

REPORT NO. MCW-DOT-04SN08

**NEW CAR ASSESSMENT PROGRAM  
SIDE IMPACT TESTING**

TOYOTA MOTOR CORPORATION  
2004 TOYOTA CAMRY SOLARA 2 DOOR COUPE

NHTSA NUMBER: Y45100

MEDICAL COLLEGE OF WISCONSIN  
5000 WEST NATIONAL AVENUE  
MILWAUKEE, WI 53295



MARCH 30, 2004

FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
RULEMAKING  
OFFICE OF CRASHWORTHINESS STANDARDS  
ROOM 5307, NVS-111  
400 SEVENTH STREET, SW  
WASHINGTON, DC 20590

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# **TECHNICAL REPORT STANDARD TITLE PAGE**

| <b>1. Report No.</b><br>Final Copy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>2. Government Accession No.</b>                         | <b>3. Recipient's Catalog No.</b><br>04SN08                                                                                                                                                                                                                          |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
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| <b>4. Title and Subtitle</b><br>Final Report of New Car Assessment Program Side Impact Test of a 2004 Toyota Camry Solara 2 Door Coupe<br>NHTSA No. Y45100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                            | <b>5. Report Date</b><br>March 30, 2004                                                                                                                                                                                                                              |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
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| <b>7. Author(s)</b><br>John Humm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                            | <b>8. Performing Organization Report No.</b><br>04SN08                                                                                                                                                                                                               |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
| <b>9. Performing Organization Name and Address</b><br>Medical College of Wisconsin<br>5000 W. National Avenue<br>Milwaukee, WI 53295                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                            | <b>10. Work Unit No.</b>                                                                                                                                                                                                                                             |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
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| <b>12. Sponsoring Agency Name and Address</b><br>U.S. Department of Transportation<br>National Highway Traffic Safety Administration<br>Rulemaking<br>Office of Crashworthiness Standards<br>Room 5307, NVS-111<br>400 Seventh Street, SW<br>Washington, DC 20590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                            | <b>13. Type of Report and Period Covered</b>                                                                                                                                                                                                                         |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
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| <b>15. Supplementary Notes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                            |                                                                                                                                                                                                                                                                      |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
| <b>16. Abstract</b><br><p>A 55/28 km/h 90° Impact Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2004 Toyota Camry Solara 2 Door Coupe in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for generation of consumer information on vehicle side crash protection. This test was conducted at the Medical College of Wisconsin Vehicle Crashworthiness Lab in Milwaukee, Wisconsin, on March 30, 2004.</p> <p>The impact velocity of the Moving Deformable Barrier (MDB) was 62.10 km/h, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 21.4° C. The target vehicle post-test maximum crush was 312 mm at Level 3. The test vehicle's performance follows:</p> <table border="1"> <thead> <tr> <th></th><th><u><b>DRIVER</b></u></th><th><u><b>PASSENGER</b></u></th></tr> </thead> <tbody> <tr> <td><b>Left Upper Rib Acceleration G</b></td><td>59.6</td><td>45.0</td></tr> <tr> <td><b>Left Lower Rib Acceleration G</b></td><td>58.5</td><td>54.3</td></tr> <tr> <td><b>Lower Spine Acceleration G</b></td><td>53.8</td><td>51.3</td></tr> <tr> <td><b>Thoracic Trauma Index TTI</b></td><td>57</td><td>53</td></tr> <tr> <td><b>Pelvis Acceleration G</b></td><td>80</td><td>68</td></tr> </tbody> </table> <p>The 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><b>DRIVER</b></u> | <u><b>PASSENGER</b></u> | <b>Left Upper Rib Acceleration G</b> | 59.6 | 45.0 | <b>Left Lower Rib Acceleration G</b> | 58.5 | 54.3 | <b>Lower Spine Acceleration G</b> | 53.8 | 51.3 | <b>Thoracic Trauma Index TTI</b> | 57 | 53 | <b>Pelvis Acceleration G</b> | 80 | 68 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <u><b>DRIVER</b></u>                                       | <u><b>PASSENGER</b></u>                                                                                                                                                                                                                                              |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
| <b>Left Upper Rib Acceleration G</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 59.6                                                       | 45.0                                                                                                                                                                                                                                                                 |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
| <b>Left Lower Rib Acceleration G</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 58.5                                                       | 54.3                                                                                                                                                                                                                                                                 |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
| <b>Lower Spine Acceleration G</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 53.8                                                       | 51.3                                                                                                                                                                                                                                                                 |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
| <b>Thoracic Trauma Index TTI</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 57                                                         | 53                                                                                                                                                                                                                                                                   |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
| <b>Pelvis Acceleration G</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 80                                                         | 68                                                                                                                                                                                                                                                                   |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
| <b>17. Key Words</b><br>New Car Assessment Program (NCAP)<br>Side Impact<br>MDB<br>Side Impact Dummy (SID H3)<br>NHTSA No. Y45100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                            | <b>18. Distribution Statement</b><br><u>Copies of this report are available from:</u><br>National Highway Traffic Safety Administration<br>Rulemaking<br>Office of Crashworthiness Standards<br>Room 5307, NVS-111<br>400 Seventh Street, SW<br>Washington, DC 20590 |                  |  |                      |                         |                                      |      |      |                                      |      |      |                                   |      |      |                                  |    |    |                              |    |    |
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**SECTION 1****PURPOSE AND TEST PROCEDURE**

This side impact test was part of the FY04 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-01-D-02003. The purpose of this test was to evaluate side impact protection of a 2004 Toyota Camry Solara 2 Door Coupe. This side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated November 2002.

The Medical College of Wisconsin does not endorse or certify products. The manufacturer's name appears solely for identification purposes only.

## SECTION 2

### SUMMARY OF SIDE IMPACT TEST

A 2004 Toyota Camry Solara 2 Door Coupe was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) that was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.10 km/h (38.59 mph). The target vehicle was stationary and positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Medical College of Wisconsin in Milwaukee, Wisconsin, on March 30, 2004.

Two restrained Side Impact Hybrid III Dummies (SID H3's) were placed in the driver and left rear designated seating positions, according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated November 2002. The side impact event was documented by nine high-speed video cameras and one real-time camera. Camera locations and other pertinent camera information can be found in this report.

The SID H3s were instrumented with the following accelerometers.

1. Left Upper Rib (LUR) Primary and Redundant uniaxial accelerometers (Y-direction)
2. Left Lower Rib (LLR) Primary and Redundant uniaxial accelerometers (Y-direction)
3. Lower Thoracic Spine (T<sub>12</sub>) Primary and Redundant uniaxial accelerometers (Y-direction)
4. Pelvic (PEV) section Primary and Redundant uniaxial accelerometers (Y-direction)
5. Head Center of Gravity triaxial accelerometers (X-, Y-, and Z-direction)
6. Upper Neck (NKU) six axis load cell (Fx, Fy, Fz, Mx, My, and Mz)

Pre- and post-test photographs of the test vehicle, the MDB, and the side impact dummies (SID H3s) are included in Appendix A. Appendix B contains the vehicle, MDB, and dummy response data traces. A summary of the side impact dummy configuration and performance verification test data is shown in Appendix C. Dummy and vehicle calibration data can be found in Appendix D of this report.

The following table summarizes the results of this test.

| Injury Criteria | Front SID H3 | Rear SID H3 |
|-----------------|--------------|-------------|
| TTI (G)         | 57           | 53          |
| PELVIS (G)      | 80           | 68          |
| HIC36           | 155.8        | 674.2       |

The vehicle's airbag information is summarized in the following table

|                     | Frontal            | Side-Torso      | Side-Torso/Head | Side-Head |
|---------------------|--------------------|-----------------|-----------------|-----------|
| Driver              | Yes-Steering wheel | Yes – Seat back | None            | None      |
| Front Passenger     | Yes- Dashboard     | Yes – Seat back | None            | None      |
| Left Rear Passenger | None               | None            | None            | None      |

**SECTION 3**  
**SUMMARY OF TEST RESULTS**

**DATA SHEET NO. 1****GENERAL VEHICLE TEST PARAMETER DATA**TEST VEHICLE INFORMATION

|                               |                         |                                       |                         |                        |  |
|-------------------------------|-------------------------|---------------------------------------|-------------------------|------------------------|--|
| Year/ Make/ Model/ Body Style |                         | 2004 Toyota Camry Solara 2 Door Coupe |                         |                        |  |
| Vehicle NHTSA NO.             |                         | Y45100                                | VIN                     | 4T1CE38P34U813957      |  |
| Vehicle Body Color            |                         | Desert Sand                           | Build Date              | October 2003           |  |
| Engine Data                   | <u>4</u> Cylinders      | CID                                   | <u>2.4</u> Liter        | <u>cc</u>              |  |
| Placement                     | <u>Longitudinal</u>     | <u>X</u> Lateral                      |                         |                        |  |
| Transmission                  | <u>4</u> Speed          | <u>Manual</u>                         | <u>X</u> Automatic      | <u>X</u> Overdrive     |  |
| Final Drive                   | <u>Rear Wheel Drive</u> | <u>X</u> Front Wheel Drive            | <u>Four Wheel Drive</u> |                        |  |
| Odometer Reading              | <u>57 Miles</u>         | Date                                  | <u>March 16, 2004</u>   |                        |  |
| Options                       | <u>X</u> A/C            | <u>X</u> Power Steering               | <u>X</u> Power Brakes   | <u>X</u> Power Windows |  |
|                               | <u>X</u> Cruise Control | <u>X</u> Tilt Wheel                   | <u>X</u> Power Locks    | <u>ADL's</u>           |  |

DATA FROM TIRE PLACARD:

|                             |                                                   |
|-----------------------------|---------------------------------------------------|
| Tire Pressure (at Capacity) | <u>29</u> PSI Front                               |
|                             | <u>29</u> PSI Rear                                |
| Recommended Tire Size       | <u>P215 60R16</u>                                 |
| Tires on Test Vehicle       | <u>P215 60R16</u> Manufacturer <u>Bridgestone</u> |

TEST VEHICLE AIRBAG INFORMATION:

|                     | <u>Frontal</u>     | <u>Side-Torso</u> | <u>Side-Torso/Head</u> | <u>Side-Head</u> |
|---------------------|--------------------|-------------------|------------------------|------------------|
| Driver              | Yes-Steering wheel | Yes – Seat back   | None                   | None             |
| Front Passenger     | Yes- Dashboard     | Yes – Seat back   | None                   | None             |
| Left Rear Passenger | None               | None              | None                   | None             |

VEHICLE CAPACITY DATA:

|                              |                 |                        |                            |                |
|------------------------------|-----------------|------------------------|----------------------------|----------------|
| Number of Occupants:         | <u>2</u> Front  | <u>3</u> Rear          | <u>3<sup>rd</sup></u> Seat | <u>5</u> Total |
| Type of Front Seats          | <u>X</u> Bucket | <u>Bench</u>           | <u>Split Bench</u>         |                |
| Type of Front Seat Back      | <u>Fixed</u>    | <u>X</u> Adjustable w/ | <u>X</u> Lever             | <u>X</u> Knob  |
| Vehicle Max Capacity Loading | <u>408.2</u> kg |                        | (A)                        |                |
| No. of Occupants X 68.04 kg  | <u>340.2</u> kg |                        | (B)                        |                |
| Cargo Capacity (A) – (B)     | <u>68.0</u> kg  |                        |                            |                |

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

|                |   |                  |               |   |                 |
|----------------|---|------------------|---------------|---|-----------------|
| Left Front     | = | <u>445.9</u> kg  | Left Rear     | = | <u>278.1</u> kg |
| Right Front    | = | <u>426.8</u> kg  | Right Rear    | = | <u>282.6</u> kg |
| TOTAL FRONT    | = | <u>872.7</u> kg  | TOTAL REAR    | = | <u>560.7</u> kg |
| % Total Weight | = | <u>60.9</u> %    | %Total Weight | = | <u>39.1</u> %   |
| TOTAL WEIGHT   | = | <u>1433.4</u> kg |               |   |                 |

**DATA SHEET 1 (continued)****GENERAL VEHICLE TEST PARAMETER DATA**CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

|                                                     |   |               |    |         |
|-----------------------------------------------------|---|---------------|----|---------|
| Total Test Vehicle Delivered Weight with Max Fluids | = | <u>1433.4</u> | kg | (A)     |
| Maximum Cargo Carrying Capacity of Test Vehicle     | = | <u>68.0</u>   | kg | (B)     |
| Weight of (2) instrumented Side Impact Dummies      | = | <u>161.5</u>  | kg | (C)     |
| TEST VEHICLE TARGET WEIGHT                          | = | <u>1662.9</u> | kg | (A+B+C) |

FULLY LOADED TEST VEHICLE (UDVW + 1 OR 2 SID H3(s) + CARGO)

|                |   |               |    |               |   |              |    |
|----------------|---|---------------|----|---------------|---|--------------|----|
| Left Front     | = | <u>492.4</u>  | kg | Left Rear     | = | <u>385.3</u> | kg |
| Right Front    | = | <u>427.3</u>  | kg | Right Rear    | = | <u>357.9</u> | kg |
| TOTAL FRONT    | = | <u>919.7</u>  | kg | TOTAL REAR    | = | <u>743.2</u> | kg |
| % Total Weight | = | <u>56.4</u>   | %  | %Total Weight | = | <u>43.6</u>  | %  |
| TOTAL WEIGHT   | = | <u>1662.9</u> | kg |               |   |              |    |

AS TESTED WEIGHT OF TEST VEHICLE (UDVW+ SID H3(s)+CARGO+EQUIPMENT & INSTRUMENTATION)

|                |   |               |    |               |   |              |    |
|----------------|---|---------------|----|---------------|---|--------------|----|
| Left Front     | = | <u>485.8</u>  | kg | Left Rear     | = | <u>381.0</u> | kg |
| Right Front    | = | <u>447.7</u>  | kg | Right Rear    | = | <u>341.6</u> | kg |
| TOTAL FRONT    | = | <u>933.5</u>  | kg | TOTAL REAR    | = | <u>722.6</u> | kg |
| % Total Weight | = | <u>56.4</u>   | %  | %Total Weight | = | <u>43.6</u>  | %  |
| TOTAL WEIGHT   | = | <u>1656.1</u> | kg |               |   |              |    |

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

## AS DELIVERED

|            |            |             |            |           |            |            |            |
|------------|------------|-------------|------------|-----------|------------|------------|------------|
| Left Front | <u>731</u> | Right Front | <u>728</u> | Left Rear | <u>753</u> | Right Rear | <u>756</u> |
|------------|------------|-------------|------------|-----------|------------|------------|------------|

## FULLY LOADED

|            |            |             |            |           |            |            |            |
|------------|------------|-------------|------------|-----------|------------|------------|------------|
| Left Front | <u>707</u> | Right Front | <u>713</u> | Left Rear | <u>706</u> | Right Rear | <u>713</u> |
|------------|------------|-------------|------------|-----------|------------|------------|------------|

## AS TESTED

|            |            |             |            |           |            |            |            |
|------------|------------|-------------|------------|-----------|------------|------------|------------|
| Left Front | <u>714</u> | Right Front | <u>719</u> | Left Rear | <u>708</u> | Right Rear | <u>718</u> |
|------------|------------|-------------|------------|-----------|------------|------------|------------|

Test Vehicle Wheelbase 2708 mm

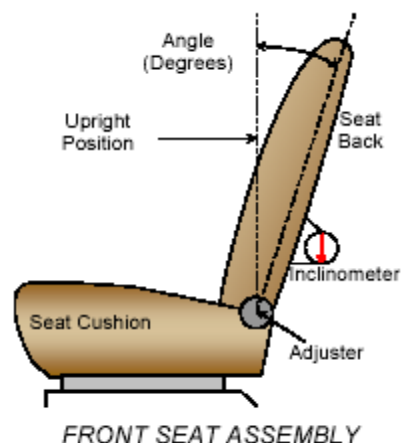
As Tested CG = 1183 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

|            |   |             |    |
|------------|---|-------------|----|
| Right Side | = | <u>4455</u> | mm |
| Left Side  | = | <u>4455</u> | mm |
| Centerline | = | <u>4893</u> | mm |

**DATA SHEET 1 (continued)****GENERAL TEST VEHICLE PARAMETER DATA**

Nominal Design Riding Position for adjustable driver and passenger seats. Please describe how to position the inclinometer to measure the seat back angle. Include a description of the adjustment latch detent if applicable

FRONT SEAT CUSHION PLACEMENT:

|                                   |           |               |                                                    |
|-----------------------------------|-----------|---------------|----------------------------------------------------|
| Total Length of Adjustment Travel |           |               | <u>240 mm</u>                                      |
| Total Number of Detents           | <u>17</u> | Test Position | <u>9th detent from full forward (Mid Position)</u> |

FRONT SEAT BACK ADJUSTMENT:

|                 |                                         |
|-----------------|-----------------------------------------|
| Seat Back Angle | <u>5th notch (8° from full upright)</u> |
|-----------------|-----------------------------------------|

REAR SEAT POSITION:

|                                  |            |
|----------------------------------|------------|
| Total Length Fore/Aft Adjustment | <u>N/A</u> |
| Seat Back Adjustment Position    | <u>N/A</u> |

ADJUSTABLE STEERING COLUMN POSITION:

|                     |
|---------------------|
| <u>Mid position</u> |
|---------------------|

WINDOW POSITIONS:

|            |           |             |                |
|------------|-----------|-------------|----------------|
| Left Front | <u>Up</u> | Right Front | <u>Down</u>    |
| Left Rear  | <u>Up</u> | Right Rear  | <u>Removed</u> |

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

|                             |               |                            |
|-----------------------------|---------------|----------------------------|
| Fuel System usable Capacity | <u>70.0 L</u> |                            |
| Test Volume                 | <u>65.1 L</u> | <u>93% usable capacity</u> |

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

|                        |                        |                          |
|------------------------|------------------------|--------------------------|
| Wheelbase              | <u>2708 mm</u>         |                          |
| Impact Point is        | <u>414 mm rearward</u> | of front axle centerline |
| Actual Impact Point is | <u>400 mm rearward</u> | of front axle centerline |



## DATA SHEET 2

### TEST VEHICLE SUMMARY

VEHICLE IDENTIFICATION:

|                            |                                       |               |                   |
|----------------------------|---------------------------------------|---------------|-------------------|
| Year/Make/Model/Body Style | 2004 Toyota Camry Solara 2 Door Coupe |               |                   |
| Body Color                 | Desert Sand                           | VIN           | 4T1CE38P34U813957 |
| NHTSA No.                  | Y45100                                | Test Date     | March 30, 2004    |
| Overall Length             | 4893 mm                               | Overall Width | 1804 mm           |

VEHICLE TEST WEIGHT (Pre-Test):

|                                           |   |               |    |               |   |                |    |
|-------------------------------------------|---|---------------|----|---------------|---|----------------|----|
| Left Front                                | = | <u>485.8</u>  | kg | Left Rear     | = | <u>381.0</u>   | kg |
| Right Front                               | = | <u>447.7</u>  | kg | Right Rear    | = | <u>341.6</u>   | kg |
| TOTAL FRONT                               | = | <u>933.5</u>  | kg | TOTAL REAR    | = | <u>722.6</u>   | kg |
| % Total Weight                            | = | <u>56.6</u>   | %  | %Total Weight | = | <u>43.7</u>    | %  |
| TOTAL WEIGHT                              | = | <u>1656.1</u> | kg |               |   |                |    |
| Wheelbase                                 |   |               |    | =             |   | <u>2708 mm</u> |    |
| Longitudinal CG from Center of Front Axle |   |               |    | =             |   | <u>1183 mm</u> |    |
| Impact Angle with Respect to Impactor     |   |               |    | =             |   | <u>90°</u>     |    |

ACTUAL IMPACT POINT

Actual Impact Point is 14 mm forward and 2 mm below nominal impact point

MAXIMUM EXTERIOR STATIC CRUSH:

|            |                        |   |            |    |
|------------|------------------------|---|------------|----|
| 1. LEVEL 1 | (257 mm above ground)  | = | <u>51</u>  | mm |
| 2. LEVEL 2 | (488 mm above ground)  | = | <u>296</u> | mm |
| 3. LEVEL 3 | (611 mm above ground)  | = | <u>312</u> | mm |
| 4. LEVEL 4 | (954 mm above ground)  | = | <u>181</u> | mm |
| 5. LEVEL 5 | (1343 mm above ground) | = | <u>77</u>  | mm |

Maximum Post-Test intrusion at Level 3 is 312 mm

OCCUPANTS

|                      |                                       |                            |
|----------------------|---------------------------------------|----------------------------|
|                      | <u>Left Front Passenger</u>           | <u>Left Rear Passenger</u> |
| Dummy Identification | <u>SIDH3/056</u>                      | <u>SIDH3/058</u>           |
| Restraints Used      | <u>3 Point Belt</u>                   | <u>3 Point Belt</u>        |
|                      | <u>Seat back mounted side air bag</u> |                            |

INSTRUMENTATION:

|                                 |           |
|---------------------------------|-----------|
| Number of Vehicle Data Channels | <u>23</u> |
| Number of Cameras               | <u>3</u>  |
| Onboard                         | <u>4</u>  |
| Off board                       | <u>2</u>  |
| MDB                             | <u>1</u>  |
| Real Time                       | <u>10</u> |
| TOTAL                           |           |

**DATA SHEET NO. 3****MOVING DEFORMABLE BARRIER (MDB) SUMMARY**MDB FACE MANUFACTURER AND SERIAL NUMBER:

Plascore Serial Number 016A0303-013C0203

---

POSITION OF IMPACT (MDB) ON TOW SYSTEM

Crabbed 27° to the left

---

MDB DETAILS:

|                                                     |   |         |
|-----------------------------------------------------|---|---------|
| Overall Width of Framework Carriage                 | = | 1250 mm |
| Overall Length of MDB (incl. honeycomb impact face) | = | 4116 mm |
| Wheelbase of Framework Carriage                     | = | 2578 mm |
| Tread of Framework Carriage (Front & Rear)          | = | 1880 mm |
| C.G. Location Rearward of Front Axle                | = | 1135 mm |
| C.G. Location From Center Line                      | = | -10 mm  |
| C.G. Location Above Ground Level                    | = | 480 mm  |

MDB WEIGHT:

|                |   |        |    |               |   |       |    |
|----------------|---|--------|----|---------------|---|-------|----|
| Left Front     | = | 458.0  | kg | Left Rear     | = | 228.9 | kg |
| Right Front    | = | 307.2  | kg | Right Rear    | = | 365.6 | kg |
| TOTAL FRONT    | = | 765.2  | kg | TOTAL REAR    | = | 594.5 | kg |
| % Total Weight | = | 56.3   | %  | %Total Weight | = | 43.7  | %  |
| TOTAL WEIGHT   | = | 1359.7 | kg |               |   |       |    |

MDB IMPACT:

|                                          |           |            |           |
|------------------------------------------|-----------|------------|-----------|
| Impact Angle (MDB C/L to Target Vehicle) |           | 270°       |           |
| Impact Speed                             | Primary   | 62.10 km/h | 38.59 mph |
|                                          | Secondary | 61.91 km/h | 38.47 mph |

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

|                           |   |     |    |
|---------------------------|---|-----|----|
| 1. Row A Center of Bumper | = | 184 | mm |
| 2. Row B Top of Bumper    | = | 91  | mm |
| 3. Row C Mid-Level        | = | 97  | mm |
| 4. Row D Top of Stack     | = | 135 | mm |

INSTRUMENTATION:

|                             |   |   |
|-----------------------------|---|---|
| Number of MDB Data Channels | = | 5 |
|-----------------------------|---|---|

**DATA SHEET NO. 4****POST-TEST OBSERVATIONS**VISIBLE DUMMY CONTACT POINTS

|             | <u>LEFT FRONT SID H3</u>                                                       | <u>LEFT REAR SID H3</u>                               |
|-------------|--------------------------------------------------------------------------------|-------------------------------------------------------|
| Head        | Back of head to head rest; top of head to left front door panel at window sill | Side of head to C-Pillar                              |
| Upper Torso | To side airbag                                                                 | To left rear interior panel ~150 mm below window sill |
| Lower Torso | To side airbag                                                                 | To left rear interior panel ~100 mm above arm rest    |
| Left Knee   | To left front door panel ~150 mm below arm rest                                | To left rear interior panel ~90 mm below arm rest     |
| Left Leg    | To left front door panel ~110 mm below arm rest                                | To left rear arm rest near B-Pillar                   |

DOOR OPENING

|       | <u>LEFT DOOR</u>          | <u>RIGHT DOOR</u>       |
|-------|---------------------------|-------------------------|
| Front | Closed/latched/inoperable | Closed/latched/operable |
| Rear  | N/A                       | N/A                     |

MDB DISTANCE FROM TARGET IMPACT POINT

|            |            |          |               |
|------------|------------|----------|---------------|
| Horizontal | 2 mm below | Vertical | 14 mm forward |
|------------|------------|----------|---------------|

ARM REST LOCATIONS

|       |                          |
|-------|--------------------------|
| Front | 285 mm below window sill |
| Rear  | 355 mm below window sill |

SEAT MOVEMENT

|       |                                           |
|-------|-------------------------------------------|
| Front | ~65 mm seat crush; ~65 mm seat back crush |
| Rear  | ~85 mm seat crush; ~50 mm seat back crush |

GLAZING DAMAGE

|            |                                       |
|------------|---------------------------------------|
| Windshield | None                                  |
| Window     | Left front window shattered on impact |

PILLAR PERFORMANCE:

|            |
|------------|
| None noted |
|------------|

SILL SEPARATION

|            |
|------------|
| None noted |
|------------|

DOOR LOCK INFORMATION

Test vehicle was not equipped with Automatic Door Locks as standard equipment.

|                 |          |                  |          |
|-----------------|----------|------------------|----------|
| LEFT FRONT DOOR | Unlocked | RIGHT FRONT DOOR | Unlocked |
| LEFT REAR DOOR  | Unlocked | RIGHT REAR DOOR  | Unlocked |

AIRBAG DEPLOYMENT STATUS

|       | DRIVER         | FRONT PASSENGER | REAR PASSENGER |
|-------|----------------|-----------------|----------------|
| FRONT | Did not deploy | Did not deploy  | N/A            |
| SIDE  | Deployed       | Did not deploy  | N/A            |

OTHER NOTABLE IMPACT EFFECTS

|      |
|------|
| None |
|------|

**SECTION 4**  
**OCCUPANT AND VEHICLE INFORMATION**

**DATA SHEET 5****SID H3 INSTRUMENTATION DATA**

|                                     | Front Dummy SID H3/056<br>Accelerations |       |       |       | Rear Dummy SID H3/058<br>Accelerations |       |       |       |
|-------------------------------------|-----------------------------------------|-------|-------|-------|----------------------------------------|-------|-------|-------|
|                                     | Max                                     |       | Min   |       | Max                                    |       | Min   |       |
|                                     | G's                                     | msec  | G's   | msec  | G's                                    | msec  | G's   | msec  |
| HEAD ACCELERATIONS                  |                                         |       |       |       |                                        |       |       |       |
| Longitudinal (X)                    | 6.2                                     | 198.1 | -15.8 | 81.8  | 9.0                                    | 194.6 | -18.5 | 51.3  |
| Lateral (Y)                         | 15.1                                    | 81.1  | -3.7  | 199.0 | 134.8                                  | 52.6  | -9.6  | 197.1 |
| Vertical (Z)                        | 38.0                                    | 51.4  | -1.2  | 106.7 | 16.1                                   | 42.4  | -36.1 | 59.2  |
| Resultant (R)                       | 41.6                                    | 54.4  |       |       | 135.6                                  | 52.6  |       |       |
| HIC36                               | 155.8                                   |       |       |       | 674.2                                  |       |       |       |
| RIB ACCELERATIONS                   |                                         |       |       |       |                                        |       |       |       |
| Upper Rib Lateral (Y)               | 59.6                                    | 34.4  | -11.4 | 54.4  | 45.0                                   | 38.8  | -4.2  | 171.3 |
| Upper Rib Lateral (Y <sub>R</sub> ) | 60.8                                    | 34.4  | -11.9 | 54.4  | 44.7                                   | 38.8  | -4.2  | 162.5 |
| Lower Rib Lateral (Y)               | 58.5                                    | 34.4  | -6.4  | 93.1  | 54.3                                   | 40.0  | -3.8  | 163.1 |
| Lower Rib Lateral (Y <sub>R</sub> ) | 60.1                                    | 34.4  | -9.1  | 93.1  | 53.7                                   | 40.0  | -3.7  | 163.8 |
| SPINE ACCELERATIONS                 |                                         |       |       |       |                                        |       |       |       |
| Lower Lateral (Y)                   | 53.8                                    | 38.1  | -7.1  | 98.1  | 51.3                                   | 42.5  | -3.1  | 72.5  |
| Lower Lateral (Y <sub>R</sub> )     | 53.1                                    | 38.1  | -7.0  | 98.8  | 50.3                                   | 42.5  | -3.3  | 71.9  |
| TTI                                 | 57                                      |       |       |       | 53                                     |       |       |       |
| PELVIS ACCELERATIONS                |                                         |       |       |       |                                        |       |       |       |
| Lateral (Y)                         | 80.4                                    | 30.6  | -6.8  | 121.9 | 68.3                                   | 36.3  | -6.0  | 64.4  |
| Lateral (Y <sub>R</sub> )           | 80.6                                    | 30.6  | -6.8  | 121.9 | 68.1                                   | 36.3  | -6.4  | 64.4  |

**REFERENCE:**

|                      |                    |                  |
|----------------------|--------------------|------------------|
| Positive Direction - | Anterior/Posterior | +(X) = anterior  |
|                      | Lateral            | +(Y)= right      |
|                      | Superior/Inferior  | +(Z)= inferior   |
| Negative Direction   | Anterior/Posterior | -(X) = posterior |
|                      | Lateral            | -(Y)= left       |
|                      | Superior/Inferior  | -(Z)= superior   |

All the above data (except head accelerations) has been filtered using FIR (Version 1.0; July 16, 1990)

Head Accelerations have been filtered at SAE Class 1000

Y<sub>R</sub> denotes redundant Y-direction accelerometer

**DATA SHEET 5 (continued)****SID H3 INSTRUMENTATION DATA**

|                       | Front Dummy SID H3/056 |      |        |       | Rear Dummy SID H3/058 |       |         |       |
|-----------------------|------------------------|------|--------|-------|-----------------------|-------|---------|-------|
|                       | Max                    |      | Min    |       | Max                   |       | Min     |       |
|                       | N                      | msec | N      | msec  | N                     | msec  | N       | msec  |
| <b>NECK FORCES</b>    |                        |      |        |       |                       |       |         |       |
| Longitudinal (X)      | 33.0                   | 34.6 | -615.9 | 57.9  | 345.0                 | 59.6  | -82.5   | 199.9 |
| Lateral (Y)           | 499.0                  | 45.8 | -73.3  | 199.6 | 256.5                 | 52.6  | -927.8  | 59.8  |
| Vertical (Z)          | 1702.0                 | 54.2 | -38.3  | 102.3 | 665.2                 | 48.9  | -1136.8 | 59.7  |
| <b>NECK MOMENTS</b>   |                        |      |        |       |                       |       |         |       |
|                       | Nm                     | msec | Nm     | msec  | Nm                    | msec  | Nm      | msec  |
| Lateral Bending (X)   | 54.1                   | 69.9 | -26.9  | 42.1  | 17.4                  | 138.1 | -163.9  | 53.3  |
| Flexion/Extension (Y) | 23.0                   | 89.3 | -26.4  | 52.1  | 7.9                   | 112.2 | -16.2   | 199.7 |
| Rotation (Z)          | 16.3                   | 86.6 | -7.8   | 199.7 | 15.0                  | 83.0  | -17.9   | 54.5  |

**REFERENCE:**

*Upper neck load cell polarity follows the dummy manipulation table A-1 in the NHTSA Test Reference Guide version 5*

**Force**

Fx positive response: Head rearward, chest forward  
 Fy positive response: Head leftward, chest rightward  
 Fz positive response: Head upward, chest downward

**Moment**

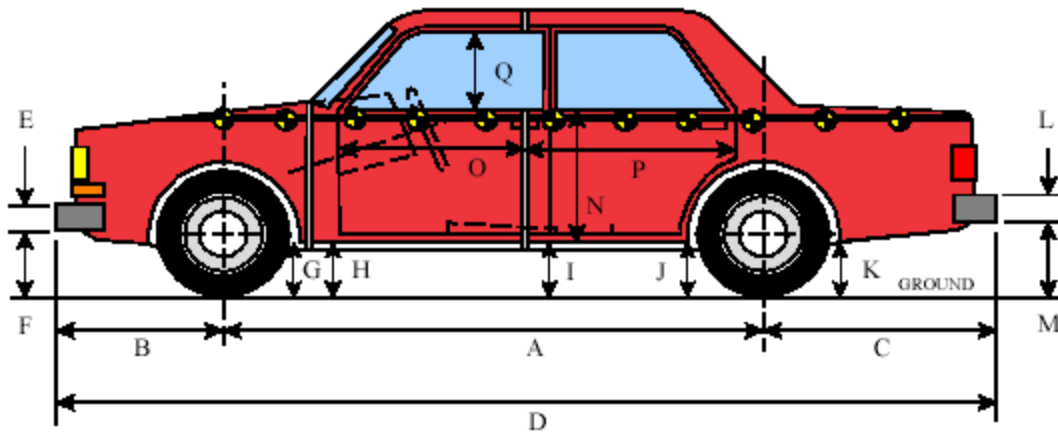
Mx positive response: Left ear to left shoulder  
 My positive response: Chin to sternum  
 Mz positive response: Chin to left shoulder

Neck forces have been filtered at SAE Class 1000

Neck moments have been filtered at SAE Class 600

## DATA SHEET 6

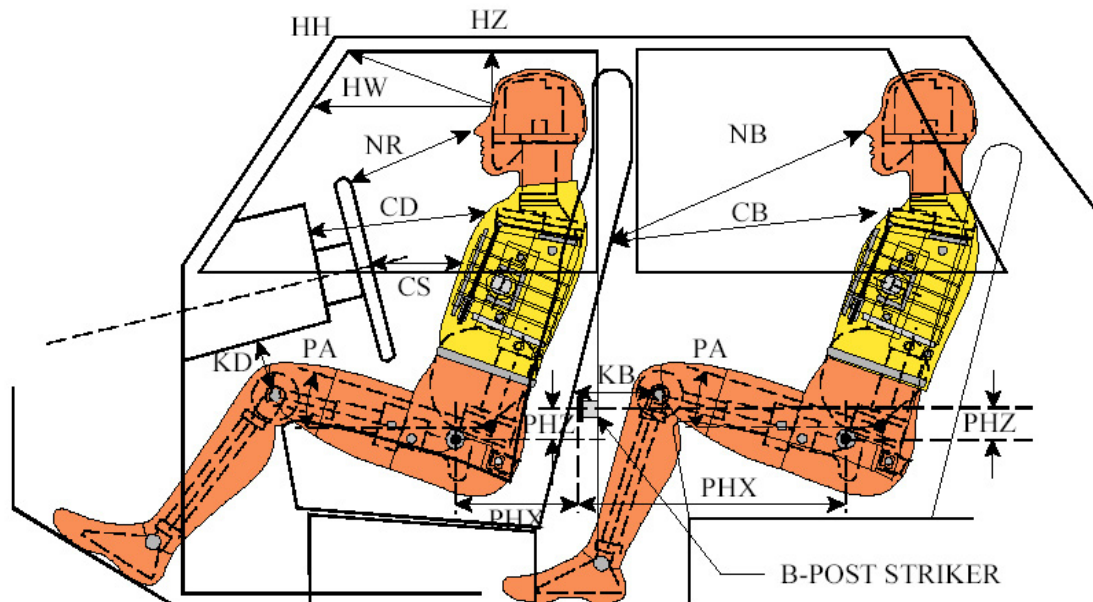
## VEHICLE PRE- AND POST- MEASUREMENTS



|    | PRE-TEST<br>As delivered (mm) | PRE-TEST<br>As Tested (mm) | POST-TEST<br>(mm) | Δ CHANGE<br>(mm) |
|----|-------------------------------|----------------------------|-------------------|------------------|
| A  | 2708                          | -                          | 2686              | -22              |
| B  | 751                           | -                          | 747               | -4               |
| C  | 996                           | -                          | 981               | -15              |
| D  | 4893                          | -                          | 4878              | -15              |
| E  | 266                           | -                          | 266               | 0                |
| F  | 243                           | 242                        | 257               | 15               |
| G  | 212                           | 188                        | 181               | -7               |
| H  | 212                           | 188                        | 181               | -7               |
| I  | 244                           | 210                        | 234               | 24               |
| J1 | 220                           | 181                        | 202               | 21               |
| J2 | 248                           | 207                        | 268               | 61               |
| K  | 303                           | 254                        | 250               | -4               |
| L  | 269                           | -                          | 269               | 0                |
| M  | 476                           | 413                        | 421               | 8                |
| N  | 695                           | -                          | 627               | -68              |
| O  | 1432                          | -                          | 1394              | -38              |
| P  | 710                           | -                          | 664               | -46              |
| Q  | 420                           | -                          | 456               | 36               |
| R  | 4455                          | -                          | 4456              | 1                |
| S  | 4455                          | -                          | 4414              | -41              |
| T  | 1804                          | -                          | 1564              | -240             |

## DATA SHEET 7

## SID H3 LONGITUDINAL CLEARANCE DIMENSIONS

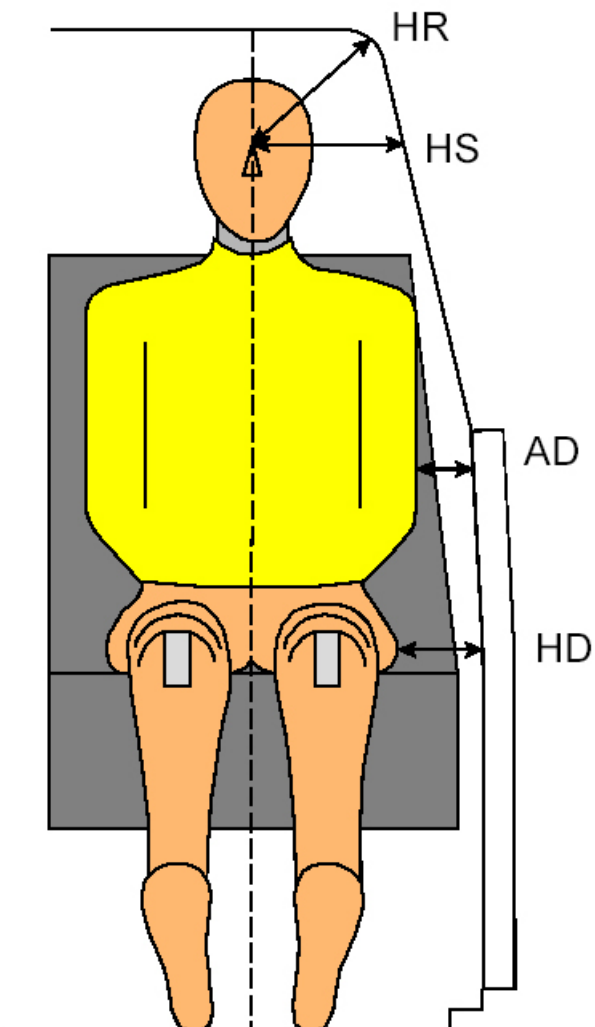


NOTE: All dimensions are in millimeters with tolerance of  $\pm 3$  mm

|                     | DRIVER ID<br>SIDH3/056 | LEFT REAR PASSENGER ID<br>SIDH3/058 |
|---------------------|------------------------|-------------------------------------|
| HH                  | 334                    | N/A                                 |
| HW                  | 644                    | N/A                                 |
| HZ                  | 163                    | 118                                 |
| NR/NB               | 429                    | 550                                 |
| CD/CB               | 519                    | 613                                 |
| CS                  | 319                    | N/A                                 |
| KDL(KDA°)/KBL(KDA°) | 180/36.5               | 236/16.7                            |
| KDR(KDA°)/KBR(KDA°) | 165/22.2               | 232/14.7                            |
| PA°                 | 23.1                   | 23.1                                |
| PHX                 | 485                    | -445                                |
| PHZ                 | 229                    | 205                                 |

PHX and PHZ measurements use the front door striker as reference for the front occupant rear occupant



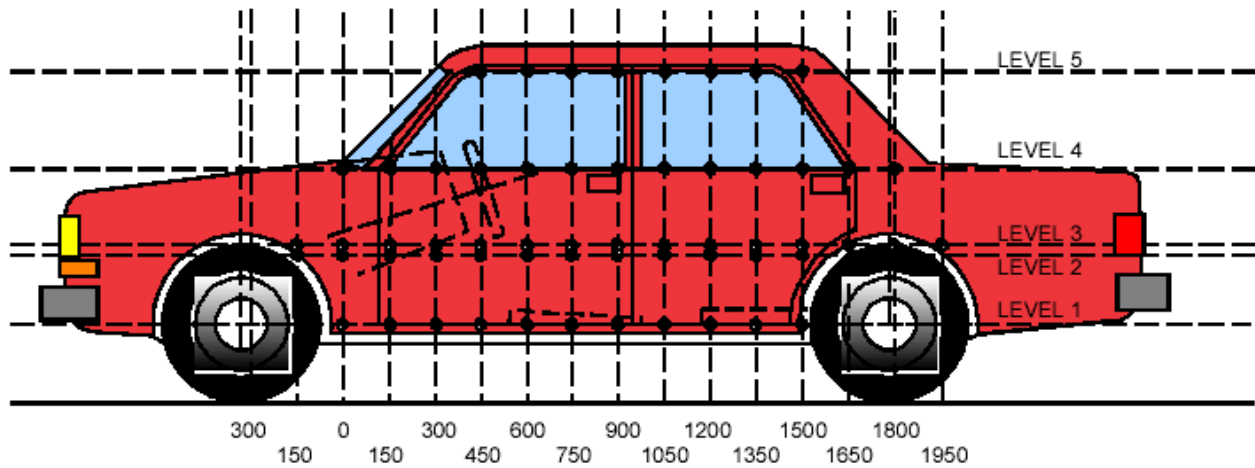
**DATASHEET 8****SID H3 LATERAL CLEARANCE DIMENSIONS**

NOTE: All dimensions are in millimeters with tolerance of  $\pm 3$  mm

|    | DRIVER ID<br>SIDH3/056  | LEFT REAR PASSENGER ID<br>SIDH3/058 |
|----|-------------------------|-------------------------------------|
| HR | 210                     | 194                                 |
| HS | 323                     | 350                                 |
| AD | Upper 118      Lower 75 | Upper 78      Lower 122             |
| HD | 155                     | 126                                 |

## DATA SHEET 9

## VEHICLE SIDE MEASUREMENTS



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 as shown

|                                              |         |
|----------------------------------------------|---------|
| Level 5 @ Window Top                         | 1343 mm |
| Level 4 @ Window Sill                        | 954 mm  |
| Level 3 @ Mid-Door                           | 611 mm  |
| Level 2 @ Occupant H-Point                   | 488 mm  |
| Level 1 @ Axle Centerline or Sill Top Height | 257 mm  |

# DATA SHEET 10

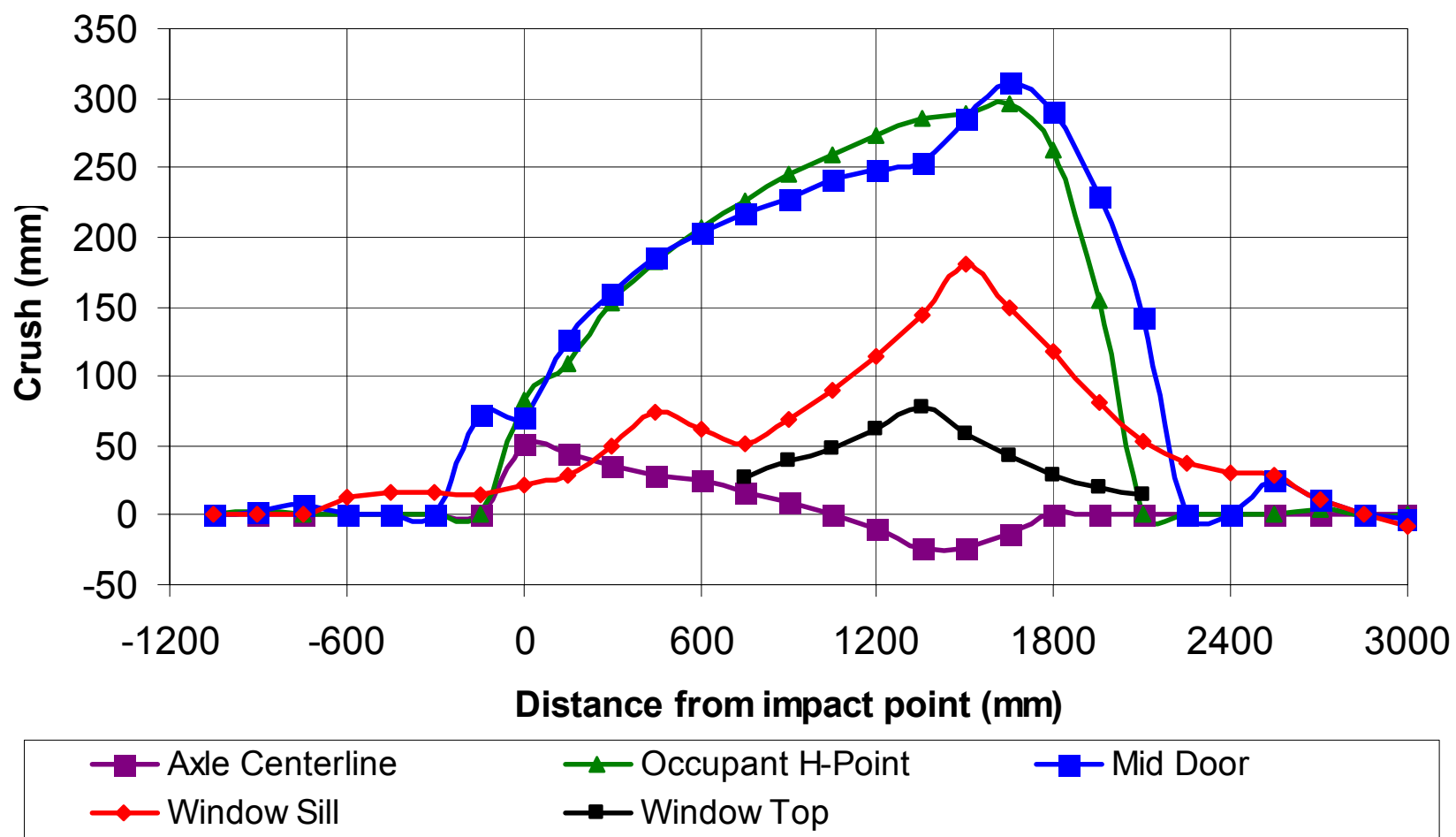
## VEHICLE EXTERIOR CRUSH PROFILES – ALL LEVELS

Note: All Dimensions are in millimeters with a tolerance of  $\pm 3$  mm

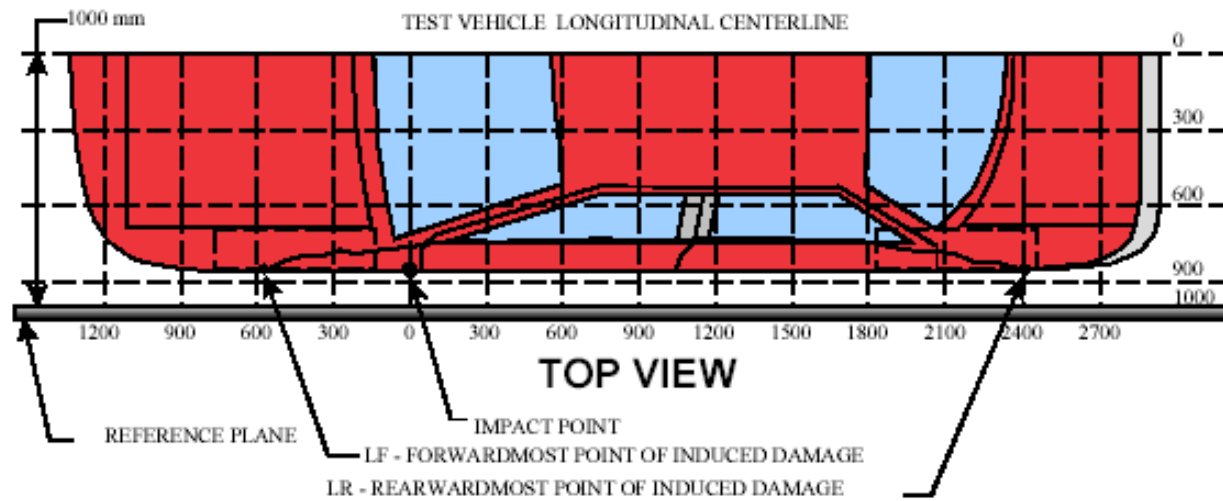
|         |      |       | DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT |      |      |      |      |      |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
|---------|------|-------|------------------------------------------------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
| HEIGHT  |      |       | -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 | 257  | PRE   |                                                |      |      |      |      |      | 195 | 198 | 201 | 201 | 197 | 196 | 194 | 193  | 192  | 189  | 187  | 185  | 184  |      |      |      |      |      |      |      |      |     |
|         |      | POST  |                                                |      |      |      |      |      | 246 | 243 | 236 | 230 | 222 | 212 | 203 | 193  | 183  | 166  | 164  | 172  | 184  |      |      |      |      |      |      |      |      |     |
|         |      | CRUSH |                                                |      |      |      |      |      |     | 51  | 45  | 35  | 29  | 25  | 16  | 9    | 0    | -9   | -23  | -23  | -13  | 0    |      |      |      |      |      |      |      |     |
| LEVEL 2 | 488  | PRE   | 191                                            |      |      |      |      |      | 160 | 163 | 165 | 166 | 166 | 167 | 168 | 170  | 172  | 170  | 168  | 167  | 161  | 155  |      |      |      |      |      | 184  | 203  | 223 |
|         |      | POST  | 194                                            |      |      |      |      |      |     | 242 | 272 | 318 | 348 | 373 | 393 | 413  | 430  | 446  | 456  | 457  | 463  | 424  | 310  |      |      |      |      | 189  | 202  | 224 |
|         |      | CRUSH | 3                                              |      |      |      |      |      |     | 82  | 109 | 153 | 182 | 207 | 226 | 245  | 260  | 274  | 286  | 289  | 296  | 263  | 155  |      |      |      |      | 5    | -1   | 1   |
| LEVEL 3 | 611  | PRE   | 199                                            | 170  |      |      |      | 154  | 153 | 152 | 151 | 150 | 150 | 152 | 153 | 154  | 155  | 157  | 158  | 157  | 155  | 154  | 152  |      |      |      | 168  | 184  | 199  | 219 |
|         |      | POST  | 202                                            | 177  |      |      |      | 227  | 224 | 279 | 311 | 336 | 354 | 369 | 381 | 395  | 404  | 411  | 444  | 469  | 445  | 383  | 294  |      |      |      | 193  | 195  | 200  | 216 |
|         |      | CRUSH | 3                                              | 7    |      |      |      | 73   | 71  | 127 | 160 | 186 | 204 | 217 | 228 | 241  | 249  | 254  | 286  | 312  | 290  | 229  | 142  |      |      |      | 25   | 11   | 1    | -3  |
| LEVEL 4 | 954  | PRE   |                                                |      | 264  | 257  | 250  | 246  | 241 | 239 | 240 | 240 | 242 | 245 | 247 | 250  | 255  | 258  | 263  | 269  | 274  | 283  | 293  | 302  | 320  | 337  | 357  | 381  | 406  |     |
|         |      | POST  |                                                |      | 277  | 273  | 266  | 260  | 263 | 267 | 290 | 314 | 304 | 296 | 316 | 340  | 370  | 402  | 444  | 418  | 391  | 364  | 346  | 340  | 351  | 366  | 369  | 382  | 398  |     |
|         |      | CRUSH |                                                |      | 13   | 16   | 16   | 14   | 22  | 28  | 50  | 74  | 62  | 51  | 69  | 90   | 115  | 144  | 181  | 149  | 117  | 81   | 53   | 38   | 31   | 29   | 12   | 1    | -8   |     |
| LEVEL 5 | 1343 | PRE   |                                                |      |      |      |      |      |     |     |     |     |     | 470 | 480 | 489  | 494  | 496  | 496  | 493  | 485  | 474  | 459  |      |      |      |      |      |      |     |
|         |      | POST  |                                                |      |      |      |      |      |     |     |     |     |     |     | 497 | 519  | 536  | 555  | 573  | 555  | 535  | 514  | 494  | 4740 |      |      |      |      |      |     |
|         |      | CRUSH |                                                |      |      |      |      |      |     |     |     |     |     |     | 27  | 39   | 47   | 61   | 77   | 59   | 42   | 29   | 20   | 15   |      |      |      |      |      |     |

## DATA SHEET 10 (continued)

## VEHICLE EXTERIOR CRUSH PROFILES ALL LEVELS



# DATA SHEET 11 VEHICLE DAMAGE PROFILE DISTANCES



| DPD MEASUREMENTS (mm) |   | POST-TEST (mm) | PRE-TEST (mm) | STATIC CRUSH (mm) |
|-----------------------|---|----------------|---------------|-------------------|
| 1                     | 1 | 174            | 174           | 0                 |
| 2                     | 2 | 199            | 177           | 22                |
| 3                     | 3 | 369            | 184           | 185               |
| 4                     | 4 | 426            | 188           | 238               |
| 5                     | 5 | 245            | 190           | 55                |
| 6                     | 6 | 198            | 198           | 0                 |

## DATA SHEET 12

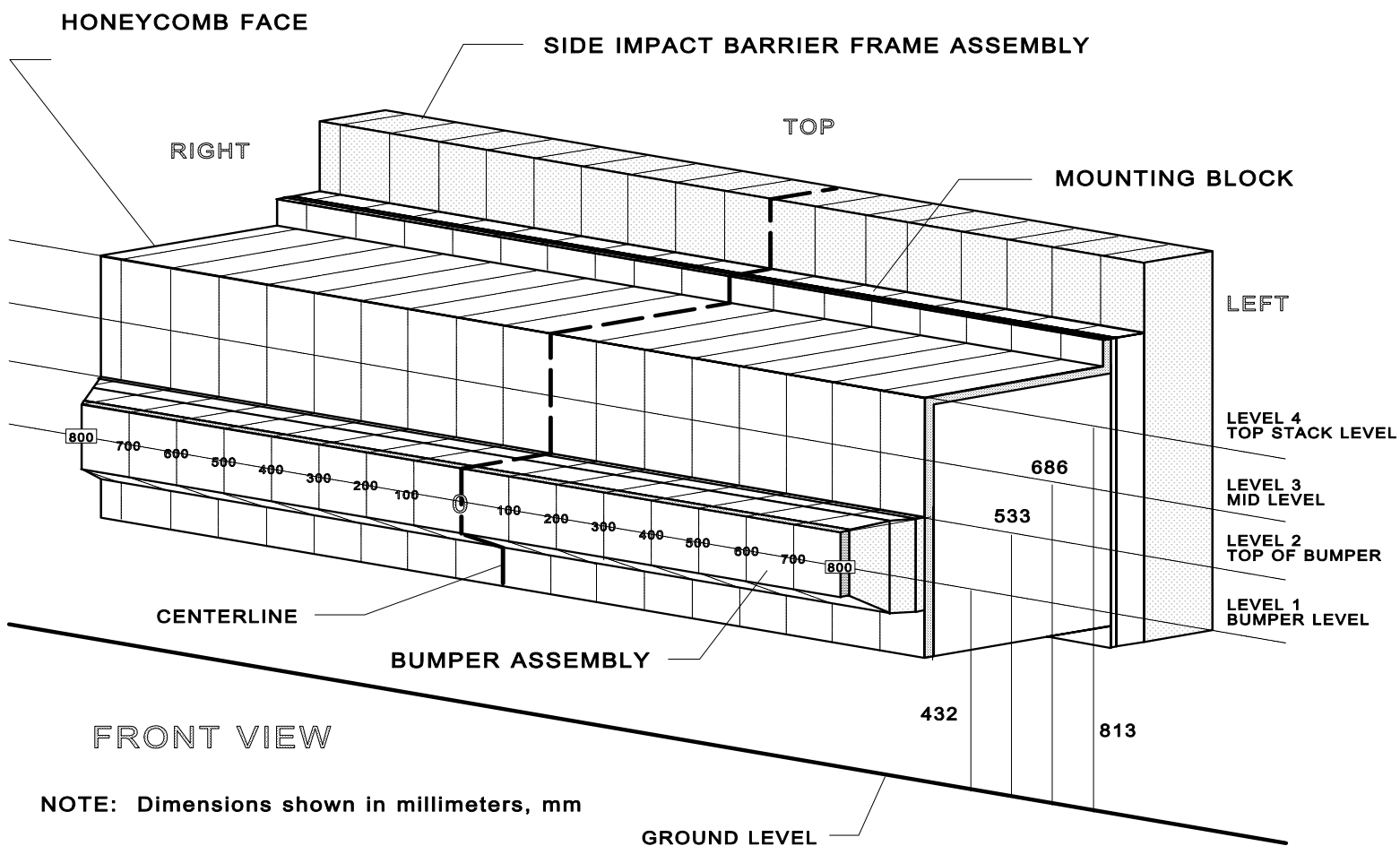
**STATIC CRUSH OF IMPACTOR FACE**  
**(Grid as looking at MDB from front)**

Note: All Dimensions are in millimeters with a tolerance of  $\pm 3$  mm

| LEVEL                     | HEIGHT<br>AT CL<br>(mm) |       | DISTANCE LEFT OF CENTER |     |     |     |     |     |     |     | 0   | DISTANCE RIGHT OF CENTER |     |     |     |     |     |     |     |
|---------------------------|-------------------------|-------|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------|-----|-----|-----|-----|-----|-----|-----|
|                           |                         |       | 800                     | 700 | 600 | 500 | 400 | 300 | 200 | 100 |     | 100                      | 200 | 300 | 400 | 500 | 600 | 700 | 800 |
| LEVEL 4<br>TOP<br>STACK   | 810                     | PRE-  | 529                     | 529 | 530 | 530 | 530 | 530 | 530 | 530 | 530 | 530                      | 531 | 531 | 531 | 531 | 531 | 532 | 532 |
|                           |                         | POST- | 612                     | 565 | 546 | 580 | 588 | 563 | 546 | 549 | 553 | 560                      | 564 | 570 | 575 | 586 | 612 | 644 | 667 |
|                           |                         | CRUSH | 83                      | 36  | 16  | 50  | 58  | 33  | 16  | 19  | 23  | 30                       | 33  | 39  | 44  | 55  | 81  | 112 | 135 |
| LEVEL 3<br>MID-<br>LEVEL  | 685                     | PRE-  | 526                     | 527 | 527 | 527 | 528 | 527 | 528 | 528 | 528 | 528                      | 528 | 529 | 529 | 529 | 530 | 530 | 531 |
|                           |                         | POST- | 588                     | 559 | 564 | 595 | 591 | 570 | 554 | 547 | 544 | 543                      | 542 | 545 | 552 | 559 | 571 | 590 | 628 |
|                           |                         | CRUSH | 62                      | 32  | 37  | 68  | 63  | 43  | 26  | 19  | 16  | 15                       | 14  | 16  | 23  | 30  | 41  | 60  | 97  |
| LEVEL 2<br>TOP<br>BUMPER  | 560                     | PRE-  | 524                     | 524 | 524 | 525 | 525 | 525 | 526 | 526 | 526 | 527                      | 526 | 527 | 527 | 527 | 527 | 528 | 528 |
|                           |                         | POST- | 615                     | 607 | 597 | 596 | 591 | 585 | 578 | 577 | 581 | 585                      | 588 | 588 | 581 | 575 | 579 | 583 | 594 |
|                           |                         | CRUSH | 91                      | 83  | 73  | 71  | 66  | 60  | 52  | 51  | 55  | 58                       | 62  | 61  | 54  | 48  | 52  | 55  | 66  |
| LEVEL 1<br>MID-<br>BUMPER | 432                     | PRE-  | 433                     | 421 | 421 | 421 | 422 | 422 | 422 | 422 | 423 | 423                      | 423 | 423 | 424 | 424 | 425 | 425 | 437 |
|                           |                         | POST- | 617                     | 596 | 592 | 590 | 583 | 571 | 563 | 558 | 558 | 556                      | 553 | 550 | 550 | 551 | 552 | 562 | 584 |
|                           |                         | CRUSH | 184                     | 175 | 171 | 169 | 161 | 149 | 141 | 136 | 135 | 133                      | 130 | 127 | 126 | 127 | 127 | 137 | 147 |

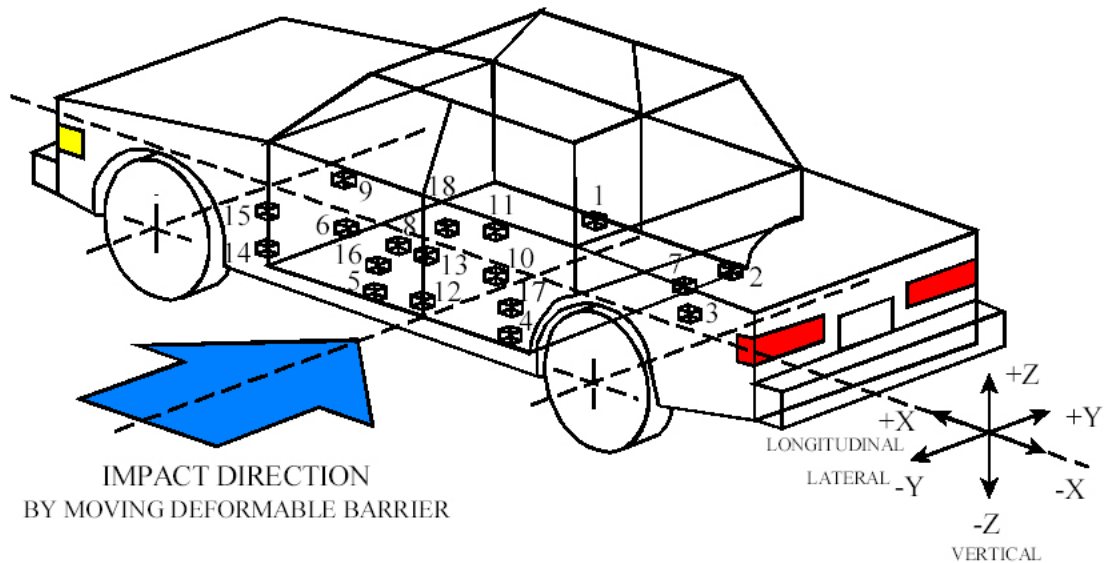
**Note: Top of Bumper static crush measurements made 560 mm above ground to avoid glue at bumper/barrier interface**

**DATA SHEET 12 (continued)**  
**STATIC CRUSH OF IMPACTOR FACE**



## DATA SHEET 13

## TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY



|                                     |                                     |
|-------------------------------------|-------------------------------------|
| 1. Right Side Sill at Front Seat    | 10. Mid-rear of Left Rear Door      |
| 2. Right Side Sill at Rear Seat     | 11. Left Rear Door Upper Centerline |
| 3. Rear Floorpan Above Axle         | 12. Left Lower B-Pillar             |
| 4. Left Side Sill at Rear Seat      | 13. Left Middle B-Pillar            |
| 5. Left Side Sill at Front Seat     | 14. Left Lower A-Pillar             |
| 6. Left Front Door on Centerline    | 15. Left Middle A-Pillar            |
| 7. Right Rear Occupant Compartment  | 16. Front Seat Track                |
| 8. Mid-rear of Left Front Door      | 17. Rear Seat Track                 |
| 9. Left Front Door Upper Centerline | 18. Vehicle CG                      |



## VEHICLE ACCELEROMETER LOCATIONS AND SUMMARY DATA

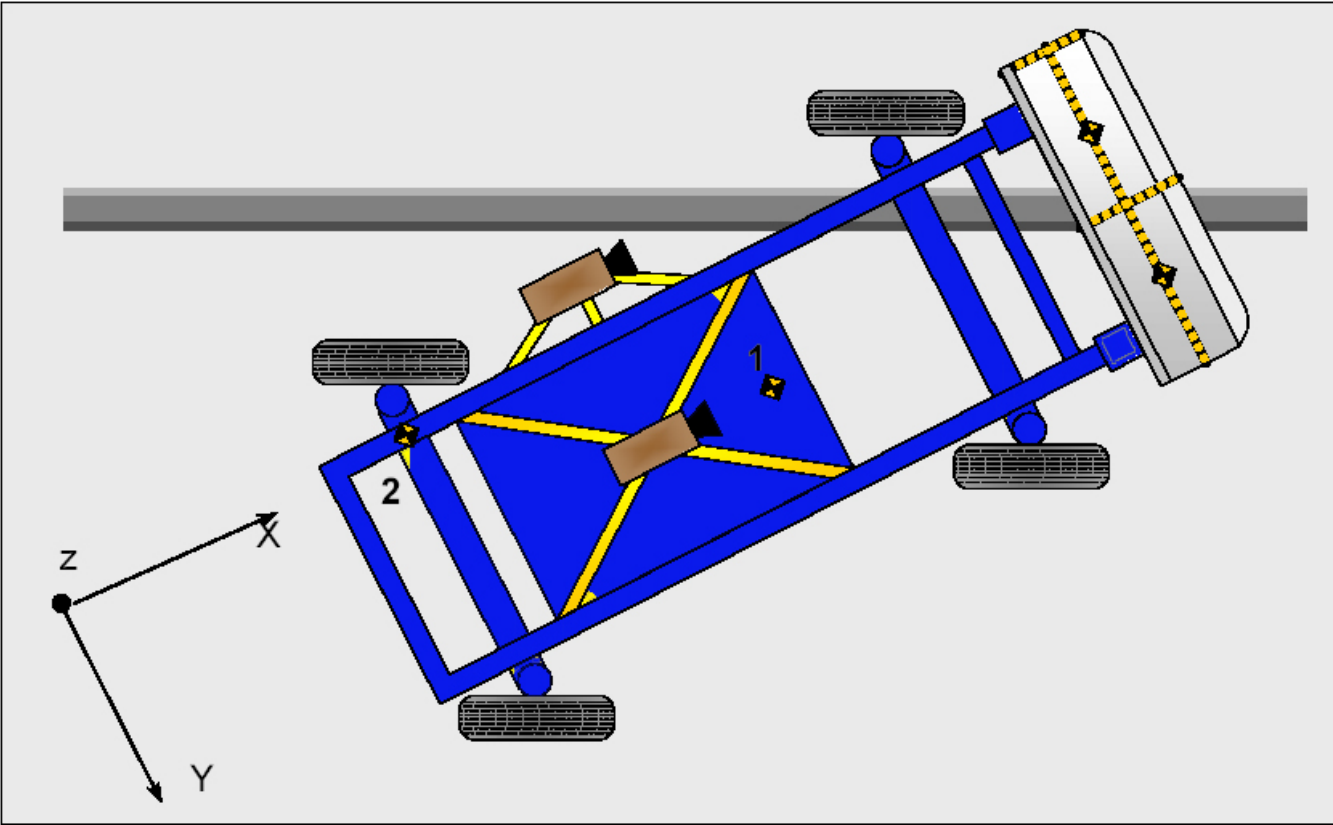
|             |             |                  |                                                                                        |
|-------------|-------------|------------------|----------------------------------------------------------------------------------------|
| Axis Origin | X – Point L | Axis Orientation | +(X) Forward where x axis is the vector from middle of rear bumper to mid front bumper |
|             | Y – Point L |                  | +(Y) Right where y axis is parallel to ground reference plane                          |
|             | Z – Point L |                  | +(Z) Down where z axis is cross product of +(X) and +(Y)                               |

## VEHICLE ACCELEROMETER LOCATIONS AND SUMMARY DATA

|             |             |                  |                                                                                        |
|-------------|-------------|------------------|----------------------------------------------------------------------------------------|
| Axis Origin | X – Point L | Axis Orientation | +(X) Forward where x axis is the vector from middle of rear bumper to mid front bumper |
|             | Y – Point L |                  | +(Y) Right where y axis is parallel to ground reference plane                          |
|             | Z – Point L |                  | +(Z) Down where z axis is cross product of +(X) and +(Y)                               |

4-15

DATA SHEET 14  
MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY



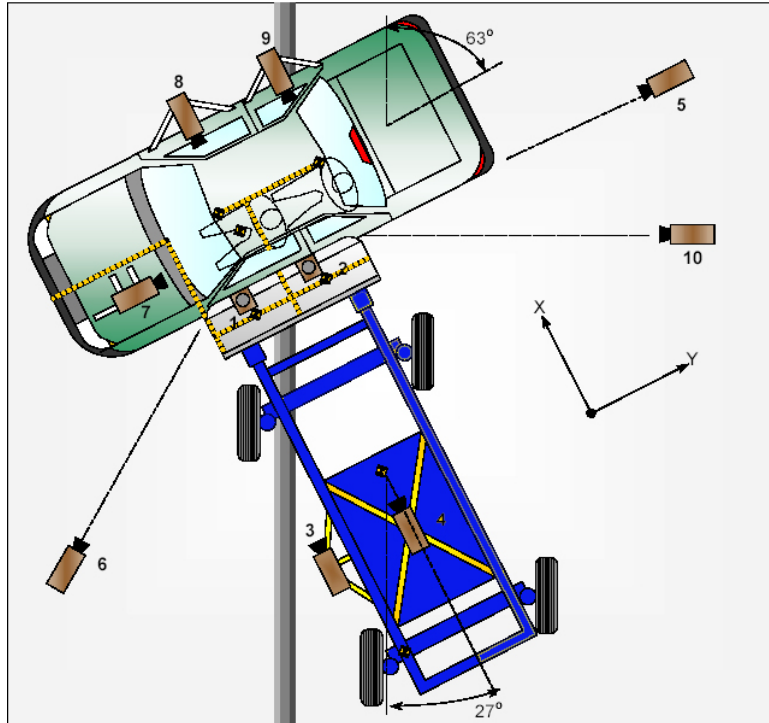
| Location |                       | Coordinates |         |         | Longitudinal (X) |       |       |      | Lateral (Y) |      |      |      | Vertical (Z) |      |      |      | Resultant |      |
|----------|-----------------------|-------------|---------|---------|------------------|-------|-------|------|-------------|------|------|------|--------------|------|------|------|-----------|------|
|          |                       | X<br>mm     | Y<br>mm | Z<br>mm | Max              |       | Min   |      | Max         |      | Min  |      | Max          |      | Min  |      | Max       |      |
|          |                       |             |         |         | G's              | msec  | G's   | msec | G's         | msec | G's  | msec | G's          | msec | G's  | msec | G's       | msec |
| 1        | MDB Center of Gravity | 1113        | -1      | 311     | 1.9              | 83.1  | -22.2 | 40.2 | 4.6         | 61.3 | -7.5 | 39.5 | 6.1          | 55.4 | -6.2 | 22.3 | 23.4      | 20.0 |
| 2        | MDB Rear Frame Member | 2812        | -614    | 585     | 1.8              | 121.8 | -21.6 | 44.2 | 4.6         | 24.2 | -2.6 | 57.7 |              |      |      |      |           |      |

Axis Origin      X – Rear Bumper  
                      Y – Vehicle Centerline  
                      Z – Middle of rear bumper

Axis Orientation      +(X) Forward  
                              +(Y) Right  
                              +(Z) Down

## DATA SHEET 15

## HIGH-SPEED CAMERA LOCATIONS AND DATA SUMMARY



| Camera No. | View                                      | Coordinates (mm)* |      |      | Angle wrt Horiz. | Lens (mm) | Film Speed (fps) |
|------------|-------------------------------------------|-------------------|------|------|------------------|-----------|------------------|
|            |                                           | X                 | Y    | Z    |                  |           |                  |
| 1          | Overhead view of test vehicle             | 150               | 992  | 4663 | -90              | 10        | 1000             |
| 2          | Overhead close-up view of impact plane    | 30                | 305  | 4669 | -90              | 13        | 1000             |
| 3          | MDB onboard close-up view of impact point | -2333             | -60  | -38  | 0                | 35        | 1000             |
| 4          | MDB onboard view of driver dummy          | -2262             | 840  | 740  | -5               | 13        | 1000             |
| 5          | Right side ground level overall view      | 10195             | 670  | 542  | -5               | 55        | 1000             |
| 6          | Left side ground level overall view       | 7994              | -870 | 682  | -10              | 35        | 1000             |
| 7          | Test vehicle onboard driver front view    | 3735              | -378 | 565  | -13              | 25        | 1000             |
| 8          | Test vehicle onboard driver side view     | 2465              | 870  | 340  | -11              | 12.5      | 1000             |
| 9          | Test vehicle onboard passenger side view  | 1665              | 910  | 355  | -13              | 12.5      | 1000             |
| 10         | Real-time film coverage of test           | -                 | -    | -    | -                | -         | -                |

\* Reference: Middle of rear bumper on test vehicle

+(X) Forward where x axis is the vector from middle of rear bumper to mid front bumper

+(Y) Right where y axis is parallel to ground reference plane

+(Z) Down where z axis is cross product of +(X) and +(Y)

**SECTION 5**  
**FUEL SYSTEM INTEGRITY**

**DATA SHEET 16****FUEL SYSTEM INTEGRITY DATA**TEST REQUIREMENTS:

Drain the test vehicle's fuel system and operate the engine until the fuel system is dry. Add Stoddard solvent, which has been dyed purple, until 92-94% of the stated usable capacity is reached. Operate the engine to assure the Stoddard solvent is present throughout the entire fuel system.

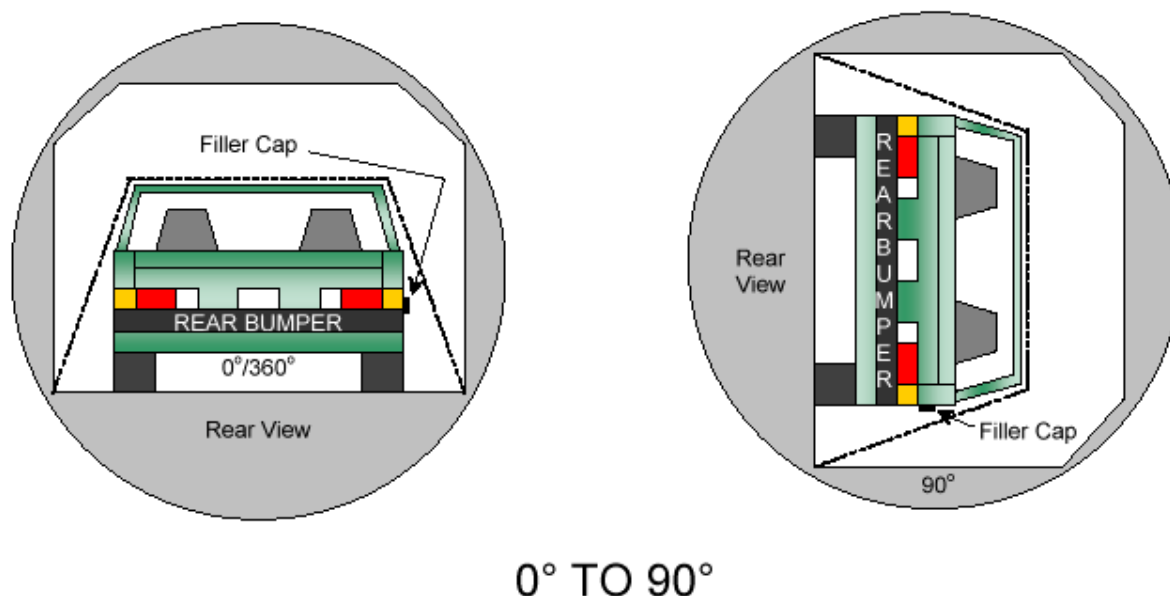
TEST VEHICLE IMPACT TYPE: Side impacting Moving Deformable Barrier contacting the driver side.

FUEL SPILLAGE MEASUREMENT:

| POST IMPACT TEST                                   | TEST RESULTS | MAXIMUM ALLOWABLE |
|----------------------------------------------------|--------------|-------------------|
| 1. From impact until vehicle motion ceases         | 0            | 1 oz.             |
| 2. For 5 minute period after vehicle motion ceases | 0            | 5 oz.             |
| 3. For next 25 minutes                             | 0            | 1 oz./minute      |

FUEL SPILLAGE LOCATION(S): None

**DATA SHEET 17**  
**ROLLOVER DATA**



**0° TO 90°**

**DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:**

|                                    |                  |                  |
|------------------------------------|------------------|------------------|
| Rollover Fixture 90° Rotation Time | <u>1</u> minutes | <u>3</u> seconds |
| (Spec Range =1 to 3 minutes)       |                  |                  |
| FMVSS 301 Position Hold Time       | <u>5</u> minutes | <u>2</u> seconds |
| TOTAL                              | <u>6</u> minutes | <u>5</u> seconds |
| Next whole minute interval         | <u>7</u> minutes |                  |

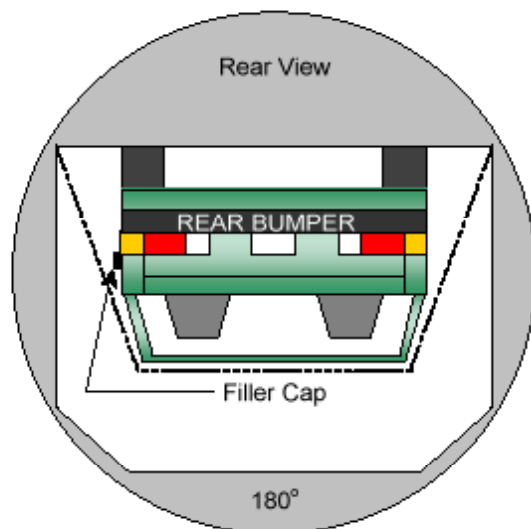
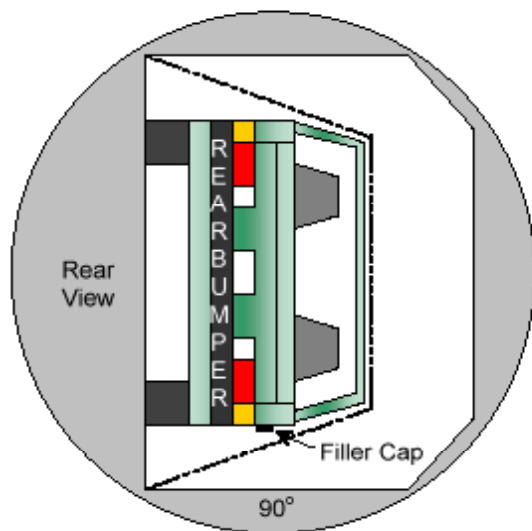
**FUEL SPILLAGE MEASUREMENT:**

| 0° TO 90° ROTATION                        | TEST RESULTS | MAXIMUM ALLOWABLE |
|-------------------------------------------|--------------|-------------------|
| 1. First 5 Minutes From Onset of Rotation | 0            | 5 oz.             |
| 2. Sixth Minute From Onset of Rotation    | 0            | 1 oz.             |
| 3. Seventh Minute From Onset of Rotation  | 0            | 1 oz.             |
| 4. Eighth Minute if Required              | -            | 1 oz.             |

**FUEL SPILLAGE LOCATION(S):** None

## DATA SHEET 17 (continued)

## ROLLOVER VEHICLE



## 90° TO 180°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

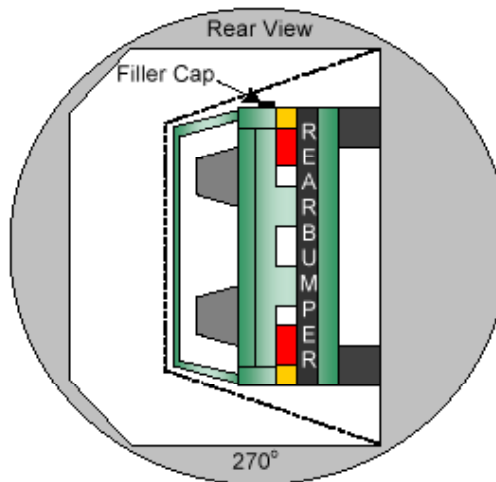
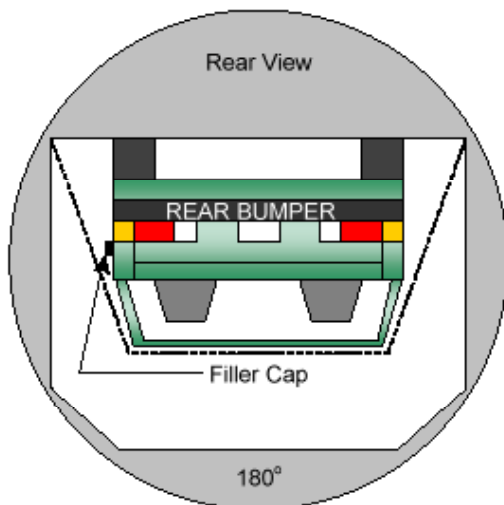
|                                    |                  |                  |
|------------------------------------|------------------|------------------|
| Rollover Fixture 90° Rotation Time | <u>1</u> minutes | <u>4</u> seconds |
| (Spec Range = 1 to 3 minutes)      |                  |                  |
| FMVSS 301 Position Hold Time       | <u>5</u> minutes | <u>5</u> seconds |
| TOTAL                              | <u>6</u> minutes | <u>9</u> seconds |
| Next whole minute interval         | <u>7</u> minutes |                  |

FUEL SPILLAGE MEASUREMENT:

| 90° TO 180° ROTATION                      | TEST RESULTS | MAXIMUM ALLOWABLE |
|-------------------------------------------|--------------|-------------------|
| 1. First 5 Minutes From Onset of Rotation | 0            | 5 oz.             |
| 2. Sixth Minute From Onset of Rotation    | 0            | 1 oz.             |
| 3. Seventh Minute From Onset of Rotation  | 0            | 1 oz.             |
| 4. Eighth Minute if Required              | -            | 1 oz.             |

FUEL SPILLAGE LOCATION(S): None



**DATA SHEET 17 (continued)****ROLLOVER VEHICLE****180° TO 270°**DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

|                                    |                  |                   |
|------------------------------------|------------------|-------------------|
| Rollover Fixture 90° Rotation Time | <u>1</u> minutes | <u>5</u> seconds  |
| (Spec Range =1 to 3 minutes)       |                  |                   |
| FMVSS 301 Position Hold Time       | <u>5</u> minutes | <u>5</u> seconds  |
| TOTAL                              | <u>6</u> minutes | <u>10</u> seconds |
| Next whole minute interval         | <u>7</u> minutes |                   |

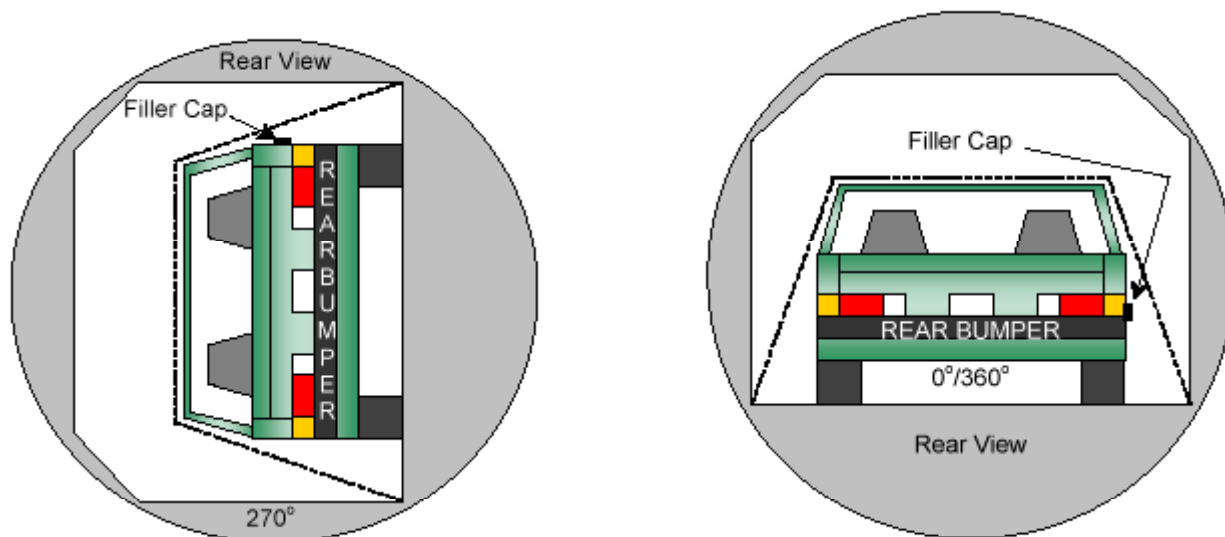
FUEL SPILLAGE MEASUREMENT:

| 180° TO 270° ROTATION                     | TEST RESULTS | MAXIMUM ALLOWABLE |
|-------------------------------------------|--------------|-------------------|
| 1. First 5 Minutes From Onset of Rotation | 0            | 5 oz.             |
| 2. Sixth Minute From Onset of Rotation    | 0            | 1 oz.             |
| 3. Seventh Minute From Onset of Rotation  | 0            | 1 oz.             |
| 4. Eighth Minute From Onset of Rotation   | -            | 1 oz.             |

FUEL SPILLAGE LOCATION(S): None

## DATA SHEET 17 (continued)

## ROLLOVER VEHICLE



270° TO 360°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

|                                    |                  |                  |
|------------------------------------|------------------|------------------|
| Rollover Fixture 90° Rotation Time | <u>1</u> minutes | <u>4</u> seconds |
| (Spec Range =1 to 3 minutes)       |                  |                  |
| FMVSS 301 Position Hold Time       | <u>5</u> minutes | <u>0</u> seconds |
| TOTAL                              | <u>6</u> minutes | <u>4</u> seconds |
| Next whole minute interval         | <u>7</u> minutes |                  |

FUEL SPILLAGE MEASUREMENT:

| 270° TO 360° ROTATION                     | TEST RESULTS | MAXIMUM ALLOWABLE |
|-------------------------------------------|--------------|-------------------|
| 1. First 5 Minutes From Onset of Rotation | 0            | 5 oz.             |
| 2. Sixth Minute From Onset of Rotation    | 0            | 1 oz.             |
| 3. Seventh Minute From Onset of Rotation  | 0            | 1 oz.             |
| 4. Eighth Minute if Required              | -            | 1 oz.             |

FUEL SPILLAGE LOCATION(S): None

**APPENDIX A**  
**PHOTOGRAPHS**

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





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





Figure A-3: PRE-TEST LEFT FRONT VIEW OF TEST VEHICLE





Figure A-4: POST-TEST LEFT FRONT VIEW OF TEST VEHICLE





Figure A-5: PRE-TEST LEFT SIDE VIEW OF TEST VEHICLE





Figure A-6: POST-TEST LEFT SIDE VIEW OF TEST VEHICLE





Figure A-7: PRE-TEST LEFT REAR VIEW OF TEST VEHICLE





Figure A-8: POST-TEST LEFT REAR VIEW OF TEST VEHICLE (TRUNK OPENED POST TEST TO ACCESS DATA)





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





Figure A-10: POST-TEST REAR VIEW OF TEST VEHICLE (TRUNK OPENED POST TEST TO ACCESS DATA)





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





Figure A-12 POST-TEST RIGHT REAR VIEW OF TEST VEHICLE (TRUNK OPENED POST TEST TO ACCESS DATA)





Figure A-13: PRE-TEST RIGHT SIDE VIEW OF TEST VEHICLE





Figure A-14: POST-TEST RIGHT SIDE VIEW OF TEST VEHICLE (TRUNK OPENED POST TEST TO ACCESS DATA)





Figure A-15: PRE-TEST FRONT RIGHT VIEW OF TEST VEHICLE





Figure A-16: POST-TEST FRONT RIGHT VIEW OF TEST VEHICLE





Figure A-17: PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID H3





Figure A-18: POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID H3



Figure A-19: PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID H3





Figure A-20: POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID H3





Figure A-21: PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID H3





Figure A-22: POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID H3



Figure A-23: PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID H3





Figure A-24: POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID H3

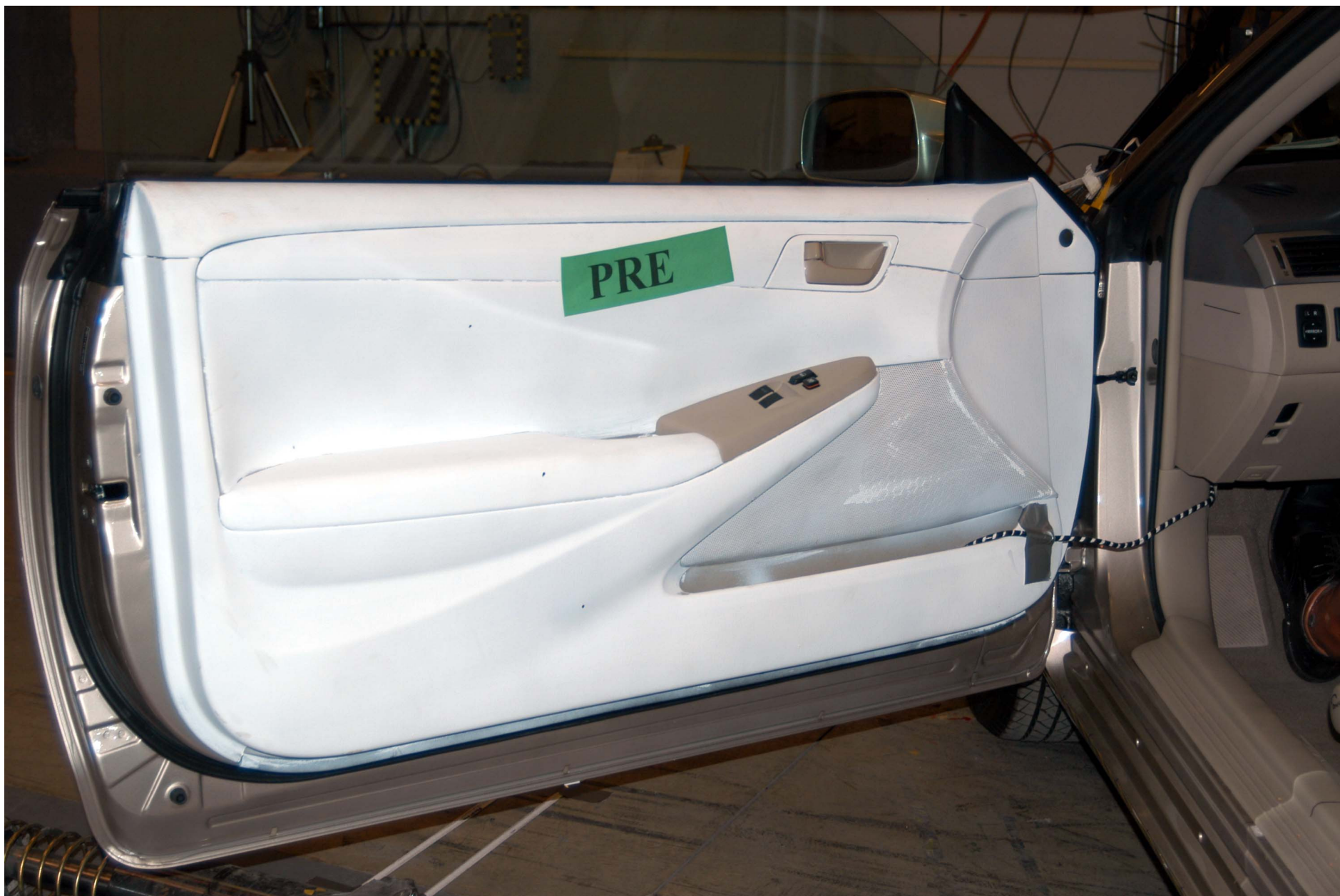


Figure A-25: PRE-TEST INTERIOR OF FRONT DOOR





Figure A-26: POST-TEST INTERIOR OF FRONT DOOR SHOWING SID H3 IMPACT LOCATIONS

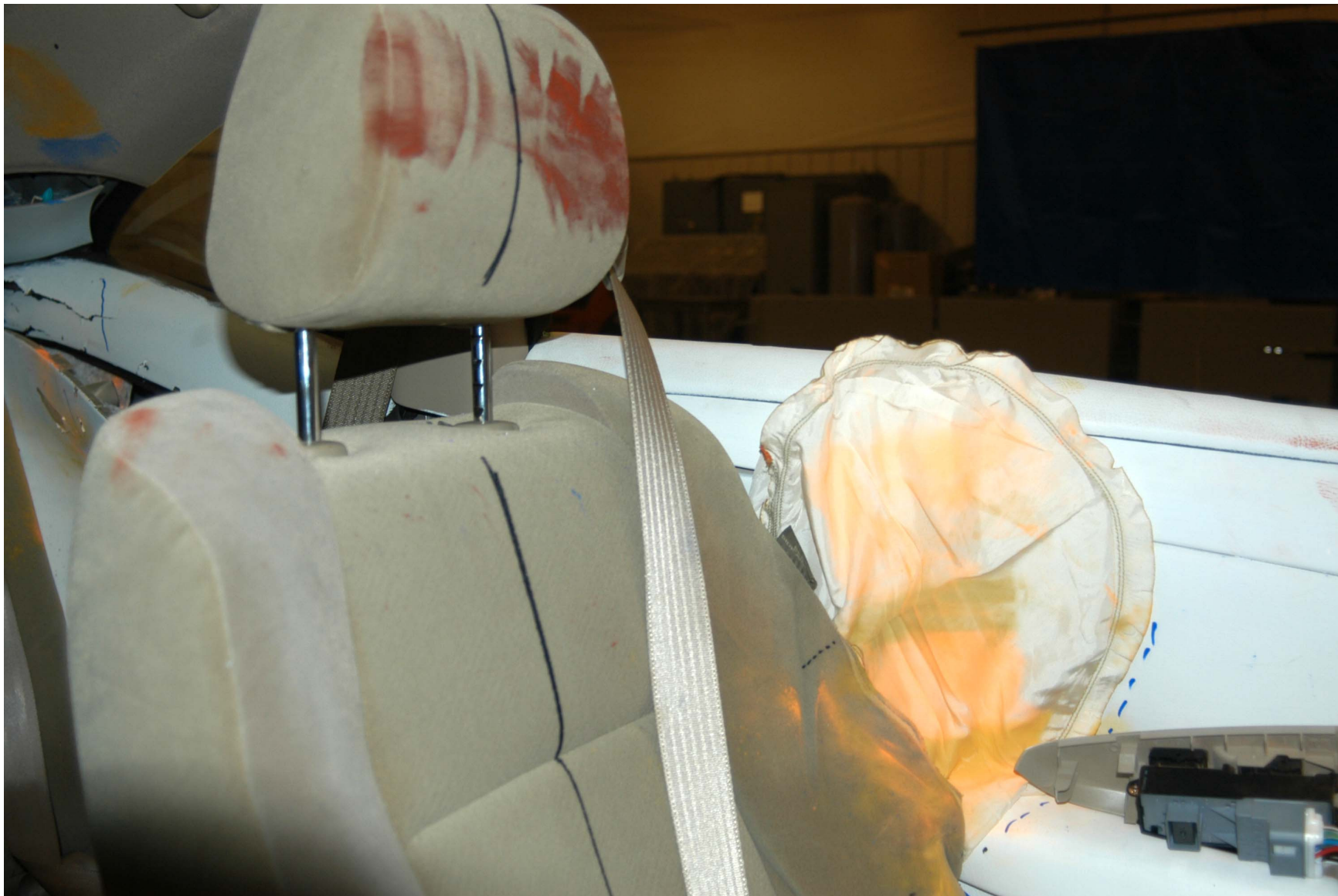


Figure A-27: POST-TEST INTERIOR OF FRONT DOOR SHOWING SID H3 IMPACT LOCATIONS 2





Figure A-28: PRE-TEST INTERIOR OF REAR PASSENGER COMPARTMENT





Figure A-29: POST-TEST INTERIOR OF REAR DOOR SHOWING SID H3 IMPACT LOCATIONS

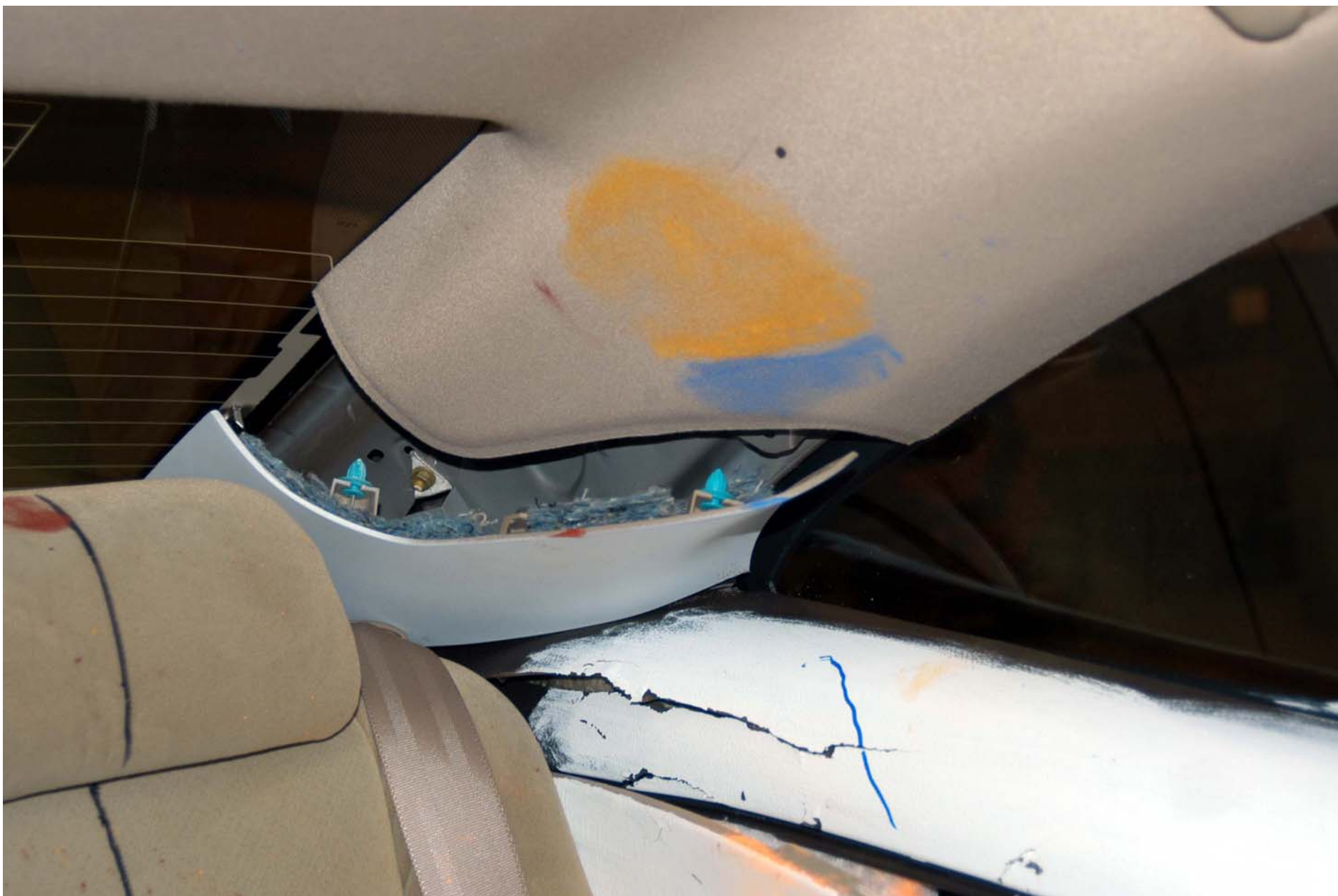


Figure A-30: POST-TEST INTERIOR OF REAR DOOR SHOWING SID H3 IMPACT LOCATIONS 2





Figure A-31: PRE TEST LEFT SIDE VIEW OF MDB IN IMPACT POSITION





Figure A-32: POST TEST LEFT SIDE VIEW OF MDB





Figure A-33: PRE TEST RIGHT SIDE VIEW OF MDB IN IMPACT POSITION





Figure A-34: POST TEST RIGHT SIDE VIEW OF MDB



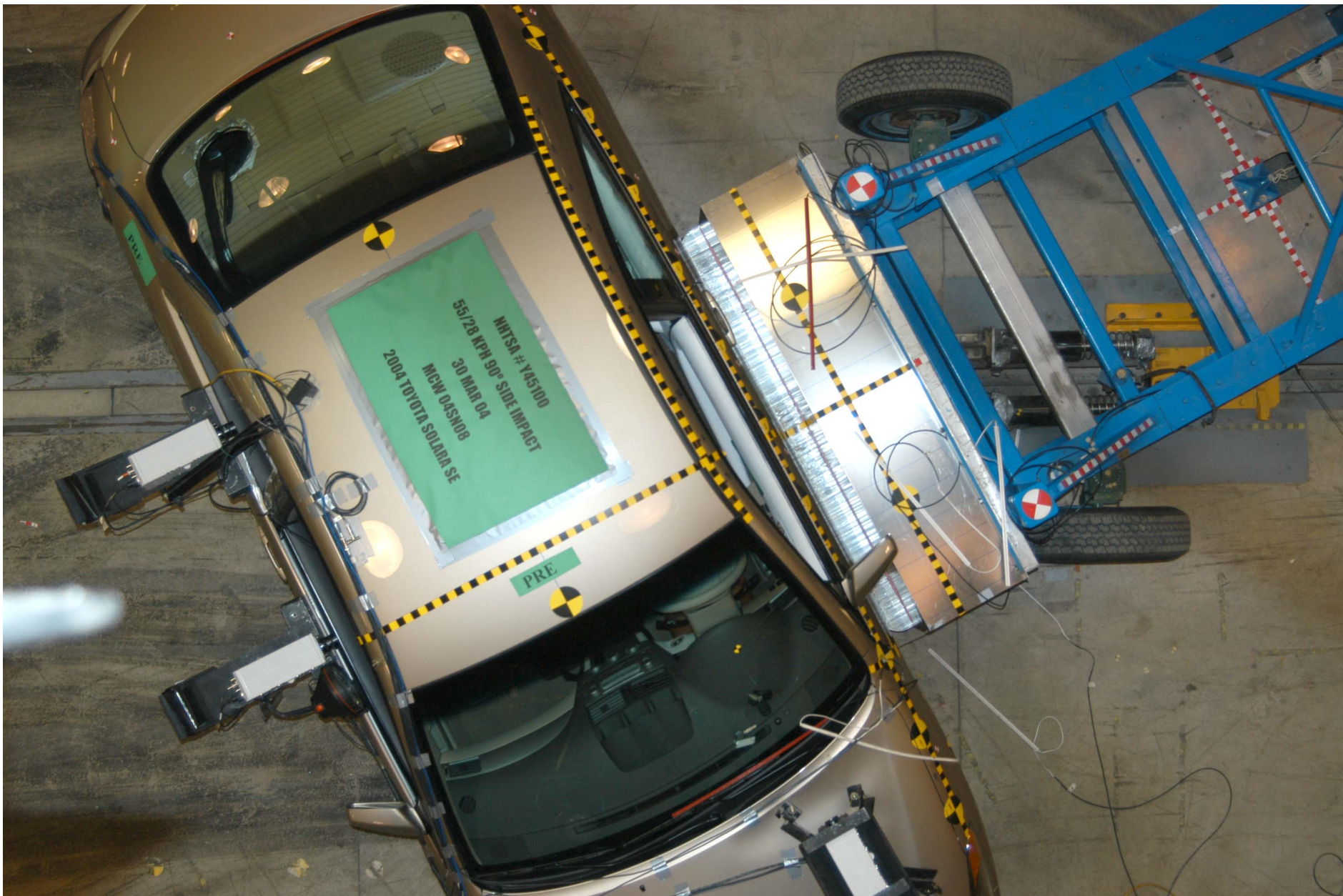


Figure A-35: PRE TEST OVERHEAD VIEW OF MDB IN IMPACT POSITION





Figure A-36: POST TEST OVERHEAD VIEW OF MDB





Figure A-37: PRE TEST CLOSE-UP OF IMPACT POINT TARGET SHOWING WELDING ROD





Figure A-38: POST TEST CLOSE-UP OF IMPACT POINT TARGET





Figure A-39: VEHICLE TIRE PLACARD



MFD. BY: TOYOTA MOTOR MANUFACTURING,  
KENTUCKY, INC. 10/03

GVWR 4233LB GAWR FR 2668LB RR 2282LB  
THIS VEHICLE CONFORMS TO ALL APPLICABLE  
FEDERAL MOTOR VEHICLE SAFETY BUMPER AND  
THEFT PREVENTION STANDARDS IN EFFECT ON  
THE DATE OF MANUFACTURE SHOWN ABOVE.  
4T1CE38P34U813957 PASS. CAR



C/TR:4Q2/FB00 ACV30L-GCPNKA  
A/TM:-02A/U241E



82944

Figure A-40: VEHICLE CERTIFICATION LABEL





Figure A-41: IMPACT



Figure A-42: ROLLOVER 0 DEGREES



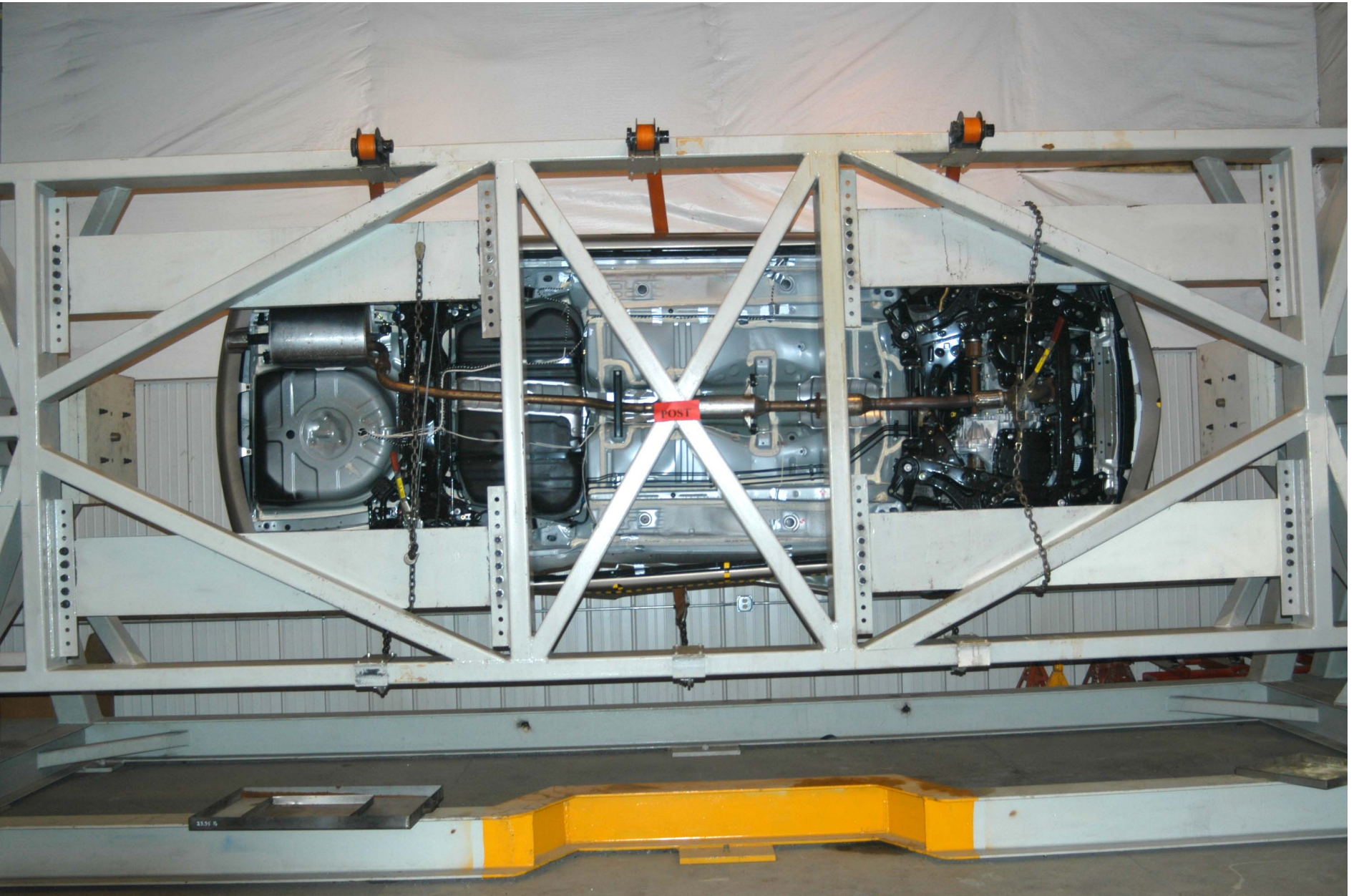


Figure A-43: ROLLOVER 90 DEGREES





Figure A-44: ROLLOVER 180 DEGREES





Figure A-45: ROLLOVER 270 DEGREES





Figure A-46: ROLLOVER 360 DEGREES





Figure A-47: PRE-TEST ALUMINUM BARRIER FRONT





Figure A-48: POST-TEST ALUMINUM BARRIER FRONT





Figure A-49: PRE-TEST ALUMINUM BARRIER LEFT SIDE





Figure A-50: POST-TEST ALUMINUM BARRIER LEFT SIDE





Figure A-51: PRE-TEST ALUMINUM BARRIER RIGHT SIDE





Figure A-52: POST-TEST ALUMINUM BARRIER RIGHT SIDE





Figure A-53: PRE-TEST ALUMINUM BARRIER TOP





Figure A-54: POST-TEST ALUMINUM BARRIER TOP

**APPENDIX B**

**VEHICLE, MDB, AND SID H3 RESPONSE DATA**



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 INTEGRATION DATA FILTER CLASS 180

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**DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS**

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**MDB INSTRUMENTATION PLOTS**  
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**DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)**  
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**DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOT (REDUNDANT)**  
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|-----------------|--------------------------------------------------|-------------|
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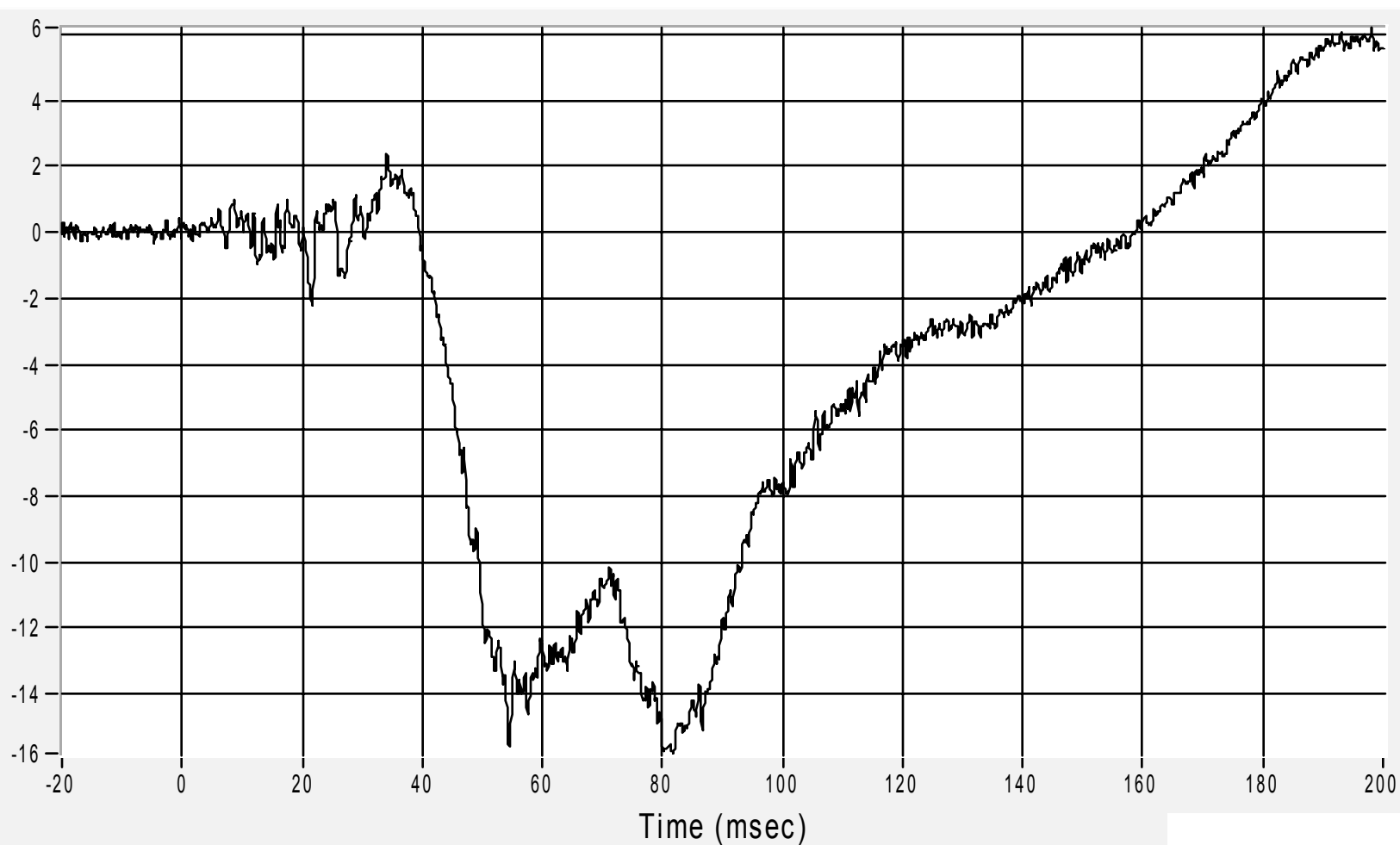


**Driver Head CG (X) Acceleration**

Acceleration (G's) CFC1000

Max 6.2 G at 198.1 msec

Min -15.8 G at 81.8 msec



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30 March 2004

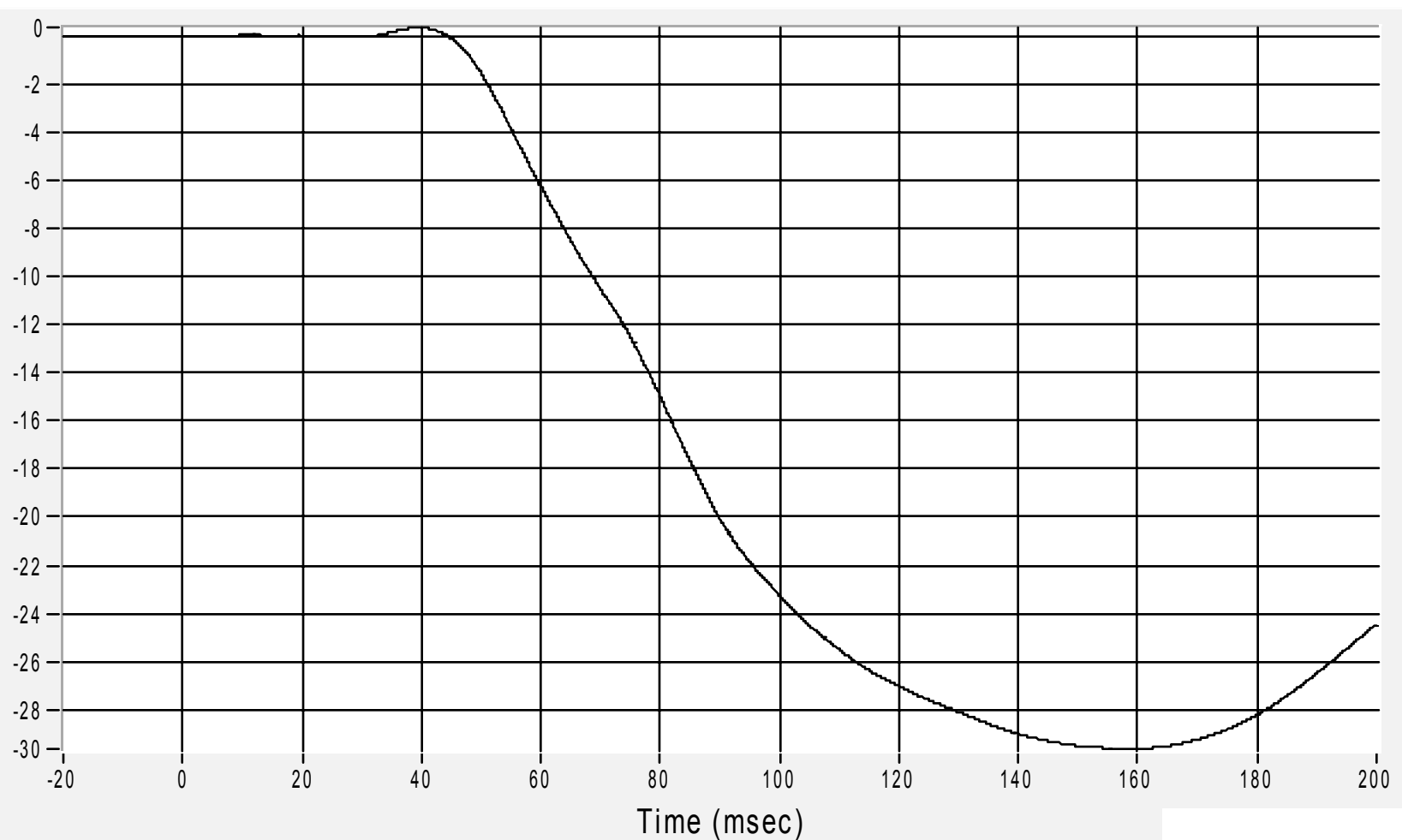
Medical College of Wisconsin  
Vehicle Crashworthiness Lab

**Driver Head CG (X) Velocity**

Velocity (km/h) CFC180

Max 0.4 km/h at 39.4 msec

Min -29.7 km/h at 158.5 msec



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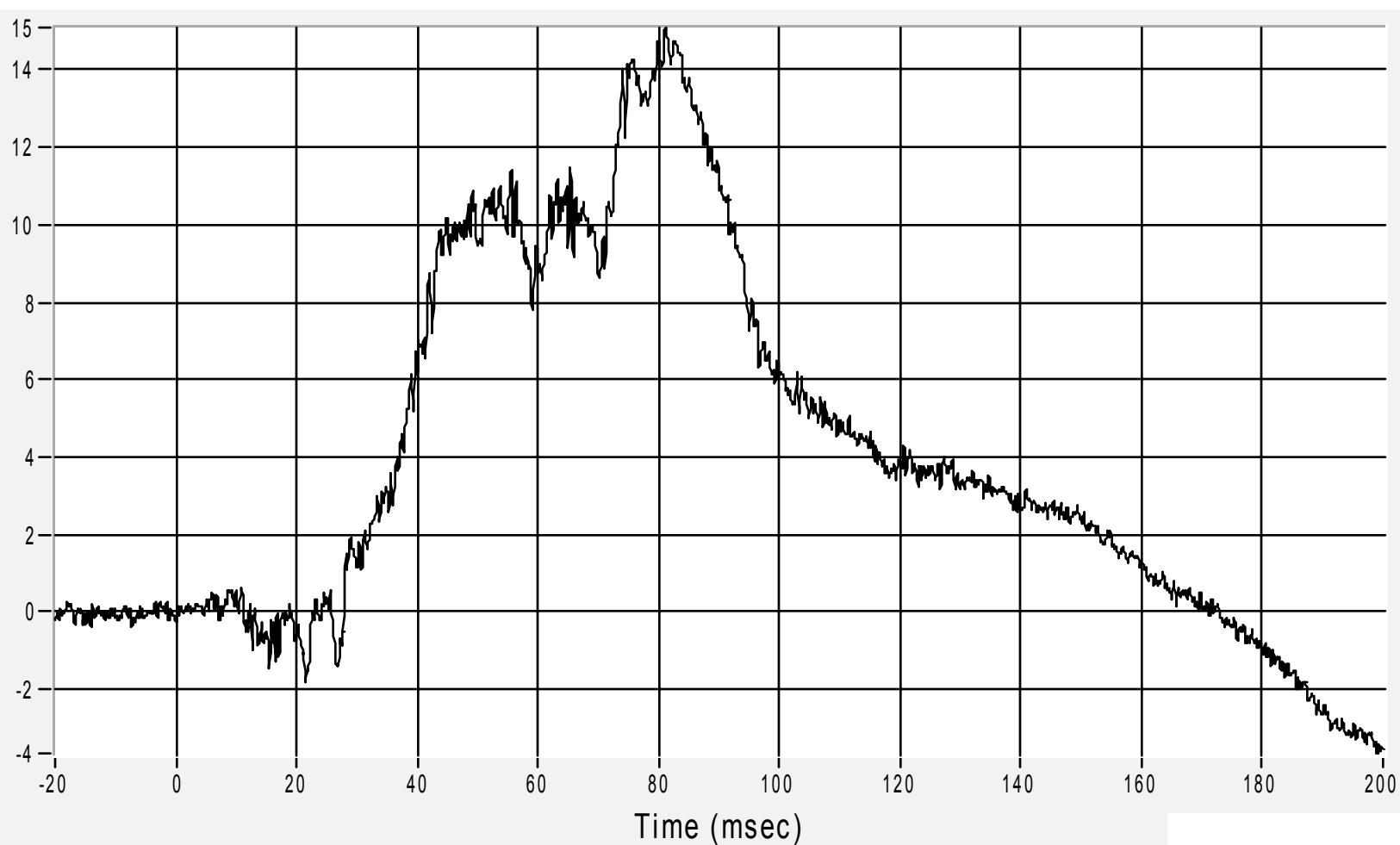


**Driver Head CG (Y) Acceleration**

Acceleration (G's) CFC1000

Max 15.1 G at 81.1 msec

Min -3.7 G at 199.0 msec



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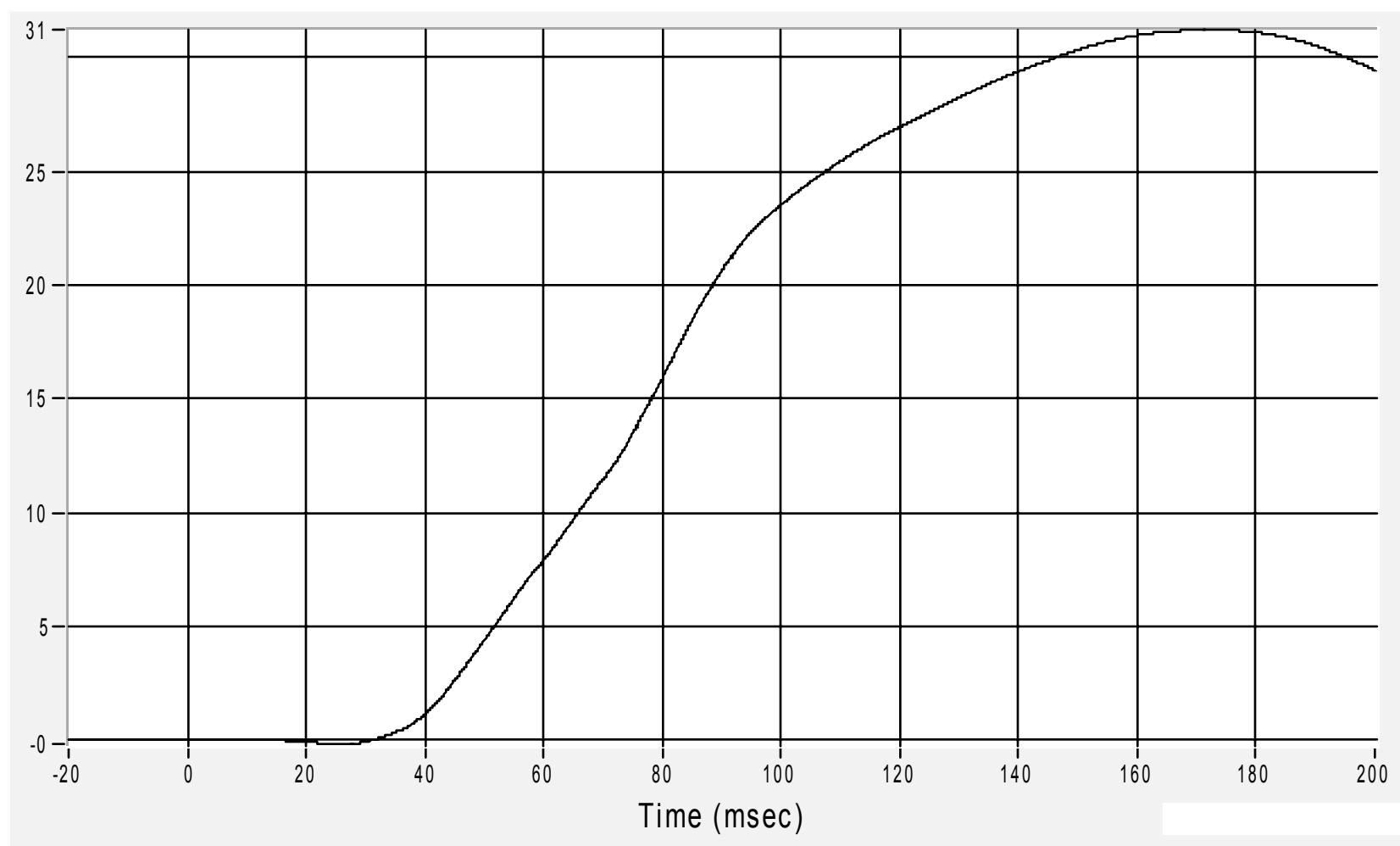
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**Driver Head CG (Y) Velocity**

Velocity (km/h) CFC180

Max 31.2 km/h at 172.7 msec

Min -0.2 km/h at 27.7 msec



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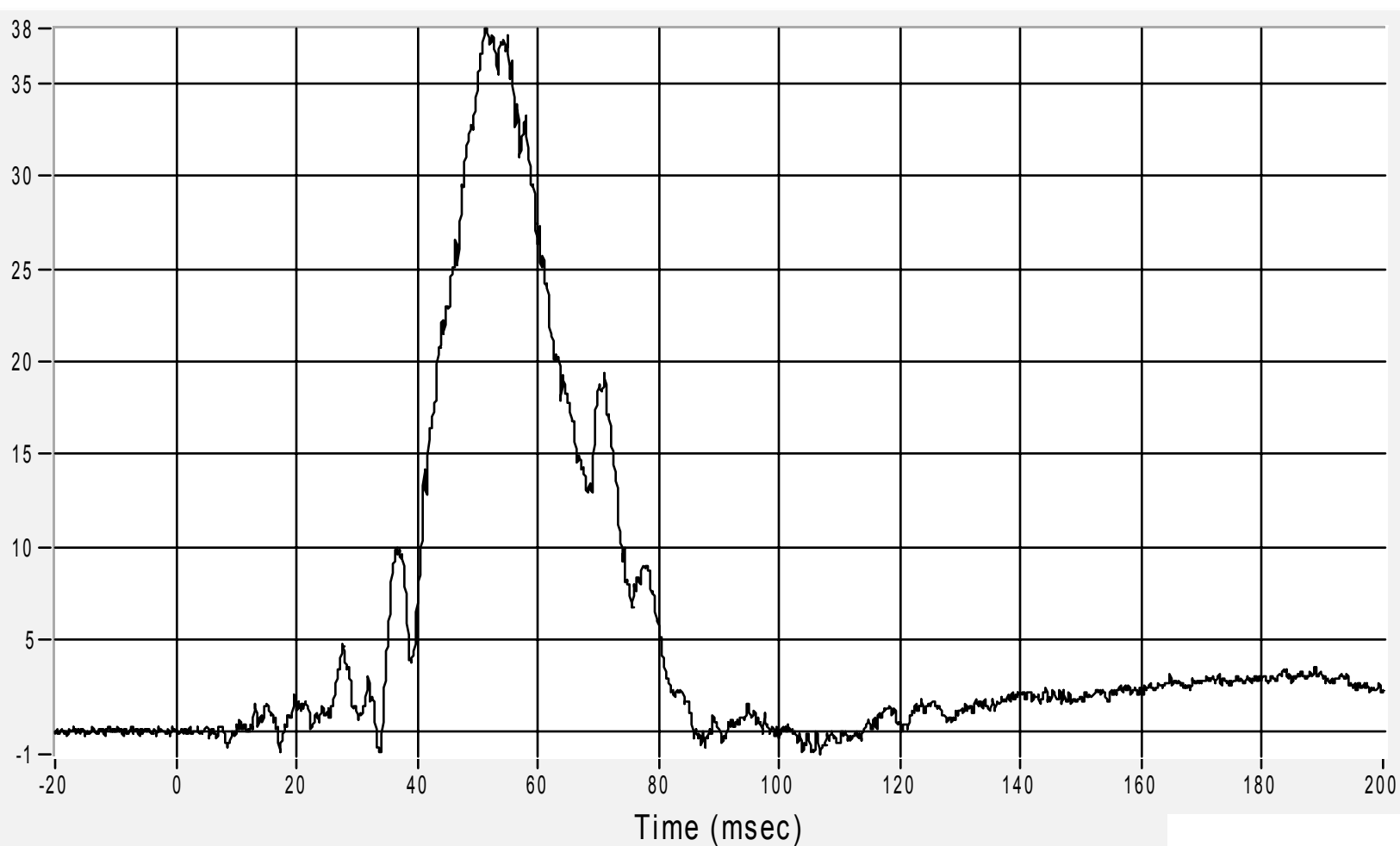


**Driver Head CG (Z) Acceleration**

Acceleration (G's) CFC1000

Max 38.0 G at 51.4 msec

Min -1.2 G at 106.7 msec



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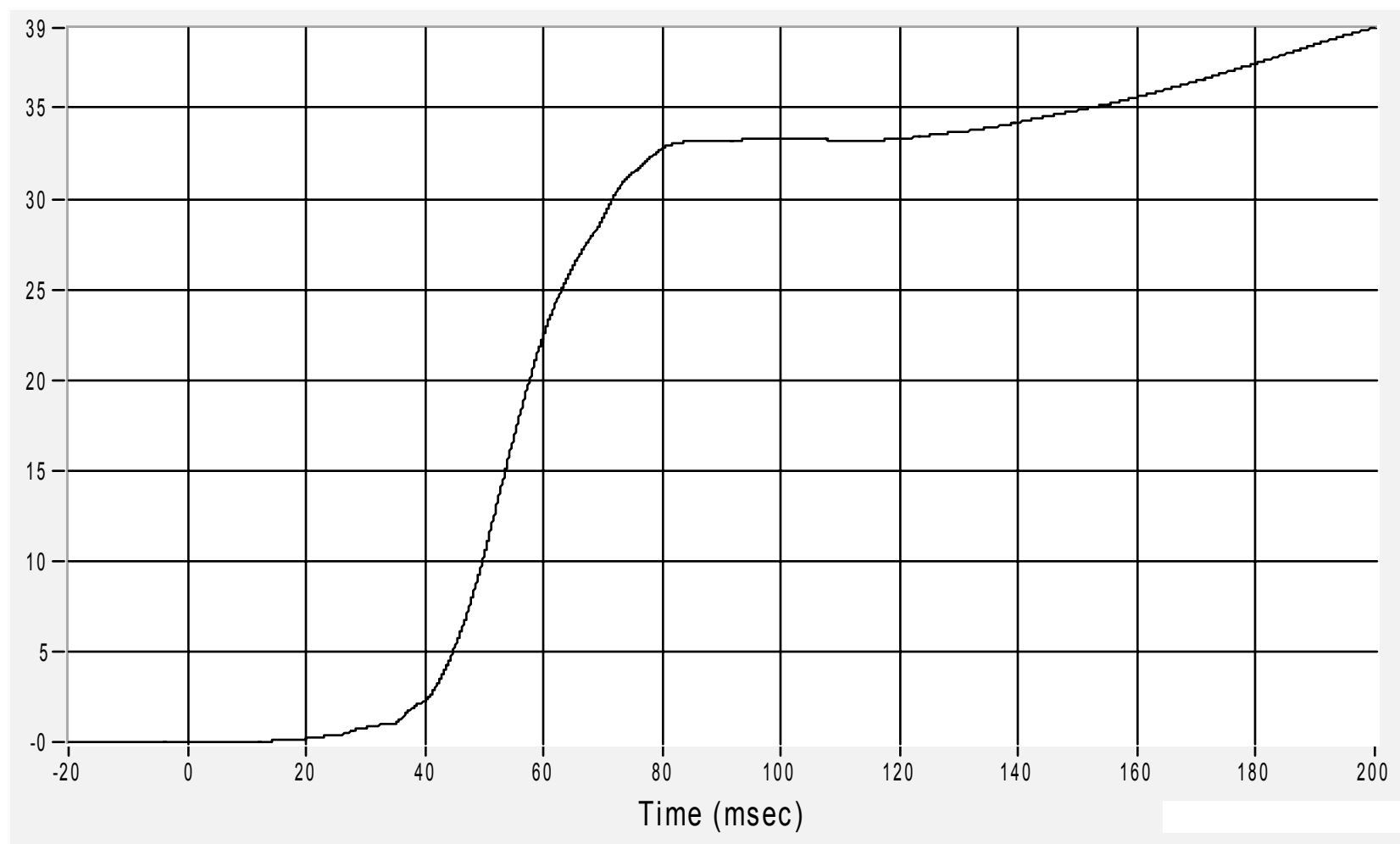
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**Driver Head CG (Z) Velocity**

Velocity (km/h) CFC180

Max 39.4 km/h at 199.9 msec

Min 0.0 km/h at 9.8 msec



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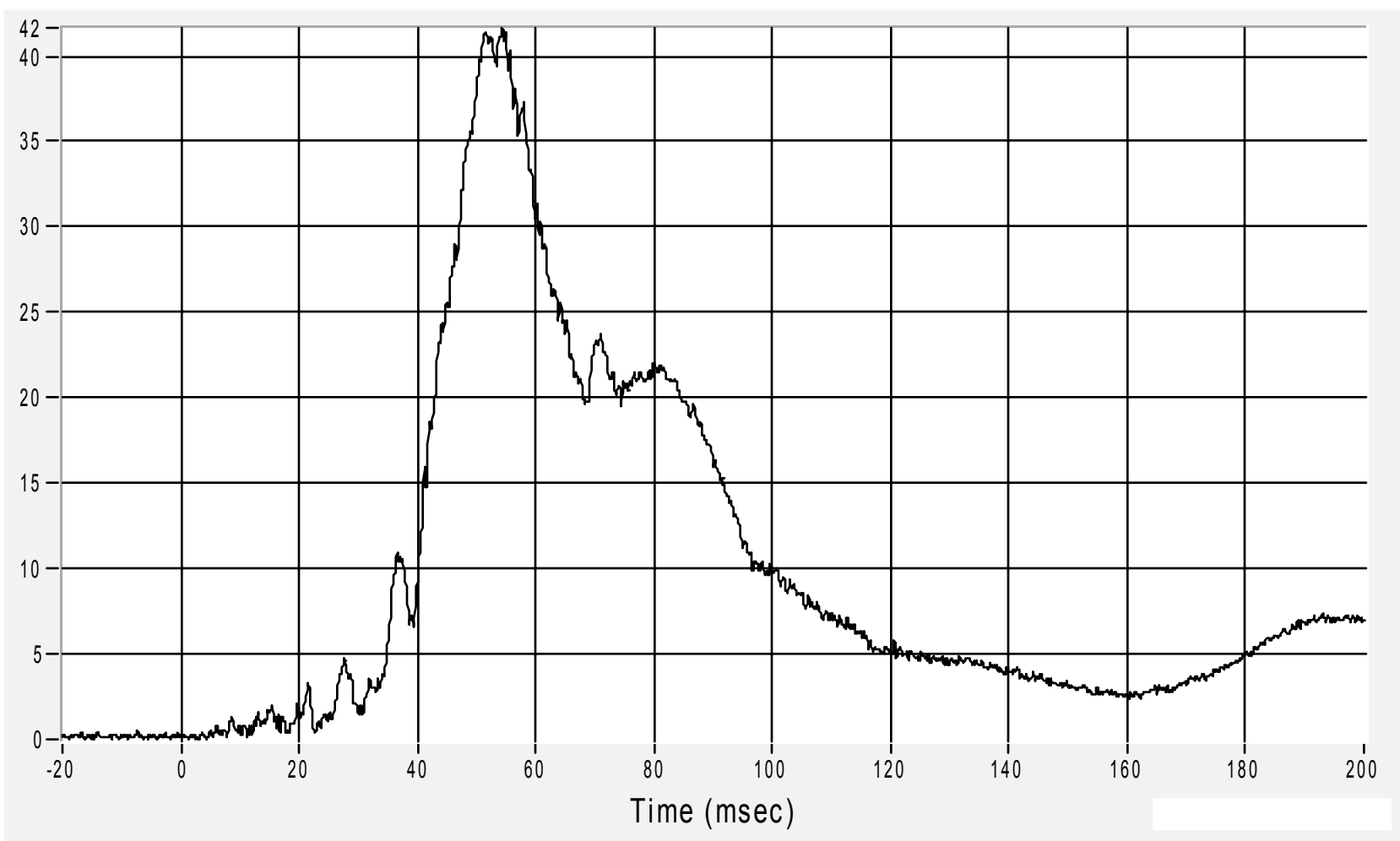
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**Driver Head Resultant Acceleration**

Acceleration (G's) CFC1000

Max 41.6 G's at 54.4 msec

Min 0.0 G's at 2.6 msec



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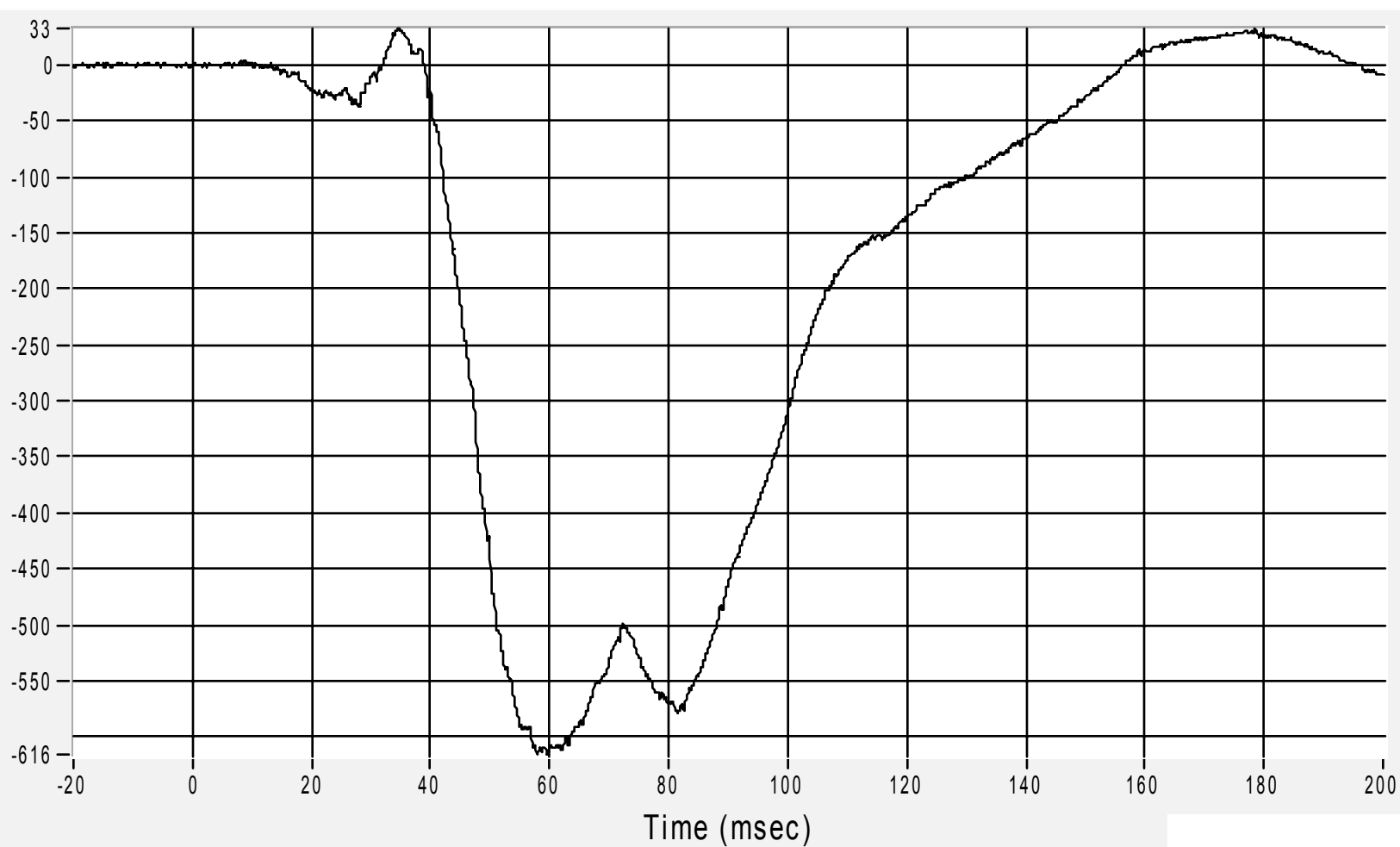
**Driver Upper Neck (X) Force**

Force (N)

CFC1000

Max 33.0 N at 34.6 msec

Min -615.9 N at 57.9 msec



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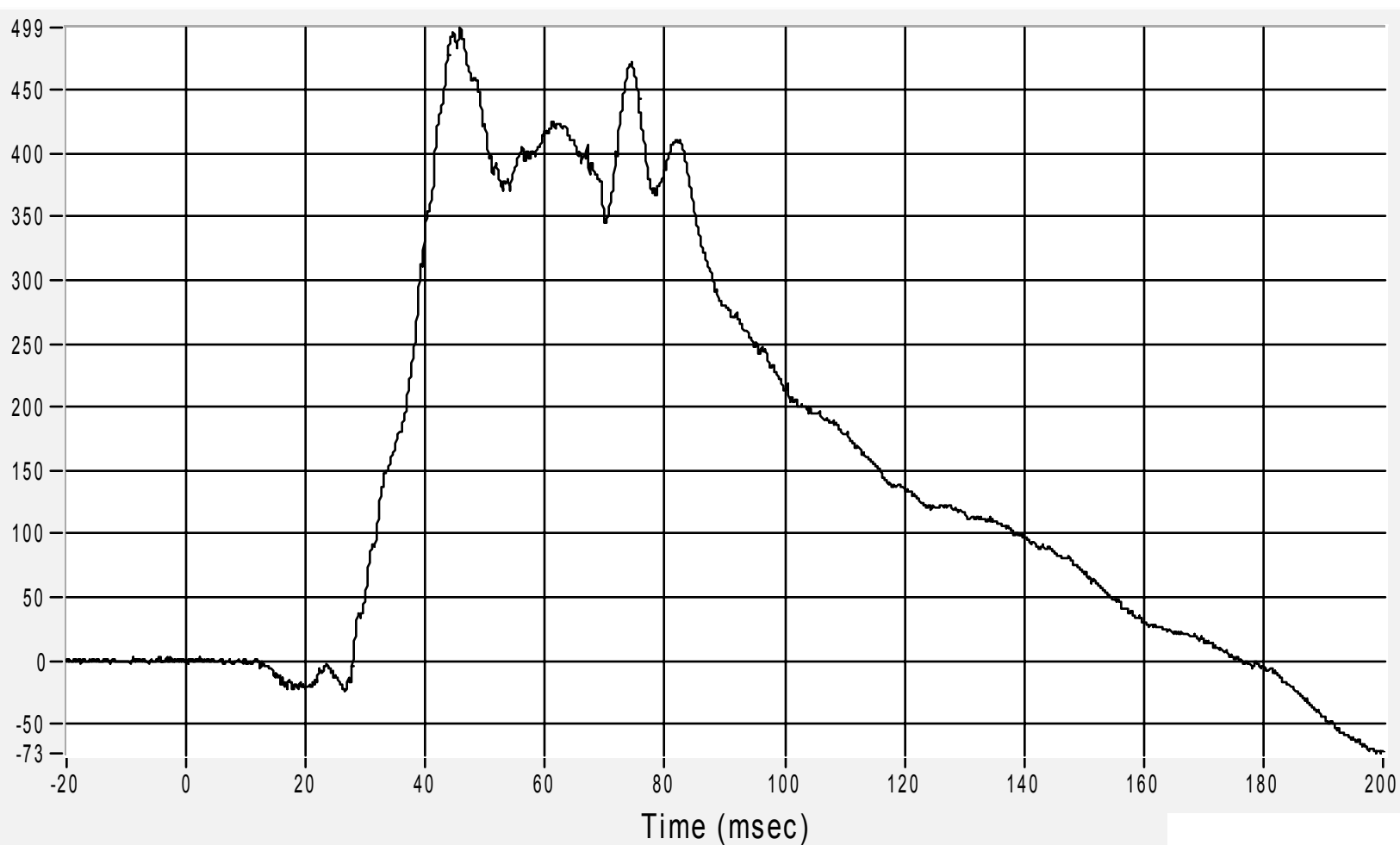
**Driver Upper Neck (Y) Force**

Force (N)

CFC1000

Max 499.0 N at 45.8 msec

Min -73.3 N at 199.6 msec



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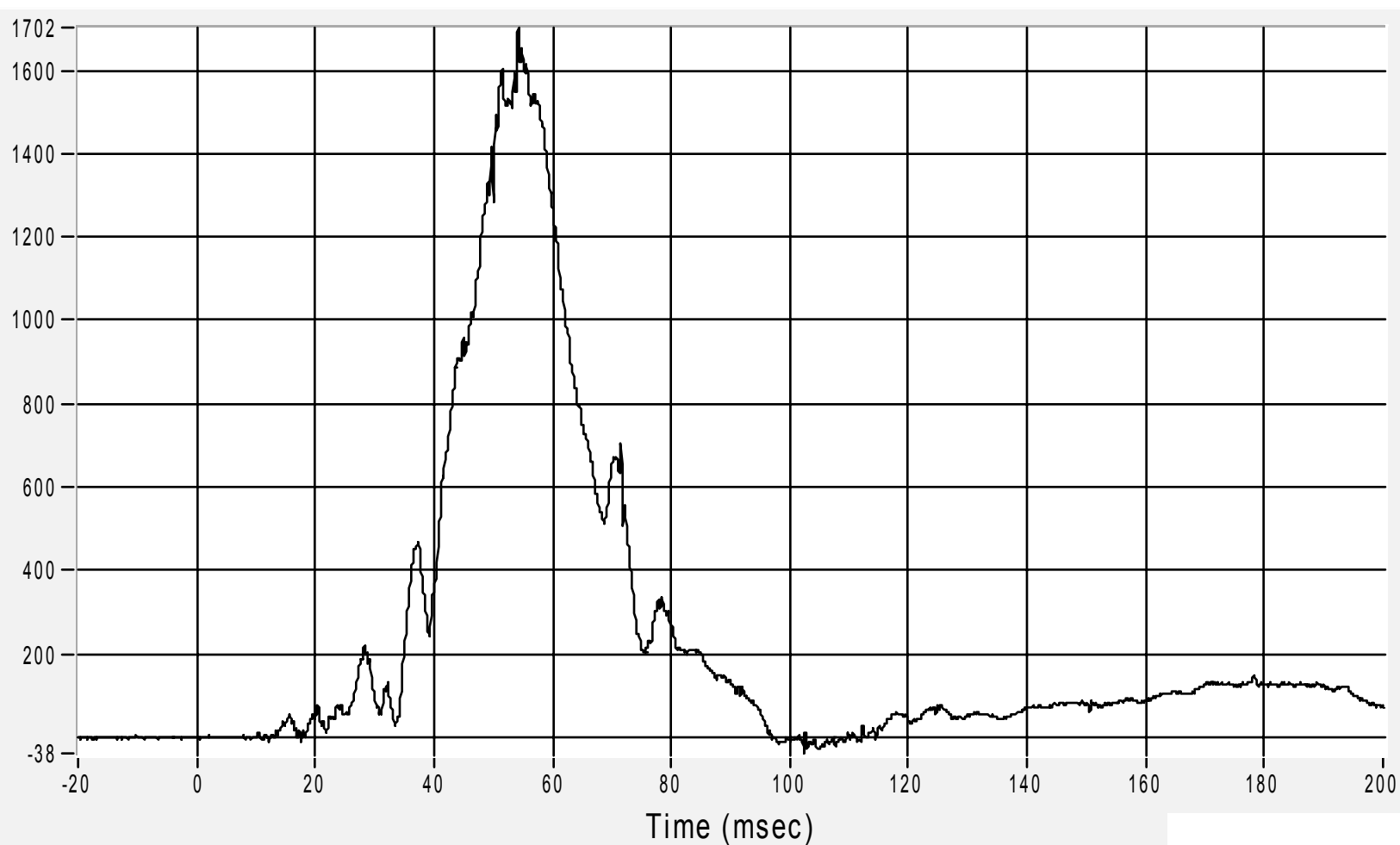
**Driver Upper Neck (Z) Force**

Force (N)

CFC1000

Max 1702.0 N at 54.2 msec

Min -38.3 N at 102.3 msec



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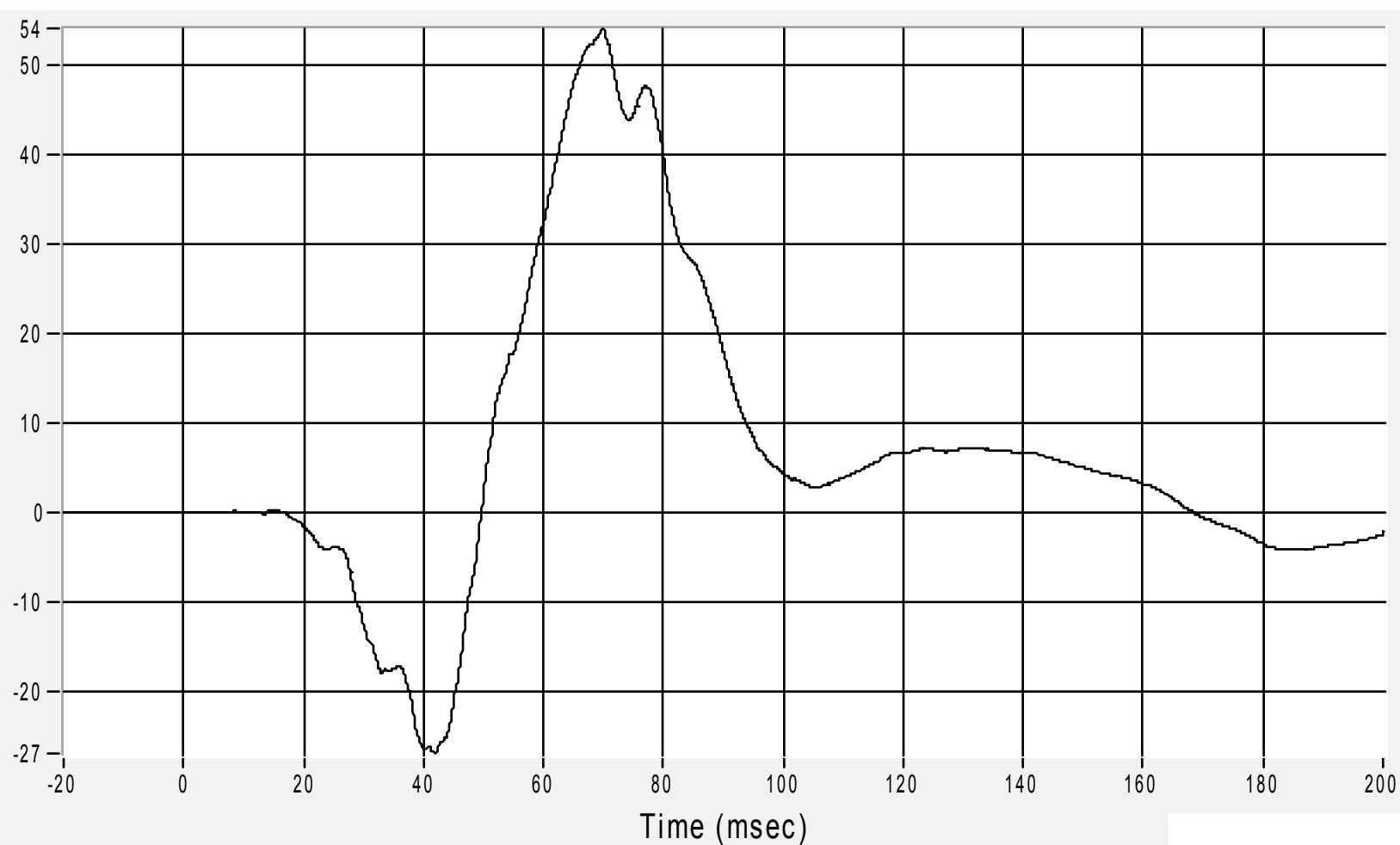


**Driver Upper Neck (X) Moment**

Moment (Nm) CFC600

Max 54.1 Nm at 69.9 msec

Min -26.9 Nm at 42.1 msec



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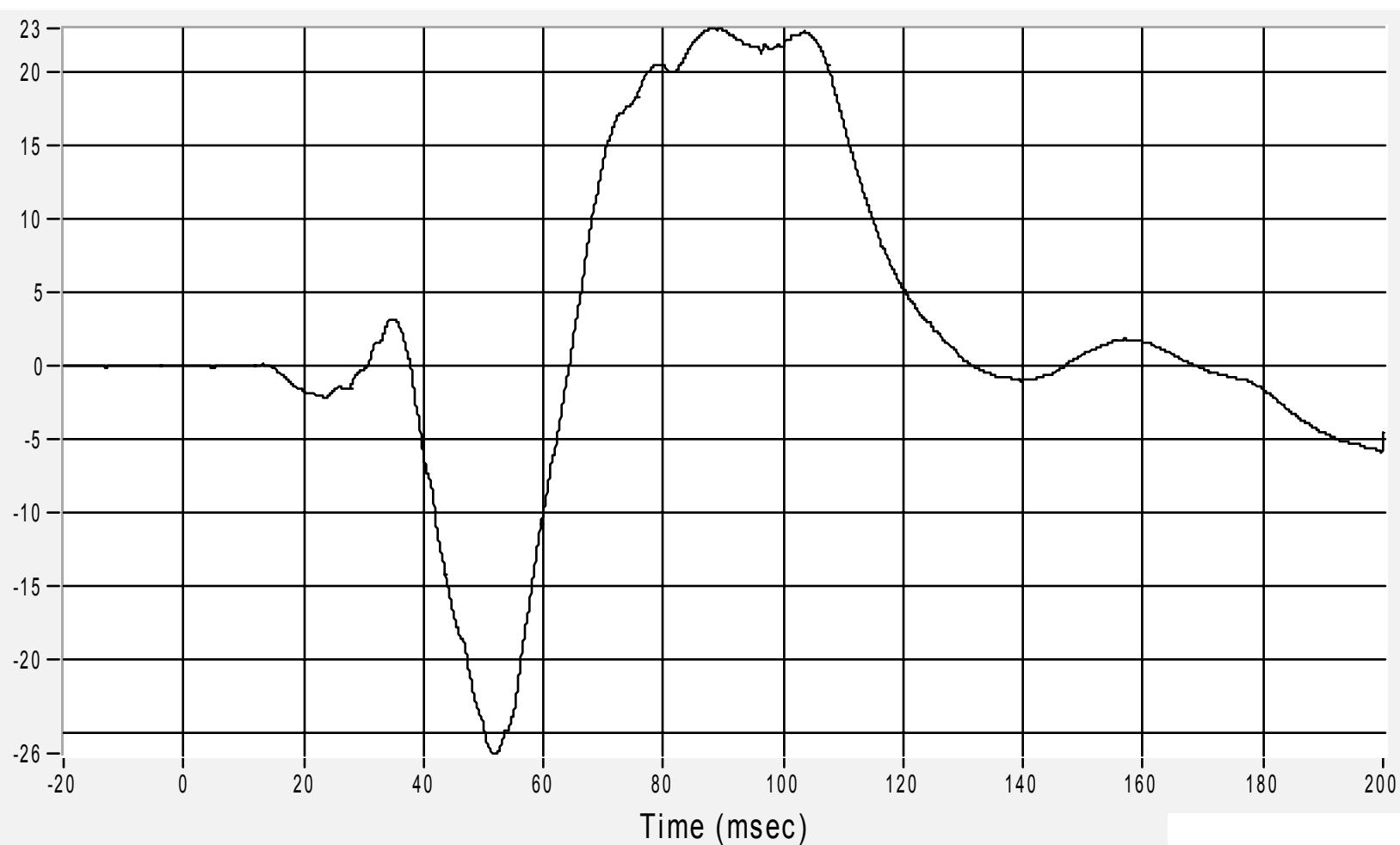
**Driver Upper Neck (Y) Moment**

Moment (Nm)

CFC600

Max 23.0 Nm at 89.3 msec

Min -26.4 Nm at 52.1 msec



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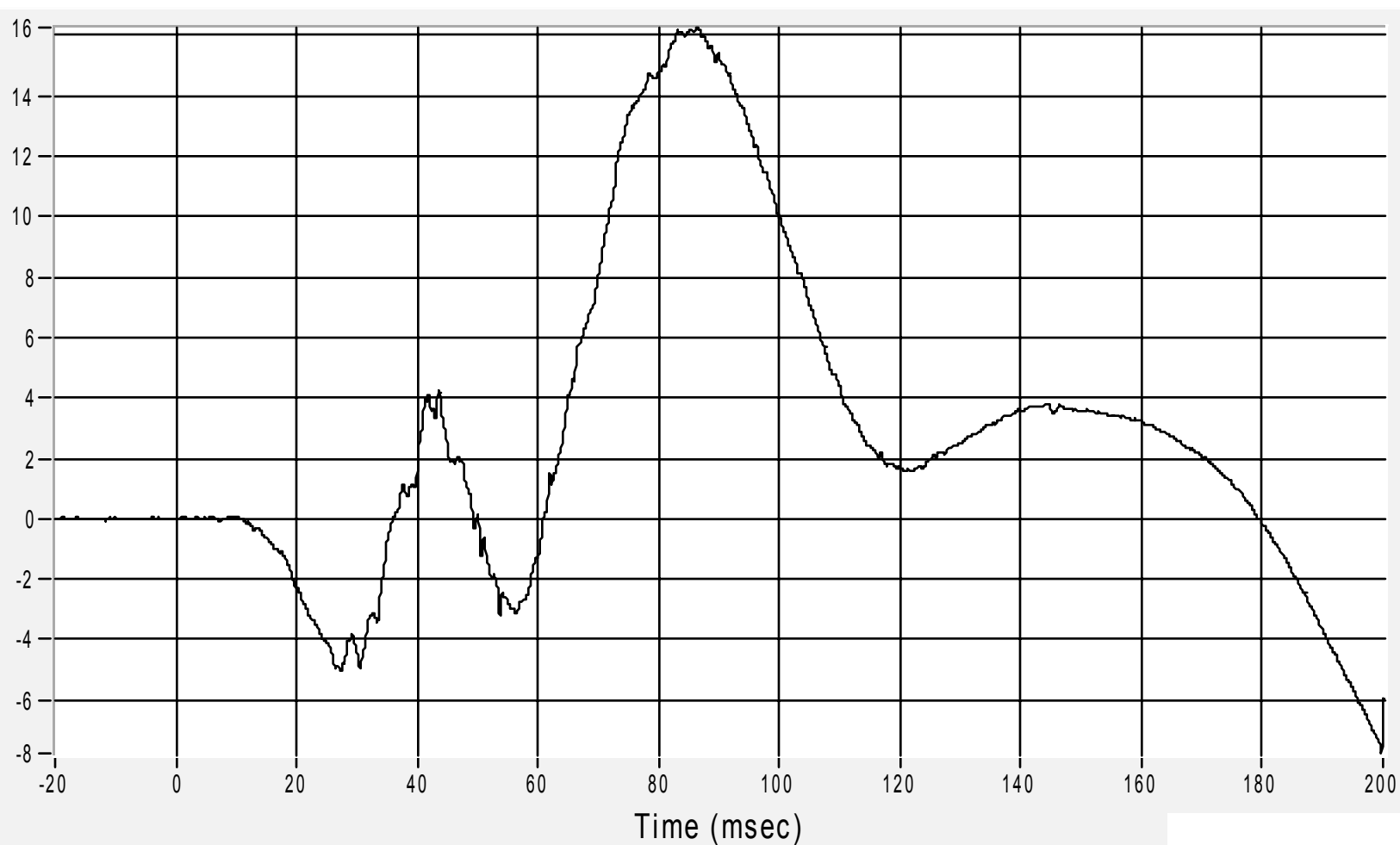
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**Driver Upper Neck (Z) Moment**

Moment (Nm) CFC600

Max 16.3 Nm at 86.6 msec

Min -7.8 Nm at 199.7 msec



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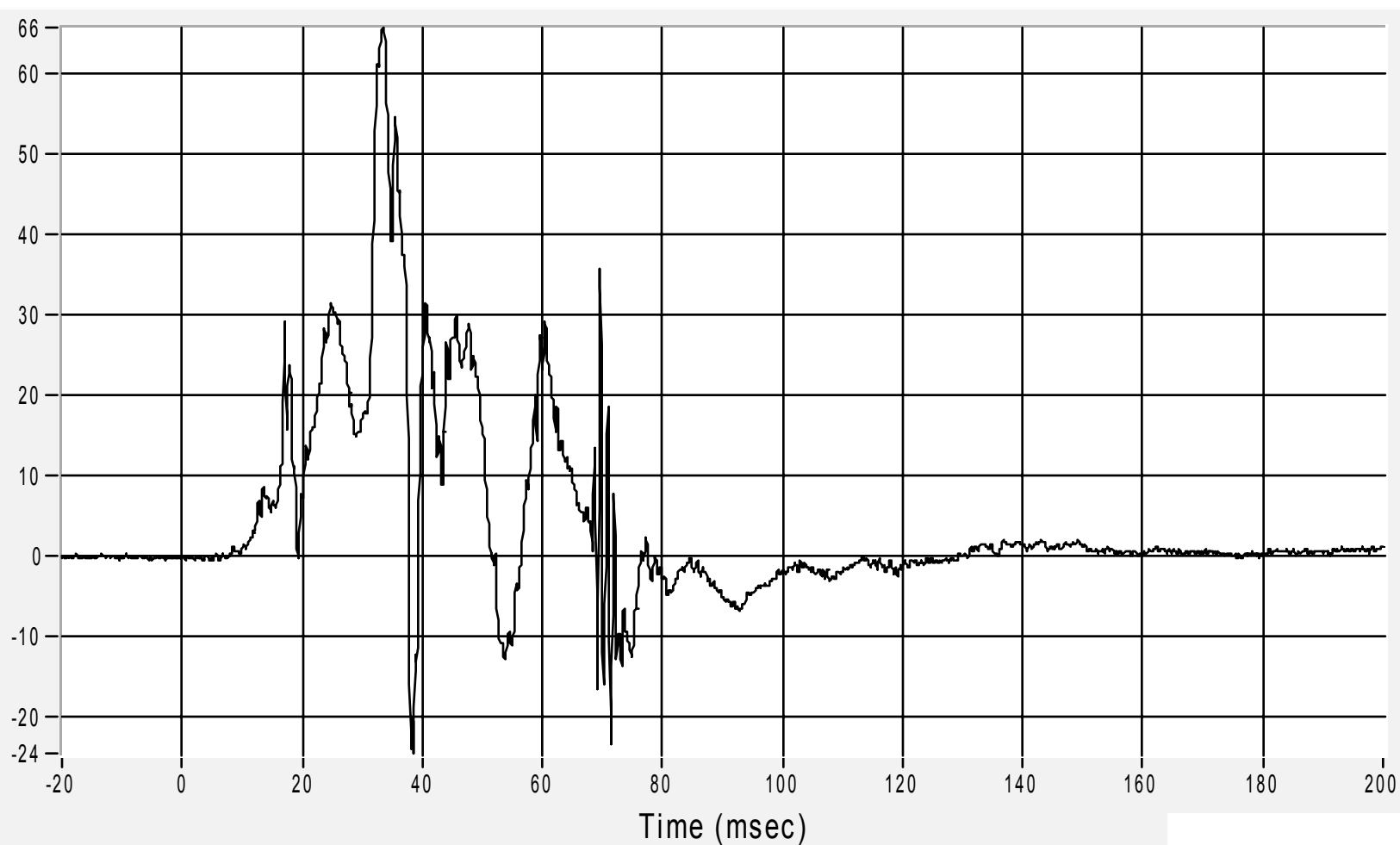


**Driver Upper Rib (Y) Acceleration**

Acceleration (G's) CFC1000

Max 65.6 G at 33.5 msec

Min -24.4 G at 38.6 msec



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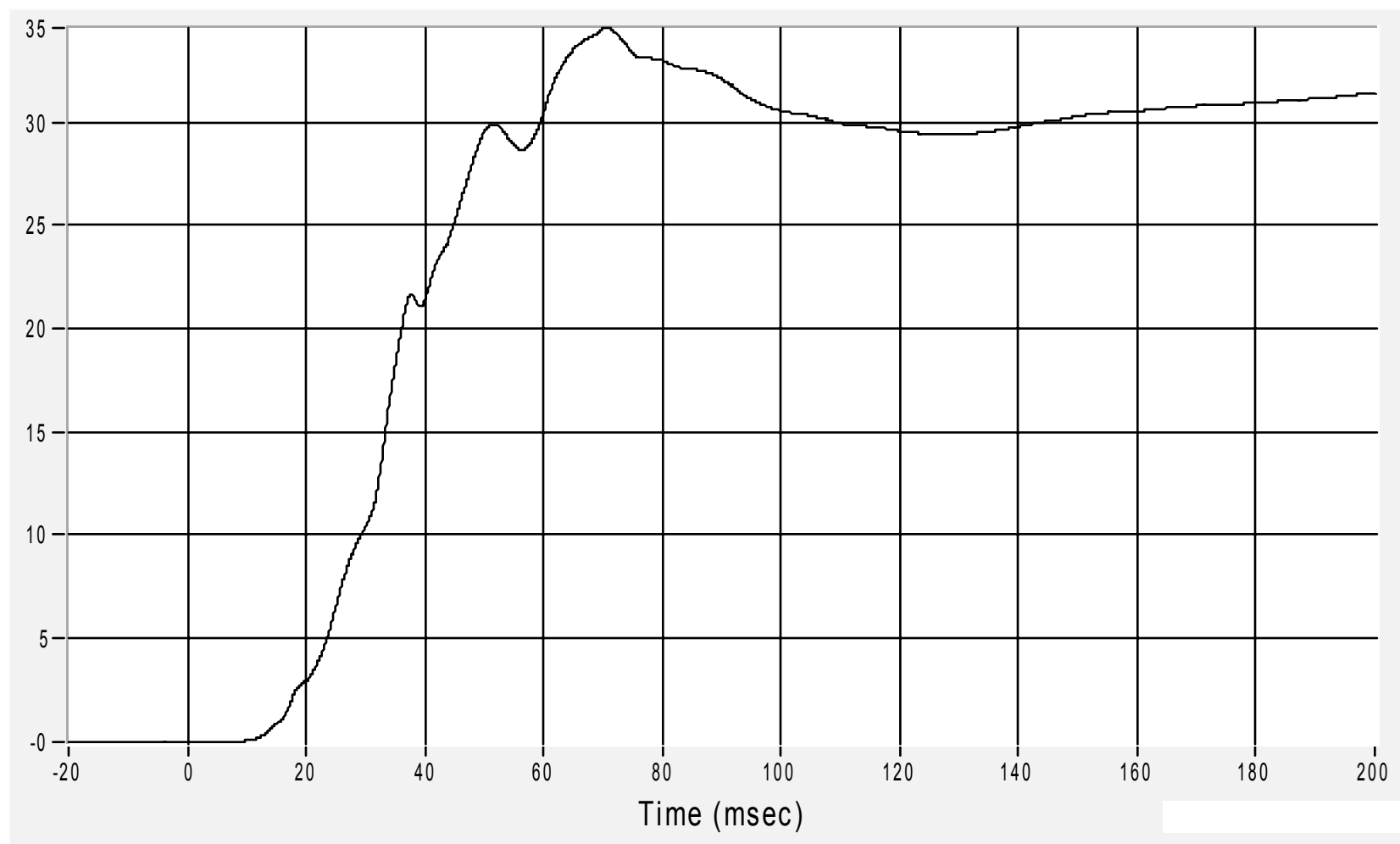
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**Driver Upper Rib (Y) Velocity**

Velocity (km/h) CFC180

Max 34.6 km/h at 70.6 msec

Min 0.0 km/h at 7.0 msec



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30 March 2004

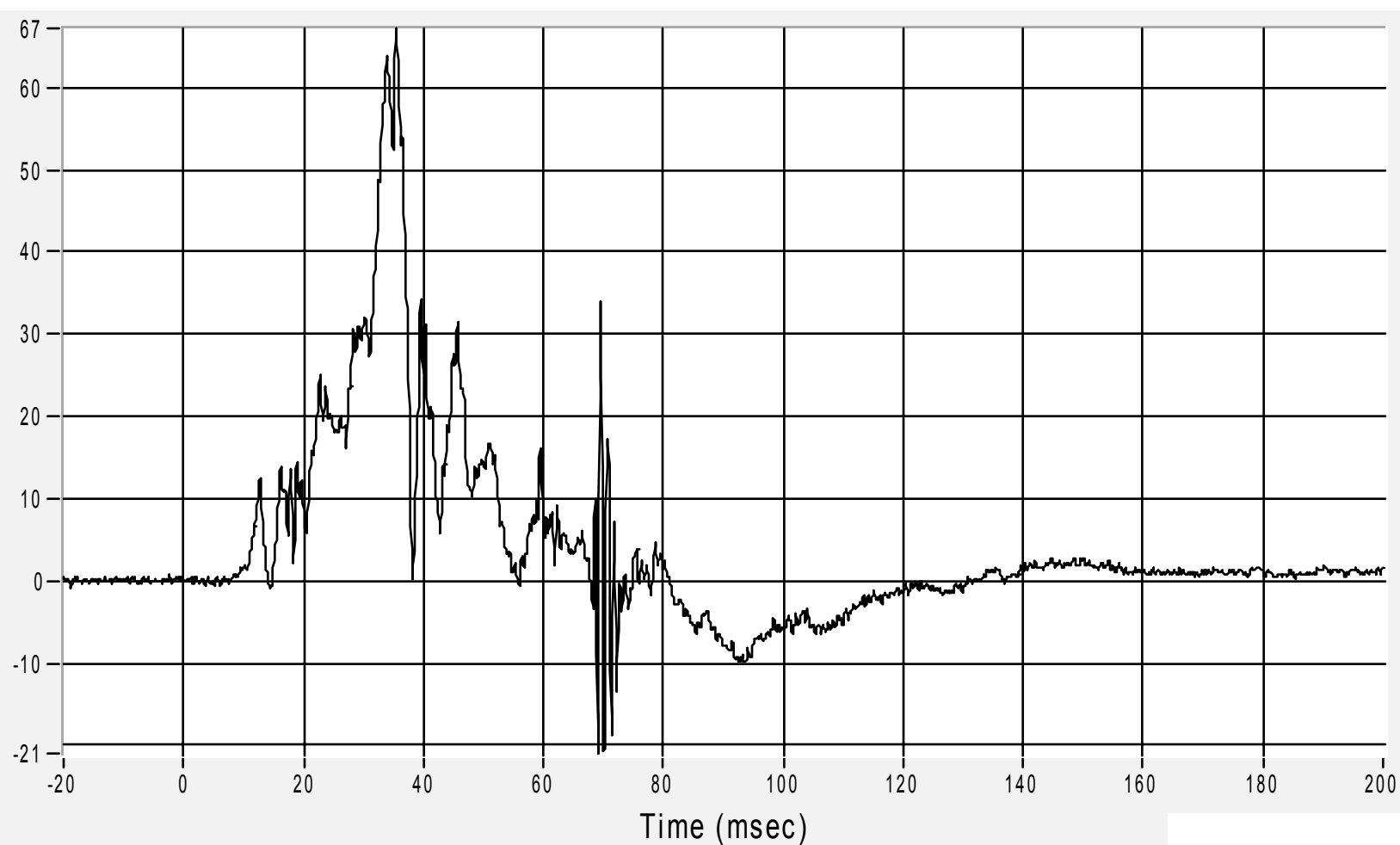
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**Driver Lower Rib (Y) Acceleration**

Acceleration (G's) CFC1000

Max 67.2 G at 35.4 msec

Min -21.0 G at 69.0 msec



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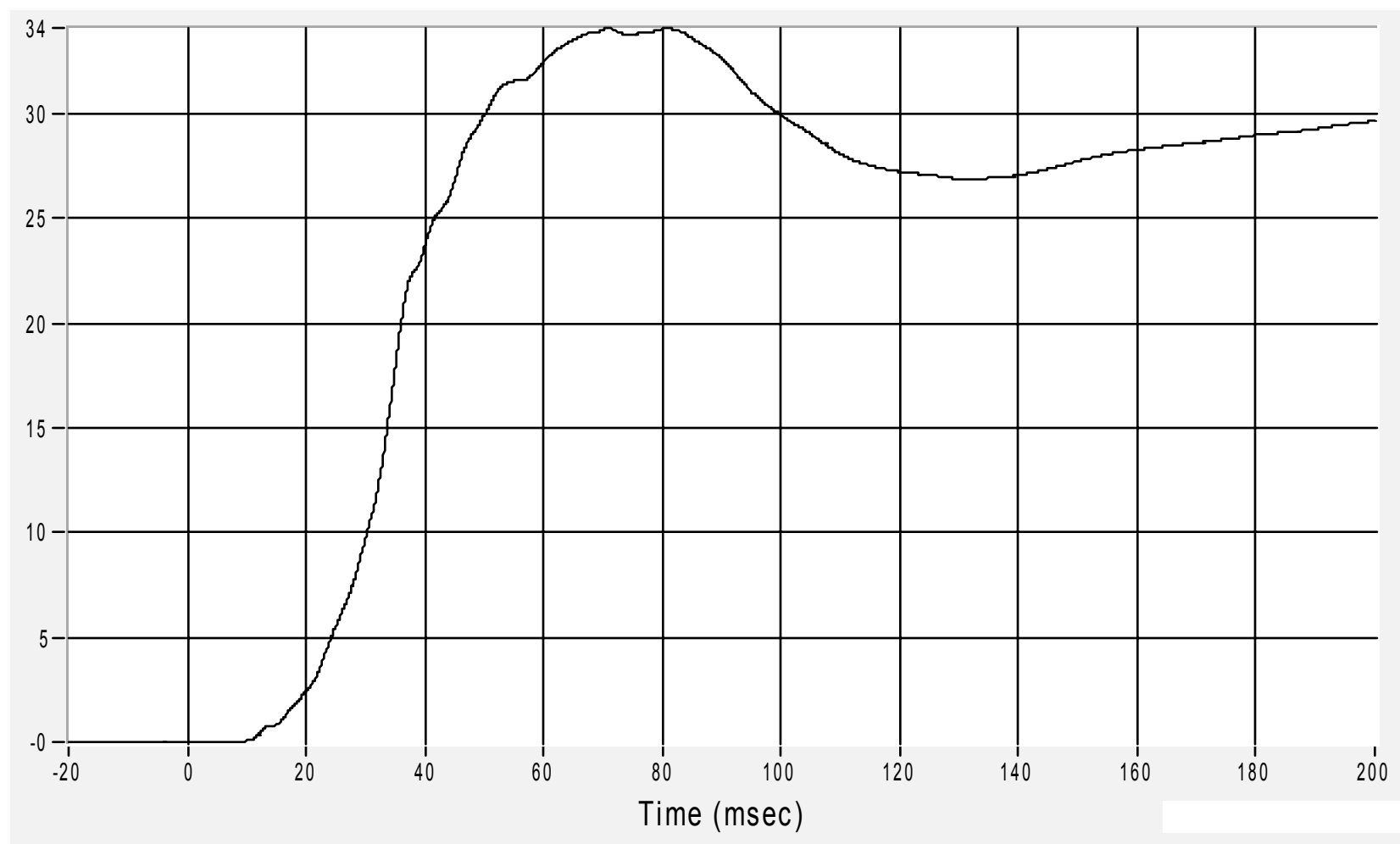


**Driver Lower Rib (Y) Velocity**

Velocity (km/h) CFC180

Max 34.1 km/h at 71.0 msec

Min 0.0 km/h at 6.7 msec



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30 March 2004

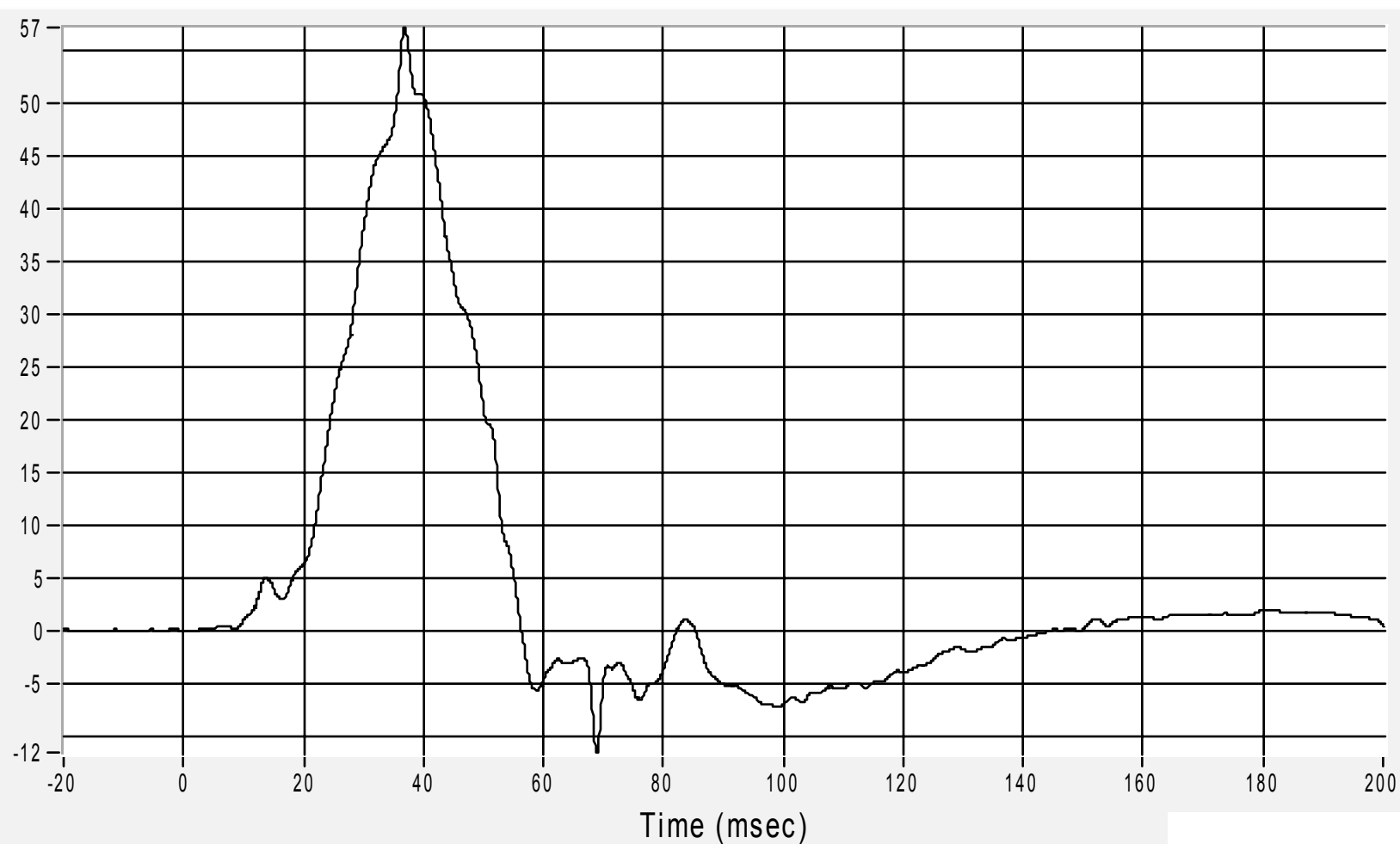
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**Driver Lower Spine (Y) Acceleration**

Acceleration (G's) CFC180

Max 57.2 G at 36.9 msec

Min -11.6 G at 68.9 msec



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30 March 2004

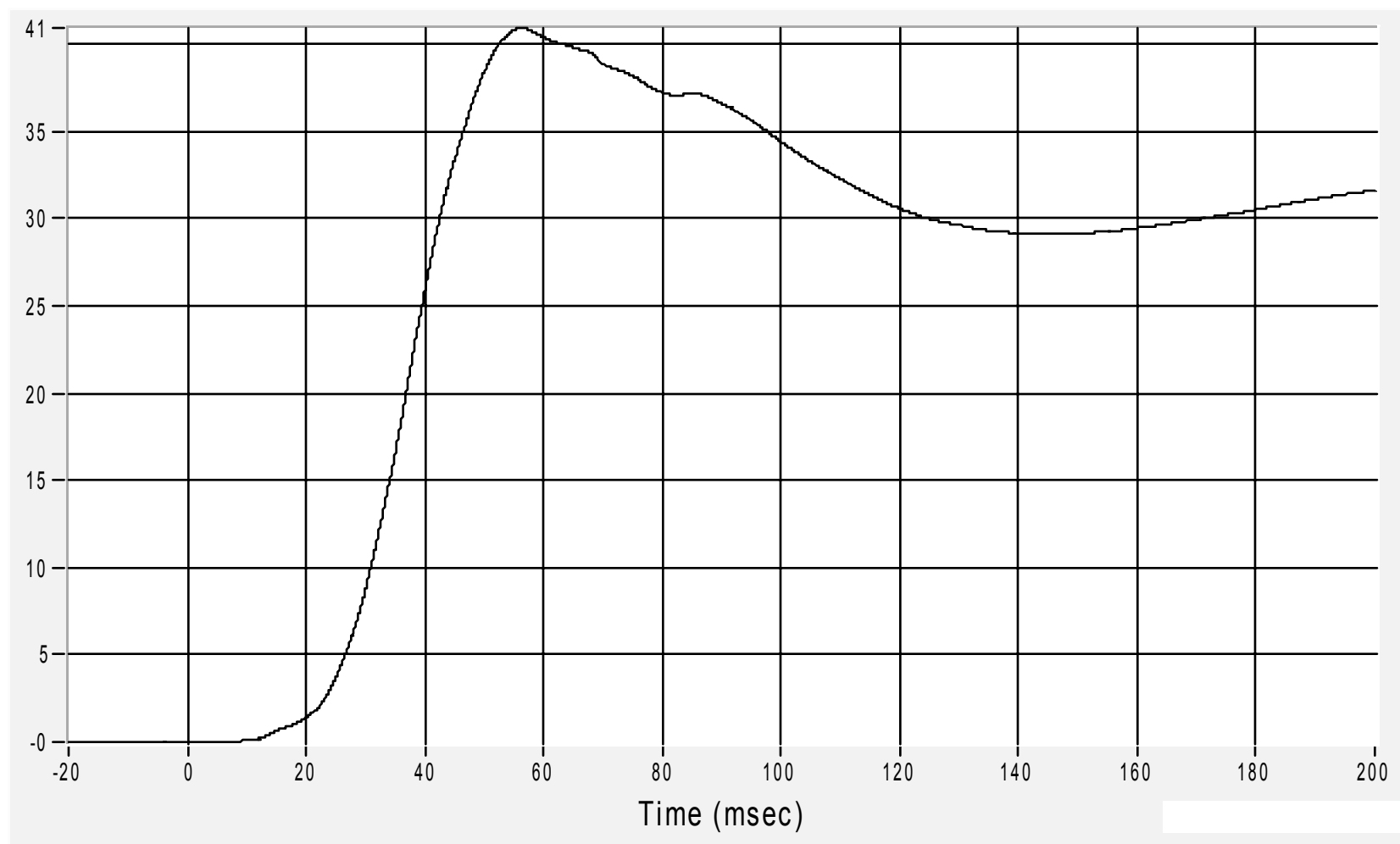
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**Driver Lower Spine (Y) Velocity**

Velocity (km/h) CFC180

Max 40.9 km/h at 56.3 msec

Min 0.0 km/h at 0.8 msec



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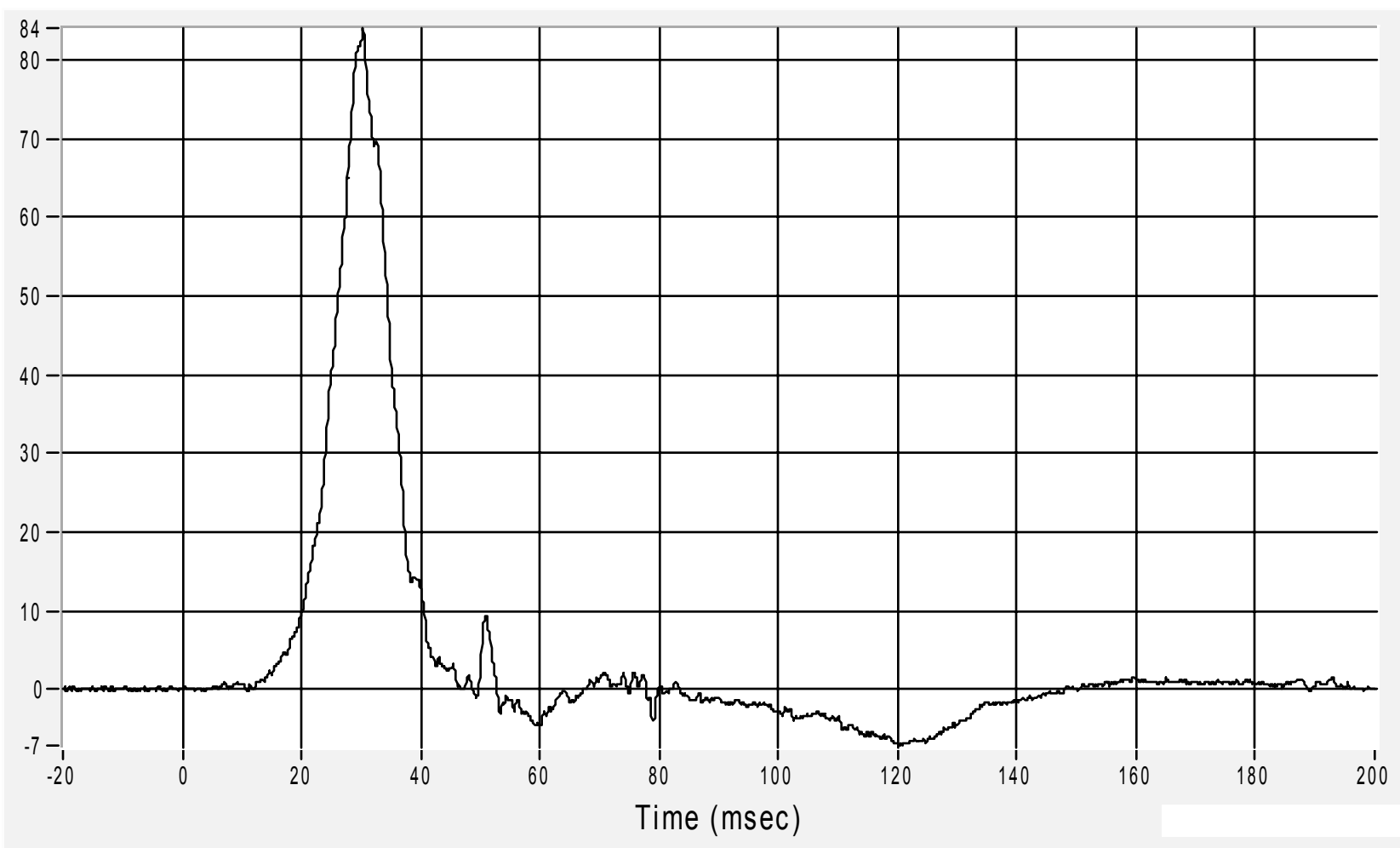


**Driver Pelvic (Y) Acceleration**

Acceleration (G's) CFC1000

Max 84.1 G at 30.3 msec

Min -7.2 G at 120.8 msec



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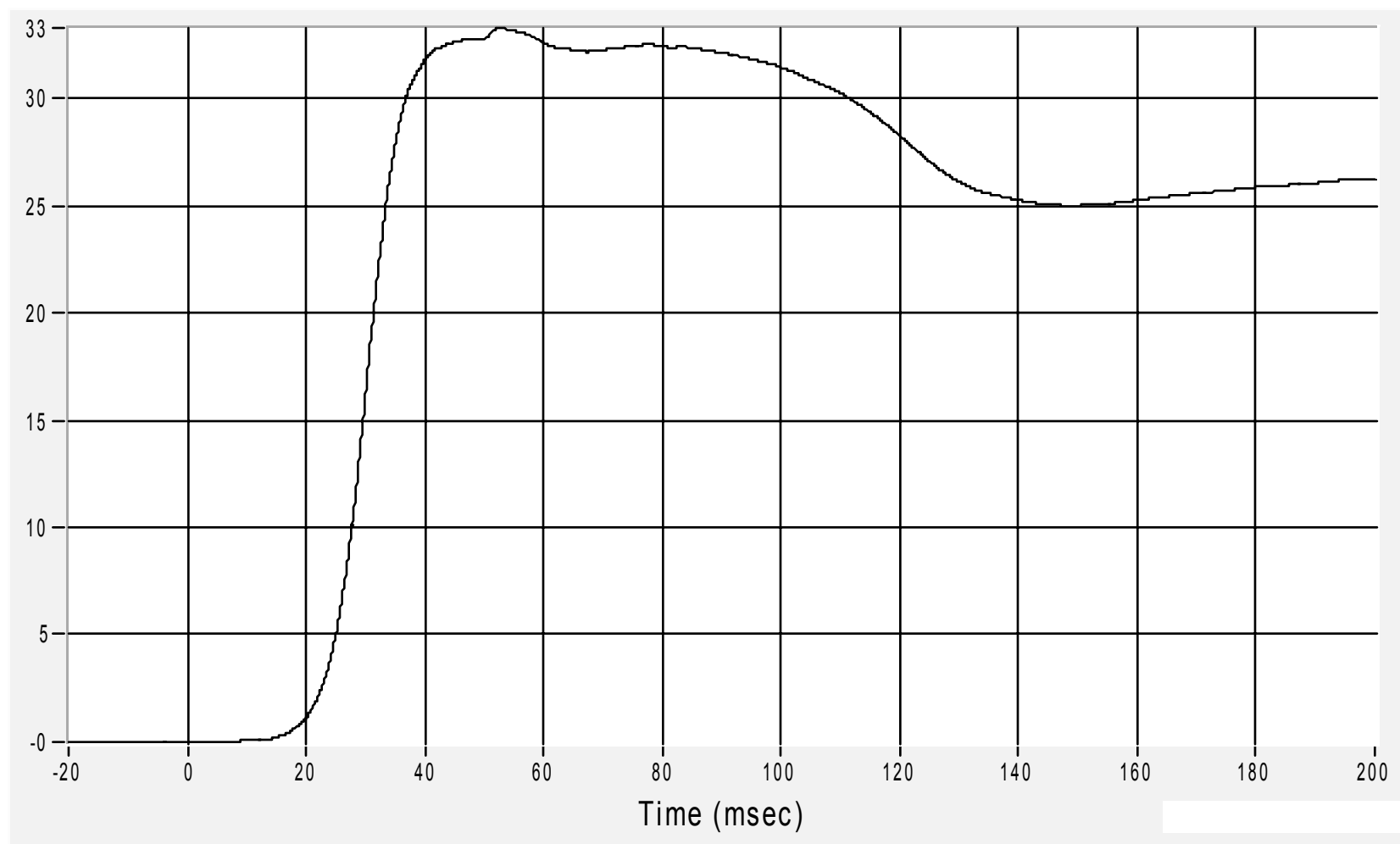
Medical College of Wisconsin  
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**Driver Pelvic (Y) Velocity**

Velocity (km/h) CFC180

Max 33.3 km/h at 52.6 msec

Min 0.0 km/h at 4.4 msec



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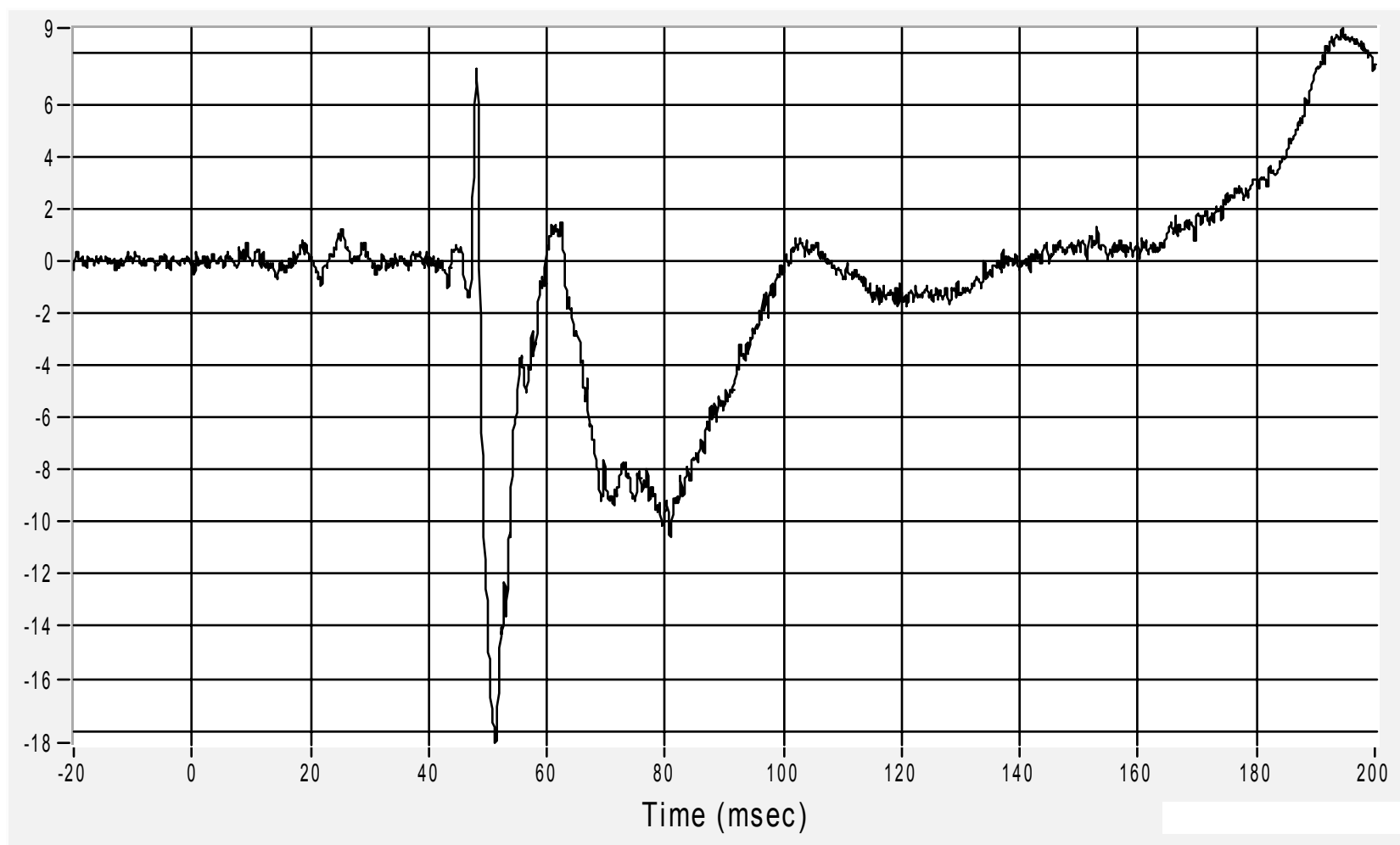
Medical College of Wisconsin  
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**Passenger Head CG (X) Acceleration**

Acceleration (G's) CFC1000

Max 9.0 G at 194.6 msec

Min -18.5 G at 51.3 msec



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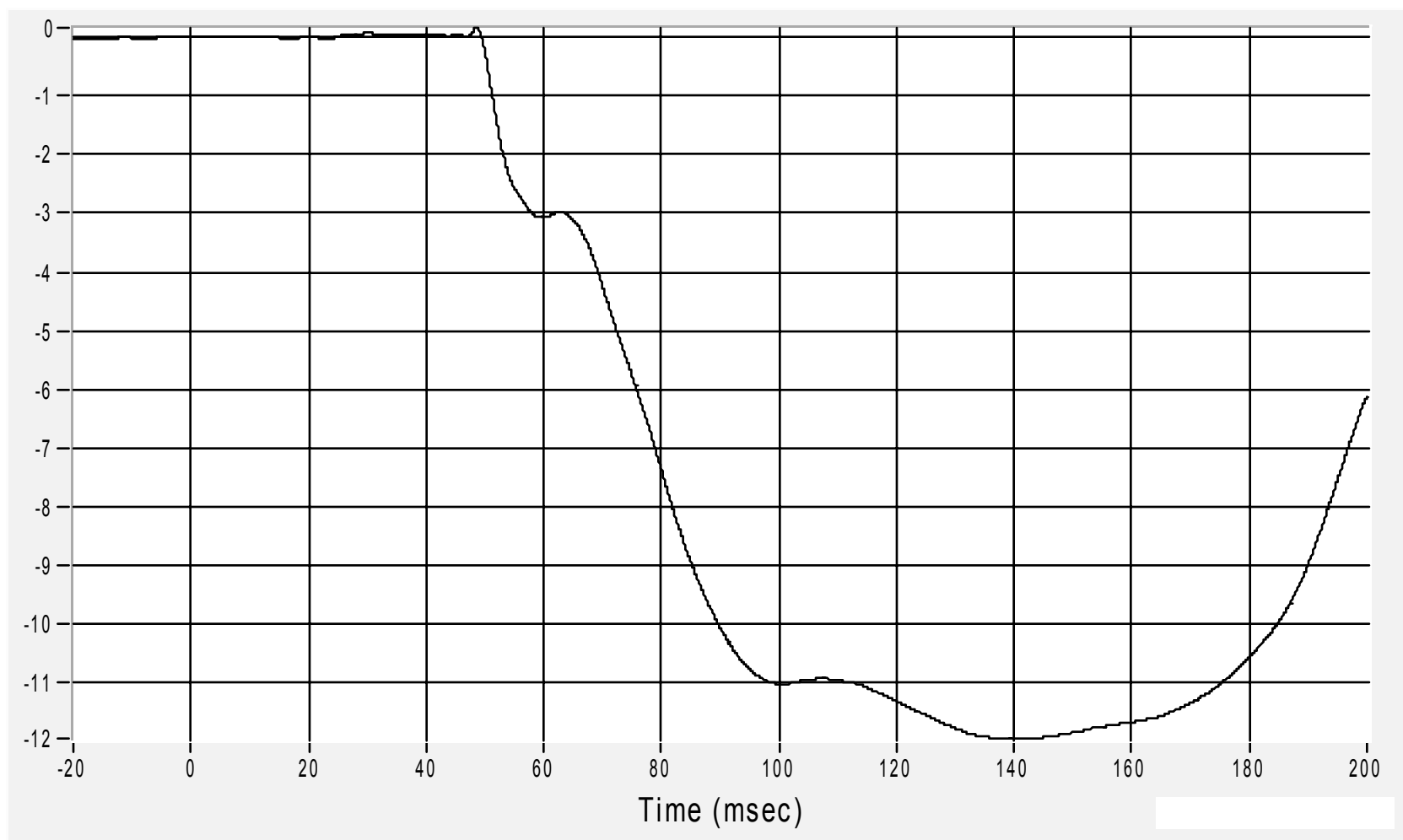


**Passenger Head CG (X) Velocity**

Velocity (km/h) CFC180

Max 0.2 km/h at 48.6 msec

Min -12.0 km/h at 141.9 msec



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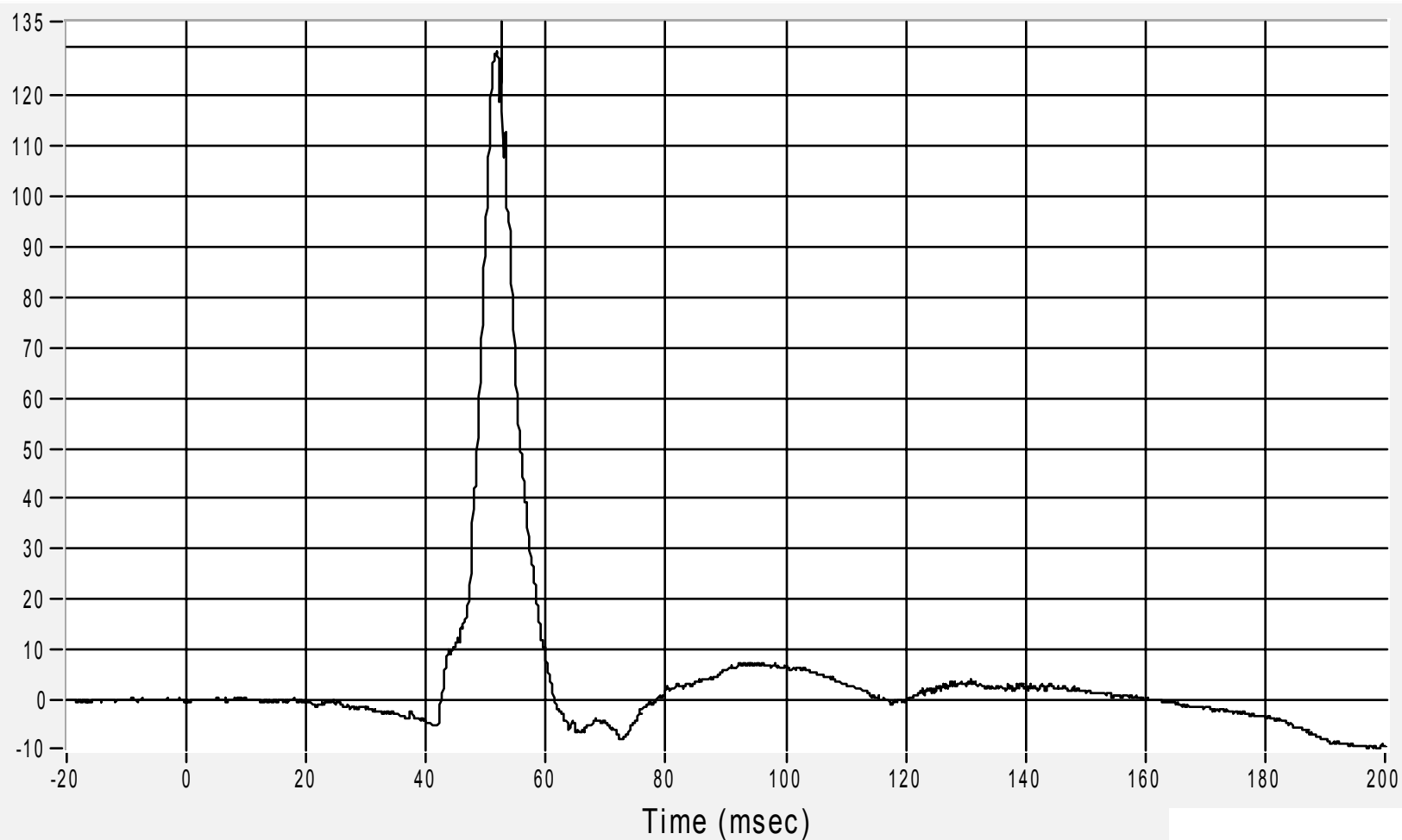
Medical College of Wisconsin  
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**Passenger Head CG (Y) Acceleration**

Acceleration (G's) CFC1000

Max 134.8 G at 52.6 msec

Min -9.6 G at 197.1 msec



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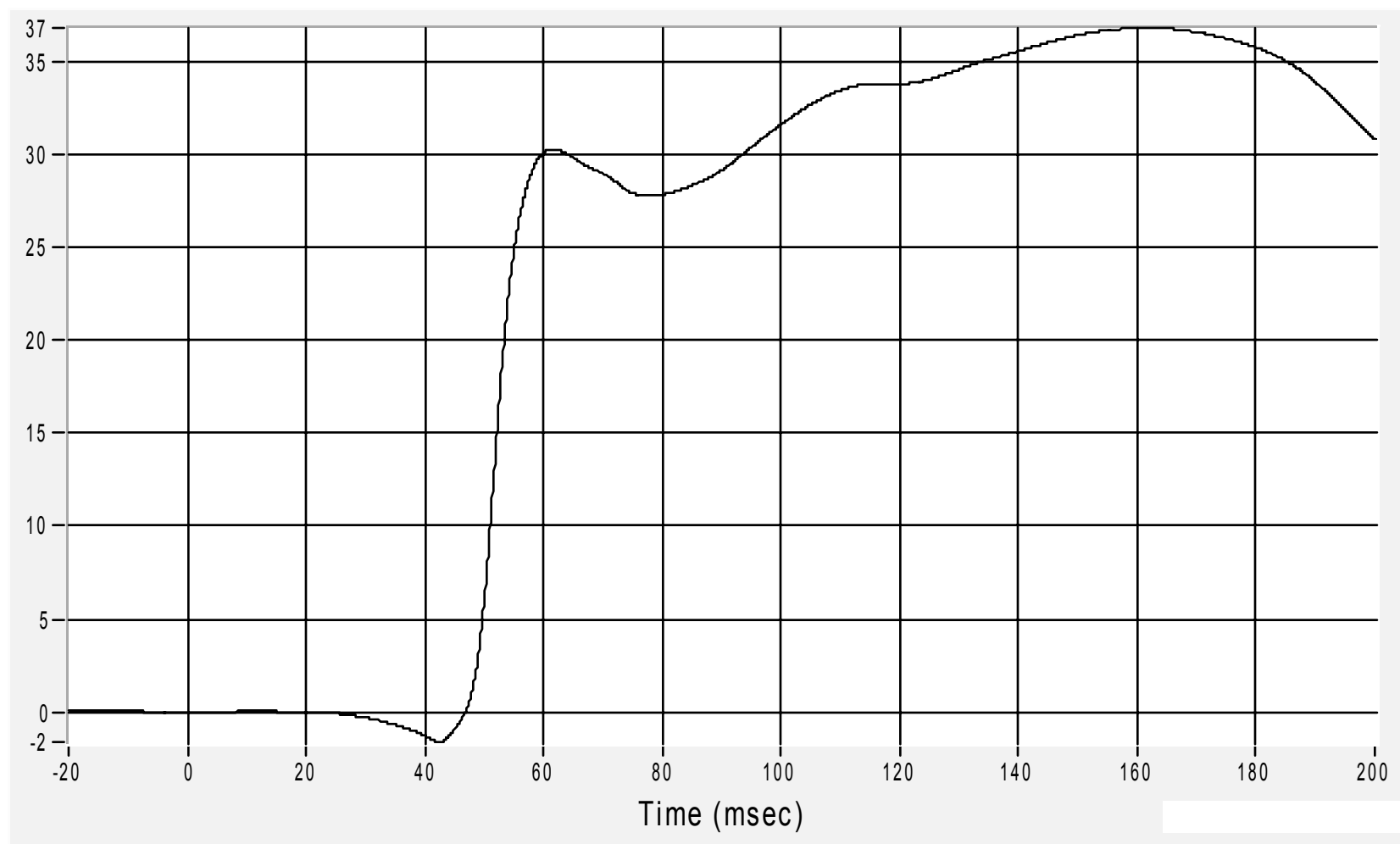
Medical College of Wisconsin  
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**Passenger Head CG (Y) Velocity**

Velocity (km/h) CFC180

Max 36.8 km/h at 161.6 msec

Min -1.6 km/h at 42.4 msec



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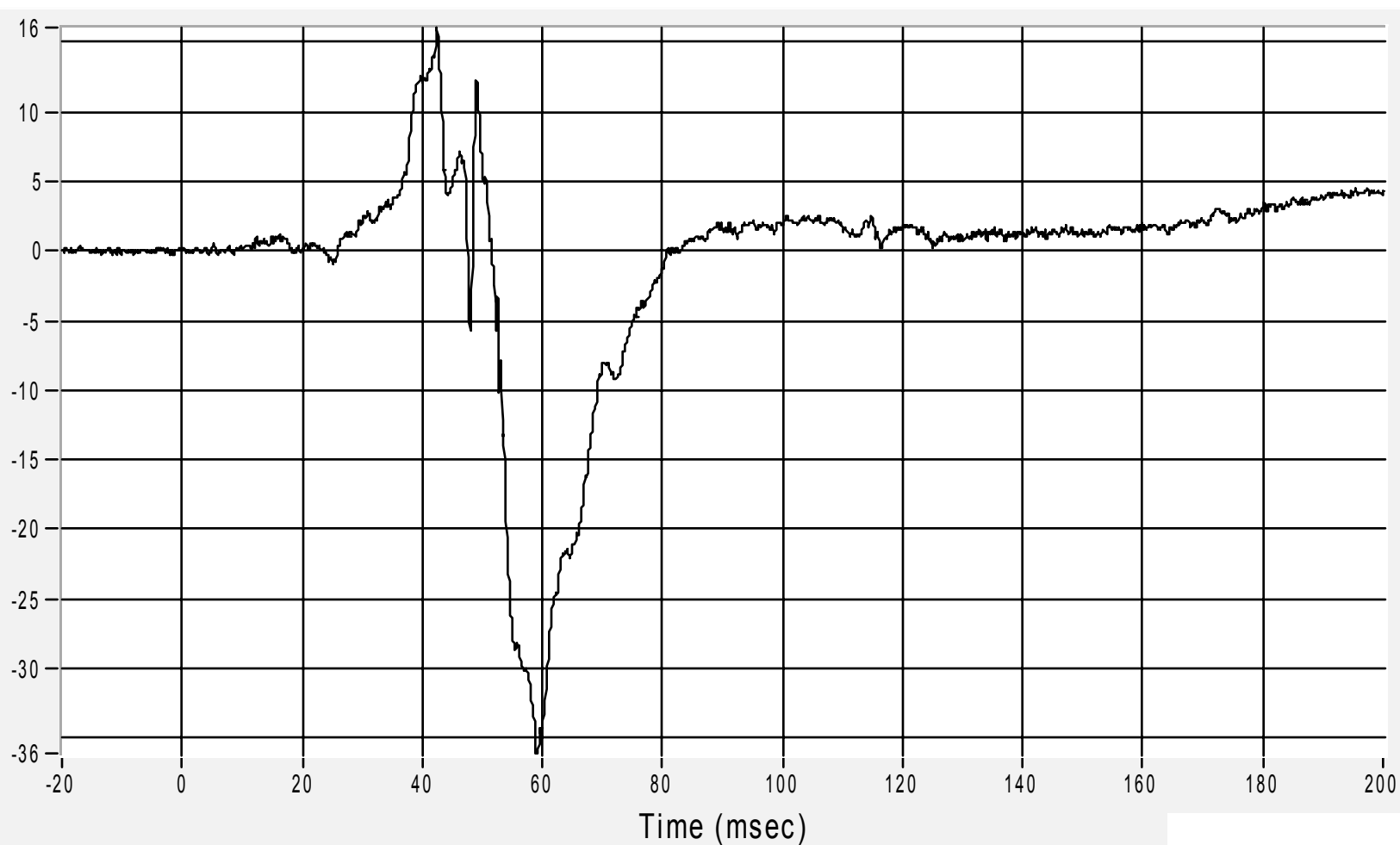


**Passenger Head CG (Z) Acceleration**

Acceleration (G's) CFC1000

Max 16.1 G at 42.4 msec

Min -36.1 G at 59.2 msec



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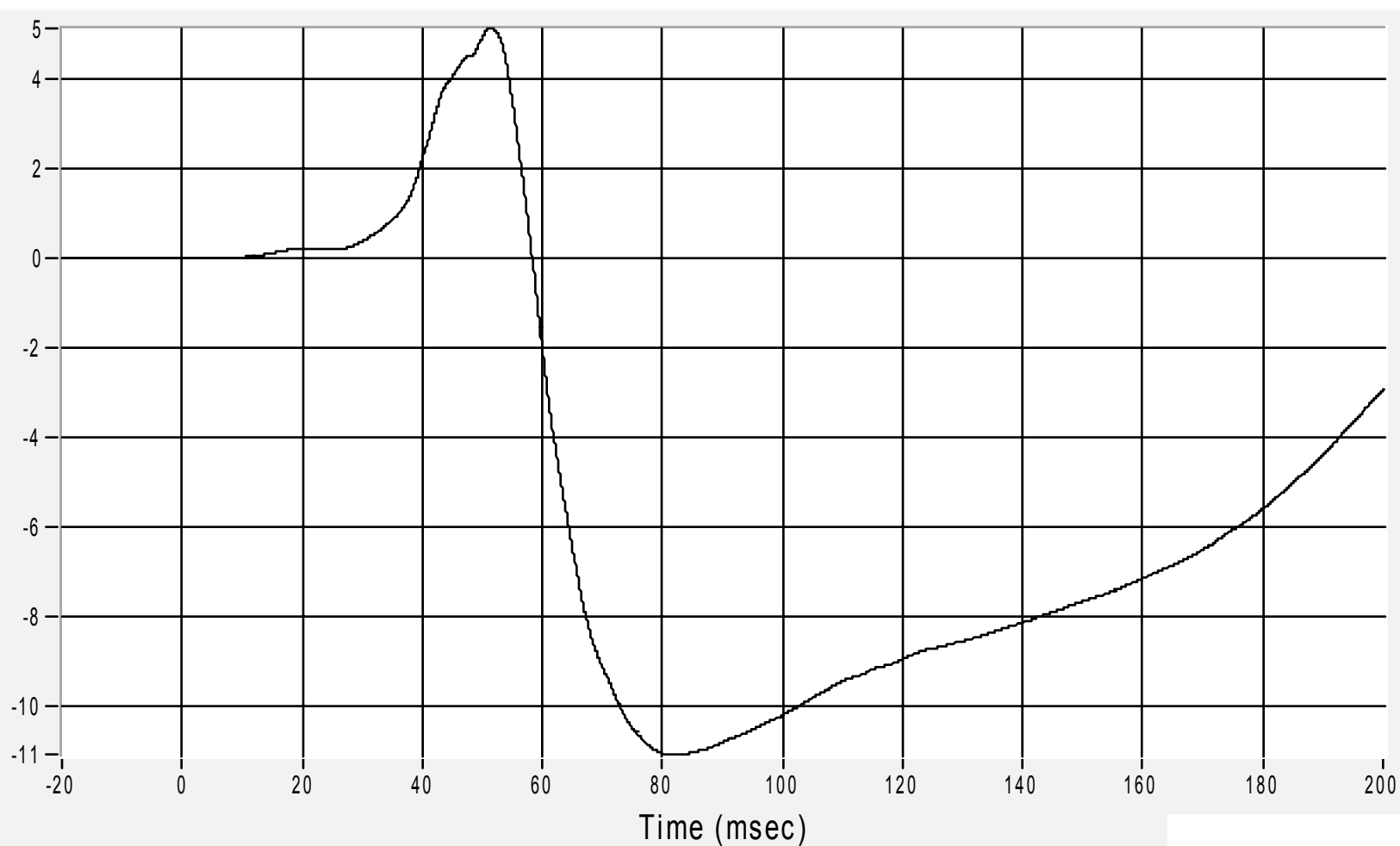
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**Passenger Head CG (Z) Velocity**

Velocity (km/h) CFC180

Max 5.1 km/h at 51.5 msec

Min -11.1 km/h at 81.4 msec



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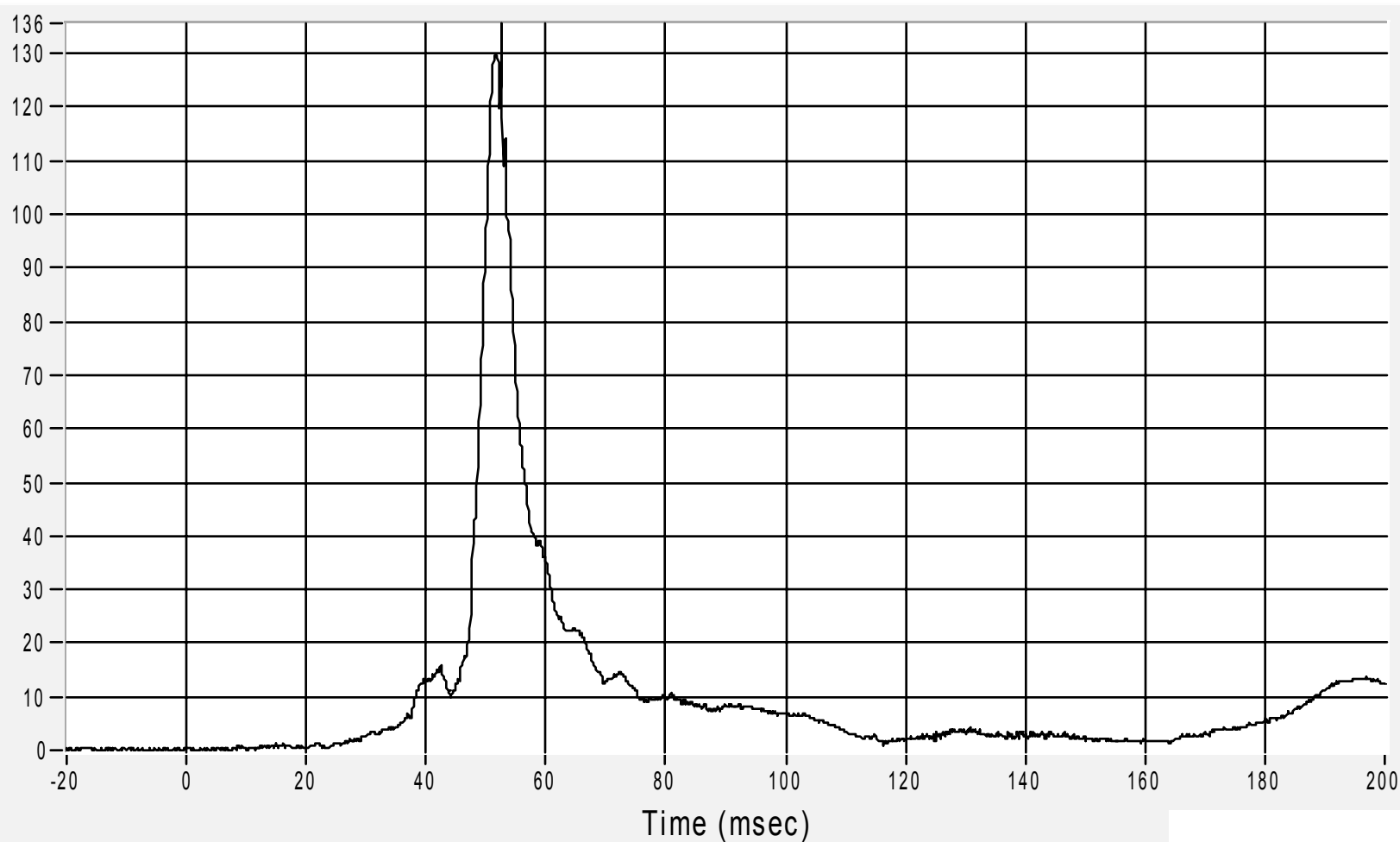
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**Passenger Head Resultant Acceleration**

Acceleration (G's) CFC1000

Max 135.6 G's at 52.6 msec

Min 0.1 G's at 2.6 msec



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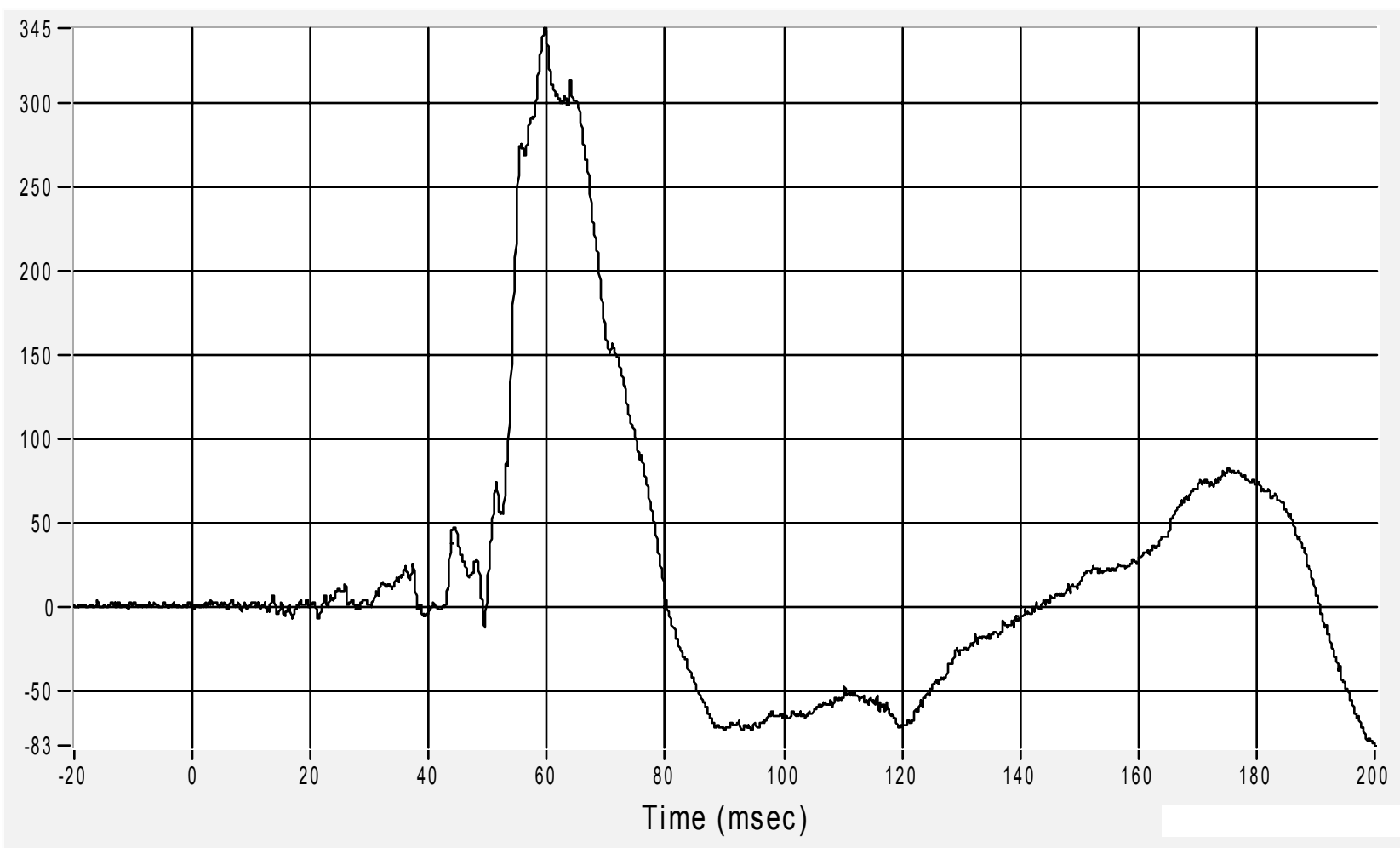
30 March 2004

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**Passenger Upper Neck (X) Force**  
Force (N) CFC1000

Max 345.0 N at 59.6 msec  
Min -82.5 N at 199.9 msec

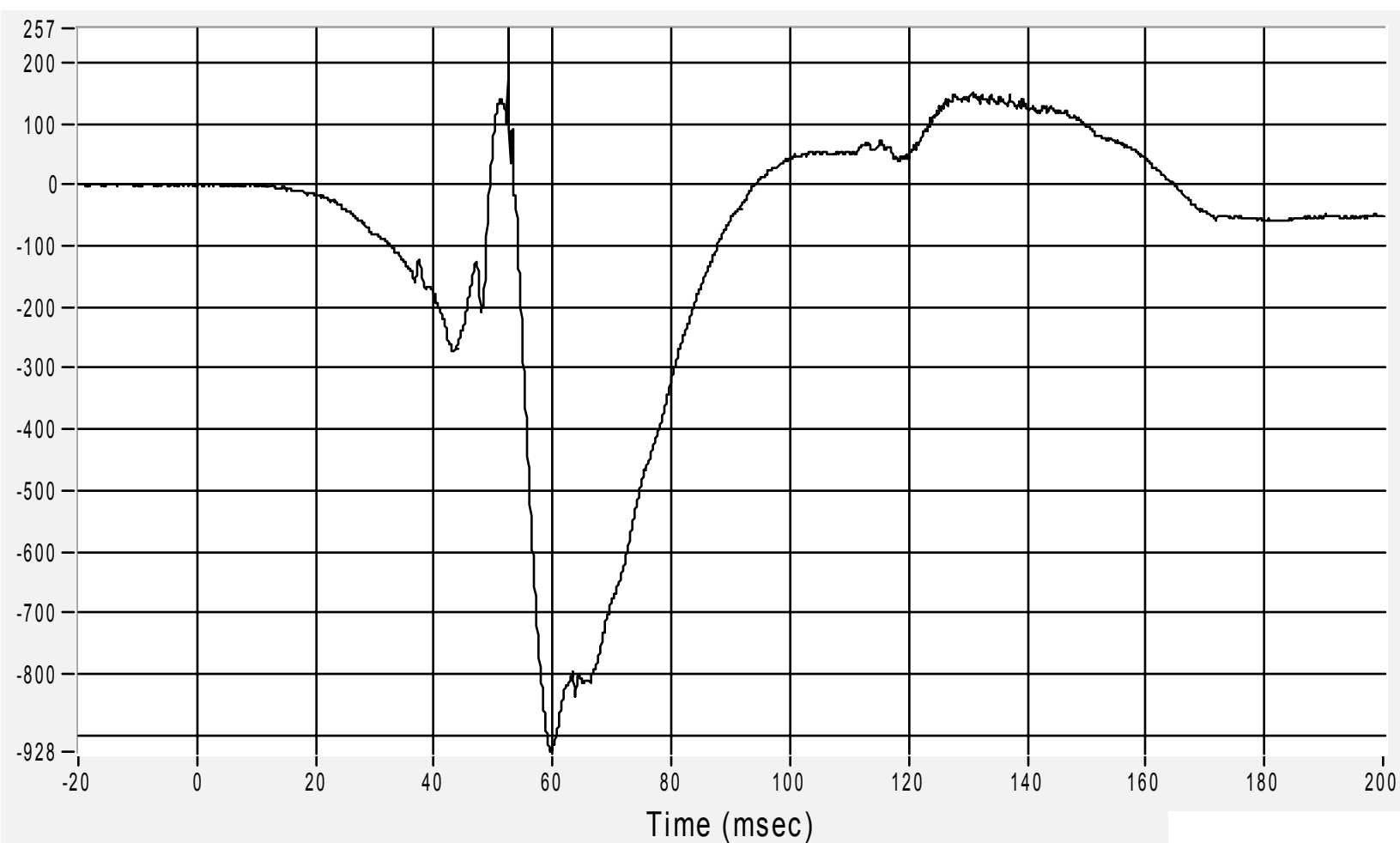


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**Passenger Upper Neck (Y) Force**  
Force (N) CFC1000

Max 256.5 N at 52.6 msec  
Min -927.8 N at 59.8 msec

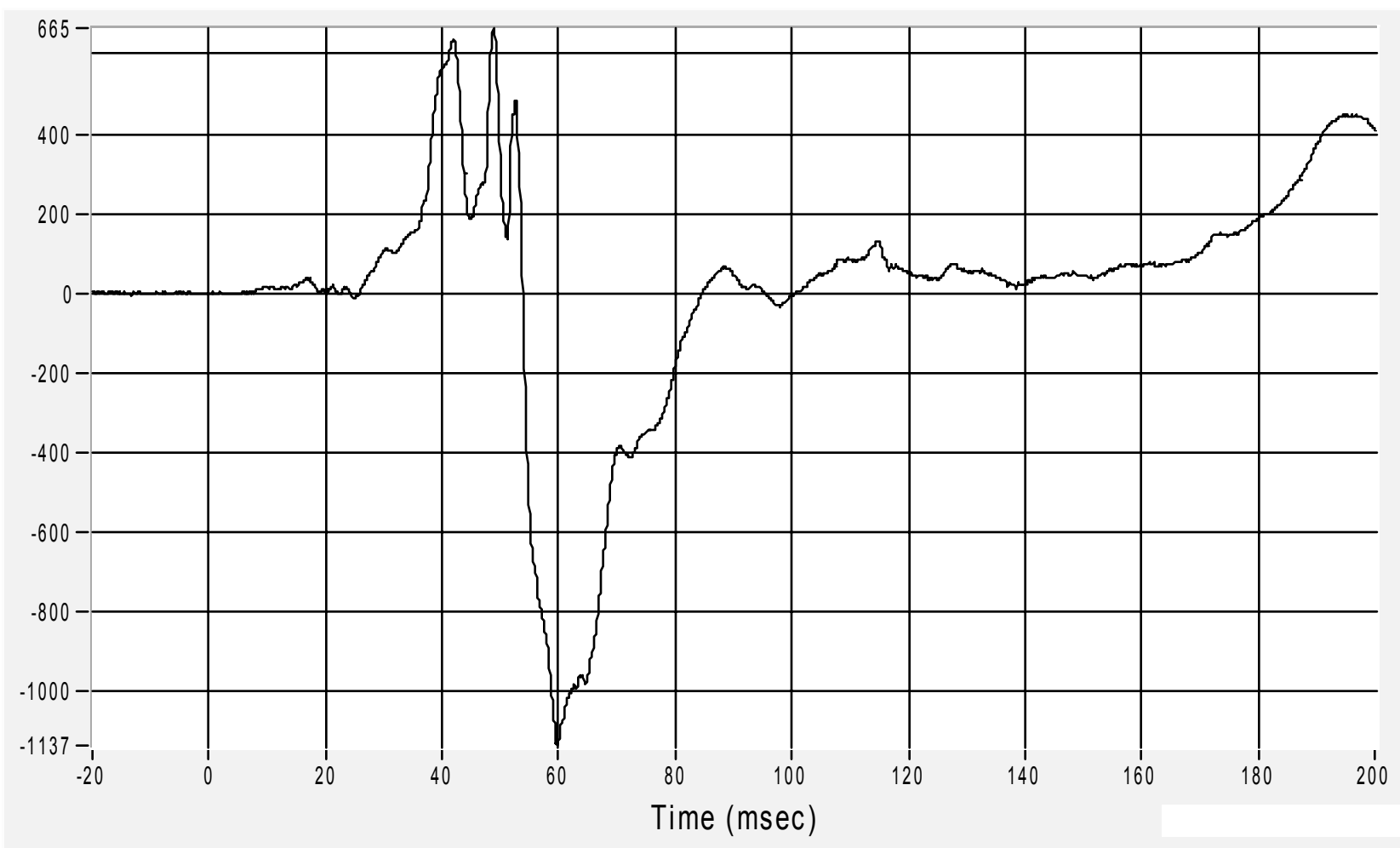


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**Passenger Upper Neck (Z) Force**  
Force (N) CFC1000

Max 665.2 N at 48.9 msec  
Min -1136.8 N at 59.7 msec



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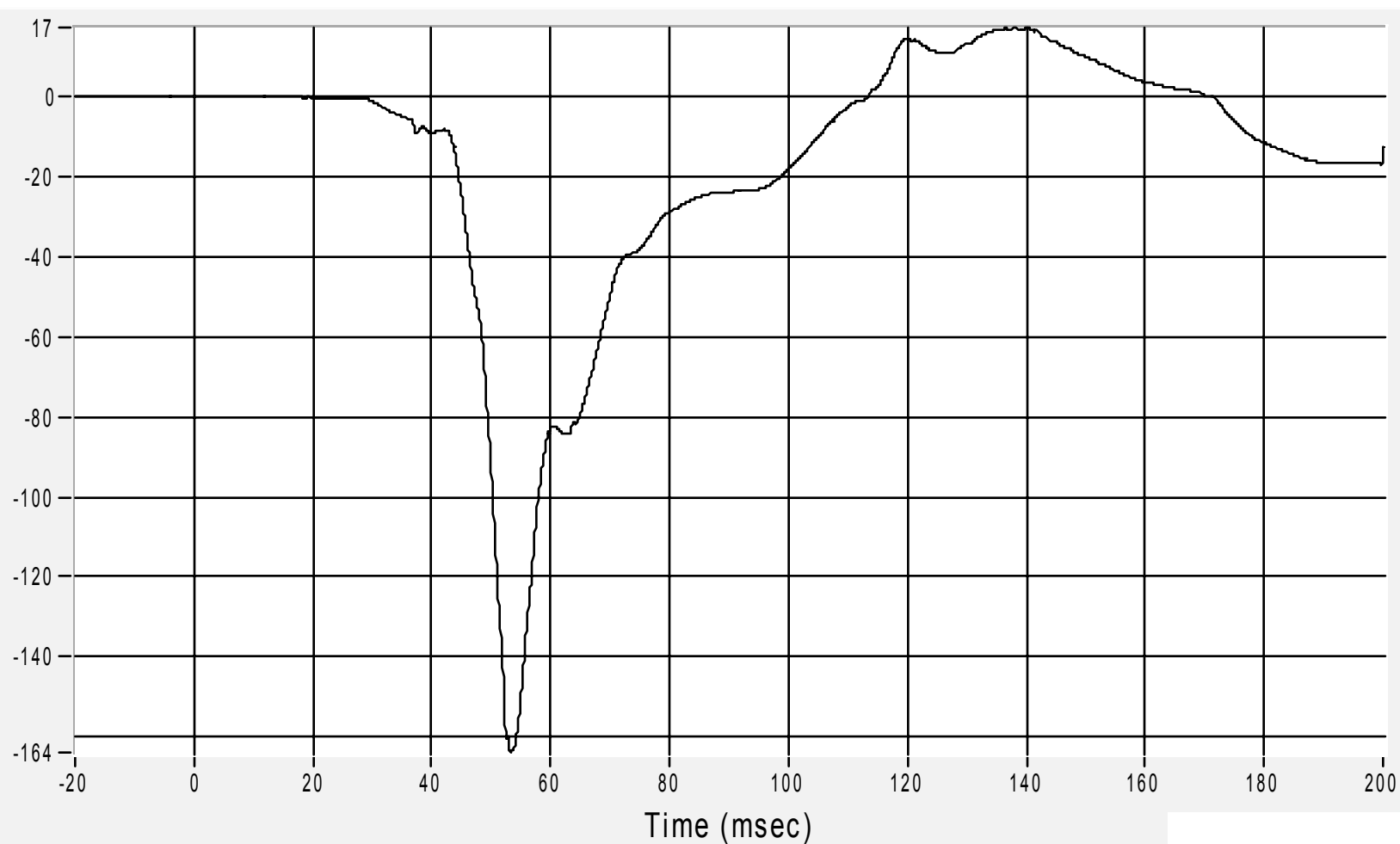


**Passenger Upper Neck (X) Moment**

Moment (Nm) CFC600

Max 17.4 Nm at 138.1 msec

Min -163.9 Nm at 53.3 msec



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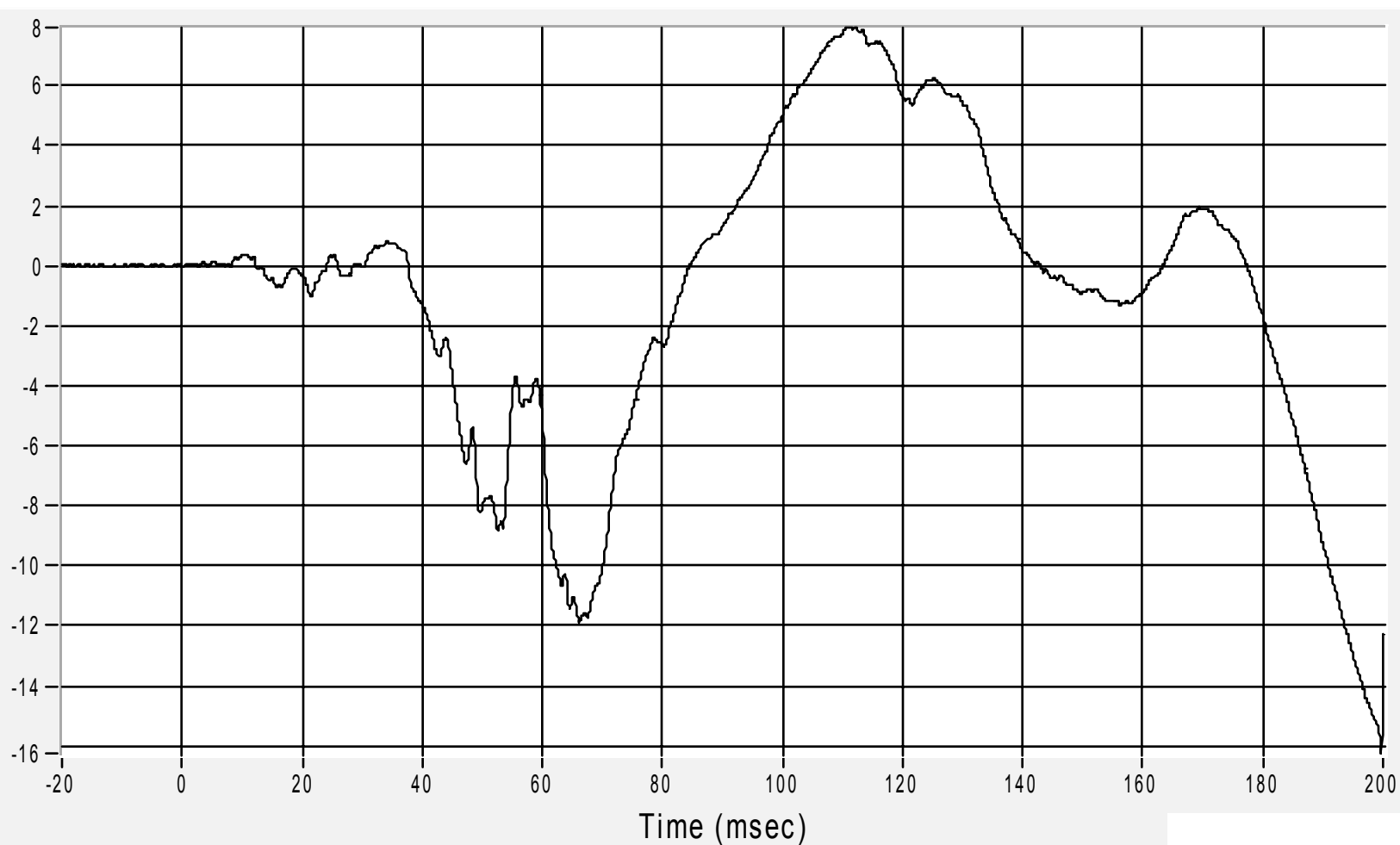
**Passenger Upper Neck (Y) Moment**

Moment (Nm)

CFC600

Max 7.9 Nm at 112.2 msec

Min -16.2 Nm at 199.7 msec



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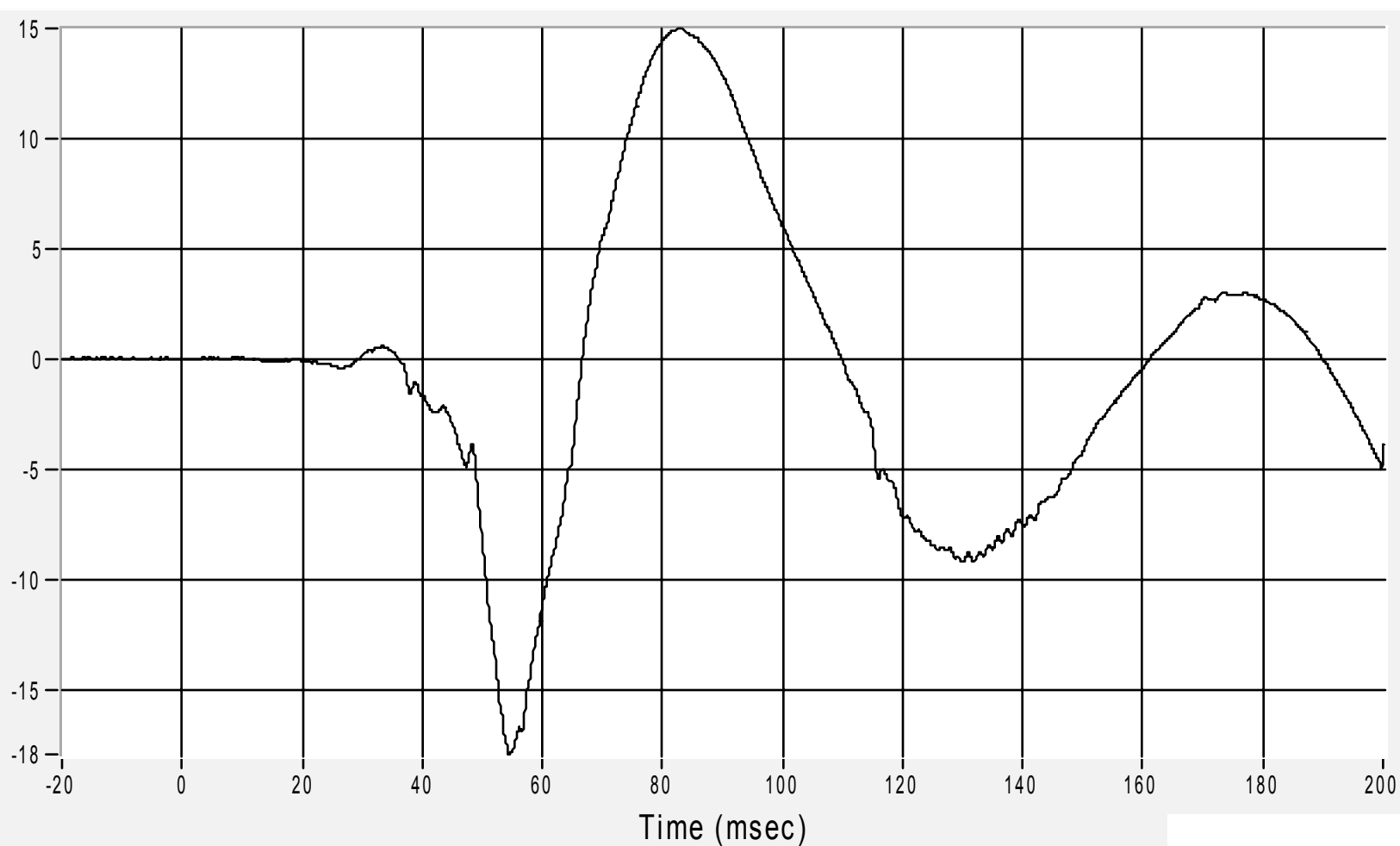
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**Passenger Upper Neck (Z) Moment**

Moment (Nm) CFC600

Max 15.0 Nm at 83.0 msec

Min -17.9 Nm at 54.5 msec



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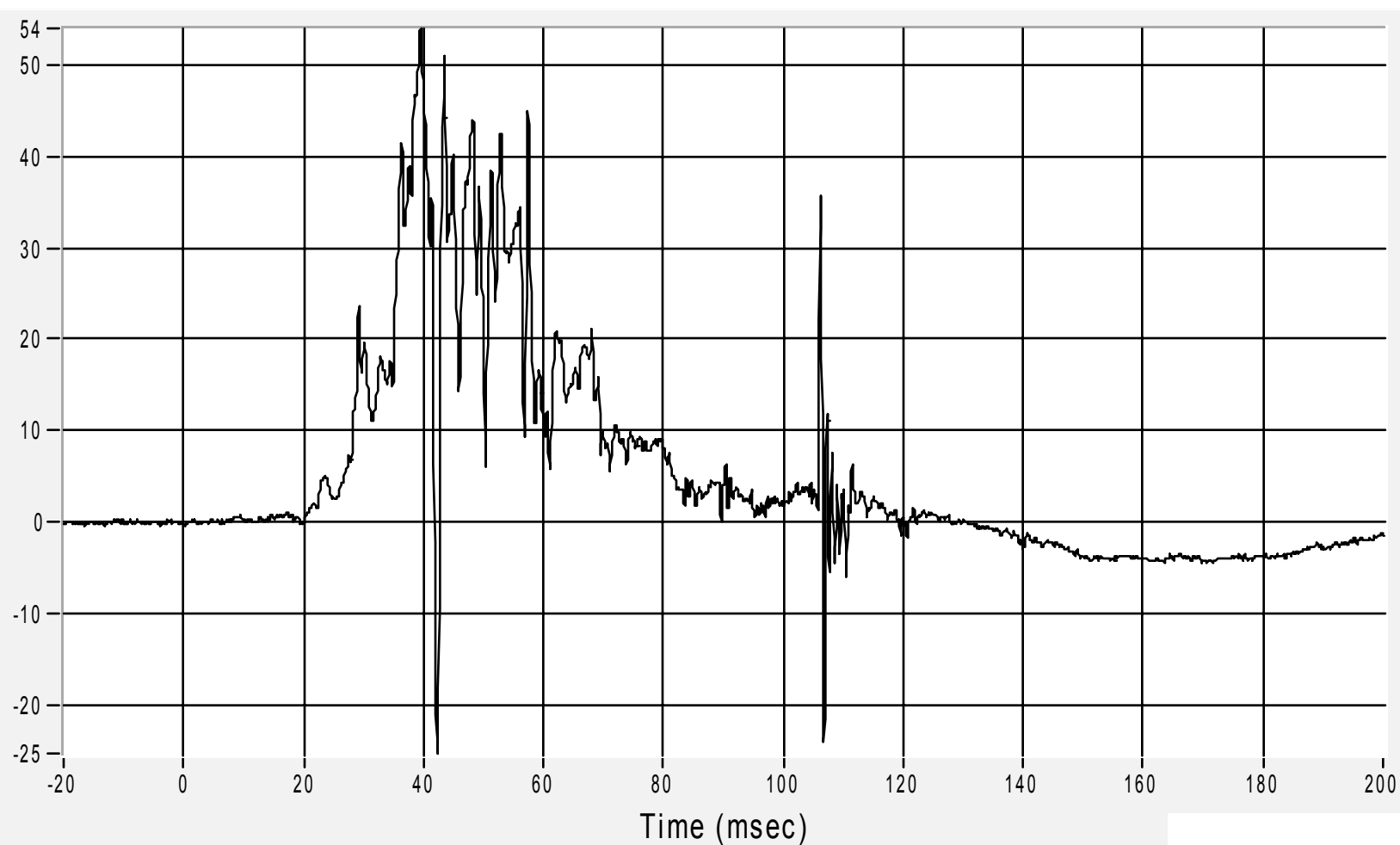


**Passenger Upper Rib (Y) Acceleration**

Acceleration (G's) CFC1000

Max 53.9 G at 39.5 msec

Min -25.3 G at 42.3 msec



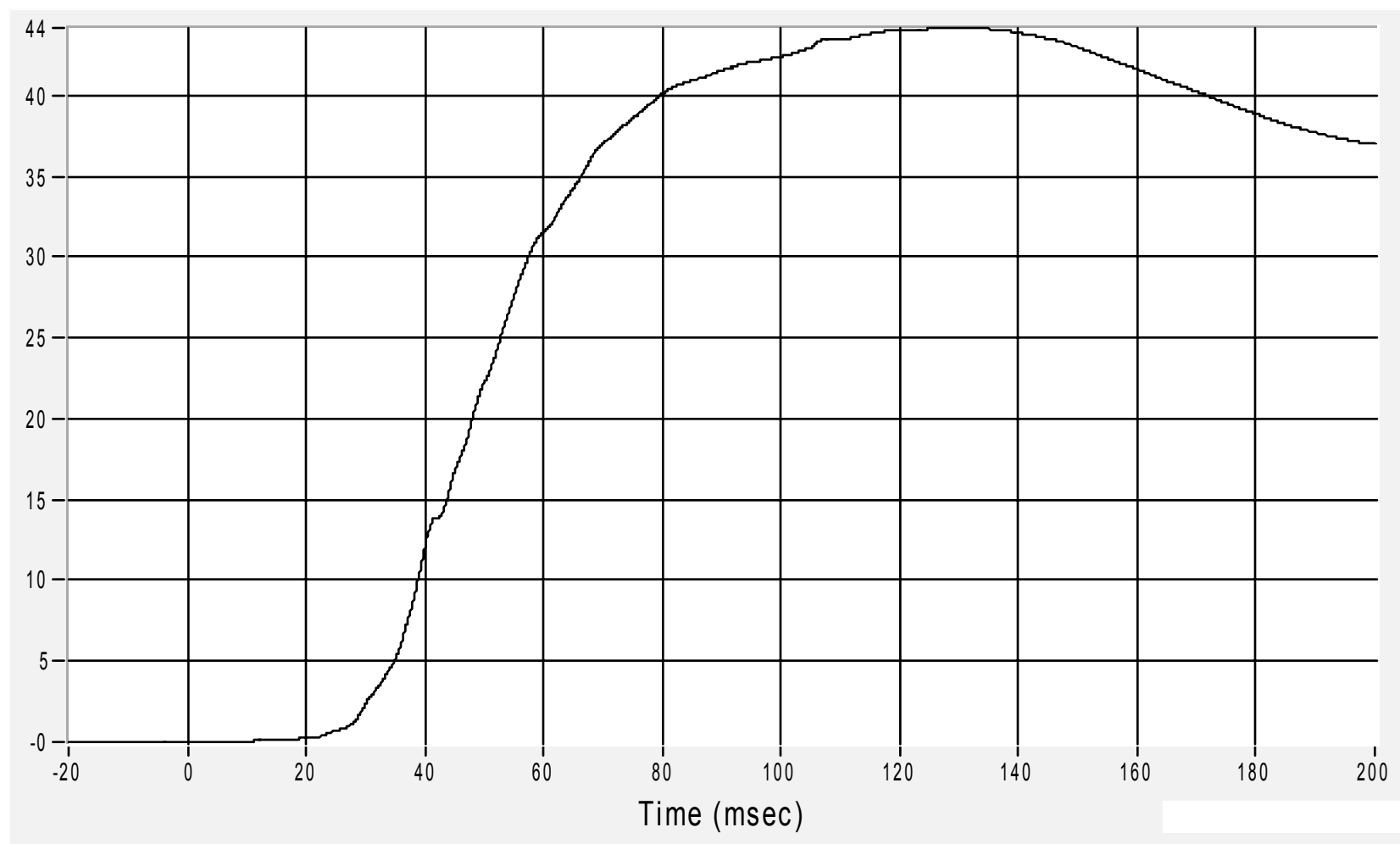
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**Passenger Upper Rib (Y) Velocity**

Velocity (km/h) CFC180

**Max 44.2 km/h at 130.6 msec****Min 0.0 km/h at 0.8 msec**

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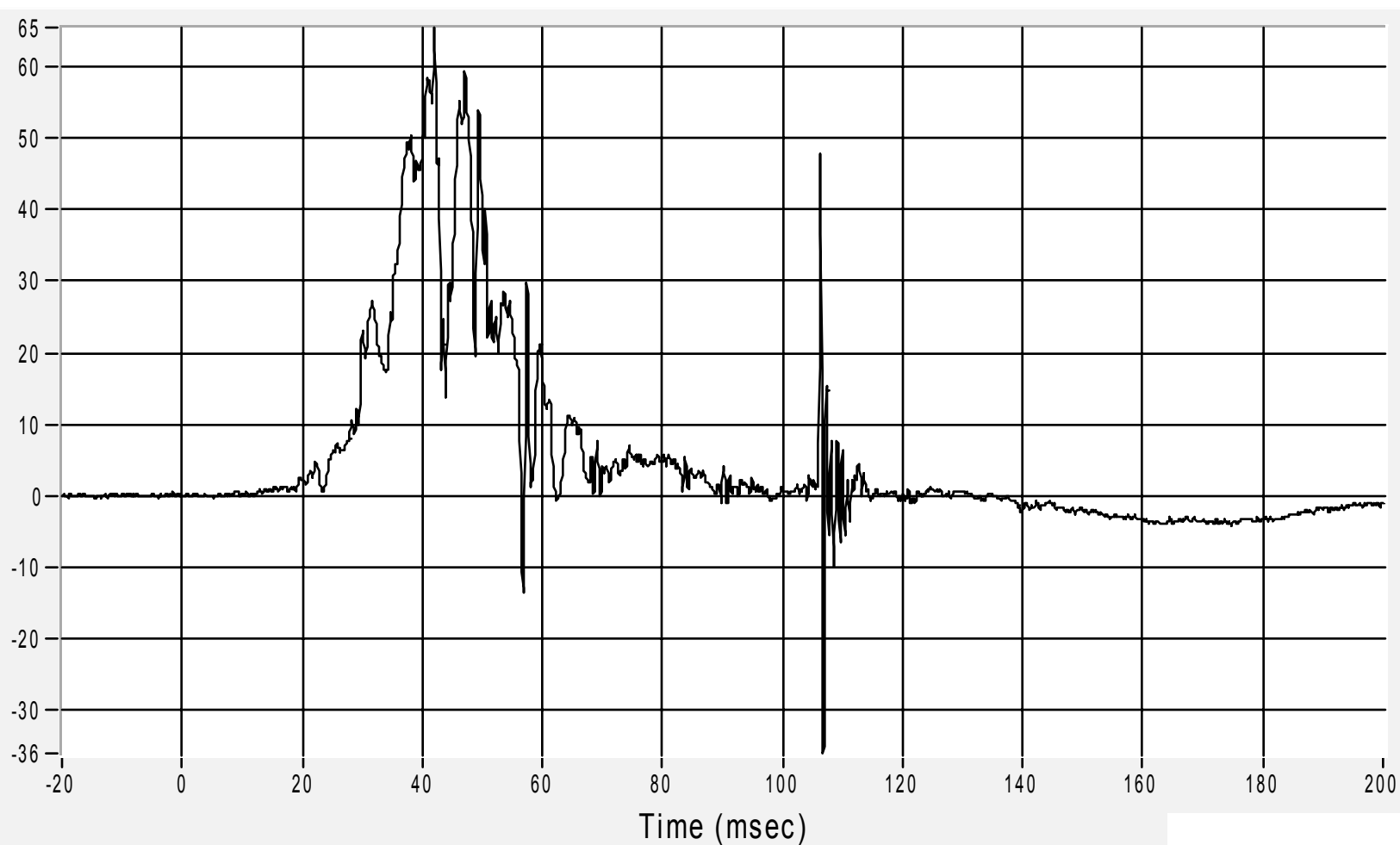
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**Passenger Lower Rib (Y) Acceleration**

Acceleration (G's) CFC1000

Max 65.5 G at 42.0 msec

Min -36.1 G at 106.8 msec



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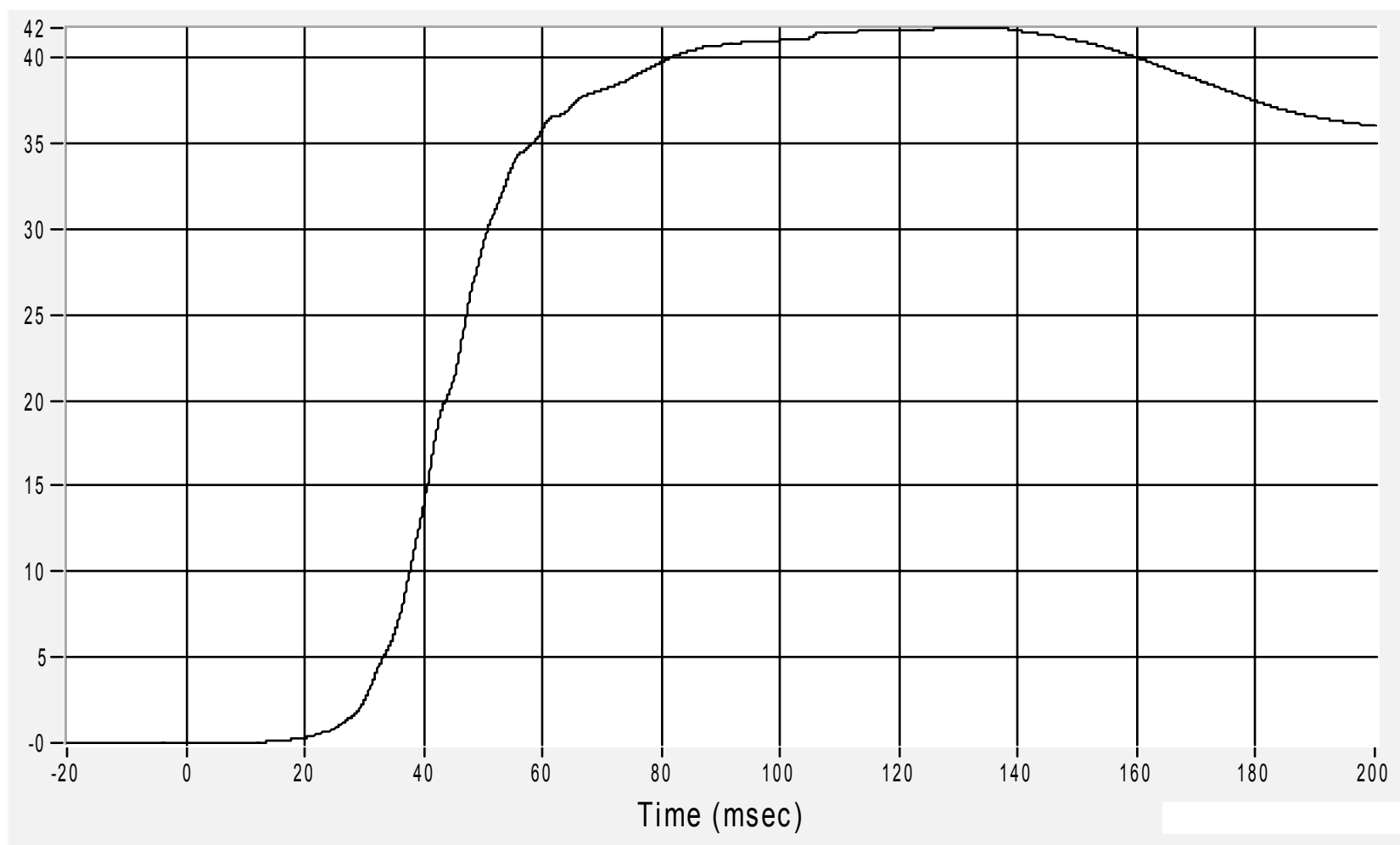


**Passenger Lower Rib (Y) Velocity**

Velocity (km/h) CFC180

Max 41.8 km/h at 131.5 msec

Min 0.0 km/h at 6.3 msec



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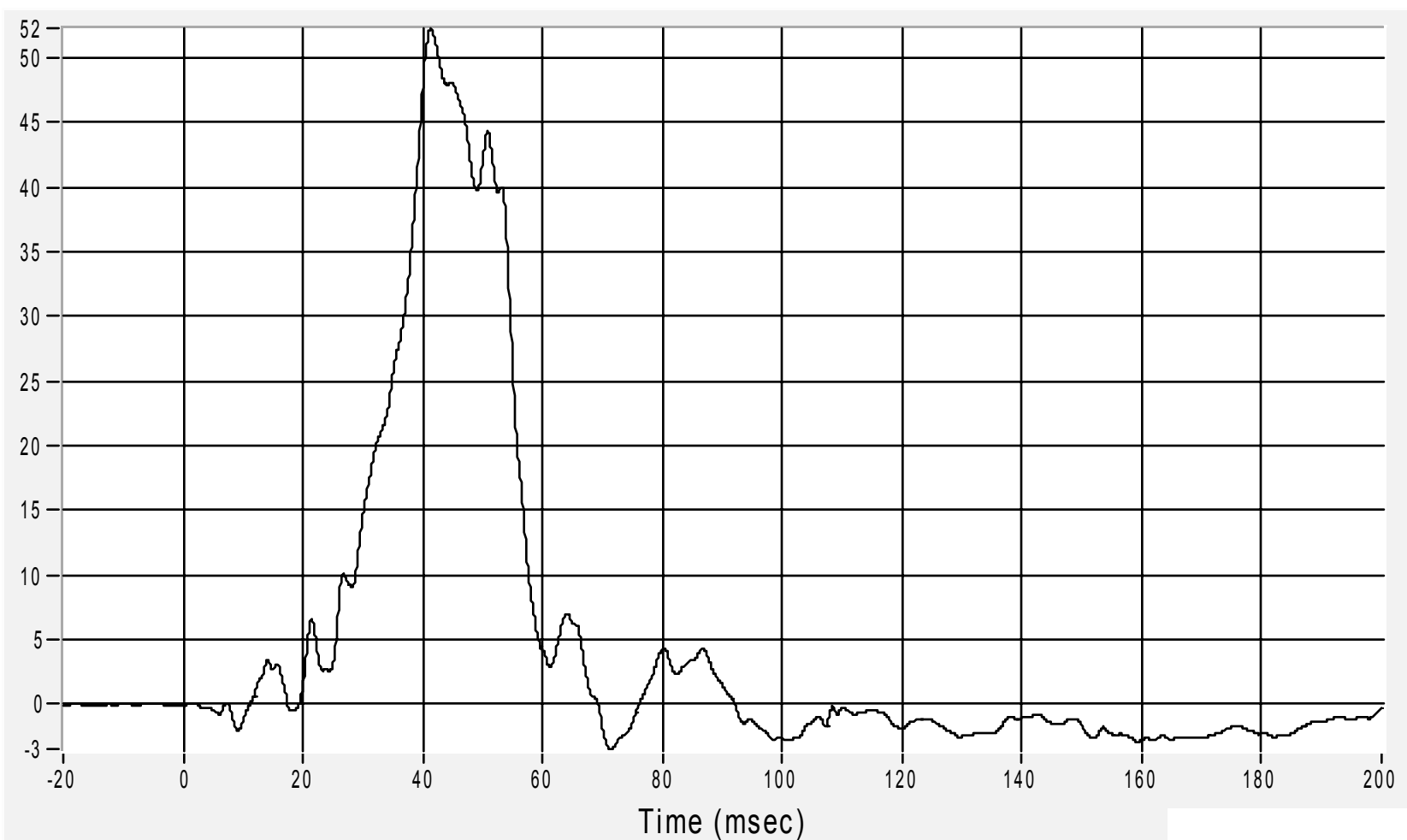
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**Passenger Lower Spine (Y) Acceleration**

Acceleration (G's) CFC180

Max 52.3 G at 41.3 msec

Min -3.4 G at 71.5 msec



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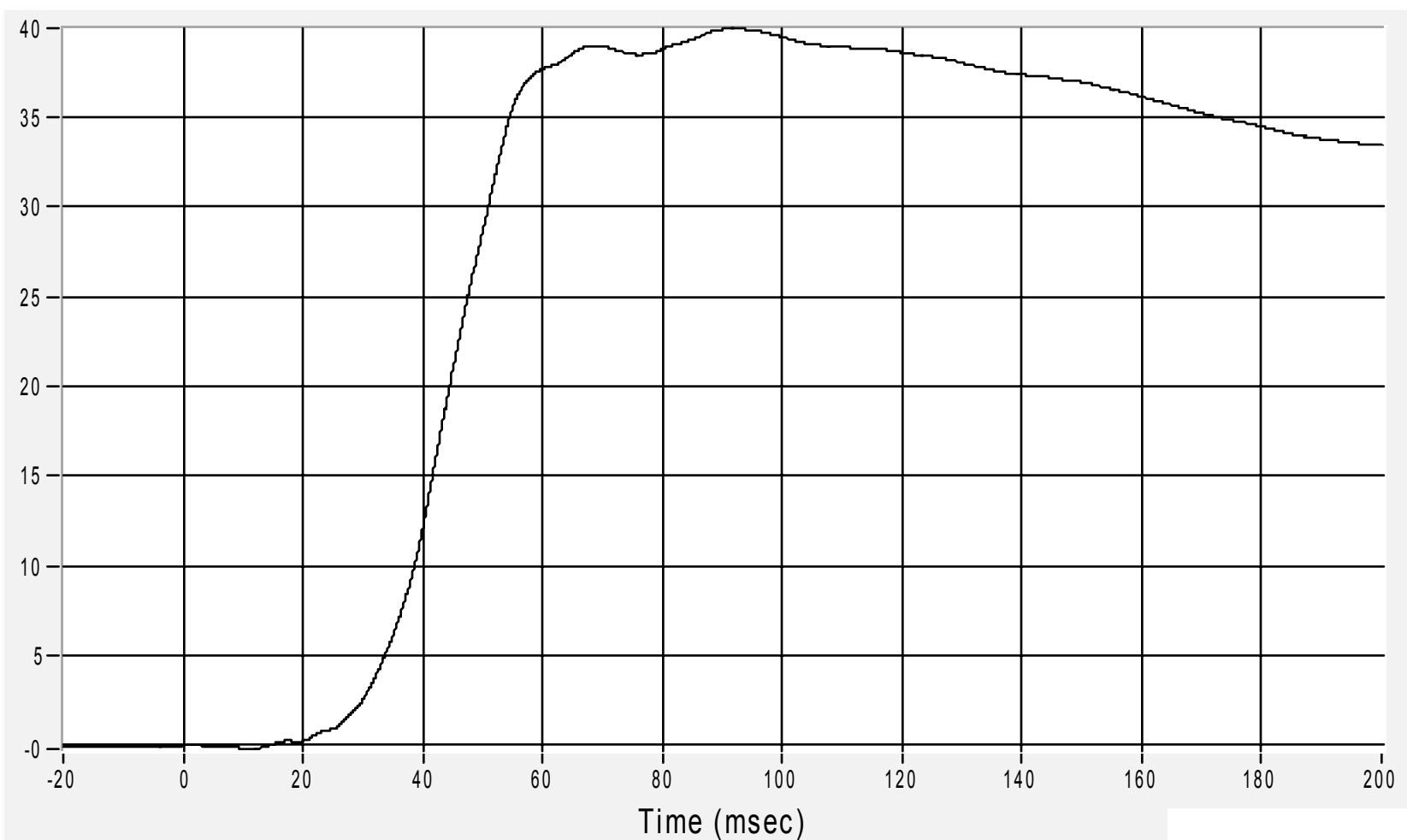
Medical College of Wisconsin  
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**Passenger Lower Spine (Y) Velocity**

Velocity (km/h) CFC180

Max 40.0 km/h at 92.1 msec

Min -0.2 km/h at 11.0 msec



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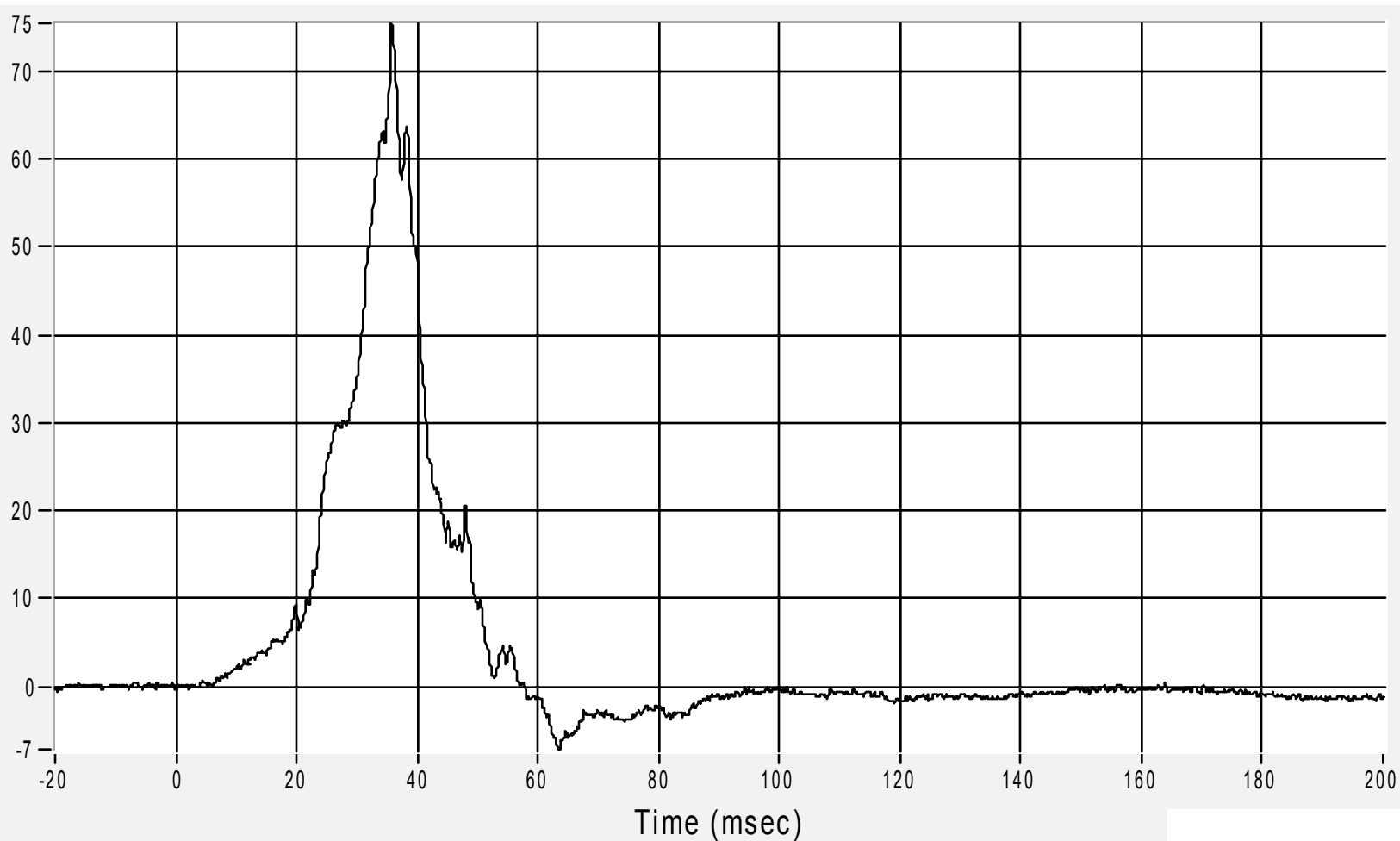
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**Passenger Pelvic (Y) Acceleration**

Acceleration (G's) CFC1000

**Max 75.5 G at 35.8 msec****Min -7.2 G at 63.5 msec**

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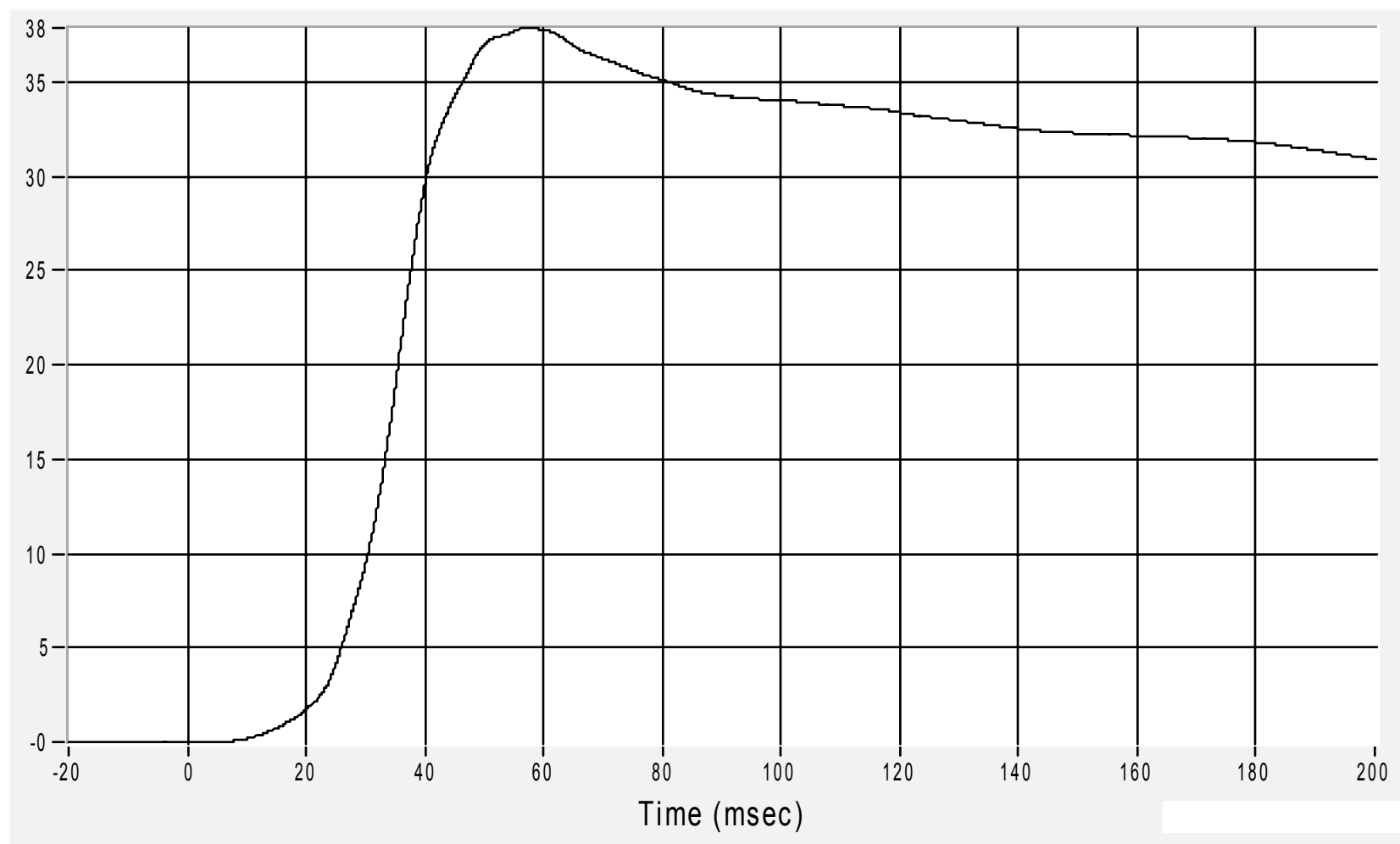
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**Passenger Pelvic (Y) Velocity**

Velocity (km/h) CFC180

Max 37.9 km/h at 57.4 msec

Min 0.0 km/h at 3.4 msec



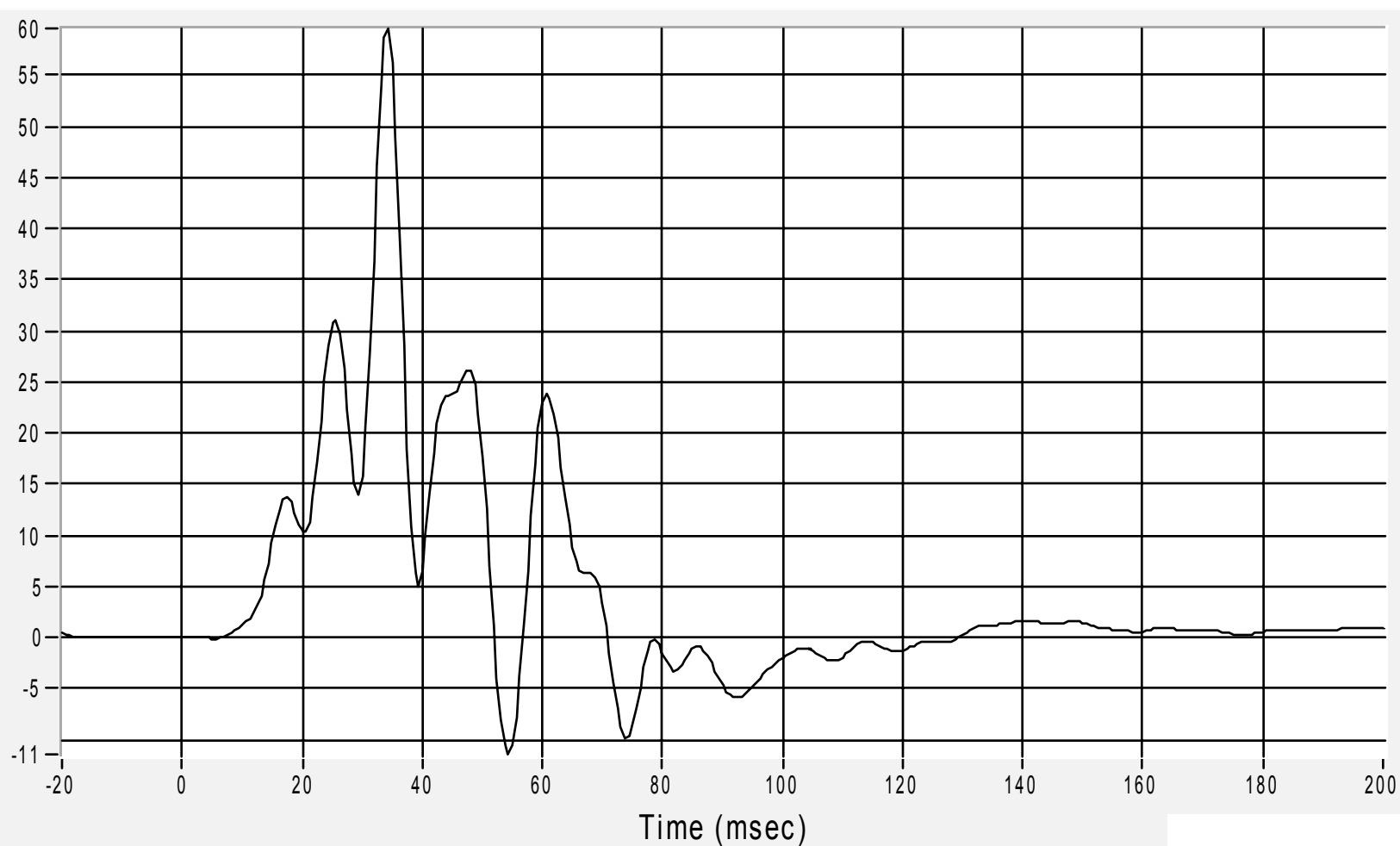
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**Driver Upper Rib (Y) Acceleration**

Acceleration (G's)      FIR100

**Max    59.6    G    at    34.4    msec****Min    -11.4    G    at    54.4    msec**

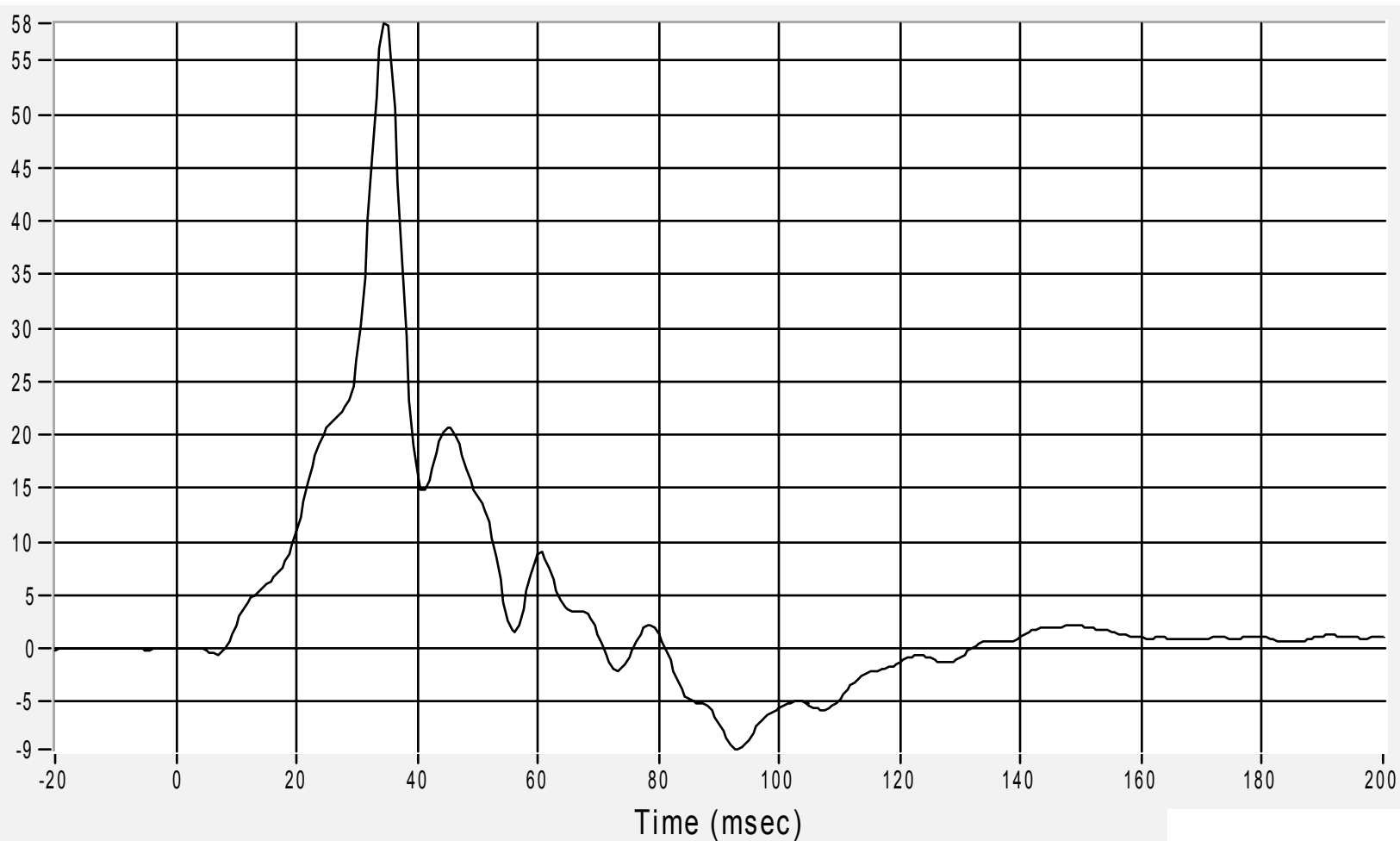
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**Driver Lower Rib (Y) Acceleration**

Acceleration (G's)      FIR100

**Max    58.5    G    at    34.4    msec****Min    -9.4    G    at    93.1    msec**

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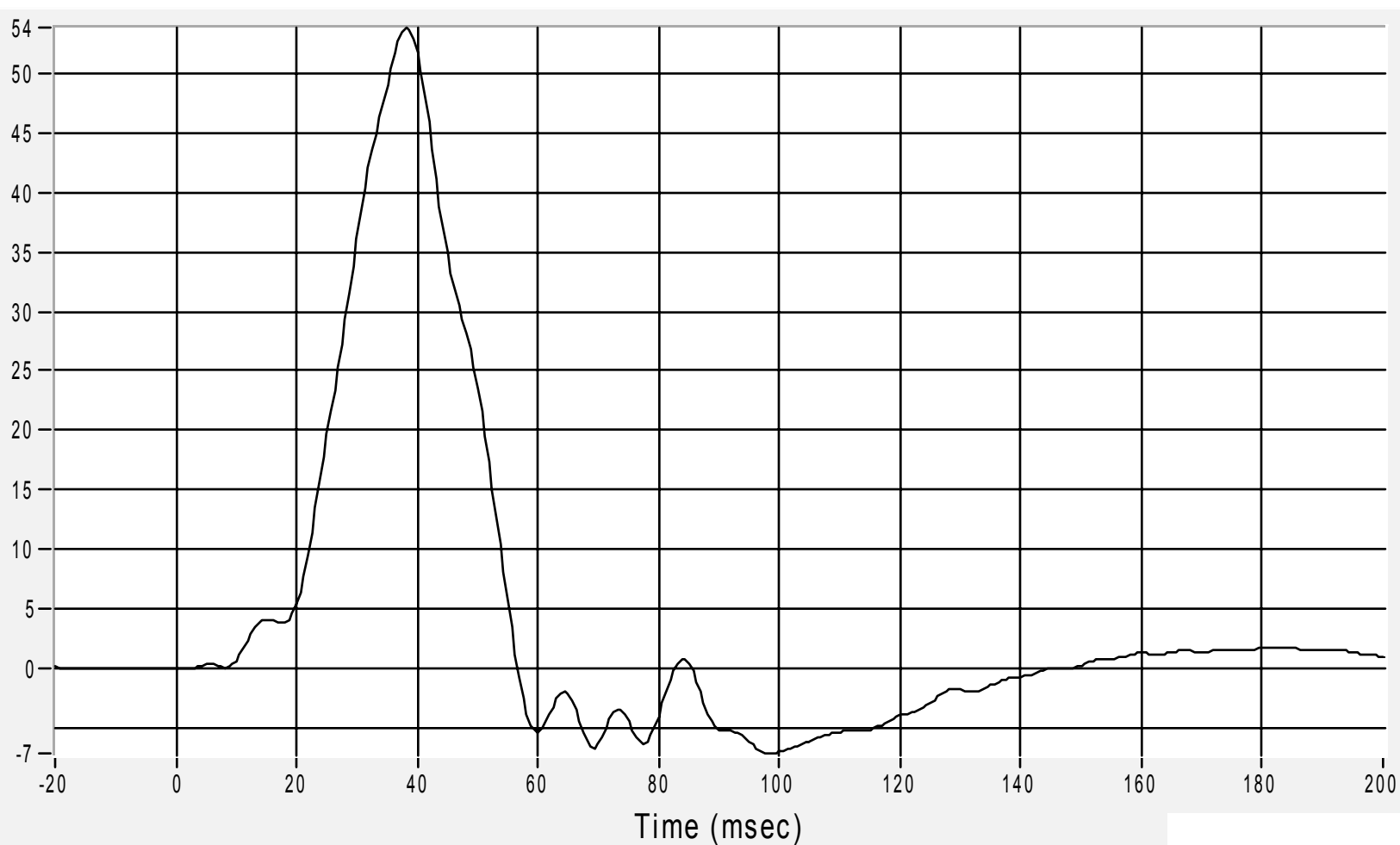
30 March 2004

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**Driver Lower Spine (Y) Acceleration**

Acceleration (G's)      FIR100

**Max    53.8    G    at    38.1    msec****Min    -7.1    G    at    98.1    msec**

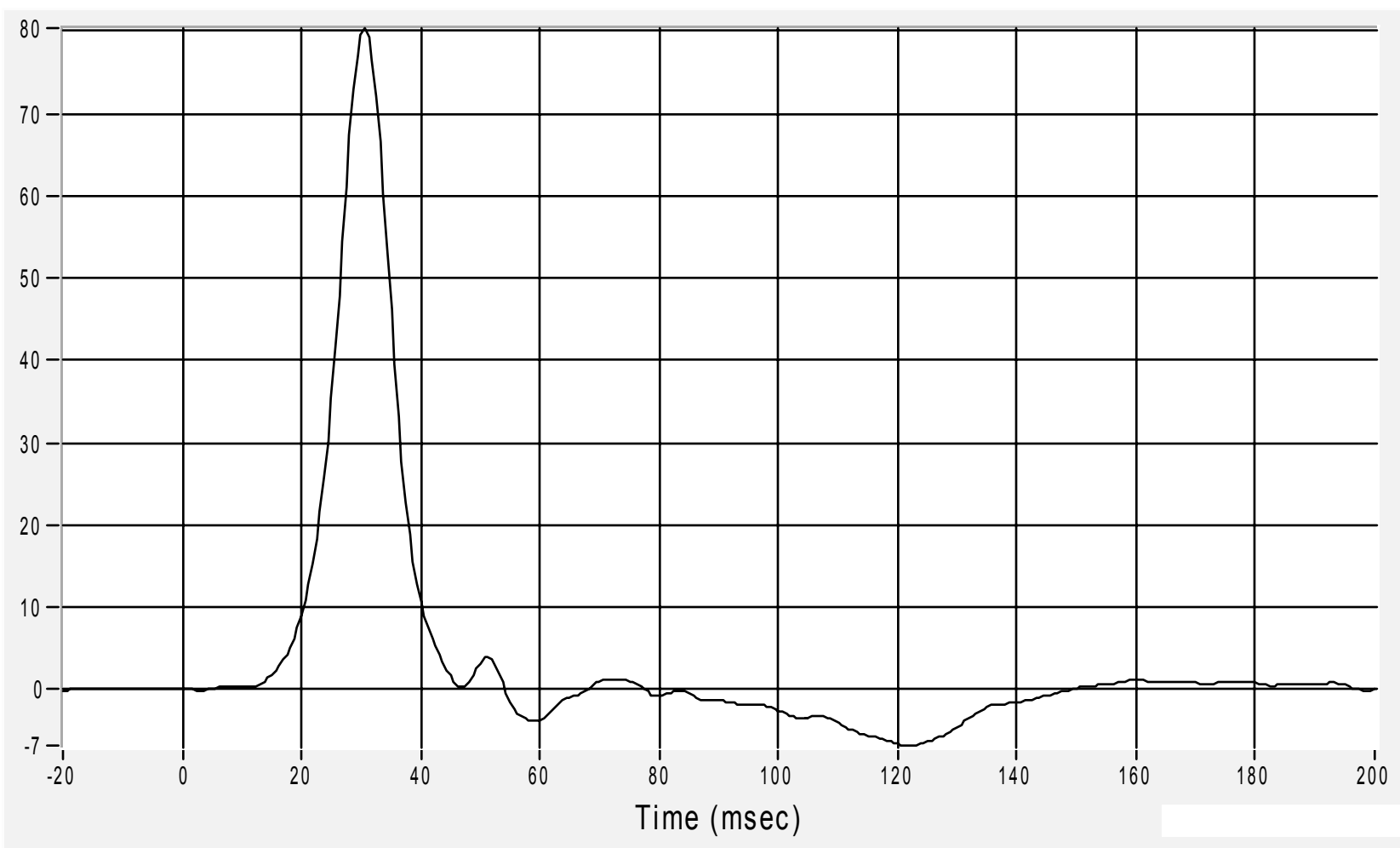
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**Driver Pelvic (Y) Acceleration**

Acceleration (G's)      FIR100

**Max    80.4    G    at    30.6    msec****Min    -6.8    G    at    121.9    msec**

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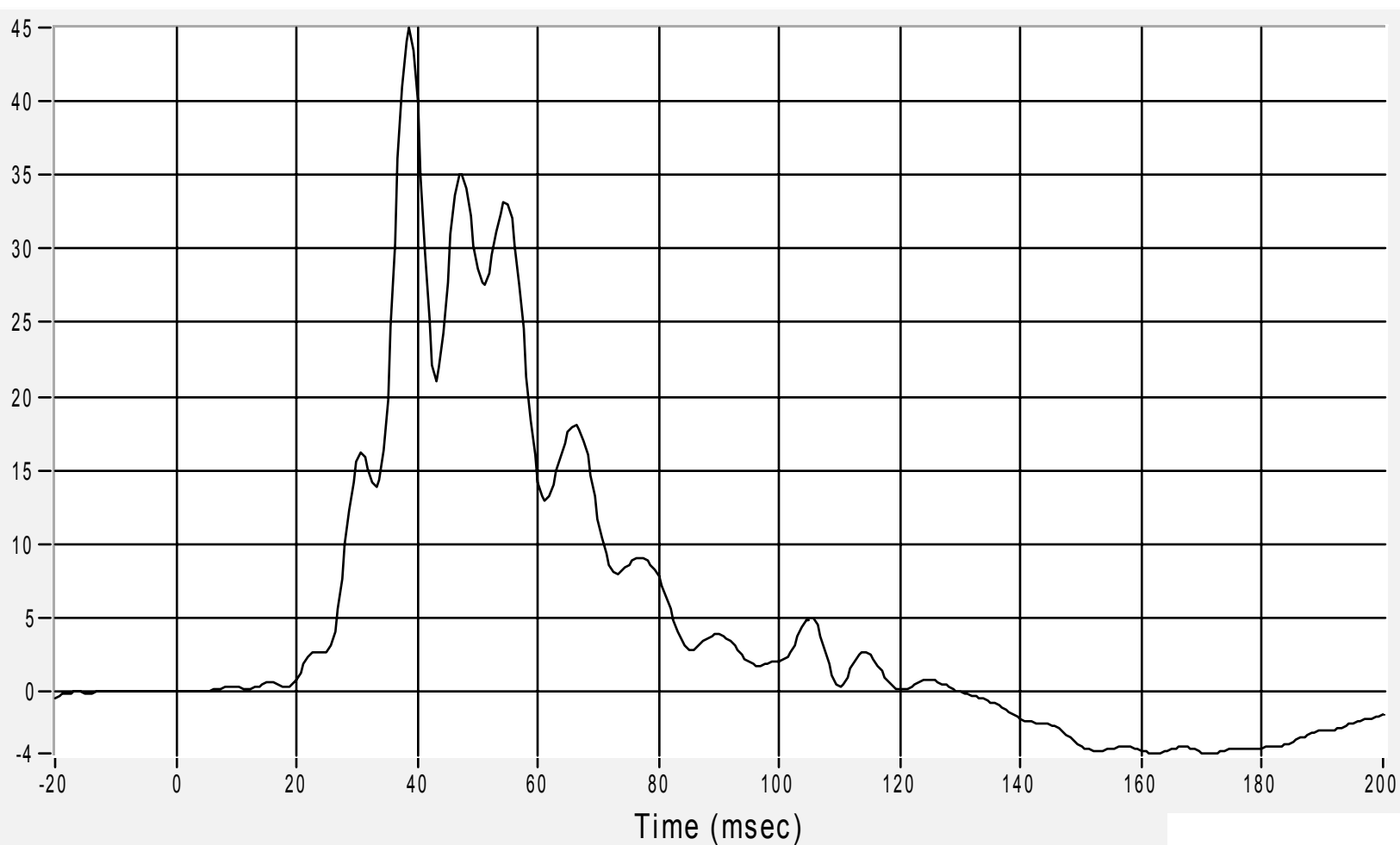
*Medical College of Wisconsin  
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**Passenger Upper Rib (Y) Acceleration**

Acceleration (G's)      FIR100

Max    45.0    G    at    38.8    msec

Min    -4.2    G    at    171.2    msec



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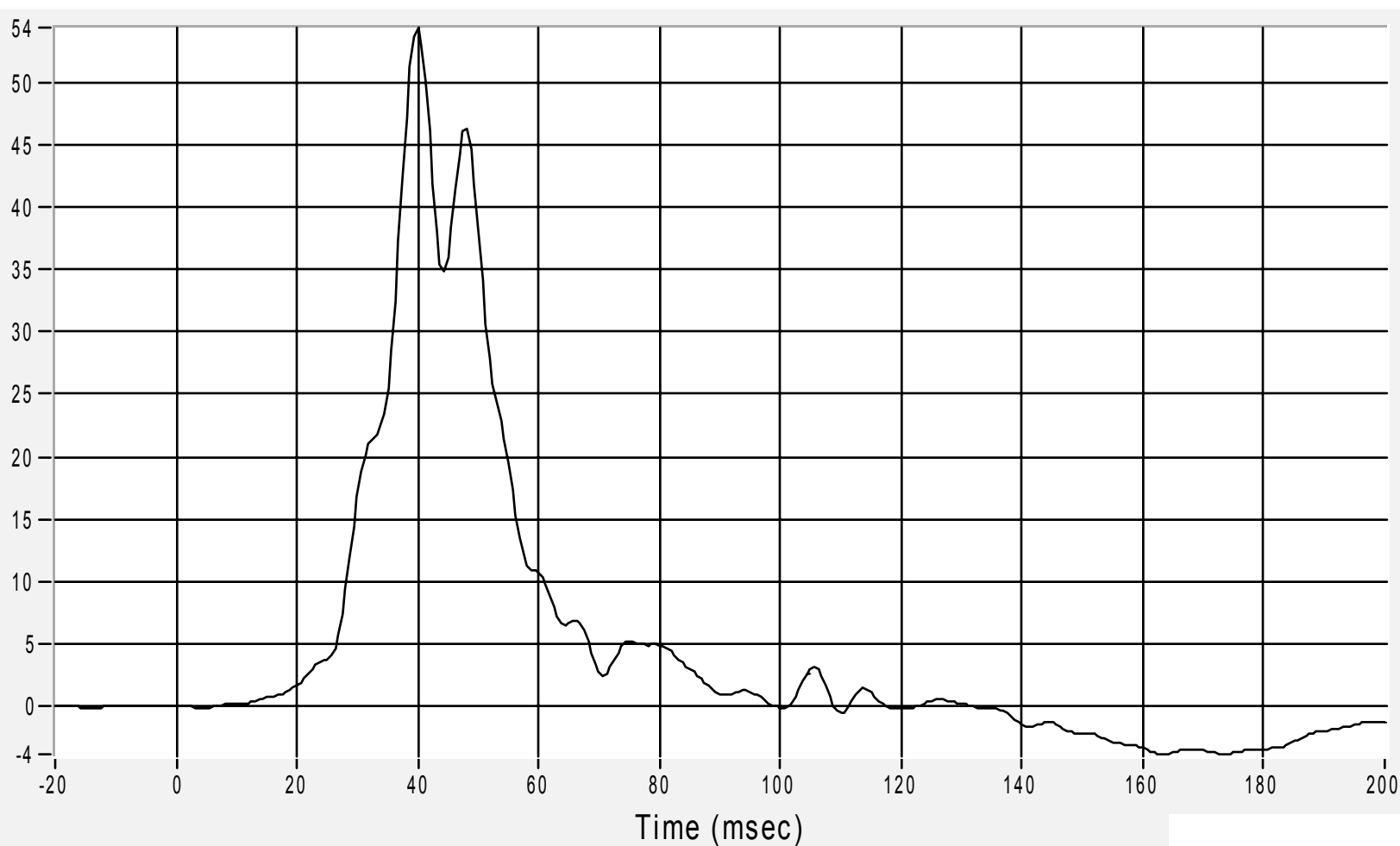
Medical College of Wisconsin  
Vehicle Crashworthiness Lab

**Passenger Lower Rib (Y) Acceleration**

Acceleration (G's)      FIR100

Max    54.3    G    at    40.0    msec

Min    -3.8    G    at    163.1    msec



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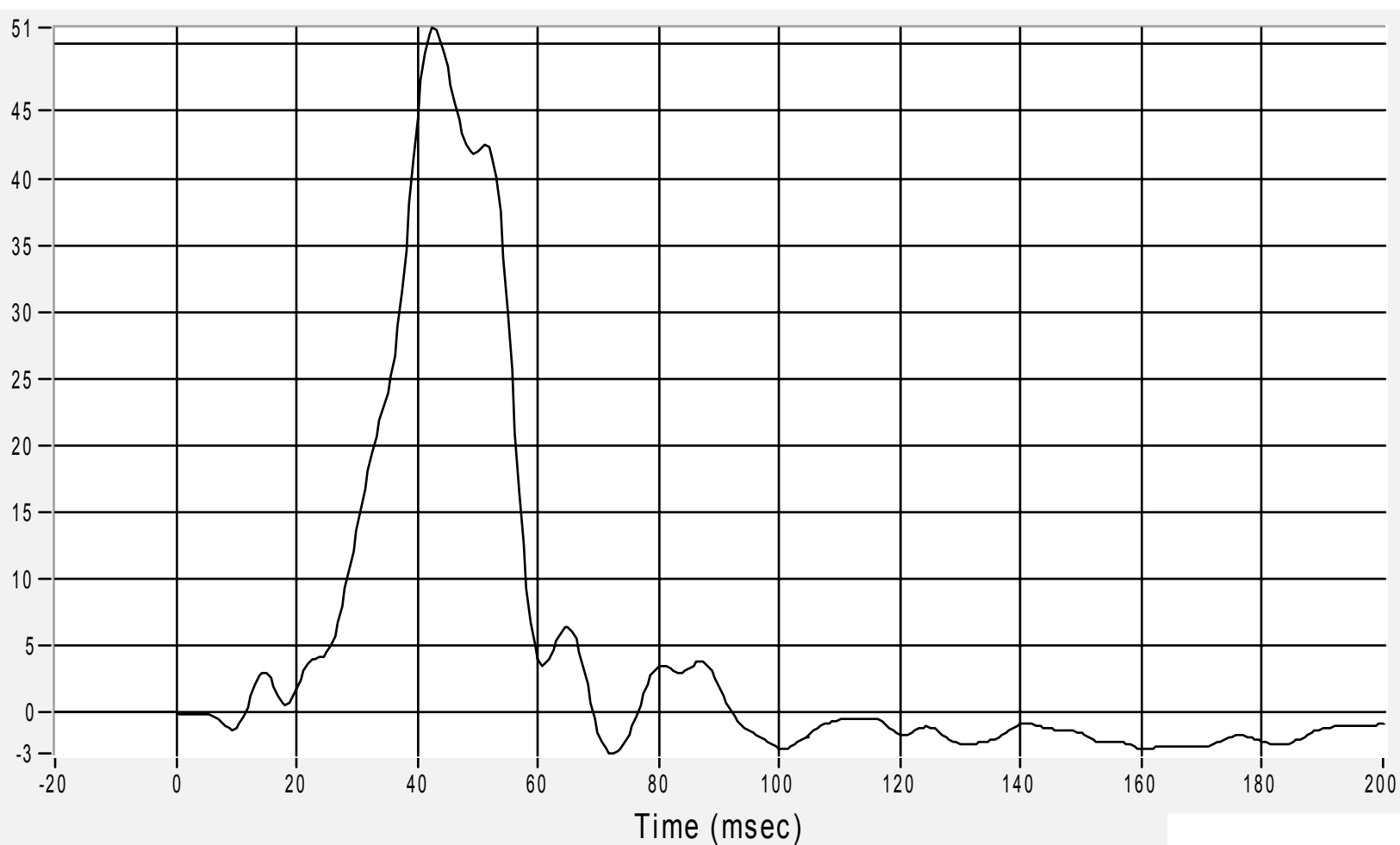
30 March 2004

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**Passenger Lower Spine (Y) Acceleration**

Acceleration (G's)      FIR100

**Max    51.3    G    at    42.5    msec****Min    -3.1    G    at    72.5    msec**

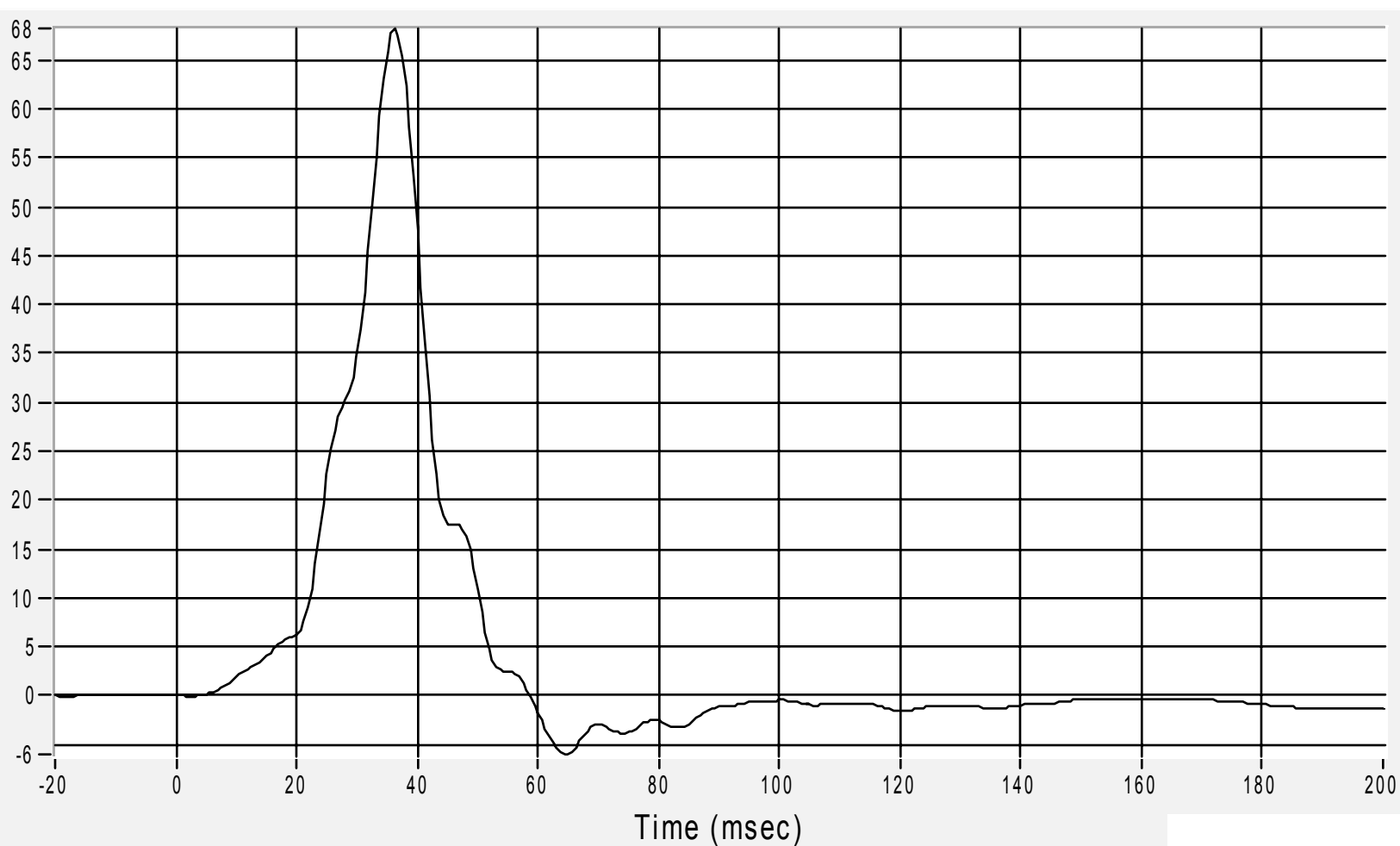
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**Passenger Pelvic (Y) Acceleration**

Acceleration (G's)      FIR100

**Max    68.3    G    at    36.2    msec****Min    -6.0    G    at    64.4    msec**

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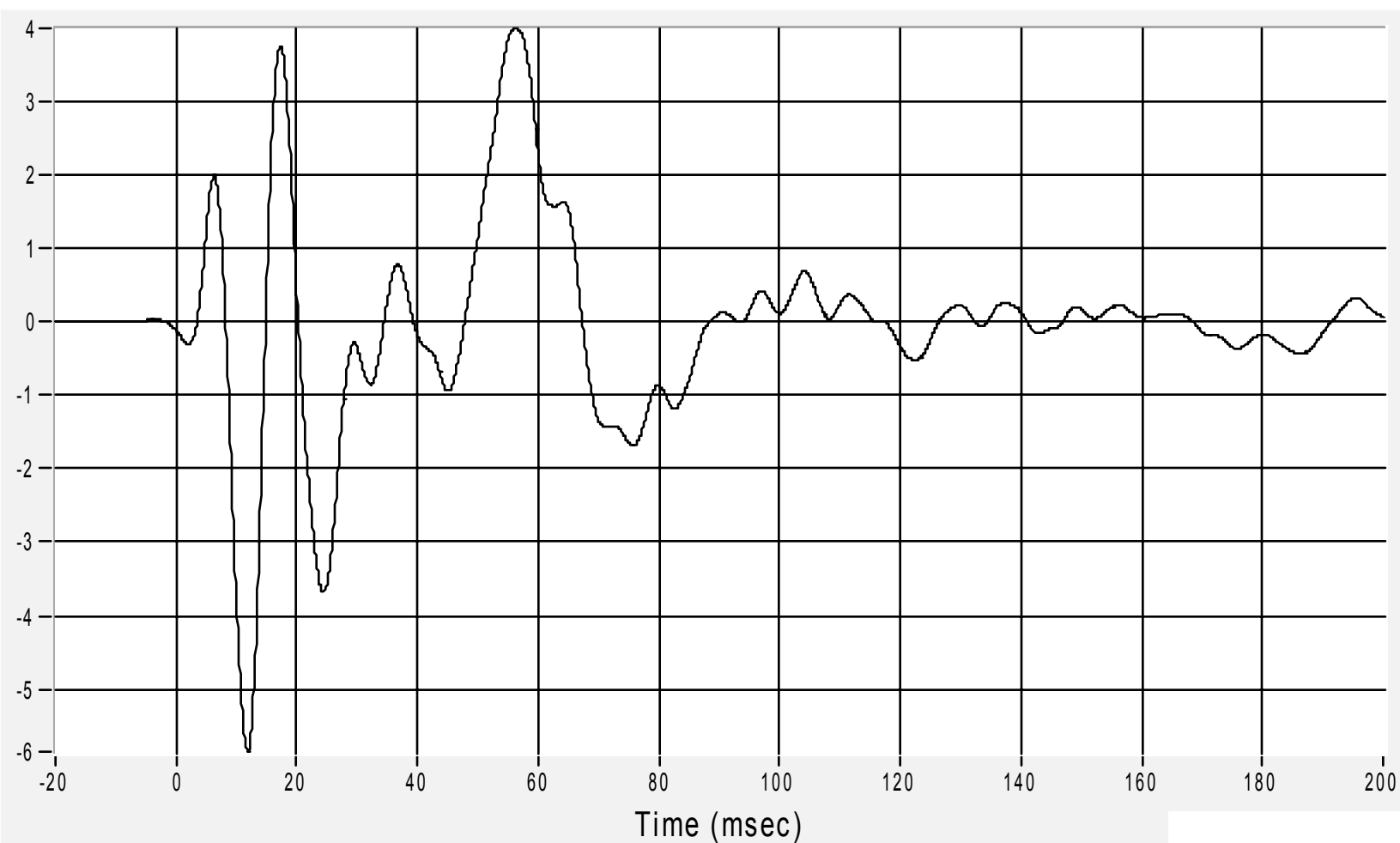
*Medical College of Wisconsin  
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**Right Side Sill at Front Seat (X) Acceleration**

Acceleration (G's) CFC60

Max 4.0 G at 56.2 msec

Min -5.9 G at 11.8 msec



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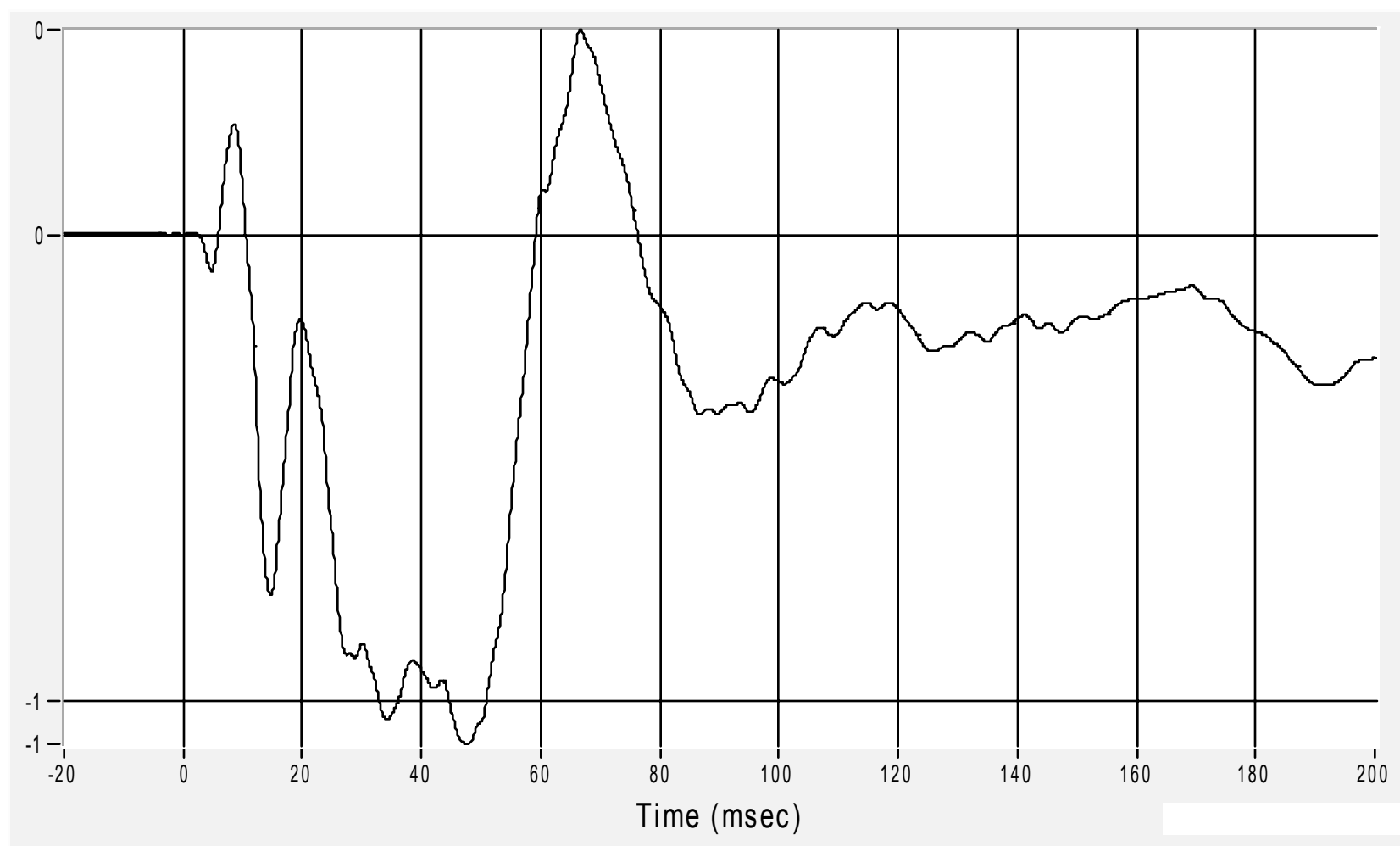
*Medical College of Wisconsin  
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**Right Side Sill at Front Seat (X) Velocity**

Velocity (km/h) CFC180

Max 0.4 km/h at 66.6 msec

Min -1.1 km/h at 47.7 msec



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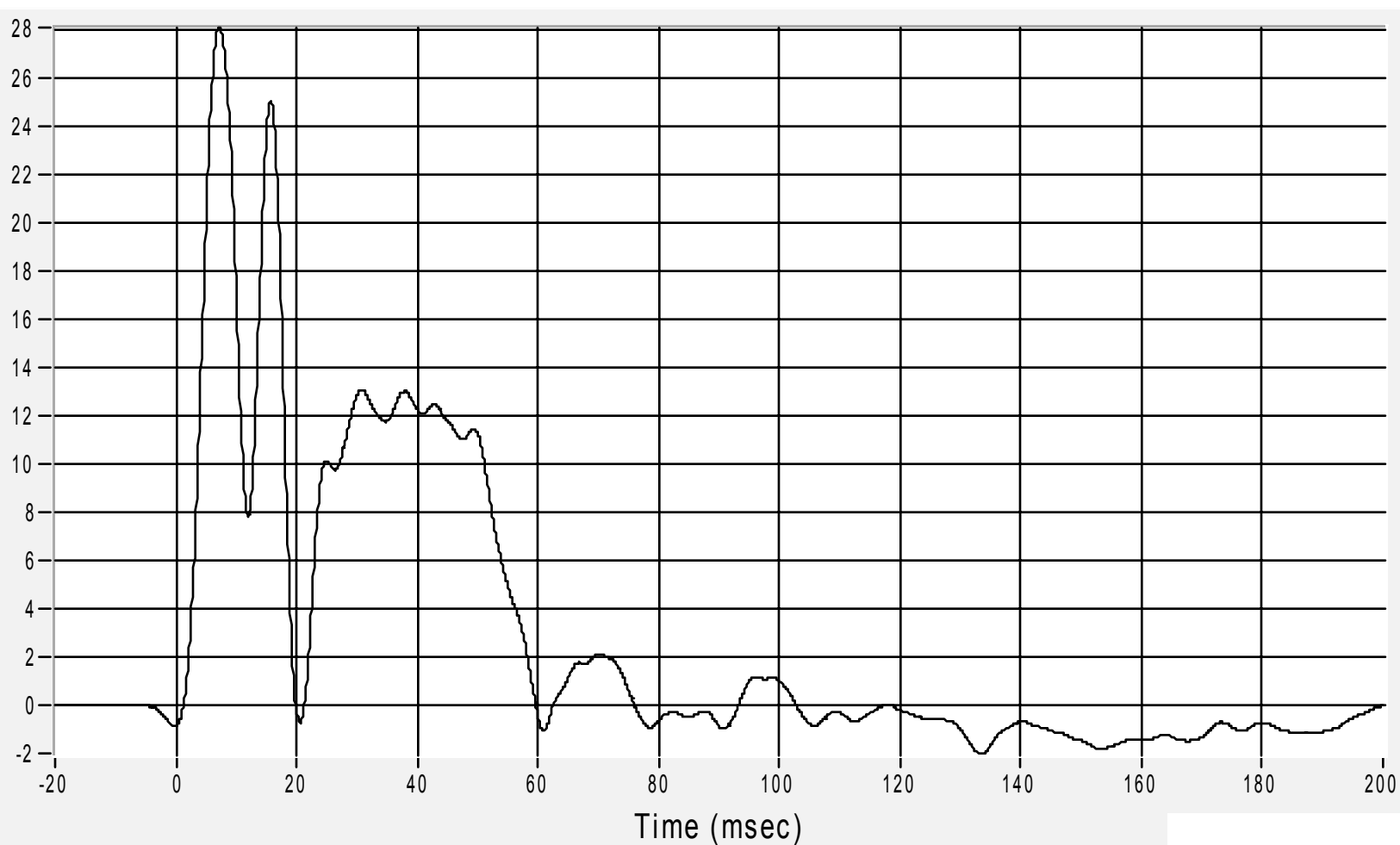


**Right Side Sill at Front Seat (Y) Acceleration**

Acceleration (G's) CFC60

Max 28.1 G at 7.2 msec

Min -2.0 G at 133.4 msec



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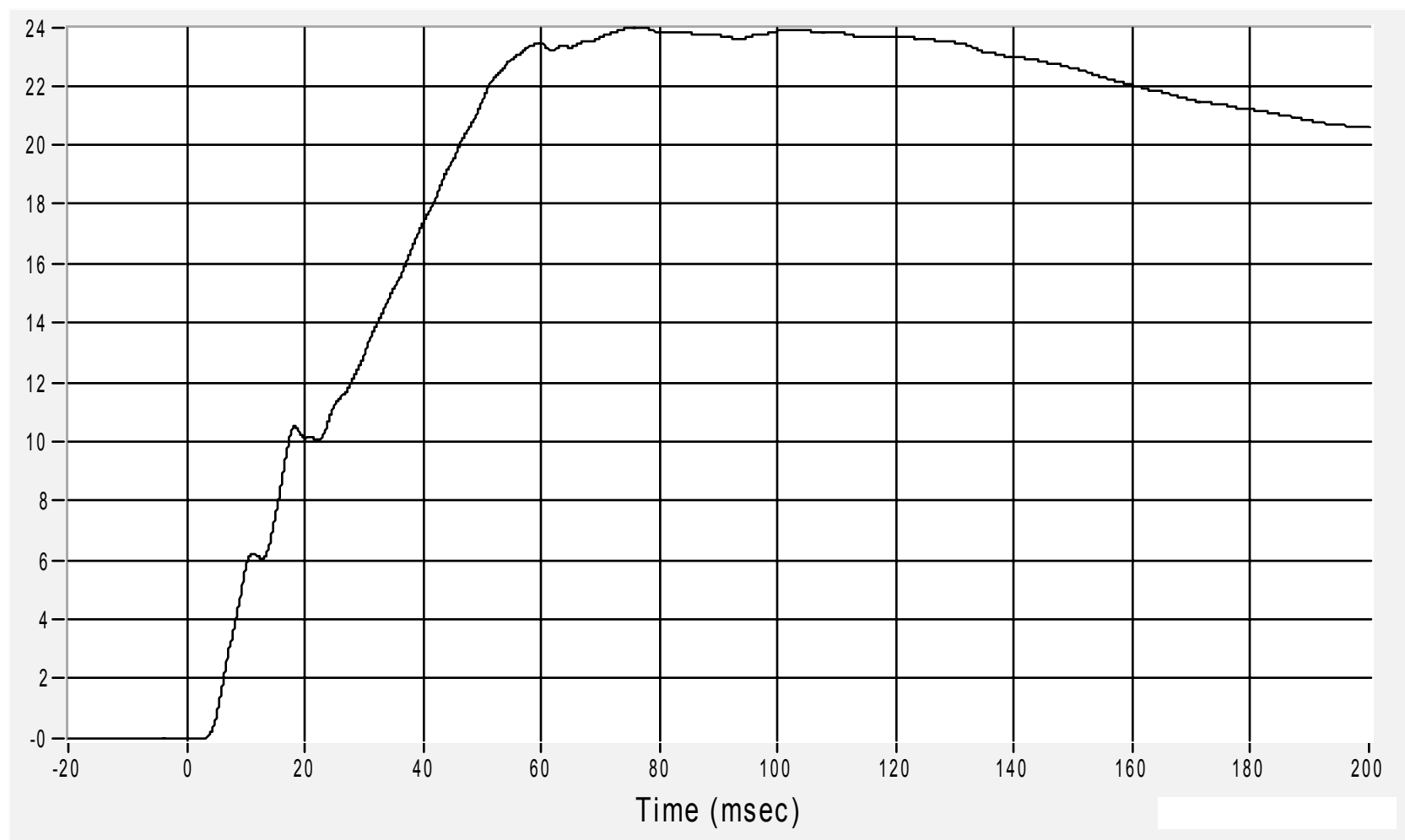
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**Right Side Sill at Front Seat (Y) Velocity**

Velocity (km/h) CFC180

Max 23.9 km/h at 75.2 msec

Min 0.0 km/h at 2.7 msec



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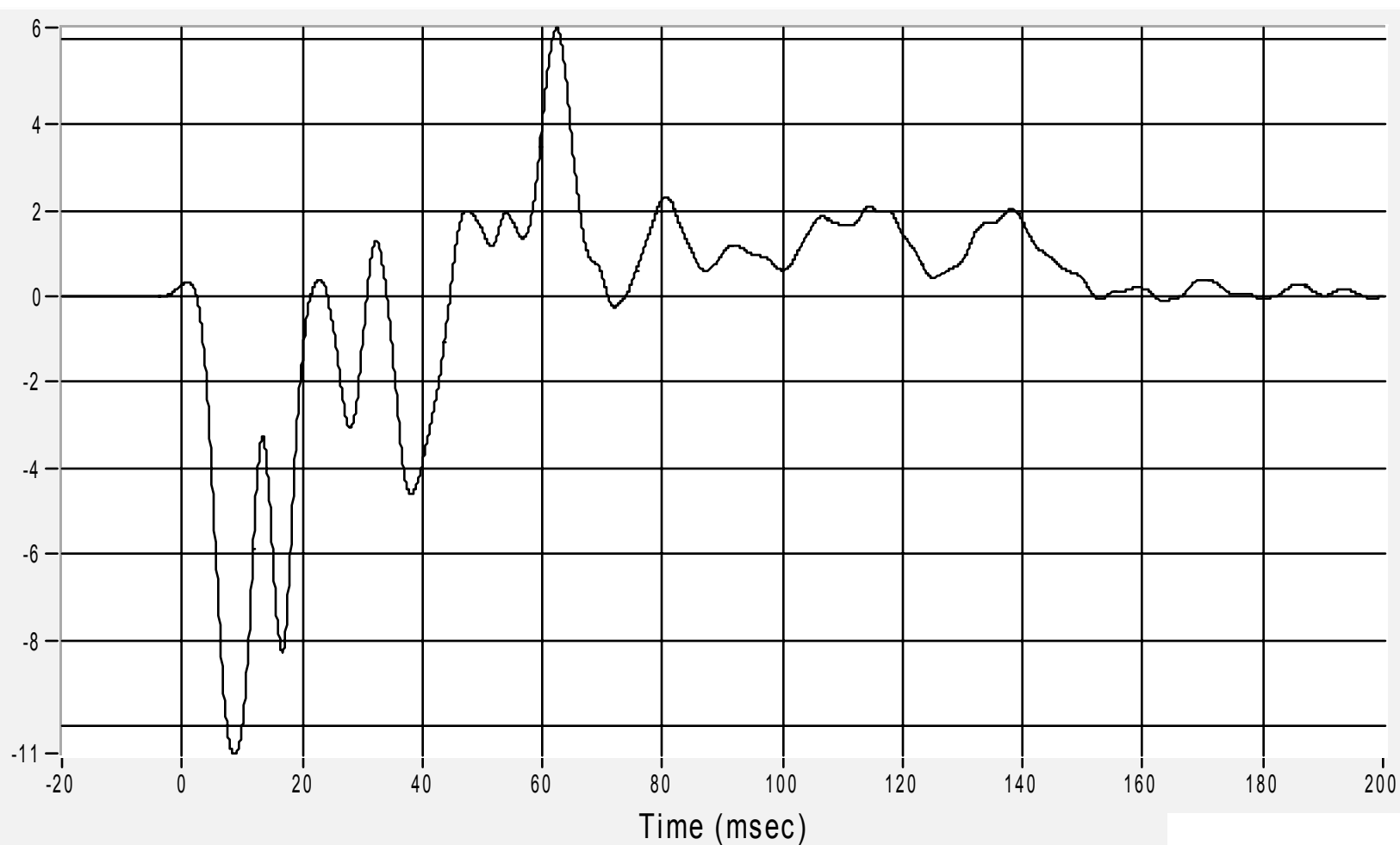
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**Right Side Sill at Front Seat (Z) Acceleration**

Acceleration (G's) CFC60

Max 6.2 G at 62.4 msec

Min -10.6 G at 8.7 msec



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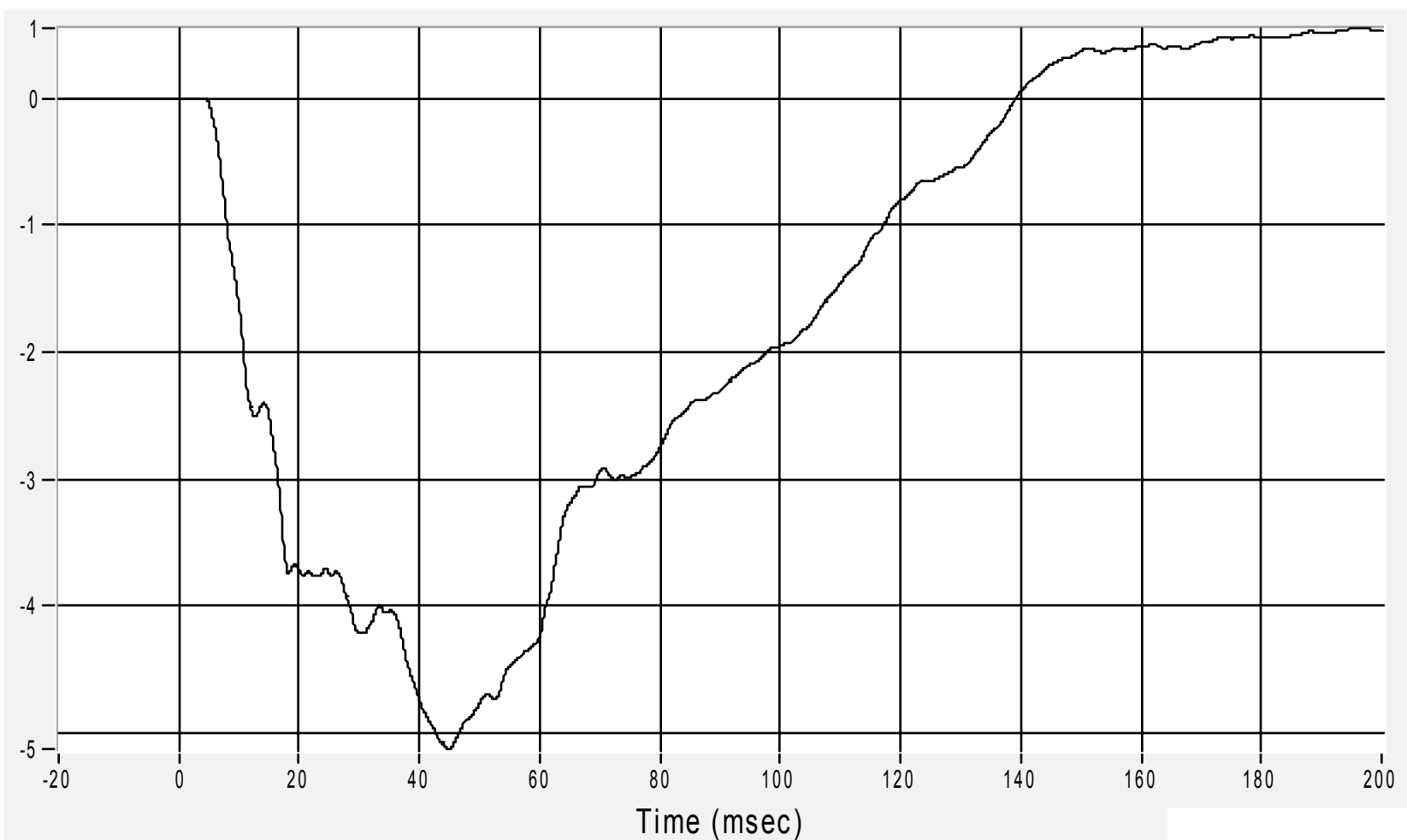
B-60

**Right Side Sill at Front Seat (Z) Velocity**

Velocity (km/h) CFC180

Max 0.6 km/h at 197.4 msec

Min -5.1 km/h at 44.7 msec



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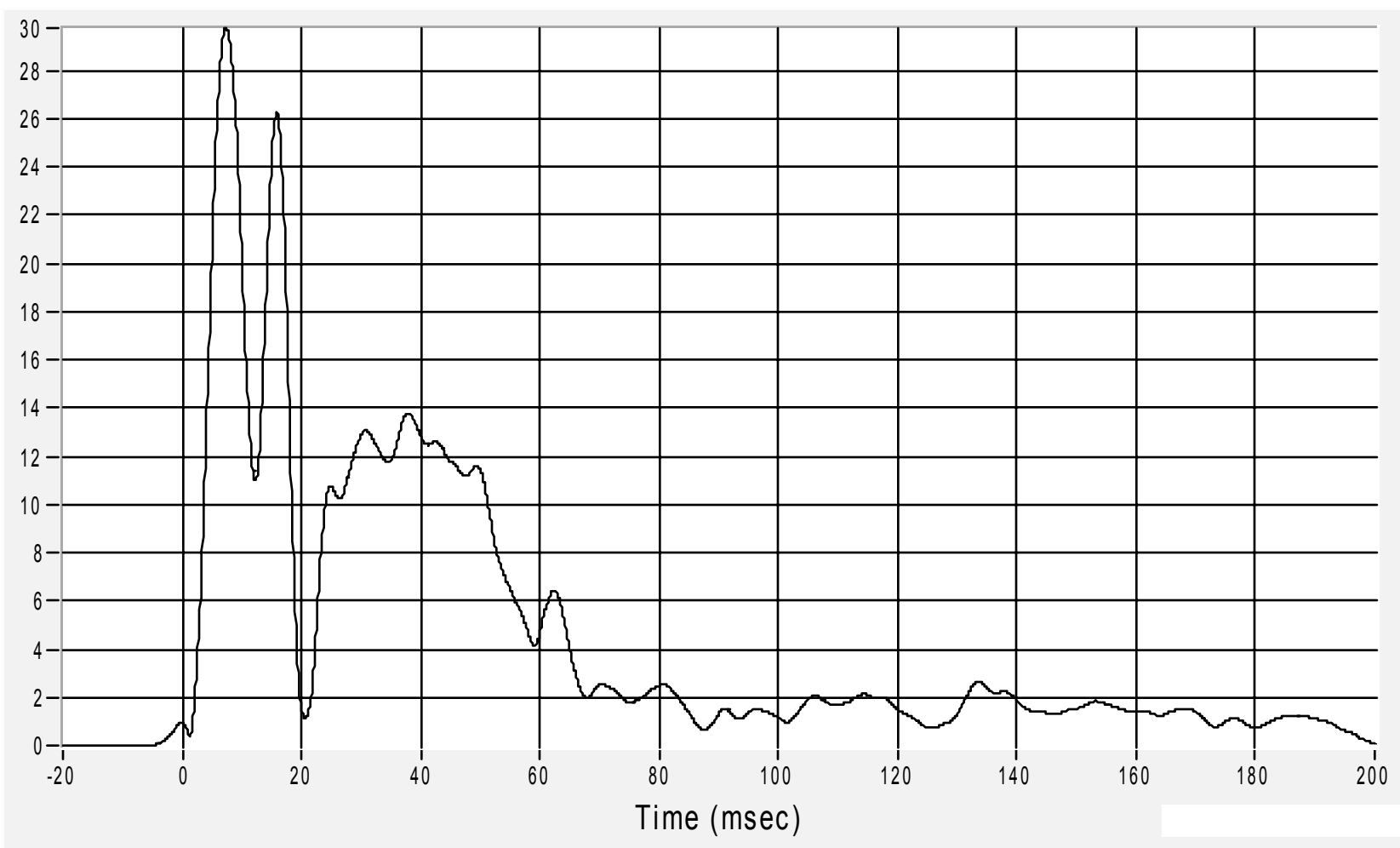


**Right Side Sill at Front Seat Resultant Acceleration**

Acceleration (G's) CFC60

Max 29.8 G's at 7.4 msec

Min 0.1 G's at 199.9 msec



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30 March 2004

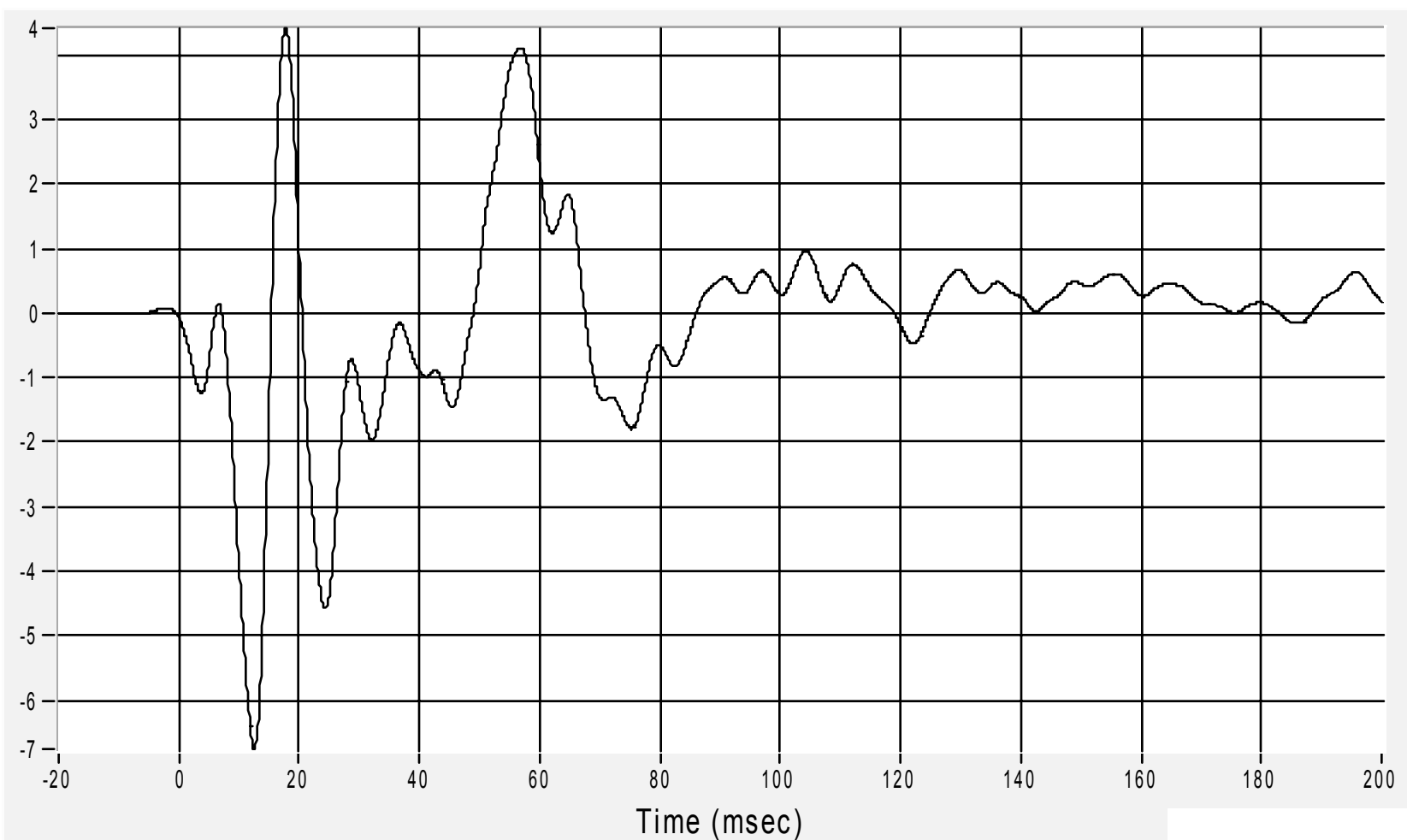
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**Right Side Sill at Rear Seat (X) Acceleration**

Acceleration (G's) CFC60

Max 4.4 G at 17.8 msec

Min -6.8 G at 12.5 msec



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30 March 2004

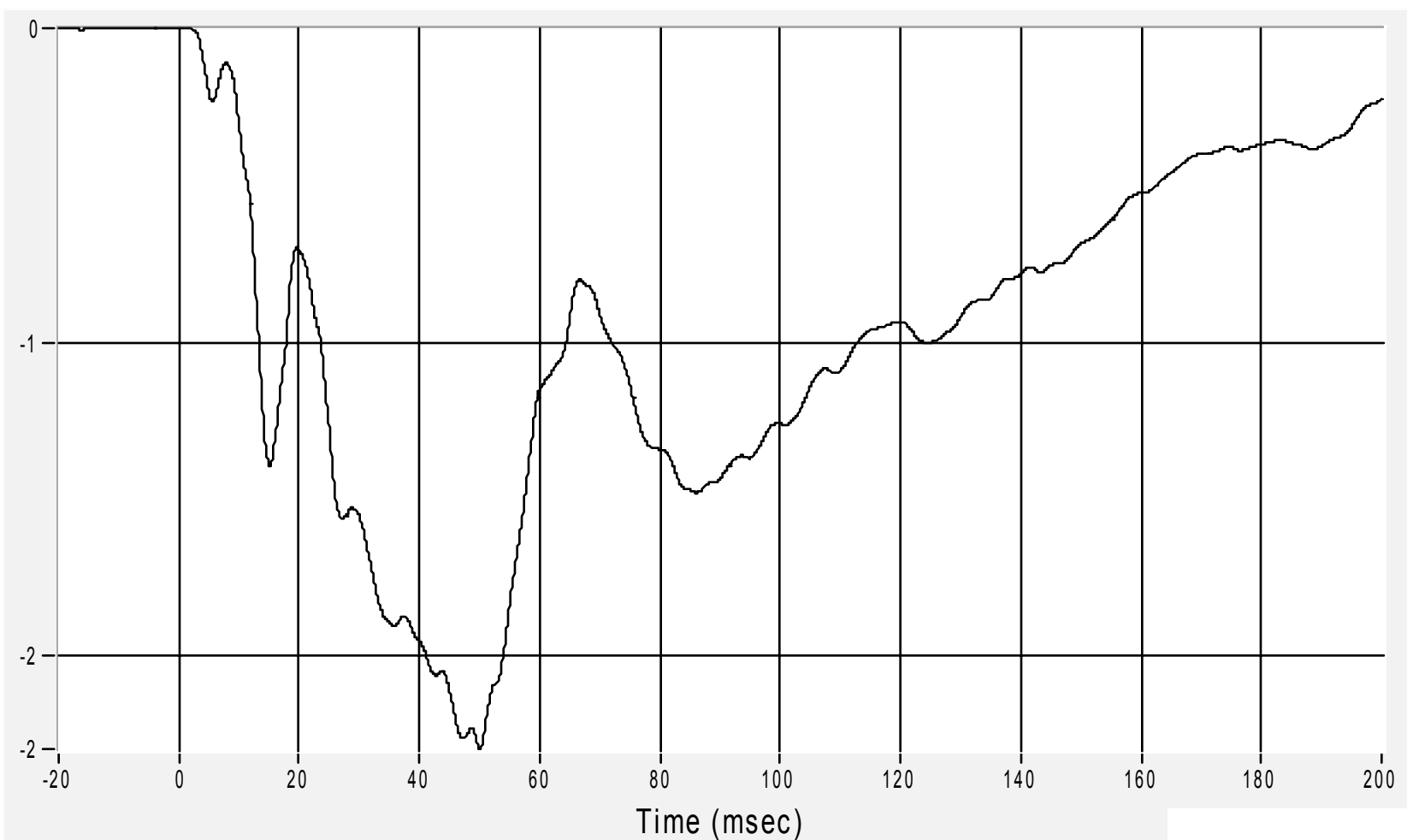
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**Right Side Sill at Rear Seat (X) Velocity**

Velocity (km/h) CFC180

Max 0.0 km/h at 1.4 msec

Min -2.3 km/h at 50.1 msec



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30 March 2004

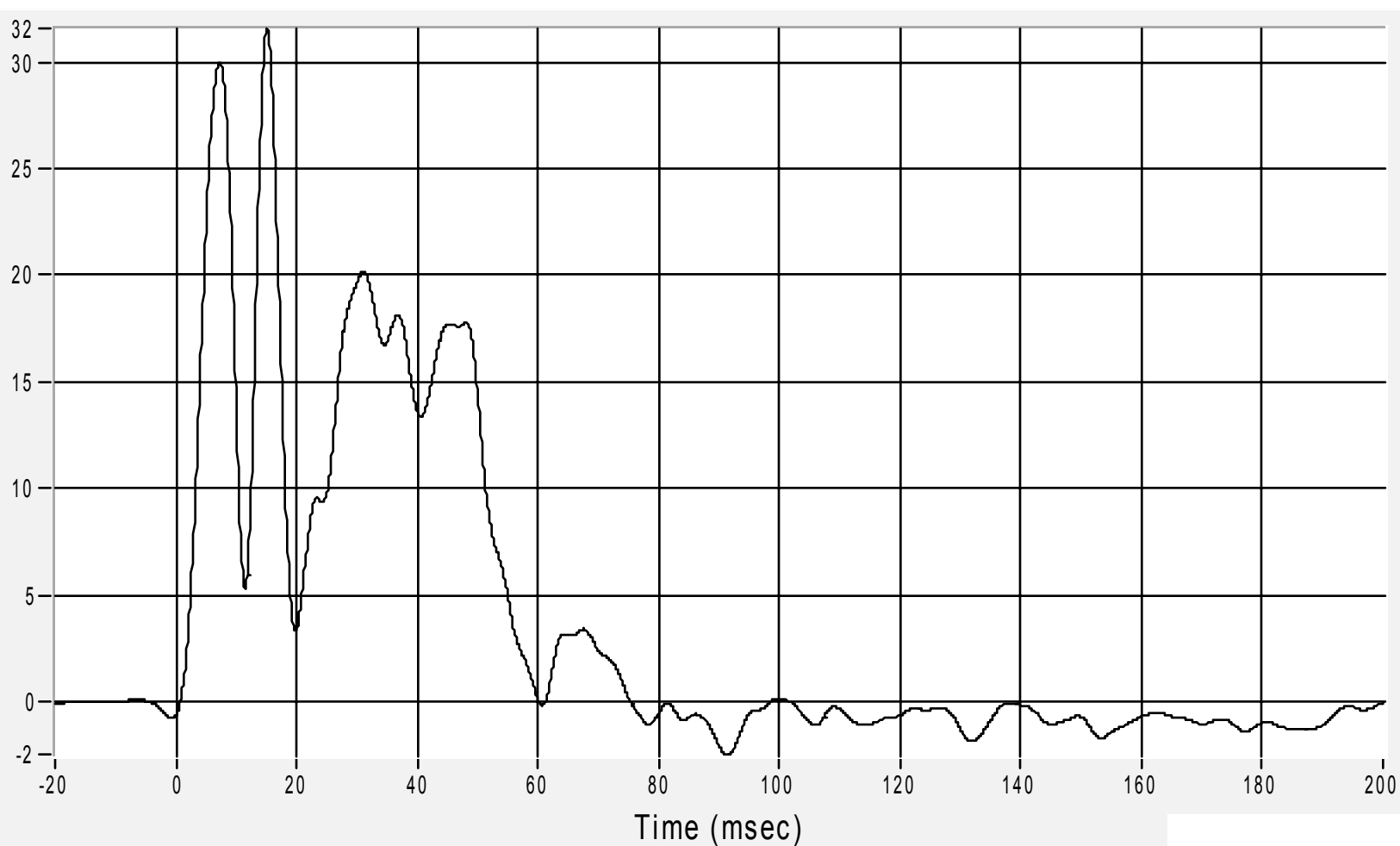
Medical College of Wisconsin  
Vehicle Crashworthiness Lab

**Right Side Sill at Rear Seat (Y) Acceleration**

Acceleration (G's) CFC60

Max 31.6 G at 15.1 msec

Min -2.5 G at 91.4 msec



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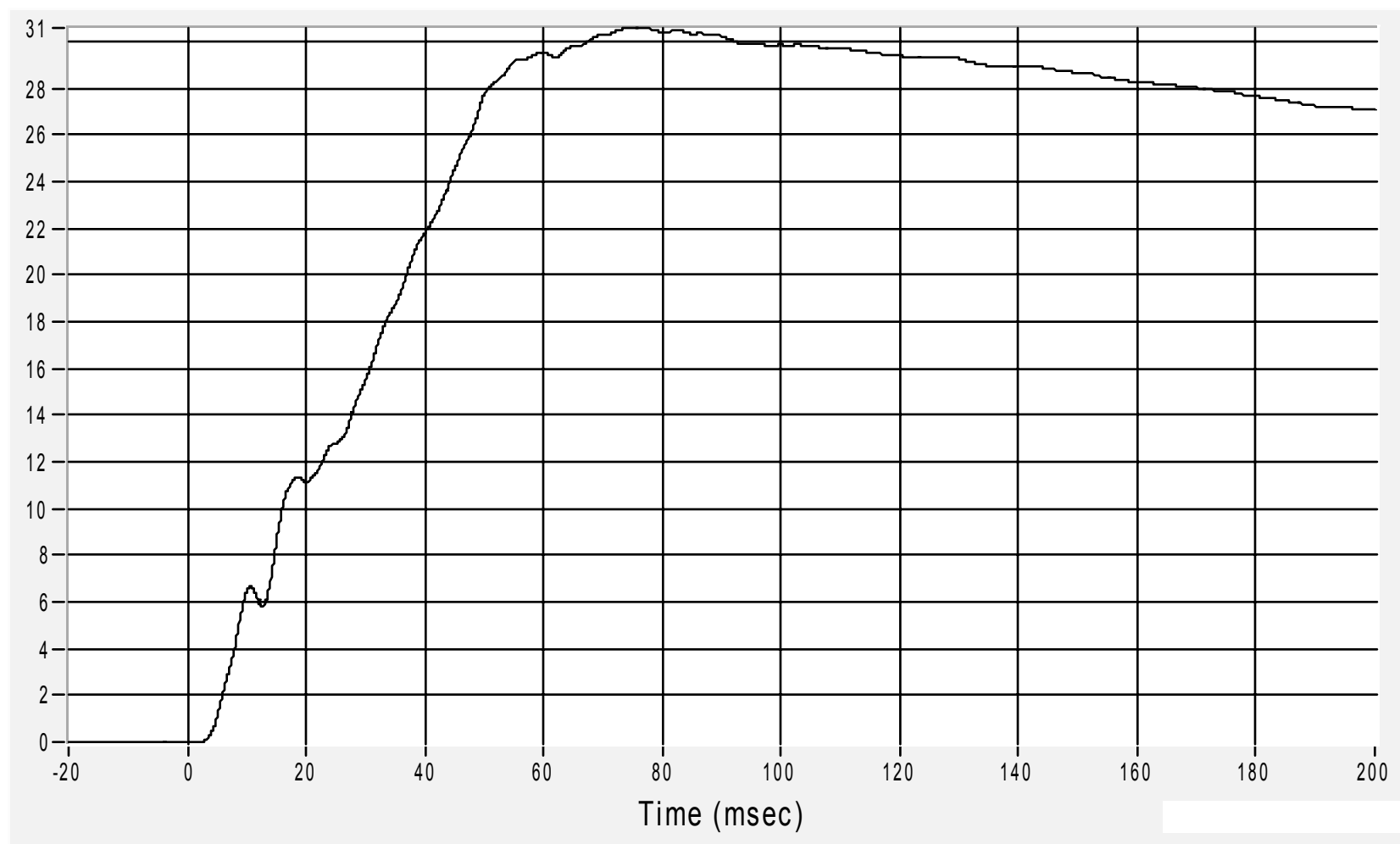


**Right Side Sill at Rear Seat (Y) Velocity**

Velocity (km/h) CFC180

Max 30.6 km/h at 74.2 msec

Min 0.0 km/h at 0.0 msec



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30 March 2004

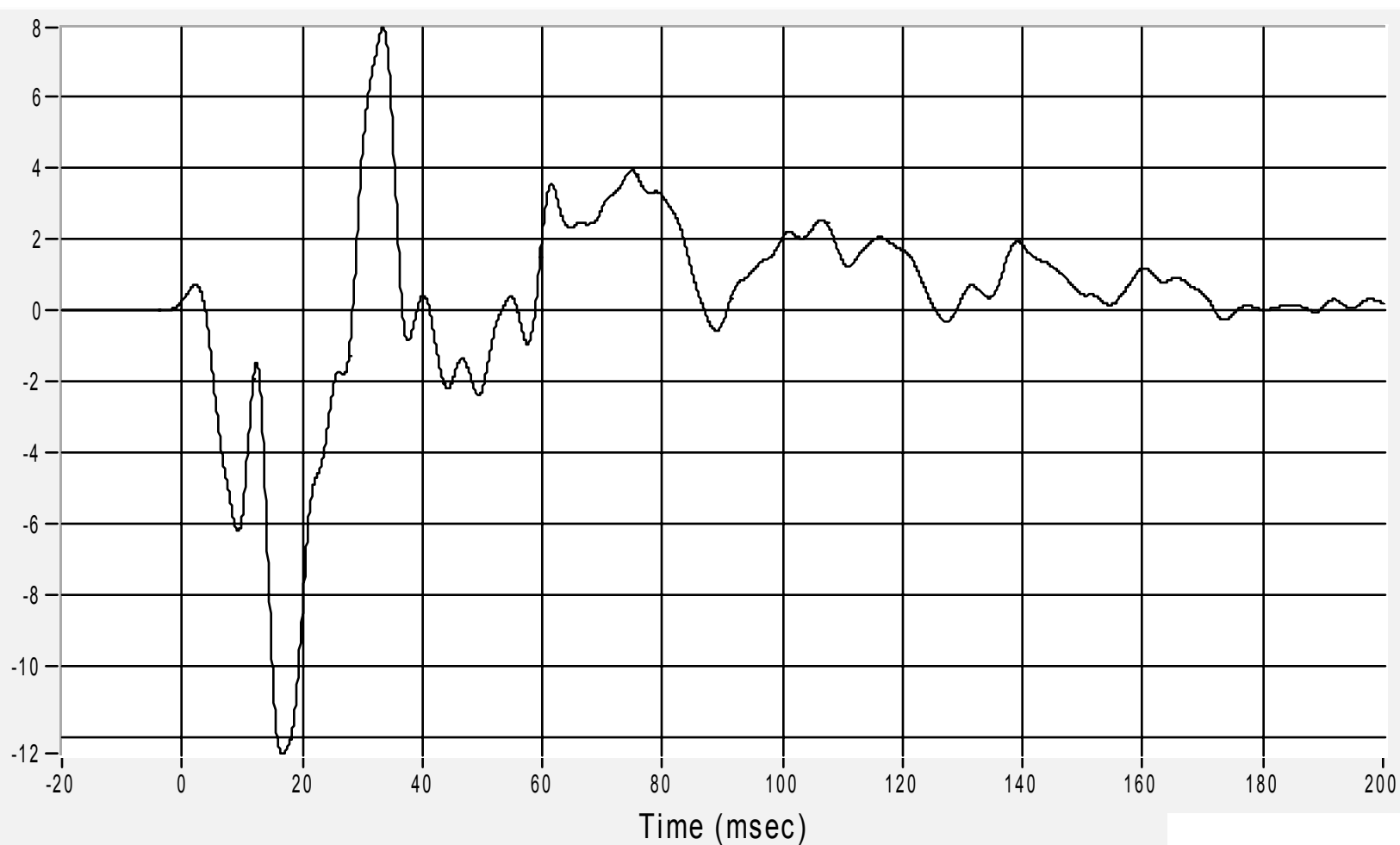
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**Right Side Sill at Rear Seat (Z) Acceleration**

Acceleration (G's) CFC60

Max 7.9 G at 33.4 msec

Min -12.5 G at 16.7 msec



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30 March 2004

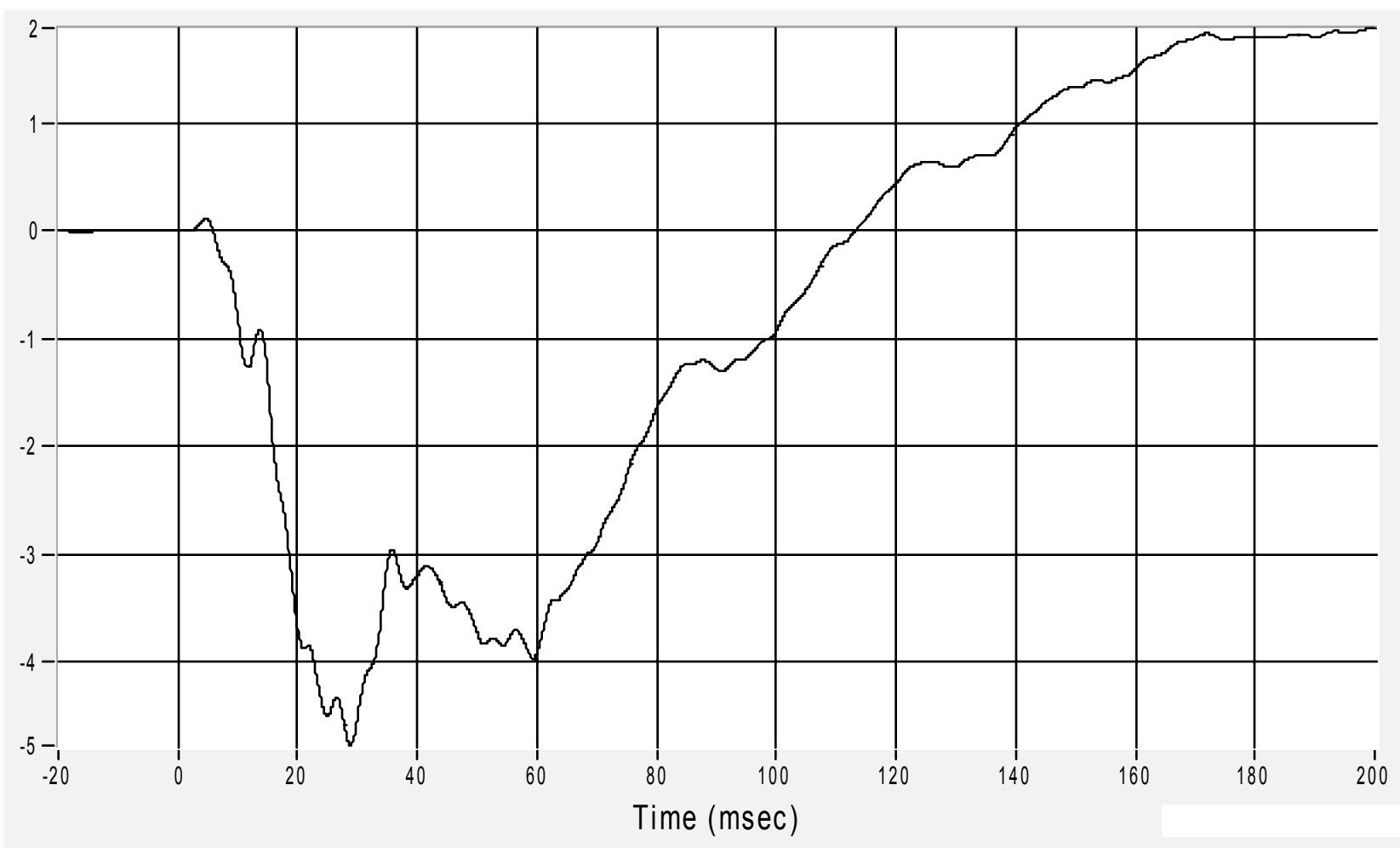
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**Right Side Sill at Rear Seat (Z) Velocity**

Velocity (km/h) CFC180

Max 1.9 km/h at 199.9 msec

Min -4.8 km/h at 28.8 msec



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30 March 2004

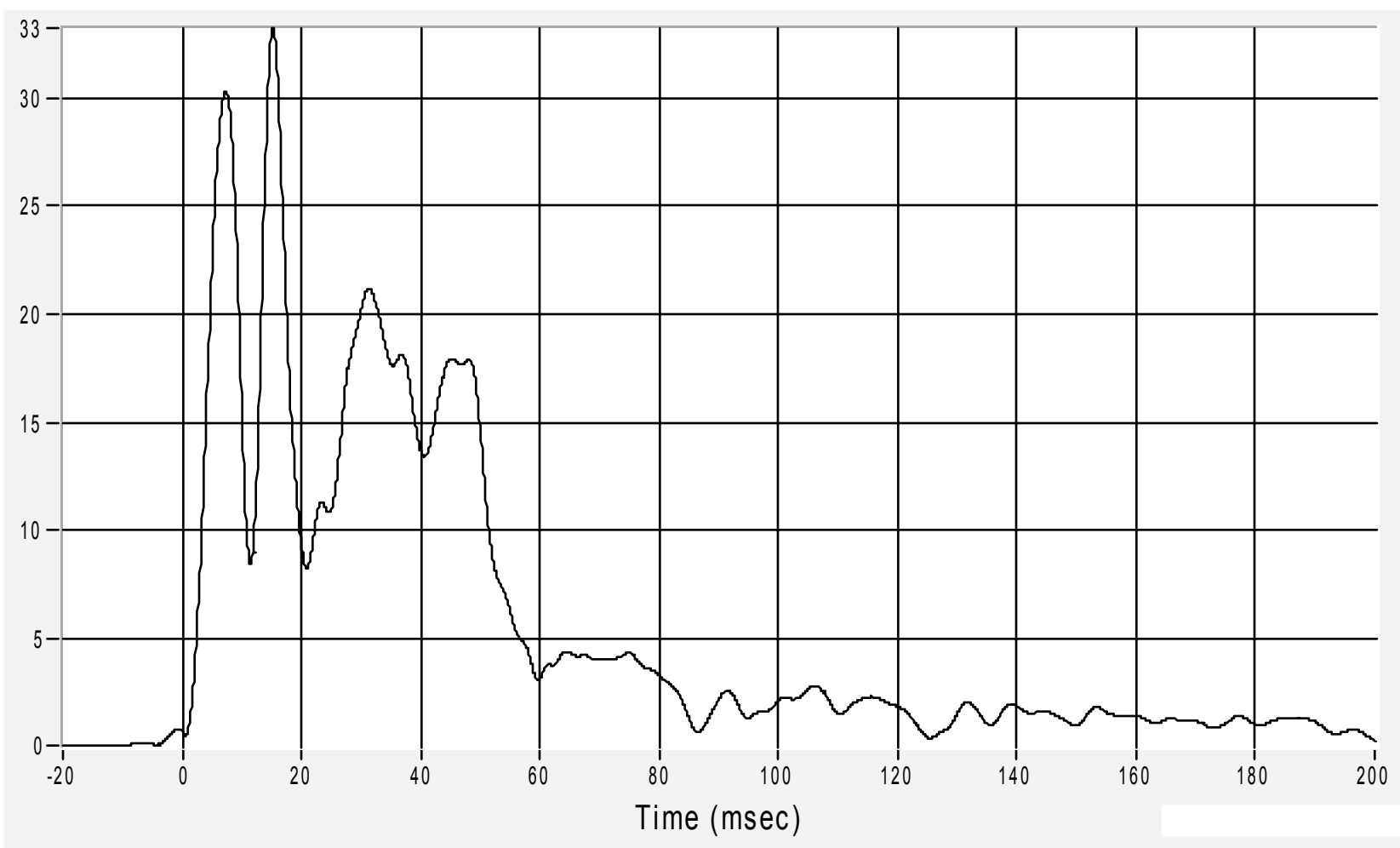
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**Right Side Sill at Rear Seat Resultant Acceleration**

Acceleration (G's) CFC60

Max 33.3 G's at 15.2 msec

Min 0.2 G's at 199.9 msec



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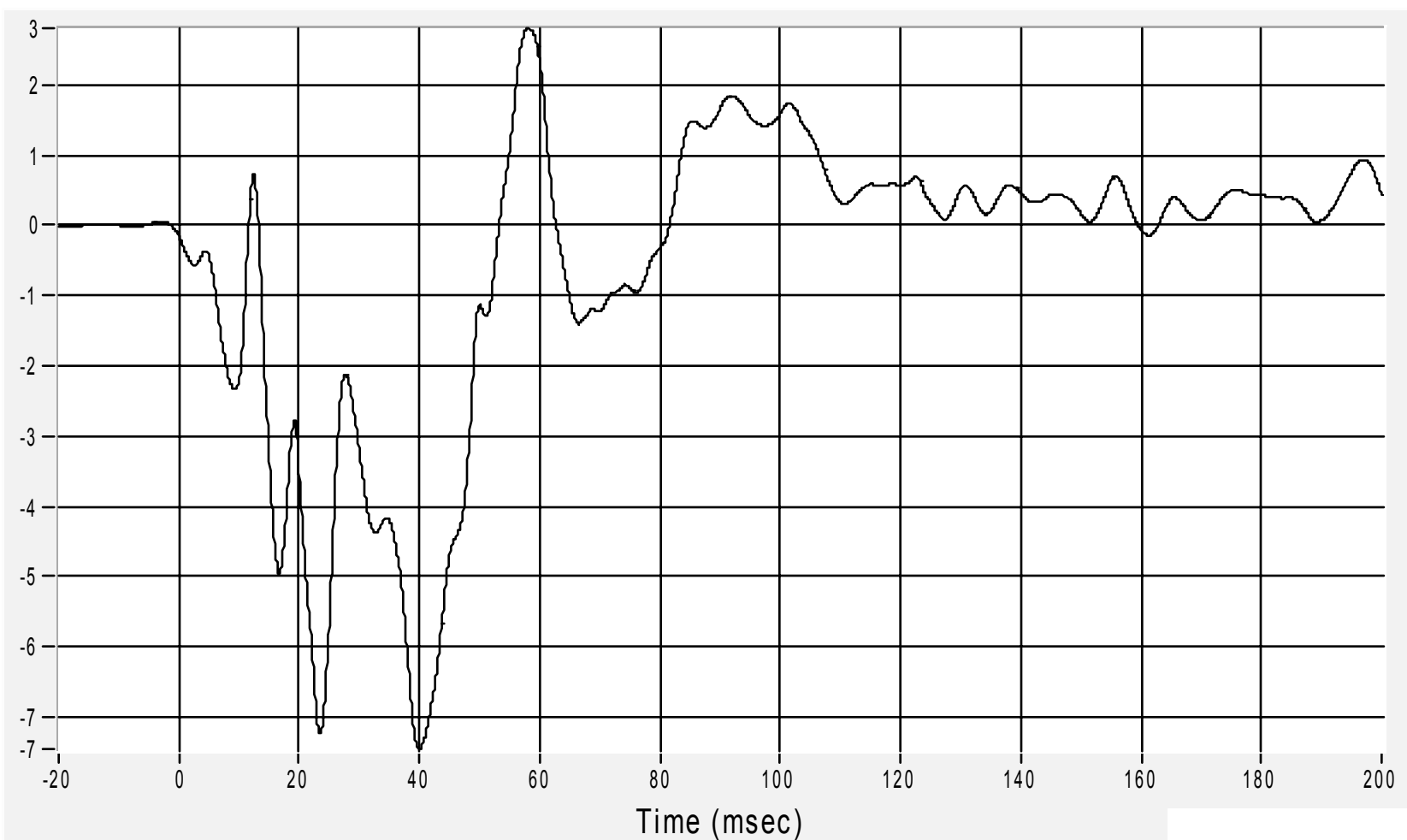
30 March 2004

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**Rear Floorpan Above Axle (X) Acceleration**

Acceleration (G's) CFC60

**Max 2.8 G at 58.0 msec****Min -7.5 G at 39.9 msec**

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30 March 2004

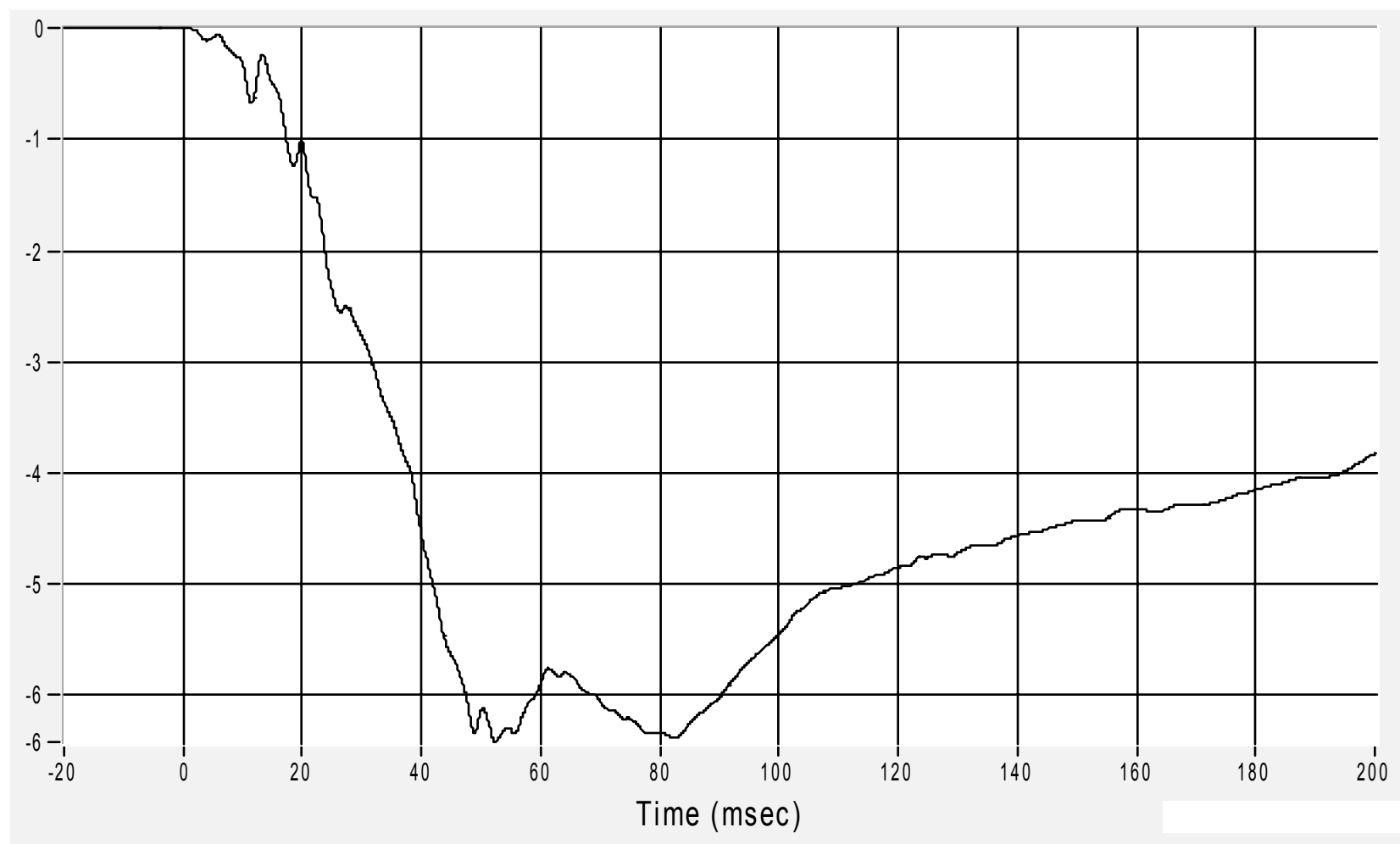
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**Rear Floorpan Above Axle (X) Velocity**

Velocity (km/h) CFC180

Max 0.0 km/h at 0.5 msec

Min -6.4 km/h at 52.3 msec



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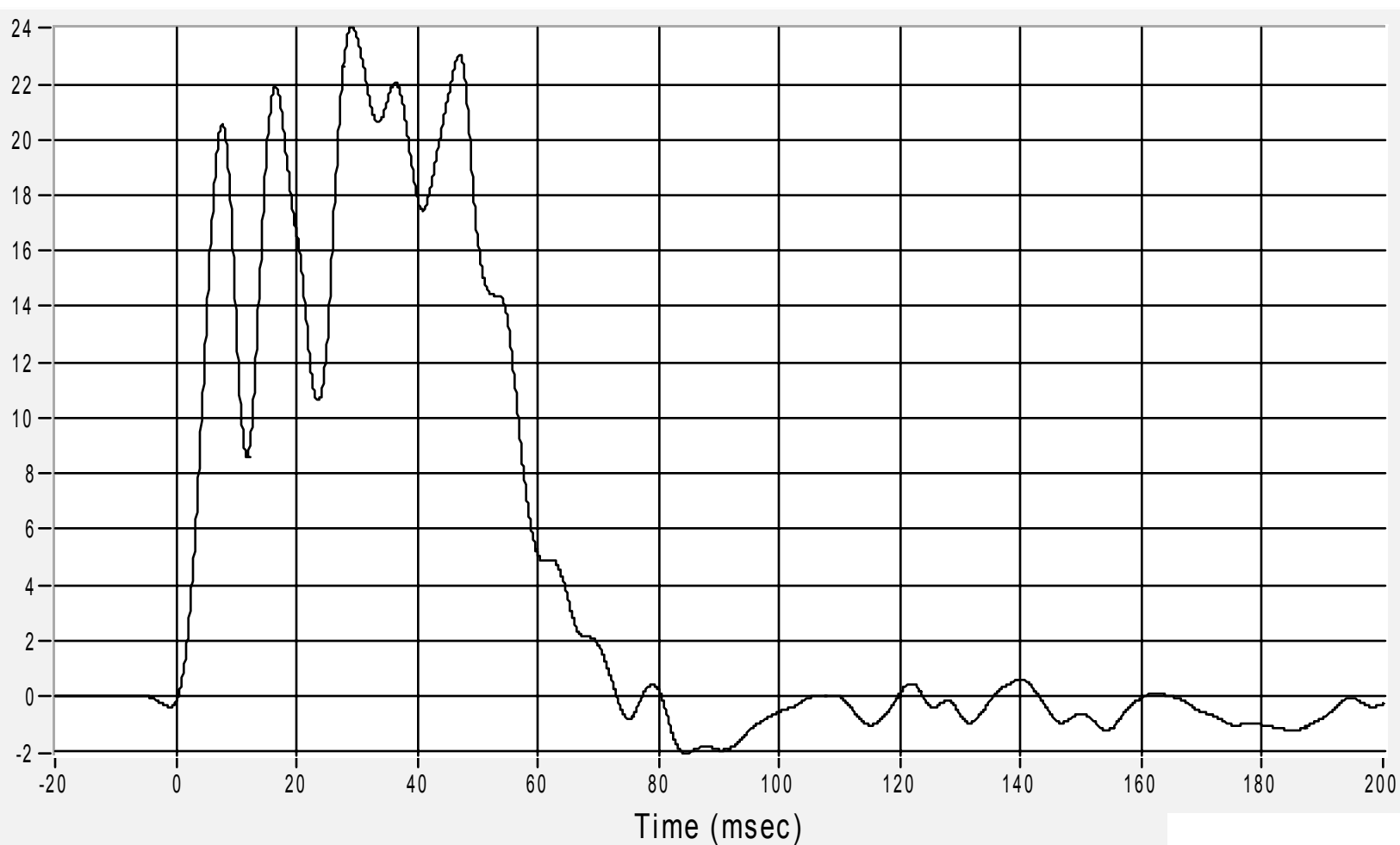
Medical College of Wisconsin  
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**Rear Floorpan Above Axle (Y) Acceleration**

Acceleration (G's) CFC60

Max 24.0 G at 29.1 msec

Min -2.1 G at 84.5 msec



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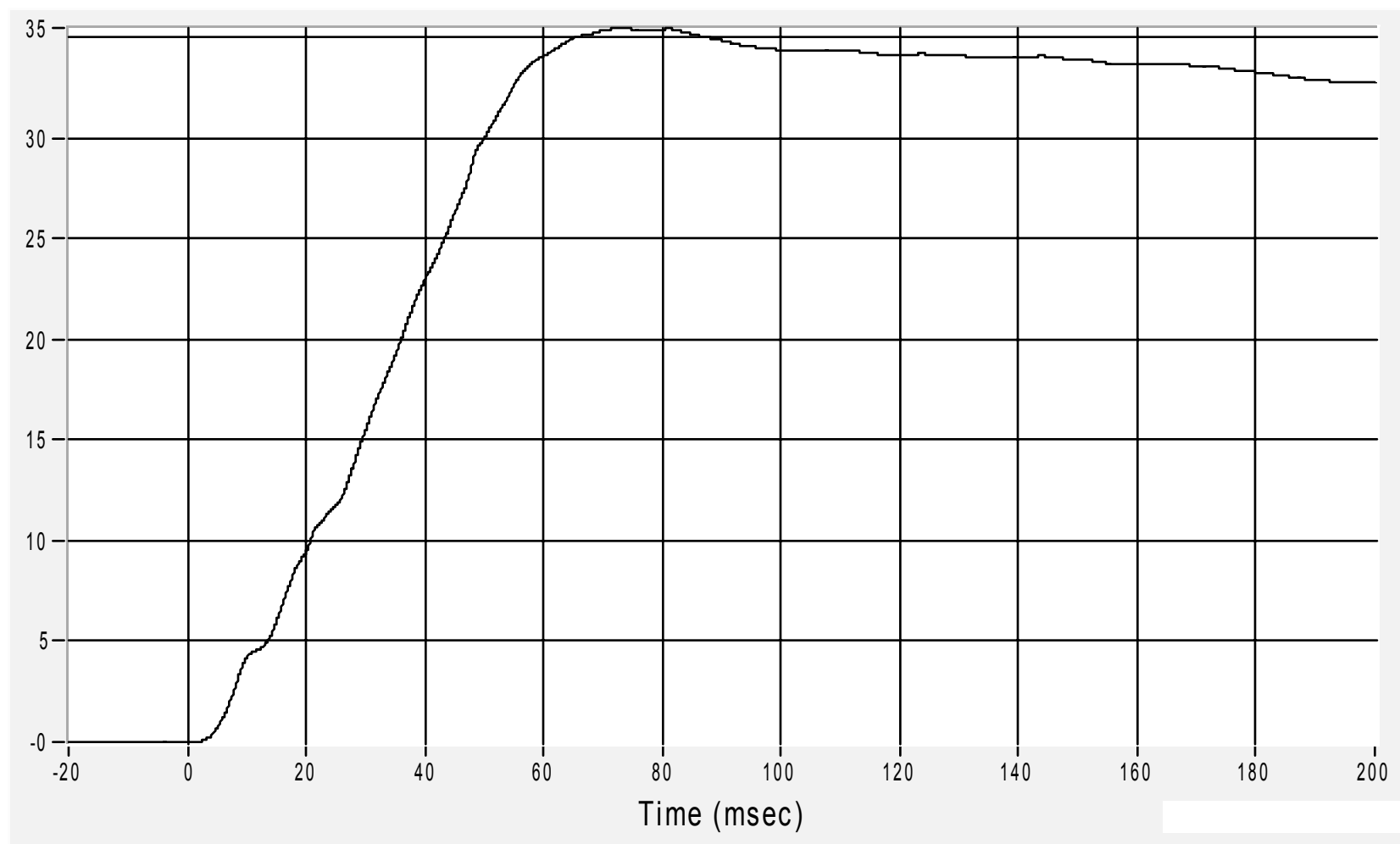
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**Rear Floorpan Above Axle (Y) Velocity**

Velocity (km/h) CFC180

Max 35.5 km/h at 73.4 msec

Min 0.0 km/h at 0.8 msec



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30 March 2004

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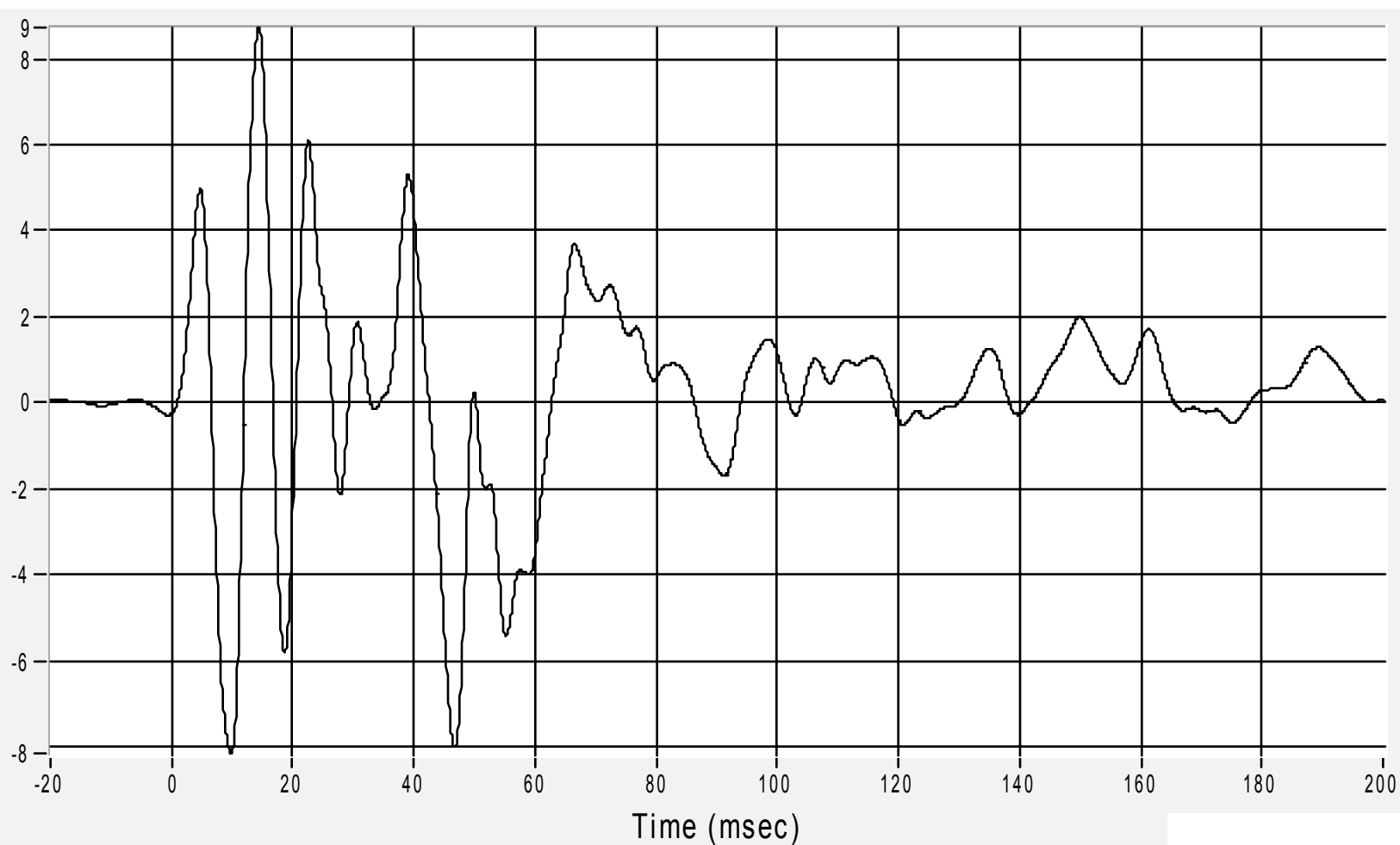


**Rear Floorpan Above Axle (Z) Acceleration**

Acceleration (G's) CFC60

Max 8.7 G at 14.4 msec

Min -8.2 G at 9.8 msec



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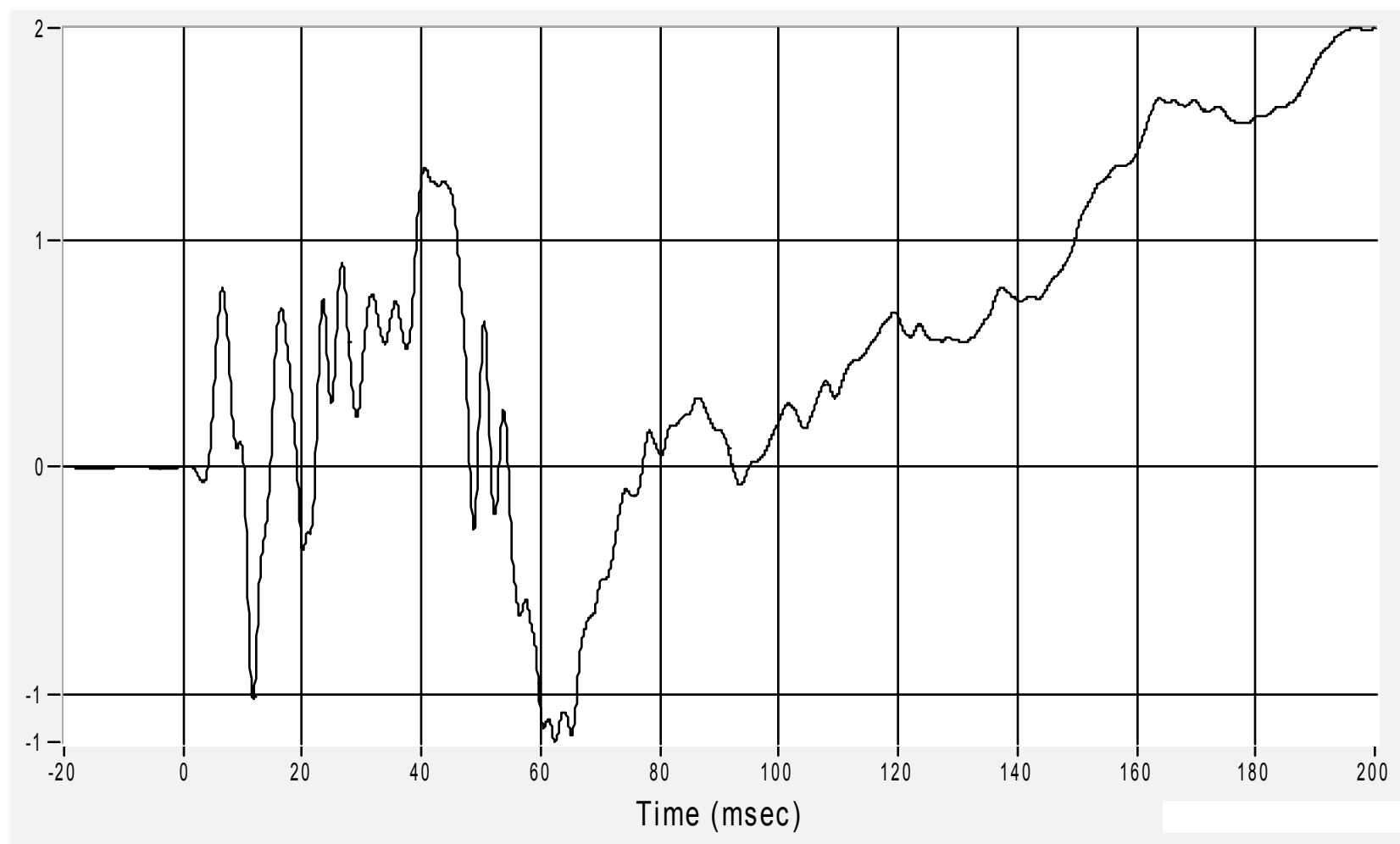
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**Rear Floorpan Above Axle (Z) Velocity**

Velocity (km/h) CFC180

Max 1.9 km/h at 196.6 msec

Min -1.2 km/h at 62.4 msec



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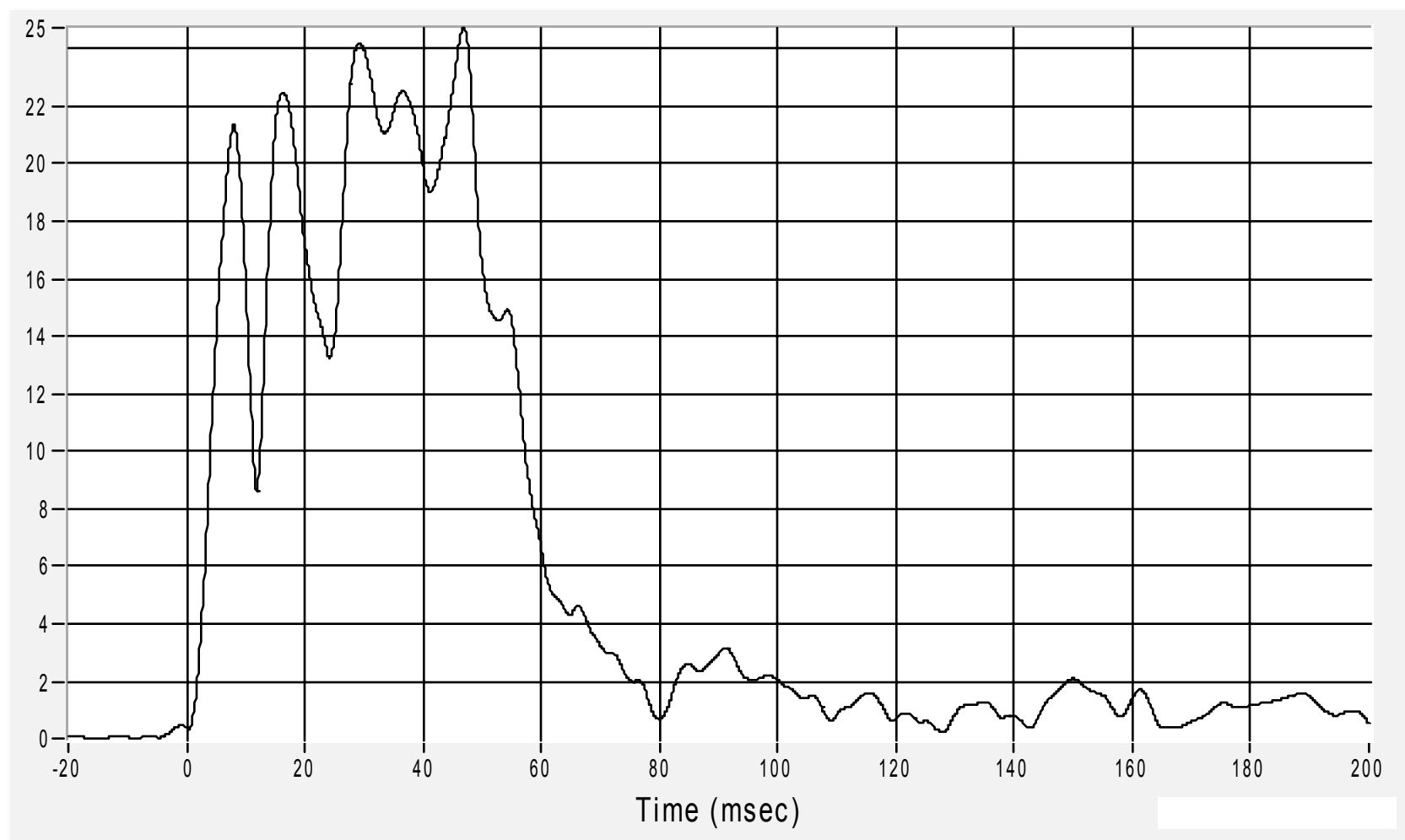
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**Rear Floorpan Above Axle Resultant Acceleration**

Acceleration (G's) CFC60

Max 24.7 G's at 46.9 msec

Min 0.2 G's at 127.8 msec



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30 March 2004

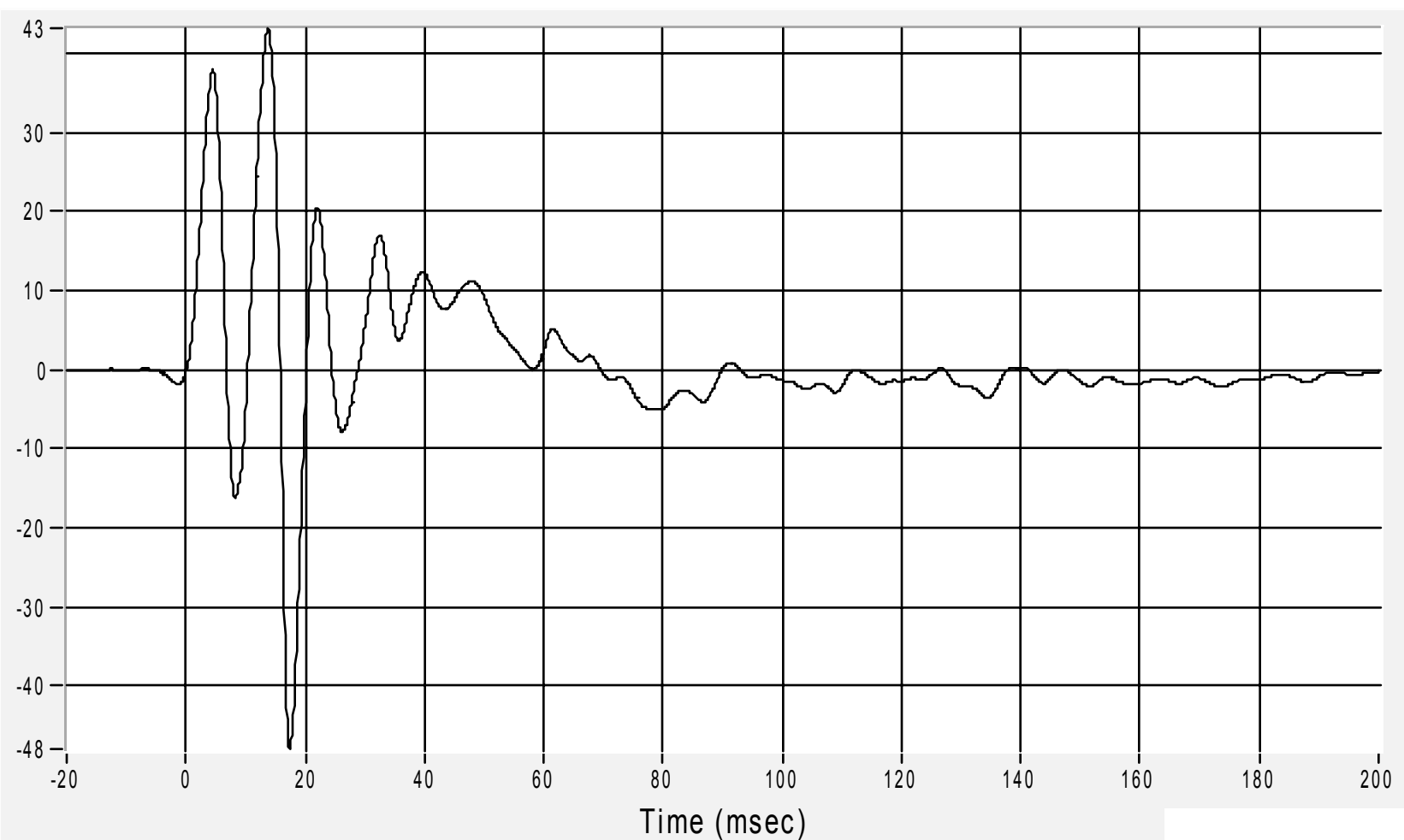
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**Left Side Sill at Rear Seat (Y) Acceleration**

Acceleration (G's) CFC60

Max 43.2 G at 13.8 msec

Min -47.9 G at 17.4 msec



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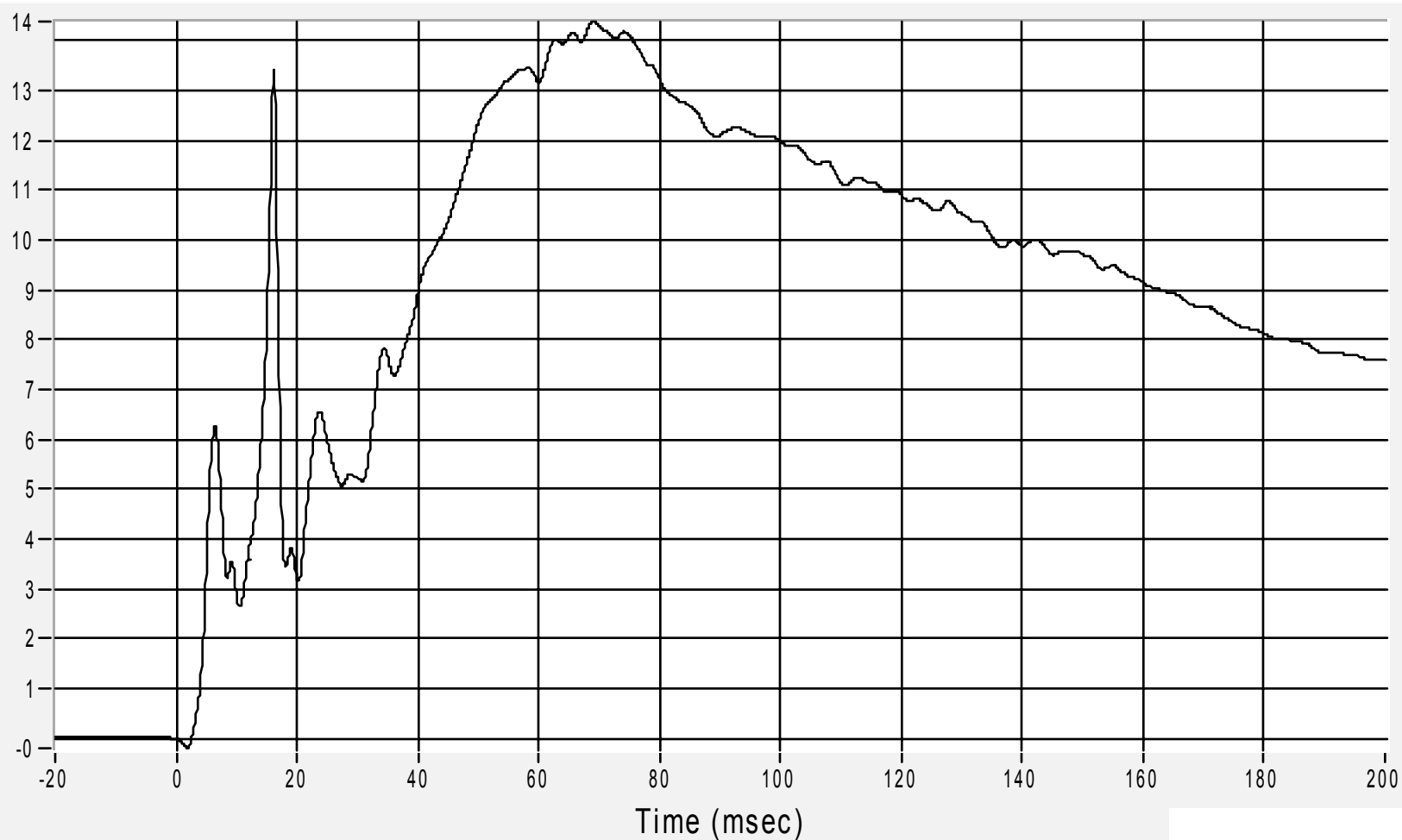


**Left Side Sill at Rear Seat (Y) Velocity**

Velocity (km/h) CFC180

Max 14.4 km/h at 69.0 msec

Min -0.2 km/h at 1.9 msec



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30 March 2004

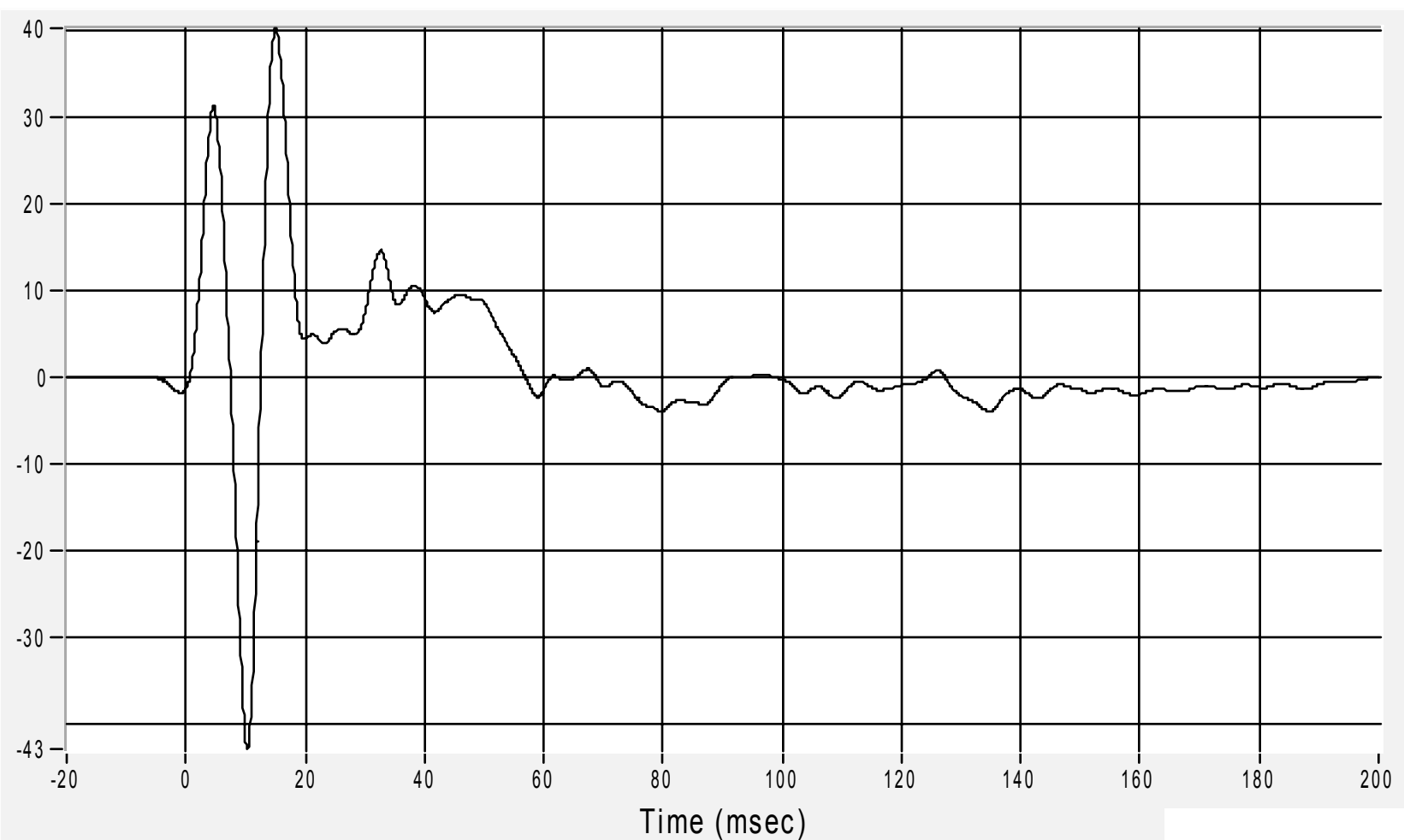
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**Left Side Sill at Front Seat (Y) Acceleration**

Acceleration (G's) CFC60

Max 40.2 G at 15.0 msec

Min -42.8 G at 10.3 msec



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30 March 2004

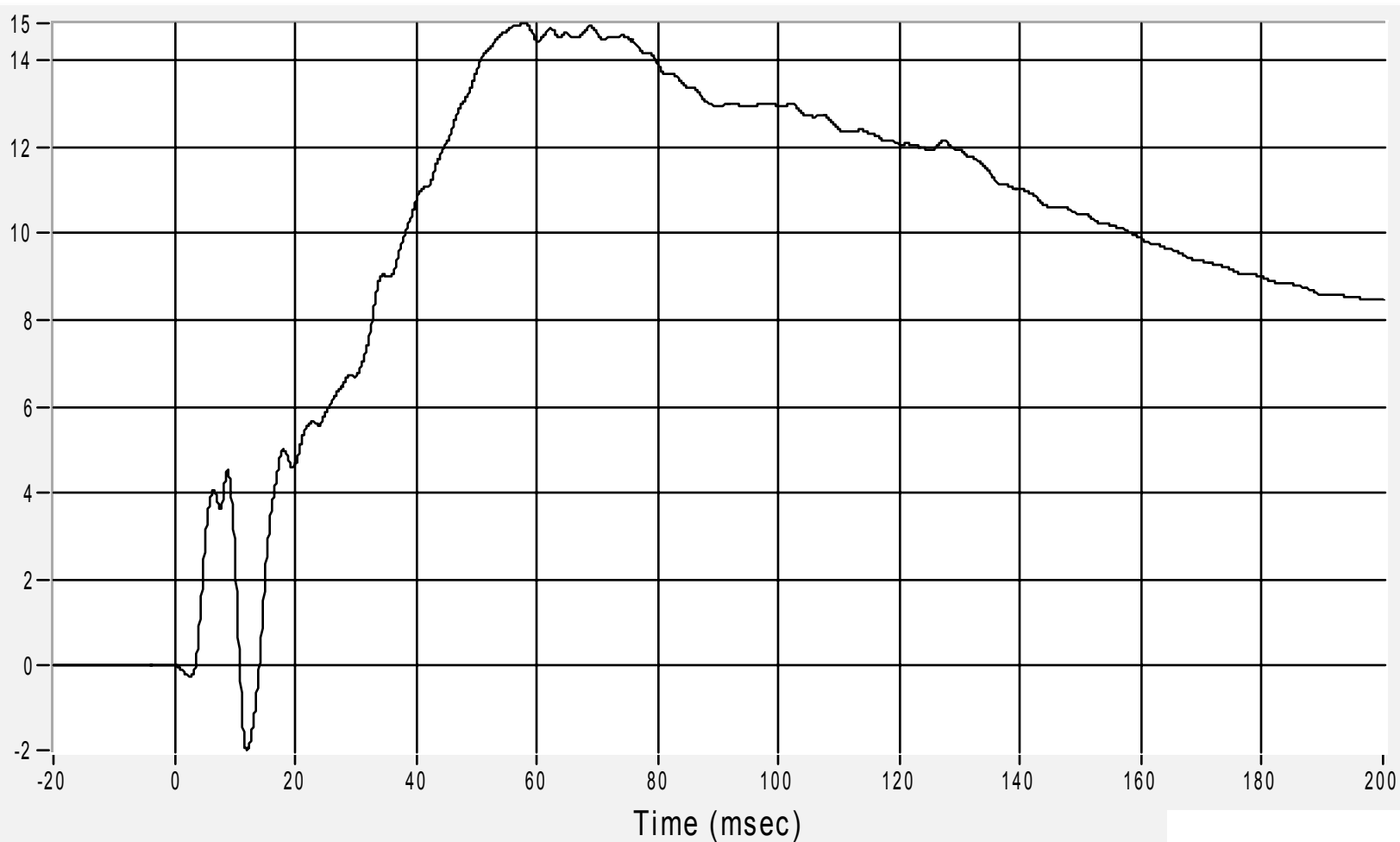
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**Left Side Sill at Front Seat (Y) Velocity**

Velocity (km/h) CFC180

Max 14.9 km/h at 57.9 msec

Min -2.0 km/h at 12.0 msec



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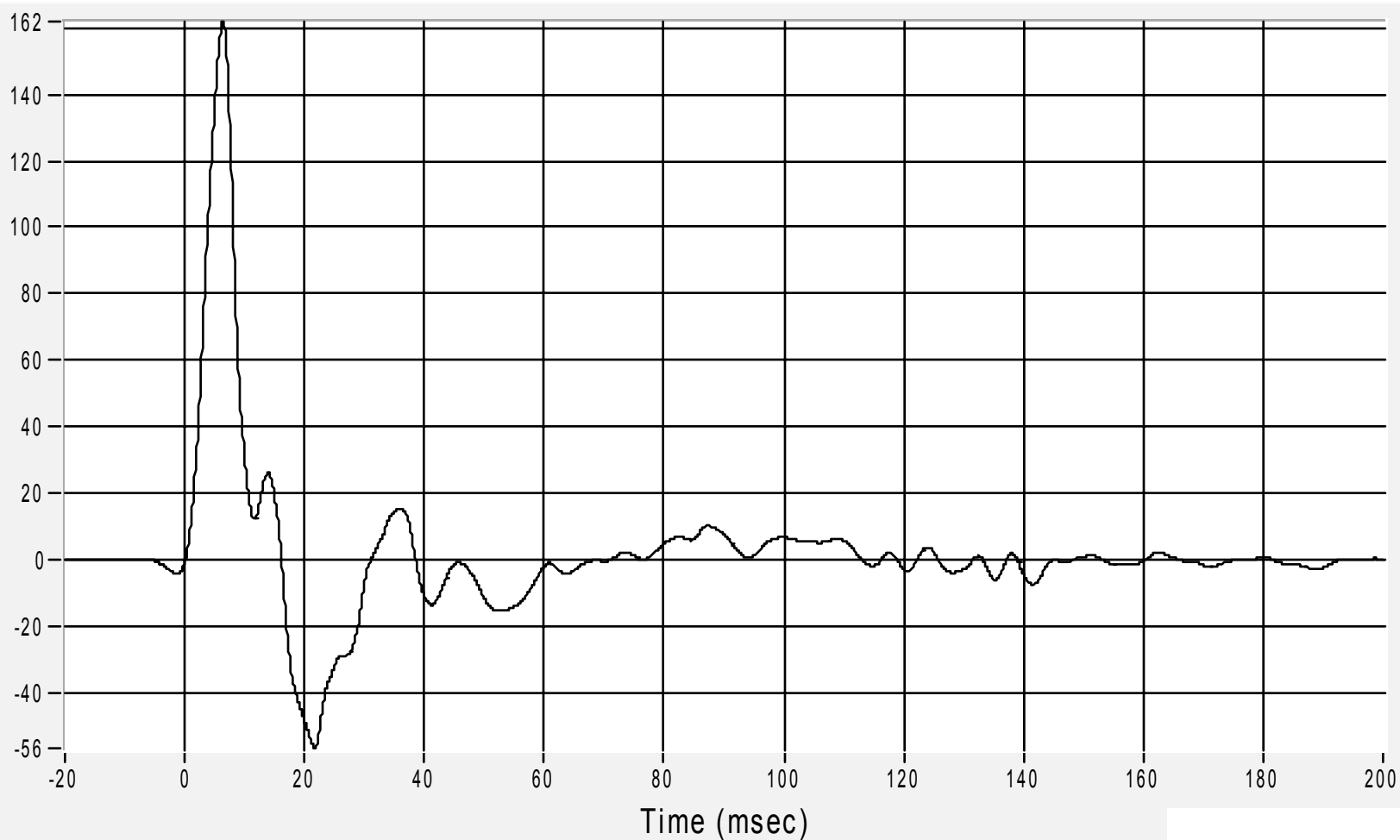
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**Left Front Door on Centerline (Y) Acceleration**

Acceleration (G's) CFC60

Max 161.8 G at 6.4 msec

Min -56.4 G at 21.7 msec



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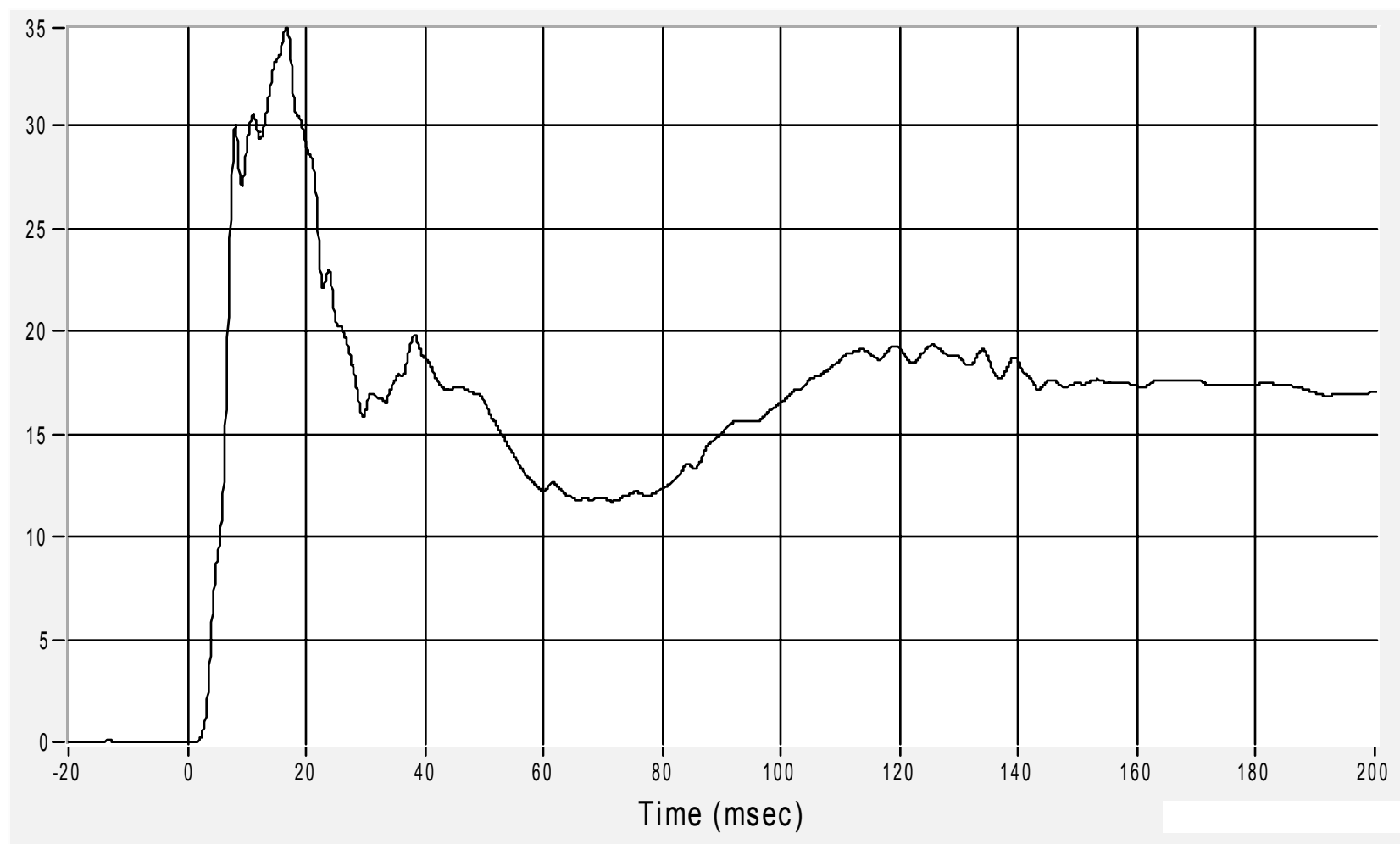
30 March 2004

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**Left Front Door on Centerline (Y) Velocity**

Velocity (km/h) CFC180

**Max 34.8 km/h at 16.6 msec****Min 0.0 km/h at 0.0 msec**

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30 March 2004

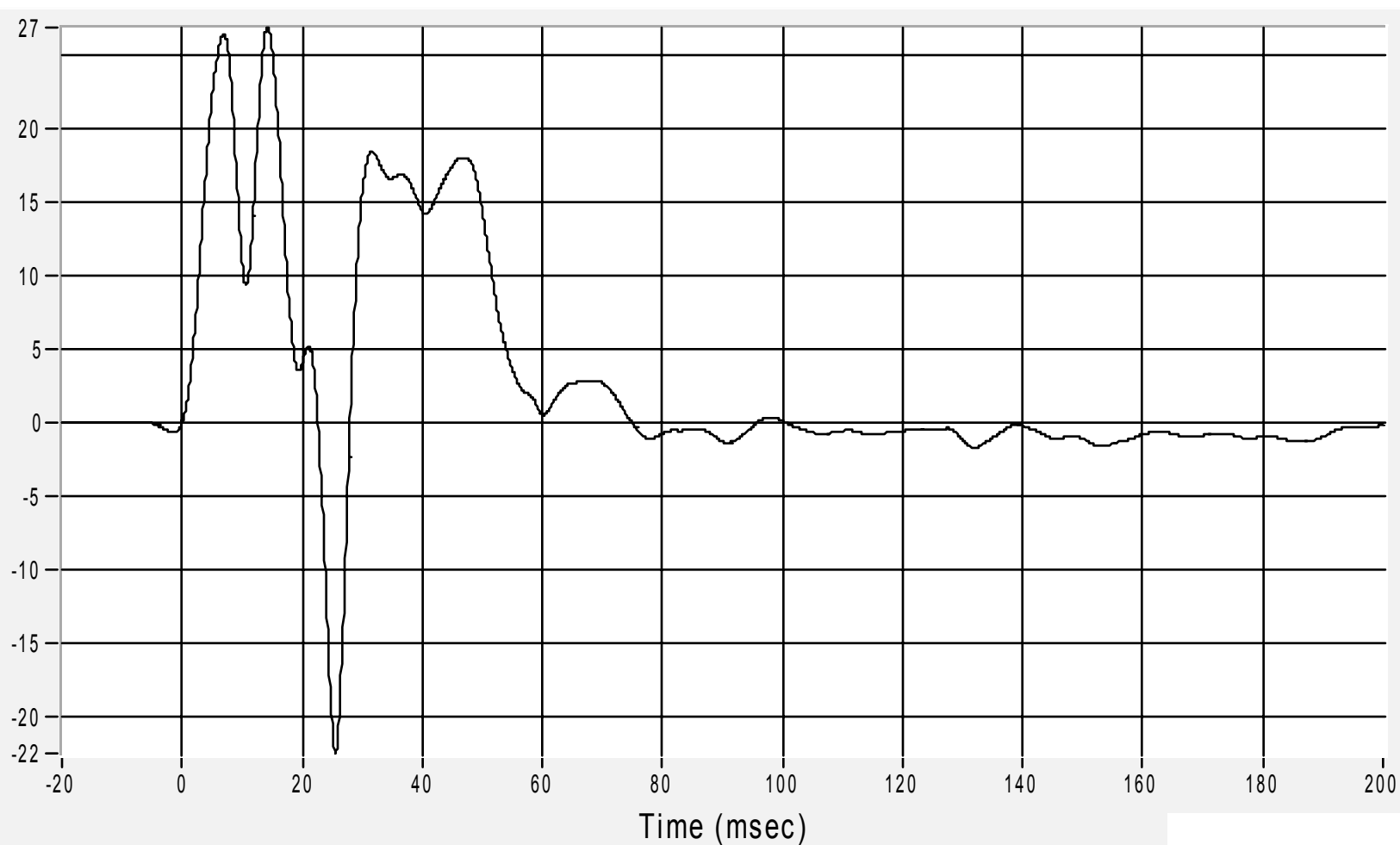
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**Right Rear Occupant Compartment (Y) Acceleration**

Acceleration (G's) CFC60

Max 26.8 G at 14.2 msec

Min -22.4 G at 25.5 msec



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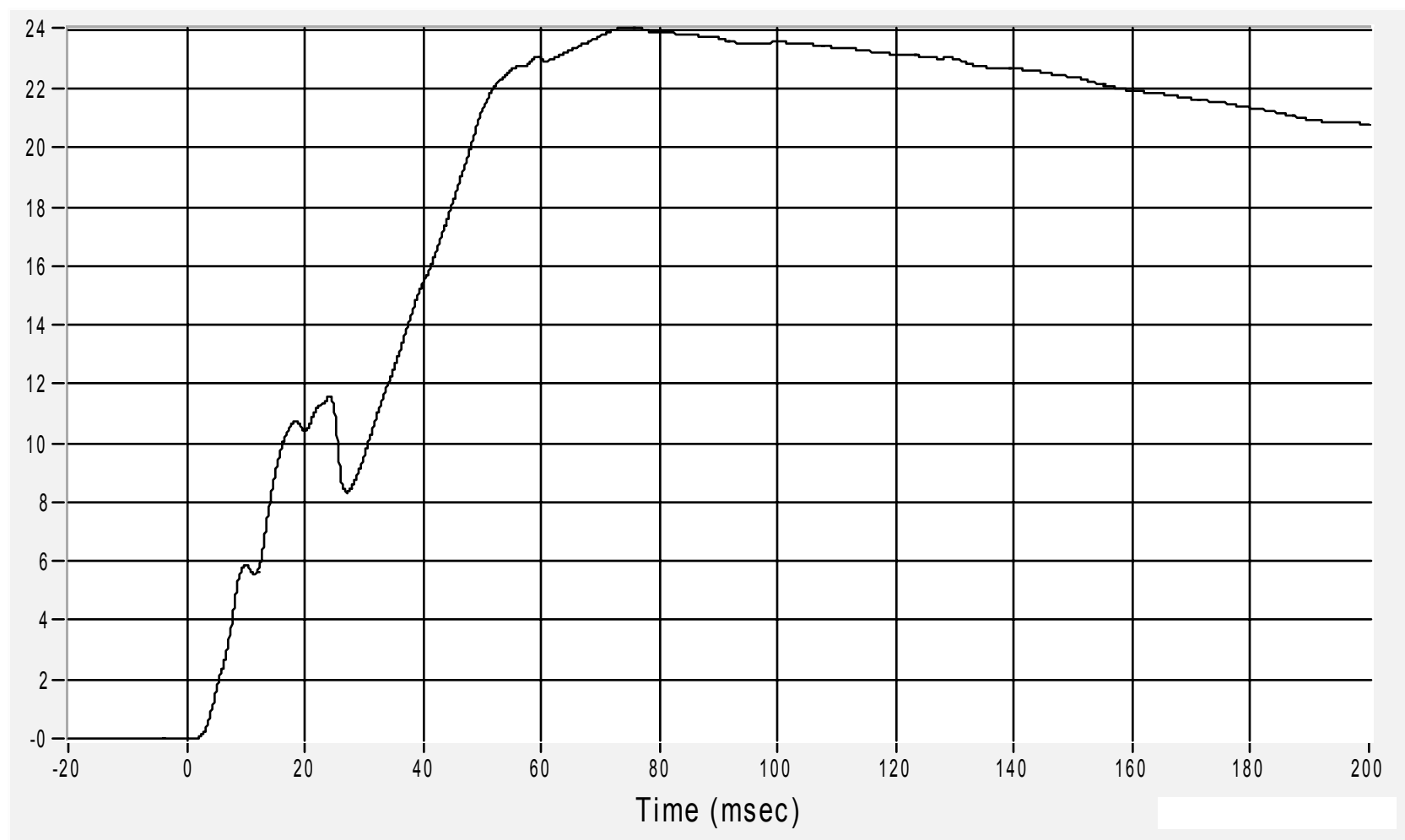
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**Right Rear Occupant Compartment (Y) Velocity**

Velocity (km/h) CFC180

Max 24.1 km/h at 75.6 msec

Min 0.0 km/h at 0.9 msec



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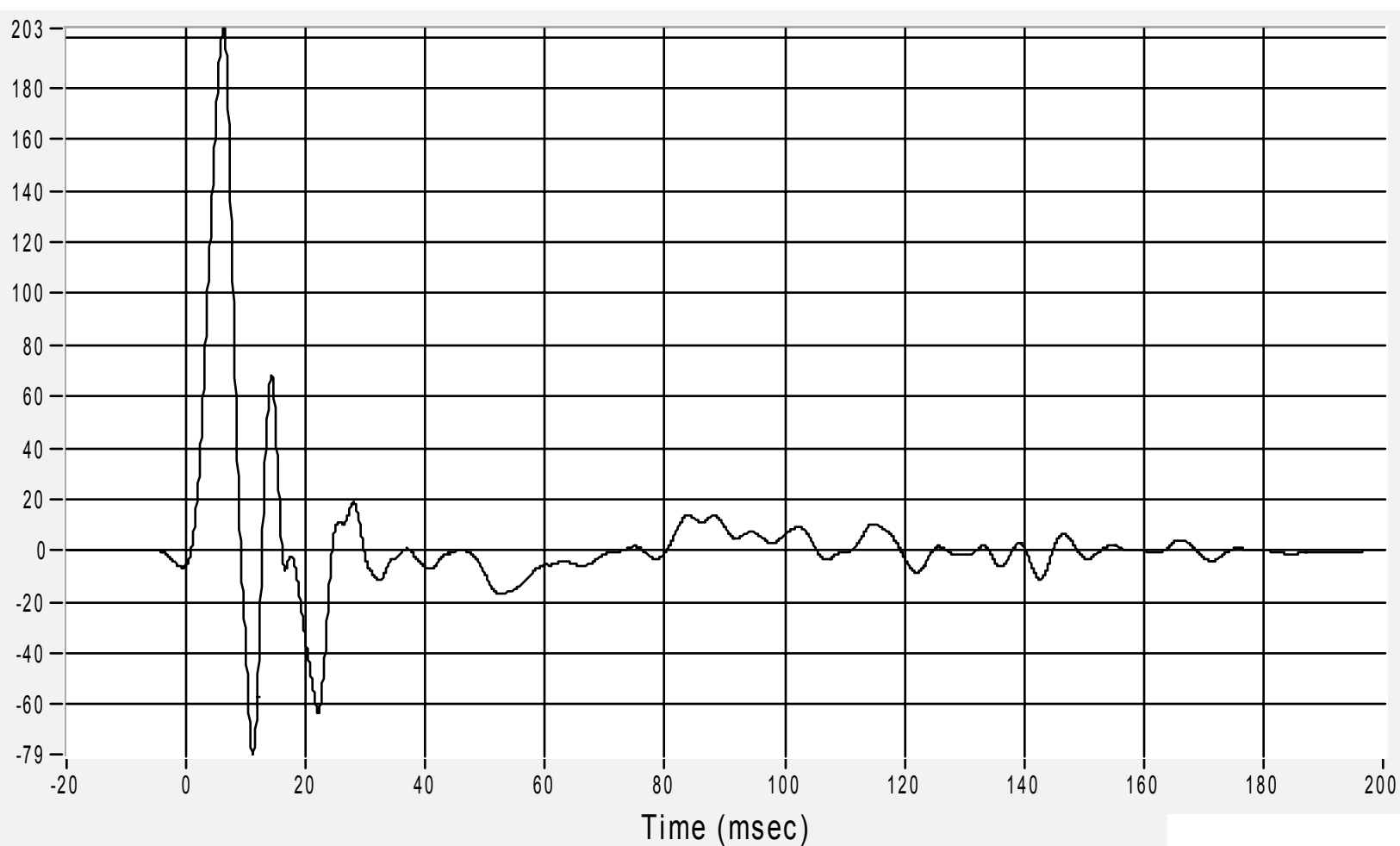
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**Mid-Rear of Left Front Door (Y) Acceleration**

Acceleration (G's) CFC60

Max 203.2 G at 6.2 msec

Min -79.3 G at 11.1 msec



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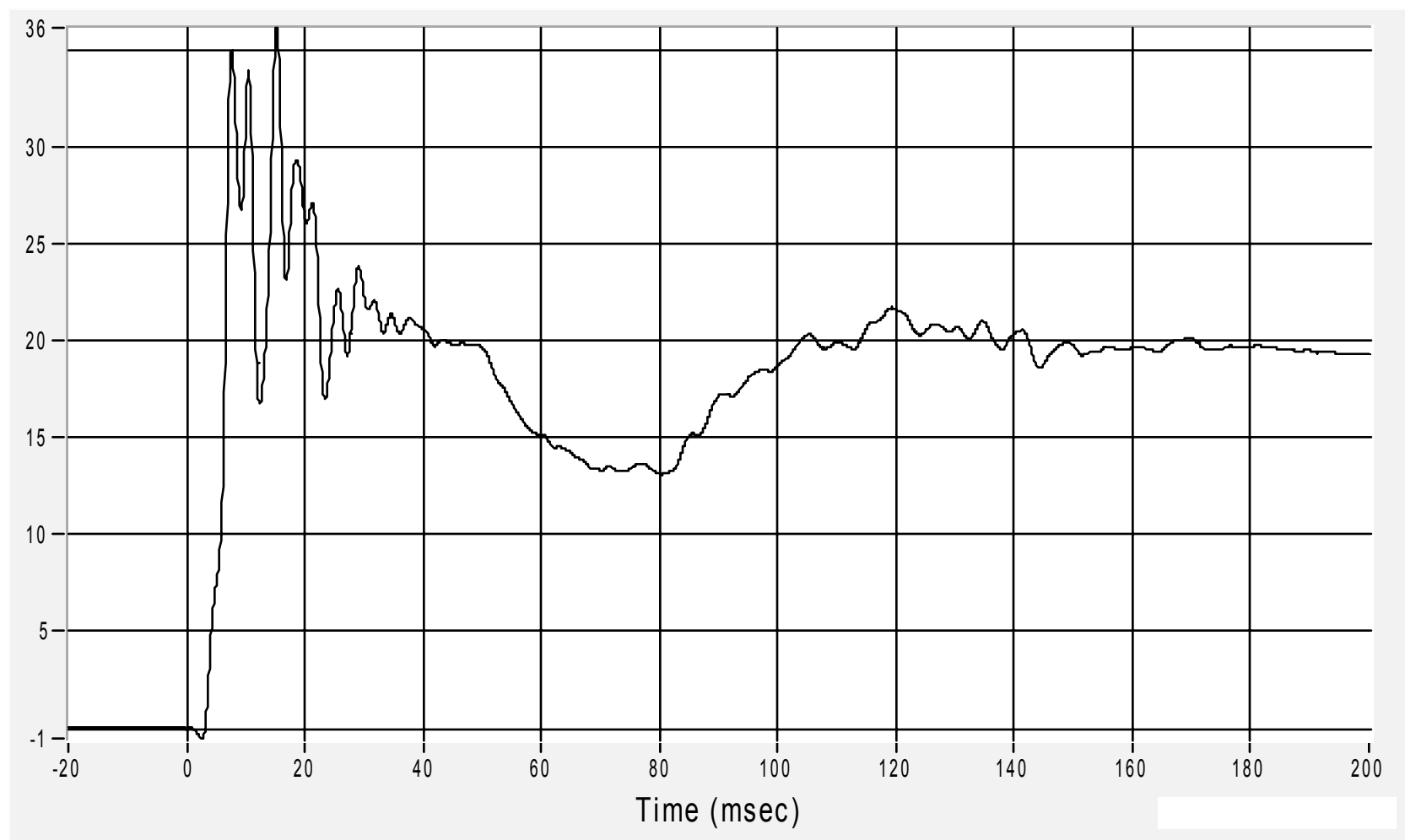
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**Mid-Rear of Left Front Door (Y) Velocity**

Velocity (km/h) CFC180

Max 36.2 km/h at 15.2 msec

Min -0.5 km/h at 2.6 msec



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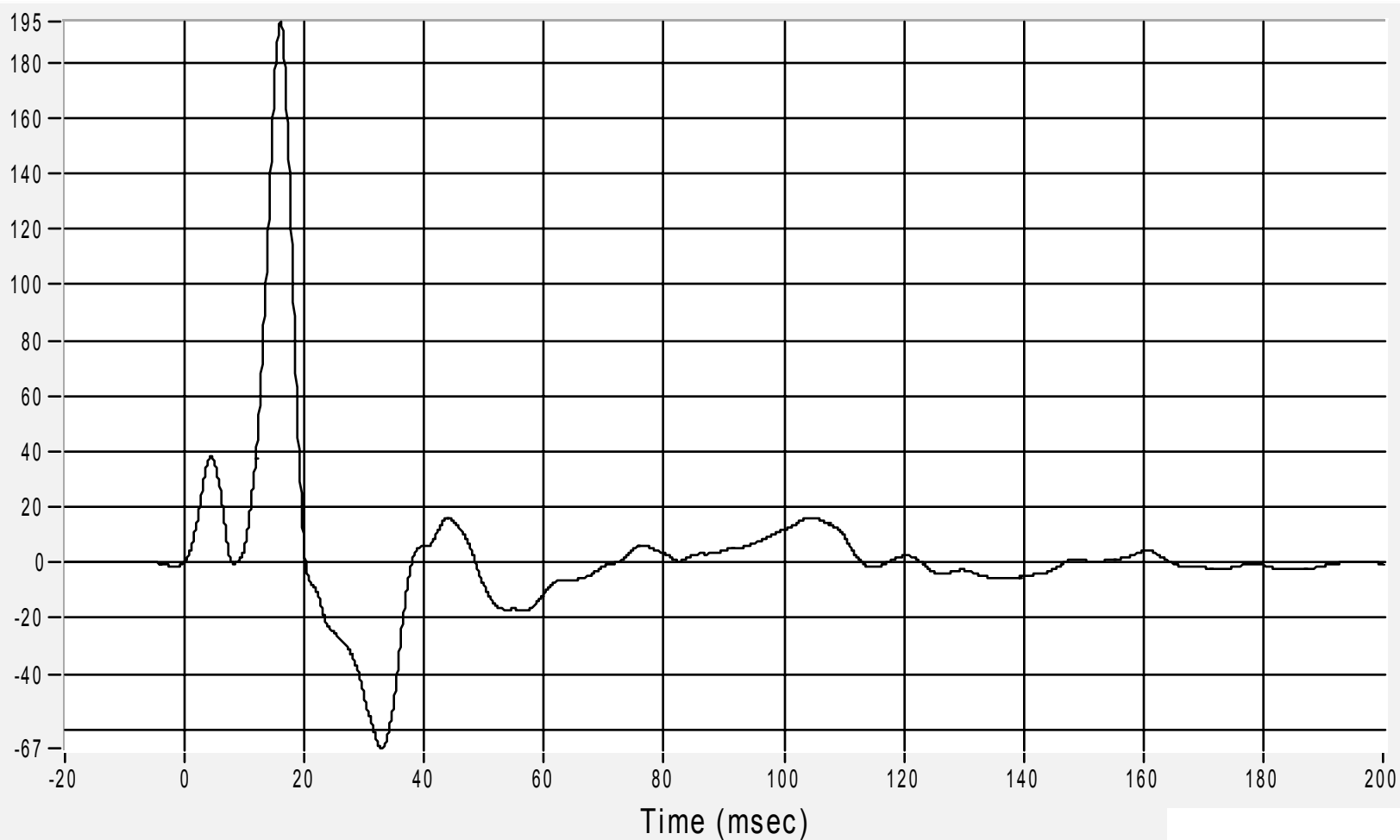


**Left Front Door Upper Centerline (Y) Acceleration**

Acceleration (G's) CFC60

Max 194.5 G at 16.0 msec

Min -66.8 G at 32.9 msec



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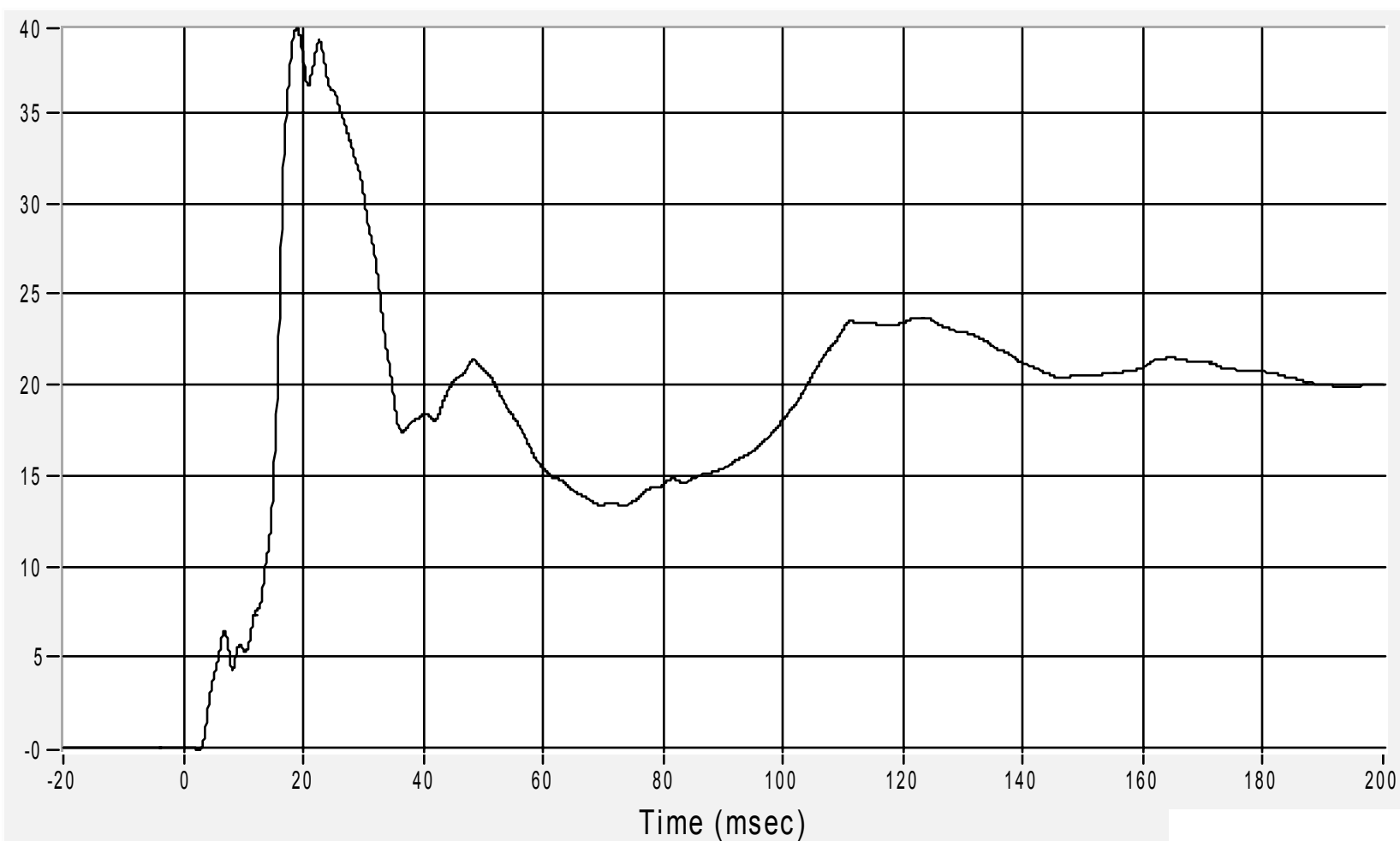
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**Left Front Door Upper Centerline (Y) Velocity**

Velocity (km/h) CFC180

Max 39.6 km/h at 18.9 msec

Min -0.1 km/h at 2.6 msec



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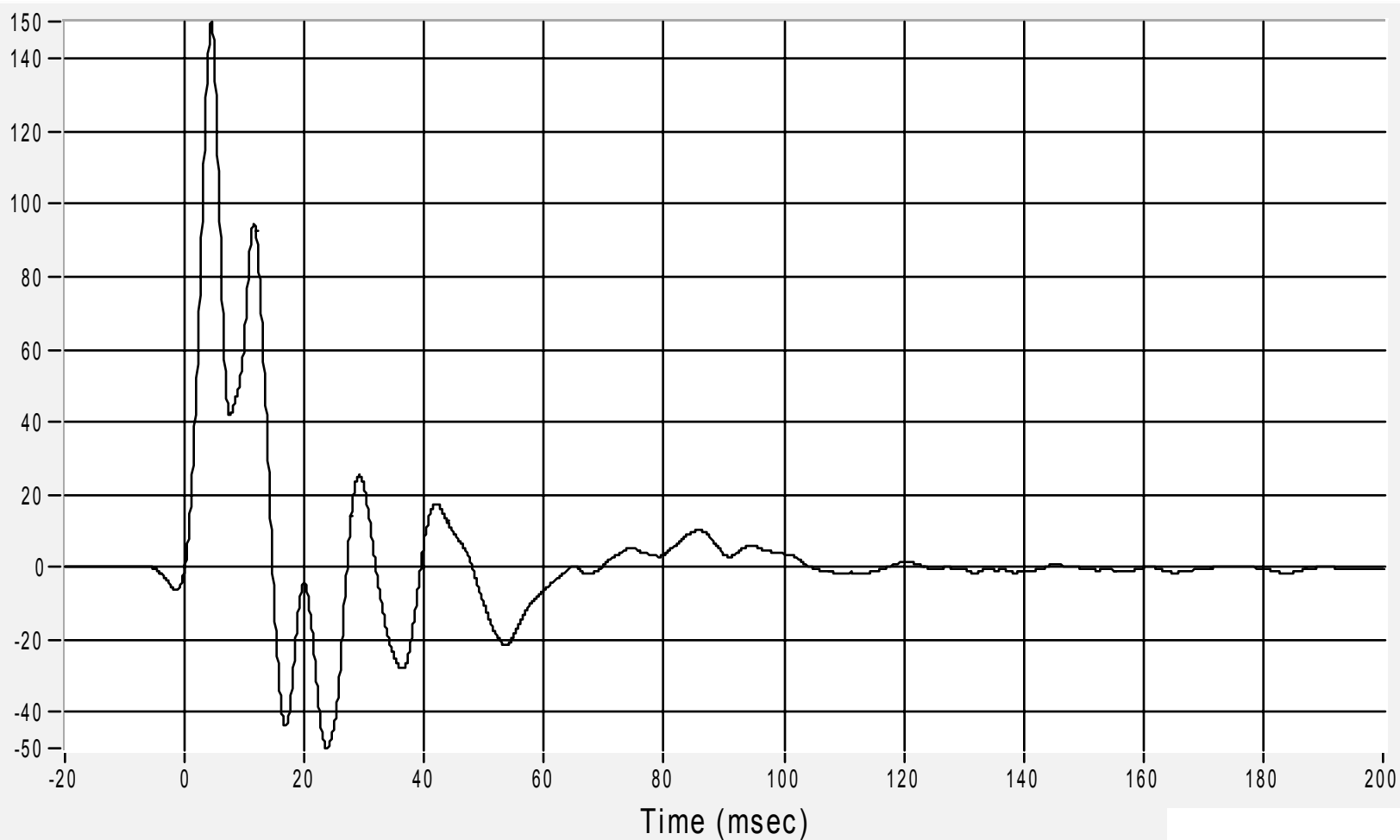
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**Left Lower B-Pillar (Y) Acceleration**

Acceleration (G's) CFC60

Max 150.3 G at 4.4 msec

Min -49.9 G at 23.7 msec



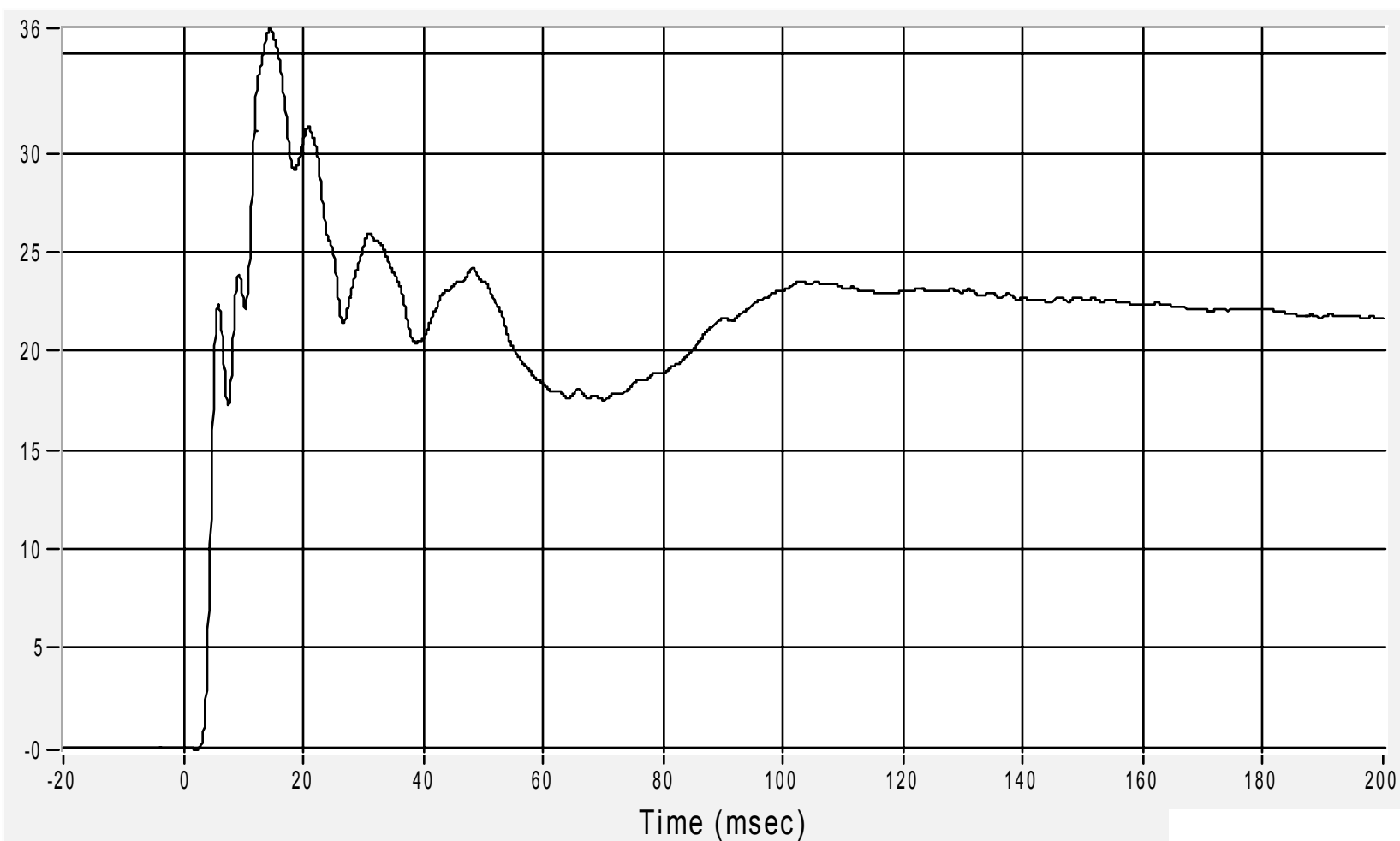
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**Left Lower B-Pillar (Y) Velocity**

Velocity (km/h) CFC180

**Max 36.3 km/h at 14.5 msec****Min -0.1 km/h at 2.2 msec**

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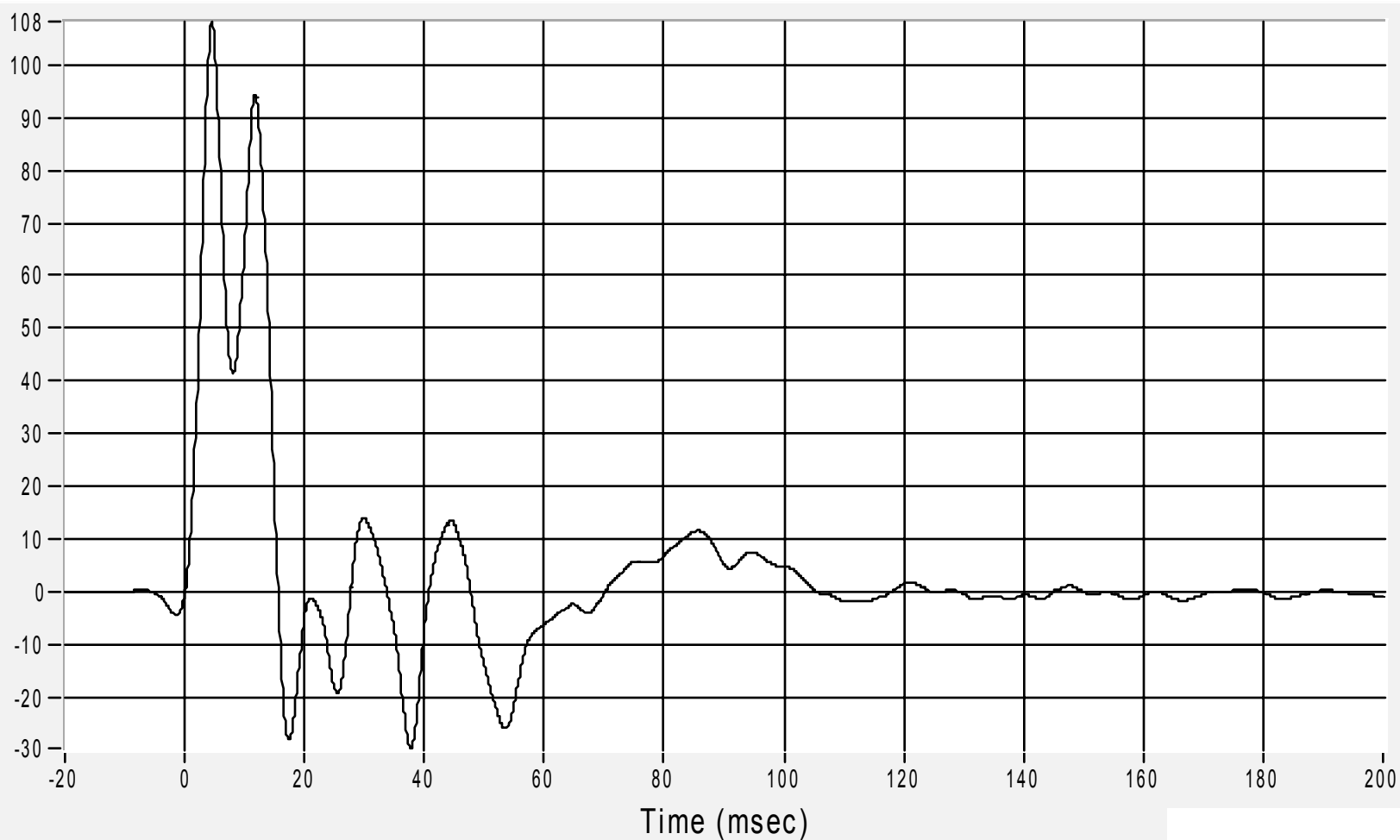
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**Left Middle B-Pillar (Y) Acceleration**

Acceleration (G's) CFC60

Max 108.2 G at 4.5 msec

Min -29.8 G at 37.7 msec



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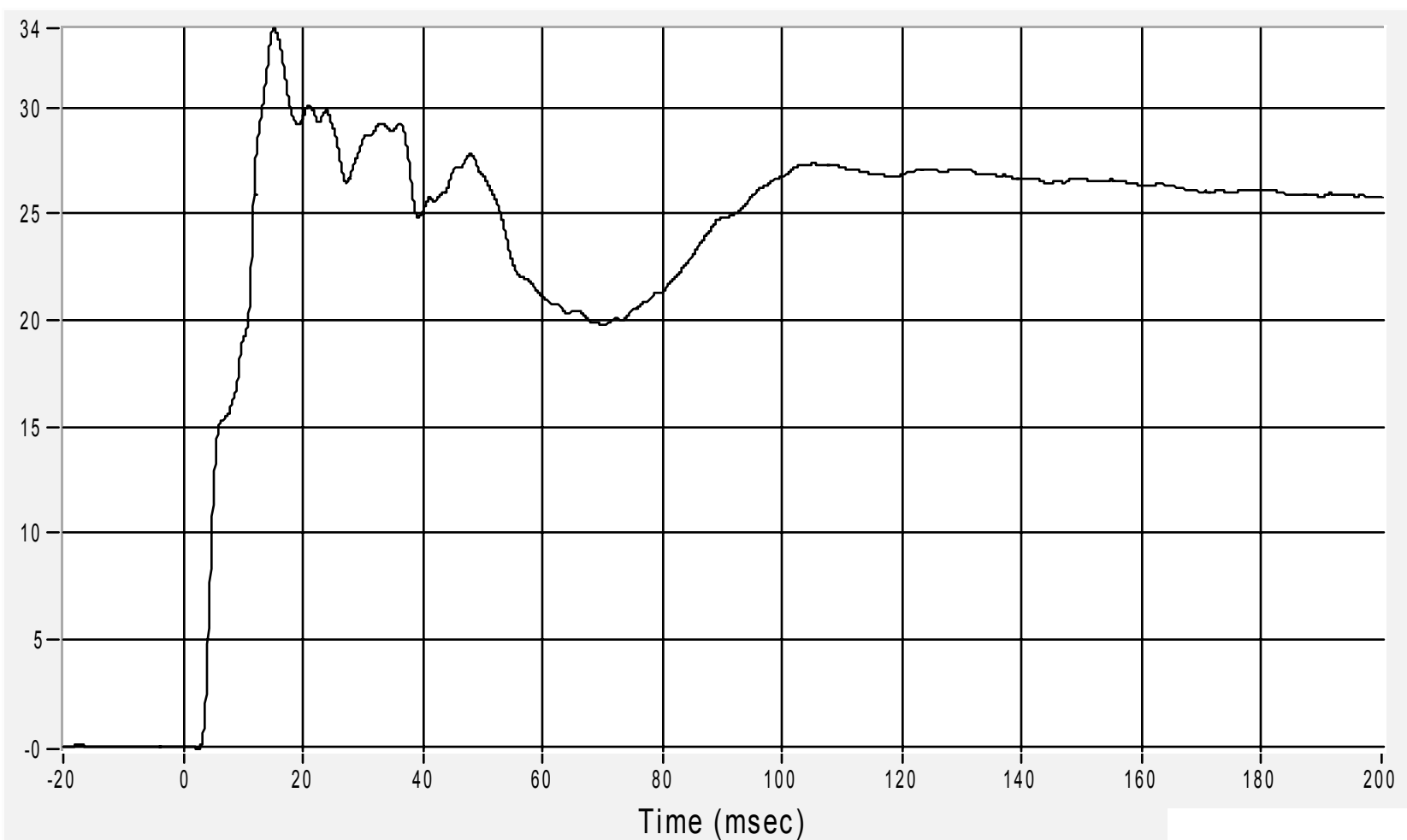


**Left Middle B-Pillar (Y) Velocity**

Velocity (km/h) CFC180

Max 33.7 km/h at 15.1 msec

Min -0.1 km/h at 2.5 msec



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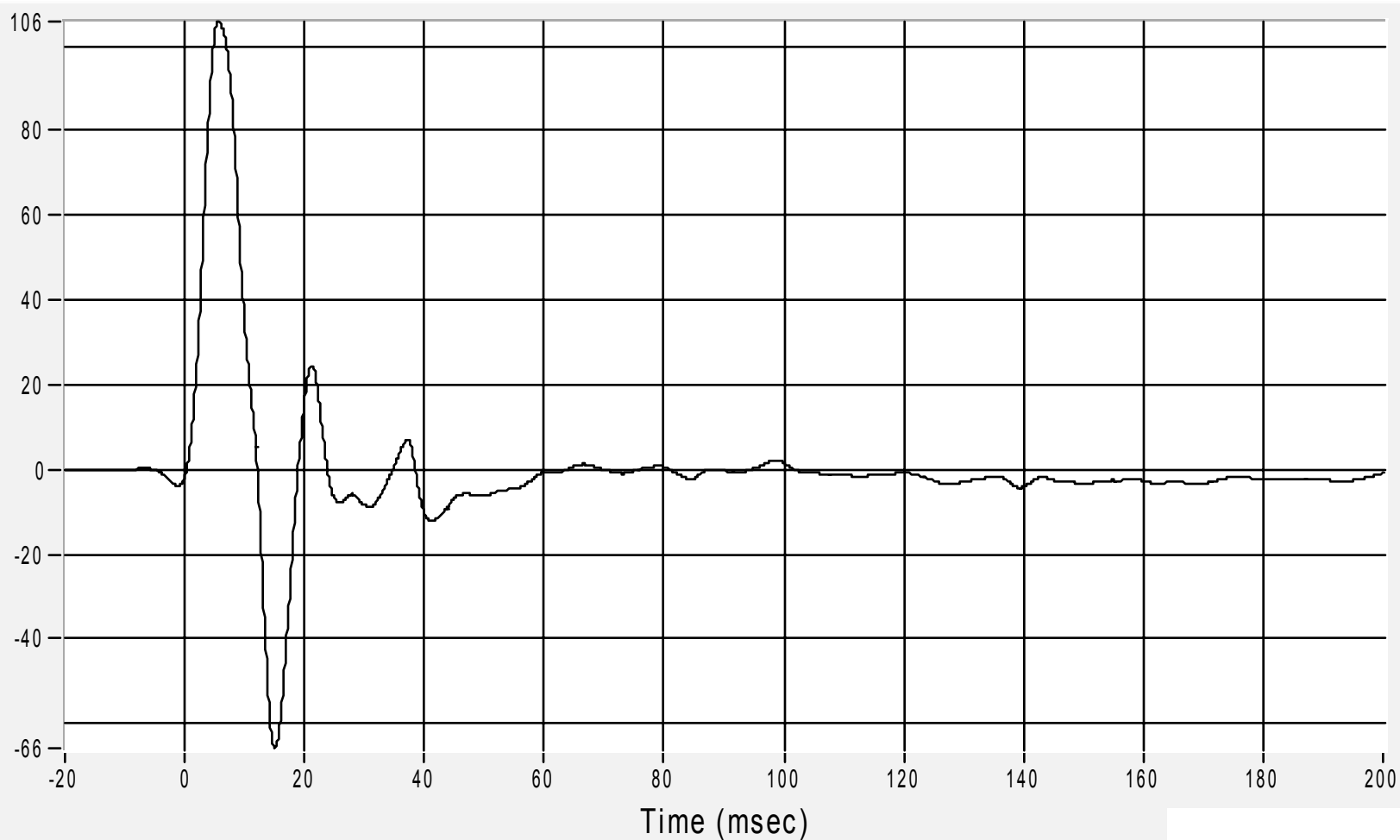
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**Left Lower A-Pillar (Y) Acceleration**

Acceleration (G's) CFC60

Max 105.7 G at 5.7 msec

Min -65.8 G at 15.0 msec



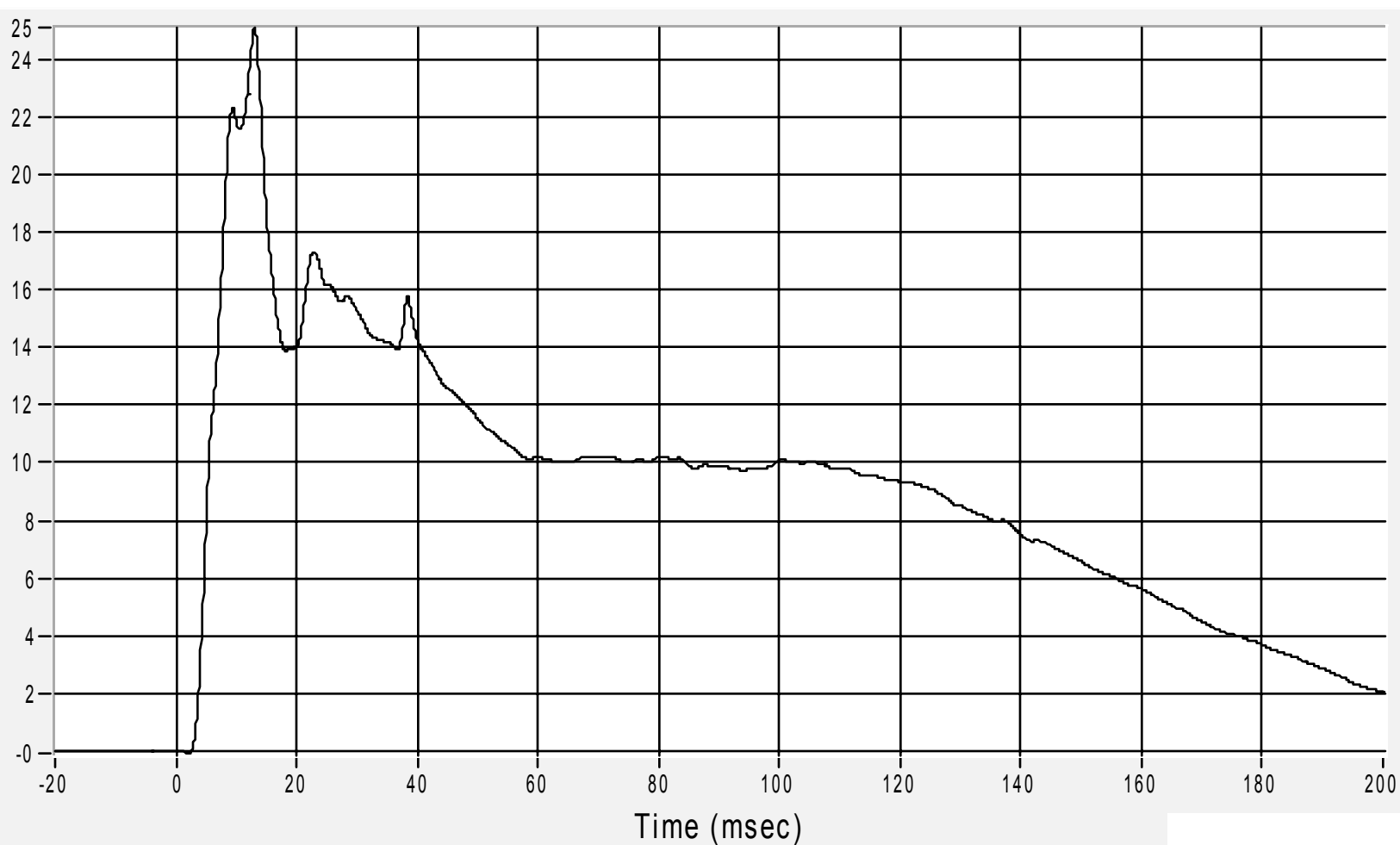
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**Left Lower A-Pillar (Y) Velocity**

Velocity (km/h) CFC180

**Max 25.1 km/h at 13.0 msec****Min 0.0 km/h at 2.1 msec**

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30 March 2004

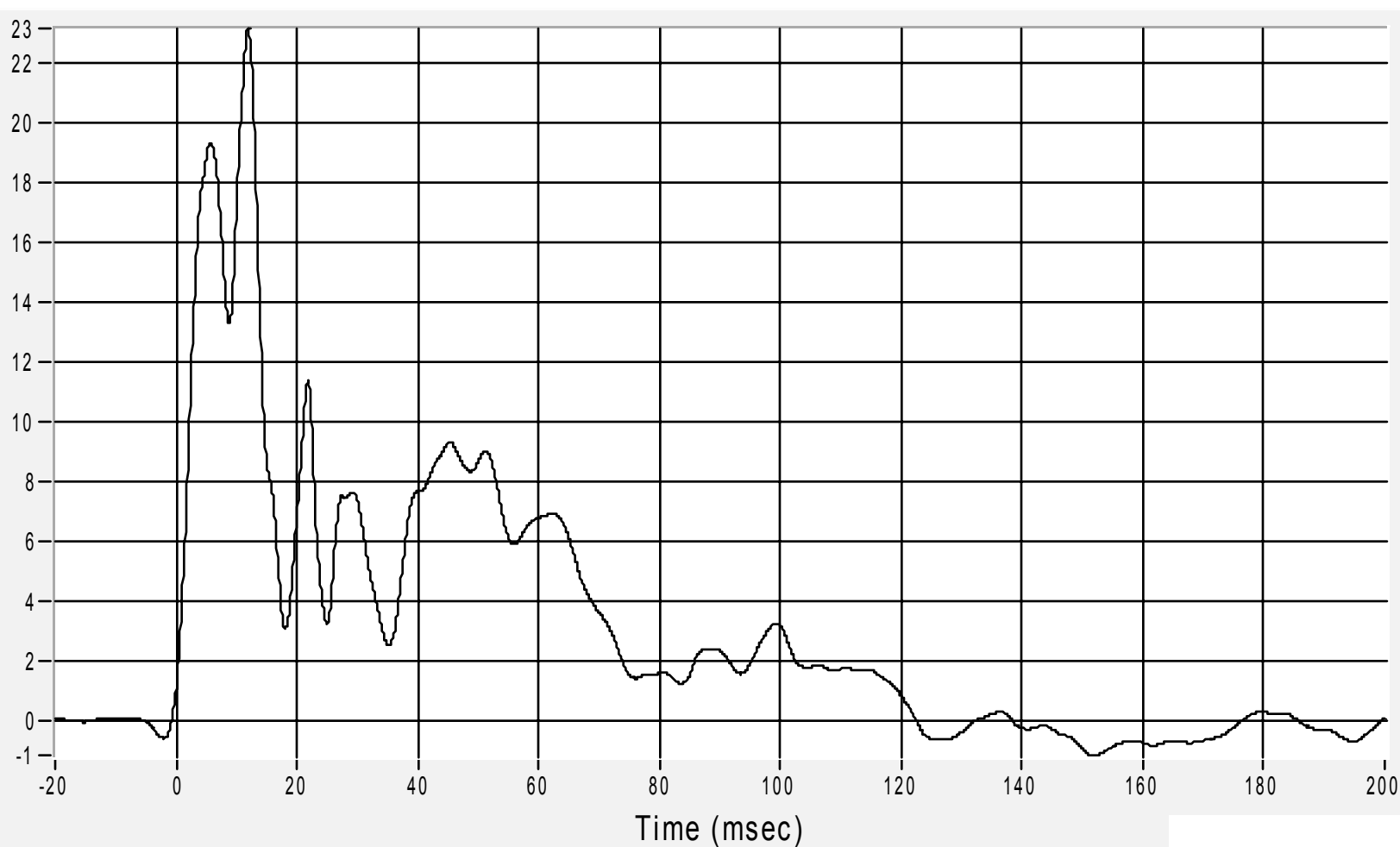
*Medical College of Wisconsin  
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**Left Middle A-Pillar (Y) Acceleration**

Acceleration (G's) CFC60

Max 23.1 G at 11.9 msec

Min -1.2 G at 152.1 msec



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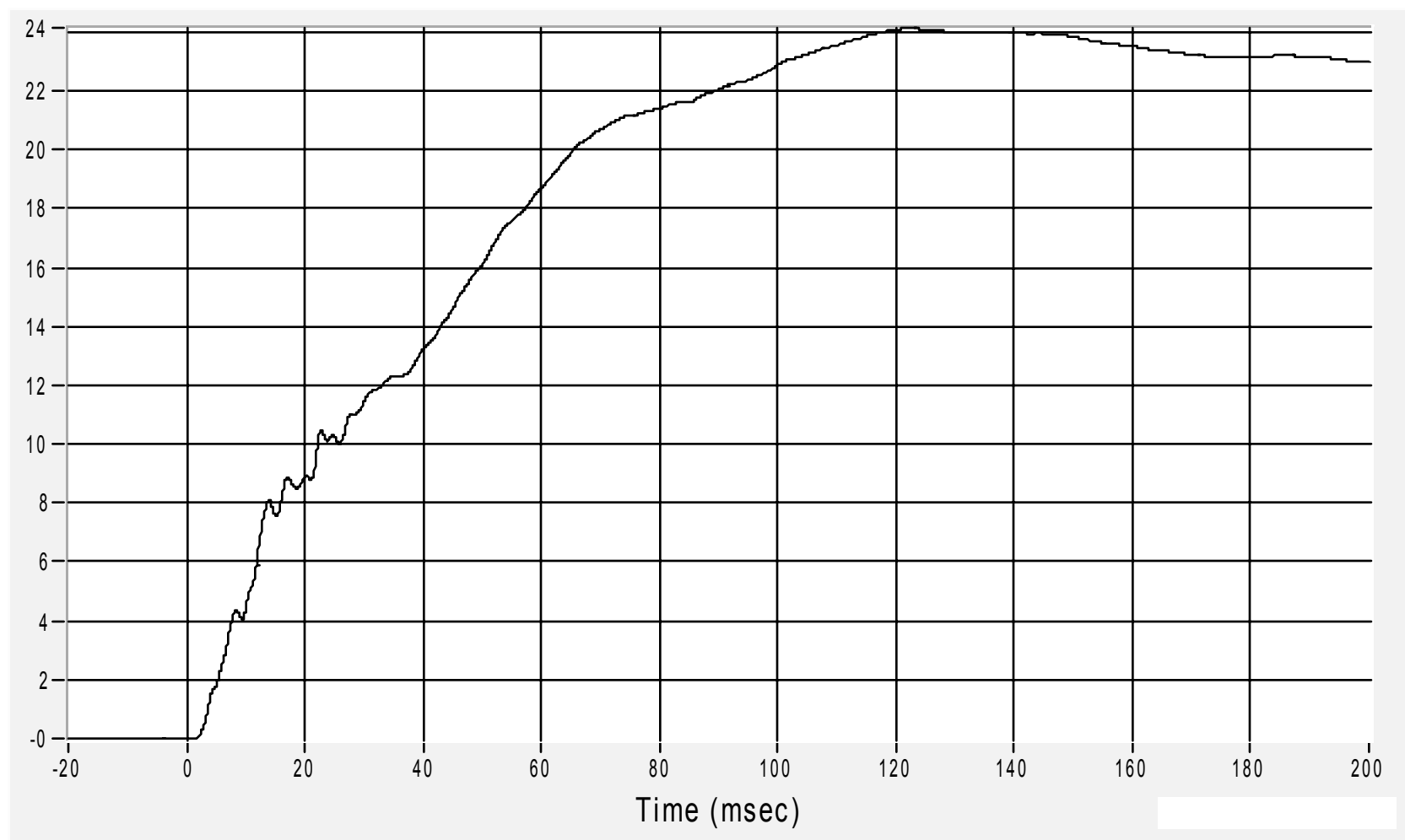
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**Left Middle A-Pillar (Y) Velocity**

Velocity (km/h) CFC180

Max 24.1 km/h at 122.8 msec

Min 0.0 km/h at 1.1 msec



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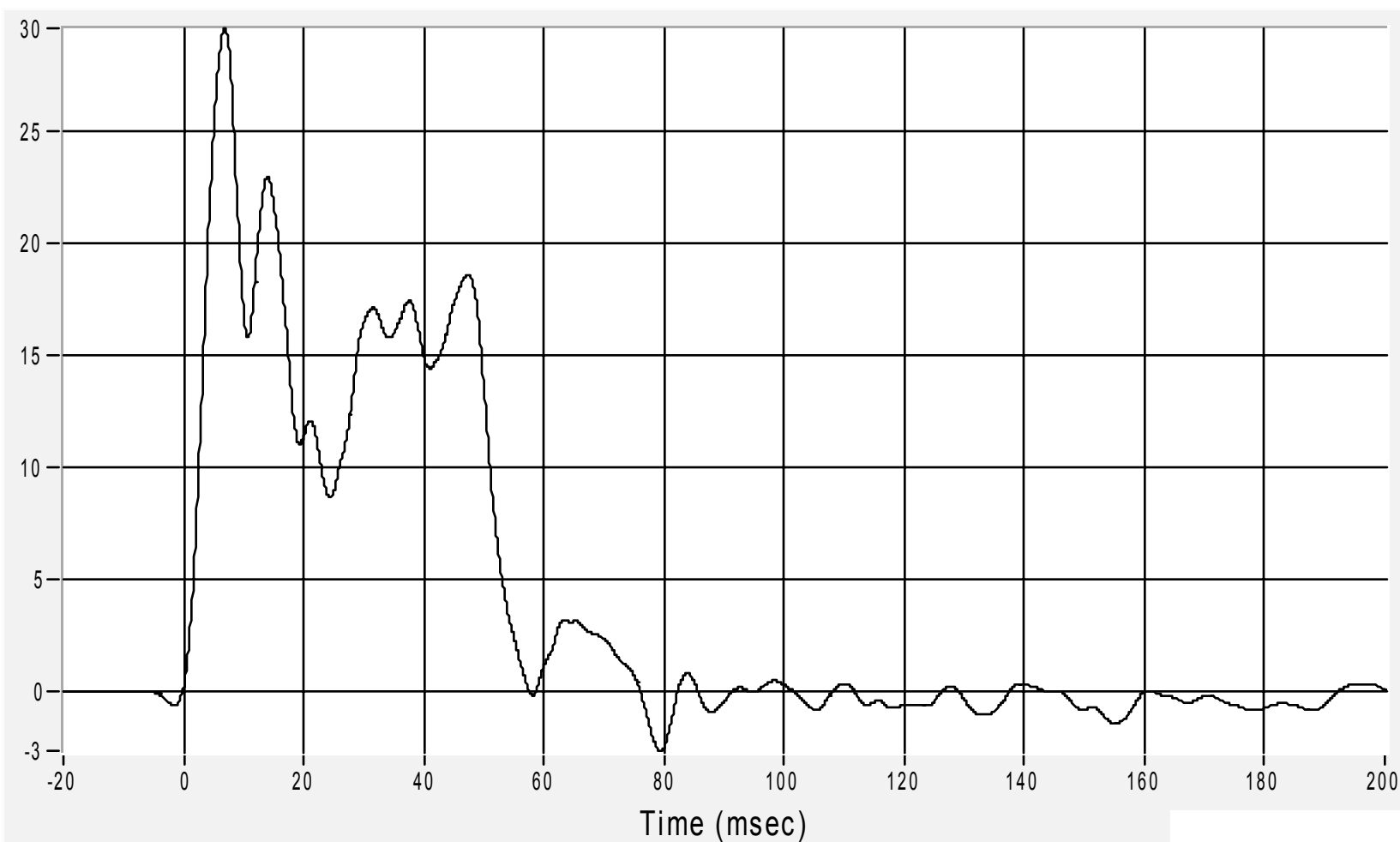
30 March 2004

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**Rear Seat Track (Y) Acceleration**

Acceleration (G's) CFC60

**Max 29.6 G at 6.9 msec****Min -2.7 G at 79.4 msec**

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30 March 2004

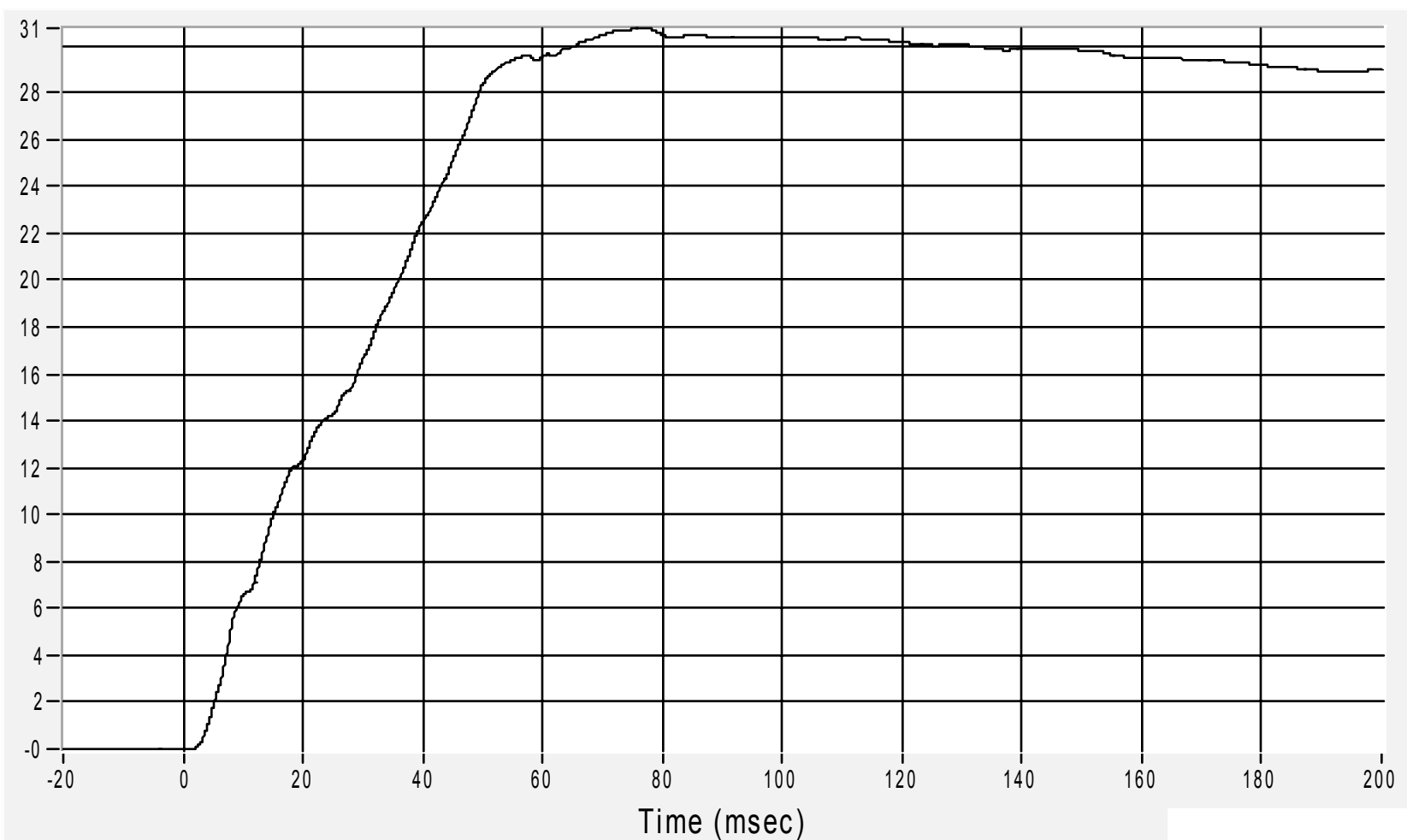
*Medical College of Wisconsin  
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**Rear Seat Track (Y) Velocity**

Velocity (km/h) CFC180

Max 30.8 km/h at 77.2 msec

Min 0.0 km/h at 0.8 msec



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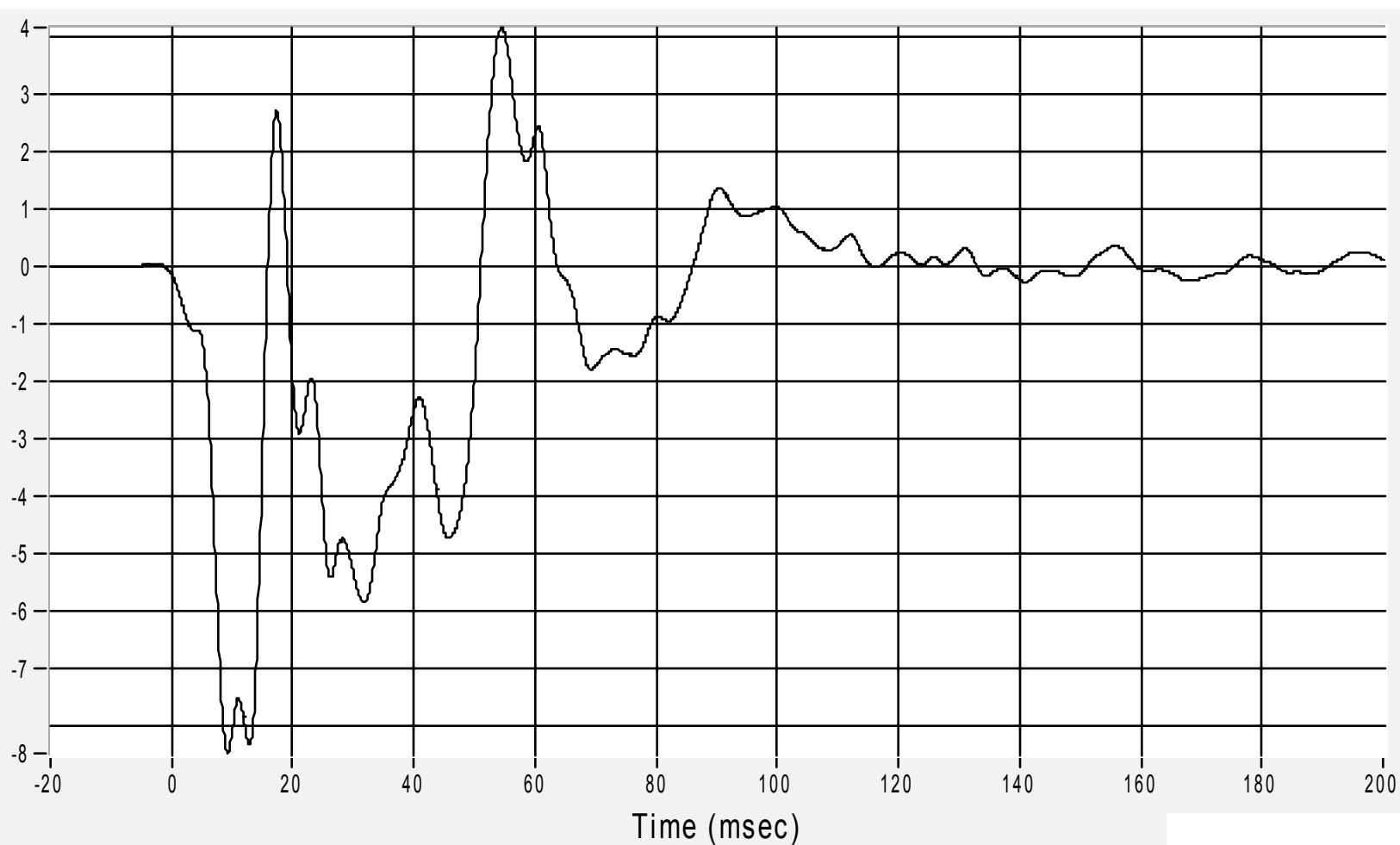
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**Vehicle Center of Gravity (X) Acceleration**

Acceleration (G's) CFC60

Max 4.2 G at 54.5 msec

Min -8.5 G at 9.2 msec



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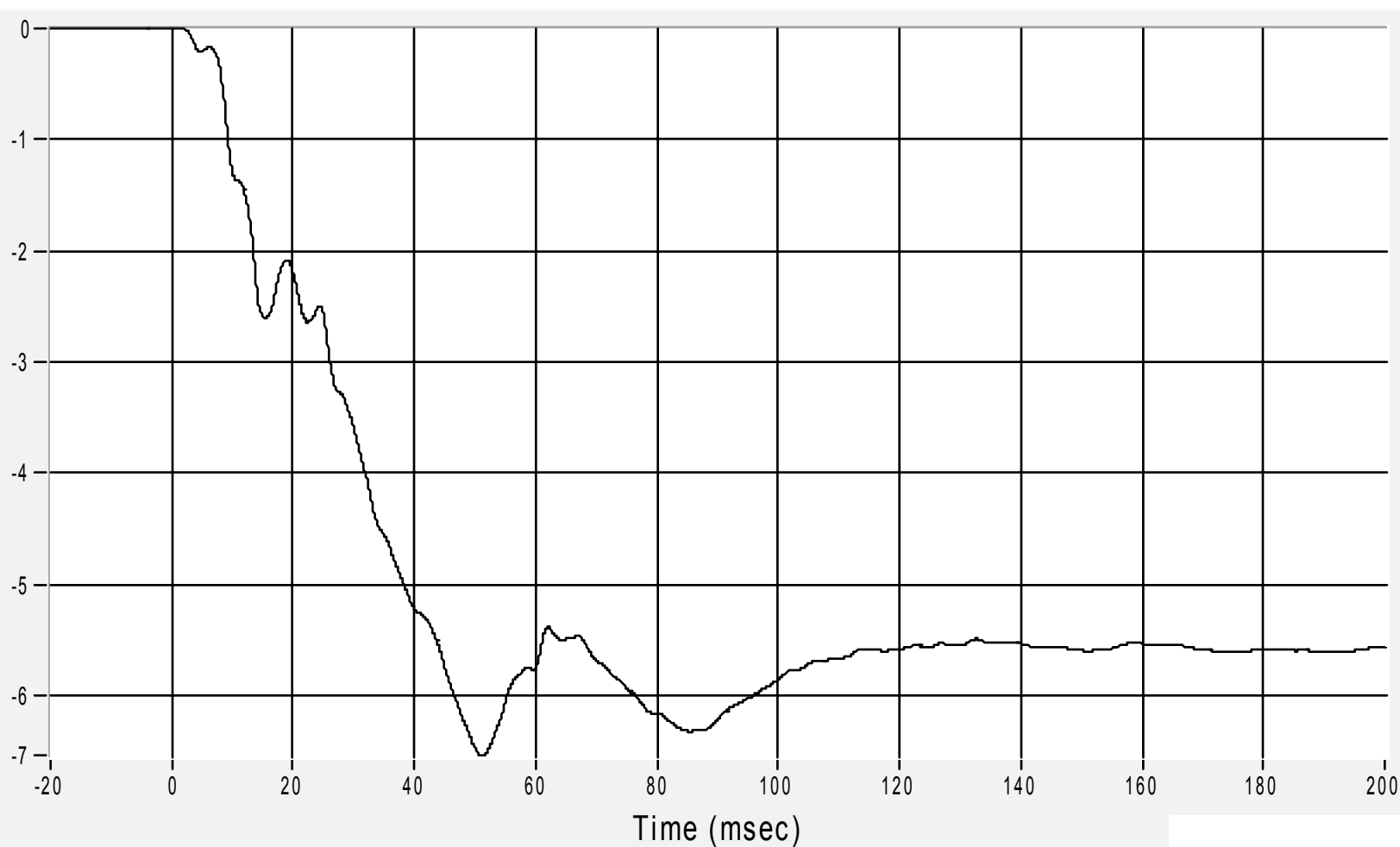
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**Vehicle Center of Gravity (X) Velocity**

Velocity (km/h) CFC180

Max 0.0 km/h at 0.6 msec

Min -6.5 km/h at 51.1 msec



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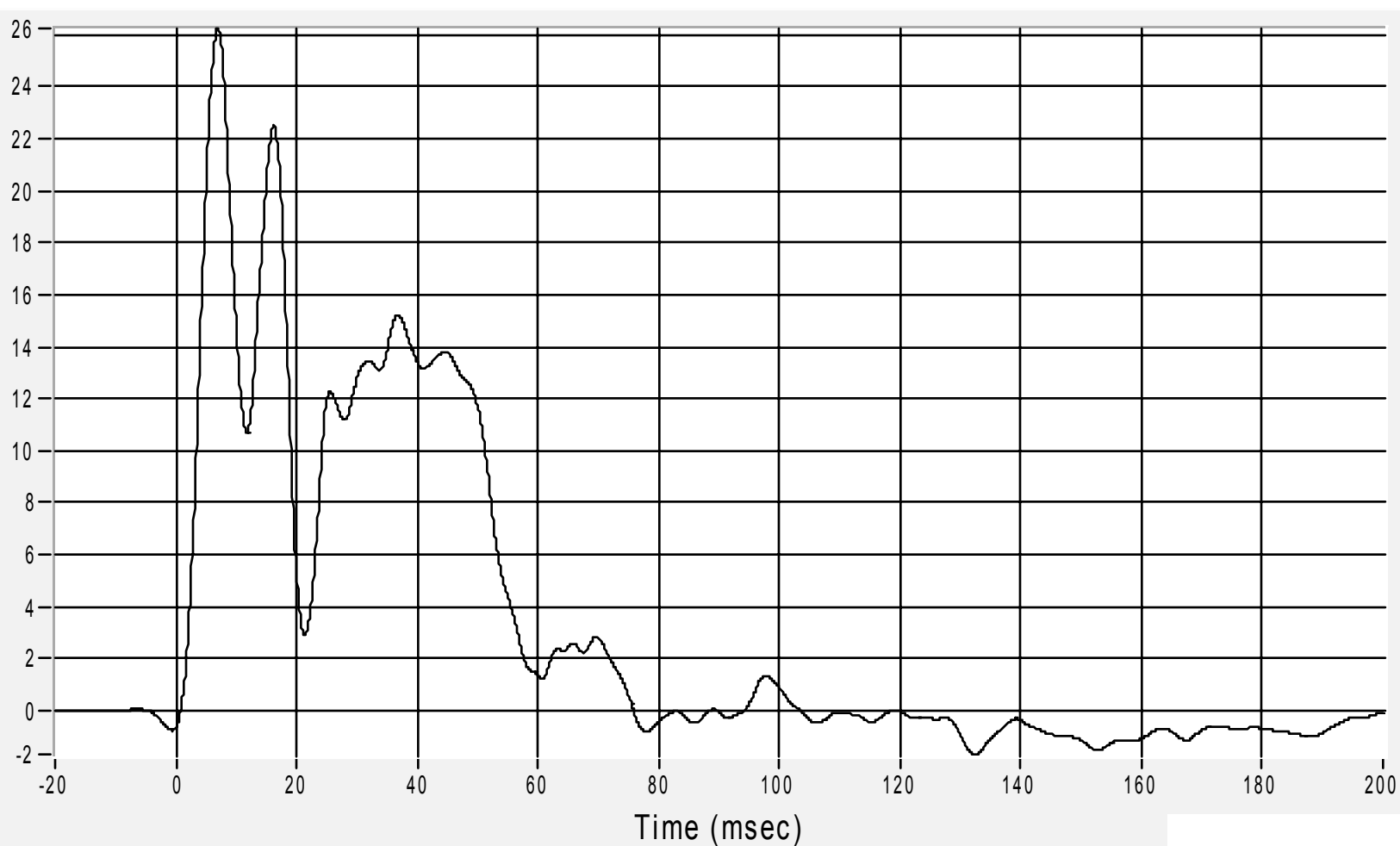
Medical College of Wisconsin  
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**Vehicle Center of Gravity (Y) Acceleration**

Acceleration (G's) CFC60

Max 26.2 G at 7.0 msec

Min -1.7 G at 132.4 msec



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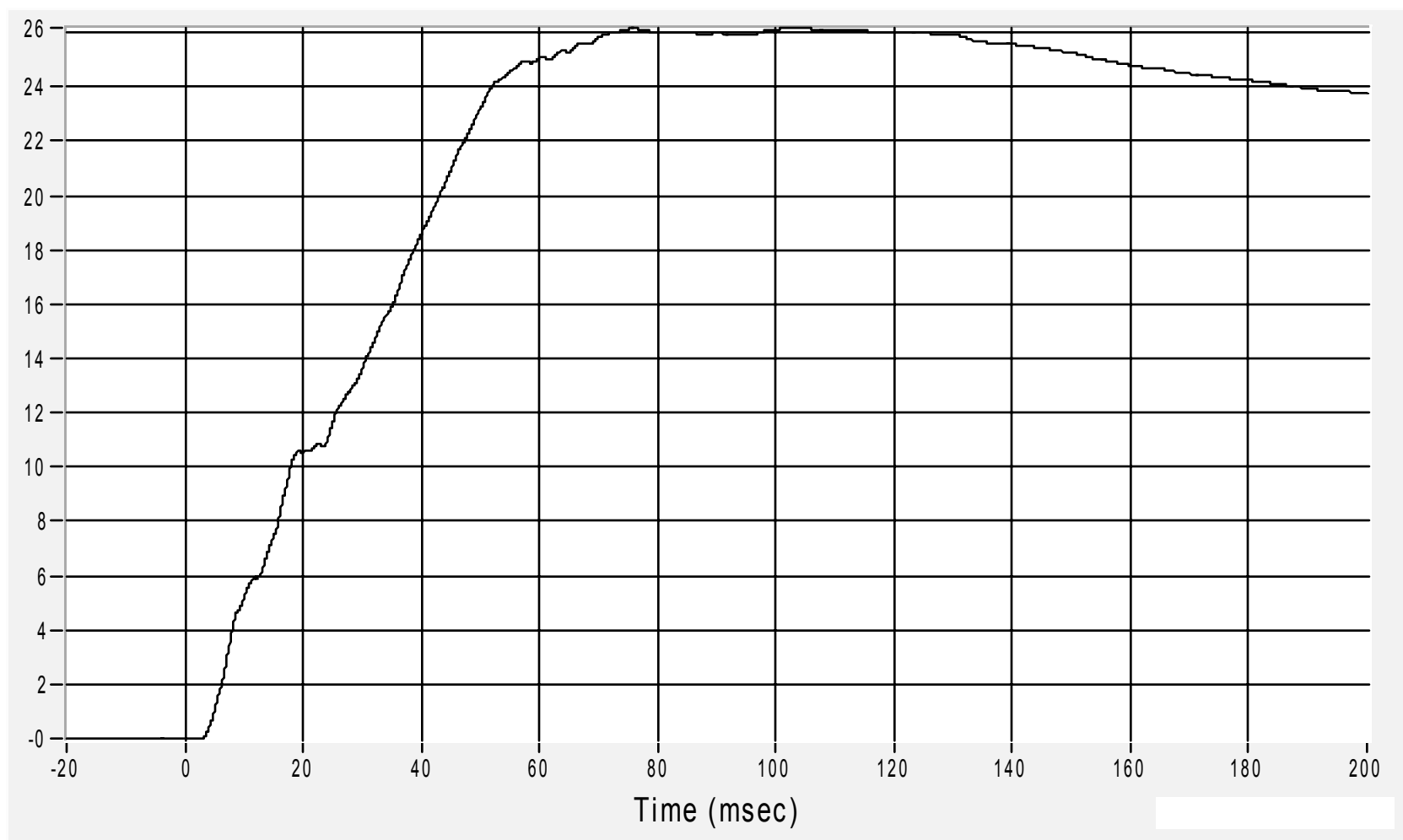


**Vehicle Center of Gravity (Y) Velocity**

Velocity (km/h) CFC180

Max 26.2 km/h at 104.6 msec

Min 0.0 km/h at 2.2 msec



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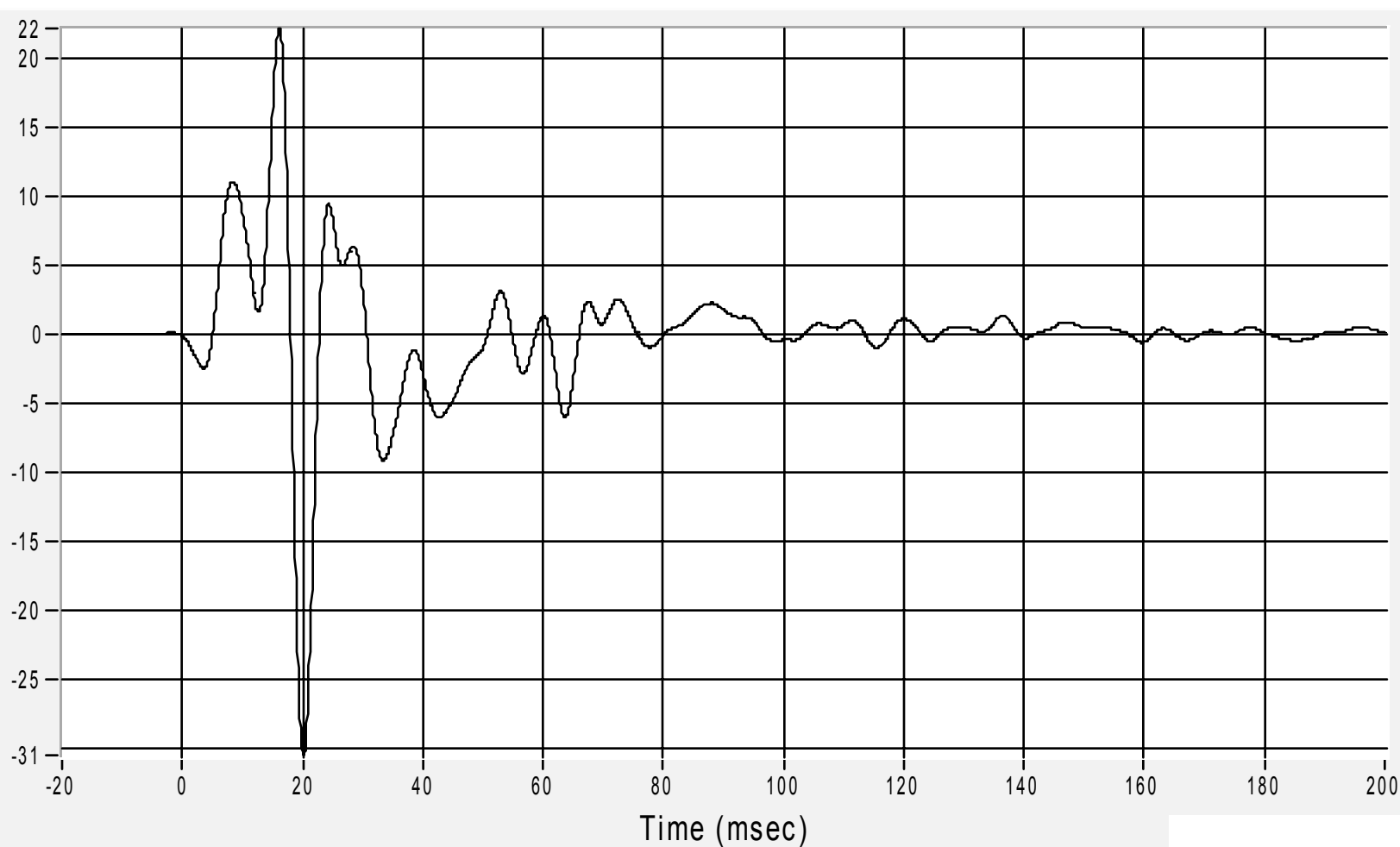
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**Vehicle Center of Gravity (Z) Acceleration**

Acceleration (G's) CFC60

Max 22.2 G at 16.2 msec

Min -30.6 G at 20.2 msec



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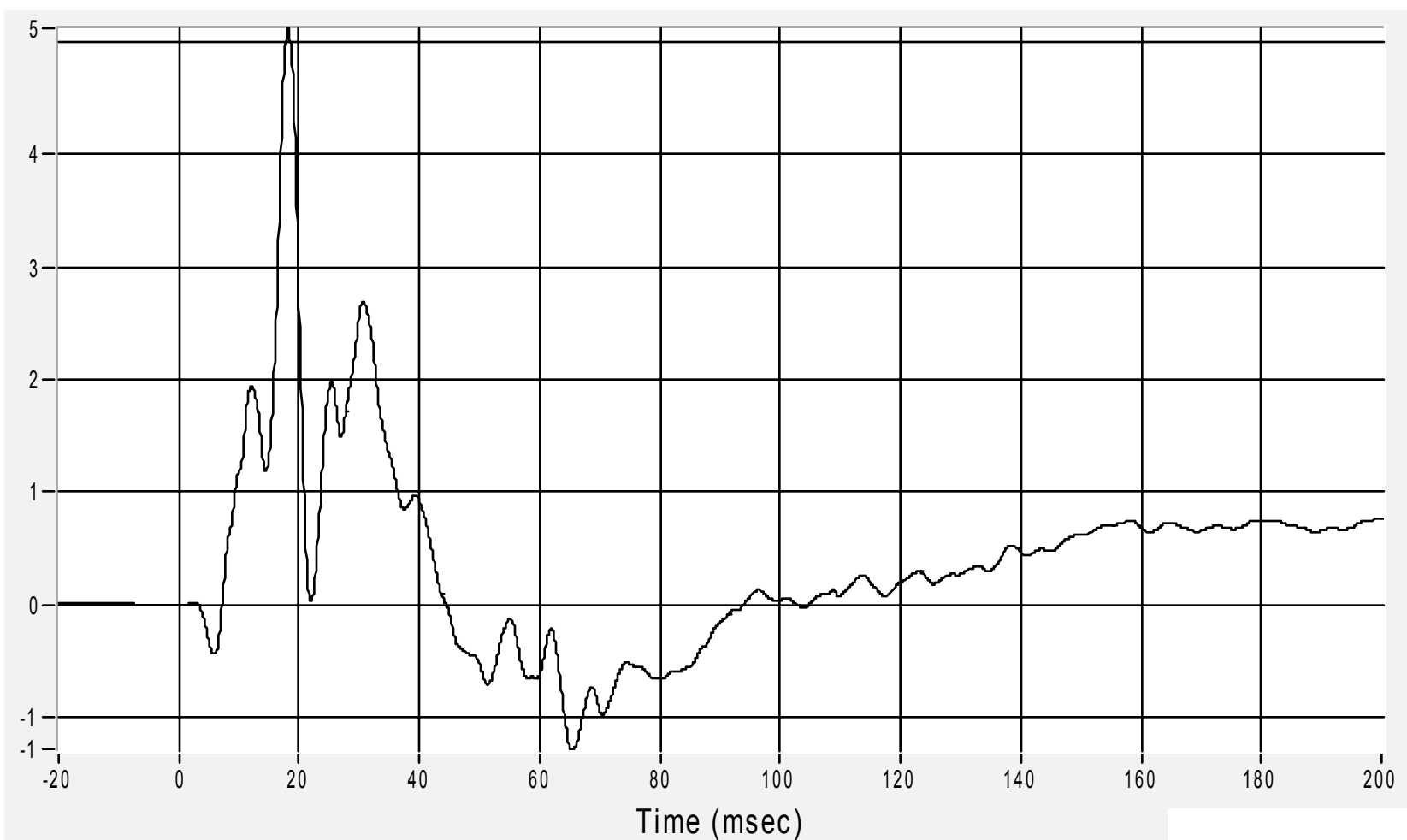
*Medical College of Wisconsin  
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**Vehicle Center of Gravity (Z) Velocity**

Velocity (km/h) CFC180

Max 5.1 km/h at 18.2 msec

Min -1.3 km/h at 65.4 msec



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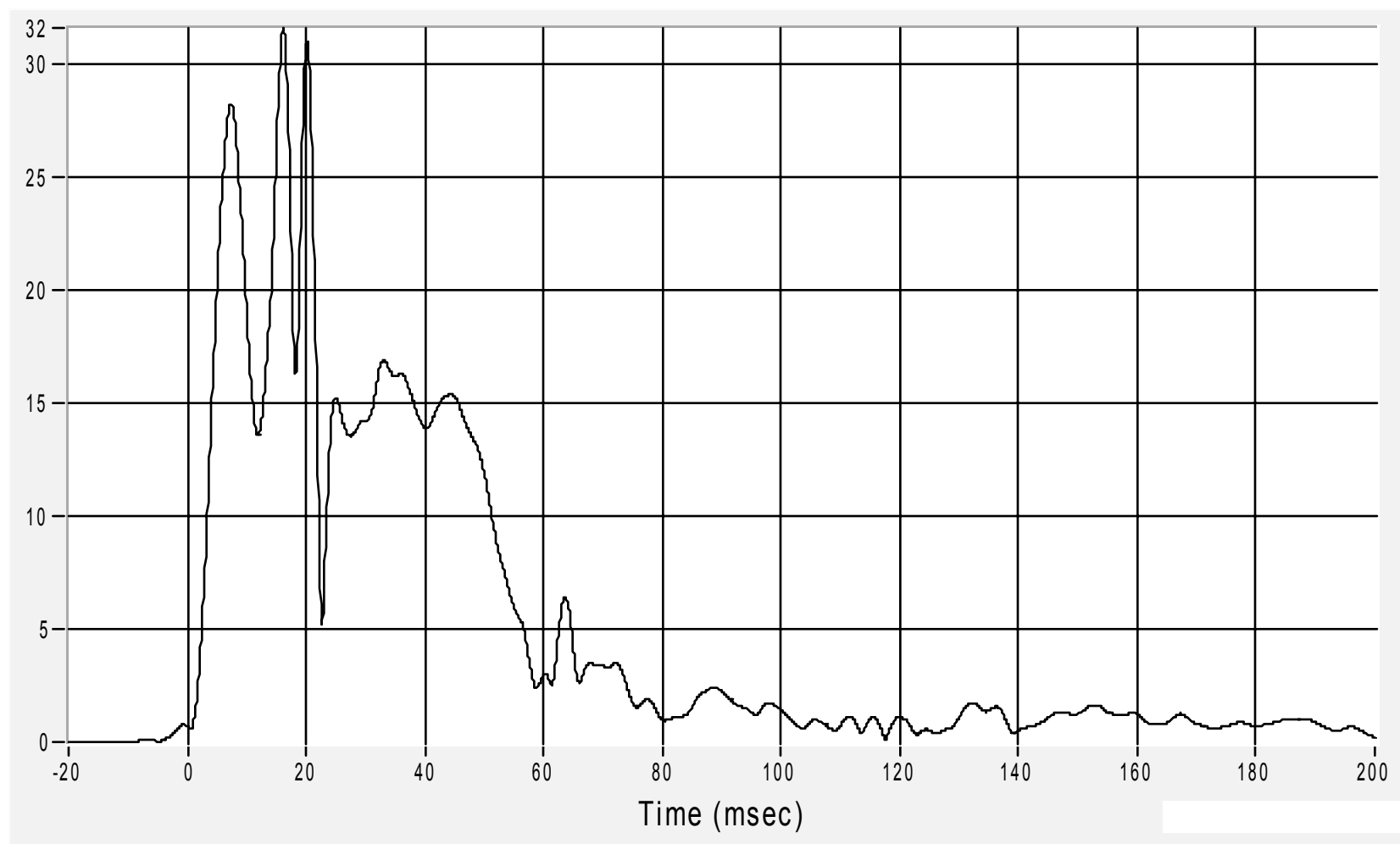
B-104

**Vehicle Center of Gravity Resultant Acceleration**

Acceleration (G's) CFC60

Max 31.6 G's at 16.2 msec

Min 0.1 G's at 117.6 msec



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30 March 2004

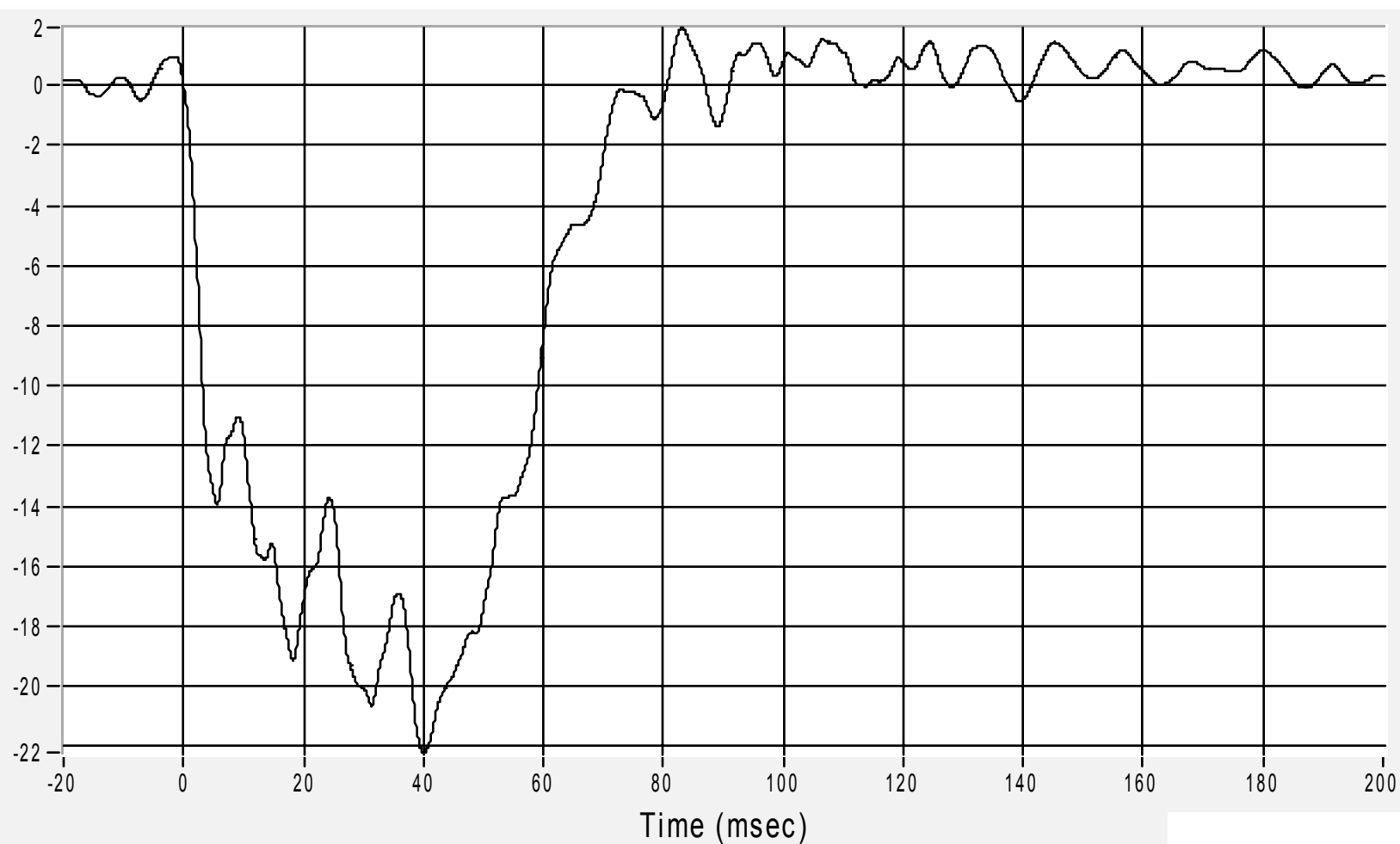
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**MDB Center of Gravity (X) Acceleration**

Acceleration (G's) CFC60

Max 1.9 G at 83.1 msec

Min -22.2 G at 40.2 msec



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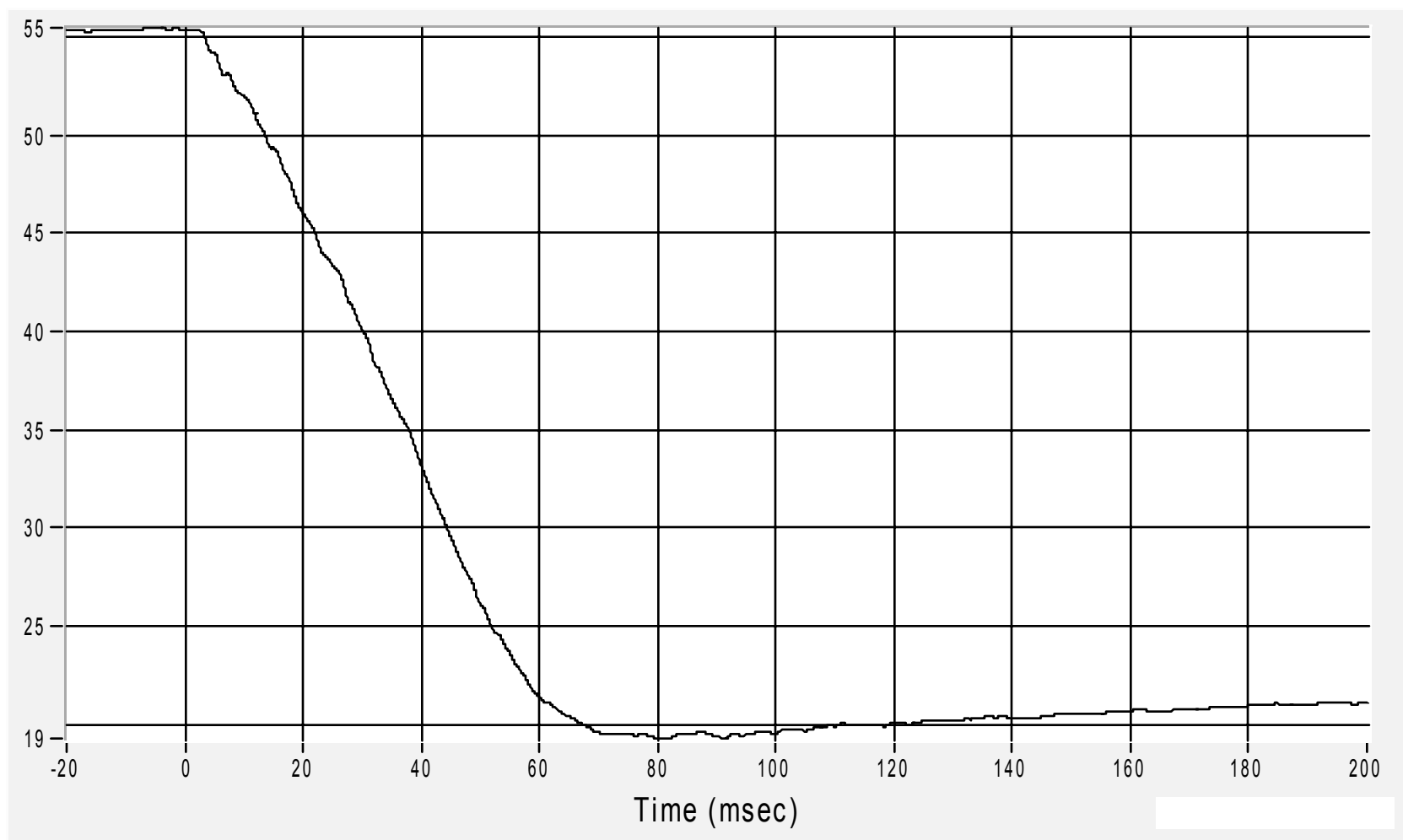


**MDB Center of Gravity (X) Velocity**

Velocity (km/h) CFC180

Max 55.3 km/h at 0.0 msec

Min 19.3 km/h at 81.5 msec



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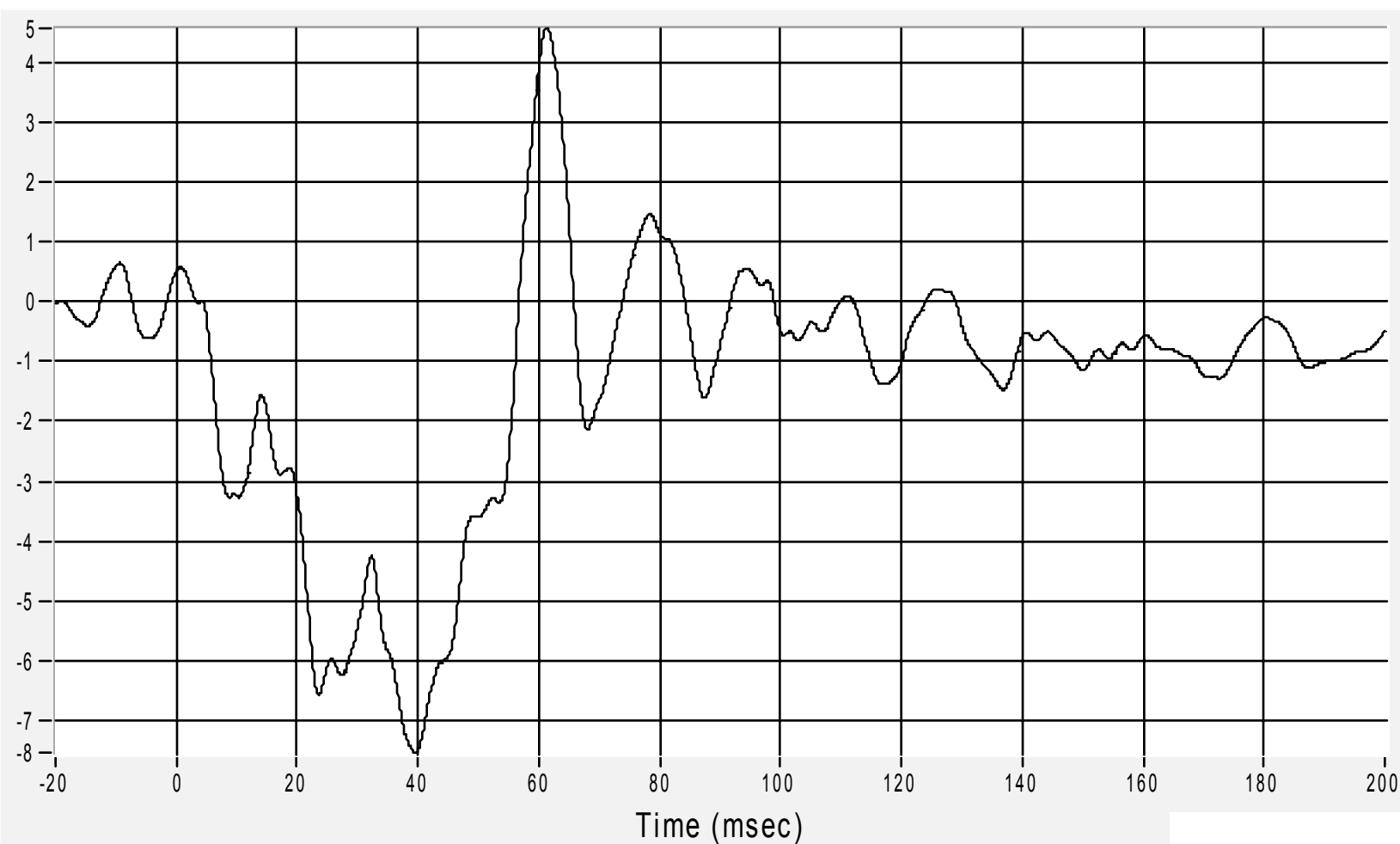
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**MDB Center of Gravity (Y) Acceleration**

Acceleration (G's) CFC60

Max 4.6 G at 61.3 msec

Min -7.5 G at 39.5 msec



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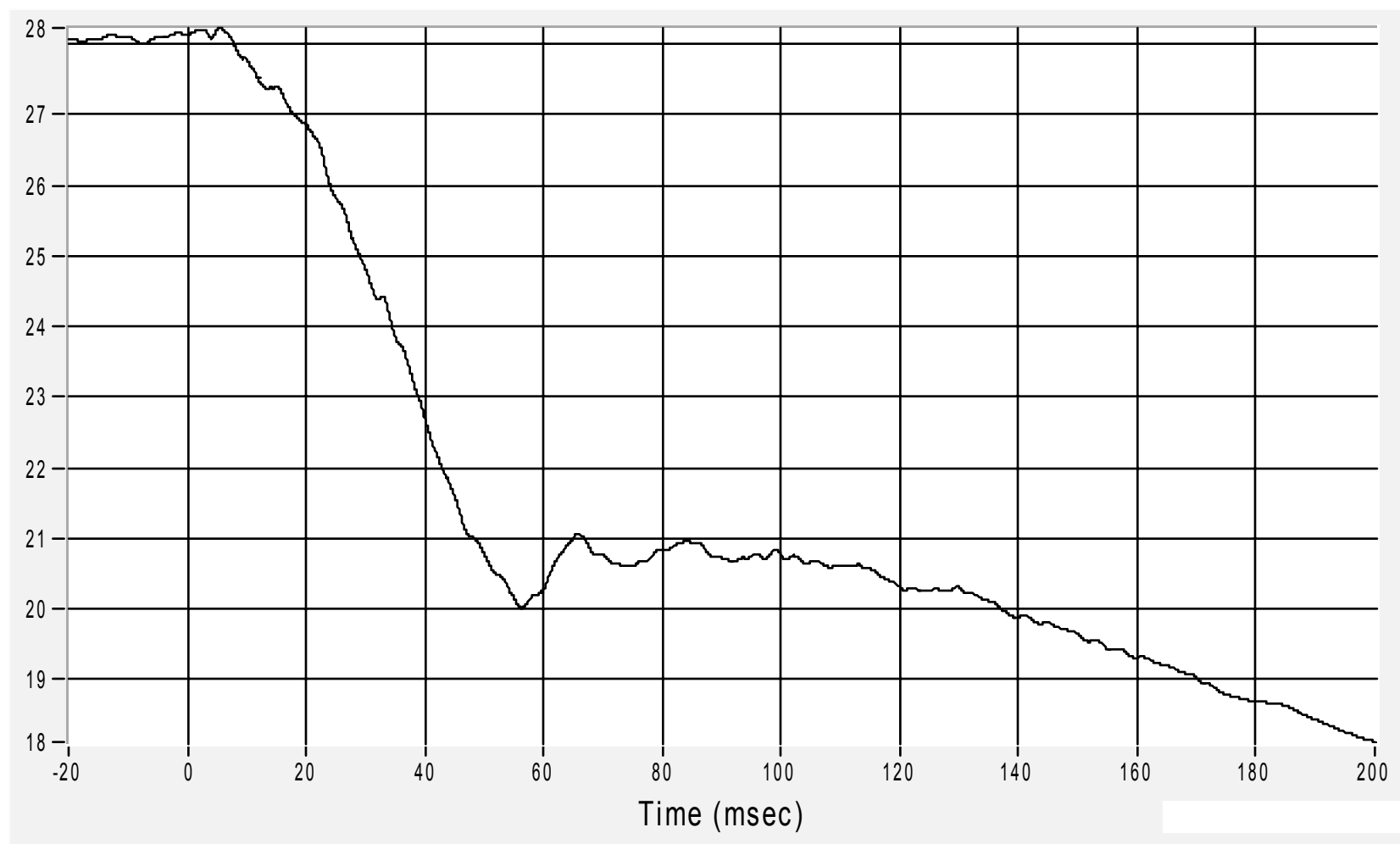
Medical College of Wisconsin  
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**MDB Center of Gravity (Y) Velocity**

Velocity (km/h) CFC180

Max 28.2 km/h at 5.4 msec

Min 18.1 km/h at 199.9 msec



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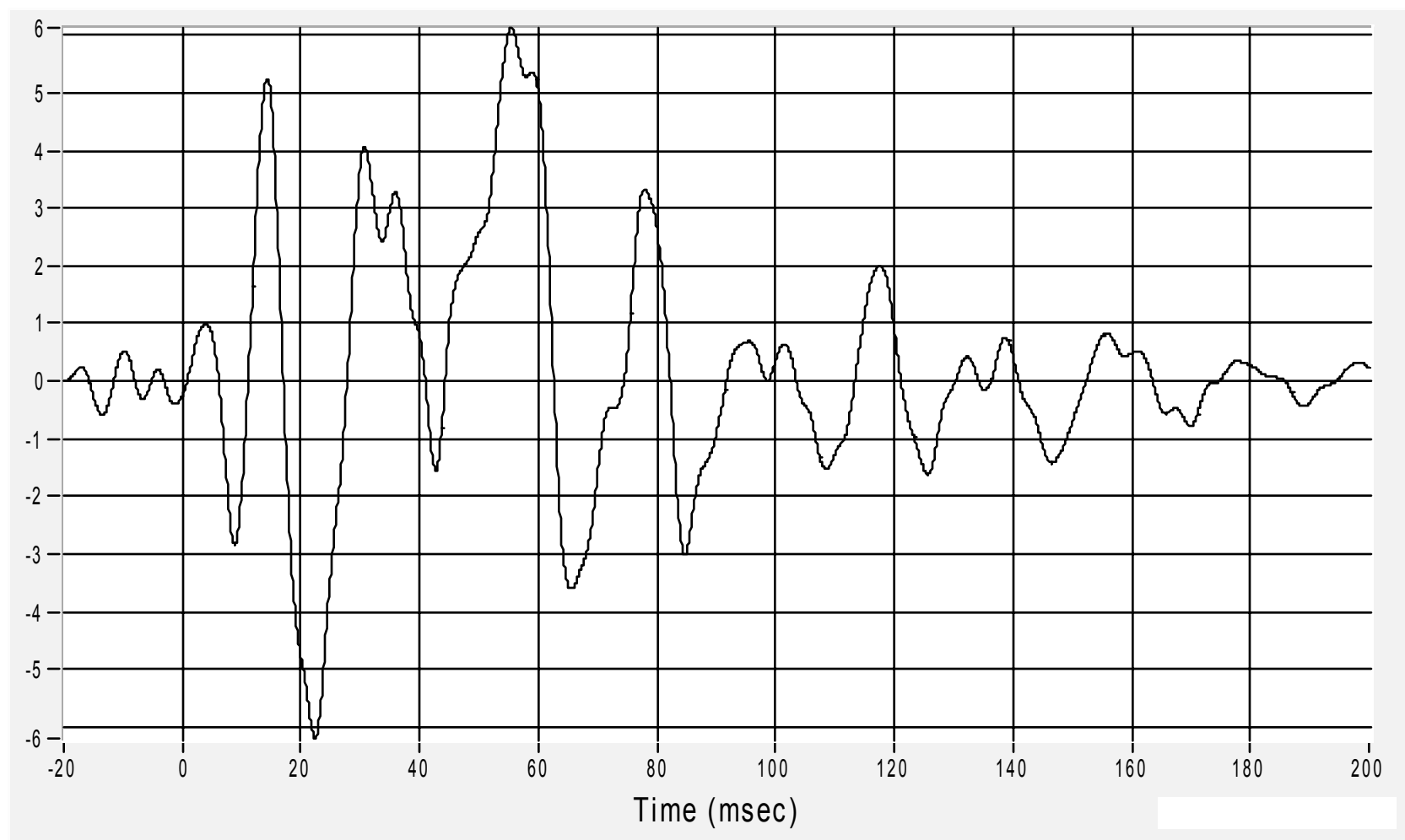
**MDB Center of Gravity (Z) Acceleration**

Acceleration (G's) CFC60

Max 6.1 G at 55.4 msec

Min -6.2 G at 22.3 msec

B-110



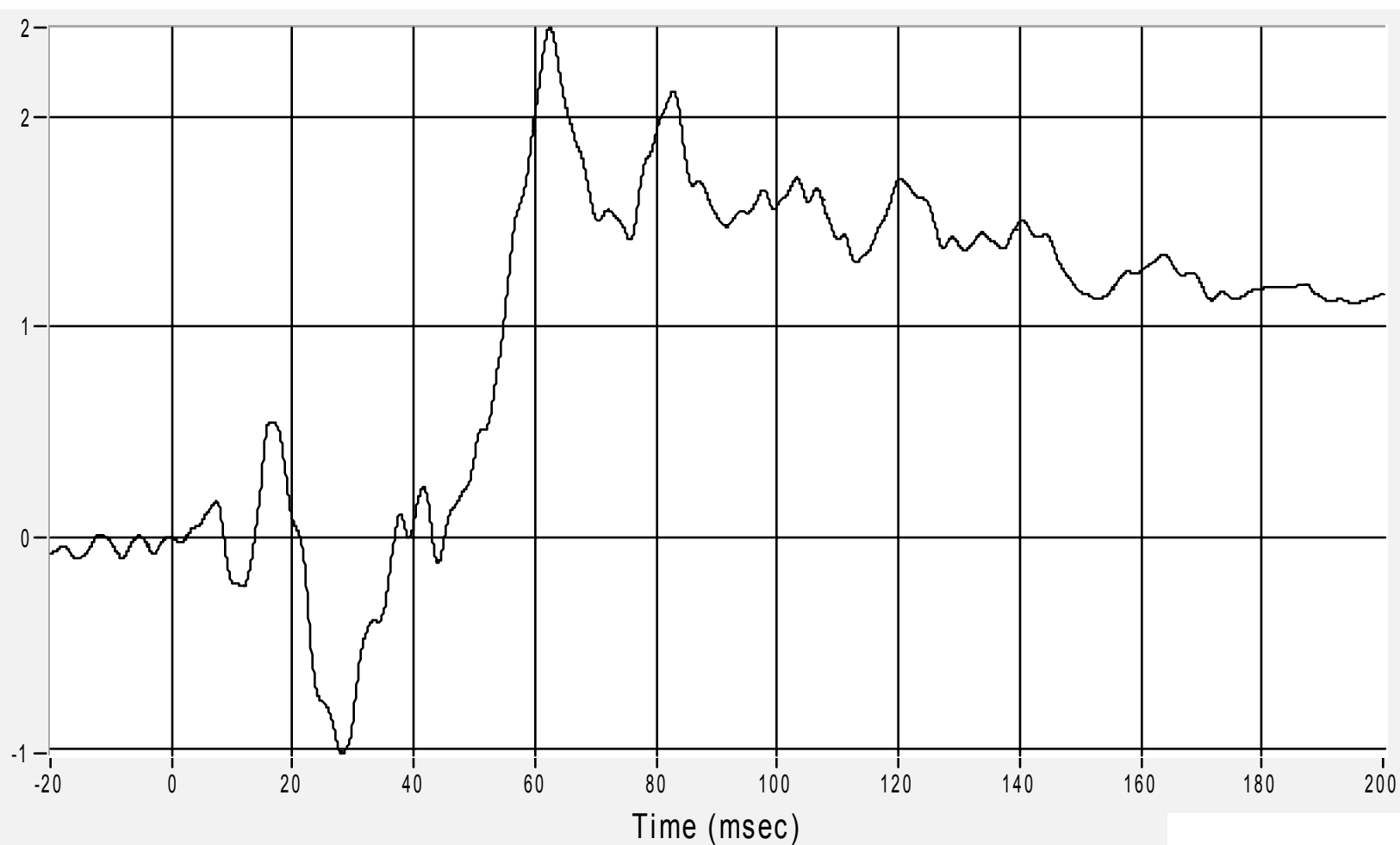
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**MDB Center of Gravity (Z) Velocity**

Velocity (km/h) CFC180

**Max 2.4 km/h at 62.4 msec****Min -1.0 km/h at 28.1 msec**

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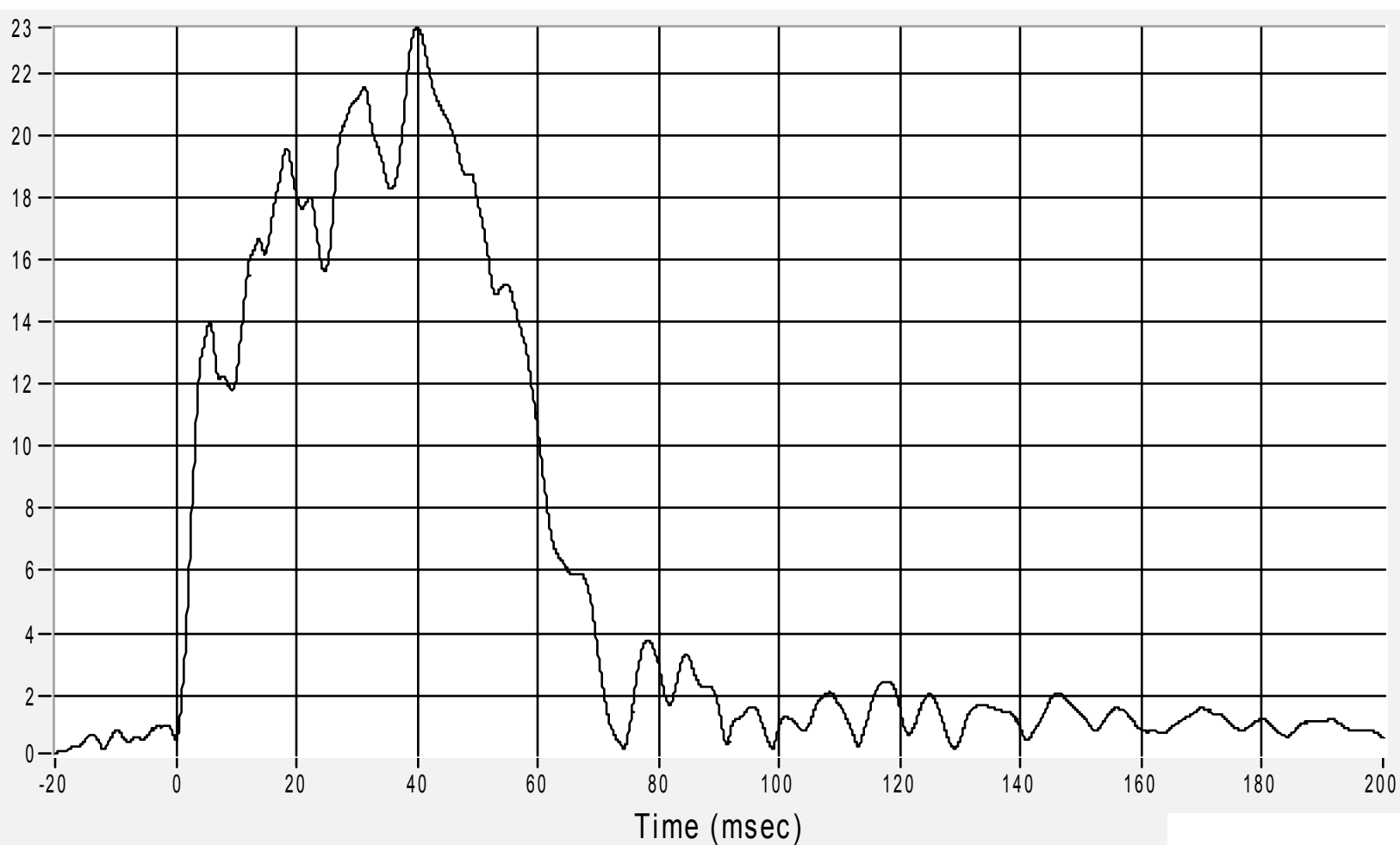


**MDB Center of Gravity Resultant Acceleration**

Acceleration (G's) CFC60

Max 23.4 G's at 40.0 msec

Min 0.3 G's at 129.0 msec



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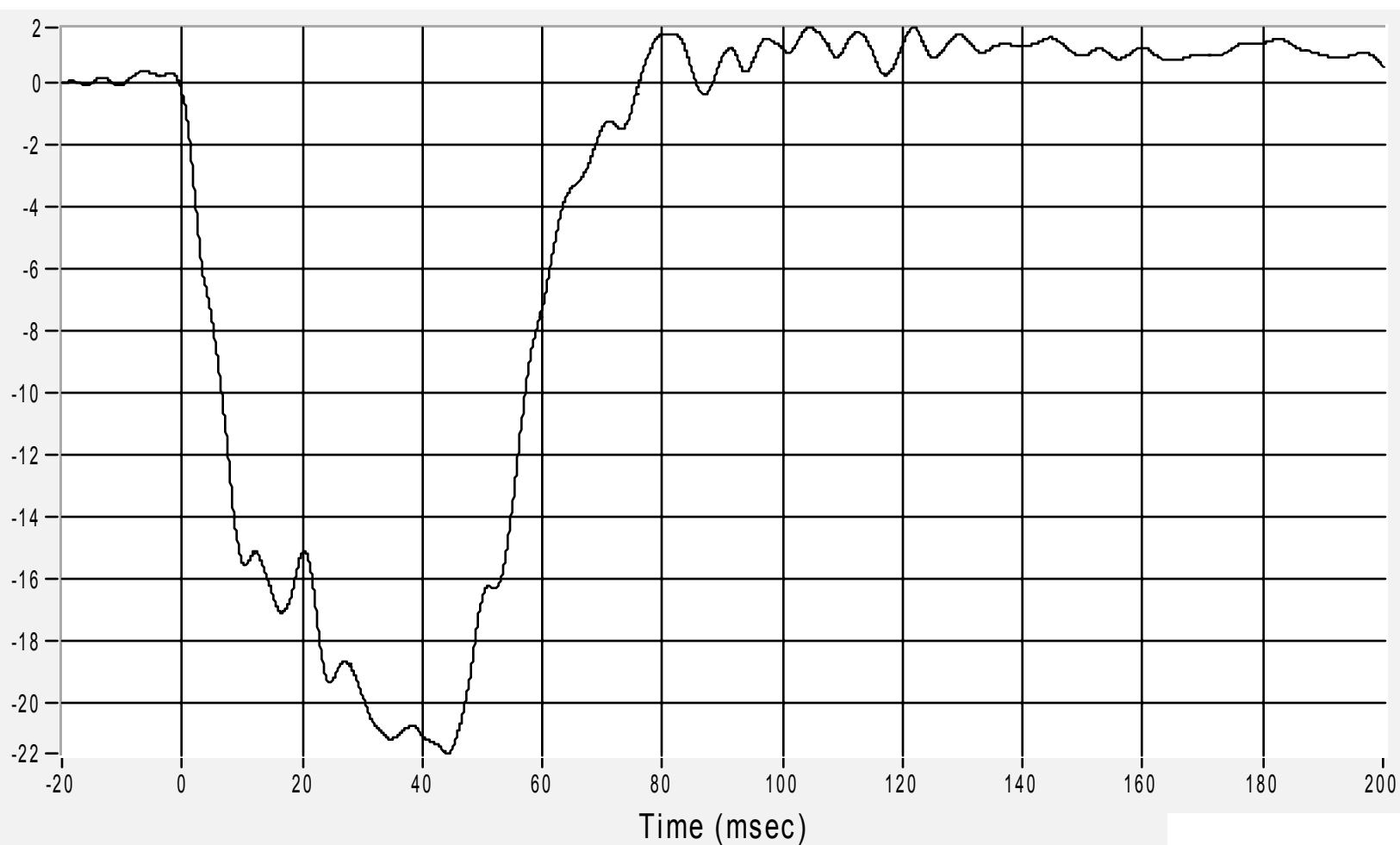
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**MDB Rear (X) Acceleration**

Acceleration (G's) CFC60

Max 1.8 G at 121.8 msec

Min -21.6 G at 44.2 msec



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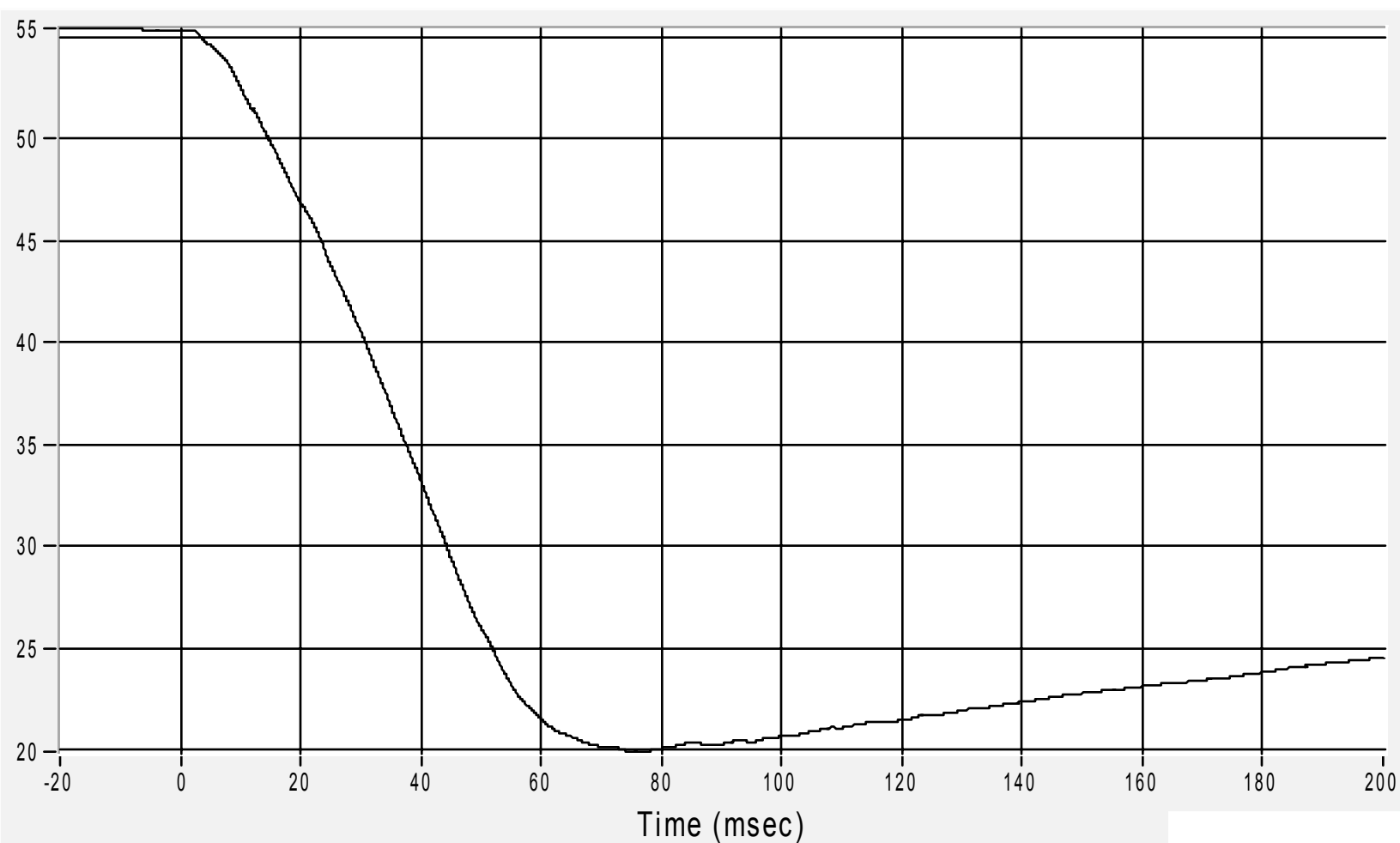
30 March 2004

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**MDB Rear (X) Velocity**

Velocity (km/h)

CFC180

**Max 55.4 km/h at 1.8 msec****Min 19.9 km/h at 75.4 msec**

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30 March 2004

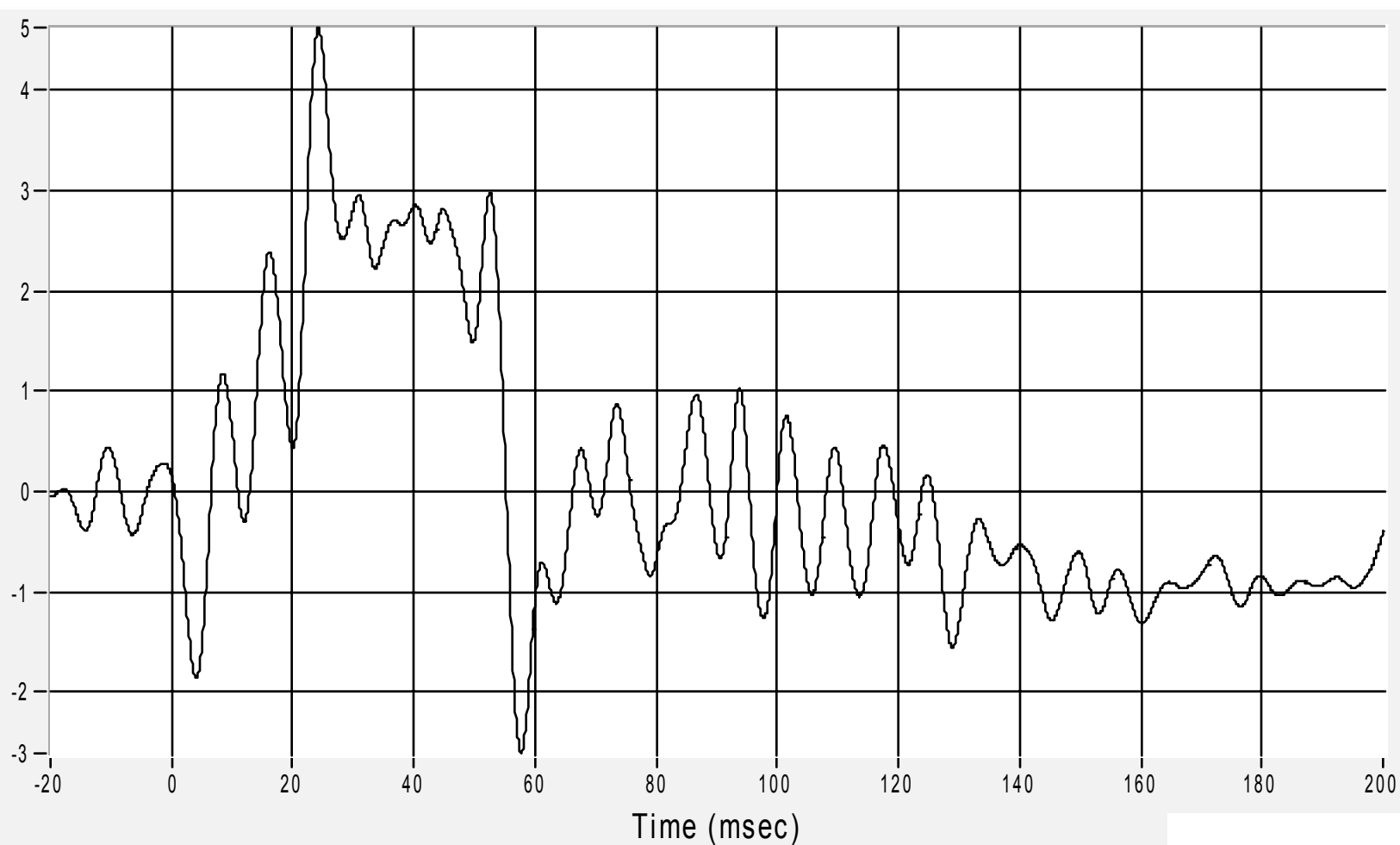
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**MDB Rear (Y) Acceleration**

Acceleration (G's) CFC60

Max 4.6 G at 24.2 msec

Min -2.6 G at 57.7 msec



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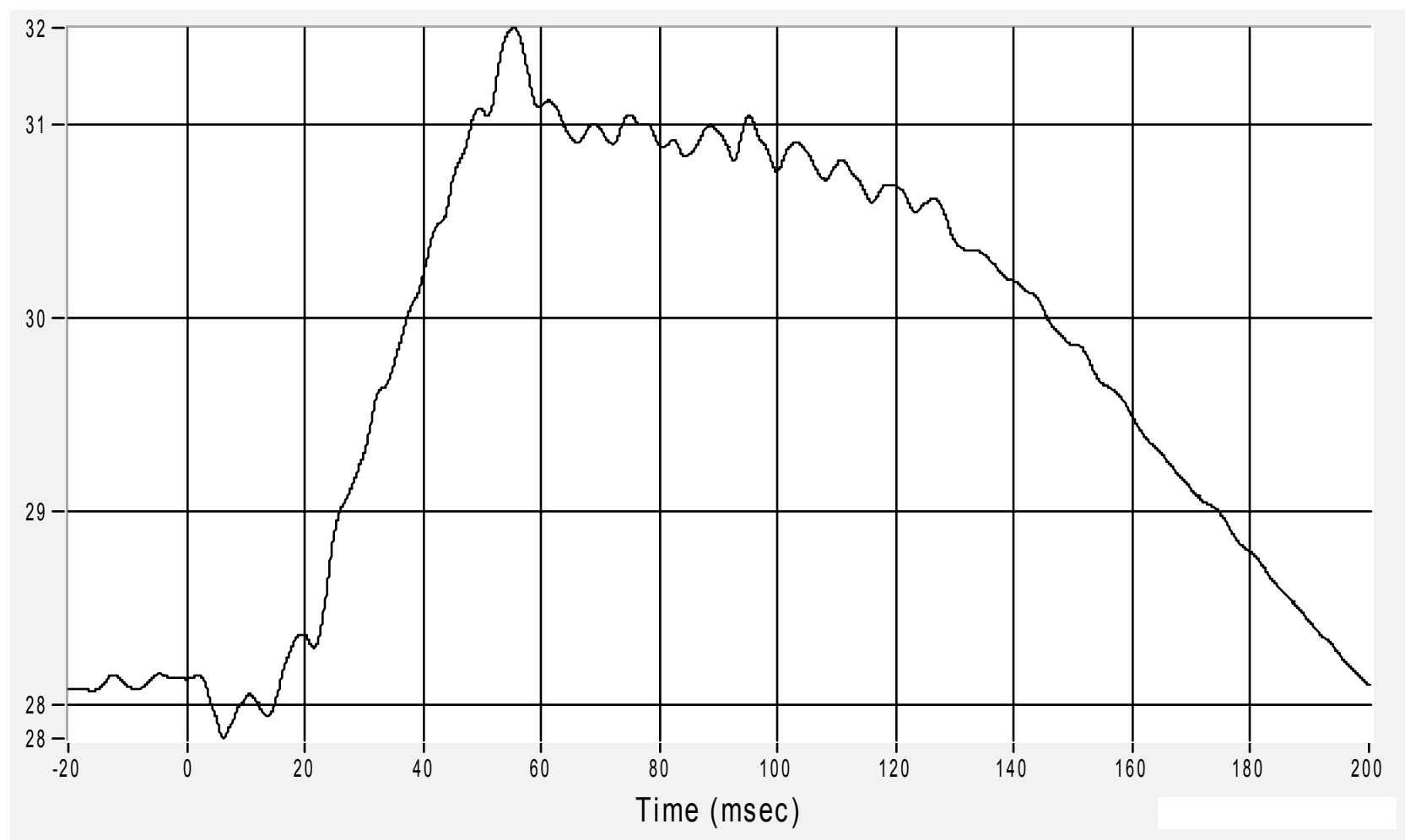
30 March 2004

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**MDB Rear (Y) Velocity**

Velocity (km/h)

CFC180

**Max 31.5 km/h at 55.4 msec****Min 27.8 km/h at 6.2 msec**

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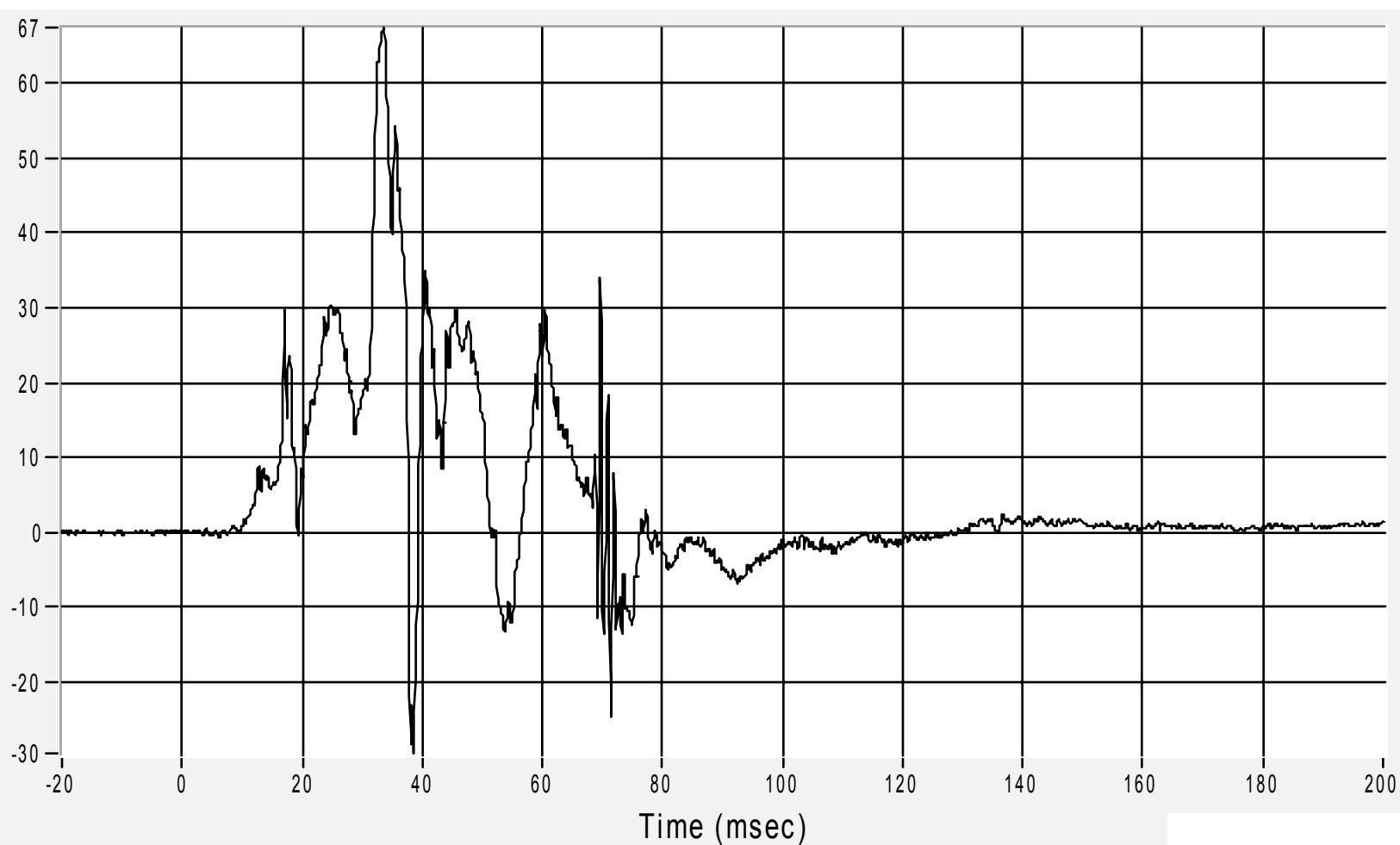


**Driver Upper Rib (Y) - Redundant Acceleration**

Acceleration (G's) CFC1000

Max 67.5 G at 33.5 msec

Min -29.6 G at 38.6 msec



04SN08 - 2004 TOYOTA SOLARA 2 DOOR COUPE

30 March 2004

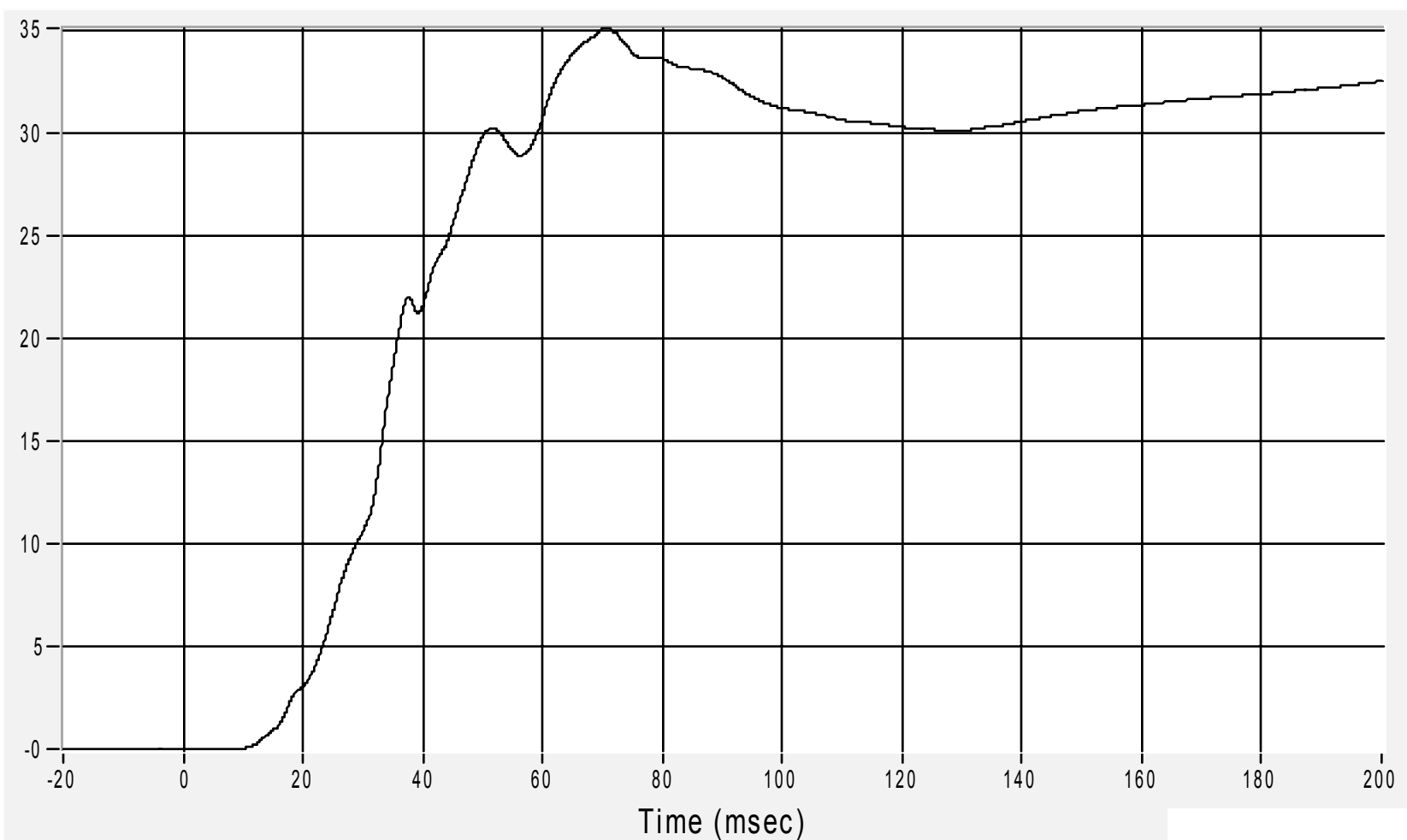
Medical College of Wisconsin  
Vehicle Crashworthiness Lab

**Driver Upper Rib (Y) Velocity - Redundant**

Velocity (km/h) CFC180

Max 35.1 km/h at 70.7 msec

Min 0.0 km/h at 6.9 msec



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30 March 2004

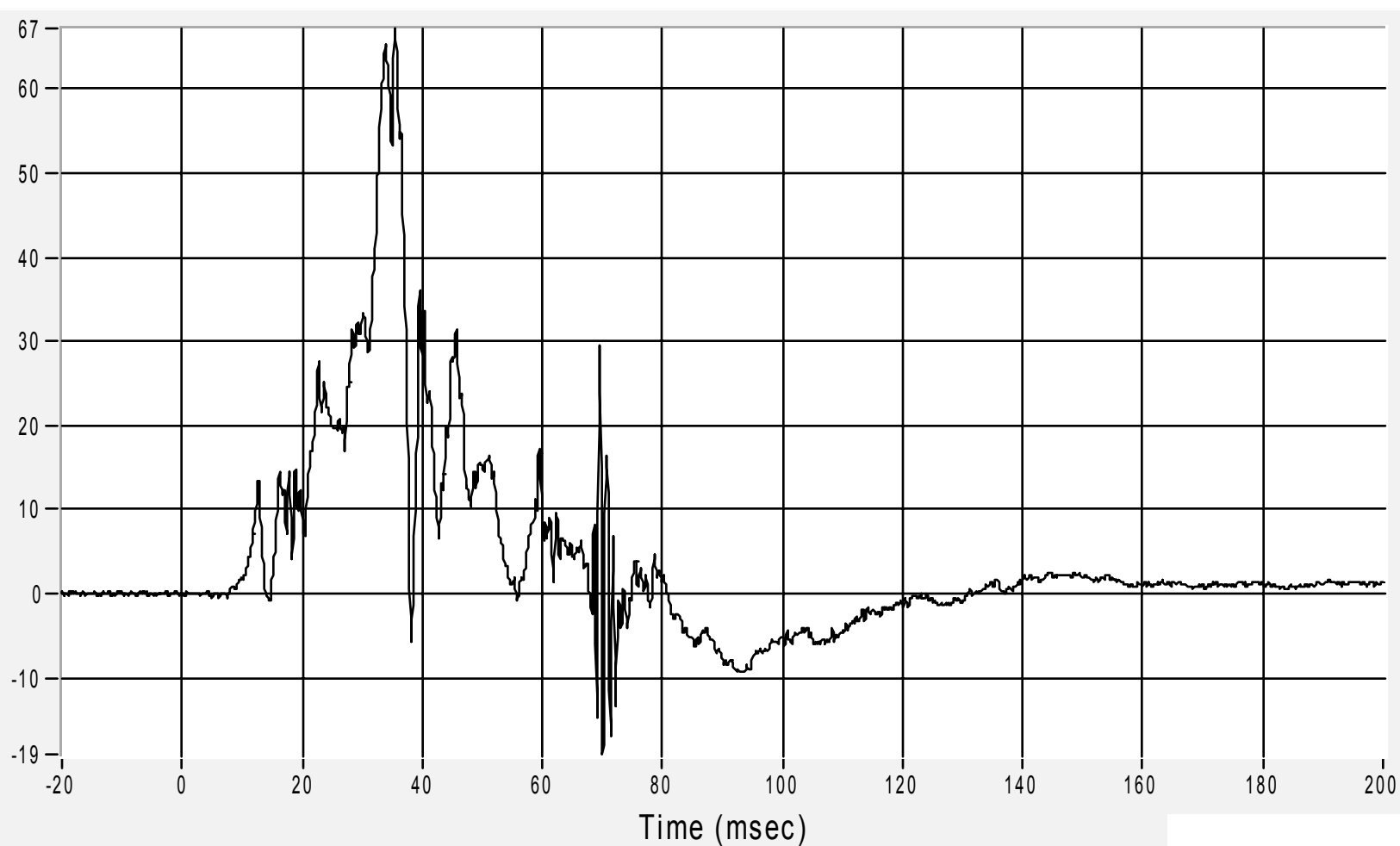
*Medical College of Wisconsin  
Vehicle Crashworthiness Lab*

**Driver Lower Rib (Y) - Redundant Acceleration**

Acceleration (G's) CFC1000

Max 67.2 G at 35.4 msec

Min -19.1 G at 70.1 msec



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30 March 2004

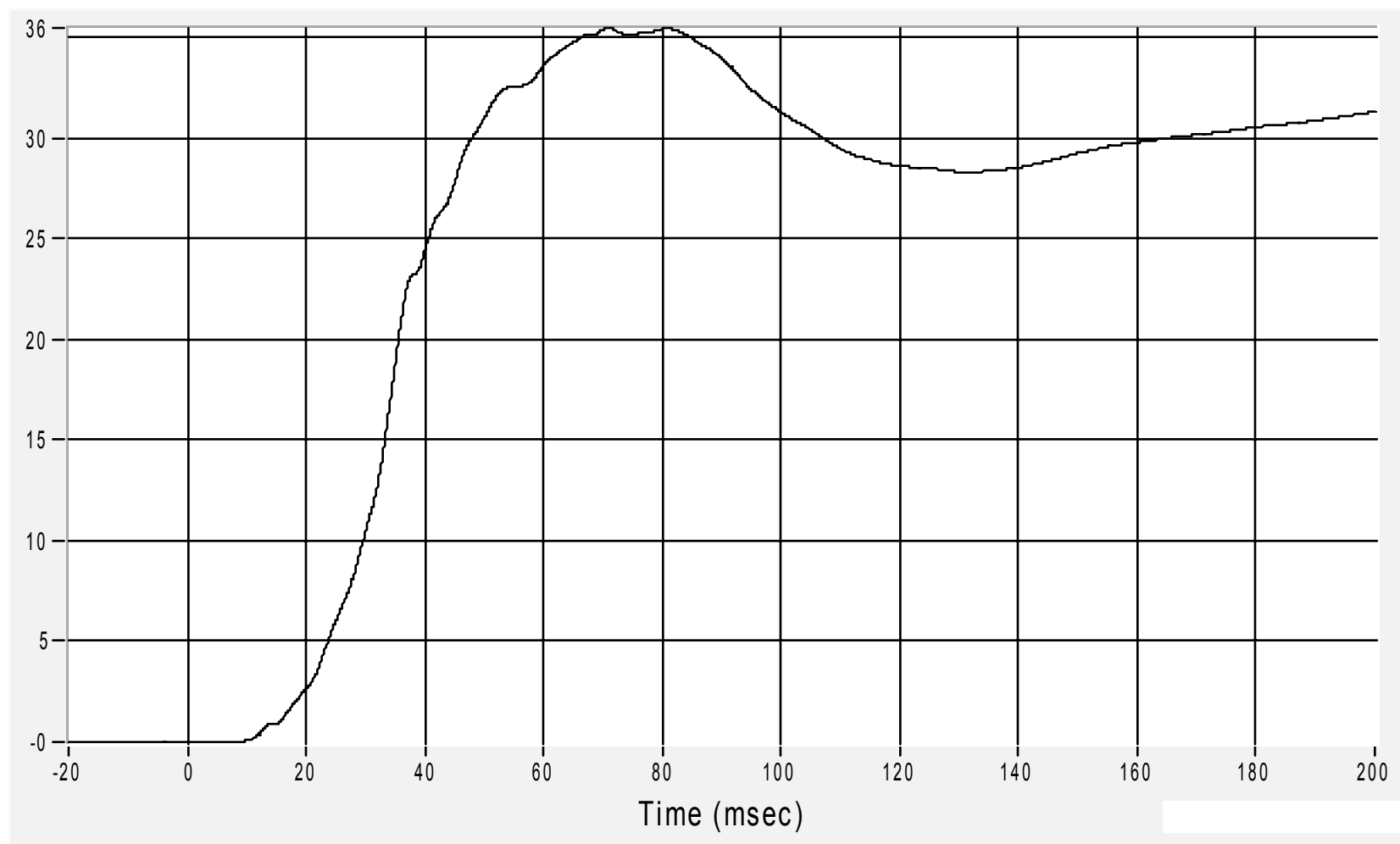
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Vehicle Crashworthiness Lab

**Driver Lower Rib (Y) Velocity - Redundant**

Velocity (km/h) CFC180

Max 35.5 km/h at 71.0 msec

Min 0.0 km/h at 7.4 msec



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30 March 2004

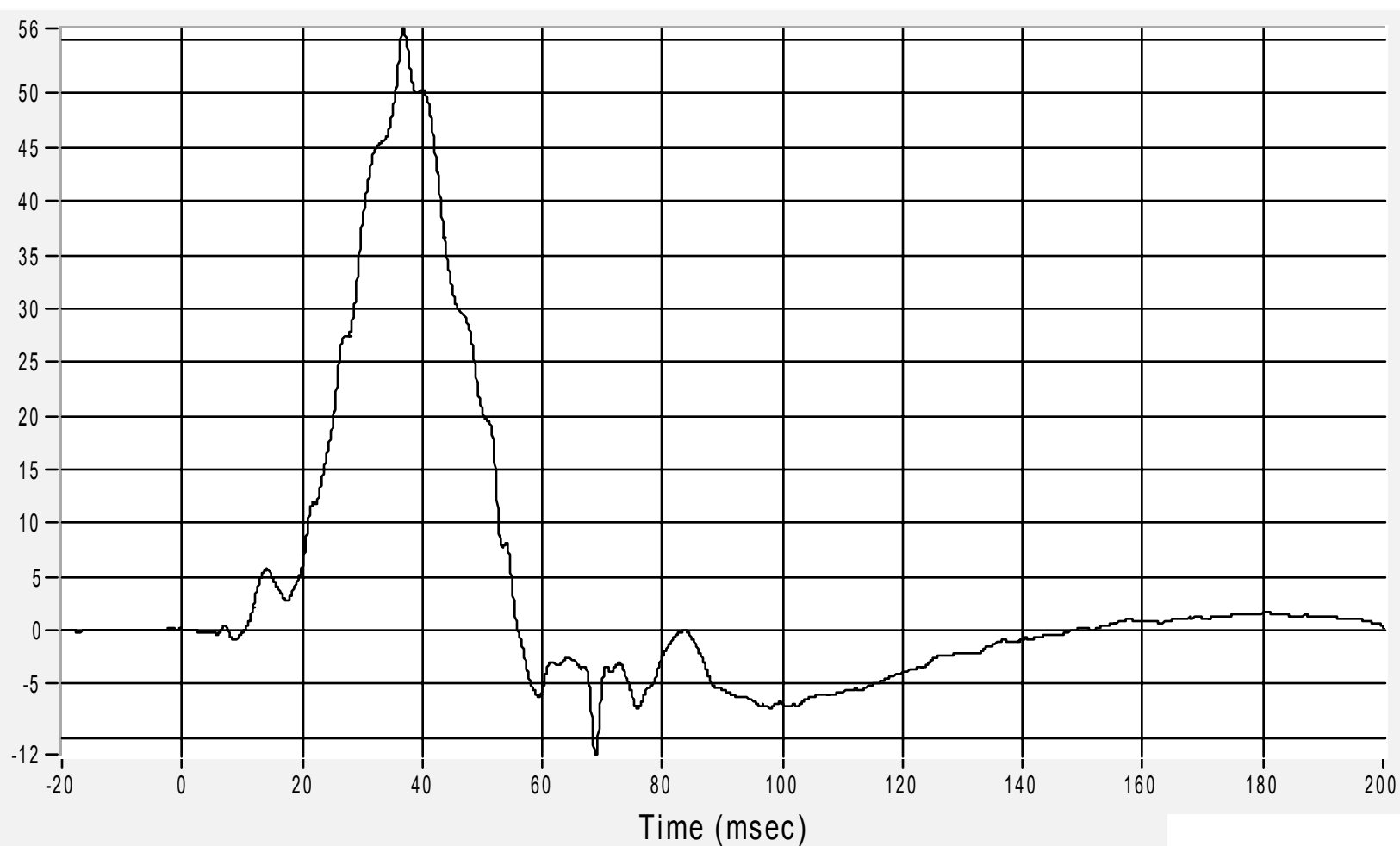
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**Driver Lower Spine (Y) - Redundant Acceleration**

Acceleration (G's) CFC180

Max 56.1 G at 36.9 msec

Min -11.6 G at 68.9 msec



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30 March 2004

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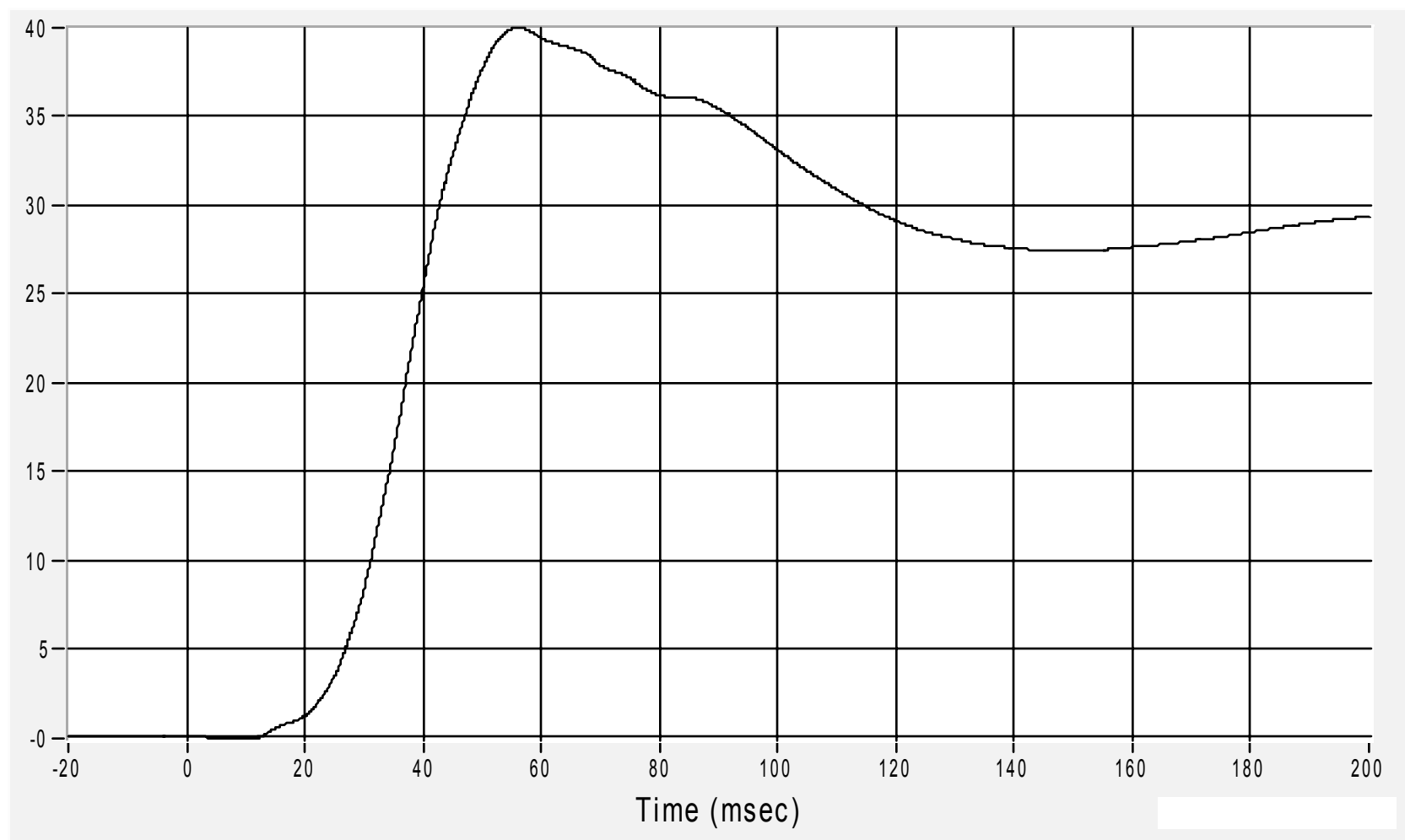


**Driver Lower Spine (Y) Velocity - Redundant**

Velocity (km/h) CFC180

Max 40.0 km/h at 55.9 msec

Min 0.0 km/h at 10.4 msec



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30 March 2004

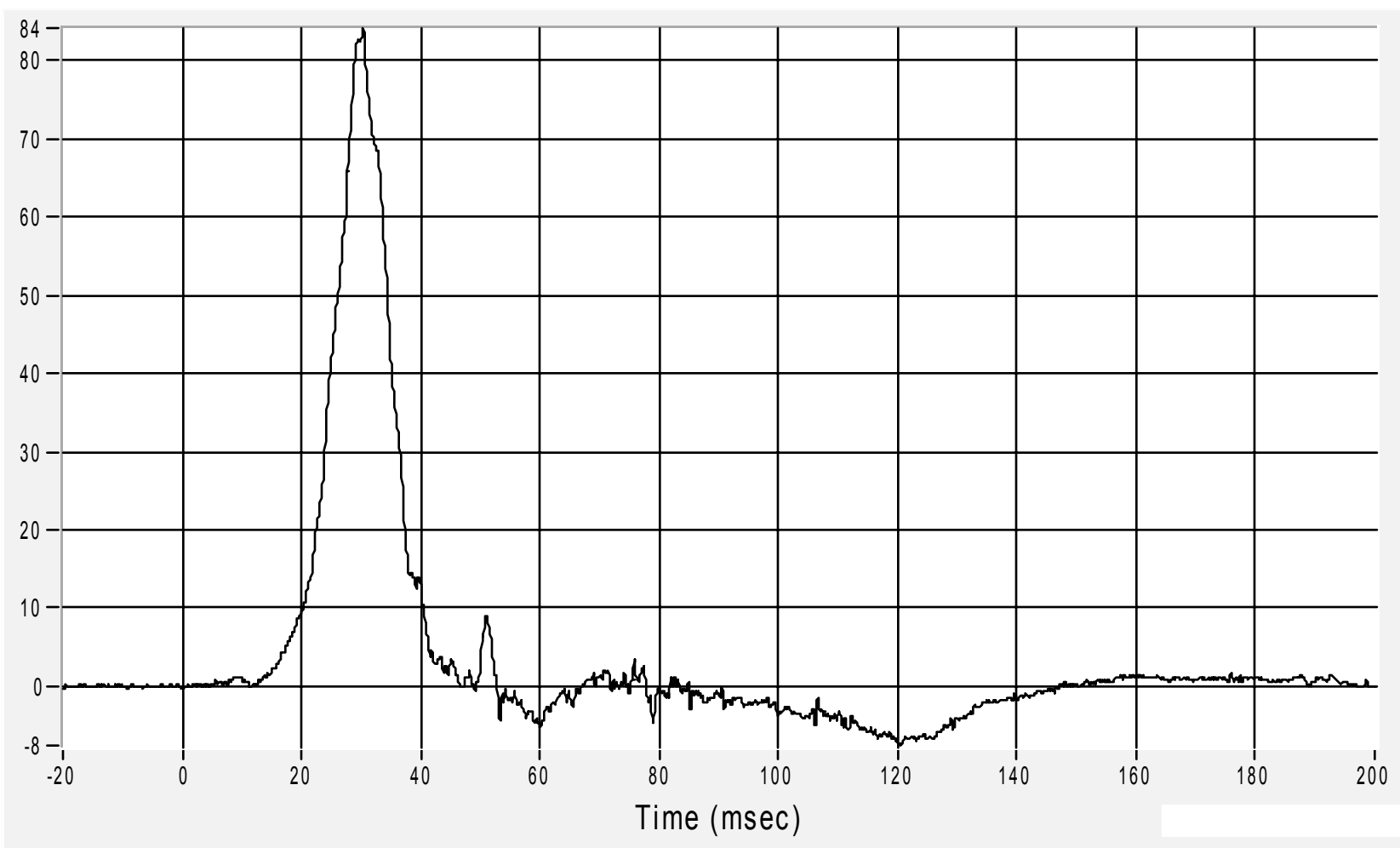
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**Driver Pelvic (Y) - Redundant Acceleration**

Acceleration (G's) CFC1000

Max 84.1 G at 30.3 msec

Min -7.6 G at 120.2 msec



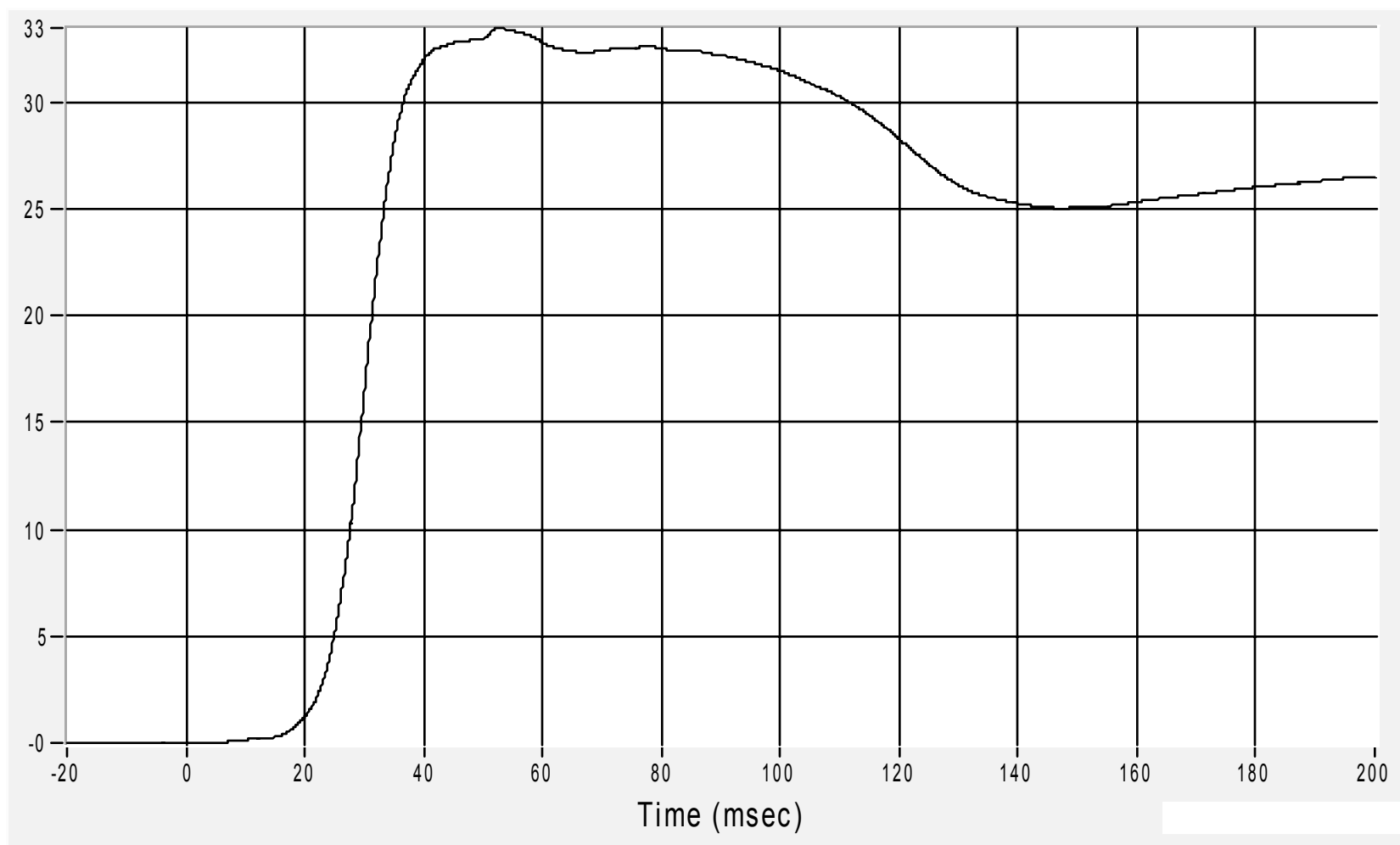
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**Driver Pelvic (Y) Velocity - Redundant**

Velocity (km/h) CFC180

**Max 33.5 km/h at 52.6 msec****Min 0.0 km/h at 1.0 msec**

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30 March 2004

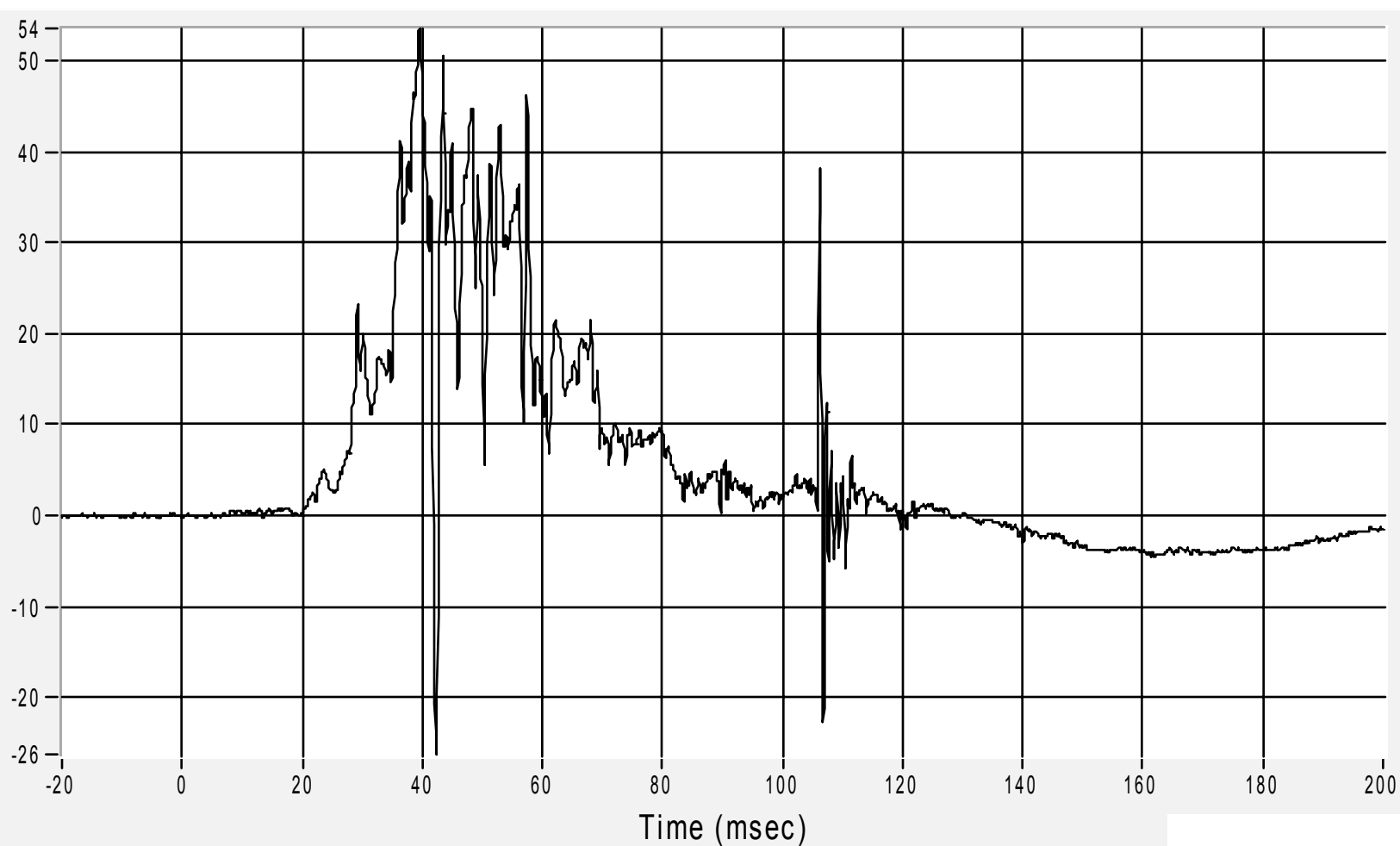
*Medical College of Wisconsin  
Vehicle Crashworthiness Lab*

**Passenger Upper Rib (Y) - Redundant Acceleration**

Acceleration (G's) CFC1000

Max 53.5 G at 39.5 msec

Min -26.2 G at 42.3 msec



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30 March 2004

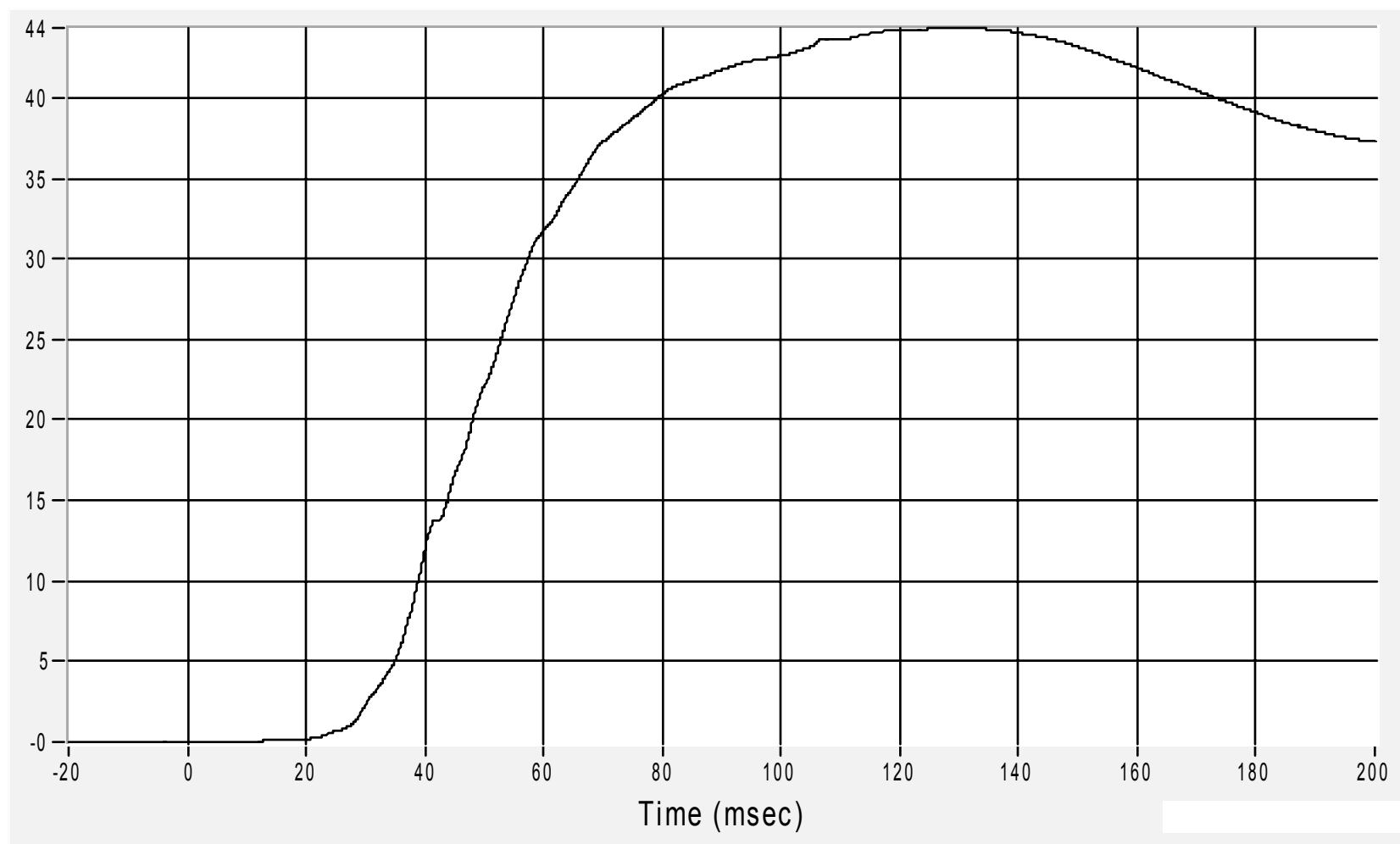
Medical College of Wisconsin  
Vehicle Crashworthiness Lab

**Passenger Upper Rib (Y) Velocity - Redundant**

Velocity (km/h) CFC180

Max 44.4 km/h at 128.2 msec

Min 0.0 km/h at 6.5 msec



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30 March 2004

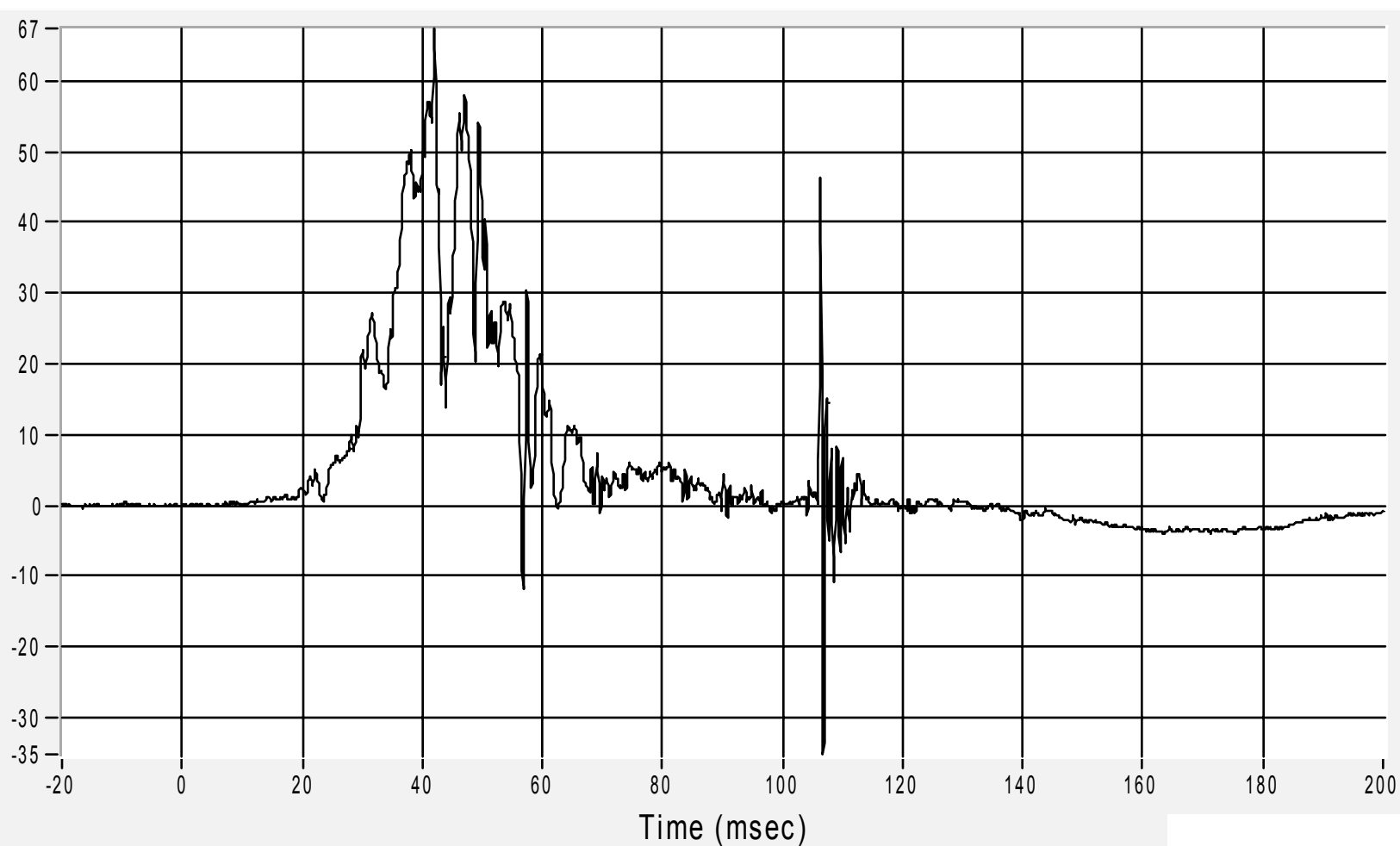
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Vehicle Crashworthiness Lab*

**Passenger Lower Rib (Y) - Redundant Acceleration**

Acceleration (G's) CFC1000

Max 67.4 G at 42.0 msec

Min -35.2 G at 106.8 msec



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30 March 2004

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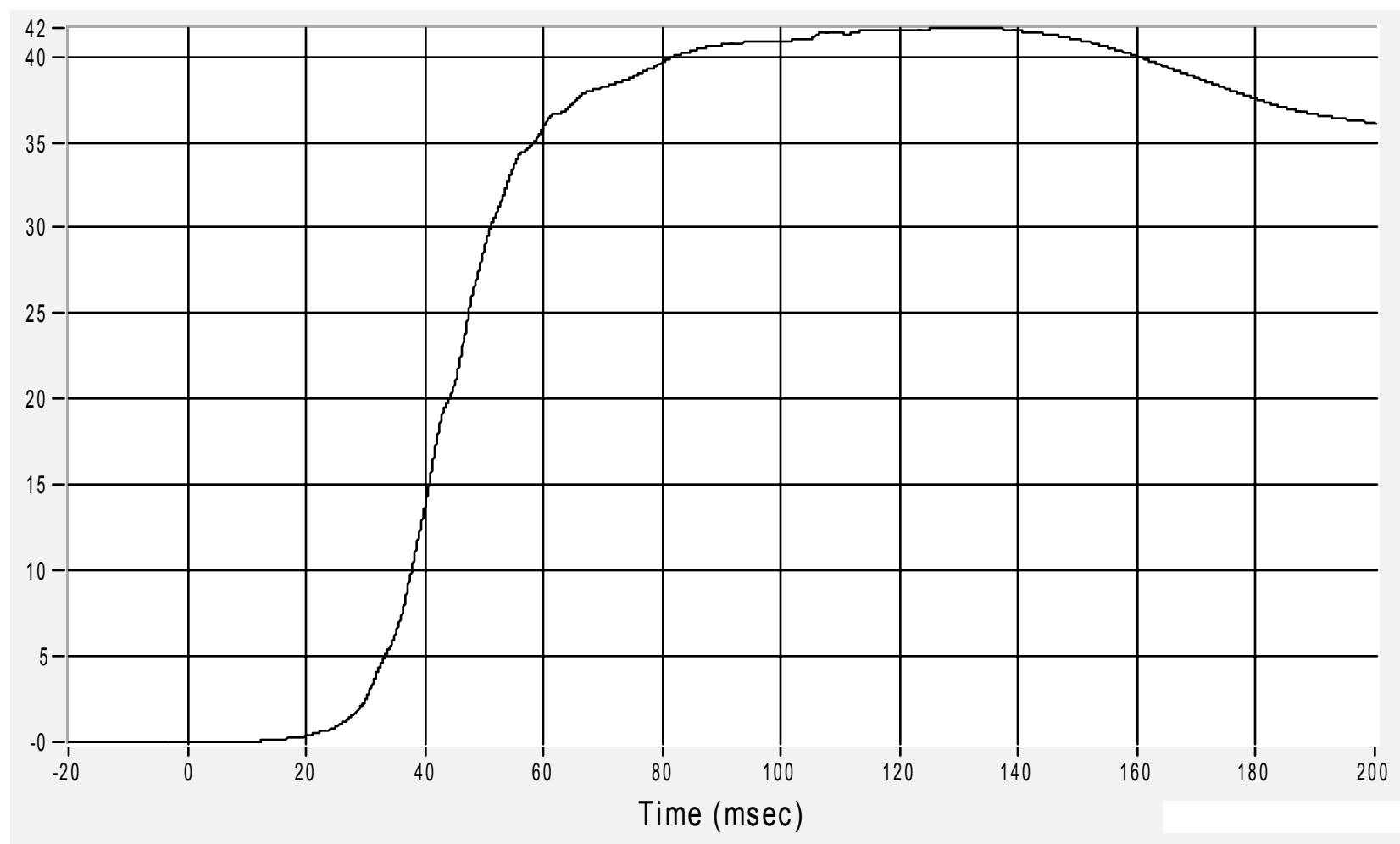


**Passenger Lower Rib (Y) Velocity - Redundant**

Velocity (km/h) CFC180

Max 41.7 km/h at 131.3 msec

Min 0.0 km/h at 0.0 msec



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30 March 2004

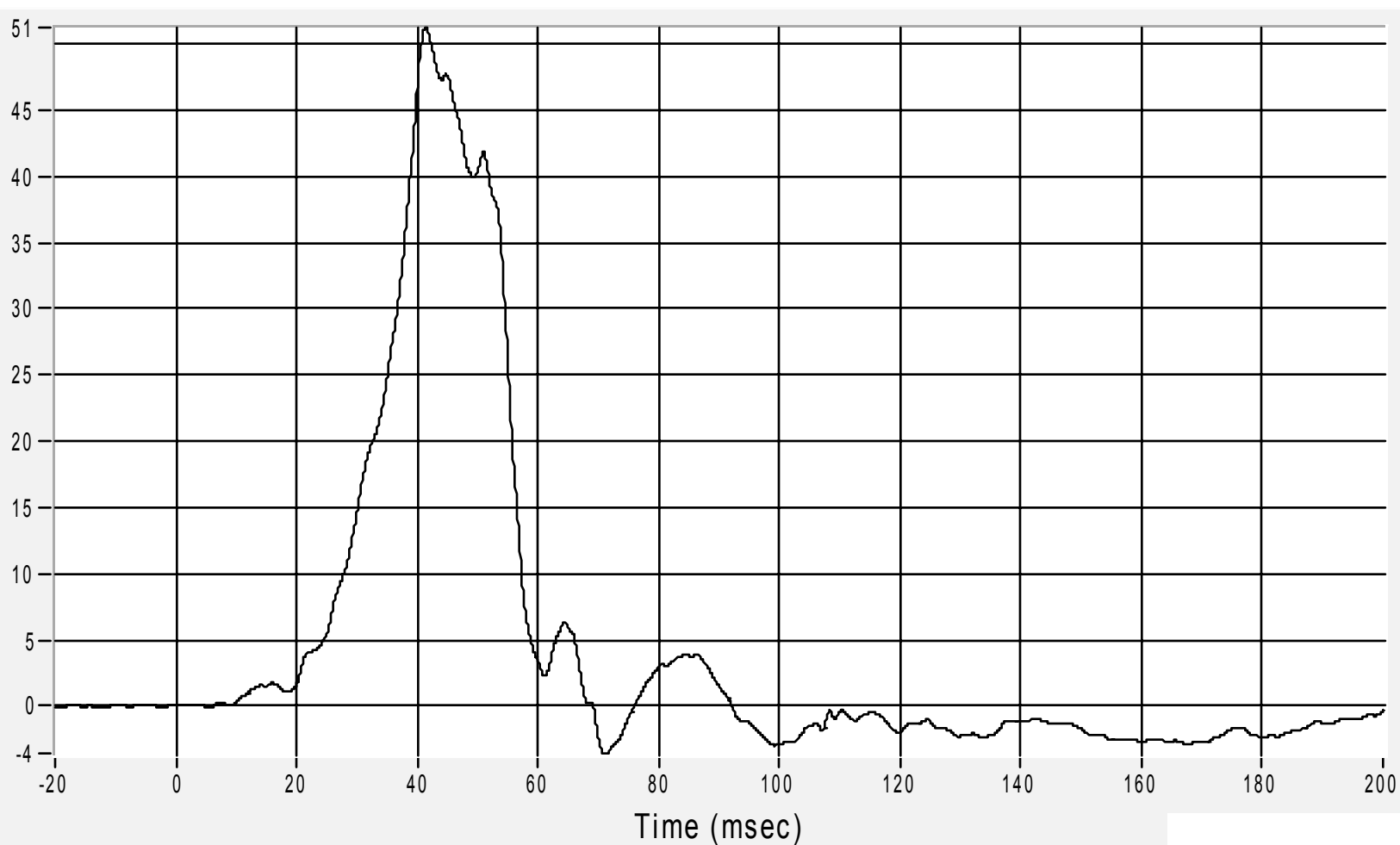
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Vehicle Crashworthiness Lab

**Passenger Lower Spine (Y) - Redundant Acceleration**

Acceleration (G's) CFC180

Max 51.2 G at 41.4 msec

Min -3.6 G at 71.0 msec



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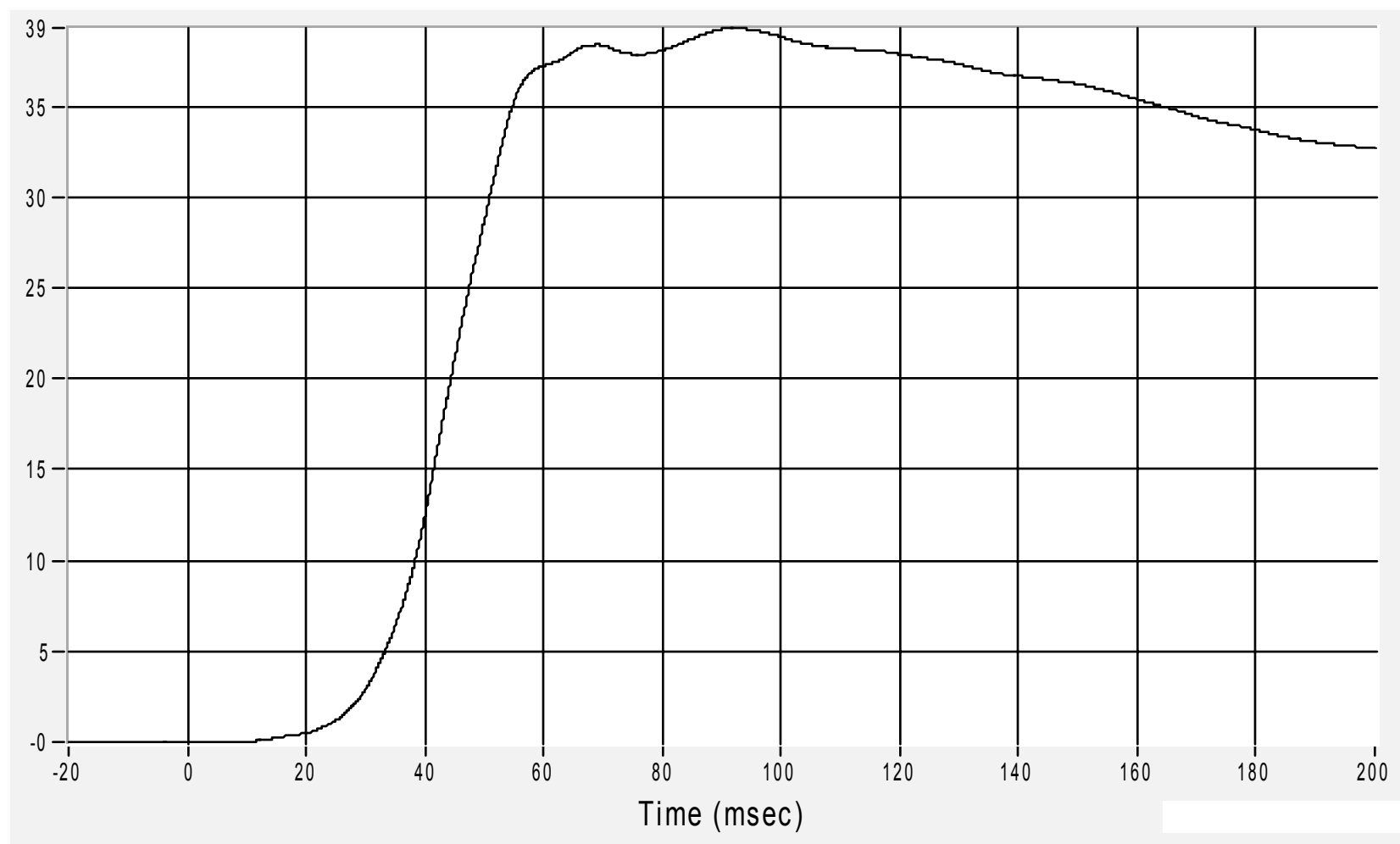
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Vehicle Crashworthiness Lab

**Passenger Lower Spine (Y) Velocity - Redundant**

Velocity (km/h) CFC180

Max 39.3 km/h at 92.1 msec

Min 0.0 km/h at 0.0 msec



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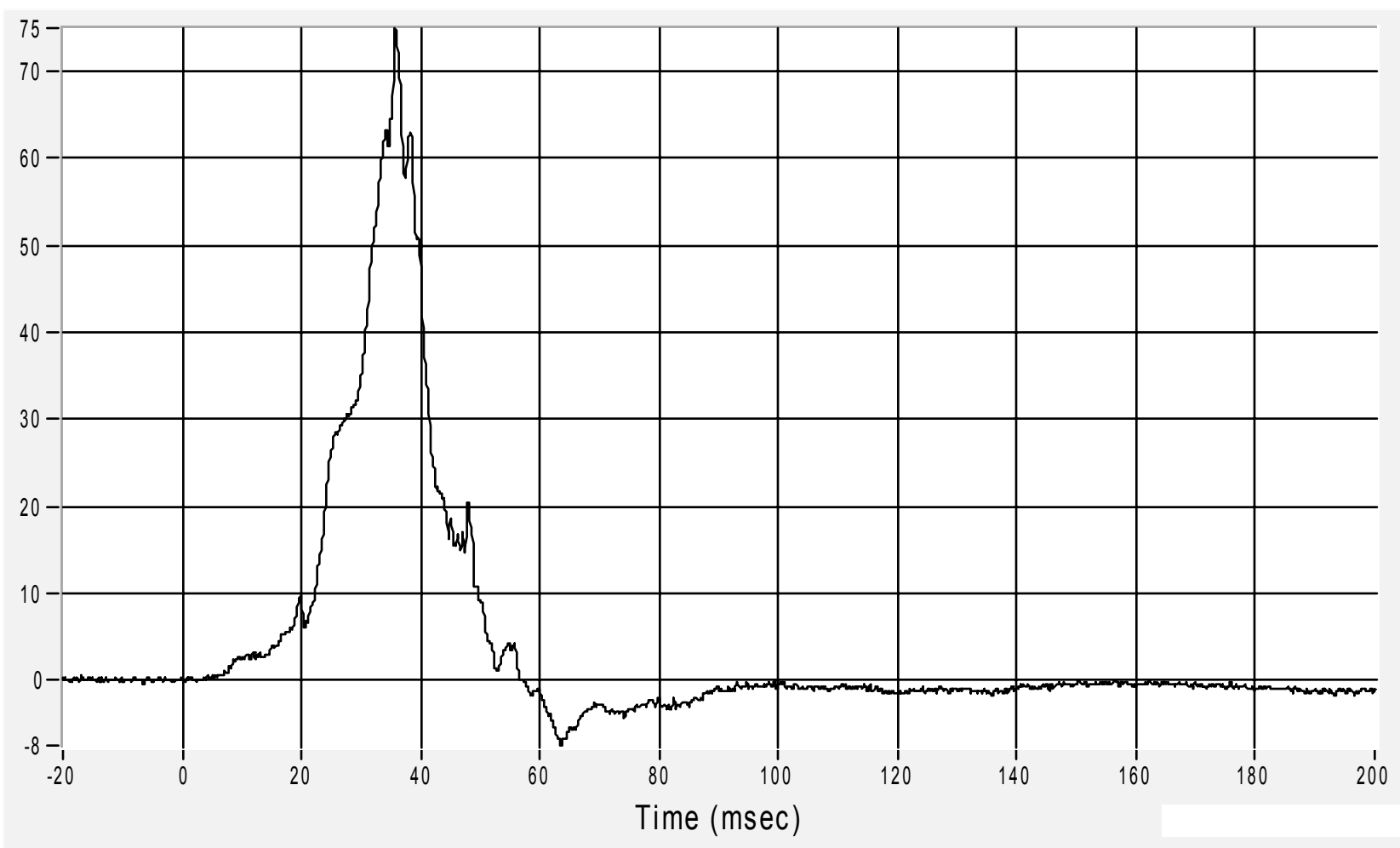
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**Passenger Pelvic (Y) - Redundant Acceleration**

Acceleration (G's) CFC1000

Max 75.0 G at 35.8 msec

Min -7.5 G at 63.5 msec



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30 March 2004

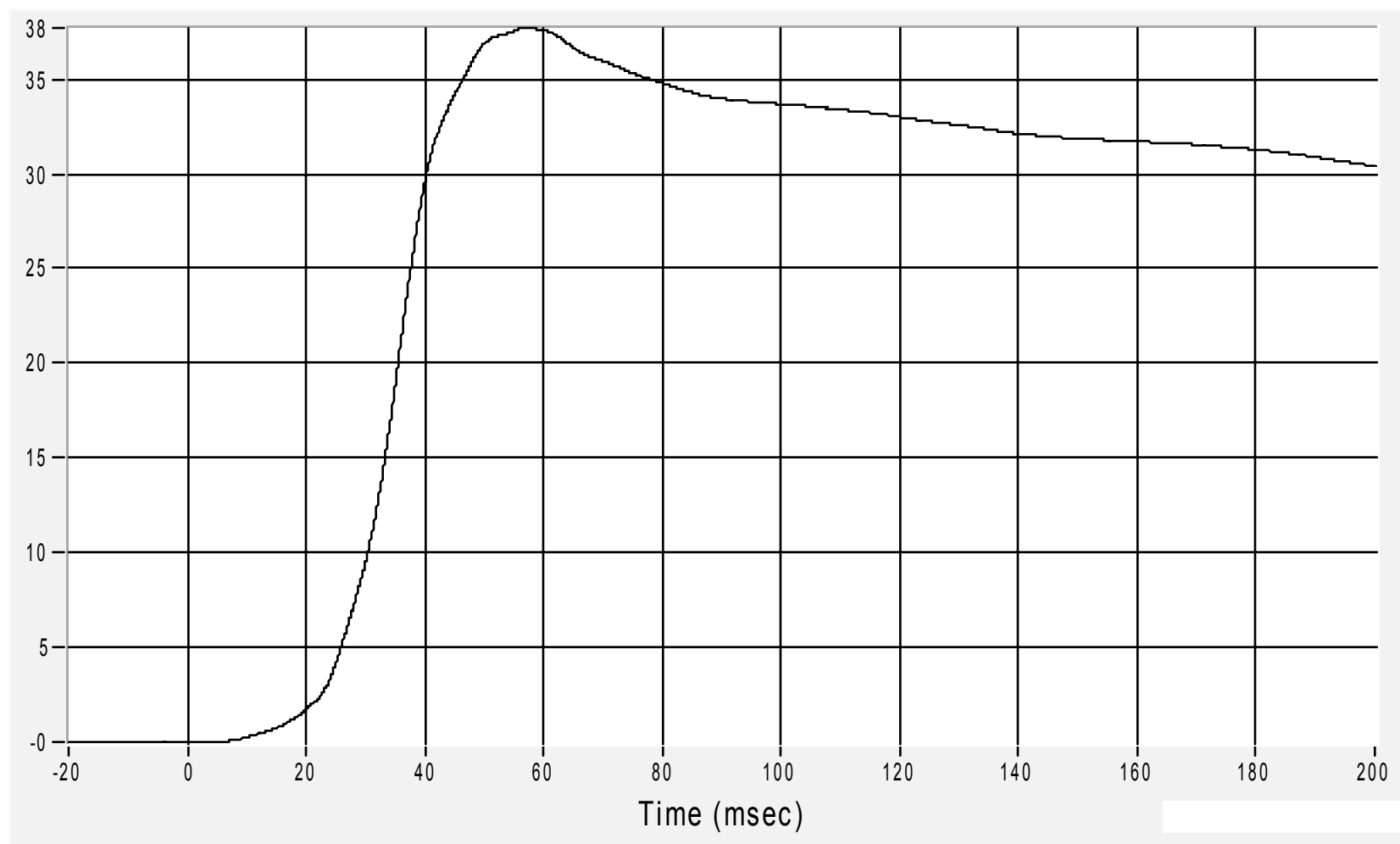
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Vehicle Crashworthiness Lab

**Passenger Pelvic (Y) Velocity - Redundant**

Velocity (km/h) CFC180

Max 37.7 km/h at 57.0 msec

Min 0.0 km/h at 0.0 msec



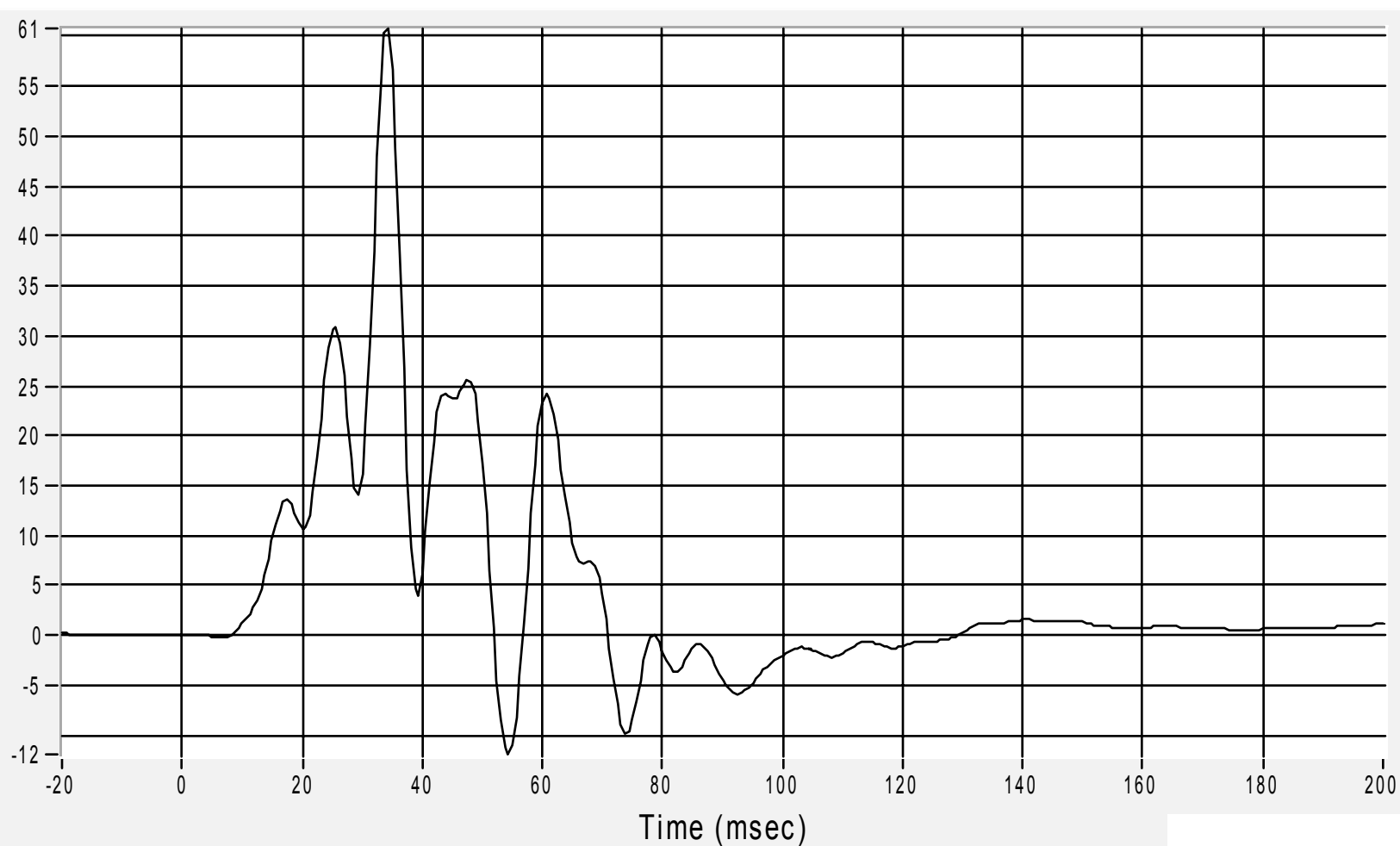
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**Driver Upper Rib (Y) - Redundant Acceleration**

Acceleration (G's)      FIR100

**Max    60.8    G    at    34.4    msec****Min    -11.9    G    at    54.4    msec**

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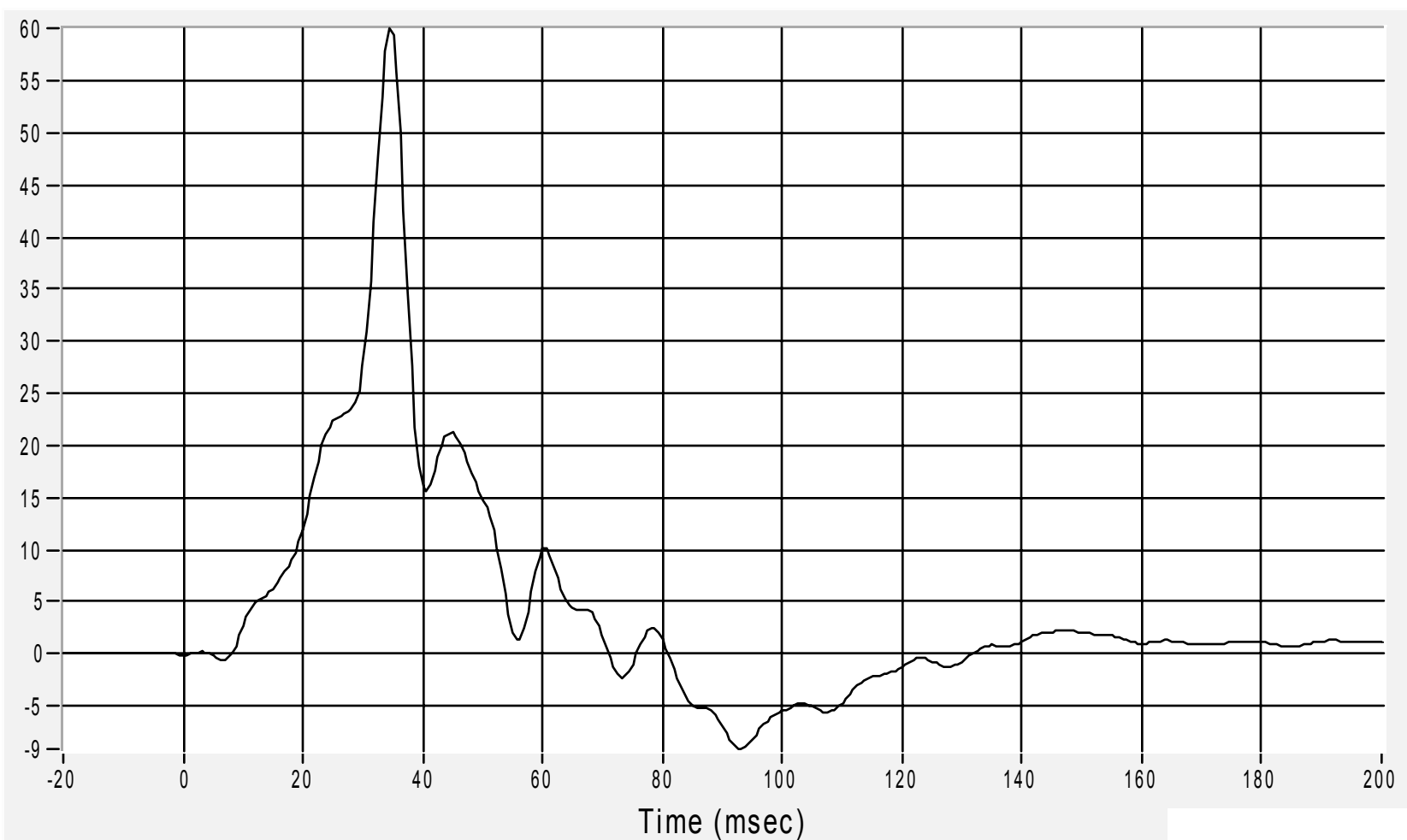


**Driver Lower Rib (Y) - Redundant Acceleration**

Acceleration (G's)      FIR100

Max    60.1    G    at    34.4    msec

Min    -9.1    G    at    93.1    msec



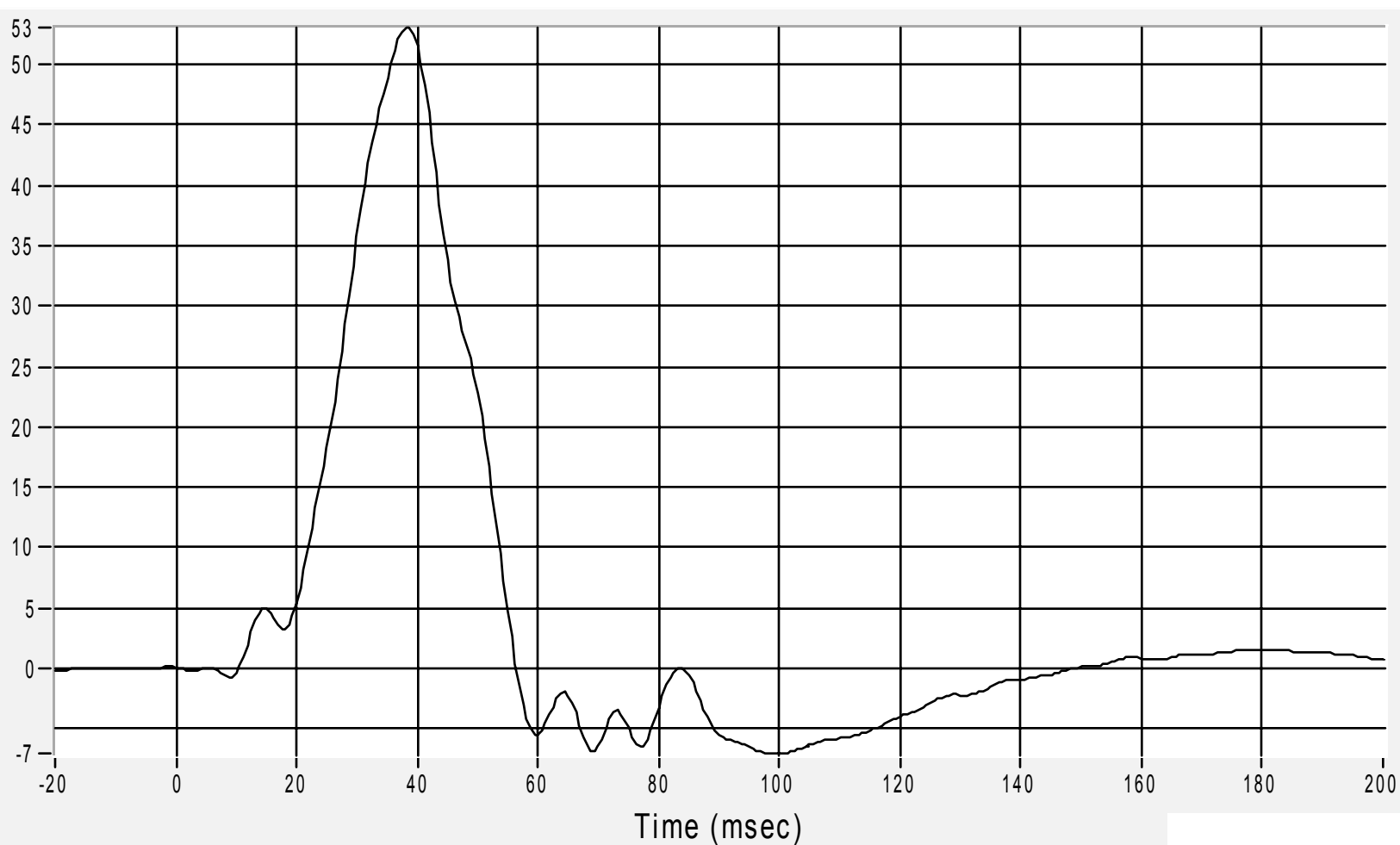
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**Driver Lower Spine (Y) - Redundant Acceleration**

Acceleration (G's)      FIR100

**Max    53.1    G    at    38.1    msec****Min    -7.0    G    at    98.8    msec**

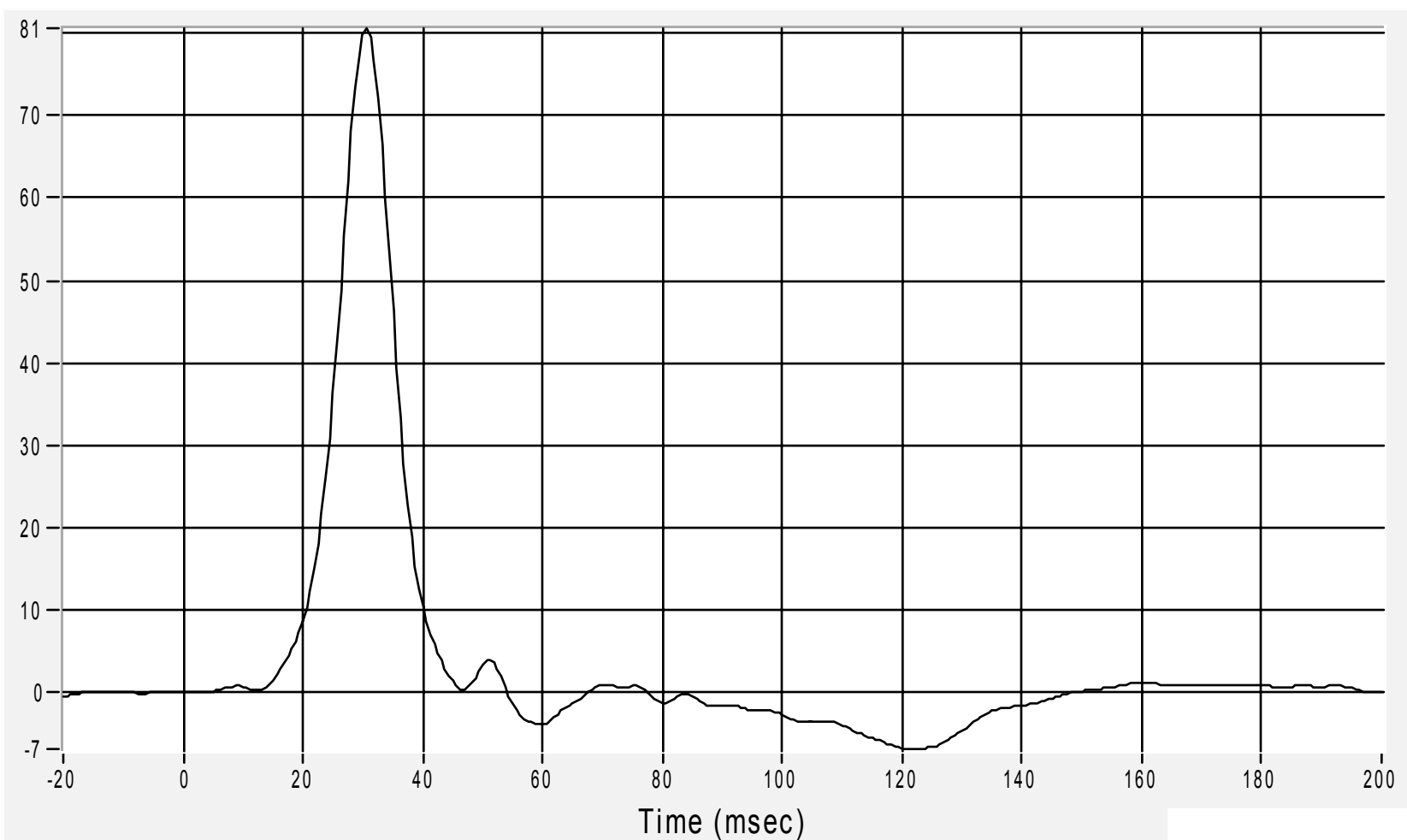
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30 March 2004

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**Driver Pelvic (Y) - Redundant Acceleration**

Acceleration (G's)      FIR100

**Max    80.6    G    at    30.6    msec****Min    -6.8    G    at    121.9    msec**

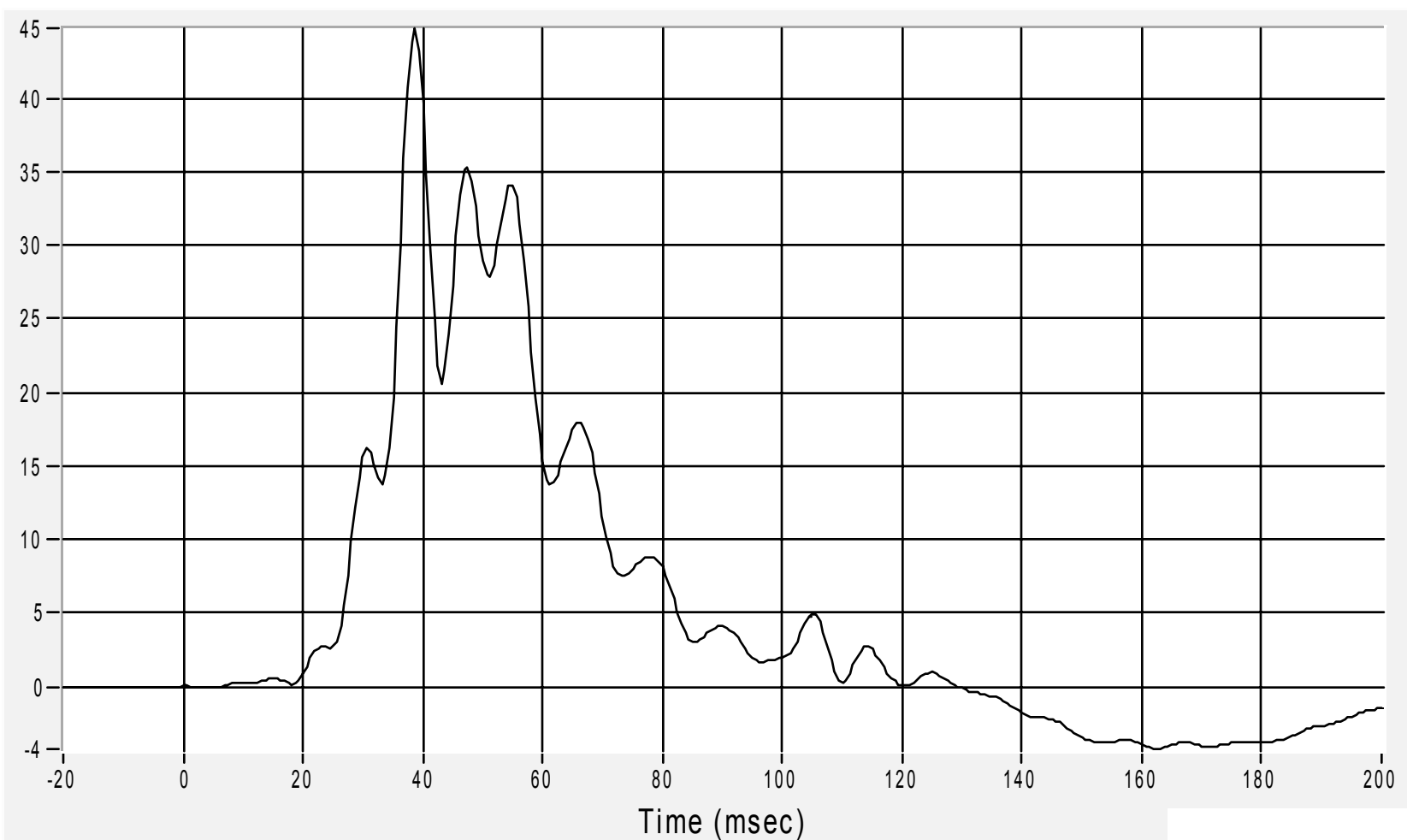
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30 March 2004

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**Passenger Upper Rib (Y) - Redundant Acceleration**

Acceleration (G's)      FIR100

**Max    44.7    G    at    38.8    msec****Min    -4.2    G    at    162.5    msec**

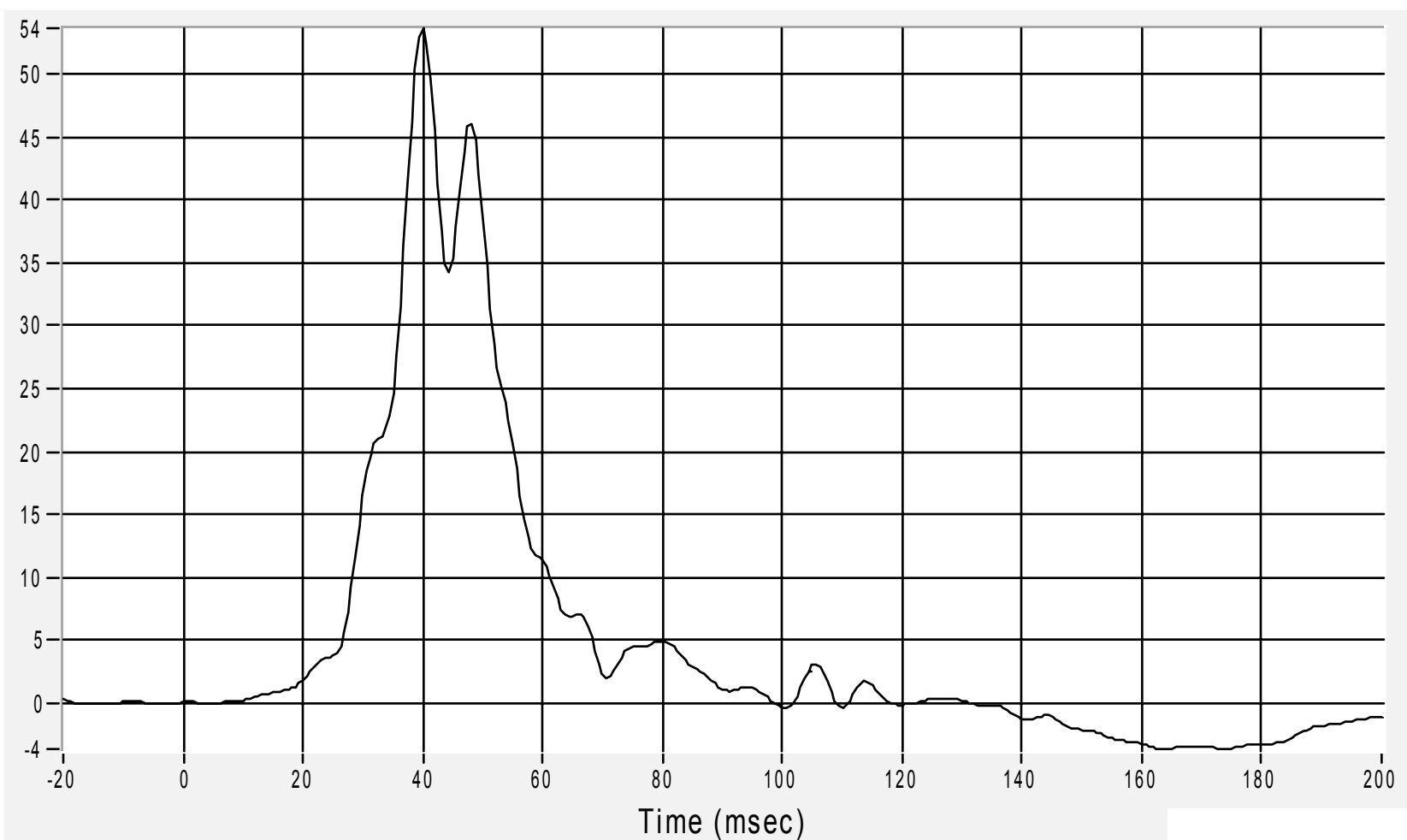
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30 March 2004

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**Passenger Lower Rib (Y) - Redundant Acceleration**

Acceleration (G's)      FIR100

**Max    53.7    G      at    40.0    msec****Min    -3.7    G      at    163.8    msec**

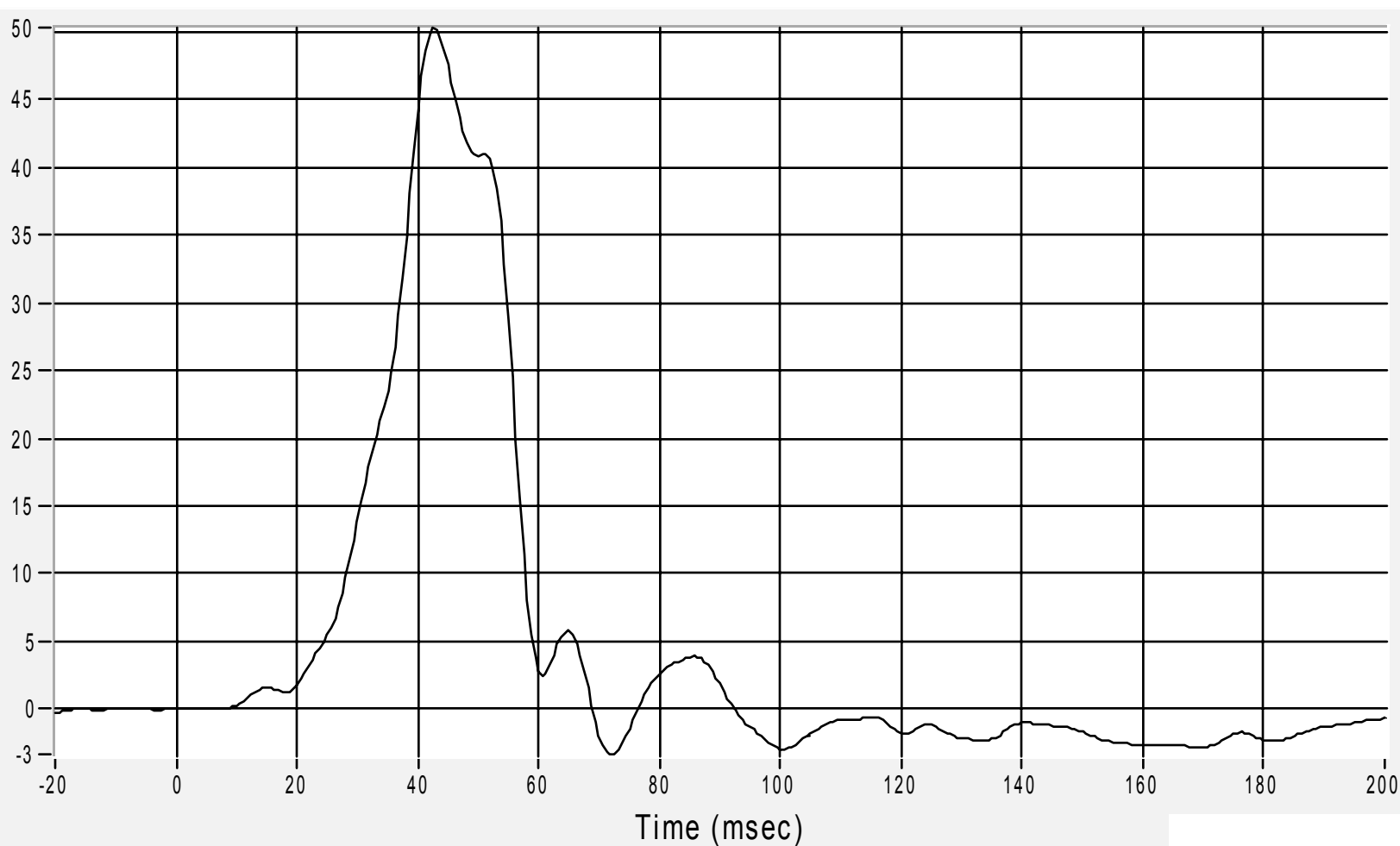
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30 March 2004

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**Passenger Lower Spine (Y) - Redundant Acceleration**

Acceleration (G's)      FIR100

**Max    50.3    G    at    42.5    msec****Min    -3.3    G    at    71.9    msec**

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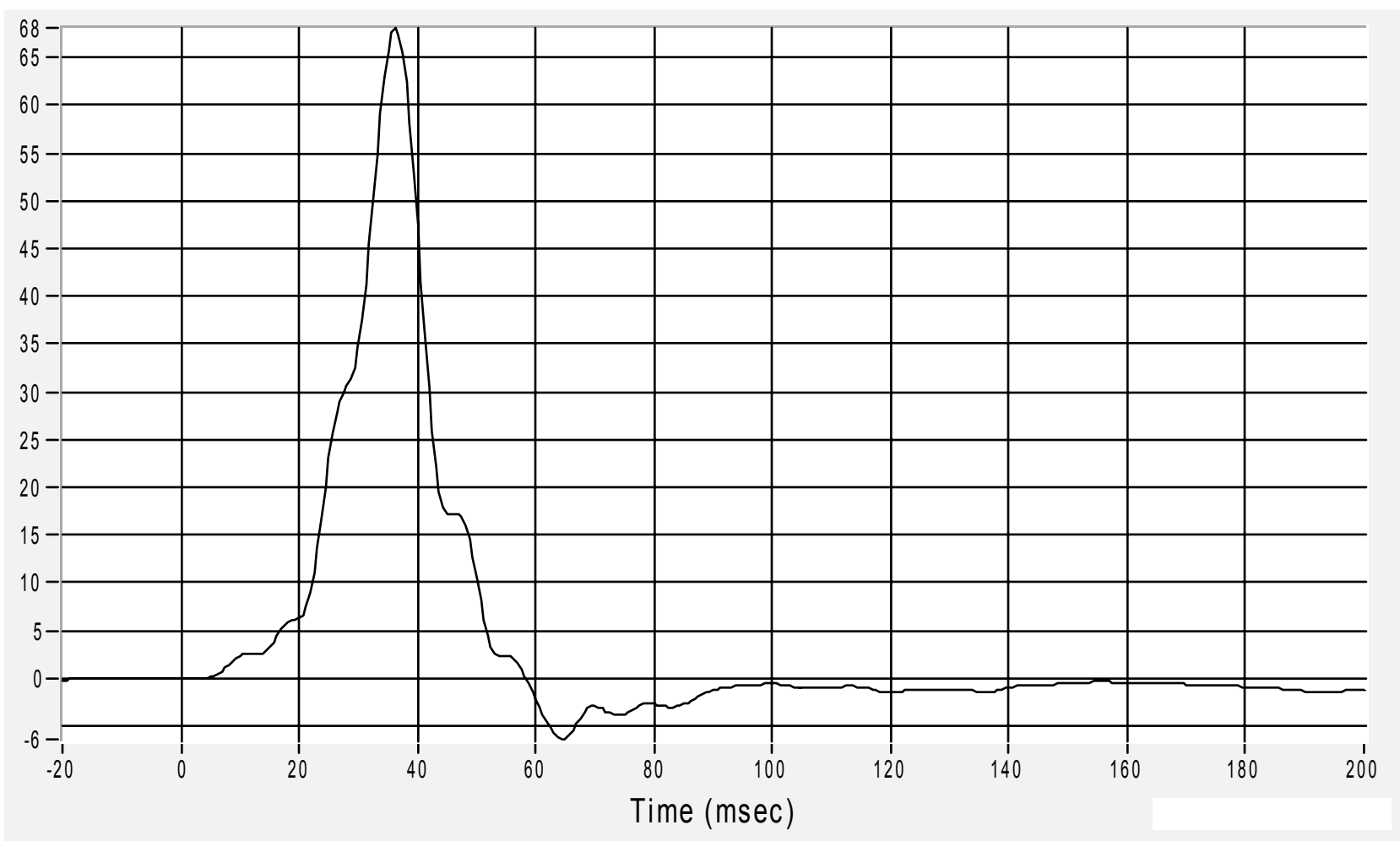
30 March 2004

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**Passenger Pelvic (Y) - Redundant Acceleration**

Acceleration (G's)      FIR100

**Max    68.1    G    at    36.2    msec****Min    -6.4    G    at    64.4    msec**

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30 March 2004

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Vehicle Crashworthiness Lab*

## **APPENDIX C**

### **SID H3 CONFIGURATION AND VERIFICATION RESULTS**

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| DUMMY INSPECTION LIST PRE AND POST TEST             | C-4      |
|                                                     | C-6      |

**VERIFICATION TEST RESULTS SUMMARY  
PRE AND POST TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID Serial Number SID H3 056

Test Sequences 07 and 08

| TEST                         | PRE                   |            | POST                  |            |
|------------------------------|-----------------------|------------|-----------------------|------------|
|                              | COMMENTS              | BY         | COMMENTS              | BY         |
| EXTERNAL DIMENSIONS          | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| THORACIC SHOCK ABSORBER TEST | Pass all requirements | Mark Meyer | N/A                   | N/A        |
| LATERAL THORAX IMPACT TEST   | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| LATERAL PELVIS IMPACT TEST   | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| ABDOMINAL COMPRESSION        | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| LUMBAR FLEXION               | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| HYBRID III LATERAL NECK TEST | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| HYBRID III LATERAL HEAD DROP | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |

SID Serial Number SID H3 058

Test Sequences 07 and 08

| TEST                         | PRE                   |            | POST                  |            |
|------------------------------|-----------------------|------------|-----------------------|------------|
|                              | COMMENTS              | BY         | COMMENTS              | BY         |
| EXTERNAL DIMENSIONS          | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| THORACIC SHOCK ABSORBER TEST | Pass all requirements | Mark Meyer | N/A                   | N/A        |
| LATERAL THORAX IMPACT TEST   | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| LATERAL PELVIS IMPACT TEST   | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| ABDOMINAL COMPRESSION        | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| LUMBAR FLEXION               | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| HYBRID III LATERAL NECK TEST | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |
| HYBRID III LATERAL HEAD DROP | Pass all requirements | Mark Meyer | Pass all requirements | Mark Meyer |

**SUMMARY**  
**SID H3 PRE AND POST VERIFICATION**  
**CONFIGURED FOR LEFT SIDE IMPACT**

SID Serial Number

SID H3 056

Test Sequences

07 and 08

SID H3 058

| TEST PARAMETER                      | SPECIFICATION | SID H3 056 |         | SID H3 058 |         |
|-------------------------------------|---------------|------------|---------|------------|---------|
|                                     |               | PRE        | POST    | PRE        | POST    |
| MEASUREMENTS                        |               |            |         |            |         |
| Date                                | -             | 18Mar04    | 07Apr04 | 18Mar04    | 07Apr04 |
| Sequential Test Number              | -             | 07         | 08      | 07         | 08      |
| Temperature (°C)                    | 18.9-25.5     | 20.7       | 20.0    | 20.4       | 20.5    |
| Relative Humidity (%)               | 10-70         | 28.7       | 28.9    | 28.5       | 28.4    |
| SH – Seated Height (mm)             | 889-909       | 907        | 908     | 909        | 907     |
| RH – Rib Height (mm)                | 501-521       | 512        | 506     | 509        | 506     |
| HP – Hip Pivot Height (mm)          | 99            | 99/99      | 99/99   | 99/99      | 99/99   |
| RD – Rib From Back Line (mm)        | 229-241       | 229        | 229     | 229        | 229     |
| KH – Knee Pivot from Back Line (mm) | 511-526       | 525/517    | 520/525 | 524/522    | 519/520 |
| KV – Knee Pivot to Floor (mm)       | 490-505       | 505/505    | 501/505 | 500/500    | 499/504 |
| HW – Hip Width (mm)                 | 356-391       | 365        | 365     | 366        | 365     |
| THORAX IMPACTS                      |               |            |         |            |         |
| Date                                | -             | 20Mar04    | 07Apr04 | 18Mar04    | 07Apr04 |
| Sequential Test Number              | -             | 07         | 08      | 07         | 08      |
| Temperature (°C)                    | 18.9-25.5     | 20.7       | 20.5    | 22.9       | 20.2    |
| Relative Humidity (%)               | 10-70         | 29.2       | 29.9    | 32.2       | 30.0    |
| Probe Speed (m/s)                   | 4.21-4.33     | 4.28       | 4.27    | 4.30       | 4.30    |
| Upper Rib Acceleration (G)          | 37-46         | 42.7       | 42.0    | 44.6       | 44.4    |
| Lower Rib Acceleration (G)          | 37-46         | 42.1       | 42.7    | 44.1       | 44.5    |
| Lower Spine Acceleration (G)        | 15-22         | 20.2       | 18.9    | 18.7       | 19.6    |
| PELVIS IMPACTS                      |               |            |         |            |         |
| Date                                | -             | 20Mar04    | 07Apr04 | 19Mar04    | 07Apr04 |
| Sequential Test Number              | -             | 07         | 08      | 07         | 08      |
| Temperature (°C)                    | 18.9-25.5     | 21.6       | 20.5    | 21.6       | 20.3    |
| Relative Humidity (%)               | 10-70         | 28.5       | 29.7    | 28.9       | 30.1    |
| Probe Speed (m/s)                   | 4.21-4.33     | 4.27       | 4.27    | 4.28       | 4.27    |
| Pelvis Acceleration (G)             | 40-60         | 46.4       | 45.7    | 44.8       | 43.2    |
| THORACIC SHOCK ABSORBER             |               |            |         |            |         |
| Shock Absorber ID Number            | -             | 1764       | -       | 03130364   | -       |
| Damper Setting                      | 1-10          | 6-1/4      | -       | 5.5        | -       |
| Date                                | -             | 11Feb04    | -       | 11Feb04    | -       |
| Sequential Test Number              | -             | 02         | -       | 02         | -       |
| Temperature                         | 18.9-25.5     | 20.7       | -       | 19.5       | -       |
| Relative Humidity                   | 10-70         | 31.2       | -       | 27.9       | -       |
| Probe Speed (m/s) Low               | 3.05          | 3.05       | -       | 3.05       | -       |
| Force (N)                           | 836 – 1125    | 1020.5     | -       | 846.3      | -       |
| Displacement (mm)                   | 30 – 35       | 31.9       | -       | 32.1       | -       |
| Probe Speed (m/s) Middle            | 4.27          | 4.27       | -       | 4.27       | -       |
| Force (N)                           | 1730 – 2099   | 1785.0     | -       | 1750.5     | -       |
| Displacement (mm)                   | 32 – 37       | 34.7       | -       | 35.8       | -       |
| Probe Speed (m/s) High              | 6.10          | 6.10       | -       | 6.10       | -       |
| Force (N)                           | 3741 – 4448   | 4241.3     | -       | 4052.7     | -       |
| Displacement (mm)                   | 33 - 40       | 37.3       | -       | 37.1       | -       |

| TEST PARAMETER                    | SPECIFICATION | SID H3 056 |         | SID H3 058 |         |
|-----------------------------------|---------------|------------|---------|------------|---------|
|                                   |               | PRE        | POST    | PRE        | POST    |
| ABDOMINAL COMPRESSION             |               |            |         |            |         |
| Date                              | -             | 18Mar04    | 05Apr04 | 17Mar04    | 05Apr04 |
| Sequential Test Number            | -             | 07         | 08      | 07         | 08      |
| Temperature (°C)                  | 18.9-25.5     | 21.0       | 21.0    | 21.9       | 20.7    |
| Relative Humidity (%)             | 10-70         | 31.7       | 28.7    | 32.1       | 28.7    |
| Force at 13 mm (N)                | 104-162       | 123.3      | 124.5   | 131.4      | 130.5   |
| Force at 19 mm (N)                | 163-221       | 181.1      | 174.7   | 179.4      | 179.1   |
| Force at 25 mm (N)                | 222-280       | 252.9      | 233.8   | 233.1      | 234.1   |
| Force at 33 mm (N)                | 325-391       | 366.9      | 329.4   | 327.2      | 326.4   |
| LUMBAR FLEXION                    |               |            |         |            |         |
| Date                              | -             | 17Mar04    | 05Apr04 | 17Mar04    | 05Apr04 |
| Sequential Test Number            | -             | 07         | 08      | 07         | 08      |
| Temperature (°C)                  | 18.9-25.5     | 21.7       | 21.6    | 21.9       | 21.6    |
| Relative Humidity (%)             | 10-70         | 28.3       | 27.5    | 29.9       | 27.3    |
| Force at 0° (N)                   | 0-26.7        | 4.6        | 0       | 3.7        | 0       |
| Force at 0° (N)                   | 97.8-151.2    | 114.5      | 129.2   | 104.5      | 106.3   |
| Force at 0° (N)                   | 151.2-204.6   | 169.5      | 156.2   | 152.1      | 154.0   |
| Force at 0° (N)                   | 204.6-258     | 222.6      | 208.0   | 214.4      | 225.6   |
| Return Angle                      | 12° Maximum   | 4.3        | 1.7     | 5.4        | 5.0     |
| HYBRID III LATERAL NECK           |               |            |         |            |         |
| Date                              | -             | 23Feb04    | 06Apr04 | 24Feb04    | 06Apr04 |
| Sequential Test Number            | -             | 07         | 08      | 07         | 08      |
| Temperature (°C)                  | 18.9-25.5     | 21.3       | 20.0    | 21.0       | 19.7    |
| Relative Humidity (%)             | 10-70         | 32.1       | 30.7    | 32.3       | 29.3    |
| Pendulum Speed (m/s)              | 6.89-7.13     | 7.11       | 7.13    | 7.09       | 7.11    |
| Pendulum Pulse 10ms (m/s)         | 1.96-2.55     | 2.07       | 2.02    | 2.19       | 2.16    |
| Pendulum Pulse 20ms (m/s)         | 4.12-5.10     | 4.24       | 4.45    | 4.35       | 4.61    |
| Pendulum Pulse 30ms (m/s)         | 5.73-7.01     | 6.68       | 6.96    | 6.66       | 6.85    |
| Pendulum Pulse 40 –70 ms (m/s)    | 6.27-7.64     | 7.01       | 6.90    | 6.93       | 6.86    |
| Max Head rotation (deg)           | 66-82         | 74.6       | 76.7    | 77.3       | 81.1    |
| Head angle crosses zero (ms)      | 58-67         | 64.0       | 66.2    | 61.0       | 59.1    |
| Peak Moment (Nm)                  | 73-88         | 82.6       | 74.5    | 81.7       | 84.3    |
| Moment crosses zero (ms)          | 49-64         | 51.8       | 49.2    | 49.8       | 49.1    |
| Max rotation wrt peak moment (ms) | 2-15          | 5.0        | 7.6     | 4.8        | 7.0     |
| HYBRID III LATERAL HEAD DROP      |               |            |         |            |         |
| Date                              | -             | 23Feb04    | 04Apr04 | 23Feb04    | 04Apr04 |
| Sequential Test Number            | -             | 07         | 08      | 07         | 08      |
| Temperature (°C)                  | 18.9-25.5     | 20.9       | 20.7    | 21.3       | 20.3    |
| Relative Humidity (%)             | 10-70         | 32.2       | 25.0    | 32.1       | 25.6    |
| Resultant Max (G)                 | 120-150       | 134.0      | 133.1   | 128.6      | 130.7   |
| Longitudinal Max (G)              | <15           | 6.1        | 5.1     | 10.4       | 14.1    |



**DUMMY INSPECTION LIST  
PRE AND POST TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID Serial Number

SID H3 056

Test Sequences

07 and 08

SID H3 058

|                 |                                                      | SID H3 056 |            | SID H3 058 |            |
|-----------------|------------------------------------------------------|------------|------------|------------|------------|
|                 |                                                      | PRE        | POST       | PRE        | POST       |
|                 | Date                                                 | 29Mar04    | 07Apr04    | 29Mar04    | 07Apr04    |
|                 | Performed By                                         | Mark Meyer | Mark Meyer | Mark Meyer | Mark Meyer |
| PART            | INSPECTION                                           | Pass       | Pass       | Pass       | Pass       |
| Skin            | Visual                                               | Pass       | Pass       | Pass       | Pass       |
| Head            | Visual, Ballast,<br>Accelerometer Mount              | Pass       | Pass       | Pass       | Pass       |
| Neck            | Visual and Palpated,<br>Cable Torque                 | Pass       | Pass       | Pass       | Pass       |
| Spine Box       | Visual, Ballast,<br>Weldment,<br>Accelerometer Mount | Pass       | Pass       | Pass       | Pass       |
| Rib Cage        | Visual, Palpated,<br>Measured, Stiffness             | Pass       | Pass       | Pass       | Pass       |
| Sternum         | Visual                                               | Pass       | Pass       | Pass       | Pass       |
| Lumbar<br>Spine | Visual                                               | Pass       | Pass       | Pass       | Pass       |
| Abdomen         | Visual                                               | Pass       | Pass       | Pass       | Pass       |
| Pelvis          | Visual, Palpated,<br>Accelerometer Mount             | Pass       | Pass       | Pass       | Pass       |
| Upper<br>Legs   | Visual                                               | Pass       | Pass       | Pass       | Pass       |
| Knees           | Visual, Stops, Inserts                               | Pass       | Pass       | Pass       | Pass       |
| Lower<br>Legs   | Visual, Range of Motion                              | Pass       | Pass       | Pass       | Pass       |
| Ankles          | Visual, Range of Motion                              | Pass       | Pass       | Pass       | Pass       |
| Feet            | Visual, Range of Motion                              | Pass       | Pass       | Pass       | Pass       |
| Joints          | 1 to 2 G Range                                       | Pass       | Pass       | Pass       | Pass       |
| Other           |                                                      | None       | None       | None       | None       |

**APPENDIX D**

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

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**SID INSTRUMENTATION****FRONT SID H3 NO. 056**

|                                                              | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
|--------------------------------------------------------------|---------------|--------------|------------------|
| HEAD X ACCELERATION                                          | J21551        | ENDEVCO      | 20Aug03          |
| HEAD Y ACCELERATION                                          | J36659        | ENDEVCO      | 29May03          |
| HEAD Z ACCELERATION                                          | J21466        | ENDEVCO      | 29May03          |
| SIX AXIS UPPER NECK<br>LOAD CELL (FX, FY, FZ, MX,<br>MY, MZ) | 1591          | DENTON ATD   | 7Apr03           |
| UPPER RIB ACCELERATION                                       | J43512        | ENDEVCO      | 22Aug03          |
| LOWER RIB<br>ACCELERATION                                    | J43444        | ENDEVCO      | 22Aug03          |
| LOWER SPINE<br>ACCELERATION                                  | J32665        | ENDEVCO      | 07Aug03          |
| PELVIS ACCELERATION                                          | J43429        | ENDEVCO      | 22Aug03          |
| UPPER RIB REDUNDANT<br>ACCELERATION                          | J43480        | ENDEVCO      | 22Aug03          |
| LOWER RIB REDUNDANT<br>ACCELERATION                          | J43445        | ENDEVCO      | 22Aug03          |
| LOWER SPINE REDUNDANT<br>ACCELERATION                        | J36603        | ENDEVCO      | 07Aug03          |
| PELVIS REDUNDANT<br>ACCELERATION                             | J36617        | ENDEVCO      | 07Aug03          |

**REAR SID H3 NO. 058**

|                                                              | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
|--------------------------------------------------------------|---------------|--------------|------------------|
| HEAD X ACCELERATION                                          | P24628        | ENDEVCO      | 08Sep03          |
| HEAD Y ACCELERATION                                          | P21689        | ENDEVCO      | 20Aug03          |
| HEAD Z ACCELERATION                                          | P22311        | ENDEVCO      | 08Sep03          |
| SIX AXIS UPPER NECK<br>LOAD CELL (FX, FY, FZ, MX,<br>MY, MZ) | 0452          | DENTON       | 02Sep03          |
| UPPER RIB ACCELERATION                                       | J43513        | ENDEVCO      | 22Aug03          |
| LOWER RIB<br>ACCELERATION                                    | J43481        | ENDEVCO      | 22Aug03          |
| LOWER SPINE<br>ACCELERATION                                  | J44021        | ENDEVCO      | 29Jan04          |
| PELVIS ACCELERATION                                          | P13869        | ENDEVCO      | 13Feb04          |
| UPPER RIB REDUNDANT<br>ACCELERATION                          | J43479        | ENDEVCO      | 22Aug03          |
| LOWER RIB REDUNDANT<br>ACCELERATION                          | J43475        | ENDEVCO      | 22Aug03          |
| LOWER SPINE REDUNDANT<br>ACCELERATION                        | J44018        | ENDEVCO      | 29Jan04          |
| PELVIS REDUNDANT<br>ACCELERATION                             | P23025        | ENDEVCO      | 13Feb04          |

**VEHICLE INSTRUMENTATION**

|                               | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
|-------------------------------|---------------|--------------|------------------|
| RIGHT FRONT SILL X            | P22350        | ENDEVCO      | 07Aug03          |
| RIGHT FRONT SILL Y            | P22978        | ENDEVCO      | 19Apr03          |
| RIGHT FRONT SILL Z            | P22312        | ENDEVCO      | 27May03          |
| RIGHT REAR SILL X             | P21605        | ENDEVCO      | 05Sep03          |
| RIGHT REAR SILL Y             | P14135        | ENDEVCO      | 08Sep03          |
| RIGHT REAR SILL Z             | P21575        | ENDEVCO      | 08Sep03          |
| REAR FLOORPAN ABOVE AXLE X    | 98G98E11-K02  | ENTRAN       | 08Sep03          |
| REAR FLOORPAN ABOVE AXLE Y    | 98B98A26-D05  | ENTRAN       | 29May03          |
| REAR FLOORPAN ABOVE AXLE Z    | 98G98D22-Z04  | ENTRAN       | 23May03          |
| LEFT REAR SILL Y              | P18111        | ENDEVCO      | 08Sep03          |
| LEFT FRONT SILL Y             | P23582        | ENDEVCO      | 13Feb04          |
| LEFT FRONT DOOR CENTERLINE Y  | 04A04A05-A14  | ENTRAN       | 29Jan04          |
| RIGHT REAR OCCUPANT COMP Y    | P21708        | ENDEVCO      | 20Aug03          |
| MID-REAR OF LEFT FRONT DOOR Y | 04A04A07-J13  | ENTRAN       | 29Jan04          |
| LEFT FRONT DOOR UPPER C/L Y   | 04A04A12-Z10  | ENTRAN       | 29Jan04          |
| MID-REAR OF LEFT REAR DOOR Y  | N/A           | N/A          | N/A              |
| LEFT REAR DOOR UPPER C/L Y    | N/A           | N/A          | N/A              |
| LEFT LOWER B-PILLAR Y         | P22366        | ENDEVCO      | 13Feb04          |
| LEFT MIDDLE B-PILLAR Y        | P22951        | ENDEVCO      | 13Feb04          |
| LEFT LOWER A-PILLAR Y         | 04A04A06-A06  | ENTRAN       | 29Jan04          |
| LEFT UPPER A-PILLAR           | 98F98C27-B04  | ENTRAN       | 18Aug03          |
| FRONT SEAT TRACK Y            | N/A           | N/A          | N/A              |
| REAR SEAT TRACK Y             | P22322        | ENDEVCO      | 05Sep03          |
| VEHICLE CG X                  | P21788        | ENDEVCO      | 08Sep03          |
| VEHICLE CG Y                  | P19387        | ENDEVCO      | 05Sep03          |
| VEHICLE CG Z                  | P21617        | ENDEVCO      | 08Sep03          |

**MDB INSTRUMENTATION**

|                         |        |         |         |
|-------------------------|--------|---------|---------|
| MDB CG X                | P24089 | ENDEVCO | 05Sep03 |
| MDB CG Y                | P24733 | ENDEVCO | 03Sep03 |
| MDB CG Z                | P23595 | ENDEVCO | 29May03 |
| MDB REAR FRAME MEMBER X | P13842 | ENDEVCO | 19Mar03 |
| MDB REAR FRAME MEMBER Y | J43479 | ENDEVCO | 22Aug03 |