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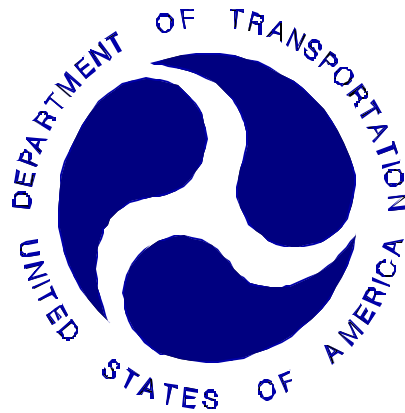
**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

FUJI HEAVY IND. LTD., JAPAN
2002 SUBARU IMPREZA
4-DOOR WAGON

NHTSA NUMBER: M25501

VERIDIAN ENGINEERING TEST NUMBER: 8652-SNCAP-02

VERIDIAN ENGINEERING
TRANSPORTATION SCIENCES CENTER
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February 6, 2002

FINAL REPORT

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

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Accepted By: _____

Acceptance Date: _____

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| 15. Supplementary Notes | | | | | | | | | | | | | | | | | | | | | |
| 16. Abstract <p>A 55/28 kph 90⁰ Impact Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2002 Subaru Impreza 4-door Wagon in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at the Veridian Engineering Crash Test Facility in Buffalo, New York, on February 6, 2002.</p> <p>The impact velocity of the Moving Deformable Barrier (MDB) was 61.64 kph, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21⁰C. The target vehicle post-test maximum crush was 270 mm at level 2.</p> <p>The test or target vehicle's performance is given below:</p> <table border="0" style="margin-left: 40px;"> <tr> <td></td> <td align="center"><u>Front SID</u></td> <td></td> </tr> <tr> <td>Left Upper Rib Acceleration:</td> <td align="center">53.7</td> <td align="right">g's</td> </tr> <tr> <td>Left Lower Rib Acceleration:</td> <td align="center">51.8</td> <td align="right">g's</td> </tr> <tr> <td>Lower Spine Acceleration:</td> <td align="center">64.9</td> <td align="right">g's</td> </tr> <tr> <td>Thoracic Trauma Index (TTI):</td> <td align="center">59</td> <td align="right">g's</td> </tr> <tr> <td>Pelvis Acceleration (PEV):</td> <td align="center">54</td> <td align="right">g's</td> </tr> </table> <p>The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.</p> | | | | | <u>Front SID</u> | | Left Upper Rib Acceleration: | 53.7 | g's | Left Lower Rib Acceleration: | 51.8 | g's | Lower Spine Acceleration: | 64.9 | g's | Thoracic Trauma Index (TTI): | 59 | g's | Pelvis Acceleration (PEV): | 54 | g's |
| | <u>Front SID</u> | | | | | | | | | | | | | | | | | | | | |
| Left Upper Rib Acceleration: | 53.7 | g's | | | | | | | | | | | | | | | | | | | |
| Left Lower Rib Acceleration: | 51.8 | g's | | | | | | | | | | | | | | | | | | | |
| Lower Spine Acceleration: | 64.9 | g's | | | | | | | | | | | | | | | | | | | |
| Thoracic Trauma Index (TTI): | 59 | g's | | | | | | | | | | | | | | | | | | | |
| Pelvis Acceleration (PEV): | 54 | g's | | | | | | | | | | | | | | | | | | | |
| 17. Key Words New Car Assessment Program (NCAP) Side Impact MDB Side Impact Dummy (SID) | | 18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Reference Division Room 5108 (NAD-52) 400 Seventh St., S.W. Washington, D.C. 20590 Telephone No. (202) 366-4946 ATTN: Robert Hornicle | | | | | | | | | | | | | | | | | | | |
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SECTION 1

PURPOSE AND TEST PROCEDURE

This side impact test is part of the FY2001 New Car Assessment Program Side Impact Protection sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-98-D-02001. The purpose of this test was to generate comparative side impact performance in a 2002 Subaru Impreza 4-door Wagon. The test was conducted in accordance with the Office of Crashworthiness Standards' Laboratory Test Procedure dated July 1997.

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A 2002 Subaru Impreza 4-door Wagon was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 61.64 kph (38.3 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Veridian Engineering Transportation Sciences Center in Buffalo, New York on February 6, 2002. Pre- and post-test photographs of the test vehicle, the moving deformable barrier (MDB), and the side impact dummies (SIDs) are included in Appendix A.

One restrained Side Impact Dummy (SID) was placed in the driver (Pos. #1) designated seating position according to the instructions specified in the OCWS Side Impact Laboratory Test Procedure which is dated July, 1997. The side impact test was documented by one real-time camera and 9 high-speed cameras. Camera locations and other pertinent camera information are included in this report.

The SID was instrumented with the following accelerometers:

1. Left Upper Rib (LUR) uniaxial and redundant accelerometer (Y-direction)
2. Left Lower Rib (LLR) uniaxial and redundant accelerometer (Y-direction)
3. Lower Thoracic Spine (T₁₂) uniaxial and redundant accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial and redundant accelerometer (Y-direction)
5. Head triaxial accelerometers (X-, Y- and Z-direction)

A summary of the side impact dummy (SID) configuration and verification test data can be found in Appendix C. A total of 42 channels of data were recorded. Appendix B contains the vehicle, MDB and dummy response data traces.

The following table summarizes the results of the test.

| Injury Criteria | Front SID |
|-----------------|-----------|
| TTI (g) | 59 |
| PEV (g) | 54 |

SECTION 3

SUMMARY OF TEST RESULTS

DATA SHEET 1

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2002 Subaru Impreza 4-door Wagon

Vehicle Body Color: Green VIN: JF1GG655X2G821138

Vehicle NHTSA No.: M25501 Month & Year of Manufacture: 10/01

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

Engine Placement: X Longitudinal; or - Lateral

Transmission: 5 Speed; X Manual; - Automatic; X Overdrive

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

Odometer Reading - km

Options: X A/C; X Power Steering; X Power Brakes; X Power Windows

DATA FROM TIRE PLACARD

Tire Pressure* (at capacity); 220 kPa FRONT
200 kPa REAR

Recommended Tire Size: P195/60R15

Tires on Test Vehicle: P195/60R15 ; Manufacturer: Bridgestone

Vehicle Capacity Data:

Number of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 Total

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

Type of Front Seat Back: - Fixed; X Adjustable with X Lever or - Knob

Vehicle Max Capacity Loading = 408 kg (A)

No. of Occupants x 68.04 kg. = 340.2 kg (B)

Vehicle Cargo Capacity = 67.8 kg (A-B)

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

Left Front = 396.5 kg Left Rear = 315.0 kg

Right Front = 396.0 kg Right Rear = 293.5 kg

TOTAL FRONT = 792.5 kg TOTAL REAR = 608.5 kg

% of Total Weight = 56.6% % % of Total Weight = 43.43 %

TOTAL WEIGHT = 1401.0 kg

* Tire pressure used in test.

DATA SHEET 1 (continued)

GENERAL TEST VEHICLE PARAMETER DATA

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Max. Fluids = 1401.0 kg (A)
Maximum Cargo Carrying Capacity of Test Vehicle = 67.8 kg (B)
Weight of instrumented Side Impact Dummies (2 X 81.2 kg) = 162.4 kg (C)
TEST VEHICLE TARGET WEIGHT: = 1631.2 kg (A+B+C)

FULLY LOADED TEST VEHICLE (UDVW + 1 or 2 SID(s) + CARGO):

Left Front = 431.5 kg Left Rear = 402.5 kg
Right Front = 413.5 kg Right Rear = 357.0 kg
TOTAL FRONT = 845.0 kg TOTAL REAR = 759.5 kg
% of Total Weight = 52.7% % % of Total Weight = 47.3% %
TOTAL TEST WEIGHT = 1604.5 kg

AS TESTED WEIGHT OF TEST VEHICLE (1 OR 2 SID(s) + CARGO + EQUIPMENT & INSTRUMENTATION):

Left Front = 413 kg Left Rear = 396 kg
Right Front = 429 kg Right Rear = 384 kg
TOTAL FRONT = 842.0 kg TOTAL REAR = 780.0 kg
% of Total Weight = 51.9% % % of Total Weight = 48.1% %
TOTAL TEST WEIGHT = 1622 kg

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

AS DELIVERED:

Left Front 694 Right Front 698 Left Rear 696 Right Rear 693

FULLY LOADED:

Left Front 677 Right Front 690 Left Rear 662 Right Rear 666

READY FOR TEST:

Left Front 686 Right Front 690 Left Rear 662 Right Rear 657*

Test Vehicle Wheelbase: 2530 millimeters

C.G. = 1216.65 millimeters rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4316 millimeters
Left Side = 4320 millimeters
Centerline = 2528 millimeters

* As tested attitude was lower than fully loaded. Vehicle test conducted with approval from manufacturer and the NHTSA representative

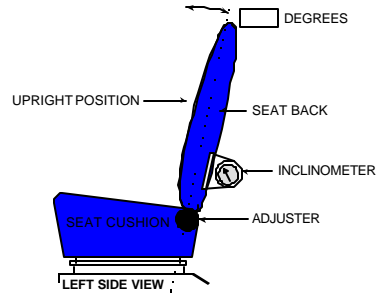
DATA SHEET 1 (continued)

GENERAL TEST VEHICLE PARAMETER DATA

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501

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

FRONT SEAT CUSHION PLACEMENT: Placed in ninth detent with forward most detent defined as 1

Total Length of Adjustment Travel: 214 millimeters

Total Number of Adjustment Positions or Detents: 17 detents

FRONT SEAT BACK ADJUSTMENT POSITION: Placed in 3rd locking position from full forward

Seat Back Torso Angle: 21 degrees

SECOND POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: none millimeters

Seat Back Adjustment Position: none

ADJUSTABLE STEERING COLUMN POSITION: Mid-position

WINDOW POSITIONS: Left Front: Closed Left Rear: Closed

Right Front: Removed Right Rear: Removed

Note: Windows will be in closed position on struck side of test vehicle and in open position on opposite side.

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

60.2 liters (Fuel Tank Usable Capacity)

55.7 liters used for test (92% -94% of Fuel Tank Usable Capacity)

LOCATION OF IMPACT POINT ON TEST VEHICLE SIDE TO BE IMPACTED:

Wheelbase = 2530 millimeters

Impact Point is 325 millimeters rearward of front axle centerline
(which is 940 millimeters forward of the wheelbase midpoint)

Actual Impact Point is 317 millimeters rearward of front axle centerline

DATA SHEET 2

TEST VEHICLE SUMMARY OF RESULTS

VEHICLE IDENTIFICATION:

Vehicle Year/Make/Model: 2002 Subaru Impreza

Body Style: 4-door Wagon

VIN: JF1GG655X2G821138

NHTSA No.: M25501

Test Date: February 6, 2002

Overall Length = 2530 millimeters; Overall Width = 1692 millimeters

VEHICLE TEST WEIGHT (Pre-Test):

Left Front = 413 kg Left Rear = 396 kg

Right Front = 429 kg Right Rear = 384 kg

TOTAL FRONT = 842.0 kg TOTAL REAR = 780.0 kg

TOTAL VEHICLE WEIGHT 1622.0 kg

Wheelbase = 2530 millimeters

Longitudinal C.G. from Center of Front Axle = 1216.65 millimeters

Impact Angle with Respect to Impactor = 90 degrees

ACTUAL IMPACT POINT

Actual Impact Point is 8 mm forward of nominal impact ref. line (Lateral)

Actual Impact Point is 6 Mm below nominal impact point (Vertical)

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (242 mm above ground) = 80 millimeters

2. LEVEL 2 (473 mm above ground) = 270 millimeters

3. LEVEL 3 (588 mm above ground) = 265 millimeters

4. LEVEL 4 (838 mm above ground) = 255 millimeters

5. LEVEL 5 (1364 mm above ground) = 47 millimeters

Maximum Post-Test Intrusion = 270 millimeters

OCCUPANTS:

Front Passenger:

Rear Passenger:

Dummy Identification 013 142

Restraints Used 3-Point active seat belt Safety belt / CRS Latch and top tether

INSTRUMENTATION:

Number of Vehicle Data Channels: = 21

Number of Cameras: Onboard = 6

Offboard = 8

TOTAL = 14

DATA SHEET 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501

MDB FACE MANUFACTURER AND SERIAL NUMBER:

Plascore 085B1001-4 020C1001

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to left

MDB DETAILS:

| | | | |
|---|---|-------------|-------------|
| Overall Width of Framework Carriage | = | <u>1250</u> | millimeters |
| Overall Length of MDB (incl. honeycomb impact face) | = | <u>4120</u> | millimeters |
| Wheelbase of Framework Carriage | = | <u>2590</u> | millimeters |
| Tread of Framework Carriage (Front & Rear) | = | <u>1875</u> | millimeters |
| C.G. Location Rearward of Front Axle | = | <u>1104</u> | millimeters |

MDB WEIGHT:

| | | | | | | | |
|--|---|---------------|---------|------------|---|--------------|----|
| Left Front | = | <u>409.5</u> | kg | Left Rear | = | <u>281.5</u> | kg |
| Right Front | = | <u>372.5</u> | kg | Right Rear | = | <u>299.0</u> | kg |
| TOTAL FRONT | = | <u>782.0</u> | kg | TOTAL REAR | = | <u>580.5</u> | kg |
| TOTAL MDB WEIGHT | = | <u>1362.5</u> | kg | | | | |
| Impact Angle (MDB C/L to Target Vehicle C/L) | = | <u>90</u> | degrees | | | | |
| Impact Speed | = | <u>61.64</u> | kph | | | | |

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

| | | | |
|------------------------------------|---|------------|-------------|
| 1. Row A at Center of Bumper Level | = | <u>185</u> | millimeters |
| 2. Row B at Top of Bumper Level | = | <u>116</u> | millimeters |
| 3. Row C at Mid Level | = | <u>154</u> | millimeters |
| 4. Row D at Top of Stack Level | = | <u>186</u> | millimeters |

INSTRUMENTATION:

| | | |
|-----------------------------|---|----------|
| Number of MDB Data Channels | = | <u>5</u> |
|-----------------------------|---|----------|

DATA SHEET 4

POST-TEST OBSERVATIONS

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501

TEST DUMMY INFORMATION AND CONTACT POINTS:

| DESCRIPTION | FRONT SEAT | REAR SEAT |
|----------------------|---|---|
| ATD Type/Serial No. | SID/013 | Hybrid III 3C/042 |
| Head Contact: | Side of face to the left shoulder and upper door trim; The back of the head to the headrest | Top of the head and side of the face to CRS upper bolster and side door trim. |
| Upper Torso Contact: | Door Trim | CRS Bolster |
| Lower Torso Contact: | Door Trim | CRS Bolster |
| Left Knee Contact: | Arm Rest and Door Trim | CRS Bolster |
| Right Knee Contact: | Left Knee | Left Knee |

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

| DESCRIPTION | FRONT | REAR |
|--------------------|--------------------------------|--------------------------------|
| Left Side Doors | Closed and Latched, Inoperable | Closed and Latched, Inoperable |
| Right Side Doors | Closed , Latched and Operable | Closed , Latched and Operable |
| Hatch/Other Door | N/A | Closed , Latched and Operable |
| Seat Movement (mm) | 0 | 0 |
| Seat Back Failure | None | None |

POST TEST STRUCTURAL OBSERVATIONS

| CRITICAL AREAS OF PERFORMANCE | |
|-------------------------------|---|
| Pillar Performance | Pillars were pushed inboard during the event with no visible tears or separations |
| Sill Separation | No visible tears or separations |
| Windshield Damage | Small cracks on driver side |
| Window Damage | Both driver and passenger side windows shattered. |
| Other Notable Effects | None |

AIR BAG DEPLOYMENT STATUS:

| | DRIVER | FRONT PASSENGER | REAR PASSENGER |
|------------------|--------|-----------------|----------------|
| Front Air Bag | None | None | N/A |
| Side Air Bag | N/A | N/A | N/A |
| Side Curtain Bag | N/A | N/A | N/A |

MDB LEFT EDGE IMPACT DATA

| Measured Parameter | Units | Requirement | Value |
|--------------------|-------|-------------|-------|
| Horizontal Offset | mm | ? 50 mm | -8 |
| Vertical Offset | mm | ? 20 mm | 6 |

SECTION 4

OCCUPANT AND VEHICLE INFORMATION

DATA SHEET 5

SID INSTRUMENTATION DATA

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501

| Front Dummy ID# 013 | | | | | |
|------------------------------|------|----------------|----------------|----------------|----------------|
| | | Pos. Direction | | Neg. Direction | |
| | | Max (g) | Time (msec) | Max (g) | Time (msec) |
| HEAD ACCELERATIONS: | | | | | |
| Longitudinal | X | 6.4 | 180.9 | -28.3 | 75.1 |
| Lateral | Y | 37.2 | 49.0 | -8.2 | 153.2 |
| Vertical | Z | 56.1 | 55.1 | -3.8 | 42.3 |
| Resultant | R | 57.5 | 55.0 | 0.0 | -12.6 |
| HIC | | 379.4 | | | |
| RIB ACCELERATIONS: | | | | | |
| Upper Rib Lateral | Y | 53.7 | 26.9 | -15.0 | 85.6 |
| Upper Rib Lateral | Y(R) | 54.1 | 26.9 | -14.8 | 85.6 |
| Lower Rib Lateral | Y | 51.8 | 28.2 | -12.0 | 81.3 |
| Lower Rib Lateral | Y(R) | 52.8 | 28.2 | -12.0 | 80.6 |
| SPINE ACCELERATIONS: | | | | | |
| Lower Lateral | Y | 64.9 | 33.1 | -16.9 | 61.3 |
| Lower Lateral | Y(R) | 63.7 | 33.1 | -17.0 | 61.3 |
| PELVIC ACCELERATIONS: | | | | | |
| Lateral | Y | 53.9 | 26.9 | -10.9 | 91.9 |
| Lateral | Y(R) | 54.3 | 26.9 | -10.9 | 91.9 |

REFERENCE: Positive Direction - Longitudinal (X) = forward
 Lateral (Y) = to right
 Vertical (Z) = down
 Negative Direction - Longitudinal (X) = rearward
 Lateral (Y) = to left
 Vertical (Z) = up

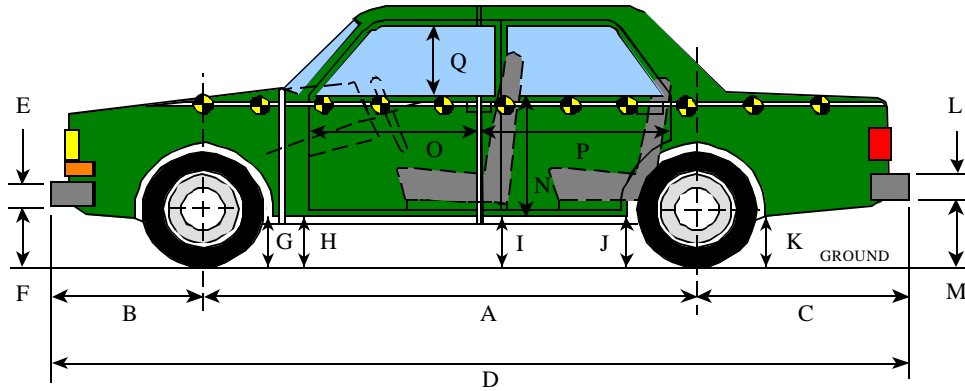
Note: Above data has been FIR filtered, Y(R) denotes redundant Y direction accelerometer.
 Head Accelerations are filtered at SAE Class 1000.

DATA SHEET 6

VEHICLE SIDE MEASUREMENTS

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501



LEFT SIDE VIEW

NOTE: all dimensions are in millimeters with tolerance of ± 3 mm

| | PRE-TEST (as delivered) | PRE-TEST (as tested) | POST-TEST (as tested) | ? CHANGE |
|----|----------------------------|-------------------------|--------------------------|----------|
| A | 2528 | 2530 | 2505 | 25 |
| B | 924 | - | 929 | -5 |
| C | 957 | - | 957 | 0 |
| D | 4409 | - | 4391 | 18 |
| E | 296 | - | 296 | 0 |
| F | 257 | 255 | 275 | -20 |
| G | 207 | 188 | 254 | -66 |
| H | 207 | 188 | 254 | -66 |
| I | 207 | 182 | 230 | -48 |
| J1 | 212 | 184 | 170 | 14 |
| J2 | 184 | 156 | 200 | -44 |
| K | 273 | 238 | 254 | -16 |
| L | 307 | - | 307 | 0 |
| M | 343 | 311 | 303 | 8 |
| N | 648 | - | 629 | 19 |
| O | 703 | - | 702 | 1 |
| P | 1141 | - | 1052 | 89 |
| Q | 469 | - | 456 | 13 |
| R | 4316 | - | 4304 | 12 |
| S | 4320 | - | 4320 | 0 |
| T | 1692 | - | 1586 | 106 |

D = Length at Centerline

E&L = Bumper Thickness

R = Right Side Length

S = Left Side Length

T = Width at B-Pillar

J1 = To Pinch Weld

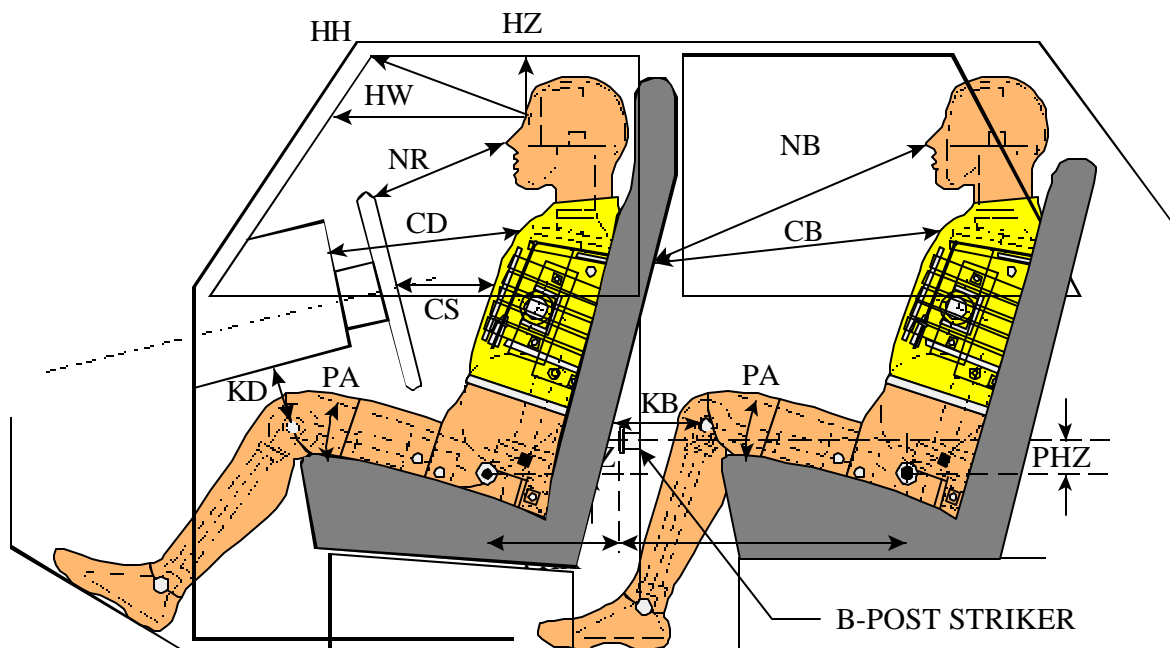
J2 = To Sill

DATA SHEET 7

SID LONGITUDINAL CLEARANCE DIMENSIONS

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
REAR DUMMY PHX & PHZ
MEASUREMENTS FOR A 4-DOOR
VEHICLE WOULD USE THE C-POST
STRIKER AS A REFERENCE POINT

NOTE: All dimensions are in millimeters with tolerance of ± 3 mm

| | DRIVER ID# 013 |
|---------------------|----------------|
| HH | 345 |
| HW | 613 |
| HZ | 206 |
| NR/NB | 425 |
| CD/CB | 509 |
| CS | 302 |
| KDL(KDA°)/KBL(KDA°) | 204 / (24 °) |
| KDR(KBA°)/KBR(KBA°) | 195 / (25 °) |
| PA° | 23° |
| PHX | 4 rearward |
| PHZ | 2 above |

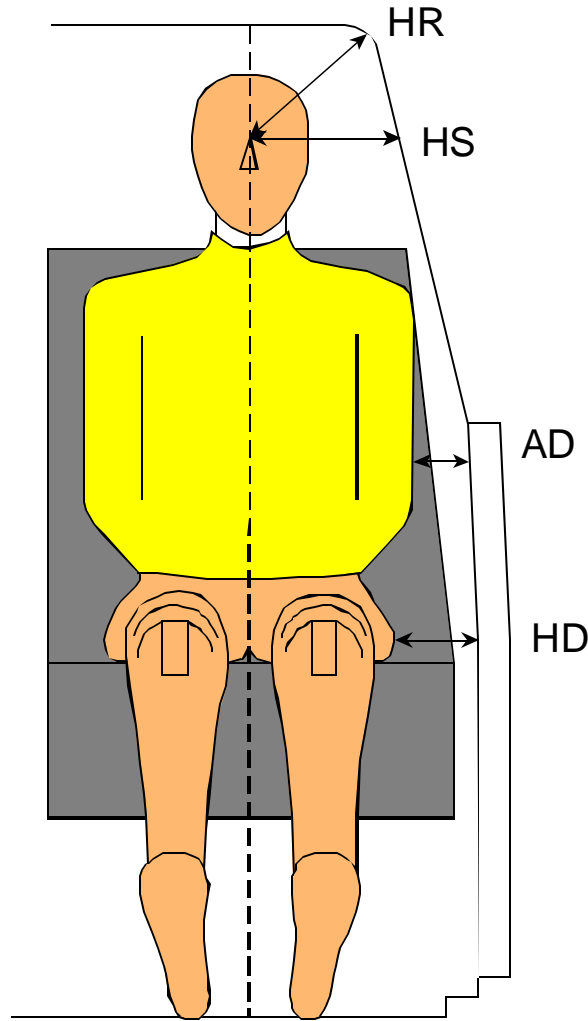
Note: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

DATA SHEET 8

SID LATERAL CLEARANCE DIMENSIONS

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501



NOTE: All dimensions are in millimeters with tolerance of ± 3 mm

| DRIVER ID # 013 | | | |
|-----------------|--------|-----|-----------|
| HR | 187 | | |
| HS | 300 | | |
| AD* | LOWER: | 111 | UPPER: 92 |
| HD | 144 | | |

*Lower measurement is taken laterally at the center of the lower rib accelerometer height from the SID arm segment to the closest part of the vehicle side.

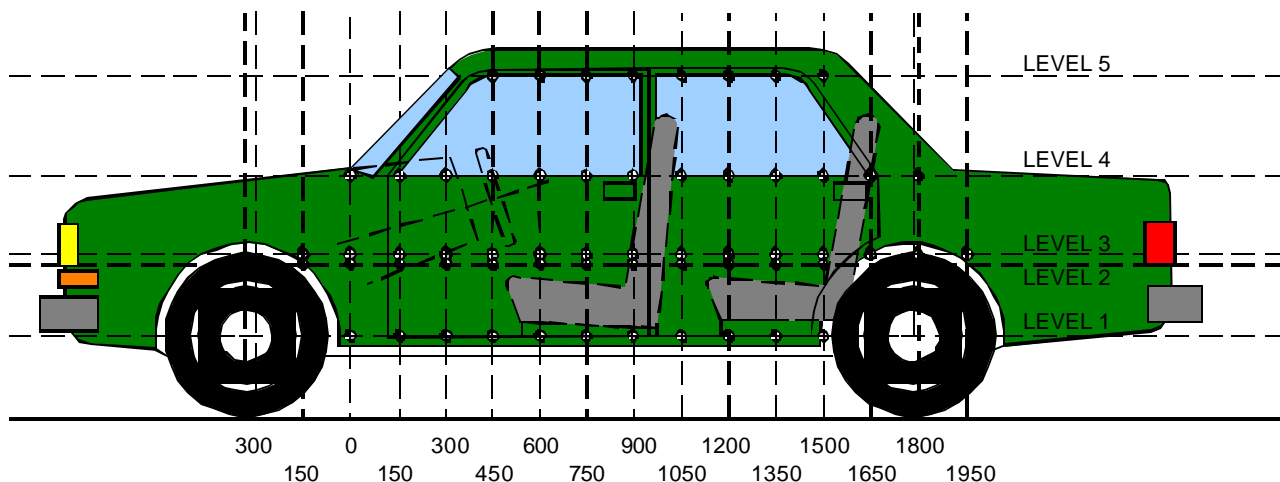
*Upper measurement is taken laterally at the center of the upper rib accelerometer height from the SID arm segment to the closest part of the vehicle side.

DATA SHEET 9

VEHICLE SIDE MEASUREMENTS

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501



LEFT SIDE VIEW

NOTE: All measurements are in millimeters (mm)

- LEVEL 5 - WINDOW TOP
- LEVEL 4 - WINDOW SILL
- LEVEL 3 - MID-DOOR
- LEVEL 2 - OCCUPANT H-POINT
- LEVEL 1 - AXLE CENTERLINE HEIGHT OR SILL TOP HEIGHT

MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE "AS TESTED" CONFIGURATION.

Measurements Along the Vertical 750 mm Line Shown Above:

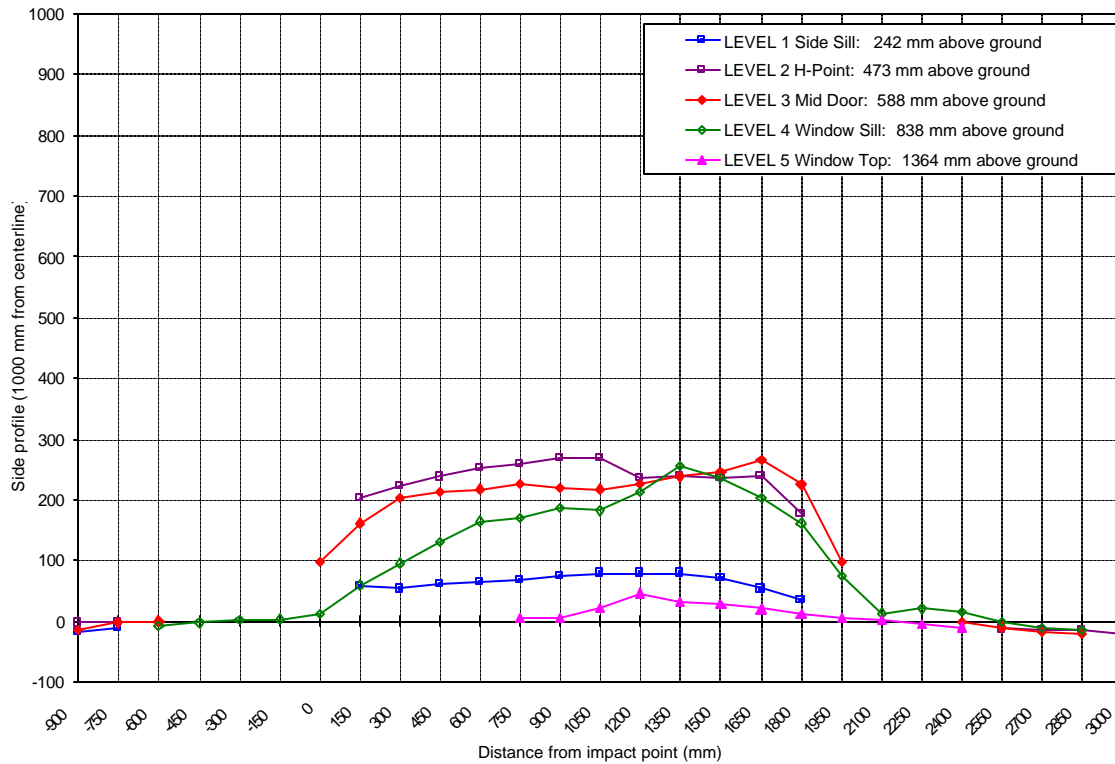
| | | | |
|----------------------------|---|-------------|-------------|
| Level 5 @ Window Top | = | <u>242</u> | millimeters |
| Level 4 @ Window Sill | = | <u>473</u> | millimeters |
| Level 3 @ Mid Door | = | <u>588</u> | millimeters |
| Level 2 @ Occupant H-Point | = | <u>838</u> | millimeters |
| Level 1 @ Sill Top Height | = | <u>1364</u> | millimeters |

DATA SHEET 10

VEHICLE EXTERIOR CRUSH PROFILES - ALL LEVELS

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501



NOTE: All dimensions are in millimeters with a tolerance of +3 mm

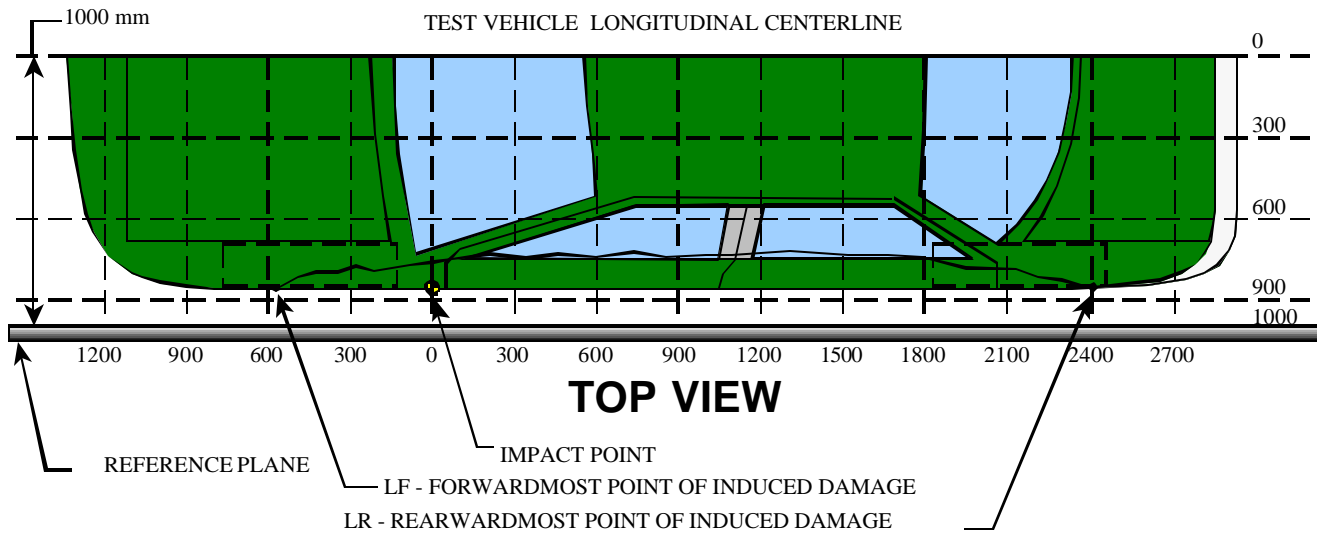
| LEVEL | HEIGHT (mm) | | DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------|-------------|-------|--|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
| | | | -900 | -750 | -600 | -450 | -300 | -150 | 0 | 150 | 300 | 450 | 600 | 750 | 900 | 1050 | 1200 | 1350 | 1500 | 1650 | 1800 | 1950 | 2100 | 2250 | 2400 | 2550 | 2700 | 2850 | 3000 | |
| LEVEL 1 SIDE SILL | 242 | PRE | 230 | 208 | -- | -- | -- | -- | -- | 218 | 223 | 221 | 221 | 220 | 221 | 220 | 218 | 218 | 220 | 218 | 216 | -- | -- | -- | -- | -- | -- | -- | -- | |
| | | POST | 214 | 198 | -- | -- | -- | -- | -- | 276 | 277 | 282 | 287 | 289 | 297 | 300 | 298 | 298 | 291 | 272 | 252 | -- | -- | -- | -- | -- | -- | -- | -- | |
| | | CRUSH | -16 | -10 | N/A | N/A | N/A | N/A | N/A | 58 | 54 | 61 | 66 | 69 | 76 | 80 | 80 | 80 | 71 | 54 | 36 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | |
| LEVEL 2 H POINT | 473 | PRE | 217 | 192 | -- | -- | -- | -- | -- | 173 | 171 | 170 | 168 | 168 | 166 | 166 | 166 | 166 | 165 | 169 | 172 | -- | -- | -- | -- | 168 | 186 | 209 | 263 | |
| | | POST | 215 | 192 | -- | -- | -- | -- | -- | 377 | 395 | 408 | 420 | 428 | 436 | 434 | 401 | 406 | 400 | 409 | 350 | -- | -- | -- | -- | 156 | 172 | 195 | 241 | |
| | | CRUSH | -2 | 0 | N/A | N/A | N/A | N/A | N/A | 204 | 224 | 238 | 252 | 260 | 270 | 268 | 235 | 240 | 235 | 240 | 178 | N/A | N/A | N/A | N/A | N/A | -12 | -14 | -14 | -22 |
| LEVEL 3 MID DOOR | 588 | PRE | 249 | 214 | 173 | -- | -- | -- | 165 | 169 | 169 | 167 | 165 | 166 | 165 | 166 | 166 | 168 | 167 | 168 | 159 | -- | -- | -- | 159 | 179 | 202 | 229 | -- | |
| | | POST | 236 | 212 | 174 | -- | -- | -- | 263 | 331 | 373 | 381 | 383 | 392 | 385 | 384 | 392 | 404 | 415 | 432 | 393 | 258 | -- | -- | 159 | 170 | 185 | 209 | -- | |
| | | CRUSH | -13 | -2 | 1 | N/A | N/A | N/A | 98 | 162 | 204 | 214 | 218 | 226 | 220 | 218 | 226 | 238 | 247 | 265 | 225 | 99 | N/A | N/A | 0 | -9 | -17 | -20 | N/A | |
| LEVEL 4 WINDOW SILL | 838 | PRE | -- | -- | 297 | 255 | 235 | 223 | 213 | 207 | 201 | 197 | 194 | 190 | 182 | 176 | 184 | 186 | 183 | 182 | 185 | 175 | 187 | 191 | 195 | 207 | 223 | 264 | -- | |
| | | POST | -- | -- | 291 | 253 | 237 | 227 | 226 | 267 | 297 | 327 | 359 | 361 | 368 | 358 | 397 | 441 | 419 | 386 | 347 | 250 | 201 | 212 | 211 | 207 | 213 | 249 | -- | |
| | | CRUSH | N/A | N/A | -6 | -2 | 2 | 4 | 13 | 60 | 96 | 130 | 165 | 171 | 186 | 182 | 213 | 255 | 236 | 204 | 162 | 75 | 14 | 21 | 16 | 0 | -10 | -15 | N/A | |
| LEVEL 5 WINDOW TOP | 1364 | PRE | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 648 | 460 | 455 | 454 | 457 | 458 | 461 | 466 | 476 | 491 | 515 | 590 | -- | -- | -- | -- | | |
| | | POST | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 654 | 466 | 477 | 501 | 490 | 488 | 482 | 479 | 483 | 493 | 512 | 581 | -- | -- | -- | -- | | |
| | | CRUSH | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 6 | 6 | 22 | 47 | 33 | 30 | 21 | 13 | 7 | 2 | -3 | -9 | N/A | N/A | N/A | N/A | |

DATA SHEET 11

VEHICLE DAMAGE PROFILE DISTANCES

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501



MEASUREMENT CONVENTIONS:
 Forward of the impact point (towards front of vehicle) is considered negative (-).
 Rearward of the impact point (toward rearend of vehicle) is considered positive (+).

NOTE: All dimensions are in millimeters with tolerance of ± 3 mm.

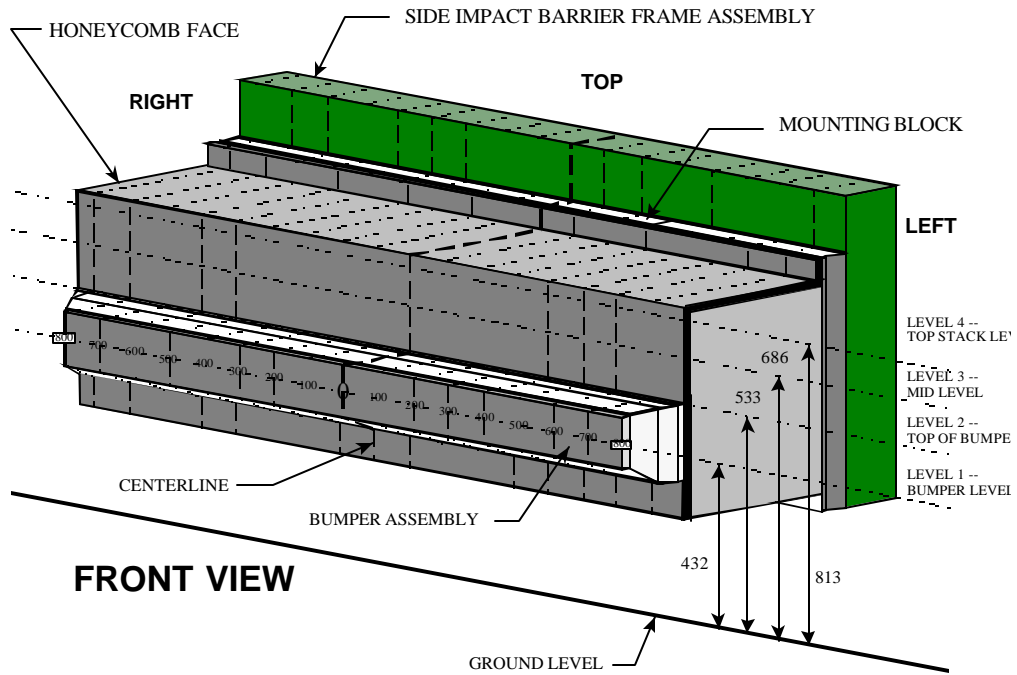
| DPD MEASUREMENTS | | POST TEST (mm) | PRETEST (mm) | STATIC CRUSH (mm) |
|------------------|-----------------------|----------------|--------------|-------------------|
| 1 | (LR = <u>2550</u> mm) | 170 | 179 | -9 |
| 2 | 1980 | 240 | 177 | 63 |
| 3 | 1410 | 432 | 185 | 247 |
| 4 | 840 | 433 | 167 | 266 |
| 5 | 270 | 391 | 171 | 220 |
| 6 | (LF = <u>-300</u> mm) | 237 | 235 | 2 |

DATA SHEET 12

EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501



NOTE: Dimensions are shown in millimeters, mm

NOTE: All dimensions are in millimeters with a tolerance of +3 mm

| LEVEL | HEIGHT AT CL (mm)* | | DISTANCE RIGHT OF CENTER (mm) | | | | | | | | | DISTANCE LEFT OF CENTER (mm) | | | | | | | | |
|--------------------------|--------------------|-------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|-----|-----|--|
| | | | 800 | 700 | 600 | 500 | 400 | 300 | 200 | 100 | 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | |
| LEVEL 4 TOP STACK | 813 | PRE | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | | |
| | | POST | 680 | 656 | 635 | 621 | 626 | 658 | 670 | 677 | 665 | 661 | 671 | 678 | 688 | 705 | 734 | 768 | 805 | |
| | | CRUSH | 61 | 37 | 16 | 2 | 7 | 39 | 51 | 58 | 46 | 42 | 52 | 59 | 69 | 86 | 115 | 149 | 186 | |
| LEVEL 3 MID LEVEL | 686 | PRE | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | | |
| | | POST | 647 | 628 | 627 | 630 | 640 | 665 | 672 | 655 | 646 | 644 | 641 | 646 | 658 | 673 | 691 | 720 | 773 | |
| | | CRUSH | 28 | 9 | 8 | 11 | 21 | 46 | 53 | 36 | 27 | 25 | 22 | 27 | 39 | 54 | 72 | 101 | 154 | |
| LEVEL 2 TOP BUMPER | 533 | PRE | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | | |
| | | POST | 710 | 708 | 707 | 702 | 697 | 688 | 684 | 686 | 689 | 682 | 690 | 692 | 694 | 698 | 702 | 714 | 735 | |
| | | CRUSH | 91 | 89 | 88 | 83 | 78 | 69 | 65 | 67 | 70 | 63 | 71 | 73 | 75 | 79 | 83 | 95 | 116 | |
| LEVEL 1 MID BUMPER | 432 | PRE | 535 | 519 | 518 | 518 | 518 | 518 | 518 | 518 | 518 | 518 | 518 | 518 | 518 | 518 | 519 | 535 | | |
| | | POST | 710 | 704 | 696 | 684 | 676 | 672 | 663 | 660 | 656 | 652 | 650 | 648 | 648 | 647 | 655 | 673 | 687 | |
| | | CRUSH | 175 | 185 | 178 | 166 | 158 | 154 | 145 | 142 | 138 | 134 | 132 | 130 | 130 | 129 | 137 | 154 | 152 | |

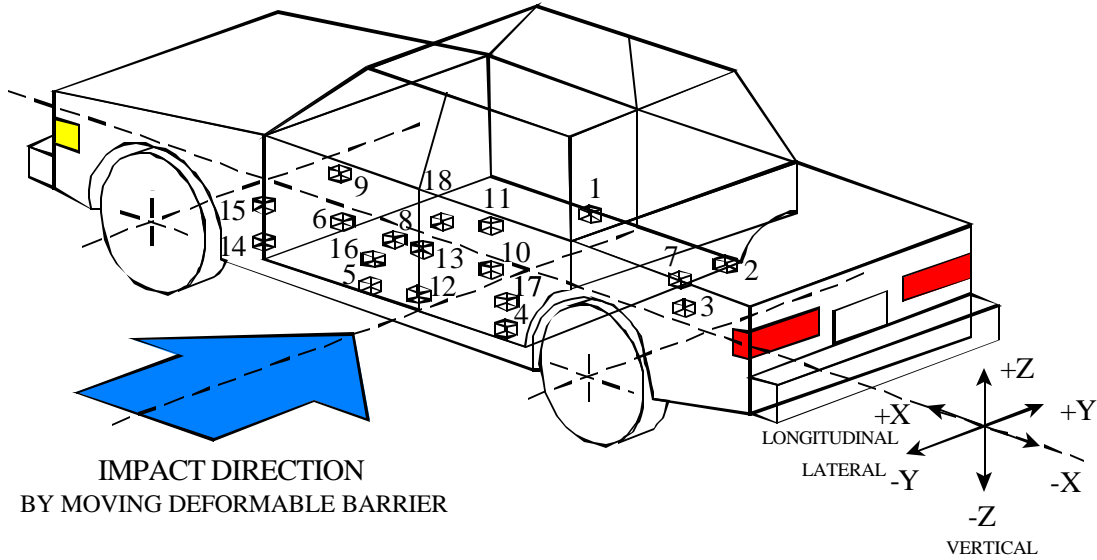
*Heights measured above ground level.

DATA SHEET 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501



- 1-Right Side Sill @ Front Seat
- 2-Right Side Sill @ Rear Seat
- 3-Rear Floorpan Above Axle
- 4-Left Side Sill @ Rear Seat
- 5-Left Side Sill @ Front Seat
- 6-Left Front Door on Centerline
- 7-Right Rear Occupant Compartment
- 8-Midrear of Left Front Door
- 9-Left Front Door Upper Centerline

- 10-Midrear of Left Rear Door
- 11-Left Rear Door Upper Centerline
- 12-Left Lower B-Pillar
- 13-Left Middle B-Pillar
- 14-Left Lower A-Pillar
- 15-Left Middle A-Pillar
- 16-Front Seat Track
- 17-Rear Seat Track
- 18-Vehicle CG

DATA SHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501

| Accel. No. | Location | Coordinates (mm)±3 mm | | | | Long. (x) | | Lat. (y) | | Vert. (z) | | Resultant | |
|------------|----------------------------------|-----------------------|-------|------|------|-----------|-------------|----------|-------------|-----------|-------------|-----------|-------------|
| | | X* | Y* | Z* | | Max (g) | Time (msec) | Max (g) | Time (msec) | Max (g) | Time (msec) | Max (g) | Time (msec) |
| | | | | | | pos. | neg. | pos. | neg. | pos. | neg. | pos. | neg. |
| 1 | Right Side Sill at Front Seat | 2722 | 671 | -276 | pos. | 2.5 | 57.0 | 23.7 | 7.1 | 5.7 | 28.7 | 25.3 | 7.5 |
| | | | | | neg. | -5.2 | 14.1 | -2.0 | 82.8 | -11.6 | 13.9 | 0.0 | -16.8 |
| 2 | Right Side Sill at Rear Seat | 1842 | 664 | -255 | pos. | 2.2 | 56.3 | 31.3 | 7.5 | 7.4 | 36.2 | 31.7 | 7.7 |
| | | | | | neg. | -5.7 | 13.8 | -2.0 | 115.3 | -5.7 | 11.3 | 0.0 | -20.0 |
| 3 | Rear Floorpan Above Axle | 1020 | 20 | -507 | pos. | 13.2 | 47.3 | 30.9 | 47.4 | 16.2 | 30.2 | 36.7 | 47.4 |
| | | | | | neg. | -17.0 | 25.4 | -6.7 | 155.0 | -15.0 | 47.1 | 0.0 | -4.1 |
| 4 | Left Side Sill at Rear Seat | 1926 | -641 | -201 | pos. | - | - | *** | *** | - | - | - | - |
| | | | | | neg. | - | - | *** | *** | - | - | - | - |
| 5 | Left Side Sill at Front Seat | 2796 | -617 | -260 | pos. | - | - | 95.9 | 4.4 | - | - | - | - |
| | | | | | neg. | - | - | -18.3 | 17.7 | - | - | - | - |
| 6 | Left Front Door on Centerline | 2655 | -1223 | -556 | pos. | - | - | 146.4 | 4.6 | - | - | - | - |
| | | | | | neg. | - | - | -145.8 | 25.8 | - | - | - | - |
| 7 | Right Rear Occupant Compartment | 1899 | 385 | -154 | pos. | - | - | 30.4 | 7.6 | - | - | - | - |
| | | | | | neg. | - | - | -1.8 | 115.5 | - | - | - | - |
| 8 | Midrear of Left Front Door | 2188 | -651 | -577 | pos. | - | - | 137.1 | 4.1 | - | - | - | - |
| | | | | | neg. | - | - | -111.7 | 19.4 | - | - | - | - |
| 9 | Left Front Door Upper Centerline | 2344 | -694 | -881 | pos. | - | - | 343.0 | 16.5 | - | - | - | - |
| | | | | | neg. | - | - | -210.3 | 23.0 | - | - | - | - |
| 10 | Midrear of Left Rear Door | 1640 | -651 | -576 | Pos. | - | - | 147.6 | 6.4 | - | - | - | - |
| | | | | | neg. | - | - | -92.1 | 15.8 | - | - | - | - |
| 11 | Left Rear Door Upper Centerline | 1542 | -666 | -906 | pos. | - | - | 291.6 | 16.0 | - | - | - | - |
| | | | | | neg. | - | - | -106.3 | 23.3 | - | - | - | - |

*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To Right) Z - Ground Level (+ Down)

**Accelerometer was not requested by COTR.

*** Not Accurate after 26 ms.

4-11

8652-

DATA SHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501

| Accel. No. | Location | Coordinates (mm)±3 mm | | | | Long. (x) | | Lat. (y) | | Vert. (z) | | Resultant | |
|------------|----------------------|-----------------------|------|------|------|-----------|-------------|----------|-------------|-----------|-------------|-----------|-------------|
| | | X* | Y* | Z* | | Max (g) | Time (msec) | Max (g) | Time (msec) | Max (g) | Time (msec) | Max (g) | Time (msec) |
| | | | | | | | | | | | | | |
| 12 | Left Lower B-Pillar | 2044 | -645 | -354 | pos. | - | - | 266.6 | 5.3 | - | - | - | - |
| | | | | | neg. | - | - | -129.3 | 9.1 | - | - | - | - |
| 13 | Left Middle B-Pillar | 1972 | -647 | -778 | pos. | - | - | 198.2 | 4.8 | - | - | - | - |
| | | | | | neg. | - | - | -158.7 | 11.0 | - | - | - | - |
| 14 | Left Lower A-Pillar | 3042 | -621 | -461 | pos. | - | - | 147.2 | 5.2 | - | - | - | - |
| | | | | | neg. | - | - | -141.8 | 20.7 | - | - | - | - |
| 15 | Left Middle A-Pillar | 2846 | -618 | -959 | pos. | - | - | 37.1 | 35.7 | - | - | - | - |
| | | | | | neg. | - | - | -20.5 | 30.4 | - | - | - | - |
| 16 | Front Seat Track | 2113 | -567 | -228 | pos. | - | - | 96.6 | 11.1 | - | - | - | - |
| | | | | | neg. | - | - | -35.9 | 20.2 | - | - | - | - |
| 17 | Rear Seat Track | 960 | -469 | -794 | pos. | - | - | 54.4 | 23.3 | - | - | - | - |
| | | | | | neg. | - | - | -5.5 | 105.7 | - | - | - | - |
| 18 | Vehicle CG | 2072 | 13 | -552 | pos. | 20.7 | 19.1 | ** | ** | 20.0 | 52.0 | ** | ** |
| | | | | | neg. | -27.8 | 15.8 | ** | ** | -14.9 | 45.6 | ** | ** |

*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To Right) Z - Ground Level (+ Down)

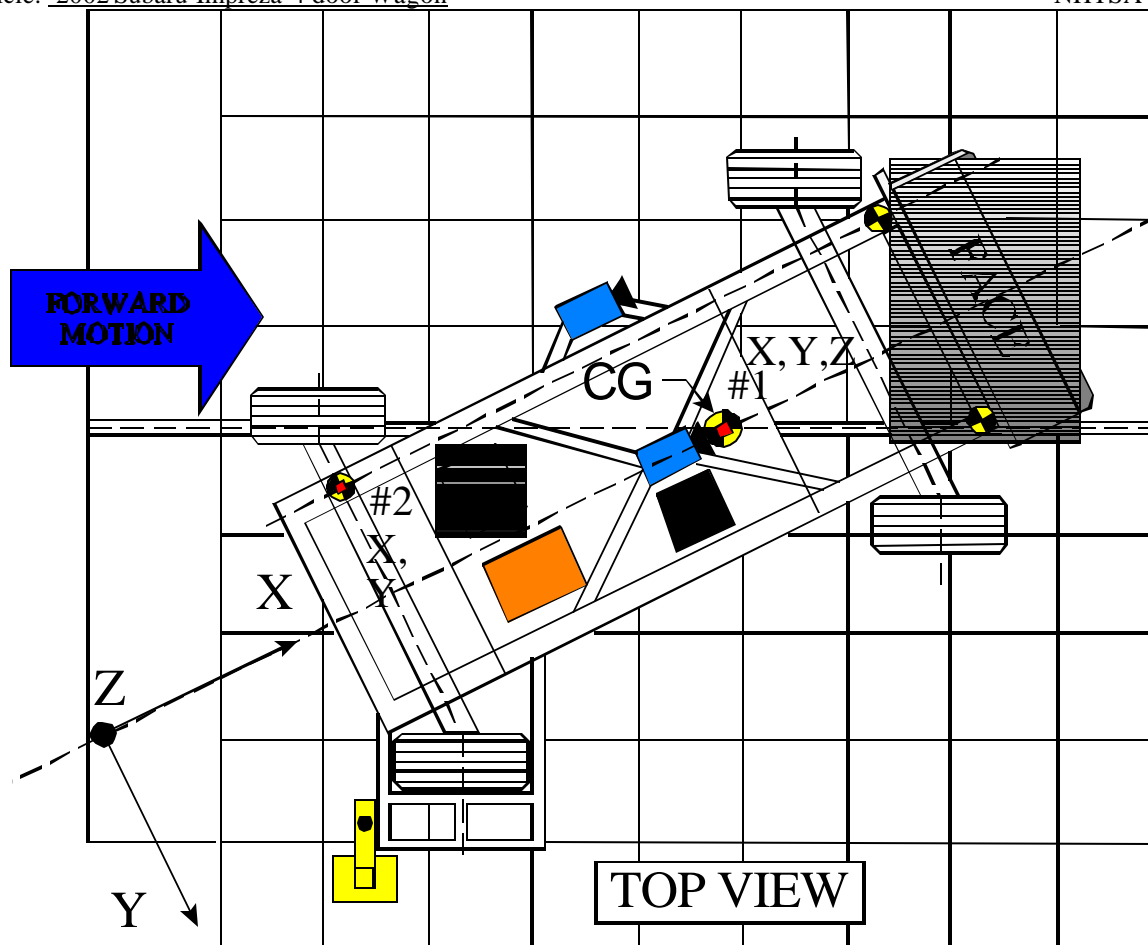
4-12

DATA SHEET 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501



| Accel. No. | Location | Coordinates (millimeters) | | | Pos. Direct. | | Neg. Direct. | |
|------------|-----------------------|---------------------------|------|------|--------------|-------------|--------------|-------------|
| | | X* | Y* | Z* | Max (g) | Time (msec) | Max (g) | Time (msec) |
| | | | | | | | | |
| 1 | MDB Center of Gravity | | | | | | | |
| | Longitudinal... X | 1859 | 0 | -330 | 0.5 | 128.9 | -19.7 | 42.0 |
| | Lateral..... Y | | | | 1.3 | 88.5 | -8.1 | 26.6 |
| | Vertical..... Z | | | | 8.8 | 24.2 | -16.6 | 19.5 |
| | Resultant..... R | | | | 22.7 | 19.4 | 0.1 | 162.6 |
| 2 | Rear Frame Member | | | | | | | |
| | Longitudinal... X | 386 | -660 | -660 | 2.3 | 88.5 | -21.8 | 35.0 |
| | Lateral..... Y | | | | 4.1 | 23.1 | -3.3 | 63.0 |

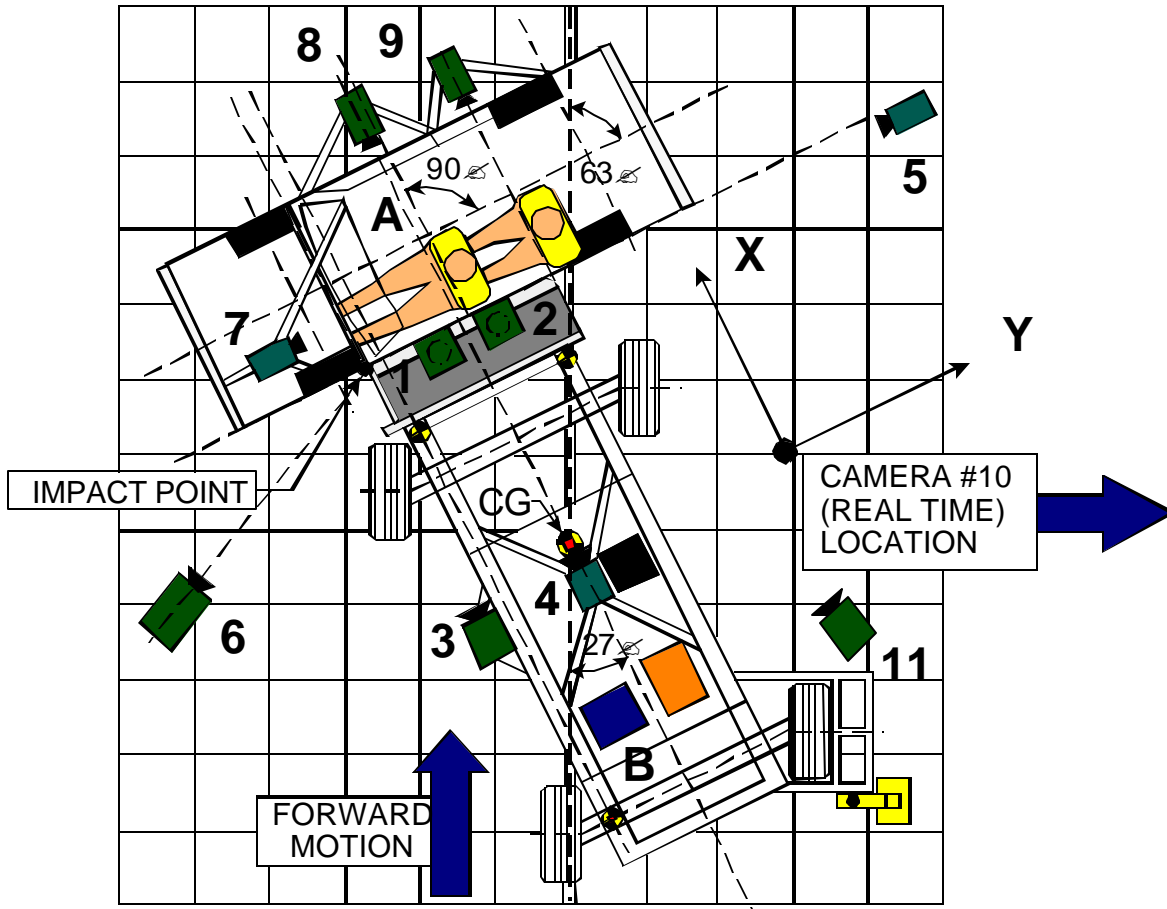
*Reference: X = Rear Bumper (+ Forward)
 Y = Vehicle Centerline (+ To Right)
 Z = Ground Level (+ Down)
 All measurements accurate to within ±3 mm.

DATA SHEET 15

HIGH SPEED CAMERA LOCATIONS AND DATA SUMMARY

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No. M25501



| Camera No. | View | Coordinates (millimeters) | | | Angle (deg.) | Lens (mm) | Film Speed (fps) |
|------------|--|---------------------------|------|-------|--------------|-----------|------------------|
| | | X* | Y* | Z* | | | |
| 1 | Overhead view of test vehicle | 331 | 905 | -4880 | -90 | 8 | 955 |
| 2 | Overhead closeup view of impact plane | 12 | 744 | -4880 | -90 | 12.5 | 1005 |
| 3 | MDB onboard closeup view of impact point | -1470 | 0 | -847 | 0 | 13 | 1035 |
| 4 | MDB onboard view of driver dummy | -1140 | 838 | -1586 | -17 | 7.5 | 1015 |
| 5 | Right side ground level overall view | 1485 | 2918 | -1051 | -2.4 | 25 | 1000 |
| 6 | Left side ground level overall view | 2854 | 1641 | -1063 | -5.2 | 13 | 1000 |
| 7 | Test vehicle onboard driver front view | 239 | 1163 | -1239 | -10.7 | 13 | N.T. |
| 8 | Test vehicle onboard driver side view | 779 | 1710 | -991 | -7.8 | 8 | 965 |
| 9 | Test vehicle onboard passenger side view | 1670 | 1716 | -1021 | -6.0 | 8 | 1020 |
| 10 | Real time film coverage of test | - | - | - | - | - | 24 |
| 11 | Secondary impact point view | 4790 | 3315 | -1096 | -3.7 | 25 | 1000 |

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

X = (Impact Point) + Forward

Y = (Impact Point) + To Right

Z = (Ground Level) + Down

SECTION 5

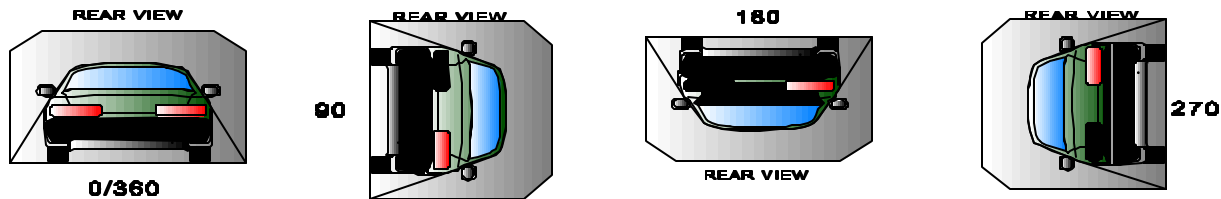
FUEL SYSTEM INTEGRITY

DATA SHEET 17

ROLLOVER DATA

Vehicle: 2002 Subaru Impreza 4-door Wagon

NHTSA No.: M25501



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

| Rollover Stage | Rotation Time (spec. 1 -3 min) | | | | FMVSS 301 Hold Time | | Total Time | | | | Next Whole Minute Interval | |
|----------------|--------------------------------|---------|----|---------|---------------------|---------|------------|---------|----|---------|----------------------------|---------|
| | 1 | minutes | 07 | seconds | 5 | minutes | 6 | minutes | 7 | seconds | 7 | minutes |
| 0° - 90° | 1 | minutes | 11 | seconds | 5 | minutes | 6 | minutes | 11 | seconds | 7 | minutes |
| 90° - 180° | 1 | minutes | 11 | seconds | 5 | minutes | 6 | minutes | 11 | seconds | 7 | minutes |
| 180°-270° | 1 | minutes | 09 | seconds | 5 | minutes | 6 | minutes | 9 | 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° | - |
| 90° - 180° | - |
| 180°-270° | - |
| 270°-360° | - |

APPENDIX A

PHOTOGRAPHS

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| Figure A- 20 | POST-TEST RIGHT SIDE VIEW OF IMPACTOR FACE | A- 22 |
| Figure A- 21 | PRE-TEST TOP VIEW OF IMPACTOR FACE | A- 23 |
| Figure A- 22 | POST-TEST TOP VIEW OF IMPACTOR FACE | A- 24 |
| Figure A- 23 | PRE-TEST OVERHEAD VIEW OF ALIGNED MDB AND VEHICLE | A- 25 |
| Figure A- 24 | POST-TEST OVERHEAD VIEW OF MDB AND VEHICLE | A- 26 |
| Figure A- 25 | PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID | A- 27 |
| Figure A- 26 | POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID | A- 28 |
| Figure A- 27 | PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID | A- 29 |
| Figure A- 28 | POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID | A- 30 |
| Figure A- 29 | PRE-TEST INTERIOR OF FRONT DOOR | A- 31 |
| Figure A- 30 | POST-TEST INTERIOR OF FRONT DOOR SHOWING SID IMPACT LOCATIONS | A- 32 |
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| Figure A- 33 | PRE-TEST LEFT SIDE VIEW OF MDB WITH IMPACTOR FACE IN POSITION | A- 35 |
| Figure A- 34 | PRE-TEST RIGHT SIDE VIEW OF MDB WITH IMPACTOR FACE IN POSITION | A- 36 |
| Figure A- 35 | POST-TEST CLOSE-UP VIEW OF IMPACT POINT TARGET | A- 37 |
| Figure A- 36 | CLOSE-UP VIEW OF VEHICLE'S CERTIFICATION LABEL | A- 38 |
| Figure A- 37 | CLOSE-UP VIEW OF VEHICLE'S TIRE PLACARD LABEL | A- 39 |
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| Figure A- 39 | ROLLOVER 90 DEGREES | A- 41 |
| Figure A- 40 | ROLLOVER 180 DEGREES | A- 42 |
| Figure A- 41 | ROLLOVER 270 DEGREES | A- 43 |
| Figure A- 42 | ROLLOVER 360 DEGREES | A- 44 |



Figure A-1 PRE-TEST FRONTAL VIEW OF TEST VEHICLE



Figure A-2 POST-TEST FRONTAL VIEW OF TEST VEHICLE



A-5

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Figure A-3 PRE-TEST REAR VIEW OF TEST VEHICLE



Figure A-4 POST-TEST REAR VIEW OF TEST VEHICLE



Figure A-5 PRE-TEST IMPACTED SIDE VIEW OF TEST VEHICLE



Figure A-6 POST-TEST IMPACTED SIDE VIEW OF TEST VEHICLE



Figure A-7 PRE-TEST LEFT FRONT VIEW OF TEST VEHICLE



Figure A-8 POST-TEST LEFT FRONT VIEW OF TEST VEHICLE



Figure A-9 PRE-TEST LEFT REAR VIEW OF TEST VEHICLE



Figure A-10 POST-TEST LEFT REAR VIEW OF TEST VEHICLE



Figure A-11 PRE-TEST RIGHT FRONT VIEW OF TEST VEHICLE



Figure A-12 POST-TEST RIGHT FRONT VIEW OF TEST VEHICLE

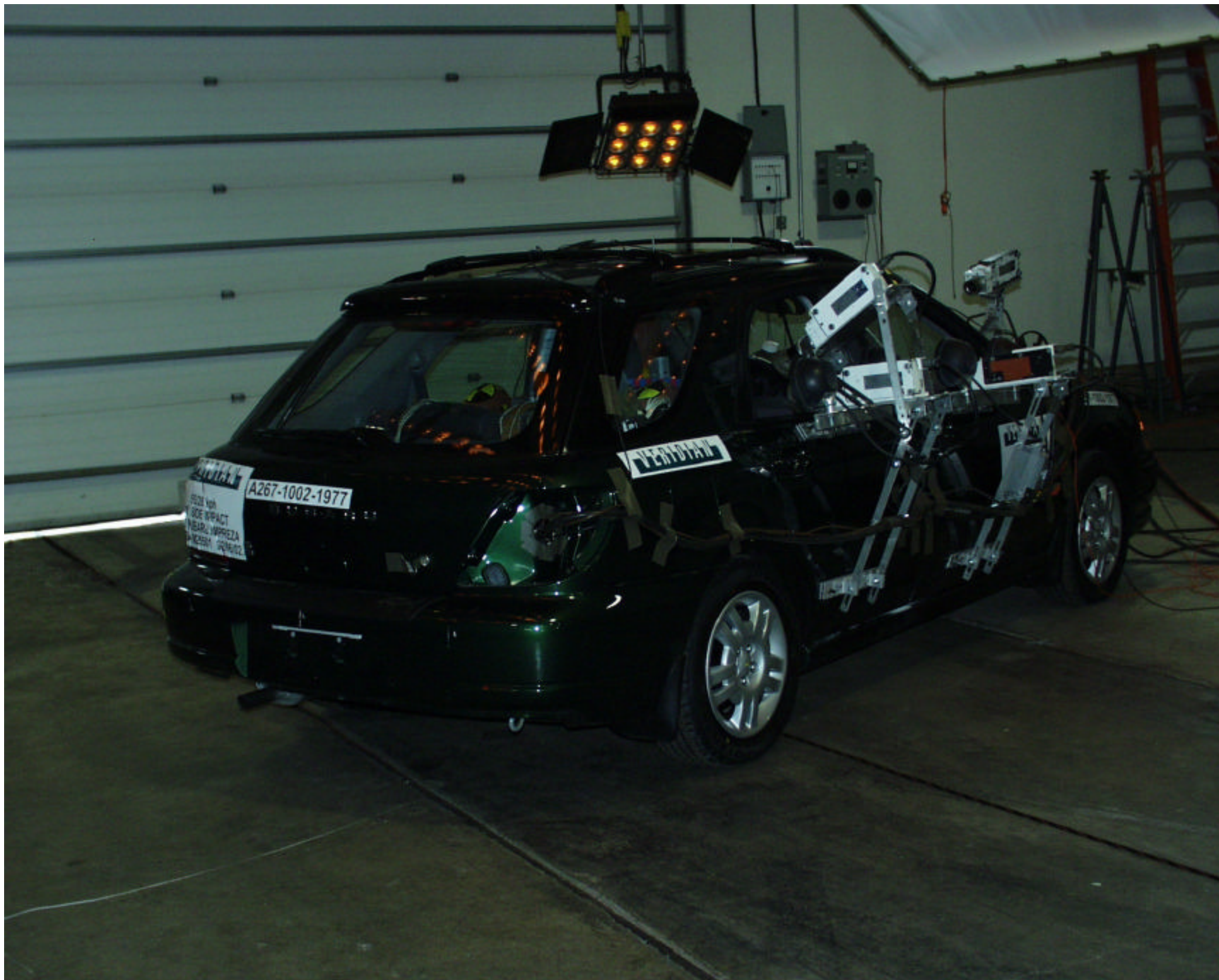


Figure A-13 PRE-TEST RIGHT REAR VIEW OF TEST VEHICLE



Figure A-14 POST-TEST RIGHT REAR VIEW OF TEST VEHICLE



Figure A-15 PRE-TEST FRONTAL VIEW OF IMPACTOR FACE



Figure A-16 POST-TEST FRONTAL VIEW OF IMPACTOR FACE

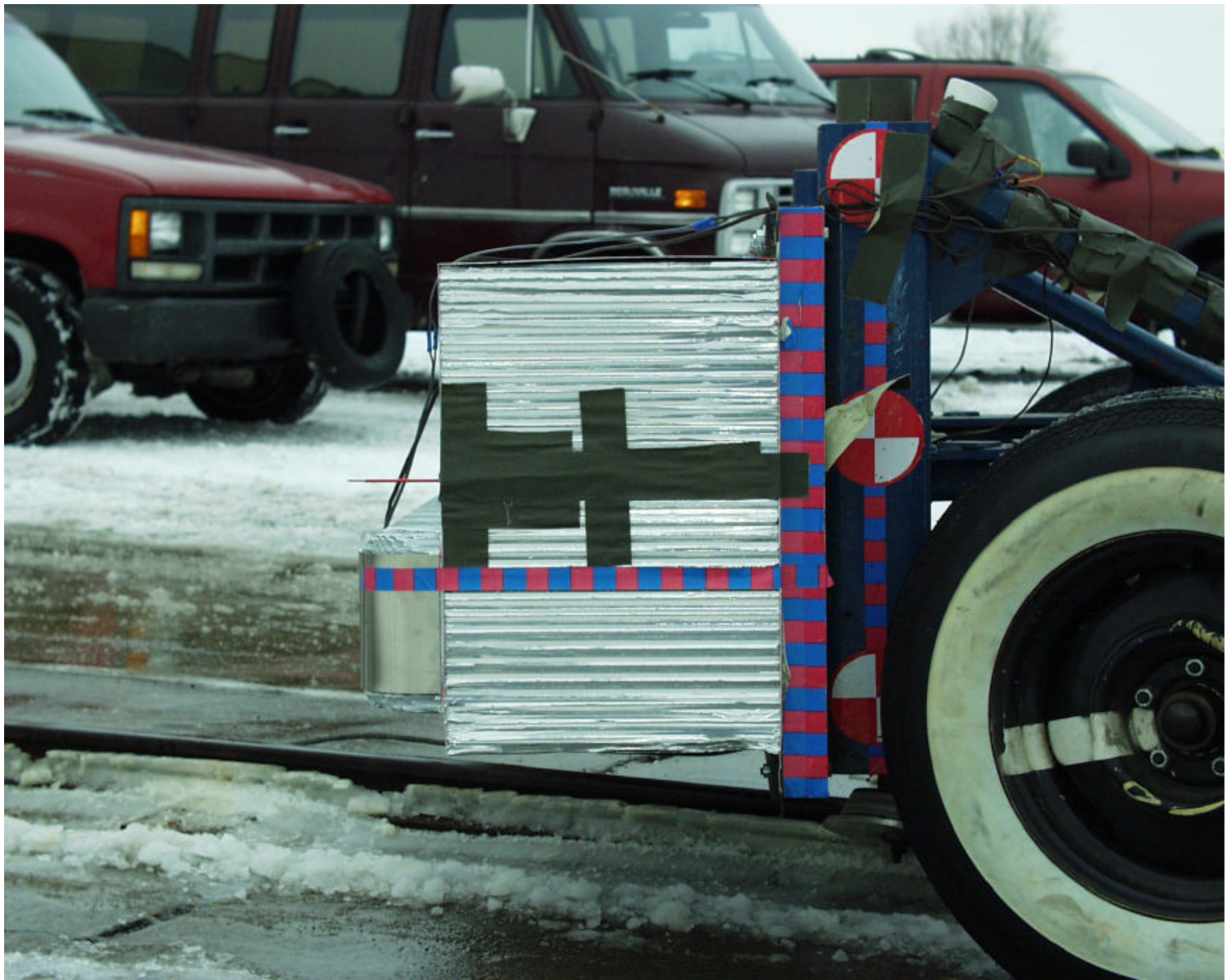


Figure A-17 PRE-TEST LEFT SIDE VIEW OF IMPACTOR FACE



Figure A-18 POST-TEST LEFT SIDE VIEW OF IMPACTOR FACE

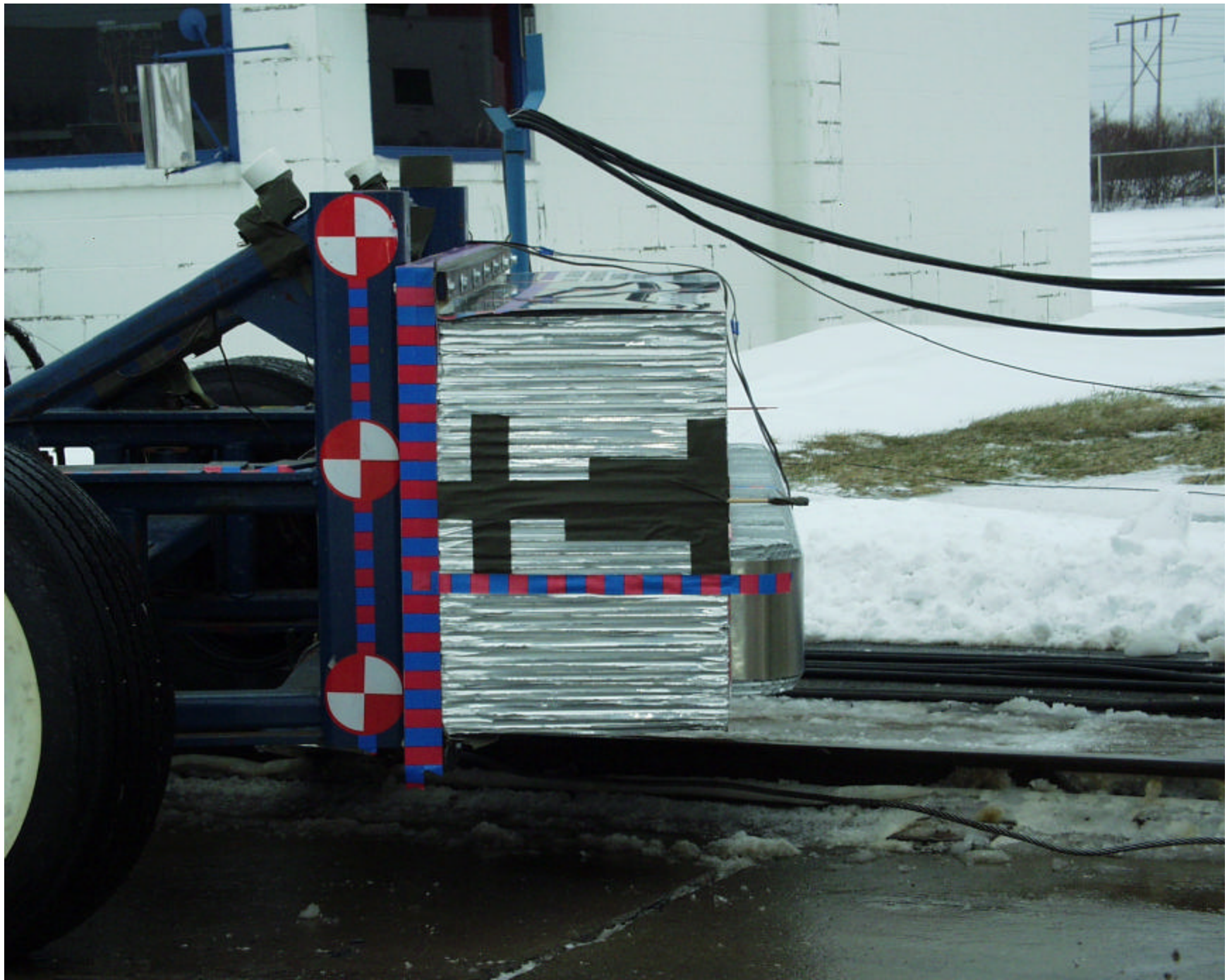


Figure A-19 PRE-TEST RIGHT SIDE VIEW OF IMPACTOR FACE



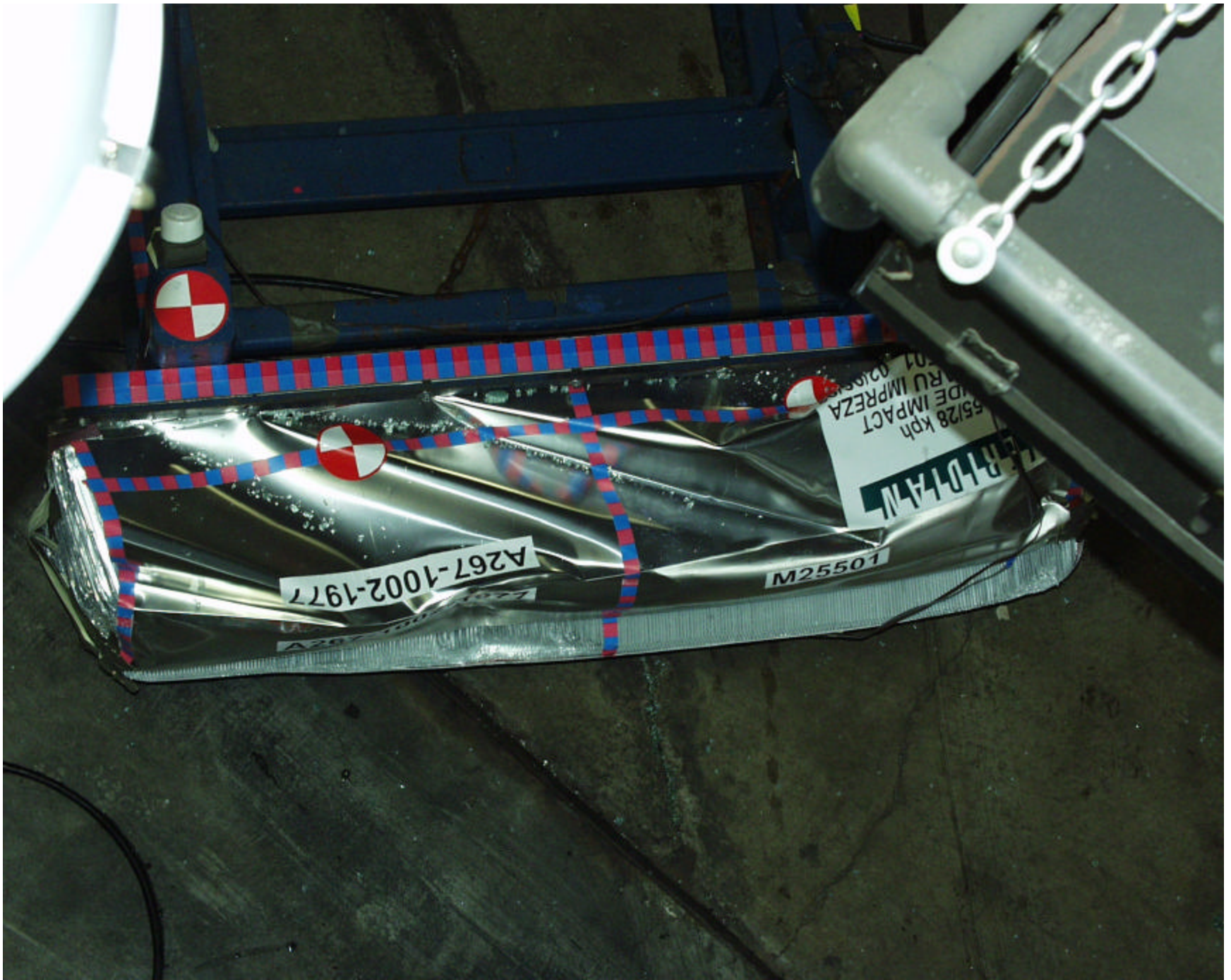
A-22

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Figure A-20 POST-TEST RIGHT SIDE VIEW OF IMPACTOR FACE



Figure A-21 PRE-TEST TOP VIEW OF IMPACTOR FACE



A-24

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Figure A-22 POST-TEST TOP VIEW OF IMPACTOR FACE

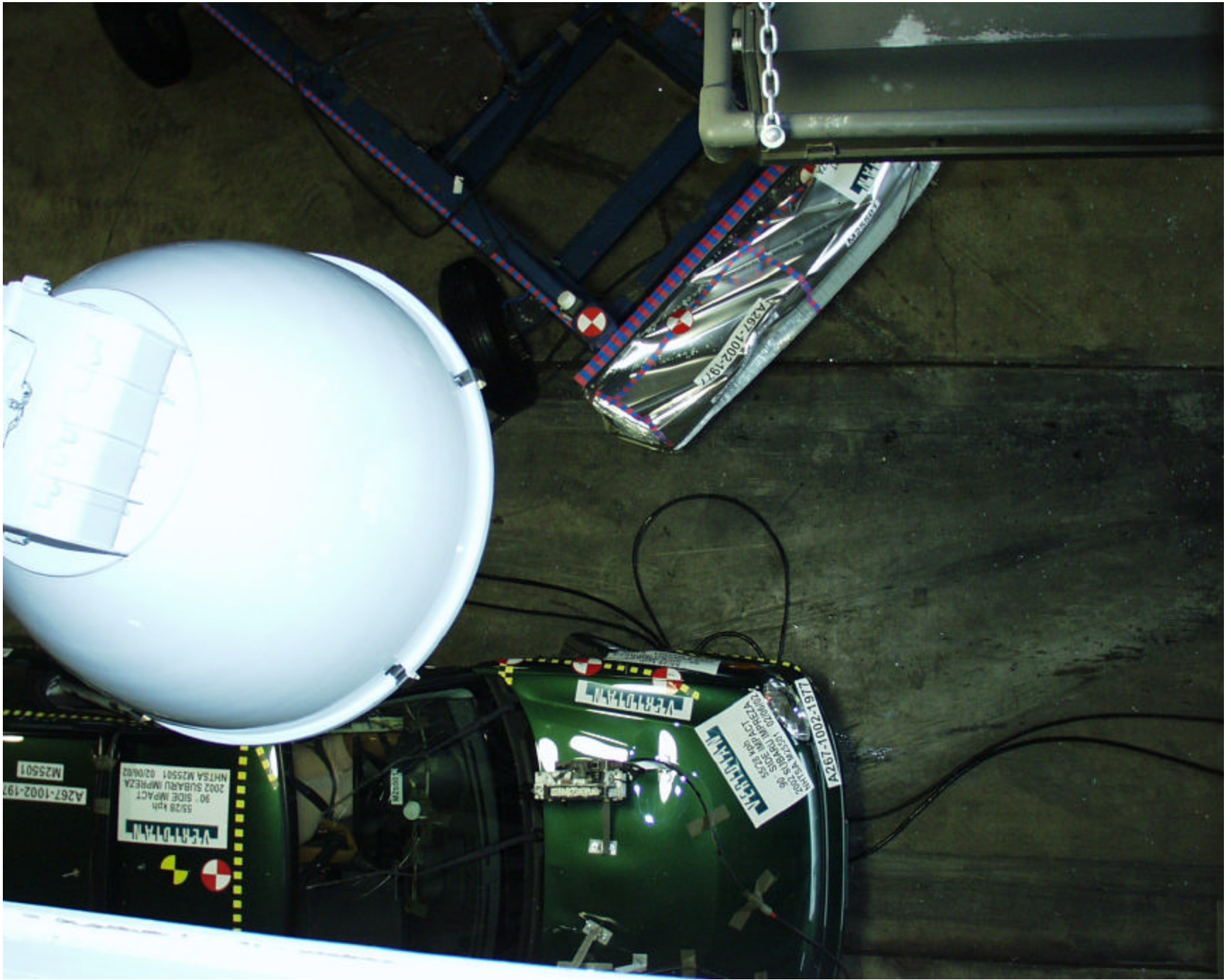


Figure A-24 POST-TEST OVERHEAD VIEW OF MDB AND VEHICLE



Figure A-25 PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-26 POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID



A-29

8652-SNCAP-02

Figure A-27 PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-28 POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID

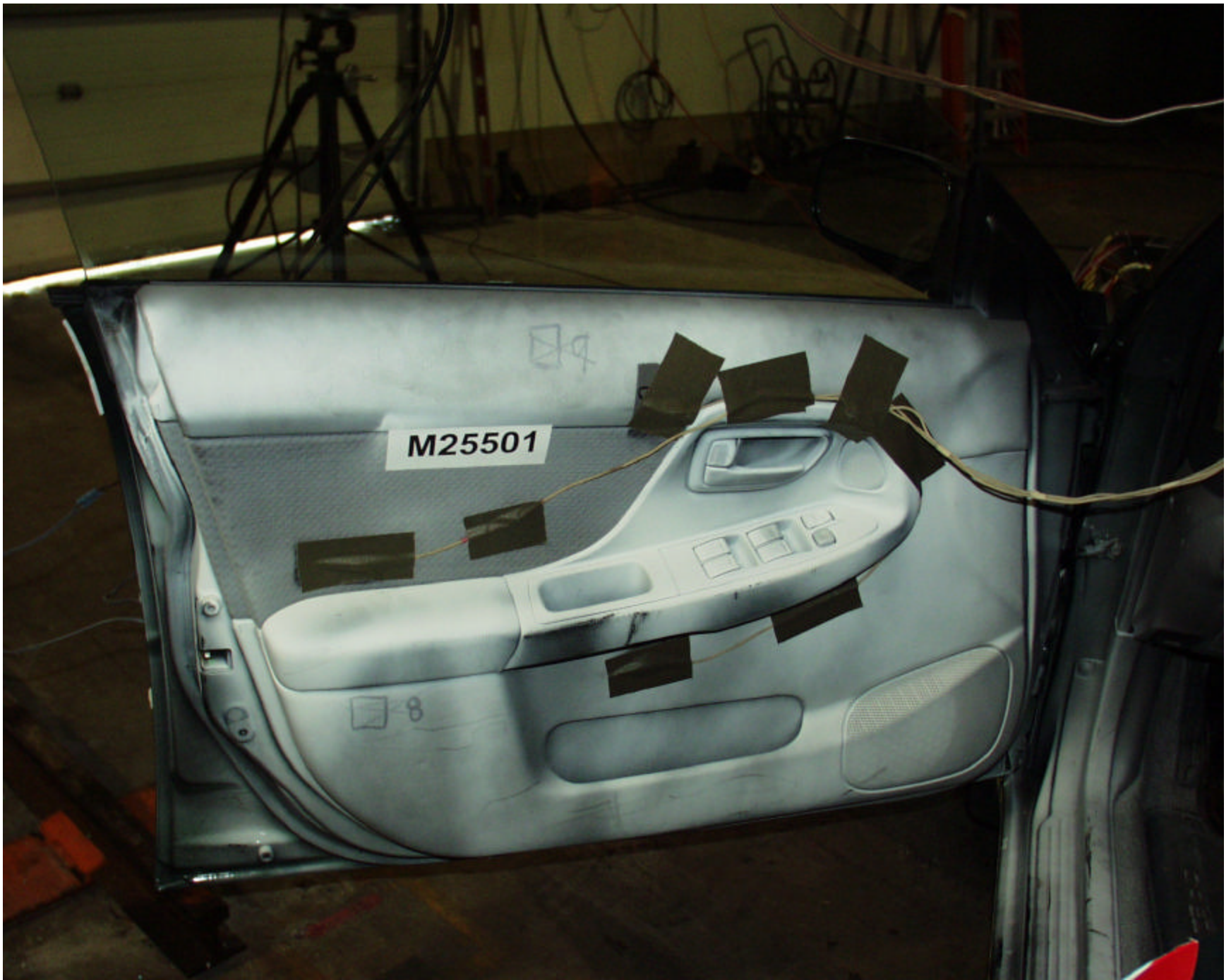


Figure A-29 PRE-TEST INTERIOR OF FRONT DOOR



Figure A-30 POST-TEST INTERIOR OF FRONT DOOR SHOWING SID IMPACT LOCATIONS



Figure A-31 PRE-TEST INTERIOR OF REAR DOOR



Figure A-32 POST-TEST INTERIOR OF REAR DOOR SHOWING IMPACT LOCATIONS



Figure A-33 PRE-TEST LEFT SIDE VIEW OF MDB WITH IMPACTOR FACE IN POSITION



Figure A-34 PRE-TEST RIGHT SIDE VIEW OF MDB WITH IMPACTOR FACE IN POSITION

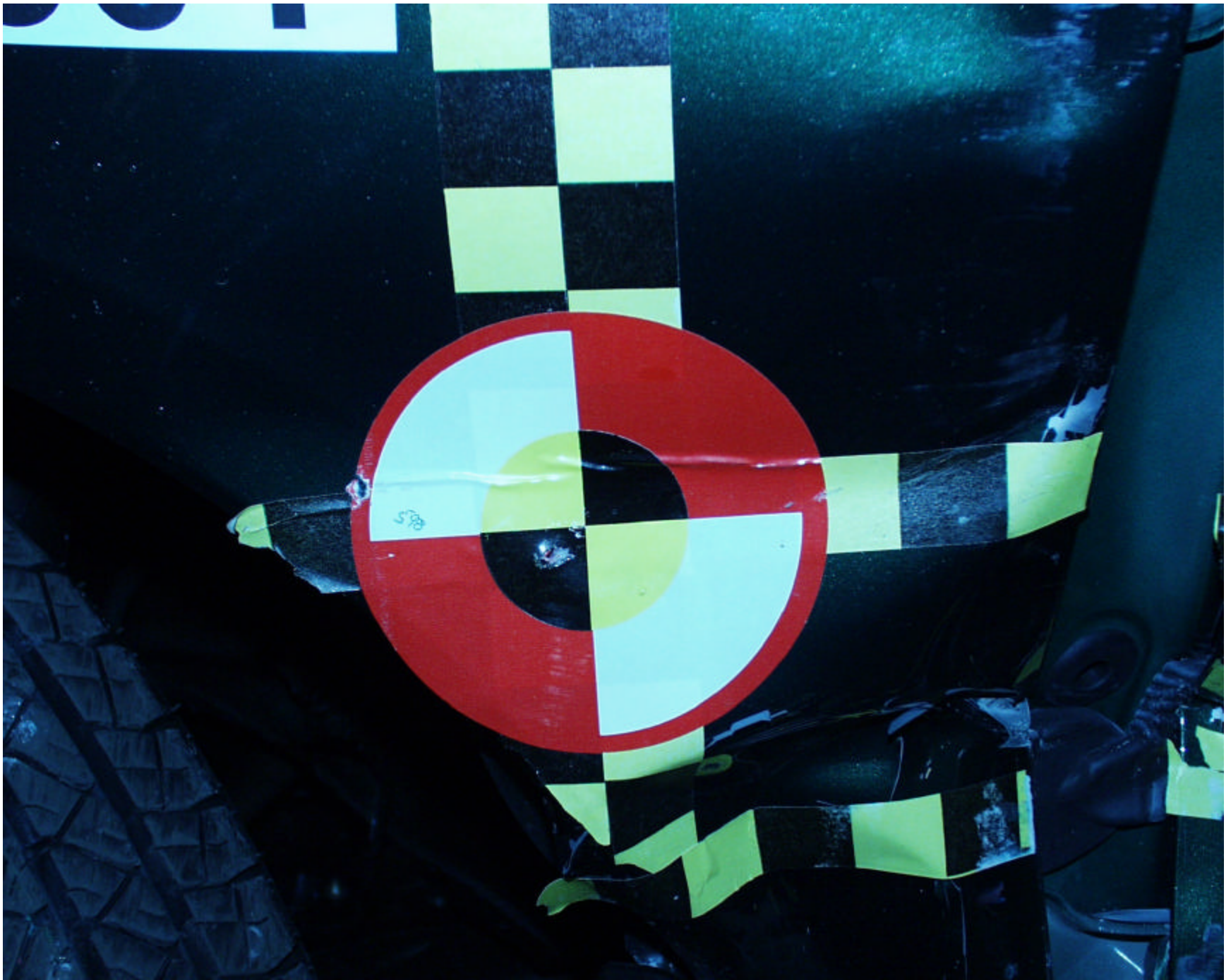


Figure A-35 POST-TEST CLOSE-UP VIEW OF IMPACT POINT TARGET

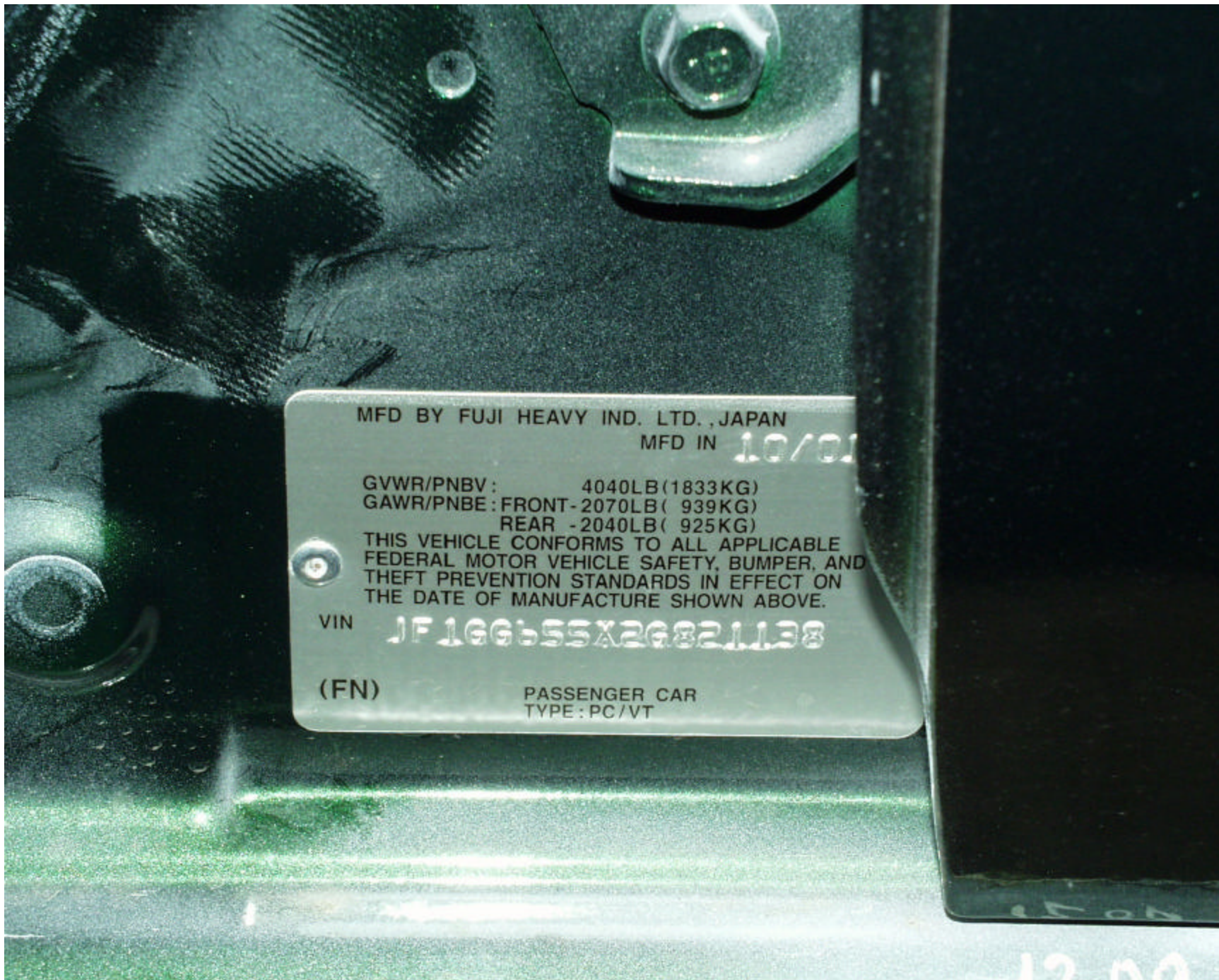


Figure A-36CLOSE-UP VIEW OF VEHICLE'S CERTIFICATION LABEL

SUBARU

VEHICLE CAPACITY WEIGHT:
900LB(408KG)

NUMBER OF OCCUPANTS:
TOTAL 5 (FRONT 2/REAR 3)

RECOMMENDED TIRE INFLATION
PRESSURE kPa(psi)

| TIRE SIZE | FRONT | REAR |
|----------------------|---------|---------|
| P195.60R15 87H | 220(32) | 200(29) |
| TEMPORARY SPARE TIRE | | |
| T135 70D16 100M | | 420(60) |

WAGON JA

Figure A-37 CLOSE-UP VIEW OF VEHICLE'S TIRE PLACARD LABEL

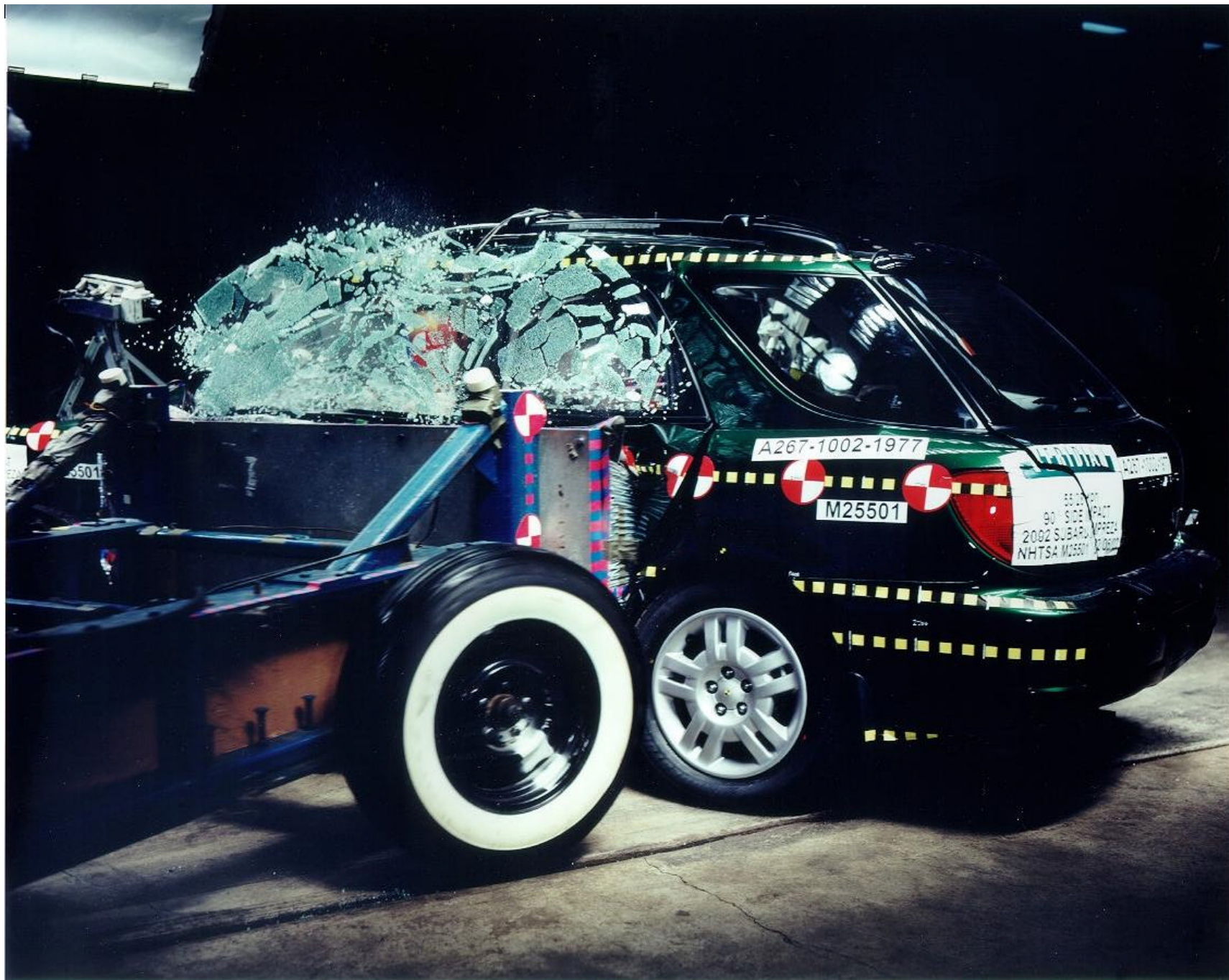


Figure A-38 IMPACT PHOTO



Figure A-39 ROLLOVER 90 DEGREES



Figure A-40 ROLLOVER 180 DEGREES

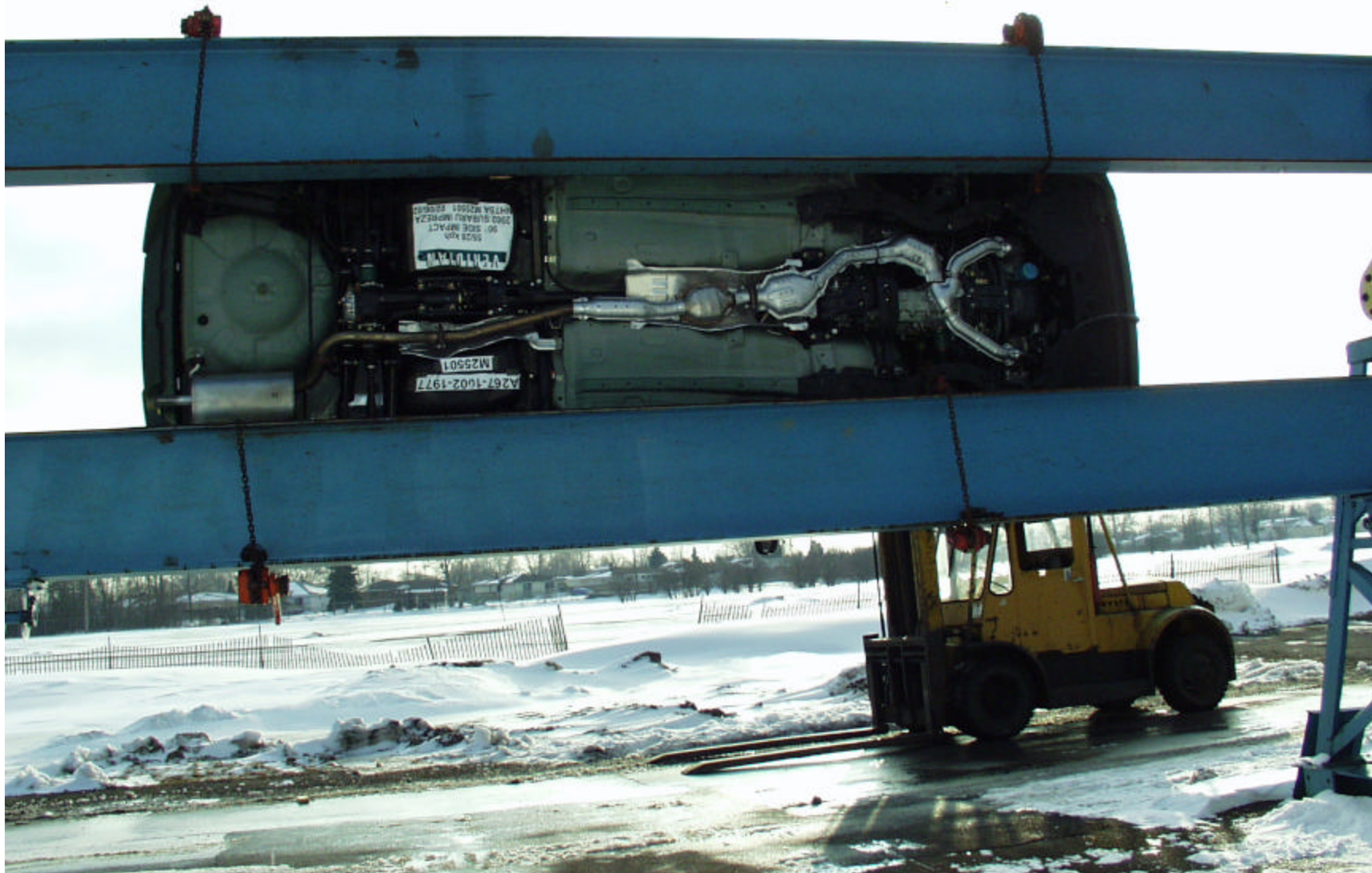


Figure A-41 ROLLOVER 270 DEGREES



Figure A-42 ROLLOVER 360 DEGREES

APPENDIX B

VEHICLE, MDB AND SID RESPONSE DATA

TABLE OF DATA PLOTS

DRIVER DUMMY INSTRUMENTATION PLOTS ACCELERATION DATA - FILTER CLASS 1000, LOWER SPINE - FILTER CLASS 180 INTEGRATION DATA - FILTER CLASS 180

| <u>Plot No.</u> | <u>Data Plot Title</u> | <u>Page</u> |
|-----------------|---|-------------|
| 1 | DRIVER HEAD (X) ACCELERATION VS TIME | B- 6 |
| 2 | DRIVER HEAD (X) VELOCITY VS TIME | B- 7 |
| 3 | DRIVER HEAD (Y) ACCELERATION VS TIME | B- 8 |
| 4 | DRIVER HEAD (Y) VELOCITY VS TIME | B- 9 |
| 5 | DRIVER HEAD (Z) ACCELERATION VS TIME | B- 10 |
| 6 | DRIVER HEAD (Z) VELOCITY VS TIME | B- 11 |
| 7 | DRIVER HEAD RESULTANT ACCELERATION VS TIME | B- 12 |
| 8 | DRIVER UPPER RIB (Y) ACCELERATION VS TIME | B- 13 |
| 9 | DRIVER UPPER RIB (Y) VELOCITY VS TIME | B- 14 |
| 10 | DRIVER LOWER RIB (Y) ACCELERATION VS TIME | B- 15 |
| 11 | DRIVER LOWER RIB (Y) VELOCITY VS TIME | B- 16 |
| 12 | DRIVER LOWER SPINE (Y) ACCELERATION VS TIME | B- 17 |
| 13 | DRIVER LOWER SPINE (Y) VELOCITY VS TIME | B- 18 |
| 14 | DRIVER PELVIC (Y) ACCELERATION VS TIME | B- 19 |
| 15 | DRIVER PELVIC (Y) VELOCITY VS TIME | B- 20 |

DRIVER DUMMY INSTRUMENTATION PLOTS ACCELERATION DATA - FIR FILTERED

| <u>Plot No.</u> | <u>Data Plot Title</u> | <u>Page</u> |
|-----------------|---|-------------|
| 16 | DRIVER UPPER RIB (Y) ACCELERATION VS TIME | B- 21 |
| 17 | DRIVER LOWER RIB (Y) ACCELERATION VS TIME | B- 22 |
| 18 | DRIVER LOWER SPINE (Y) ACCELERATION VS TIME | B- 23 |
| 19 | DRIVER PELVIC (Y) ACCELERATION VS TIME | B- 24 |

TEST VEHICLE INSTRUMENTATION PLOTS
ACCELERATION DATA - FILTER CLASS 60
INTEGRATION DATA - FILTER CLASS 180

| <u>Plot No.</u> | <u>Data Plot Title</u> | <u>Page</u> |
|-----------------|--|-------------|
| 20 | RIGHT SIDE SILL AT FRONT SEAT (X) ACCELERATION VS TIME | B- 25 |
| 21 | RIGHT SIDE SILL AT FRONT SEAT (X) VELOCITY VS TIME | B- 26 |
| 22 | RIGHT SIDE SILL AT FRONT SEAT (Y) ACCELERATION VS TIME | B- 27 |
| 23 | RIGHT SIDE SILL AT FRONT SEAT (Y) VELOCITY VS TIME | B- 28 |
| 24 | RIGHT SIDE SILL AT FRONT SEAT (Z) ACCELERATION VS TIME | B- 29 |
| 25 | RIGHT SIDE SILL AT FRONT SEAT (Z) VELOCITY VS TIME | B- 30 |
| 26 | RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION VS TIME | B- 31 |
| 27 | RIGHT SIDE SILL AT REAR SEAT (X) ACCELERATION VS TIME | B- 32 |
| 28 | RIGHT SIDE SILL AT REAR SEAT (X) VELOCITY VS TIME | B- 33 |
| 29 | RIGHT SIDE SILL AT REAR SEAT (Y) ACCELERATION VS TIME | B- 34 |
| 30 | RIGHT SIDE SILL AT REAR SEAT (Y) VELOCITY VS TIME | B- 35 |
| 31 | RIGHT SIDE SILL AT REAR SEAT (Z) ACCELERATION VS TIME | B- 36 |
| 32 | RIGHT SIDE SILL AT REAR SEAT (Z) VELOCITY VS TIME | B- 37 |
| 33 | RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION VS TIME | B- 38 |
| 34 | REAR FLOORPAN ABOVE AXLE (X) ACCELERATION VS TIME | B- 39 |
| 35 | REAR FLOORPAN ABOVE AXLE (X) VELOCITY VS TIME | B- 40 |
| 36 | REAR FLOORPAN ABOVE AXLE (Y) ACCELERATION VS TIME | B- 41 |
| 37 | REAR FLOORPAN ABOVE AXLE (Y) VELOCITY VS TIME | B- 42 |
| 38 | REAR FLOORPAN ABOVE AXLE (Z) ACCELERATION VS TIME | B- 43 |
| 39 | REAR FLOORPAN ABOVE AXLE (Z) VELOCITY VS TIME | B- 44 |
| 40 | REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION VS TIME | B- 45 |
| 41 | LEFT SIDE SILL AT REAR SEAT (Y) ACCELERATION VS TIME | B- 46 |
| 42 | LEFT SIDE SILL AT REAR SEAT (Y) VELOCITY VS TIME | B- 47 |
| 43 | LEFT SIDE SILL AT FRONT SEAT (Y) ACCELERATION VS TIME | B- 48 |
| 44 | LEFT SIDE SILL AT FRONT SEAT (Y) VELOCITY VS TIME | B- 49 |
| 45 | LEFT FRONT DOOR ON CENTERLINE (Y) ACCELERATION VS TIME | B- 50 |
| 46 | LEFT FRONT DOOR ON CENTERLINE (Y) VELOCITY VS TIME | B- 51 |
| 47 | RIGHT REAR OCCUPANT COMPARTMENT (Y) ACCELERATION VS TIME | B- 52 |
| 48 | RIGHT REAR OCCUPANT COMPARTMENT (Y) VELOCITY VS TIME | B- 53 |
| 49 | MID REAR OF LEFT FRONT DOOR (Y) ACCELERATION VS TIME | B- 54 |
| 50 | MID REAR OF LEFT FRONT DOOR (Y) VELOCITY VS TIME | B- 55 |
| 51 | LEFT FRONT DOOR UPPER CENTERLINE (Y) ACCELERATION VS TIME | B- 56 |
| 52 | LEFT FRONT DOOR UPPER CENTERLINE (Y) VELOCITY VS TIME | B- 57 |
| 53 | MID REAR OF LEFT REAR DOOR (Y) ACCELERATION VS TIME | B- 58 |
| 54 | MID REAR OF LEFT REAR DOOR (Y) VELOCITY VS TIME | B- 59 |
| 55 | LEFT REAR DOOR UPPER CENTERLINE (Y) ACCELERATION VS TIME | B- 60 |
| 56 | LEFT REAR DOOR UPPER CENTERLINE (Y) VELOCITY VS TIME | B- 61 |
| 57 | LOWER B-POST (Y) ACCELERATION VS TIME | B- 62 |
| 58 | LOWER B-POST (Y) VELOCITY VS TIME | B- 63 |
| 59 | UPPER B-POST (Y) ACCELERATION VS TIME | B- 64 |
| 60 | UPPER B-POST (Y) VELOCITY VS TIME | B- 65 |
| 61 | LOWER A-POST (Y) ACCELERATION VS TIME | B- 66 |

TEST VEHICLE INSTRUMENTATION PLOTS
 ACCELERATION DATA - FILTER CLASS 60
 INTEGRATION DATA - FILTER CLASS 180

| <u>Plot No.</u> | <u>Data Plot Title</u> | <u>Page</u> |
|-----------------|---|-------------|
| 62 | LOWER A-POST (Y) VELOCITY VS TIME | B- 67 |
| 63 | UPPER A-POST (Y) ACCELERATION VS TIME | B- 68 |
| 64 | UPPER A-POST (Y) VELOCITY VS TIME | B- 69 |
| 65 | FRONT SEAT TRACK (Y) ACCELERATION VS TIME | B- 70 |
| 66 | FRONT SEAT TRACK (Y) VELOCITY VS TIME | B- 71 |
| 67 | REAR SEAT TRACK (Y) ACCELERATION VS TIME | B- 72 |
| 68 | REAR SEAT TRACK (Y) VELOCITY VS TIME | B- 73 |
| 69 | VEHICLE CENTER OF GRAVITY (X) ACCELERATION VS TIME | B- 74 |
| 70 | VEHICLE CENTER OF GRAVITY (X) VELOCITY VS TIME | B- 75 |
| 71 | VEHICLE CENTER OF GRAVITY (Y) ACCELERATION VS TIME | B- 76 |
| 72 | VEHICLE CENTER OF GRAVITY (Y) VELOCITY ACCELERATION VS TIME | B- 77 |
| 73 | VEHICLE CENTER OF GRAVITY (Z) ACCELERATION VS TIME | B- 78 |
| 74 | VEHICLE CENTER OF GRAVITY (Z) VELOCITY VS TIME | B- 79 |
| 75 | VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION VS TIME | B- 80 |

MDB INSTRUMENTATION PLOTS
 ACCELERATION DATA - FILTER CLASS 60
 INTEGRATION DATA - FILTER CLASS 180

| <u>Plot No.</u> | <u>Data Plot Title</u> | <u>Page</u> |
|-----------------|--|-------------|
| 76 | MDB CENTER OF GRAVITY (X) ACCELERATION VS TIME | B- 81 |
| 77 | MDB CENTER OF GRAVITY (X) VELOCITY VS TIME | B- 82 |
| 78 | MDB CENTER OF GRAVITY (Y) ACCELERATION VS TIME | B- 83 |
| 79 | MDB CENTER OF GRAVITY (Y) VELOCITY VS TIME | B- 84 |
| 80 | MDB CENTER OF GRAVITY (Z) ACCELERATION VS TIME | B- 85 |
| 81 | MDB CENTER OF GRAVITY (Z) VELOCITY VS TIME | B- 86 |
| 82 | MDB CENTER OF GRAVITY RESULTANT ACCELERATION VS TIME | B- 87 |
| 83 | MDB REAR (X) ACCELERATION VS TIME | B- 88 |
| 84 | MDB REAR (X) VELOCITY VS TIME | B- 89 |
| 85 | MDB REAR (Y) ACCELERATION VS TIME | B- 90 |
| 86 | MDB REAR (Y) VELOCITY VS TIME | B- 91 |

DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)
ACCELERATION DATA - FILTER CLASS 1000, LOWER SPINE - FILTER CLASS 180
INTEGRATION DATA - FILTER CLASS 180

| <u>Plot No.</u> | <u>Data Plot Title</u> | <u>Page</u> |
|-----------------|---|-------------|
| 87 | DRIVER UPPER RIB (Y) ACCELERATION VS TIME | B- 92 |
| 88 | DRIVER UPPER RIB (Y) VELOCITY VS TIME | B- 93 |
| 89 | DRIVER LOWER RIB (Y) ACCELERATION VS TIME | B- 94 |
| 90 | DRIVER LOWER RIB (Y) VELOCITY VS TIME | B- 95 |
| 91 | DRIVER LOWER SPINE (Y) ACCELERATION VS TIME | B- 96 |
| 92 | DRIVER LOWER SPINE (Y) VELOCITY VS TIME | B- 97 |
| 93 | DRIVER PELVIC (Y) ACCELERATION VS TIME | B- 98 |
| 94 | DRIVER PELVIC (Y) VELOCITY VS TIME | B- 99 |

DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)
ACCELERATION DATA - FIR FILTERED

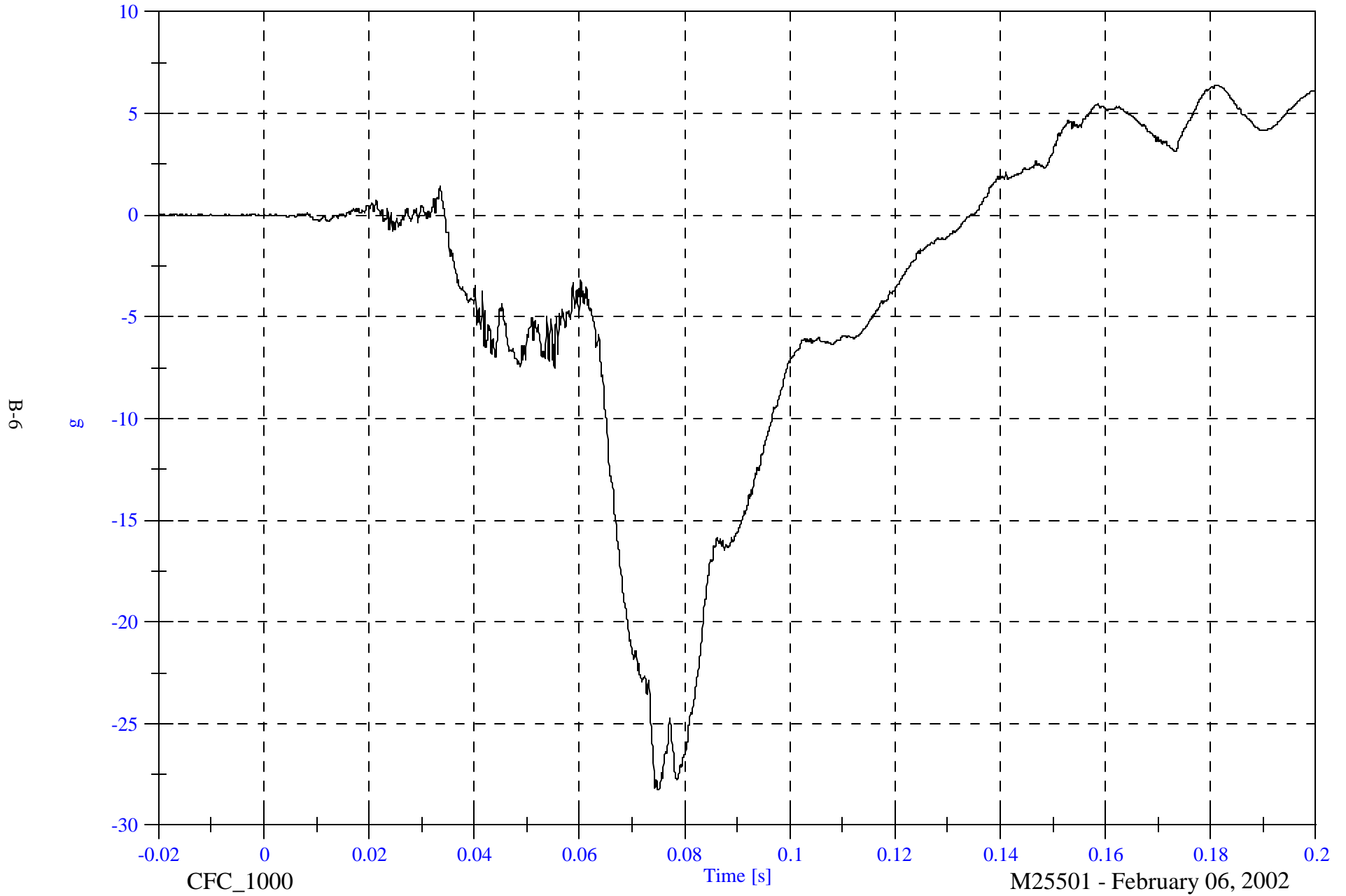
| <u>Plot No.</u> | <u>Data Plot Title</u> | <u>Page</u> |
|-----------------|---|-------------|
| 95 | DRIVER UPPER RIB (Y) ACCELERATION VS TIME | B- 100 |
| 96 | DRIVER LOWER RIB (Y) ACCELERATION VS TIME | B- 101 |
| 97 | DRIVER LOWER SPINE (Y) ACCELERATION VS TIME | B- 102 |
| 98 | DRIVER PELVIC (Y) ACCELERATION VS TIME | B- 103 |

2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 6.4 [g] at 0.181 [s]

P1 Head x

Min: -28.3 [g] at 0.075 [s]



B-6

g

CFC_1000

Time [s]

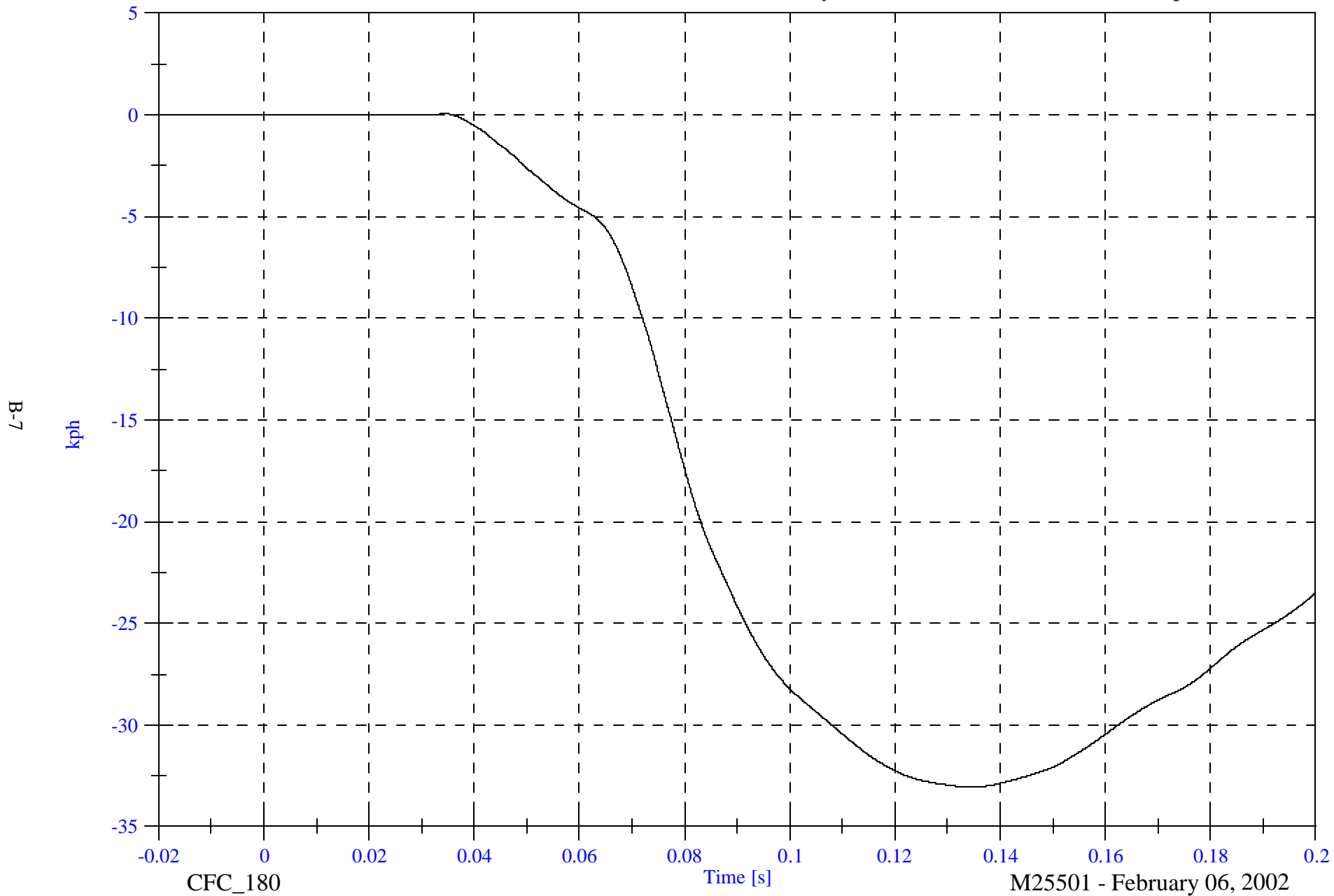
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Head x Velocity

Max: 0.1 [kph] at 0.034 [s]

Min: -33.0 [kph] at 0.135 [s]

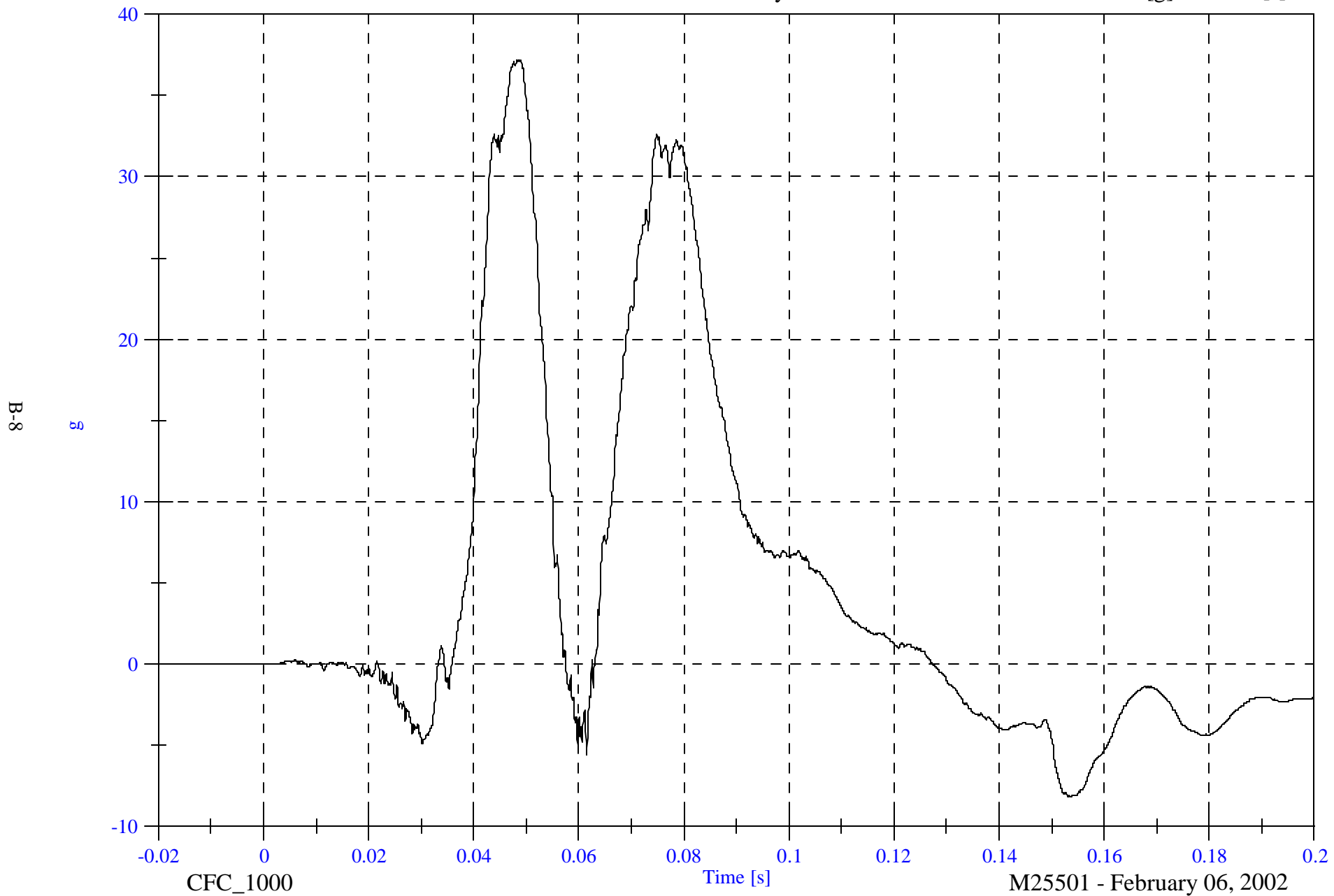


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 37.2 [g] at 0.049 [s]

P1 Head y

Min: -8.2 [g] at 0.153 [s]

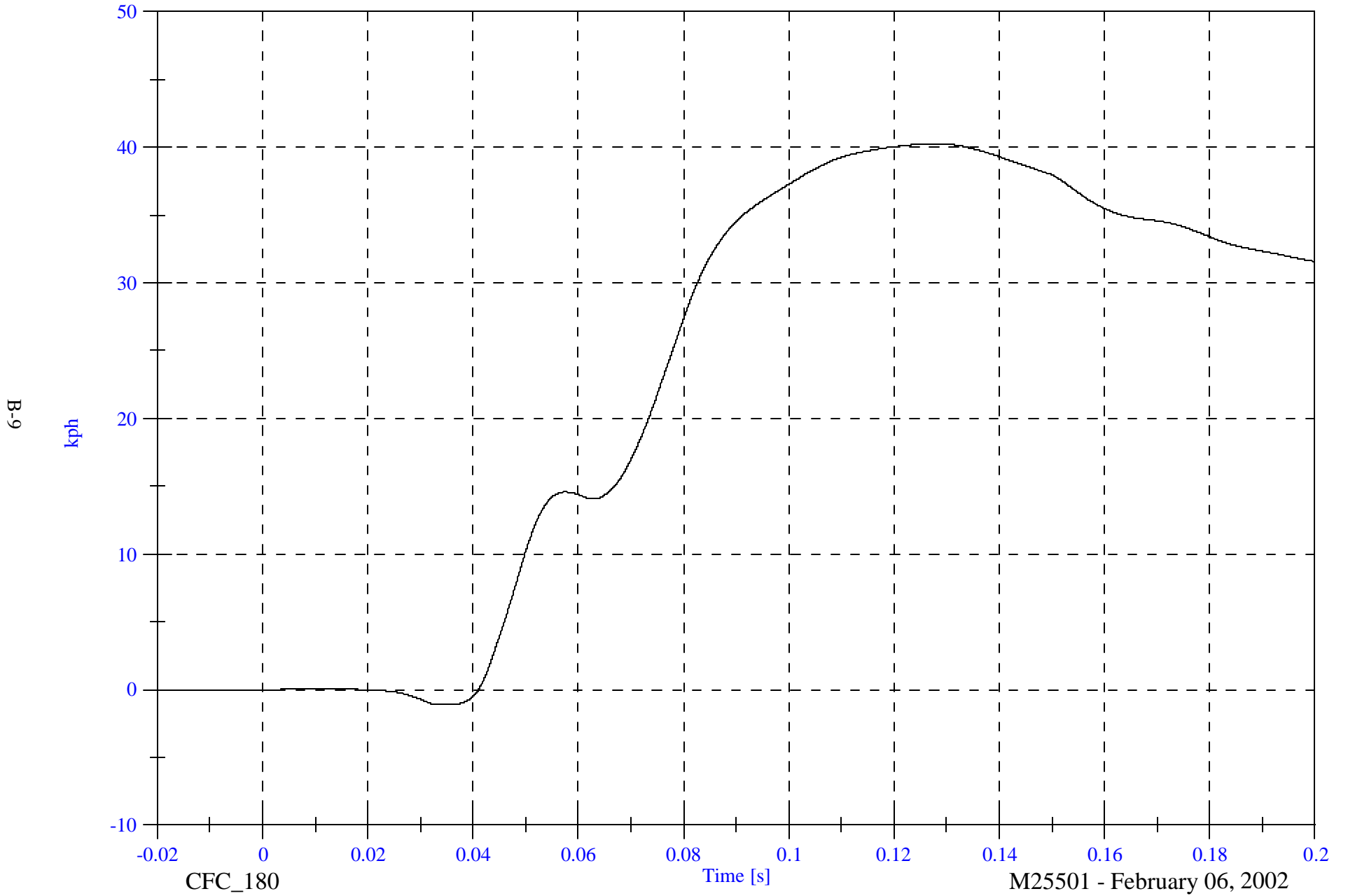


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 40.3 [kph] at 0.127 [s]

P1 Head y Velocity

Min: -1.1 [kph] at 0.036 [s]

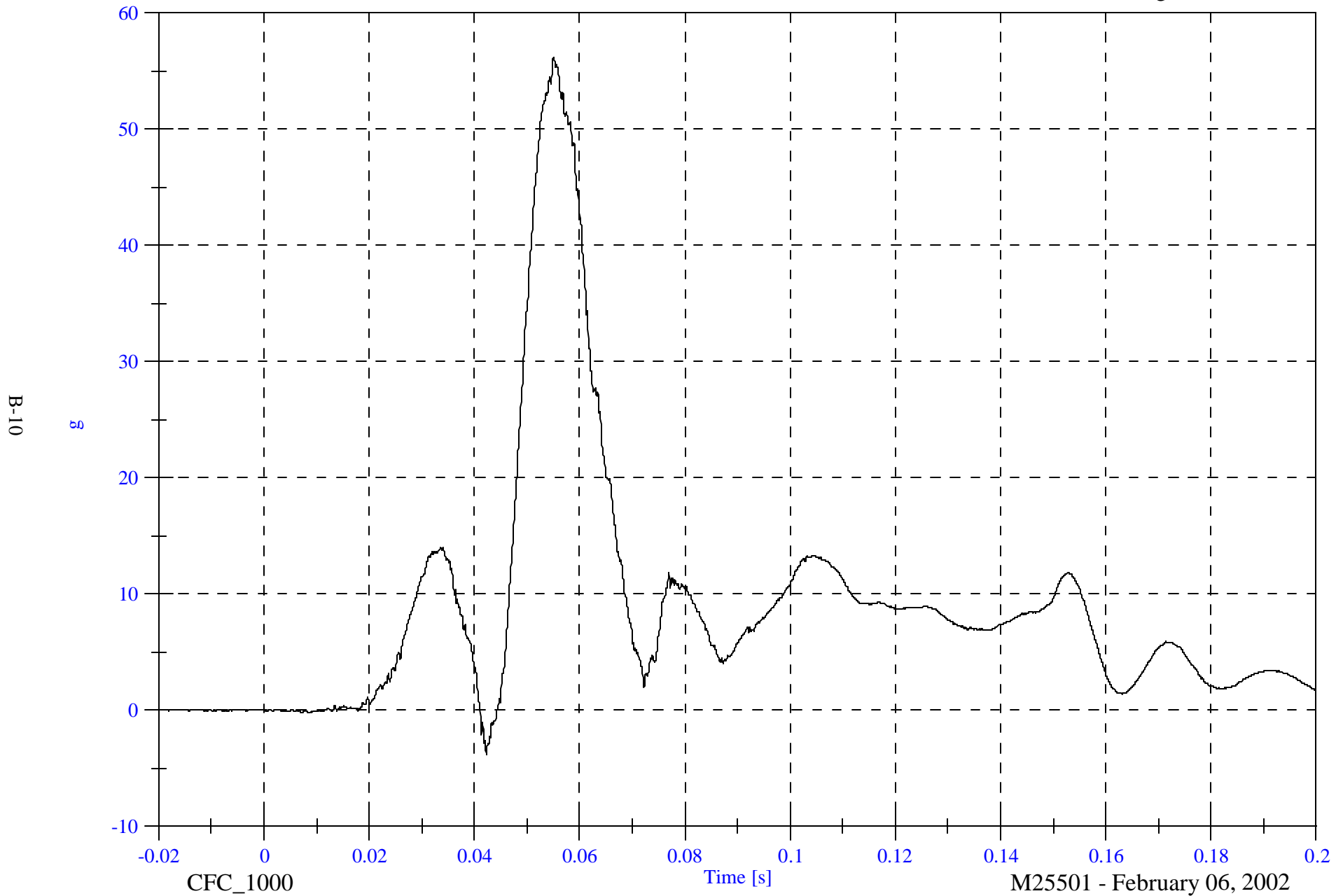


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 56.1 [g] at 0.055 [s]

P1 Head z

Min: -3.8 [g] at 0.042 [s]



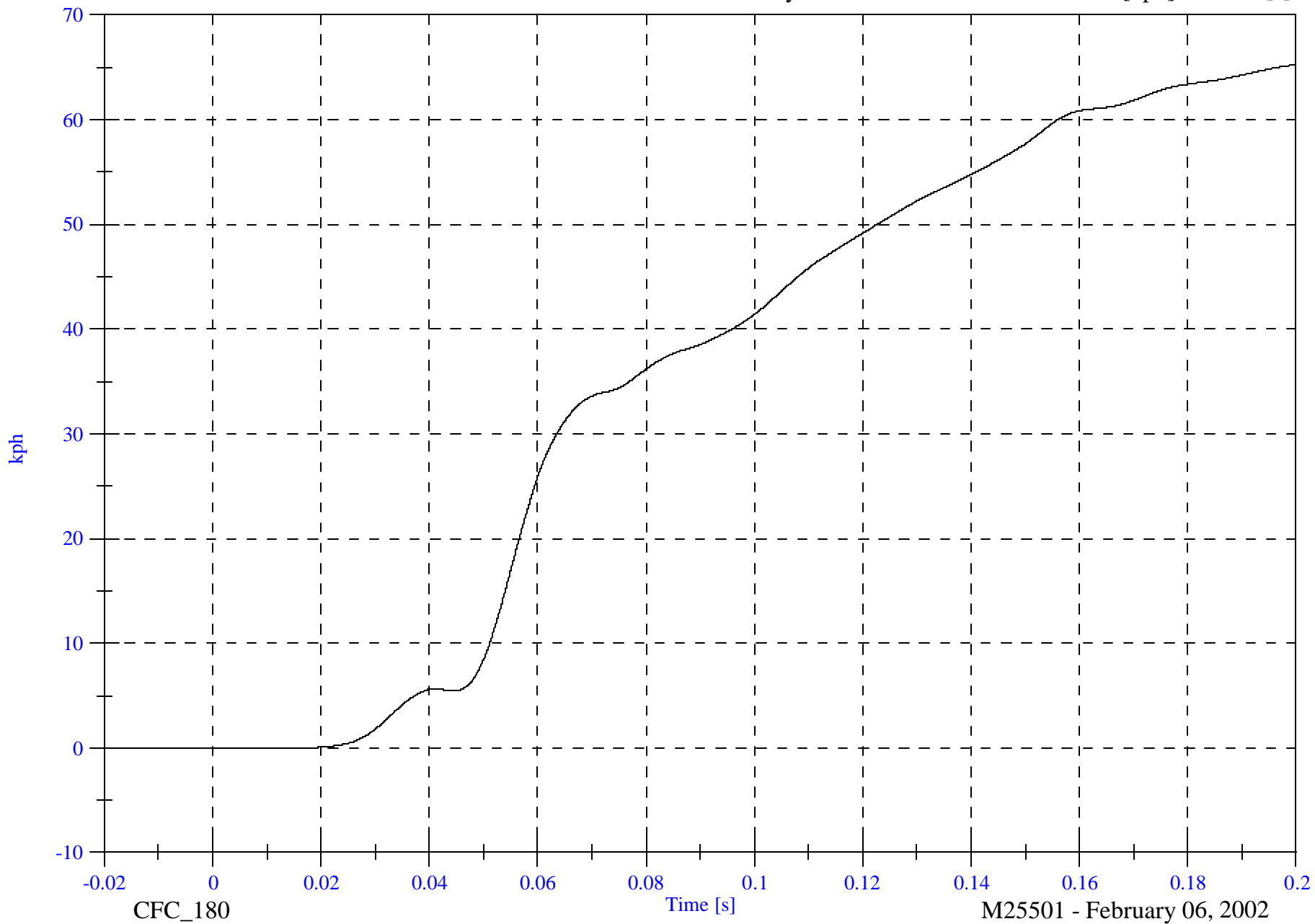
2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 65.2 [kph] at 0.200 [s]

P1 Head z Velocity

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

B-11

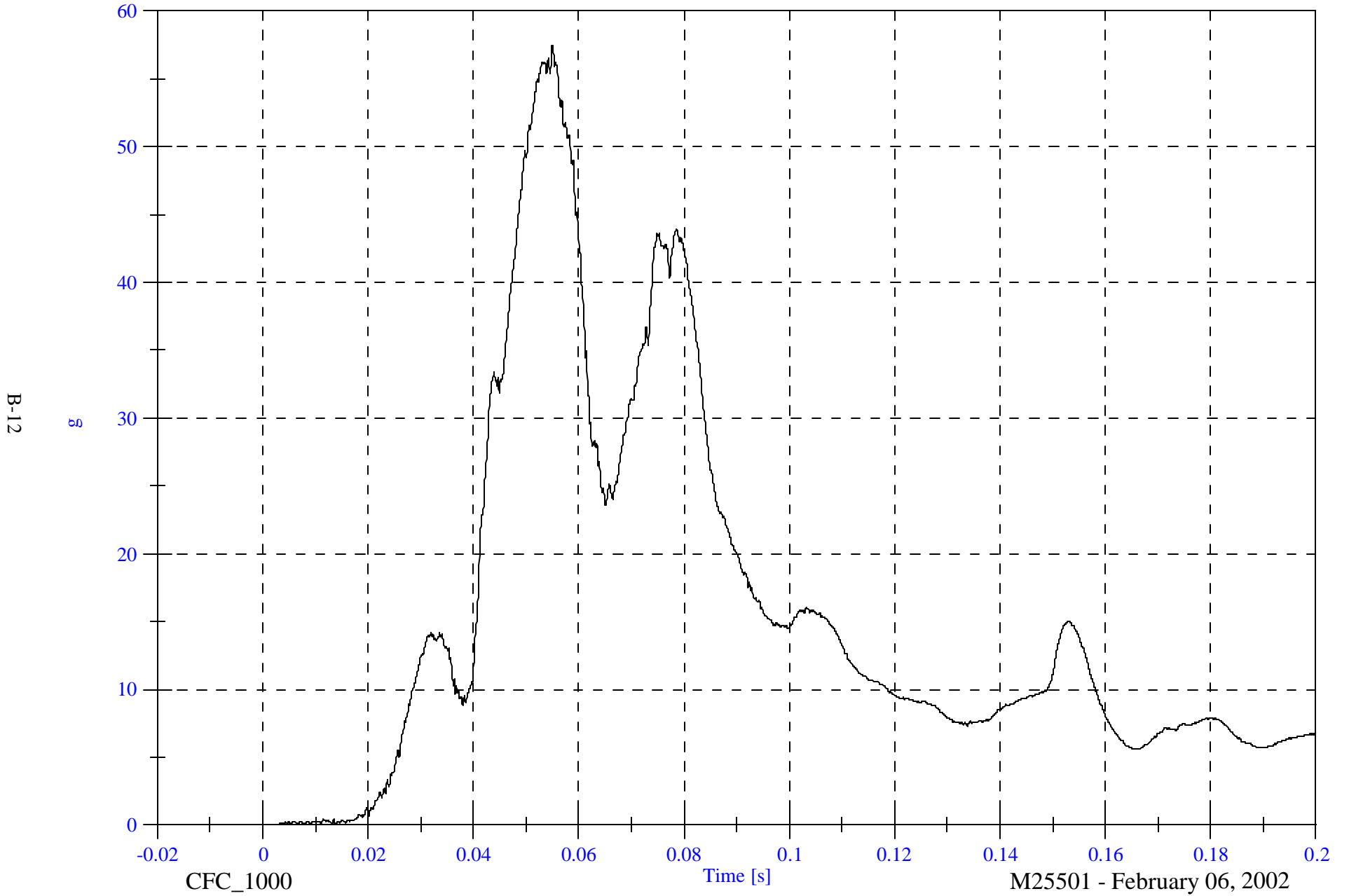


2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Head Resultant

Max: 57.5 [g] at 0.055 [s]

Min: 0.0 [g] at -0.013 [s]

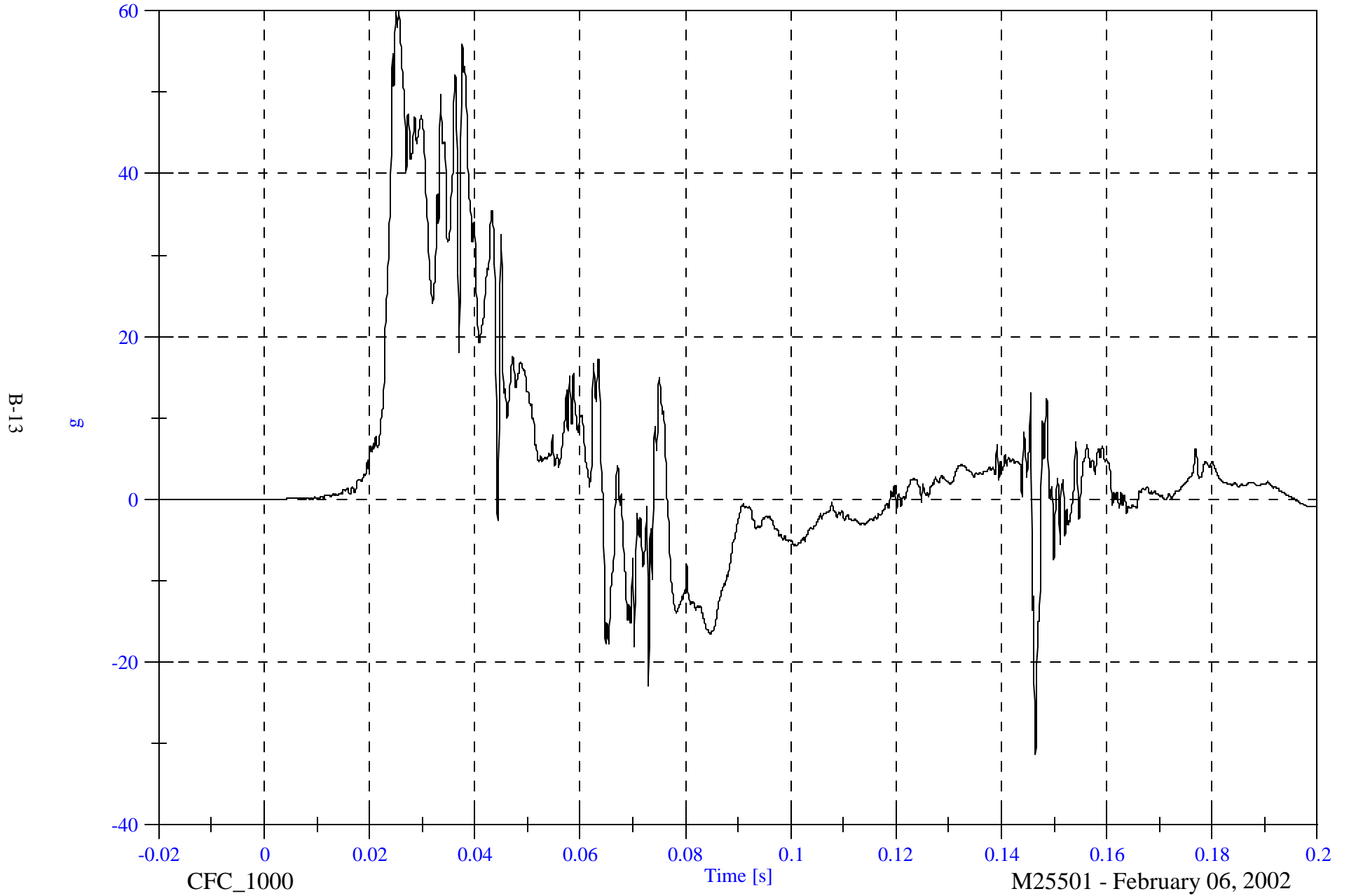


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 59.9 [g] at 0.026 [s]

P1 Upper Rib y

Min: -31.3 [g] at 0.146 [s]

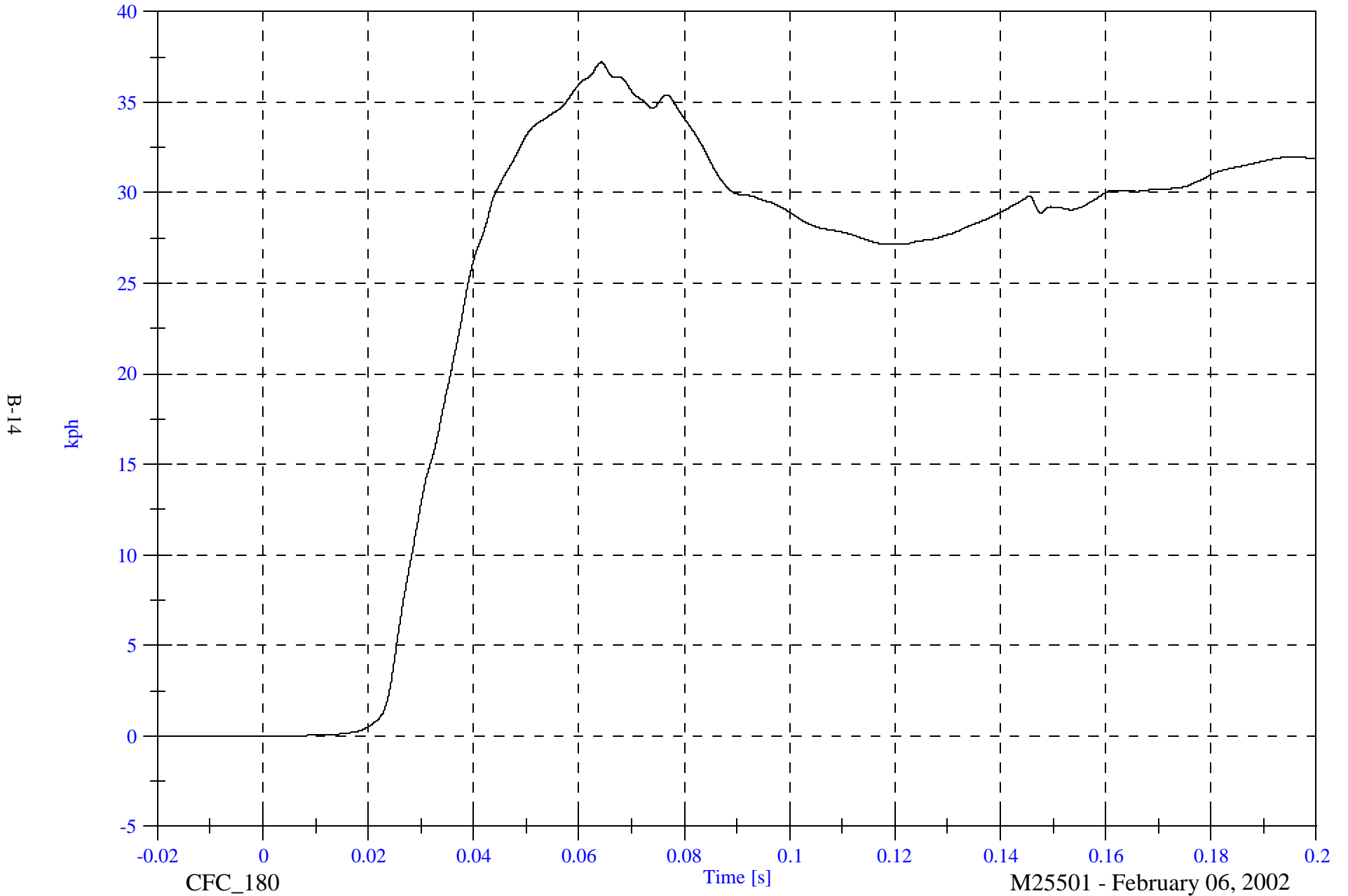


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 37.2 [kph] at 0.064 [s]

P1 Upper Rib y Velocity

Min: -0.0 [kph] at -0.015 [s]

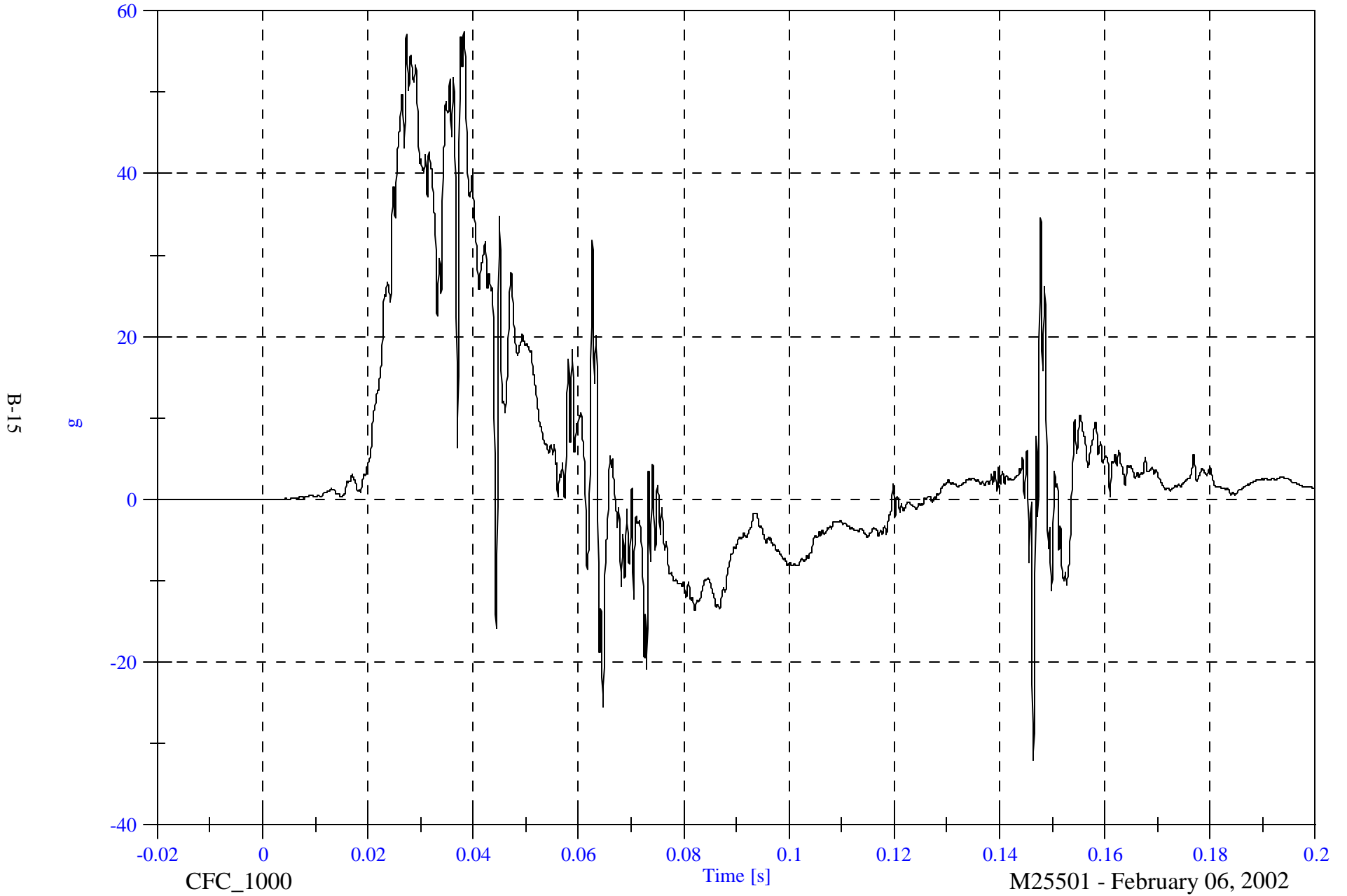


2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Lower Rib y

Max: 57.5 [g] at 0.038 [s]

Min: -32.1 [g] at 0.146 [s]

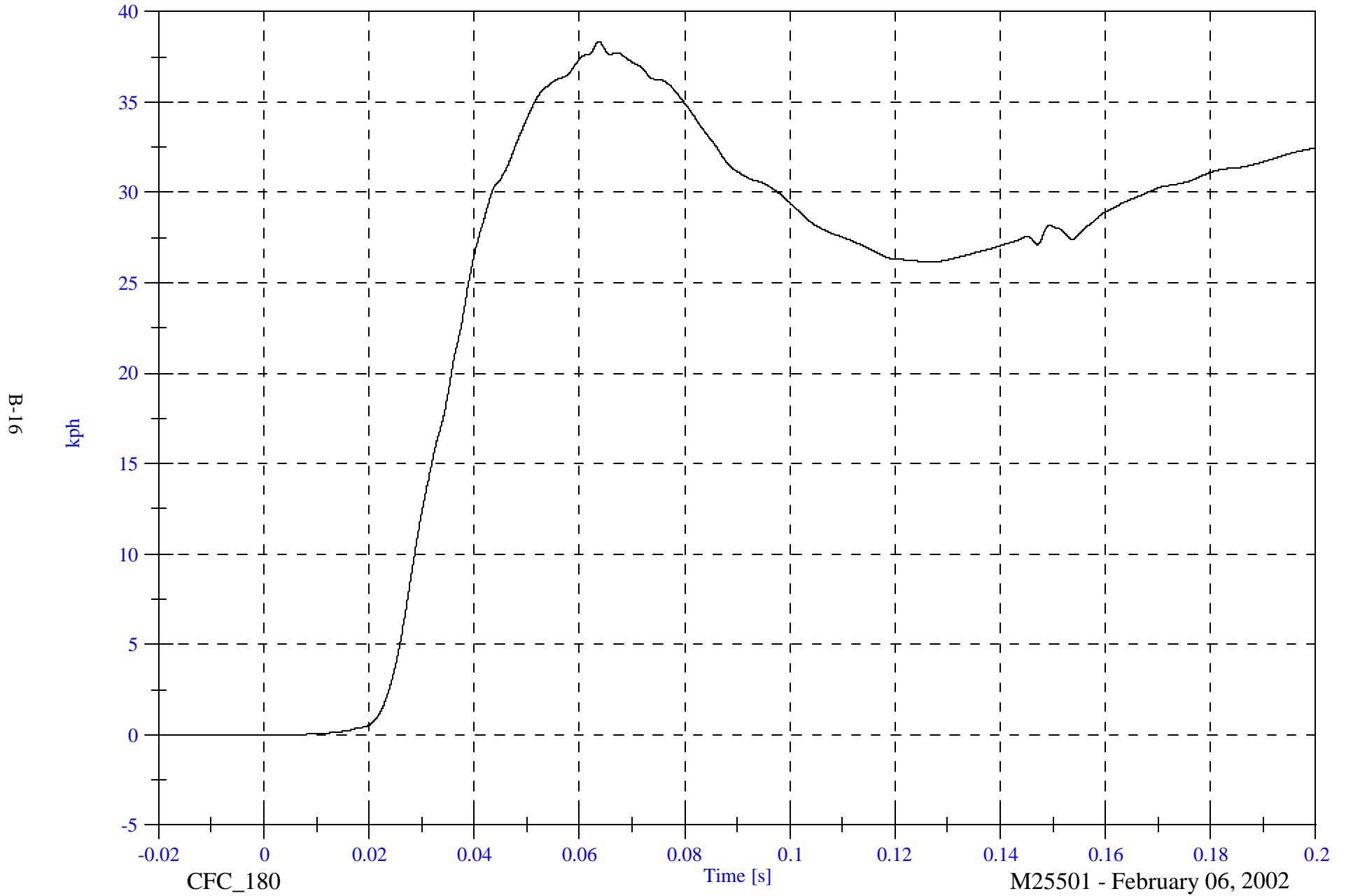


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 38.3 [kph] at 0.064 [s]

P1 Lower Rib y Velocity

Min: -0.0 [kph] at -0.019 [s]

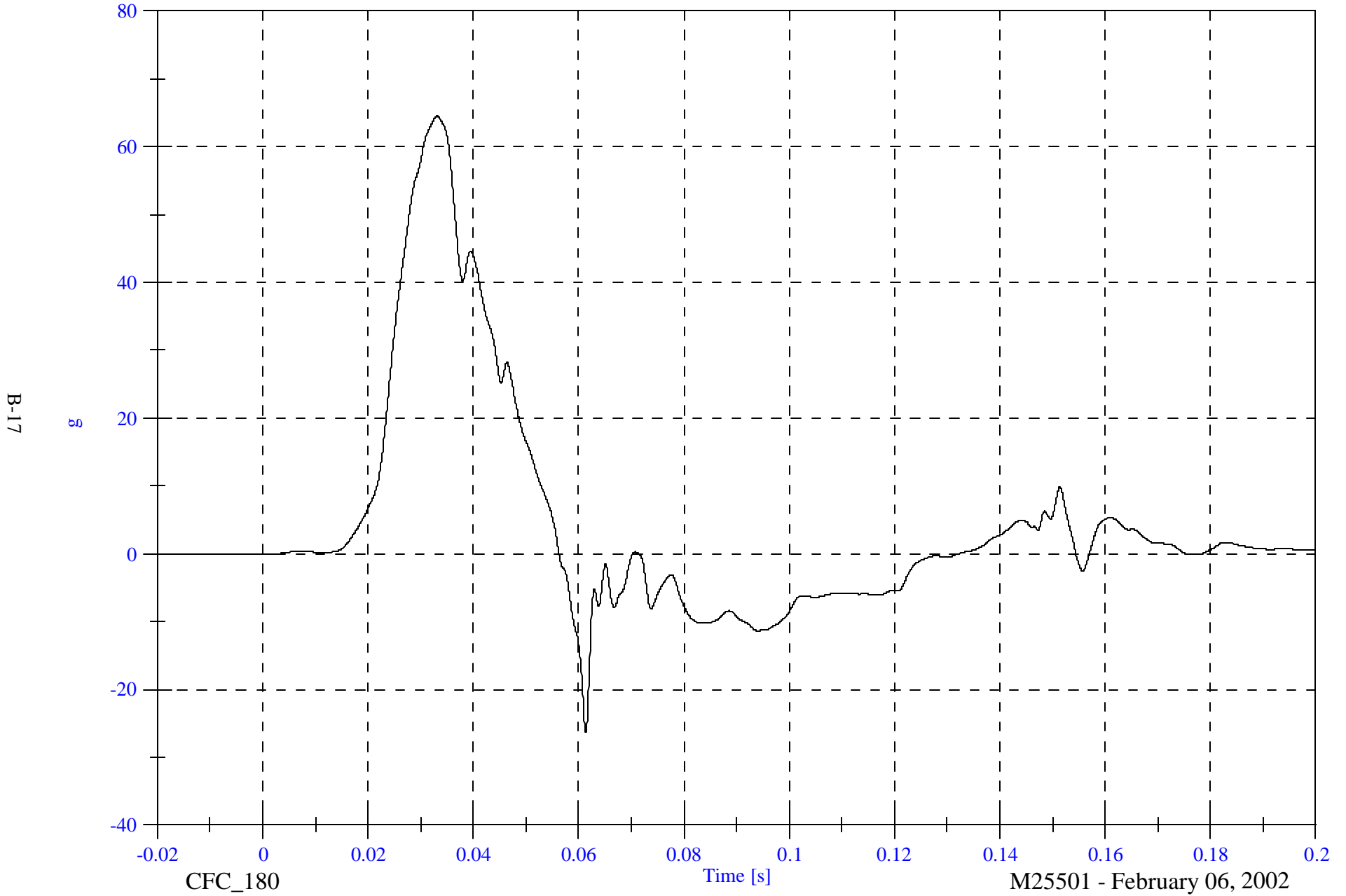


2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Lower Spine y

Max: 64.5 [g] at 0.033 [s]

Min: -26.3 [g] at 0.061 [s]



B-17

CFC_180

Time [s]

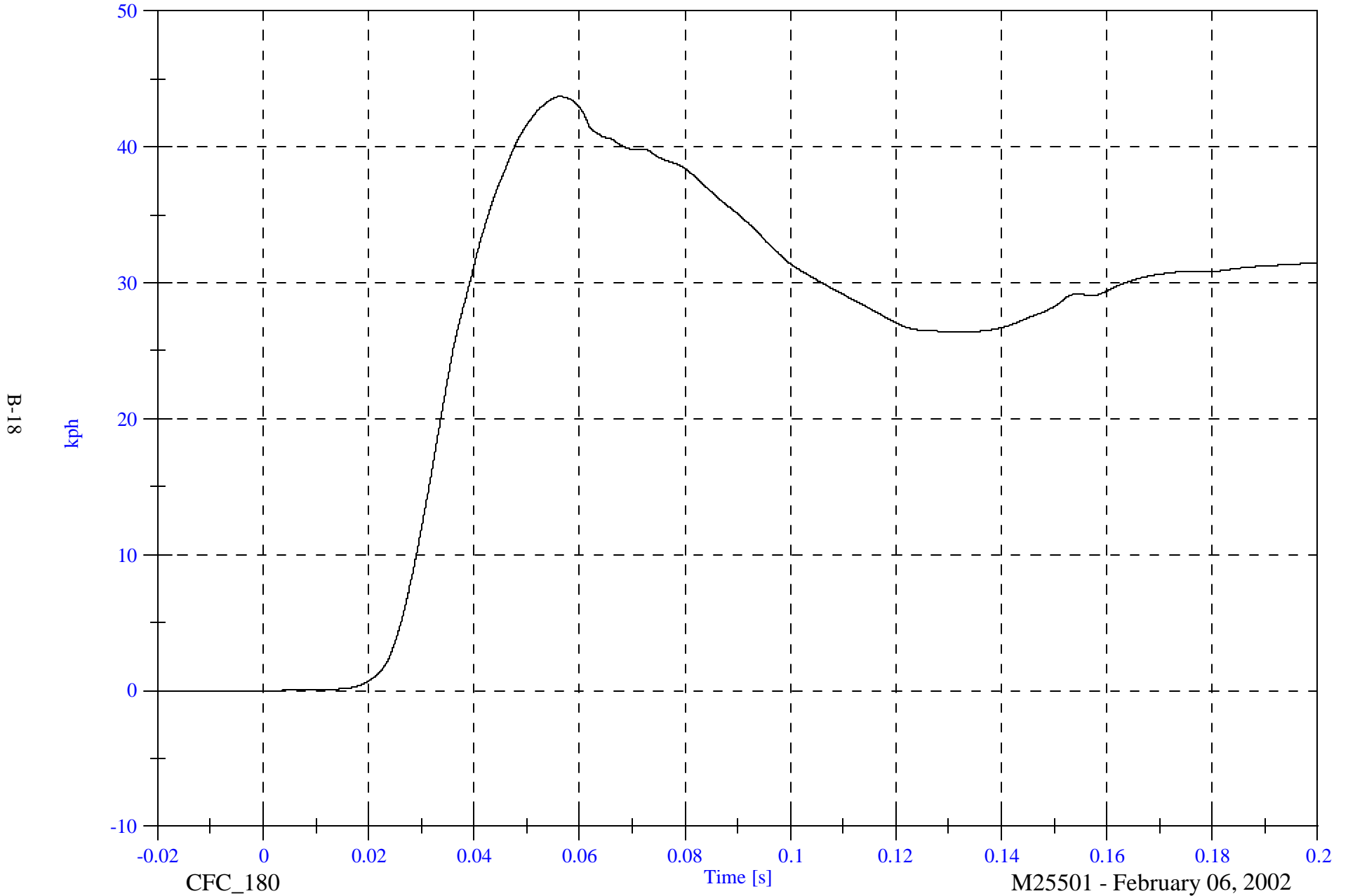
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 43.7 [kph] at 0.056 [s]

P1 Lower Spine y Velocity

Min: -0.0 [kph] at -0.020 [s]

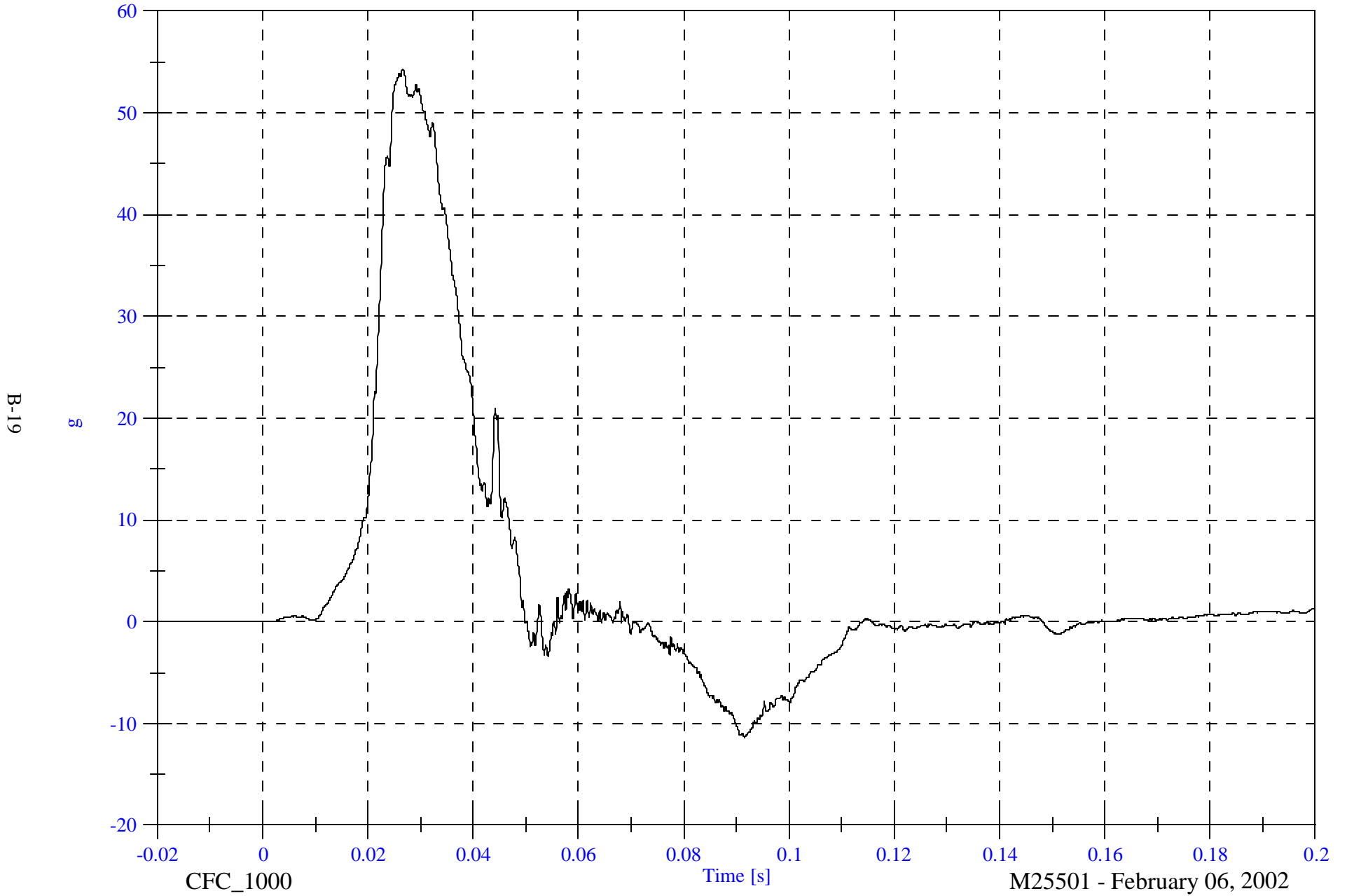


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 54.3 [g] at 0.027 [s]

P1 Pelvic y

Min: -11.3 [g] at 0.092 [s]



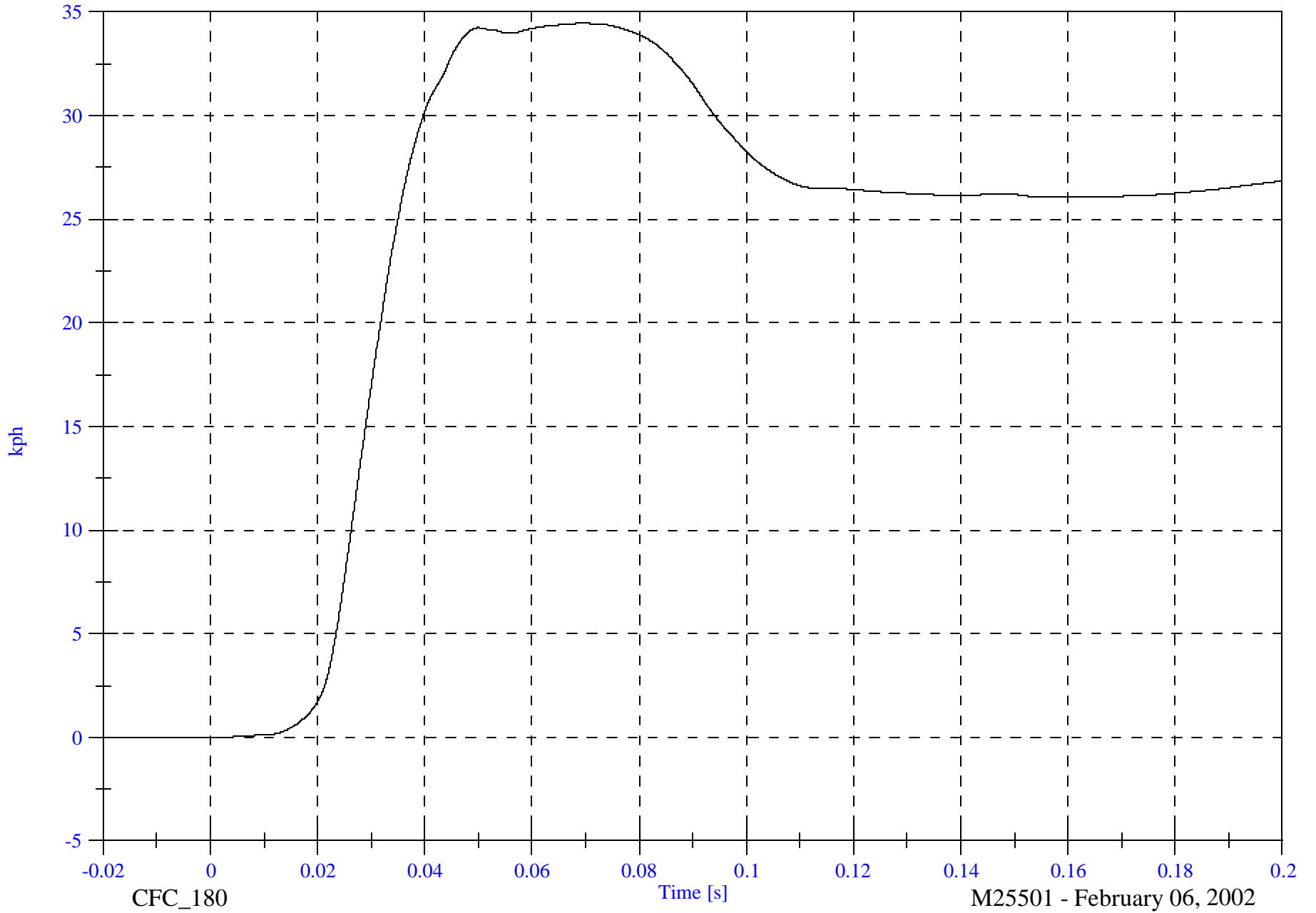
2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 34.5 [kph] at 0.069 [s]

P1 Pelvic y Velocity

Min: -0.0 [kph] at -0.018 [s]

B-20



CFC_180

Time [s]

M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

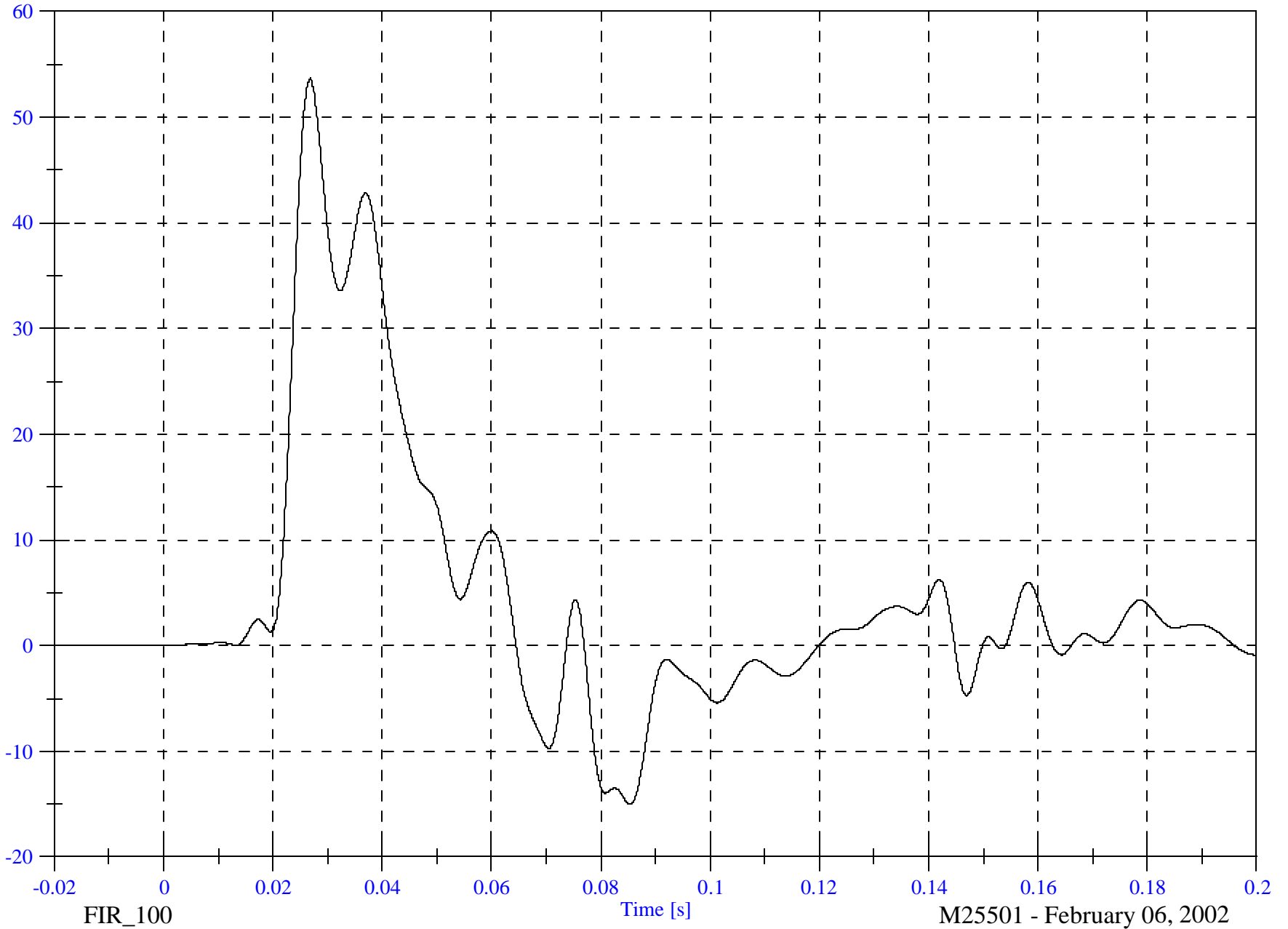
P1 Upper Rib y

Max: 53.7 [g] at 0.027 [s]

Min: -15.0 [g] at 0.086 [s]

B-21

g



FIR_100

Time [s]

M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Lower Rib y

Max: 51.8 [g] at 0.028 [s]

Min: -12.0 [g] at 0.081 [s]

B-22

g



2002 SNCAP Test 2 - 2002 Subaru Impreza

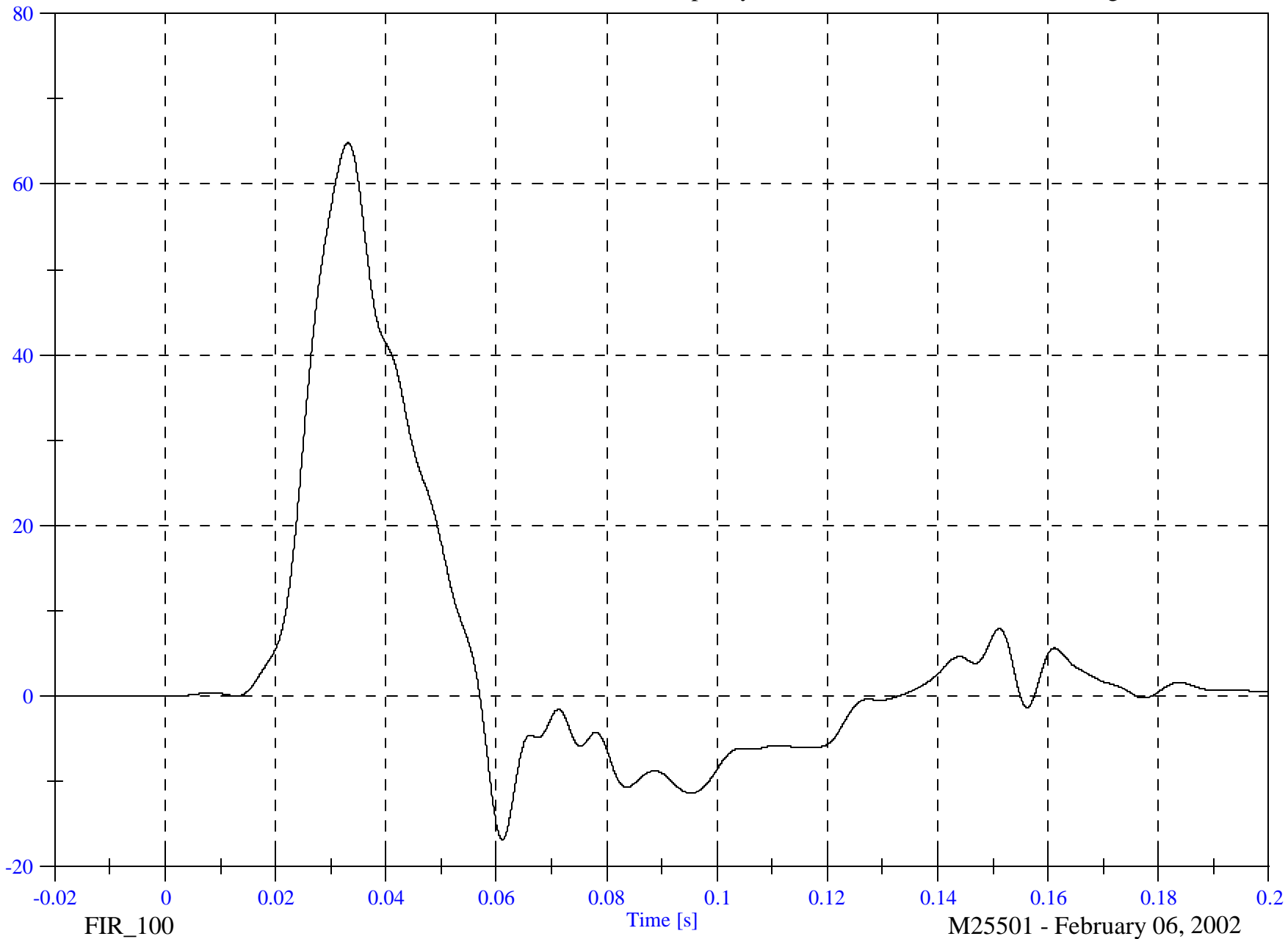
P1 Lower Spine y

Max: 64.9 [g] at 0.033 [s]

Min: -16.9 [g] at 0.061 [s]

B-23

g



2002 SNCAP Test 2 - 2002 Subaru Impreza

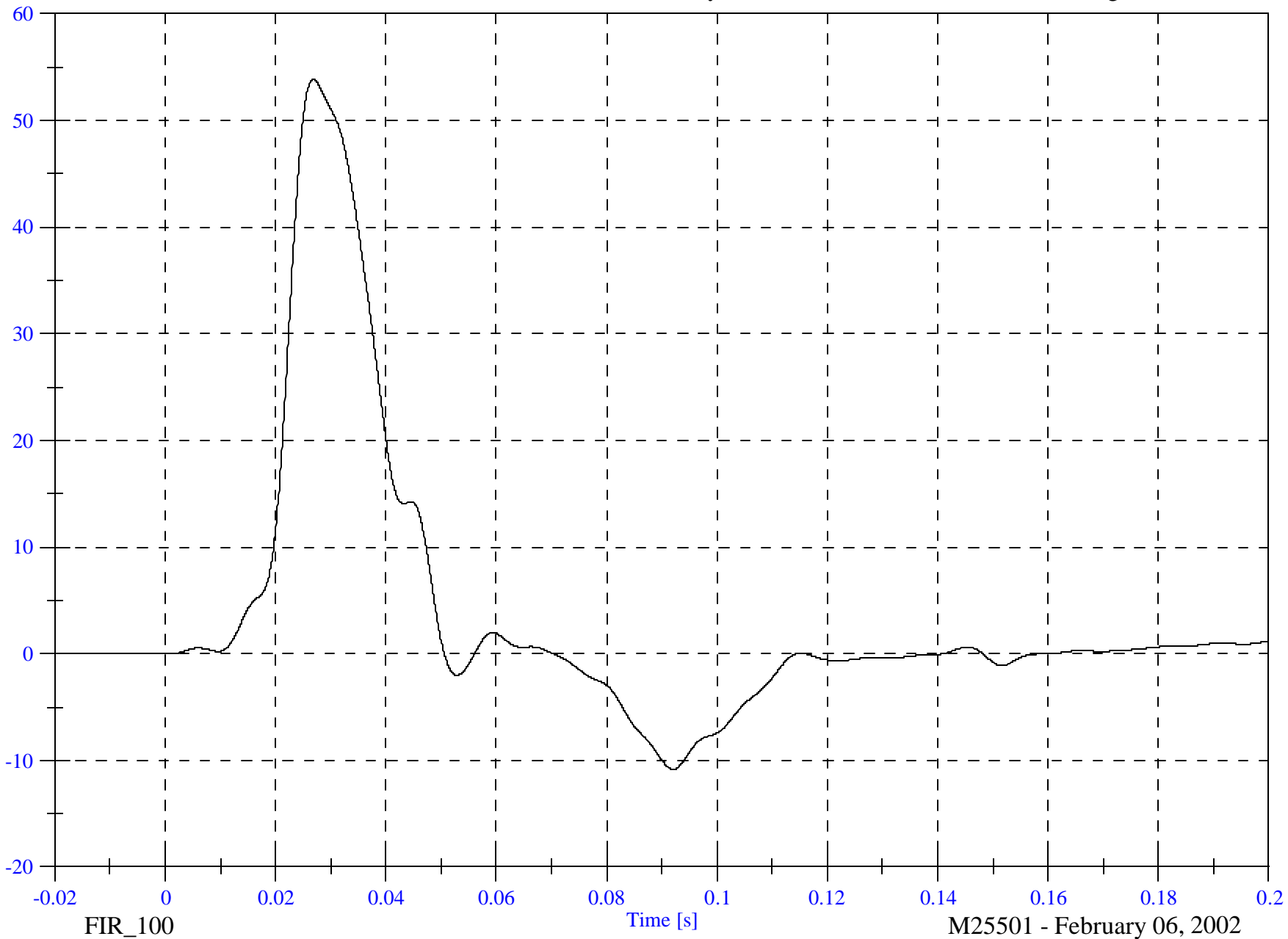
Max: 53.9 [g] at 0.027 [s]

P1 Pelvic y

Min: -10.9 [g] at 0.092 [s]

B-24

g

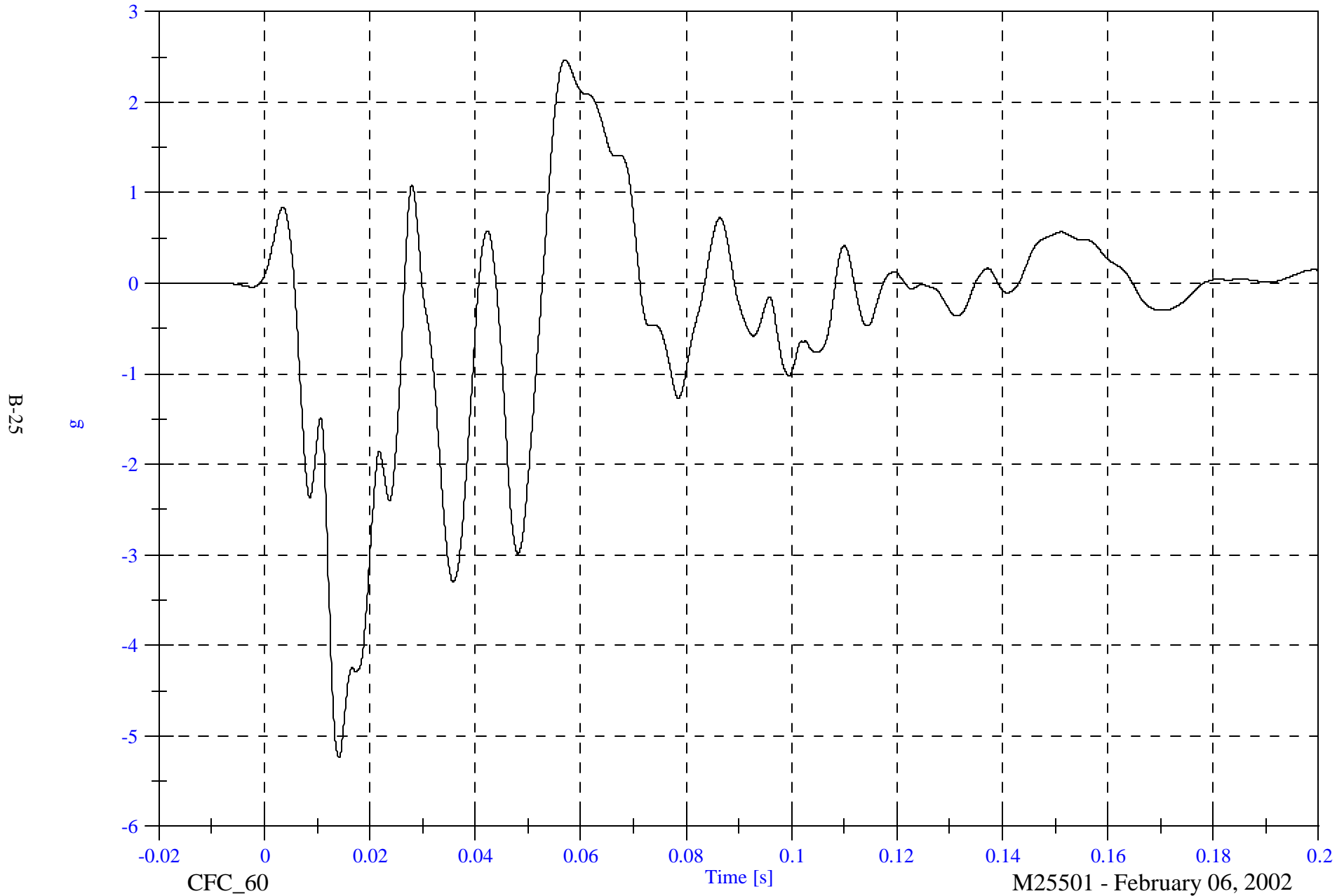


2002 SNCAP Test 2 - 2002 Subaru Impreza

A1 Right Front Sill X

Max: 2.5 [g] at 0.057 [s]

Min: -5.2 [g] at 0.014 [s]



B-25

g

CFC_60

Time [s]

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2002 SNCAP Test 2 - 2002 Subaru Impreza

A1 Right Front Sill X Velocity

Max: 0.1 [kph] at 0.007 [s]

Min: -3.1 [kph] at 0.053 [s]

B-26



2002 SNCAP Test 2 - 2002 Subaru Impreza

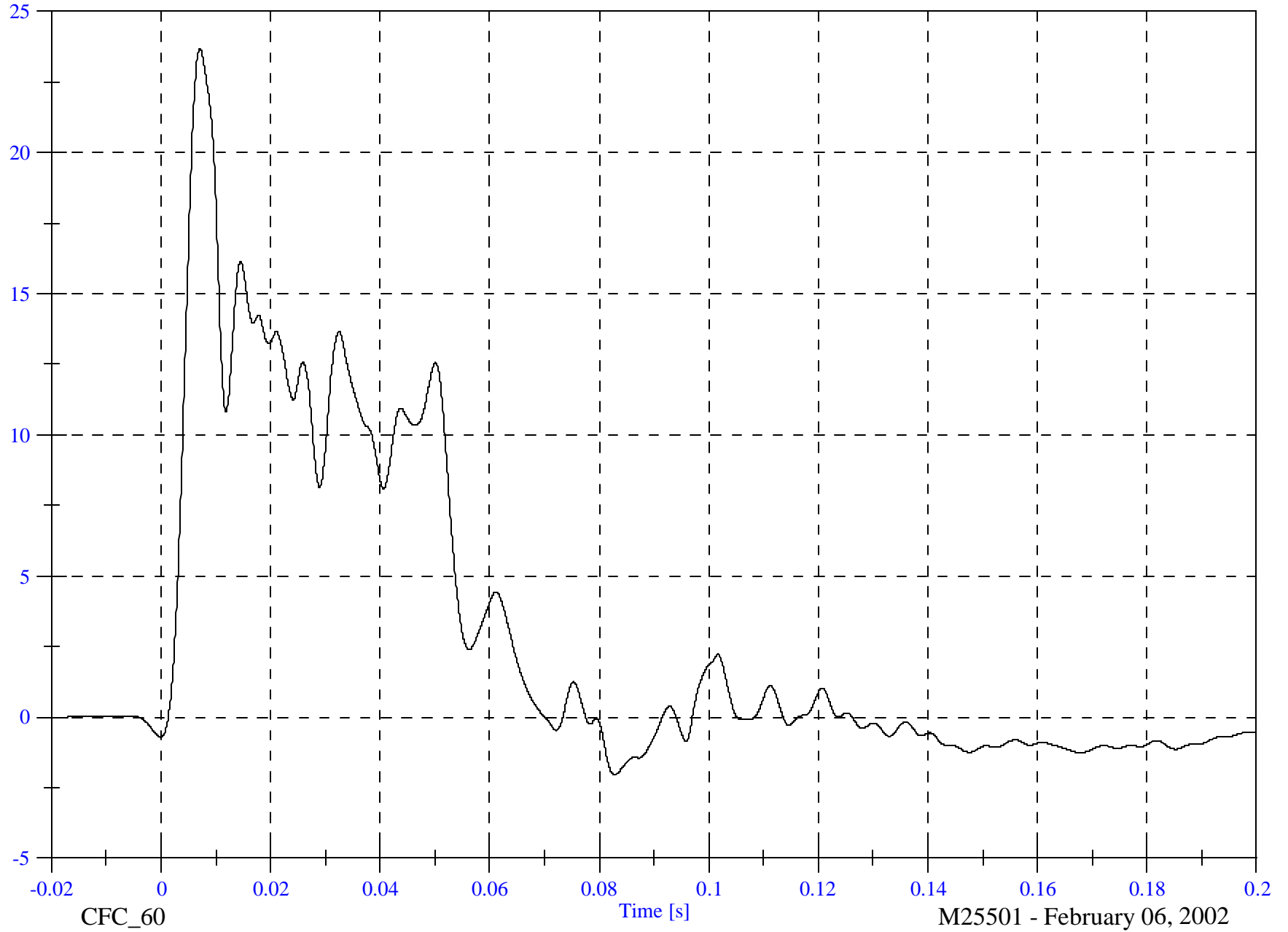
A1 Right Front Sill Y

Max: 23.7 [g] at 0.007 [s]

Min: -2.0 [g] at 0.083 [s]

B-27

g



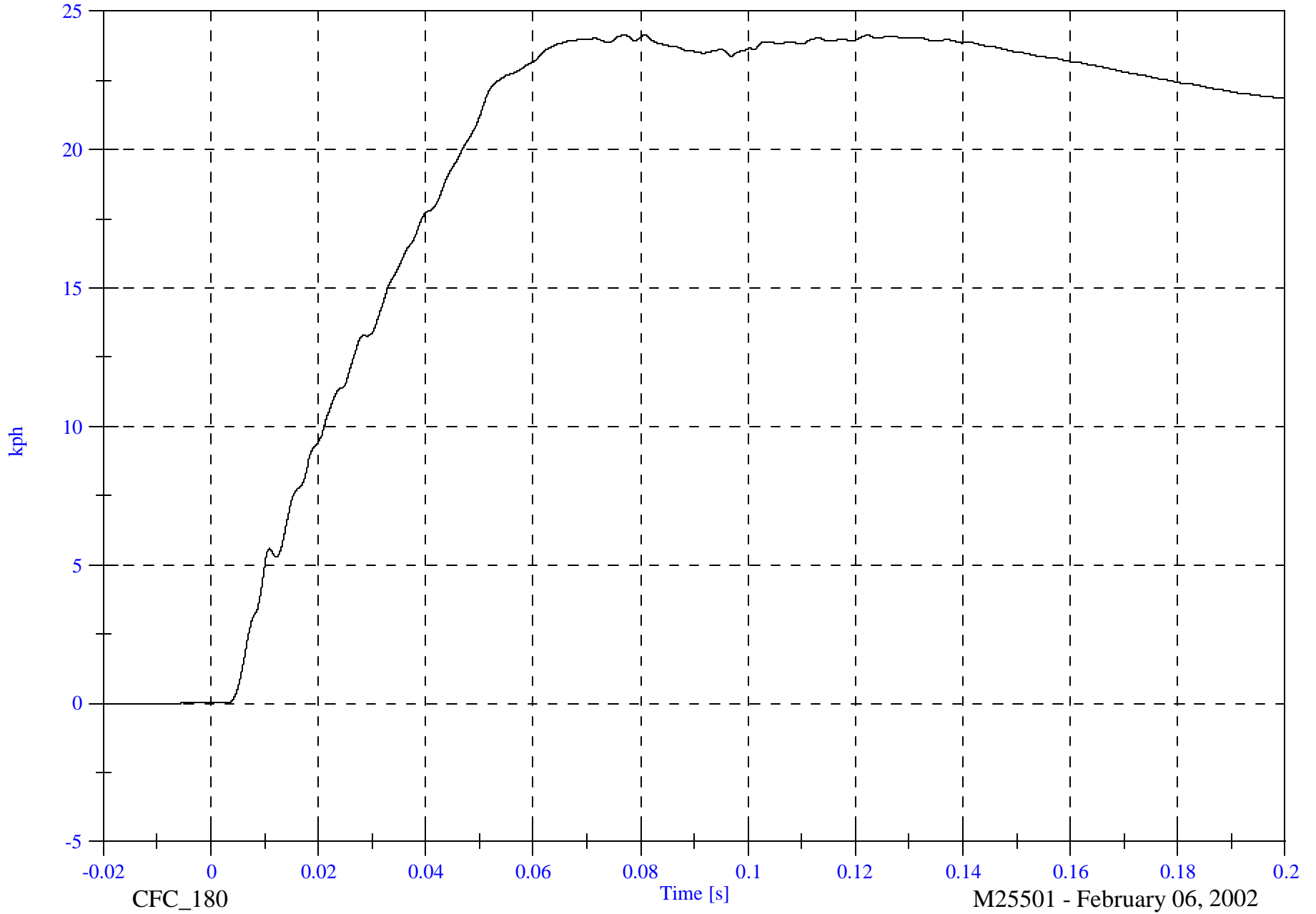
2002 SNCAP Test 2 - 2002 Subaru Impreza

A1 Right Front Sill Y Velocity

Max: 24.1 [kph] at 0.081 [s]

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

B-28



CFC_180

Time [s]

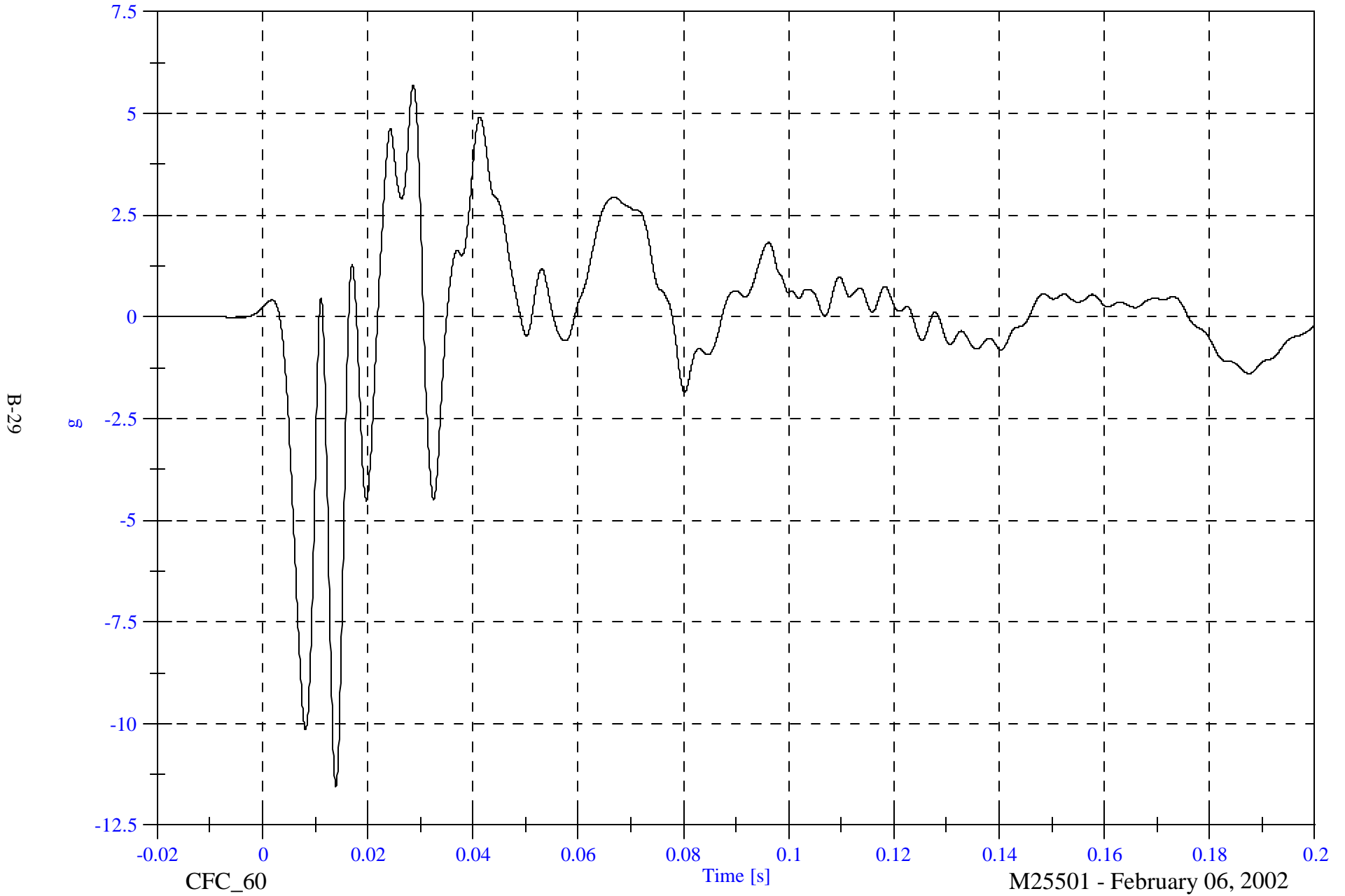
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2002 SNCAP Test 2 - 2002 Subaru Impreza

A1 Right Front Sill Z

Max: 5.7 [g] at 0.029 [s]

Min: -11.6 [g] at 0.014 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

A1 Right Front Sill Z Velocity

Max: 0.8 [kph] at 0.176 [s]

Min: -3.1 [kph] at 0.016 [s]

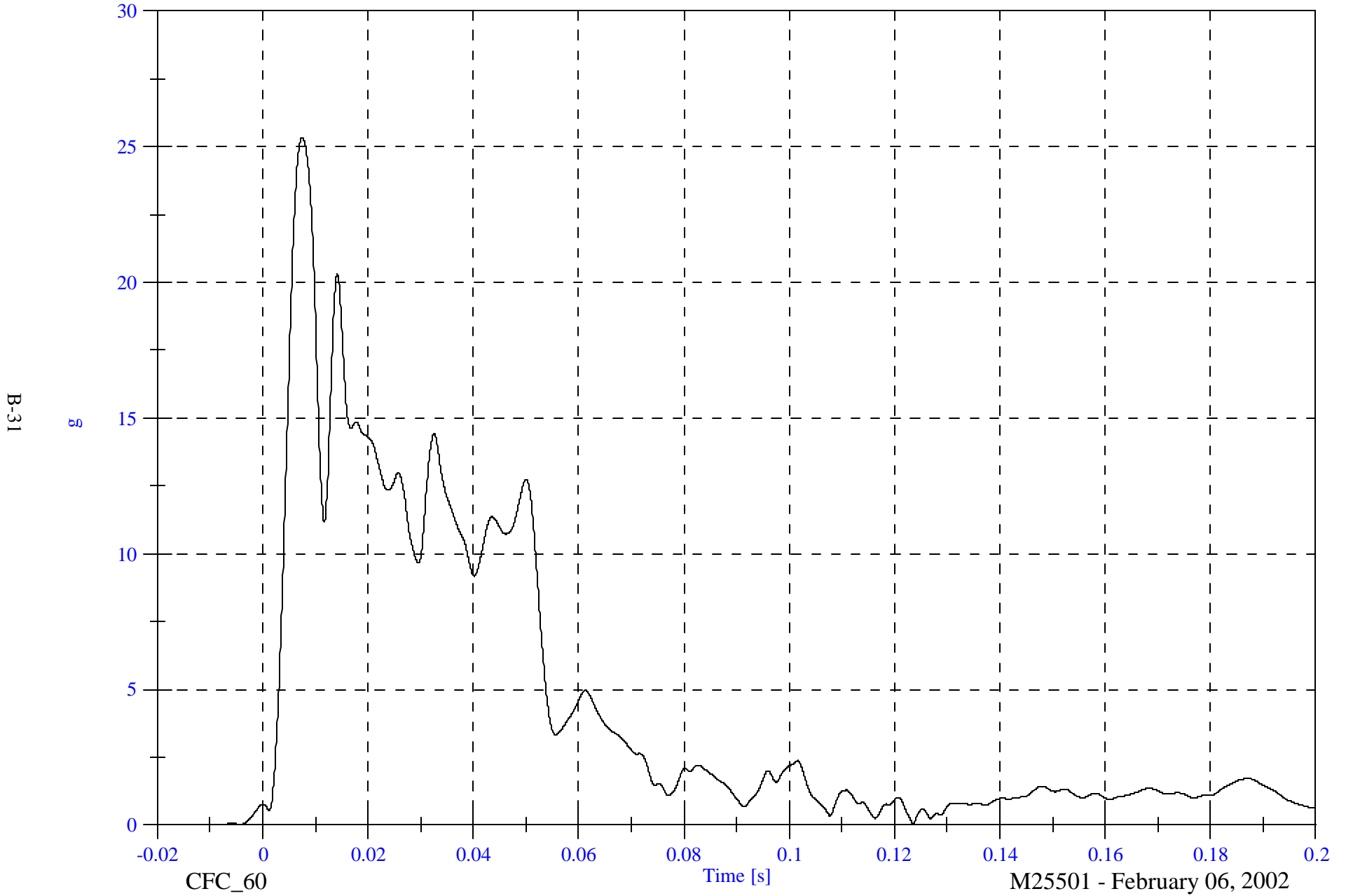


2002 SNCAP Test 2 - 2002 Subaru Impreza

A1 Right Front Sill Resultant

Max: 25.3 [g] at 0.007 [s]

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



2002 SNCAP Test 2 - 2002 Subaru Impreza

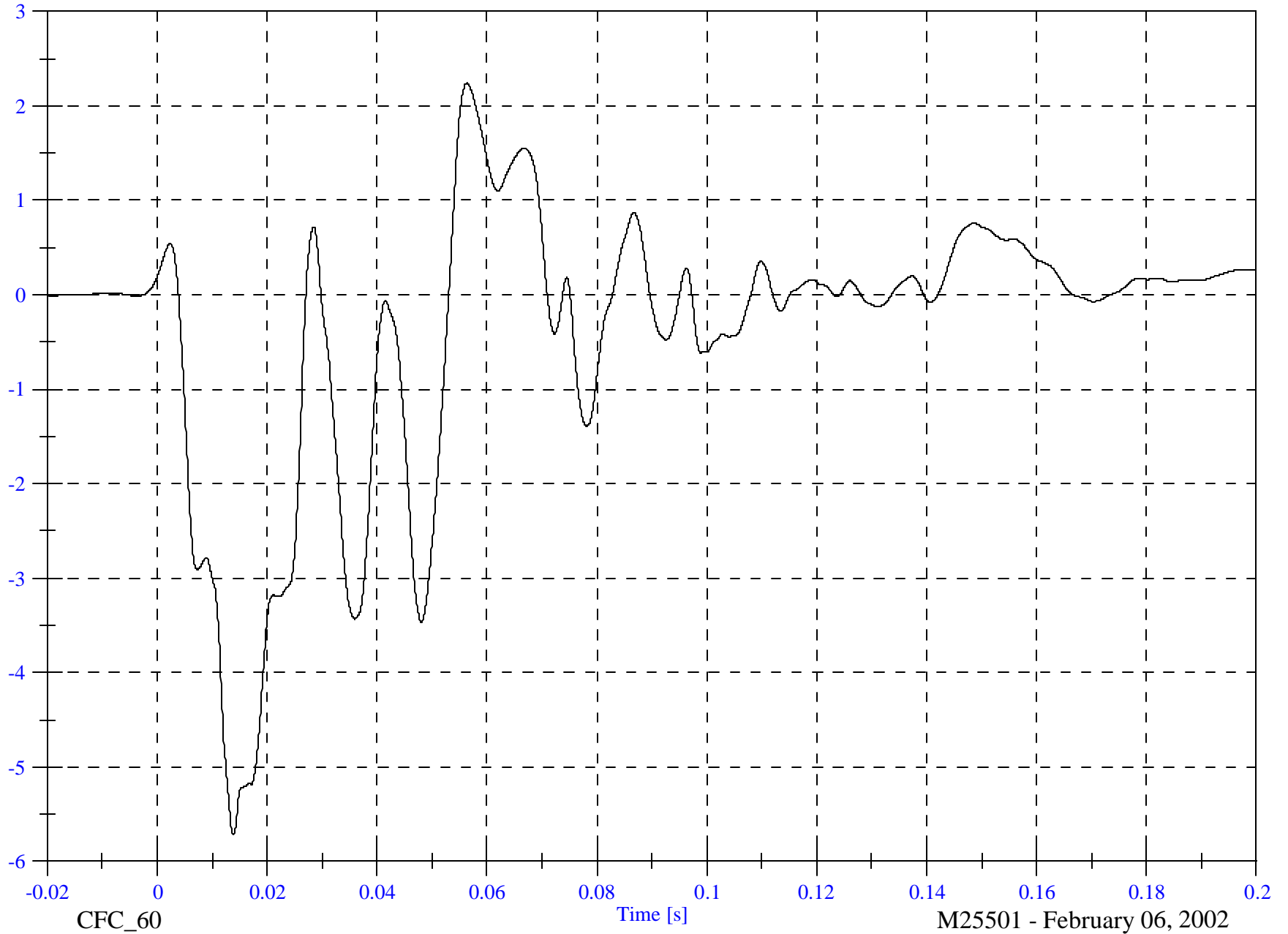
A2 Right Rear Sill X

Max: 2.2 [g] at 0.056 [s]

Min: -5.7 [g] at 0.014 [s]

B-32

g



CFC_60

Time [s]

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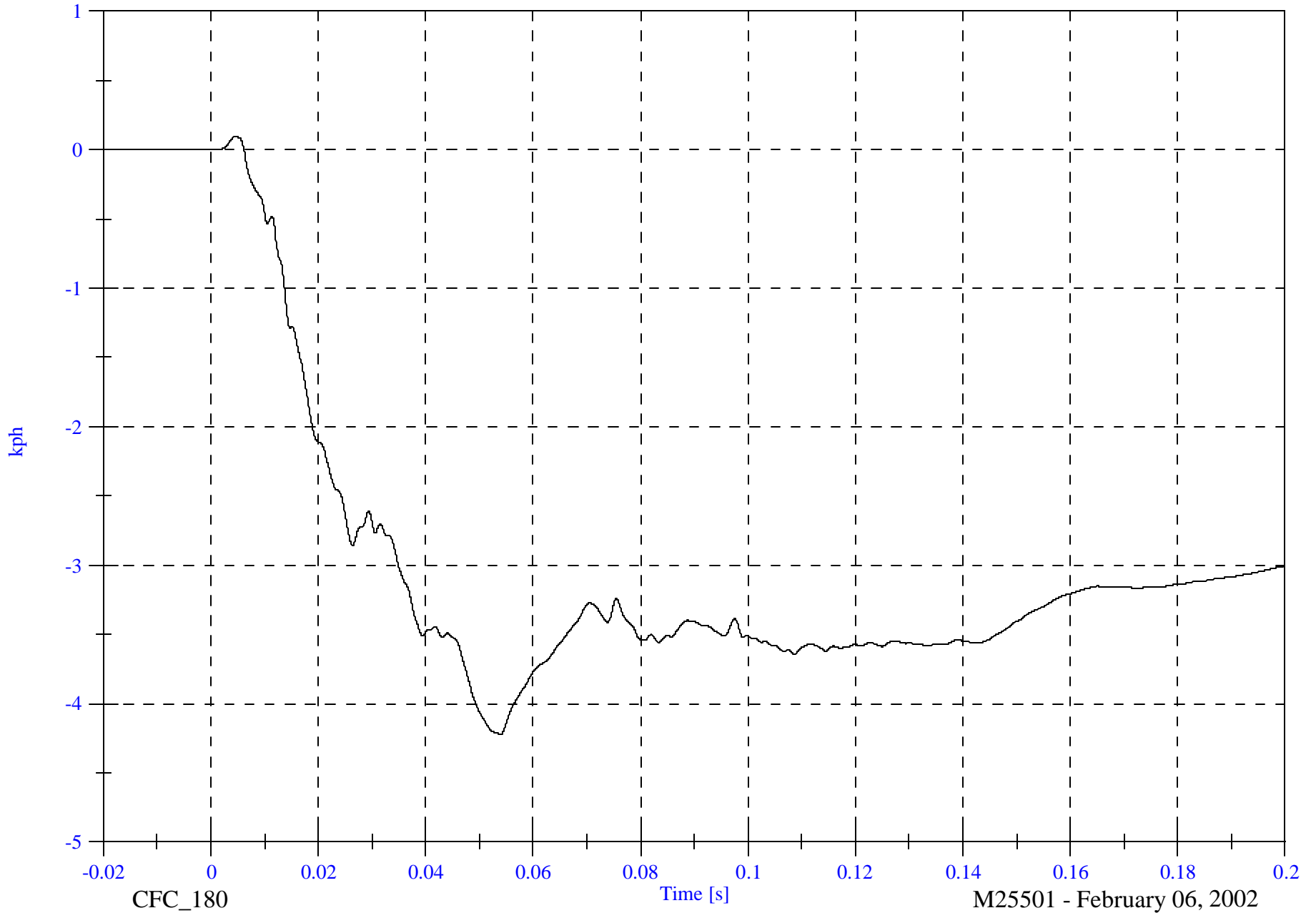
2002 SNCAP Test 2 - 2002 Subaru Impreza

A2 Right Rear Sill X Velocity

Max: 0.1 [kph] at 0.005 [s]

Min: -4.2 [kph] at 0.054 [s]

B-33



CFC_180

Time [s]

M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

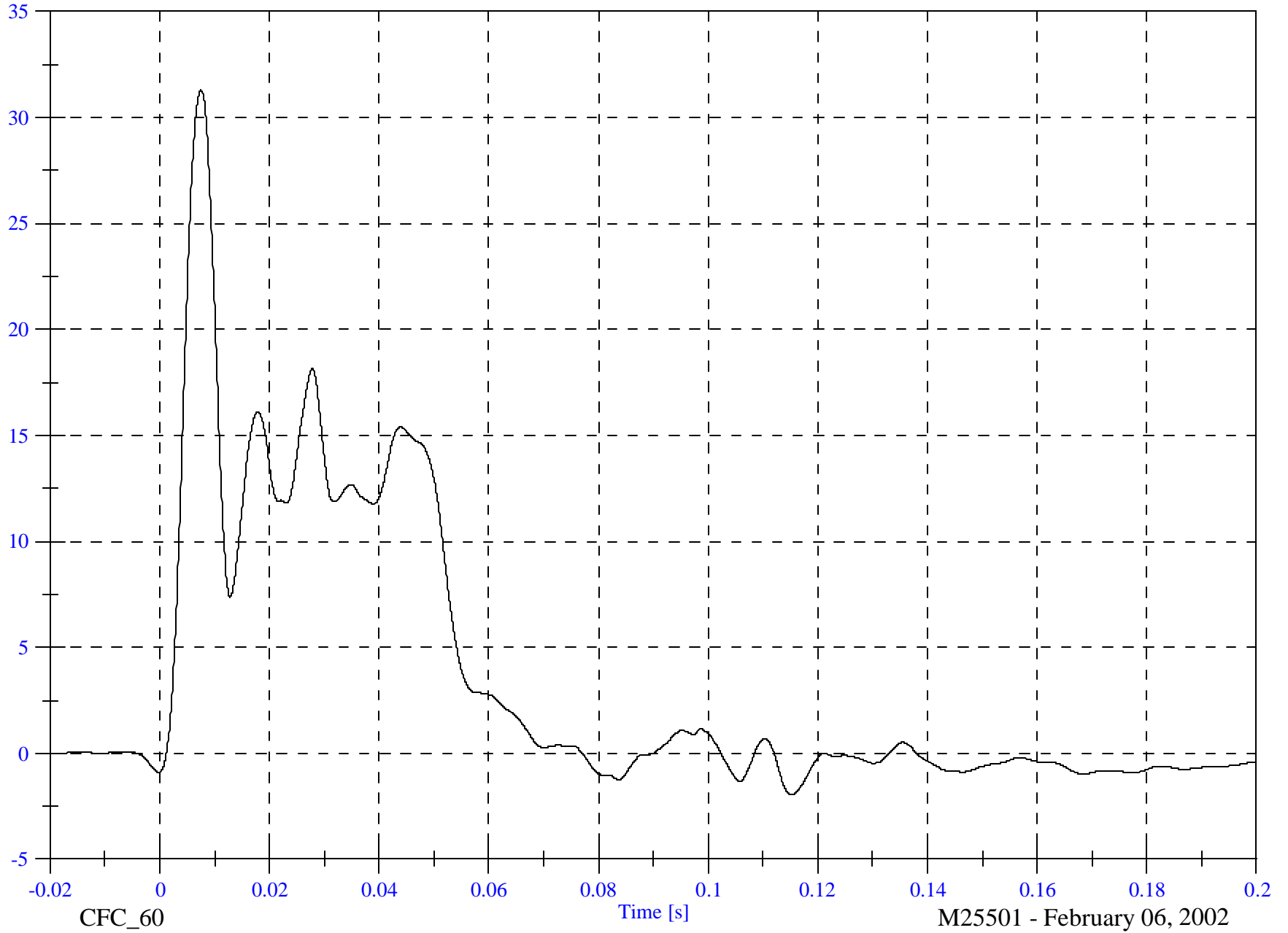
A2 Right Rear Sill Y

Max: 31.3 [g] at 0.008 [s]

Min: -2.0 [g] at 0.115 [s]

B-34

g

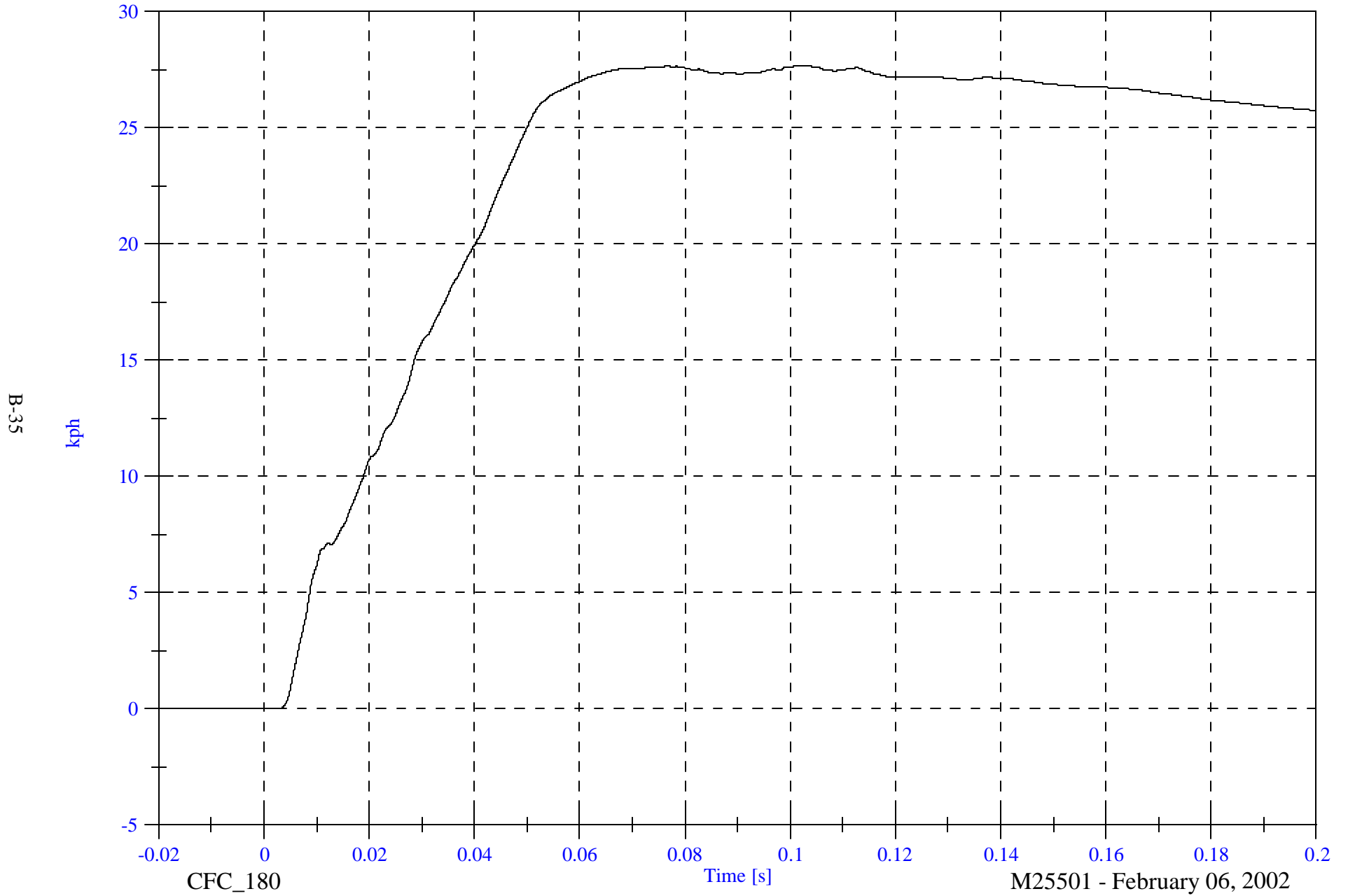


2002 SNCAP Test 2 - 2002 Subaru Impreza

A2 Right Rear Sill Y Velocity

Max: 27.7 [kph] at 0.102 [s]

Min: -0.0 [kph] at -0.020 [s]

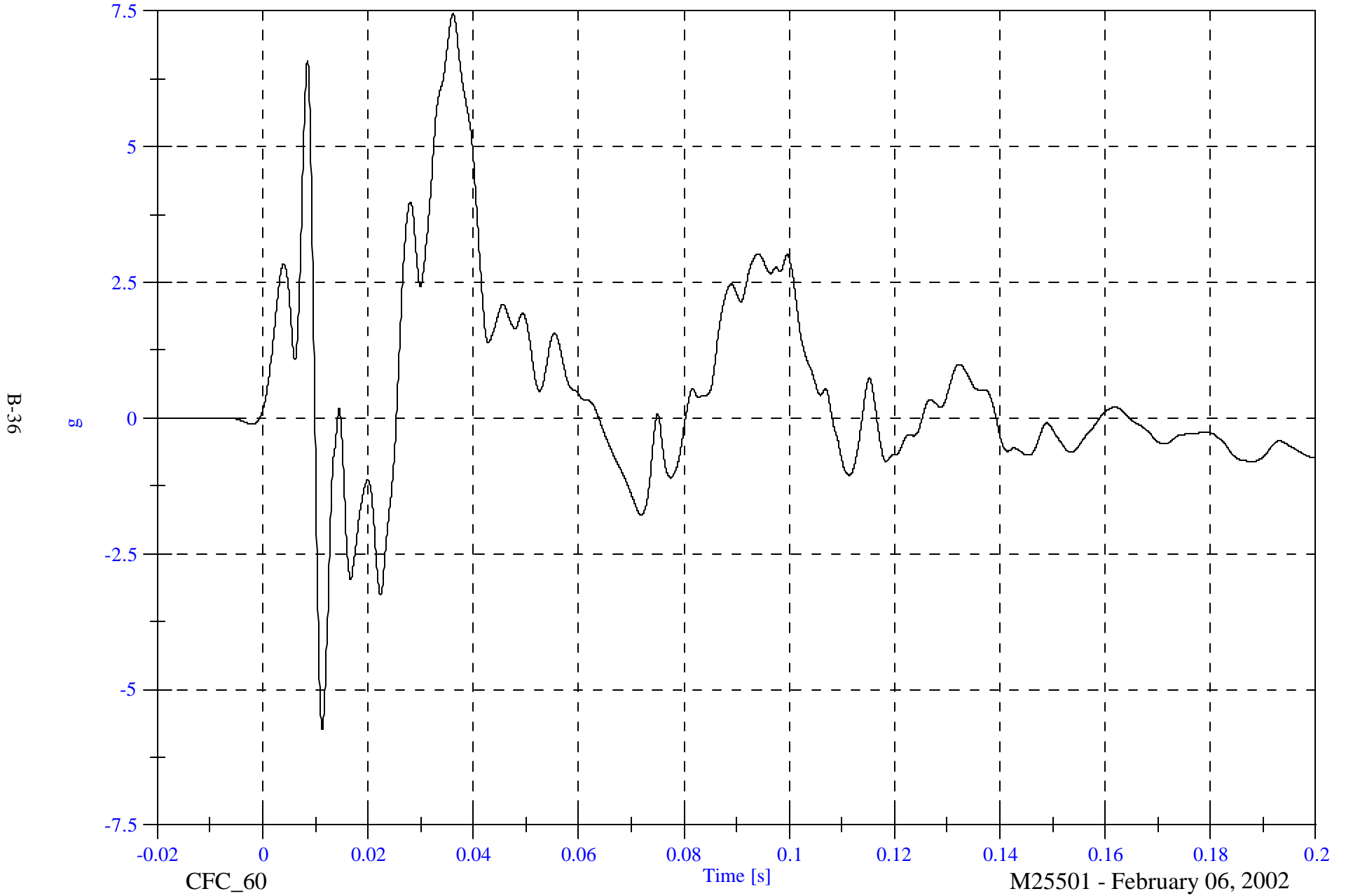


2002 SNCAP Test 2 - 2002 Subaru Impreza

A2 Right Rear Sill Z

Max: 7.4 [g] at 0.036 [s]

Min: -5.7 [g] at 0.011 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

A2 Right Rear Sill Z Velocity

Max: 4.5 [kph] at 0.108 [s]

Min: -0.4 [kph] at 0.026 [s]

B-37

kph



CFC_180

Time [s]

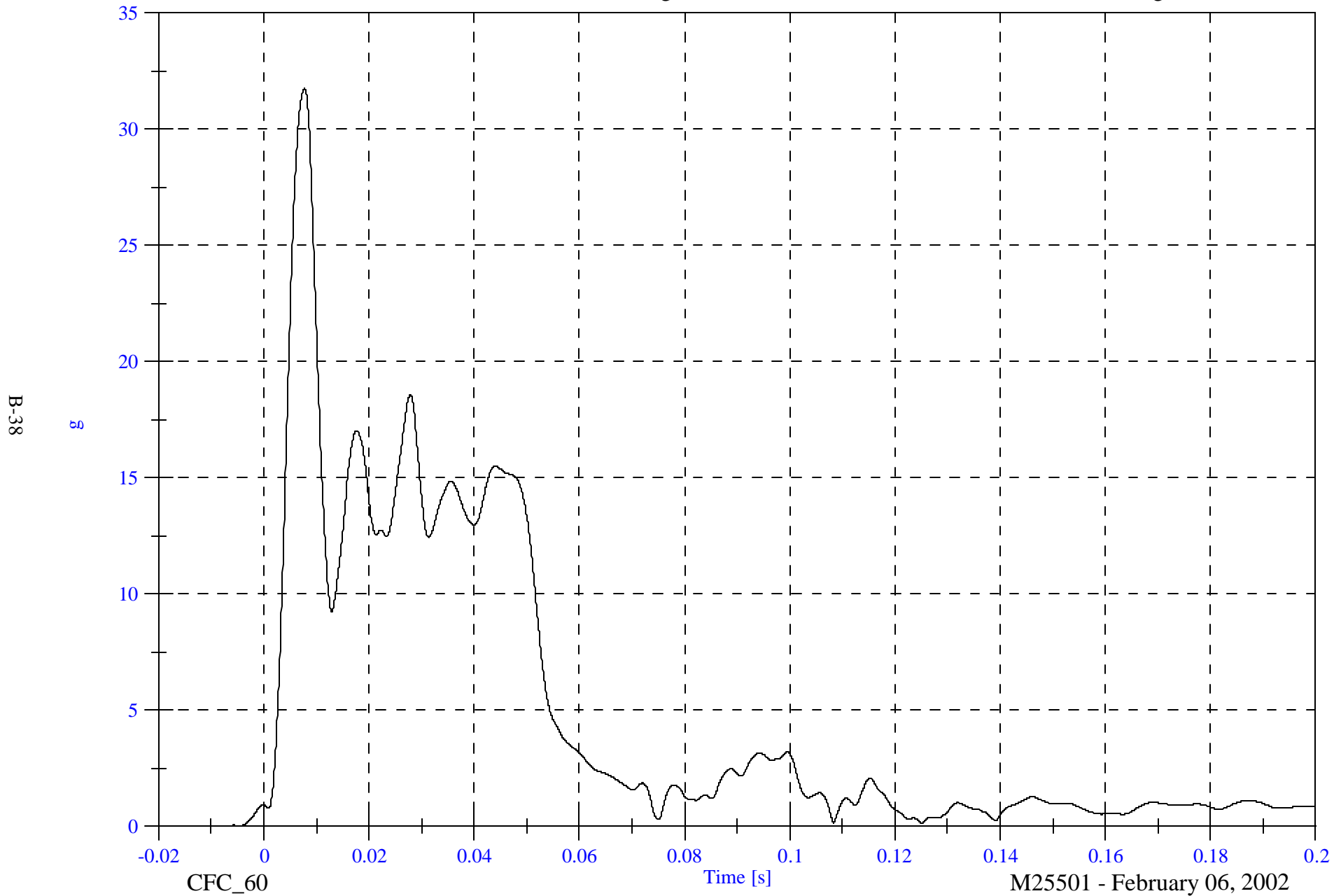
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2002 SNCAP Test 2 - 2002 Subaru Impreza

A2 Right Rear Sill Resultant

Max: 31.7 [g] at 0.008 [s]

Min: 0.0 [g] at -0.020 [s]

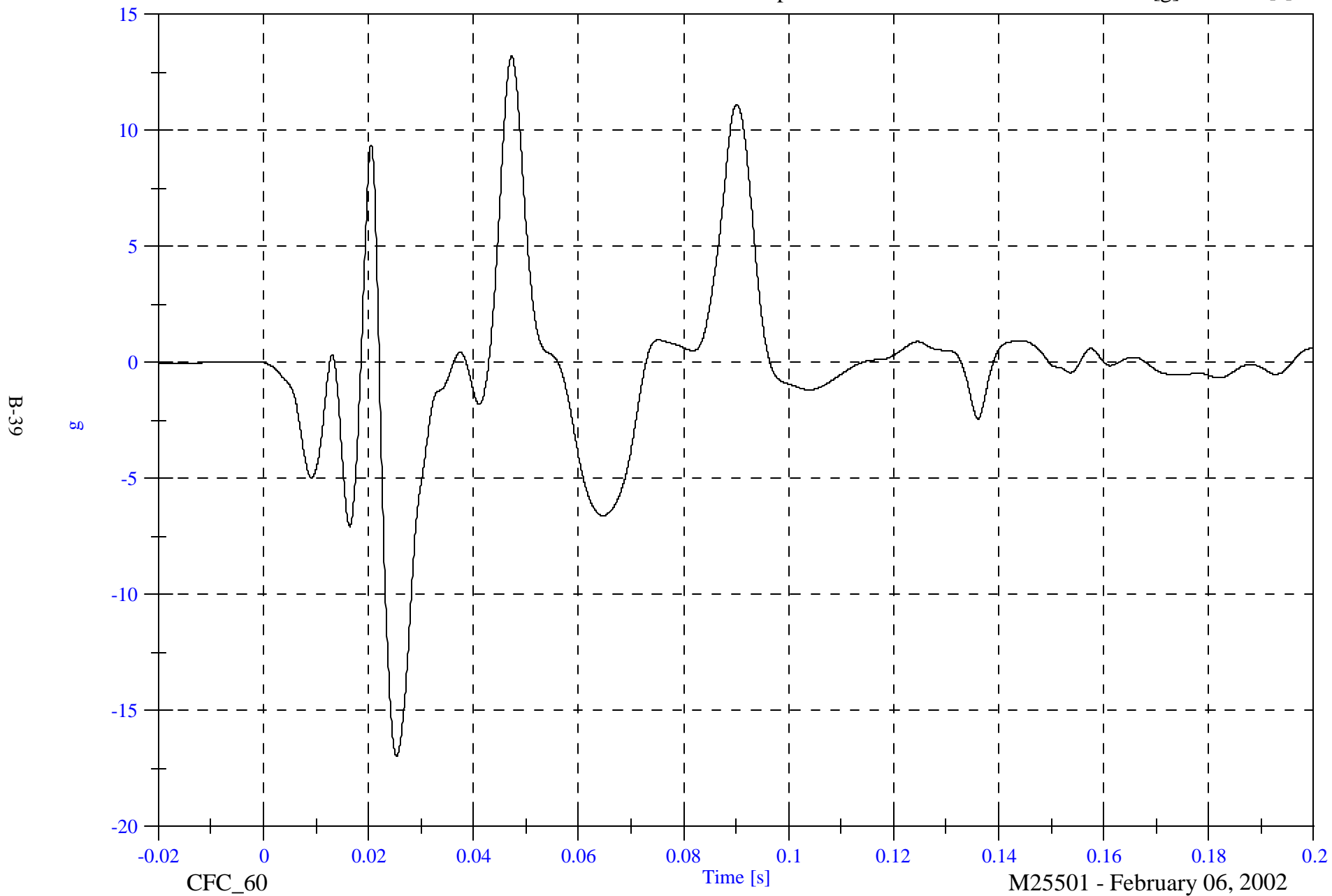


2002 SNCAP Test 2 - 2002 Subaru Impreza

A3 Rear Floorpan X

Max: 13.2 [g] at 0.047 [s]

Min: -17.0 [g] at 0.025 [s]

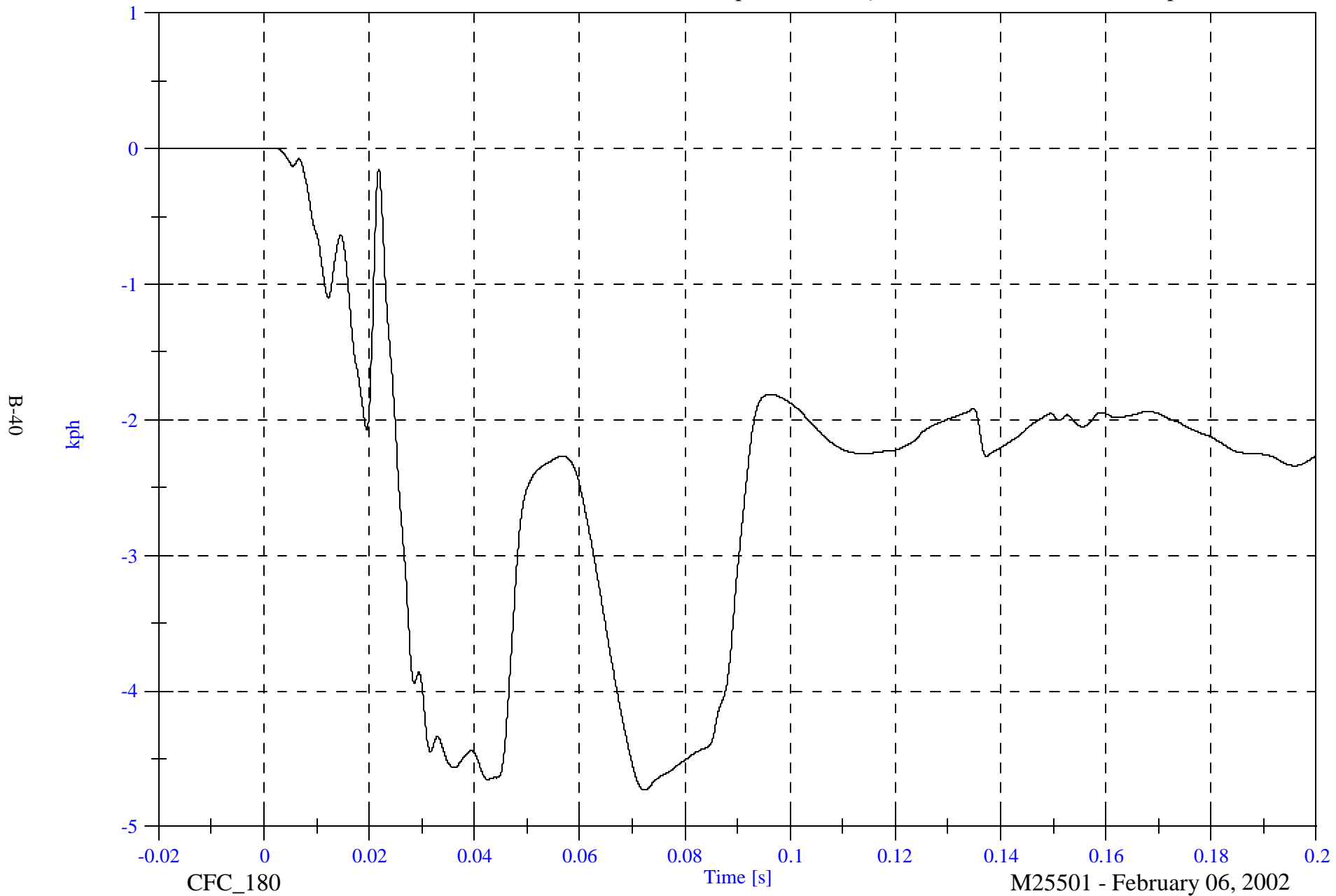


2002 SNCAP Test 2 - 2002 Subaru Impreza

A3 Rear Floorpan X Velocity

Max: 0.0 [kph] at 0.002 [s]

Min: -4.7 [kph] at 0.072 [s]

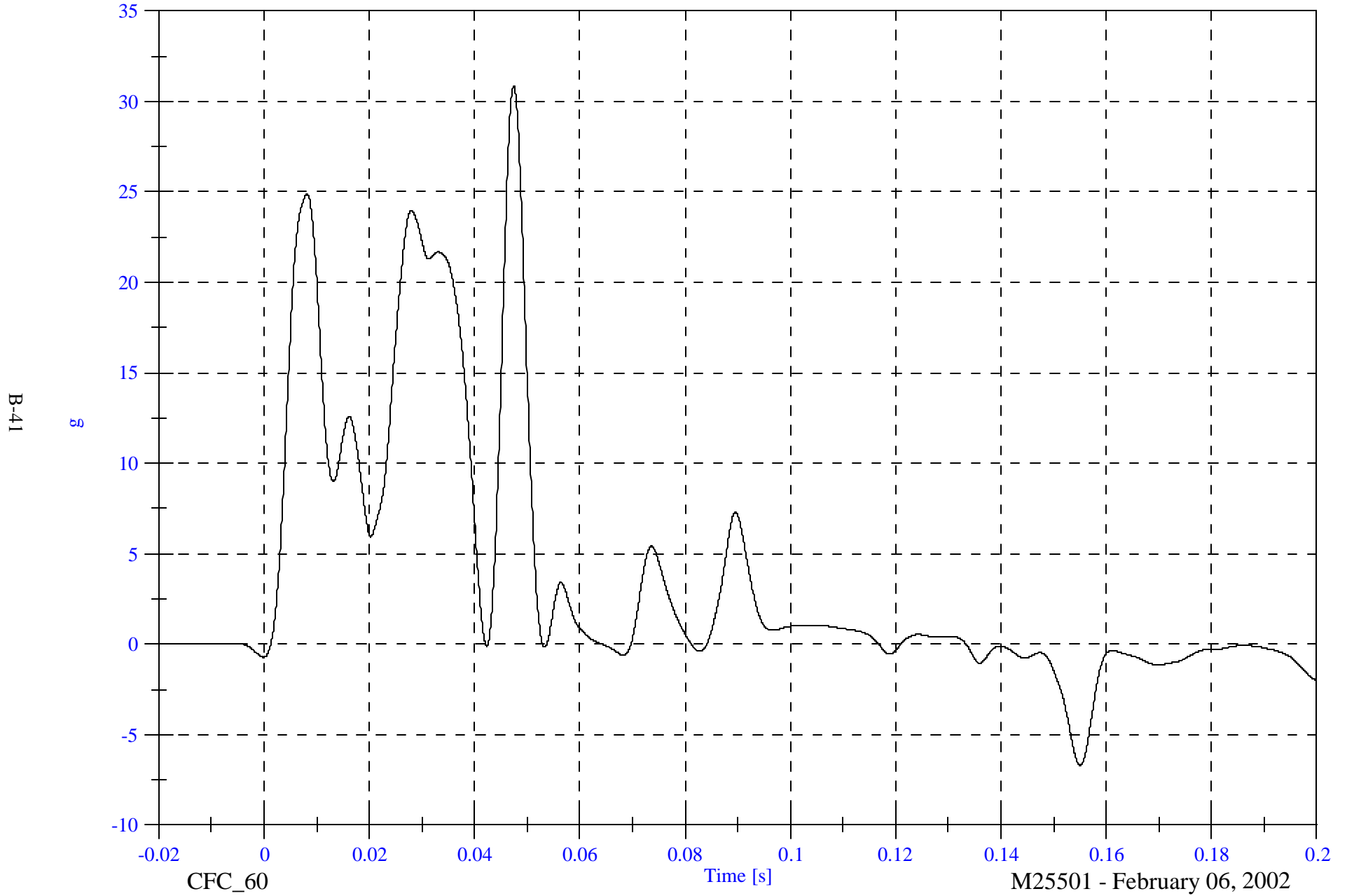


2002 SNCAP Test 2 - 2002 Subaru Impreza

A3 Rear Floorpan Y

Max: 30.9 [g] at 0.047 [s]

Min: -6.7 [g] at 0.155 [s]



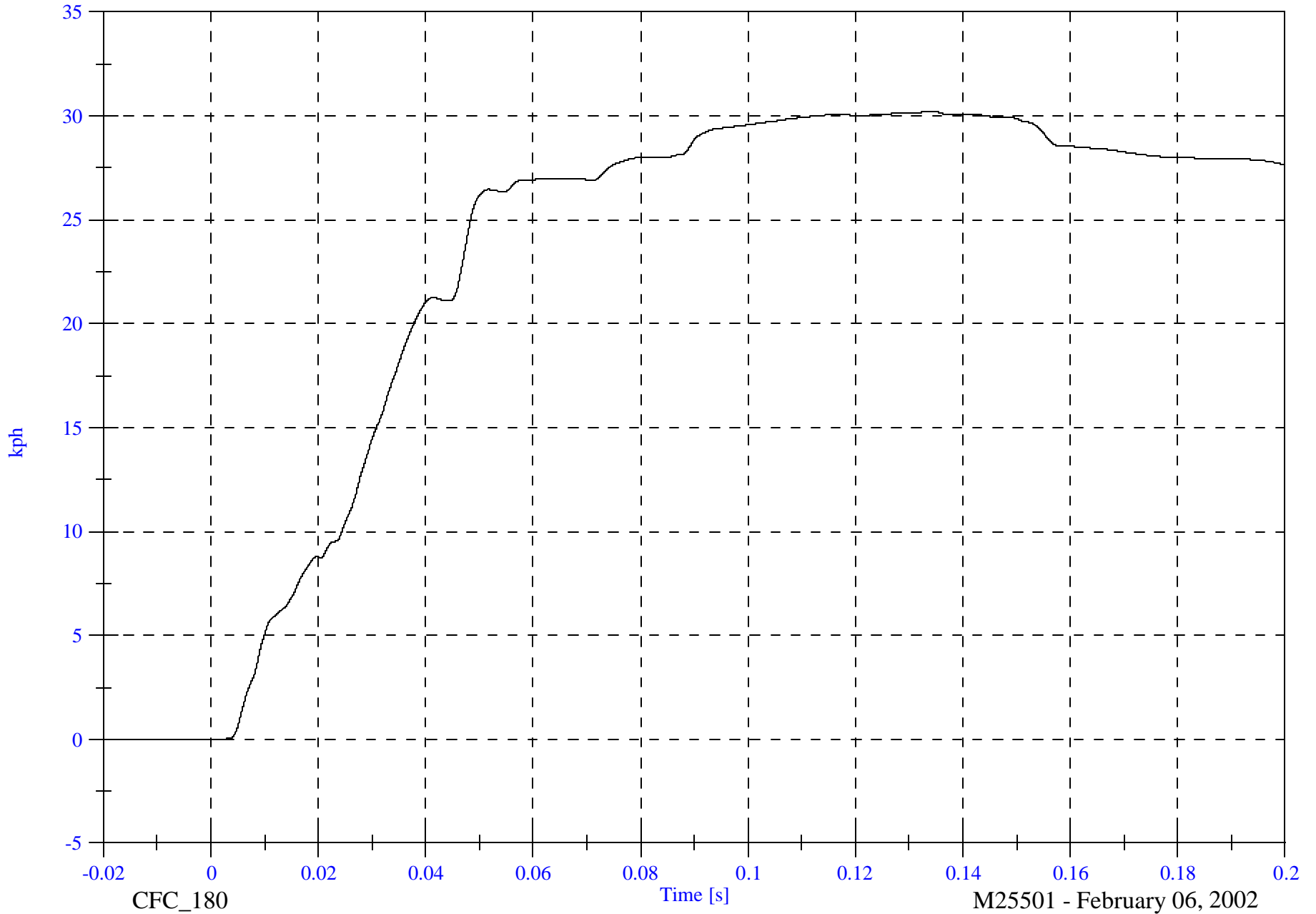
2002 SNCAP Test 2 - 2002 Subaru Impreza

A3 Rear Floorpan Y Velocity

Max: 30.2 [kph] at 0.135 [s]

Min: -0.0 [kph] at -0.020 [s]

B-42



CFC_180

Time [s]

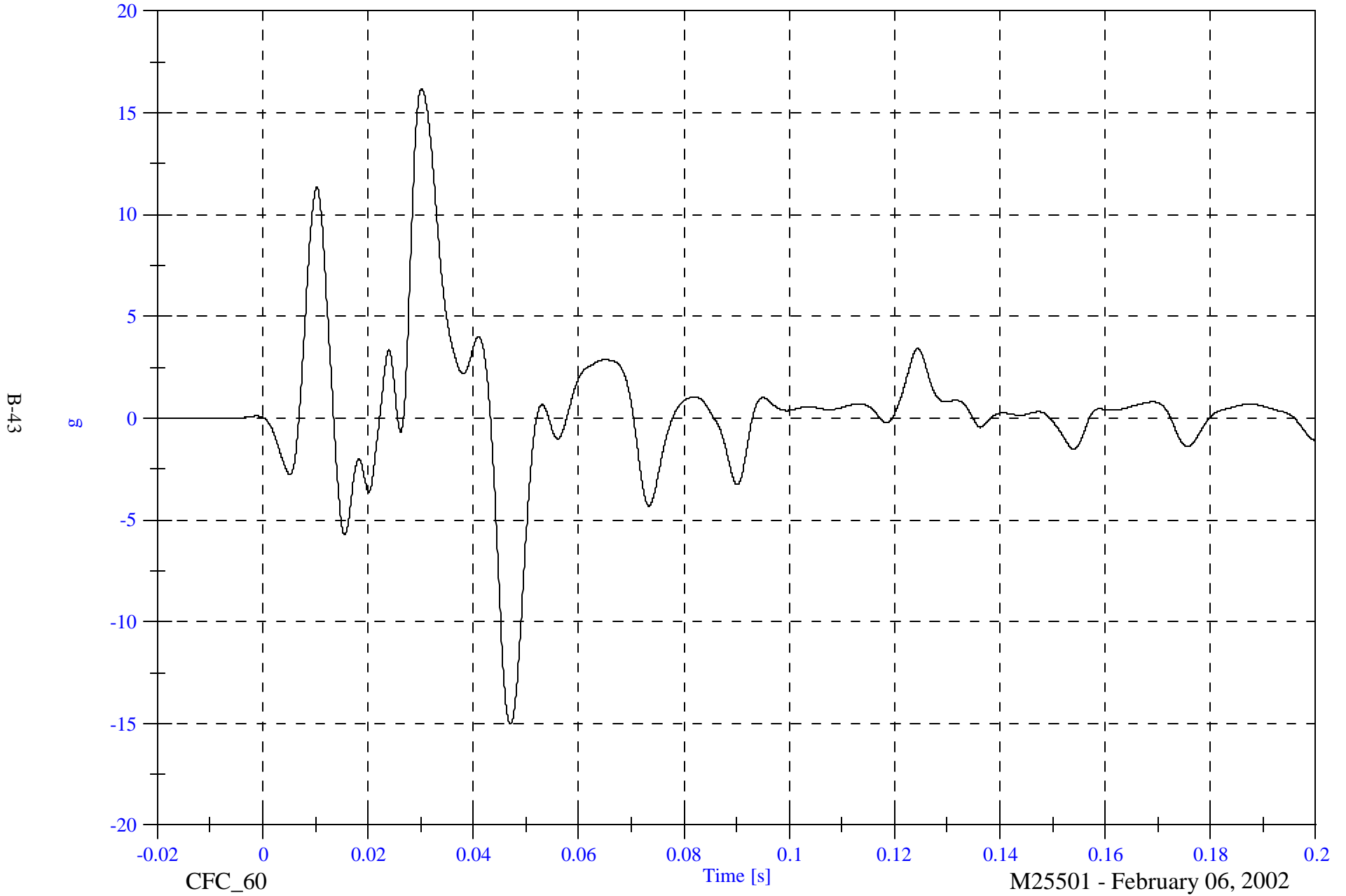
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

A3 Rear Floorplan Z

Max: 16.2 [g] at 0.030 [s]

Min: -15.0 [g] at 0.047 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

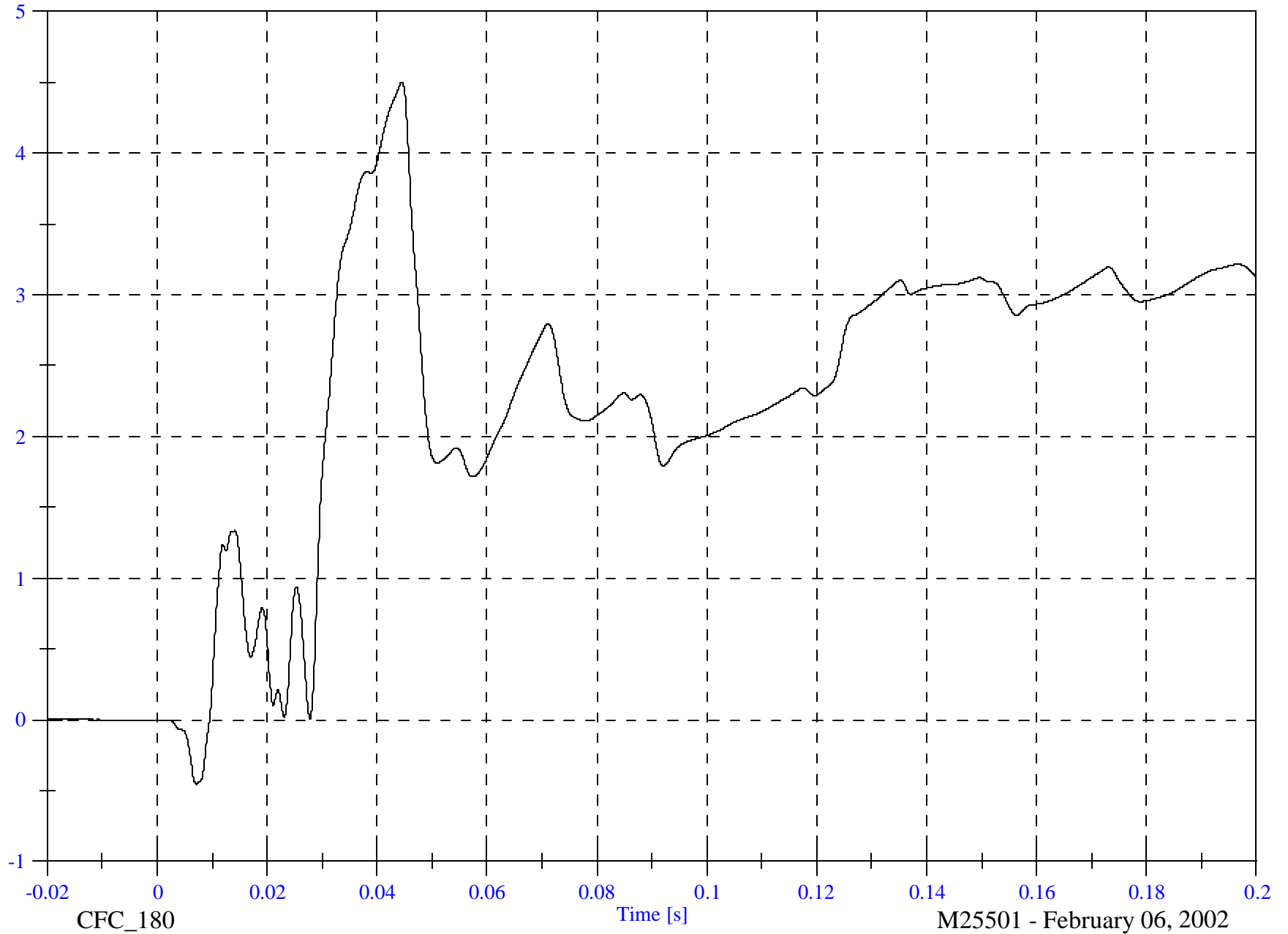
A3 Rear Floorplan Z Velocity

Max: 4.5 [kph] at 0.045 [s]

Min: -0.5 [kph] at 0.007 [s]

B-44

kph



CFC_180

Time [s]

M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

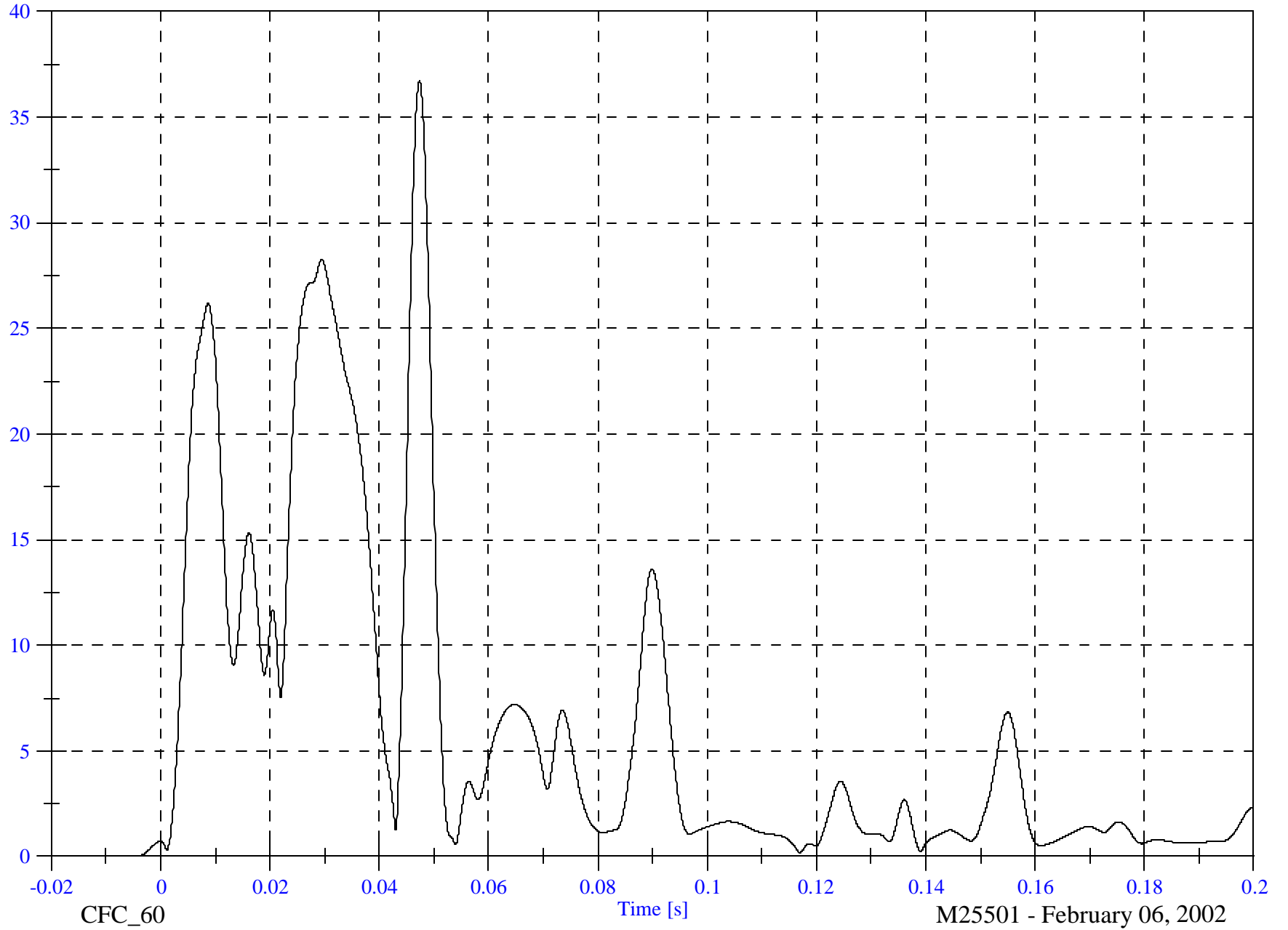
A3 Rear Floorpan Resultant

Max: 36.7 [g] at 0.047 [s]

Min: 0.0 [g] at -0.004 [s]

B-45

g

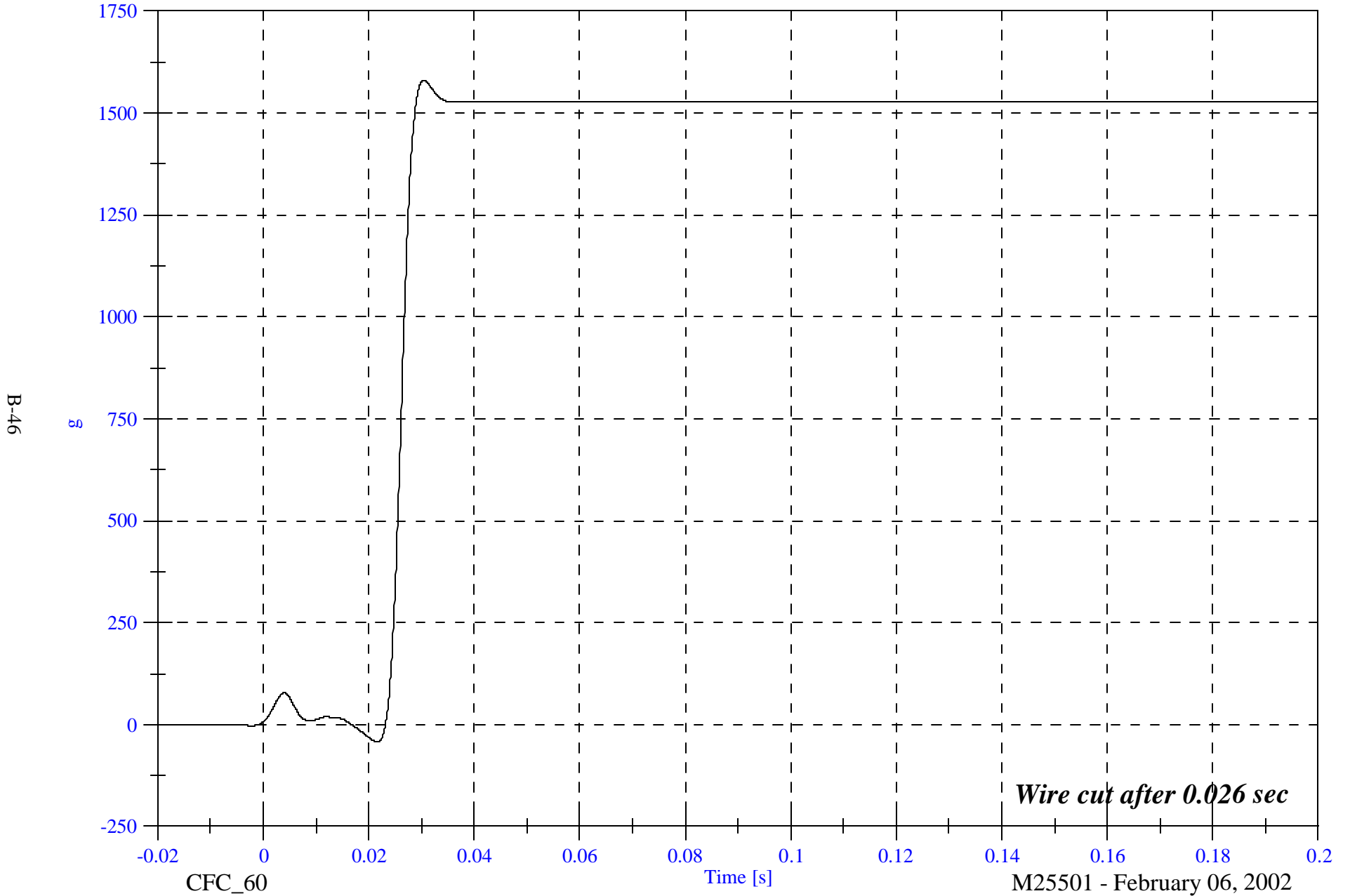


2002 SNCAP Test 2 - 2002 Subaru Impreza

A4 Left Rear Sill Y

Max: 1579.5 [g] at 0.030 [s]

Min: -43.4 [g] at 0.022 [s]



B-46

Wire cut after 0.026 sec

CFC_60

Time [s]

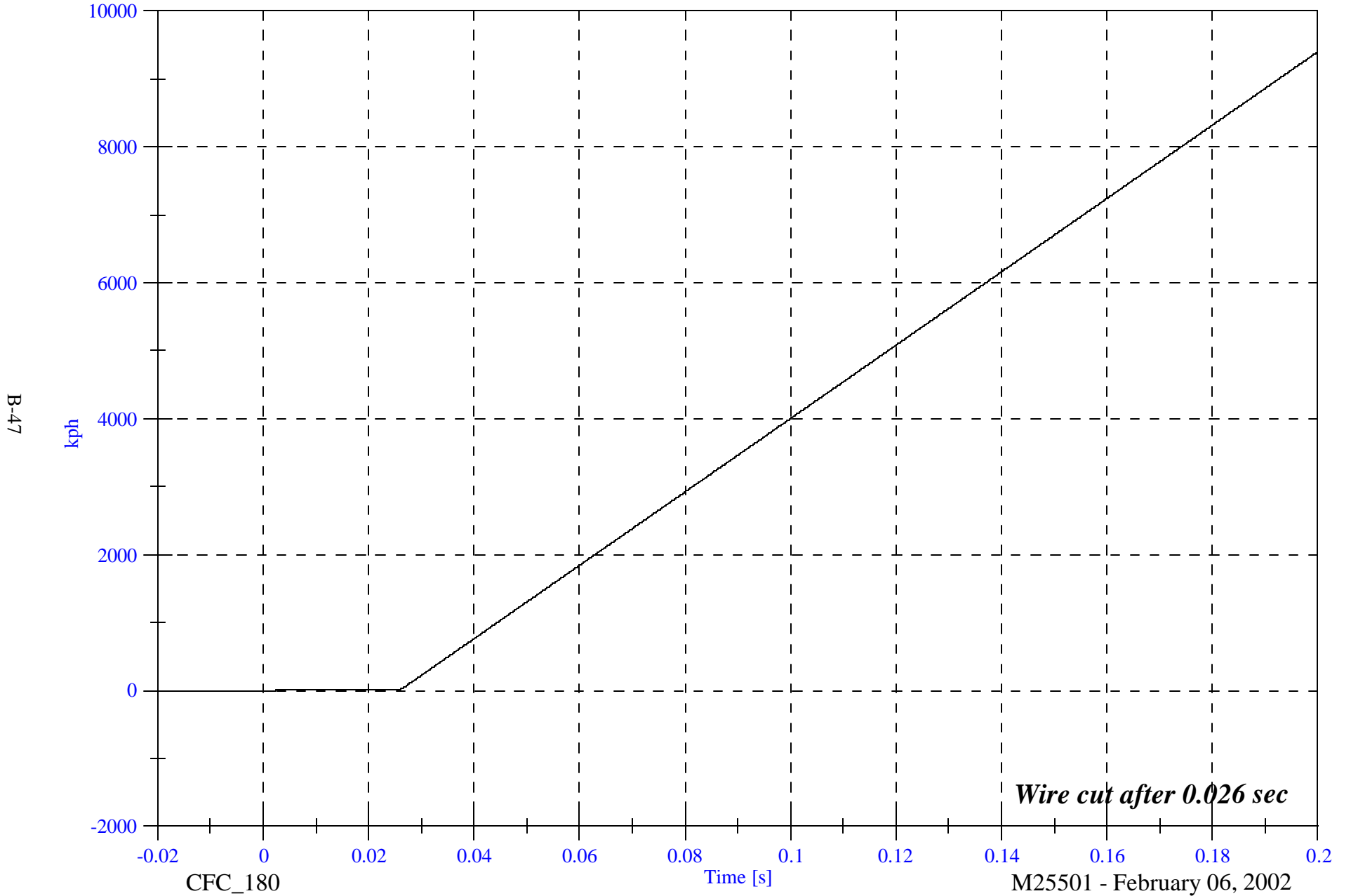
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Max: 9397.2 [kph] at 0.200 [s]

A4 Left Rear Sill Y Velocity

Min: -0.0 [kph] at -0.020 [s]



B-47

Wire cut after 0.026 sec

CFC_180

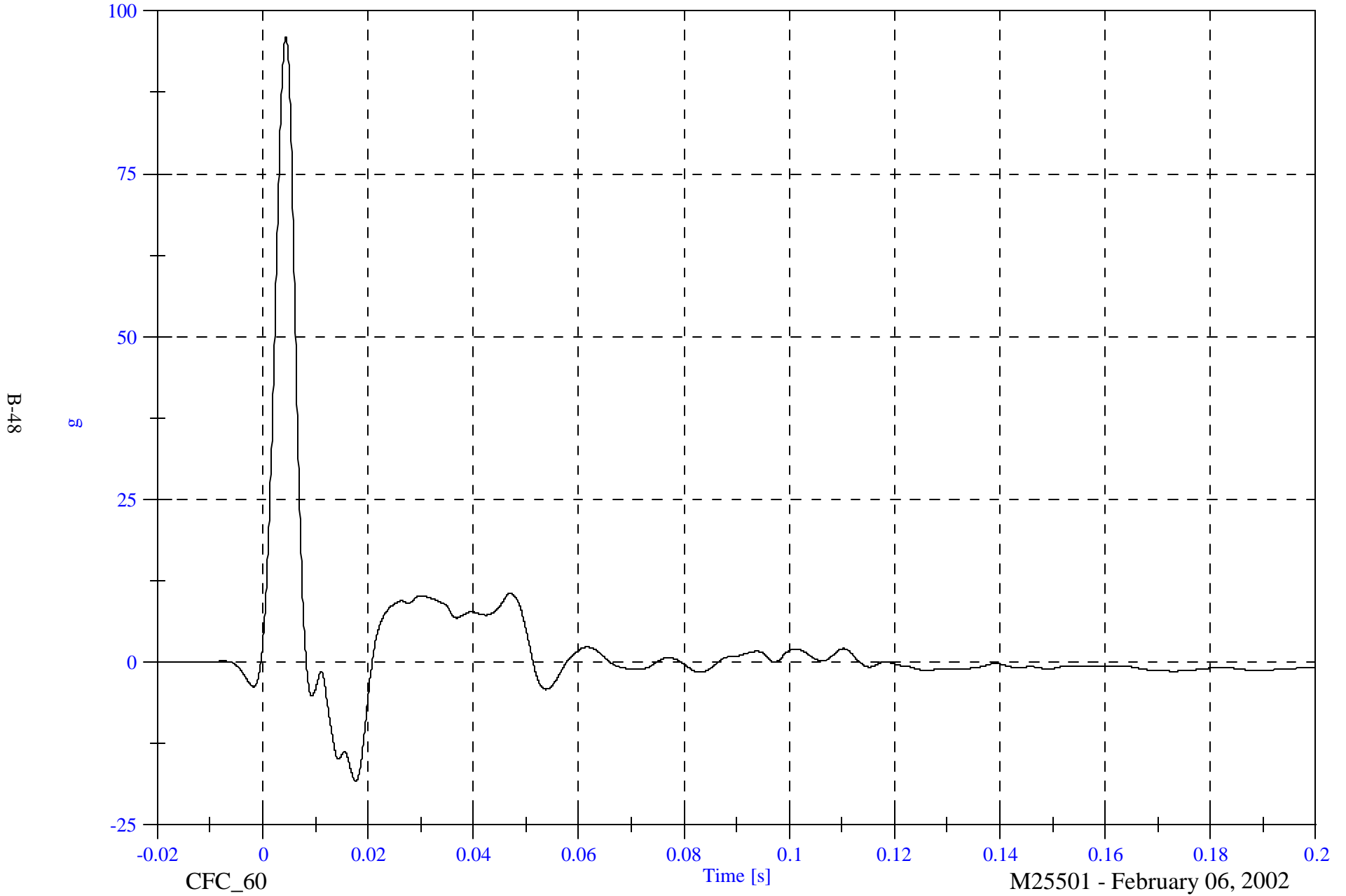
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2002 SNCAP Test 2 - 2002 Subaru Impreza

A5 Left Front Sill Y

Max: 95.9 [g] at 0.004 [s]

Min: -18.3 [g] at 0.018 [s]

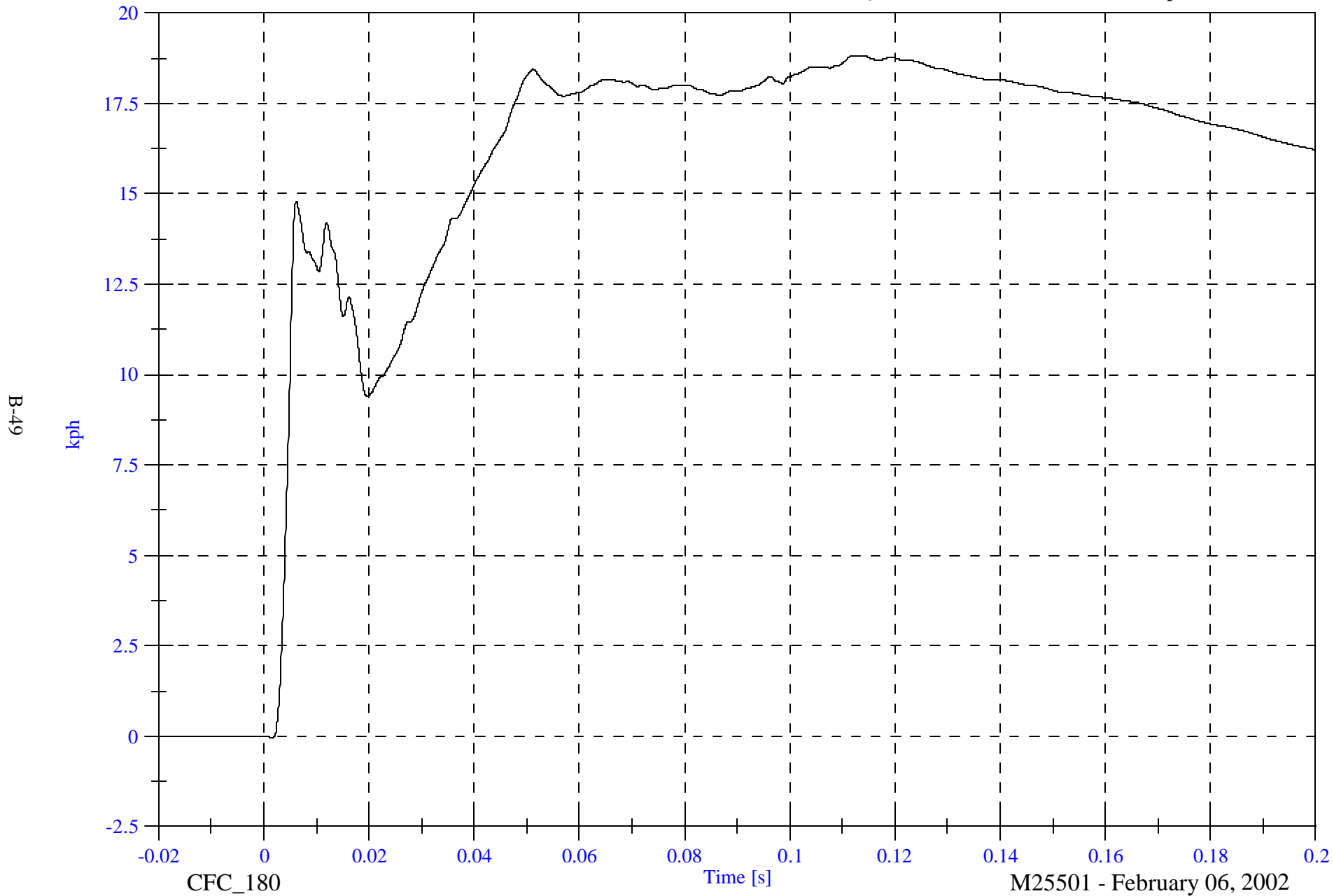


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 18.8 [kph] at 0.112 [s]

A5 Left Front Sill Y Velocity

Min: -0.1 [kph] at 0.002 [s]

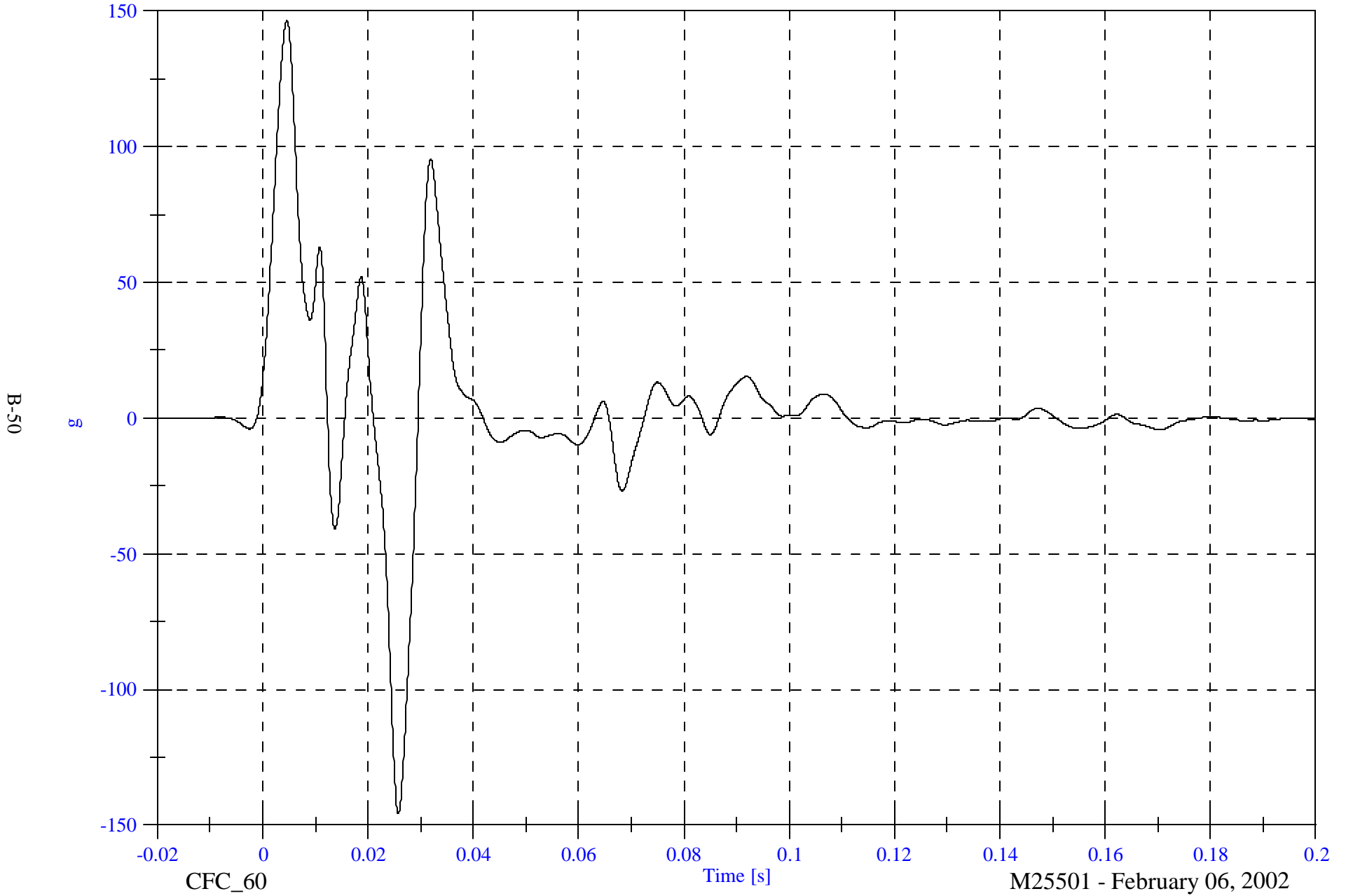


2002 SNCAP Test 2 - 2002 Subaru Impreza

A6 Left Front Door CL Y

Max: 146.4 [g] at 0.005 [s]

Min: -145.8 [g] at 0.026 [s]



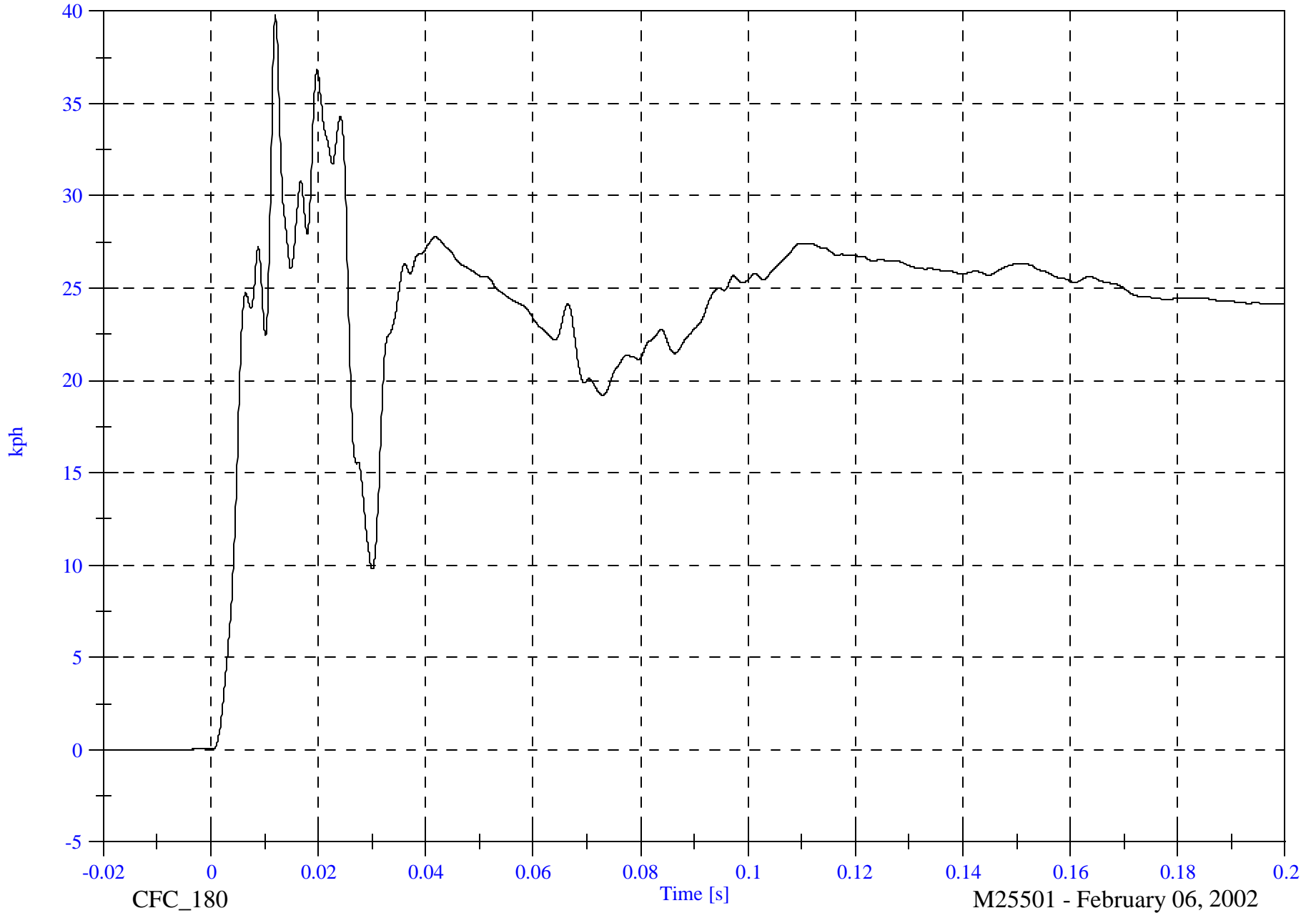
2002 SNCAP Test 2 - 2002 Subaru Impreza

A6 Left Front Door CL Y Velocity

Max: 39.8 [kph] at 0.012 [s]

Min: -0.0 [kph] at -0.015 [s]

B-51



CFC_180

Time [s]

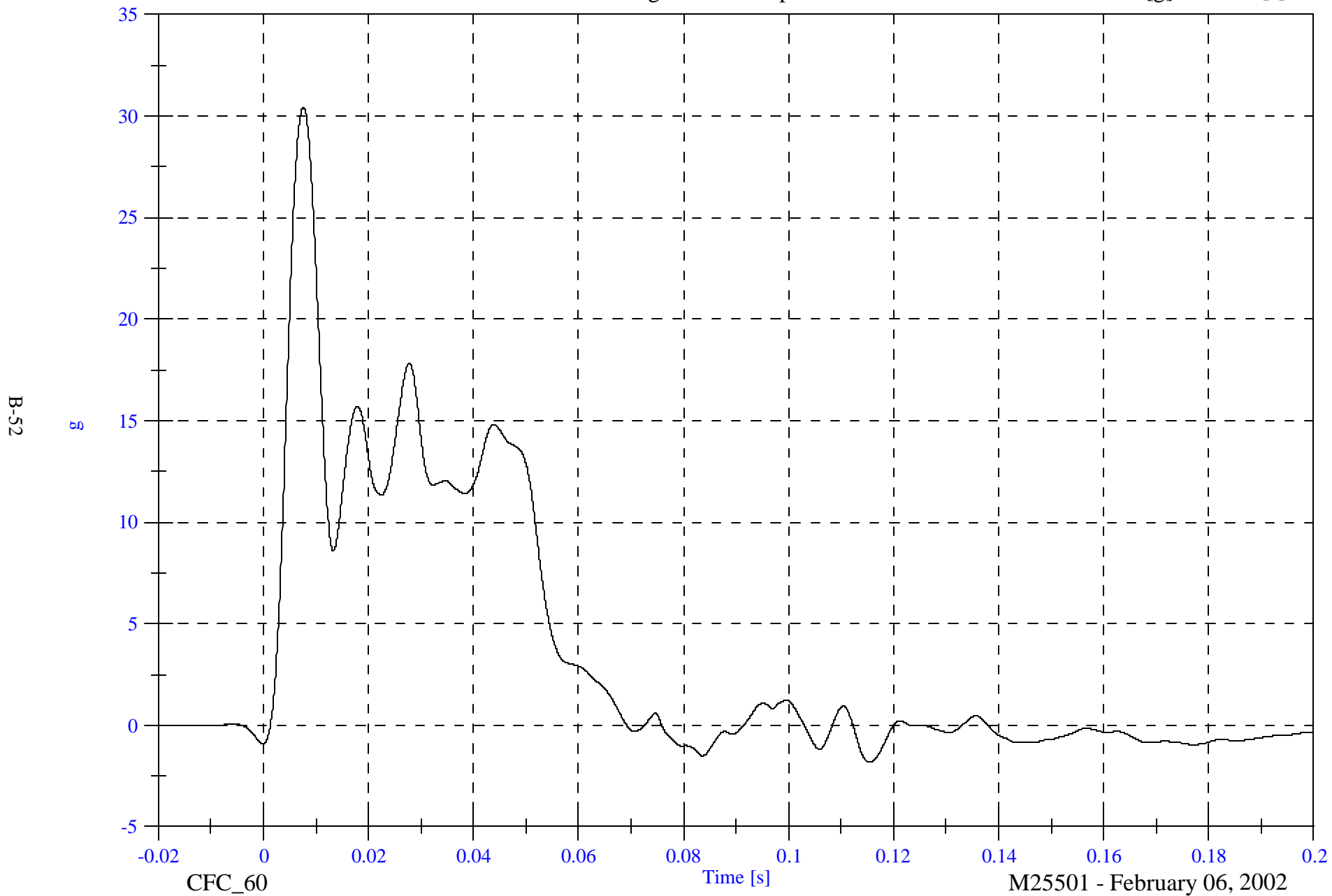
M25501 - February 06, 2002

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A7 Right Rear Compartment Y

Max: 30.4 [g] at 0.008 [s]

Min: -1.8 [g] at 0.115 [s]



B-52

CFC_60

Time [s]

M25501 - February 06, 2002

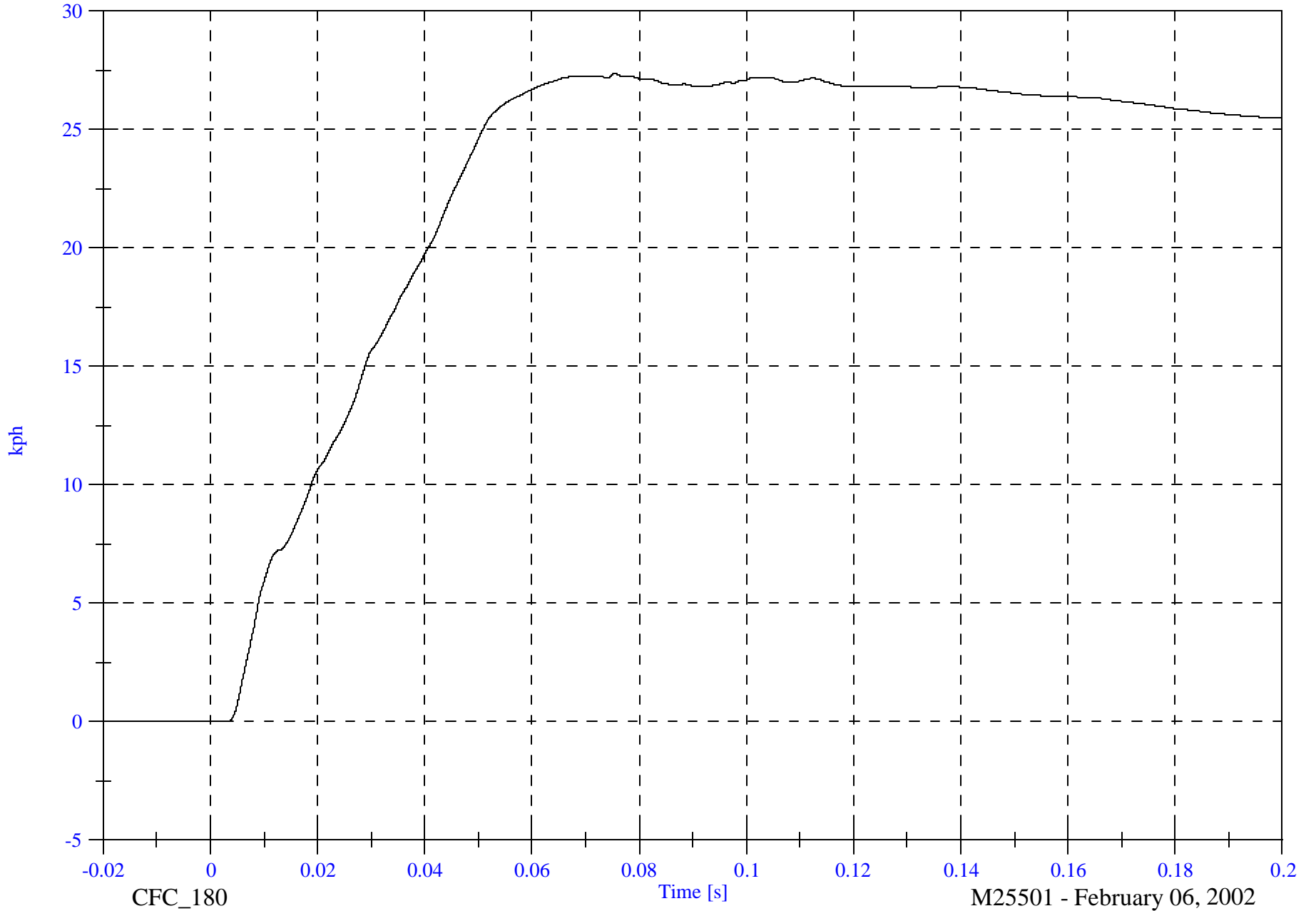
2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 27.4 [kph] at 0.075 [s]

A7 Right Rear Compartment Y Velocity

Min: -0.0 [kph] at 0.003 [s]

B-53



CFC_180

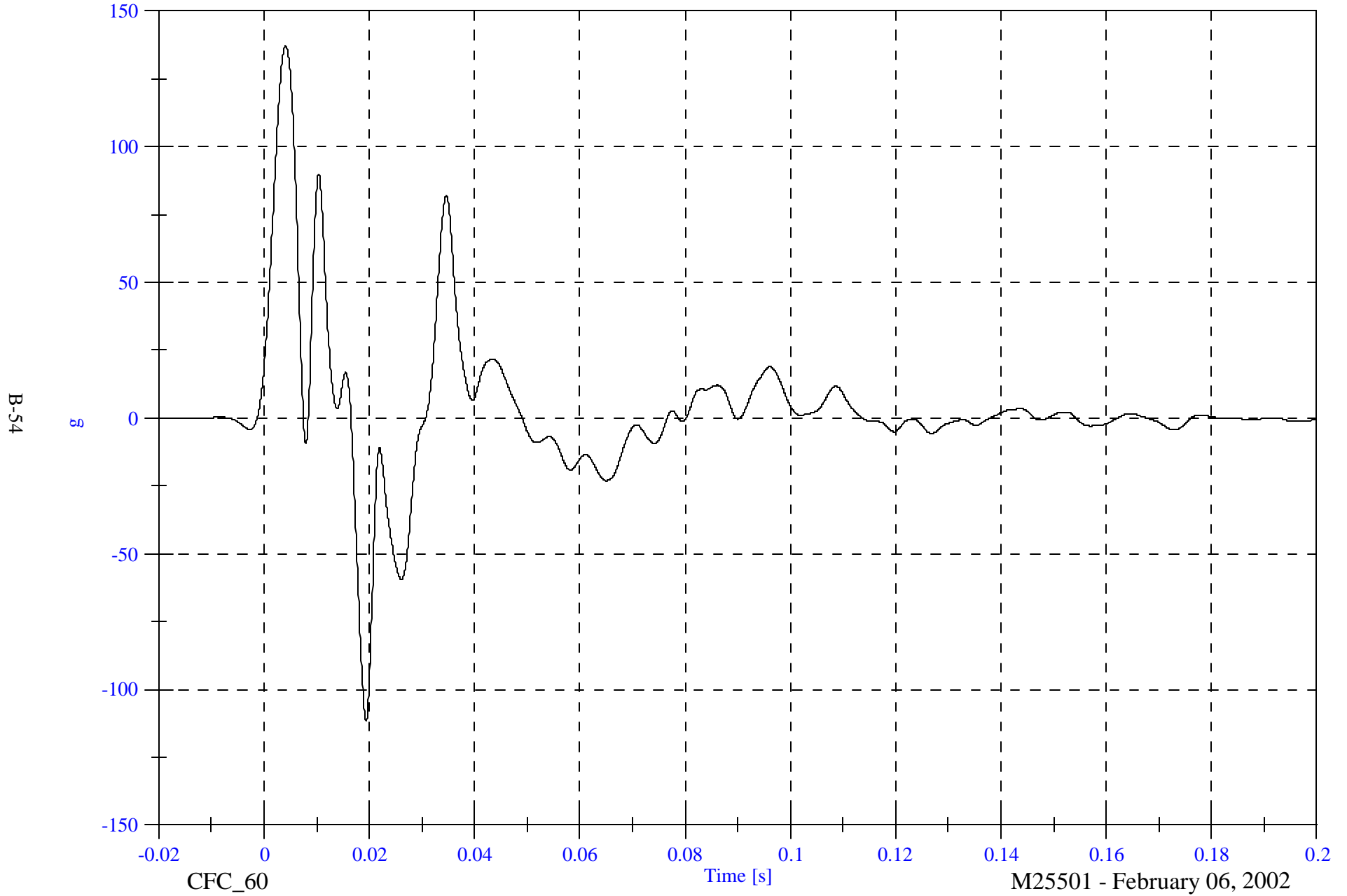
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

A8 Left Front Door Midrear Y

Max: 137.1 [g] at 0.004 [s]

Min: -111.7 [g] at 0.019 [s]

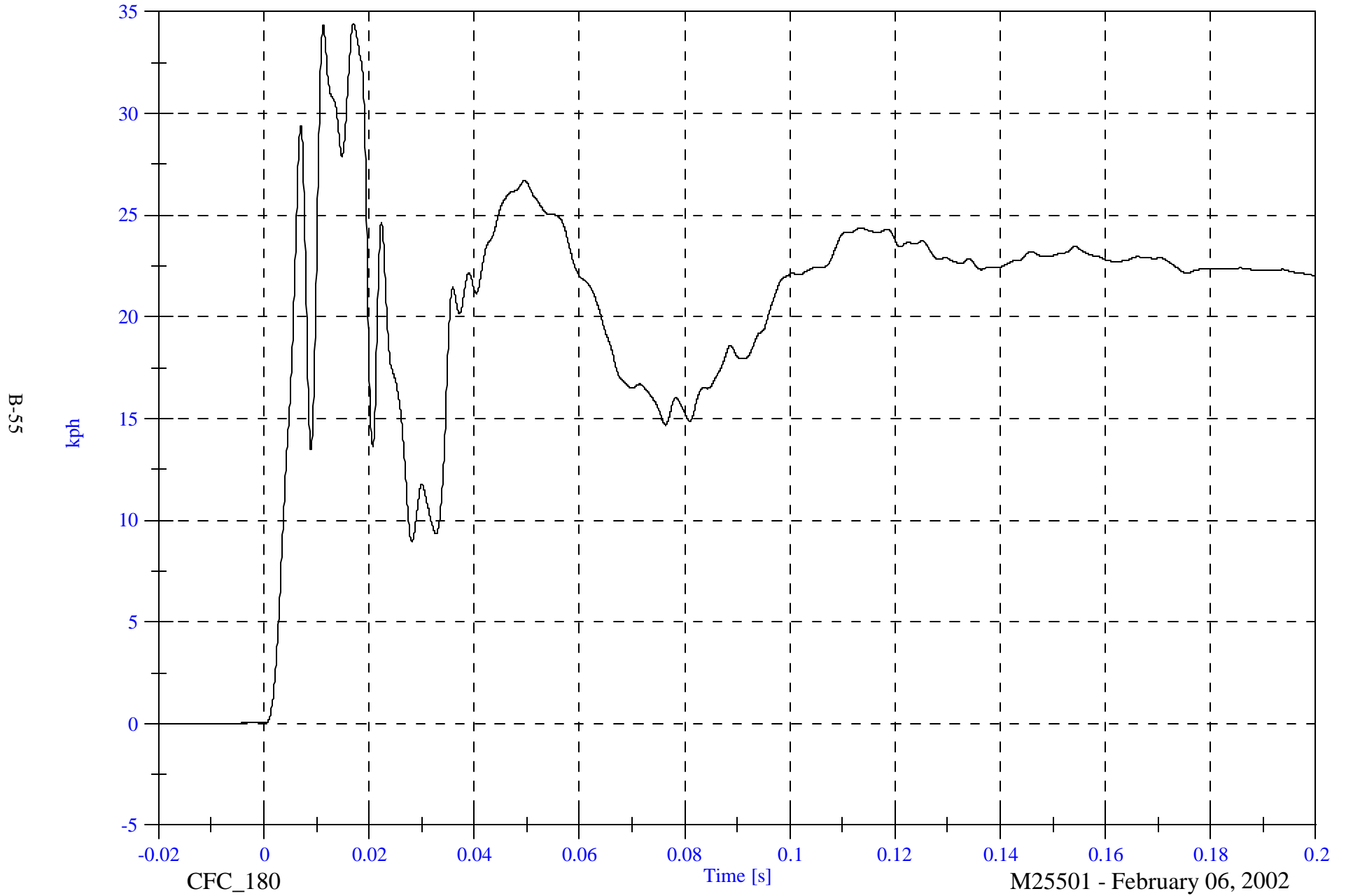


2002 SNCAP Test 2 - 2002 Subaru Impreza

A8 Left Front Door Midrear Y Velocity

Max: 34.4 [kph] at 0.017 [s]

Min: -0.0 [kph] at -0.018 [s]



B-55

kph

CFC_180

Time [s]

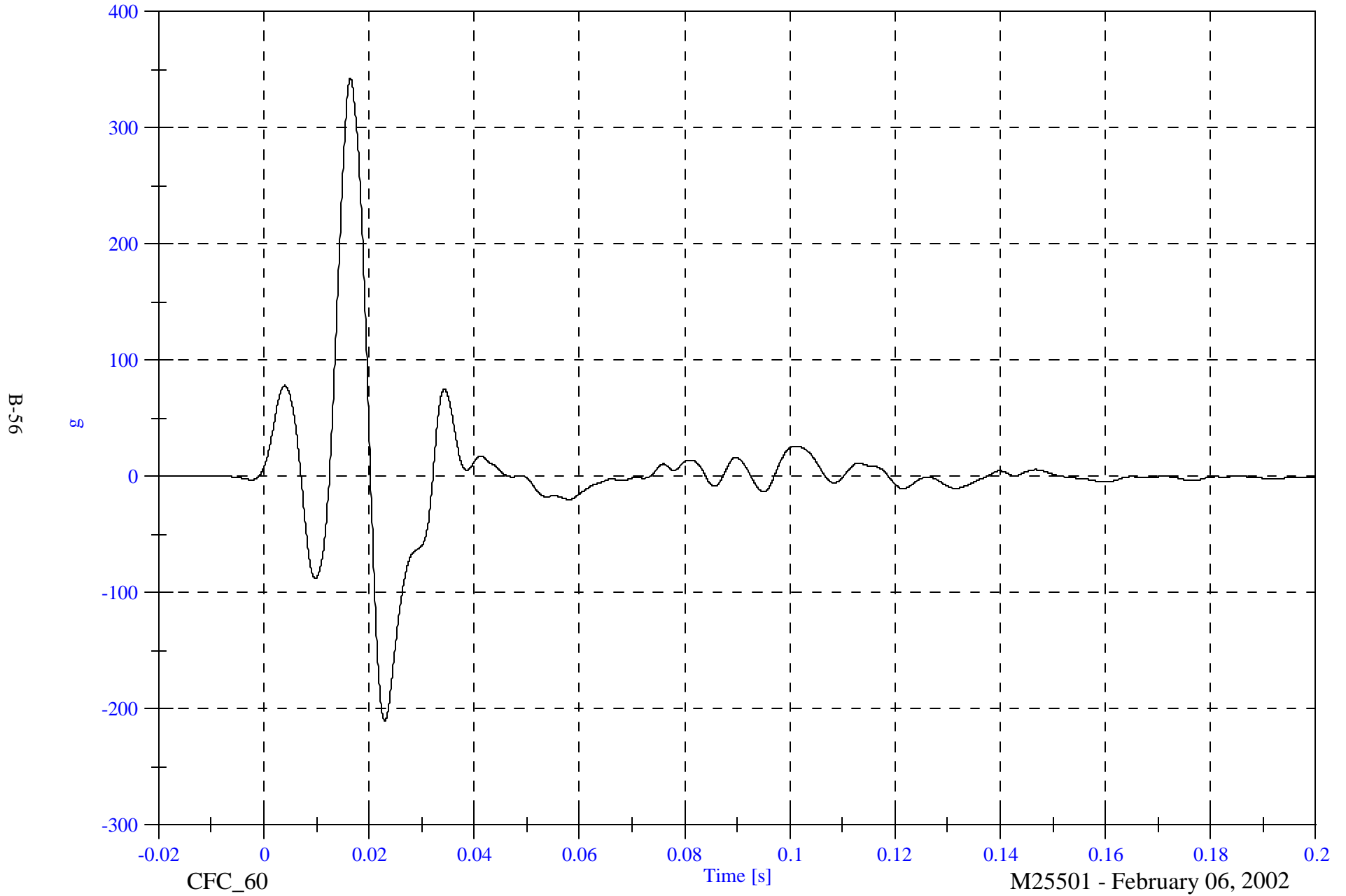
M25501 - February 06, 2002

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A9 Left Front Door Upper C/L Y

Max: 343.0 [g] at 0.016 [s]

Min: -210.3 [g] at 0.023 [s]



B-56

g

CFC_60

Time [s]

M25501 - February 06, 2002

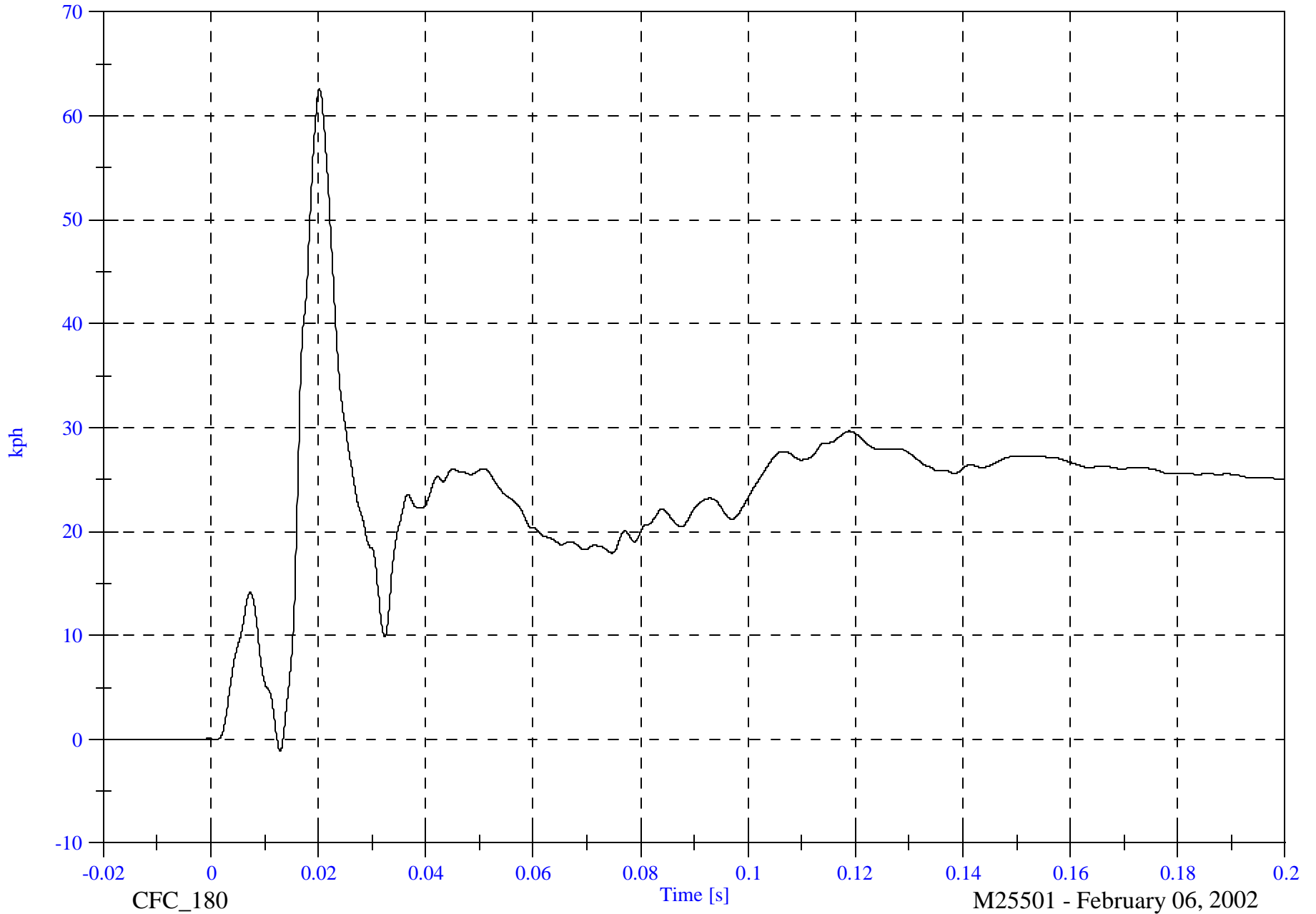
2002 SNCAP Test 2 - 2002 Subaru Impreza

A9 Left Front Door Upper C/L Y Velocity

Max: 62.6 [kph] at 0.020 [s]

Min: -1.2 [kph] at 0.013 [s]

B-57



CFC_180

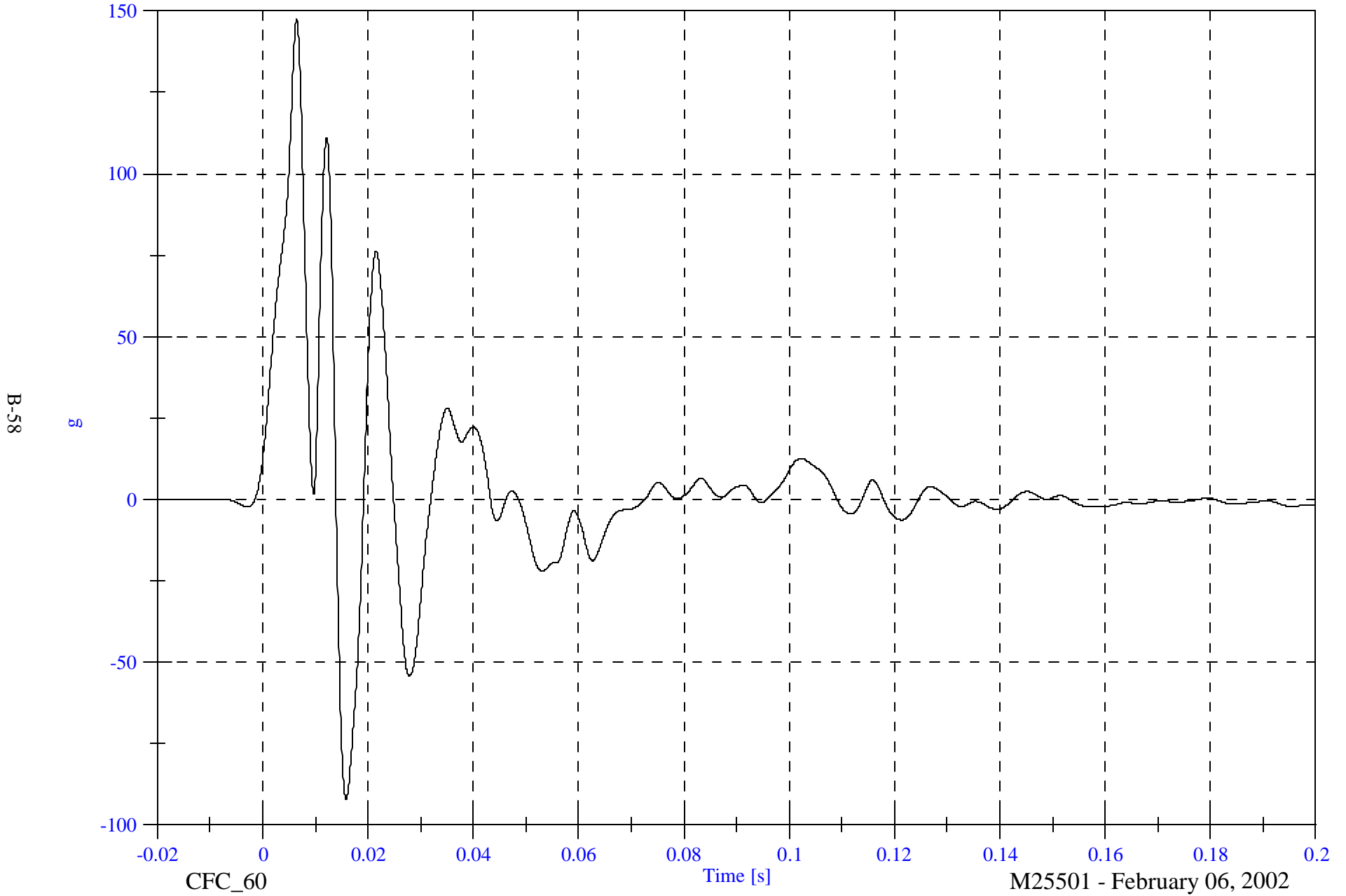
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

A10 Left Rear Door Midrear Y

Max: 147.6 [g] at 0.006 [s]

Min: -92.1 [g] at 0.016 [s]

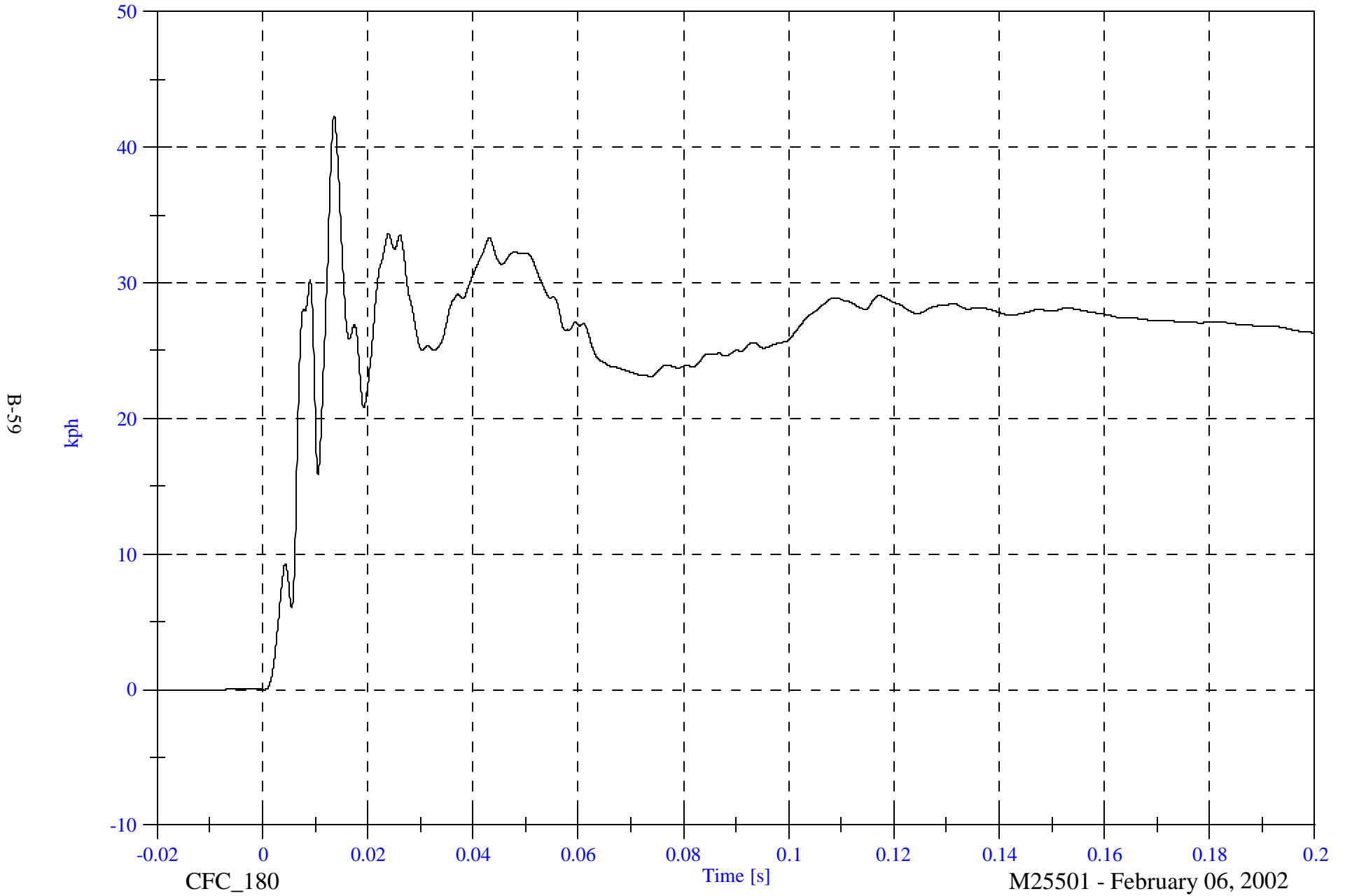


2002 SNCAP Test 2 - 2002 Subaru Impreza

A10 Left Rear Door Midrear Y Velocity

Max: 42.3 [kph] at 0.014 [s]

Min: -0.0 [kph] at -0.020 [s]



B-59

kph

CFC_180

Time [s]

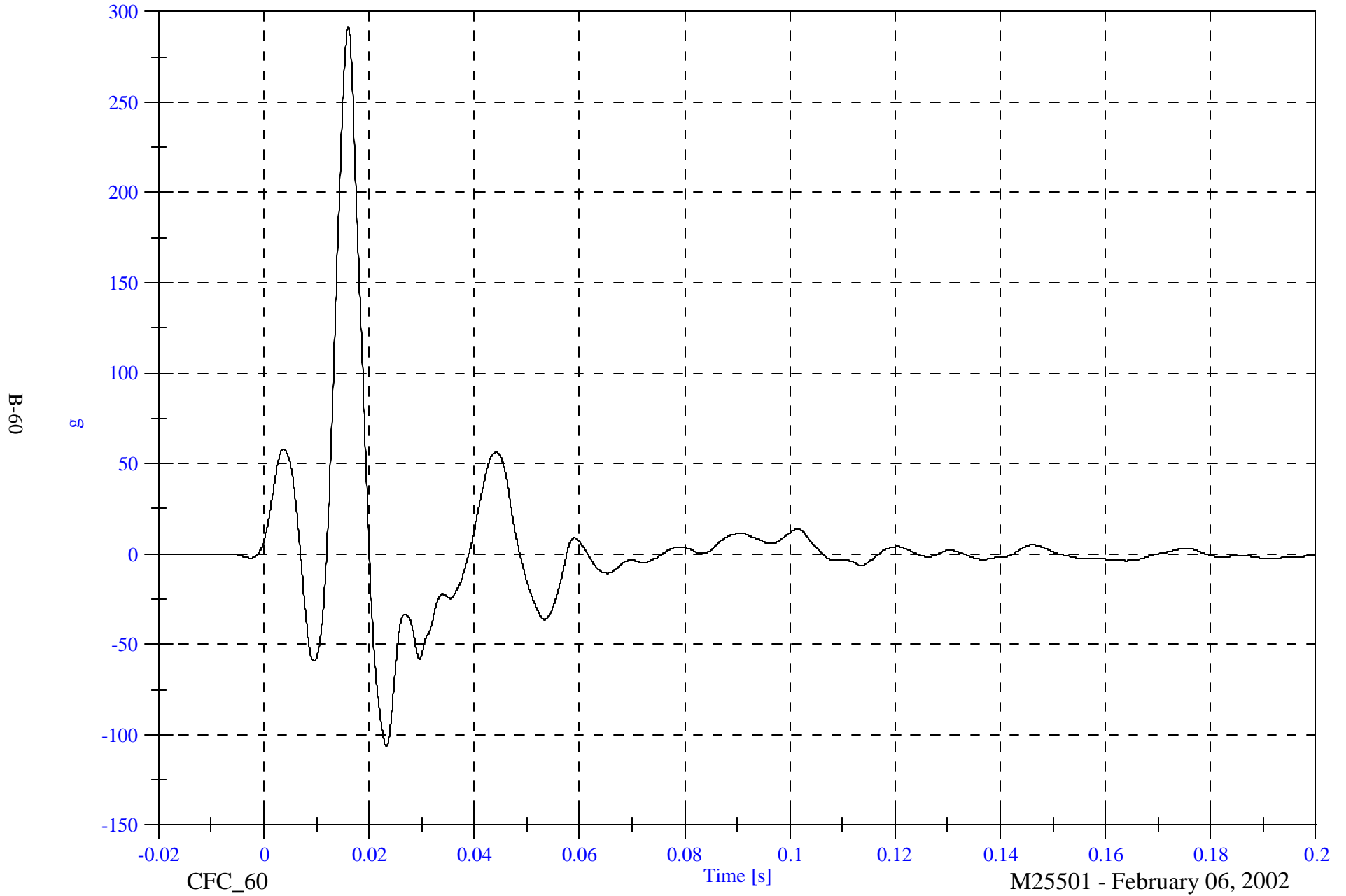
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A11 Left Rear Door Upper C/L Y

Max: 291.6 [g] at 0.016 [s]

Min: -106.3 [g] at 0.023 [s]

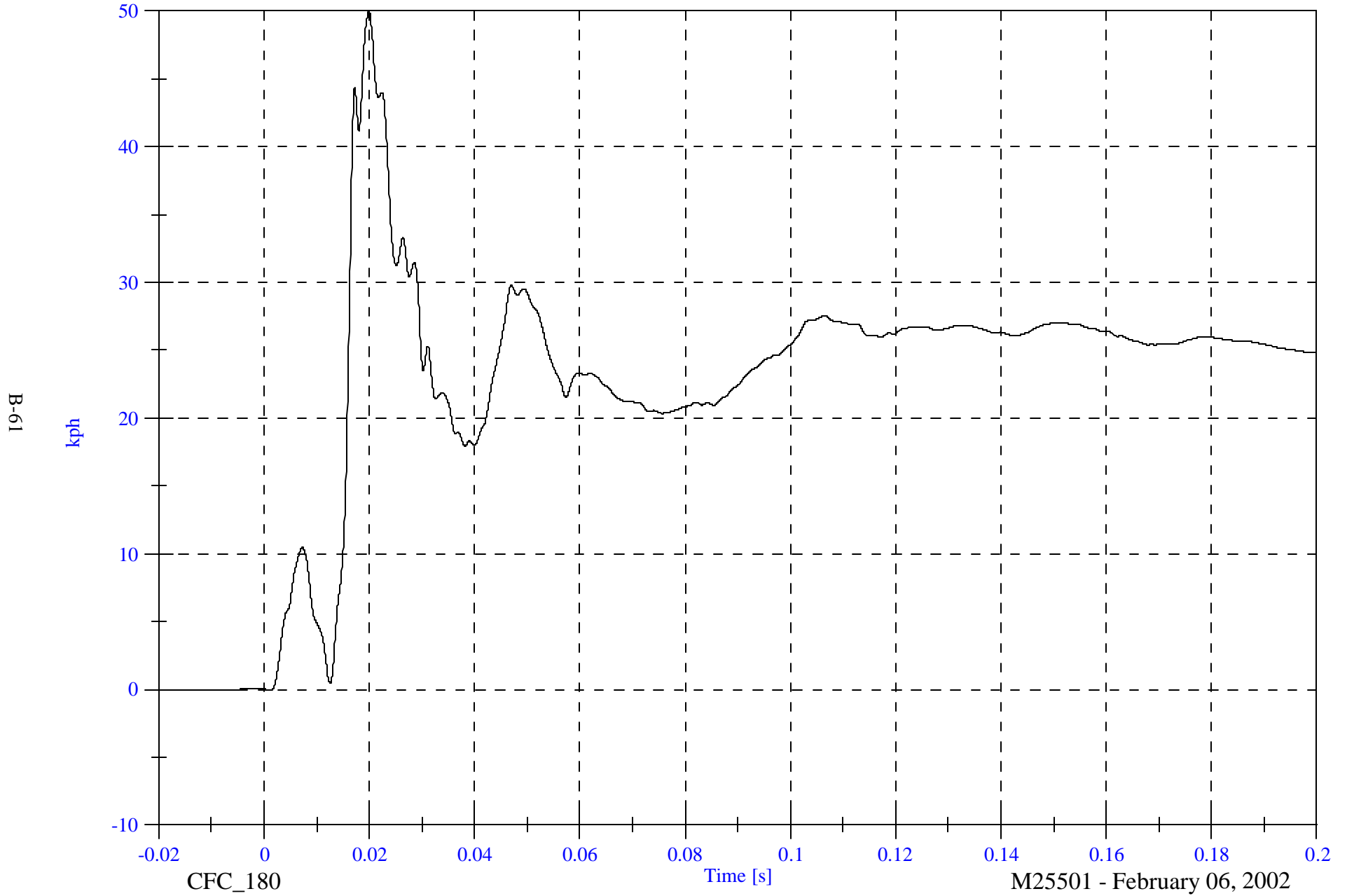


2002 SNCAP Test 2 - 2002 Subaru Impreza

A11 Left Rear Door Upper C/L Y Velocity

Max: 50.0 [kph] at 0.020 [s]

Min: -0.1 [kph] at 0.001 [s]



B-61

kph

CFC_180

Time [s]

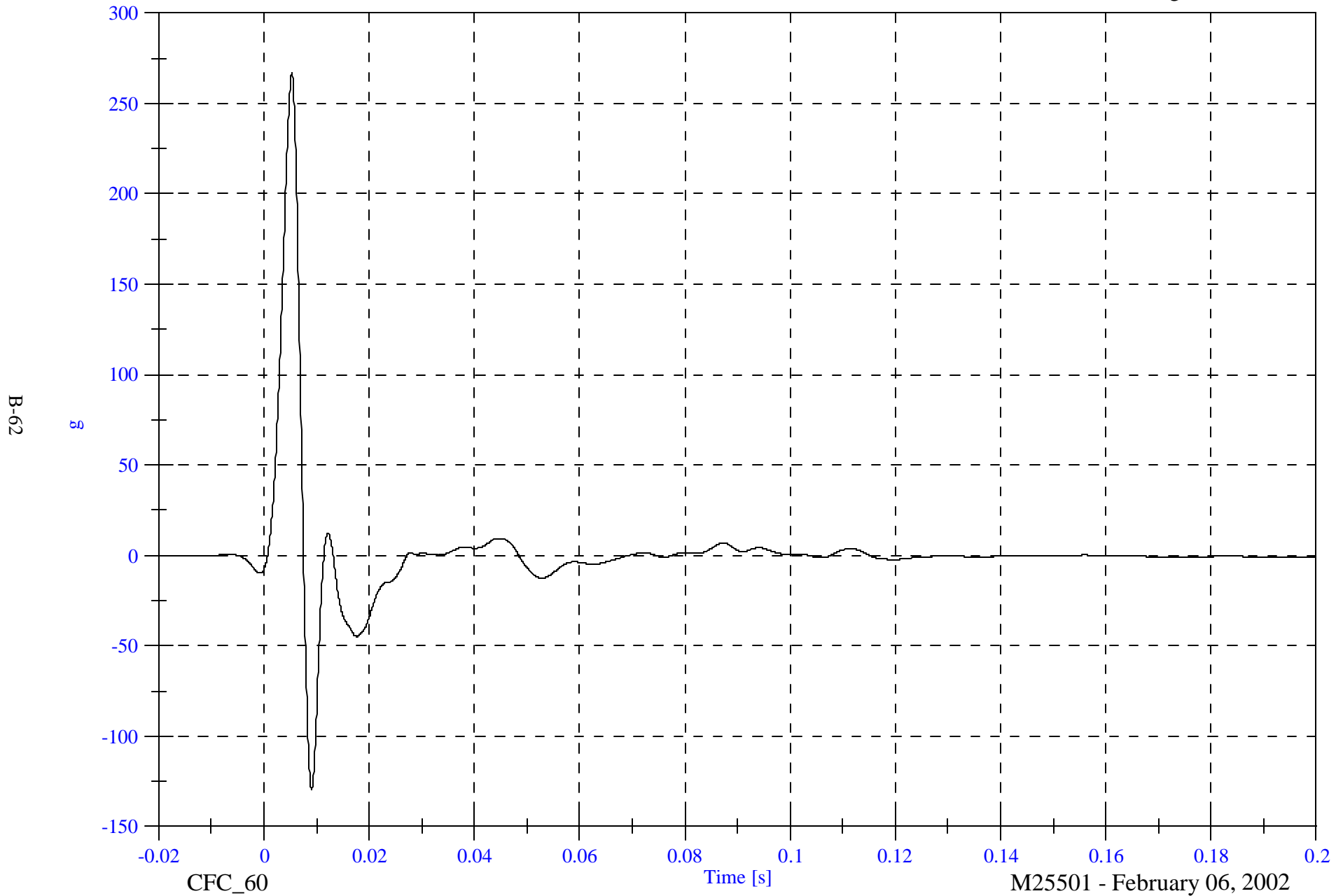
M25501 - February 06, 2002

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A12 Left Lower B Post Y

Max: 266.6 [g] at 0.005 [s]

Min: -129.3 [g] at 0.009 [s]

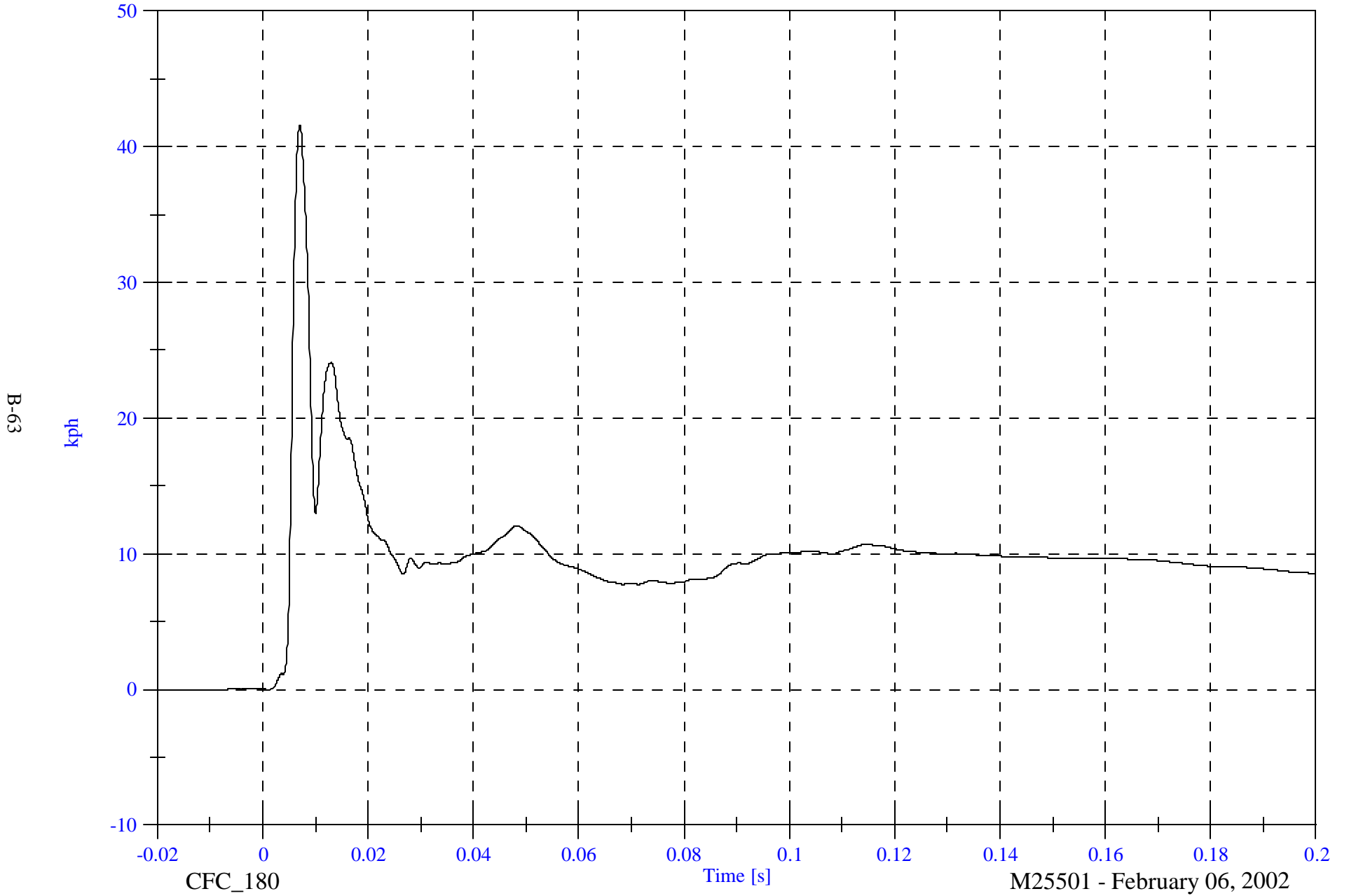


2002 SNCAP Test 2 - 2002 Subaru Impreza

A12 Left Lower B Post Y Velocity

Max: 41.6 [kph] at 0.007 [s]

Min: -0.0 [kph] at 0.001 [s]



B-63

CFC_180

Time [s]

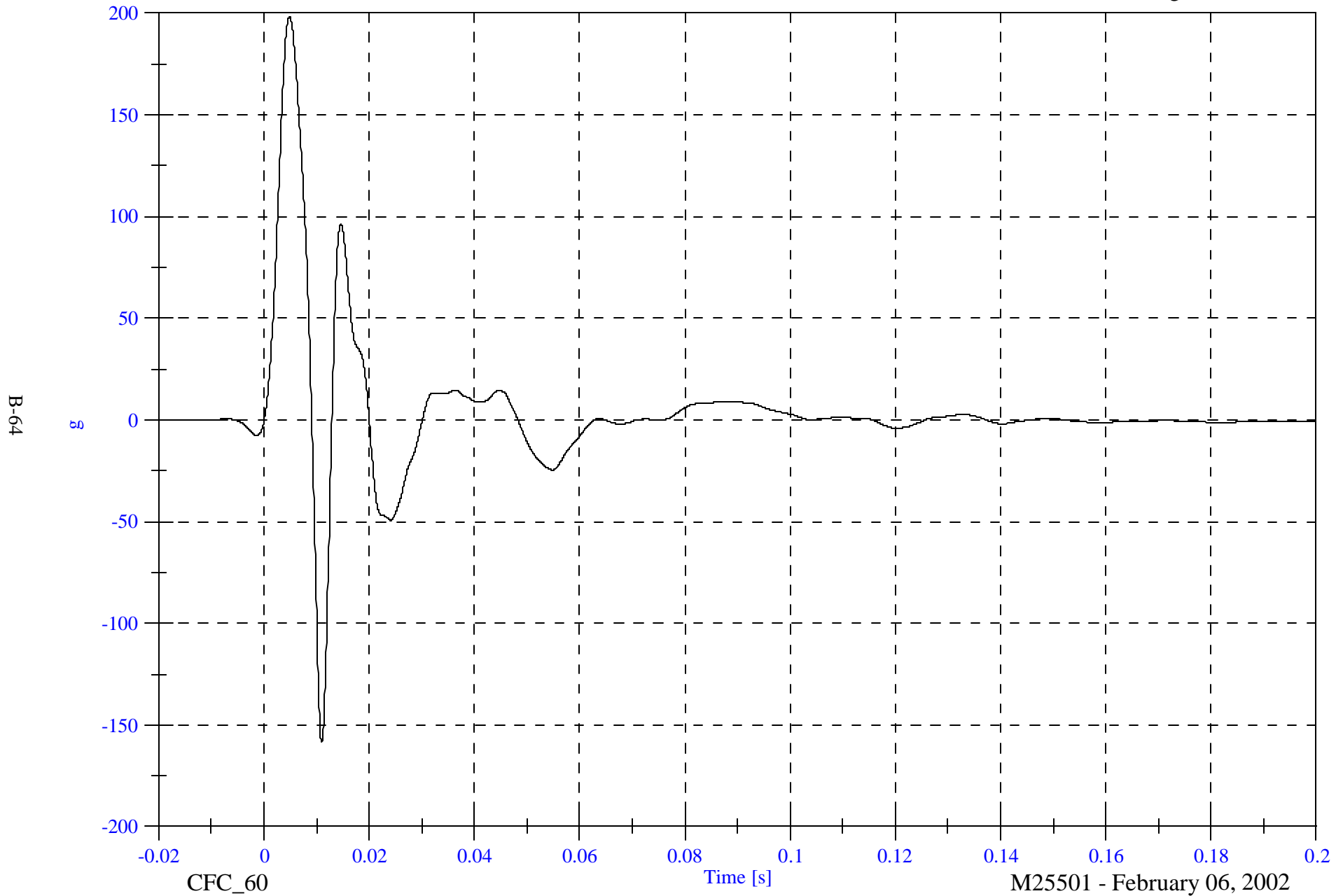
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

A13 Left Mid B Post Y

Max: 198.2 [g] at 0.005 [s]

Min: -158.7 [g] at 0.011 [s]

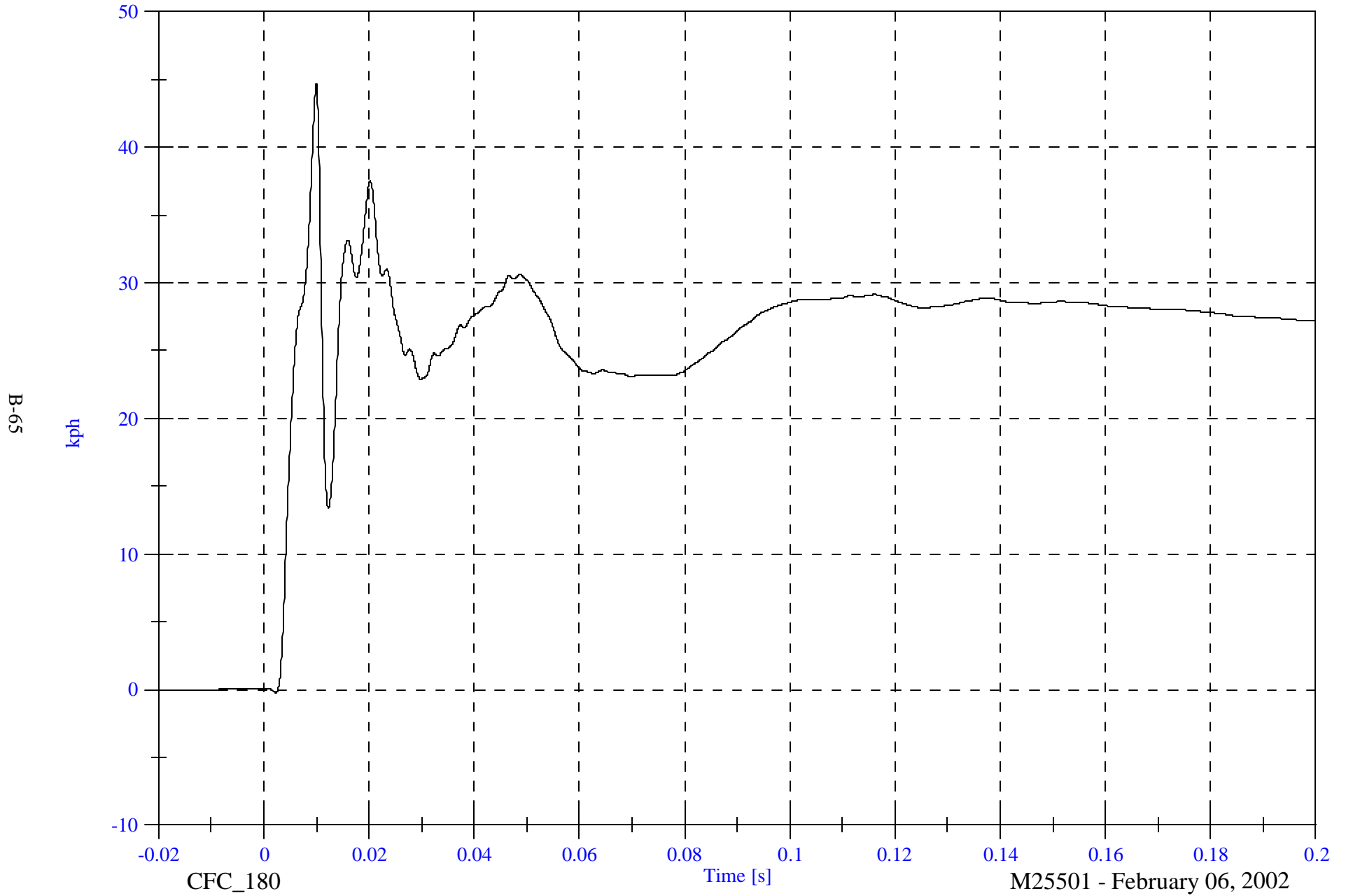


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Max: 44.6 [kph] at 0.010 [s]

A13 Left Mid B Post Y Velocity

Min: -0.2 [kph] at 0.002 [s]



B-65

kph

CFC_180

Time [s]

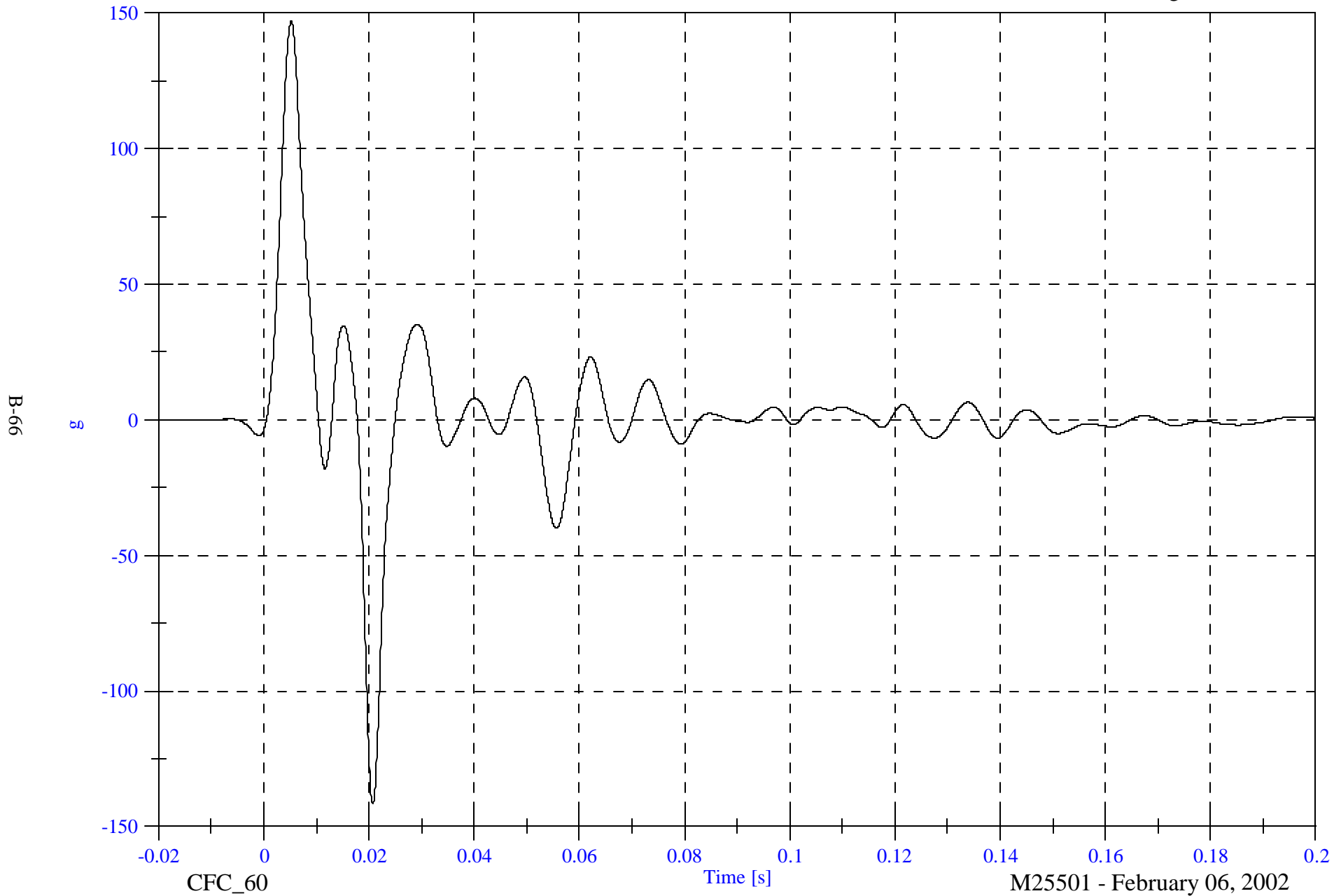
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

A14 Left Lower A Post Y

Max: 147.2 [g] at 0.005 [s]

Min: -141.8 [g] at 0.021 [s]

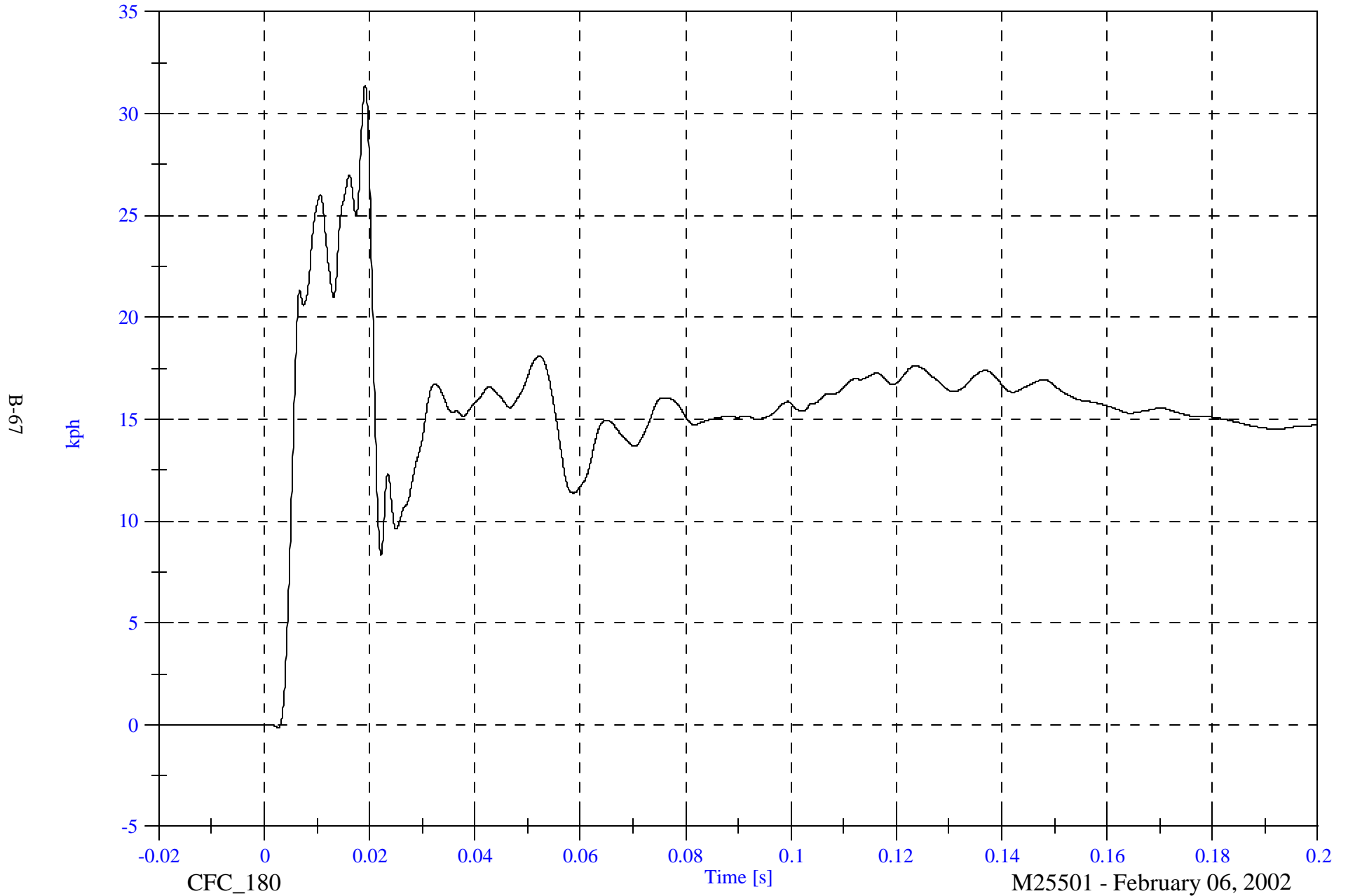


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Max: 31.4 [kph] at 0.019 [s]

A14 Left Lower A Post Y Velocity

Min: -0.1 [kph] at 0.003 [s]



B-67

CFC_180

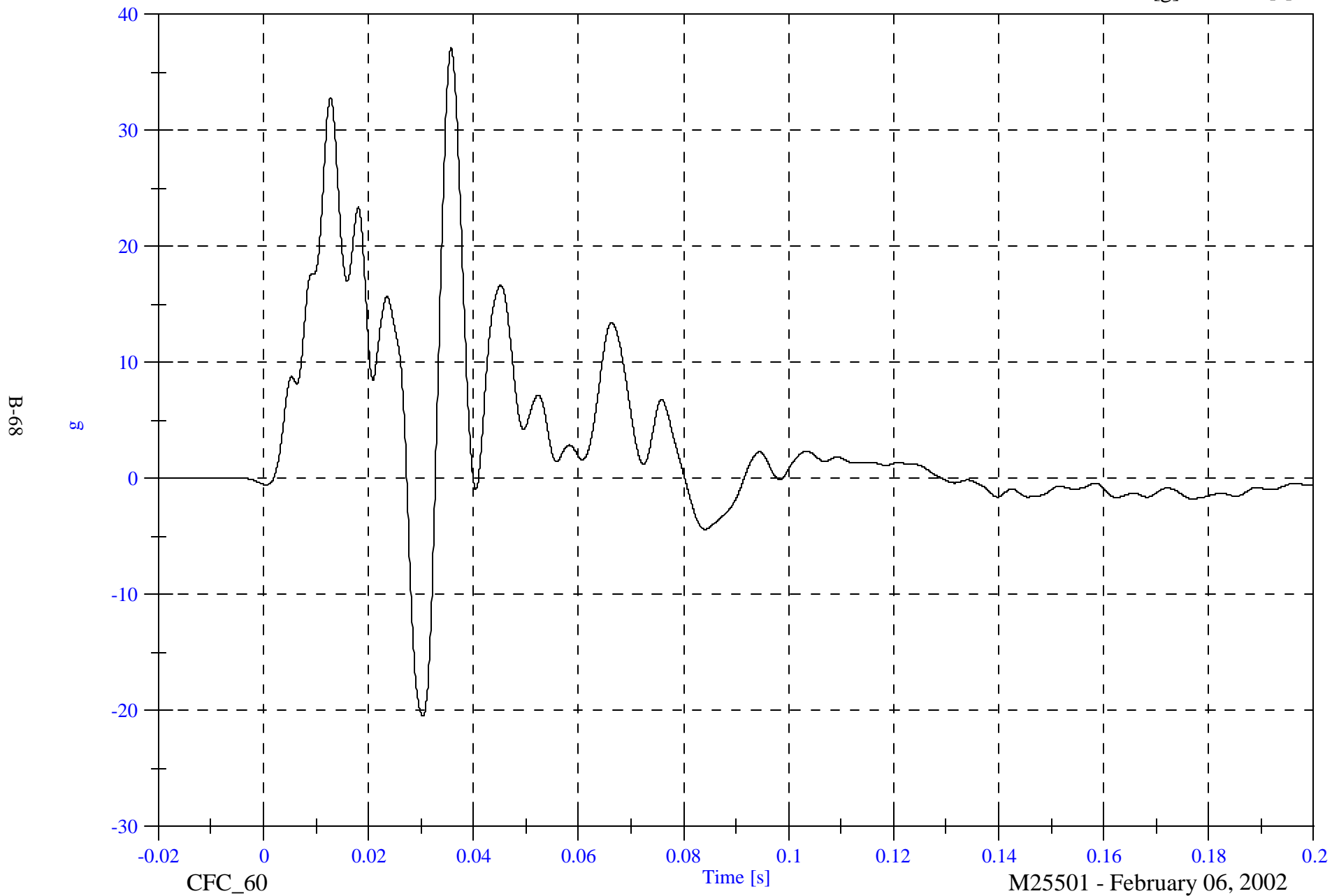
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

A15 Left Mid A Post Y

Max: 37.1 [g] at 0.036 [s]

Min: -20.5 [g] at 0.030 [s]

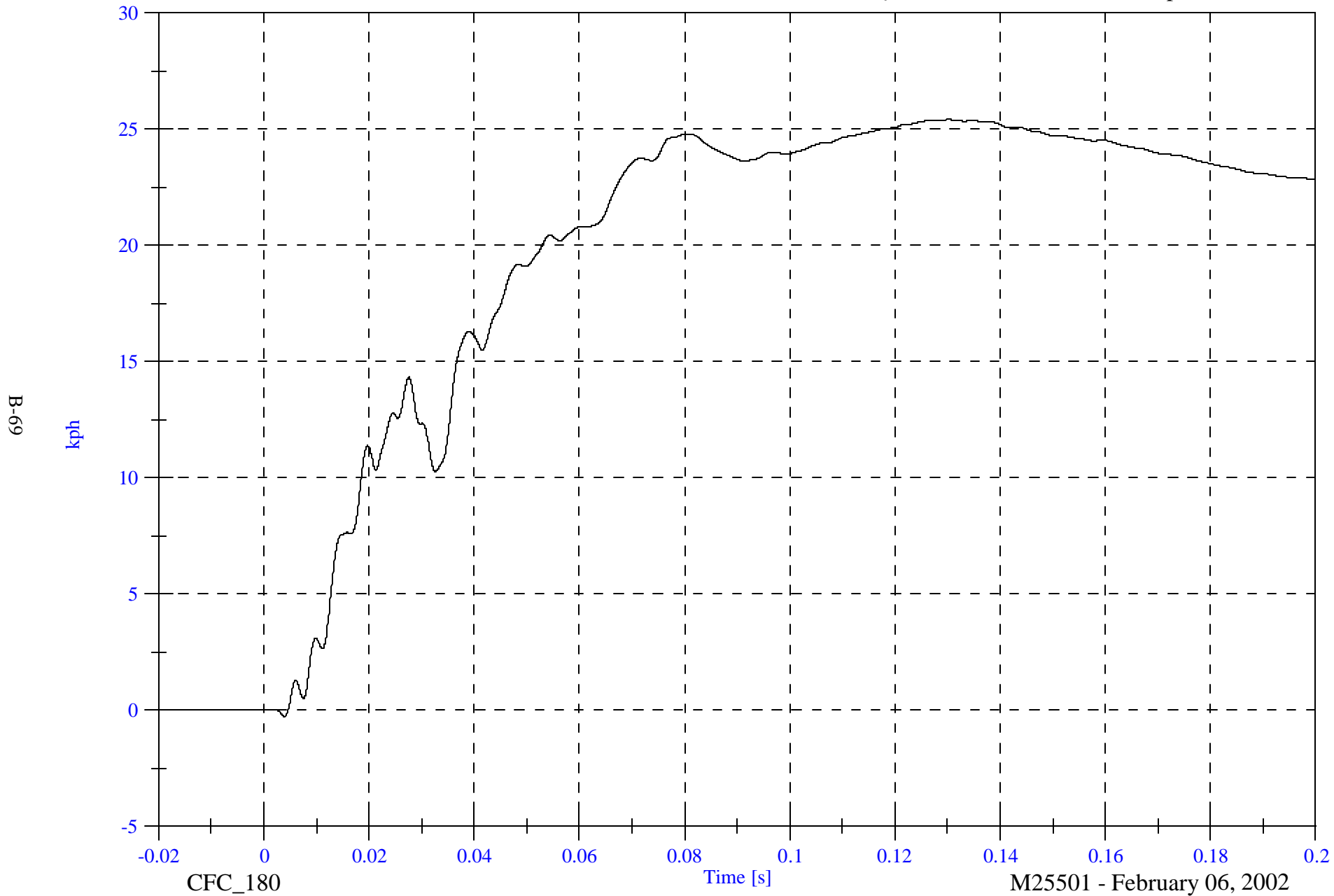


2002 SNCAP Test 2 - 2002 Subaru Impreza

A15 Left Mid A Post Y Velocity

Max: 25.4 [kph] at 0.130 [s]

Min: -0.3 [kph] at 0.004 [s]



B-69

CFC_180

Time [s]

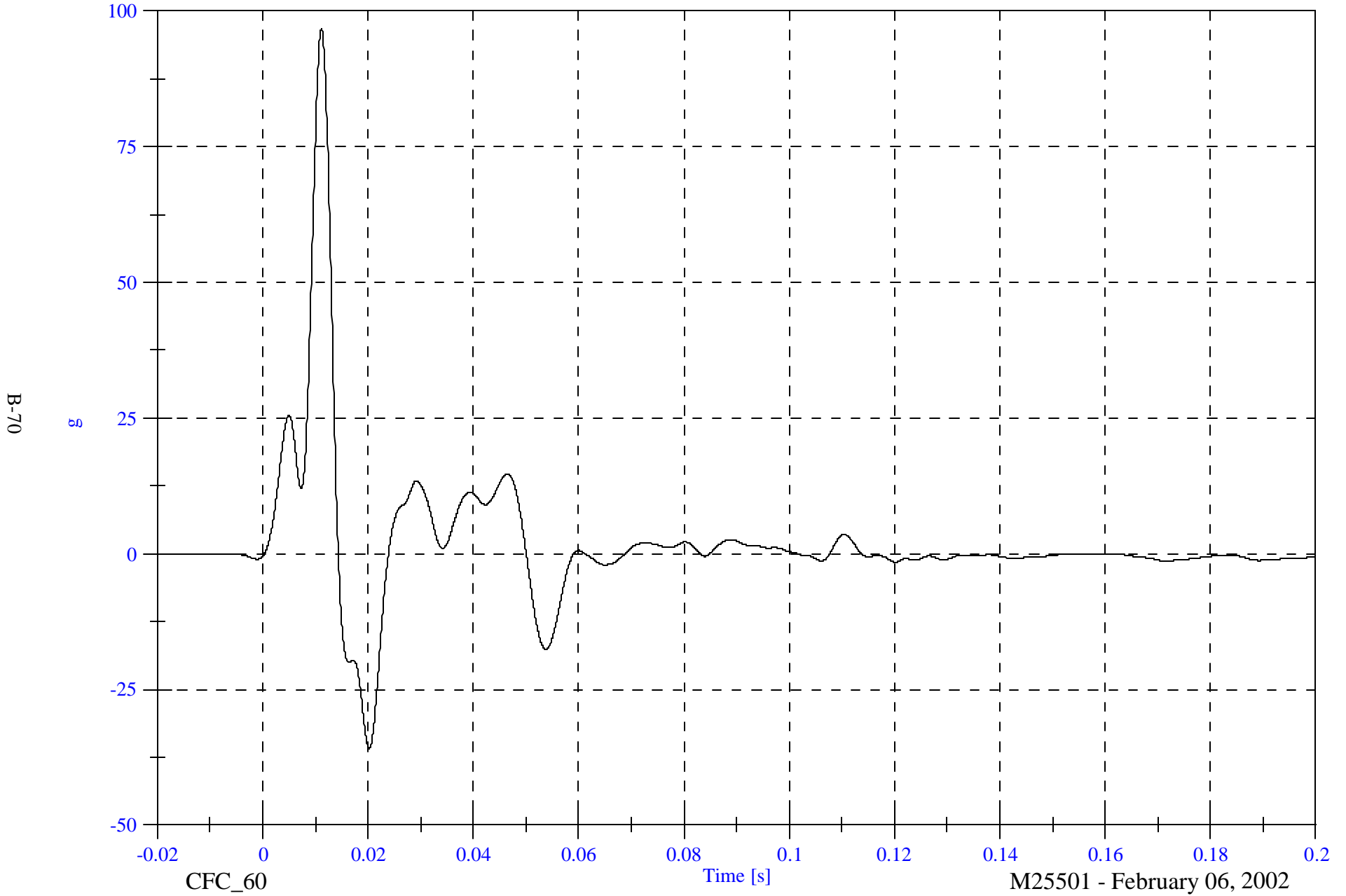
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2002 SNCAP Test 2 - 2002 Subaru Impreza

A16 Front Seat Track Y

Max: 96.6 [g] at 0.011 [s]

Min: -35.9 [g] at 0.020 [s]

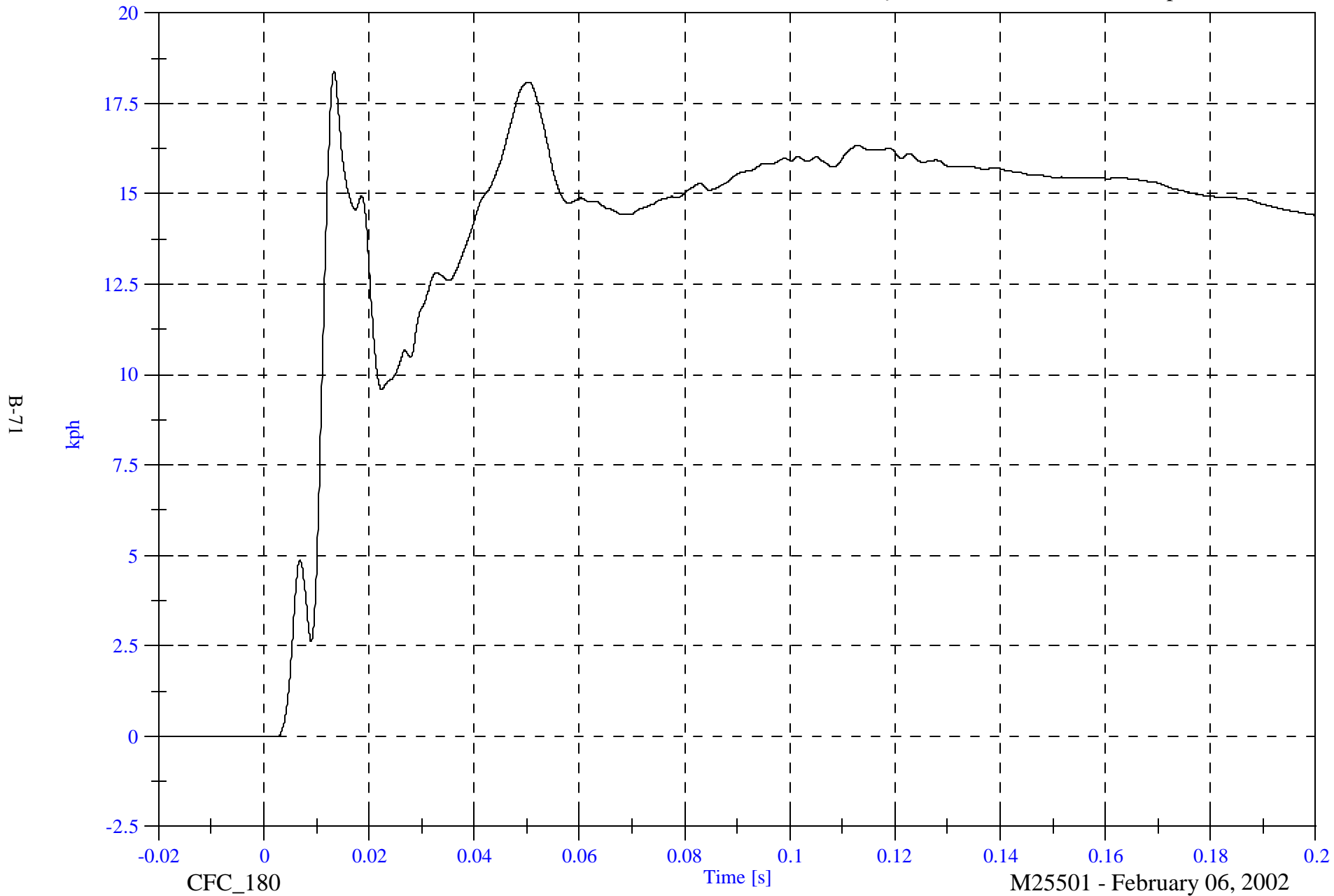


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Max: 18.4 [kph] at 0.013 [s]

A16 Front Seat Track Y Velocity

Min: -0.0 [kph] at 0.002 [s]

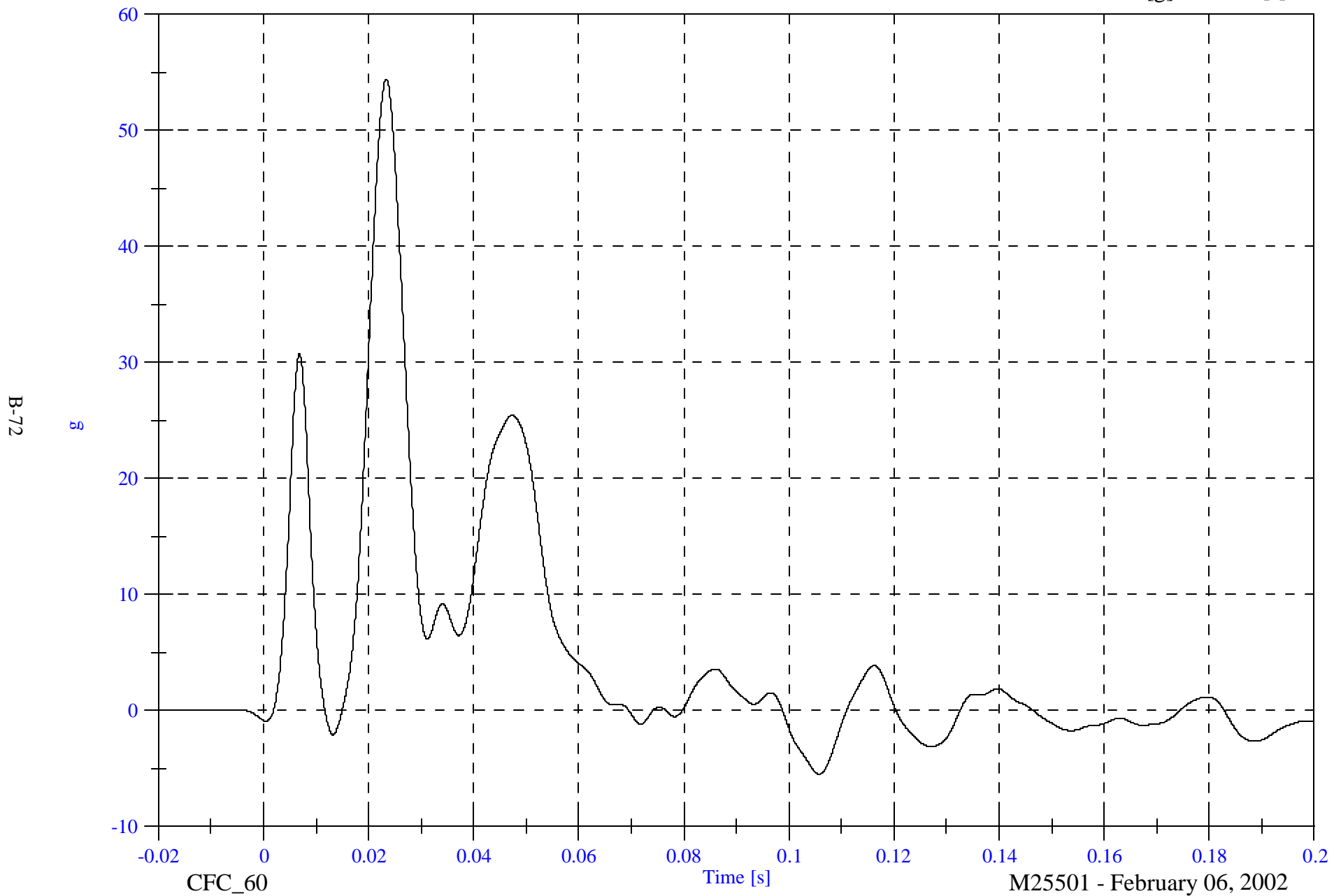


2002 SNCAP Test 2 - 2002 Subaru Impreza

A17 Rear Seat Track Y

Max: 54.4 [g] at 0.023 [s]

Min: -5.5 [g] at 0.106 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

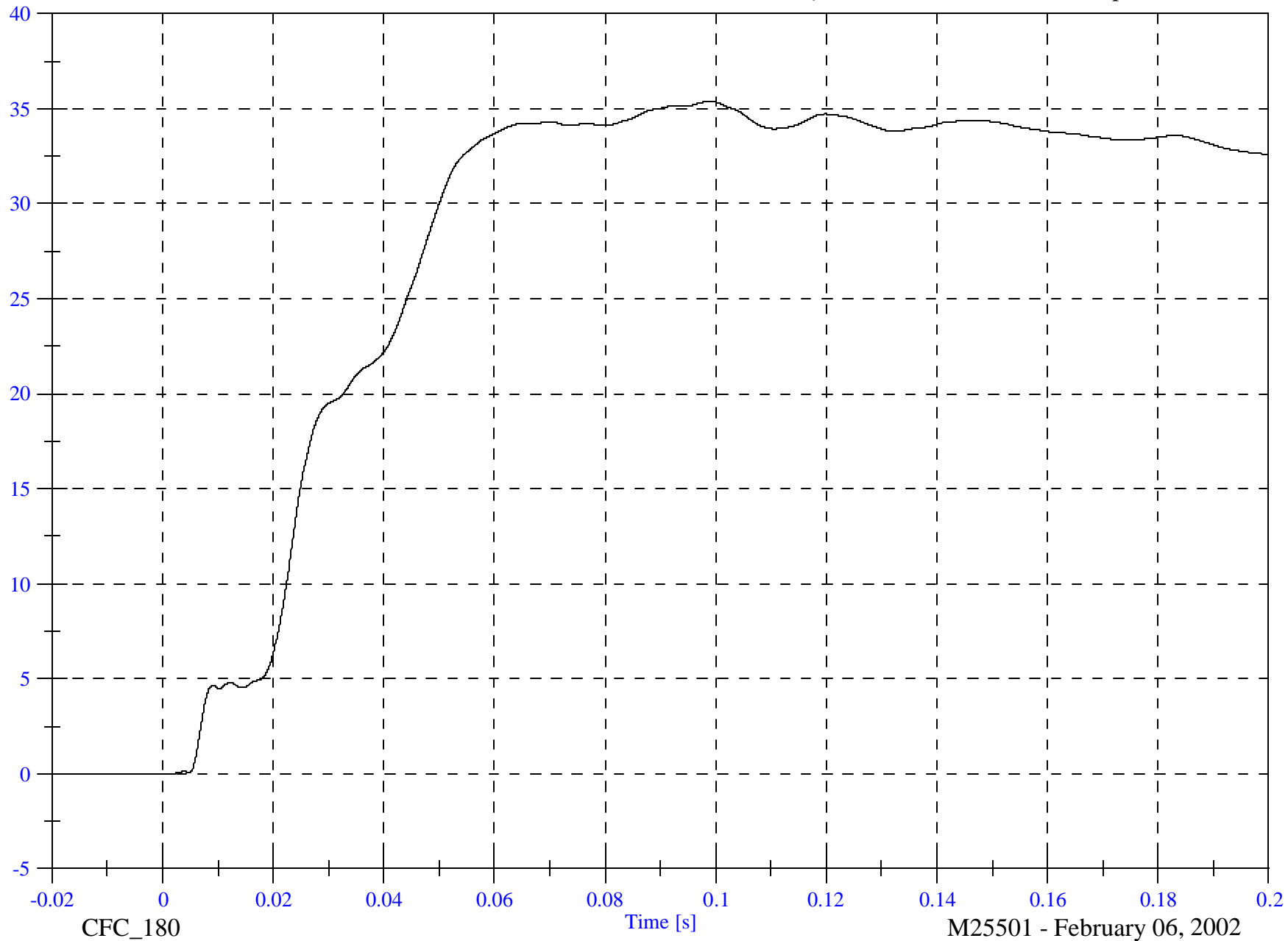
A17 Rear Seat Track Y Velocity

Max: 35.4 [kph] at 0.099 [s]

Min: -0.0 [kph] at -0.018 [s]

B-73

kph



CFC_180

Time [s]

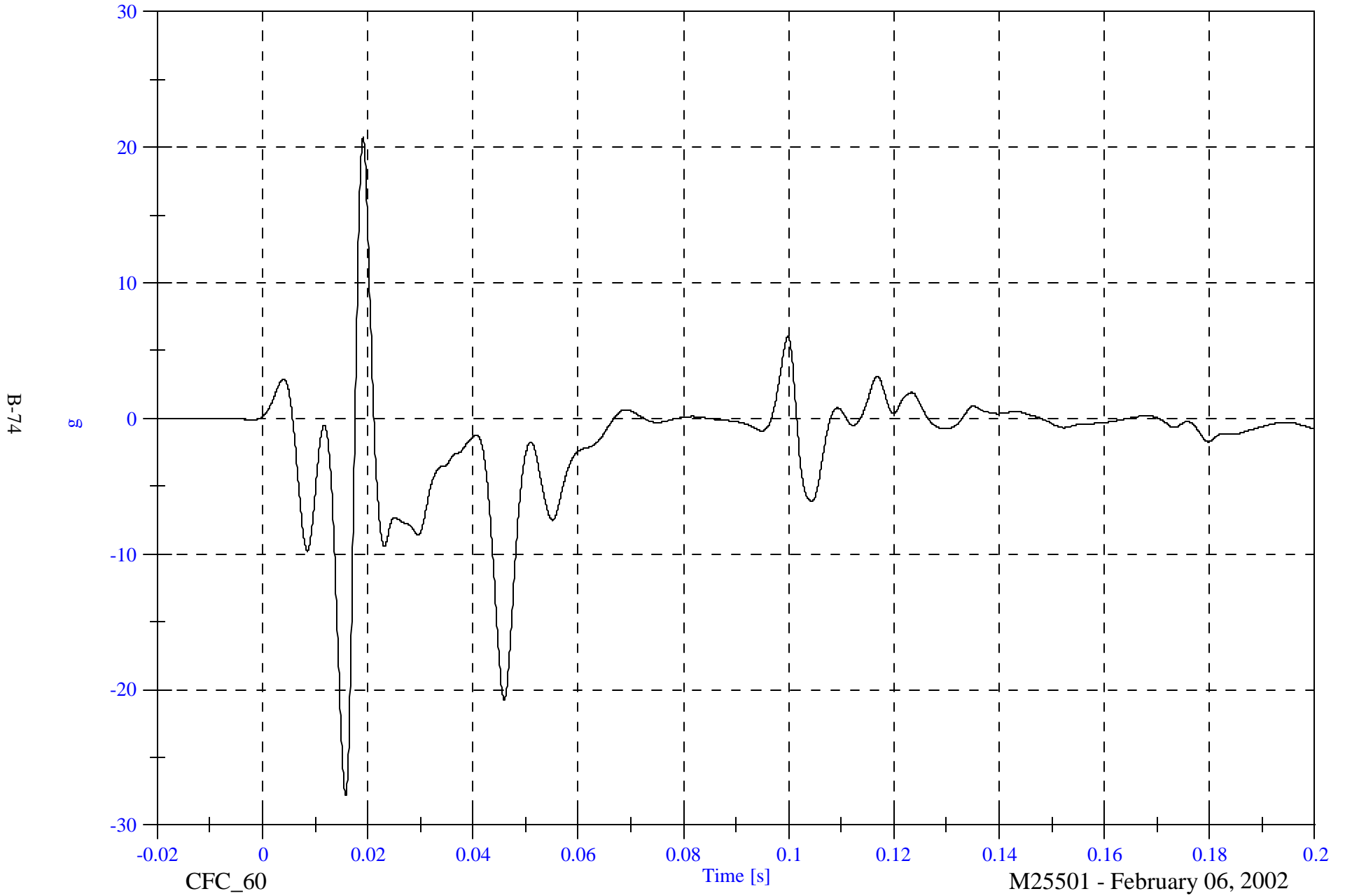
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

A18 Target CG X

Max: 20.7 [g] at 0.019 [s]

Min: -27.8 [g] at 0.016 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

A18 Target CG X Velocity

Max: 0.5 [kph] at 0.007 [s]

Min: -11.7 [kph] at 0.200 [s]

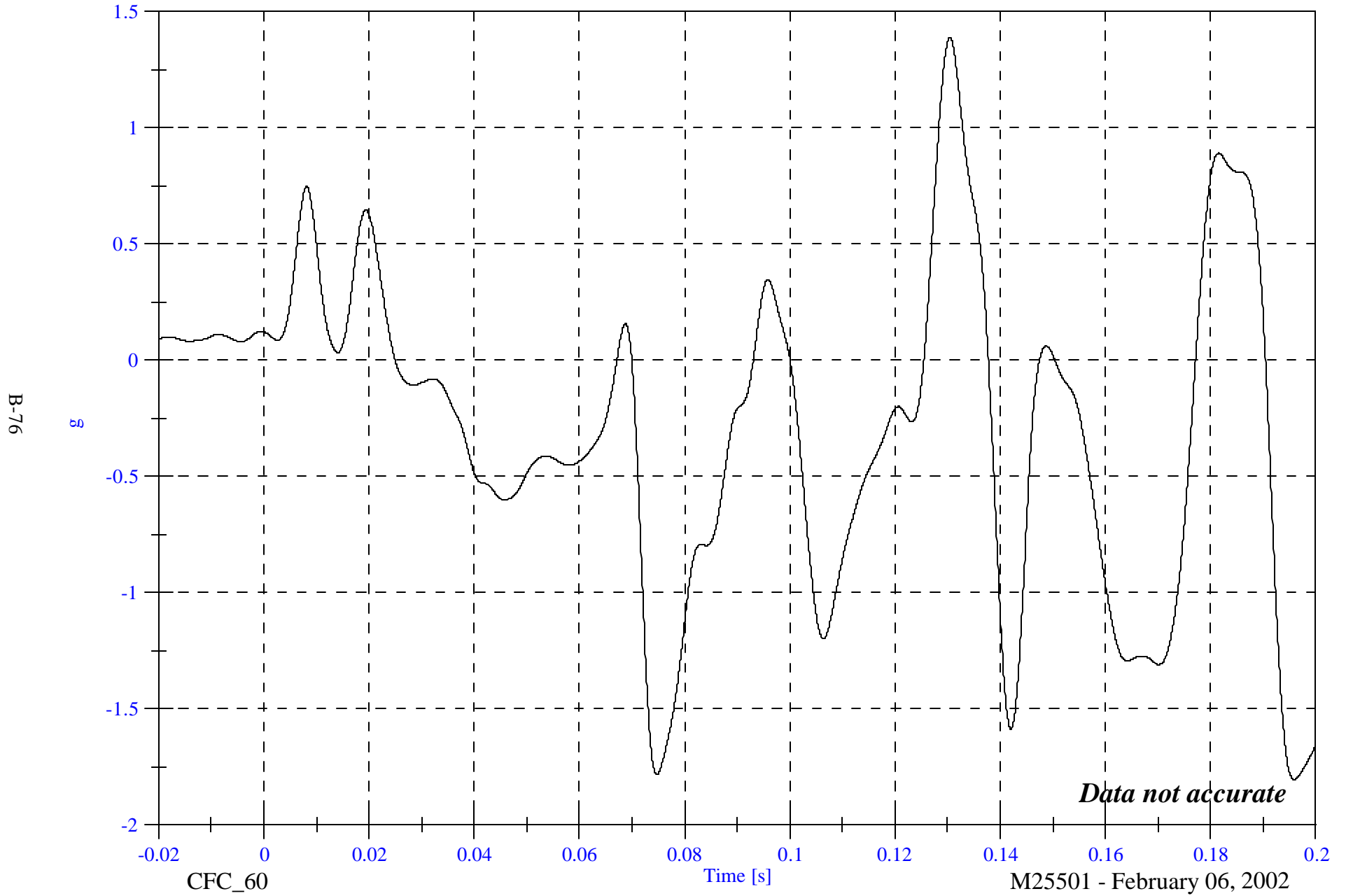


2002 SNCAP Test 2 - 2002 Subaru Impreza

A18 Target CG Y

Max: 1.4 [g] at 0.130 [s]

Min: -1.8 [g] at 0.196 [s]



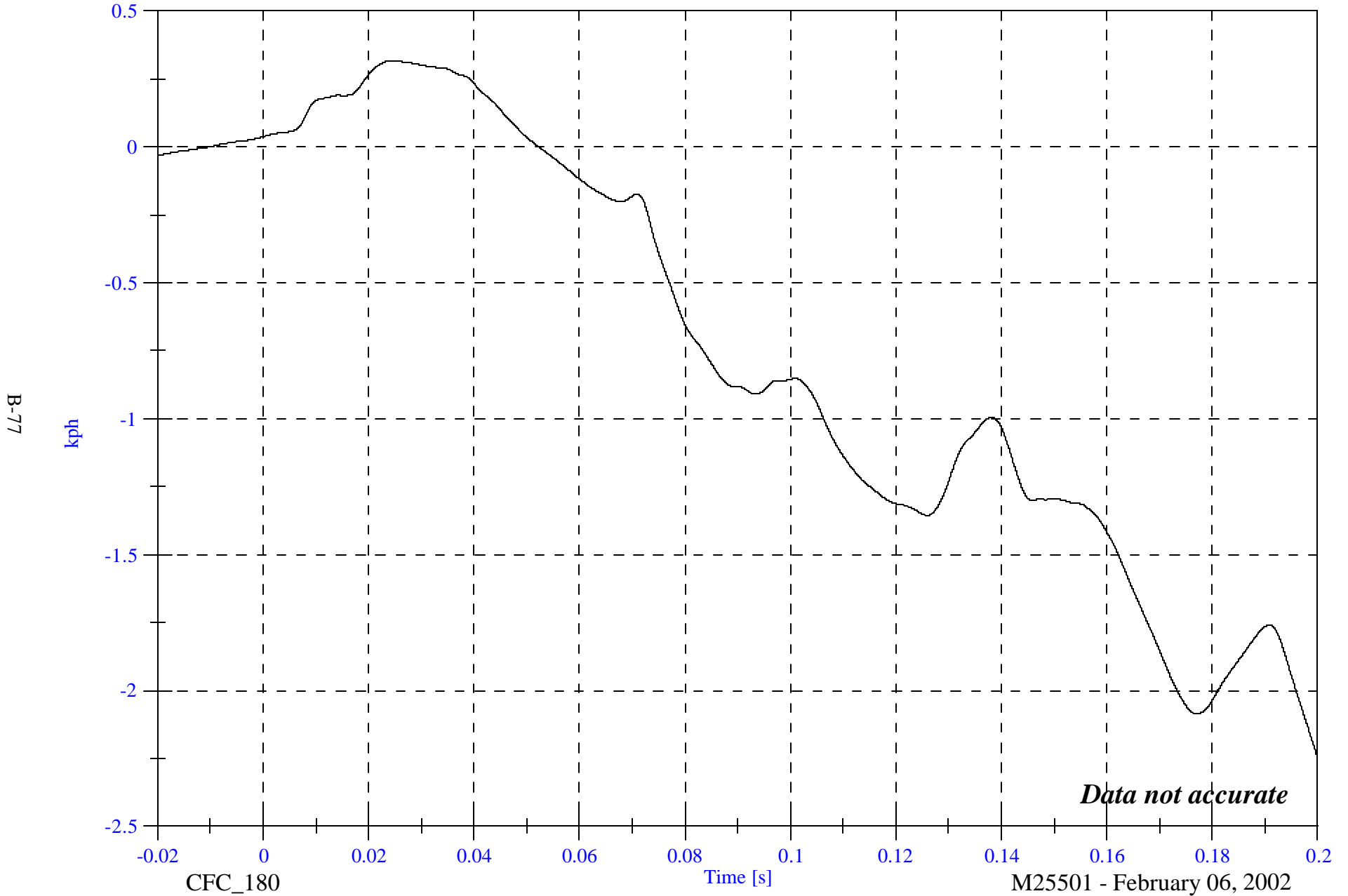
Data not accurate

2002 SNCAP Test 2 - 2002 Subaru Impreza

A18 Target CG Y Velocity

Max: 0.3 [kph] at 0.024 [s]

Min: -2.2 [kph] at 0.200 [s]

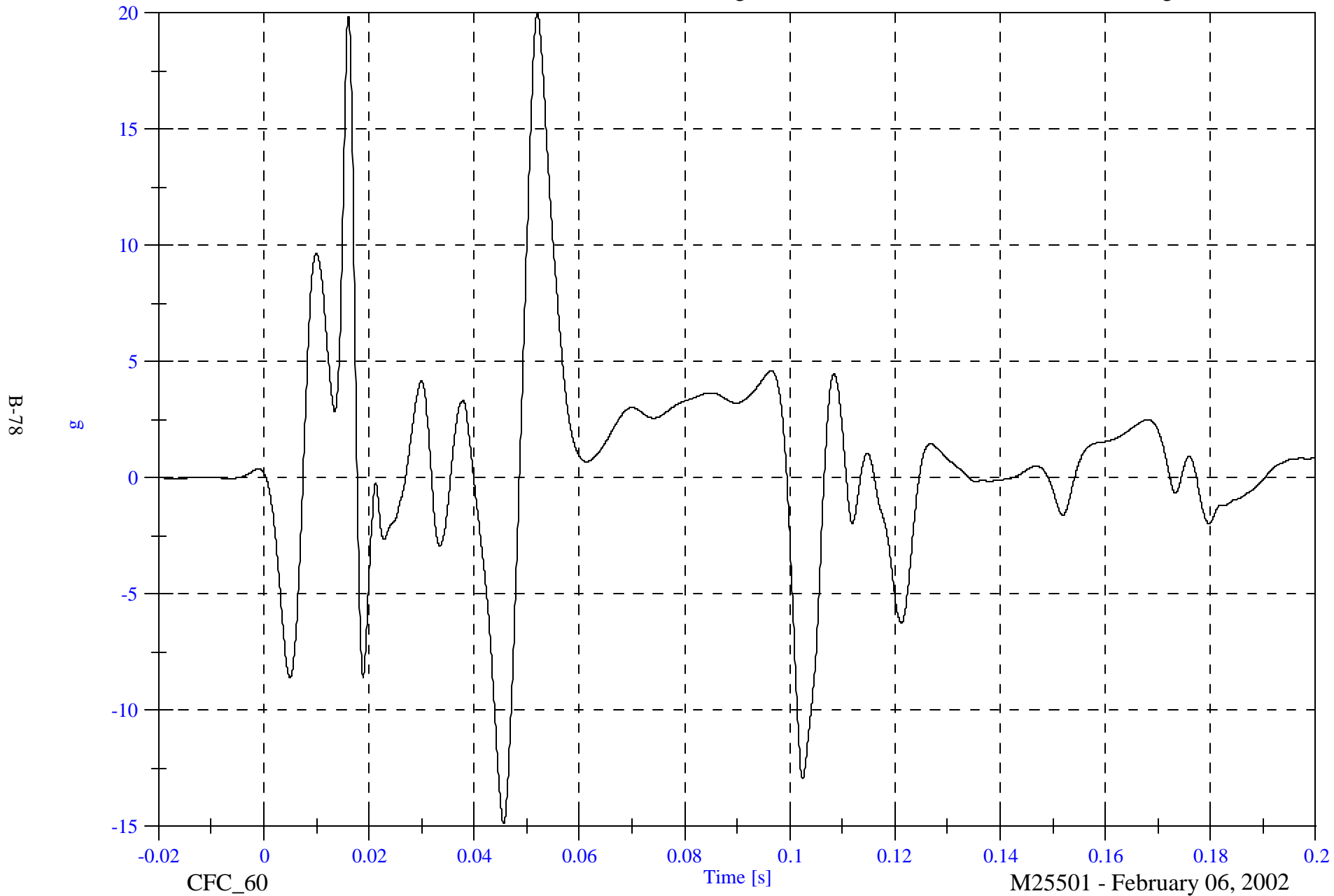


2002 SNCAP Test 2 - 2002 Subaru Impreza

A18 Target CG Z

Max: 20.0 [g] at 0.052 [s]

Min: -14.9 [g] at 0.046 [s]

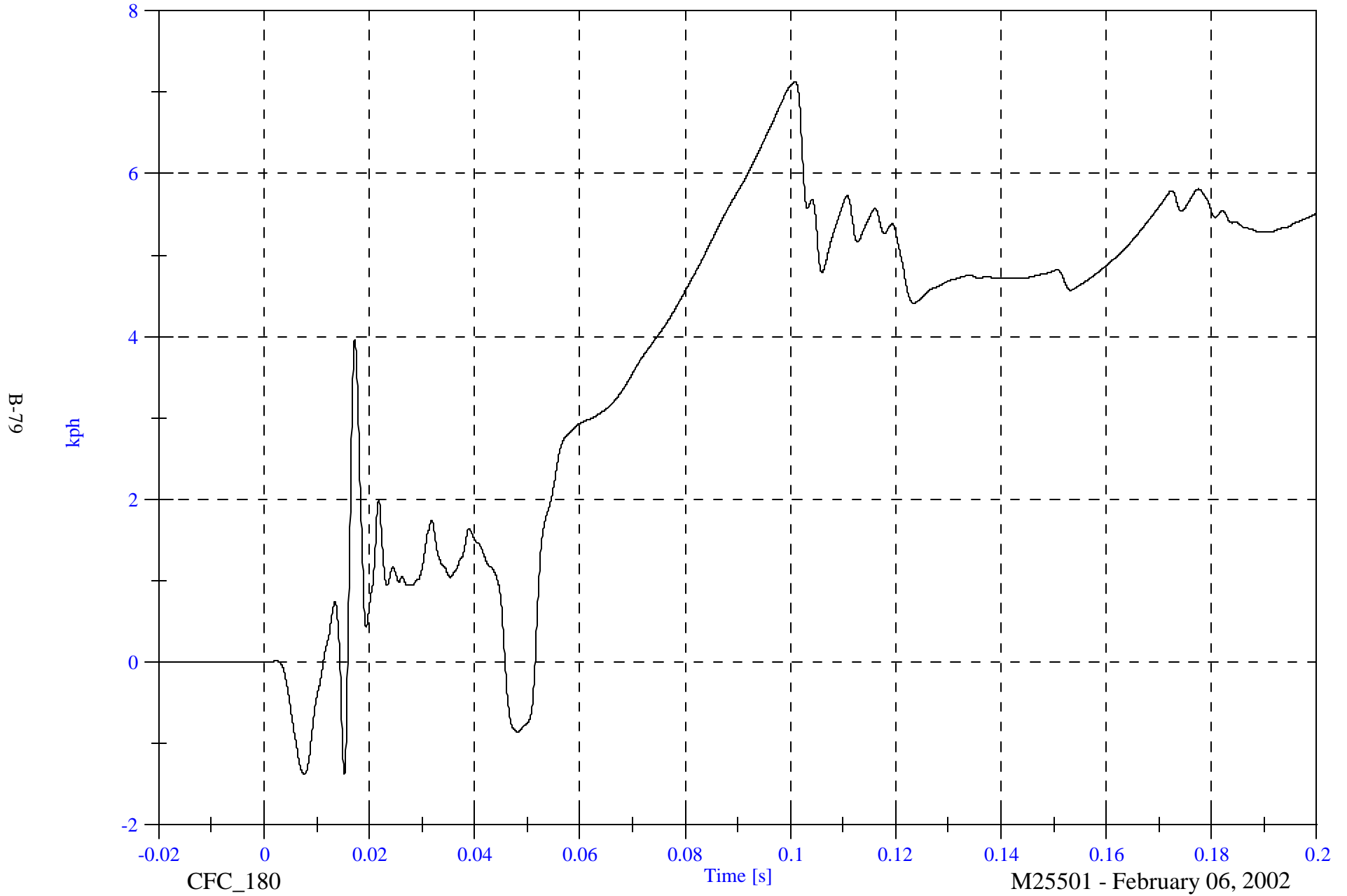


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 7.1 [kph] at 0.101 [s]

A18 Target CG Z Velocity

Min: -1.4 [kph] at 0.015 [s]

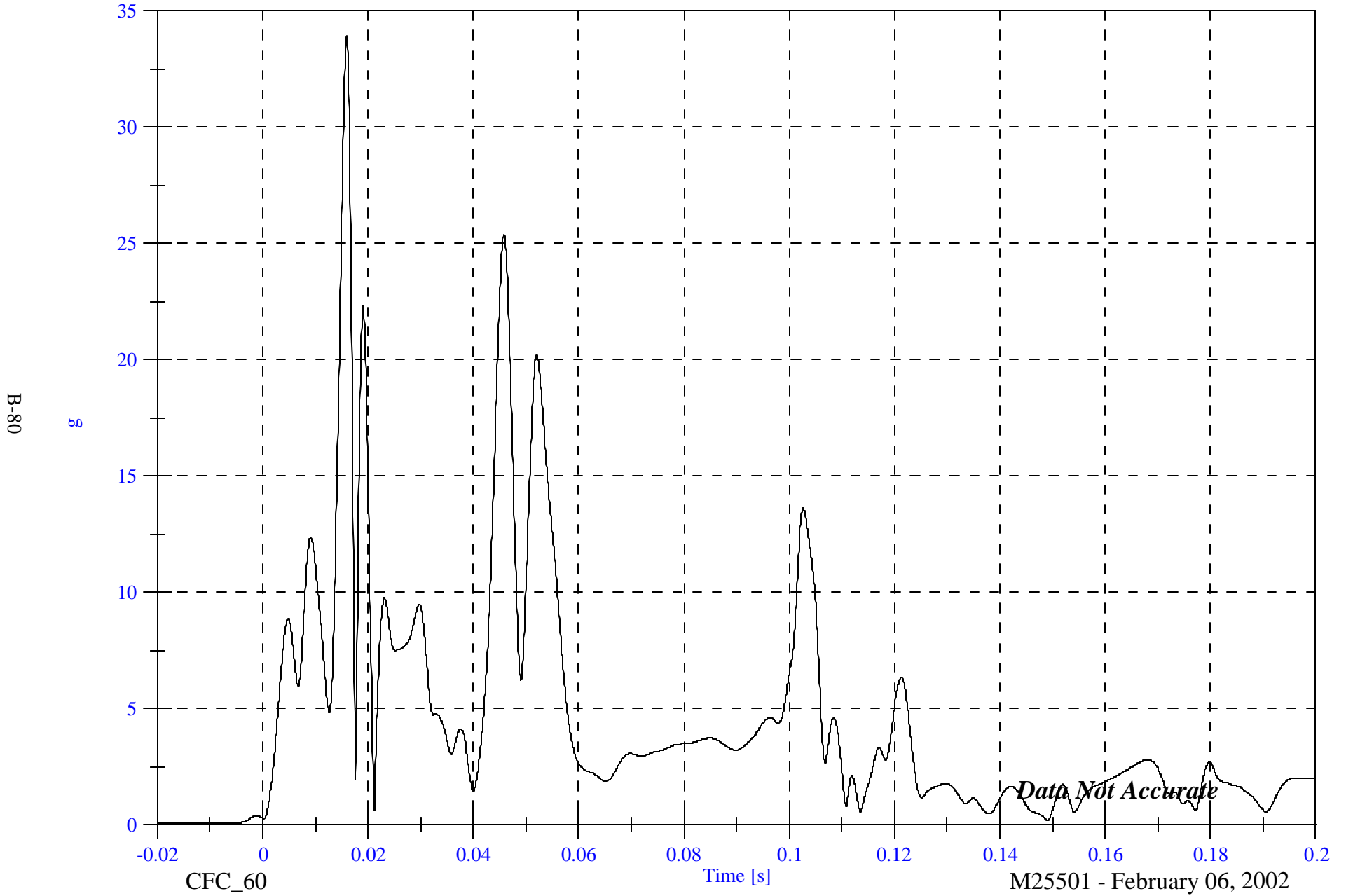


2002 SNCAP Test 2 - 2002 Subaru Impreza

A18 Target CG Resultant

Max: 33.9 [g] at 0.016 [s]

Min: 0.1 [g] at -0.005 [s]

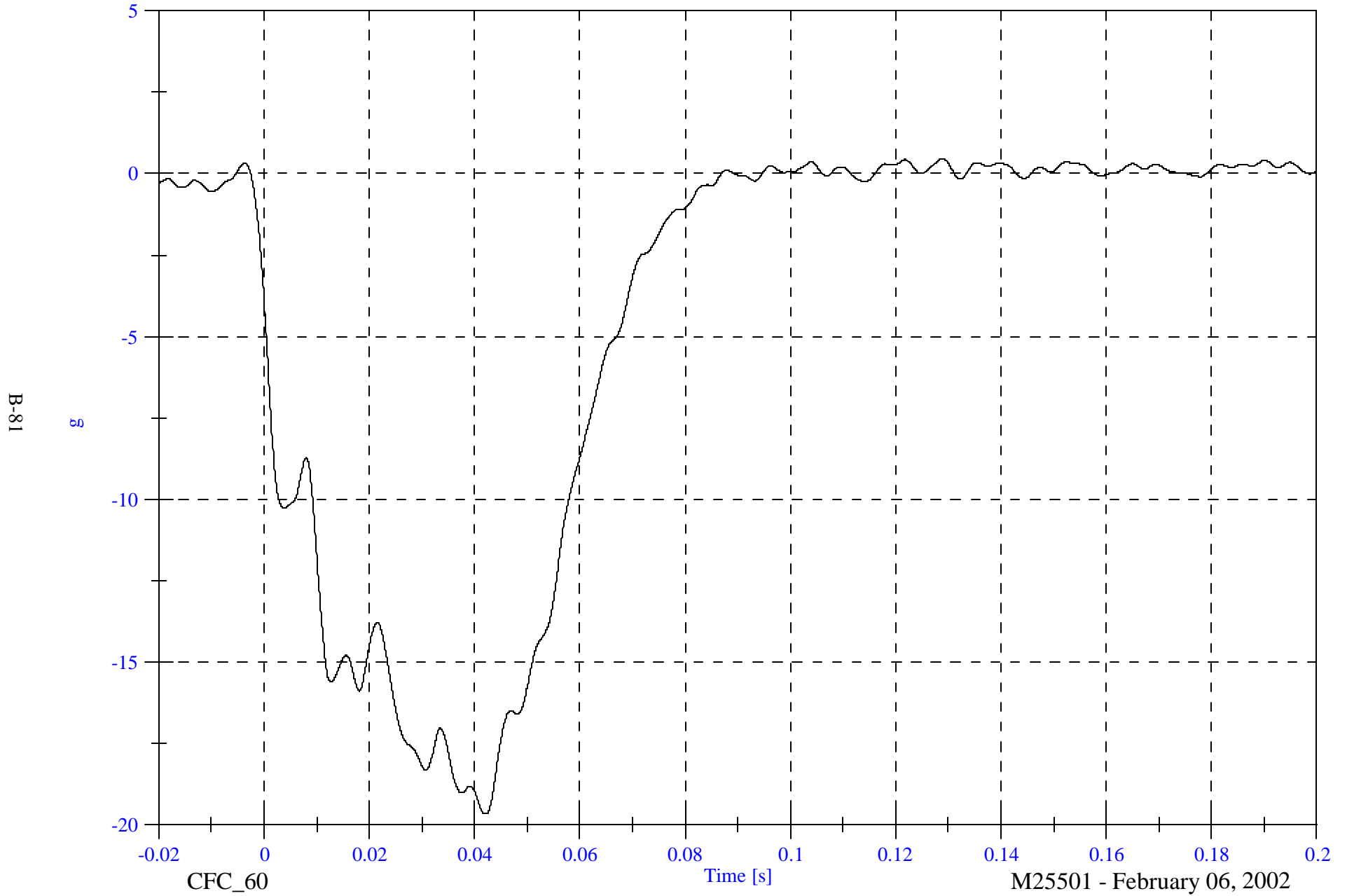


2002 SNCAP Test 2 - 2002 Subaru Impreza

Moving Barrier CG X

Max: 0.5 [g] at 0.129 [s]

Min: -19.7 [g] at 0.042 [s]



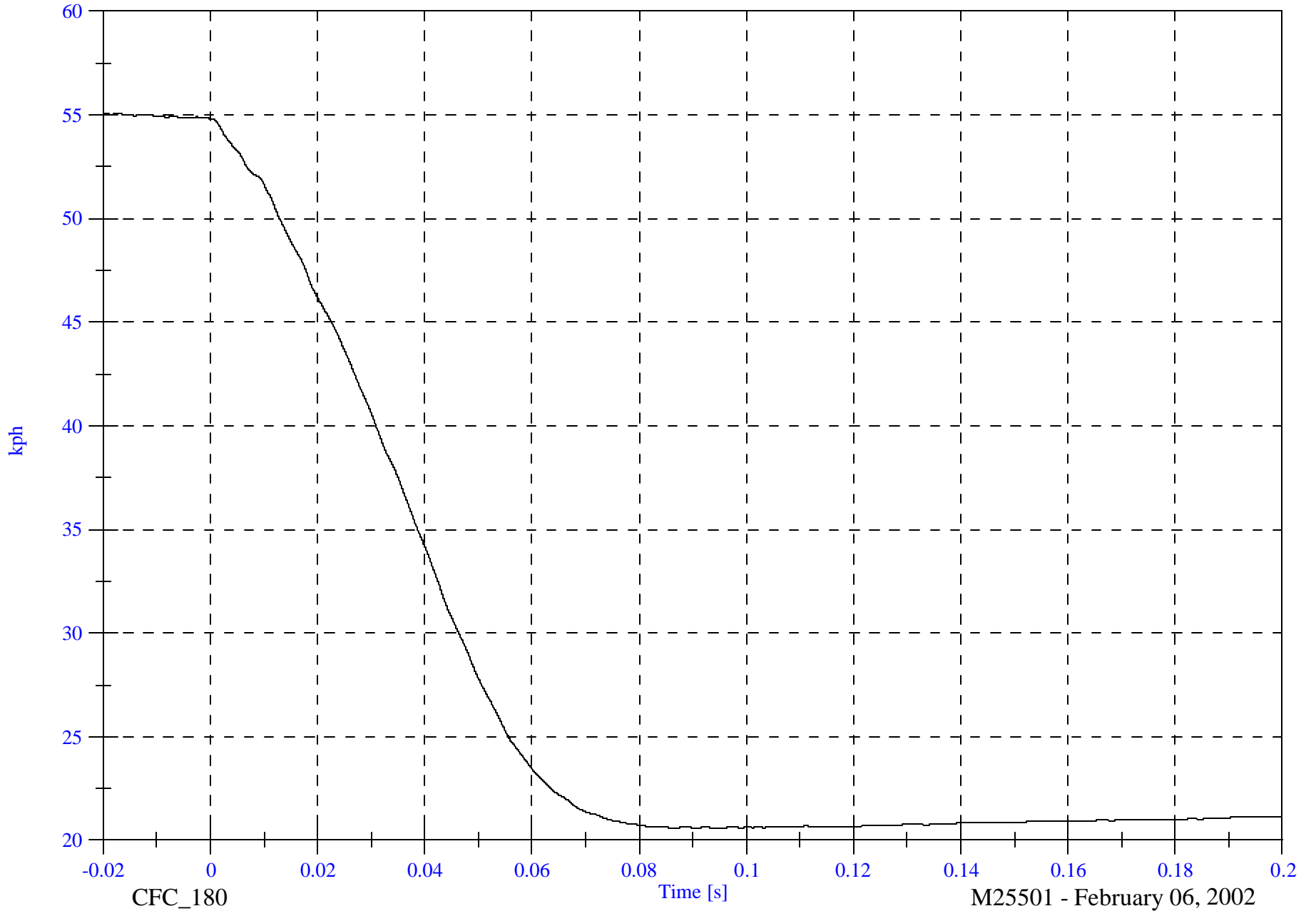
2002 SNCAP Test 2 - 2002 Subaru Impreza

Moving Barrier CG X Velocity

Max: 55.0 [kph] at -0.017 [s]

Min: 20.6 [kph] at 0.095 [s]

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CFC_180

Time [s]

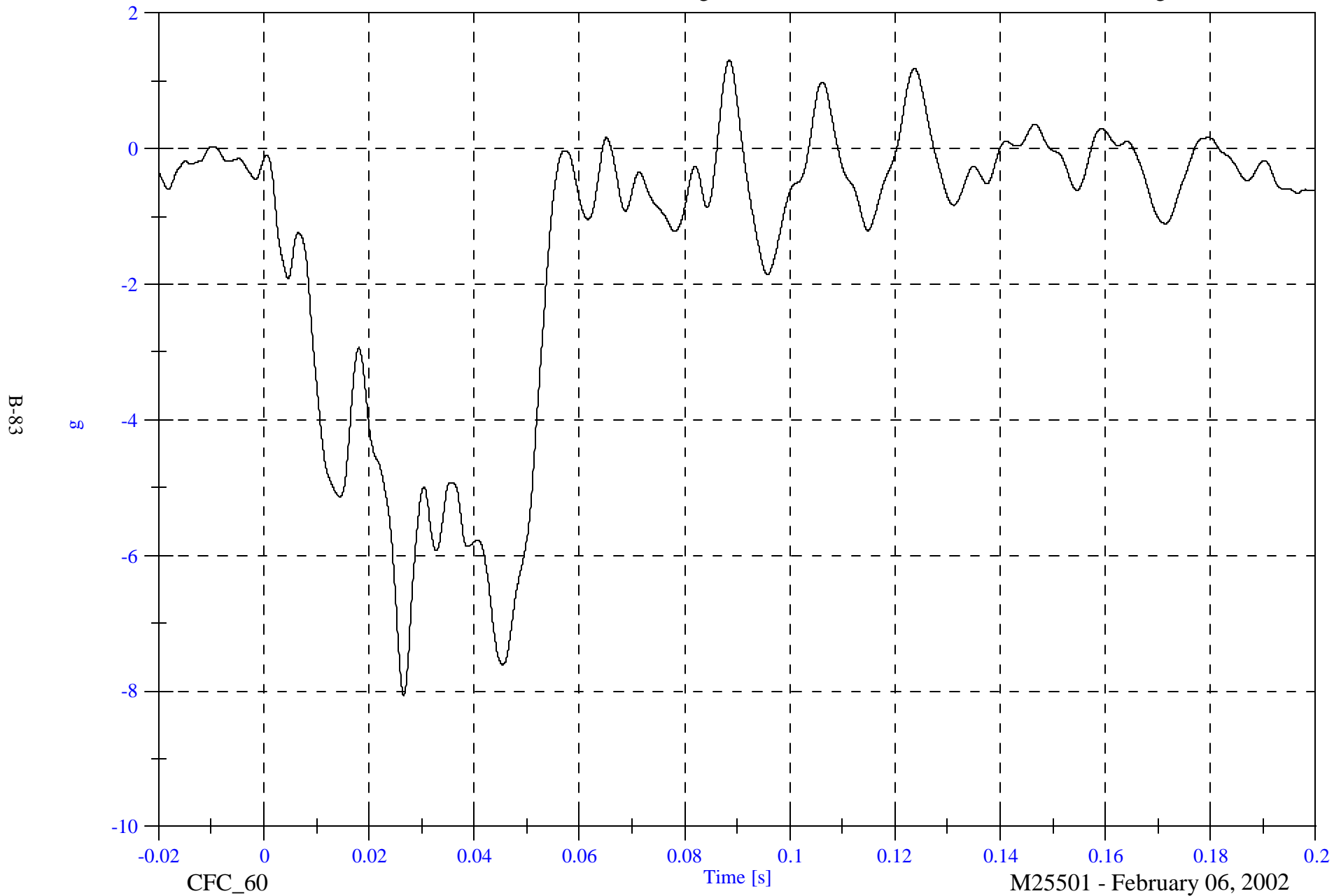
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

Moving Barrier CG Y

Max: 1.3 [g] at 0.089 [s]

Min: -8.1 [g] at 0.027 [s]

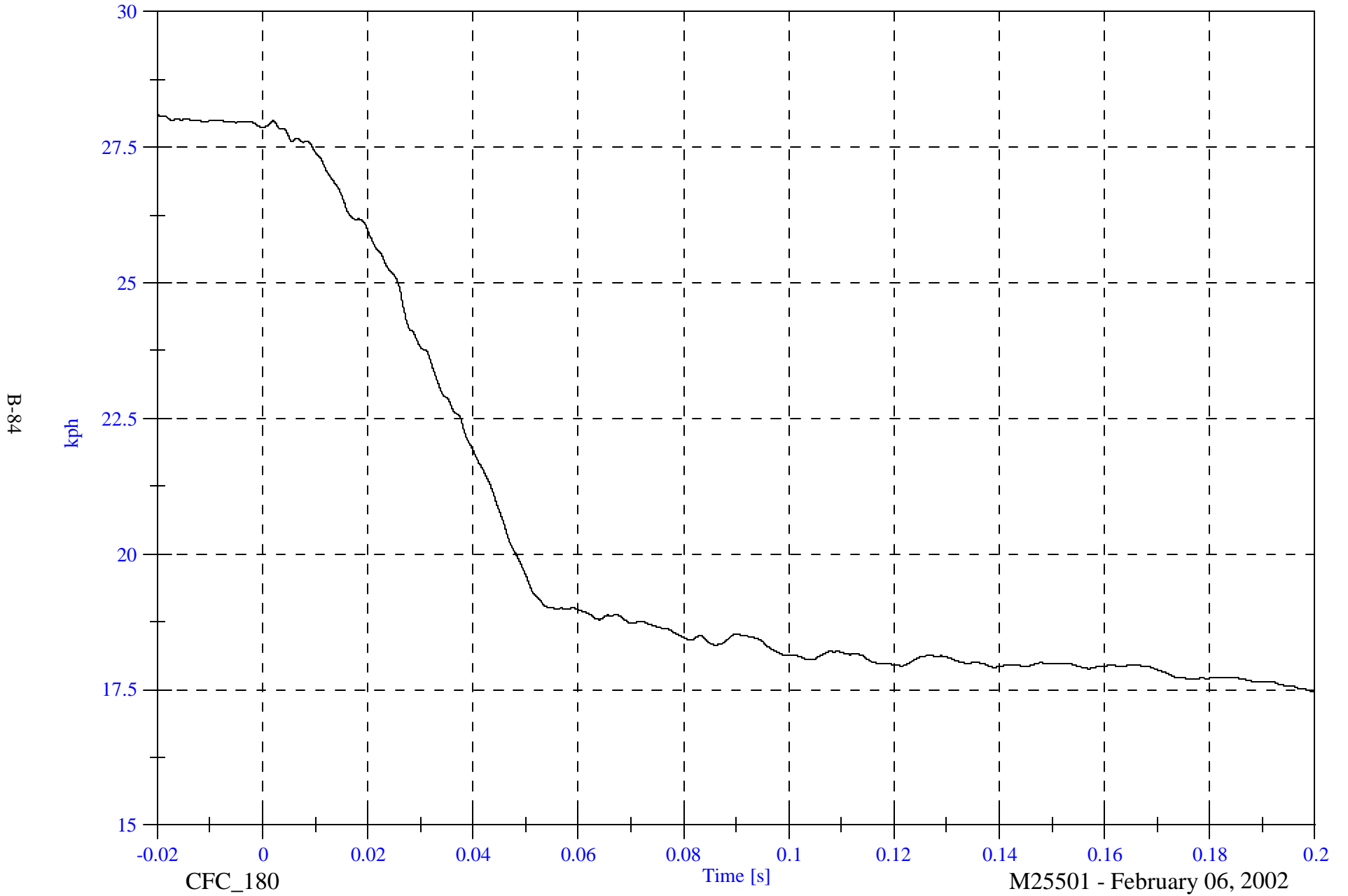


2002 SNCAP Test 2 - 2002 Subaru Impreza

Moving Barrier CG Y Velocity

Max: 28.1 [kph] at -0.020 [s]

Min: 17.5 [kph] at 0.200 [s]

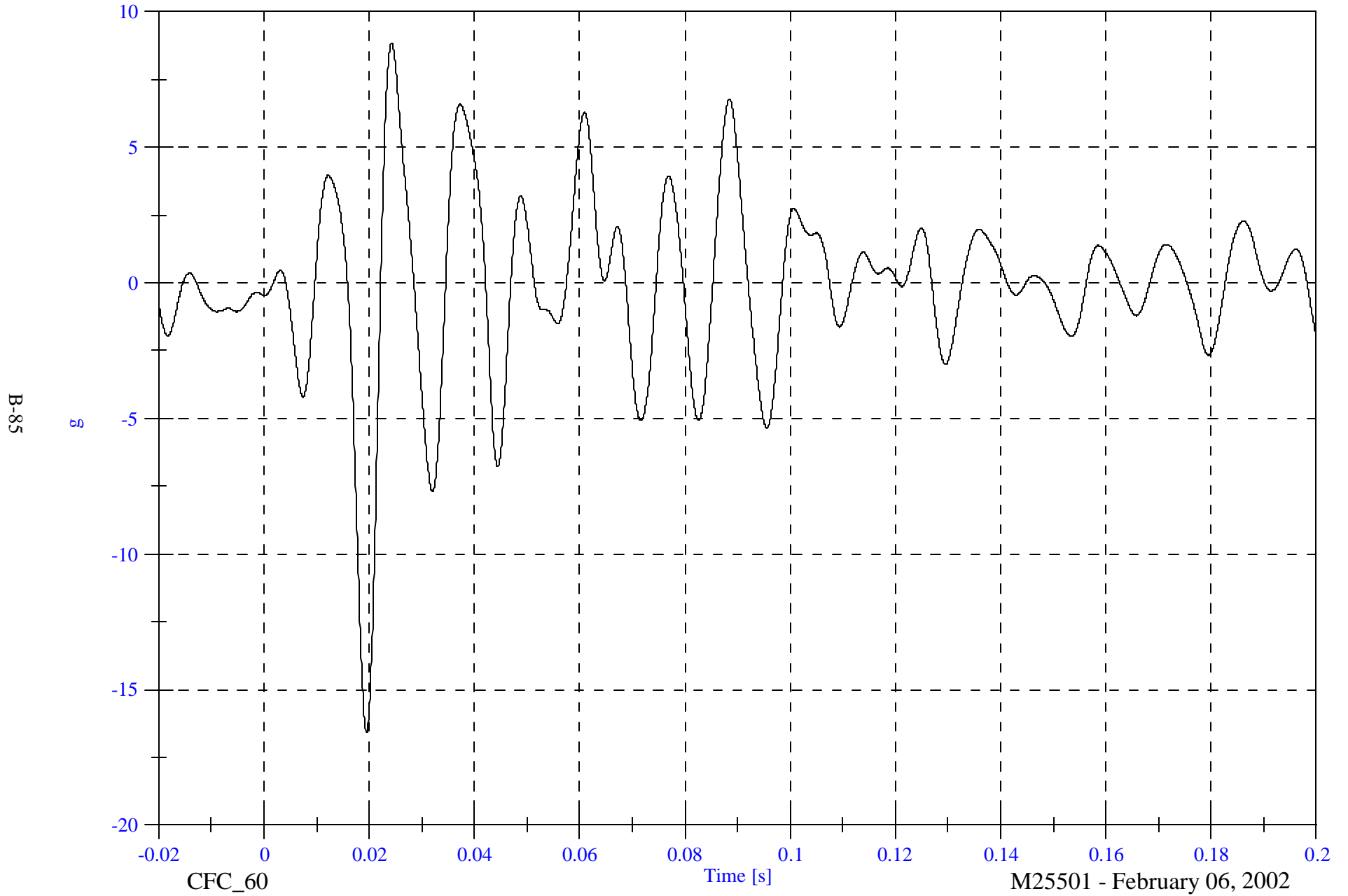


2002 SNCAP Test 2 - 2002 Subaru Impreza

Moving Barrier CG Z

Max: 8.8 [g] at 0.024 [s]

Min: -16.6 [g] at 0.019 [s]

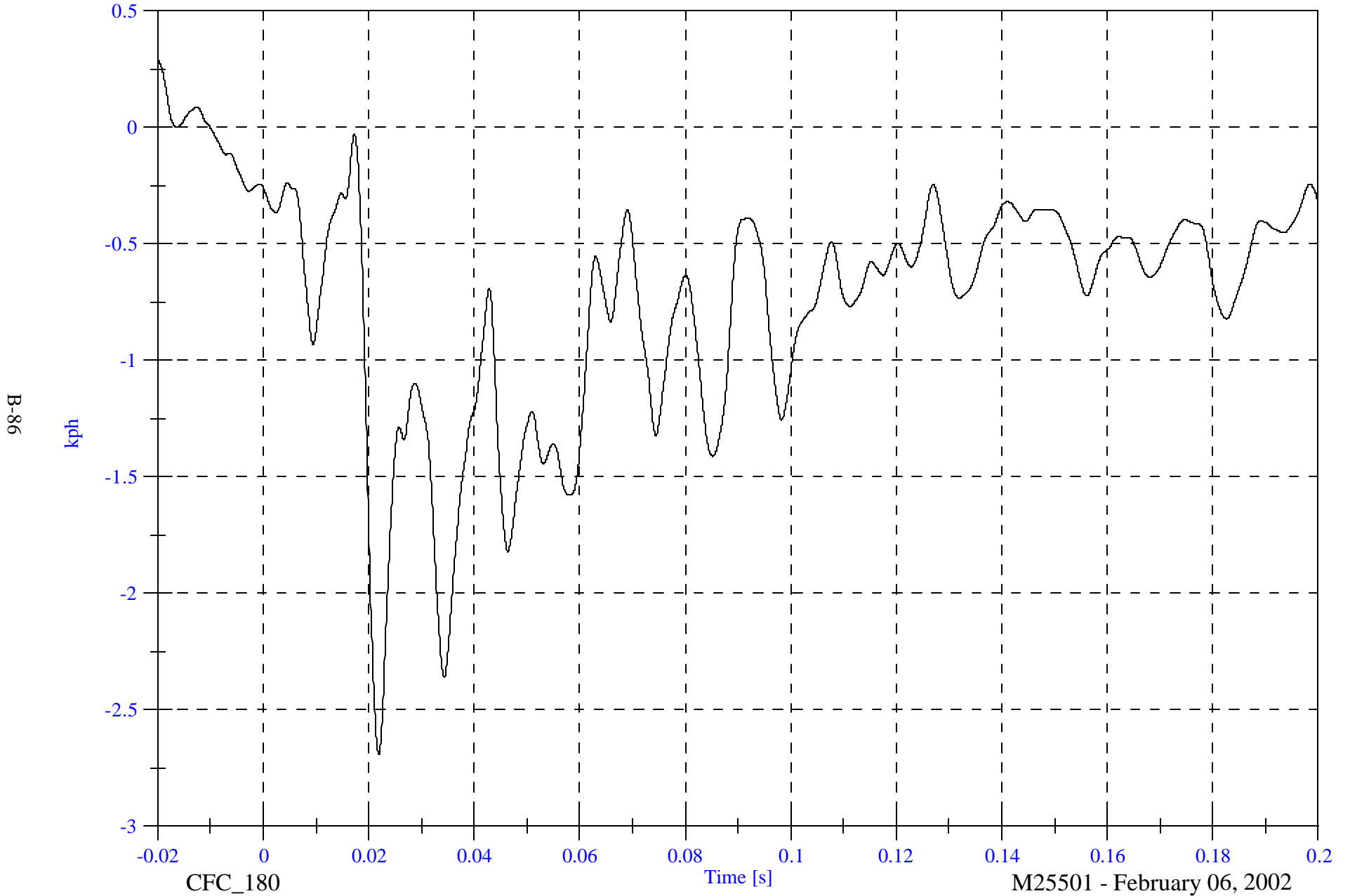


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 0.3 [kph] at -0.020 [s]

Moving Barrier CG Z Velocity

Min: -2.7 [kph] at 0.022 [s]

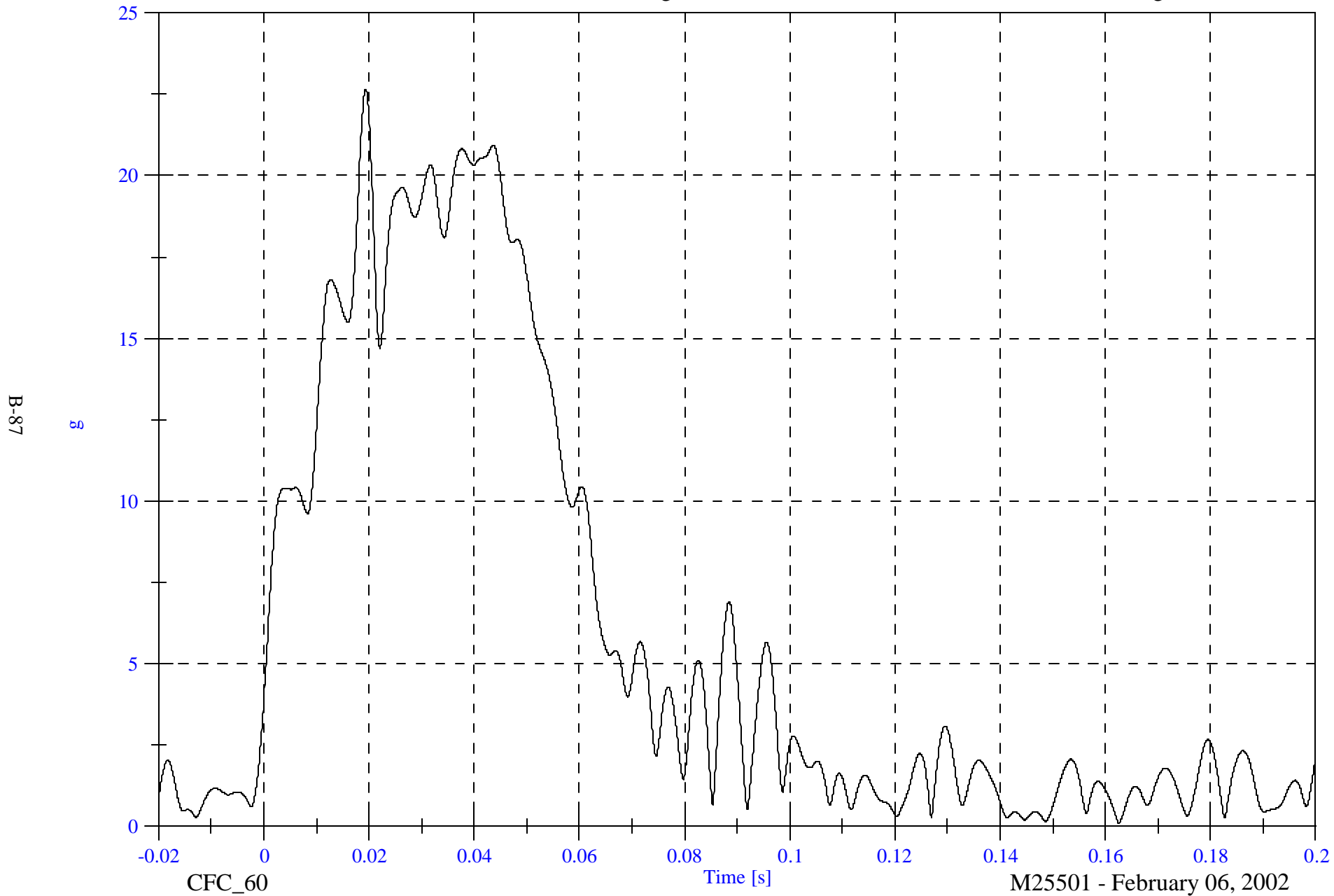


2002 SNCAP Test 2 - 2002 Subaru Impreza

Moving Barrier CG Resultant

Max: 22.7 [g] at 0.019 [s]

Min: 0.1 [g] at 0.163 [s]

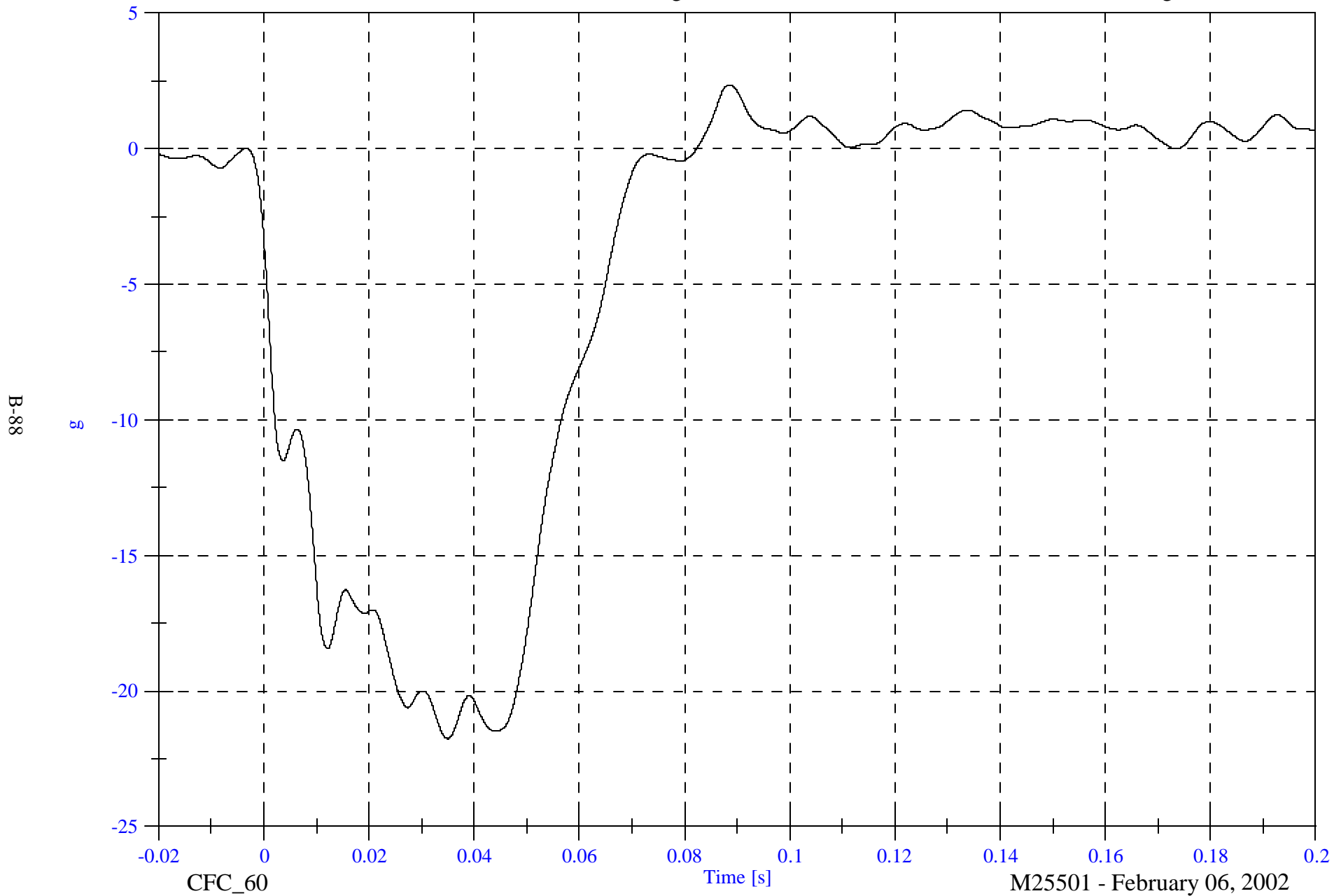


2002 SNCAP Test 2 - 2002 Subaru Impreza

Moving Barrier Left Rail X

Max: 2.3 [g] at 0.089 [s]

Min: -21.8 [g] at 0.035 [s]

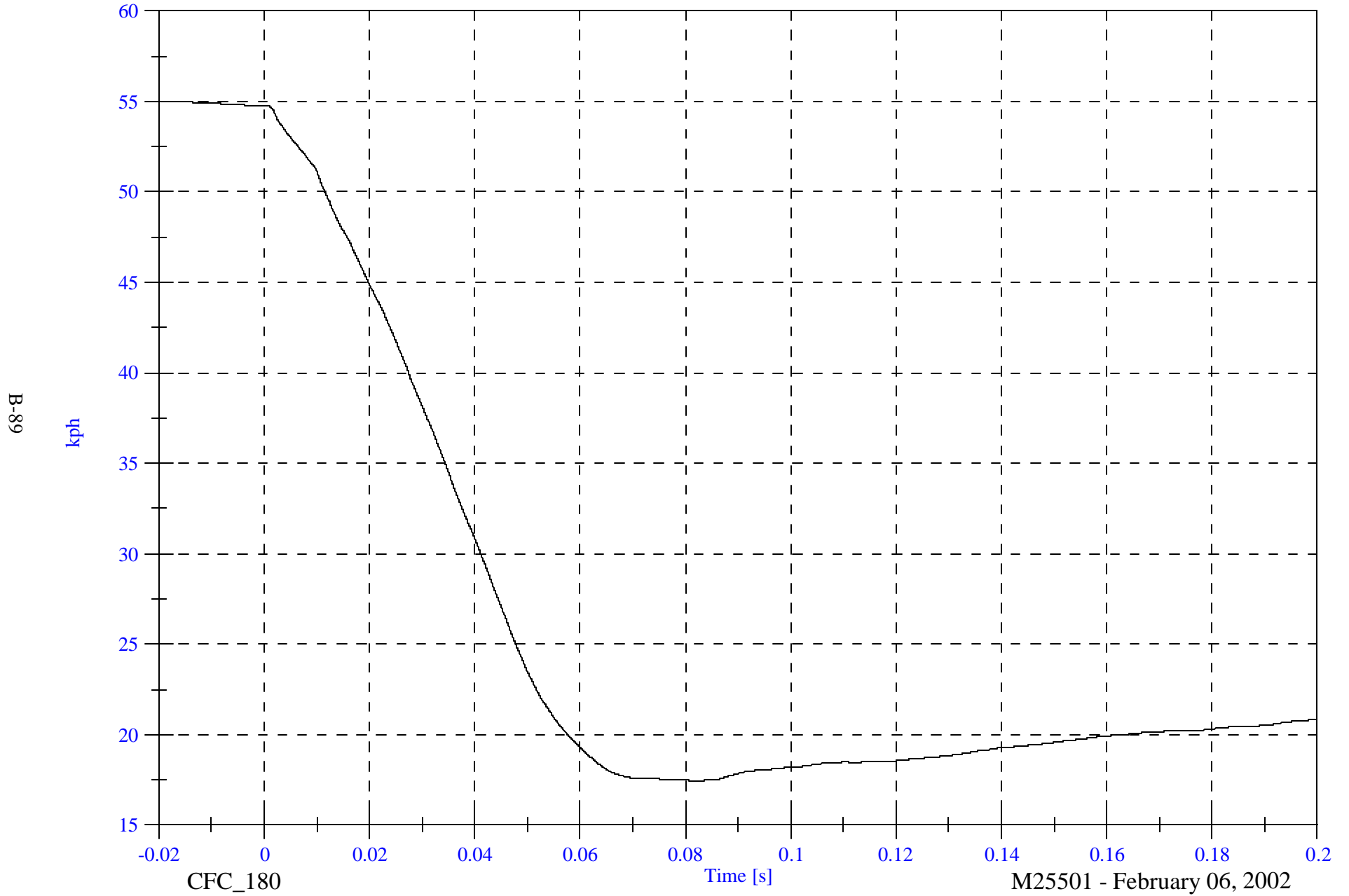


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 55.0 [kph] at -0.019 [s]

Moving Barrier Left Rail X Velocity

Min: 17.5 [kph] at 0.082 [s]



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CFC_180

Time [s]

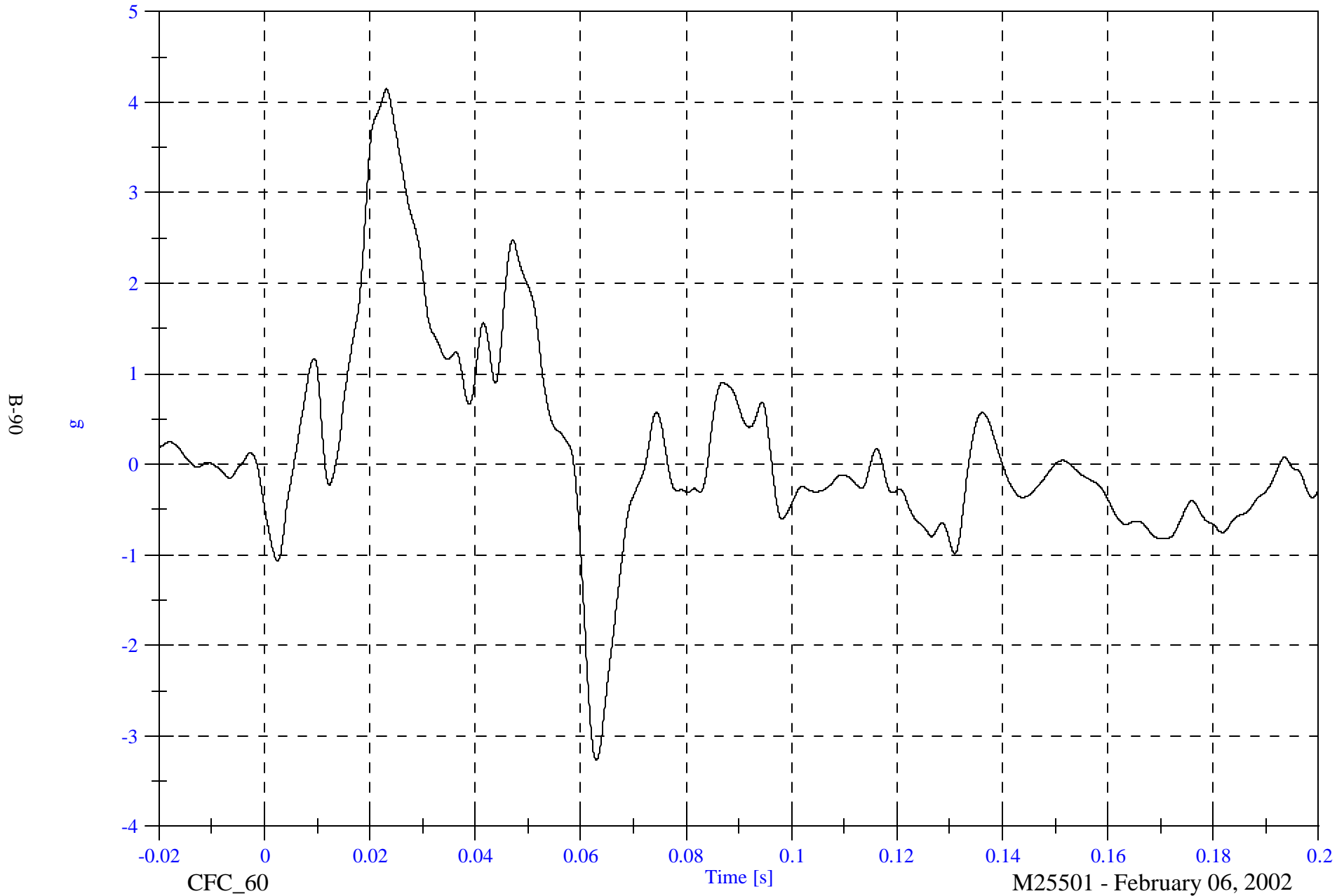
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

Moving Barrier Left Rail Y

Max: 4.1 [g] at 0.023 [s]

Min: -3.3 [g] at 0.063 [s]



CFC_60

M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 30.8 [kph] at 0.060 [s]

Moving Barrier Left Rail Y Velocity

Min: 27.8 [kph] at 0.004 [s]

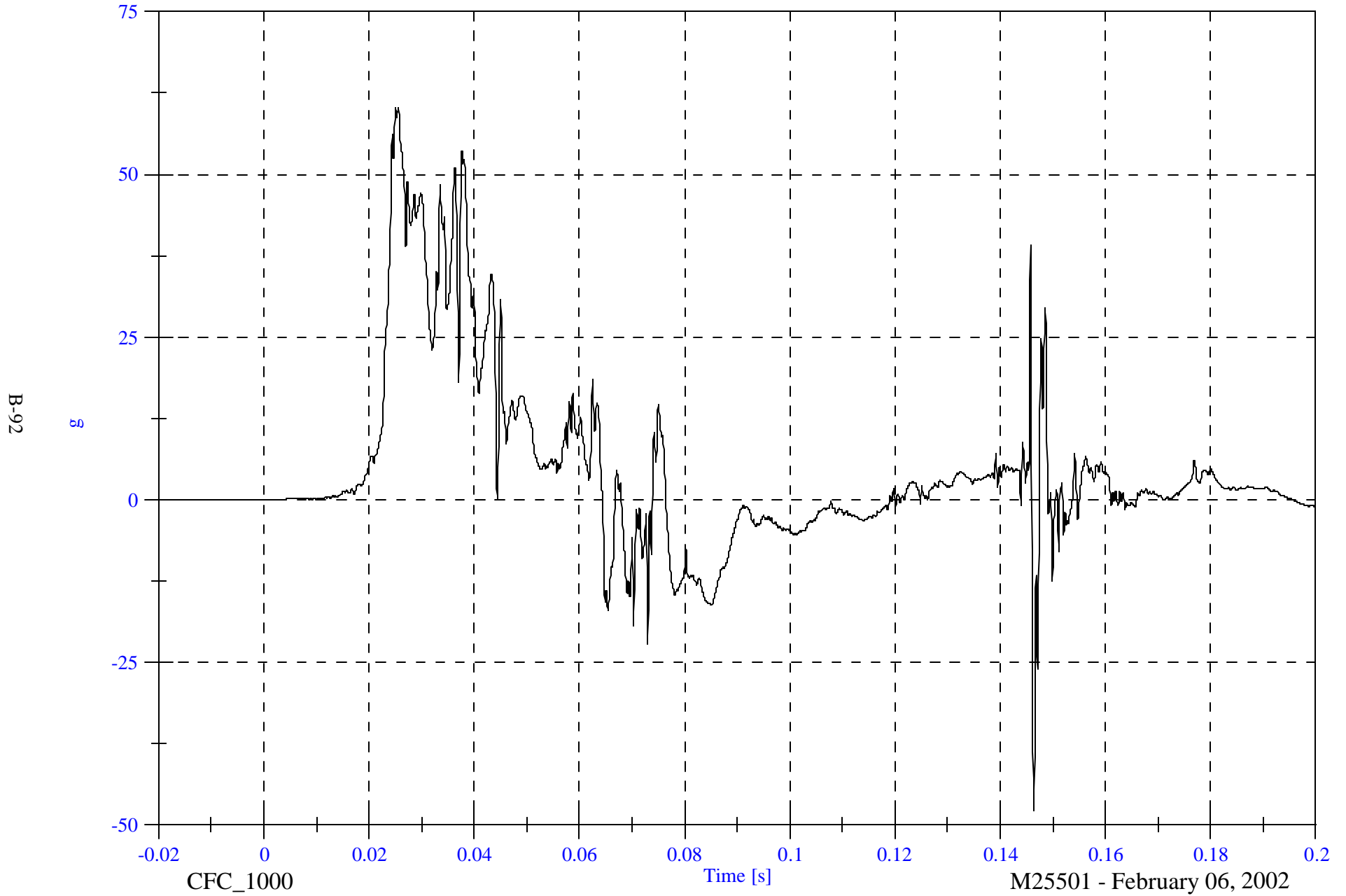


2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Upper Rib Ry

Max: 60.3 [g] at 0.026 [s]

Min: -47.7 [g] at 0.146 [s]

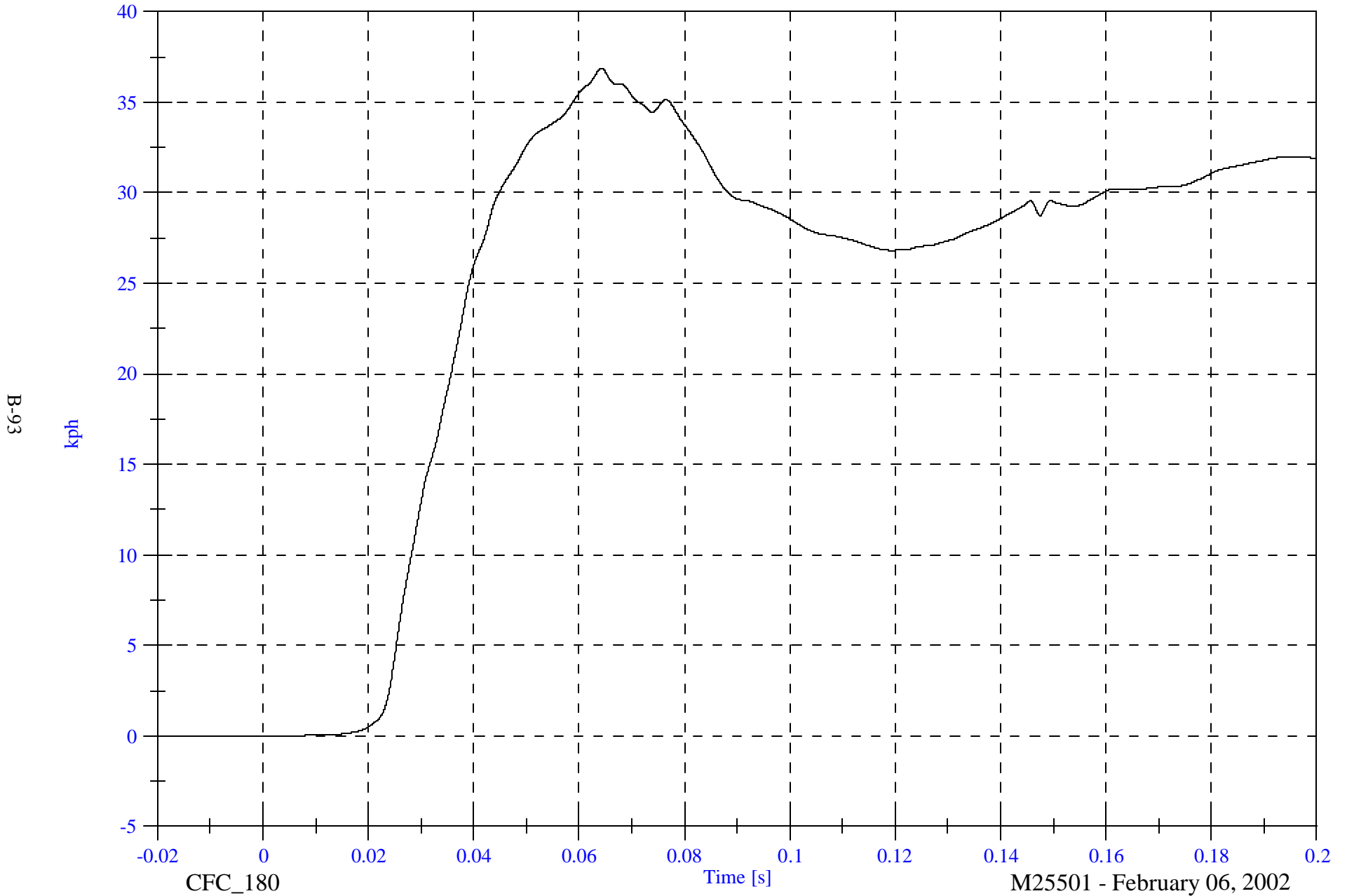


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 36.9 [kph] at 0.064 [s]

P1 Upper Rib Ry Velocity

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

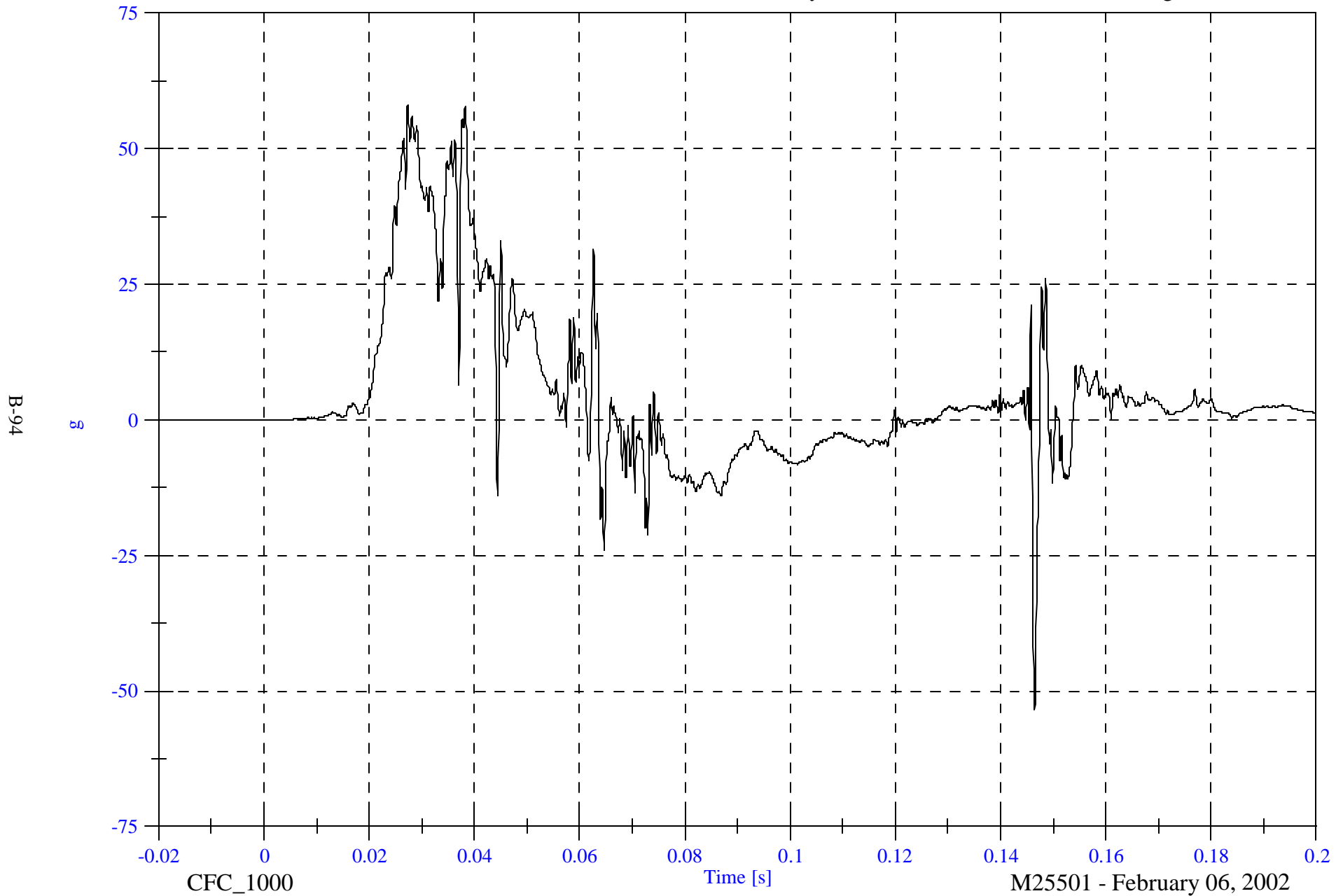


2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Lower Rib Ry

Max: 58.0 [g] at 0.027 [s]

Min: -53.6 [g] at 0.146 [s]

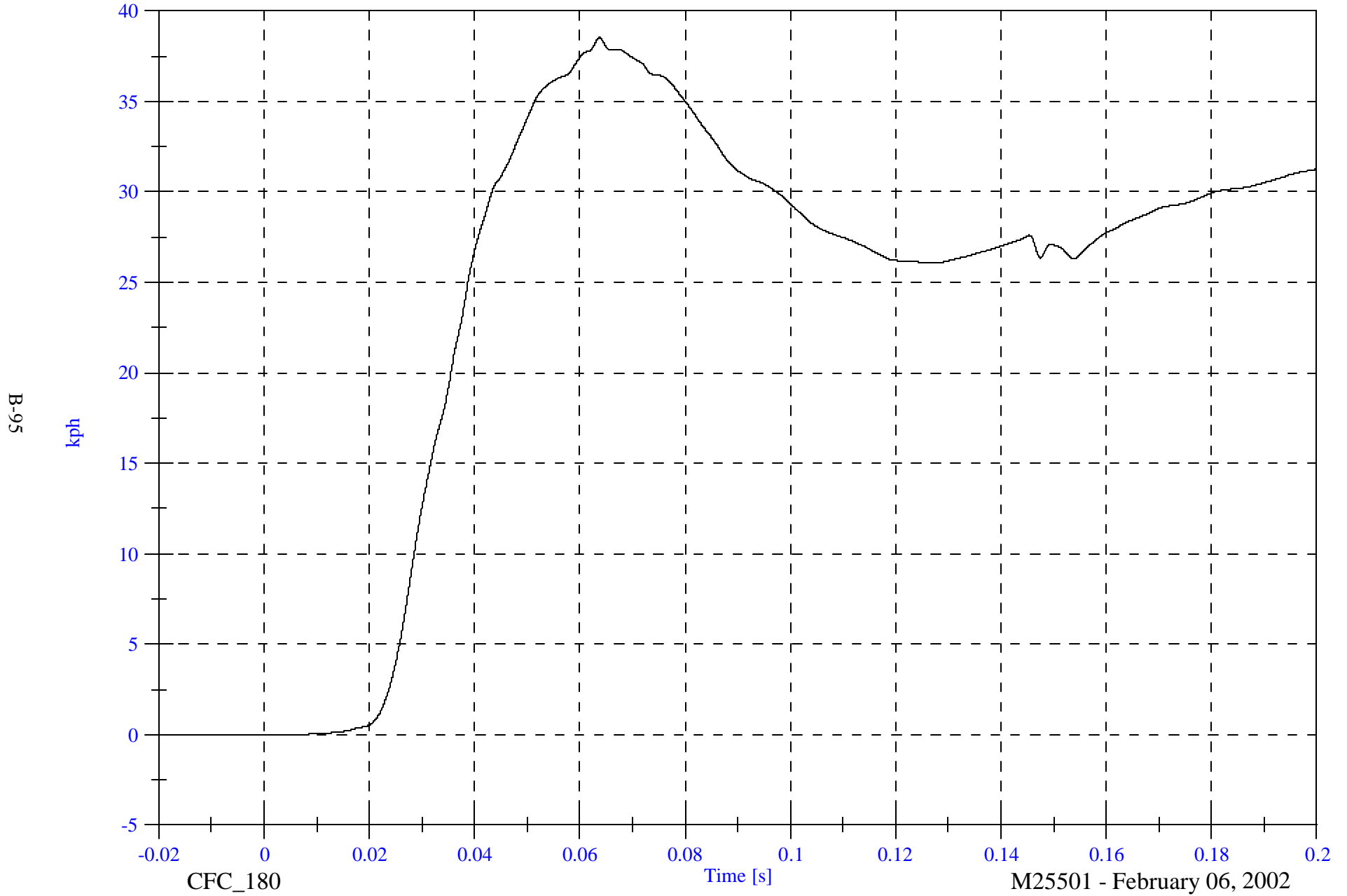


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 38.5 [kph] at 0.064 [s]

P1 Lower Rib Ry Velocity

Min: -0.0 [kph] at -0.007 [s]

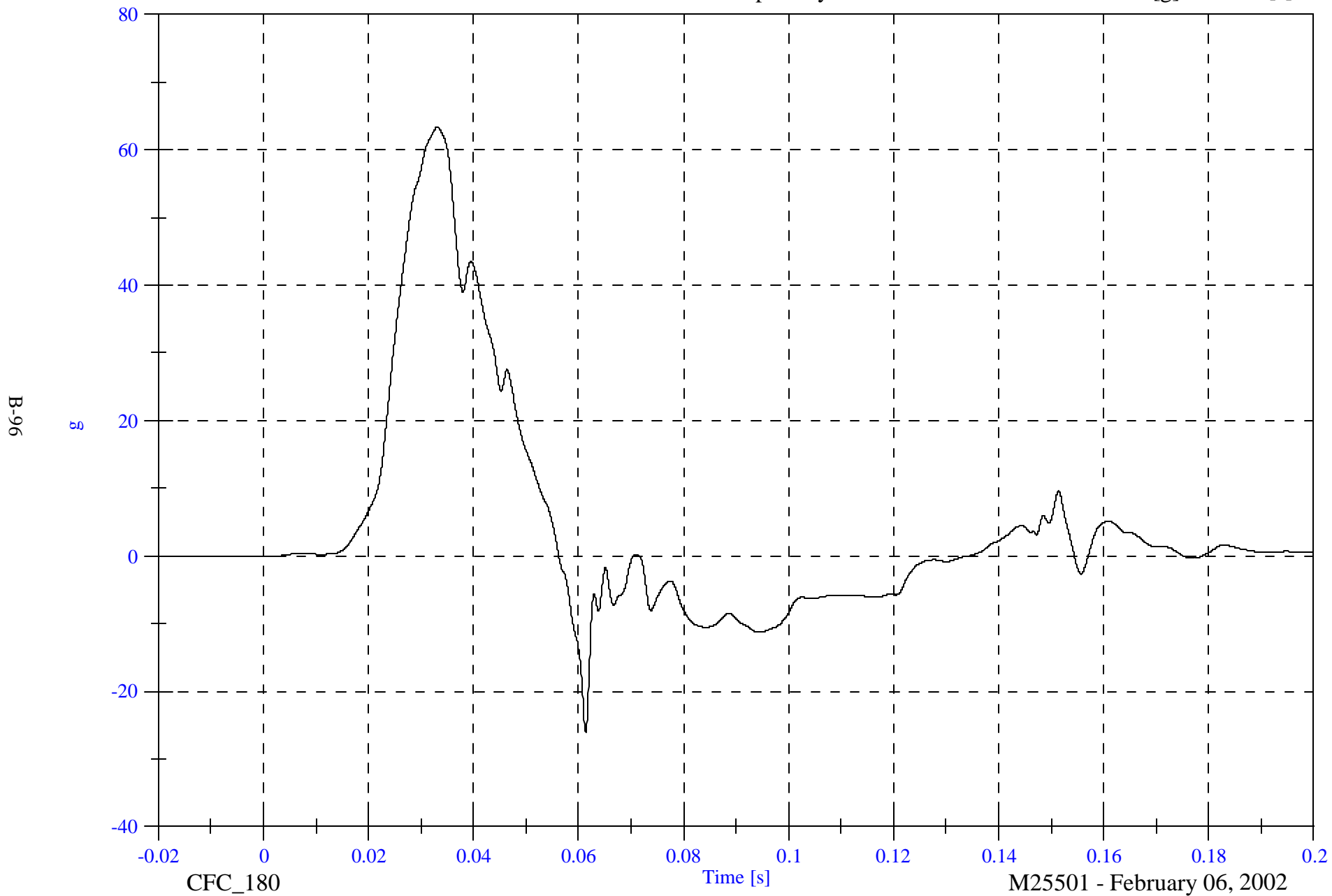


2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Lower Spine Ry

Max: 63.4 [g] at 0.033 [s]

Min: -26.0 [g] at 0.061 [s]

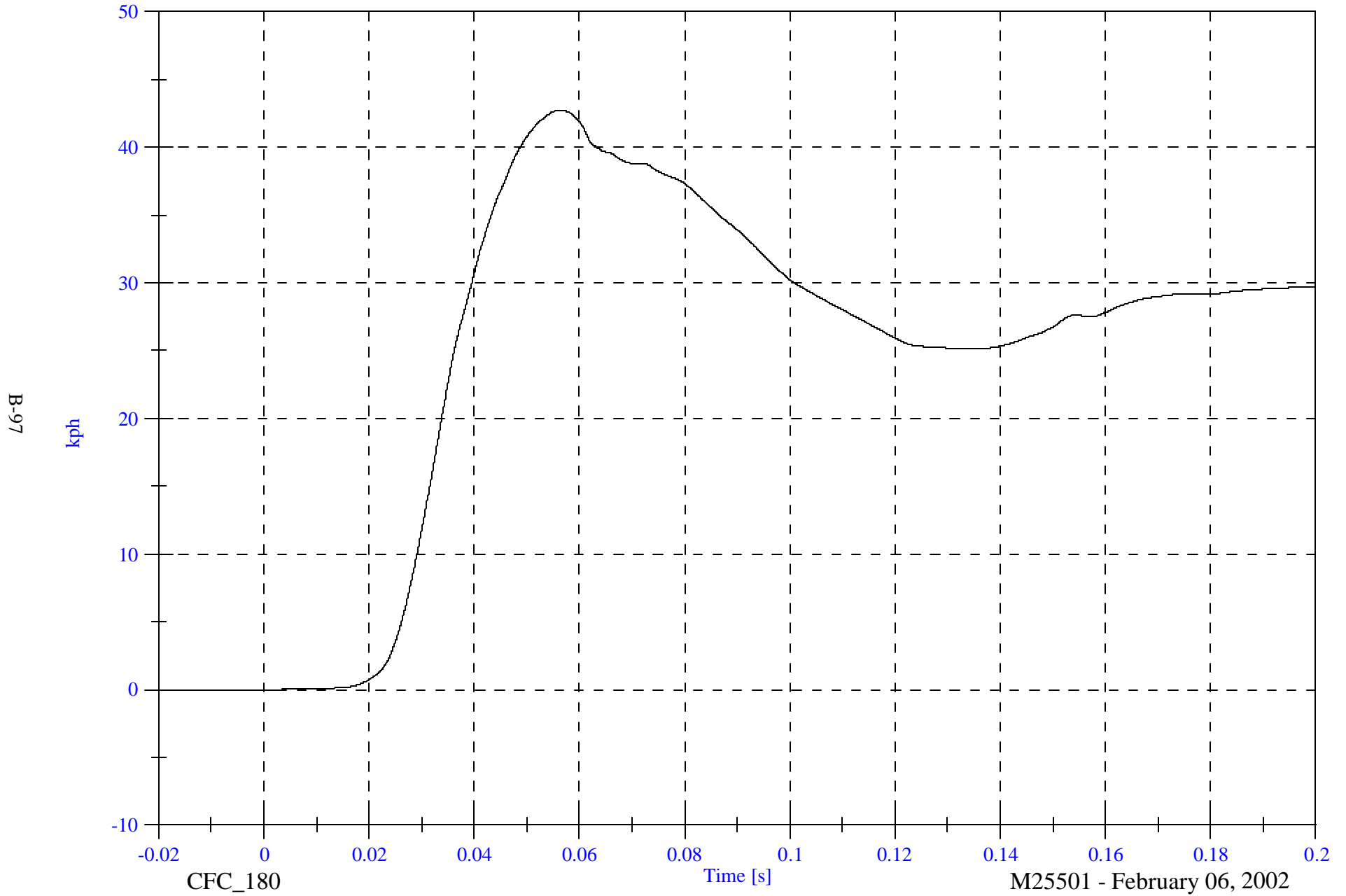


2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Lower Spine Ry Velocity

Max: 42.7 [kph] at 0.056 [s]

Min: -0.0 [kph] at -0.019 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Pelvic Ry

Max: 54.3 [g] at 0.027 [s]

Min: -11.5 [g] at 0.091 [s]



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g

CFC_1000

Time [s]

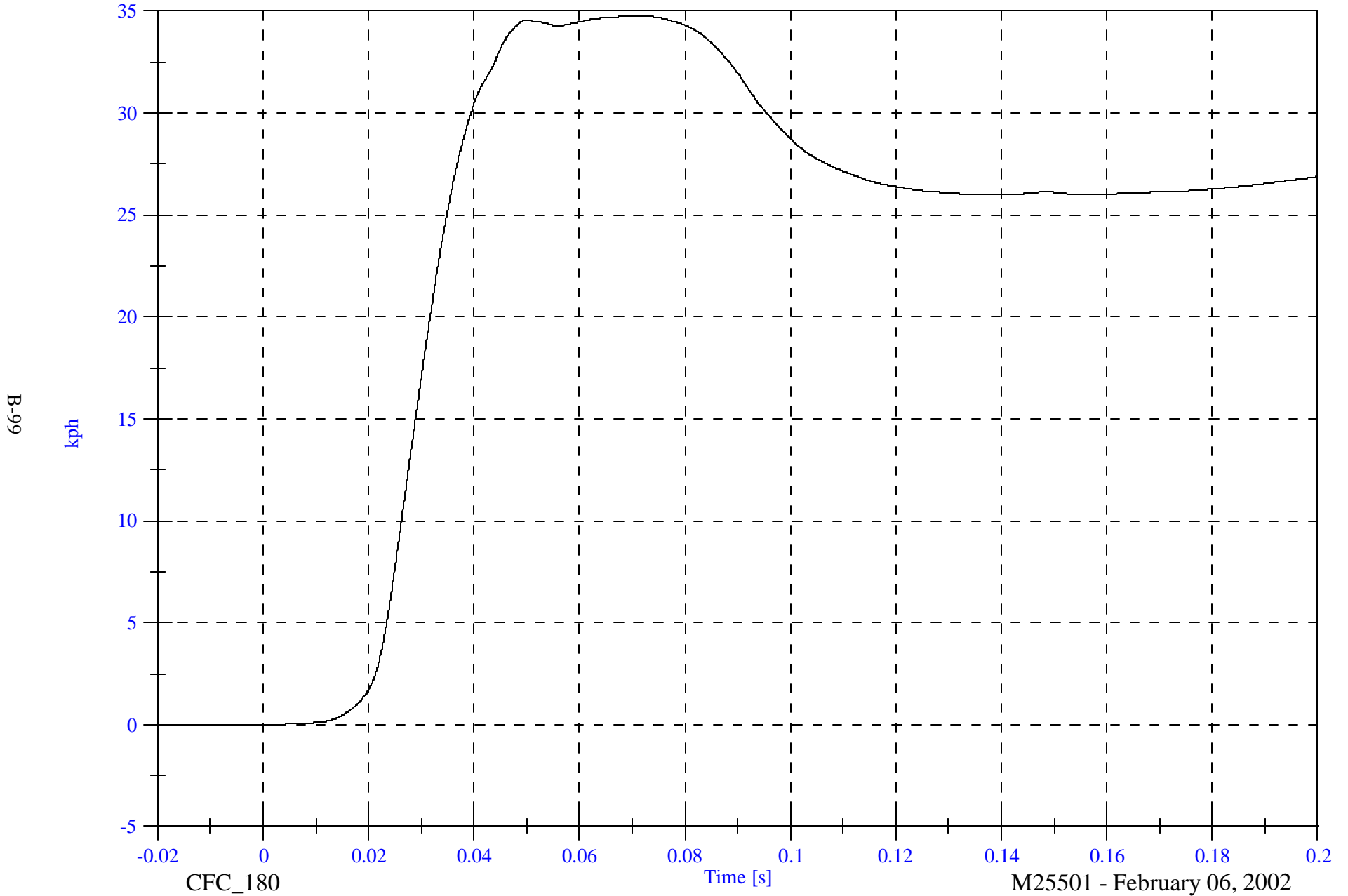
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 34.7 [kph] at 0.069 [s]

Min: -0.0 [kph] at -0.020 [s]

P1 Pelvic Ry Velocity



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kph

CFC_180

Time [s]

M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Upper Rib Ry

Max: 54.1 [g] at 0.027 [s]

Min: -14.8 [g] at 0.086 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Lower Rib Ry

Max: 52.8 [g] at 0.028 [s]

Min: -12.0 [g] at 0.081 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Lower Spine Ry

Max: 63.7 [g] at 0.033 [s]

Min: -17.0 [g] at 0.061 [s]

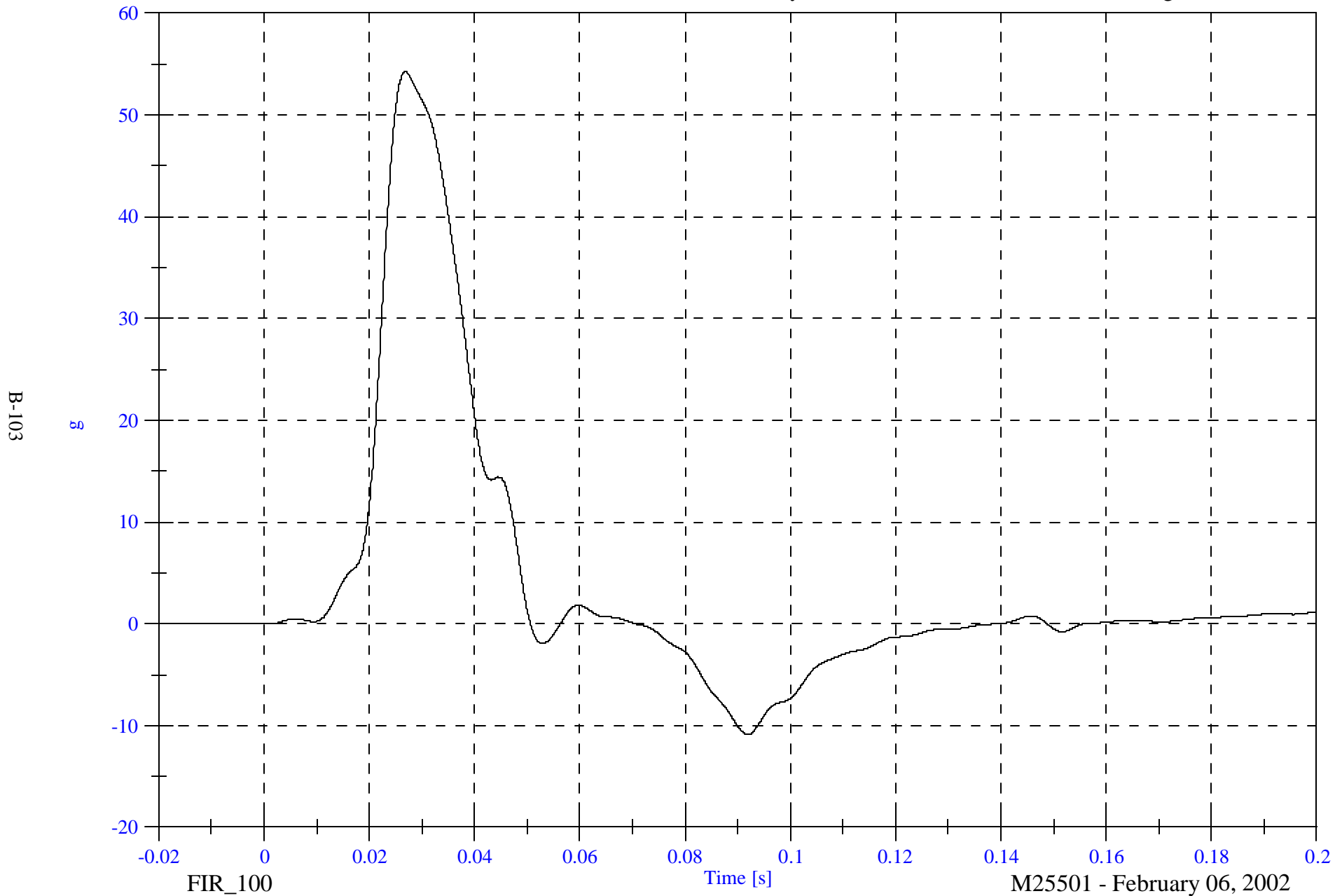


2002 SNCAP Test 2 - 2002 Subaru Impreza

P1 Pelvic Ry

Max: 54.3 [g] at 0.027 [s]

Min: -10.9 [g] at 0.092 [s]



APPENDIX C

SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA

**SUMMARY
SID PRE & POST TEST CALIBRATION**

CONFIGURED FOR LEFT SIDE IMPACT

Date: 1/14/2002, 2/18/2002

Sequential Test Number:

1, 2

Laboratory Technician:

B. Swiecicki

| TEST PARAMETER | SPECIFICATION | SID NO.: 013 | |
|------------------------------------|---------------|--------------|-----------|
| | | PRE TEST | POST TEST |
| SH- Seated Height (mm) | 889 - 909 | 902 | 902 |
| RH- Rib Height (mm) | 501 - 521 | 513 | 513 |
| HP- Hip Pivot Height (mm) | 99 ref. | 99 | 99 |
| RD- Rib from Back Line (mm) | 229 - 241 | 236 | 236 |
| KV- Knee Pivot from Back Line (mm) | 511 - 526 | 518 | 518 |
| SW- Knee Pivot to Floor (mm) | 490 - 505 | 493 | 493 |
| HW- Hip Width (mm) | 356 - 391 | 378 | 379 |
| THORAX IMPACTS | | | |
| TEMPERATURE (? C) | 18.9 - 25.5 | 21.7 | 21.7 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 30 | 30 |
| PROBE SPEED (m/s) | 4.27 - 4.33 | 4.32 | 4.29 |
| UPPER RIB (g's) | 37 - 46 | 38.7 | 42.15 |
| LOWER RIB (g's) | 37 - 46 | 42.1 | 44.54 |
| LOWER SPINE (g's) | 15 - 22 | 18.2 | 19.07 |
| PELVIS IMPACT | | | |
| TEMPERATURE (? C) | 18.9 - 25.5 | 21.7 | 21.7 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 30 | 30 |
| PROBE SPEED (m/s) | 4.27 - 4.33 | 4.28 | 4.30 |
| PELVIS (g's) | 40 - 60 | 44.8 | 48.26 |

REMARKS: None

CALIBRATION TEST RESULTS

PRE-TEST

SID NO.: 013

CONFIGURED FOR LEFT SIDE IMPACT

**CALIBRATION TEST RESULTS SUMMARY
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 1
Date: 1/14/02 Laboratory Technician: B. Swiecicki

| TEST | COMMENTS |
|------------------------------|--------------------------|
| EXTERNAL DIMENSIONS | Passed all requirements. |
| THORACIC SHOCK ABSORBER TEST | Passed all requirements. |
| LATERAL THORAX IMPACT TEST | Passed all requirements. |
| LATERAL PELVIS IMPACT TEST | Passed all requirements. |
| HEAD DROP TEST* | Passed all requirements. |
| ABDOMINAL COMPRESSION TEST* | Passed all requirements. |
| LUMBAR FLEXION TEST* | Passed all requirements. |

* Test not required for SID certification.

REMARKS: None

**EXTERNAL DIMENSIONS
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 1
Date: 1/14/02 Laboratory Technician: B. Swiecicki

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|------------------------------------|---------------|--------------|
| SH- Seated Height (mm) | 889 – 909 | 902 |
| RH- Rib Height (mm) | 502 – 520 | 513 |
| HP- Hip Pivot Height (mm) | 99 ref. | 99 |
| RD- Rib from Back Line (mm) | 229 – 241 | 236 |
| KH- Knee Pivot from Back Line (mm) | 511 – 526 | 518 |
| KV- Knee Pivot to Floor (mm) | 490 – 505 | 493 |
| HW- Hip Width (mm) | 356 - 391 | 378 |

REMARKS: None

**THORACIC SHOCK ABSORBER TESTS
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 1.2
 Date: 8/29/01 Laboratory Technician: B. Swiecicki

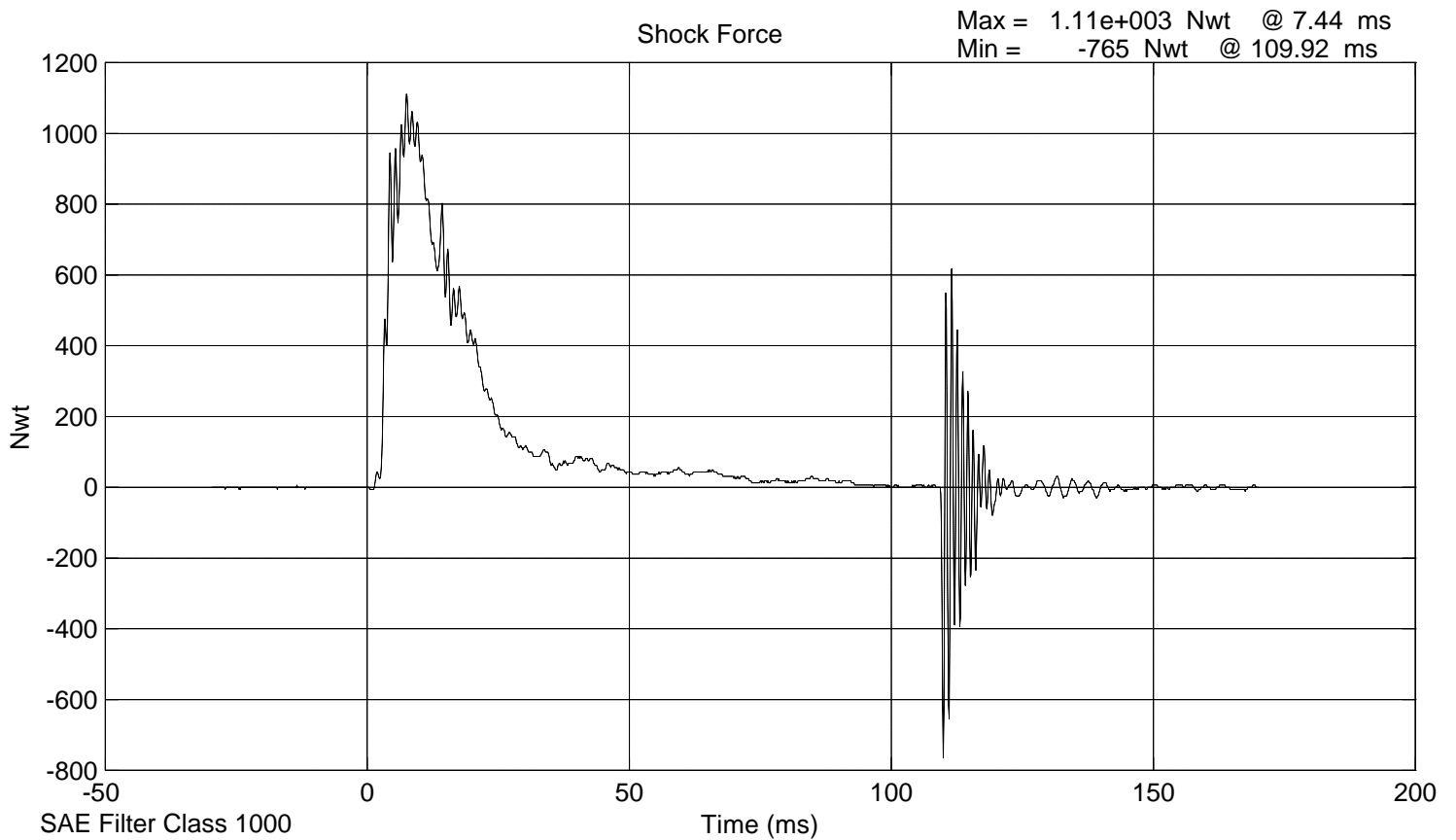
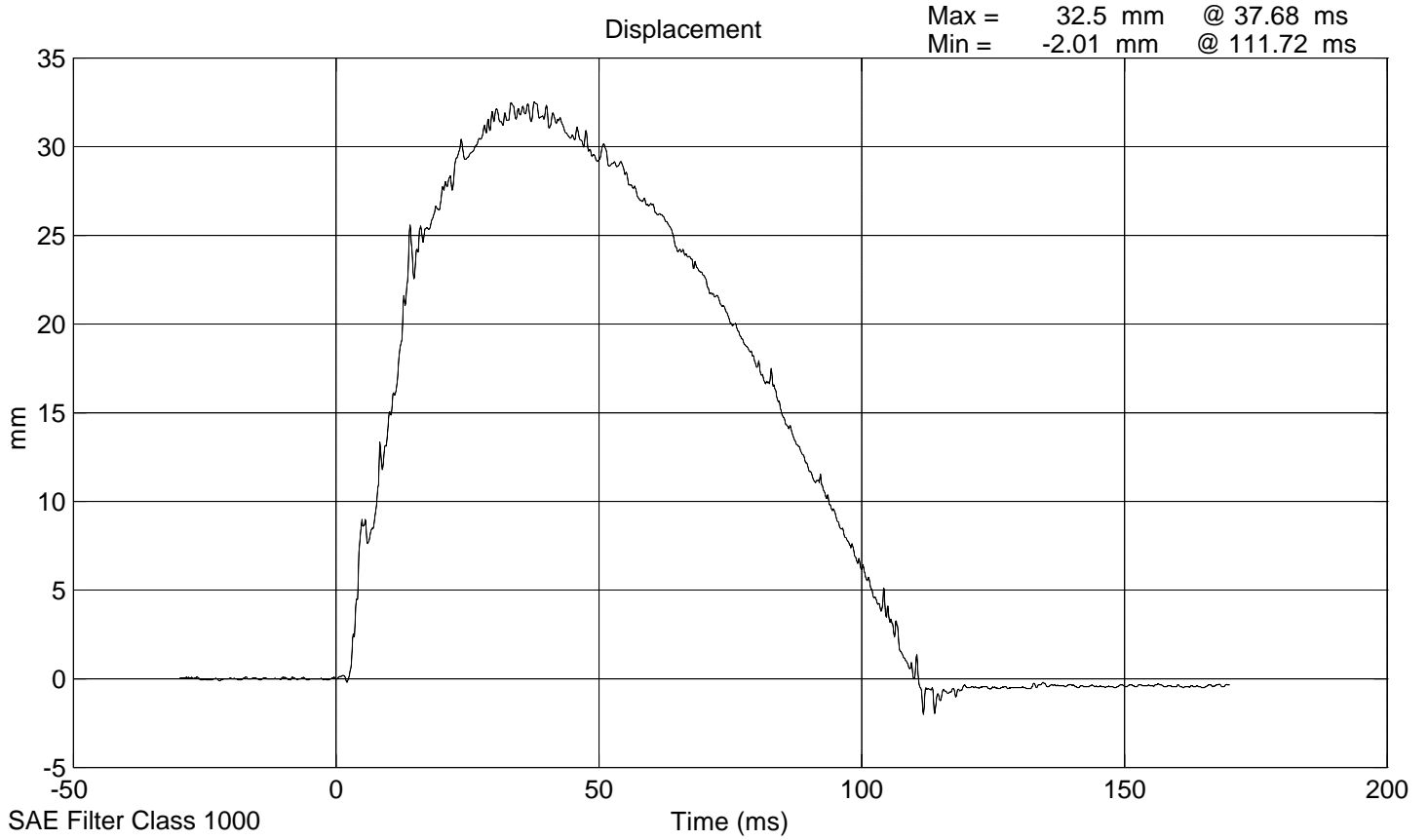
DAMPER IDENTIFICATION: _____

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|-----------------------|-------------------|---------------|--------------|
| TEMPERATURE (? C) | | 18.9 - 25.5 | 20.1 |
| RELATIVE HUMIDITY (%) | | 10 - 70 | 30 |
| VELOCITY 3.05 m/s | FORCE (N) | 836 - 1125 | 1111.4 |
| | DISPLACEMENT (mm) | 30 - 35 | 32.5 |
| VELOCITY 4.27 m/s | FORCE (N) | 1730 - 2099 | 2047.4 |
| | DISPLACEMENT (mm) | 32 - 37 | 35.0 |
| VELOCITY 6.10 m/s | FORCE (N) | 3741 - 4448 | 4100.5 |
| | DISPLACEMENT (mm) | 33 - 40 | 36.5 |

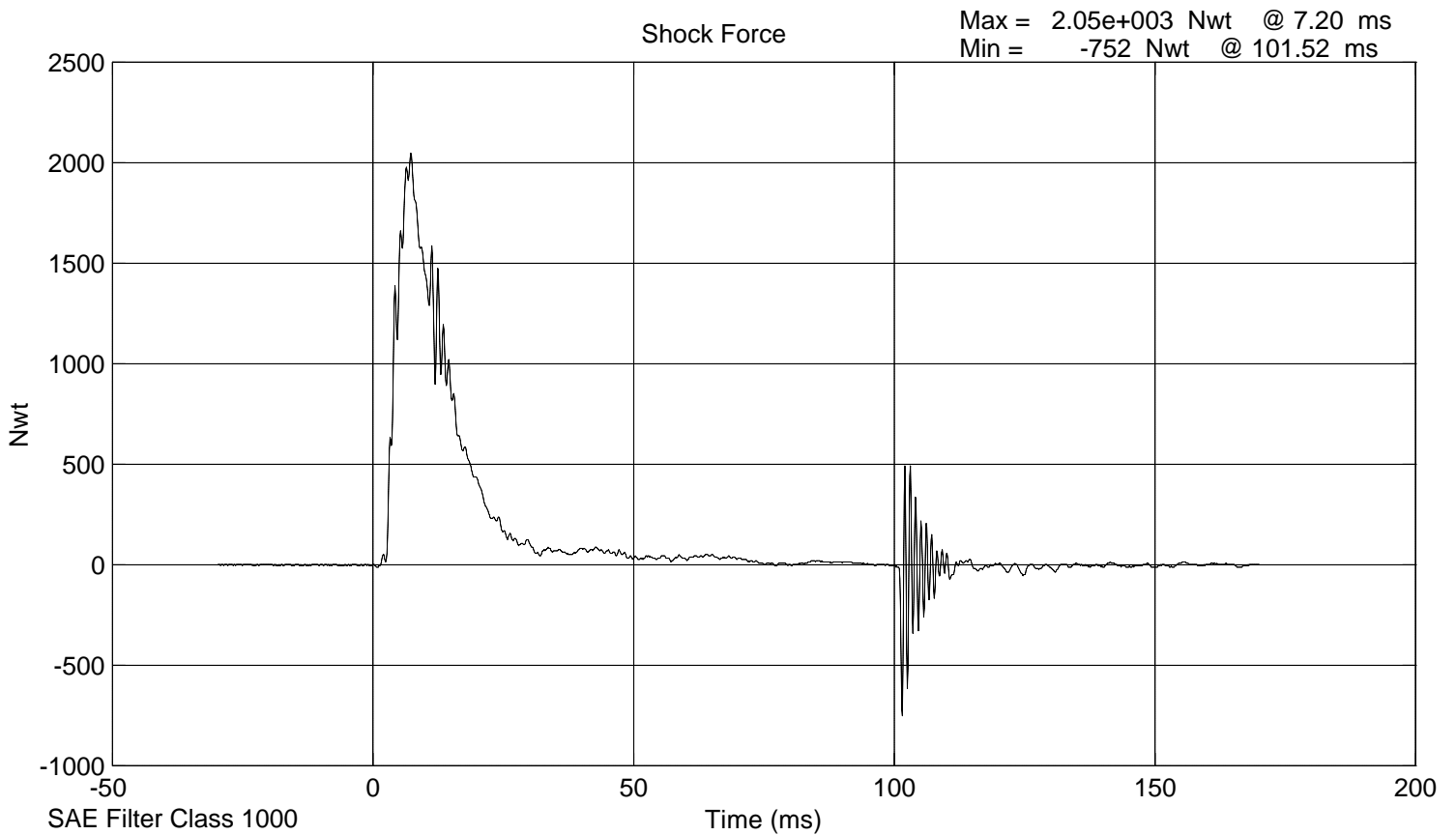
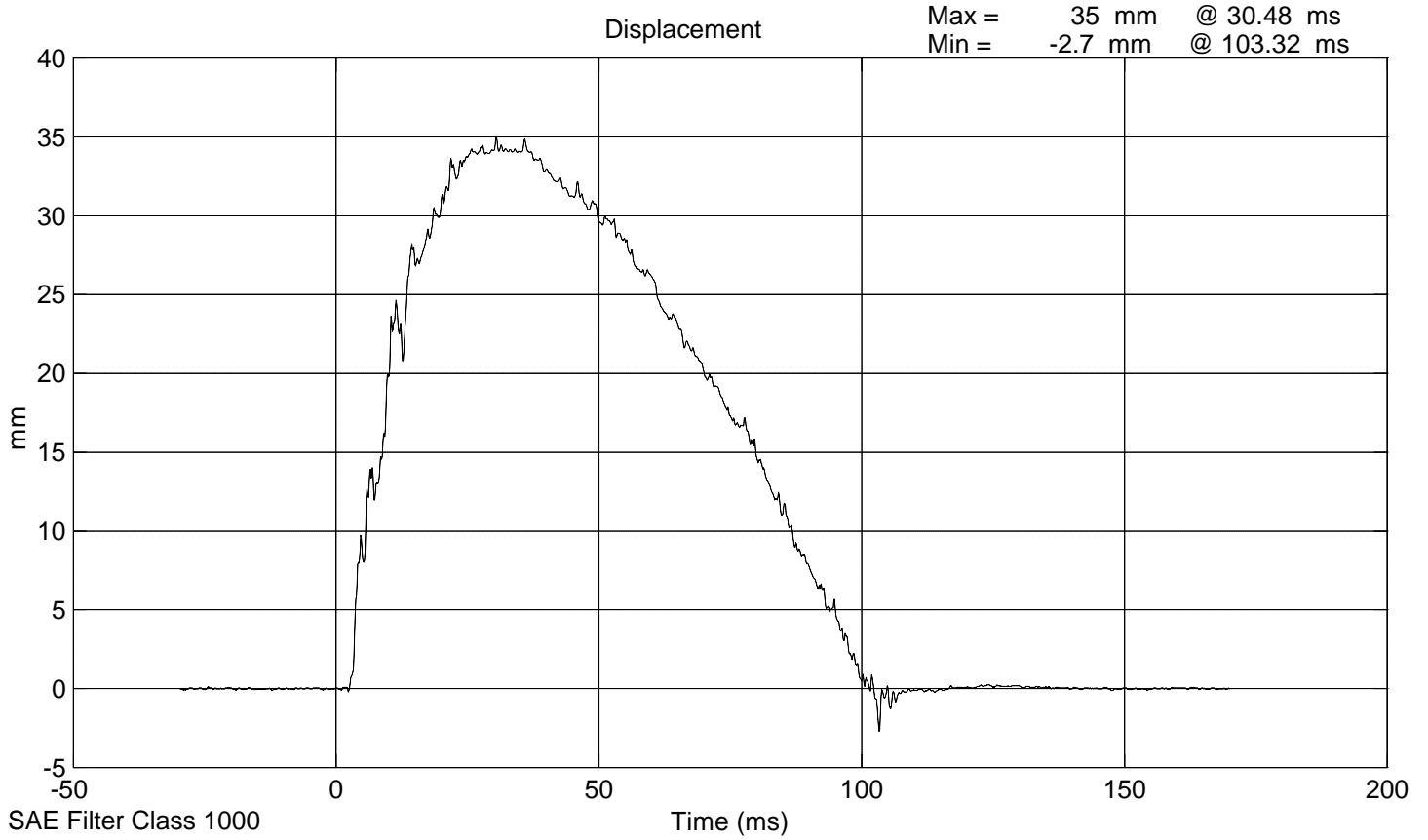
DAMPER SETTING: 5

REMARKS: None

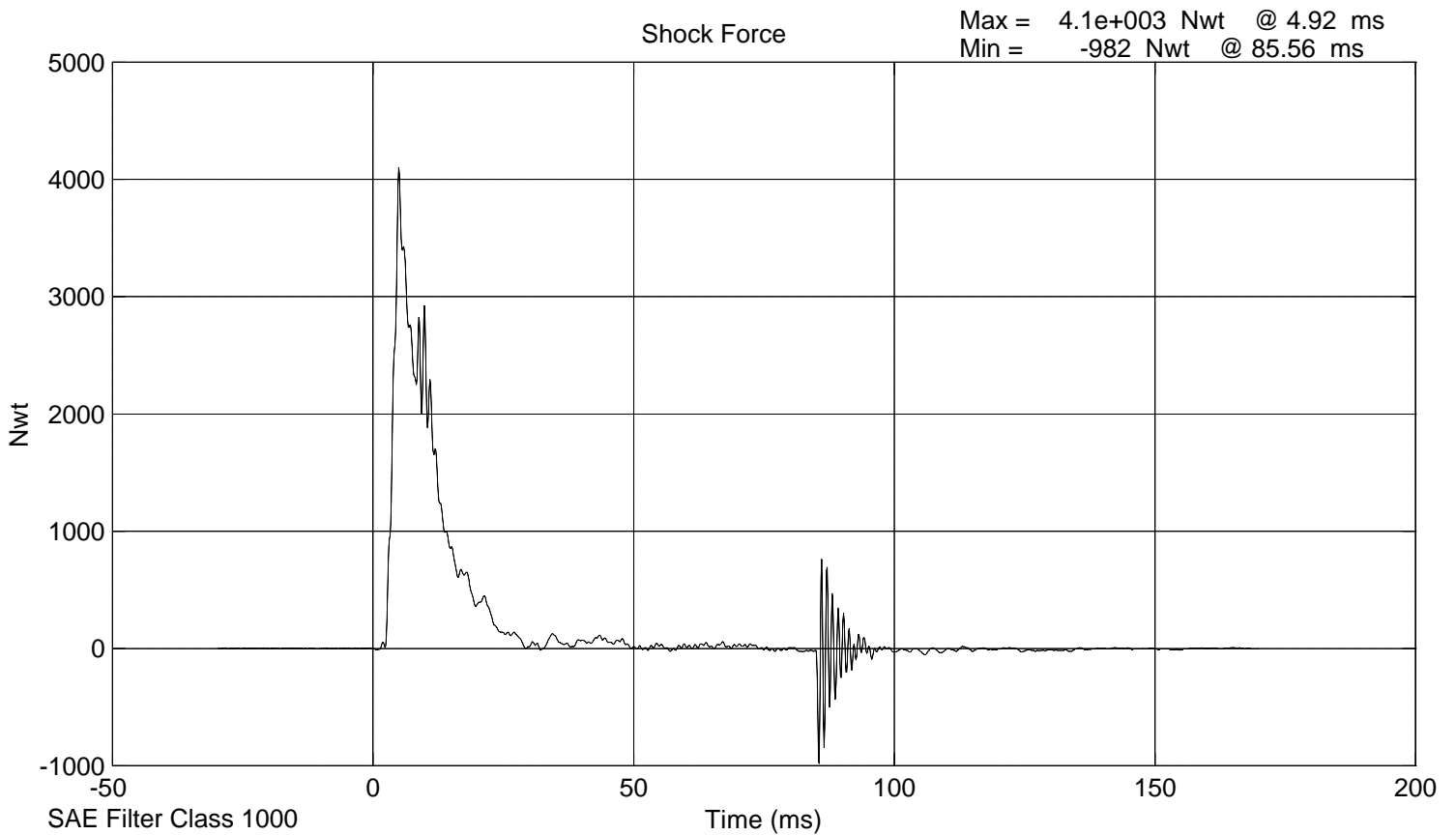
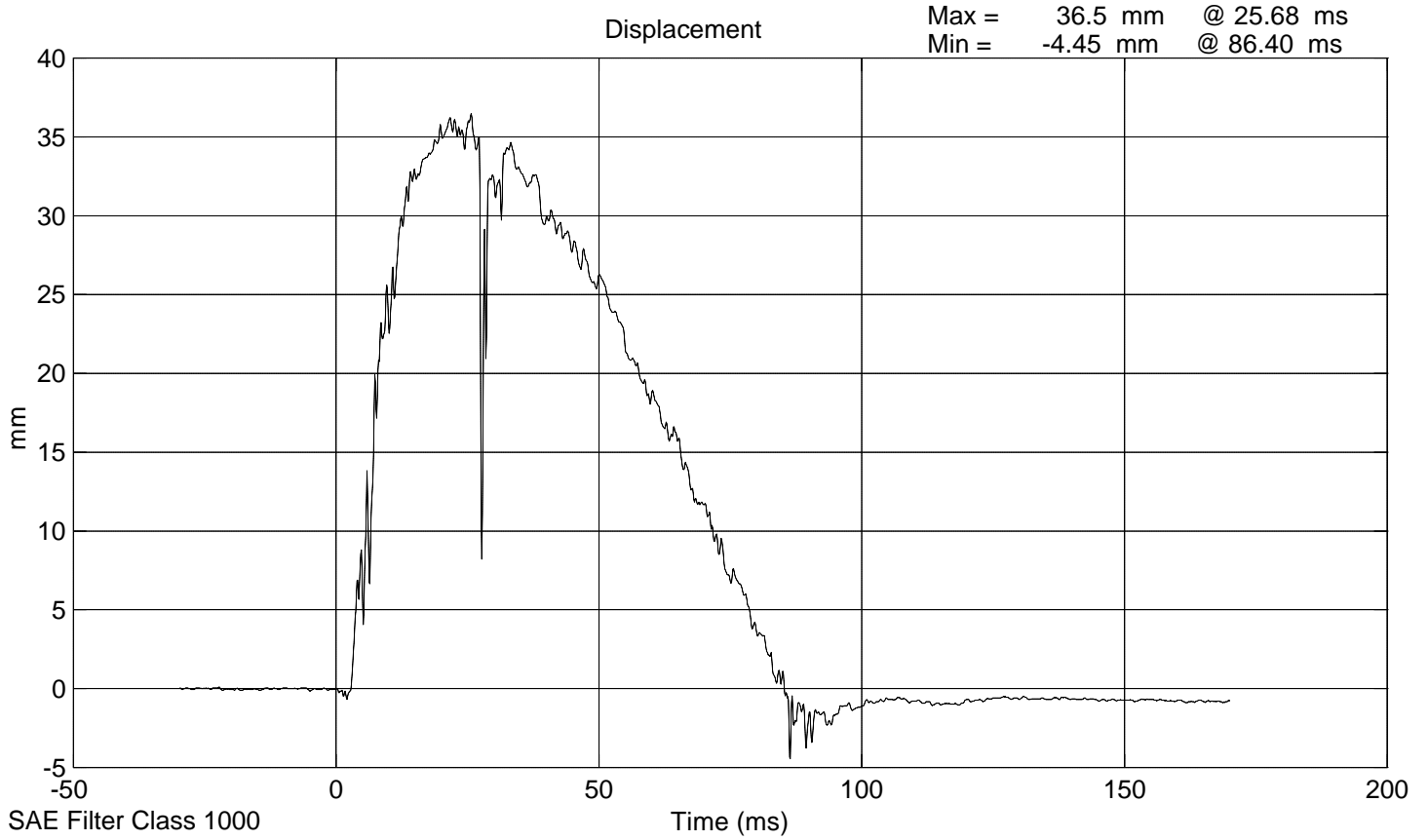
SID 013 Shock Absorber Impact Test @ 3.048 m/s



SID 013 Shock Absorber Impact Test @ 4.2672 m/s



SID 013 Shock Absorber Impact Test @ 6.096 m/s



**LATERAL THORAX IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

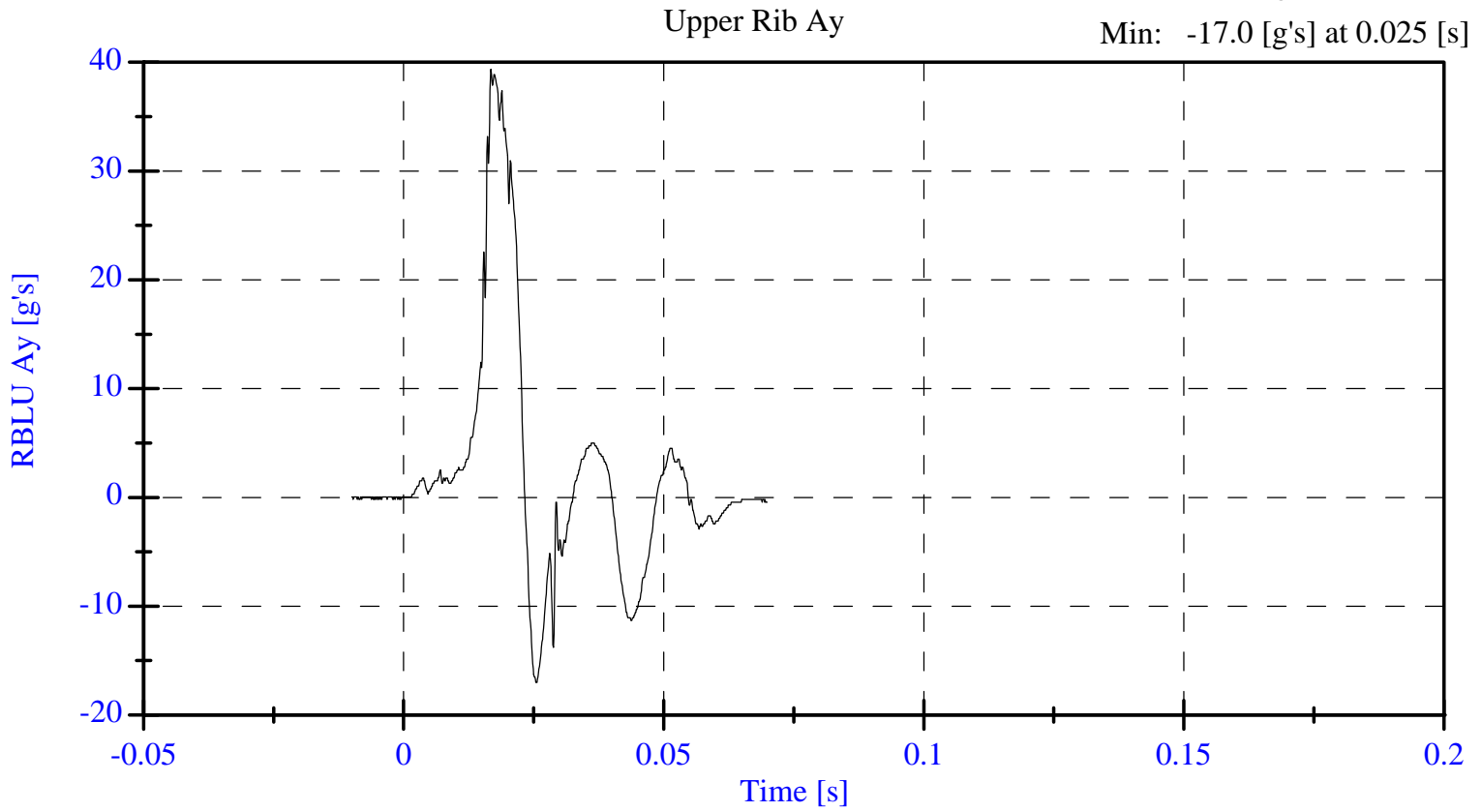
SID Serial No.: 013 Sequential Test Number: 1
Date: 1/14/02 Laboratory Technician: B. Swiecicki

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|-----------------------|---------------|--------------|
| TEMPERATURE (? C) | 18.9 - 25.5 | 21.7 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 30 |
| PROBE SPEED (m/s) | 4.27 - 4.33 | 4.32 |
| UPPER RIB (g's) | 37 - 46 | 38.7 |
| LOWER RIB (g's) | 37 - 46 | 42.1 |
| LOWER SPINE (g's) | 15 - 22 | 18.2 |

REMARKS: None

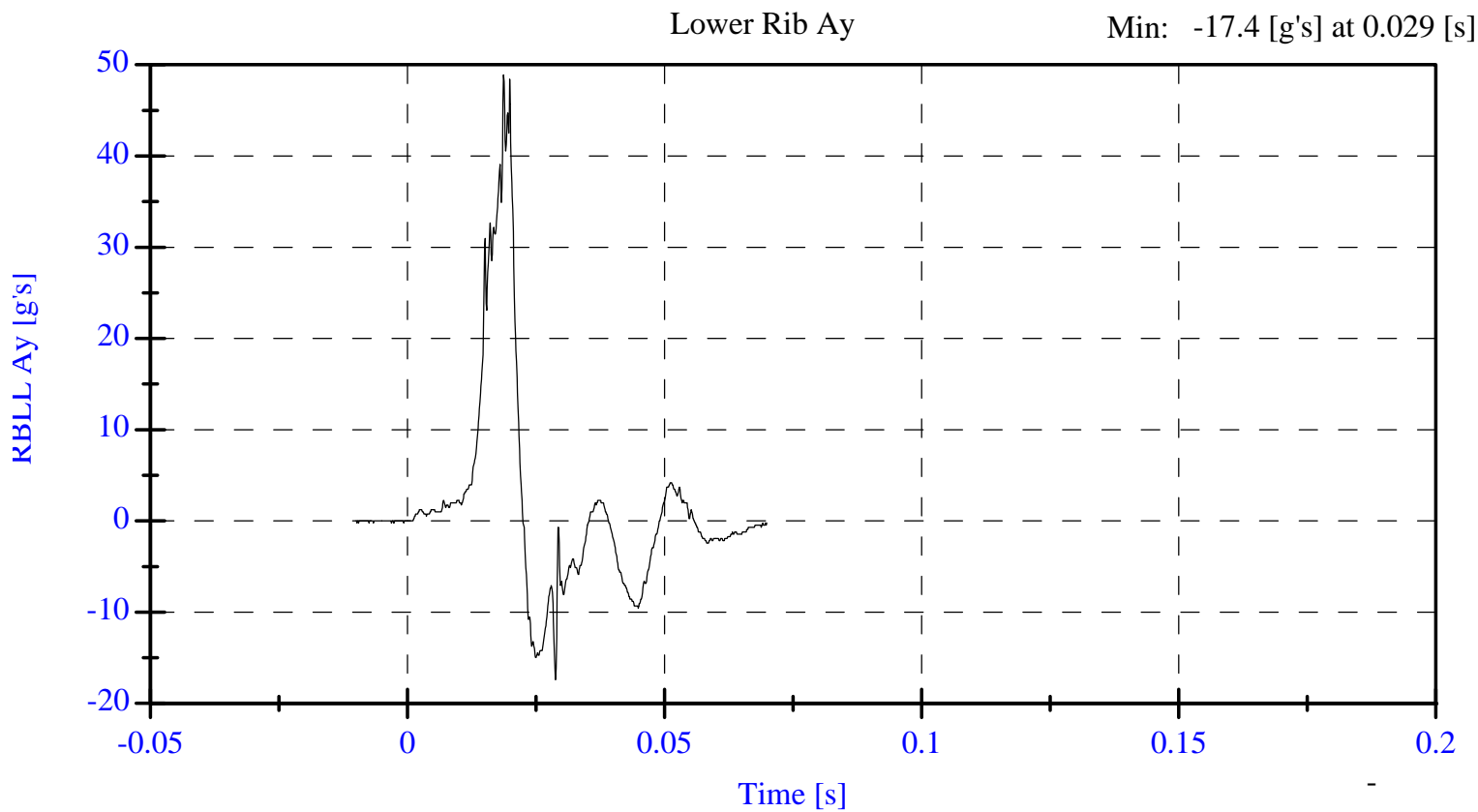
Max: 39.4 [g's] at 0.017 [s]

Min: -17.0 [g's] at 0.025 [s]



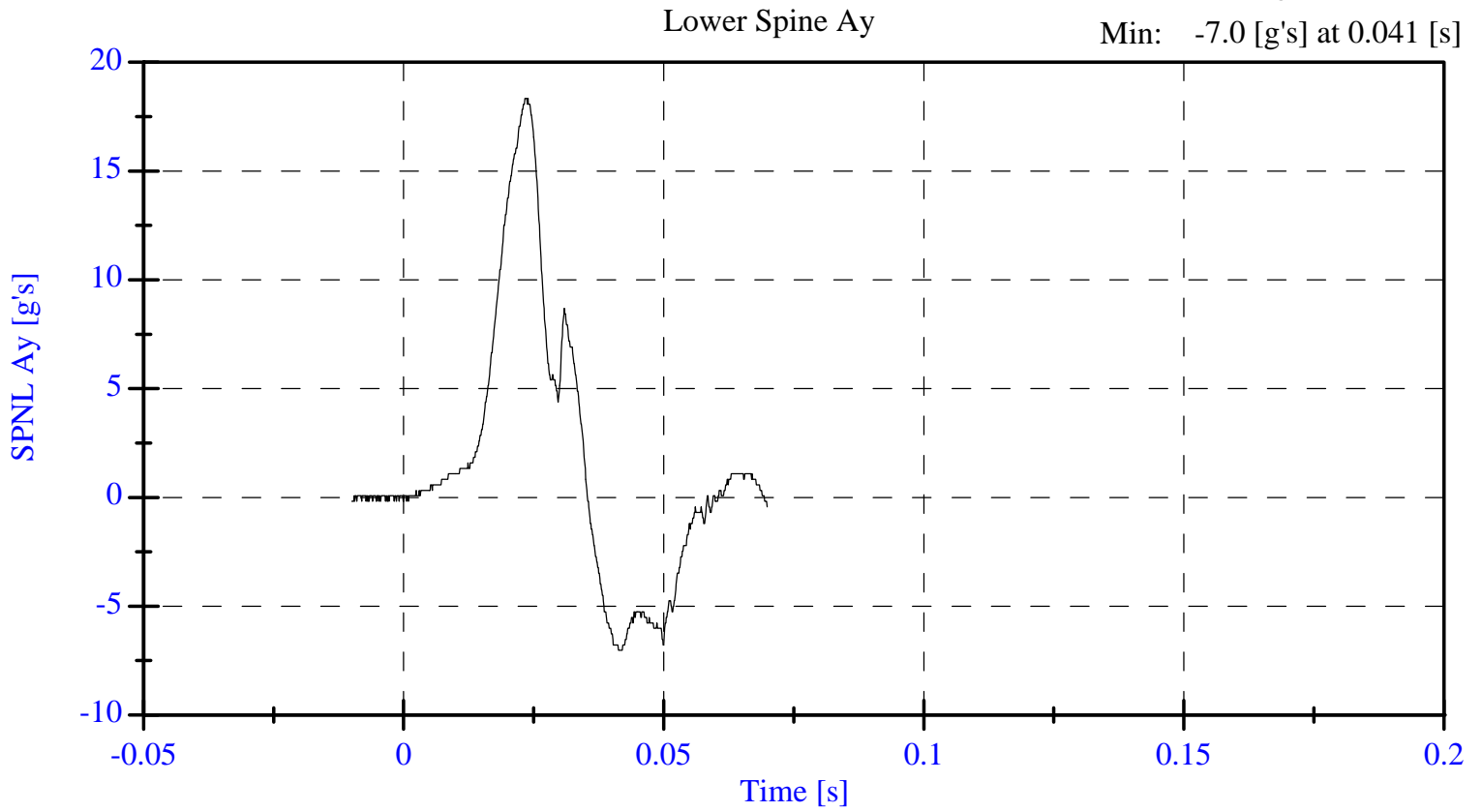
Max: 48.9 [g's] at 0.019 [s]

Min: -17.4 [g's] at 0.029 [s]



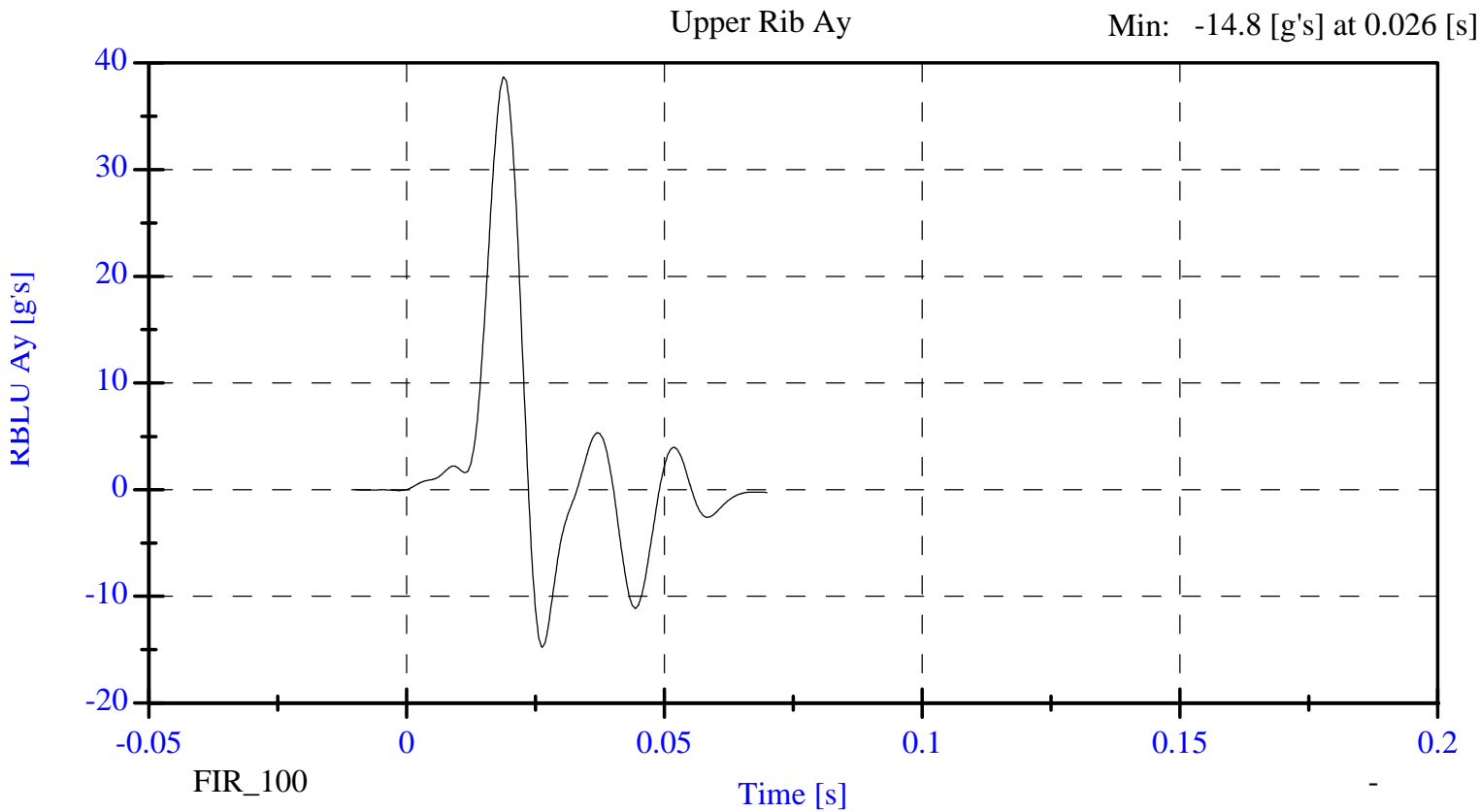
Max: 18.3 [g's] at 0.023 [s]

Min: -7.0 [g's] at 0.041 [s]



Max: 38.7 [g's] at 0.019 [s]

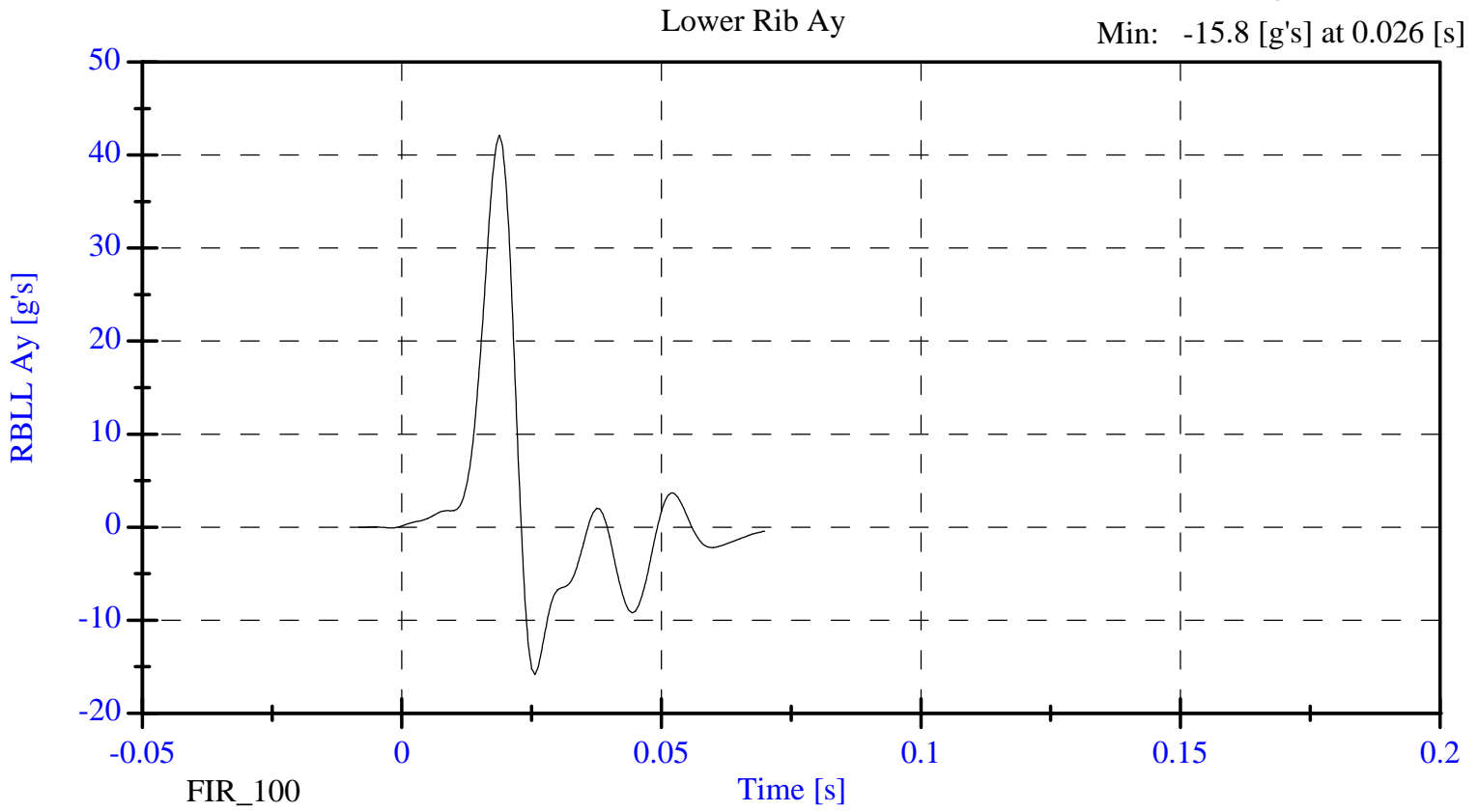
Min: -14.8 [g's] at 0.026 [s]



FIR_100

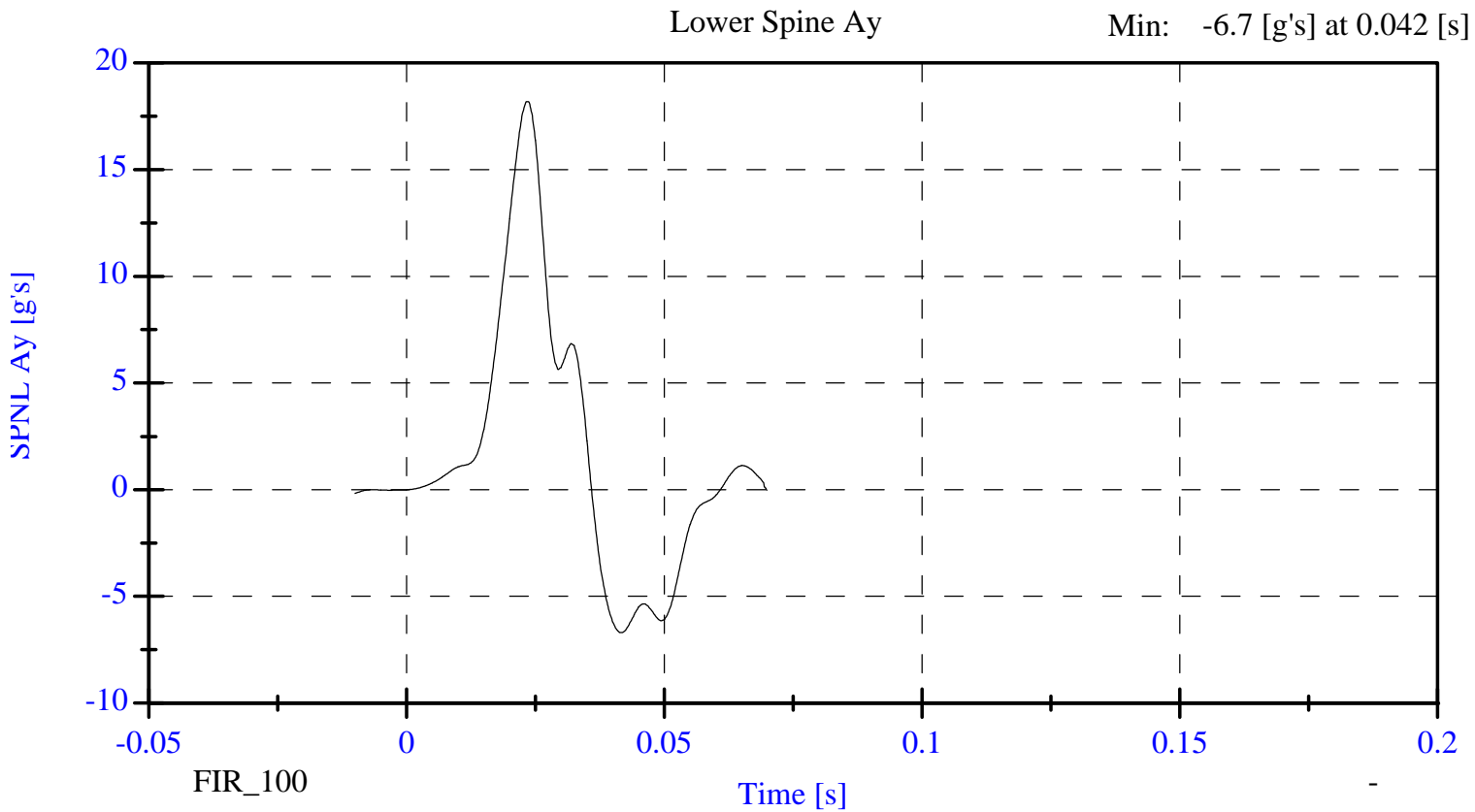
Max: 42.1 [g's] at 0.019 [s]

Min: -15.8 [g's] at 0.026 [s]



Max: 18.2 [g's] at 0.024 [s]

Min: -6.7 [g's] at 0.042 [s]



**LATERAL PELVIS IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

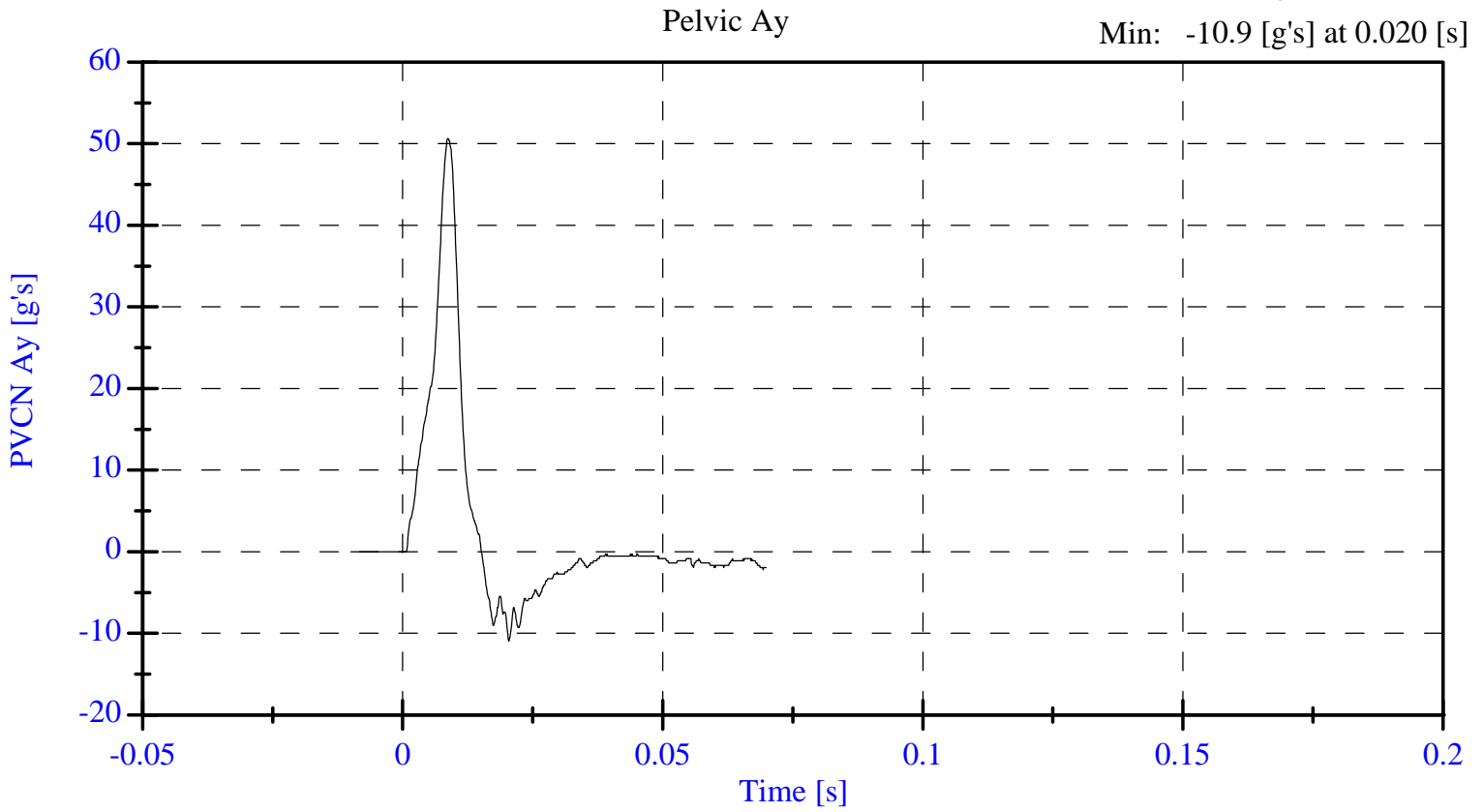
SID Serial No.: 013 Sequential Test Number: 1
Date: 1/14/02 Laboratory Technician: B. Swiecicki

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---------------------------|---------------|--------------|
| TEMPERATURE (? C) | 18.9 - 25.5 | 21.7 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 30 |
| PROBE SPEED (m/s) | 4.27 - 4.33 | 4.28 |
| PELVIS ACCELERATION (g's) | 40 - 60 | 44.8 |

REMARKS: None

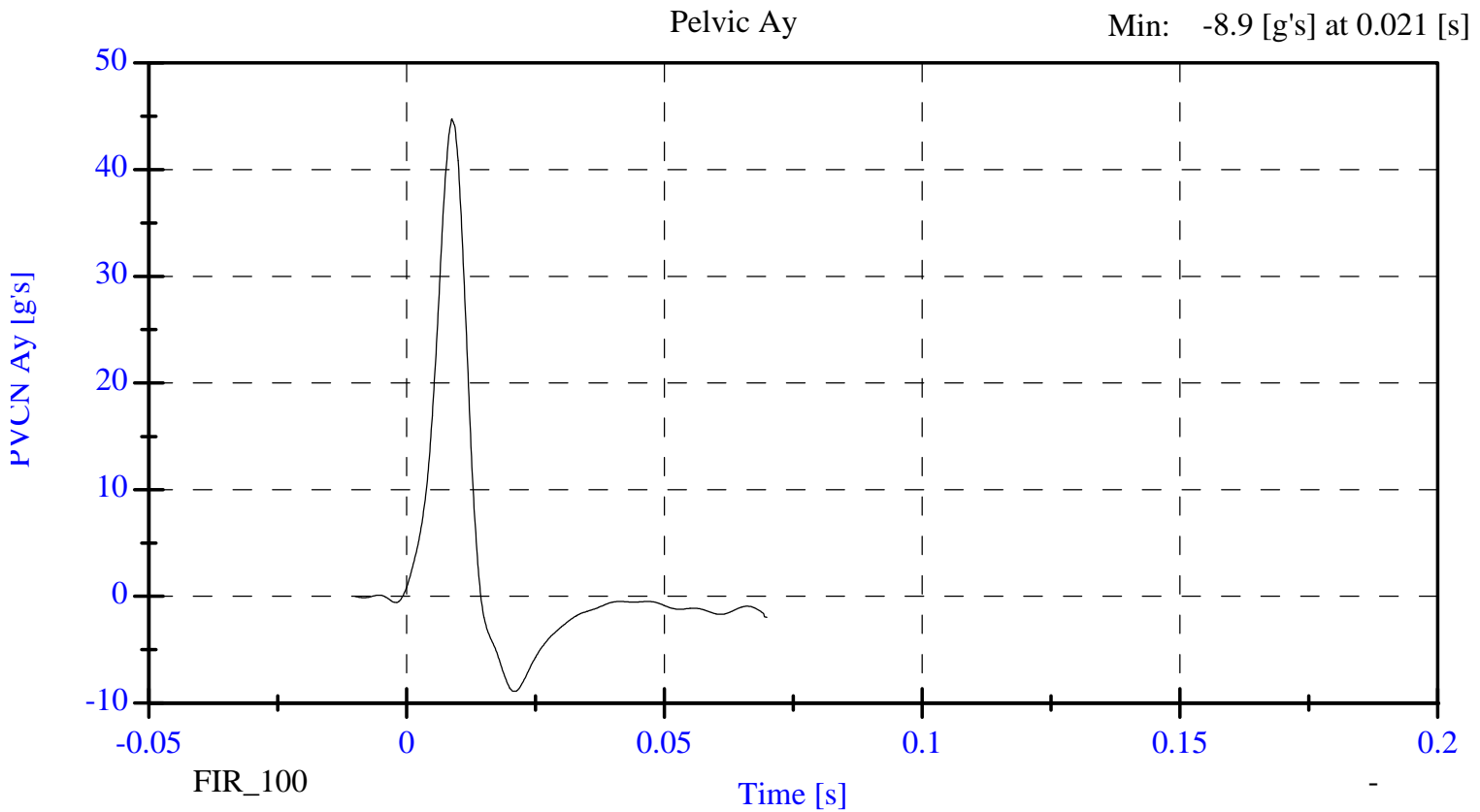
Max: 50.6 [g's] at 0.009 [s]

Min: -10.9 [g's] at 0.020 [s]



Max: 44.8 [g's] at 0.009 [s]

Min: -8.9 [g's] at 0.021 [s]



**HEAD DROP TEST
PRE-TEST**
(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 1
Date: 1/14/02 Laboratory Technician: B. Swiecicki

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|-------------------------------------|------------------|--------------|
| TEMPERATURE (? C) | 18.9 - 25.5 | 21.7 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 30 |
| PEAK RESULTANT ACCELERATION (Gs) | 210 - 260 | 217.32 |
| PEAK LATERAL ACCELERATION (Gs) | Not to Exceed 10 | 1.16 |
| UNIMODAL CRITERIA ABOVE 100 Gs (ms) | 0.9 - 1.5 | 1.25 |

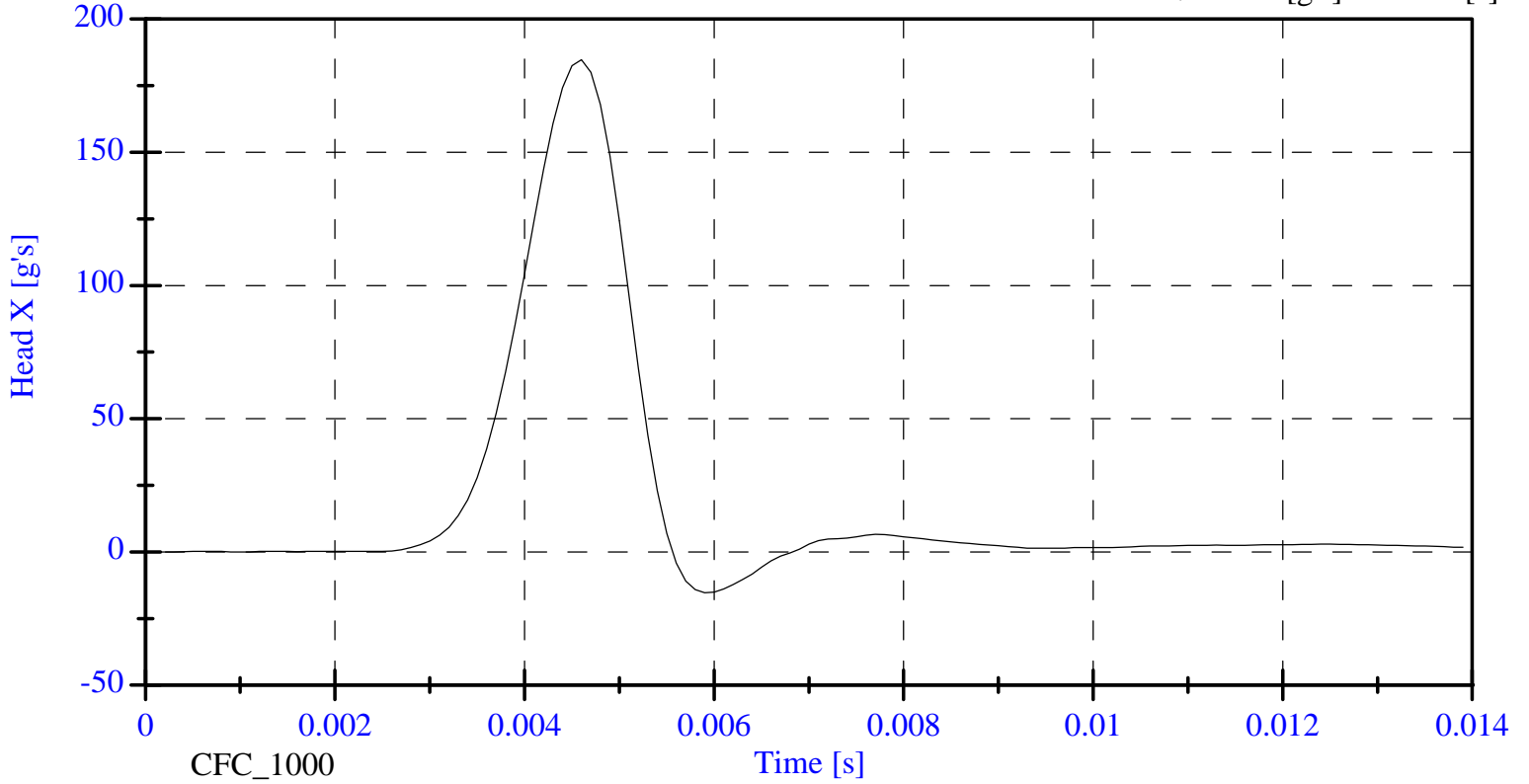
REMARKS: None

Hybrid II Head Drop Calibration

Headform X Acceleration

Max: 184.7 [g's] at 0.005 [s]

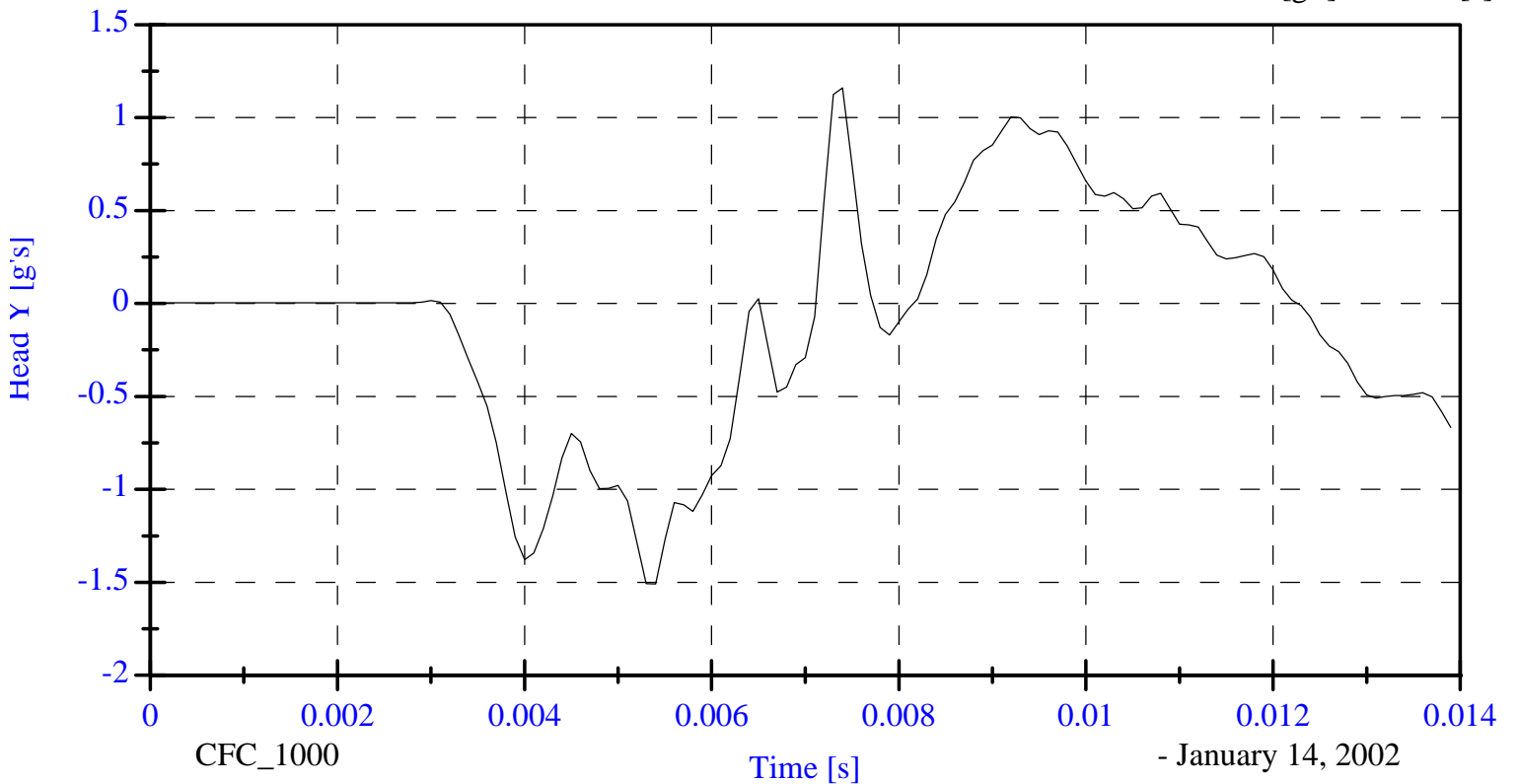
Min: -15.3 [g's] at 0.006 [s]



Headform Y Acceleration

Max: 1.2 [g's] at 0.007 [s]

Min: -1.5 [g's] at 0.005 [s]

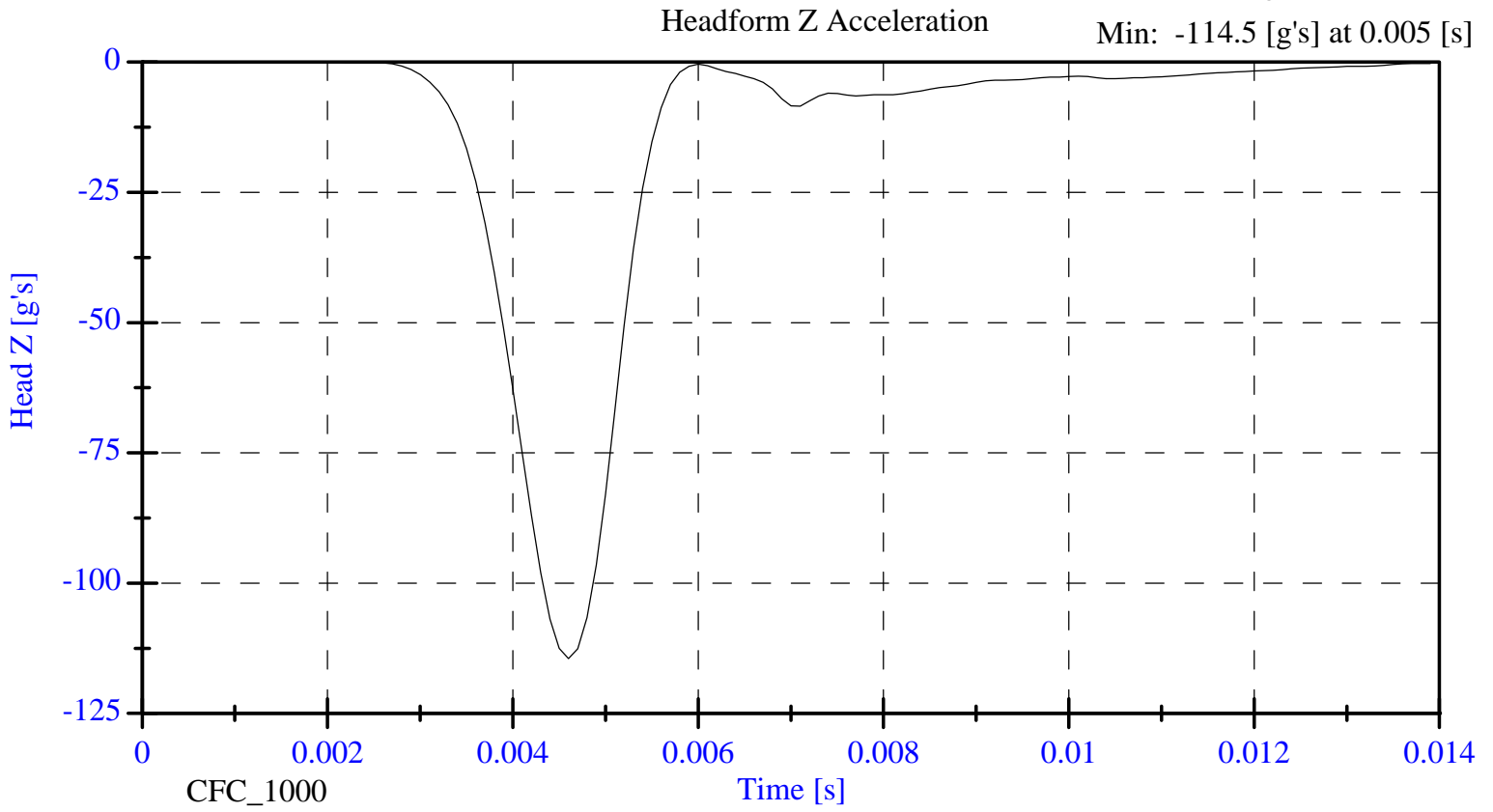


- January 14, 2002

Hybrid II Head Drop Calibration

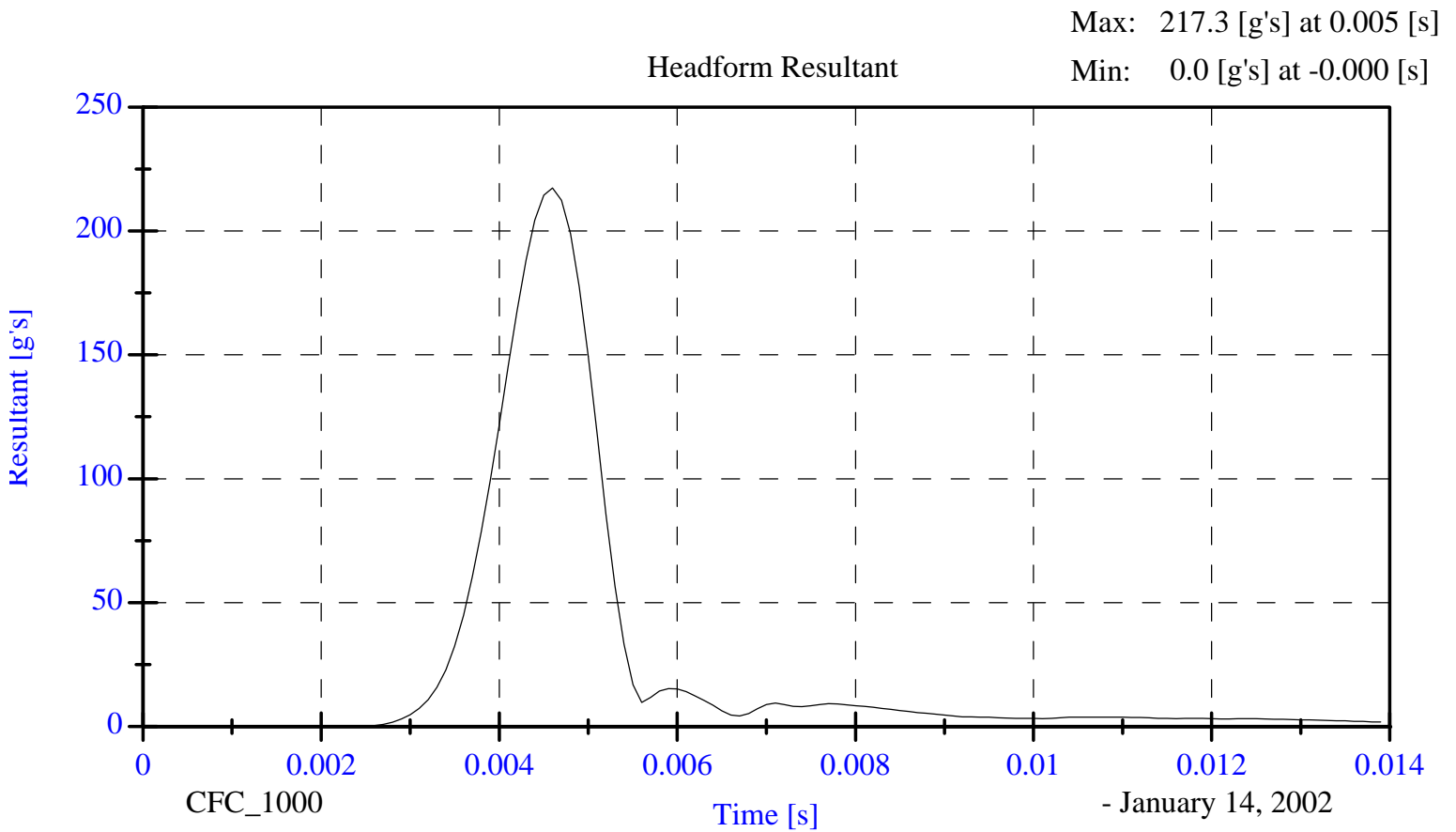
Max: 0.0 [g's] at 0.000 [s]

Min: -114.5 [g's] at 0.005 [s]



Max: 217.3 [g's] at 0.005 [s]

Min: 0.0 [g's] at -0.000 [s]



**ABDOMINAL COMPRESSION TEST
PRE-TEST**

(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 1
Date: 1/14/02 Laboratory Technician: B. Swiecicki

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|-----------------------|---------------|--------------|
| TEMPERATURE (? C) | 18.9 - 25.5 | 21.7 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 30 |
| FORCE @ 13 mm (N) | 104 - 162 | 111 |
| FORCE @ 19 mm (N) | 163 - 221 | 178 |
| FORCE @ 25 mm (N) | 222 - 280 | 256 |
| FORCE @ 33 mm (N) | 325 - 391 | 369 |

REMARKS: None

Dummy S/N 013

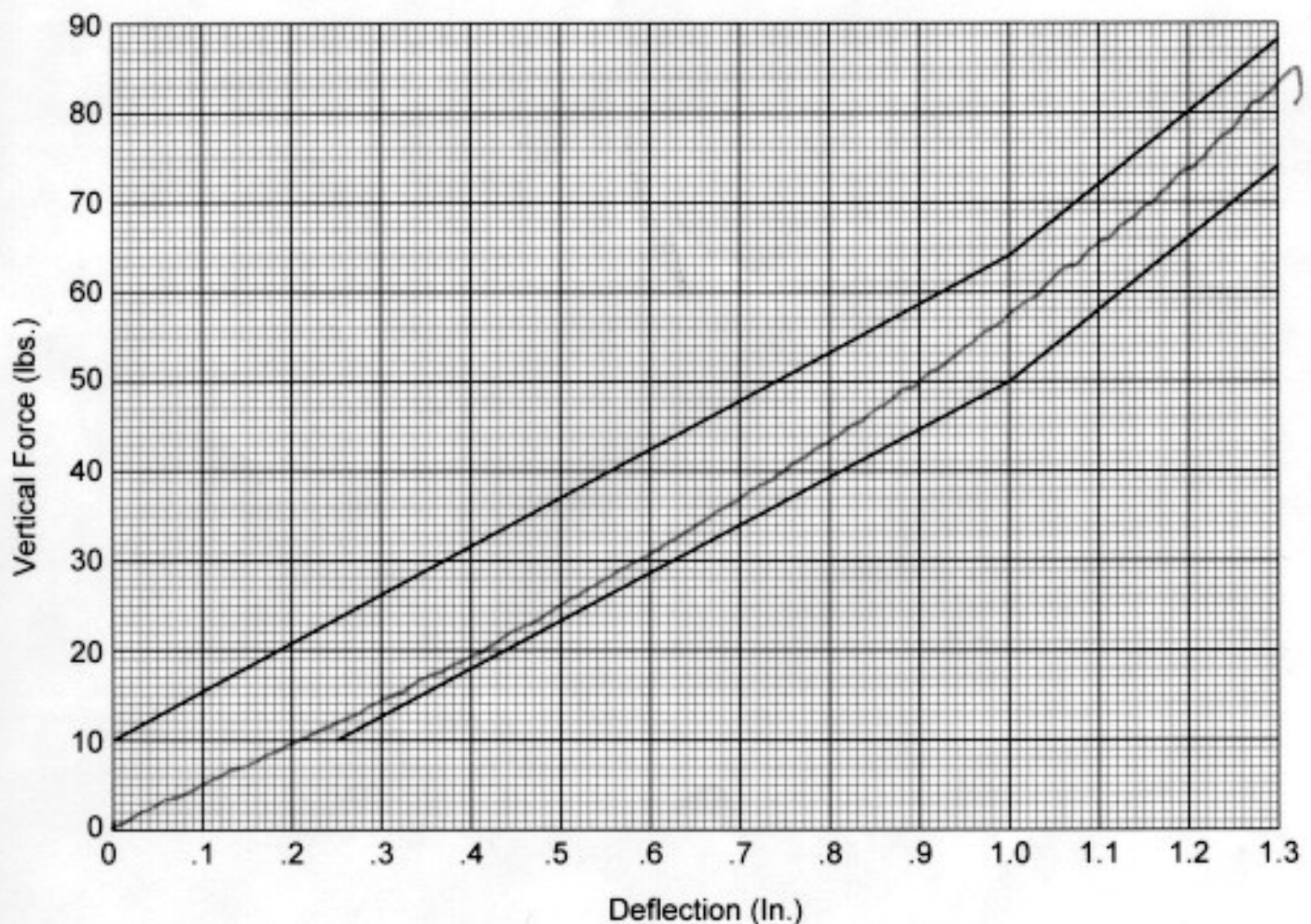
W/A _____

Date 01-14-02

Performed By [Signature]

Temp. 70

Humidity 29



Hybrid II
Abdomen Static Press

LUMBAR FLEXION TEST
PRE-TEST
 (Test not required for SID certification)

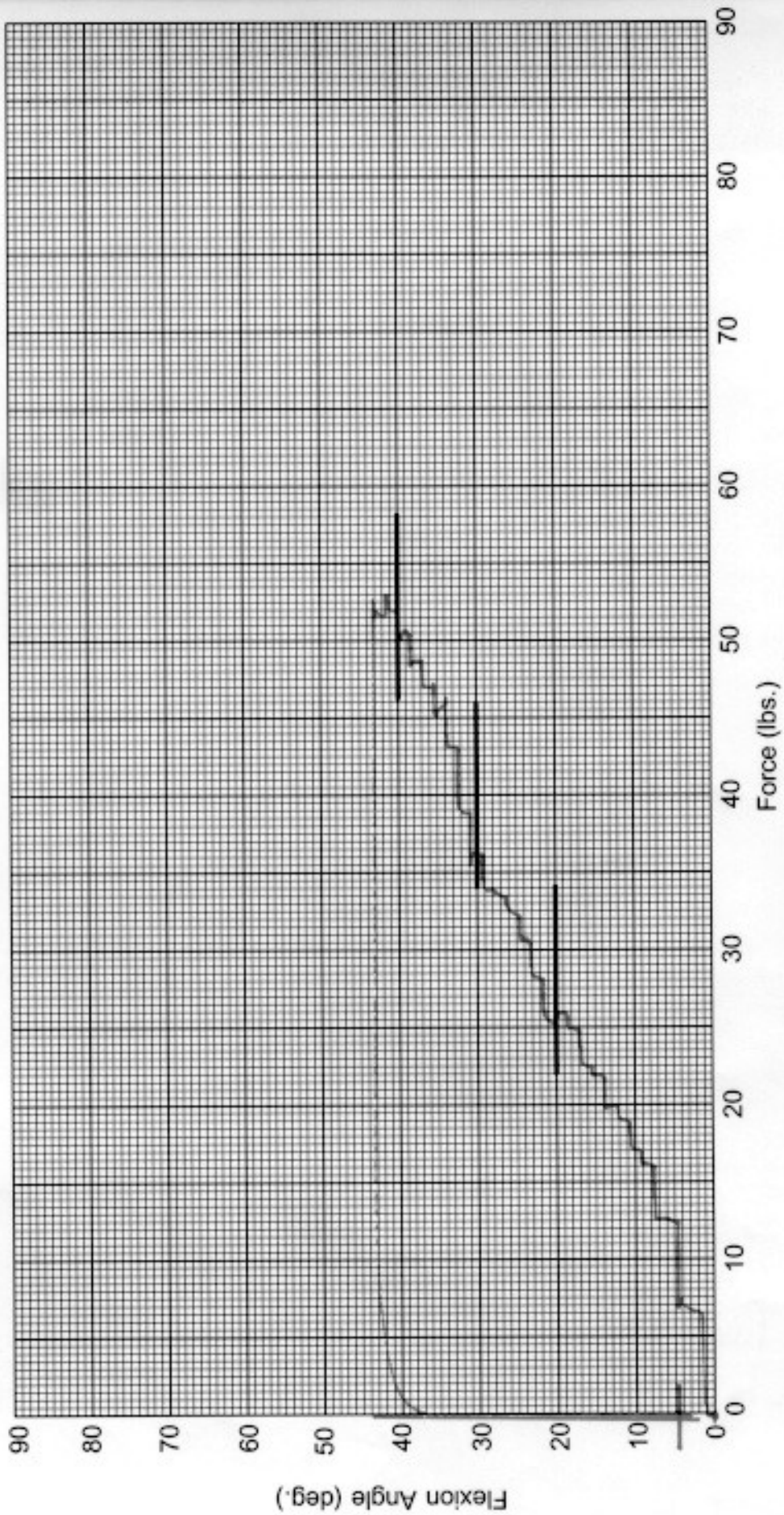
CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 1
 Date: 1/14/02 Laboratory Technician: B. Swiecicki

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|-----------------------|---------------|--------------|
| TEMPERATURE (? C) | 18.9 - 25.5 | 21.7 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 30 |
| FORCE @ 0? (N) | 0 - 26.7 | 0 |
| FORCE @ 20? (N) | 97.8 - 151.2 | 115 |
| FORCE @ 30? (N) | 151.2 - 204.6 | 160 |
| FORCE @ 40? (N) | 204.6 - 258 | 228 |
| RETURN ANGLE | 12? max. | 4.8 |

REMARKS: None

Dummy S/N 013
 W/A _____
 Date 01-14-02
 Performed By [Signature]
 Temp. 71
 Humidity 30



Hybrid II Lumbar Spine Flexion Test

PRE-TEST DUMMY INSPECTION LIST
CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 1
 Date: 1/14/02 Laboratory Technician: B. Swiecicki

| PART | ITEMS CHECKED | COMMENTS |
|--------------|---|----------|
| SKIN | VISUAL INSPECTION | OK |
| HEAD | VISUAL, BALLAST, ACCELEROMETER MOUNT | OK |
| NECK | VISUAL, CABLE TORQUE | OK |
| SPINE BOX | VISUAL, BALLAST, WELDMENT, ACCELEROMETER MOUNT | OK |
| RIB CAGE | VISUAL, MEASURE, STIFFENERS | OK |
| STERNUM | VISUAL | OK |
| LUMBAR SPINE | VISUAL | OK |
| ABDOMEN | VISUAL | OK |
| PELVIS | VISUAL, PALPATE, ACCELEROMETER MOUNT | OK |
| UPPER LEGS | VISUAL | OK |
| KNEES | VISUAL, STOPS, INSERTS | OK |
| LOWER LEGS | VISUAL, RANGE OF MOTION | OK |
| ANKLES | VISUAL, RANGE OF MOTION | OK |
| FEET | VISUAL, RANGE OF MOTION | OK |
| JOINTS | 1 TO 2 g RANGE | OK |
| OTHER | NONE | - |

REMARKS: None

CALIBRATION TEST RESULTS

POST TEST

SID NO.: 013

CONFIGURED FOR LEFT SIDE IMPACT

**CALIBRATION TEST RESULTS SUMMARY
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 2
Date: 2/13/02 Laboratory Technician: B. Swiecicki

| TEST | COMMENTS |
|-----------------------------|--------------------------|
| EXTERNAL DIMENSIONS | Passed all requirements. |
| LATERAL THORAX IMPACT TEST | Passed all requirements. |
| LATERAL PELVIS IMPACT TEST | Passed all requirements. |
| HEAD DROP TEST* | Passed all requirements. |
| ABDOMINAL COMPRESSION TEST* | Passed all requirements. |
| LUMBAR FLEXION TEST* | Passed all requirements. |

* Test not required for SID certification.

REMARKS: None

**EXTERNAL DIMENSIONS
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 2
Date: 2/13/02 Laboratory Technician: B. Swiecicki

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|------------------------------------|---------------|--------------|
| SH- Seated Height (mm) | 889 - 909 | 902 |
| RH- Rib Height (mm) | 502 - 520 | 513 |
| HP- Hip Pivot Height (mm) | 99 ref. | 99 |
| RD- Rib from Back Line (mm) | 229 - 241 | 236 |
| KH- Knee Pivot from Back Line (mm) | 511 - 526 | 518 |
| KV- Knee Pivot to Floor (mm) | 490 - 505 | 493 |
| HW- Hip Width (mm) | 356 - 391 | 379 |

REMARKS: None

**LATERAL THORAX IMPACT TEST
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 2
Date: 2/13/02 Laboratory Technician: B. Swiecicki

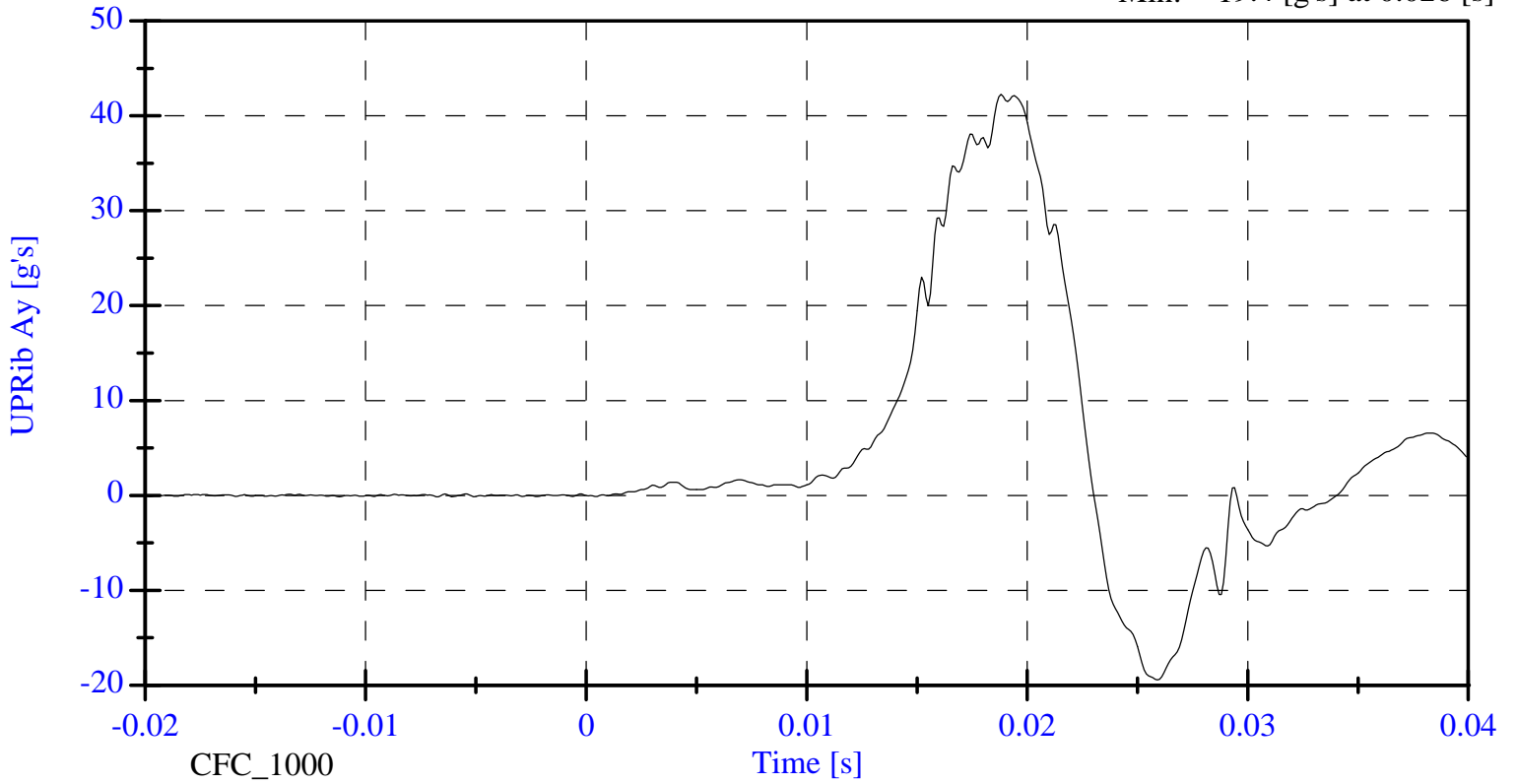
| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|-----------------------|---------------|--------------|
| TEMPERATURE (? C) | 18.9 - 25.5 | 21.7 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 30 |
| PROBE SPEED (m/s) | 4.27 - 4.33 | 4.29 |
| UPPER RIB (g's) | 37 - 46 | 42.15 |
| LOWER RIB (g's) | 37 - 46 | 44.54 |
| LOWER SPINE (g's) | 15 - 22 | 19.07 |

REMARKS: None

Upper Rib Y Acceleration

Max: 42.3 [g's] at 0.019 [s]

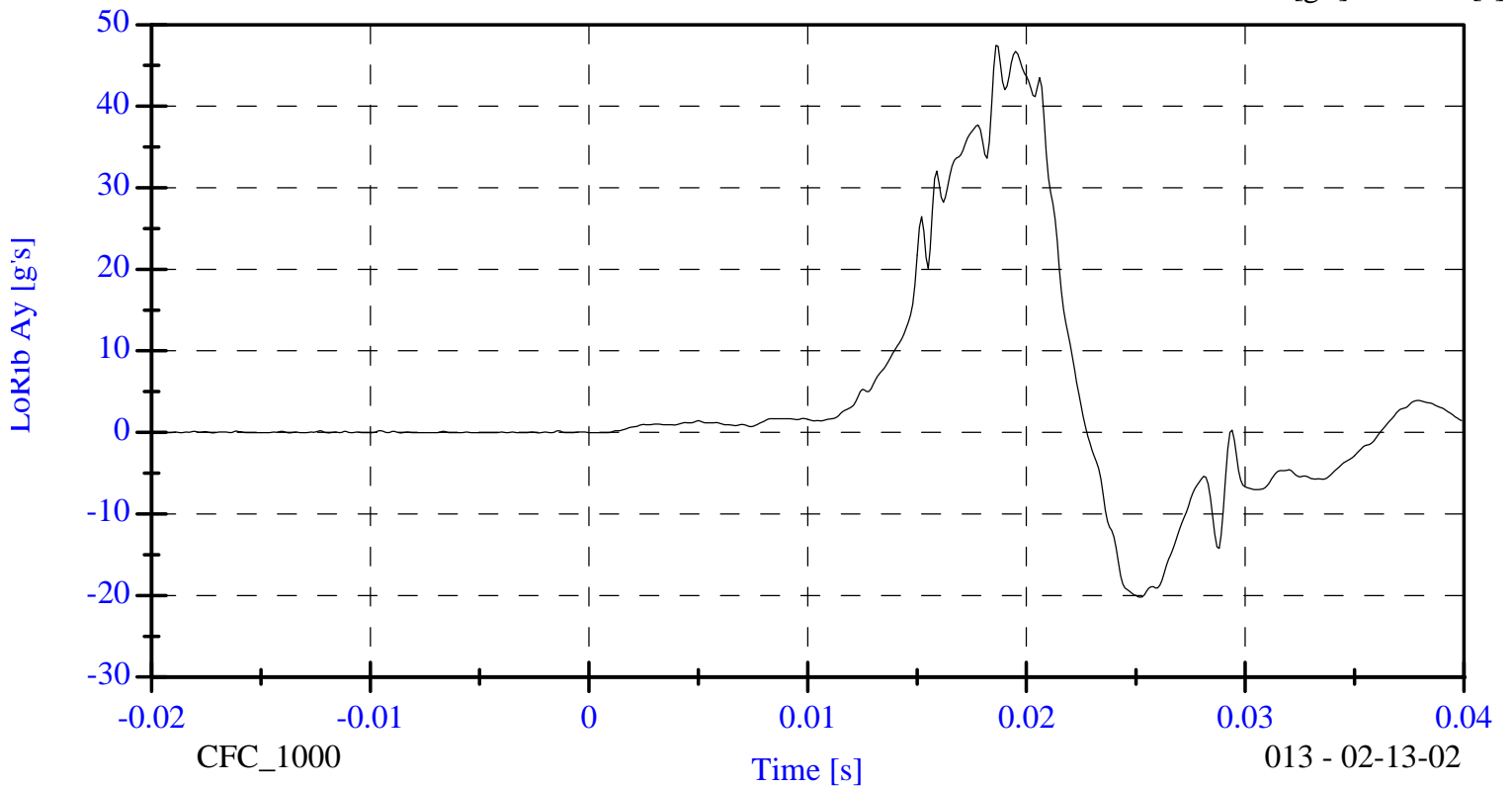
Min: -19.4 [g's] at 0.026 [s]

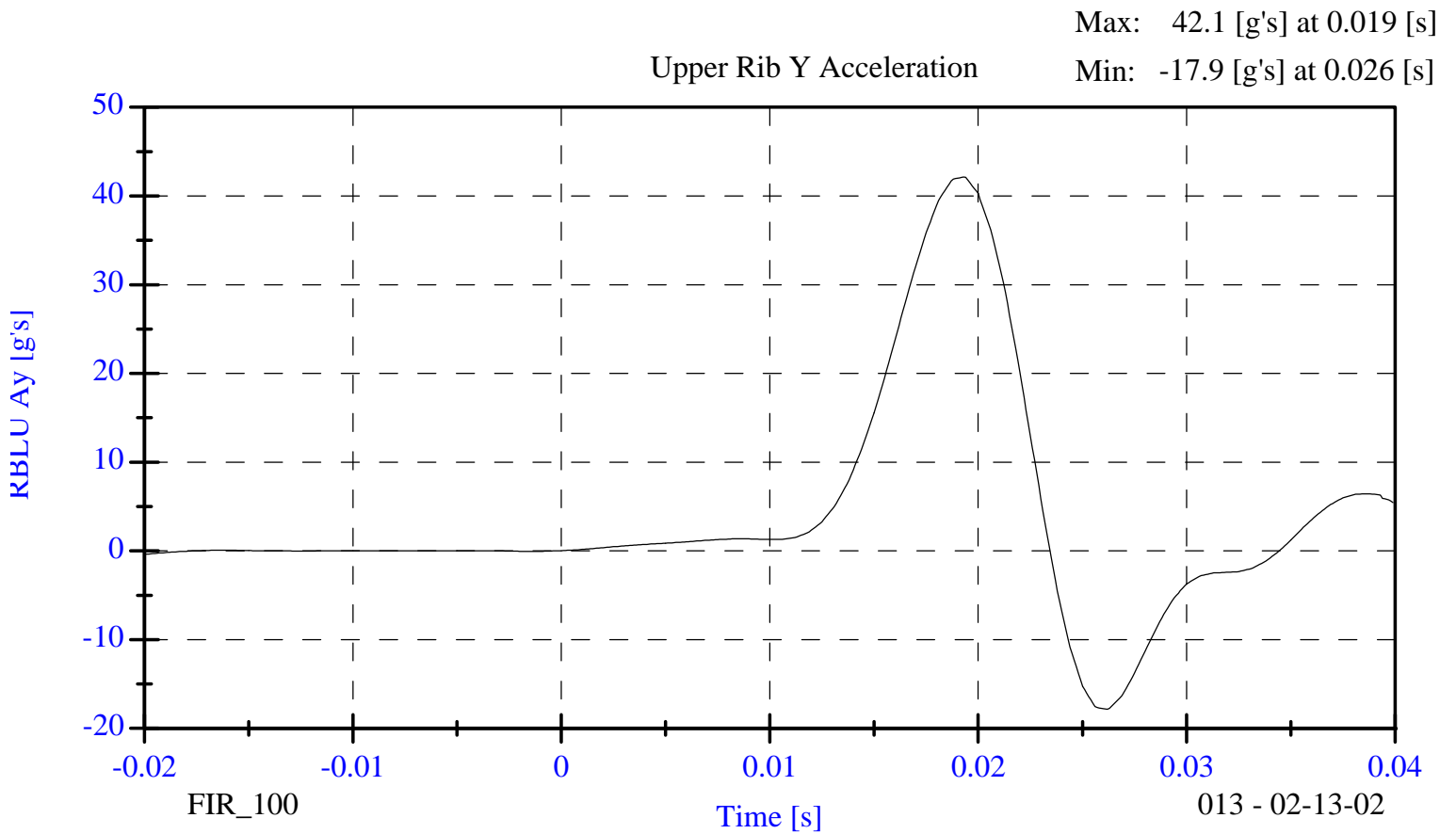
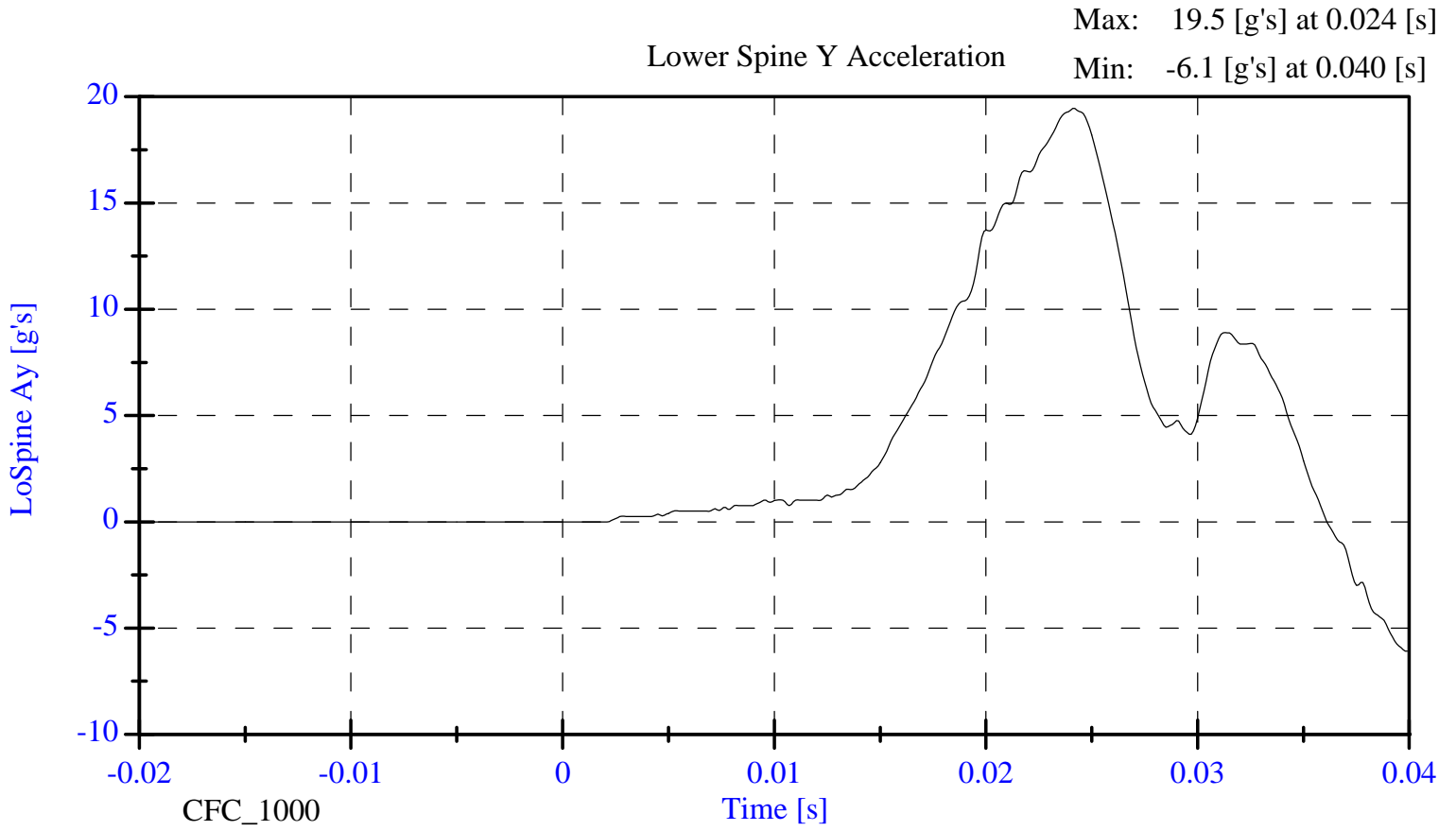


Lower Rib Y Acceleration

Max: 47.5 [g's] at 0.019 [s]

Min: -20.2 [g's] at 0.025 [s]

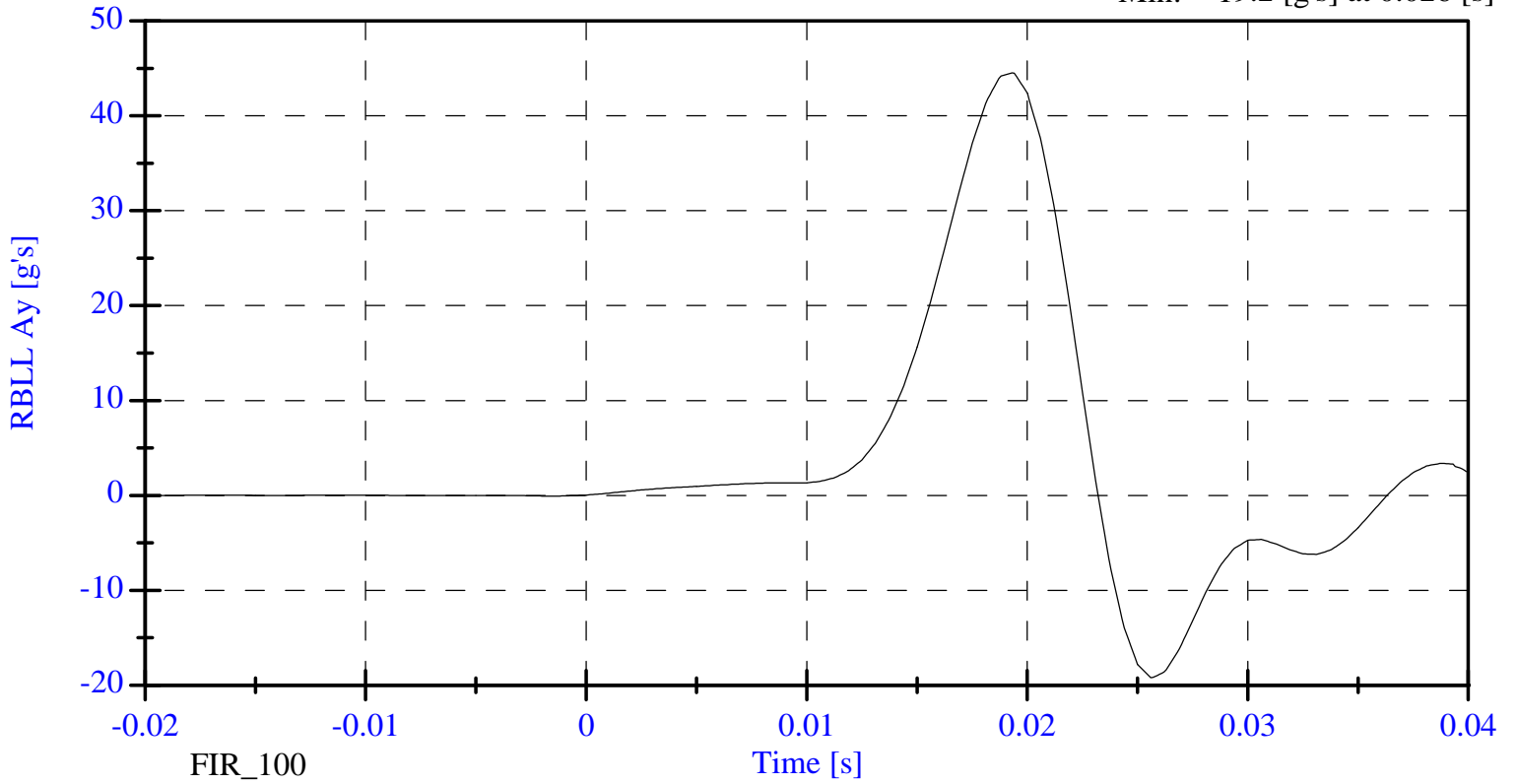




Lower Rib Y Acceleration

Max: 44.5 [g's] at 0.019 [s]

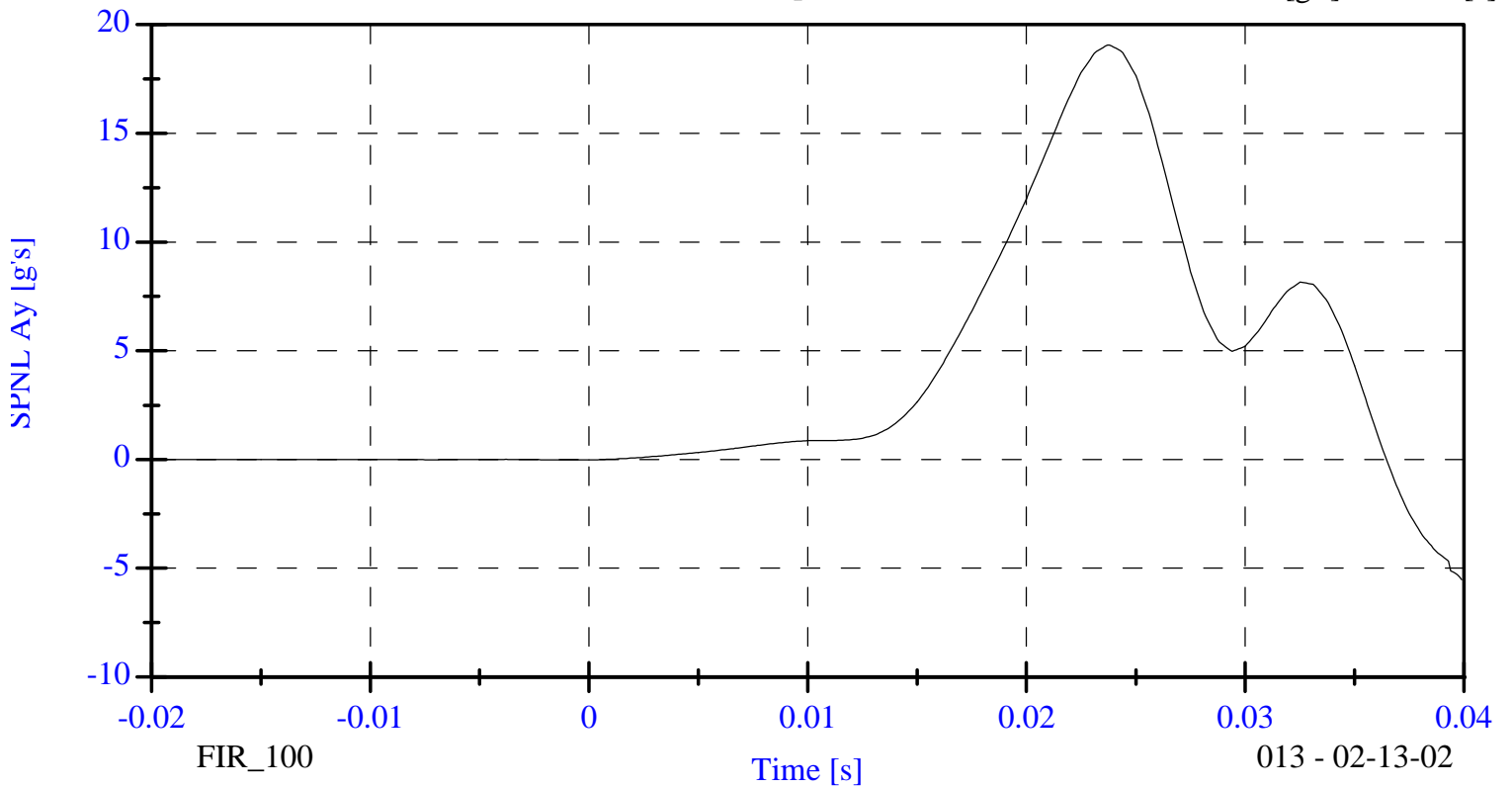
Min: -19.2 [g's] at 0.026 [s]



Lower Spine Y Acceleration

Max: 19.1 [g's] at 0.024 [s]

Min: -5.5 [g's] at 0.040 [s]



**LATERAL PELVIS IMPACT TEST
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

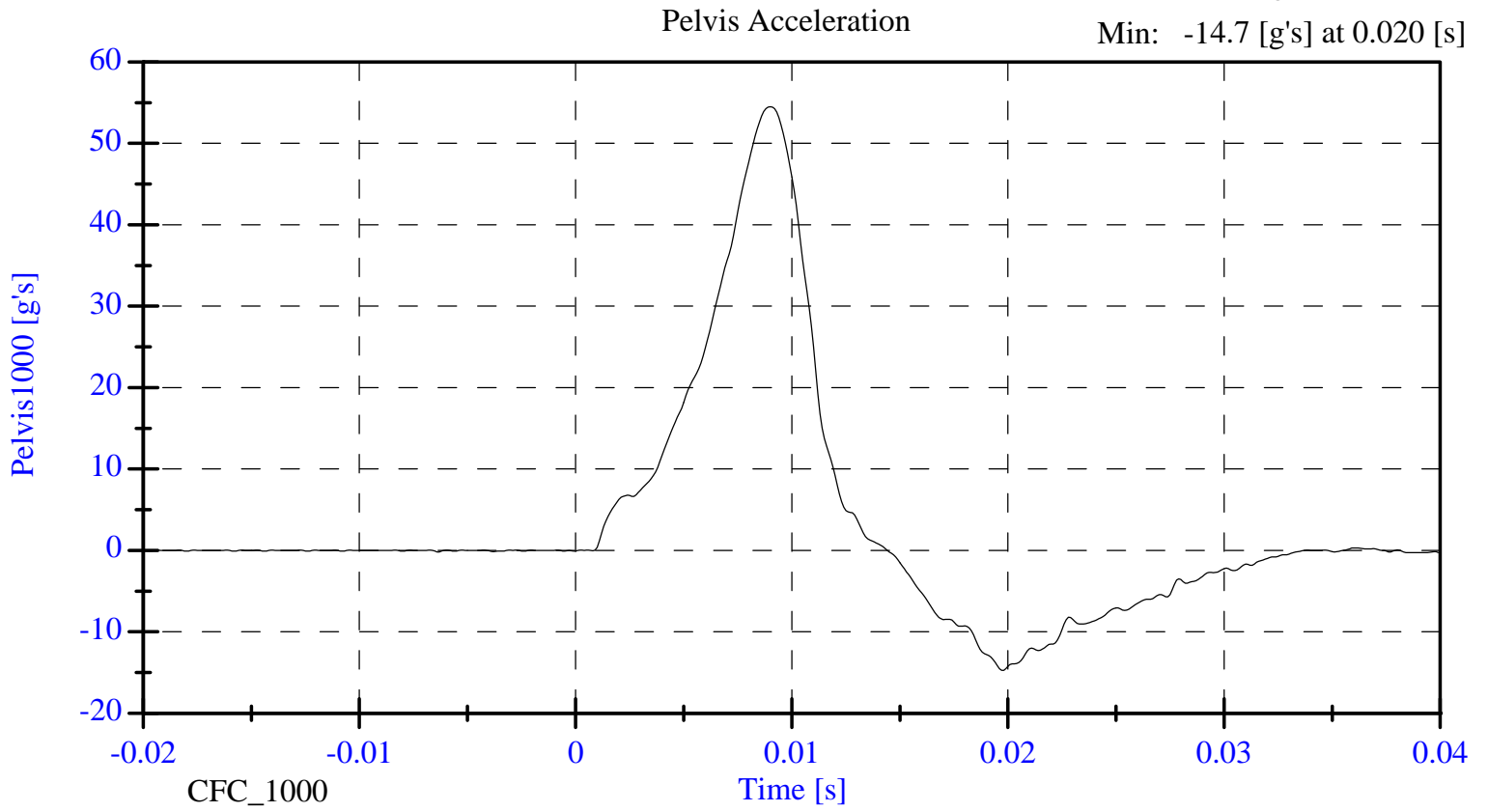
SID Serial No.: 013 Sequential Test Number: 2
Date: 2/13/02 Laboratory Technician: B. Swiecicki

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---------------------------|---------------|--------------|
| TEMPERATURE (? C) | 18.9 - 25.5 | 21.7 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 30 |
| PROBE SPEED (m/s) | 4.27 - 4.33 | 4.30 |
| PELVIS ACCELERATION (g's) | 40 - 60 | 48.26 |

REMARKS: None

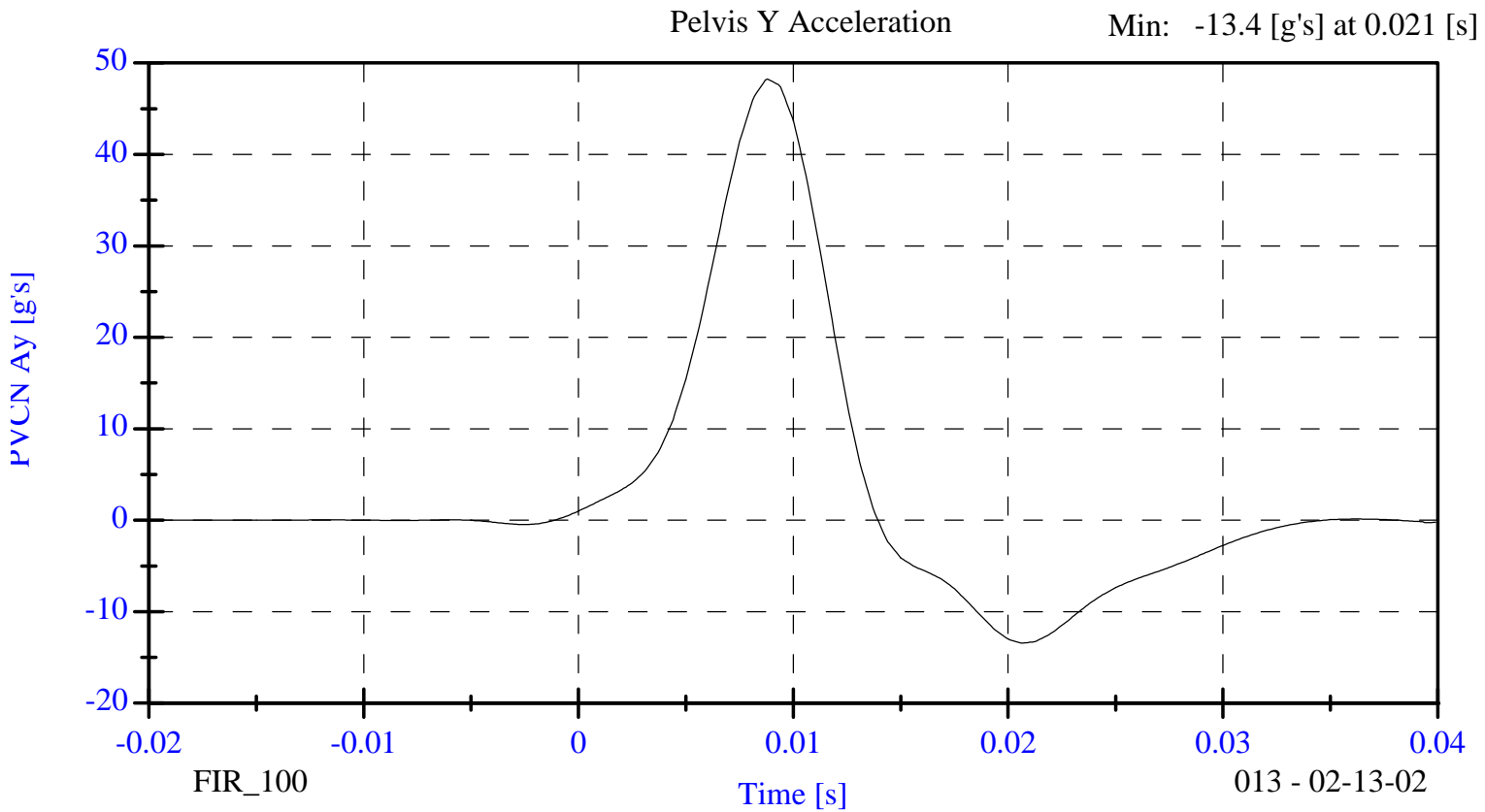
Max: 54.5 [g's] at 0.009 [s]

Min: -14.7 [g's] at 0.020 [s]



Max: 48.3 [g's] at 0.009 [s]

Min: -13.4 [g's] at 0.021 [s]



**HEAD DROP TEST
POST-TEST**
(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

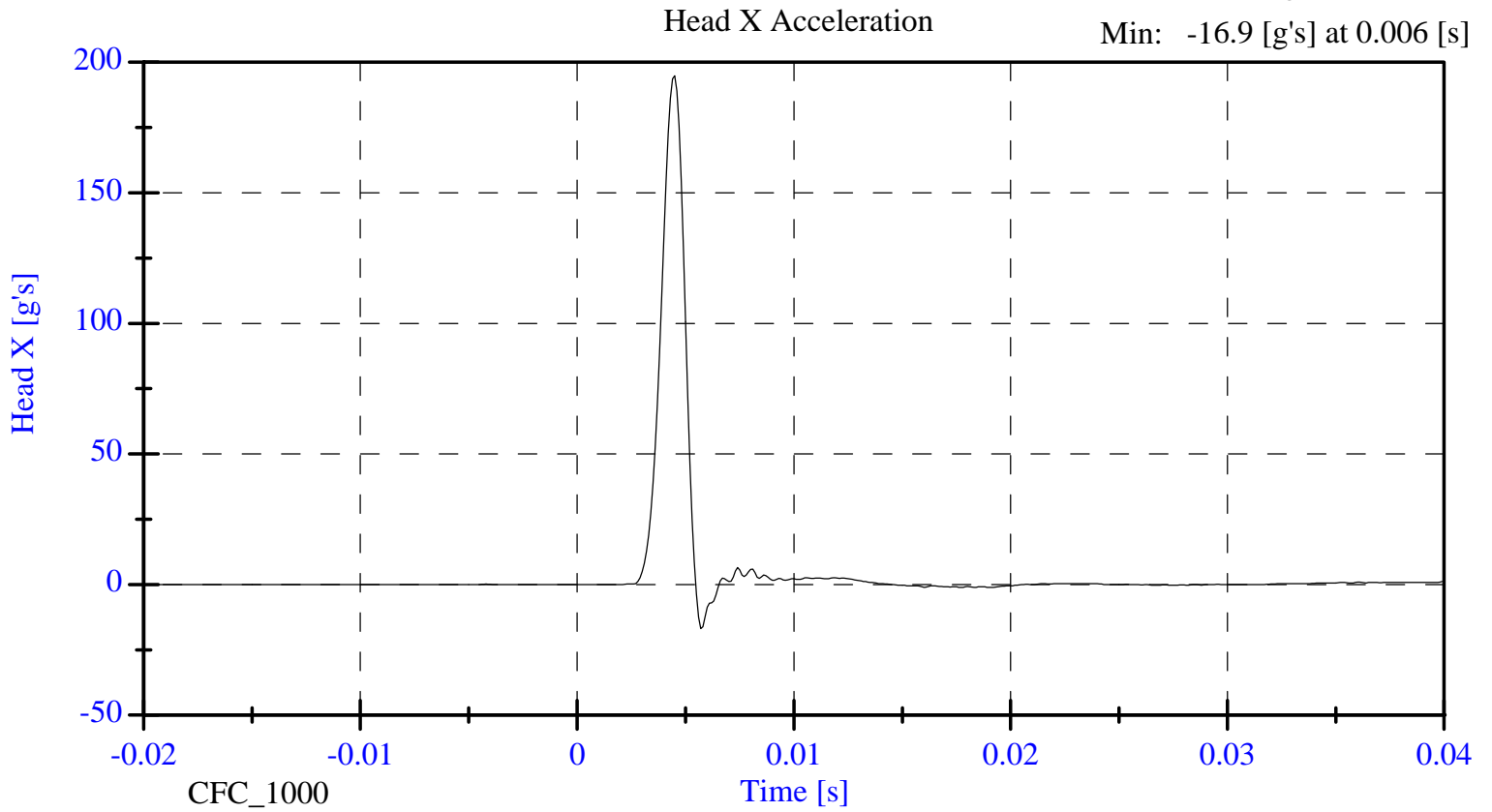
SID Serial No.: 013 Sequential Test Number: 2
Date: 2/13/02 Laboratory Technician: B. Swiecicki

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|-------------------------------------|------------------|--------------|
| TEMPERATURE (? C) | 18.9 - 25.5 | 21.1 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 29 |
| PEAK RESULTANT ACCELERATION (Gs) | 210 - 260 | 219.21 |
| PEAK LATERAL ACCELERATION (Gs) | Not to Exceed 10 | 6.40 |
| UNIMODAL CRITERIA ABOVE 100 Gs (ms) | 0.9 - 1.5 | 1.25 |

REMARKS: None

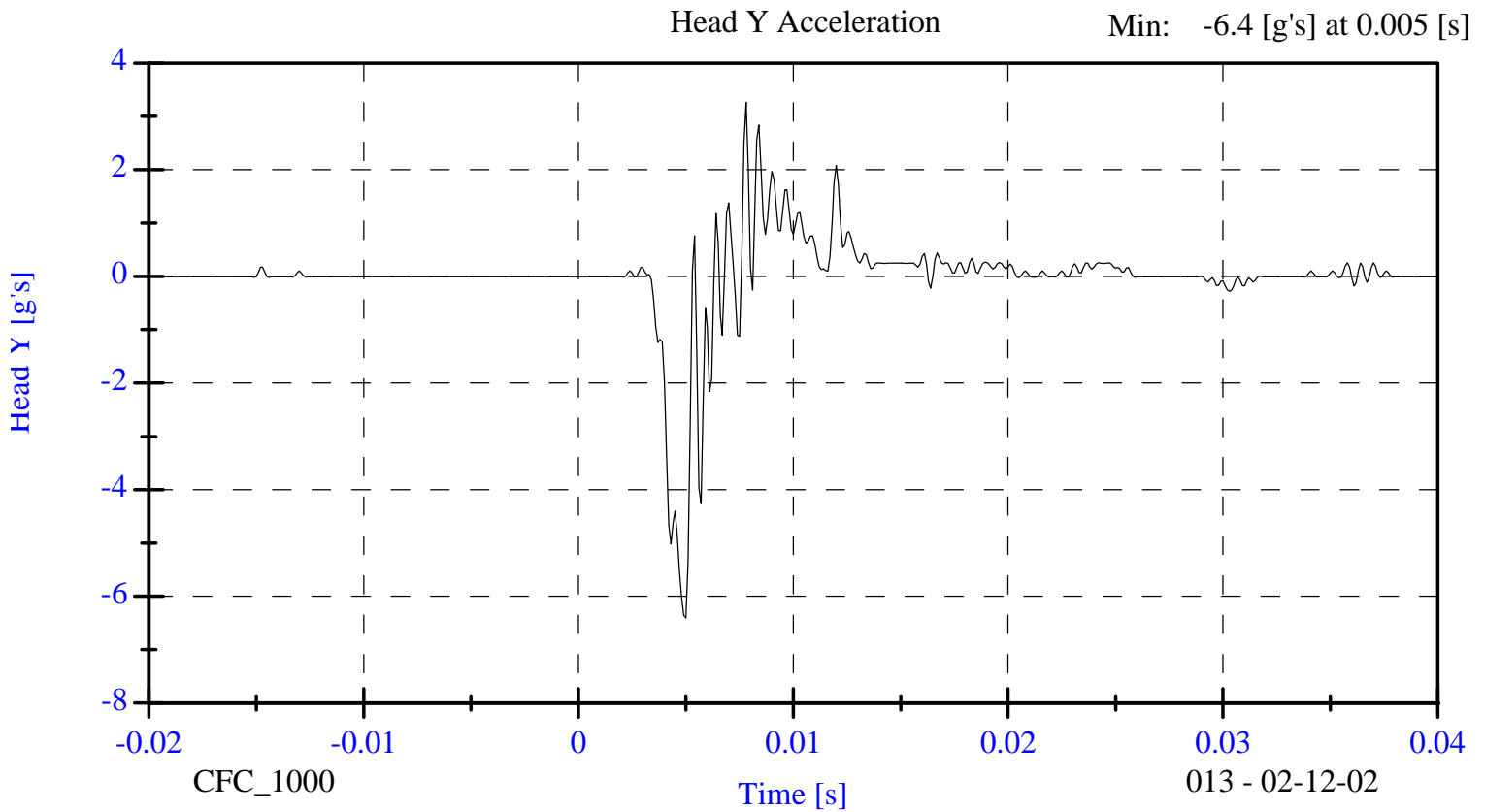
Max: 194.7 [g's] at 0.004 [s]

Min: -16.9 [g's] at 0.006 [s]



Max: 3.3 [g's] at 0.008 [s]

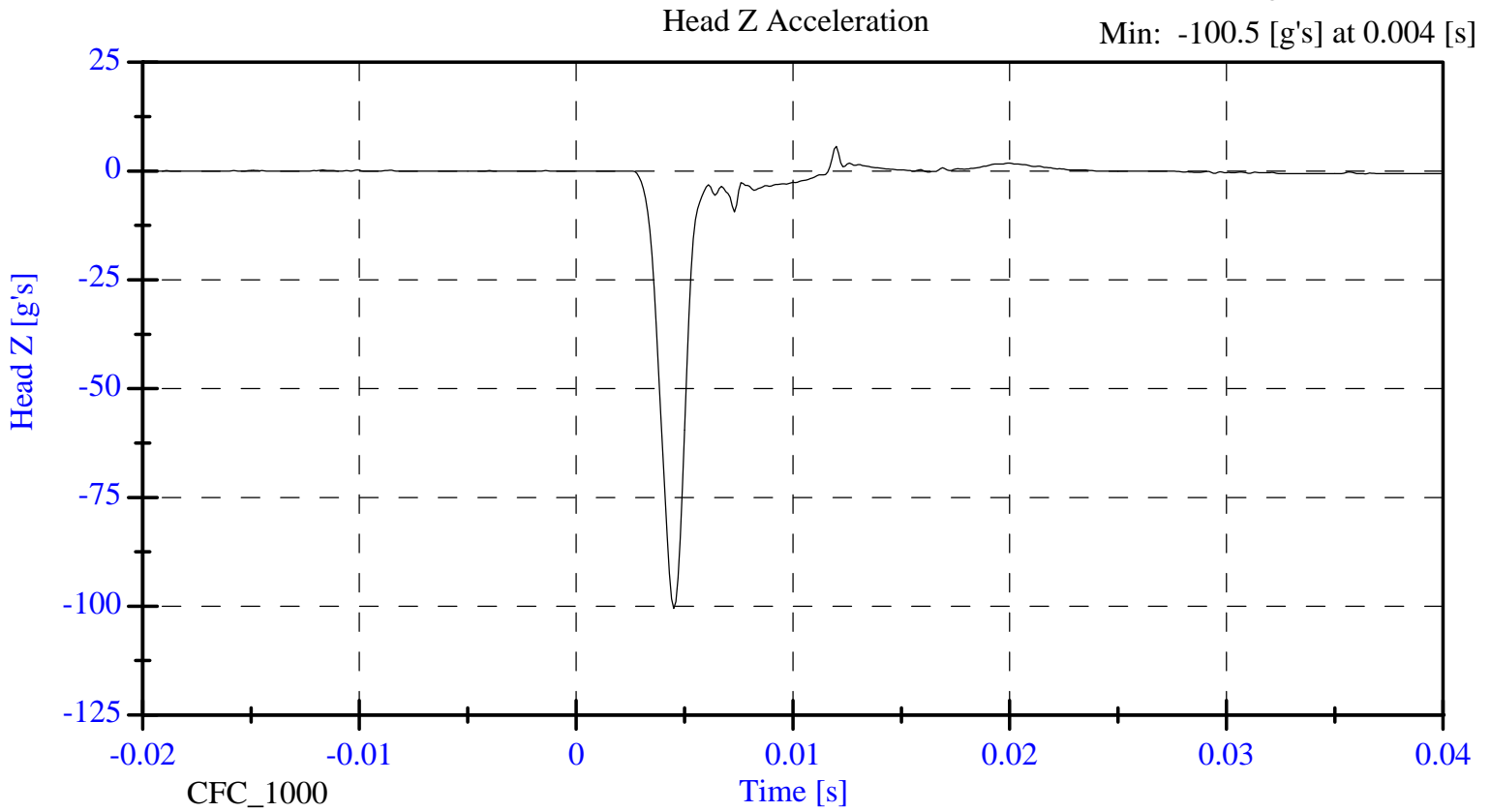
Min: -6.4 [g's] at 0.005 [s]



013 - 02-12-02

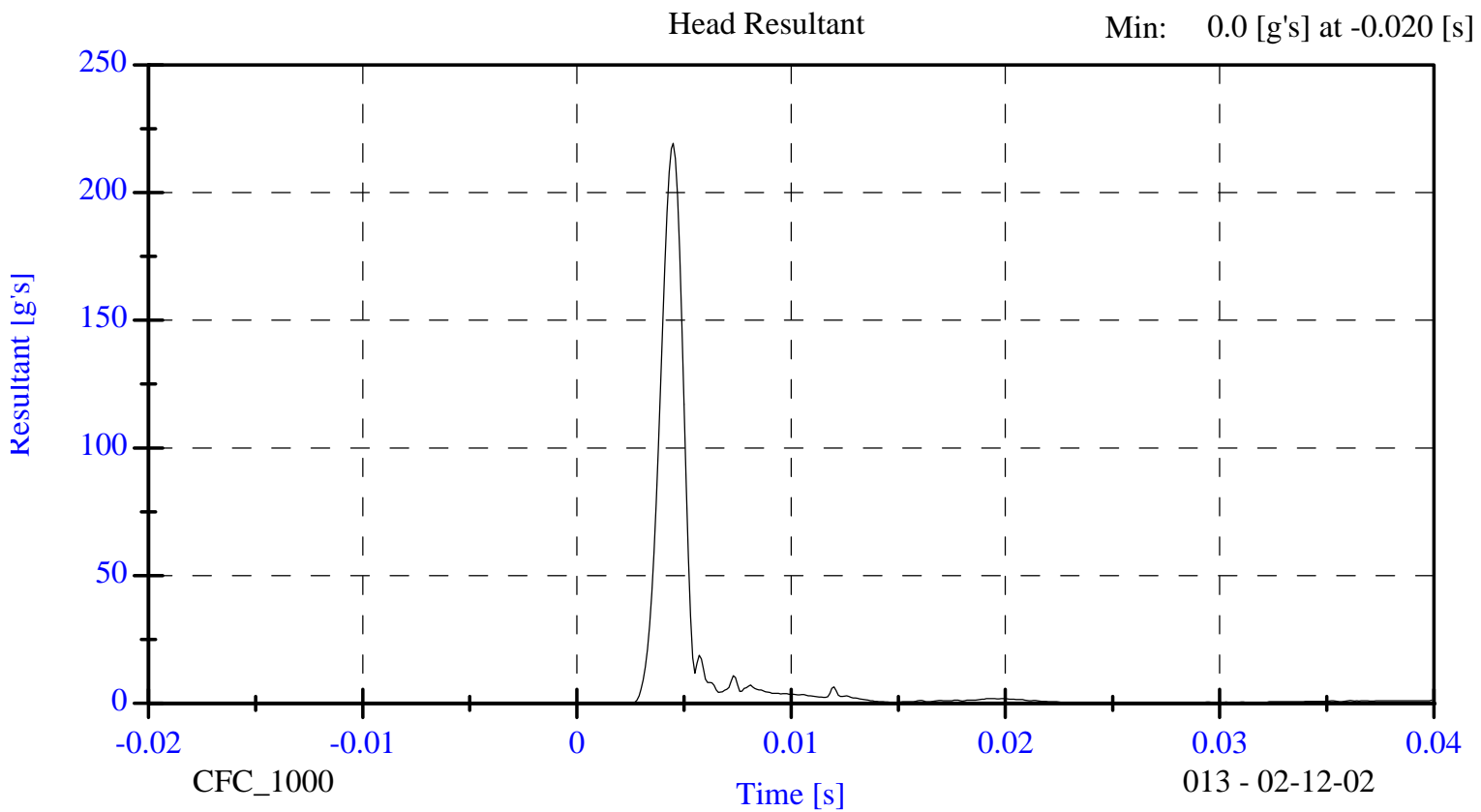
Max: 5.7 [g's] at 0.012 [s]

Min: -100.5 [g's] at 0.004 [s]



Max: 219.2 [g's] at 0.004 [s]

Min: 0.0 [g's] at -0.020 [s]



013 - 02-12-02

**ABDOMINAL COMPRESSION TEST
POST TEST**

(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 2
Date: 2/13/02 Laboratory Technician: B. Swiecicki

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|-----------------------|---------------|--------------|
| TEMPERATURE (? C) | 18.9 - 25.5 | 21 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 30 |
| FORCE @ 13 mm (N) | 104 - 162 | 120.1 |
| FORCE @ 19 mm (N) | 163 - 221 | 182.4 |
| FORCE @ 25 mm (N) | 222 - 280 | 249.1 |
| FORCE @ 33 mm (N) | 325 - 391 | 369.2 |

REMARKS: None

Dummy S/N 013

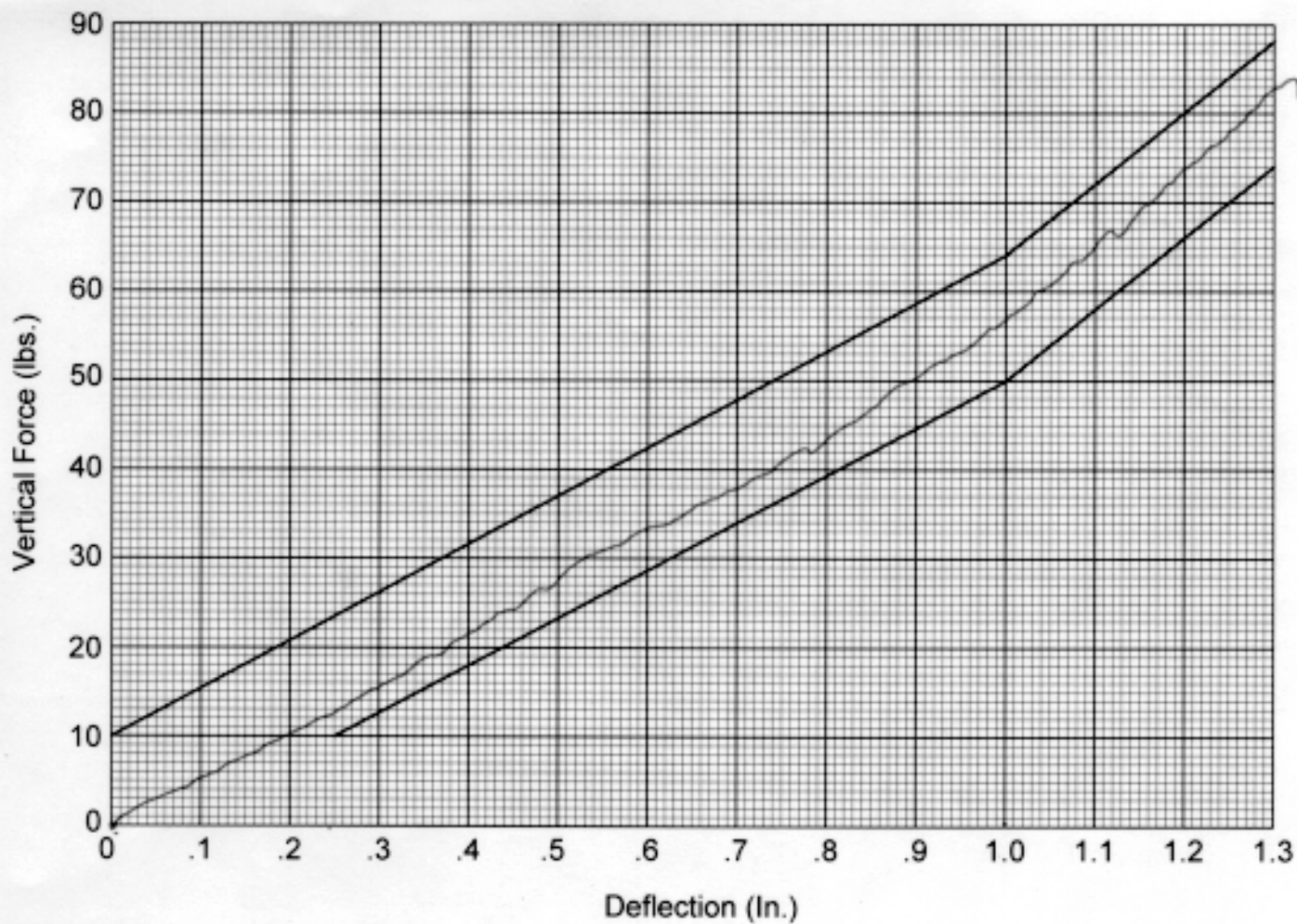
W/A _____

Date 2-13-02

Performed By BD

Temp. 69°

Humidity 30%



**Hybrid II
Abdomen Static Press**

**LUMBAR FLEXION TEST
POST TEST**
(Test not required for SID certification)

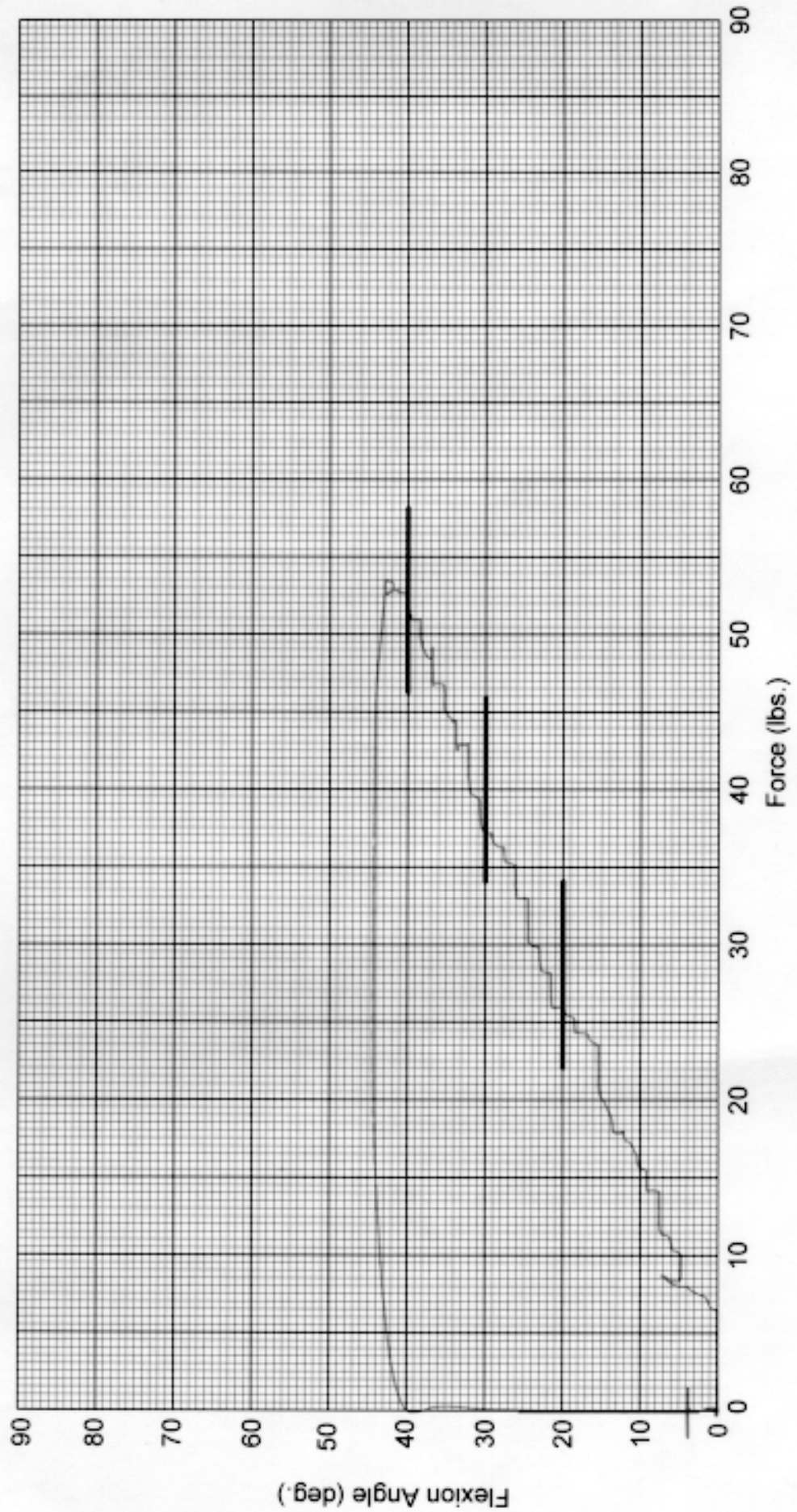
CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 2
 Date: 2/13/02 Laboratory Technician: B. Swiecicki

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|-----------------------|---------------|--------------|
| TEMPERATURE (? C) | 18.9 - 25.5 | 21 |
| RELATIVE HUMIDITY (%) | 10 - 70 | 30 |
| FORCE @ 0? (N) | 0 - 26.7 | 0 |
| FORCE @ 20? (N) | 97.8 - 151.2 | 113 |
| FORCE @ 30? (N) | 151.2 - 204.6 | 165 |
| FORCE @ 40? (N) | 204.6 - 258 | 227 |
| RETURN ANGLE | 12? max. | 3.9 |

REMARKS: None

Dummy S/N 013
 W/A _____
 Date 2-13-02
 Performed By [Signature]
 Temp. 70°
 Humidity 29%



Hybrid II Lumbar Spine Flexion Test

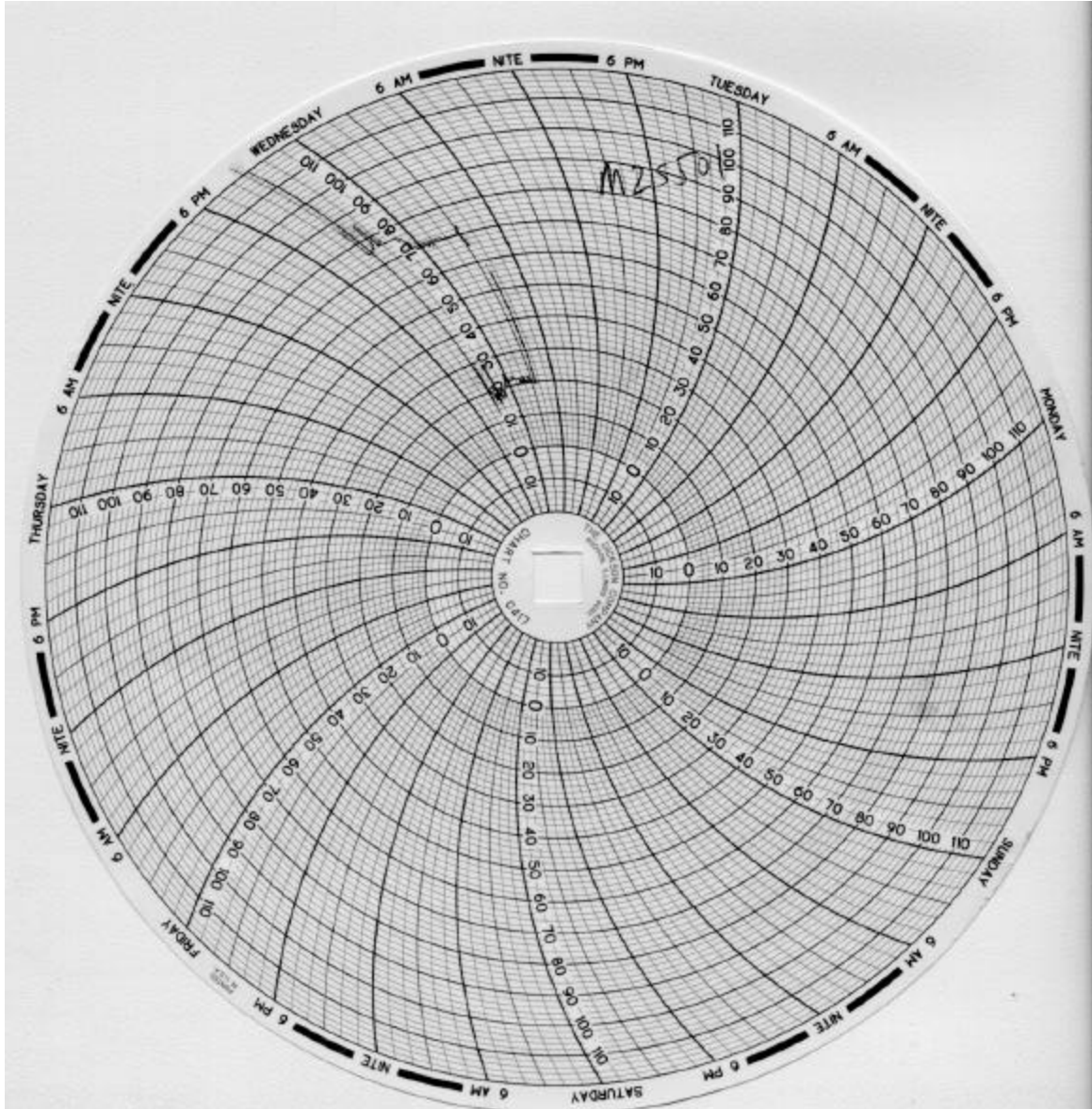
POST TEST DUMMY INSPECTION LIST
CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 013 Sequential Test Number: 2
 Date: 2/13/02 Laboratory Technician: B. Swiecicki

| PART | ITEMS CHECKED | COMMENTS |
|--------------|---|----------|
| SKIN | VISUAL INSPECTION | OK |
| HEAD | VISUAL, BALLAST, ACCELEROMETER MOUNT | OK |
| NECK | VISUAL, CABLE TORQUE | OK |
| SPINE BOX | VISUAL, BALLAST, WELDMENT, ACCELEROMETER MOUNT | OK |
| RIB CAGE | VISUAL, MEASURE, STIFFENERS | OK |
| STERNUM | VISUAL | OK |
| LUMBAR SPINE | VISUAL | OK |
| ABDOMEN | VISUAL | OK |
| PELVIS | VISUAL, PALPATE, ACCELEROMETER MOUNT | OK |
| UPPER LEGS | VISUAL | OK |
| KNEES | VISUAL, STOPS, INSERTS | OK |
| LOWER LEGS | VISUAL, RANGE OF MOTION | OK |
| ANKLES | VISUAL, RANGE OF MOTION | OK |
| FEET | VISUAL, RANGE OF MOTION | OK |
| JOINTS | 1 TO 2 g RANGE | OK |
| OTHER | NONE | - |

REMARKS: None

TEMPERATURE TRACE



APPENDIX D

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

SID INSTRUMENTATION

| | FRONT SID NO.: 013 | | |
|-----------------------|--------------------|--------------|------------------|
| | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
| HEAD AX | P16813 | Endevco | 8/20/2001 |
| HEAD AY | P17255 | Endevco | 8/20/2001 |
| HEAD AZ | P17145 | Endevco | 8/20/2001 |
| UPPER RIB | P16761 | Endevco | 8/20/2001 |
| LOWER RIB | P17131 | Endevco | 8/20/2001 |
| LOWER SPINE | P15736 | Endevco | 8/20/2001 |
| PELVIS | P16628 | Endevco | 8/20/2001 |
| UPPER RIB REDUNDANT | P17247 | Endevco | 8/20/2001 |
| LOWER RIB REDUNDANT | P16616 | Endevco | 8/20/2001 |
| LOWER SPINE REDUNDANT | P16289 | Endevco | 9/4/2001 |
| PELVIS REDUNDANT | P16575 | Endevco | 8/20/2001 |

REMARKS: None

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

VEHICLE AND MDB INSTRUMENTATION

| | VEHICLE AND MDB INSTRUMENTS | | |
|------------------------------------|-----------------------------|--------------|------------------|
| | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
| RIGHT FRONT SILL (X) | B10827 | ENDEVCO | 8/29/2001 |
| RIGHT FRONT SILL (Y) | A13513 | ENDEVCO | 8/29/2001 |
| RIGHT FRONT SILL (Z) | B11408 | ENDEVCO | 8/29/2001 |
| RIGHT REAR SILL (X) | J32143 | ENDEVCO | 1/7/2002 |
| RIGHT REAR SILL (Y) | J32838 | ENDEVCO | 1/7/2002 |
| RIGHT REAR SILL (Z) | J32174 | ENDEVCO | 1/7/2002 |
| REAR FLOORPAN ABOVE AXLE (X) | J32782 | ENDEVCO | 8/28/2001 |
| REAR FLOORPAN ABOVE AXLE (Y) | AP064 | ENDEVCO | 8/28/2001 |
| REAR FLOORPAN ABOVE AXLE (Z) | J33127 | ENDEVCO | 8/28/2001 |
| LEFT REAR SILL (Y) | AP1A2 | ENDEVCO | 8/29/2001 |
| LEFT FRONT SILL (Y) | APWG2 | ENDEVCO | 10/11/2001 |
| LEFT FRONT DOOR CENTERLINE (Y) | J27927 | ENDEVCO | 10/5/2001 |
| RIGHT REAR SEAT OCCUPANT COMP. (Y) | J32383 | ENDEVCO | 9/5/2001 |
| MID REAR OF LEFT FRONT DOOR (Y) | J24754 | ENDEVCO | 9/25/2001 |
| LEFT FRONT DOOR UPPER C\L (Y) | J33032 | ENDEVCO | 9/4/2001 |
| MID REAR OF LEFT REAR DOOR (Y) | J31060 | ENDEVCO | 9/4/2001 |
| LEFT REAR DOOR UPPER C\L (Y) | J33156 | ENDEVCO | 8/20/2001 |
| LOWER LEFT B- PILLAR (Y) | J32186 | ENDEVCO | 9/5/2001 |
| MIDDLE LEFT B-PILLAR (Y) | J26604 | ENDEVCO | 10/5/2001 |
| LOWER LEFT A-PILLAR (Y) | B11073 | ENDEVCO | 1/7/2002 |
| UPPER LEFT A-PILLAR (Y) | A14433 | ENDEVCO | 9/25/2001 |
| FRONT SEAT TRACK (Y) | A13883 | ENDEVCO | 8/29/2001 |
| REAR SEAT TRACK (Y) | B10951 | ENDEVCO | 1/15/2002 |
| VEHICLE CG (X) | J27941 | ENDEVCO | 8/16/2001 |
| VEHICLE CG (Y) | J32176 | ENDEVCO | 9/21/2001 |
| VEHICLE CG (Z) | ACC06 | ENDEVCO | 9/25/2001 |
| MDB CG (X) | C16682 | ENDEVCO | 6-Sep-01 |
| MDB CG (Y) | CJ54 | ENDEVCO | 6-Sep-01 |
| MDB CG (Z) | GK12 | ENDEVCO | 6-Sep-01 |
| MDB REAR FRAME MEMBER (X) | CX05 | ENDEVCO | 6-Sep-01 |
| MDB REAR FRAME MEMBER (Y) | C16685 | ENDEVCO | 6-Sep-01 |

REMARKS: None

REPORT NUMBER: SNCAP-CAL-02-02

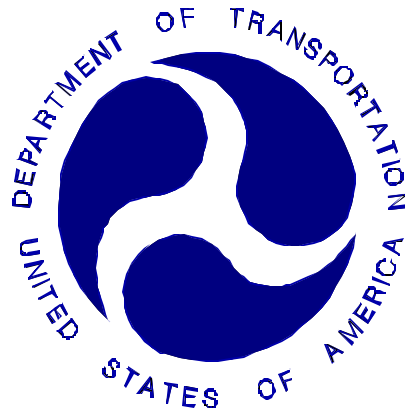
**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

SAFETY FIRST FORERUNNER LATCH

NHTSA NUMBER: M25501

VERIDIAN ENGINEERING TEST NUMBER: 8652-SNCAP-02

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



Feb.6,2002

FINAL REPORT

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

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

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Transportation Sciences Center

Approval Date:

FINAL REPORT ACCEPTANCE BY:

Accepted By:

Acceptance Date:

TECHNICAL REPORT STANDARD TITLE PAGE

| | | | | | |
|--|--|---|--|--|-----------|
| 1. Report No. SNCAP-CAL-02-02 | | 2. Government Accession No. | | 3. Recipient's Catalog No. | |
| 4. Title and Subtitle Final Report of Safety First Forerunner LATCH NHTSA No.: M25501 | | | | 5. Report Date Feb.6,2002 | |
| | | | | 6. Performing Organization Code CAL | |
| 7. Author(s) James Czarnecki, Project Engineer David J. Travale, Program Manager | | | | 8. Performing Organization Report No. 8652-SNCAP-02 | |
| 9. Performing Organization Name and Address Veridian Engineering Transportation Sciences Center P.O. Box 400 Buffalo, New York 14225 | | | | 10. Work Unit No. | |
| | | | | 11. Contract or Grant No. DTNH22-01-D-32005 | |
| 12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NPS-10 400 Seventh SW, Room 5313 Washington, D.C. 20590 | | | | 13. Type of Report and Period Covered Final Report, February and March 2002 | |
| | | | | 14. Sponsoring Agency Code NPS-10 | |
| 15. Supplementary Notes | | | | | |
| 16. Abstract A 55/28 kph 90 ⁰ Impact Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject CRS Safety First Forerunner LATCH in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the determination of CRS crashworthiness. This test was conducted at the Veridian Engineering Crash Test Facility in Buffalo, New York, on Feb.6,2002. | | | | | |
| 17. Key Words New Car Assessment Program (NCAP) Side Impact | | | | 18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Reference Division Room 5108 (NAD-52) 400 Seventh St., S.W. Washington, D.C. 20590 Telephone No. (202) 366-4946 ATTN: Robert Hornicle | |
| 19. Security Classification of Report UNCLASSIFIED | | 20. Security Classification of Page UNCLASSIFIED | | 21. No. of Pages 293 | 22. Price |

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SECTION 1

PURPOSE AND SUMMARY OF TEST M25501

The purpose of this test was to obtain CRS performance data in a side impact NCAP condition.

The 38.5 side impact NCAP moving deformable barrier (MDB) test was conducted in accordance with the Office of Crashworthiness Standards (OCS) Side Impact NCAP Laboratory Test Procedure.

SUMMARY

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

The right rear (Position 3) child dummy (serial no. 142) and left rear (Position 4) child dummy (serial no. 042) were calibrated previous to this test. Child dummy certification information is found in section 5.

The right rear child dummy's HIC was 122.3, maximum chest deceleration over 3 ms was 22.8 g's. The left rear child dummy's HIC was 320.0, maximum chest deceleration over 3 ms was 83.6 g's.

SECTION 2
DATA SHEET NO. 1
CRASH TEST SUMMARY

TEST DUMMY INFORMATION:

| DESCRIPTION | Position #3 CRS | Position #4 CRS |
|---------------------|-------------------------------|-------------------------------|
| ATD Type/Serial No. | Hybrid III 3C/142 | Hybrid III 3C /042 |
| Restraint System: | Safety First Forerunner Latch | Safety First Forerunner Latch |

Number of Data Channels _____ 57 _____
 Number of Cameras: _____ 1 _____ Real Time
 _____ 3 _____ High Speed

POST TEST DOOR OPENING

| DESCRIPTION | FRONT | REAR |
|------------------|--------------------------------|--------------------------------|
| Left Side Doors | Closed and Latched, Inoperable | Closed and Latched, Inoperable |
| Right Side Doors | Closed, Latched and Operable | Closed, Latched and Operable |
| Hatch/Other Door | N/A | Closed, Latched and Operable |

POST TEST SEAT DATA

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

VISIBLE DUMMY CONTACT POINTS

| | Position #3 CRS | Position #4 CRS |
|----------------------|--|---|
| Head Contact: | Side of the face and top of the head to the CRS upper bolster. | Top of the head and side of the face to CRS upper bolster and side door trim. |
| Upper Torso Contact: | CRS Bolster | CRS Bolster |
| Lower Torso Contact: | CRS Bolster | CRS Bolster |
| Left Knee Contact: | CRS Bolster | CRS Bolster |
| Right Knee Contact: | Left Knee | Left Knee |

DATA SHEET NO. 2

CRS PARAMETER DATA

CRS: _Safety First Forerunner Latch

NHTSA No. M25501

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Delivered Weight of Vehicle with Maximum Fluids = 1401 kg (A)

AS TESTED WEIGHT OF VEHICLE (1 SID + 2 P572C w/ CRS +CARGO + EQUIPMENT & INSTRUMENTATION):

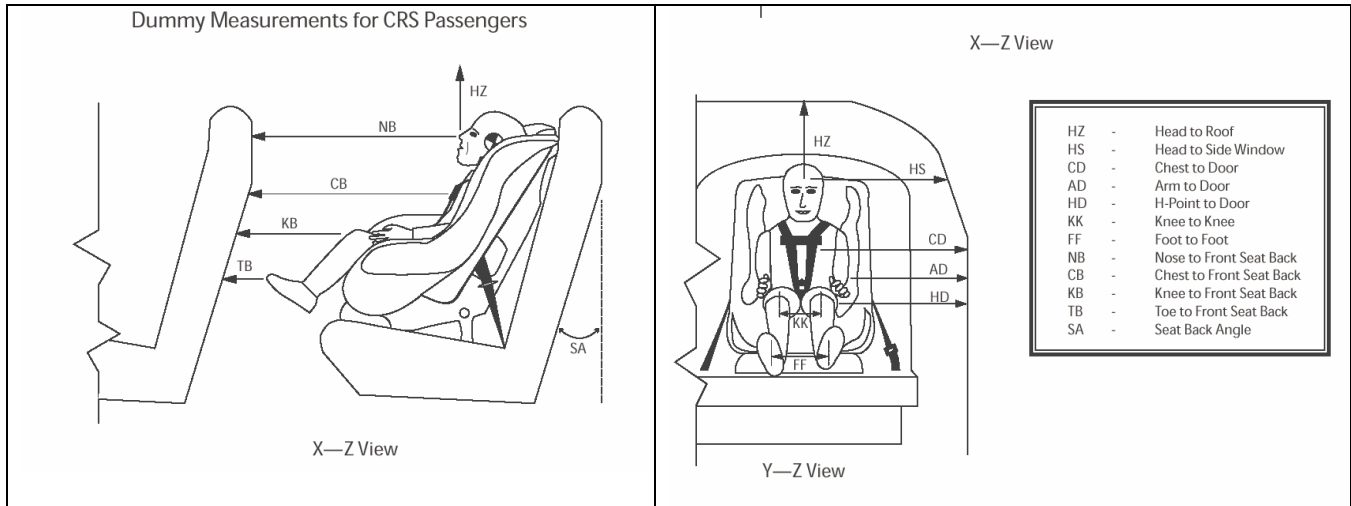
| | | | | | | | |
|---------------------|---|---------------|----|------------|---|--------------|----|
| Left Front | = | <u>413</u> | kg | Left Rear | = | <u>396</u> | kg |
| Right Front | = | <u>429</u> | kg | Right Rear | = | <u>384</u> | kg |
| TOTAL FRONT | = | <u>842.0</u> | kg | TOTAL REAR | = | <u>780.0</u> | kg |
| TOTAL TEST WEIGHT = | | <u>1622.0</u> | kg | | | | |

DATA SHEET NO. 3

CHILD DUMMY POSITIONING IN VEHICLE

CRS: Safety First Forerunner Latch

NHTSA No. M25501



| Measurement | Pre-Test (mm) | | Post Test (mm) | |
|-------------|---------------|--------------|----------------|--------------|
| | P3 CRS (142) | P4 CRS (142) | P3 CRS (142) | P4 CRS (042) |
| SA | 26.6° | 26.6° | 26.6° | 26.6° |
| HS | 406 | 354 | 349 | 343 |
| CD | 339 | 321 | 257 | 299 |
| AD | 223 | 195 | 111 | 189 |
| HD | 224 | 236 | 195 | 186 |
| HZ | 377 | 359 | 402 | 351 |
| NB | 492 | 531 | 503 | 520 |
| CB | 474 | 503 | 481 | 491 |
| KK | 171 | 140 | 179 | 130 |
| FF | 200 | 148 | 223 | 130 |
| KB – LEFT | 259 | 311 | 295 | 291 |
| KB – RIGHT | 270 | 333 | 365 | 369 |
| TB – LEFT | 40 | 50 | 0 | 34 |
| TB – RIGHT | 19 | 45 | 85 | 70 |

All dimensions in mm (unless noted)
 P3 – Right Rear Passenger (CRS #1)
 P4 – Left Rear Passenger (CRS #2)

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES

CRS: Safety First Forerunner Latch

NHTSA No. M25501

| DESCRIPTION | Unit | MAXIMUM VALUE | | | | | | | |
|------------------------|------|---------------|-------|--------|-------|-------------|------|--------|-------|
| | | Position #3 | | | | Position #4 | | | |
| | | Pos | msec | Neg | msec | Pos | msec | Neg | msec |
| Head X | g | 0.3 | 16.4 | -15.4 | 102.0 | 1.6 | 31.5 | -20.1 | 48.3 |
| Head Y | g | 21.2 | 87.9 | -3.1 | 177.1 | 60.4 | 53.3 | -4.0 | 151.8 |
| Head Z | g | 17.8 | 70.6 | -0.6 | 35.1 | 35.5 | 49.7 | -11.2 | 35.8 |
| Head Resultant | g | 28.6 | 87.9 | 0.0 | -14.3 | 66.6 | 51.1 | 0.0 | 2.9 |
| Redundant Head Z | g | 18.6 | 83.1 | -2.2 | 37.1 | 27.0 | 61.1 | -19.1 | 36.1 |
| Upper Neck Fx | N | 53.6 | 127.6 | -260.2 | 79.3 | 25.9 | 26.7 | -259.7 | 49.1 |
| Upper Neck Fy | N | 249.1 | 88.1 | -97.2 | 175.1 | 981.7 | 46.7 | -86.6 | 145.9 |
| Upper Neck Fz | N | 374.4 | 65.9 | -169.9 | 110.6 | 802.7 | 52.3 | -344.5 | 36.0 |
| Upper Neck F Resultant | N | 428.8 | 79.4 | 0.0 | -12.2 | 1256.8 | 47.0 | 0.0 | -2.3 |
| Upper Neck Mx | N-m | 77.3 | 98.7 | -12.0 | 176.9 | 89.3 | 52.4 | -12.6 | 158.8 |
| Upper Neck My | N-m | 24.4 | 85.7 | -1.0 | 189.2 | 24.4 | 83.9 | -1.2 | 22.4 |
| Upper Neck Mz | N-m | 34.0 | 103.2 | -3.5 | 42.6 | 18.3 | 74.1 | -5.0 | 144.8 |
| Upper Neck M Resultant | N-m | 86.2 | 98.8 | 0.0 | -13.2 | 91.0 | 52.4 | 0.0 | -17.8 |
| Lower Neck Fx | N | 5.6 | 17.8 | -418.1 | 107.3 | 30.9 | 31.6 | -426.1 | 48.1 |
| Lower Neck Fy | N | 548.6 | 90.5 | -77.9 | 177.2 | 587.0 | 48.2 | -84.8 | 151.8 |
| Lower Neck Fz | N | 479.3 | 73.1 | -15.4 | 36.3 | 991.7 | 52.8 | -316.9 | 36.0 |
| Lower Neck F Resultant | N | 728.2 | 88.3 | 0.0 | -16.0 | 1154.0 | 52.1 | 0.0 | -11.0 |
| Lower Neck Mx | N-m | 27.4 | 96.1 | -5.3 | 169.2 | 31.3 | 55.9 | -19.6 | 42.4 |
| Lower Neck My | N-m | 14.9 | 100.7 | -4.9 | 171.0 | 8.4 | 77.6 | -16.1 | 46.8 |
| Lower Neck Mz | N-m | 11.1 | 107.7 | -5.4 | 185.8 | 18.3 | 75.8 | -2.8 | 125.9 |
| Lower Neck M Resultant | N-m | 32.0 | 104.0 | 0.0 | -13.8 | 32.8 | 56.1 | 0.0 | -12.6 |
| Chest X | g | 6.4 | 112.9 | -12.7 | 63.3 | 8.4 | 49.1 | -28.2 | 37.5 |
| Chest Y | g | 21.5 | 71.3 | -0.4 | 199.9 | 83.4 | 38.6 | -7.2 | 63.8 |
| Chest Z | g | 4.9 | 79.2 | -2.7 | 35.0 | 9.9 | 58.9 | -21.7 | 41.4 |
| Chest Resultant | g | 23.3 | 70.4 | 0.0 | -9.2 | 88.3 | 38.4 | 0.0 | -13.3 |
| Chest Displacement | g | 0.1 | 13.3 | -7.5 | 69.7 | 19.6 | 43.6 | -1.9 | 31.2 |
| Pelvic X | g | * | * | * | * | 8.6 | 51.7 | -28.9 | 32.4 |
| Pelvic Y | g | 20.9 | 93.2 | -1.9 | 130.6 | 121.4 | 34.6 | -18.8 | 86.5 |
| Pelvic Z | g | 4.3 | 97.2 | -1.9 | 53.8 | 12.3 | 60.1 | -21.1 | 35.6 |
| Pelvic Resultant | g | * | * | * | * | 124.0 | 34.6 | 0.0 | -9.5 |
| Tether Load | N | 636.0 | 83.7 | -2.0 | 6.4 | 249.2 | 31.9 | -64.1 | 12.9 |

* Damaged cable - Data is not accurate.

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Safety First Forerunner Latch

NHTSA No. M25501

| | HEAD INJURY CRITERIA (HIC) | | | |
|---------------------|----------------------------|-----------------------|-----------------------|--|
| | HIC** | t ₁ (msec) | t ₂ (msec) | Average Acceleration (g's) t ₁ to t ₂ |
| Position #3 - Right | 122.3 | 73.2 | 109.2 | 25.9 |
| Position #4 - Left | 320.0 | 43.8 | 62.7 | 49.1 |

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

| | CLIP SUMMARY* | | | |
|---------------------|---------------|-----------------------|-----------------------|-------|
| | CLIP (g's) | t ₁ (msec) | t ₂ (msec) | CSI |
| Position #3 - Right | 22.8 | 68.9 | 71.9 | 99.6 |
| Position #4 - Left | 83.6 | 37.3 | 40.3 | 569.4 |

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

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

| Nij V10 | Nij | Time (ms) | Z Force (N) | X Force (N) | Y Moment (N-m) |
|---------|-----|-----------|-------------|-------------|----------------|
| Ntf | 0.5 | 79.4 | 287.2 | -259.6 | 23.6 |
| Nte | 0.1 | 189.2 | 134.7 | -13.4 | -1.0 |
| Ncf | 0.4 | 108.1 | -153.4 | -94.0 | 20.3 |
| Nce | 0.1 | 130.7 | -88.3 | 43.0 | -0.5 |

Peak Tension (CFC1000) 374.4 N

Peak Compression (CFC1000) 169.9 N

Critical Values

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

Condyle Offset 0

Position 4 Neck Injury Summary (HIII 3 year old – In Position)

| Nij V10 | Nij | Time (ms) | Z Force (N) | X Force (N) | Y Moment (N-m) |
|---------|-----|-----------|-------------|-------------|----------------|
| Ntf | 0.6 | 48.7 | 749.3 | -259.0 | 19.1 |
| Nte | 0.1 | 23.7 | 22.6 | 17.0 | -1.2 |
| Ncf | 0.4 | 84.6 | -10.8 | -57.5 | 24.3 |
| Nce | 0.1 | 33.3 | -222.9 | -31.4 | 0.0 |

Peak Tension (CFC1000) 802.7 N

Peak Compression (CFC1000) 344.5 N

Critical Values

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

Condyle Offset 0

DATA SHEET NO. 5

CRS PERFORMANCE DATA

CRS: Safety First Forerunner Latch

NHTSA No. M25501

| | | MAXIMUM VALUE | | | |
|----------------------------|------|---------------|-----------|----------|-----------|
| | | | | | |
| DESCRIPTION | Unit | Positive | Time (ms) | Negative | Time (ms) |
| Right Rear Compartment YR | g | 30.5 | 7.6 | -1.8 | 115.5 |
| Right Rear Compartment X | g | 2.0 | 60.6 | -5.7 | 7.5 |
| Right Rear Compartment Ang | g | 1.6 | 115.7 | -25.0 | 7.6 |
| P3 CRS X | g | 12.5 | 151.0 | -16.6 | 57.4 |
| P3 CRS Y | g | 30.7 | 151.0 | -37.6 | 109.1 |
| P3 CRS Z | g | 11.5 | 61.9 | -16.0 | 83.9 |
| P3 CRS Resultant | g | 38.5 | 109.1 | 0.0 | -13.7 |
| P4 CRS X | g | 24.5 | 54.4 | -25.5 | 21.4 |
| P4 CRS Y | g | 76.6 | 20.5 | -33.5 | 27.7 |
| P4 CRS Z | g | 12.8 | 33.3 | -25.7 | 41.2 |
| P4 CRS Resultant | g | 80.7 | 20.5 | 0.0 | -4.5 |

DATA SHEET NO. 5

CRS PERFORMANCE DATA (CONTINUED)

CRS: Safety First Forerunner Latch

NHTSA No. M25501

POSITION #3 CRS POST-TEST INSPECTION (Serial No. 02-925-BRD)

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

POSITION #4 CRS POST-TEST INSPECTION (Serial No. 02-925-BRD)

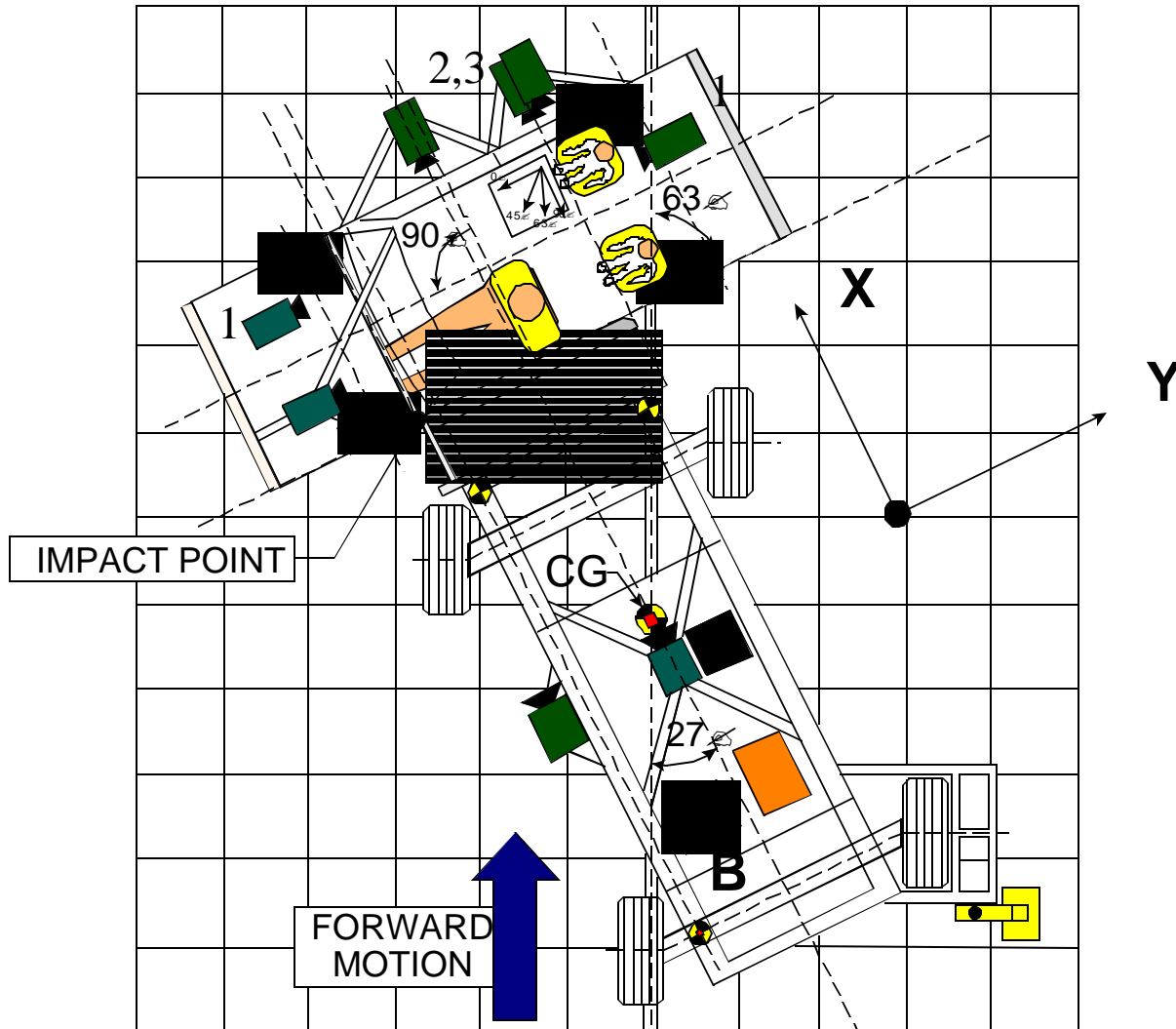
| LOCATION | DAMAGE | REMARKS |
|--------------------------------|---------------|----------------|
| Upper Tether Strap | No | None |
| Upper Tether Buckle | No | None |
| Upper Tether Hook | No | None |
| Vehicle Upper Tether Anchor | No | None |
| Lower Anchor Strap | No | None |
| Lower Anchor Buckle | 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: Safety First Forerunner Latch

NHTSA No. M25501



| Camera No. | View | Coordinates (millimeters) | | | Angle (deg.) | Lens (mm) | Film Speed (fps) |
|------------|---|---------------------------|------|------|--------------|-----------|------------------|
| | | X* | Y* | Z* | | | |
| 1** | Overall longitudinal view of child restraints | 205 | 1233 | 1279 | 10.2 | 8 | 900 |
| 2 | Right side CRS lower lateral view | 1670 | 1712 | 1021 | 6.0 | 8 | 1020 |
| 3 | Right side CRS upper lateral view | 1670 | 1712 | 1201 | 36.0 | 8 | 1015 |

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

X = (Impact Point) + Forward

Y = (Impact Point) + To Right

Z = (Ground Level) + Down

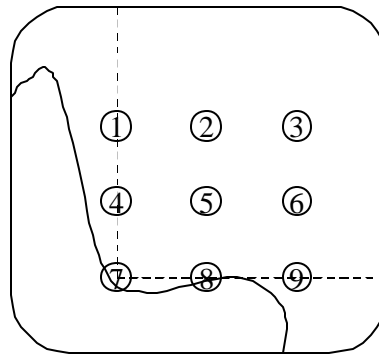
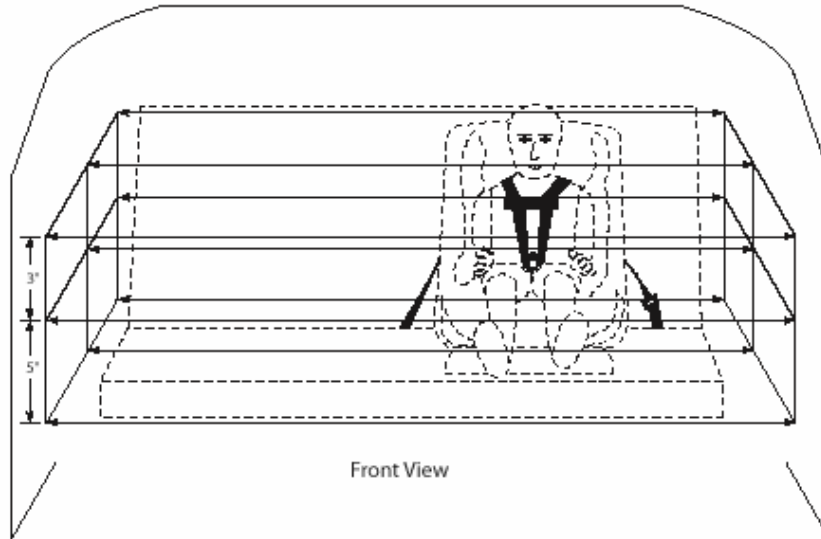
** Camera can be mounted for front or rear view

DATA SHEET NO. 7

REAR SEAT LATERAL DIMENSIONS

CRS: Safety First Forerunner Latch

NHTSA No. M25501



Side View

| Location | Pre-Test (mm) | Post-Test (mm) | Crush (mm) |
|----------|---------------|----------------|------------|
| 1 | 1354 | 1276 | 78 |
| 2 | 1380 | 1240 | 140 |
| 3 | 1410 | 1214 | 196 |
| 4 | 1406 | 1302 | 104 |
| 5 | 1417 | 1245 | 172 |
| 6 | 1405 | 1212 | 193 |
| 7 | 1189 | 1146 | 43 |
| 8 | 1321 | 1196 | 125 |
| 9 | 1375 | 1213 | 162 |

? Origin taken from intersection of seat bight and horizontal of uppermost point on bottom seat cushion.

? Rows heights and column widths are at 200 mm intervals

SECTION 3

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



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



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

Photo Not Available

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

Photo Not Available

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



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



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



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



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



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



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



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

Photo Not Available

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

Photo Not Available

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



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



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



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



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

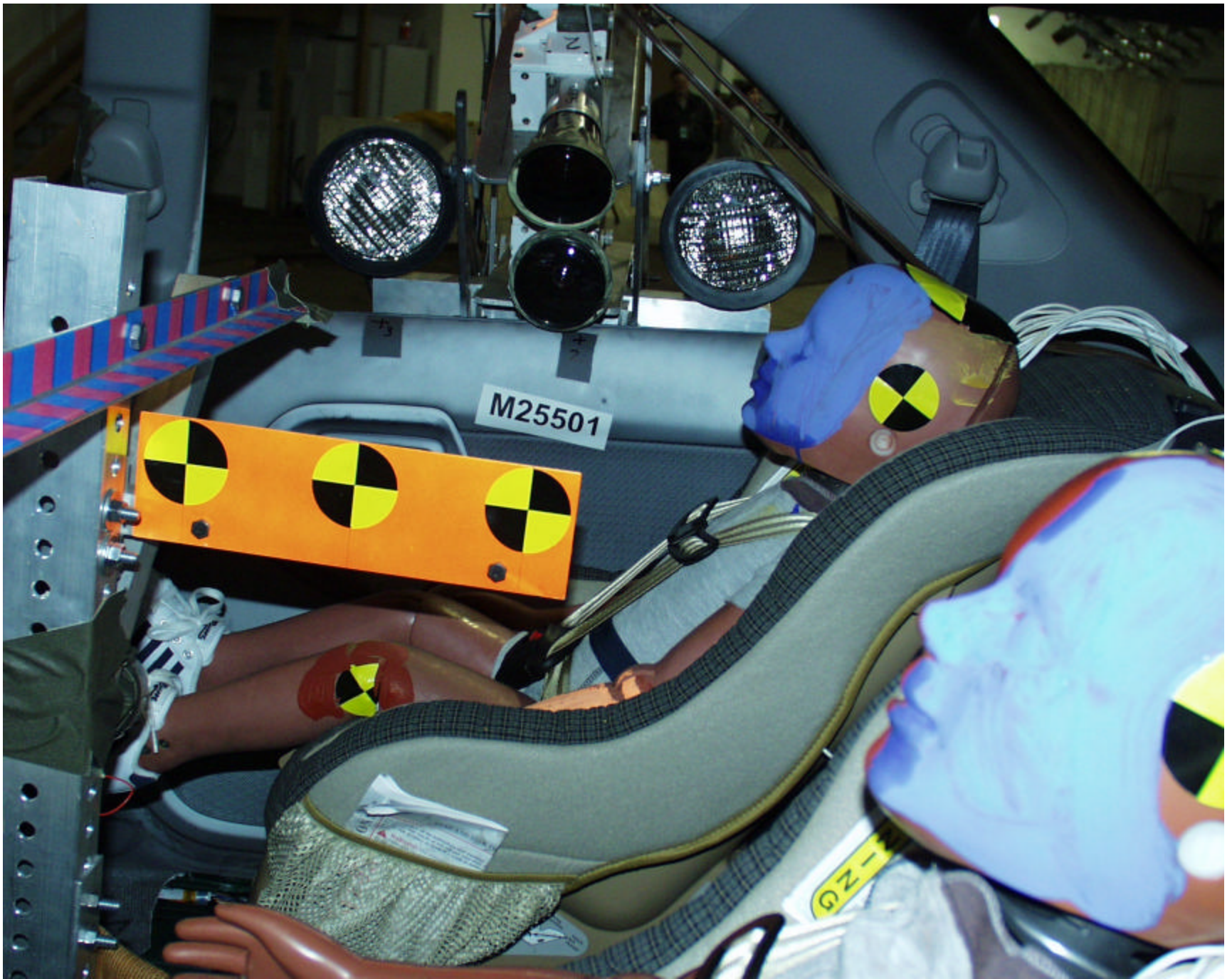


Figure 3-19 PRE-TEST POSITION 3 LEFT SIDE VIEW

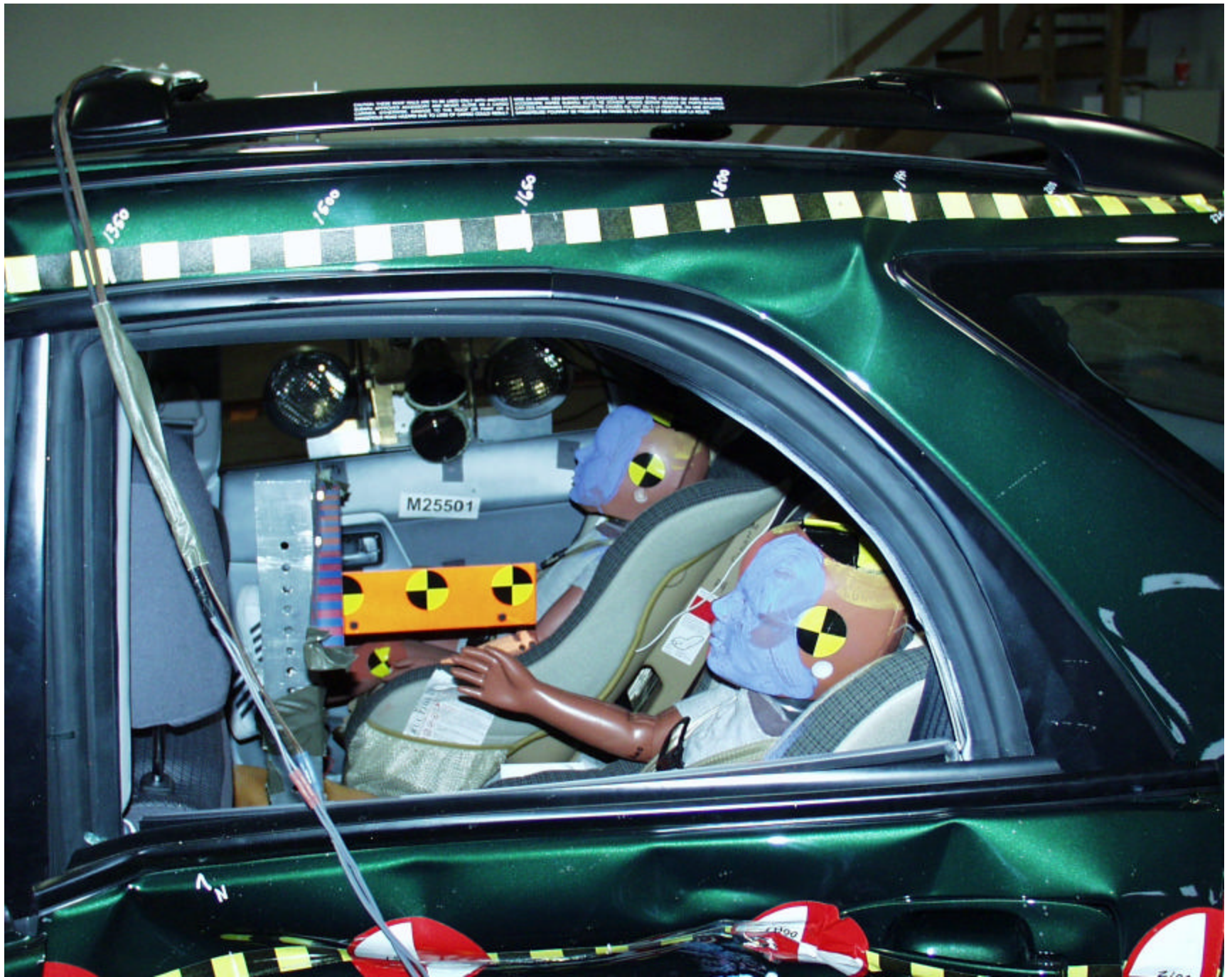


Figure 3-20 POST-TEST POSITION 3 LEFT SIDE VIEW



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

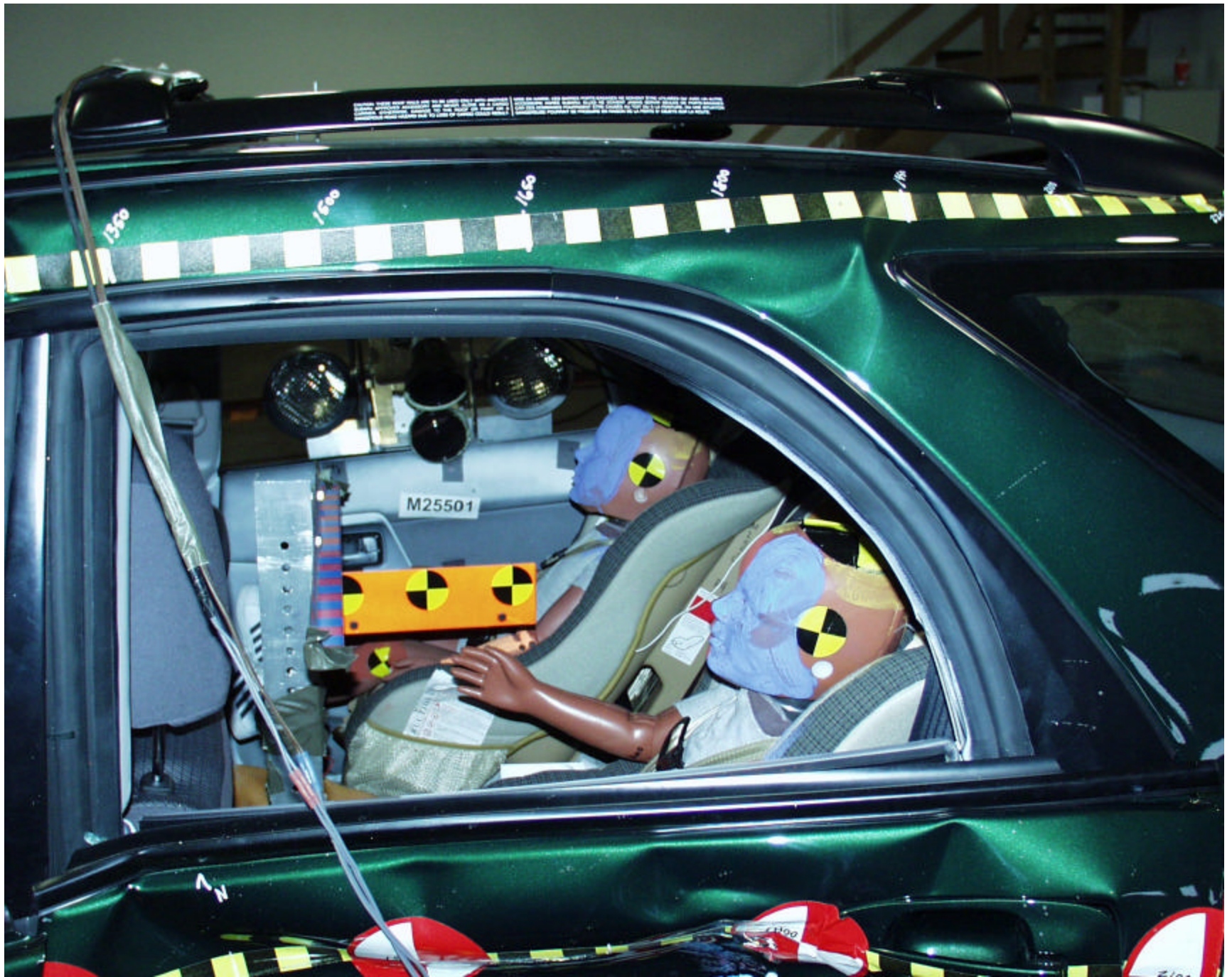


Figure 3-22 POST-TEST POSITION 4 LEFT SIDE VIEW



3-25

8652-SNCRP-02

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



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8652-SNCAP-02

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



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



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

Photo Not Available

Figure 3-27 PRE-TEST POSITION 3 REAR VIEW

Photo Not Available

Figure 3-28 POST-TEST POSITION 3 REAR VIEW

Photo Not Available

Figure 3-29 PRE-TEST POSITION 4 REAR VIEW

Photo Not Available

Figure 3-30 POST-TEST POSITION 4 REAR VIEW

SECTION 4

CHILD DUMMY RESPONSE AND CRS DATA TRACES

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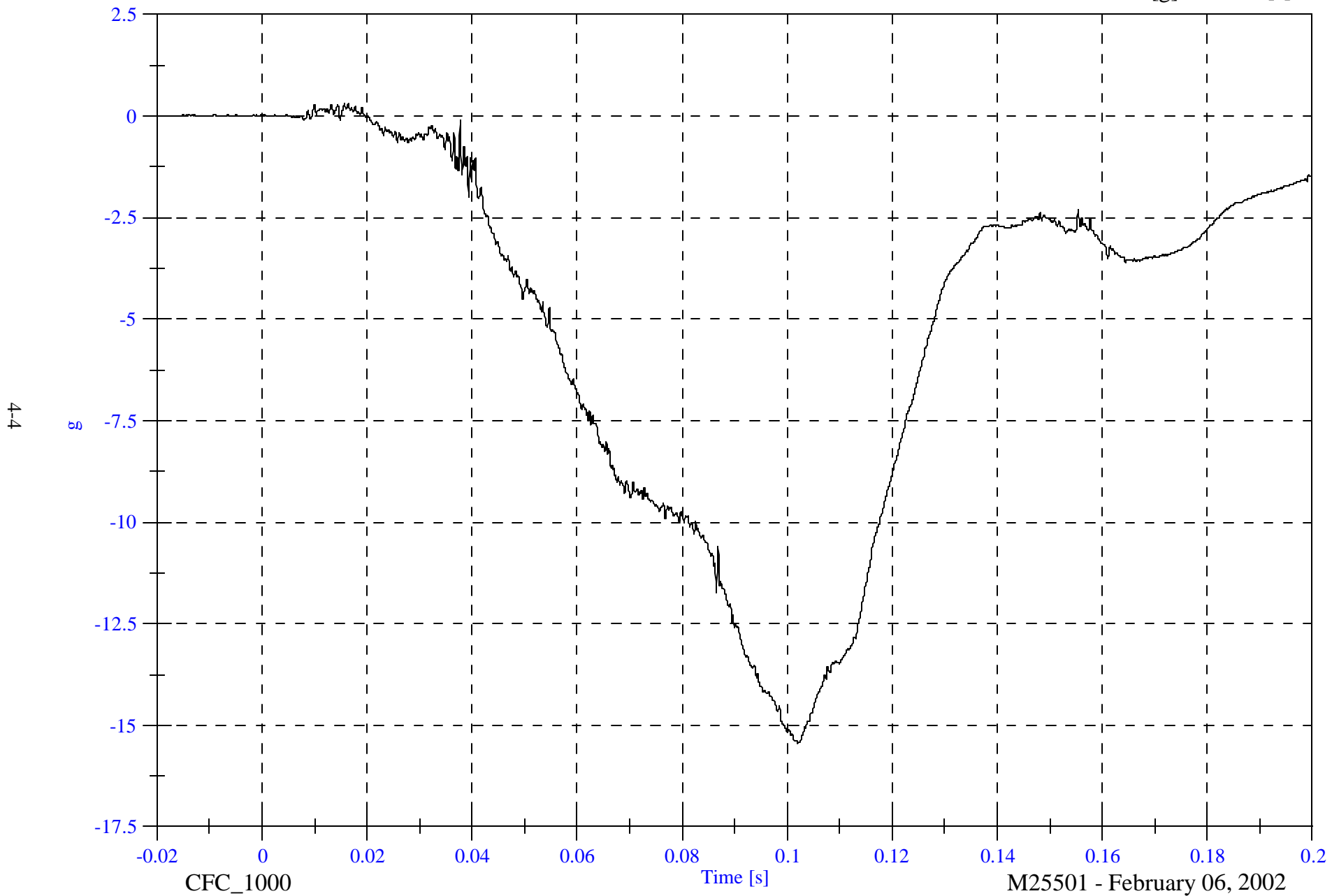
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2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Head x

Max: 0.3 [g] at 0.016 [s]

Min: -15.4 [g] at 0.102 [s]

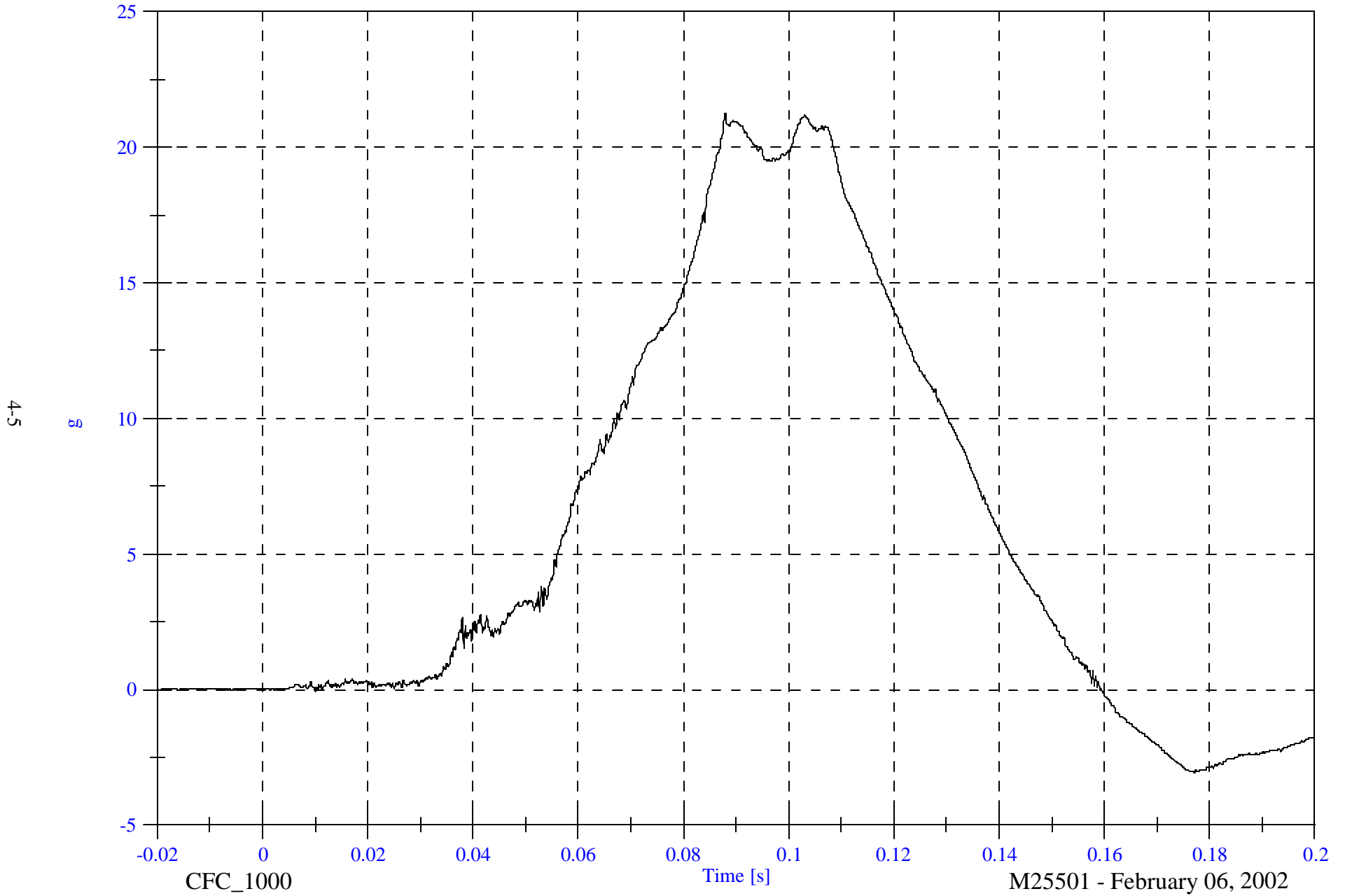


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 21.2 [g] at 0.088 [s]

Min: -3.1 [g] at 0.177 [s]

P3 Head y

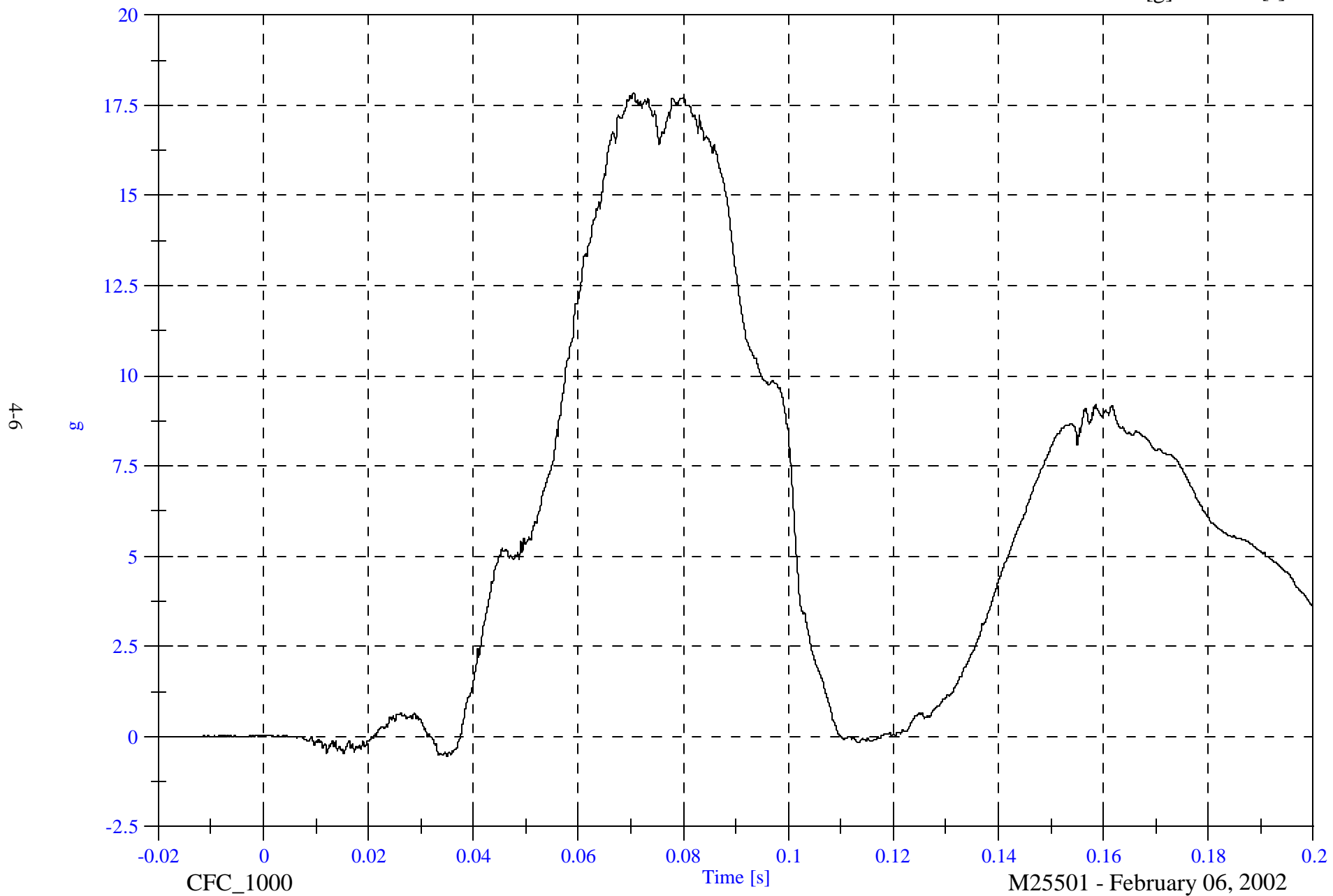


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 17.8 [g] at 0.071 [s]

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

P3 Head z

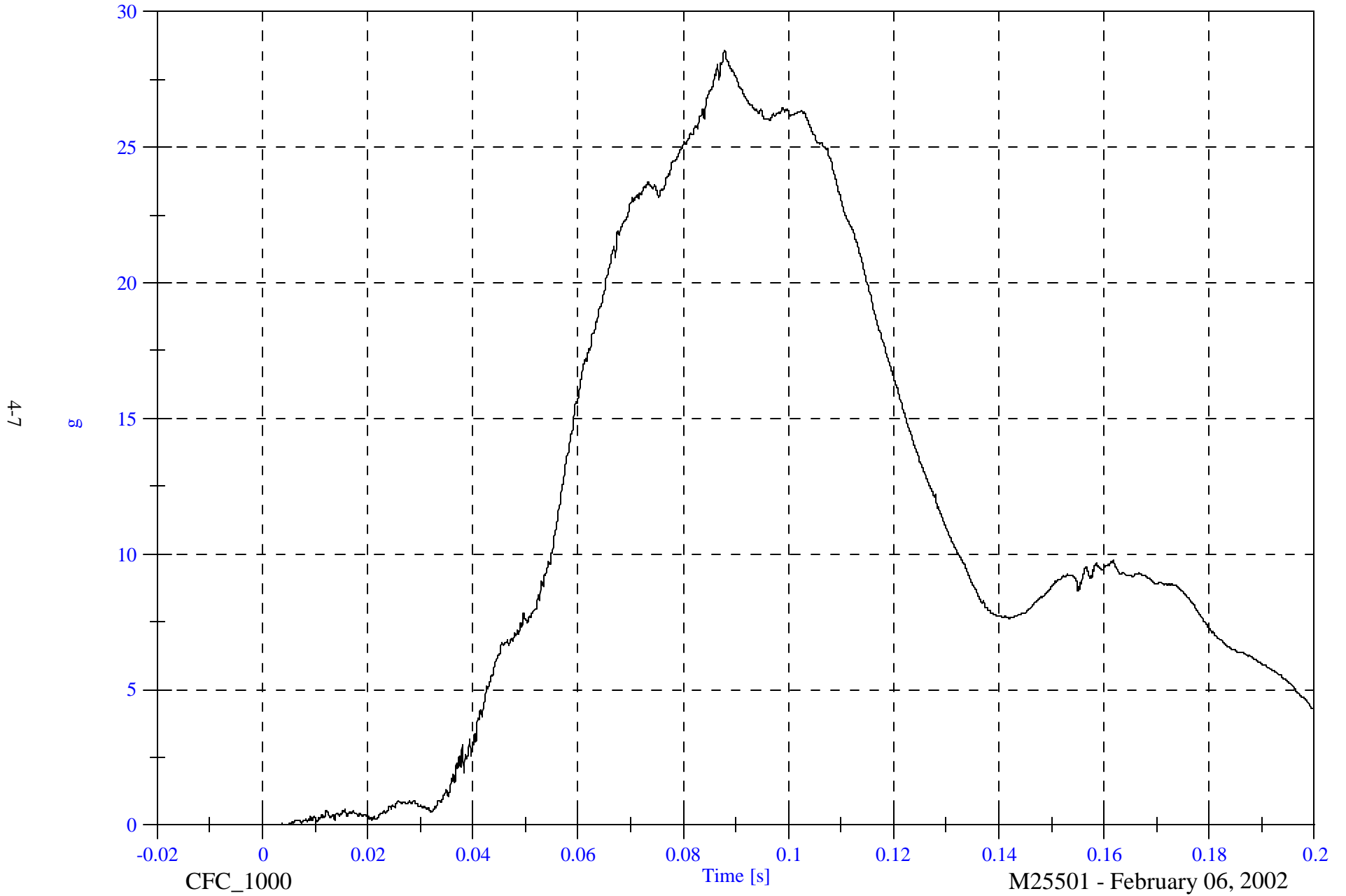


2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Head Resultant

Max: 28.6 [g] at 0.088 [s]

Min: 0.0 [g] at -0.014 [s]

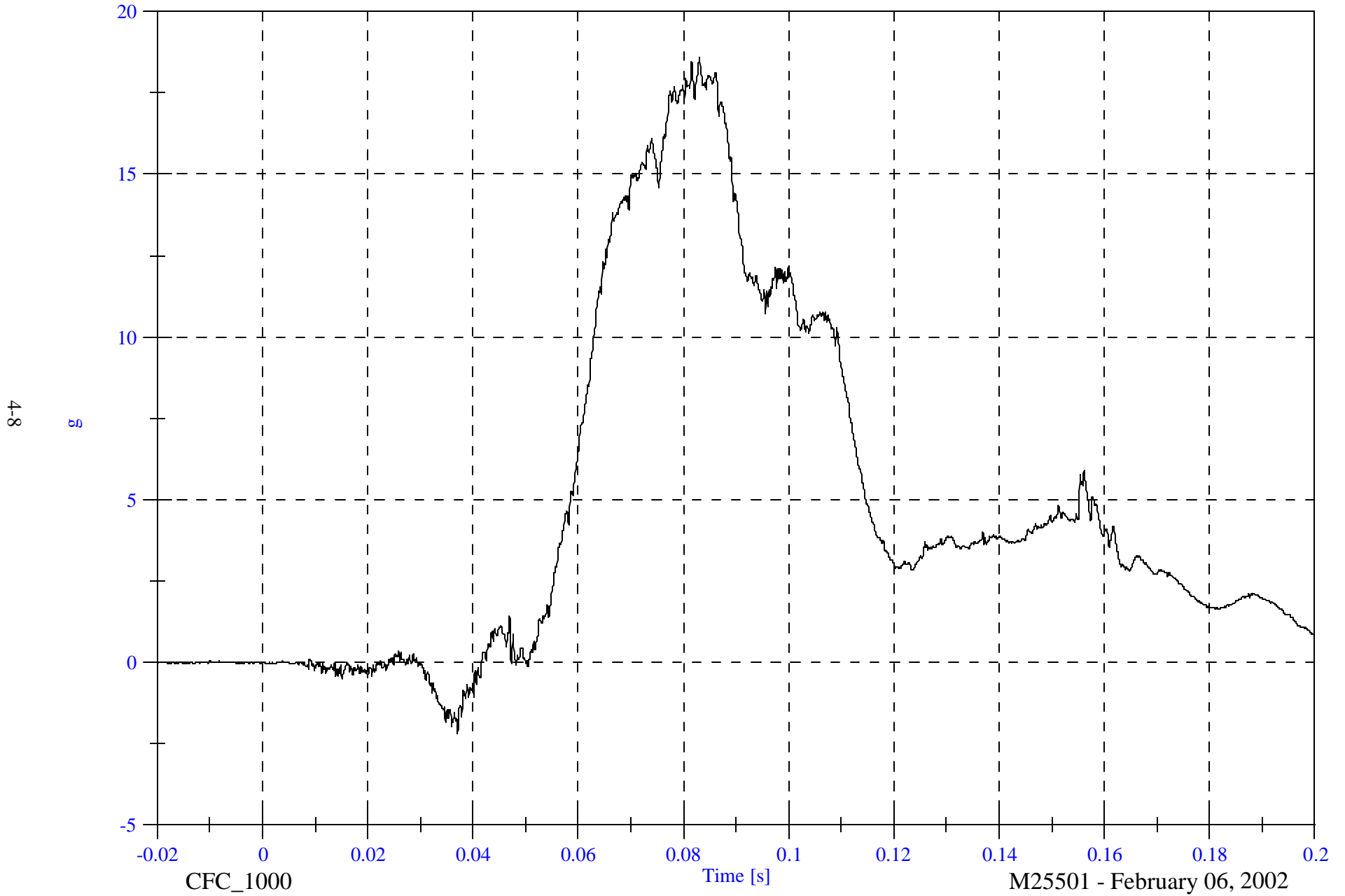


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 18.6 [g] at 0.083 [s]

P3 Head Red z

Min: -2.2 [g] at 0.037 [s]

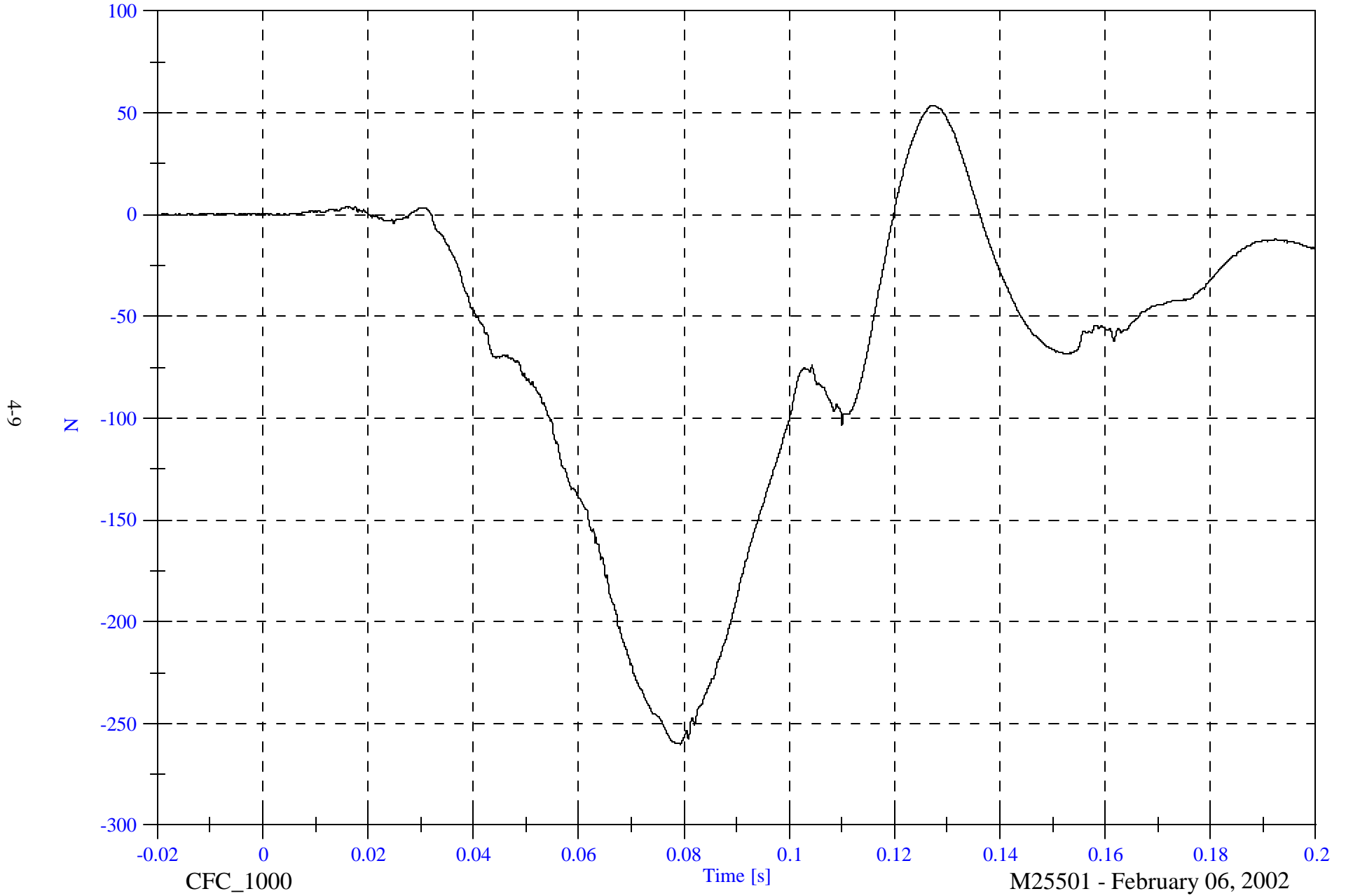


2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Upper Neck Fx

Max: 53.6 [N] at 0.128 [s]

Min: -260.2 [N] at 0.079 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 249.1 [N] at 0.088 [s]

Min: -97.2 [N] at 0.175 [s]

P3 Upper Neck Fy

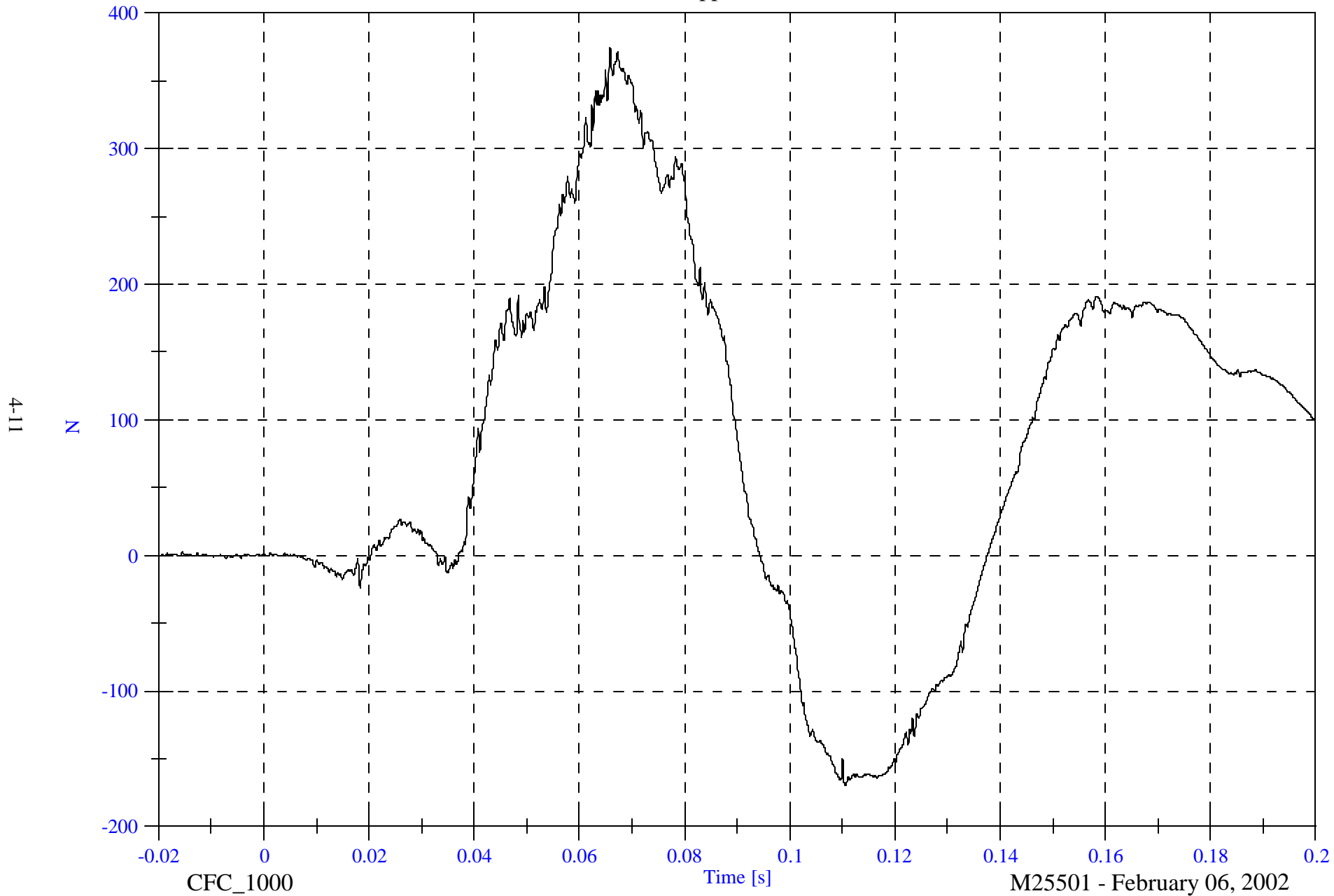


2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Upper Neck Fz

Max: 374.4 [N] at 0.066 [s]

Min: -169.9 [N] at 0.111 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Upper Neck F Resultant

Max: 428.8 [N] at 0.079 [s]

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



2002 SNCAP Test 2 - 2002 Subaru Impreza

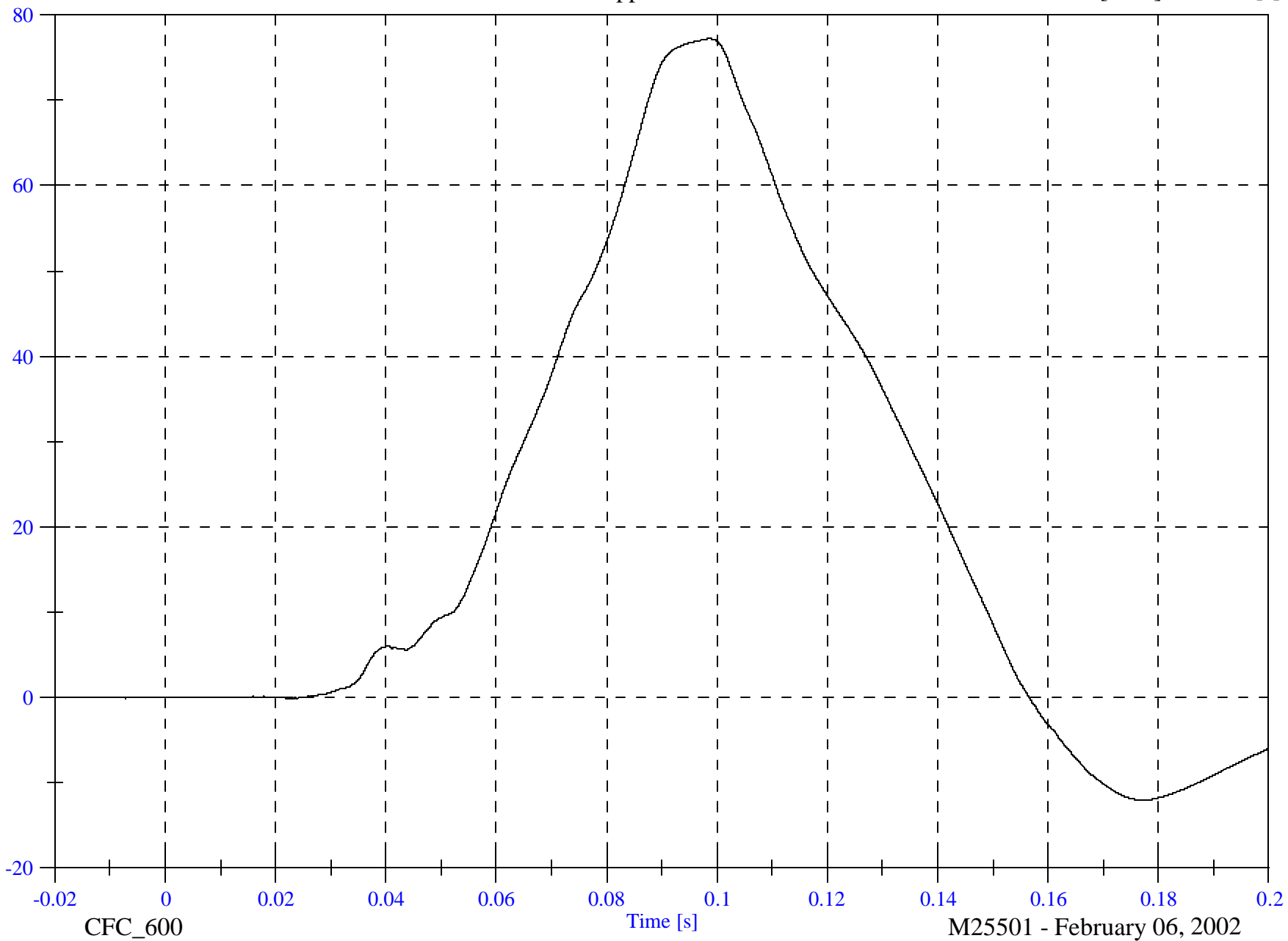
P3 Upper Neck Mx

Max: 77.3 [N-m] at 0.099 [s]

Min: -12.0 [N-m] at 0.177 [s]

4-13

N-m



CFC_600

Time [s]

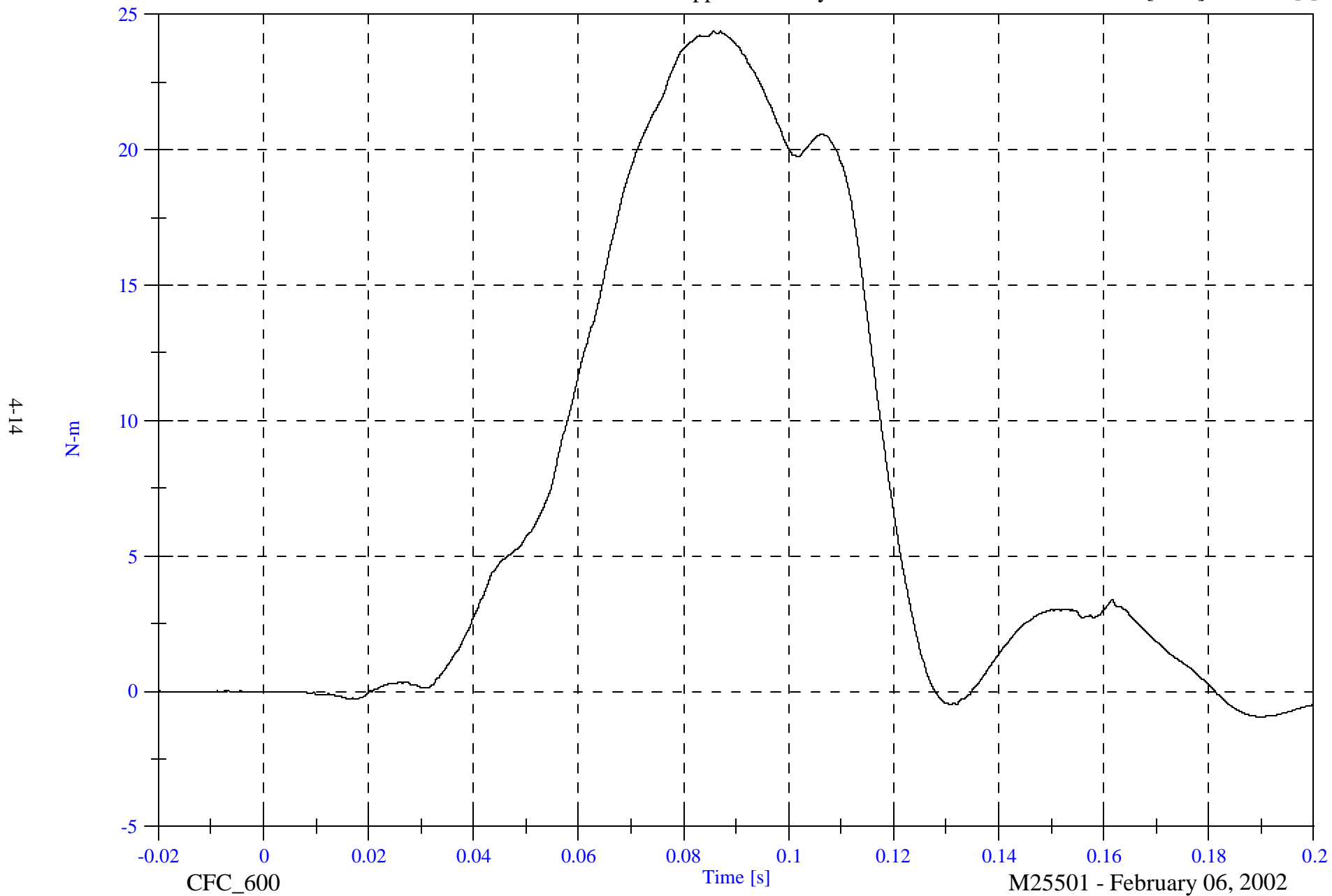
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 24.4 [N-m] at 0.086 [s]

P3 Upper Neck My

Min: -1.0 [N-m] at 0.189 [s]



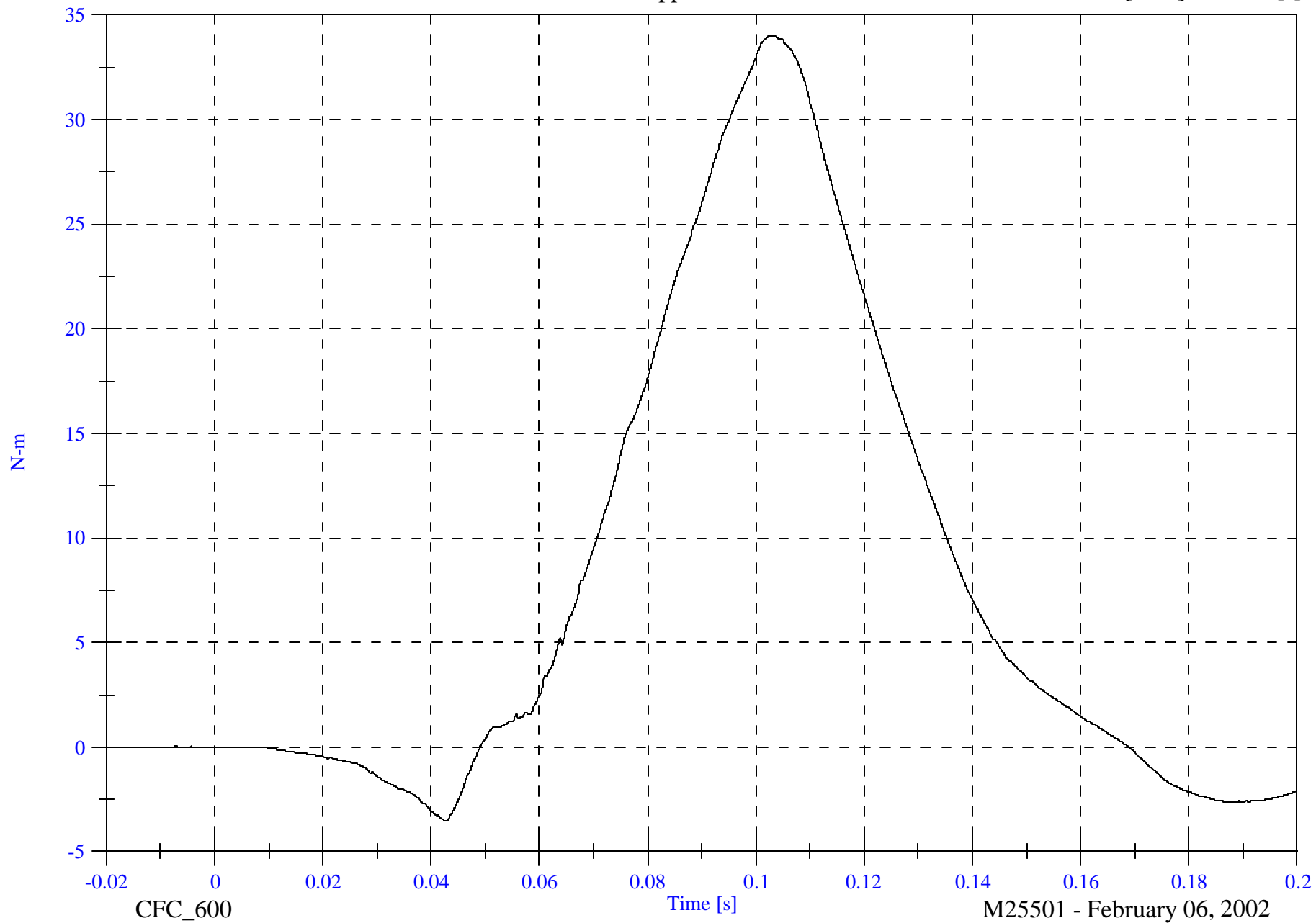
2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 34.0 [N-m] at 0.103 [s]

P3 Upper Neck Mz

Min: -3.5 [N-m] at 0.043 [s]

4-15



CFC_600

M25501 - February 06, 2002

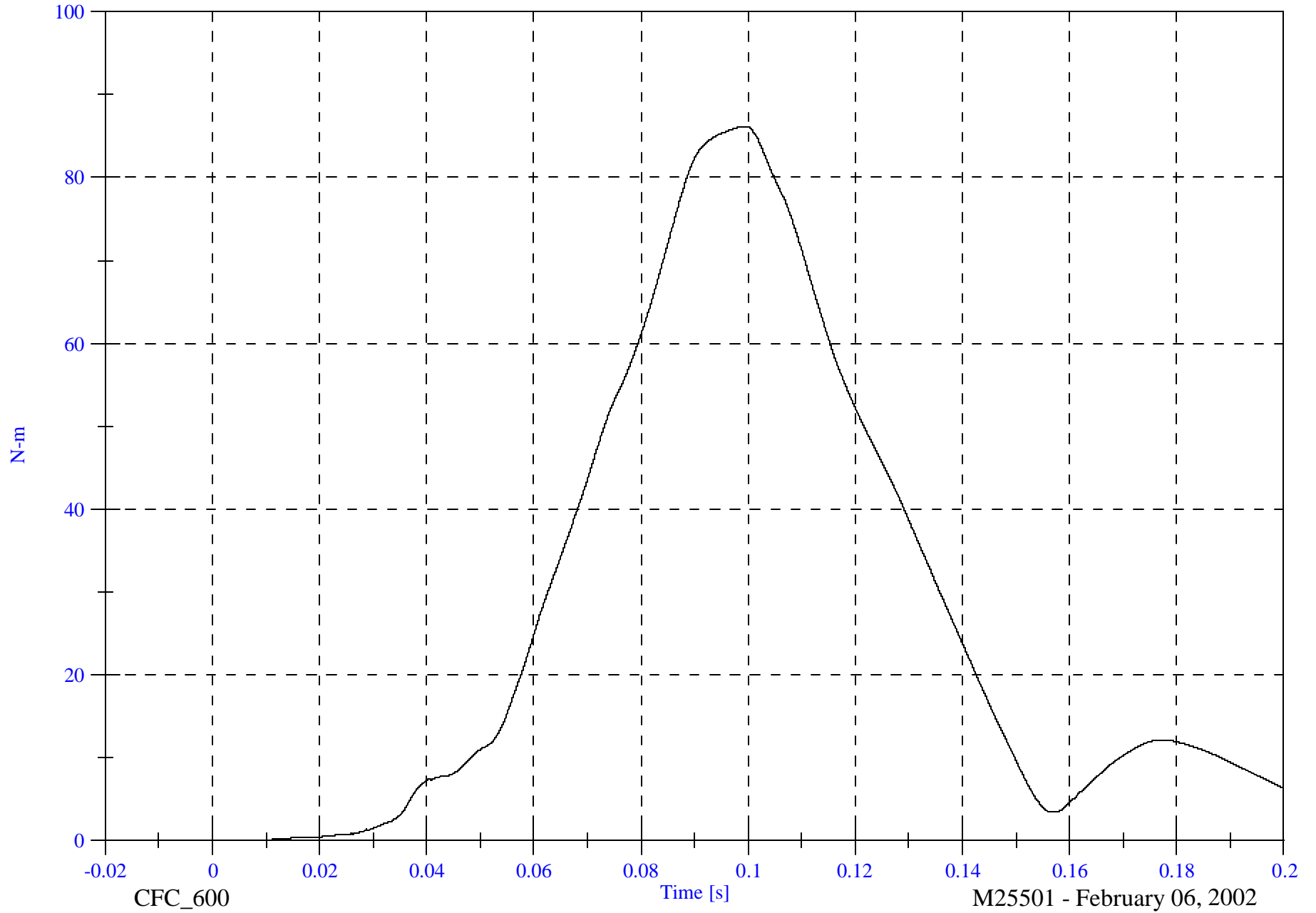
2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Upper Neck M Resultant

Max: 86.2 [N-m] at 0.099 [s]

Min: 0.0 [N-m] at -0.013 [s]

4-16



CFC_600

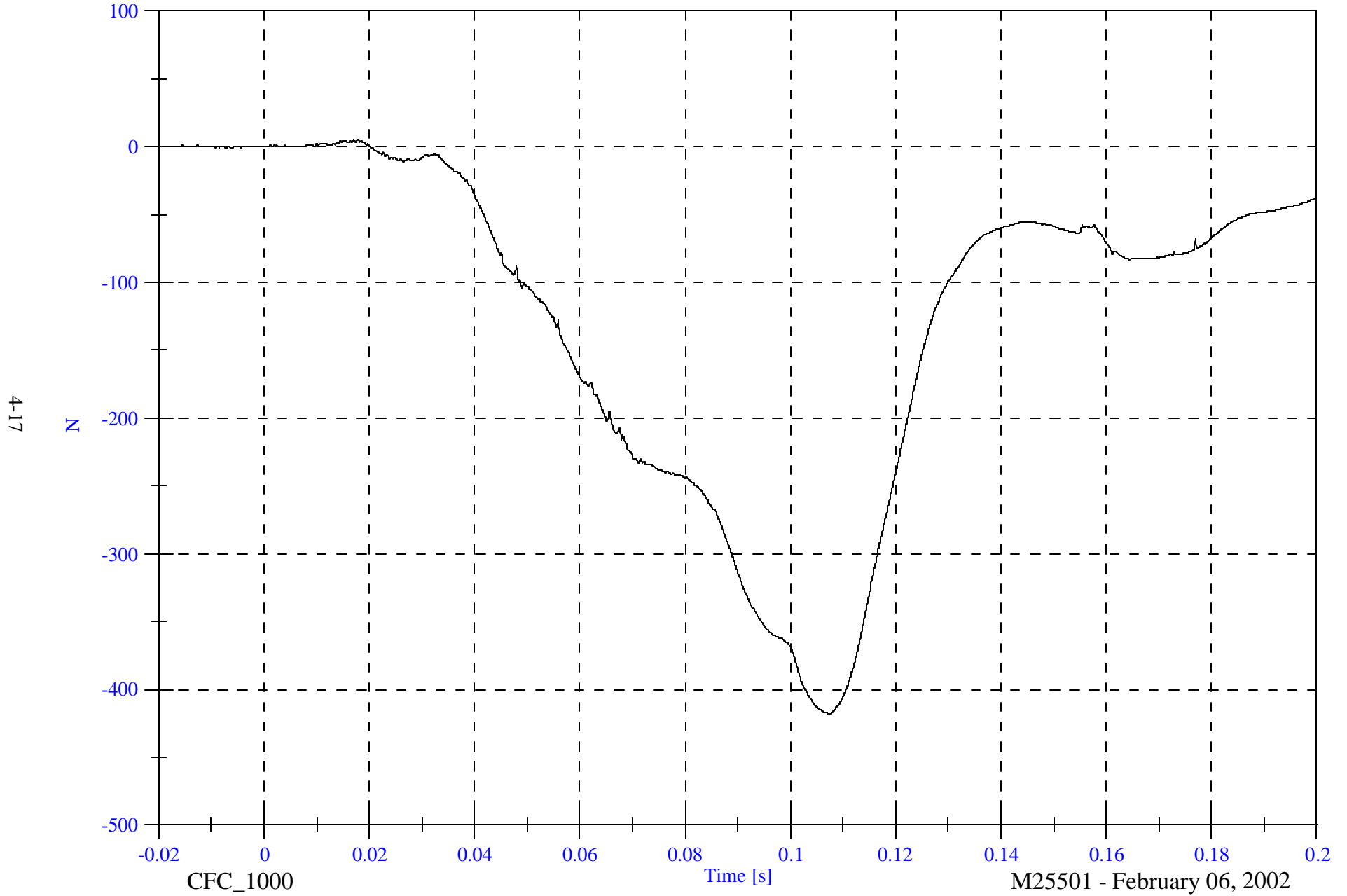
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Lower Neck Fx

Max: 5.6 [N] at 0.018 [s]

Min: -418.1 [N] at 0.107 [s]

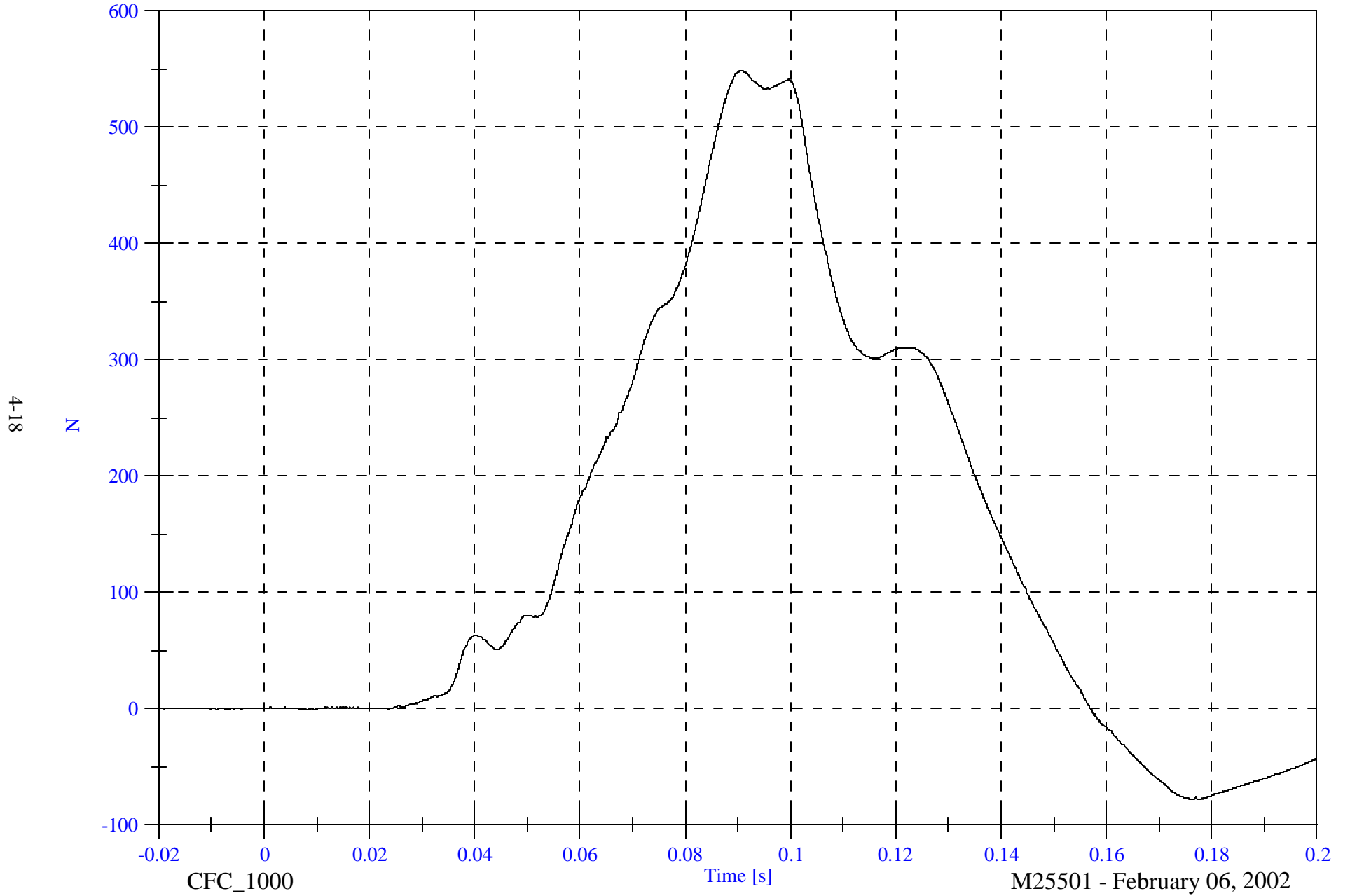


2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Lower Neck Fy

Max: 548.6 [N] at 0.090 [s]

Min: -77.9 [N] at 0.177 [s]

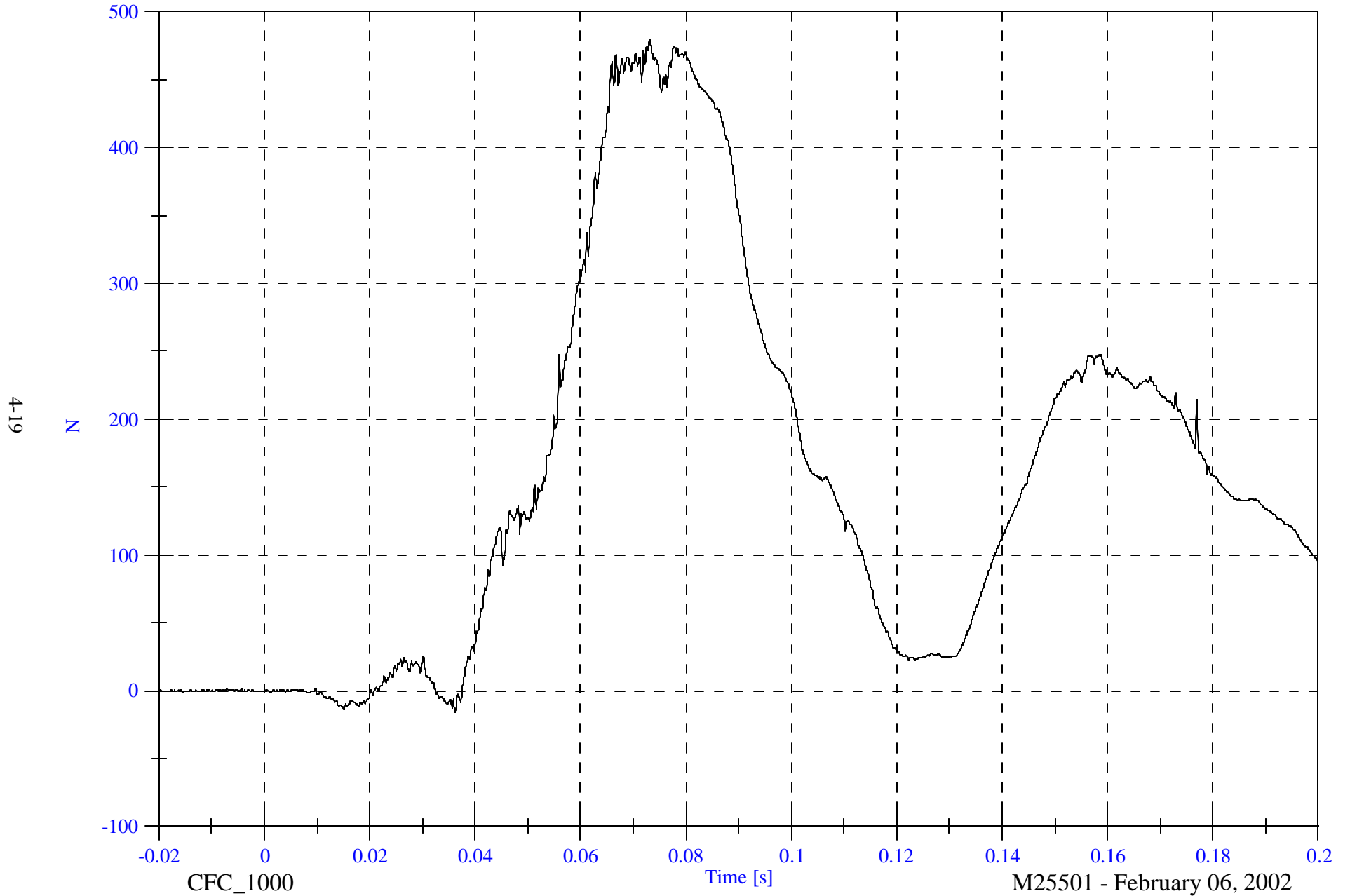


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 479.3 [N] at 0.073 [s]

P3 Lower Neck Fz

Min: -15.4 [N] at 0.036 [s]

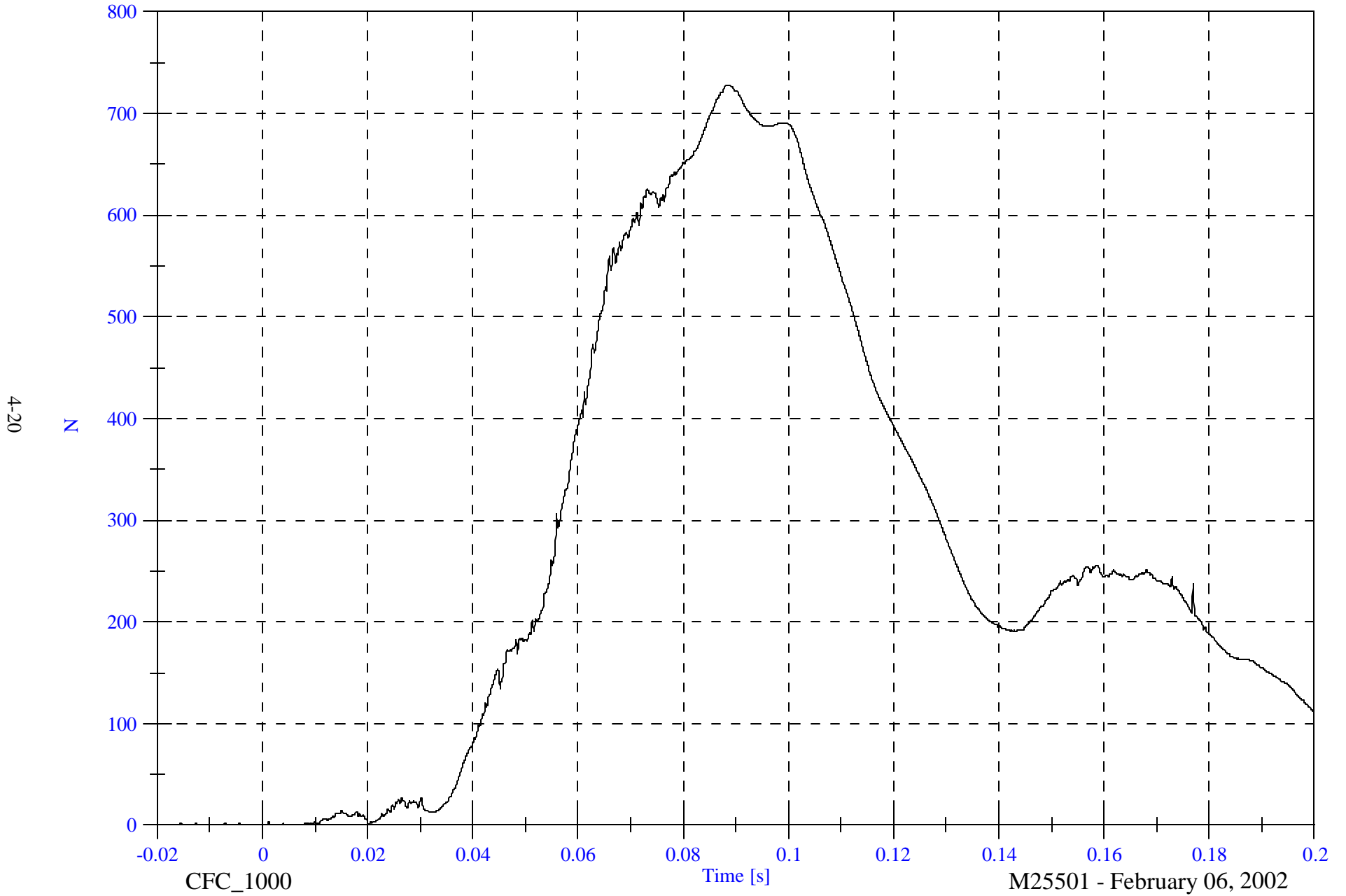


2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Lower Neck F Resultant

Max: 728.2 [N] at 0.088 [s]

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



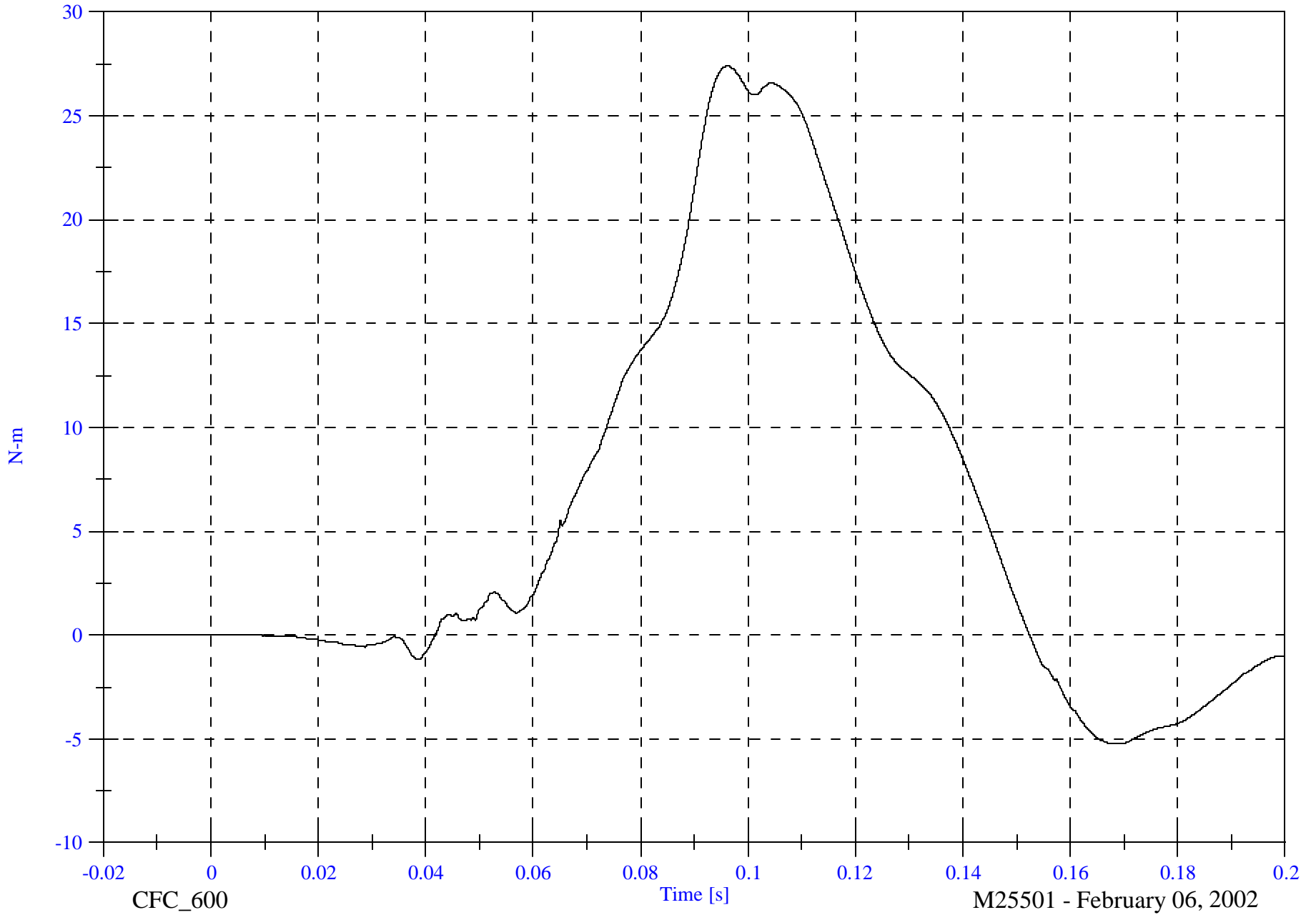
2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Lower Neck Mx

Max: 27.4 [N-m] at 0.096 [s]

Min: -5.3 [N-m] at 0.169 [s]

4-21



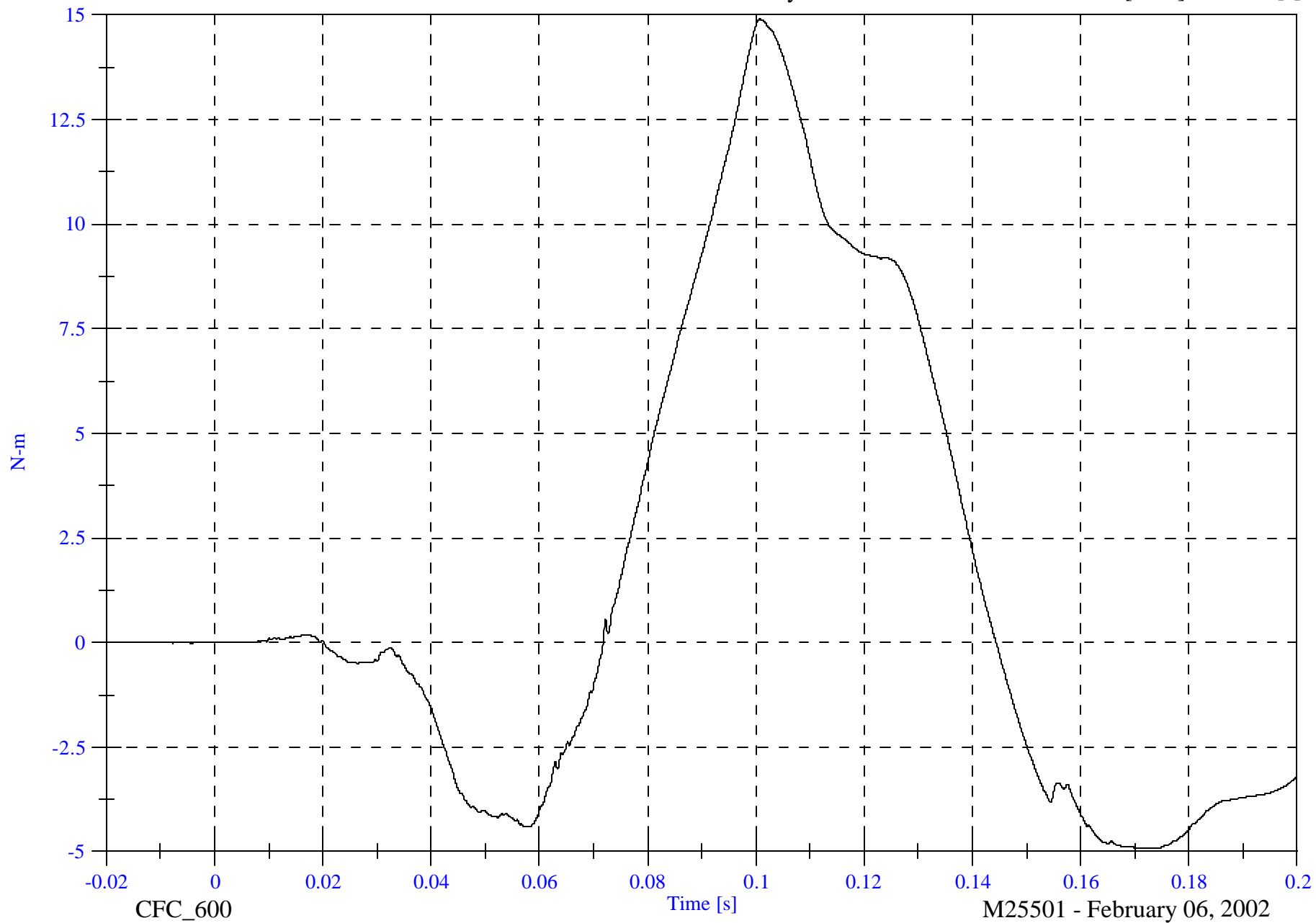
2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 14.9 [N-m] at 0.101 [s]

P3 Lower Neck My

Min: -4.9 [N-m] at 0.171 [s]

4-22



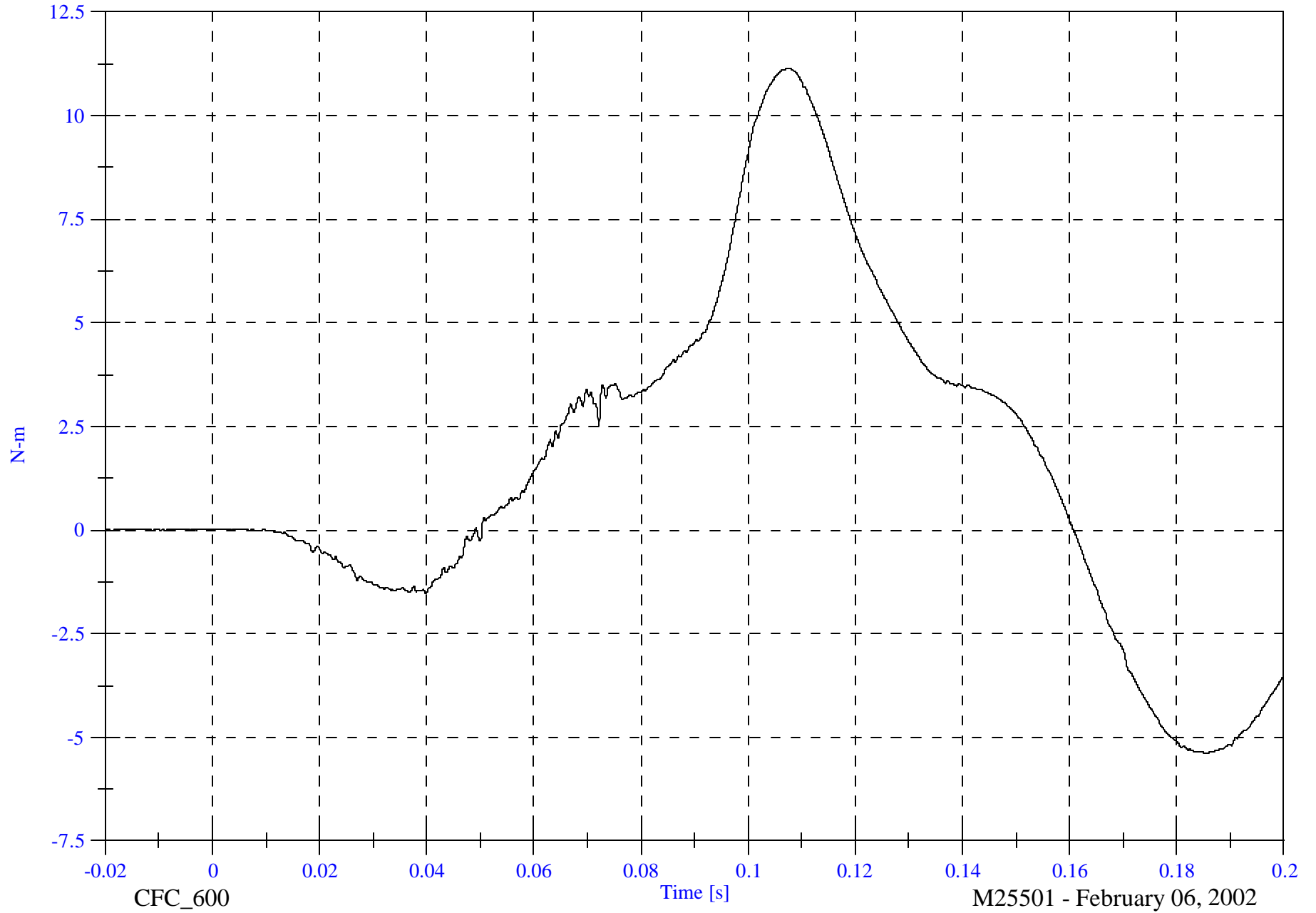
2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Lower Neck Mz

Max: 11.1 [N-m] at 0.108 [s]

Min: -5.4 [N-m] at 0.186 [s]

4-23



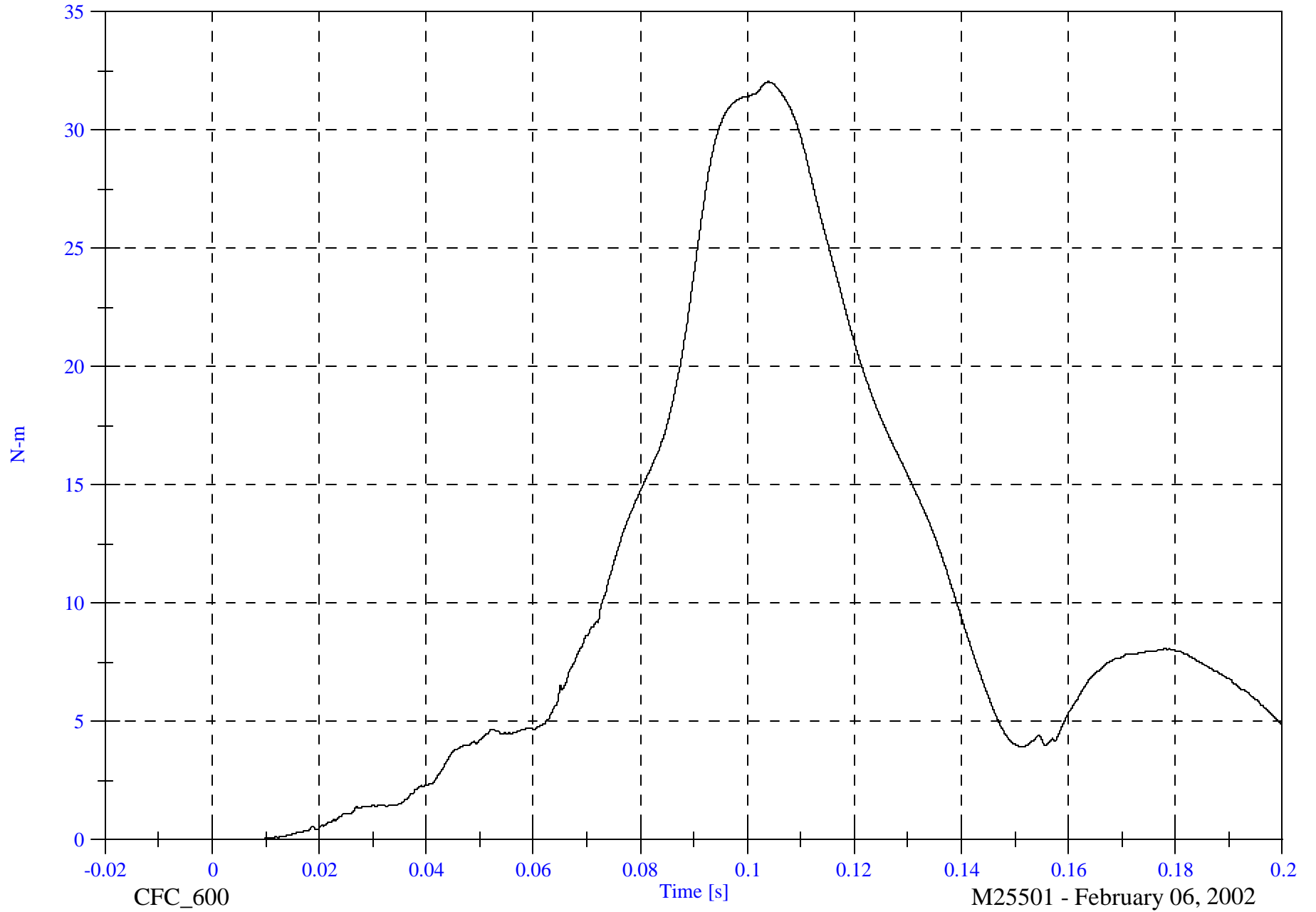
2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Lower Neck M Resultant

Max: 32.0 [N-m] at 0.104 [s]

Min: 0.0 [N-m] at -0.014 [s]

4-24



CFC_600

M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Chest x

Max: 6.4 [g] at 0.113 [s]

Min: -12.7 [g] at 0.063 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

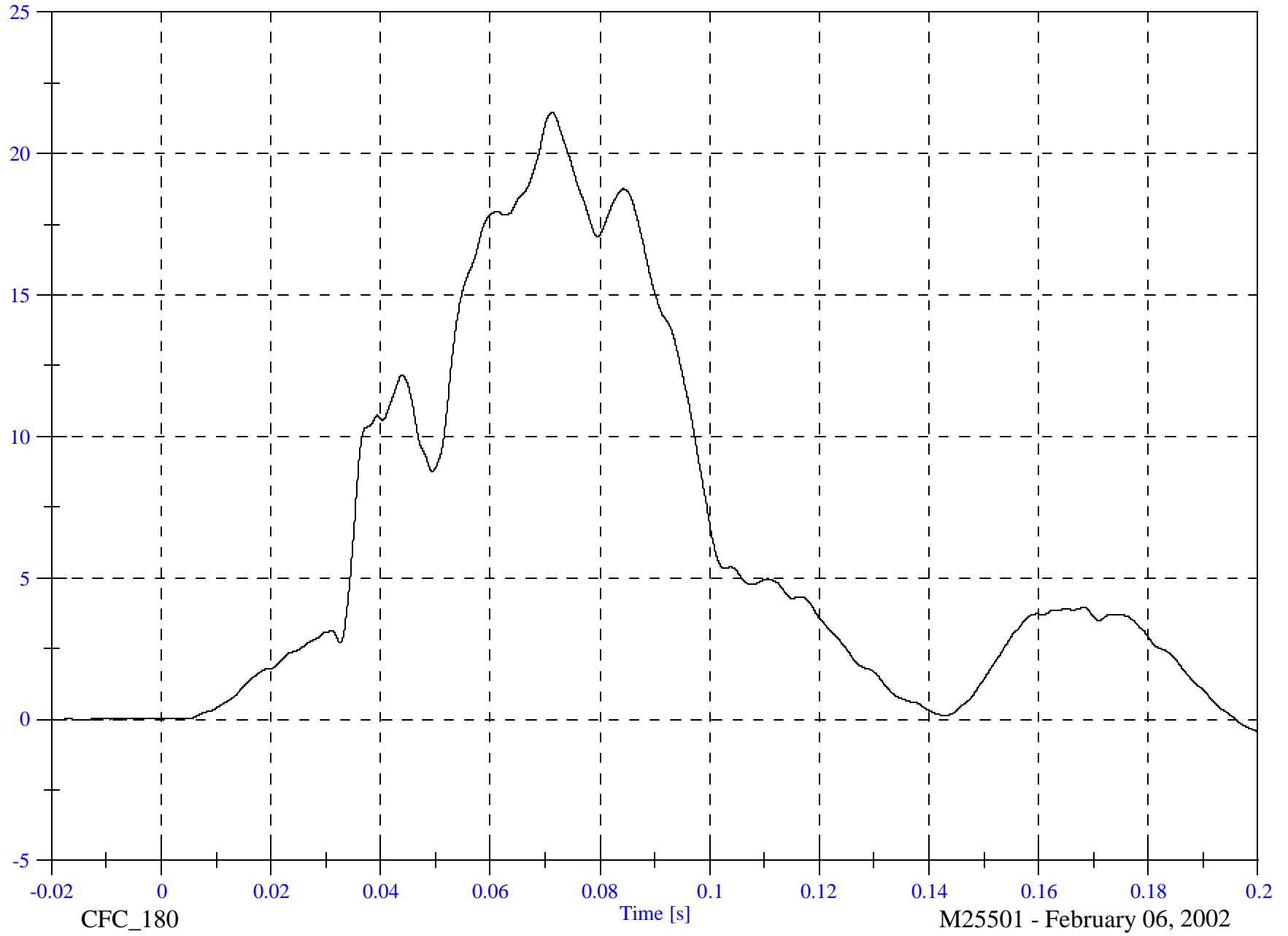
P3 Chest y

Max: 21.5 [g] at 0.071 [s]

Min: -0.4 [g] at 0.200 [s]

4-26

g



2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 4.9 [g] at 0.079 [s]

Min: -2.7 [g] at 0.035 [s]

P3 Chest z

4-27

g



CFC_180

Time [s]

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2002 SNCAP Test 2 - 2002 Subaru Impreza

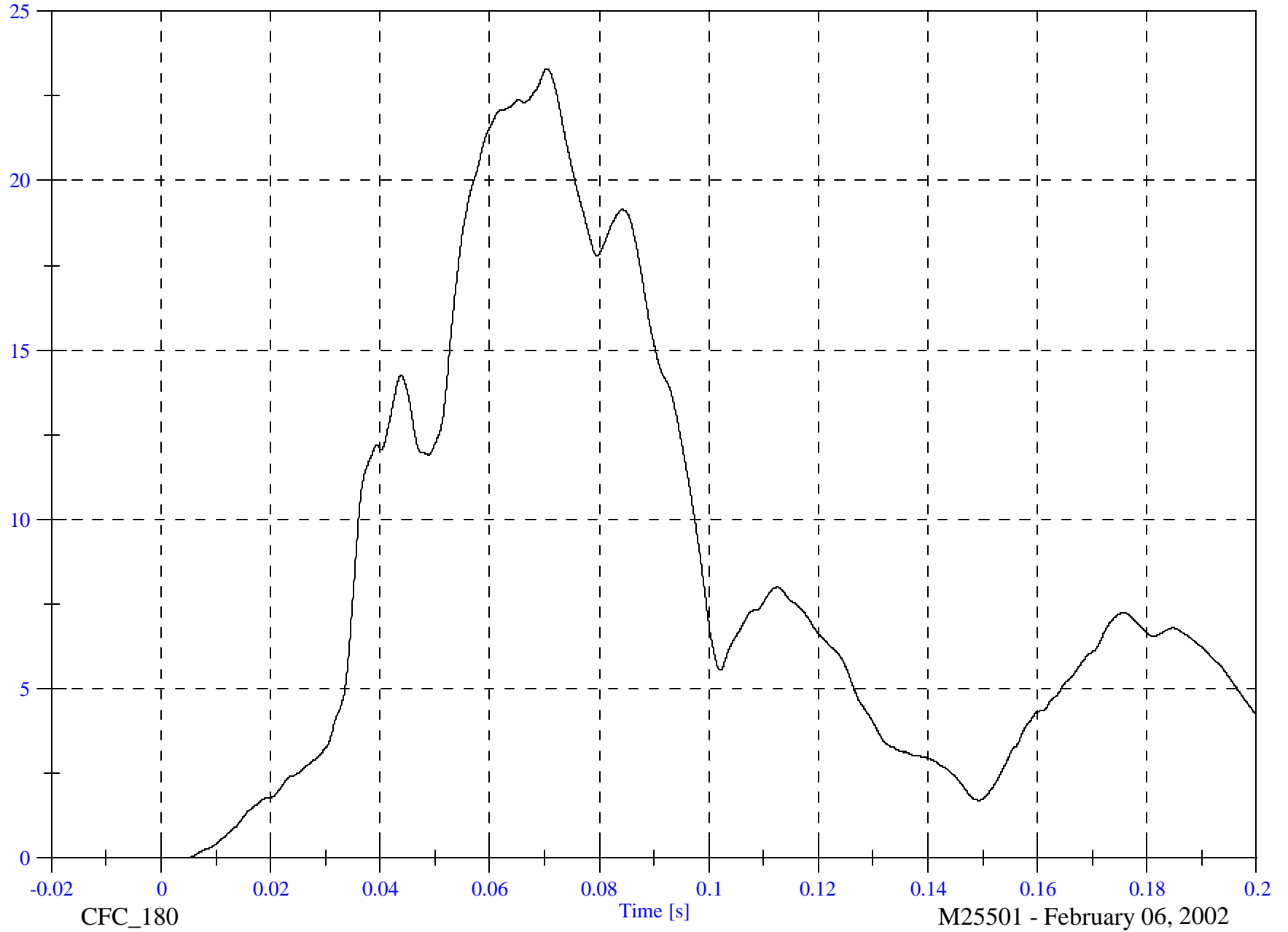
P3 Chest Resultant

Max: 23.3 [g] at 0.070 [s]

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

4-28

g



2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Chest Compression

Max: 0.1 [mm] at 0.013 [s]

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

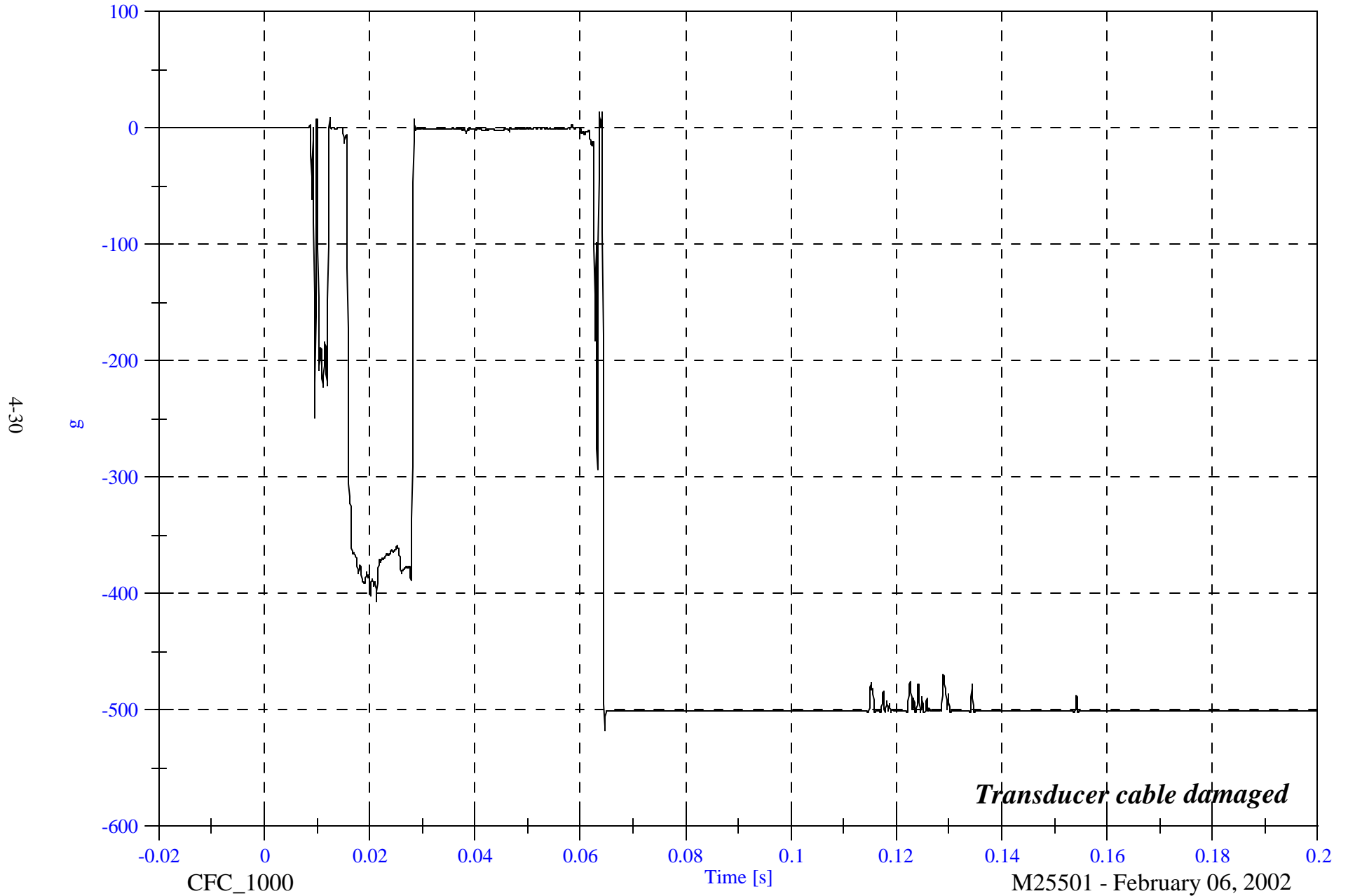


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 13.9 [g] at 0.064 [s]

Min: -518.0 [g] at 0.065 [s]

P3 Pelvic x

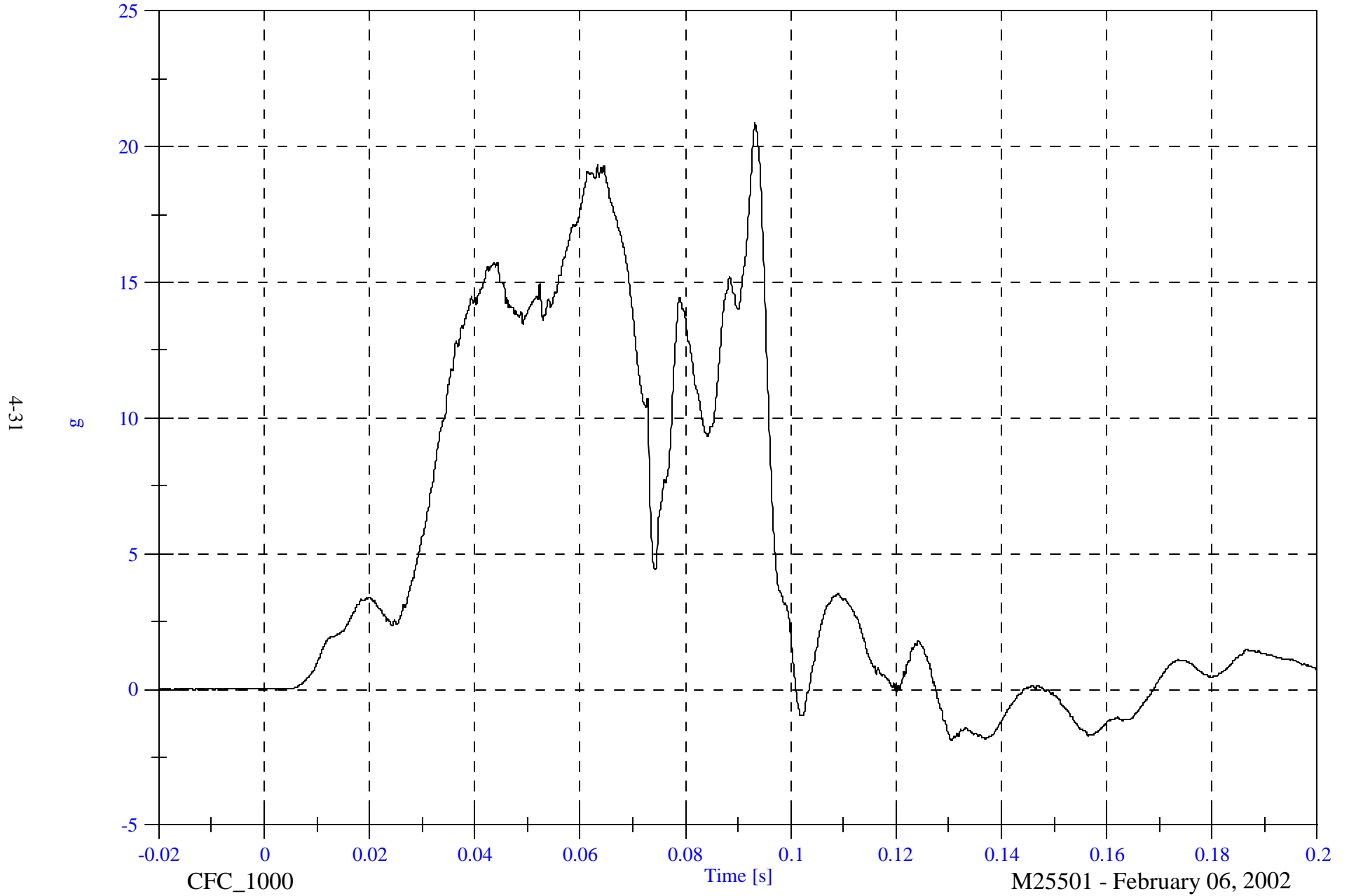


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 20.9 [g] at 0.093 [s]

Min: -1.9 [g] at 0.131 [s]

P3 Pelvic y

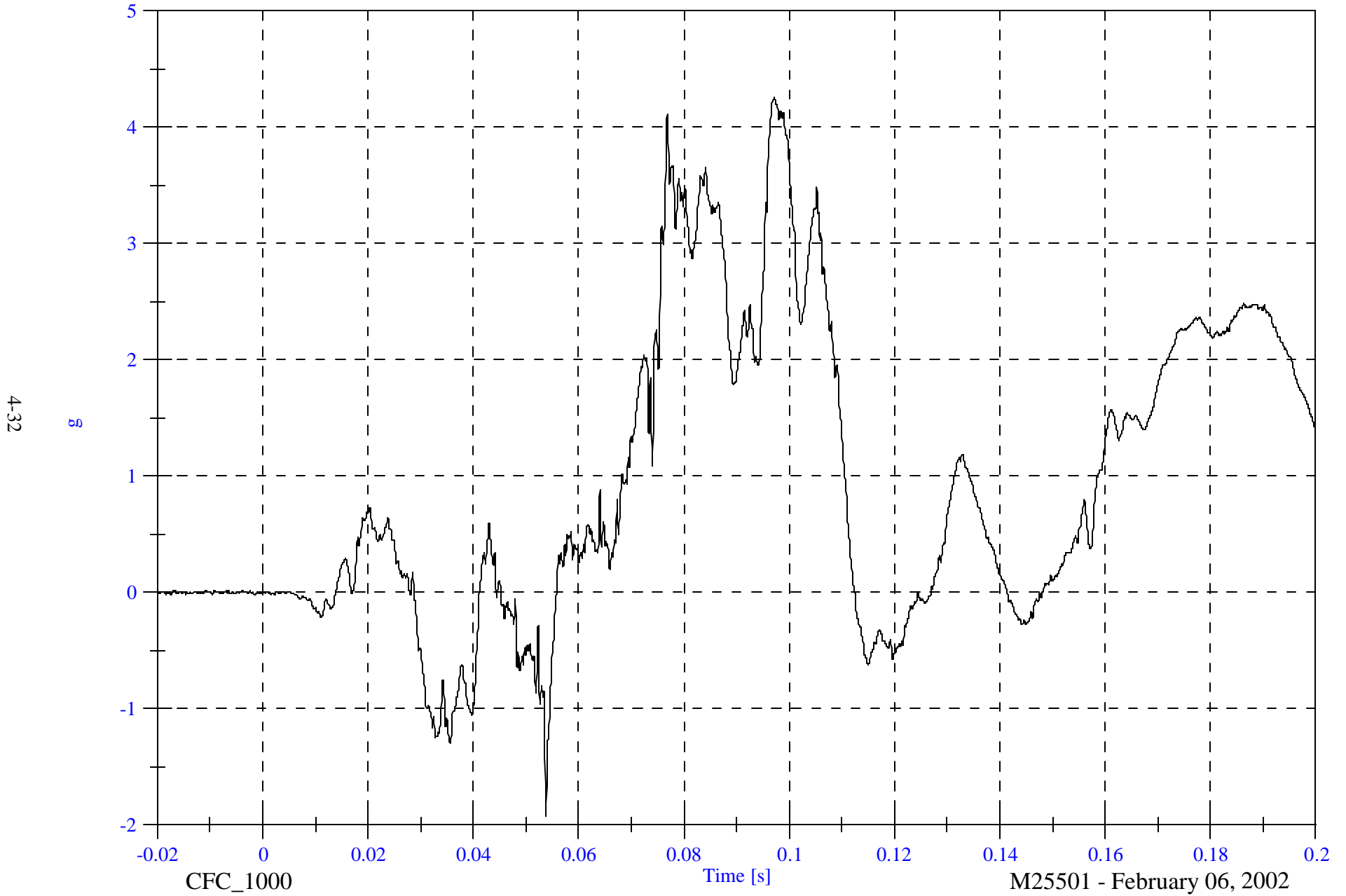


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 4.3 [g] at 0.097 [s]

P3 Pelvic z

Min: -1.9 [g] at 0.054 [s]



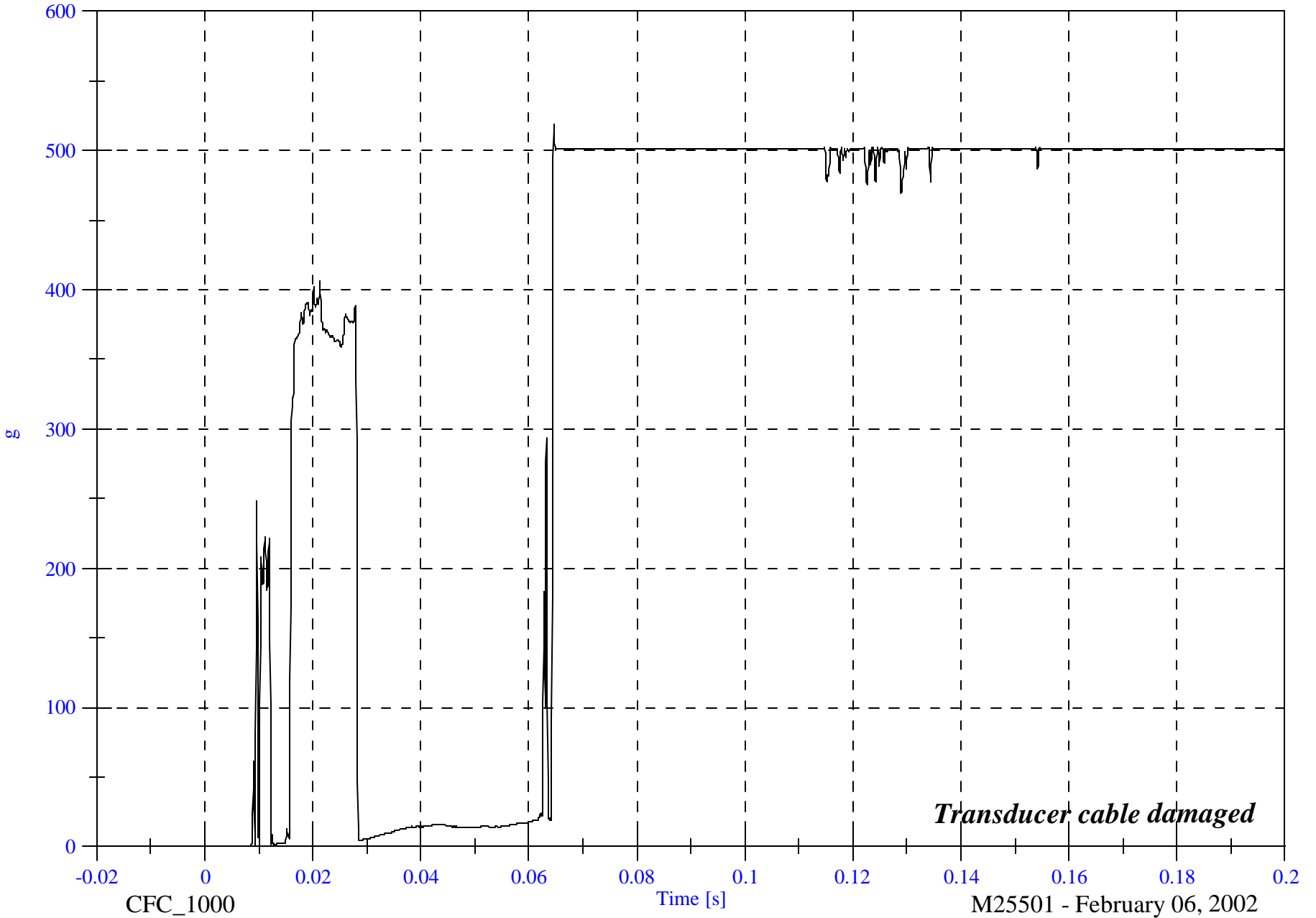
2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Pelvic Resultant

Max: 518.3 [g] at 0.065 [s]

Min: 0.0 [g] at -0.020 [s]

4-33



Transducer cable damaged

CFC_1000

Time [s]

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2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Tether Strap Load

Max: 636.0 [N] at 0.084 [s]

Min: -2.0 [N] at 0.006 [s]

4-34

N

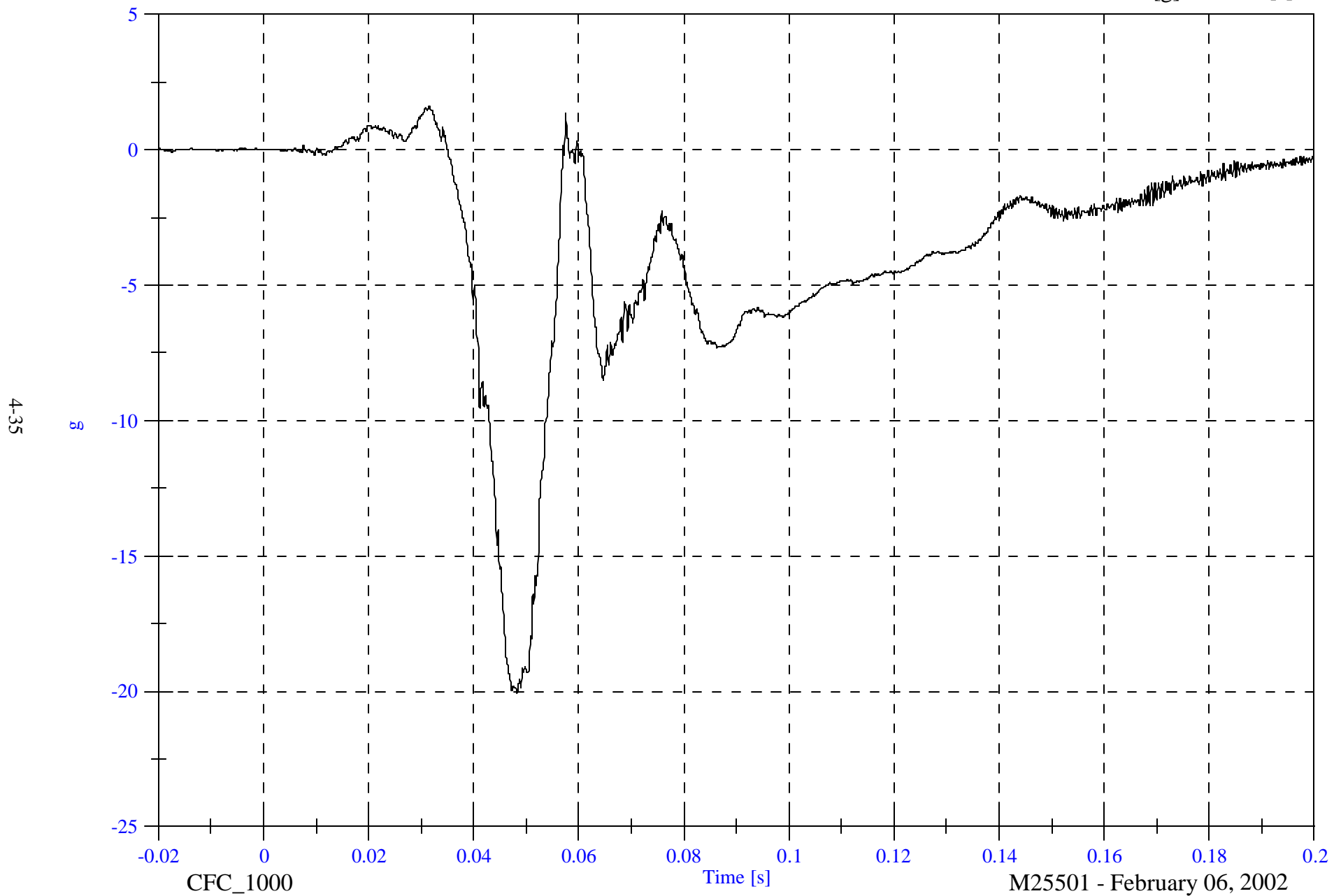


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 1.6 [g] at 0.031 [s]

P4 Head x

Min: -20.1 [g] at 0.048 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

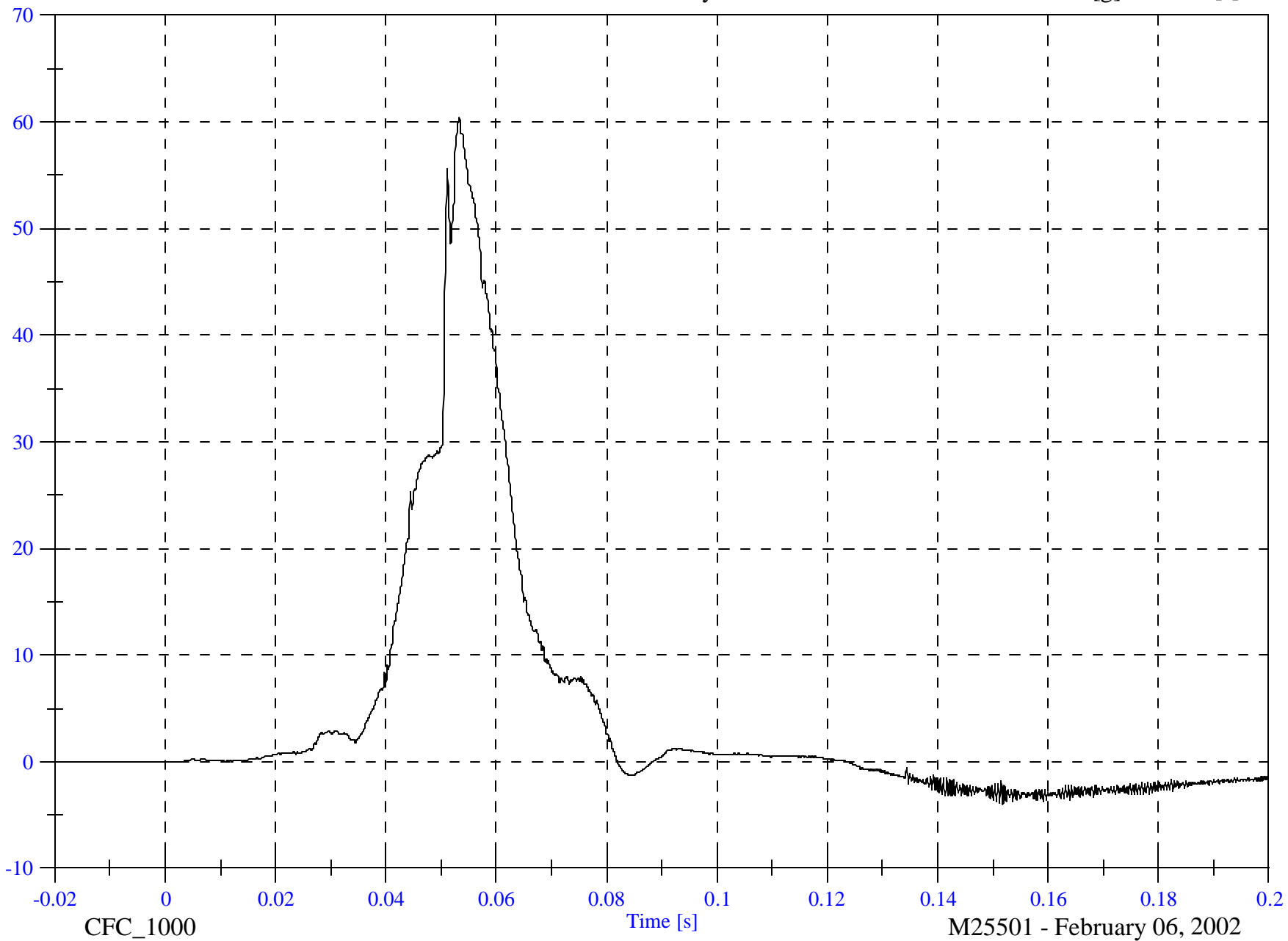
P4 Head y

Max: 60.4 [g] at 0.053 [s]

Min: -4.0 [g] at 0.152 [s]

4-36

g



2002 SNCAP Test 2 - 2002 Subaru Impreza

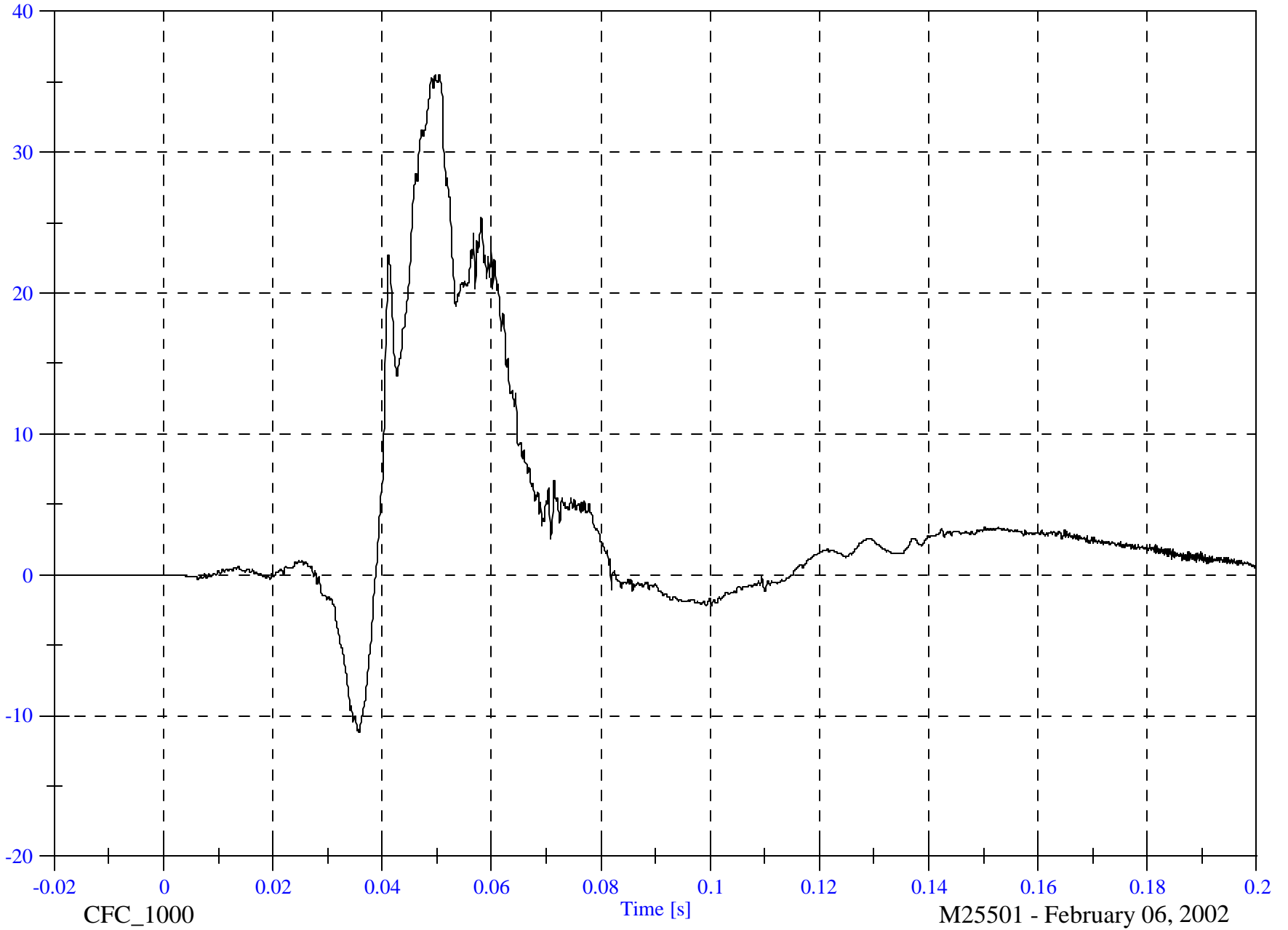
Max: 35.5 [g] at 0.050 [s]

P4 Head z

Min: -11.2 [g] at 0.036 [s]

4-37

g



2002 SNCAP Test 2 - 2002 Subaru Impreza

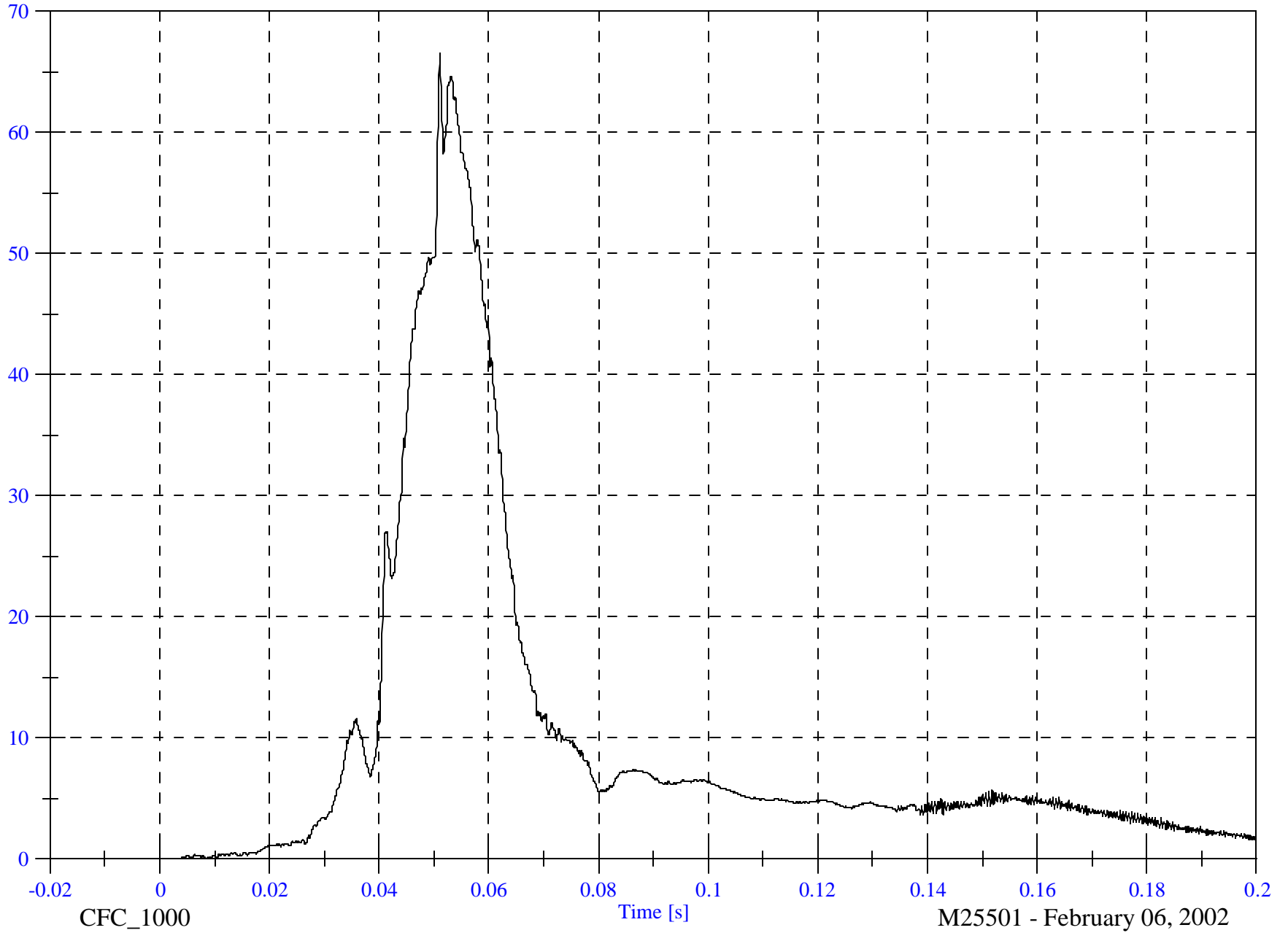
P4 Head Resultant

Max: 66.6 [g] at 0.051 [s]

Min: 0.0 [g] at 0.003 [s]

4-38

g

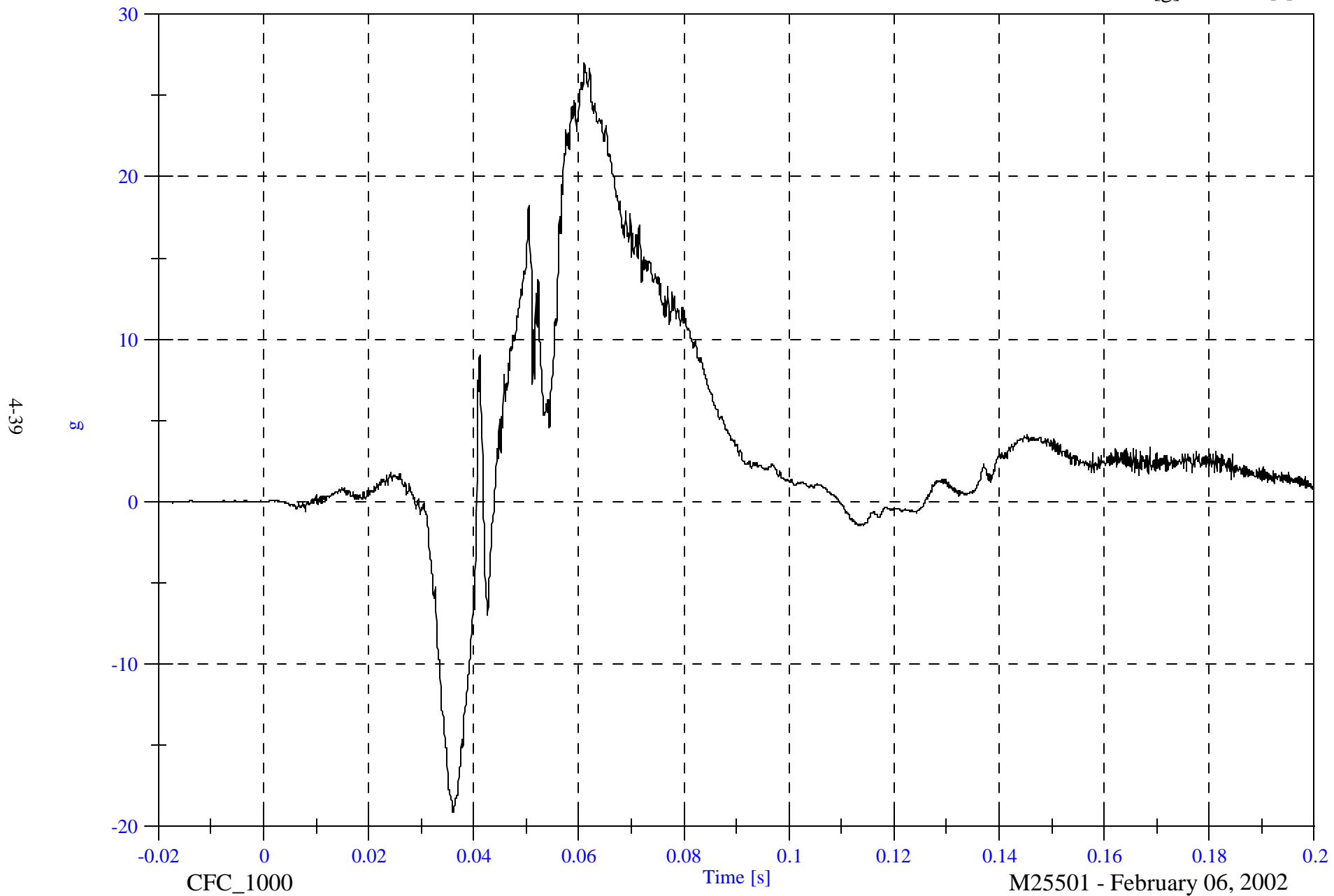


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Head Red z

Max: 27.0 [g] at 0.061 [s]

Min: -19.1 [g] at 0.036 [s]

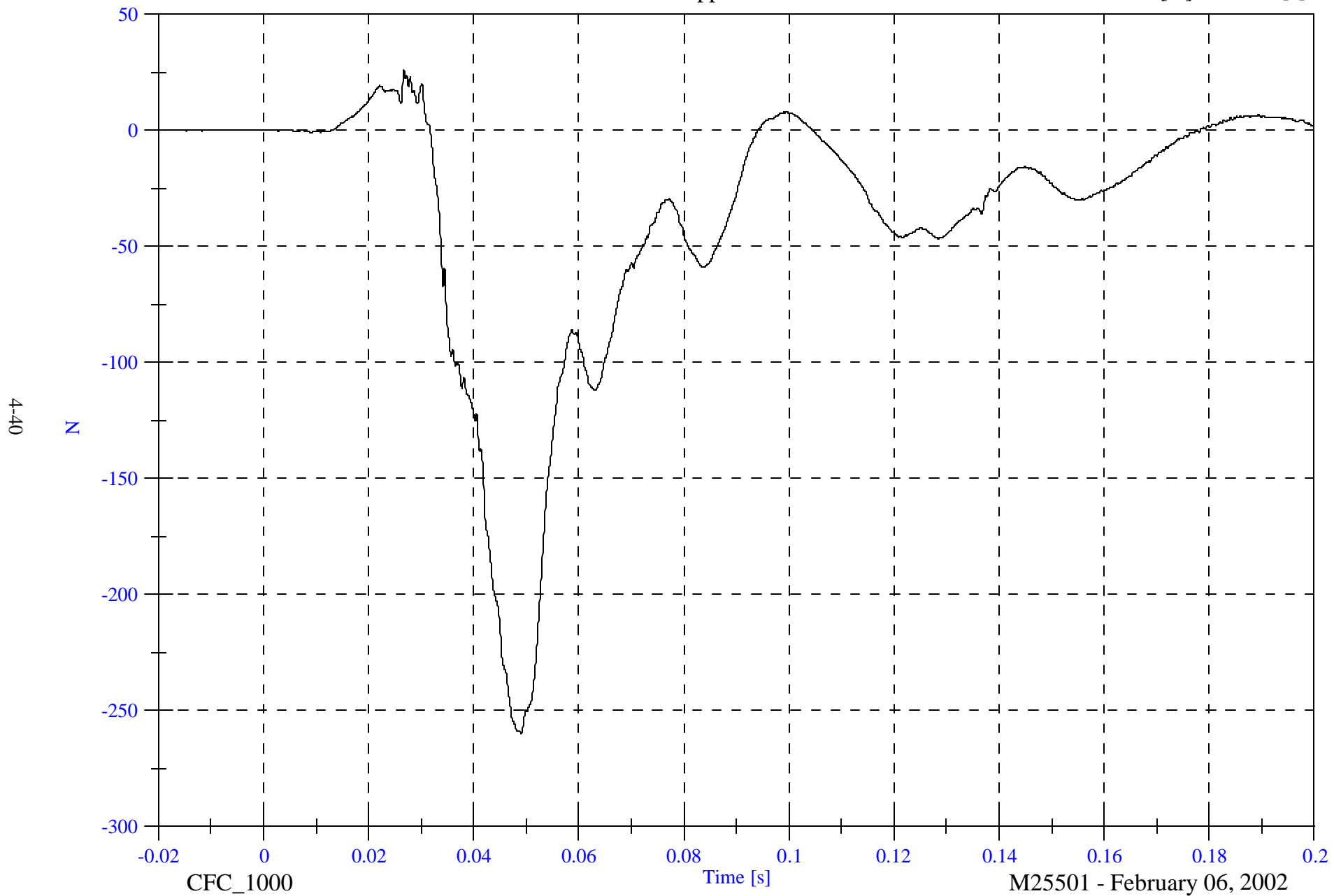


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Upper Neck Fx

Max: 25.9 [N] at 0.027 [s]

Min: -259.7 [N] at 0.049 [s]

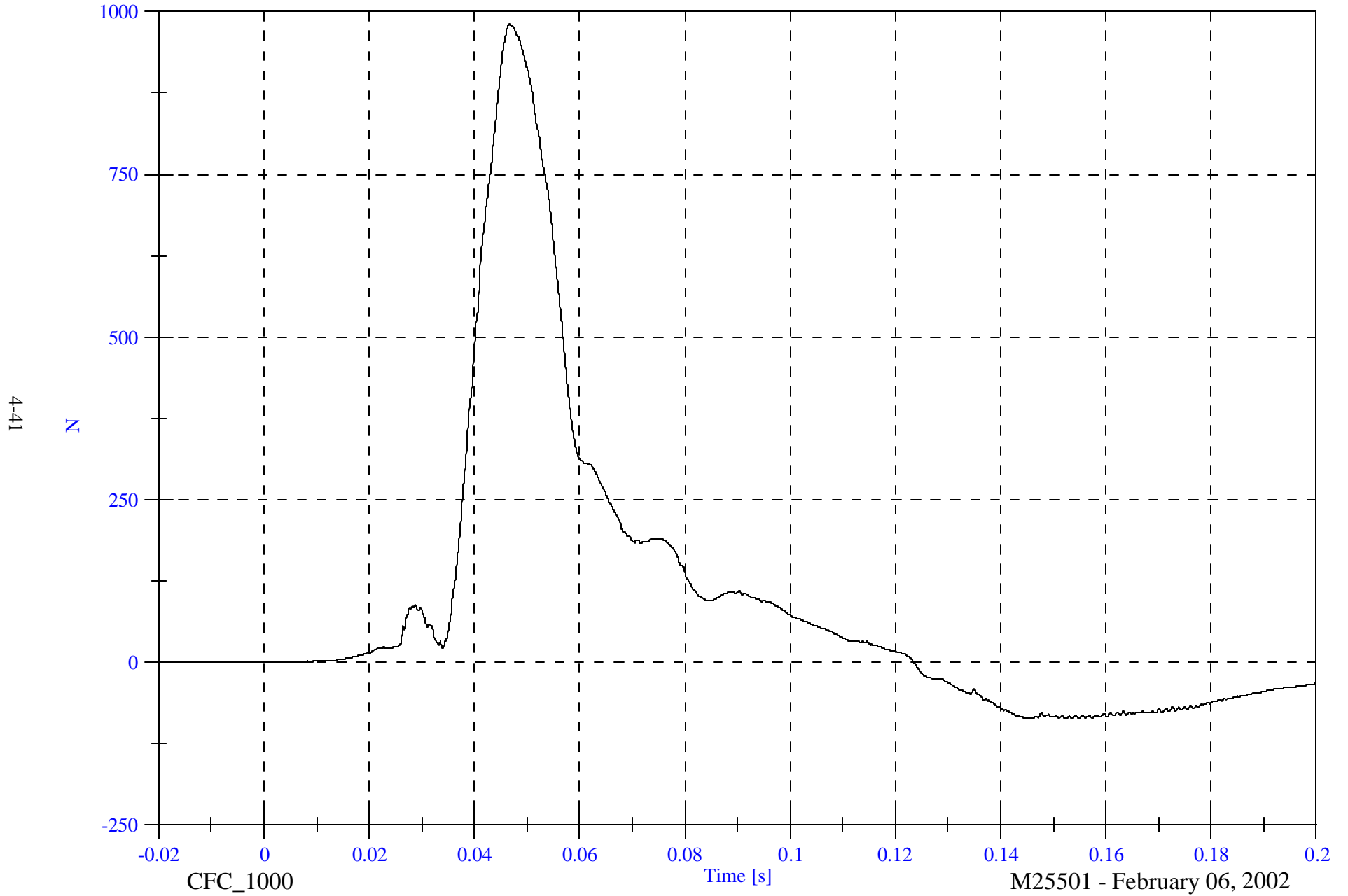


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Upper Neck Fy

Max: 981.7 [N] at 0.047 [s]

Min: -86.6 [N] at 0.146 [s]

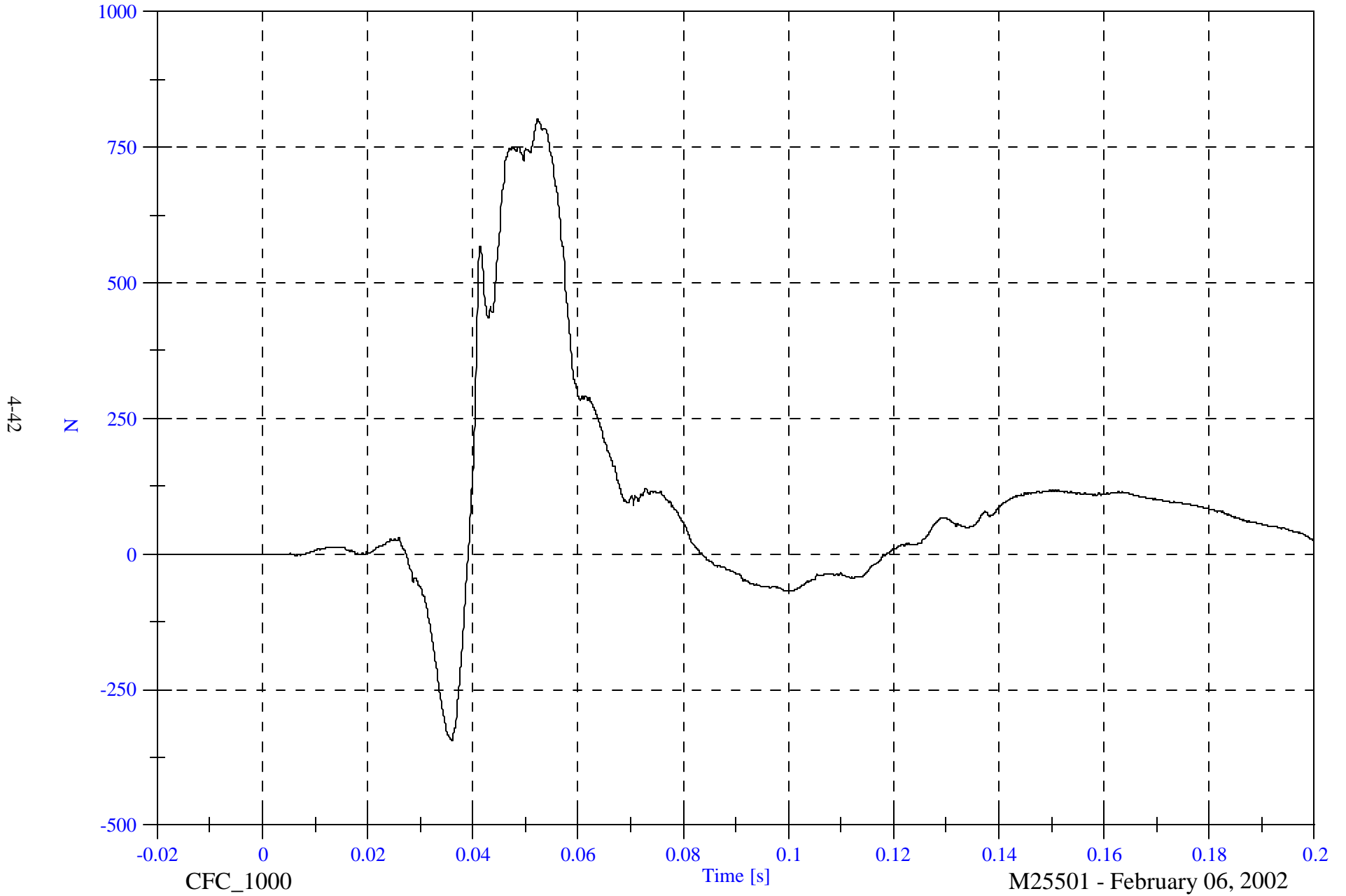


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Upper Neck Fz

Max: 802.7 [N] at 0.052 [s]

Min: -344.5 [N] at 0.036 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

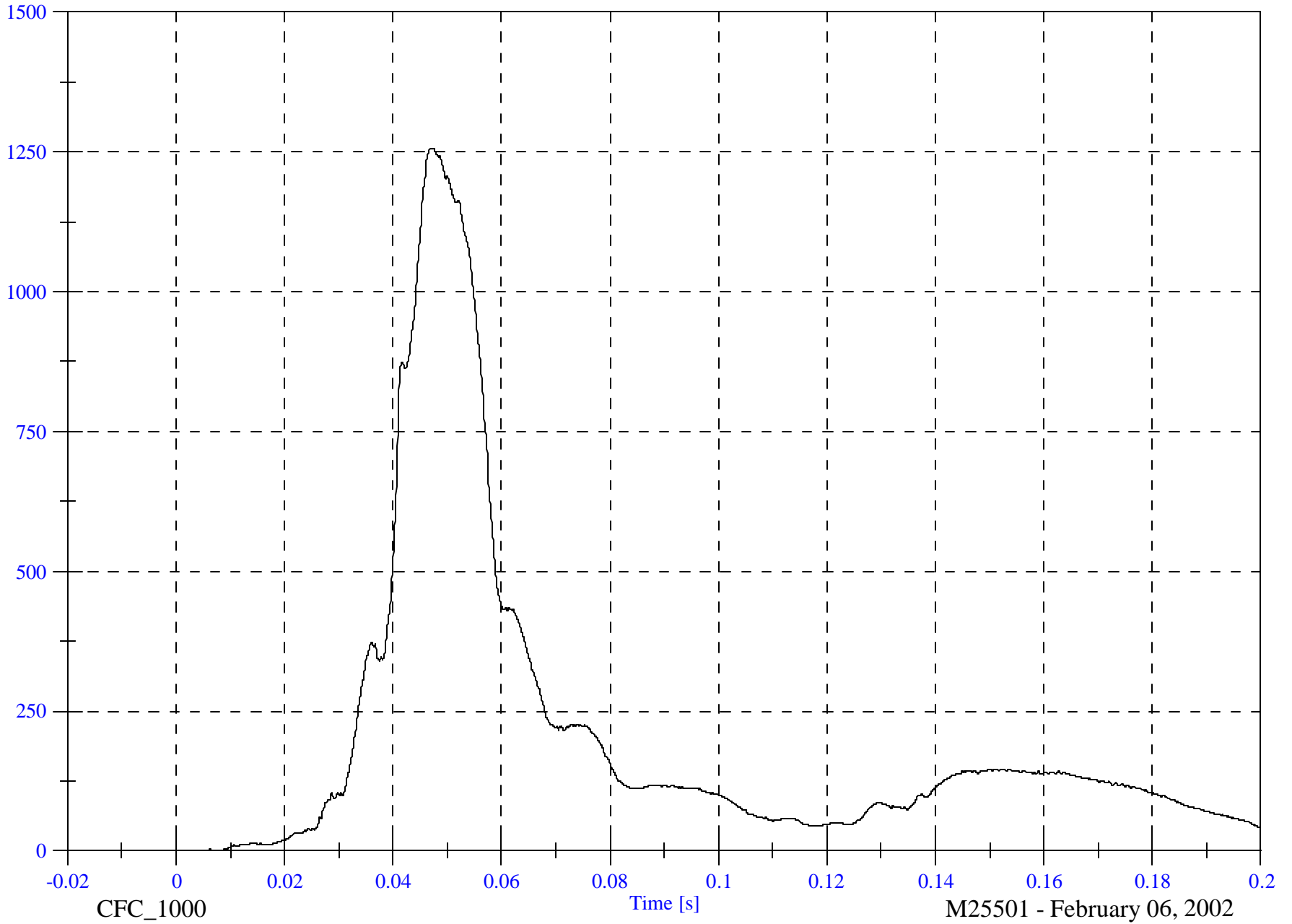
P4 Upper Neck F Resultant

Max: 1256.8 [N] at 0.047 [s]

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

4-43

Z

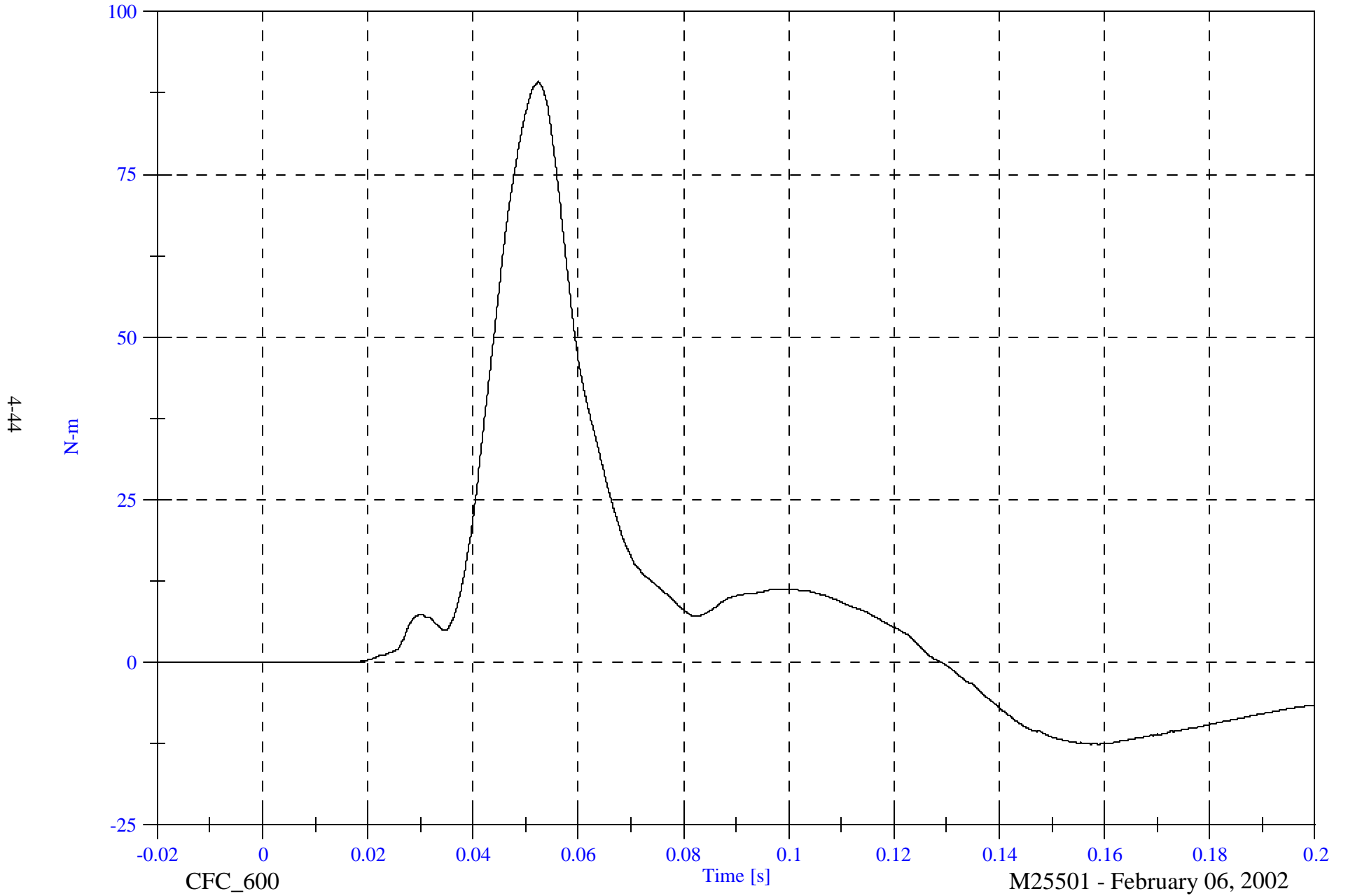


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Upper Neck Mx

Max: 89.3 [N-m] at 0.052 [s]

Min: -12.6 [N-m] at 0.159 [s]



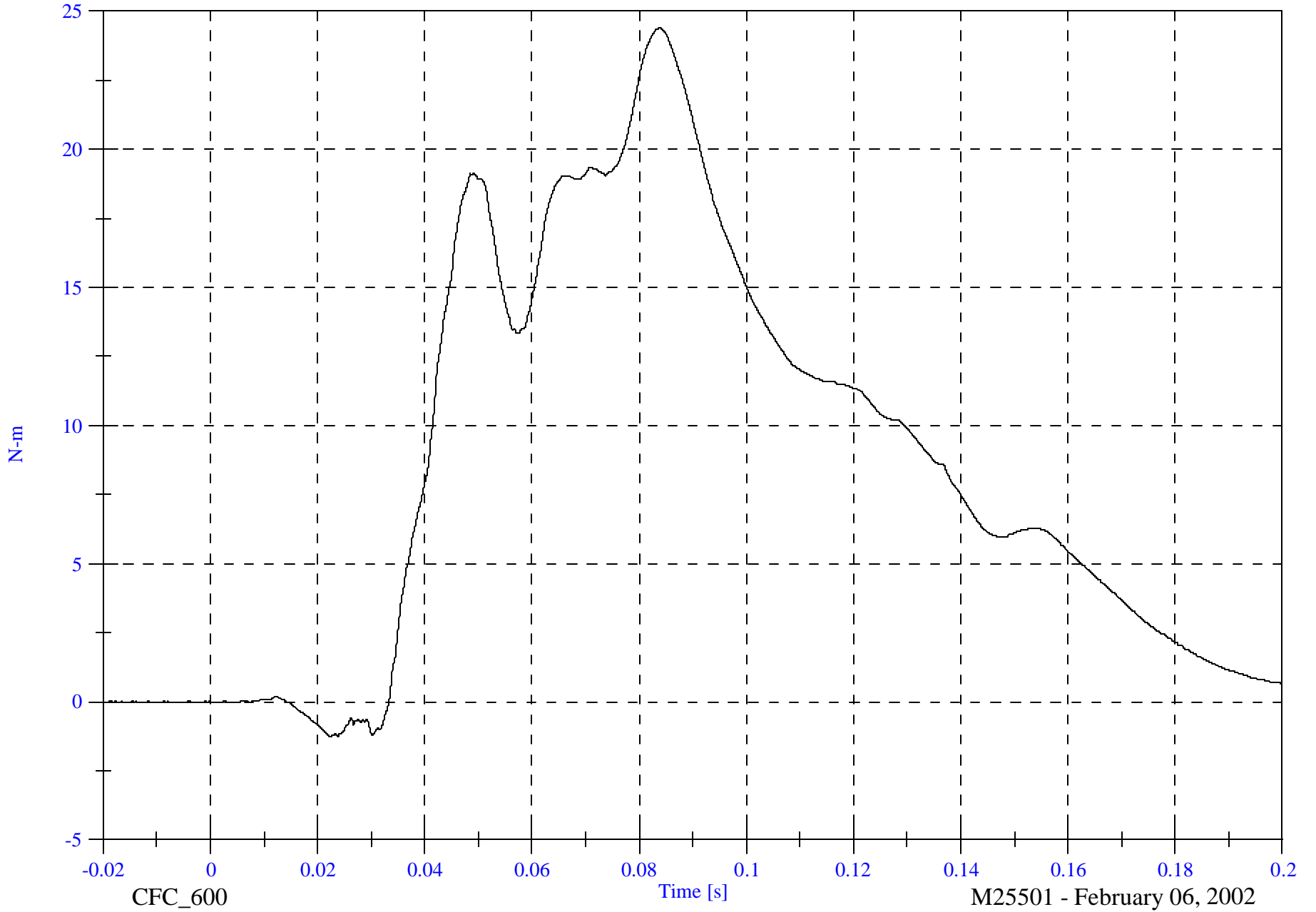
2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 24.4 [N-m] at 0.084 [s]

P4 Upper Neck My

Min: -1.2 [N-m] at 0.022 [s]

4-45



CFC_600

Time [s]

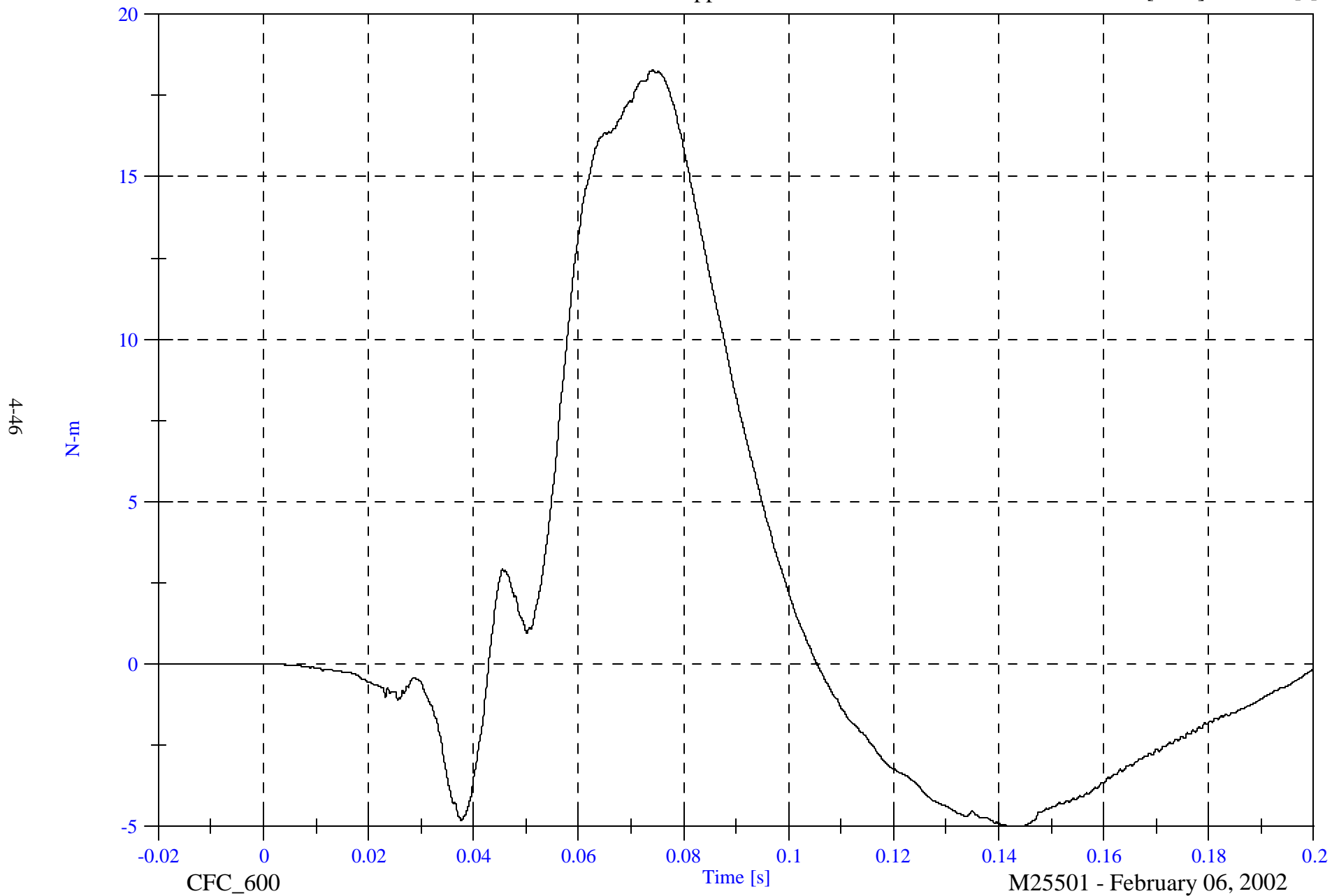
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2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 18.3 [N-m] at 0.074 [s]

P4 Upper Neck Mz

Min: -5.0 [N-m] at 0.145 [s]

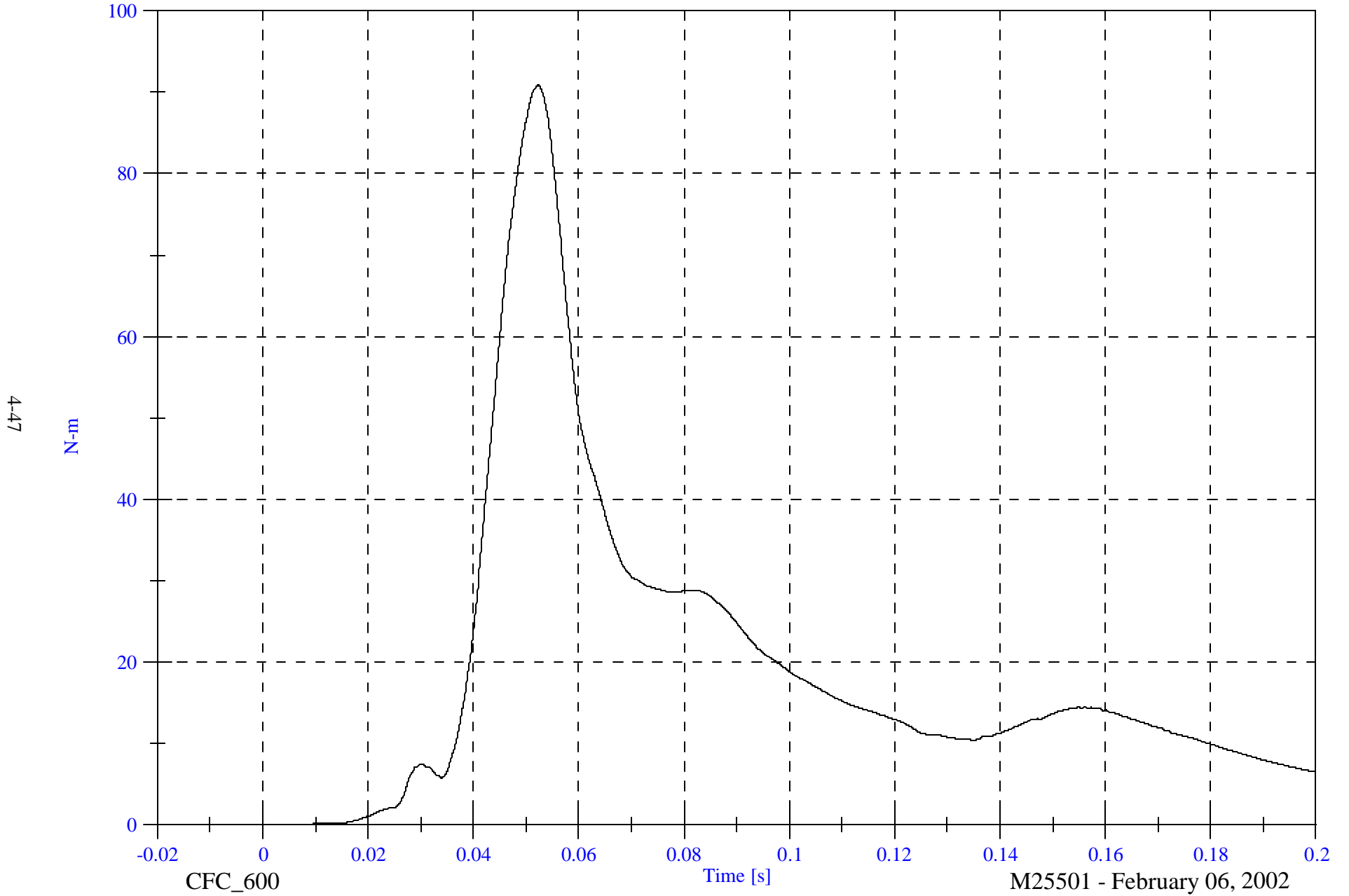


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Upper Neck M Resultant

Max: 91.0 [N-m] at 0.052 [s]

Min: 0.0 [N-m] at -0.018 [s]

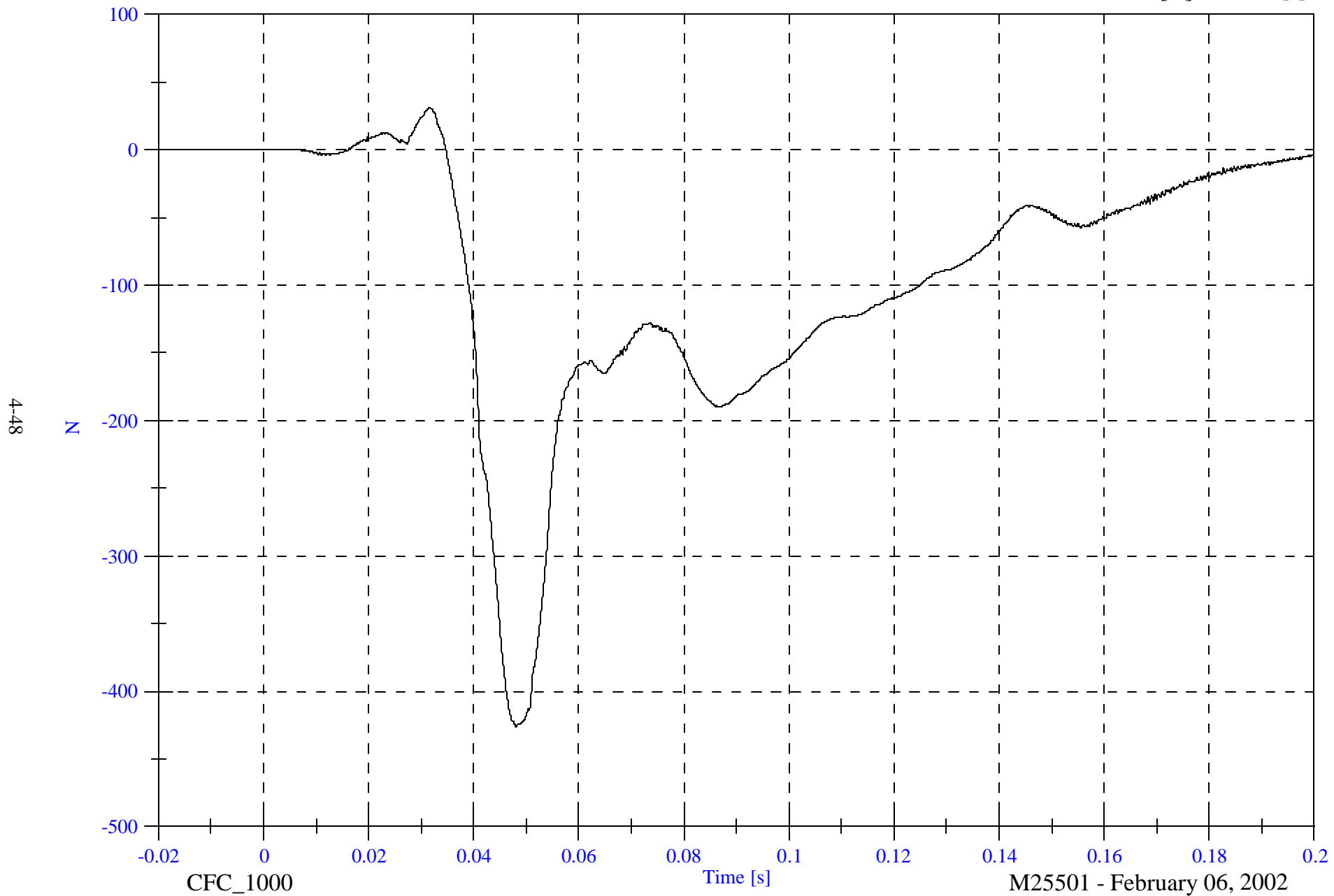


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Lower Neck Fx

Max: 30.9 [N] at 0.032 [s]

Min: -426.1 [N] at 0.048 [s]

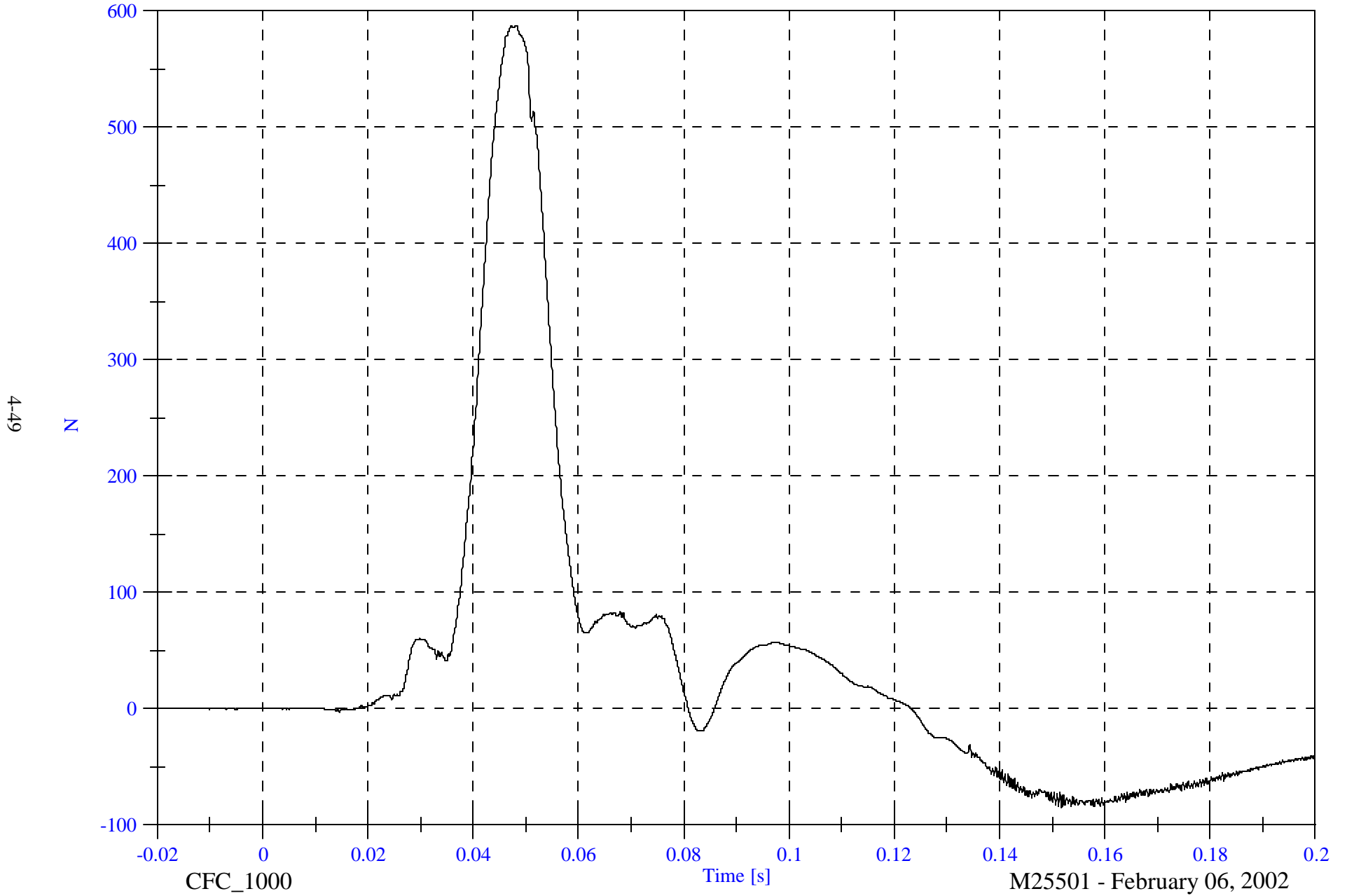


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Lower Neck Fy

Max: 587.0 [N] at 0.048 [s]

Min: -84.8 [N] at 0.152 [s]

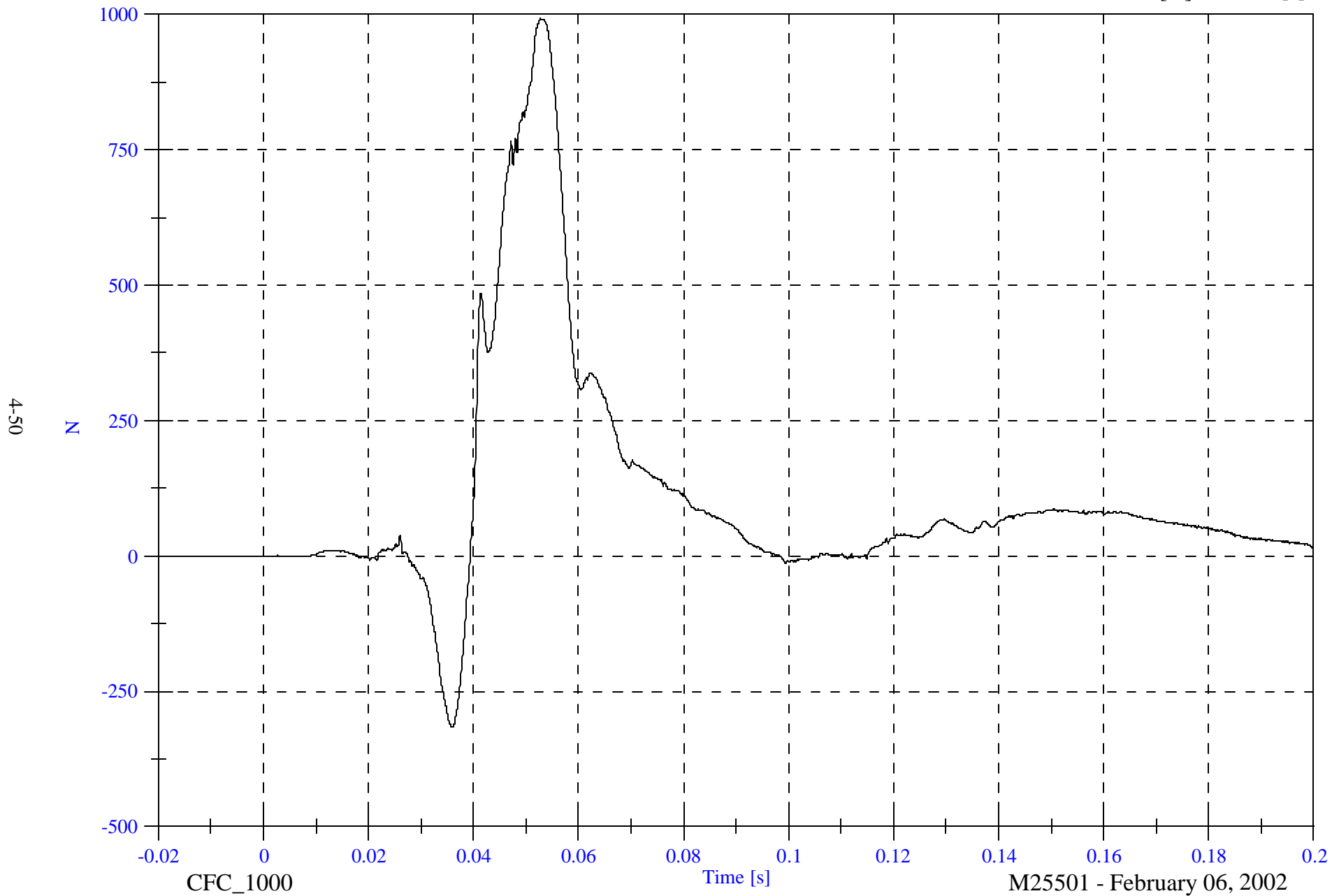


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Lower Neck Fz

Max: 991.7 [N] at 0.053 [s]

Min: -316.9 [N] at 0.036 [s]

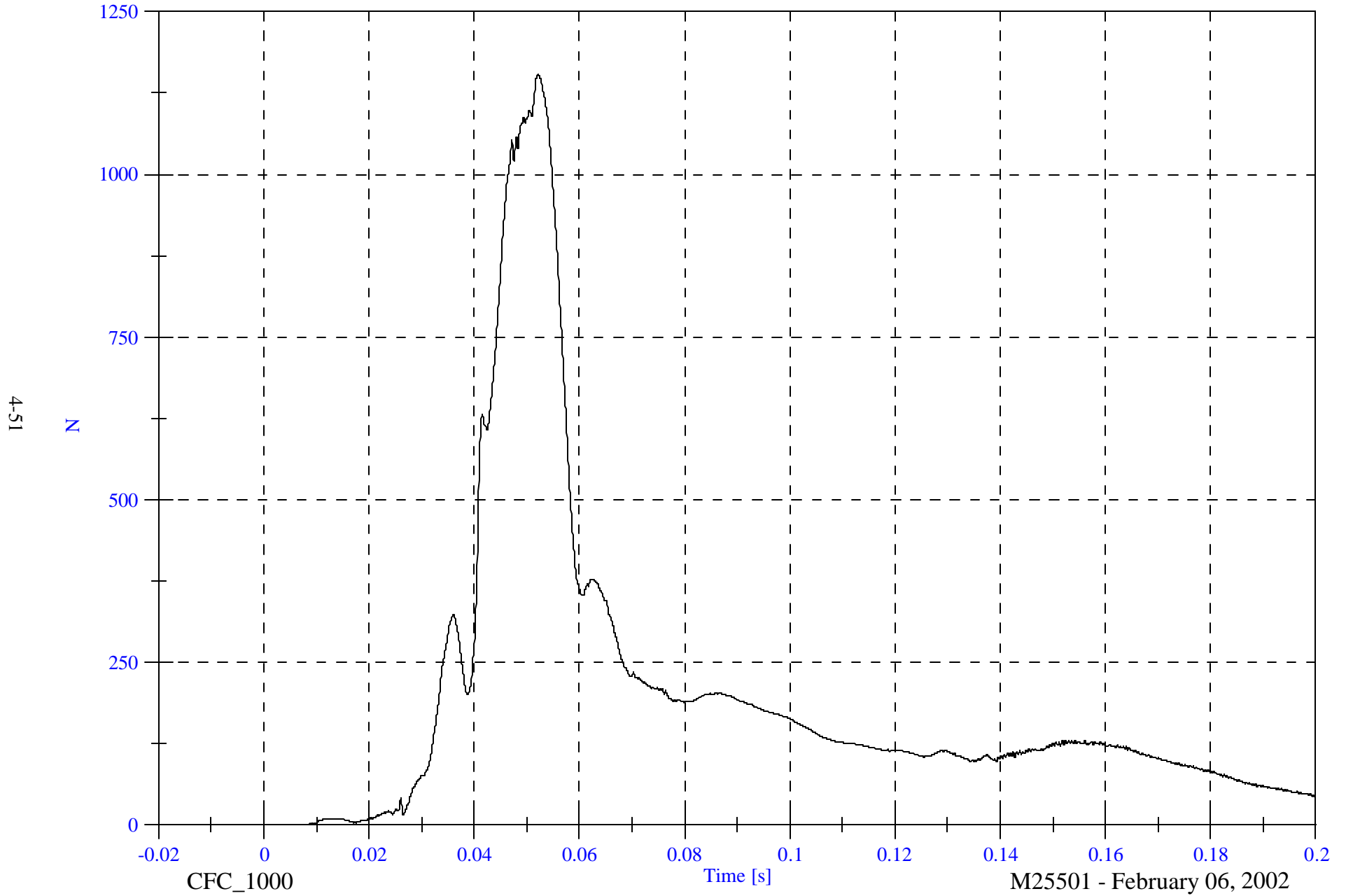


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Lower Neck F Resultant

Max: 1154.0 [N] at 0.052 [s]

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



4-51

N

CFC_1000

Time [s]

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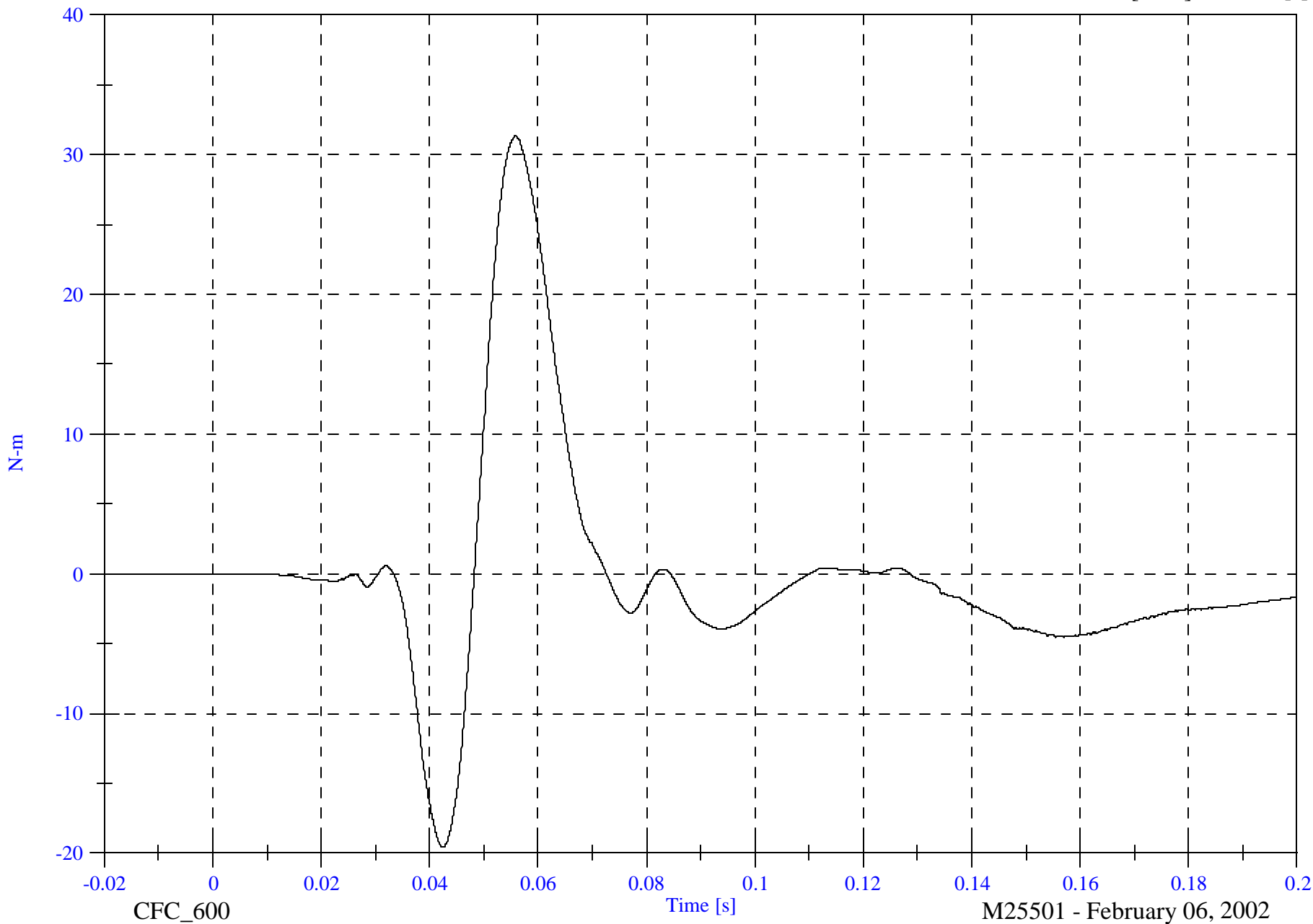
2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Lower Neck Mx

Max: 31.3 [N-m] at 0.056 [s]

Min: -19.6 [N-m] at 0.042 [s]

4-52



CFC_600

Time [s]

M25501 - February 06, 2002

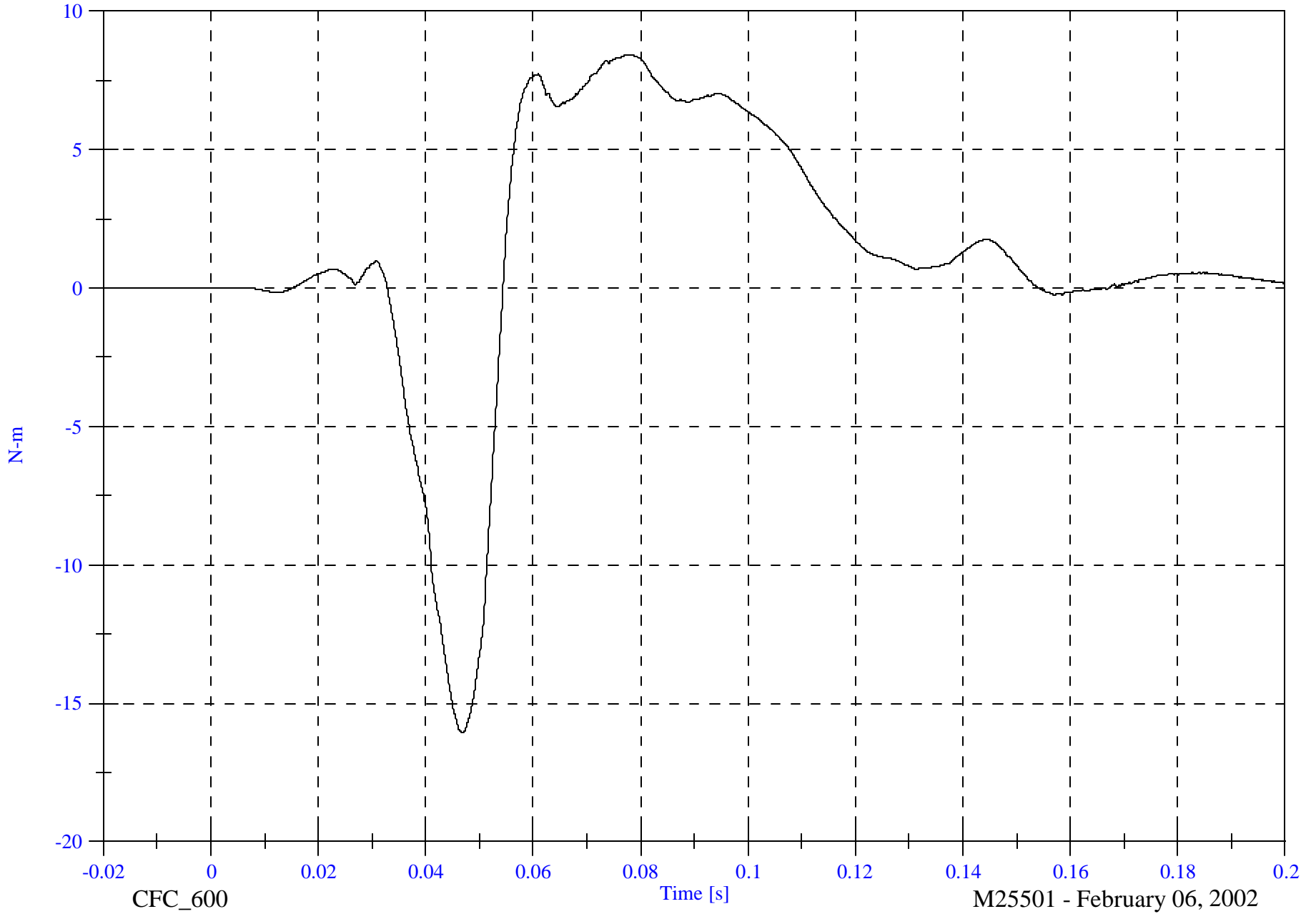
2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Lower Neck My

Max: 8.4 [N-m] at 0.078 [s]

Min: -16.1 [N-m] at 0.047 [s]

4-53



CFC_600

Time [s]

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2002 SNCAP Test 2 - 2002 Subaru Impreza

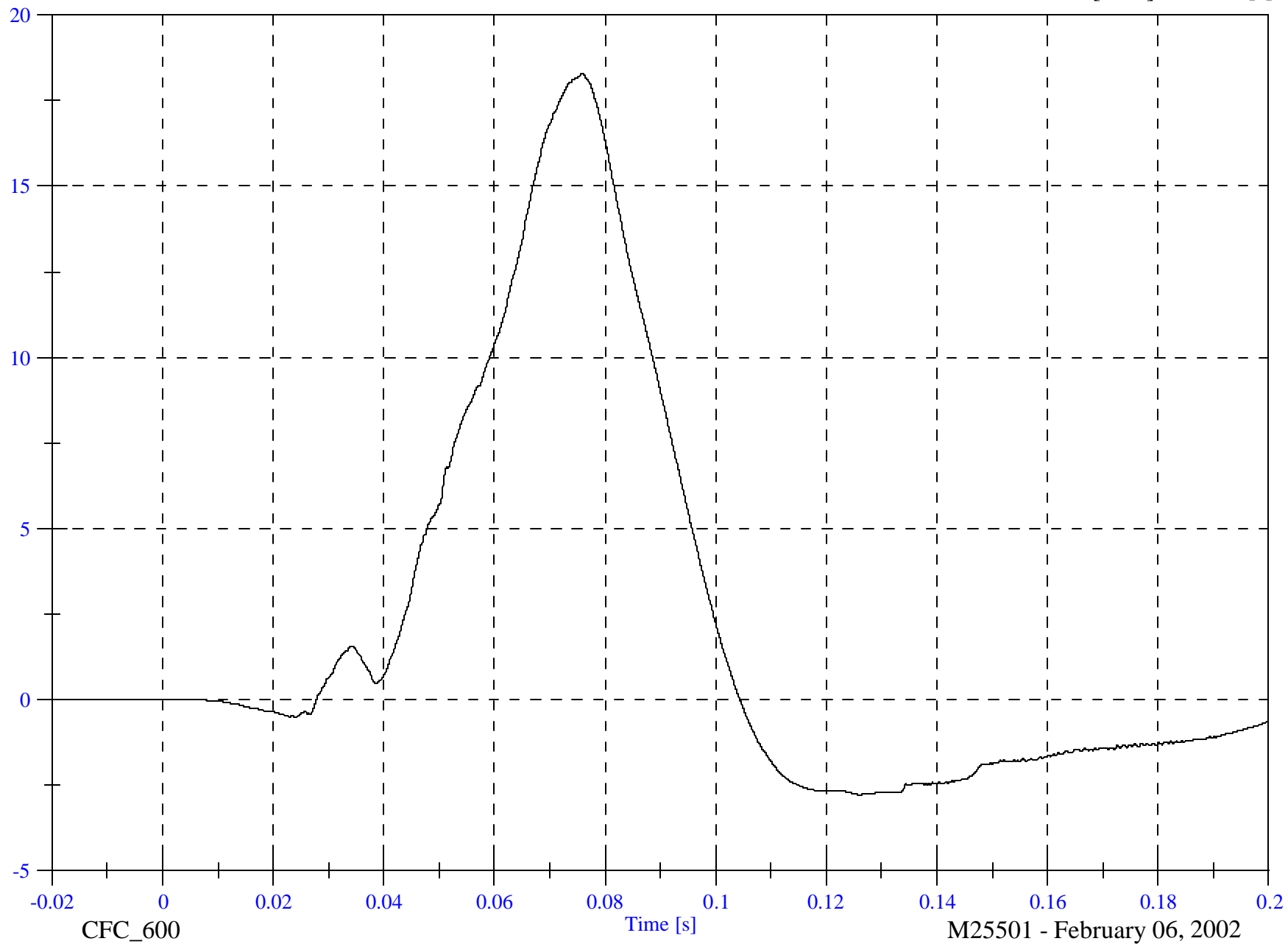
P4 Lower Neck Mz

Max: 18.3 [N-m] at 0.076 [s]

Min: -2.8 [N-m] at 0.126 [s]

4-54

N-m

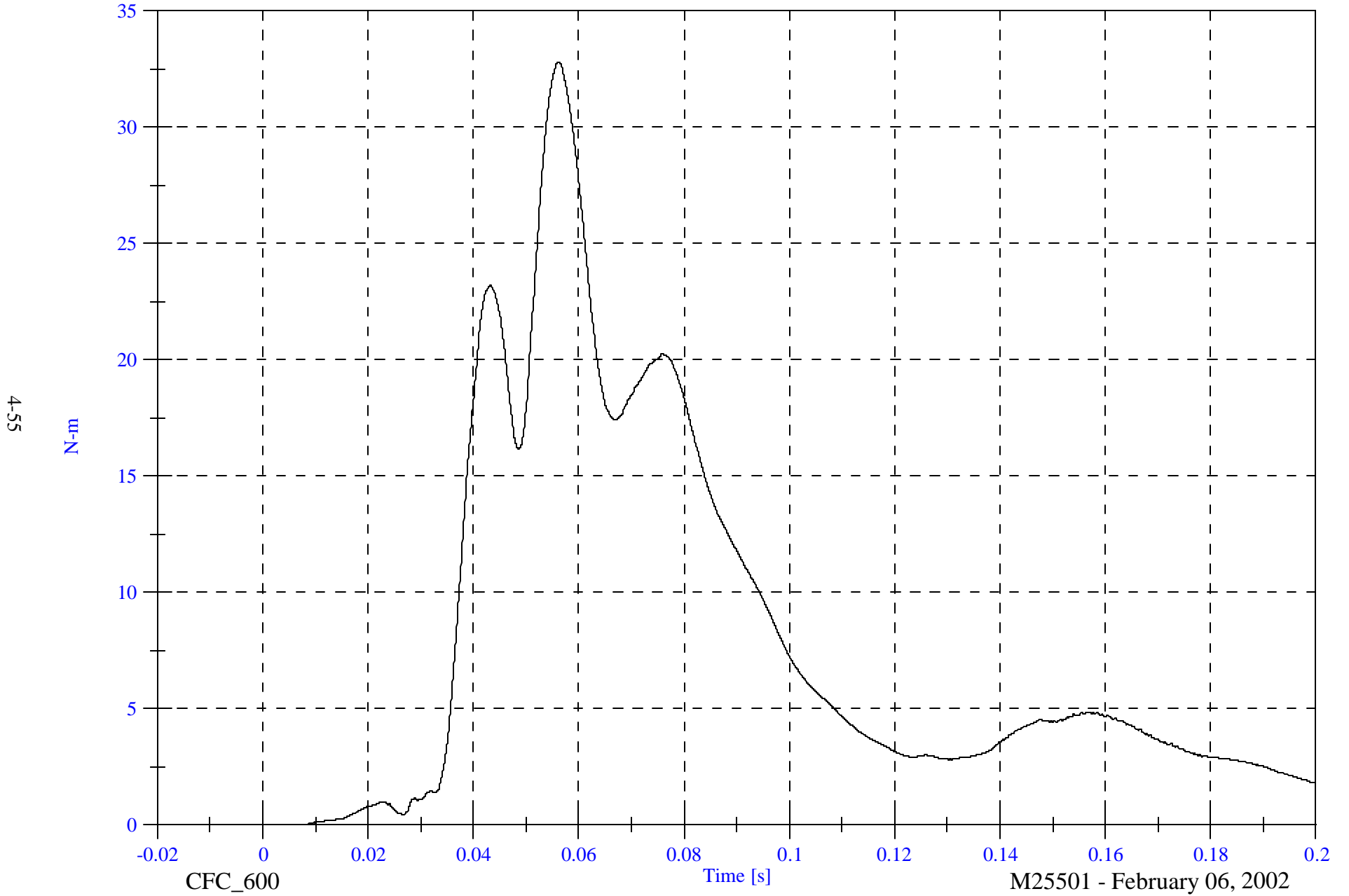


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Lower Neck M Resultant

Max: 32.8 [N-m] at 0.056 [s]

Min: 0.0 [N-m] at -0.013 [s]

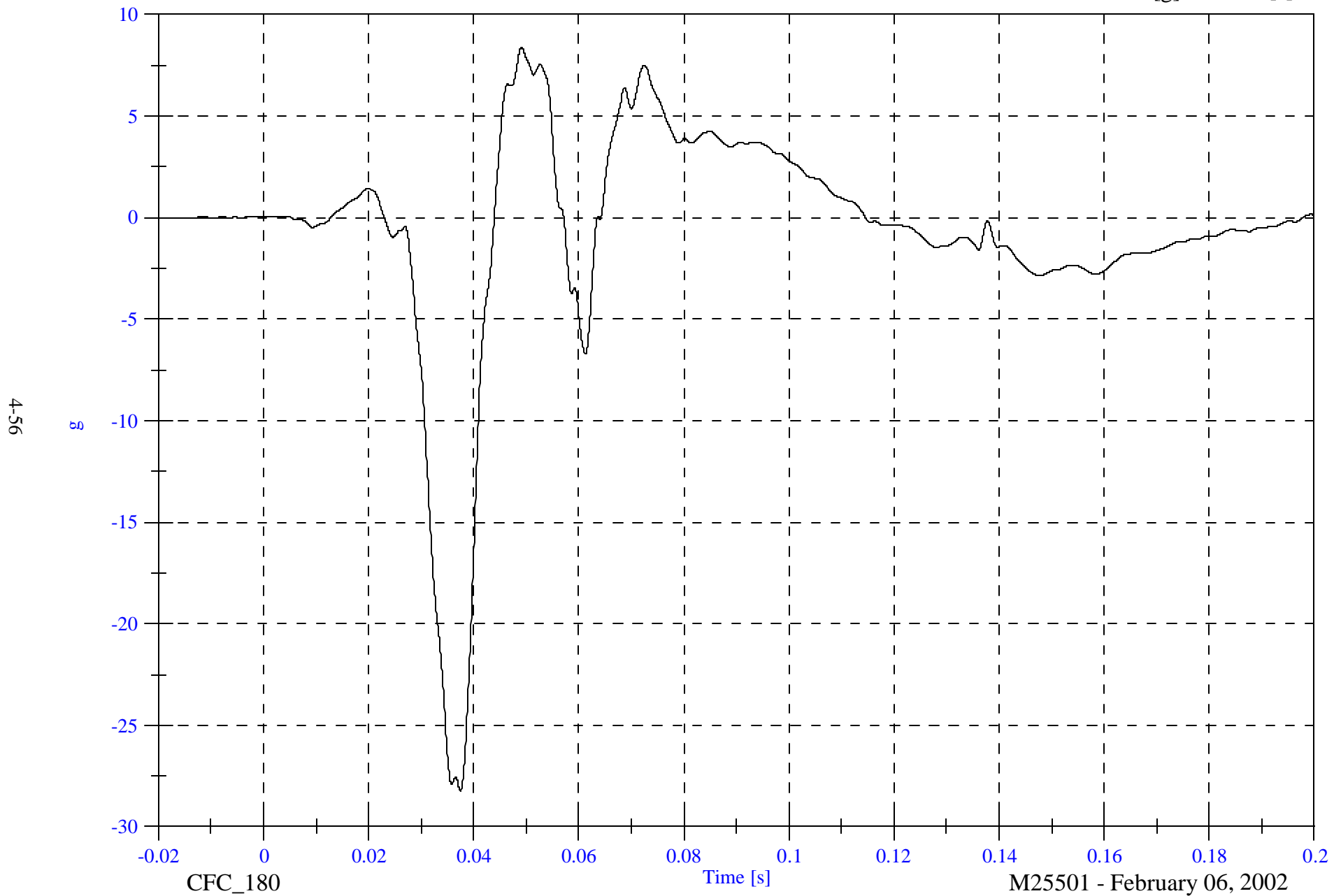


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 8.4 [g] at 0.049 [s]

P4 Chest x

Min: -28.2 [g] at 0.037 [s]

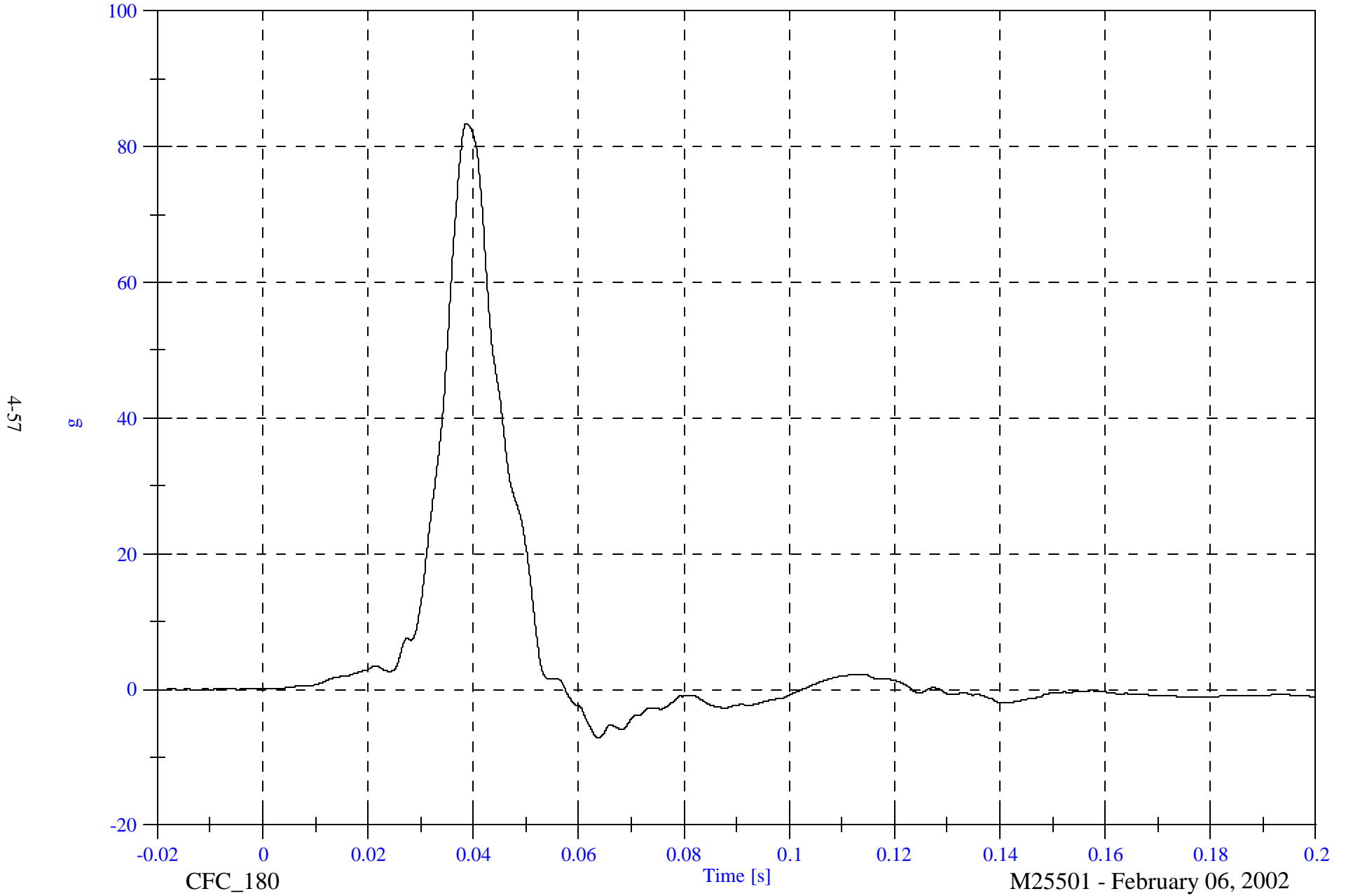


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Chest y

Max: 83.4 [g] at 0.039 [s]

Min: -7.2 [g] at 0.064 [s]

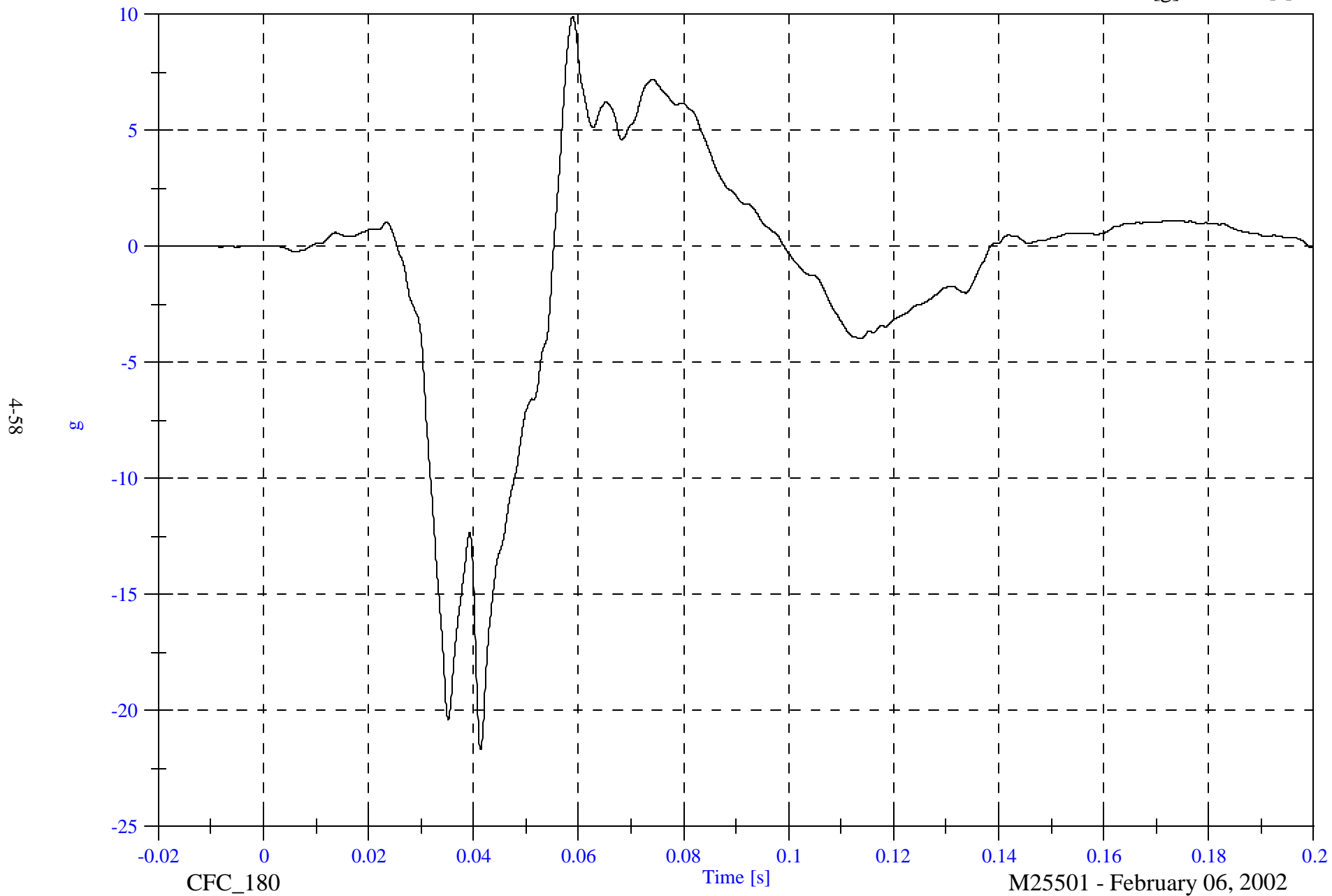


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 9.9 [g] at 0.059 [s]

P4 Chest z

Min: -21.7 [g] at 0.041 [s]



4-58

g

CFC_180

Time [s]

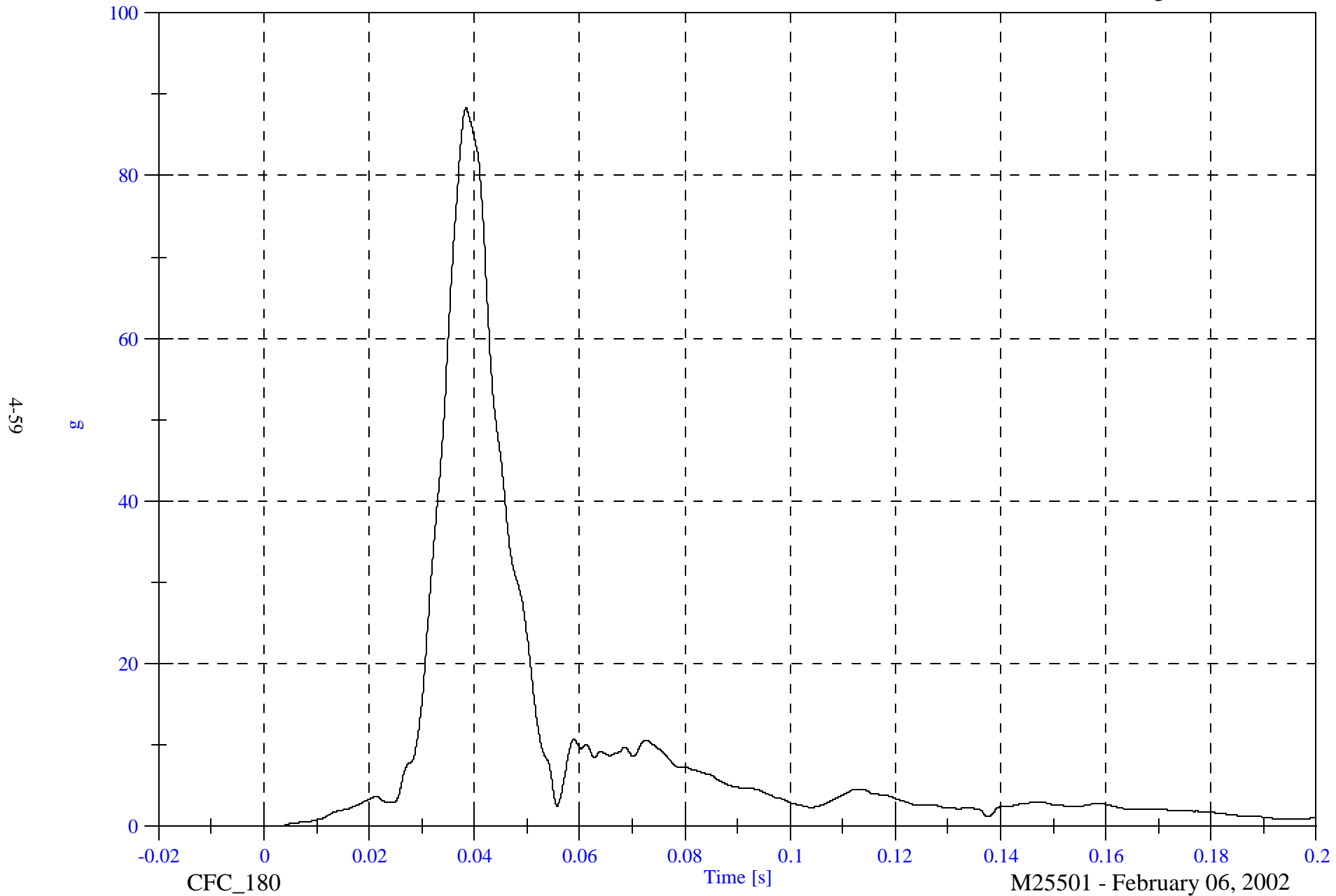
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Chest Resultant

Max: 88.3 [g] at 0.038 [s]

Min: 0.0 [g] at -0.013 [s]

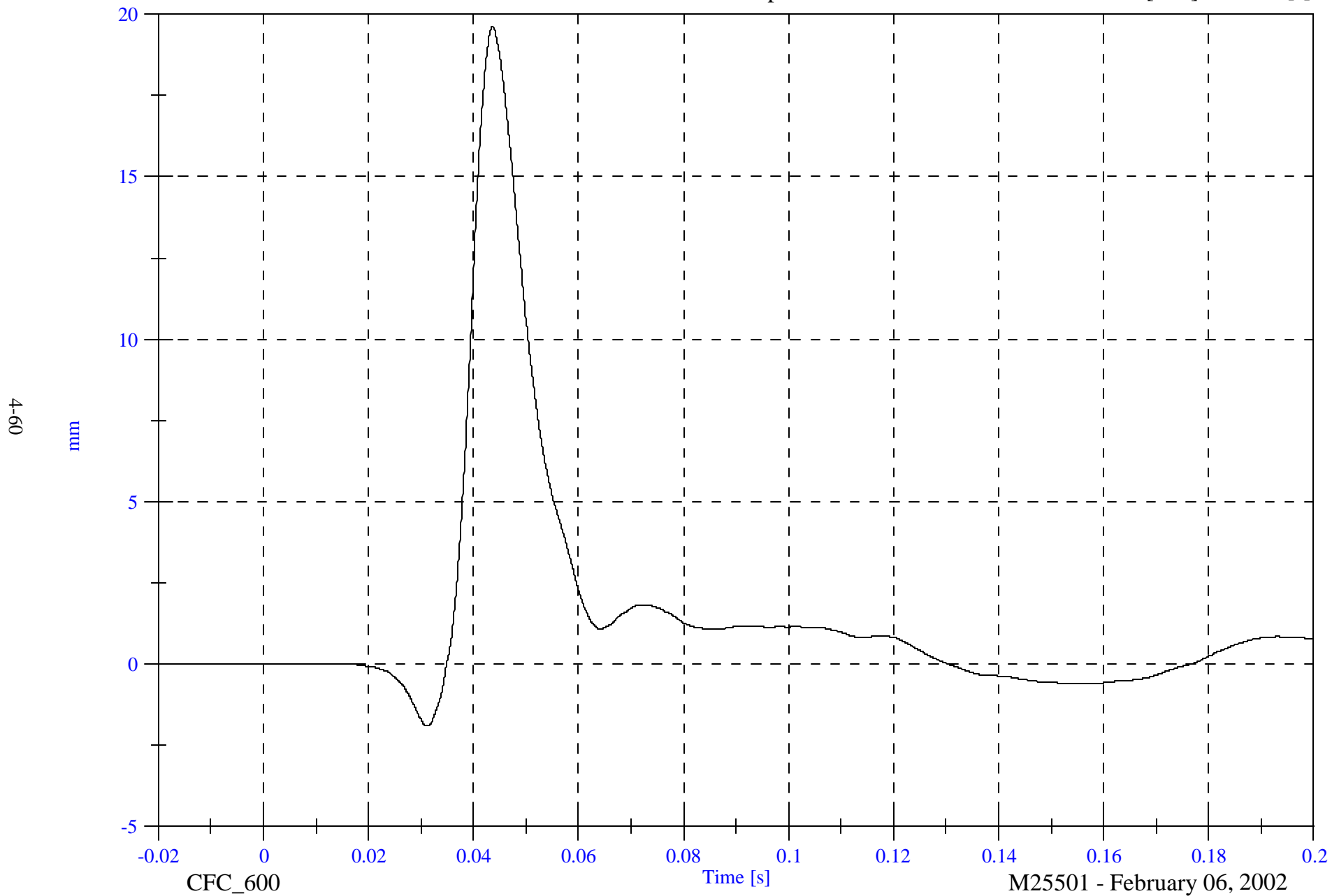


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Chest Compression

Max: 19.6 [mm] at 0.044 [s]

Min: -1.9 [mm] at 0.031 [s]



4-60

mm

CFC_600

Time [s]

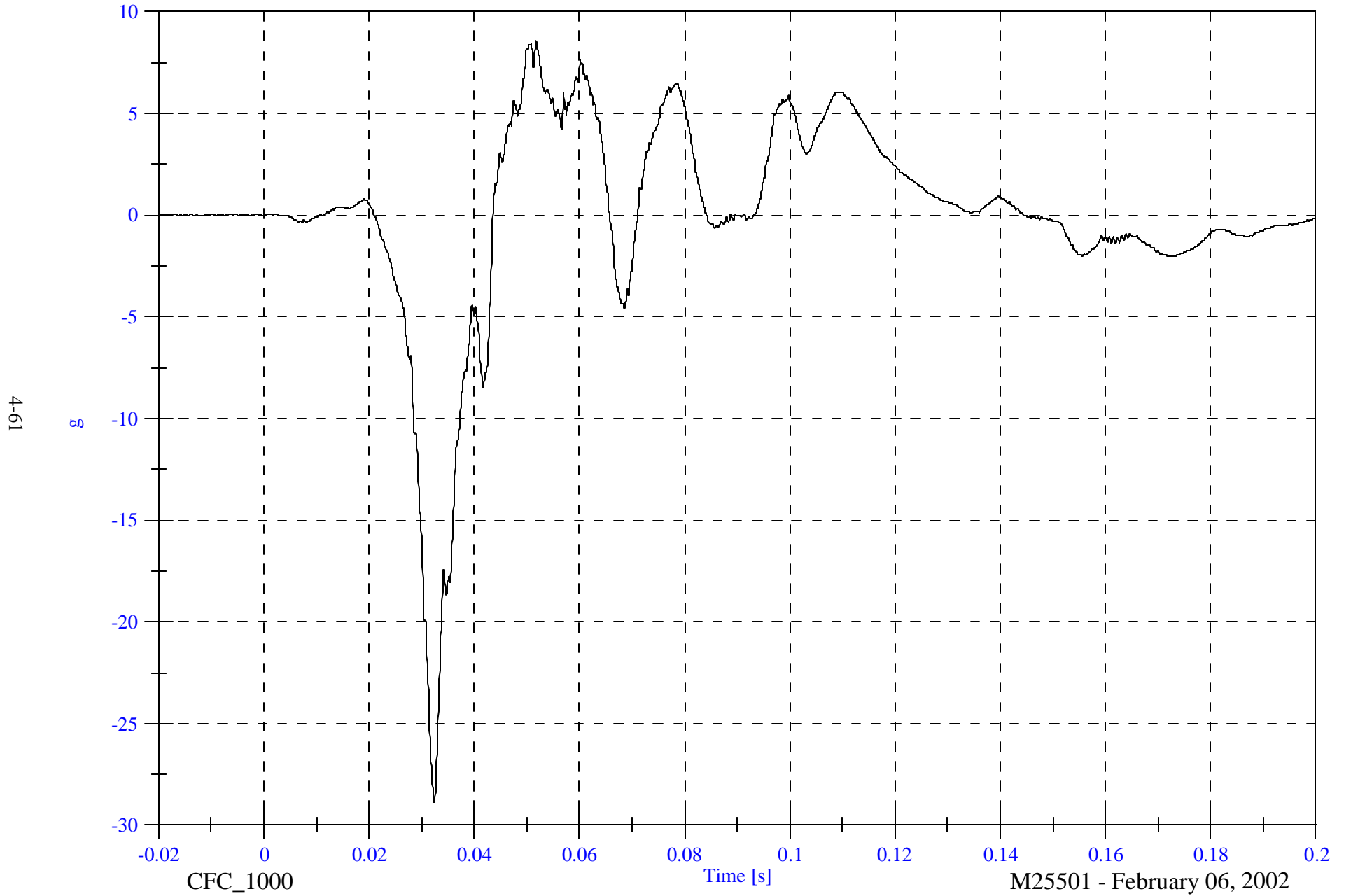
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 8.6 [g] at 0.052 [s]

Min: -28.9 [g] at 0.032 [s]

P4 Pelvic x



4-61

g

CFC_1000

Time [s]

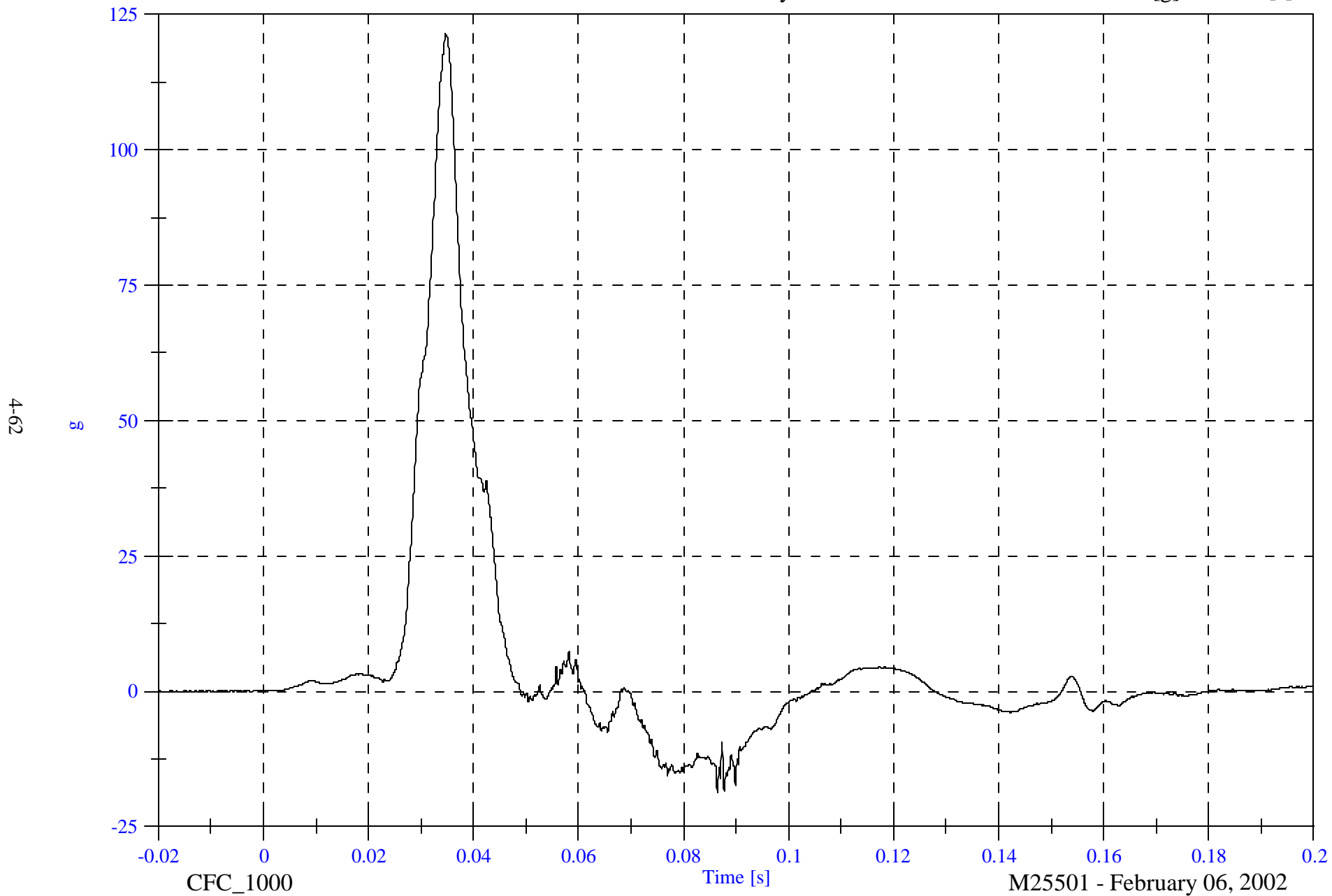
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 121.4 [g] at 0.035 [s]

P4 Pelvic y

Min: -18.8 [g] at 0.086 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

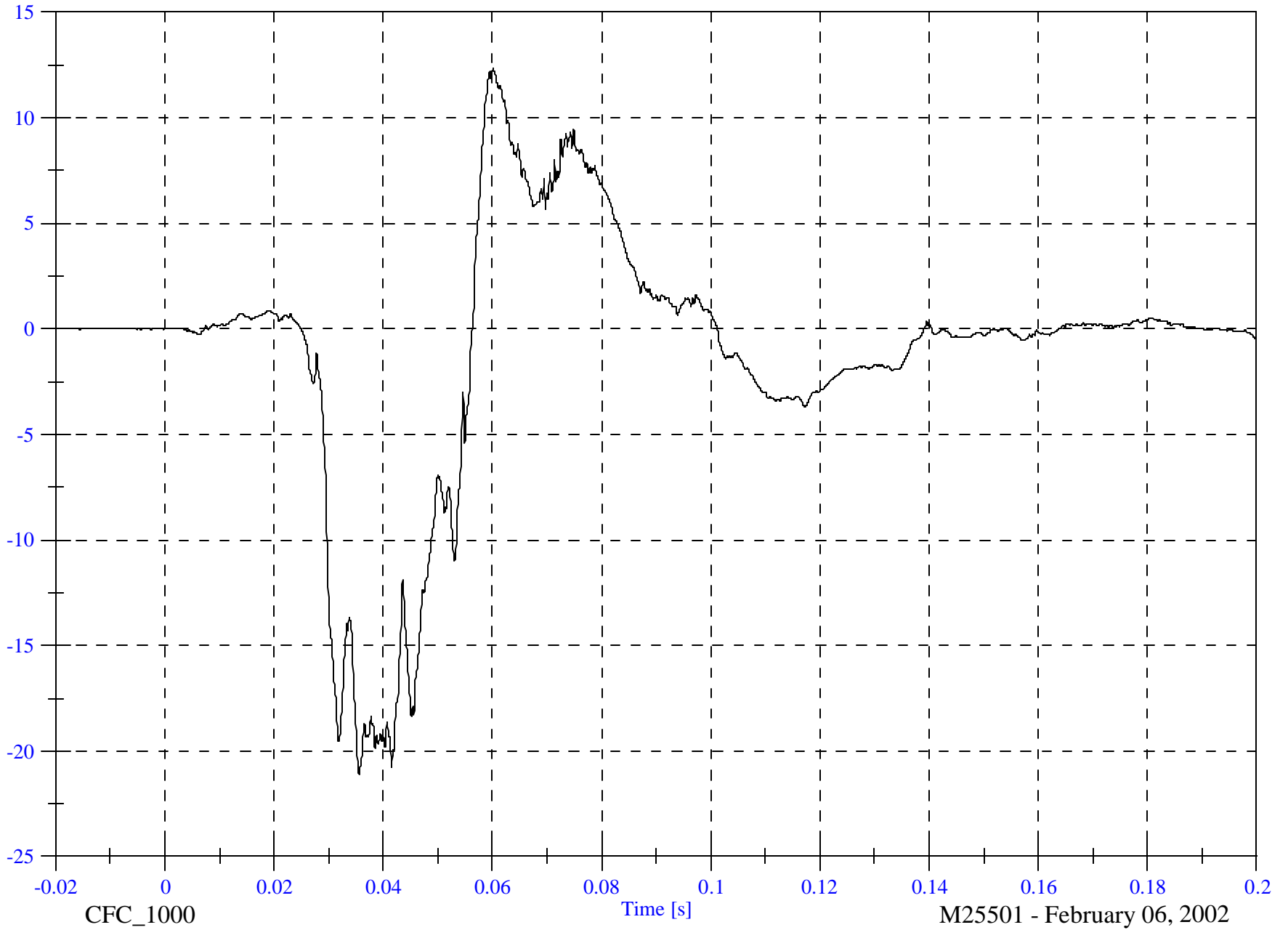
P4 Pelvic z

Max: 12.3 [g] at 0.060 [s]

Min: -21.1 [g] at 0.036 [s]

4-63

g

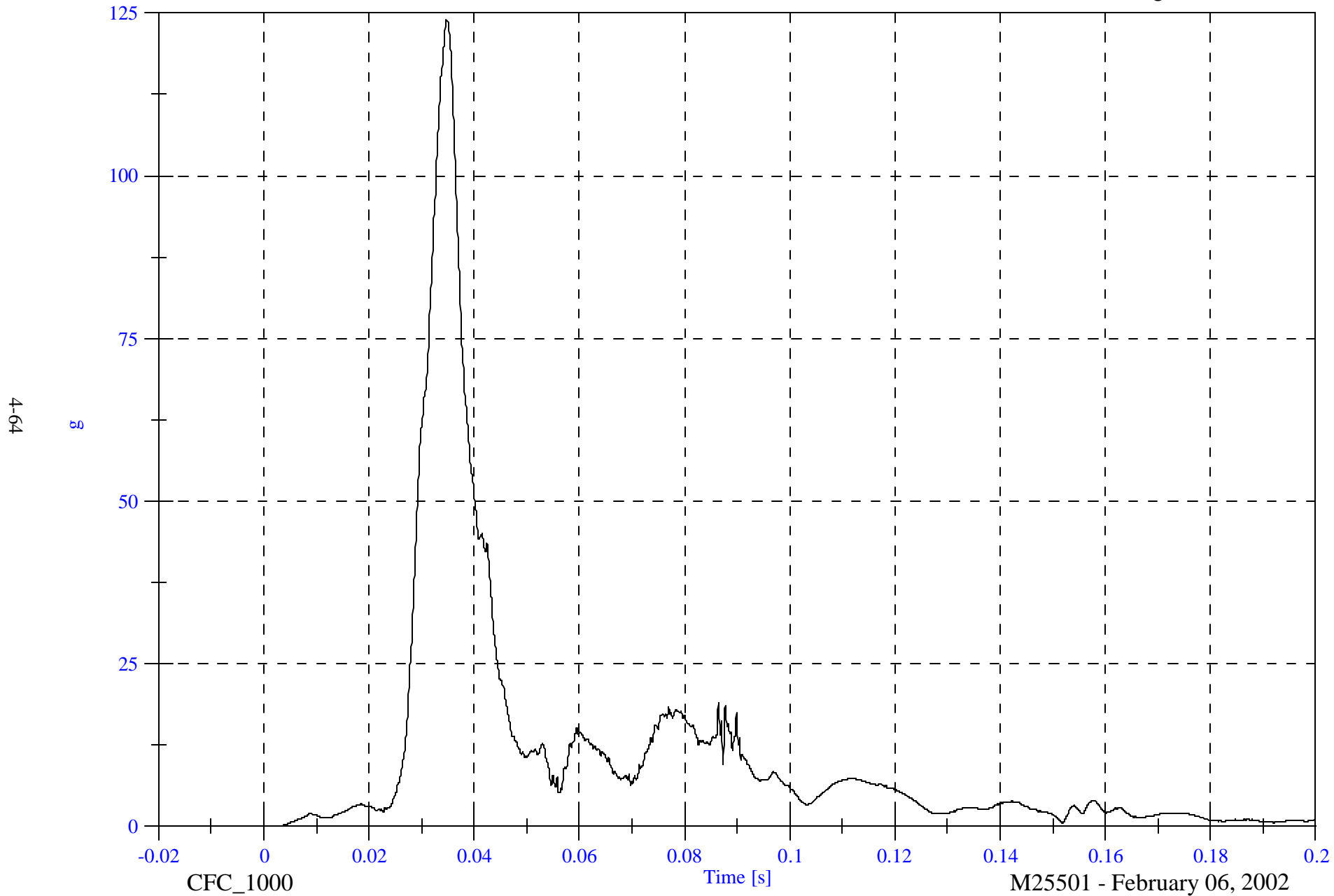


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Pelvic Resultant

Max: 124.0 [g] at 0.035 [s]

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

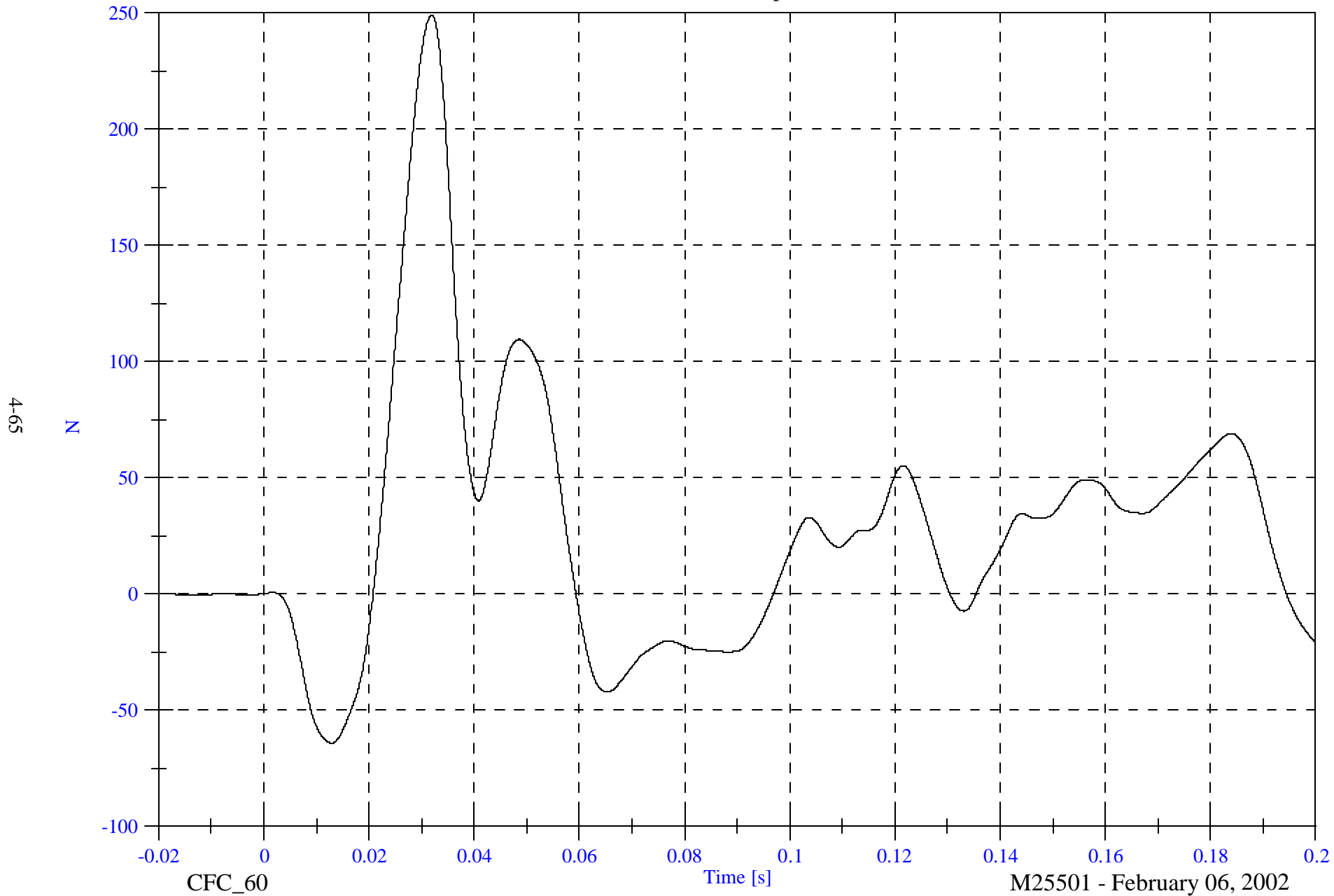


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Tether Strap Load

Max: 249.2 [N] at 0.032 [s]

Min: -64.1 [N] at 0.013 [s]

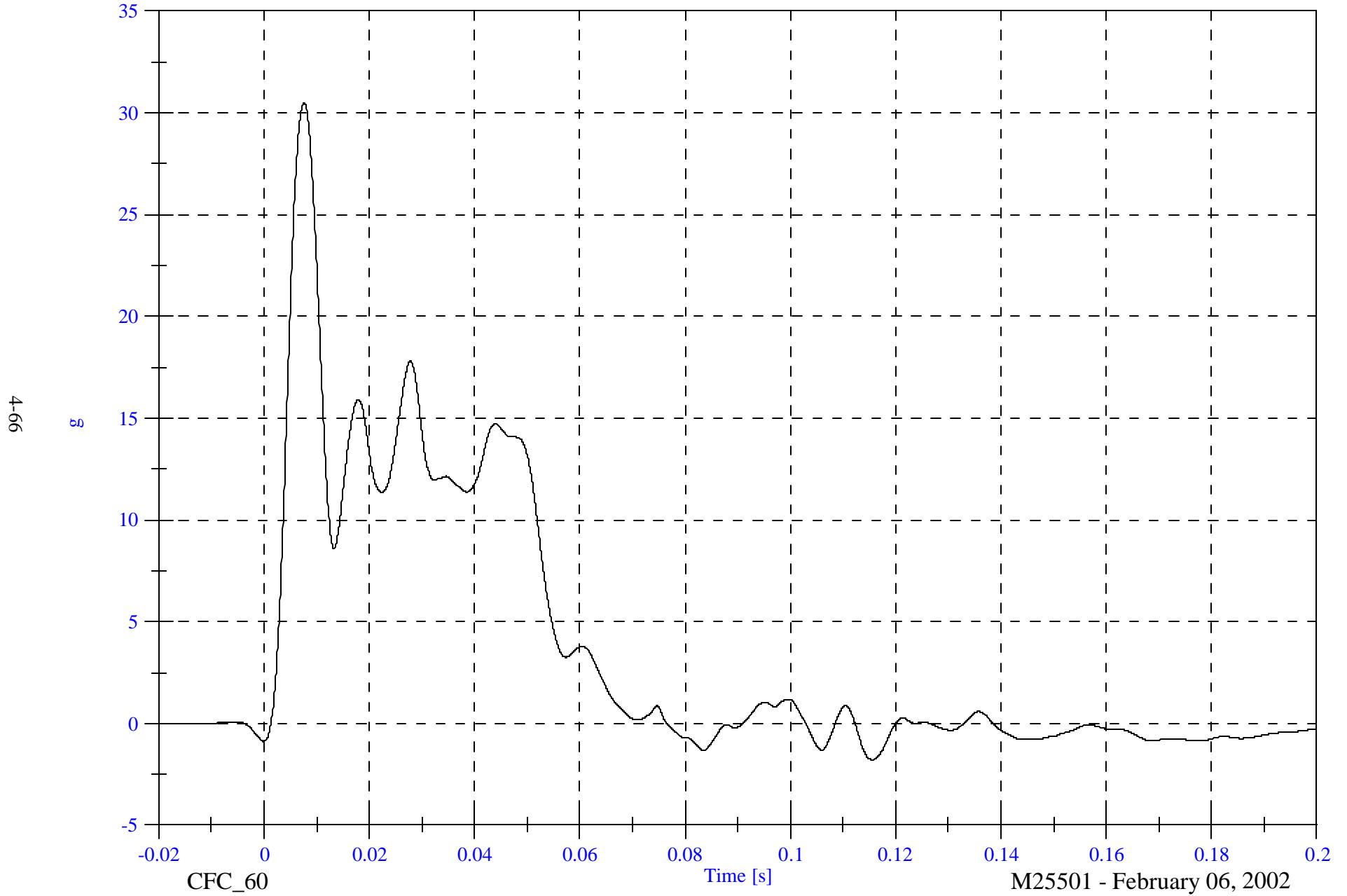


2002 SNCAP Test 2 - 2002 Subaru Impreza

A19 Right Rear Compartment y Red

Max: 30.5 [g] at 0.008 [s]

Min: -1.8 [g] at 0.116 [s]



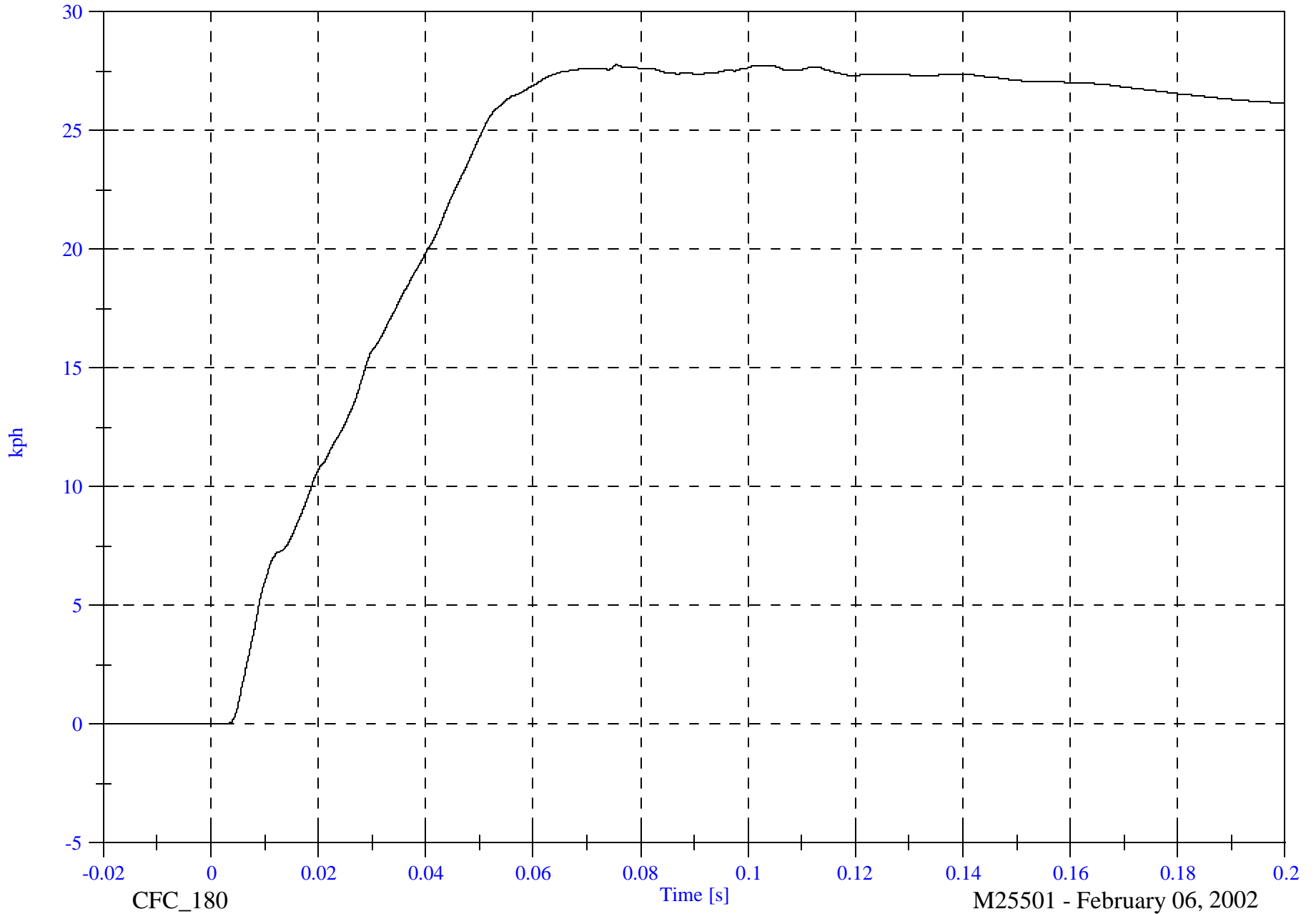
2002 SNCAP Test 2 - 2002 Subaru Impreza

A19 Right Rear Compartment y Red Velocity

Max: 27.8 [kph] at 0.076 [s]

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

4-67



CFC_180

Time [s]

M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

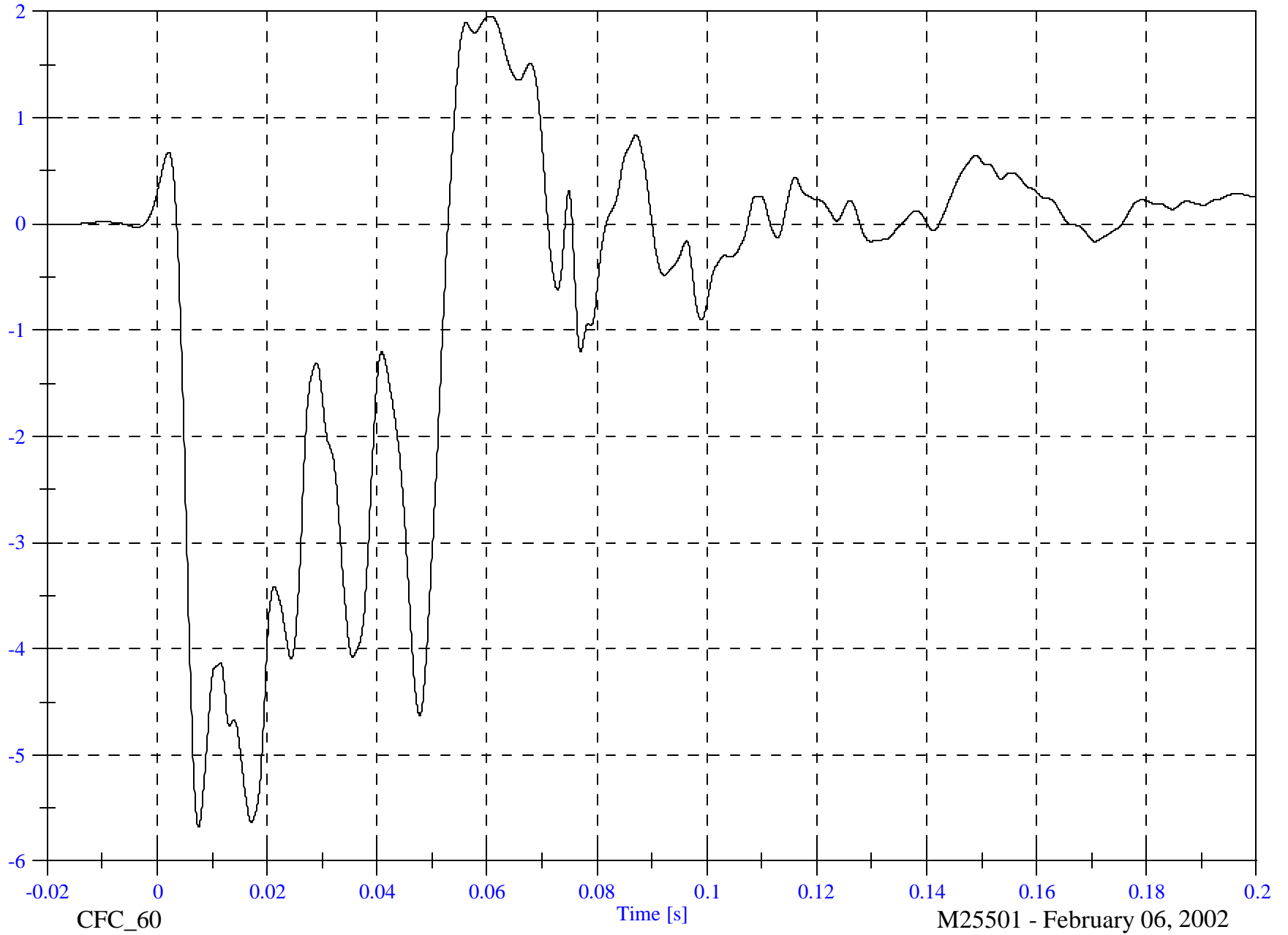
Max: 2.0 [g] at 0.061 [s]

A20 Right rear Compartment x

Min: -5.7 [g] at 0.008 [s]

4-68

g



2002 SNCAP Test 2 - 2002 Subaru Impreza

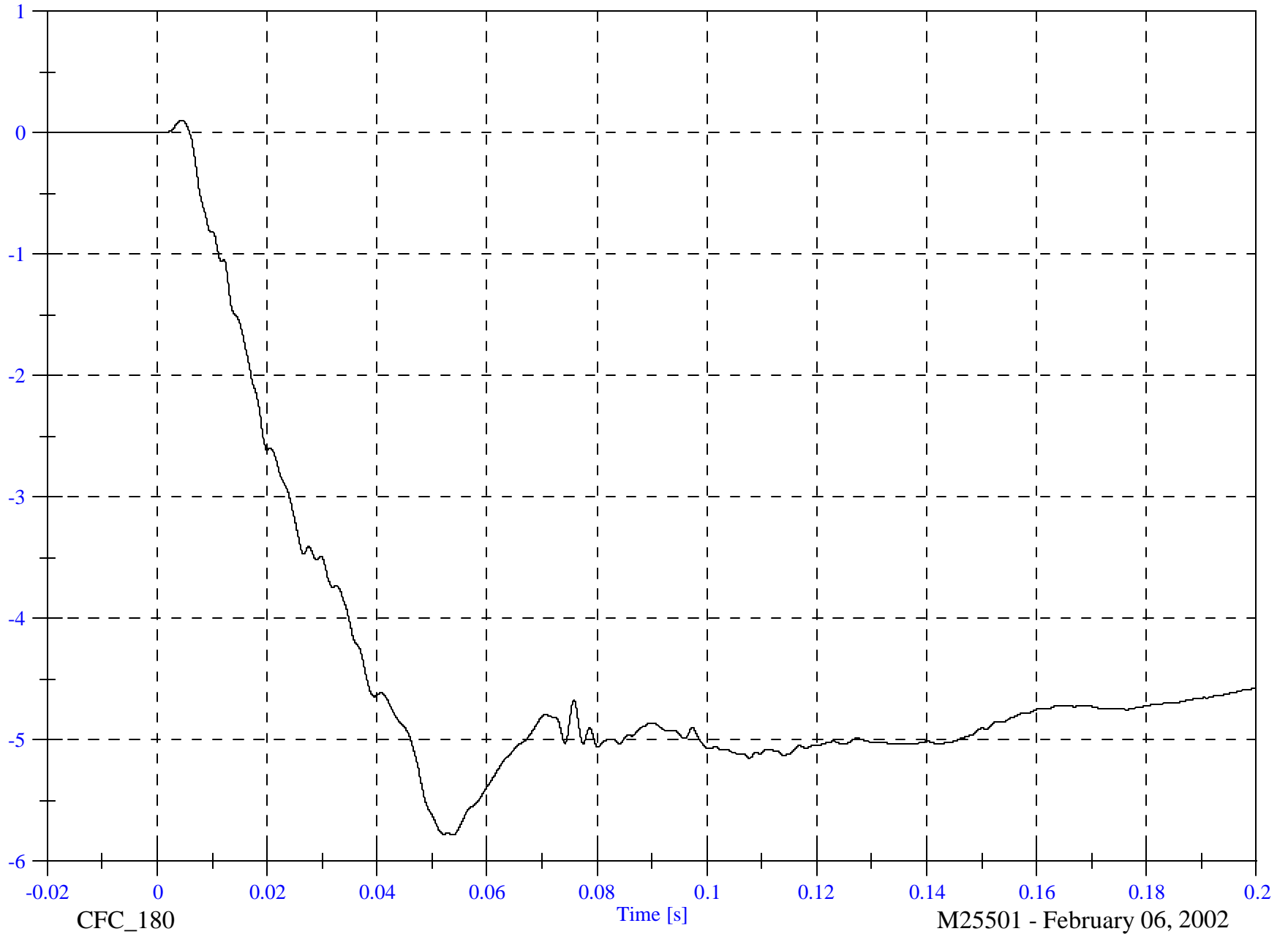
A20 Right rear Compartment x Velocity

Max: 0.1 [kph] at 0.004 [s]

Min: -5.8 [kph] at 0.054 [s]

4-69

kph



CFC_180

Time [s]

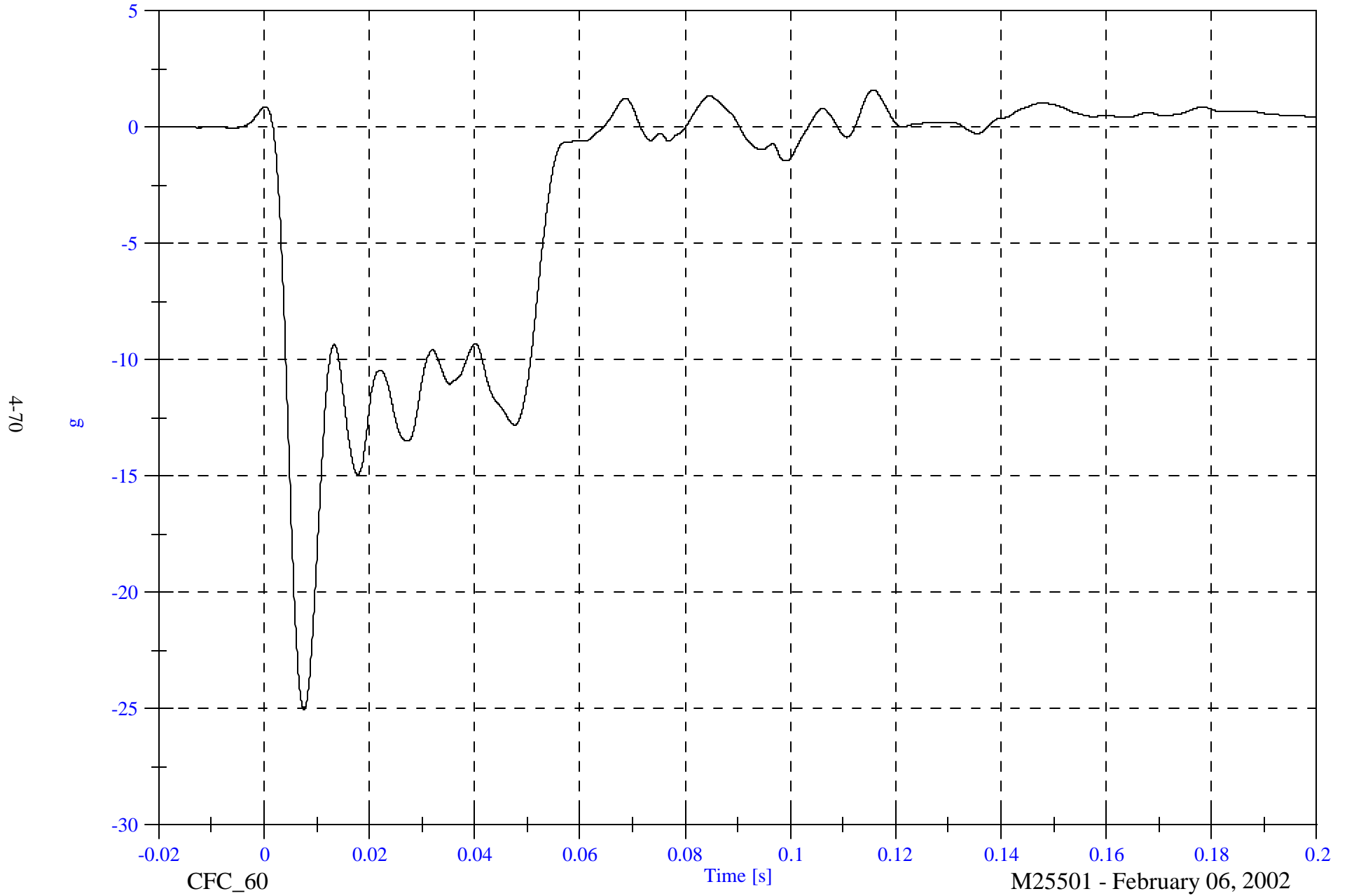
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

A21 Right Rear Compartment Angular

Max: 1.6 [g] at 0.116 [s]

Min: -25.0 [g] at 0.008 [s]

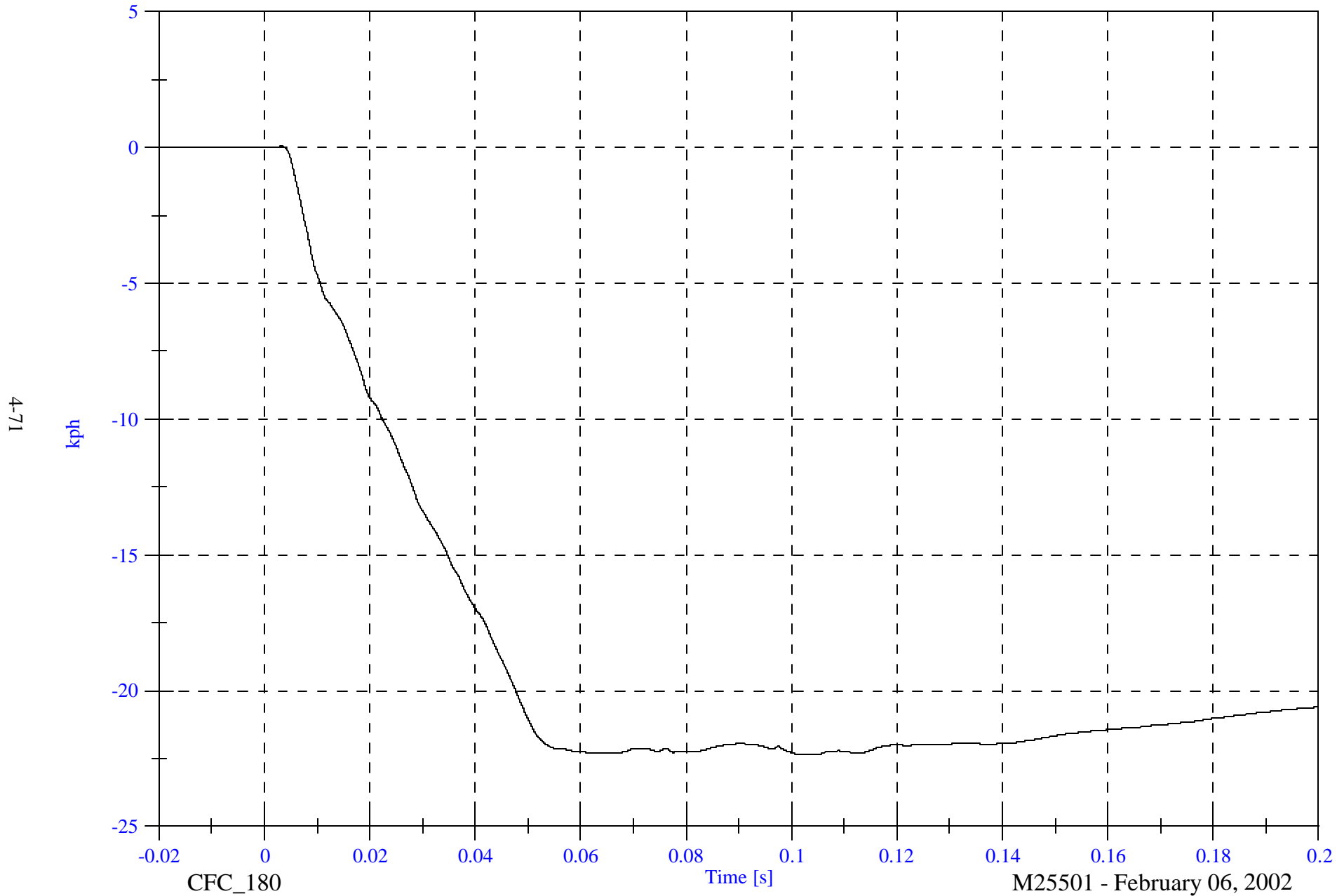


2002 SNCAP Test 2 - 2002 Subaru Impreza

A21 Right Rear Compartment Angular Velocity

Max: 0.0 [kph] at 0.003 [s]

Min: -22.3 [kph] at 0.104 [s]



4-71

CFC_180

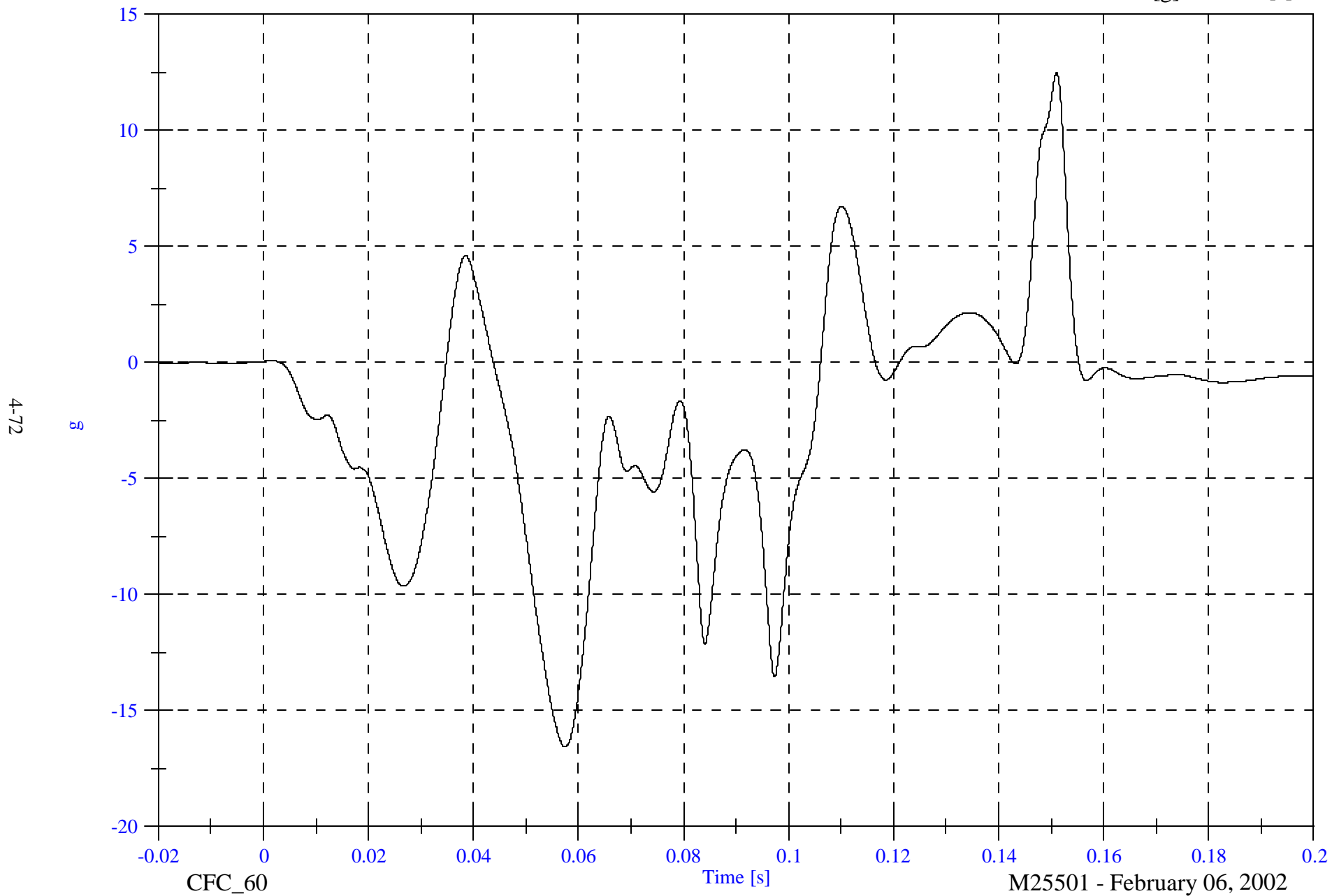
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Child Seat x

Max: 12.5 [g] at 0.151 [s]

Min: -16.6 [g] at 0.057 [s]

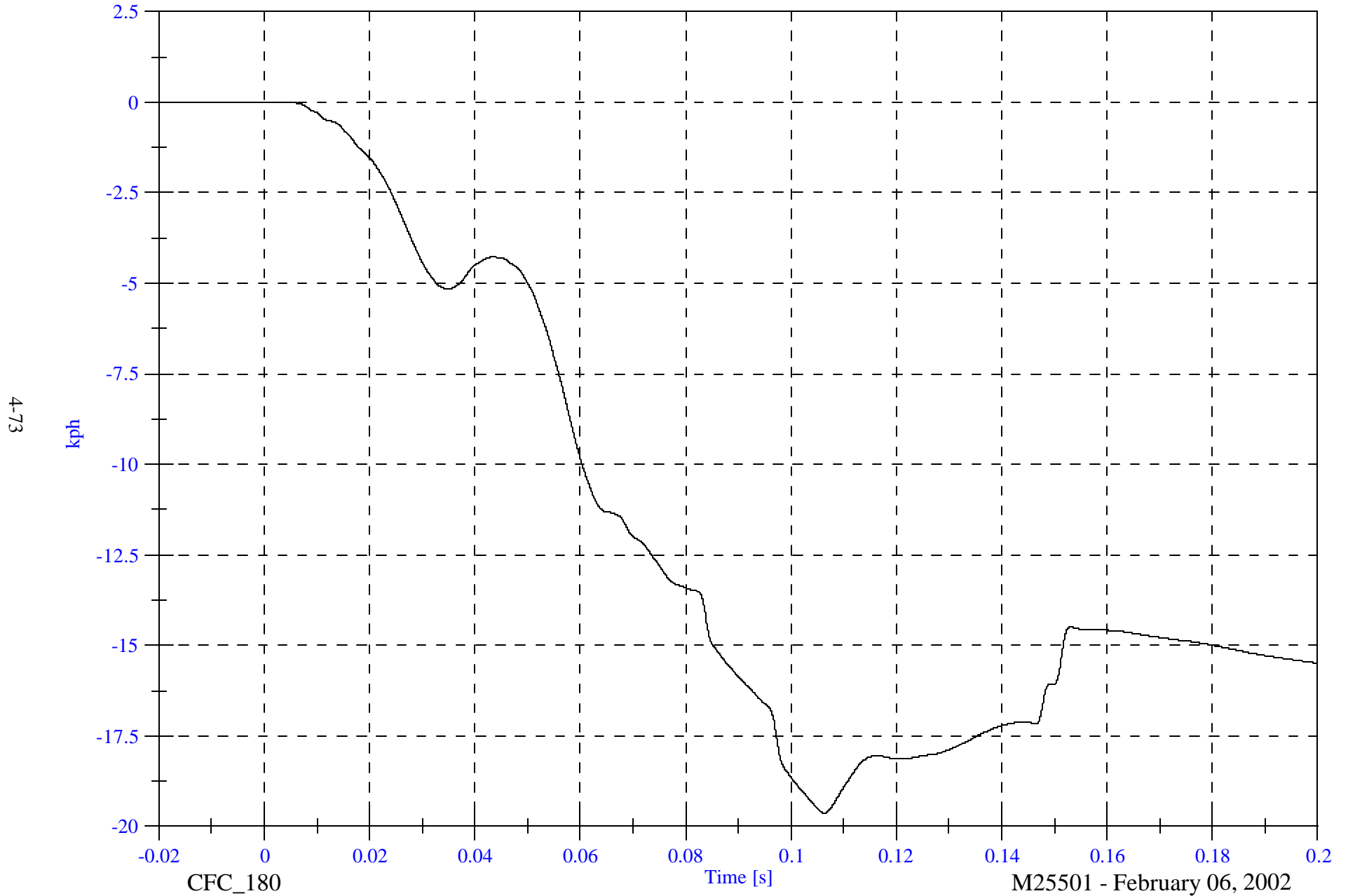


2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Child Seat x Velocity

Max: 0.0 [kph] at -0.020 [s]

Min: -19.6 [kph] at 0.106 [s]



4-73

kph

Time [s]

CFC_180

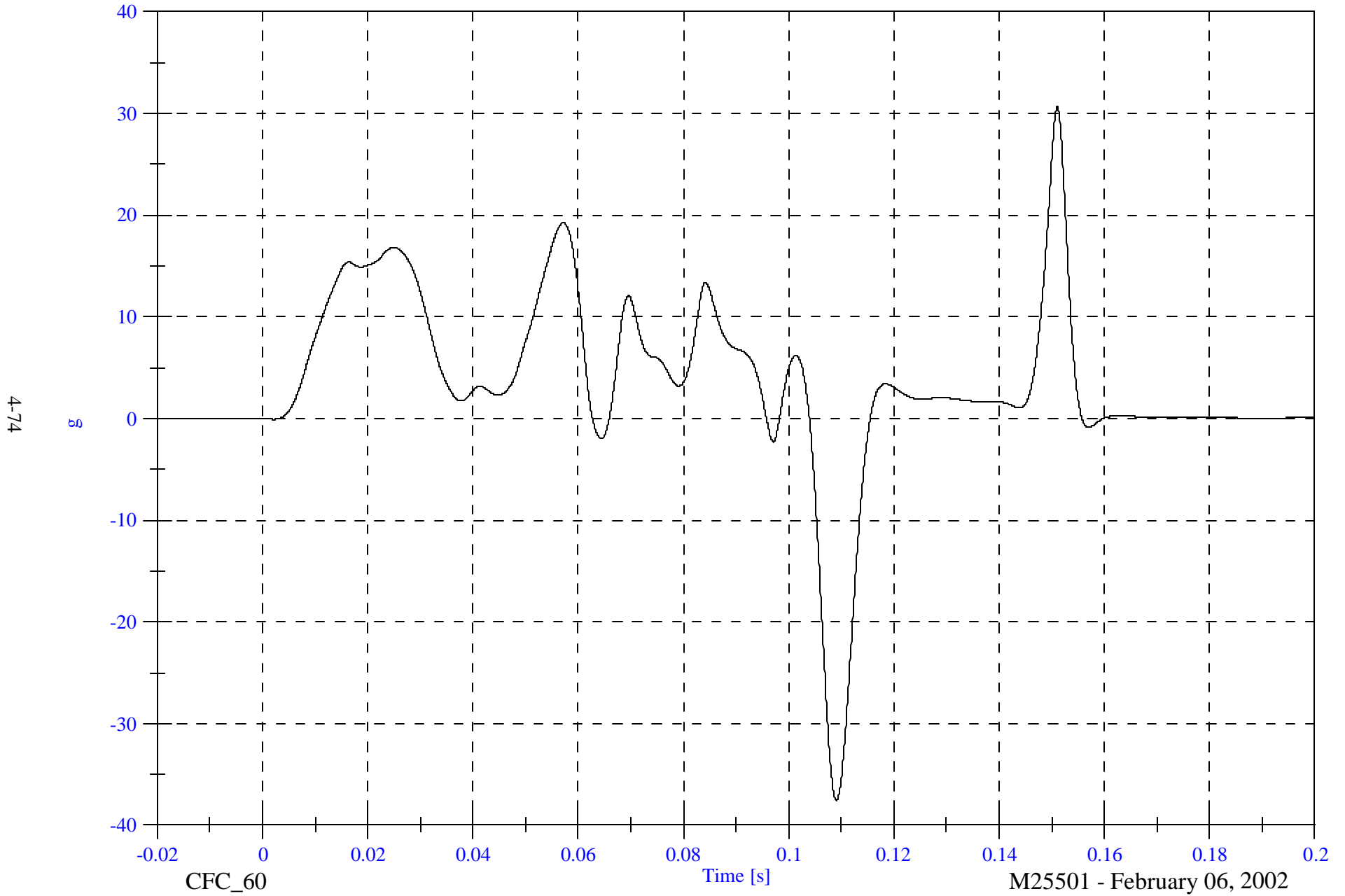
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Child Seat y

Max: 30.7 [g] at 0.151 [s]

Min: -37.6 [g] at 0.109 [s]

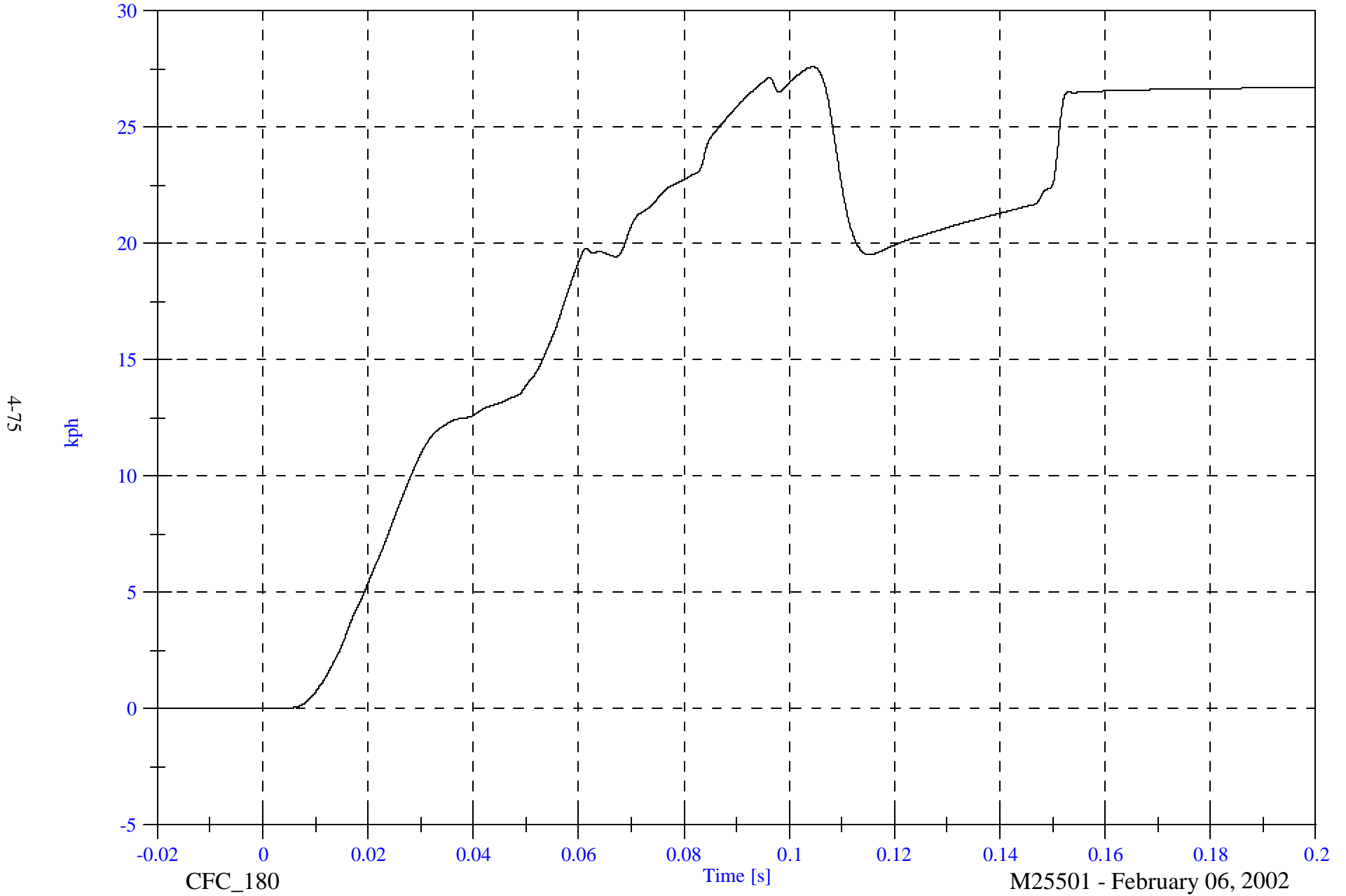


2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Child Seat y Velocity

Max: 27.6 [kph] at 0.105 [s]

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

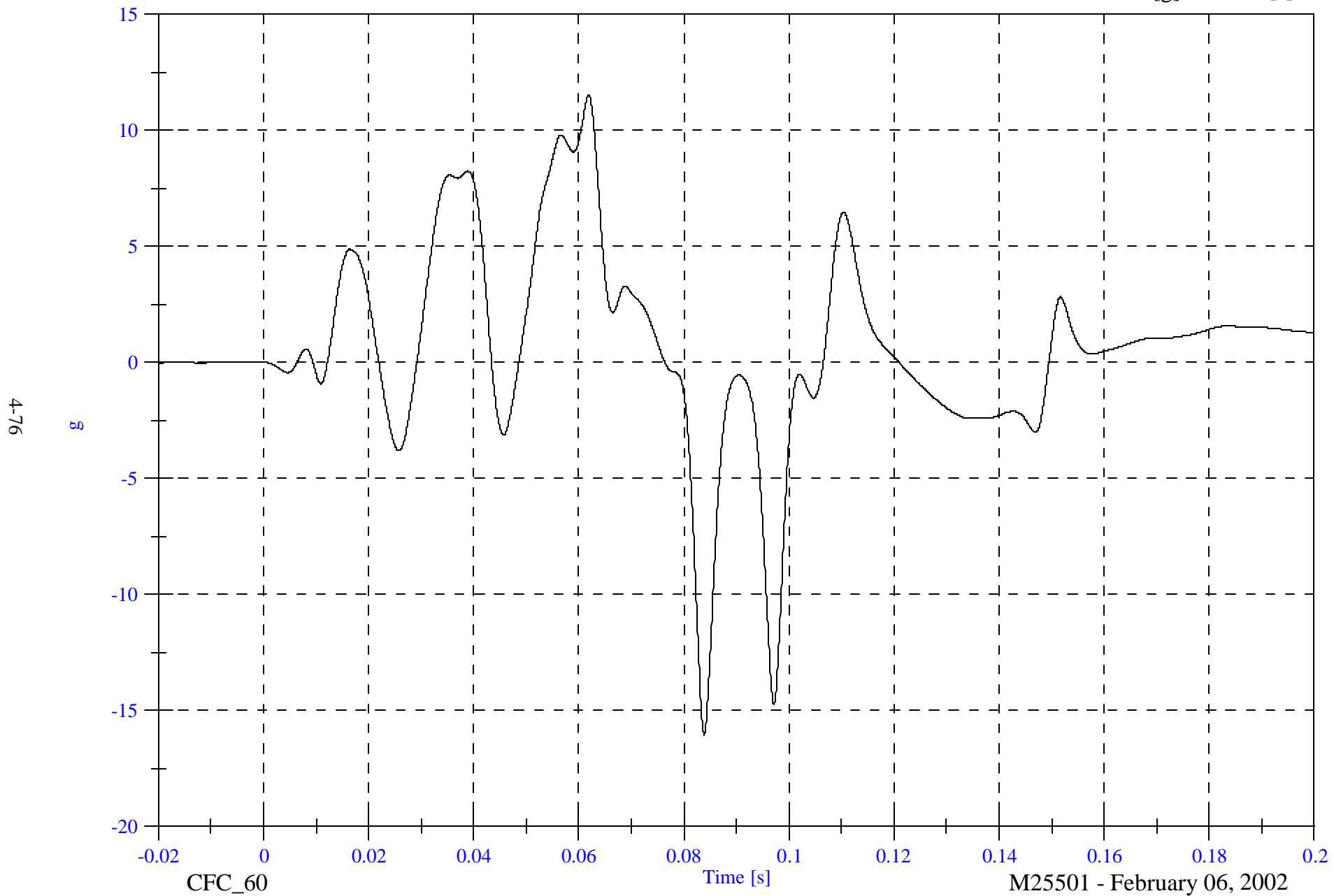


2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Child Seat z

Max: 11.5 [g] at 0.062 [s]

Min: -16.0 [g] at 0.084 [s]



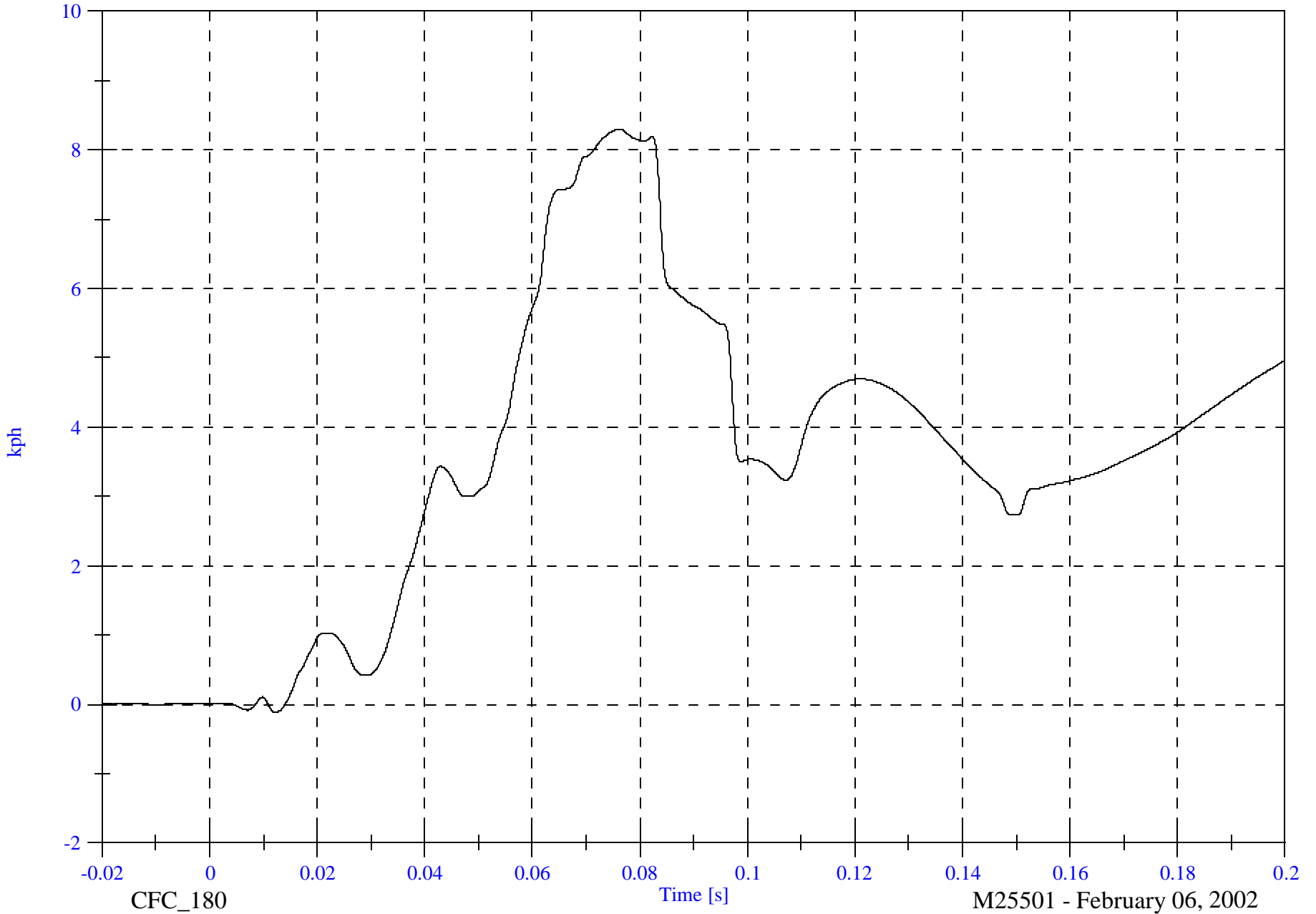
2002 SNCAP Test 2 - 2002 Subaru Impreza

P3 Child Seat z Velocity

Max: 8.3 [kph] at 0.076 [s]

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

4-77



CFC_180

Time [s]

M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

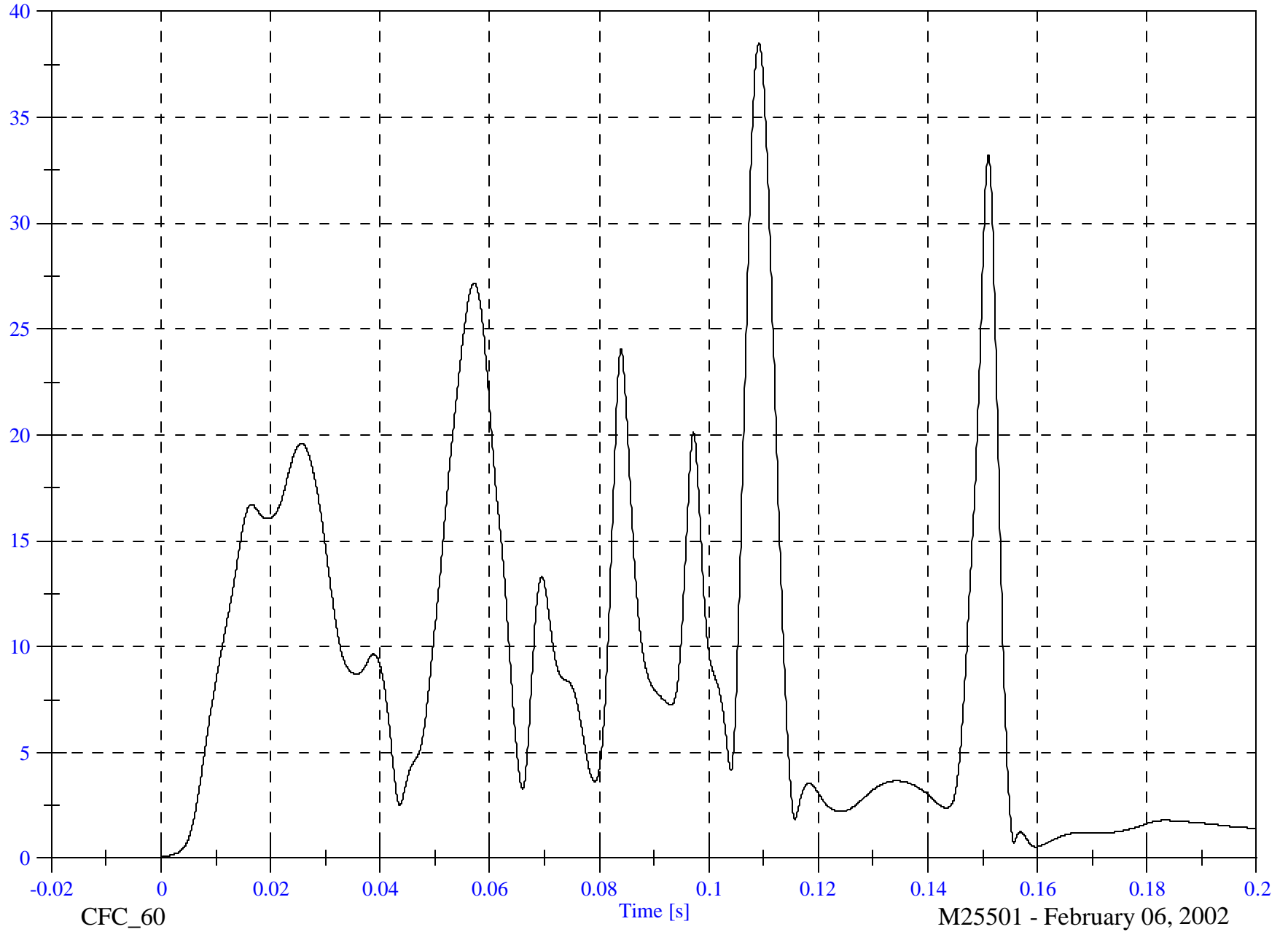
P3 Child Seat Resultant

Max: 38.5 [g] at 0.109 [s]

Min: 0.0 [g] at -0.014 [s]

4-78

g



CFC_60

Time [s]

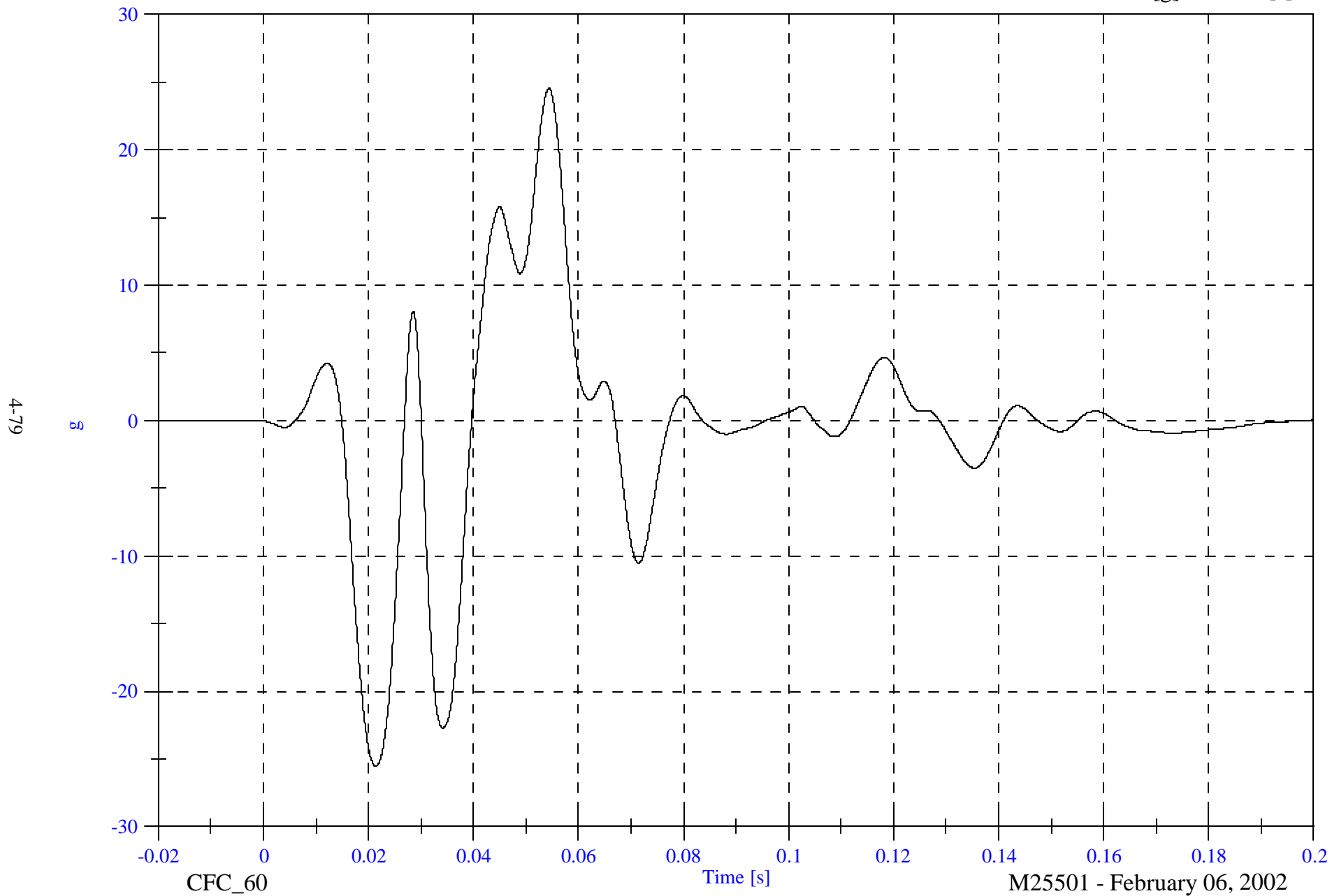
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Child Seat x

Max: 24.5 [g] at 0.054 [s]

Min: -25.5 [g] at 0.021 [s]

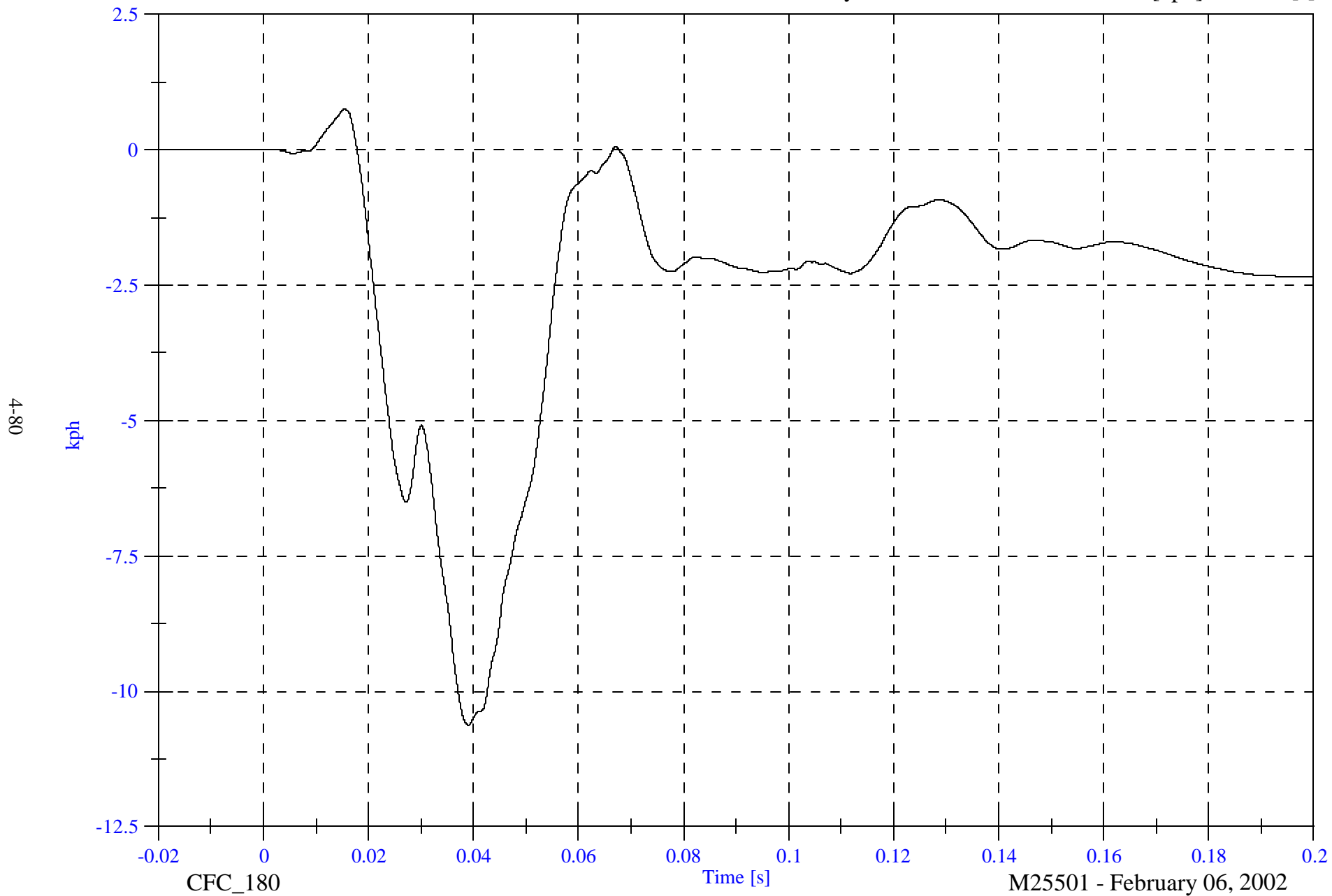


2002 SNCAP Test 2 - 2002 Subaru Impreza

Max: 0.7 [kph] at 0.015 [s]

P4 Child Seat x Velocity

Min: -10.6 [kph] at 0.039 [s]

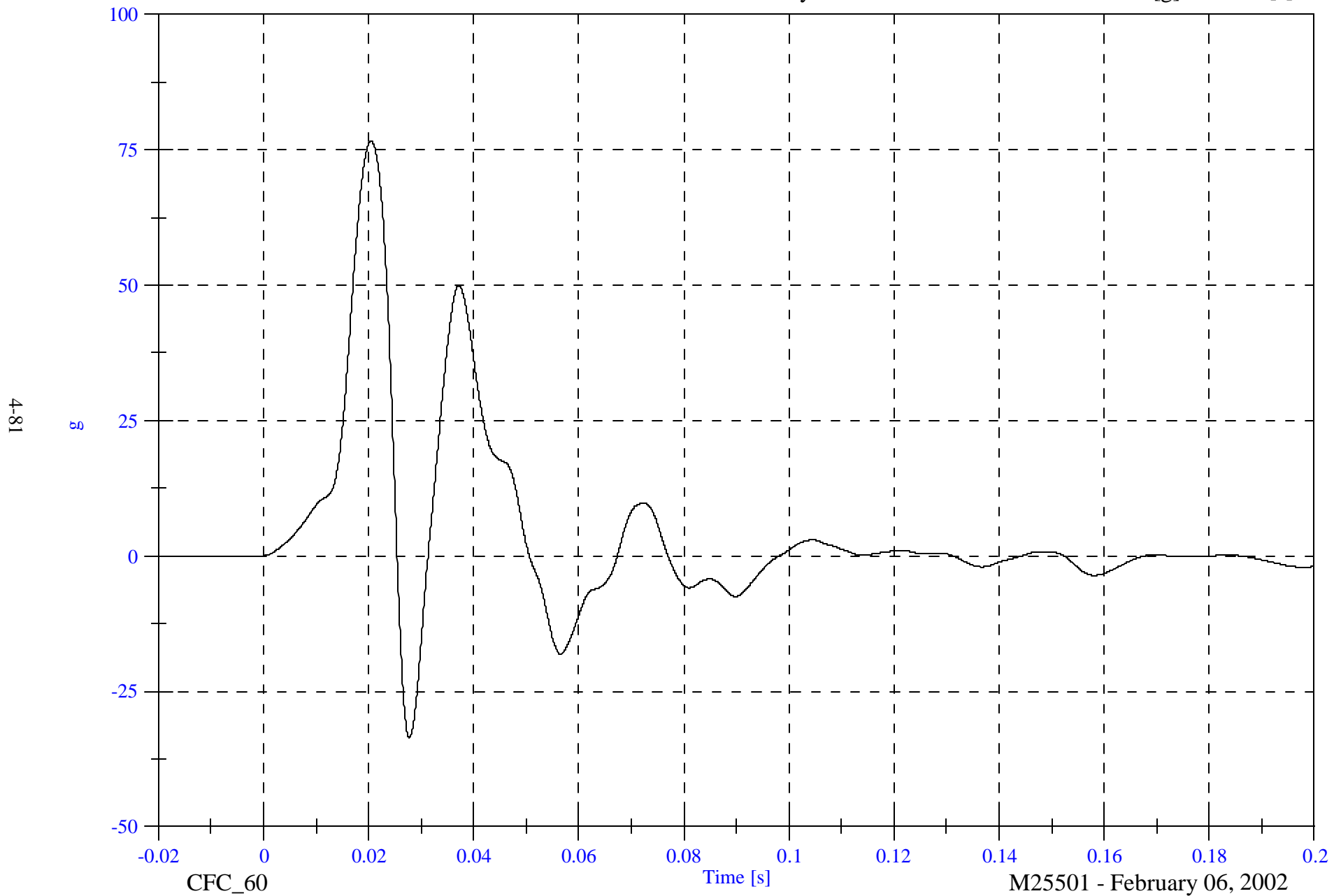


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Child Seat y

Max: 76.6 [g] at 0.020 [s]

Min: -33.5 [g] at 0.028 [s]



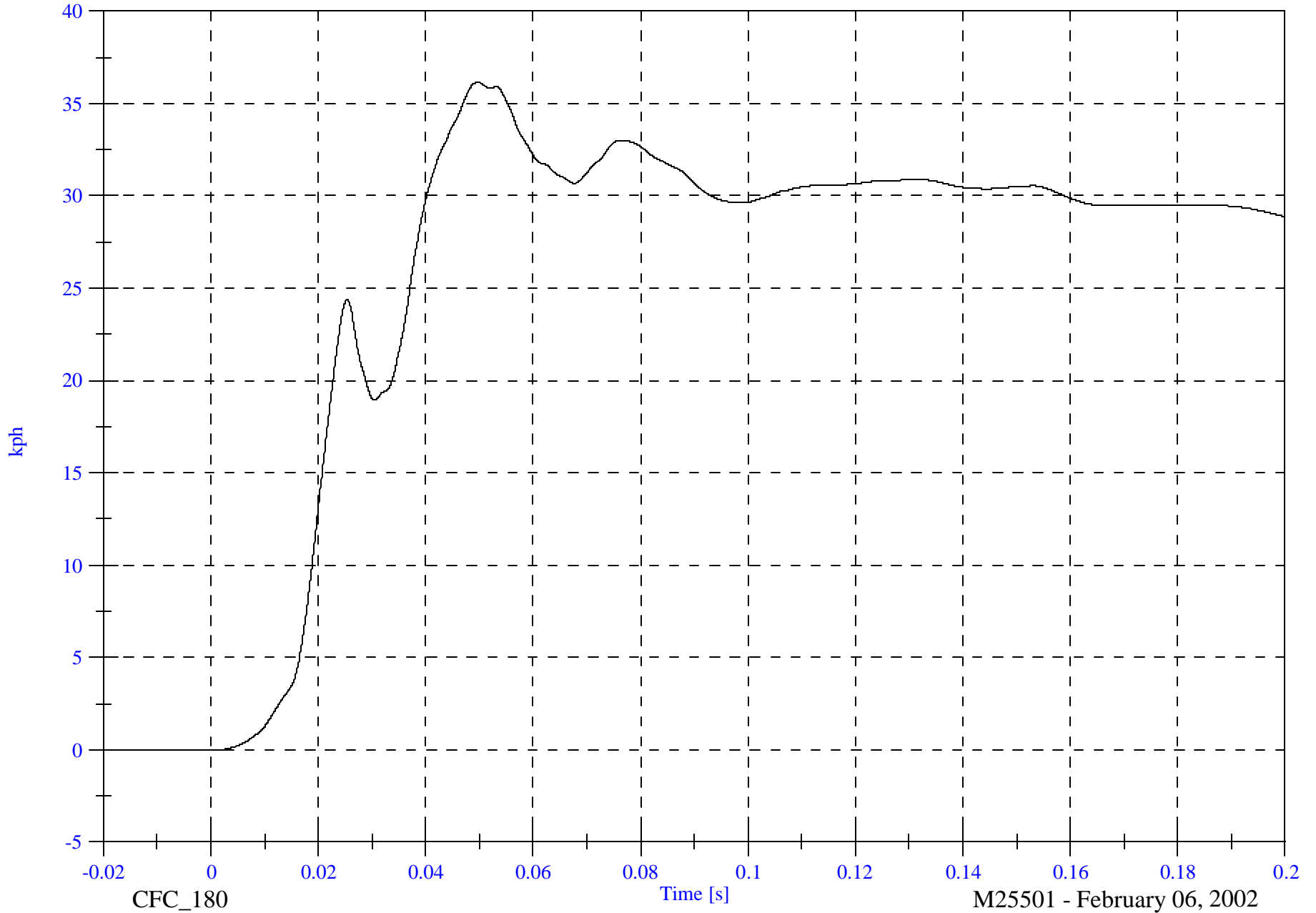
2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Child Seat y Velocity

Max: 36.2 [kph] at 0.050 [s]

Min: -0.0 [kph] at -0.020 [s]

4-82

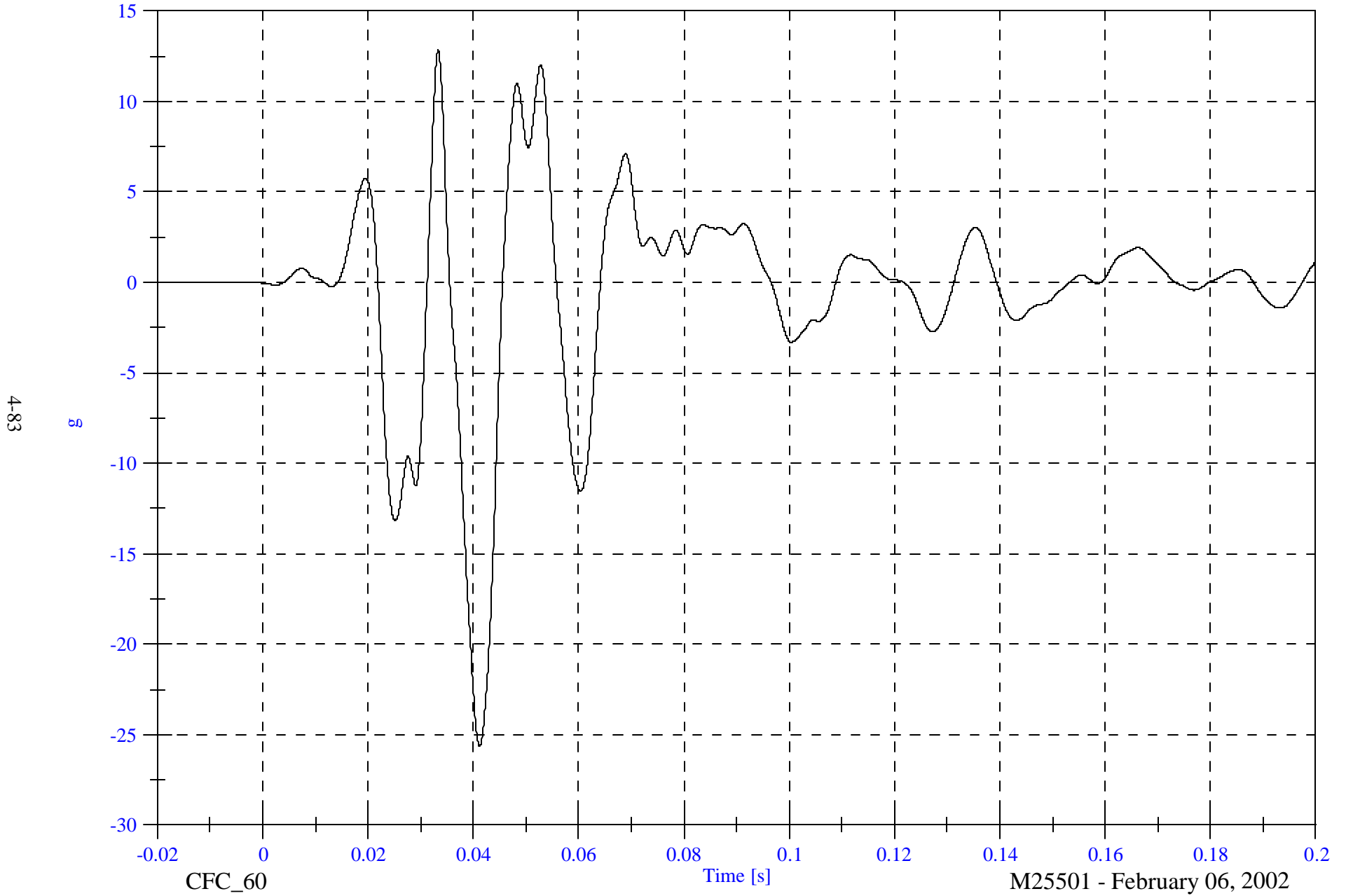


2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Child seat z

Max: 12.8 [g] at 0.033 [s]

Min: -25.7 [g] at 0.041 [s]



2002 SNCAP Test 2 - 2002 Subaru Impreza

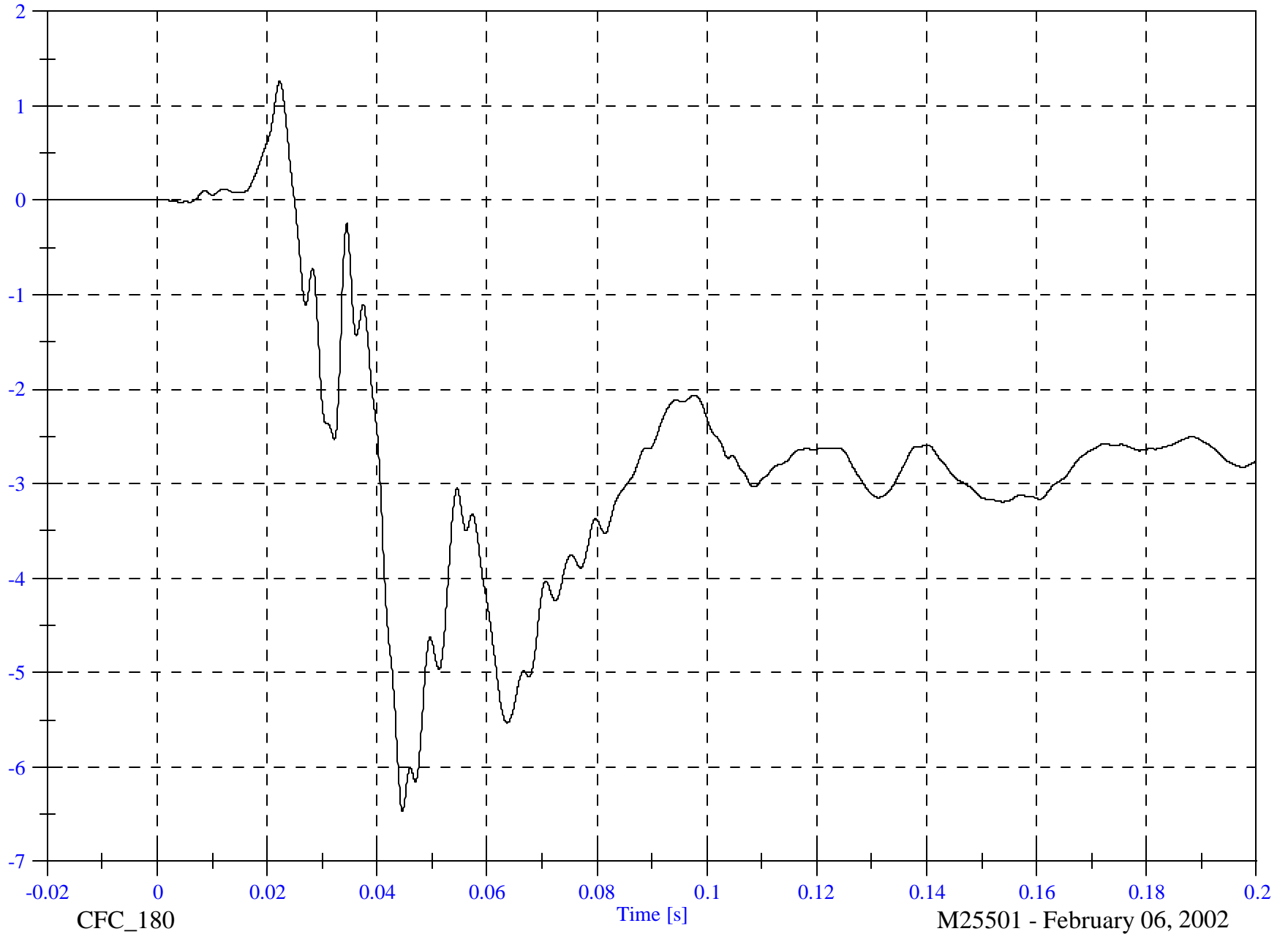
P4 Child seat z Velocity

Max: 1.3 [kph] at 0.022 [s]

Min: -6.5 [kph] at 0.045 [s]

4-84

kph



CFC_180

Time [s]

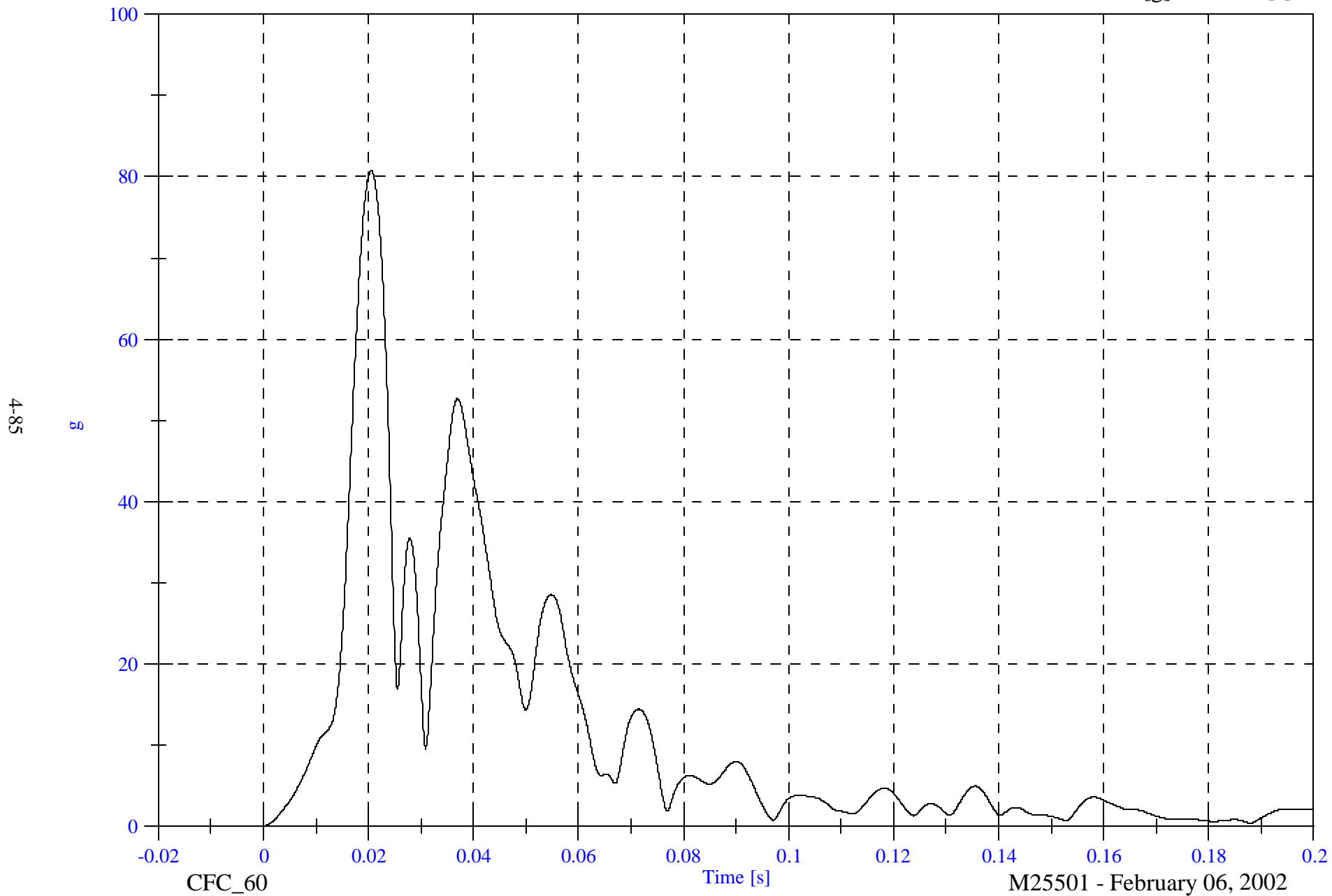
M25501 - February 06, 2002

2002 SNCAP Test 2 - 2002 Subaru Impreza

P4 Child Seat Resultant

Max: 80.7 [g] at 0.021 [s]

Min: 0.0 [g] at -0.005 [s]



SECTION 5

CHILD DUMMY CALIBRATION INFORMATION

Child Dummies were certified by VRTC prior to test program
Certification Information can be found in the bound report

SECTION 6

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

P572C INSTRUMENTATION

| | POSITION #3 (RIGHT) SERIAL NO.: 142 | | |
|----------------------|-------------------------------------|--------------|------------------|
| | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
| HEAD AX | 99108-F29 | ENTRAN | 9-Jan-02 |
| HEAD AY | 99102-F12 | ENTRAN | 9-Jan-02 |
| HEAD AZ | 00L13-F03 | ENTRAN | 9-Jan-02 |
| HEAD RAZ | 98G18-F18 | ENTRAN | 9-Jan-02 |
| UPPER NECK FX | 121-Fx | Denton | 8-Nov-00 |
| UPPER NECK FY | 121-Fy | Denton | 8-Nov-00 |
| UPPER NECK FZ | 121-Fz | Denton | 8-Nov-00 |
| UPPER NECK MX | 121-Mx | Denton | 8-Nov-00 |
| UPPER NECK MY | 121-My | Denton | 8-Nov-00 |
| UPPER NECK MZ | 121-Mz | Denton | 8-Nov-00 |
| LOWER NECK FX | 120-Fx | Denton | 6-Nov-00 |
| LOWER NECK FY | 120-Fy | Denton | 6-Nov-00 |
| LOWER NECK FZ | 120-Fz | Denton | 6-Nov-00 |
| LOWER NECK MX | 120-Mx | Denton | 6-Nov-00 |
| LOWER NECK MY | 120-My | Denton | 6-Nov-00 |
| LOWER NECK MZ | 120-Mz | Denton | 6-Nov-00 |
| CHEST AX | 99H30-Z04 | ENTRAN | 9-Jan-02 |
| CHEST AY | 99108-F28 | ENTRAN | 9-Jan-02 |
| CHEST AZ | 99108-F30 | ENTRAN | 9-Jan-02 |
| CHEST DISPLACEMENT X | 142 | SERVO | 4-Jan-02 |
| PELVIS AX | 99102-F06 | ENTRAN | 9-Jan-02 |
| PELVIS AY | 99102-F15 | ENTRAN | 9-Jan-02 |
| PELVIS AZ | 99G29-Q13 | ENTRAN | 9-Jan-02 |
| TETHER | 706 | LEBOW | 24-Aug-01 |

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

P572C INSTRUMENTATION

| | POSITION #4 (LEFT) SERIAL NO.: 042 | | |
|----------------------|------------------------------------|--------------|------------------|
| | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
| HEAD AX | 98H10-F10 | ENTRAN | 27-Dec-01 |
| HEAD AY | 98H10-F12 | ENTRAN | 26-Dec-01 |
| HEAD AZ | AJ4L1 | ENDEVCO | 27-Dec-01 |
| HEAD RAZ | ADAT0 | ENDEVCO | 27-Dec-01 |
| UPPER NECK FX | 215-Fx | Denton | 5-Jan-02 |
| UPPER NECK FY | 215-Fy | Denton | 5-Jan-02 |
| UPPER NECK FZ | 215-Fz | Denton | 5-Jan-02 |
| UPPER NECK MX | 215-Mx | Denton | 5-Jan-02 |
| UPPER NECK MY | 215-My | Denton | 5-Jan-02 |
| UPPER NECK MZ | 215-Mz | Denton | 5-Jan-02 |
| LOWER NECK FX | 213-FX | Denton | 7-Jan-02 |
| LOWER NECK FY | 213-Fy | Denton | 7-Jan-02 |
| LOWER NECK FZ | 213-Fz | Denton | 7-Jan-02 |
| LOWER NECK MX | 213-Mx | Denton | 7-Jan-02 |
| LOWER NECK MY | 213-My | Denton | 7-Jan-02 |
| LOWER NECK MZ | 213-Mz | Denton | 7-Jan-02 |
| CHEST AX | J19547 | ENDEVCO | 27-Dec-01 |
| CHEST AY | CC92H | ENDEVCO | 27-Dec-01 |
| CHEST AZ | J26976 | ENDEVCO | 27-Dec-01 |
| CHEST DISPLACEMENT X | 42 | SERVO | 4-Jan-02 |
| PELVIS AX | BE95J | ENDEVCO | 27-Dec-01 |
| PELVIS AY | DE54J | ENDEVCO | 27-Dec-01 |
| PELVIS AZ | 99H12-F30 | ENTRAN | 27-Dec-01 |
| TETHER | 635 | LEBOW | 24-Aug-01 |

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

VEHICLE AND MDB INSTRUMENTATION

| VEHICLE AND MDB INSTRUMENTS | | | |
|-------------------------------|---------------|--------------|------------------|
| | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
| RIGHT REAR COMPARTMENT (Y) | J32383 | ENDEVCO | 9/5/01 |
| RIGHT REAR COMPARTMENT (X) | J32787 | ENDEVCO | 8/21/01 |
| RIGHT REAR COMPARTMENT ANGLED | J32098 | ENDEVCO | 9/5/01 |
| P3 CRS (X) | J31009 | ENDEVCO | 9/21/01 |
| P3 CRS (Y) | J31042 | ENDEVCO | 9/21/01 |
| P3 CRS (Z) | J33030 | ENDEVCO | 8/16/01 |
| P4 CRS (X) | P18948 | ENDEVCO | 10/1/01 |
| P4 CRS (Y) | P23471 | ENDEVCO | 10/1/01 |
| P4 CRS (Z) | P22943 | ENDEVCO | 10/1/01 |

REMARKS: None