12.9 [g] at 0.093 [s]

Min: -8.7 [g] at 0.043 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

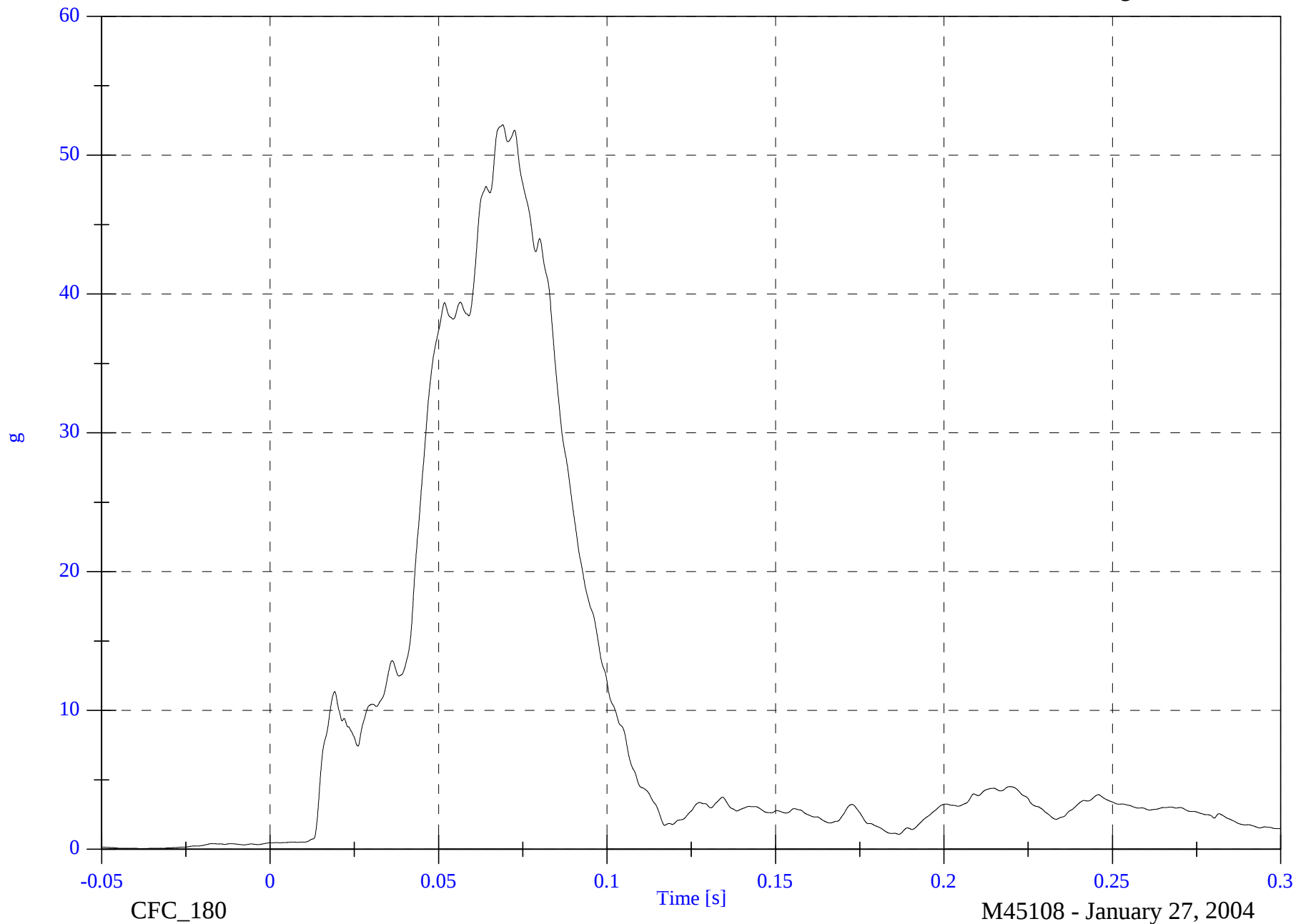
V1P1 Chest Red Resultant

Max: 52.2 [g] at 0.069 [s]

Min: 0.0 [g] at -0.038 [s]

B-37

8642-NCAP-41

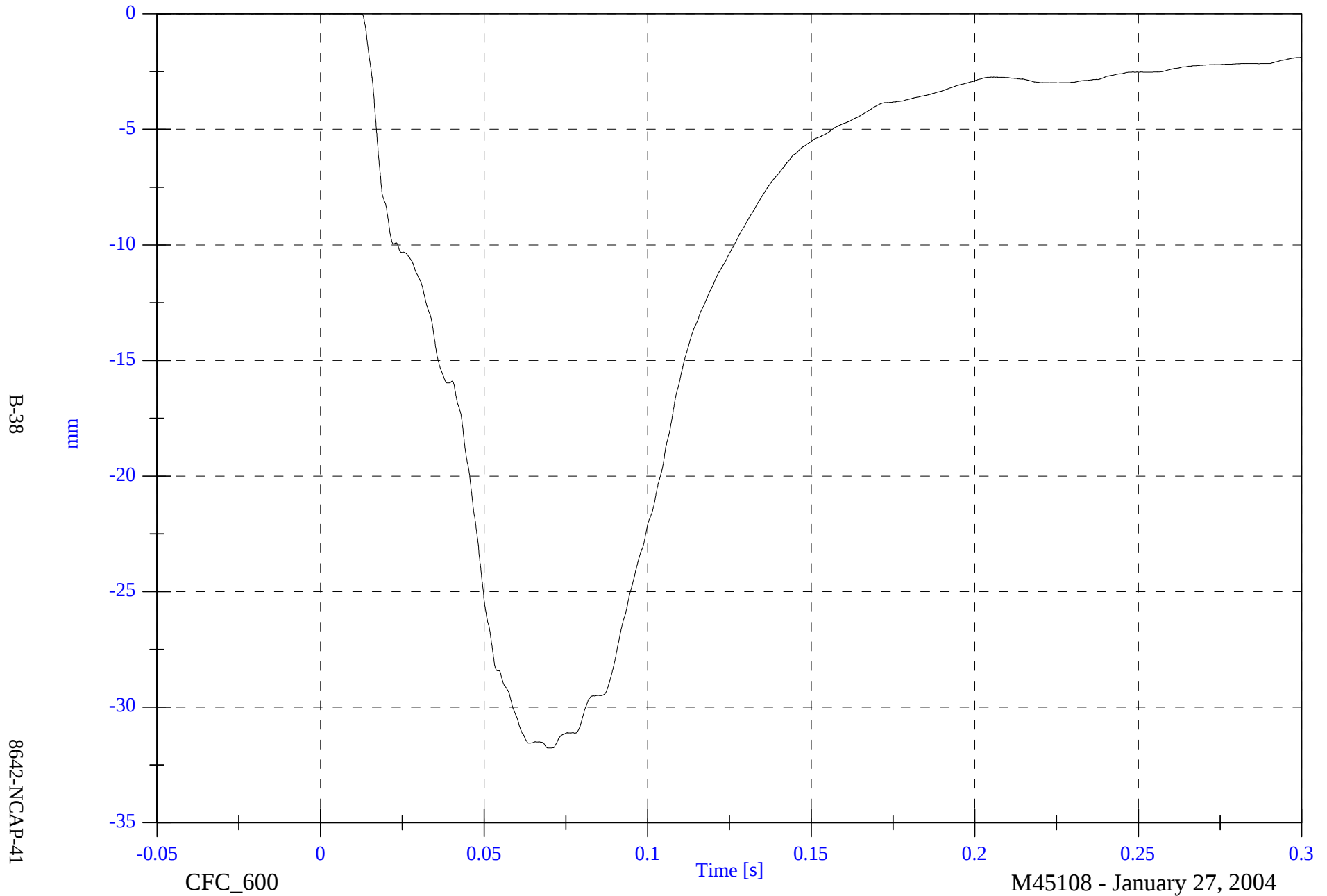


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Chest Compression x

Max: 0.0 [mm] at -0.034 [s]

Min: -31.8 [mm] at 0.070 [s]

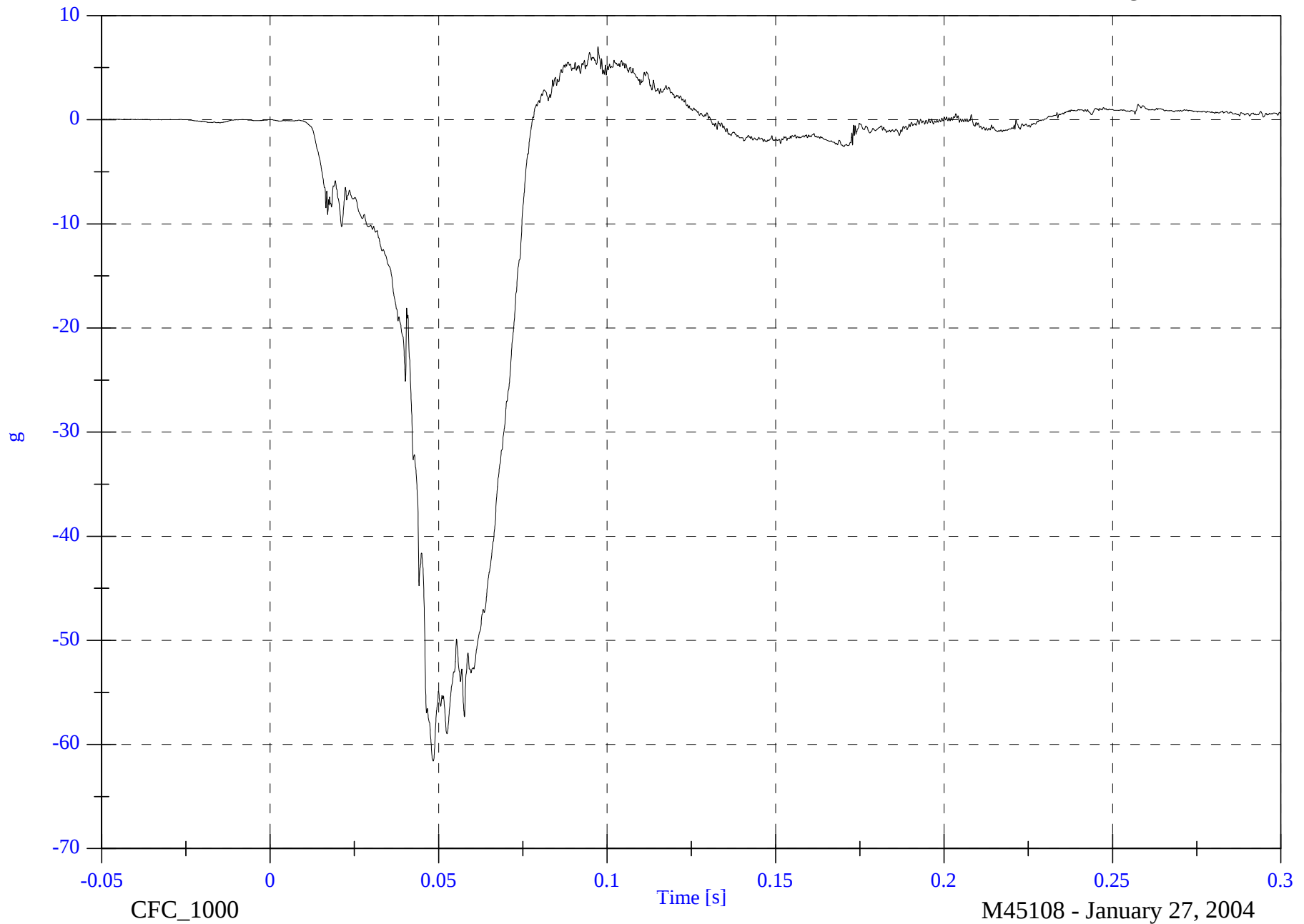


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Pelvic x

Max: 7.0 [g] at 0.097 [s]

Min: -61.6 [g] at 0.048 [s]



B-39

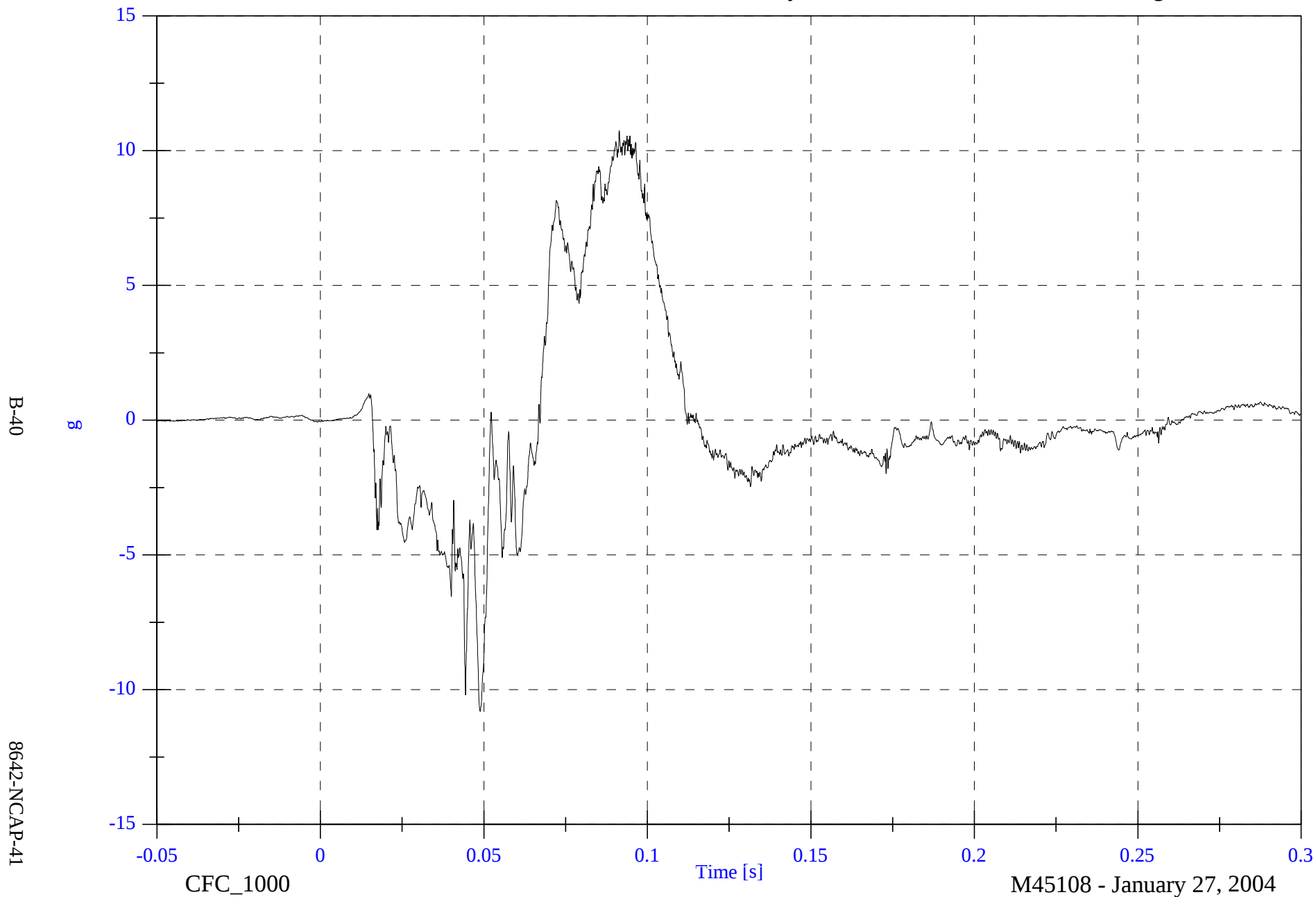
8642-NCAP-41

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Pelvic y

Max: 10.7 [g] at 0.091 [s]

Min: -10.8 [g] at 0.049 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

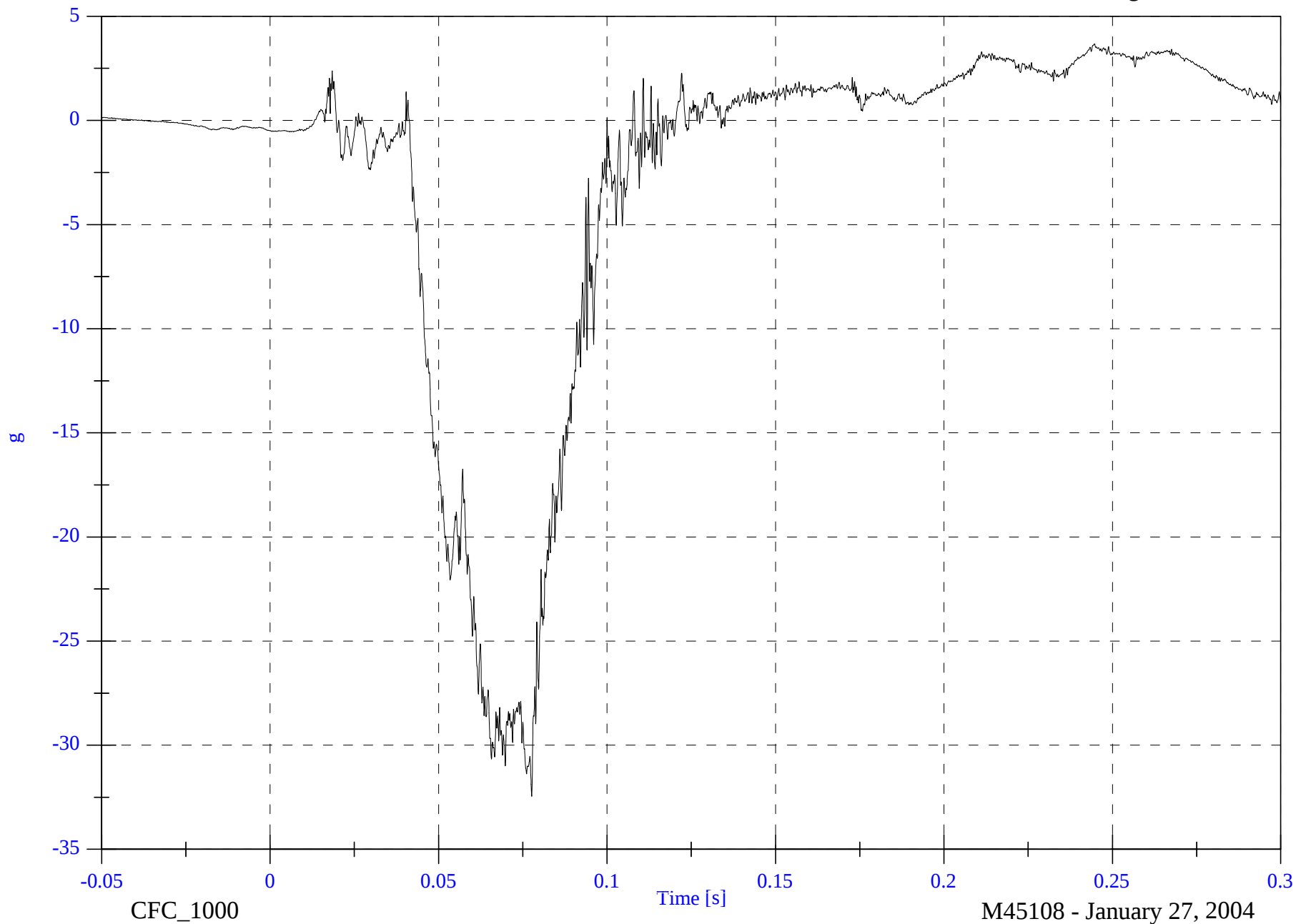
V1P1 Pelvic z

Max: 3.7 [g] at 0.245 [s]

Min: -32.5 [g] at 0.078 [s]

B-41

8642-NCAP-41



CFC_1000

Time [s]

M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

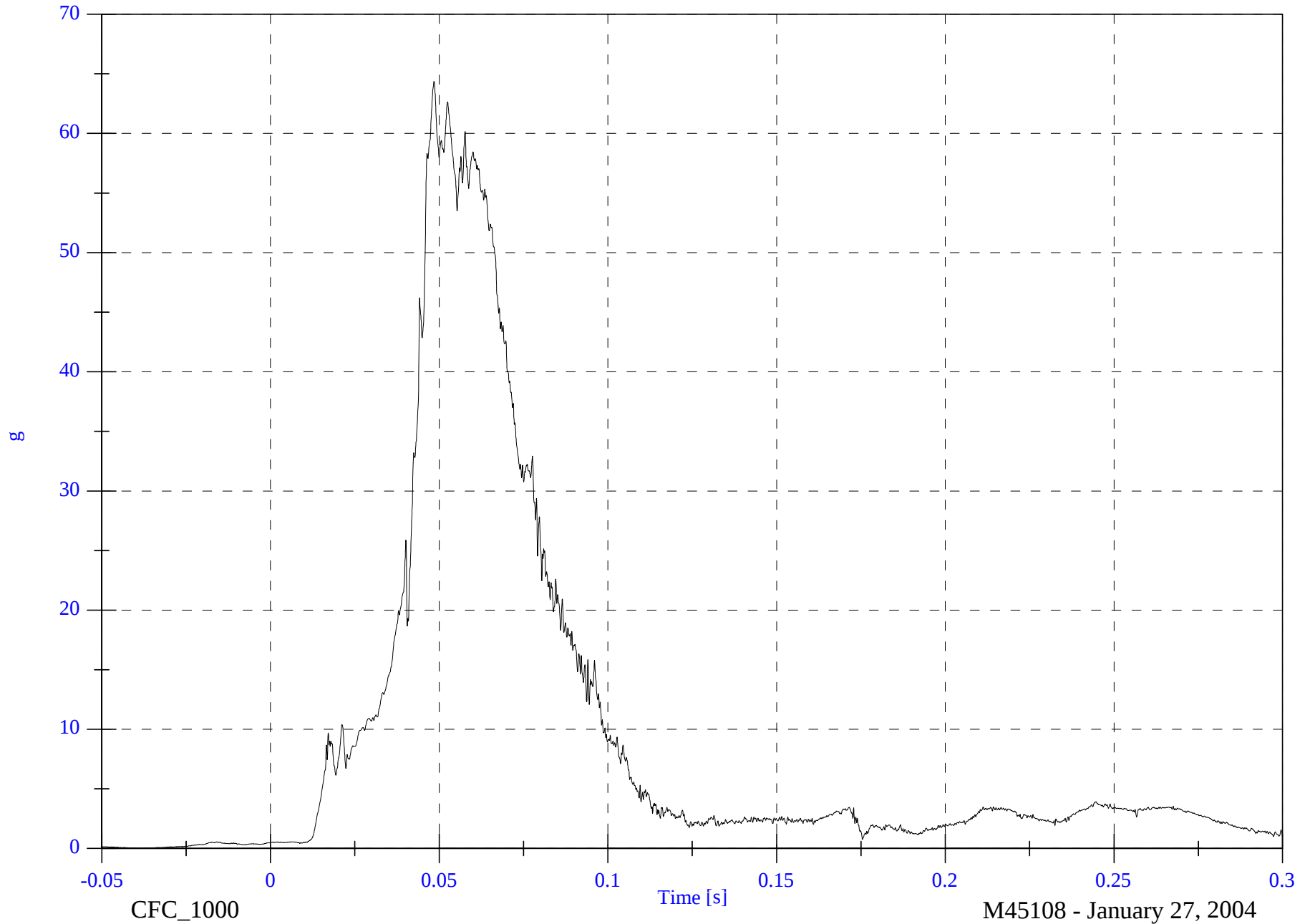
V1P1 Pelvic Resultant

Max: 64.4 [g] at 0.048 [s]

Min: 0.0 [g] at -0.038 [s]

B-42

8642-NCAP-41

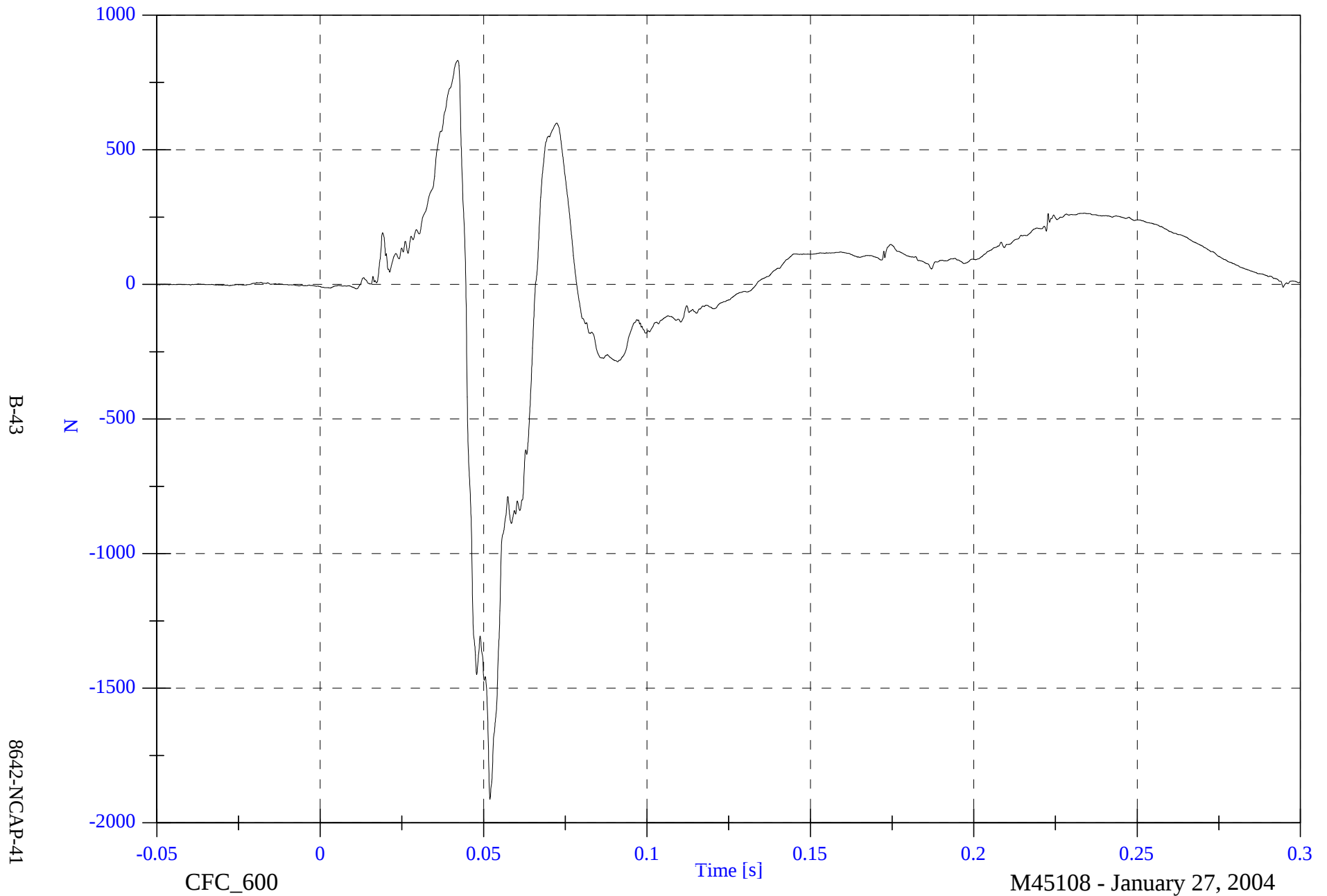


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Left Femur z

Max: 832.0 [N] at 0.042 [s]

Min: -1912.1 [N] at 0.052 [s]

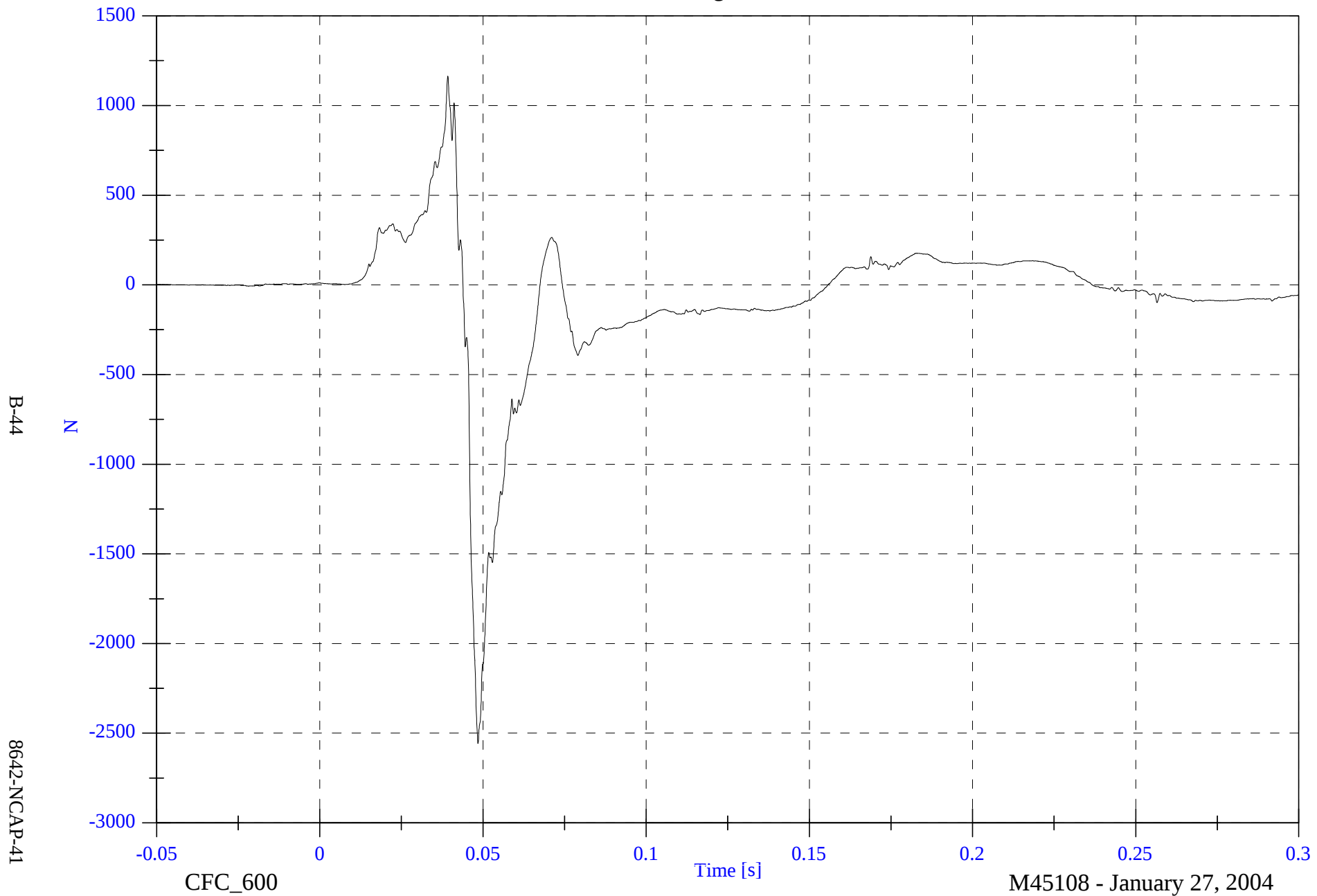


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Right Femur z

Max: 1164.1 [N] at 0.039 [s]

Min: -2557.1 [N] at 0.048 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

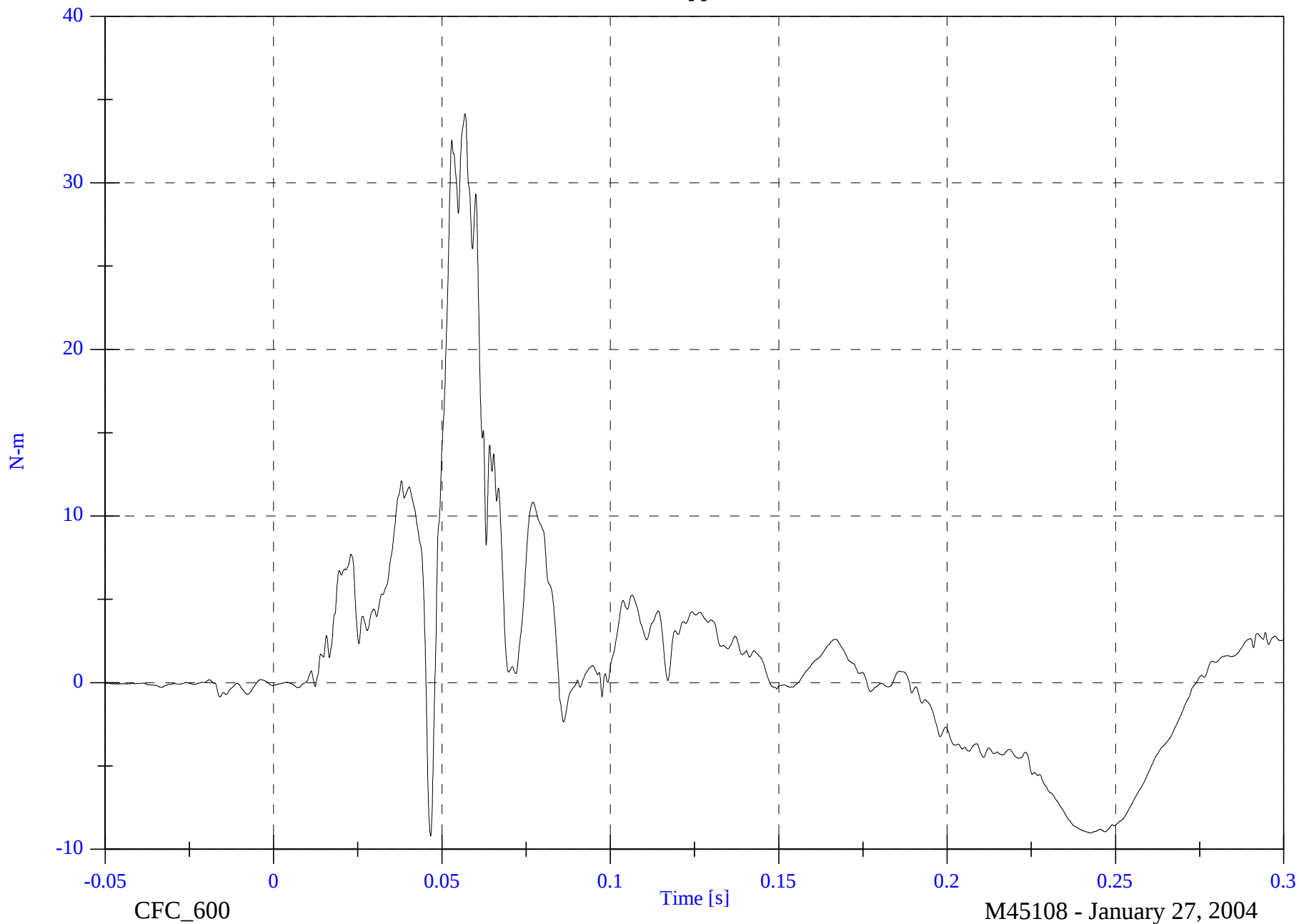
V1P1 Left Upper Tibia Mx

Max: 34.2 [N-m] at 0.057 [s]

Min: -9.2 [N-m] at 0.047 [s]

B-45

8642-NCAP-41

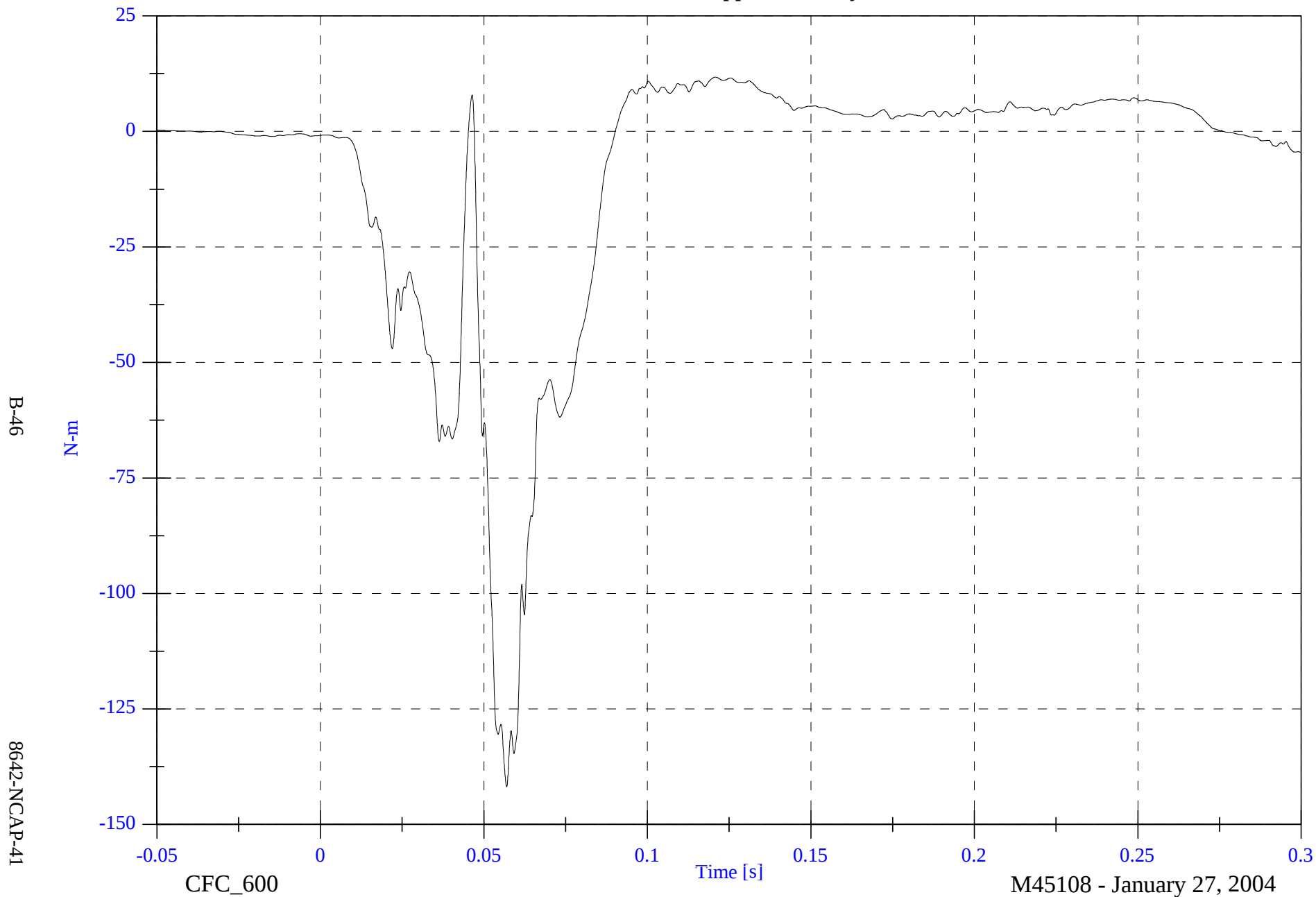


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Left Upper Tibia My

Max: 11.7 [N-m] at 0.121 [s]

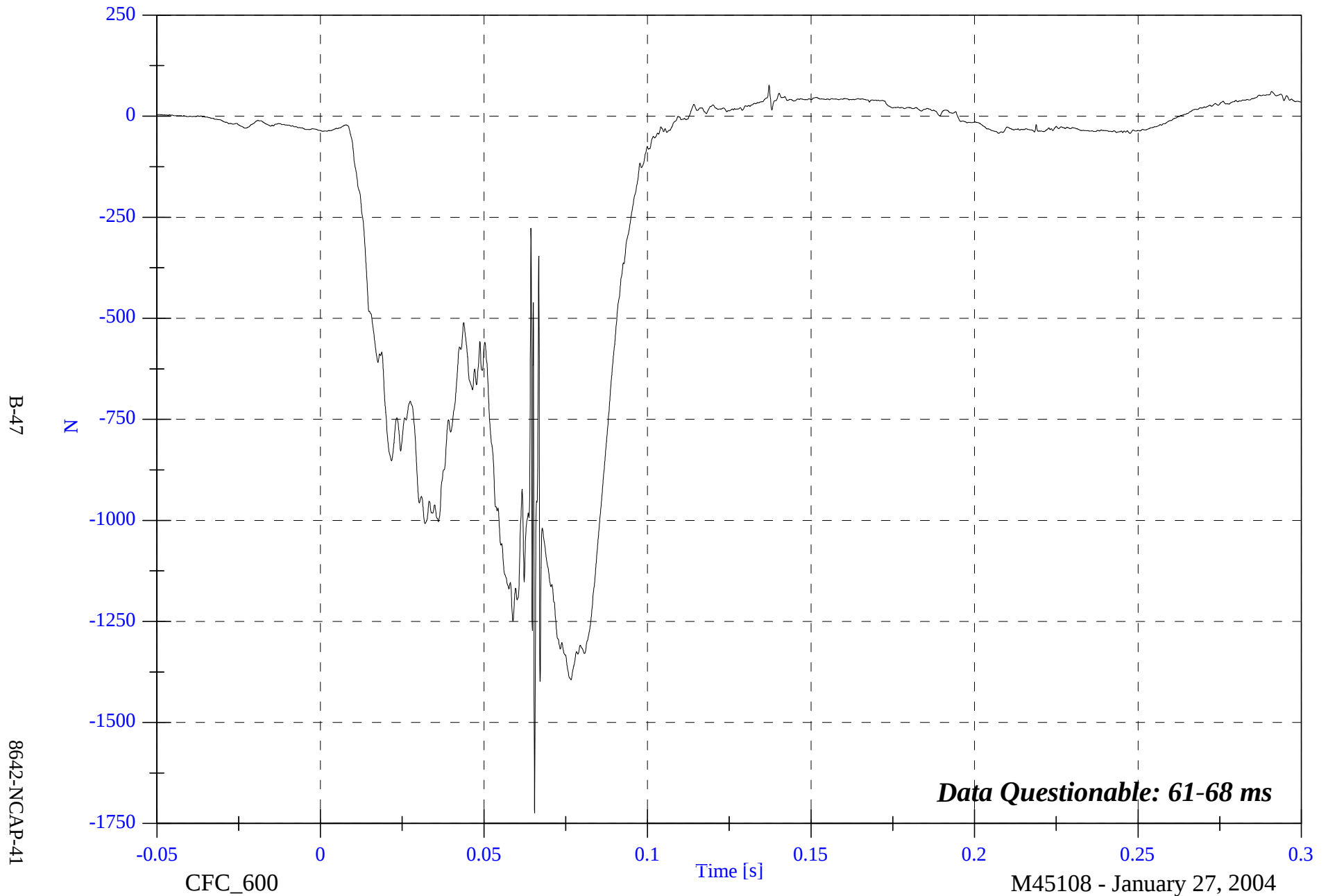
Min: -141.8 [N-m] at 0.057 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Left Lower Tibia Fz

Max: 76.8 [N] at 0.137 [s]
Min: -1724.3 [N] at 0.065 [s]

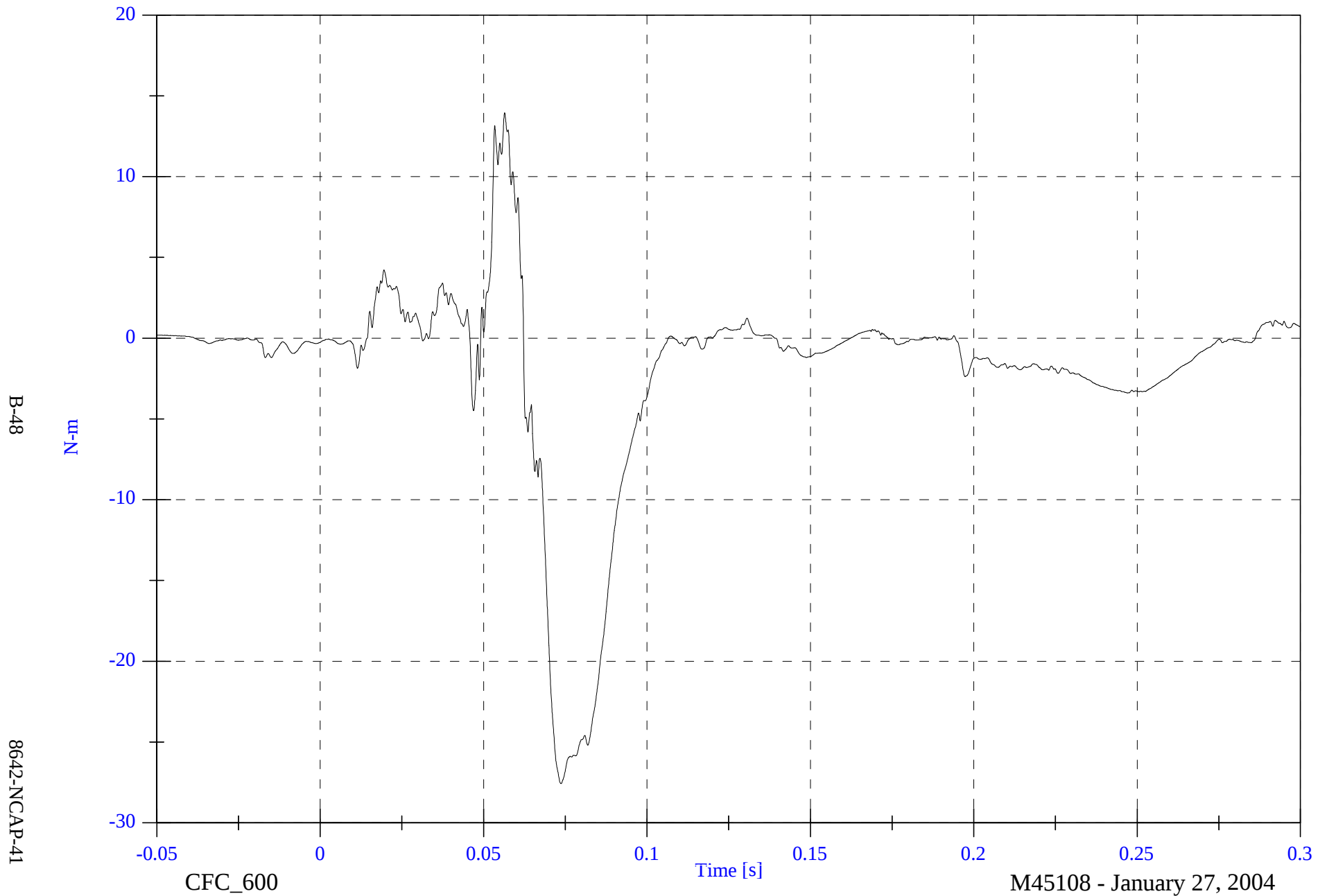


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Left Lower Tibia Mx

Max: 14.0 [N-m] at 0.056 [s]

Min: -27.6 [N-m] at 0.074 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

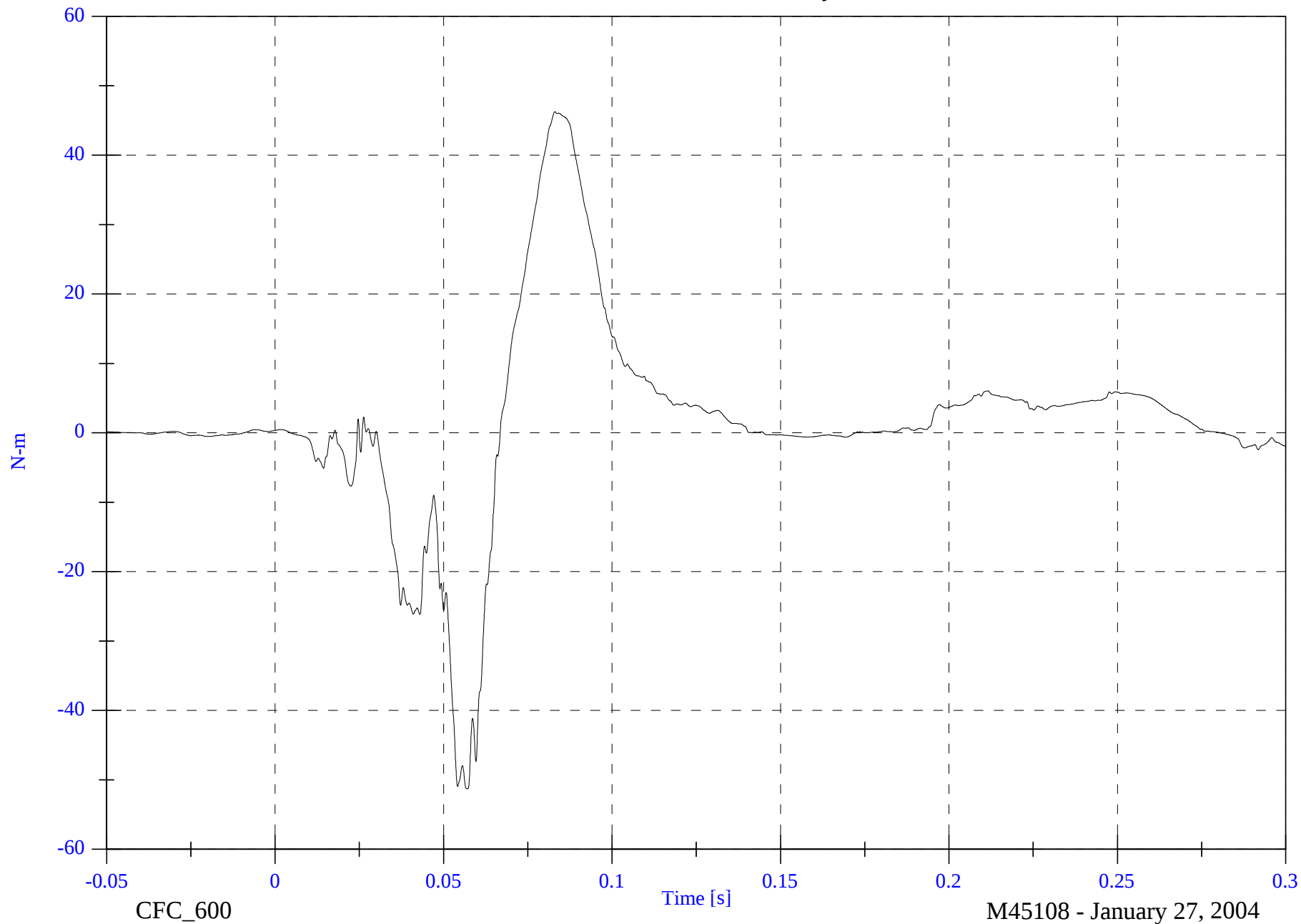
V1P1 Left Lower Tibia My

Max: 46.3 [N-m] at 0.083 [s]

Min: -51.3 [N-m] at 0.057 [s]

B-49

8642-NCAP-41

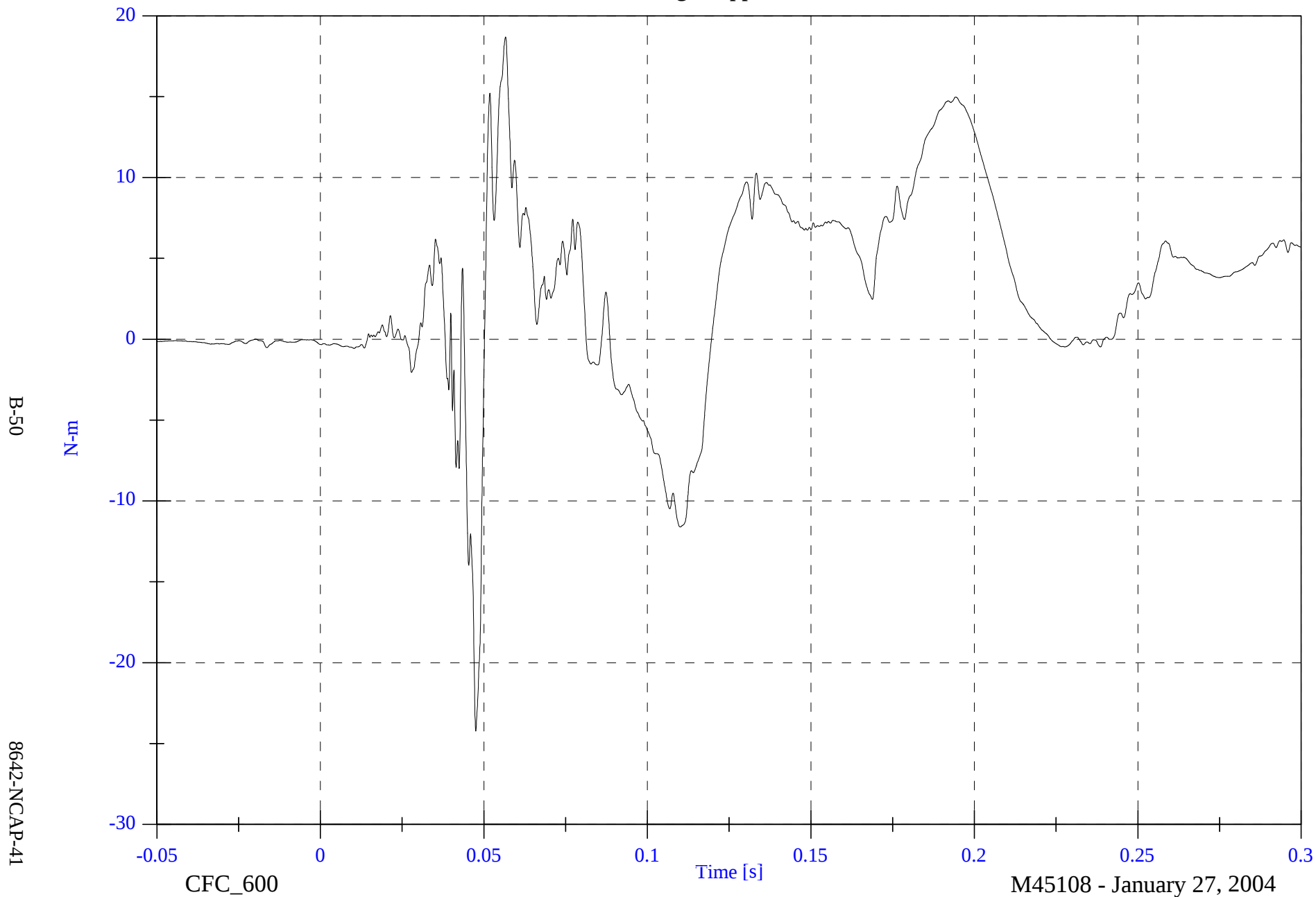


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Right Upper Tibia Mx

Max: 18.7 [N-m] at 0.057 [s]

Min: -24.2 [N-m] at 0.048 [s]

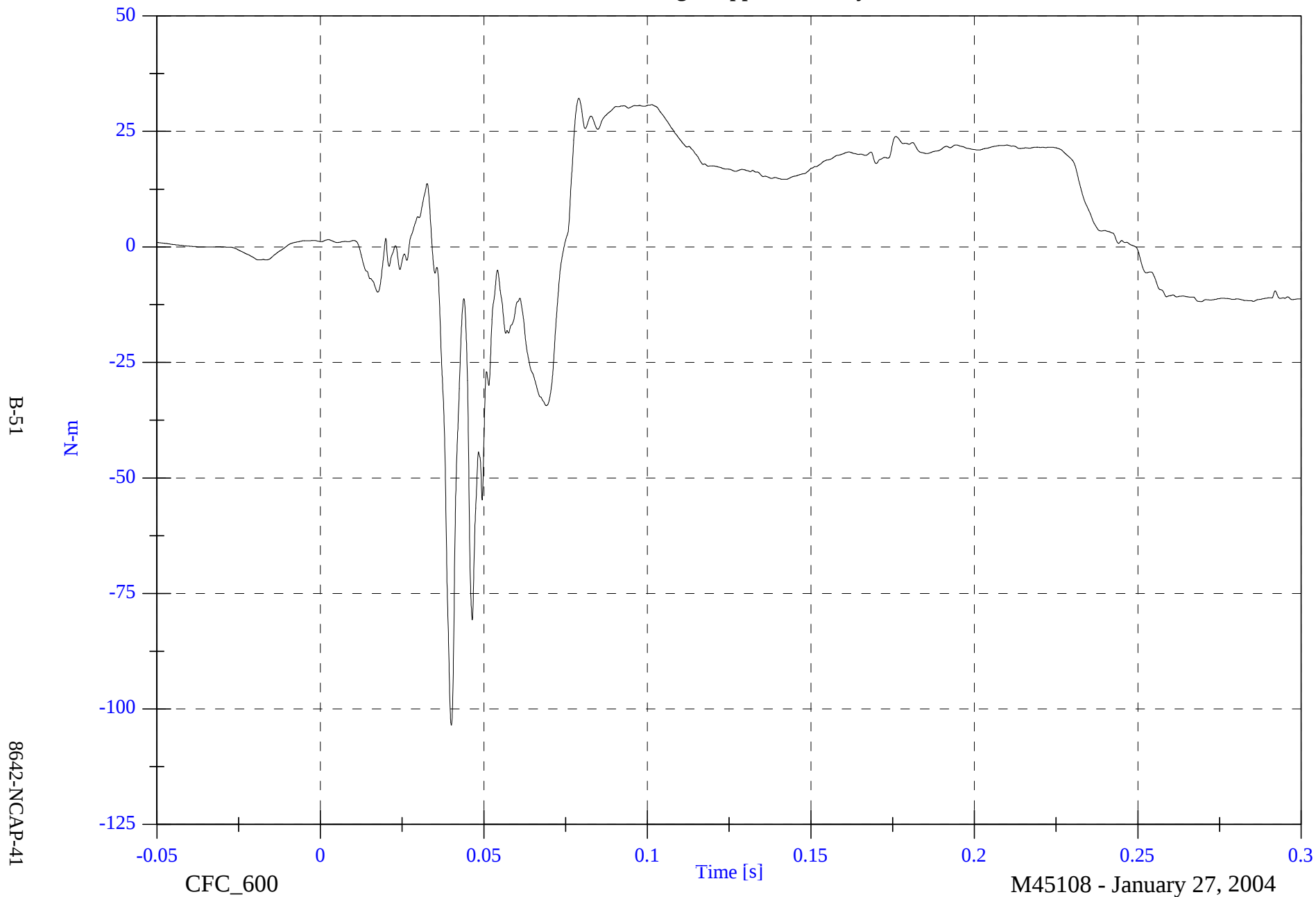


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Right Upper Tibia My

Max: 32.2 [N-m] at 0.079 [s]

Min: -103.5 [N-m] at 0.040 [s]

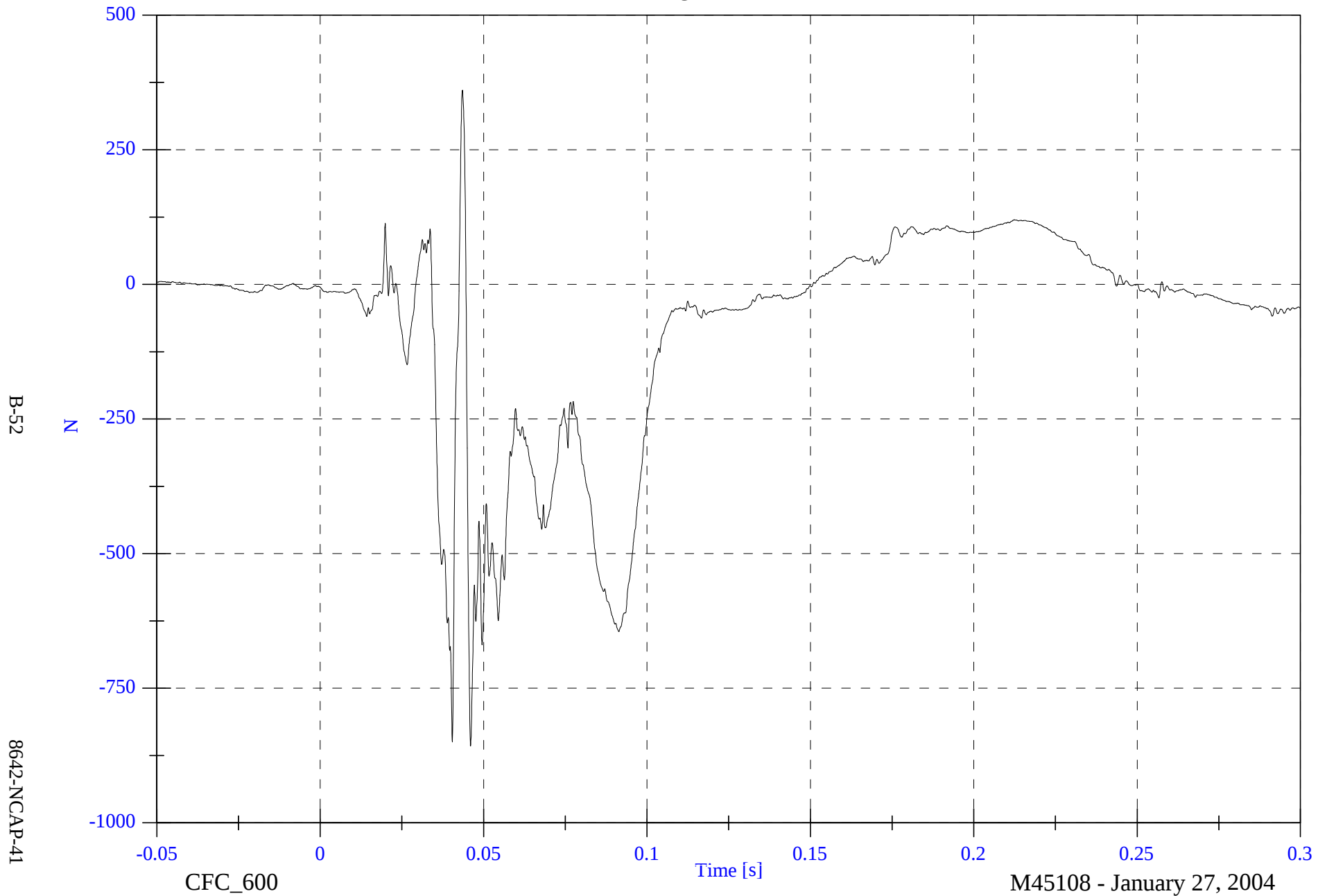


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Right Lower Tibia Fz

Max: 360.7 [N] at 0.044 [s]

Min: -857.4 [N] at 0.046 [s]

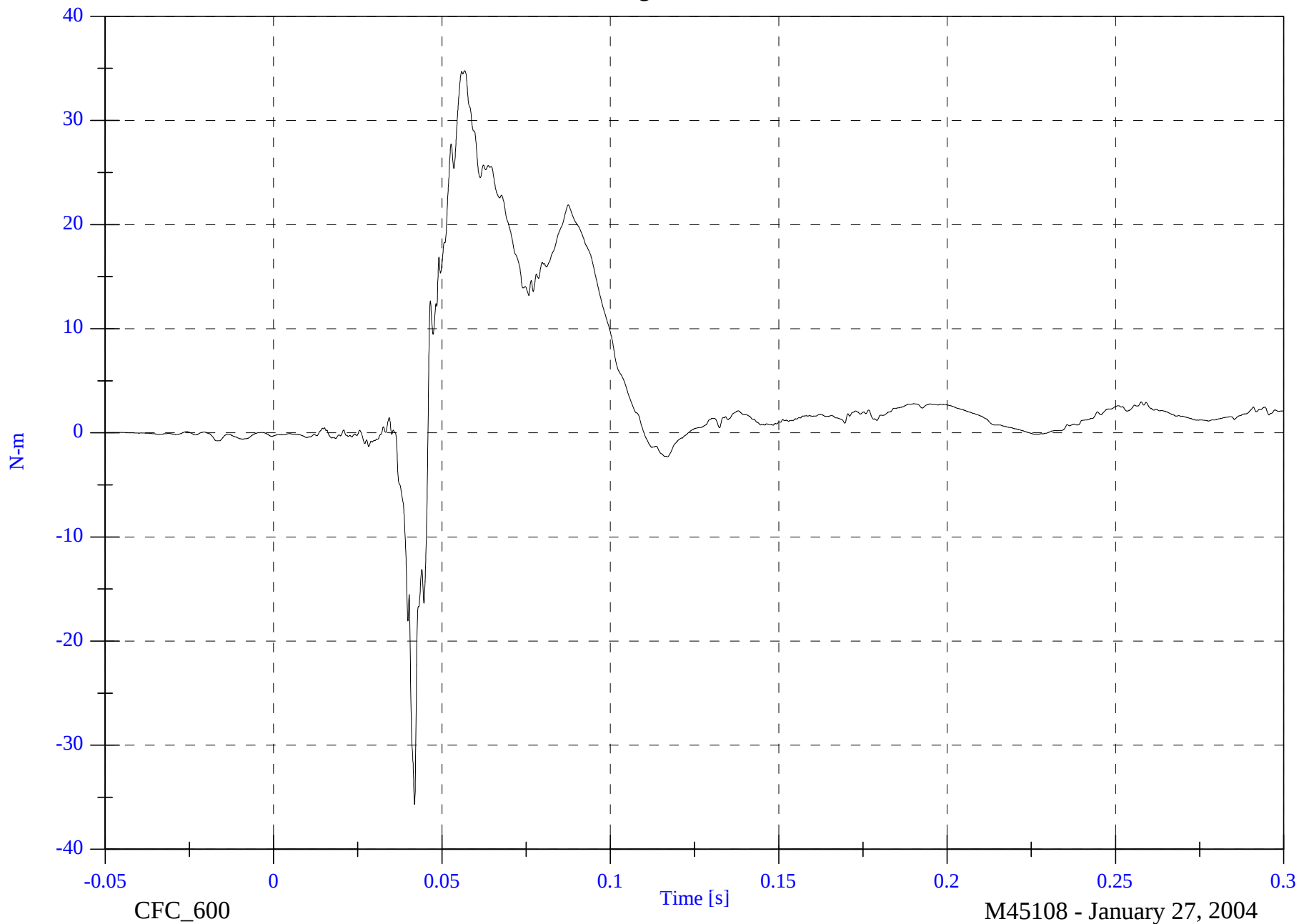


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Right Lower Tibia Mx

Max: 34.8 [N-m] at 0.057 [s]

Min: -35.7 [N-m] at 0.042 [s]



B-53

8642-NCAP-41

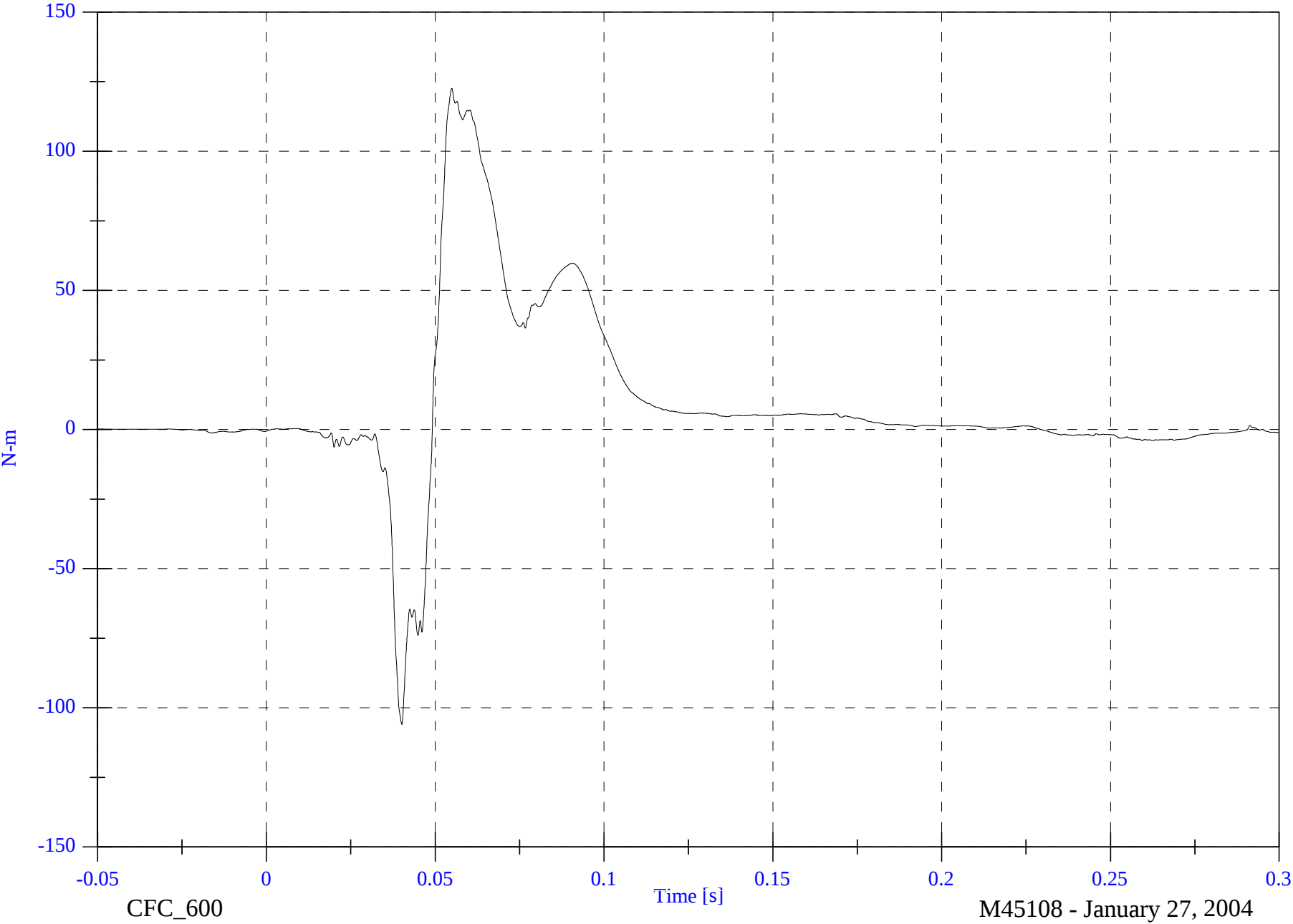
CFC_600

Time [s]

M45108 - January 27, 2004

B-54

8642-NCAP-41

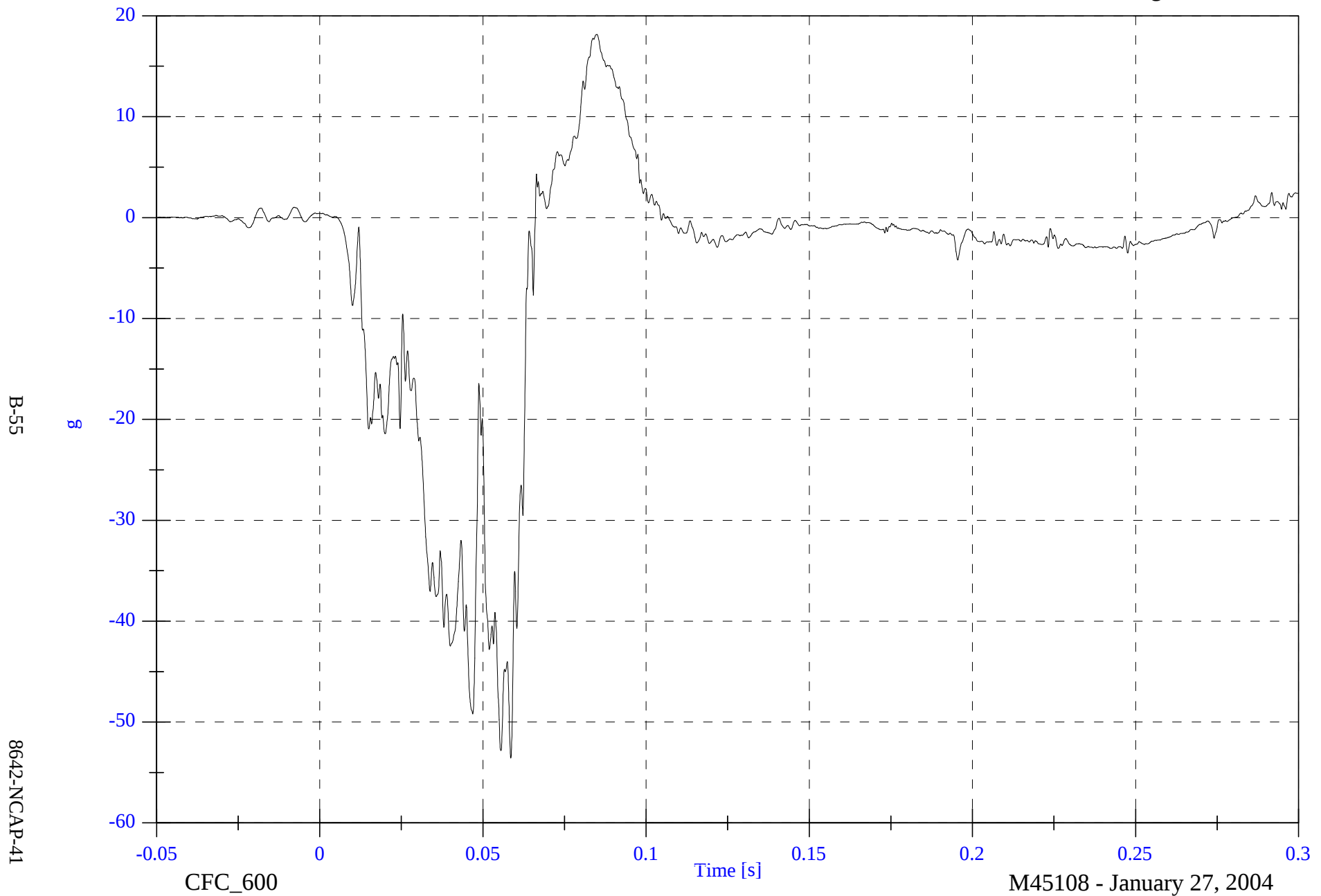


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Left Foot Aft x

Max: 18.1 [g] at 0.085 [s]

Min: -53.6 [g] at 0.059 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

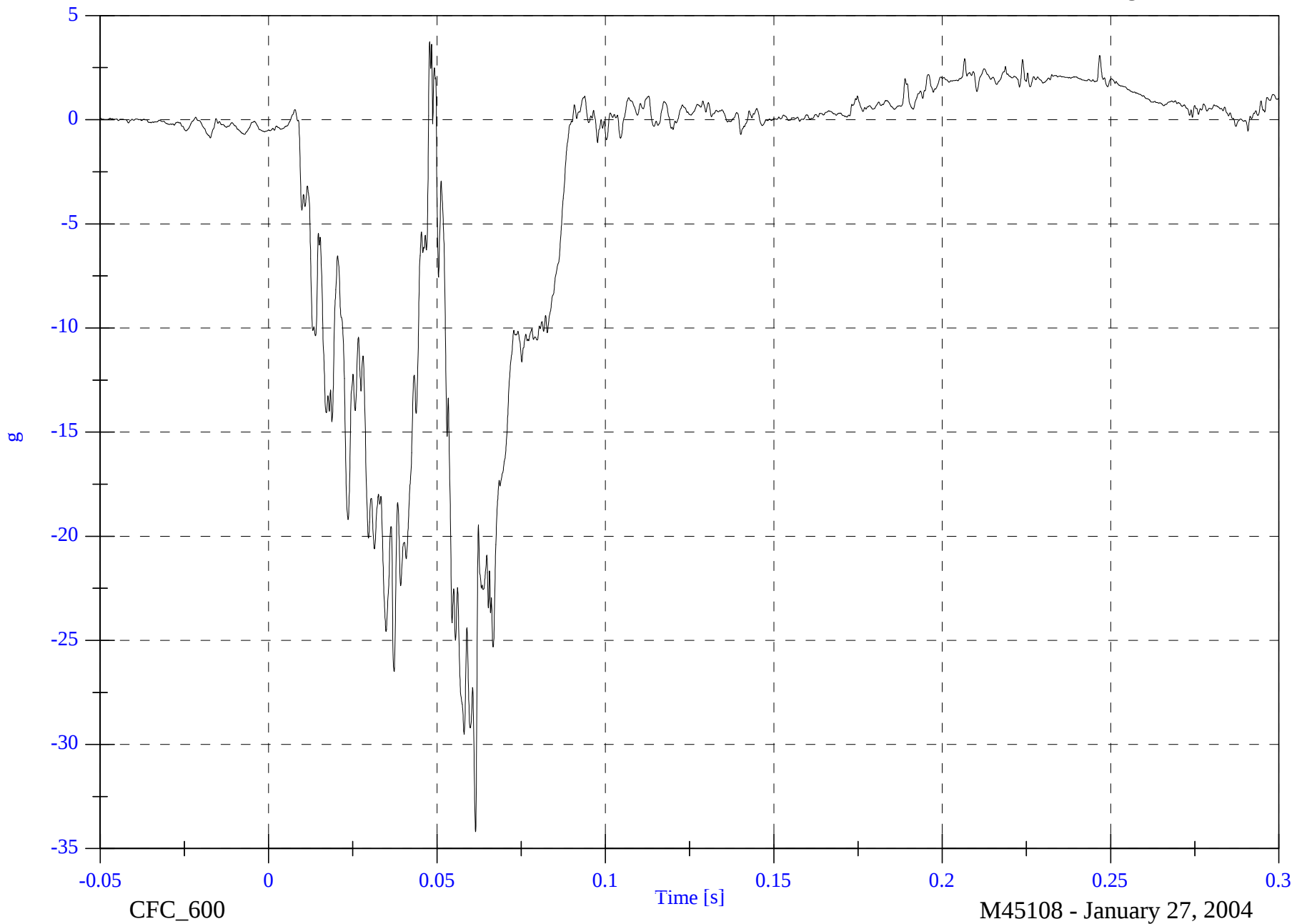
V1P1 Left Foot Aft z

Max: 3.7 [g] at 0.048 [s]

Min: -34.2 [g] at 0.061 [s]

B-56

8642-NCAP-41

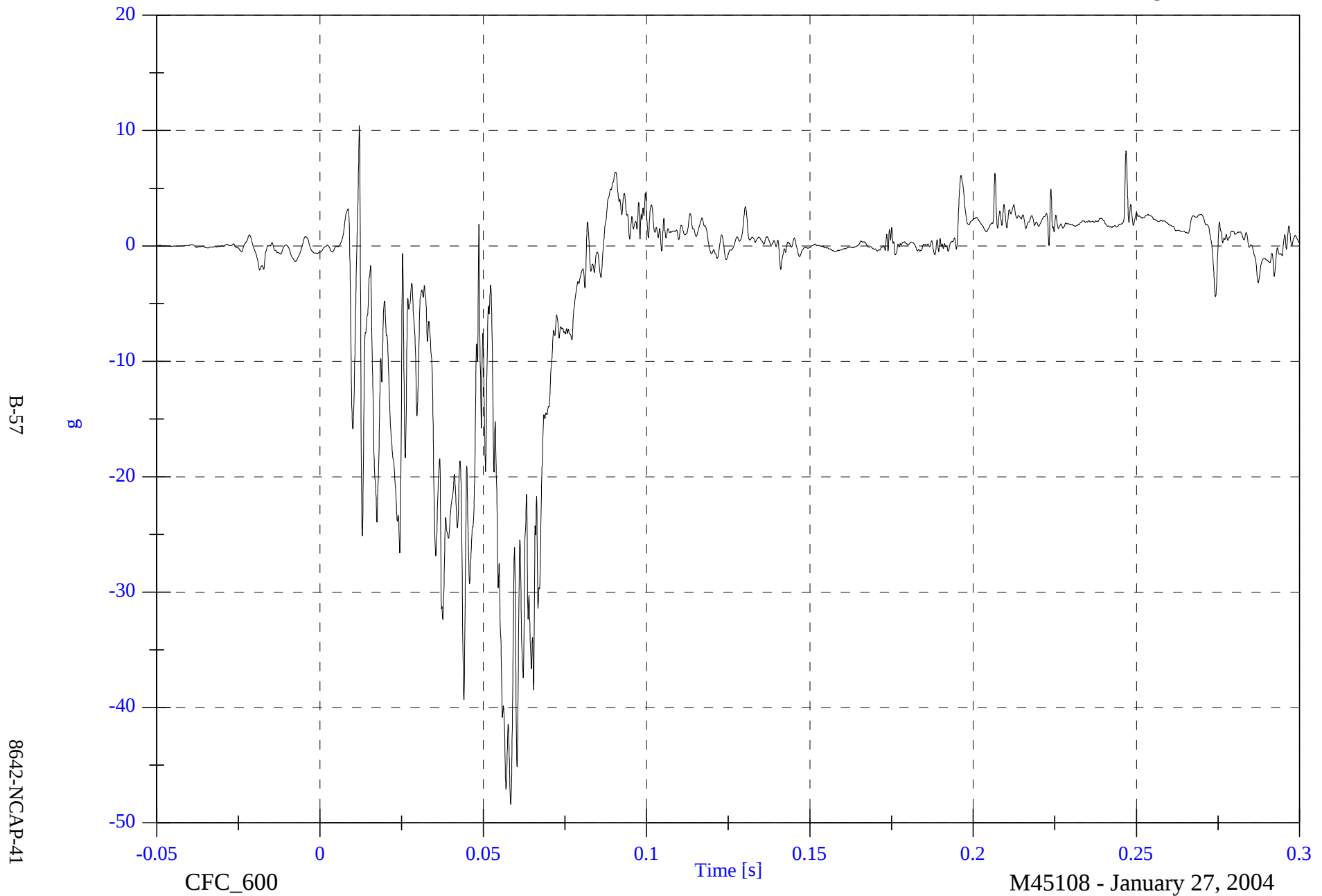


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Left Foot Fore z

Max: 10.4 [g] at 0.012 [s]

Min: -48.4 [g] at 0.058 [s]

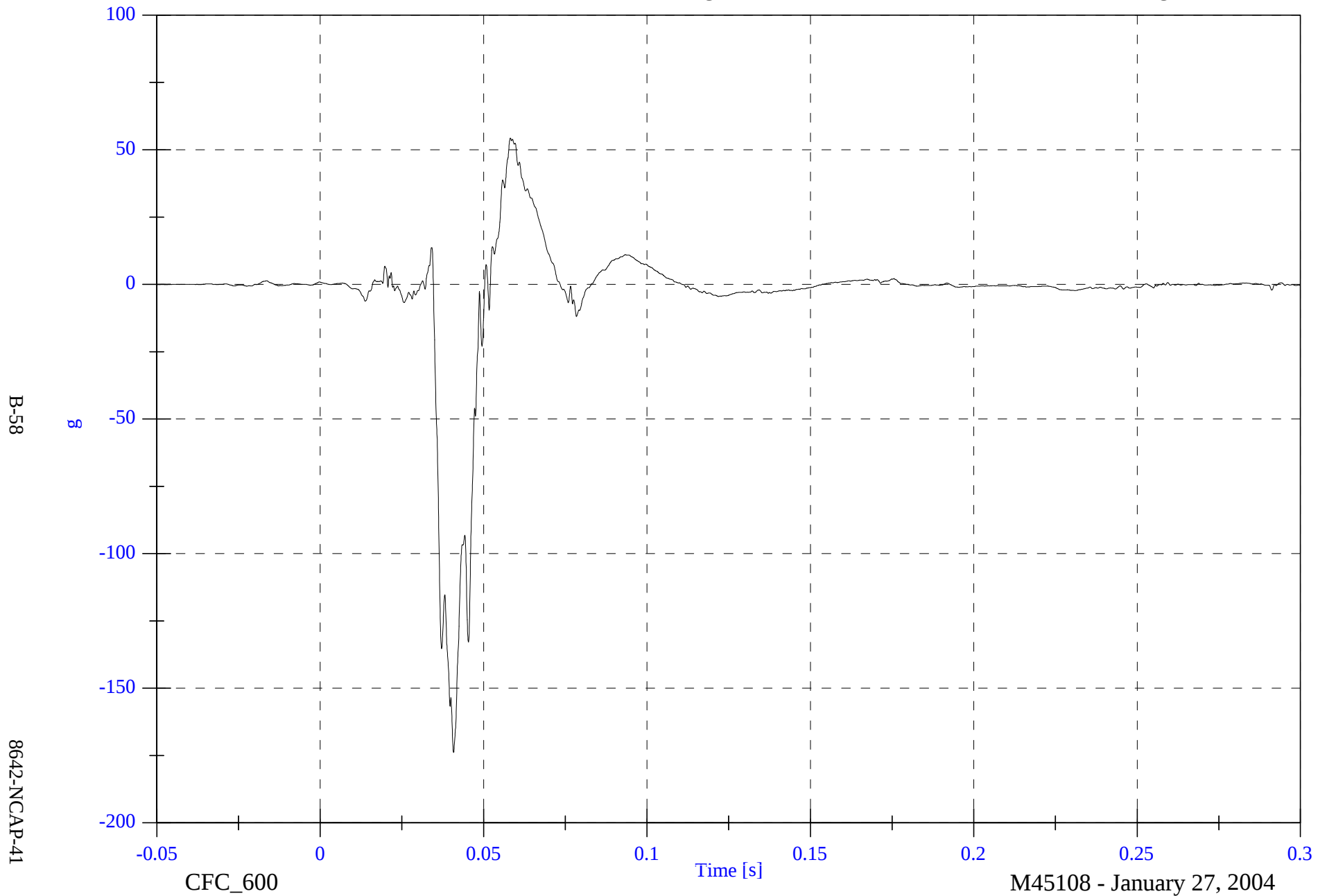


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Right Foot Aft x

Max: 54.4 [g] at 0.058 [s]

Min: -173.9 [g] at 0.041 [s]

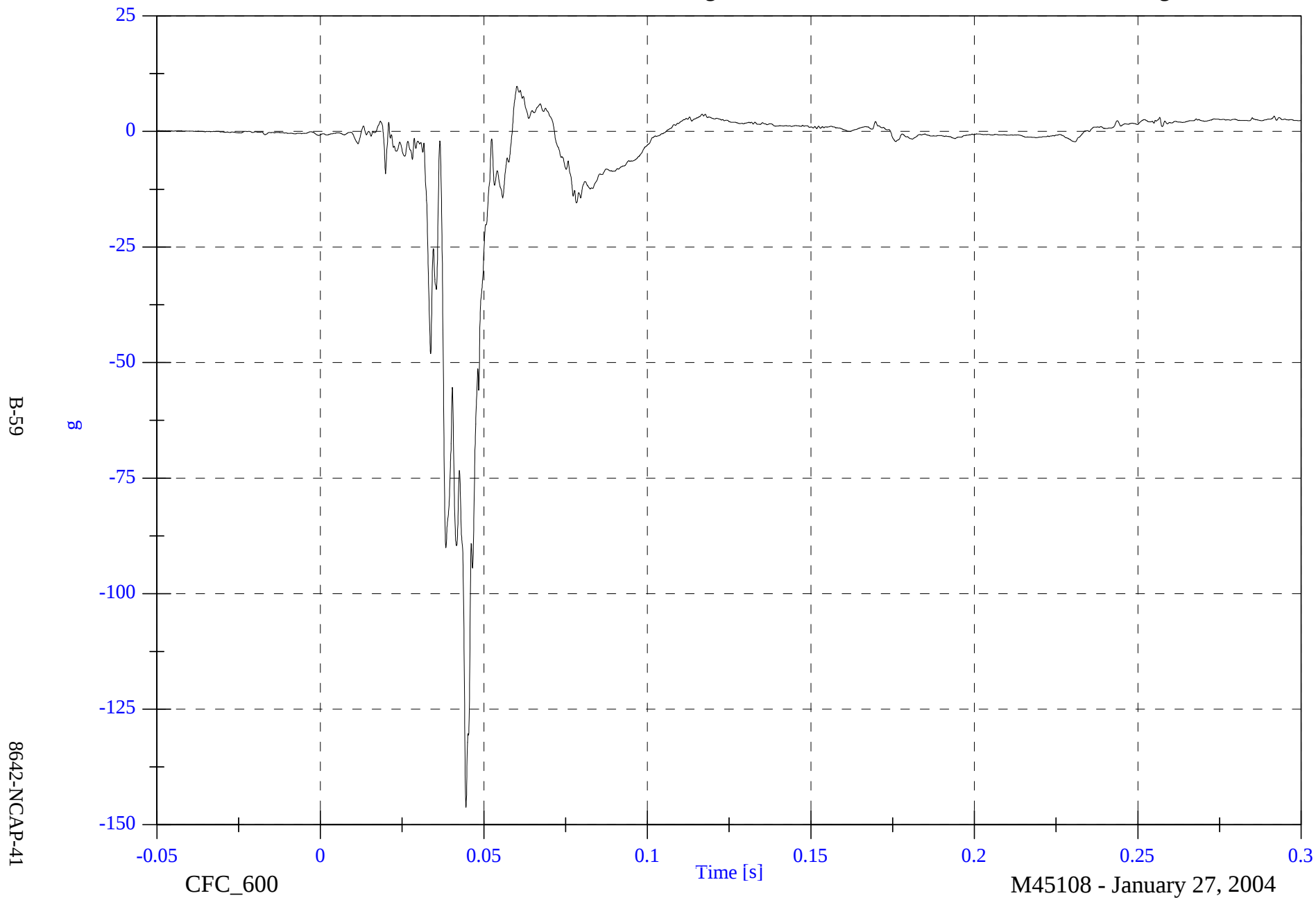


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Right Foot Aft z

Max: 9.8 [g] at 0.060 [s]

Min: -146.2 [g] at 0.045 [s]

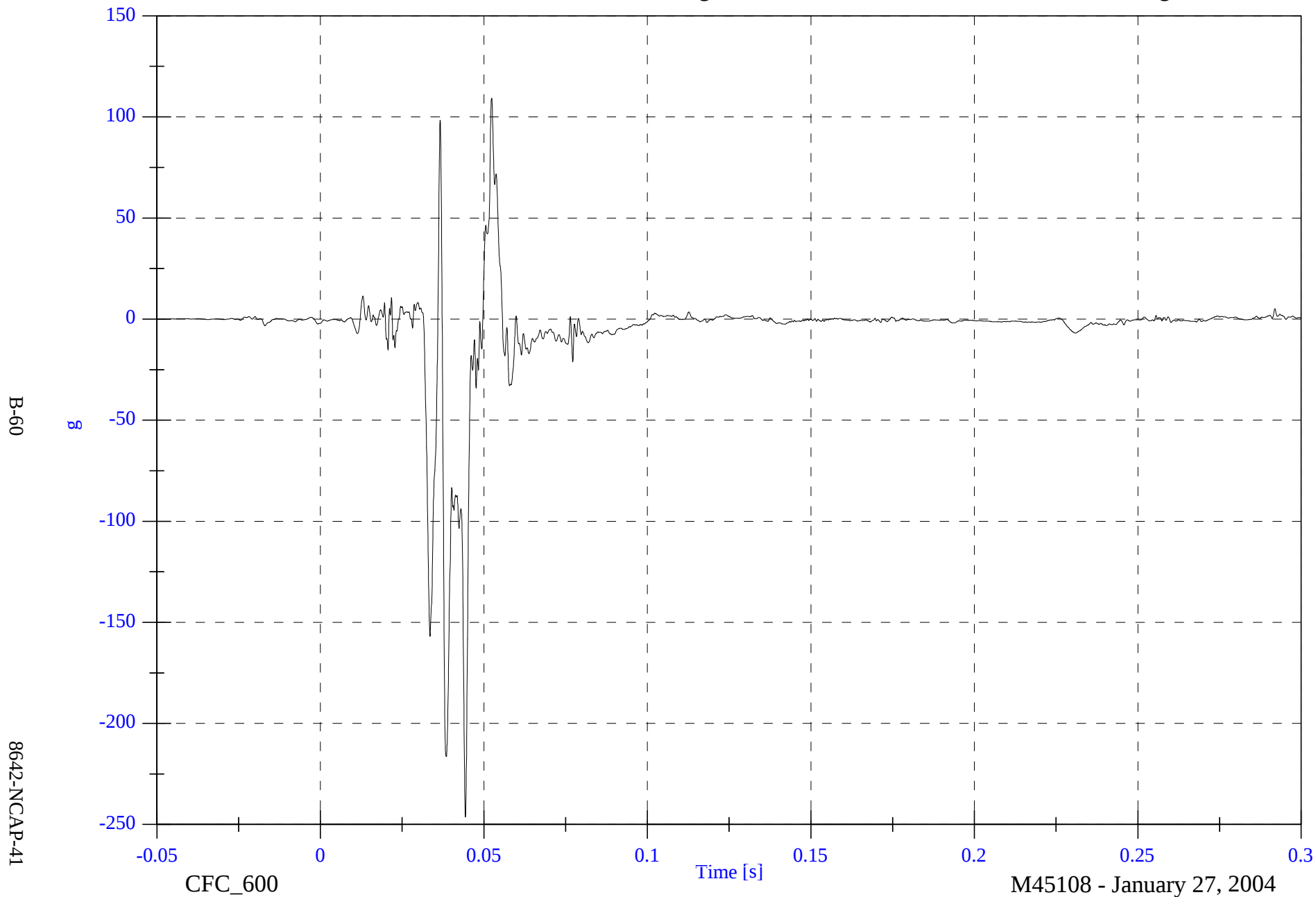


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P1 Right Foot Fore z

Max: 109.3 [g] at 0.052 [s]

Min: -246.3 [g] at 0.044 [s]

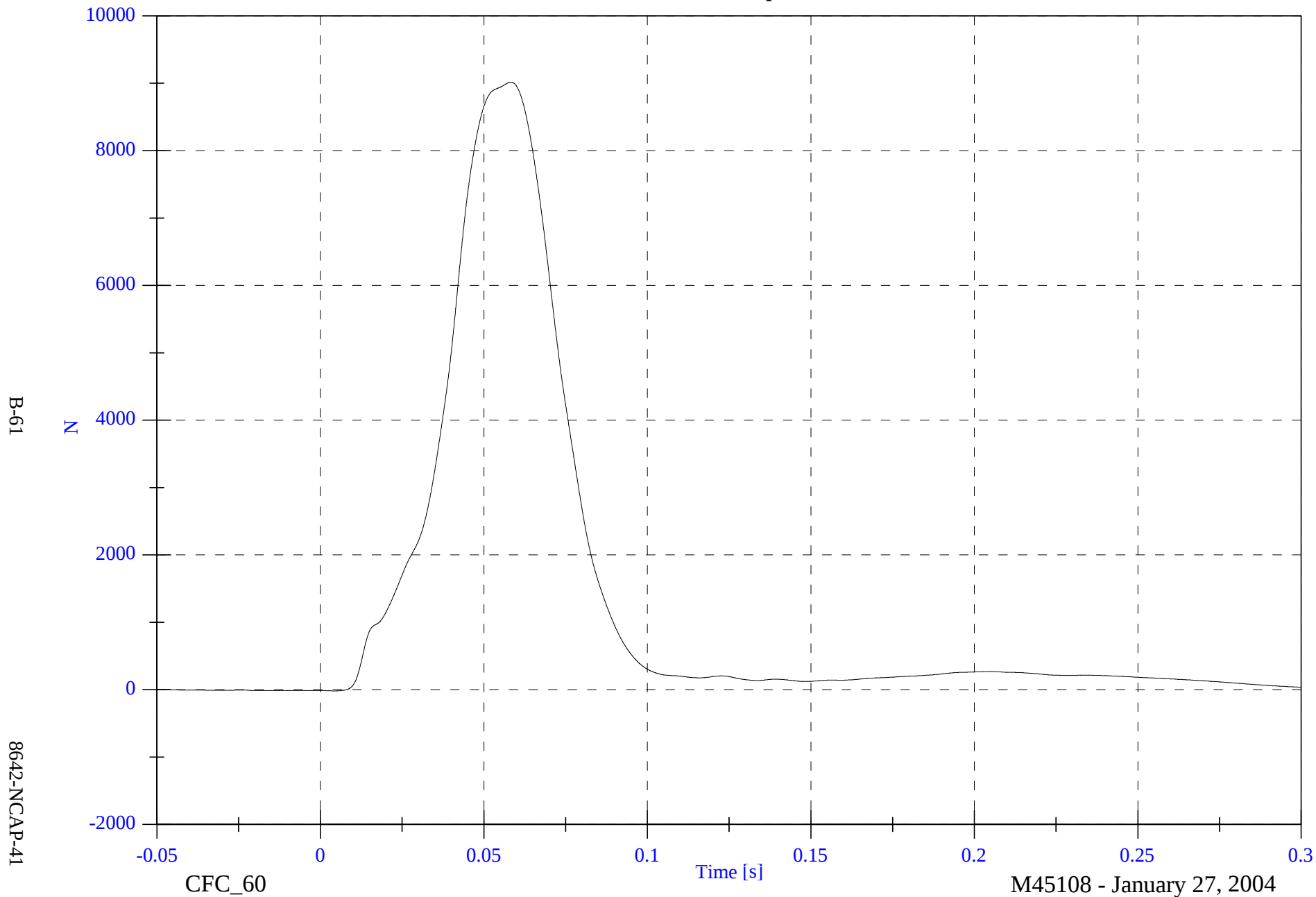


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Driver Lap Belt

Max: 9015.2 [N] at 0.058 [s]

Min: -16.3 [N] at 0.004 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

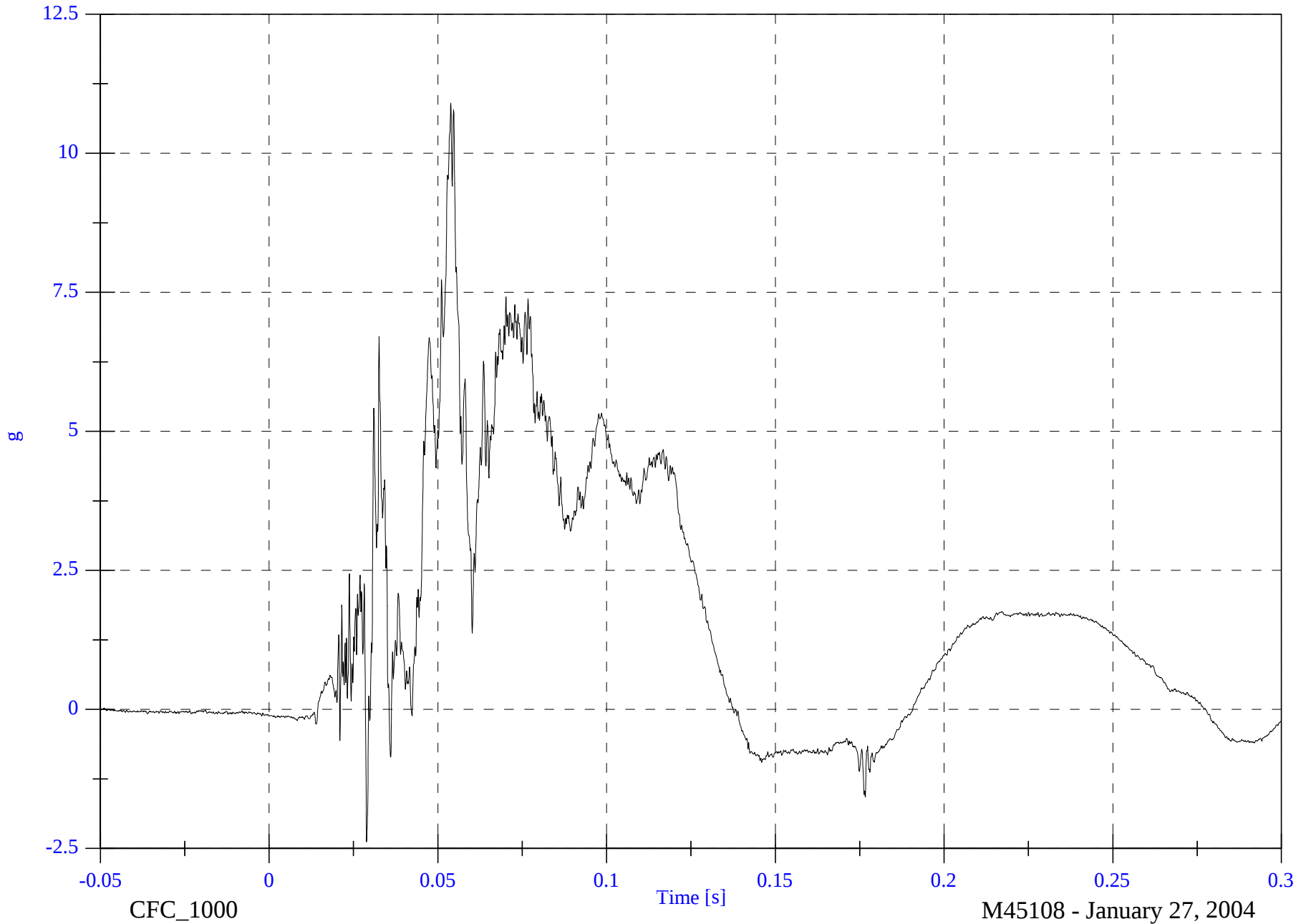
V1P2 Head 9 Array X Arm Ay

Max: 10.9 [g] at 0.054 [s]

Min: -2.4 [g] at 0.029 [s]

B-62

8642-NCAP-41

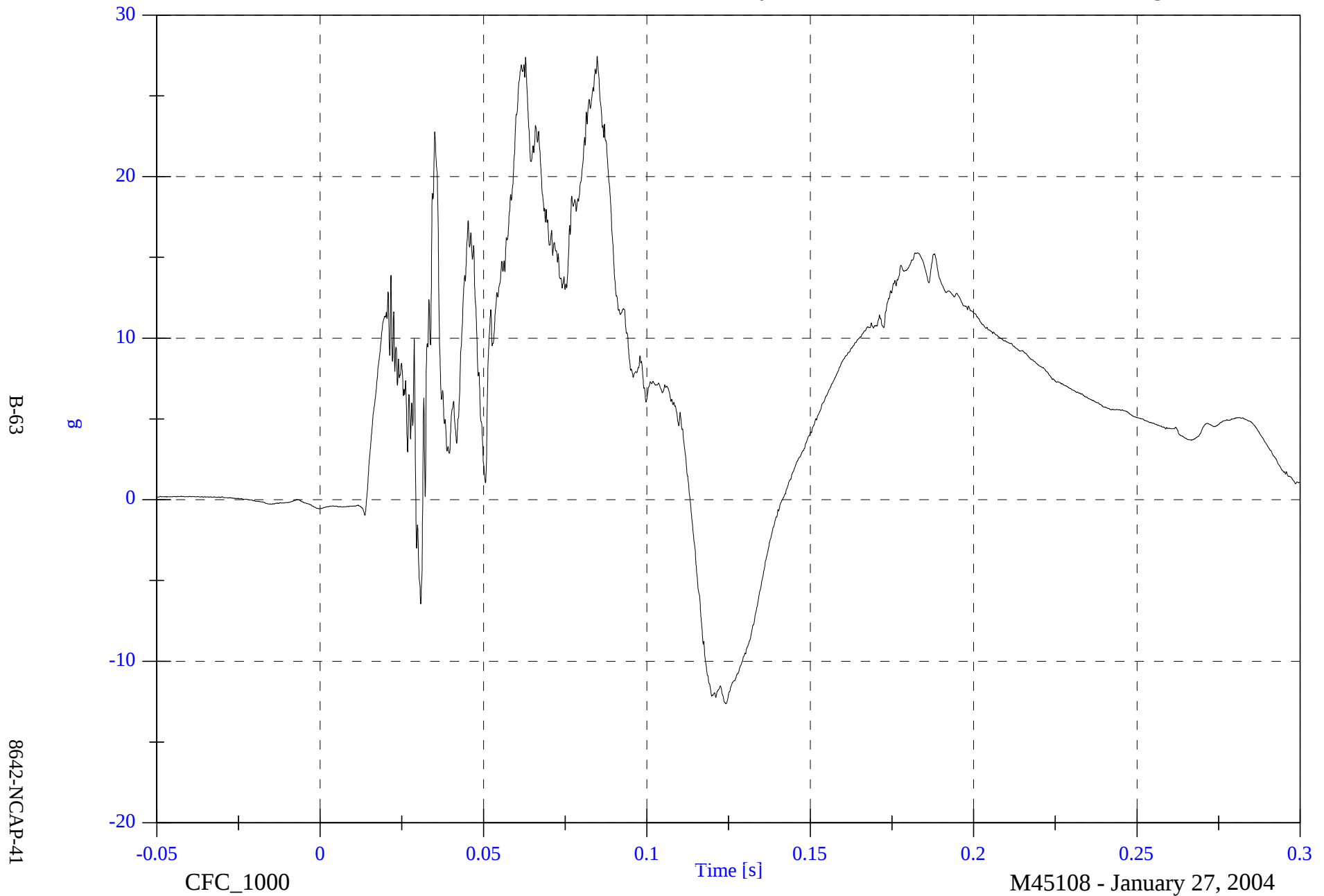


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Head 9 Array X Arm Az

Max: 27.5 [g] at 0.085 [s]

Min: -12.6 [g] at 0.124 [s]

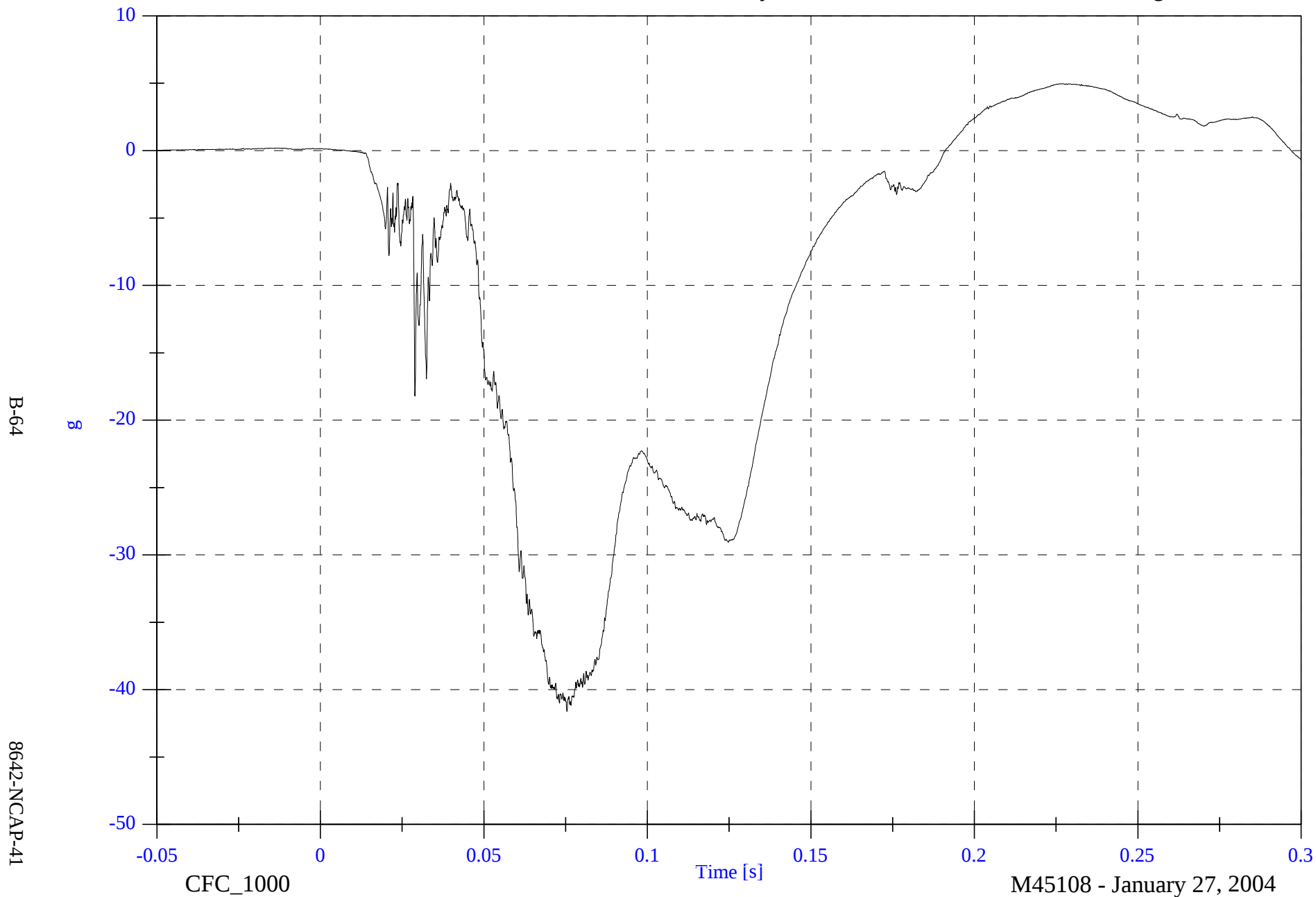


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Head 9 Array Y Arm Ax

Max: 5.0 [g] at 0.226 [s]

Min: -41.6 [g] at 0.075 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

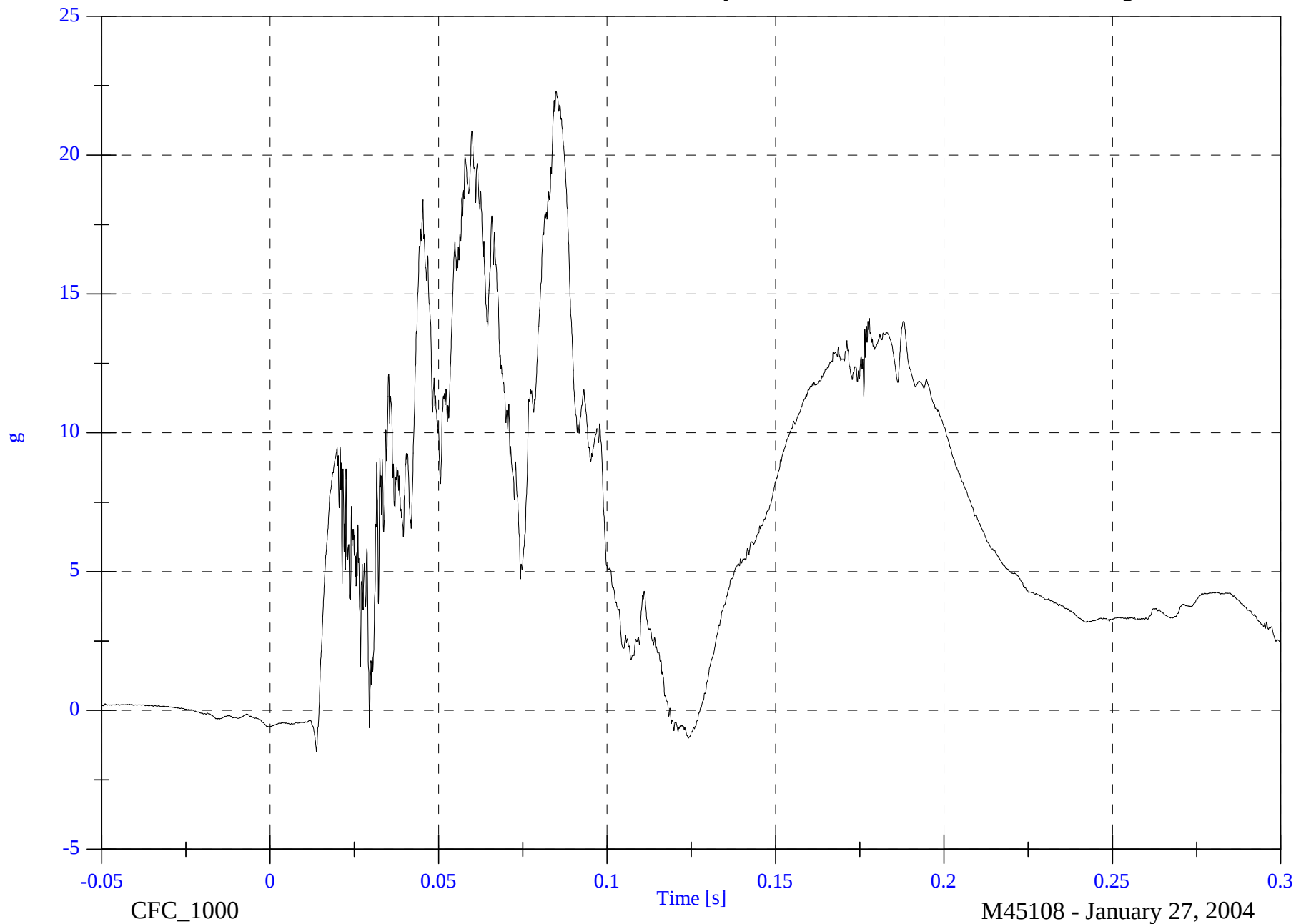
V1P2 Head 9 Array Y Arm Az

Max: 22.3 [g] at 0.085 [s]

Min: -1.5 [g] at 0.014 [s]

B-65

8642-NCAP-41

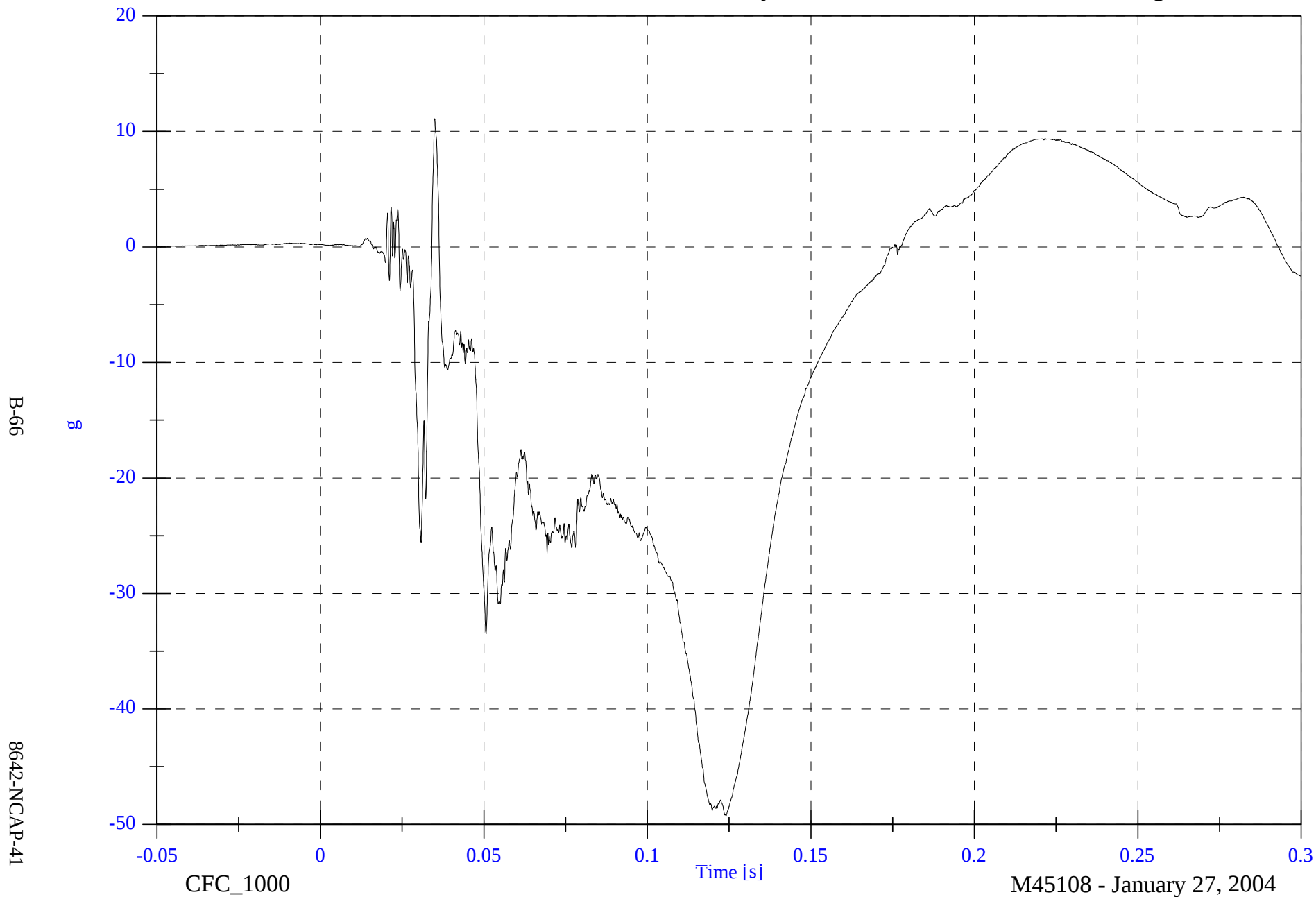


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Head 9 Array Z Arm Ax

Max: 11.1 [g] at 0.035 [s]

Min: -49.2 [g] at 0.124 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

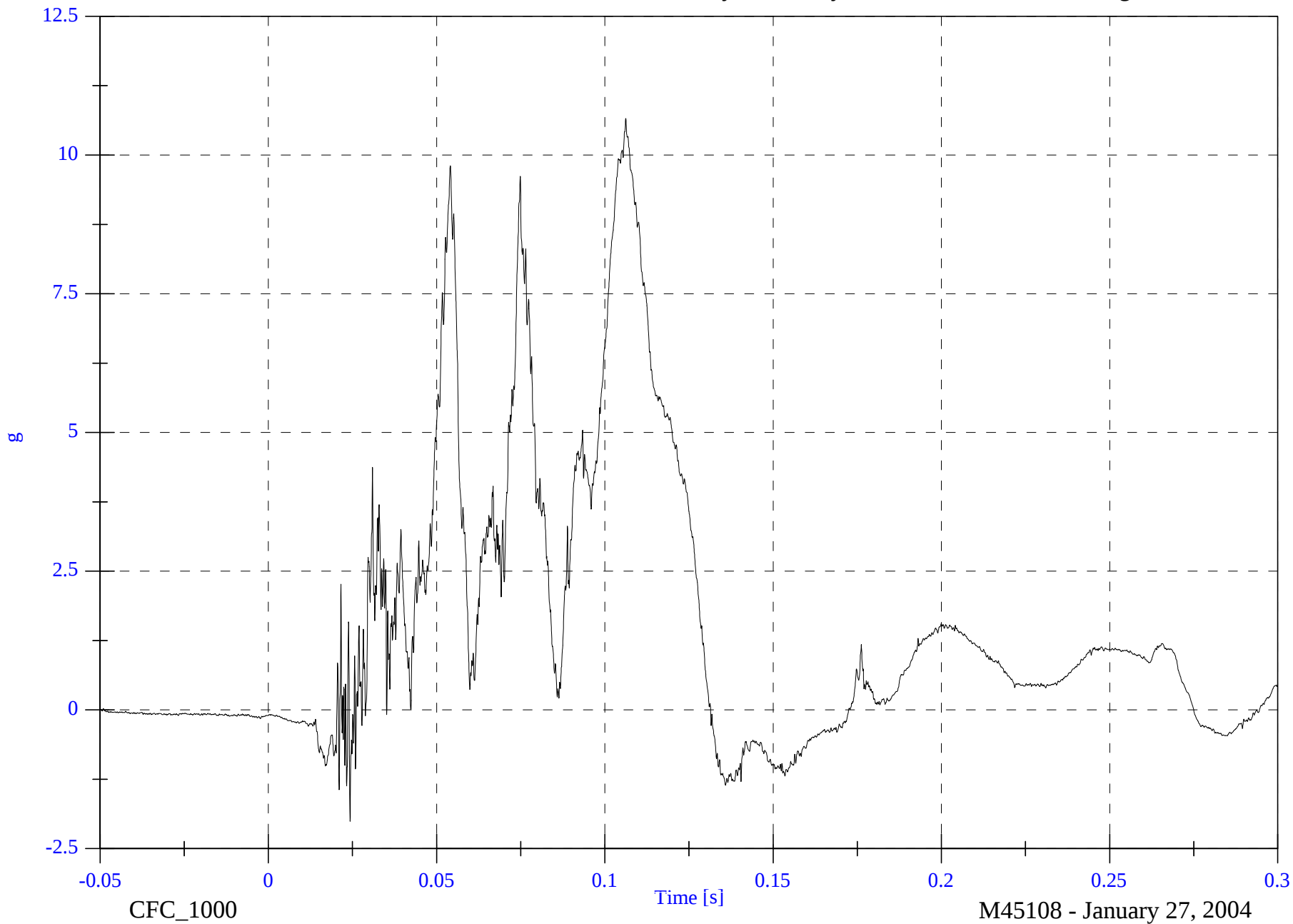
V1P2 Head 9 Array Z Arm Ay

Max: 10.7 [g] at 0.106 [s]

Min: -2.0 [g] at 0.024 [s]

B-67

8642-NCAP-41

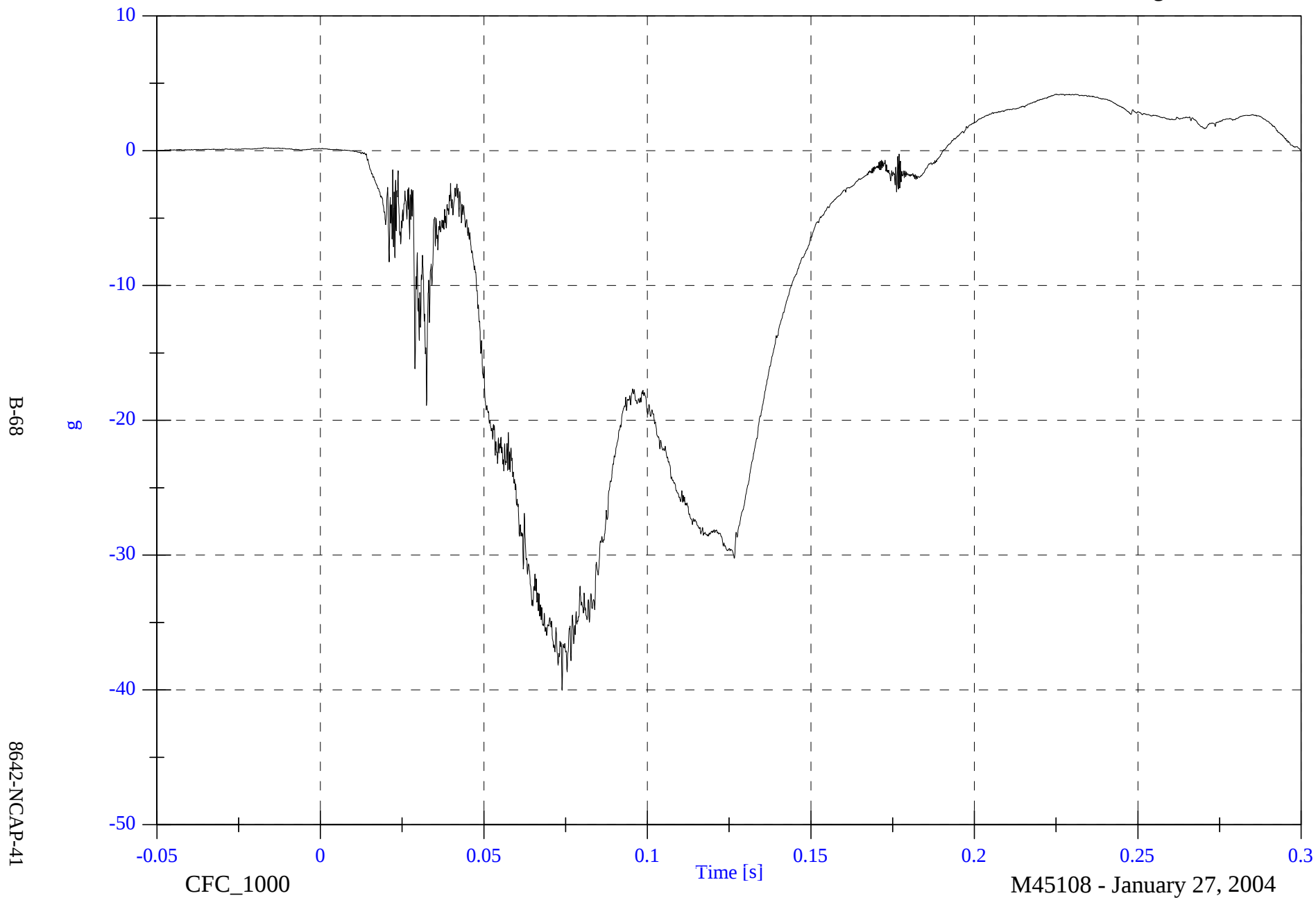


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Head CG x

Max: 4.2 [g] at 0.225 [s]

Min: -40.0 [g] at 0.074 [s]

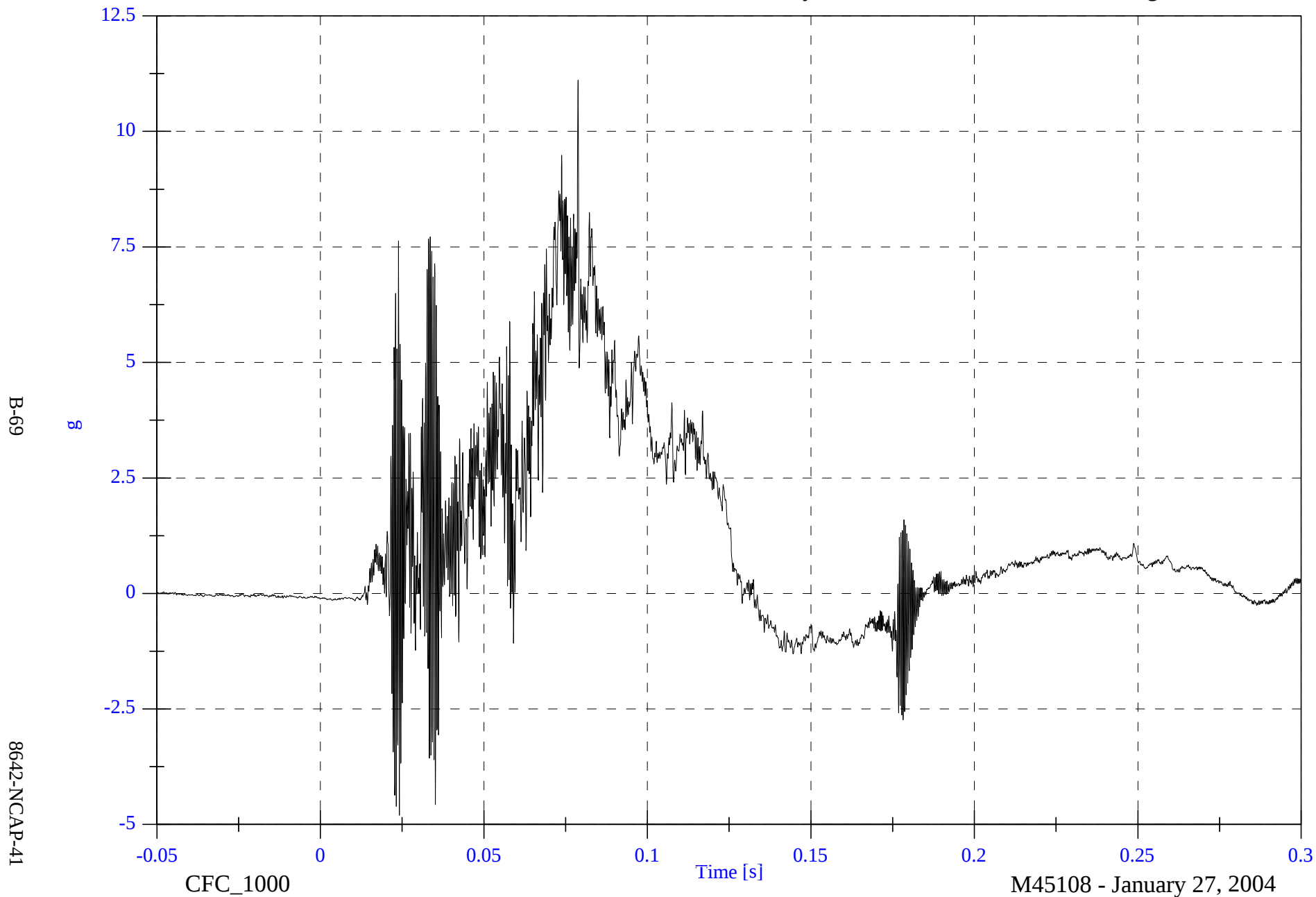


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Head CG y

Max: 11.1 [g] at 0.079 [s]

Min: -4.8 [g] at 0.024 [s]

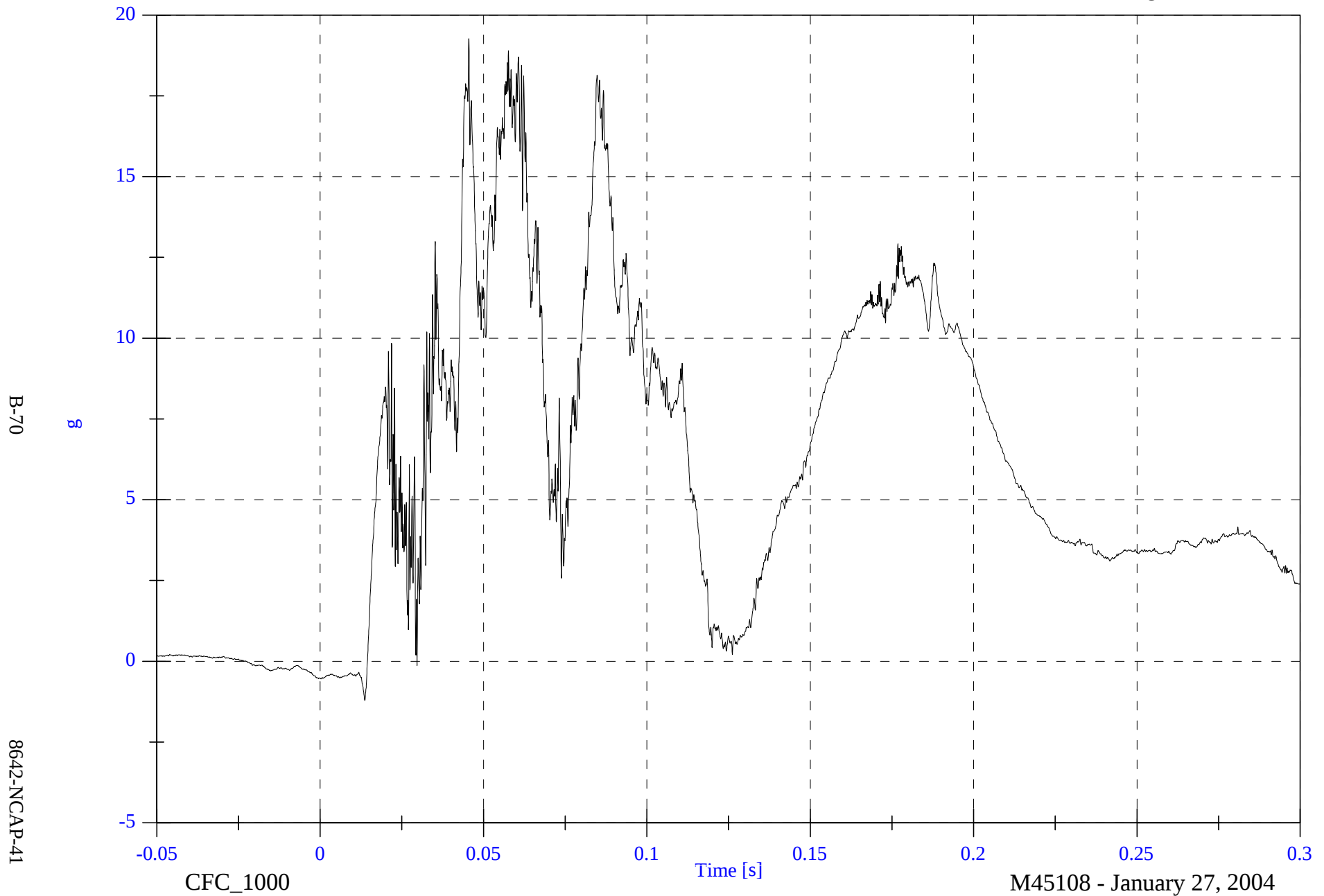


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Head CG z

Max: 19.3 [g] at 0.045 [s]

Min: -1.2 [g] at 0.014 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

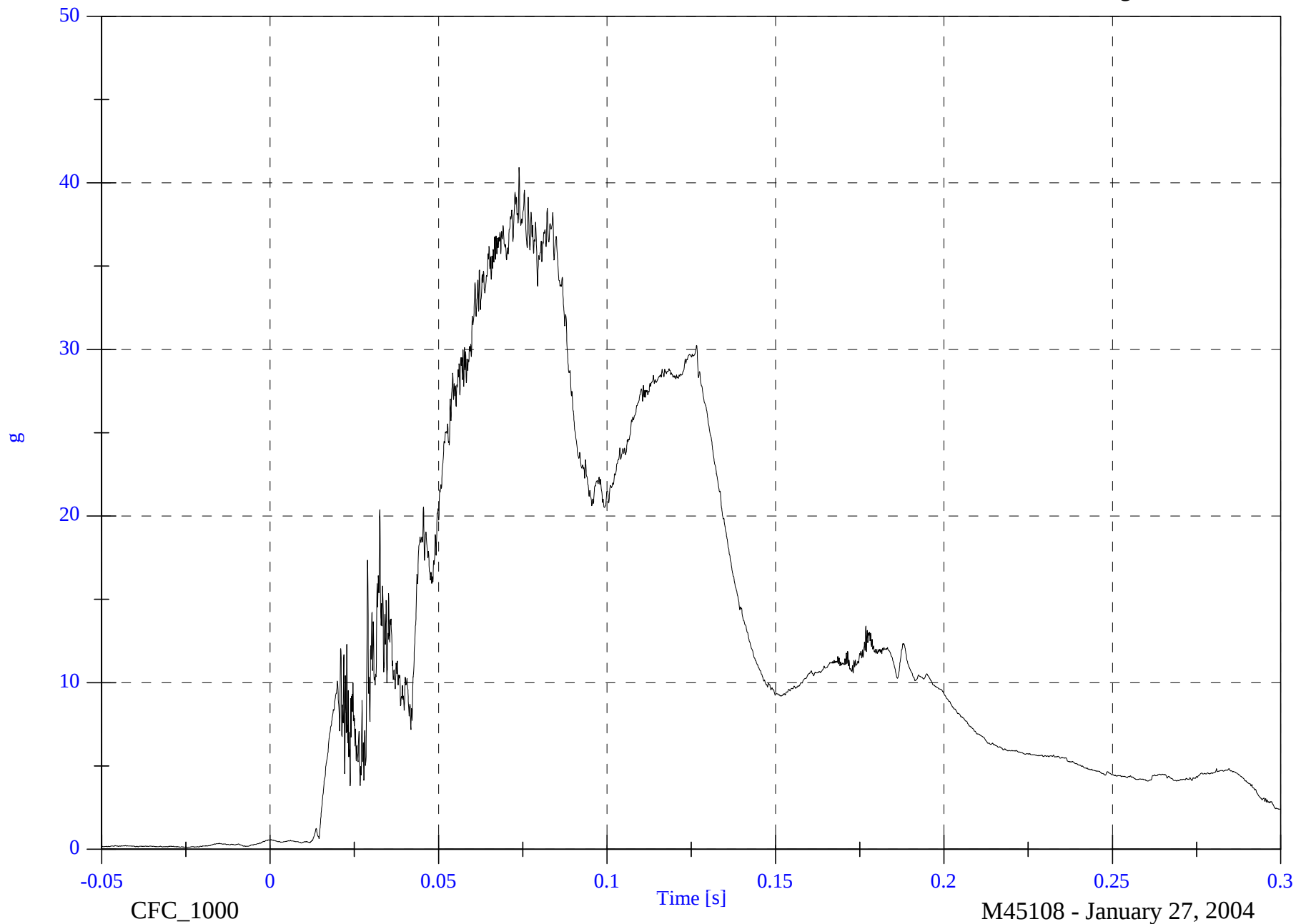
V1P2 Head CG Resultant

Max: 40.9 [g] at 0.074 [s]

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

B-71

8642-NCAP-41

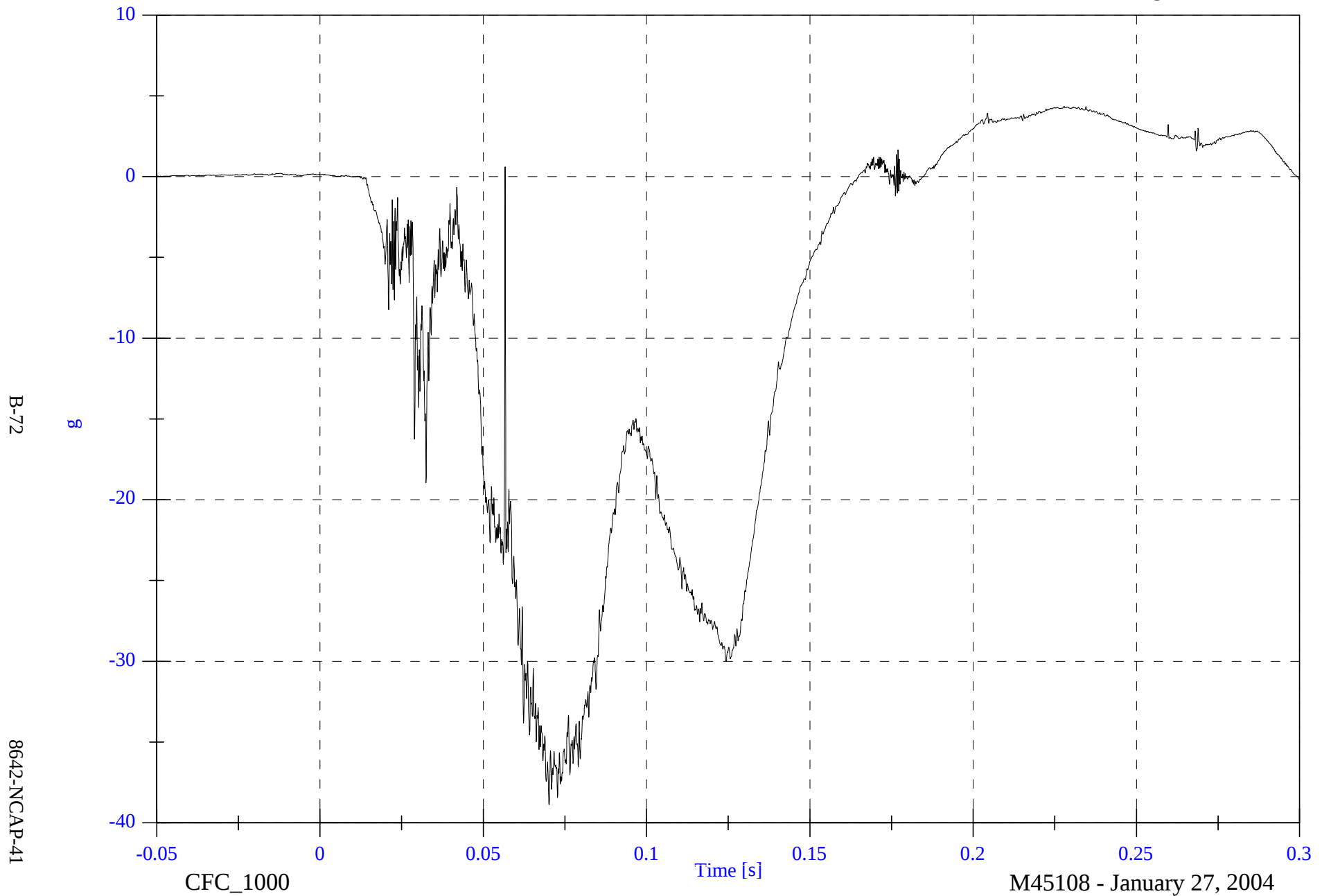


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Head CG Red x

Max: 4.4 [g] at 0.228 [s]

Min: -38.9 [g] at 0.070 [s]

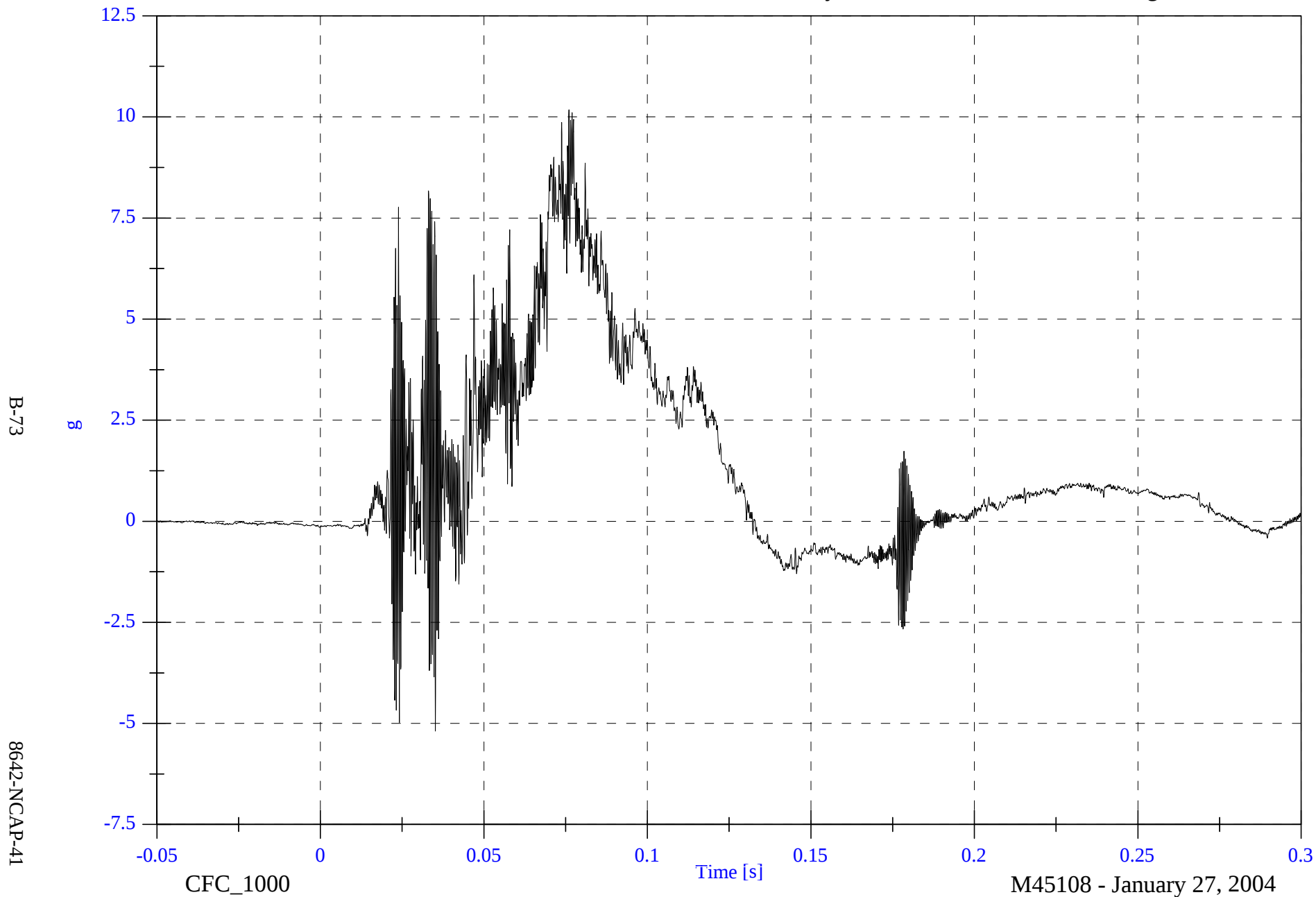


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Head CG Red y

Max: 10.2 [g] at 0.076 [s]

Min: -5.2 [g] at 0.035 [s]

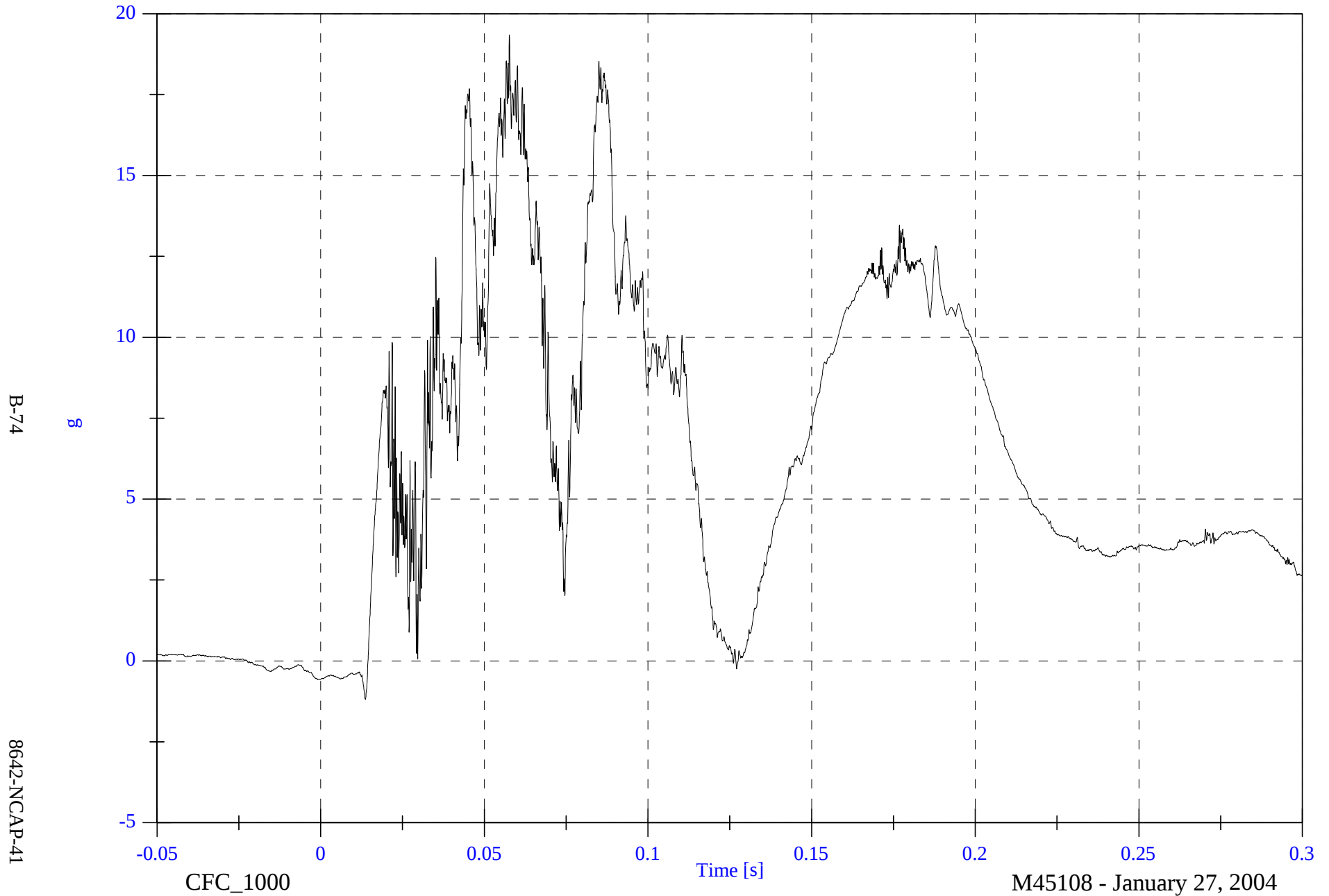


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Head CG Red z

Max: 19.3 [g] at 0.058 [s]

Min: -1.2 [g] at 0.014 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

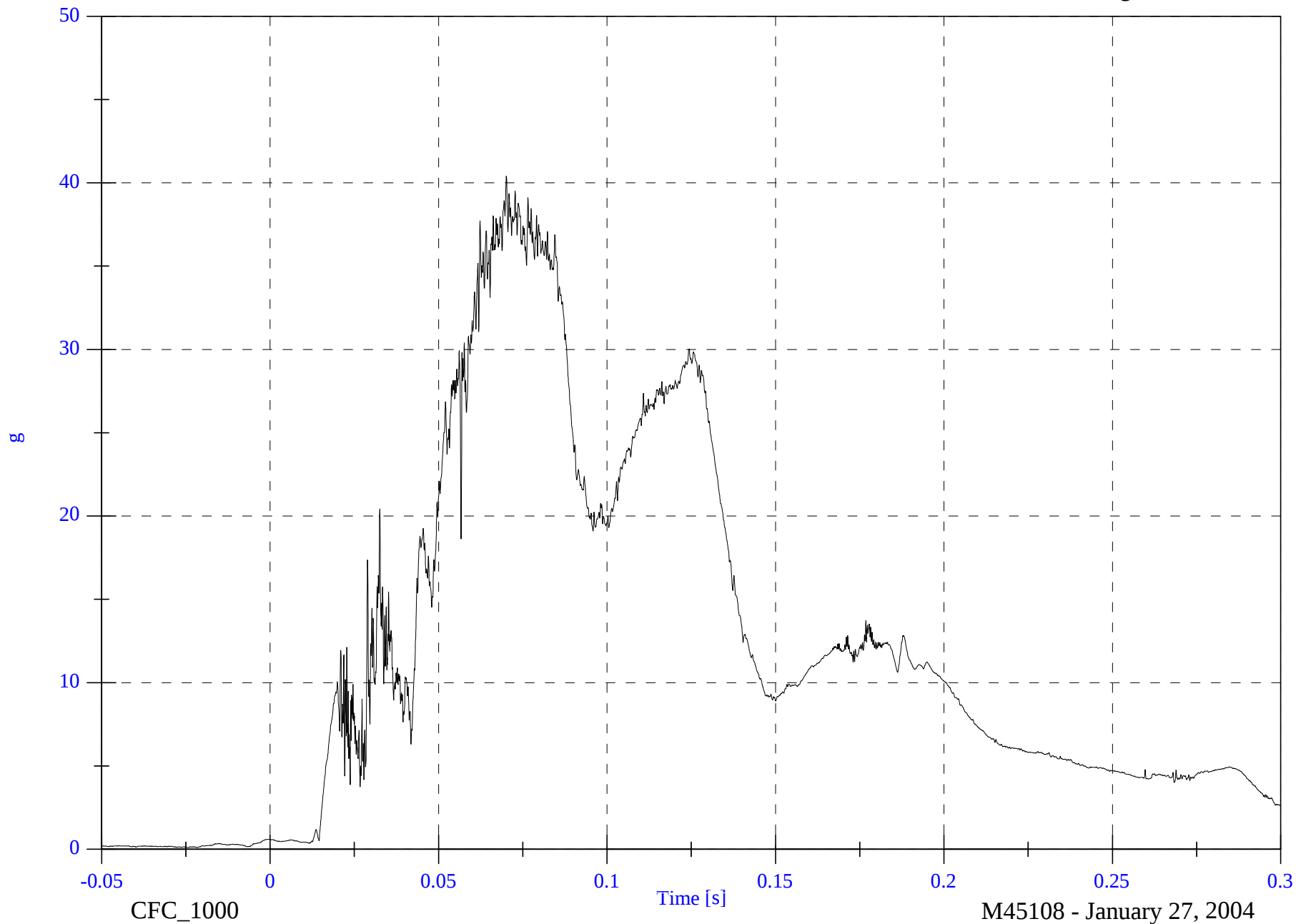
V1P2 Head CG Red Resultant

Max: 40.4 [g] at 0.070 [s]

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

B-75

8642-NCAP-41

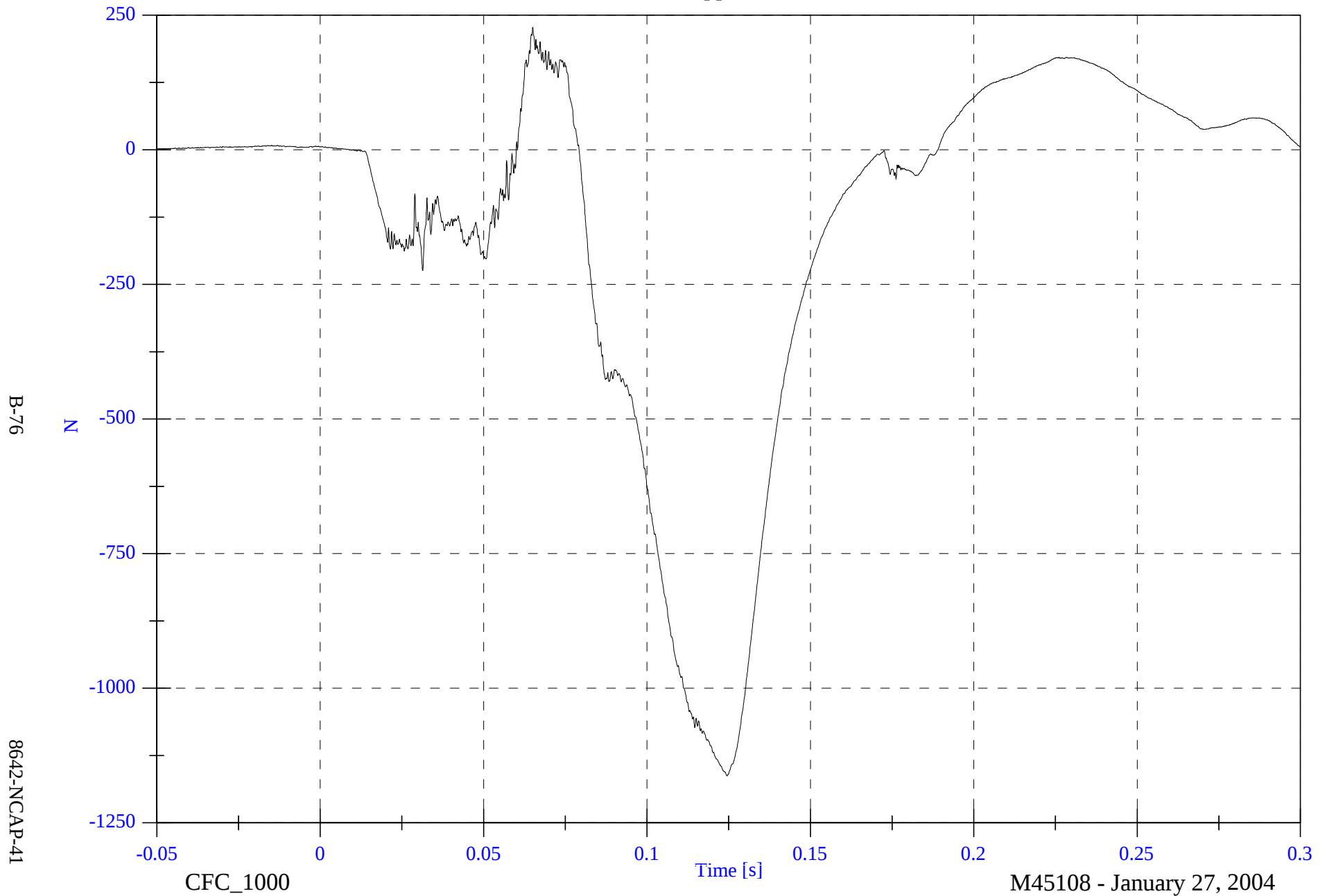


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Upper Neck Fx

Max: 227.4 [N] at 0.065 [s]

Min: -1163.1 [N] at 0.125 [s]

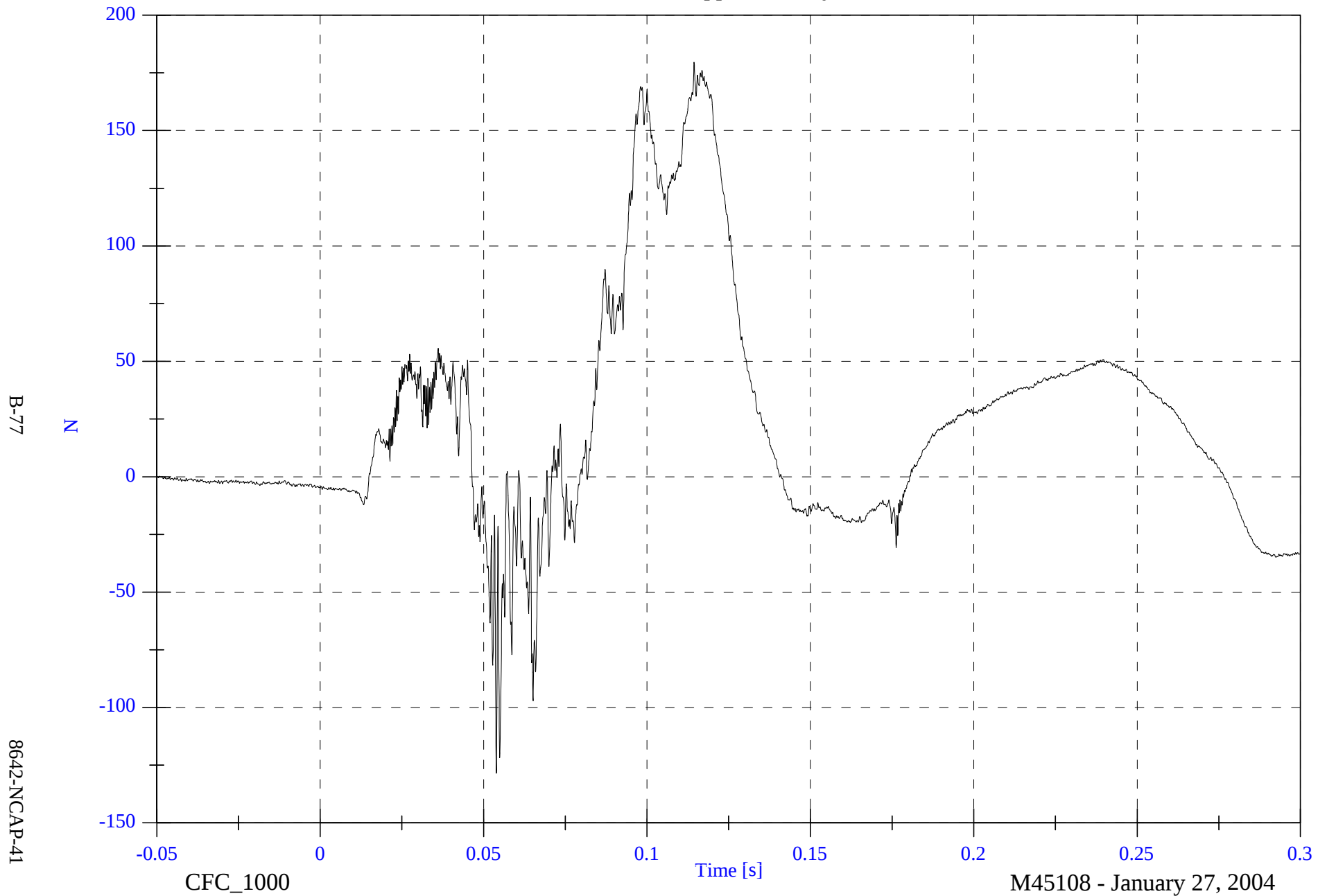


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Upper Neck Fy

Max: 179.7 [N] at 0.114 [s]

Min: -128.6 [N] at 0.054 [s]

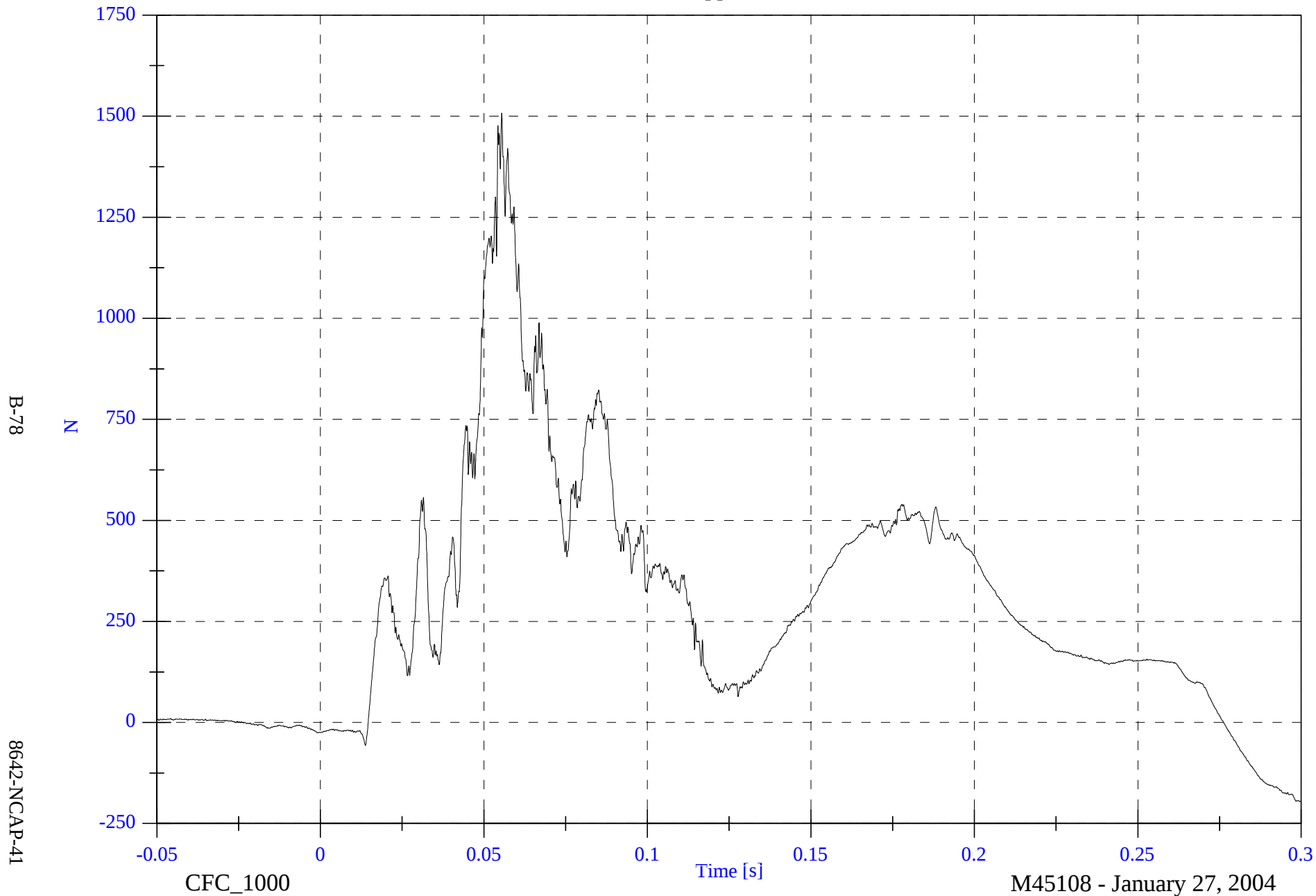


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Upper Neck Fz

Max: 1507.9 [N] at 0.055 [s]

Min: -196.0 [N] at 0.300 [s]

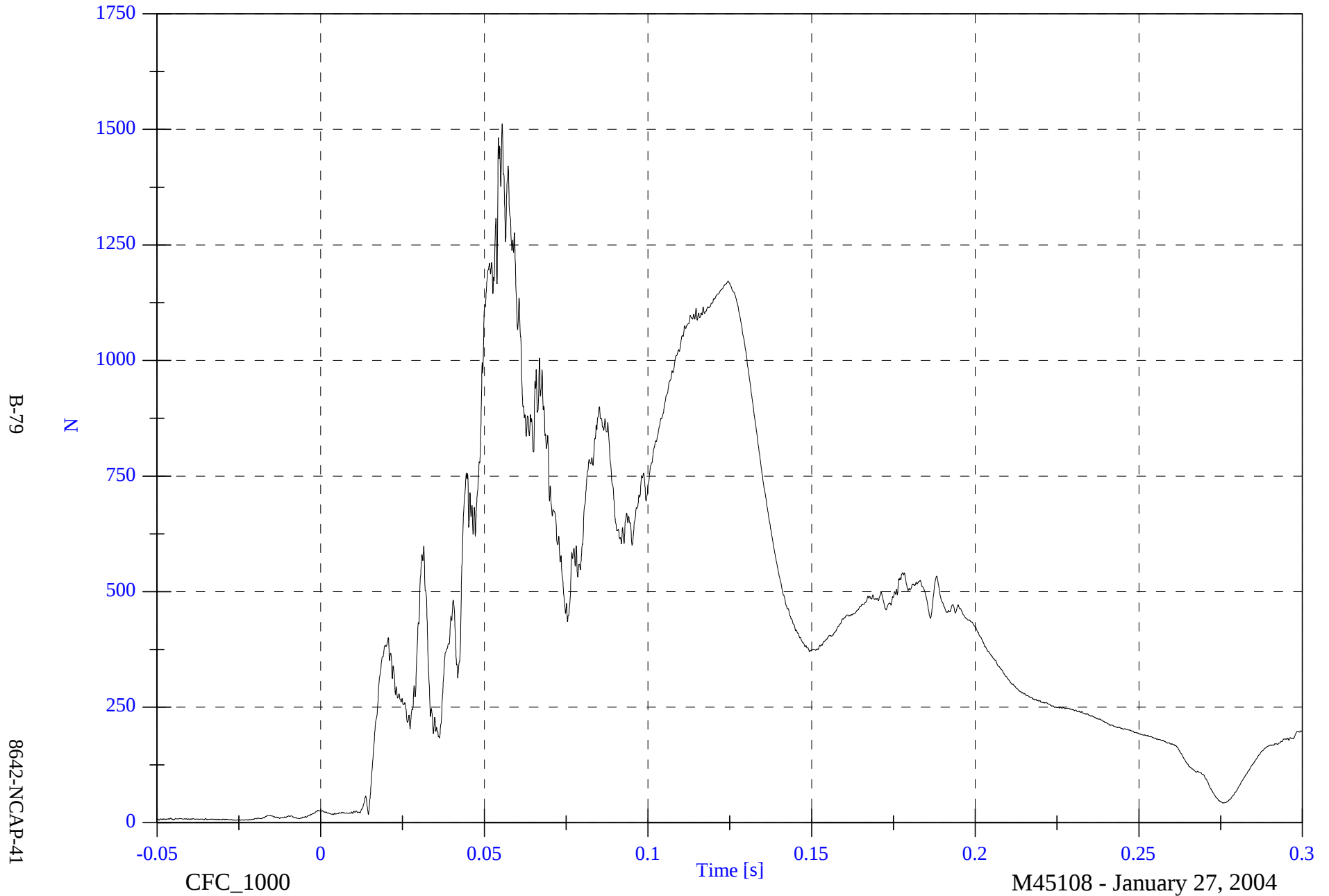


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Upper Neck F Resultant

Max: 1511.8 [N] at 0.055 [s]

Min: 5.3 [N] at -0.049 [s]

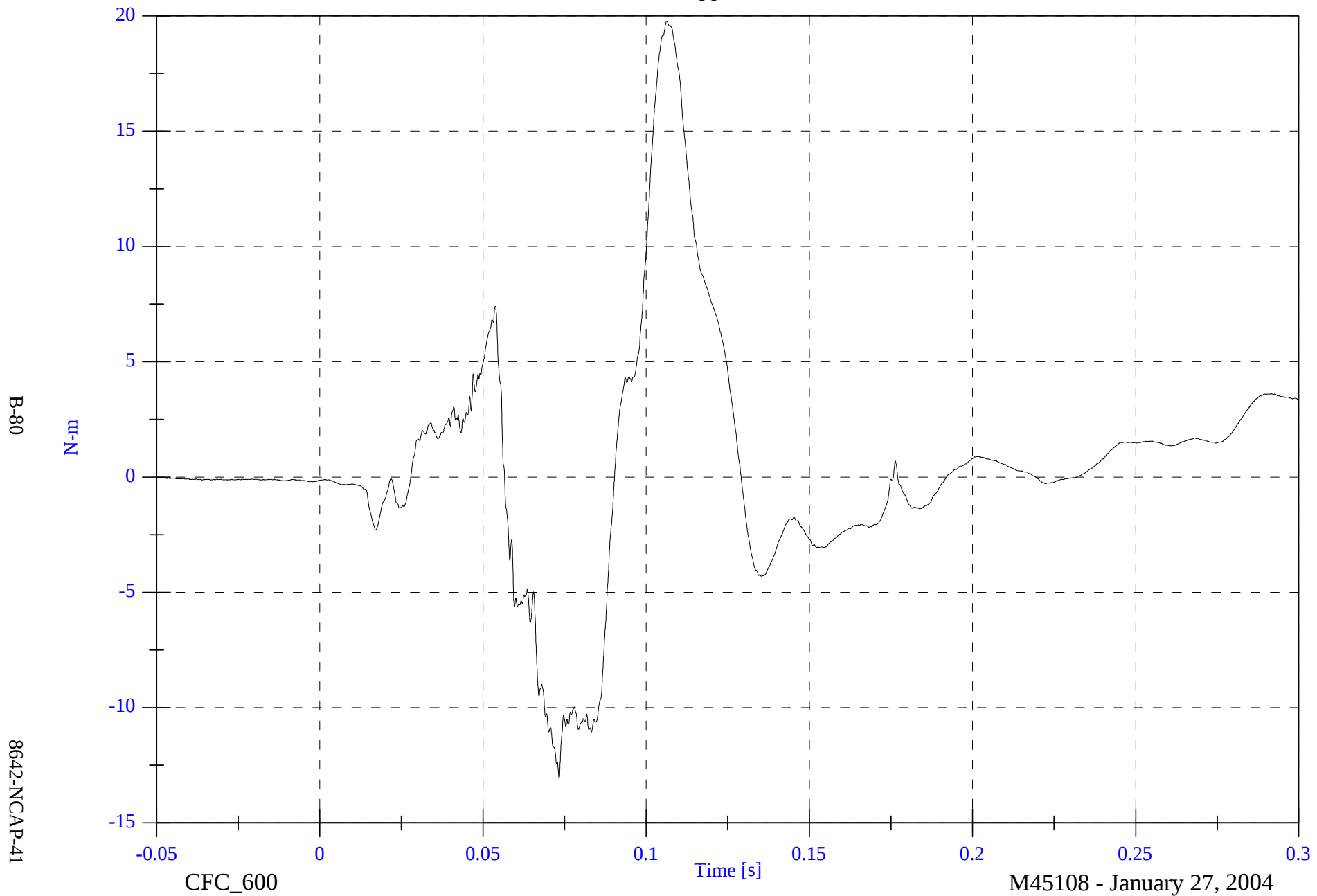


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Upper Neck Mx

Max: 19.8 [N-m] at 0.106 [s]

Min: -13.1 [N-m] at 0.073 [s]



B-80

8642-NCAP-41

CFC_600

Time [s]

M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

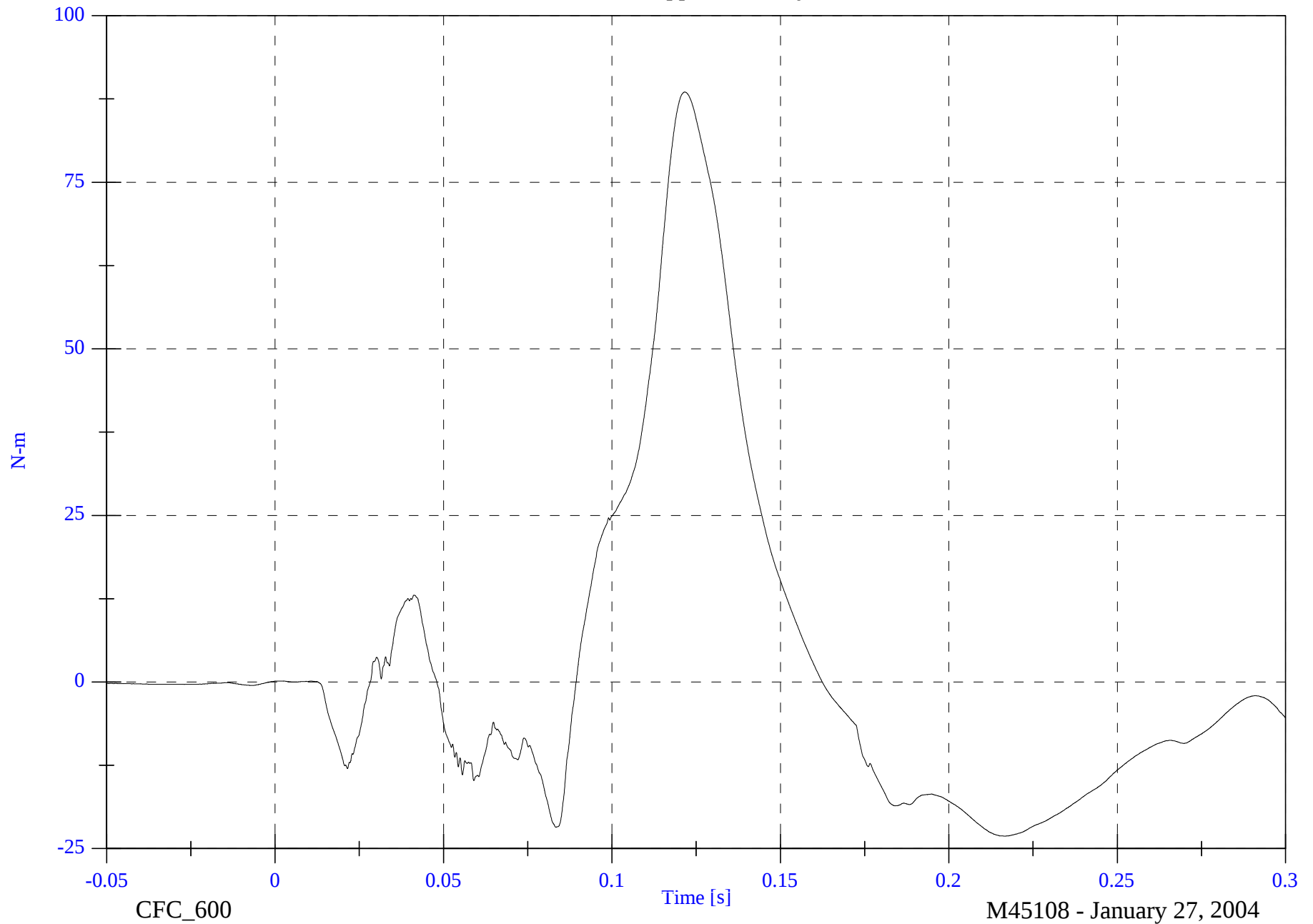
V1P2 Upper Neck My

Max: 88.5 [N-m] at 0.122 [s]

Min: -23.1 [N-m] at 0.217 [s]

B-81

8642-NCAP-41

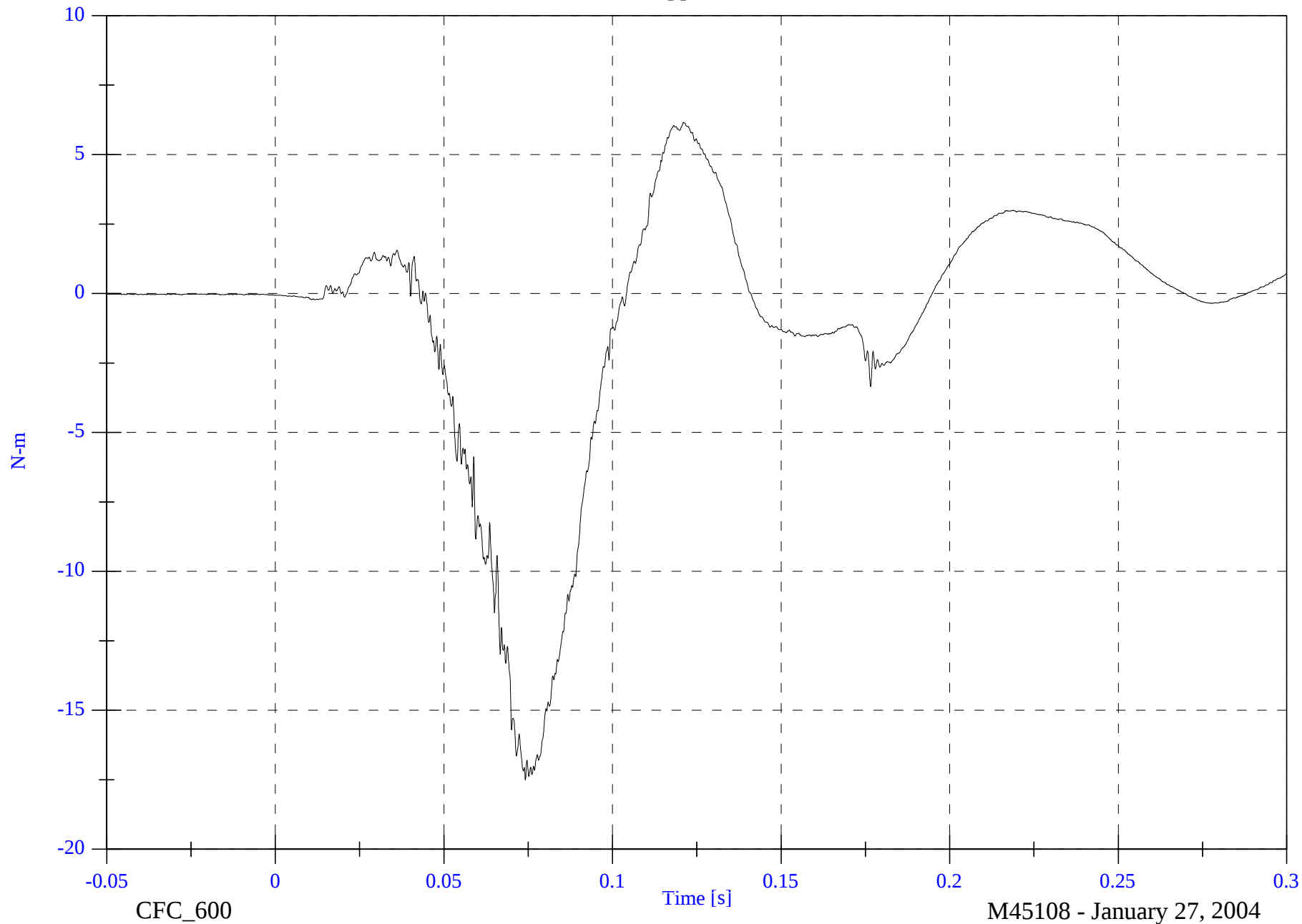


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Upper Neck Mz

Max: 6.2 [N-m] at 0.121 [s]

Min: -17.5 [N-m] at 0.074 [s]



B-82

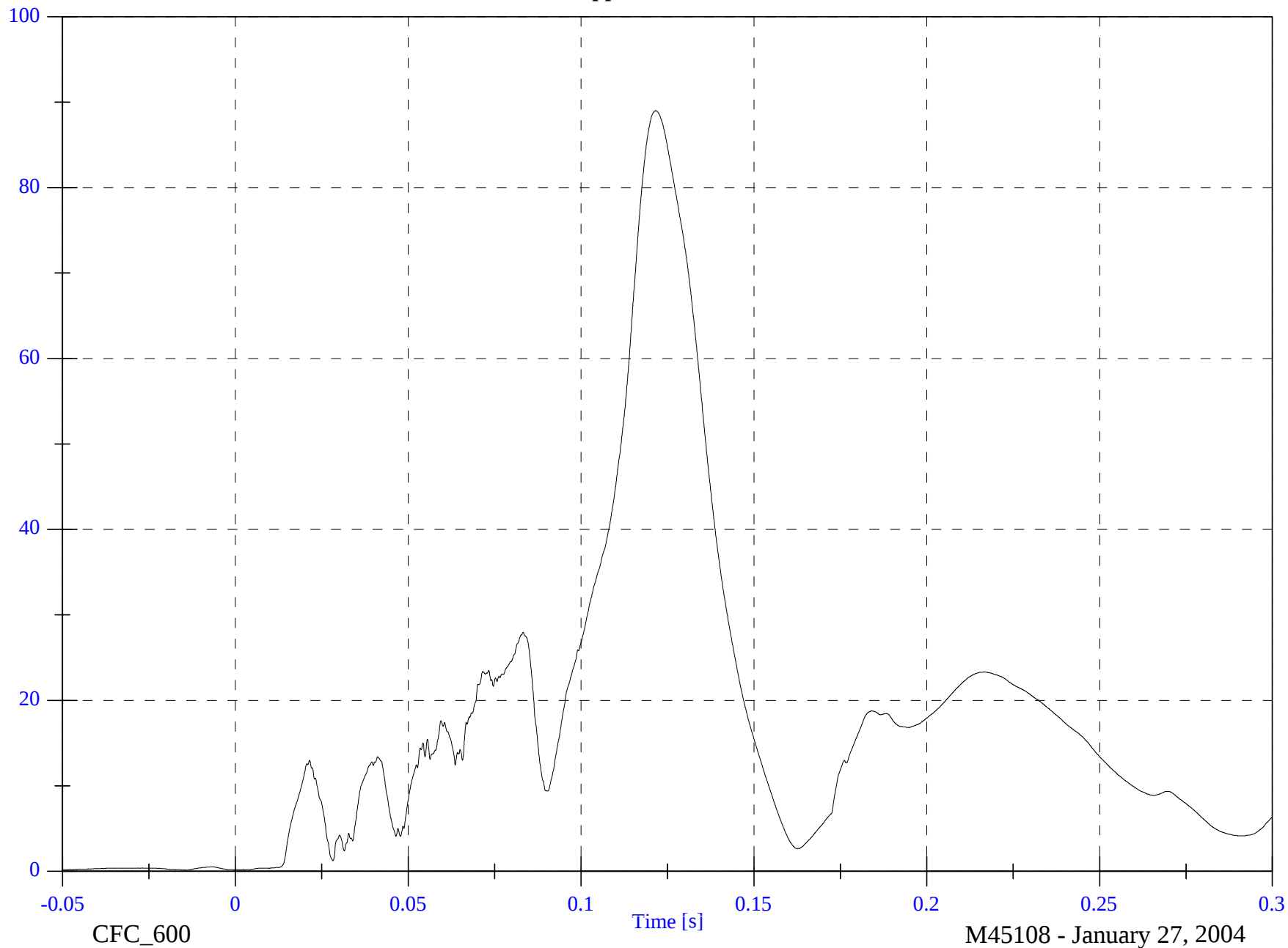
8642-NCAP-41

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Upper Neck M Resultant

Max: 89.0 [N-m] at 0.122 [s]

Min: 0.1 [N-m] at -0.014 [s]



B-83

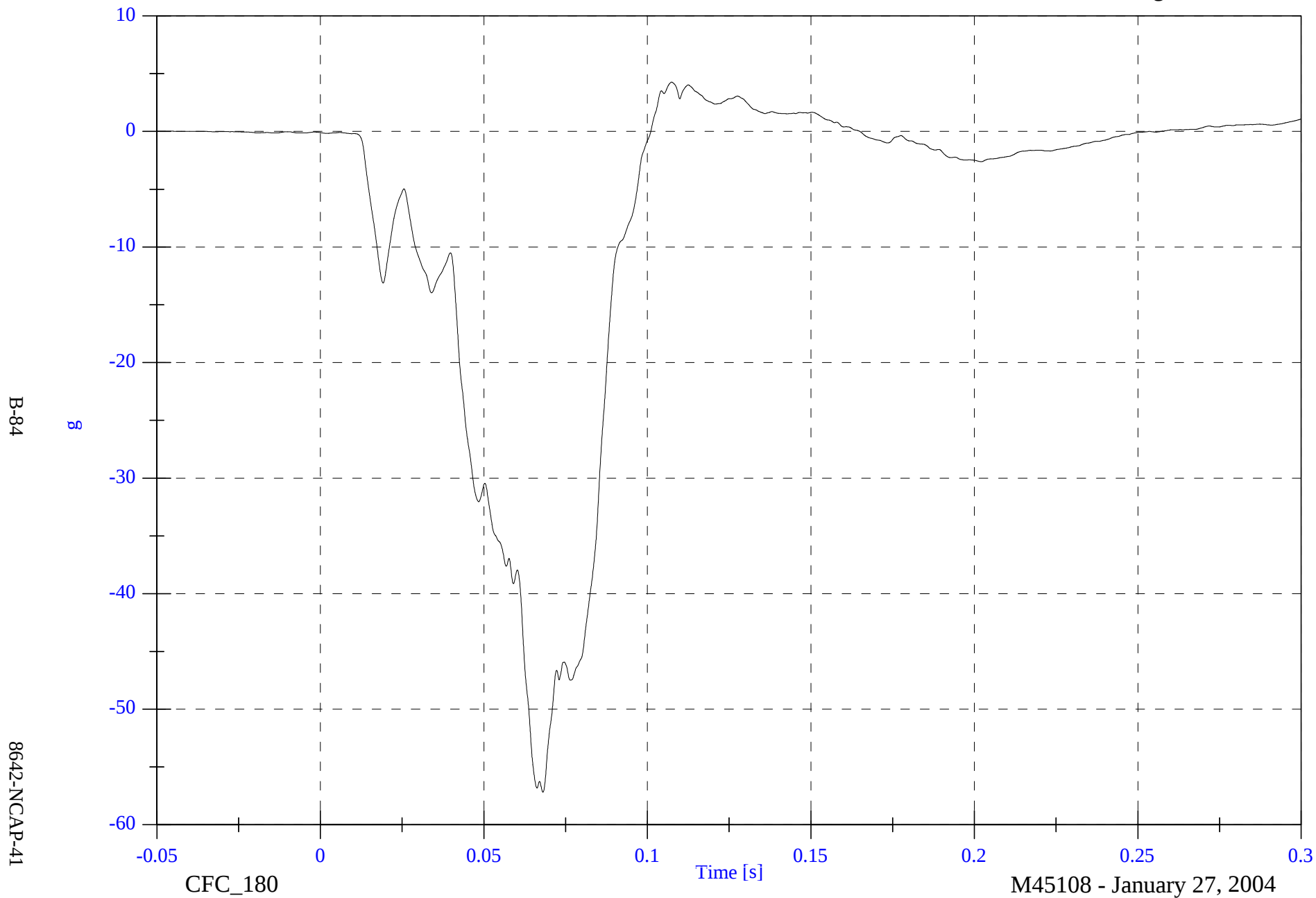
8642-NCAP-41

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Chest x

Max: 4.3 [g] at 0.107 [s]

Min: -57.2 [g] at 0.068 [s]

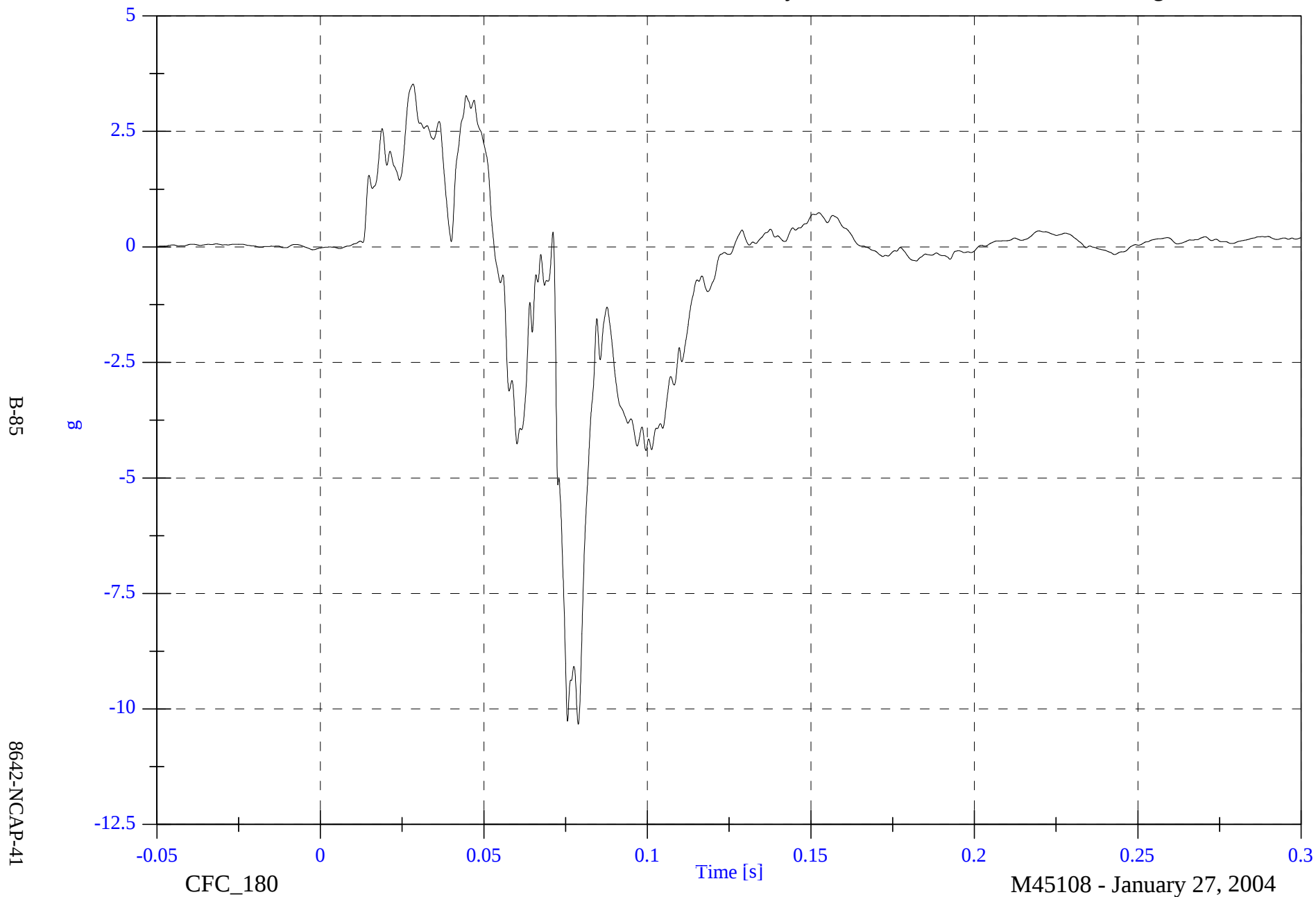


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Chest y

Max: 3.5 [g] at 0.028 [s]

Min: -10.3 [g] at 0.079 [s]

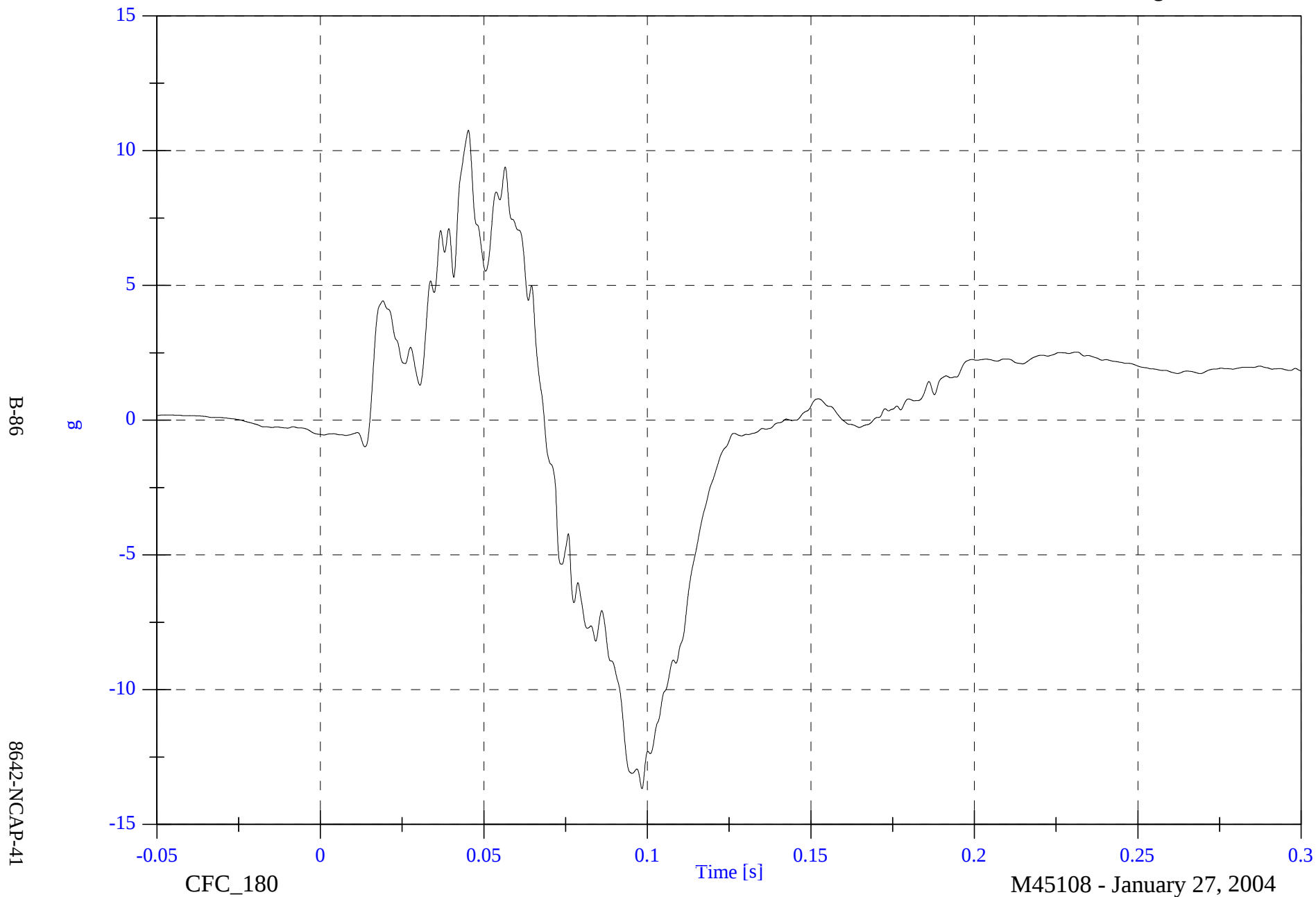


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Chest z

Max: 10.8 [g] at 0.045 [s]

Min: -13.7 [g] at 0.098 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

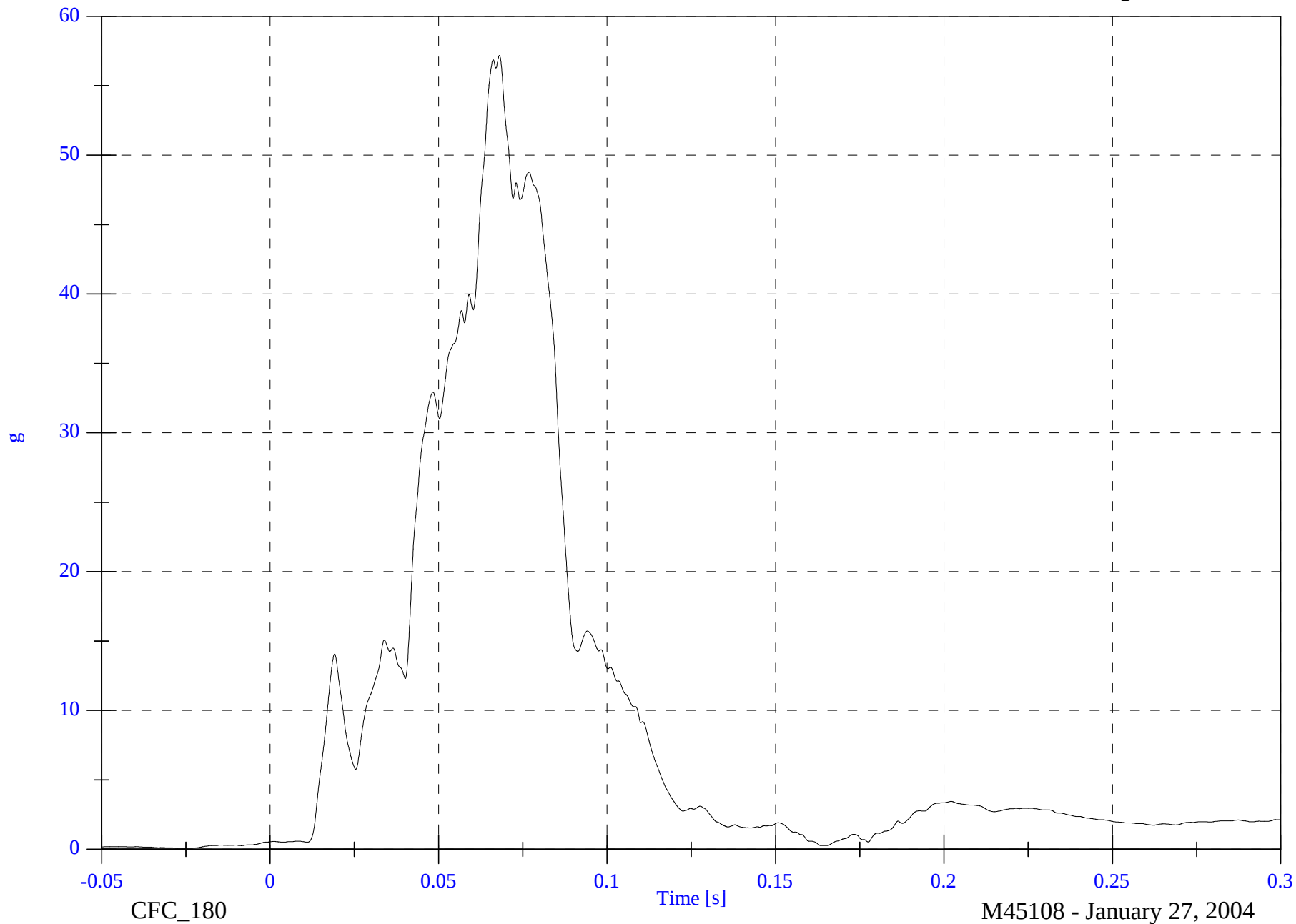
V1P2 Chest Resultant

Max: 57.2 [g] at 0.068 [s]

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

B-87

8642-NCAP-41

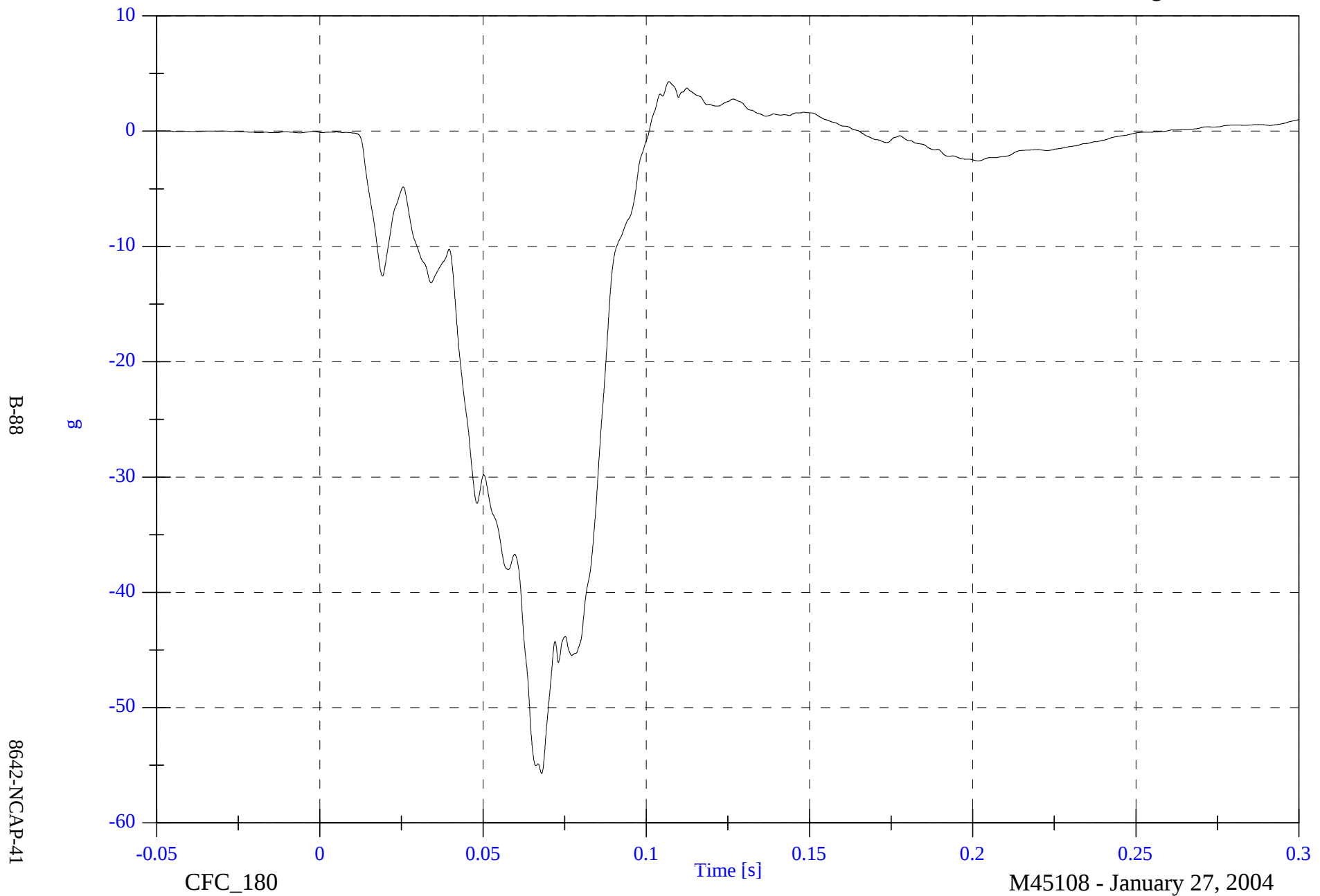


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Chest Red x

Max: 4.3 [g] at 0.107 [s]

Min: -55.7 [g] at 0.068 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

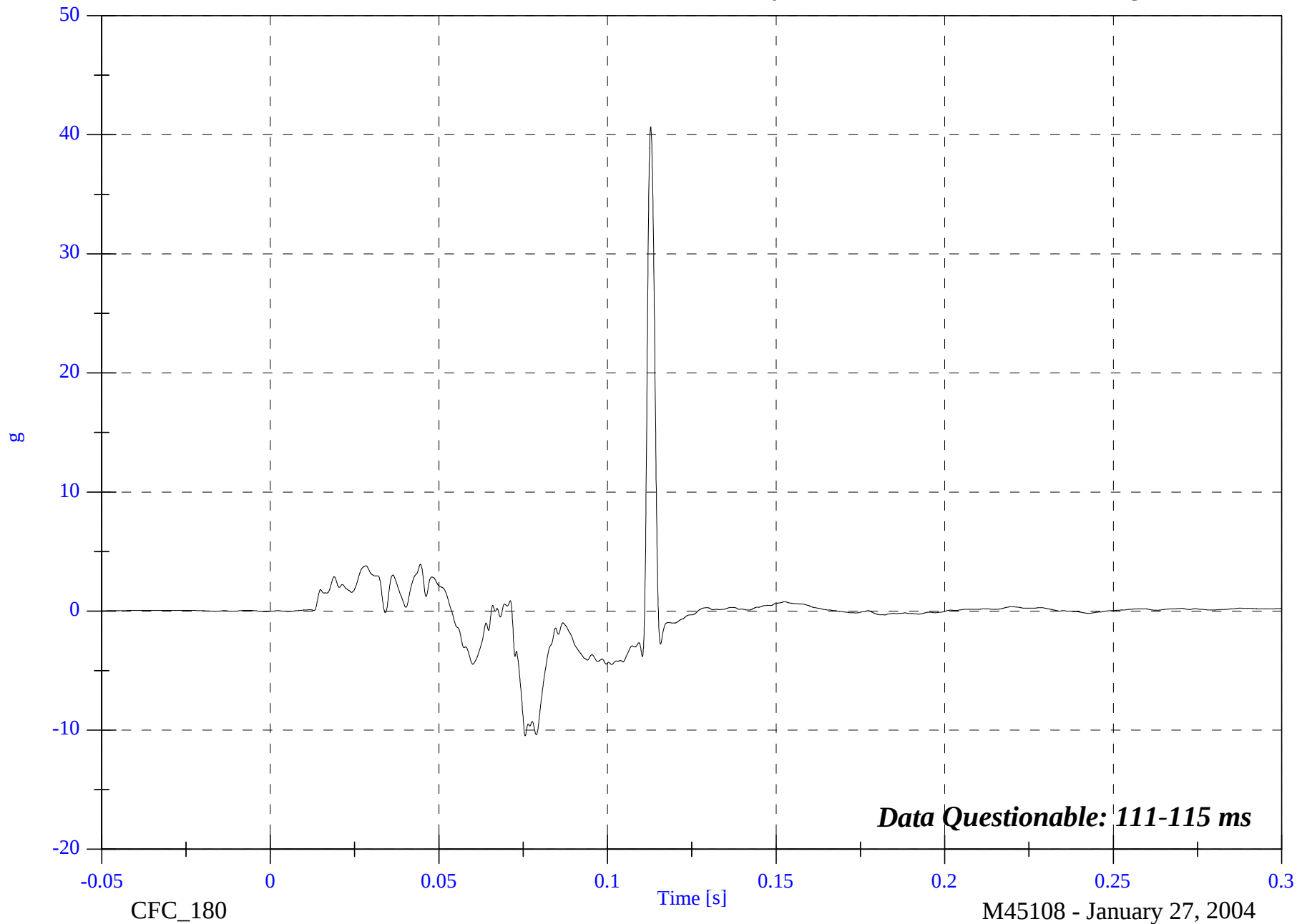
V1P2 Chest Red y

Max: 40.7 [g] at 0.113 [s]

Min: -10.5 [g] at 0.076 [s]

B-89

8642-NCAP-41

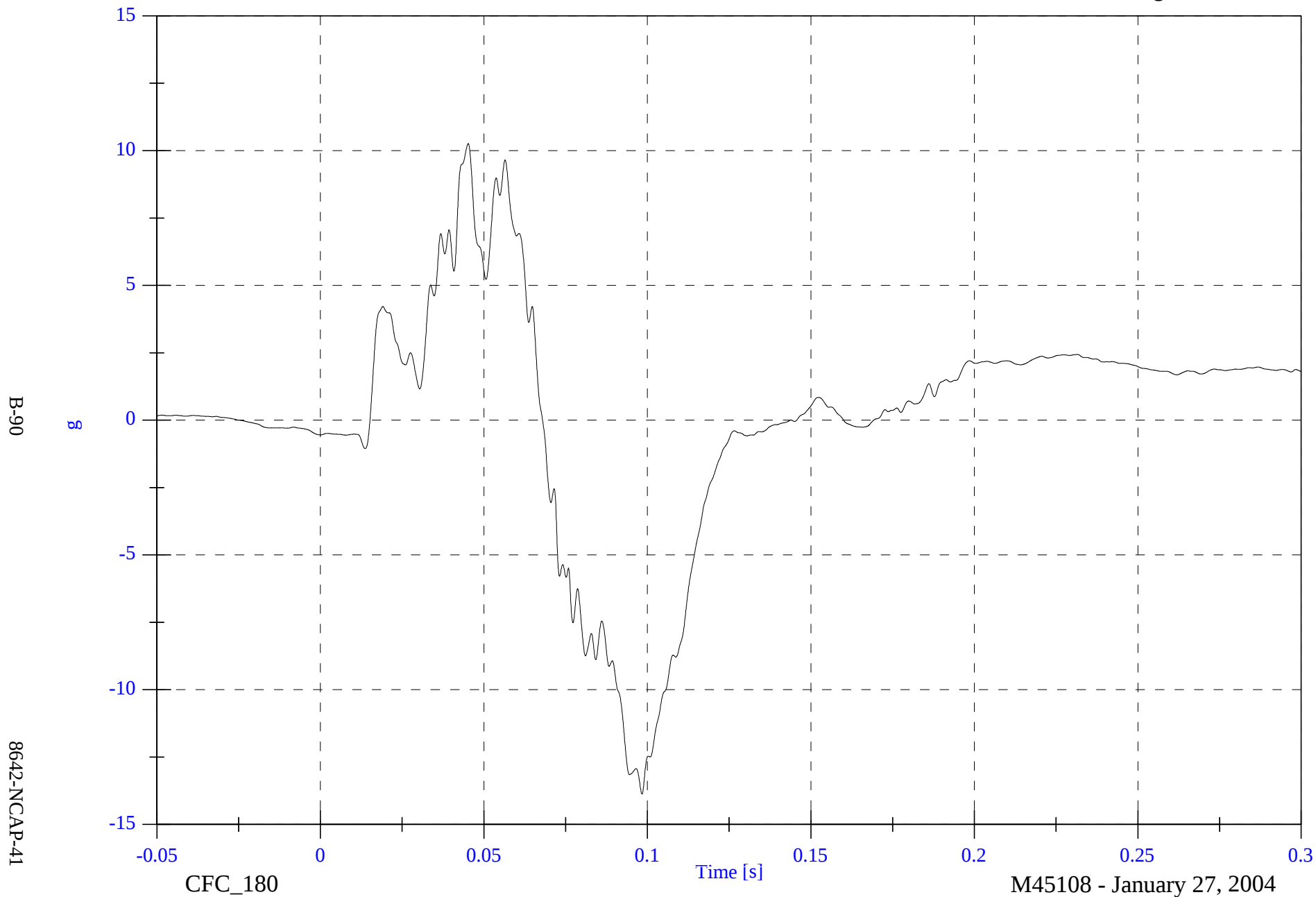


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Chest Red z

Max: 10.3 [g] at 0.045 [s]

Min: -13.9 [g] at 0.098 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

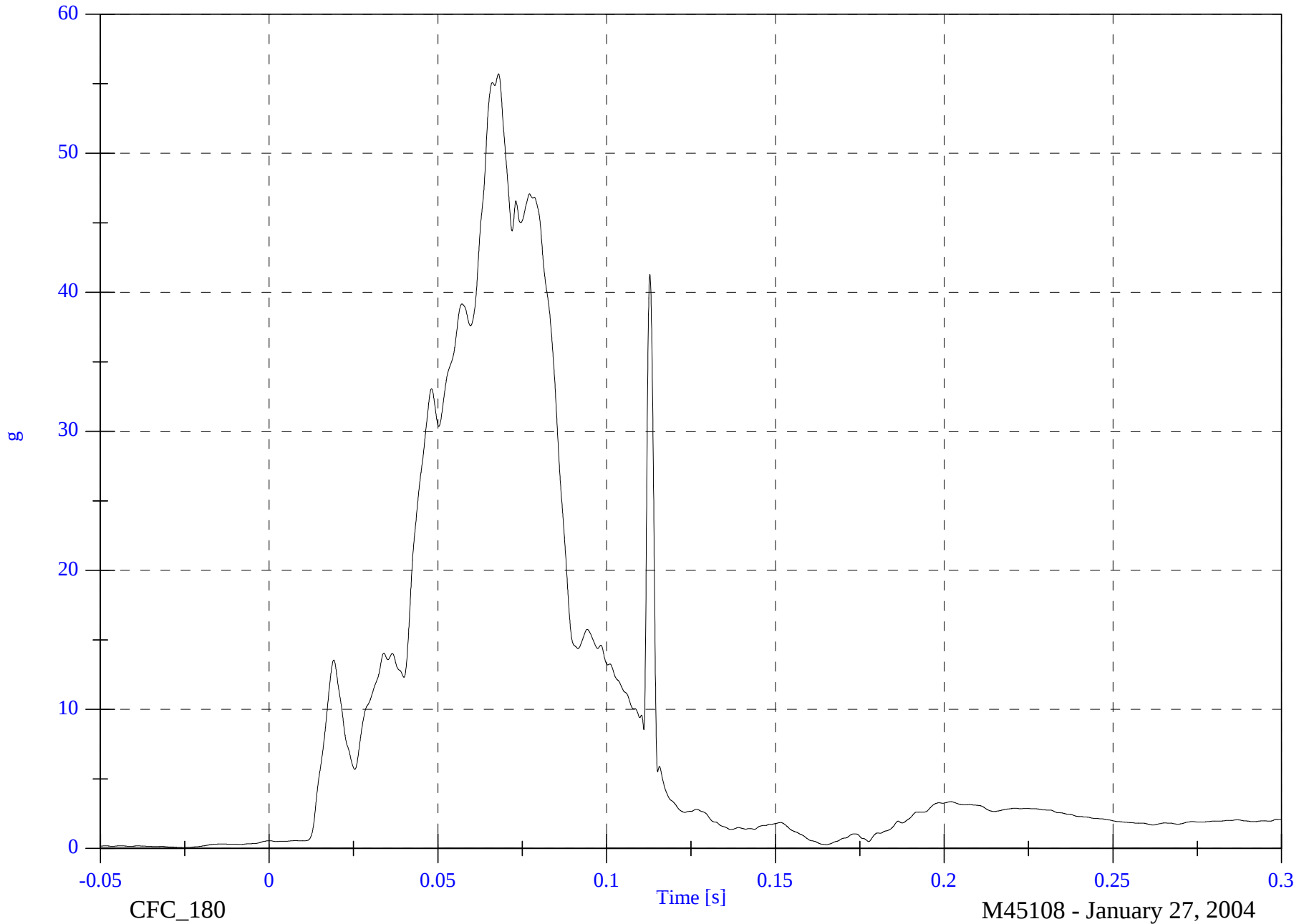
V1P2 Chest Red Resultant

Max: 55.7 [g] at 0.068 [s]

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

B-91

8642-NCAP-41

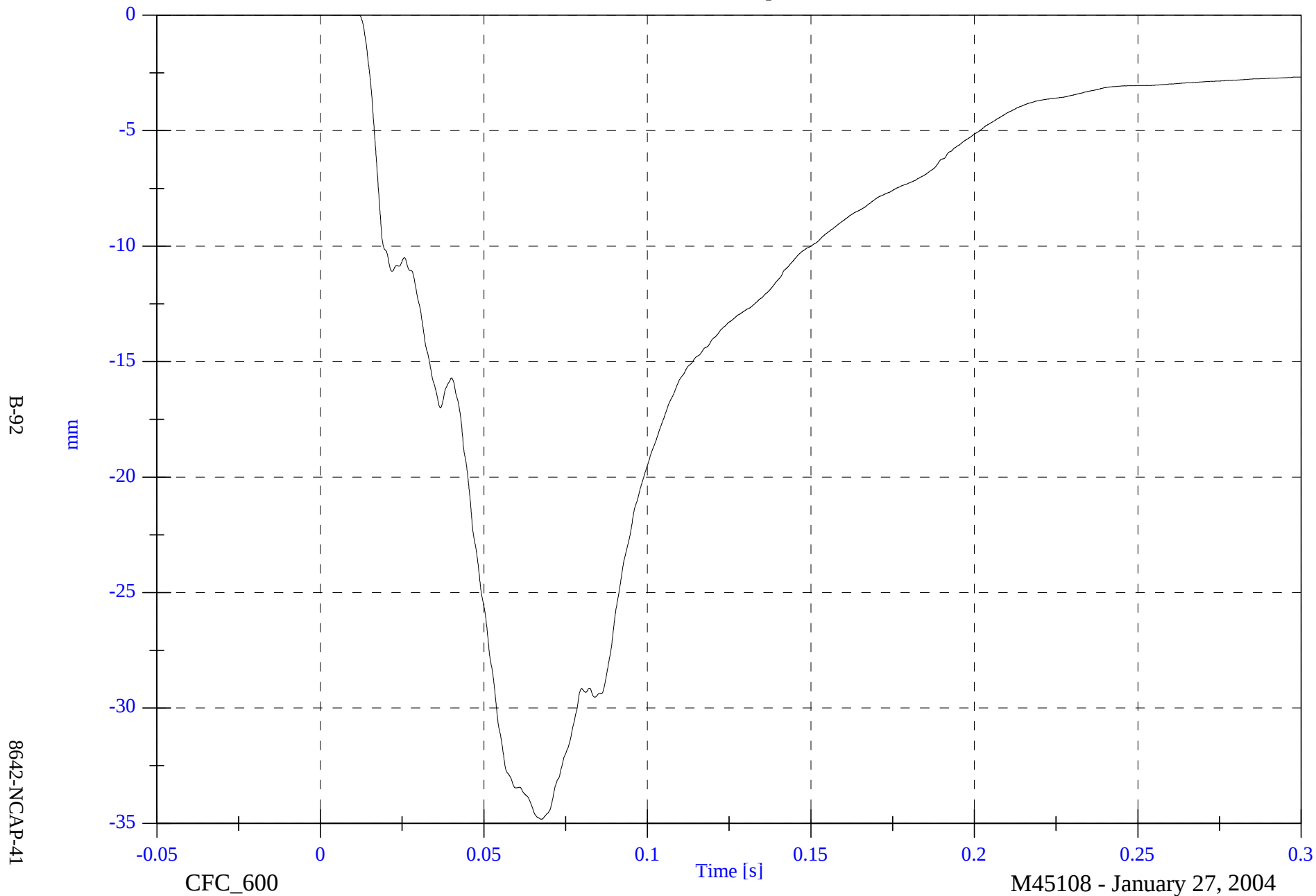


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Chest Compression x

Max: 0.0 [mm] at -0.015 [s]

Min: -34.8 [mm] at 0.068 [s]

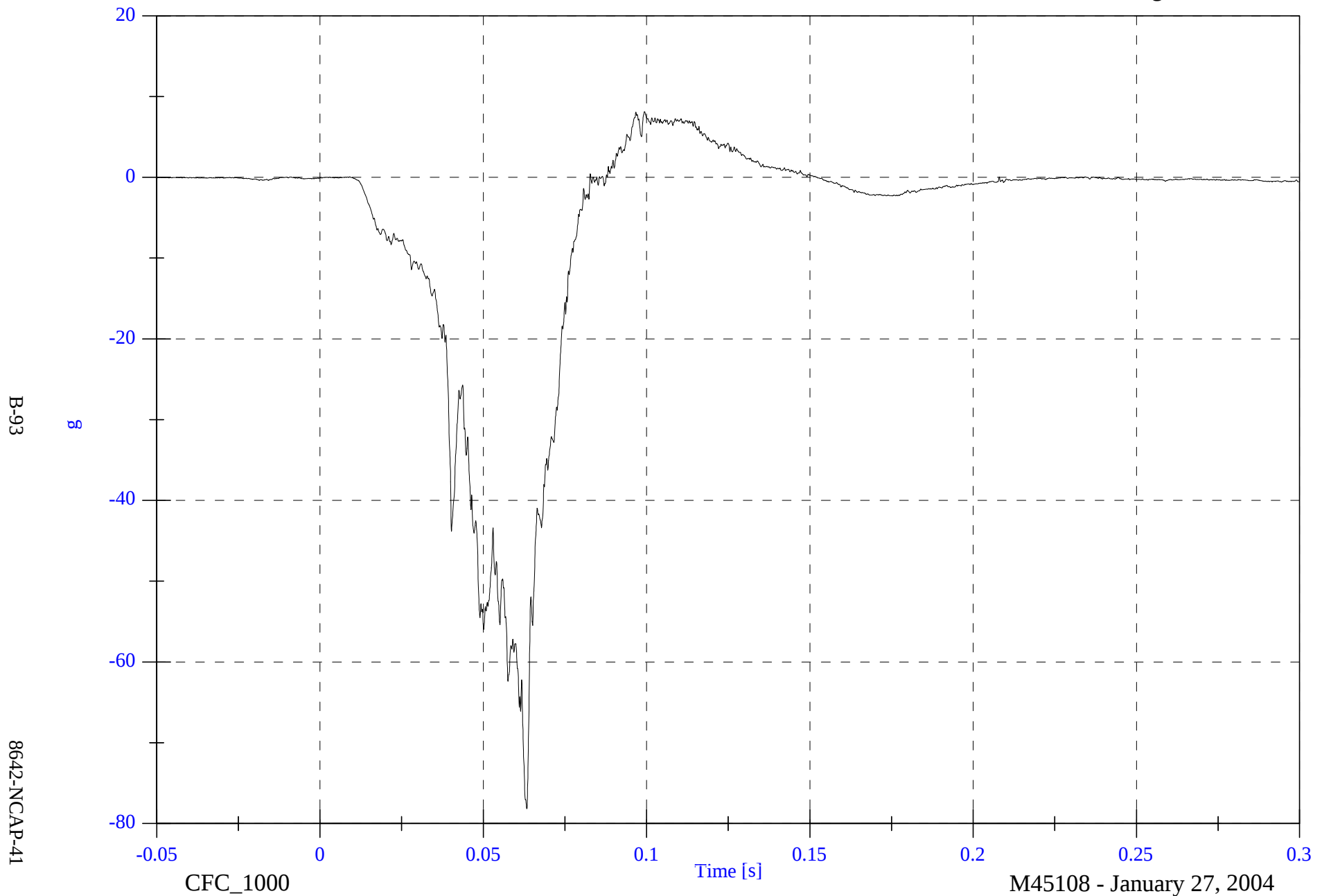


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Pelvic x

Max: 8.1 [g] at 0.099 [s]

Min: -78.2 [g] at 0.063 [s]

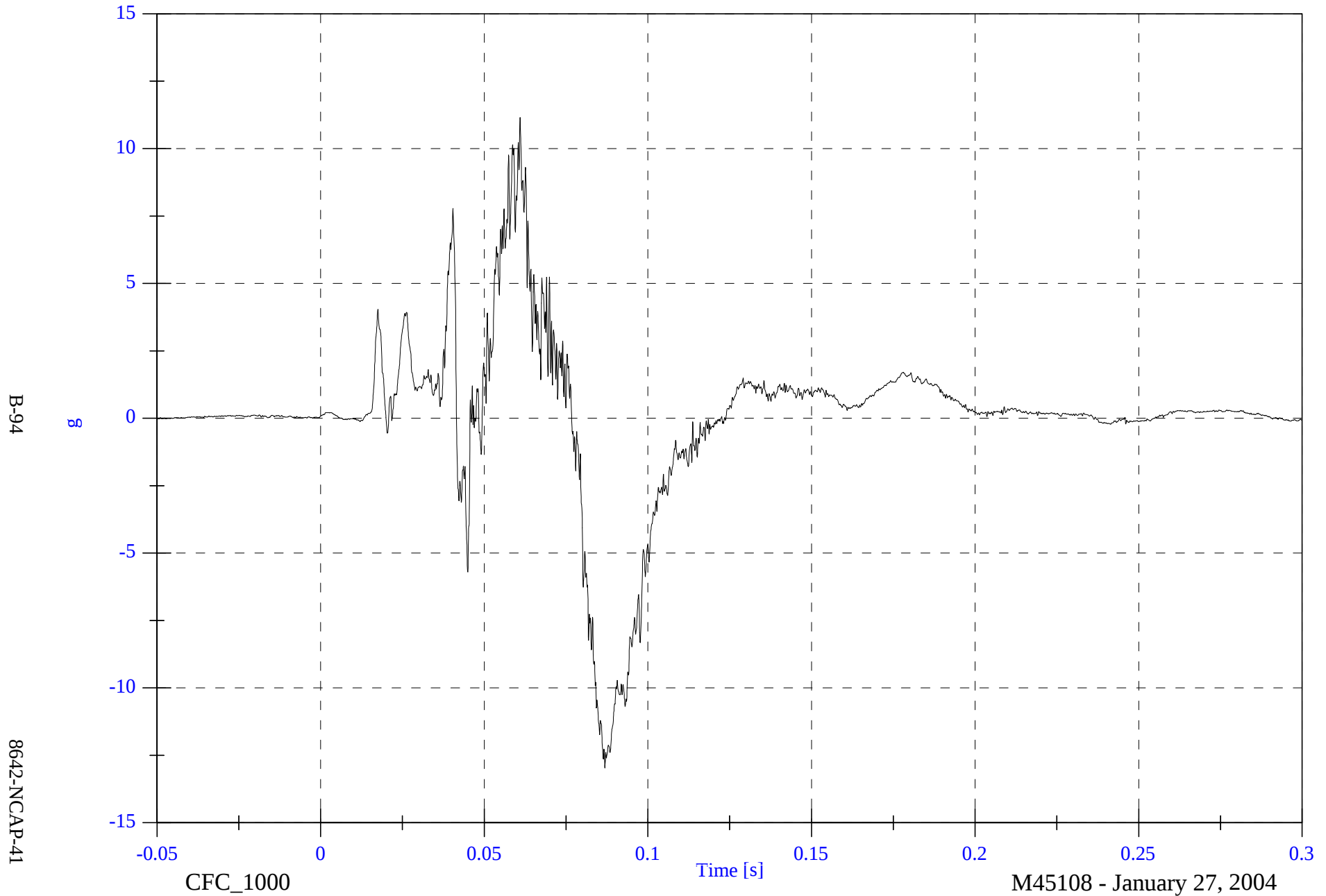


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Pelvic y

Max: 11.2 [g] at 0.061 [s]

Min: -13.0 [g] at 0.087 [s]

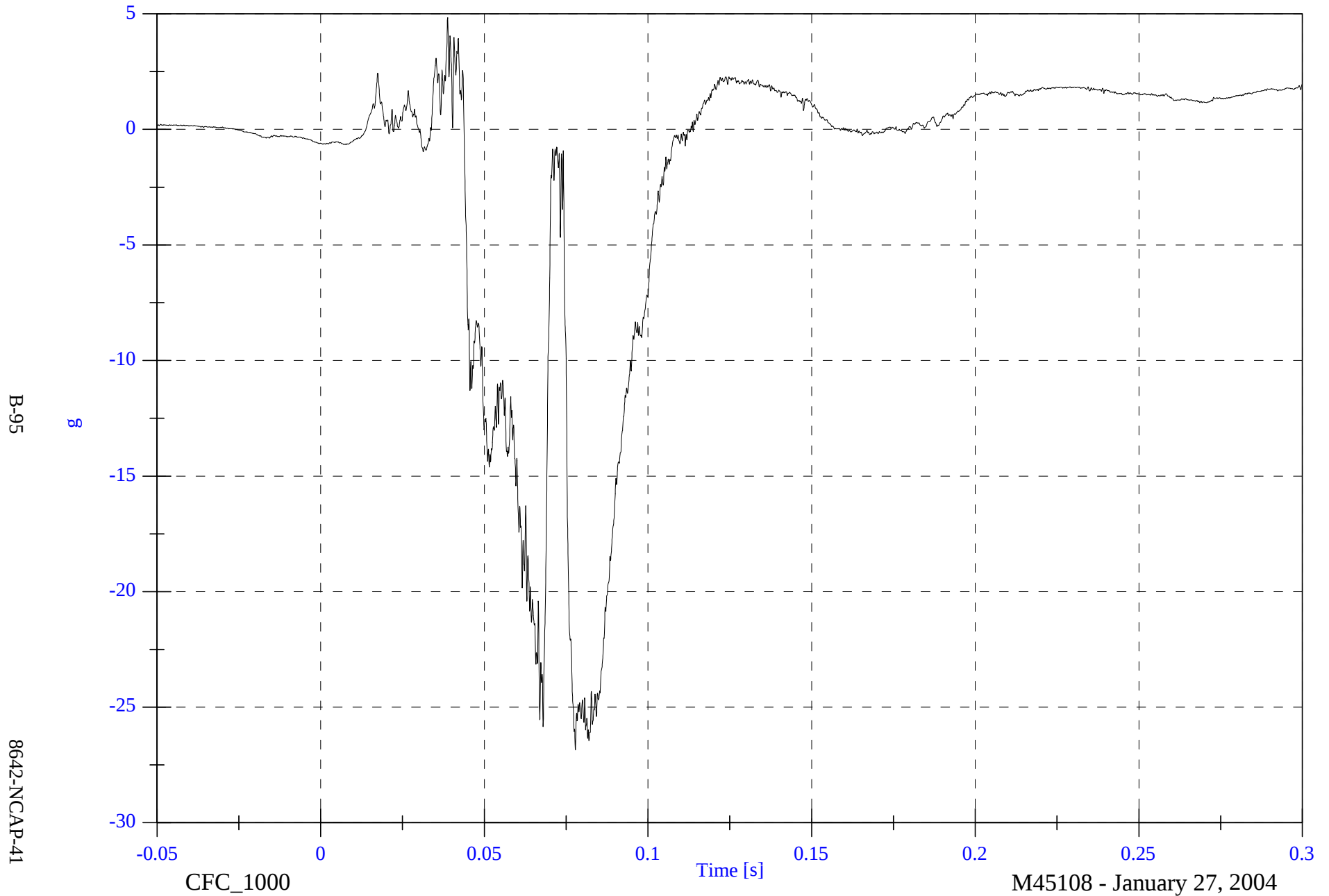


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Pelvic z

Max: 4.8 [g] at 0.039 [s]

Min: -26.8 [g] at 0.078 [s]

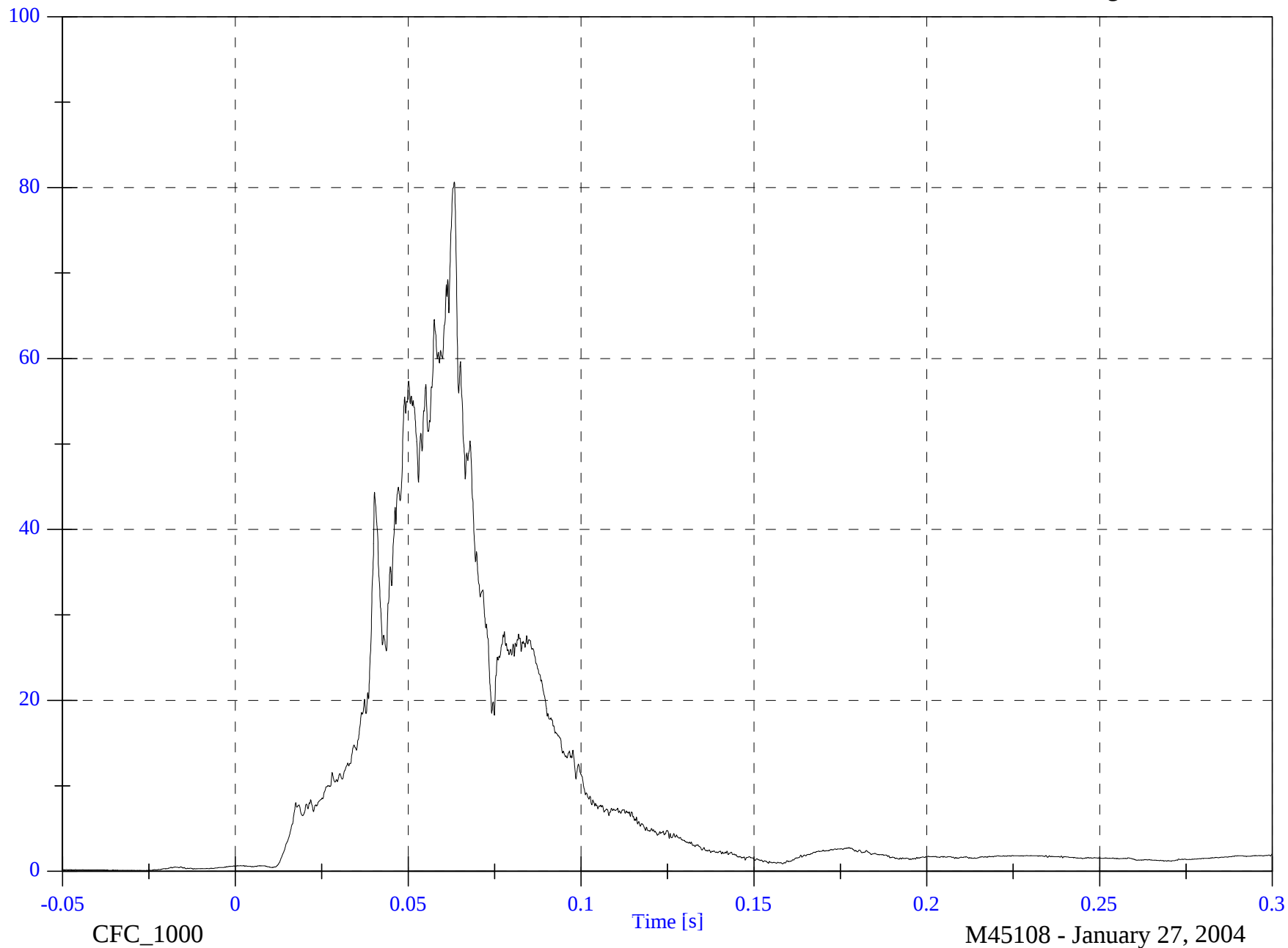


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Pelvic Resultant

Max: 80.7 [g] at 0.063 [s]

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



B-96

8642-NCAP-41

CFC_1000

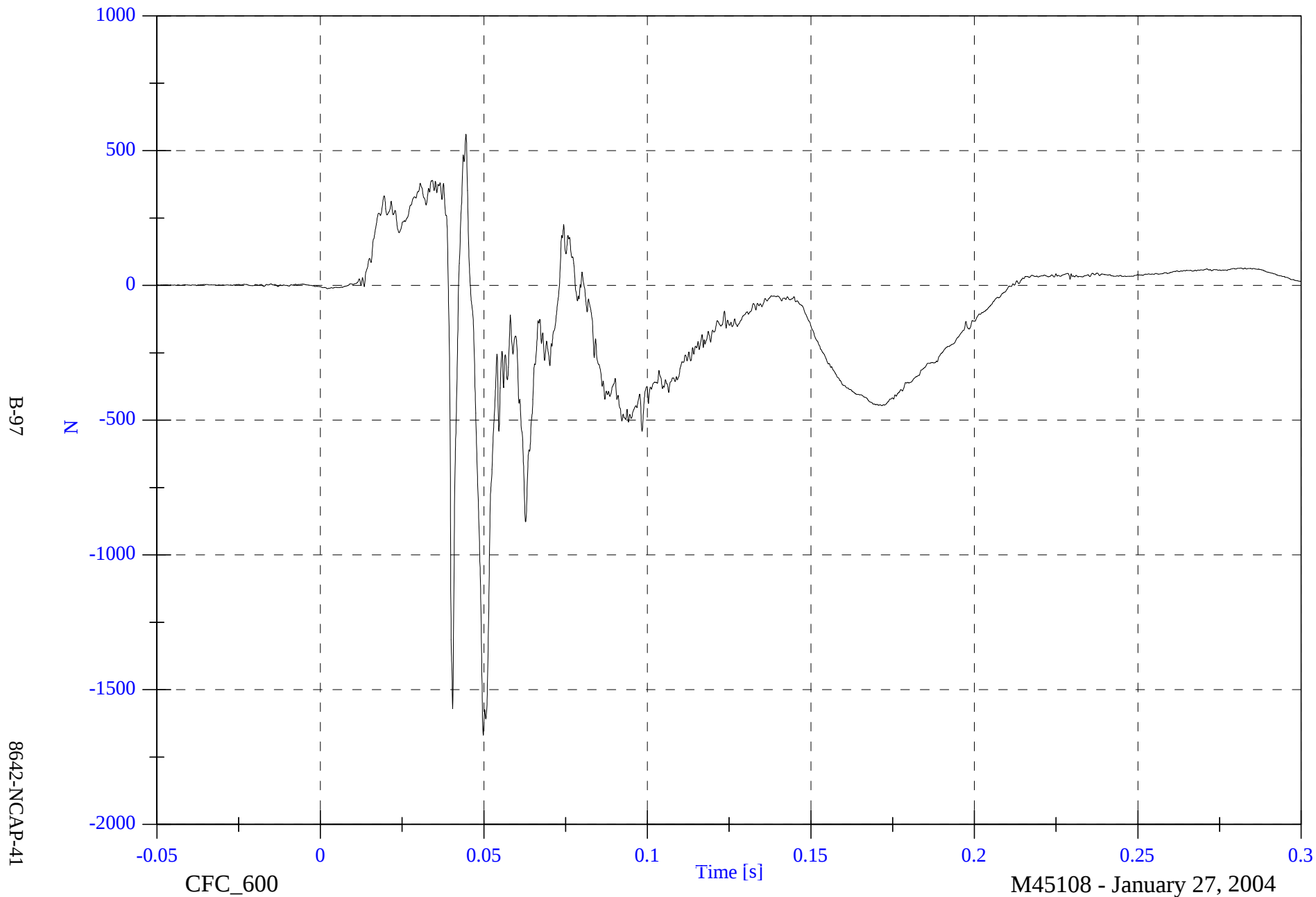
M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Left Femur z

Max: 561.0 [N] at 0.045 [s]

Min: -1669.6 [N] at 0.050 [s]

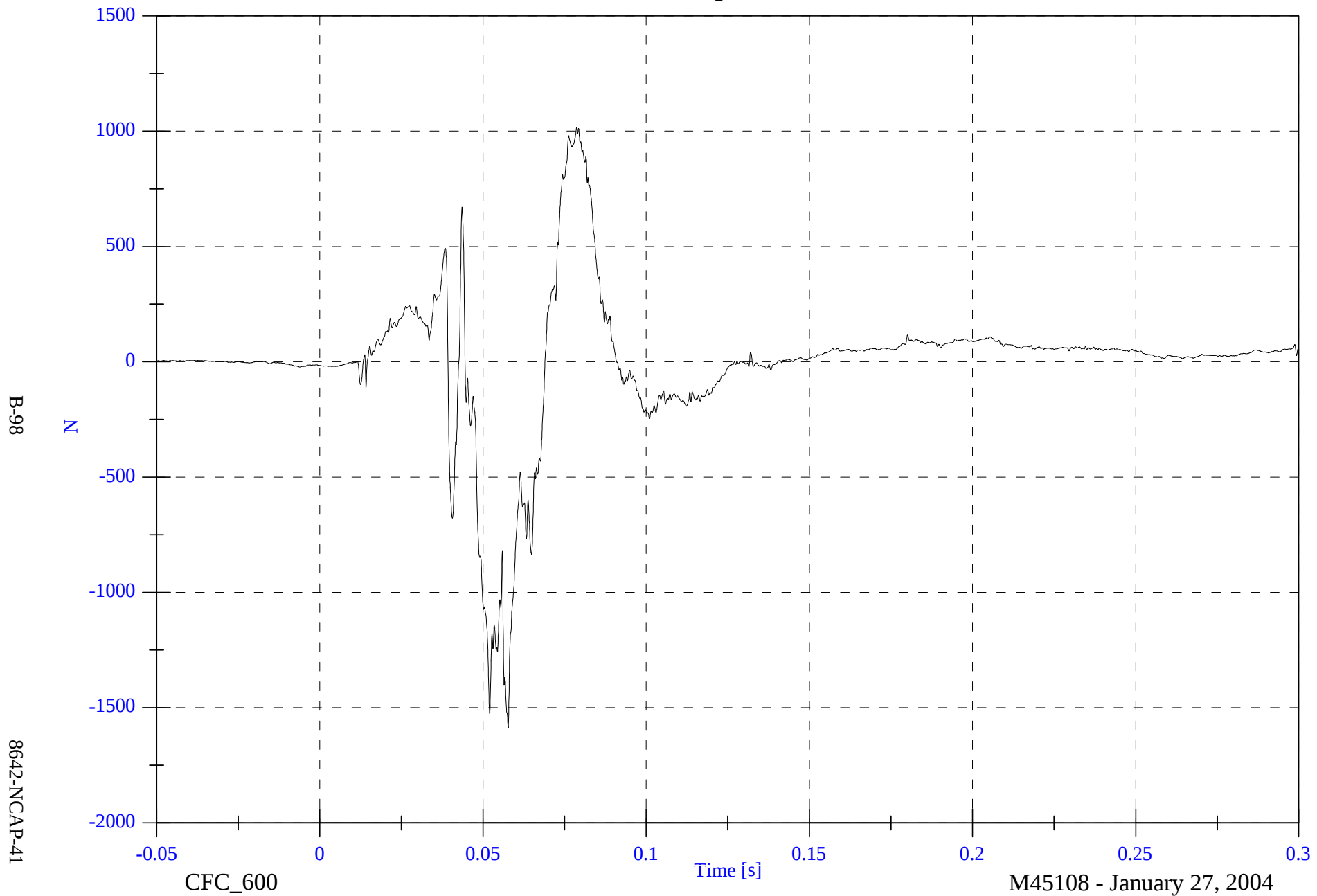


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Right Femur z

Max: 1015.8 [N] at 0.079 [s]

Min: -1589.7 [N] at 0.058 [s]

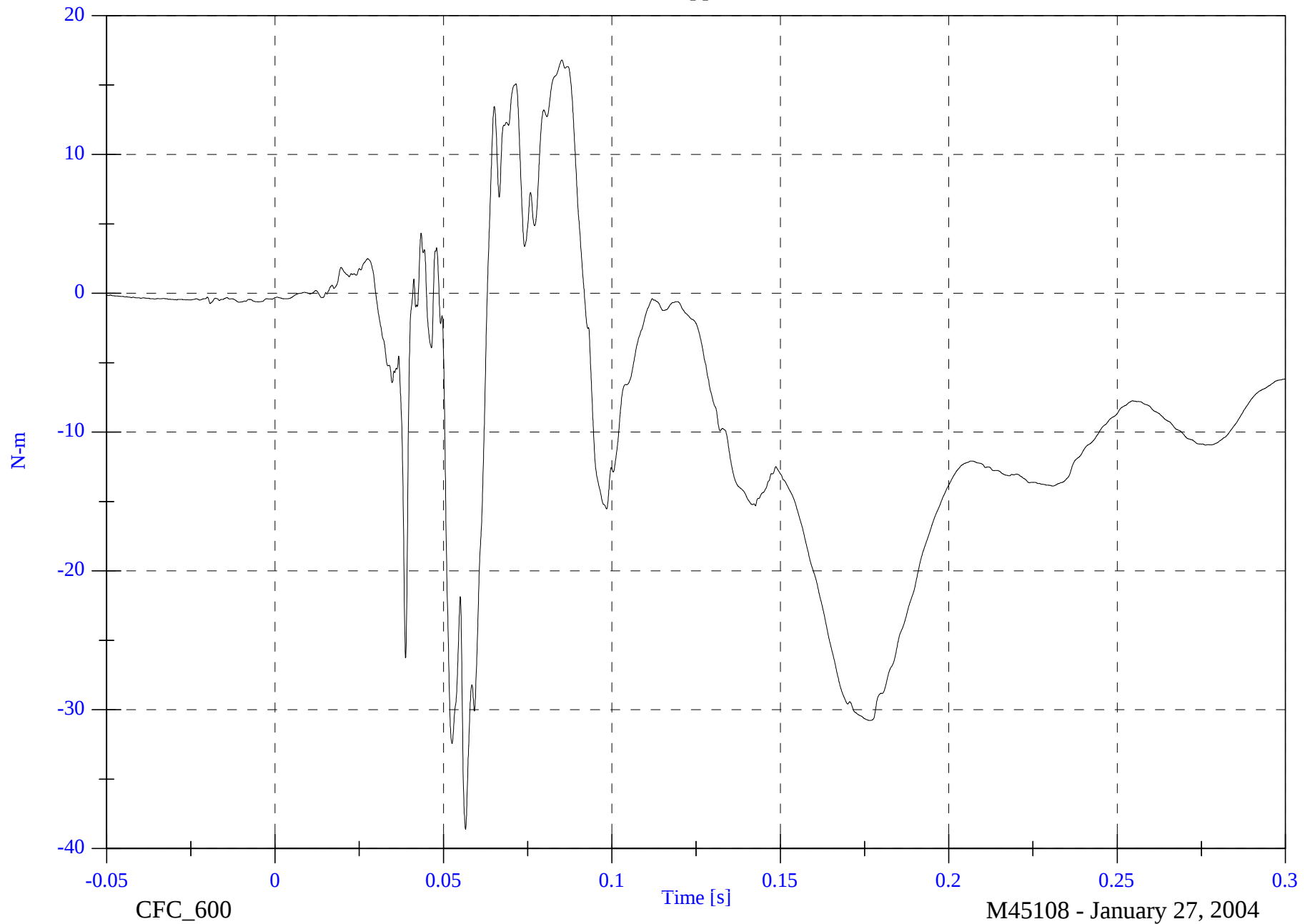


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Left Upper Tibia Mx

Max: 16.8 [N-m] at 0.085 [s]

Min: -38.6 [N-m] at 0.057 [s]

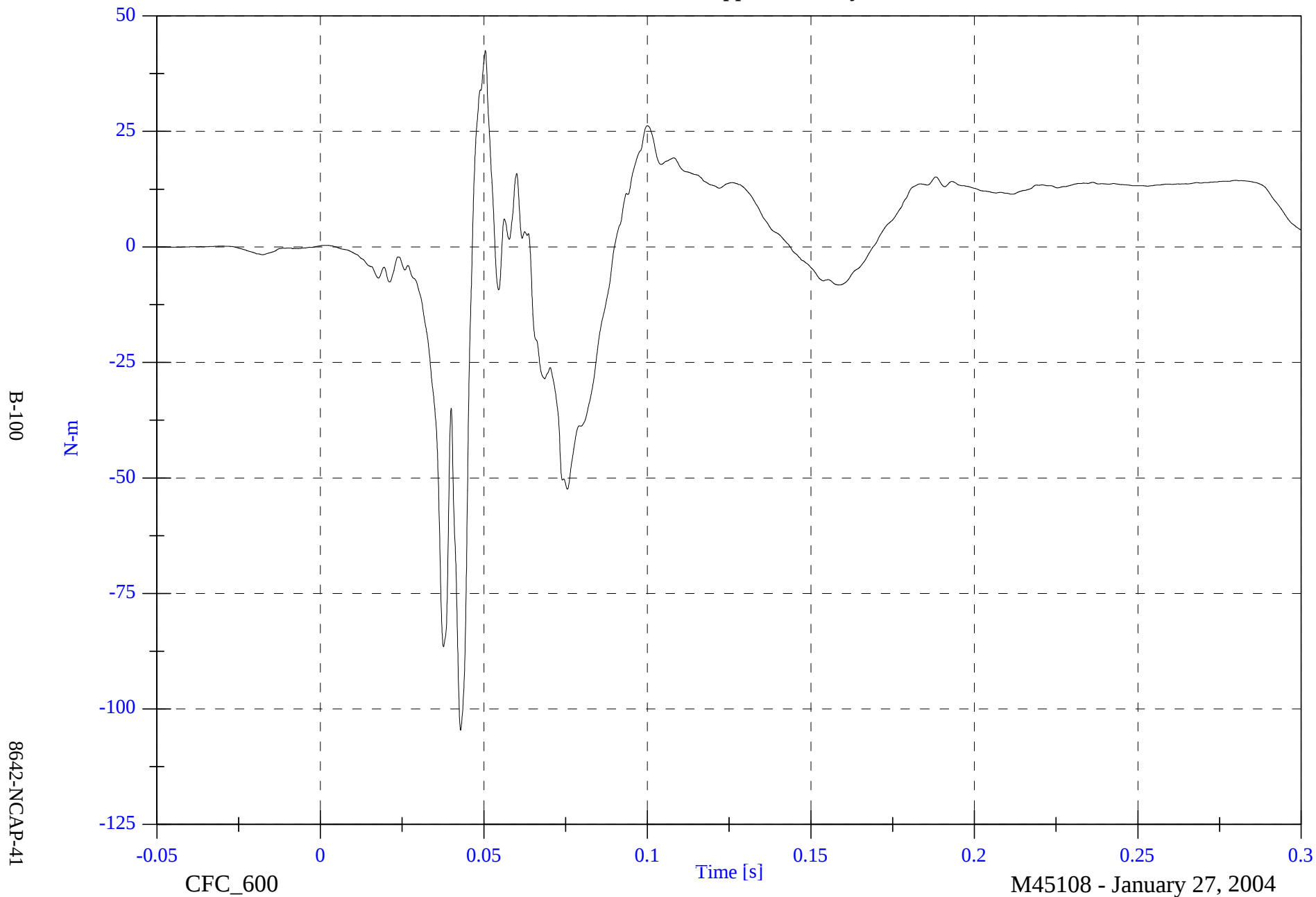


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Left Upper Tibia My

Max: 42.5 [N-m] at 0.050 [s]

Min: -104.6 [N-m] at 0.043 [s]

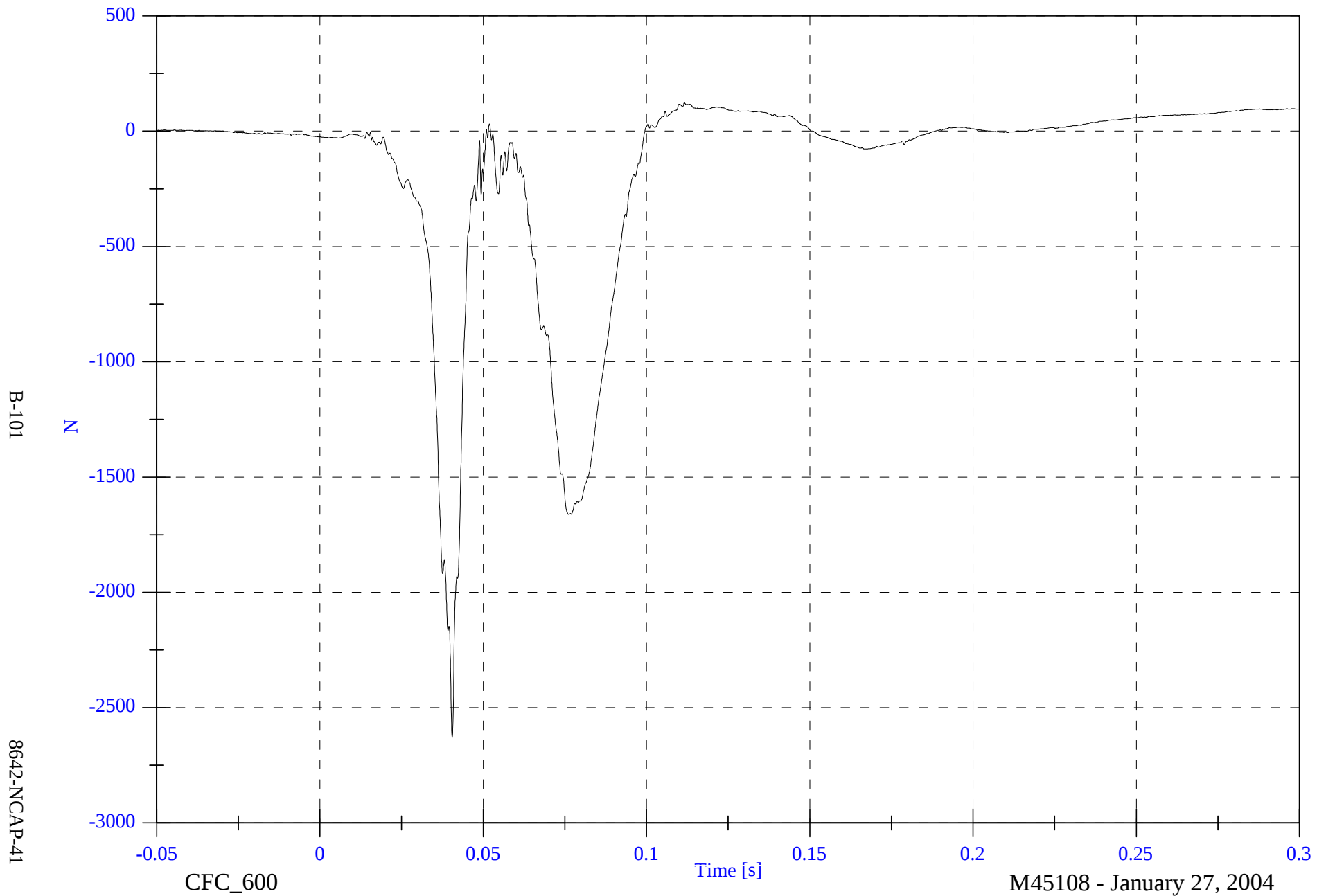


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Left Lower Tibia Fz

Max: 122.9 [N] at 0.112 [s]

Min: -2631.1 [N] at 0.040 [s]

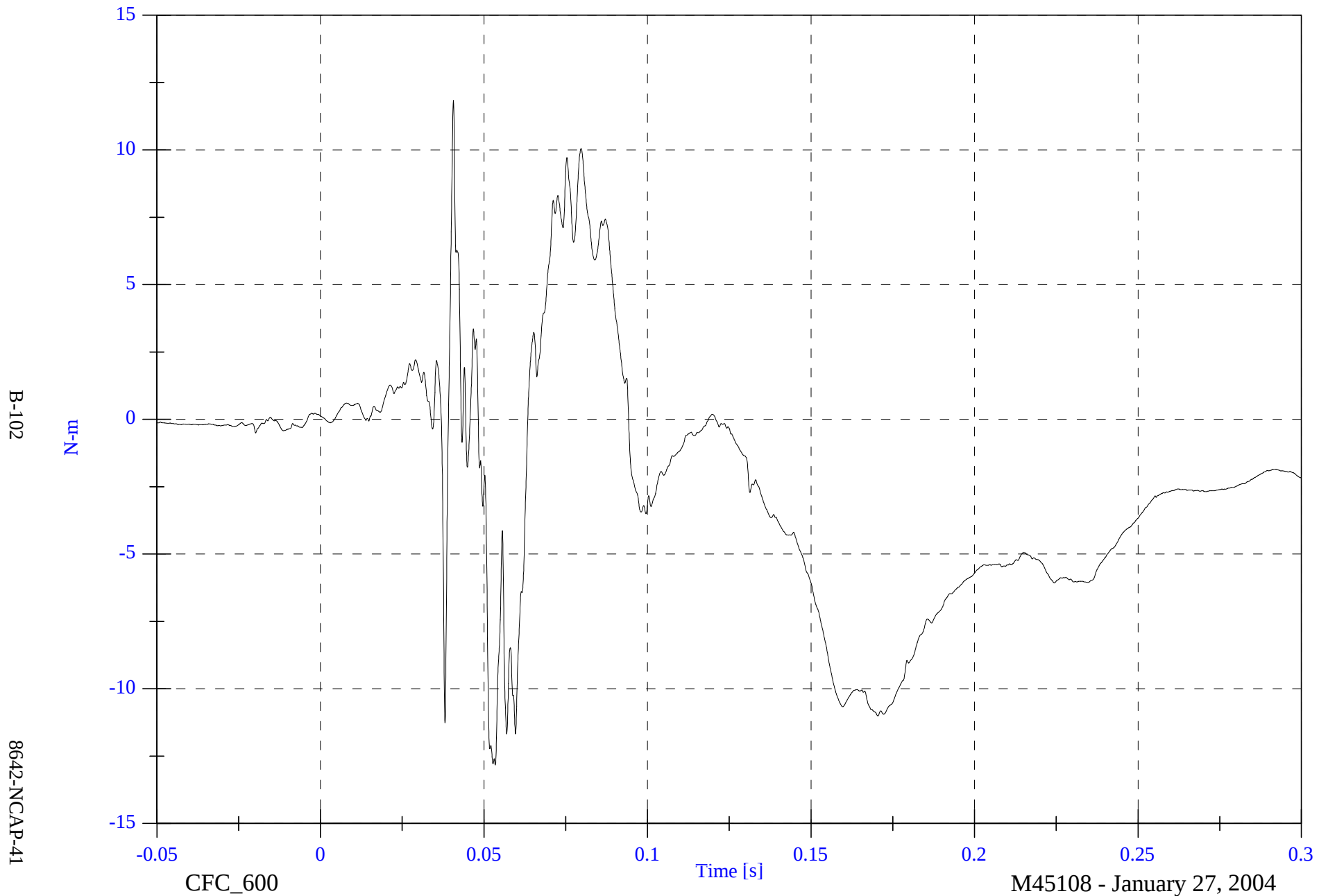


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Left Lower Tibia Mx

Max: 11.8 [N-m] at 0.041 [s]

Min: -12.8 [N-m] at 0.053 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

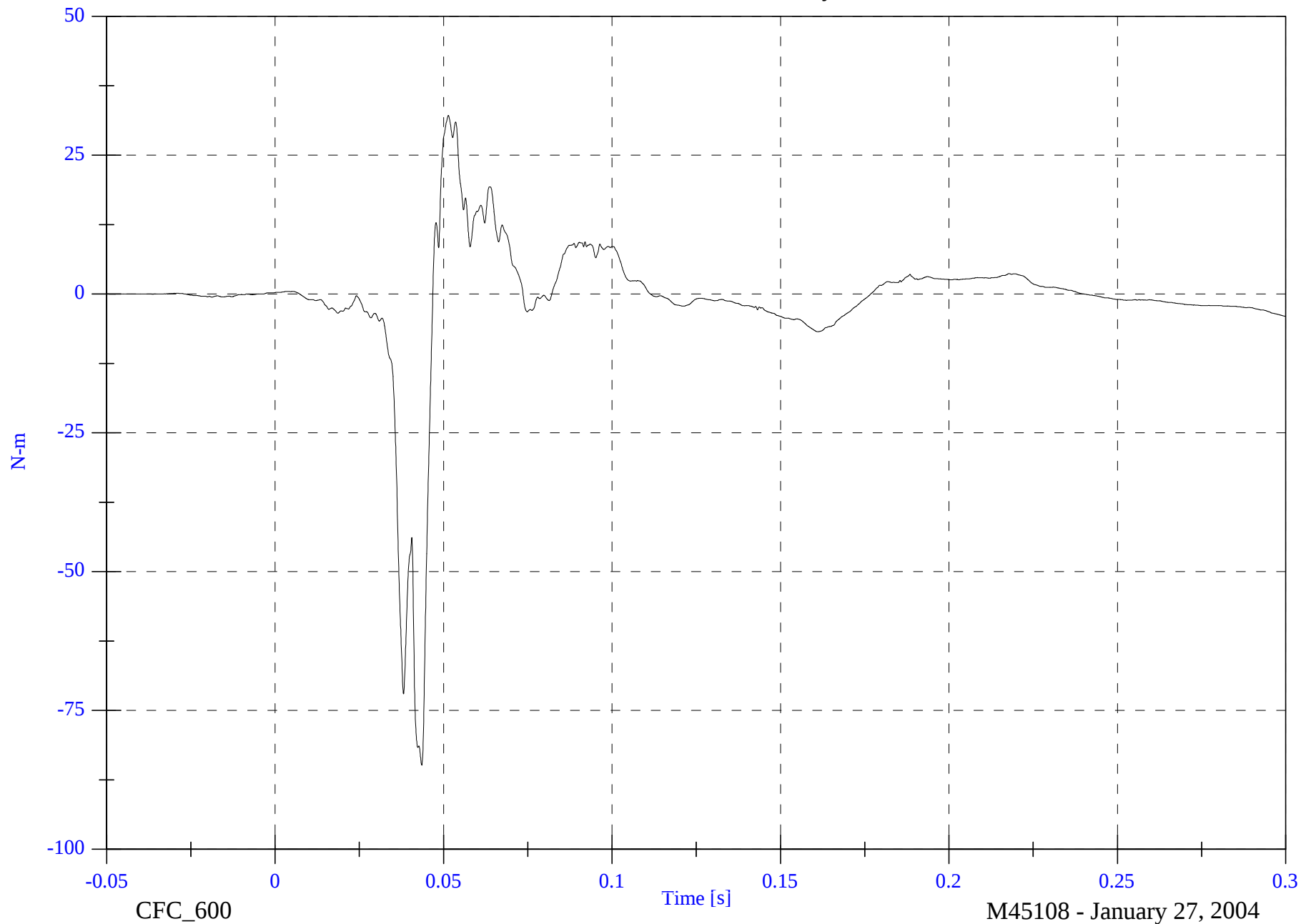
V1P2 Left Lower Tibia My

Max: 32.2 [N-m] at 0.051 [s]

Min: -84.9 [N-m] at 0.044 [s]

B-103

8642-NCAP-41

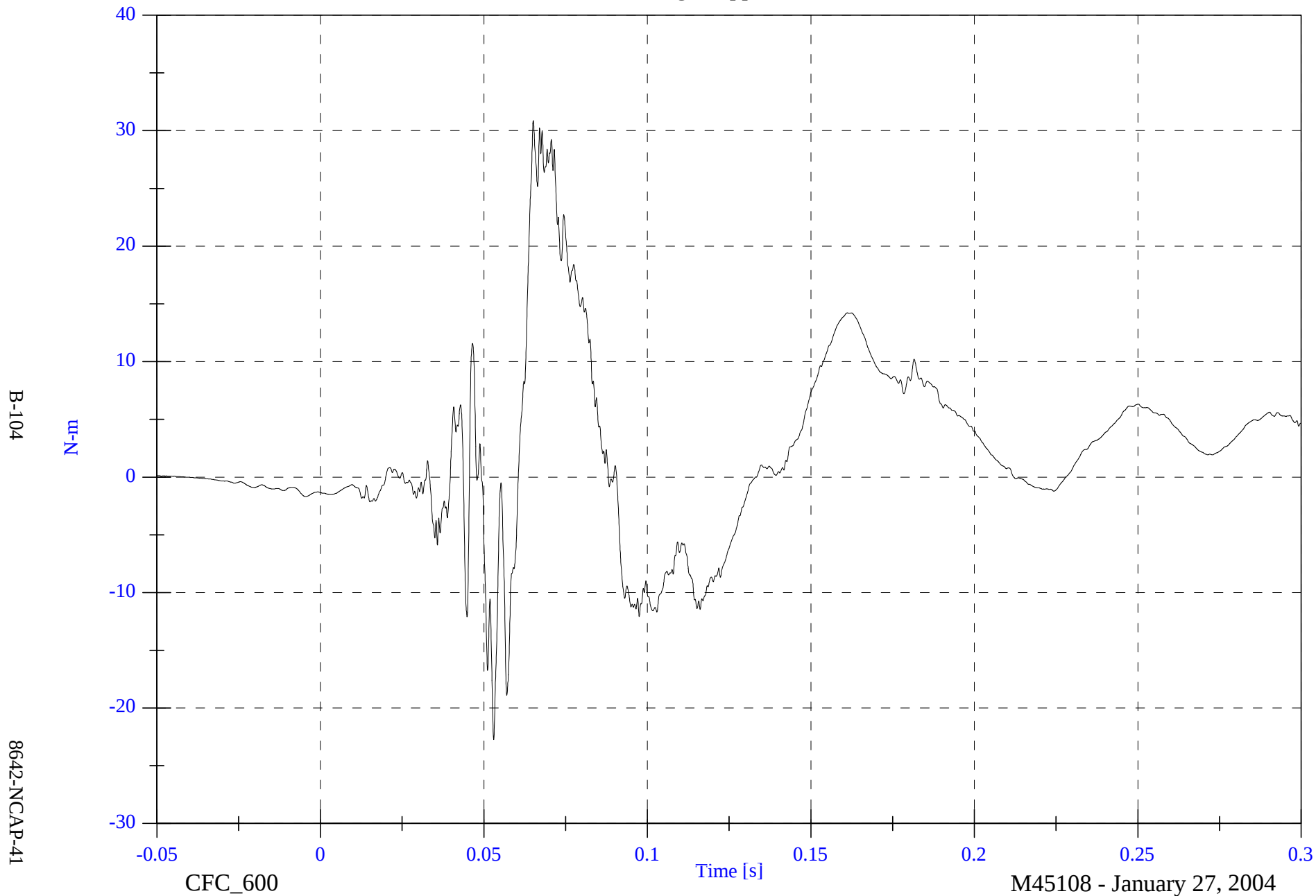


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Right Upper Tibia Mx

Max: 30.9 [N-m] at 0.065 [s]

Min: -22.7 [N-m] at 0.053 [s]

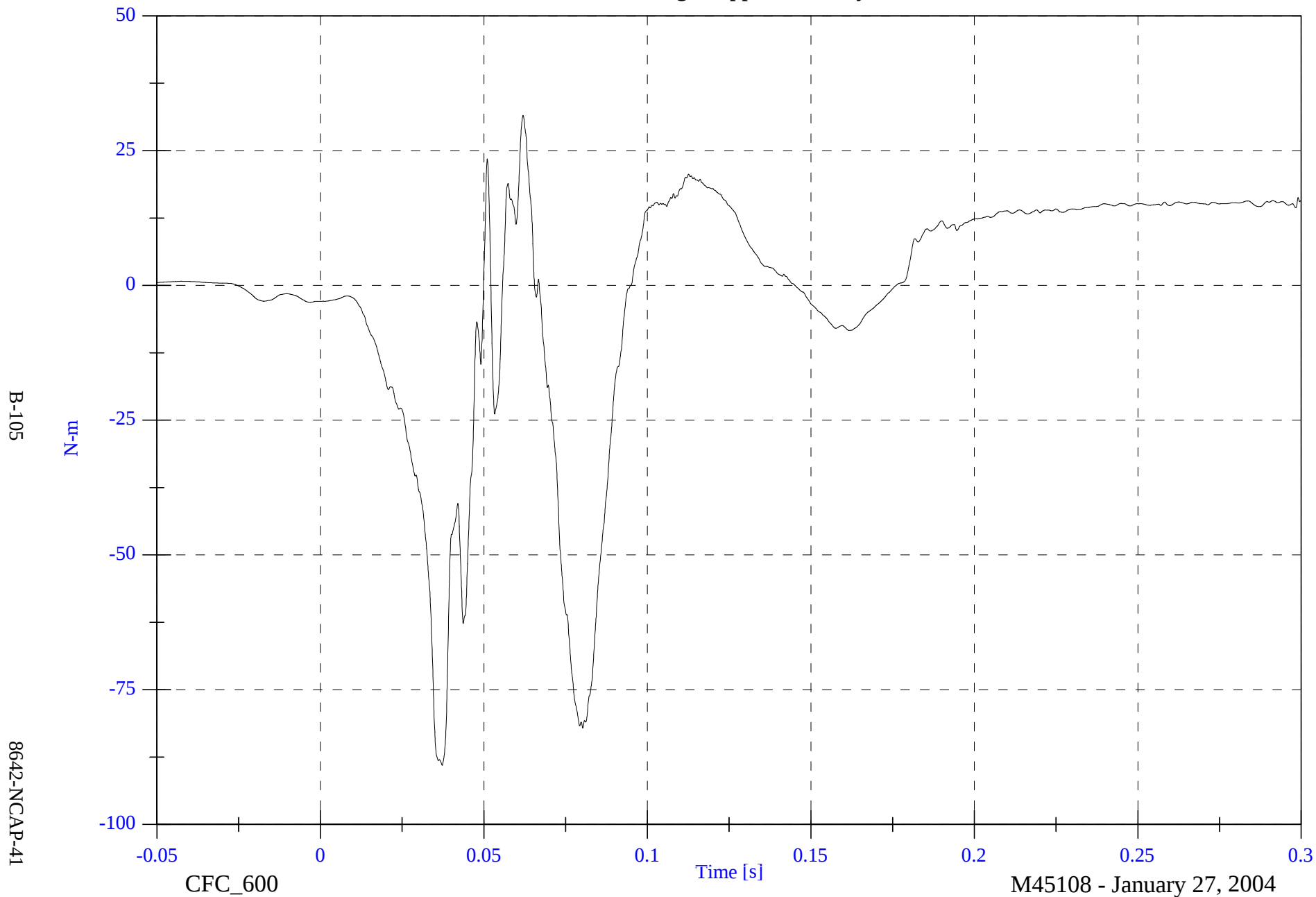


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Right Upper Tibia My

Max: 31.5 [N-m] at 0.062 [s]

Min: -89.0 [N-m] at 0.037 [s]

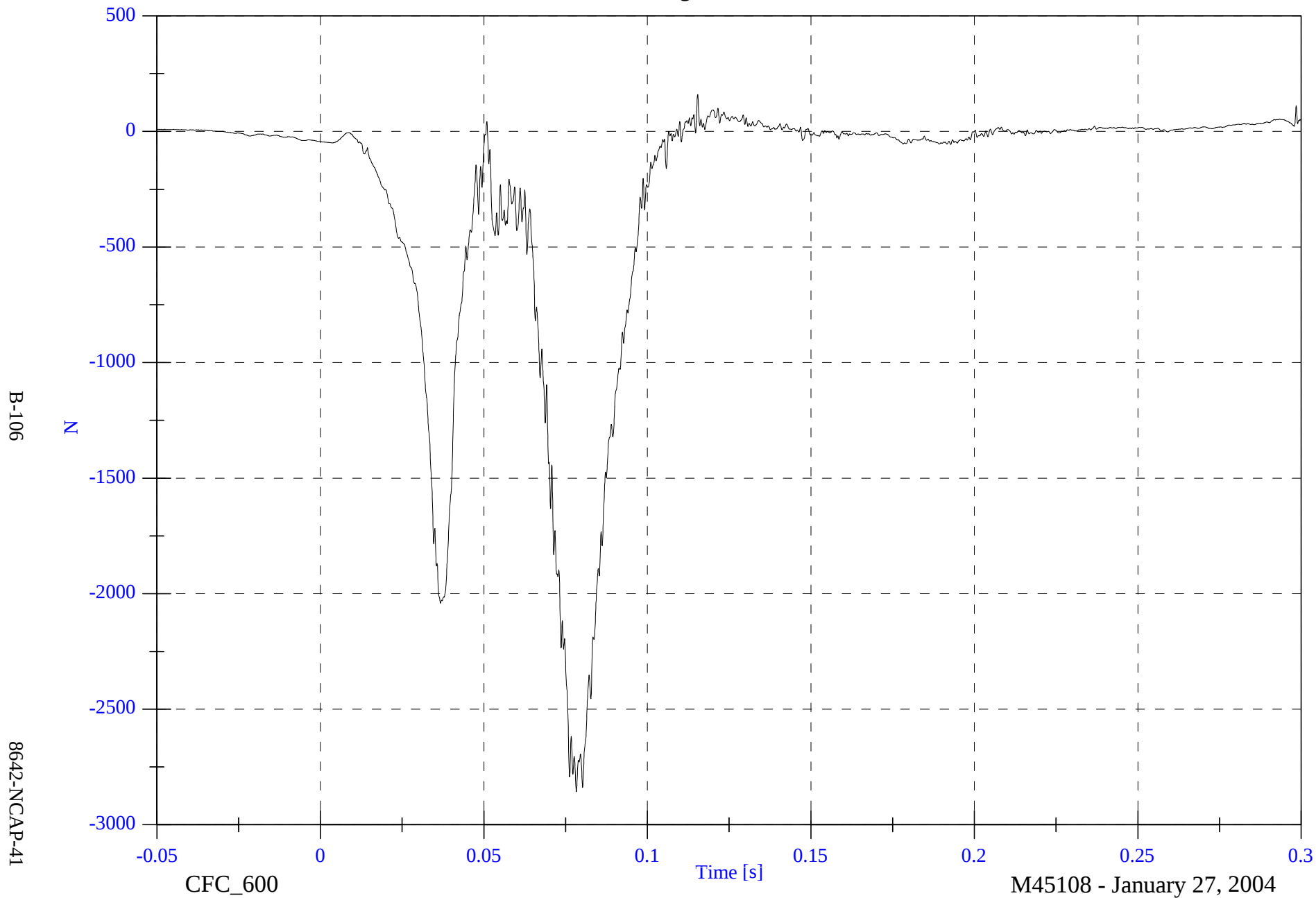


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Right Lower Tibia Fz

Max: 159.2 [N] at 0.115 [s]

Min: -2857.1 [N] at 0.078 [s]

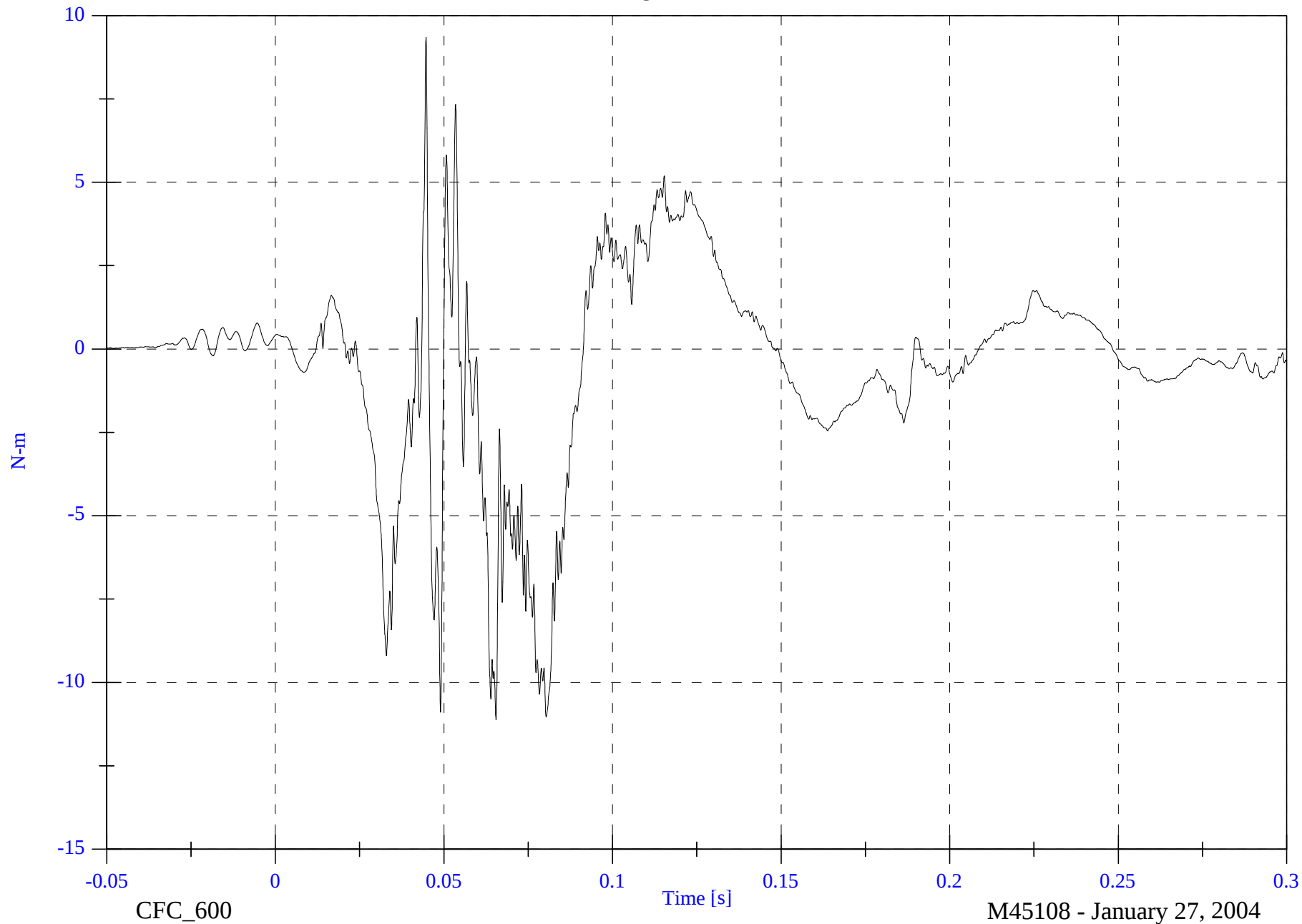


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Right Lower Tibia Mx

Max: 9.3 [N-m] at 0.045 [s]

Min: -11.1 [N-m] at 0.065 [s]



B-107

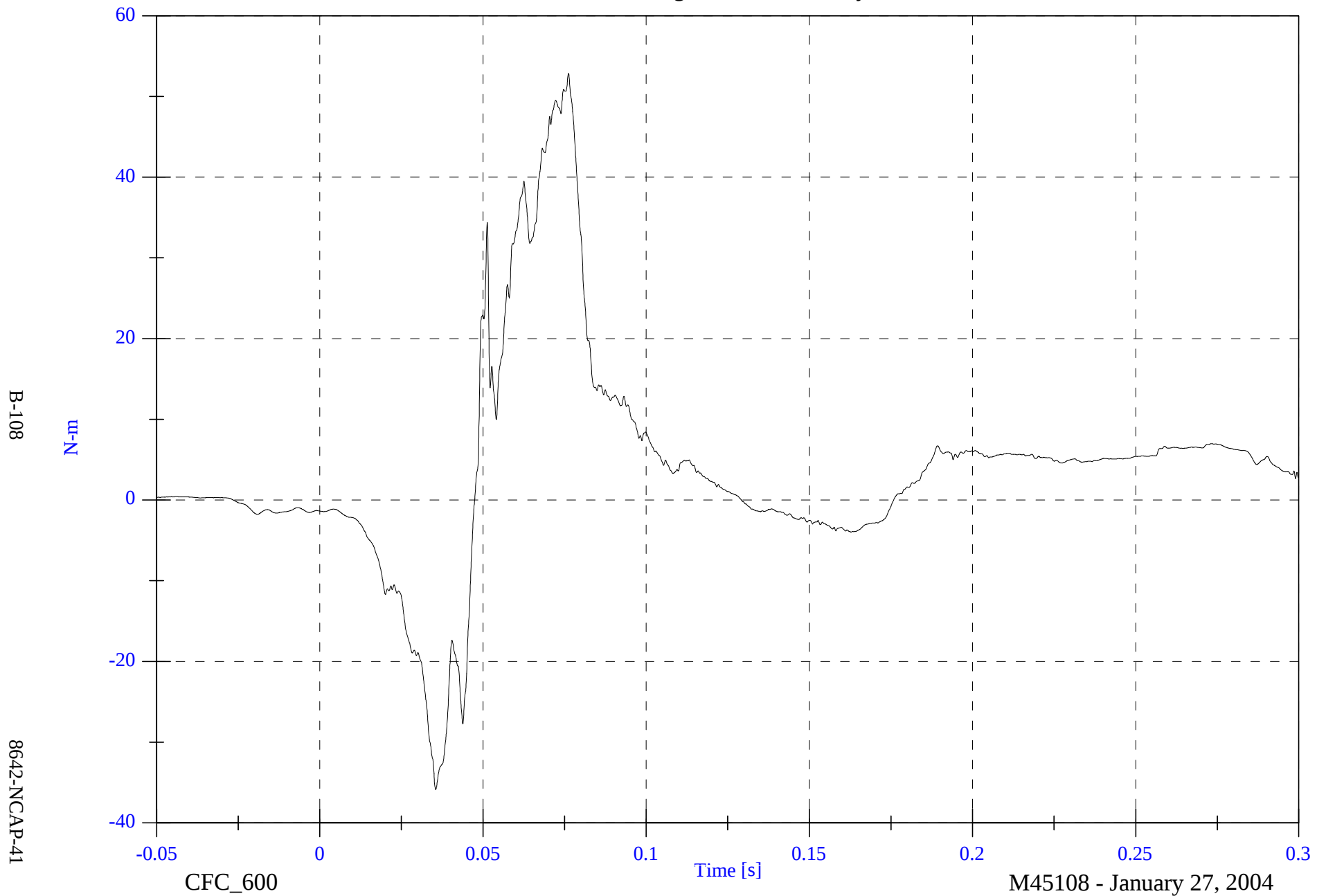
8642-NCAP-41

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Right Lower Tibia My

Max: 52.9 [N-m] at 0.076 [s]

Min: -35.9 [N-m] at 0.036 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

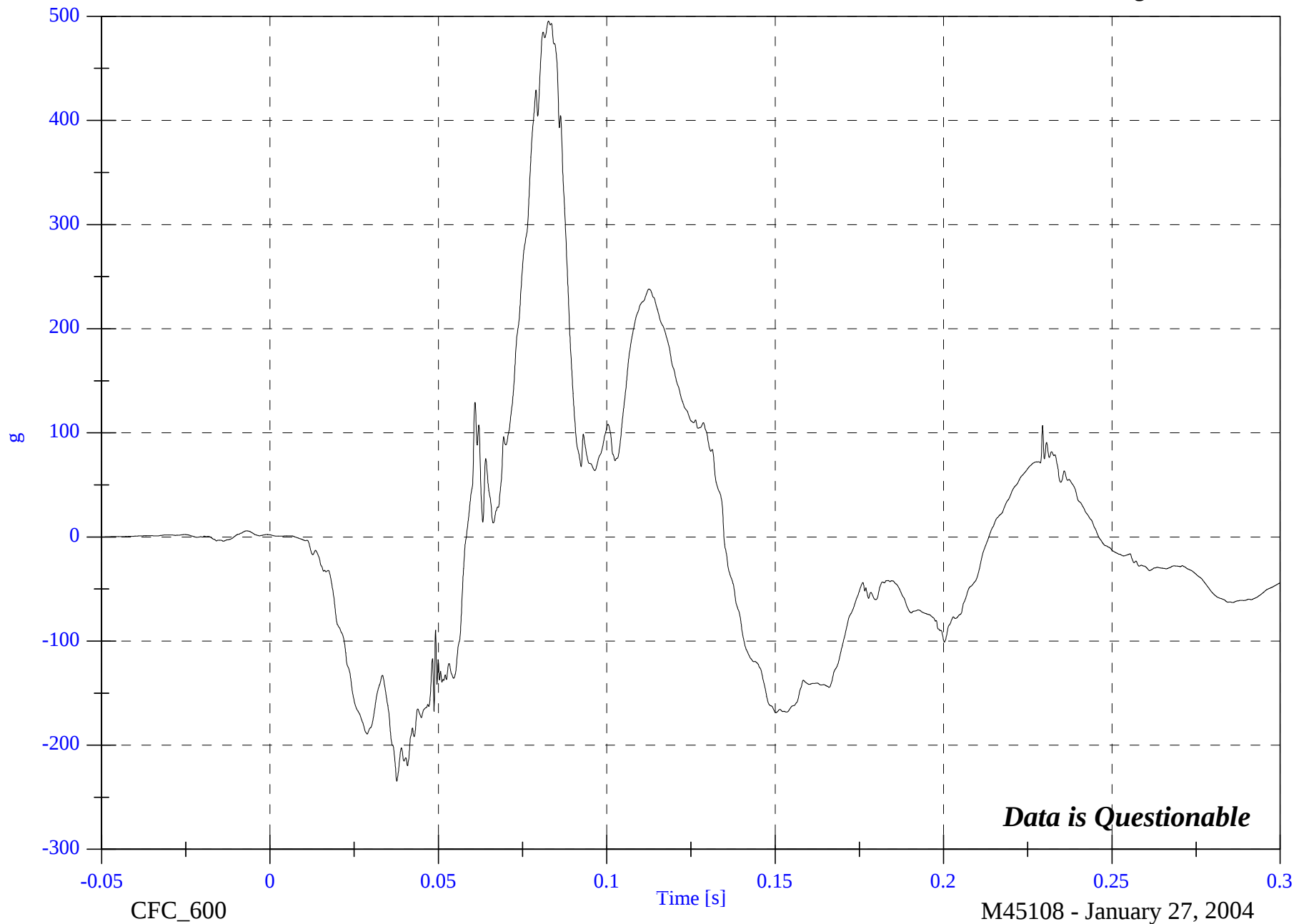
V1P2 Left Foot Aft x

Max: 495.4 [g] at 0.083 [s]

Min: -234.7 [g] at 0.038 [s]

B-109

8642-NCAP-41

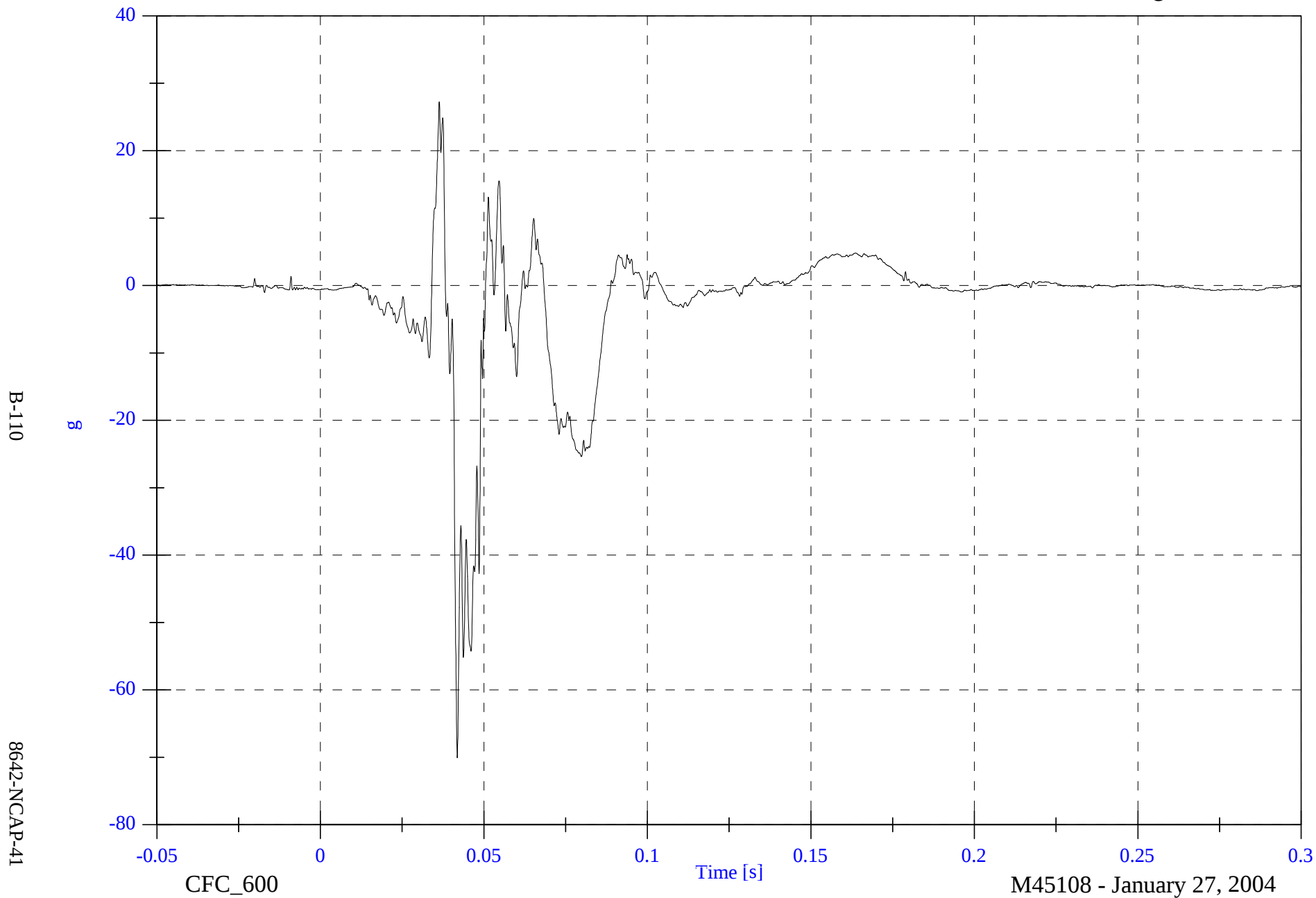


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Left Foot Aft z

Max: 27.3 [g] at 0.036 [s]

Min: -70.1 [g] at 0.042 [s]

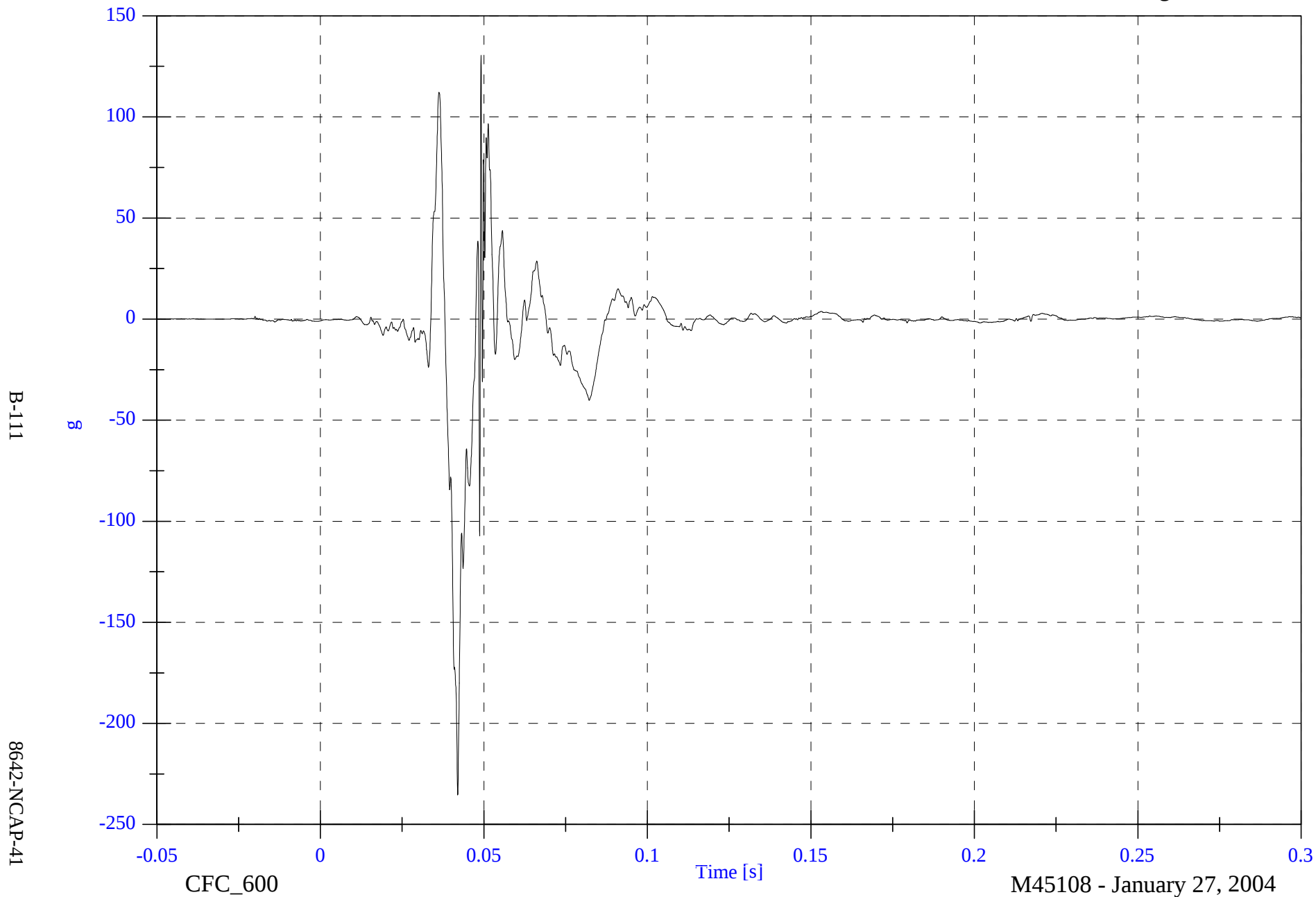


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Left Foot Fore z

Max: 130.5 [g] at 0.049 [s]

Min: -235.5 [g] at 0.042 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

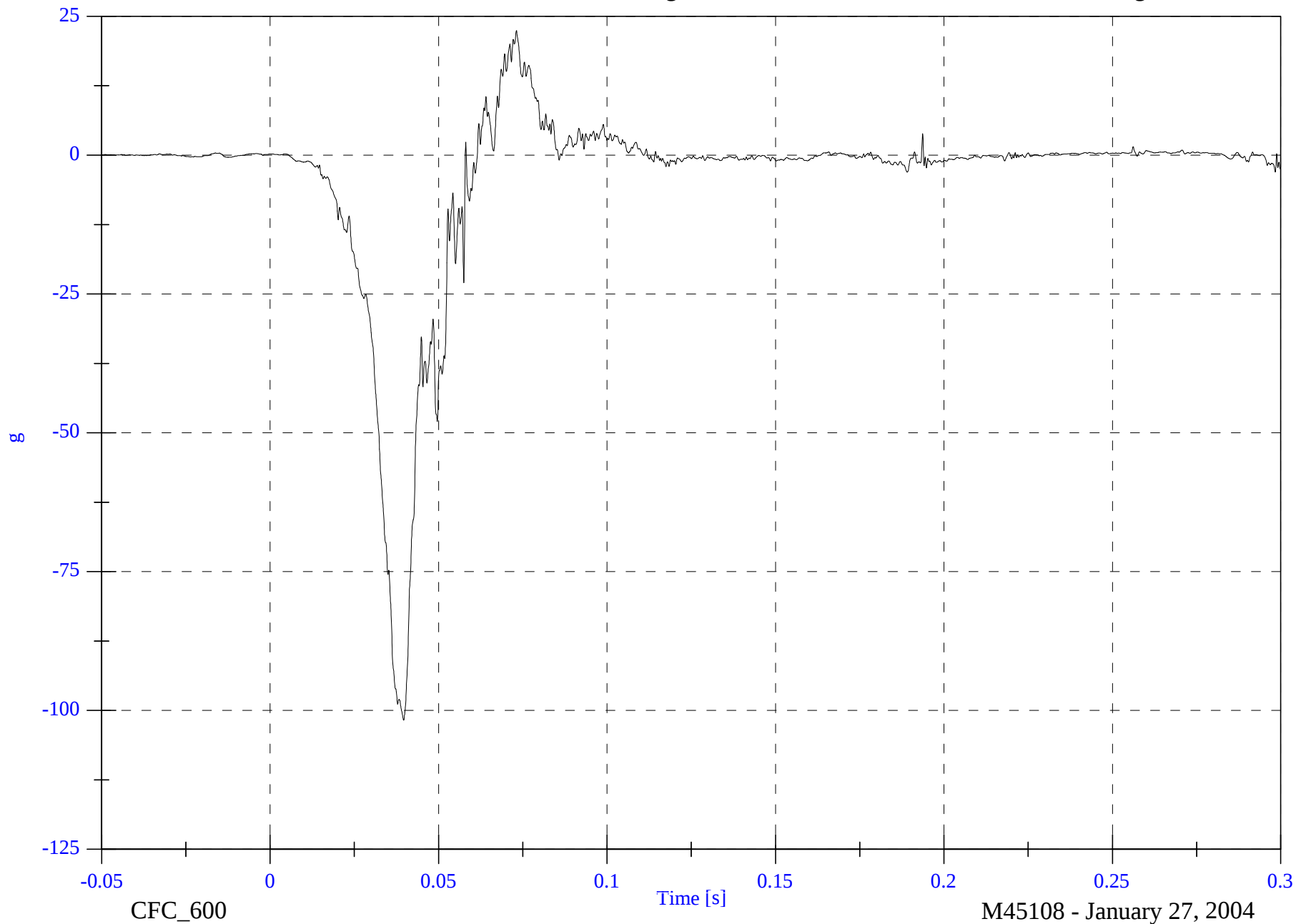
V1P2 Right Foot Aft x

Max: 22.4 [g] at 0.073 [s]

Min: -101.7 [g] at 0.040 [s]

B-112

8642-NCAP-41

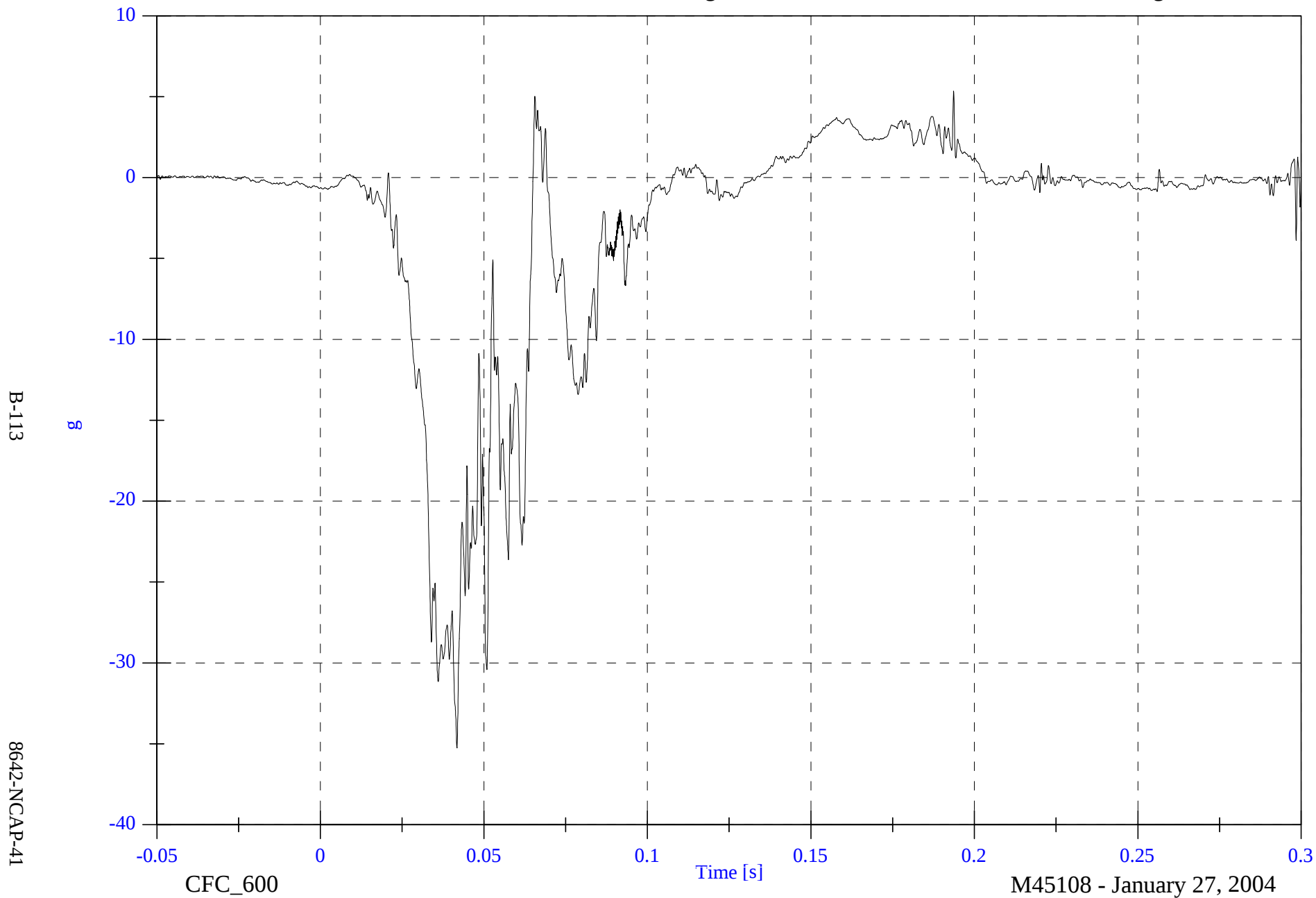


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Right Foot Aft z

Max: 5.4 [g] at 0.194 [s]

Min: -35.3 [g] at 0.042 [s]

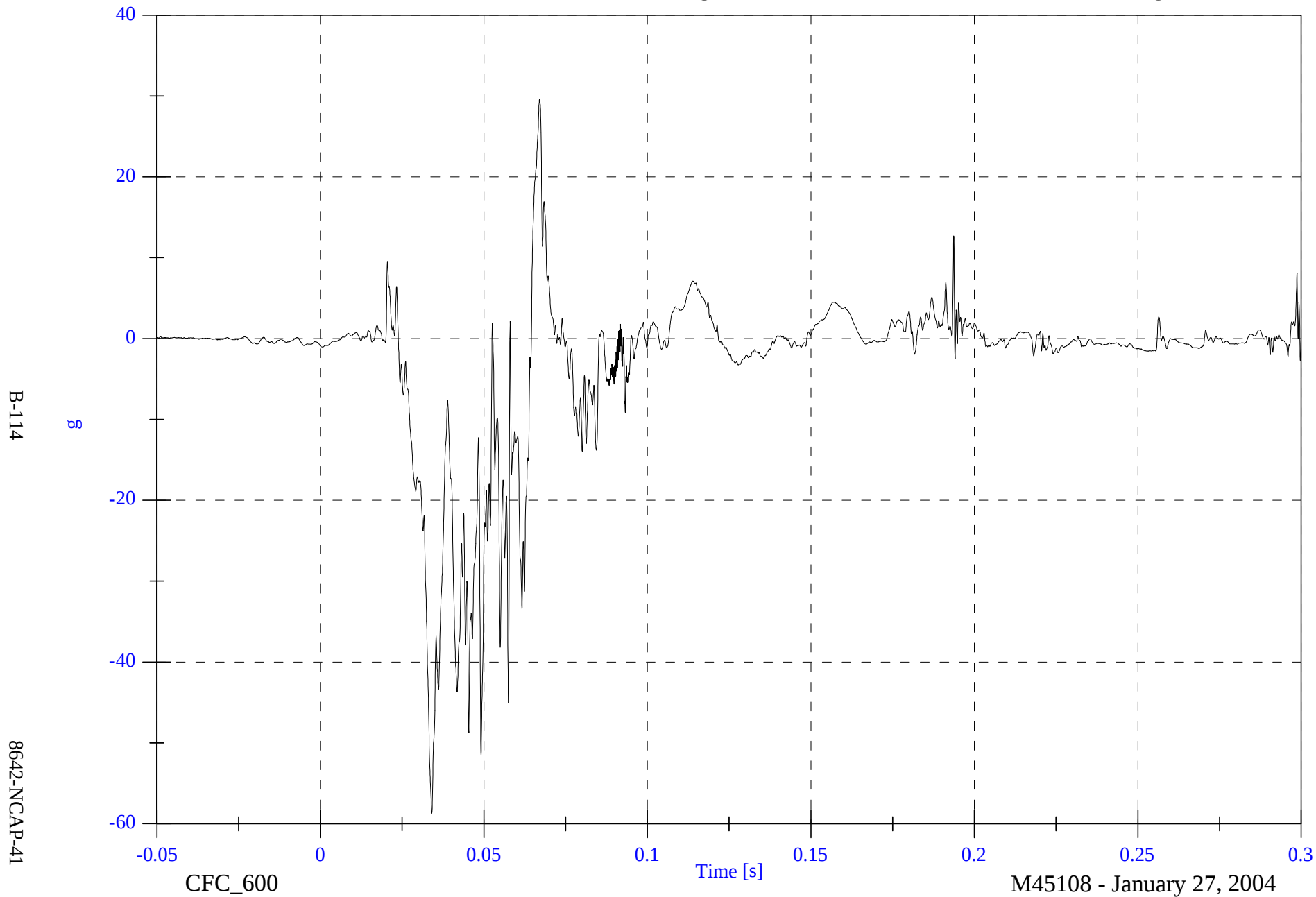


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P2 Right Foot Fore z

Max: 29.6 [g] at 0.067 [s]

Min: -58.7 [g] at 0.034 [s]

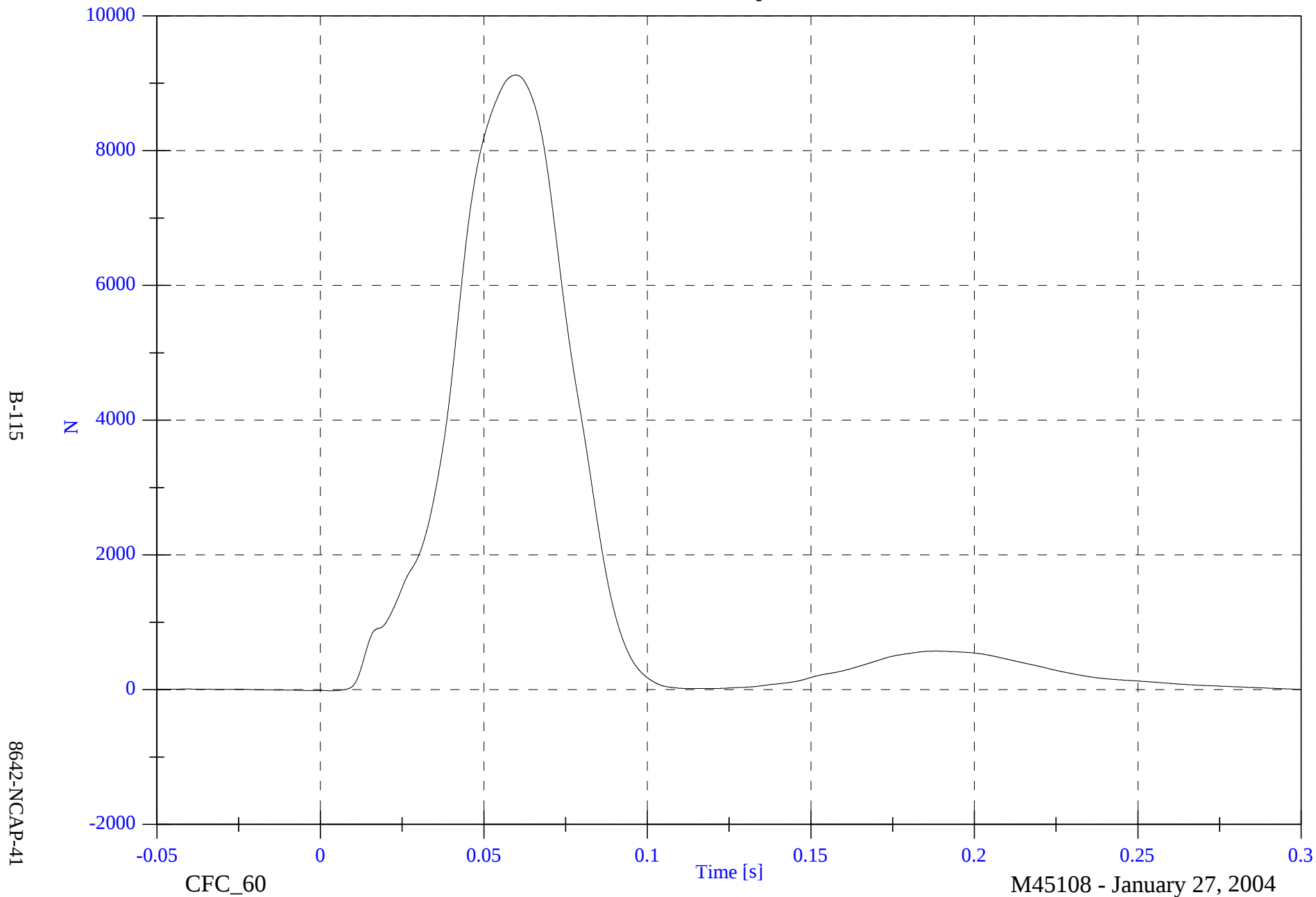


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 RFP Lap Belt

Max: 9122.7 [N] at 0.060 [s]

Min: -14.3 [N] at 0.003 [s]

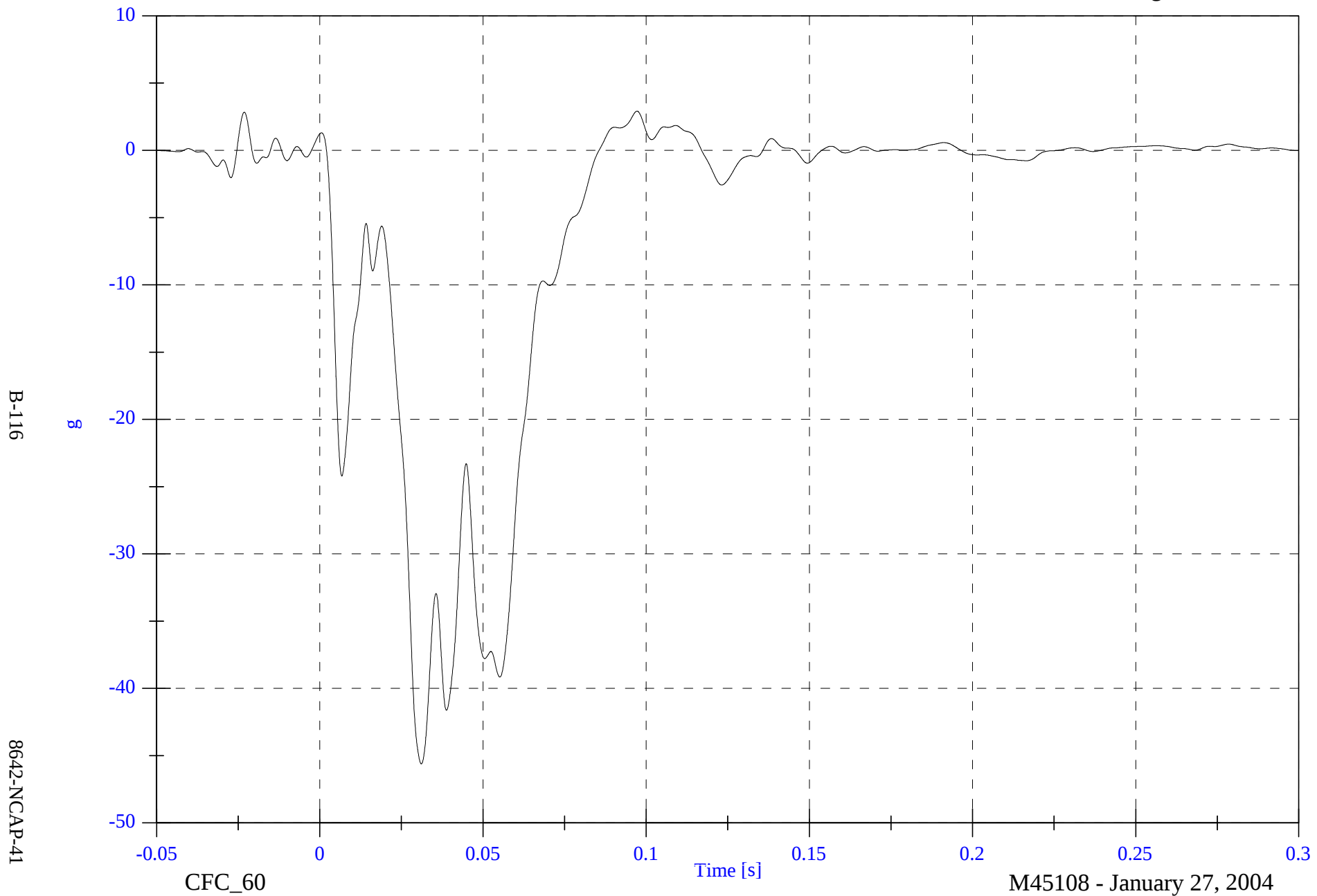


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Left Rear #1x

Max: 2.9 [g] at 0.097 [s]

Min: -45.6 [g] at 0.031 [s]

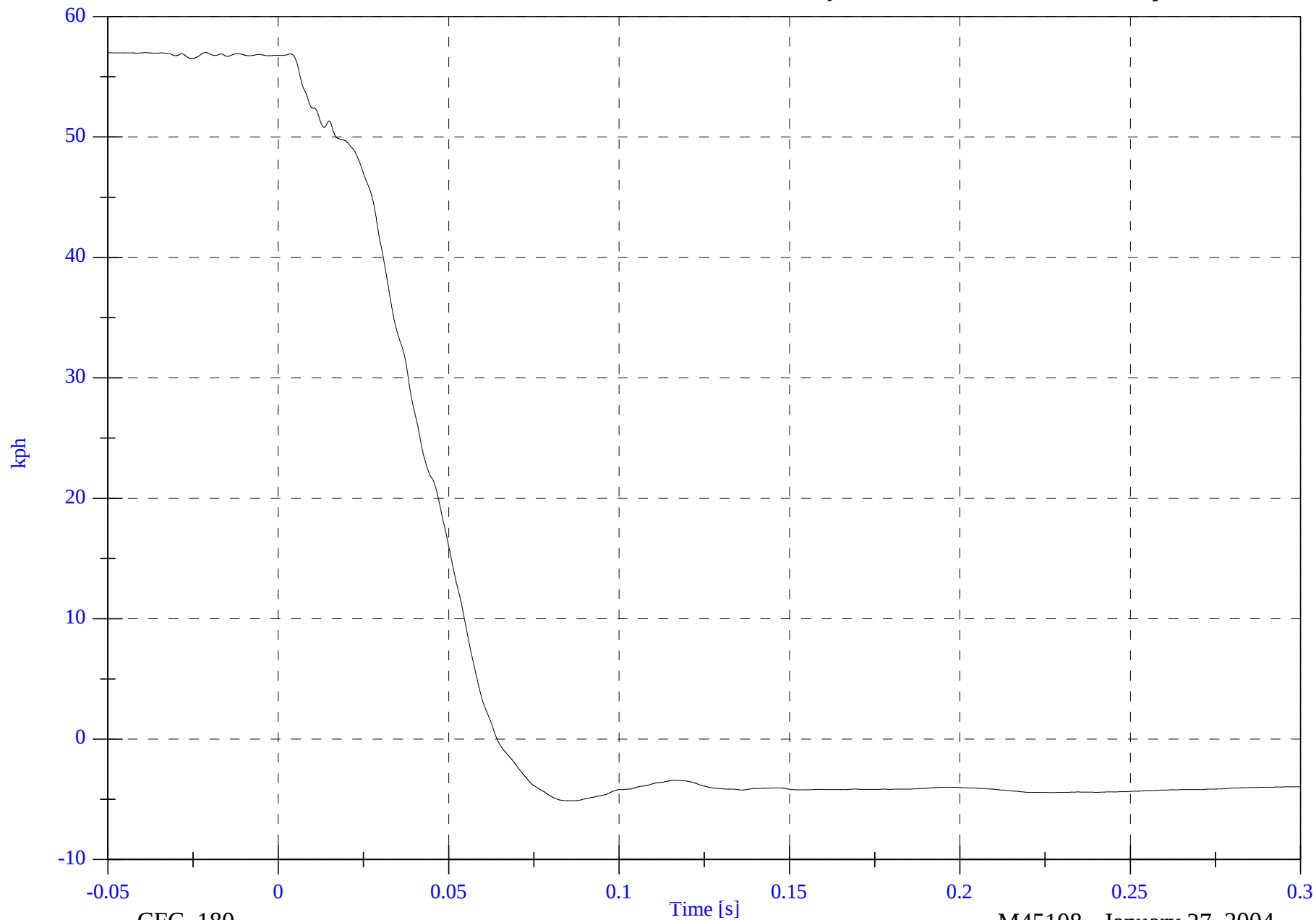


2004 NCAP Test 5 - 2004 Toyota RAV4

Max: 57.0 [kph] at -0.021 [s]

Min: -5.1 [kph] at 0.087 [s]

V1 Left Rear #1x Velocity



B-117

8642-NCAP-41

CFC_180

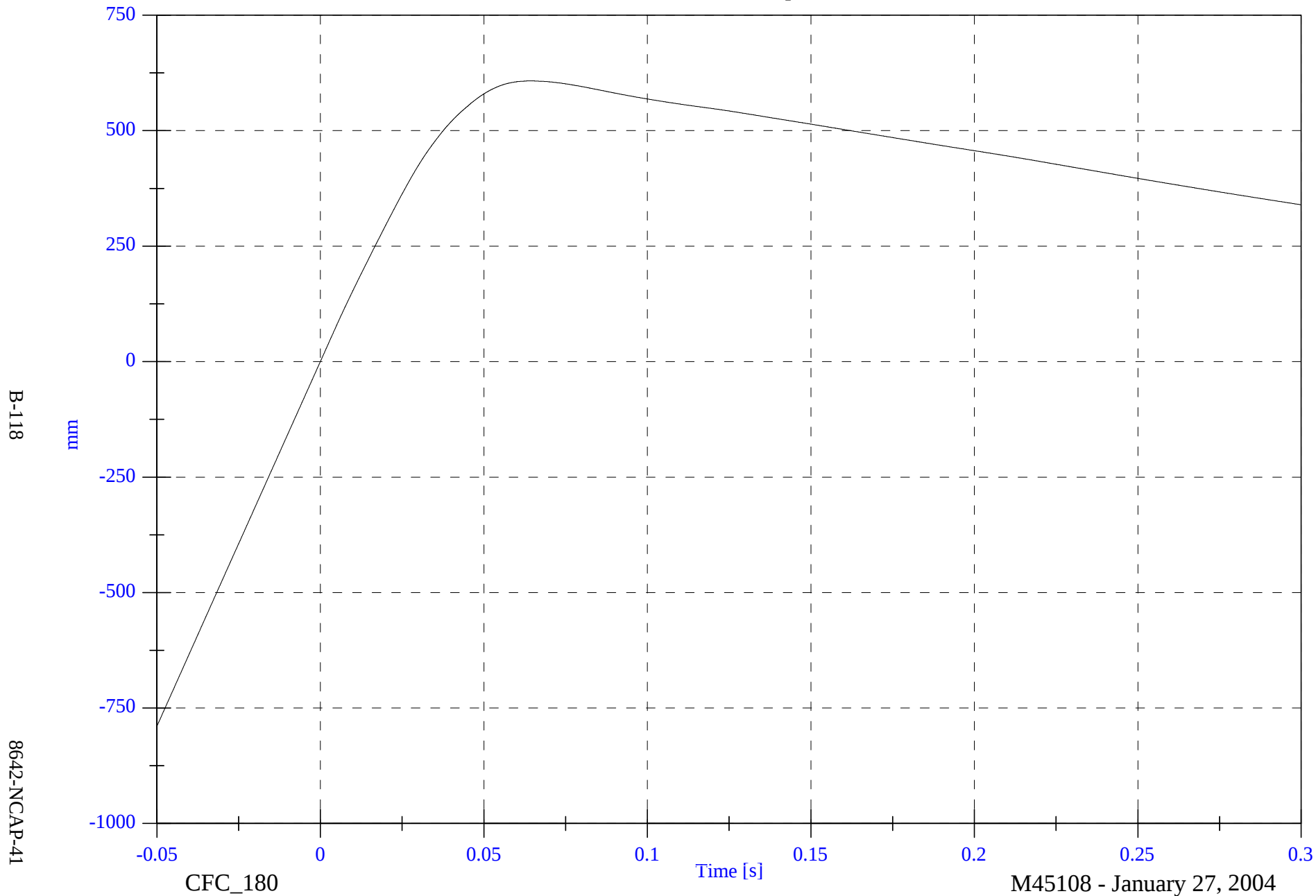
M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Left Rear #1x Displacement

Max: 607.6 [mm] at 0.064 [s]

Min: -789.7 [mm] at -0.050 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

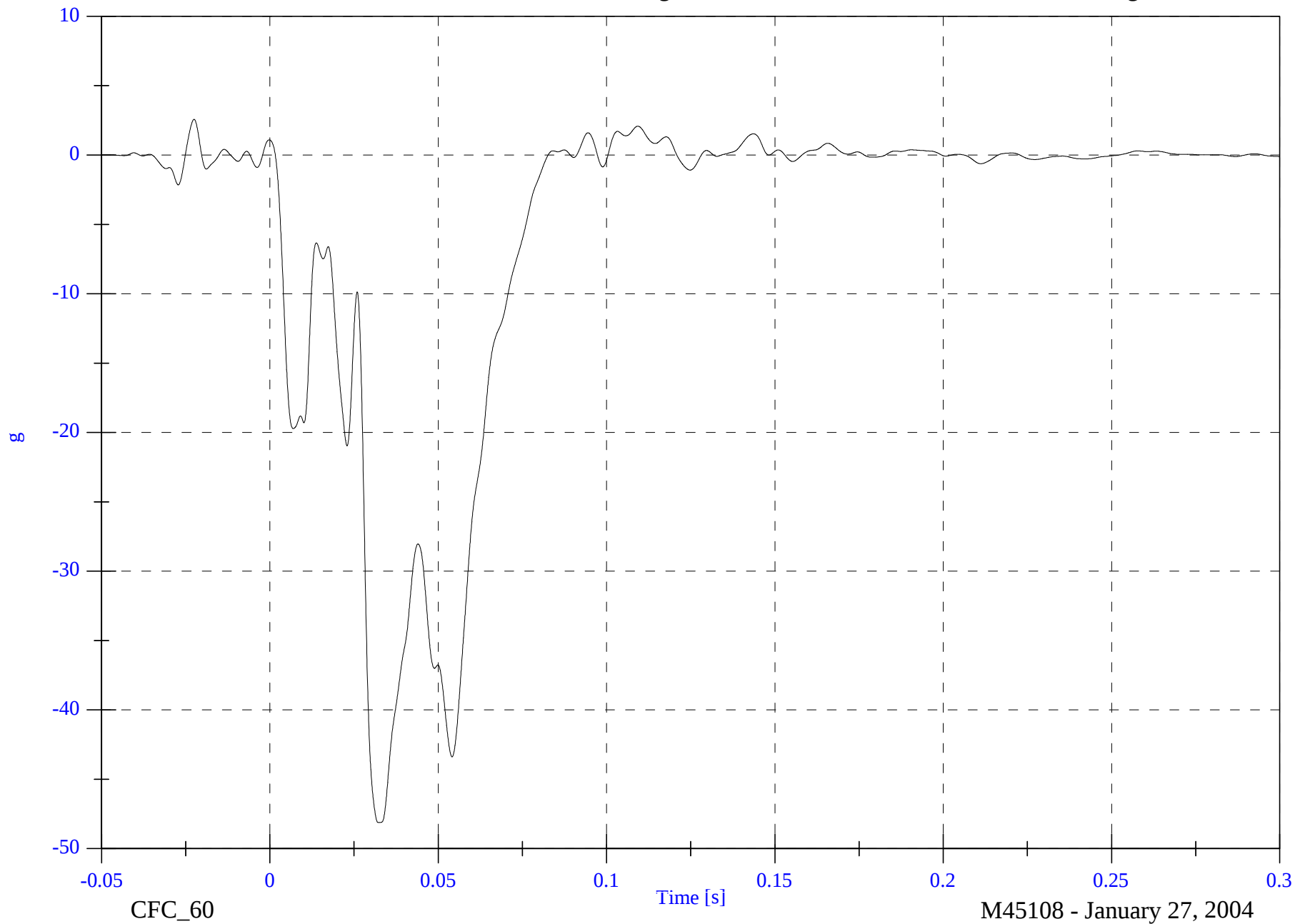
V1 Right Rear #2x

Max: 2.6 [g] at -0.023 [s]

Min: -48.1 [g] at 0.033 [s]

B-119

8642-NCAP-41



2004 NCAP Test 5 - 2004 Toyota RAV4

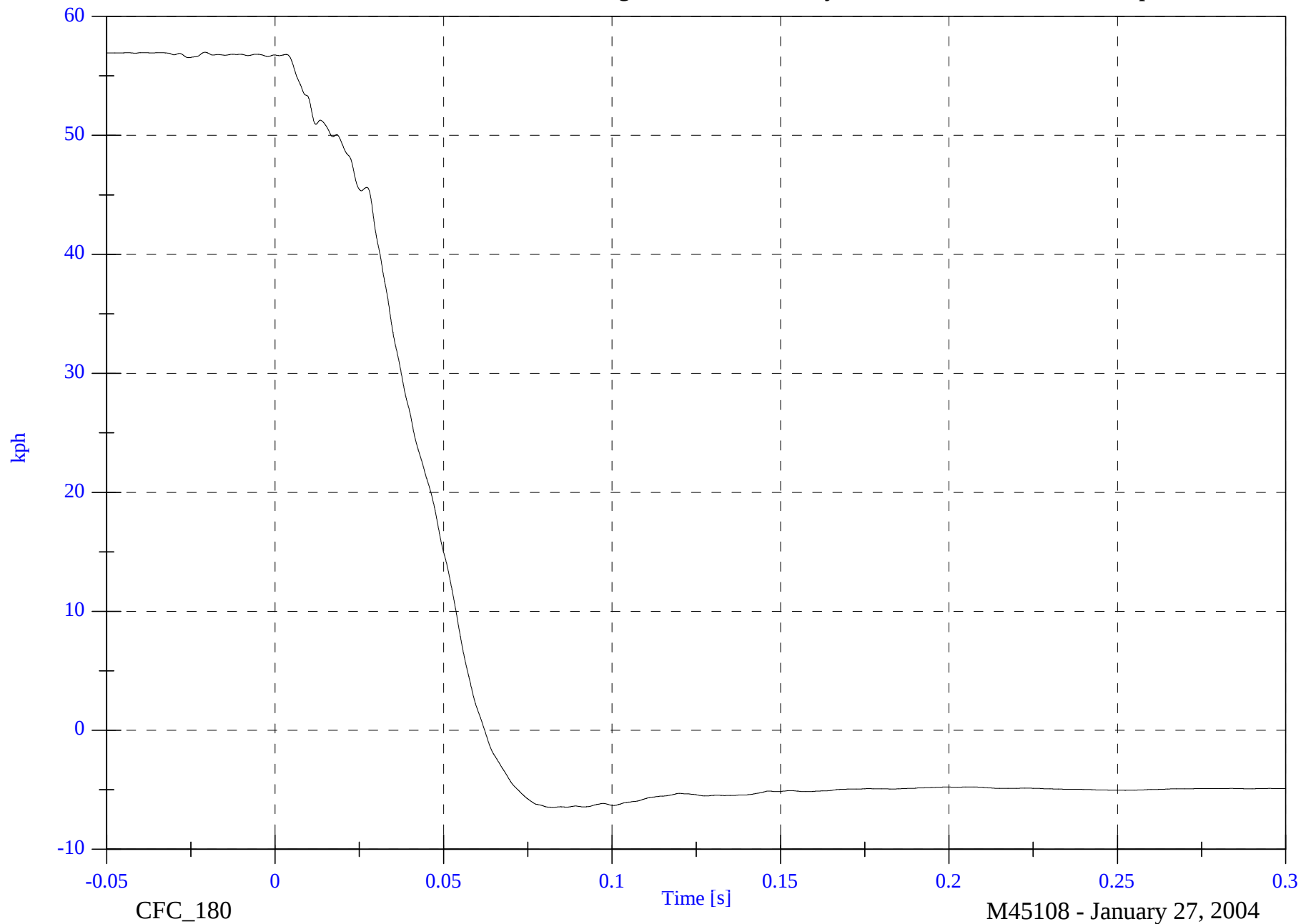
V1 Right Rear #2x Velocity

Max: 57.0 [kph] at -0.021 [s]

Min: -6.5 [kph] at 0.083 [s]

B-120

8642-NCAP-41

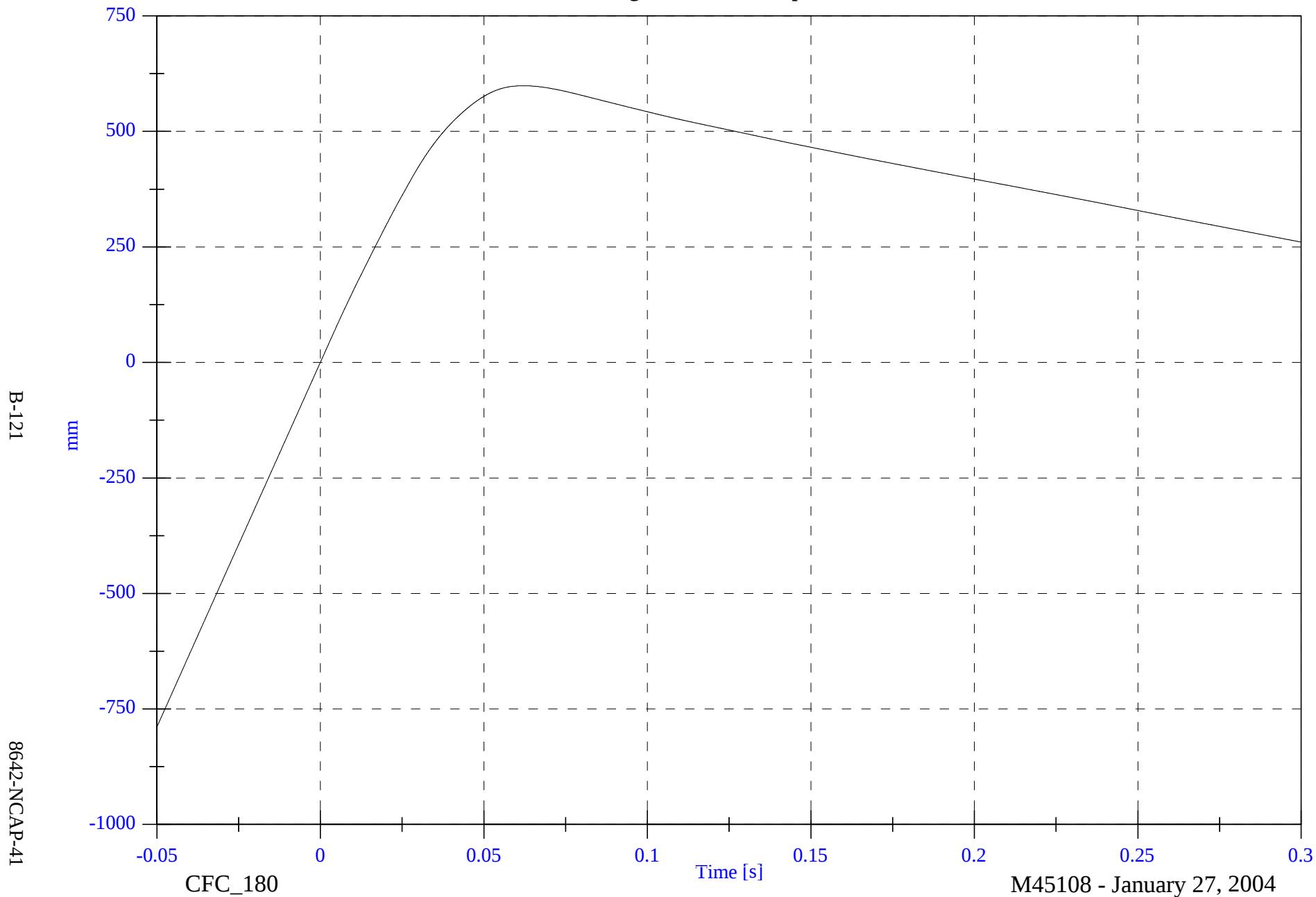


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Right Rear #2x Displacement

Max: 598.9 [mm] at 0.062 [s]

Min: -789.2 [mm] at -0.050 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

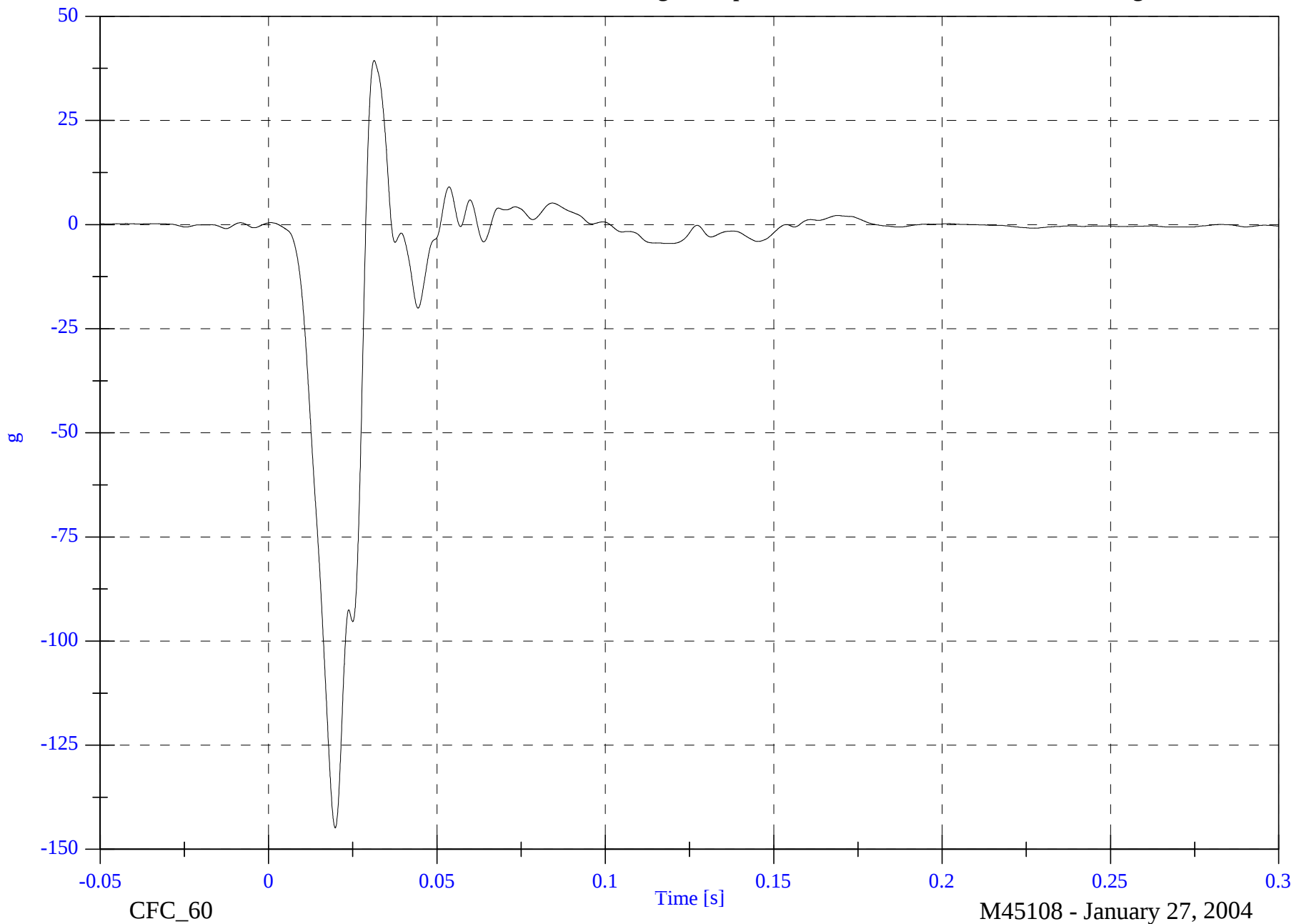
V1 Engine Top #3x

Max: 39.4 [g] at 0.031 [s]

Min: -144.9 [g] at 0.020 [s]

B-122

8642-NCAP-41



2004 NCAP Test 5 - 2004 Toyota RAV4

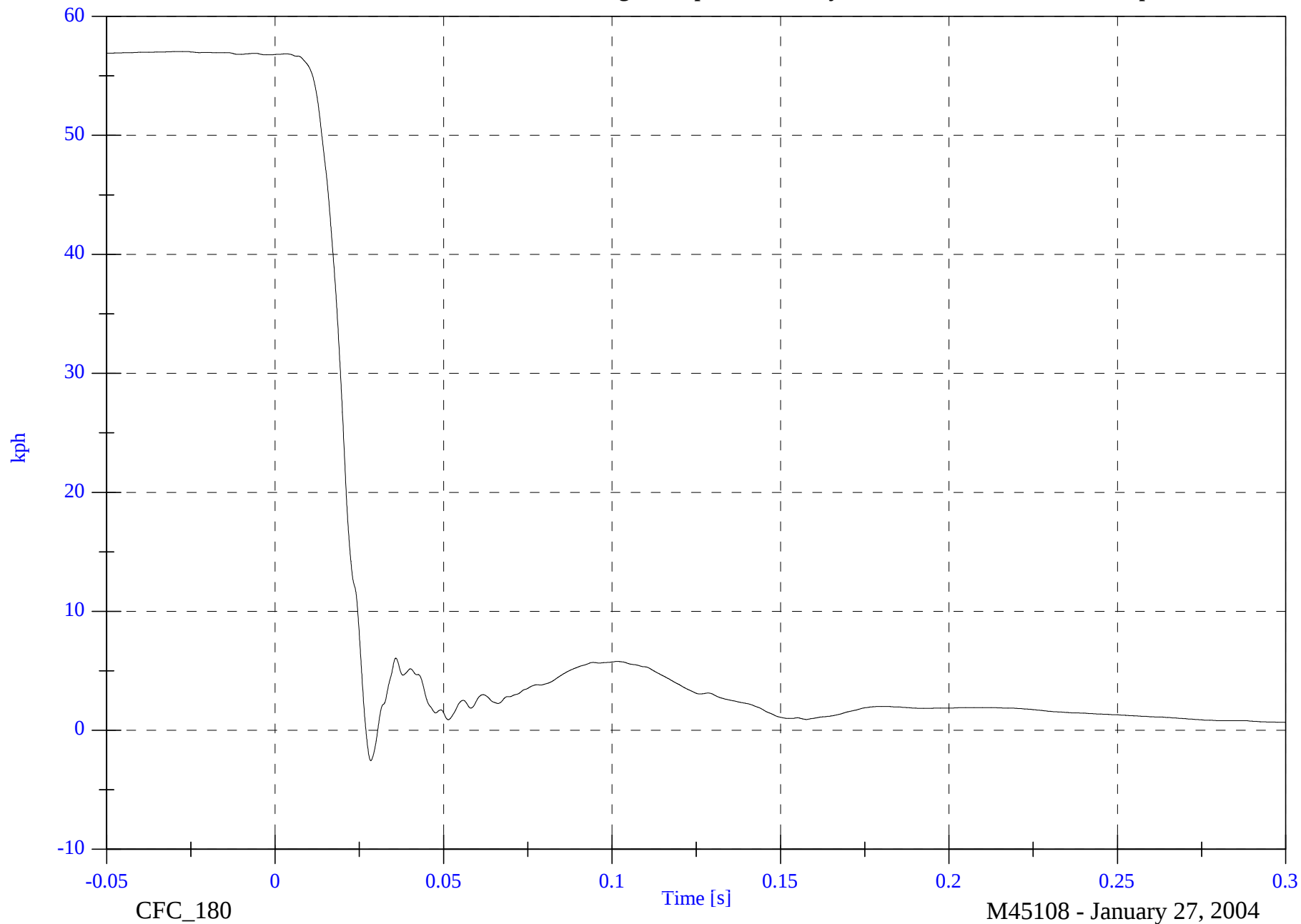
V1 Engine Top #3x Velocity

Max: 57.0 [kph] at -0.028 [s]

Min: -2.6 [kph] at 0.028 [s]

B-123

8642-NCAP-41

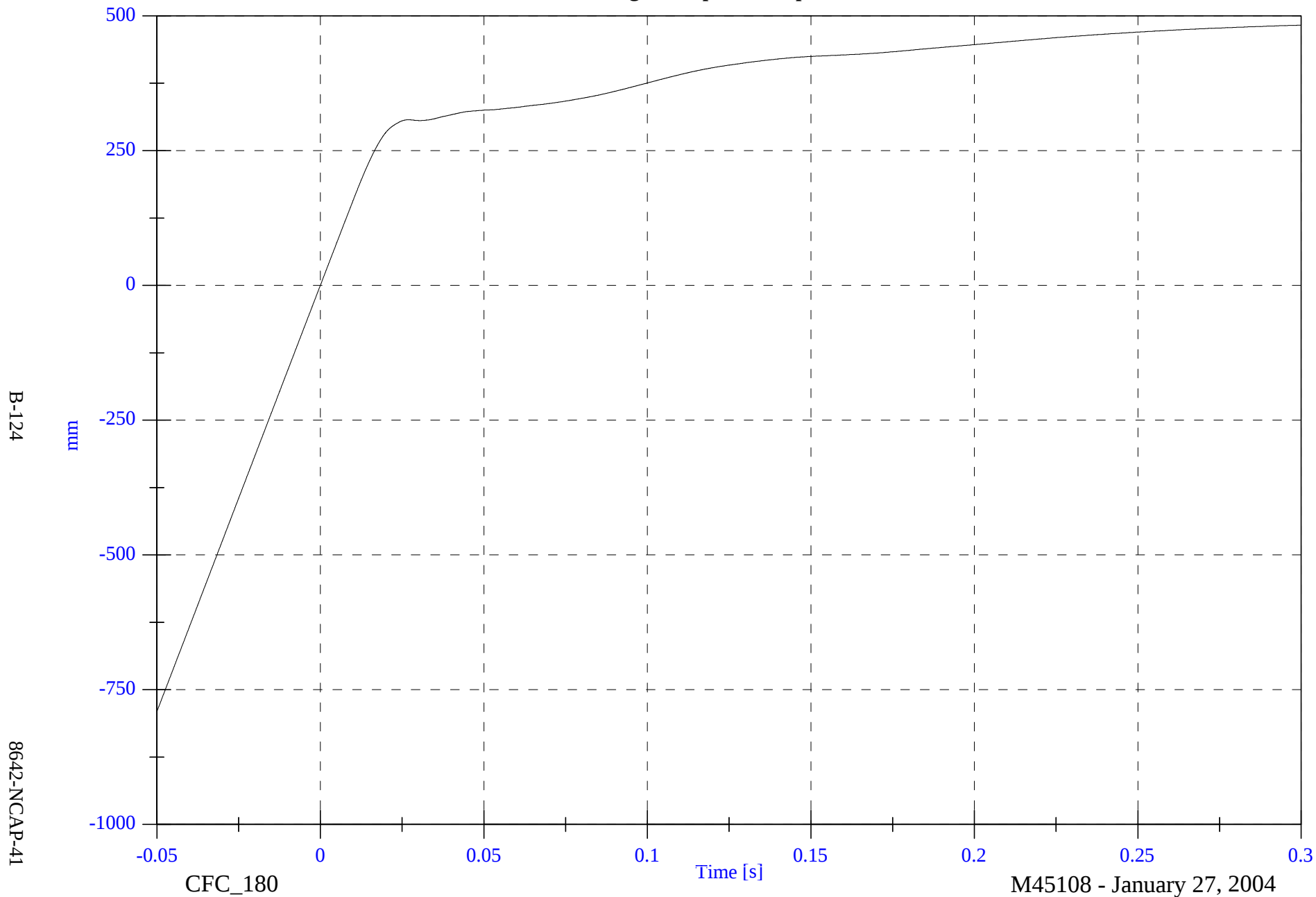


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Engine Top #3x Displacement

Max: 482.8 [mm] at 0.300 [s]

Min: -790.8 [mm] at -0.050 [s]

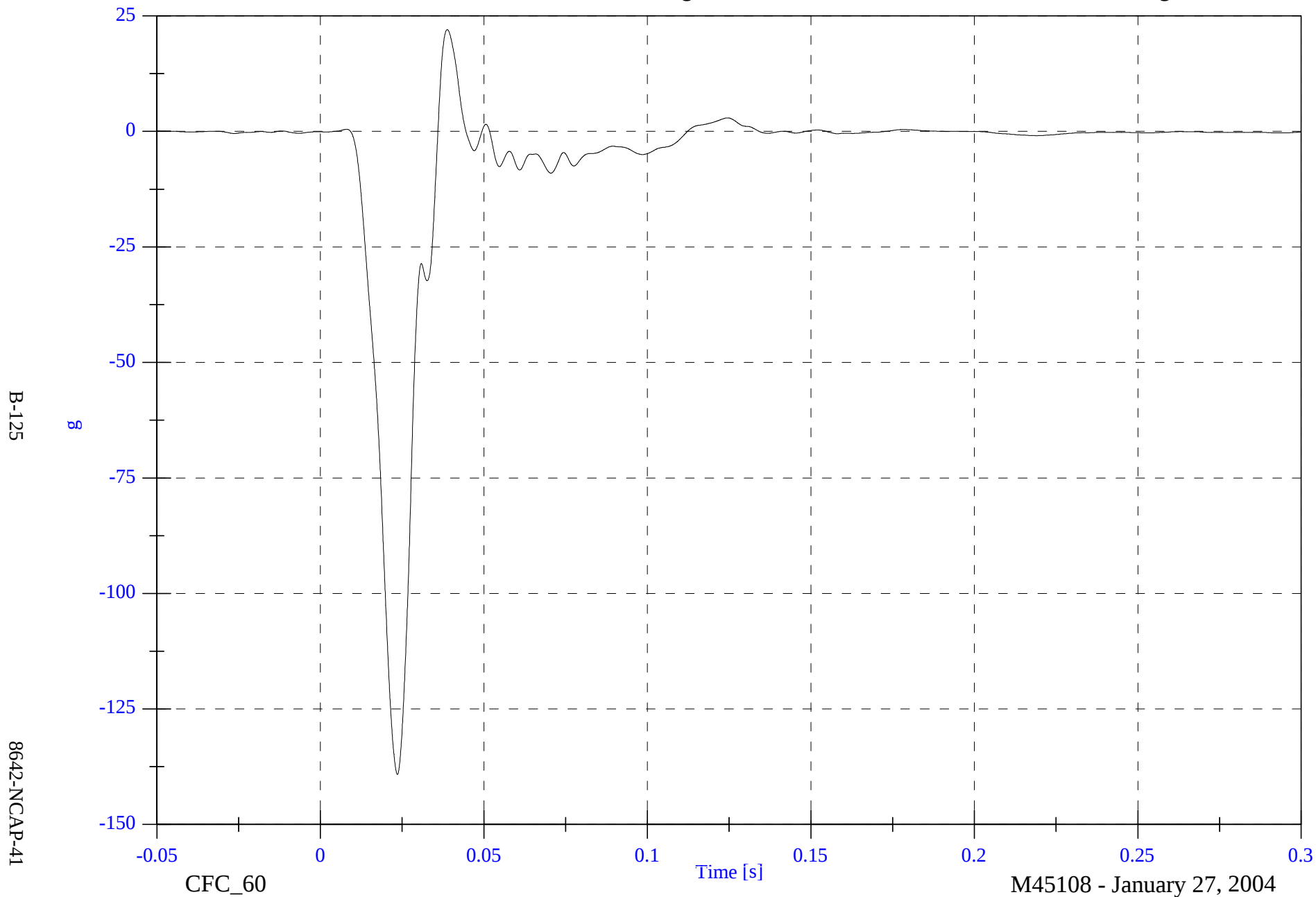


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Engine Bottom #4x

Max: 22.0 [g] at 0.039 [s]

Min: -139.2 [g] at 0.024 [s]

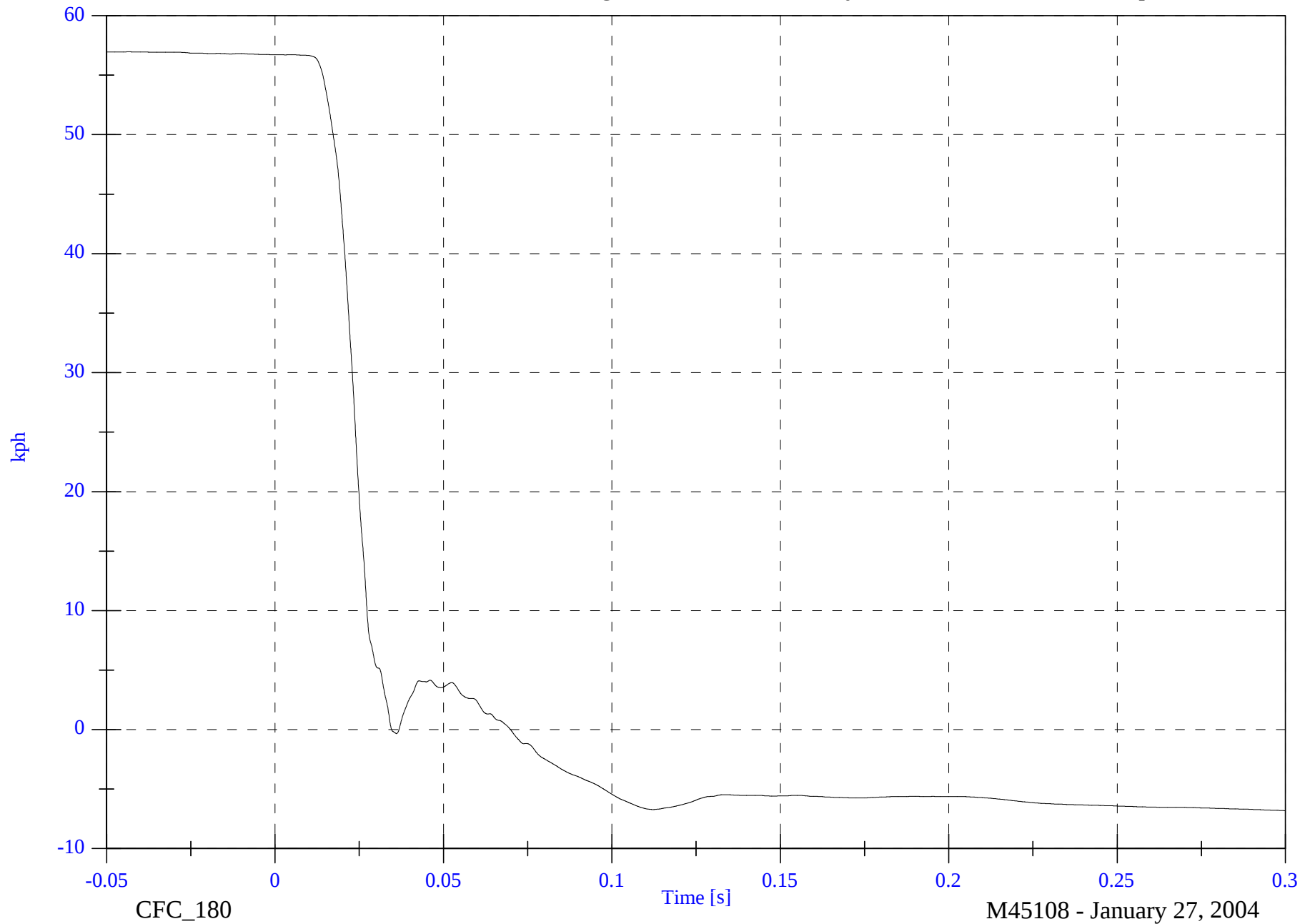


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Engine Bottom #4x Velocity

Max: 57.0 [kph] at -0.043 [s]

Min: -6.8 [kph] at 0.300 [s]



B-126

8642-NCAP-41

CFC_180

Time [s]

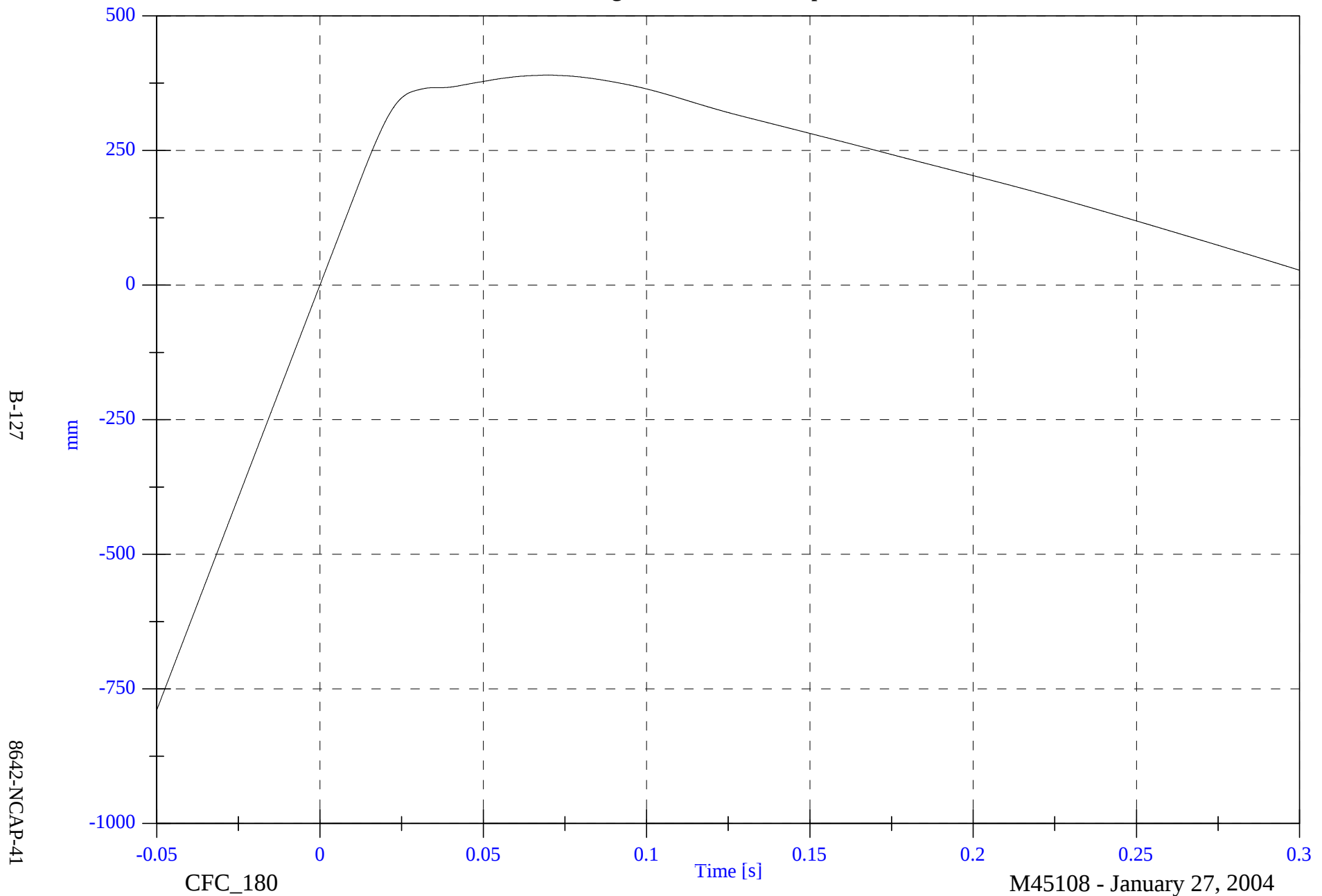
M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Engine Bottom #4x Displacement

Max: 389.9 [mm] at 0.070 [s]

Min: -789.7 [mm] at -0.050 [s]

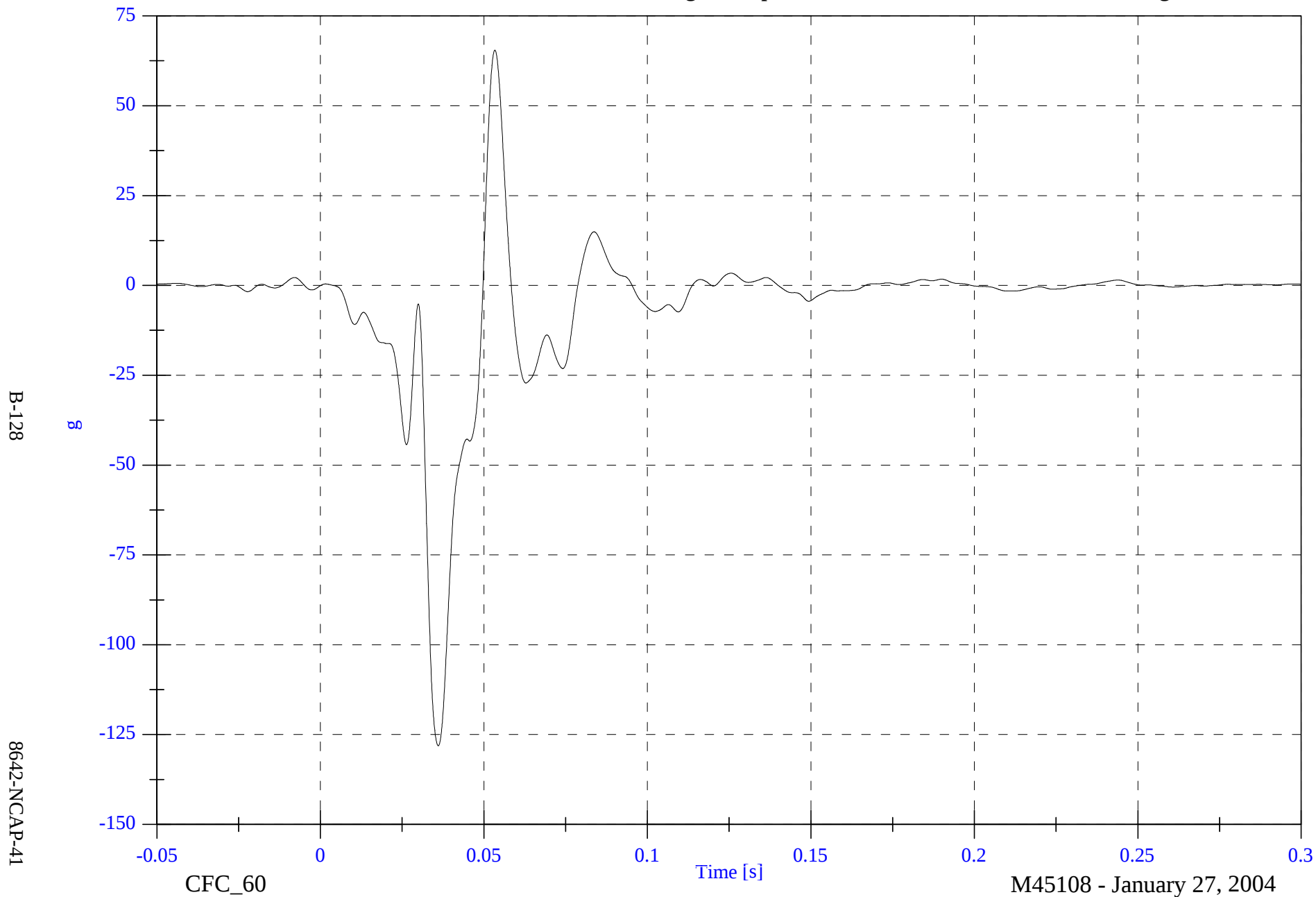


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Right Caliper #5x

Max: 65.5 [g] at 0.053 [s]

Min: -128.1 [g] at 0.036 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

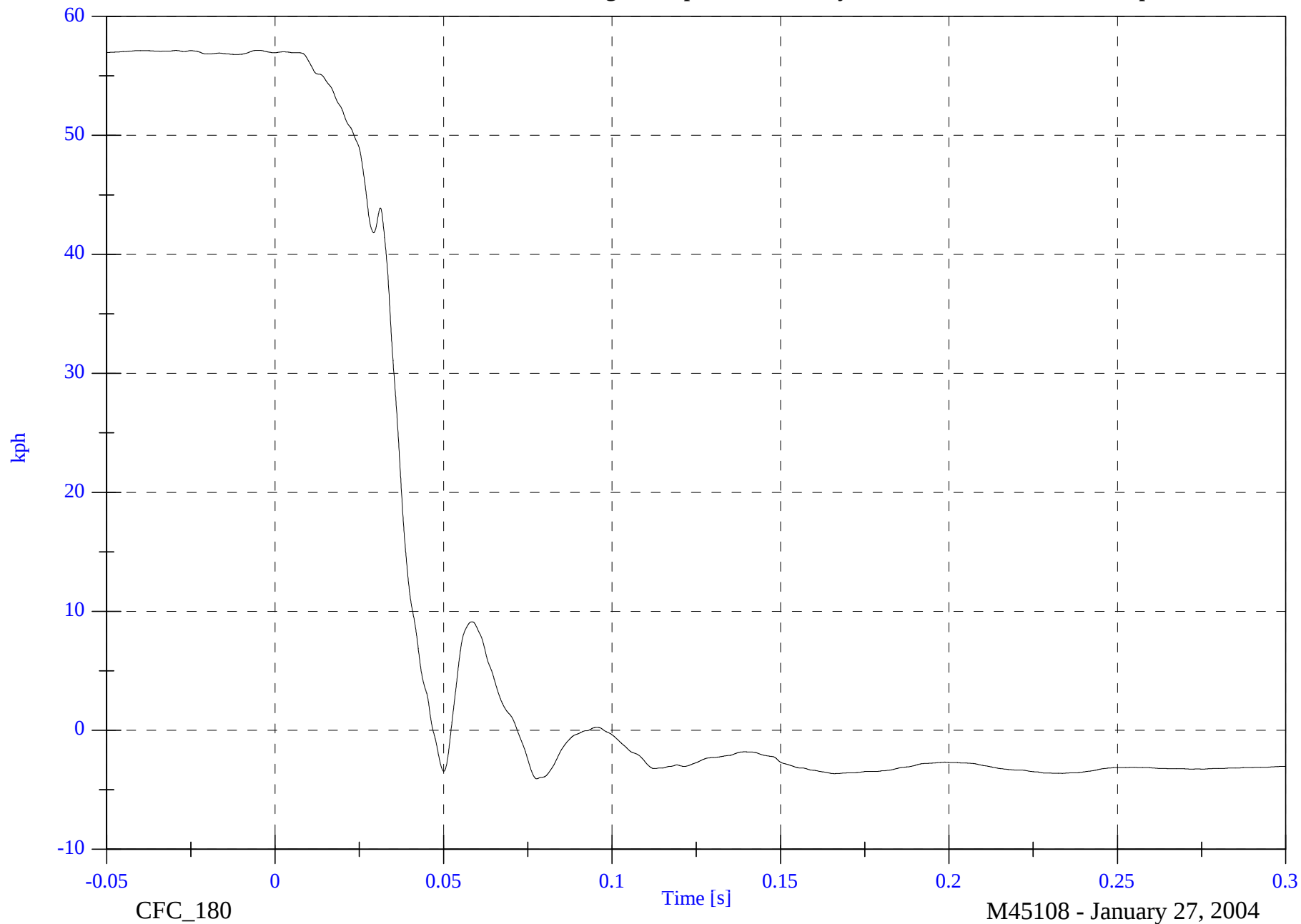
V1 Right Caliper #5x Velocity

Max: 57.1 [kph] at -0.005 [s]

Min: -4.1 [kph] at 0.078 [s]

B-129

8642-NCAP-41



CFC_180

Time [s]

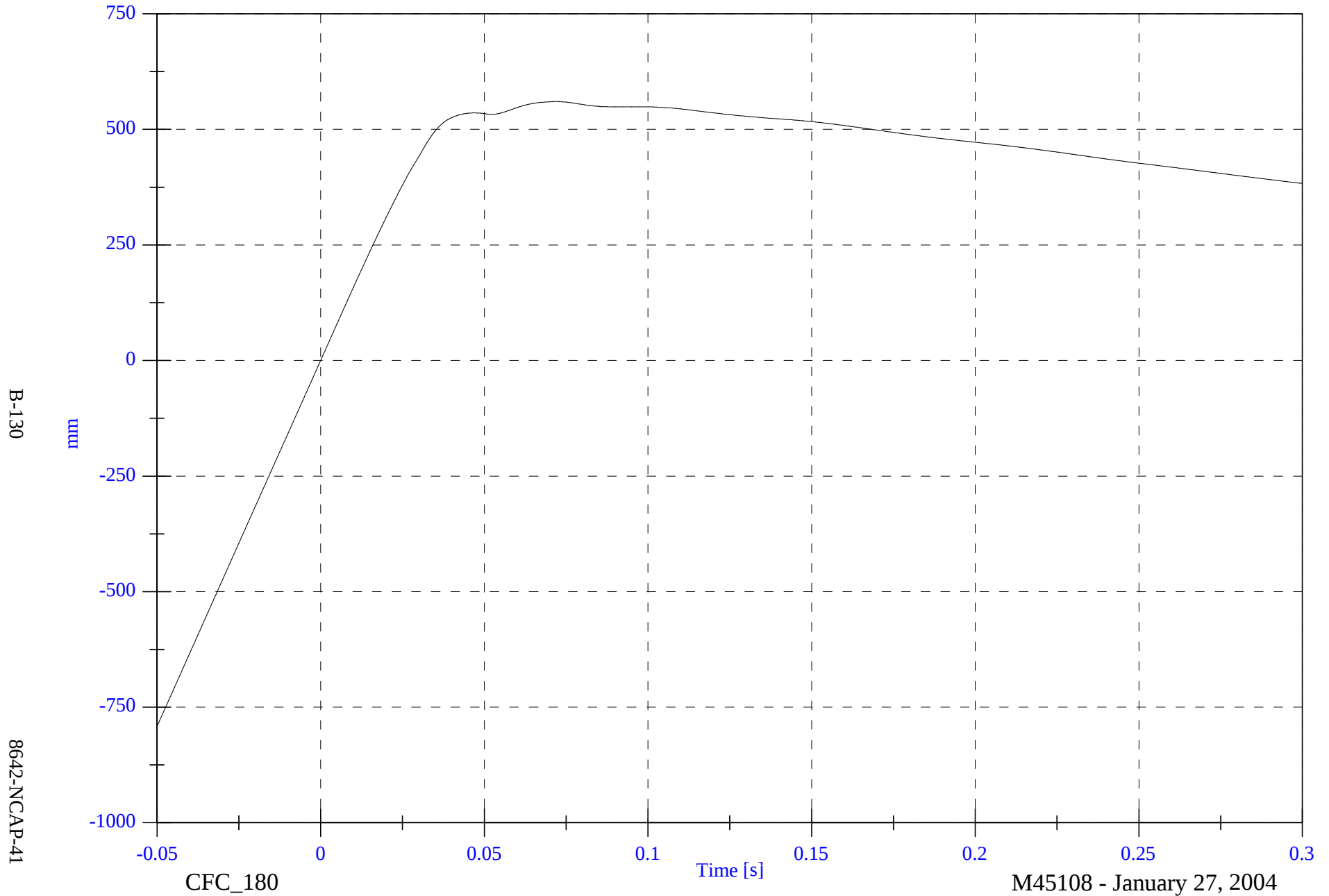
M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Right Caliper #5x Displacement

Max: 559.9 [mm] at 0.072 [s]

Min: -791.7 [mm] at -0.050 [s]

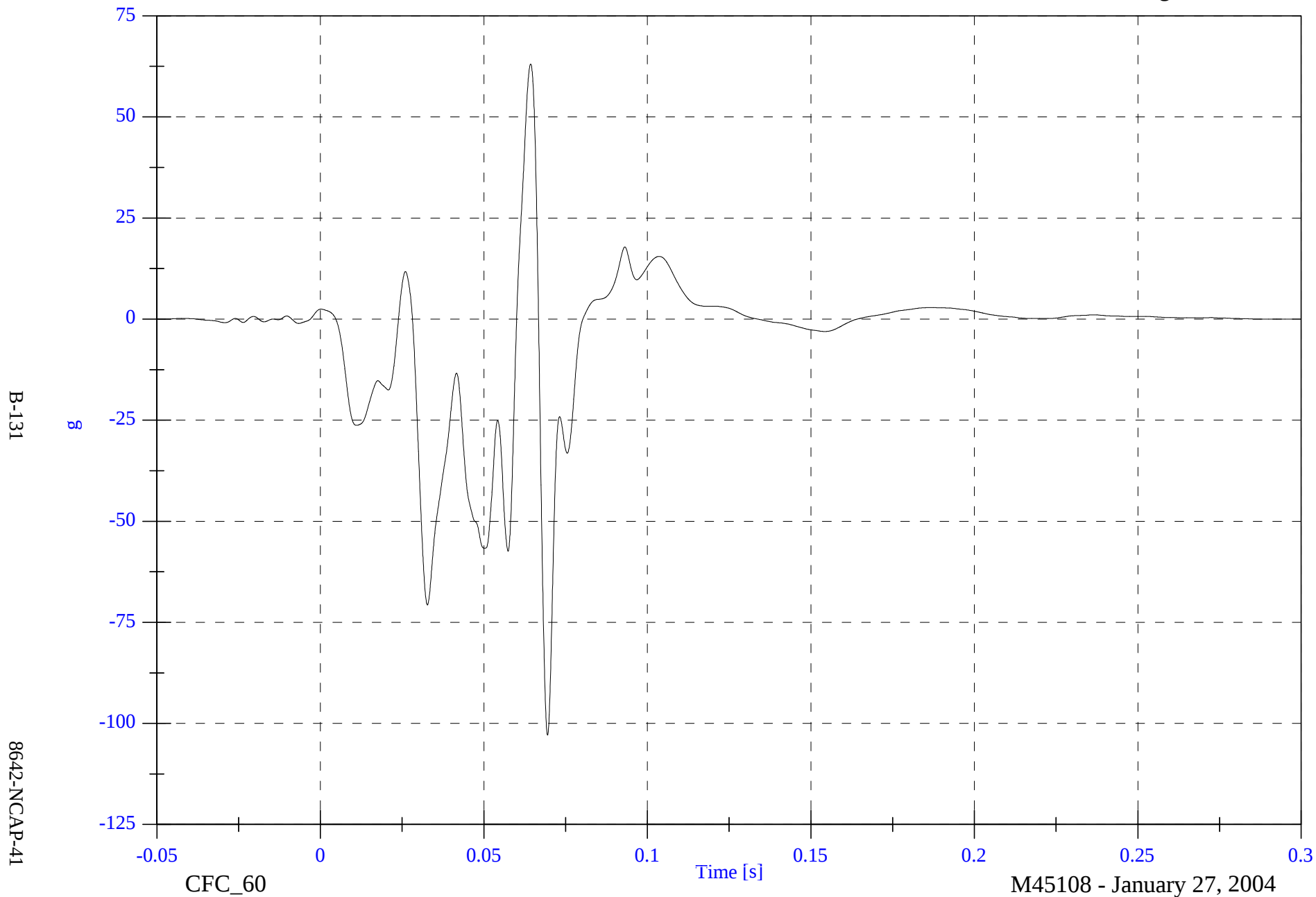


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Instrument Panel #6x

Max: 63.1 [g] at 0.064 [s]

Min: -102.9 [g] at 0.069 [s]

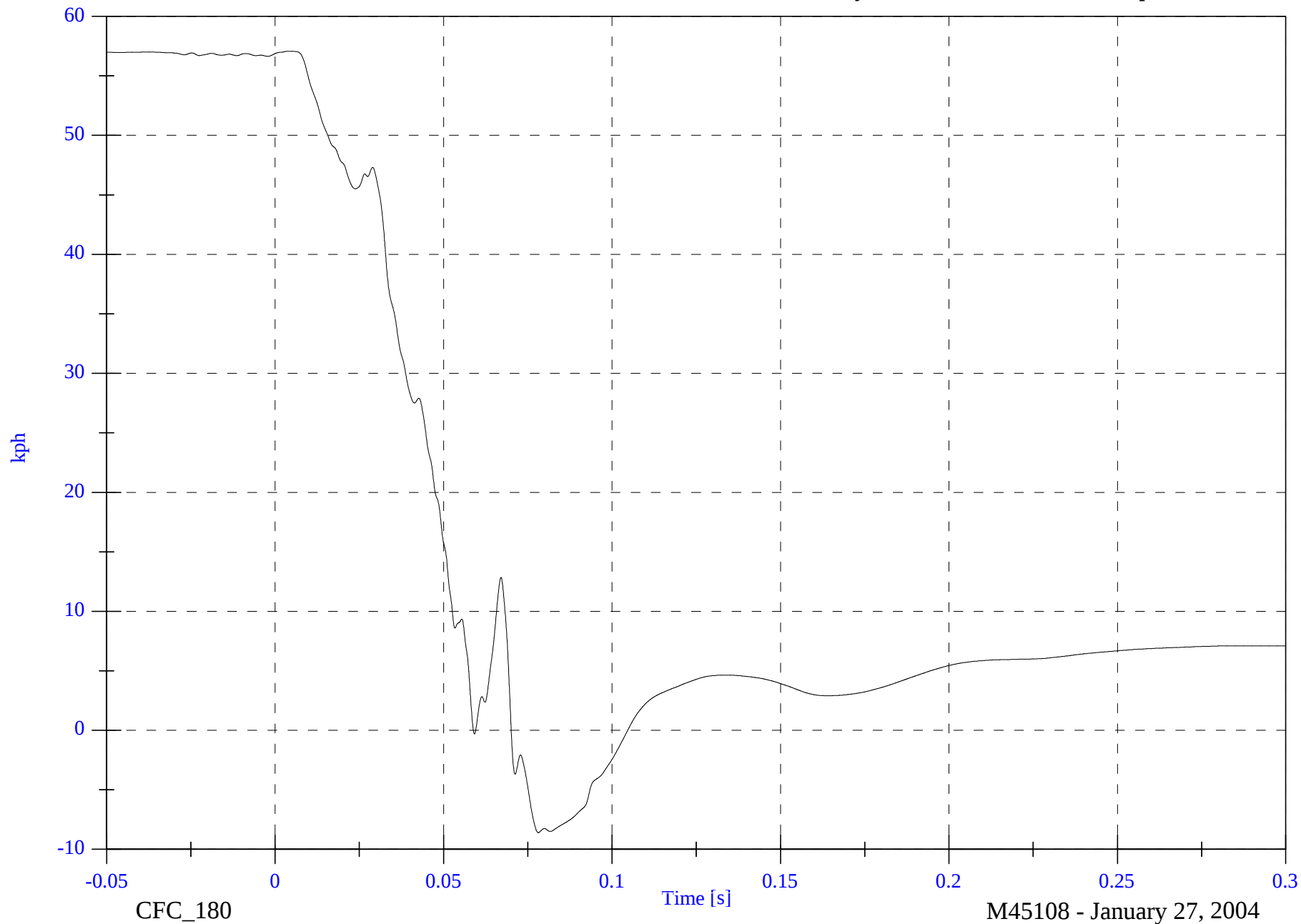


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Instrument Panel #6x Velocity

Max: 57.1 [kph] at 0.004 [s]

Min: -8.6 [kph] at 0.078 [s]



B-132

8642-NCAP-41

CFC_180

Time [s]

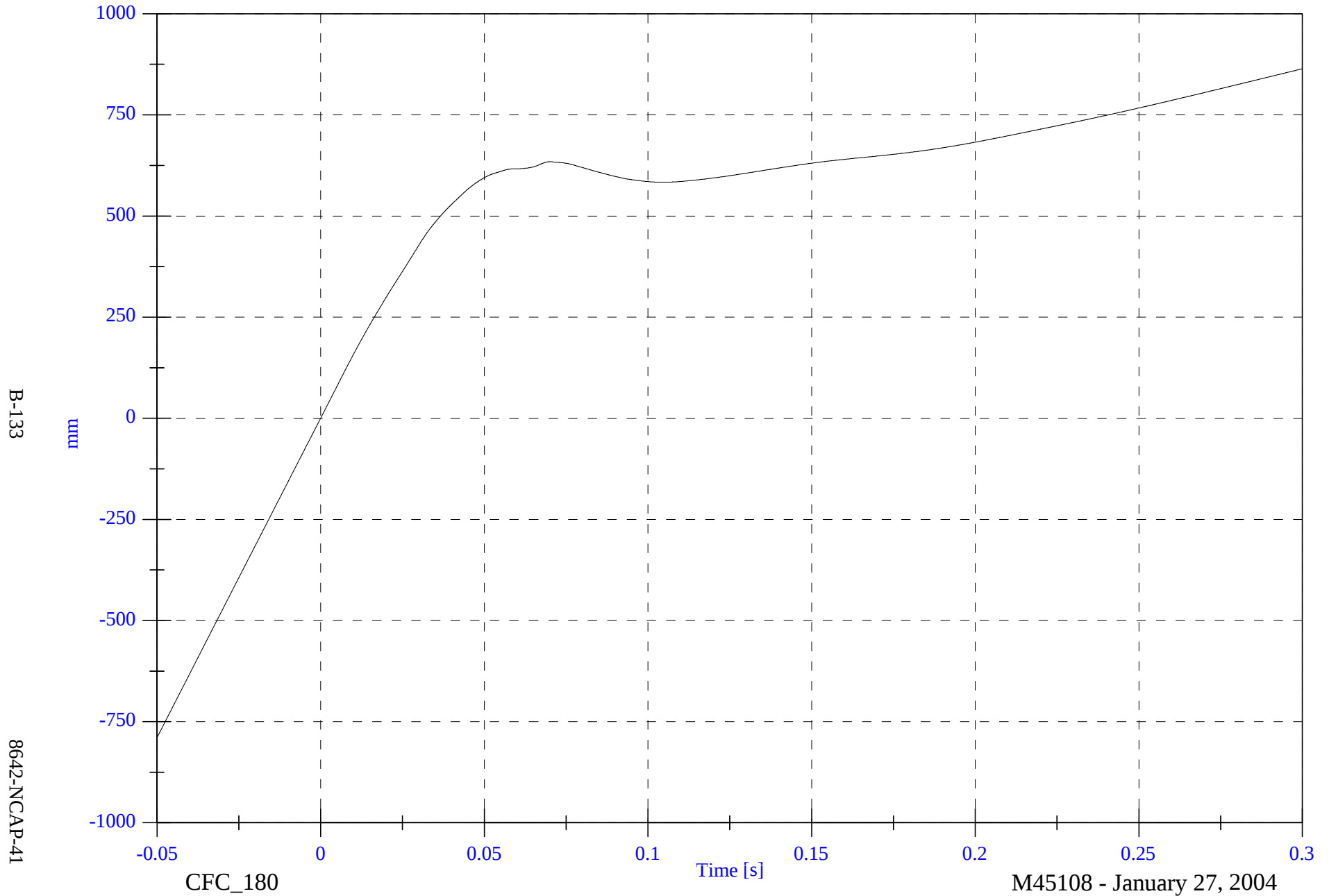
M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Instrument Panel #6x Displacement

Max: 864.0 [mm] at 0.300 [s]

Min: -789.7 [mm] at -0.050 [s]

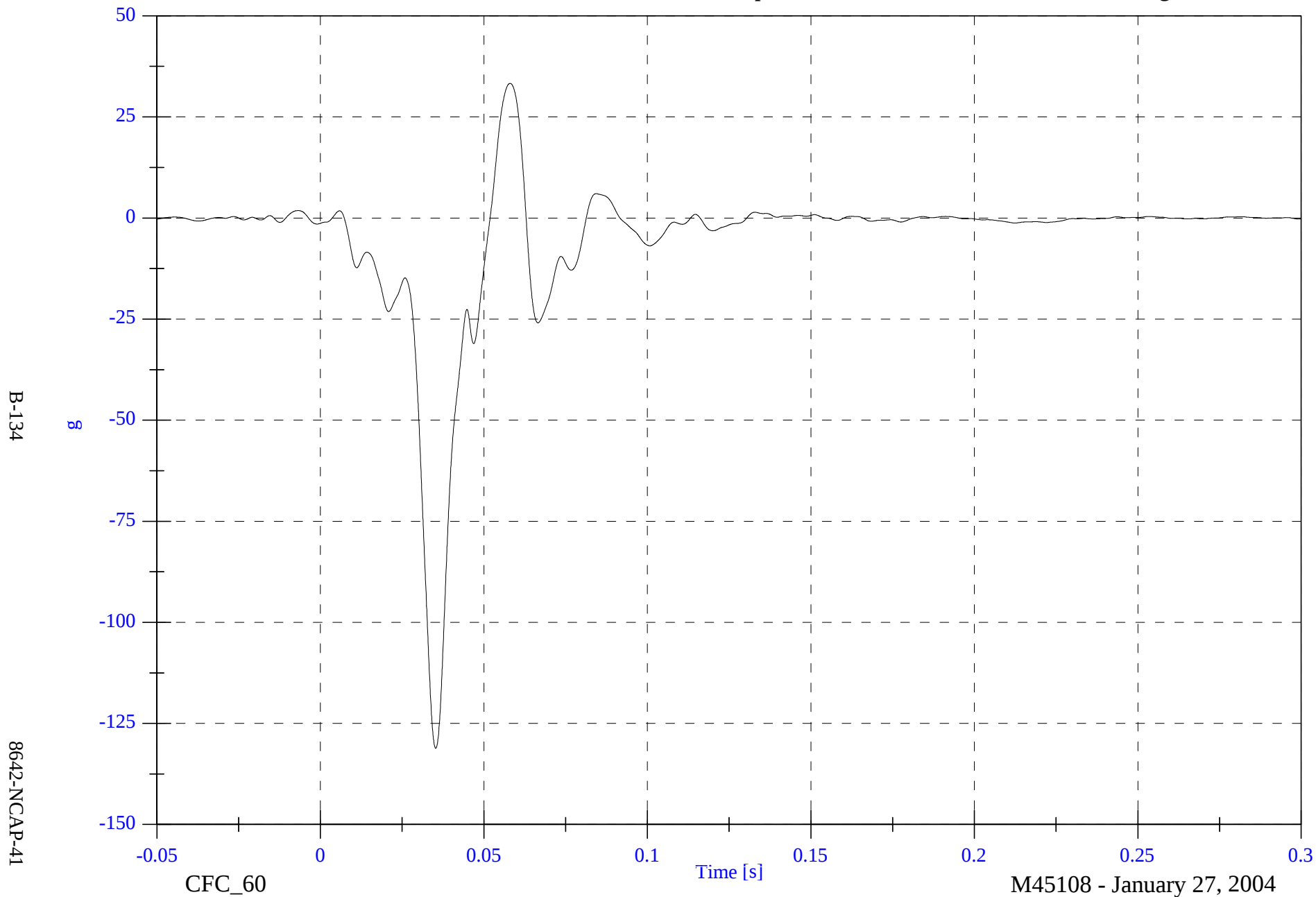


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Left Caliper #7x

Max: 33.3 [g] at 0.058 [s]

Min: -131.1 [g] at 0.035 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

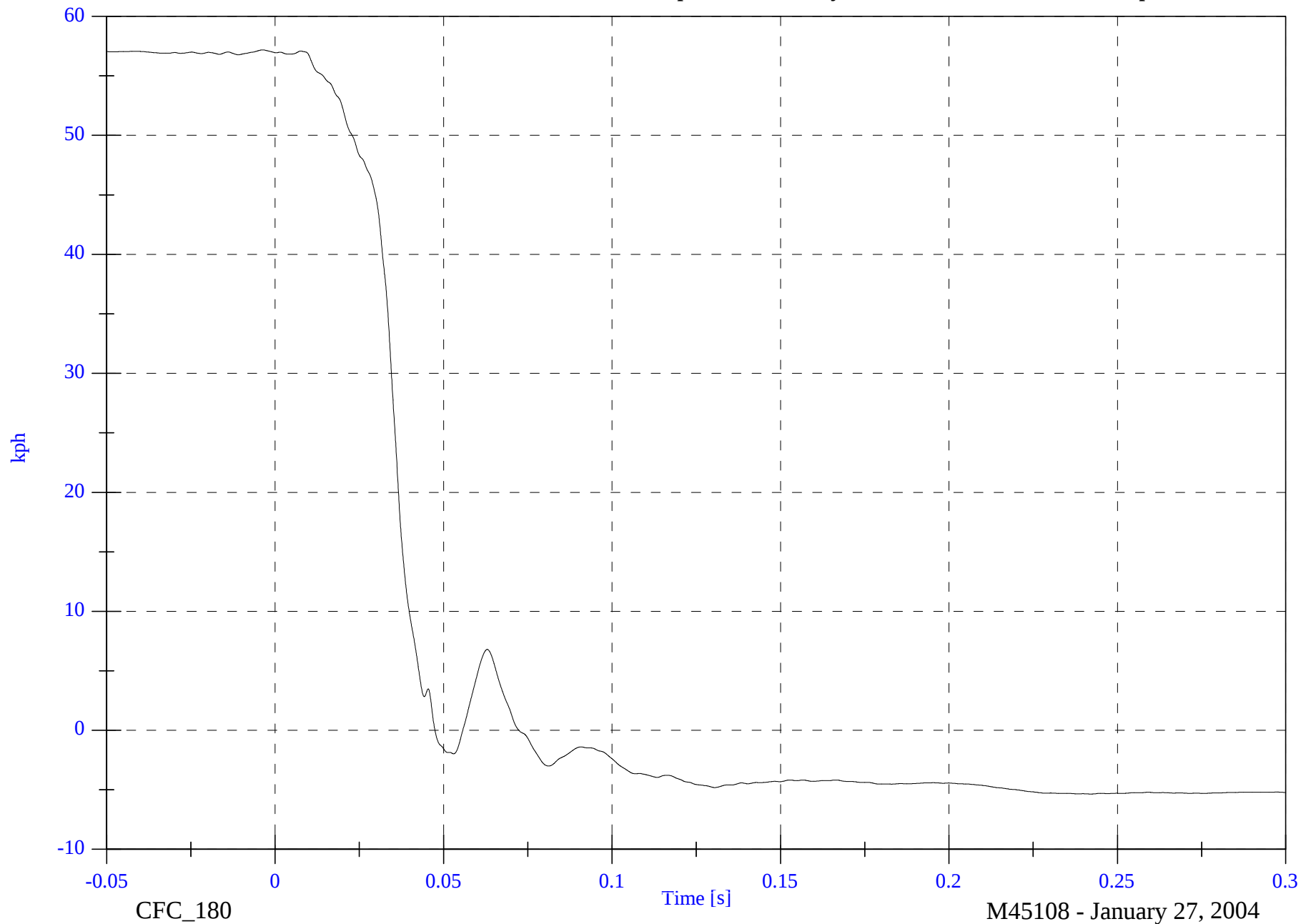
V1 Left Caliper #7x Velocity

Max: 57.2 [kph] at -0.004 [s]

Min: -5.4 [kph] at 0.242 [s]

B-135

8642-NCAP-41



CFC_180

Time [s]

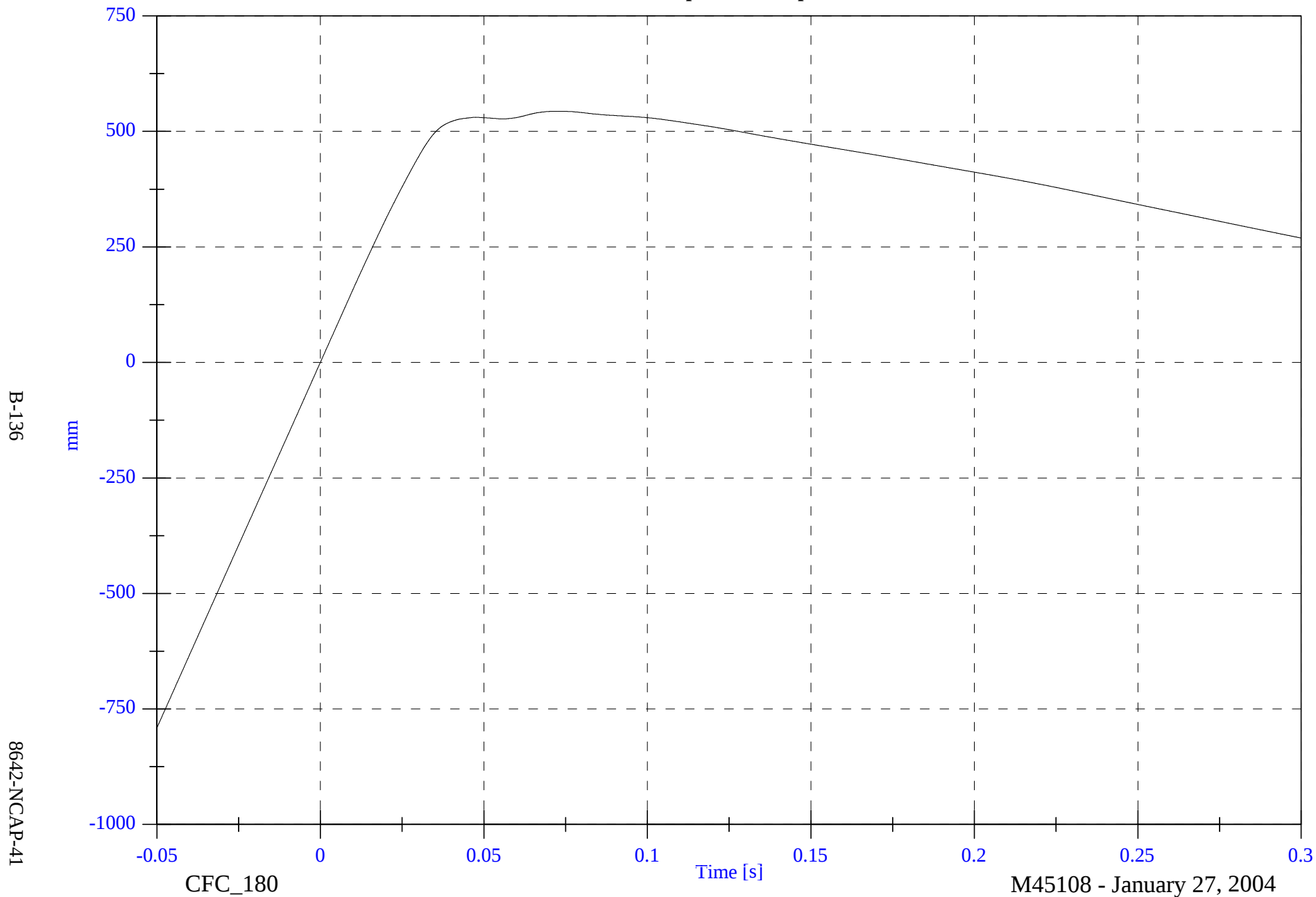
M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Left Caliper #7x Displacement

Max: 543.5 [mm] at 0.072 [s]

Min: -791.2 [mm] at -0.050 [s]



B-136

8642-NCAP-41

CFC_180

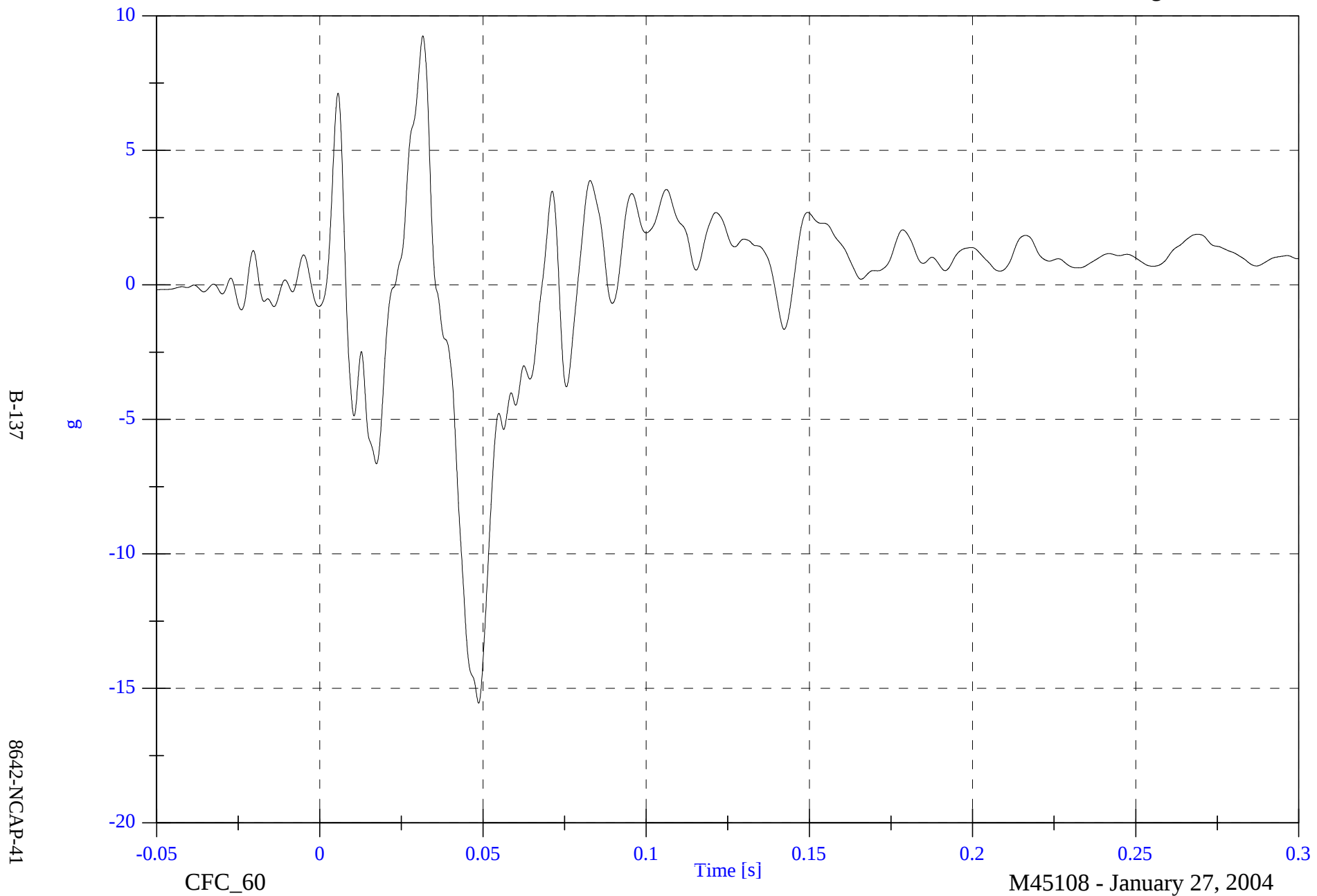
M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Left Rear #8z

Max: 9.3 [g] at 0.032 [s]

Min: -15.6 [g] at 0.049 [s]

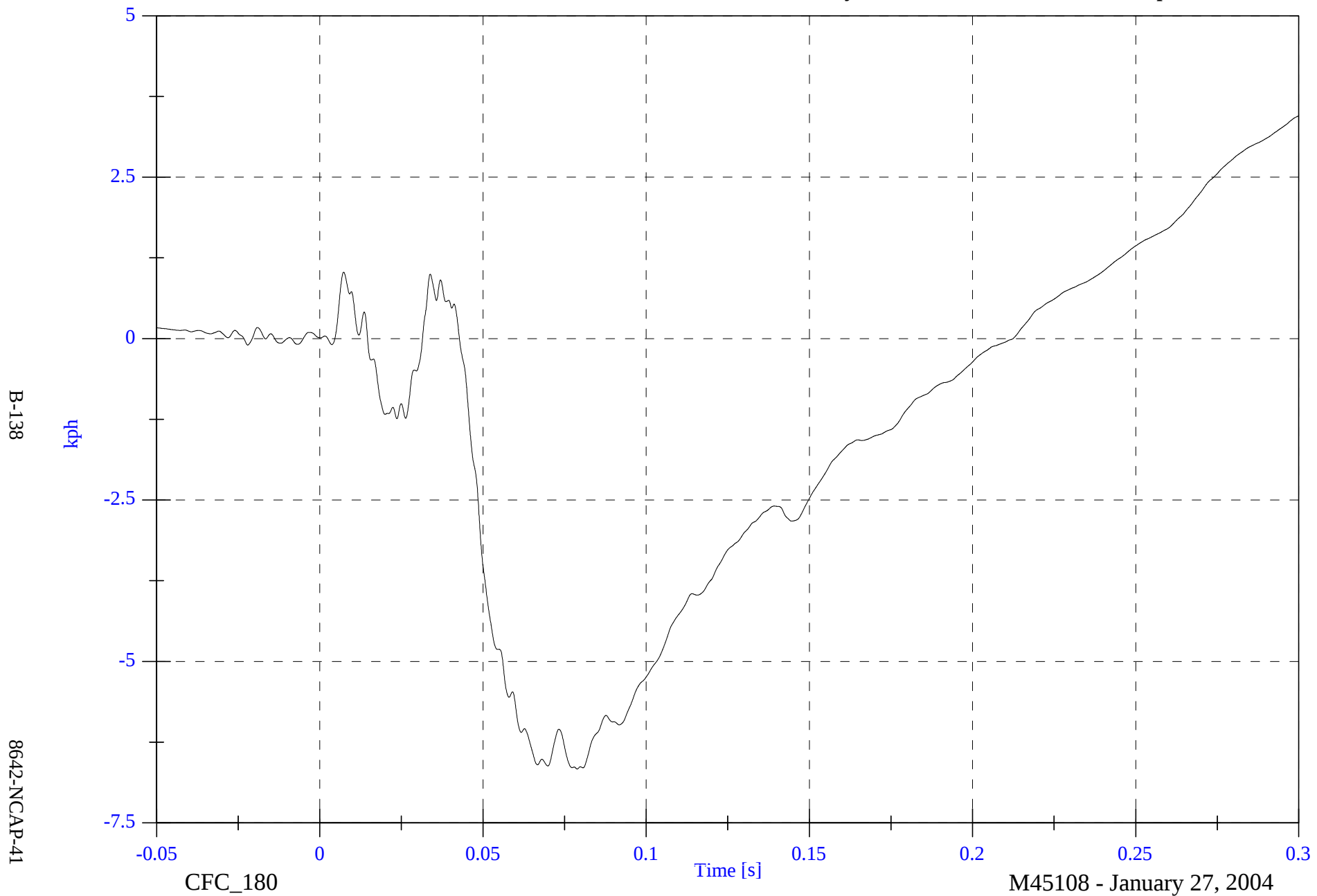


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Left Rear #8z Velocity

Max: 3.5 [kph] at 0.300 [s]

Min: -6.7 [kph] at 0.079 [s]



B-138

8642-NCAP-41

CFC_180

Time [s]

M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

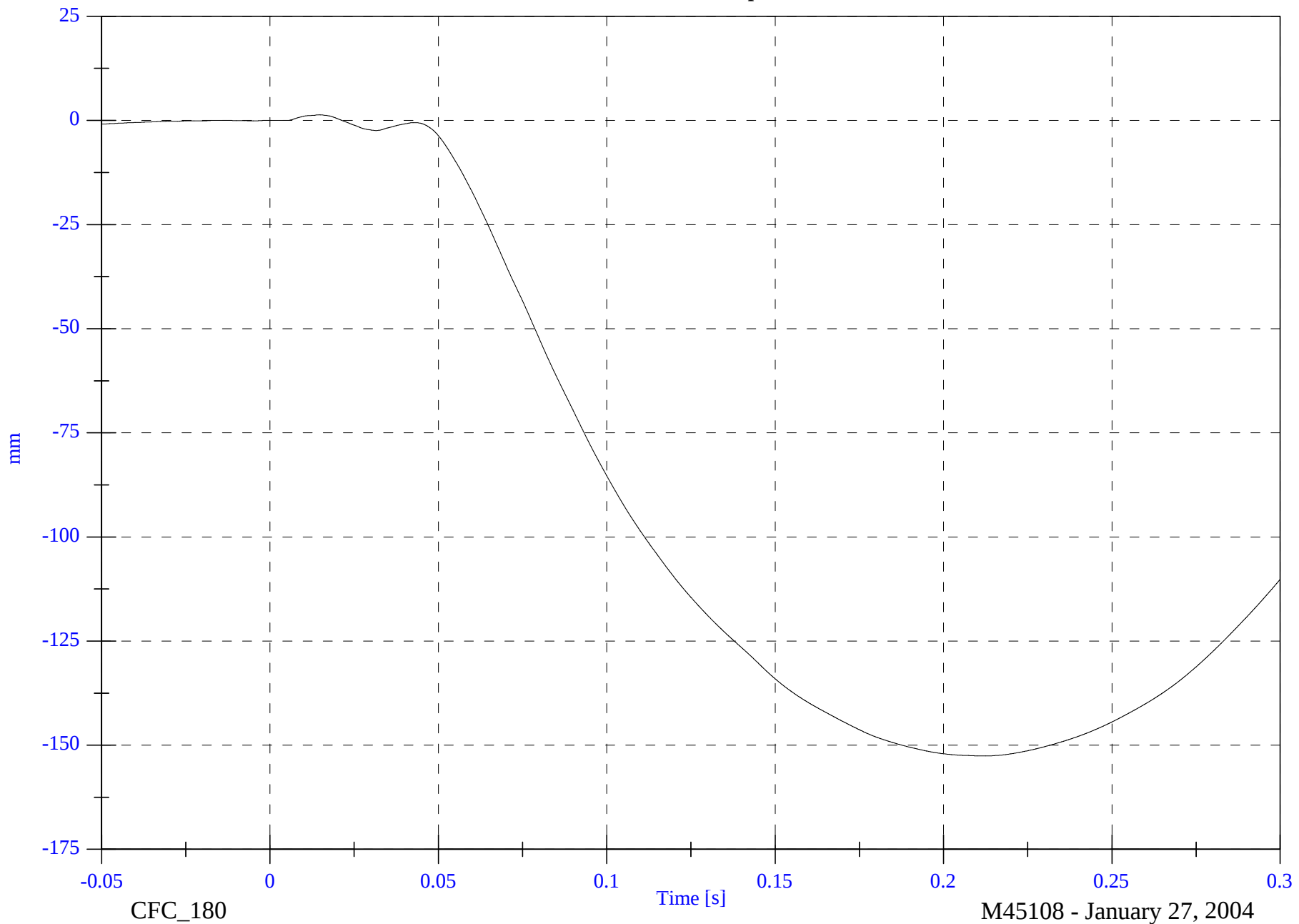
V1 Left Rear #8z Displacement

Max: 1.4 [mm] at 0.015 [s]

Min: -152.6 [mm] at 0.212 [s]

B-139

8642-NCAP-41



CFC_180

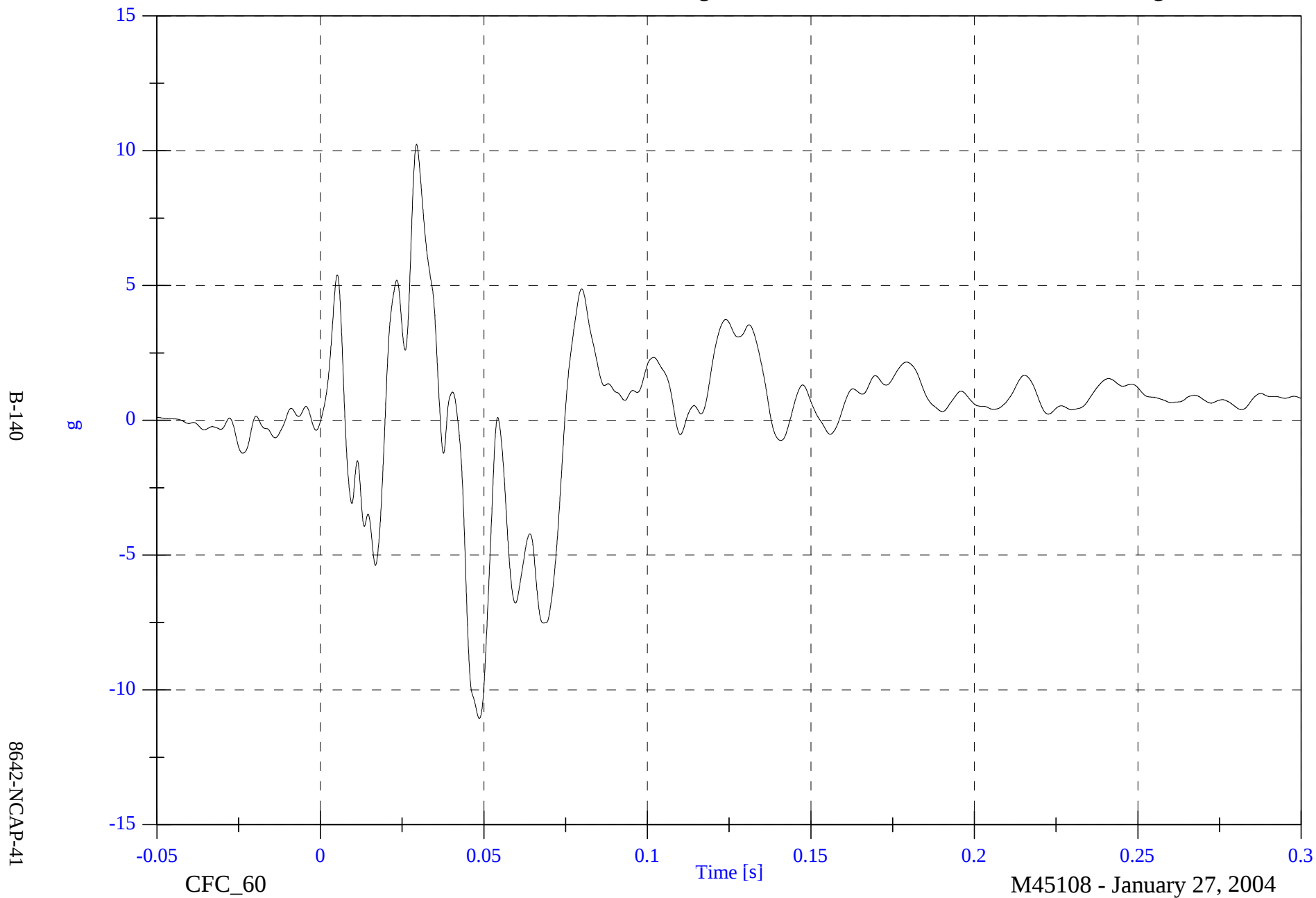
M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Right Rear #9z

Max: 10.2 [g] at 0.029 [s]

Min: -11.1 [g] at 0.049 [s]

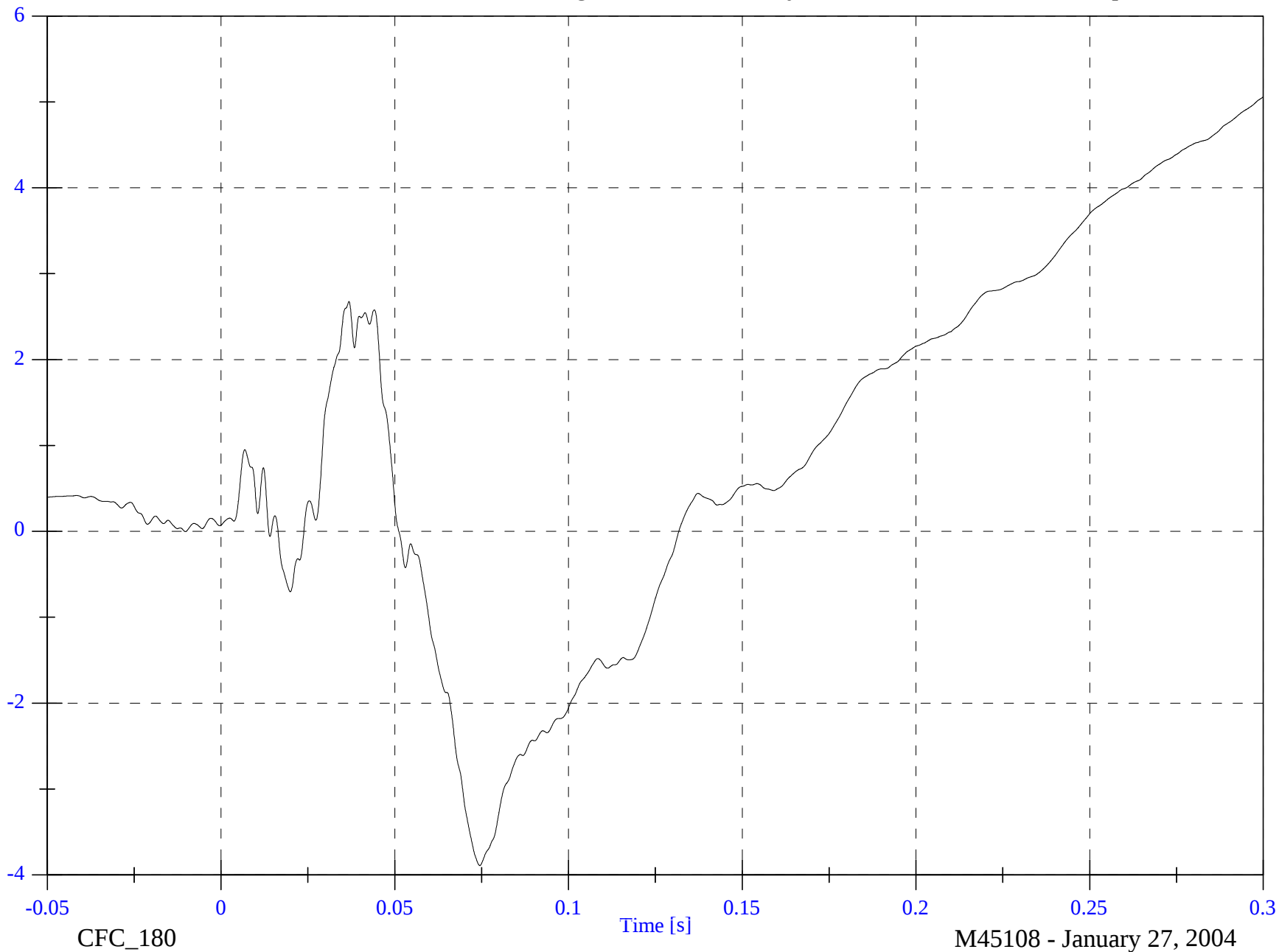


2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Right Rear #9z Velocity

Max: 5.1 [kph] at 0.300 [s]

Min: -3.9 [kph] at 0.075 [s]



B-141

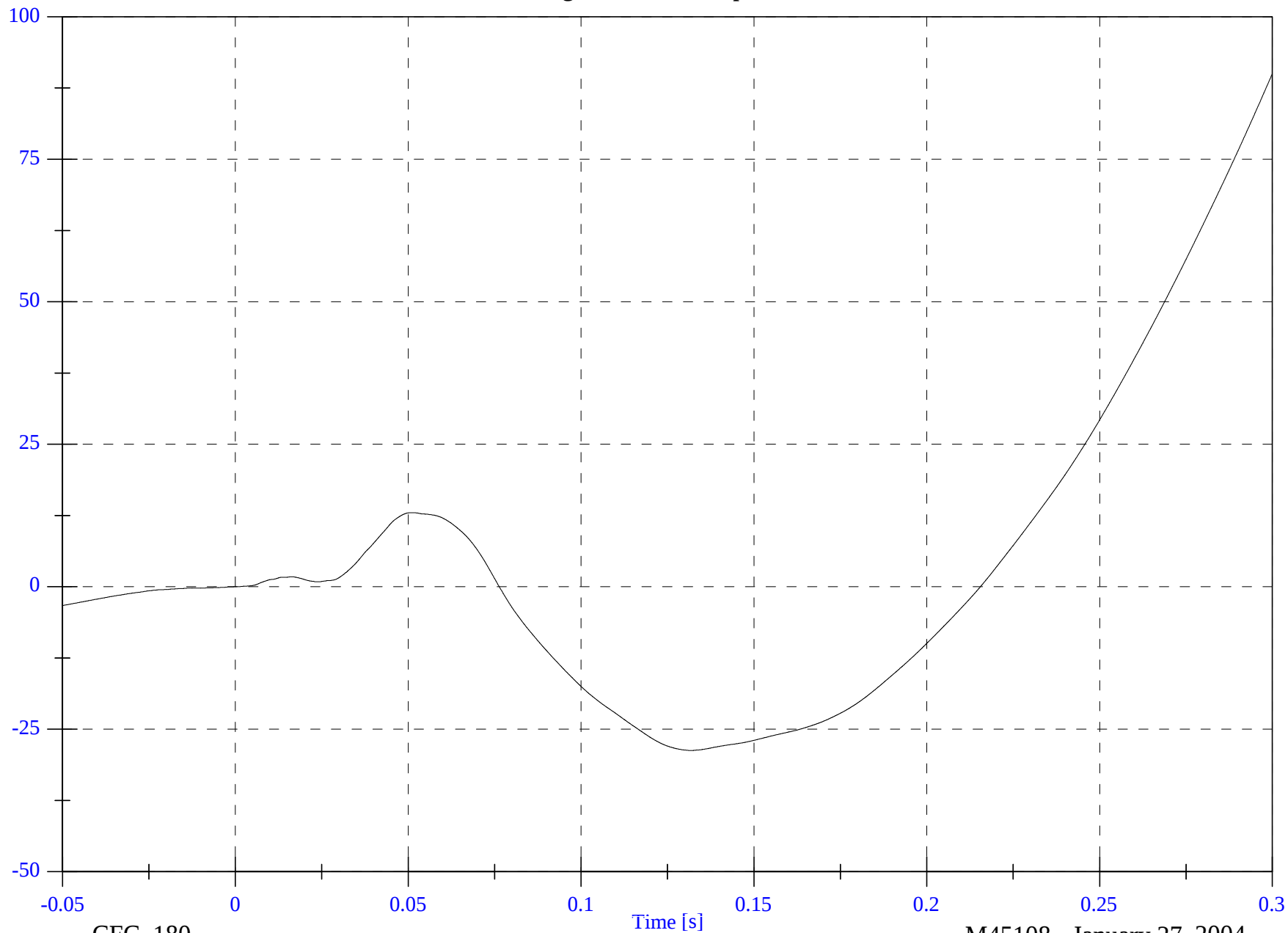
8642-NCAP-41

2004 NCAP Test 5 - 2004 Toyota RAV4

V1 Right Rear #9z Displacement

Max: 90.0 [mm] at 0.300 [s]

Min: -28.7 [mm] at 0.132 [s]



B-142

8642-NCAP-41

CFC_180

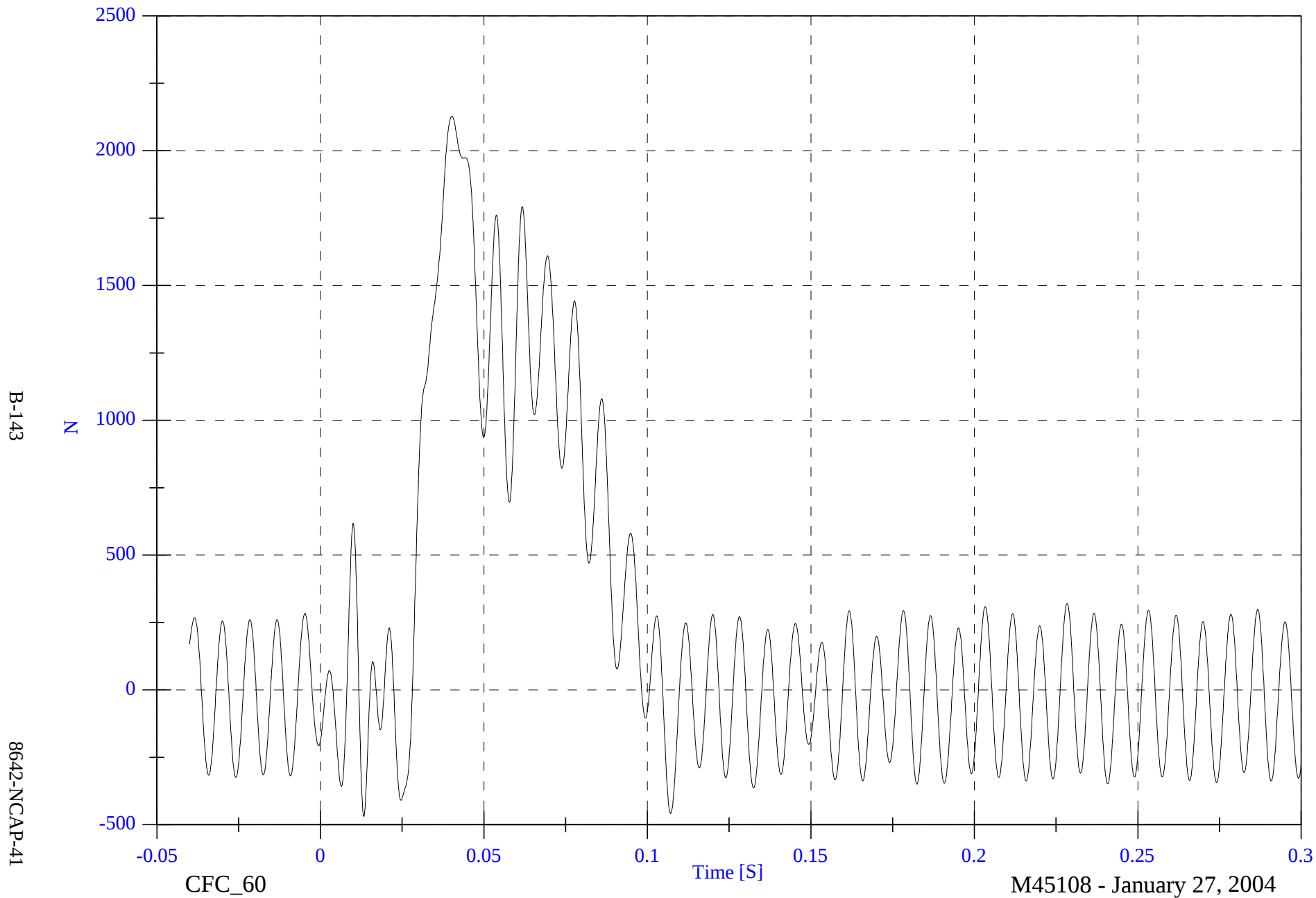
M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell A1 Fx

Max: 2127.4 [N] at 0.040 [S]

Min: -468.9 [N] at 0.013 [S]

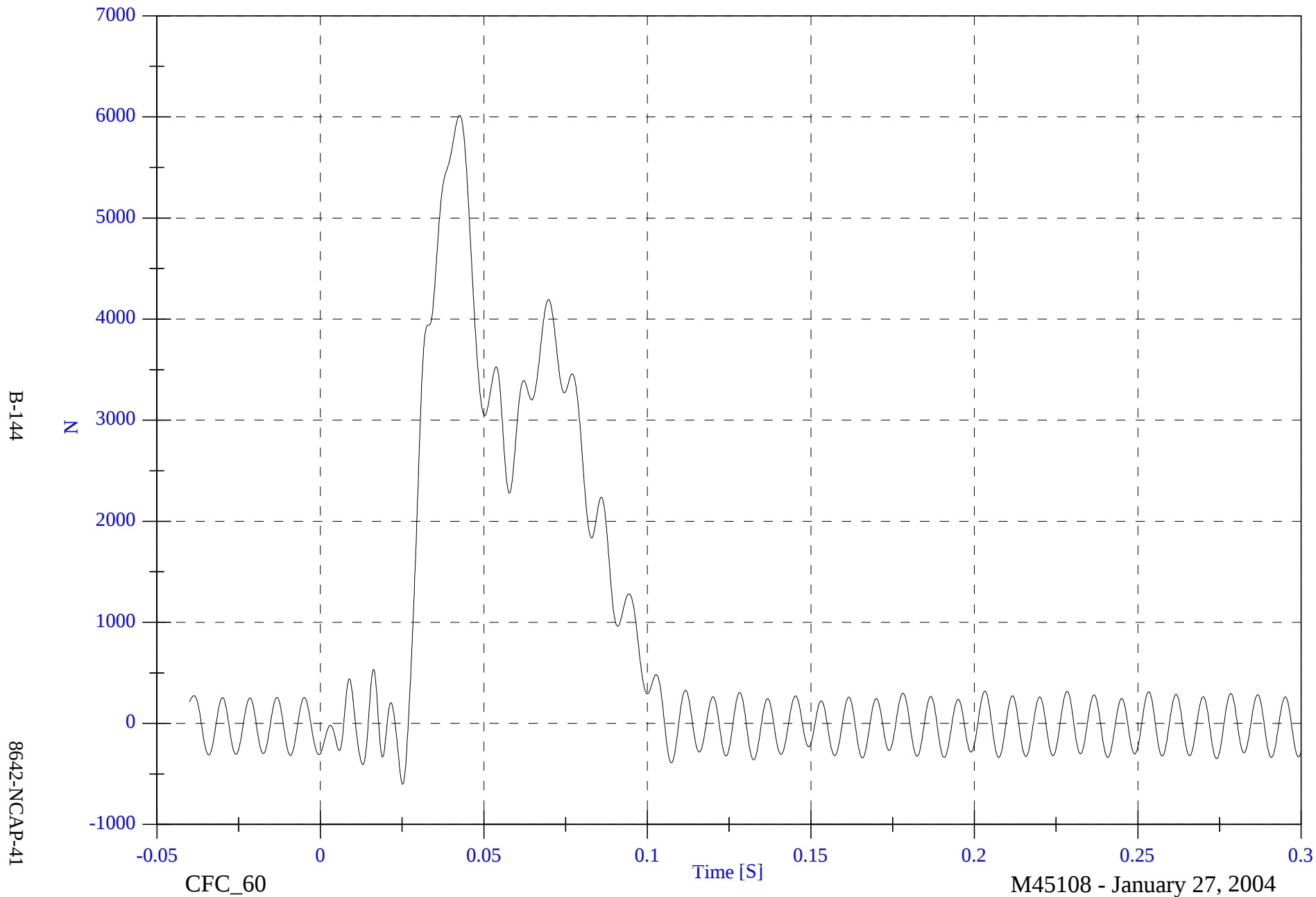


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell A2 Fx

Max: 6016.4 [N] at 0.043 [S]

Min: -600.9 [N] at 0.025 [S]

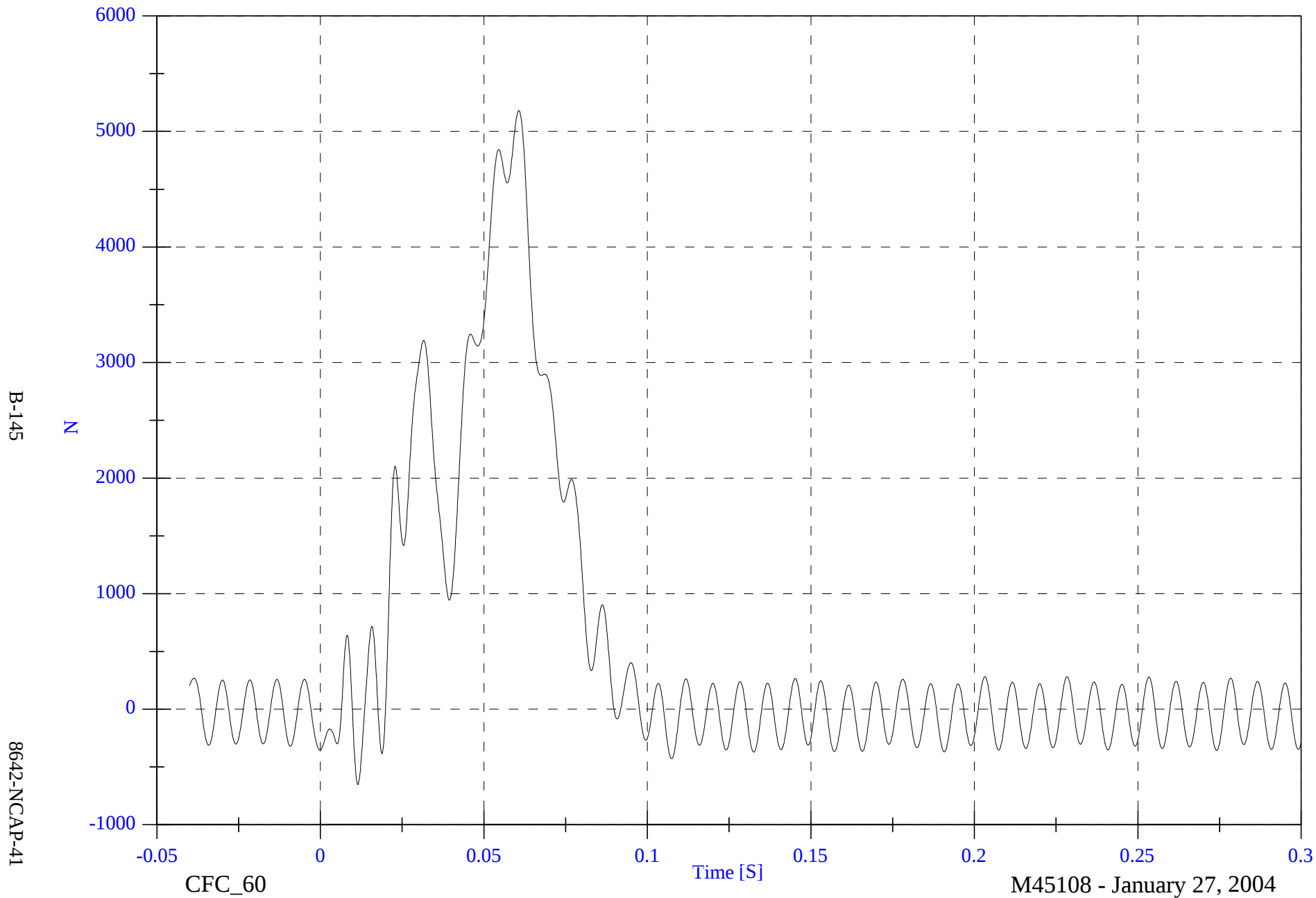


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell A3 Fx

Max: 5180.3 [N] at 0.061 [S]

Min: -651.9 [N] at 0.011 [S]

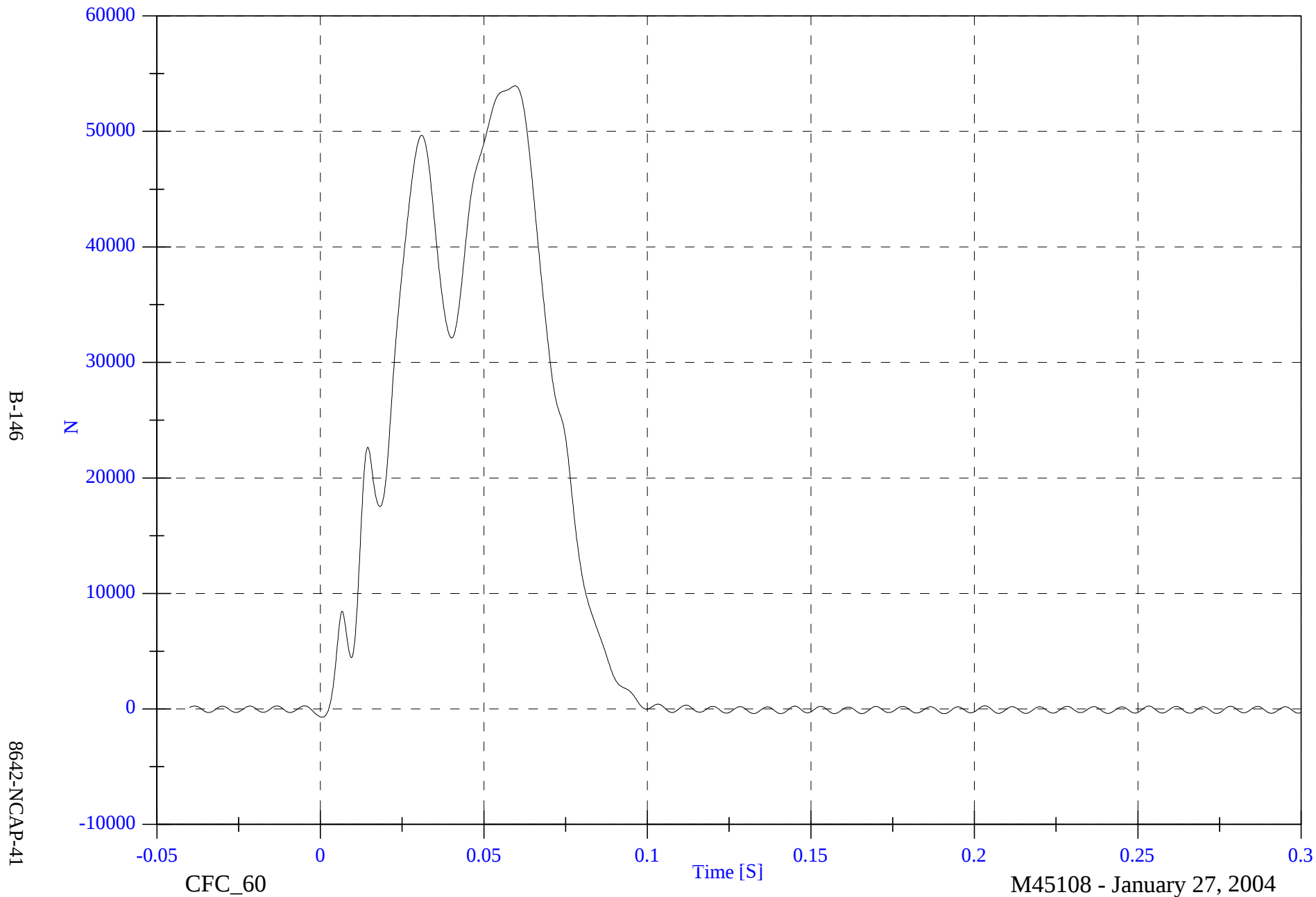


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell A4 Fx

Max: 53941.0 [N] at 0.060 [S]

Min: -716.9 [N] at 0.001 [S]

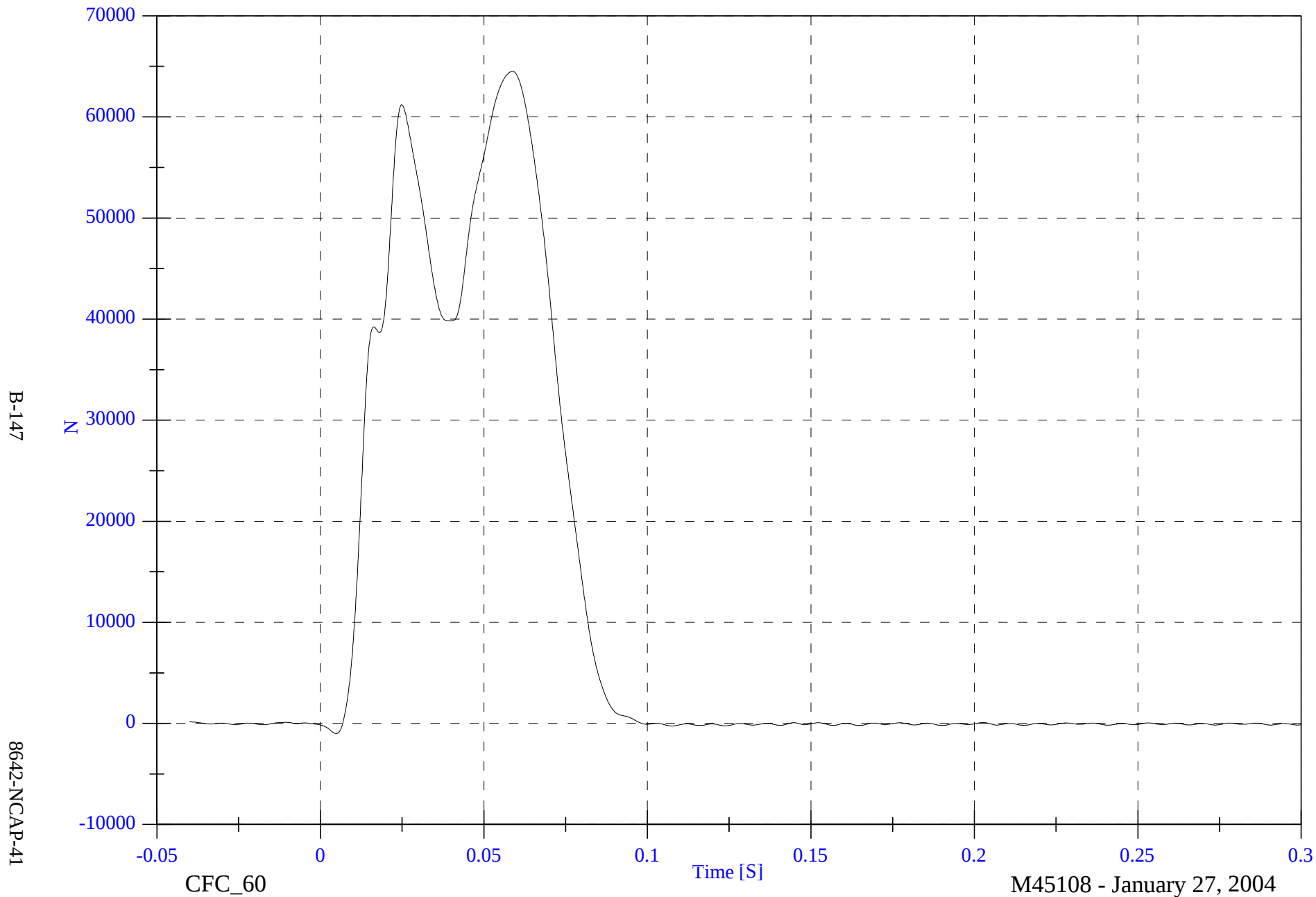


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell A5 Fx

Max: 64512.8 [N] at 0.059 [S]

Min: -1008.1 [N] at 0.005 [S]

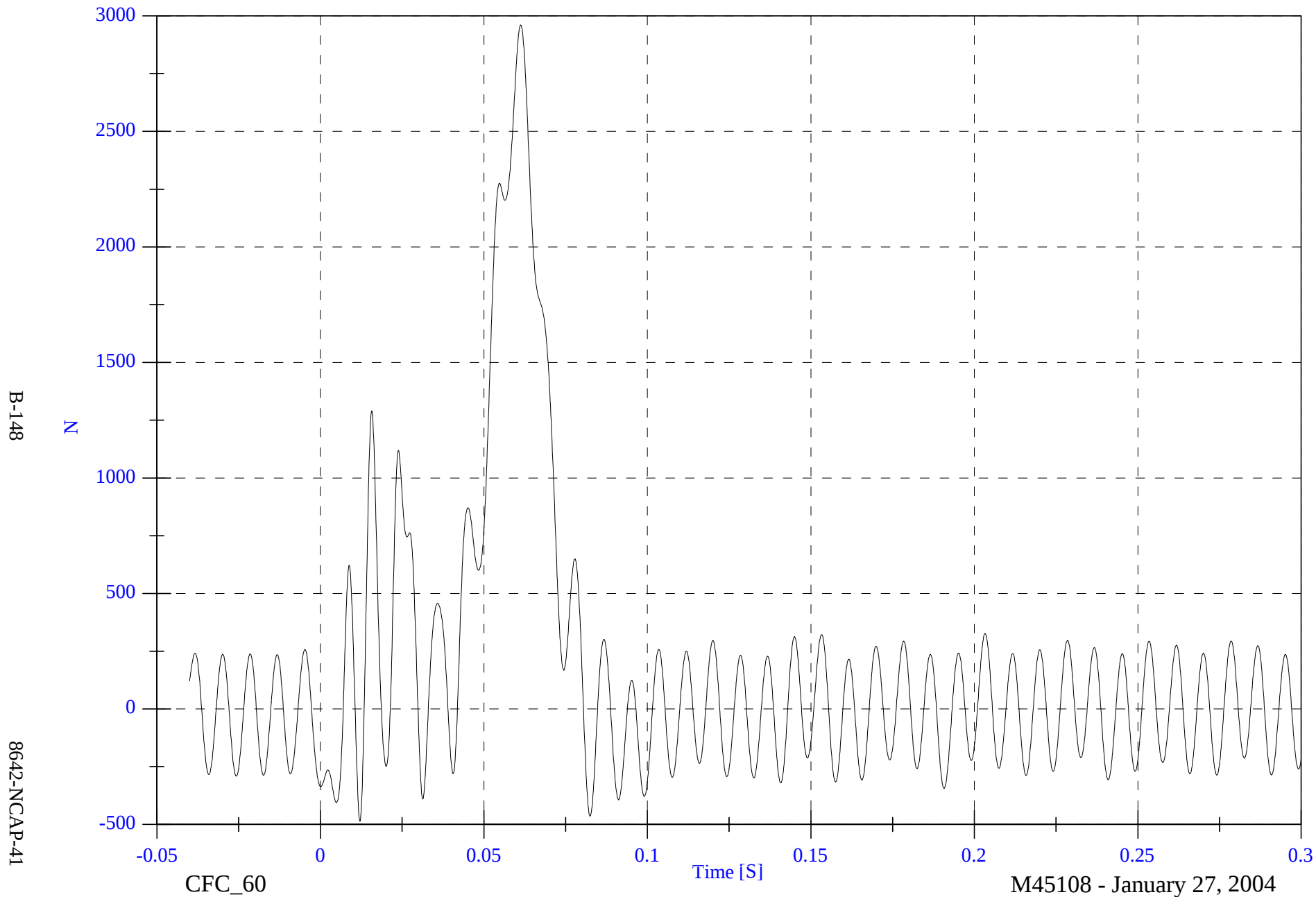


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell A6 Fx

Max: 2960.7 [N] at 0.061 [S]

Min: -485.9 [N] at 0.012 [S]

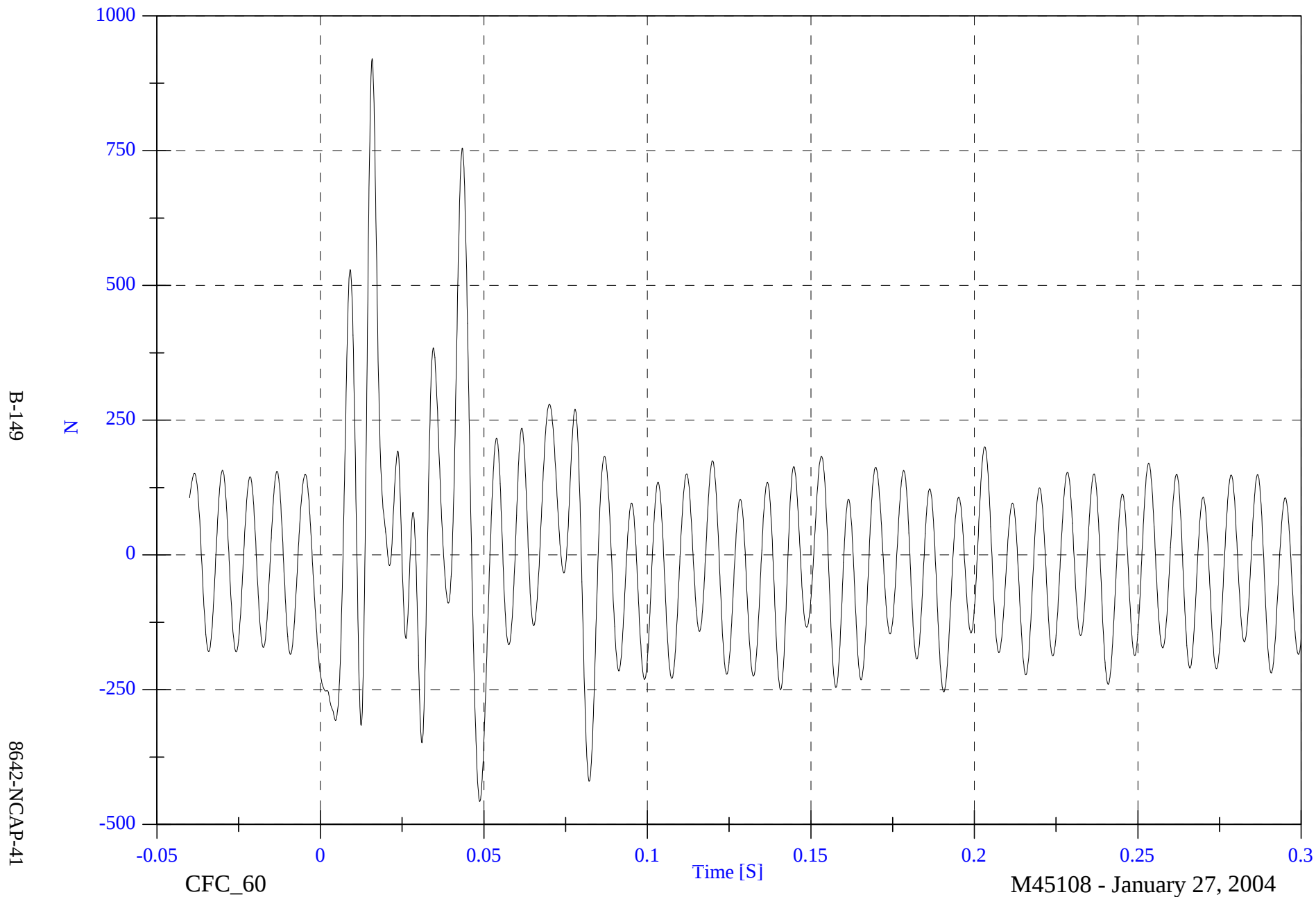


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell A7 Fx

Max: 920.4 [N] at 0.016 [S]

Min: -457.5 [N] at 0.049 [S]

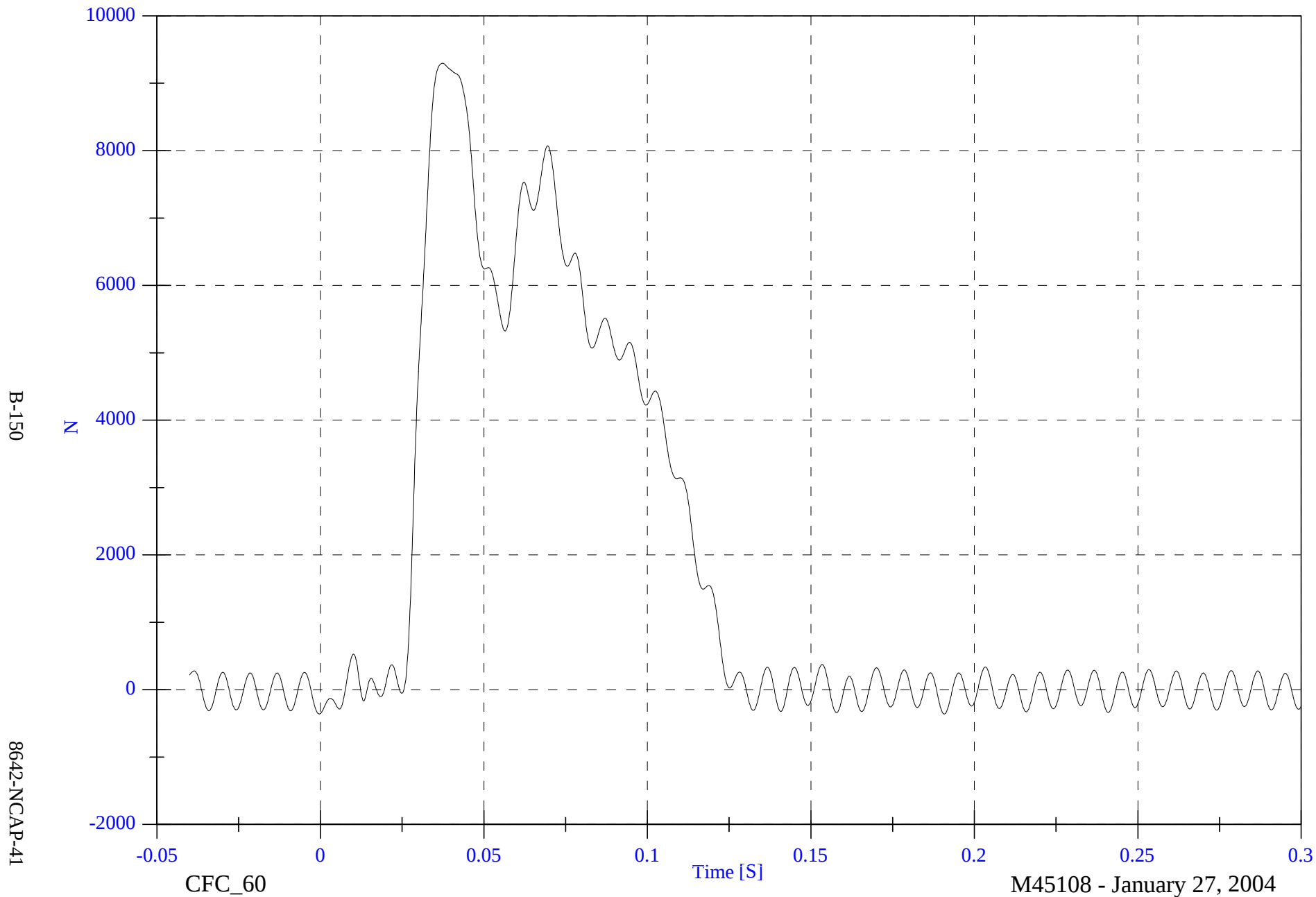


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell A8 Fx

Max: 9297.5 [N] at 0.037 [S]

Min: -360.6 [N] at -0.000 [S]

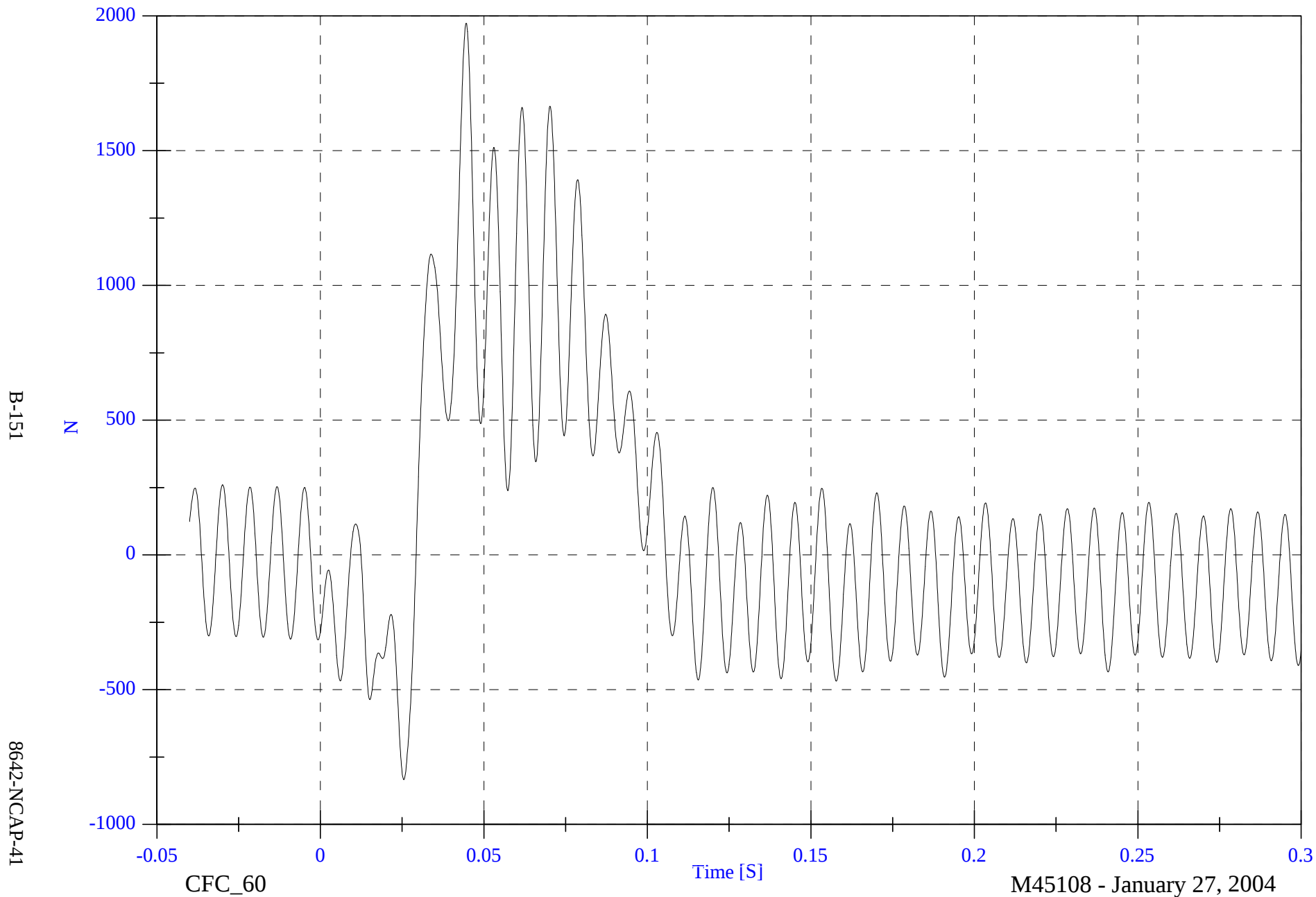


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell A9 Fx

Max: 1972.9 [N] at 0.045 [S]

Min: -834.0 [N] at 0.025 [S]

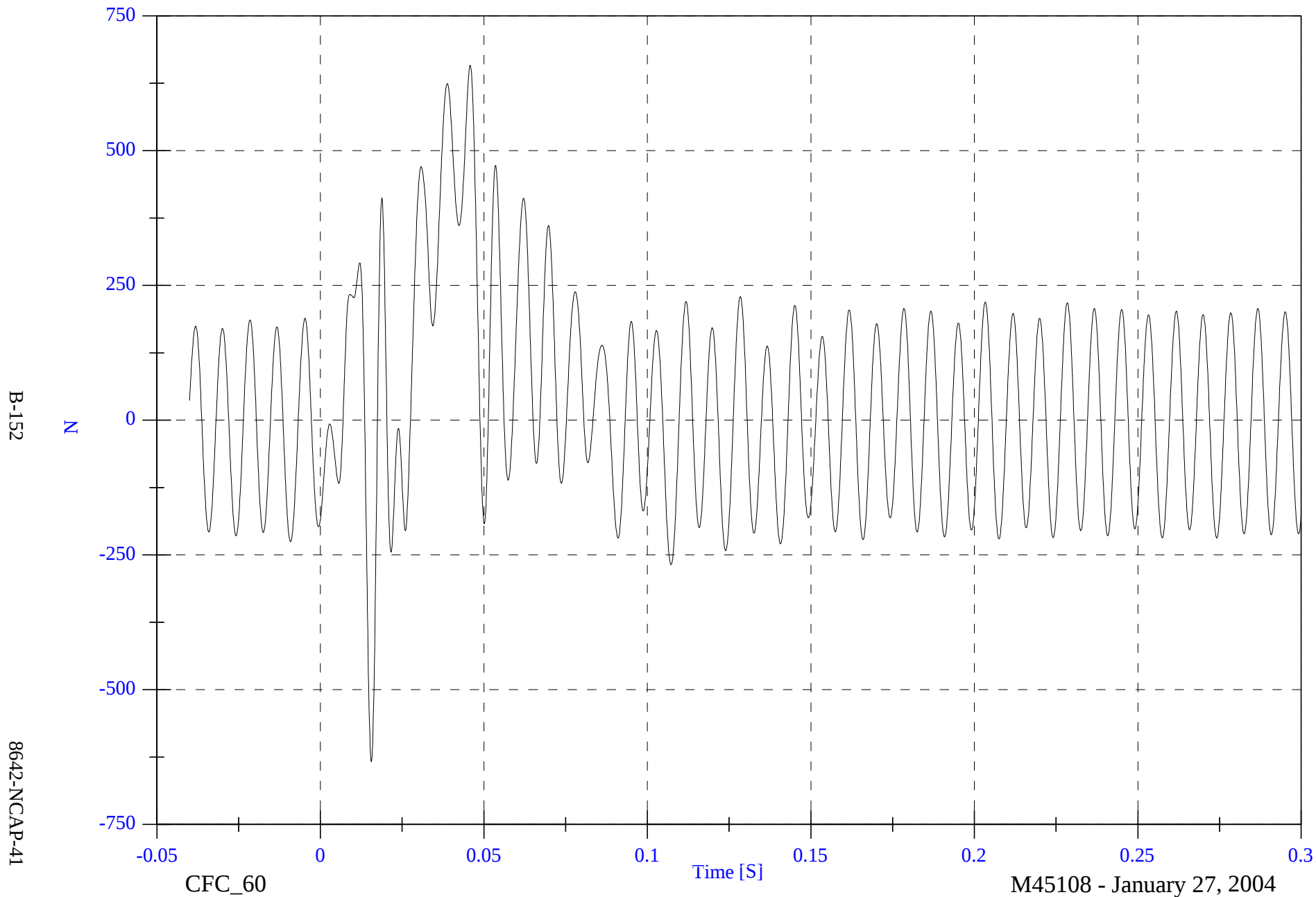


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell B1 Fx

Max: 658.3 [N] at 0.046 [S]

Min: -633.6 [N] at 0.016 [S]

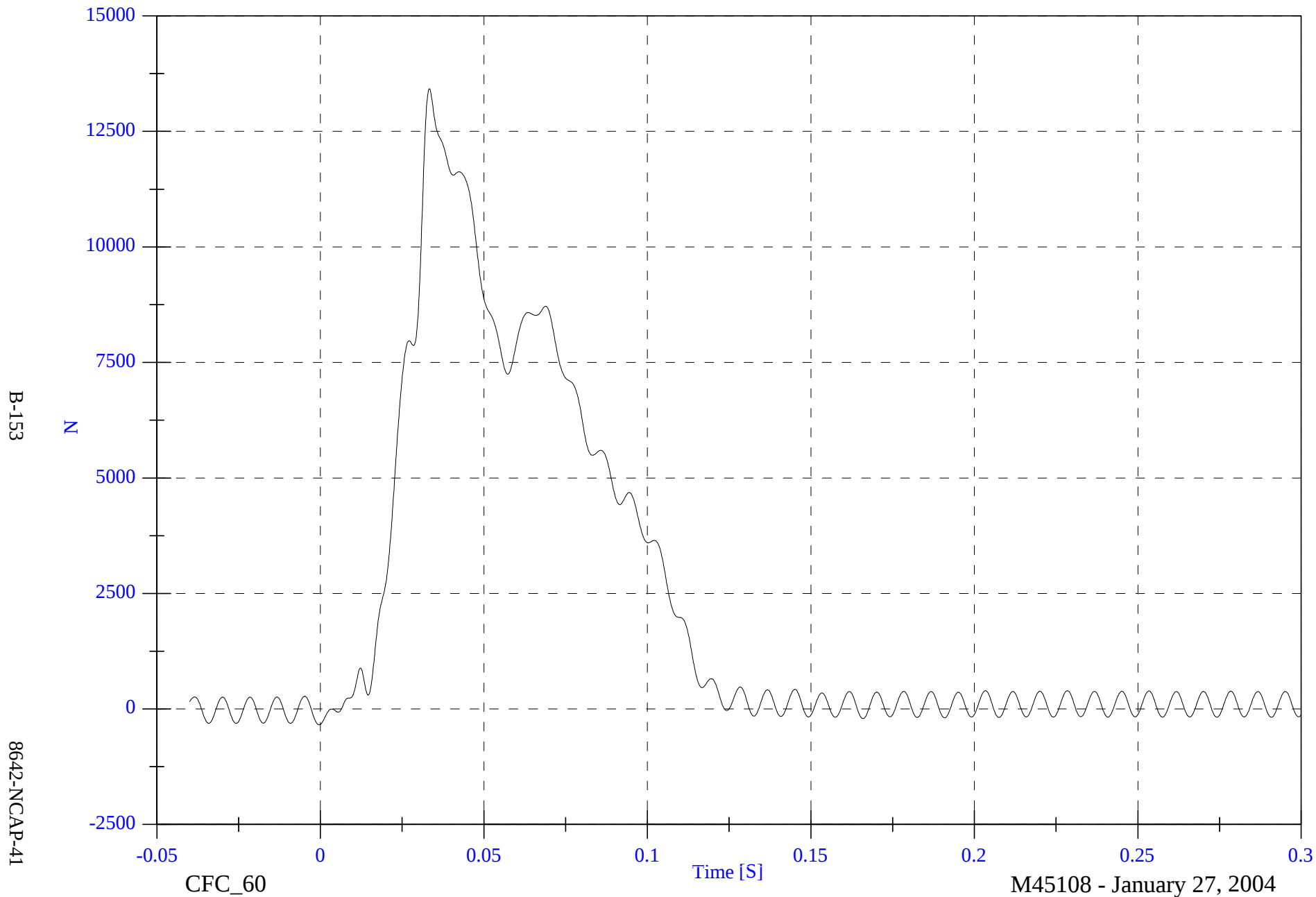


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell B2 Fx

Max: 13424.1 [N] at 0.033 [S]

Min: -343.2 [N] at -0.000 [S]

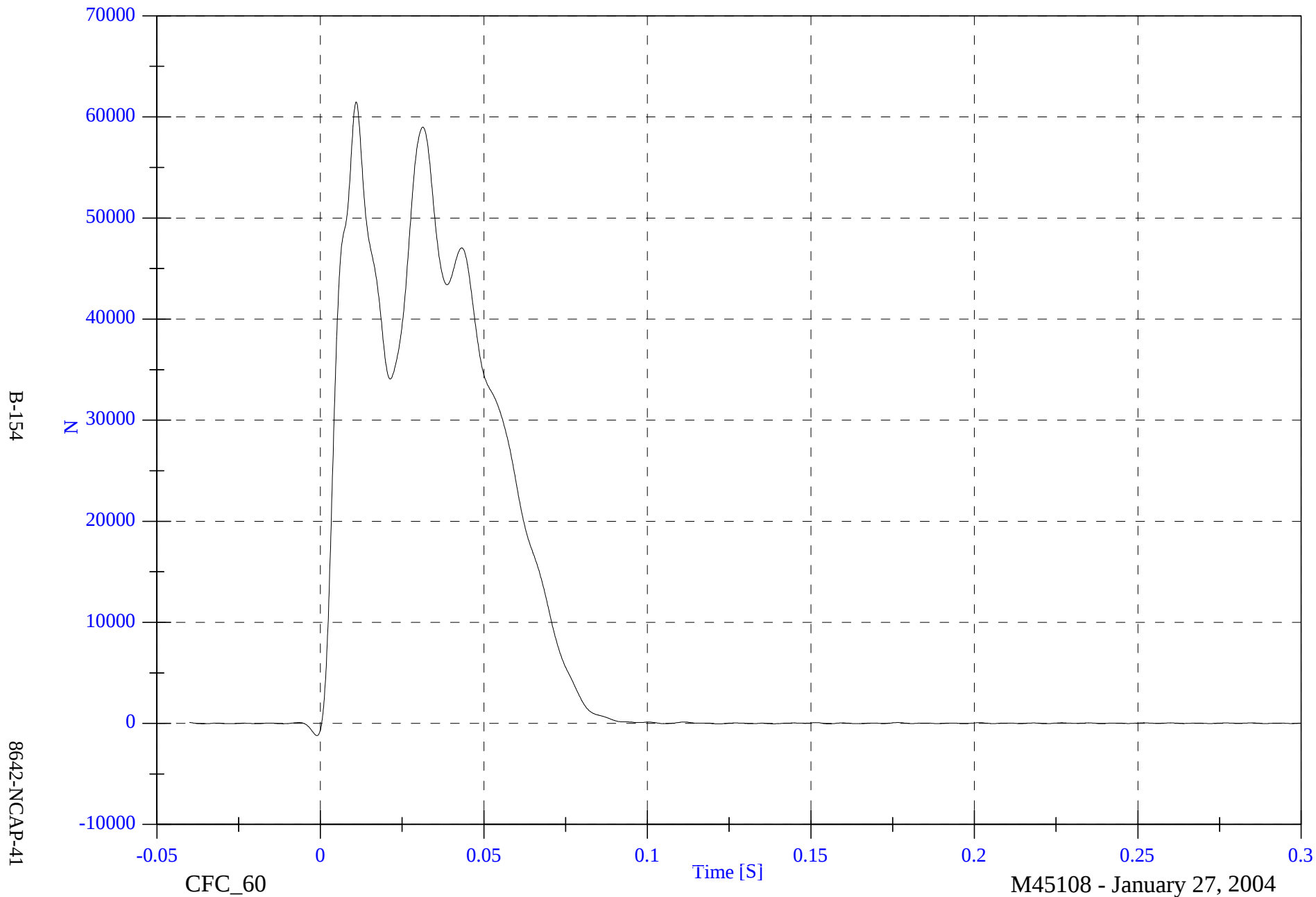


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell B3 Fx

Max: 61475.5 [N] at 0.011 [S]

Min: -1207.8 [N] at -0.001 [S]

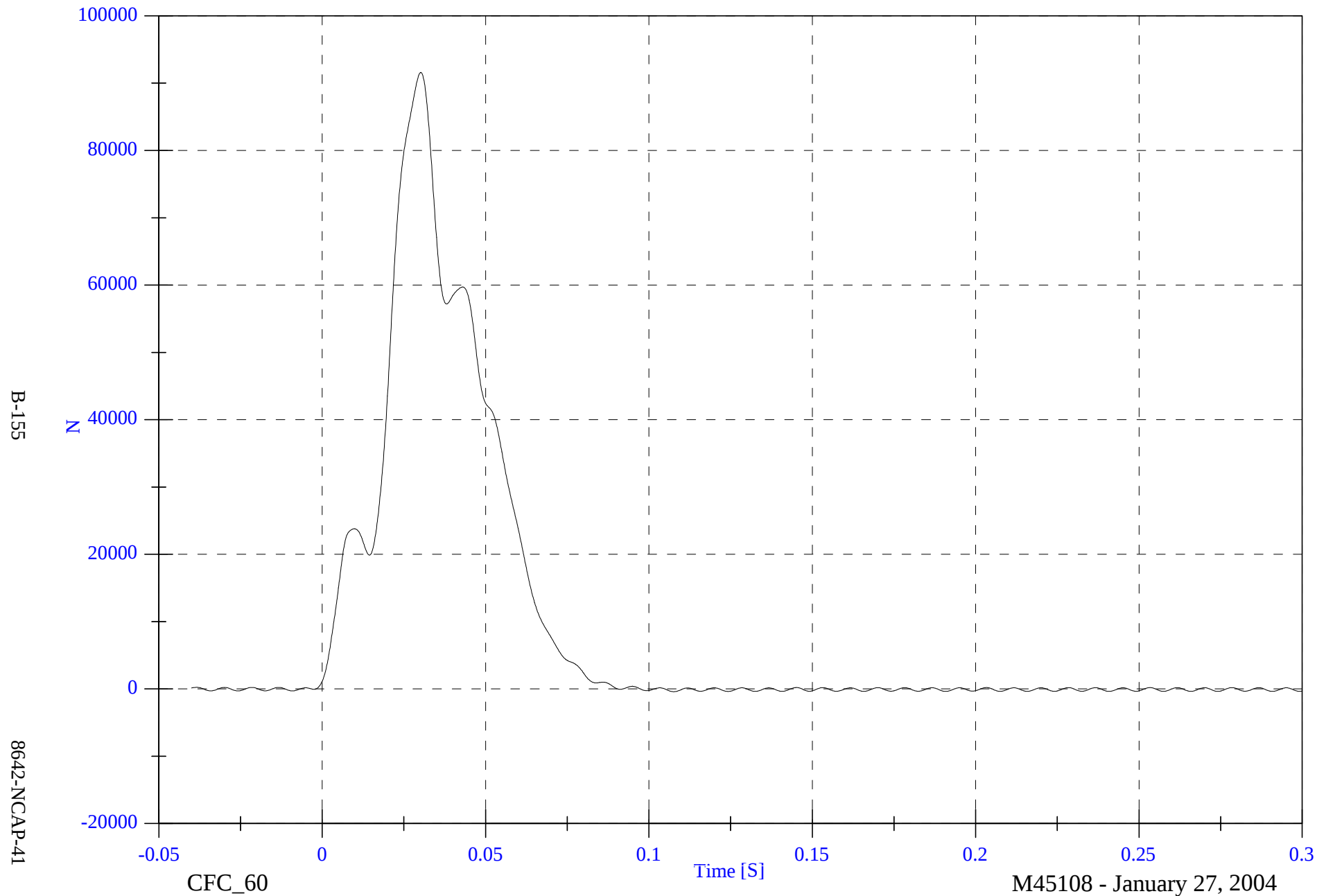


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell B4 Fx

Max: 91595.1 [N] at 0.030 [S]

Min: -412.9 [N] at 0.108 [S]

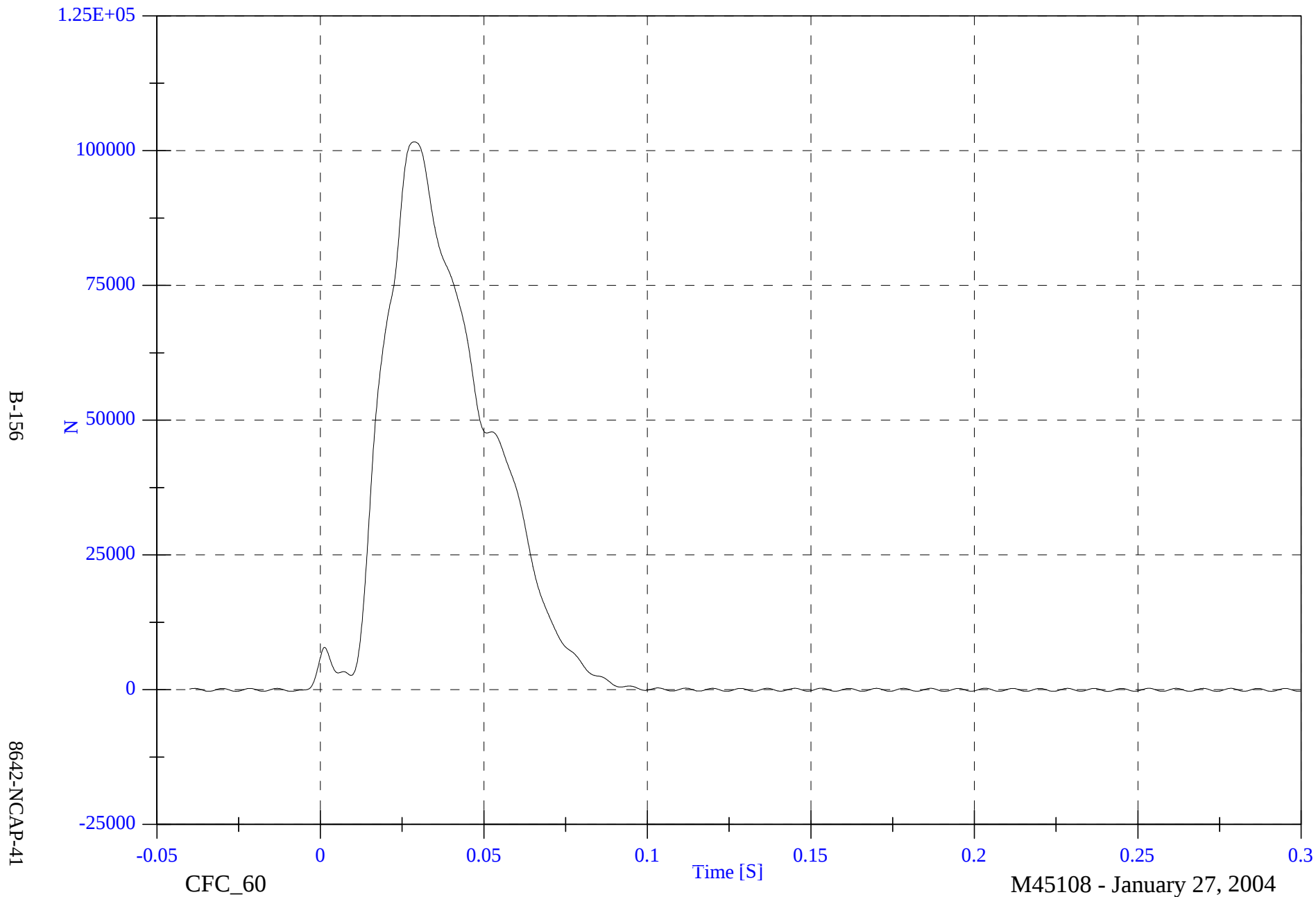


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell B5 Fx

Max: 101612.4 [N] at 0.029 [S]

Min: -311.6 [N] at 0.191 [S]

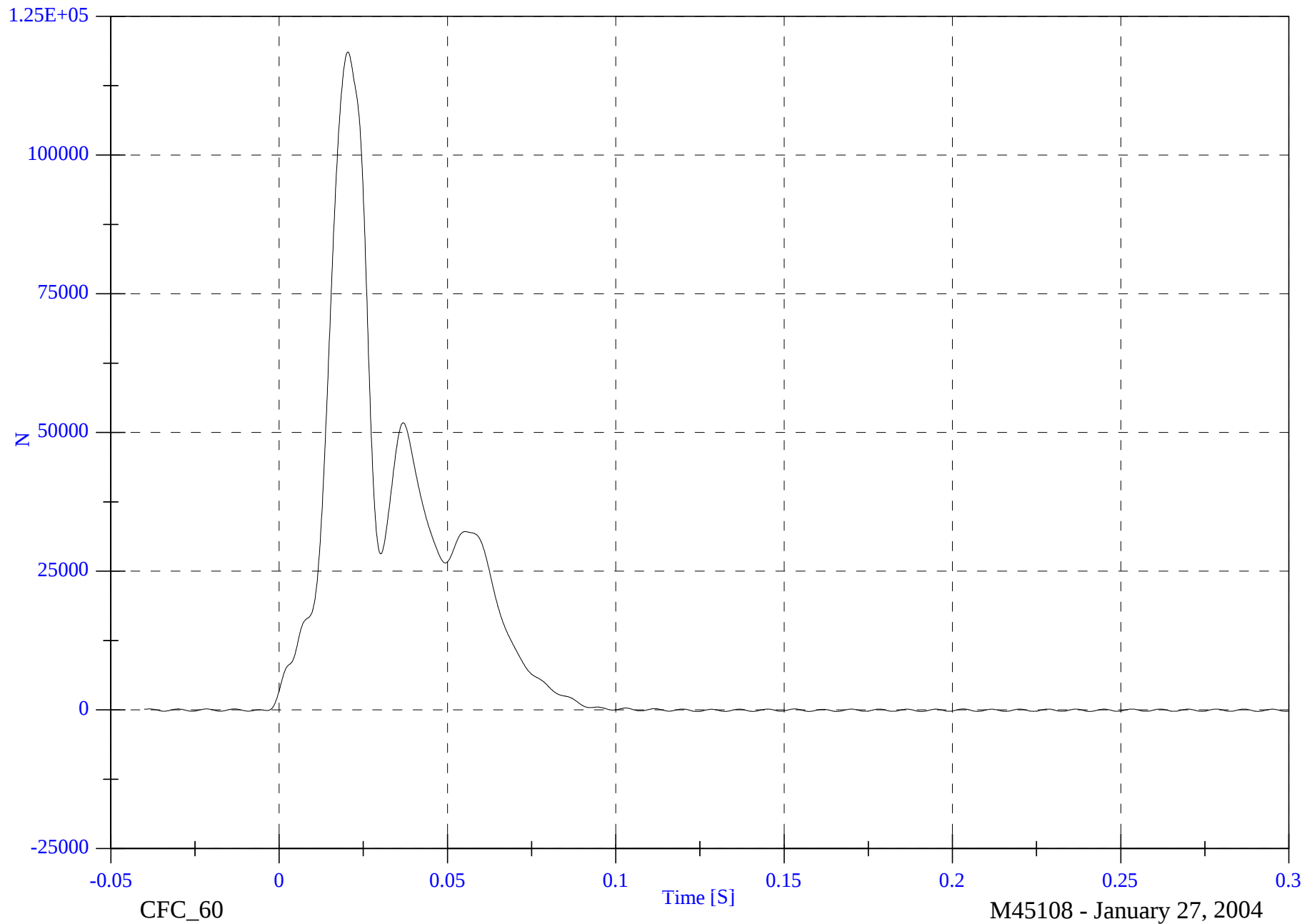


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell B6 Fx

Max: 118568.9 [N] at 0.020 [S]

Min: -296.1 [N] at 0.124 [S]



B-157

8642-NCAP-41

CFC_60

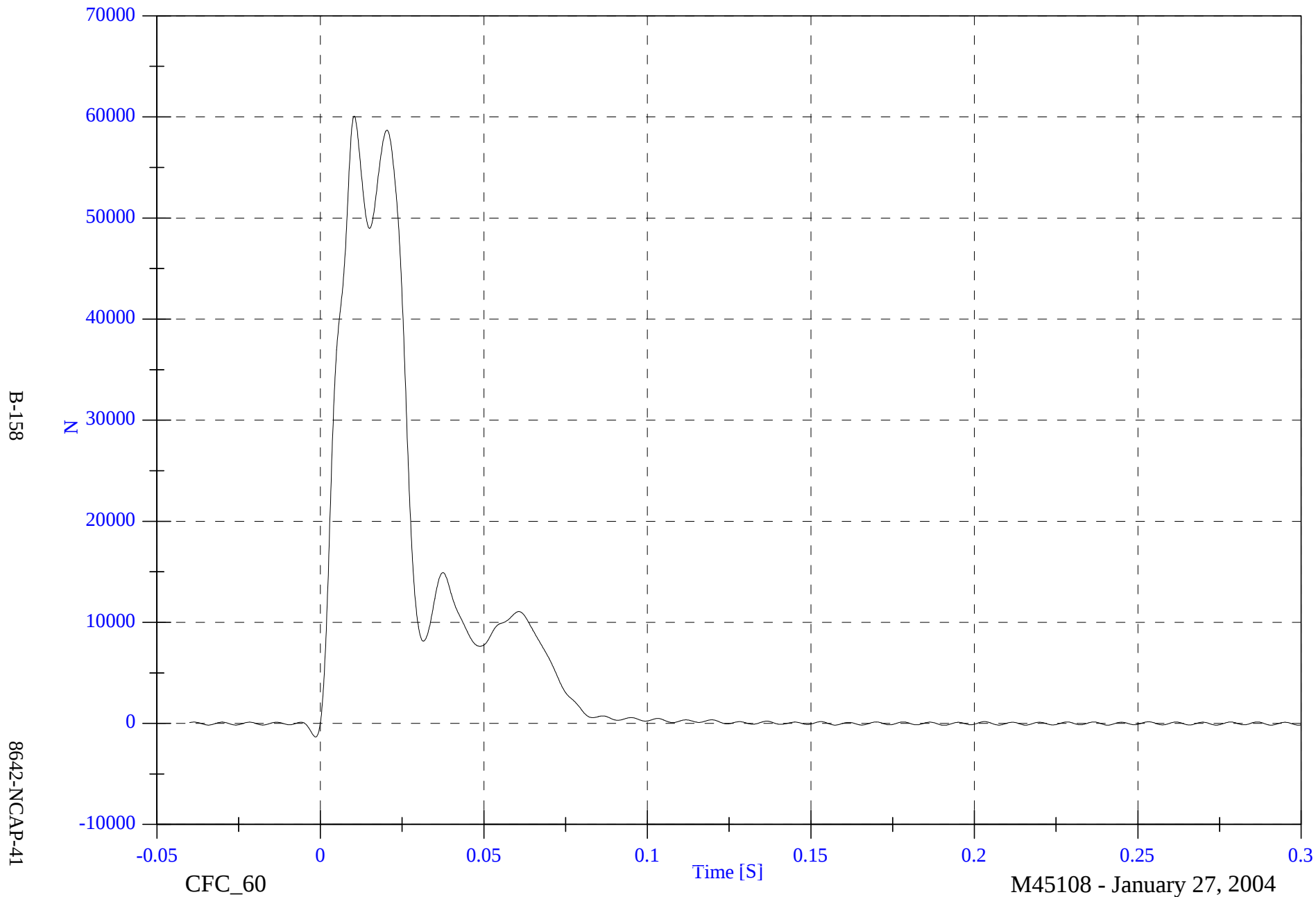
M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell B7 Fx

Max: 60083.8 [N] at 0.010 [S]

Min: -1339.7 [N] at -0.001 [S]

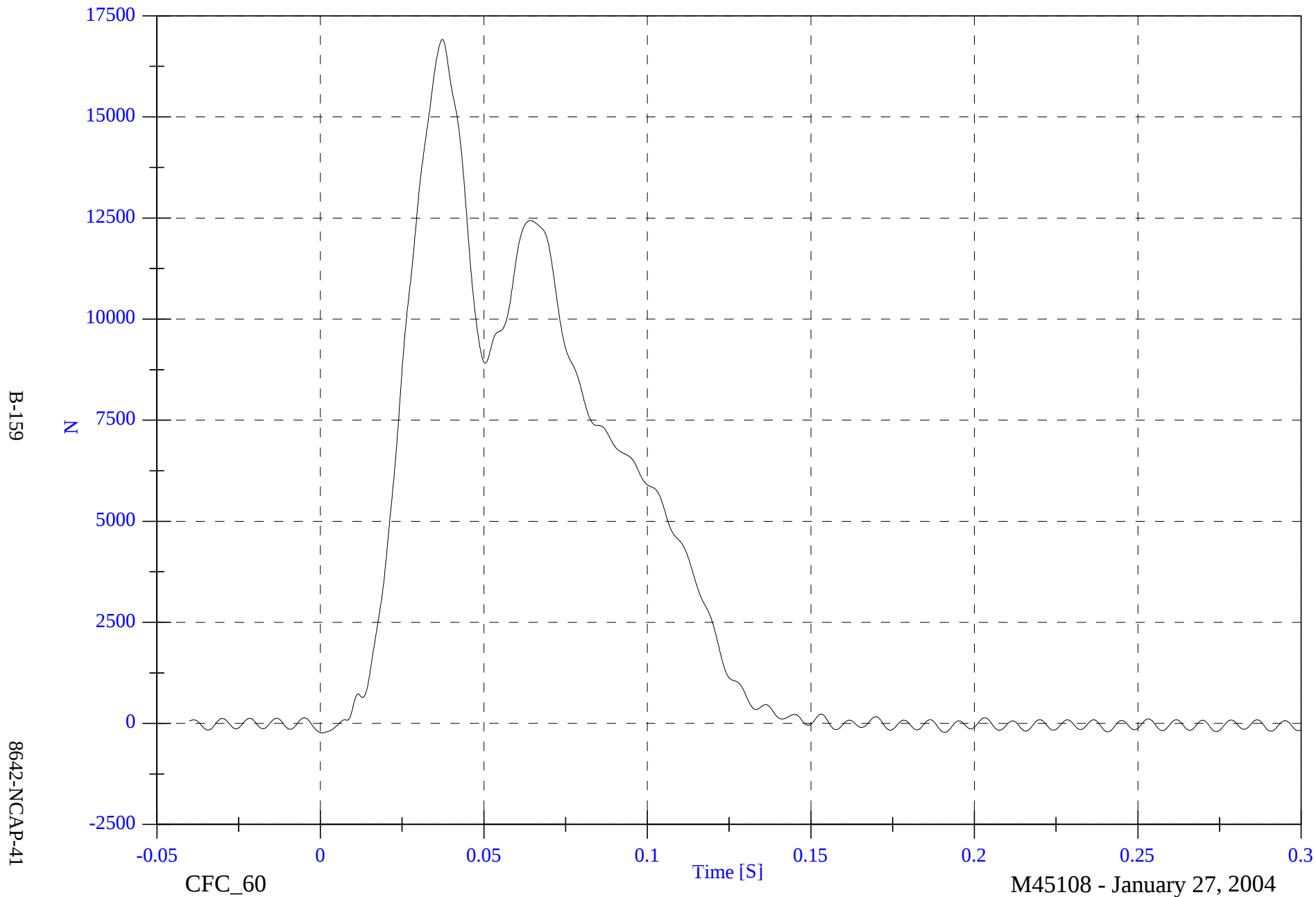


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell B8 Fx

Max: 16917.8 [N] at 0.037 [S]

Min: -233.9 [N] at 0.001 [S]

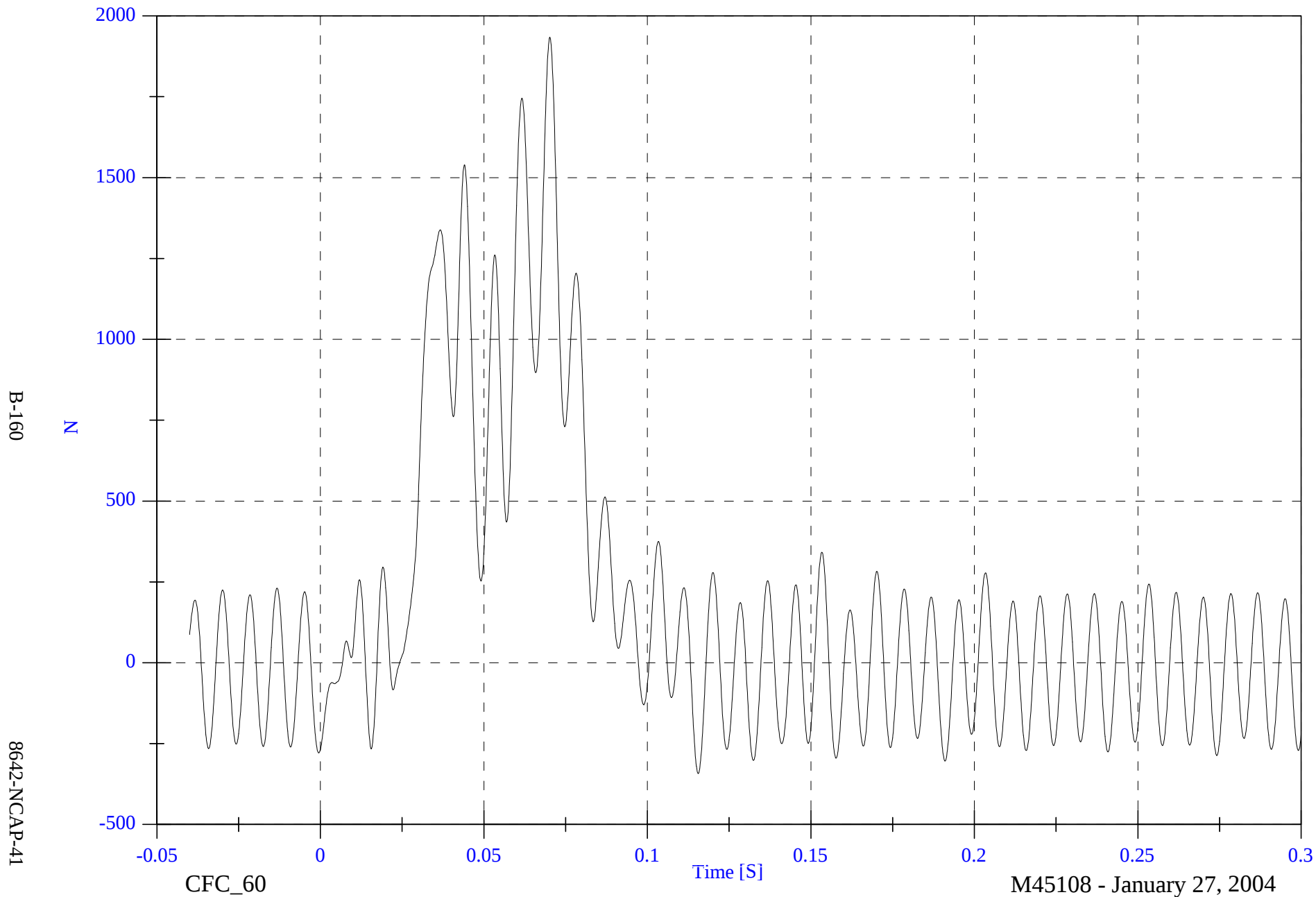


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell B9 Fx

Max: 1933.8 [N] at 0.070 [S]

Min: -342.5 [N] at 0.116 [S]

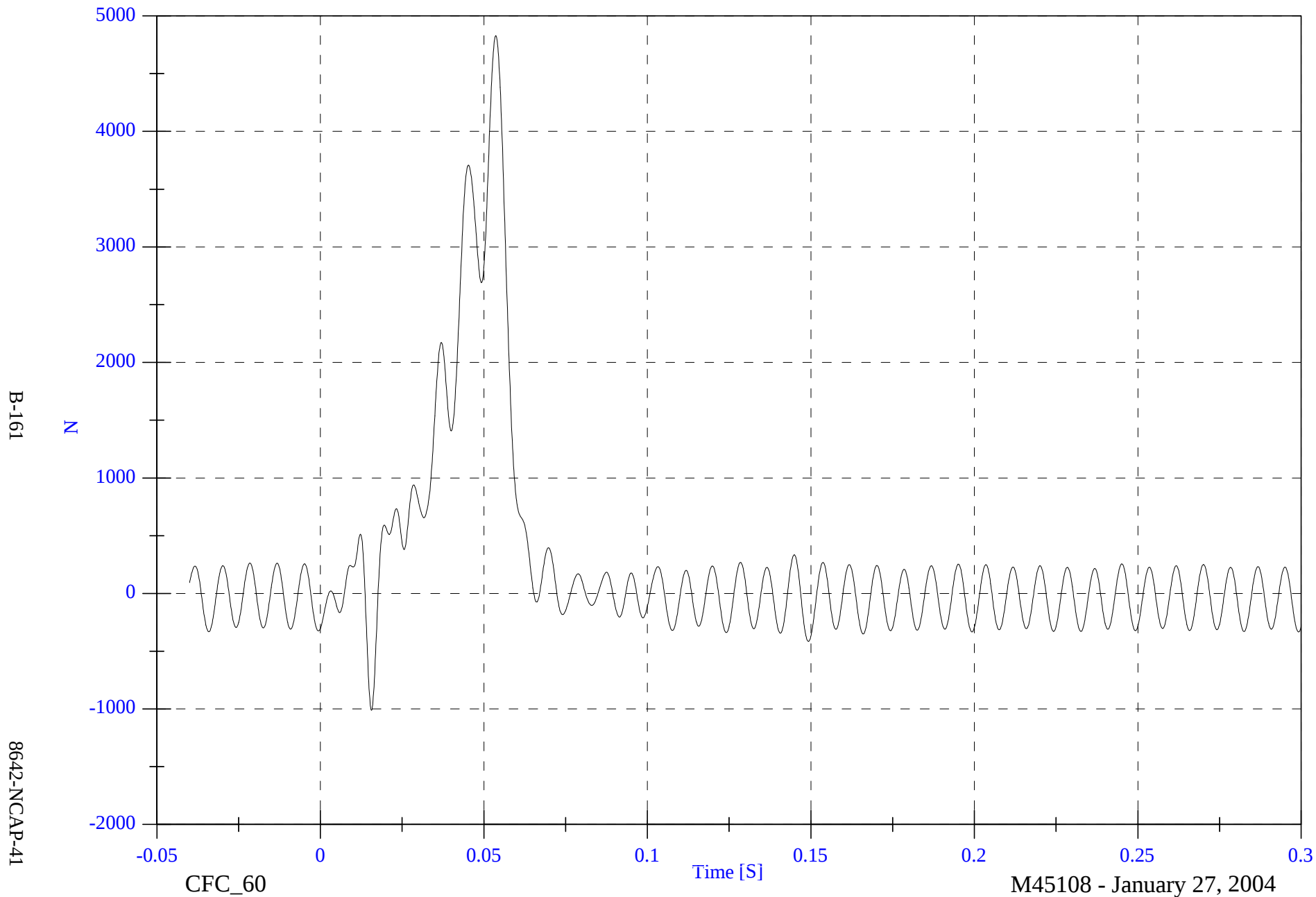


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell C1 Fx

Max: 4828.5 [N] at 0.054 [S]

Min: -1012.0 [N] at 0.016 [S]

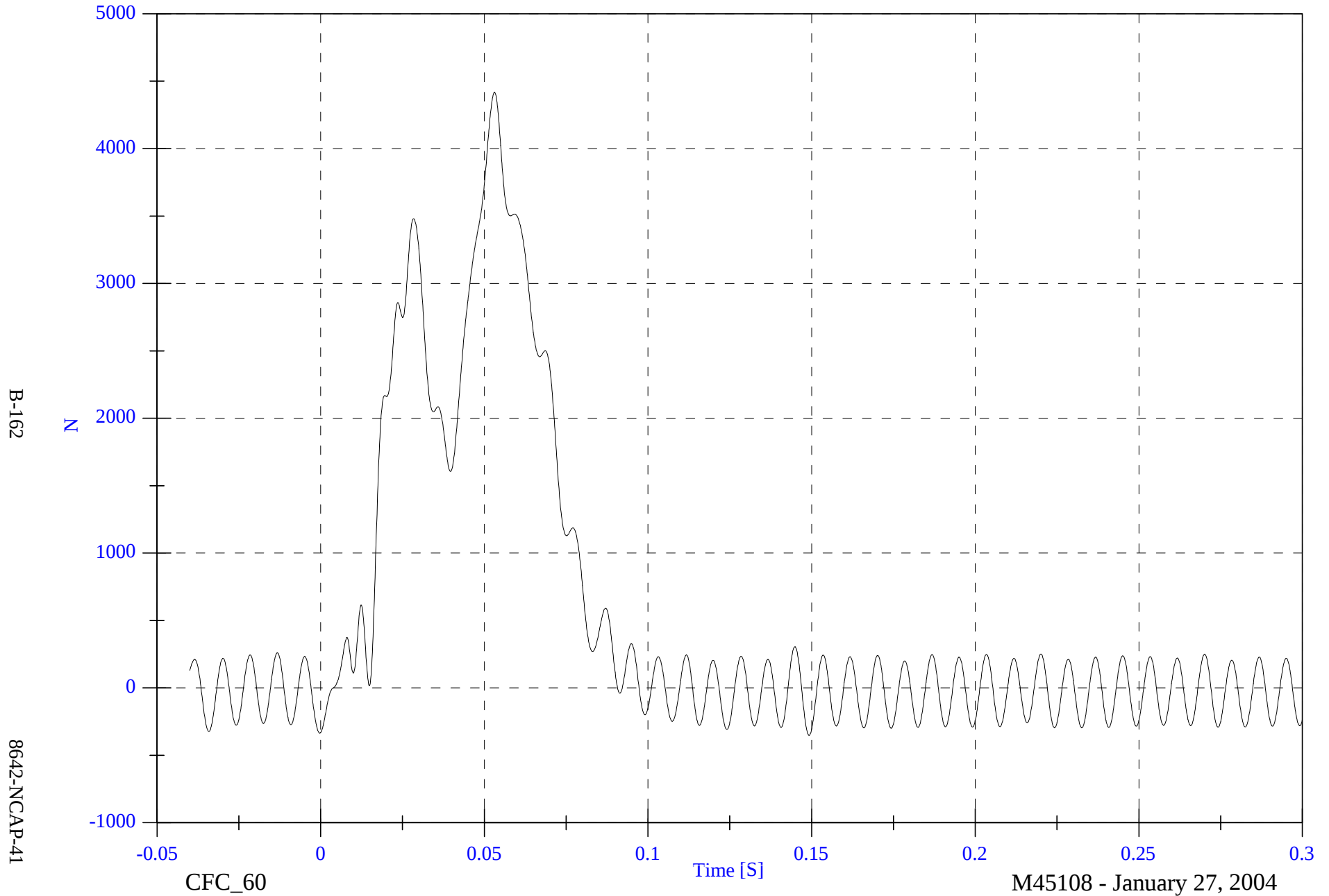


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell C2 Fx

Max: 4417.9 [N] at 0.053 [S]

Min: -351.4 [N] at 0.149 [S]

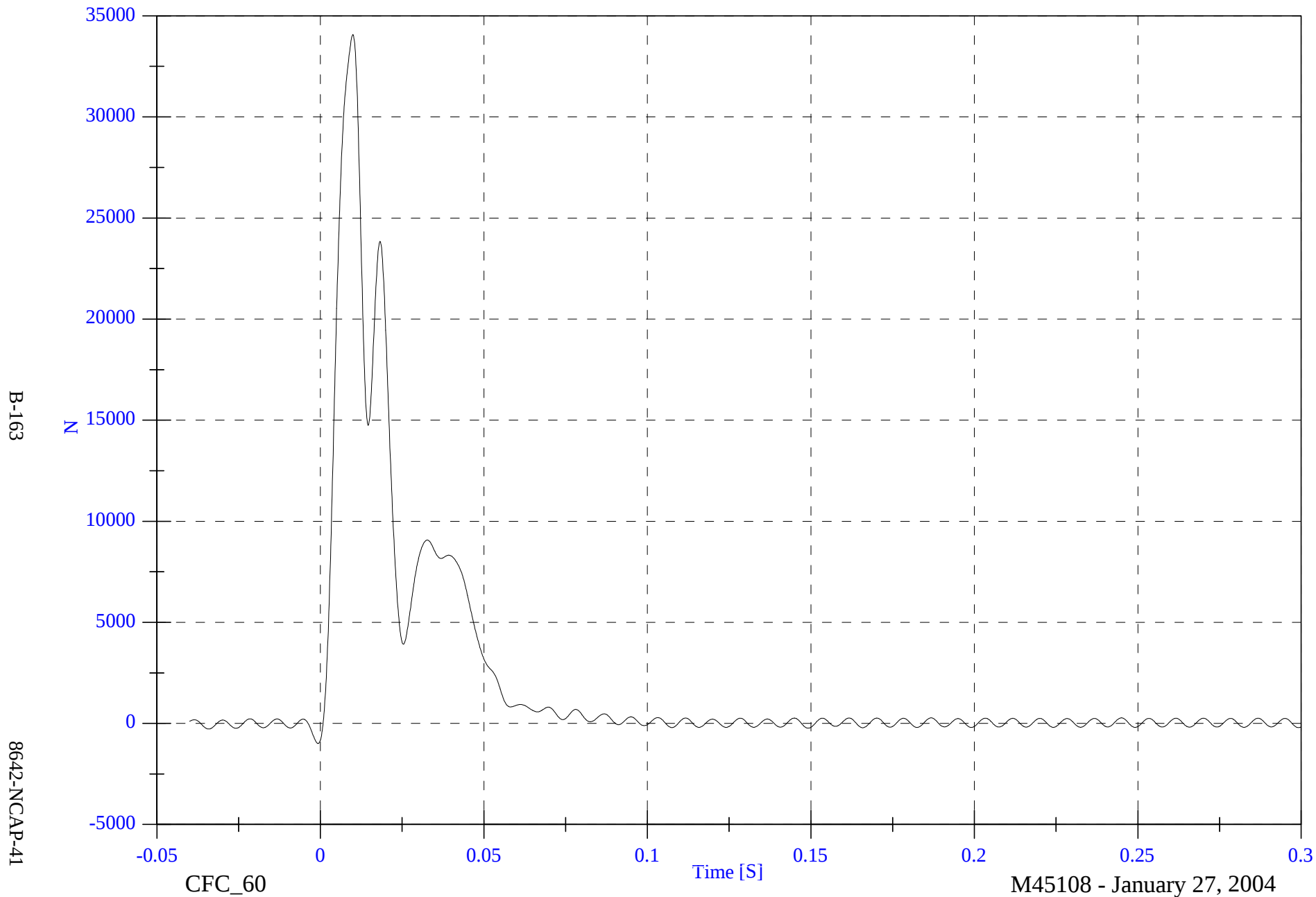


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell C3 Fx

Max: 34071.5 [N] at 0.010 [S]

Min: -994.8 [N] at -0.001 [S]

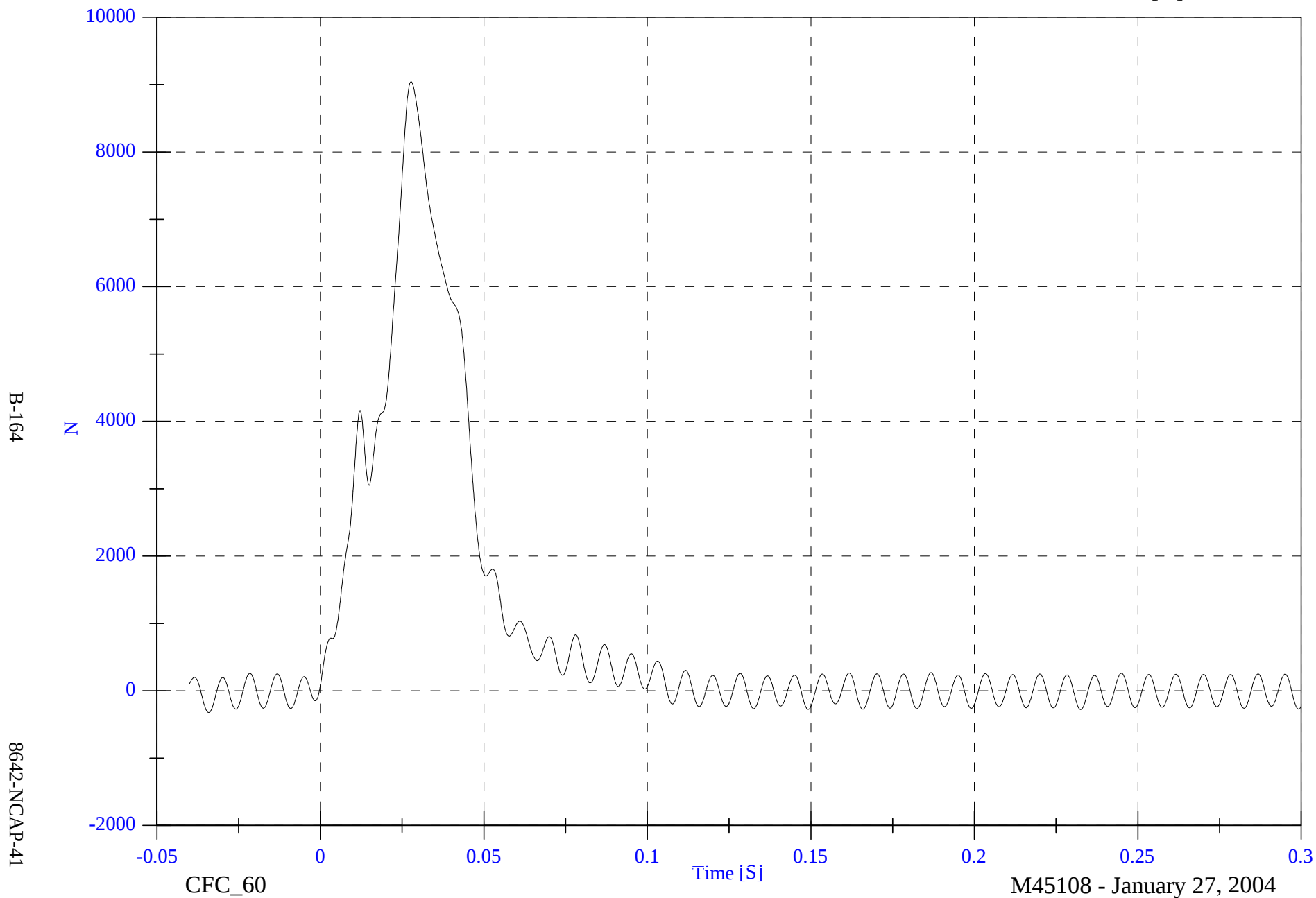


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell C4 Fx

Max: 9042.9 [N] at 0.028 [S]

Min: -323.3 [N] at -0.034 [S]

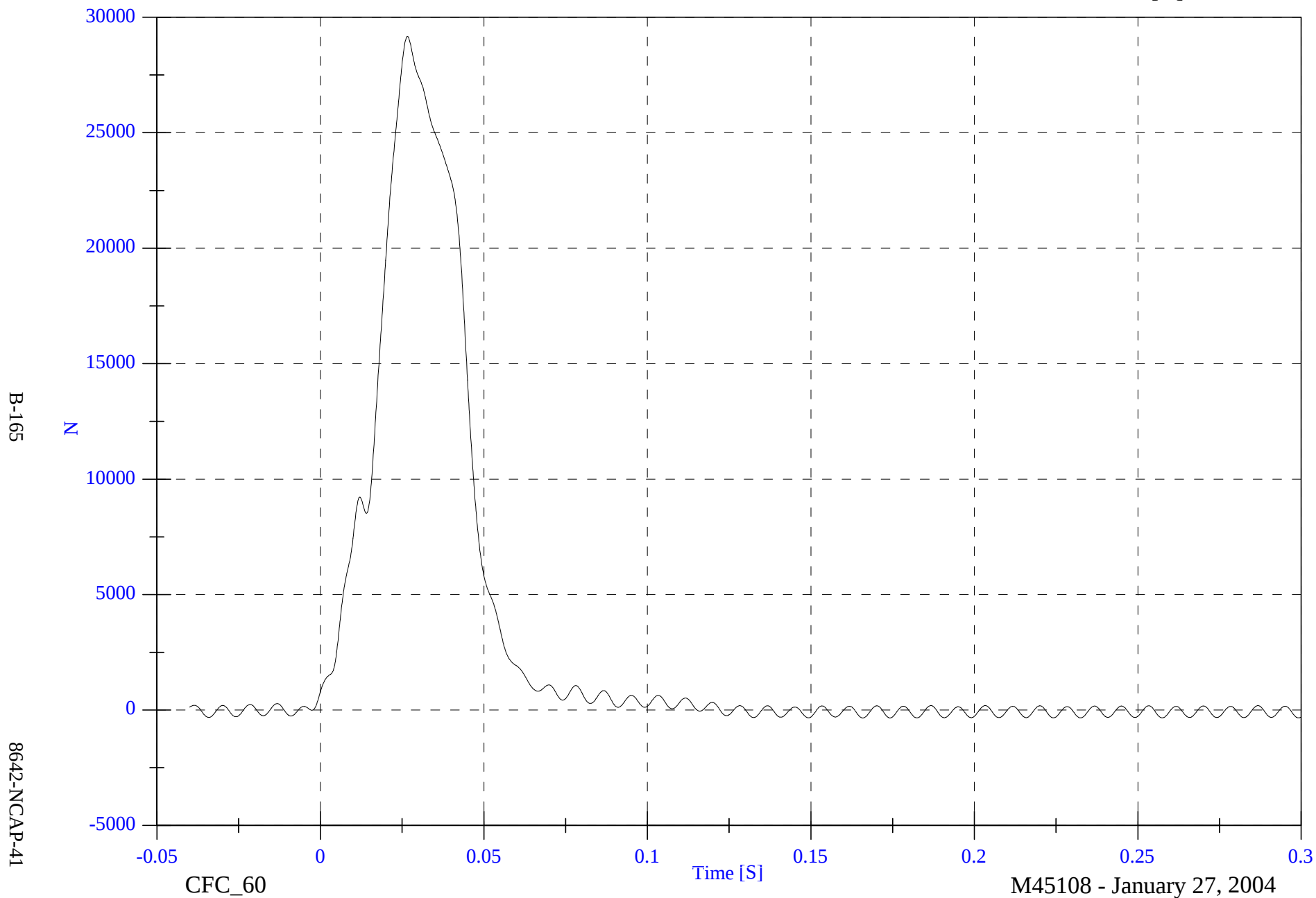


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell C5 Fx

Max: 29169.5 [N] at 0.027 [S]

Min: -343.6 [N] at 0.174 [S]

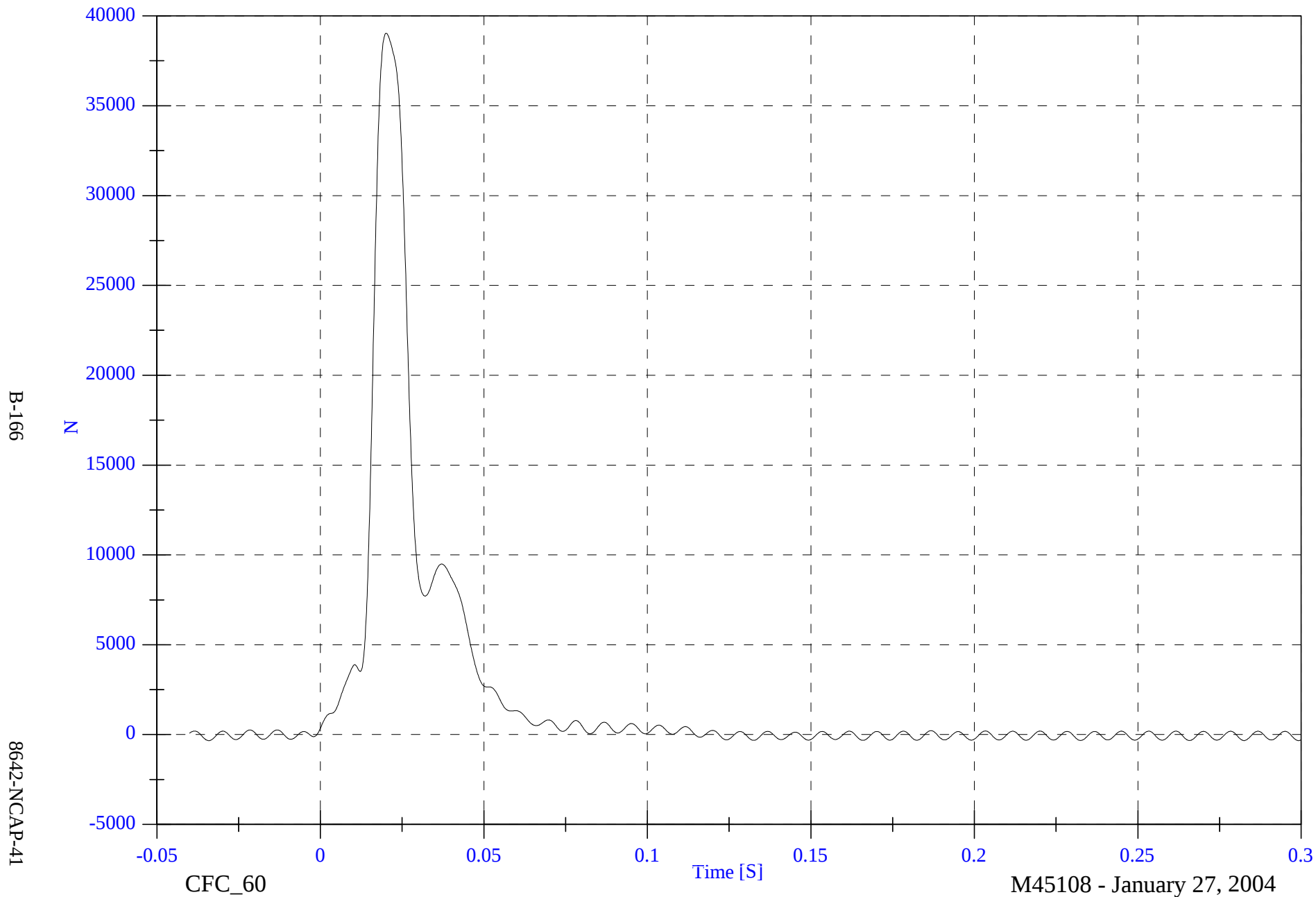


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell C6 Fx

Max: 39030.1 [N] at 0.020 [S]

Min: -332.7 [N] at -0.034 [S]

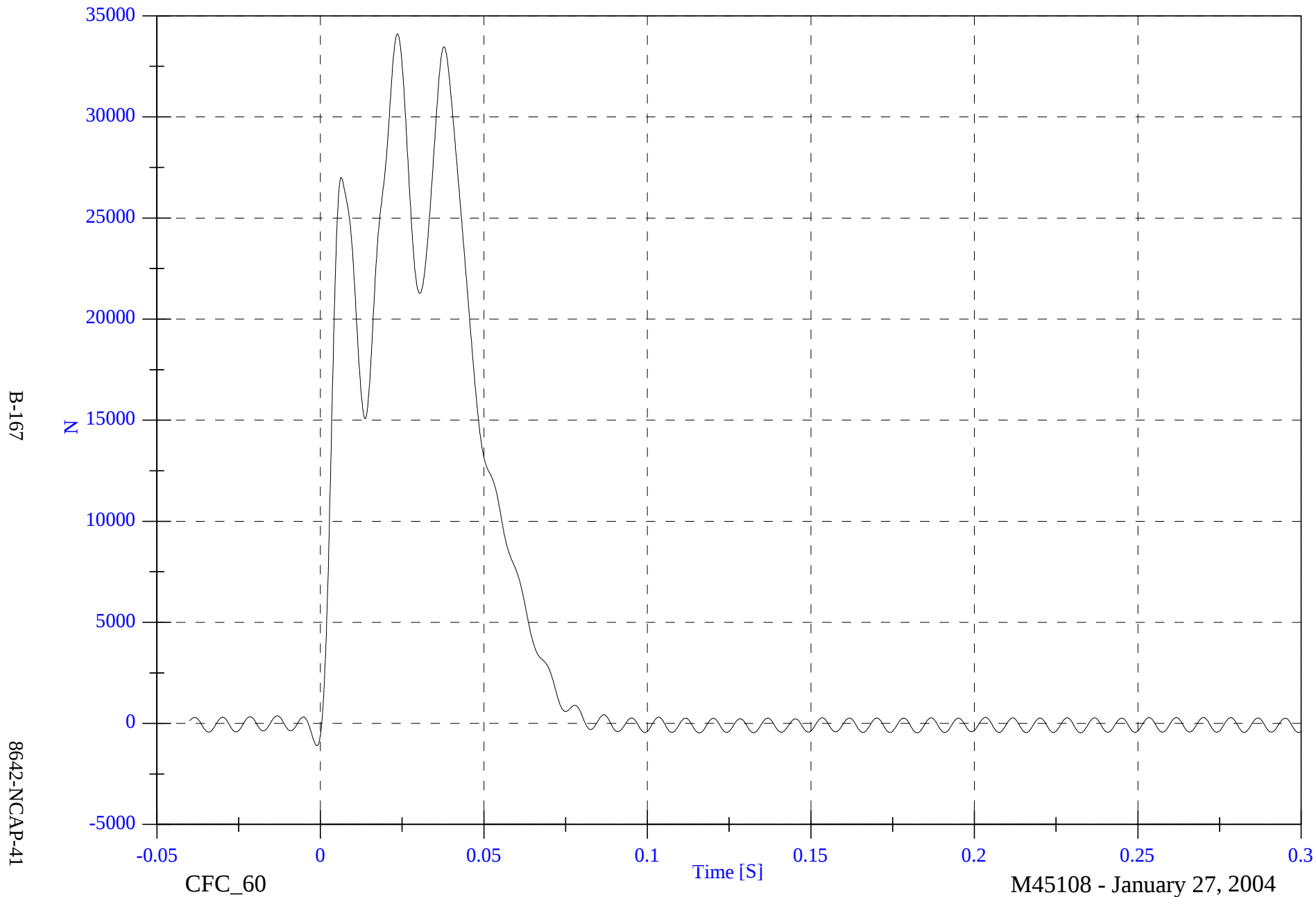


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell C7 Fx

Max: 34107.8 [N] at 0.024 [S]

Min: -1101.4 [N] at -0.001 [S]

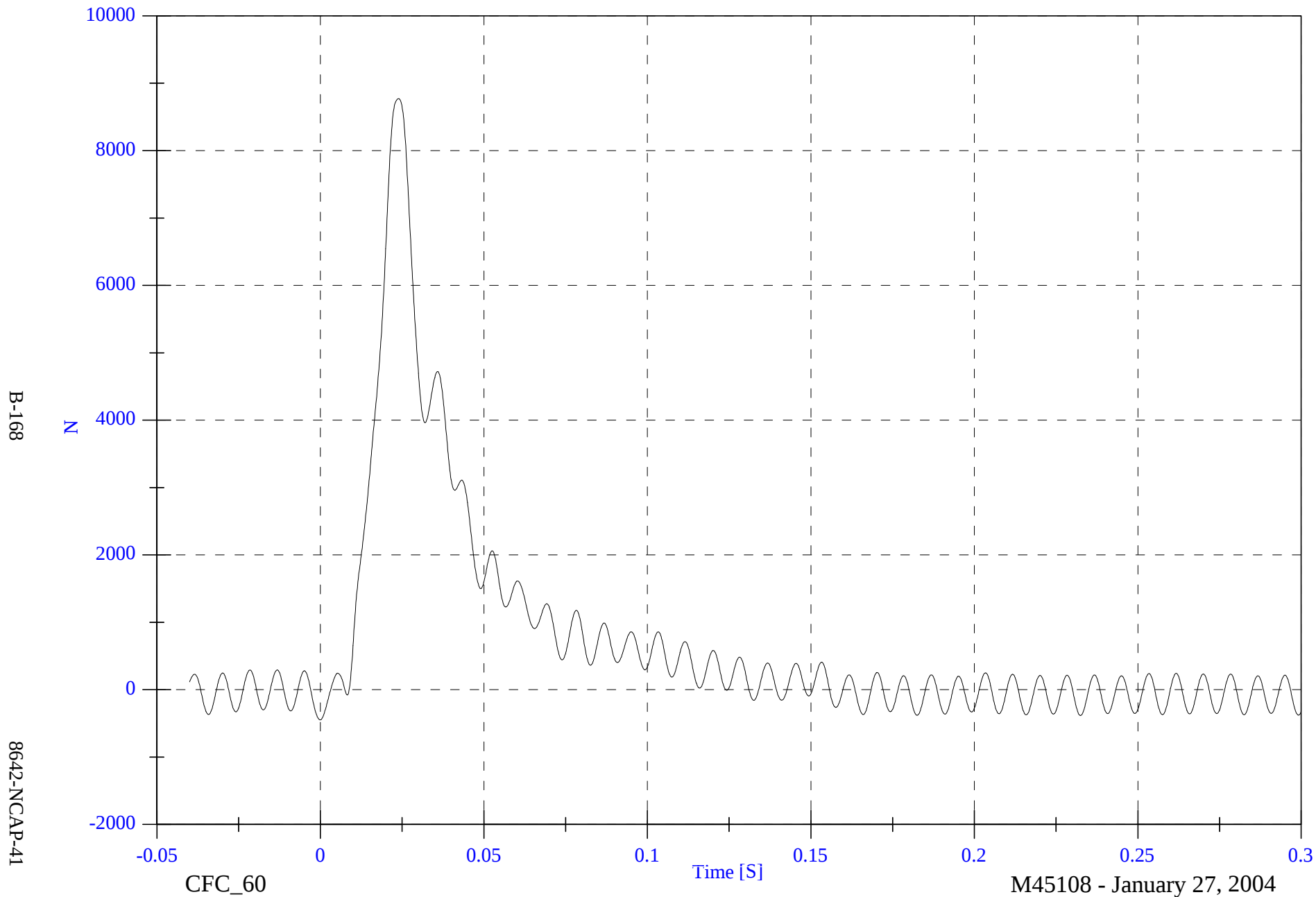


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell C8 Fx

Max: 8772.8 [N] at 0.024 [S]

Min: -447.7 [N] at -0.000 [S]

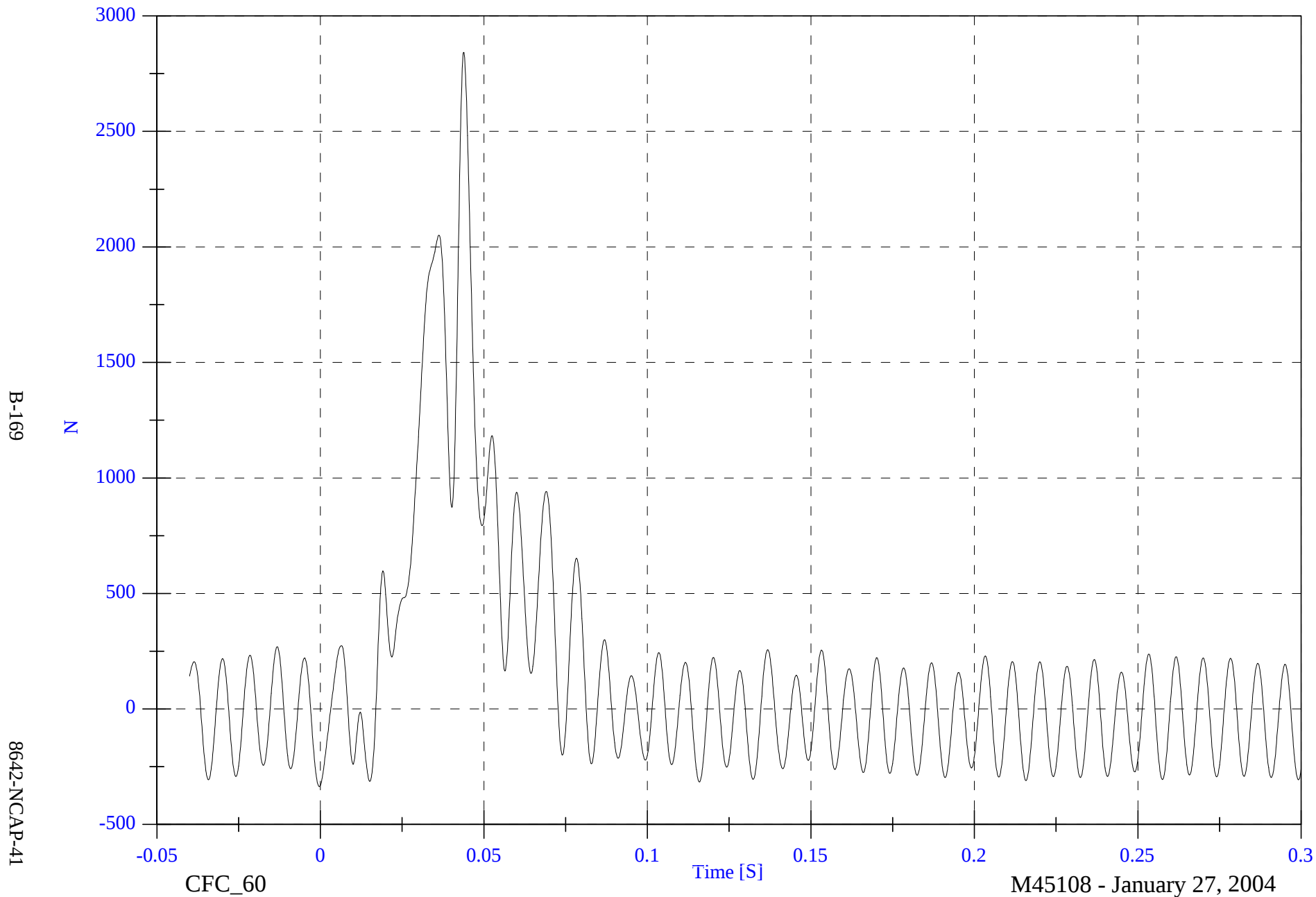


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell C9 Fx

Max: 2842.7 [N] at 0.044 [S]

Min: -335.9 [N] at -0.000 [S]

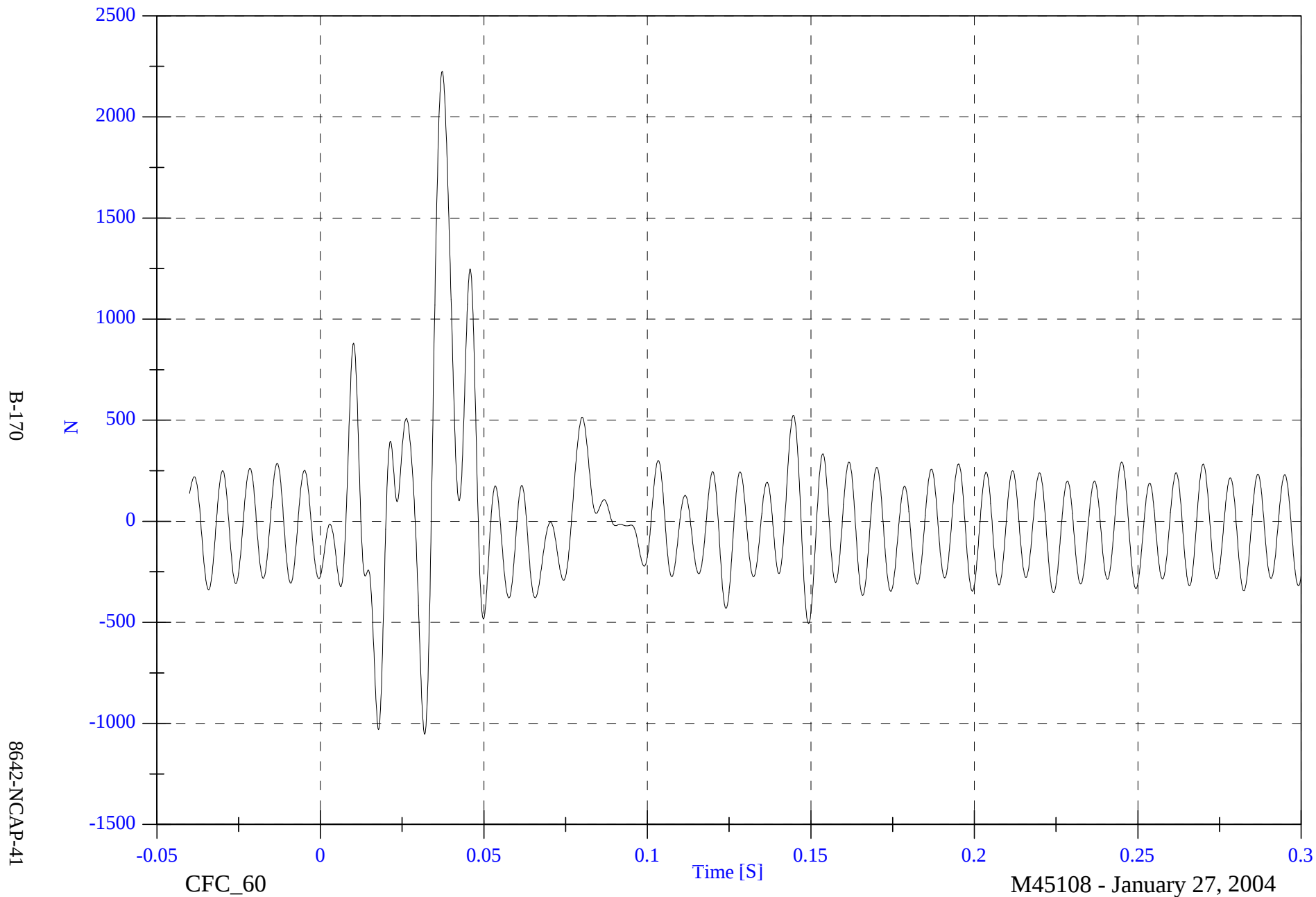


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell D1 Fx

Max: 2225.3 [N] at 0.037 [S]

Min: -1053.7 [N] at 0.032 [S]

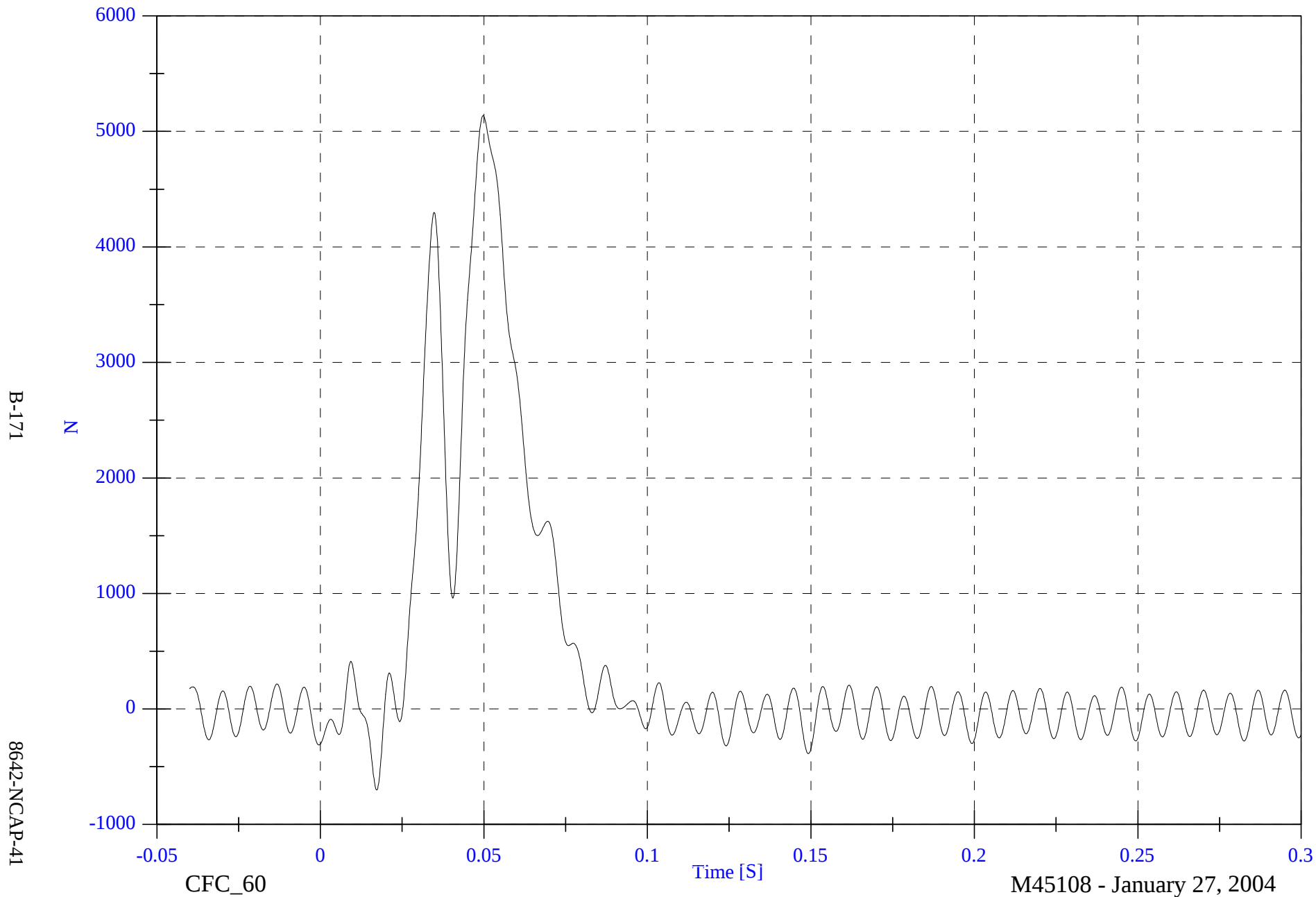


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell D2 Fx

Max: 5137.0 [N] at 0.050 [S]

Min: -702.5 [N] at 0.017 [S]

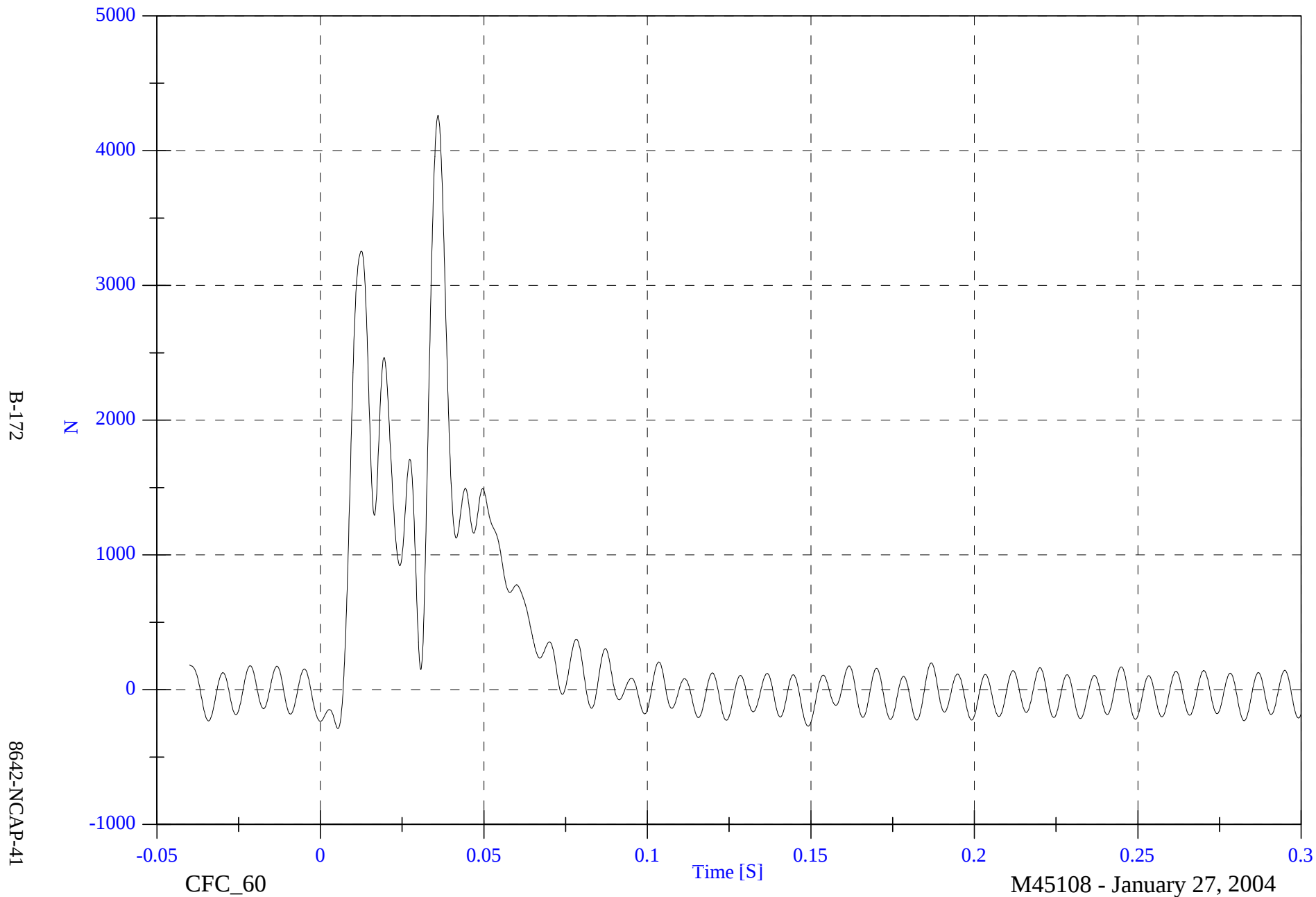


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell D3 Fx

Max: 4262.1 [N] at 0.036 [S]

Min: -287.9 [N] at 0.005 [S]

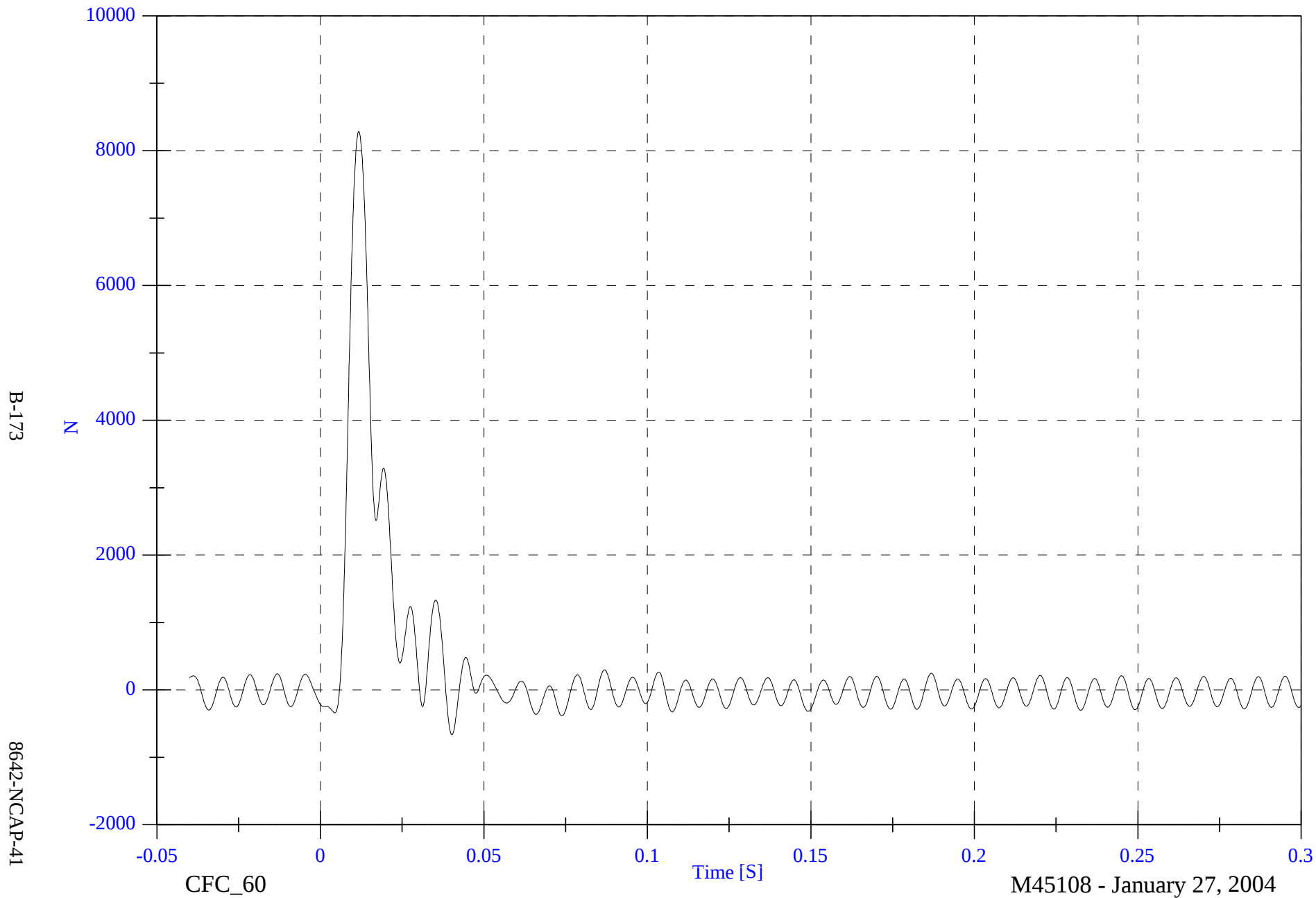


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell D4 Fx

Max: 8286.6 [N] at 0.012 [S]

Min: -663.5 [N] at 0.040 [S]

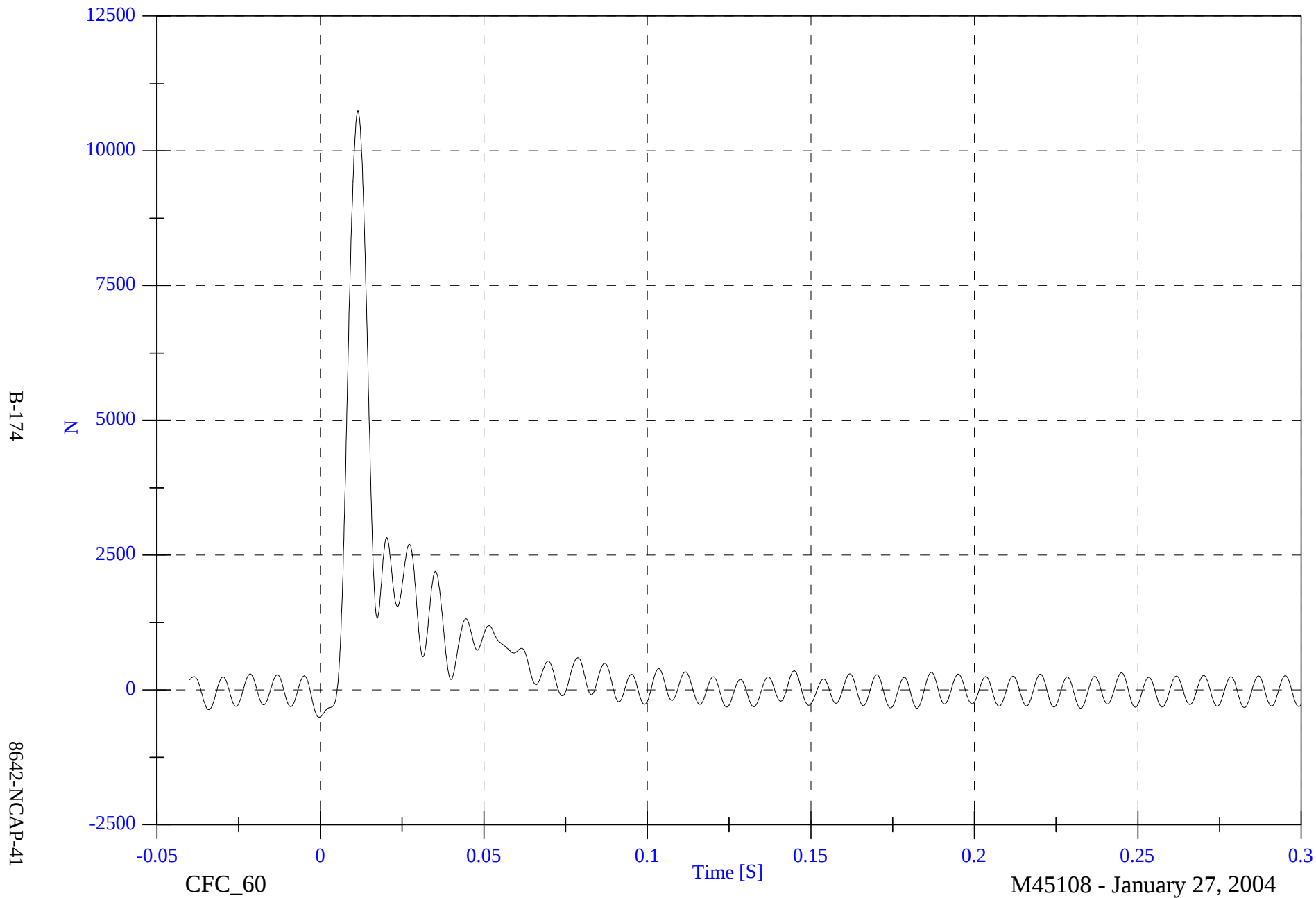


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell D5 Fx

Max: 10740.2 [N] at 0.011 [S]

Min: -505.2 [N] at -0.000 [S]

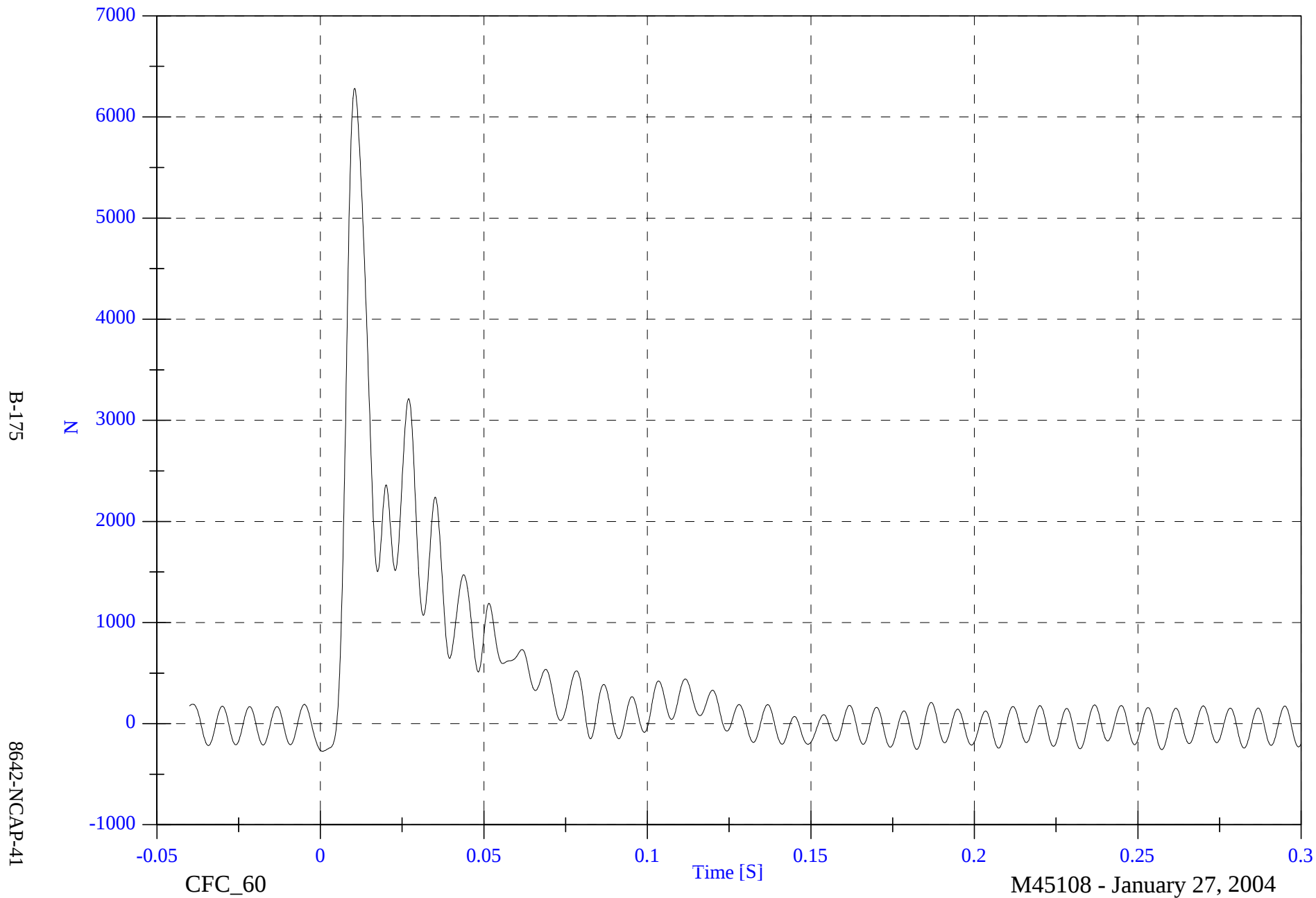


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell D6 Fx

Max: 6283.7 [N] at 0.010 [S]

Min: -273.6 [N] at 0.001 [S]

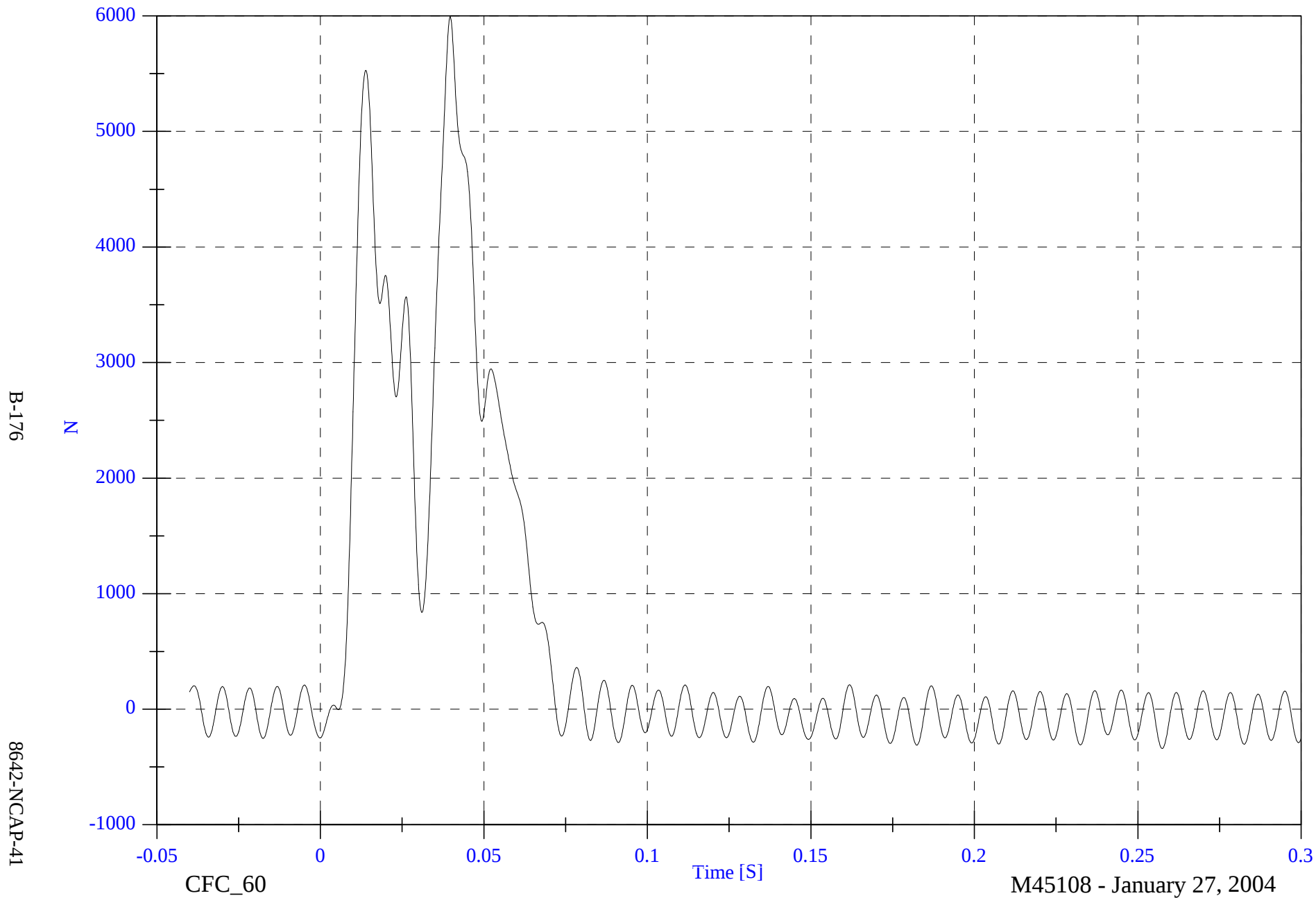


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell D7 Fx

Max: 5994.4 [N] at 0.040 [S]

Min: -340.0 [N] at 0.257 [S]

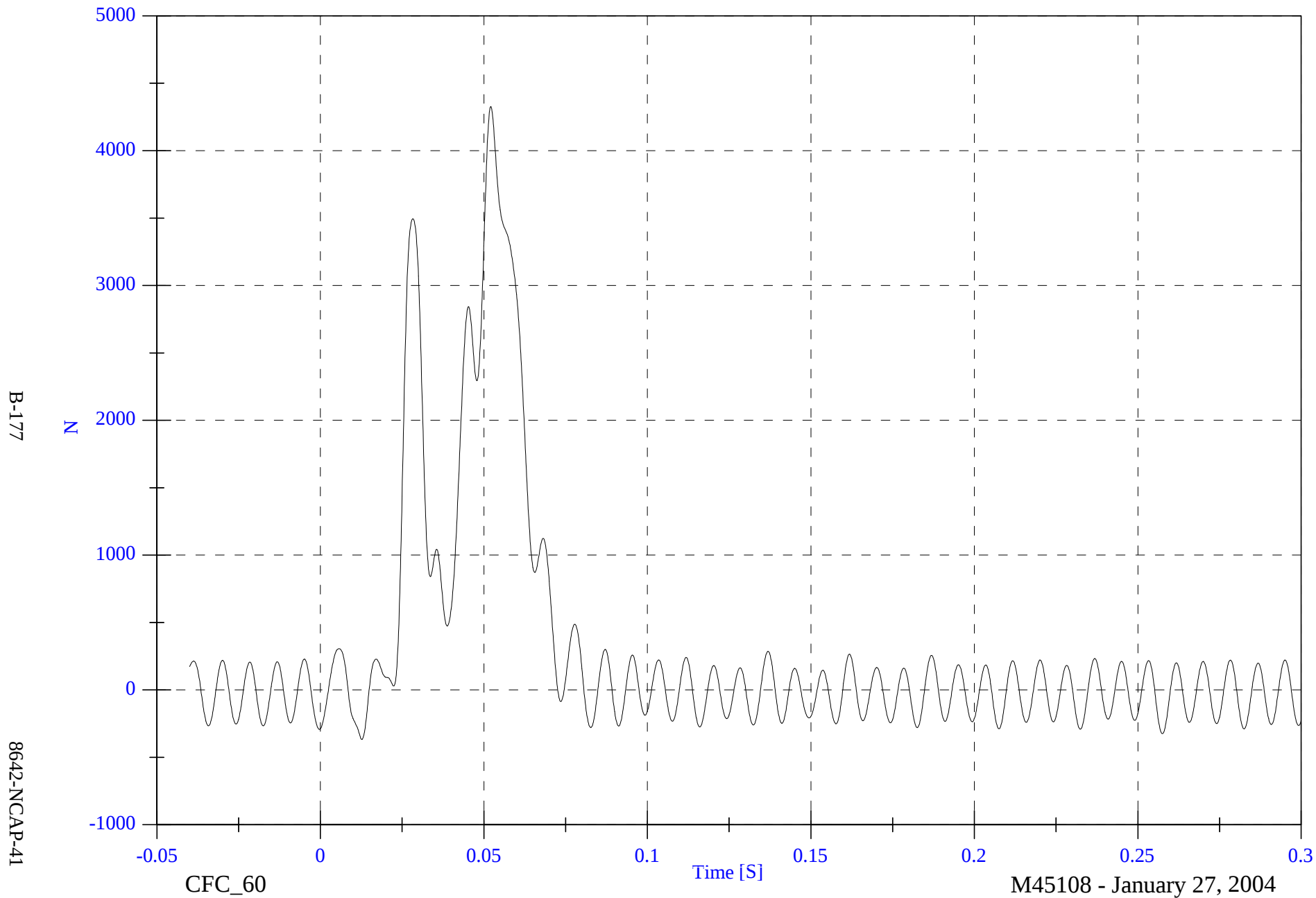


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell D8 Fx

Max: 4327.6 [N] at 0.052 [S]

Min: -367.2 [N] at 0.013 [S]

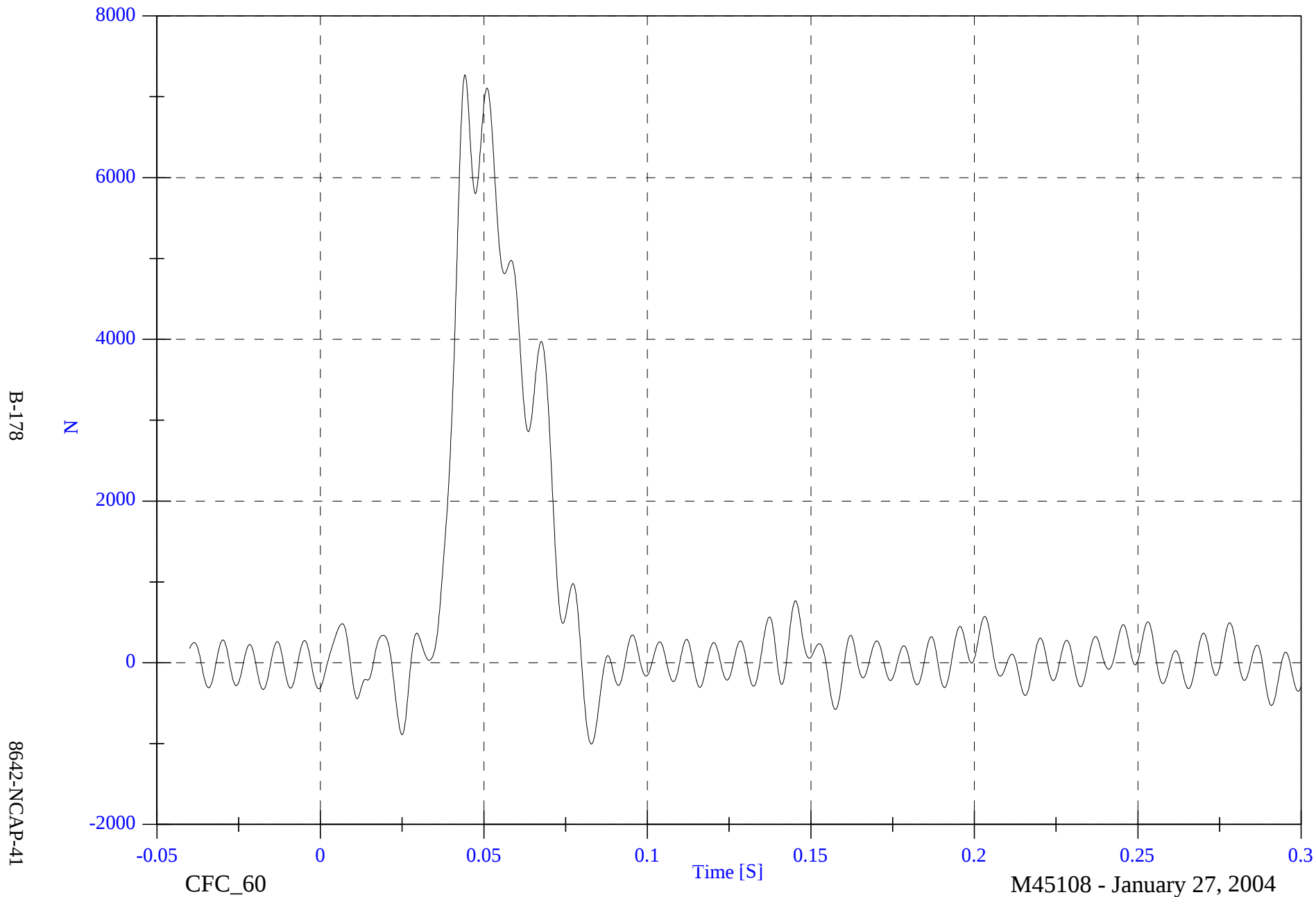


2004 NCAP Test 5 - 2004 Toyota RAV4

Barrier Load Cell D9 Fx

Max: 7271.3 [N] at 0.044 [S]

Min: -1004.8 [N] at 0.083 [S]

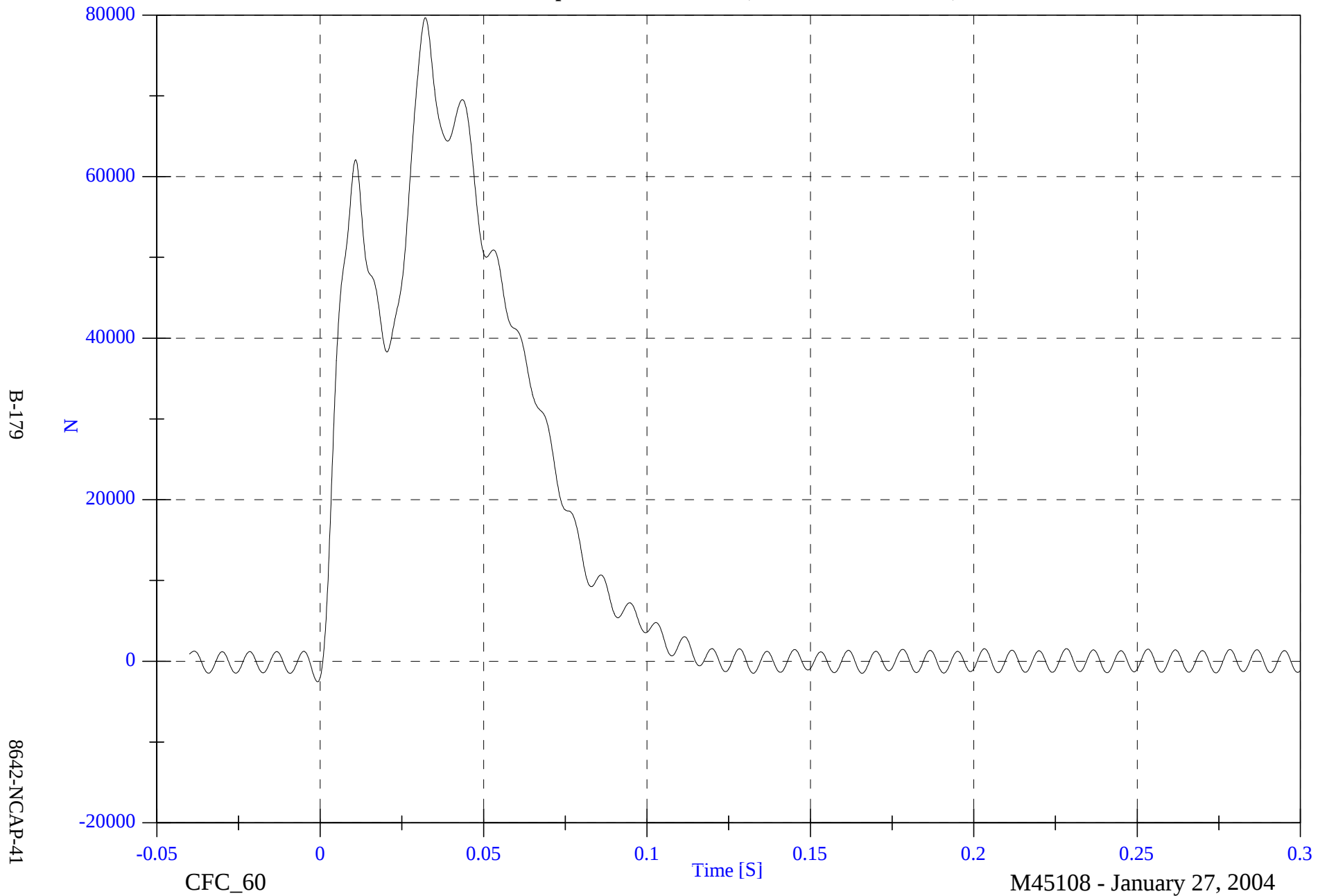


2004 NCAP Test 5 - 2004 Toyota RAV4

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

Max: 79682.3 [N] at 0.032 [S]

Min: -2542.9 [N] at -0.001 [S]

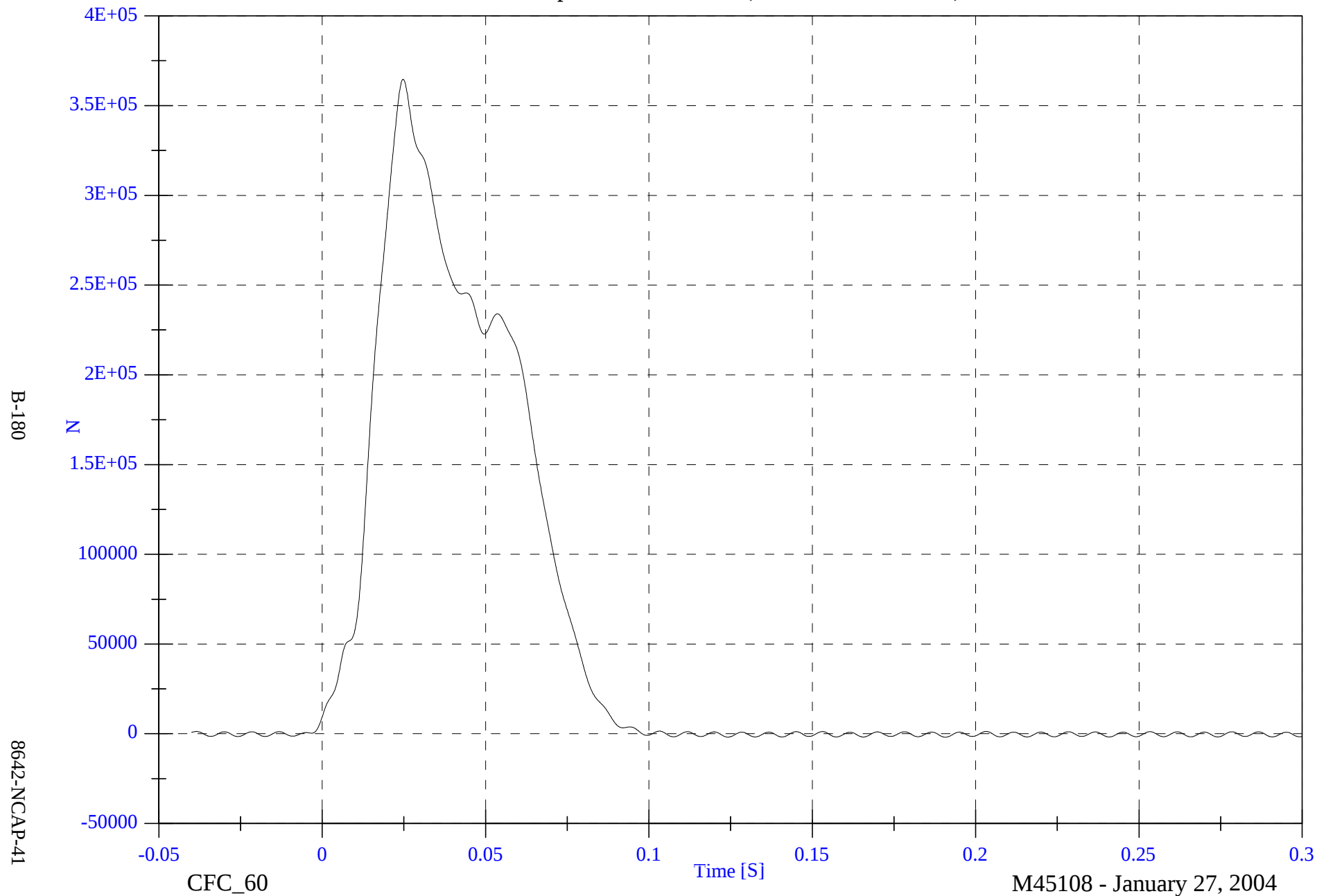


2004 NCAP Test 5 - 2004 Toyota RAV4

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

Max: 364668.0 [N] at 0.025 [S]

Min: -1908.6 [N] at 0.191 [S]

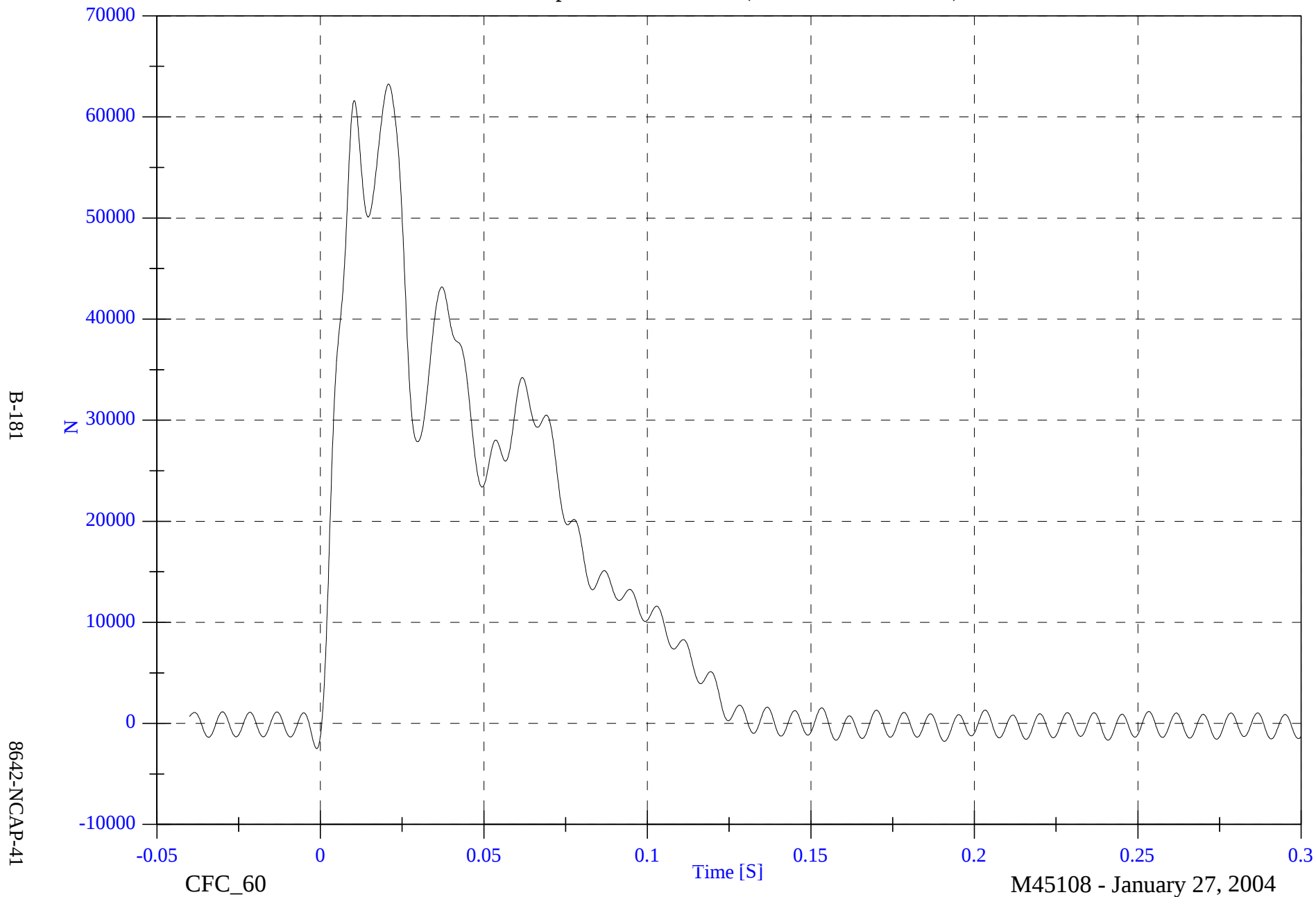


2004 NCAP Test 5 - 2004 Toyota RAV4

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

Max: 63256.2 [N] at 0.021 [S]

Min: -2491.8 [N] at -0.001 [S]

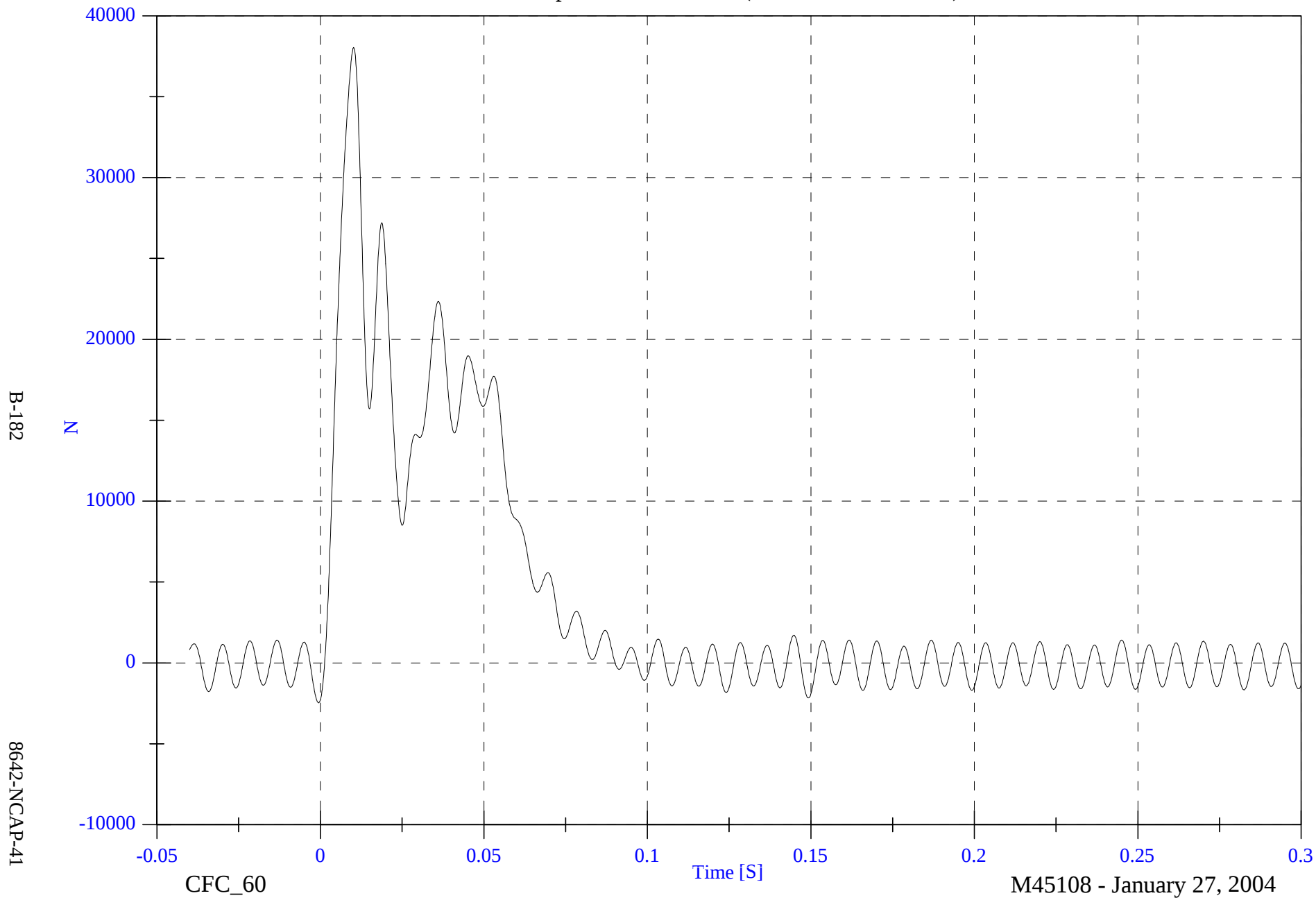


2004 NCAP Test 5 - 2004 Toyota RAV4

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

Max: 38048.4 [N] at 0.010 [S]

Min: -2461.3 [N] at -0.001 [S]

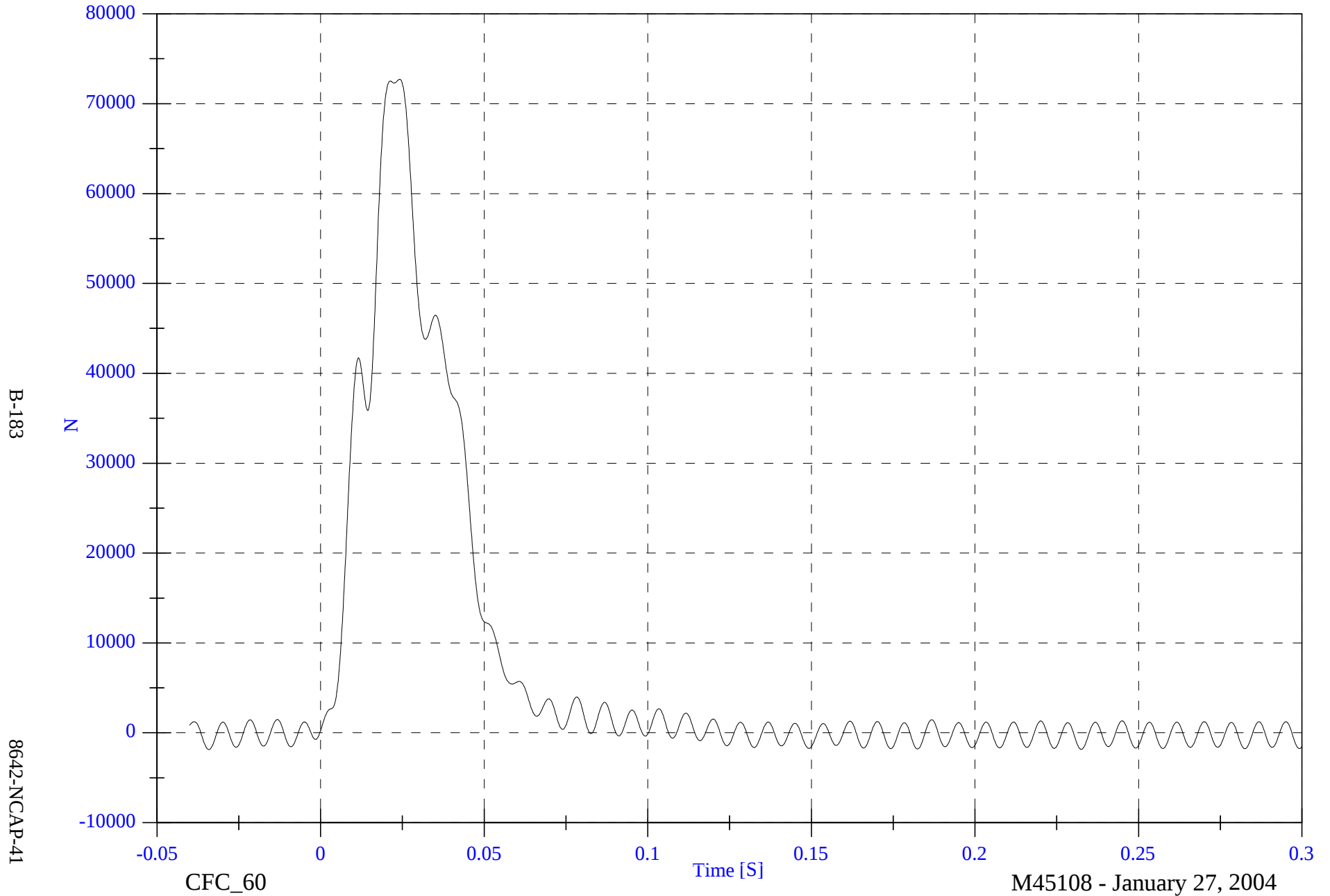


2004 NCAP Test 5 - 2004 Toyota RAV4

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

Max: 72712.4 [N] at 0.024 [S]

Min: -1855.5 [N] at -0.034 [S]

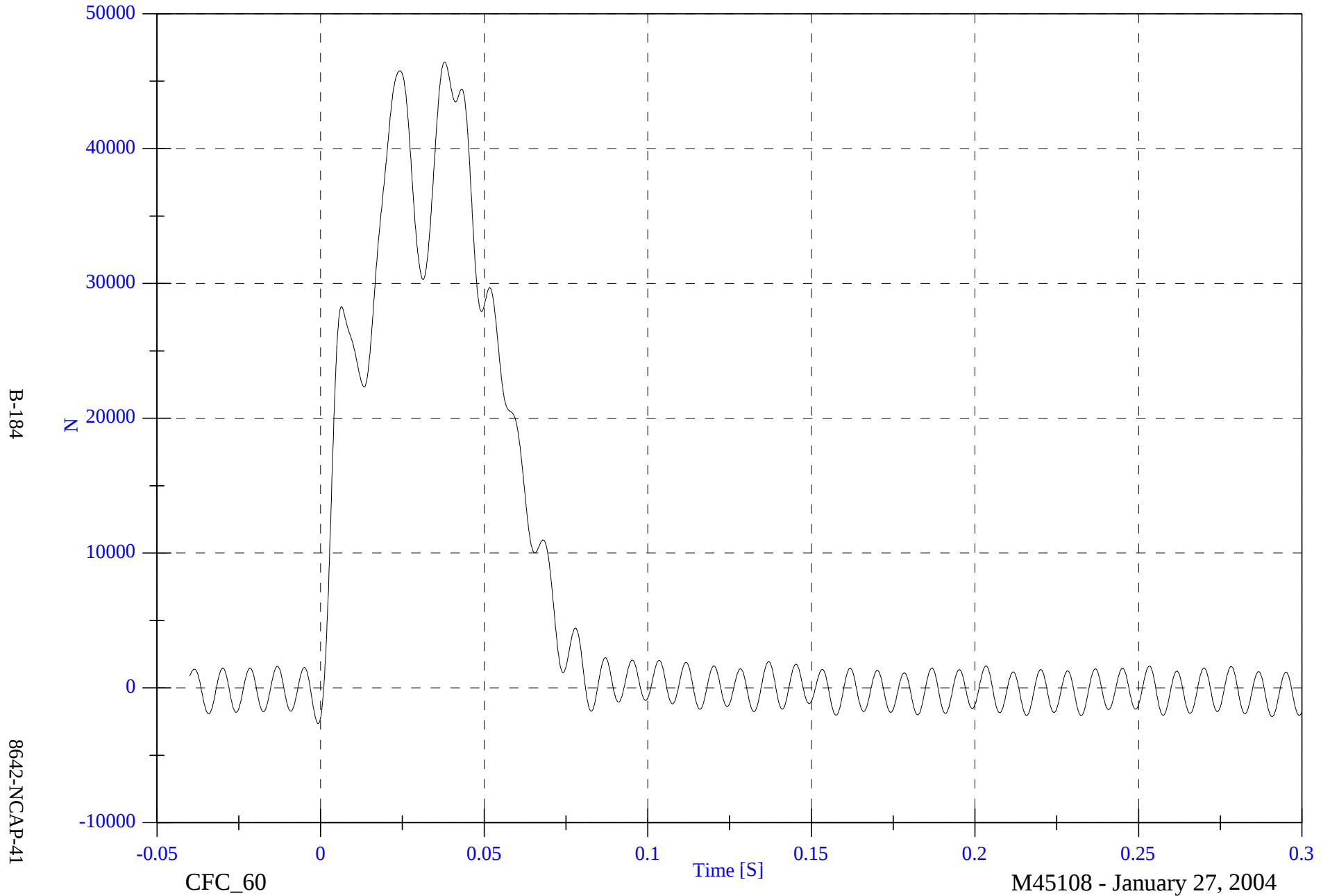


2004 NCAP Test 5 - 2004 Toyota RAV4

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

Max: 46430.3 [N] at 0.038 [S]

Min: -2643.8 [N] at -0.001 [S]

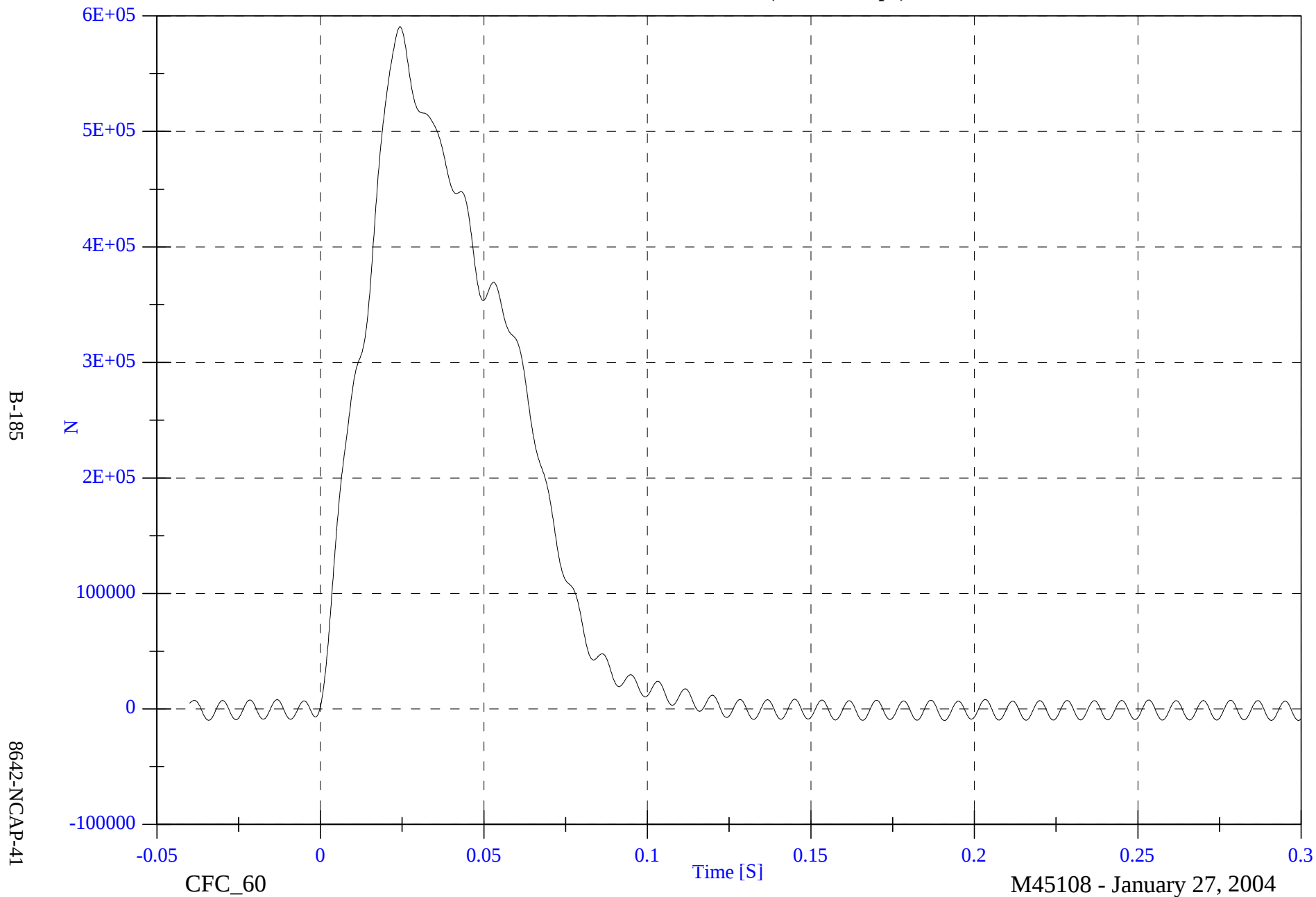


2004 NCAP Test 5 - 2004 Toyota RAV4

Total Load Cell Sum (All 6 Groups)

Max: 590457.8 [N] at 0.024 [S]

Min: -10006.6 [N] at 0.191 [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 General Dynamics . A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

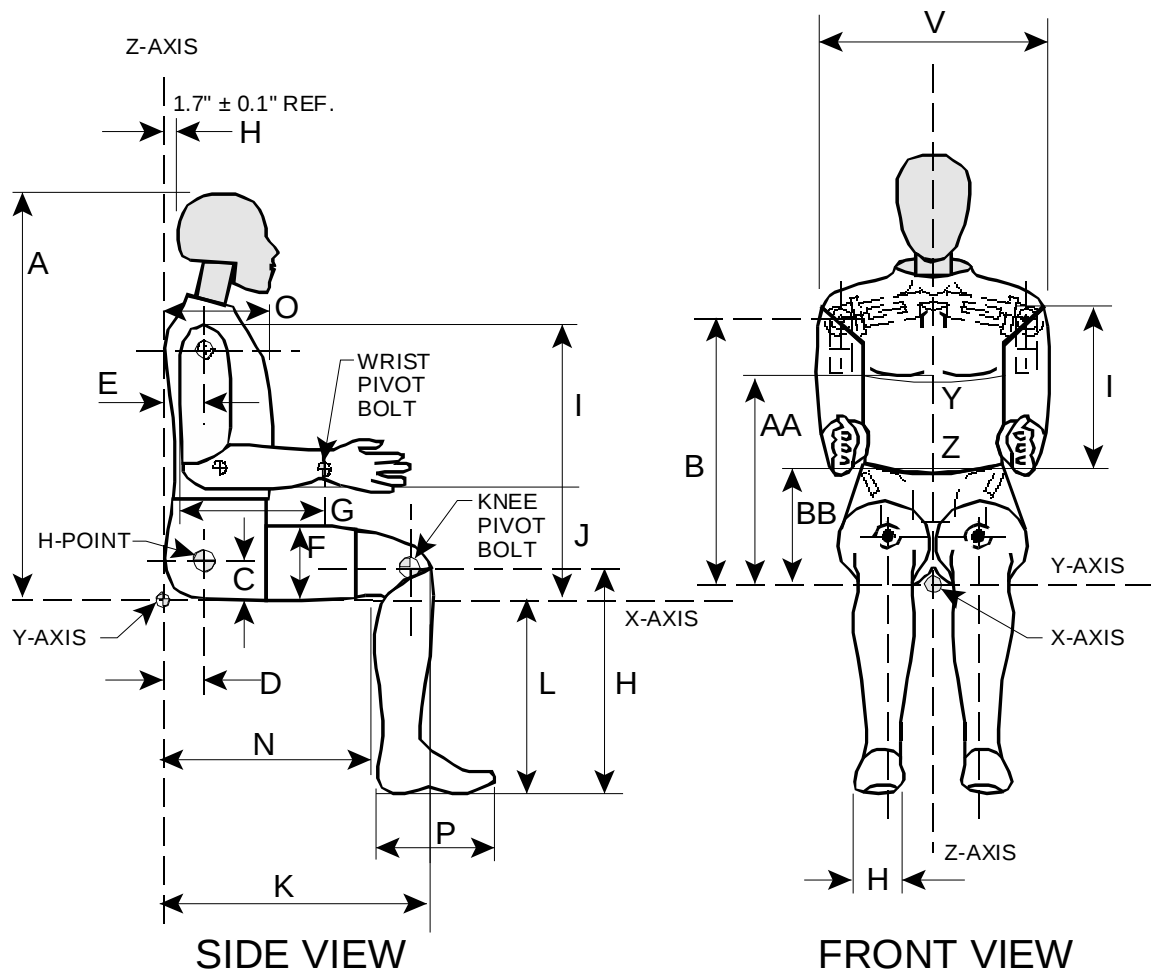
<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	061	1/9/2004
#2/Right Front Passenger	064	1/9/2004

Electronic Test Equipment

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

DUMMY CONFIGURATION DIMENSIONS

EXTERNAL DIMENSIONS SPECIFICATIONS



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

PART 572E
HEAD DROP TEST

Dummy Serial Number 061
Sequential Test Number 1
Date 01-07-04
Workfile 061H 01-07-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.0
Relative Humidity	10% - 70%	35.0
Peak Resultant Acceleration	225-275 G's	273.83
Peak Lateral Acceleration	15 G's Max	12.42
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	061	
Sequential Test Number	1	
Date	01-08-04	6 Axis Neck Transducer
Workfile	061NF1 01-08-04	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	21.11
Relative Humidity		10% - 70%	37.0
Impact Velocity		22.60 - 23.40 Ft/s	6.96
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	22.92
	20 ms	17.60 - 22.60 G's	22.28
	30 ms	12.50 - 18.50 G's	16.01
Max Pendulum G's Above 30 ms		29 G's Max	16.01
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	41.90
D Plane Rotation	Max	64 - 78 Deg	65.59
	Time	57 - 64 ms	49.54
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	104.89
	Time	47 - 58 ms	53.40
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	115.0
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	100.7

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	061	
Sequential Test Number	3	
Date	01-08-04	6 Axis Neck Transducer
Workfile	061NE3 01-08-04	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	21.11
Relative Humidity		10% - 70%	37.00
Impact Velocity		19.50 - 20.30 Ft/s	5.99
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	17.23
	20 ms	14.00 - 19.00 G's	15.23
	30 ms	11.00 - 16.00 G's	11.98
Max Pendulum G's Above 30 ms		22 G's Max	12.01
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	45.60
D Plane Rotation	Max	81 - 106 Deg	88.13
	Time	72 - 82 ms	77.10
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-61.68
	Time	65 - 79 ms	73.80
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	155.40
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	138.30

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 061
Sequential Test Number 1
Date 01-08-04
Workfile 061T 01-08-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.0
Relative Humidity	10% - 70%	37.0
Pendulum Velocity	21.6 - 22.4 Ft/s	22.06
Maximum Deflection	2.50 - 2.86 in	2.51
Maximum Resistive Force	1160 - 1325 Lbs	1315.38
Internal Hysteresis	69 - 85 %	76.30

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 061
Sequential Test Number 1
Date 01-09-04
Workfile 061LF 01-09-04/061RF 01-09-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	34.0
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1170.41
RIGHT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	34.0
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1164.39

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 061
Sequential Test Number 1
Date 01-09-04

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70.0
Relative Humidity			34.0
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	38.9
Waist Circumference	Z	32.9 - 34.1 in	33.5
Chest Depth	O	8.4 - 9.0 in	8.5
H-Point Height	C	3.3 - 3.5 in	3.5
H-Point from Backline	D	5.3 - 5.5 in	5.3
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.6
Thigh Clearance	F	5.5 - 6.1 in	6.1
Buttock Knee Length	K	22.8 - 23.8 in	23.7
Buttock Popliteal Length	N	17.8 - 18.8 in	18.0
Popliteal Height	L	16.9 - 17.9 in	17.3
Knee Pivot Height	M	19.1 - 19.7 in	19.3
Foot Length	P	9.9 - 10.5 in	10.3
Foot Breadth	W	3.6 - 4.2 in	14.6
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.4
Shoulder Breadth	V	16.6 - 17.2 in	16.5
Shoulder Pivot Height	B	19.9 - 20.5 in	20.1
Elbow Rest Height	J	7.5 - 8.3 in	8.3
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.1
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
HEAD DROP TEST

Dummy Serial Number 064
Sequential Test Number 1
Date 01-07-04
Workfile 064H1 01-07-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.0
Relative Humidity	10% - 70%	34.0
Peak Resultant Acceleration	225-275 G's	245.44
Peak Lateral Acceleration	15 G's Max	14.99
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	064	
Sequential Test Number	1	
Date	01-08-04	6 Axis Neck Transducer
Workfile	064NF1 01-08-04	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	21.11
Relative Humidity		10% - 70%	37.00
Impact Velocity		22.60 - 23.40 Ft/s	7.04
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	23.40
	20 ms	17.60 - 22.60 G's	20.16
	30 ms	12.50 - 18.50 G's	13.96
Max Pendulum G's Above 30 ms		29 G's Max	13.96
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	39.00
D Plane Rotation	Max	64 - 78 Deg	64.38
	Time	57 - 64 ms	57.30
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	106.31
	Time	47 - 58 ms	52.80
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	116.80
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	101.20

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	064	
Sequential Test Number	1	
Date	01-08-04	6 Axis Neck Transducer
Workfile	064NE 01-08-04	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	21.11
Relative Humidity		10% - 70%	37.00
Impact Velocity		19.50 - 20.30 Ft/s	5.99
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	20.90
	20 ms	14.00 - 19.00 G's	18.43
	30 ms	11.00 - 16.00 G's	13.85
Max Pendulum G's Above 30 ms		22 G's Max	13.85
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	38.10
D Plane Rotation	Max	81 - 106 Deg	94.99
	Time	72 - 82 ms	74.70
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-74.94
	Time	65 - 79 ms	69.70
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	153.90
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	132.80

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 064
Sequential Test Number 1
Date 01-09-04
Workfile 064T 01-09-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.0
Relative Humidity	10% - 70%	33.0
Pendulum Velocity	21.6 - 22.4 Ft/s	22.33
Maximum Deflection	2.50 - 2.86 in	2.53
Maximum Resistive Force	1160 - 1325 Lbs	1320.11
Internal Hysteresis	69 - 85 %	75.30

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 064
Sequential Test Number 1
Date 01-09-04
Workfile 064LF 01-09-04/064RF 01-09-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	34.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1142.42
RIGHT KNEE		
Temperature	66 - 78 Deg F	70.0
Relative Humidity	10% - 70%	34.00
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1130.84

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 064
Sequential Test Number 1
Date 01-09-2004

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70.00
Relative Humidity			34.00
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	38.9
Waist Circumference	Z	32.9 - 34.1 in	33.7
Chest Depth	O	8.4 - 9.0 in	8.9
H-Point Height	C	3.3 - 3.5 in	3.5
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.6
Thigh Clearance	F	5.5 - 6.1 in	5.9
Buttock Knee Length	K	22.8 - 23.8 in	23.0
Buttock Popliteal Length	N	17.8 - 18.8 in	18.5
Popliteal Height	L	16.9 - 17.9 in	17.5
Knee Pivot Height	M	19.1 - 19.7 in	19.4
Foot Length	P	9.9 - 10.5 in	10.1
Foot Breadth	W	3.6 - 4.2 in	14.2
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.5
Shoulder Breadth	V	16.6 - 17.2 in	16.6
Shoulder Pivot Height	B	19.9 - 20.5 in	20.2
Elbow Rest Height	J	7.5 - 8.3 in	8.2
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.5
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.5

Remarks:

Laboratory Technician:

B. Swiecicki

APPENDIX D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 061)		Manufacturer	Serial #	Calibration	
				Last	Next
Head 9 Array	X Arm Y	ENDEVCO	AC-P21399	6-Nov-03	6-May-04
	X Arm Z	ENDEVCO	AC-P23282	11-Nov-03	11-May-04
	Y Arm X	ENDEVCO	AC-P23155	11-Nov-03	11-May-04
	Y Arm Z	ENDEVCO	AC-P23358	6-Nov-03	6-May-04
	Z Arm X	ENDEVCO	AC-P18731	11-Nov-03	11-May-04
	Z Arm Y	ENDEVCO	AC-P19217	26-Nov-03	26-May-04
Head	X	ENDEVCO	AC-P18516	11-Nov-03	11-May-04
	Y	ENDEVCO	AC-P19222	11-Nov-03	11-May-04
	Z	ENDEVCO	AC-P18558	26-Nov-03	26-May-04
Head	X (R)	ENDEVCO	AC-P18663	11-Nov-03	11-May-04
	Y (R)	ENDEVCO	AC-P18639	11-Nov-03	11-May-04
	Z (R)	ENDEVCO	AC-P18537	11-Nov-03	11-May-04
Neck Load Cell	X	DENTON	LC-076Fx	24-Sep-03	24-Mar-04
	Y	DENTON	LC-076Fy	24-Sep-03	24-Mar-04
	Z	DENTON	LC-076Fz	24-Sep-03	24-Mar-04
Neck Moment	X	DENTON	LC-076Mx	24-Sep-03	24-Mar-04
	Y	DENTON	LC-076My	24-Sep-03	24-Mar-04
	Z	DENTON	LC-076Mz	24-Sep-03	24-Mar-04
Chest	X	ENDEVCO	AC-P21373	30-Oct-03	29-Apr-04
	Y	ENDEVCO	AC-P22639	30-Oct-03	29-Apr-04
	Z	ENDEVCO	AC-P21297	30-Oct-03	29-Apr-04
Chest	X (R)	ENDEVCO	AC-P21171	30-Oct-03	29-Apr-04
	Y (R)	ENDEVCO	AC-P23136	30-Oct-03	29-Apr-04
	Z (R)	ENDEVCO	AC-P23128	30-Oct-03	29-Apr-04
Chest Deflection	X	SERVO	DS-061	11-Nov-03	11-May-04
Pelvic	X	ENDEVCO	AC-P18792	11-Nov-03	11-May-04
	Y	ENDEVCO	AC-P17535	11-Nov-03	11-May-04
	Z	ENDEVCO	AC-P23134	11-Nov-03	11-May-04

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 061)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	DENTON	LC-231	3-Dec-03	2-Jun-04
Right Femur Load Cell	Fz	DENTON	LC-232	3-Dec-03	2-Jun-04
Left Upper Tibia	Mx	DENTON	LC-038Mx	26-Sep-03	26-Mar-04
	My	DENTON	LC-038My	26-Sep-03	26-Mar-04
Left Lower Tibia	Fz	DENTON	LC-124Fz	26-Sep-03	26-Mar-04
	Mx	DENTON	LC-124Mx	26-Sep-03	26-Mar-04
	My	DENTON	LC-124My	26-Sep-03	26-Mar-04
Right Upper Tibia	Mx	DENTON	LC-023Mx	26-Sep-03	26-Mar-04
	My	DENTON	LC-023My	26-Sep-03	26-Mar-04
Right Lower Tibia	Fz	DENTON	LC-111Fz	26-Sep-03	26-Mar-04
	Mx	DENTON	LC-111Mx	26-Sep-03	26-Mar-04
	My	DENTON	LC-111My	26-Sep-03	26-Mar-04
Left Foot Rear	X	ENTRAN	AC-00L13-F04	14-Nov-03	14-May-04
	Z	ENTRAN	AC-01G18-F15	14-Nov-03	14-May-04
Left Foot Front	Z	ENTRAN	AC-01G18-F14	14-Nov-03	14-May-04
Right Foot Rear	X	ENTRAN	AC-01G18-F05	14-Nov-03	14-May-04
	Z	ENTRAN	AC-01G18-F03	14-Nov-03	14-May-04
Right Foot Front	Z	ENTRAN	AC-01J02-F09	14-Nov-03	14-May-04
Lap Belt Load Cell		First Technology	LC-170	10-Oct-03	9-Apr-04

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 064)		Manufacturer	Serial #	Calibration	
				Last	Next
Head 9 Array	X Arm Y	ENDEVCO	AC-P18532	20-Nov-03	20-May-04
	X Arm Z	ENDEVCO	AC-P17237	20-Nov-03	20-May-04
	Y Arm X	ENDEVCO	AC-P16662	20-Nov-03	20-May-04
	Y Arm Z	ENDEVCO	AC-P17299	20-Nov-03	20-May-04
	Z Arm X	ENDEVCO	AC-P21441	20-Nov-03	20-May-04
	Z Arm Y	ENDEVCO	AC-P19197	26-Nov-03	26-May-04
Head	X	ENDEVCO	AC-J32184	3-Nov-03	3-May-04
	Y	ENDEVCO	AC-J32185	30-Oct-03	29-Apr-04
	Z	ENDEVCO	AC-J31011	3-Nov-03	3-May-04
Head	X (R)	ENDEVCO	AC-J31020	3-Nov-03	3-May-04
	Y (R)	ENDEVCO	AC-J31101	3-Nov-03	3-May-04
	Z (R)	ENDEVCO	AC-J31059	3-Nov-03	3-May-04
Neck Load Cell	X	DENTON	LC-441Fx	25-Sep-03	25-Mar-04
	Y	DENTON	LC-441Fy	25-Sep-03	25-Mar-04
	Z	DENTON	LC-441Fz	25-Sep-03	25-Mar-04
Neck Moment	X	DENTON	LC-441Mx	25-Sep-03	25-Mar-04
	Y	DENTON	LC-441My	25-Sep-03	25-Mar-04
	Z	DENTON	LC-441Mz	25-Sep-03	25-Mar-04
Chest	X	ENDEVCO	AC-P18948	21-Nov-03	21-May-04
	Y	ENDEVCO	AC-J33018	3-Nov-03	3-May-04
	Z	ENDEVCO	AC-J32783	3-Nov-03	3-May-04
Chest	X (R)	ENDEVCO	AC-J31066	3-Nov-03	3-May-04
	Y (R)	ENDEVCO	AC-P16979	3-Nov-03	3-May-04
	Z (R)	ENDEVCO	AC-J31022	3-Nov-03	3-May-04
Chest Deflection	X	SERVO	DS-064	20-Nov-03	20-May-04
Pelvic	X	ENDEVCO	AC-P23174	30-Oct-03	29-Apr-04
	Y	ENDEVCO	AC-P23164	30-Oct-03	29-Apr-04
	Z	ENDEVCO	AC-P23137	30-Oct-03	29-Apr-04

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 064)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	GSE	LC-723	3-Dec-03	2-Jun-04
Right Femur Load Cell	Fz	GSE	LC-955	3-Dec-03	2-Jun-04
Left Upper Tibia	Mx	DENTON	LC-045Mx	26-Sep-03	26-Mar-04
	My	DENTON	LC-045My	26-Sep-03	26-Mar-04
Left Lower Tibia	Fz	DENTON	LC-125Fz	26-Sep-03	26-Mar-04
	Mx	DENTON	LC-125Mx	26-Sep-03	26-Mar-04
	My	DENTON	LC-125My	26-Sep-03	26-Mar-04
Right Upper Tibia	Mx	DENTON	LC-016Mx	26-Sep-03	26-Mar-04
	My	DENTON	LC-016My	26-Sep-03	26-Mar-04
Right Lower Tibia	Fz	DENTON	LC-123Fz	26-Sep-03	26-Mar-04
	Mx	DENTON	LC-123Mx	26-Sep-03	26-Mar-04
	My	DENTON	LC-123My	26-Sep-03	26-Mar-04
Left Foot Rear	X	ENDEVCO	AC-J18059	4-Dec-03	3-Jun-04
	Z	ENDEVCO	AC-J36176	4-Dec-03	3-Jun-04
Left Foot Front	Z	ENDEVCO	AC-J18662	4-Dec-03	3-Jun-04
Right Foot Rear	X	ENDEVCO	AC-AJ8C0	4-Dec-03	3-Jun-04
	Z	ENDEVCO	AC-J19868	4-Dec-03	3-Jun-04
Right Foot Front	Z	ENDEVCO	AC-J34378	4-Dec-03	3-Jun-04
Lap Belt Load Cell		First Technology	LC-175	10-Oct-03	9-Apr-04

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	GS SENSORS	AC-9444-038	3-Dec-03	2-Jun-04
Right Rear Seat Crossmember X	GS SENSORS	AC-9440-023	3-Dec-03	2-Jun-04
Top of Engine	GS SENSORS	AC-9440-024	2-Dec-03	1-Jun-04
Bottom of Engine	ICS	AC-8084-006	11-Dec-03	10-Jun-04
Right Disc Brake Caliper	ICS	AC-8084-023	11-Dec-03	10-Jun-04
Instrument Panel	GS SENSORS	AC-9440-032	19-Jan-04	19-Jul-04
Left Disc Brake Caliper	ICS	AC-8083-037	11-Dec-03	10-Jun-04
Left Seat Rear Crossmember Z	GS SENSORS	AC-9440-029	3-Dec-03	2-Jun-04
Right Seat Rear Crossmember Z	GS SENSORS	AC-9440-046	3-Dec-03	2-Jun-04

REPORT NUMBER: CAL-04-05

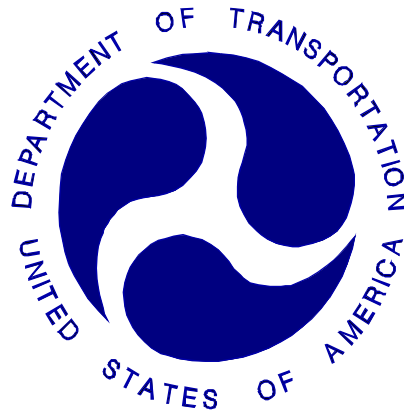
NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

EVENFLO VANGUARD 5 LATCH WITH TOP TETHER

NHTSA NUMBER: M45108

GENERAL DYNAMICS REPORT NUMBER: 8642-NCAP-41

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



January 27, 2004

FINAL REPORT

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

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

Prepared By:

Lawrence Q. Valvo, Project Engineer

Approved By:

David J. Travale, Program Manager
Transportation Sciences Center

Approval Date:

FINAL REPORT ACCEPTANCE BY:

Accepted By:

Acceptance Date:

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. CAL-04-05		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of Evenflo Vanguard 5 LATCH with Top Tether NHTSA No.: M45108				5. Report Date January 27, 2004	
				6. Performing Organization Code CAL	
7. Author(s) Lawrence Q. Valvo, Project Engineer David J. Travale, Program Manager				8. Performing Organization Report No. 8642-NCAP-41	
9. Performing Organization Name and Address General Dynamics Advance Information Engineering Services Transportation Sciences Center P.O. Box 400 Buffalo, New York 14225				10. Work Unit No.	
				11. Contract or Grant No. DTNH22-01-D-32005	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NVS-111 400 Seventh SW, Room 5313 Washington, D.C. 20590				13. Type of Report and Period Covered Final Report January 2004 – February 2004	
				14. Sponsoring Agency Code NVS-111	
15. Supplementary Notes					
16. Abstract This CRS test was performed in conjunction with a New Car Assessment Program (NCAP) load cell barrier test. An Evenflo Vanguard 5 forward facing convertible CRS was secured in Position 3 (P3) with the LATCH system and top tether. This test was conducted at the General Dynamics Crash Test Facility in Buffalo, New York, on January 27, 2004.					
ATD Position		HIC 15		HIC 36	
P3 (Right Rear) (142)		938.5		1130.6	
				Clip (3 ms)	
				62.9	
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 5111 (NAD-52) 400 Seventh St., S.W. Washington, D.C. 20590 Telephone No. (202) 366-4946 ATTN: Robert Hornicle	
19. Security Classification of Report UNCLASSIFIED		20. Security Classification of Page UNCLASSIFIED		21. No. of Pages 85	
22. Price					

TABLE OF CONTENTS

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

SECTION 1

PURPOSE AND SUMMARY OF TEST M45108

The purpose of this test was to obtain CRS performance data in a frontal impact NCAP condition. The 56.81 kph NCAP frontal impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

SUMMARY

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

The right rear child dummy's HIC (15 ms) was 938.5, maximum chest deceleration over 3 ms was 62.9 g's.

SECTION 2
DATA SHEET NO. 1
CRASH TEST SUMMARY

TEST DUMMY INFORMATION:

DESCRIPTION	Position #3 CRS
ATD Type/Serial No.	Hybrid III 3C/142
Restraint System:	Evenflo Vanguard 5 LATCH with Top Tether

<u>Number of Data Channels</u>	28	
<u>Number of Cameras:</u>	1	<u>Real Time</u>
	2	<u>High Speed</u>

POST TEST DOOR OPENING

DESCRIPTION	FRONT	REAR
Left Side Doors	Closed, Latched and Operable without tools	Closed, Latched and Operable without tools
Right Side Doors	Closed, Latched and Operable without tools	Closed, Latched and Operable without tools
Hatch/Other Door	N/A	Closed, Latched and Operable without tools

POST TEST SEAT DATA

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

VISIBLE DUMMY CONTACT POINTS

	Position #3 CRS
Head Contact:	The chin to the chest and the back of the head to the child restraint upper seatback and vehicle P3 head restraint.
Upper Torso Contact:	None
Lower Torso Contact:	None
Left Knee Contact:	No knee contact. Left foot to P2 seatback.
Right Knee Contact:	No knee contact. Right foot to P2 seatback.

† Seat was removed to achieve target test weight.

DATA SHEET NO. 2
CRS PARAMETER DATA

CRS: Evenflo Vanguard 5 LATCH with Top Tether

NHTSA No. M45108

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Delivered Weight of Vehicle with Maximum Fluids = 1452.0 kg (A)

AS TESTED WEIGHT OF VEHICLE

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

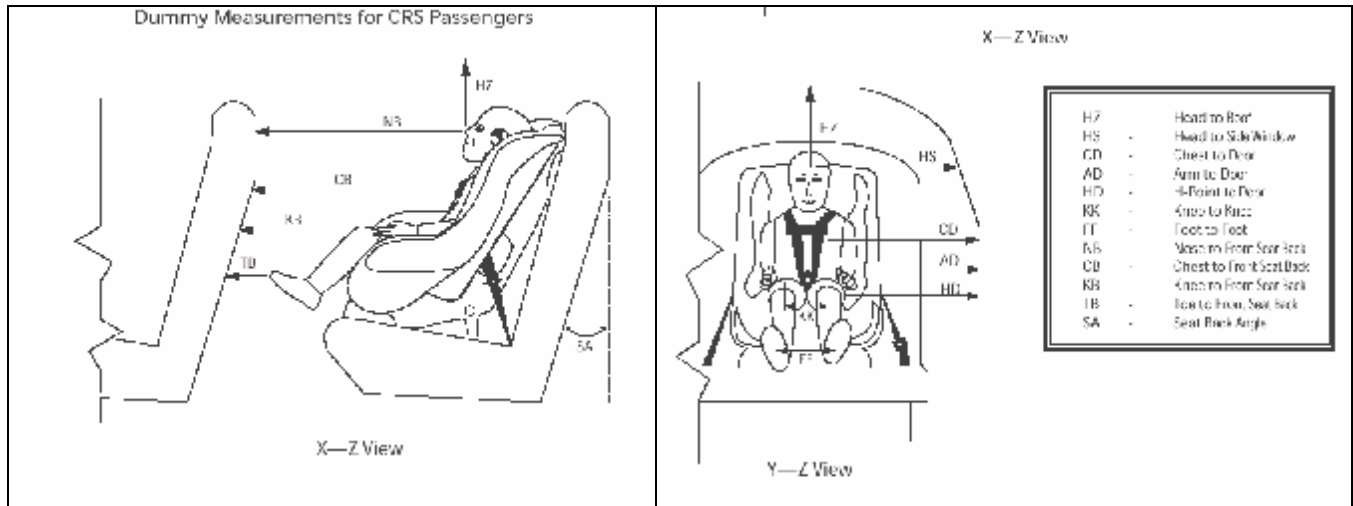
Left Front	=	<u>448.0</u>	kg	Left Rear	=	<u>347.0</u>	kg
Right Front	=	<u>443.5</u>	kg	Right Rear	=	<u>363.0</u>	kg
TOTAL FRONT	=	<u>448.0</u>	kg	TOTAL REAR	=	<u>347.0</u>	kg
TOTAL TEST WEIGHT =		<u>806.5</u>	kg				

DATA SHEET NO. 3

CHILD DUMMY POSITIONING IN VEHICLE

CRS: Evenflo Vanguard 5 LATCH with Top Tether

NHTSA No. M45108



Measurement	P3 CRS (142)
SA	18.5
HS	416
CD	393
AD	255
HD	315
HZ	395
NB	592
CB	546
KK	140
FF	150
KB – LEFT	373
KB – RIGHT	369
TB – LEFT	65
TB – RIGHT	60

All dimensions in mm (unless noted)

P3 – Right Rear Passenger (CRS #1)

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES

CRS: Evenflo Vanguard 5 LATCH with Top Tether

NHTSA No. M45108

		MAXIMUM VALUE			
		Position #3			
DESCRIPTION	Unit	Pos	msec	Neg	msec
Head X	g	108.5	172.4	-31.3	79.6
Head Y	g	3.6	117.1	-5.8	175.2
Head Z	g	85.1	83.4	-8.5	37.9
Head Resultant	g	111.5	172.4	-	-
Head Rear Z	g	100.3	89.6	-39.0	173.1
Upper Neck Fx	N	254.4	168.4	-802.7	97.2
Upper Neck Fy	N	61.2	102.8	-43.4	242.6
Upper Neck Fz	N	2305.7	84.9	-239.3	37.7
Upper Neck F Resultant	N	2381.2	84.9	-	-
Upper Neck Mx	N-m	8.0	84.4	-4.6	71.0
Upper Neck My	N-m	13.1	168.1	-14.3	79.6
Upper Neck Mz	N-m	1.9	160.8	-2.3	247.1
Upper Neck M Resultant	N-m	14.6	79.7	-	-
Lower Neck Fx	N	362.6	169.3	-1102.2	85.4
Lower Neck Fy	N	111.9	102.1	-54.2	240.9
Lower Neck Fz	N	2155.7	83.5	-409.0	59.5
Lower Neck F Resultant	N	2404.9	83.5	-	-
Lower Neck Mx	N-m	11.7	103.0	-6.7	243.9
Lower Neck My	N-m	125.6	96.0	-20.0	169.6
Lower Neck Mz	N-m	4.6	101.1	-4.0	70.0
Lower Neck M Resultant	N-m	125.9	96.0	-	-
Chest X	g	24.8	165.1	-42.5	67.4
Chest Y	g	8.5	65.8	-4.4	164.4
Chest Z	g	36.3	93.7	-49.2	64.7
Chest Resultant	g	64.5	65.8	-	-
Chest Displacement	mm	0.1	16.9	-21.4	98.4

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Evenflo Vanguard 5 LATCH with Top Tether

NHTSA No. M45108

		MAXIMUM VALUE			
		Position #3			
DESCRIPTION	Unit	Pos	msec	Neg	msec
Pelvic X	g	†	-	†	-
Pelvic Y	g	16.0	60.5	-19.2	69.3
Pelvic Z	g	30.3	95.9	-47.2	62.9
Pelvic Resultant	g	†	-	-	-
Tether Belt Load	N	1318.8	66.8	-66.9	186.9
LATCH Belt Load	N	3730.0	68.4	-193.1	169.8

† Transducer wire was cut at 55 ms.

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Evenflo Vanguard 5 LATCH with Top Tether

NHTSA No. M45108

	HEAD INJURY CRITERIA (HIC)							
	HIC15				HIC36			
	HIC	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂	HIC	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #3 - Right	938.5	76.0	91.0	82.9	1130.6	70.7	97.3	71.0

	CLIP SUMMARY*			
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #3 - Right	62.9	64.5	67.5	750.4

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

DATA SHEET NO. 5
CRS PERFORMANCE DATA

CRS: Evenflo Vanguard 5 LATCH with Top Tether

NHTSA No. M45108

		MAXIMUM VALUE			
DESCRIPTION	Unit	Positive	Time (ms)	Negative	Time (ms)
P3 CRS X	g	14.0	171.6	-53.8	45.2
P3 CRS Y	g	7.4	64.6	-12.1	212.4
P3 CRS Z	g	21.4	41.9	-33.4	51.2
P3 CRS Resultant	g	58.4	51.6	-	-

DATA SHEET NO. 5

CRS PERFORMANCE DATA (CONTINUED)

CRS: Evenflo Vanguard 5 LATCH with Top Tether

NHTSA No. M45108

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

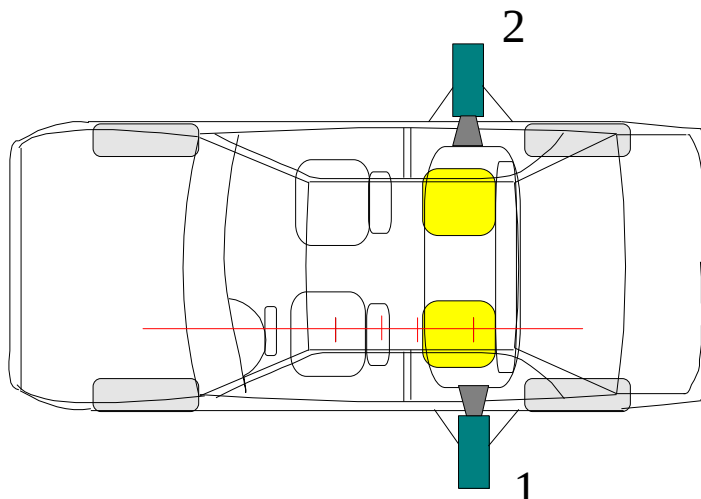
LOCATION	DAMAGE	REMARKS
Upper Tether Strap	No	None
Upper Tether Buckle	No	None
Upper Tether Hook	No	None
Vehicle Upper Tether Anchor	No	None
Lower Anchor Strap	No	None
Lower Anchor Buckle	No	None
Lower Anchor Hooks	No	None
Vehicle Lower CRS Anchors	No	None
Five Point Harness Connections	No	None
Cracks 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

DATA SHEET NO. 6

CRS CAMERA DATA

CRS: Evenflo Vanguard 5 LATCH with Top Tether

NHTSA No. M45108



Camera No.	View	Coordinates (millimeters)			Angle** (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Left side CRS lateral view	3240	2760	2315	-22.0	28-70	1000
2	Right side CRS lateral view	3235	2670	2365	-25.0	28-70	1000

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

** = referenced to horizontal plane

X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

SECTION 3

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	PRE-TEST POSITION 3 LEFT SIDE VIEW	3- 12
Figure 3- 11	POST-TEST POSITION 3 LEFT SIDE VIEW	3- 13
Figure 3- 12	PRE-TEST POSITION 3 RIGHT SIDE VIEW	3- 14
Figure 3- 13	POST-TEST POSITION 3 RIGHT SIDE VIEW	3- 15
Figure 3- 14	PRE-TEST POSITION 3 FRONT VIEW	3- 16
Figure 3- 15	POST-TEST POSITION 3 FRONT VIEW	3- 17

Manufactured in 17DEC03

Model # 3691261 P1

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



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



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



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



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



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



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



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



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



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



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



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



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



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



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

SECTION 4

CHILD DUMMY RESPONSE AND CRS DATA TRACES

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 Head Rear z [g, CFC_60]	4-8
6	V1P3 Upper Neck Fx [N, CFC_1000]	4-9
7	V1P3 Upper Neck Fy [N, CFC_1000]	4-10
8	V1P3 Upper Neck Fz [N, CFC_1000]	4-11
9	V1P3 Upper Neck F Resultant [N, CFC_1000]	4-12
10	V1P3 Upper Neck Mx [N-m, CFC_600]	4-13
11	V1P3 Upper Neck My [N-m, CFC_600]	4-14
12	V1P3 Upper Neck Mz [N-m, CFC_600]	4-15
13	V1P3 Upper Neck M Resultant [N-m, CFC_600]	4-16
14	V1P3 Lower Neck Fx [N, CFC_1000]	4-17
15	V1P3 Lower Neck Fy [N, CFC_1000]	4-18
16	V1P3 Lower Neck Fz [N, CFC_1000]	4-19
17	V1P3 Lower Neck F Resultant [N, CFC_1000]	4-20
18	V1P3 Lower Neck Mx [N-m, CFC_600]	4-21
19	V1P3 Lower Neck My [N-m, CFC_600]	4-22
20	V1P3 Lower Neck Mz [N-m, CFC_600]	4-23
21	V1P3 Lower Neck M Resultant [N-m, CFC_600]	4-24
22	V1P3 Chest x [g, CFC_180]	4-25
23	V1P3 Chest y [g, CFC_180]	4-26
24	V1P3 Chest z [g, CFC_180]	4-27
25	V1P3 Chest Resultant [g, CFC_180]	4-28
26	V1P3 Chest Compression [mm, CFC_600]	4-29
27	V1P3 Pelvic x [g, CFC_1000]	4-30
28	V1P3 Pelvic y [g, CFC_1000]	4-31
29	V1P3 Pelvic z [g, CFC_1000]	4-32
30	V1P3 Pelvic Resultant [g, CFC_1000]	4-33
31	V1P3 Tether Belt [N, CFC_60]	4-34
32	V1P3 Latch Belt [N, CFC_1000]	4-35

TABLE OF DATA PLOTS (Continued)

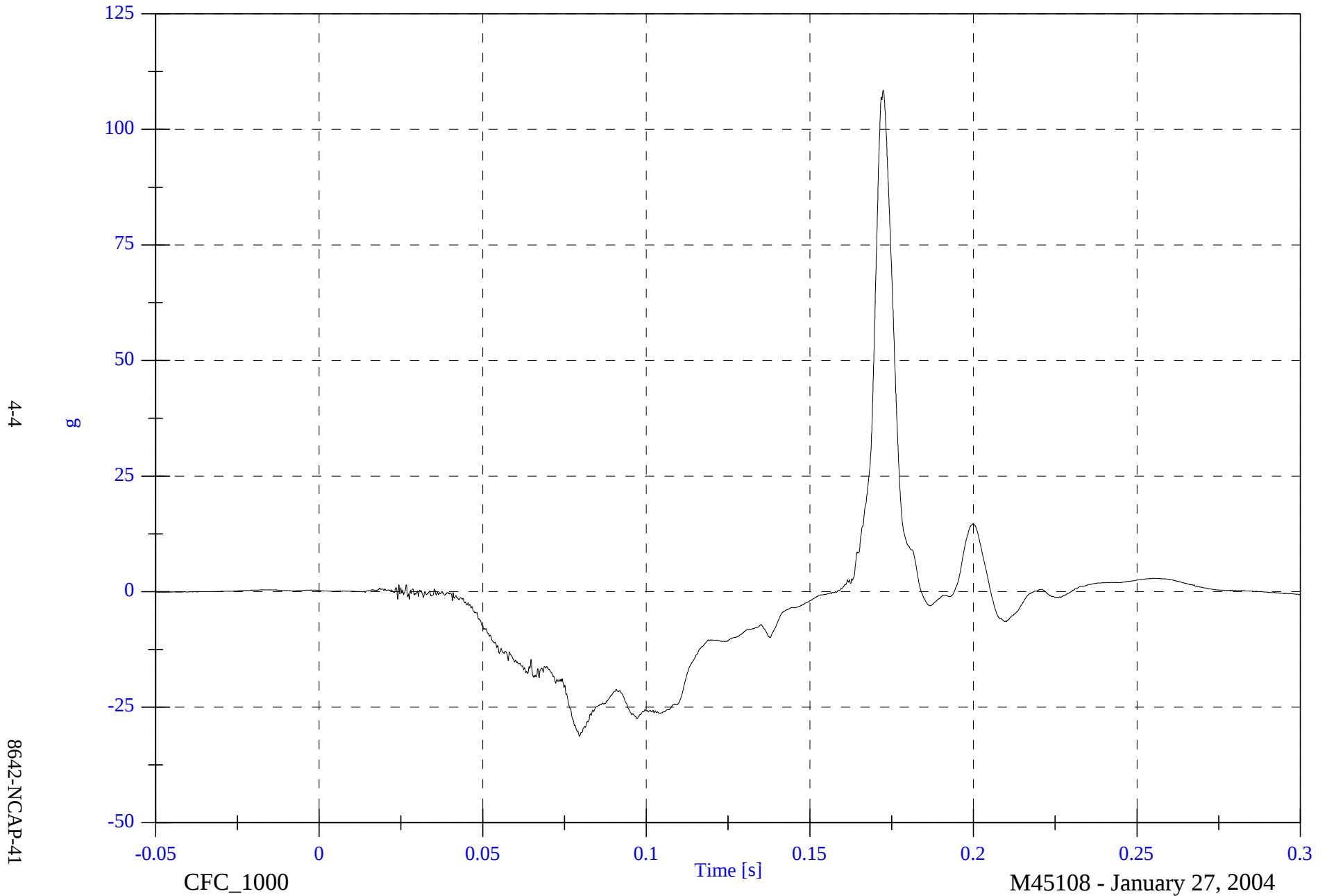
PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
33	V1P3 Seat x [g, CFC_60]	4-36
34	V1P3 Seat x Velocity [kph, CFC_180]	4-37
35	V1P3 Seat x Displacement [mm, CFC_180]	4-38
36	V1P3 Seat y [g, CFC_60]	4-39
37	V1P3 Seat y Velocity [kph, CFC_180]	4-40
38	V1P3 Seat y Displacement [mm, CFC_180]	4-41
39	V1P3 Seat z [g, CFC_60]	4-42
40	V1P3 Seat z Velocity [kph, CFC_180]	4-43
41	V1P3 Seat z Displacement [mm, CFC_180]	4-44
42	V1P3 Seat Resultant [g, CFC_60]	4-45

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Head x

Max: 108.5 [g] at 0.172 [s]

Min: -31.3 [g] at 0.080 [s]

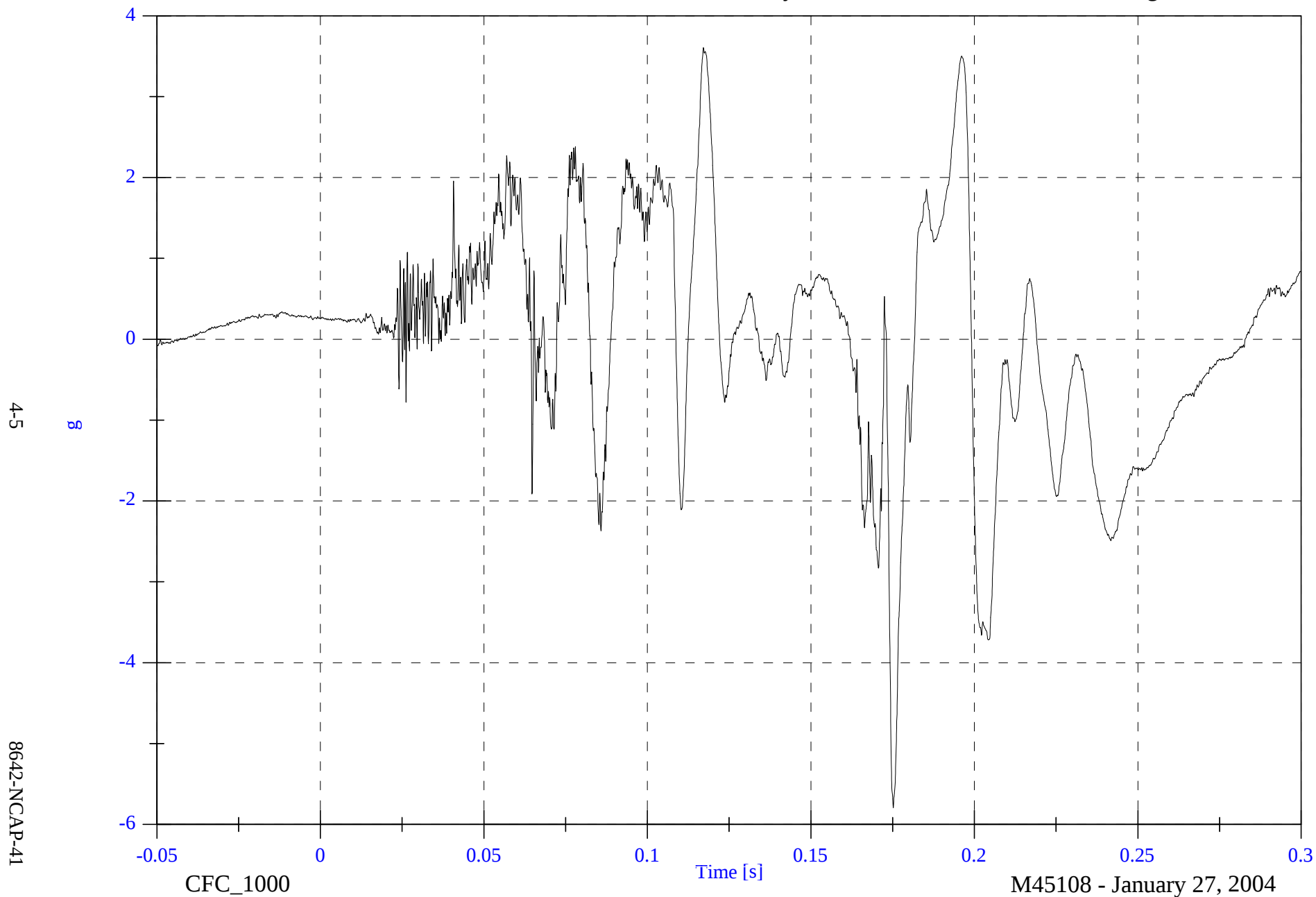


2004 NCAP Test 5 - 2004 Toyota RAV4

Max: 3.6 [g] at 0.117 [s]

Min: -5.8 [g] at 0.175 [s]

V1P3 Head y

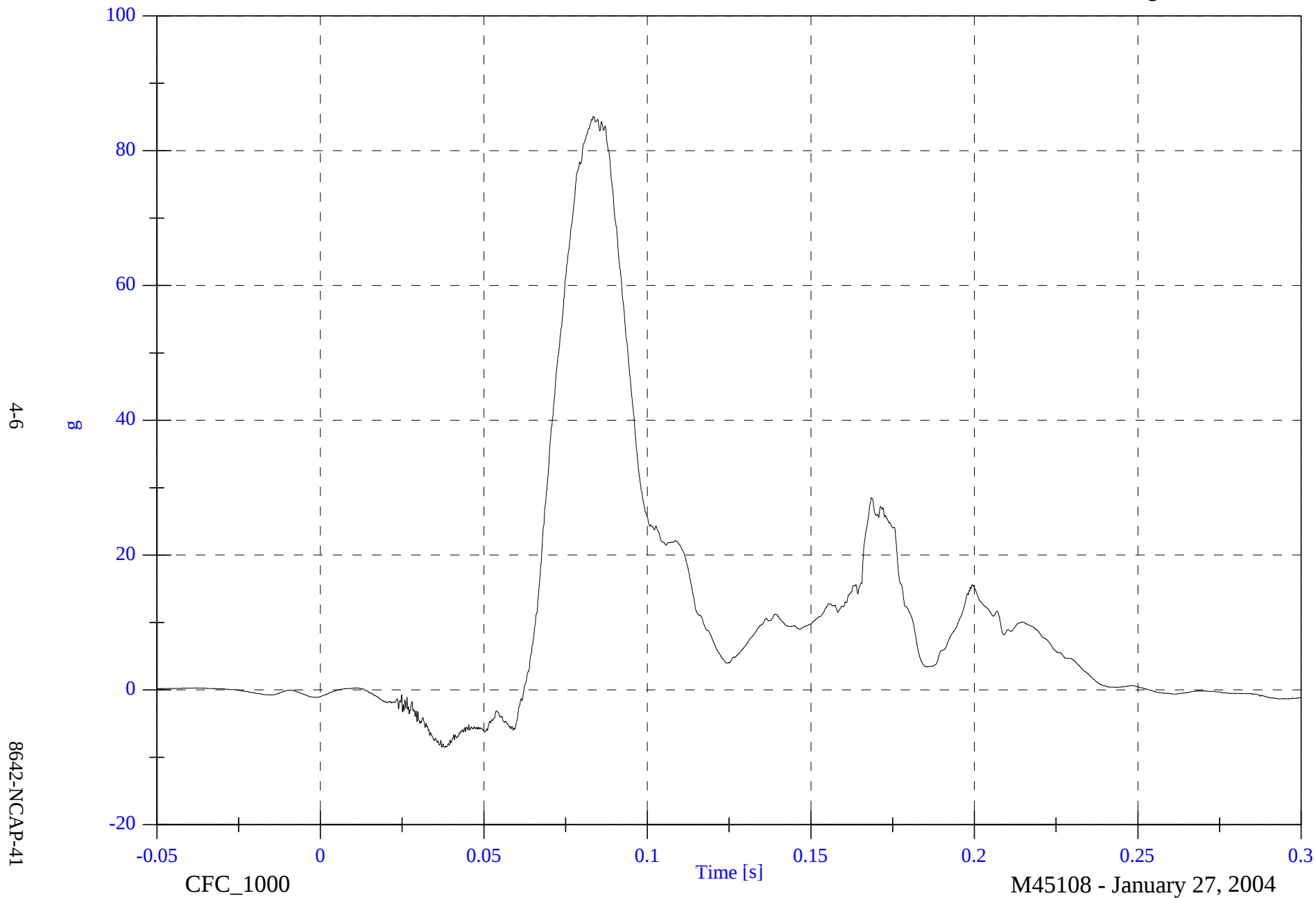


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Head z

Max: 85.1 [g] at 0.083 [s]

Min: -8.5 [g] at 0.038 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

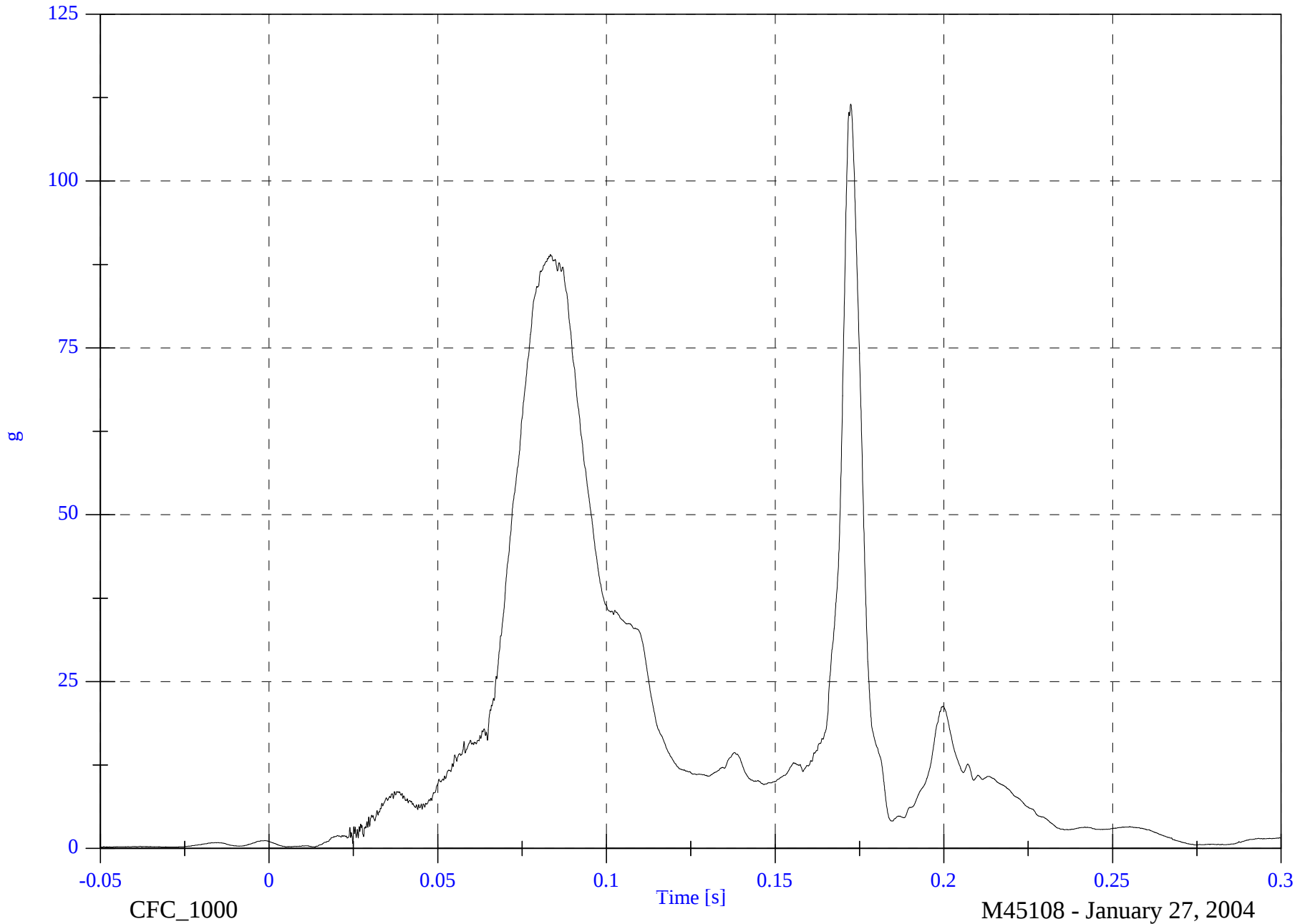
V1P3 Head Resultant

Max: 111.5 [g] at 0.172 [s]

Min: 0.2 [g] at -0.049 [s]

4-7

8642-NCAP-41

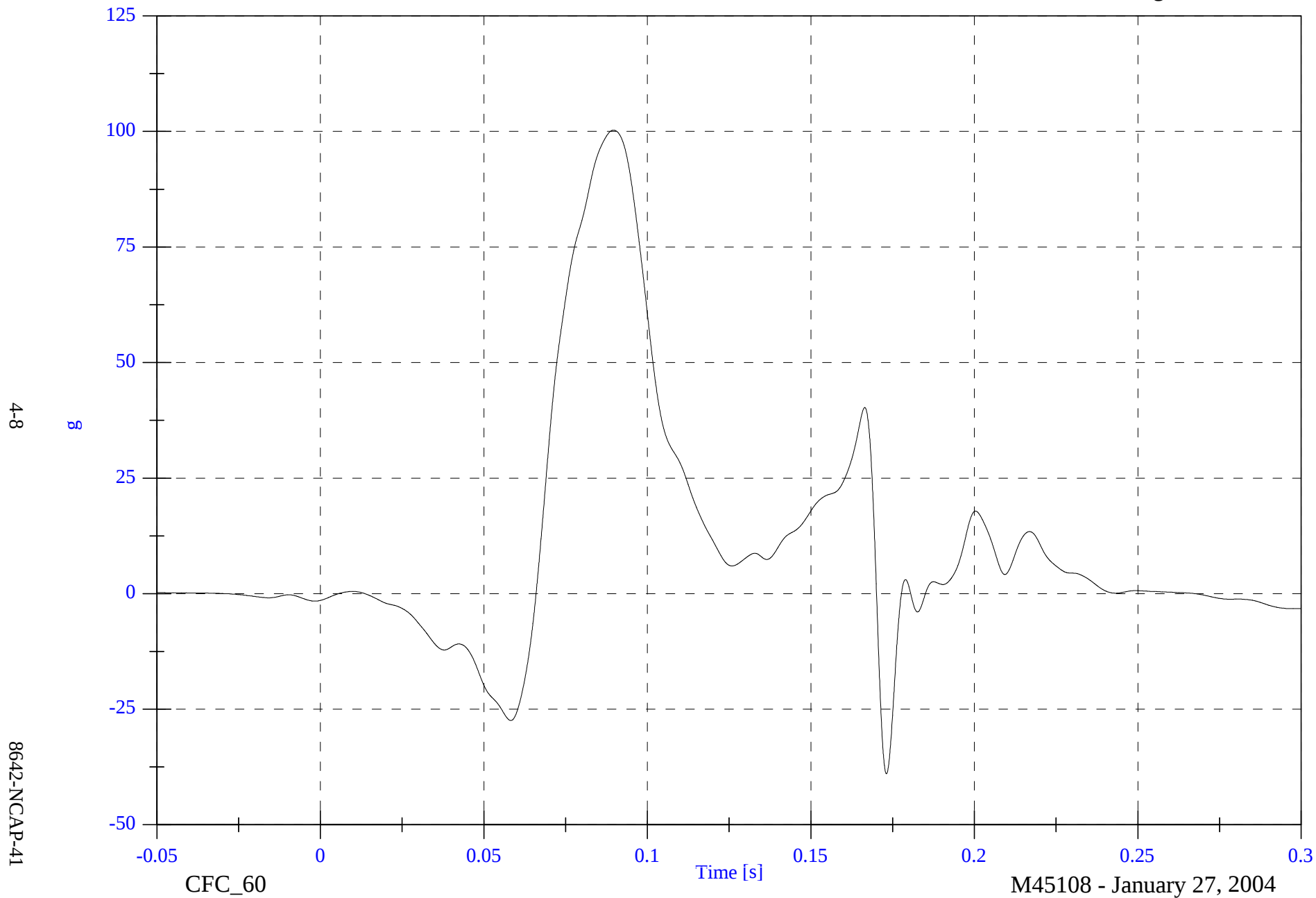


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Head Rear z

Max: 100.3 [g] at 0.090 [s]

Min: -39.0 [g] at 0.173 [s]

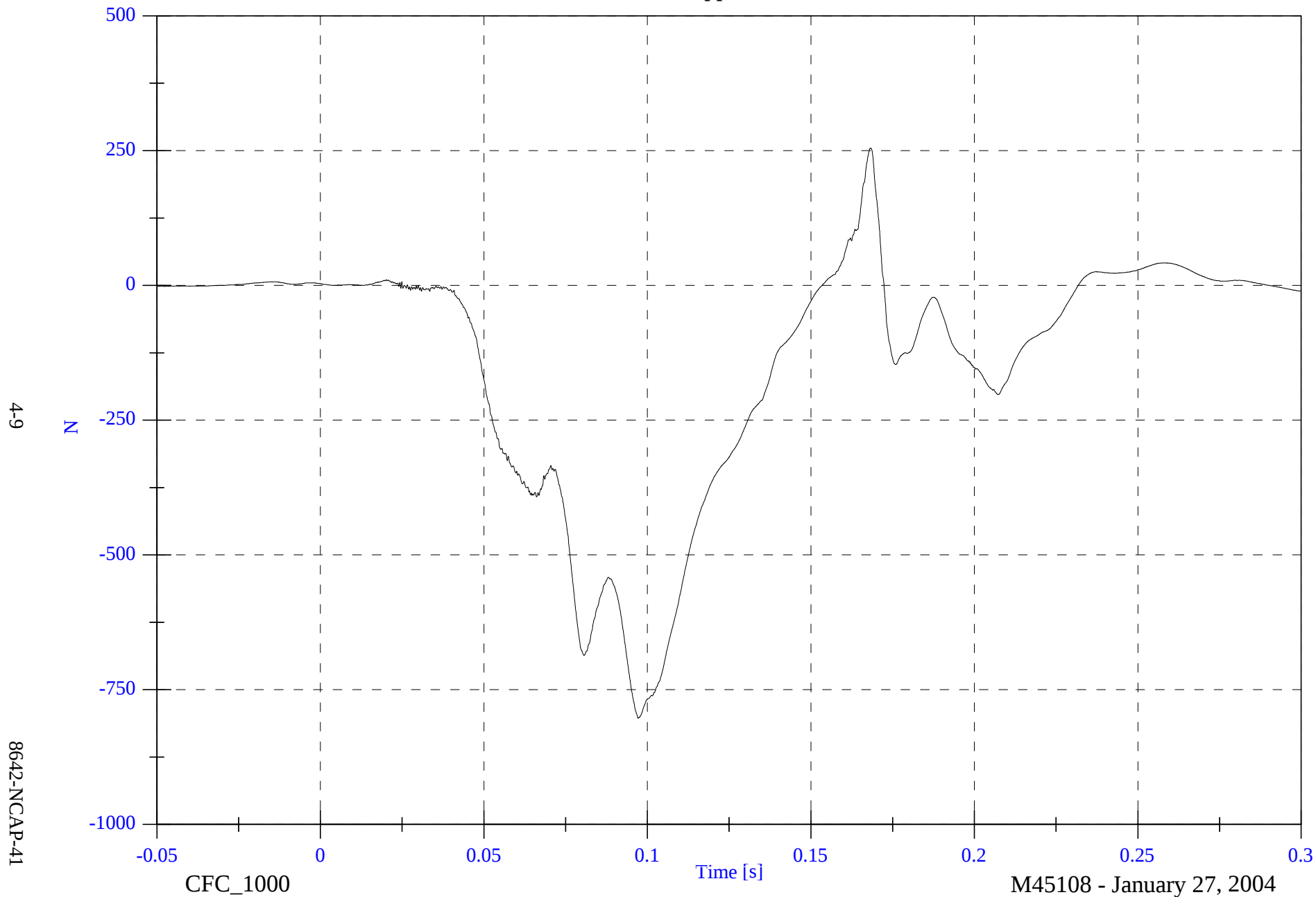


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Upper Neck Fx

Max: 254.4 [N] at 0.168 [s]

Min: -802.7 [N] at 0.097 [s]

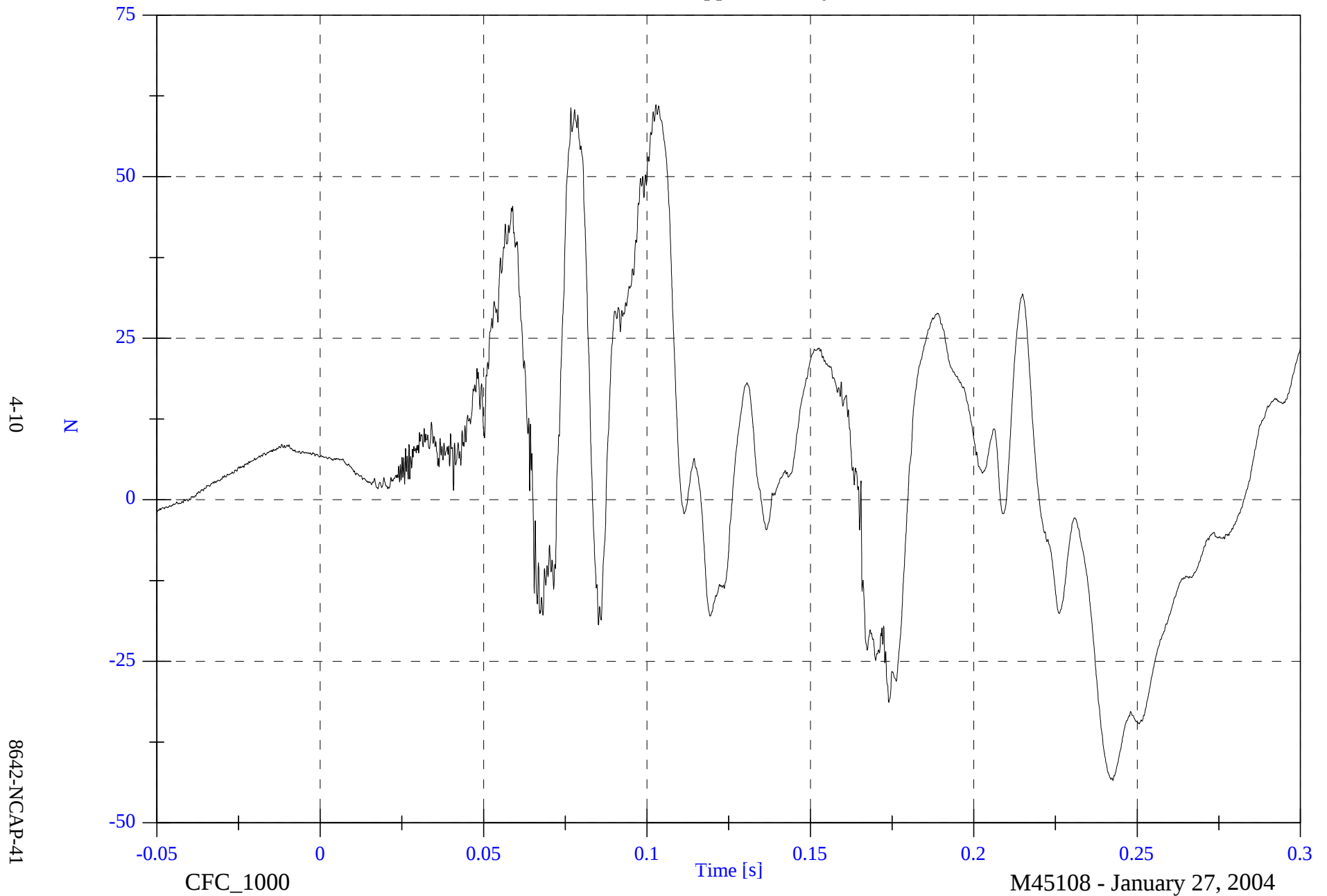


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Upper Neck Fy

Max: 61.2 [N] at 0.103 [s]

Min: -43.4 [N] at 0.243 [s]

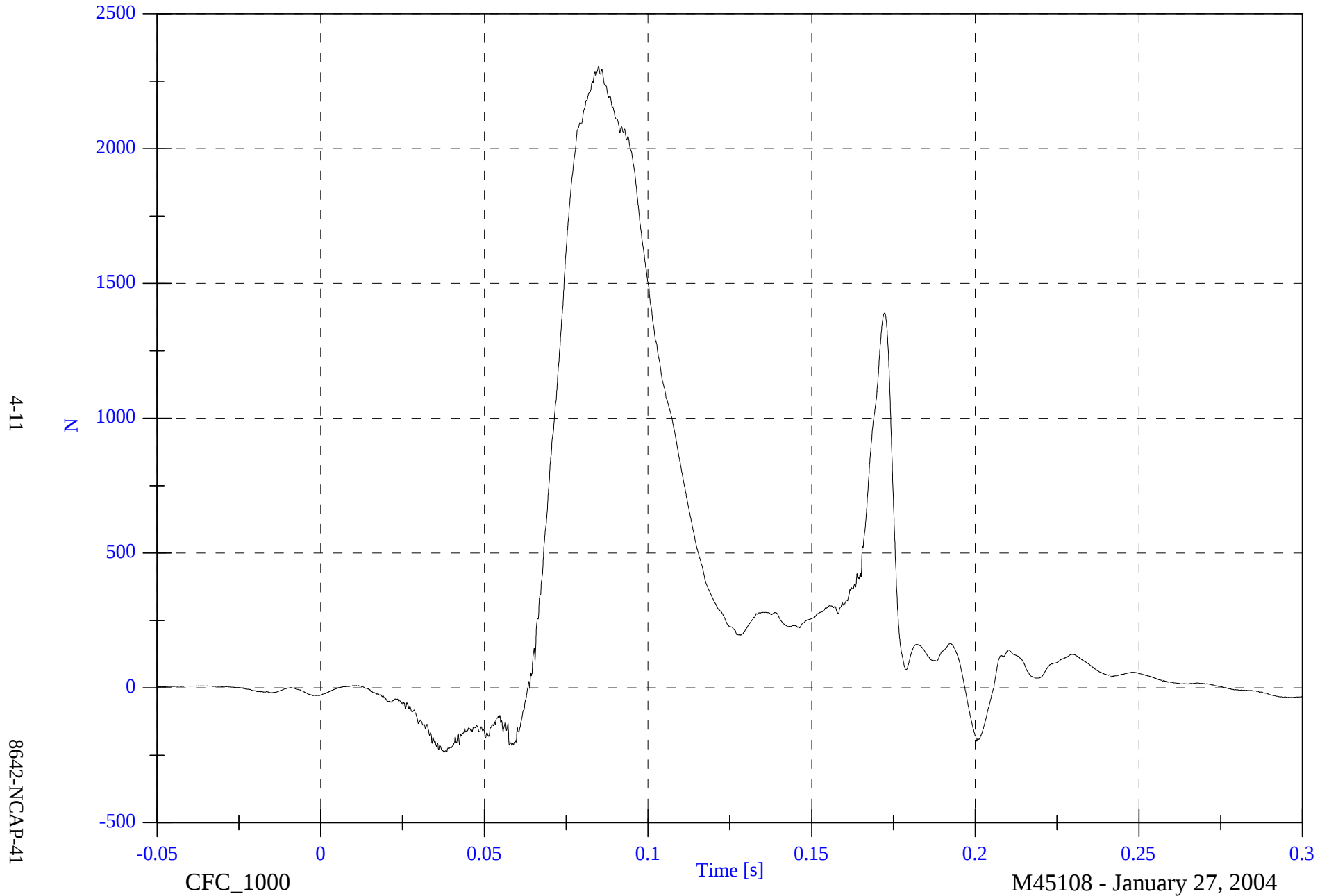


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Upper Neck Fz

Max: 2305.7 [N] at 0.085 [s]

Min: -239.3 [N] at 0.038 [s]

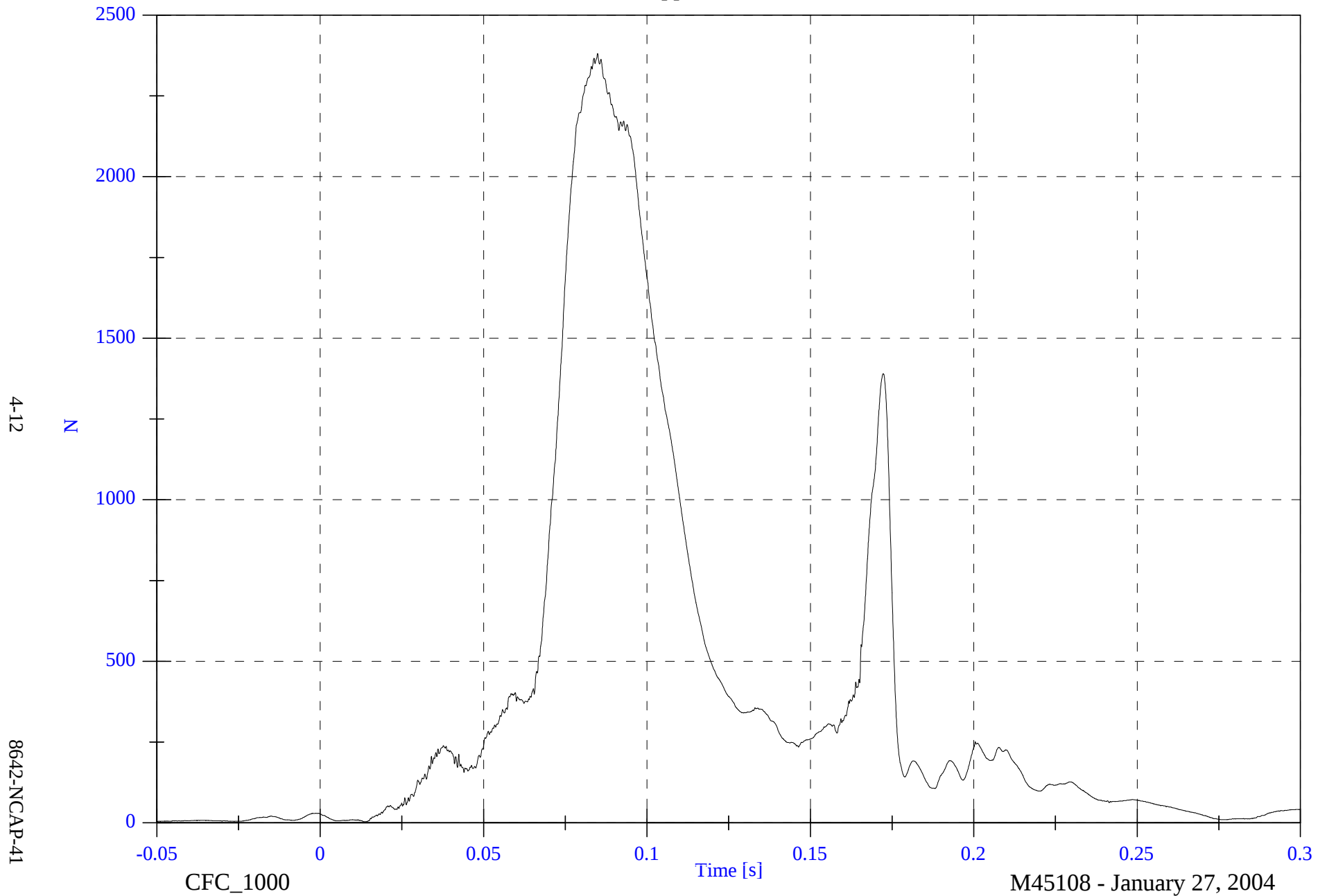


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Upper Neck F Resultant

Max: 2381.2 [N] at 0.085 [s]

Min: 3.3 [N] at 0.013 [s]

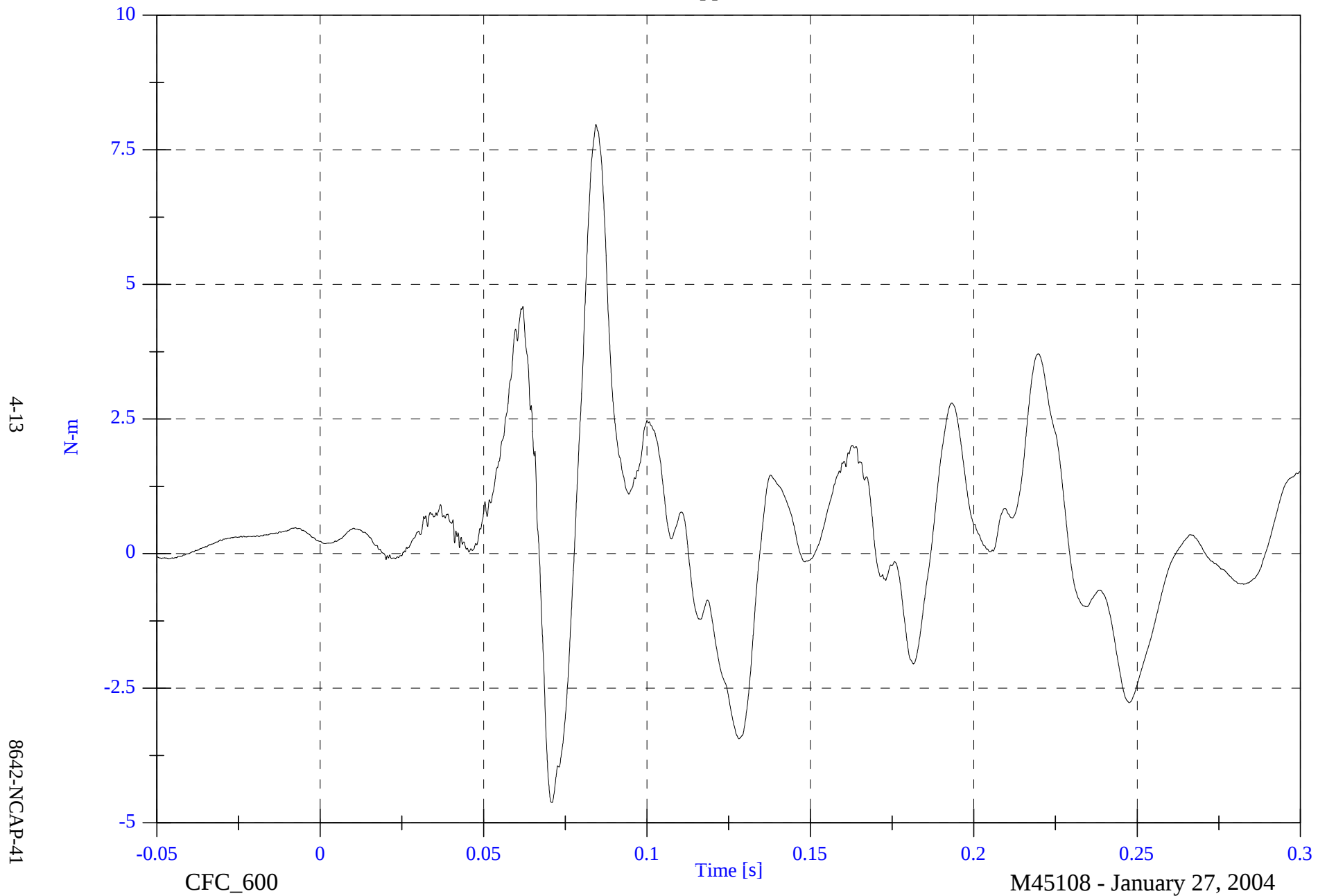


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Upper Neck Mx

Max: 8.0 [N-m] at 0.084 [s]

Min: -4.6 [N-m] at 0.071 [s]

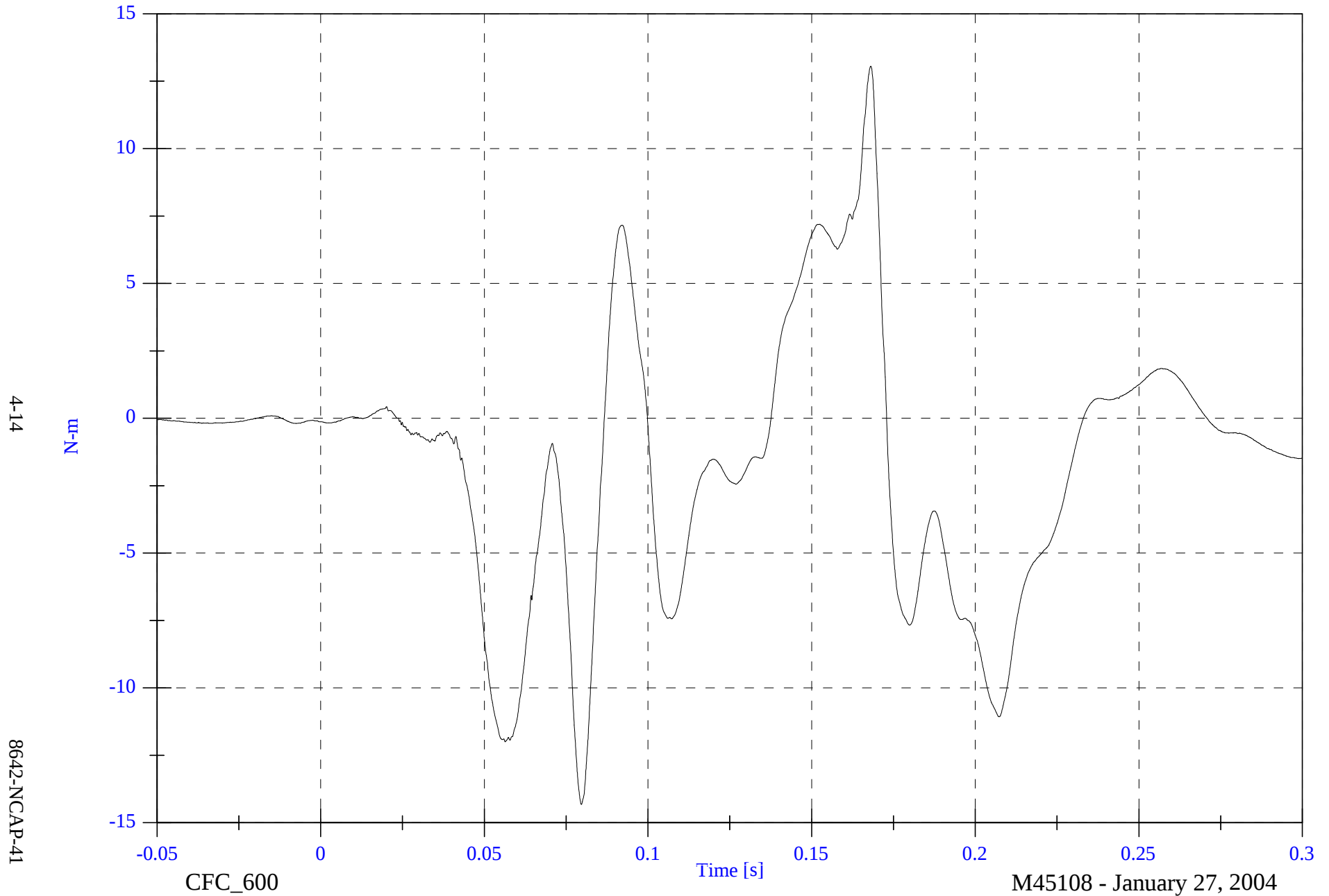


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Upper Neck My

Max: 13.1 [N-m] at 0.168 [s]

Min: -14.3 [N-m] at 0.080 [s]

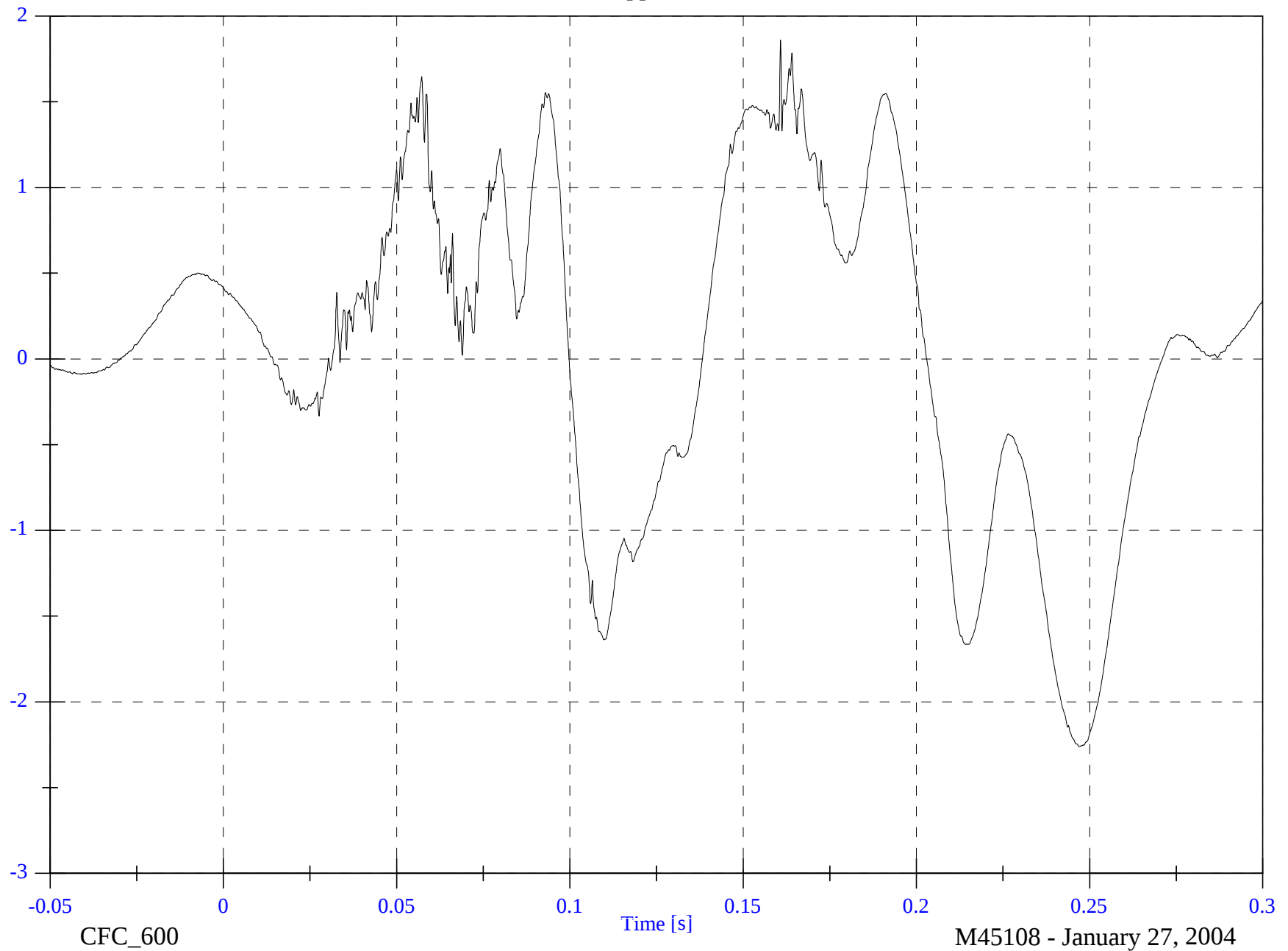


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Upper Neck Mz

Max: 1.9 [N-m] at 0.161 [s]

Min: -2.3 [N-m] at 0.247 [s]



4-15

8642-NCAP-41

2004 NCAP Test 5 - 2004 Toyota RAV4

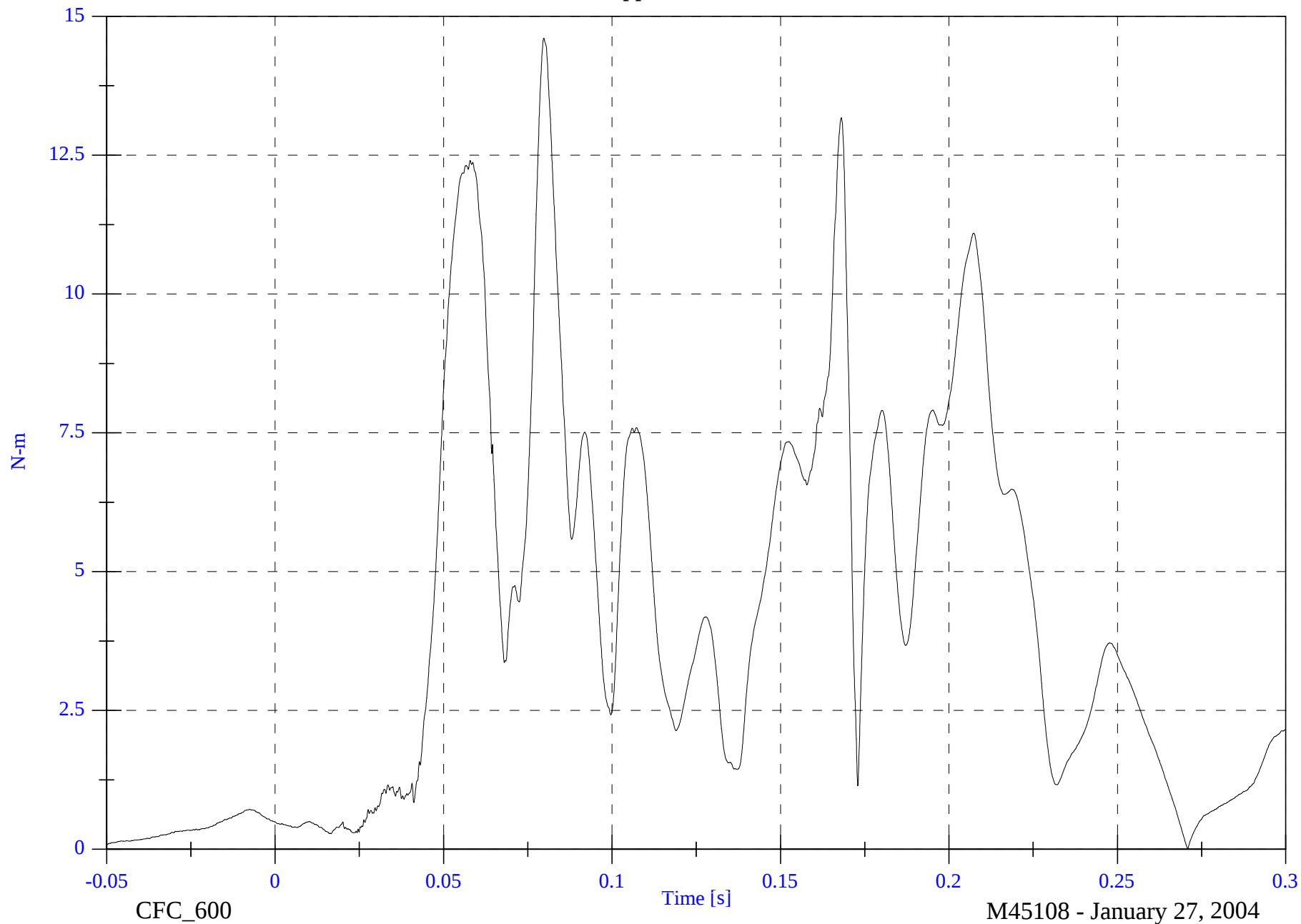
V1P3 Upper Neck M Resultant

Max: 14.6 [N-m] at 0.080 [s]

Min: 0.0 [N-m] at 0.271 [s]

4-16

8642-NCAP-41

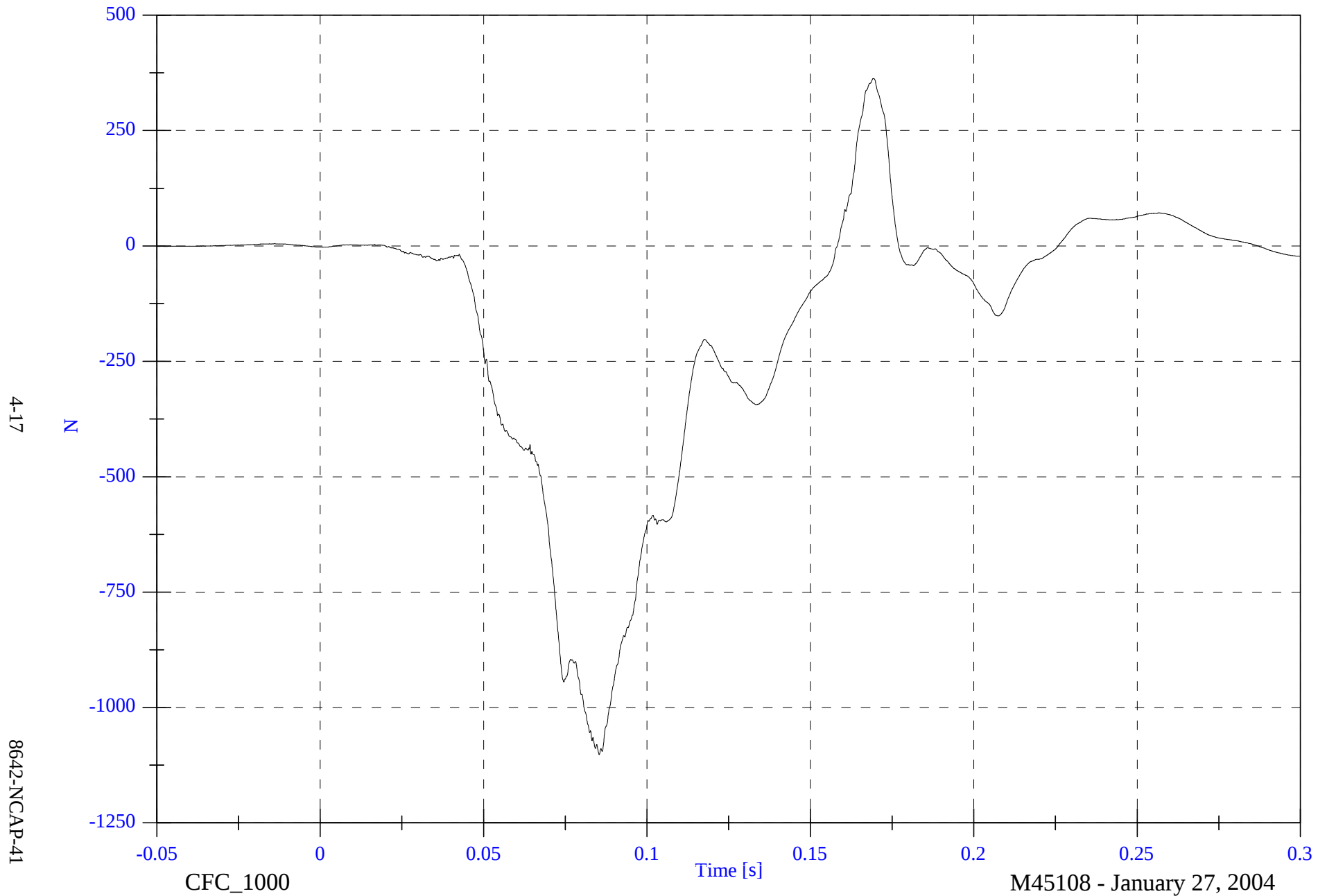


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Lower Neck Fx

Max: 362.6 [N] at 0.169 [s]

Min: -1102.2 [N] at 0.085 [s]

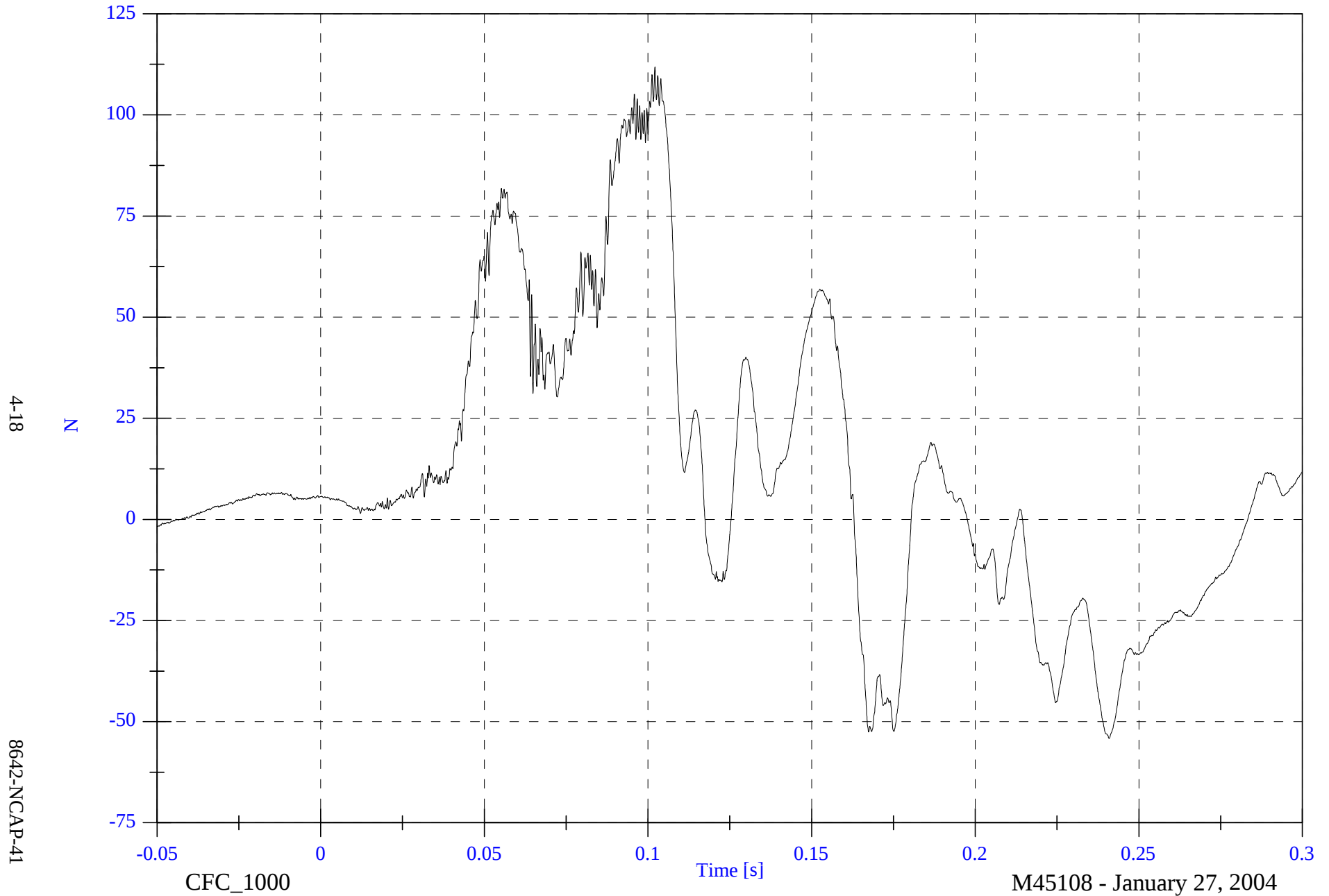


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Lower Neck Fy

Max: 111.9 [N] at 0.102 [s]

Min: -54.2 [N] at 0.241 [s]

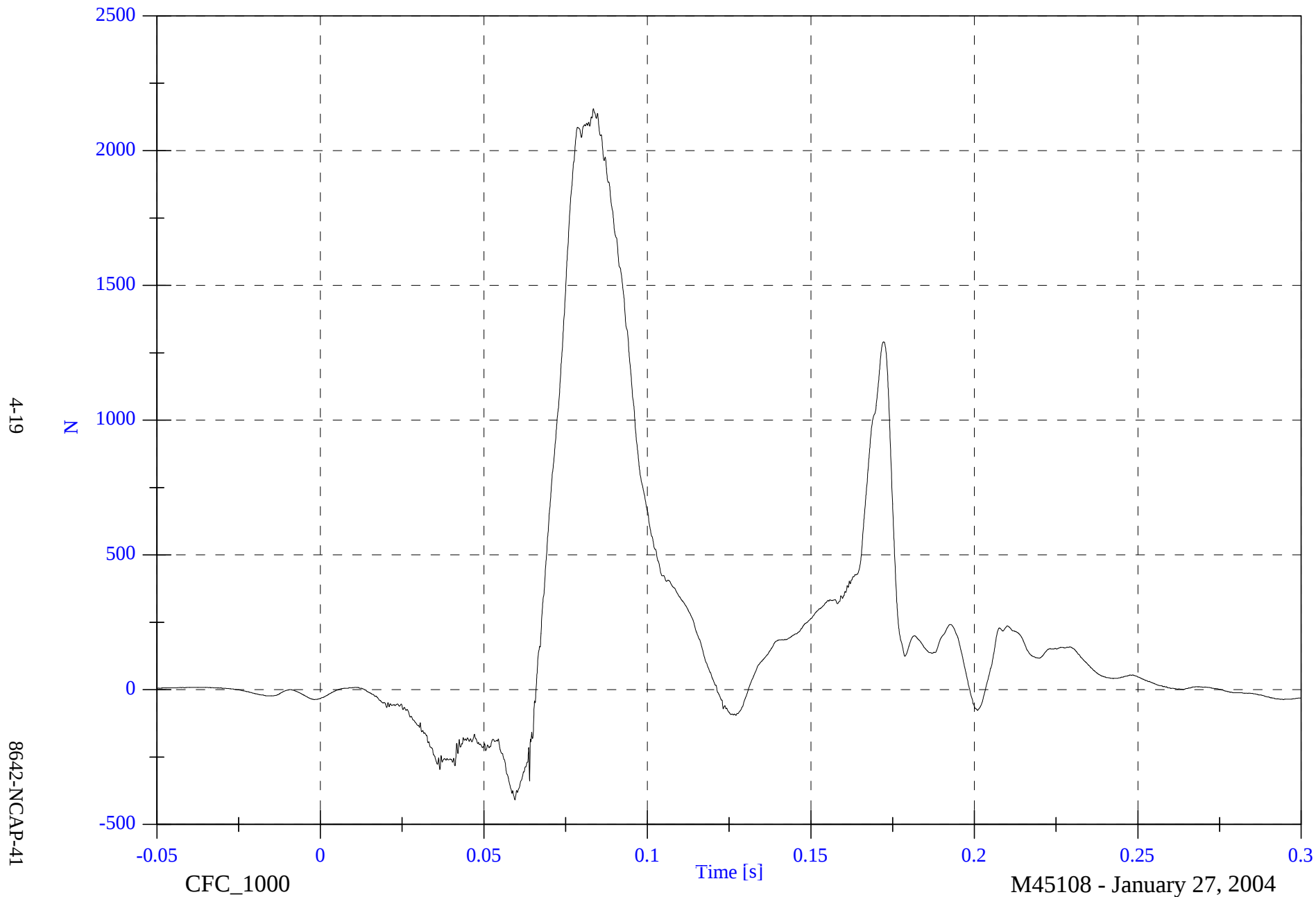


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Lower Neck Fz

Max: 2155.7 [N] at 0.084 [s]

Min: -409.0 [N] at 0.059 [s]

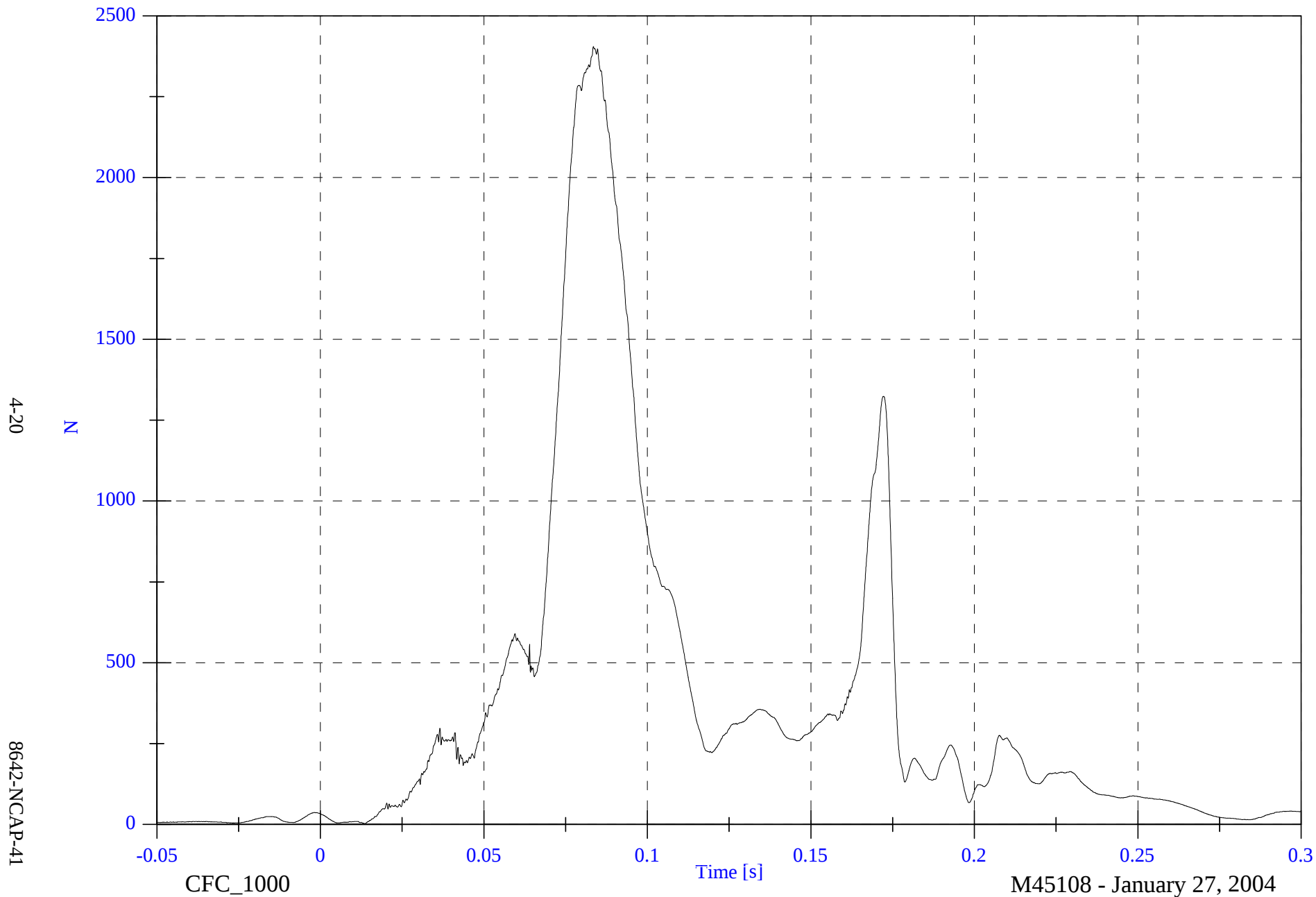


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Lower Neck F Resultant

Max: 2404.9 [N] at 0.084 [s]

Min: 2.8 [N] at 0.013 [s]

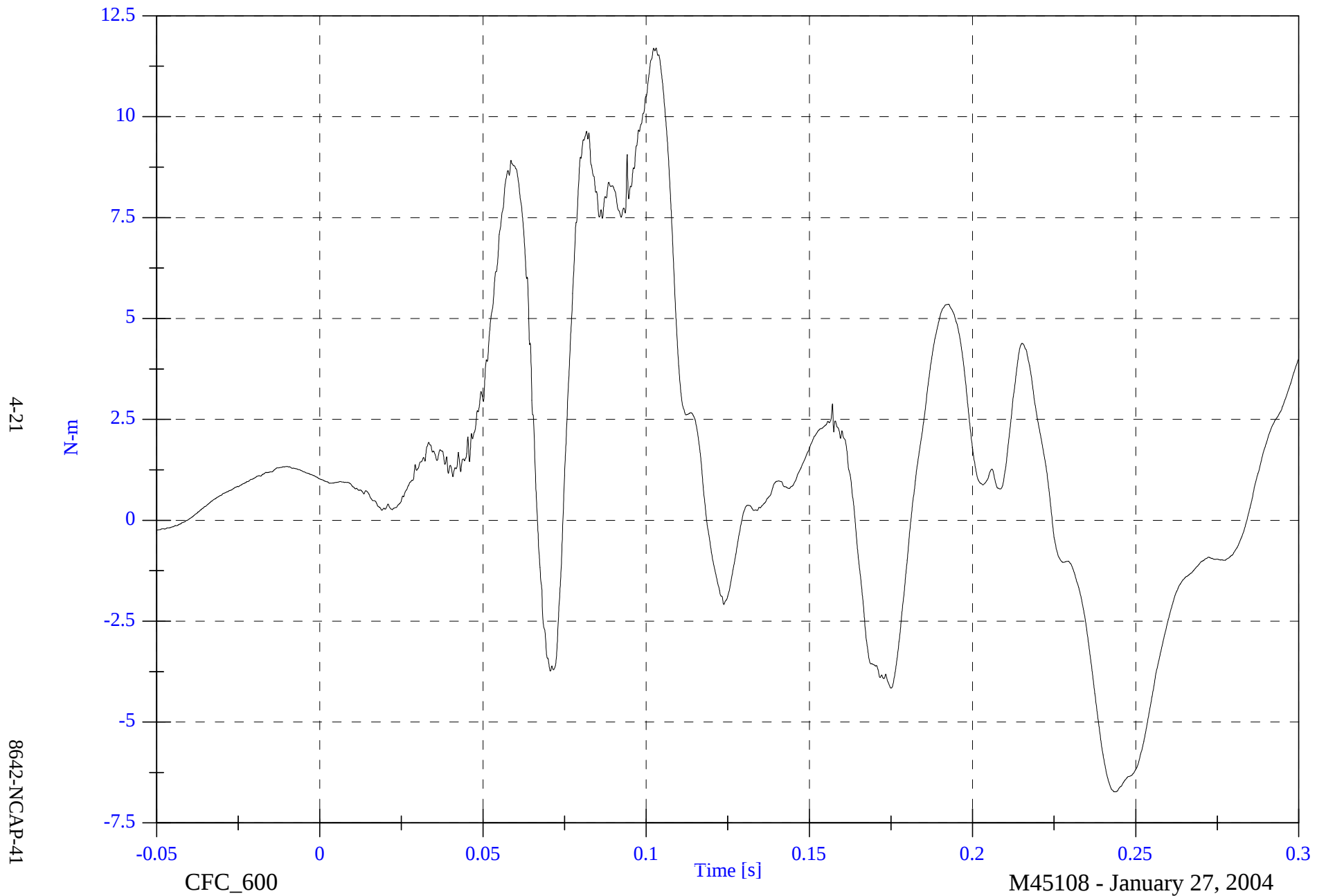


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Lower Neck Mx

Max: 11.7 [N-m] at 0.103 [s]

Min: -6.7 [N-m] at 0.244 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

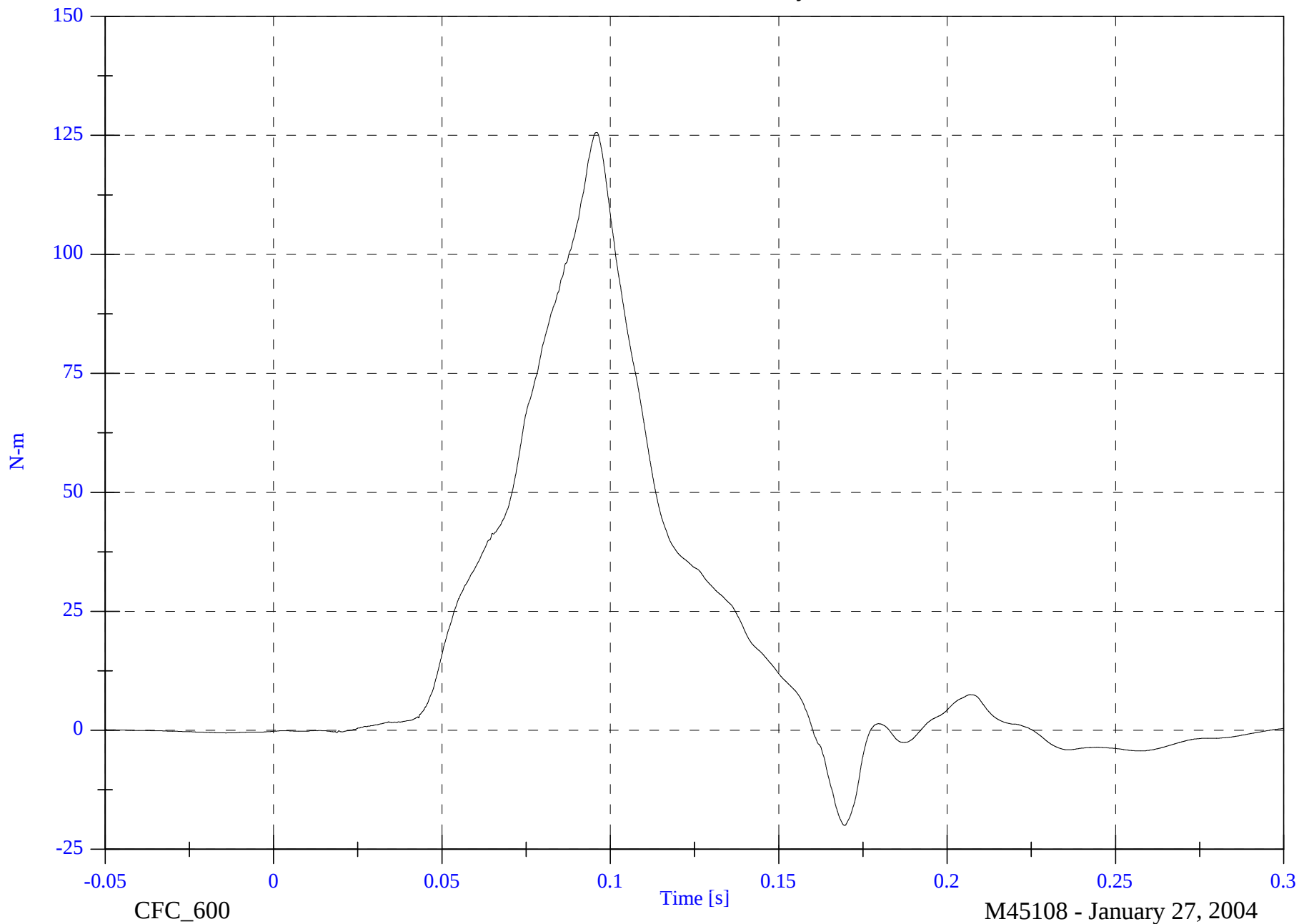
V1P3 Lower Neck My

Max: 125.6 [N-m] at 0.096 [s]

Min: -20.0 [N-m] at 0.170 [s]

4-22

8642-NCAP-41

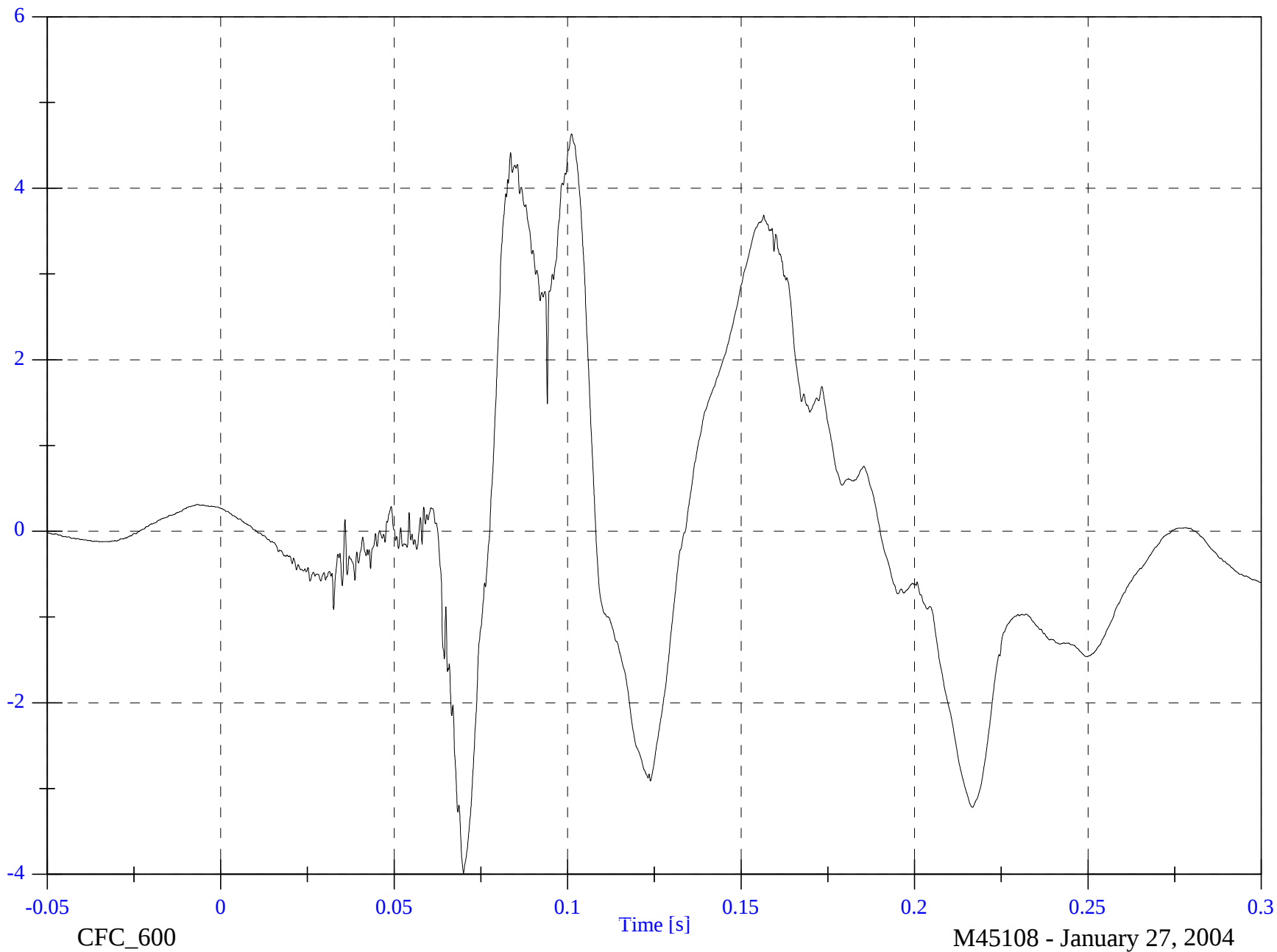


2004 NCAP Test 5 - 2004 Toyota RAV4

Max: 4.6 [N-m] at 0.101 [s]

Min: -4.0 [N-m] at 0.070 [s]

V1P3 Lower Neck Mz



4-23

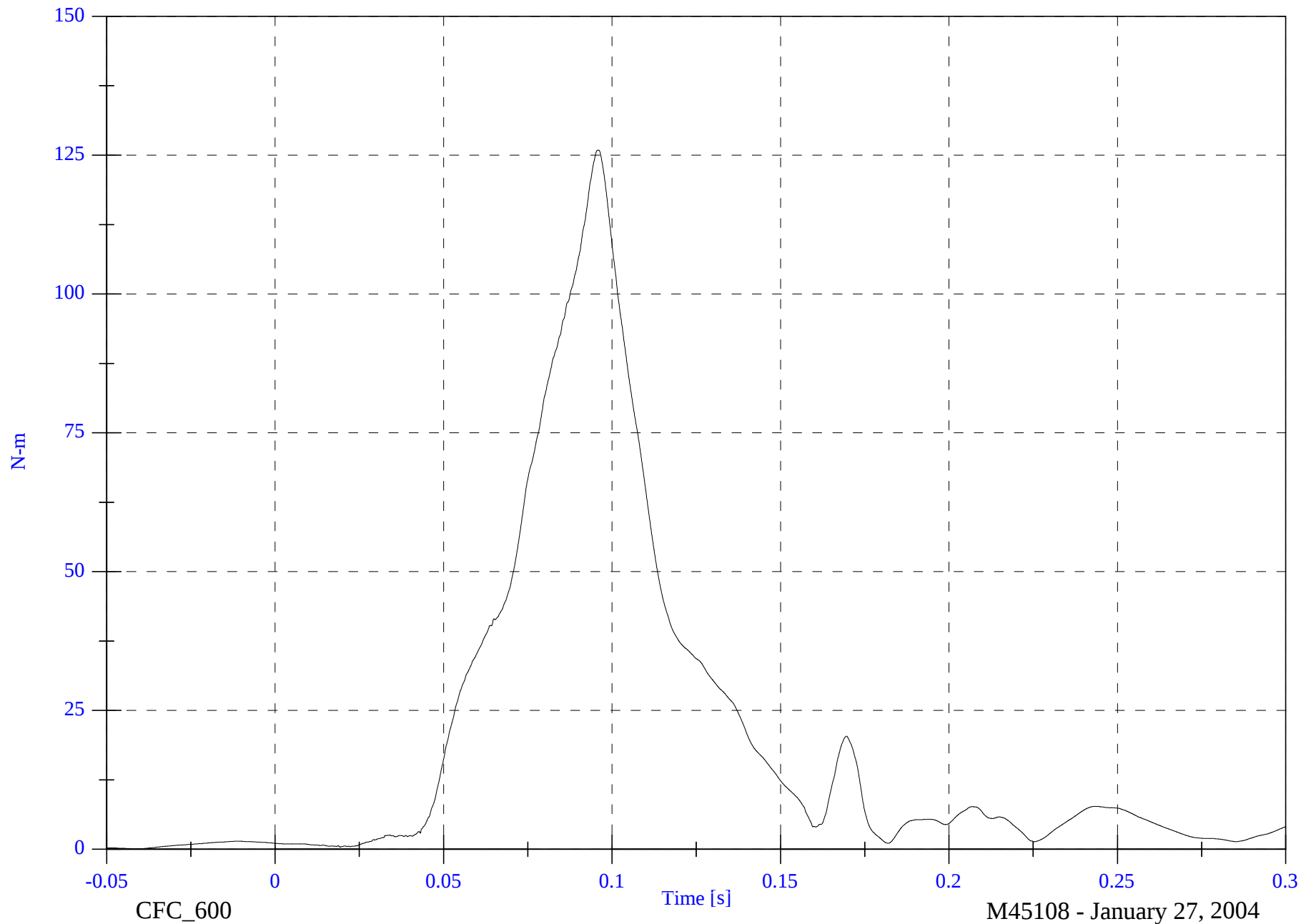
8642-NCAP-41

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Lower Neck M Resultant

Max: 125.9 [N-m] at 0.096 [s]

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



4-24

8642-NCAP-41

CFC_600

M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

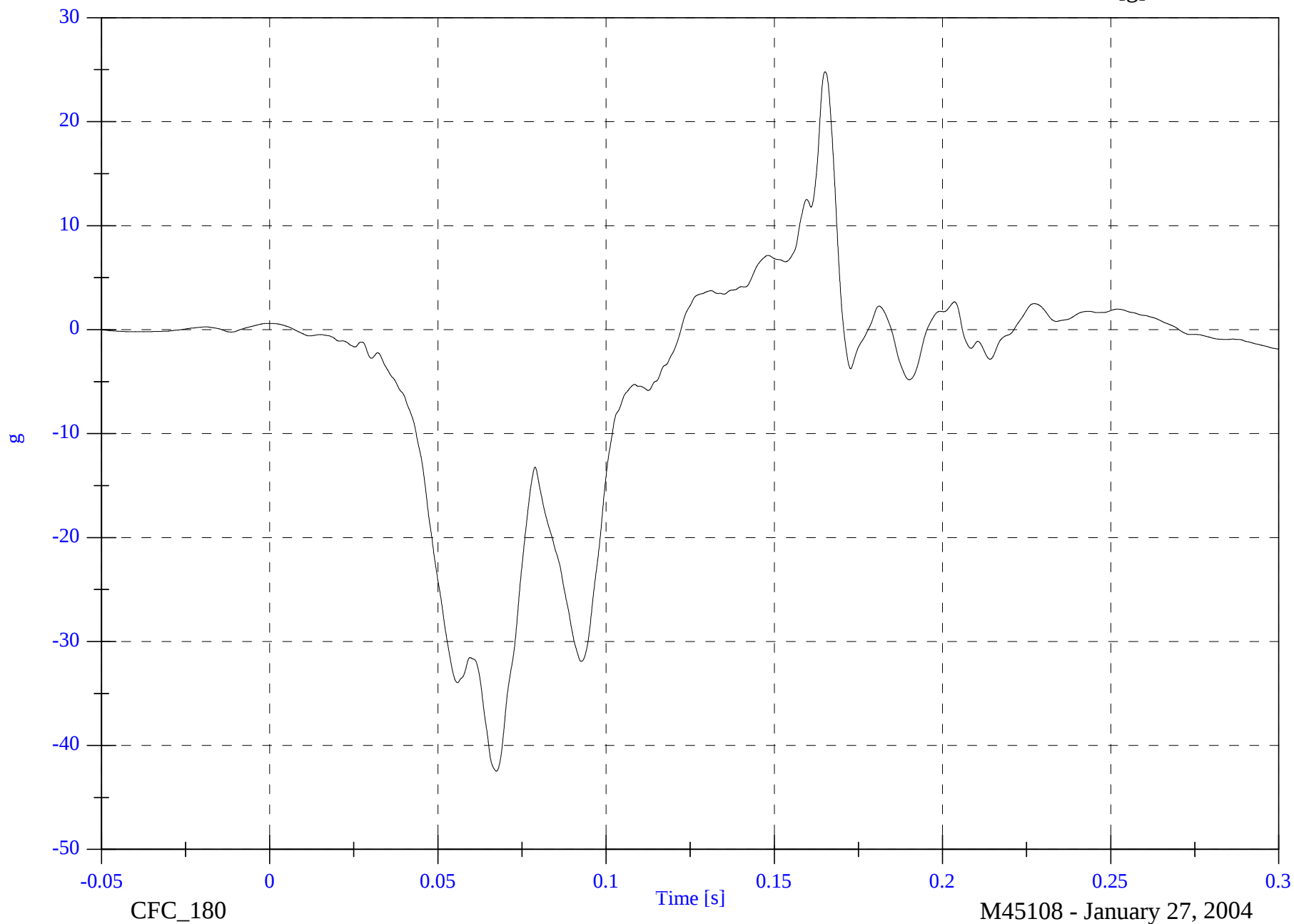
V1P3 Chest x

Max: 24.8 [g] at 0.165 [s]

Min: -42.5 [g] at 0.067 [s]

4-25

8642-NCAP-41



2004 NCAP Test 5 - 2004 Toyota RAV4

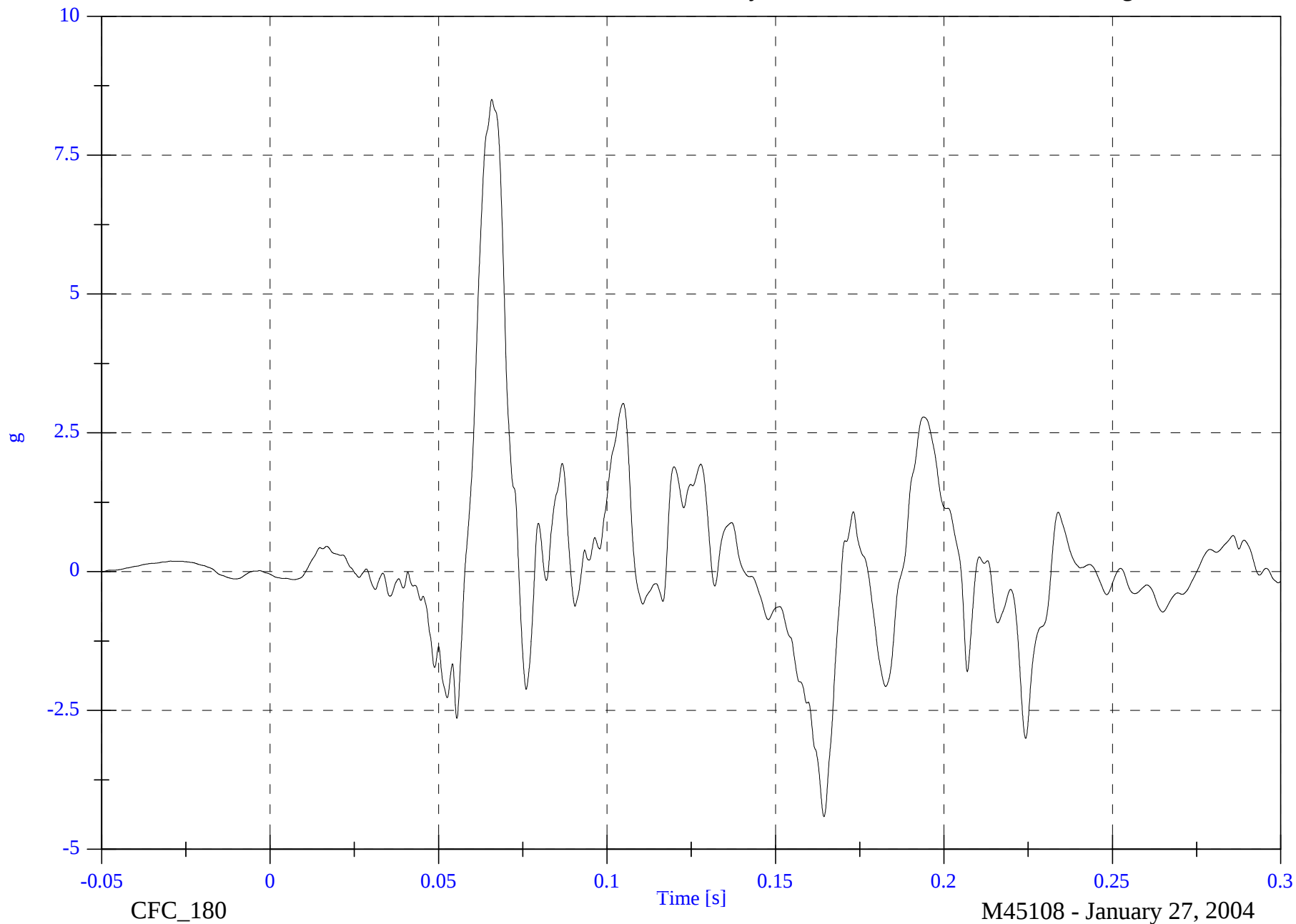
V1P3 Chest y

Max: 8.5 [g] at 0.066 [s]

Min: -4.4 [g] at 0.164 [s]

4-26

8642-NCAP-41

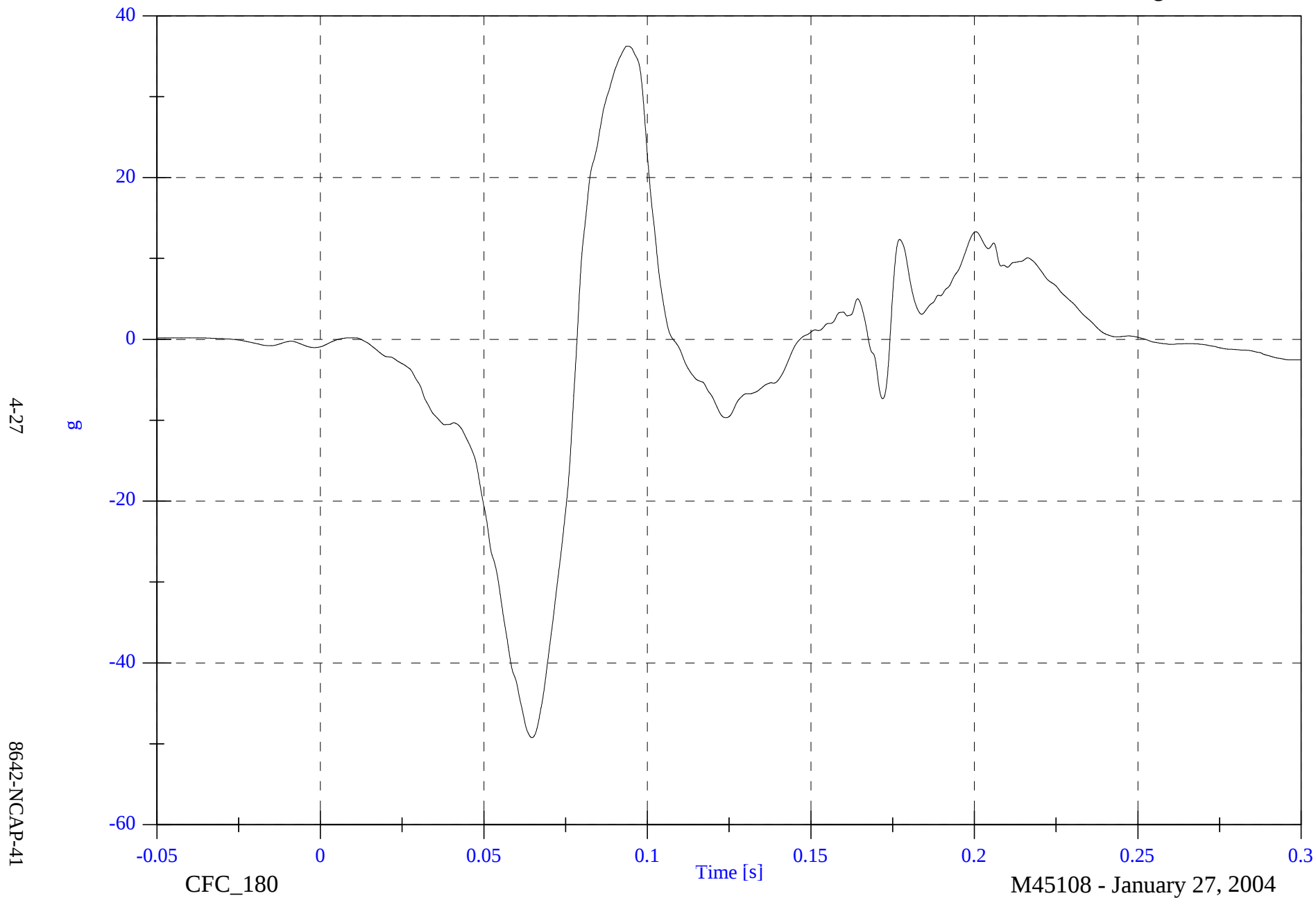


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Chest z

Max: 36.3 [g] at 0.094 [s]

Min: -49.2 [g] at 0.065 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

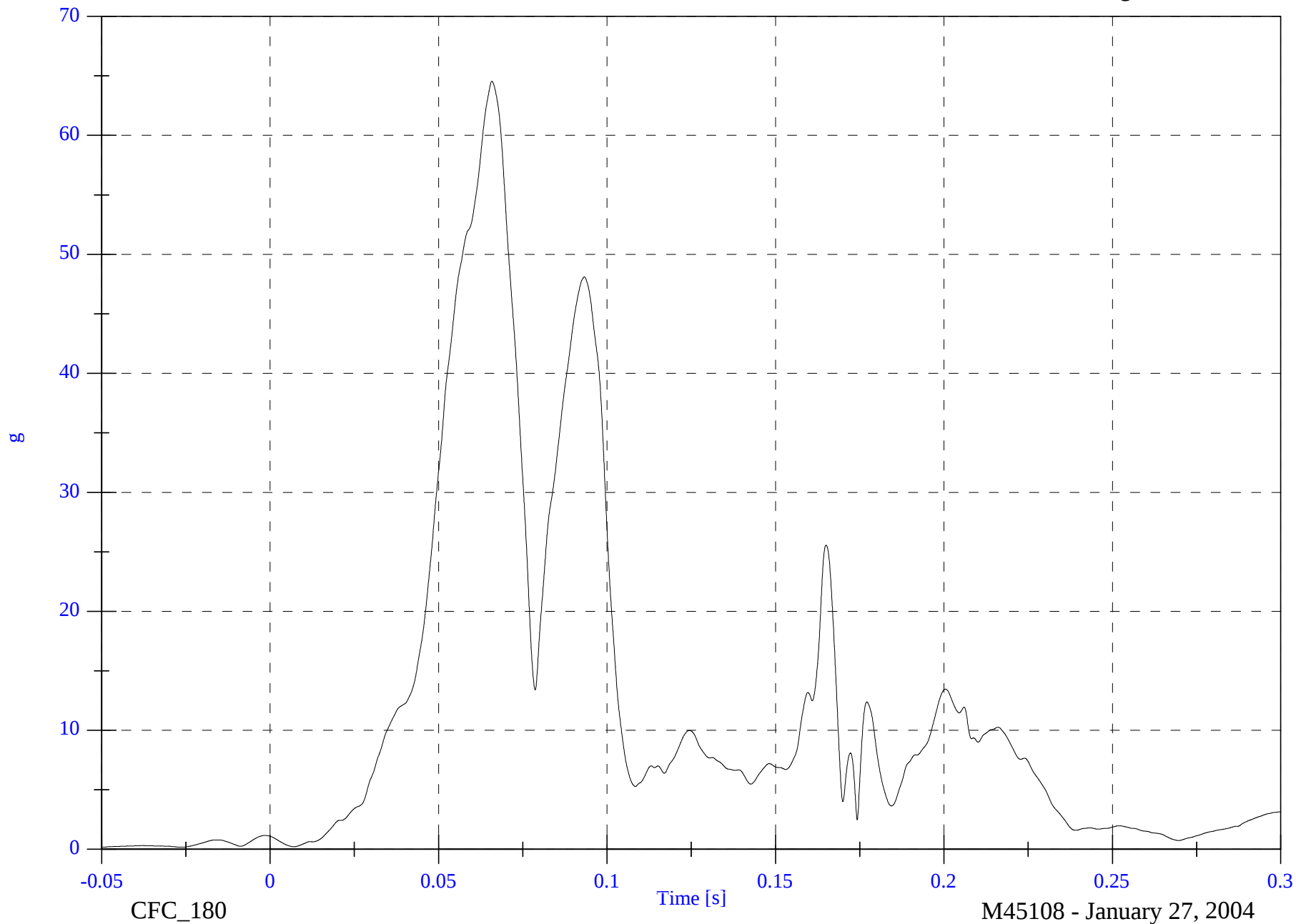
V1P3 Chest Resultant

Max: 64.5 [g] at 0.066 [s]

Min: 0.2 [g] at -0.050 [s]

4-28

8642-NCAP-41

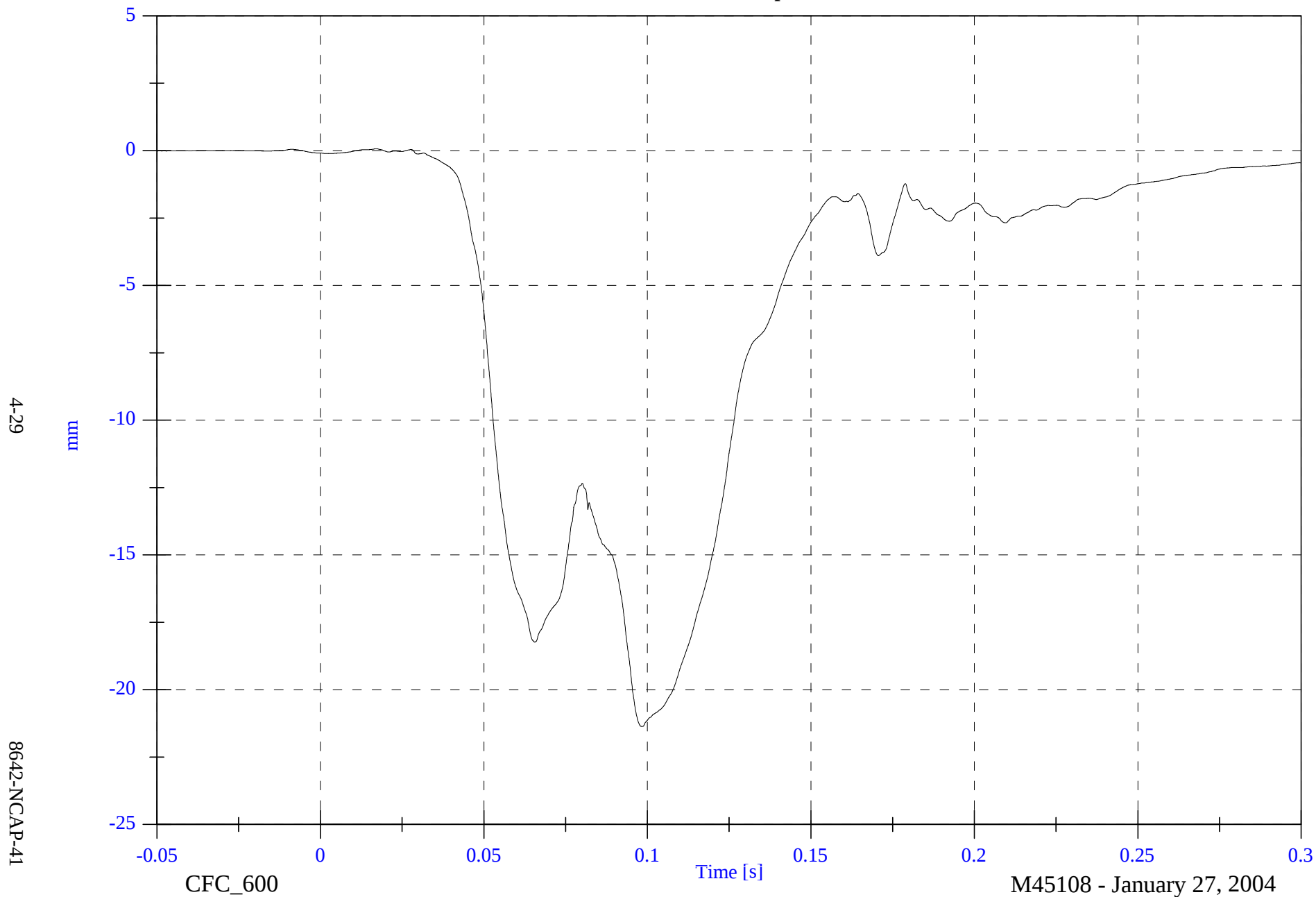


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Chest Compression

Max: 0.1 [mm] at 0.017 [s]

Min: -21.4 [mm] at 0.098 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

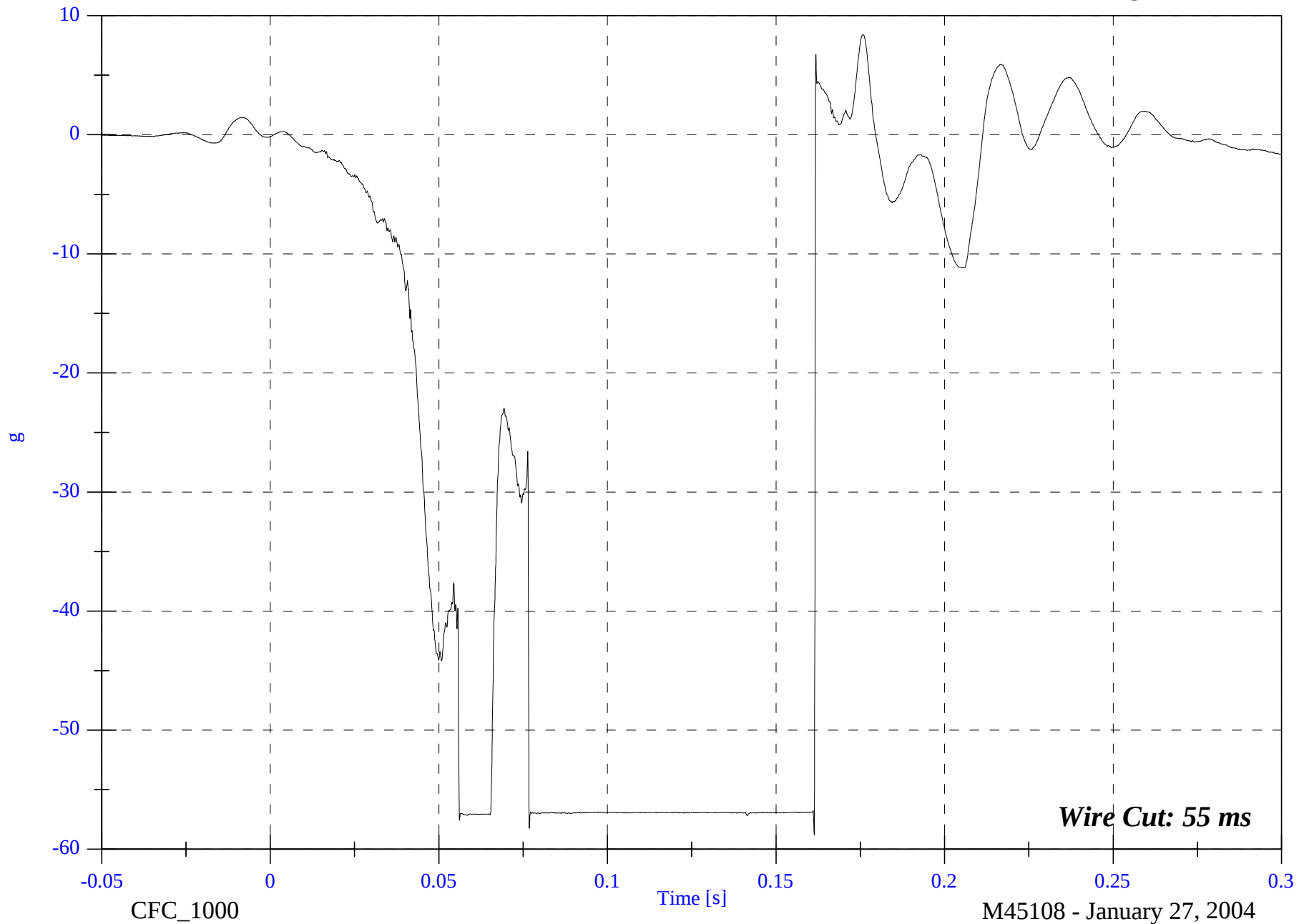
V1P3 Pelvic x

Max: 8.4 [g] at 0.176 [s]

Min: -58.8 [g] at 0.161 [s]

4-30

8642-NCAP-41



Wire Cut: 55 ms

M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

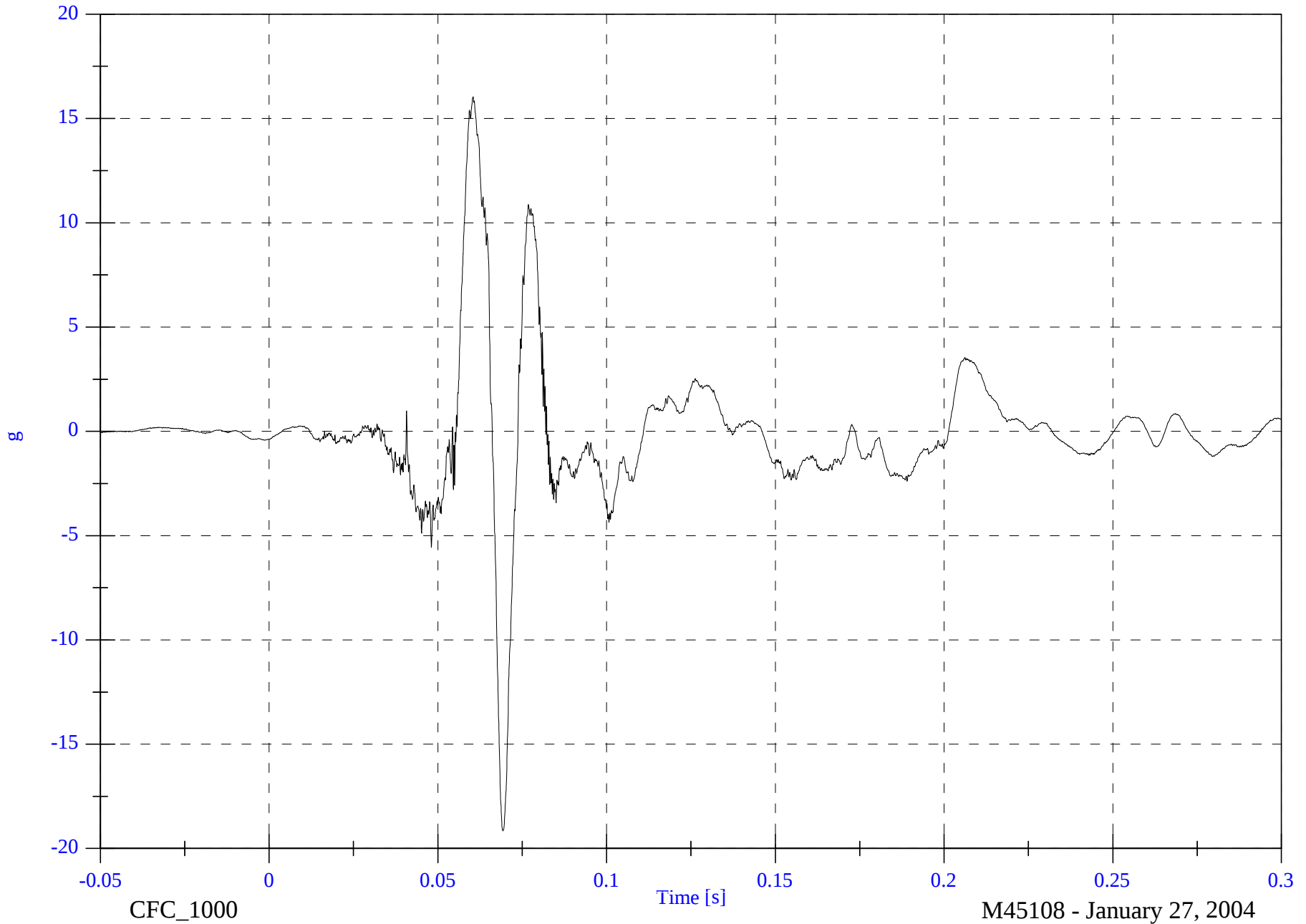
V1P3 Pelvic y

Max: 16.0 [g] at 0.060 [s]

Min: -19.2 [g] at 0.069 [s]

4-31

8642-NCAP-41

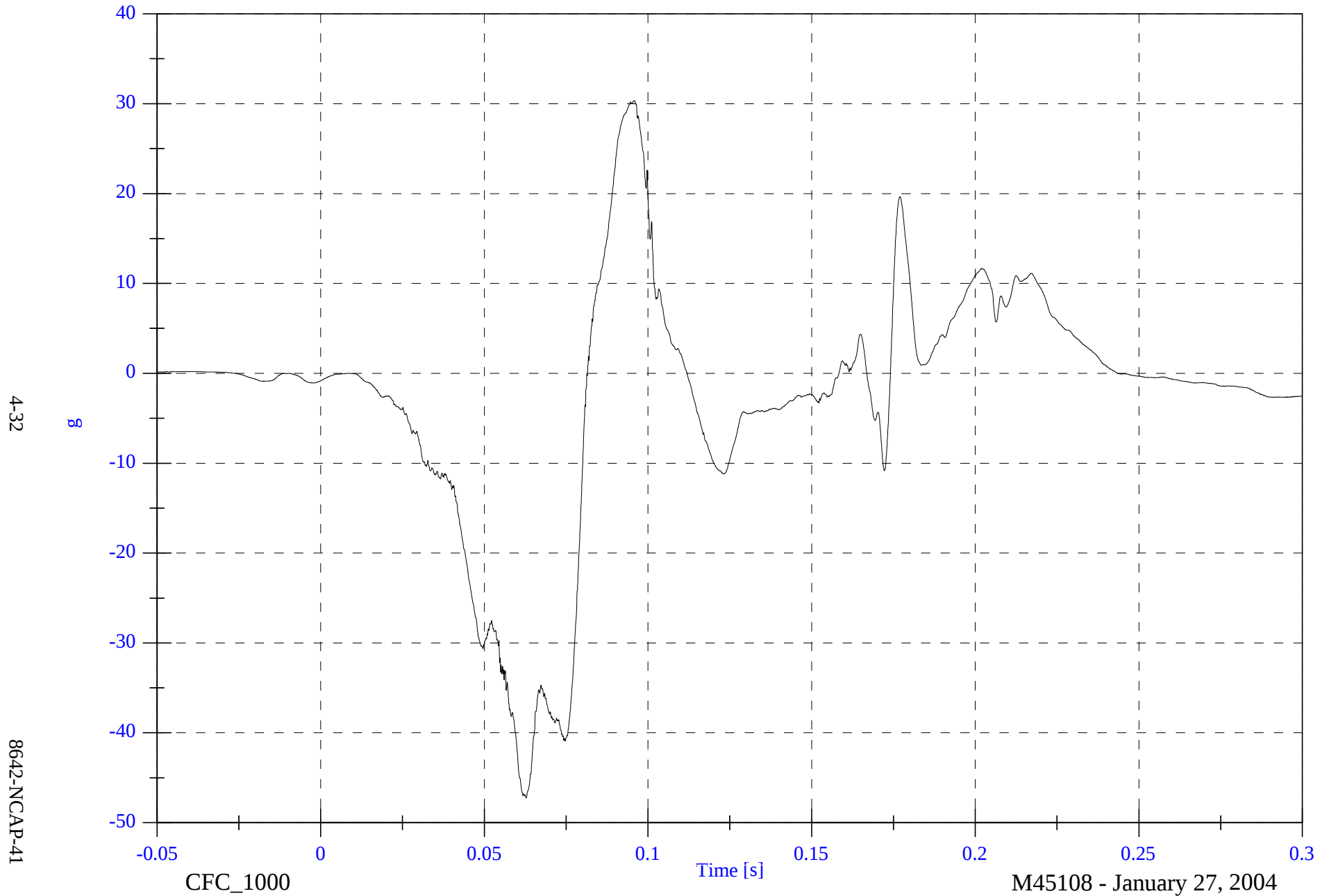


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Pelvic z

Max: 30.3 [g] at 0.096 [s]

Min: -47.2 [g] at 0.063 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

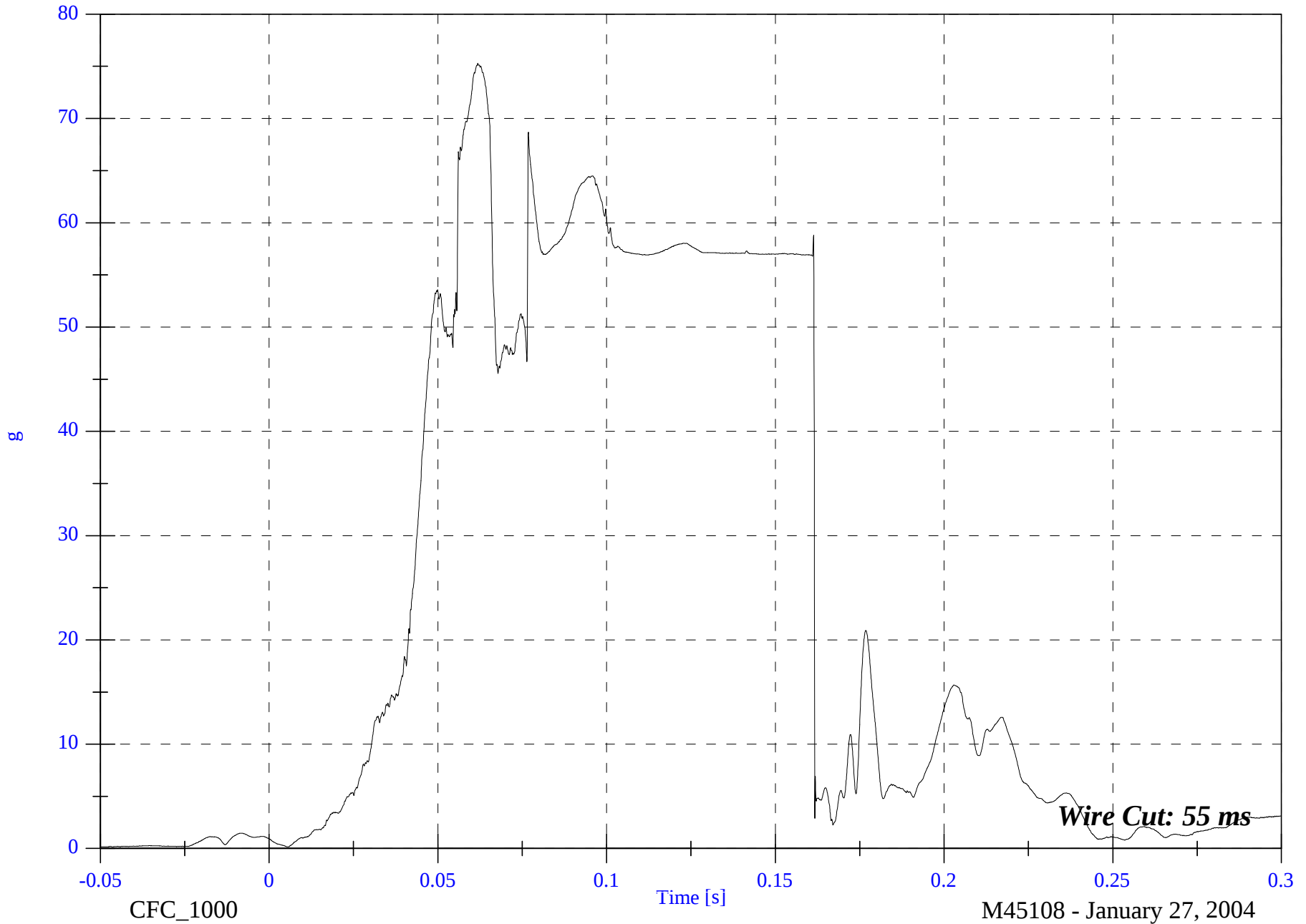
V1P3 Pelvic Resultant

Max: 75.3 [g] at 0.062 [s]

Min: 0.2 [g] at -0.050 [s]

4-33

8642-NCAP-41



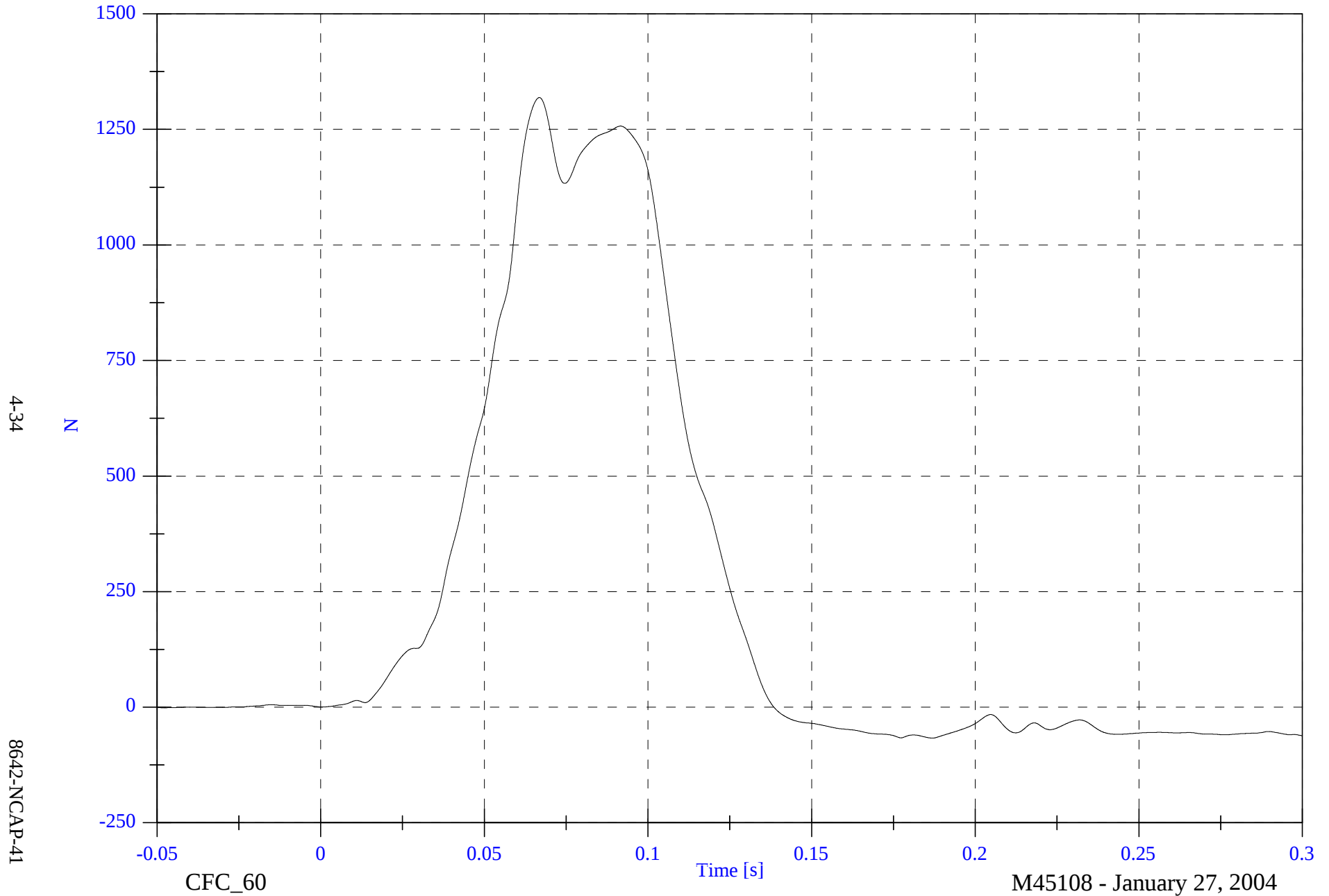
M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Tether Belt

Max: 1318.8 [N] at 0.067 [s]

Min: -66.9 [N] at 0.187 [s]

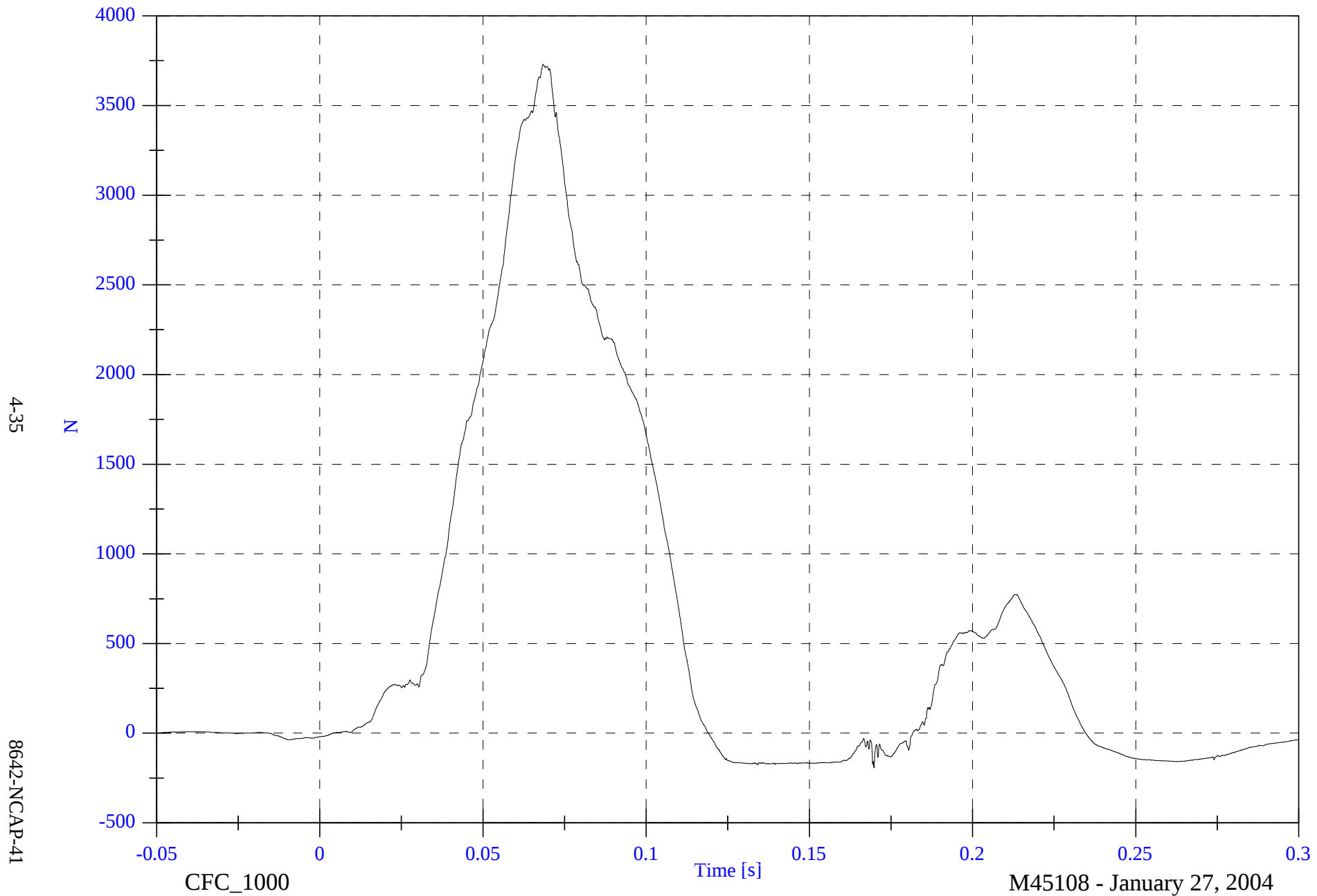


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Latch Belt

Max: 3730.0 [N] at 0.068 [s]

Min: -193.1 [N] at 0.170 [s]

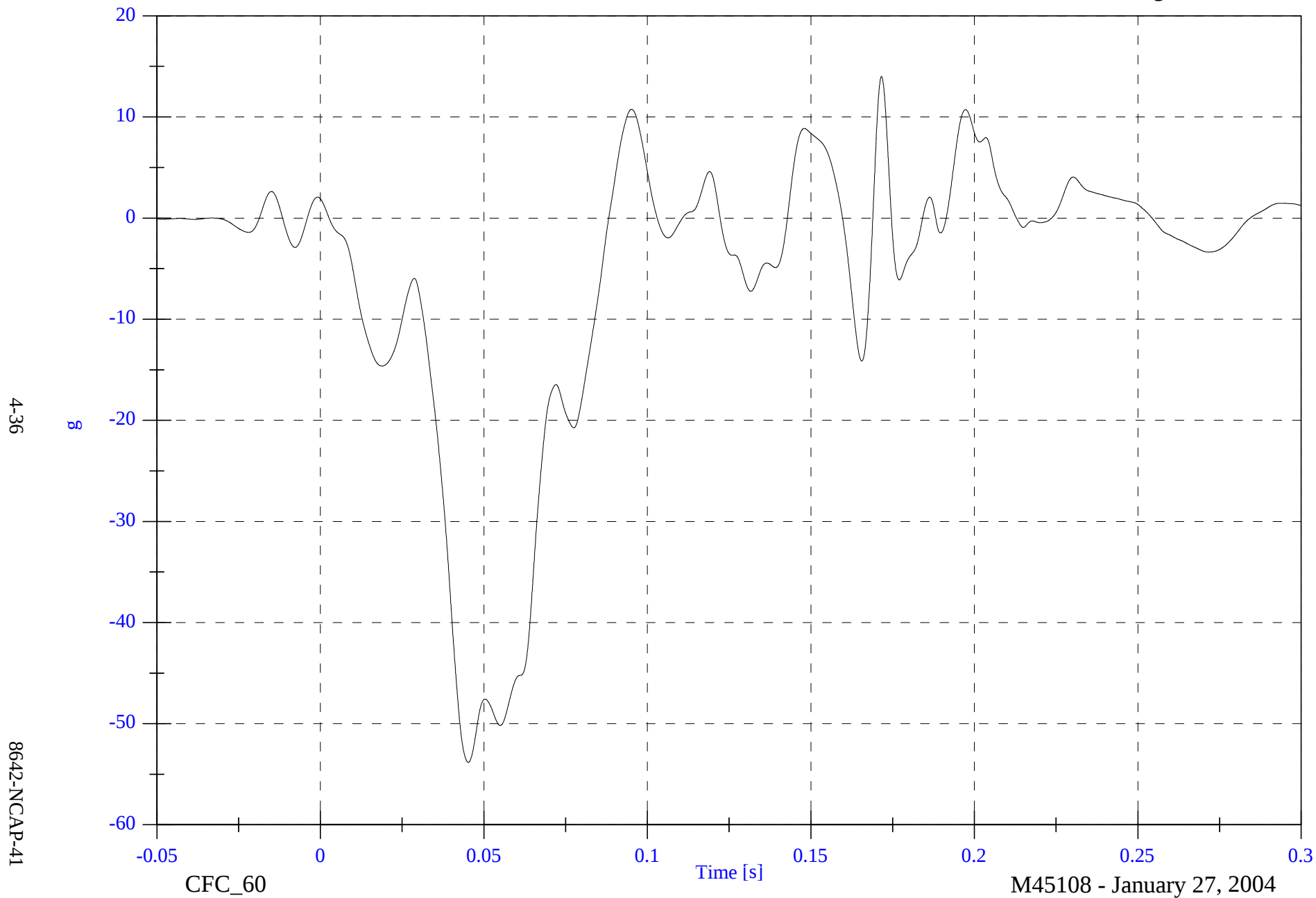


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Seat x

Max: 14.0 [g] at 0.172 [s]

Min: -53.8 [g] at 0.045 [s]

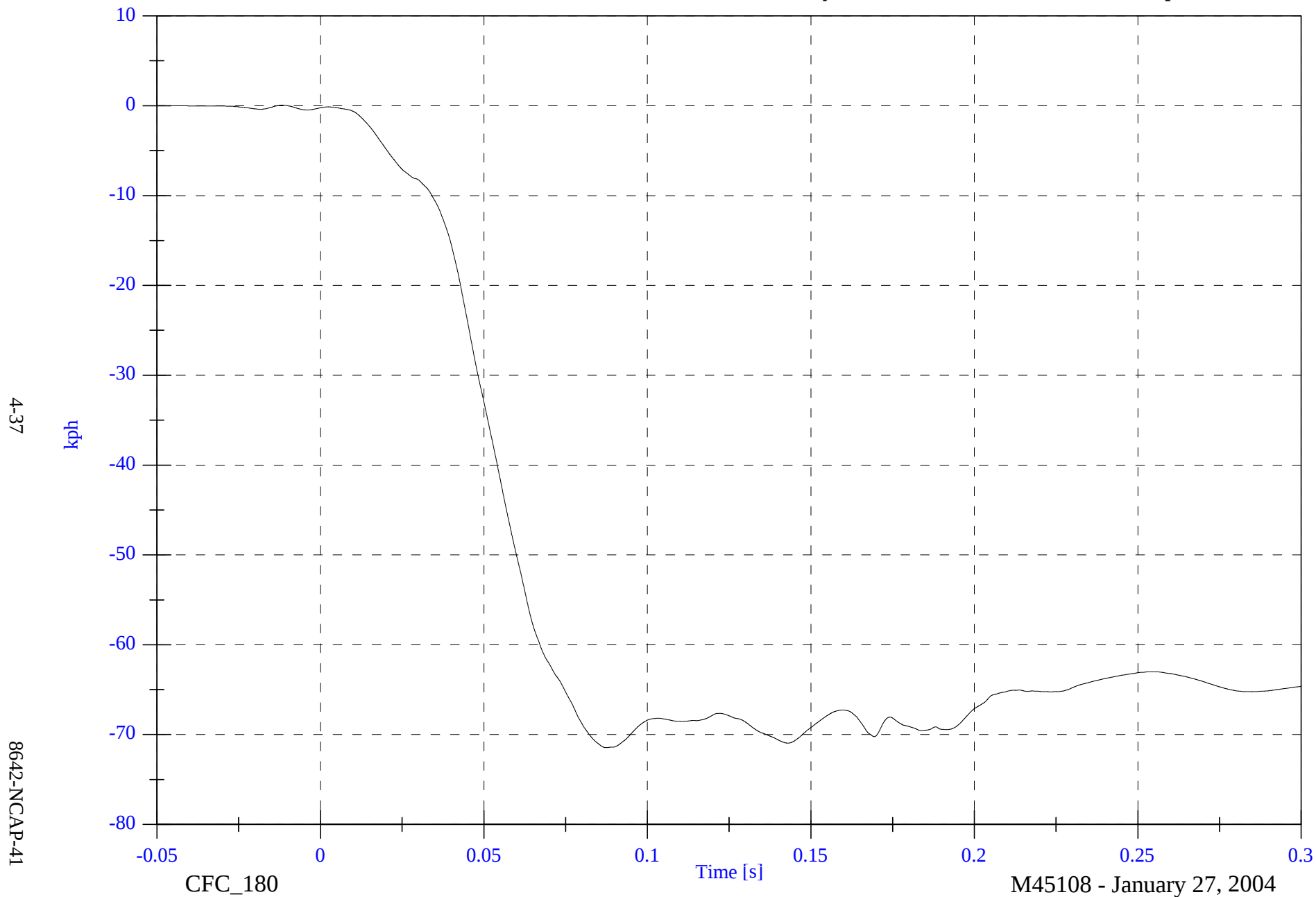


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Seat x Velocity

Max: 0.1 [kph] at -0.012 [s]

Min: -71.4 [kph] at 0.087 [s]



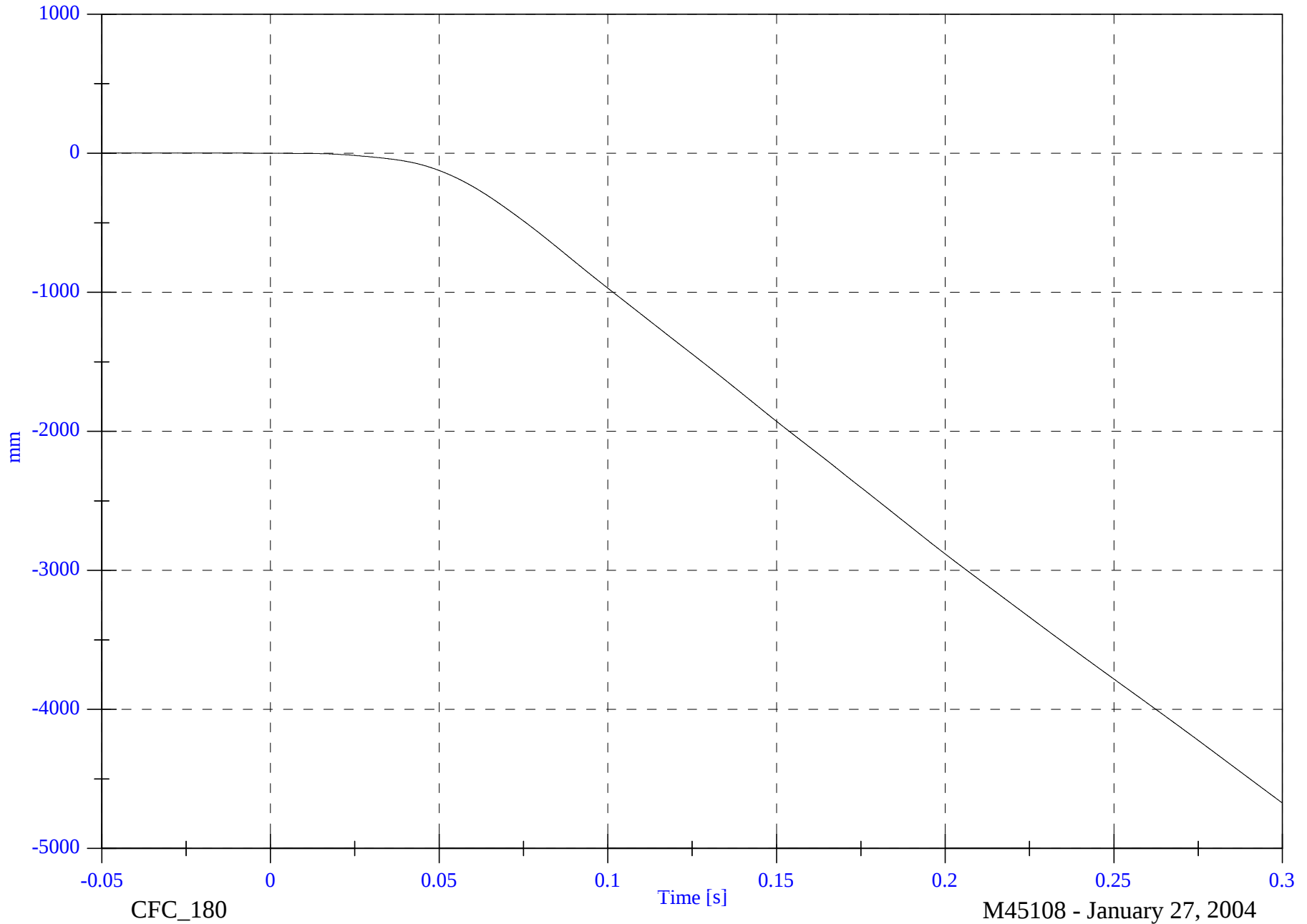
2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Seat x Displacement

Max: 1.9 [mm] at -0.047 [s]
Min: -4672.9 [mm] at 0.300 [s]

4-38

8642-NCAP-41

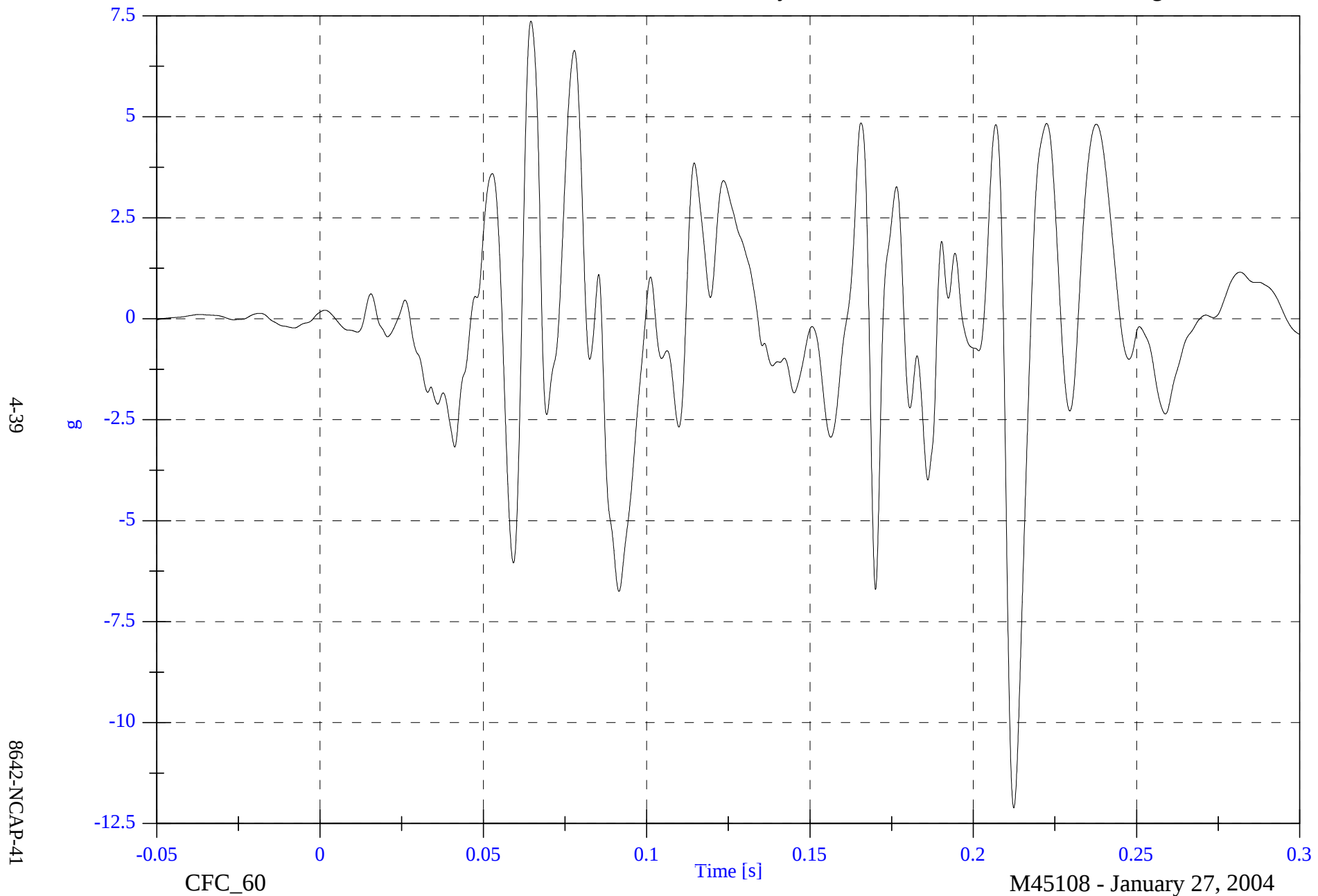


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Seat y

Max: 7.4 [g] at 0.065 [s]

Min: -12.1 [g] at 0.212 [s]

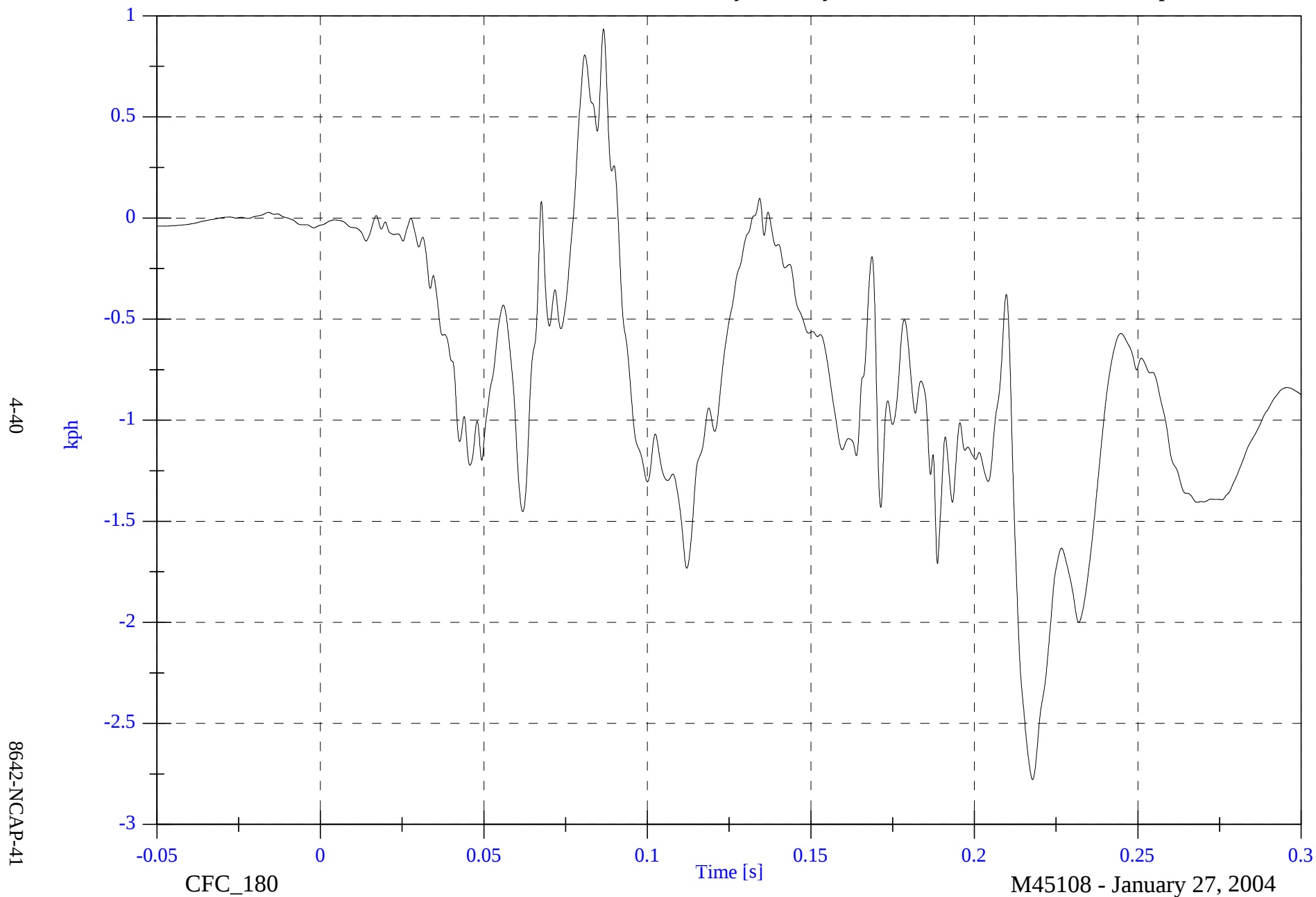


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Seat y Velocity

Max: 0.9 [kph] at 0.087 [s]

Min: -2.8 [kph] at 0.218 [s]

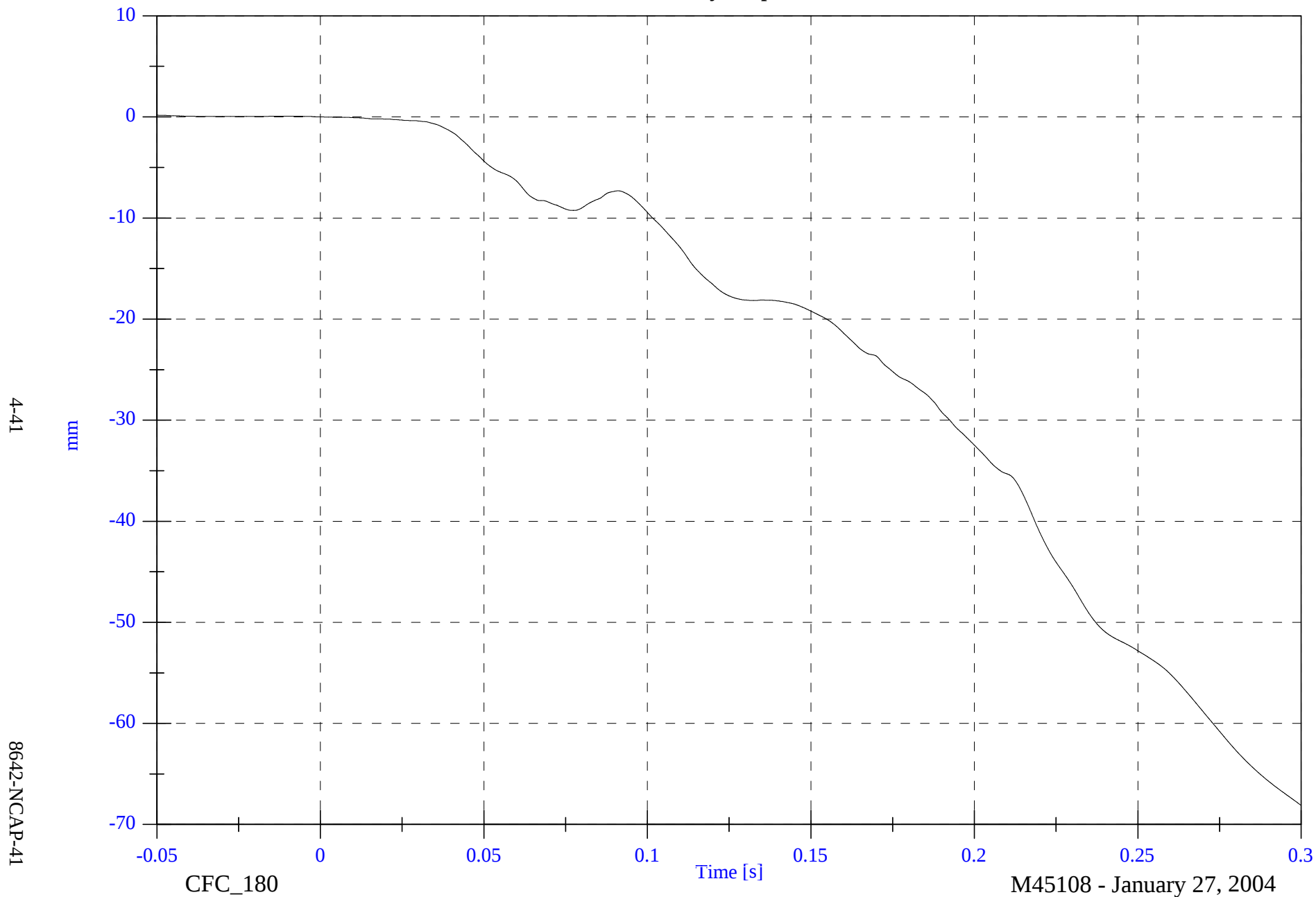


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Seat y Displacement

Max: 0.2 [mm] at -0.050 [s]

Min: -68.1 [mm] at 0.300 [s]

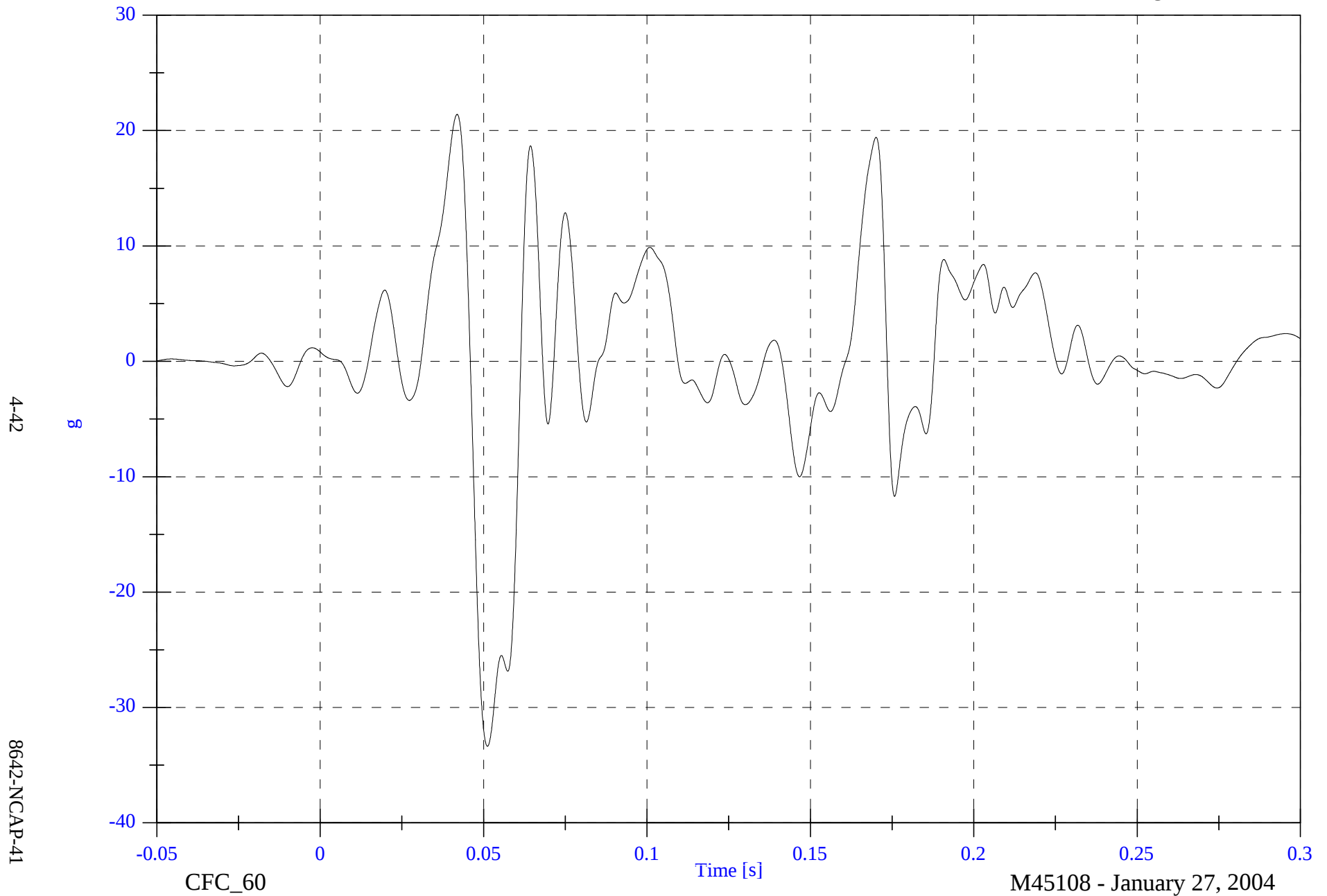


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Seat z

Max: 21.4 [g] at 0.042 [s]

Min: -33.4 [g] at 0.051 [s]

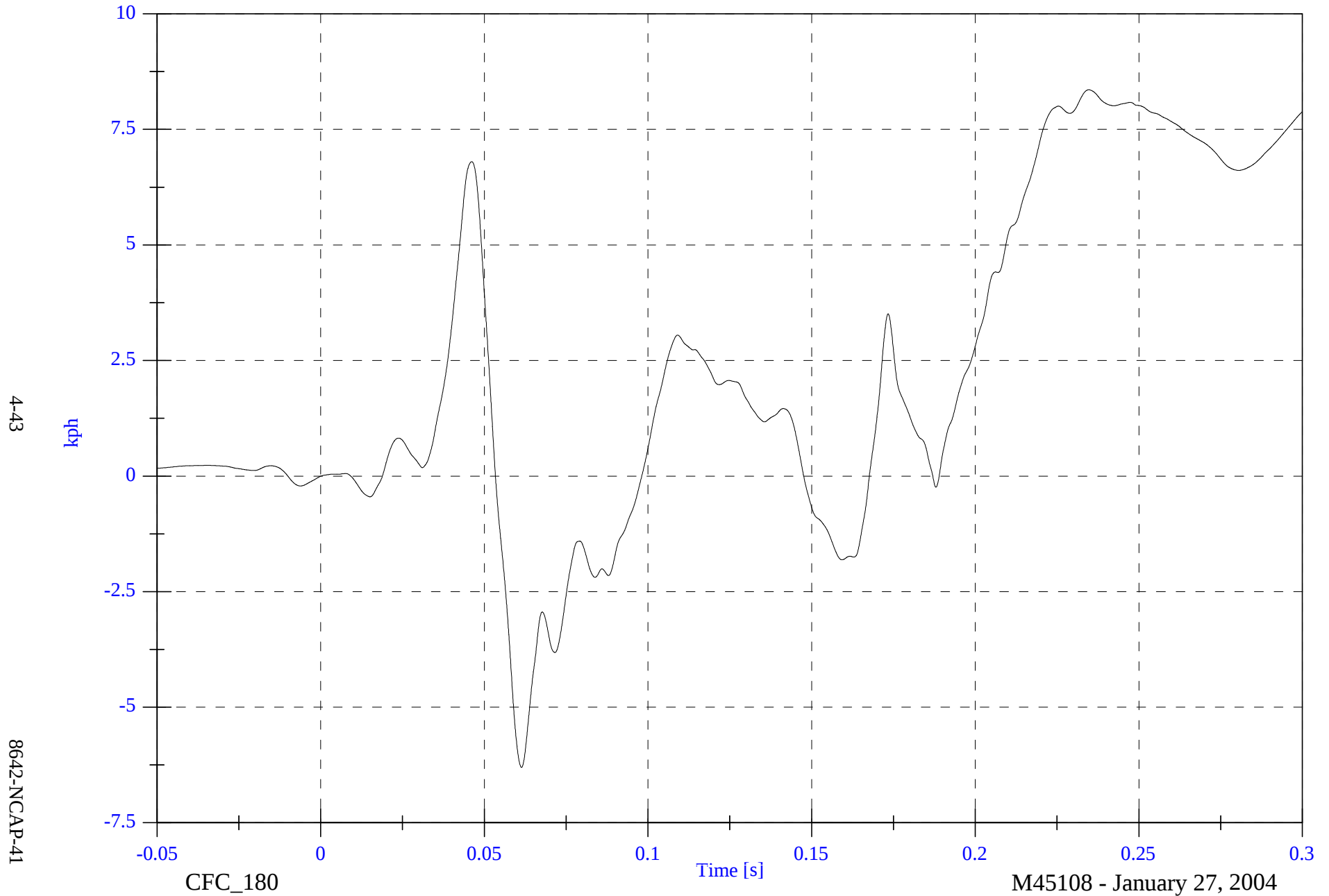


2004 NCAP Test 5 - 2004 Toyota RAV4

V1P3 Seat z Velocity

Max: 8.4 [kph] at 0.235 [s]

Min: -6.3 [kph] at 0.061 [s]



2004 NCAP Test 5 - 2004 Toyota RAV4

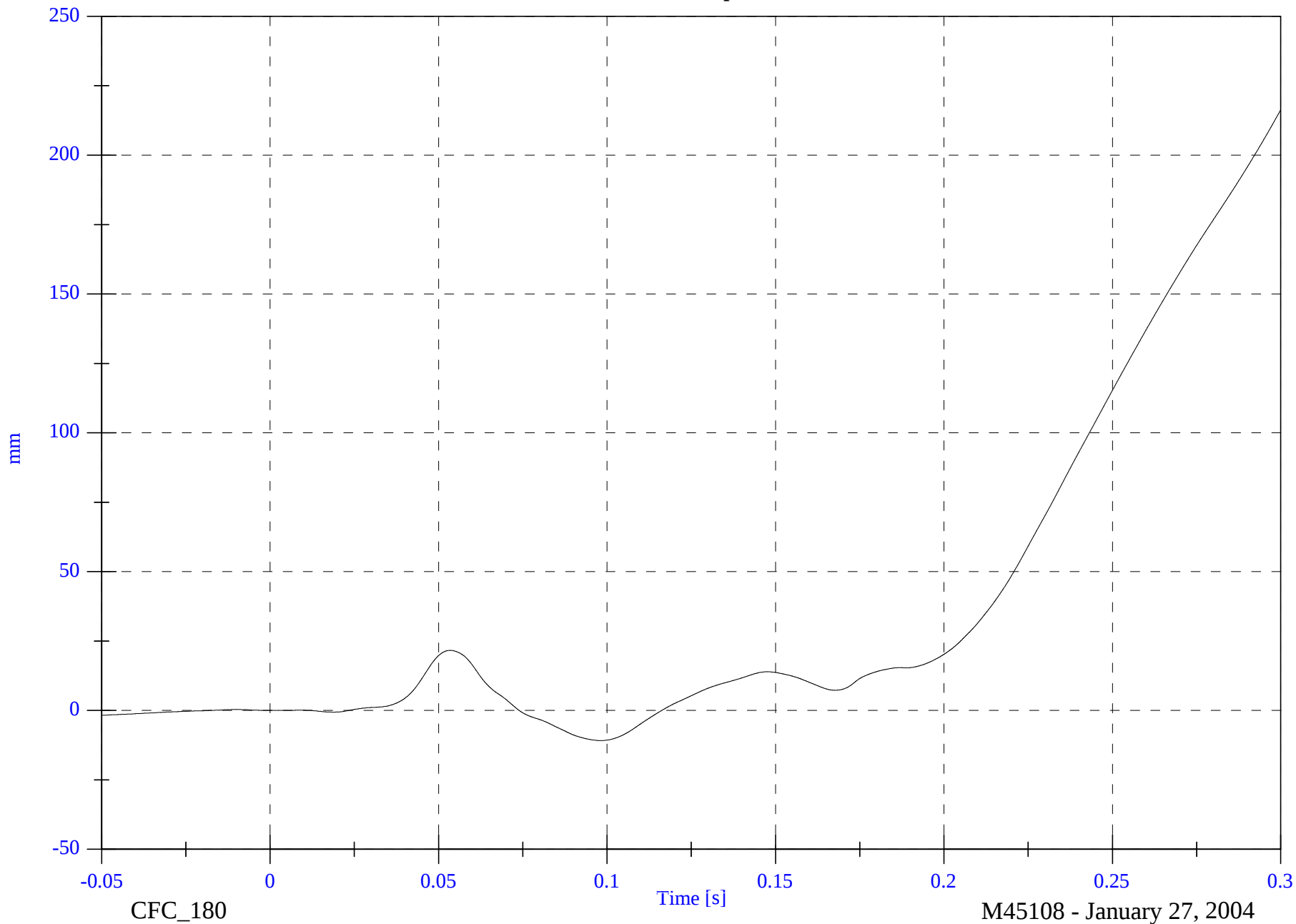
V1P3 Seat z Displacement

Max: 216.3 [mm] at 0.300 [s]

Min: -10.8 [mm] at 0.098 [s]

4-44

8642-NCAP-41



CFC_180

M45108 - January 27, 2004

2004 NCAP Test 5 - 2004 Toyota RAV4

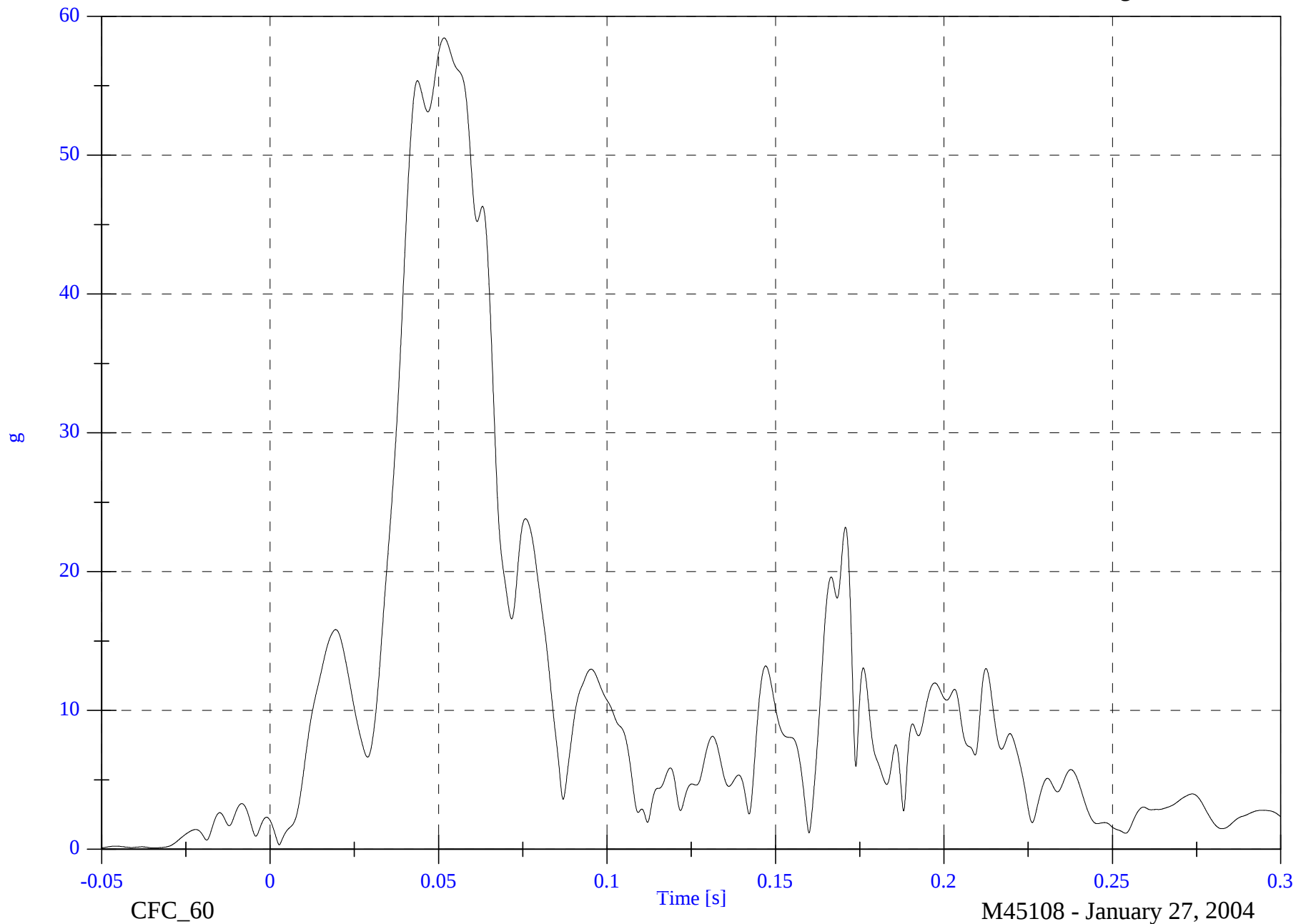
V1P3 Seat Resultant

Max: 58.4 [g] at 0.052 [s]

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

4-45

8642-NCAP-41



SECTION 5

CHILD DUMMY CALIBRATION INFORMATION

PART 572P
HEAD DROP TEST

Dummy Serial Number 142
Sequential Test Number 1
Date 01-12-2004
Workfile 142H2 01-12-04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70.00 F
Relative Humidity	10% - 70%	33.00 %
Peak Resultant Acceleration	250-280 G's	263.52 Gs
Peak Lateral Acceleration	15 G's Max	12.48 Gs
Is Acceleration Curve Unimodal?	<10%	4.38 %

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572P
NECK FLEXION TEST

Dummy Serial Number 142
Sequential Test Number 1
Date 12-11-03
Workfile 142nf 12-11-03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.11
Relative Humidity		10% - 70%	27.0
Pendulum Speed		5.40-5.60 m/s	5.55
Pendulum Pulse	10 ms	2.00 – 2.70 m/s	2.05
	15 ms	3.00 – 4.00 m/s	3.03
	20 ms	4.00 – 5.10 m/s	4.13
D Plane Rotation	Max	70.0 – 82.0 Deg	80.64
Maximum Occipital Moment		42.00 - 53.00 N-m	42.46
Occipital Moment Decay		60.0 - 80.0 ms	69.60

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572P
NECK EXTENSION TEST

Dummy Serial Number 142
Sequential Test Number 2
Date 12-11-03
Workfile 142ne2 12-11-03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.11
Relative Humidity		10% - 70%	27.00
Pendulum Speed		3.55 – 3.75 m/s	3.60
Pendulum Pulse	10 ms	1.00 – 1.40 m/s	1.10
	15 ms	1.90 – 2.50 m/s	2.02
	20 ms	2.80 – 3.50 m/s	2.85
D Plane Rotation	Max	83.0 – 93.0 Deg	83.64
Maximum Occipital Moment		-53.30 - -43.70 N-m	-52.76
Occipital Moment Decay		60.0 - 80.0 ms	72.40

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572P
THORAX IMPACT TEST

Dummy Serial Number 142
Sequential Test Number 1
Date 12-12-03
Workfile 142T 12-12-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.0
Relative Humidity	10% - 70%	35.0
Pendulum Velocity	19.40 – 20.00 Ft/s	19.70
Maximum Deflection	1.30 – 1.50 in	1.30
Maximum Resistive Force	152.90 – 182.10 Lbs	167.53
Internal Hysteresis	65 - 85 %	76.46
Sternum Force Criteria	193.30 lbf	179.91

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572P
EXTERNAL DIMENSIONS

Dummy Serial Number 142
Sequential Test Number 1
Date 12-11-03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Total Sitting Height	A	21.2 – 21.8 in	21.2
Shoulder Pivot Height	B	12.1 - 12.7 in	12.4
H-Point Height	C	1.35 – 1.75 in	1.55
H-Point from Backline	D	2.24 – 2.64 in	2.5
Shoulder Pivot from Backline	E	2.40 – 2.80 in	2.6
Thigh Clearance	F	3.19 – 3.59 in	3.5
Back of Elbow to Fingertip	G	9.74 – 10.34 in	10.1
Head back from Backline	H	1.9 – 2.3 in	2.1
Shoulder - Elbow Length	I	7.3 – 7.9 in	7.7
Elbow Rest Height	J	5.26 – 5.86 in	5.5
Buttock to Knee Length	K	11.21 – 11.81 in	11.5
Popliteal Height	L	8.60 – 9.20 in	8.9
Knee Pivot Height	M	9.51 – 10.11 in	9.75
Buttock Popliteal Length	N	8.58 - 9.18 in	9.0
Chest Depth with Jacket	O	5.45 - 6.05 in	5.8
Foot Length	P	5.42 – 5.82 in	5.8
Stature	Q	36.7 – 37.7 in	37.0
Buttock to Knee Pivot Length	R	9.9 - 10.3 in	10.25
Head Breadth	S	5.15 – 5.55 in	5.4
Head Depth	T	6.59 -7.19 in	6.9
Hip Breadth	U	7.9 – 8.5 in	8.1
Shoulder Breadth	V	9.31 – 9.91in	9.9
Foot Breadth	W	2.11 – 2.51 in	2.3
Head Circumference	X	19.7 – 20.3 in	20.3
Chest Circumference (With Jacket)	Y	20.75 – 21.75 in	21.4
Waist Circumference	Z	20.75 – 21.75 in	21.4
Location for Chest Circumference	AA	9.8 – 10.2 in	10.00
Location for Waist Circumference	BB	6.3 – 6.7 in	6.50

Remarks:

Laboratory Technician:

B. Swiecicki

SECTION 6

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

HYBRID III INSTRUMENTATION

	POSITION #3 (RIGHT) SERIAL NO.: 142		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	ENDEVCO	AC-P23804	18-Sep-03
HEAD AY	ENTRAN	AC-99102-F12	18-Aug-03
HEAD AZ	ENDEVCO	AC-00L13-F03	18-Aug-03
HEAD REAR AZ	ENDEVCO	AC-P23926	10-Sep-03
UPPER NECK FX	Denton	LC-213Fx	1-Oct-03
UPPER NECK FY	Denton	LC-213Fy	1-Oct-03
UPPER NECK FZ	Denton	LC-213Fz	1-Oct-03
UPPER NECK MX	Denton	LC-213Mx	1-Oct-03
UPPER NECK MY	Denton	LC-213My	1-Oct-03
UPPER NECK MZ	Denton	LC-213Mz	1-Oct-03
LOWER NECK FX	Denton	LC-214Fx	1-Oct-03
LOWER NECK FY	Denton	LC-214Fy	1-Oct-03
LOWER NECK FZ	Denton	LC-214Fz	1-Oct-03
LOWER NECK MX	Denton	LC-214Mx	1-Oct-03
LOWER NECK MY	Denton	LC-214My	1-Oct-03
LOWER NECK MZ	Denton	LC-214Mz	1-Oct-03
CHEST AX	ENTRAN	AC-99108-F30	18-Aug-03
CHEST AY	ENTRAN	AC-99108-F28	18-Aug-03
CHEST AZ	ENTRAN	AC-99H30-Z04	18-Aug-03
CHEST DISPLACEMENT X	SERVO	DS-142	18-Aug-03
PELVIS AX	ENTRAN	AC-99102-F06	18-Aug-03
PELVIS AY	ENTRAN	AC-99102-F15	18-Aug-03
PELVIS AZ	ENTRAN	AC-99G29-Q13	18-Aug-03
TETHER BELT LOAD	First Technology	LC-174	10-Oct-03
LATCH BELT LOAD	First Technology	LC-173	10-Oct-03

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

CRS INSTRUMENTATION

	CRS ACCELEROMETERS		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
P3 CRS AX	ENDEVCO	AC-P16585	24-Sep-03
P3 CRS AY	ENDEVCO	AC-P14438	24-Sep-03
P3 CRS AZ	ENDEVCO	AC-P15747	24-Sep-03