

REPORT NO. MCW-DOT-02SN02

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TESTING**

NISSAN MOTOR CORPORATION
2002 NISSAN ALTIMA 4-DOOR SEDAN

NHTSA NUMBER: M2 5205

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



20 December 2001

FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Performance Standards
Office of Crashworthiness Standards
Mail Code: NPS-10
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Washington, DC 20590

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Acceptance Date:

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16. Abstract A 55/28 km/h 90° Impact Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2002 Nissan Altima 4 Door Sedan 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 20 December 2001. The impact velocity of the Moving Deformable Barrier (MDB) was 61.7 km/h, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 21° C. The target vehicle post-test maximum crush was 431 mm at Level 2. The test vehicle's performance follows: <table border="1"> <thead> <tr> <th></th><th><u>DRIVER</u></th><th><u>PASSENGER</u></th></tr> </thead> <tbody> <tr> <td>Left Upper Rib Acceleration G</td><td>72.2</td><td>71.6</td></tr> <tr> <td>Left Lower Rib Acceleration G</td><td>65.7</td><td>78.3</td></tr> <tr> <td>Lower Spine Acceleration G</td><td>99.8</td><td>65.6</td></tr> <tr> <td>Thoracic Trauma Index TTI</td><td>86</td><td>72</td></tr> <tr> <td>Pelvis Acceleration G</td><td>114</td><td>96</td></tr> </tbody> </table> 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.					<u>DRIVER</u>	<u>PASSENGER</u>	Left Upper Rib Acceleration G	72.2	71.6	Left Lower Rib Acceleration G	65.7	78.3	Lower Spine Acceleration G	99.8	65.6	Thoracic Trauma Index TTI	86	72	Pelvis Acceleration G	114	96
	<u>DRIVER</u>	<u>PASSENGER</u>																			
Left Upper Rib Acceleration G	72.2	71.6																			
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17. Key Words New Car Assessment Program (NCAP) Side Impact MDB Side Impact Dummy (SID) NHTSA No. M2 5205		18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Reference Division, Room 5108(NAD-52) 400 Seventh Street, S.W. Washington, D.C. 20590																			
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SECTION 1

PURPOSE AND TEST PROCEDURE

This side impact test was part of the FY02 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 2002 Nissan Altima 4-Door Sedan. This side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated May 1999.

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 2002 Nissan Altima 4-Door Sedan 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 61.7 km/h (38.3 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 20 December 2001. Pre and post-test photographs of the test vehicle, the MDB, and the side impact dummies (SIDs) are included in Appendix A.

Two restrained Side Impact Dummies (SIDs) were placed in the driver and left rear designated seating positions, according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated May 1999. The side impact event was documented by nine high-speed cameras, one real-time camera, and one high-speed video camera. Camera locations and other pertinent camera information can be found in this report.

The SIDs were instrumented with the following accelerometers.

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

Appendix B contains the vehicle, MDB, and dummy response data traces. A summary of the side impact dummy (SID) 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	Rear SID
TTI (G)	86	72
PELVIS (G)	114	96
HIC36	517	710

SECTION 3
SUMMARY OF TEST RESULTS

DATA SHEET NO. 1

GENERAL VEHICLE TEST PARAMETER DATA

TEST VEHICLE INFORMATION

Year/ Make/ Model/ Body Style		<u>2002 Nissan Altima 4-Door Sedan</u>			
Vehicle NHTSA NO.		<u>M2 5205</u>	VIN	<u>1N4AL11D82C125273</u>	
Vehicle Body Color		<u>Black</u>	Build Date	<u>Nov-01</u>	
Engine Data	<u>4</u> Cylinders	<u>CID</u>	<u>2.5</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>83</u>	Date	<u>12-Dec-01</u>		
Options	<u>A/C</u>	<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		

DATA FROM TIRE PLACARD:

Tire Pressure (at Capacity)	<u>29</u> PSI Front
	<u>29</u> PSI Rear
Recommended Tire Size	<u>P205/65 R16 94T</u>
Tires on Test Vehicle	<u>P205/65 R16 94T CT95</u> Manufacturer <u>Contitouring</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	None	None	None
Left Rear Passenger	None	None	None	None

VEHICLE CAPACITY DATA:

Number of Occupants:	<u>2</u> Front	<u>3</u> Rear	<u>3rd</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>Knob</u>
Vehicle Max Capacity Loading	<u>390.1</u> kg		(A)	
No. of Occupants X 68.04 kg	<u>340.2</u> kg		(B)	
Cargo Capacity (A) – (B)	<u>49.9</u> kg			

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

Left Front	=	<u>433.2</u> kg	Left Rear	=	<u>273.1</u> kg
Right Front	=	<u>427.3</u> kg	Right Rear	=	<u>264.9</u> kg
TOTAL FRONT	=	<u>860.5</u> kg	TOTAL REAR	=	<u>538</u> kg
% Total Weight	=	<u>61.5</u> %	%Total Weight	=	<u>38.5</u> %
TOTAL WEIGHT	=	<u>1398.5</u> kg			

DATA SHEET 1 (continued)**GENERAL VEHICLE TEST PARAMETER DATA**Vehicle: 2002 Nissan AltimaNHTSA No. M2 5205**CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:**

Total Test Vehicle Delivered Weight with Max Fluids	=	<u>1398.5</u>	kg	(A)
Maximum Cargo Carrying Capacity of Test Vehicle	=	<u>49.8</u>	kg	(B)
Weight of (2) instrumented Side Impact Dummies	=	<u>157.5</u>	kg	(C)
TEST VEHICLE TARGET WEIGHT	=	<u>1605.8</u>	kg	(A+B+C)

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

Left Front	=	<u>477.6</u>	kg	Left Rear	=	<u>371.1</u>	kg
Right Front	=	<u>432.7</u>	kg	Right Rear	=	<u>324.4</u>	kg
TOTAL FRONT	=	<u>910.3</u>	kg	TOTAL REAR	=	<u>695.5</u>	kg
% Total Weight	=	<u>56.7</u>	%	%Total Weight	=	<u>43.3</u>	%
TOTAL WEIGHT	=	<u>1605.8</u>	kg				

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

Left Front	=	<u>474.5</u>	kg	Left Rear	=	<u>367.4</u>	kg
Right Front	=	<u>432.7</u>	kg	Right Rear	=	<u>323.9</u>	kg
TOTAL FRONT	=	<u>907.2</u>	kg	TOTAL REAR	=	<u>691.3</u>	kg
% Total Weight	=	<u>56.8</u>	%	%Total Weight	=	<u>43.2</u>	%
TOTAL WEIGHT	=	<u>1598.5</u>	kg				

TEST VEHICLE ATTITUDE (all dimensions in millimeters):**AS DELIVERED**

Left Front	<u>752</u>	Right Front	<u>762</u>	Left Rear	<u>730</u>	Right Rear	<u>739</u>
------------	------------	-------------	------------	-----------	------------	------------	------------

FULLY LOADED

Left Front	<u>736</u>	Right Front	<u>698</u>	Left Rear	<u>718</u>	Right Rear	<u>756</u>
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AS TESTED

Left Front	<u>740</u>	Right Front	<u>699</u>	Left Rear	<u>718</u>	Right Rear	<u>758</u>
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Test Vehicle Wheelbase 2799 mmAs Tested CG = 1590 mm rearward of front wheel centerline**TOTAL VEHICLE LENGTH:**

Right Side	=	<u>4550</u>	mm
Left Side	=	<u>4550</u>	mm
Centerline	=	<u>4861</u>	mm

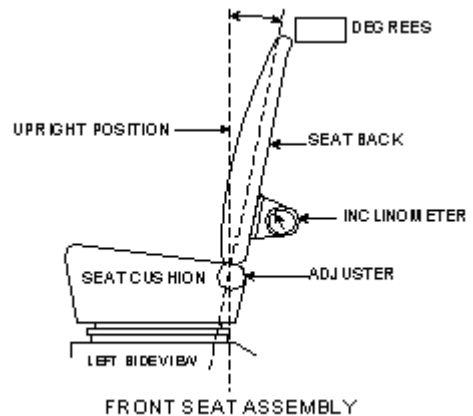
DATA SHEET 1 (continued)

GENERAL TEST VEHICLE PARAMETER DATA

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

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>236 mm</u>
Total Number of Detents	<u>None (power seat)</u>	Test Position	<u>118 mm</u>

FRONT SEAT BACK ADJUSTMENT:

Seat Back Angle	<u>21 degrees. Head rest post was measured at 10.5 degrees</u>
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SECOND POSITION SEAT:

Total Length Fore/Aft Adjustment	<u>236 mm</u>
Seat Back Adjustment Position	<u>21 degrees</u>

ADJUSTABLE STEERING COLUMN POSITION:

Adjusted to mid position. Steering column measured at 25.5 degrees.

WINDOW POSITIONS:

Left Front	<u>Up</u>	Right Front	<u>Down</u>
Left Rear	<u>Up</u>	Right Rear	<u>Down</u>

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

Fuel System usable capacity	<u>75.0 L</u>	
Test Volume	<u>69.7 L</u>	<u>92.9% usable capacity</u>

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

Wheelbase	<u>2799 mm</u>	
Impact Point is	<u>460 mm rearward</u>	of front axle centerline
Actual Impact Point is	<u>458 mm rearward</u>	of front axle centerline

DATA SHEET 2
TEST VEHICLE SUMMARY

VEHICLE IDENTIFICATION:

Year/Make/Model/Body Style	2002 Nissan Altima 4-Door Sedan		
Body Color	Black	VIN	1N4AL11D82C125273
NHTSA No.	M2 5205	Test Date	20 December 2001
Overall Length	4861 mm	Overall Width	1780 mm

VEHICLE TEST WEIGHT (Pre-Test):

Left Front	=	474	kg	Left Rear	=	370	kg
Right Front	=	433	kg	Right Rear	=	324	kg
TOTAL FRONT	=	907	kg	TOTAL REAR	=	694	kg
% Total Weight	=	56.7	%	%Total Weight	=	43.3	%
TOTAL WEIGHT	=	1598	kg				
Wheelbase				=		2799	mm
Longitudinal CG from Center of Front Axle				=		1590	mm
Impact Angle with Respect to Impactor				=		90	degrees

ACTUAL IMPACT POINT

Actual Impact Point is 2 mm forward of nominal impact reference line (lateral)

Actual Impact Point is 9 mm downward of nominal impact line (vertical)

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1	(206 mm above ground)	=	280	mm
2. LEVEL 2	(491 mm above ground)	=	431	mm
3. LEVEL 3	(596 mm above ground)	=	385	mm
4. LEVEL 4	(930 mm above ground)	=	308	mm
5. LEVEL 5	(1933 mm above ground)	=	143	mm

Maximum Post-Test intrusion at Level 2 is 431 mm

OCCUPANTS

	<u>Left Front Passenger</u>	<u>Left Rear Passenger</u>
Dummy Identification	056	058
Restraints Used	3 point belt	3 point belt

INSTRUMENTATION:

Number of Vehicle Data Channels		23
Number of Cameras	Onboard	3
	Off board	5
	MDB	2
	TOTAL	10

DATA SHEET NO. 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

MDB FACE MANUFACTURER AND SERIAL NUMBER:

Plascore Serial Number 018 1200 159C 1000

POSITION OF IMPACT (MDB) ON TOW SYSTEM

Crabbed 27 degrees to the left

MDB DETAILS:

Overall Width of Framework Carriage	=	<u>1250 mm</u>
Overall Length of MDB (incl. honeycomb impact face)	=	<u>4116 mm</u>
Wheelbase of Framework Carriage	=	<u>2578 mm</u>
Tread of Framework Carriage (Front & Rear)	=	<u>1880 mm</u>
C.G. Location Rearward of Front Axle	=	<u>1109.3 mm</u>
C.G. Location From Center Line	=	<u>-1.9 mm</u>
C.G. Location Above Ground Level	=	<u>477.2 mm</u>

MDB WEIGHT:

Left Front	=	<u>495.2</u>	kg	Left Rear	=	<u>184.8</u>	kg
Right Front	=	<u>278</u>	kg	Right Rear	=	<u>399.2</u>	kg
TOTAL FRONT	=	<u>773.2</u>	kg	TOTAL REAR	=	<u>584</u>	kg
% Total Weight	=	<u>57.0</u>	%	%Total Weight	=	<u>43.0</u>	%
TOTAL WEIGHT	=	<u>1357.2</u>	kg				

MDB IMPACT:

Impact Angle (MDB C/L to Target Vehicle)		<u>90 degrees</u>	
Impact Speed	Primary	<u>61.7 km/h</u>	<u>38.3 mph</u>
	Secondary	<u>No valid data collected</u>	<u>No valid data collected</u>
	Radar	<u>No valid data collected</u>	<u>No valid data collected</u>
	On-Board	<u>61.8 km/h</u>	<u>38.4 mph</u>

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A Center of Bumper	=	<u>90</u>	mm
2. Row B Top of Bumper	=	<u>59</u>	mm
3. Row C Mid-Level	=	<u>99</u>	mm
4. Row D Top of Stack	=	<u>166</u>	mm

INSTRUMENTATION:

Number of MDB Data Channels = 5

DATA SHEET NO. 4**POST-TEST OBSERVATIONS**Vehicle: 2002 Nissan AltimaNHTSA No. M2 5205**VISIBLE DUMMY CONTACT POINTS:****LEFT FRONT SID**

Head	<u>No visible contact</u>
Upper Torso	<u>Left front door window sill</u>
Lower Torso	<u>Left front door above arm rest</u>
Left Knee	<u>Left lower front door panel</u>
Right Knee	<u>Left knee</u>

LEFT REAR SID

<u>Face to window sill, top of head to side header, back of head to seat rest</u>
<u>Upper rear door and upper side of seat back</u>
<u>Middle of left rear door and arm rest</u>
<u>Middle of left rear door panel</u>
<u>Left Knee</u>

DOOR OPENING:**LEFT DOOR**

Front	<u>Closed/ Inoperable</u>
Rear	<u>Closed/ Inoperable</u>

RIGHT DOOR

<u>Closed/ Operable</u>
<u>Closed/ Operable</u>

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal	<u>9 mm below</u>	Vertical	<u>2 mm forward</u>
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ARM REST LOCATIONS:

Front	<u>245mm below window opening</u>
Rear	<u>295mm below window opening</u>

SEAT MOVEMENT:

Front	<u>Seat was crushed approximately 85 mm.</u>
Rear	<u>Seat was crushed approximately 170 mm.</u>

GLAZING DAMAGE

Windshield	<u>Windshield cracked on driver's side near A-Pillar.</u>
Window	<u>The front and rear windows on the struck side of the vehicle shattered on impact.</u>

PILLAR PERFORMANCE:

<u>None noted</u>

SILL SEPARATION

<u>None noted</u>

AIRBAG DEPLOYMENT STATUS:

	DRIVER	FRONT PASSENGER	REAR PASSENGER
FRONT	Did not deploy	Did not deploy	-
SIDE	None	None	None

OTHER NOTABLE IMPACT EFFECTS:

<u>None</u>

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET 5

SID INSTRUMENTATION DATA

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

	Front Dummy ID 056 Accelerations				Rear Dummy ID 058 Accelerations			
	Max		Min		Max		Min	
	G's	msec	G's	msec	G's	msec	G's	msec
HEAD ACCELERATIONS								
Longitudinal (X)	12.1	167.4	-27.6	71.0	28.0	126.4	-60.6	89.8
Lateral (Y)	54.7	47	-15.5	56.6	119	89.8	-100.2	125.5
Vertical (Z)	69.5	52.3	-9.5	43.8	70.6	78.0	-35.6	89.4
Resultant (R)	72.2	51.8	-	-	144.2	89.8	-	-
HIC36	516.7		-	-	710.1		-	-
RIB ACCELERATIONS								
Upper Rib Lateral (Y)	72.2	34.4	-35.2	151.9	71.6	45.0	-11.0	97.5
Upper Rib Lateral (Y _R)	68.2	34.4	-24.9	70.6	71.1	45.0	-11.4	97.5
Lower Rib Lateral (Y)	65.7	34.4	-124.6	153.1	78.3	43.8	-27.4	77.5
Lower Rib Lateral (Y _R)	65.2	34.4	-19.7	71.2	77.9	43.8	-27.2	77.5
SPINE ACCELERATIONS								
Lower Lateral (Y)	99.8	33.8	-13.5	75.0	65.6	43.1	-30.9	72.5
Lower Lateral (Y _R)	98.7	33.8	-13.5	75.0	64.6	43.1	-31.4	71.9
PELVIS ACCELERATIONS								
Lateral (Y)	114.0	30.6	-13.7	53.8	96.2	34.4	-17.1	69.4
Lateral (Y _R)	116.5	30.6	-14.2	53.8	95.4	34.4	-16.7	69.4

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

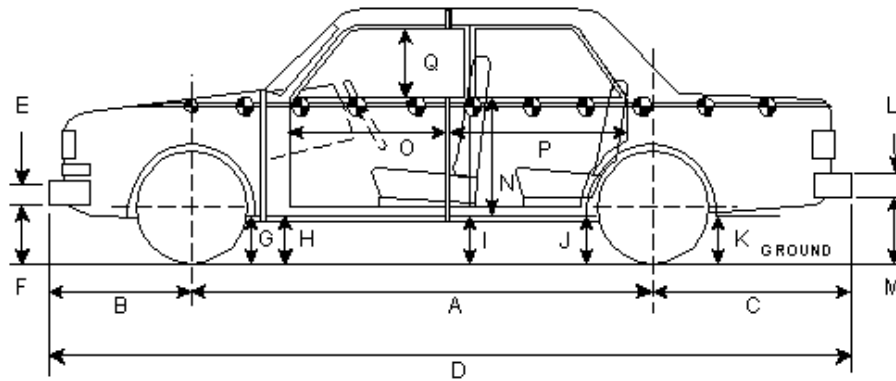
Y_R denotes redundant Y-direction accelerometer

DATA SHEET 6

VEHICLE PRE- AND POST- MEASUREMENTS

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205



LEFT SIDE VIEW

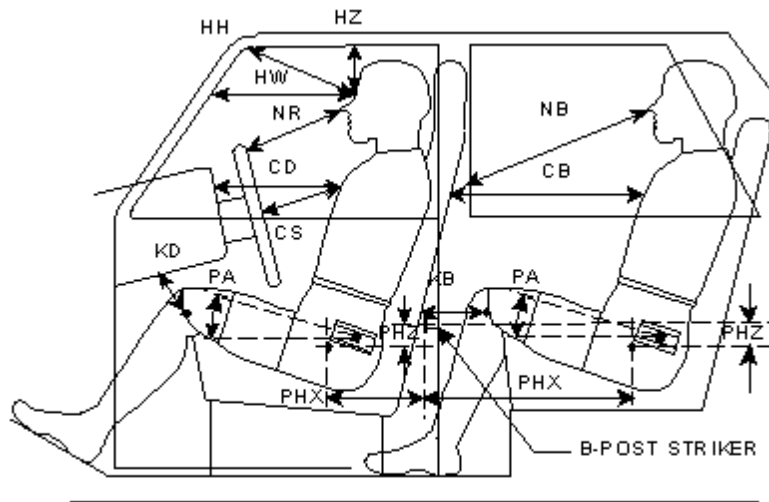
	PRE-TEST As delivered (mm)	PRE-TEST As Tested (mm)	POST-TEST (mm)	Δ CHANGE (mm)
A	2799	-	2739	-60
B	794	-	786	-8
C	957	-	960	3
D	4861	-	4832	-29
E	284	-	283	-1
F	237	236	241	5
G	190	174	185	11
H	196	180	195	15
I	209	190	263	73
J1	201	175	189	14
J2	195	168	65	-103
K	239	205	205	0
L	308	-	308	0
M	313	273	270	-3
N	685	-	585	-100
O	1138	-	1058	-80
P	1036	-	903	-133
Q	465	-	441	-24
R	4550	-	4556	6
S	4550	-	4485	-65
T	1780	-	1431	-349

DATA SHEET 7

SID LONGITUDINAL CLEARANCE DIMENSIONS

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205



LEFT SIDE VIEW

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

	DRIVER ID# 056	LEFT REAR PASSENGER ID# 058
HH	356	-
HW	670	-
HZ	151	-
NR/NB	446	670
CD/CB	578	584
CS	325	-
KDL(KDA°)/KBL(KDA°)	176 / 13.0 degrees	252 / 37.5 degrees
KDR(KDA°)/KBR(KDA°)	139 / 25 degrees	263 / 31.0 degrees
PA°	23.2 degrees	23.3 degrees
PHX	201	310
PHZ	134	326

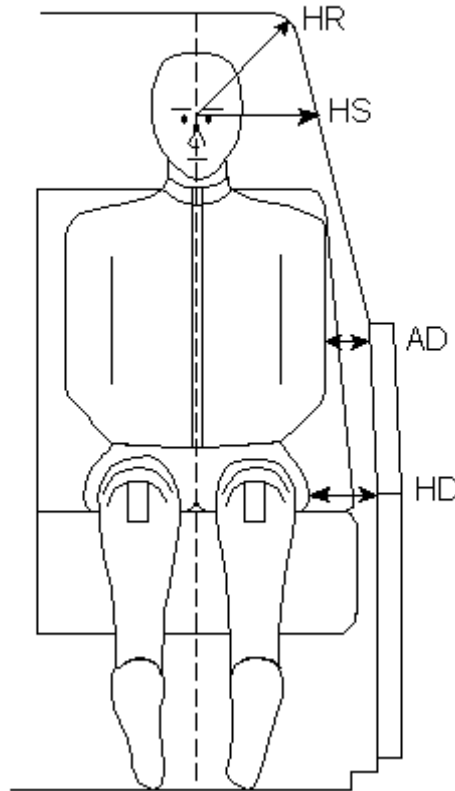
Note: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-Pillar striker as a reference point

DATASHEET 8

SID LATERAL CLEARANCE DIMENSIONS

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205



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

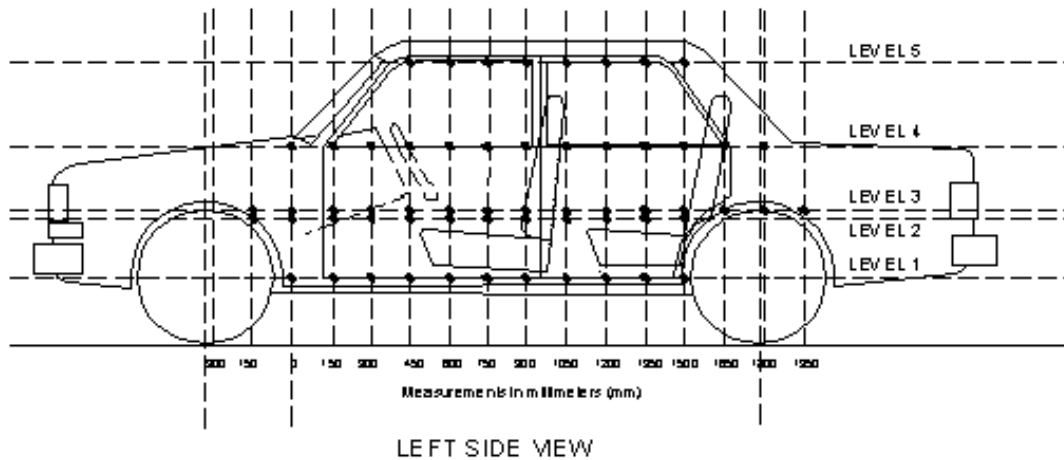
	DRIVER ID# 056		LEFT REAR PASSENGER ID# 058	
HR	194		213	
HS	309		342	
AD	Upper 110	Lower 129	Upper 152	Lower 169
HD	150		225	

DATA SHEET 9

VEHICLE SIDE MEASUREMENTS

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205



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	1933 mm
Level 4 @ Window Sill	930 mm
Level 3 @ Mid-Door	596 mm
Level 2 @ Occupant H-Point	491 mm
Level 1 @ Axle Centerline or Sill Top Height	206 mm

DATA SHEET 10

VEHICLE EXTERIOR CRUSH PROFILES – ALL LEVELS

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

Note: All Dimensions are in millimeters with a tolerance of ± 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	206	PRE							225	227	227	226	225	224	224	223	223	222	222	223	226	227								
		POST							279	300	321	336	372	399	425	458	503	489	414	356	305	259								
		CRUSH							54	73	94	110	147	175	201	235	280	267	192	133	79	32								
LEVEL 2	491	PRE	215						174	174	173	173	173	173	173	174	174	175	176	176	176	176						190	212	228
		POST	225						210	385	448	485	508	540	566	597	605	598	581	554	485	385						213	230	242
		CRUSH	10						36	211	275	312	335	367	393	423	431	423	405	378	309	209						23	18	14
LEVEL 3	596	PRE	215					160	170	170	170	170	170	170	170	170	170	170	175	175	175	170					175	199	212	228
		POST	231					206	211	375	418	455	475	485	506	535	555	538	535	515	476	398	242				205	223	230	243
		CRUSH	16					46	41	205	248	285	305	315	336	365	385	368	365	340	301	223	72				30	24	18	15
LEVEL 4	930	PRE	321	300	285	275	270	265	262	260	258	255	254	253	254	256	261	262	266	272	277	284	292	300	303	311	321	332	343	
		POST	330	315	307	305	305	305	306	302	373	442	483	492	505	515	551	560	570	580	486	395	314	240	342	342	344	347	351	
		CRUSH	9	15	22	30	35	40	44	42	115	187	229	239	251	259	290	298	304	308	209	111	22	-60	39	31	23	15	8	
LEVEL 5	1933	PRE													453	471	485	491	494	491	490	482	469	448	430					
		POST													512	551	588	627	637	606	577	548	518	4890	464					
		CRUSH													59	80	103	136	143	115	87	66	49	41	34					

DATA SHEET 10 (continued)

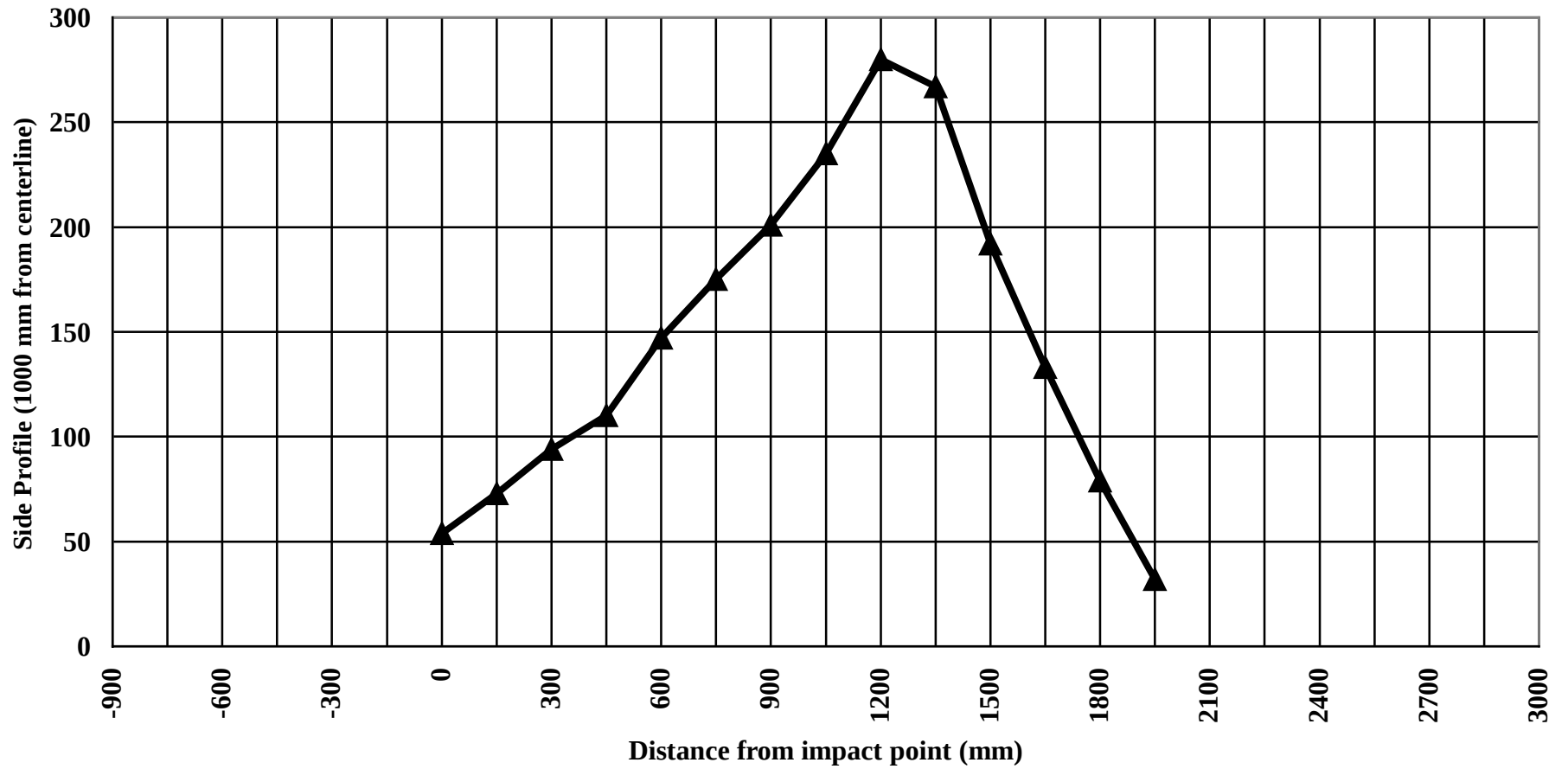
VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

SIDE PROFILE LEVEL 1

206 mm above ground



DATA SHEET 10 (continued)

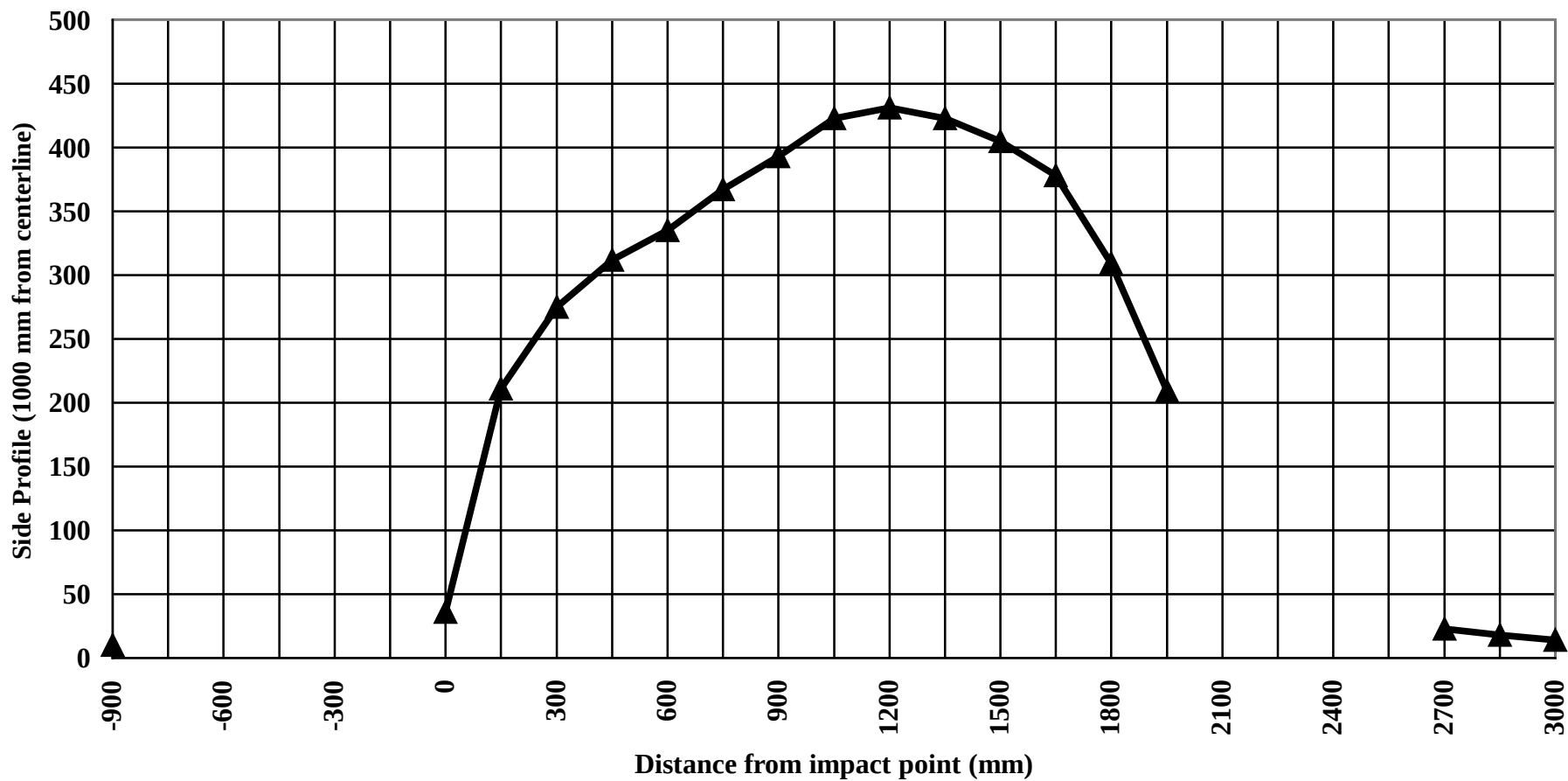
VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

SIDE PROFILE LEVEL 2

491 mm above ground



DATA SHEET 10 (continued)

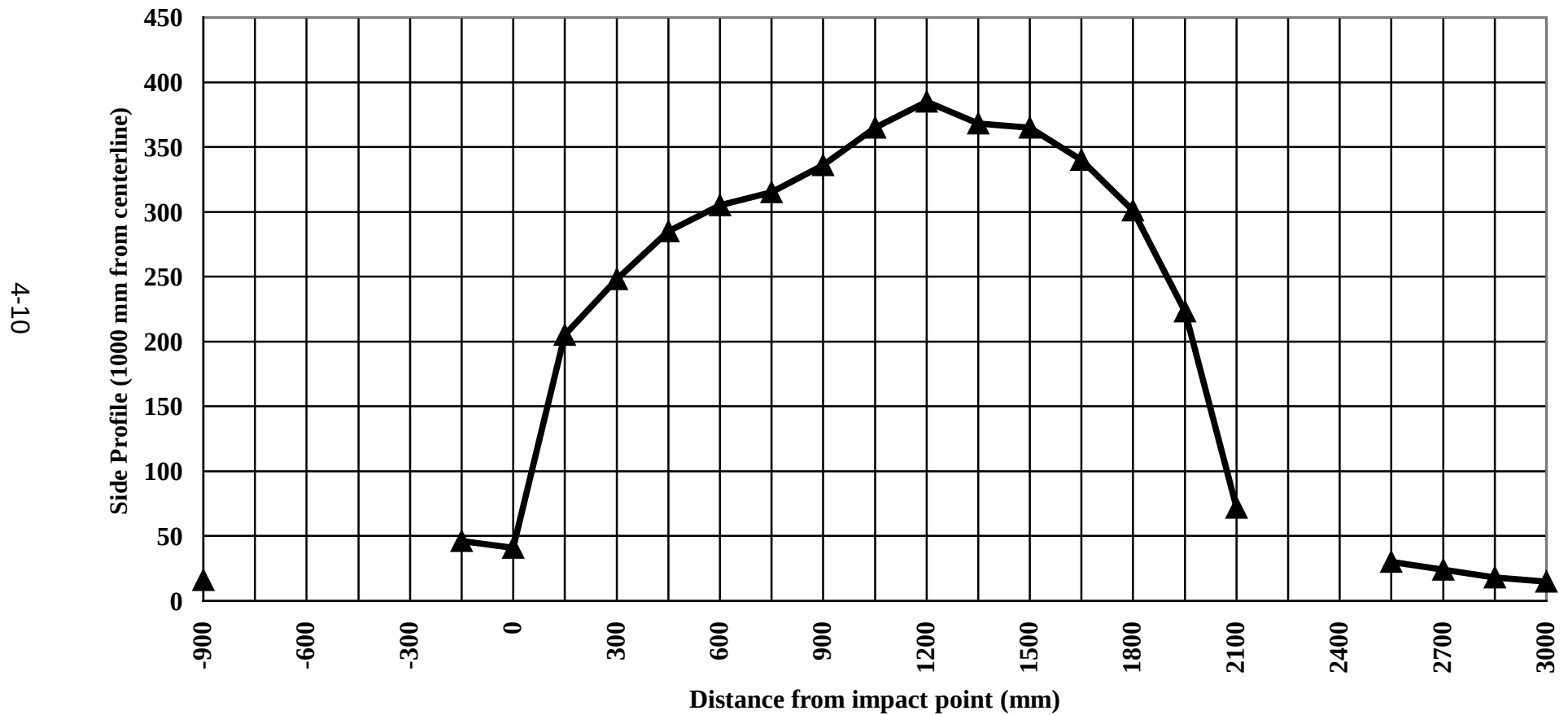
VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

SIDE PROFILE LEVEL 3

596 mm above ground



DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

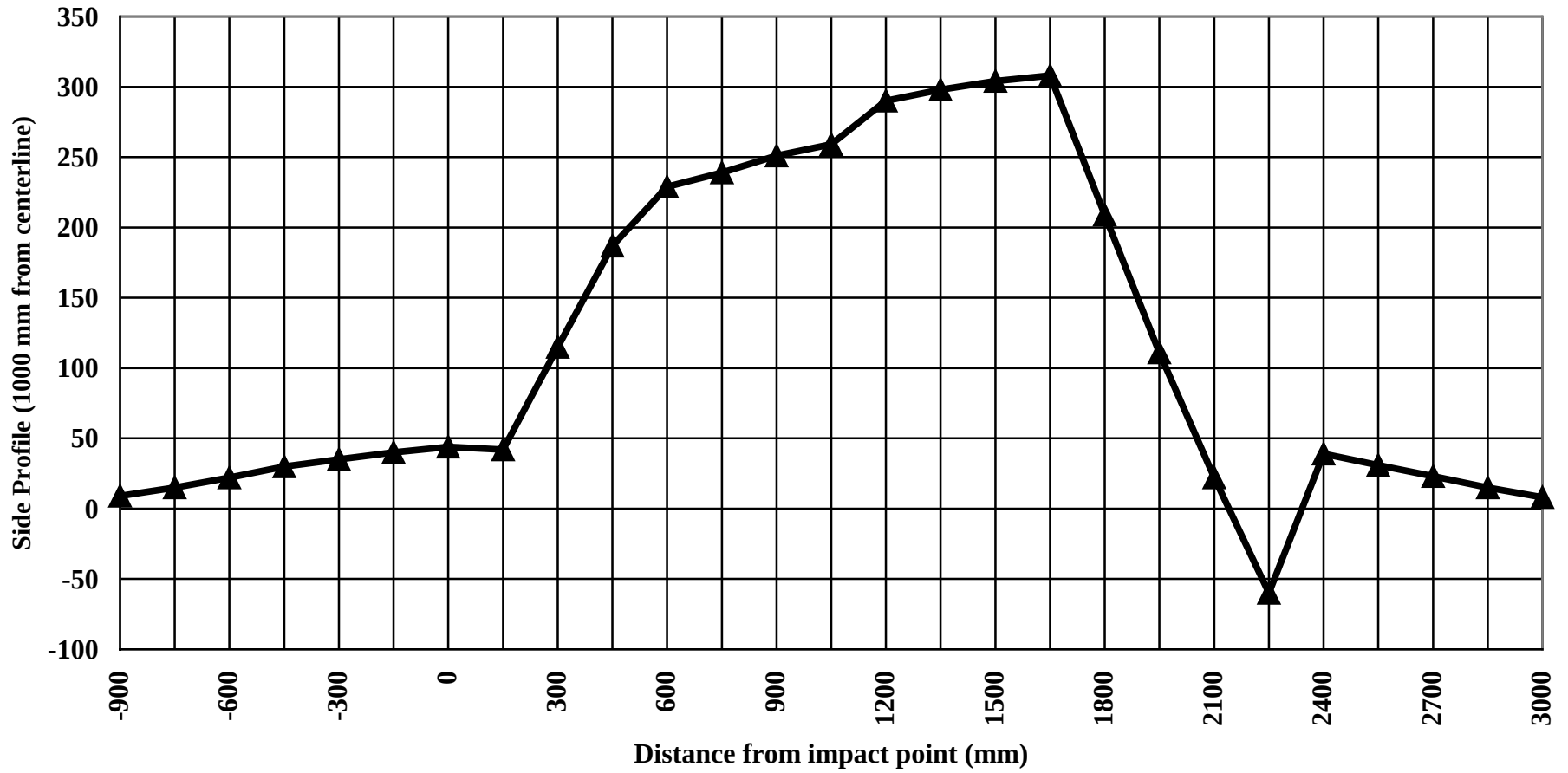
Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

SIDE PROFILE LEVEL 4

930 mm above ground

4-11



DATA SHEET 10 (continued)

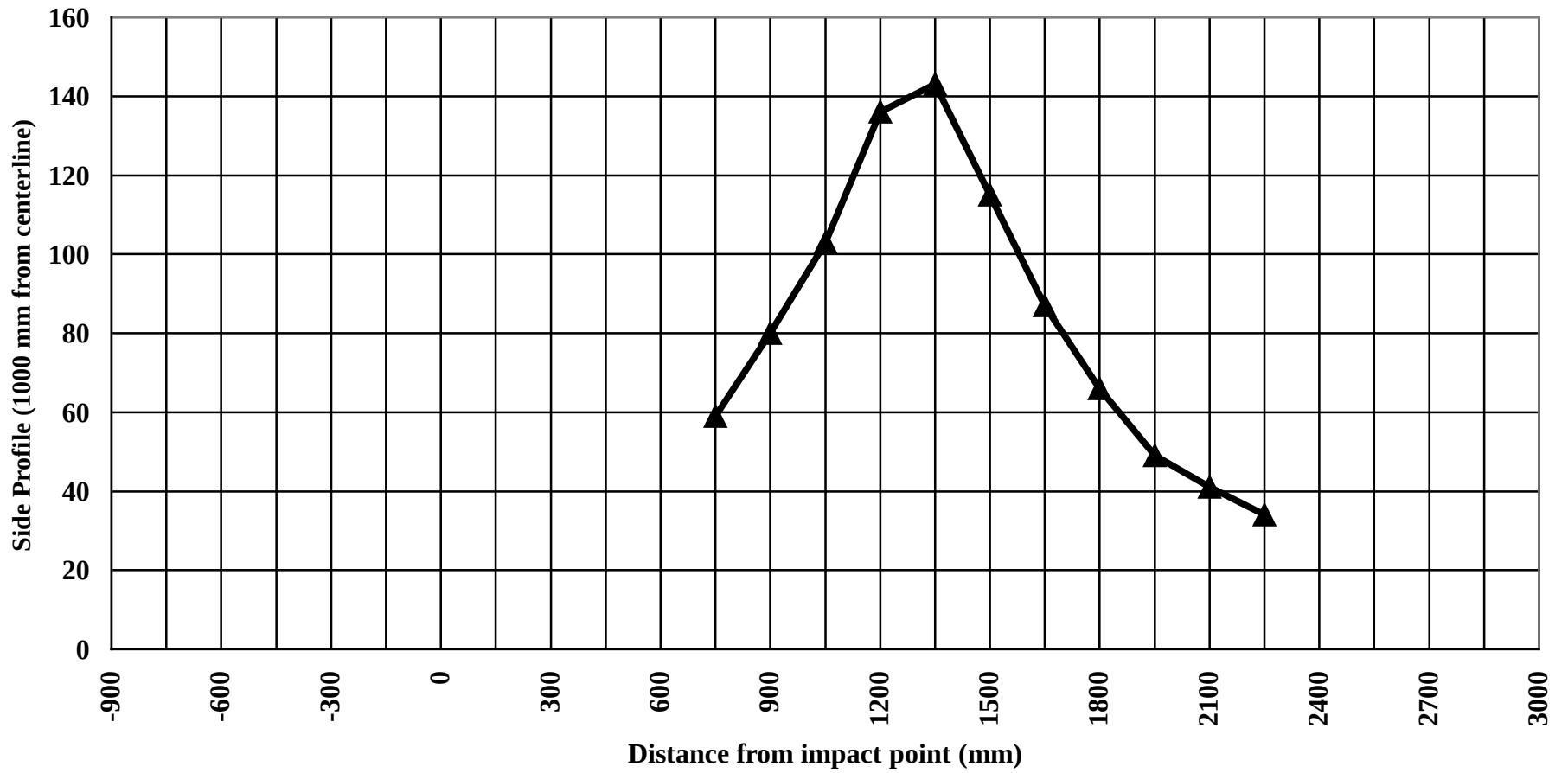
VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

SIDE PROFILE LEVEL 5

1933 mm above ground

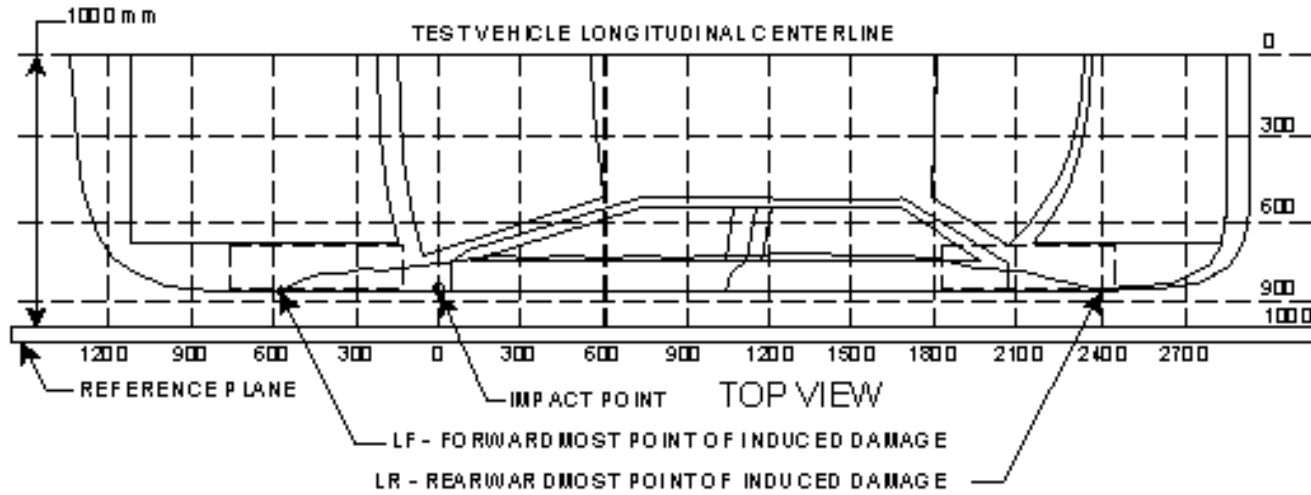


DATA SHEET 11

VEHICLE DAMAGE PROFILE DISTANCES

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205



DPD MEASUREMENTS (mm)		POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1	-90	217	217	0
2	408	474	212	262
3	906	561	207	354
4	1404	596	204	392
5	1902	442	201	241
6	2400	198	198	0

DATA SHEET 12

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

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

Note: All Dimensions are in millimeters with a tolerance of ± 3 mm

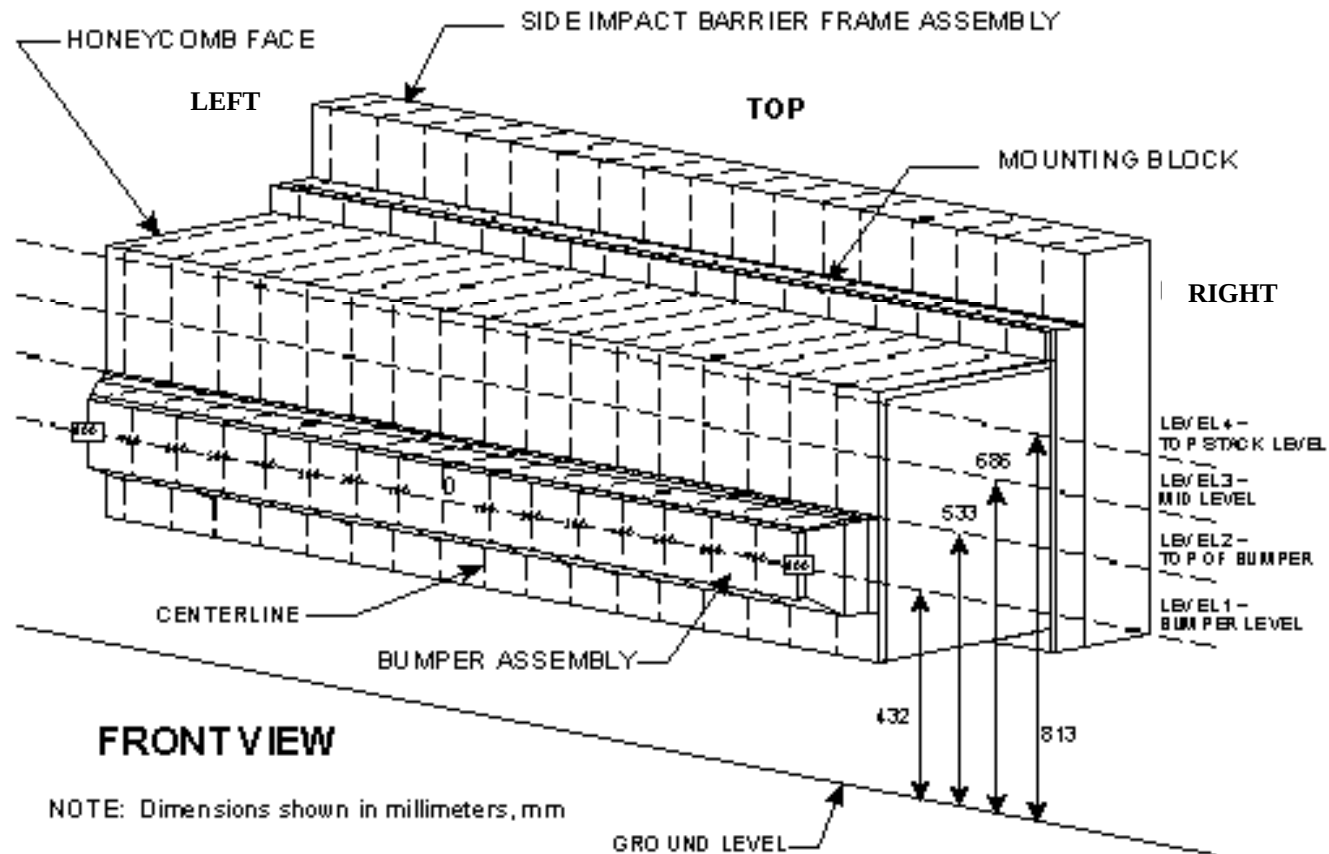
LEVEL	HEIGHT AT CL (mm)		DISTANCE LEFT OF CENTER								0	DISTANCE RIGHT OF CENTER							
			800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
LEVEL 4 TOP STACK	810	PRE-	580	580	580	580	580	580	580	580	580	580	580	580	580	580	581	581	581
		POST-	646	592	581	580	580	593	609	599	595	598	592	595	603	617	657	702	747
		CRUSH	66	12	1	0	0	13	29	19	15	18	12	15	23	37	76	121	166
LEVEL 3 MID- LEVEL	685	PRE-	578	579	579	579	578	578	578	578	578	579	579	579	579	579	579	579	579
		POST-	633	600	581	589	580	584	597	597	587	583	583	584	587	593	608	638	678
		CRUSH	55	21	2	10	2	6	21	9	9	4	4	5	8	14	29	59	99
LEVEL 2 TOP BUMPER	560	PRE-	576	576	576	576	576	576	576	576	576	576	576	577	572	577	577	577	577
		POST-	635	610	595	586	580	580	580	578	576	584	584	588	589	595	598	607	623
		CRUSH	59	34	19	10	4	4	4	2	0	8	8	11	12	18	21	30	46
LEVEL 1 MID- BUMPER	432	PRE-	485	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	485
		POST-	519	496	493	492	499	509	508	509	504	508	513	517	522	526	531	544	575
		CRUSH	34	23	20	19	26	36	35	36	31	35	40	44	49	53	58	71	90

DATA SHEET 12 (continued)

STATIC CRUSH OF IMPACTOR FACE

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

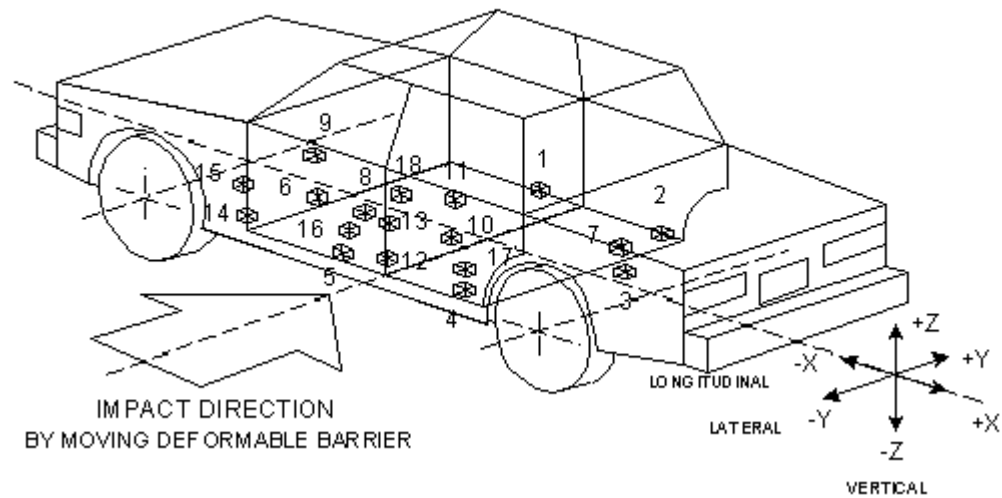


DATA SHEET 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205



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

DATASHEET 13

VEHICLE ACCELEROMETER LOCATIONS AND SUMMARY DATA

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

Location		Coordinates			Longitudinal (X)				Lateral (Y)				Vertical (Z)				Resultant	
		X mm	Y mm	Z 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	Right Side Sill at Front Seat	2745	845	221	3.2	60.1	-5.4	13.6	23.2	6.3	-2.0	148.8	5.6	58.9	-6.1	10.3	23.4	6.4
2	Right Side Sill at Rear Seat	1920	835	219	3.5	67.0	-6.3	21.2	24.2	7.3	-2.4	148.6	6.3	33.0	-28.4	21.0	33.8	20.9
3	Rear Floorpan Above Axle	1115	0	475	1.9	141.1	-3.8	60.0	18.8	32.8	-2.7	133.8	8.1	30.3	-5.0	56.2	19.2	2.0
4	Left Side Sill at Rear Seat	2748	850	215					80.8	8.9	-23.7	30.1						
5	Left Side Sill at Front Seat**	1917	840	215					55.3	11.2	-15.2	27.5						
6	Left Front Door on Centerline	2710	775	380					207.5	7.4	-94.2	25.0						
7	Right Rear Occupant Compartment	1770	395	335					20.6	6.9	-2.1	185.2						
8	Midrear of Left Front Door*	-	-	-					-	-	-	-						
9	Left Front Door Upper Centerline	2705	780	920					309.0	15.8	-166.3	25.4						
10	Midrear of Left Rear Door*	-	-	-					-	-	-	-						

Axis Origin X – Rear Bumper
 Y – Vehicle Centerline
 Z – Test Surface

Axis Orientation

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

*Accelerometer not requested

** Wire broken approximately 29 msec after impact

DATASHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND SUMMARY DATA

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

Location		Coordinates			Longitudinal (X)				Lateral (Y)				Vertical (Z)				Resultant	
		X	Y	Z	Max		Min		Max		Min		Max		Min		Max	
		mm	mm	mm	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec
11	Left Rear Door Upper Centerline	1770	755	915					118.8	13.6	-150.5	29.4						
12	Left Lower B-Pillar	2255	720	620					269.9	29.4	-25.1	24.2						
13	Left Middle B-Pillar	2250	715	840					134.7	5.0	-24.3	26.0						
14	Left Lower A-Pillar	3285	765	440					66.4	7.2	-31.0	22.5						
15	Left Middle A-Pillar	3270	765	725					37.5	11.6	-2.5	15.8						
16	Front Seat Track	2490	625	385					72.7	13.8	-92.8	28.7						
17	Rear Seat Track	-	-	-					-	-	-	-						
18	Vehicle CG	2250	0	410	4.0	59.4	-10.9	16.3	21.6	6.3	-2.4	162.2	8.6	15.4	-10.6	47.0	22.1	16.4

Axis Origin X – Rear Bumper
 Y – Vehicle Centerline
 Z – Test Surface

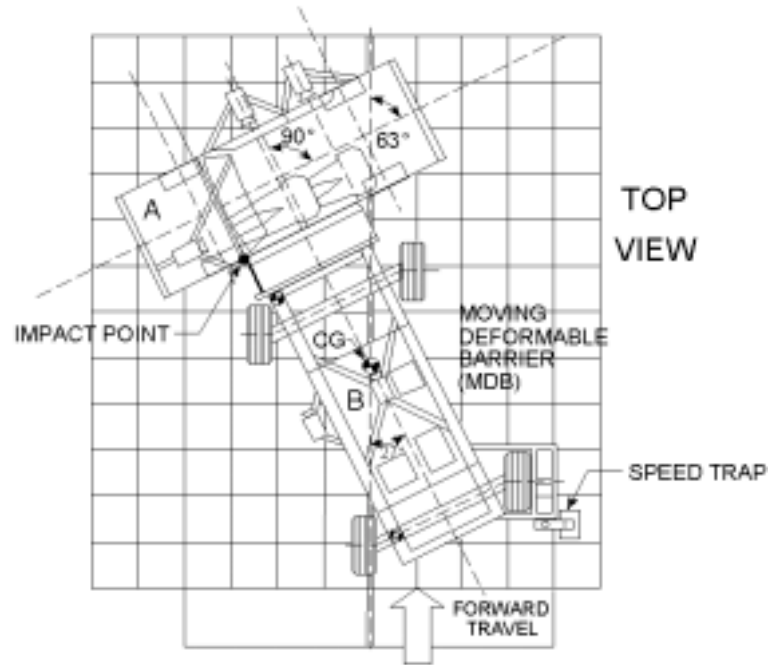
Axis Orientation

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

*Accelerometer not requested

DATA SHEET 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY



Location		Coordinates			Longitudinal (X)				Lateral (Y)				Vertical (Z)				Resultant	
		X mm	Y mm	Z 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	3.2	0.0	-30.9	42.6	21.9	0.0	-8.9	21.4	10.4	60.9	-13.9	68.9	59.7	42.6
2	MDB Rear Frame Member	2812	-614	585	0.2	124.7	-21.1	40.5	5.1	23.3	-4.2	0.4						

Axis Origin

X – Rear Bumper
Y – Vehicle Centerline
Z – Test Surface

Axis Orientation

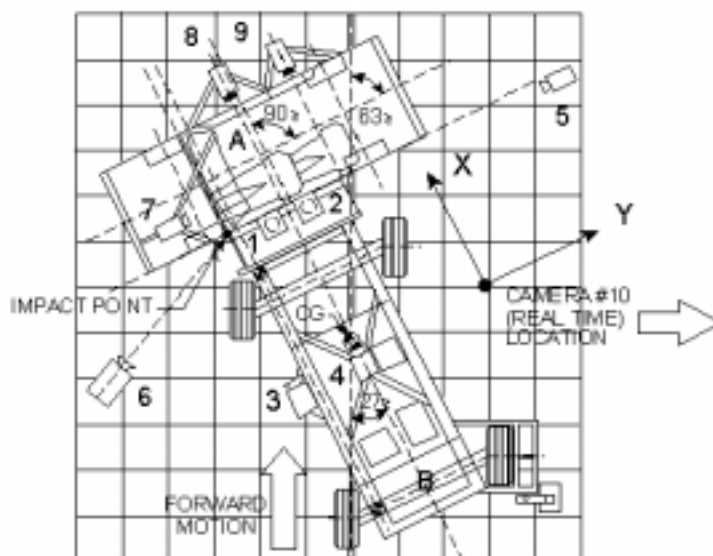
+(X) Forward
+(Y) Right
+(Z) Downward

DATA SHEET 15

HIGH-SPEED CAMERA LOCATIONS AND DATA SUMMARY

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205



Camera No.	View	Coordinates (mm)*			Angle wrt Horiz.	Lens (mm)	Film Speed (fps)
		X	Y	Z			
1	Overhead view of test vehicle	110	990	4623	-90	7	1000
2	Overhead close-up view of impact plane	30	305	4629	-90	12	1000
3	MDB onboard close-up view of impact point	-2333	-60	-32	0.4	13	1000
4	MDB onboard view of driver dummy	-2262	840	468	-3.9	13	1000
5	Right side ground level overall view	3900	13577	620	-4.2	45	1000
6	Left side ground level overall view	-401	-4447	820	-13.1	8	1000
7	Test vehicle onboard driver front view	840	-655	510	-15	10	1000
8	Test vehicle onboard driver side view	1510	910	340	-5	7.5	1000
9	Test vehicle onboard passenger side view	1420	1875	360	-5	7.5	1000
10	Real-time film coverage of test	-	-	-	-	-	-
11	High speed video of left side of vehicle	-3004	-5349	953	-10	20	1000

* Reference: (from point of impact)
 + X = Forward
 + Y = To Right
 + Z = Upward

SECTION 5
FUEL SYSTEM INTEGRITY

DATA SHEET 16

FUEL SYSTEM INTEGRITY DATA

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205

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 (MDB) contacting the driver side.

FUEL SPILLAGE MEASUREMENT:

POST IMPACT TEST	TEST RESULTS	MAXIMUM ALLOWABLE
1. From impact until vehicle motion ceases	0	29.6 ml
2. For 5 minute period after vehicle motion ceases	0	147.9 ml
3. For next 25 minutes	0	29.6 ml / 1 min.

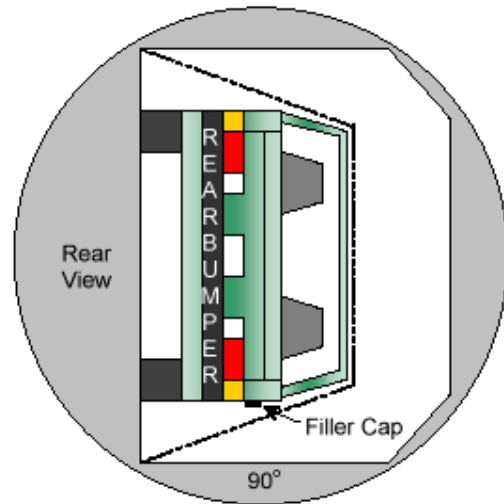
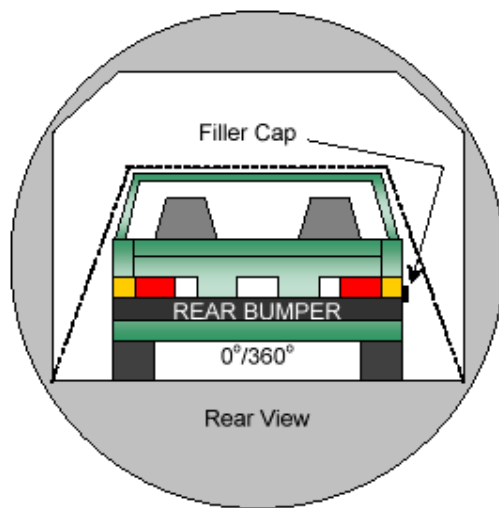
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17

ROLLOVER DATA

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205



0° TO 90°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FUEL SPILLAGE MEASUREMENT:

0° TO 90° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0	147.9 ml
2. Sixth Minute From Onset of Rotation	0	29.6 ml
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute if Required	-	29.6 ml

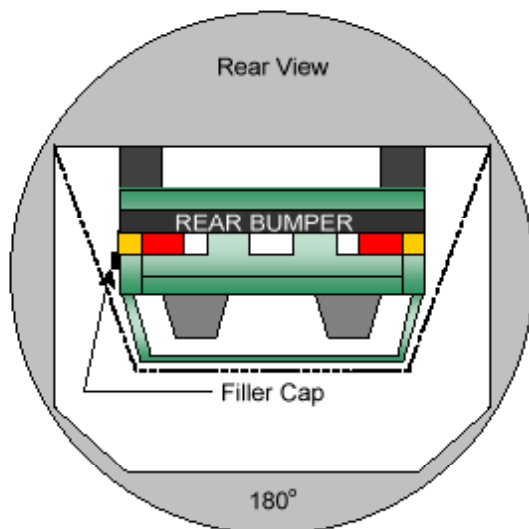
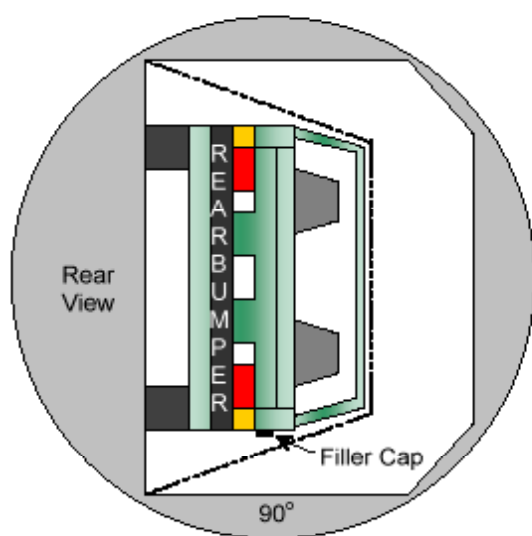
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205



90° TO 180°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	<u>1</u> minutes	<u>10</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>10</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	147.9 ml
2. Sixth Minute From Onset of Rotation	0	29.6 ml
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute if Required	-	29.6 ml

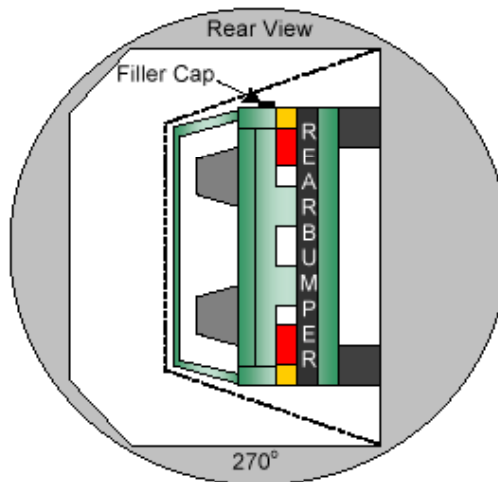
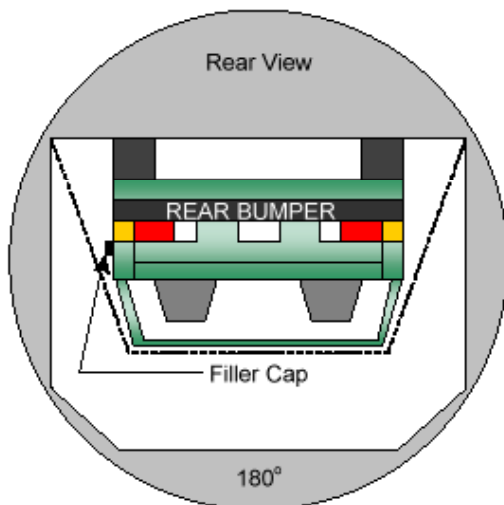
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205



180° TO 270°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	<u>1</u> minutes	<u>8</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>8</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	147.9 ml
2. Sixth Minute From Onset of Rotation	0	29.6 ml
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute From Onset of Rotation	-	29.6 ml

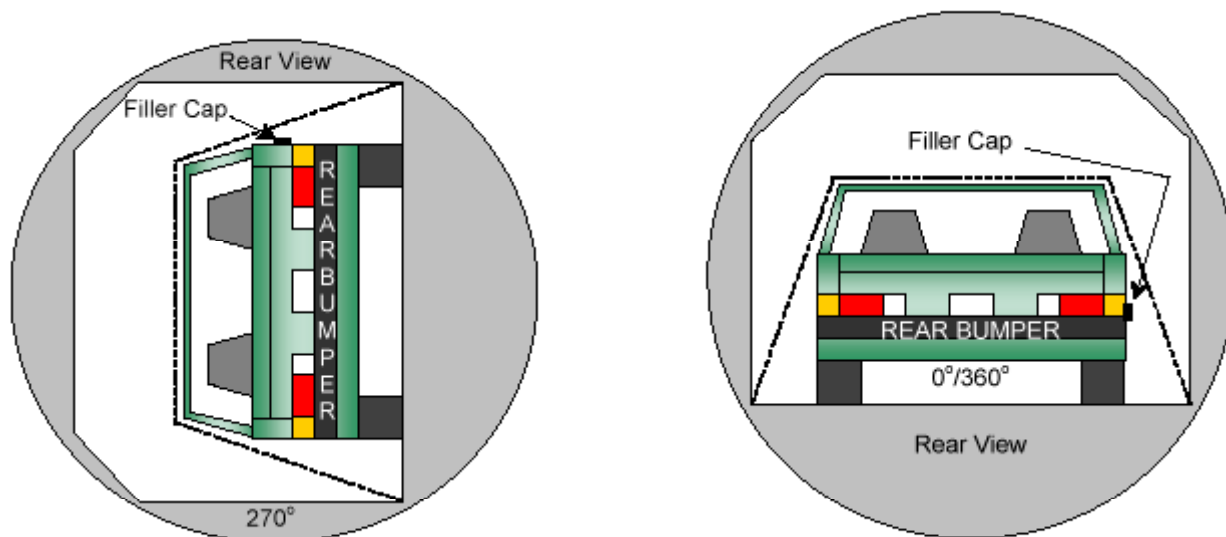
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE

Vehicle: 2002 Nissan Altima

NHTSA No. M2 5205



270° TO 360°

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>0</u> seconds
TOTAL	<u>6</u> minutes	<u>5</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	147.9 ml
2. Sixth Minute From Onset of Rotation	0	29.6 ml
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute if Required	-	29.6 ml

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 REAR VIEW OF TEST VEHICLE



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



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



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



Figure A-7: PRE-TEST RIGHT SIDE VIEW OF TEST VEHICLE



Figure A-8: POST-TEST RIGHT SIDE VIEW OF TEST VEHICLE



Figure A-9: PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-10: POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-11: PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID



Figure A-12: POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID



Figure A-13: PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-14: POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-15: PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID



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Figure A-17: PRE-TEST INTERIOR OF FRONT DOOR



Figure A-18: POST-TEST INTERIOR OF FRONT DOOR SHOWING SID IMPACT LOCATIONS



Figure A-19: PRE-TEST INTERIOR OF REAR DOOR



Figure A-20: POST-TEST INTERIOR OF REAR DOOR SHOWING SID IMPACT LOCATIONS



Figure A-21: PRE-TEST LEFT SIDE VIEW OF MDB IN IMPACT POSITION



Figure A-22: POST-TEST LEFT SIDE VIEW OF MDB



Figure A-23: PRE-TEST RIGHT SIDE VIEW OF MDB IN IMPACT POSITION



Figure A-24: POST-TEST LEFT SIDE VIEW OF MDB

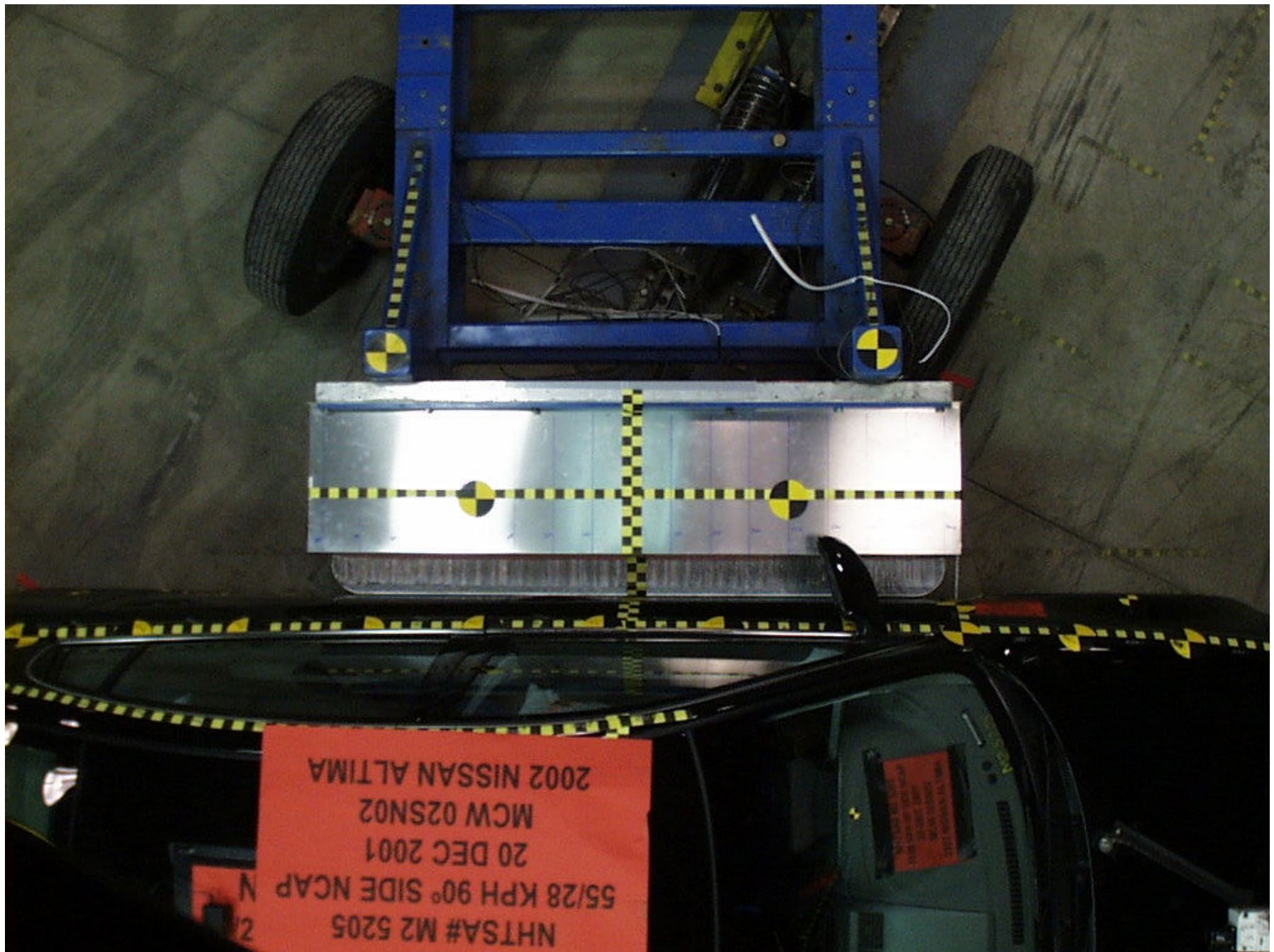


Figure A-25: PRE-TEST OVERHEAD VIEW OF MDB IN IMPACT POSITION



Figure A-26: POST-TEST OVERHEAD VIEW OF MDB



Figure A-27: PRE-TEST CLOSE-UP OF IMPACT POINT TARGET SHOWING WELDING ROD



Figure A-28: POST-TEST CLOSE-UP OF IMPACT POINT TARGET

MANUFACTURED BY NISSAN MOTOR CO., LTD.

DATE	11/01	GVWR	4202 LB
GAWR FR.	2249 LB	GAWR RR.	1969 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR
VEHICLE SAFETY, BUMPER AND THEFT PREVENTION STANDARDS
IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.
SEE OWNERS MANUAL FOR ADDITIONAL INFORMATION.

VIN: 1N4AL11D82C125273 PASSENGER CAR

COLOR	TRIM	TRANS	AXLE	ENGINE
KH3	K	RE4F04B	FT40	QR25 2488CC
MODEL: BDBALBA-EUA			570	02000



1N4AL11D82C125273

Figure A-29: CLOSE-UP OF VEHICLE'S CERTIFICATION LABELS

VEHICLE CAPACITY WEIGHT	860 lbs	SEATING CAPACITY	FRONT AVANT 2	TOTAL TOTAL	SPARE TIRE ROUE DE SECOURS	psi (kPa)
POIDS UTILE DU VEHICULE	390 kg	NOMBRE DE PLACES	REAR ARRIERE 3	5	T135/90D16	60 (420)
RECOMMENDED COLD TIRE INFLATION PRESSURE PRESSION DE GONFLAGE RECOMMANDEE DES PNEUS FROIDS.					DO NOT USE IN EXCESS OF 50 MPH. 80 km/h SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION. UTILISATION A UNE VITESSE MAX 50 MPH. 80 km/h POUR LES DETAILS SE REFERER AU MANUEL DU CONDUCTEUR.	
TIRE SIZE DIMENSIONS	FRONT psi AVANT (kPa)	REAR psi ARRIERE (kPa)				
P205/65R16 94T	29 (200)	29 (200)				

32001

3Z001

Figure A-30: CLOSE-UP OF VEHICLE'S TIRE PLACARD LABELS



Figure A-31: IMPACT



Figure A-32: ROLLOVER 0 DEGREES

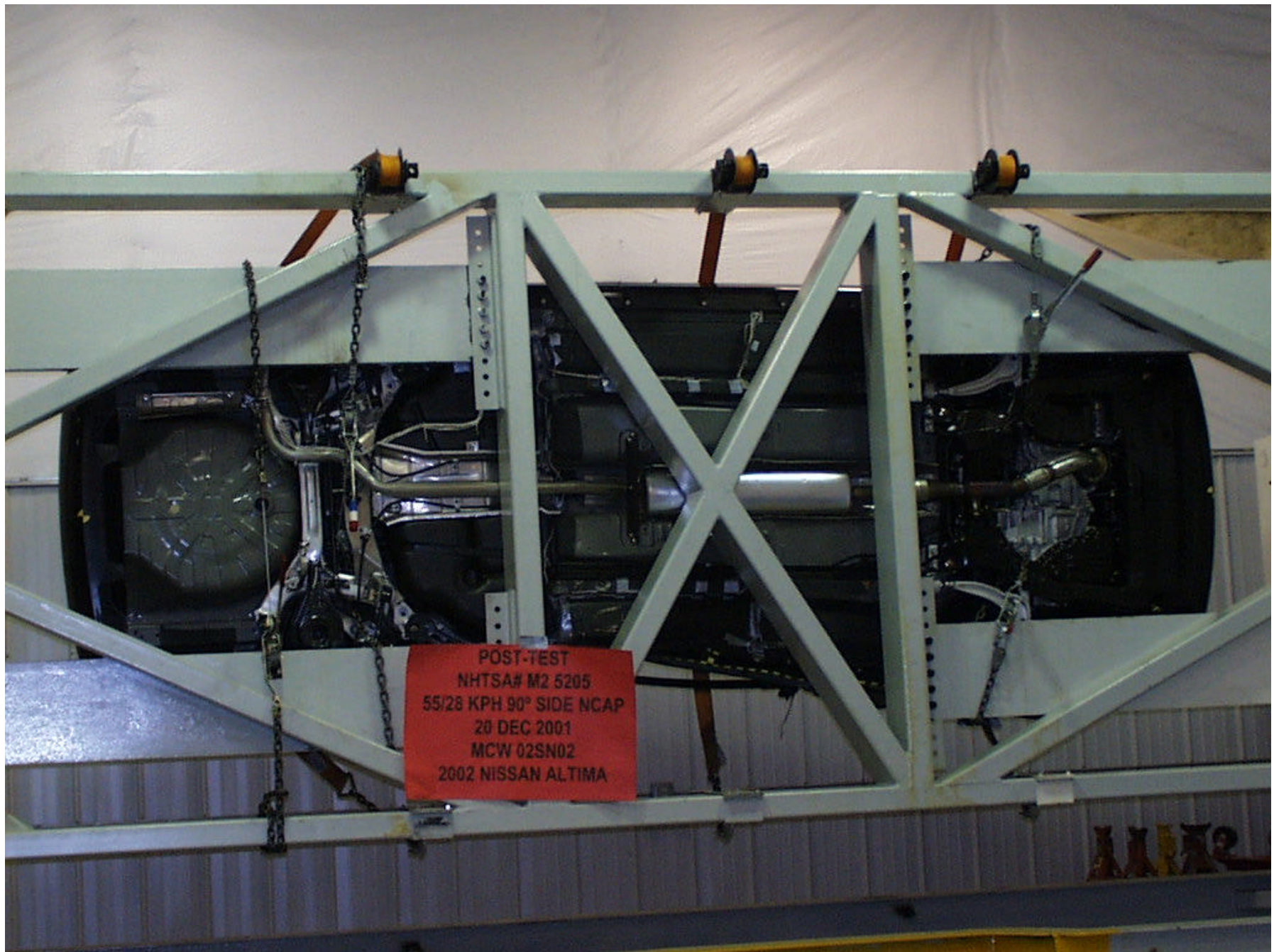


Figure A-33: ROLLOVER 90 DEGREES

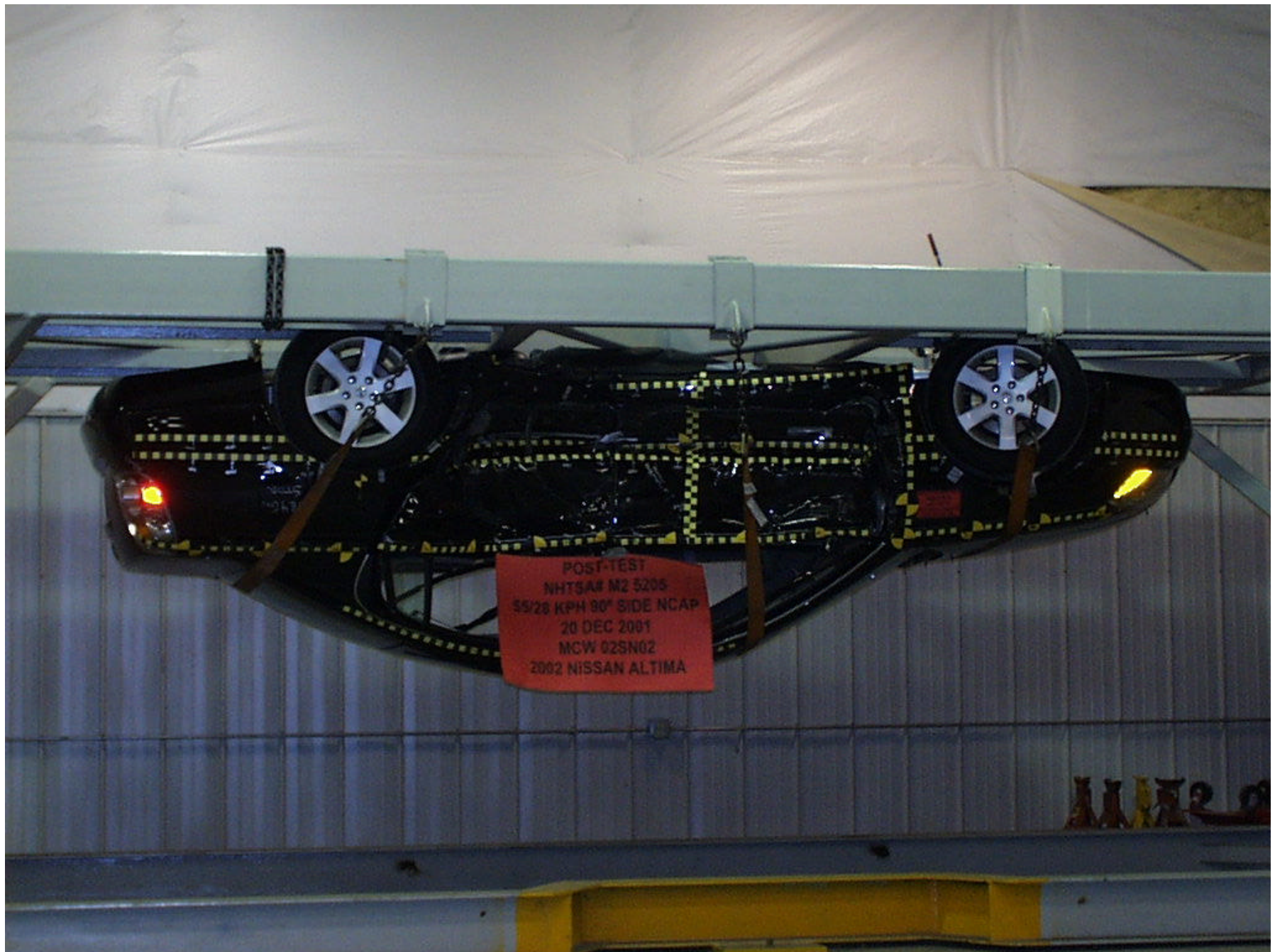


Figure A-34: ROLLOVER 180 DEGREES



Figure A-35: ROLLOVER 270 DEGREES



Figure A-36: ROLLOVER 360 DEGREES



Figure A-37: PRE-TEST ALUMINUM BARRIER FRONT



Figure A-38: POST-TEST ALUMINUM BARRIER FRONT



Figure A-39: PRE-TEST ALUMINUM BARRIER LEFT SIDE



Figure A-40: POST-TEST ALUMINUM BARRIER LEFT SIDE



Figure A-41: PRE-TEST ALUMINUM BARRIER RIGHT SIDE

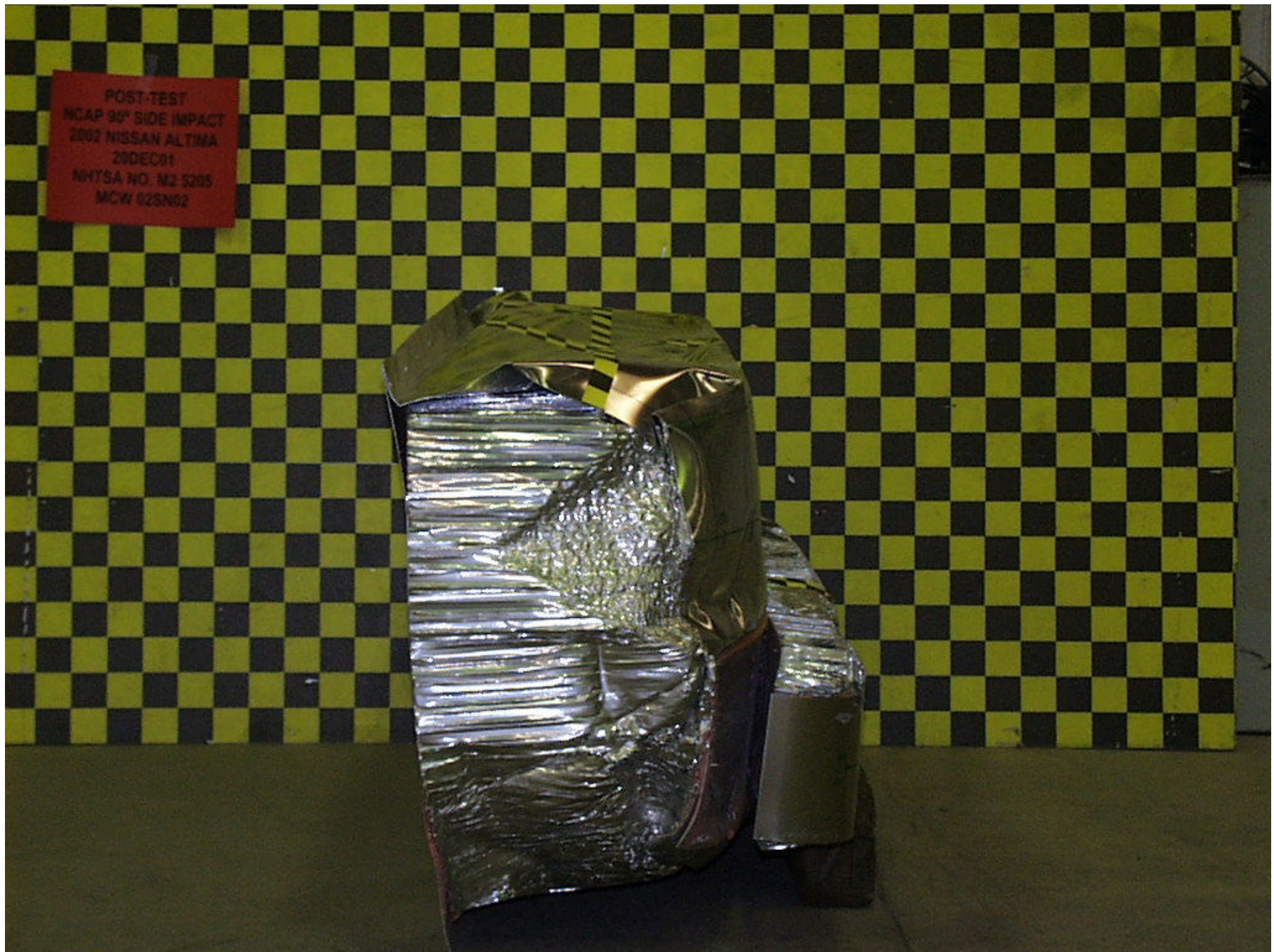


Figure A-42: POST-TEST ALUMINUM BARRIER RIGHT SIDE



Figure A-43: PRE-TEST ALUMINUM BARRIER OVERHEAD



Figure A-44: POST-TEST ALUMINUM BARRIER OVERHEAD

APPENDIX B

VEHICLE, MDB, AND SID RESPONSE DATA

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DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS ACCELERATION DATA – FIR FILTERED

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DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)
ACCELERATION DATA – FILTER CLASS 1000, LOWER SPINE FILTER CLASS 180
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DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOT (REDUNDANT)
ACCELERATION DATA – FIR FILTERED

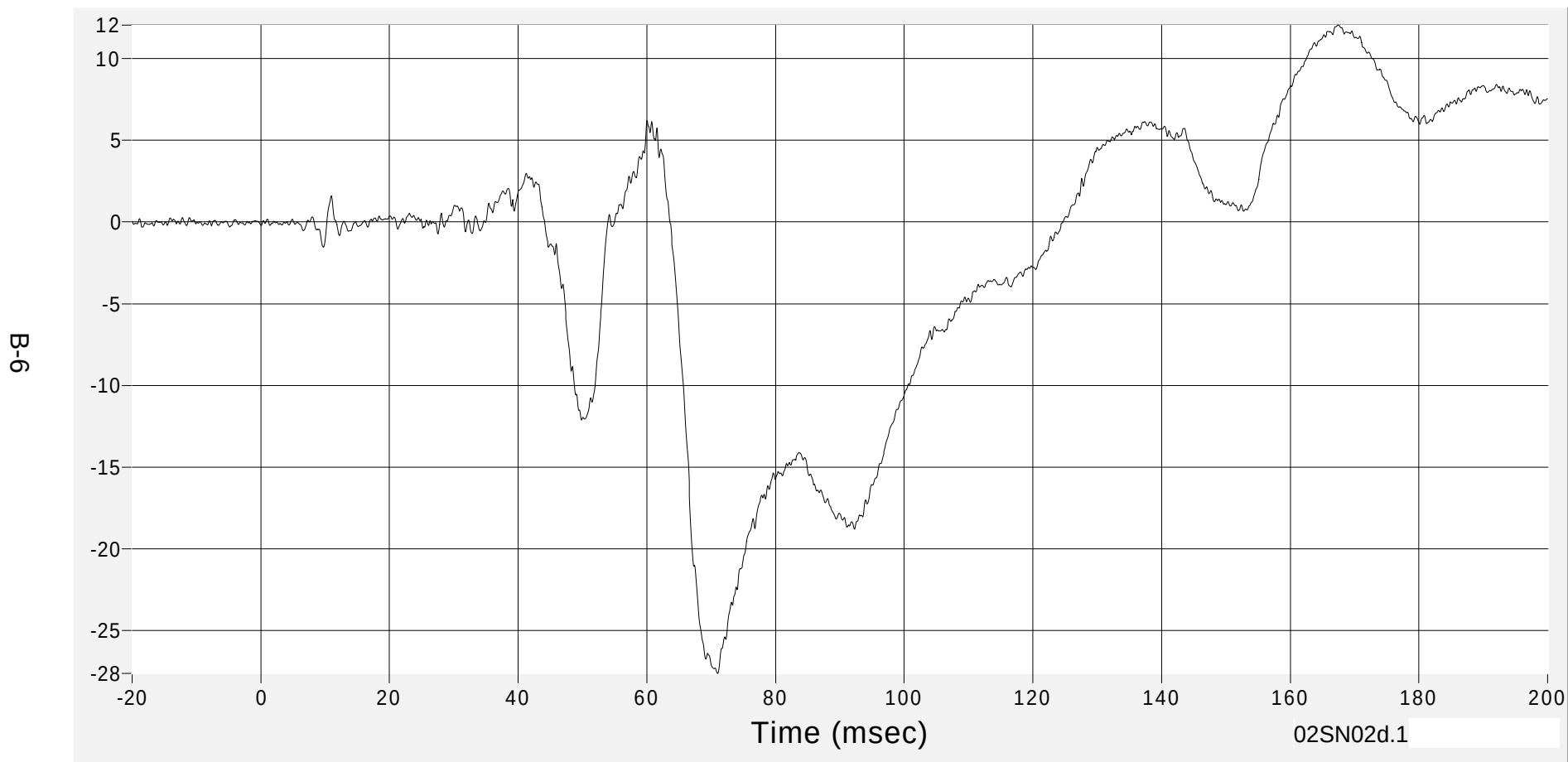
<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
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Driver Head CG (X) Acceleration

Acceleration (G's) CFC1000

Max 12.1 G's at 167.4 msec

Min -27.6 G's at 71.0 msec



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20 December 2001

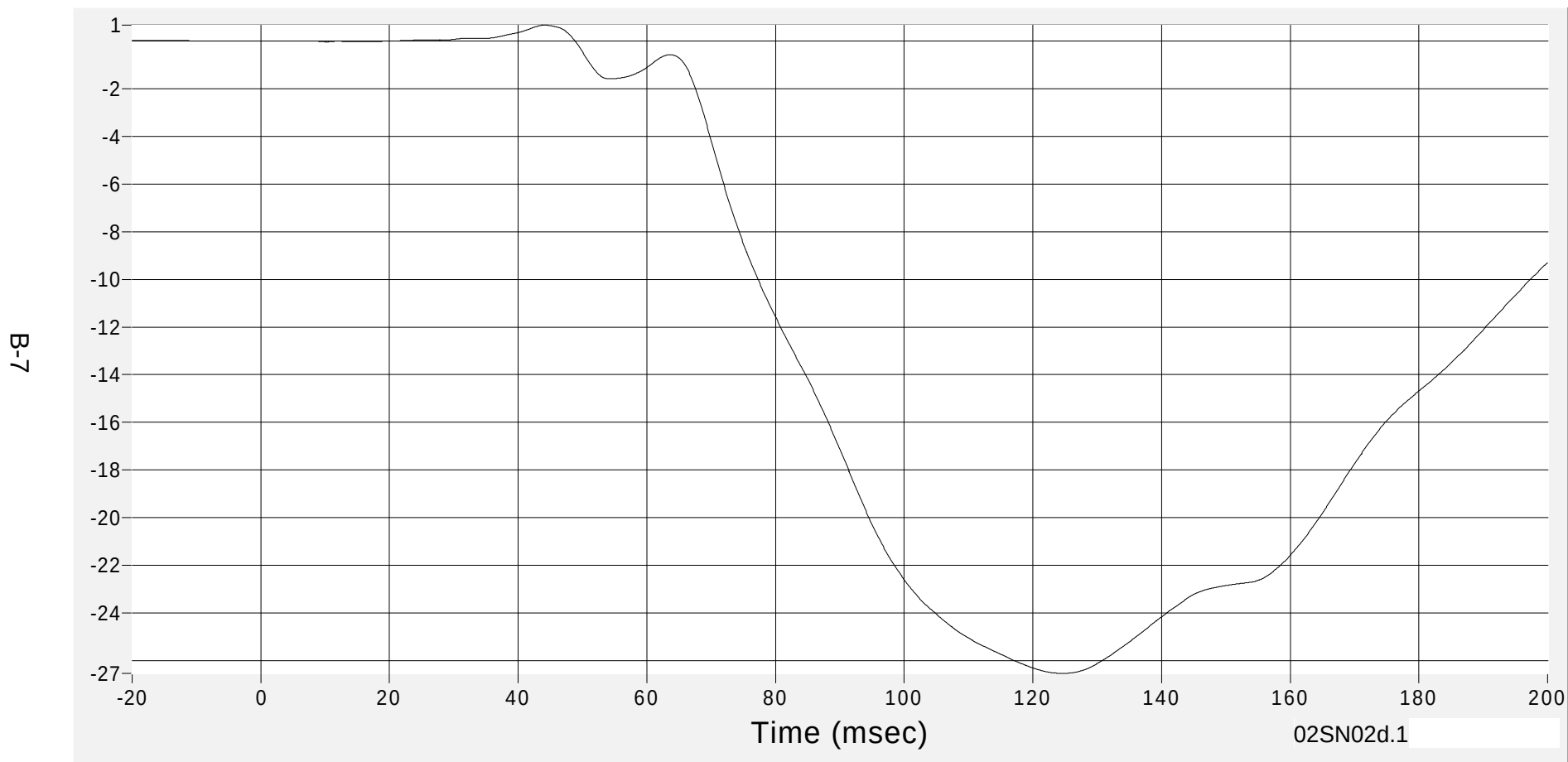
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Head CG (X) Velocity

Velocity (km/h) CFC180

Max 0.7 km/h at 44.2 msec

Min -26.5 km/h at 124.6 msec



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20 December 2001

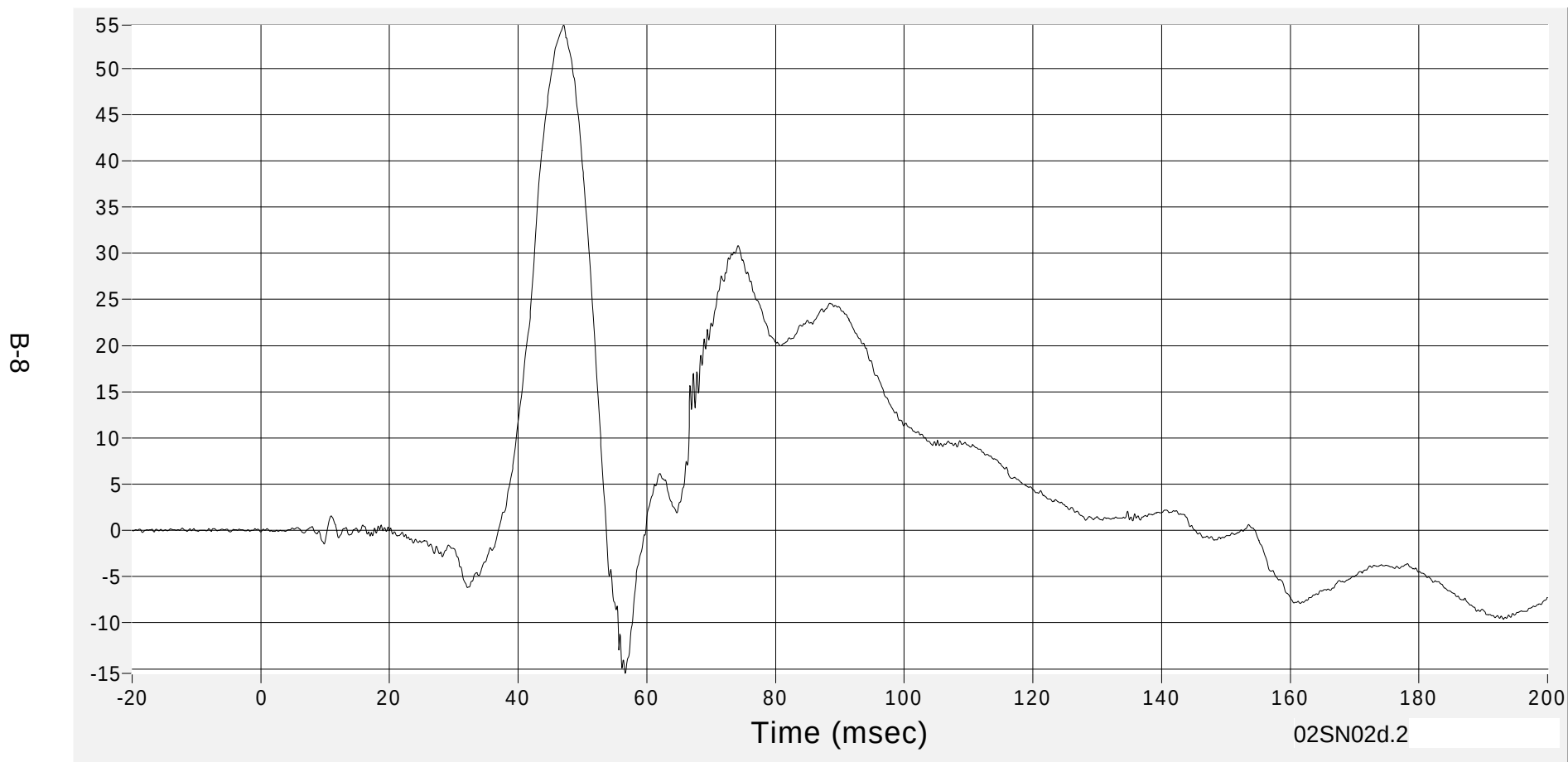
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Head CG (Y) Acceleration

Acceleration (G's) CFC1000

Max 54.7 G's at 47.0 msec

Min -15.5 G's at 56.6 msec



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20 December 2001

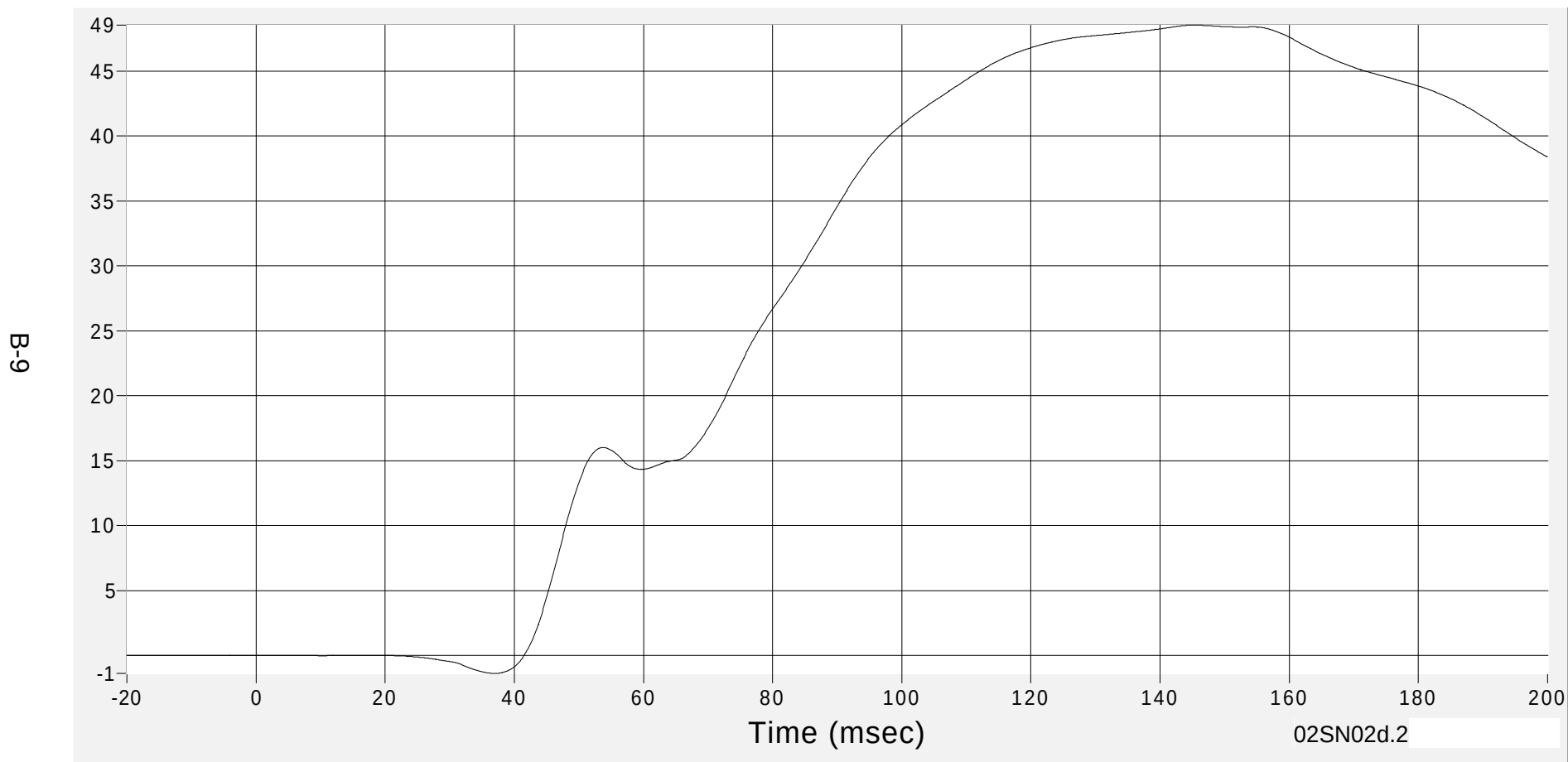
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Head CG (Y) Velocity

Velocity (km/h) CFC180

Max 48.5 km/h at 145.2 msec

Min -1.4 km/h at 37.0 msec



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20 December 2001

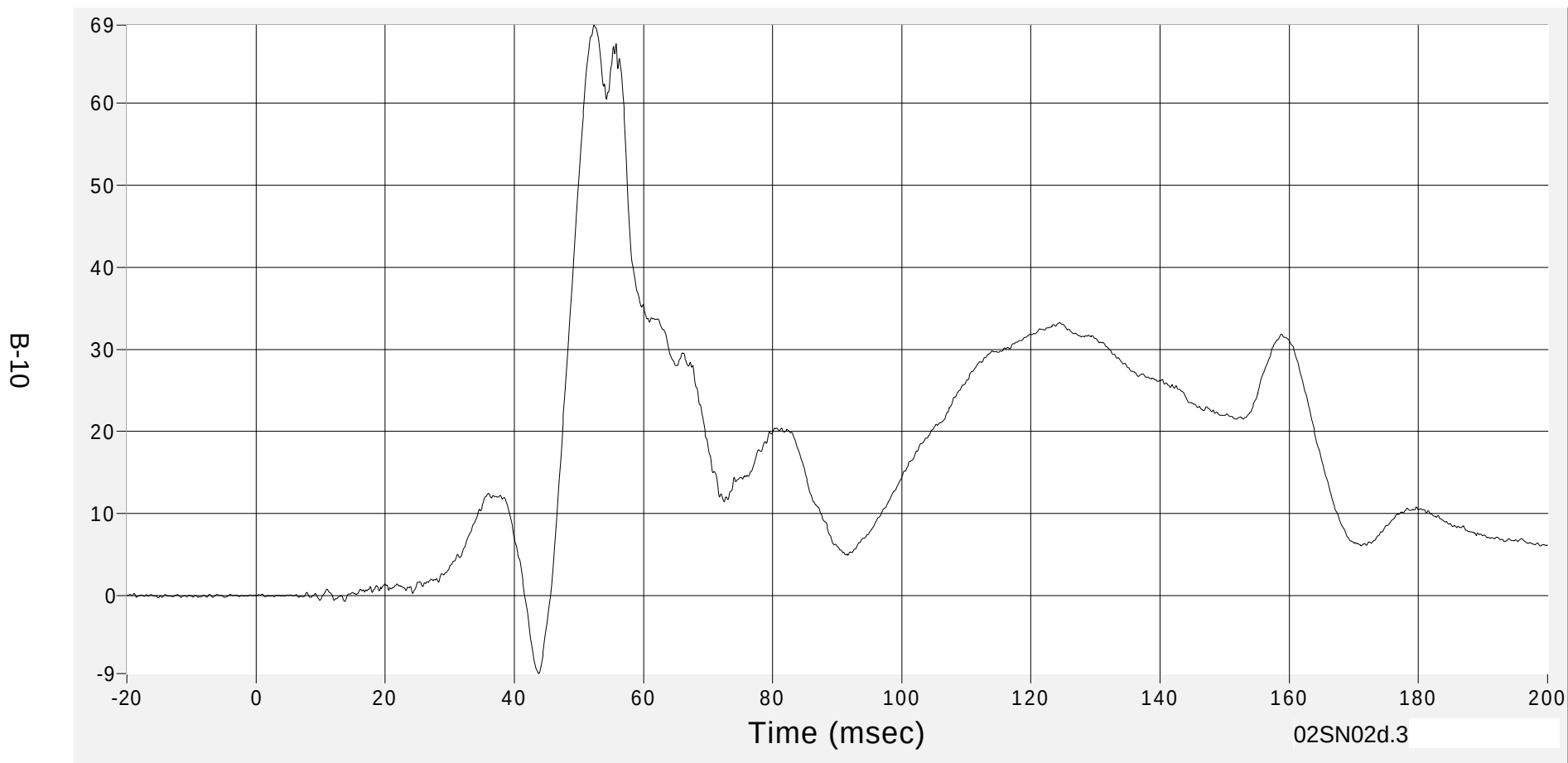
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Head CG (Z) Acceleration

Acceleration (G's) CFC1000

Max 69.5 G's at 52.3 msec

Min -9.5 G's at 43.8 msec



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20 December 2001

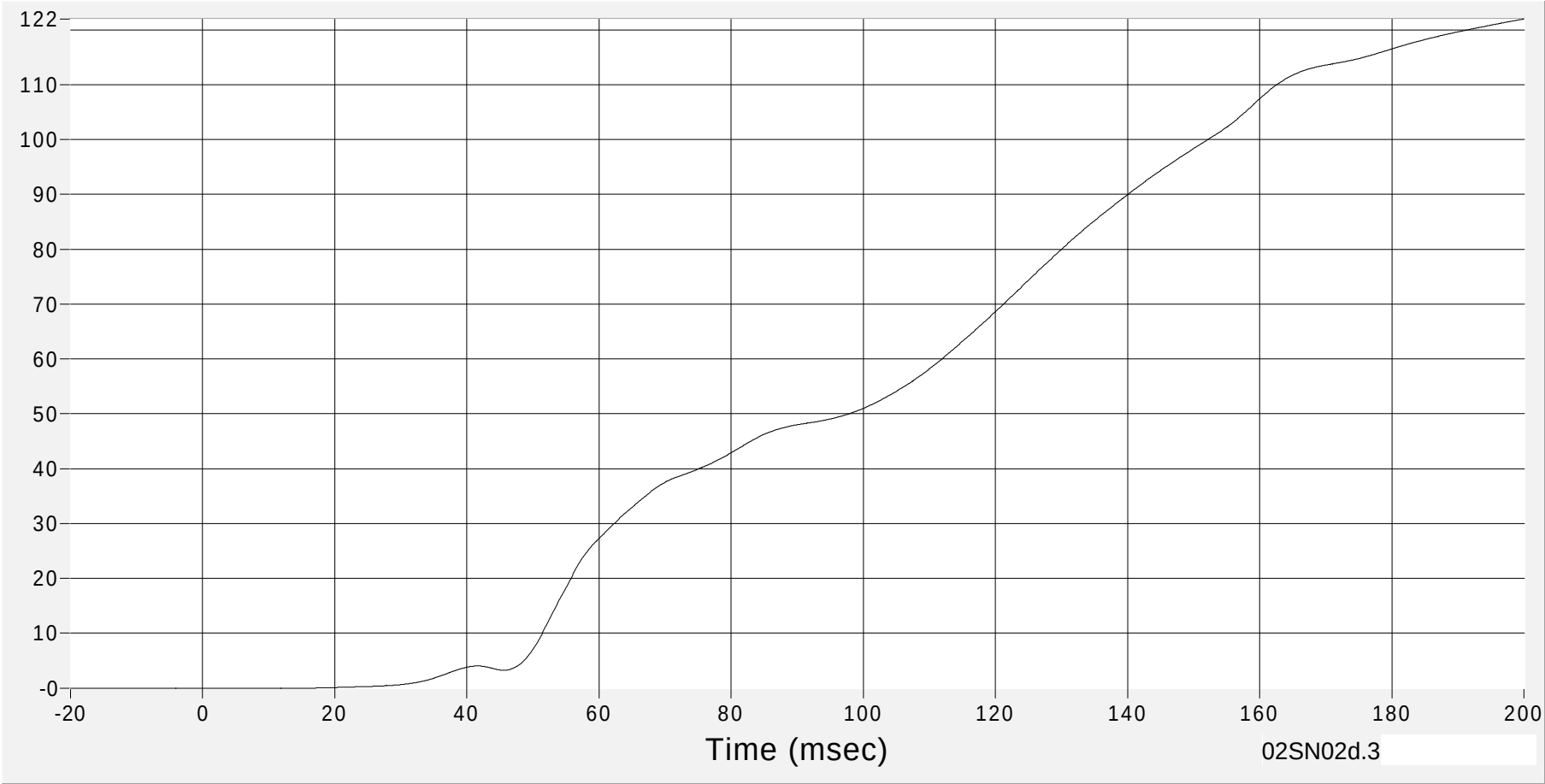
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Head CG (Z) Velocity

Velocity (km/h) CFC180

Max 122.0 km/h at 199.9 msec
Min 0.0 km/h at 14.4 msec

B-11



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20 December 2001

Medical College of Wisconsin
Vehicle Crashworthiness Lab

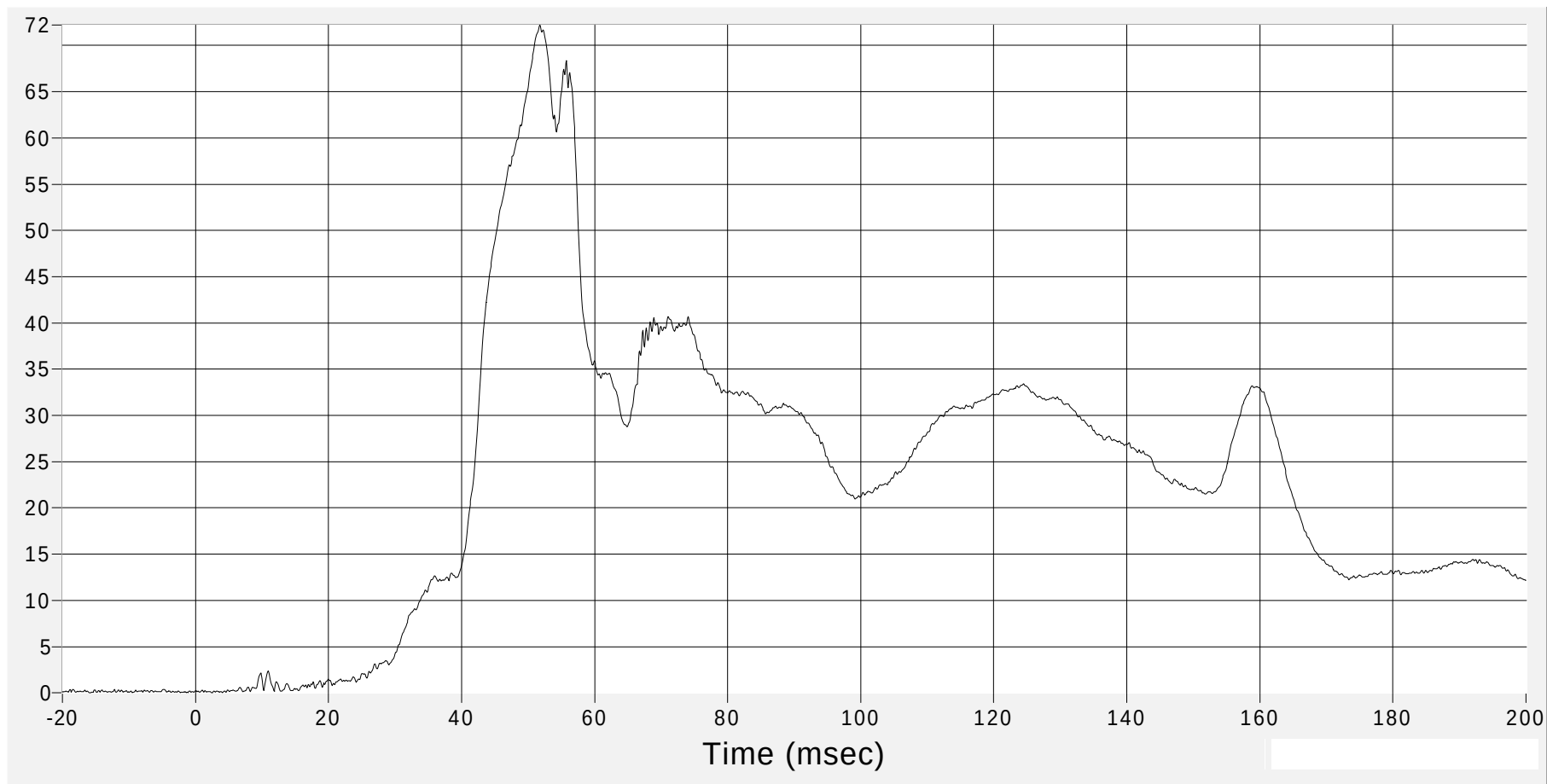
Driver Head Resultant Acceleration

Acceleration (G's) CFC1000

Max 72.2 G's at 51.8 msec

Min 0.0 G's at 2.5 msec

B-12



02SN02 - 2002 NISSAN ALTIMA 4 DOOR SEDAN
20 December 2001

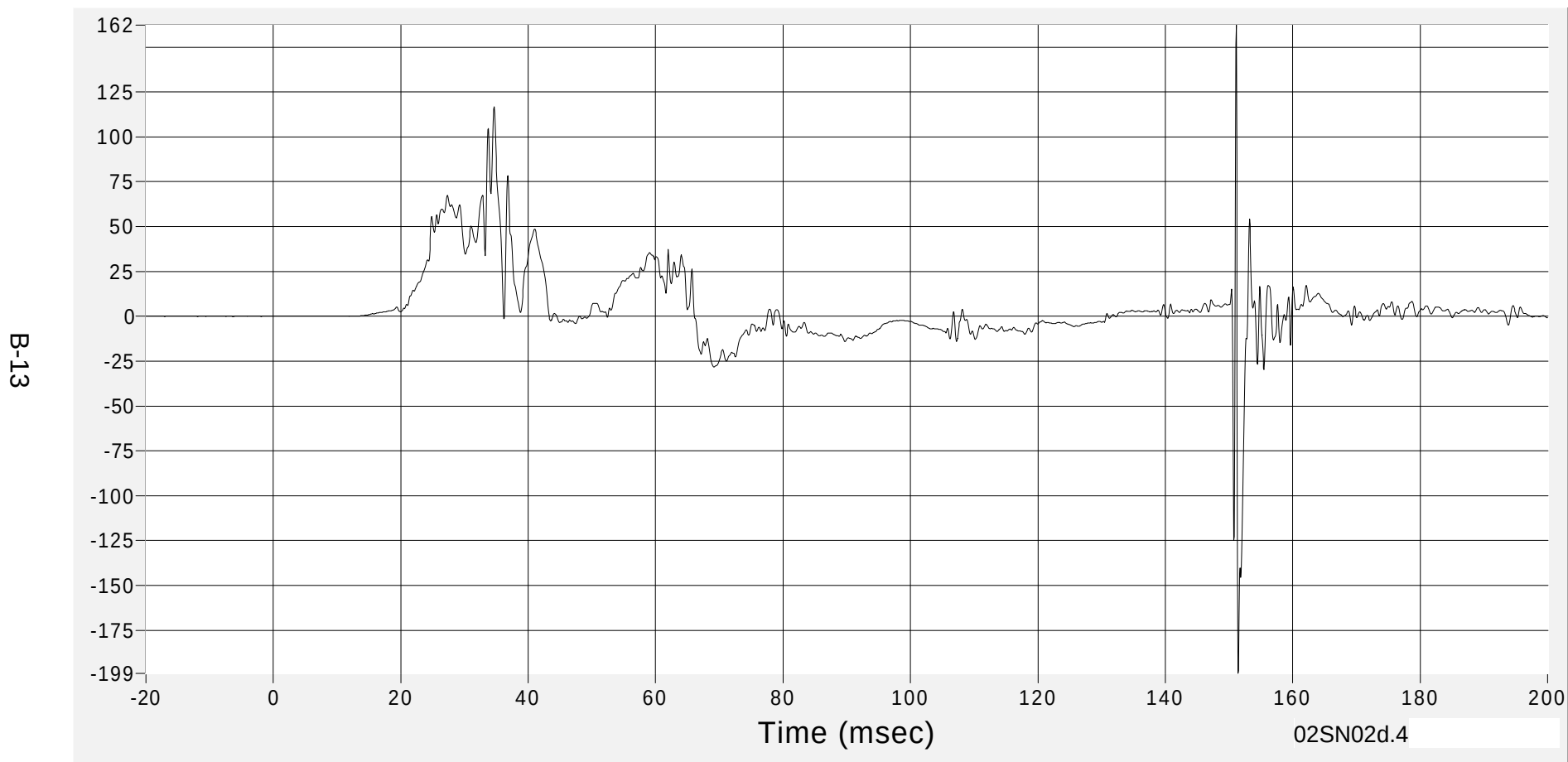
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Upper Rib (Y) Acceleration

Acceleration (G's) CFC1000

Max 162.3 G's at 151.1 msec

Min -199.0 G's at 151.4 msec



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20 December 2001

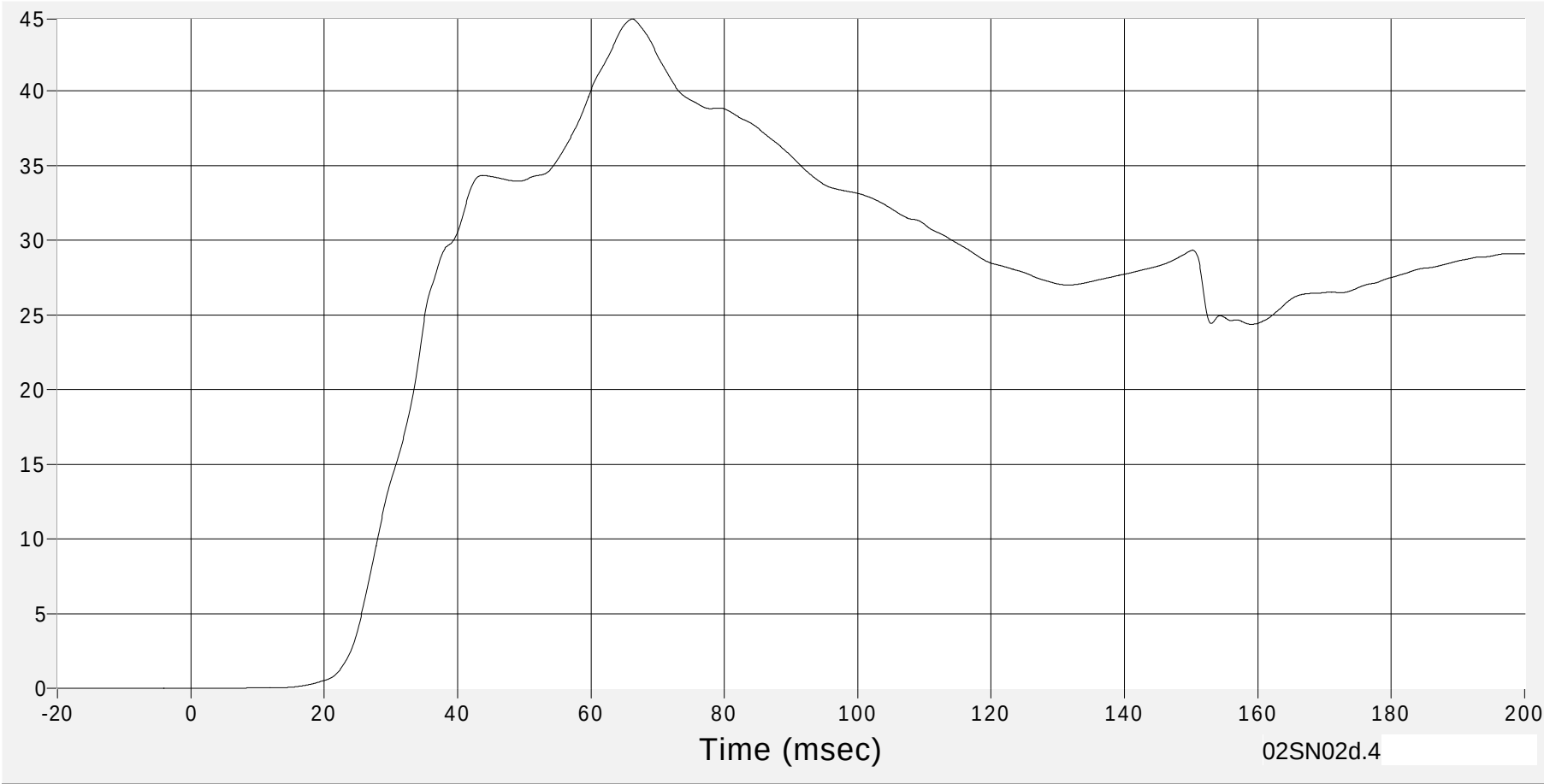
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Upper Rib (Y) Velocity

Velocity (km/h) CFC180

Max	44.8	km/h	at	66.2	msec
Min	0.0	km/h	at	0.0	msec

B-14



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20 December 2001

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Vehicle Crashworthiness Lab

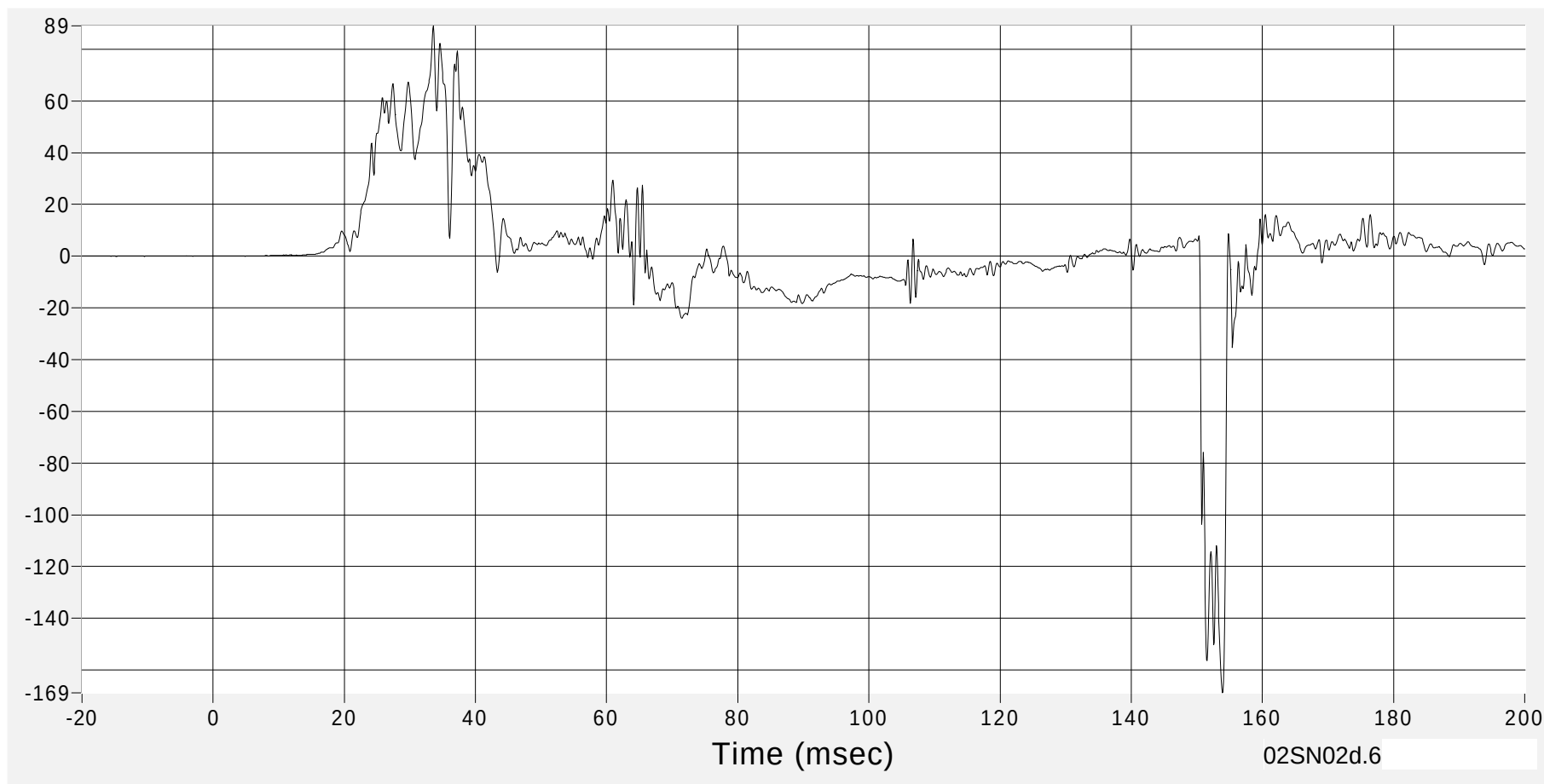
Driver Lower Rib (Y) Acceleration

Acceleration (G's) CFC1000

Max 89.1 G's at 33.6 msec

Min -168.8 G's at 153.9 msec

B-15



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20 December 2001

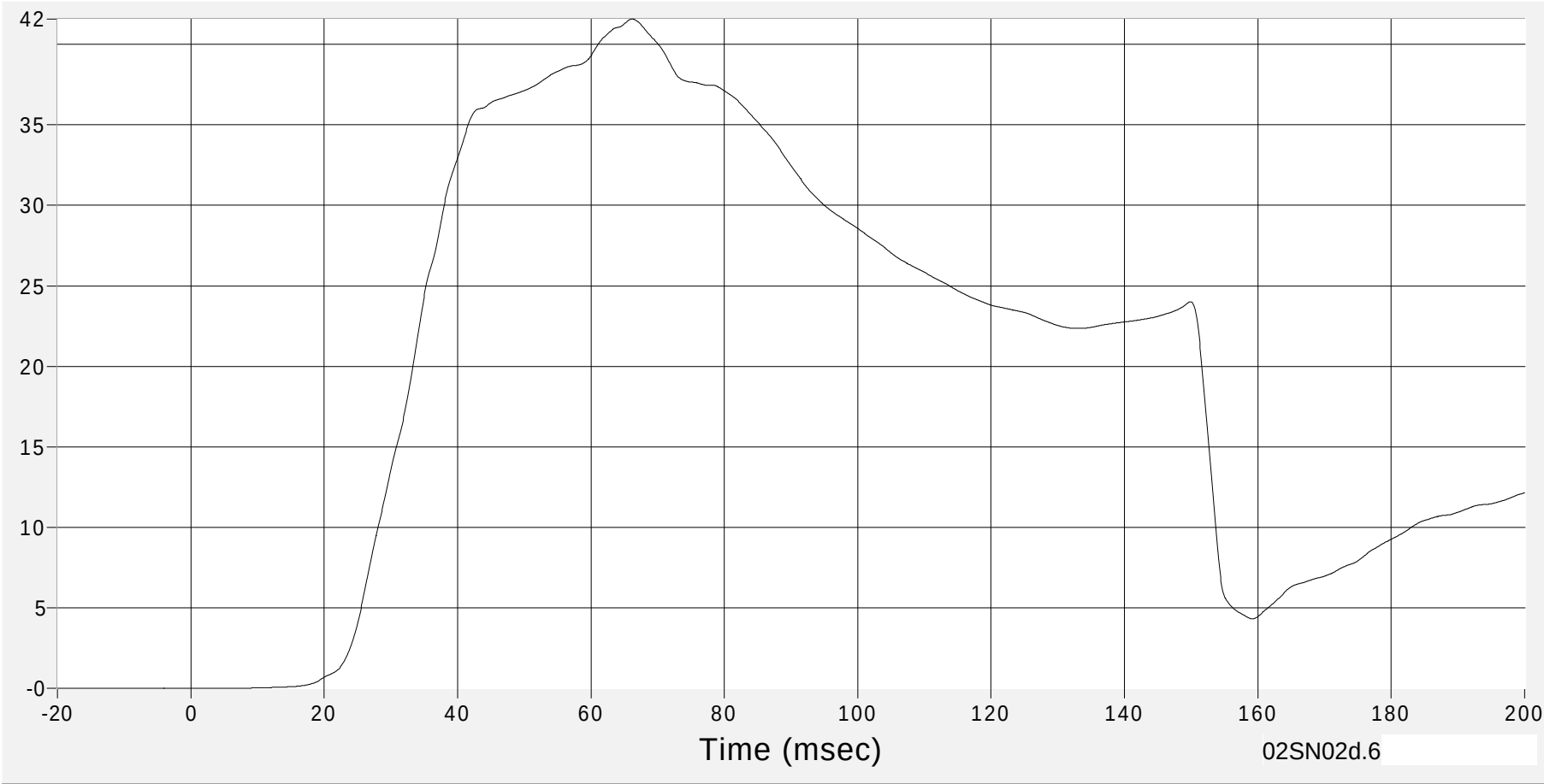
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Lower Rib (Y) Velocity

Velocity (km/h) CFC180

Max 41.6 km/h at 66.2 msec
Min 0.0 km/h at 0.0 msec

B-16



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20 December 2001

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Vehicle Crashworthiness Lab

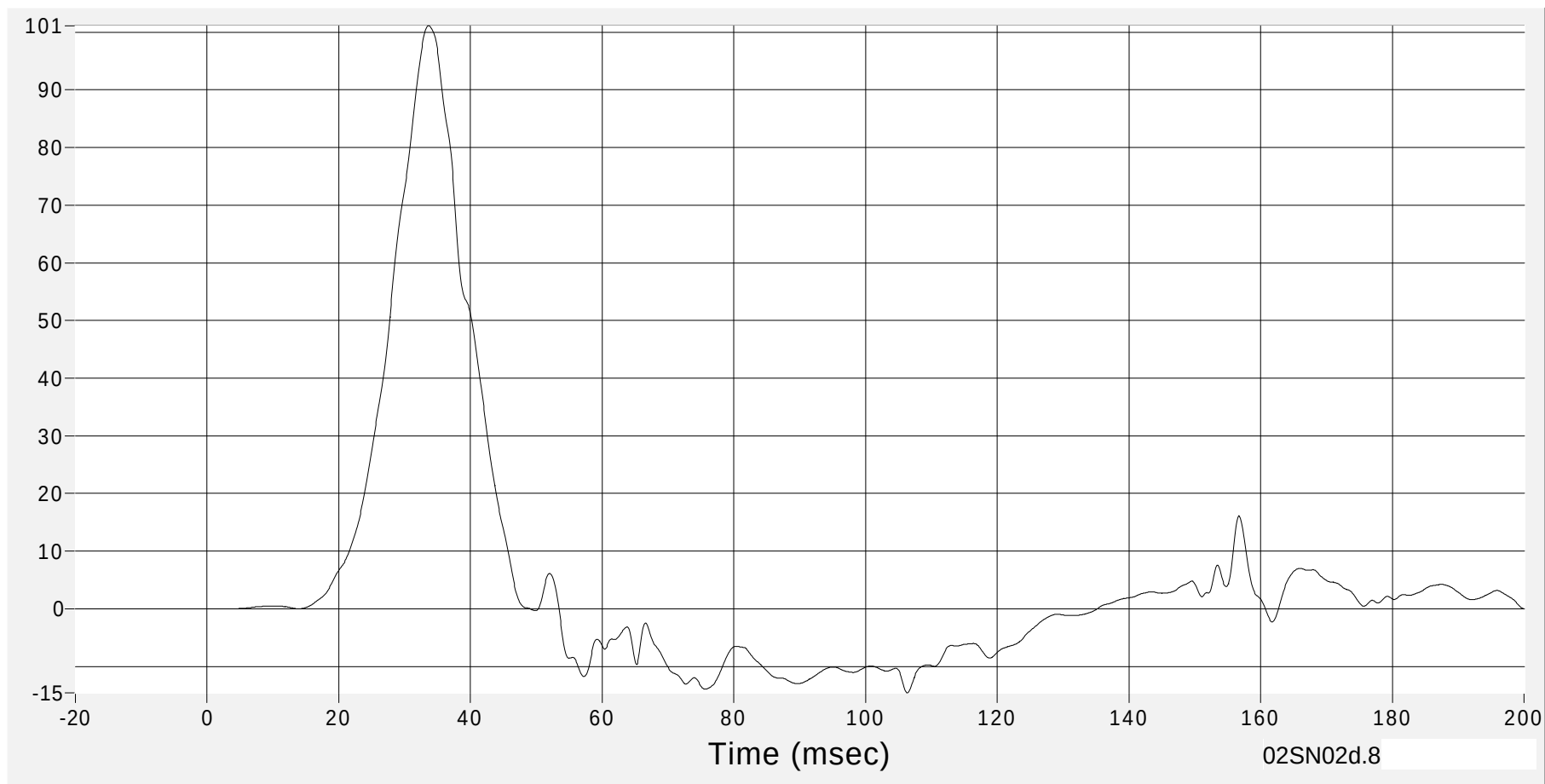
Driver Lower Spine (Y) Acceleration

Acceleration (G's) CFC180

Max 101.1 G's at 33.6 msec

Min -14.6 G's at 106.3 msec

B-17



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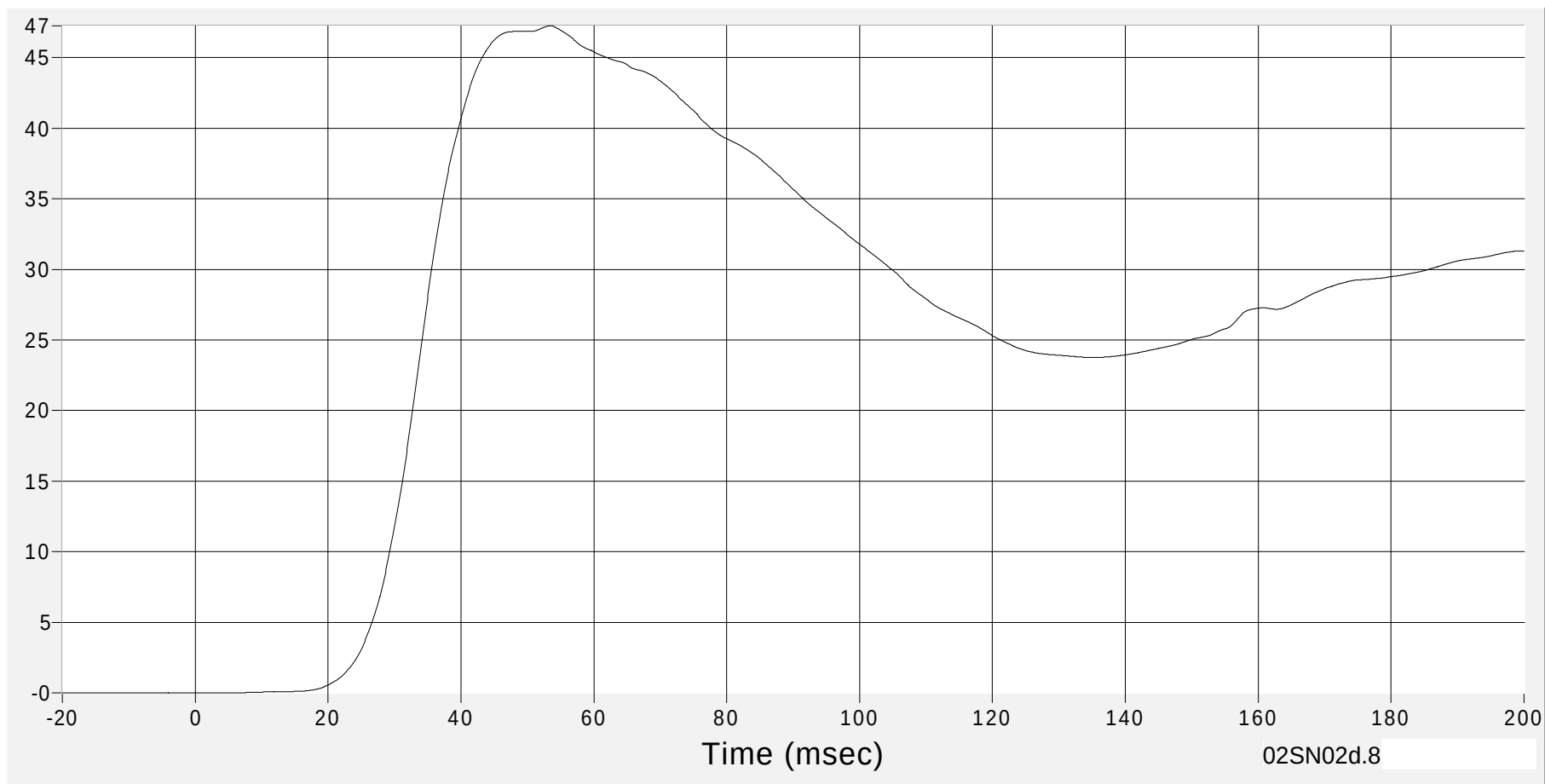
Driver Lower Spine (Y) Velocity

Velocity (km/h) CFC180

Max 47.3 km/h at 53.4 msec

Min 0.0 km/h at 2.2 msec

B-18



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20 December 2001

Medical College of Wisconsin
Vehicle Crashworthiness Lab

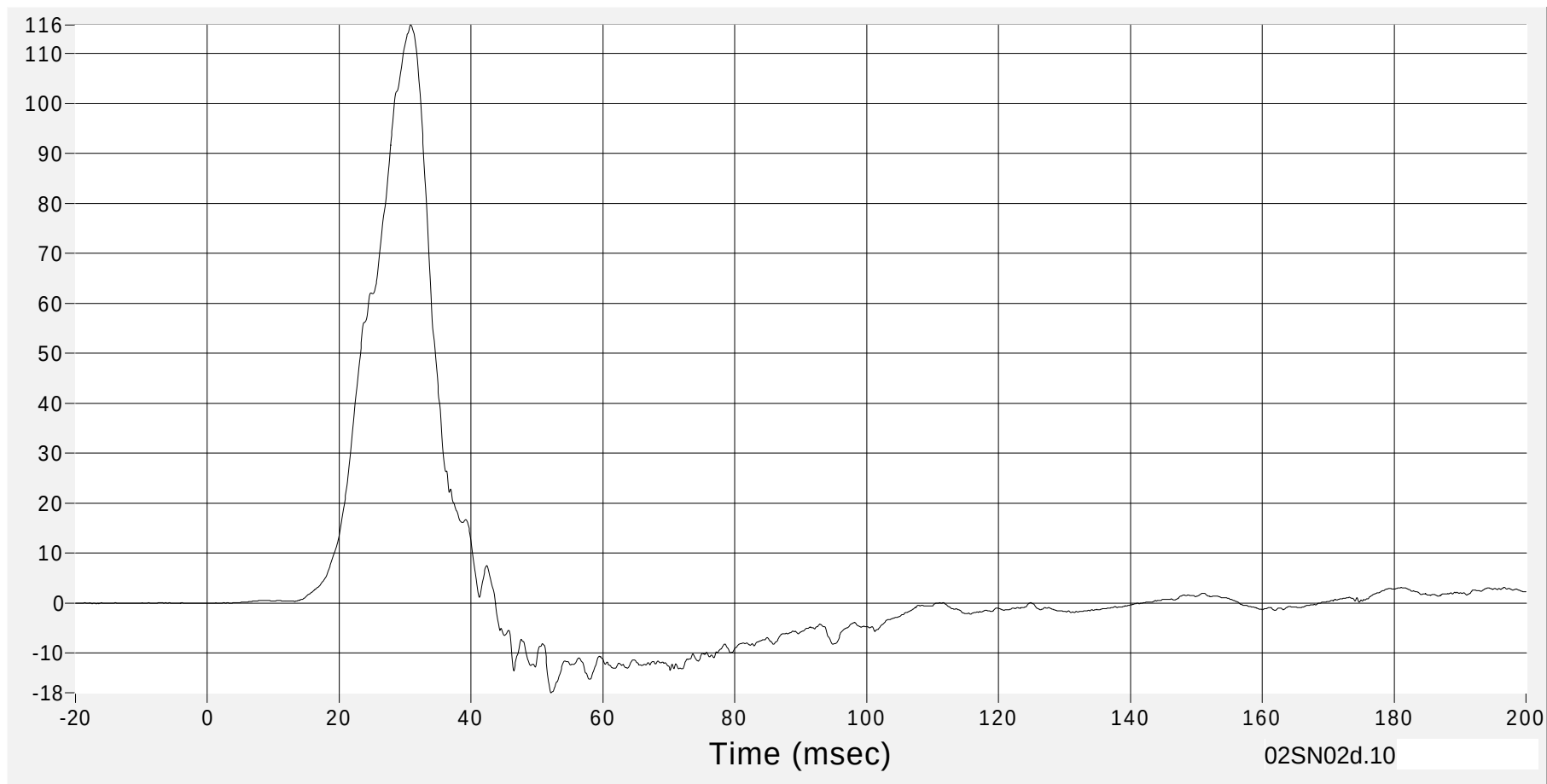
Driver Pelvic (Y) Acceleration

Acceleration (G's) CFC1000

Max 115.7 G's at 30.9 msec

Min -17.9 G's at 52.2 msec

B-19



02SN02 - 2002 NISSAN ALTIMA 4 DOOR SEDAN
20 December 2001

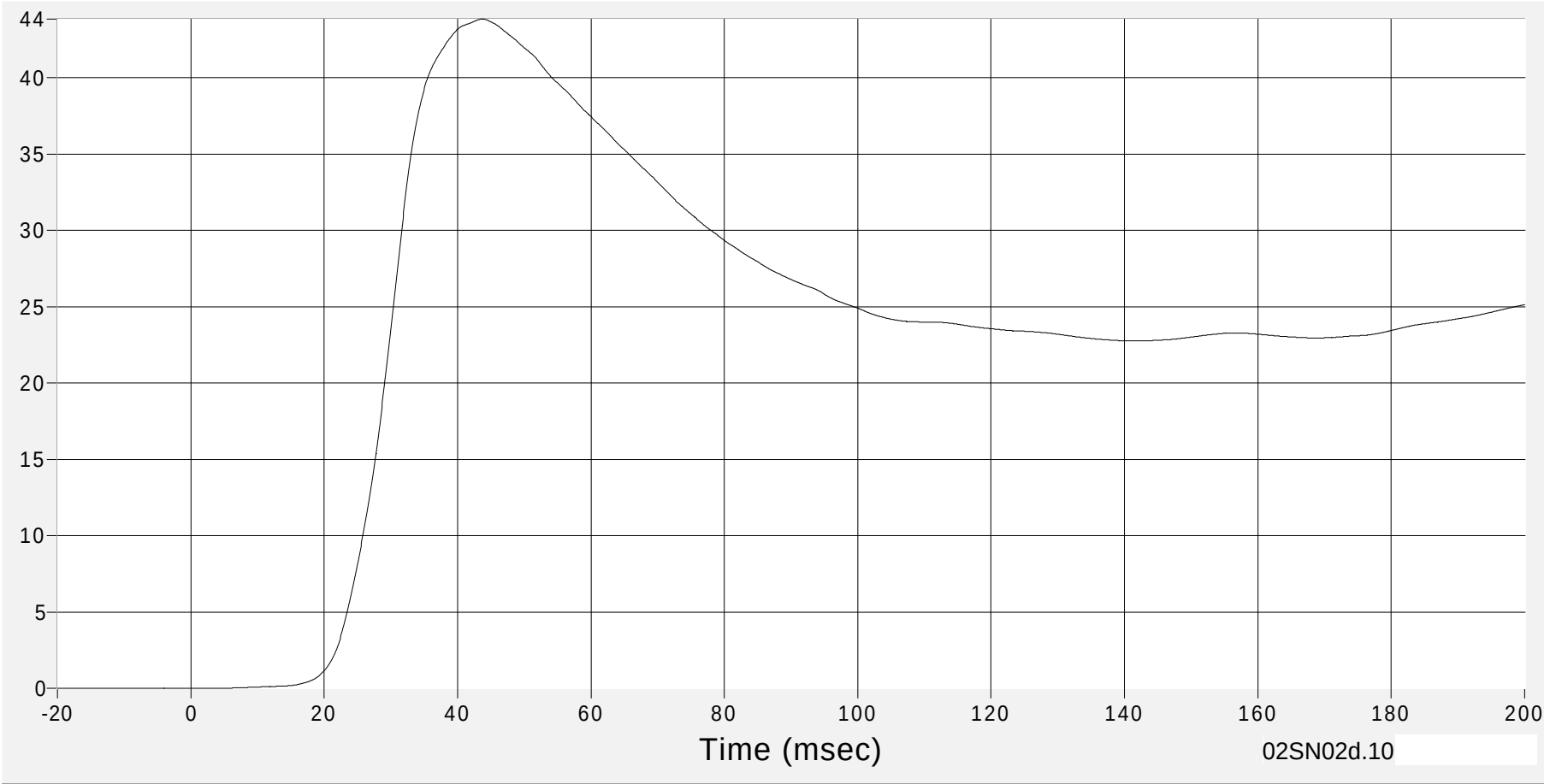
Medical College of Wisconsin
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Driver Pelvic (Y) Velocity

Velocity (km/h) CFC180

Max 43.9 km/h at 43.7 msec
Min 0.0 km/h at 0.0 msec

B-20



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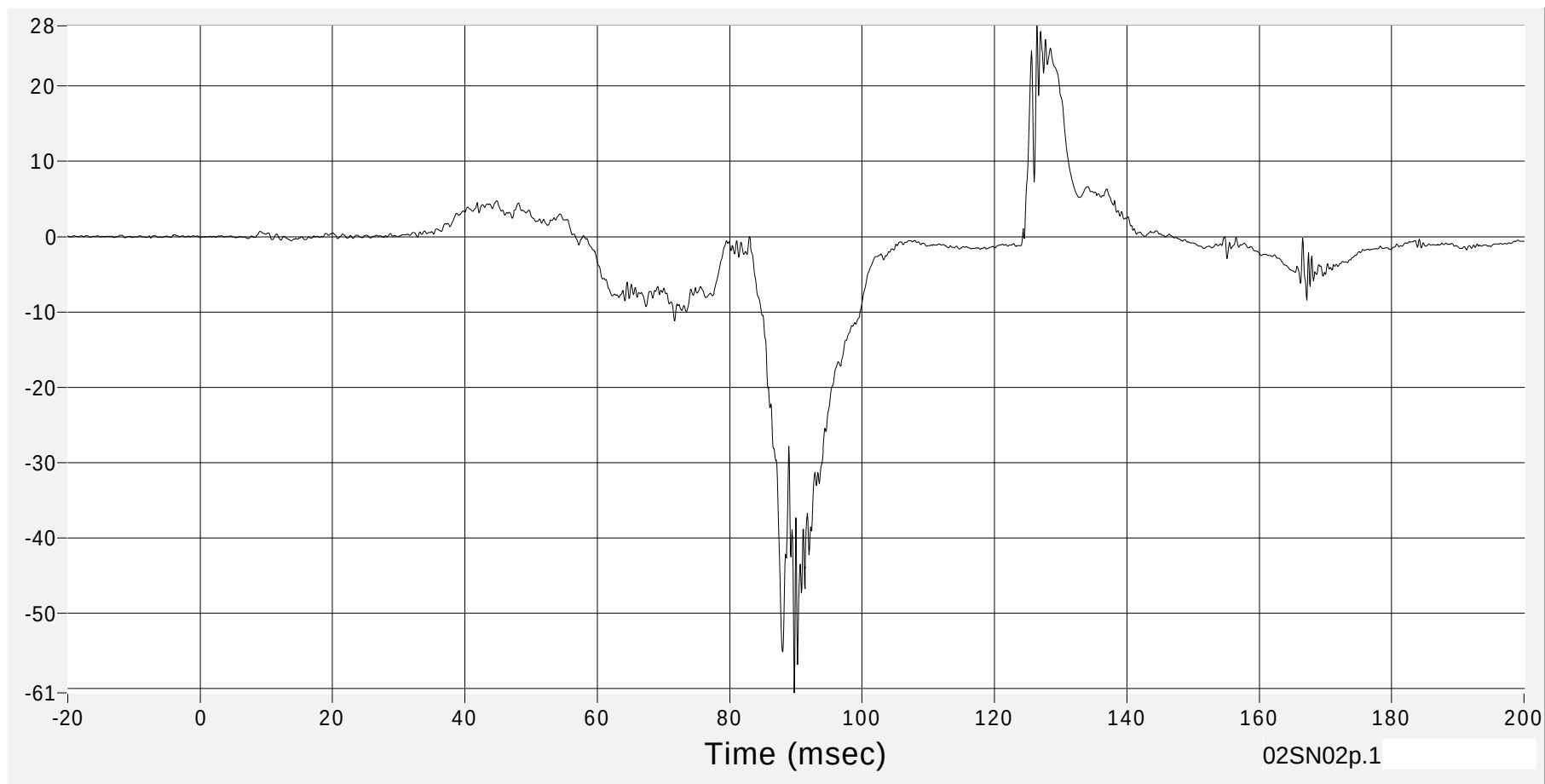
Passenger Head CG (X) Acceleration

Acceleration (G's) CFC1000

Max 28.0 G's at 126.4 msec

Min -60.6 G's at 89.8 msec

B-21



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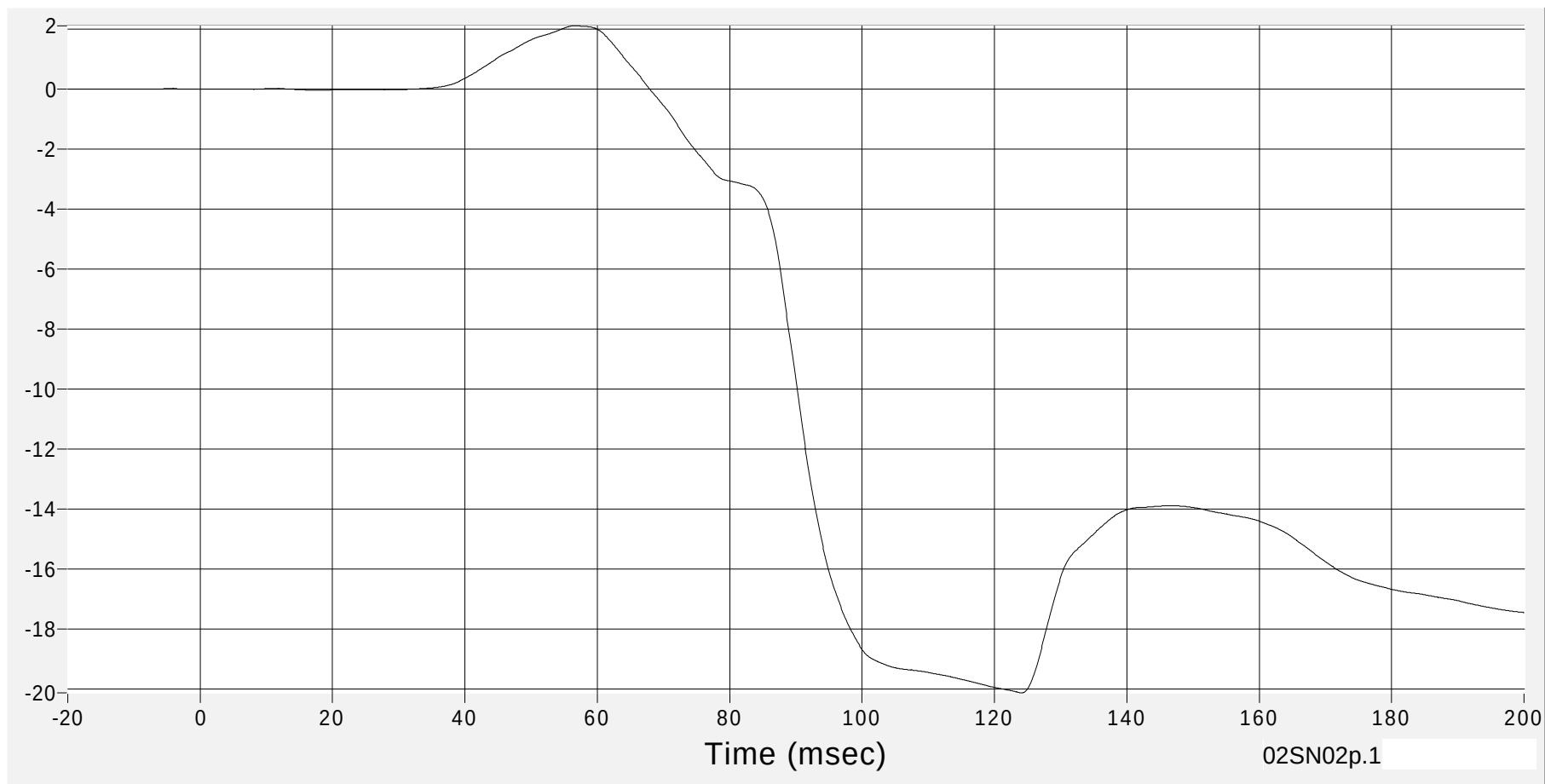
Passenger Head CG (X) Velocity

Velocity (km/h) CFC180

Max 2.1 km/h at 56.6 msec

Min -20.1 km/h at 124.1 msec

B-22



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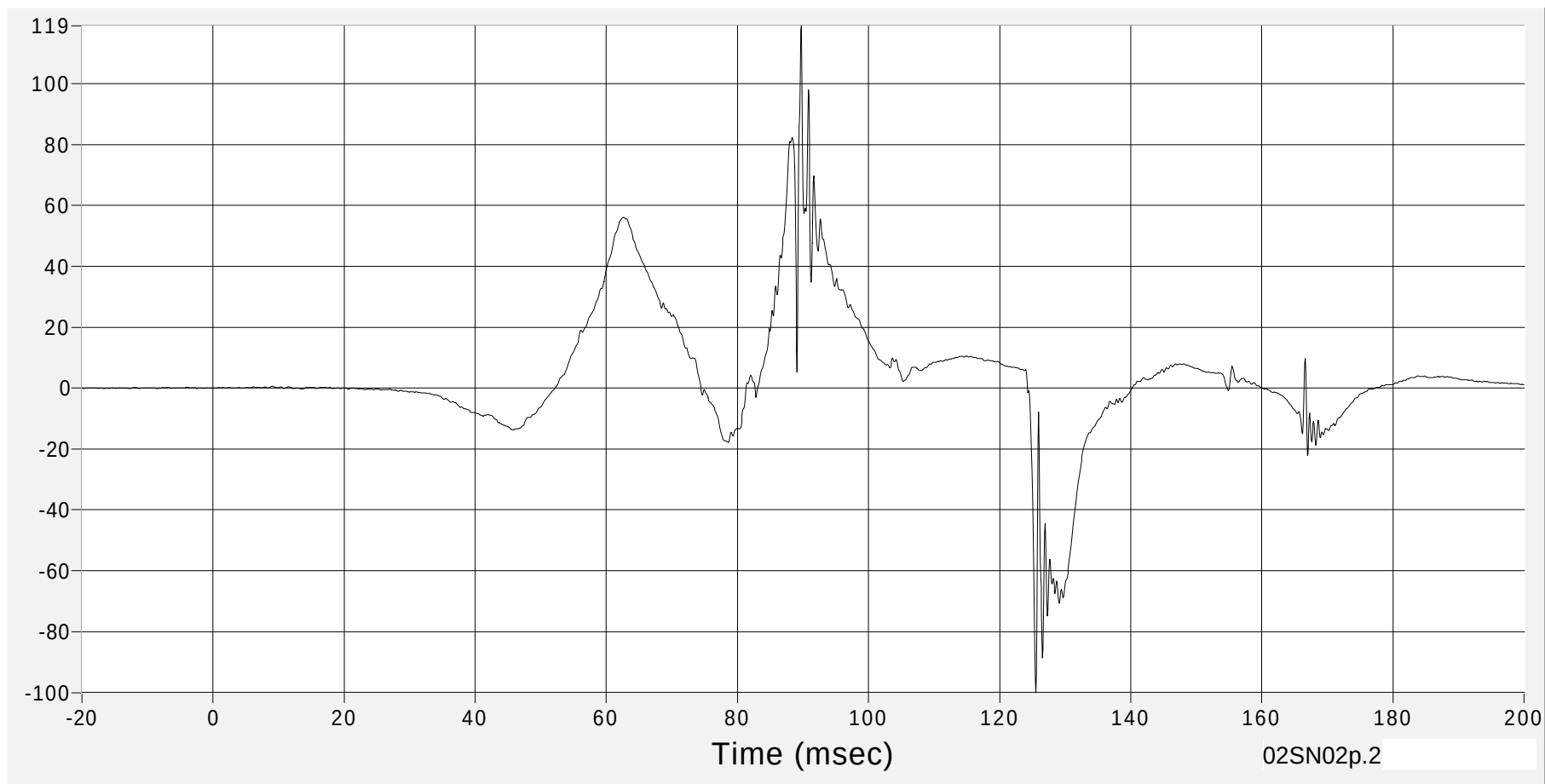
Passenger Head CG (Y) Acceleration

Acceleration (G's) CFC1000

Max 119.0 G's at 89.8 msec

Min -100.2 G's at 125.5 msec

B-23



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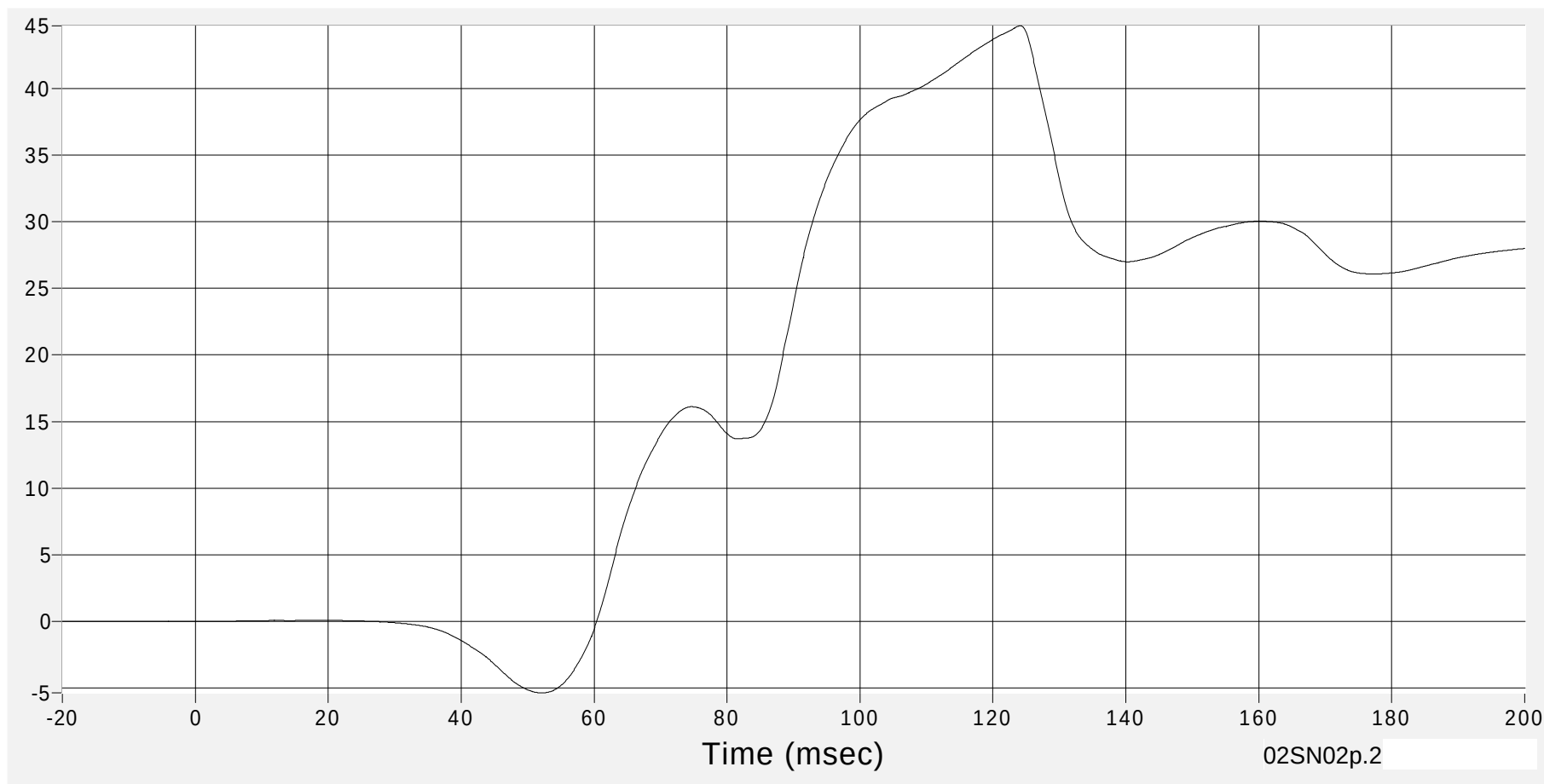
Passenger Head CG (Y) Velocity

Velocity (km/h) CFC180

Max 44.7 km/h at 124.1 msec

Min -5.4 km/h at 52.2 msec

B-24



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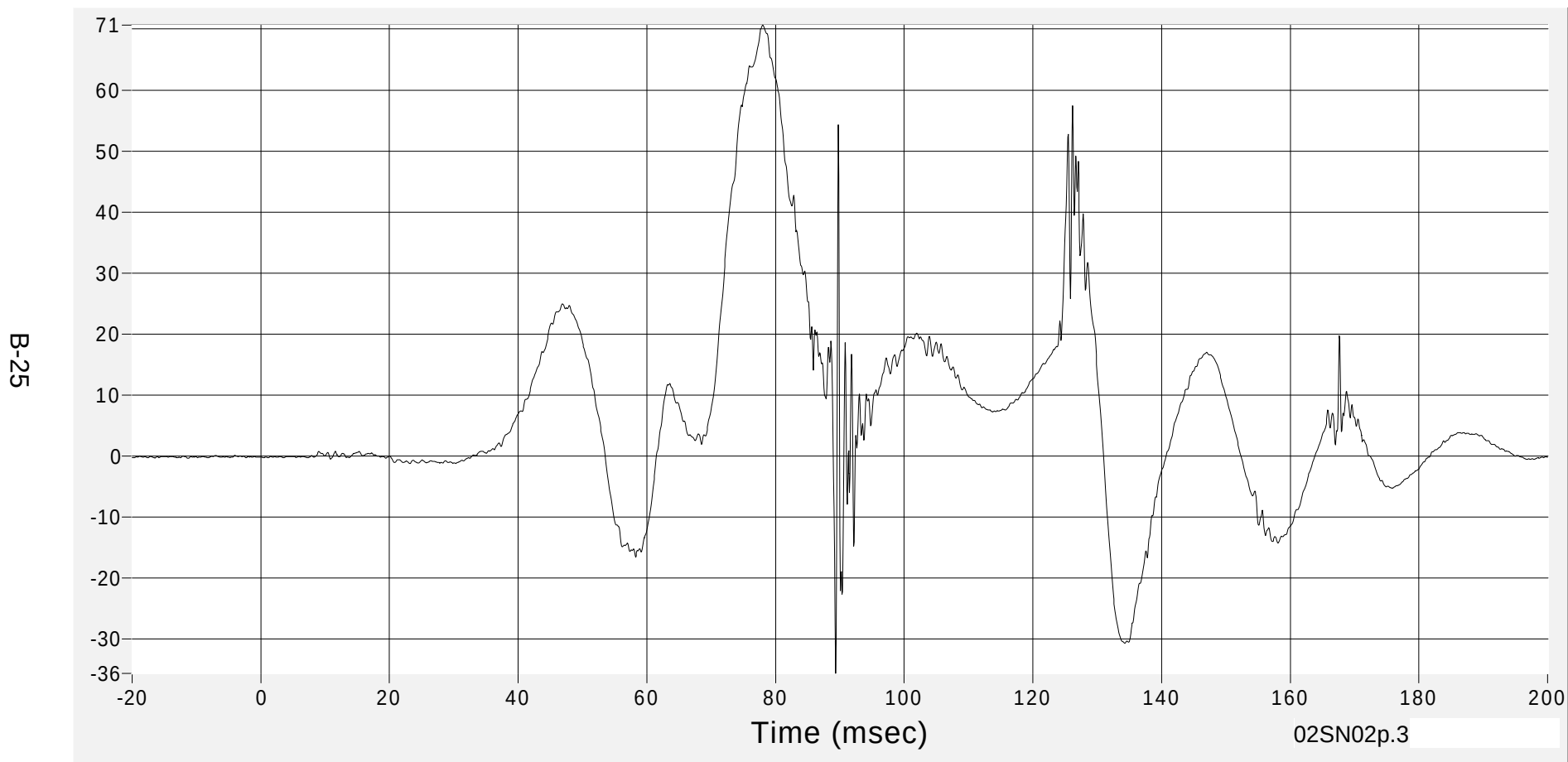
Medical College of Wisconsin
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Passenger Head CG (Z) Acceleration

Acceleration (G's) CFC1000

Max 70.6 G's at 78.0 msec

Min -35.6 G's at 89.4 msec



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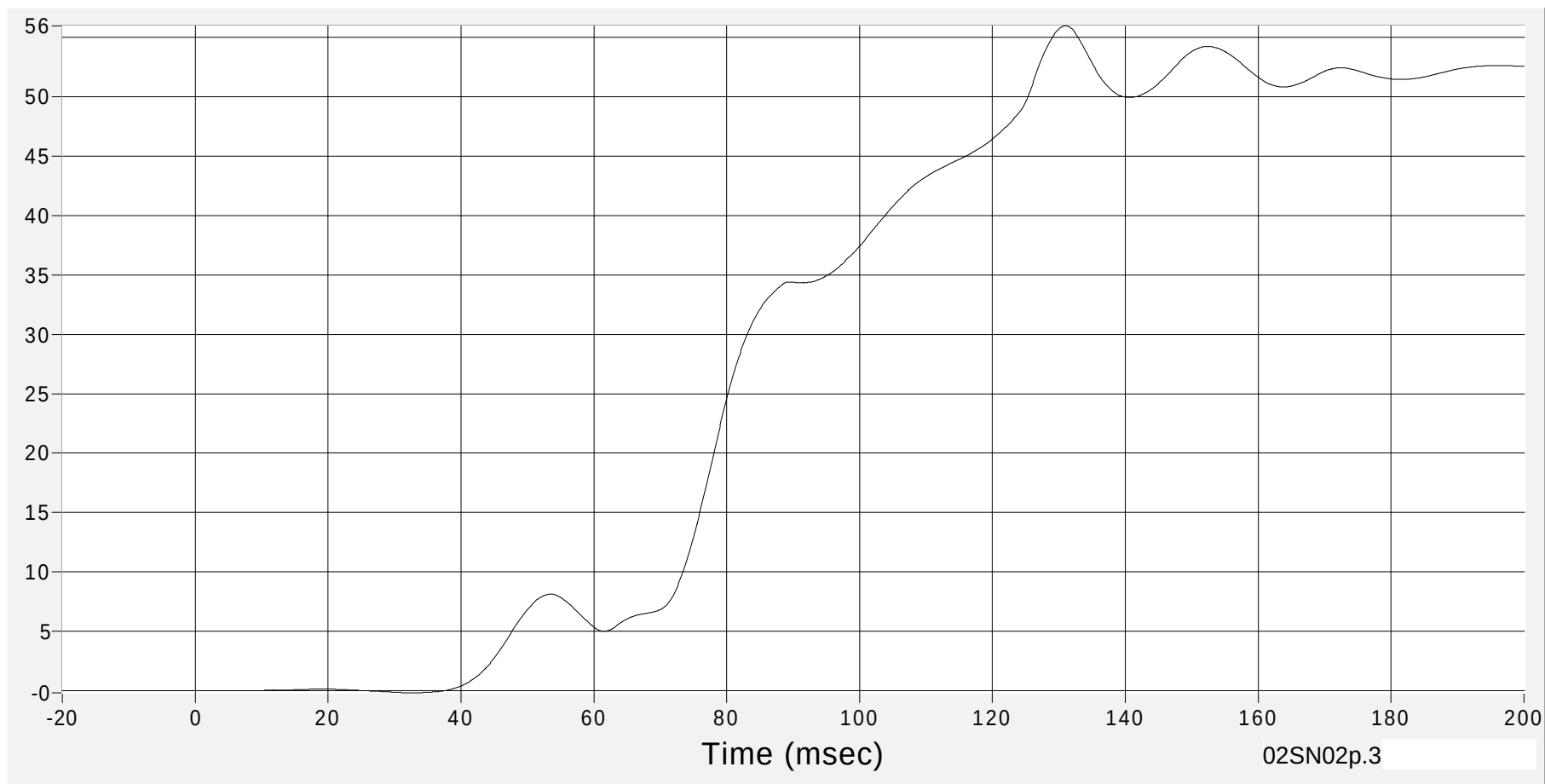
Passenger Head CG (Z) Velocity

Velocity (km/h) CFC180

Max 56.0 km/h at 131.0 msec

Min -0.2 km/h at 32.6 msec

B-26



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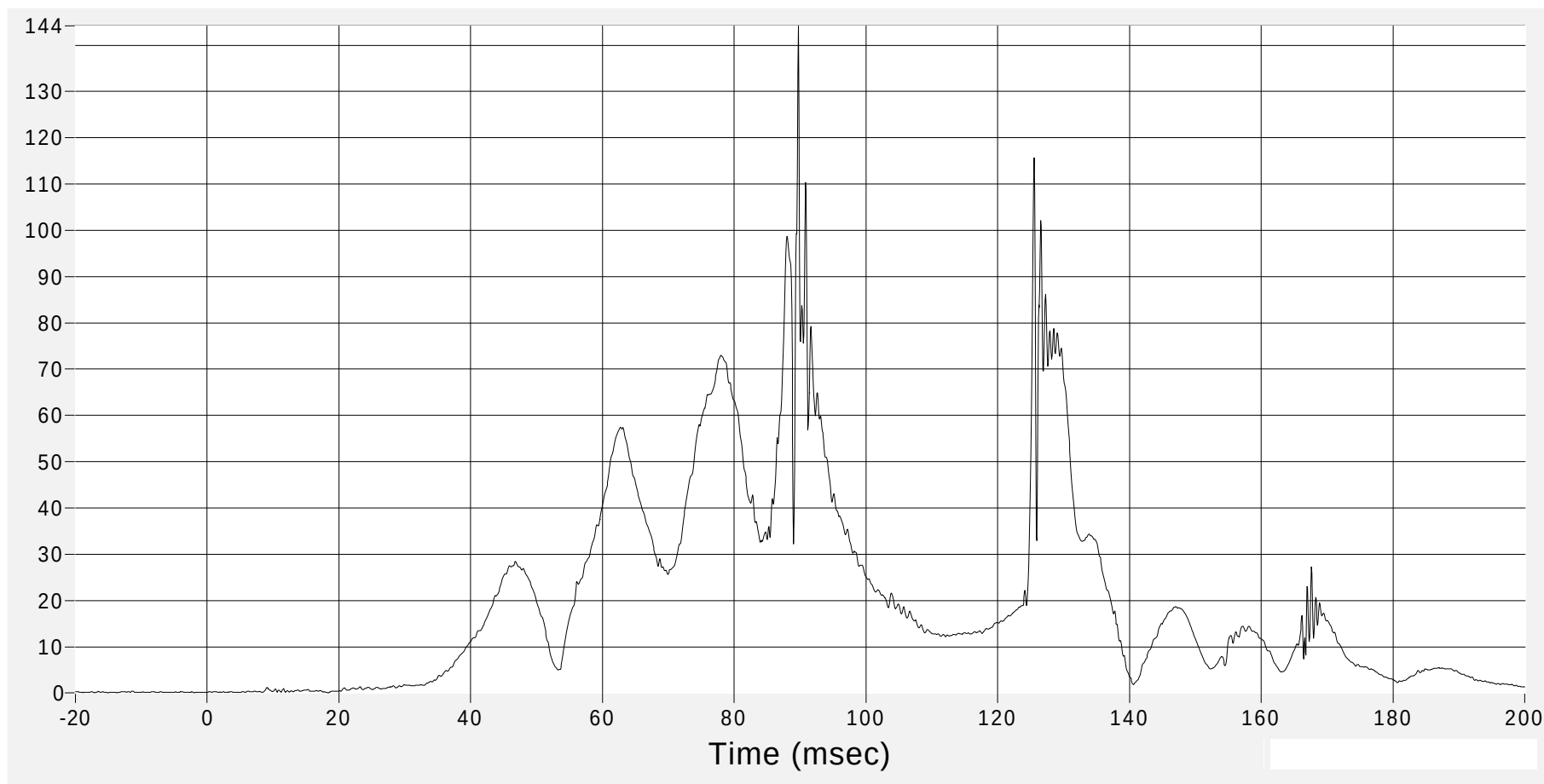
Passenger Head Resultant Acceleration

Acceleration (G's) CFC1000

Max 144.2 G's at 89.8 msec

Min 0.0 G's at 18.4 msec

B-27



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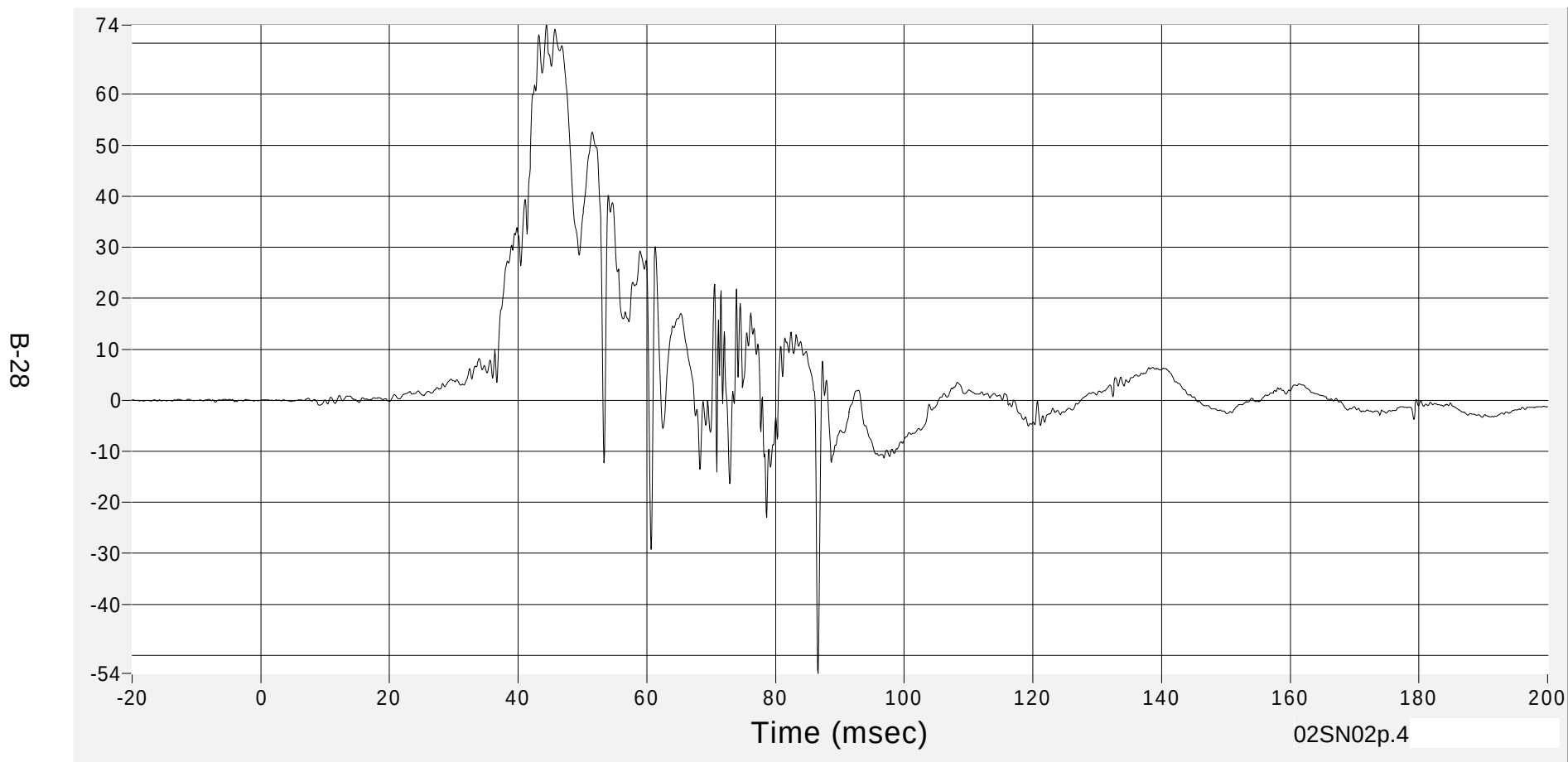
Medical College of Wisconsin
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Passenger Upper Rib (Y) Acceleration

Acceleration (G's) CFC1000

Max 73.5 G's at 44.3 msec

Min -53.5 G's at 86.6 msec



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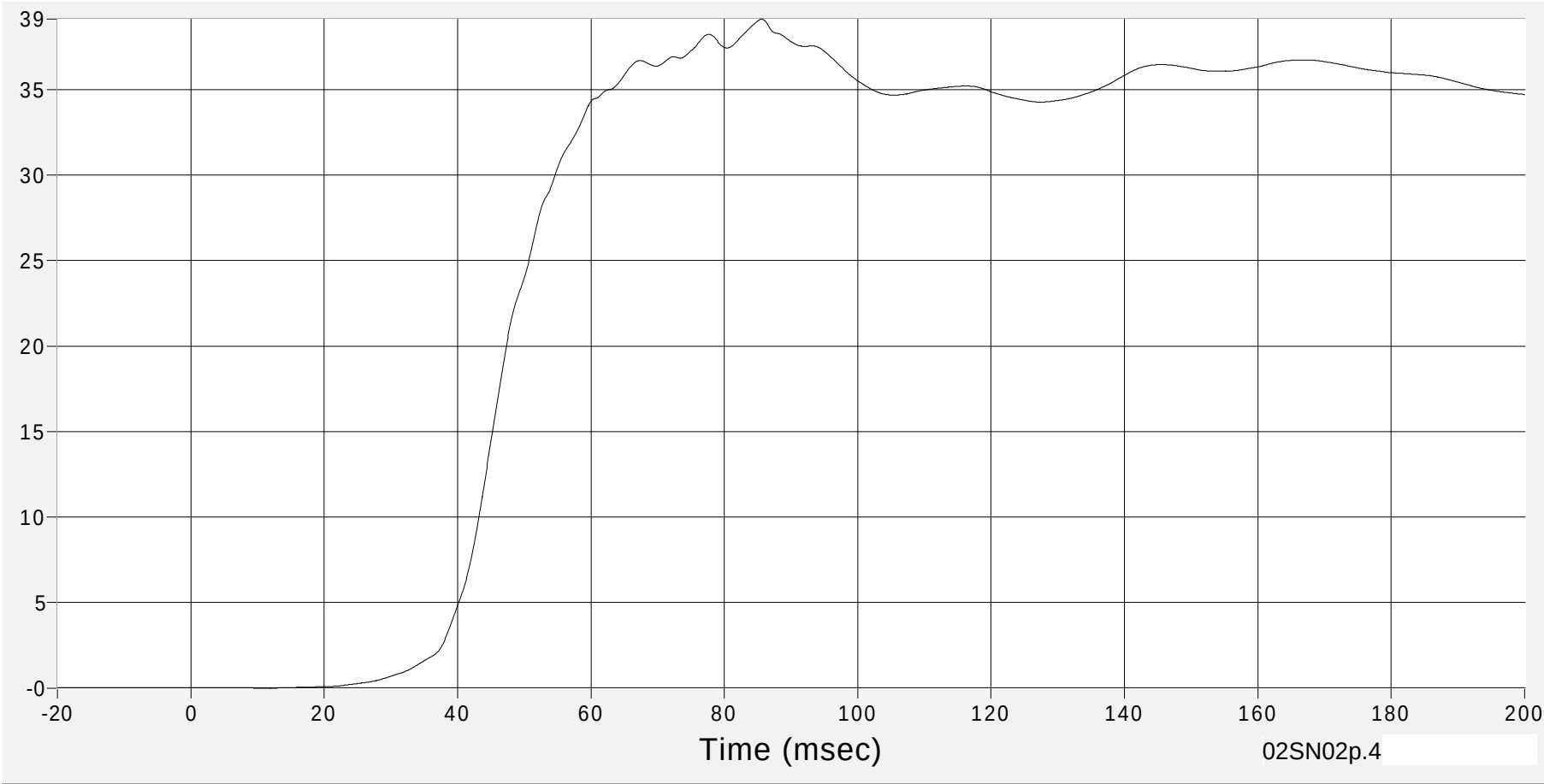
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Upper Rib (Y) Velocity

Velocity (km/h) CFC180

Max 39.1 km/h at 85.6 msec
Min 0.0 km/h at 11.0 msec

B-29



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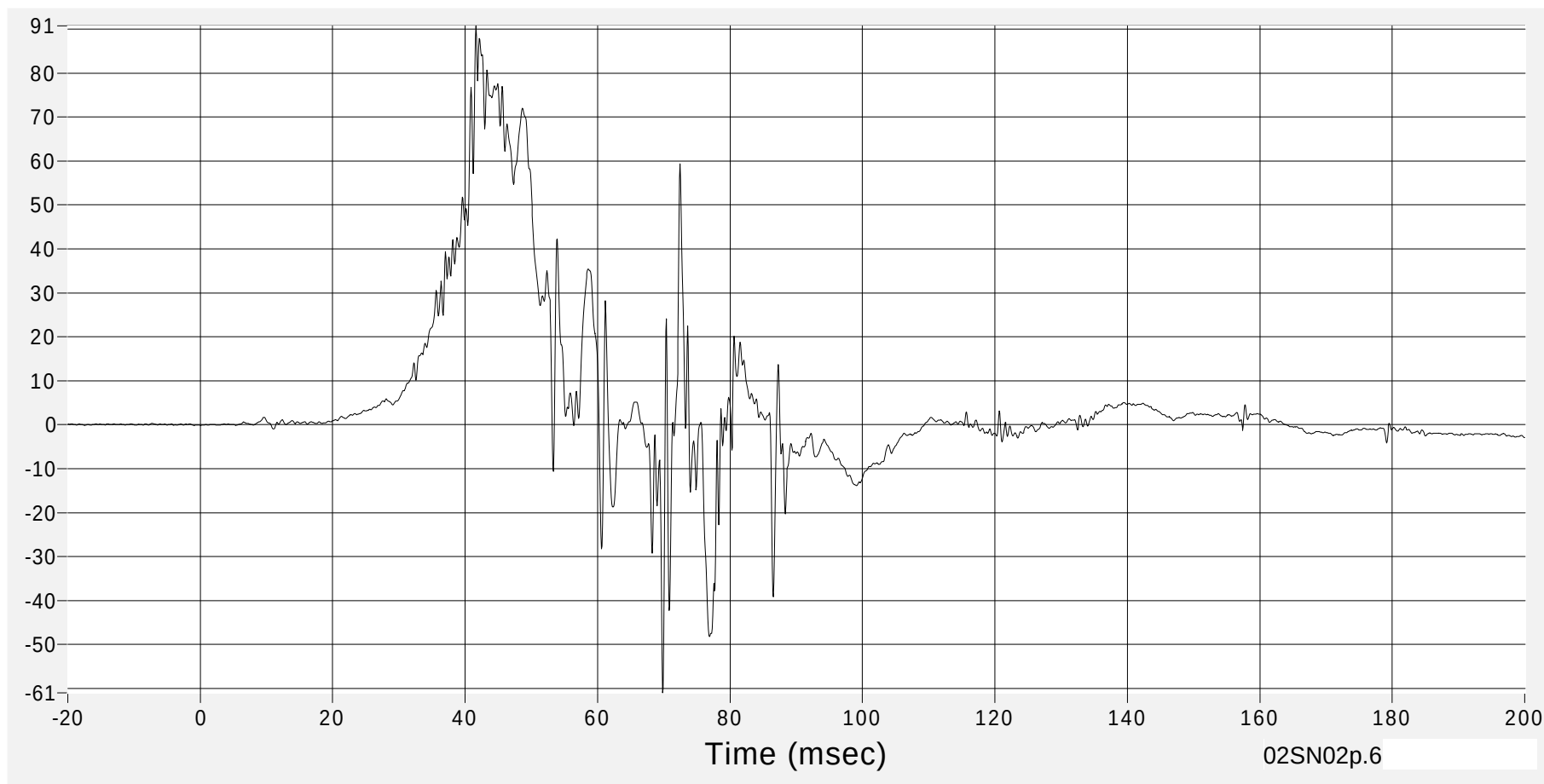
Medical College of Wisconsin
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Passenger Lower Rib (Y) Acceleration

Acceleration (G's) CFC1000

Max 90.7 G's at 41.6 msec
Min -61.0 G's at 69.8 msec

B-30



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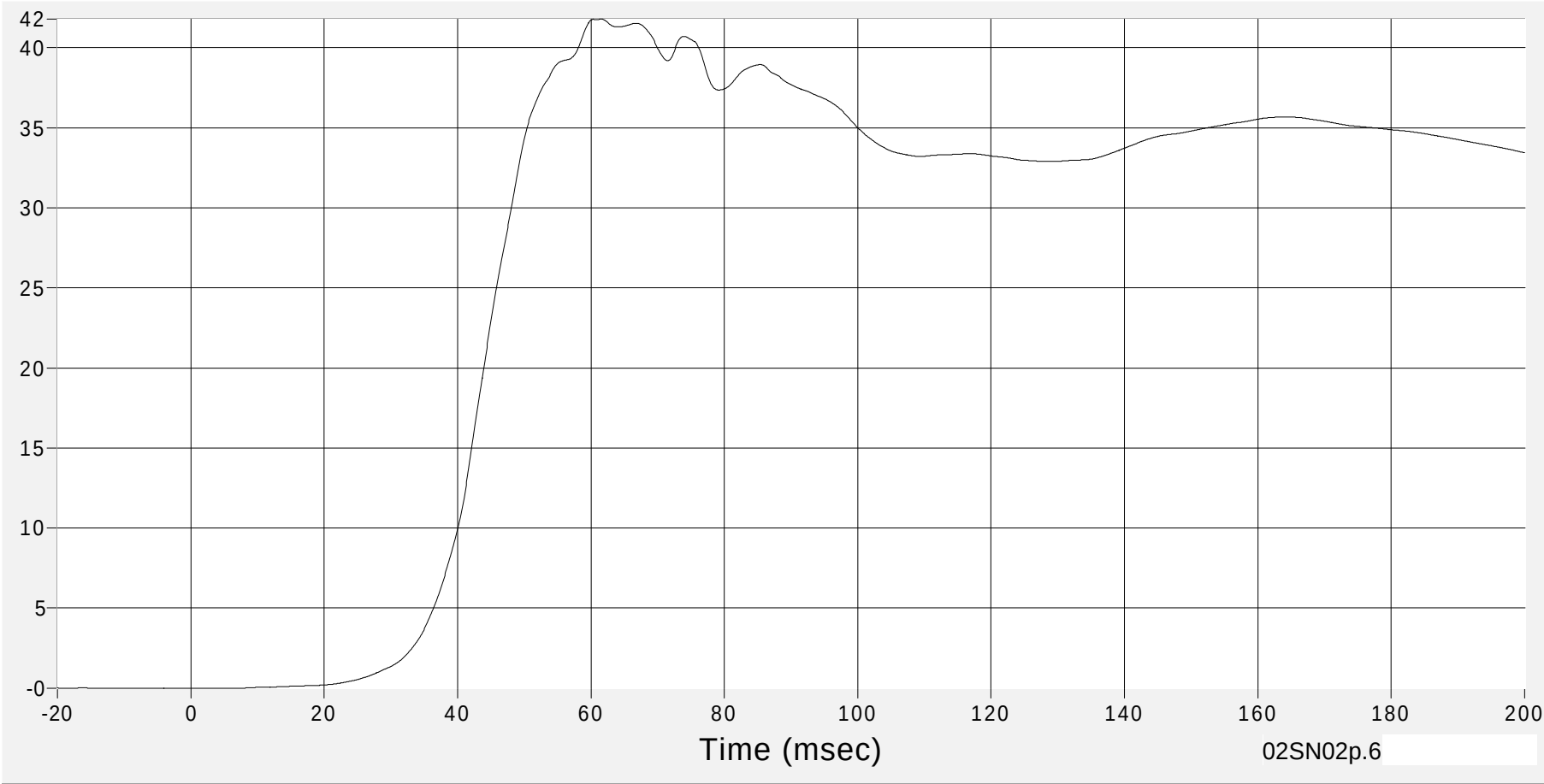
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Lower Rib (Y) Velocity

Velocity (km/h) CFC180

Max 41.8 km/h at 61.6 msec
Min 0.0 km/h at 3.4 msec

B-31



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20 December 2001

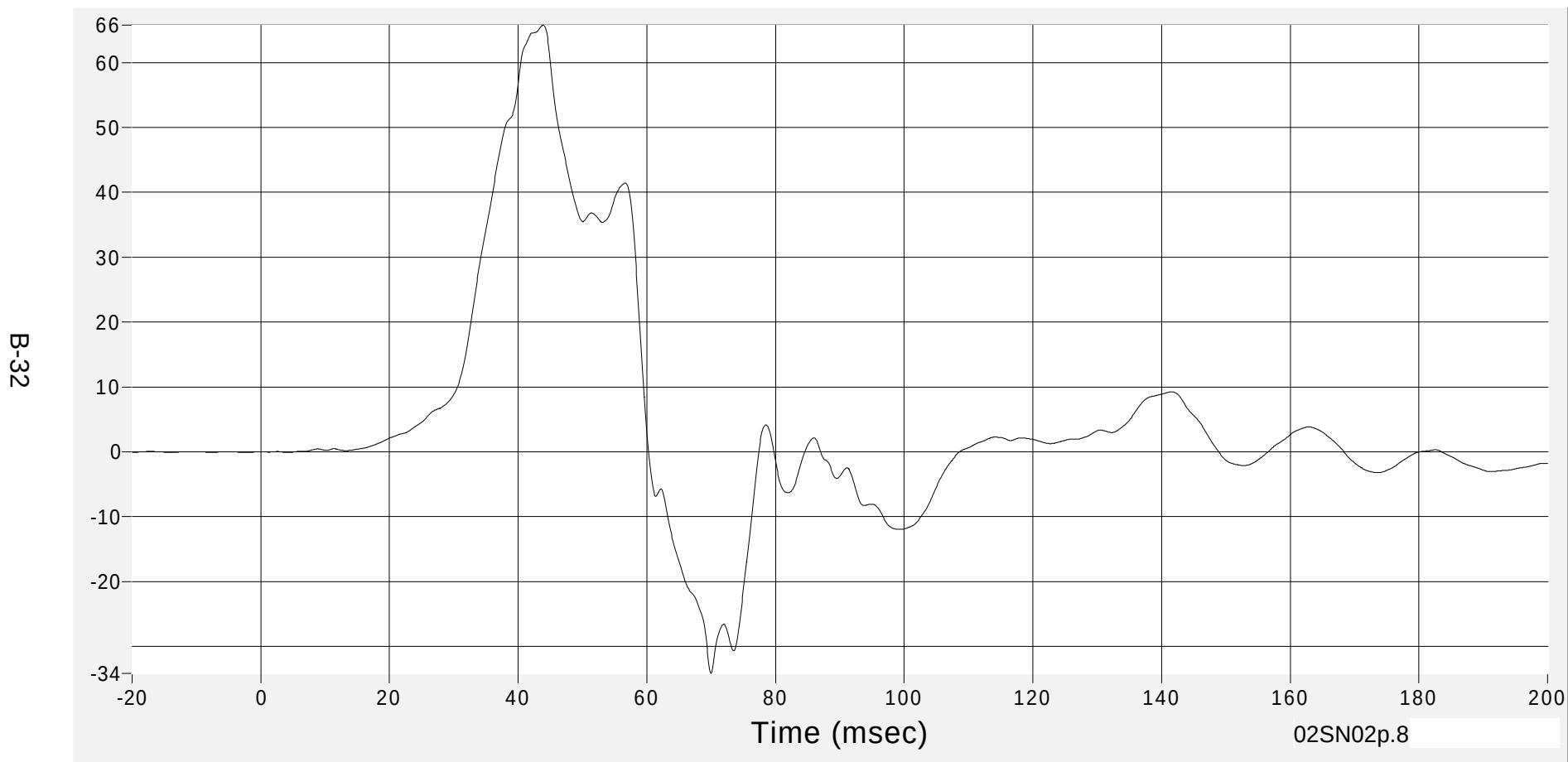
Medical College of Wisconsin
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Passenger Lower Spine (Y) Acceleration

Acceleration (G's) CFC180

Max 65.8 G's at 43.8 msec

Min -34.2 G's at 70.0 msec



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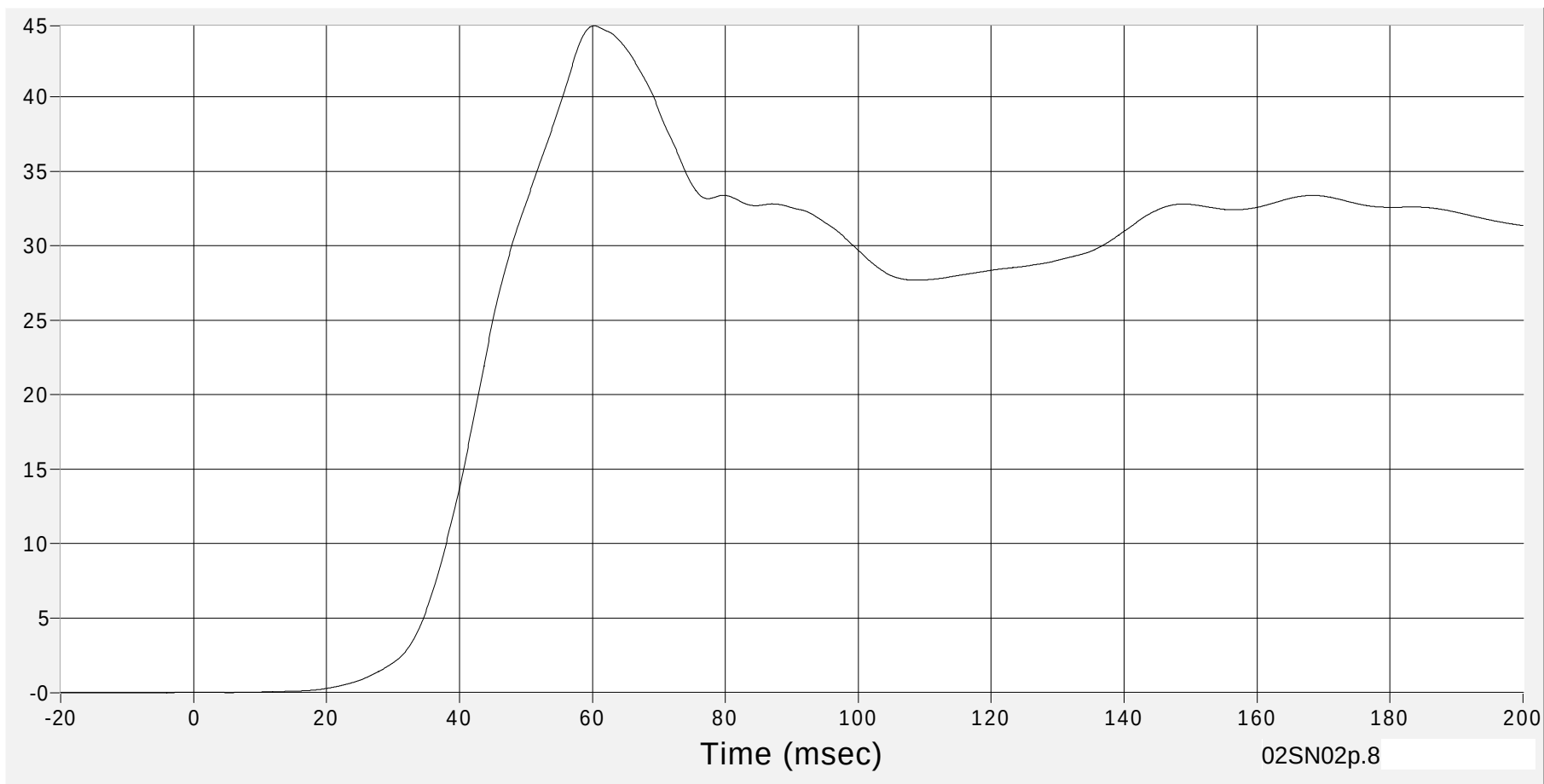
Passenger Lower Spine (Y) Velocity

Velocity (km/h) CFC180

Max 44.8 km/h at 60.2 msec

Min 0.0 km/h at 5.3 msec

B-33



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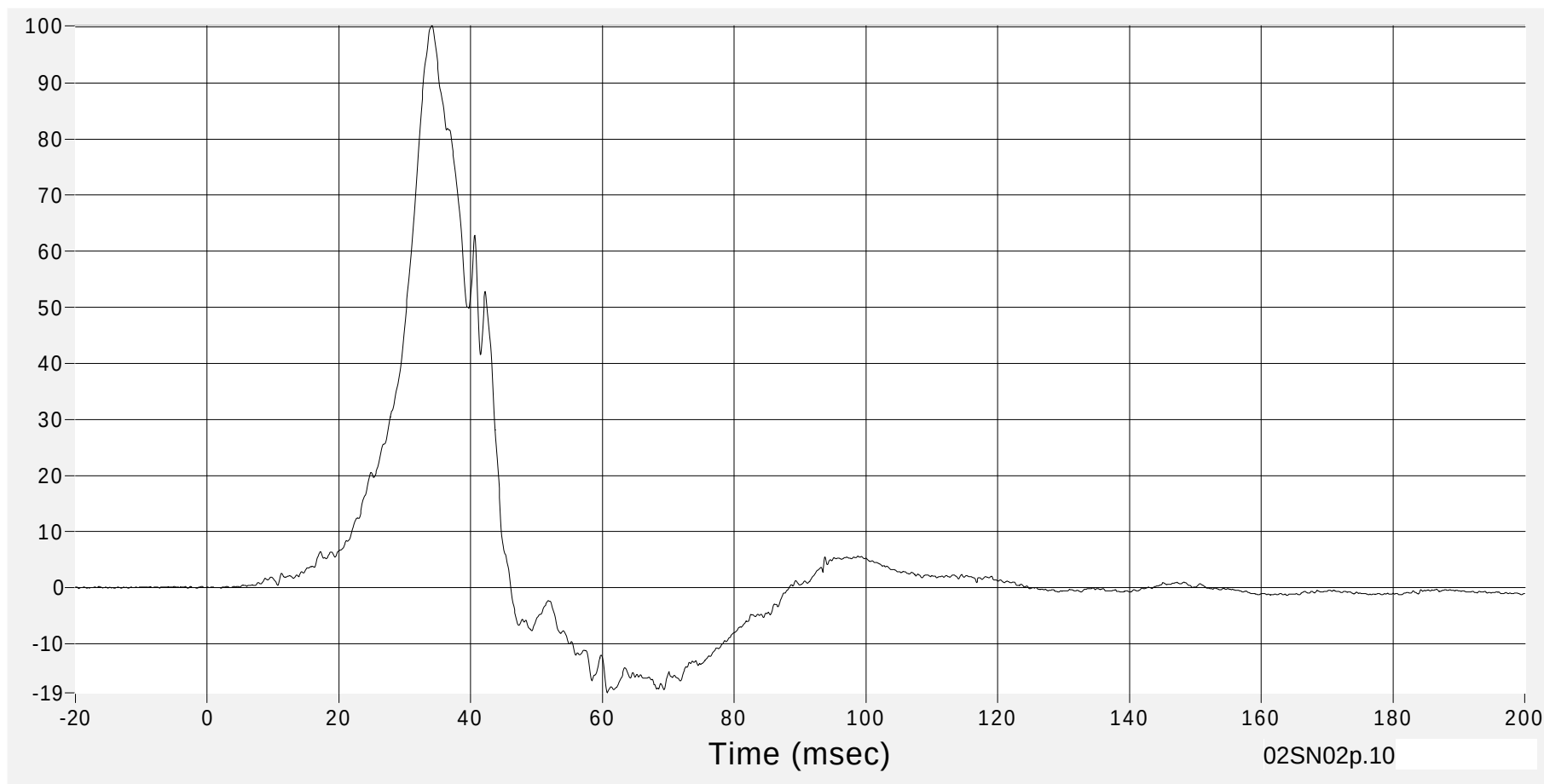
Passenger Pelvic (Y) Acceleration

Acceleration (G's) CFC1000

Max 100.2 G's at 34.1 msec

Min -18.8 G's at 60.7 msec

B-34



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20 December 2001

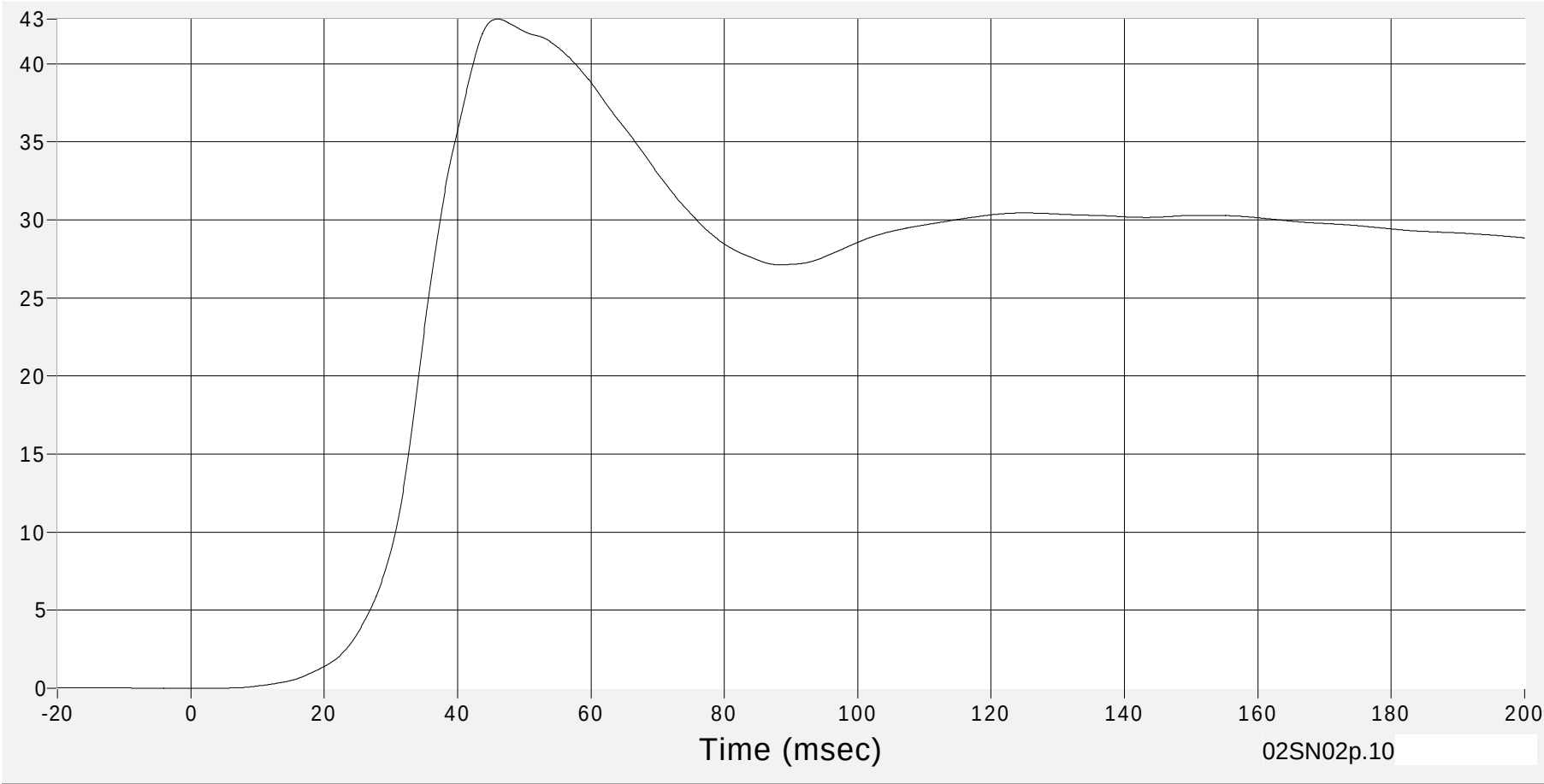
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Pelvic (Y) Velocity

Velocity (km/h) CFC180

Max 42.9 km/h at 46.0 msec
Min 0.0 km/h at 0.0 msec

B-35



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20 December 2001

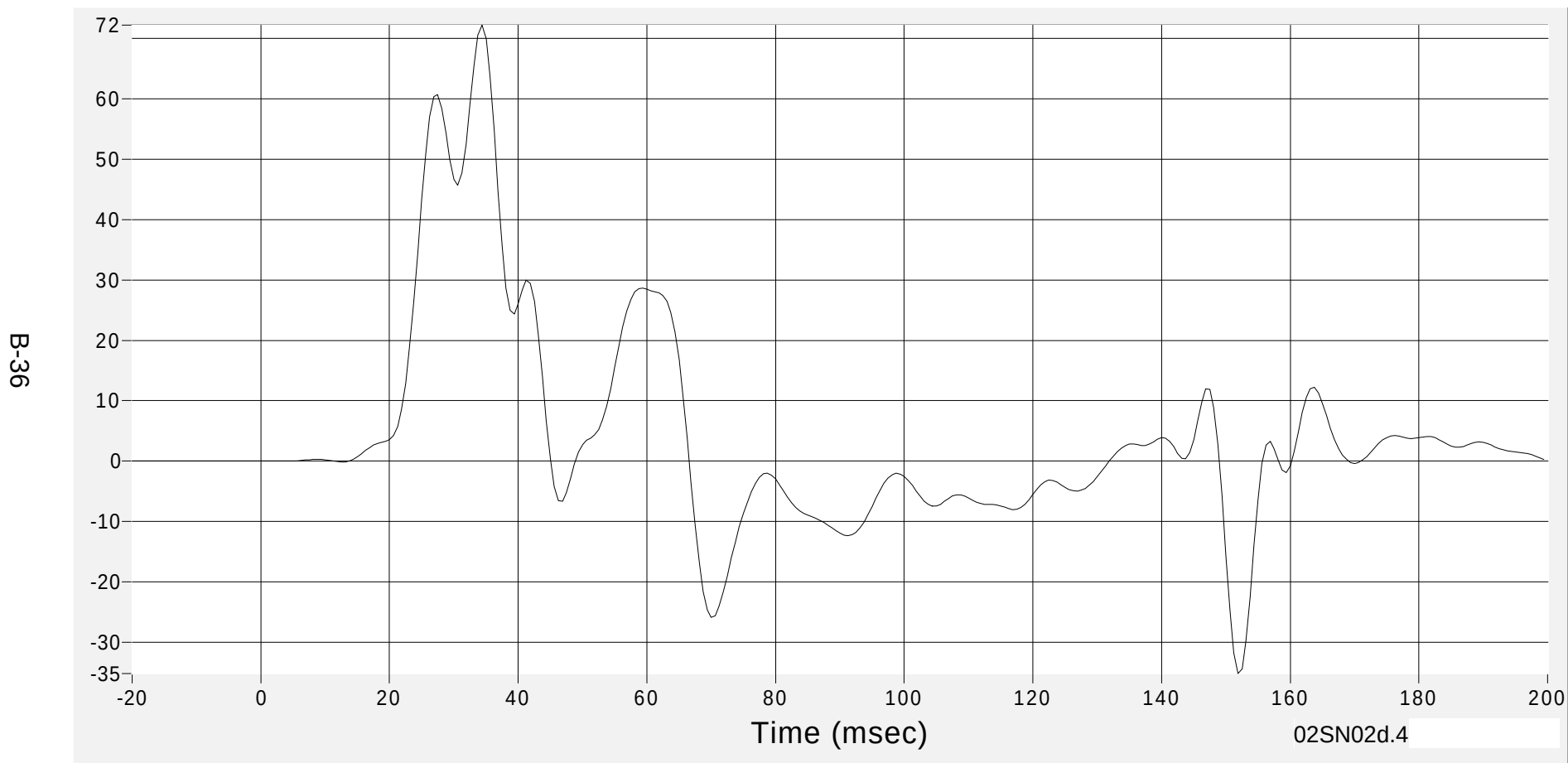
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Driver Upper Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 72.2 G's at 34.4 msec

Min -35.2 G's at 151.9 msec



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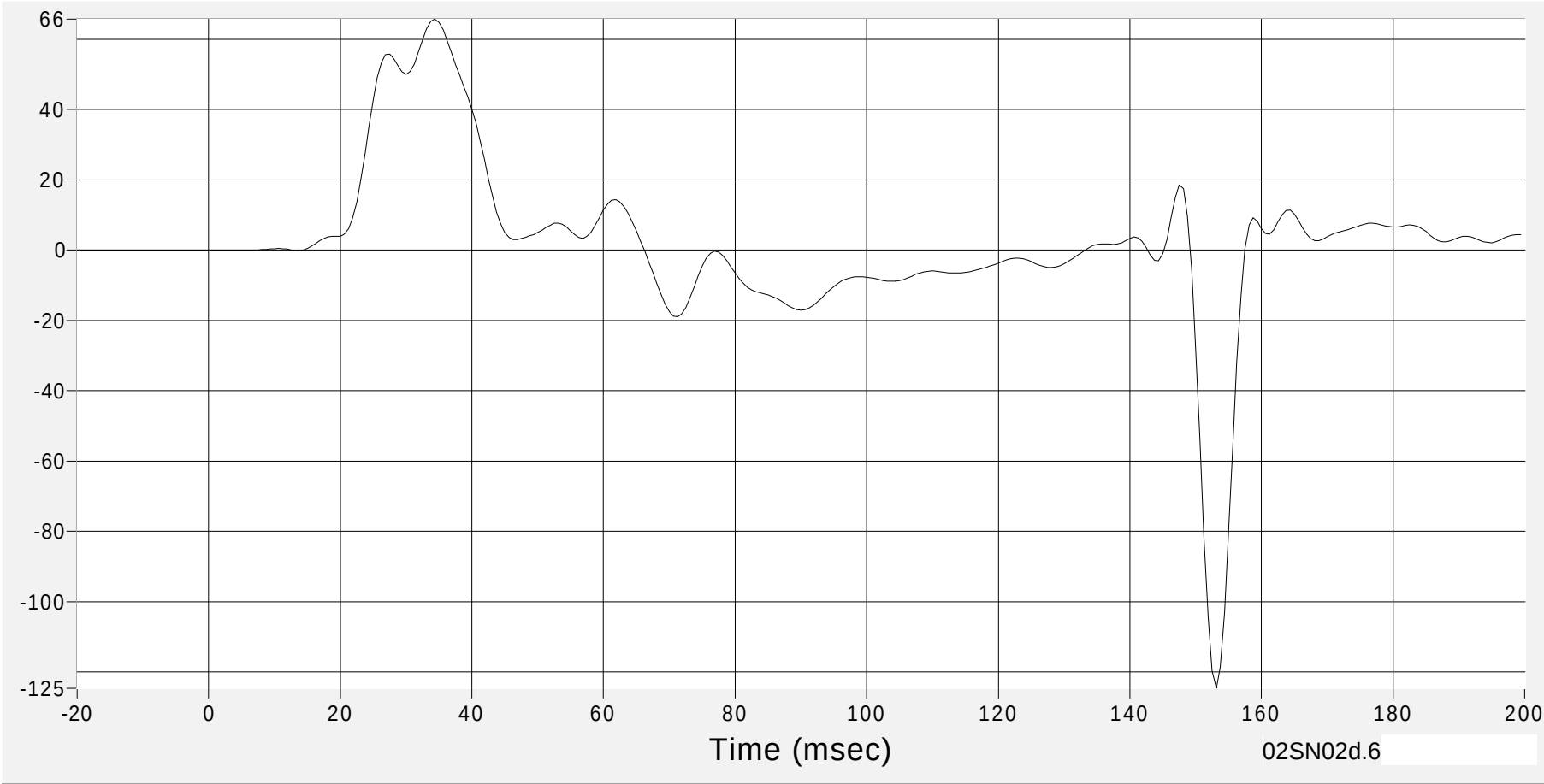
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Lower Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 65.7 G's at 34.4 msec
Min -124.6 G's at 153.1 msec

B-37



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20 December 2001

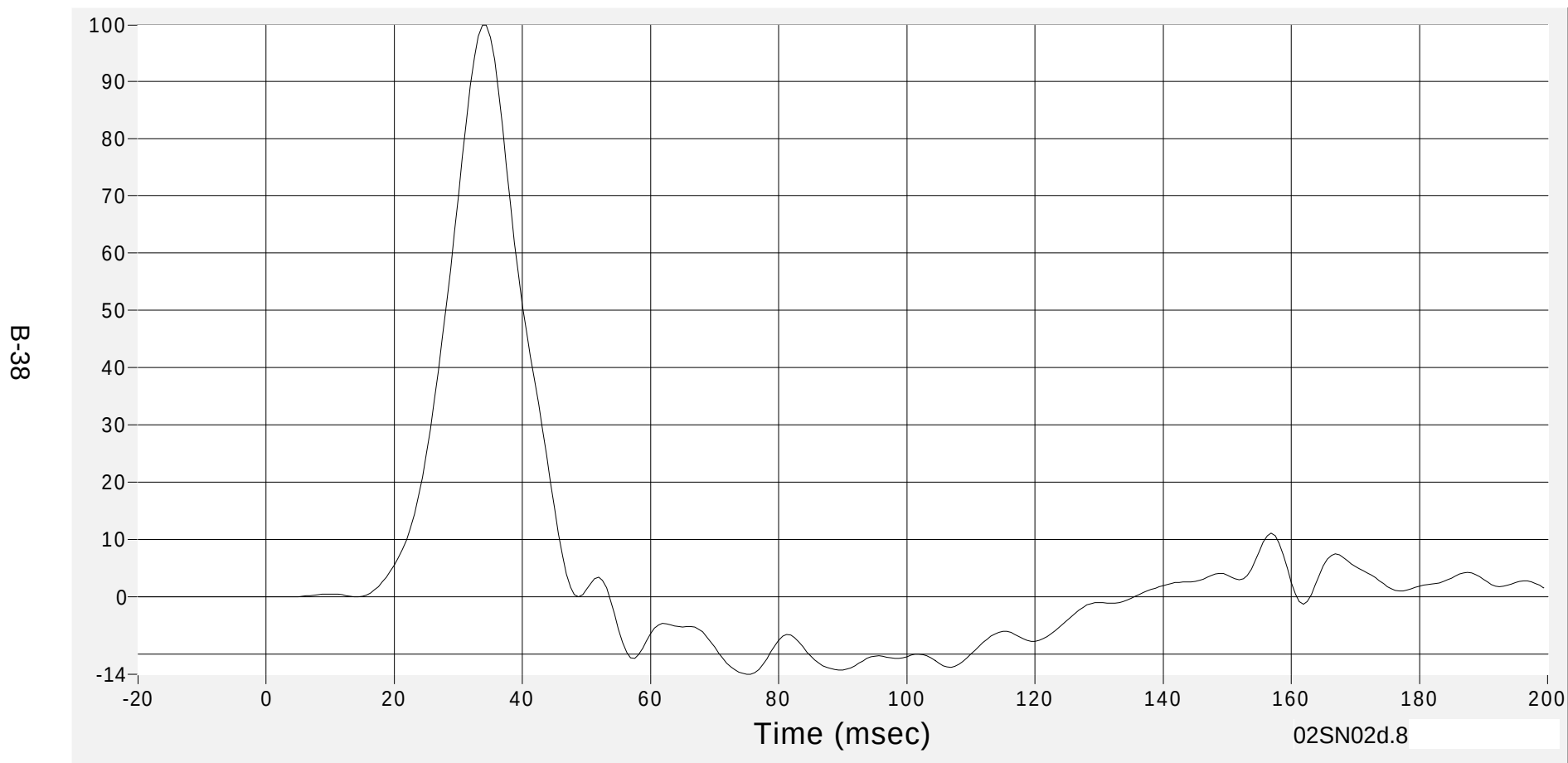
Medical College of Wisconsin
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Driver Lower Spine (Y) Acceleration

Acceleration (G's) FIR100

Max 99.8 G's at 33.8 msec

Min -13.5 G's at 75.0 msec



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20 December 2001

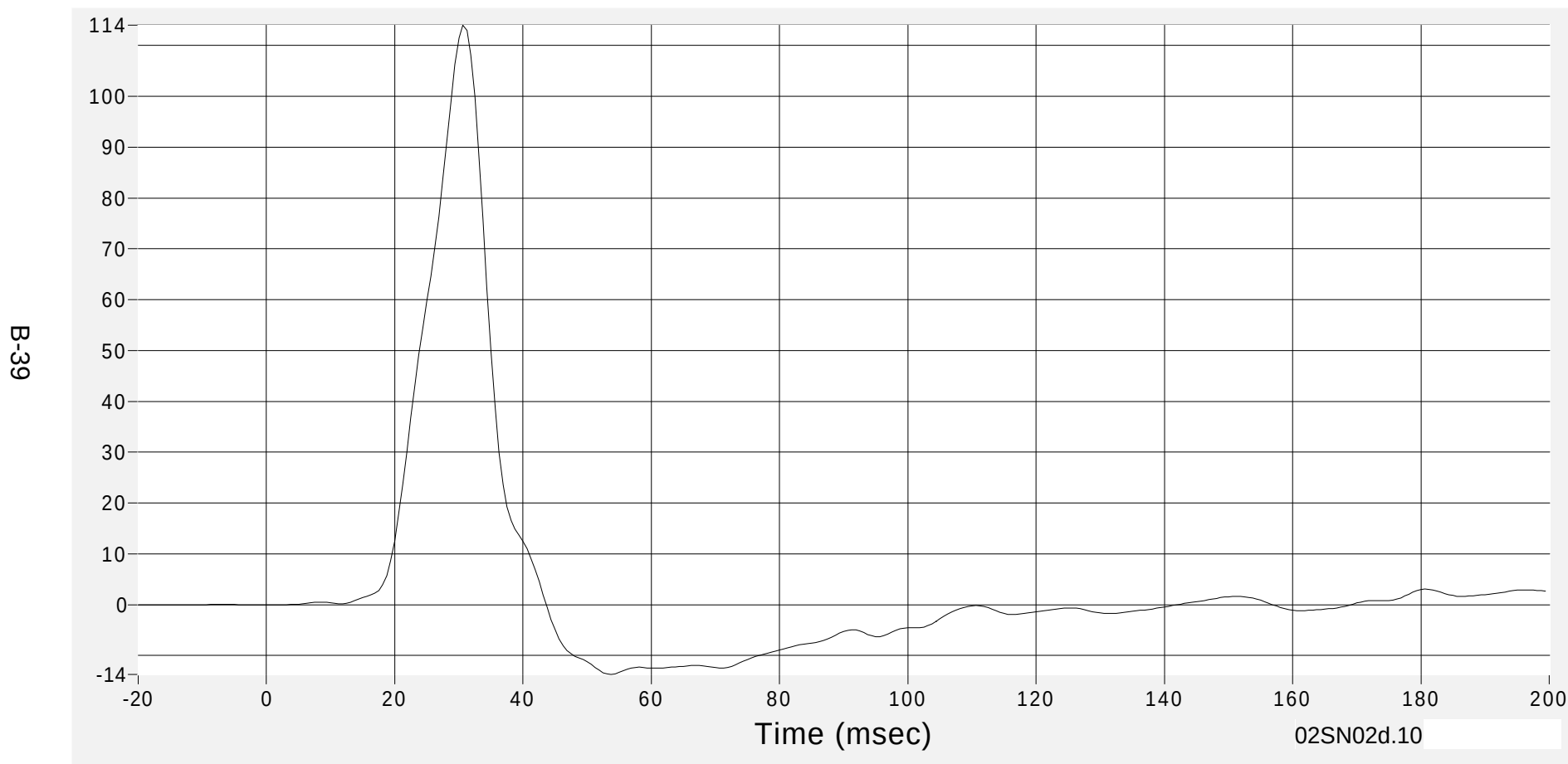
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Driver Pelvic (Y) Acceleration

Acceleration (G's) FIR100

Max 114.0 G's at 30.6 msec

Min -13.7 G's at 53.8 msec



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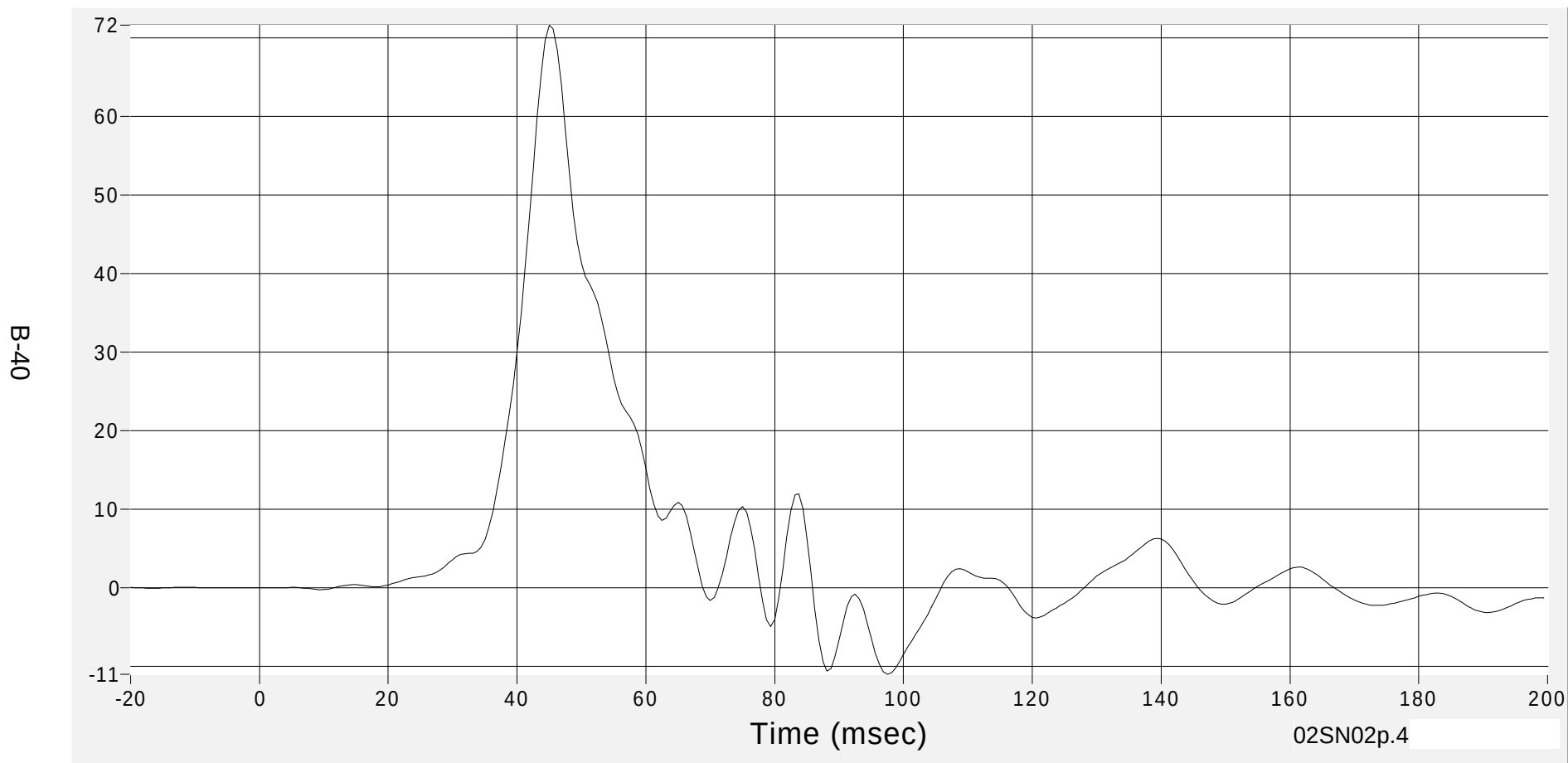
Medical College of Wisconsin
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Passenger Upper Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 71.6 G's at 45.0 msec

Min -11.0 G's at 97.5 msec



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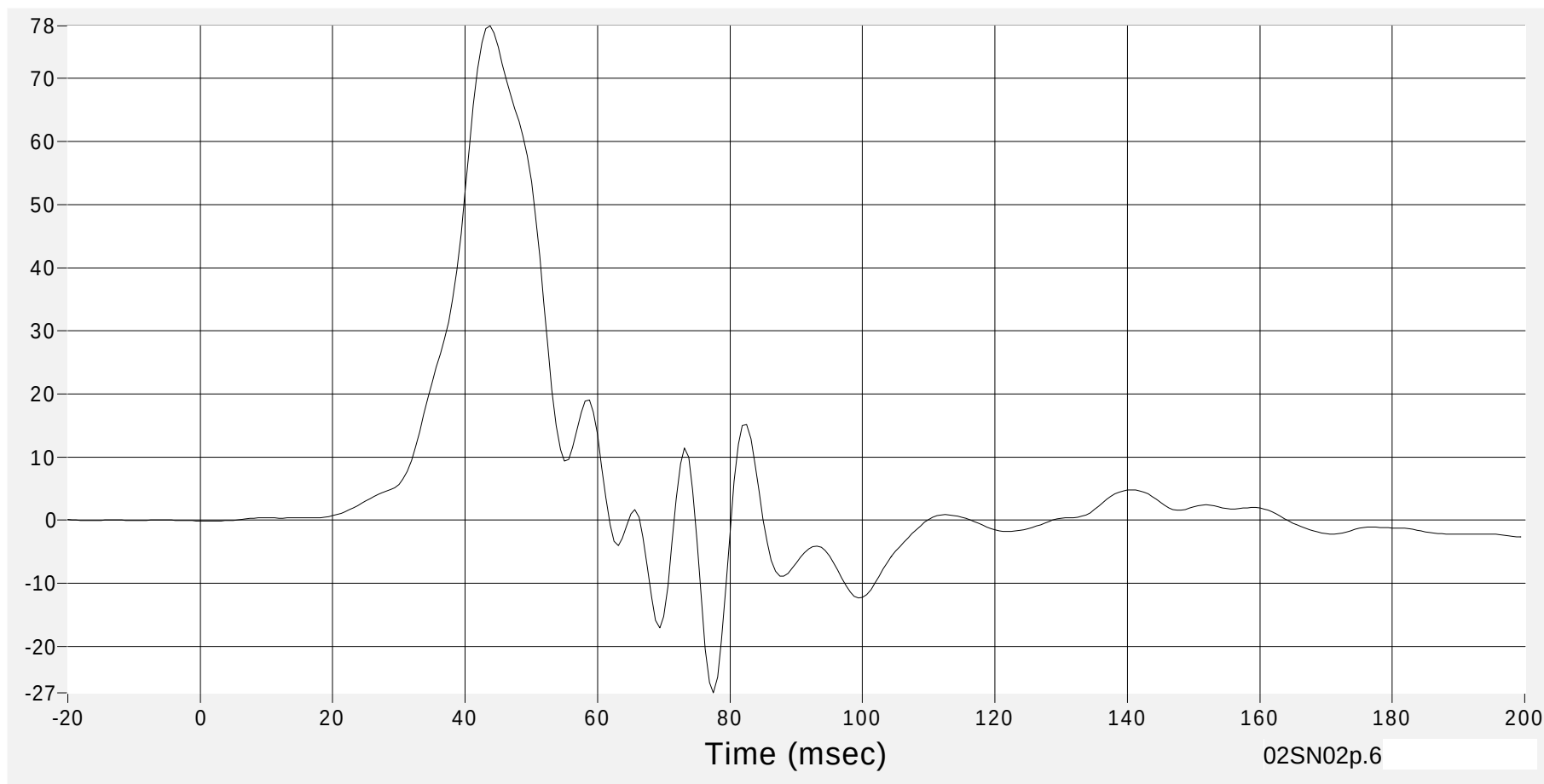
Passenger Lower Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 78.3 G's at 43.8 msec

Min -27.4 G's at 77.5 msec

B-41



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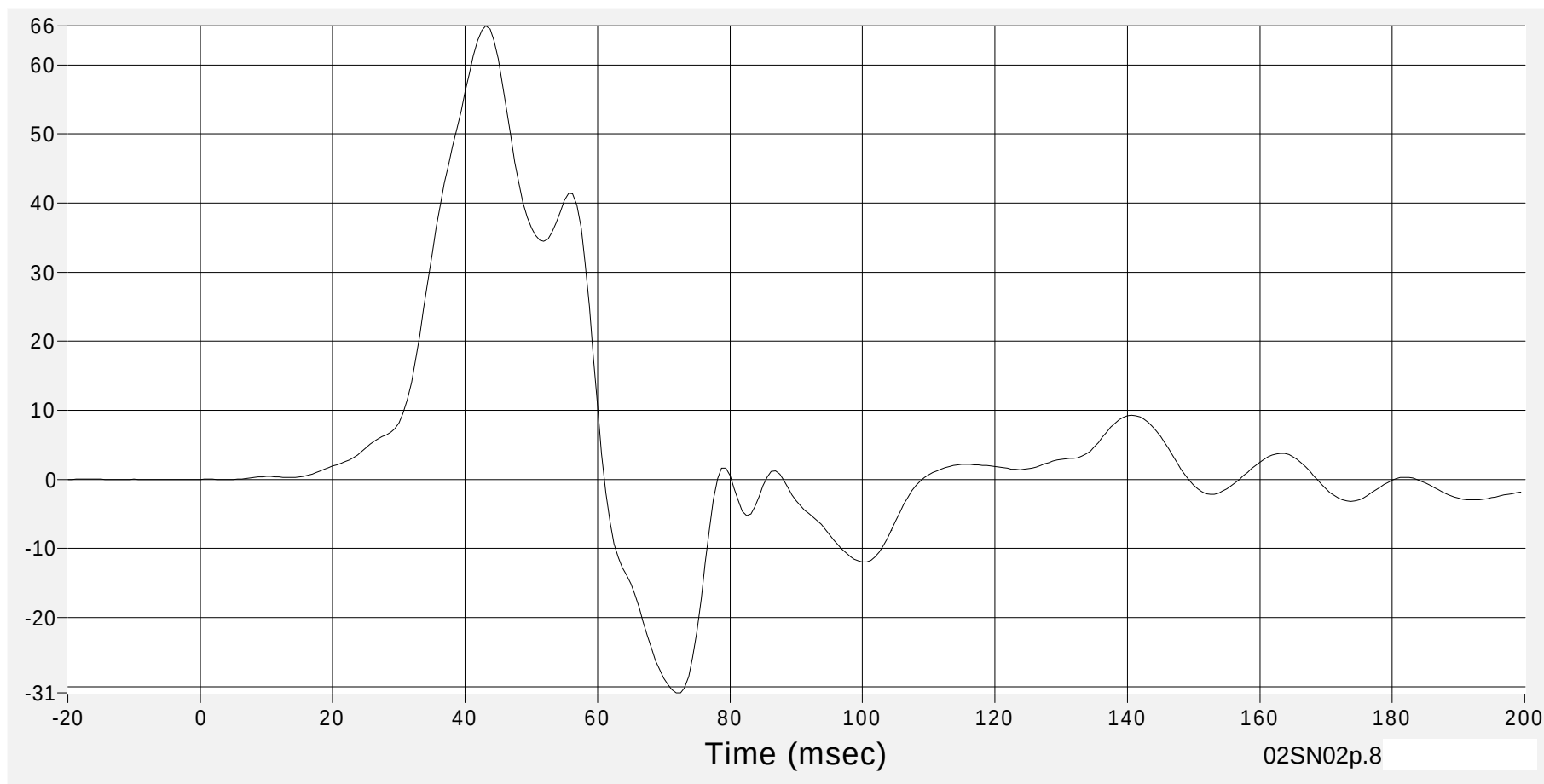
Passenger Lower Spine (Y) Acceleration

Acceleration (G's) FIR100

Max 65.6 G's at 43.1 msec

Min -30.9 G's at 72.5 msec

B-42



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20 December 2001

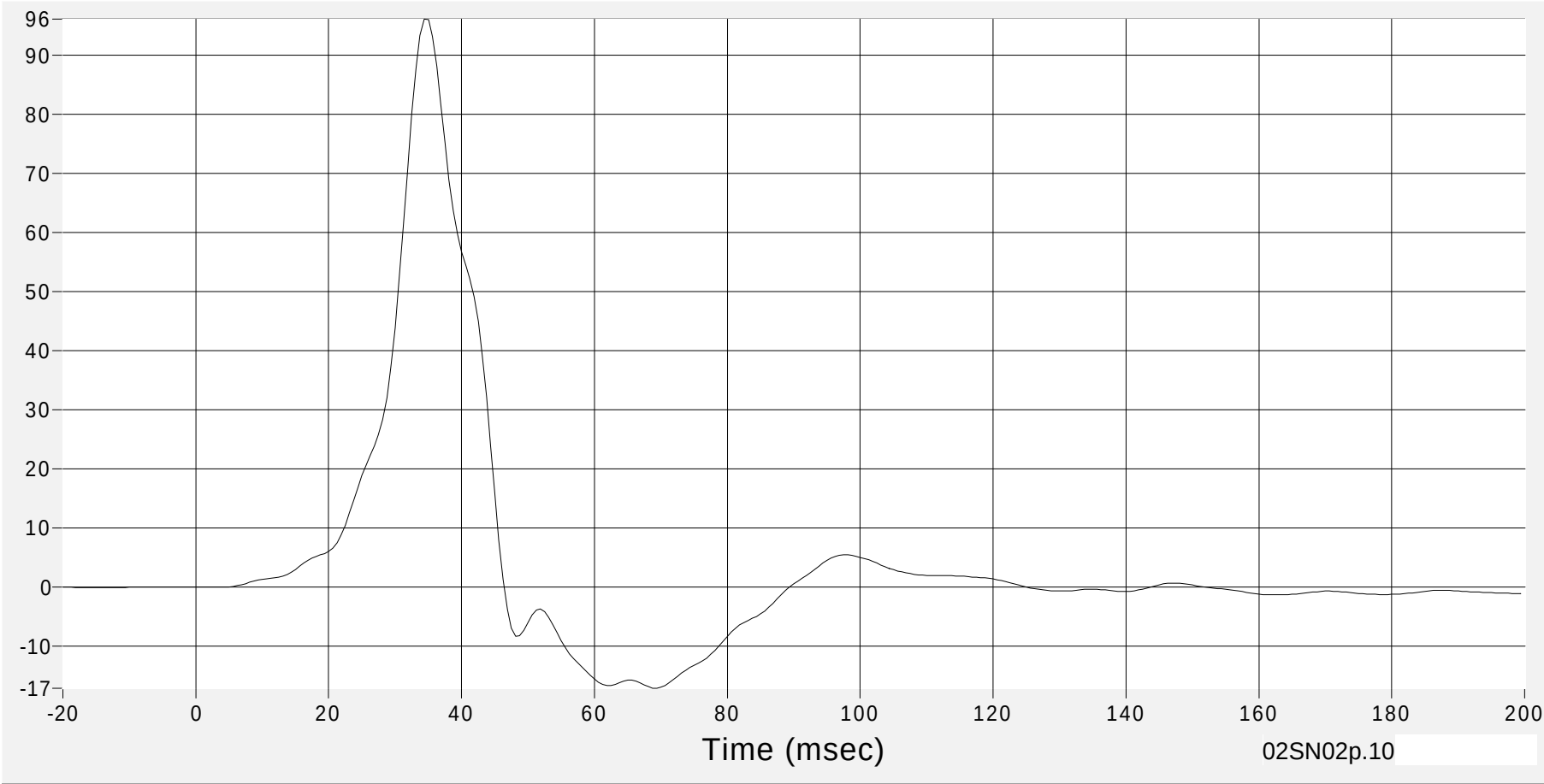
Medical College of Wisconsin
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Passenger Pelvic (Y) Acceleration

Acceleration (G's) FIR100

Max 96.2 G's at 34.4 msec
Min -17.1 G's at 69.4 msec

B-43



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20 December 2001

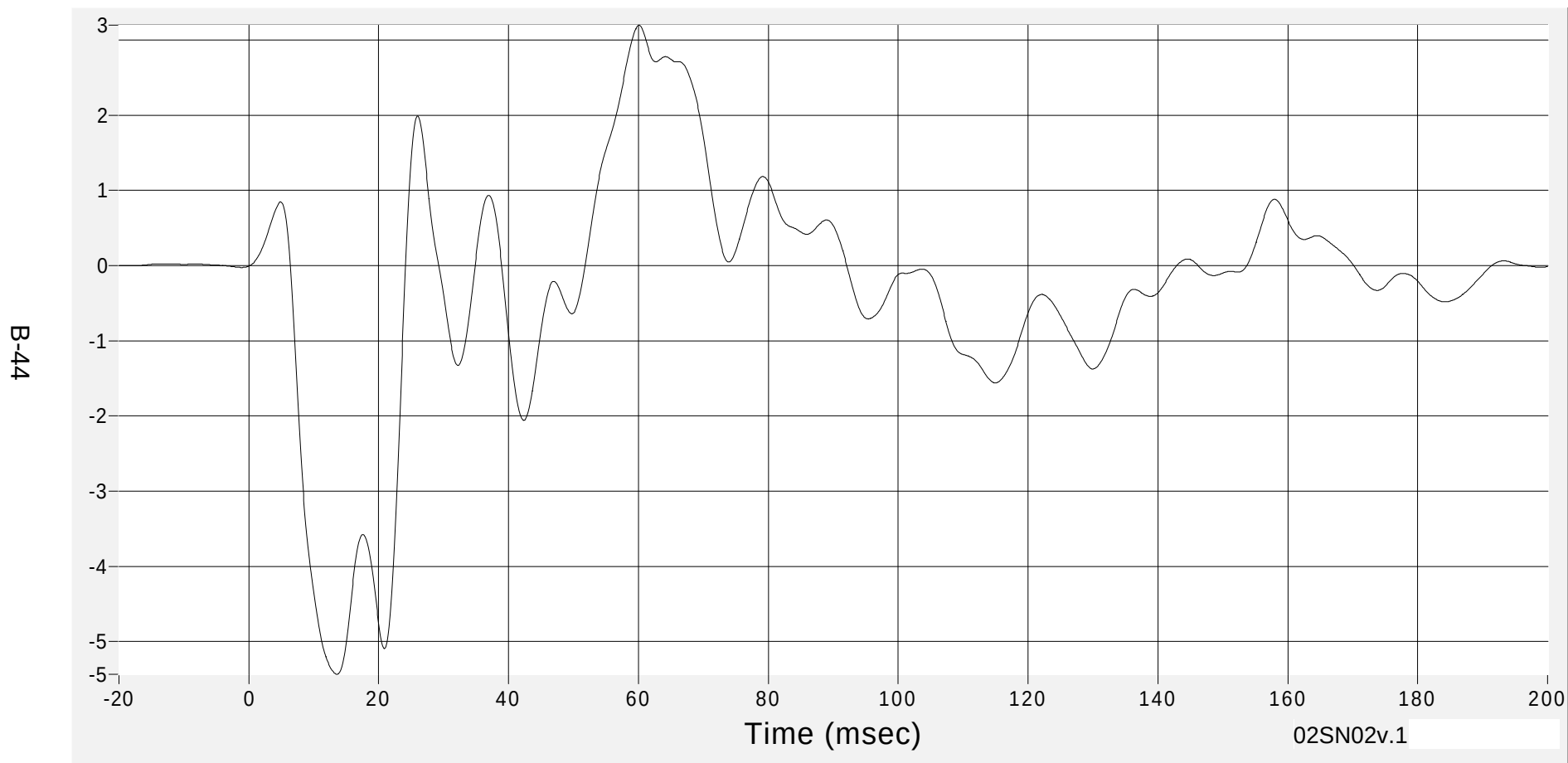
Medical College of Wisconsin
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Right Side Sill at Front Seat (X) Acceleration

Acceleration (G's) CFC60

Max 3.2 G's at 60.1 msec

Min -5.4 G's at 13.6 msec



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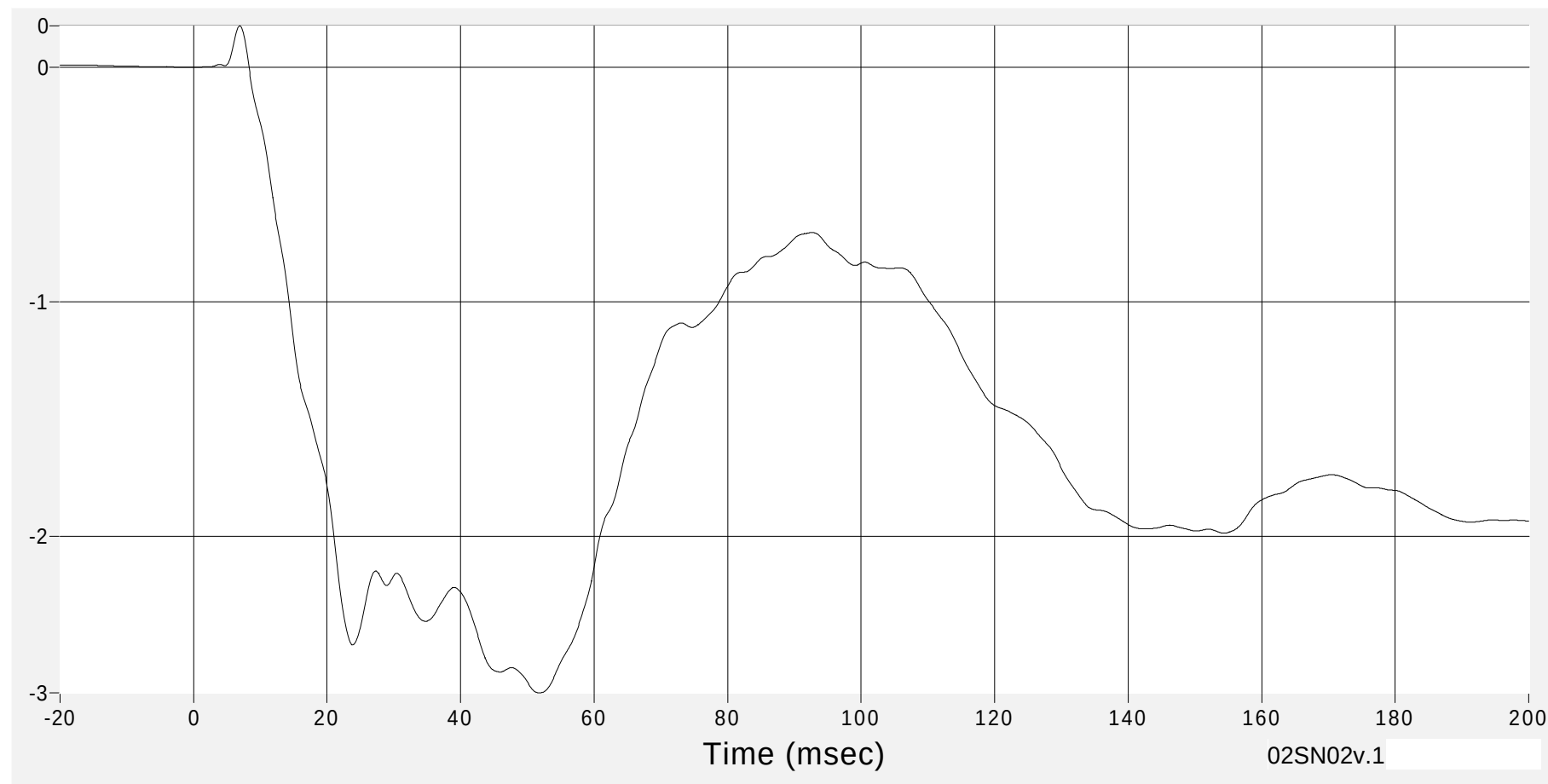
Right Side Sill at Front Seat (X) Velocity

Velocity (km/h) CFC180

Max 0.2 km/h at 6.9 msec

Min -2.7 km/h at 51.8 msec

B-45



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20 December 2001

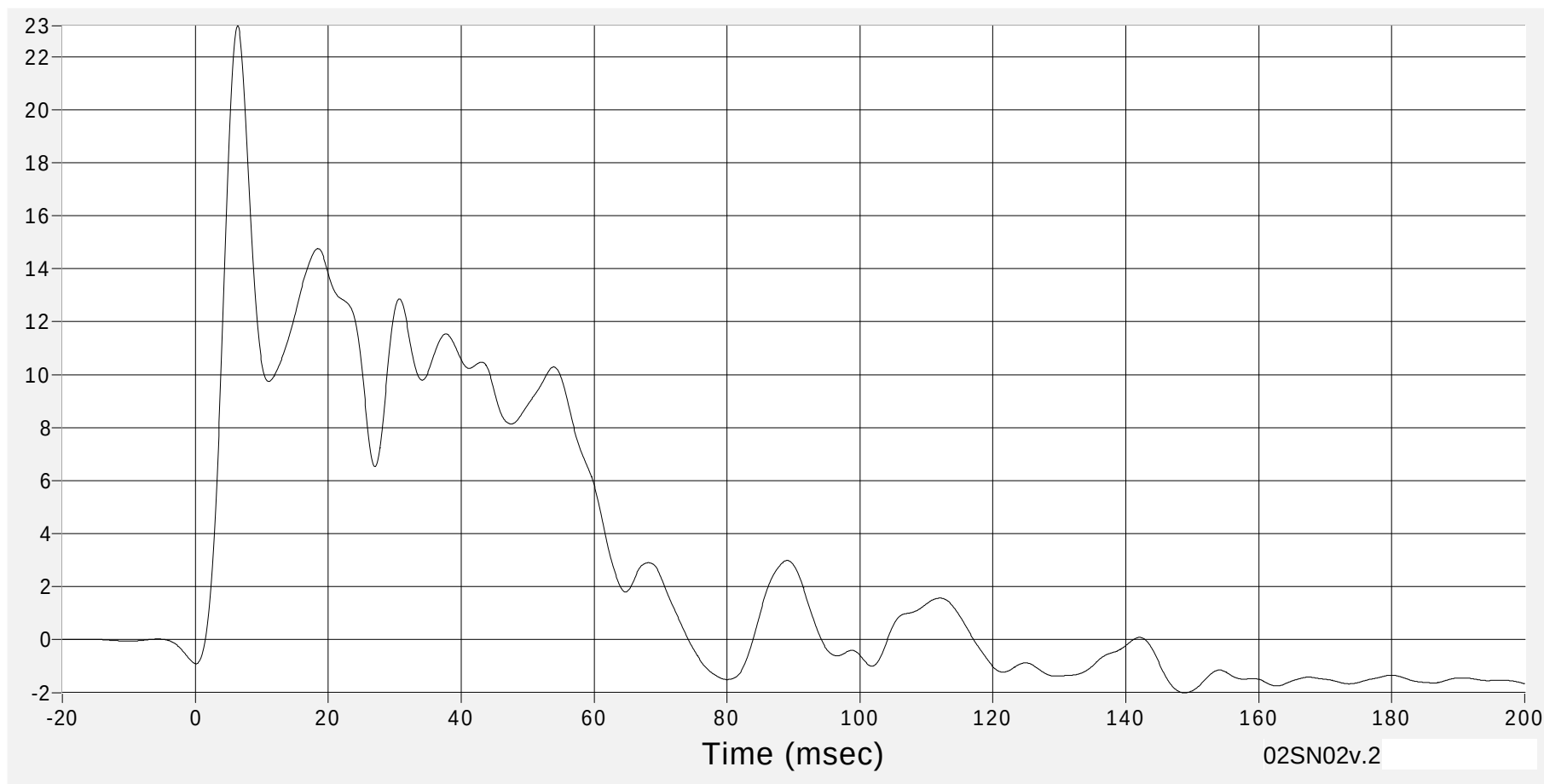
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Right Side Sill at Front Seat (Y) Acceleration

Acceleration (G's) CFC60

Max 23.2 G's at 6.3 msec
Min -2.0 G's at 148.8 msec

B-46



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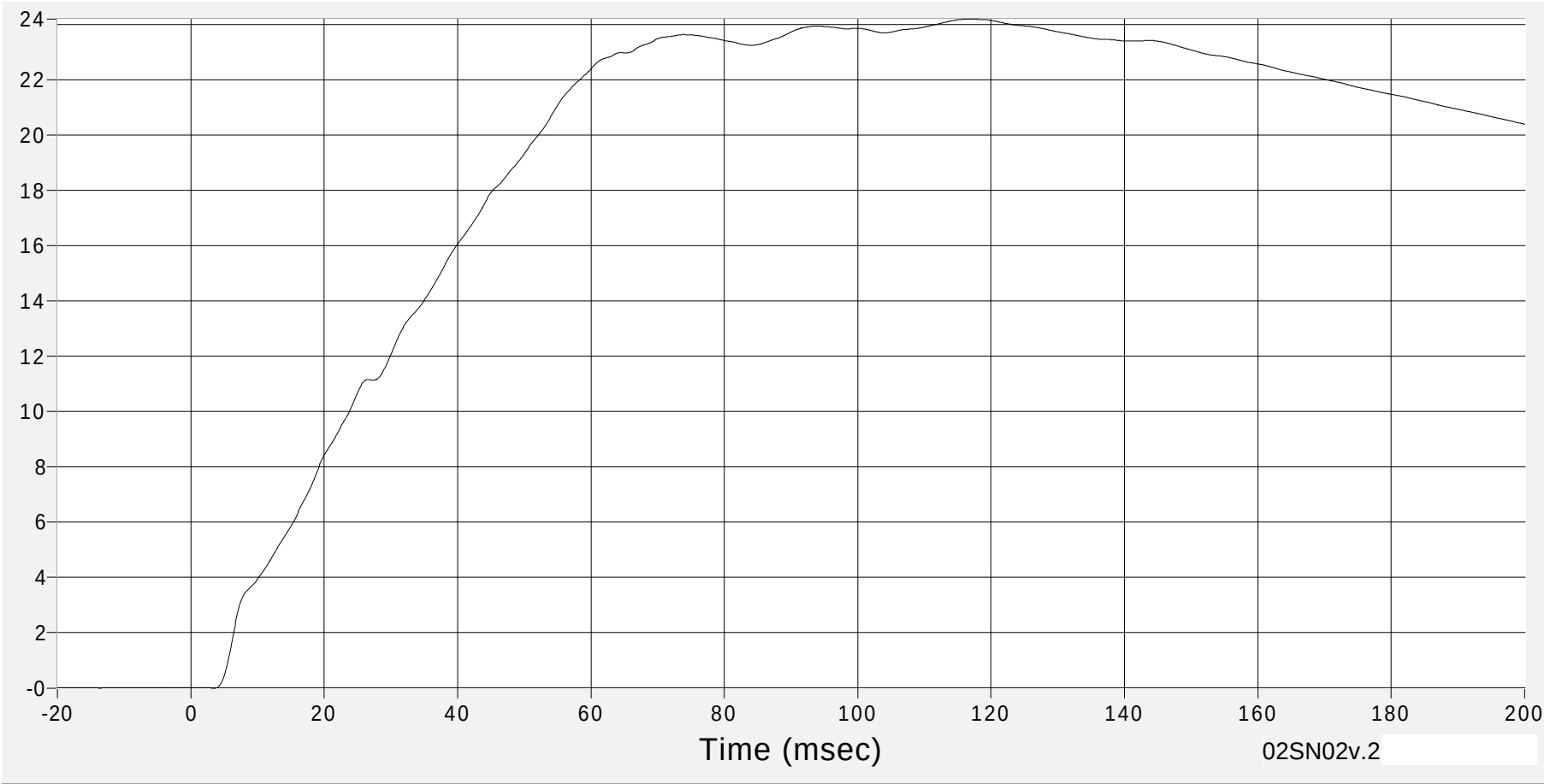
Medical College of Wisconsin
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Right Side Sill at Front Seat (Y) Velocity

Velocity (km/h) CFC180

Max 24.2 km/h at 116.7 msec
Min 0.0 km/h at 3.4 msec

B-47



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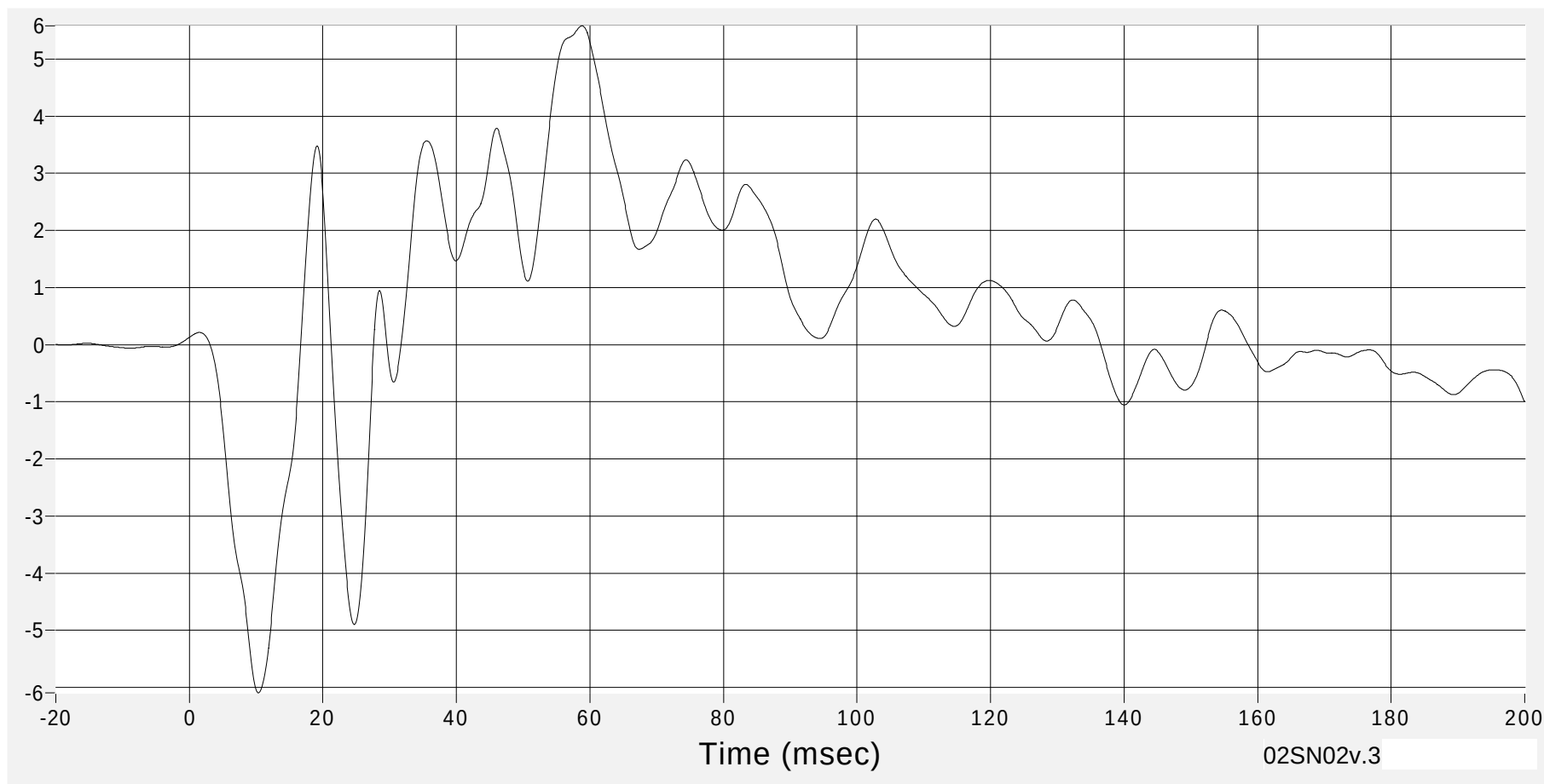
Right Side Sill at Front Seat (Z) Acceleration

Acceleration (G's) CFC60

Max 5.6 G's at 58.9 msec

Min -6.1 G's at 10.3 msec

B-48



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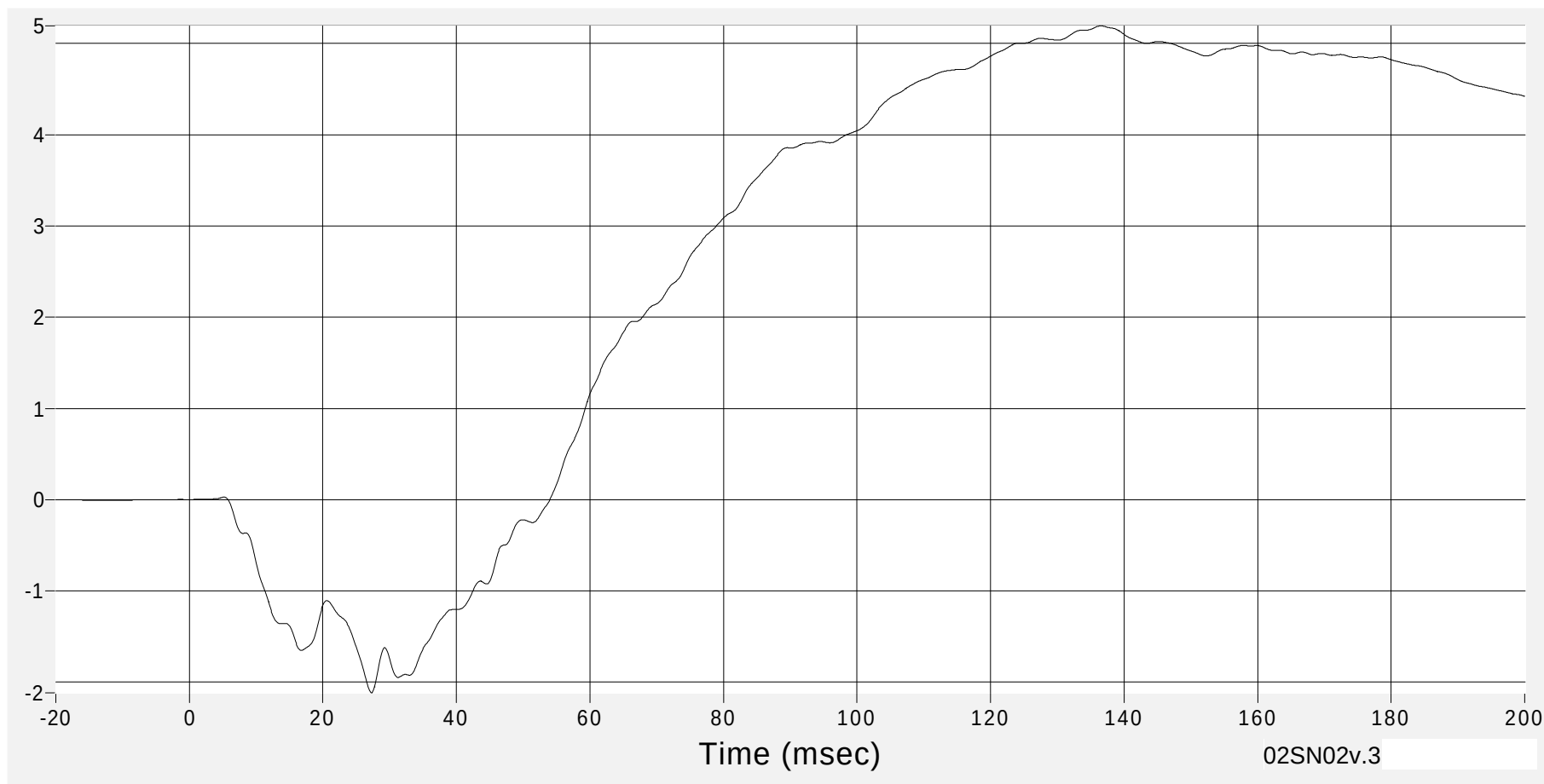
Right Side Sill at Front Seat (Z) Velocity

Velocity (km/h) CFC180

Max 5.2 km/h at 136.5 msec

Min -2.1 km/h at 27.3 msec

B-49



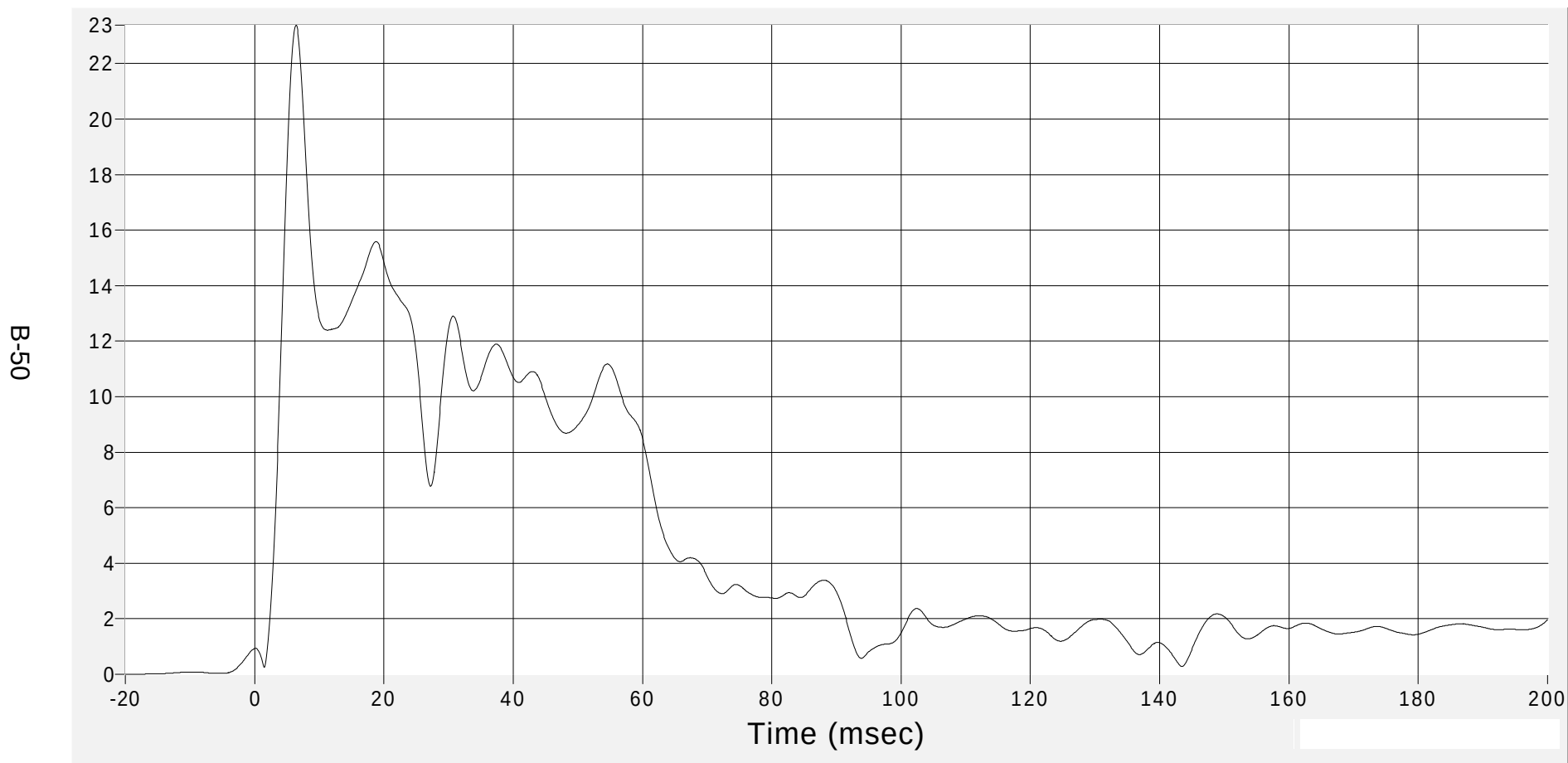
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Right Side Sill at Front Seat Resultant Acceleration

Acceleration (G's) CFC60

Max 23.4 G's at 6.4 msec
Min 0.3 G's at 1.5 msec



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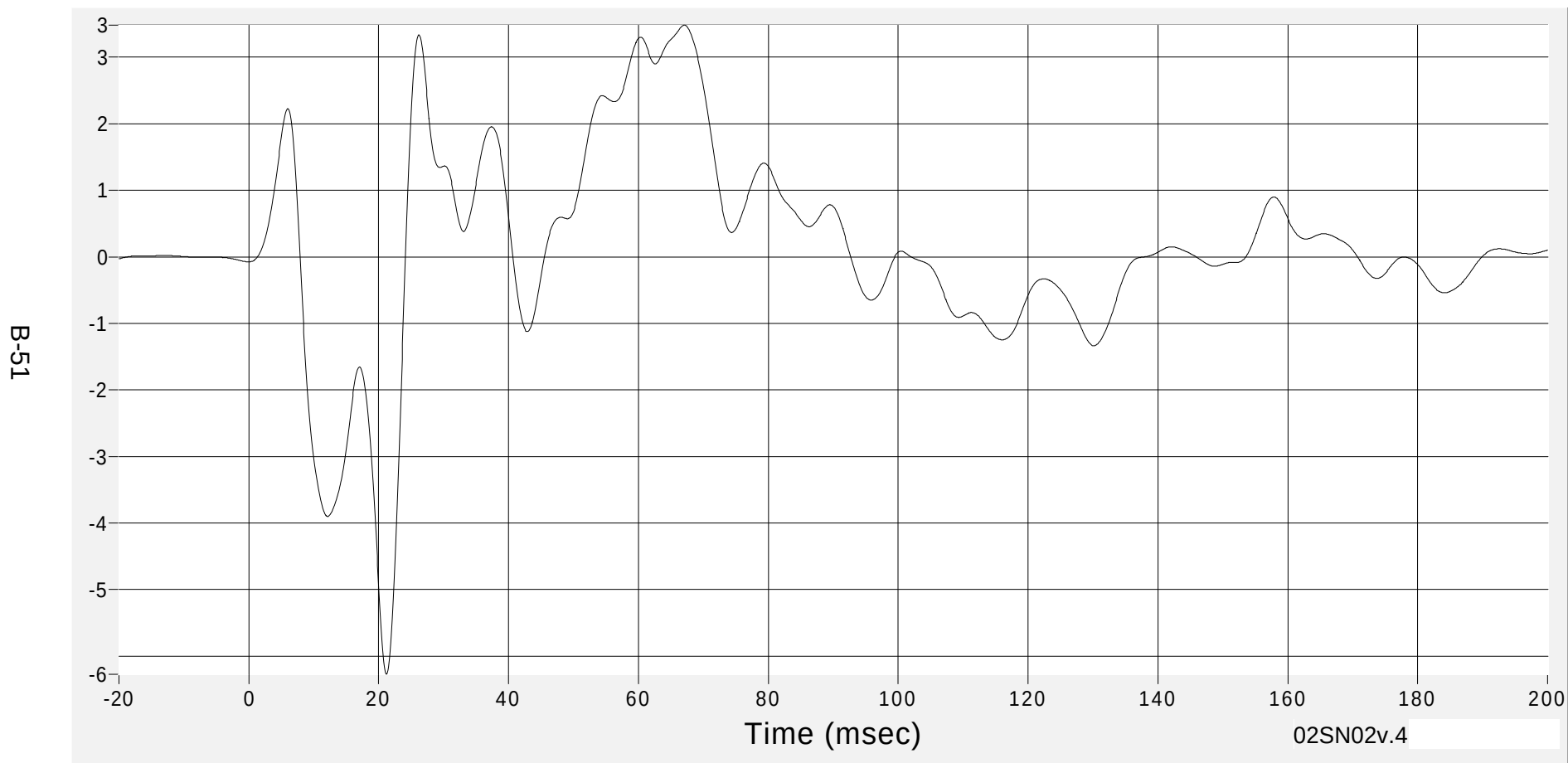
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Right Side Sill at Rear Seat (X) Acceleration

Acceleration (G's) CFC60

Max 3.5 G's at 67.0 msec

Min -6.3 G's at 21.2 msec



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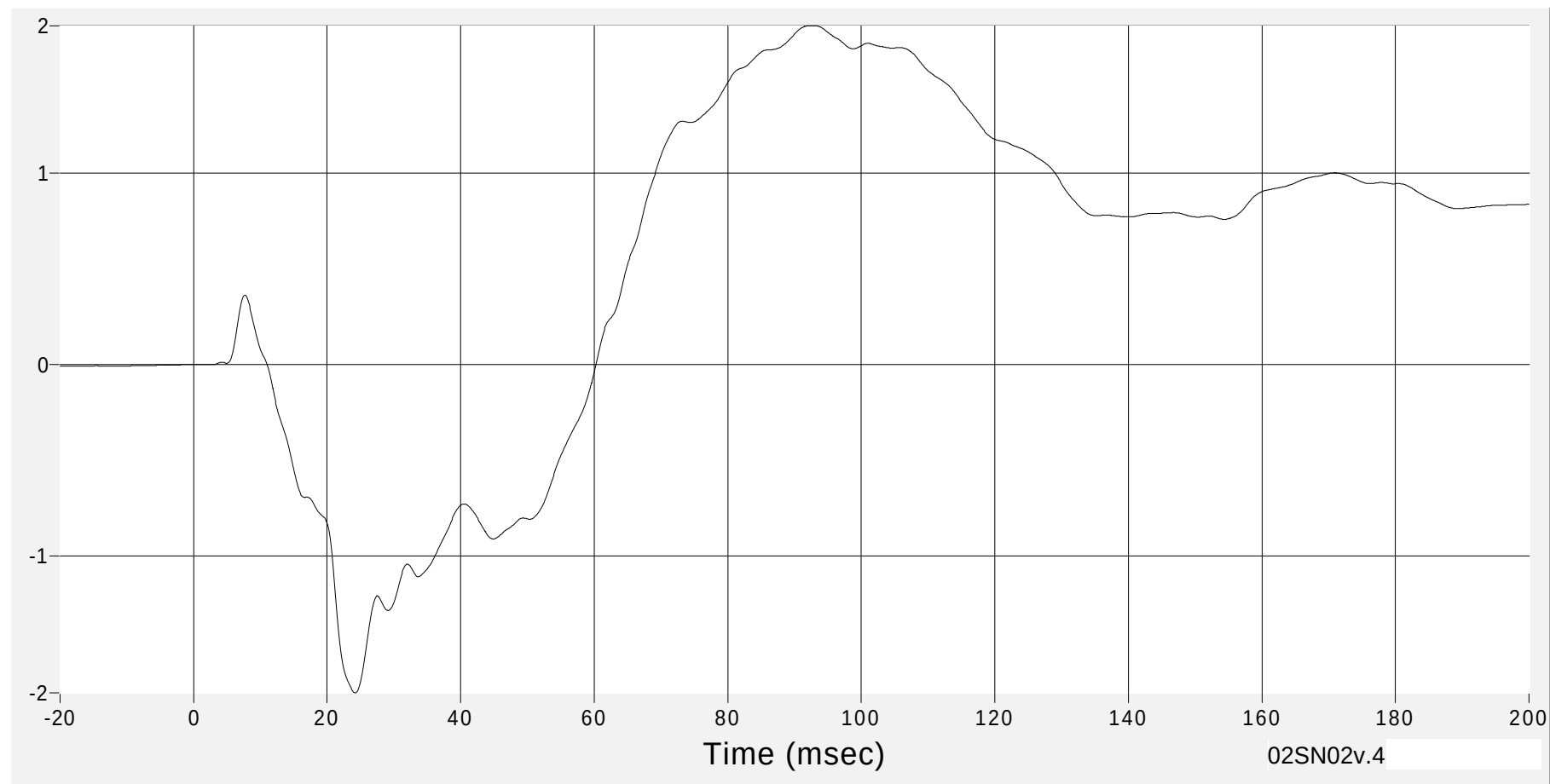
Right Side Sill at Rear Seat (X) Velocity

Velocity (km/h) CFC180

Max 1.8 km/h at 92.8 msec

Min -1.7 km/h at 24.2 msec

B-52



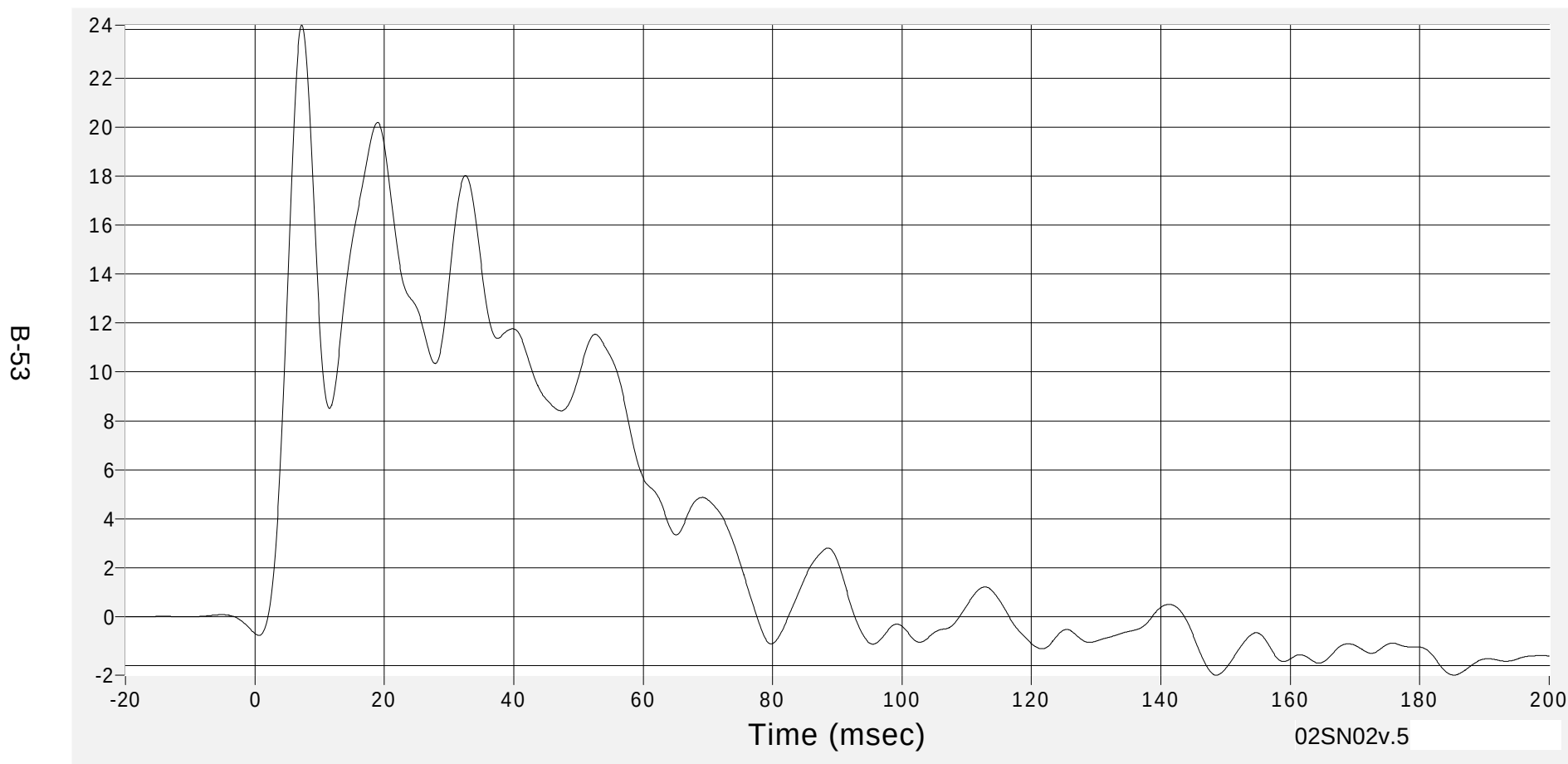
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Right Side Sill at Rear Seat (Y) Acceleration

Acceleration (G's) CFC60

Max 24.2 G's at 7.3 msec
Min -2.4 G's at 148.6 msec



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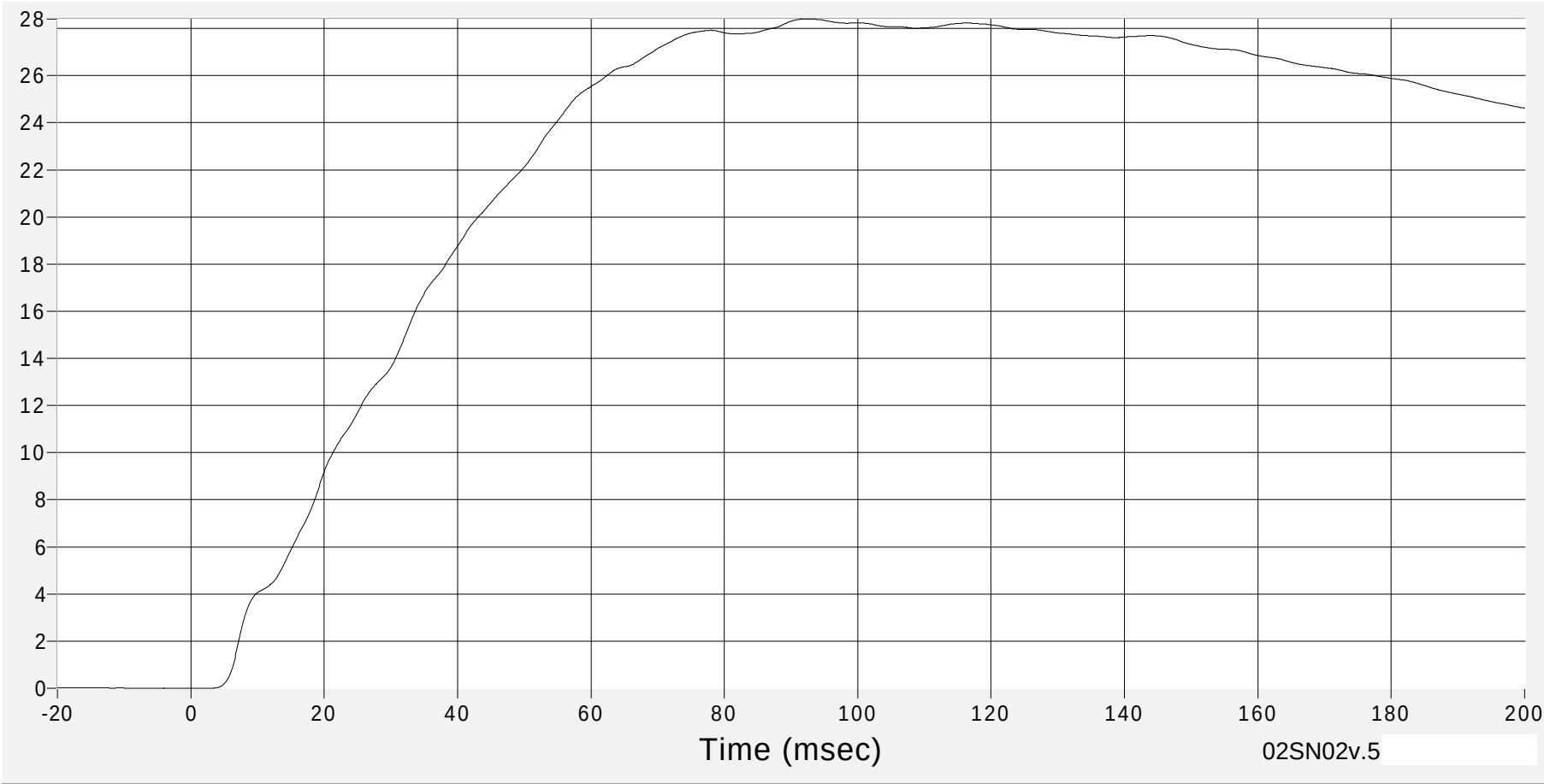
Medical College of Wisconsin
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Right Side Sill at Rear Seat (Y) Velocity

Velocity (km/h) CFC180

Max 28.4 km/h at 92.0 msec
Min 0.0 km/h at 0.0 msec

B-54



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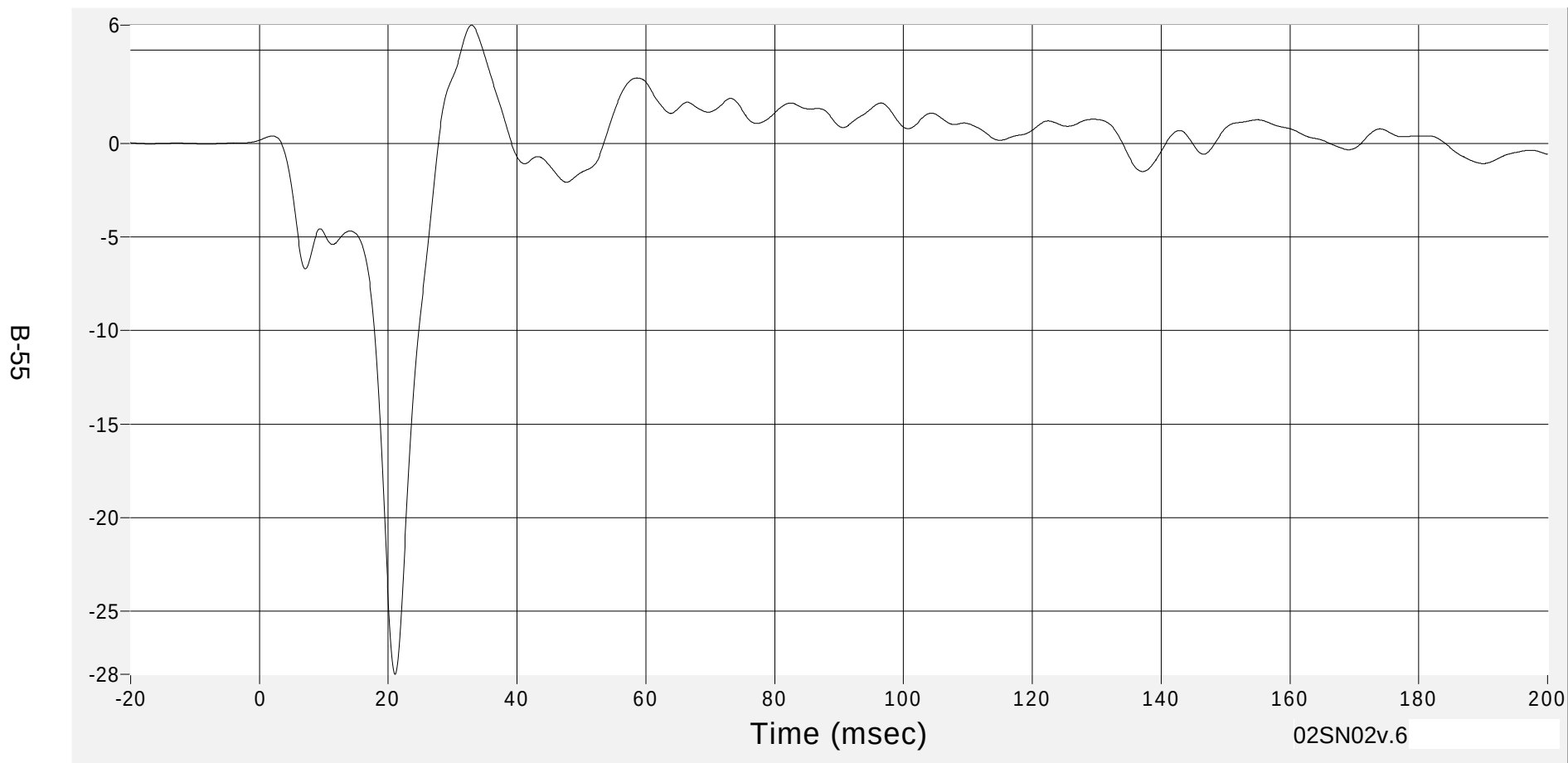
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Right Side Sill at Rear Seat (Z) Acceleration

Acceleration (G's) CFC60

Max 6.3 G's at 33.0 msec

Min -28.4 G's at 21.0 msec



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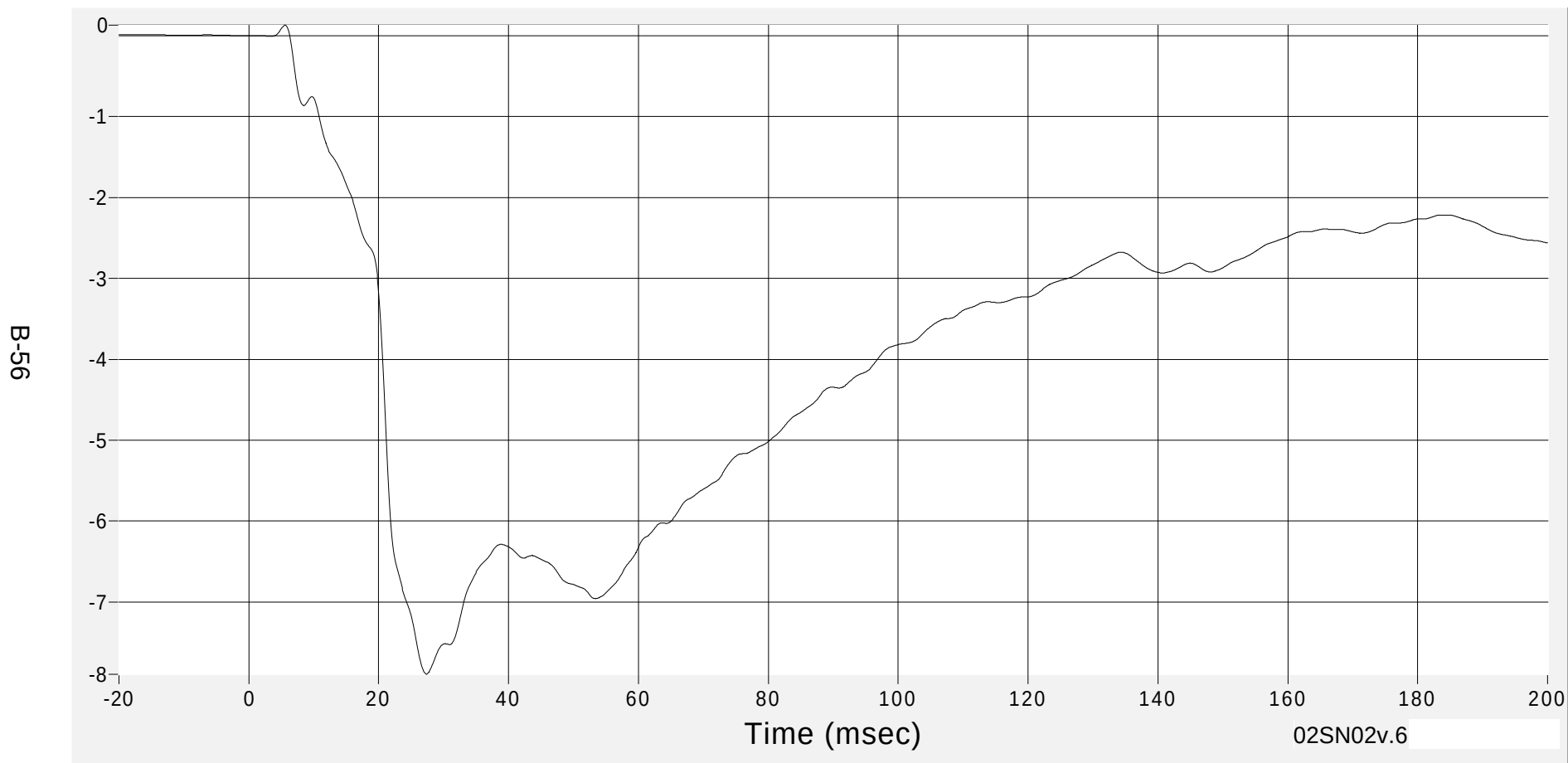
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Right Side Sill at Rear Seat (Z) Velocity

Velocity (km/h) CFC180

Max 0.1 km/h at 5.6 msec

Min -7.9 km/h at 27.4 msec



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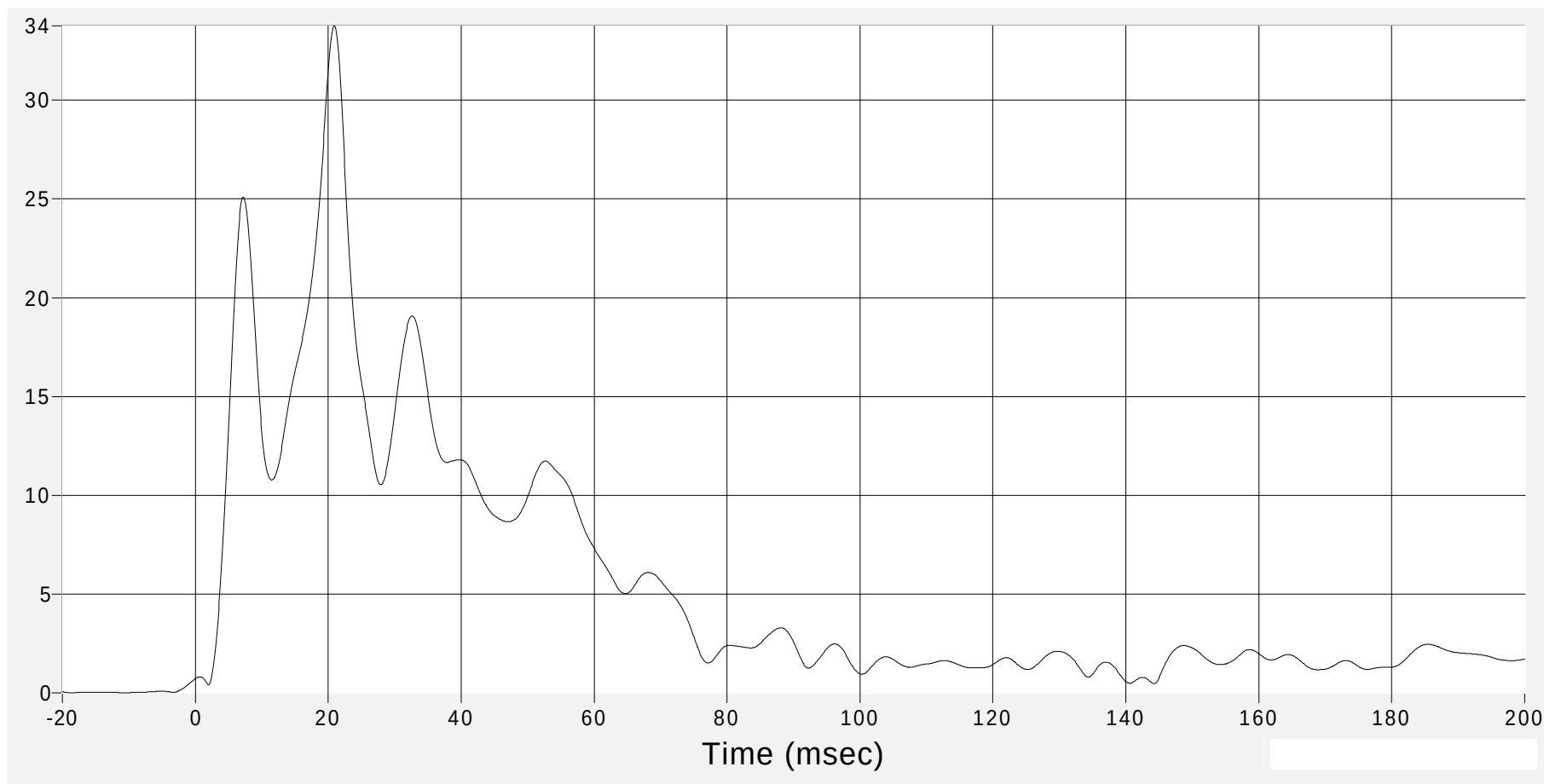
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Right Side Sill at Rear Seat Resultant Acceleration

Acceleration (G's) CFC60

Max 33.8 G's at 20.9 msec
Min 0.4 G's at 2.0 msec

B-57



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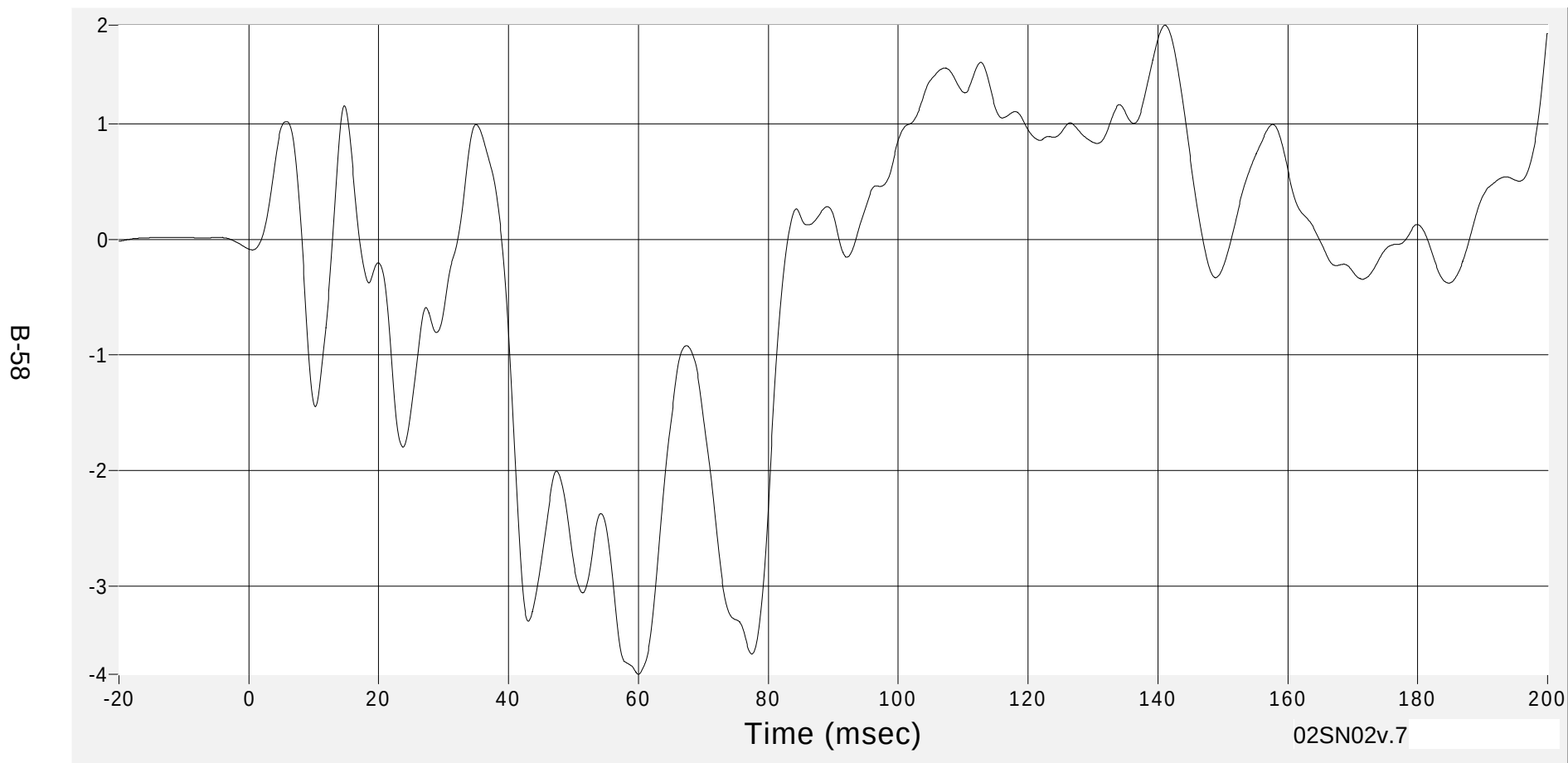
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Rear Floorpan Above Axle (X) Acceleration

Acceleration (G's) CFC60

Max 1.9 G's at 141.1 msec

Min -3.8 G's at 60.0 msec



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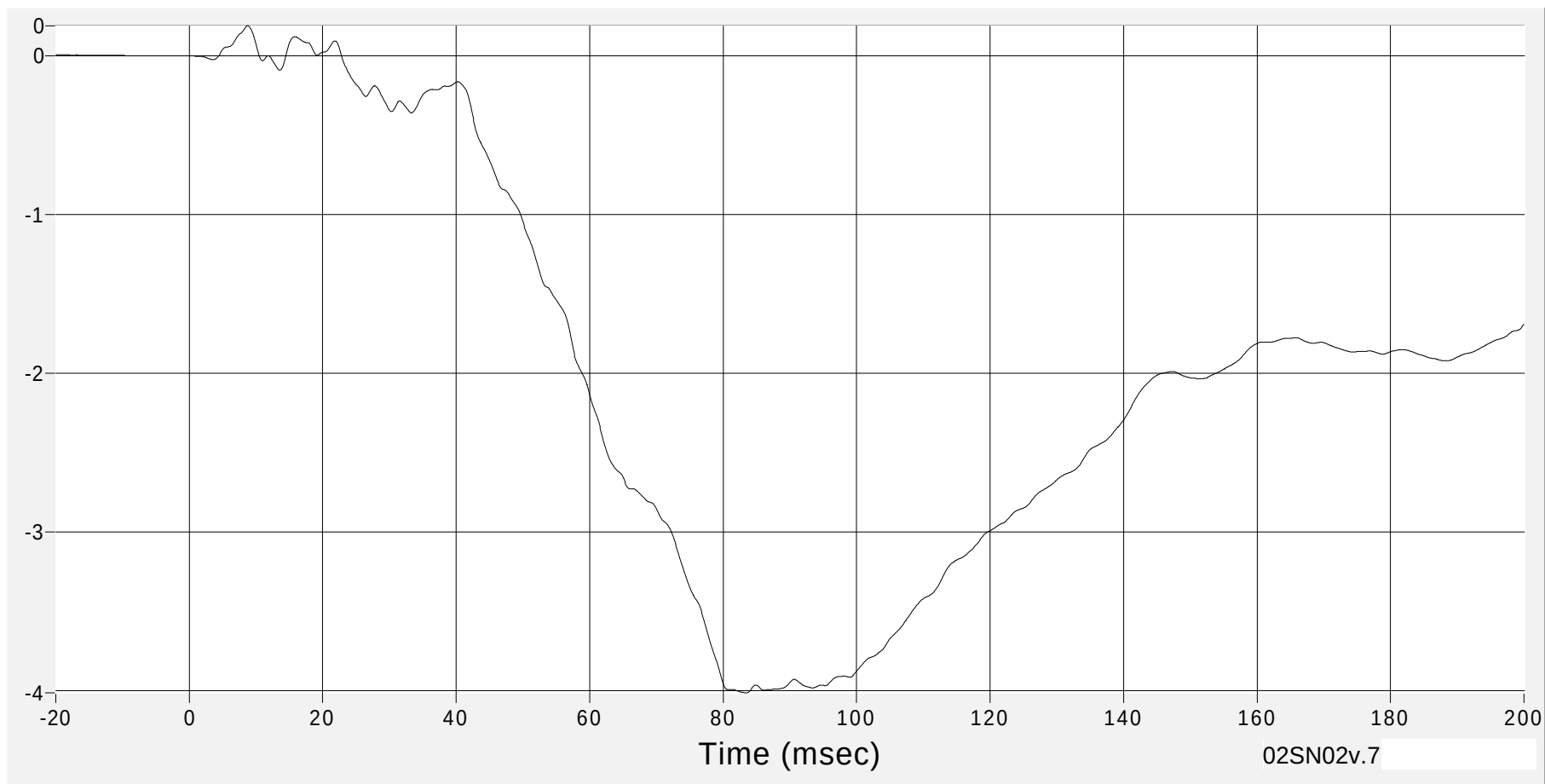
Rear Floorpan Above Axle (X) Velocity

Velocity (km/h) CFC180

Max 0.2 km/h at 8.8 msec

Min -4.0 km/h at 83.4 msec

B-59



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20 December 2001

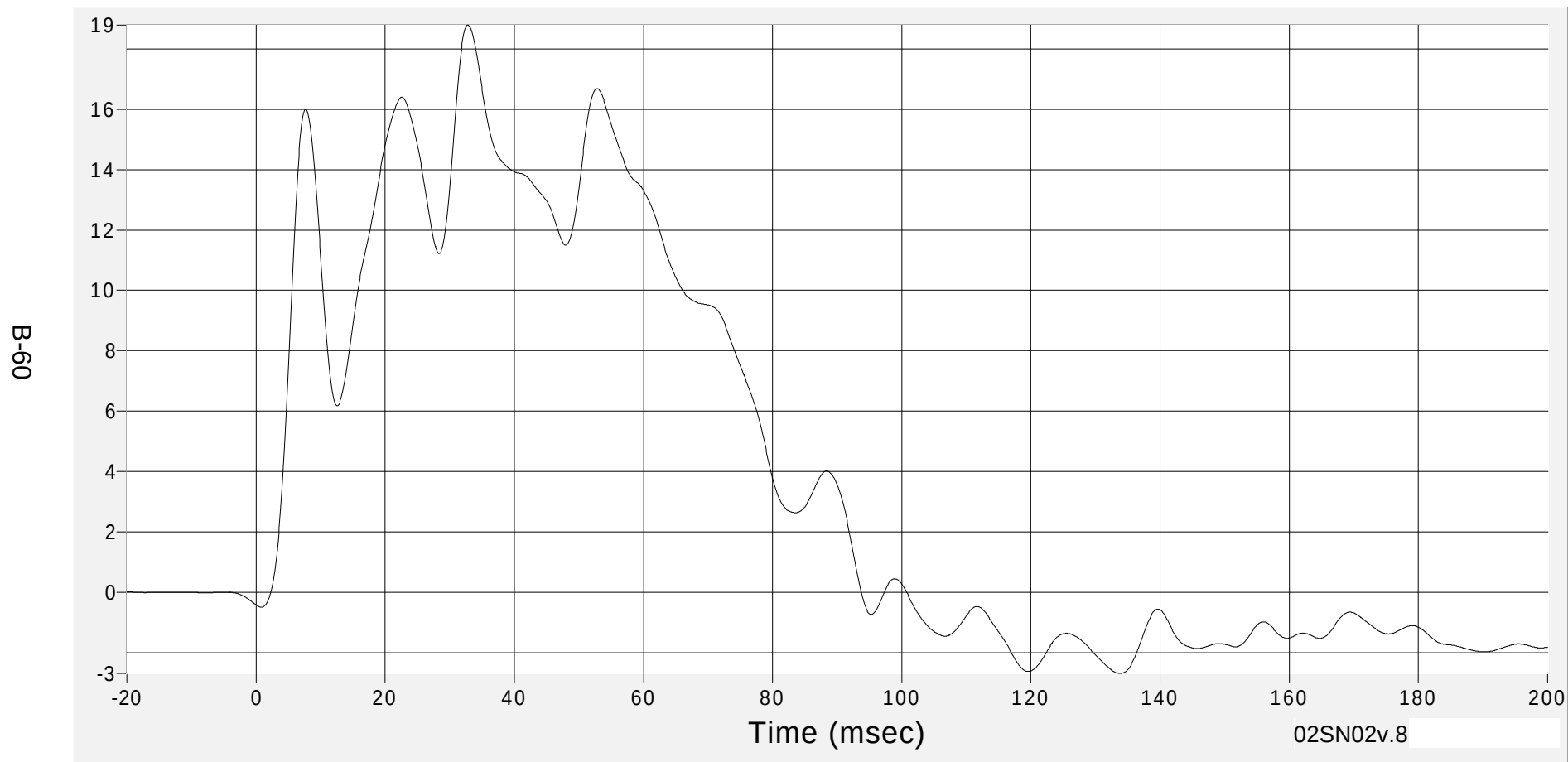
Medical College of Wisconsin
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Rear Floorpan Above Axle (Y) Acceleration

Acceleration (G's) CFC60

Max 18.8 G's at 32.8 msec

Min -2.7 G's at 133.8 msec



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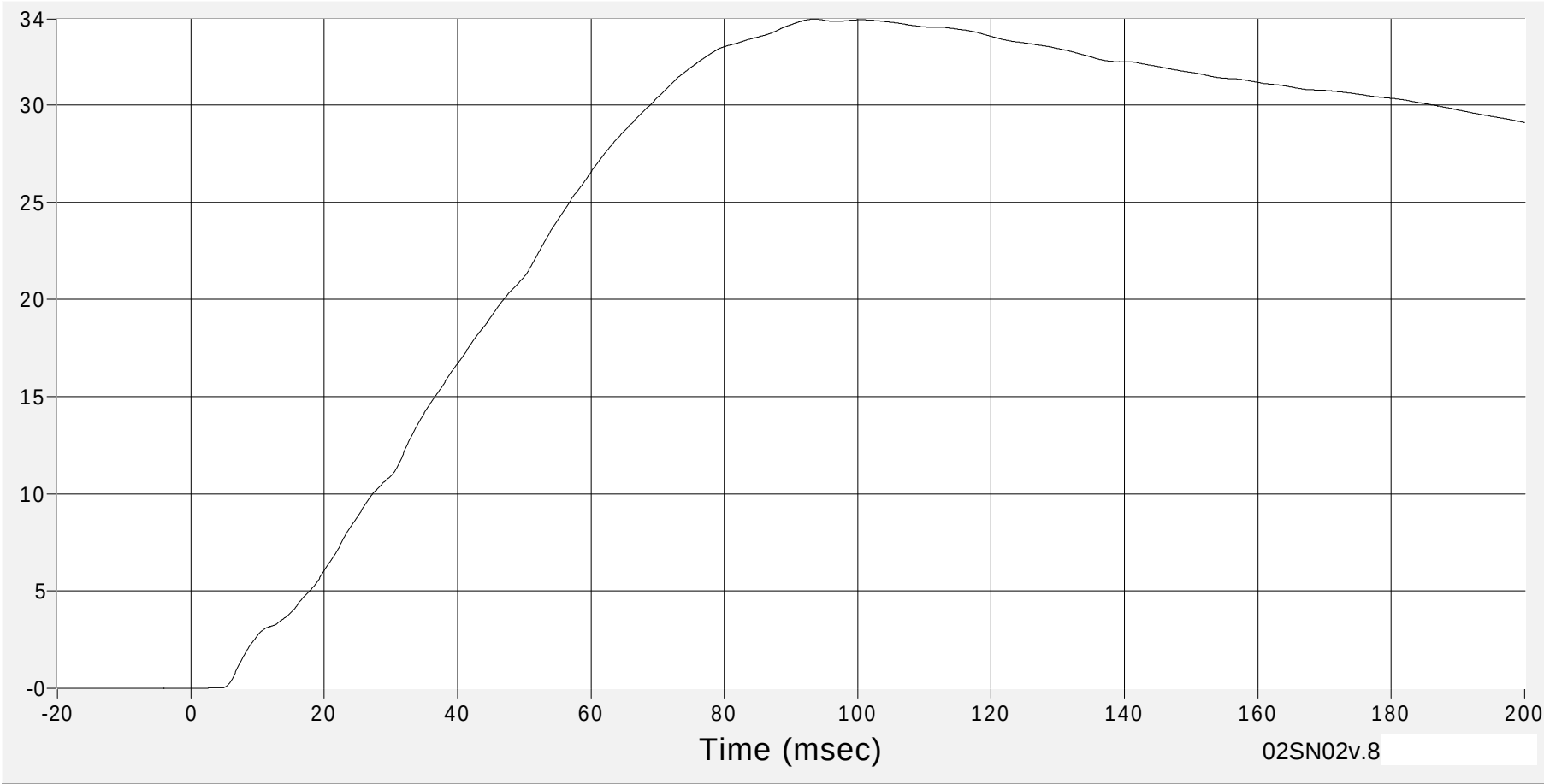
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Rear Floorpan Above Axle (Y) Velocity

Velocity (km/h) CFC180

Max 34.4 km/h at 93.5 msec
Min 0.0 km/h at 0.9 msec

B-61



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20 December 2001

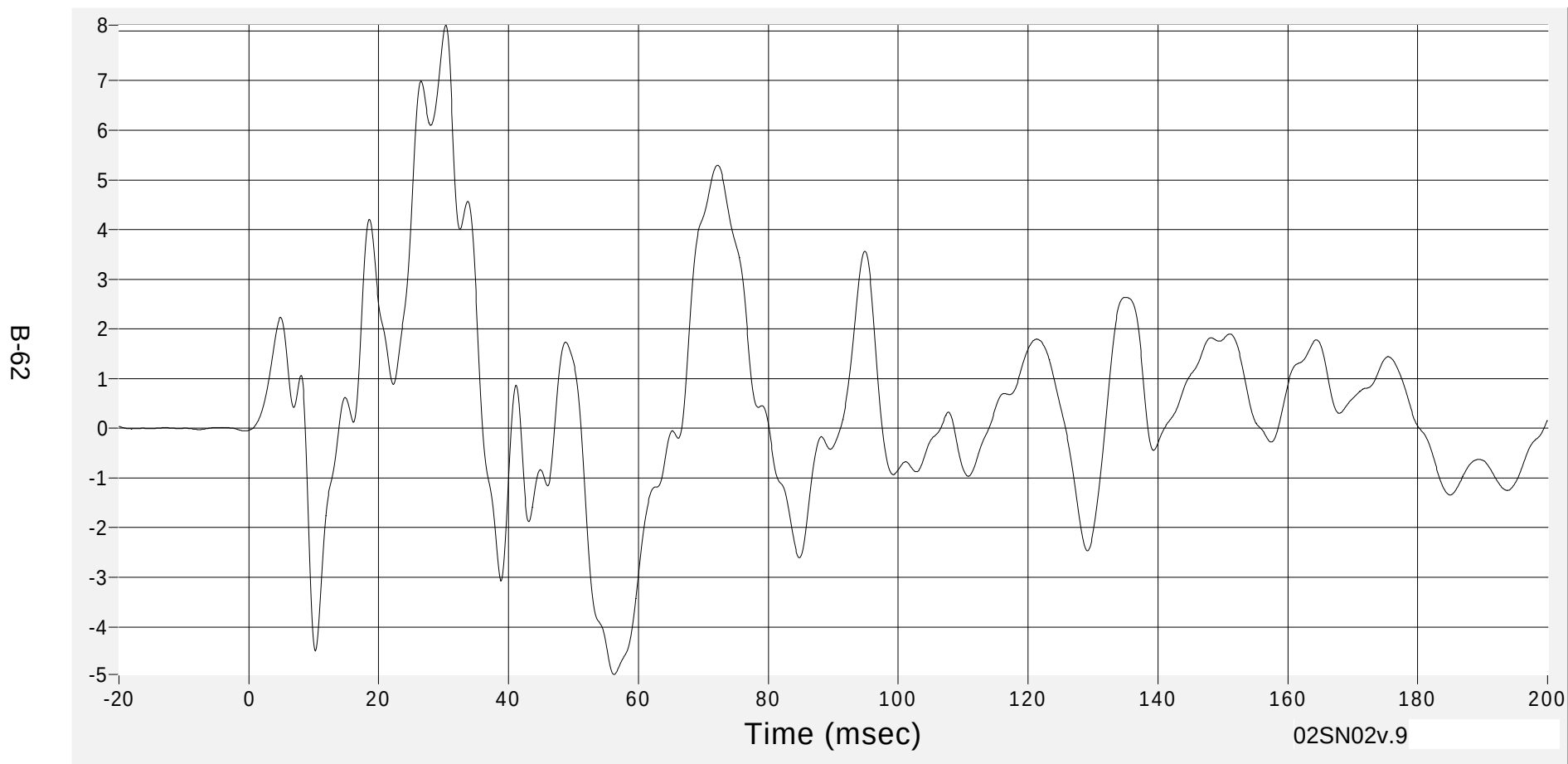
Medical College of Wisconsin
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Rear Floorpan Above Axle (Z) Acceleration

Acceleration (G's) CFC60

Max 8.1 G's at 30.3 msec

Min -5.0 G's at 56.2 msec



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20 December 2001

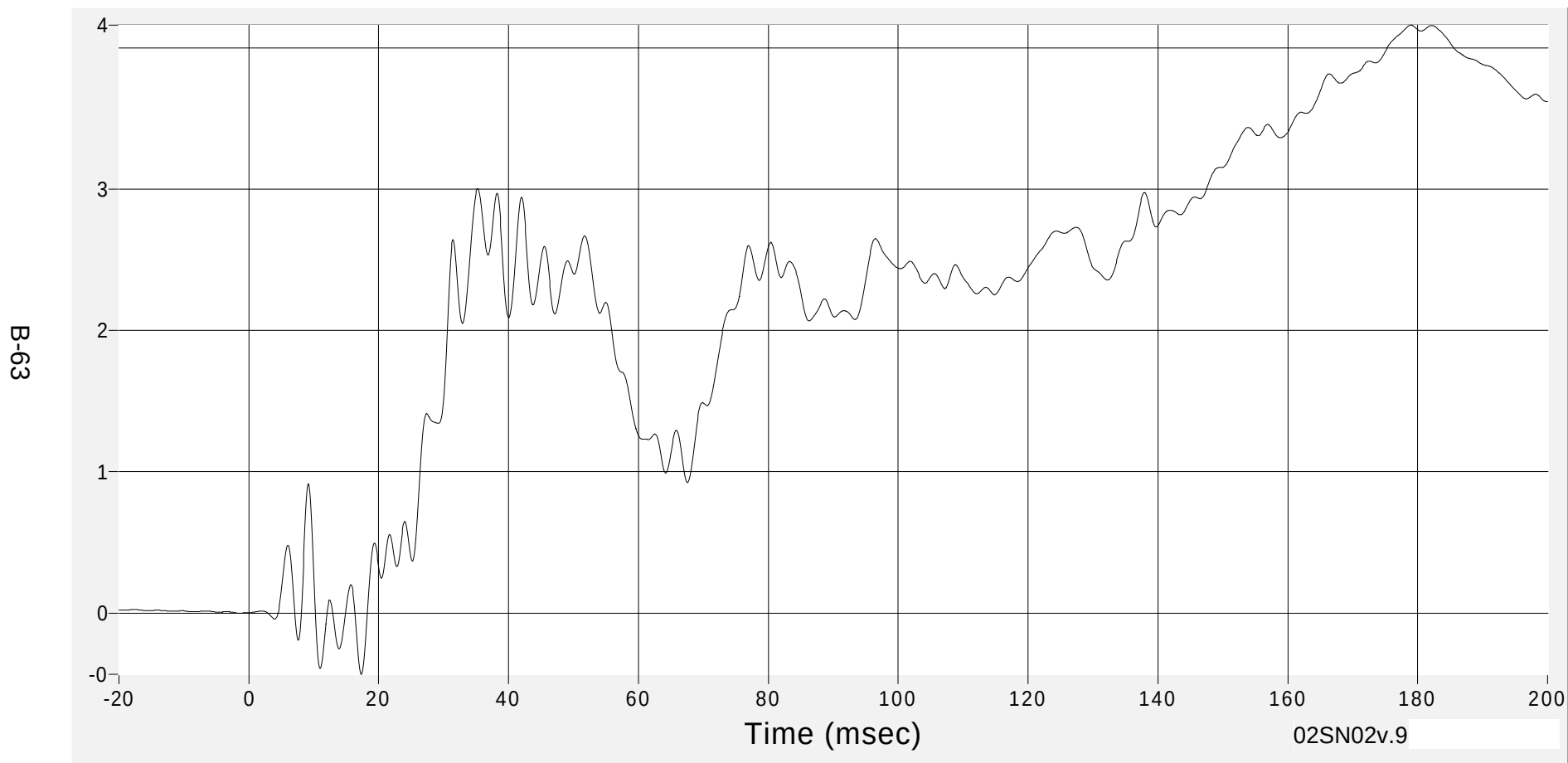
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Rear Floorpan Above Axle (Z) Velocity

Velocity (km/h) CFC180

Max 4.2 km/h at 179.0 msec

Min -0.4 km/h at 17.4 msec



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20 December 2001

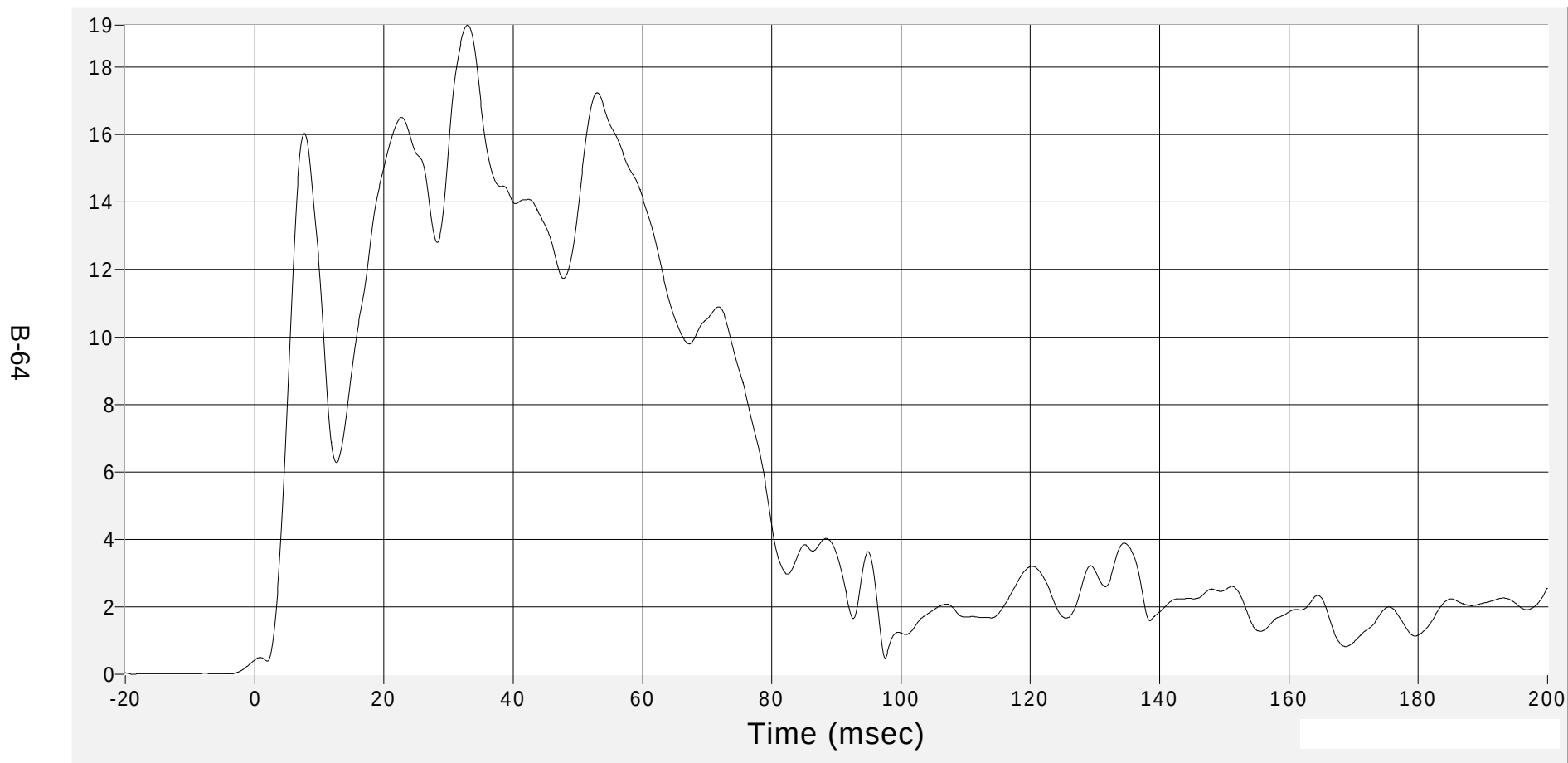
Medical College of Wisconsin
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Rear Floorpan Above Axle Resultant Acceleration

Acceleration (G's) CFC60

Max 19.2 G's at 33.0 msec

Min 0.4 G's at 2.0 msec



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20 December 2001

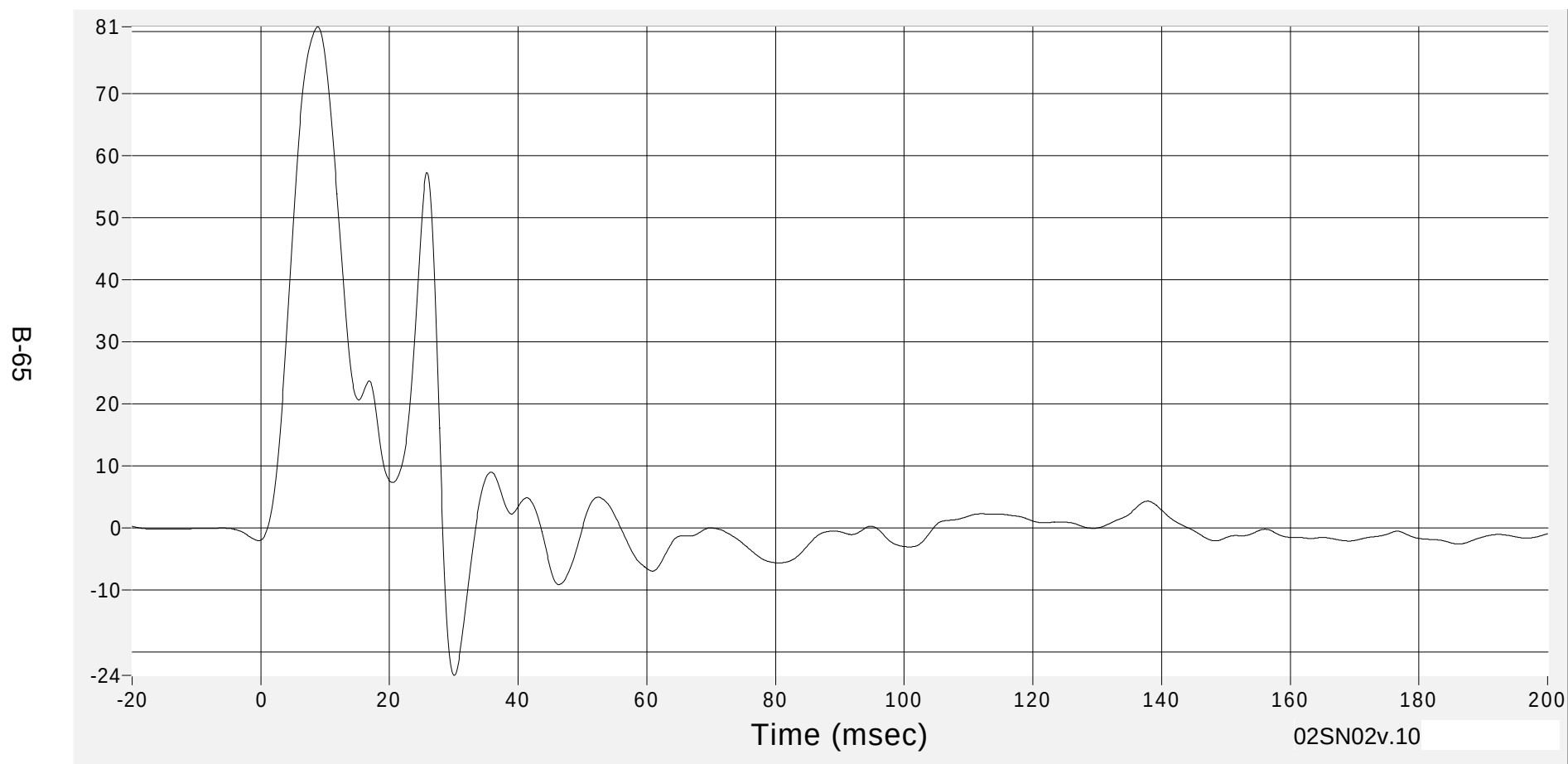
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Left Side Sill at Rear Seat (Y) Acceleration

Acceleration (G's) CFC60

Max 80.8 G's at 8.9 msec

Min -23.7 G's at 30.1 msec



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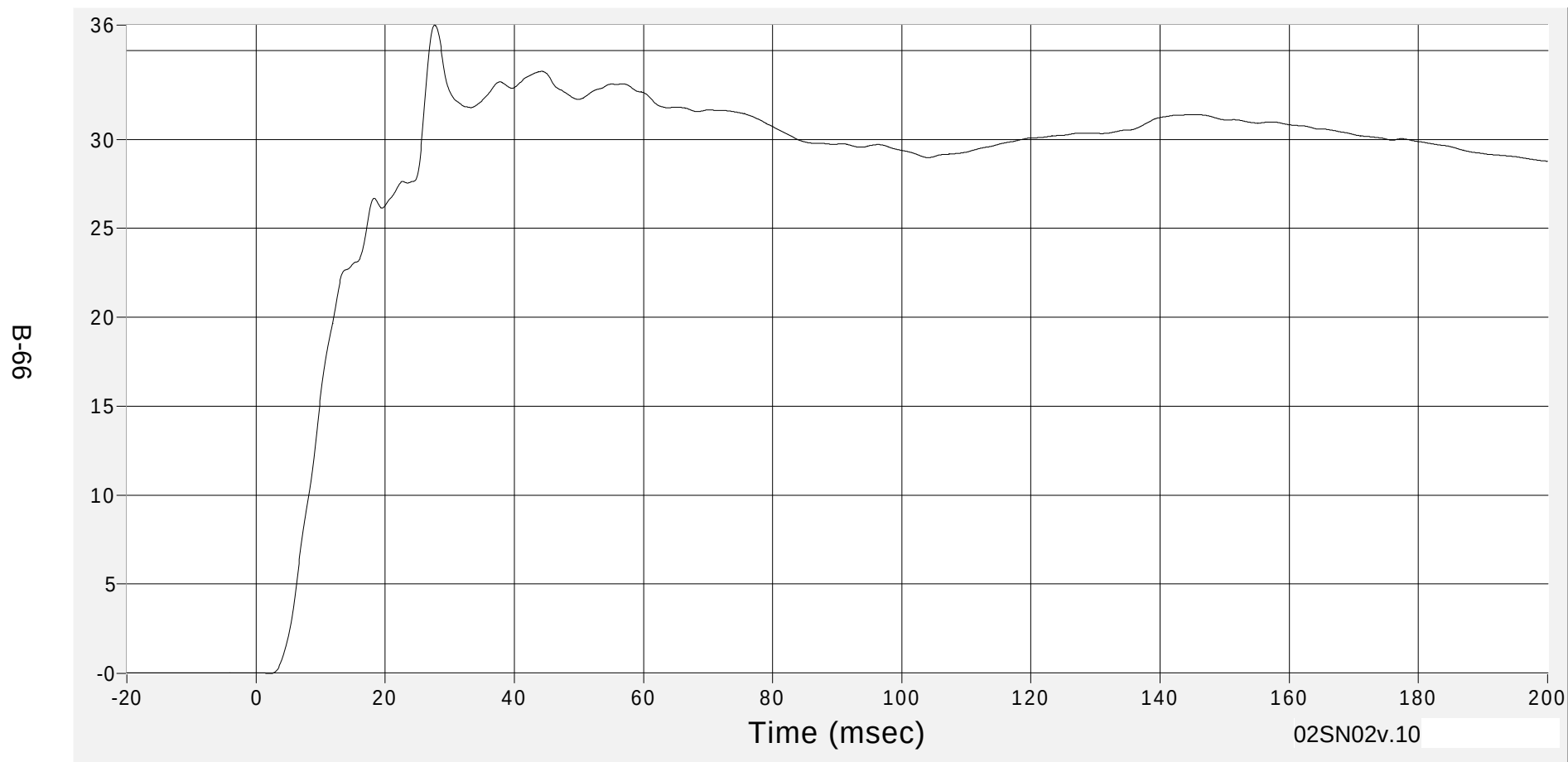
Medical College of Wisconsin
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Left Side Sill at Rear Seat (Y) Velocity

Velocity (km/h) CFC180

Max 36.4 km/h at 27.7 msec

Min 0.0 km/h at 2.2 msec



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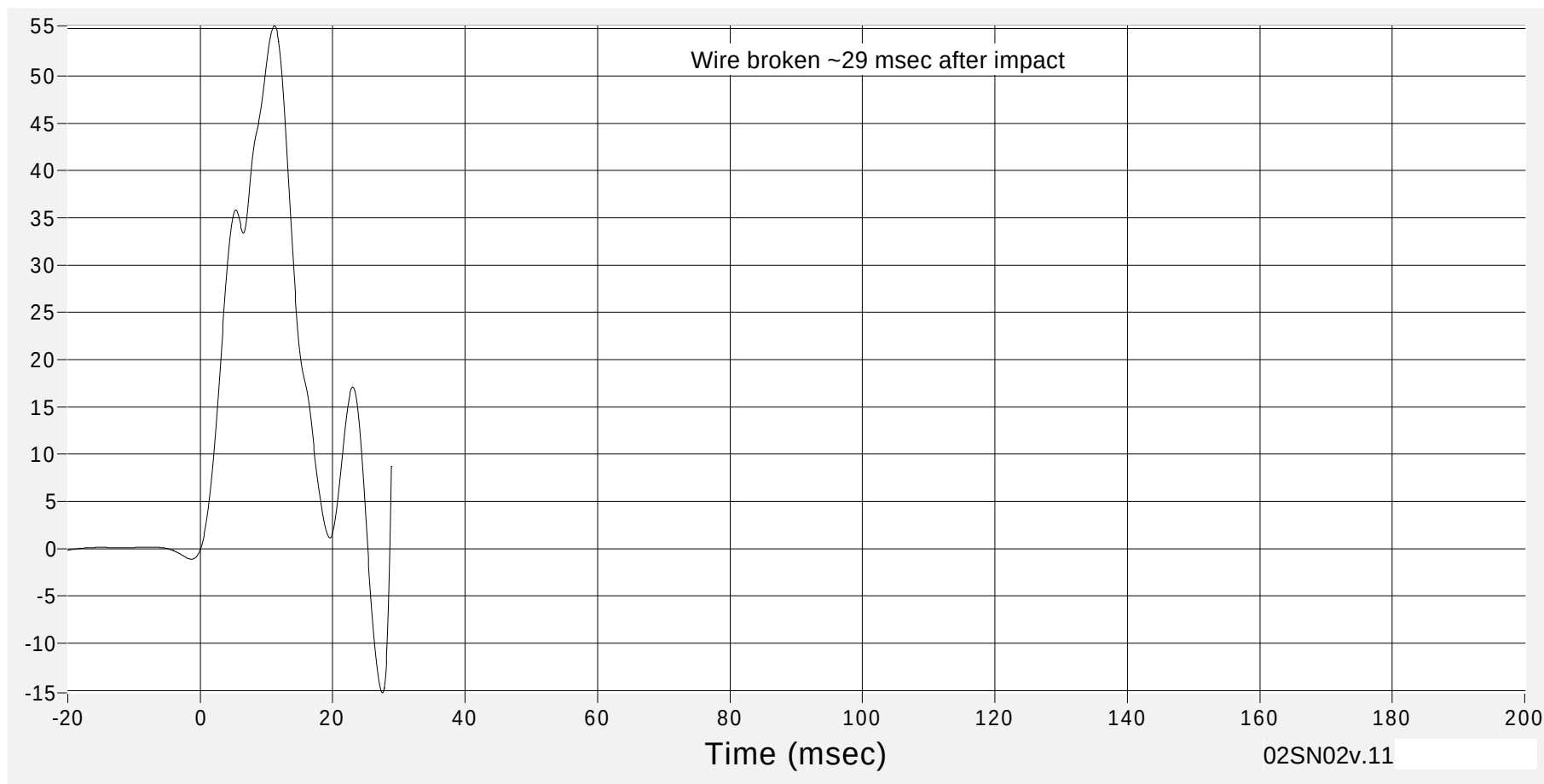
Left Side Sill at Front Seat (Y) Acceleration

Acceleration (G's) CFC60

Max 55.3 G's at 11.2 msec

Min -15.2 G's at 27.5 msec

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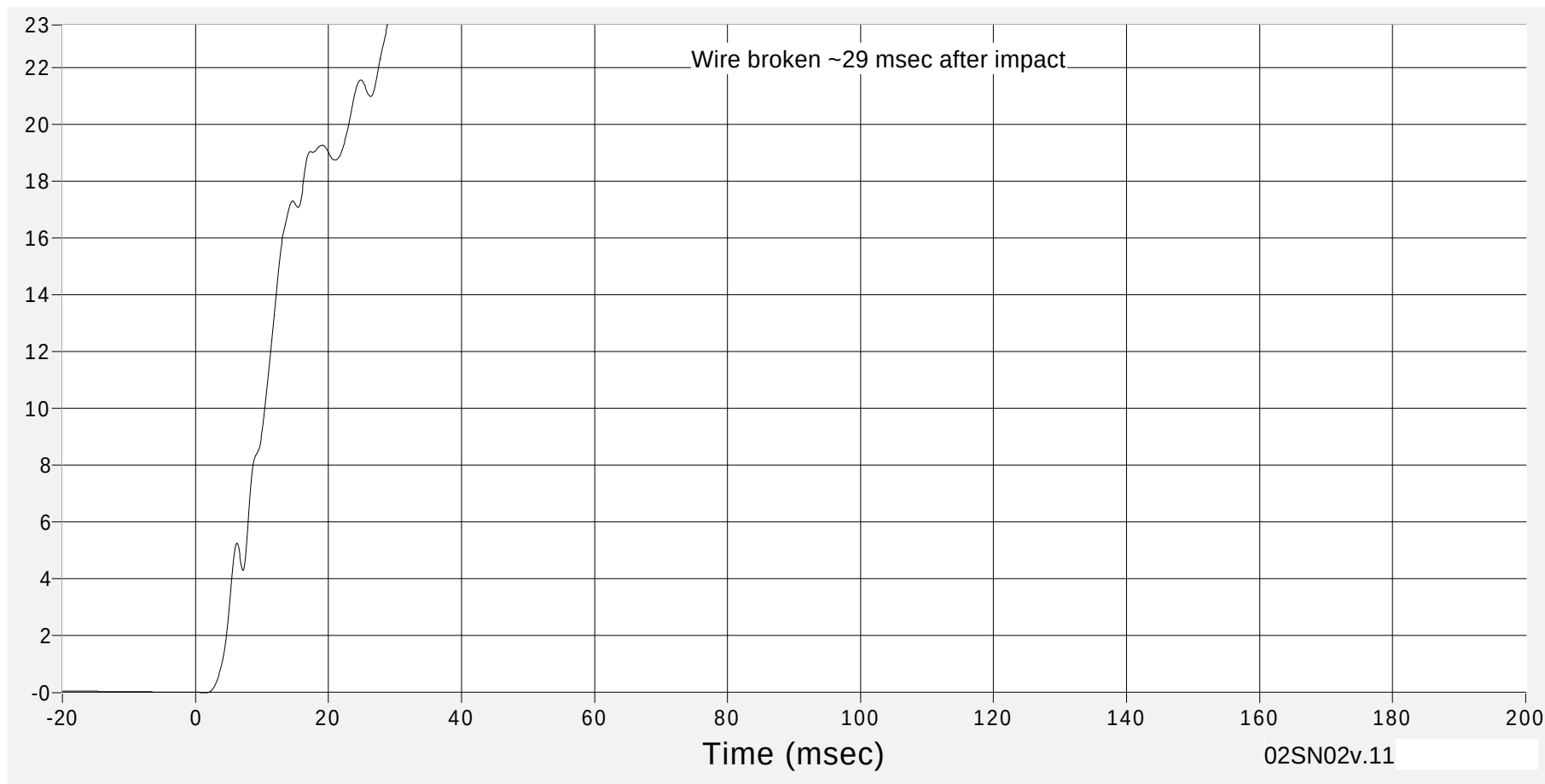
Left Side Sill at Front Seat (Y) Velocity

Velocity (km/h) CFC180

Max 23.5 km/h at 28.9 msec

Min 0.0 km/h at 1.4 msec

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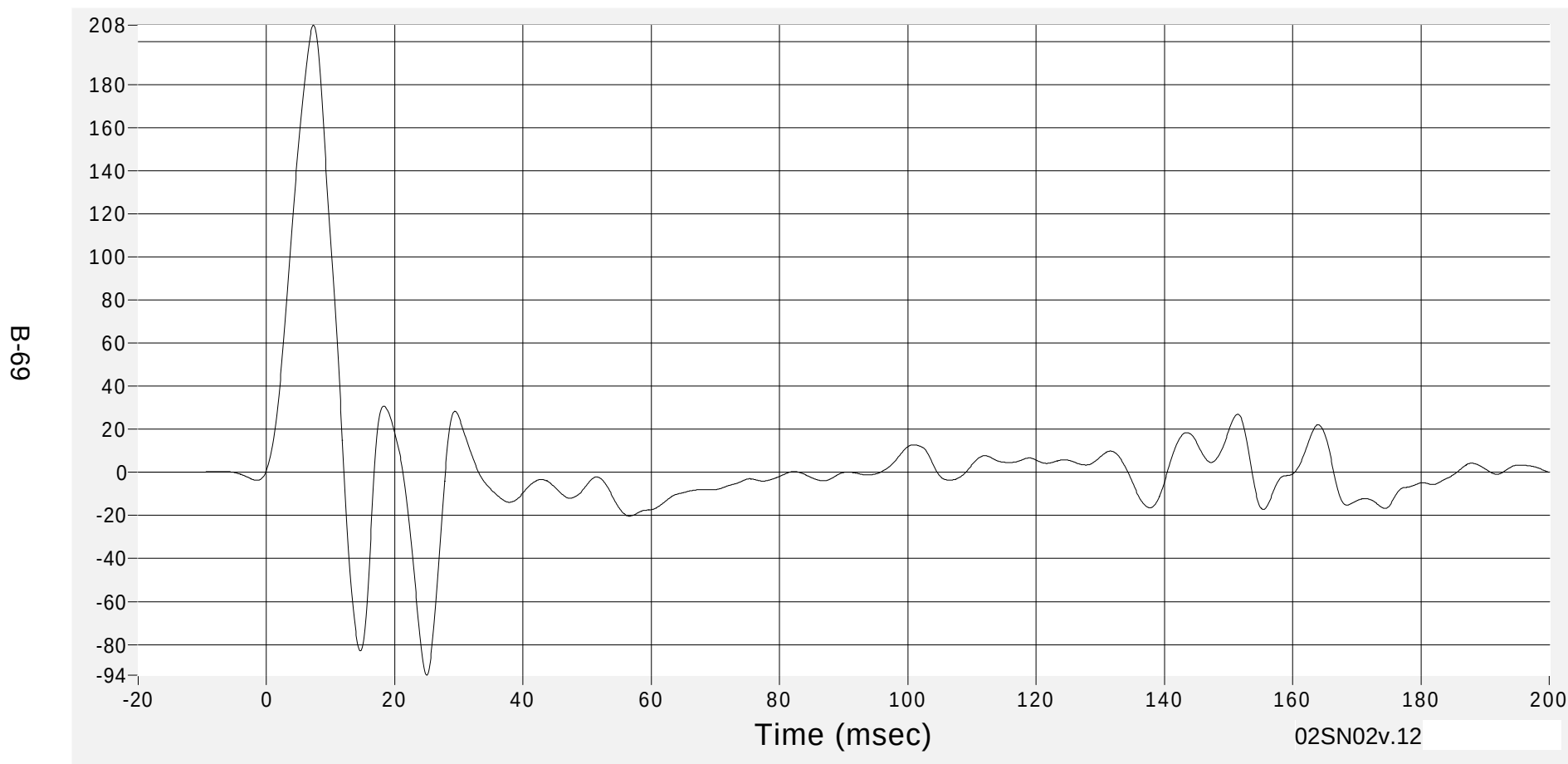
Medical College of Wisconsin
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Left Front Door on Centerline (Y) Acceleration

Acceleration (G's) CFC60

Max 207.5 G's at 7.4 msec

Min -94.2 G's at 25.0 msec



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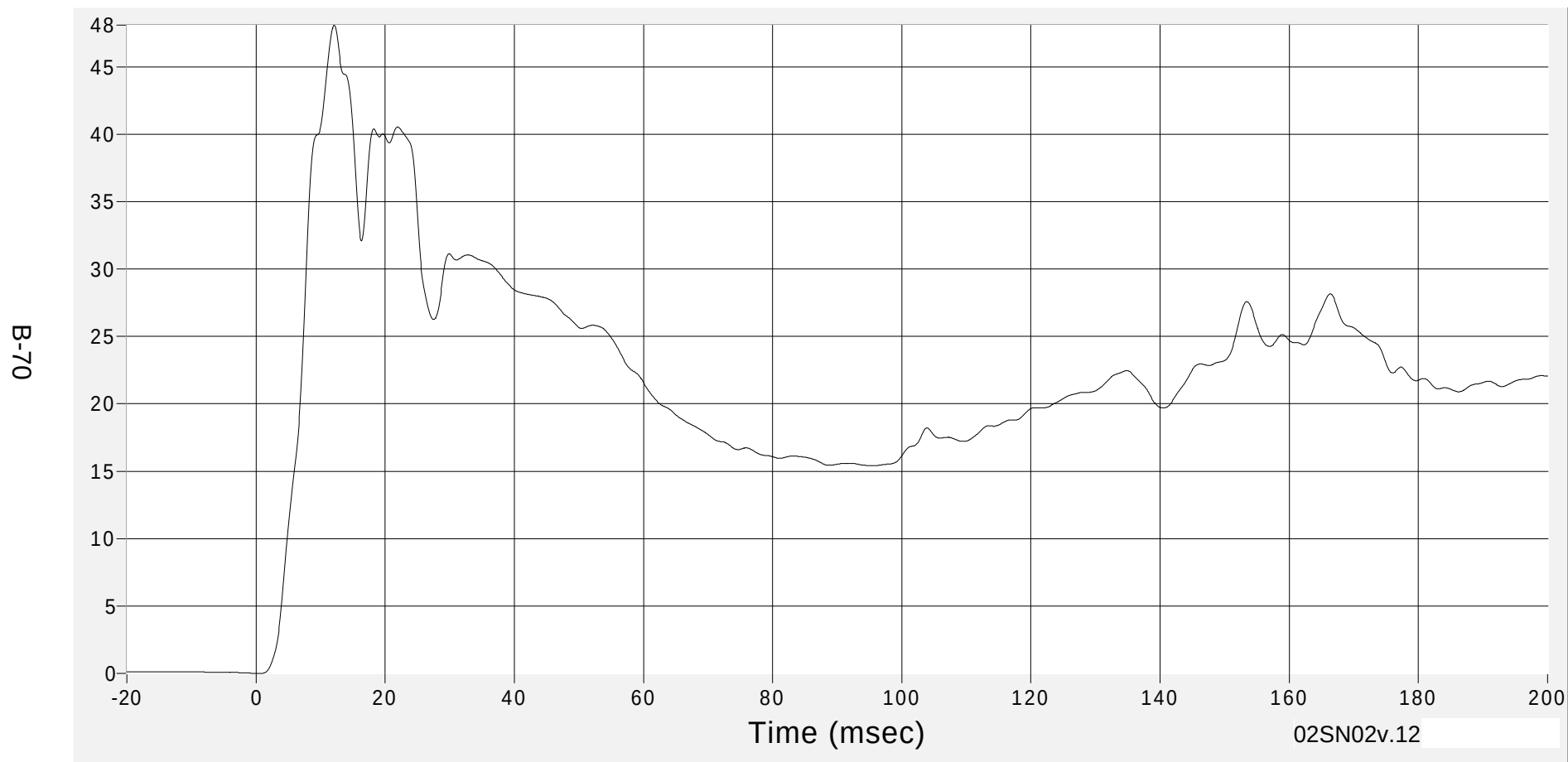
Medical College of Wisconsin
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Left Front Door on Centerline (Y) Velocity

Max 48.1 km/h at 12.1 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 0.0 msec



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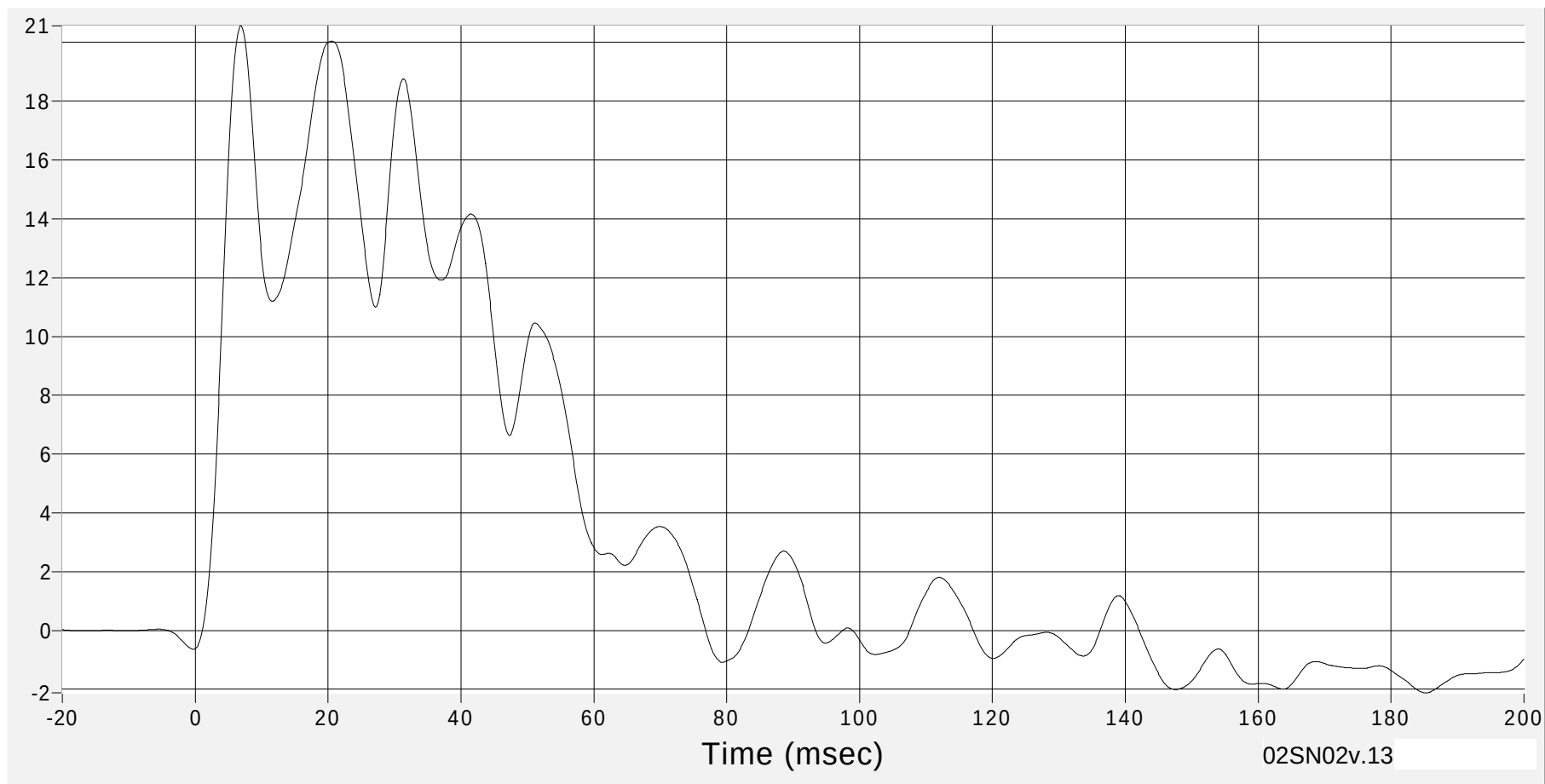
Right Rear Occupant Compartment (Y) Acceleration

Acceleration (G's) CFC60

Max 20.6 G's at 6.9 msec

Min -2.1 G's at 185.2 msec

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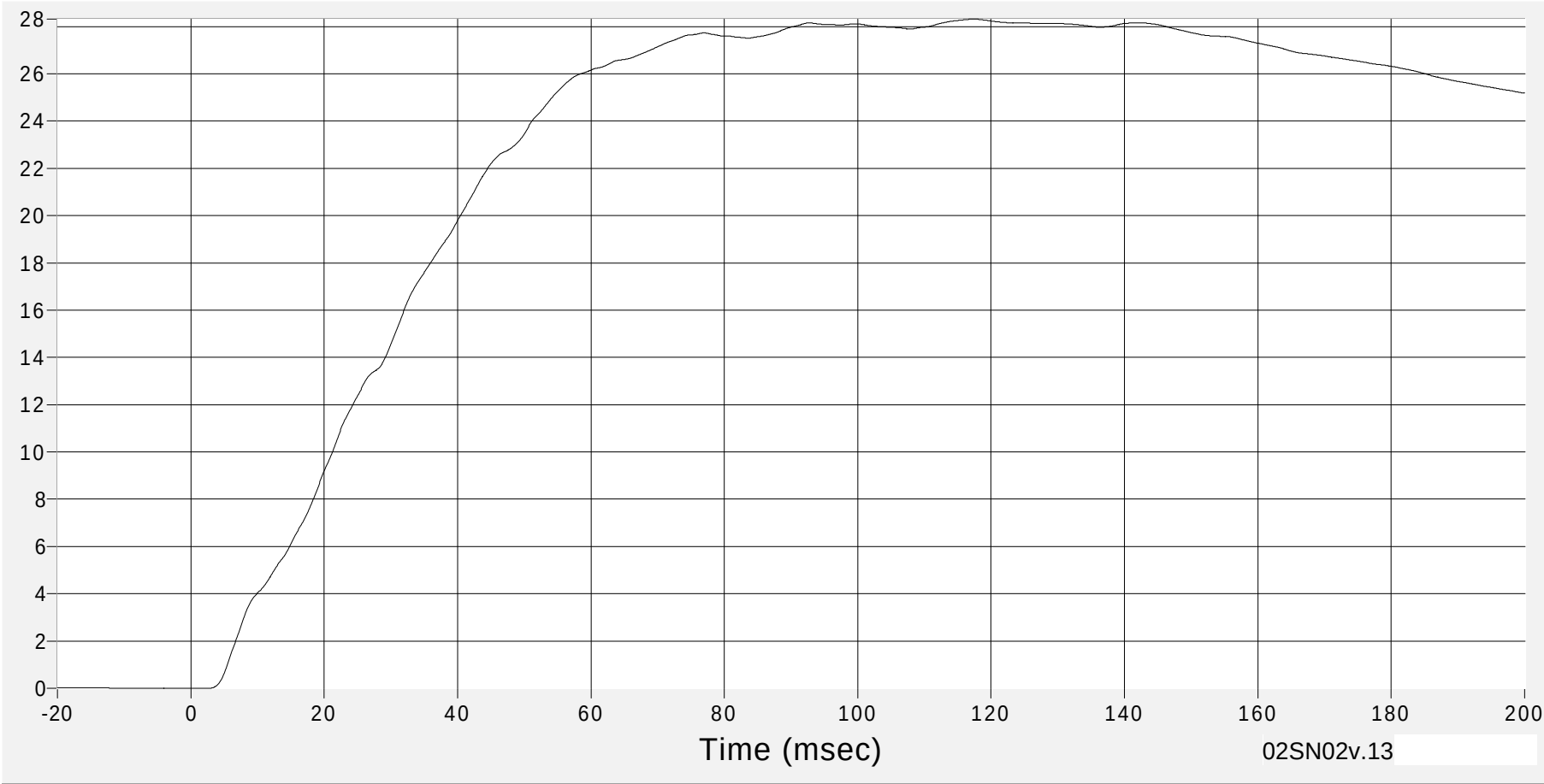
Medical College of Wisconsin
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Right Rear Occupant Compartment (Y) Velocity

Velocity (km/h) CFC180

Max 28.3 km/h at 117.4 msec
Min 0.0 km/h at 0.0 msec

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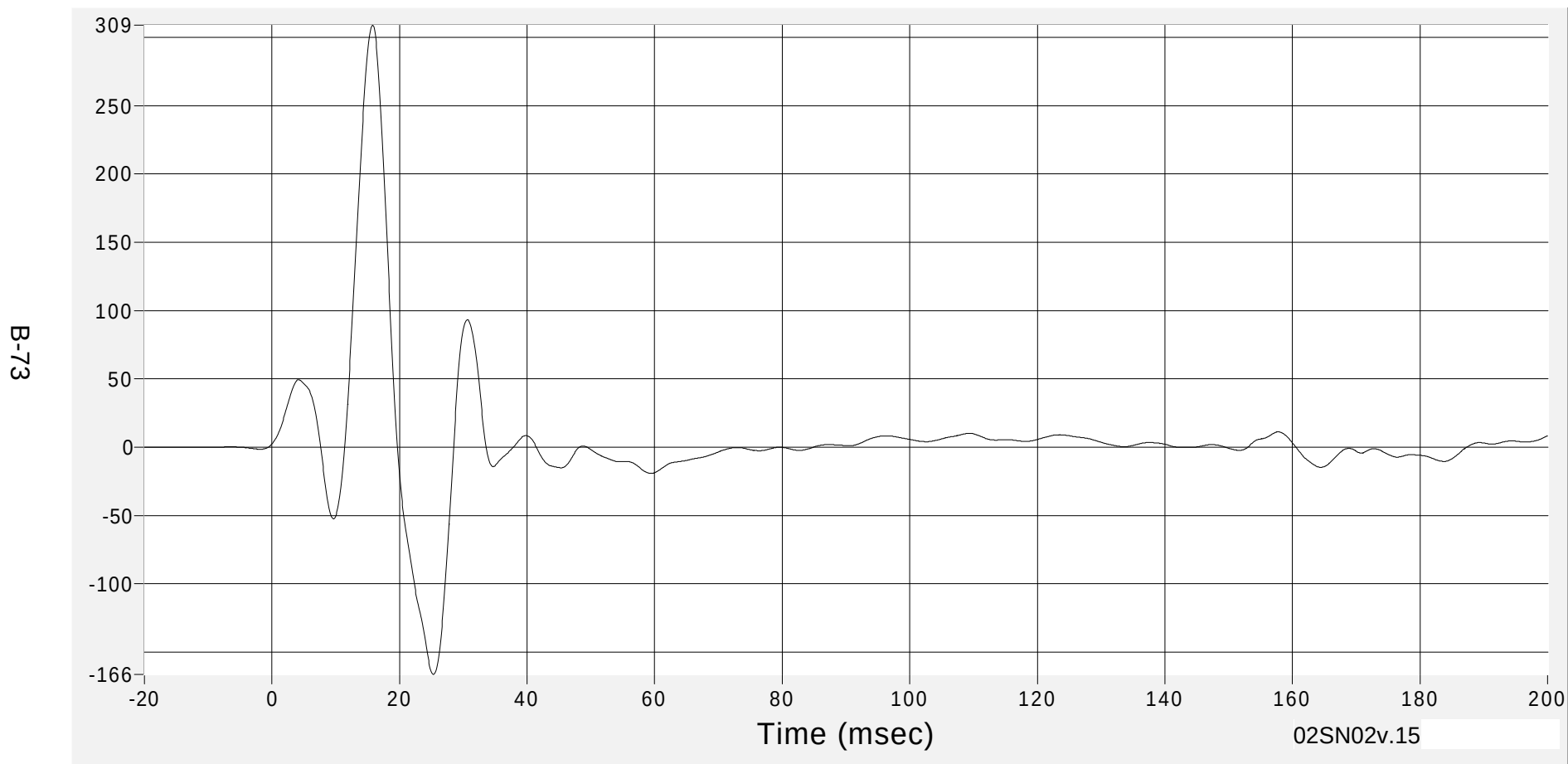
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Left Front Door Upper Centerline (Y) Acceleration

Acceleration (G's) CFC60

Max 309.0 G's at 15.8 msec

Min -166.3 G's at 25.4 msec



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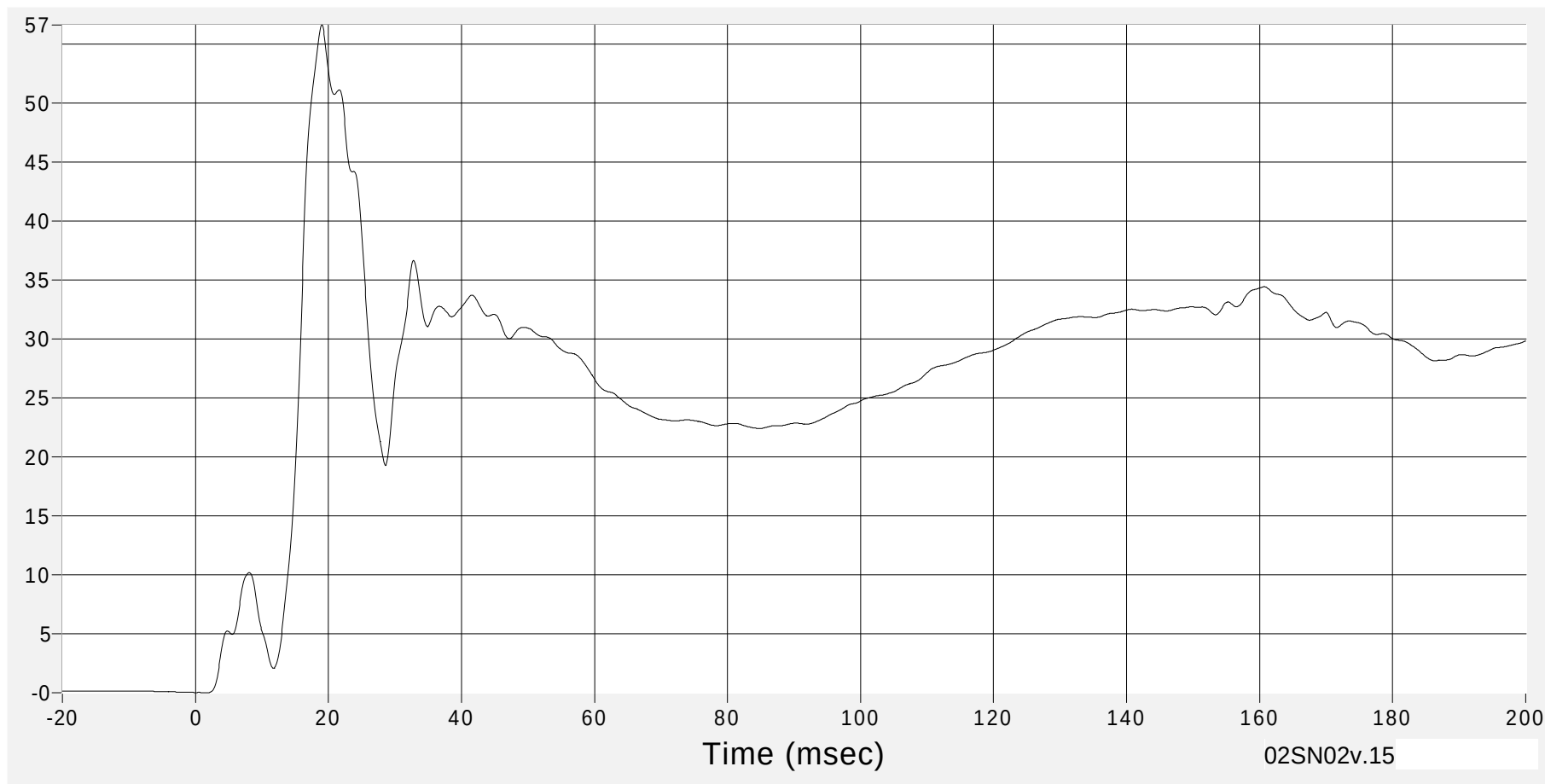
Left Front Door Upper Centerline (Y) Velocity

Velocity (km/h) CFC180

Max 56.6 km/h at 19.0 msec

Min 0.0 km/h at 1.7 msec

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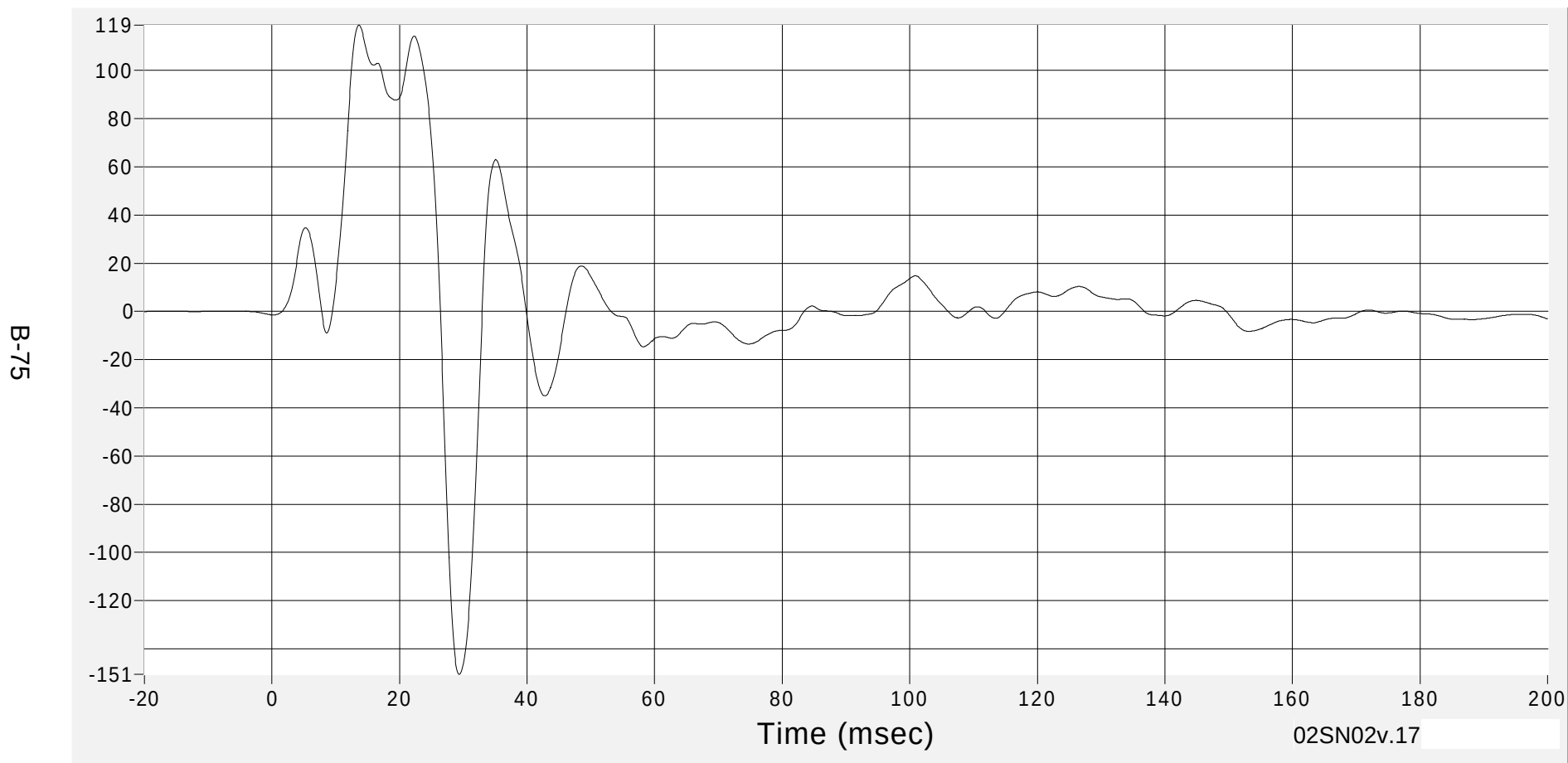
Medical College of Wisconsin
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Left Rear Door Upper Centerline (Y) Acceleration

Acceleration (G's) CFC60

Max 118.8 G's at 13.6 msec

Min -150.5 G's at 29.4 msec



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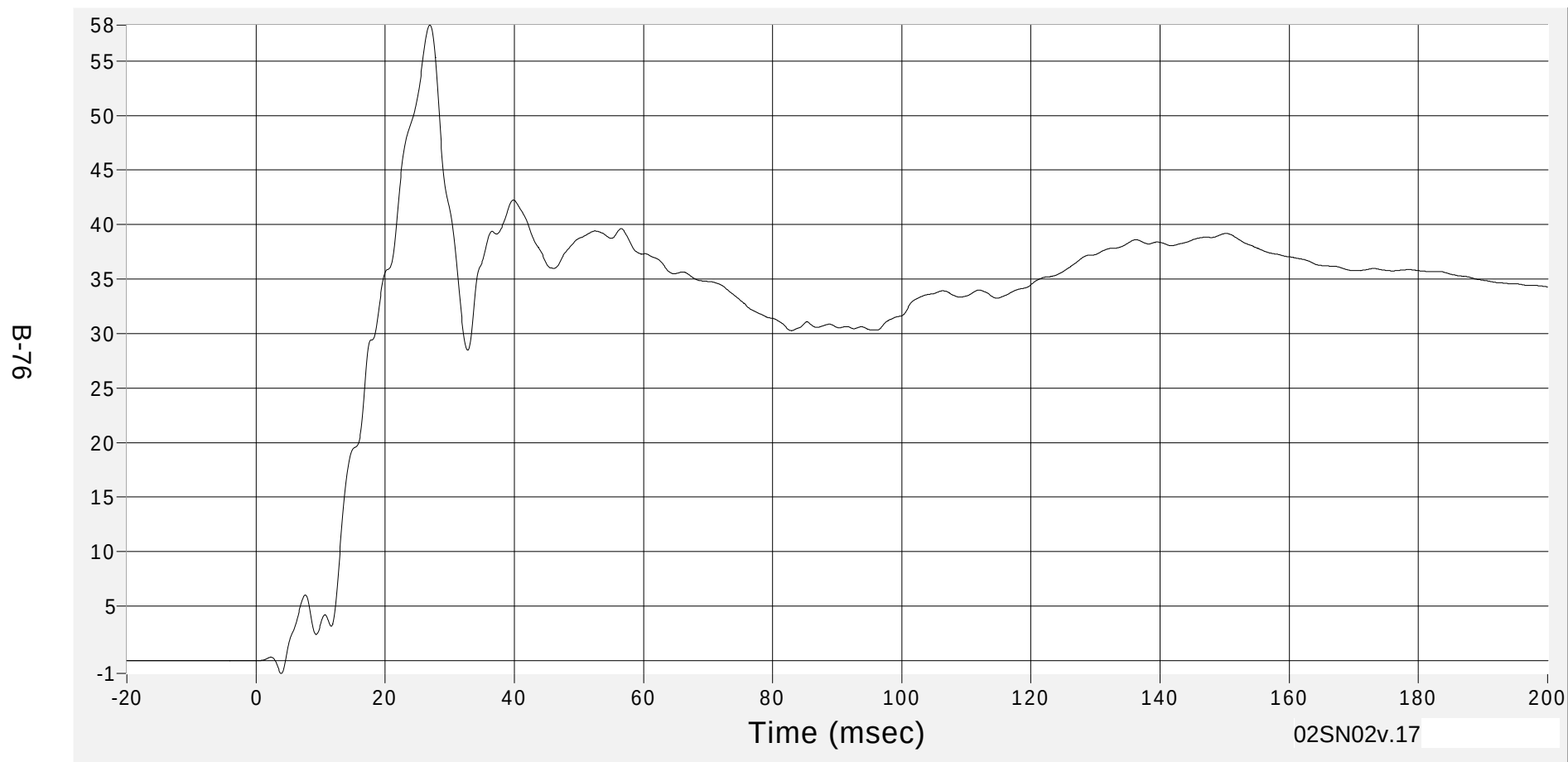
Medical College of Wisconsin
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Left Rear Door Upper Centerline (Y) Velocity

Max 58.3 km/h at 27.0 msec

Min -1.2 km/h at 3.9 msec

Velocity (km/h) CFC180



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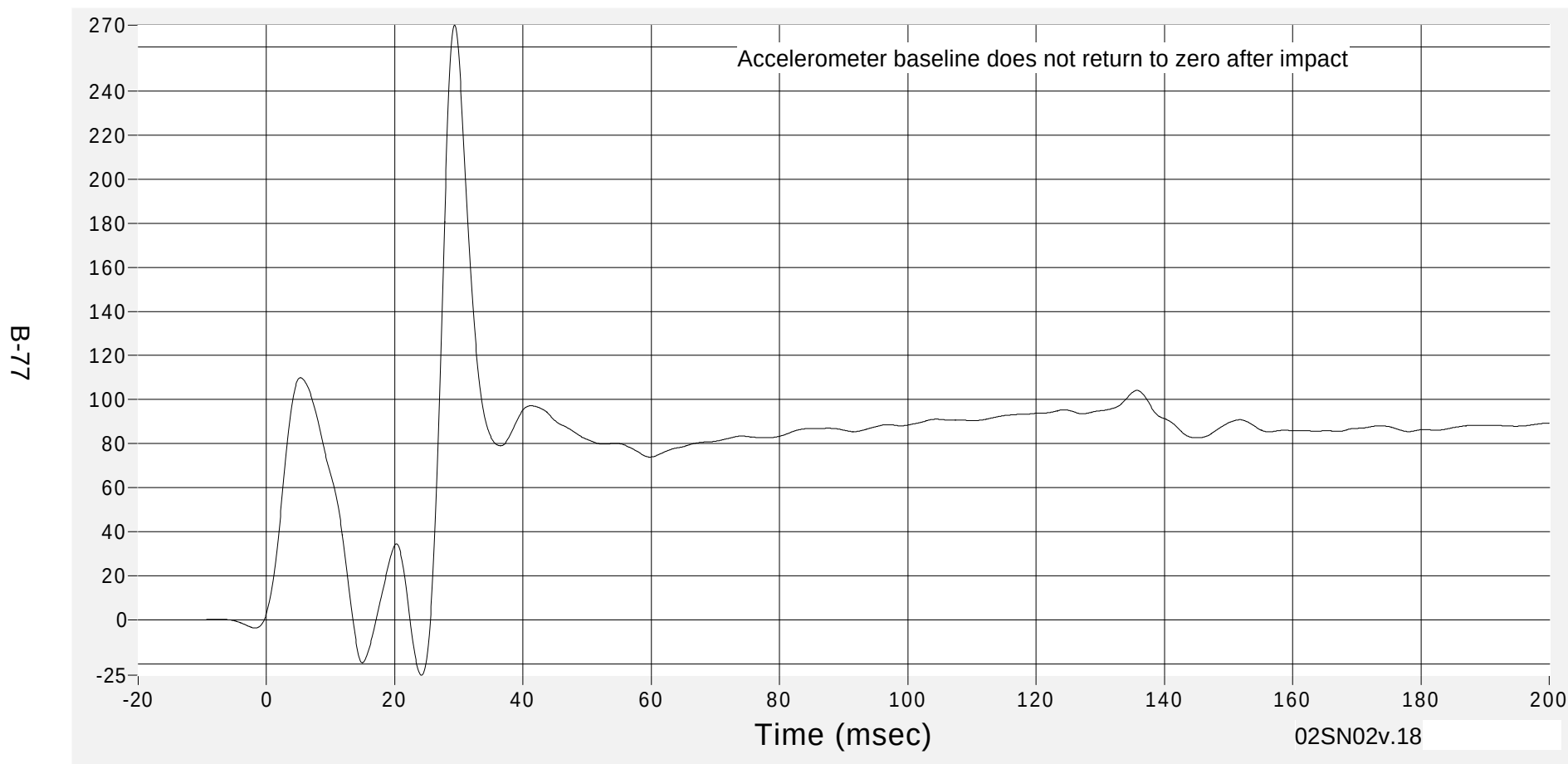
Medical College of Wisconsin
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Left Lower B-Pillar (Y) Acceleration

Acceleration (G's) CFC60

Max 269.9 G's at 29.4 msec

Min -25.1 G's at 24.2 msec



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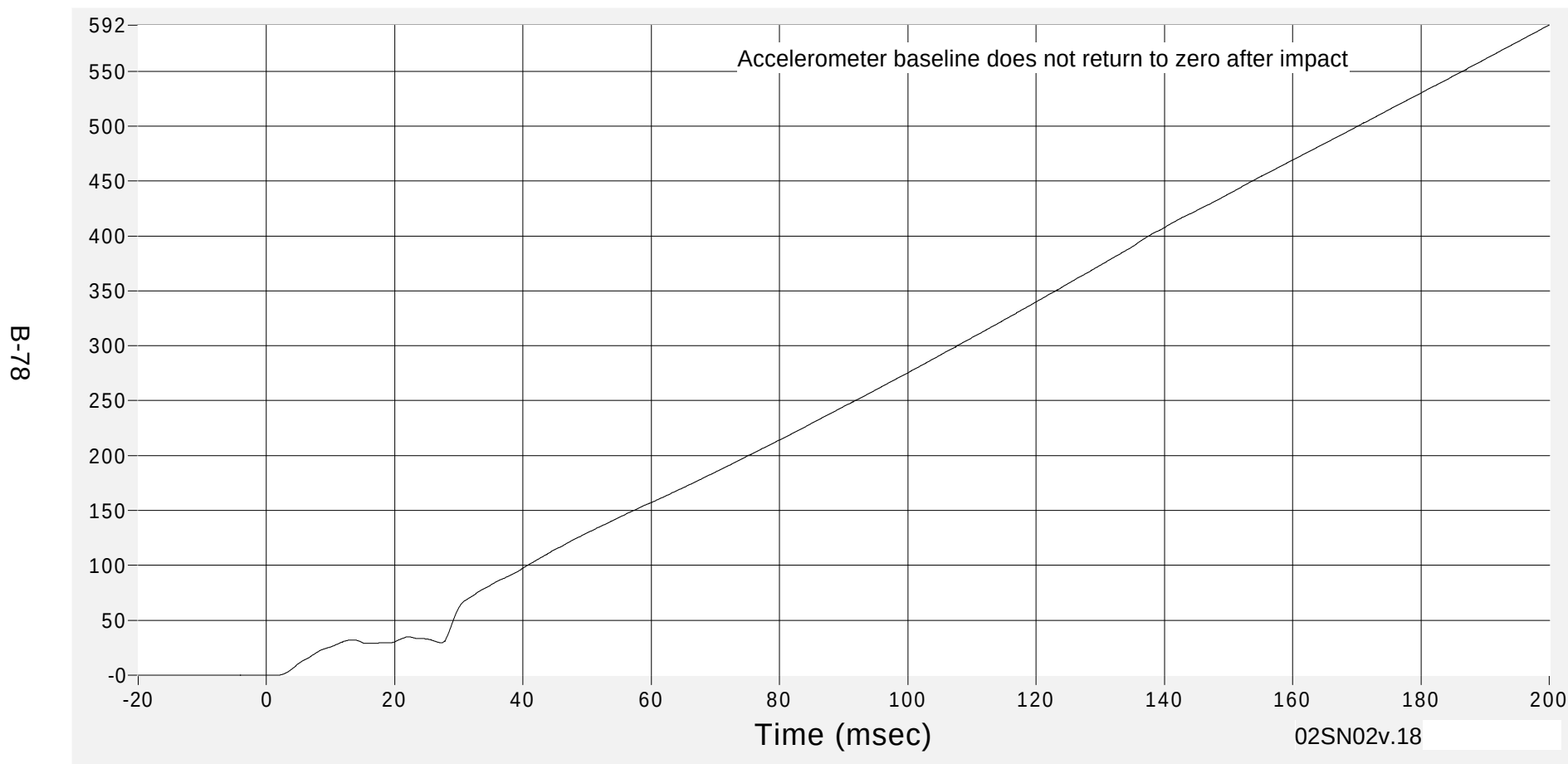
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Left Lower B-Pillar (Y) Velocity

Velocity (km/h) CFC180

Max 592.0 km/h at 199.9 msec

Min 0.0 km/h at 1.4 msec



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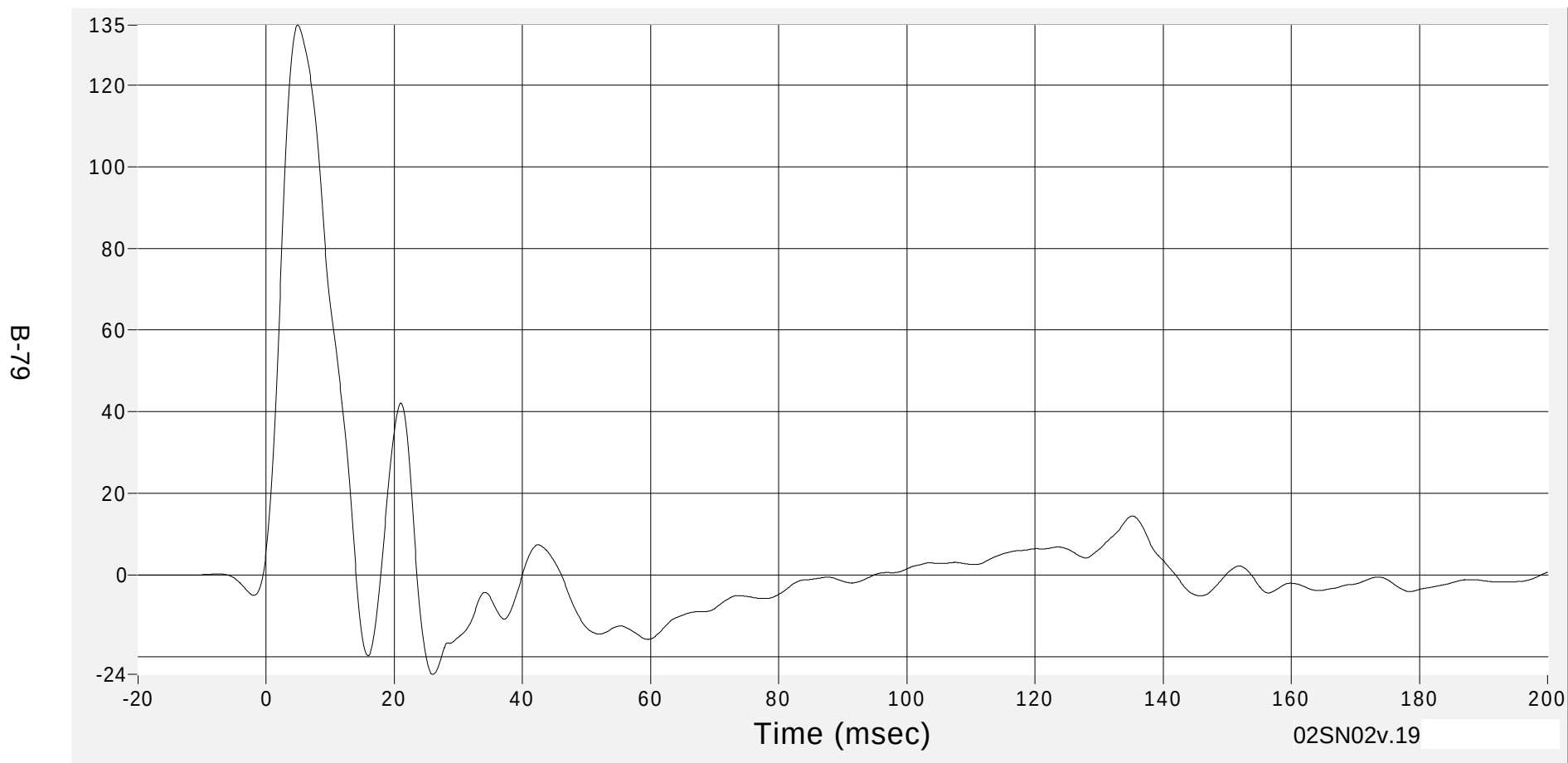
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Left Middle B-Pillar (Y) Acceleration

Acceleration (G's) CFC60

Max 134.7 G's at 5.0 msec

Min -24.3 G's at 26.0 msec



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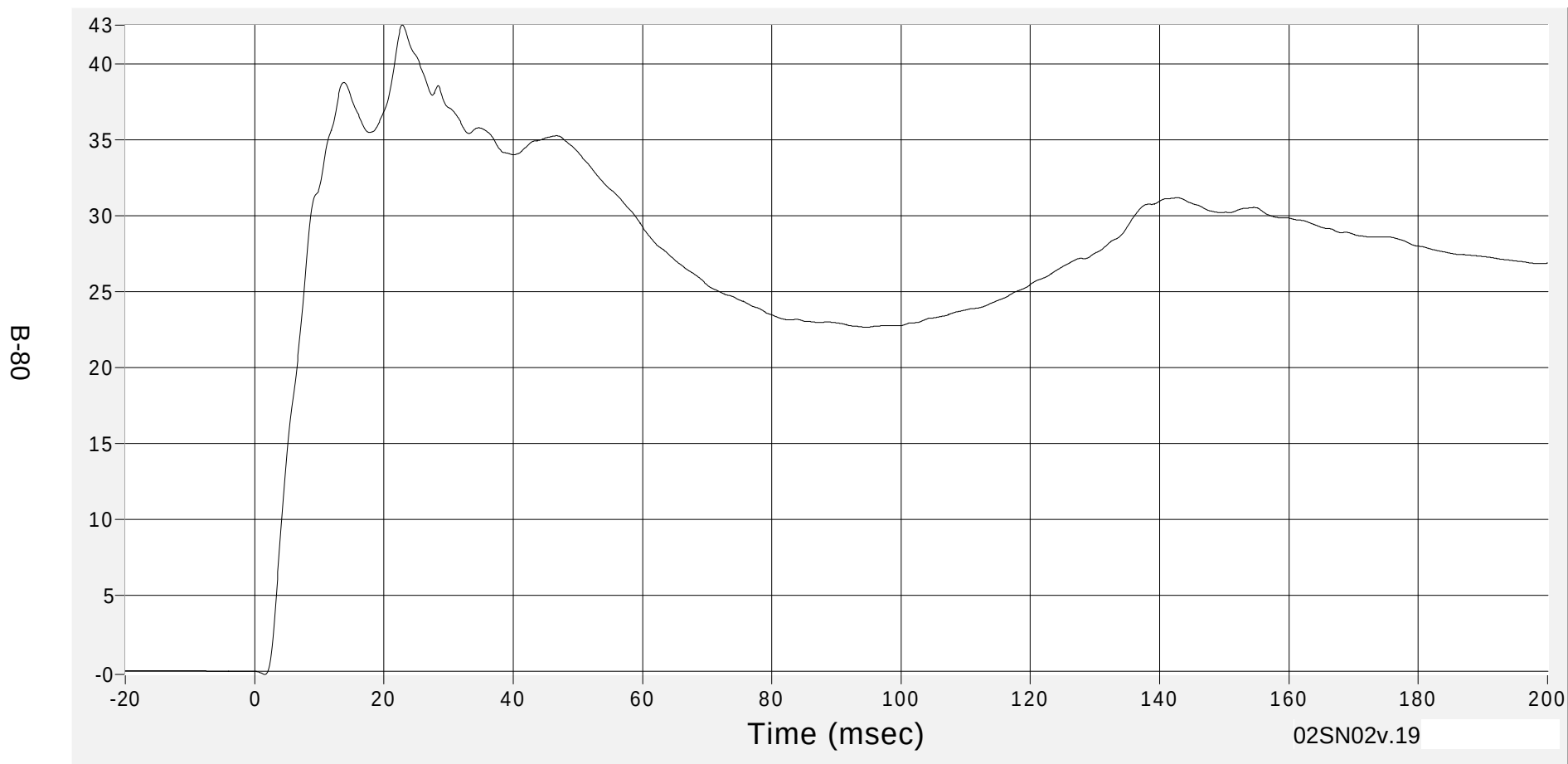
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Left Middle B-Pillar (Y) Velocity

Velocity (km/h) CFC180

Max 42.5 km/h at 22.9 msec

Min -0.2 km/h at 1.6 msec



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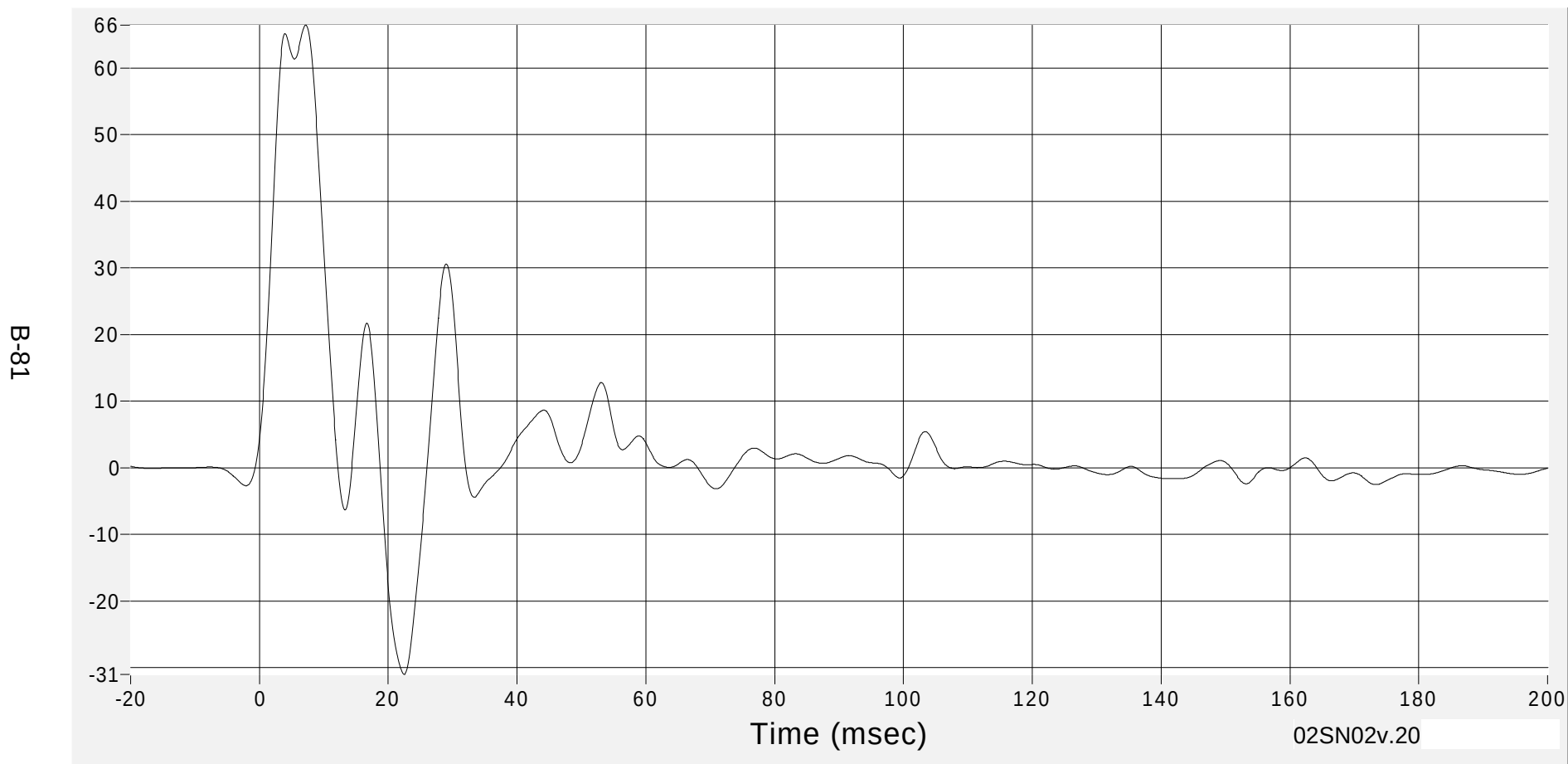
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Left Lower A-Pillar (Y) Acceleration

Acceleration (G's) CFC60

Max 66.4 G's at 7.2 msec

Min -31.0 G's at 22.5 msec



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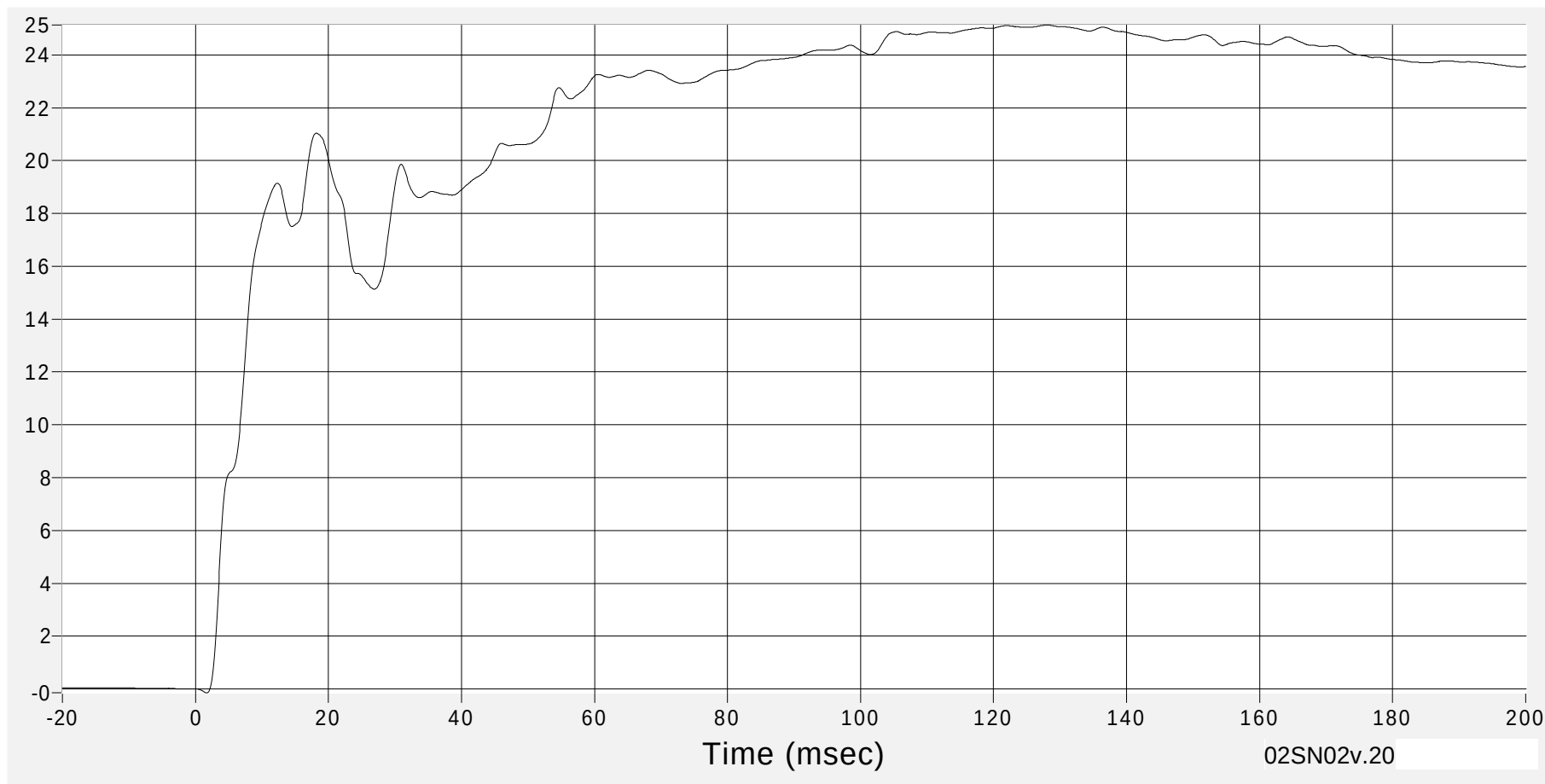
Left Lower A-Pillar (Y) Velocity

Velocity (km/h) CFC180

Max 25.1 km/h at 128.0 msec

Min -0.1 km/h at 1.7 msec

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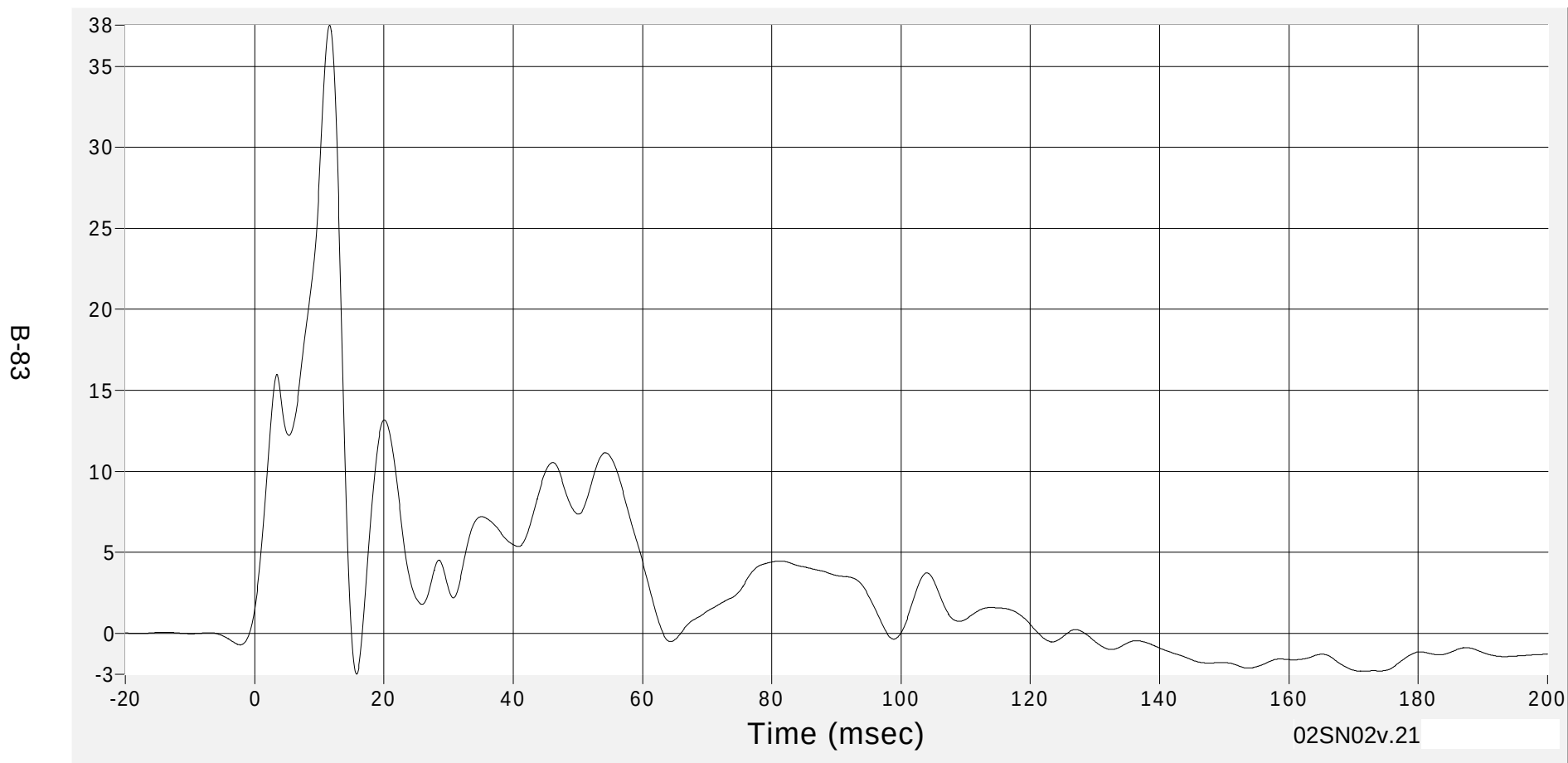
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Left Middle A-Pillar (Y) Acceleration

Acceleration (G's) CFC60

Max 37.5 G's at 11.6 msec

Min -2.5 G's at 15.8 msec



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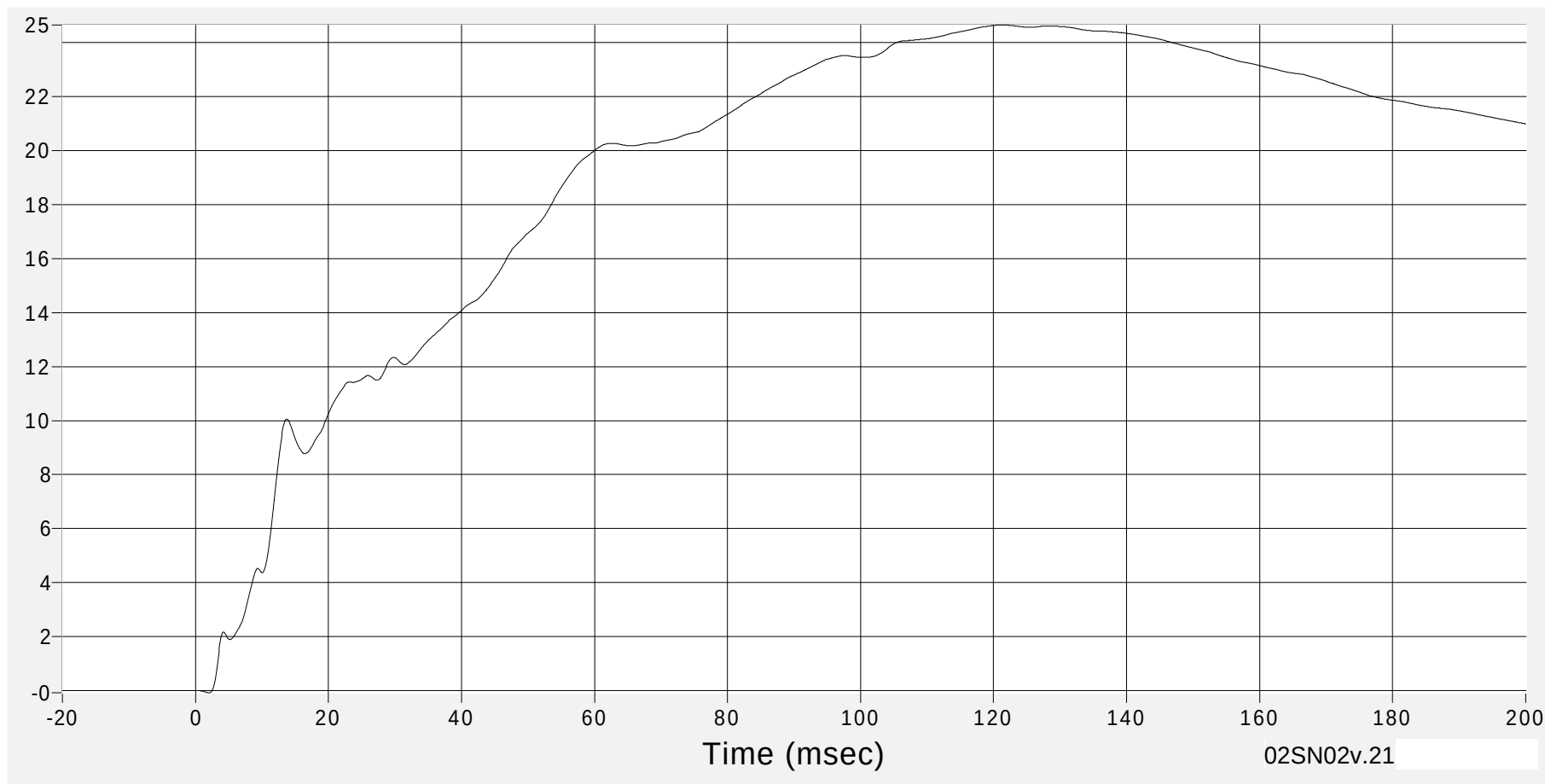
Left Middle A-Pillar (Y) Velocity

Velocity (km/h) CFC180

Max 24.6 km/h at 121.4 msec

Min 0.0 km/h at 2.0 msec

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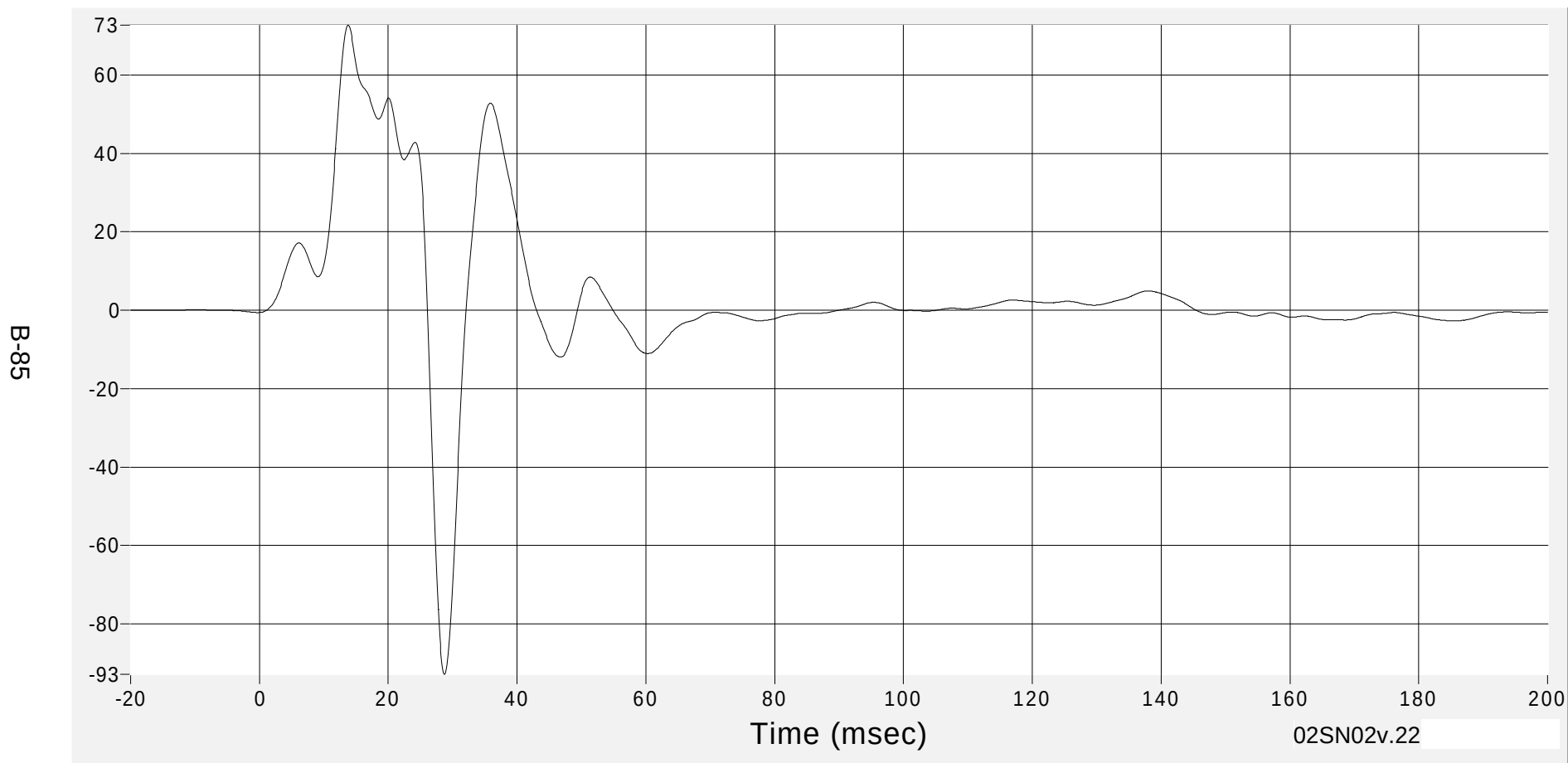
Medical College of Wisconsin
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Front Seat Track (Y) Acceleration

Acceleration (G's) CFC60

Max 72.7 G's at 13.8 msec

Min -92.8 G's at 28.7 msec



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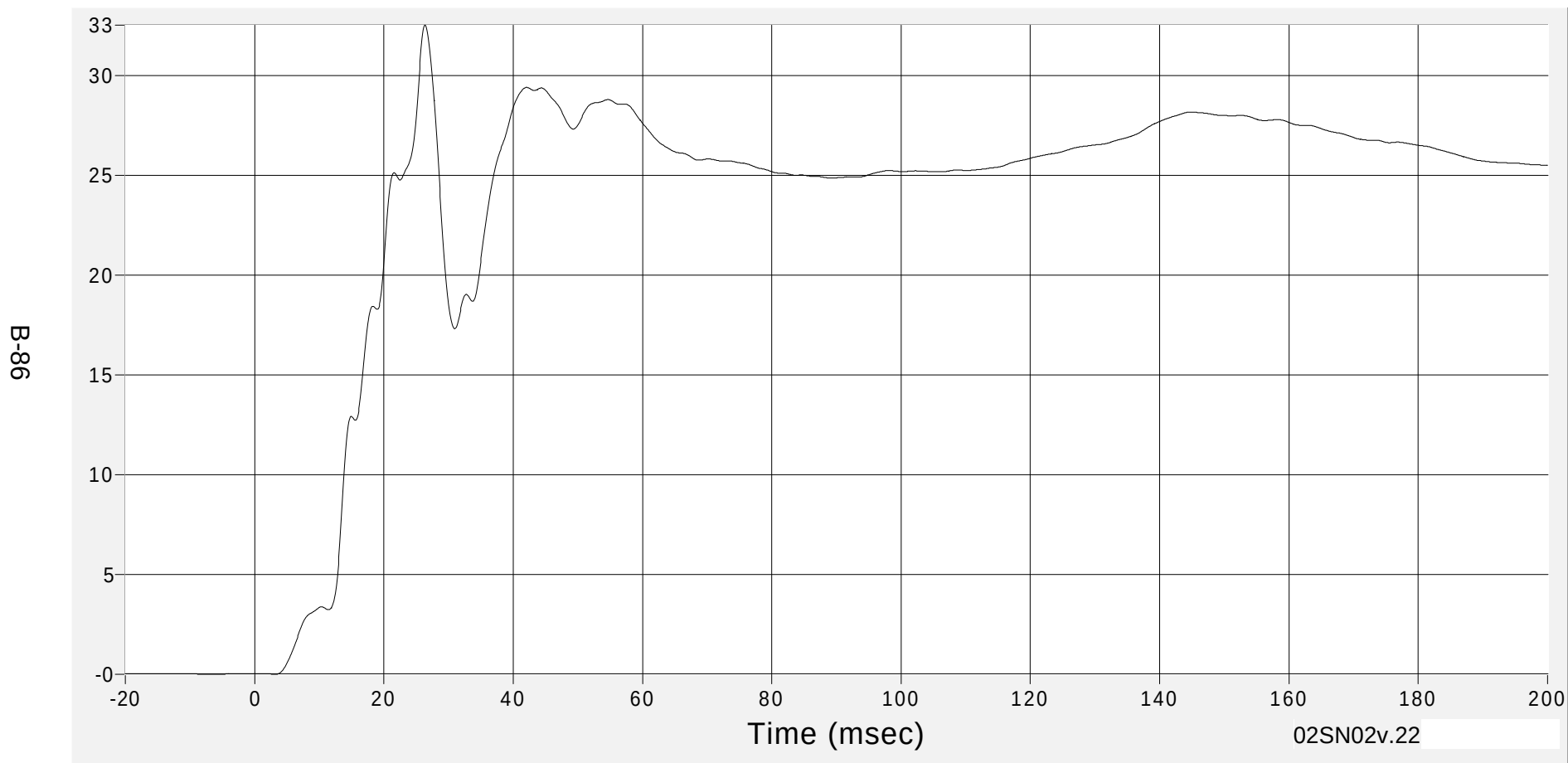
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Front Seat Track (Y) Velocity

Velocity (km/h) CFC180

Max 32.5 km/h at 26.4 msec

Min 0.0 km/h at 3.2 msec



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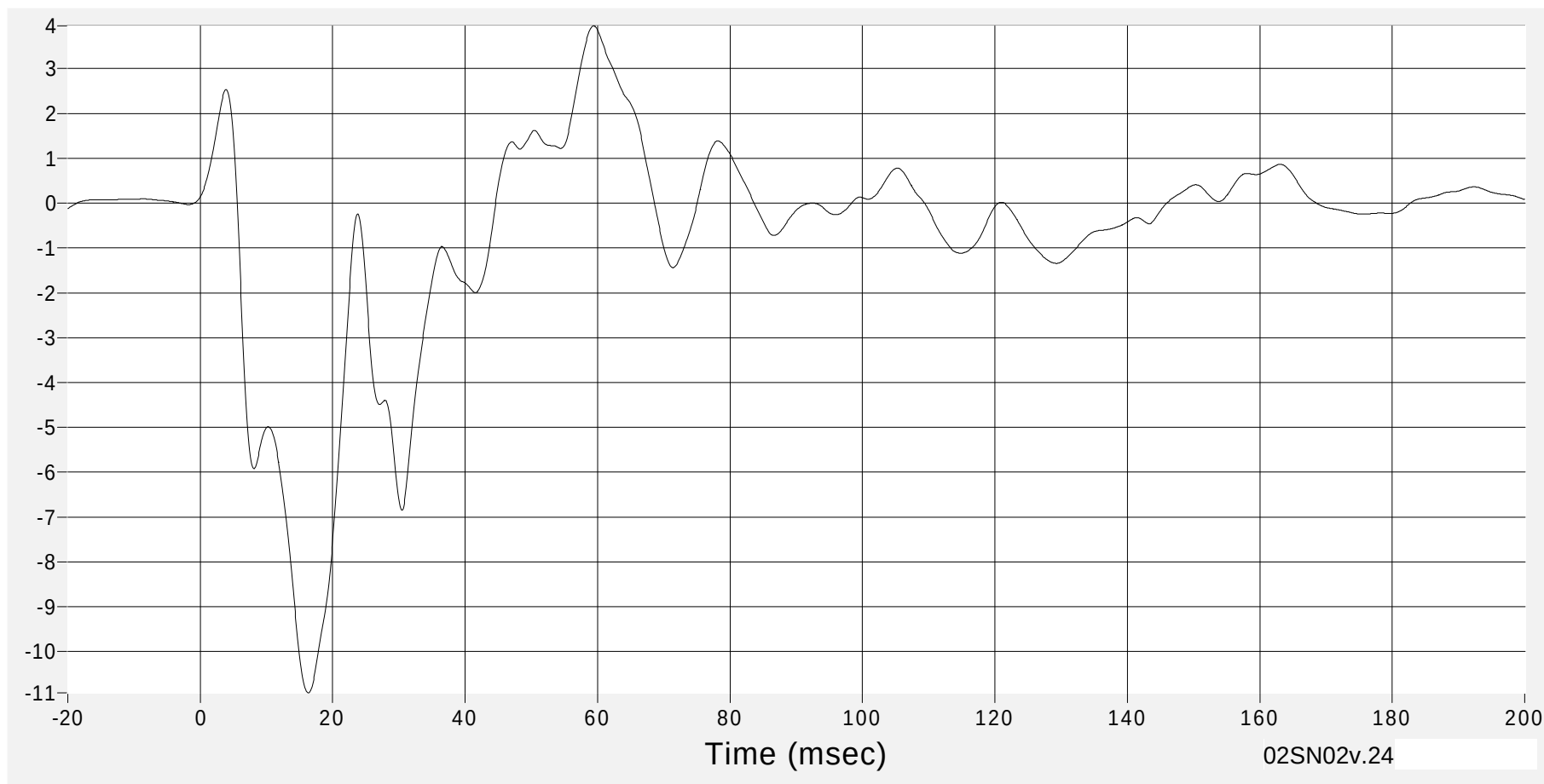
Vehicle Center of Gravity (X) Acceleration

Acceleration (G's) CFC60

Max 4.0 G's at 59.4 msec

Min -10.9 G's at 16.3 msec

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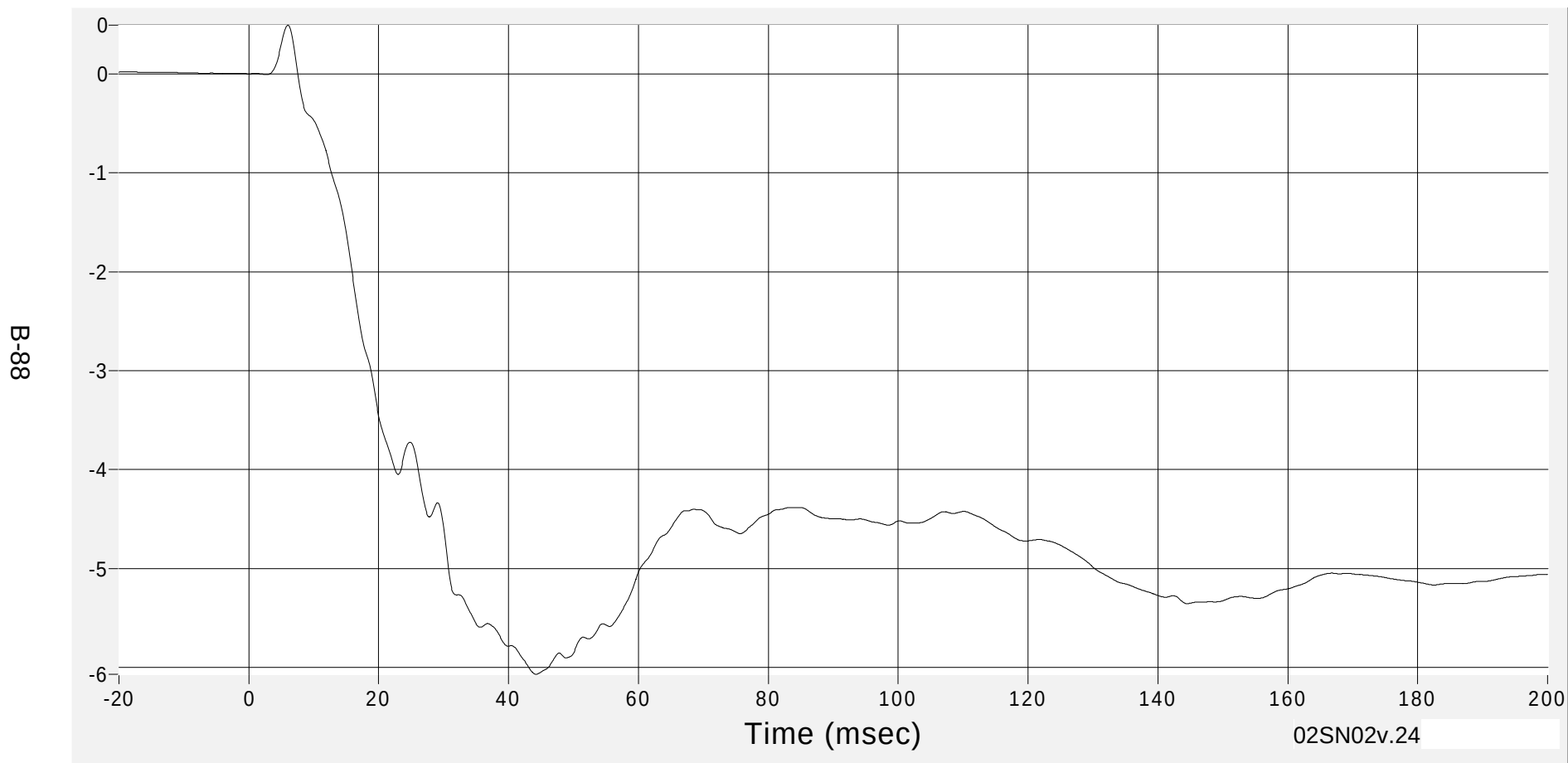
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Vehicle Center of Gravity (X) Velocity

Velocity (km/h) CFC180

Max 0.5 km/h at 6.0 msec

Min -6.1 km/h at 44.2 msec



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20 December 2001

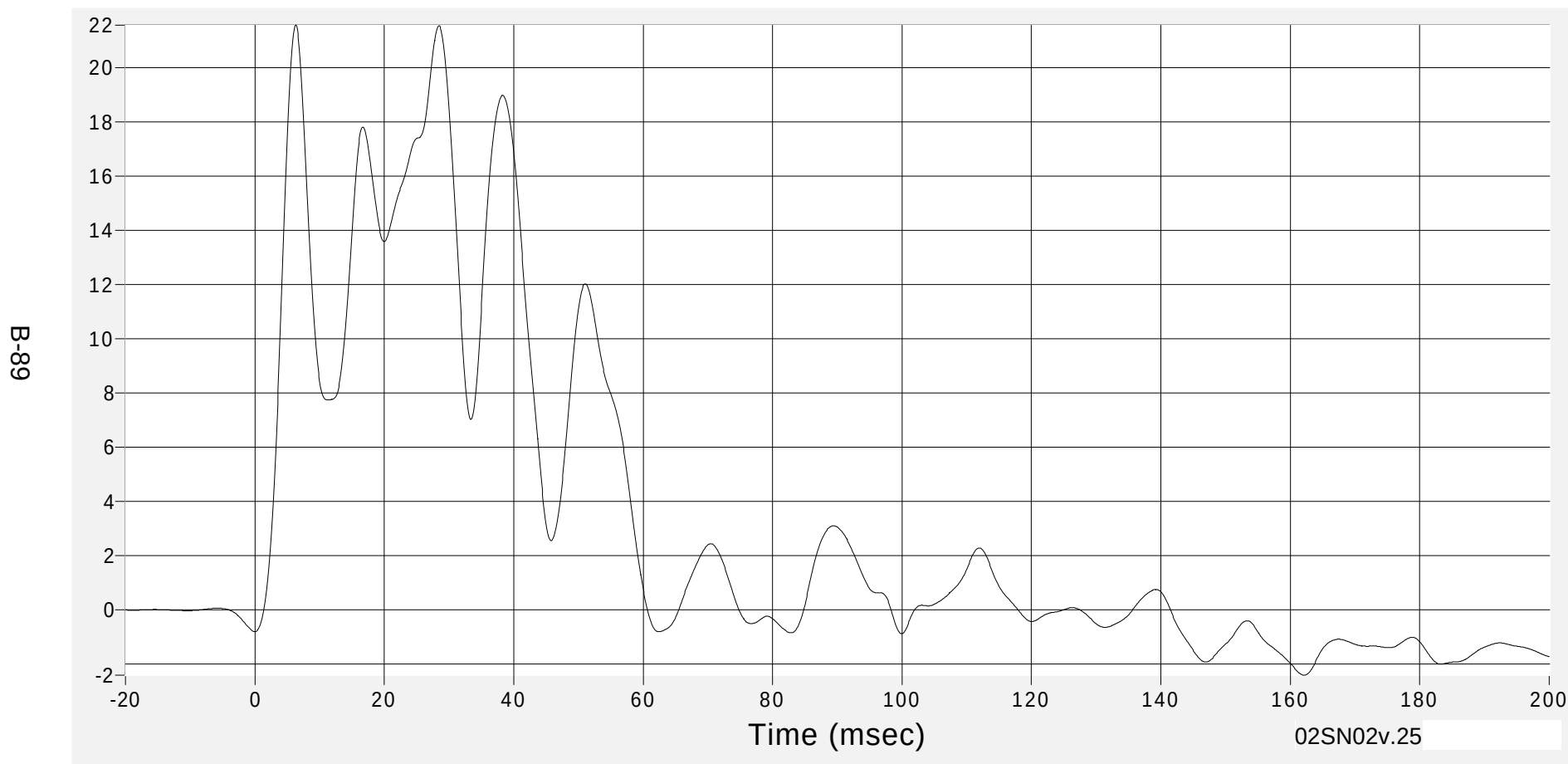
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Vehicle Center of Gravity (Y) Acceleration

Acceleration (G's) CFC60

Max 21.6 G's at 6.3 msec

Min -2.4 G's at 162.2 msec



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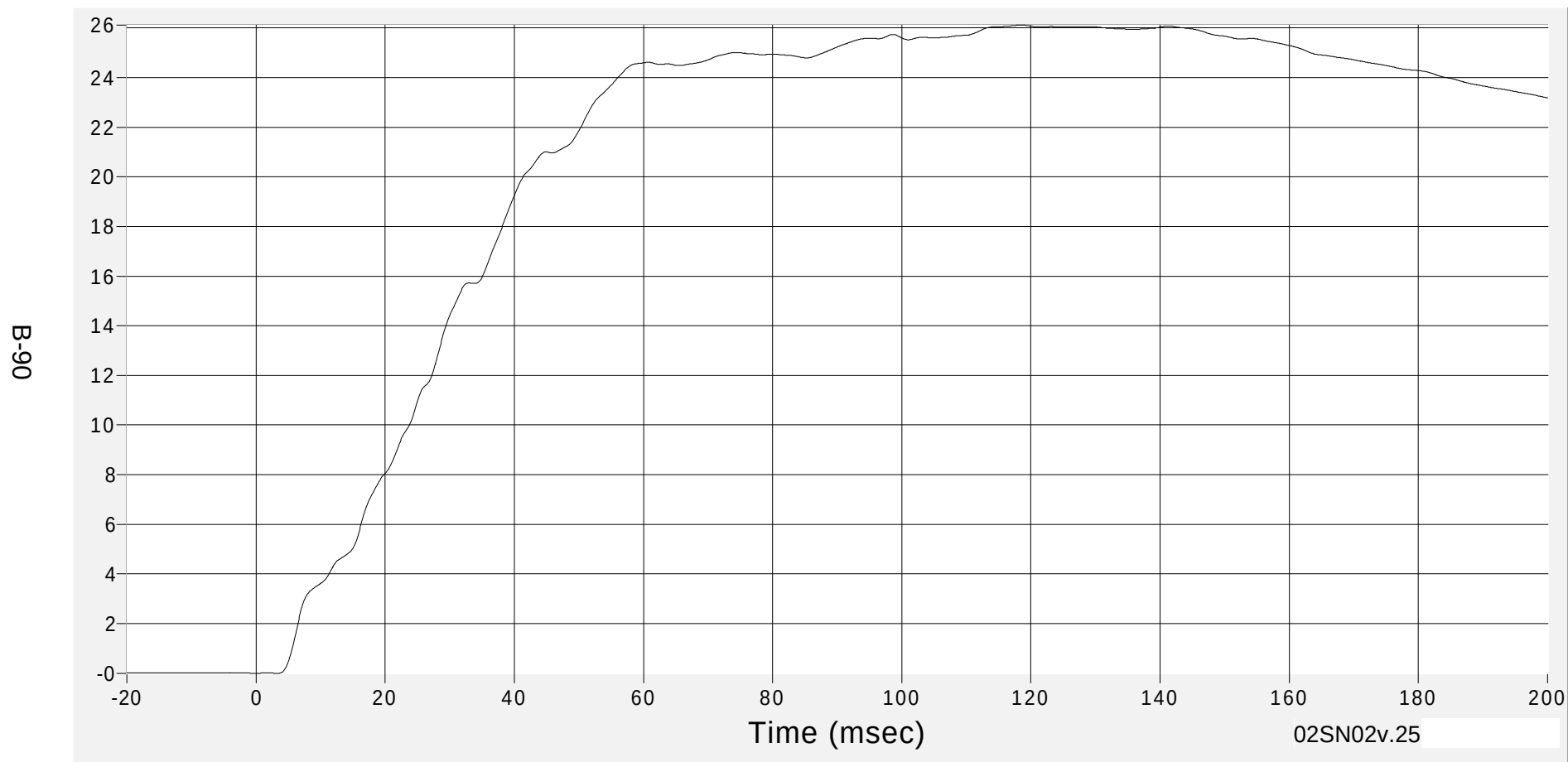
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Vehicle Center of Gravity (Y) Velocity

Velocity (km/h) CFC180

Max 26.1 km/h at 118.4 msec

Min 0.0 km/h at 3.4 msec



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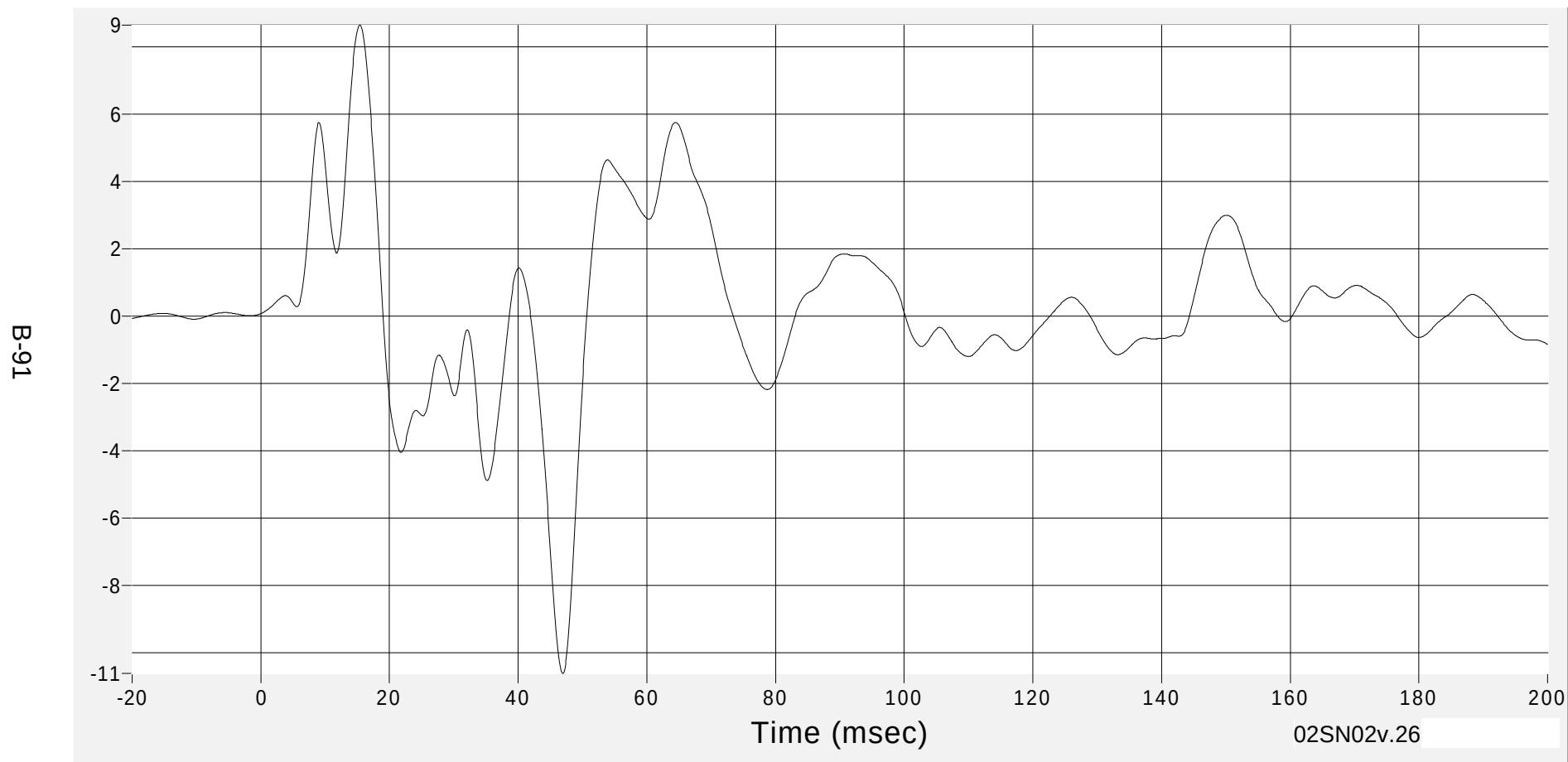
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Vehicle Center of Gravity (Z) Acceleration

Acceleration (G's) CFC60

Max 8.6 G's at 15.4 msec

Min -10.6 G's at 47.0 msec



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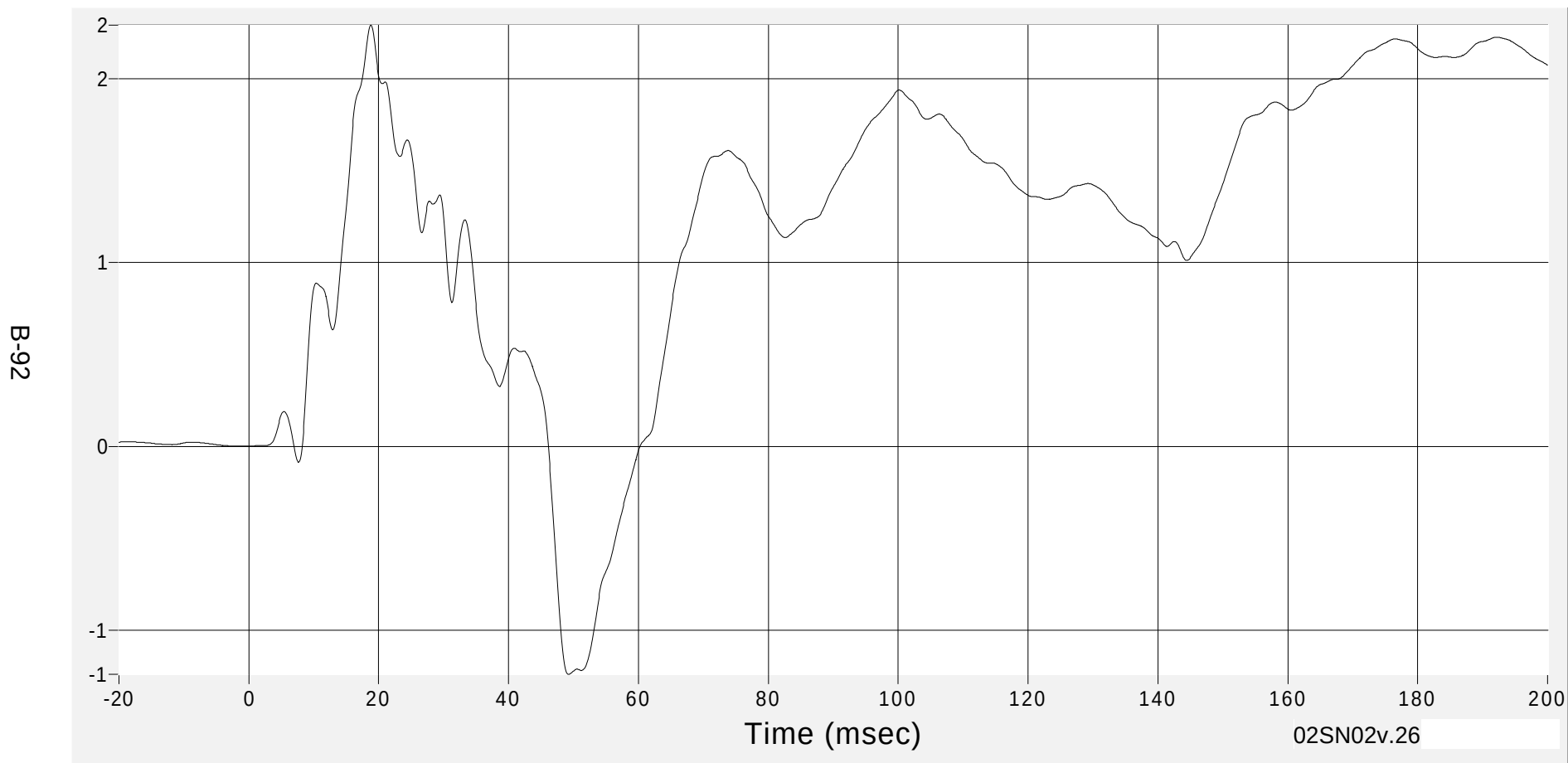
Medical College of Wisconsin
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Vehicle Center of Gravity (Z) Velocity

Velocity (km/h) CFC180

Max 2.3 km/h at 18.8 msec

Min -1.2 km/h at 49.2 msec



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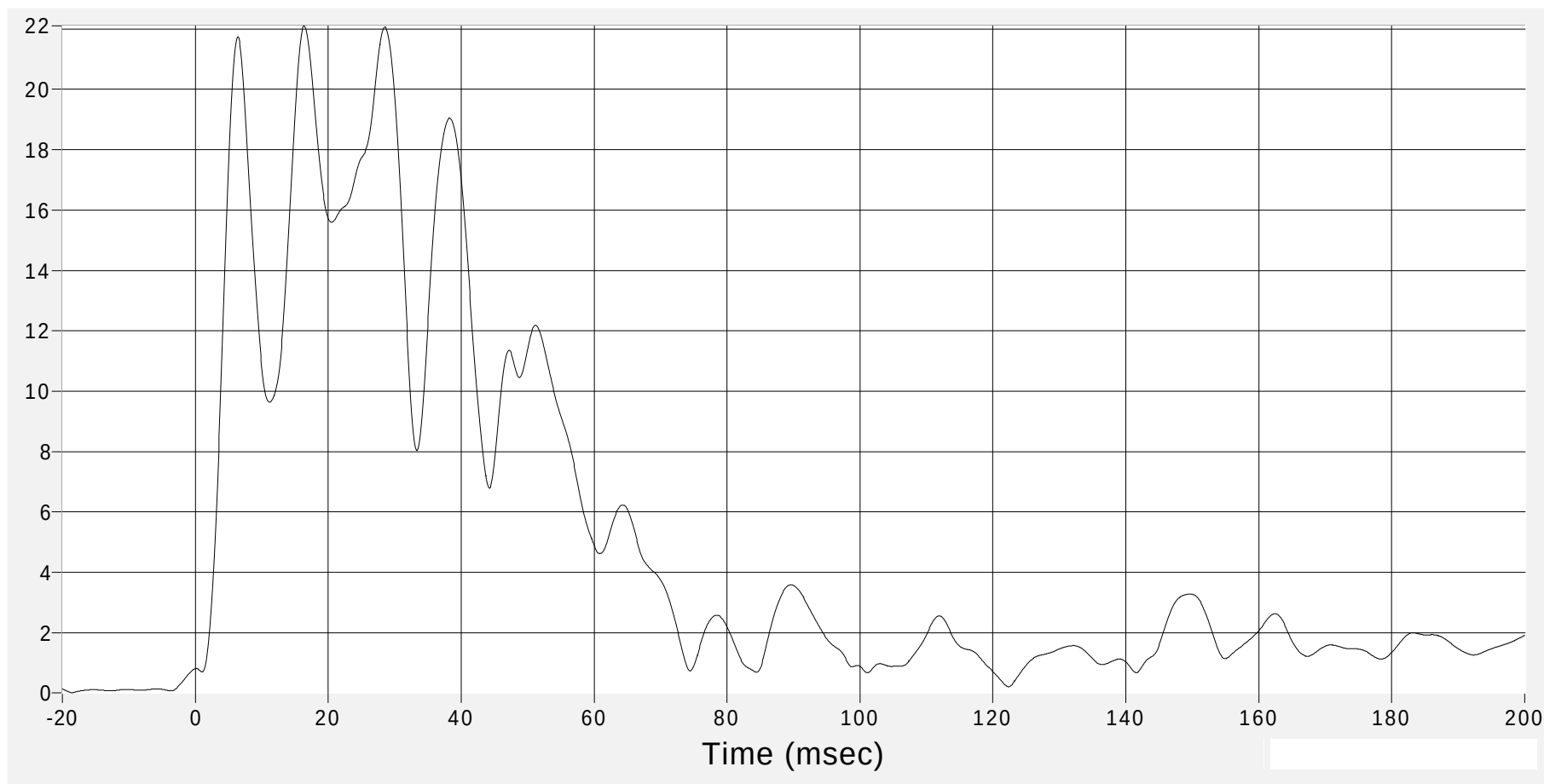
Vehicle Center of Gravity Resultant Acceleration

Acceleration (G's) CFC60

Max 22.1 G's at 16.4 msec

Min 0.2 G's at 122.3 msec

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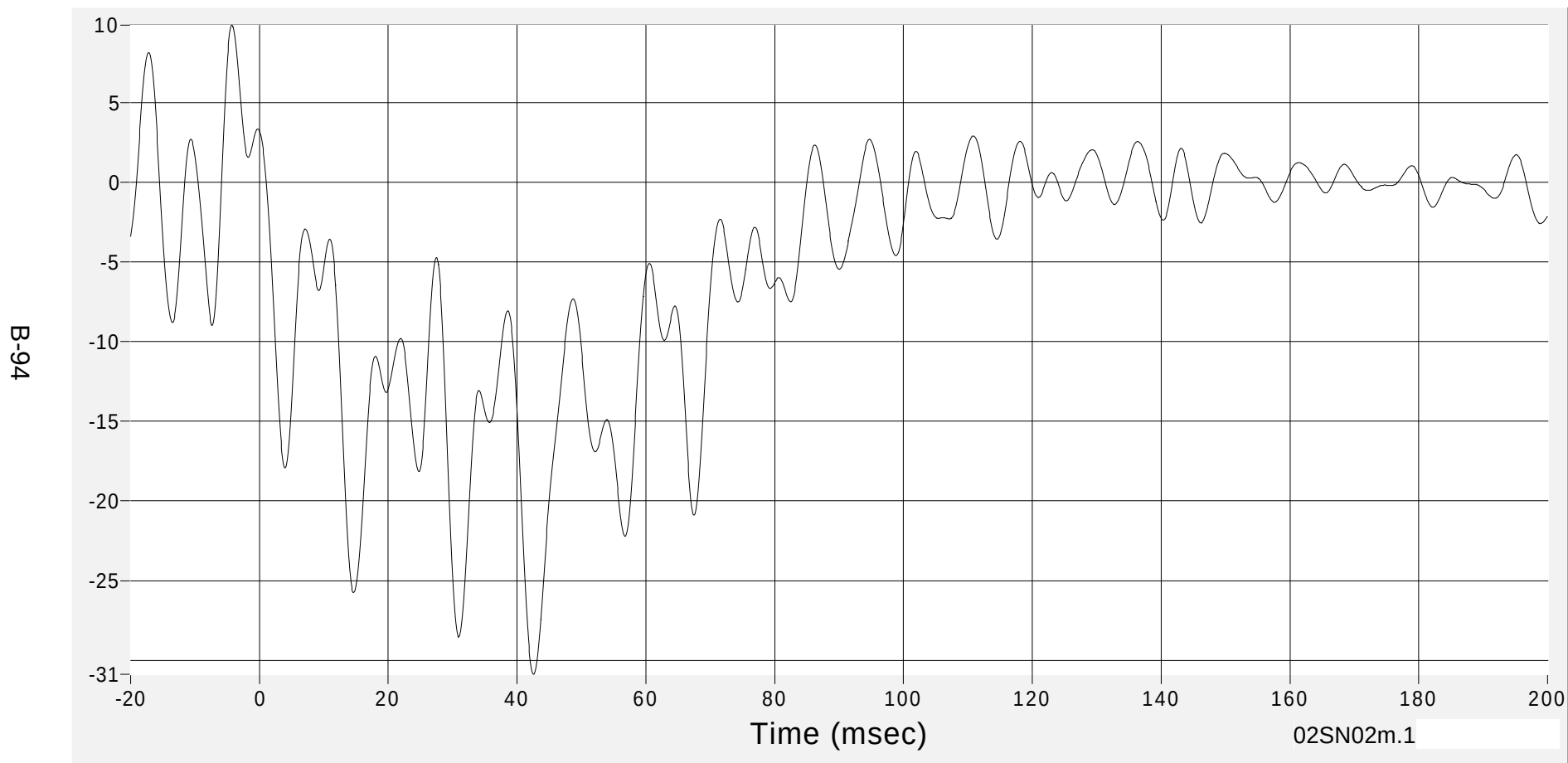
Medical College of Wisconsin
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MDB Center of Gravity (X) Acceleration

Acceleration (G's) CFC60

Max 3.2 G's at 0.0 msec

Min -30.9 G's at 42.6 msec



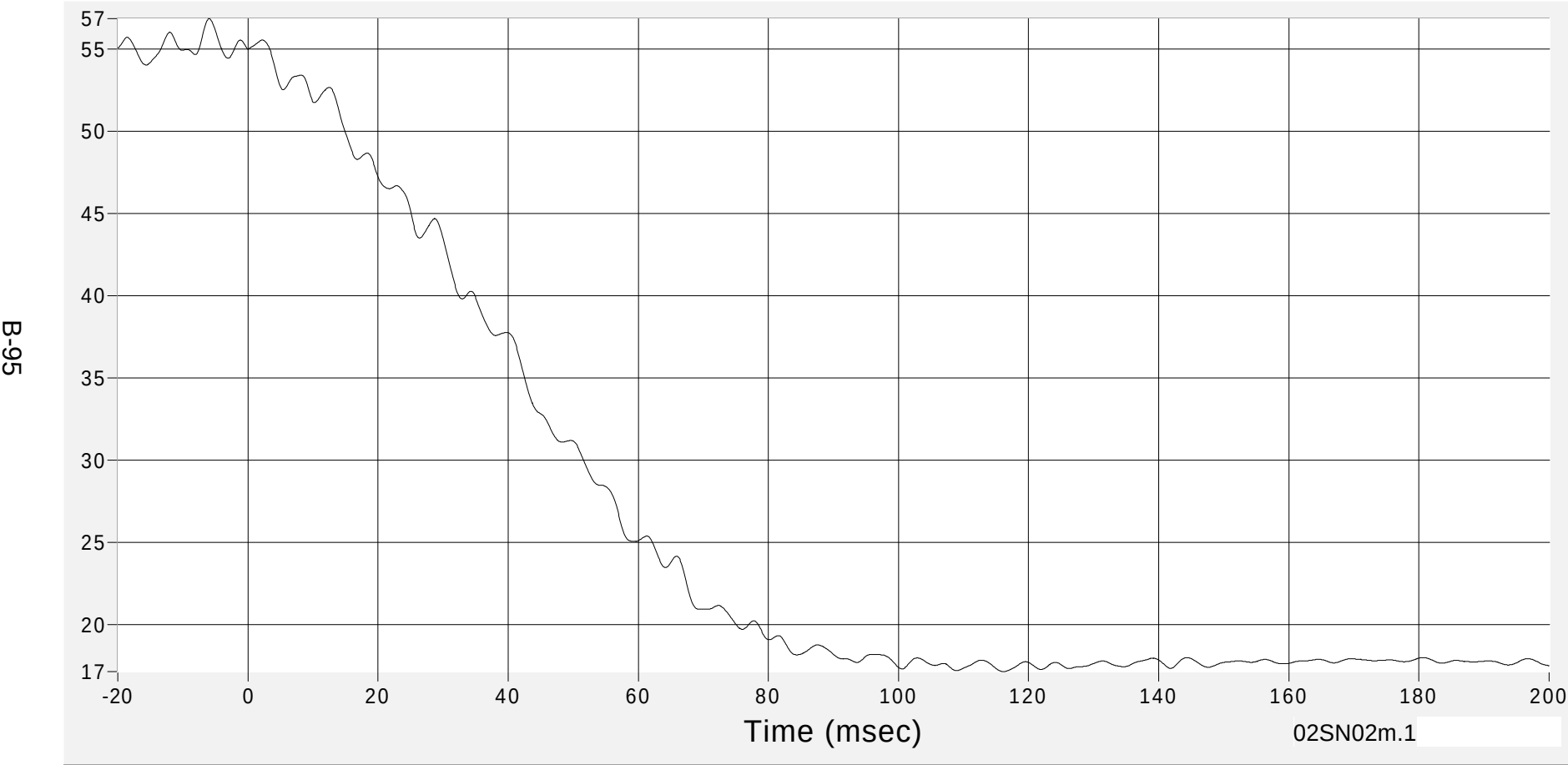
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MDB Center of Gravity (X) Velocity

Velocity (km/h) CFC180

Max	55.5	km/h	at	2.2	msec
Min	17.1	km/h	at	116.1	msec



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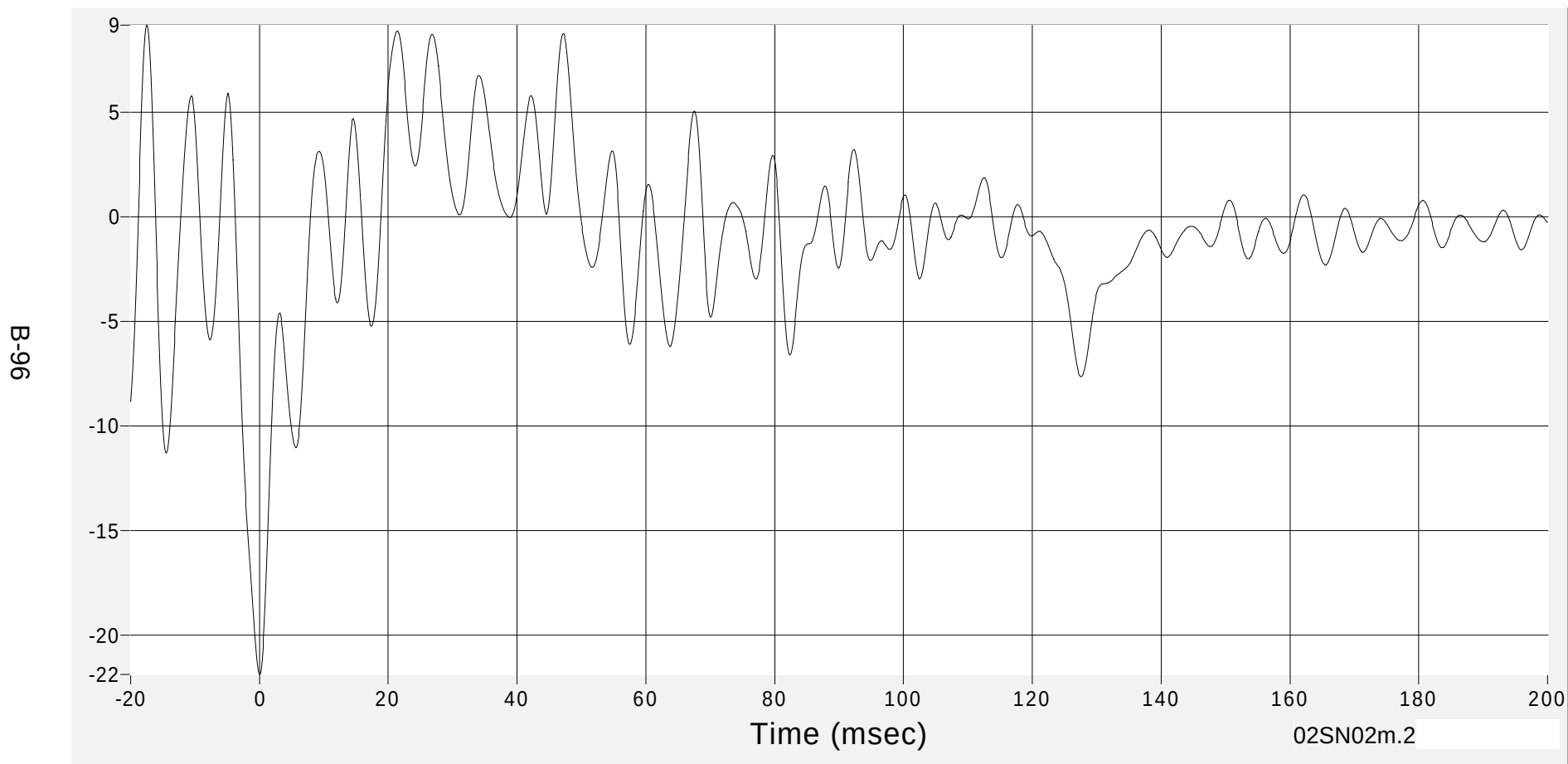
Medical College of Wisconsin
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MDB Center of Gravity (Y) Acceleration

Acceleration (G's) CFC60

Max 8.9 G's at 21.4 msec

Min -21.9 G's at 0.0 msec



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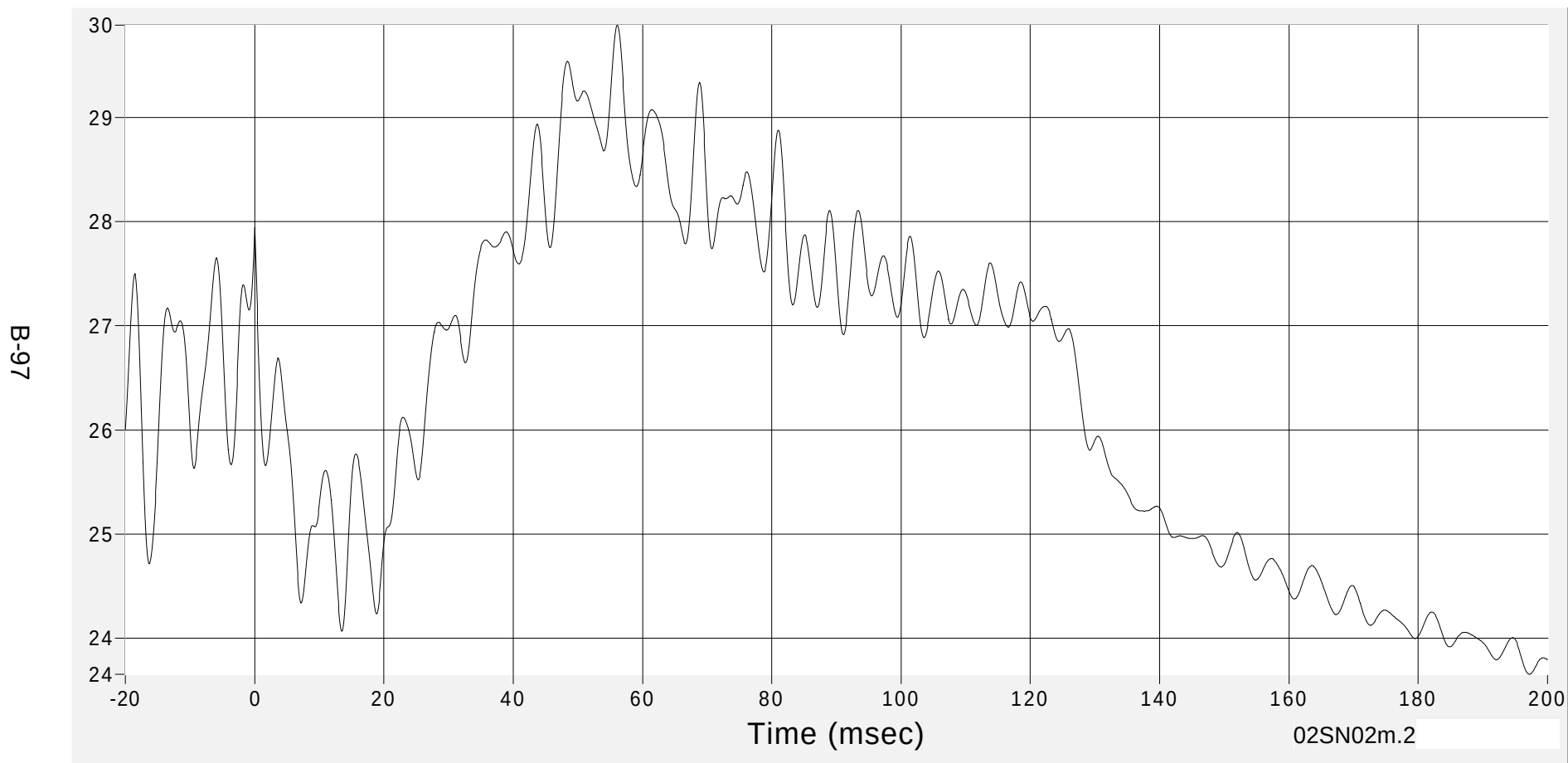
Medical College of Wisconsin
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MDB Center of Gravity (Y) Velocity

Velocity (km/h) CFC180

Max 29.9 km/h at 56.1 msec

Min 23.7 km/h at 197.2 msec



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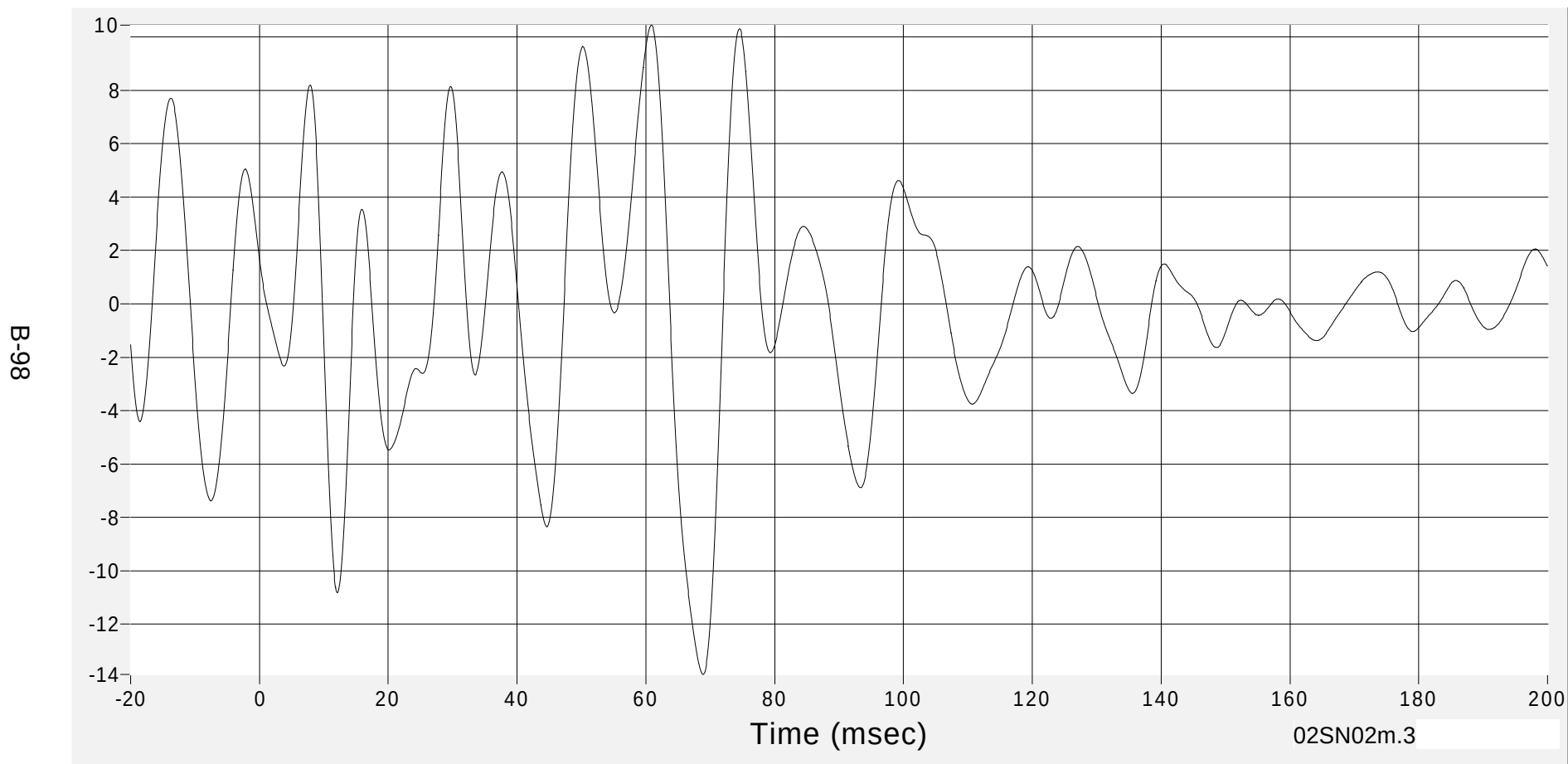
Medical College of Wisconsin
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MDB Center of Gravity (Z) Acceleration

Acceleration (G's) CFC60

Max 10.4 G's at 60.9 msec

Min -13.9 G's at 68.9 msec



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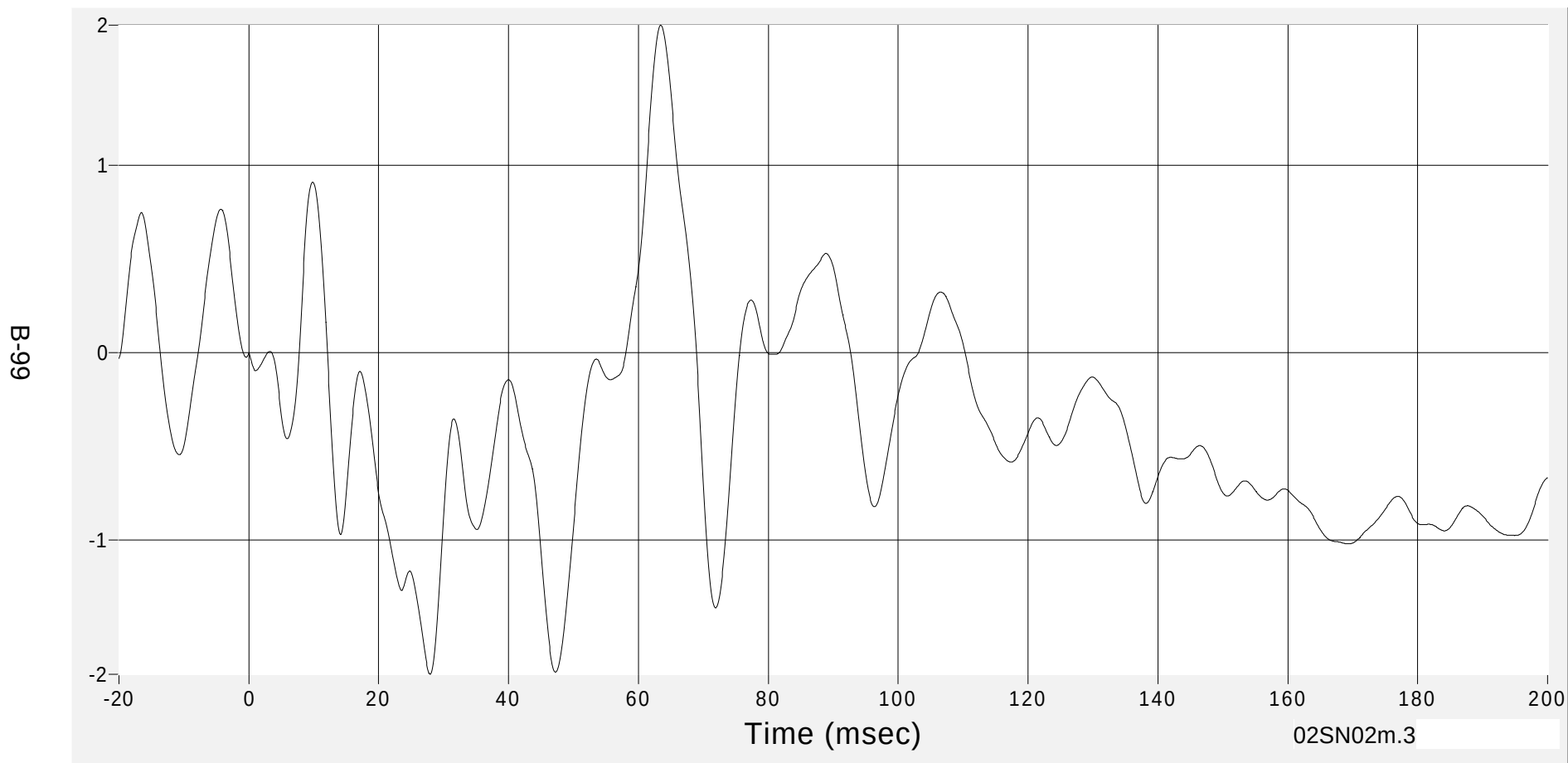
Medical College of Wisconsin
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MDB Center of Gravity (Z) Velocity

Velocity (km/h) CFC180

Max 1.7 km/h at 63.4 msec

Min -1.7 km/h at 27.9 msec



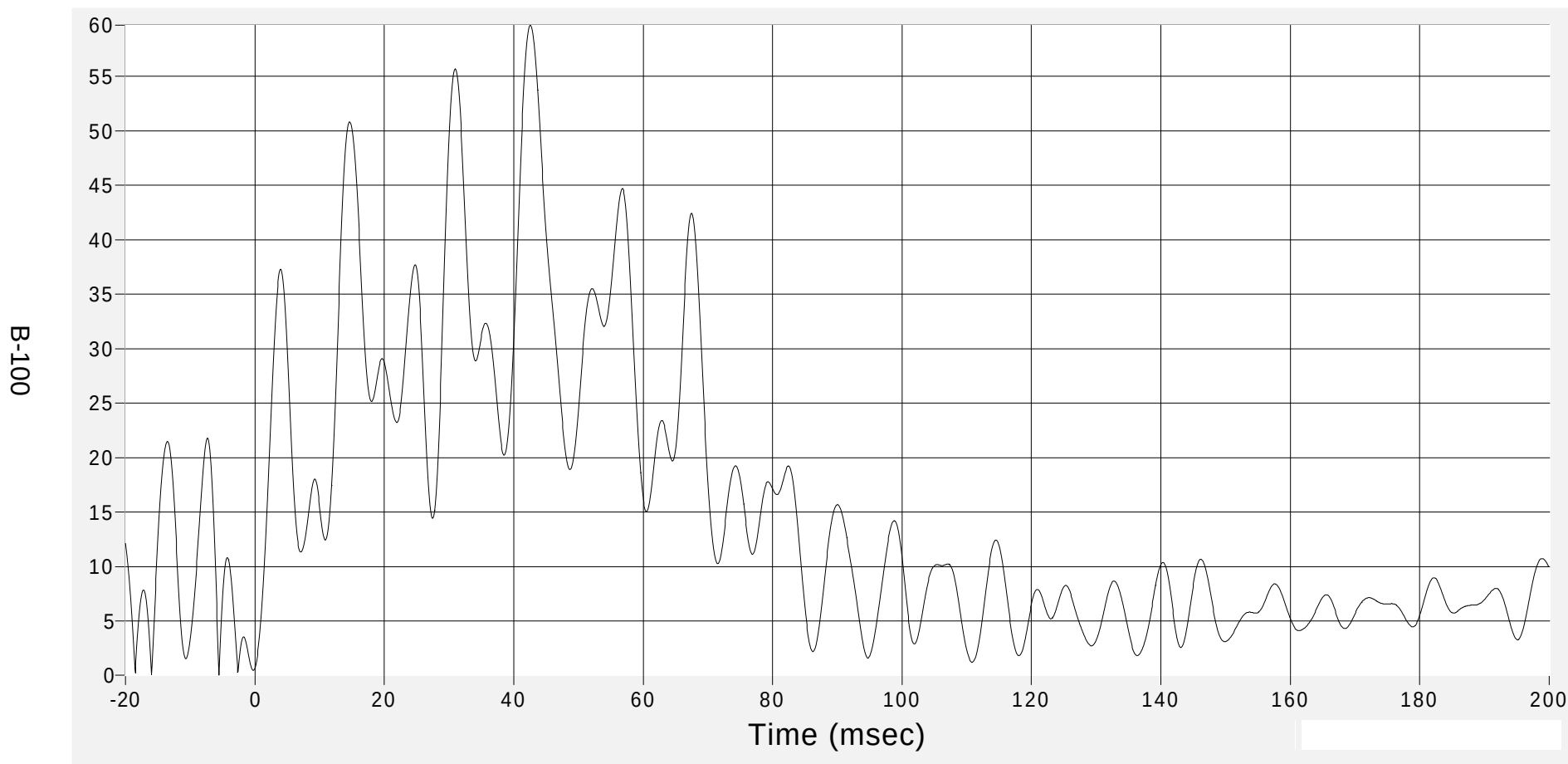
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MDB Center of Gravity Resultant Acceleration

Acceleration (G's) CFC60

Max 59.7 G's at 42.6 msec
Min 0.7 G's at 0.0 msec



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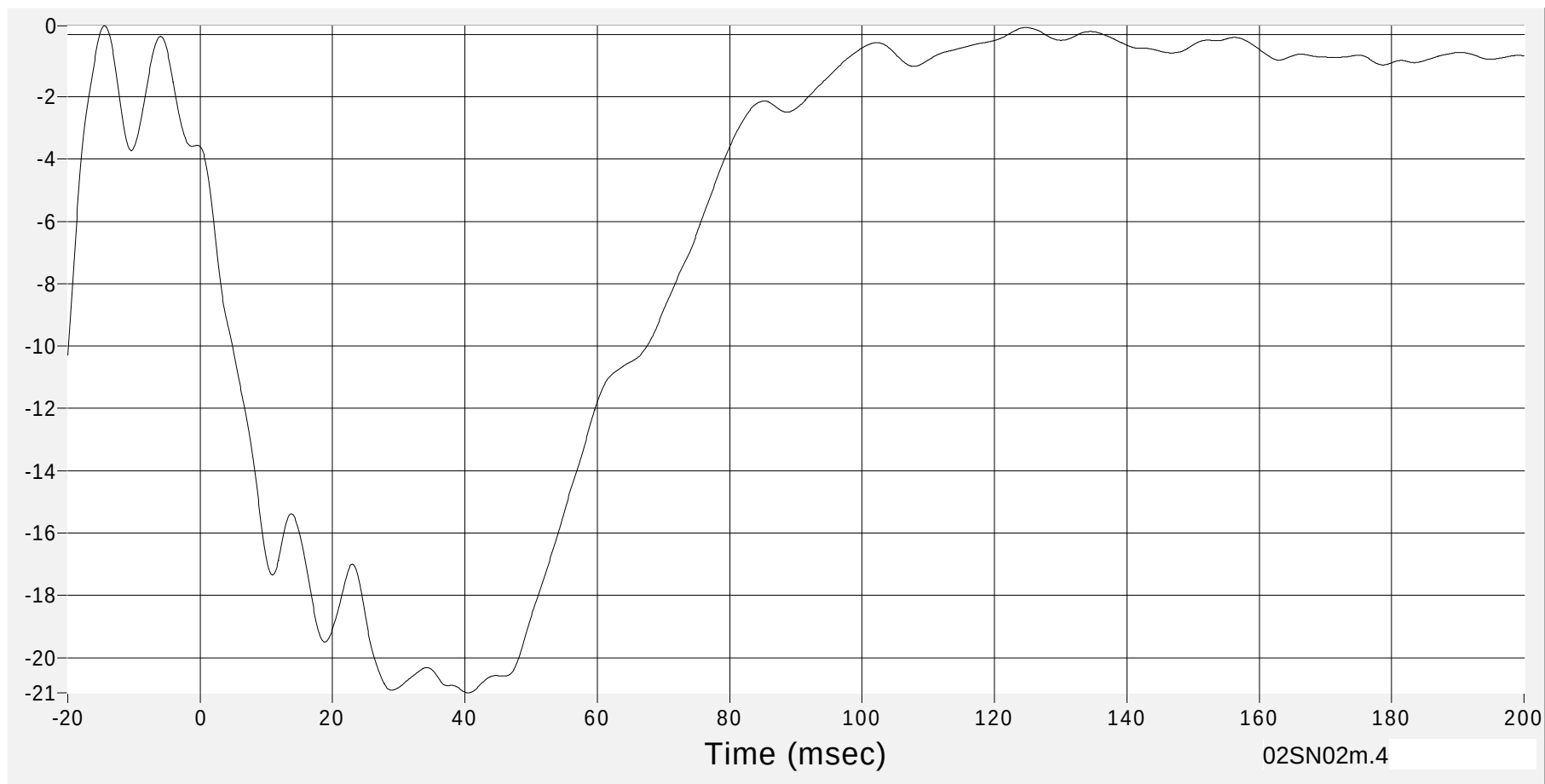
MDB Rear (X) Acceleration

Acceleration (G's) CFC60

Max 0.2 G's at 124.7 msec

Min -21.1 G's at 40.5 msec

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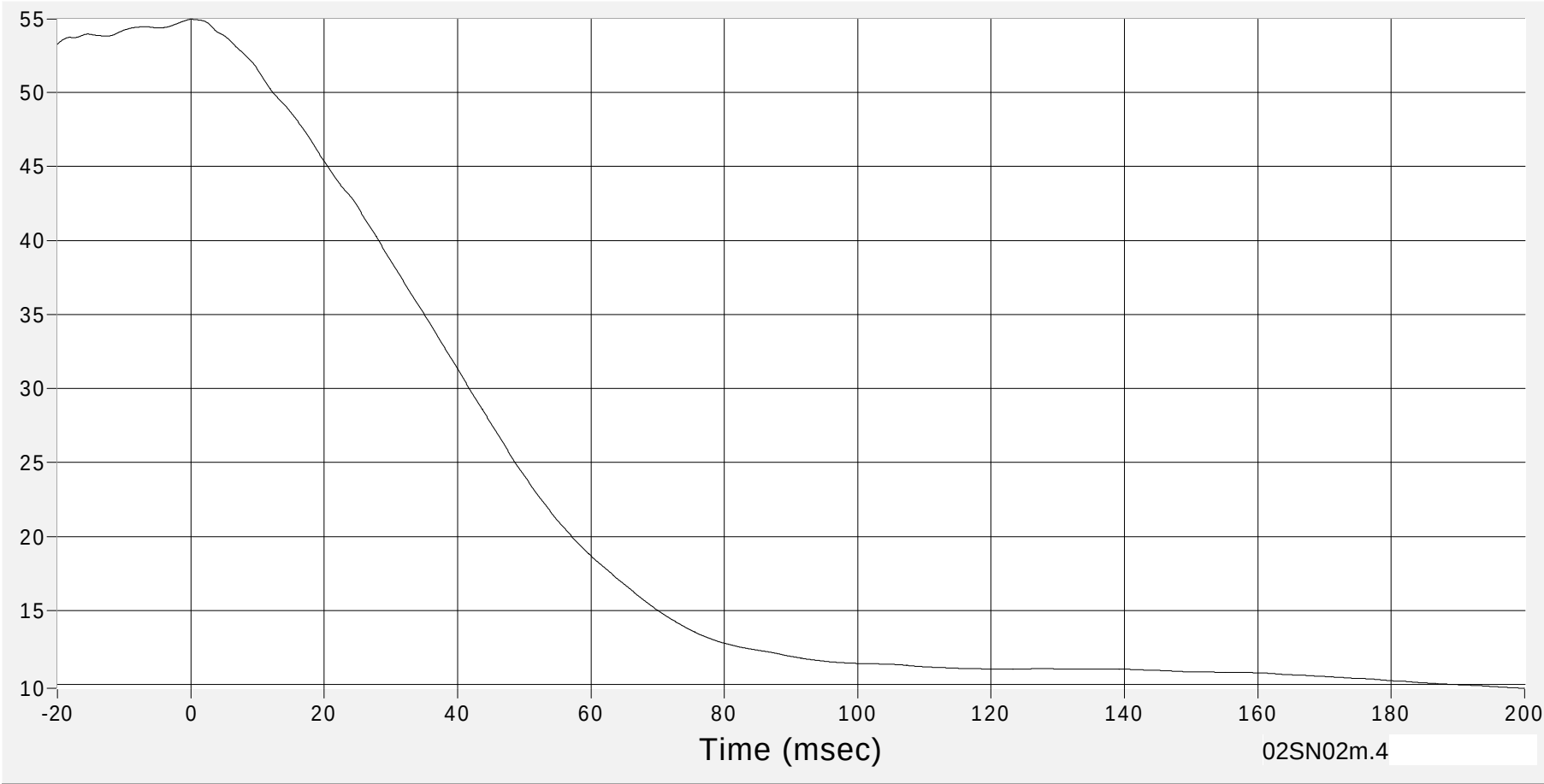
Medical College of Wisconsin
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MDB Rear (X) Velocity

Velocity (km/h) CFC180

Max 55.0 km/h at 0.0 msec
Min 9.7 km/h at 199.9 msec

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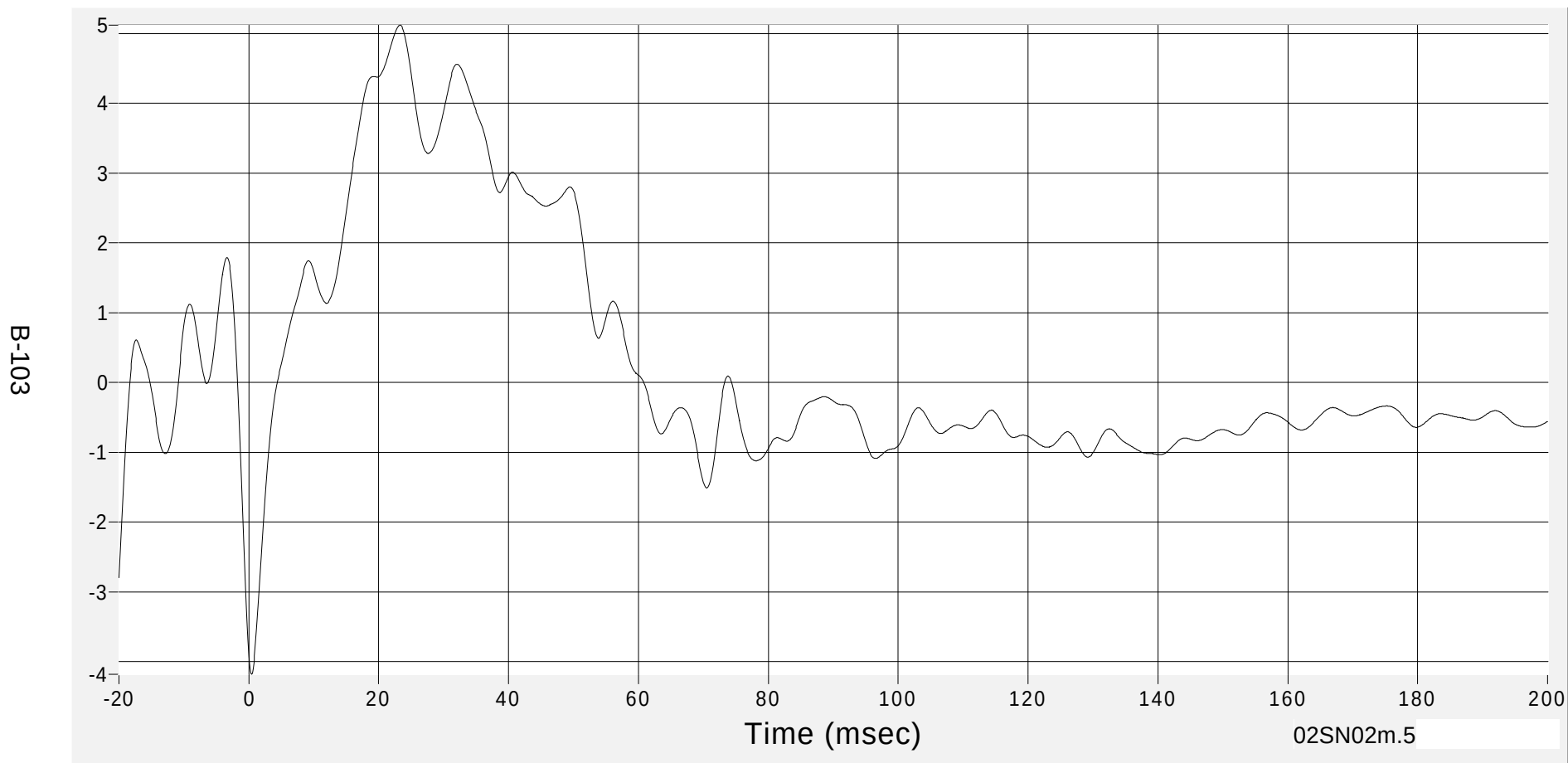
Medical College of Wisconsin
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MDB Rear (Y) Acceleration

Acceleration (G's) CFC60

Max 5.1 G's at 23.3 msec

Min -4.2 G's at 0.4 msec



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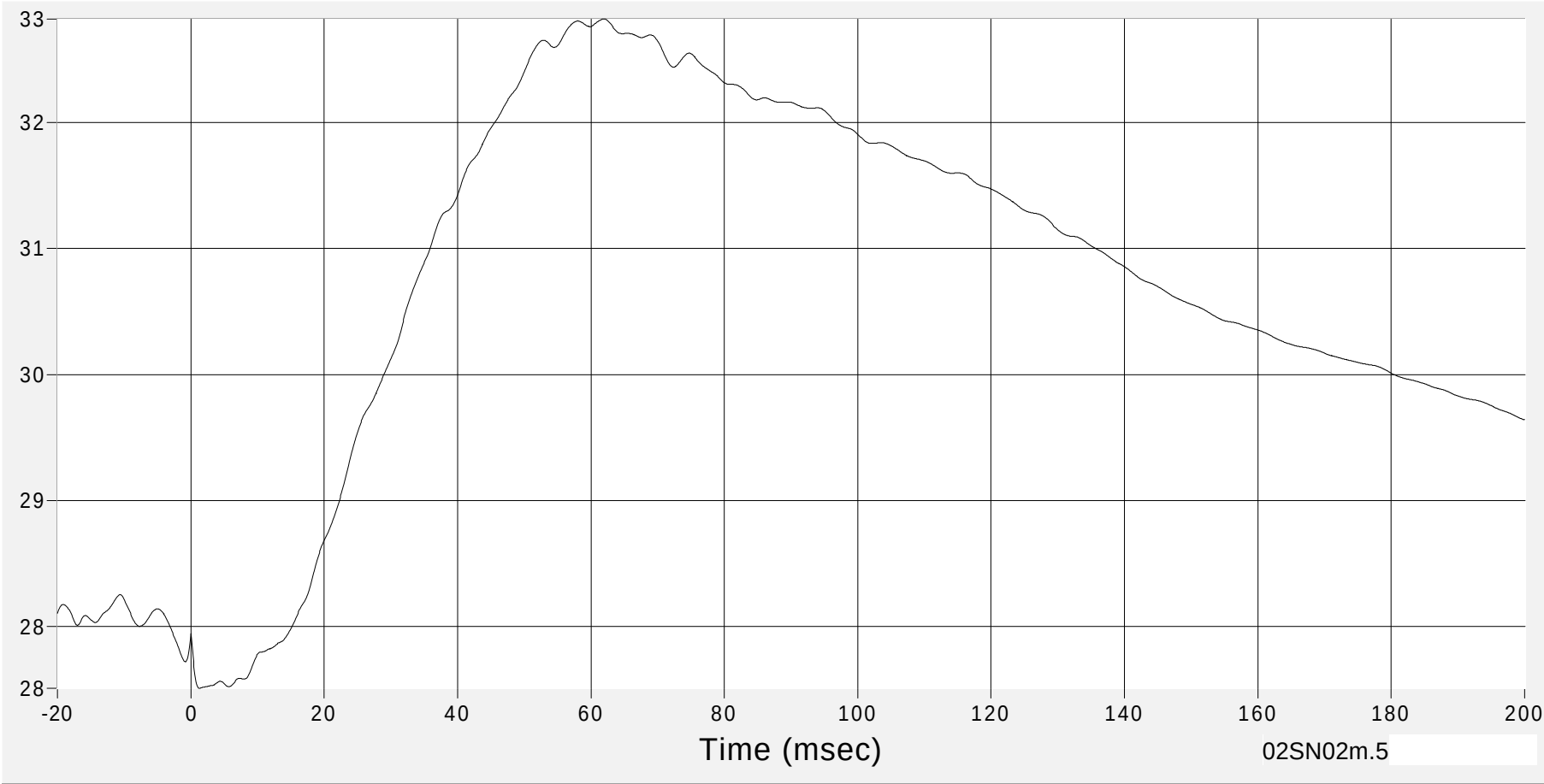
Medical College of Wisconsin
Vehicle Crashworthiness Lab

MDB Rear (Y) Velocity

Velocity (km/h) CFC180

Max 32.8 km/h at 61.9 msec
Min 27.5 km/h at 1.3 msec

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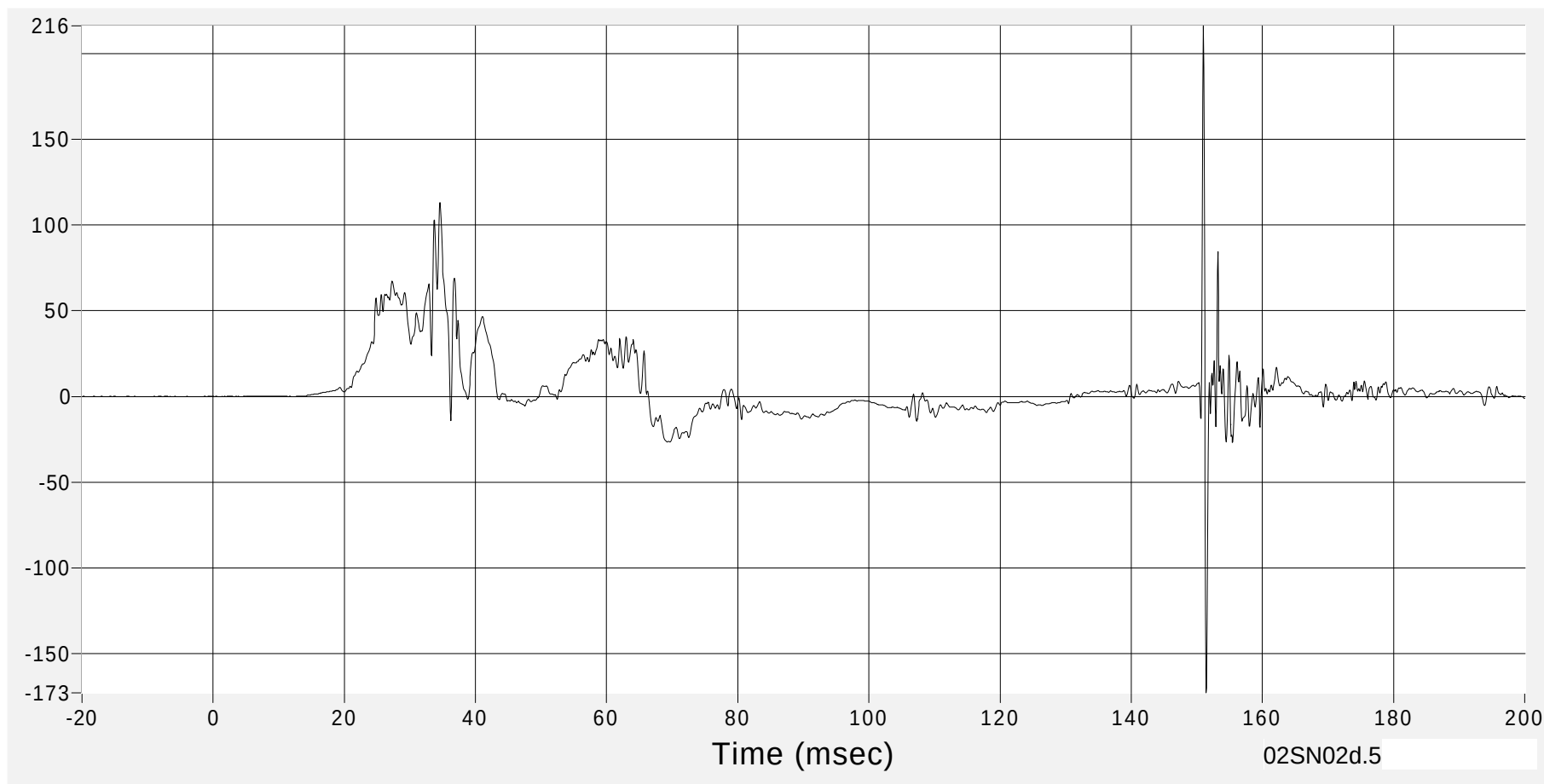
Driver Upper Rib (Y) Acceleration - Redundant

Acceleration (G's) CFC1000

Max 216.3 G's at 151.0 msec

Min -172.9 G's at 151.4 msec

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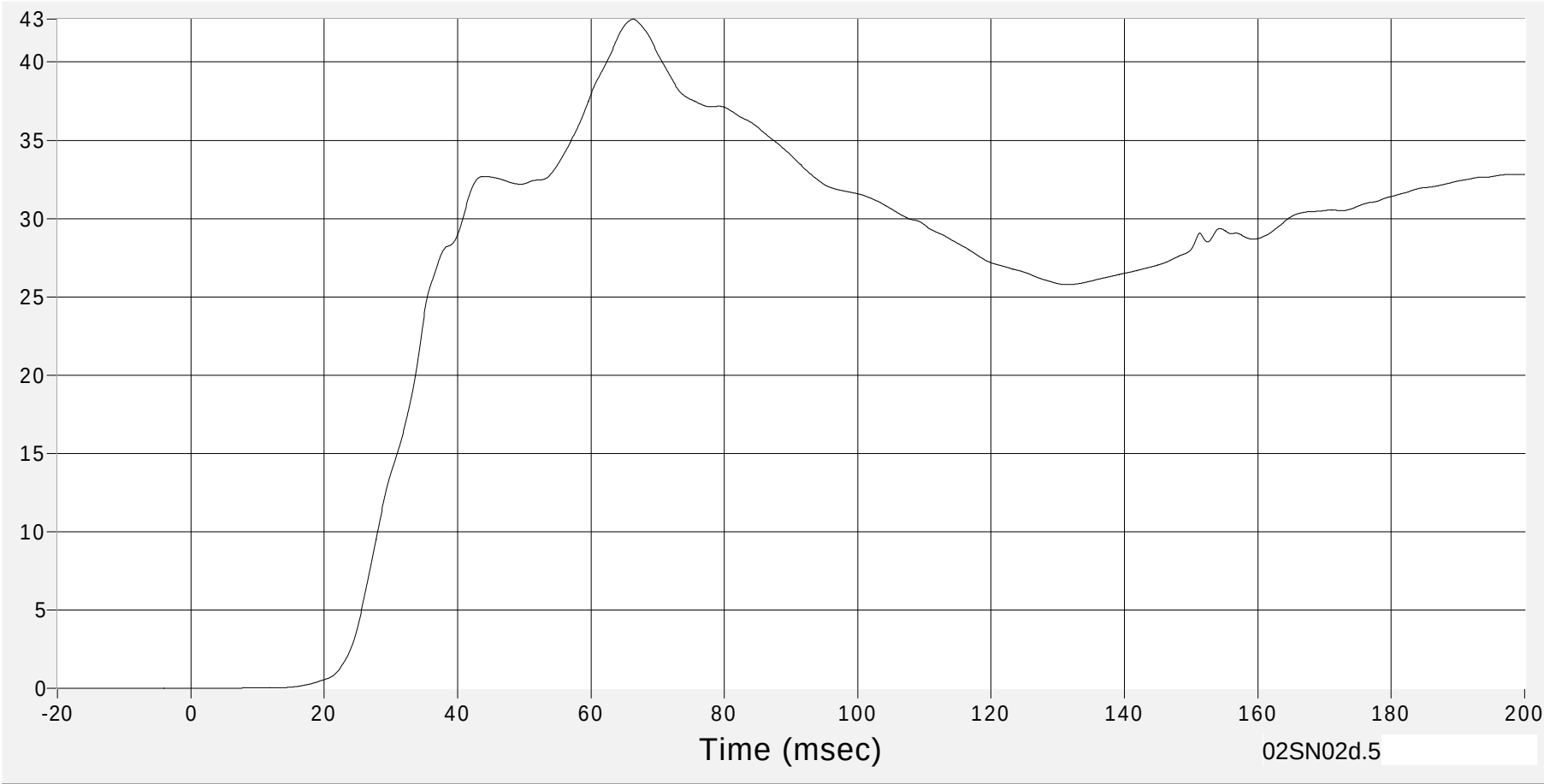
Medical College of Wisconsin
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Driver Upper Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 42.7 km/h at 66.3 msec
Min 0.0 km/h at 0.0 msec

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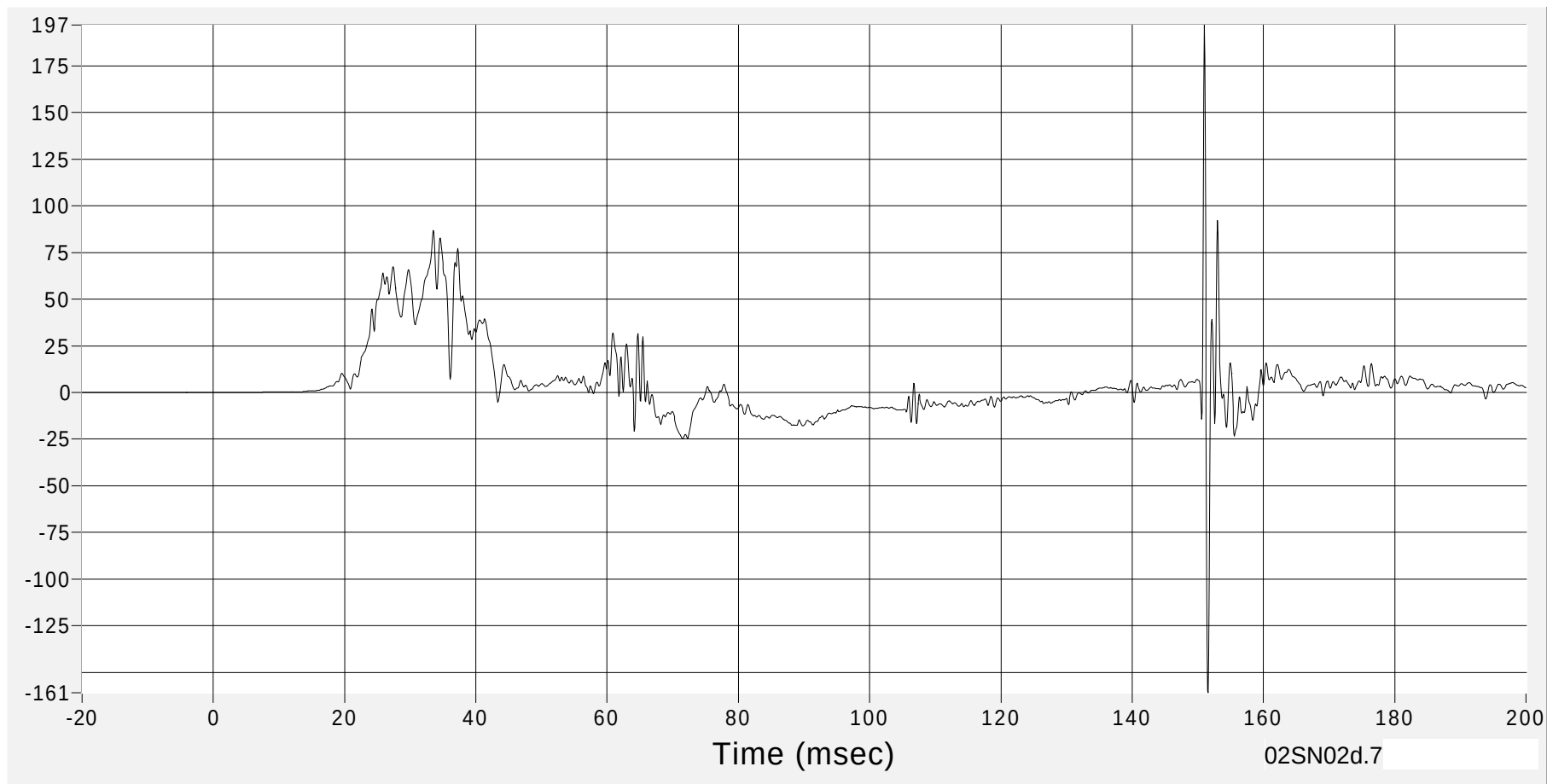
Driver Lower Rib (Y) Acceleration - Redundant

Acceleration (G's) CFC1000

Max 196.9 G's at 151.0 msec

Min -160.9 G's at 151.6 msec

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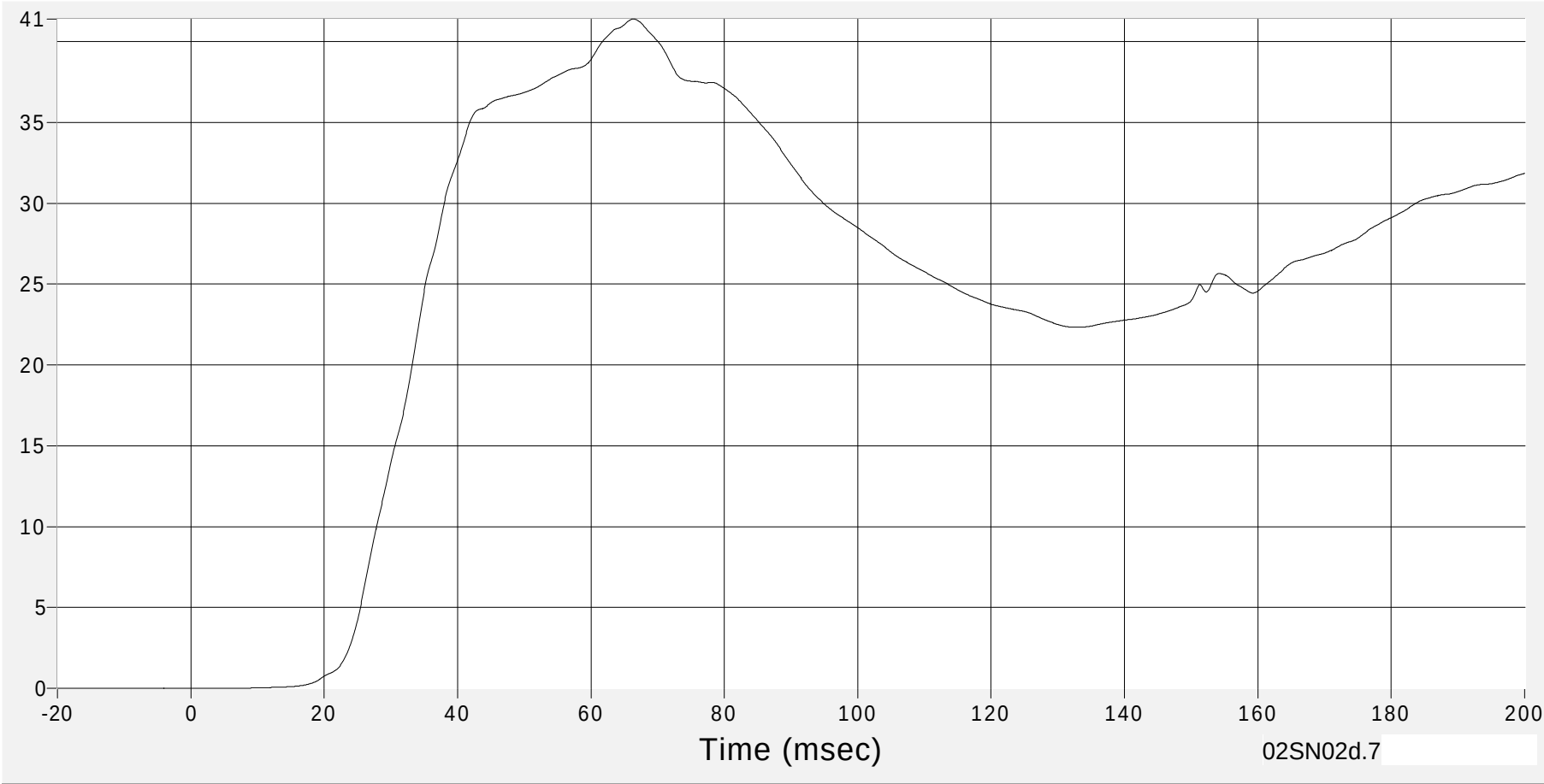
Medical College of Wisconsin
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Driver Lower Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 41.4 km/h at 66.4 msec
Min 0.0 km/h at 0.0 msec

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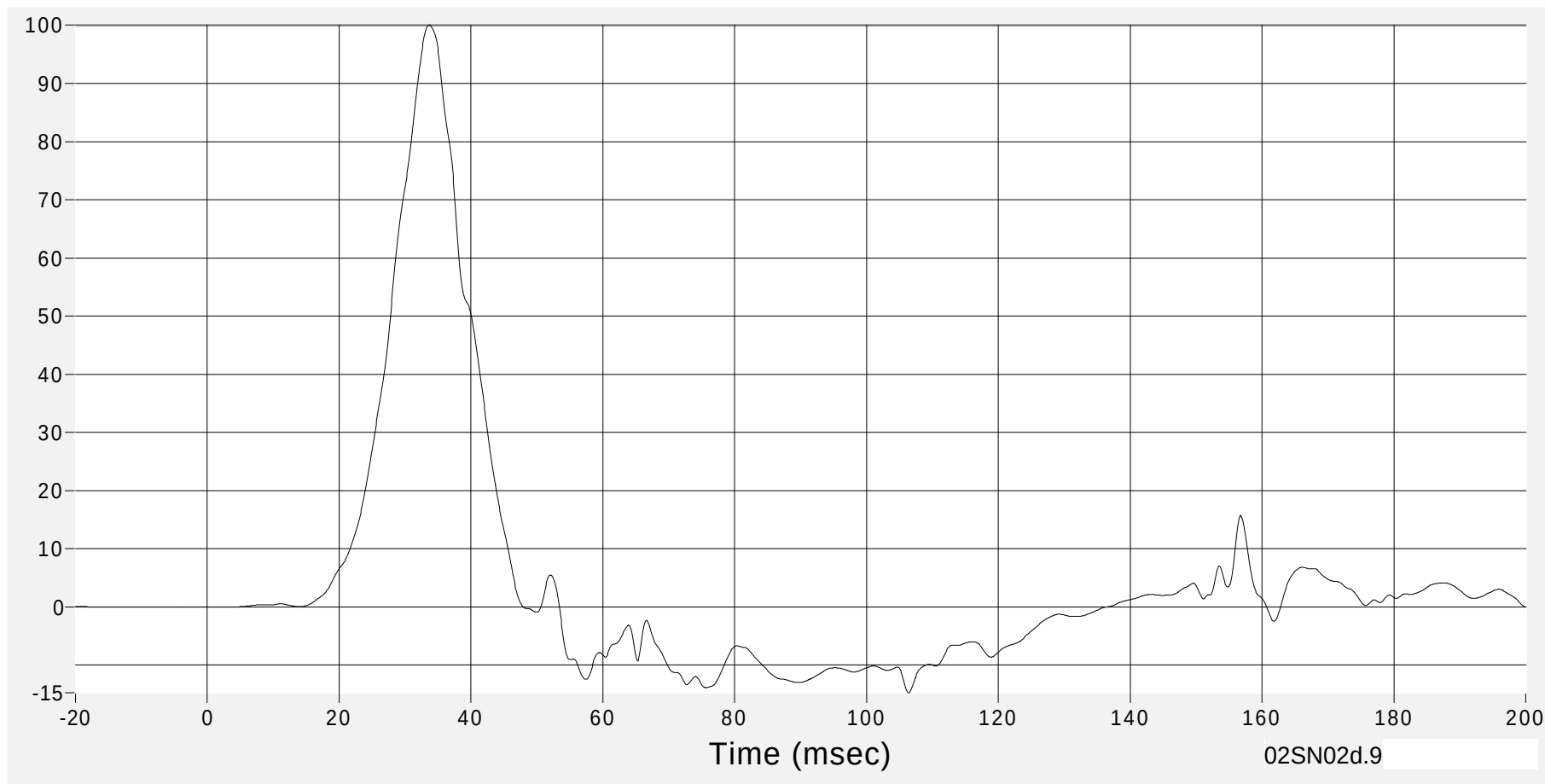
Driver Lower Spine (Y) Acceleration - Redundant

Acceleration (G's) CFC180

Max 100.1 G's at 33.7 msec

Min -14.8 G's at 106.4 msec

B-109



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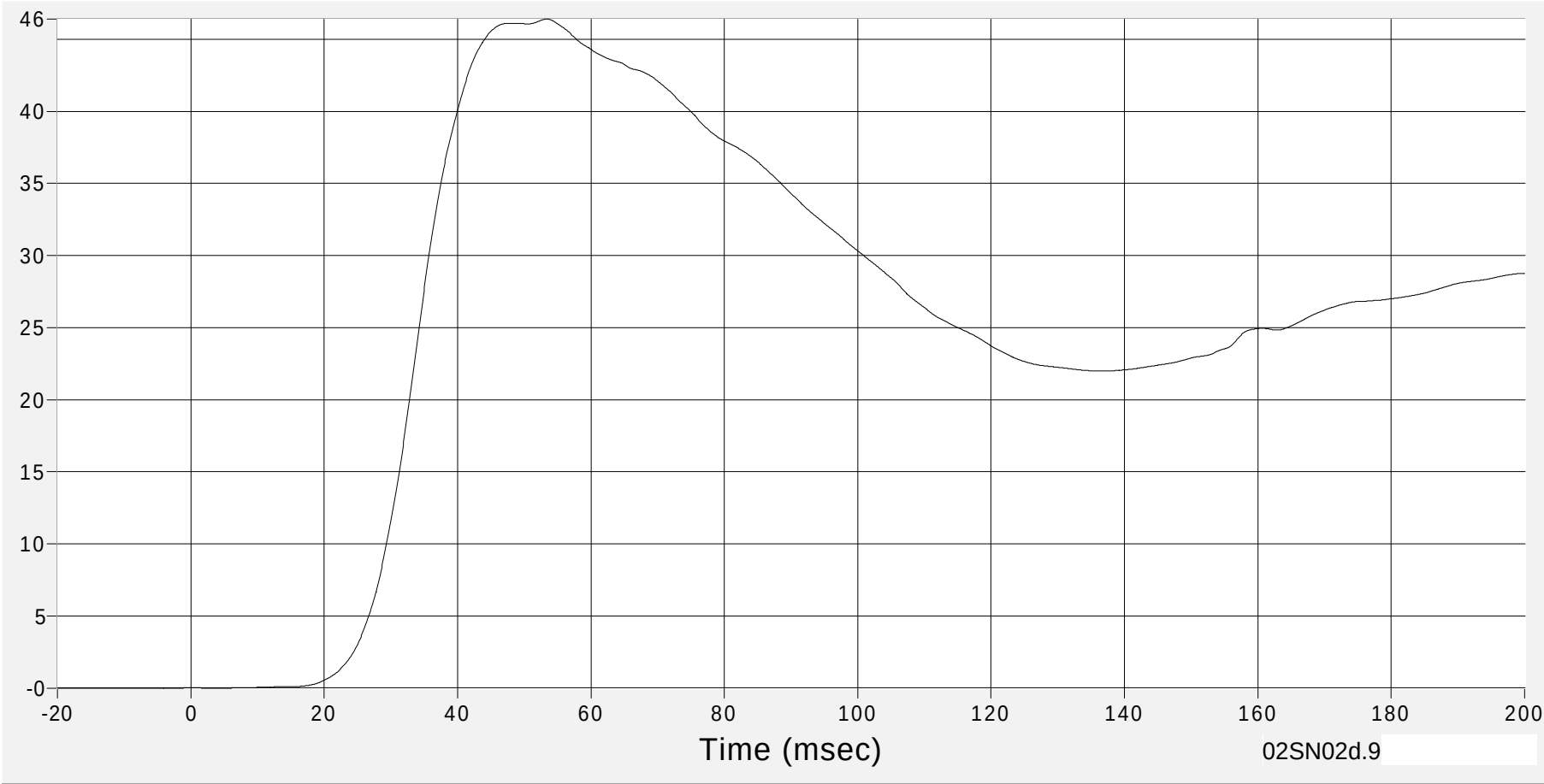
Medical College of Wisconsin
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Driver Lower Spine (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max	46.4	km/h	at	53.4	msec
Min	0.0	km/h	at	4.8	msec

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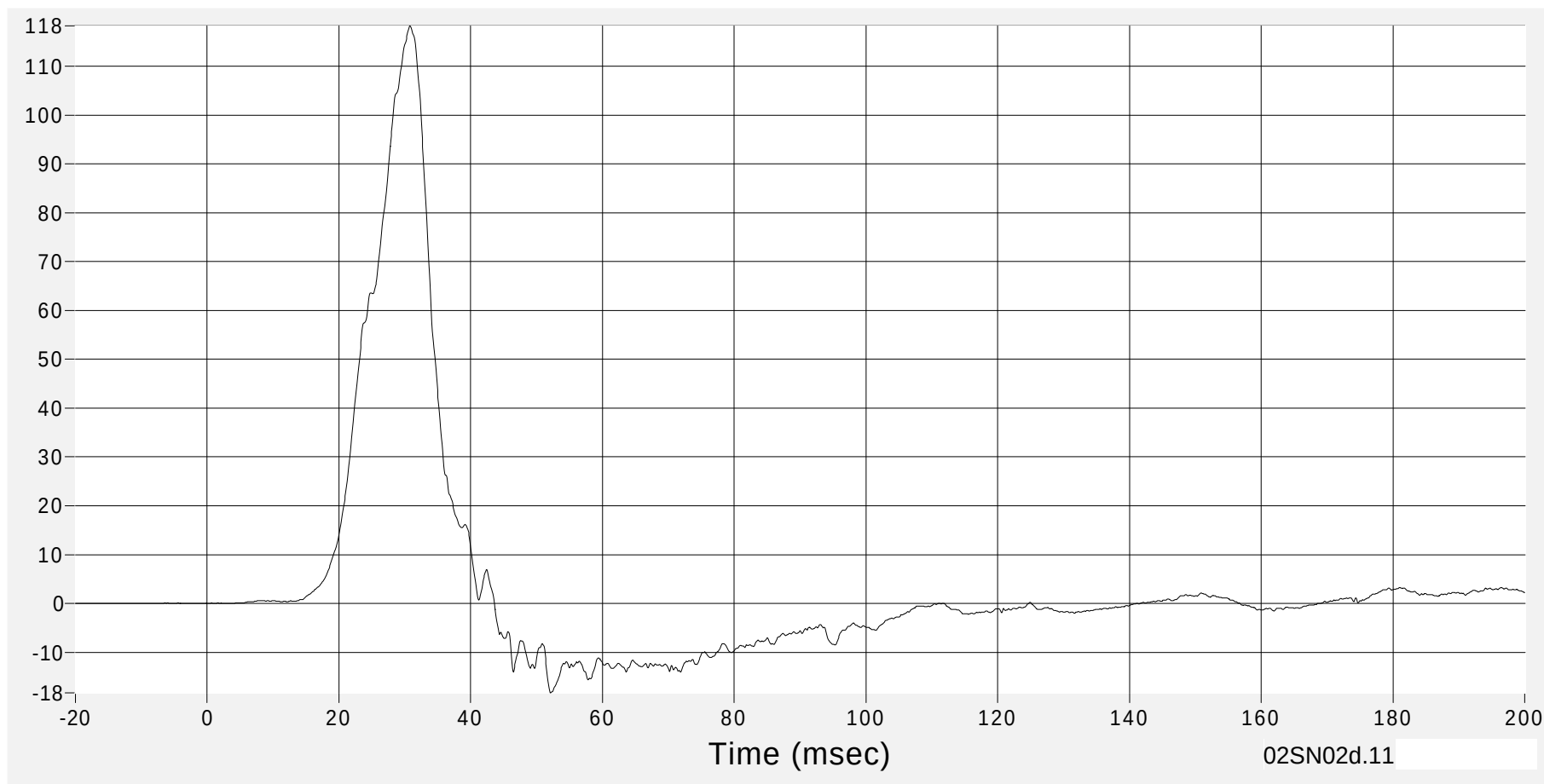
Driver Pelvic (Y) Acceleration - Redundant

Acceleration (G's) CFC1000

Max 118.3 G's at 30.8 msec

Min -18.3 G's at 52.2 msec

B-111



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20 December 2001

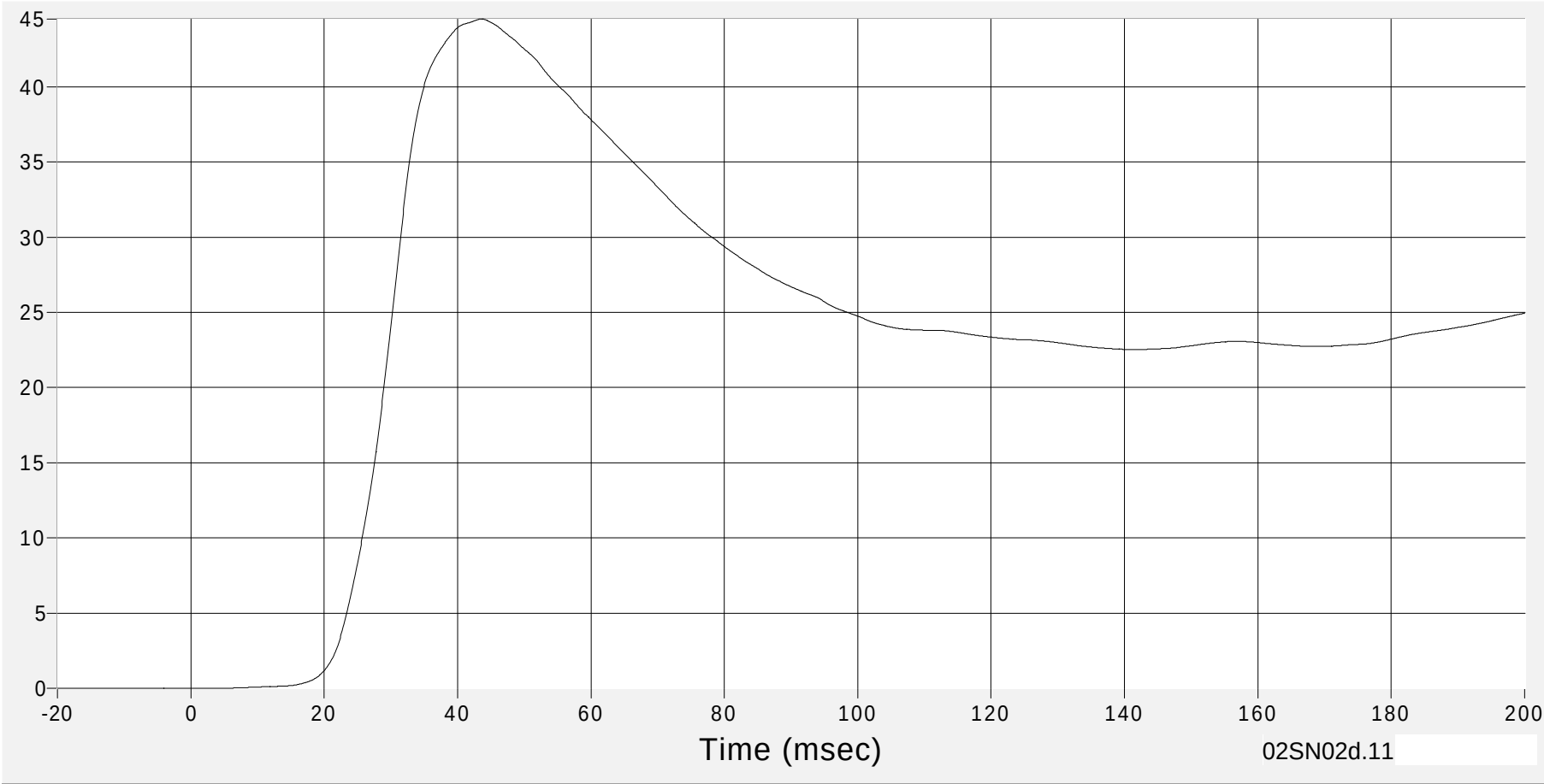
Medical College of Wisconsin
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Driver Pelvic (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max	44.5	km/h	at	43.5	msec
Min	0.0	km/h	at	0.0	msec

B-112



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20 December 2001

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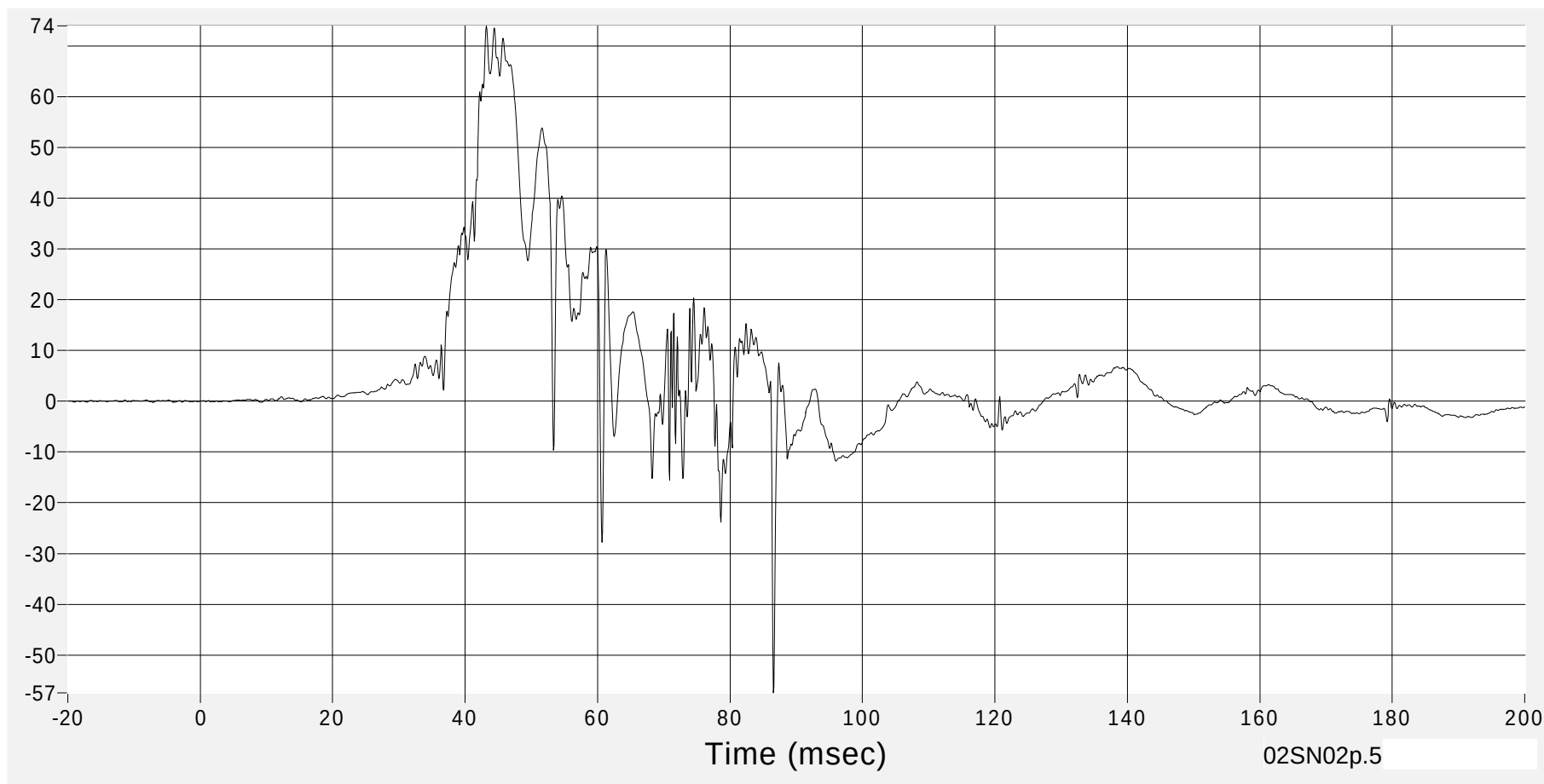
Passenger Upper Rib (Y) Acceleration - Redundant

Acceleration (G's) CFC1000

Max 73.9 G's at 43.2 msec

Min -57.4 G's at 86.6 msec

B-113



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20 December 2001

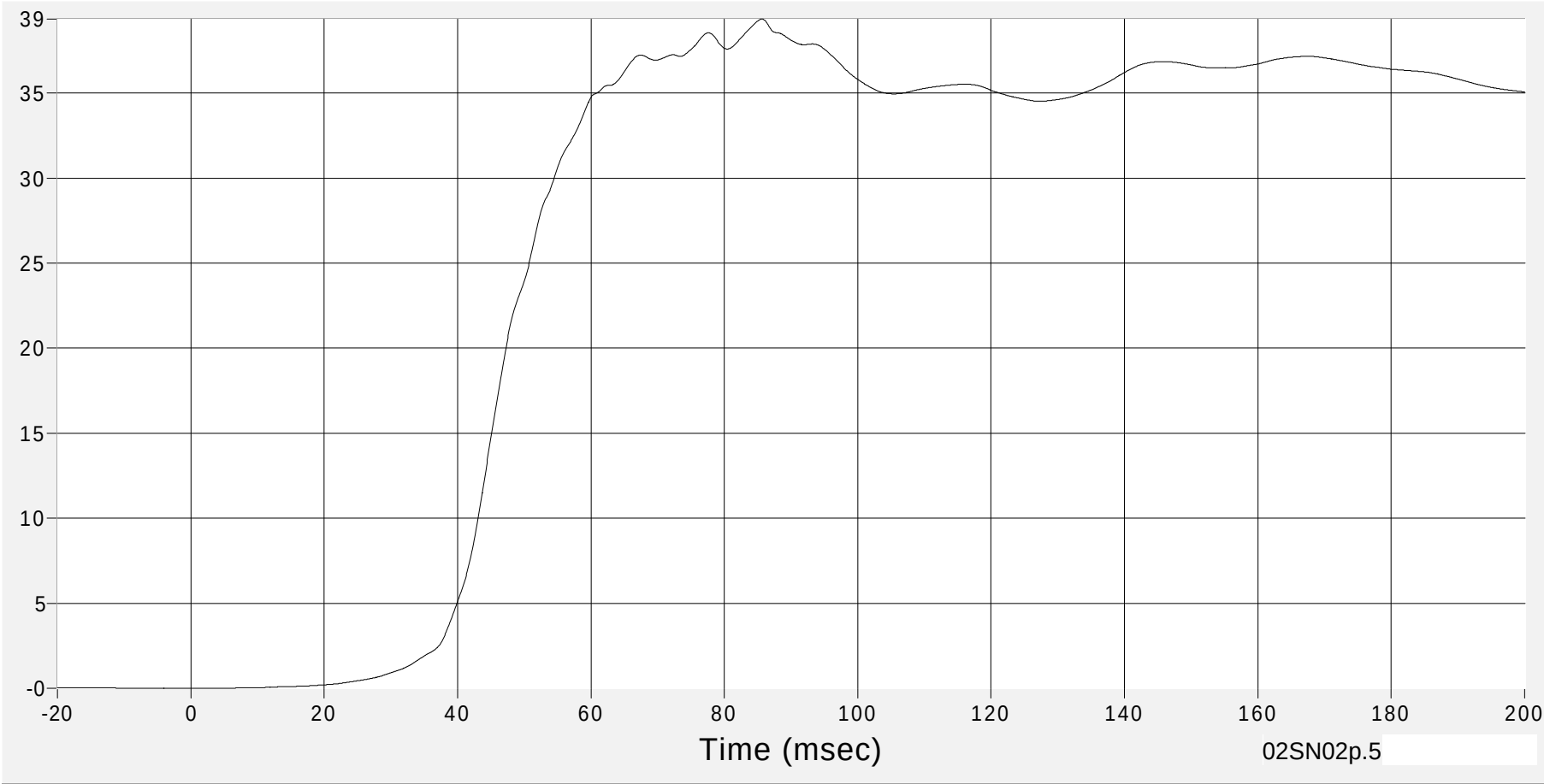
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Passenger Upper Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 39.4 km/h at 85.6 msec
Min 0.0 km/h at 0.0 msec

B-114



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20 December 2001

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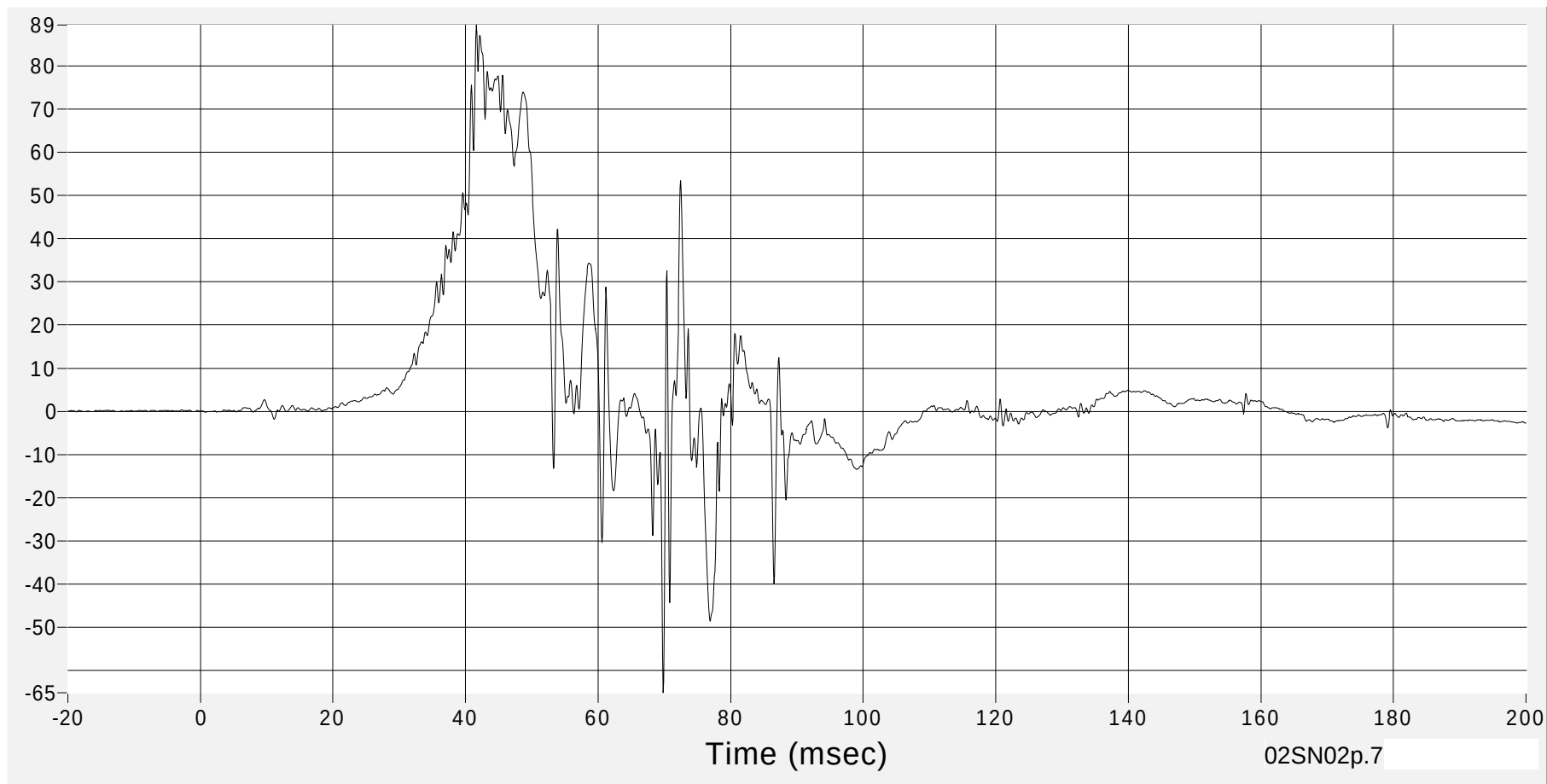
Passenger Lower Rib (Y) Acceleration - Redundant

Acceleration (G's) CFC1000

Max 89.5 G's at 41.6 msec

Min -65.2 G's at 69.8 msec

B-115



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20 December 2001

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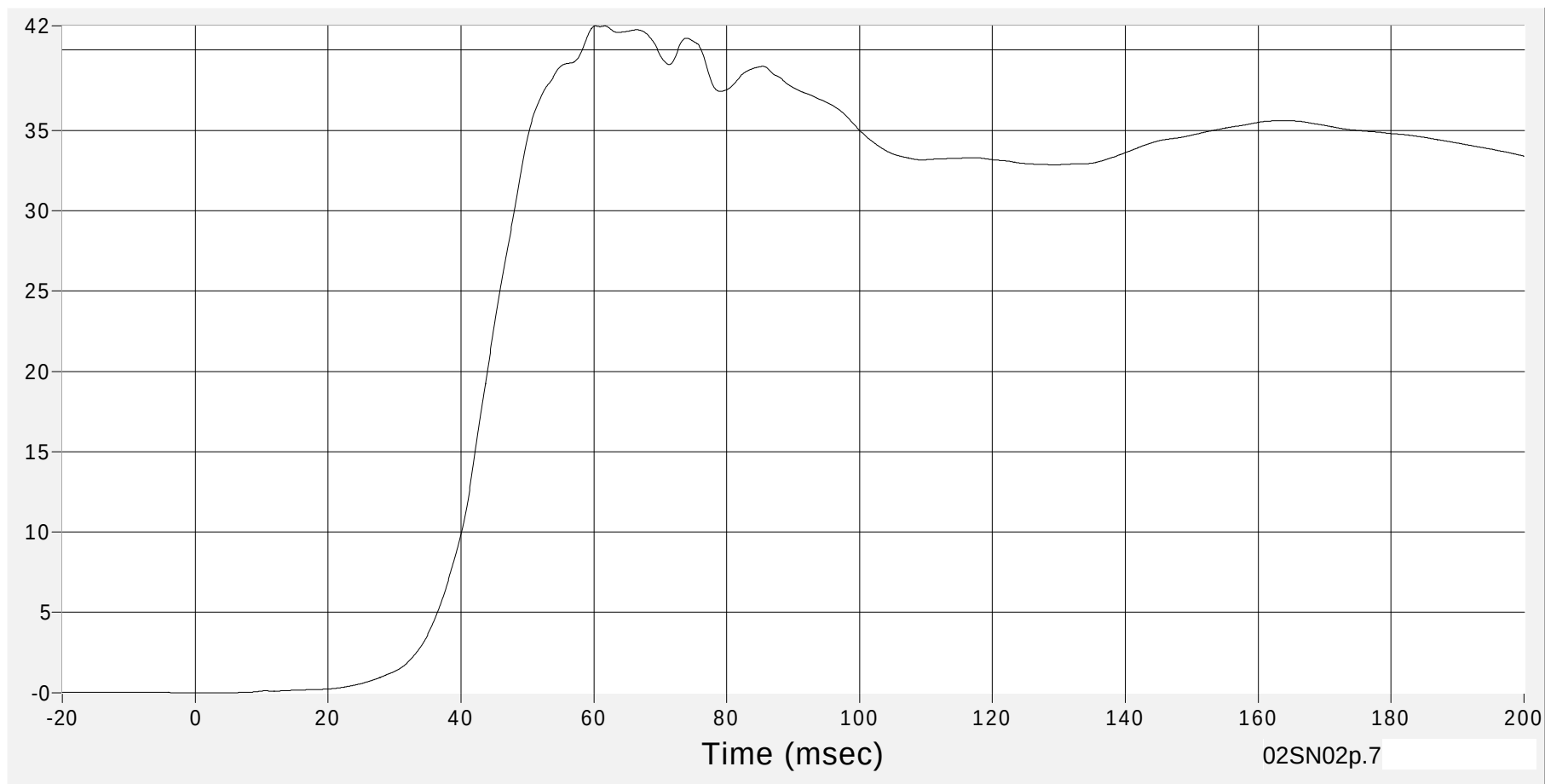
Passenger Lower Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 41.5 km/h at 60.2 msec

Min 0.0 km/h at 3.0 msec

B-116



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20 December 2001

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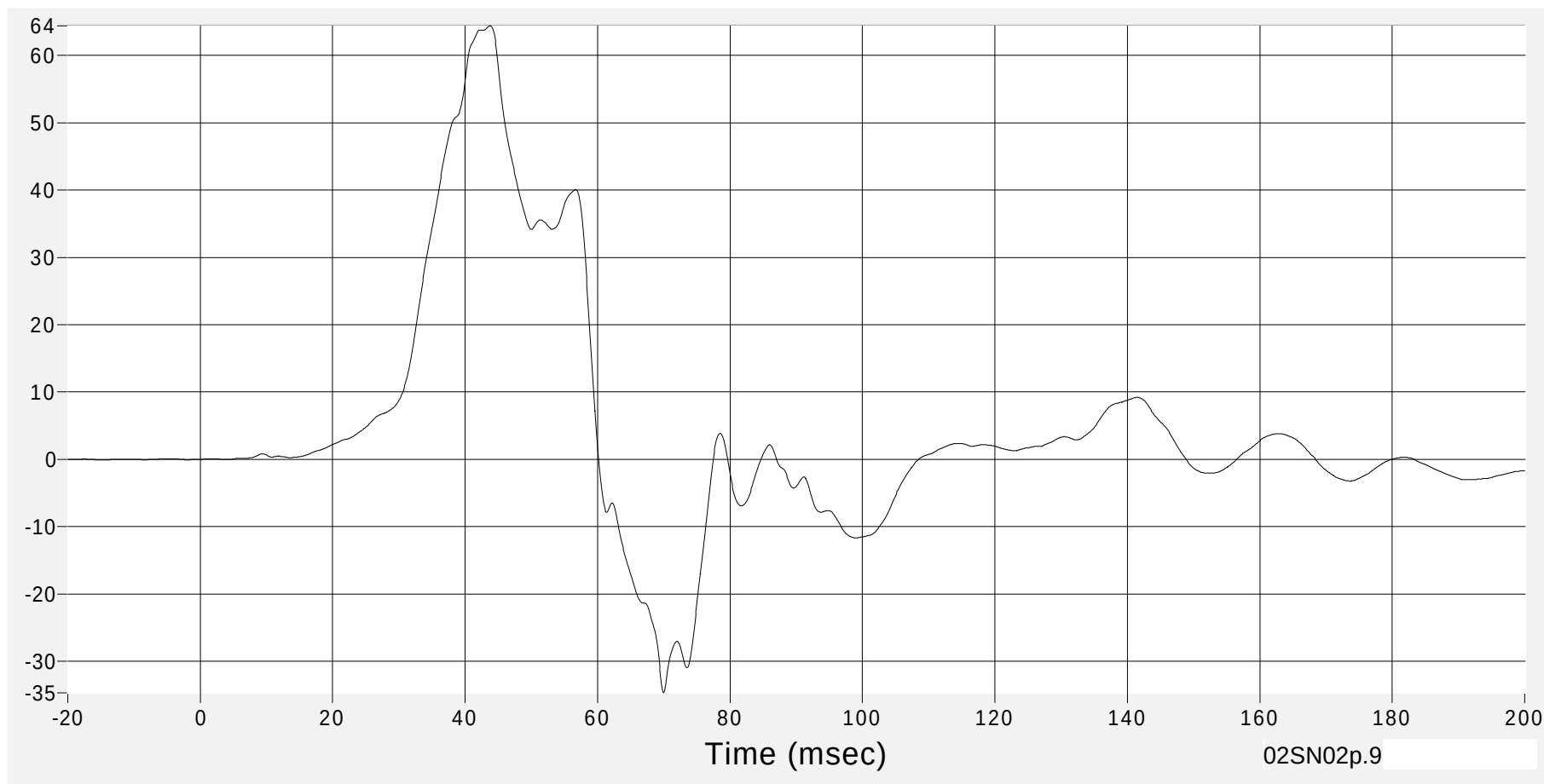
Passenger Lower Spine (Y) Acceleration - Redundant

Acceleration (G's) CFC180

Max 64.4 G's at 43.8 msec

Min -34.7 G's at 70.0 msec

B-117



02SN02 - 2002 NISSAN ALTIMA 4 DOOR SEDAN
20 December 2001

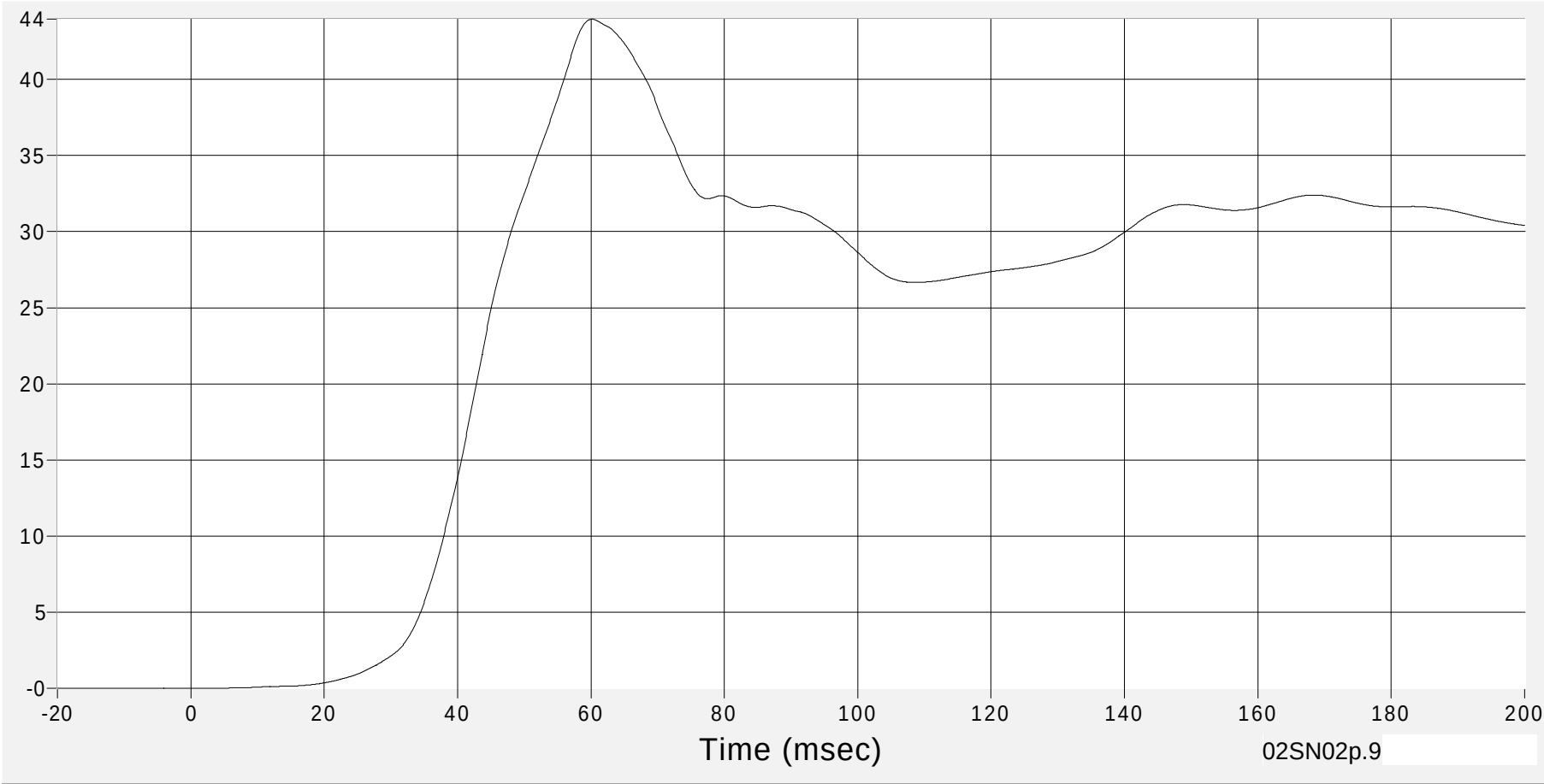
Medical College of Wisconsin
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Passenger Lower Spine (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 44.0 km/h at 60.2 msec
Min 0.0 km/h at 0.0 msec

B-118



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20 December 2001

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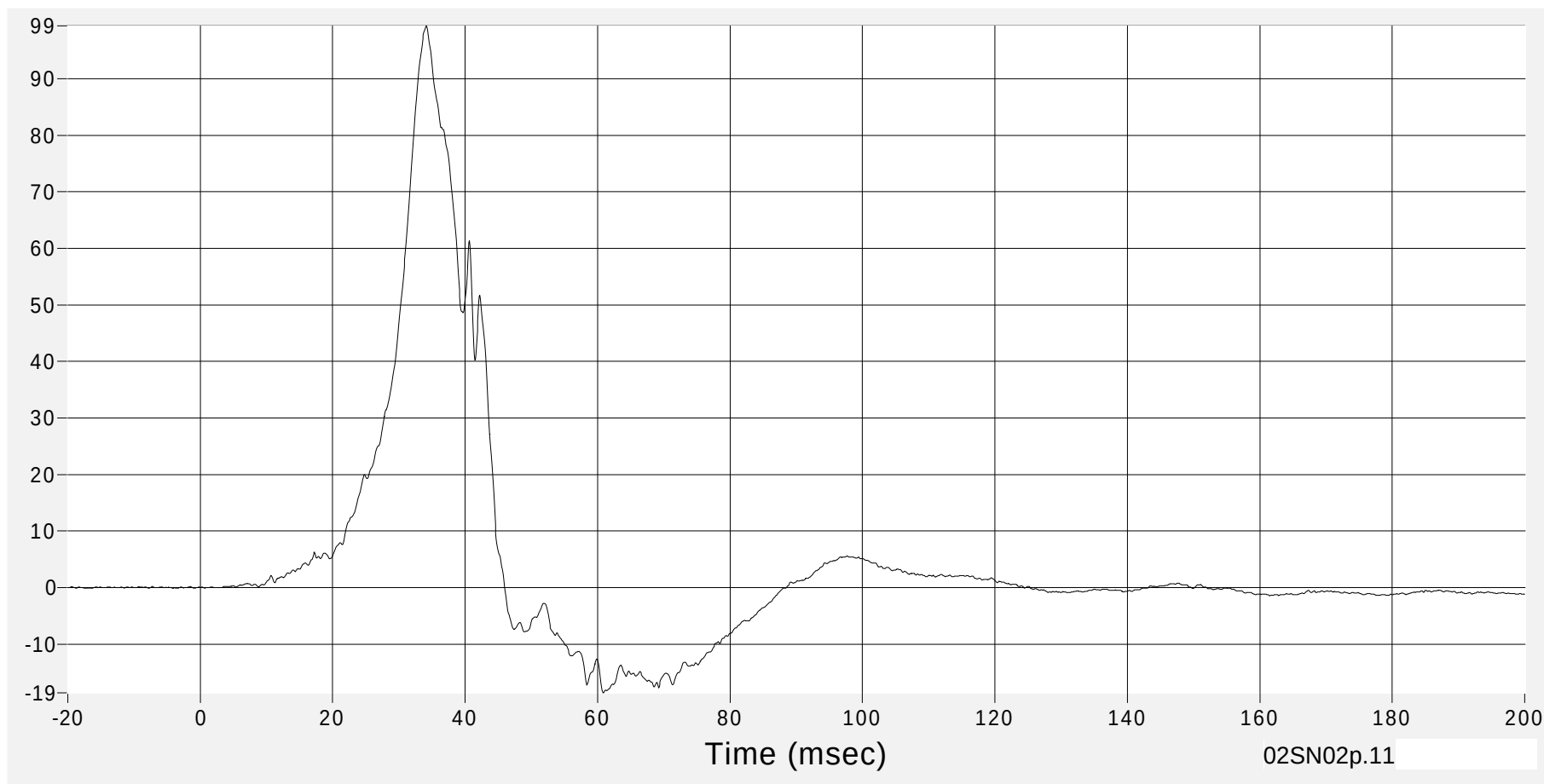
Passenger Pelvic (Y) Acceleration - Redundant

Acceleration (G's) CFC1000

Max 99.3 G's at 34.2 msec

Min -18.6 G's at 60.8 msec

B-119



02SN02 - 2002 NISSAN ALTIMA 4 DOOR SEDAN
20 December 2001

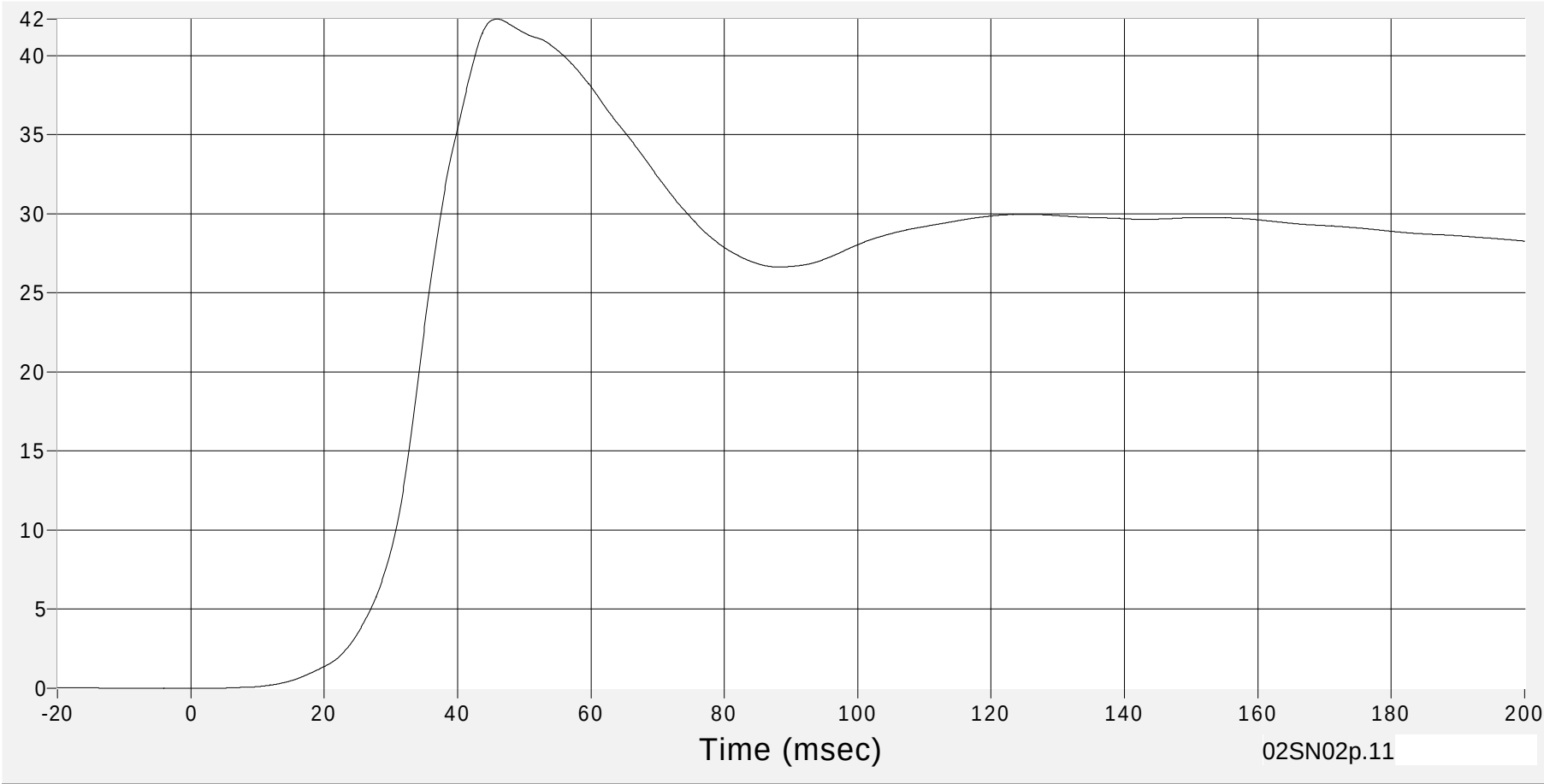
Medical College of Wisconsin
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Passenger Pelvic (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 42.3 km/h at 45.9 msec
Min 0.0 km/h at 0.0 msec

B-120



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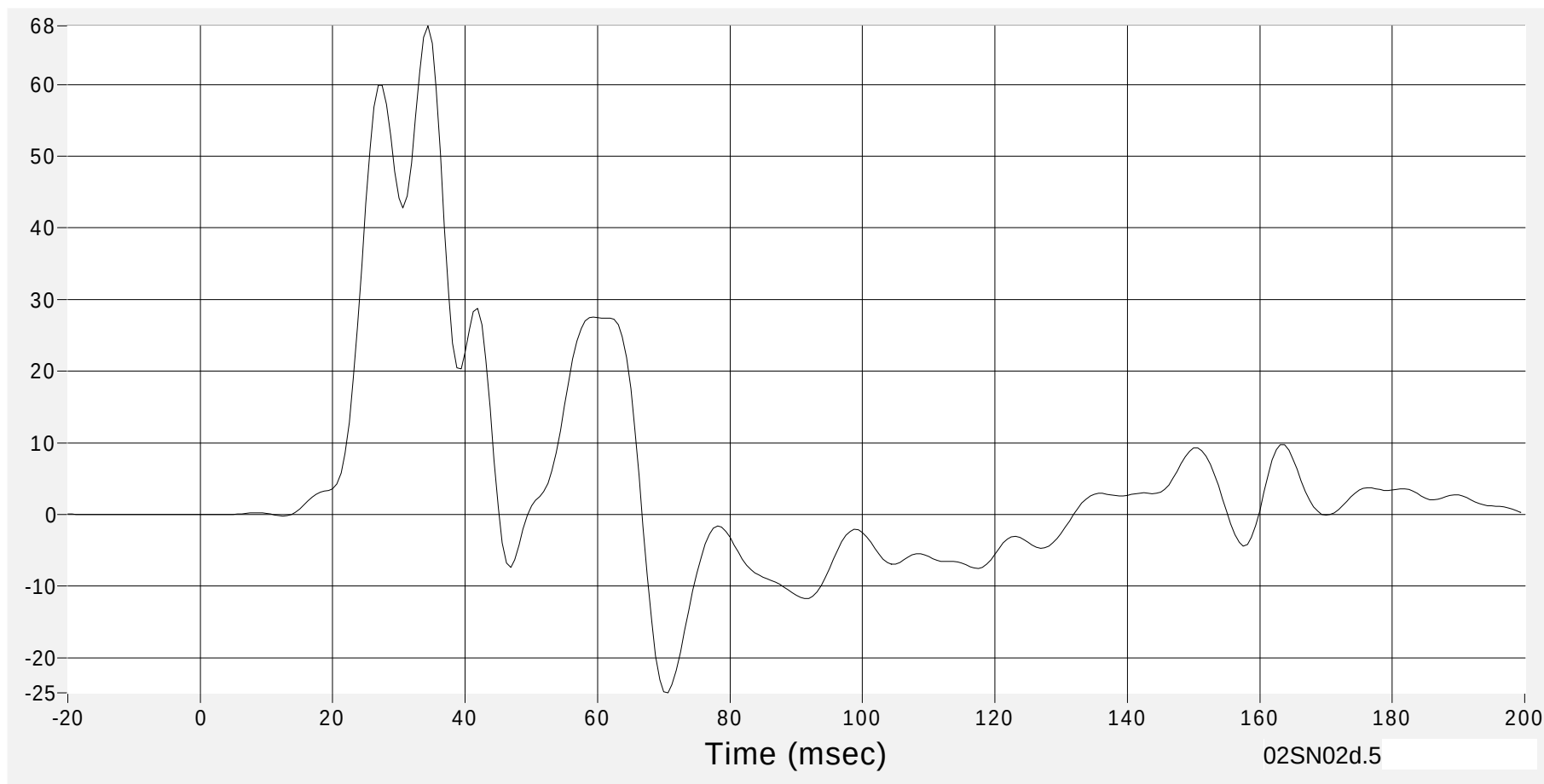
Driver Upper Rib (Y) Acceleration - Redundant

Acceleration (G's) FIR100

Max 68.2 G's at 34.4 msec

Min -24.9 G's at 70.6 msec

B-121



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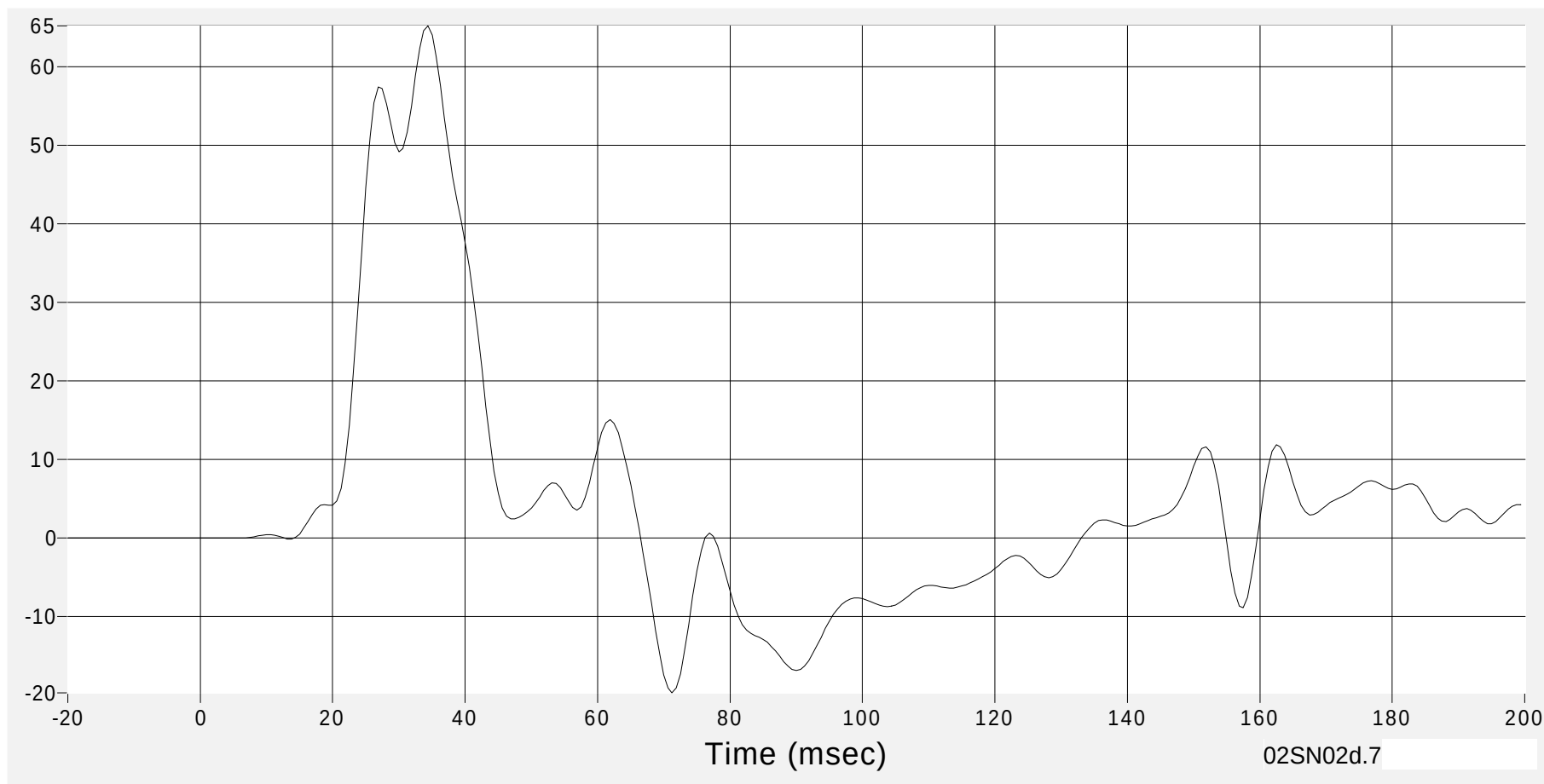
Driver Lower Rib (Y) Acceleration - Redundant

Acceleration (G's) FIR100

Max 65.2 G's at 34.4 msec

Min -19.7 G's at 71.2 msec

B-122



02SN02 - 2002 NISSAN ALTIMA 4 DOOR SEDAN
20 December 2001

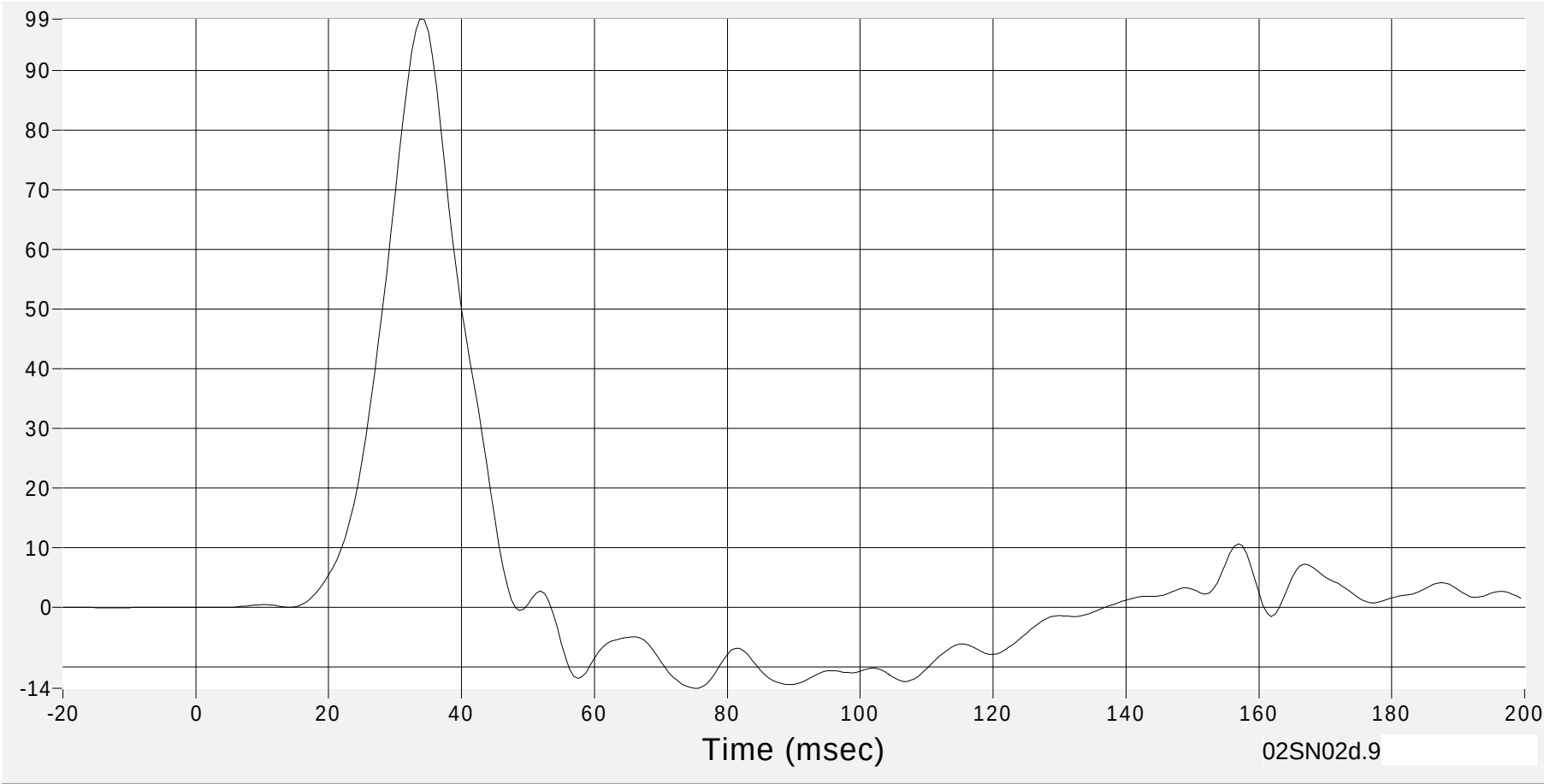
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Driver Lower Spine (Y) Acceleration - Redundant

Acceleration (G's) FIR100

Max 98.7 G's at 33.8 msec
Min -13.5 G's at 75.0 msec

B-123



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20 December 2001

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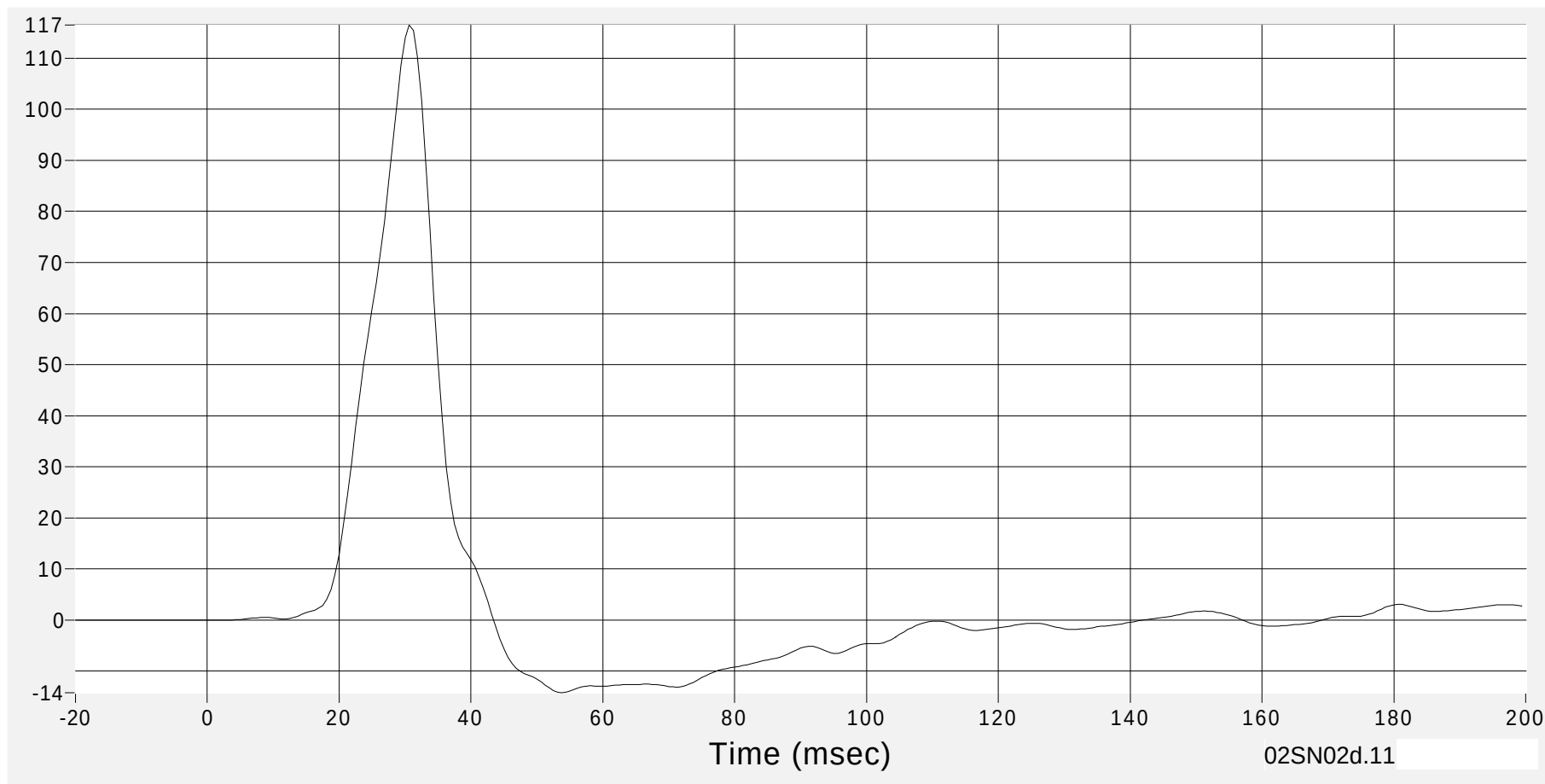
Driver Pelvic (Y) Acceleration - Redundant

Acceleration (G's) FIR100

Max 116.5 G's at 30.6 msec

Min -14.2 G's at 53.8 msec

B-124



02SN02 - 2002 NISSAN ALTIMA 4 DOOR SEDAN
20 December 2001

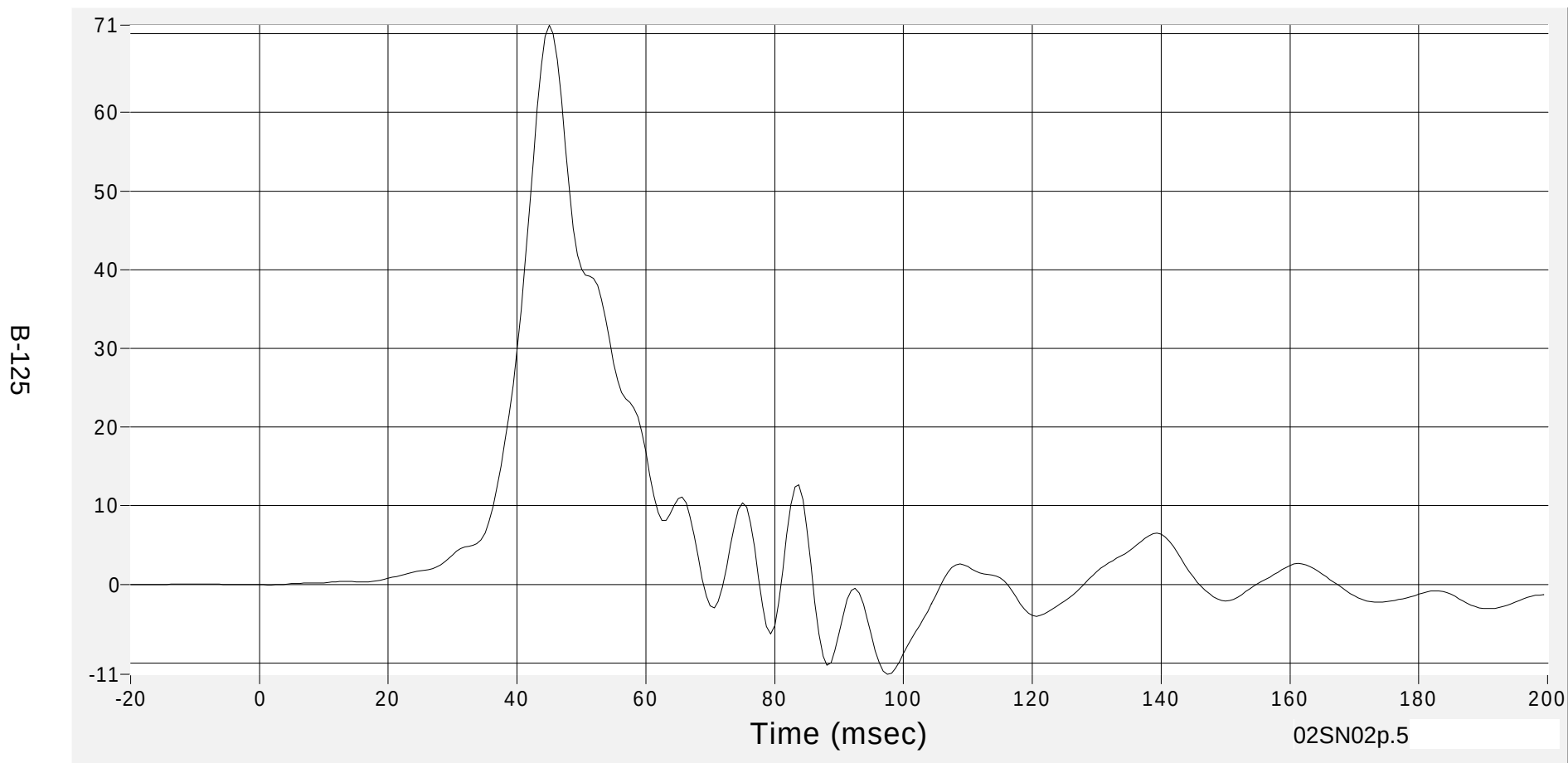
Medical College of Wisconsin
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Passenger Upper Rib (Y) Acceleration - Redundant

Acceleration (G's) FIR100

Max 71.1 G's at 45.0 msec

Min -11.4 G's at 97.5 msec



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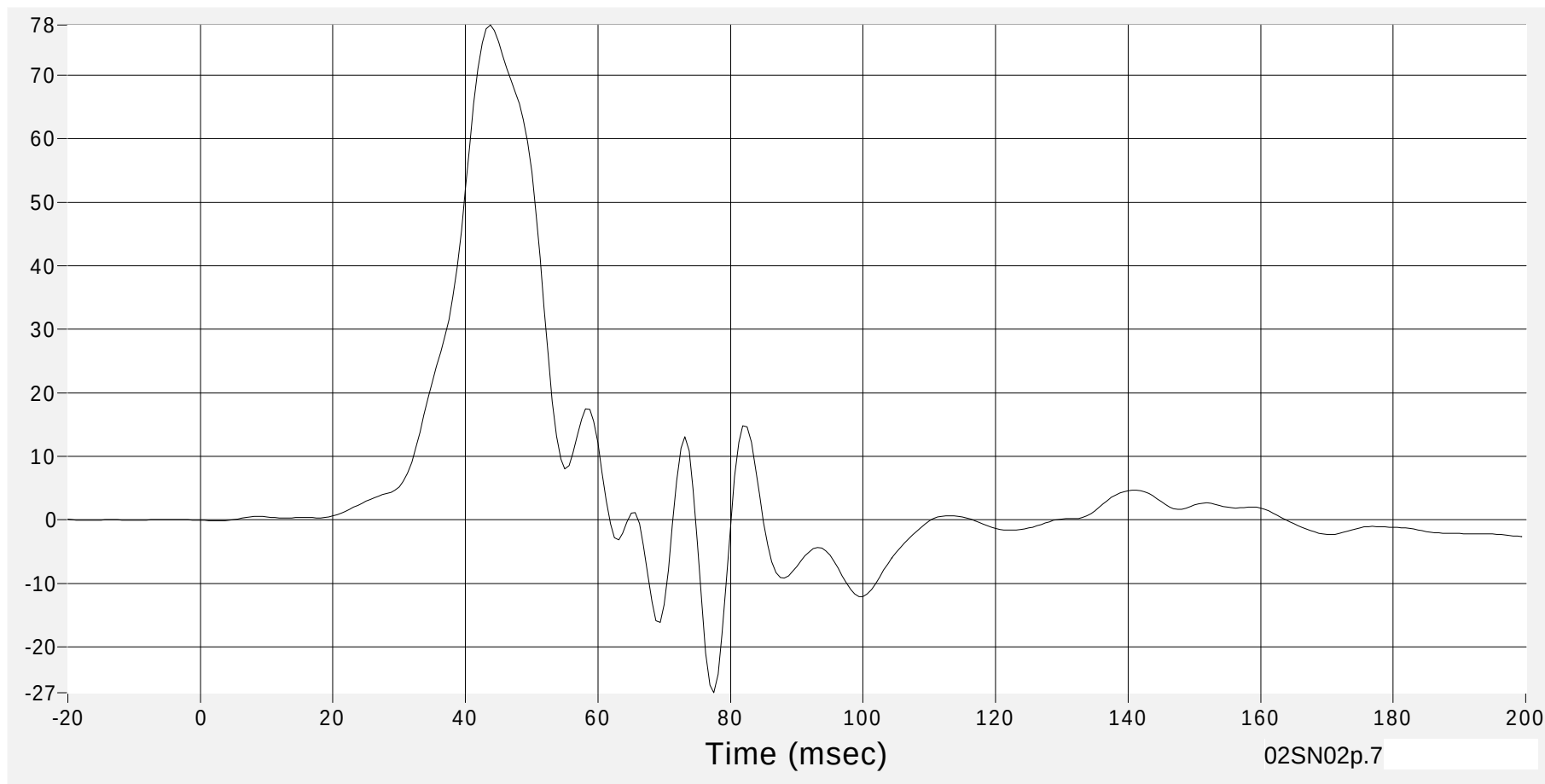
Passenger Lower Rib (Y) Acceleration - Redundant

Acceleration (G's) FIR100

Max 77.9 G's at 43.8 msec

Min -27.2 G's at 77.5 msec

B-126



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Vehicle Crashworthiness Lab

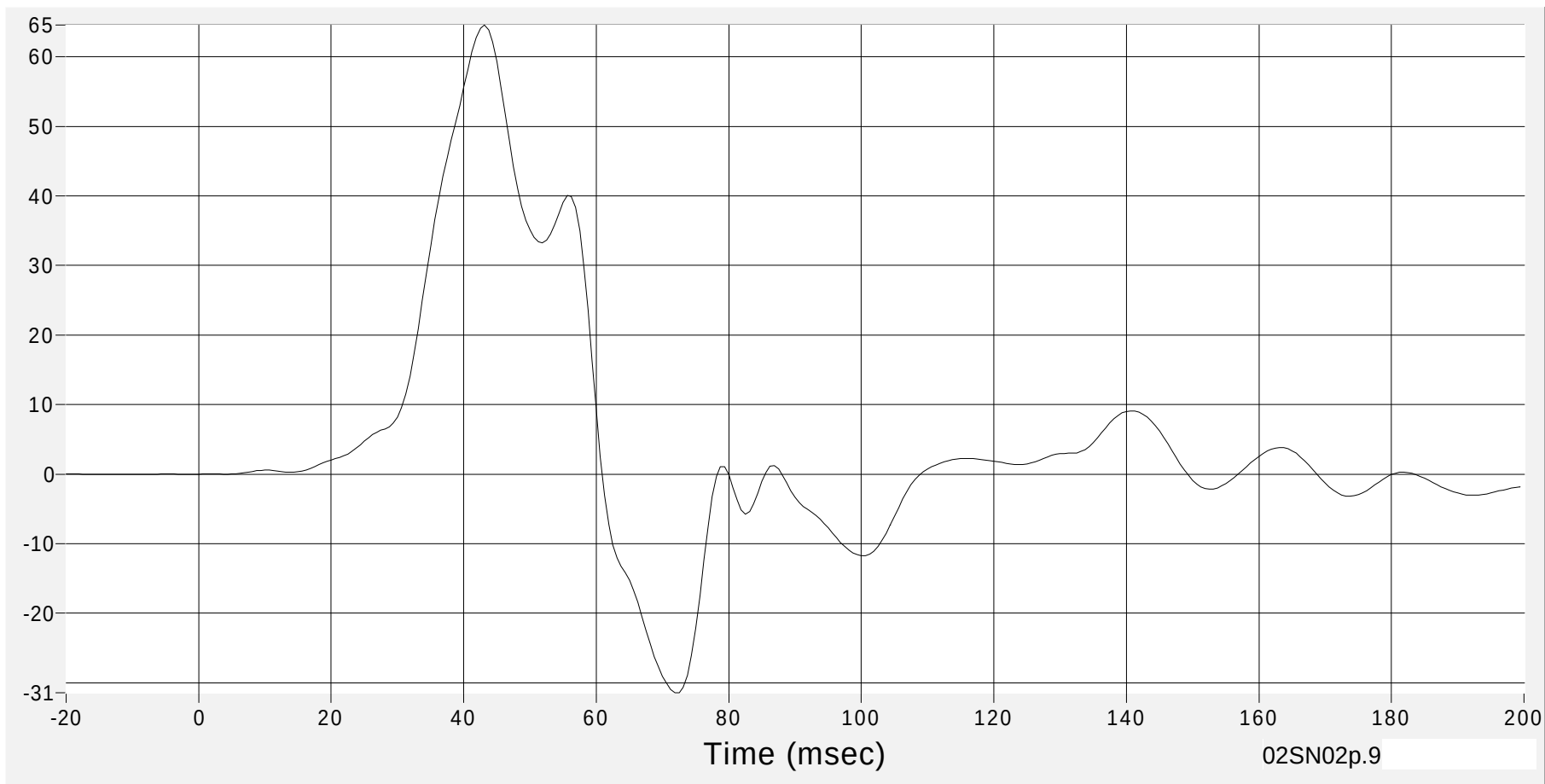
Passenger Lower Spine (Y) Acceleration - Redundant

Acceleration (G's) FIR100

Max 64.6 G's at 43.1 msec

Min -31.4 G's at 71.9 msec

B-127



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20 December 2001

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Vehicle Crashworthiness Lab

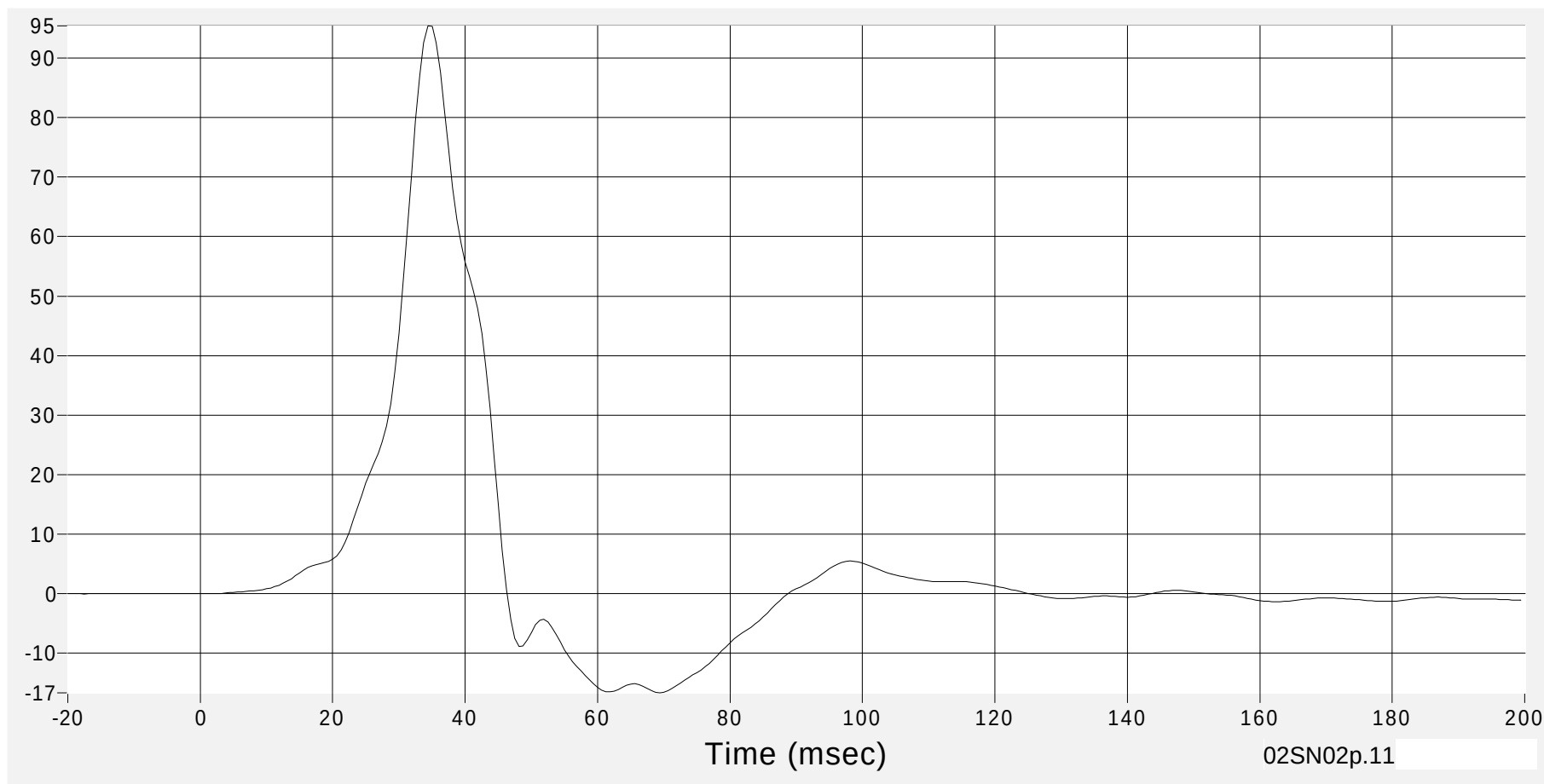
Passenger Pelvic (Y) Acceleration - Redundant

Acceleration (G's) FIR100

Max 95.4 G's at 34.4 msec

Min -16.7 G's at 69.4 msec

B-128



02SN02 - 2002 NISSAN ALTIMA 4 DOOR SEDAN

20 December 2001

Medical College of Wisconsin
Vehicle Crashworthiness Lab

APPENDIX C

SID CONFIGURATION AND VERIFICATION RESULTS

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VERIFICATION TEST RESULTS SUMMARY PRE AND POST TEST	Page No.
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DUMMY INSPECTION LIST PRE AND POST TEST	C-4
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**VERIFICATION TEST RESULTS SUMMARY
PRE AND POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number 056

Test Sequences 01 and 02

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		
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		
LUMBAR FLEXION	Pass all requirements	Mark Meyer		

SID Serial Number 058

Test Sequences 01 and 02

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		
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		
LUMBAR FLEXION	Pass all requirements	Mark Meyer		

SUMMARY
SID PRE AND POST VERIFICATION

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number 056 and 058

Test Sequences

01 and 02

TEST PARAMETER	SPECIFICATION	056		058	
		PRE	POST	PRE	POST
MEASUREMENTS					
Date	-	12Dec01	21Dec01	18Dec01	4Jan02
Sequential Test Number	-	01	02	01	02
Temperature (°C)	18.9-25.5	21.1	21.6	22.3	21.7
Relative Humidity (%)	10-70	34	34.4	43	41
SH – Seated Height (mm)	889-909	902	904	903	905
RH – Rib Height (mm)	501-521	505	511	517	519
HP – Hip Pivot Height (mm)	99	99/99	99/99	99/99	99/99
RD – Rib From Back Line (mm)	229-241	232	230	230	230
KH – Knee Pivot from Back Line (mm)	511-526	526/526	524/519	522/522	523/525
KV – Knee Pivot to Floor (mm)	490-505	500/492	501/494	494/495	496/496
HW – Hip Width (mm)	356-391	361	360	368	368
THORAX IMPACTS					
Date	-	12Dec01	3Jan02	11Dec01	4Jan02
Sequential Test Number	-	01	02	01	02
Temperature (°C)	18.9-25.5	21.3	20.8	21.7	22.0
Relative Humidity (%)	10-70	34	33.7	36	41.5
Probe Speed (m/s)	4.21-4.33	4.29	4.27	4.26	4.27
Upper Rib Acceleration (G)	37-46	43	42.2	39.3	40.3
Lower Rib Acceleration (G)	37-46	43.4	40.4	39.4	39.1
Lower Spine Acceleration (G)	15-22	17.9	20.0	18.5	19.0
PELVIS IMPACTS					
Date	-	12Dec01	3Jan02	12Dec01	4Jan02
Sequential Test Number	-	01	02	01	02
Temperature (°C)	18.9-25.5	21.3	20.7	21.5	22.1
Relative Humidity (%)	10-70	34	33.8	34.3	41.4
Probe Speed (m/s)	4.21-4.33	4.29	4.27	4.29	4.27
Pelvis Acceleration (G)	40-60	42.4	44.5	43.1	44.3
THORACIC SHOCK ABSORBER					
Shock Absorber ID Number	-	486		03130164	
Damper Setting	1-10	6		5	
Date	-	5Nov01		6Nov01	
Sequential Test Number	-	01		01	
Temperature	18.9-25.5	22.1		22.0	
Relative Humidity	10-70	34.2		40	
Probe Speed (m/s) Low	3.05	3.05		3.05	
Force (N)	836 – 1125	1064.5		898.1	
Displacement (mm)	30 – 35	30.0		30.6	
Probe Speed (m/s) Middle	4.27	4.27		4.27	
Force (N)	1730 – 2099	1747.0		1739.4	
Displacement (mm)	32 – 37	33.7		36.3	
Probe Speed (m/s) High	6.10	6.10		6.10	
Force (N)	3741 – 4448	4216.3		3927.0	
Displacement (mm)	33 - 40	36.4		37.4	

TEST PARAMETER	SPECIFICATION	056		058	
		PRE	POST	PRE	POST
ABDOMINAL COMPRESSION					
Date	-	28Nov01		28Nov01	
Sequential Test Number	-	01		01	
Temperature (°C)	18.9-25.5	21.3		21.6	
Relative Humidity (%)	10-70	40		39.8	
Force at 13 mm (N)	104-162	133.9		121.5	
Force at 19 mm (N)	163-221	185.0		177.9	
Force at 25 mm (N)	222-280	245.6		244.8	
Force at 33 mm (N)	325-391	354.4		356.1	
LUMBAR SPINE					
Date	-	7Nov01		7Nov01	
Sequential Test Number	-	01		01	
Temperature (°C)	18.9-25.5	21.4		21.4	
Relative Humidity (%)	10-70	45		45	
Force at 0° (N)	0-26.7	0		0	
Force at 0° (N)	97.8-151.2	135		128	
Force at 0° (N)	151.2-204.6	165		156	
Force at 0° (N)	204.6-258	235		208	
Return Angle	12 Deg. Maximum	5.5		7.7	

**DUMMY INSPECTION LIST
PRE AND POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number 056 and 058

Test Sequences 01 and 02

		SID 056		SID 058	
		PRE	POST	PRE	POST
	Date	18Dec01	21Dec01	18Dec01	4Jan02
	Performed By	Mark Meyer	Mark Meyer	Mark Meyer	Mark Meyer
PART	INSPECTION				Pass
Skin	Visual	Pass	Pass	Pass	Pass
Head	Visual, Ballast, Accelerometer Mount	Pass	Pass	Pass	Pass
Neck	Visual and Palpated, Cable Torque	Pass	Pass	Pass	Pass
Spine Box	Visual, Ballast, Weldment, Accelerometer Mount	Pass	Pass	Pass	Pass
Rib Cage	Visual, Palpated, Measured, Stiffness	Pass	Pass	Pass	Pass
Sternum	Visual	Pass	Pass	Pass	Pass
Lumbar Spine	Visual	Pass	Pass	Pass	Pass
Abdomen	Visual	Pass	Pass	Pass	Pass
Pelvis	Visual, Palpated, Accelerometer Mount	Pass	Pass	Pass	Pass
Upper Legs	Visual	Pass	Pass	Pass	Pass
Knees	Visual, Stops, Inserts	Pass	Pass	Pass	Pass
Lower 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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Section	Page No.
SID INSTRUMENTATION	D-3
VEHICLE INSTRUMENTATION	D-4
MDB INSTRUMENTATION	D-4

SID INSTRUMENTATION**FRONT SID NO. 056**

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD X	P12931	ENDEVCO	14Nov01
HEAD Y	P13836	ENDEVCO	14Nov01
HEAD Z	P22993	ENDEVCO	14Nov01
UPPER RIB	P13819	ENDEVCO	14Nov01
LOWER RIB	P13868	ENDEVCO	14Nov01
LOWER SPINE	P12746	ENDEVCO	14Nov01
PELVIS	P13598	ENDEVCO	14Nov01
UPPER RIB REDUNDANT	P13491	ENDEVCO	14Nov01
LOWER RIB REDUNDANT	P13835	ENDEVCO	14Nov01
LOWER SPINE REDUNDANT	P14274	ENDEVCO	14Nov01
PELVIS REDUNDANT	P13837	ENDEVCO	14Nov01

REAR SID NO. 058

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD X	J35932	ENDEVCO	14Nov01
HEAD Y	J36031	ENDEVCO	14Nov01
HEAD Z	J356411	ENDEVCO	14Nov01
UPPER RIB	J35839	ENDEVCO	14Nov01
LOWER RIB	J32662	ENDEVCO	14Nov01
LOWER SPINE	J35937	ENDEVCO	14Nov01
PELVIS	J366031	ENDEVCO	14Nov01
UPPER RIB REDUNDANT	J36617	ENDEVCO	14Nov01
LOWER RIB REDUNDANT	J32665	ENDEVCO	14Nov01
LOWER SPINE REDUNDANT	J36614	ENDEVCO	14Nov01
PELVIS REDUNDANT	J34364	ENDEVCO	14Nov01

VEHICLE INSTRUMENTATION

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
RIGHT FRONT SILL X	J32565	ENDEVCO	14Nov01
RIGHT FRONT SILL Y	J21505	ENDEVCO	14Nov01
RIGHT FRONT SILL Z	J360181	ENDEVCO	14Nov01
RIGHT REAR SILL X	P23025	ENDEVCO	14Nov01
RIGHT REAR SILL Y	P14223	ENDEVCO	14Nov01
RIGHT REAR SILL Z	P16867	ENDEVCO	14Nov01
REAR FLOORPAN ABOVE AXLE X	98G98D22-Z13	ENTRAN	14Nov01
REAR FLOORPAN ABOVE AXLE Y	98B98A26-D17	ENTRAN	14Nov01
REAR FLOORPAN ABOVE AXLE Z	98G98E07-Z09	ENTRAN	14Nov01
LEFT REAR SILL Y	P13839	ENDEVCO	14Nov01
LEFT FRONT SILL Y	J21693	ENDEVCO	14Nov01
LEFT FRONT DOOR CENTERLINE Y	B12823	ENDEVCO	14Nov01
RIGHT REAR OCCUPANT COMP Y	P23579	ENDEVCO	14Nov01
MID-REAR OF LEFT FRONT DOOR Y	N/a	N/a	N/a
LEFT FRONT DOOR UPPER C/L Y	98F98A28-Q02	ENTRAN	14Nov01
MID-REAR OF LEFT REAR DOOR Y	N/a	N/a	N/a
LEFT REAR DOOR UPPER C/L Y	B13297	ENDEVCO	14Nov01
LEFT LOWER B-PILLAR Y	P23570	ENDEVCO	14Nov01
LEFT MIDDLE B-PILLAR Y	J35768	ENDEVCO	14Nov01
LEFT LOWER A-PILLAR Y	B13281	ENDEVCO	14Nov01
LEFT UPPER A-PILLAR	B13036	ENDEVCO	14Nov01
FRONT SEAT TRACK Y	P23582	ENDEVCO	14Nov01
REAR SEAT TRACK Y	N/a	N/a	N/a
VEHICLE CG X	B13846	ENDEVCO	14Nov01
VEHICLE CG Y	B22912	ENDEVCO	14Nov01
VEHICLE CG Z	B22577	ENDEVCO	14Nov01

MDB INSTRUMENTATION

MDB CG X	P19211	ENDEVCO	14Nov01
MDB CG Y	P23595	ENDEVCO	14Nov01
MDB CG Z	P19145	ENDEVCO	14Nov01
MDB REAR FRAME MEMBER X	P21151	ENDEVCO	14Nov01
MDB REAR FRAME MEMBER Y	P22978	ENDEVCO	14Nov01