

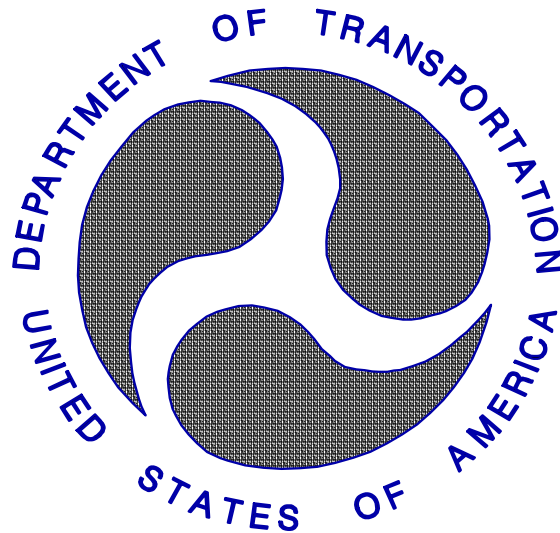
REPORT NO. MCW-DOT-04SN06

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TESTING**

KIA MOTOR CORPORATION
2004 KIA OPTIMA 4-DOOR SEDAN

NHTSA NUMBER: M40504

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



FEBRUARY 3, 2004

FINAL REPORT

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

This Final Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-01-D-02003. This document is disseminated under the sponsorship of the U. S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its content or use thereof.

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FINAL REPORT ACCEPTANCE BY:

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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 2004 Kia Optima 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 February 3, 2004. The impact velocity of the Moving Deformable Barrier (MDB) was 62.02 km/h, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 20.5° C. The target vehicle post-test maximum crush was 387 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>57.3</td><td>52.3</td></tr> <tr> <td>Left Lower Rib Acceleration G</td><td>61.8</td><td>63.6</td></tr> <tr> <td>Lower Spine Acceleration G</td><td>78.2</td><td>57.7</td></tr> <tr> <td>Thoracic Trauma Index TTI</td><td>70</td><td>61</td></tr> <tr> <td>Pelvis Acceleration G</td><td>102</td><td>76</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	57.3	52.3	Left Lower Rib Acceleration G	61.8	63.6	Lower Spine Acceleration G	78.2	57.7	Thoracic Trauma Index TTI	70	61	Pelvis Acceleration G	102	76
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SECTION 1**PURPOSE AND TEST PROCEDURE**

This side impact test was part of the FY04 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-01-D-02003. The purpose of this test was to evaluate side impact protection of a 2004 Kia Optima 4-Door Sedan. This side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated November 2002.

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

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A 2004 Kia Optima 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 62.02 km/h (38.54 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 February 3, 2004.

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

The SID H3s were instrumented with the following accelerometers.

1. Left Upper Rib (LUR) Primary and Redundant uniaxial accelerometers (Y-direction)
2. Left Lower Rib (LLR) Primary and Redundant uniaxial accelerometers (Y-direction)
3. Lower Thoracic Spine (T₁₂) Primary and Redundant uniaxial accelerometers (Y-direction)
4. Pelvic (PEV) section Primary and Redundant uniaxial accelerometers (Y-direction)
5. Head Center of Gravity triaxial accelerometers (X-, Y-, and Z-direction)
6. Upper Neck (NKU) six axis load cell (Fx, Fy, Fz, Mx, My, and Mz)

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

The following table summarizes the results of this test.

Injury Criteria	Front SID H3	Rear SID H3
TTI (G)	70	61
PELVIS (G)	101.9	76.0
HIC36	168.9	†

† Passenger head Z accelerometer failed during impact

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

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

SECTION 3
SUMMARY OF TEST RESULTS

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

Year/ Make/ Model/ Body Style		2004 Kia Optima 4-Door Sedan			
Vehicle NHTSA NO.		M40504	VIN	KNAGD126X45283877	
Vehicle Body Color		Gold/Beige	Build Date	September 2003	
Engine Data	<u>4</u> Cylinders	CID	<u>2.4</u> Liter	<u>cc</u>	
Placement	<u>Longitudinal</u>	<u>X</u> Lateral			
Transmission	<u>5</u> Speed	<u>X</u> Manual	<u>Automatic</u>	<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>60 miles</u>	Date	<u>January 27, 2004</u>		
Options	<u>X</u> A/C	<u>X</u> Power Steering	<u>X</u> Power Brakes	<u>X</u> Power Windows	
	<u>X</u> Cruise Control	<u>X</u> Tilt Wheel	<u>X</u> Power Locks	<u>ADL's</u>	

DATA FROM TIRE PLACARD:

Tire Pressure (at Capacity)	<u>33</u> PSI Front
	<u>33</u> PSI Rear
Recommended Tire Size	<u>P205 60R15</u>
Tires on Test Vehicle	<u>P205 60R15</u> Manufacturer <u>Kumho</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	Yes-Seat	None
Front Passenger	Yes- Dashboard	None	Yes-Seat	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>X</u> Knob
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>467.2</u> kg	Left Rear	=	<u>280.3</u> kg
Right Front	=	<u>442.3</u> kg	Right Rear	=	<u>295.3</u> kg
TOTAL FRONT	=	<u>909.5</u> kg	TOTAL REAR	=	<u>575.6</u> kg
% Total Weight	=	<u>61.2</u> %	%Total Weight	=	<u>38.8</u> %
TOTAL WEIGHT	=	<u>1485.1</u> kg			

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

Total Test Vehicle Delivered Weight with Max Fluids	=	<u>1485.1</u>	kg	(A)
Maximum Cargo Carrying Capacity of Test Vehicle	=	<u>49.9</u>	kg	(B)
Weight of (2) instrumented Side Impact Dummies	=	<u>161.0</u>	kg	(C)
TEST VEHICLE TARGET WEIGHT	=	<u>1696.0</u>	kg	(A+B+C)

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

Left Front	=	<u>513.0</u>	kg	Left Rear	=	<u>374.1</u>	kg
Right Front	=	<u>454.3</u>	kg	Right Rear	=	<u>354.6</u>	kg
TOTAL FRONT	=	<u>967.3</u>	kg	TOTAL REAR	=	<u>728.7</u>	kg
% Total Weight	=	<u>57.0</u>	%	%Total Weight	=	<u>43.0</u>	%
TOTAL WEIGHT	=	<u>1696.0</u>	kg				

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

Left Front	=	<u>510.3</u>	kg	Left Rear	=	<u>371.0</u>	kg
Right Front	=	<u>454.5</u>	kg	Right Rear	=	<u>353.3</u>	kg
TOTAL FRONT	=	<u>964.8</u>	kg	TOTAL REAR	=	<u>724.3</u>	kg
% Total Weight	=	<u>57.1</u>	%	%Total Weight	=	<u>42.9</u>	%
TOTAL WEIGHT	=	<u>1689.1</u>	kg				

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

AS DELIVERED

Left Front	<u>686</u>	Right Front	<u>687</u>	Left Rear	<u>697</u>	Right Rear	<u>696</u>
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FULLY LOADED

Left Front	<u>667</u>	Right Front	<u>677</u>	Left Rear	<u>651</u>	Right Rear	<u>664</u>
------------	------------	-------------	------------	-----------	------------	------------	------------

AS TESTED

Left Front	<u>670</u>	Right Front	<u>677</u>	Left Rear	<u>654</u>	Right Rear	<u>665</u>
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Test Vehicle Wheelbase 2699 mm

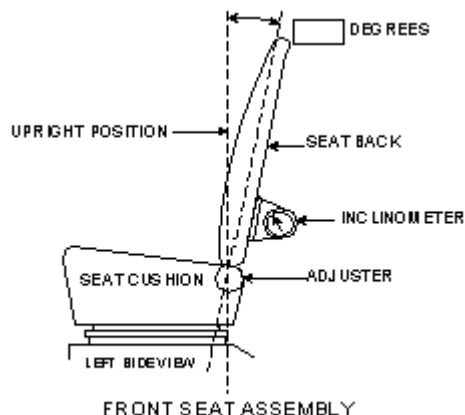
As Tested CG = 1158 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side	=	<u>4369</u>	mm
Left Side	=	<u>4369</u>	mm
Centerline	=	<u>4727</u>	mm

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

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

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel		230 mm
Total Number of Detents	20	Test Position 11th detent from full forward

FRONT SEAT BACK ADJUSTMENT:

Seat Back Angle	13th notch from initial upright position
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REAR SEAT POSITION:

Total Length Fore/Aft Adjustment	N/A
Seat Back Adjustment Position	N/A

ADJUSTABLE STEERING COLUMN POSITION:

Mid position

WINDOW POSITIONS:

Left Front	Up	Right Front	Removed
Left Rear	Up	Right Rear	Removed

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

Fuel System usable Capacity	65.1 L	
Test Volume	60.6 L	93.1% usable capacity

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

Wheelbase	2699 mm	
Impact Point is	410 mm rearward	of front axle centerline
Actual Impact Point is	426 mm rearward	of front axle centerline

DATA SHEET 2

TEST VEHICLE SUMMARY

VEHICLE IDENTIFICATION:

Year/Make/Model/Body Style	2004 Kia Optima 4-Door Sedan		
Body Color	Gold/Beige	VIN	KNAGD126X45283877
NHTSA No.	M40504	Test Date	February 3, 2004
Overall Length	4727 mm	Overall Width	1782 mm

VEHICLE TEST WEIGHT (Pre-Test):

Left Front	=	510.3	kg	Left Rear	=	371.0	kg
Right Front	=	454.5	kg	Right Rear	=	353.3	kg
TOTAL FRONT	=	964.8	kg	TOTAL REAR	=	724.3	kg
% Total Weight	=	57.1	%	%Total Weight	=	42.9	%
TOTAL WEIGHT	=	1689.1	kg				
Wheelbase	=				=	2699	mm
Longitudinal CG from Center of Front Axle	=				=	1158	mm
Impact Angle with Respect to Impactor	=				=	90°	

ACTUAL IMPACT POINT

Actual Impact Point is 16 mm rearward and 13 mm below nominal impact point.

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1	(265 mm above ground)	=	248	mm
2. LEVEL 2	(476 mm above ground)	=	387	mm
3. LEVEL 3	(582 mm above ground)	=	353	mm
4. LEVEL 4	(881 mm above ground)	=	304	mm
5. LEVEL 5	(1302 mm above ground)	=	120	mm

Maximum Post-Test intrusion at Level 2 is 387 mm

OCCUPANTS

	<u>Left Front Passenger</u>	<u>Left Rear Passenger</u>
Dummy Identification	SID H3/056	SID H3/058
Restraints Used	3-Point Belt	3-Point Belt
	Head/Torso Side Airbag	

INSTRUMENTATION:

Number of Vehicle Data Channels		26
Number of Cameras	Onboard	3
	Off board	4
	MDB	2
	Real Time	1
	TOTAL	10

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

Plascore Serial Number Plascore Serial # 016A0303-1 01360203

POSITION OF IMPACT (MDB) ON TOW SYSTEM

Crabbed 27° to the left

MDB DETAILS:

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

MDB WEIGHT:

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

MDB IMPACT:

Impact Angle (MDB C/L to Target Vehicle)		270°	
Impact Speed	Primary	62.02 km/h	38.54 mph
	Secondary	61.86 km/h	38.44 mph
	Redundant	61.99 km/h	38.52 mph

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A Center of Bumper	=	188	mm
2. Row B Top of Bumper	=	94	mm
3. Row C Mid-Level	=	134	mm
4. Row D Top of Stack	=	174	mm

INSTRUMENTATION:

Number of MDB Data Channels	=	5
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DATA SHEET NO. 4**POST-TEST OBSERVATIONS**VISIBLE DUMMY CONTACT POINTS:LEFT FRONT SID H3

Head	To driver side air bag
Upper Torso	To driver side air bag
Lower Torso	To driver side air bag
Left Knee	To left front door panel ~175 mm below arm rest
Left Leg	To left front door panel ~150 mm below arm rest

LEFT REAR SID H3

Top of head to side header, side of head to C-Pillar
To left rear door panel ~55 mm below window sill
To left rear door panel ~40 mm above arm rest
To left rear door panel ~75 mm below arm rest
To left rear door panel at arm rest ~165 mm rearward of B-Pillar

DOOR OPENING:LEFT DOOR

Front	Closed/latched/inoperable
Rear	Closed/latched/inoperable

RIGHT DOOR

Closed/latched/operable
Closed/latched/operable

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal	16 mm rearward	Vertical	13 mm below
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ARM REST LOCATIONS:

Front	240 mm below window sill
Rear	245 mm below window sill

SEAT MOVEMENT:

Front	Seat crush ~80 mm; Seat back crush ~60 mm
Rear	Seat crush ~165 mm; Seat back crush ~70 mm

GLAZING DAMAGE

Windshield	Left 1/3 of windshield cracked
Window	Struck side windows shattered on impact

PILLAR PERFORMANCE:

None noted

SILL SEPARATION

None noted

DOOR LOCK INFORMATION

Test vehicle was not equipped with Automatic Door Locks.

LEFT FRONT DOOR	Unlocked	RIGHT FRONT DOOR	Unlocked
LEFT REAR DOOR	Unlocked	RIGHT REAR DOOR	Unlocked

AIRBAG DEPLOYMENT STATUS:

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

OTHER NOTABLE IMPACT EFFECTS:

None

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET 5**SID H3 INSTRUMENTATION DATA**

	Front Dummy Accelerations SID H3/056				Rear Dummy Accelerations SID H3/058			
	Max		Min		Max		Min	
	G's	msec	G's	msec	G's	msec	G's	msec
HEAD ACCELERATIONS								
Longitudinal (X)	5.5	40.5	-25.0	86.9	6.2	52.5	-18.3	73.8
Lateral (Y)	17.3	54.5	-5.9	184.6	109.9	54.4	-7.5	45.1
Vertical (Z)	35.2	54.3	-1.1	25.9	*	*	*	*
Resultant (R)	43.4	55.7			110.1*	54.4*		
HIC36	168.9				*			
RIB ACCELERATIONS								
Upper Rib Lateral (Y)	57.3	18.1	-8.1	88.8	52.3	40.0	-6.2	119.4
Upper Rib Lateral (Y _R)	58.1	18.1	-8.1	89.4	50.9	40.0	-6.1	119.4
Lower Rib Lateral (Y)	61.8	19.4	-10.2	95.6	63.6	38.8	-7.5	102.5
Lower Rib Lateral (Y _R)	62.5	18.8	-10.5	95.6	61.4	38.8	-7.2	102.5
SPINE ACCELERATIONS								
Lower Lateral (Y)	78.2	34.4	-10.5	72.5	57.7	46.3	-5.7	97.5
Lower Lateral (Y _R)	76.8	34.4	-10.4	72.5	57.0	45.6	-5.4	105.0
PELVIS ACCELERATIONS								
Lateral (Y)	101.9	30.6	-18.1	55.6	76.0	38.1	-13.8	78.8
Lateral (Y _R)	101.8	30.6	-18.0	55.6	75.7	38.1	-13.9	78.8

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

* Passenger head Z acceleration channel failed.

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

	Front Dummy SID H3/056				Rear Dummy SID H3/058			
	Max		Min		Max		Min	
	N	msec	N	msec	N	msec	N	msec
NECK FORCES								
Longitudinal (X)	134.2	199.7	-874.4	55.8	421.8	62.6	-501.6	106.8
Lateral (Y)	474.4	52.6	-242.4	185.2	15.0	199.9	-1089.2	62.6
Vertical (Z)	1273.4	55.0	-3.7	1.0	482.8	44.3	-1838.1	59.0
NECK MOMENTS								
	Nm	msec	Nm	msec	Nm	msec	Nm	msec
Lateral Bending (X)	37.1	65.9	-22.3	28.8	5.4	182.8	-136.0	55.8
Flexion/Extension (Y)	42.1	81.9	-44.8	54.2	30.4	128.0	-9.8	51.9
Rotation (Z)	26.8	80.6	-17.0	49.7	7.2	77.2	-10.6	57.7

REFERENCE:

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

Force

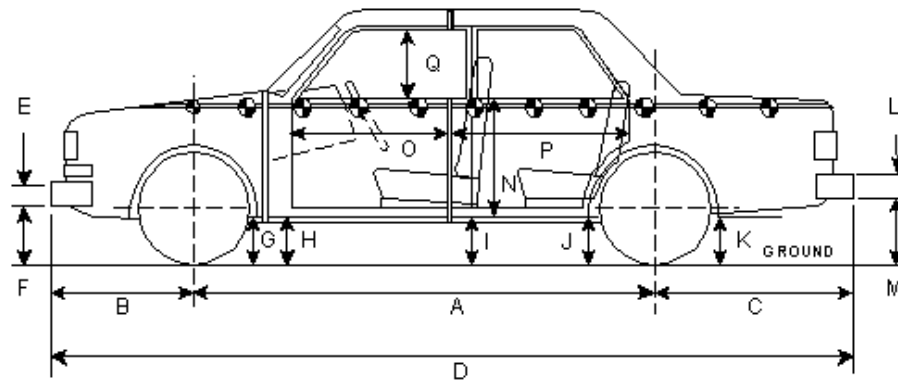
Fx positive response: Head rearward, chest forward
 Fy positive response: Head leftward, chest rightward
 Fz positive response: Head upward, chest downward

Moment

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

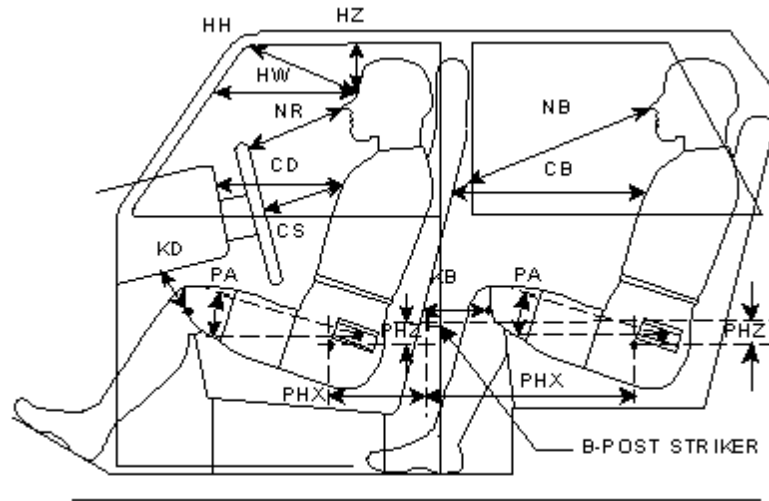
Neck forces have been filtered at SAE Class 1000

Neck moments have been filtered at SAE Class 600

DATA SHEET 6**VEHICLE PRE- AND POST- MEASUREMENTS**

LEFT SIDE VIEW

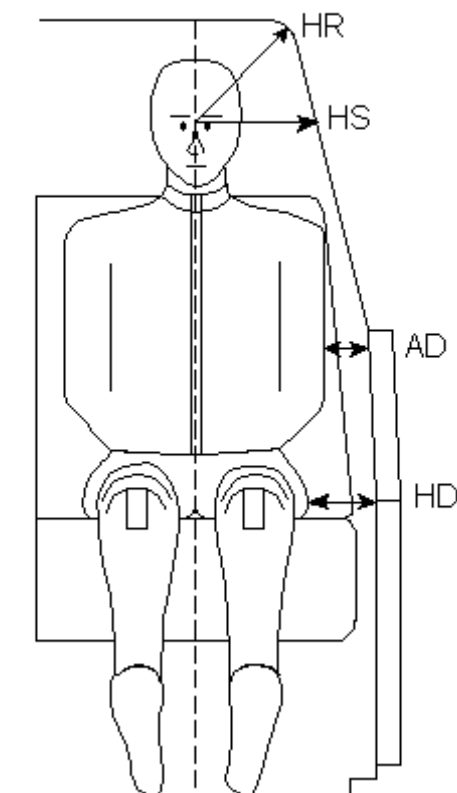
	PRE-TEST As delivered (mm)	PRE-TEST As Tested (mm)	POST-TEST (mm)	Δ CHANGE (mm)
A	2699	-	2639	-60
B	752	-	749	-3
C	918	-	920	2
D	4727	-	4714	-13
E	224	-	224	0
F	271	270	301	31
G	281	260	236	-24
H	536	238	302	64
I	280	250	290	40
J1	205	168	159	-9
J2	295	256	247	-9
K	297	249	252	3
L	242	-	242	0
M	346	294	302	8
N	643	-	565	-78
O	1100	-	1055	-45
P	870	-	763	-107
Q	444	-	432	-12
R	4369	-	4384	15
S	4369	-	4308	-61
T	1782	-	1443	-339

DATA SHEET 7**SID H3 LONGITUDINAL CLEARANCE DIMENSIONS****LEFT SIDE VIEW**

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

	DRIVER ID# SID H3/056	LEFT REAR PASSENGER ID# SID H3/058
HH	366	N/A
HW	584	N/A
HZ	173	174
NR/NB	475	609
CD/CB	556	540
CS	336	N/A
KDL(KDA°)/KBL(KDA°)	170/27	230/15.4
KDR(KDA°)/KBR(KDA°)	156/24.3	225/20.8
PA°	23.1	23.2
PHX	227	261
PHZ	-160	-310

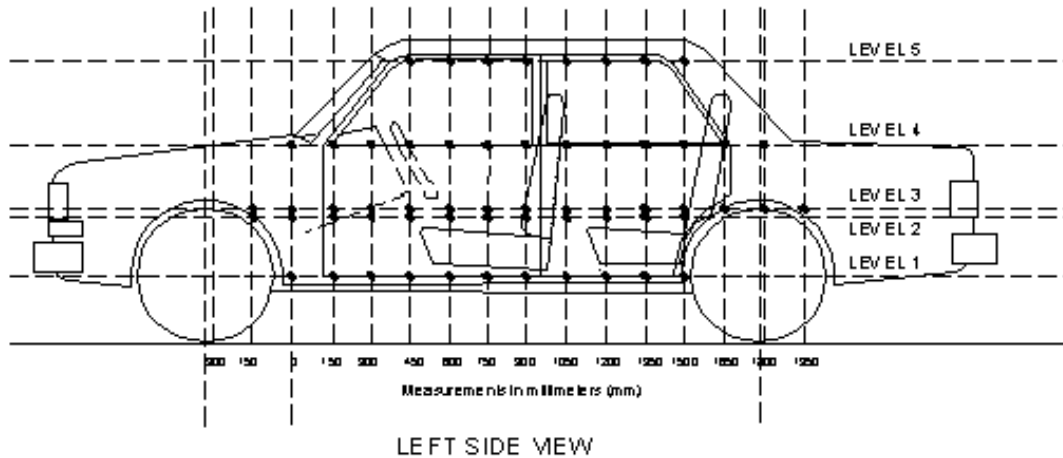
PHX and PHZ measurements use the front door striker as reference for the front occupant and the rear door striker for the rear occupant

DATASHEET 8**SID H3 LATERAL CLEARANCE DIMENSIONS**

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

	DRIVER ID# SID H3/056	LEFT REAR PASSENGER ID# SID H3/058
HR	199	204
HS	322	330
AD	Upper 131 Lower 160	Upper 115 Lower 143
HD	171	125

DATA SHEET 9
VEHICLE SIDE MEASUREMENTS



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

MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE “AS TESTED” CONFIGURATION
 Measurements along the Vertical 750 mm line as shown

Level 5 @ Window Top	1302 mm
Level 4 @ Window Sill	881 mm
Level 3 @ Mid-Door	582 mm
Level 2 @ Occupant H-Point	476 mm
Level 1 @ Axle Centerline or Sill Top Height	265 mm

DATA SHEET 10

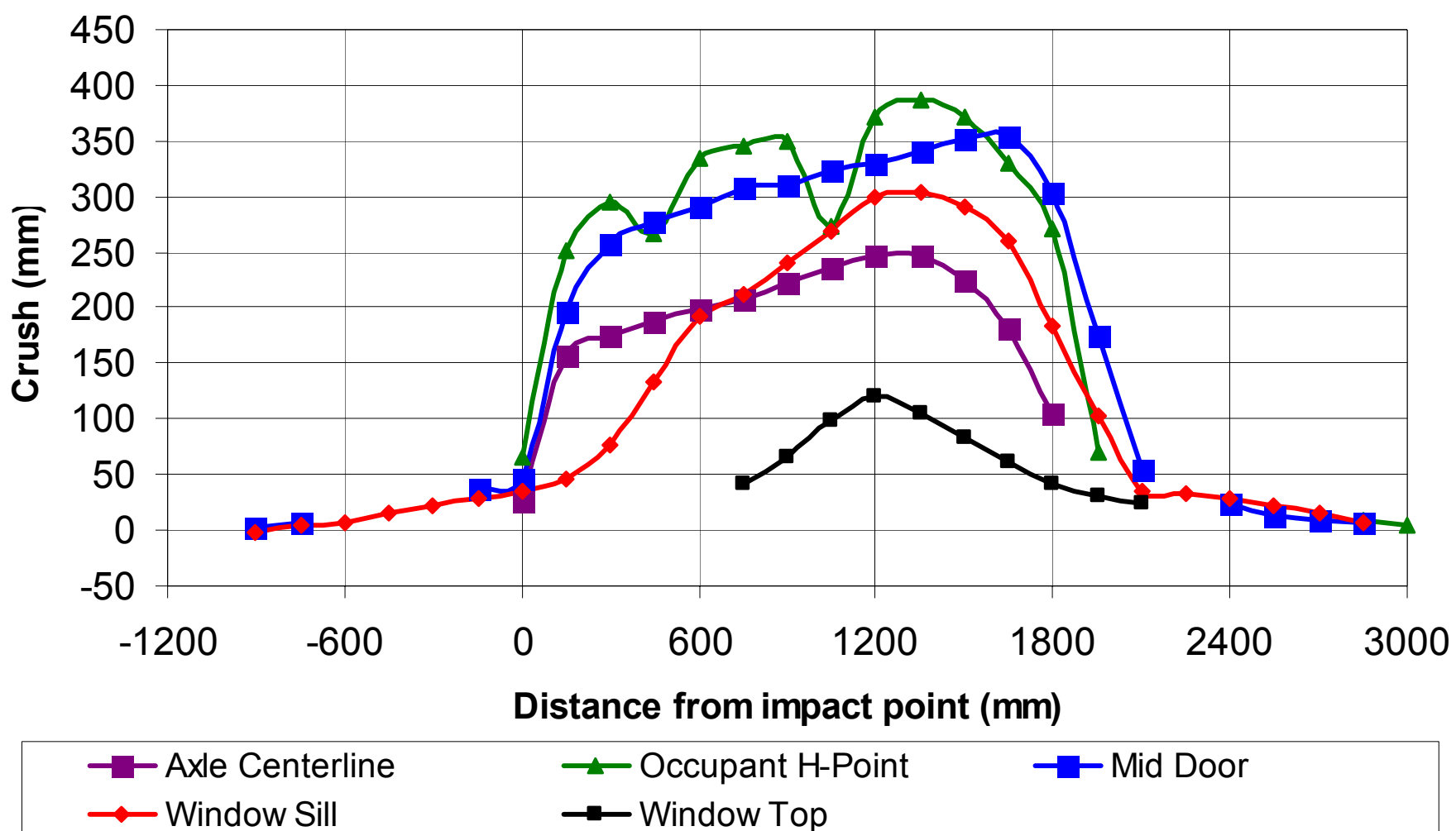
VEHICLE EXTERIOR CRUSH PROFILES – ALL LEVELS

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

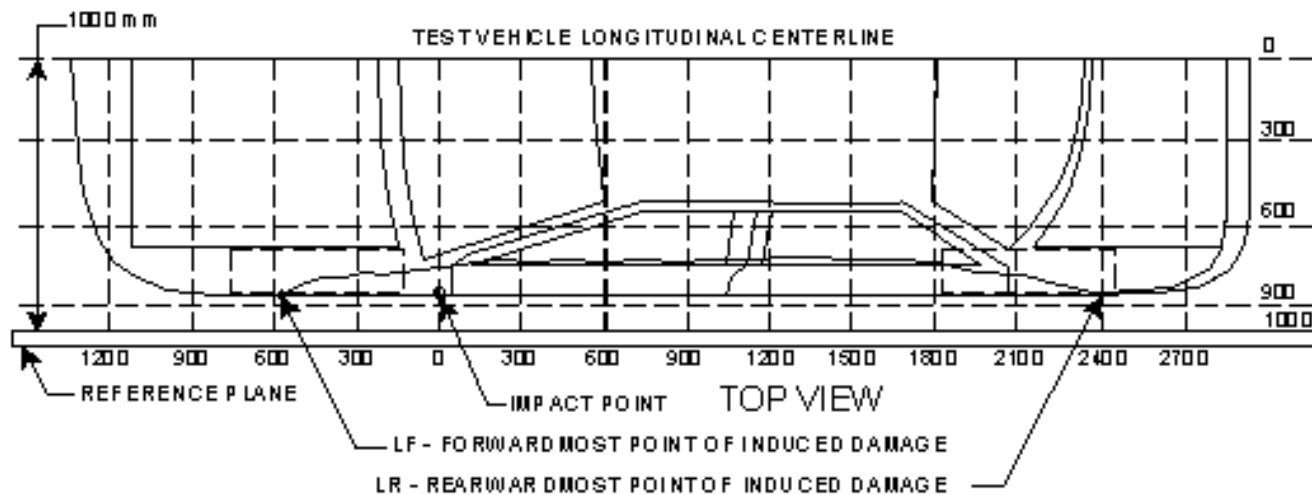
			DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT																											
HEIGHT			-900	-750	-600	-450	-300	-150	0	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700	2850	3000	
LEVEL 1	265	PRE							225	227	227	227	227	227	226	227	227	227	227	227	228									
		POST							252	385	402	415	426	435	450	463	475	475	452	409	333									
		CRUSH							27	158	175	188	199	208	224	236	248	248	225	182	105									
LEVEL 2	476	PRE							174	179	182	182	184	185	186	184	184	183	183	182	181	192						207	226	
		POST							239	430	476	449	518	530	536	457	555	570	555	513	453	262					217	231		
		CRUSH							65	251	294	267	334	345	350	273	371	387	372	331	272	70					10	5		
LEVEL 3	582	PRE	227	203				176	183	186	186	186	186	186	186	185	185	185	185	185	185	184	181		181	200	214	233		
		POST	229	210				214	229	382	443	463	476	493	496	509	514	525	537	538	488	359	236		205	213	224	240		
		CRUSH	2	7				38	46	196	257	277	290	307	310	324	329	340	352	353	303	175	55		24	13	10	7		
LEVEL 4	881	PRE	325	315	309	300	295	290	285	275	270	265	261	257	255	255	257	259	263	268	275	281	293	309	323	344	362	377		
		POST	323	319	316	315	316	318	320	320	346	399	454	470	495	523	556	563	554	527	459	383	328	342	352	367	377	384		
		CRUSH	-2	4	7	15	21	28	35	45	76	134	193	213	240	268	299	304	291	259	184	102	35	33	29	23	15	7		
LEVEL 5	1302	PRE												494	505	509	512	513	513	511	510	506	499							
		POST												536	570	607	632	617	596	573	551	537	5230							
		CRUSH												42	65	98	120	104	83	62	41	31	24							

DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES ALL LEVELS



DATA SHEET 11 VEHICLE DAMAGE PROFILE DISTANCES



DPD MEASUREMENTS (mm)		POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1	1	214	214	0
2	2	485	214	271
3	3	533	212	321
4	4	559	210	349
5	5	474	210	264
6	6	209	209	0

DATA SHEET 12

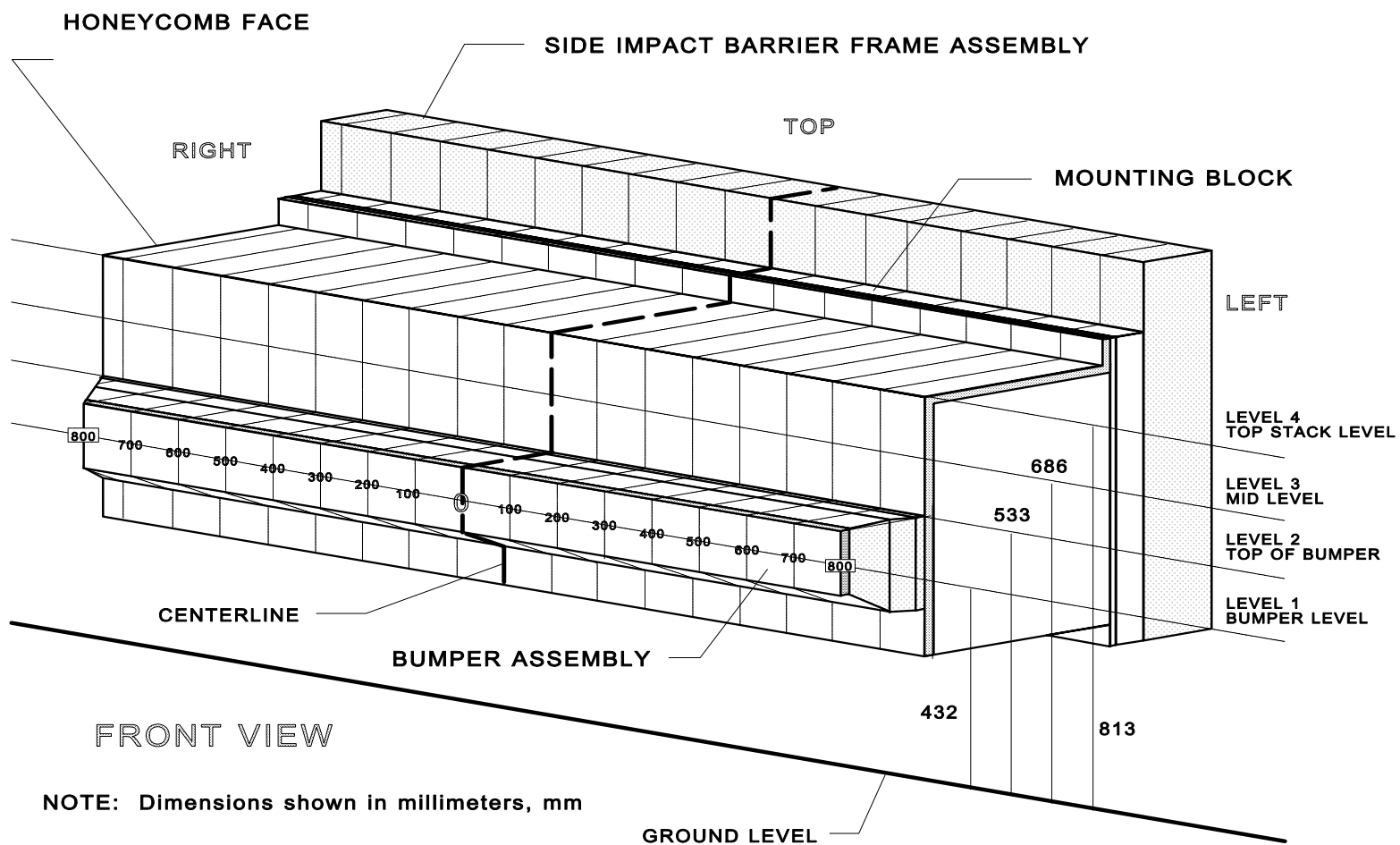
STATIC CRUSH OF IMPACTOR FACE
(Grid as looking at MDB from front)

Note: All Dimensions are in millimeters with a tolerance of ± 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-	526	527	527	527	528	528	529	529	529	530	530	531	531	531	532	533	533
		POST-	618	554	530	521	523	539	536	536	536	541	544	546	551	572	614	549	707
		CRUSH	92	27	3	-6	-5	11	7	7	7	11	14	15	20	41	82	16	174
LEVEL 3 MID- LEVEL	685	PRE-	524	525	526	526	526	527	527	527	527	527	528	529	529	530	530	530	531
		POST-	587	536	531	532	531	533	541	539	537	538	541	546	549	555	567	596	665
		CRUSH	63	11	5	6	5	6	14	12	10	11	13	17	20	25	37	66	134
LEVEL 2 TOP BUMPER	560	PRE-	523	523	524	524	524	525	525	525	526	526	527	527	527	528	528	529	529
		POST-	598	561	558	551	549	550	549	550	556	556	554	555	572	575	585	600	623
		CRUSH	75	38	34	27	25	25	24	25	30	30	27	28	45	47	57	71	94
LEVEL 1 MID- BUMPER	432	PRE-	431	420	420	421	421	421	422	422	422	422	422	423	423	423	424	425	435
		POST-	619	559	510	483	477	479	476	477	478	482	486	488	492	496	510	530	559
		CRUSH	188	139	90	62	56	58	54	55	56	60	64	65	69	73	86	105	124

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

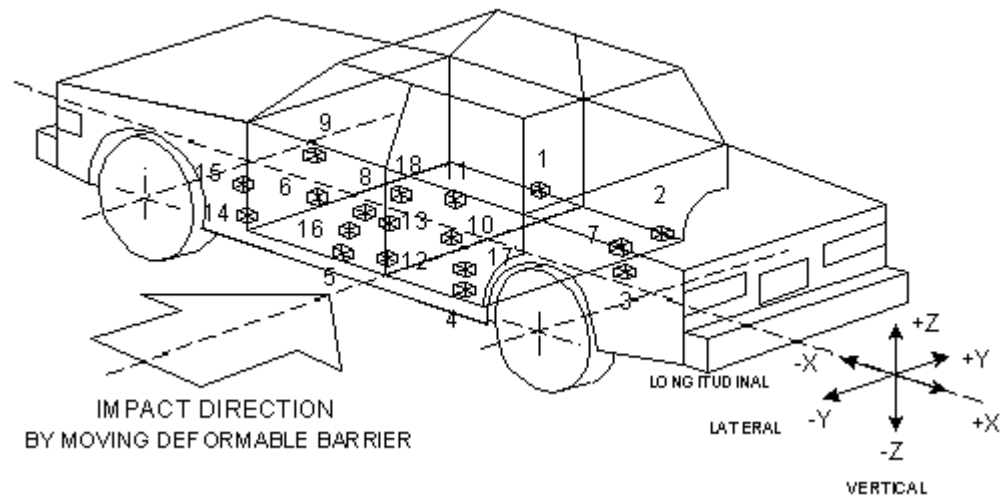
DATA SHEET 12 (continued)
STATIC CRUSH OF IMPACTOR FACE



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

DATA SHEET 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY



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

DATASHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND SUMMARY DATA

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	2880	642	392	4.0	60.8	-4.3	16.2	19.3	36.1	-2.5	66.6	5.2	43.8	-5.9	19.6	19.4	35.9
2	Right Side Sill at Rear Seat	1883	652	371	3.2	61.0	-9.0	16.1	22.9	35.8	-2.8	98.8	2.9	84.1	-4.5	22.1	23.3	35.6
3	Rear Floorpan Above Axle	1001	-5	96	3.6	54.6	-5.8	14.6	20.0	34.2	-2.5	110.6	7.1	37.1	-3.9	56.7	20.5	36.1
4	Left Side Sill at Rear Seat	1799	-713	396					35.3	16.3	-13.2	52.3						
5	Left Side Sill at Front Seat	2880	-709	418					44.7	16.1	-5.7	71.7						
6	Left Front Door on Centerline	2641	-767	161					282.8	6.9	-149.3	10.9						
7	Right Rear Occupant Compartment	1875	323	281					21.9	35.1	-1.8	98.8						
8	Midrear of Left Front Door	2654	-760	76					202.0	8.8	-70.0	14.5						
9	Left Front Door Upper Centerline	2643	-771	-116					174.5	11.7	-77.0	27.7						
10	Midrear of Left Rear Door	1560	-762	-40					88.4	3.5	-38.3	15.1						

Axis Origin

X – Point L

Y – Point L

Z – Point L

Axis Orientation

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

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

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

DATASHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND SUMMARY DATA

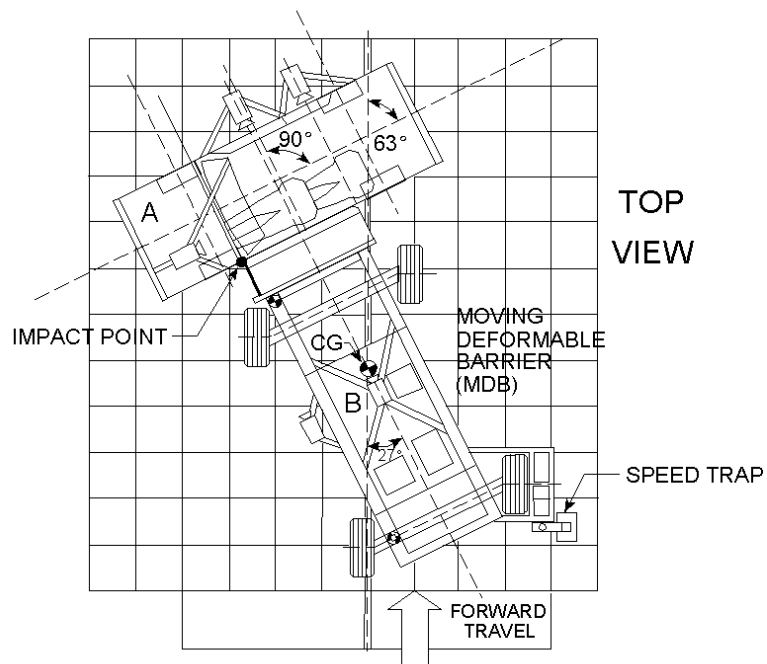
Location		Coordinates			Longitudinal (X)				Lateral (Y)				Vertical (Z)				Resultant	
		X	Y	Z	Max		Min		Max		Min		Max		Min		Max	
		mm	mm	mm	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec
11	Left Rear Door Upper Centerline	1721	-748	-80					165.2	7.2	-91.0	27.4						
12	Left Lower B-Pillar	2161	-720	55					174.4†	6.5†	-82.0 †	14.9†						
13	Left Middle B-Pillar	2146	-721	-203					129.0	7.3	-46.4	15.9						
14	Left Lower A-Pillar	3196	-713	147					153.4	4.3	-44.3	15.3						
15	Left Middle A-Pillar	3167	-775	-149					16.9	10.6	-1.3	166.3						
16	Front Seat Track	2588	-640	265					102.9	19.1	28.2	9.5						
17	Rear Seat Track	1870	-297	271					25.4	21.3	-4.3	15.4						
18	Vehicle CG	2647	-3	266	2.3	24.9	-8.1	32.9	22.7	16.0	-2.0	128.2	12.9	43.1	-13.5	18.8	24.6	16.4

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

† Lower B-Pillar accelerometer wire was broken ~15 milliseconds after impact

DATA SHEET 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY



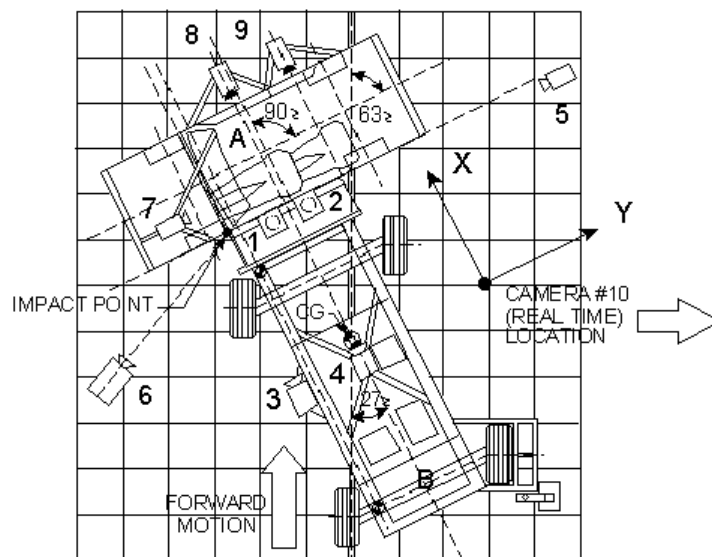
Location		Coordinates			Longitudinal (X)				Lateral (Y)				Vertical (Z)				Resultant	
		X mm	Y mm	Z mm	Max		Min		Max		Min		Max		Min		Max	
					G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec
1	MDB Center of Gravity	1113	-1	311	2.5	125.8	-20.7	31.6	3.3	60.6	-7.2	40.6	10.6	55.1	-9.5	42.2	22.9	31.5
2	MDB Rear Frame Member	2812	-614	585	2.2	100.6	-20.3	38.8	5.4	38.6	-3.2	58.4						

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

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

DATA SHEET 15

HIGH-SPEED CAMERA LOCATIONS AND DATA SUMMARY



Camera No.	View	Coordinates (mm)*			Angle wrt Horiz.	Lens (mm)	Film Speed (fps)
		X	Y	Z			
1	Overhead view of test vehicle	150	992	4663	-90	10	1000
2	Overhead close-up view of impact plane	30	305	4669	-90	13	1000
3	MDB onboard close-up view of impact point	-2333	-60	-38	0	35	1000
4	MDB onboard view of driver dummy	-2262	840	740	-5	13	1000
5	Right side ground level overall view	10195	670	542	-5	62	1000
6	Left side ground level overall view	7994	-870	682	-10	25	1000
7	Test vehicle onboard driver front view	3710	-452	-549	-15	12.5	1000
8	Test vehicle onboard driver side view	2451	809	-464	-5	10	1000
9	Test vehicle onboard passenger side view	1626	792	-516	-5	10	1000
10	Real-time film coverage of test	-	-	-	-	-	-

* Reference: Middle of rear bumper on test vehicle (Point L)

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

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

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

SECTION 5
FUEL SYSTEM INTEGRITY

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

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

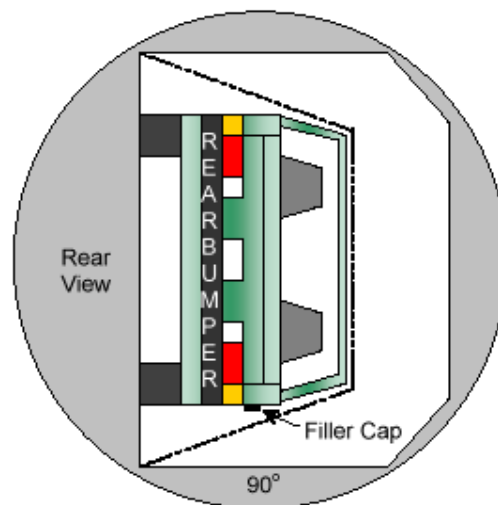
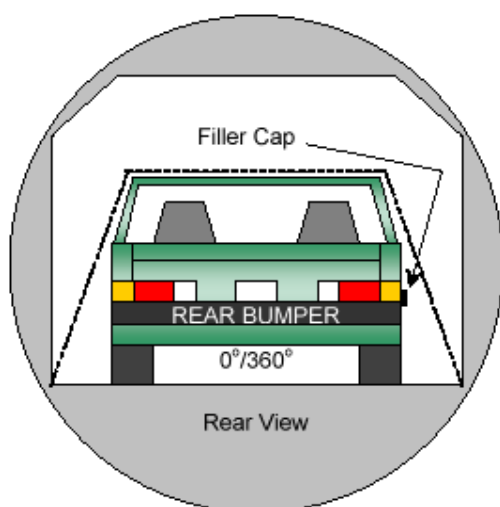
TEST VEHICLE IMPACT TYPE: Side impacting Moving Deformable Barrier contacting the driver side.

FUEL SPILLAGE MEASUREMENT:

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

FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17
ROLLOVER DATA



0° TO 90°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	1	minutes	4	seconds
(Spec Range =1 to 3 minutes)				
FMVSS 301 Position Hold Time	5	minutes	2	seconds
TOTAL	6	minutes	6	seconds
Next whole minute interval	7	minutes		

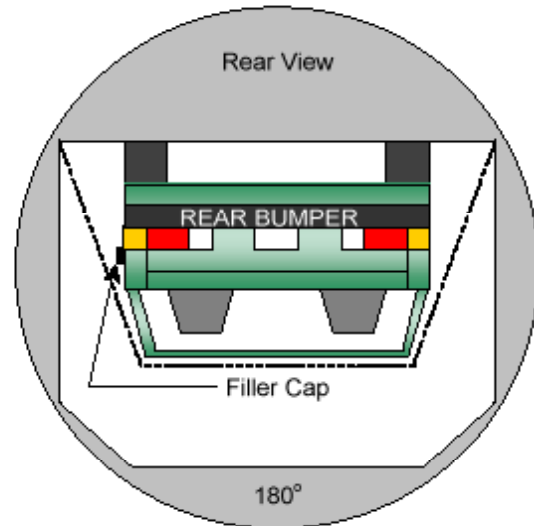
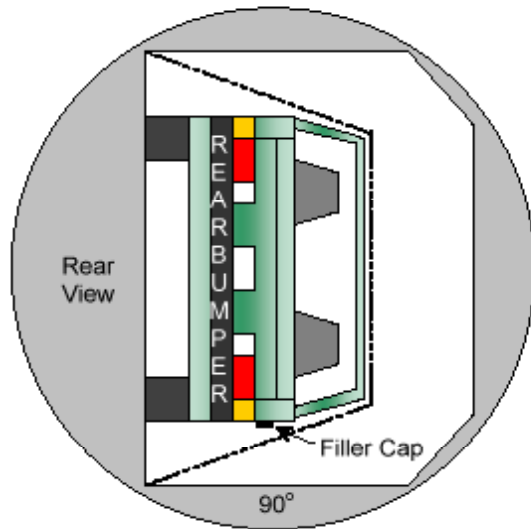
FUEL SPILLAGE MEASUREMENT:

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

FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE



90° TO 180°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	<u>1</u>	minutes	<u>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		

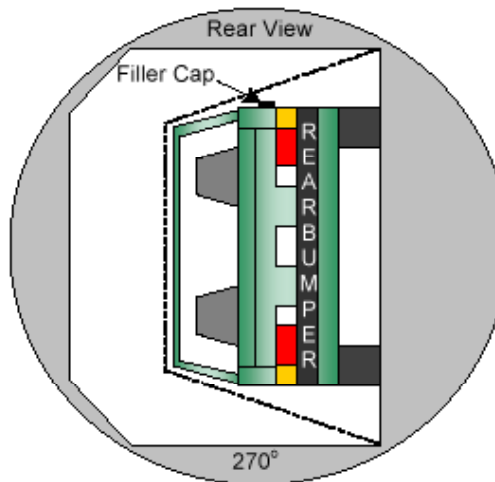
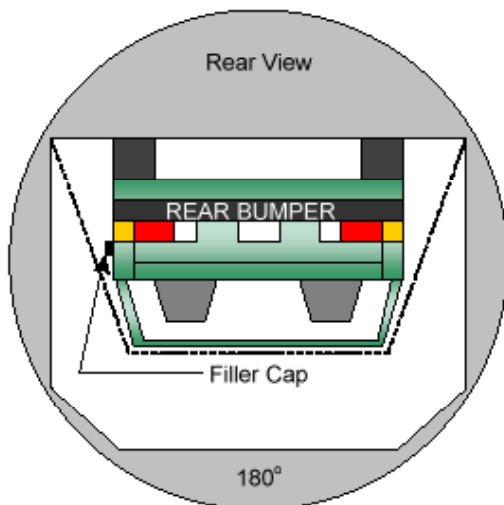
FUEL SPILLAGE MEASUREMENT:

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

FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE



180° TO 270°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

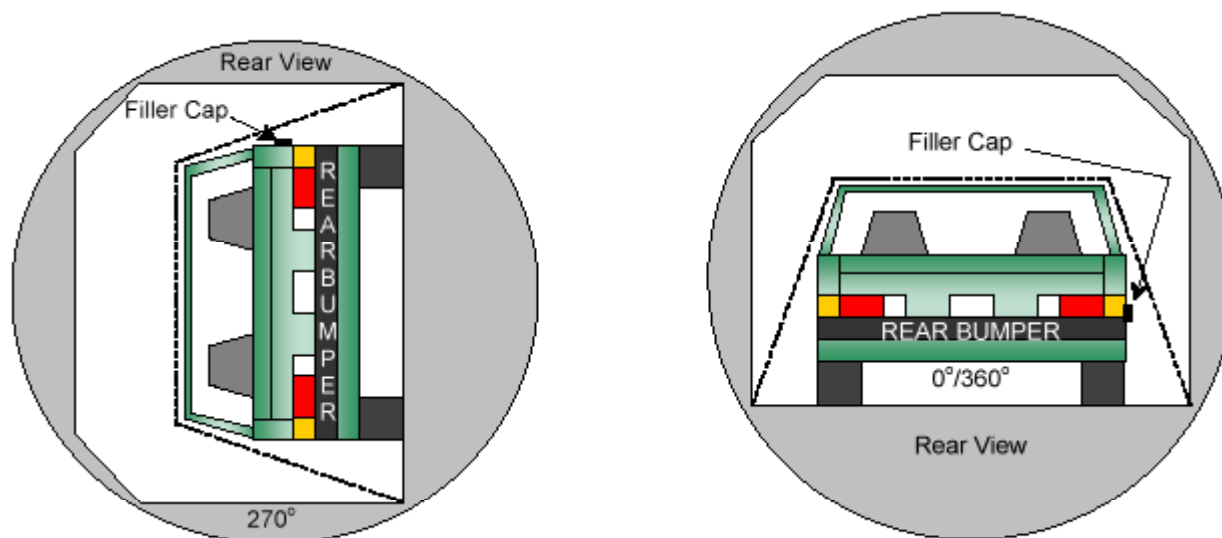
FUEL SPILLAGE MEASUREMENT:

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

FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE



270° TO 360°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FUEL SPILLAGE MEASUREMENT:

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

FUEL SPILLAGE LOCATION(S): None

APPENDIX A
PHOTOGRAPHS

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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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

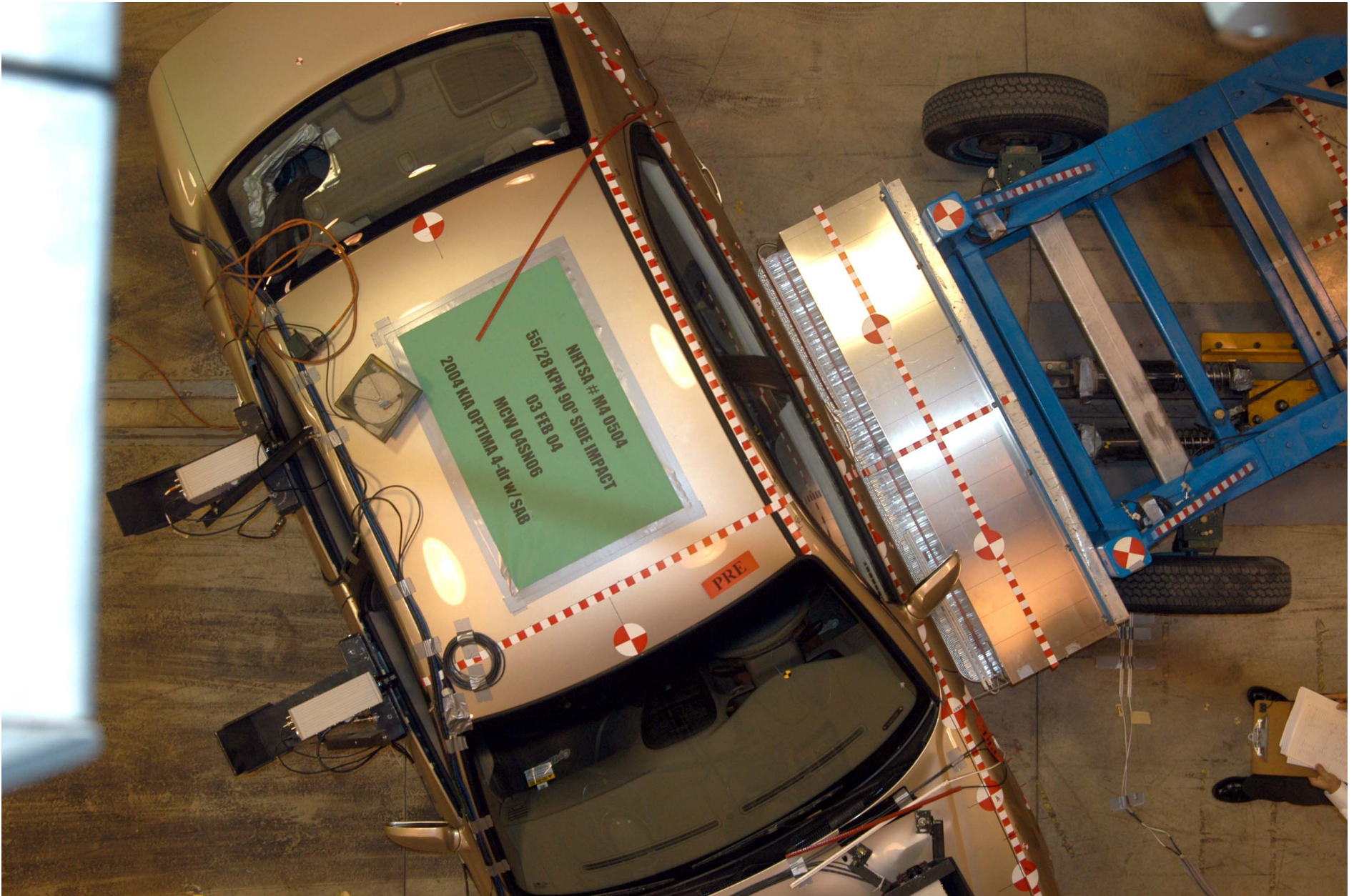


Figure A-35: PRE-TEST OVERHEAD VIEW OF MDB IN IMPACT POSITION



Figure A-36: POST-TEST OVERHEAD VIEW OF MDB

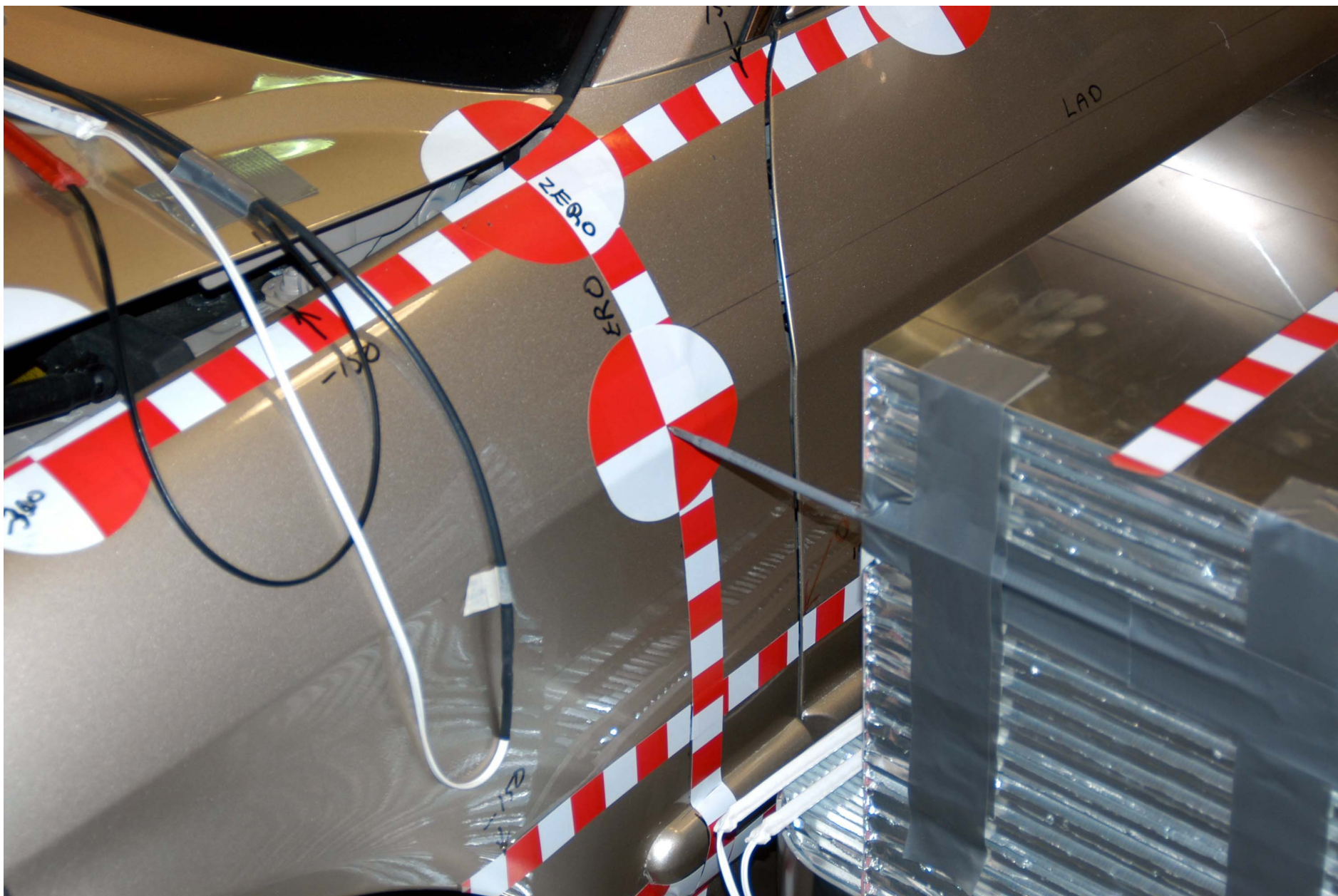


Figure A-37: PRE-TEST CLOSE-UP OF IMPACT POINT TARGET SHOWING WELDING ROD



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

1 RECOMMENDED INFLATION PRESSURE-COLD				
VEHICLE CAPACITY WEIGHT . LBS : 860				
SEATING CAPACITY : TOTAL 5 FRONT 2 REAR 3				
TIRE PRESSURE-COLD.KPA(PSI) :				
TIRE SIZE	LOAD UP TO 2 PERSONS		MAX. VEHICLE WEIGHT LIMIT	
	FRONT	REAR	FRONT	REAR
P205/60 R15, P205/55 R16	210 (30)	210 (30)	230 (33)	230 (33)
T125/70 D15, T125/70 R15	420 (60)	420 (60)	420 (60)	420 (60)

Figure A-39: VEHICLE TIRE PLACARD



Figure A-40: VEHICLE CERTIFICATION LABEL



Figure A-41: IMPACT



Figure A-42: ROLLOVER 0 DEGREES

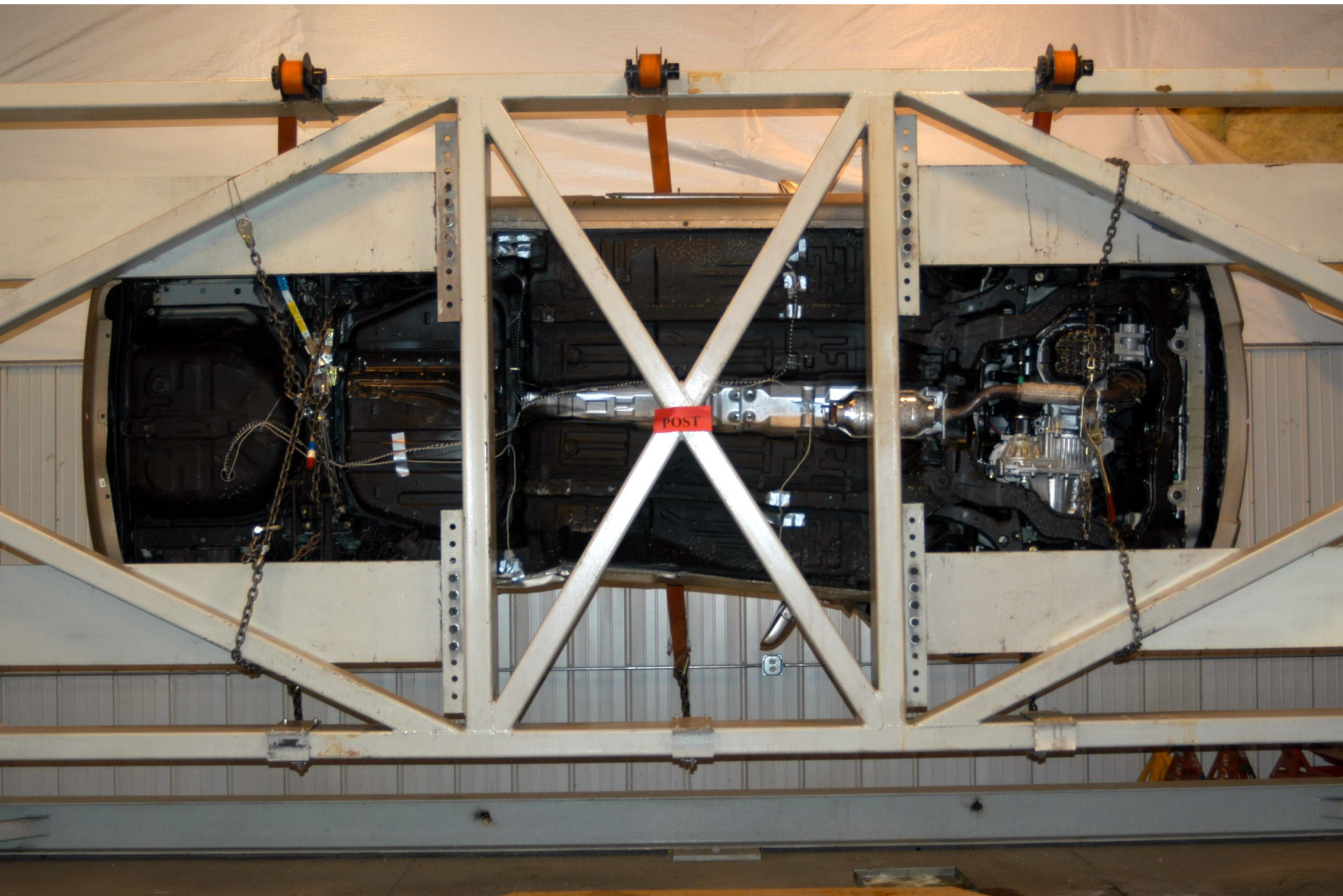


Figure A-43: ROLLOVER 90 DEGREES



Figure A-44: ROLLOVER 180 DEGREES



Figure A-45: ROLLOVER 270 DEGREES



Figure A-46: ROLLOVER 360 DEGREES



Figure A-47: PRE-TEST ALUMINUM BARRIER FRONT



Figure A-48: POST-TEST ALUMINUM BARRIER FRONT



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



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



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



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



Figure A-53: PRE-TEST ALUMINUM BARRIER TOP



Figure A-54: POST-TEST ALUMINUM BARRIER TOP

APPENDIX B

VEHICLE, MDB, AND SID RESPONSE DATA

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 UPPER NECK FORCES – FILTER CLASS 1000; UPPER NECK MOMENTS FILTER CLASS 600
 INTEGRATION DATA FILTER CLASS 180

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6	DRIVER HEAD (Z) VELOCITY	B-11
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9	DRIVER NECK (Y) FORCE	B-14
10	DRIVER NECK (Z) FORCE	B-15
11	DRIVER NECK (X) MOMENT	B-16
12	DRIVER NECK (Y) MOMENT	B-17
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15	DRIVER UPPER RIB (Y) VELOCITY	B-20
16	DRIVER LOWER RIB (Y) ACCELERATION	B-21
17	DRIVER LOWER RIB (Y) VELOCITY	B-22
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DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS

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46	DRIVER PELVIC (Y) ACCELERATION	B-51
47	PASSENGER UPPER RIB (Y) ACCELERATION	B-52
48	PASSENGER LOWER RIB (Y) ACCELERATION	B-53
49	PASSENGER LOWER SPINE (Y) ACCELERATION	B-54
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TEST VEHICLE INSTRUMENTATION PLOTS
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INTEGRATION DATA – FILTER CLASS 180

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56	RIGHT SIDE SILL AT FRONT SEAT (Z) VELOCITY	B-61
57	RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION	B-62
58	RIGHT SIDE SILL AT REAR SEAT (X) ACCELERATION	B-63
59	RIGHT SIDE SILL AT REAR SEAT (X) VELOCITY	B-64
60	RIGHT SIDE SILL AT REAR SEAT (Y) ACCELERATION	B-65
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103	VEHICLE CENTER OF GRAVITY (Y) VELOCITY	B-108
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MDB INSTRUMENTATION PLOTS
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INTEGRATION DATA – FILTER CLASS 180

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111	MDB CENTER OF GRAVITY (Z) ACCELERATION	B-116
112	MDB CENTER OF GRAVITY (Z) VELOCITY	B-117
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116	MDB REAR (X) ACCELERATION	B-121
117	MDB REAR (X) VELOCITY	B-122

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

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
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120	DRIVER LOWER RIB (Y) ACCELERATION-REDUNDANT	B-125
121	DRIVER LOWER RIB (Y) VELOCITY-REDUNDANT	B-126
122	DRIVER LOWER SPINE (Y) ACCELERATION-REDUNDANT	B-127
123	DRIVER LOWER SPINE (Y) VELOCITY-REDUNDANT	B-128
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127	PASSENGER UPPER RIB (Y) VELOCITY-REDUNDANT	B-132
128	PASSENGER LOWER RIB (Y) ACCELERATION-REDUNDANT	B-133
129	PASSENGER LOWER RIB (Y) VELOCITY-REDUNDANT	B-134
130	PASSENGER LOWER SPINE (Y) ACCELERATION-REDUNDANT	B-135
131	PASSENGER LOWER SPINE (Y) VELOCITY-REDUNDANT	B-136
132	PASSENGER PELVIC (Y) ACCELERATION-REDUNDANT	B-137
133	PASSENGER PELVIC (Y) VELOCITY-REDUNDANT	B-138

DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOT (REDUNDANT)
 ACCELERATION DATA – FIR FILTERED

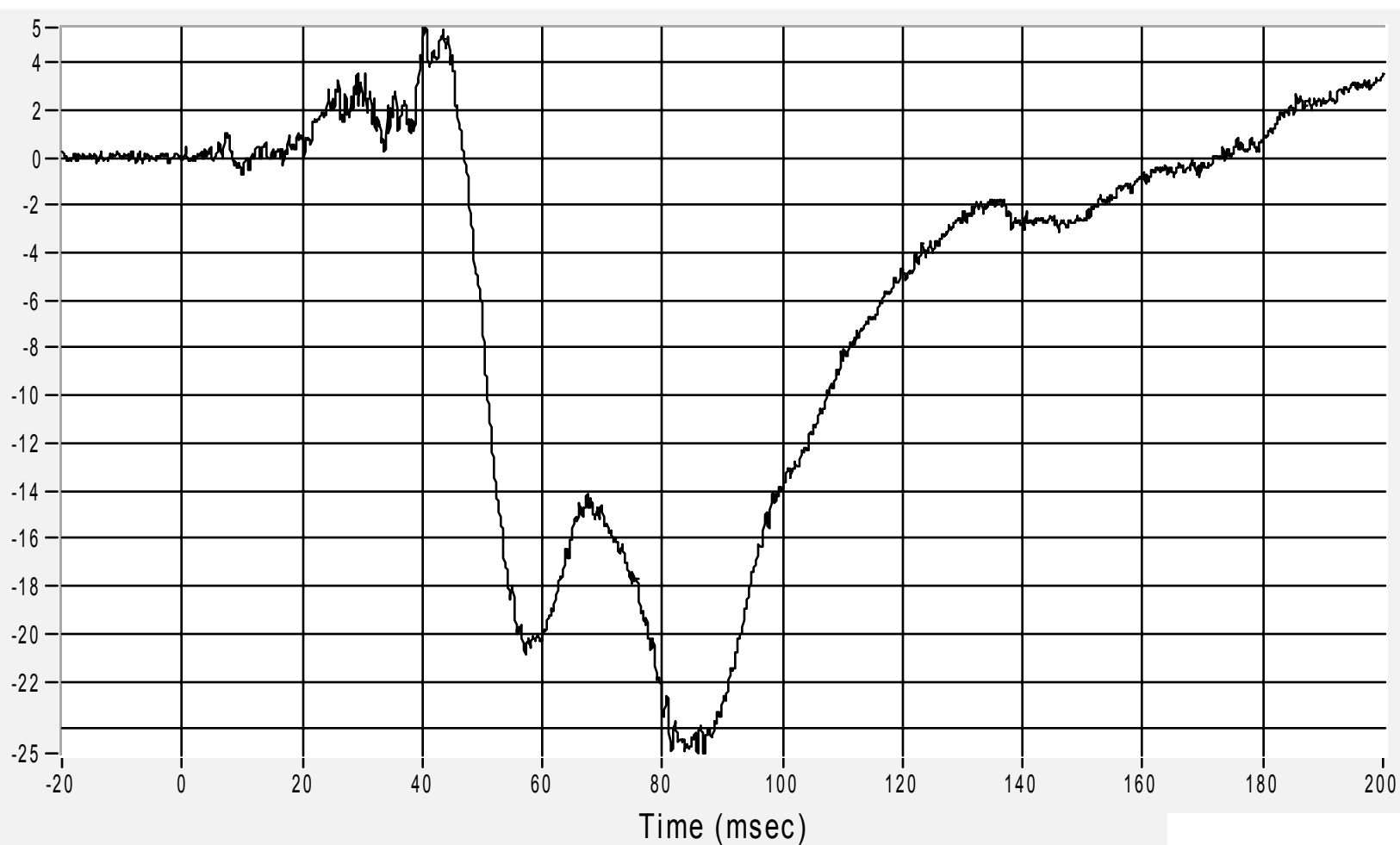
<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
134	DRIVER UPPER RIB (Y) ACCELERATION-REDUNDANT	B-139
135	DRIVER LOWER RIB (Y) ACCELERATION-REDUNDANT	B-140
136	DRIVER LOWER SPINE (Y) ACCELERATION-REDUNDANT	B-141
137	DRIVER PELVIC (Y) ACCELERATION-REDUNDANT	B-142
138	PASSENGER UPPER RIB (Y) ACCELERATION-REDUNDANT	B-143
139	PASSENGER LOWER RIB (Y) ACCELERATION-REDUNDANT	B-144
140	PASSENGER LOWER SPINE (Y) ACCELERATION-REDUNDANT	B-145
141	PASSENGER PELVIC (Y) ACCELERATION-REDUNDANT	B-146

Driver Head CG (X) Acceleration

Acceleration (G's) CFC1000

Max 5.5 G at 40.5 msec

Min -25.0 G at 86.9 msec



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3 February 2004

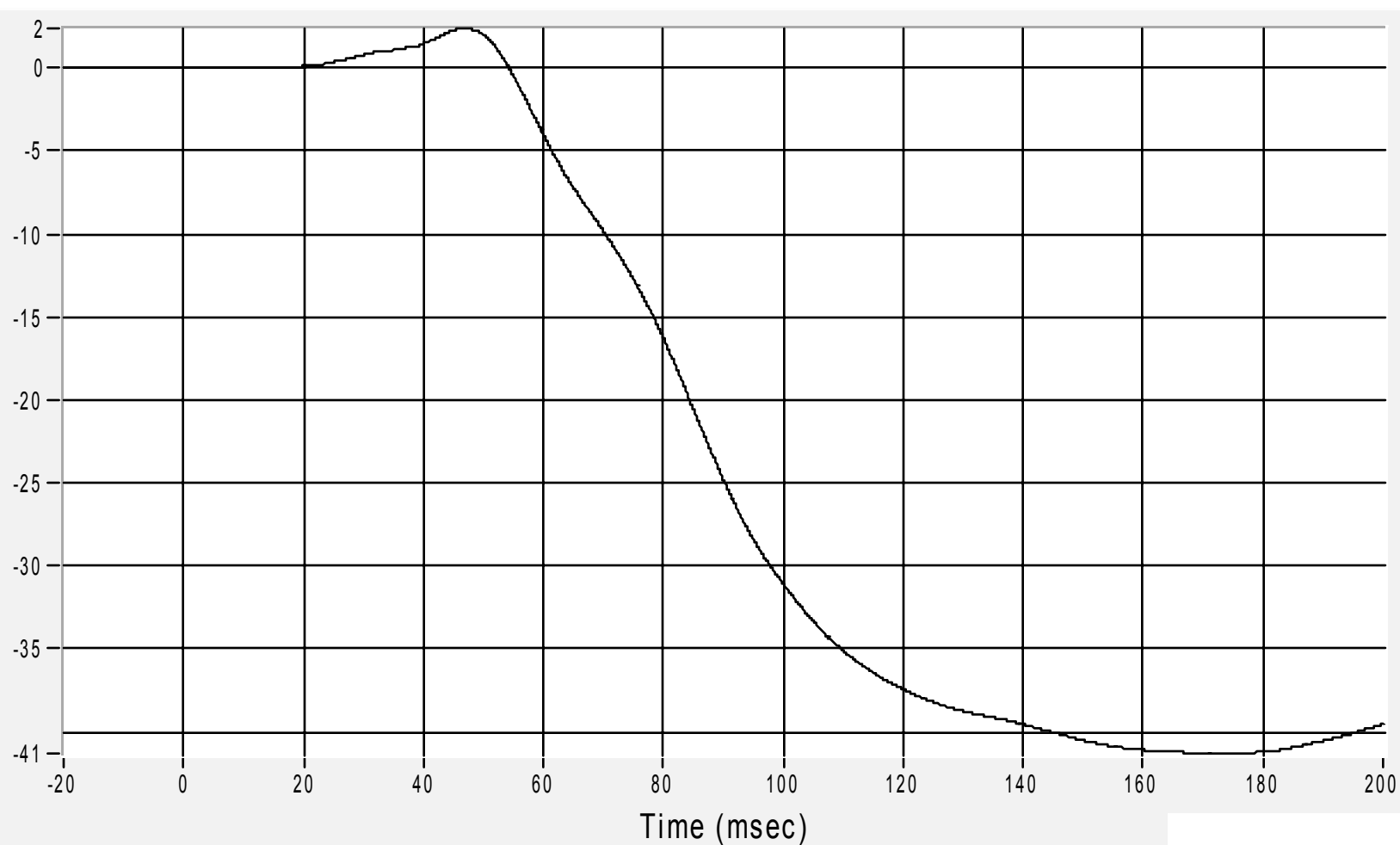
Medical College of Wisconsin
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Driver Head CG (X) Velocity

Velocity (km/h) CFC180

Max 2.4 km/h at 46.9 msec

Min -41.3 km/h at 172.2 msec



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3 February 2004

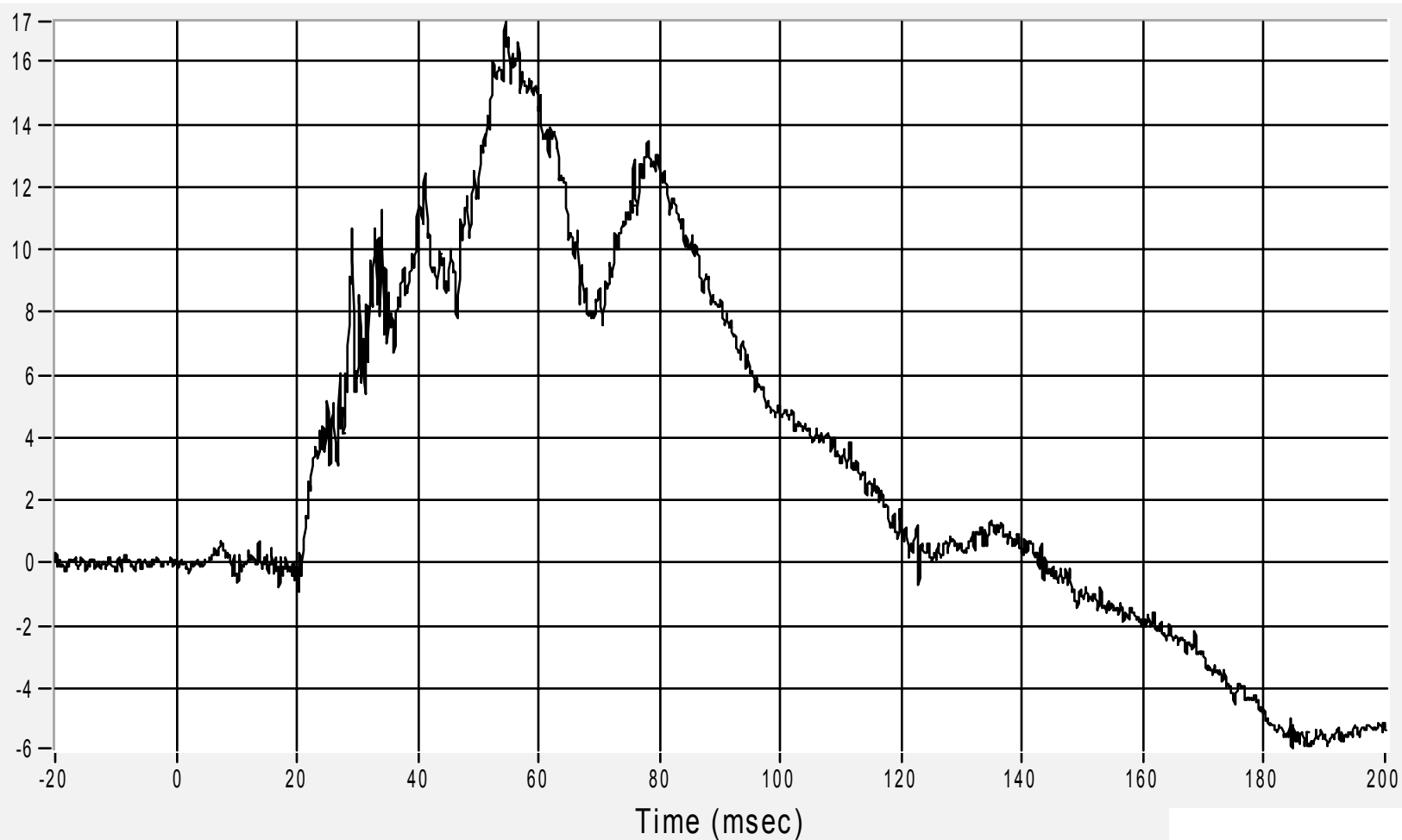
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Head CG (Y) Acceleration

Acceleration (G's) CFC1000

Max 17.3 G at 54.5 msec

Min -5.9 G at 184.6 msec



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3 February 2004

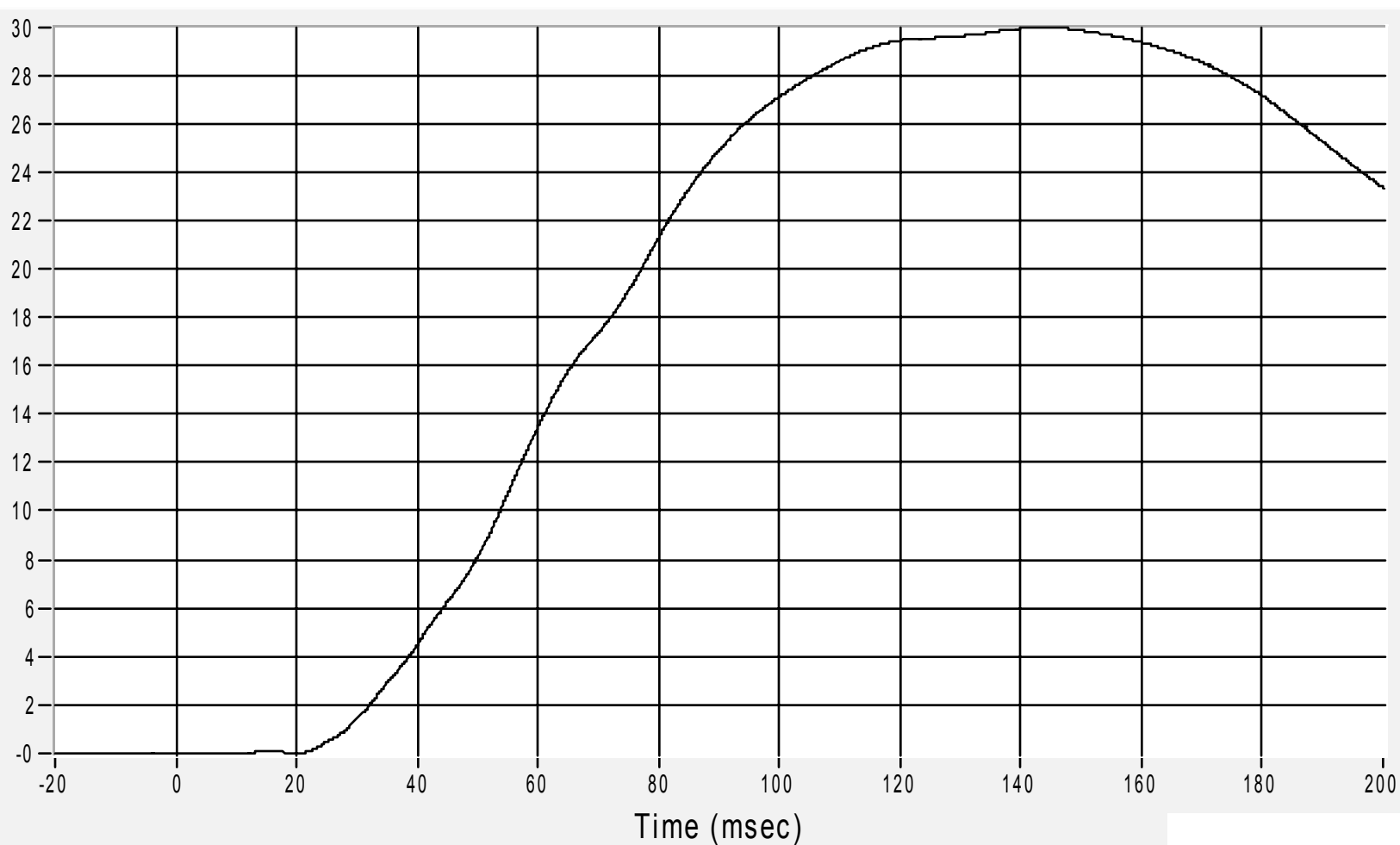
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Head CG (Y) Velocity

Velocity (km/h) CFC180

Max 30.0 km/h at 143.3 msec

Min 0.0 km/h at 3.2 msec



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3 February 2004

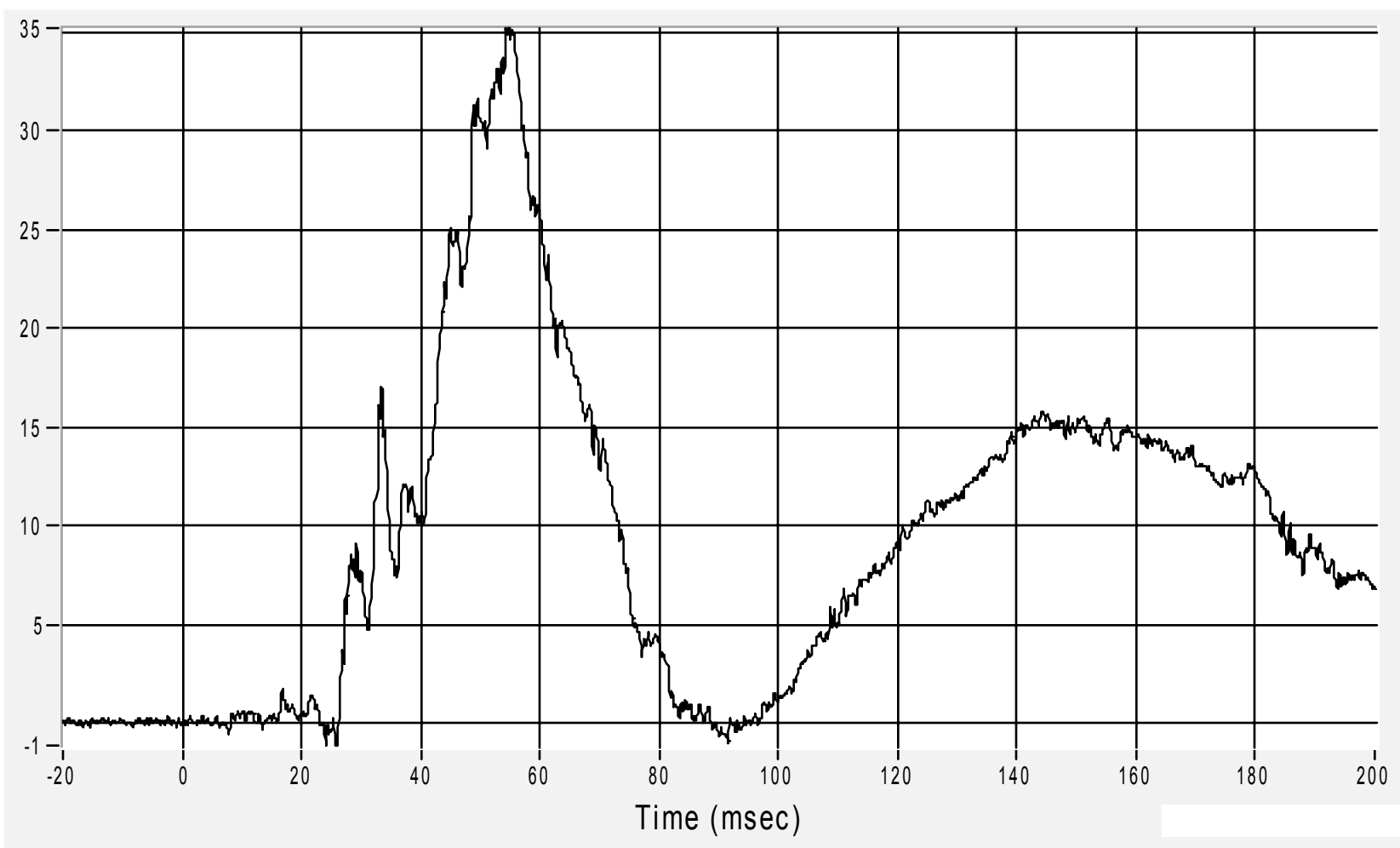
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Driver Head CG (Z) Acceleration

Acceleration (G's) CFC1000

Max 35.2 G at 54.3 msec

Min -1.1 G at 25.9 msec



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3 February 2004

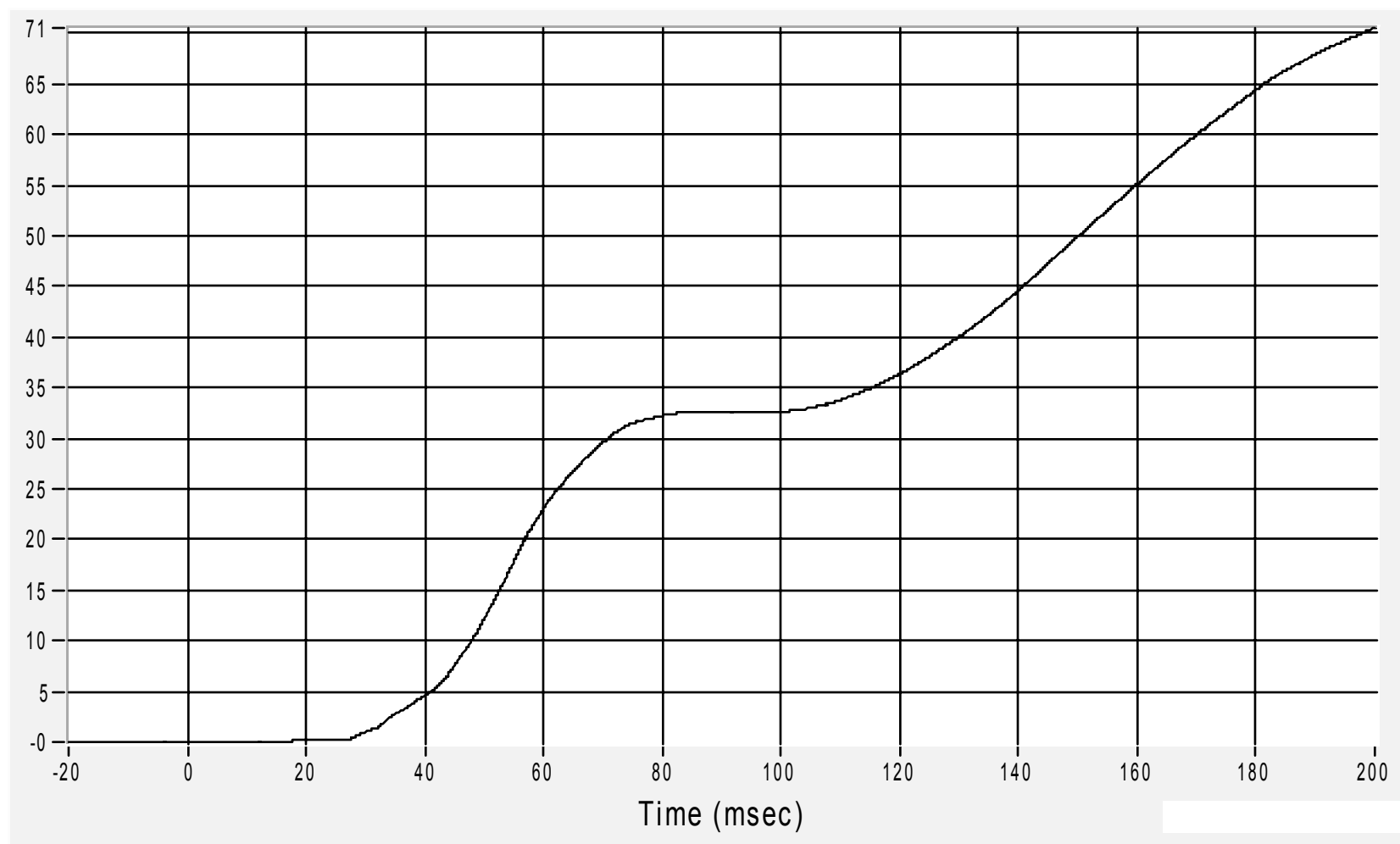
Medical College of Wisconsin
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Driver Head CG (Z) Velocity

Velocity (km/h) CFC180

Max 70.5 km/h at 199.9 msec

Min 0.0 km/h at 8.1 msec



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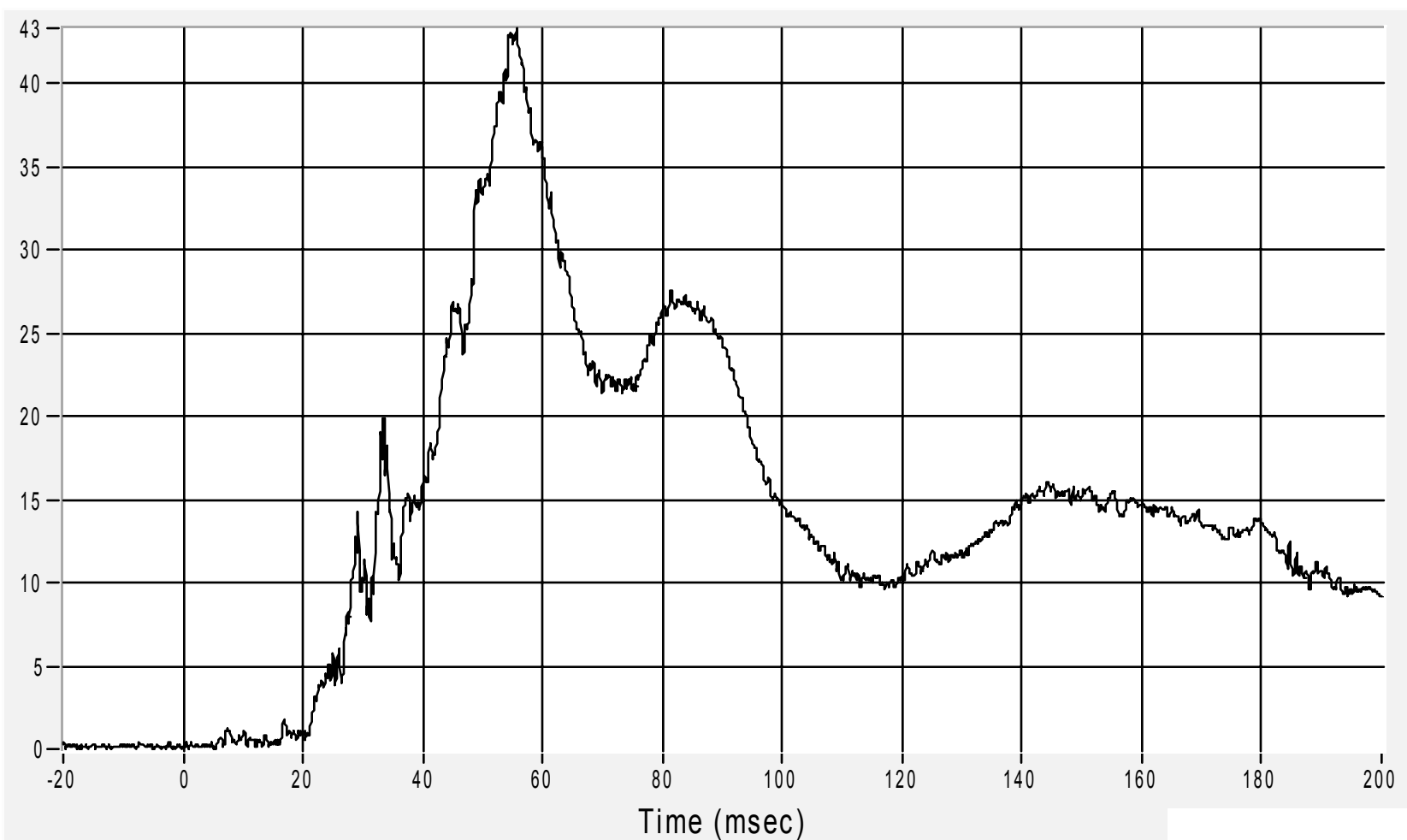
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Driver Head Resultant Acceleration

Acceleration (G's) CFC1000

Max 43.3 G's at 55.7 msec

Min 0.1 G's at 5.0 msec



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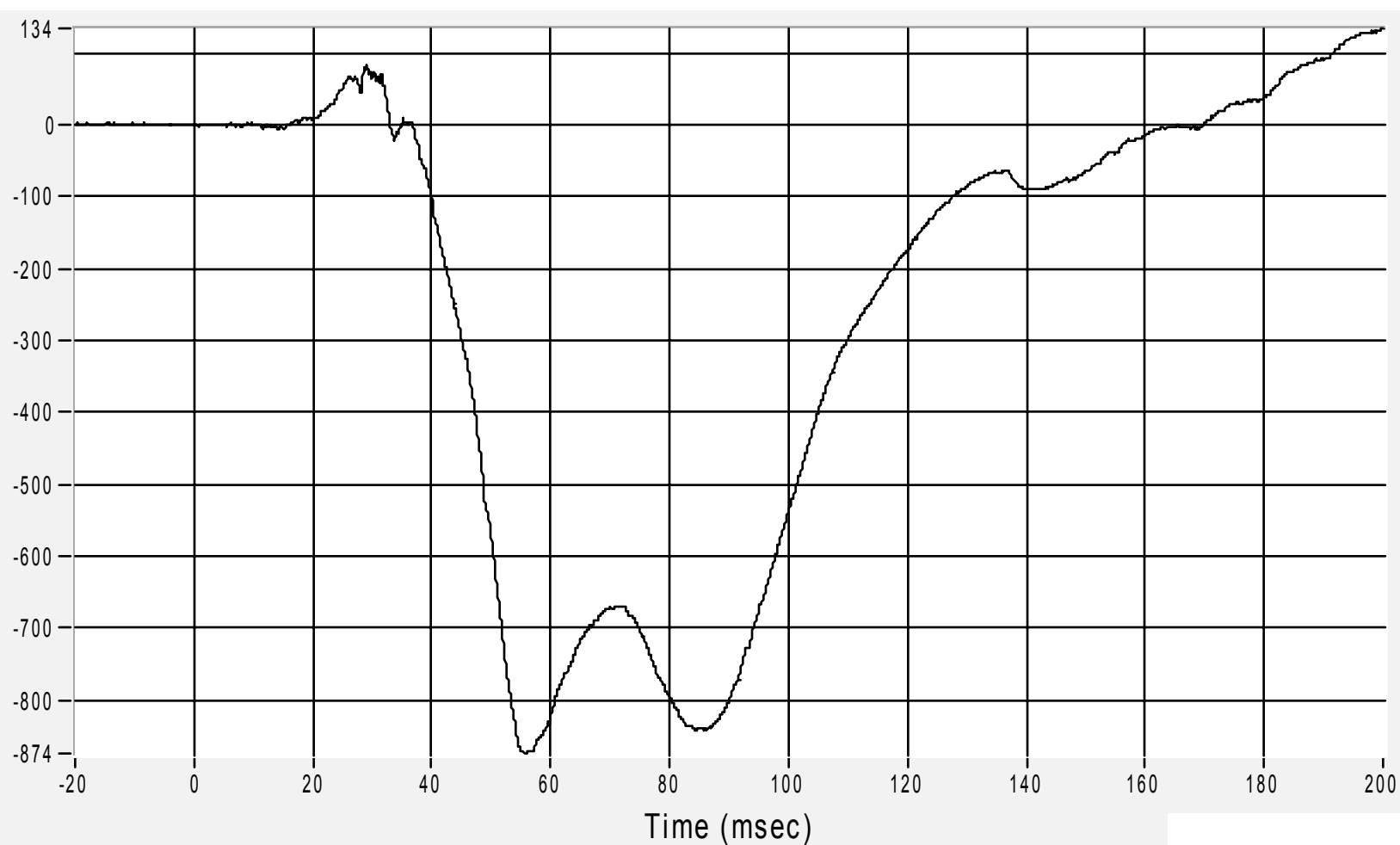
Driver Upper Neck (X) Force

Force (N)

CFC1000

Max 134.2 N at 199.7 msec

Min -874.4 N at 55.8 msec



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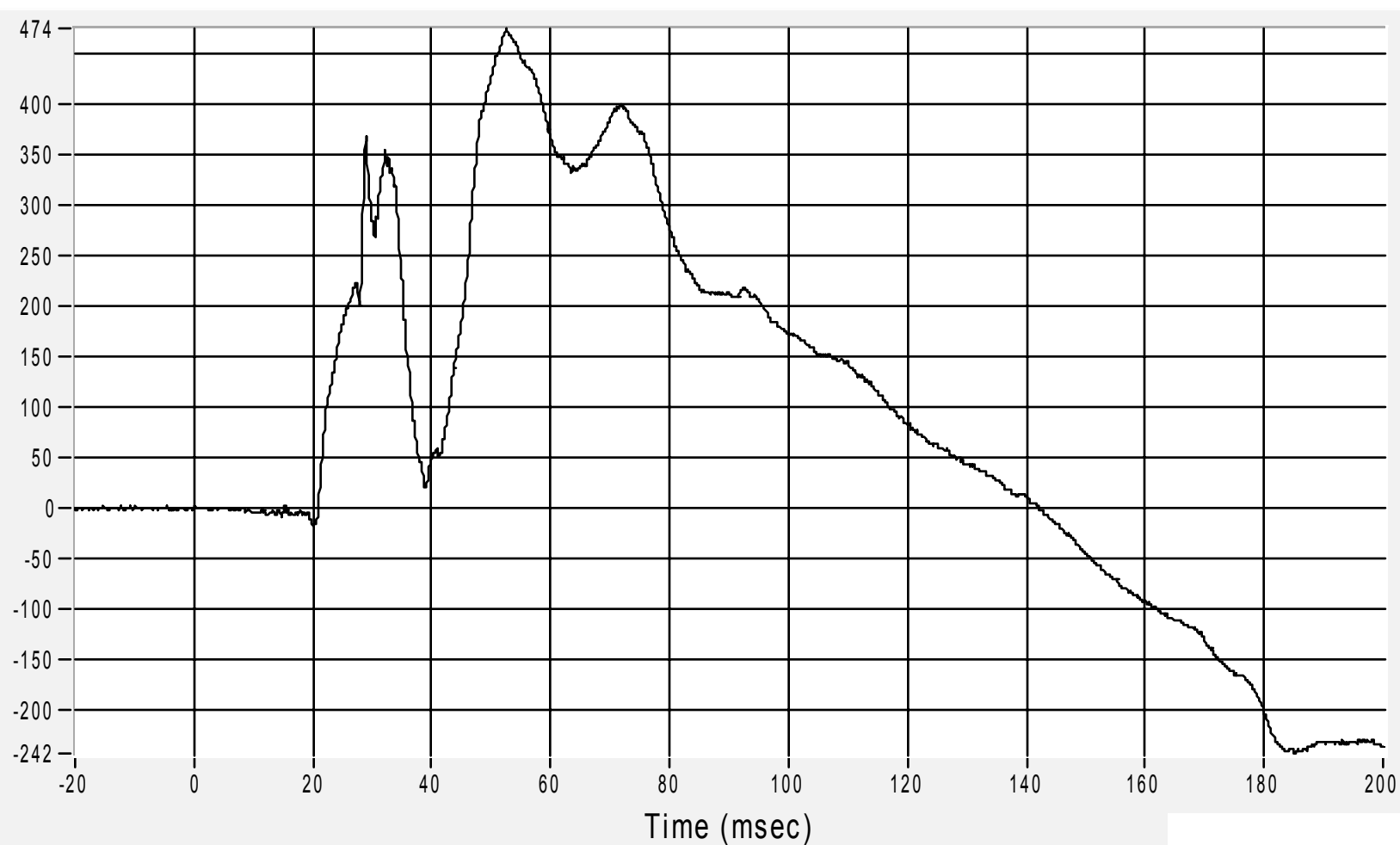
Driver Upper Neck (Y) Force

Force (N)

CFC1000

Max 474.4 N at 52.6 msec

Min -242.4 N at 185.2 msec



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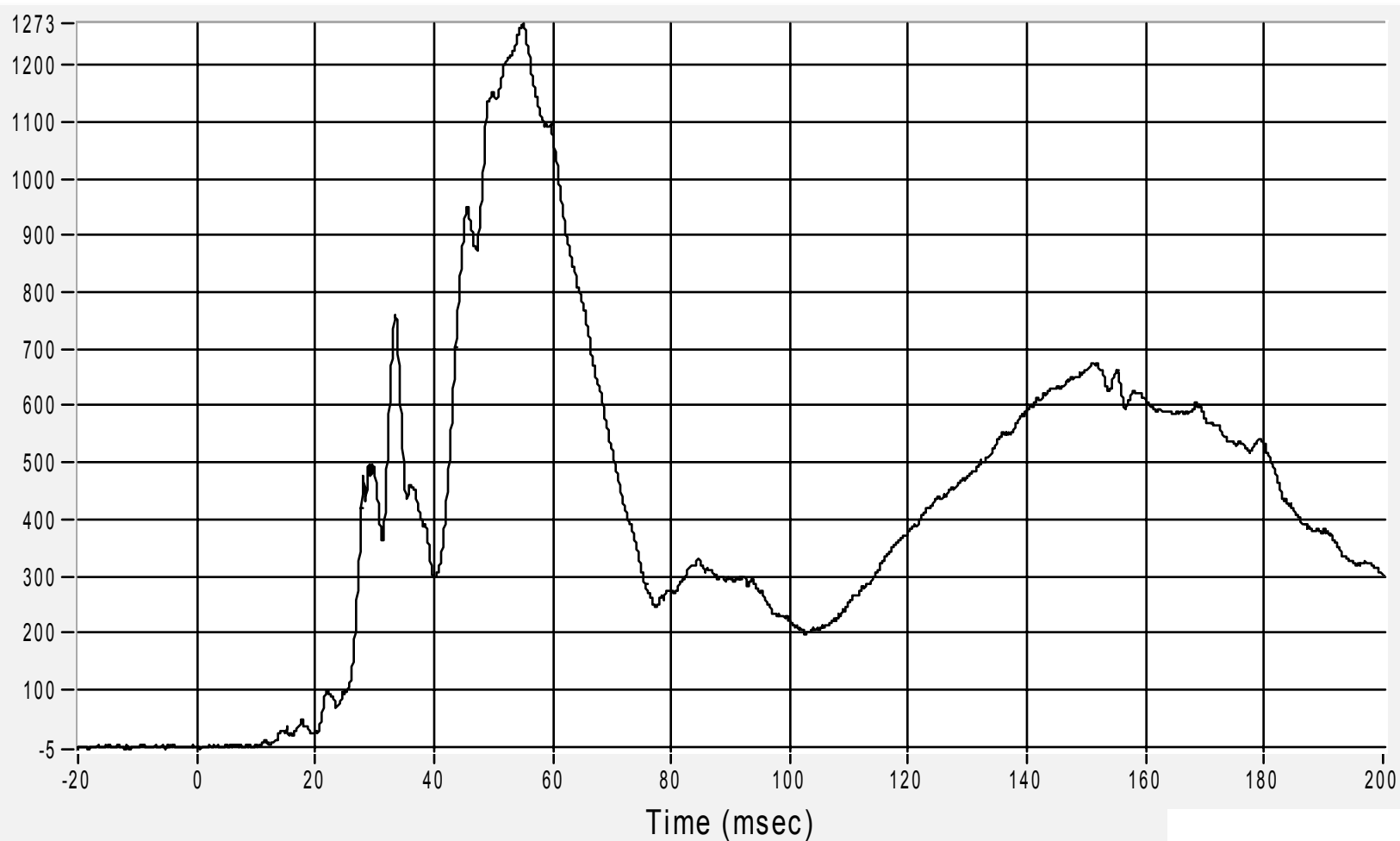
Driver Upper Neck (Z) Force

Force (N)

CFC1000

Max 1273.4 N at 55.0 msec

Min -3.7 N at 0.6 msec



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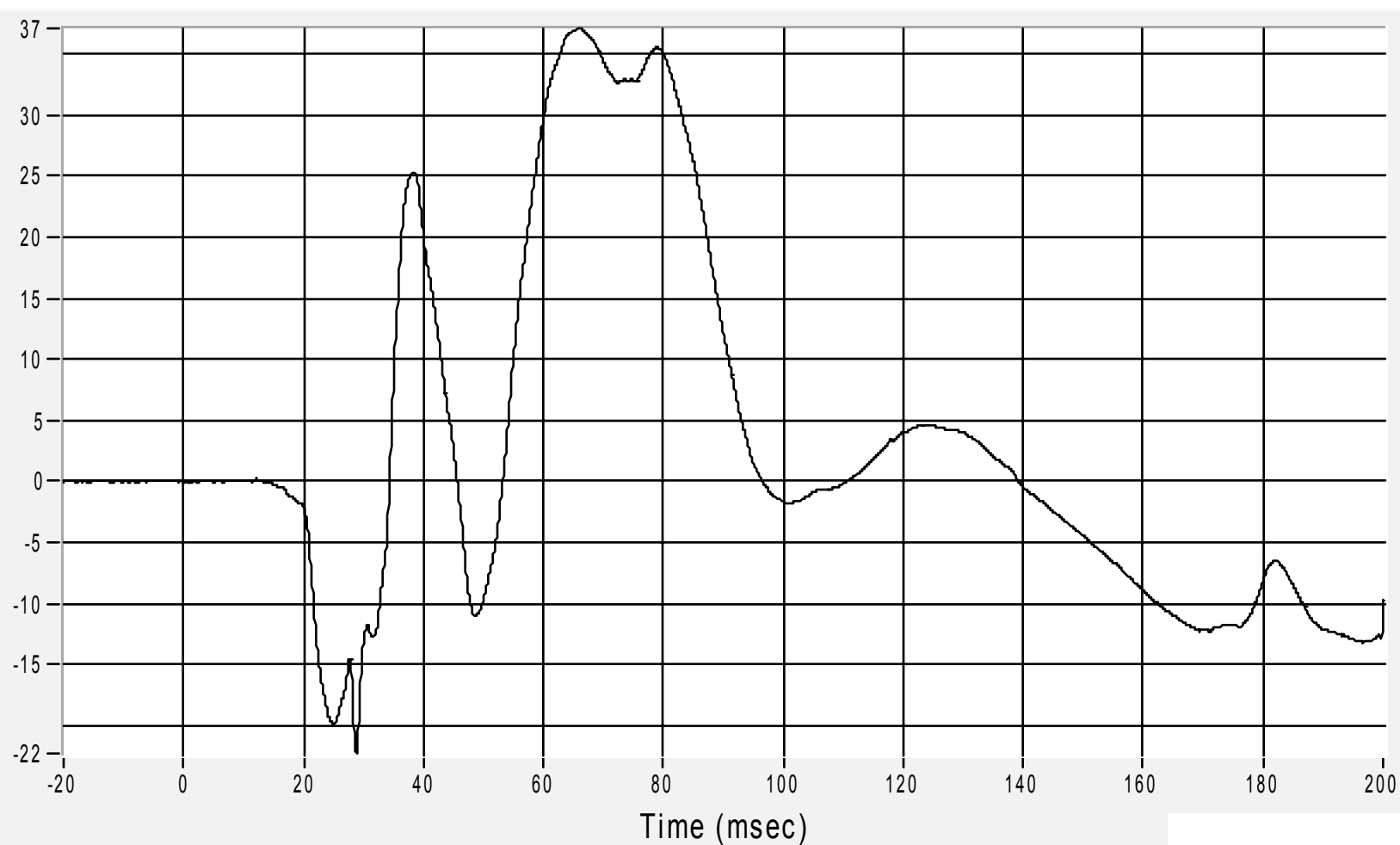
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Driver Upper Neck (X) Moment

Moment (Nm) CFC600

Max 37.1 Nm at 65.9 msec

Min -22.3 Nm at 28.8 msec



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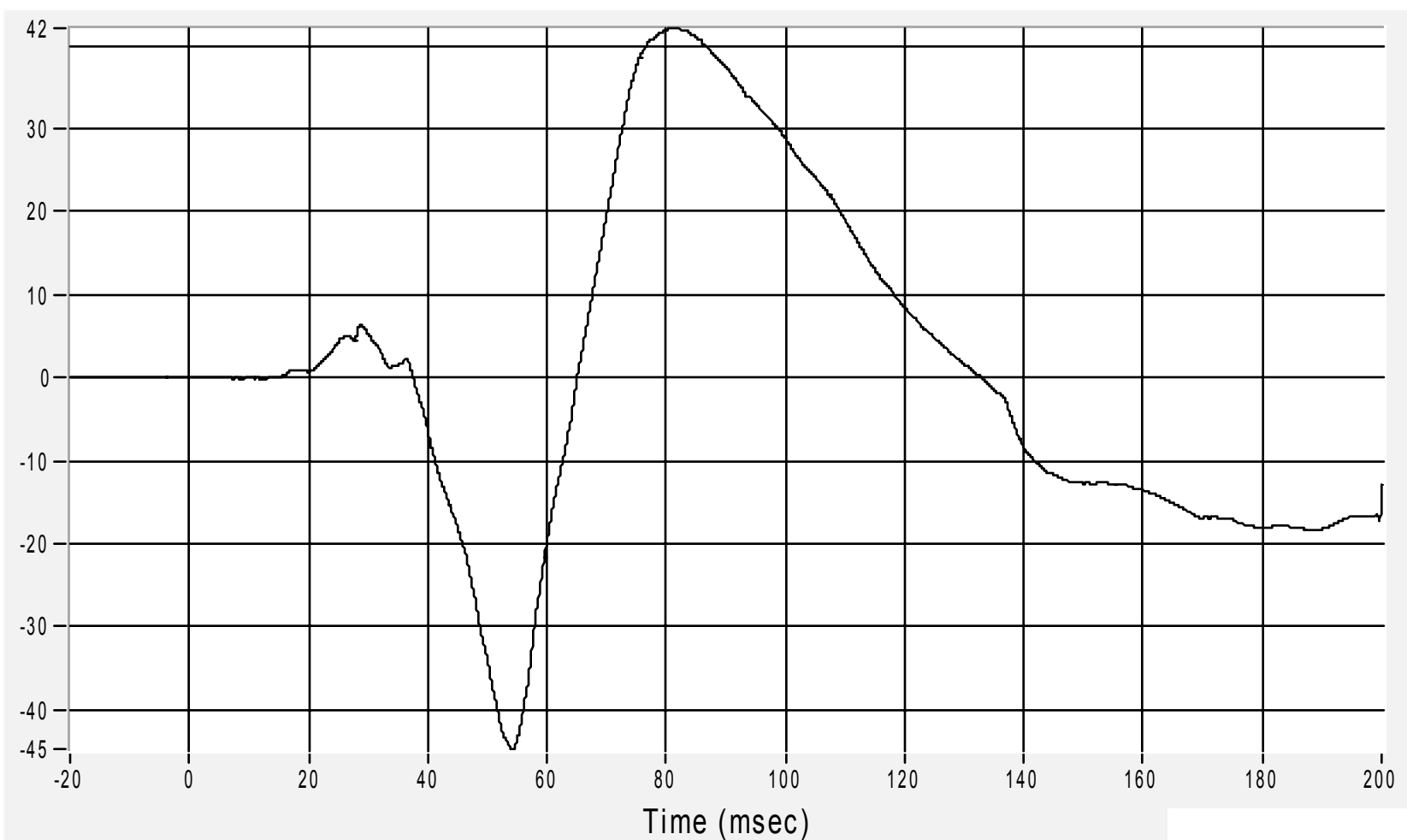
Medical College of Wisconsin
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Driver Upper Neck (Y) Moment

Moment (Nm) CFC600

Max 42.1 Nm at 81.9 msec

Min -44.8 Nm at 54.2 msec



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3 February 2004

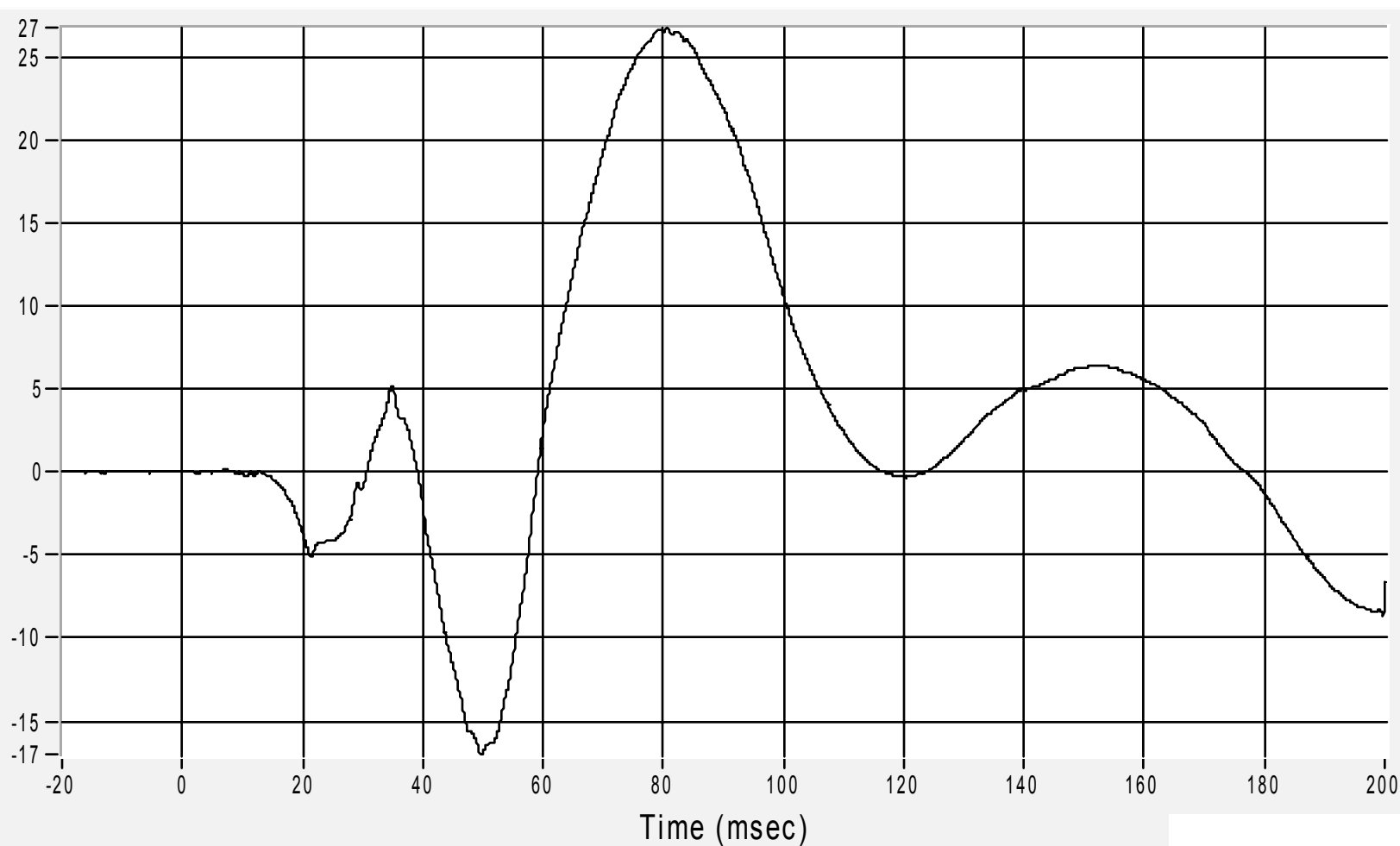
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Upper Neck (Z) Moment

Moment (Nm) CFC600

Max 26.8 Nm at 80.6 msec

Min -17.0 Nm at 49.7 msec



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3 February 2004

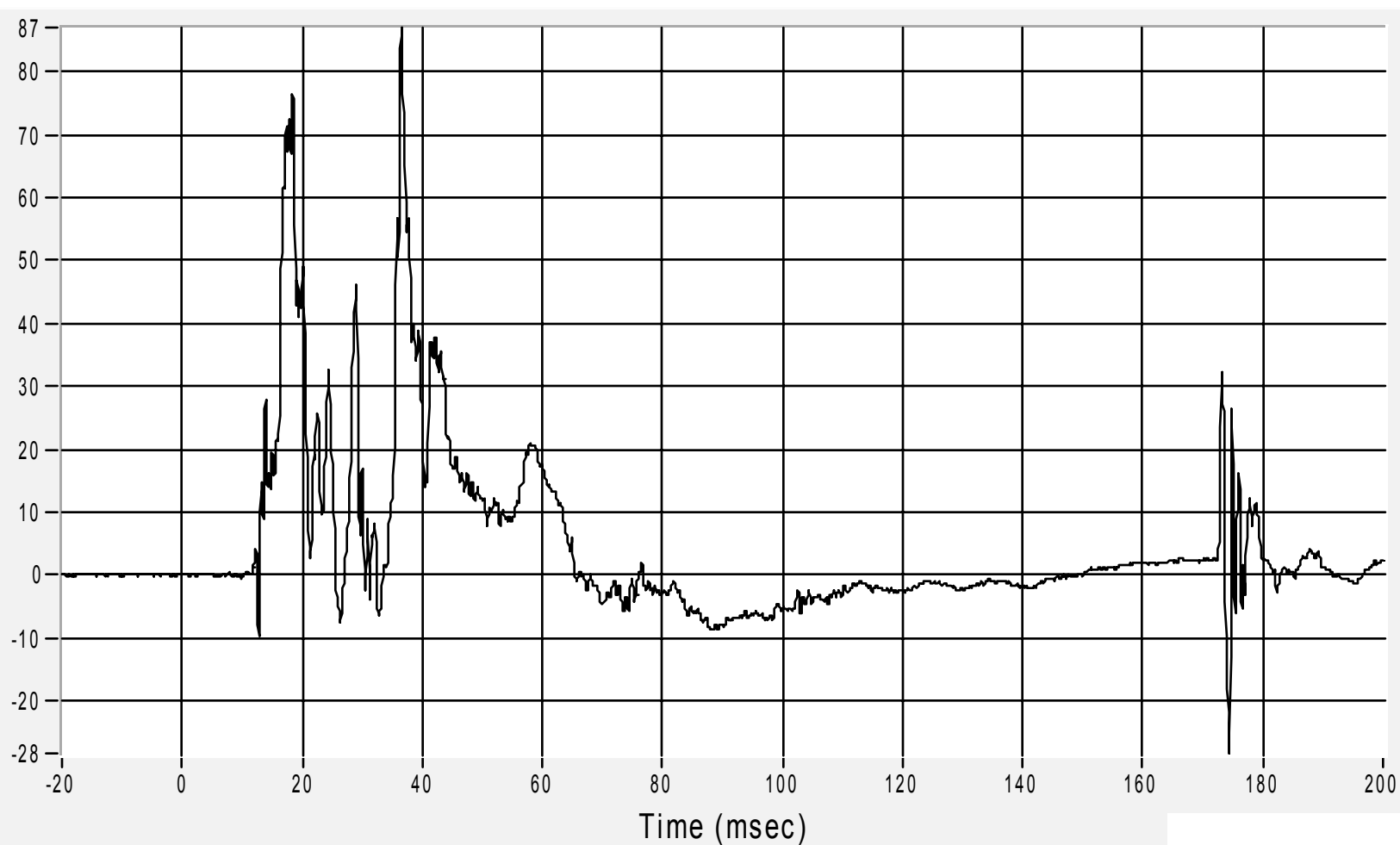
Medical College of Wisconsin
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Driver Upper Rib (Y) Acceleration

Acceleration (G's) CFC1000

Max 87.0 G at 36.6 msec

Min -28.3 G at 174.4 msec



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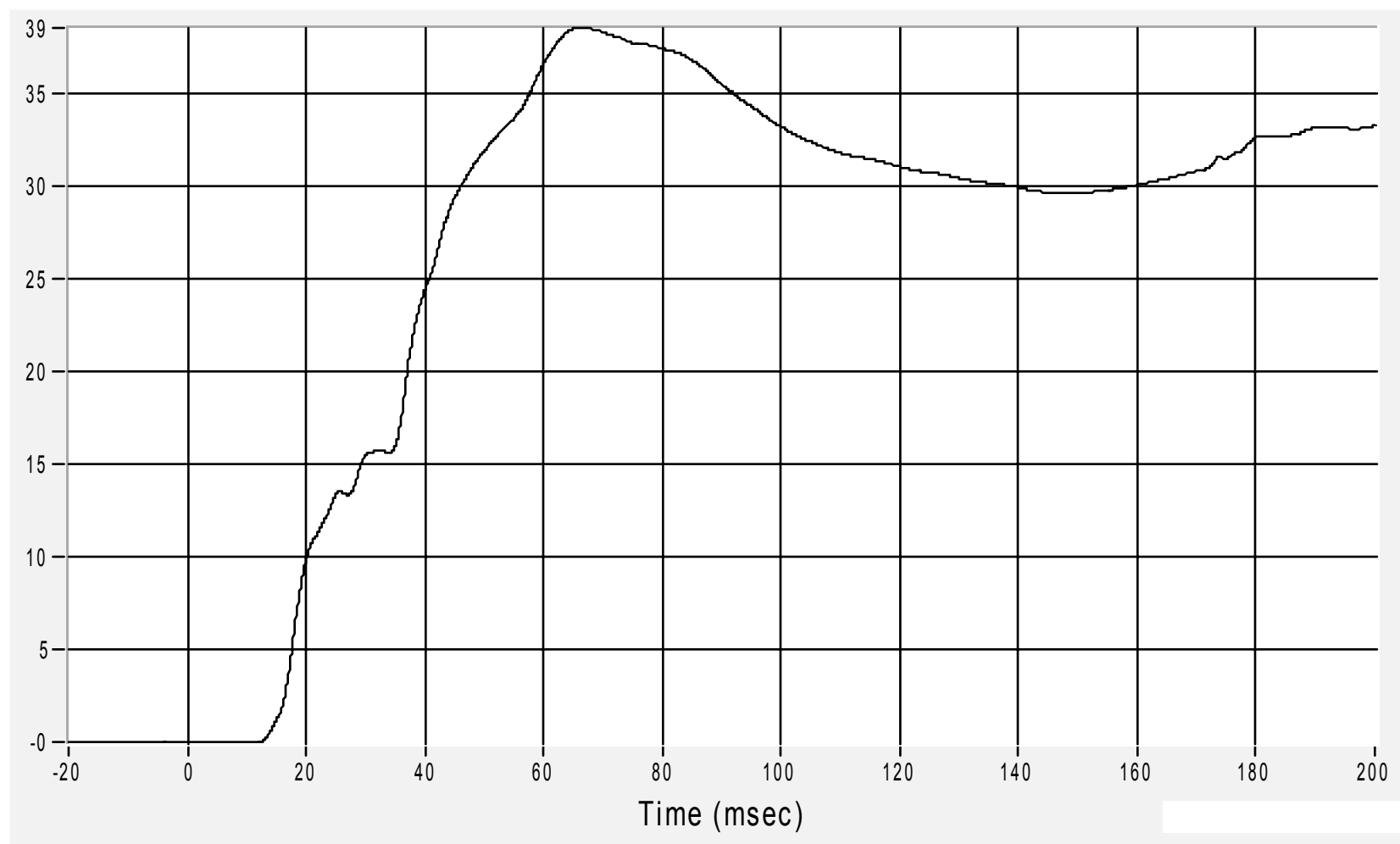
*Medical College of Wisconsin
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Driver Upper Rib (Y) Velocity

Velocity (km/h) CFC180

Max 38.5 km/h at 65.8 msec

Min 0.0 km/h at 10.2 msec



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3 February 2004

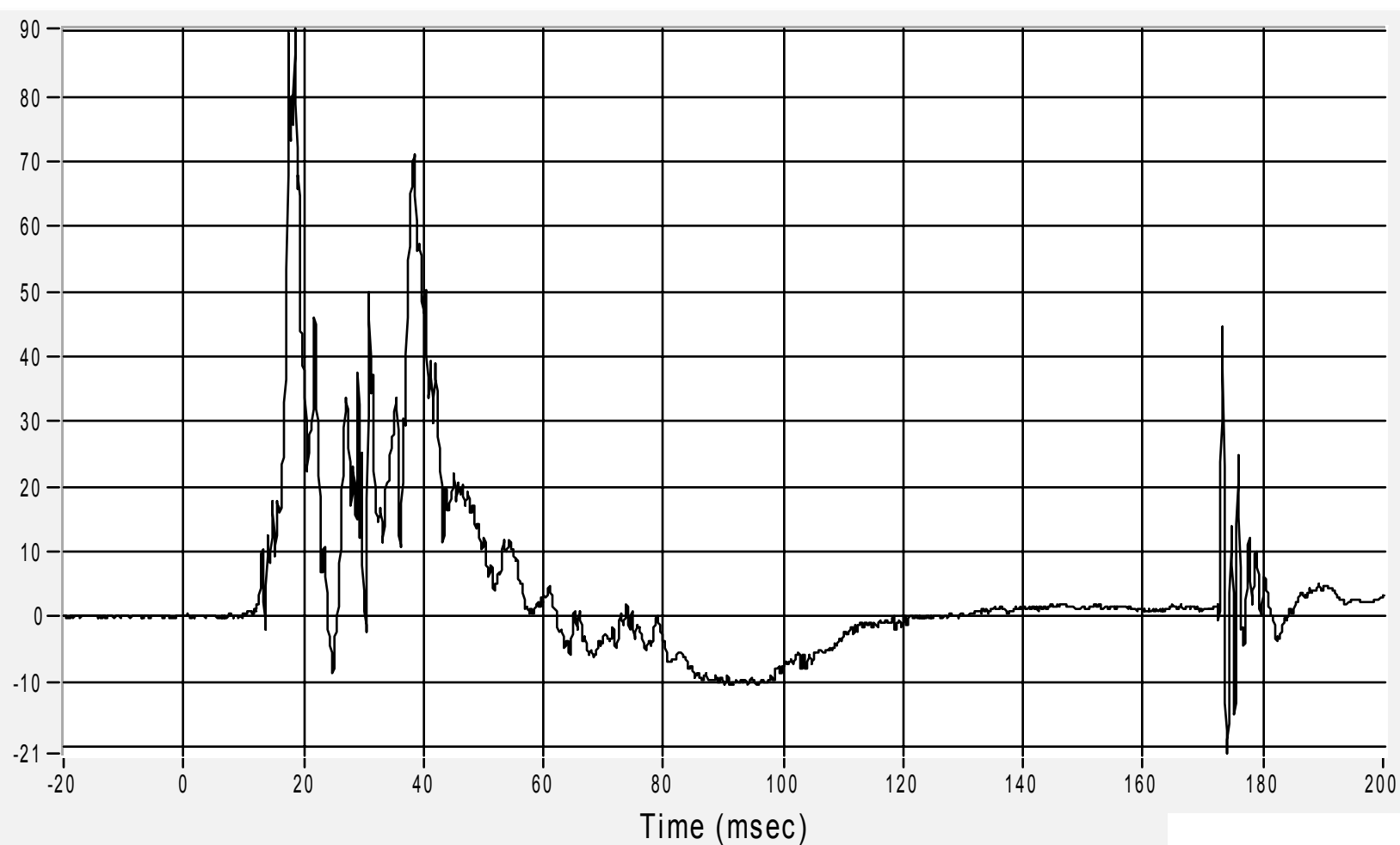
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Lower Rib (Y) Acceleration

Acceleration (G's) CFC1000

Max 90.4 G at 18.6 msec

Min -21.0 G at 174.0 msec



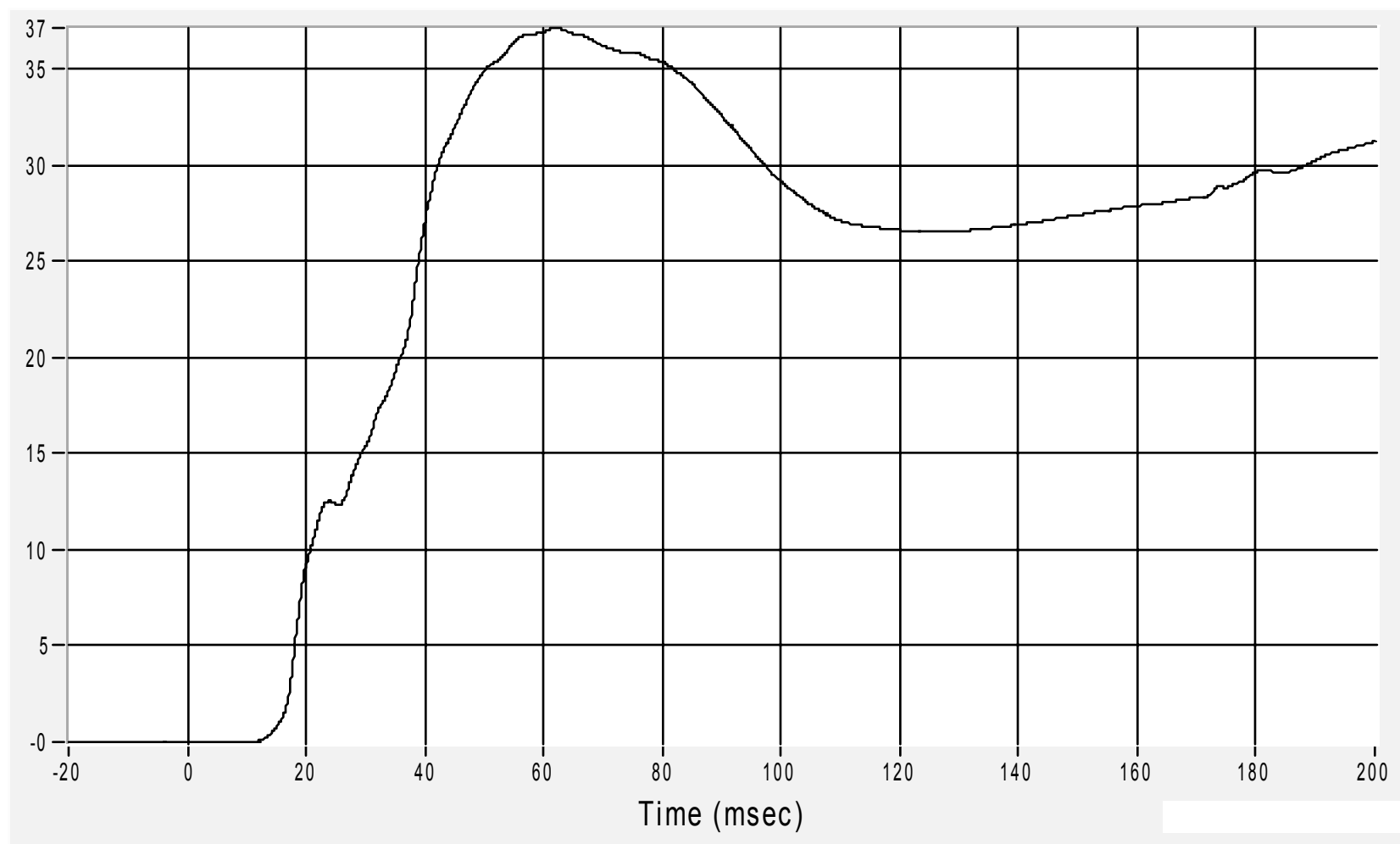
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3 February 2004

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Vehicle Crashworthiness Lab

Driver Lower Rib (Y) Velocity

Velocity (km/h) CFC180

Max 37.2 km/h at 62.1 msec**Min 0.0 km/h at 7.1 msec**

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3 February 2004

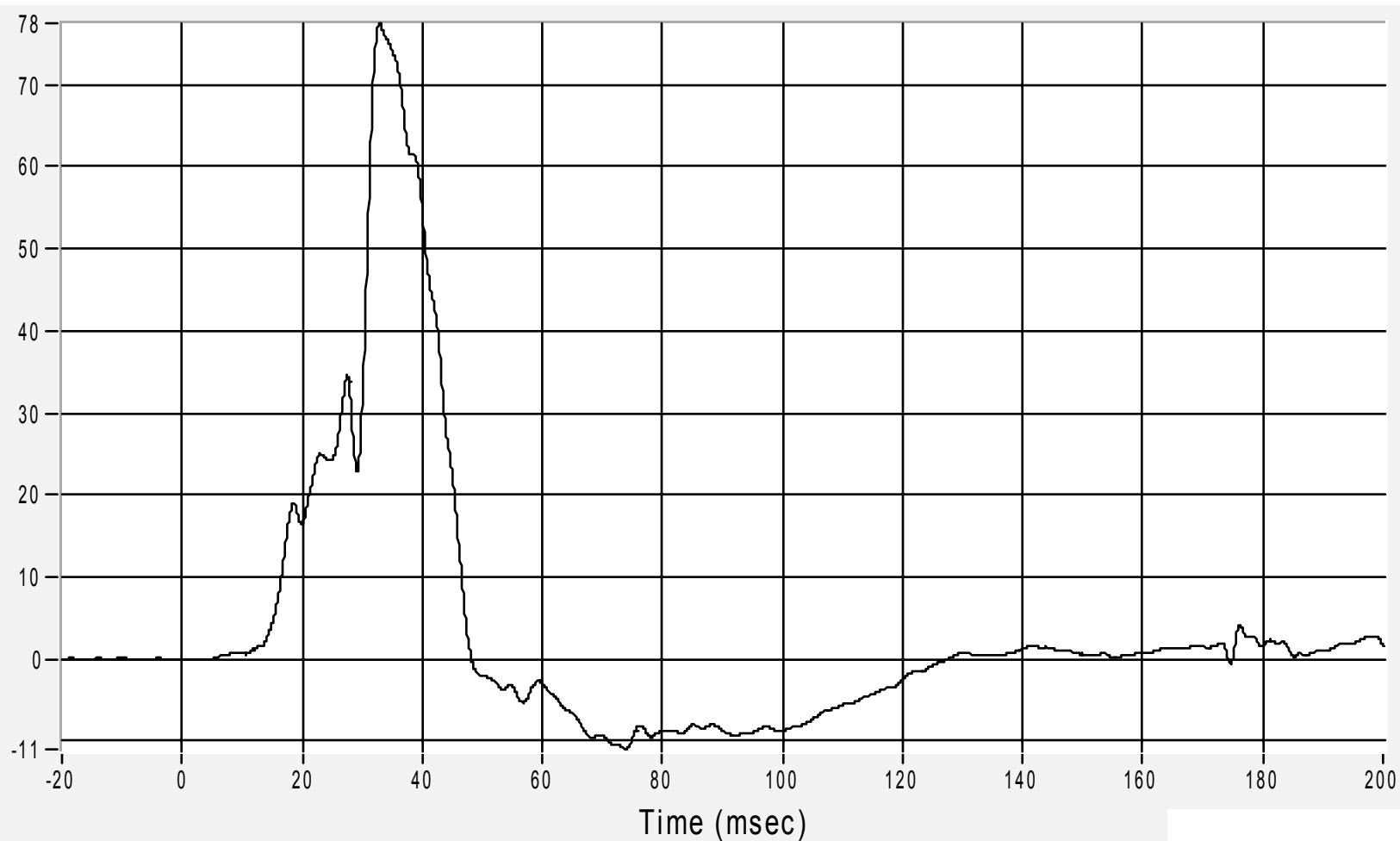
*Medical College of Wisconsin
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Driver Lower Spine (Y) Acceleration

Acceleration (G's) CFC180

Max 77.5 G at 32.9 msec

Min -11.0 G at 73.9 msec



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3 February 2004

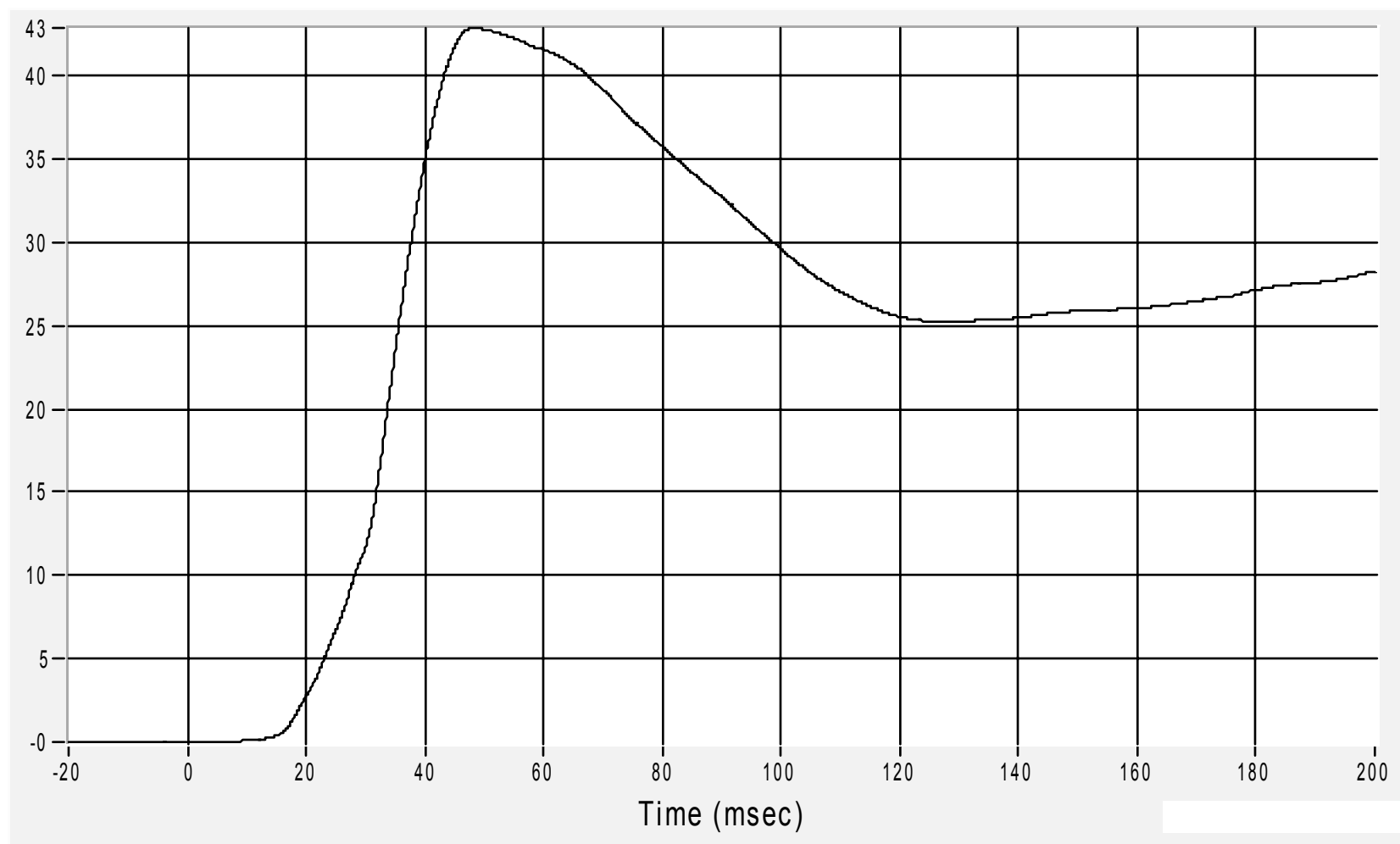
Medical College of Wisconsin
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Driver Lower Spine (Y) Velocity

Velocity (km/h) CFC180

Max 42.9 km/h at 48.2 msec

Min 0.0 km/h at 5.2 msec



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3 February 2004

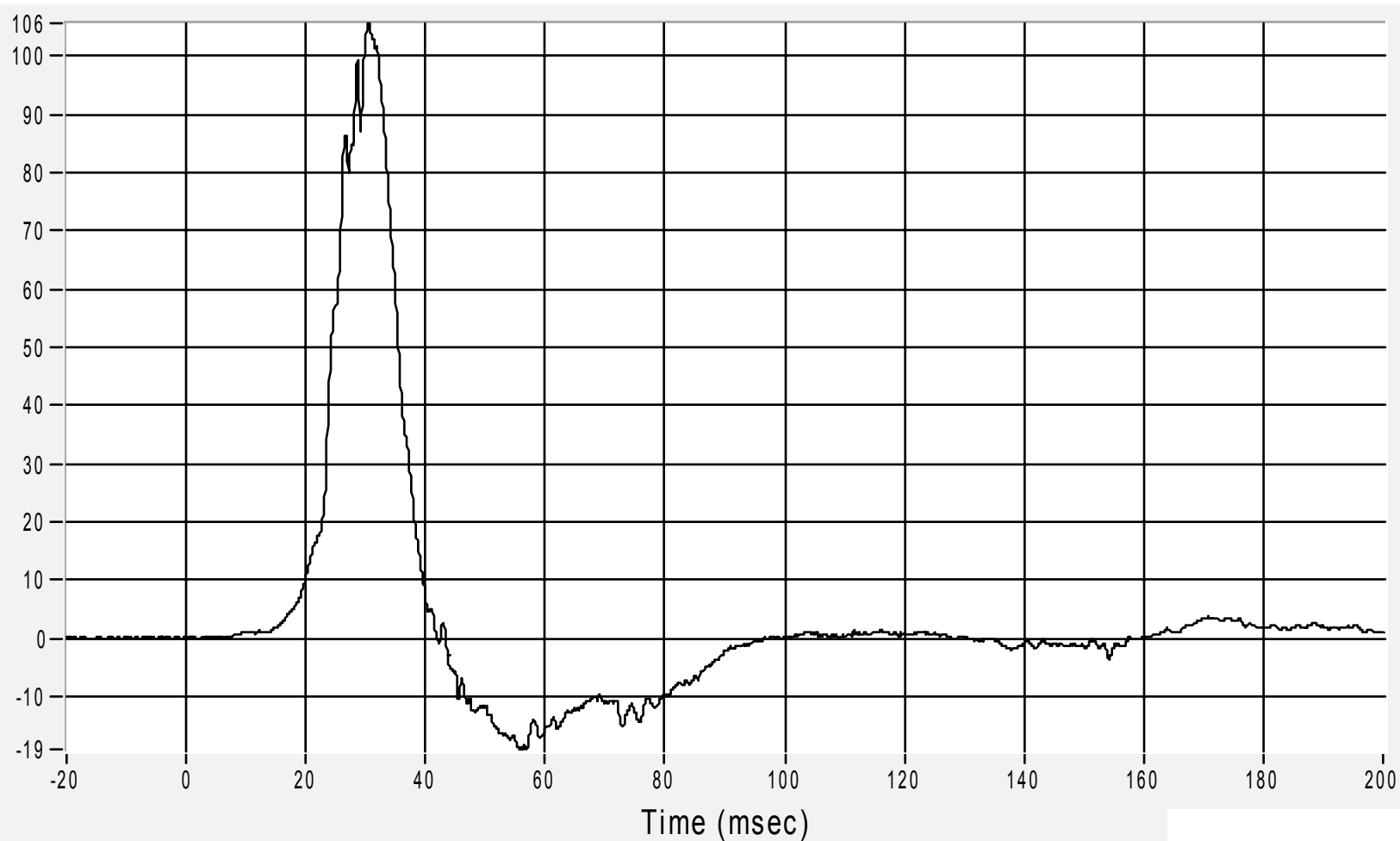
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Pelvic (Y) Acceleration

Acceleration (G's) CFC1000

Max 105.6 G at 30.5 msec

Min -19.1 G at 55.8 msec



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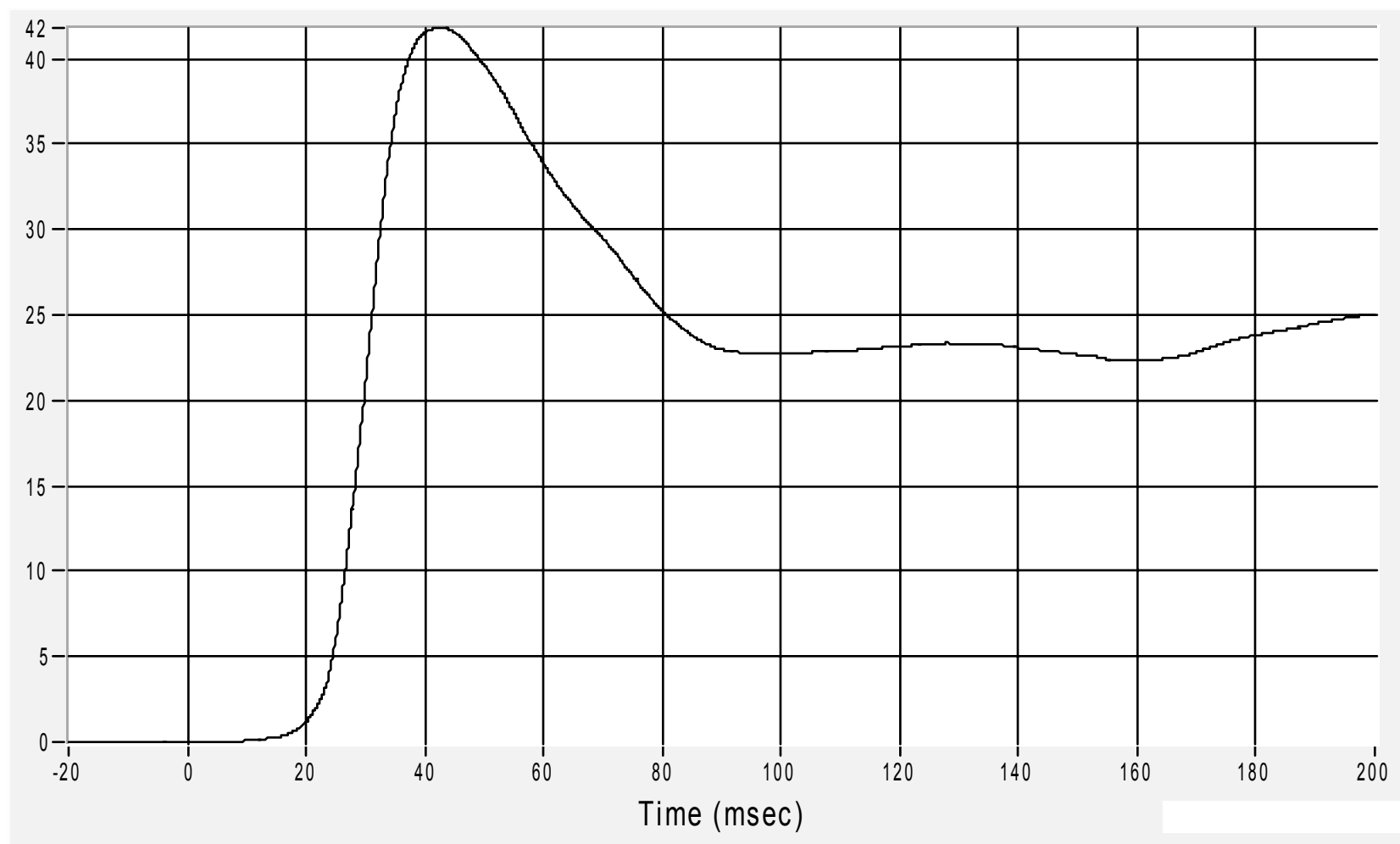
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Pelvic (Y) Velocity

Velocity (km/h) CFC180

Max 41.8 km/h at 43.1 msec

Min 0.0 km/h at 0.0 msec



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3 February 2004

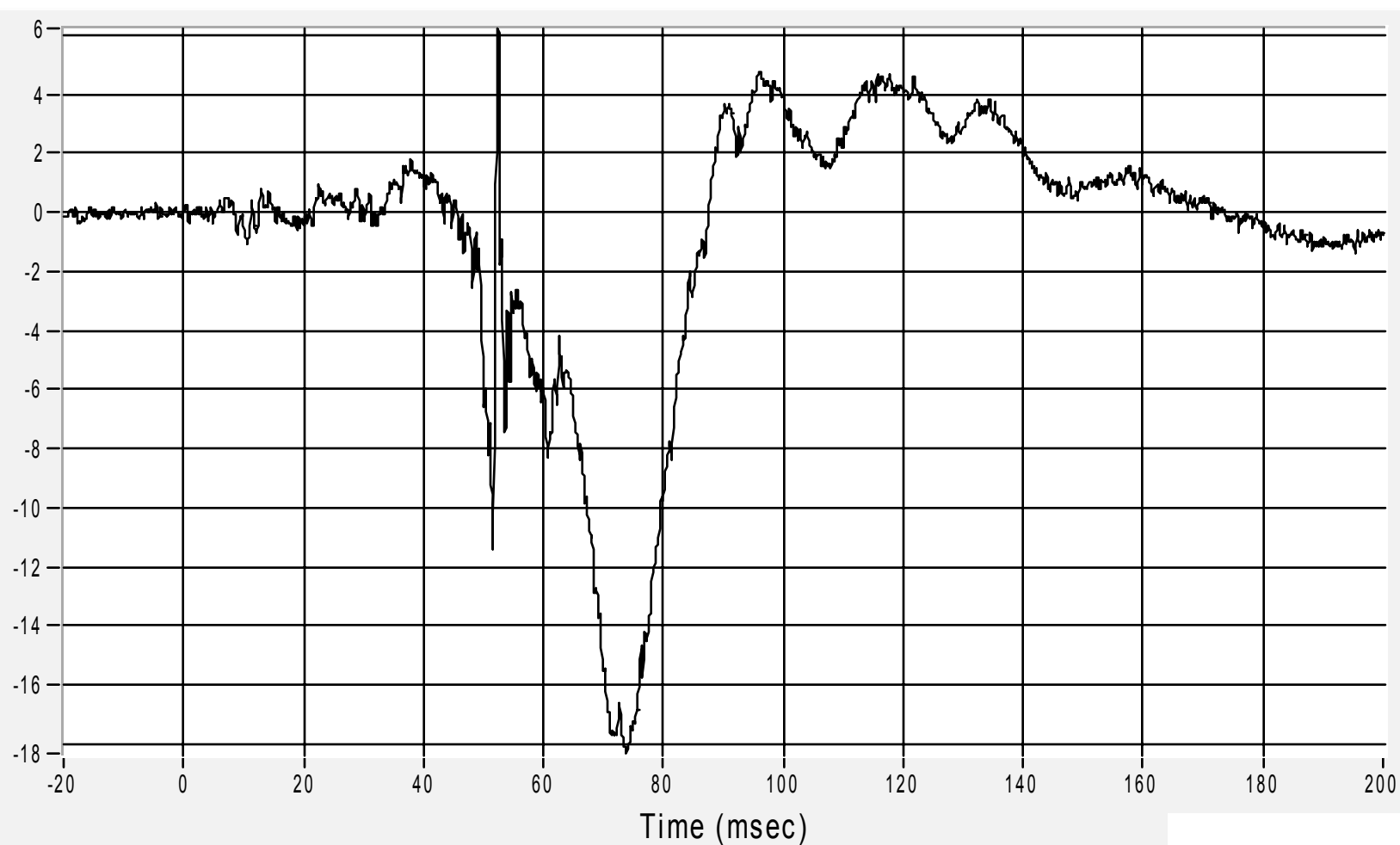
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Head CG (X) Acceleration

Acceleration (G's) CFC1000

Max 6.2 G at 52.5 msec

Min -18.3 G at 73.8 msec



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3 February 2004

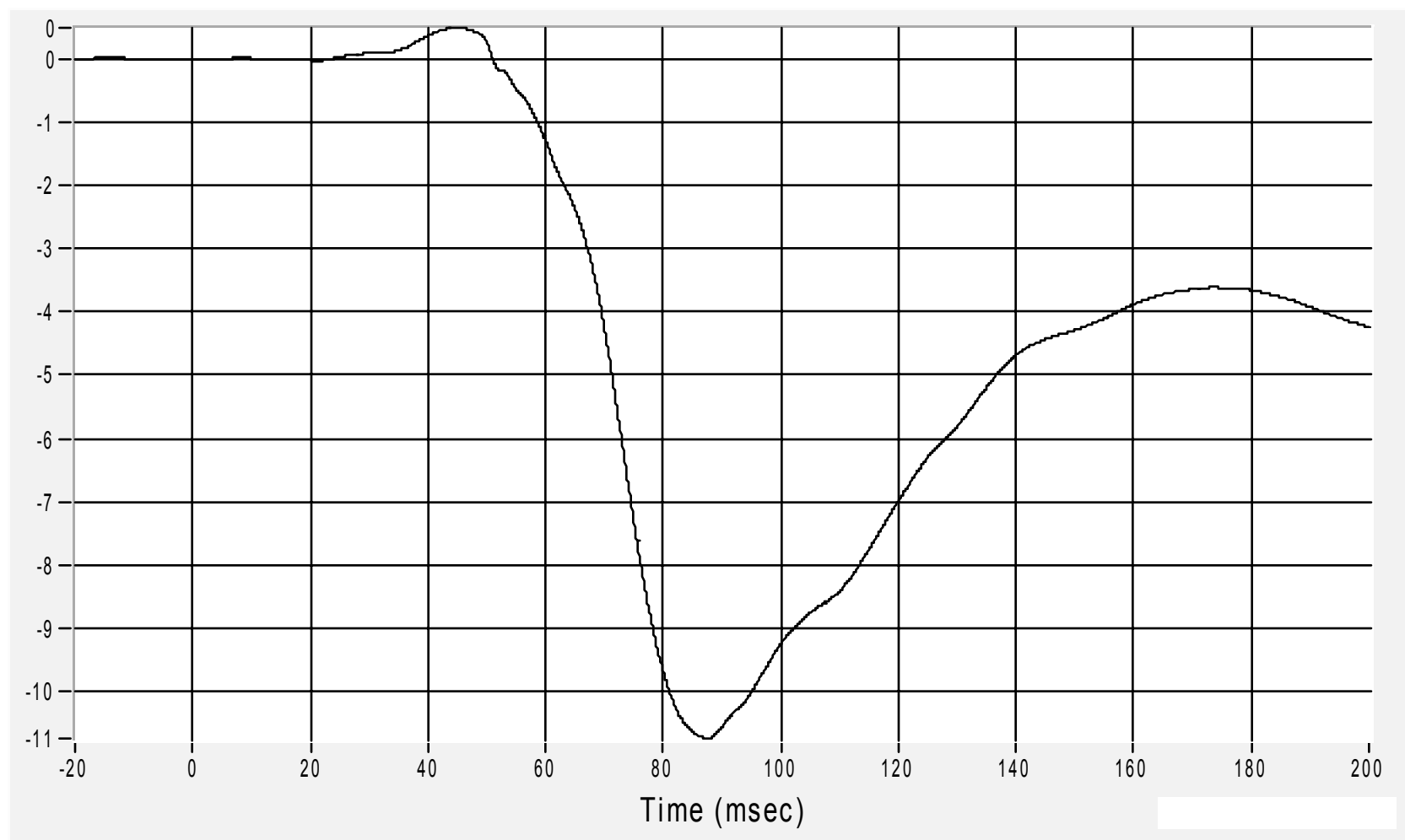
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Head CG (X) Velocity

Velocity (km/h) CFC180

Max 0.5 km/h at 45.4 msec

Min -10.8 km/h at 87.4 msec



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3 February 2004

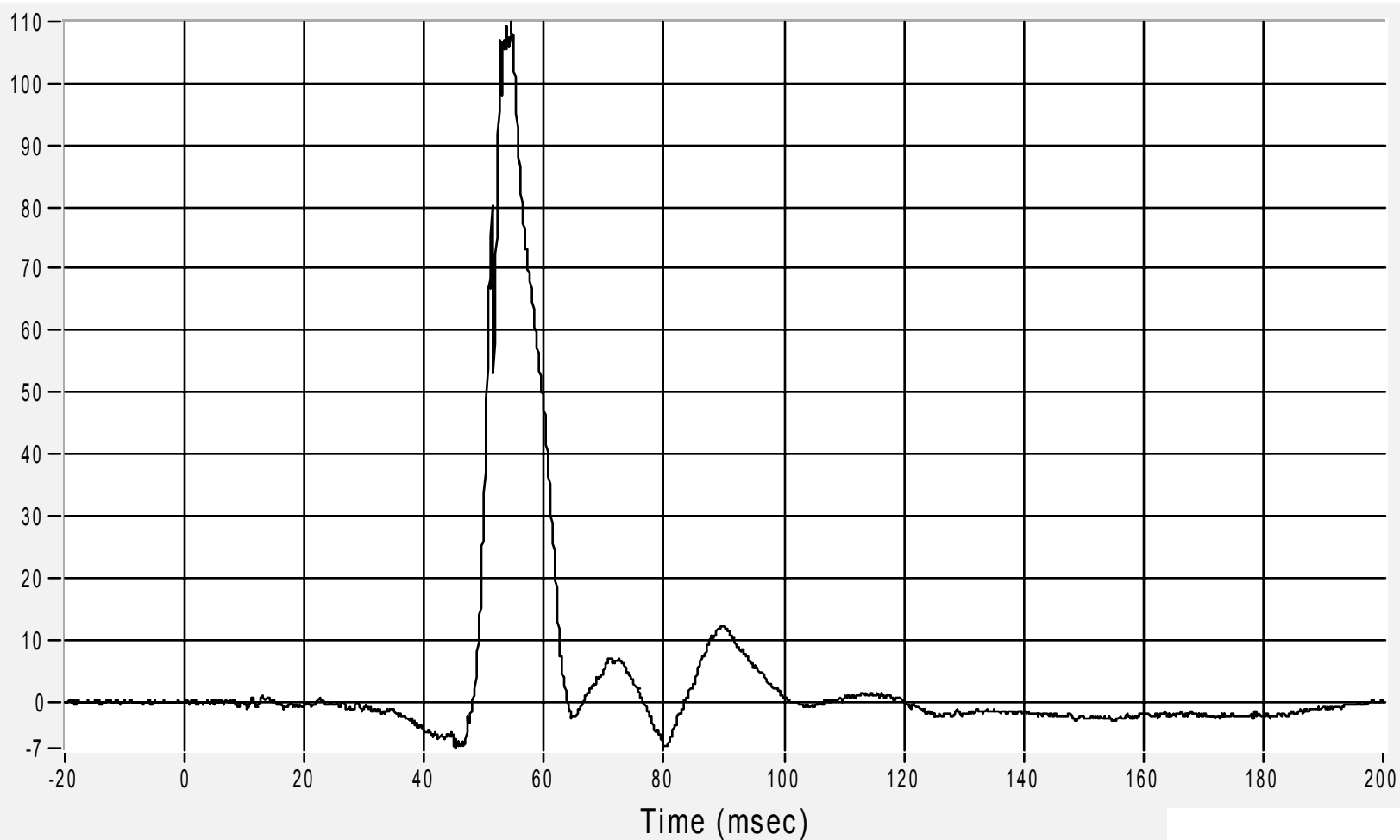
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Head CG (Y) Acceleration

Acceleration (G's) CFC1000

Max 109.9 G at 54.4 msec

Min -7.5 G at 45.1 msec



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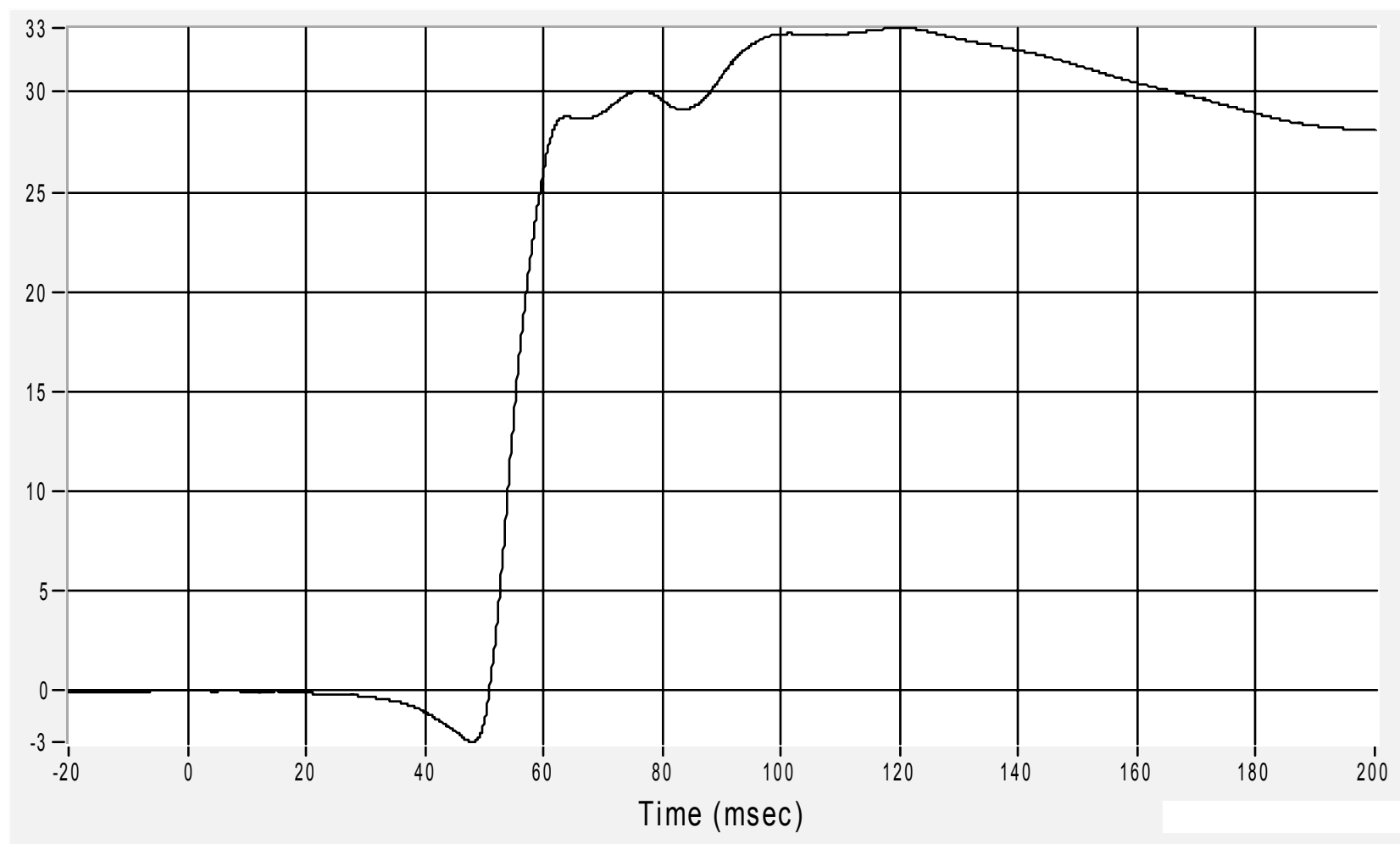
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Head CG (Y) Velocity

Velocity (km/h) CFC180

Max 33.2 km/h at 120.0 msec

Min -2.6 km/h at 48.0 msec



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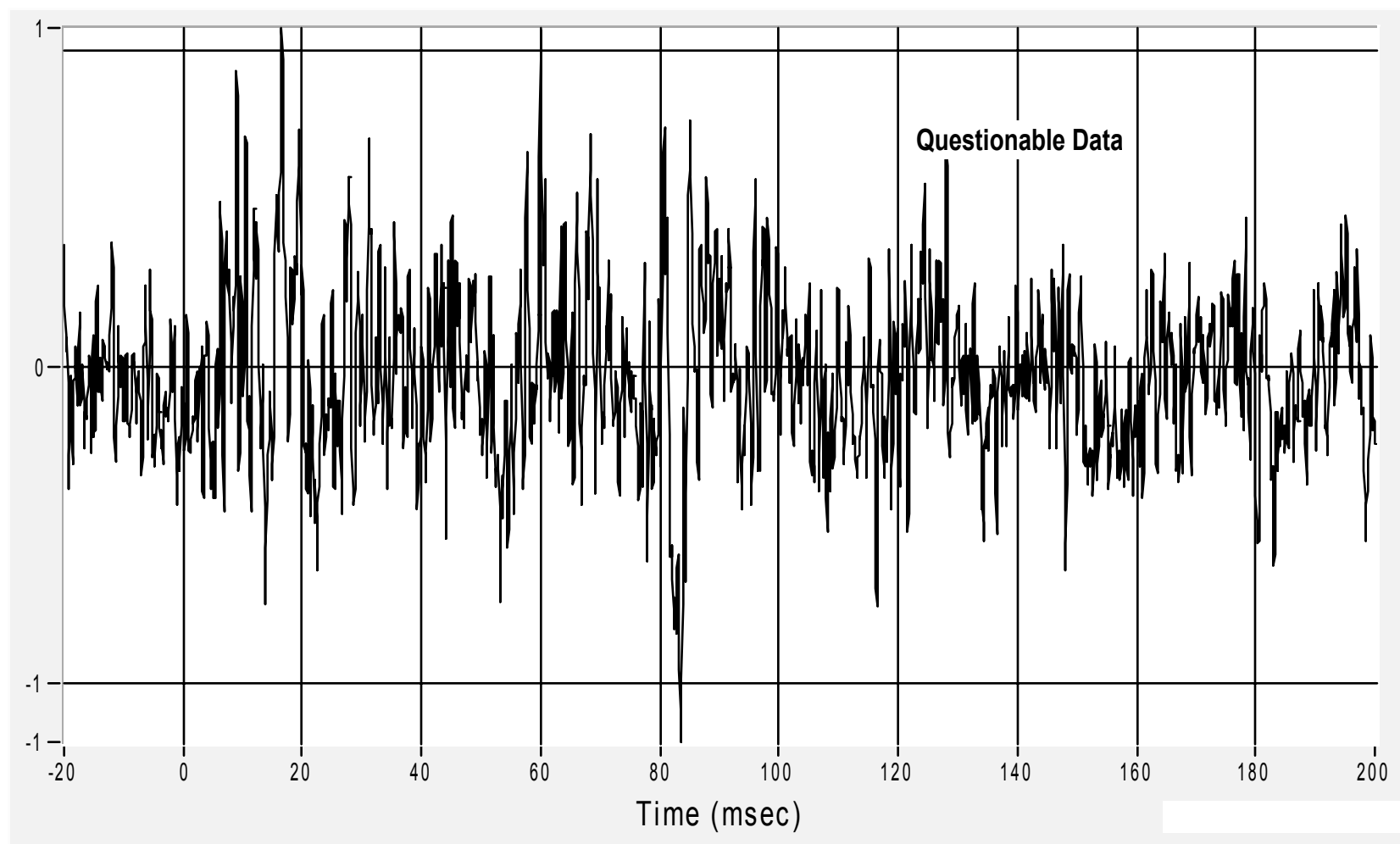
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Head CG (Z) Acceleration

Acceleration (G's) CFC1000

Max 1.1 G at 16.6 msec

Min -1.2 G at 83.5 msec



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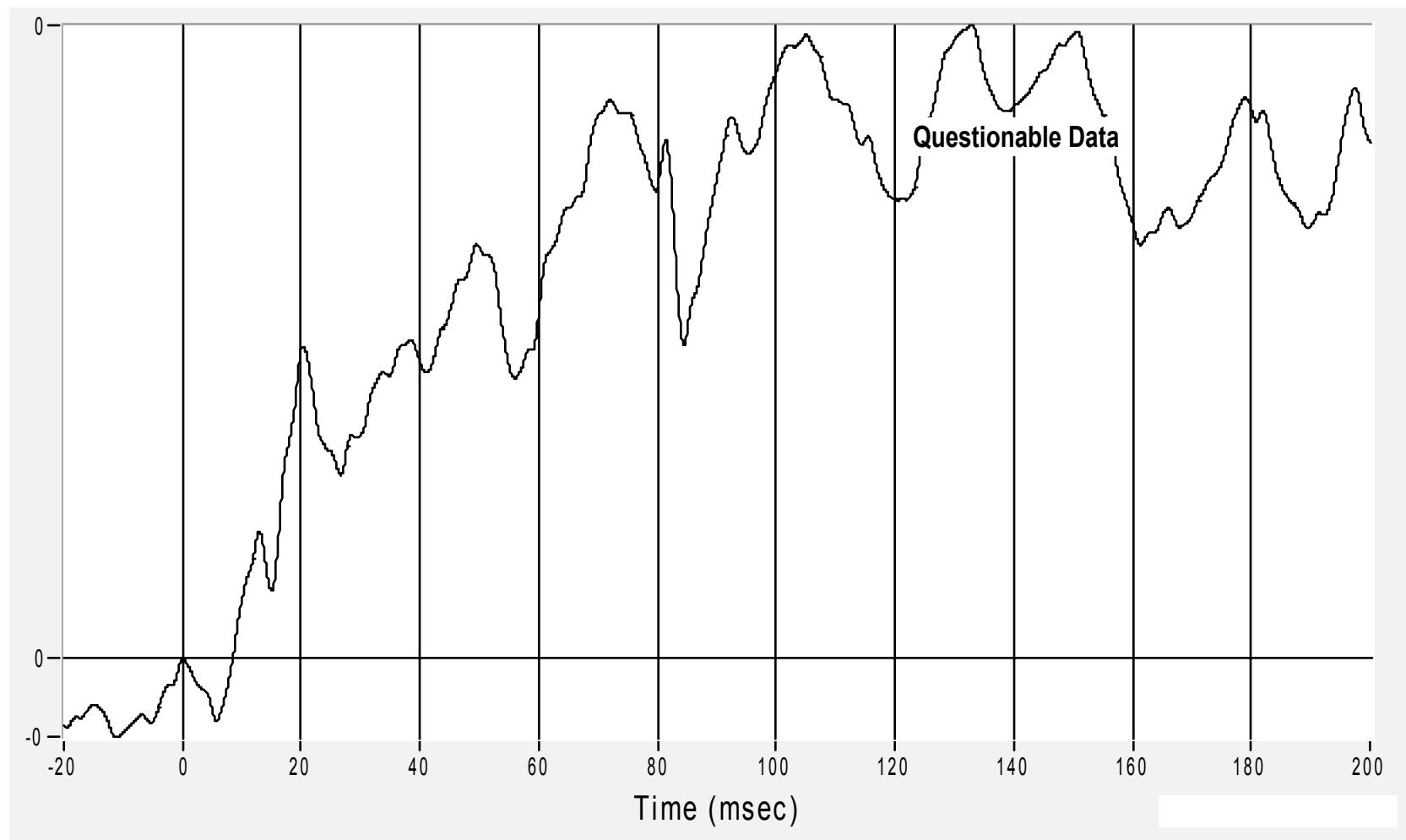
*Medical College of Wisconsin
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Passenger Head CG (Z) Velocity

Velocity (km/h) CFC180

Max 0.2 km/h at 133.0 msec

Min 0.0 km/h at 5.7 msec



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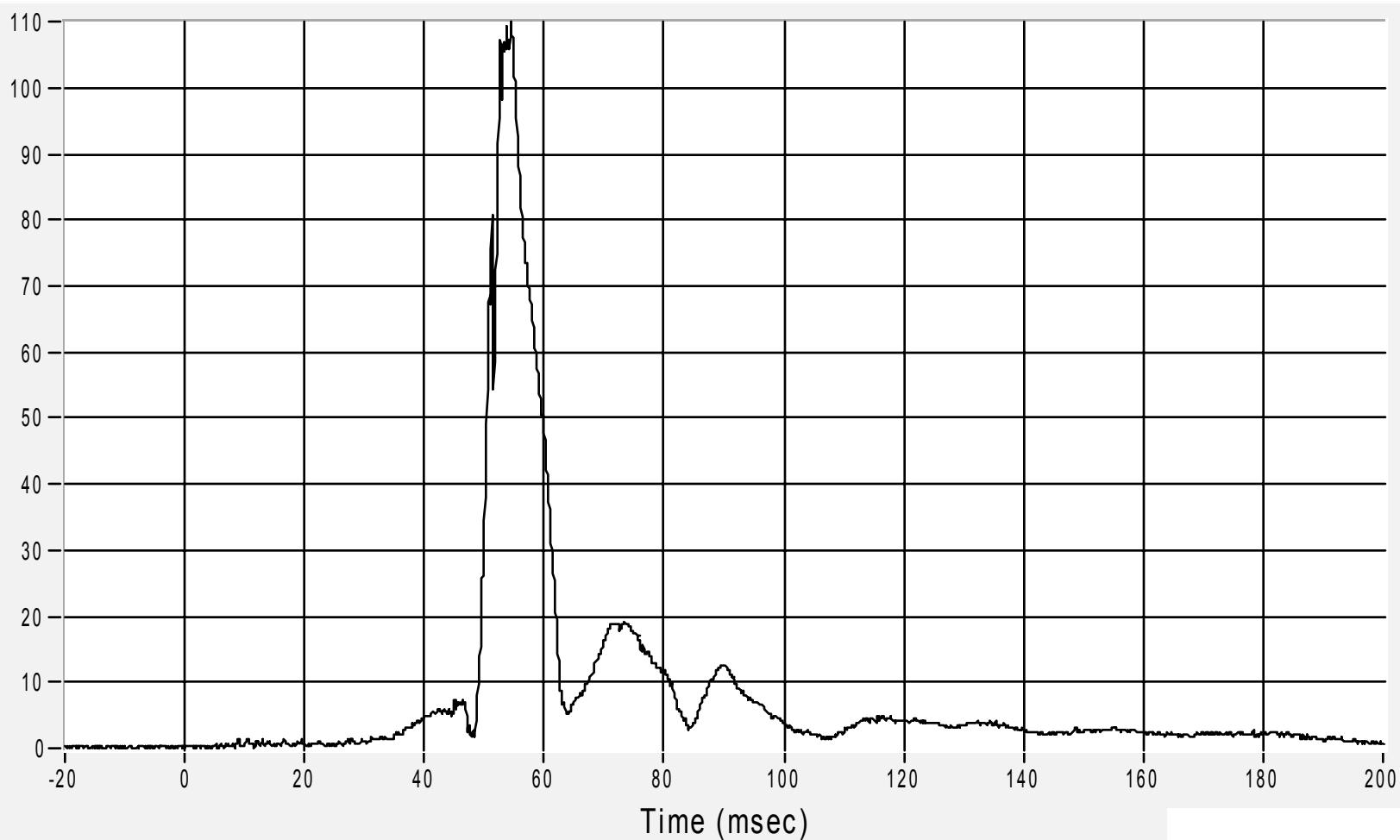
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Head Resultant Acceleration

Acceleration (G's) CFC1000

Max 110.1 G's at 54.4 msec

Min 0.0 G's at 6.6 msec



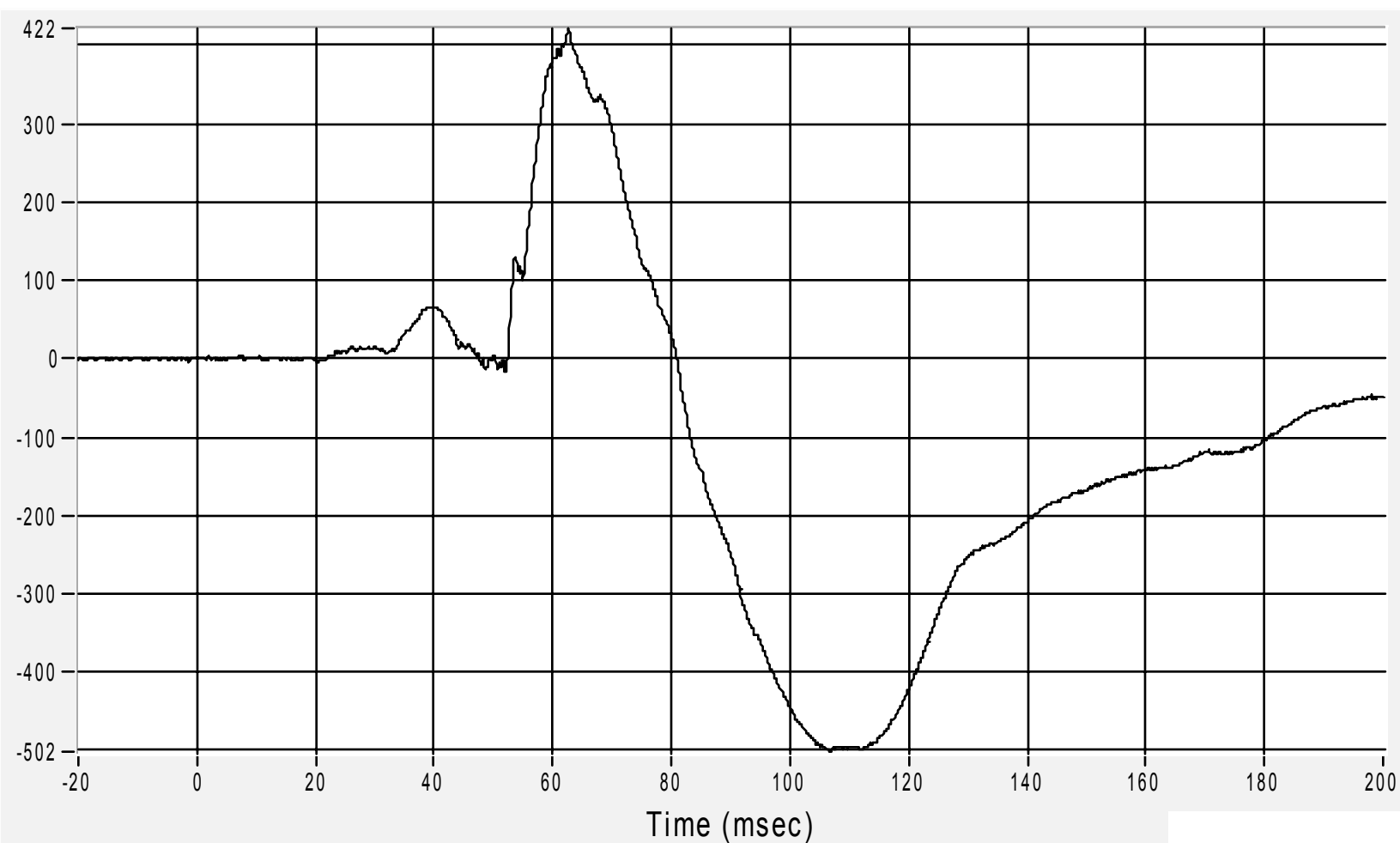
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Passenger Upper Neck (X) Force
Force (N) CFC1000

Max 421.8 N at 62.6 msec
Min -501.6 N at 106.8 msec

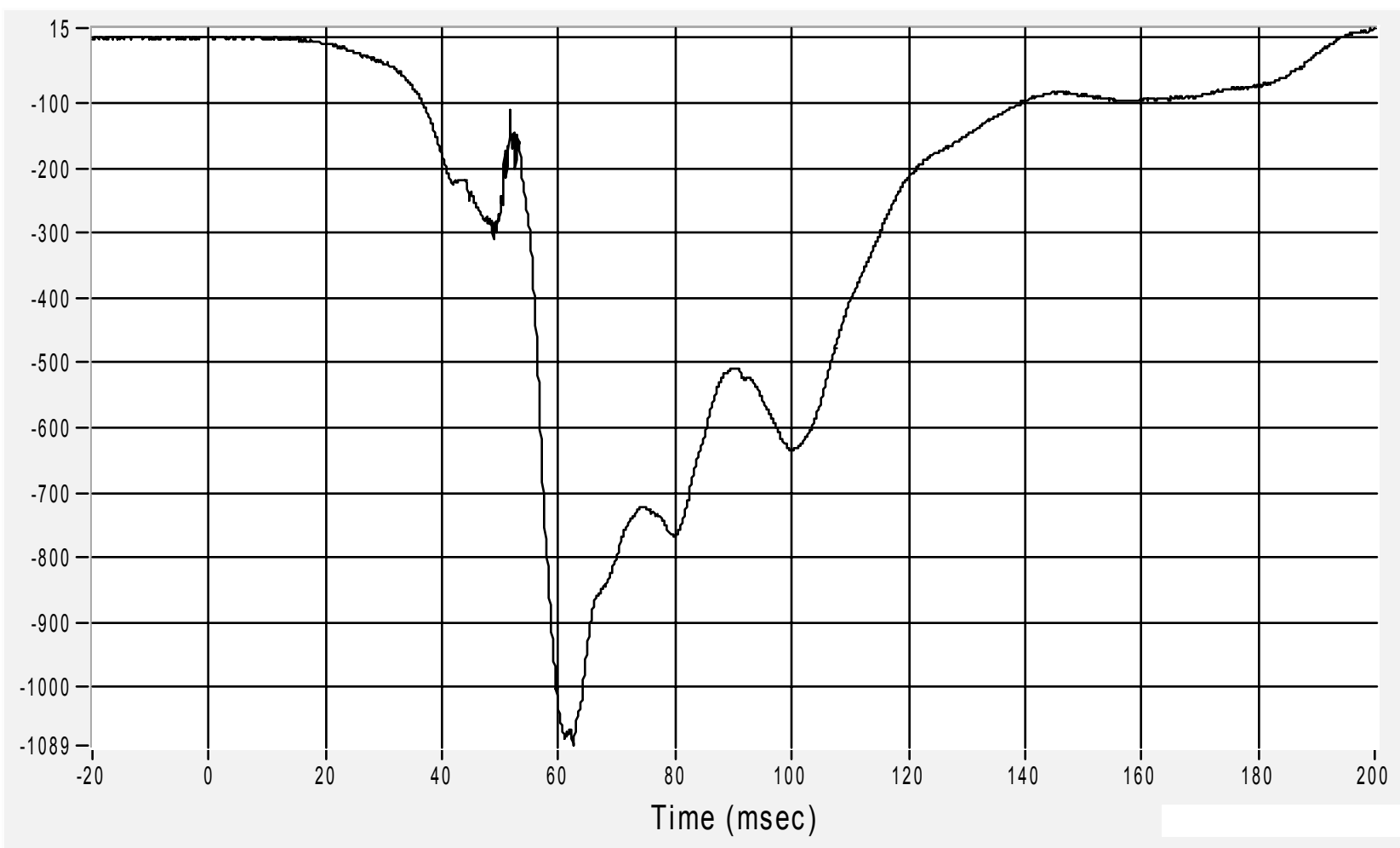


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Vehicle Crashworthiness Lab

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

Max 15.0 N at 199.9 msec
Min -1089.2 N at 62.6 msec

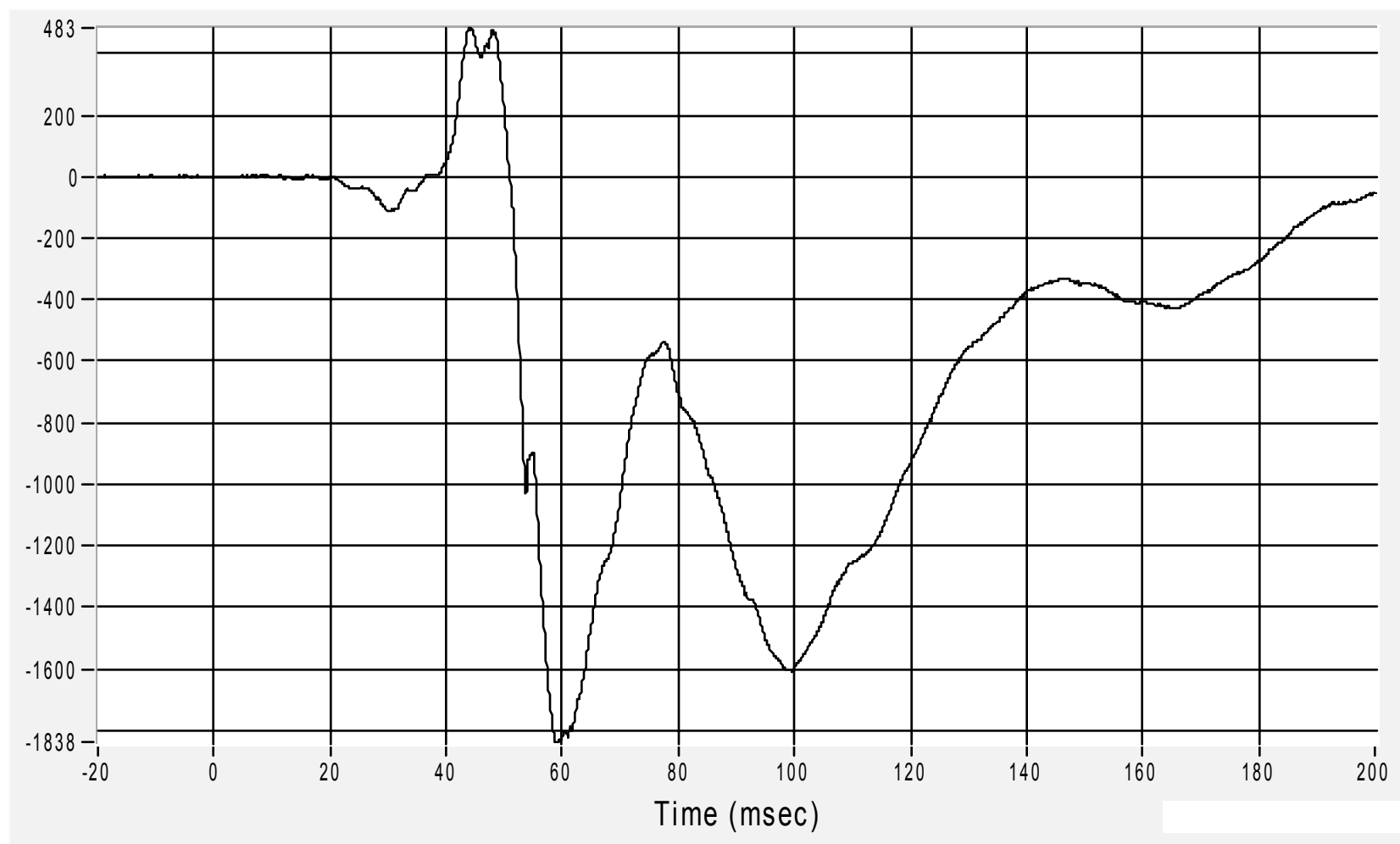


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Vehicle Crashworthiness Lab

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

Max 482.8 N at 44.3 msec
Min -1838.1 N at 59.0 msec



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3 February 2004

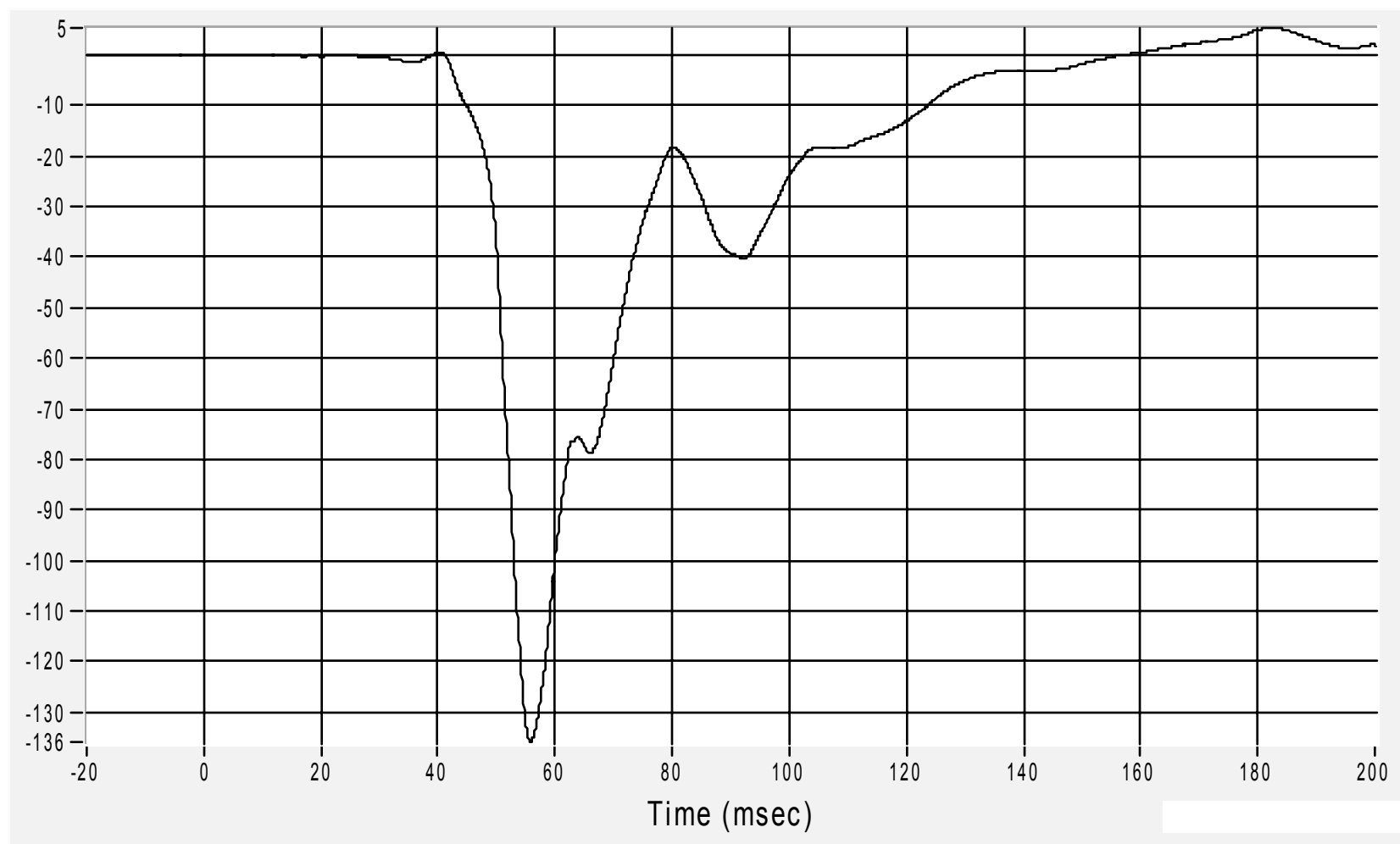
Medical College of Wisconsin
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Passenger Upper Neck (X) Moment

Moment (Nm) CFC600

Max 5.4 Nm at 182.8 msec

Min -136.0 Nm at 55.8 msec



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Vehicle Crashworthiness Lab

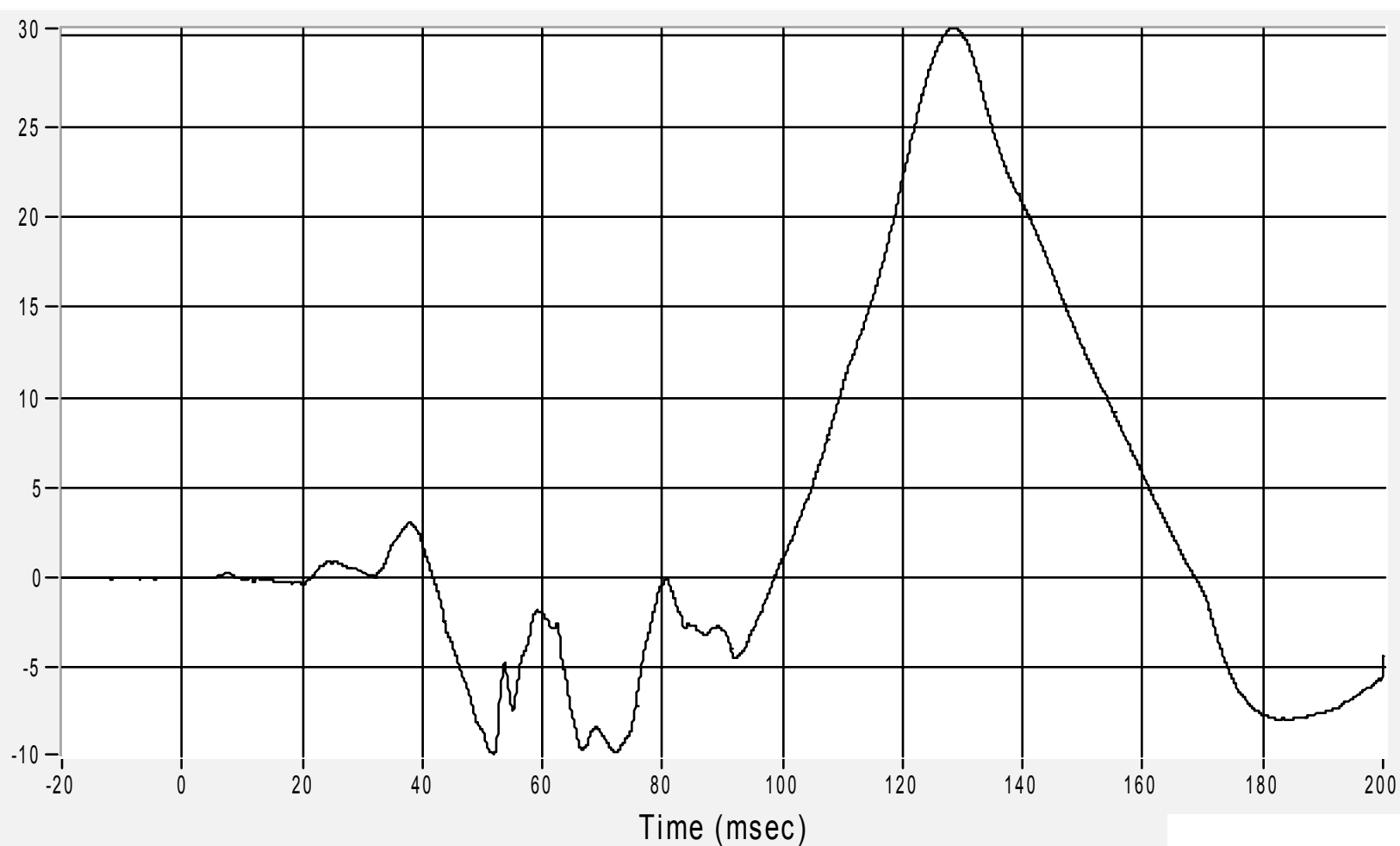
Passenger Upper Neck (Y) Moment

Moment (Nm)

CFC600

Max 30.4 Nm at 128.0 msec

Min -9.8 Nm at 51.9 msec



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Vehicle Crashworthiness Lab

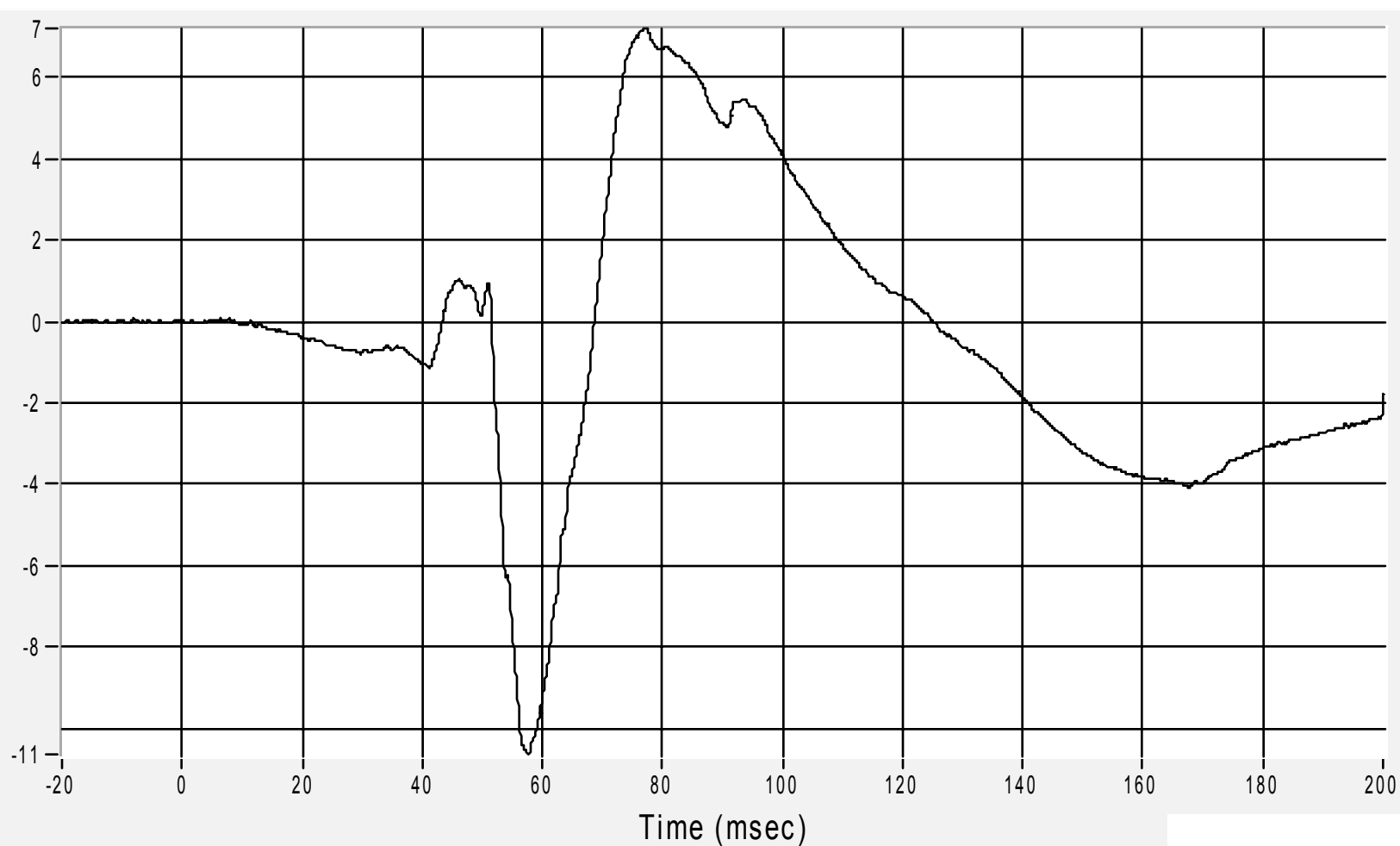
Passenger Upper Neck (Z) Moment

Moment (Nm)

CFC600

Max 7.2 Nm at 77.2 msec

Min -10.6 Nm at 57.7 msec



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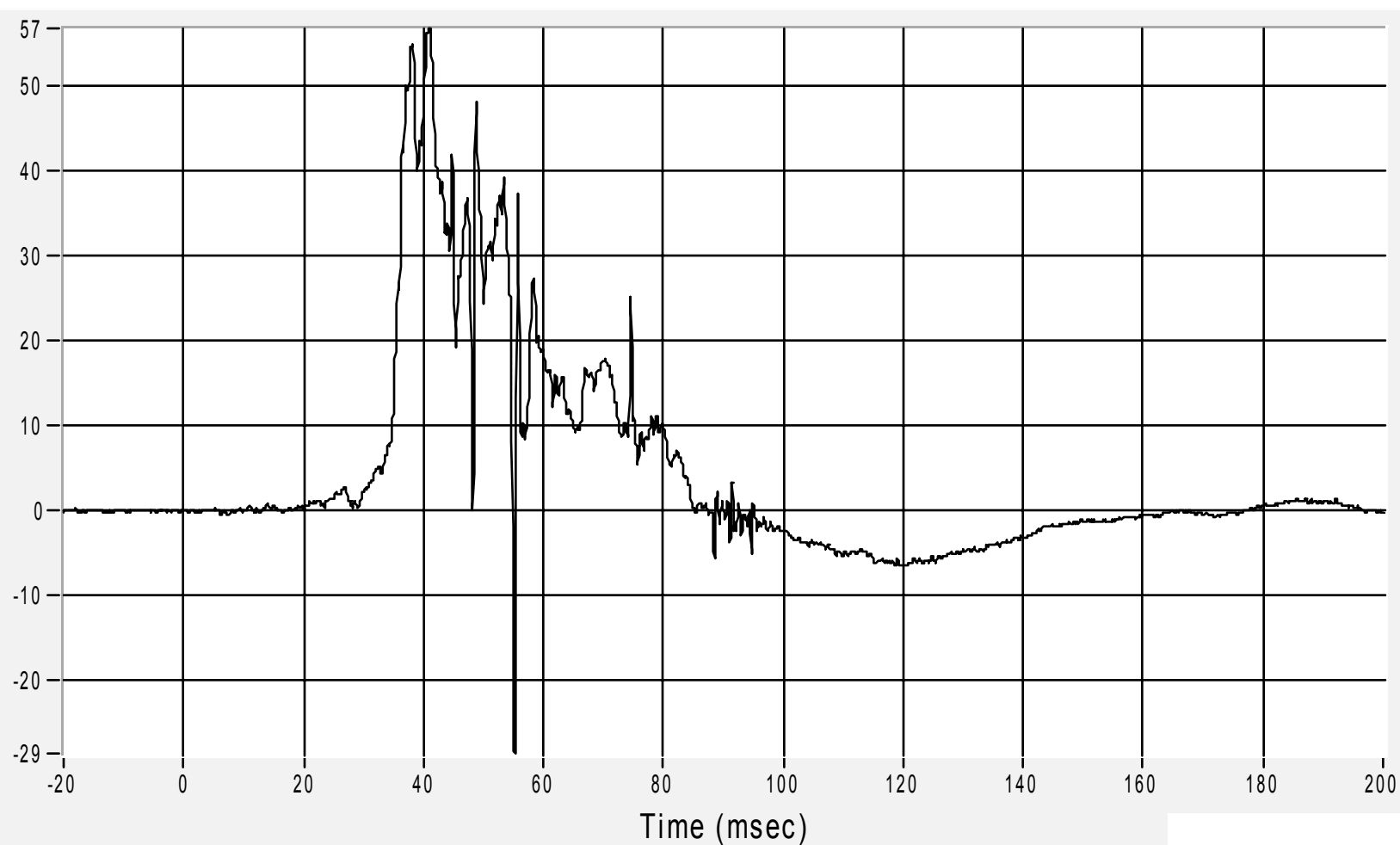
Medical College of Wisconsin
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Passenger Upper Rib (Y) Acceleration

Acceleration (G's) CFC1000

Max 56.7 G at 41.0 msec

Min -28.6 G at 55.2 msec



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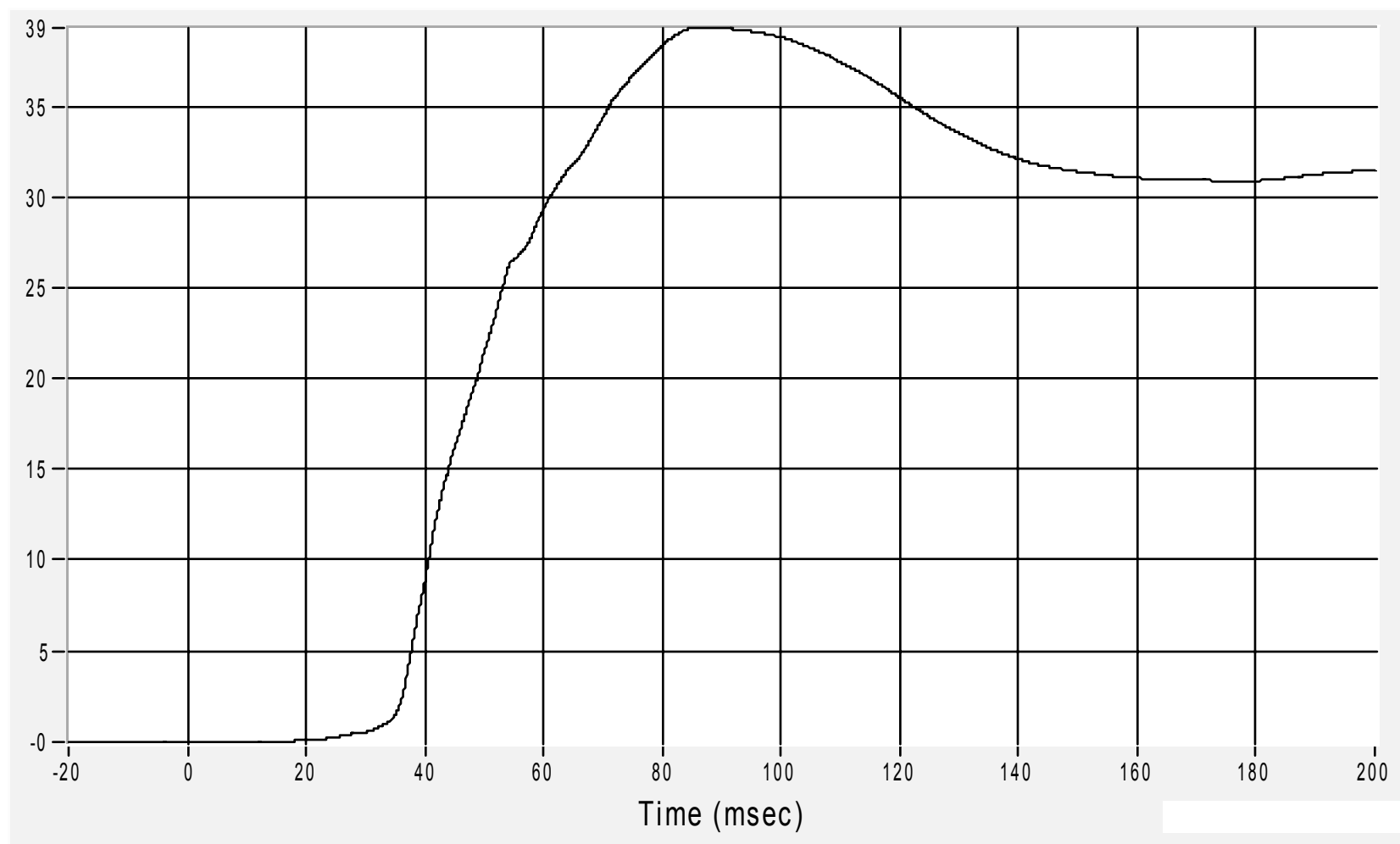
Medical College of Wisconsin
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Passenger Upper Rib (Y) Velocity

Velocity (km/h) CFC180

Max 39.3 km/h at 87.3 msec

Min 0.0 km/h at 8.7 msec



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3 February 2004

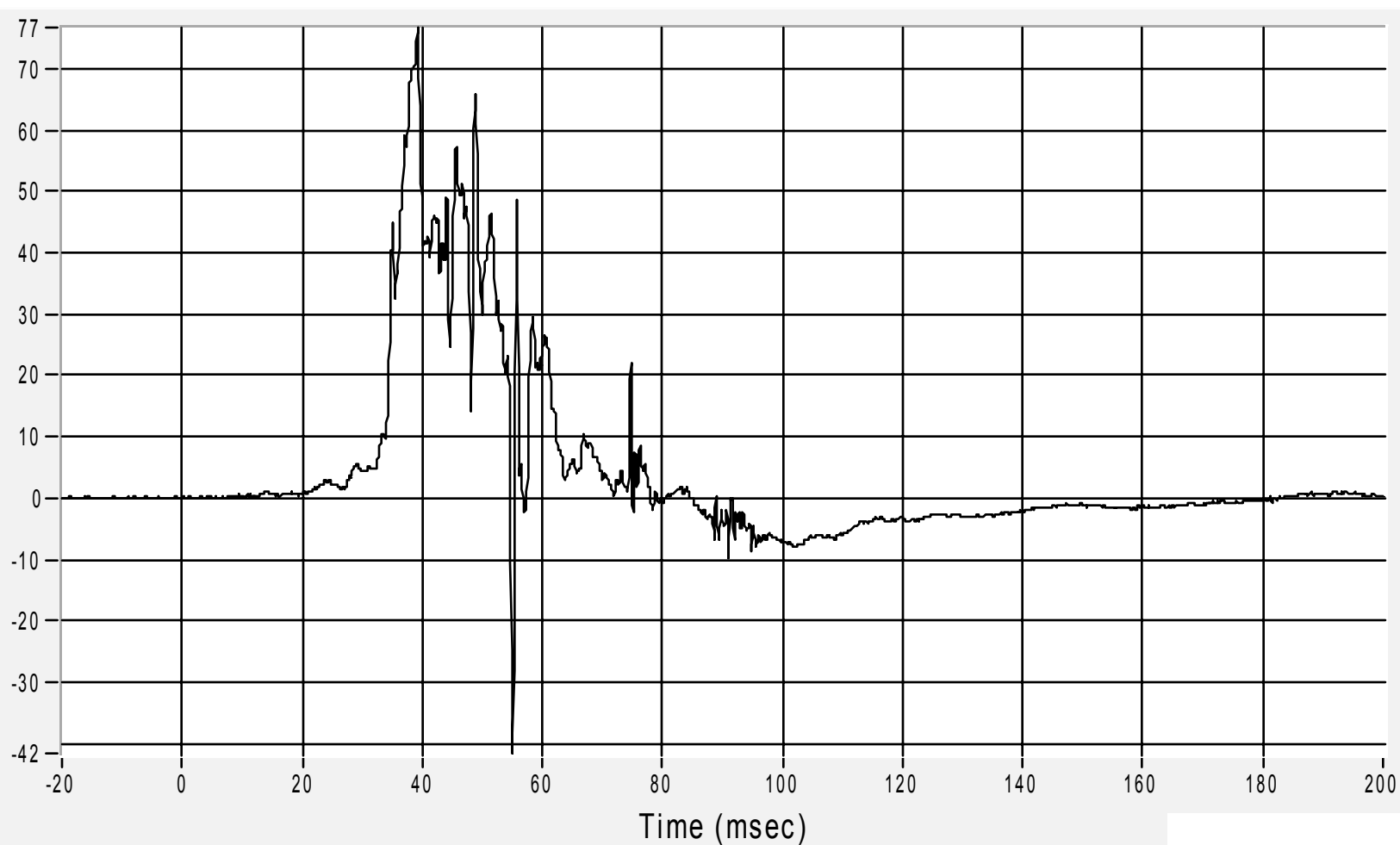
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Lower Rib (Y) Acceleration

Acceleration (G's) CFC1000

Max 76.7 G at 39.2 msec

Min -41.6 G at 55.0 msec



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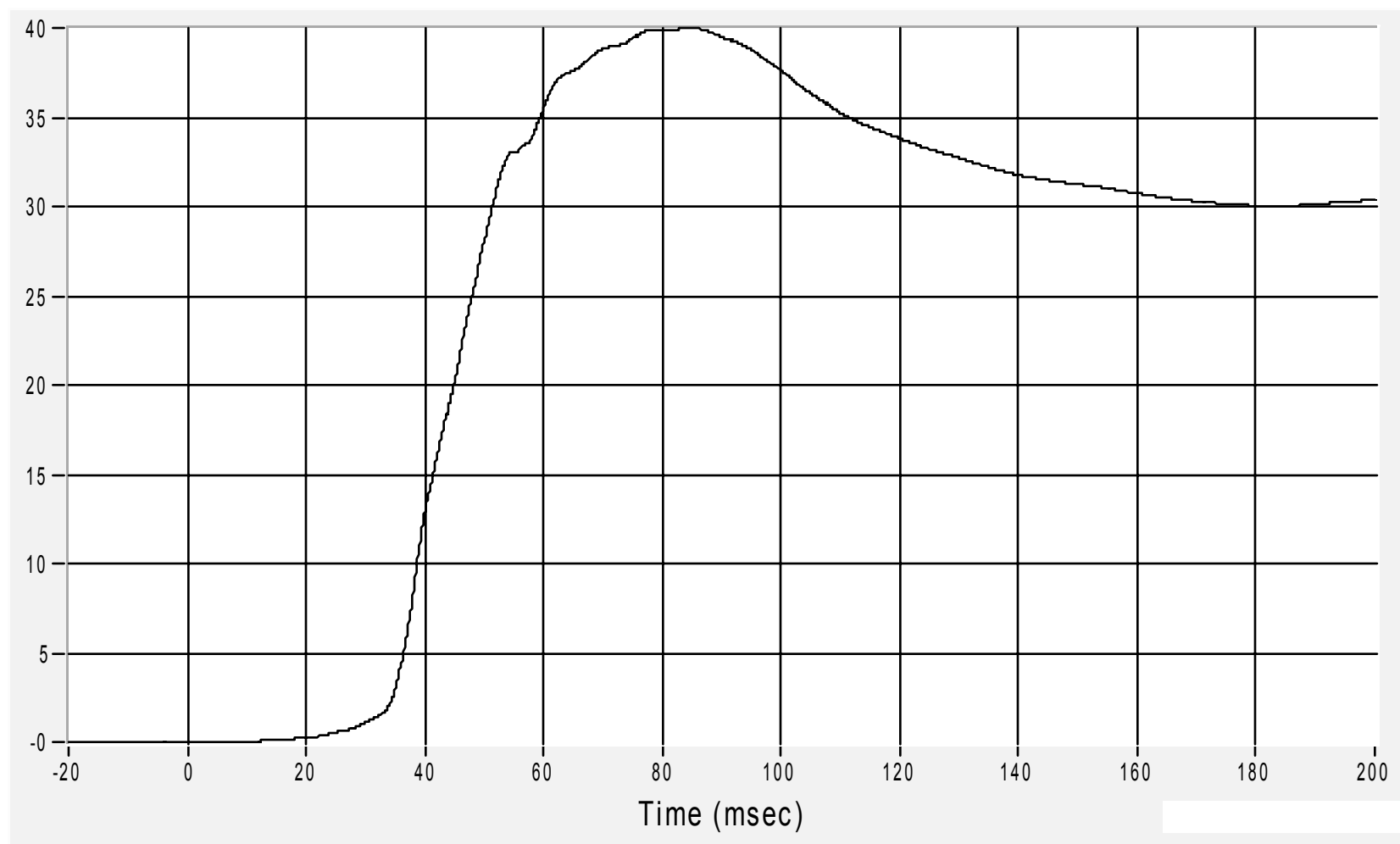
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Lower Rib (Y) Velocity

Velocity (km/h) CFC180

Max 40.0 km/h at 84.7 msec

Min 0.0 km/h at 0.0 msec



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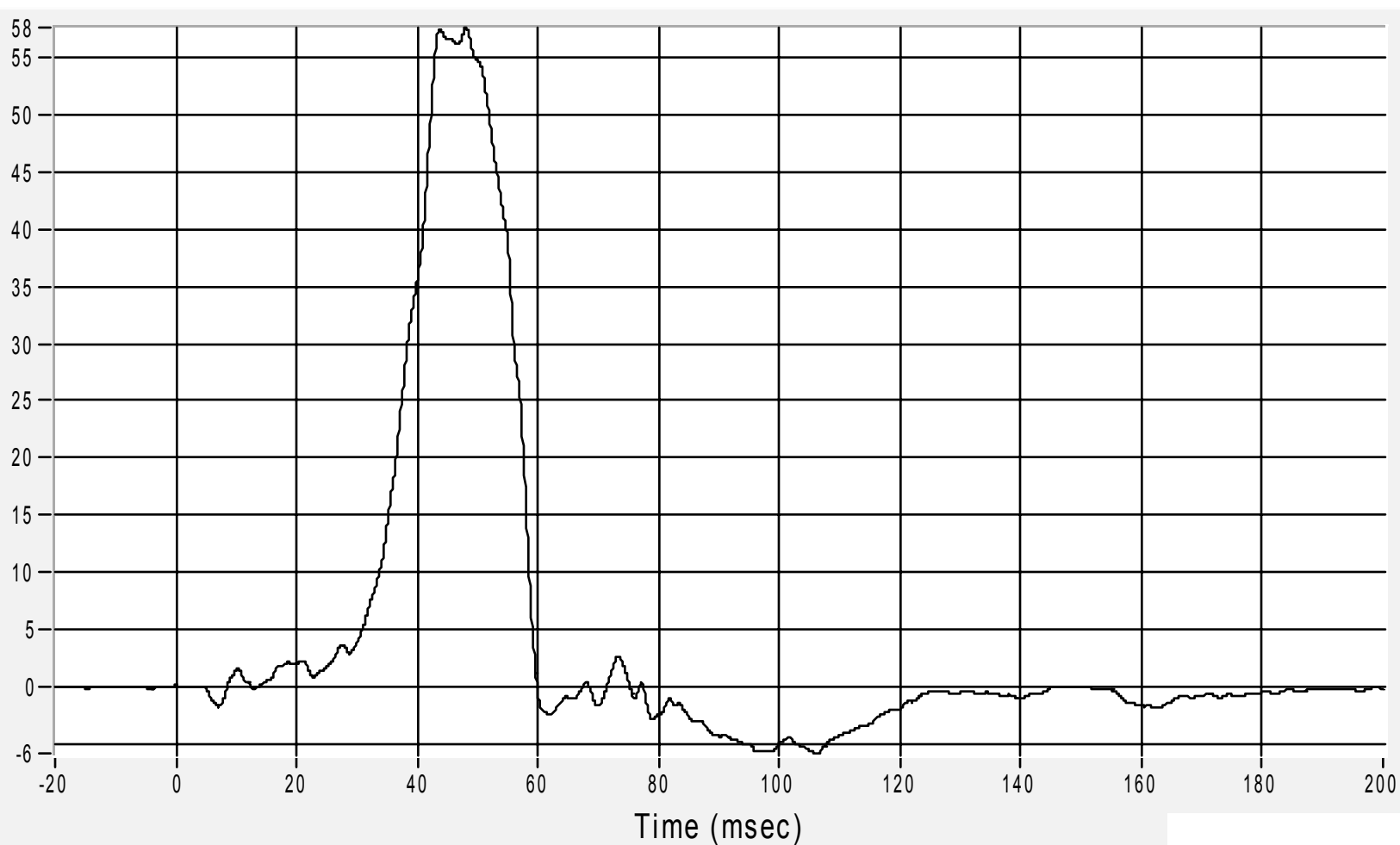
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Lower Spine (Y) Acceleration

Acceleration (G's) CFC180

Max 57.6 G at 48.1 msec

Min -5.8 G at 106.1 msec



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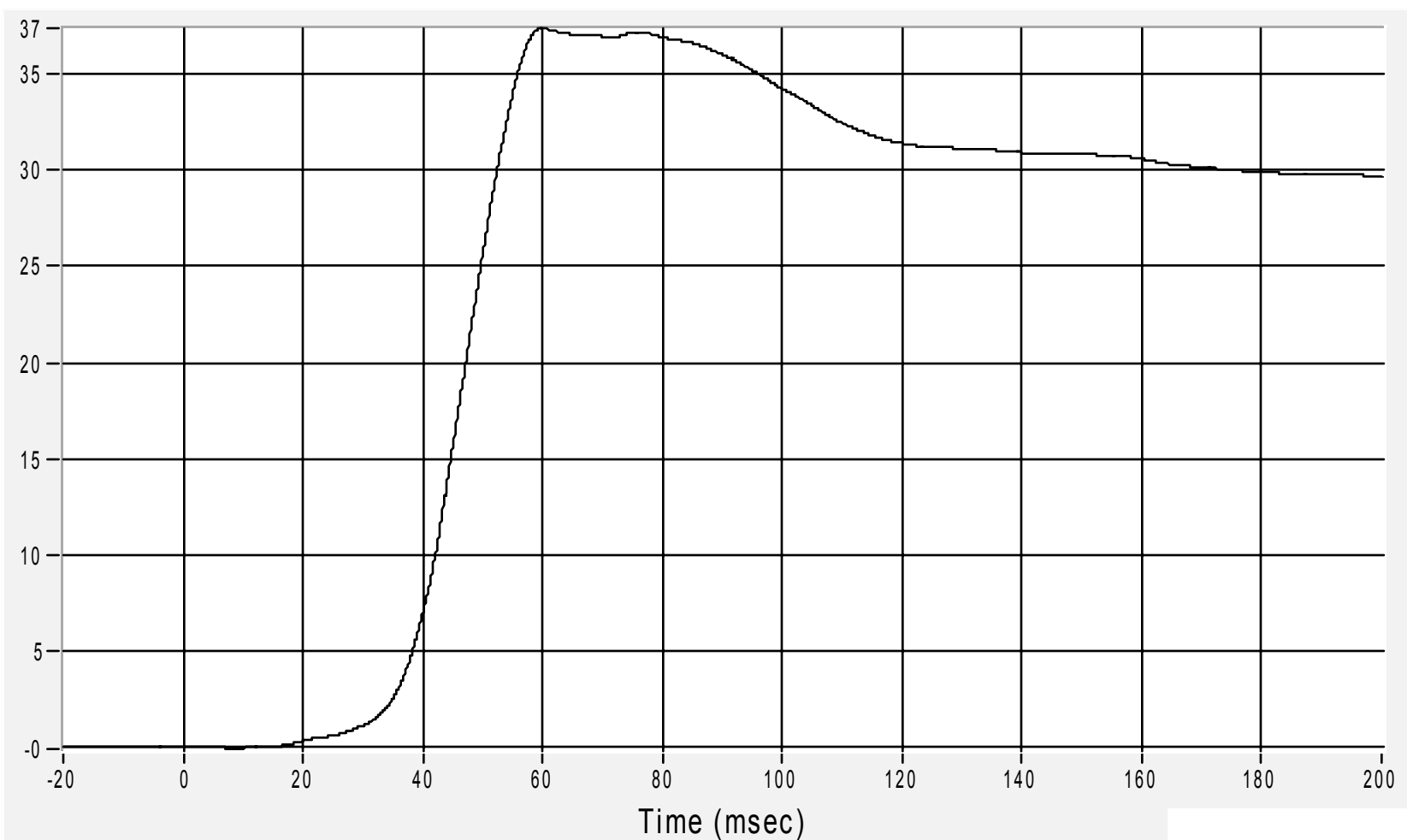
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Lower Spine (Y) Velocity

Velocity (km/h) CFC180

Max 37.4 km/h at 59.8 msec

Min -0.1 km/h at 8.6 msec



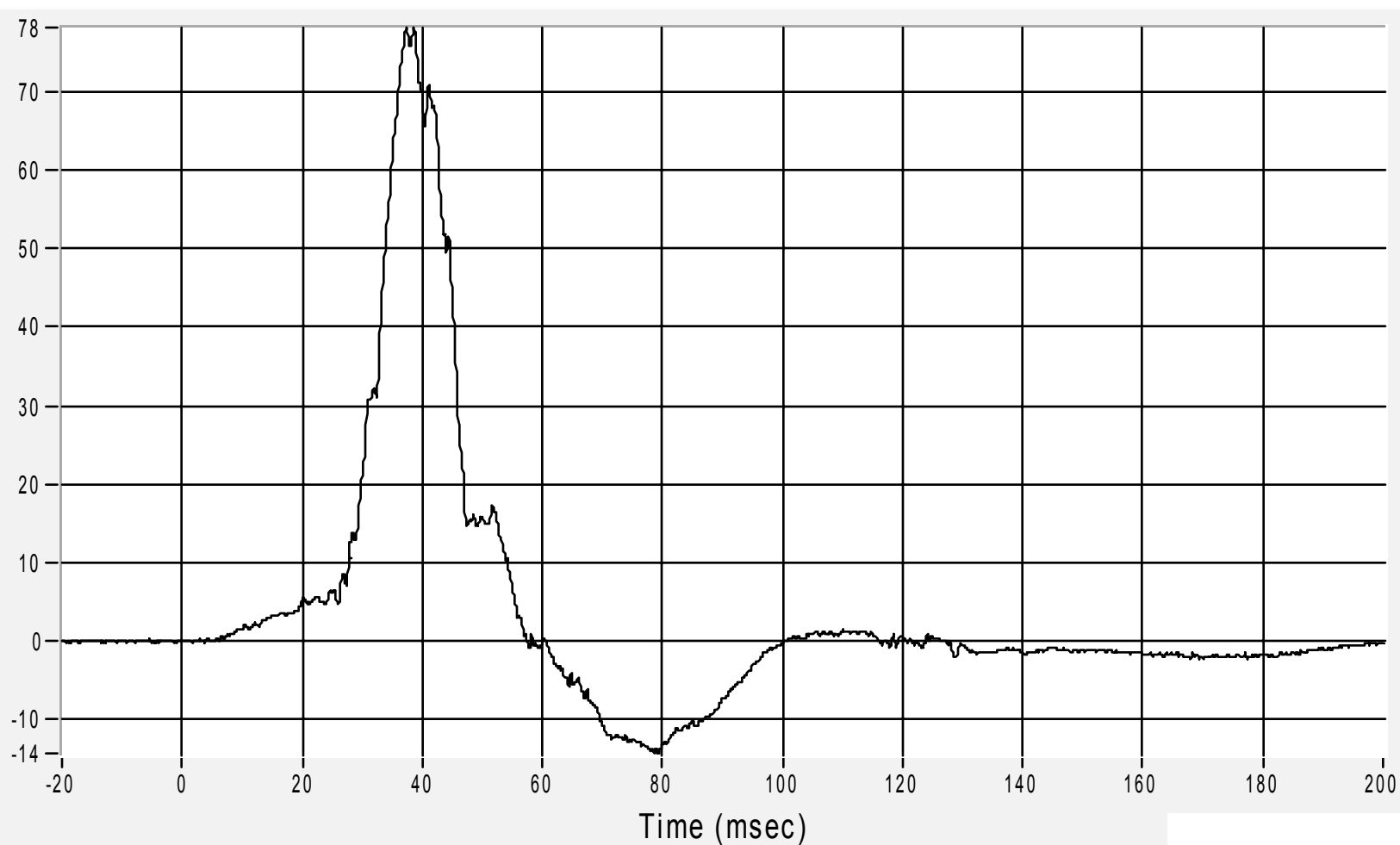
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Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Pelvic (Y) Acceleration
Acceleration (G's) CFC1000

Max 78.1 G at 38.6 msec
Min -14.3 G at 79.4 msec



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3 February 2004

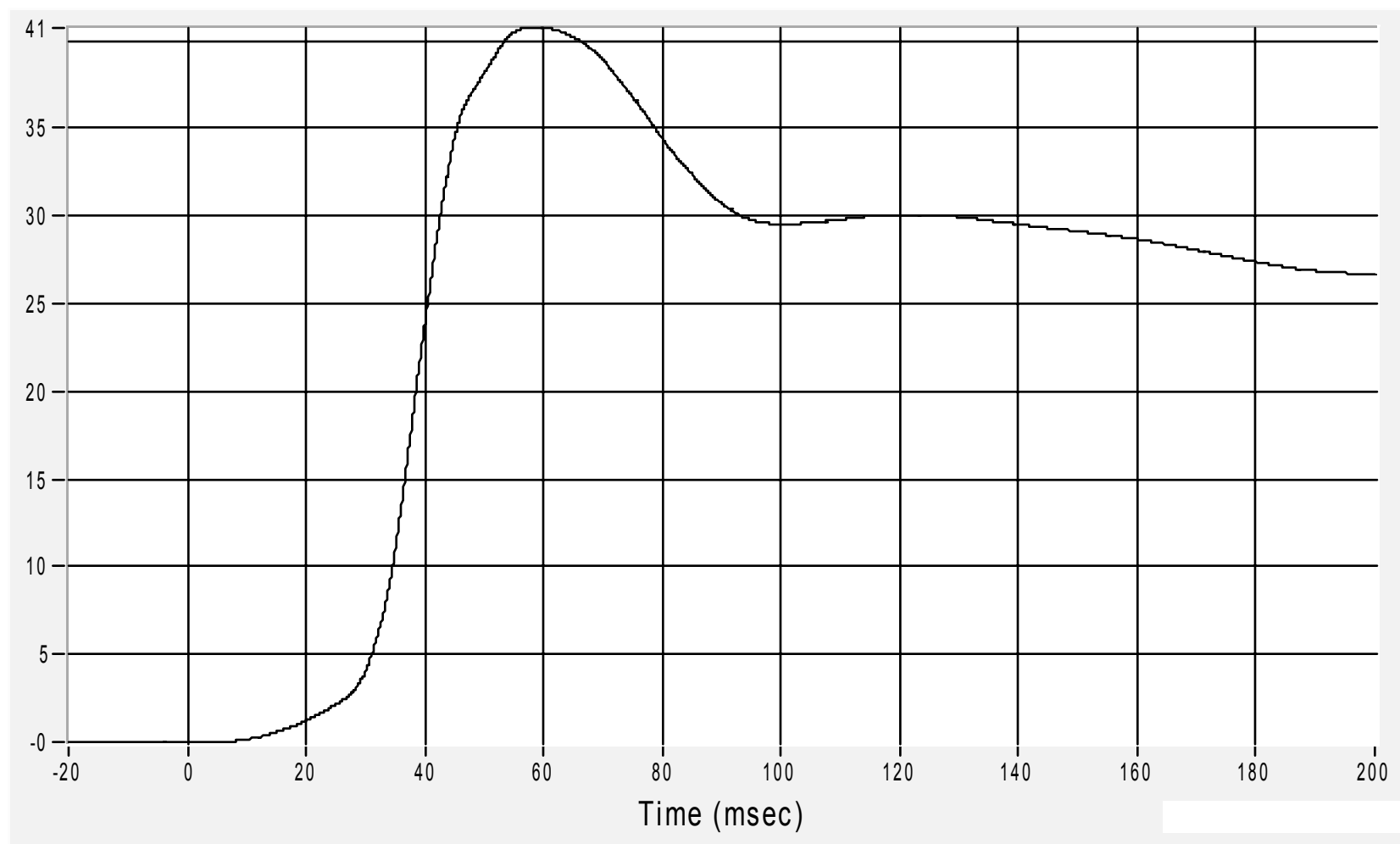
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Pelvic (Y) Velocity

Velocity (km/h) CFC180

Max 40.7 km/h at 57.5 msec

Min 0.0 km/h at 0.0 msec



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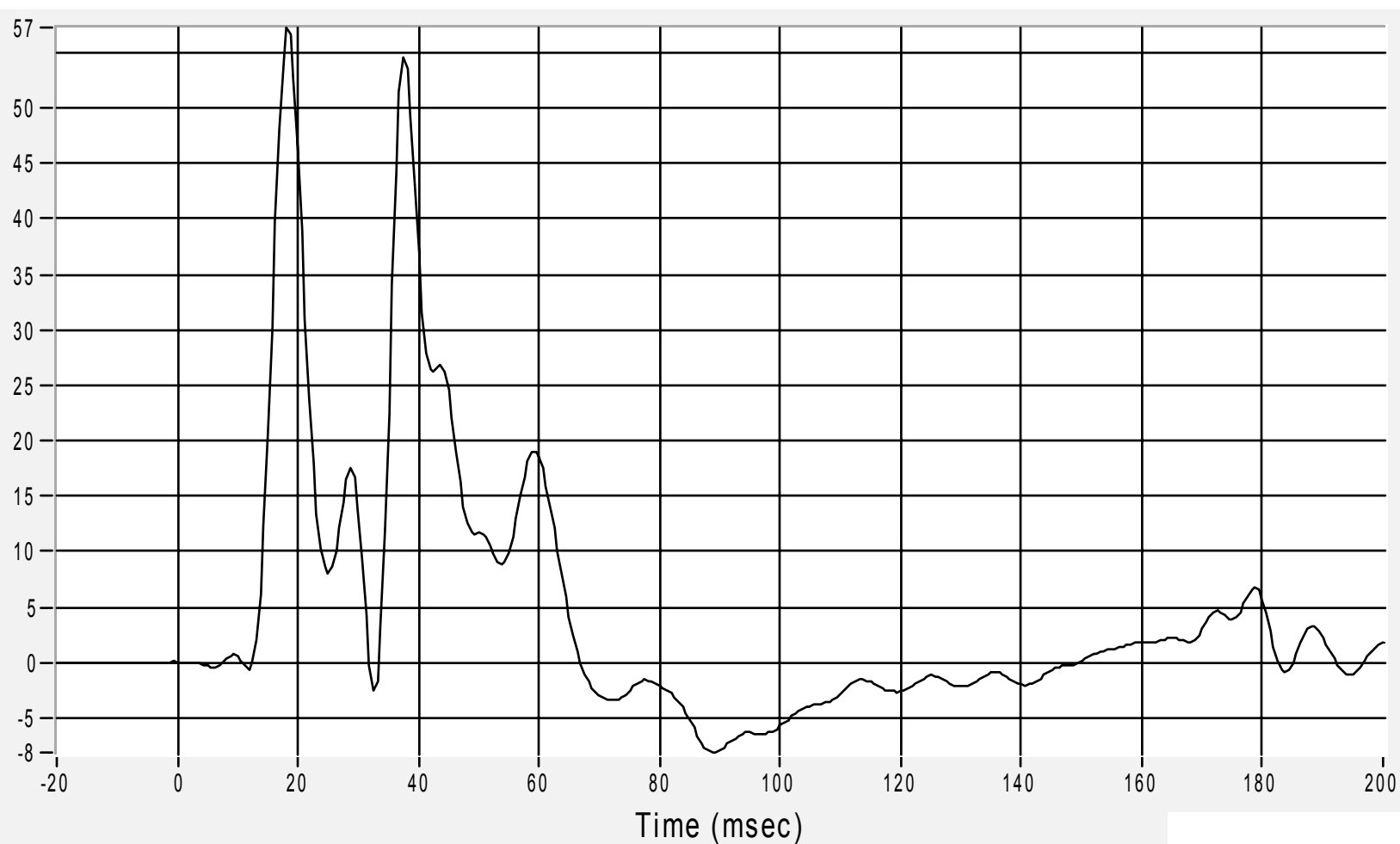
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Driver Upper Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 57.3 G at 18.1 msec

Min -8.1 G at 88.8 msec



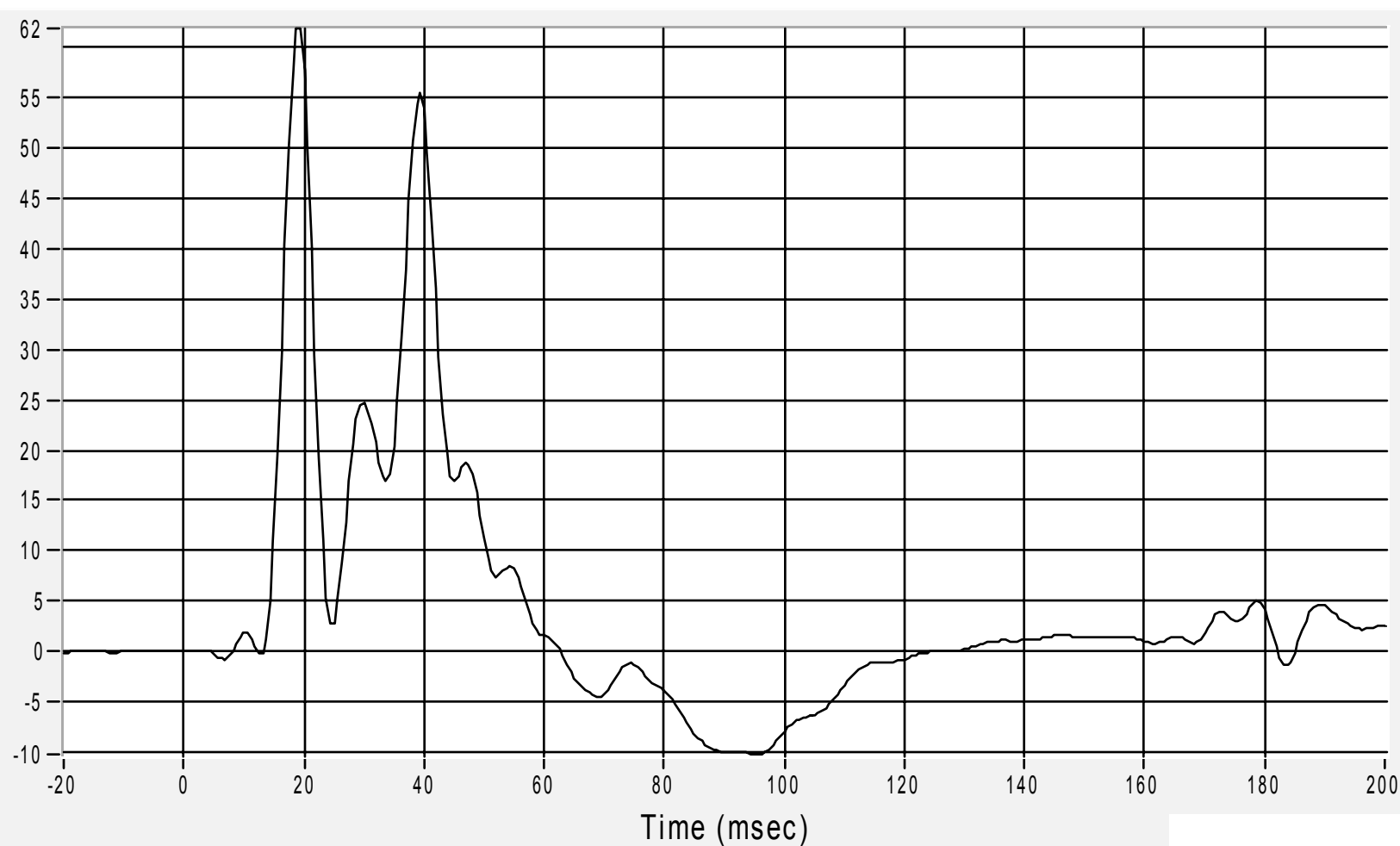
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Driver Lower Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 61.8 G at 19.4 msec**Min -10.2 G at 95.6 msec**

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3 February 2004

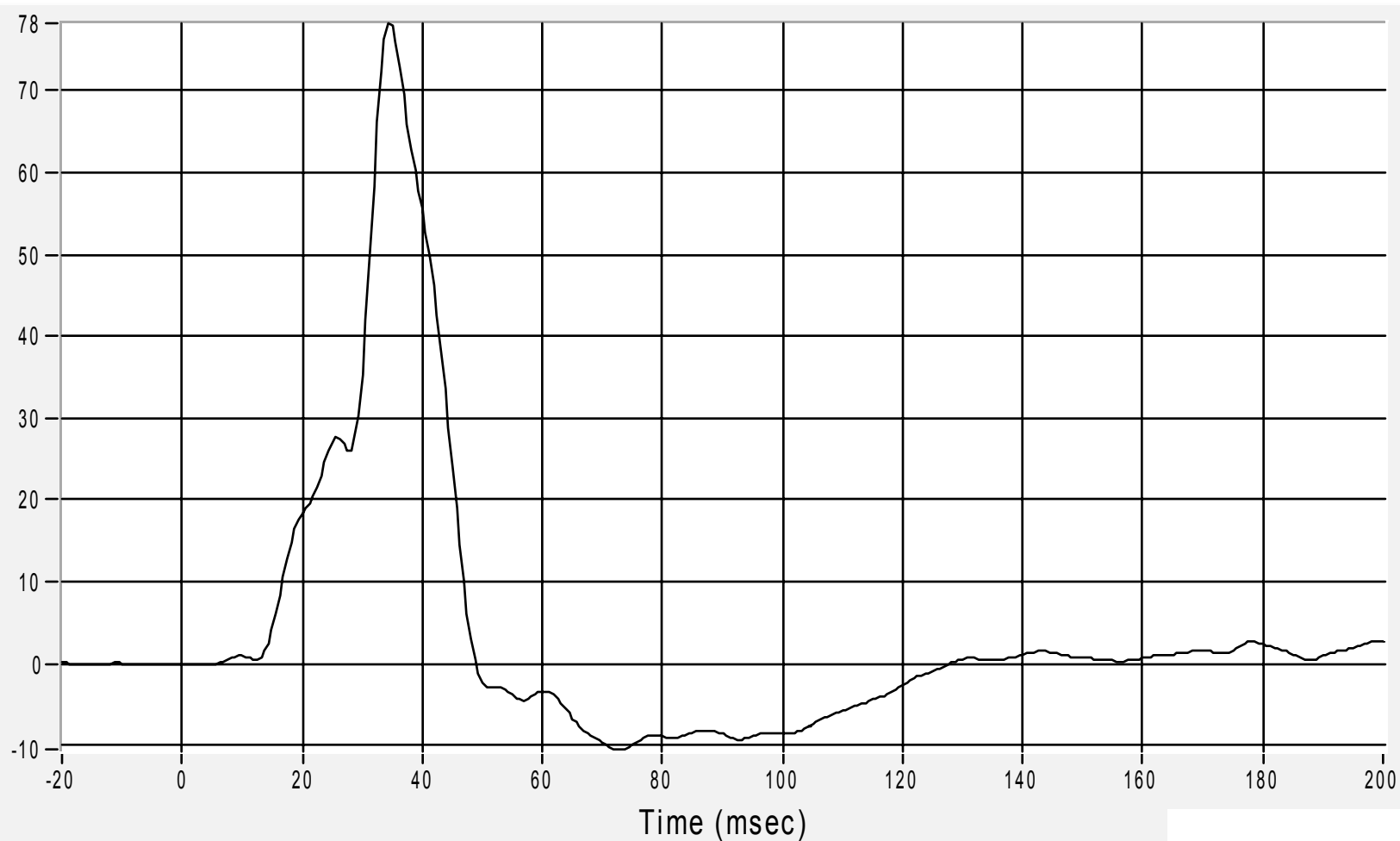
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Driver Lower Spine (Y) Acceleration

Acceleration (G's) FIR100

Max 78.2 G at 34.4 msec

Min -10.5 G at 72.5 msec



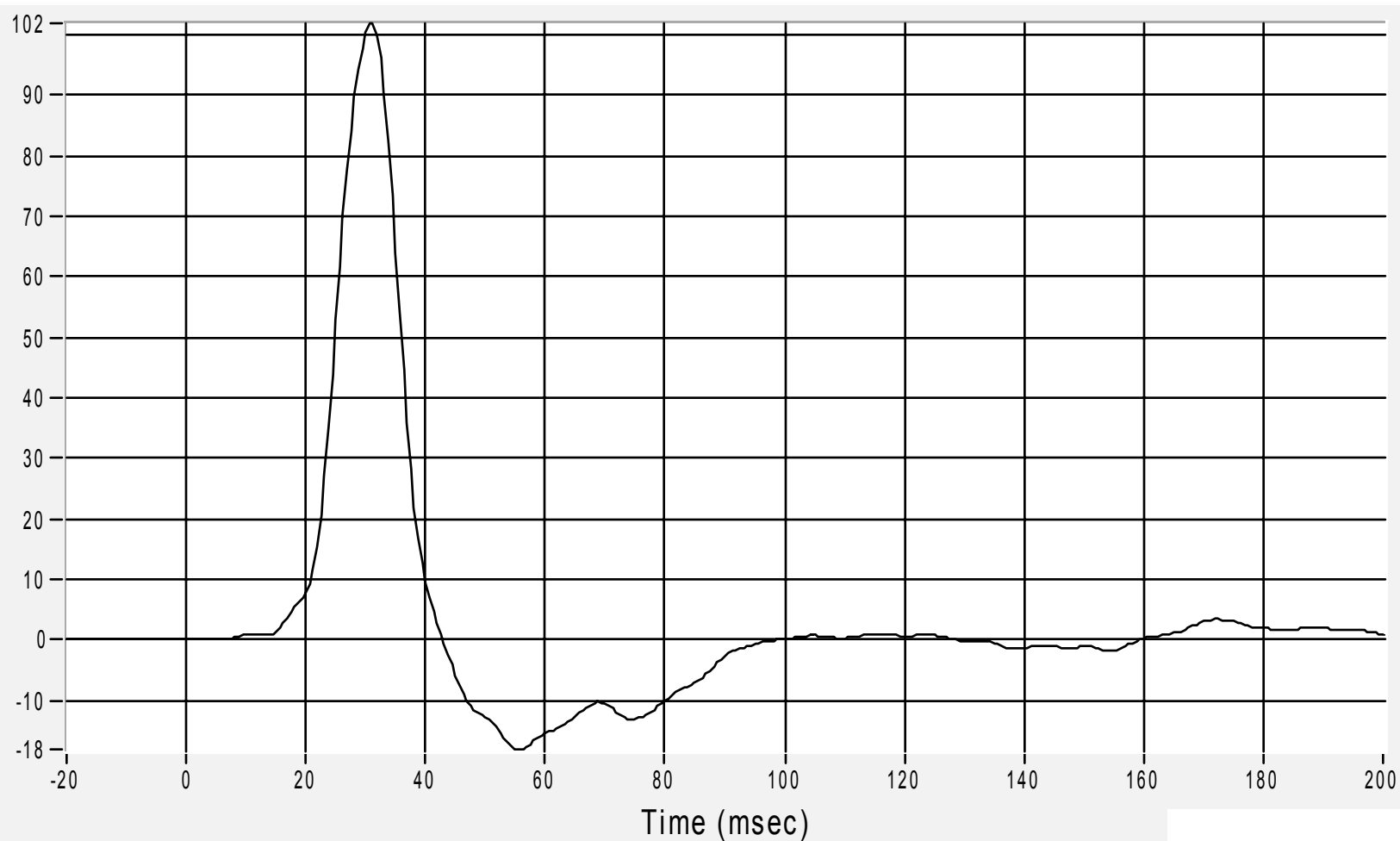
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Vehicle Crashworthiness Lab

Driver Pelvic (Y) Acceleration

Acceleration (G's) FIR100

Max 101.9 G at 30.6 msec**Min -18.1 G at 55.6 msec**

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3 February 2004

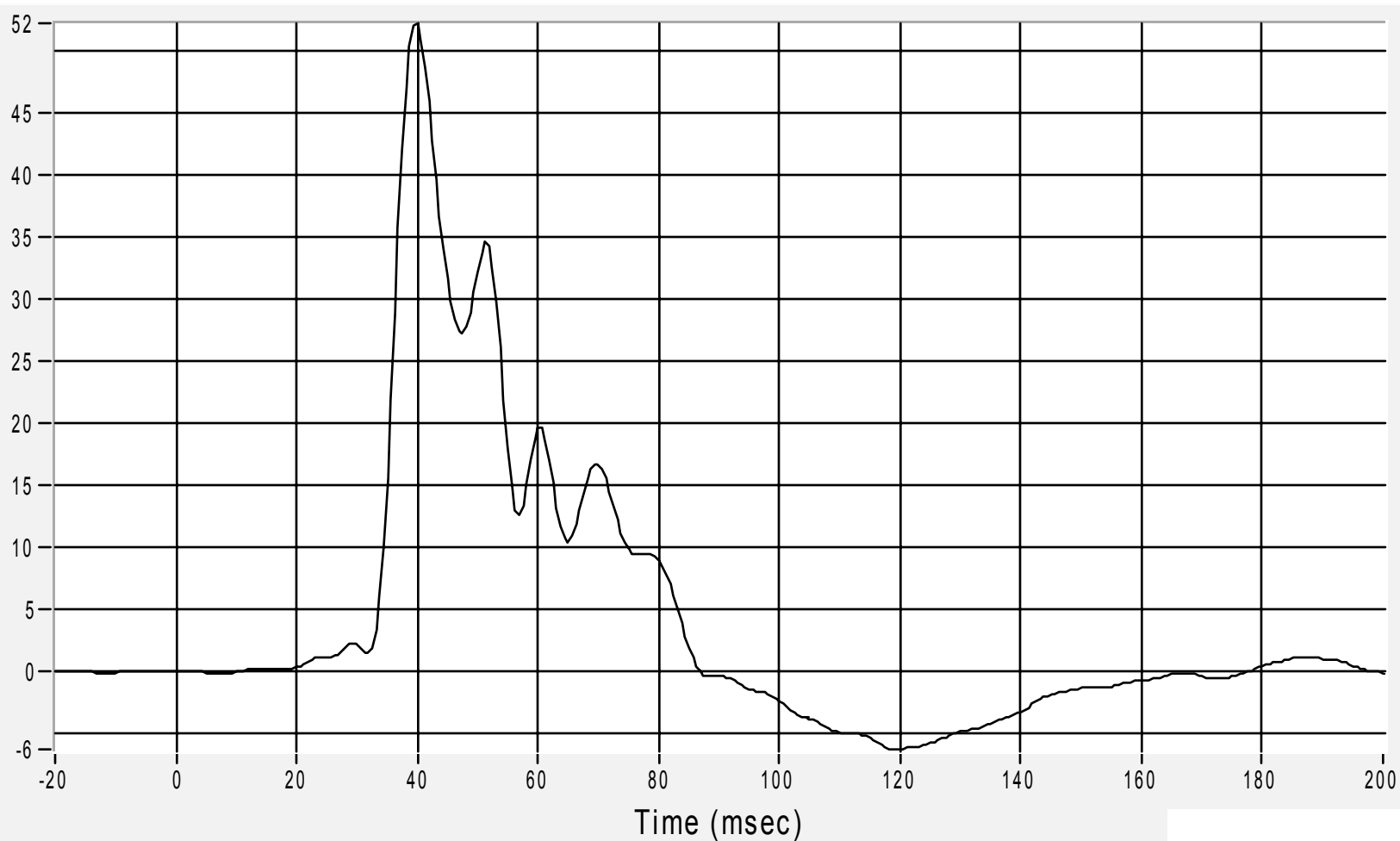
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Passenger Upper Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 52.3 G at 40.0 msec

Min -6.2 G at 119.4 msec



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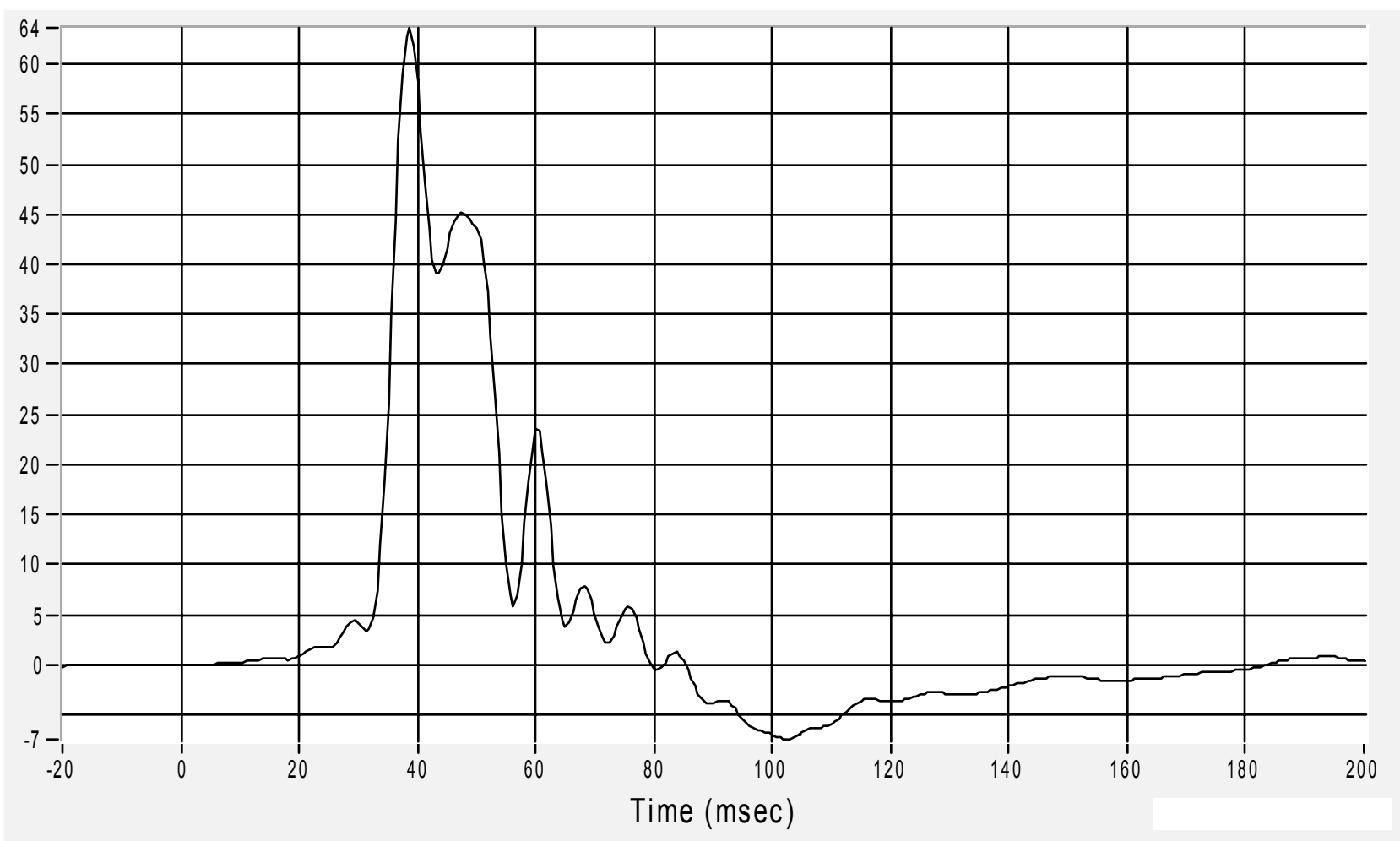
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Lower Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 63.6 G at 38.8 msec

Min -7.5 G at 102.5 msec



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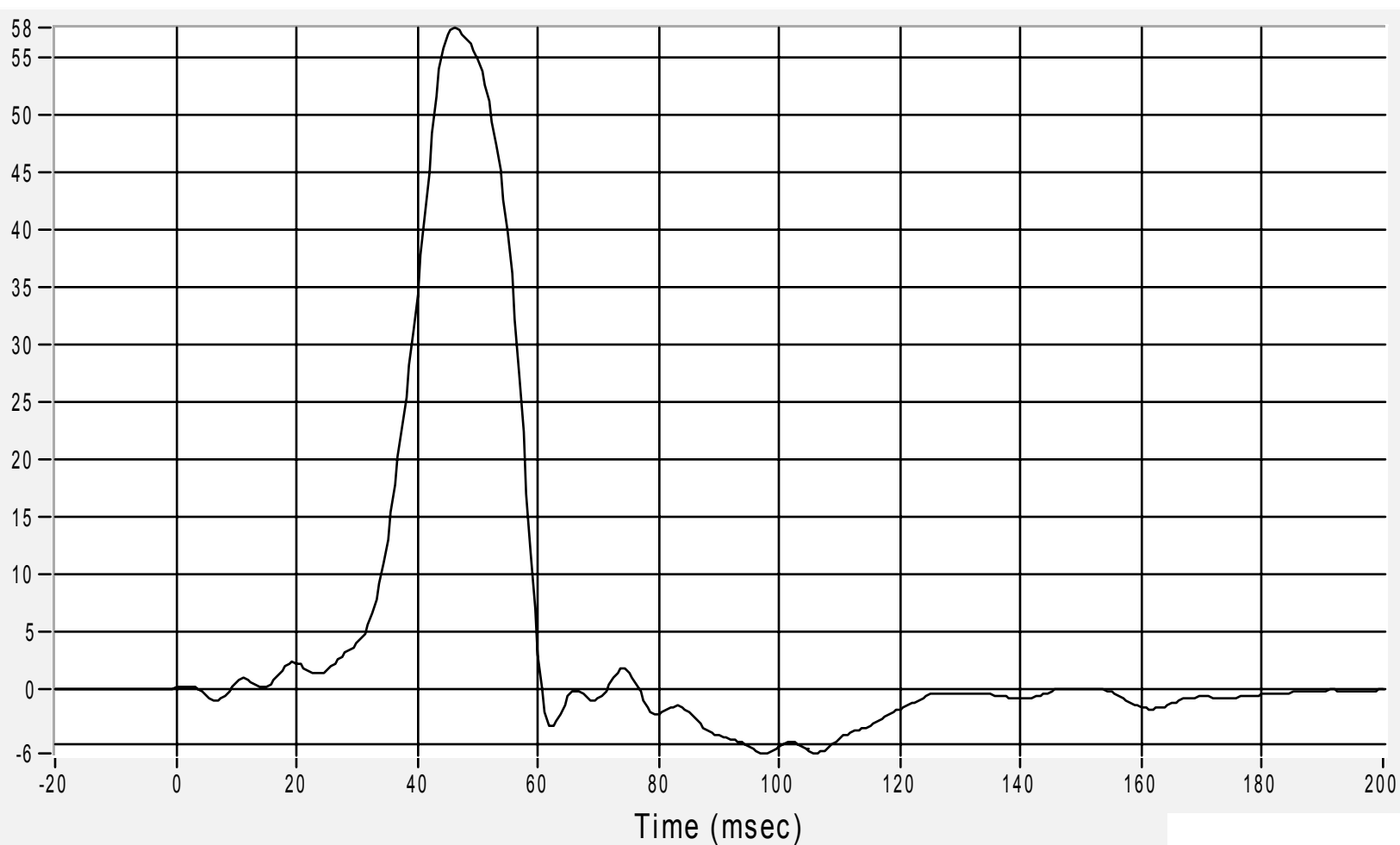
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Lower Spine (Y) Acceleration

Acceleration (G's) FIR100

Max 57.7 G at 46.2 msec

Min -5.7 G at 97.5 msec



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3 February 2004

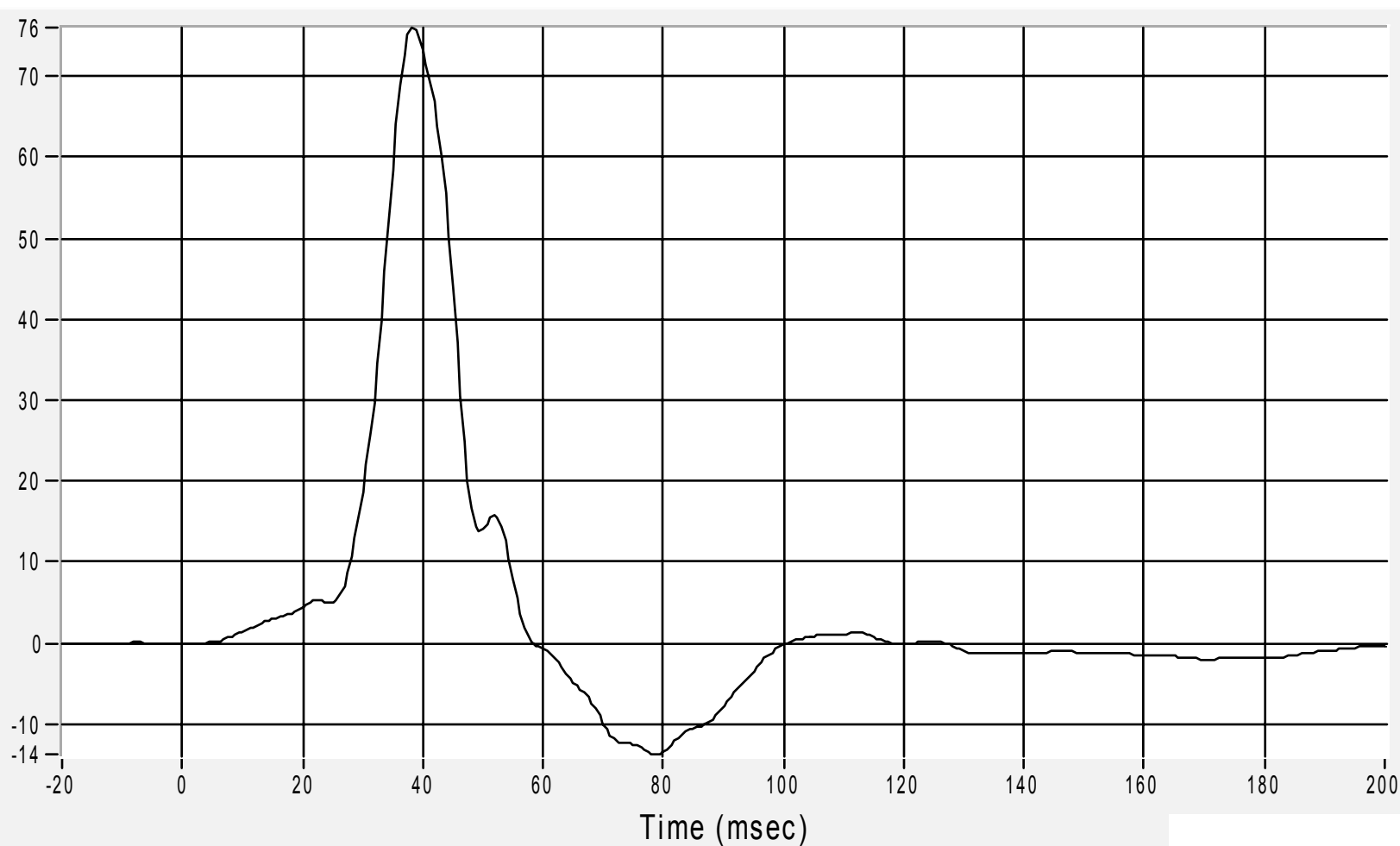
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Passenger Pelvic (Y) Acceleration

Acceleration (G's) FIR100

Max 76.0 G at 38.1 msec

Min -13.8 G at 78.8 msec



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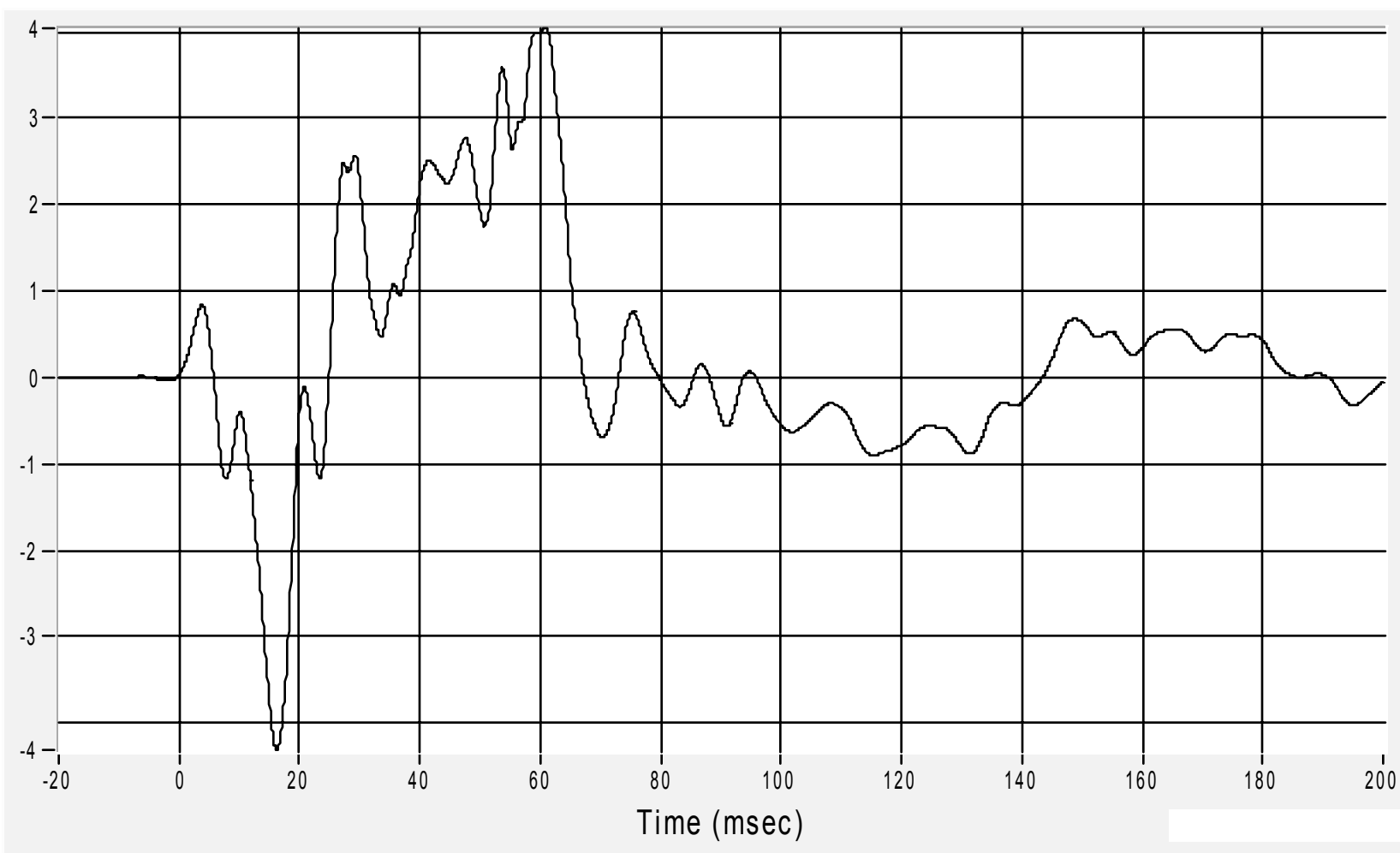
*Medical College of Wisconsin
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Right Side Sill at Front Seat (X) Acceleration

Acceleration (G's) CFC60

Max 4.0 G at 60.8 msec

Min -4.3 G at 16.2 msec



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3 February 2004

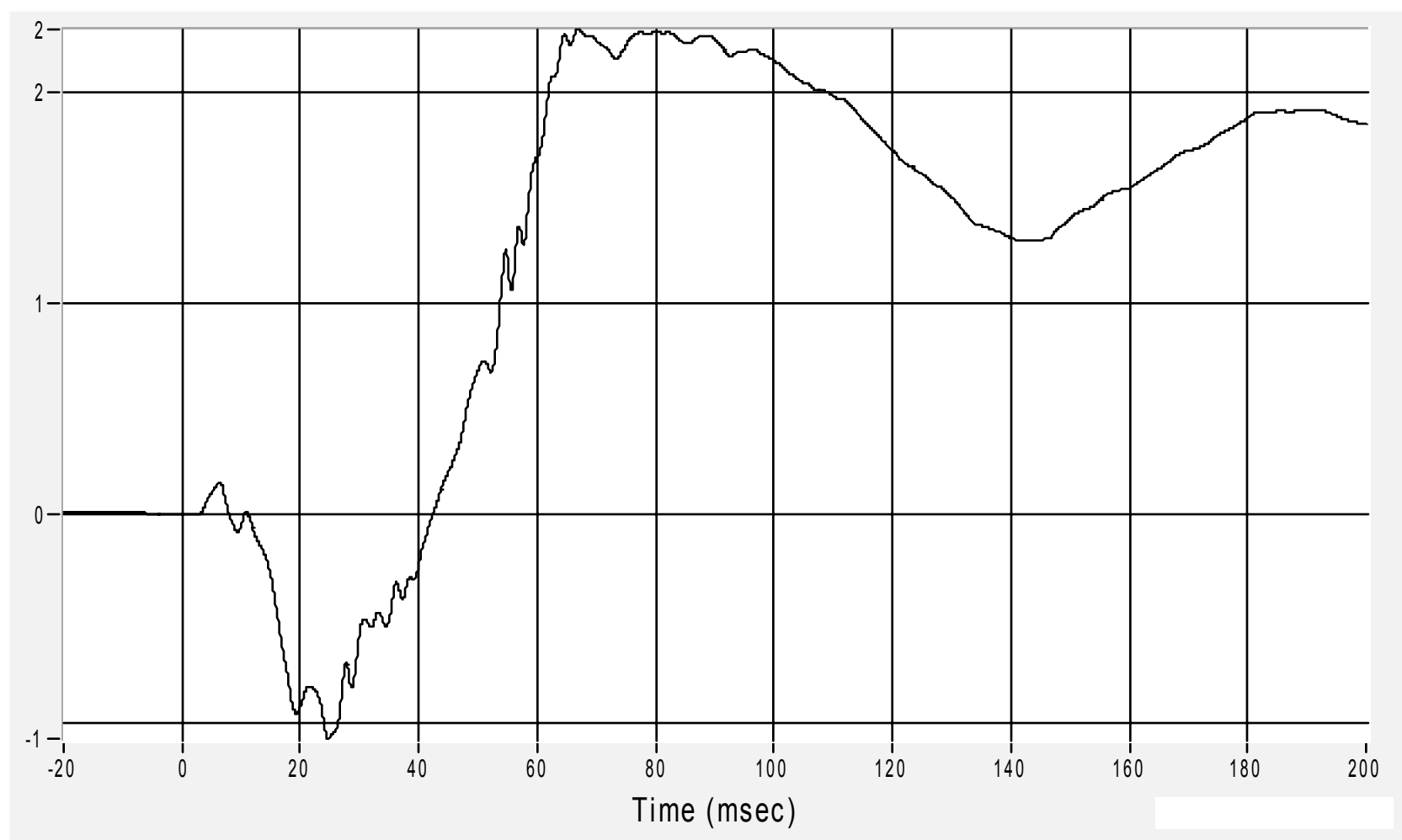
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Right Side Sill at Front Seat (X) Velocity

Velocity (km/h) CFC180

Max 2.3 km/h at 66.9 msec

Min -1.1 km/h at 24.7 msec



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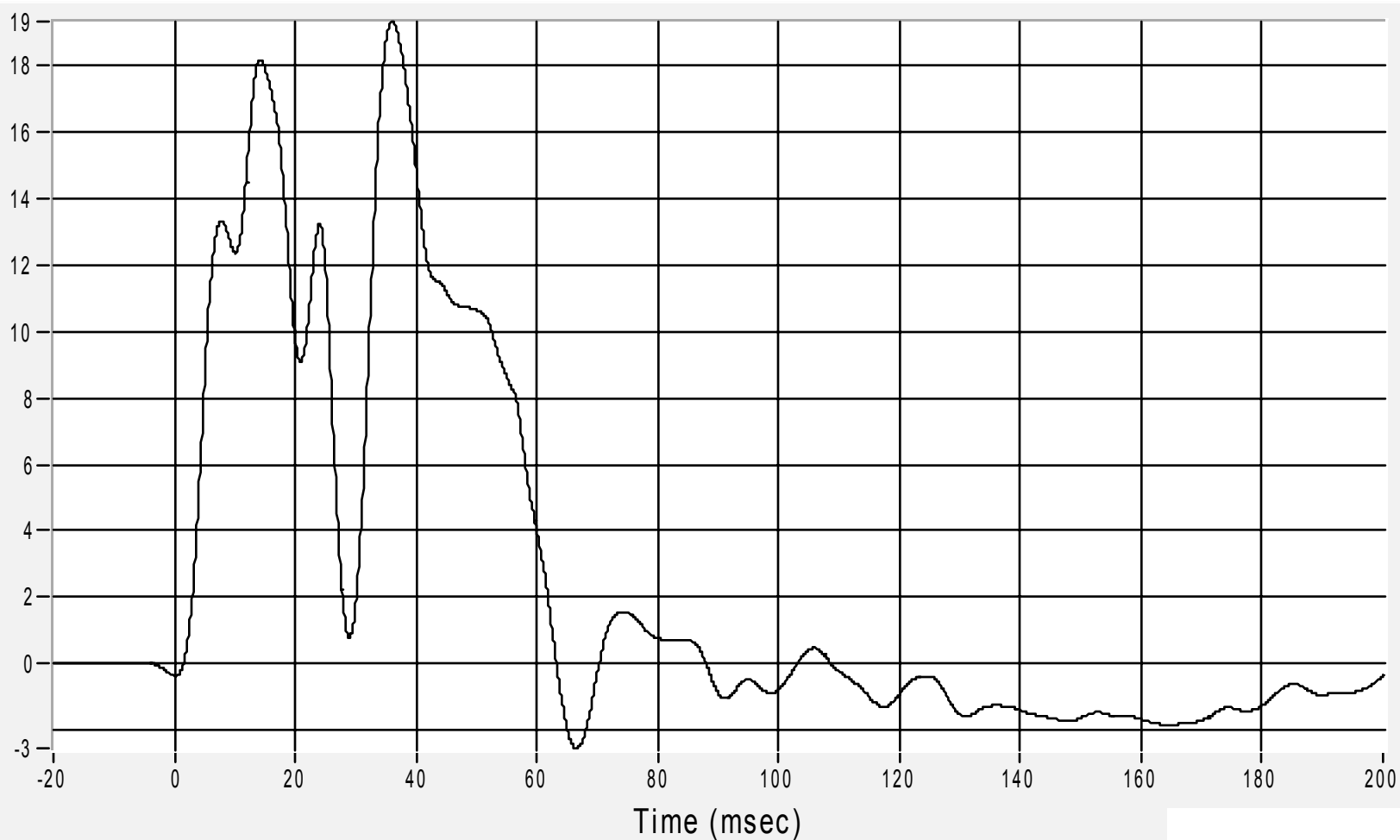
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Right Side Sill at Front Seat (Y) Acceleration

Acceleration (G's) CFC60

Max 19.3 G at 36.1 msec

Min -2.5 G at 66.6 msec



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3 February 2004

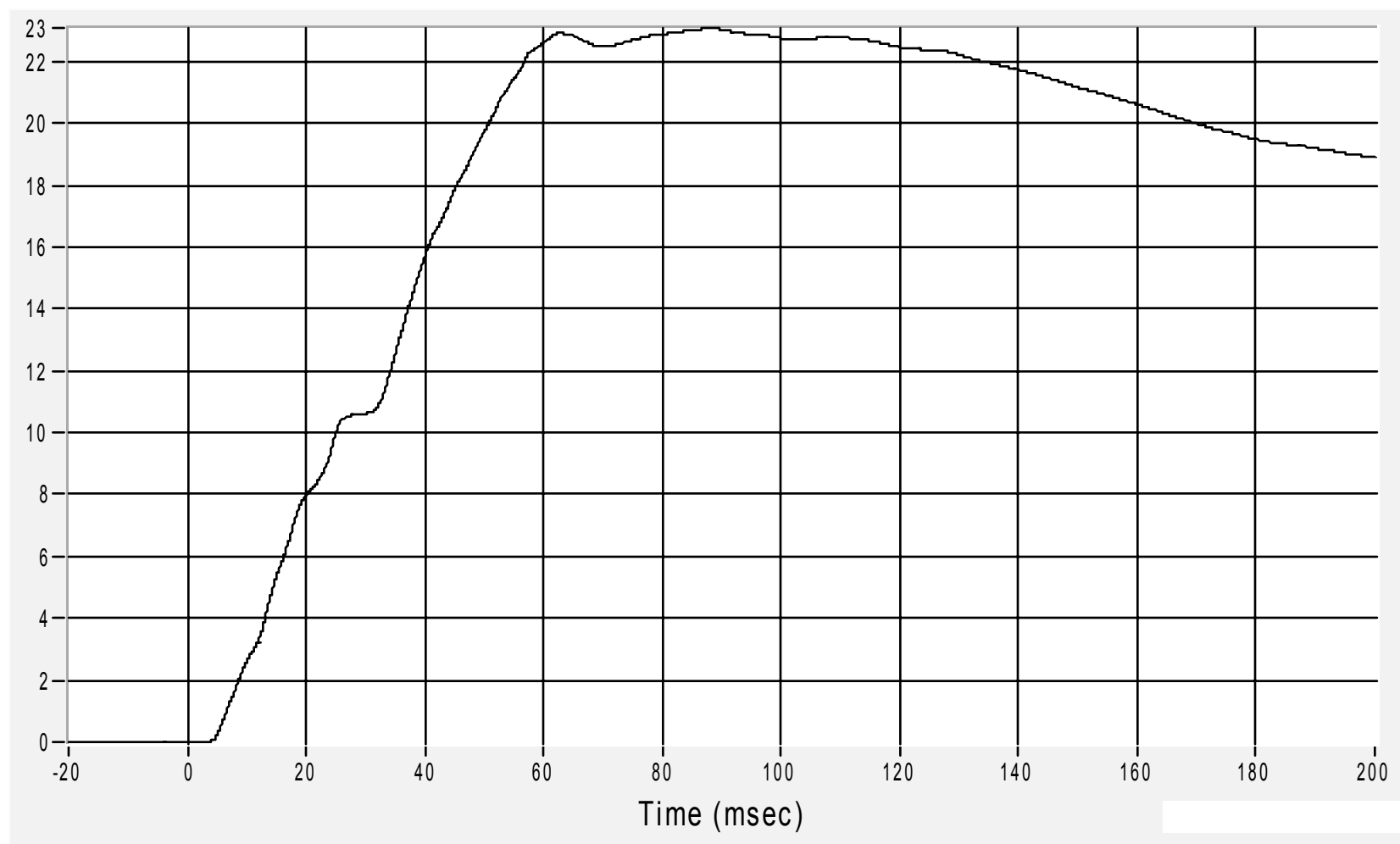
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Right Side Sill at Front Seat (Y) Velocity

Velocity (km/h) CFC180

Max 23.1 km/h at 88.4 msec

Min 0.0 km/h at 0.0 msec



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3 February 2004

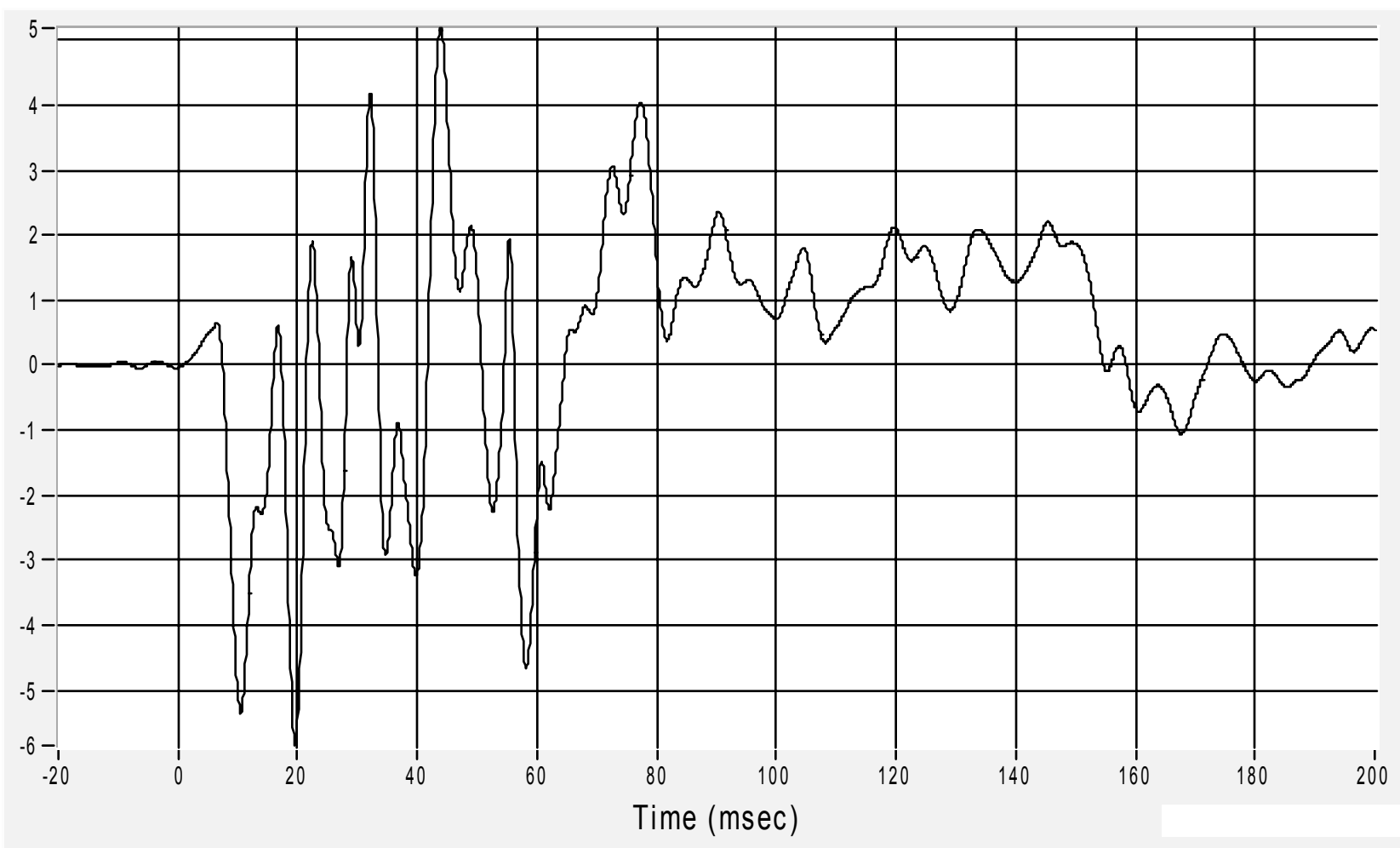
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Right Side Sill at Front Seat (Z) Acceleration

Acceleration (G's) CFC60

Max 5.2 G at 43.8 msec

Min -5.9 G at 19.6 msec



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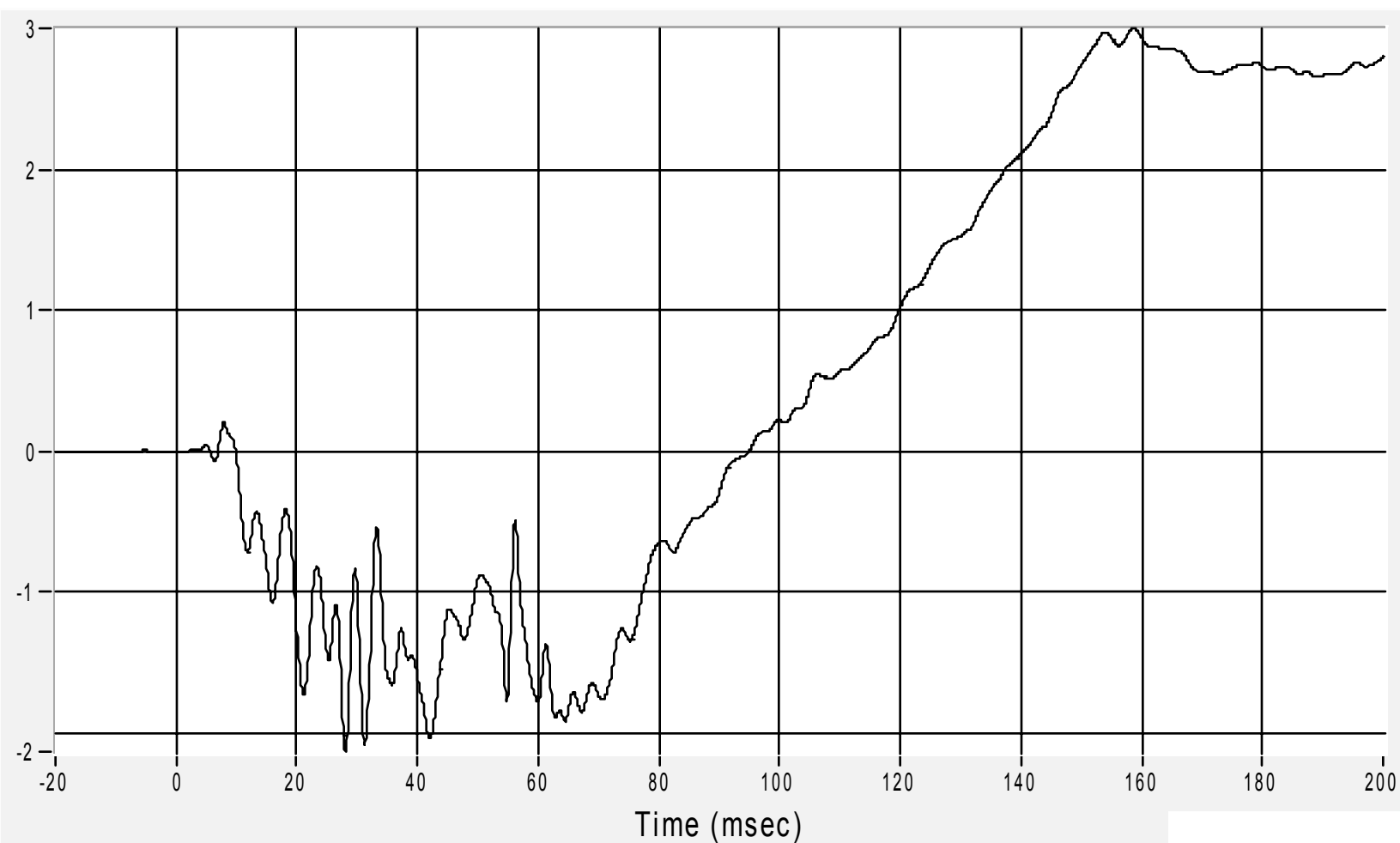
3 February 2004

Medical College of Wisconsin
Vehicle Crashworthiness Lab

B-60

Right Side Sill at Front Seat (Z) Velocity

Velocity (km/h) CFC180

Max 3.0 km/h at 158.7 msec**Min -2.1 km/h at 28.1 msec**

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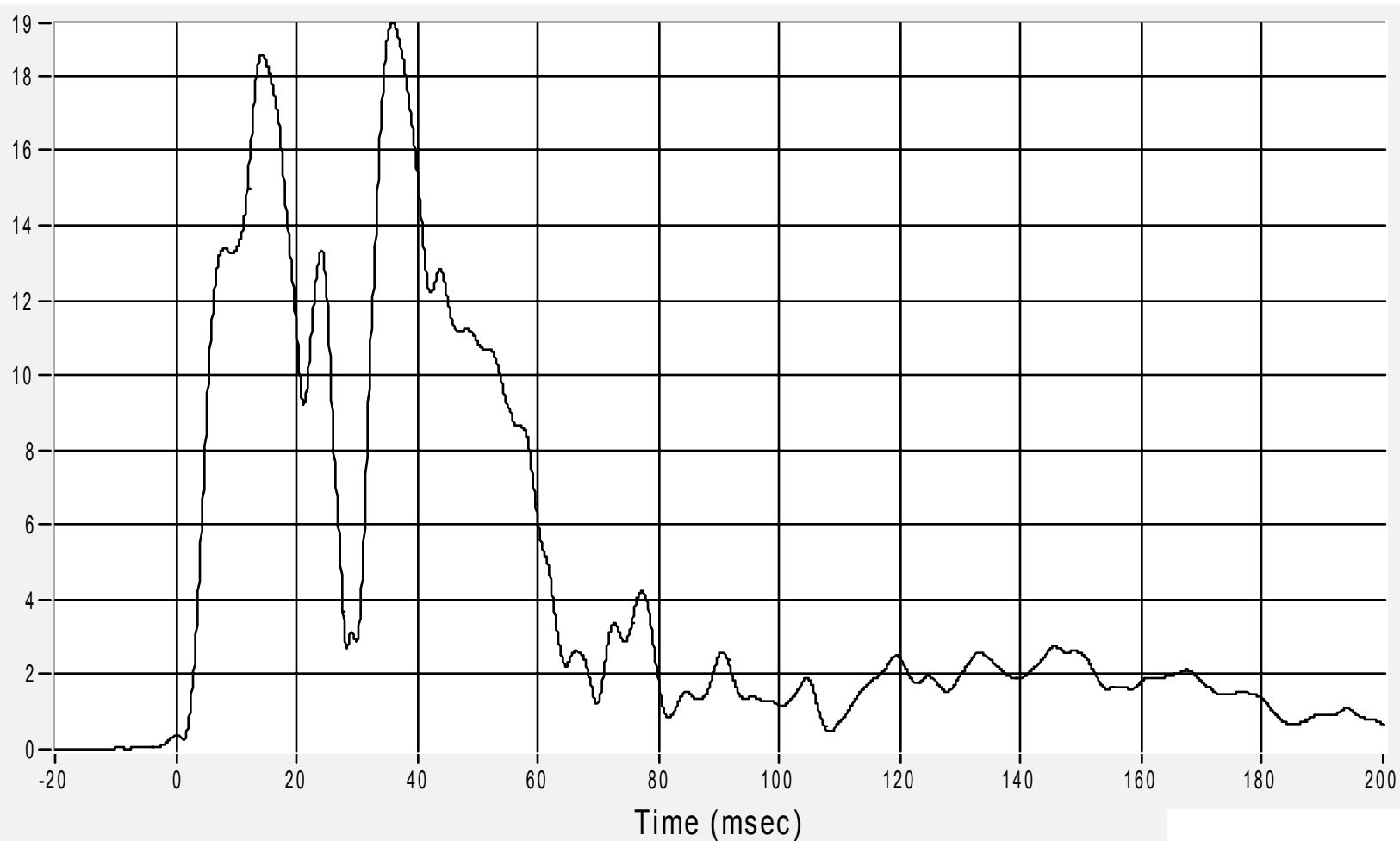
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Right Side Sill at Front Seat Resultant Acceleration

Acceleration (G's) CFC60

Max 19.4 G's at 35.9 msec

Min 0.3 G's at 1.3 msec



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3 February 2004

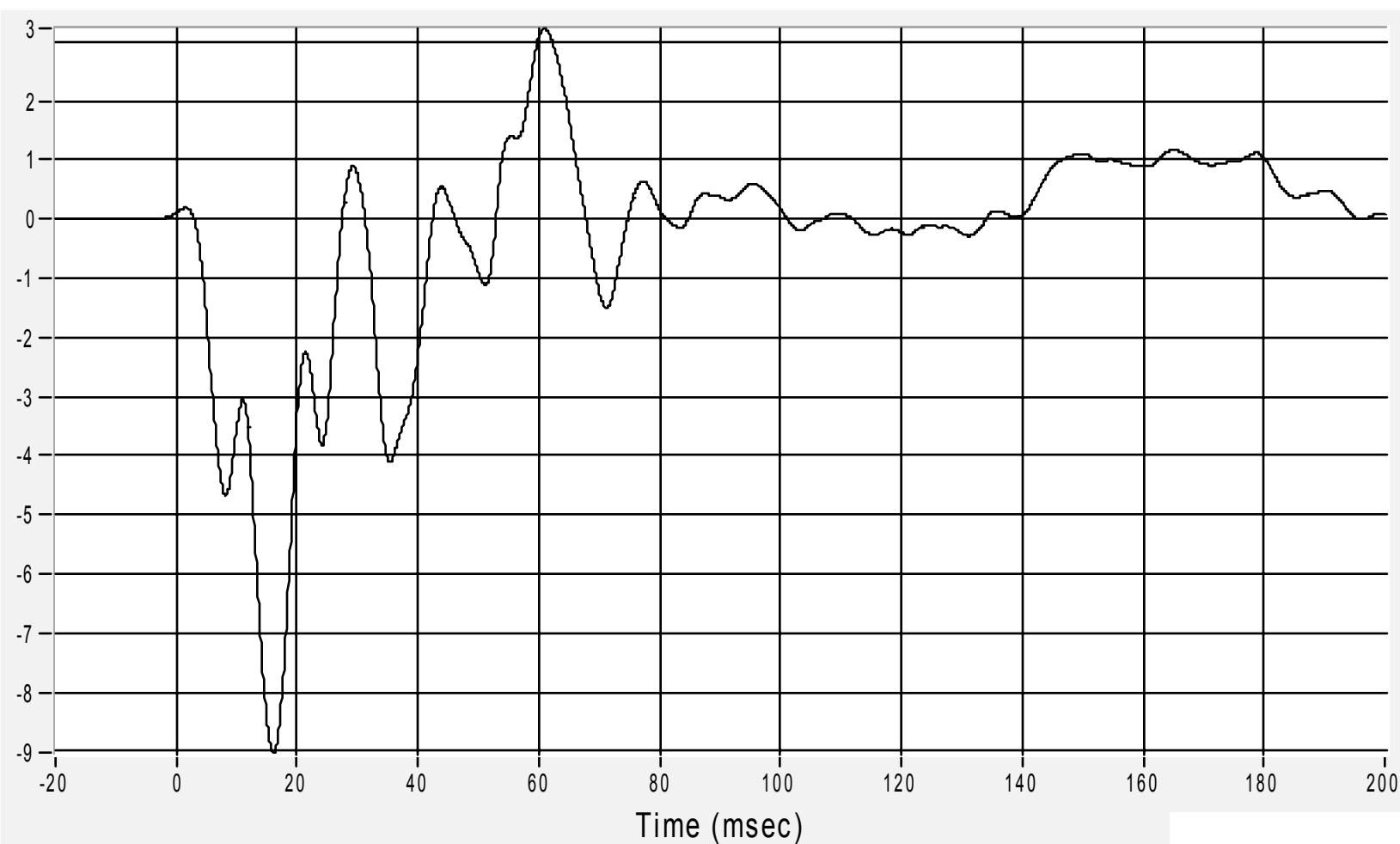
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Right Side Sill at Rear Seat (X) Acceleration

Acceleration (G's) CFC60

Max 3.2 G at 61.0 msec

Min -9.0 G at 16.1 msec



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3 February 2004

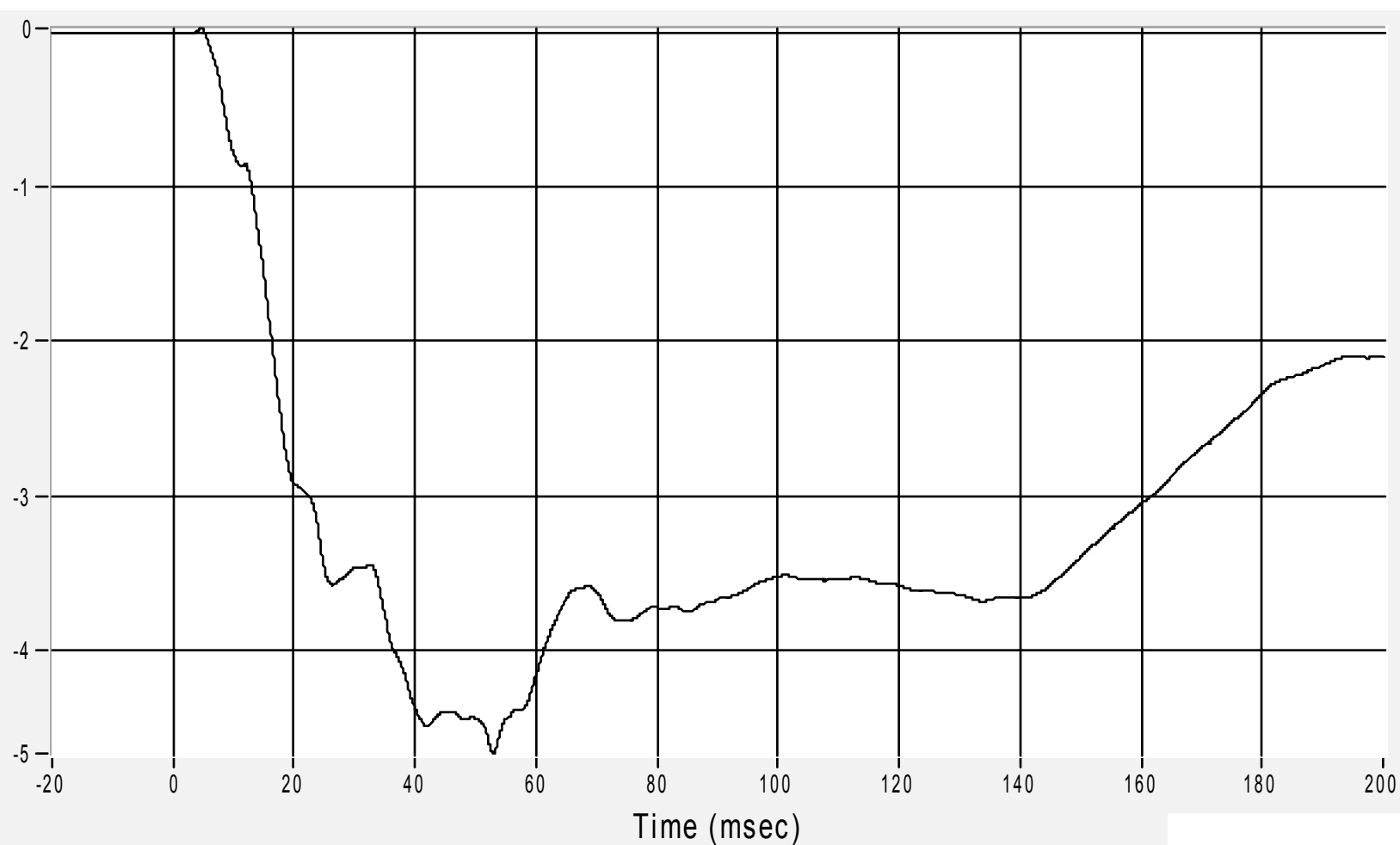
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Right Side Sill at Rear Seat (X) Velocity

Velocity (km/h) CFC180

Max 0.0 km/h at 4.6 msec

Min -4.7 km/h at 52.9 msec



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3 February 2004

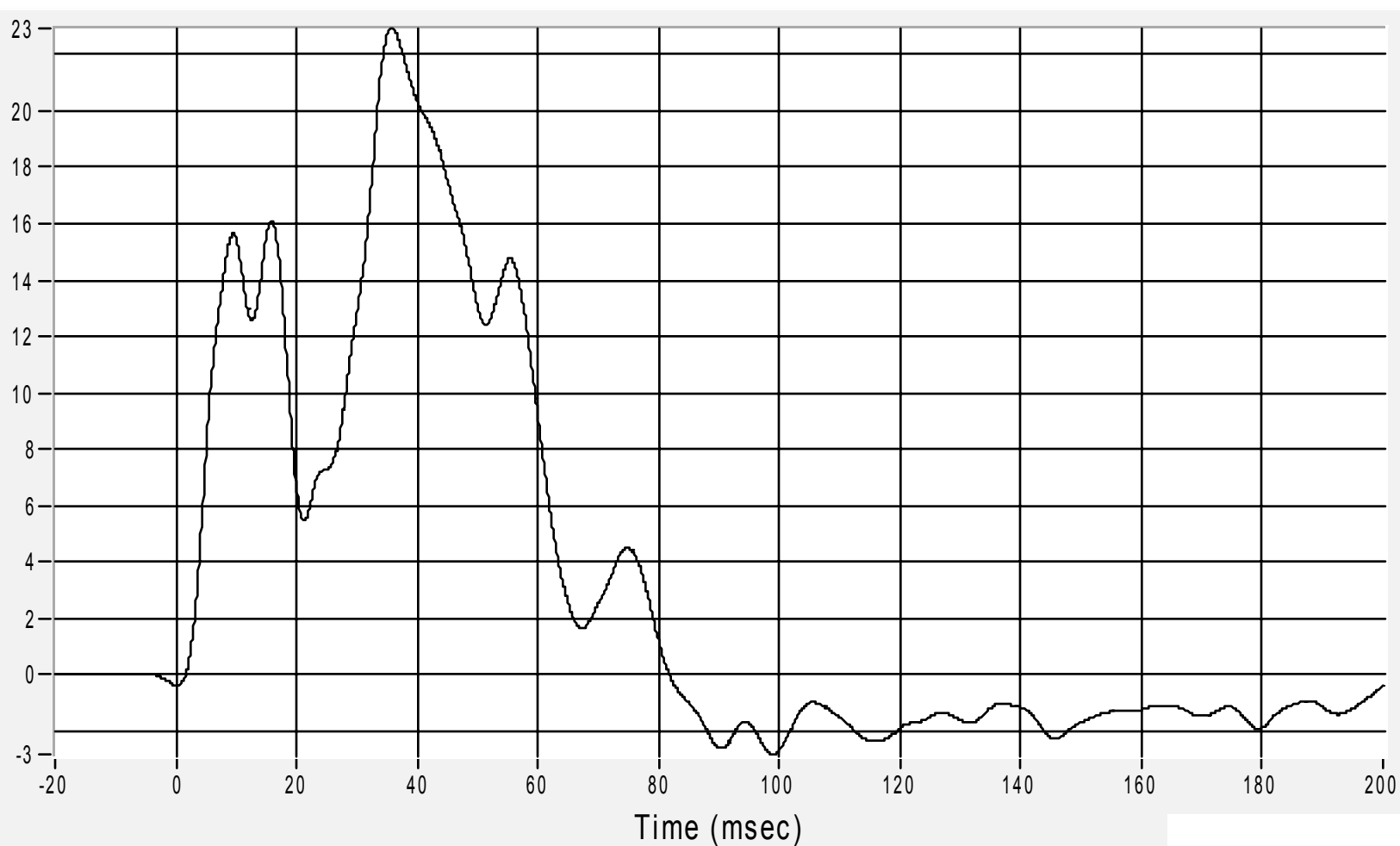
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Right Side Sill at Rear Seat (Y) Acceleration

Acceleration (G's) CFC60

Max 22.9 G at 35.8 msec

Min -2.8 G at 98.8 msec



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3 February 2004

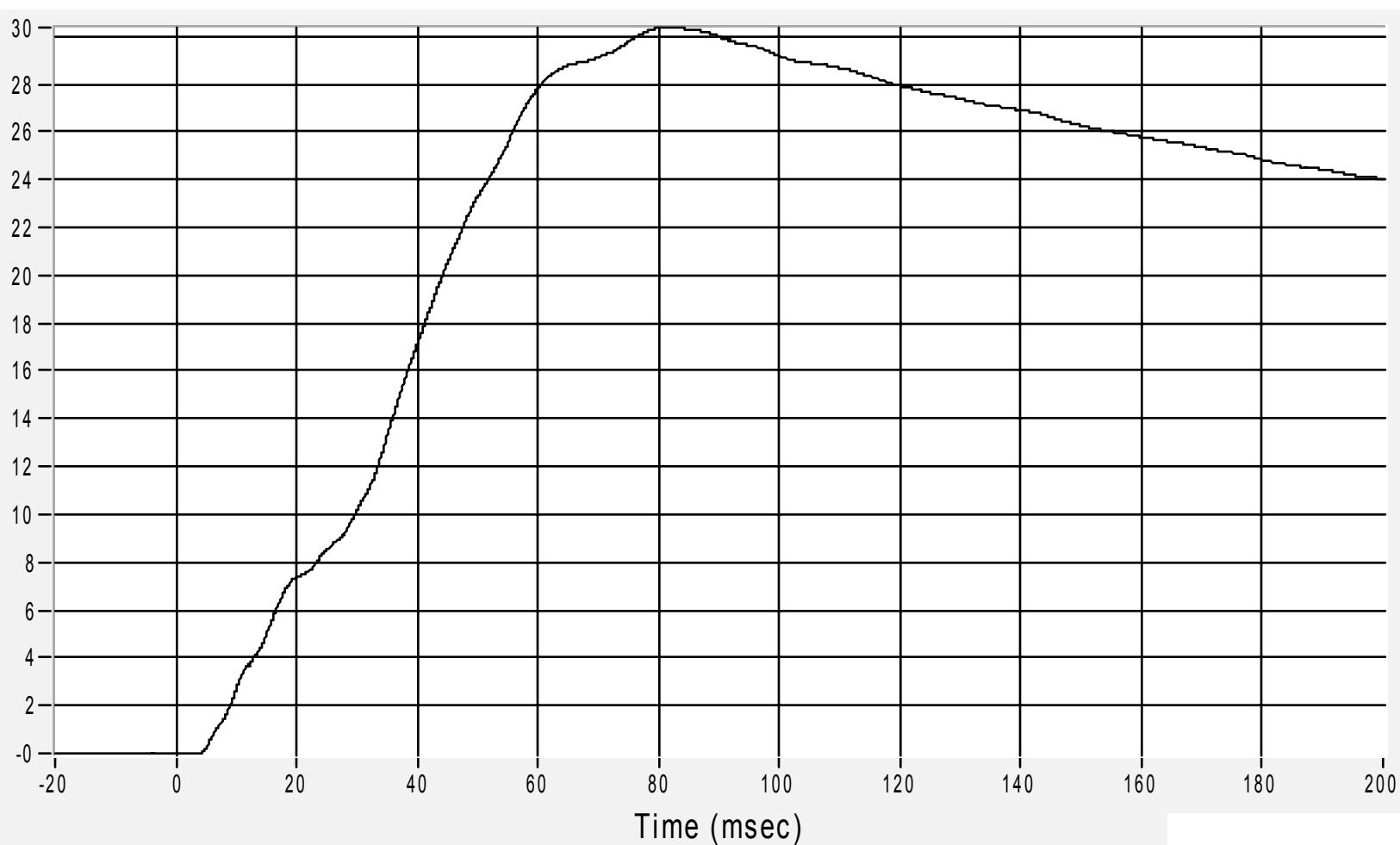
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Right Side Sill at Rear Seat (Y) Velocity

Velocity (km/h) CFC180

Max 30.4 km/h at 81.9 msec

Min 0.0 km/h at 3.5 msec



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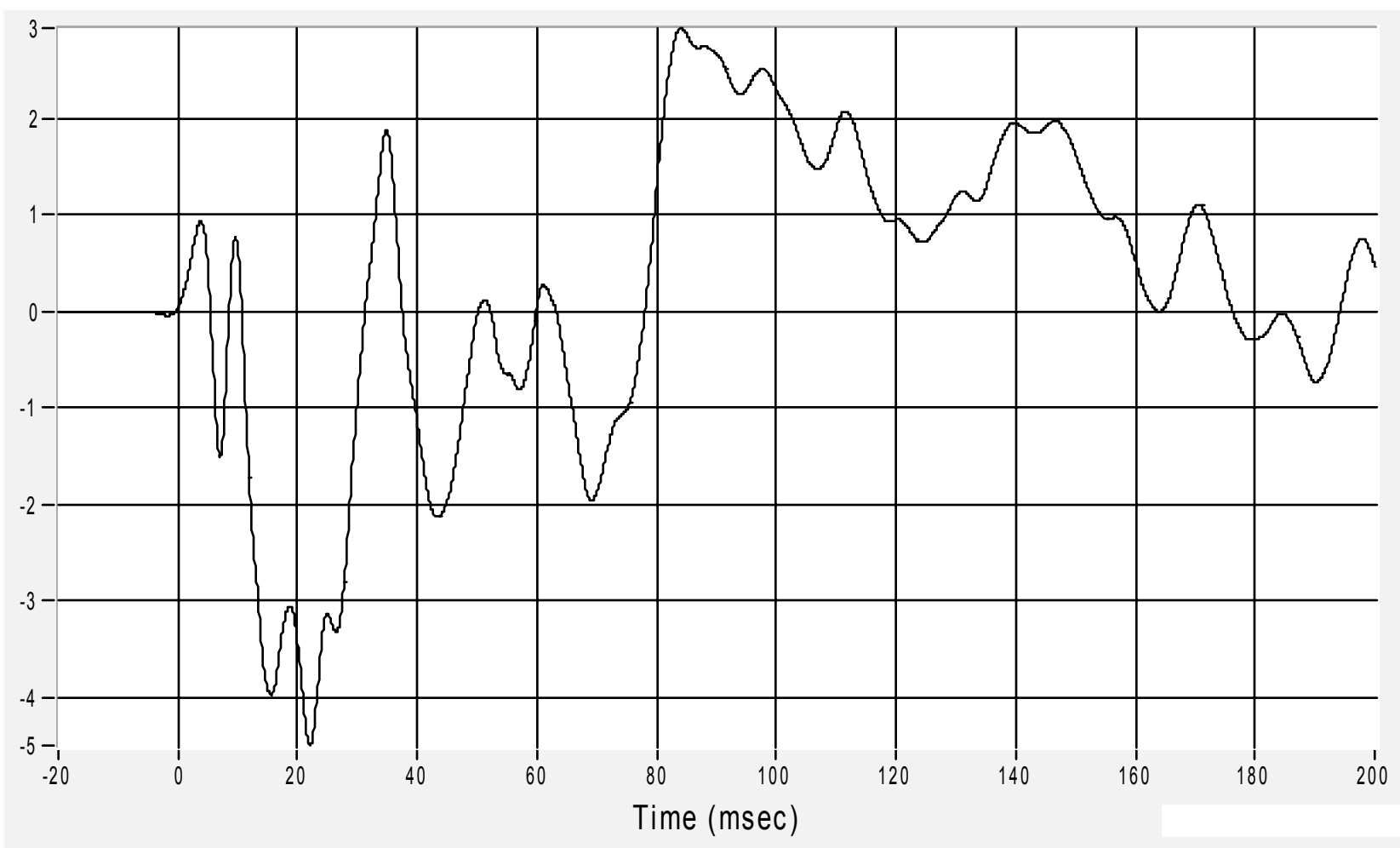
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Right Side Sill at Rear Seat (Z) Acceleration

Acceleration (G's) CFC60

Max 2.9 G at 84.1 msec

Min -4.5 G at 22.1 msec



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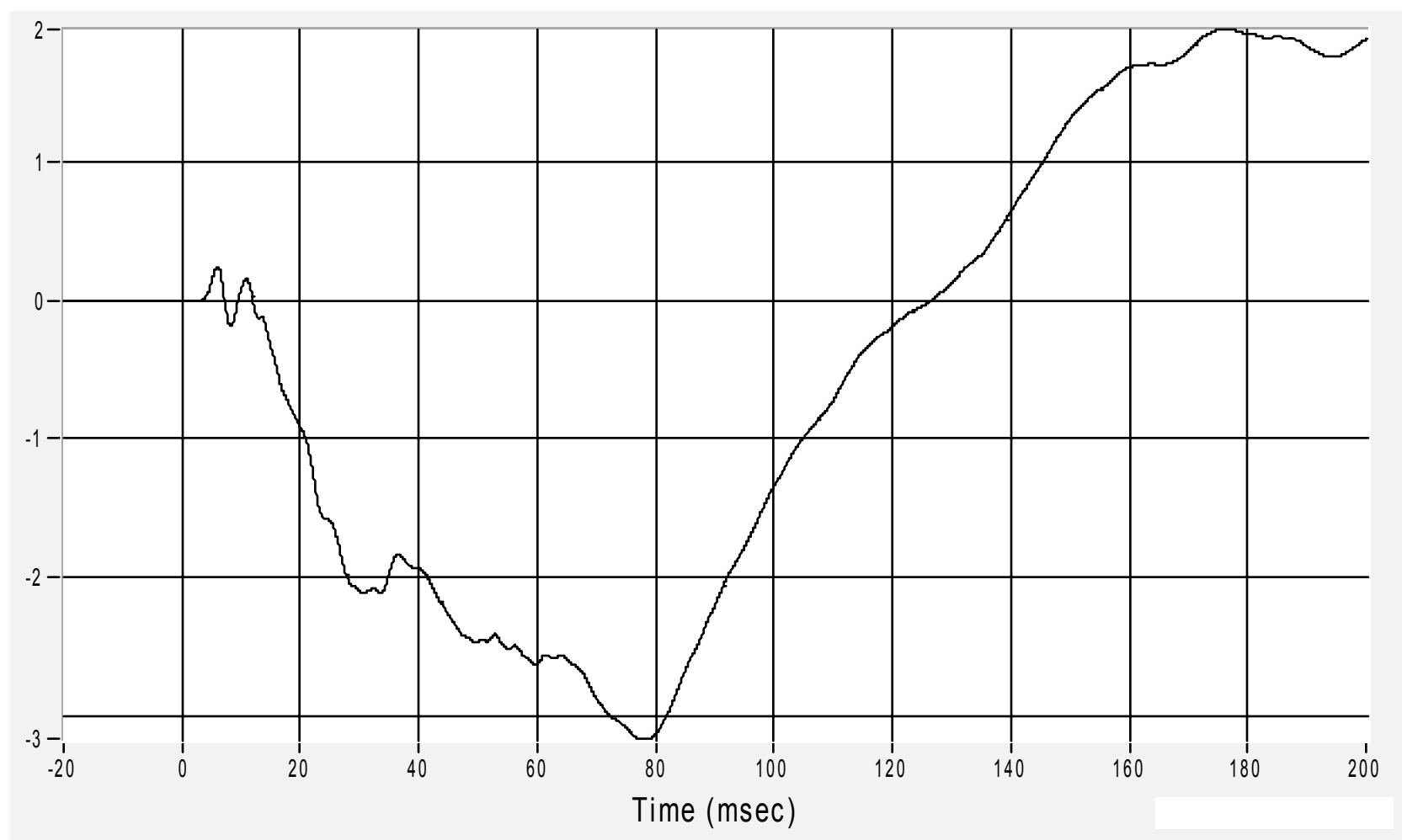
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Right Side Sill at Rear Seat (Z) Velocity

Velocity (km/h) CFC180

Max 2.0 km/h at 175.5 msec

Min -3.2 km/h at 78.6 msec



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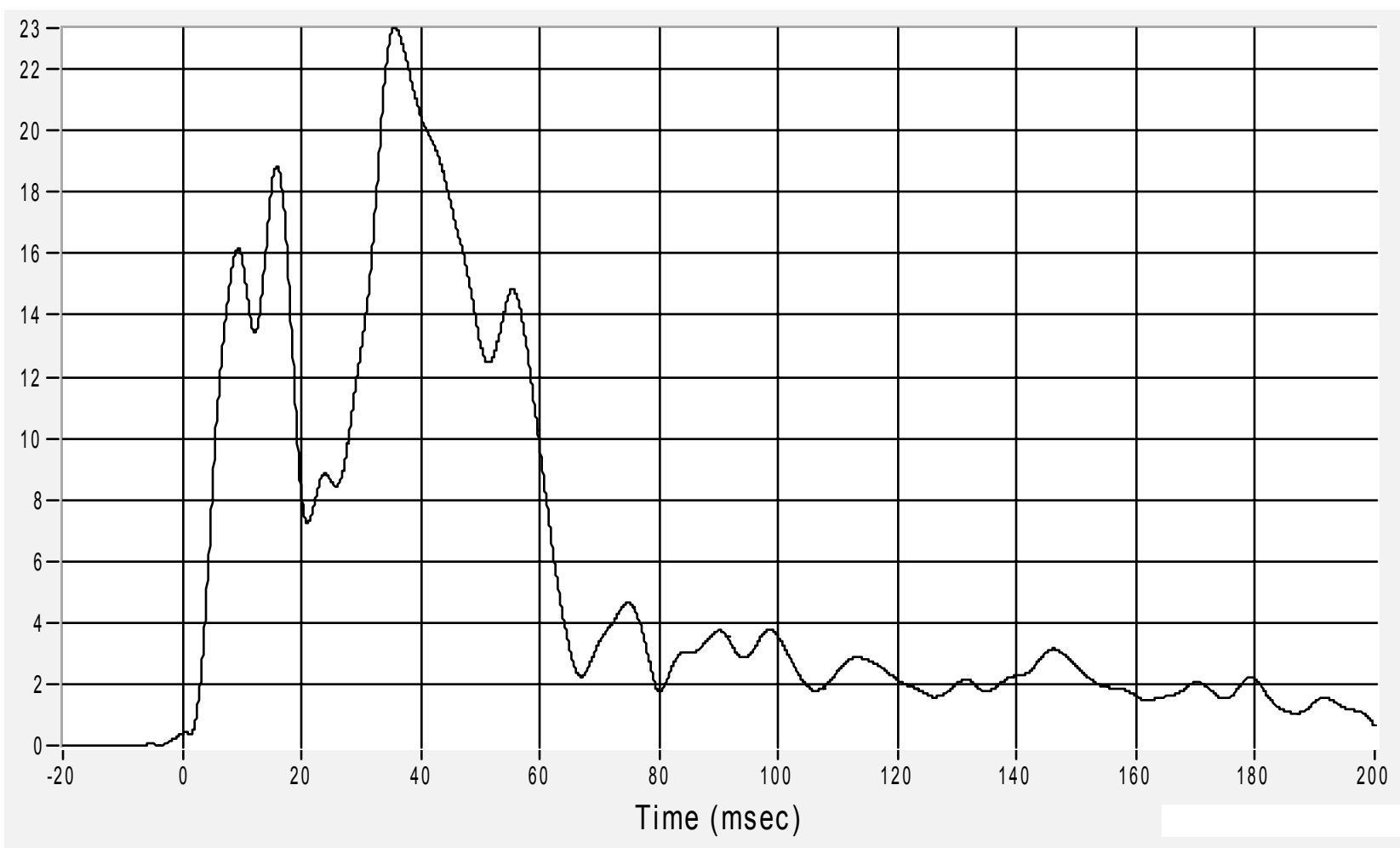
Medical College of Wisconsin
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Right Side Sill at Rear Seat Resultant Acceleration

Acceleration (G's) CFC60

Max 23.3 G's at 35.6 msec

Min 0.4 G's at 1.3 msec



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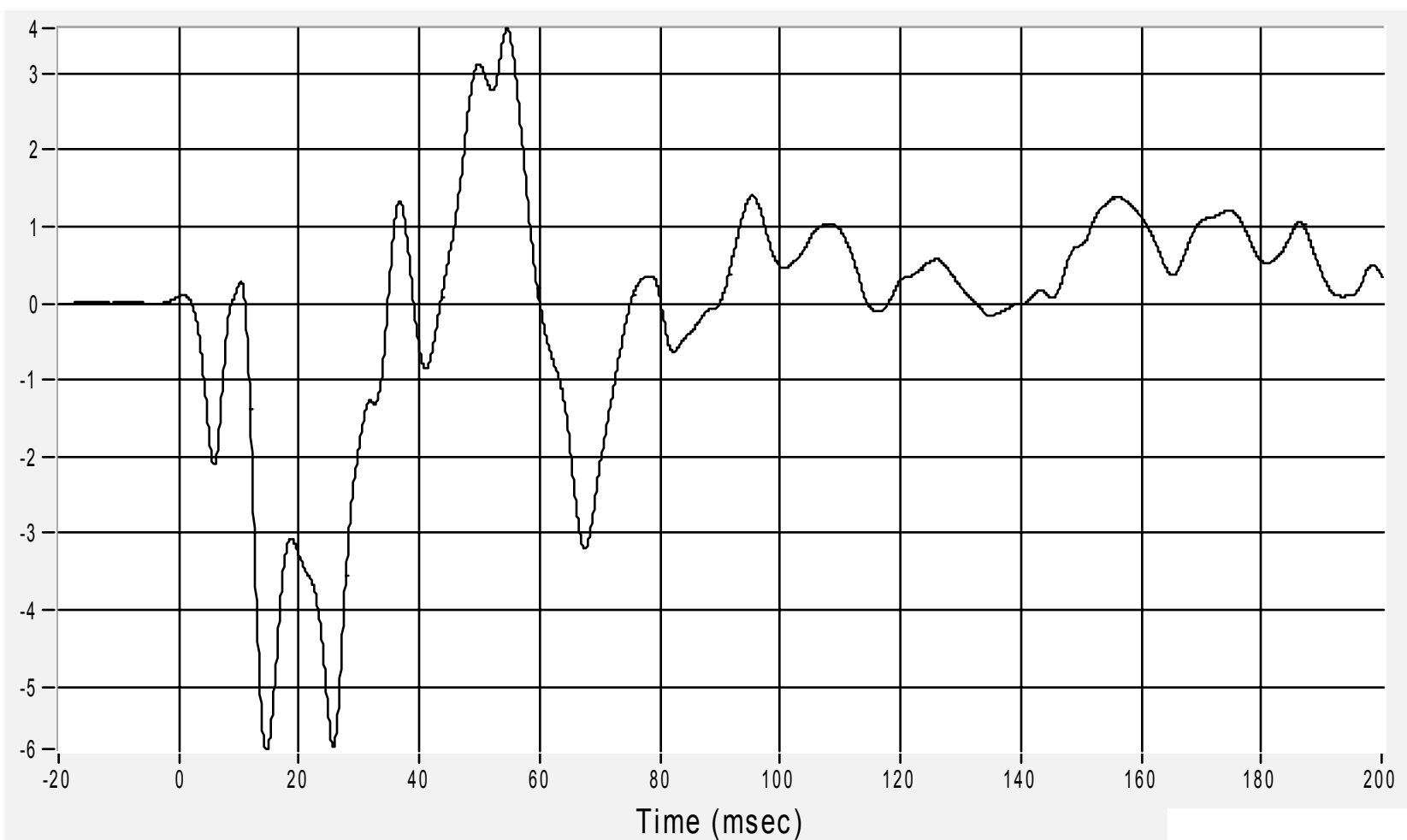
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Rear Floorpan Above Axle (X) Acceleration

Acceleration (G's) CFC60

Max 3.6 G at 54.6 msec

Min -5.8 G at 14.6 msec



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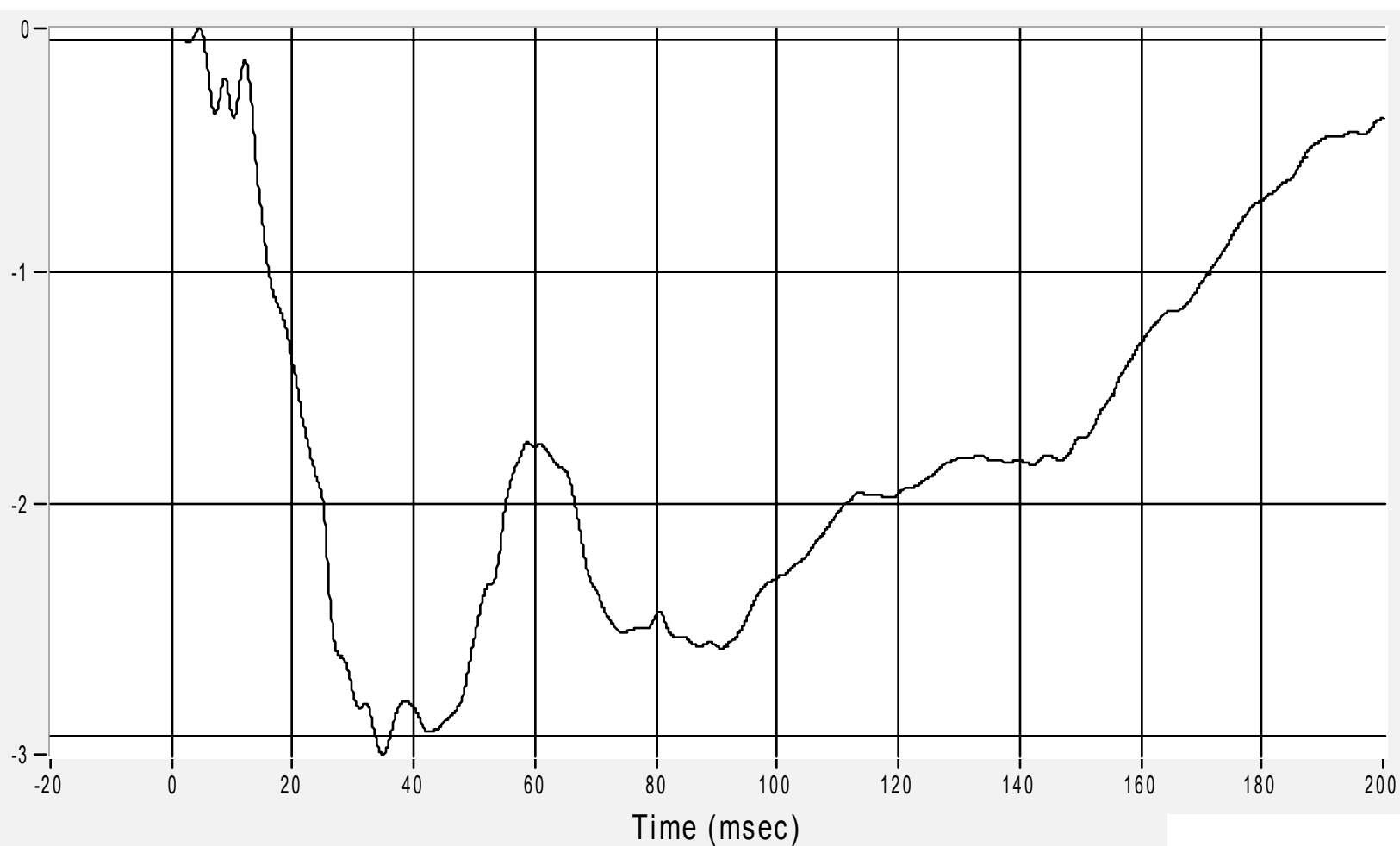
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Rear Floorpan Above Axle (X) Velocity

Velocity (km/h) CFC180

Max 0.0 km/h at 4.6 msec

Min -3.1 km/h at 34.9 msec



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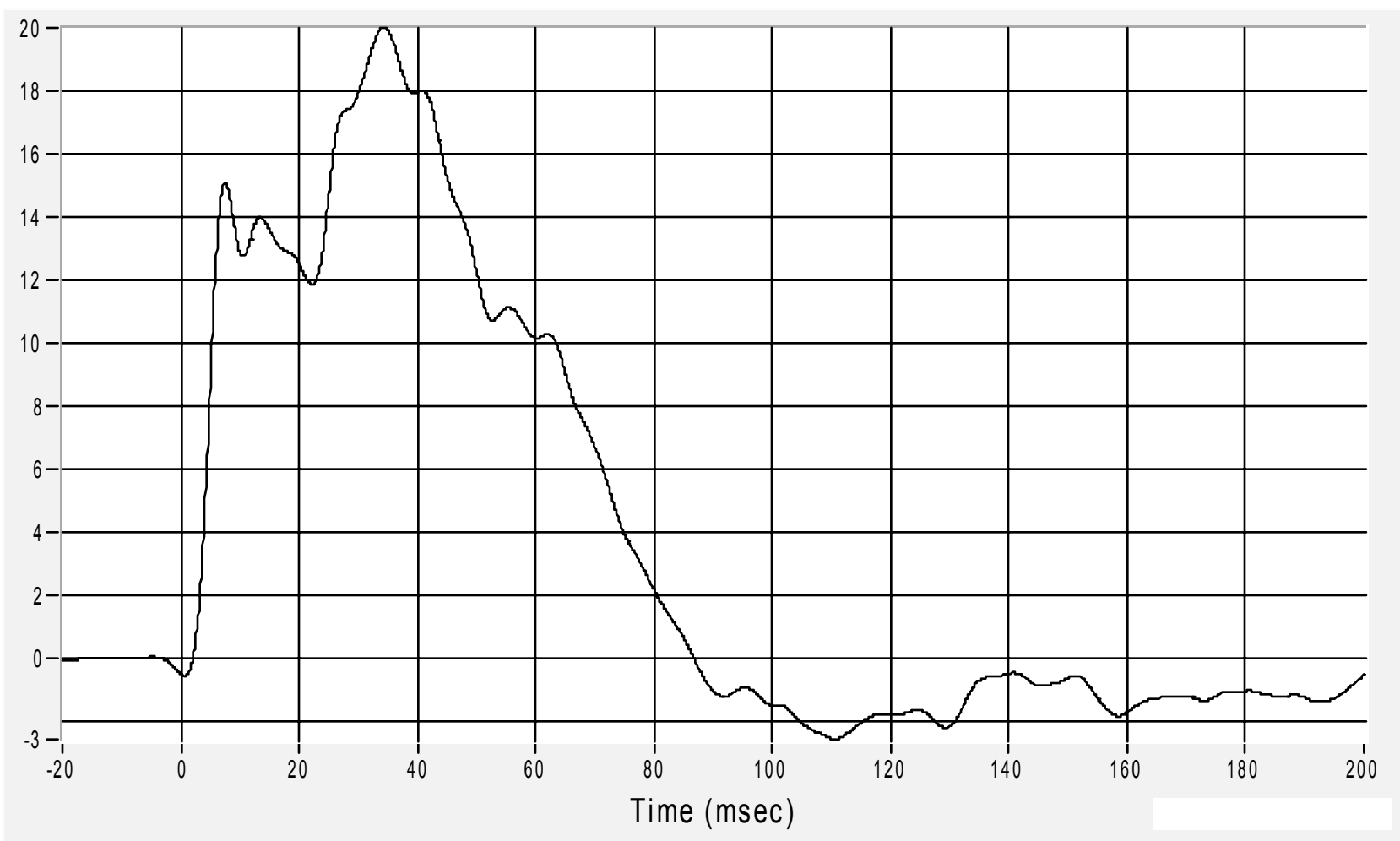
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Rear Floorpan Above Axle (Y) Acceleration

Acceleration (G's) CFC60

Max 20.0 G at 34.2 msec

Min -2.5 G at 110.6 msec



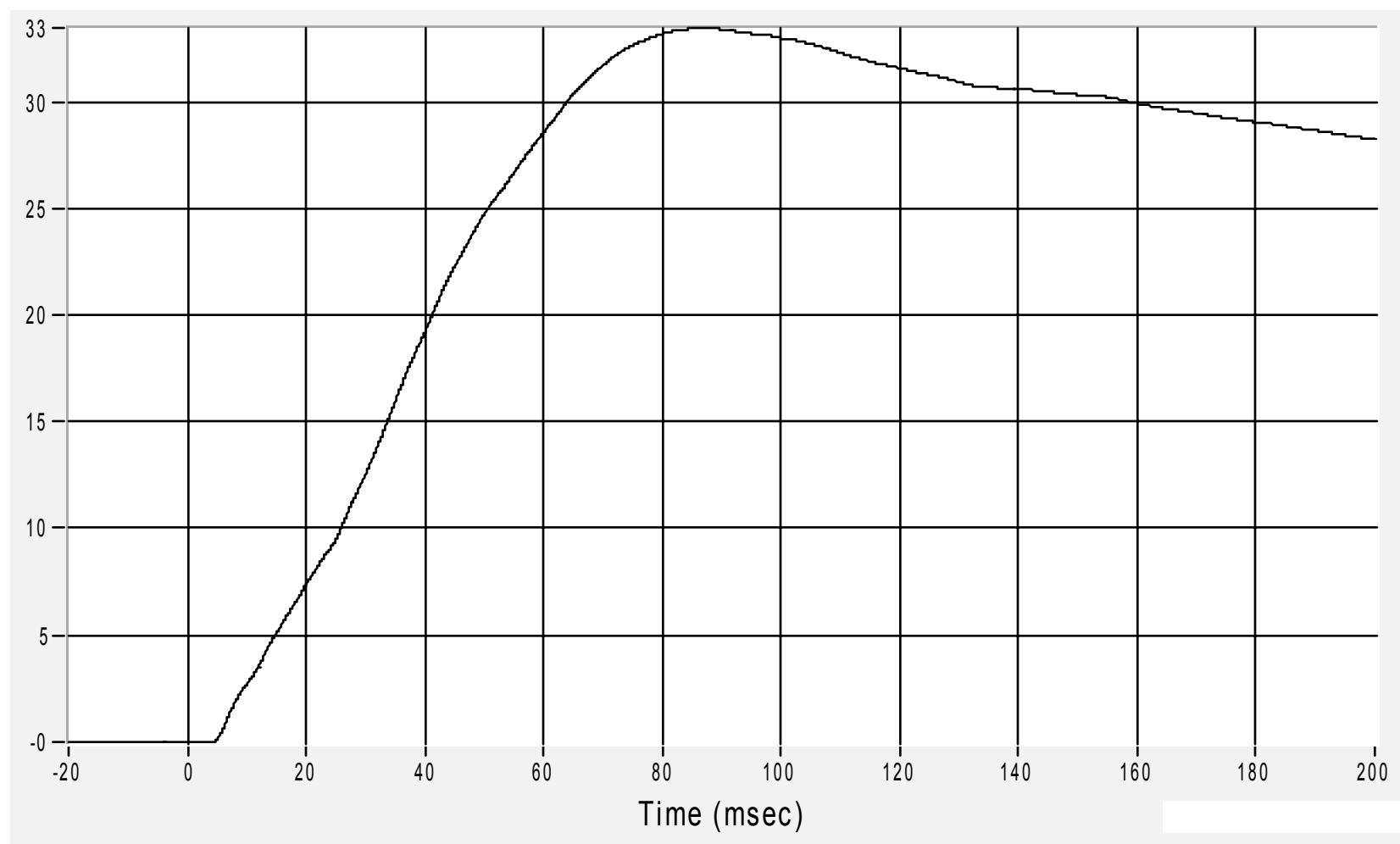
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Rear Floorpan Above Axle (Y) Velocity

Velocity (km/h) CFC180

Max 33.5 km/h at 87.0 msec**Min 0.0 km/h at 4.0 msec**

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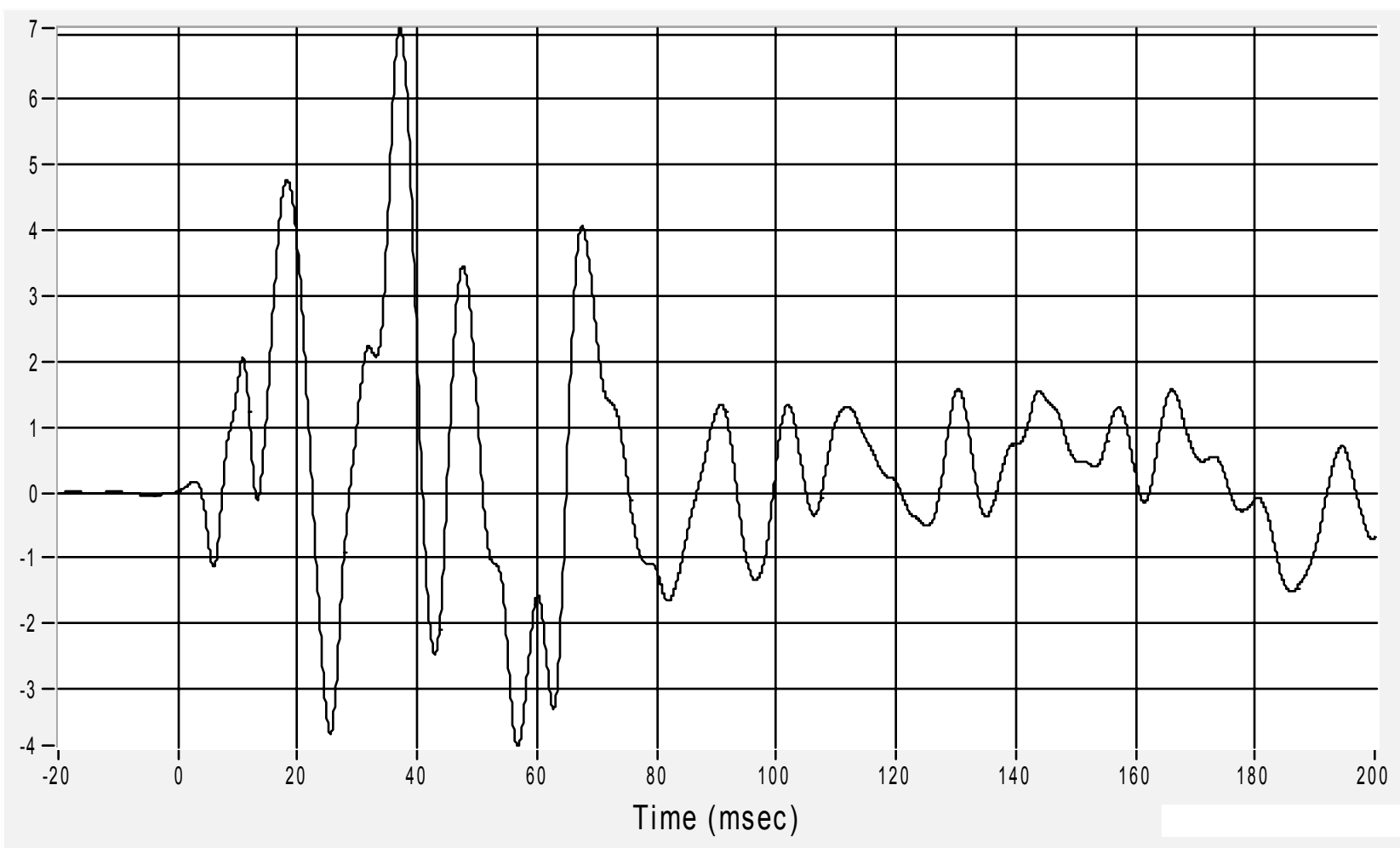
*Medical College of Wisconsin
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Rear Floorpan Above Axle (Z) Acceleration

Acceleration (G's) CFC60

Max 7.1 G at 37.1 msec

Min -3.9 G at 56.7 msec



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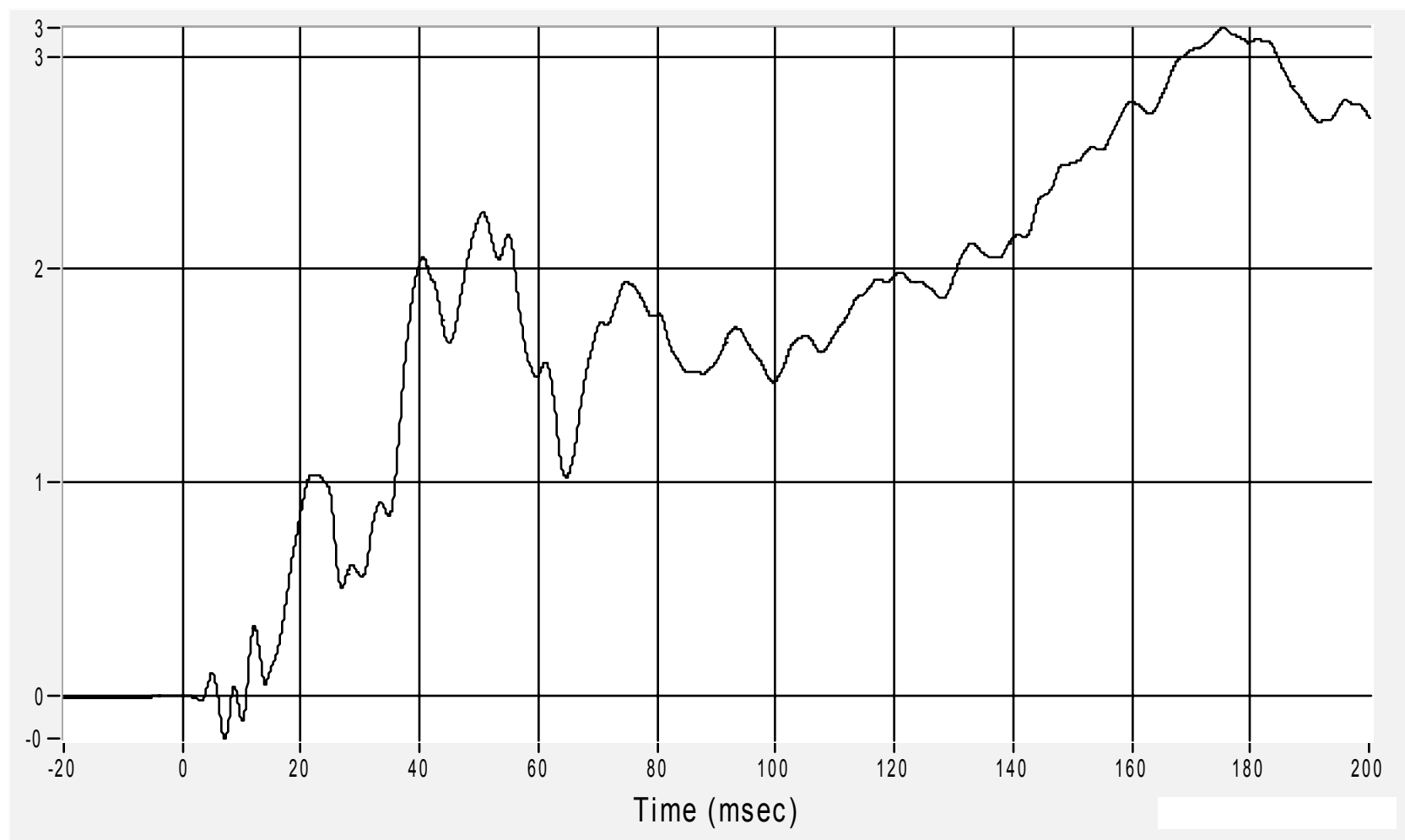
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Rear Floorpan Above Axle (Z) Velocity

Velocity (km/h) CFC180

Max 3.1 km/h at 175.4 msec

Min -0.2 km/h at 7.1 msec



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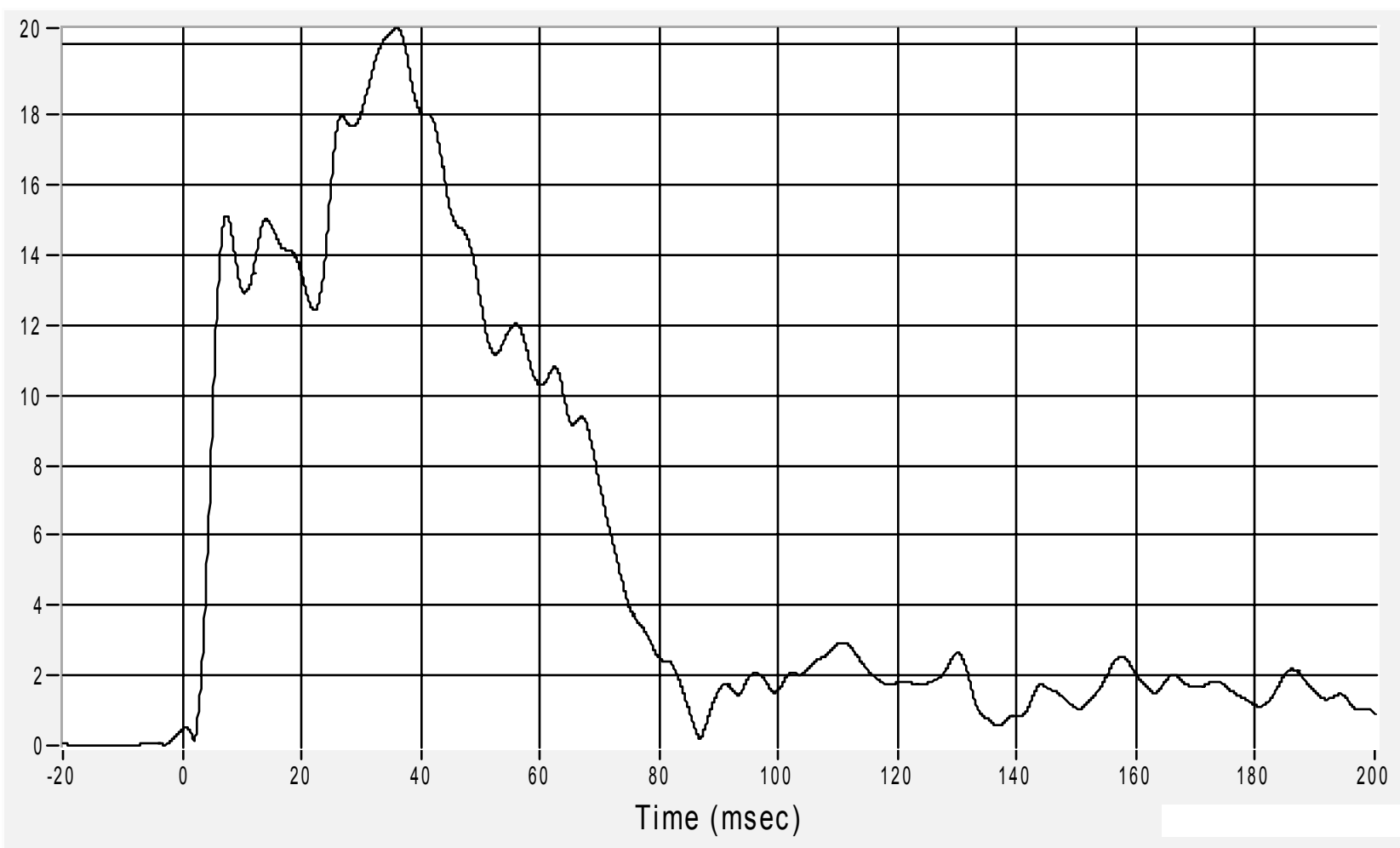
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Rear Floorpan Above Axle Resultant Acceleration

Acceleration (G's) CFC60

Max 20.5 G's at 36.1 msec

Min 0.1 G's at 2.0 msec



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3 February 2004

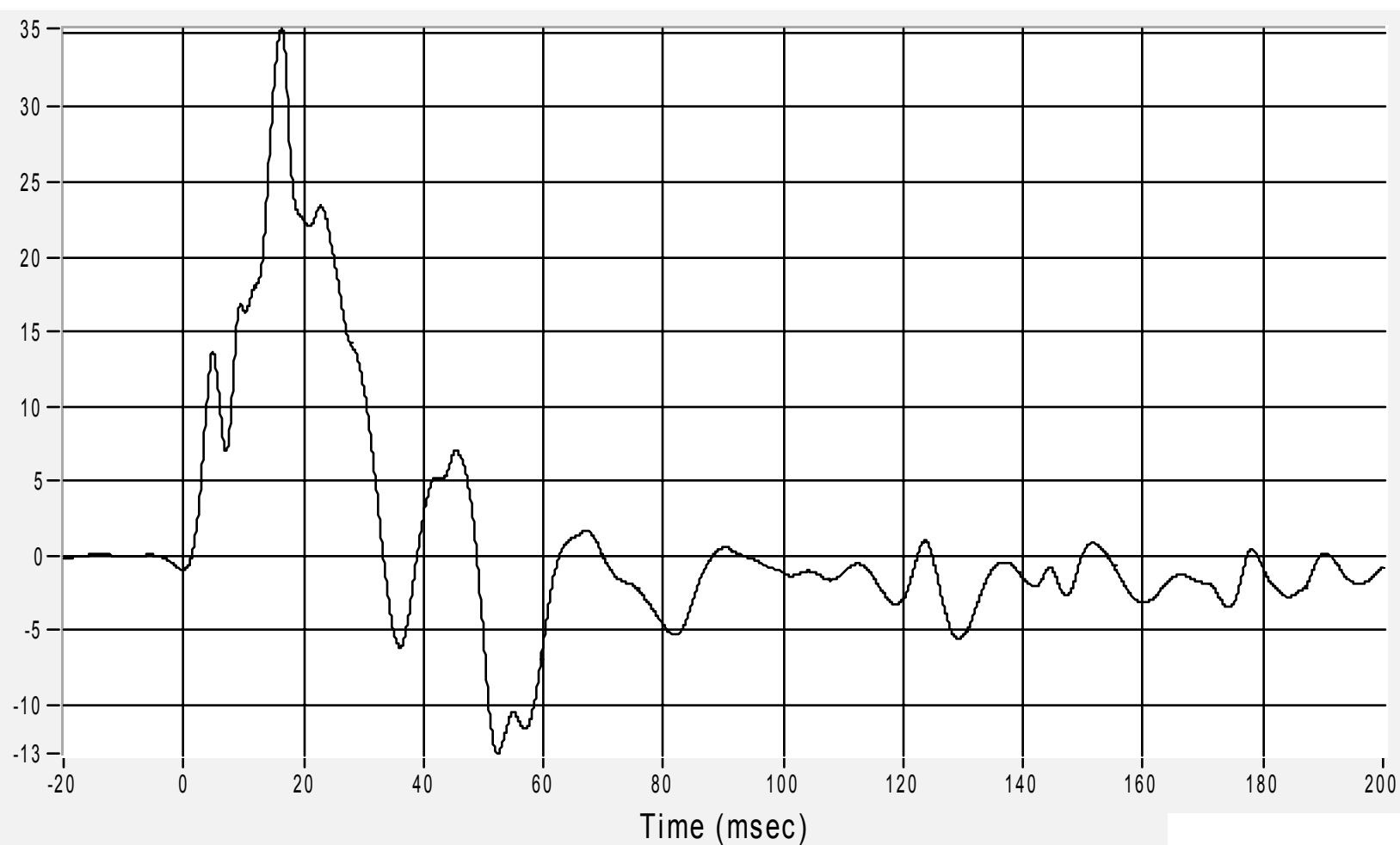
Medical College of Wisconsin
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Left Side Sill at Rear Seat (Y) Acceleration

Acceleration (G's) CFC60

Max 35.3 G at 16.3 msec

Min -13.2 G at 52.3 msec



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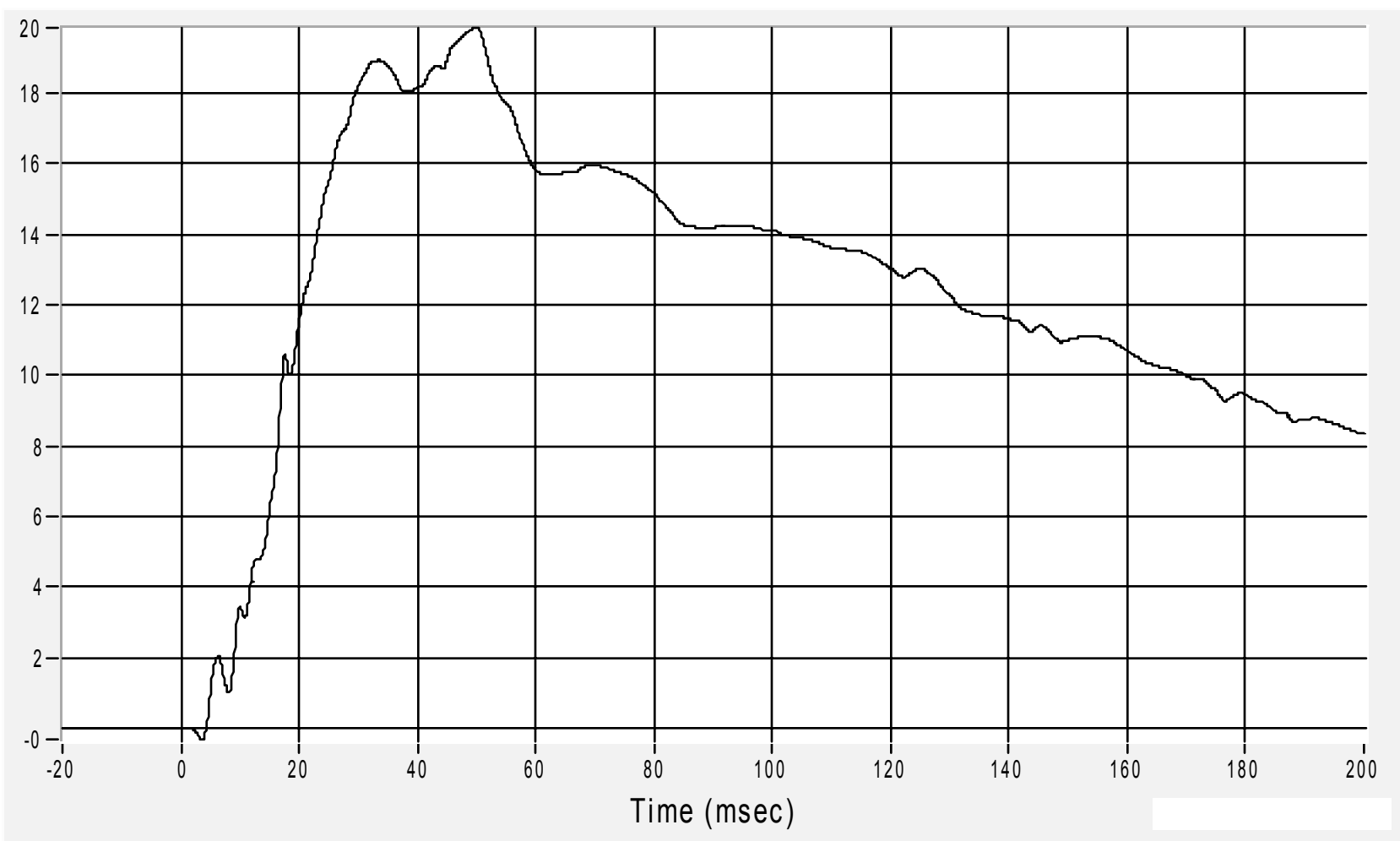
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Left Side Sill at Rear Seat (Y) Velocity

Velocity (km/h) CFC180

Max 19.9 km/h at 49.8 msec

Min -0.3 km/h at 3.6 msec



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3 February 2004

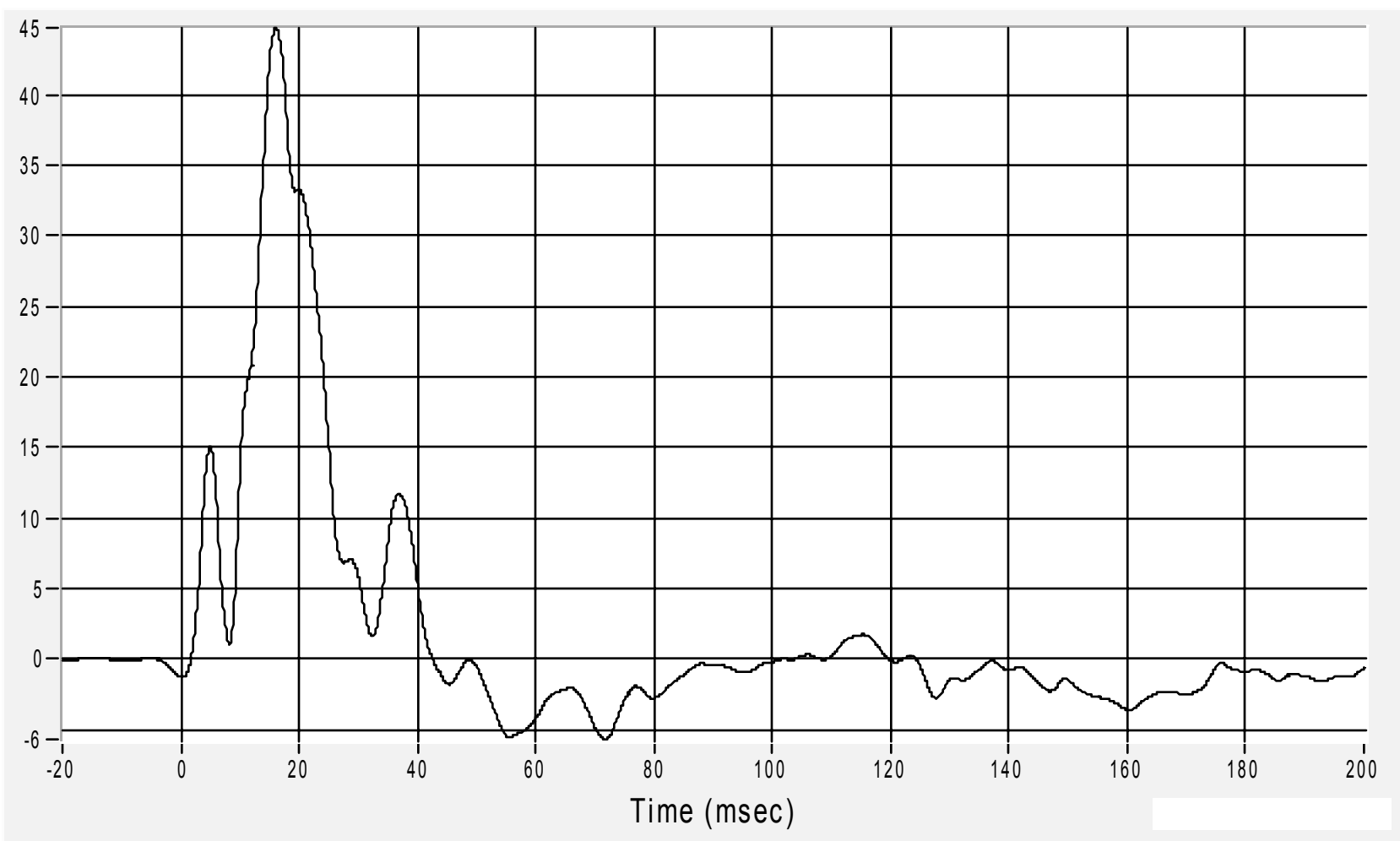
Medical College of Wisconsin
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Left Side Sill at Front Seat (Y) Acceleration

Acceleration (G's) CFC60

Max 44.7 G at 16.1 msec

Min -5.7 G at 71.7 msec



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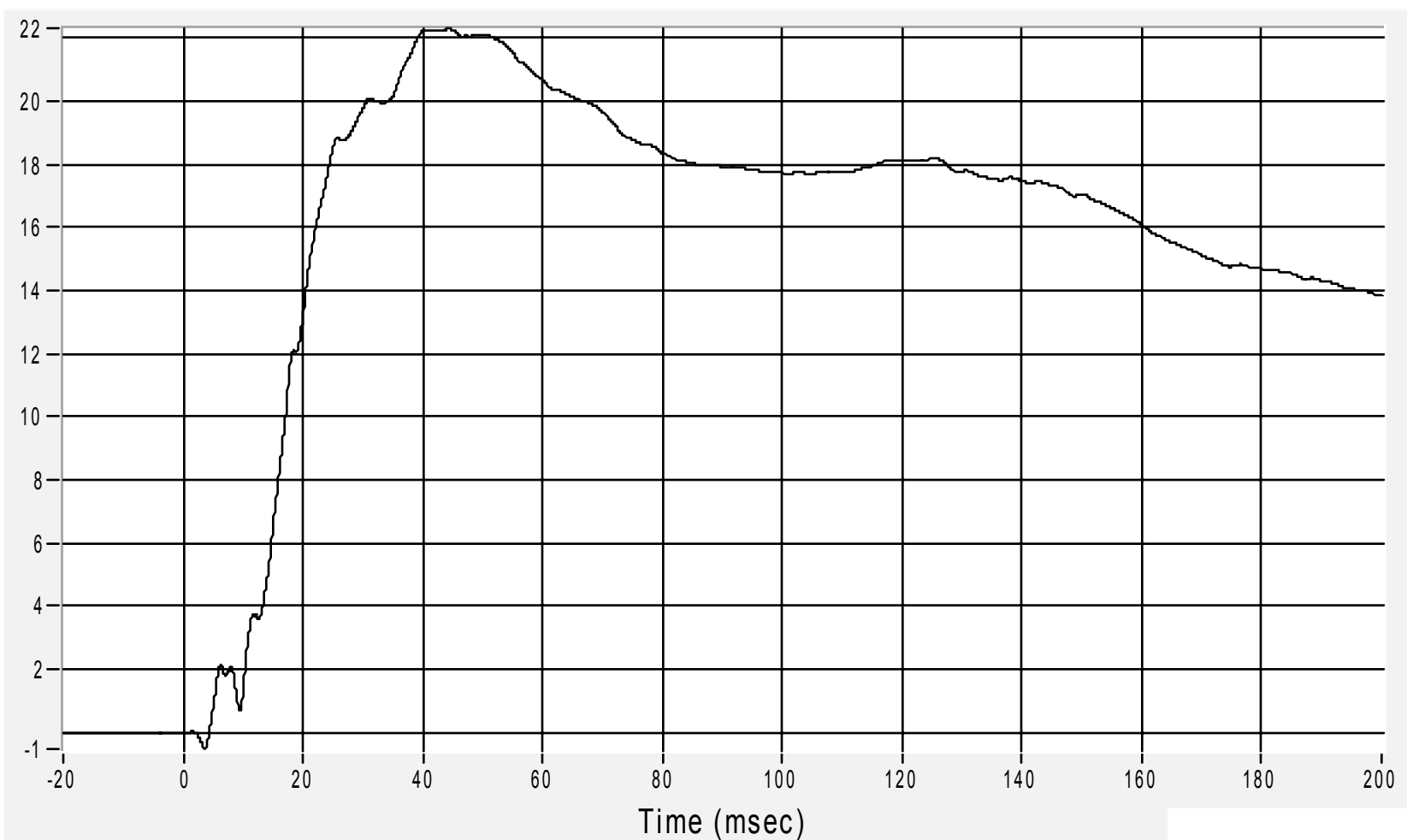
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Left Side Sill at Front Seat (Y) Velocity

Velocity (km/h) CFC180

Max 22.3 km/h at 44.2 msec

Min -0.5 km/h at 3.6 msec



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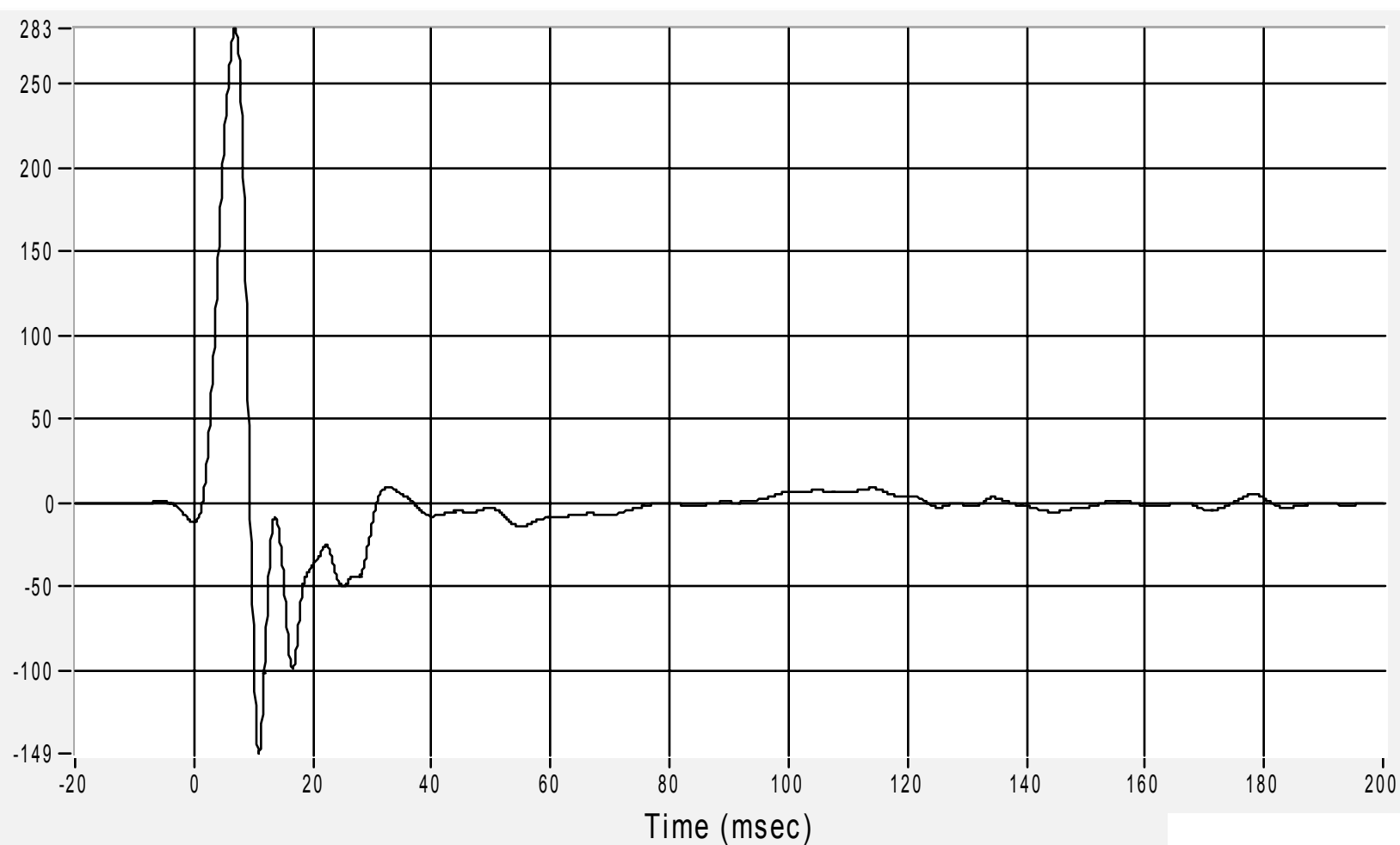
Medical College of Wisconsin
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Left Front Door on Centerline (Y) Acceleration

Acceleration (G's) CFC60

Max 282.8 G at 6.9 msec

Min -149.3 G at 10.9 msec



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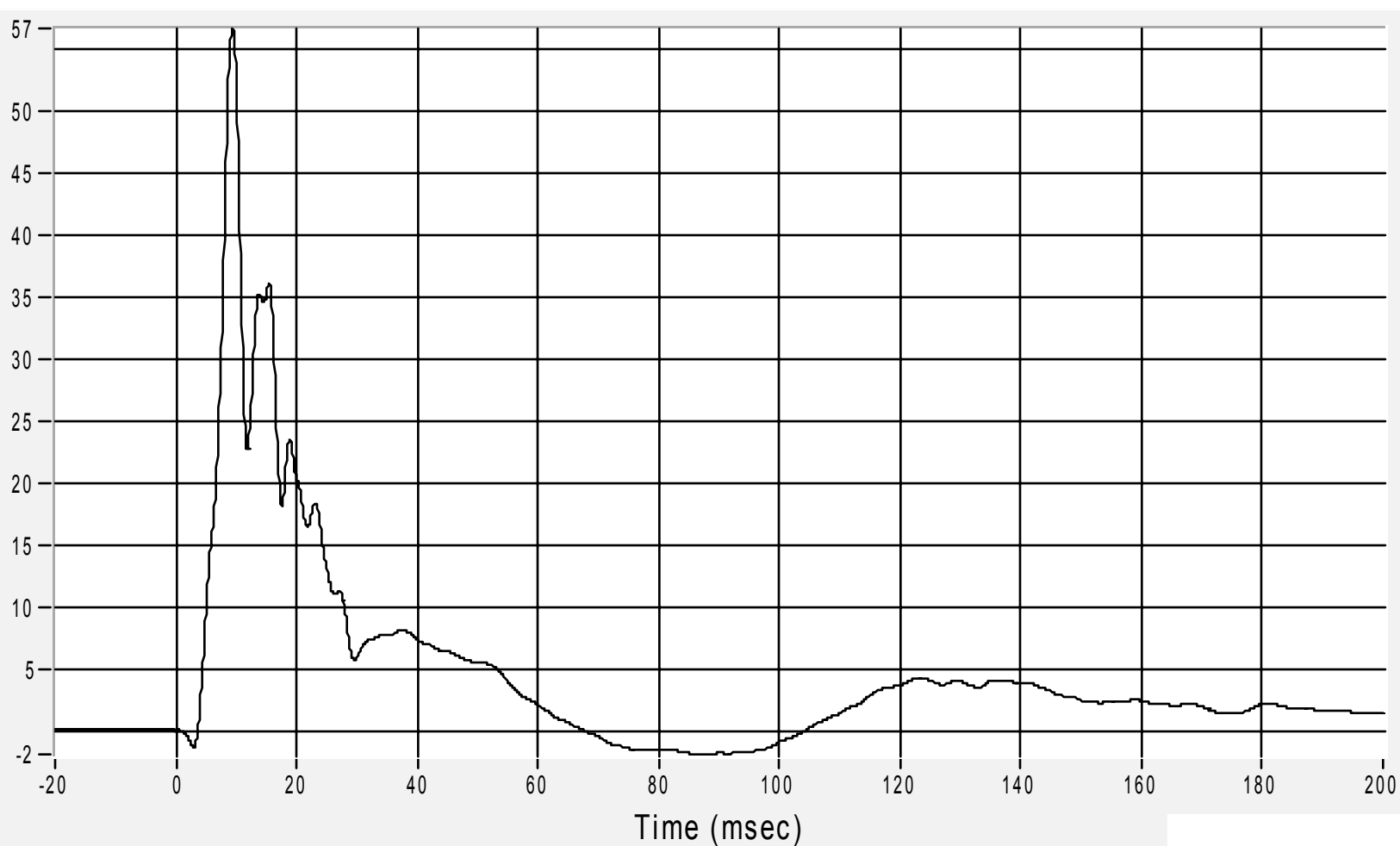
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Left Front Door on Centerline (Y) Velocity

Velocity (km/h) CFC180

Max 56.7 km/h at 9.4 msec

Min -1.9 km/h at 87.8 msec



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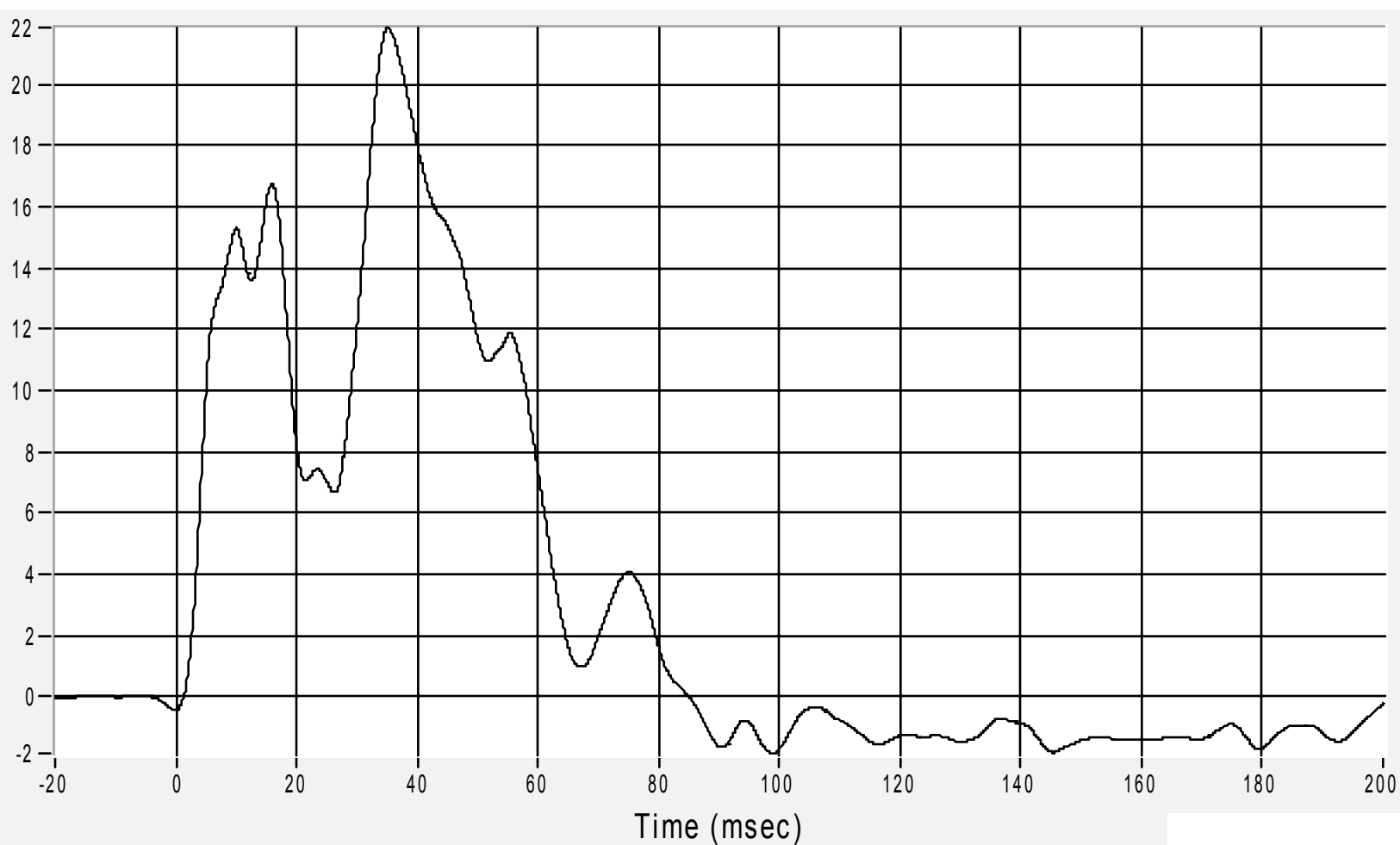
Medical College of Wisconsin
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Right Rear Occupant Compartment (Y) Acceleration

Acceleration (G's) CFC60

Max 21.9 G at 35.1 msec

Min -1.8 G at 98.8 msec



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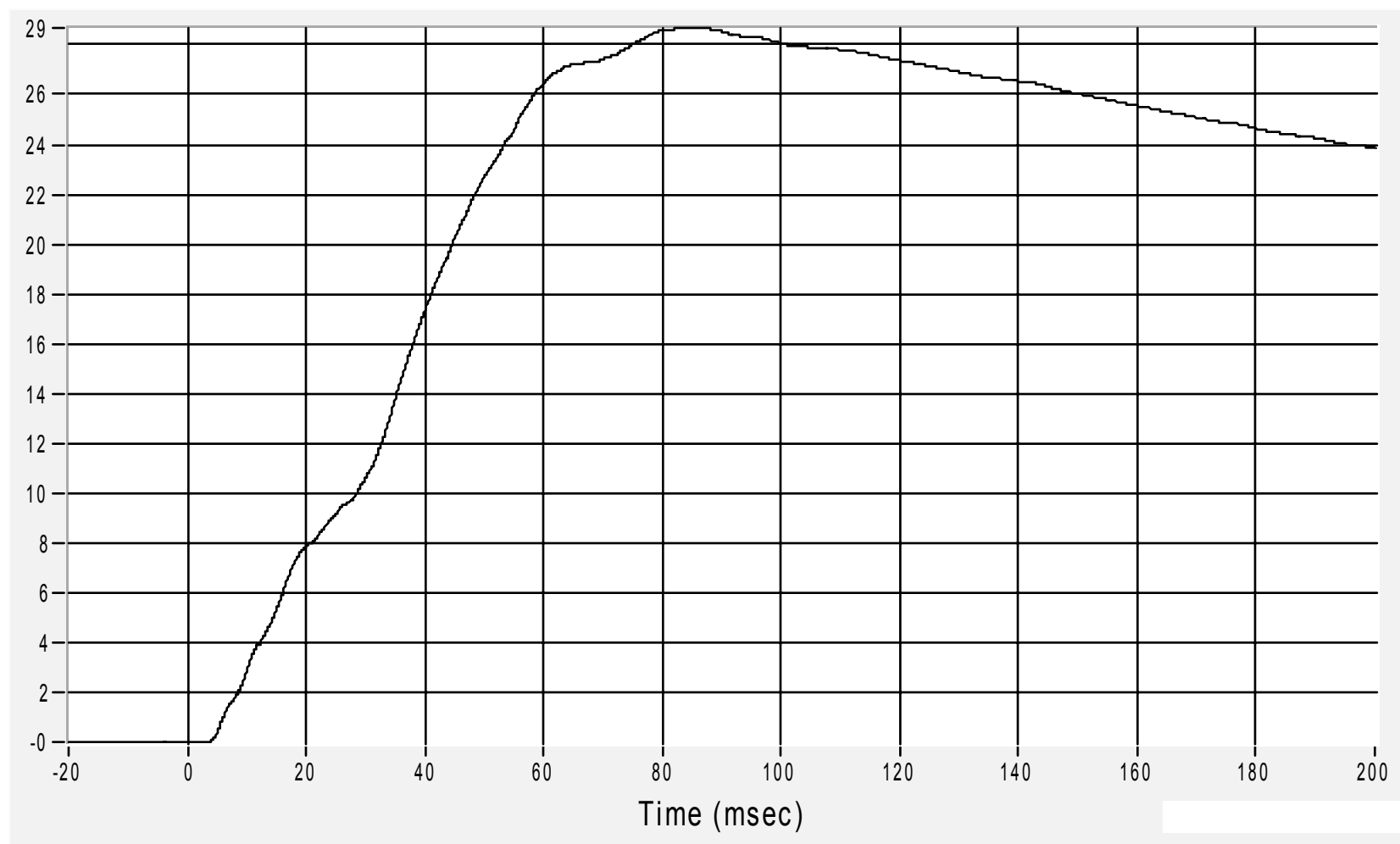
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Right Rear Occupant Compartment (Y) Velocity

Velocity (km/h) CFC180

Max 28.7 km/h at 85.0 msec

Min 0.0 km/h at 3.3 msec



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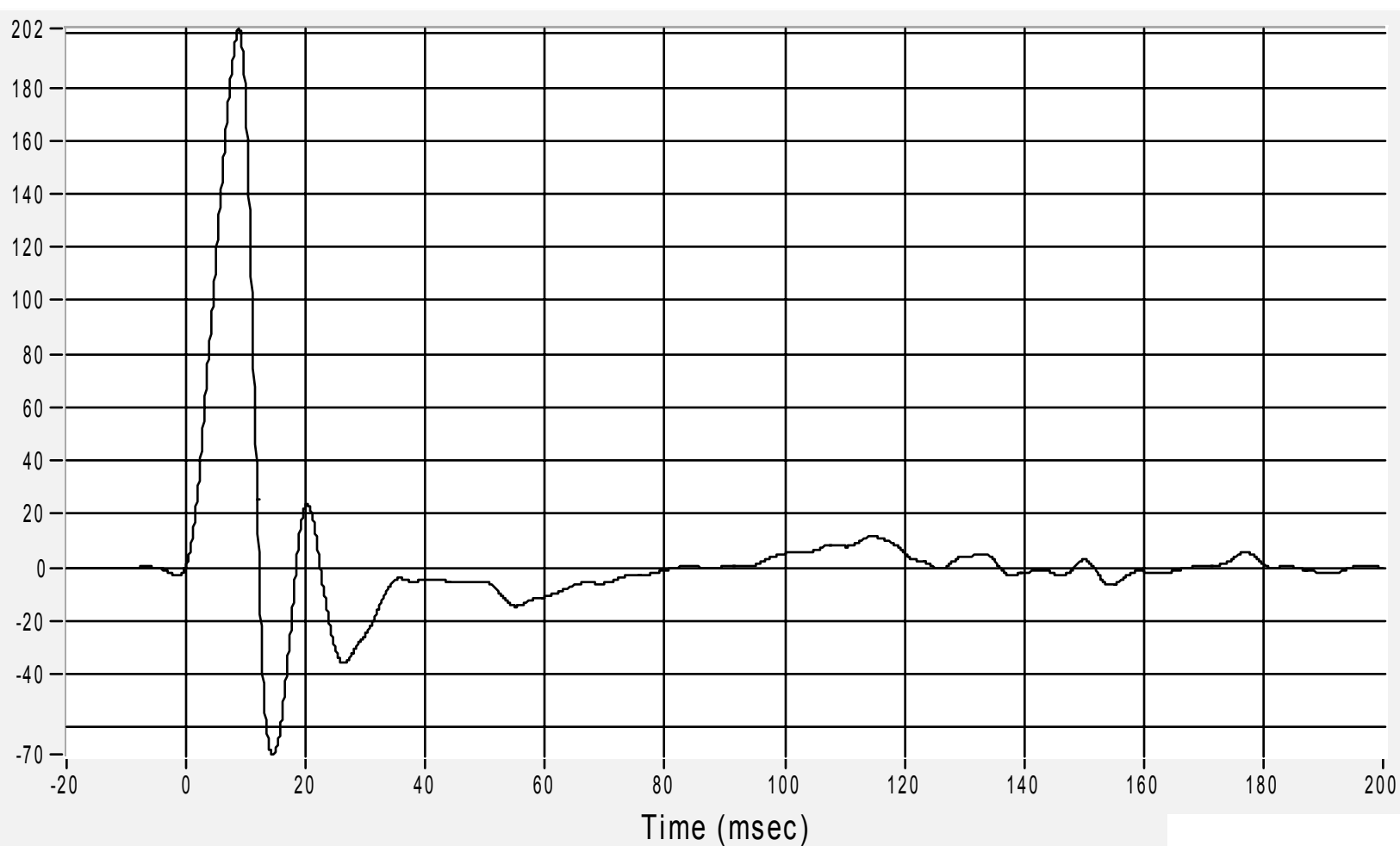
Medical College of Wisconsin
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Mid-Rear of Left Front Door (Y) Acceleration

Acceleration (G's) CFC60

Max 202.0 G at 8.8 msec

Min -70.0 G at 14.5 msec



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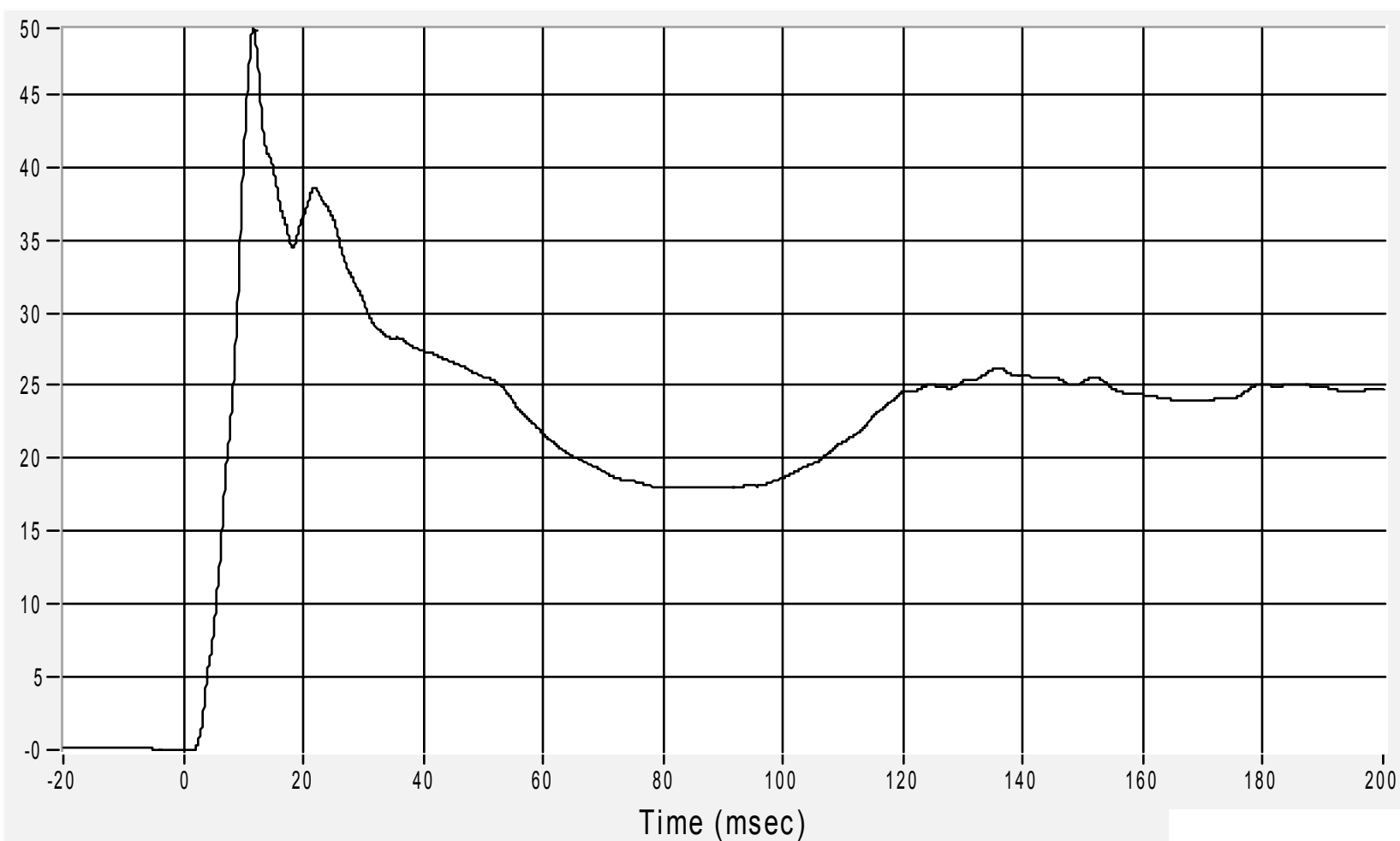
Medical College of Wisconsin
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Mid-Rear of Left Front Door (Y) Velocity

Velocity (km/h) CFC180

Max 49.5 km/h at 11.7 msec

Min 0.0 km/h at 1.3 msec



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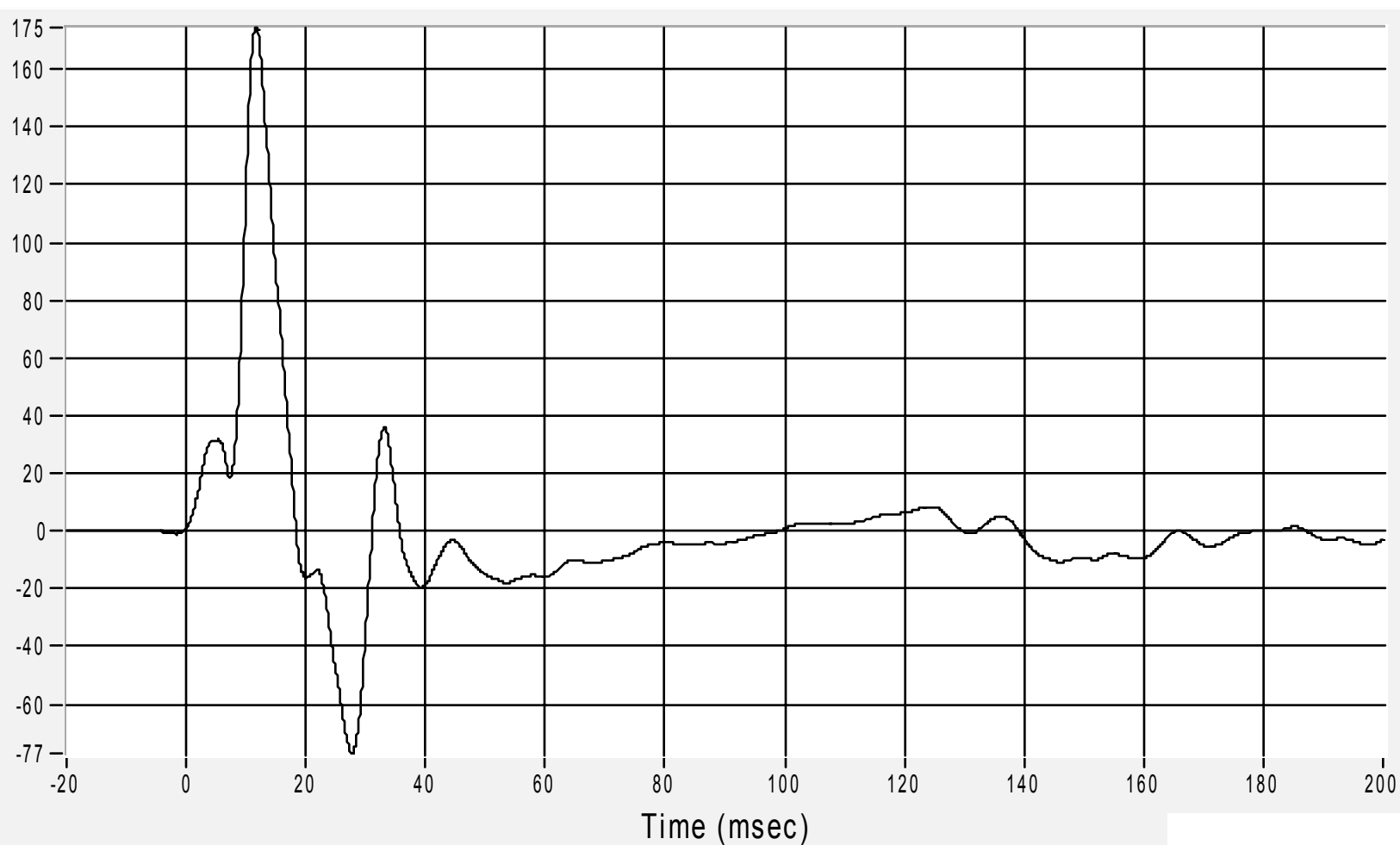
Medical College of Wisconsin
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Left Front Door Upper Centerline (Y) Acceleration

Acceleration (G's) CFC60

Max 174.5 G at 11.7 msec

Min -77.1 G at 27.7 msec



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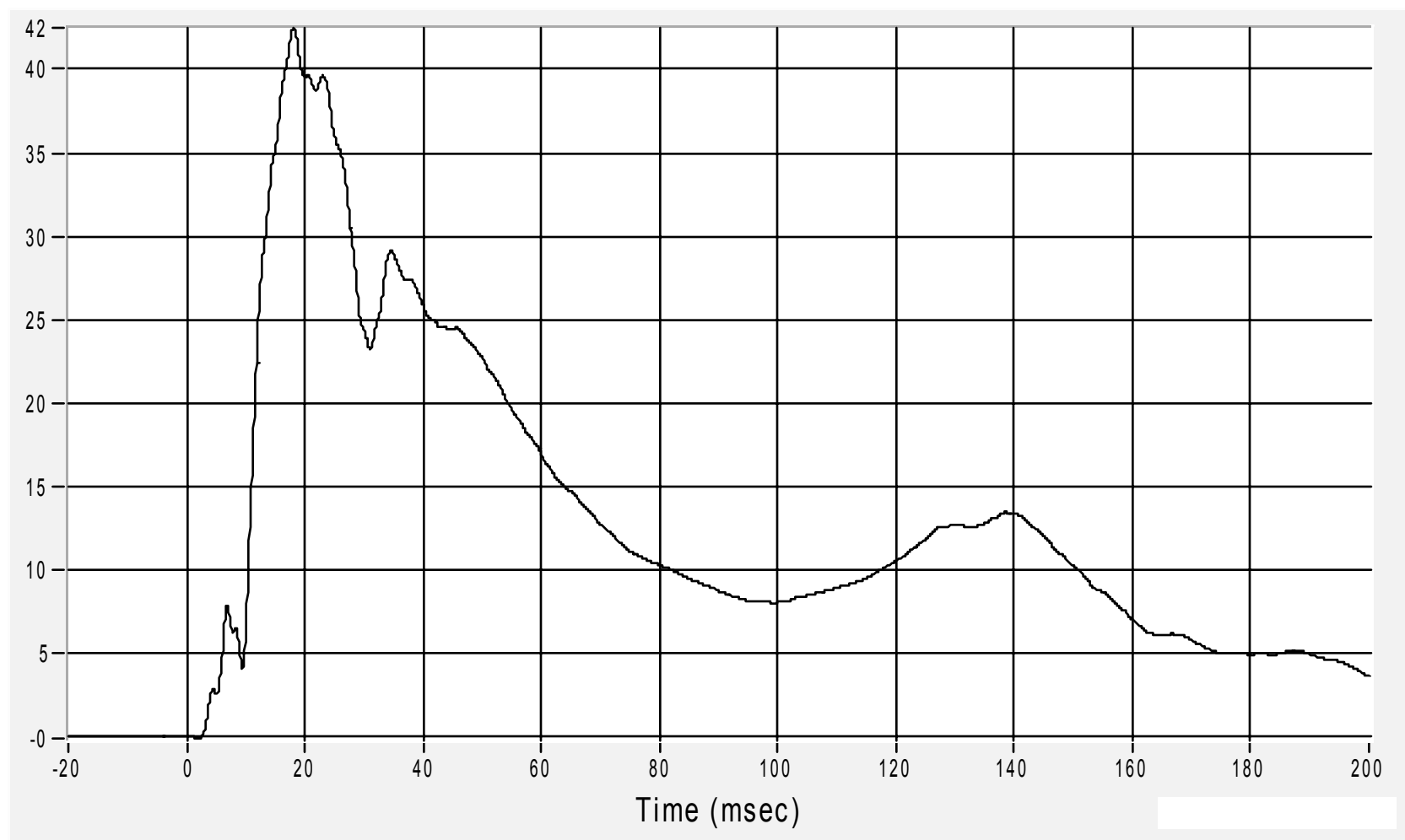
Medical College of Wisconsin
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Left Front Door Upper Centerline (Y) Velocity

Velocity (km/h) CFC180

Max 42.5 km/h at 18.1 msec

Min 0.0 km/h at 2.1 msec



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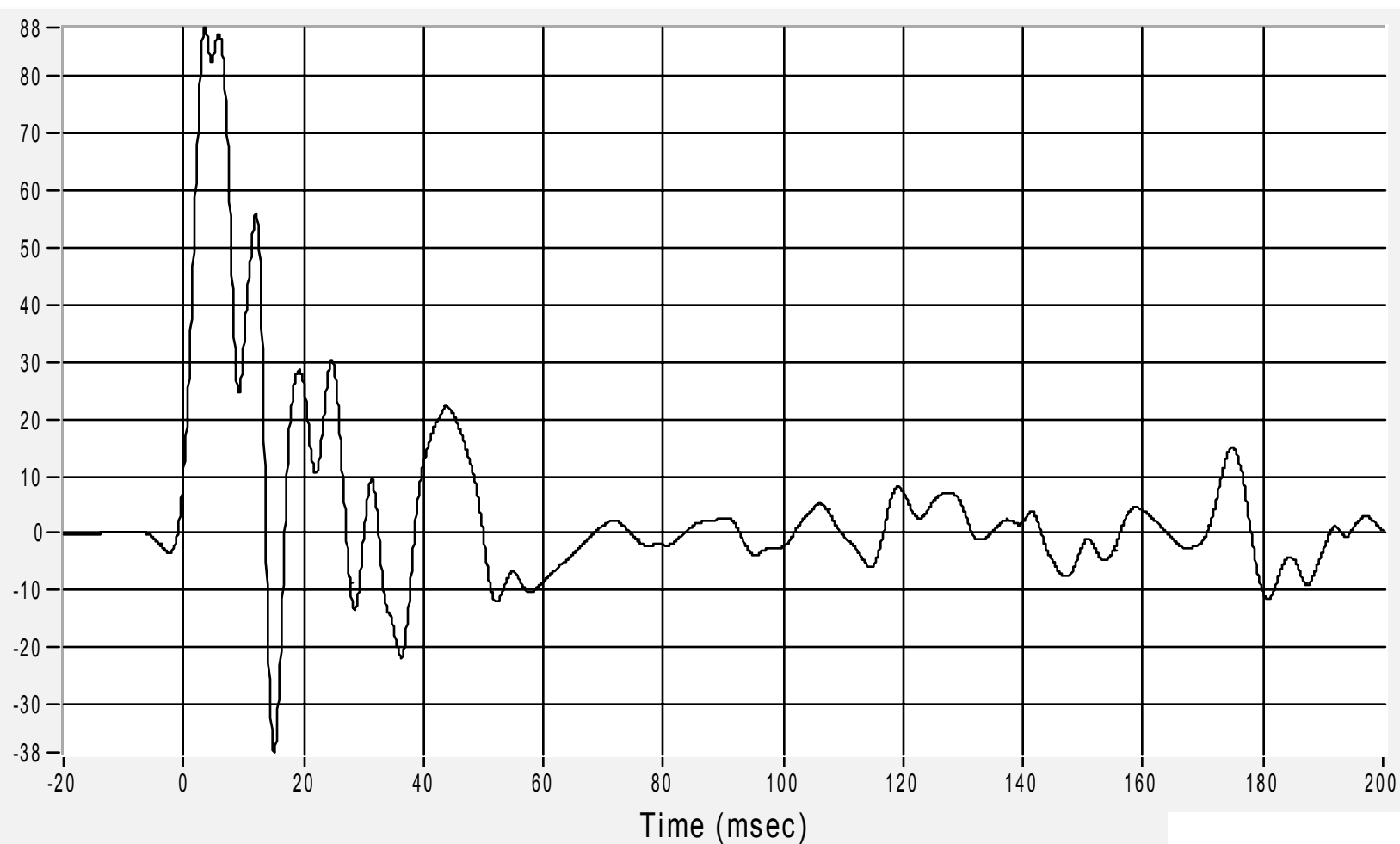
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Mid-Rear of Left Rear Door (Y) Acceleration

Acceleration (G's) CFC60

Max 88.4 G at 3.5 msec

Min -38.3 G at 15.1 msec



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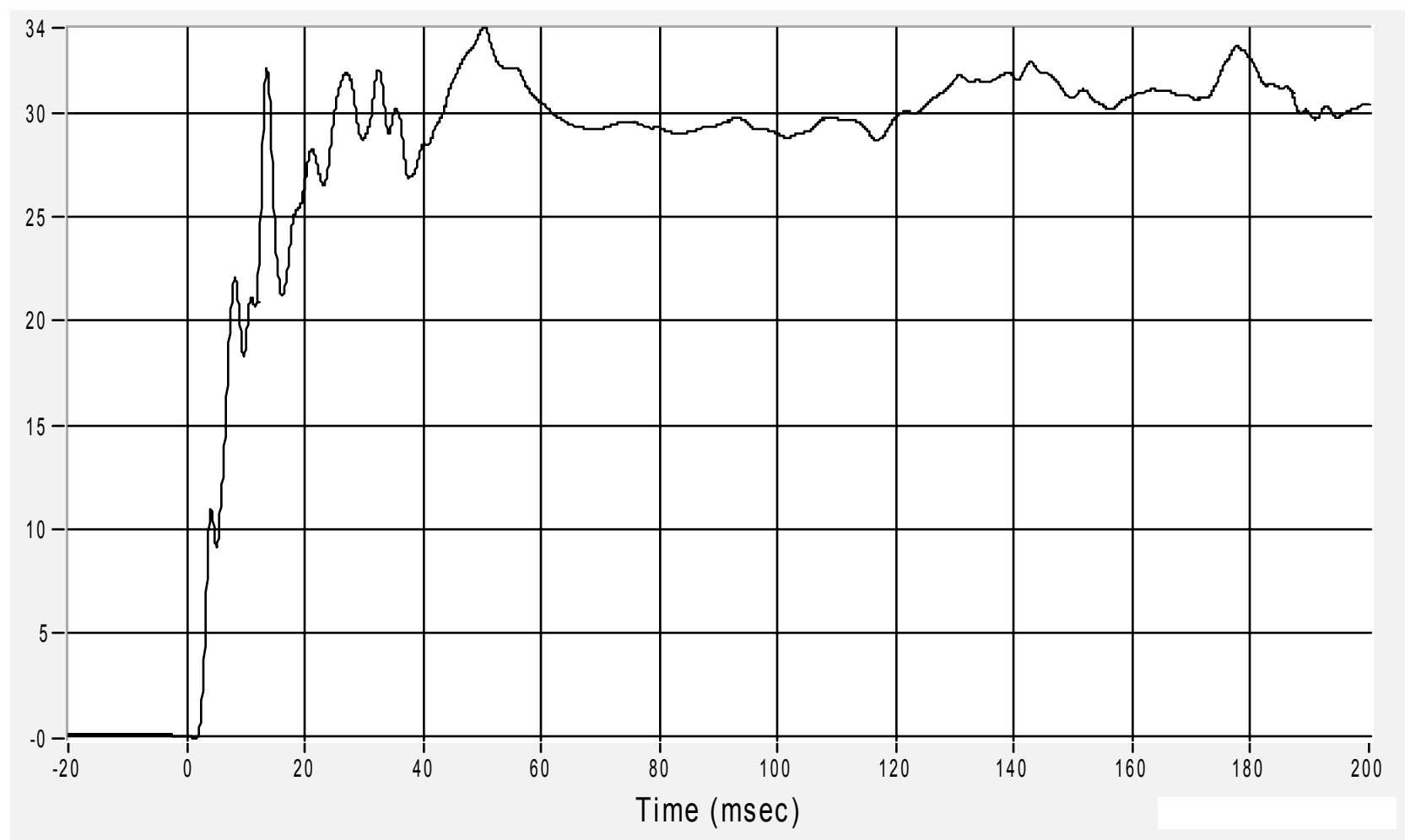
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Mid-Rear of Left Rear Door (Y) Velocity

Velocity (km/h) CFC180

Max 34.1 km/h at 50.3 msec

Min -0.1 km/h at 1.5 msec



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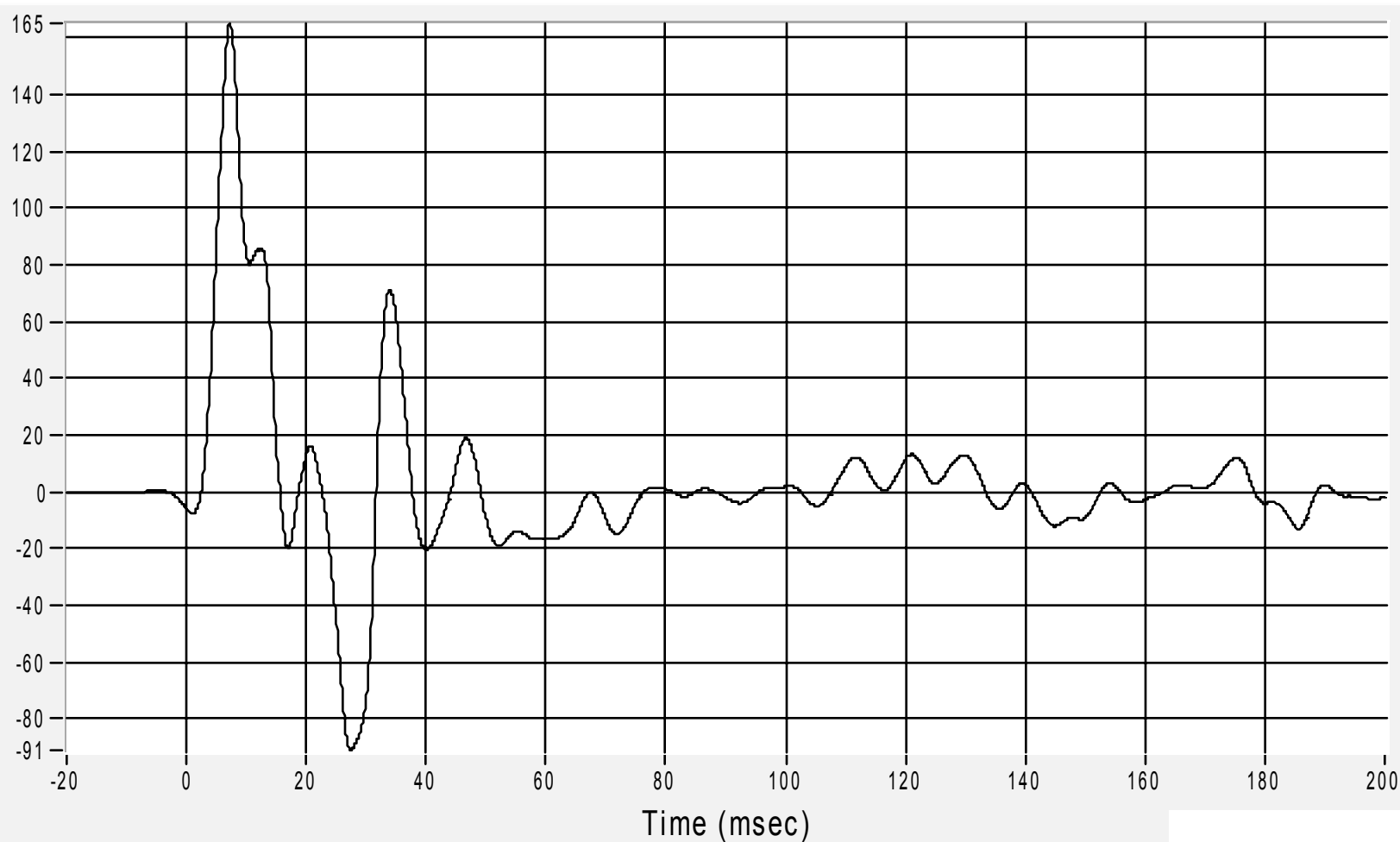
*Medical College of Wisconsin
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Left Rear Door Upper Centerline (Y) Acceleration

Acceleration (G's) CFC60

Max 165.2 G at 7.2 msec

Min -91.0 G at 27.4 msec



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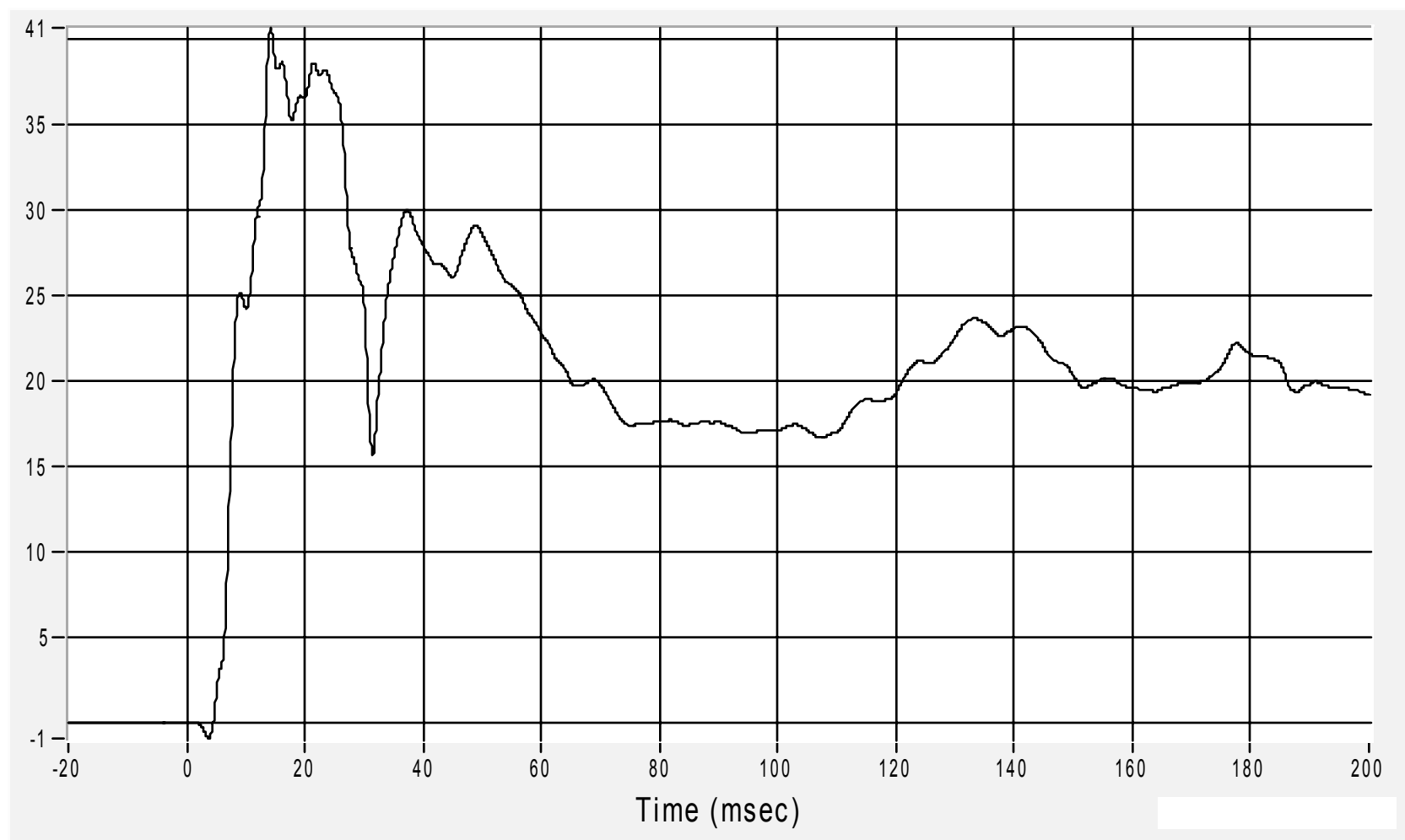
B-91

Left Rear Door Upper Centerline (Y) Velocity

Velocity (km/h) CFC180

Max 40.7 km/h at 14.2 msec

Min -0.9 km/h at 3.8 msec



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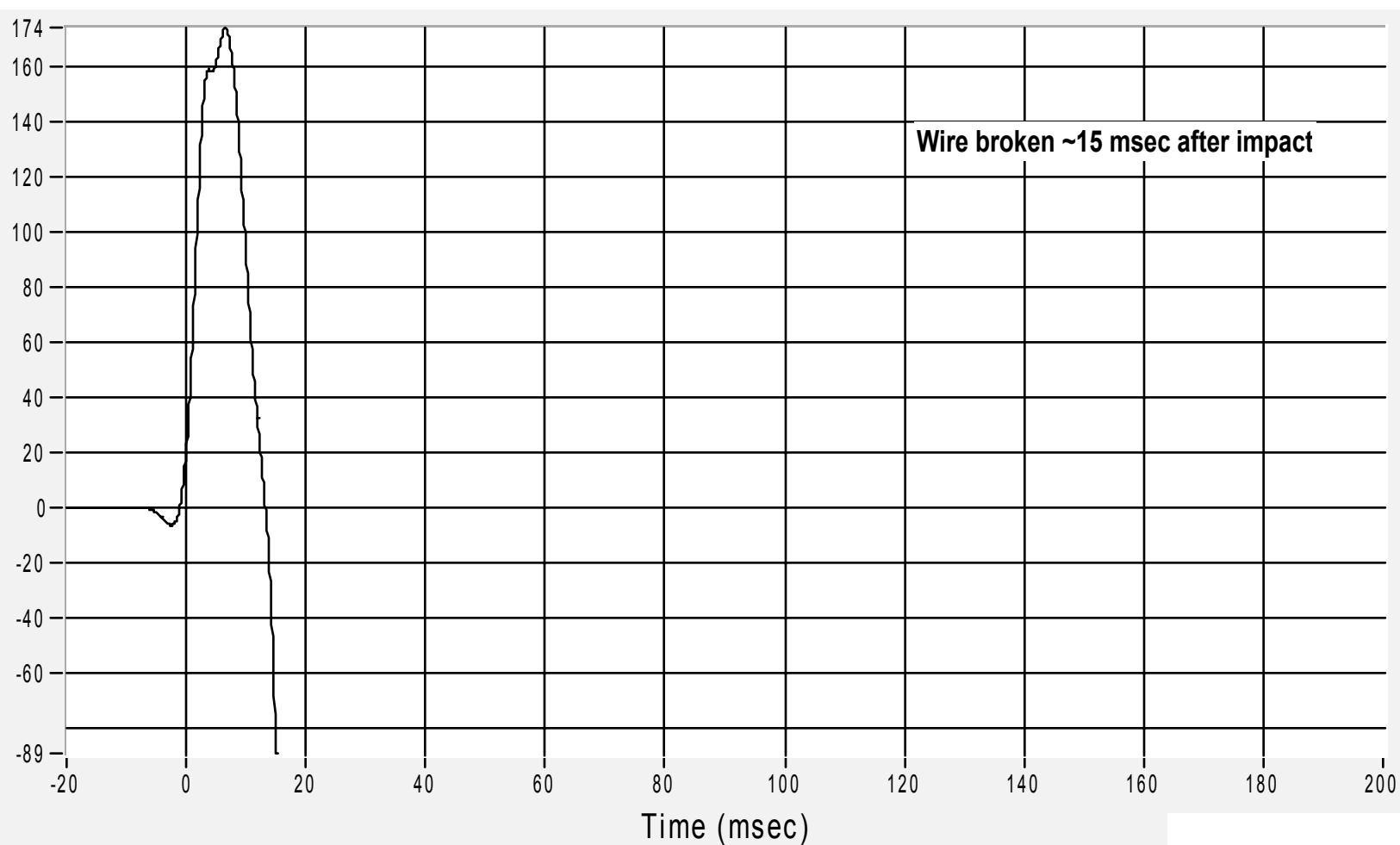
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Left Lower B-Pillar (Y) Acceleration

Acceleration (G's) CFC60

Max 174.4 G at 6.5 msec

Min -82.0 G at 14.9 msec



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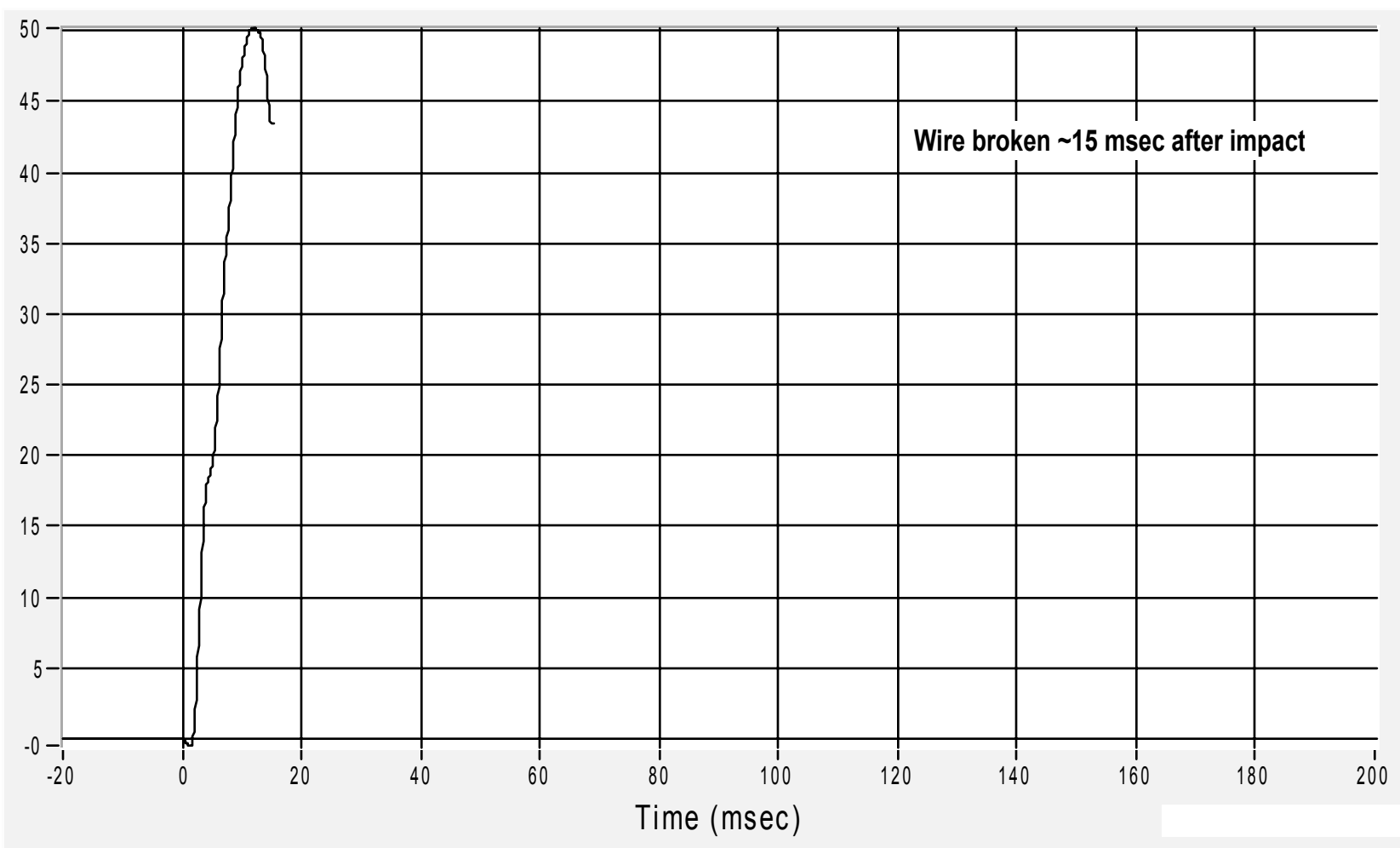
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Left Lower B-Pillar (Y) Velocity

Velocity (km/h) CFC180

Max 50.2 km/h at 11.8 msec

Min -0.5 km/h at 1.3 msec



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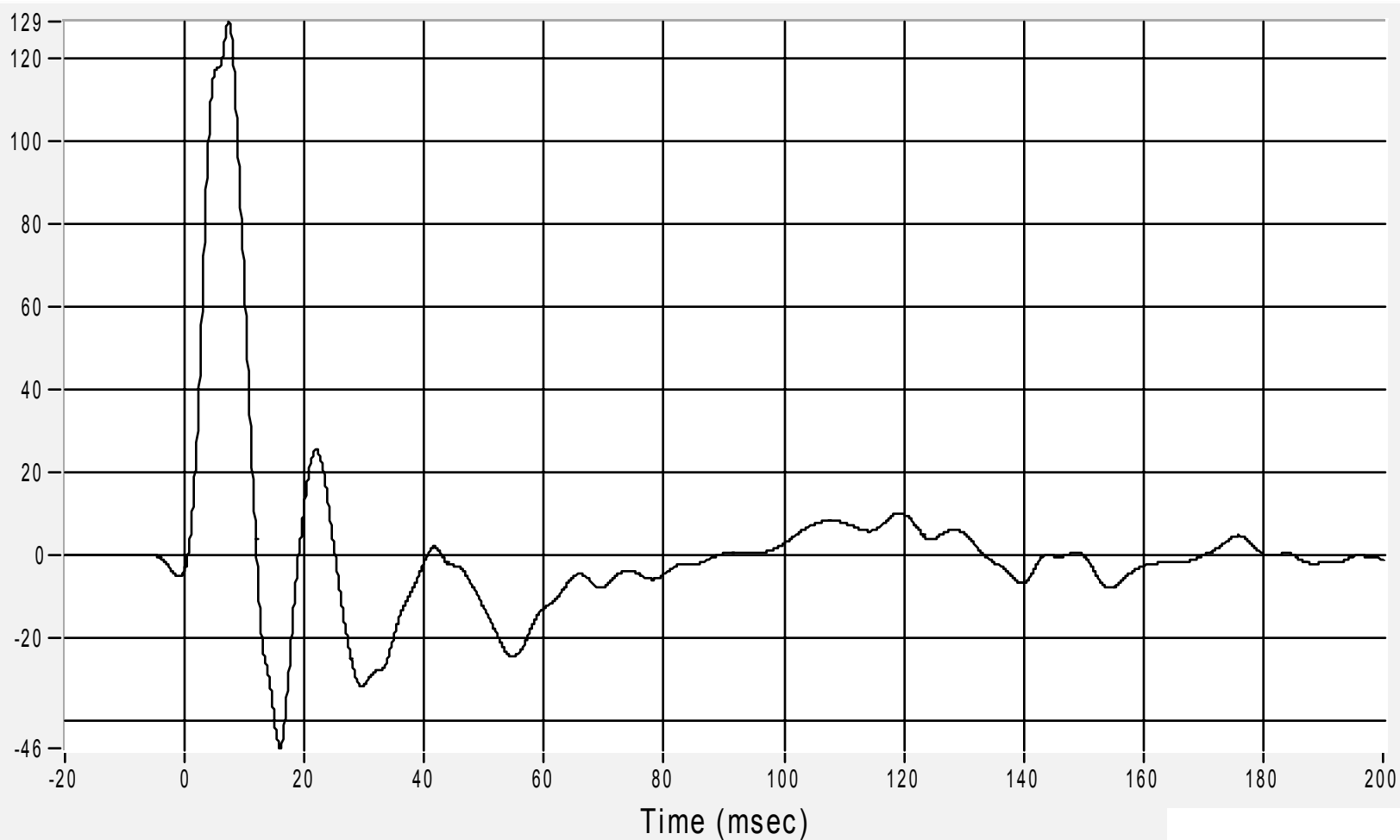
Medical College of Wisconsin
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Left Middle B-Pillar (Y) Acceleration

Acceleration (G's) CFC60

Max 129.0 G at 7.3 msec

Min -46.4 G at 15.9 msec



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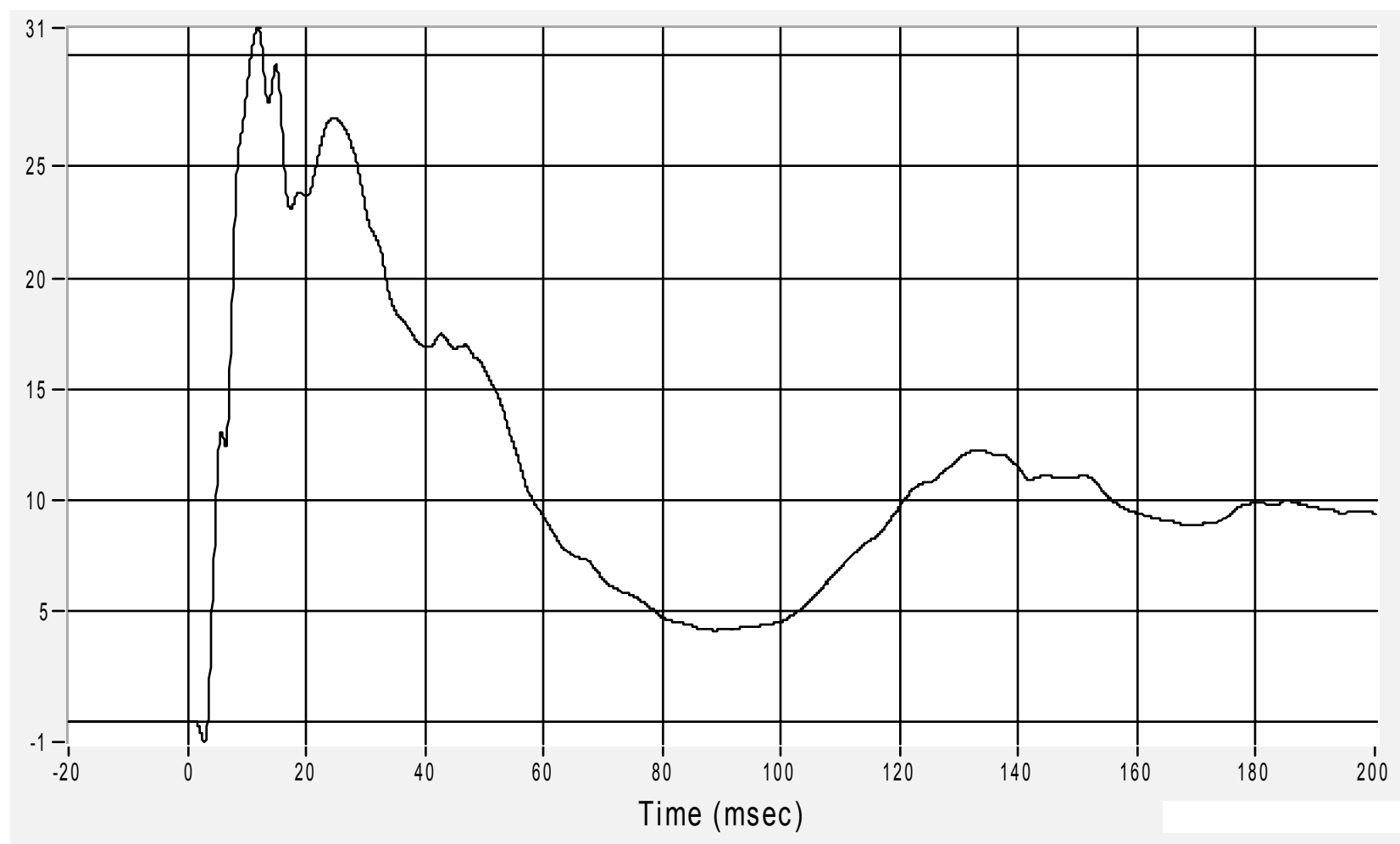
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Left Middle B-Pillar (Y) Velocity

Velocity (km/h) CFC180

Max 31.2 km/h at 11.8 msec

Min -0.9 km/h at 2.9 msec



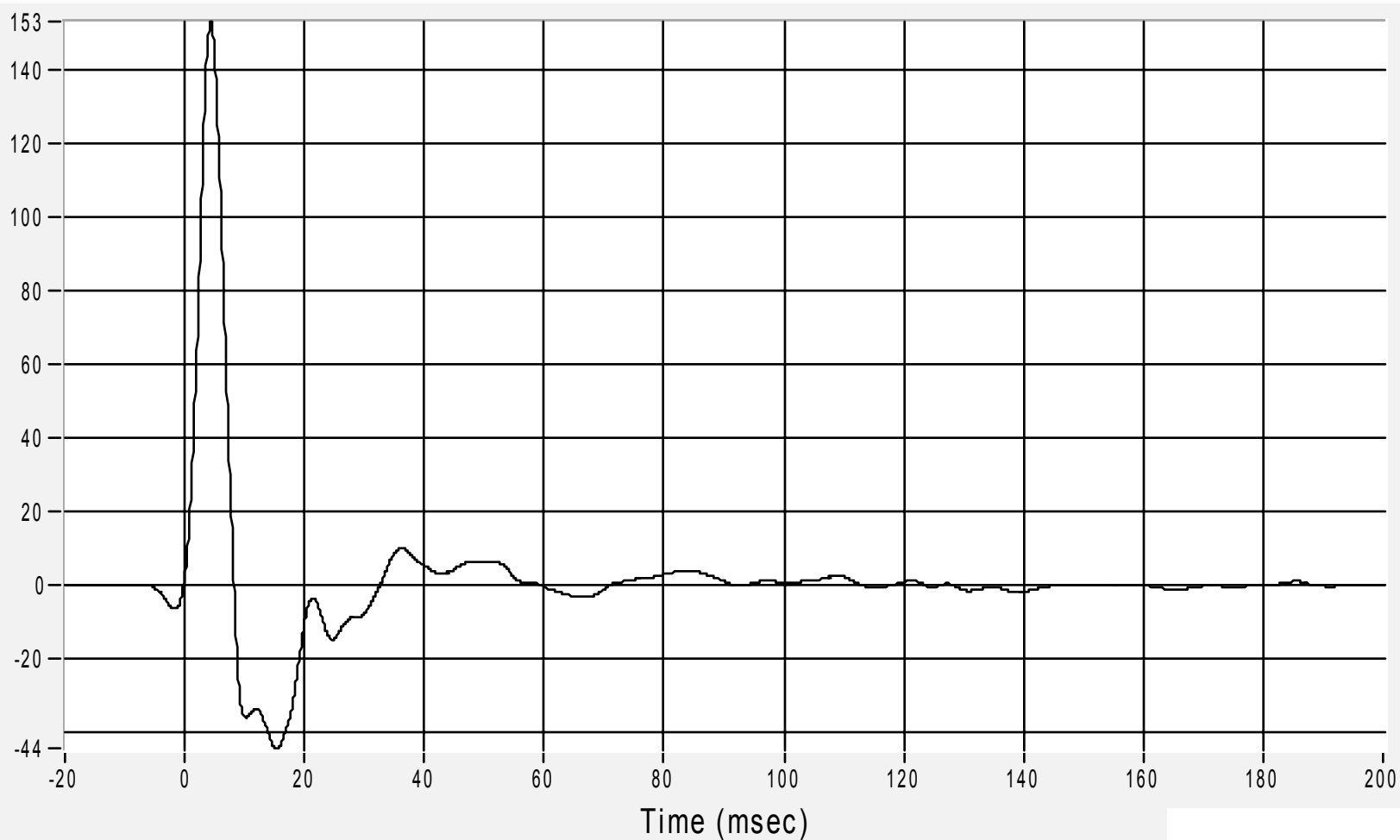
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Left Lower A-Pillar (Y) Acceleration

Acceleration (G's) CFC60

Max 153.4 G at 4.3 msec**Min -44.3 G at 15.3 msec**

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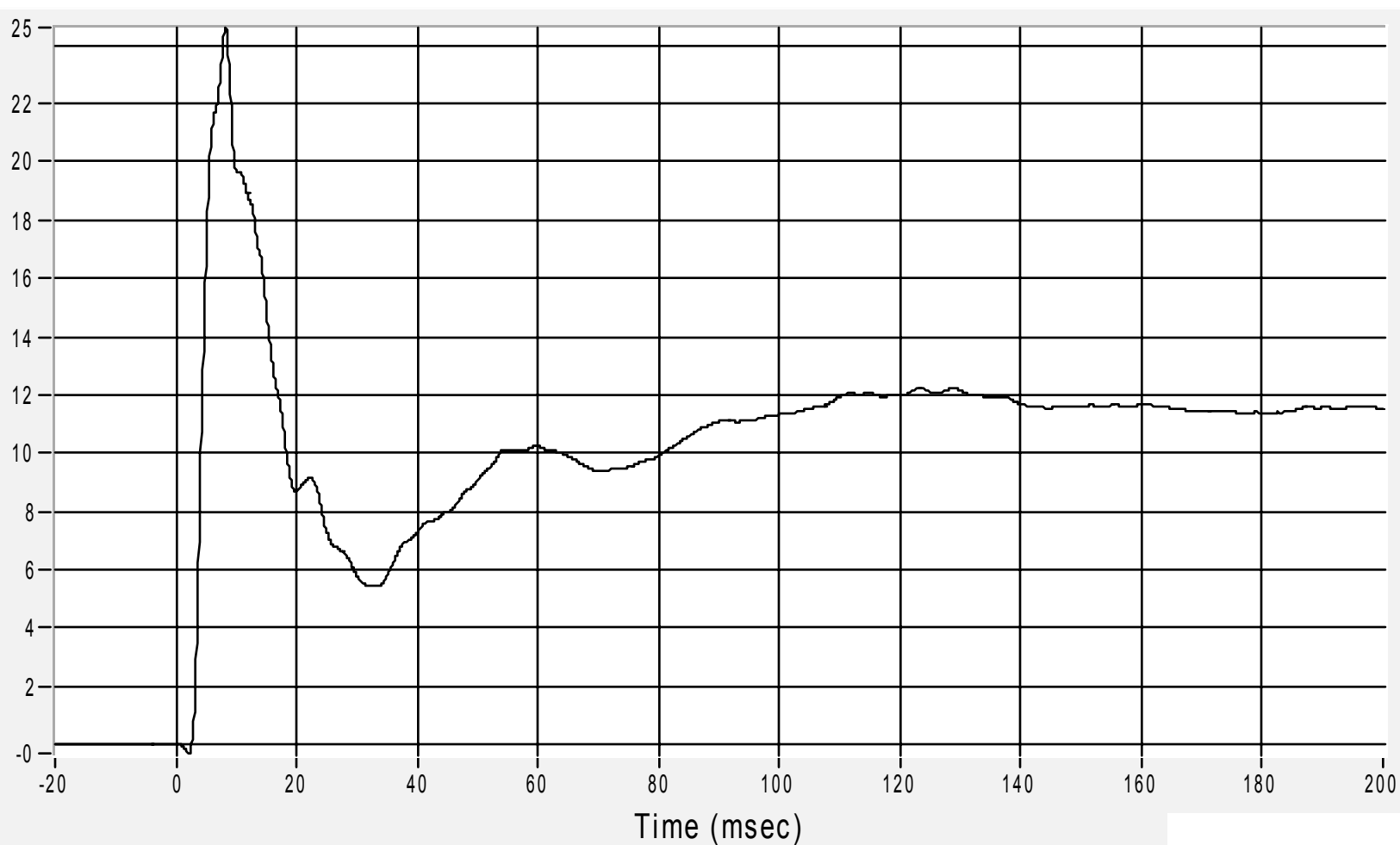
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Left Lower A-Pillar (Y) Velocity

Velocity (km/h) CFC180

Max 24.6 km/h at 8.2 msec

Min -0.3 km/h at 2.2 msec



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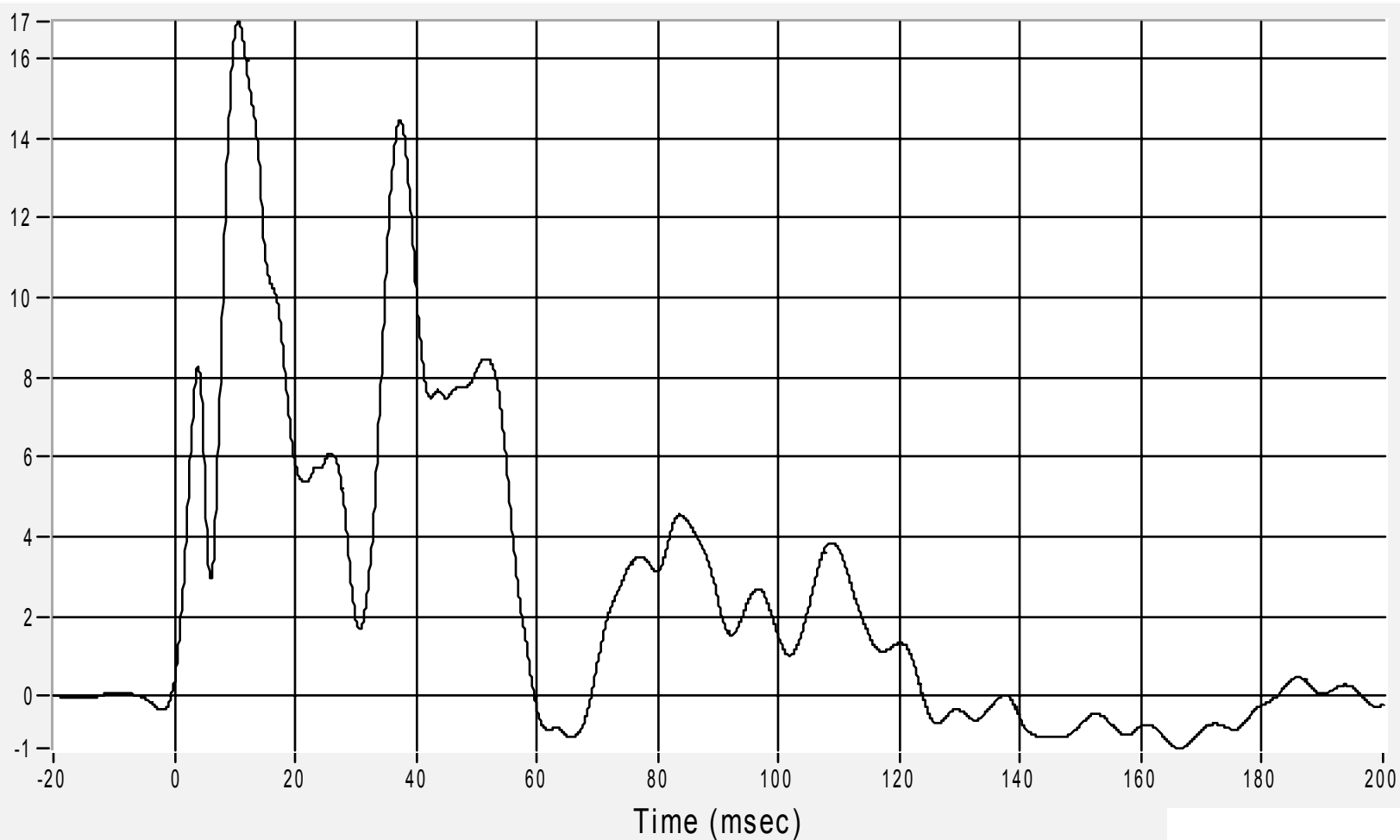
Medical College of Wisconsin
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Left Middle A-Pillar (Y) Acceleration

Acceleration (G's) CFC60

Max 16.9 G at 10.6 msec

Min -1.3 G at 166.3 msec



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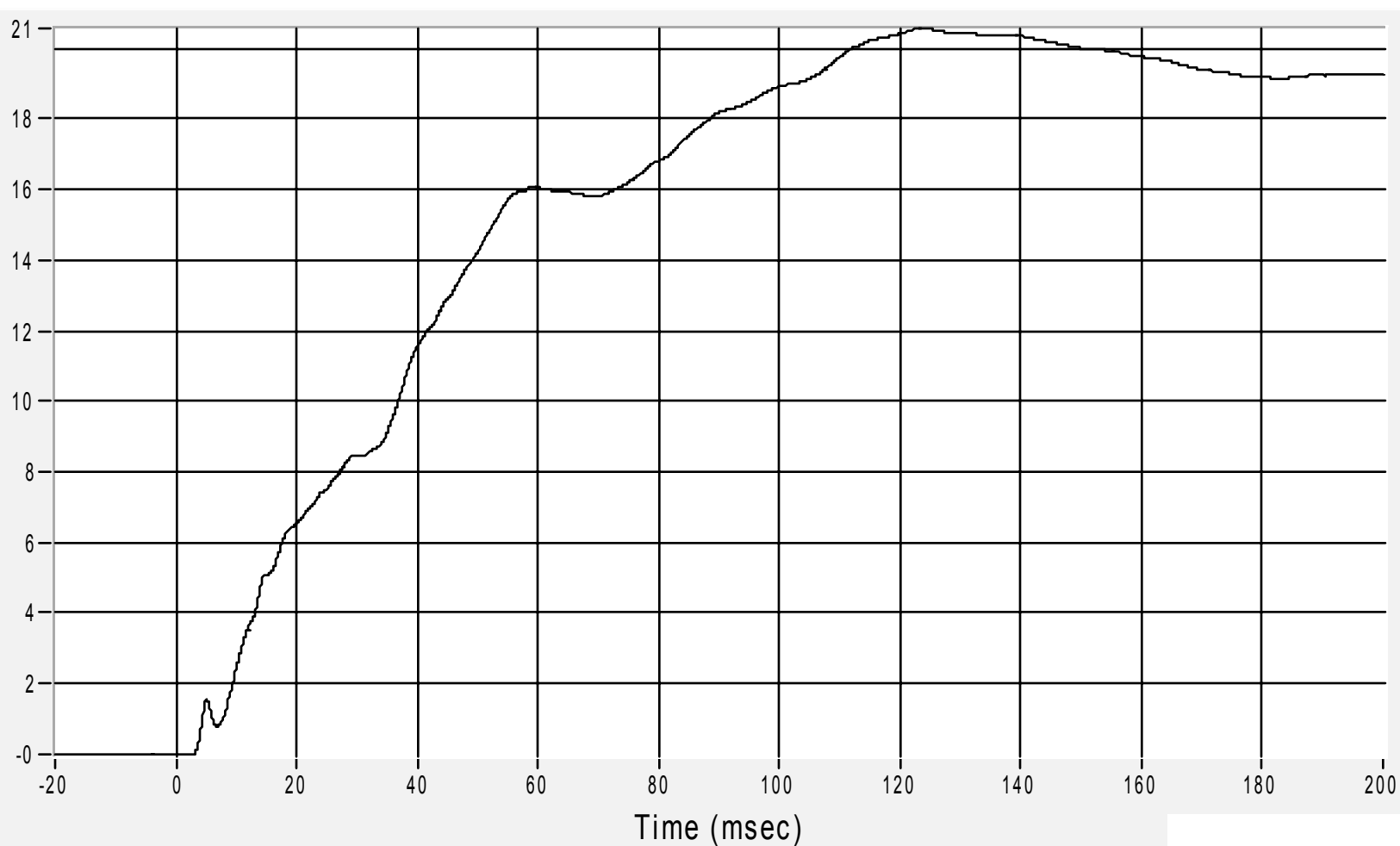
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Left Middle A-Pillar (Y) Velocity

Velocity (km/h) CFC180

Max 20.6 km/h at 123.5 msec

Min 0.0 km/h at 2.6 msec



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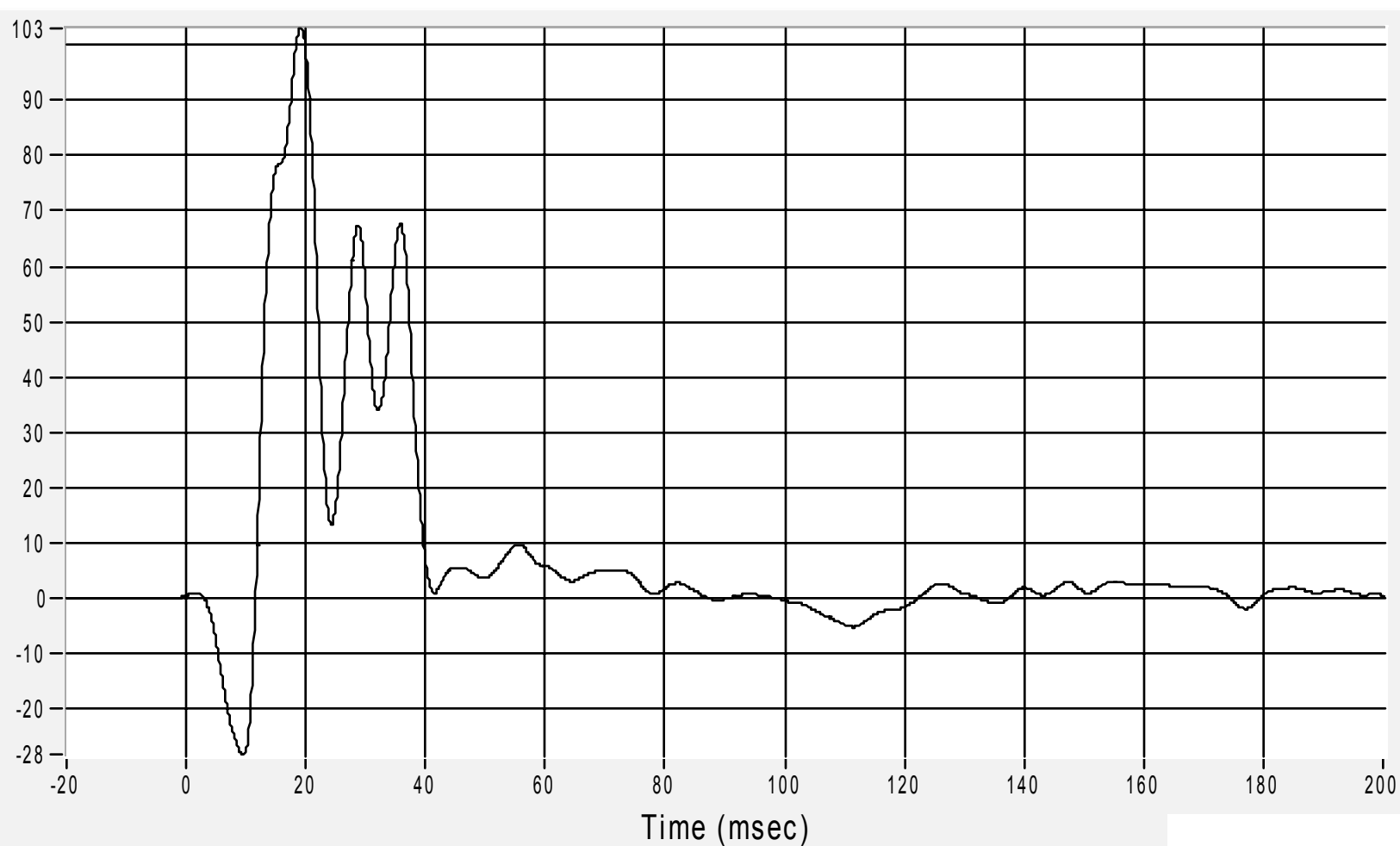
Medical College of Wisconsin
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Front Seat Track (Y) Acceleration

Acceleration (G's) CFC60

Max 102.9 G at 19.1 msec

Min -28.2 G at 9.5 msec



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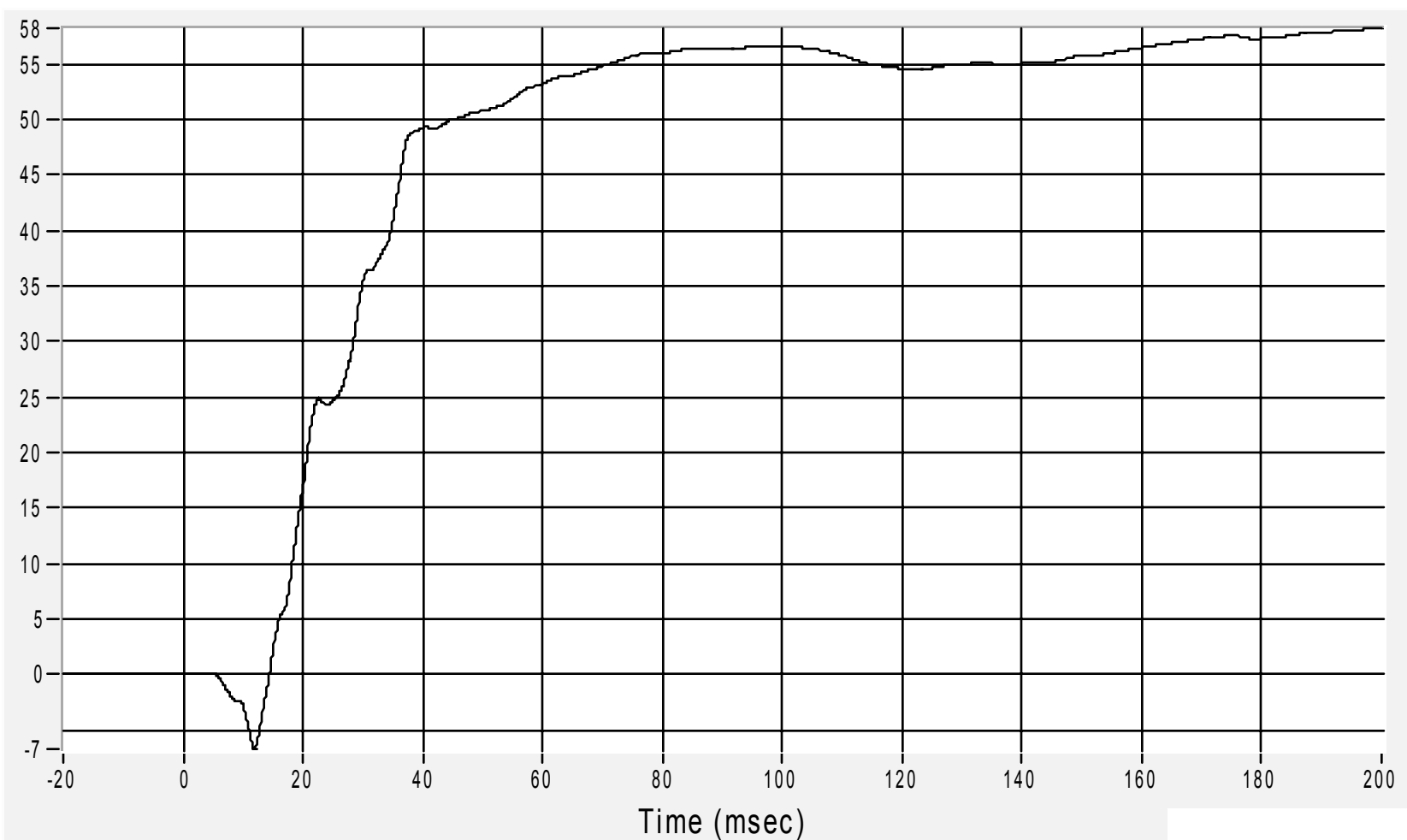
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Front Seat Track (Y) Velocity

Velocity (km/h) CFC180

Max 58.2 km/h at 199.9 msec

Min -6.7 km/h at 11.8 msec



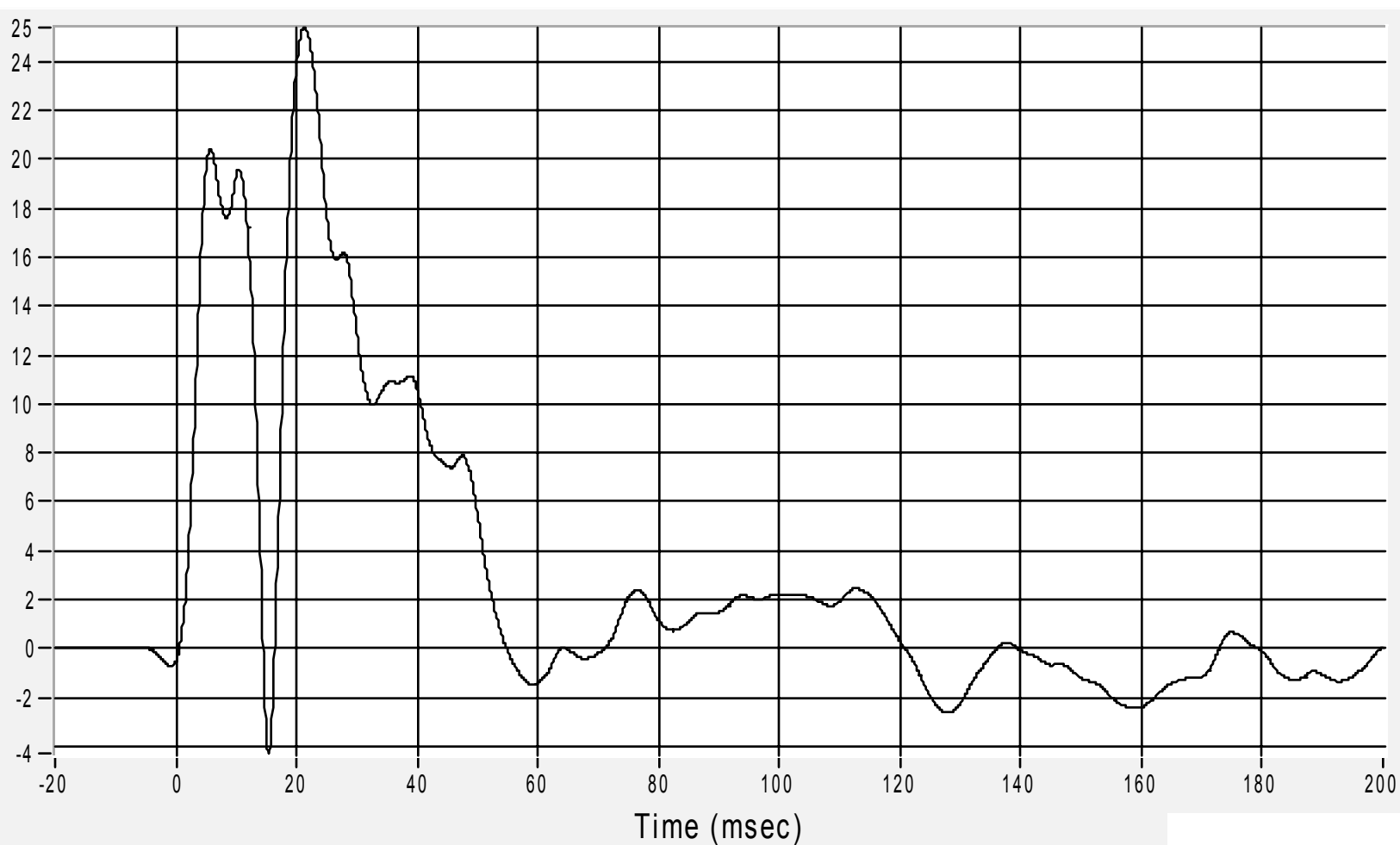
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3 February 2004

Medical College of Wisconsin
Vehicle Crashworthiness Lab

Rear Seat Track (Y) Acceleration

Acceleration (G's) CFC60

Max 25.4 G at 21.3 msec**Min -4.3 G at 15.4 msec**

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3 February 2004

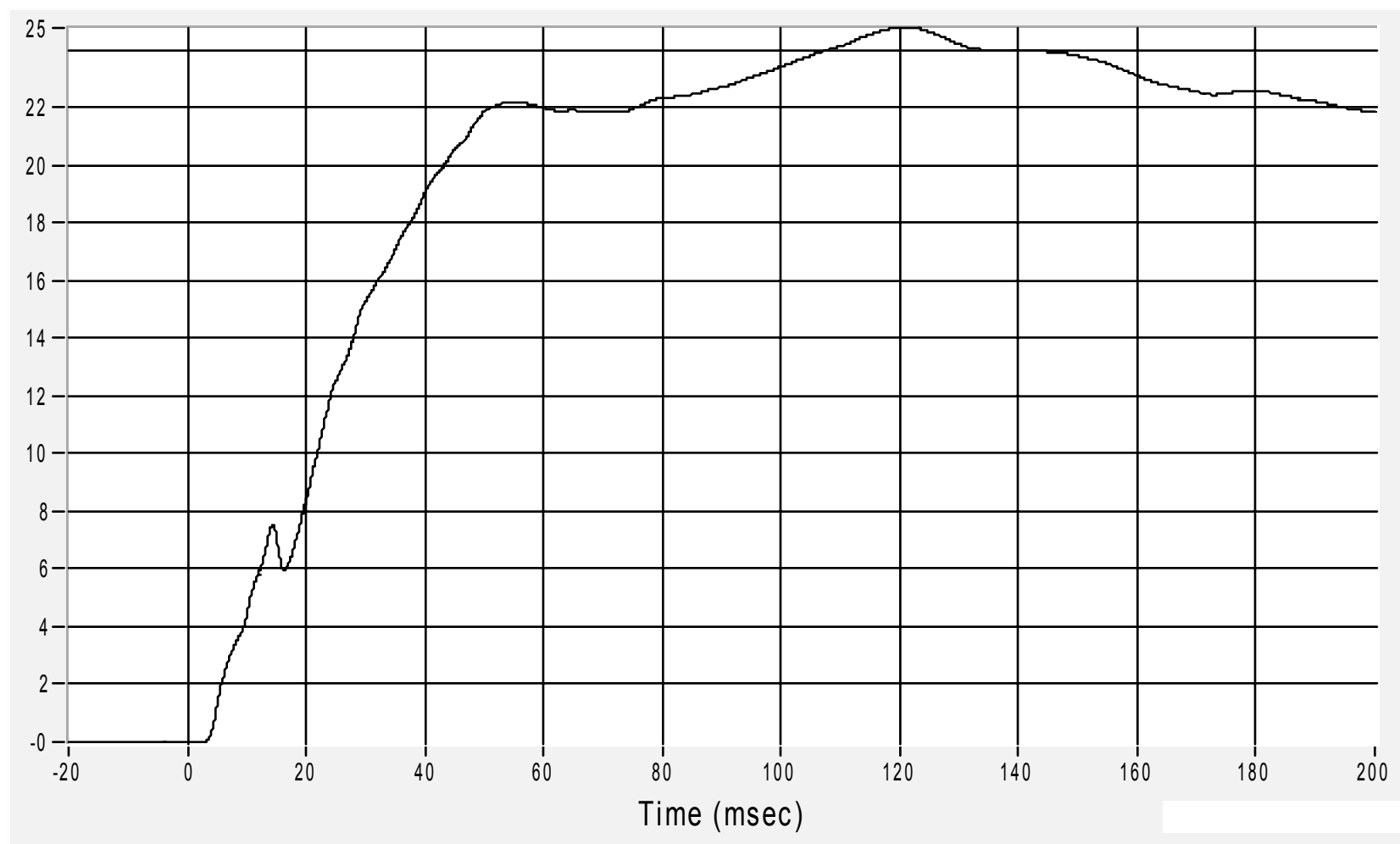
*Medical College of Wisconsin
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Rear Seat Track (Y) Velocity

Velocity (km/h) CFC180

Max 24.7 km/h at 120.1 msec

Min 0.0 km/h at 2.6 msec



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3 February 2004

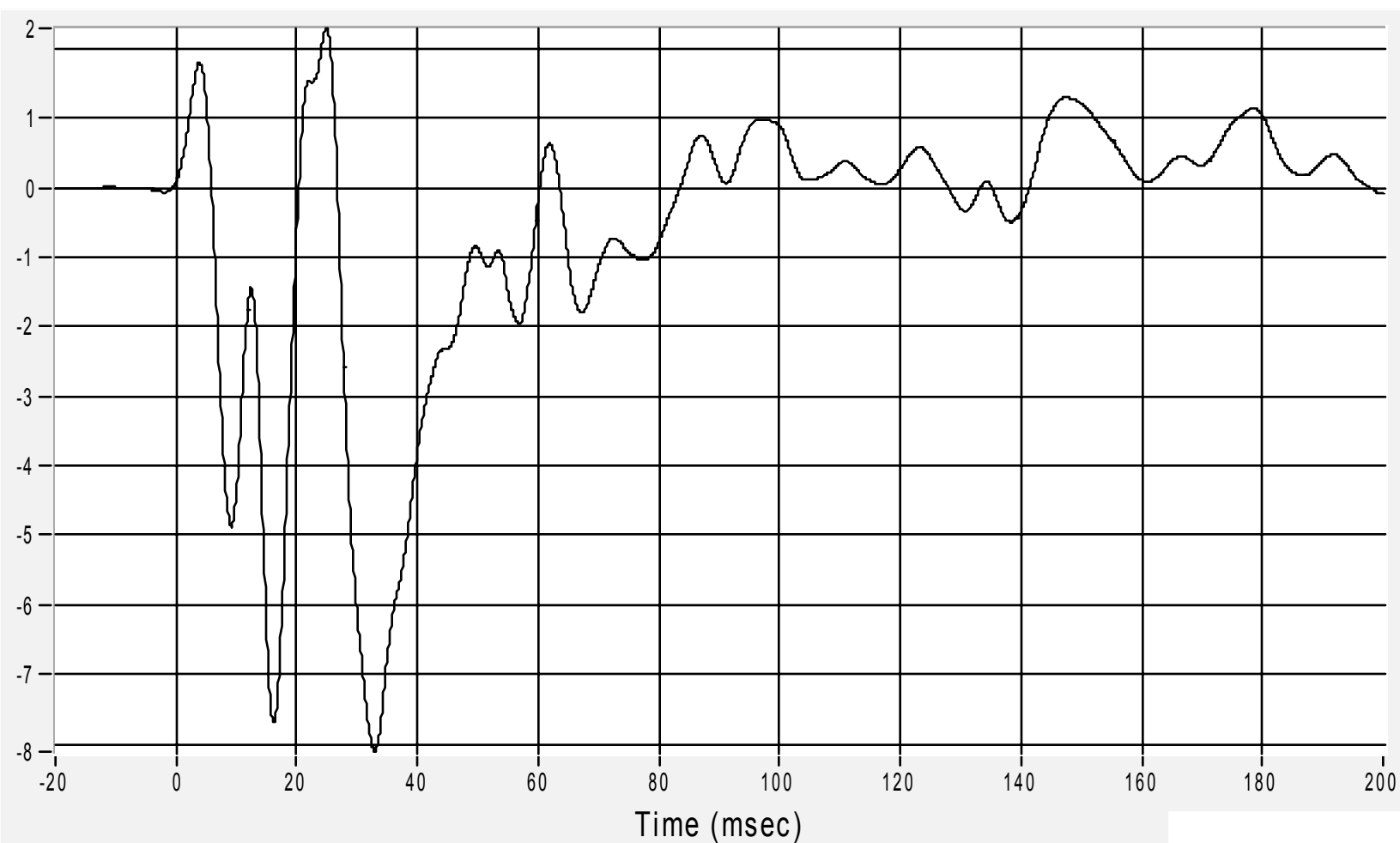
Medical College of Wisconsin
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Vehicle Center of Gravity (X) Acceleration

Acceleration (G's) CFC60

Max 2.3 G at 24.9 msec

Min -8.1 G at 32.9 msec



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3 February 2004

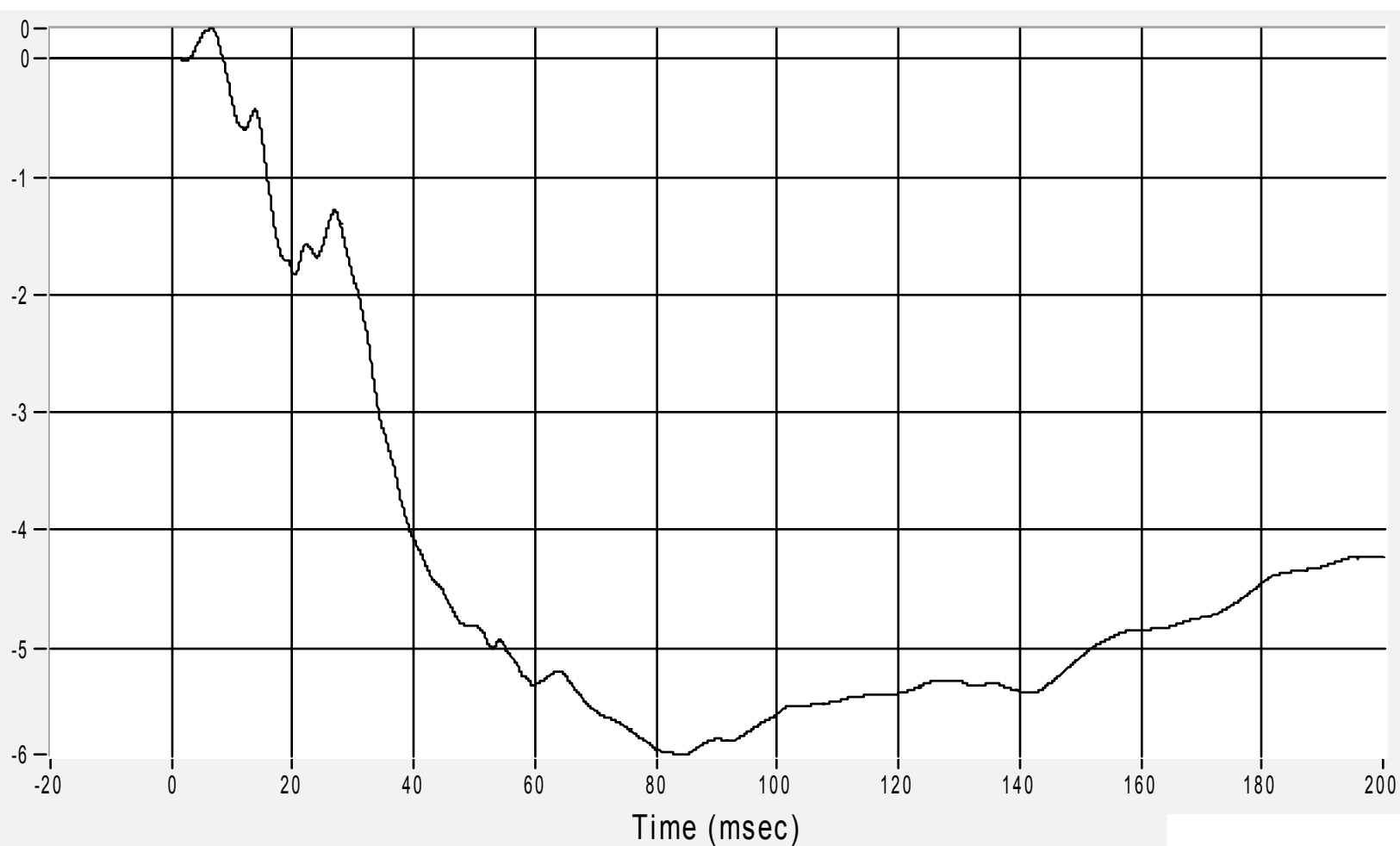
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Vehicle Center of Gravity (X) Velocity

Velocity (km/h) CFC180

Max 0.3 km/h at 6.6 msec

Min -5.9 km/h at 84.6 msec



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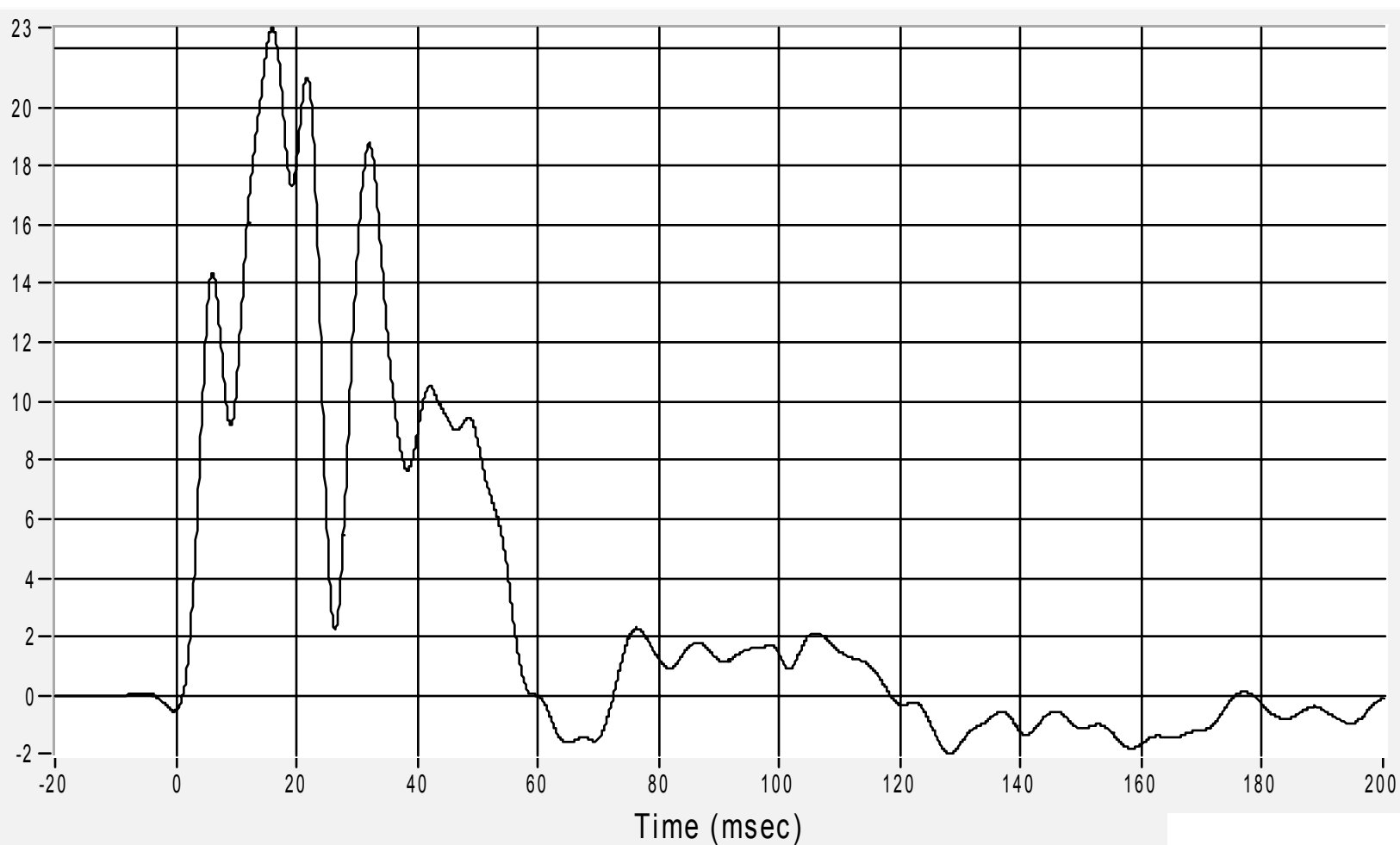
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Vehicle Center of Gravity (Y) Acceleration

Acceleration (G's) CFC60

Max 22.7 G at 16.0 msec

Min -2.0 G at 128.2 msec



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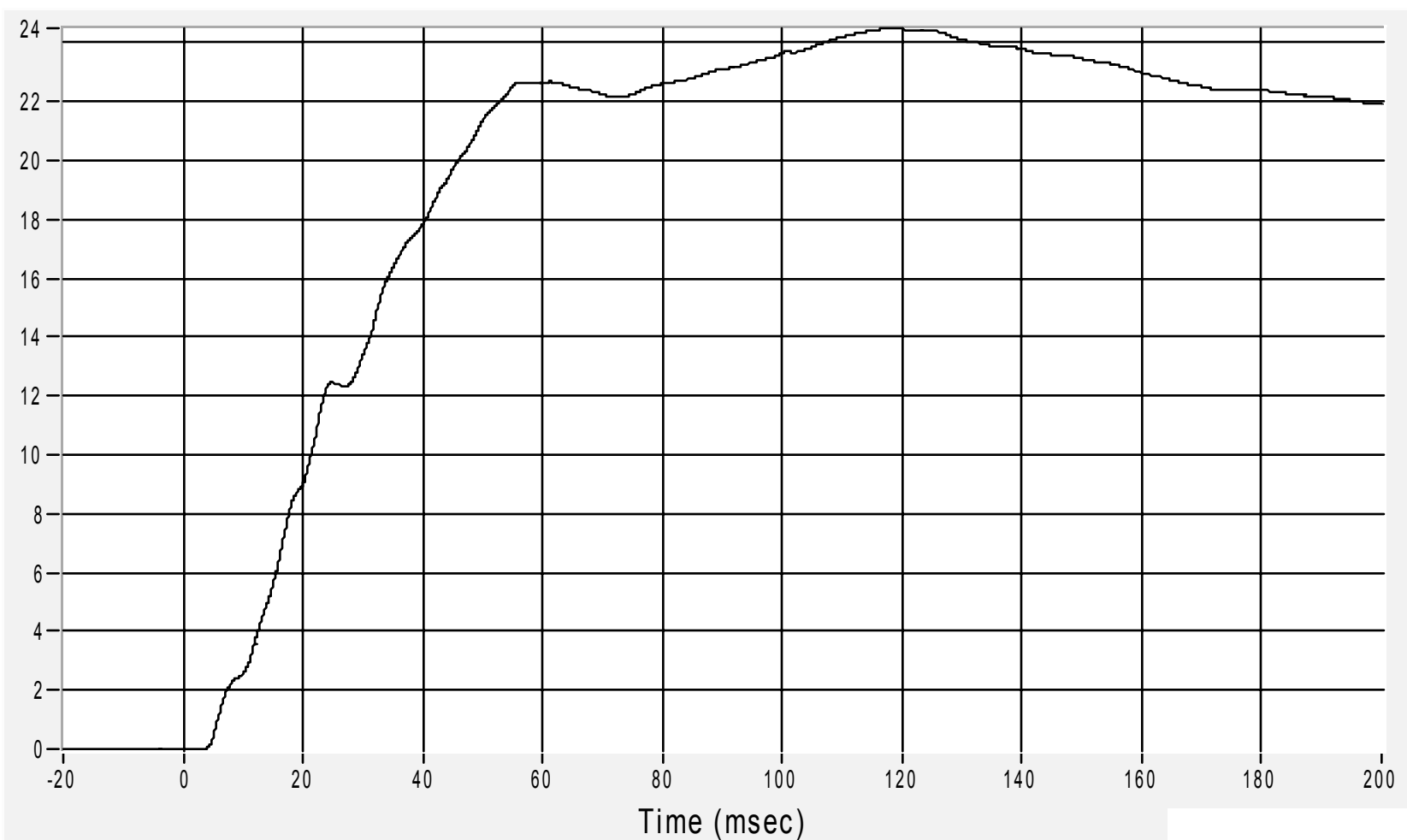
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Vehicle Center of Gravity (Y) Velocity

Velocity (km/h) CFC180

Max 24.5 km/h at 118.5 msec

Min 0.0 km/h at 0.0 msec



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3 February 2004

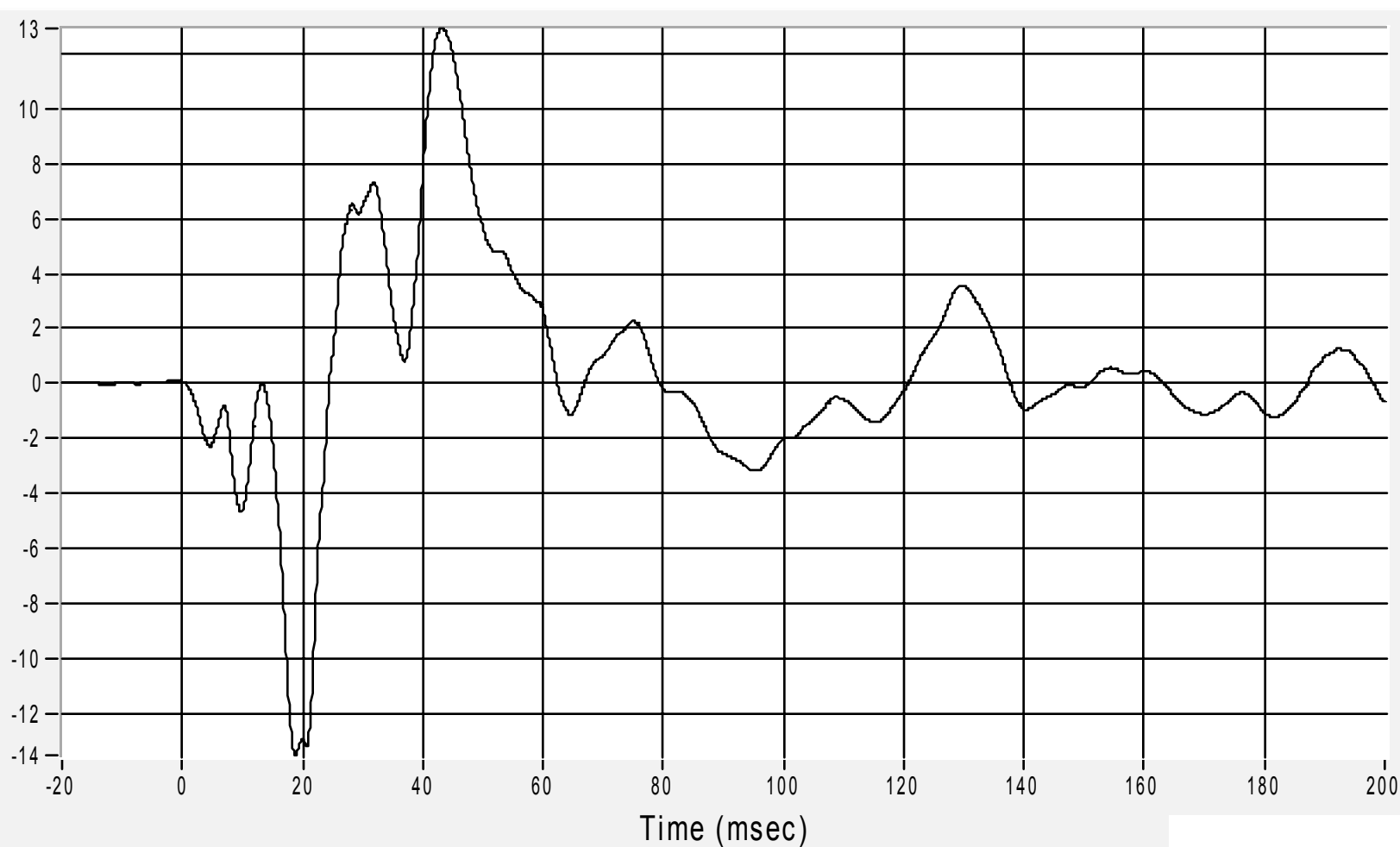
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Vehicle Center of Gravity (Z) Acceleration

Acceleration (G's) CFC60

Max 12.9 G at 43.1 msec

Min -13.5 G at 18.8 msec



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3 February 2004

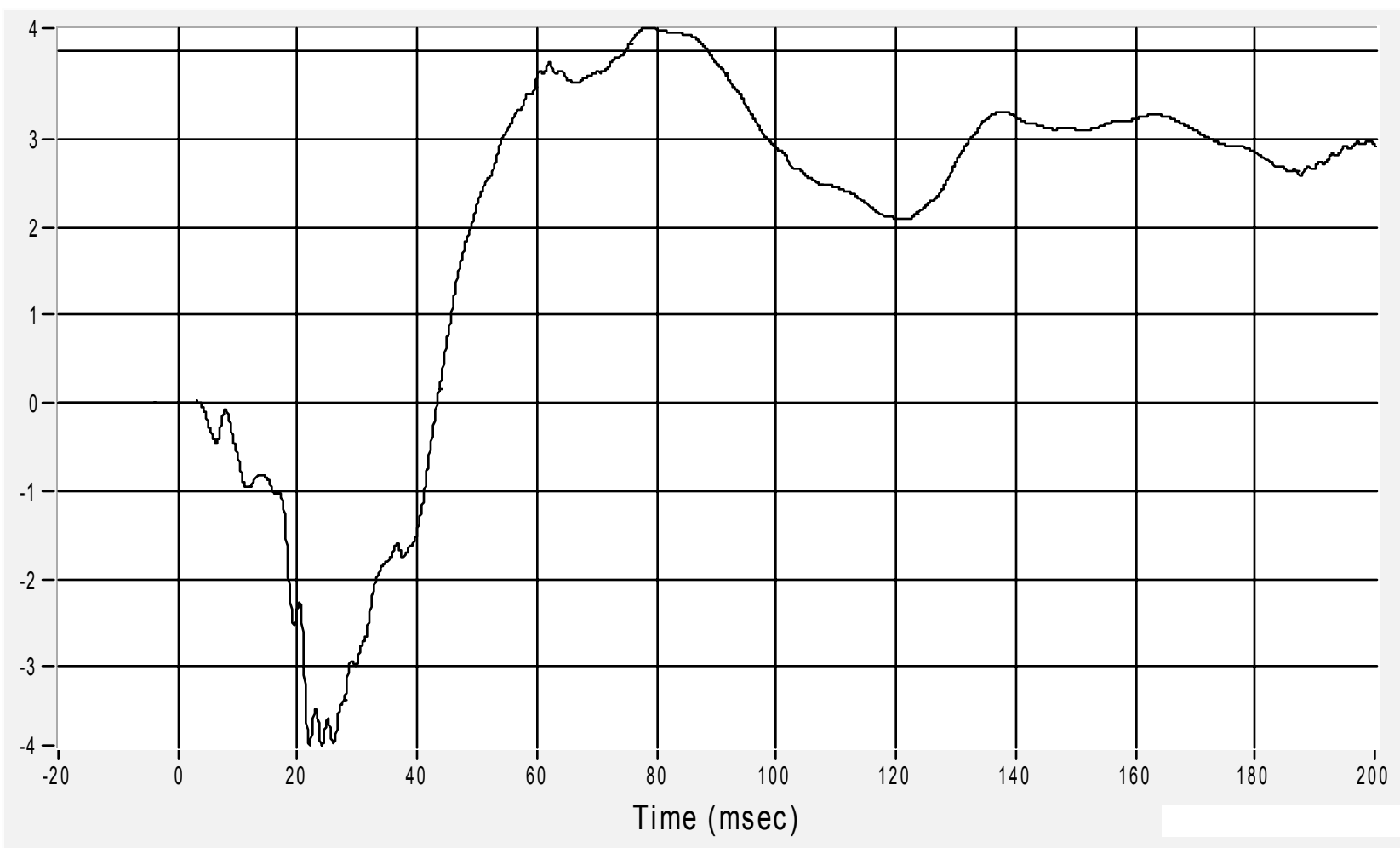
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Vehicle Center of Gravity (Z) Velocity

Velocity (km/h) CFC180

Max 4.3 km/h at 79.3 msec

Min -3.9 km/h at 24.0 msec



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3 February 2004

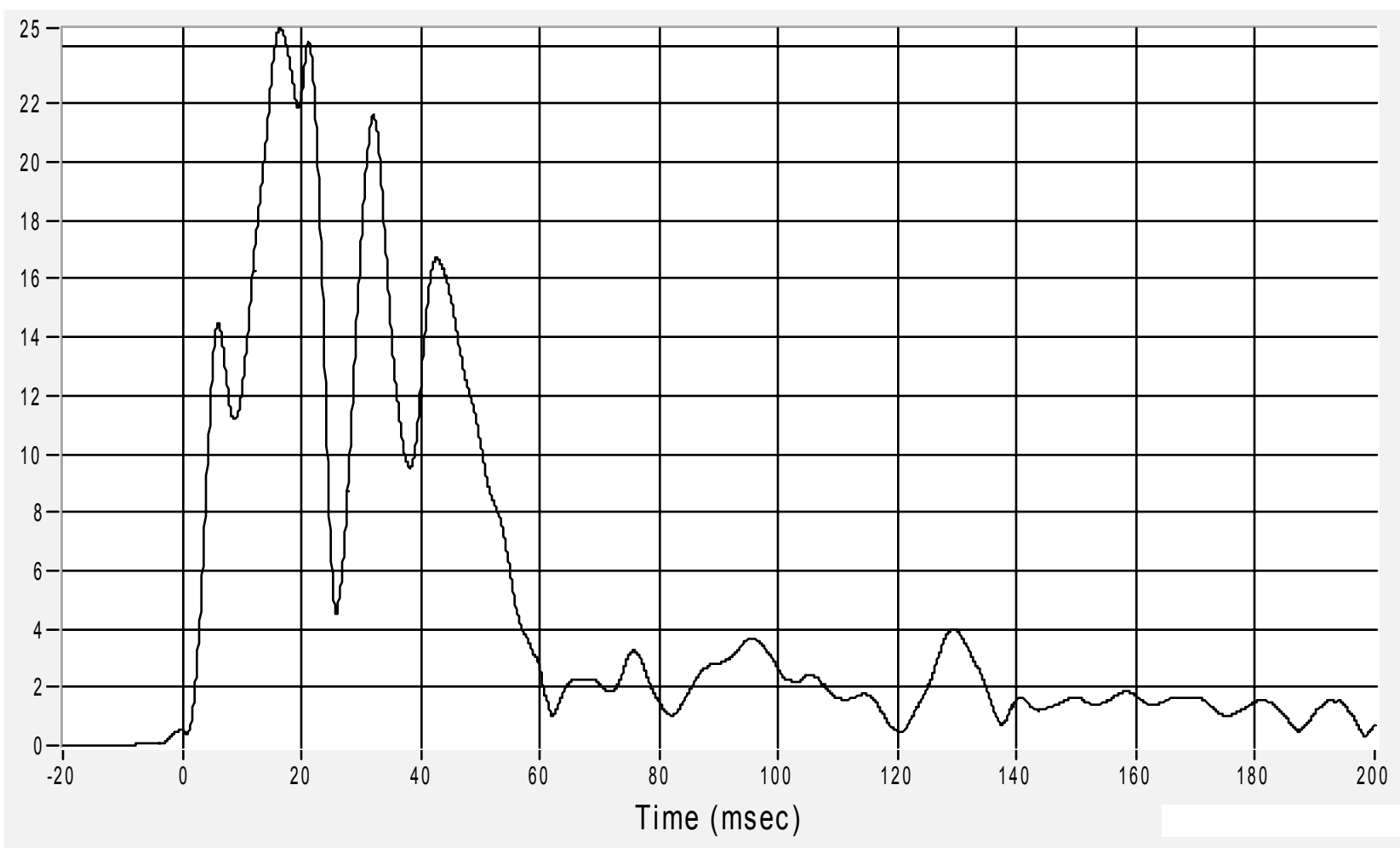
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Vehicle Center of Gravity Resultant Acceleration

Acceleration (G's) CFC60

Max 24.6 G's at 16.4 msec

Min 0.3 G's at 198.5 msec



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3 February 2004

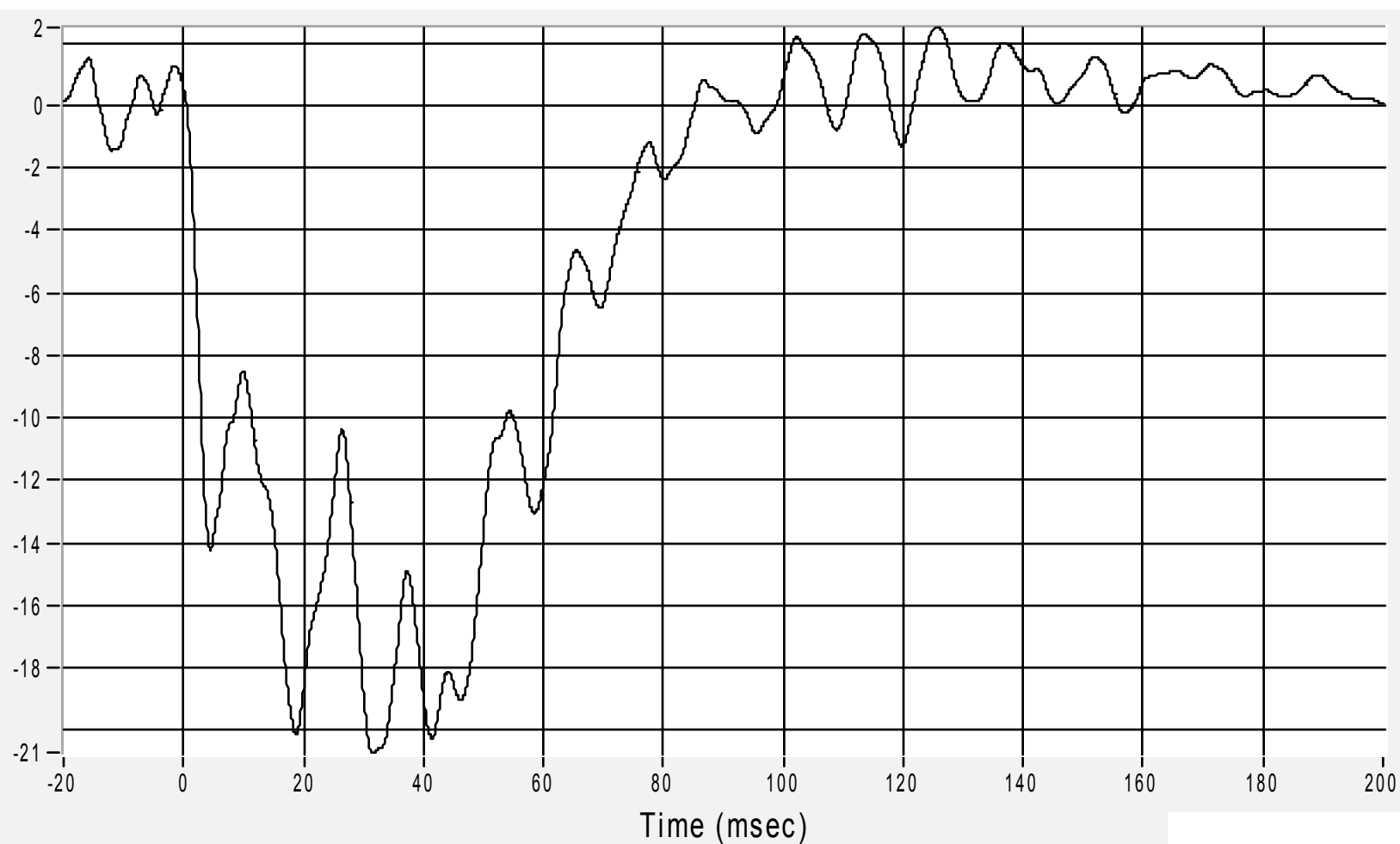
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

MDB Center of Gravity (X) Acceleration

Acceleration (G's) CFC60

Max 2.5 G at 125.8 msec

Min -20.7 G at 31.6 msec



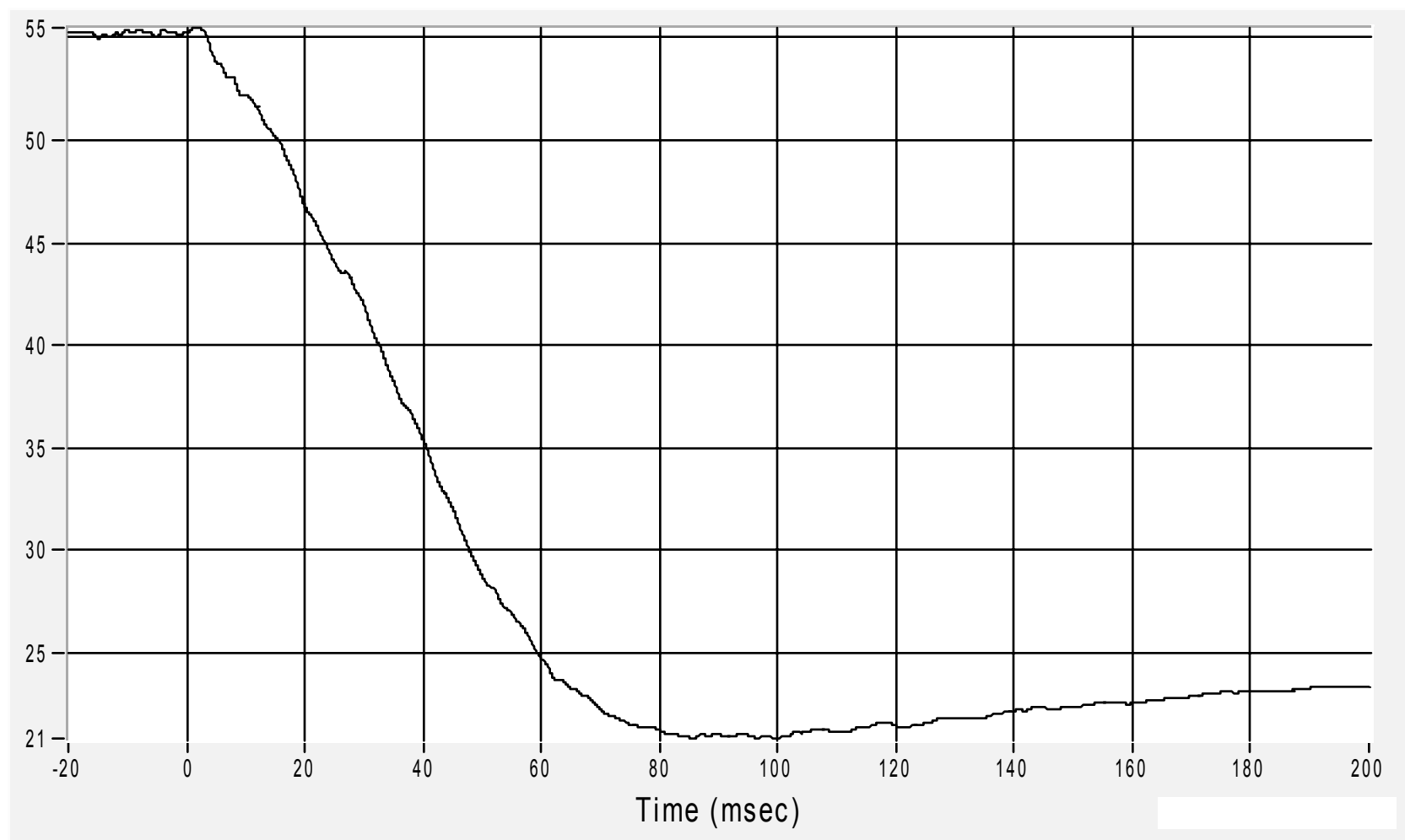
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3 February 2004

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MDB Center of Gravity (X) Velocity

Velocity (km/h) CFC180

Max 55.5 km/h at 1.8 msec**Min 20.8 km/h at 99.6 msec**

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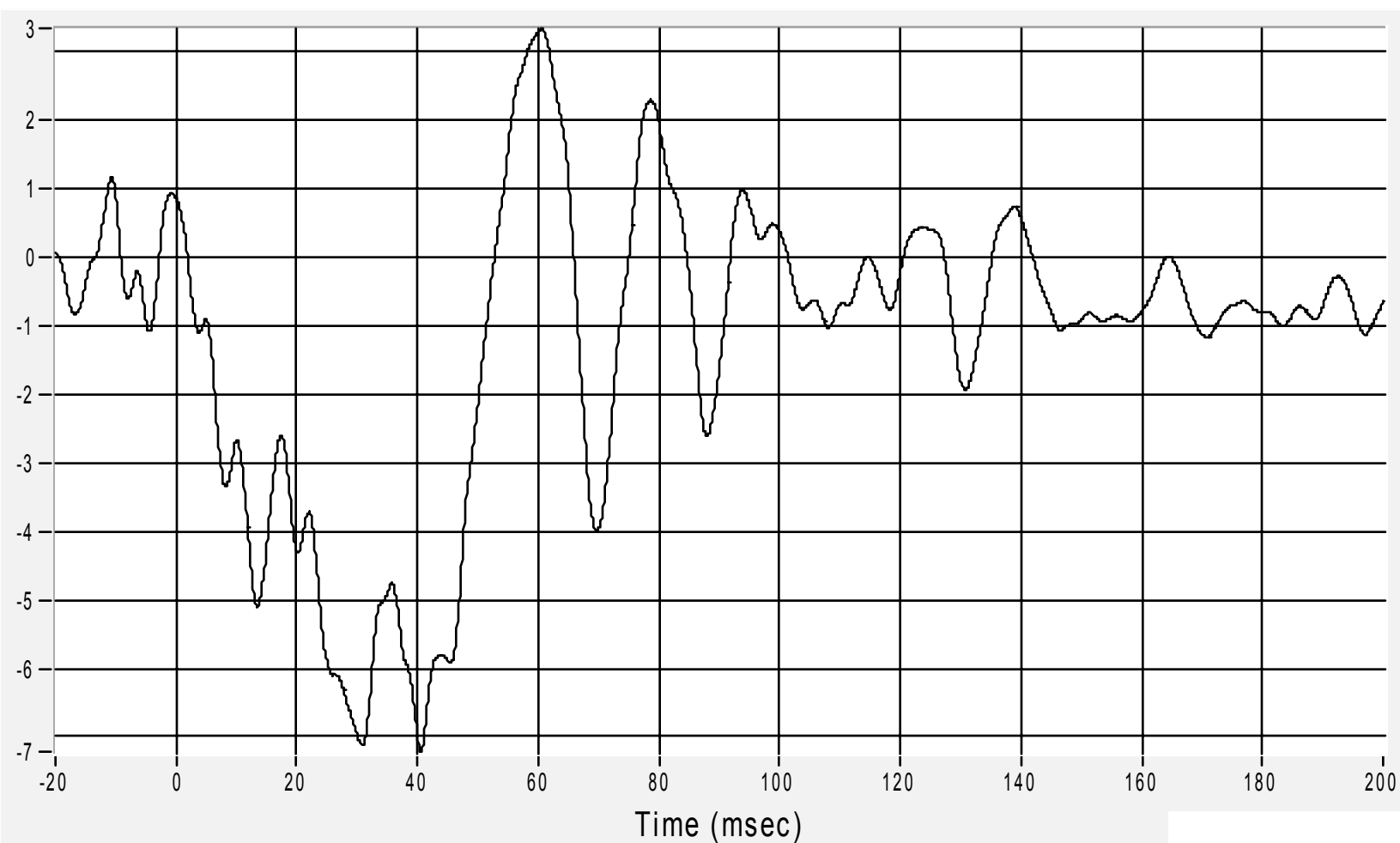
*Medical College of Wisconsin
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MDB Center of Gravity (Y) Acceleration

Acceleration (G's) CFC60

Max 3.3 G at 60.6 msec

Min -7.2 G at 40.6 msec



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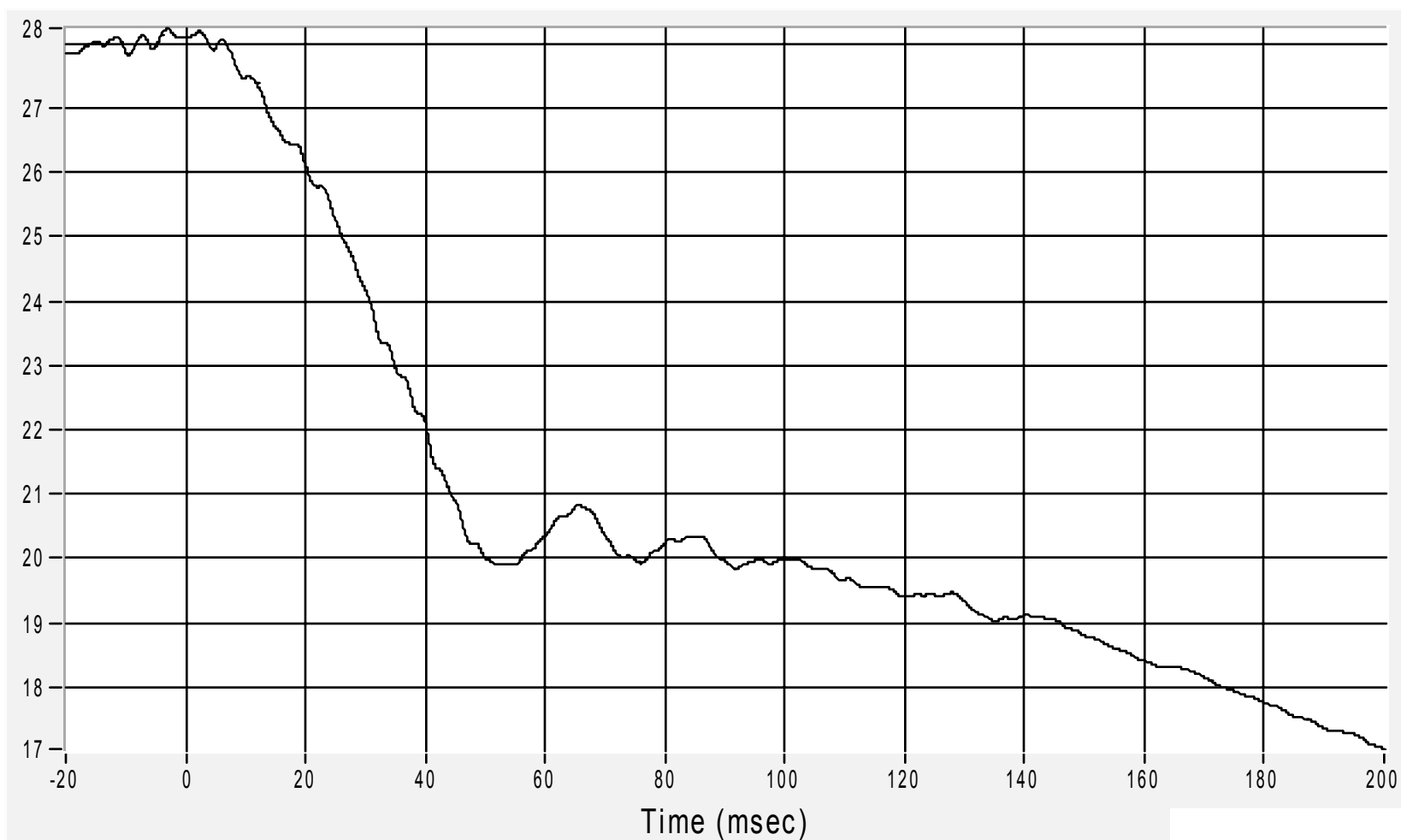
Medical College of Wisconsin
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MDB Center of Gravity (Y) Velocity

Velocity (km/h) CFC180

Max 28.2 km/h at 2.3 msec

Min 17.0 km/h at 199.9 msec



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3 February 2004

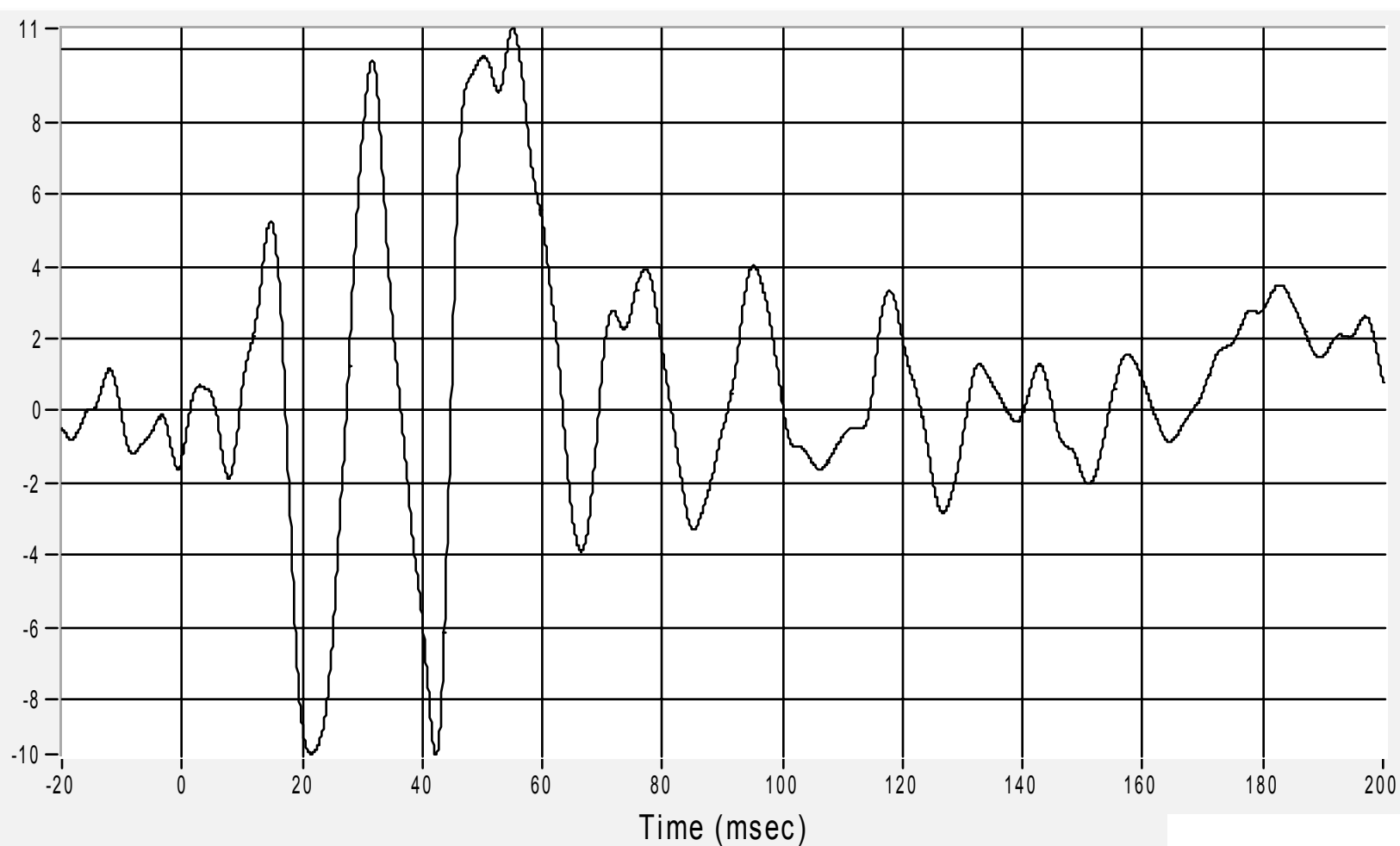
Medical College of Wisconsin
Vehicle Crashworthiness Lab

MDB Center of Gravity (Z) Acceleration

Acceleration (G's) CFC60

Max 10.6 G at 55.1 msec

Min -9.5 G at 42.2 msec



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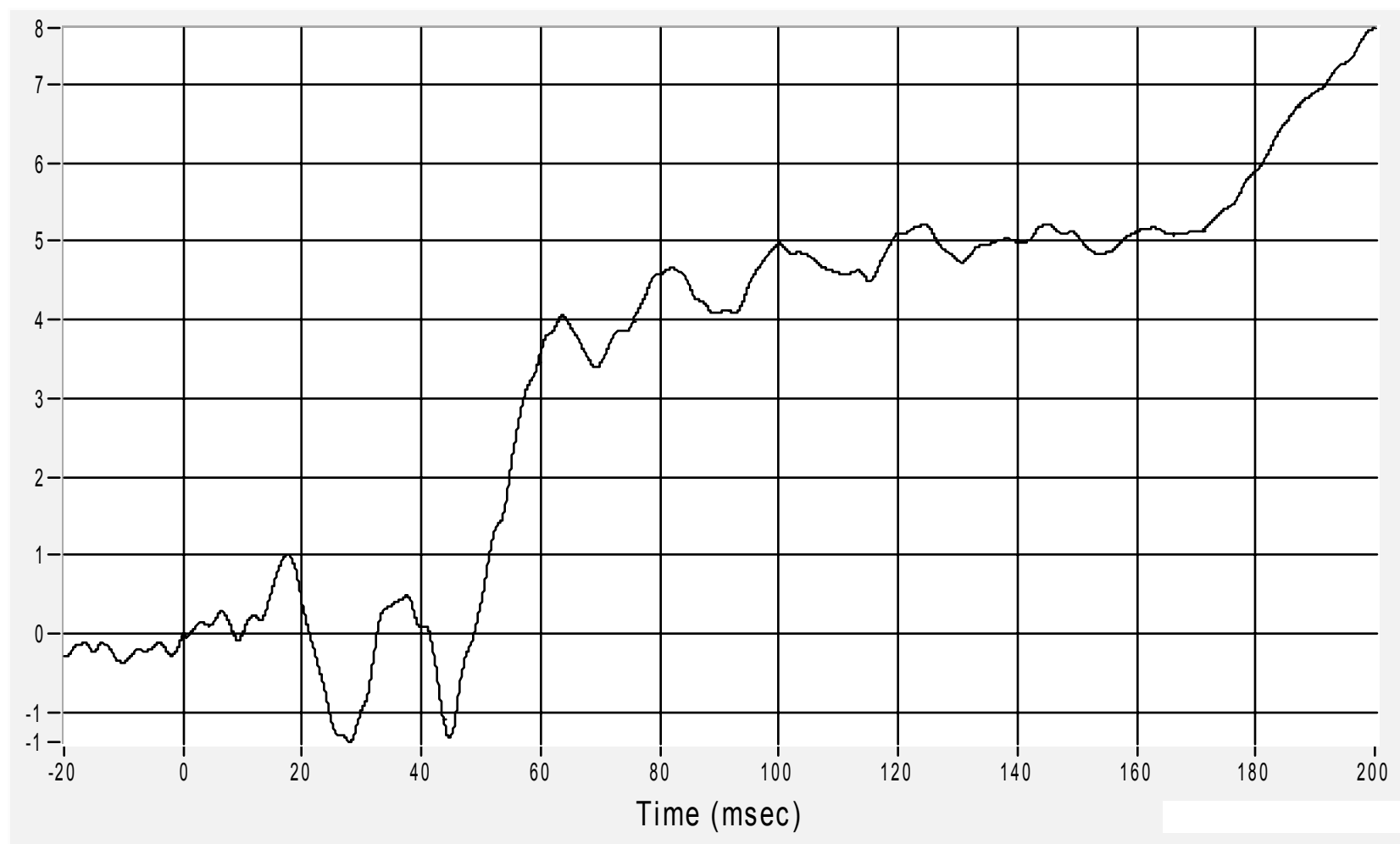
Medical College of Wisconsin
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MDB Center of Gravity (Z) Velocity

Velocity (km/h) CFC180

Max 7.7 km/h at 199.9 msec

Min -1.4 km/h at 28.0 msec



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3 February 2004

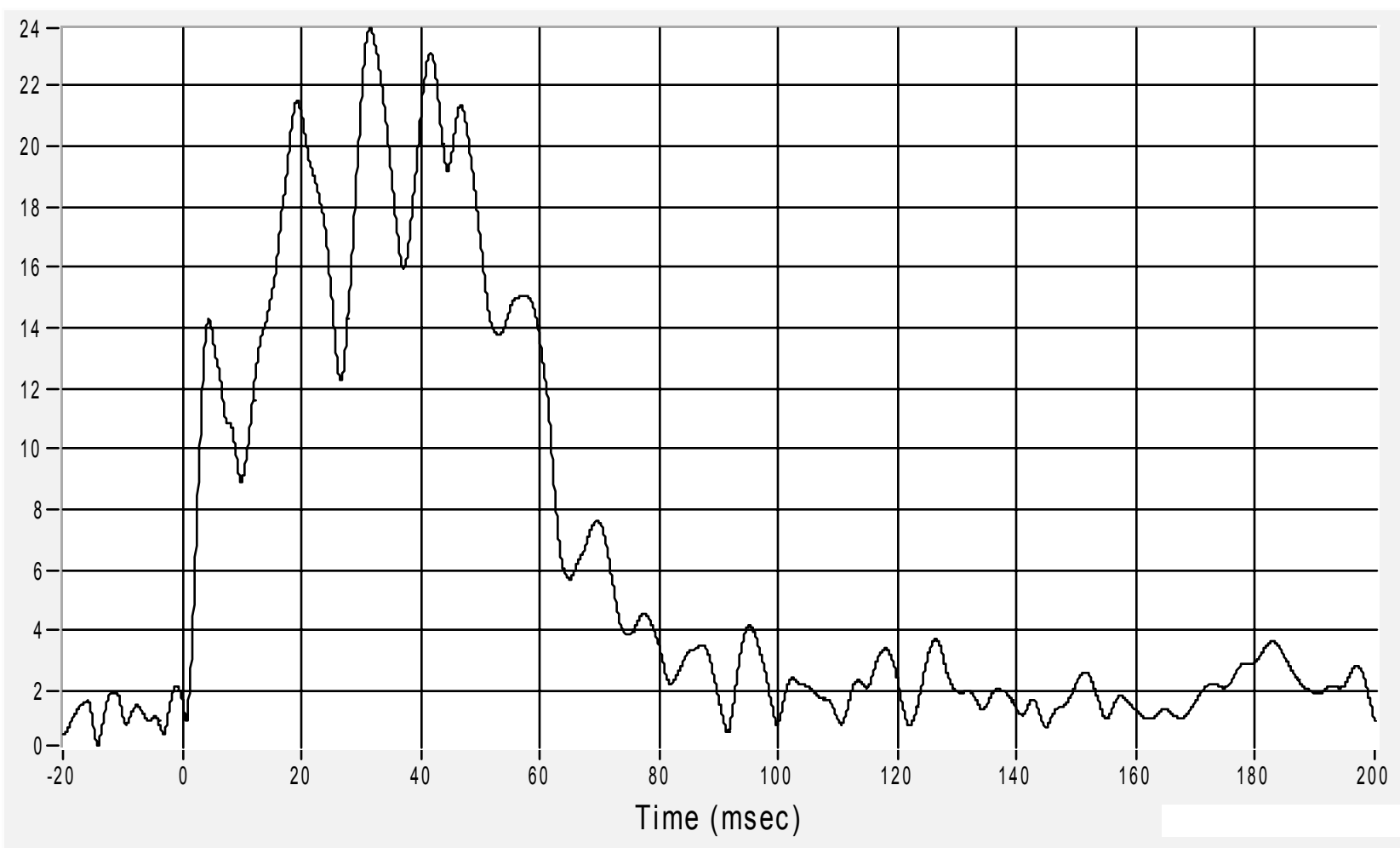
Medical College of Wisconsin
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MDB Center of Gravity Resultant Acceleration

Acceleration (G's) CFC60

Max 23.9 G's at 31.5 msec

Min 0.6 G's at 91.4 msec



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3 February 2004

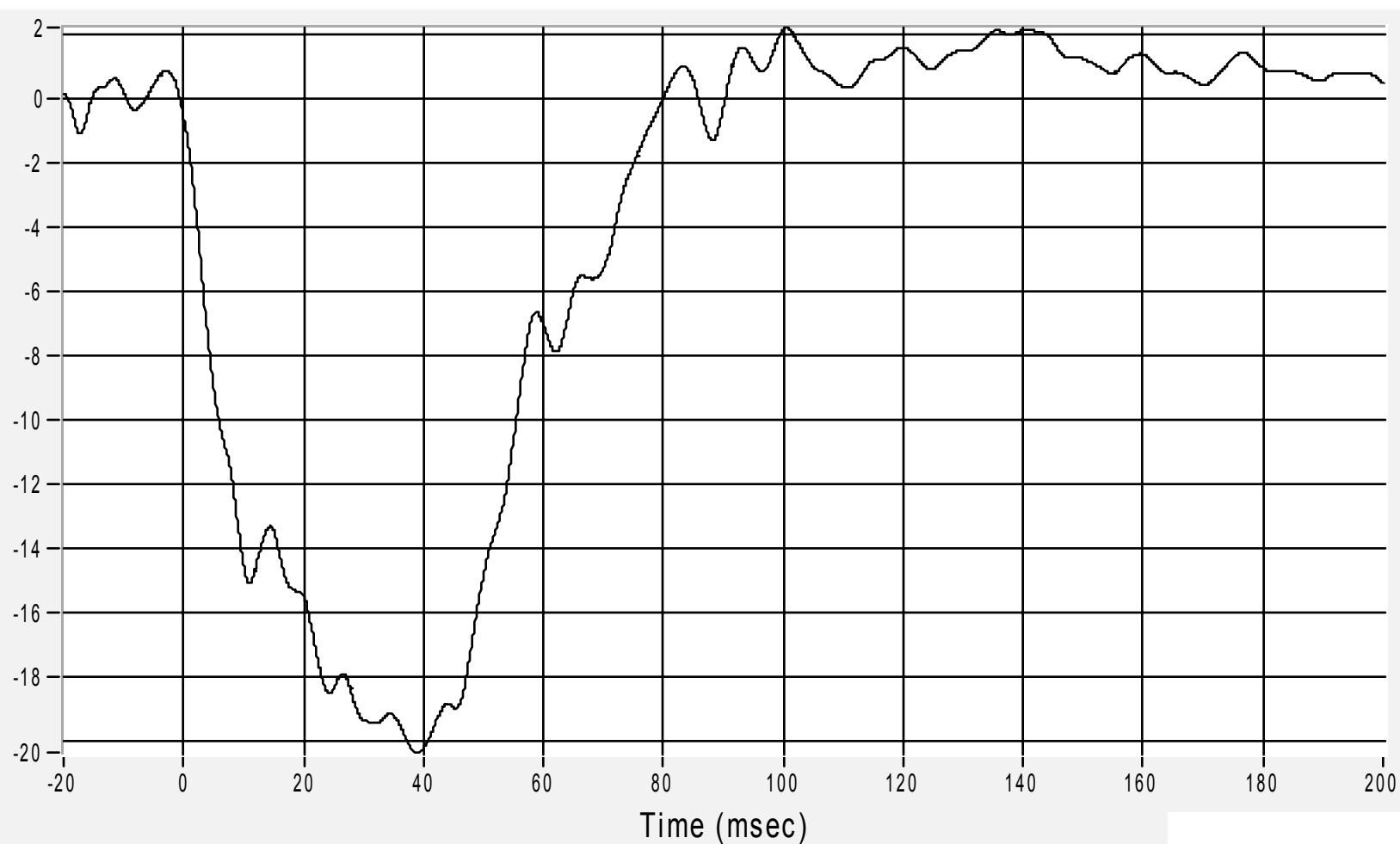
Medical College of Wisconsin
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MDB Rear (X) Acceleration

Acceleration (G's) CFC60

Max 2.2 G at 100.6 msec

Min -20.4 G at 38.8 msec



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3 February 2004

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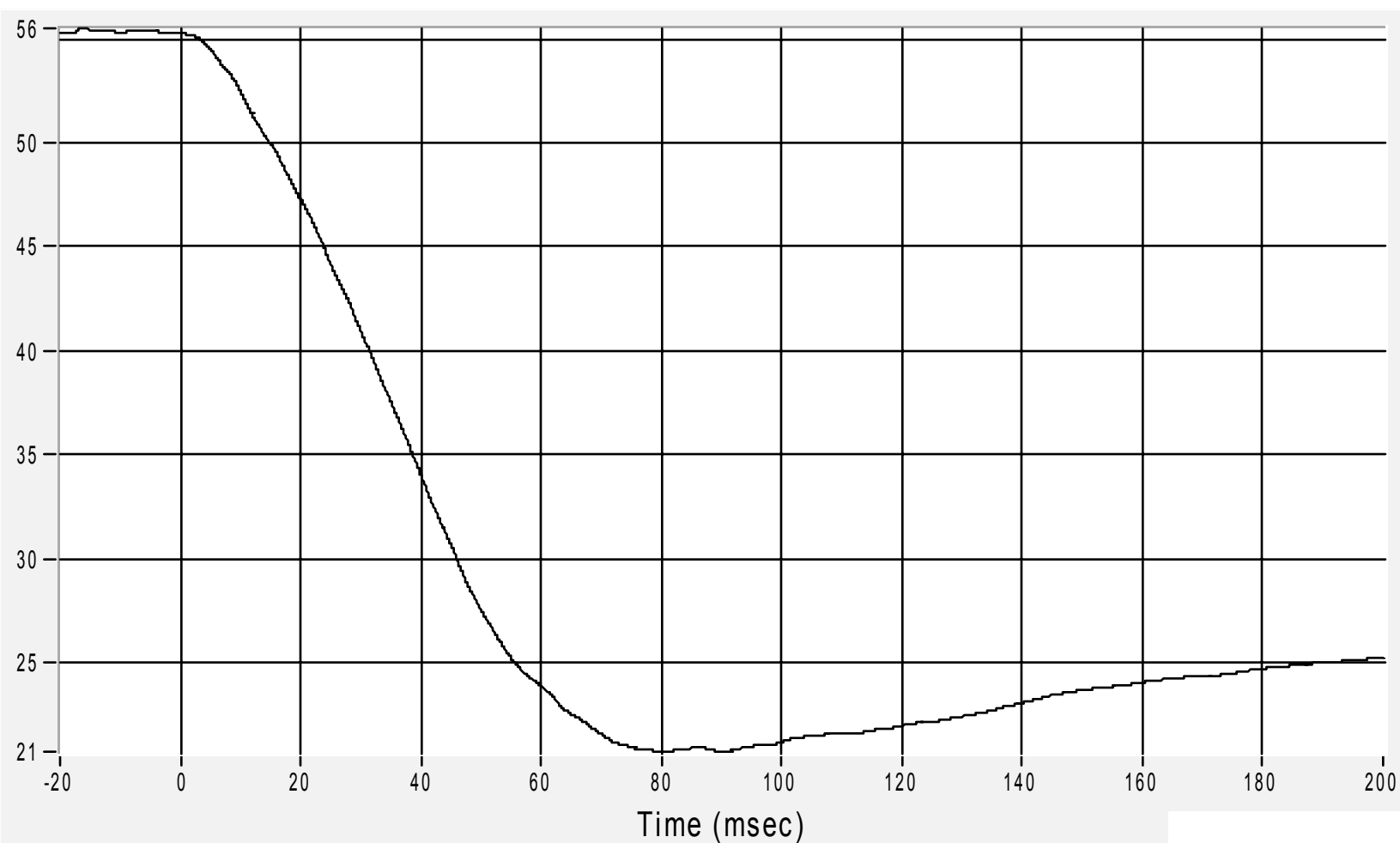
MDB Rear (X) Velocity

Velocity (km/h)

CFC180

Max 55.3 km/h at 0.0 msec

Min 20.7 km/h at 90.0 msec



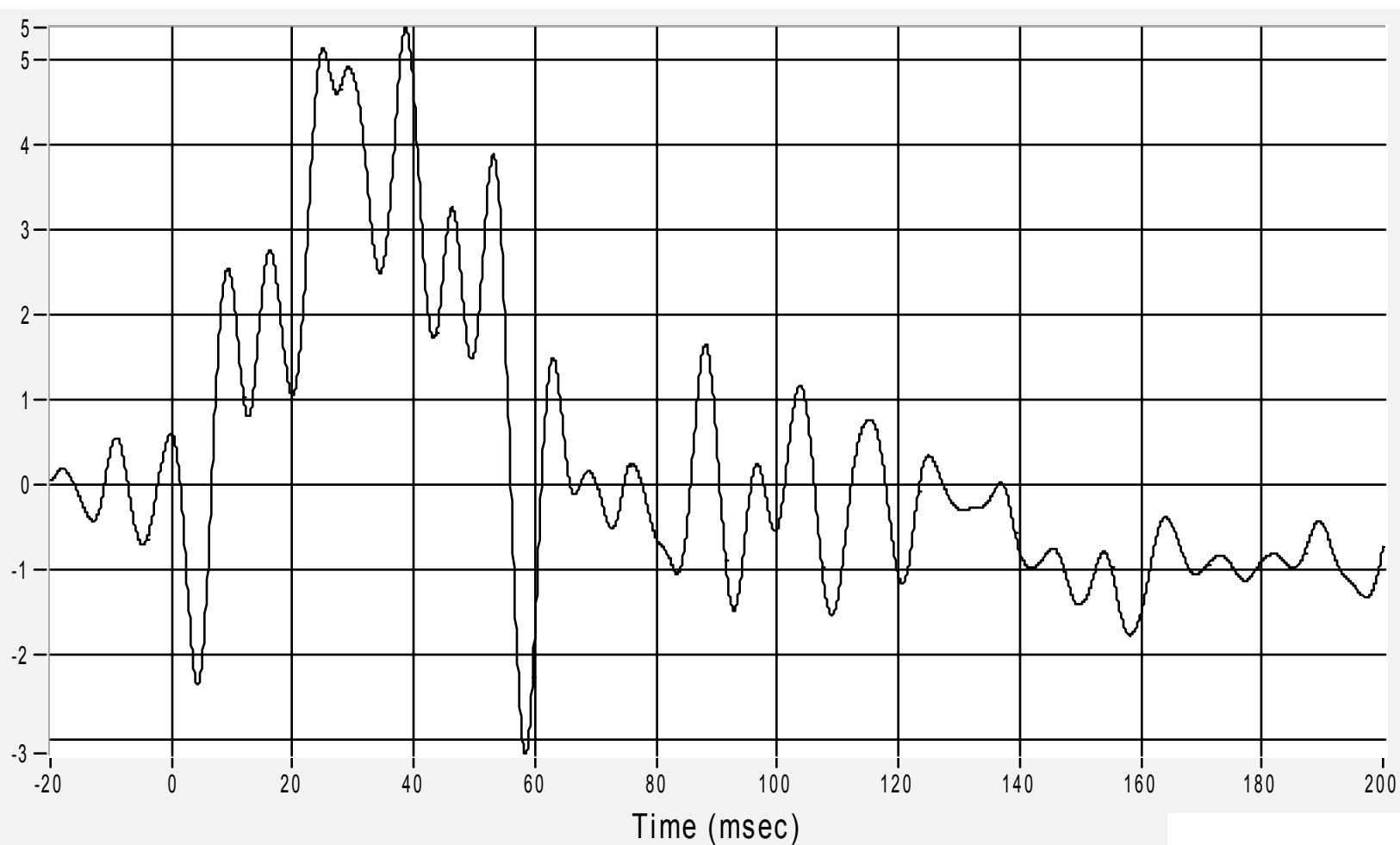
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3 February 2004

Medical College of Wisconsin
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MDB Rear (Y) Acceleration

Acceleration (G's) CFC60

Max 5.4 G at 38.6 msec**Min -3.2 G at 58.4 msec**

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3 February 2004

*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

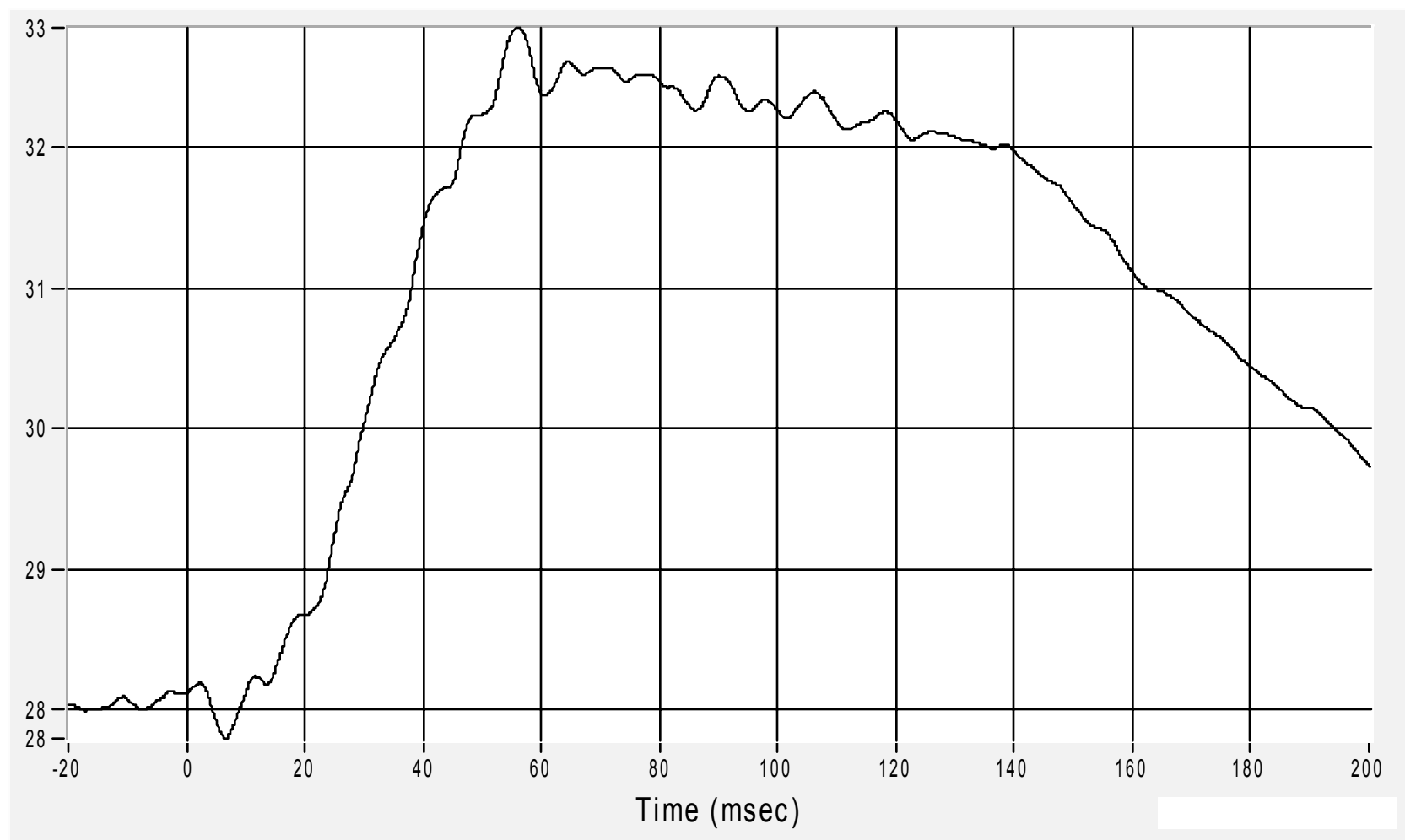
MDB Rear (Y) Velocity

Velocity (km/h)

CFC180

Max 32.9 km/h at 56.0 msec

Min 27.8 km/h at 6.6 msec



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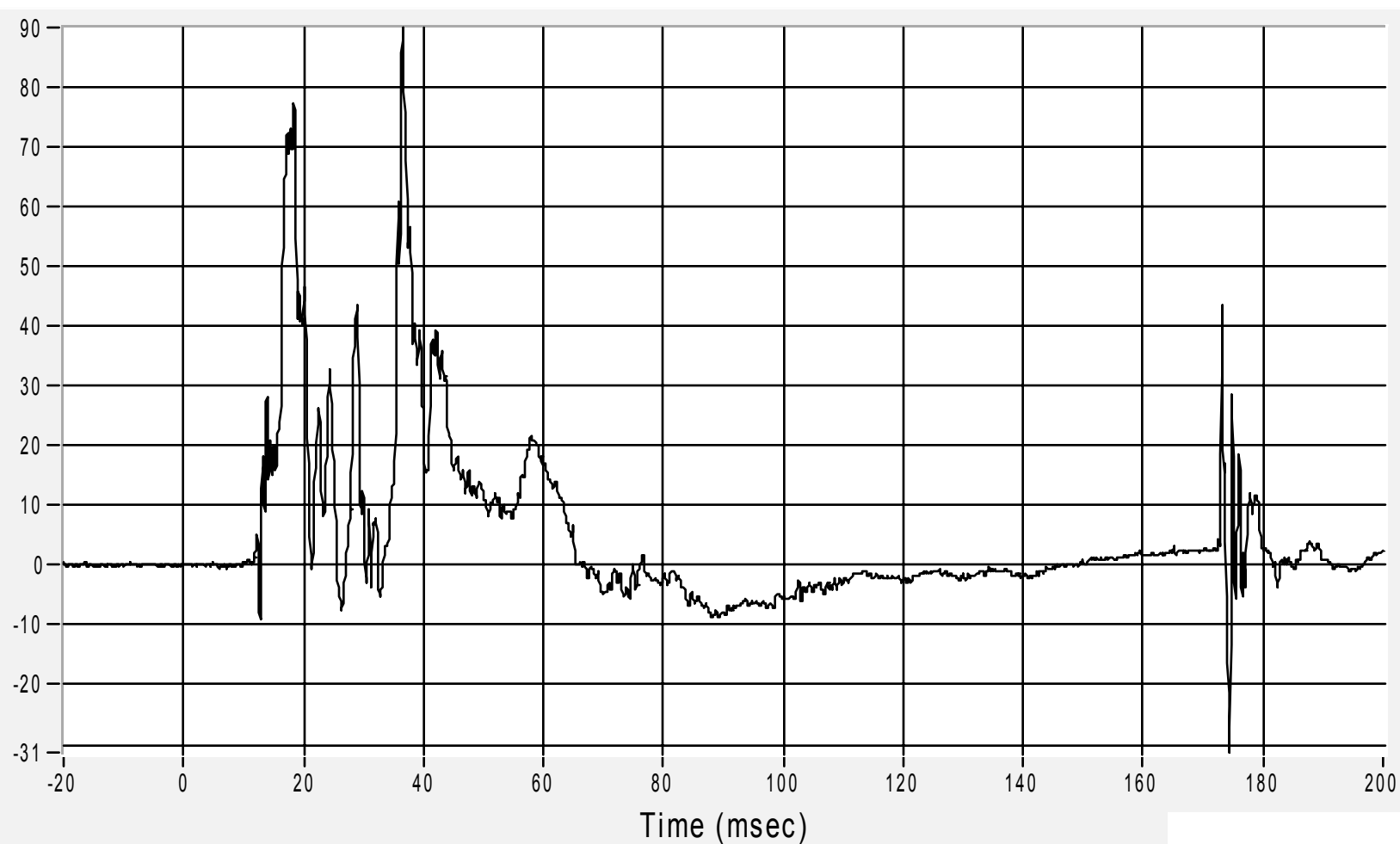
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Upper Rib (Y) - Redundant Acceleration

Acceleration (G's) CFC1000

Max 89.8 G at 36.6 msec

Min -31.3 G at 174.4 msec



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3 February 2004

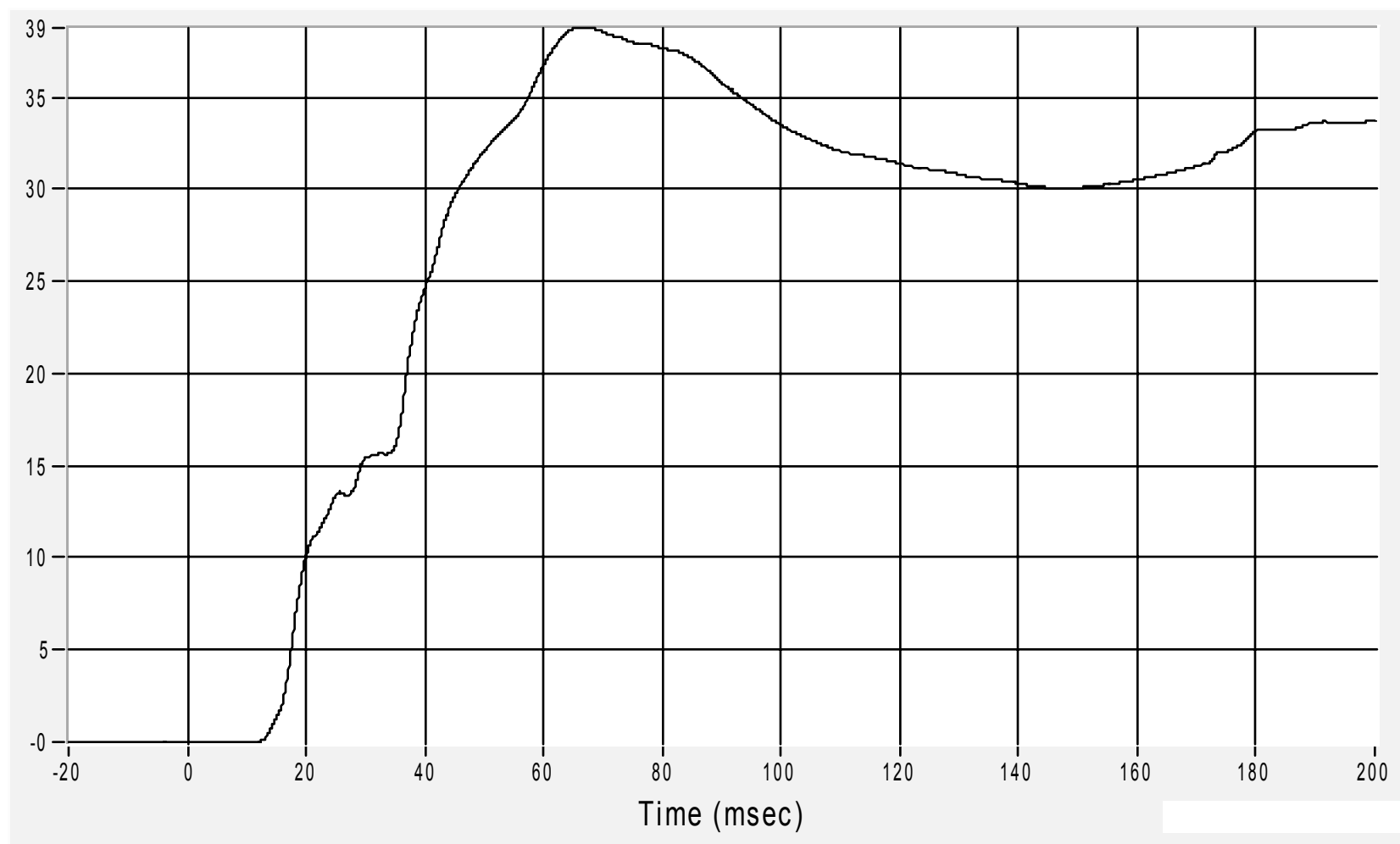
*Medical College of Wisconsin
Vehicle Crashworthiness Lab*

Driver Upper Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 38.8 km/h at 66.3 msec

Min 0.0 km/h at 8.6 msec



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3 February 2004

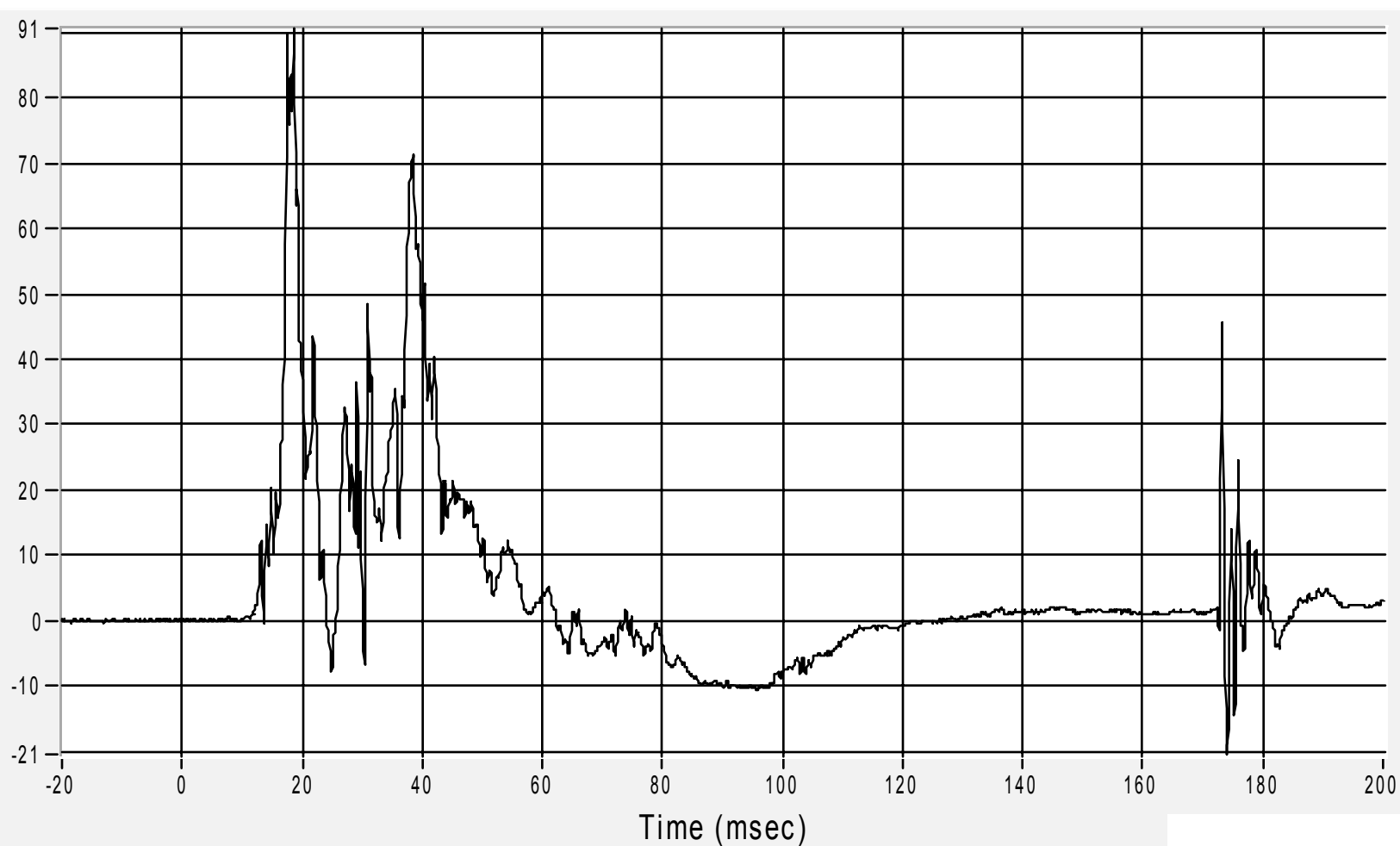
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Lower Rib (Y) - Redundant Acceleration

Acceleration (G's) CFC1000

Max 90.7 G at 18.6 msec

Min -20.5 G at 174.1 msec



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3 February 2004

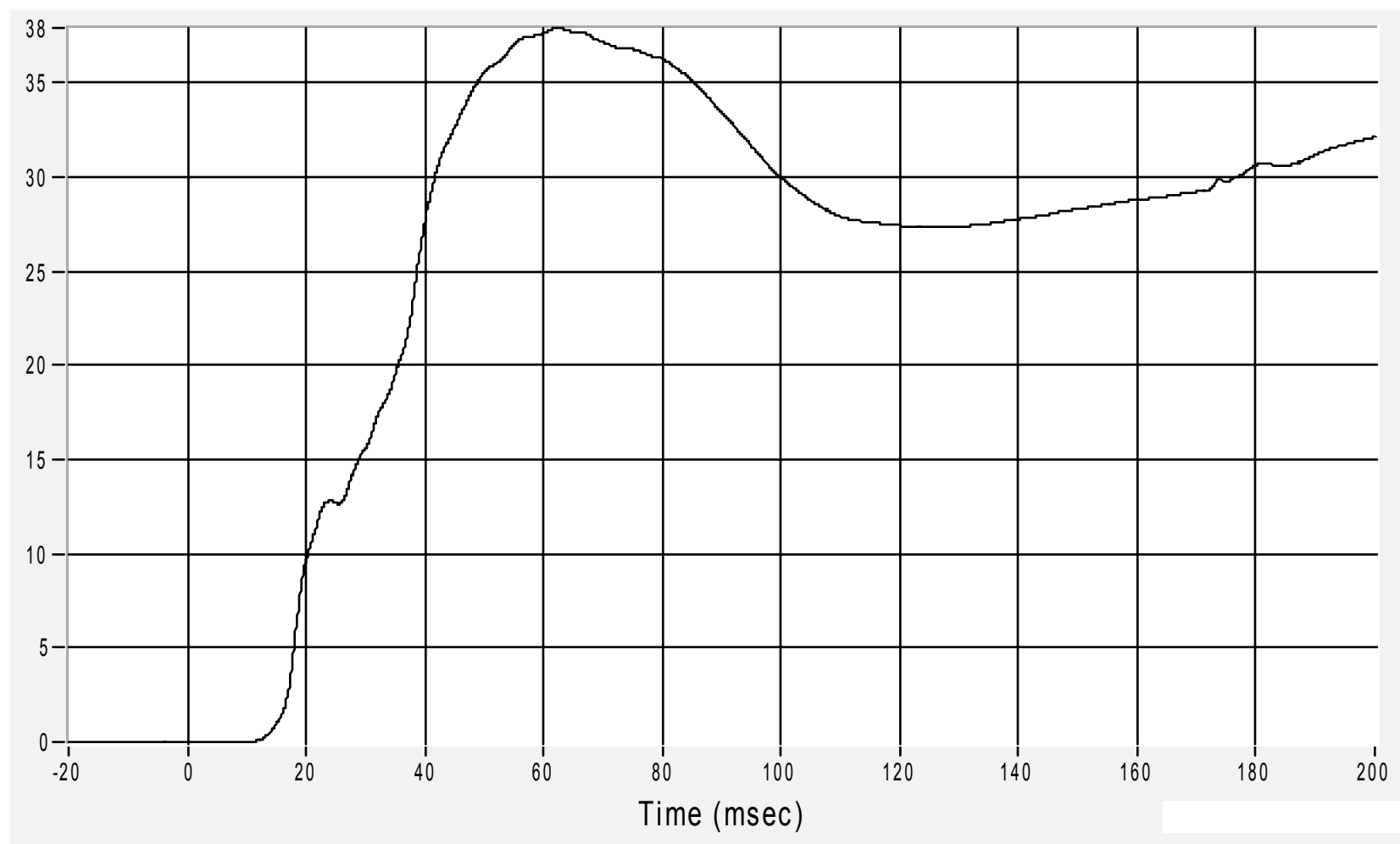
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Lower Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 37.9 km/h at 62.3 msec

Min 0.0 km/h at 0.0 msec



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3 February 2004

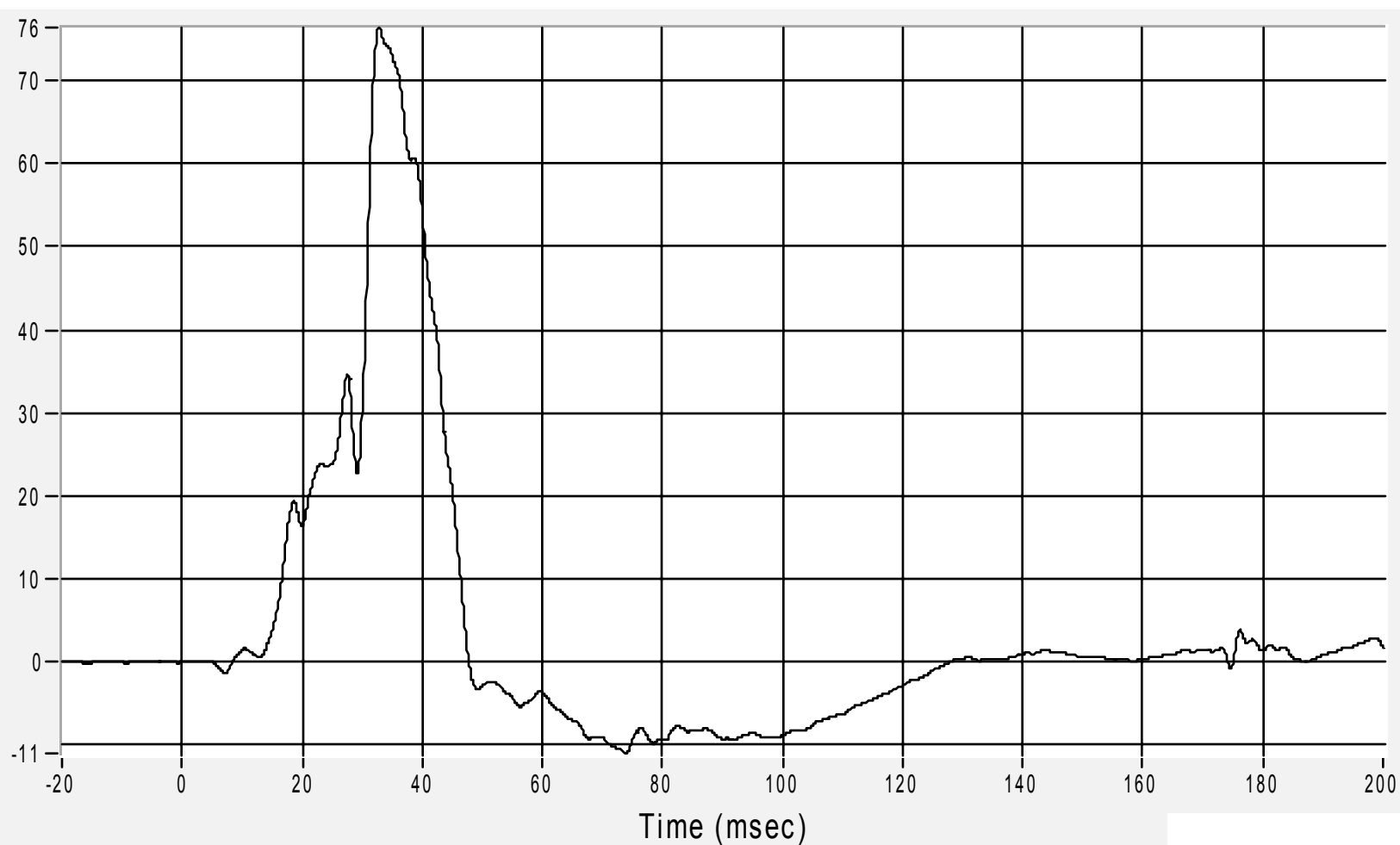
Medical College of Wisconsin
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Driver Lower Spine (Y) - Redundant Acceleration

Acceleration (G's) CFC180

Max 76.4 G at 32.8 msec

Min -11.0 G at 73.8 msec



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3 February 2004

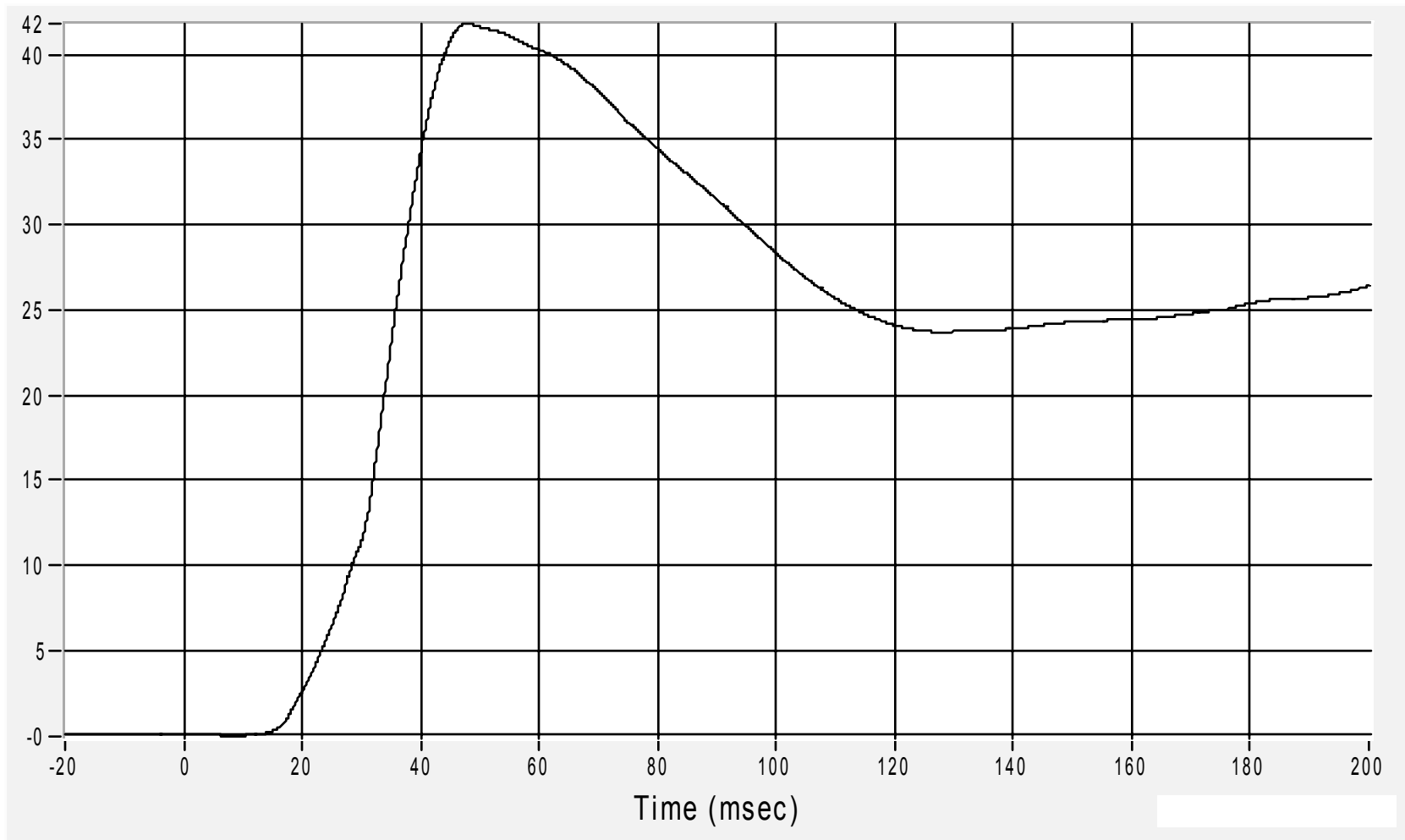
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Lower Spine (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 41.8 km/h at 47.8 msec

Min 0.0 km/h at 8.4 msec



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3 February 2004

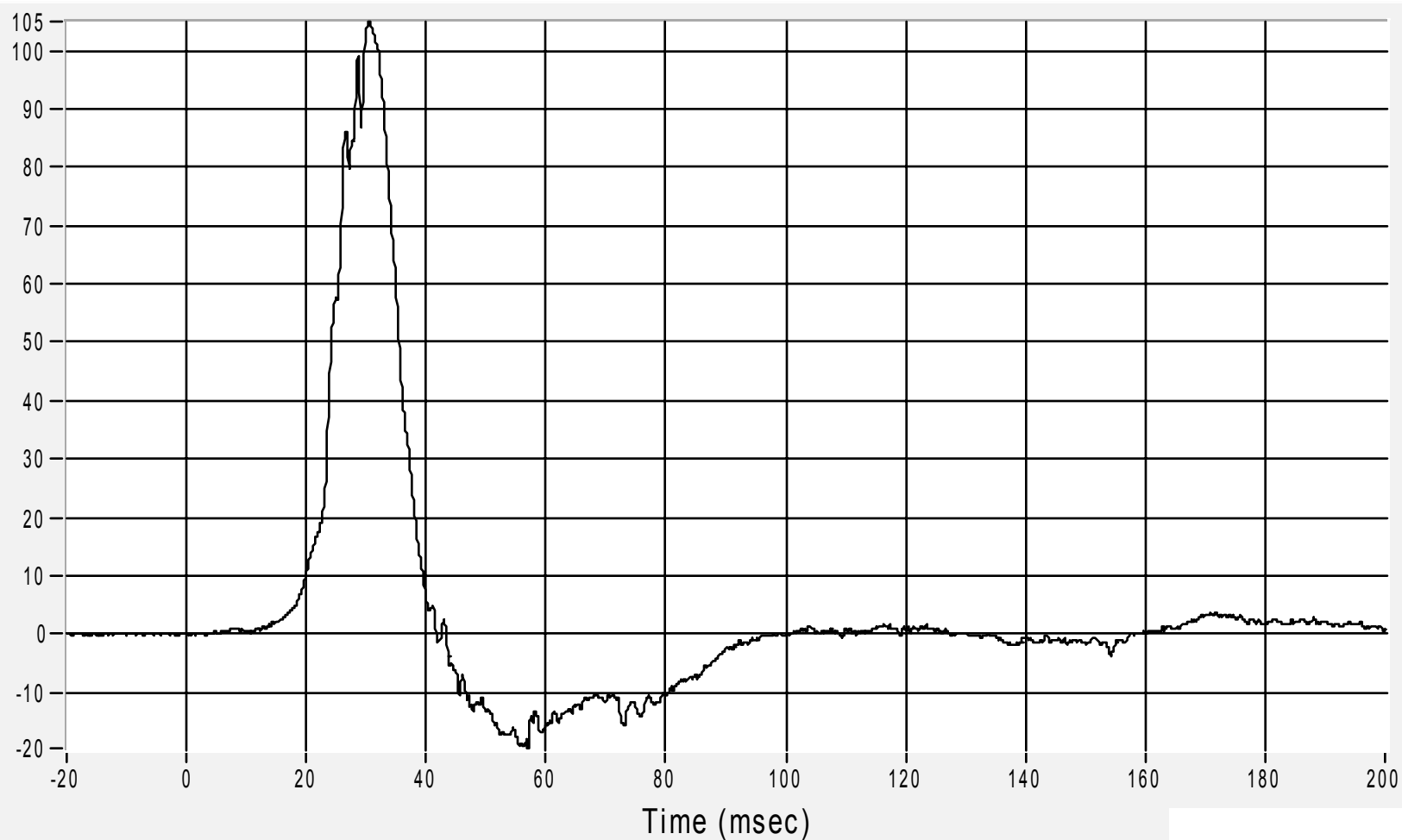
Medical College of Wisconsin
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Driver Pelvic (Y) - Redundant Acceleration

Acceleration (G's) CFC1000

Max 105.0 G at 30.4 msec

Min -19.6 G at 57.0 msec



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3 February 2004

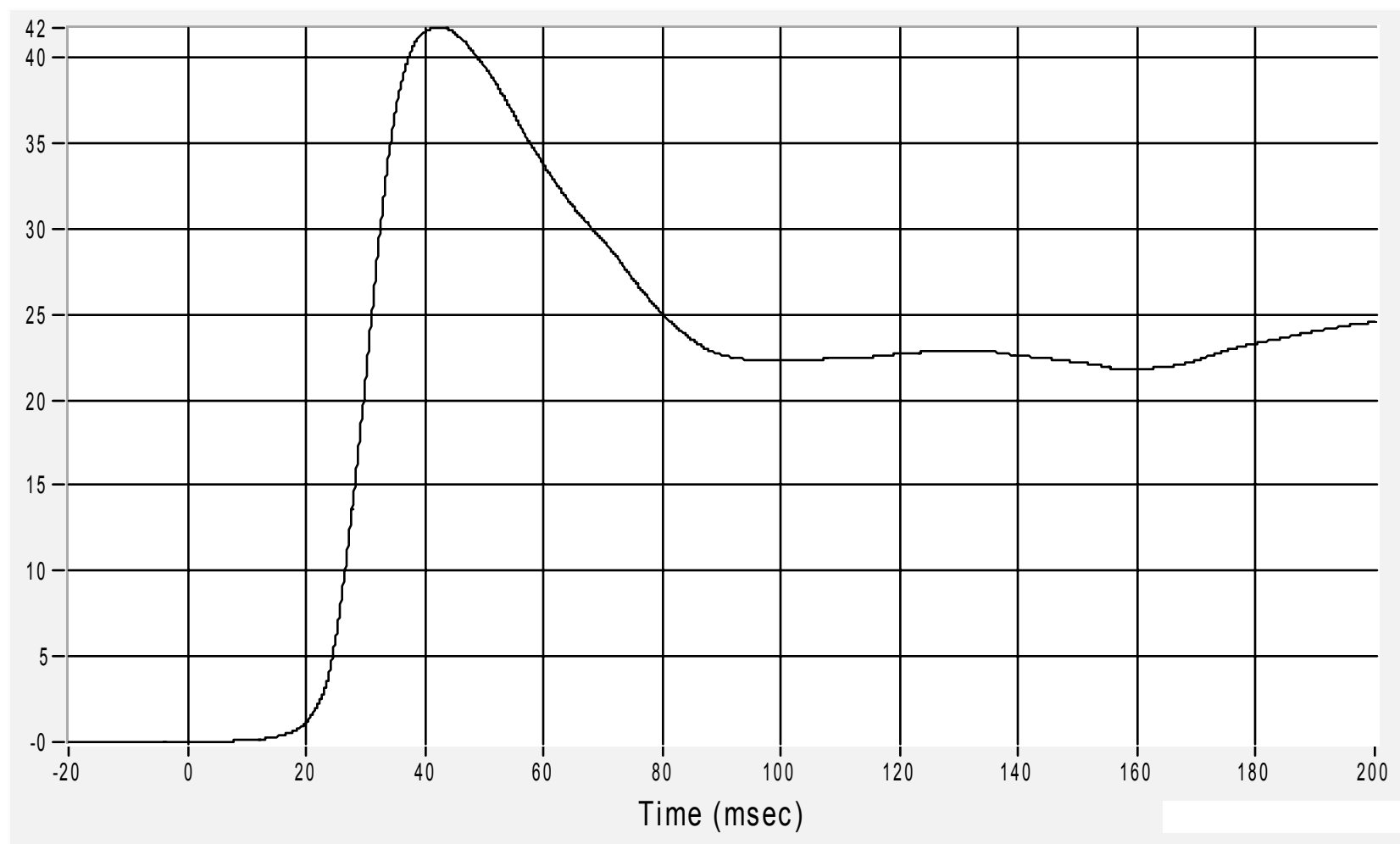
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Pelvic (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 41.7 km/h at 43.0 msec

Min 0.0 km/h at 1.3 msec



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3 February 2004

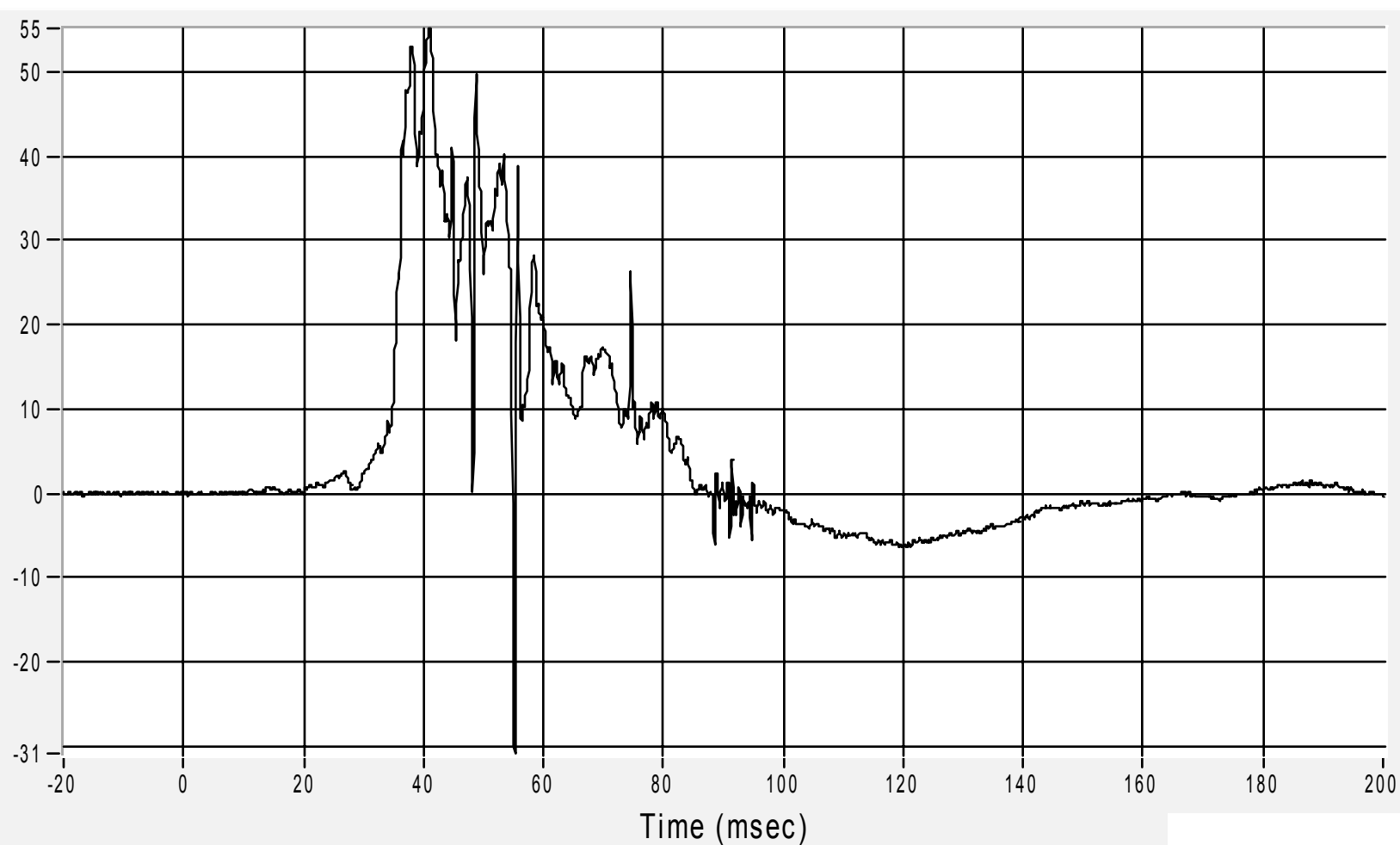
Medical College of Wisconsin
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Passenger Upper Rib (Y) - Redundant Acceleration

Acceleration (G's) CFC1000

Max 55.2 G at 41.0 msec

Min -30.9 G at 55.2 msec



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3 February 2004

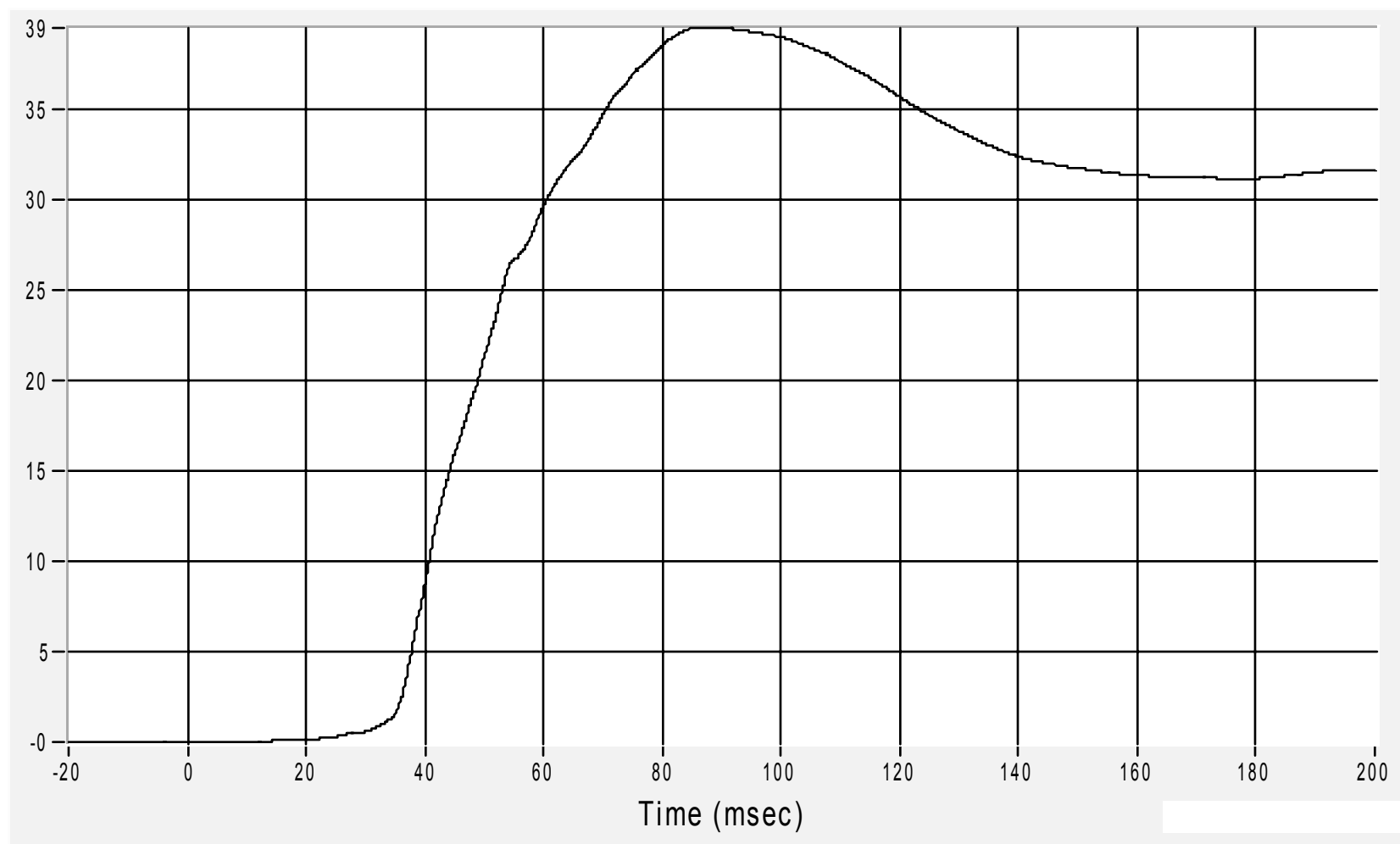
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Upper Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 39.5 km/h at 87.4 msec

Min 0.0 km/h at 0.0 msec



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3 February 2004

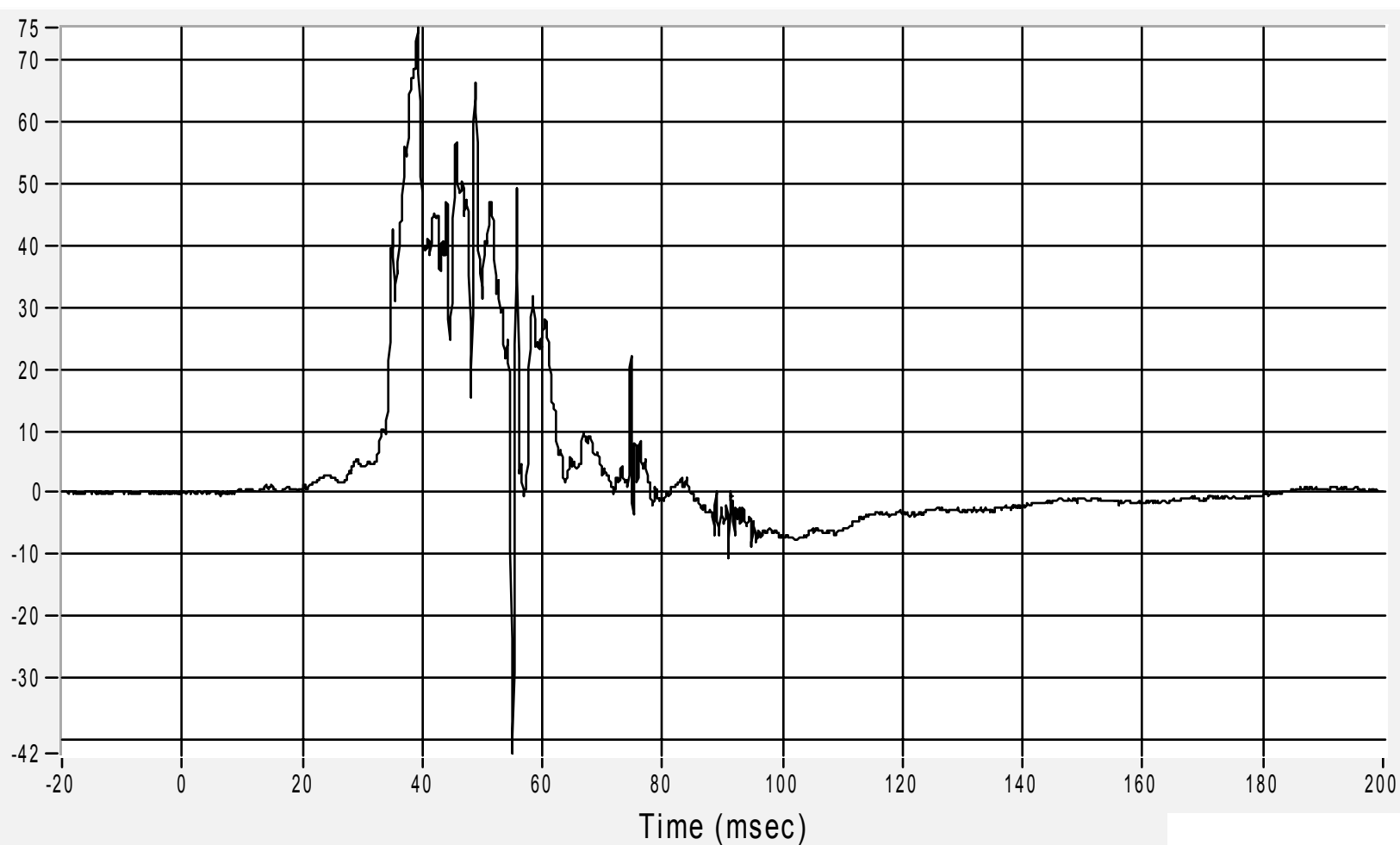
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Lower Rib (Y) - Redundant Acceleration

Acceleration (G's) CFC1000

Max 75.3 G at 39.2 msec

Min -42.2 G at 55.0 msec



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3 February 2004

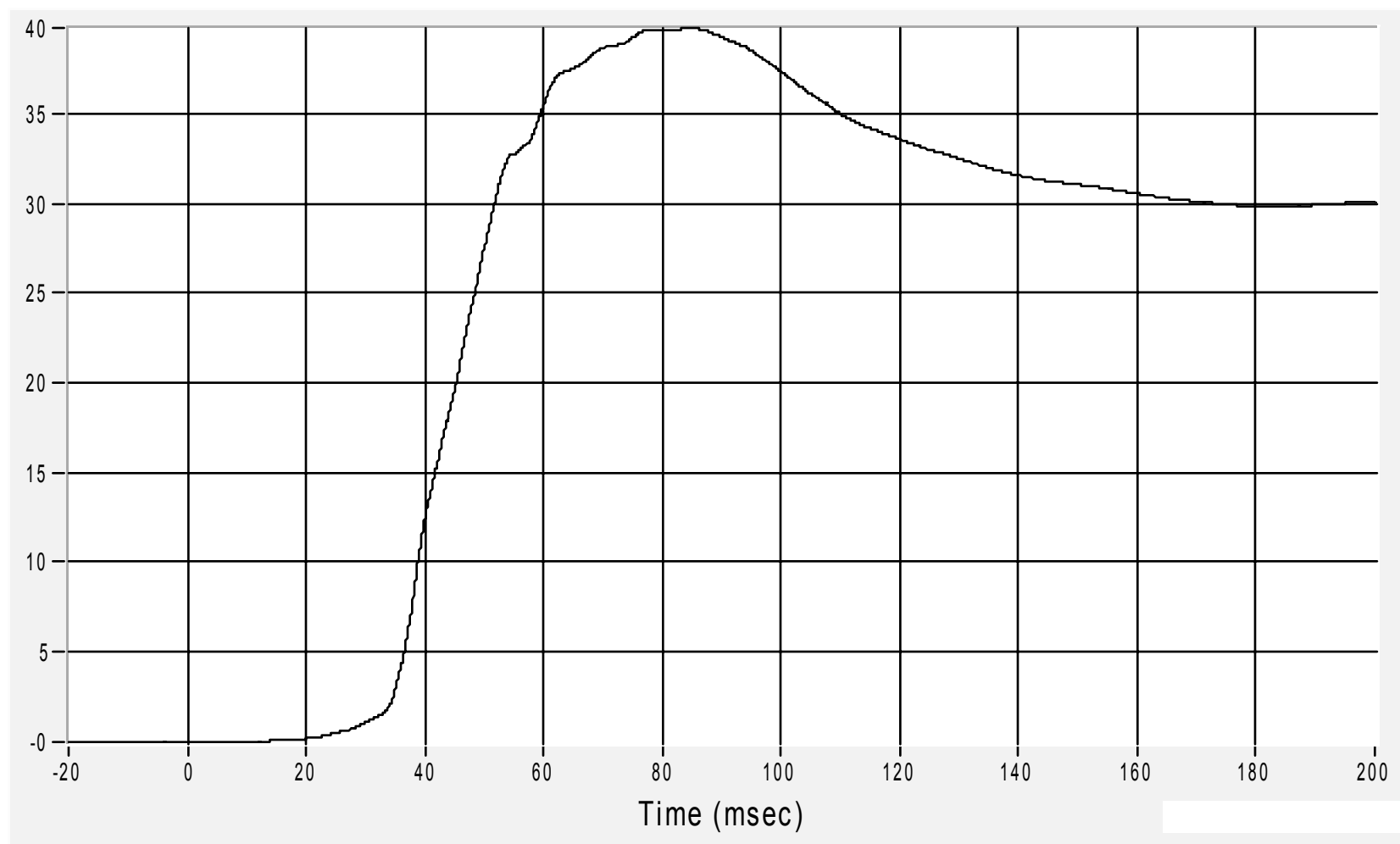
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Lower Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 39.8 km/h at 84.7 msec

Min 0.0 km/h at 8.2 msec



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3 February 2004

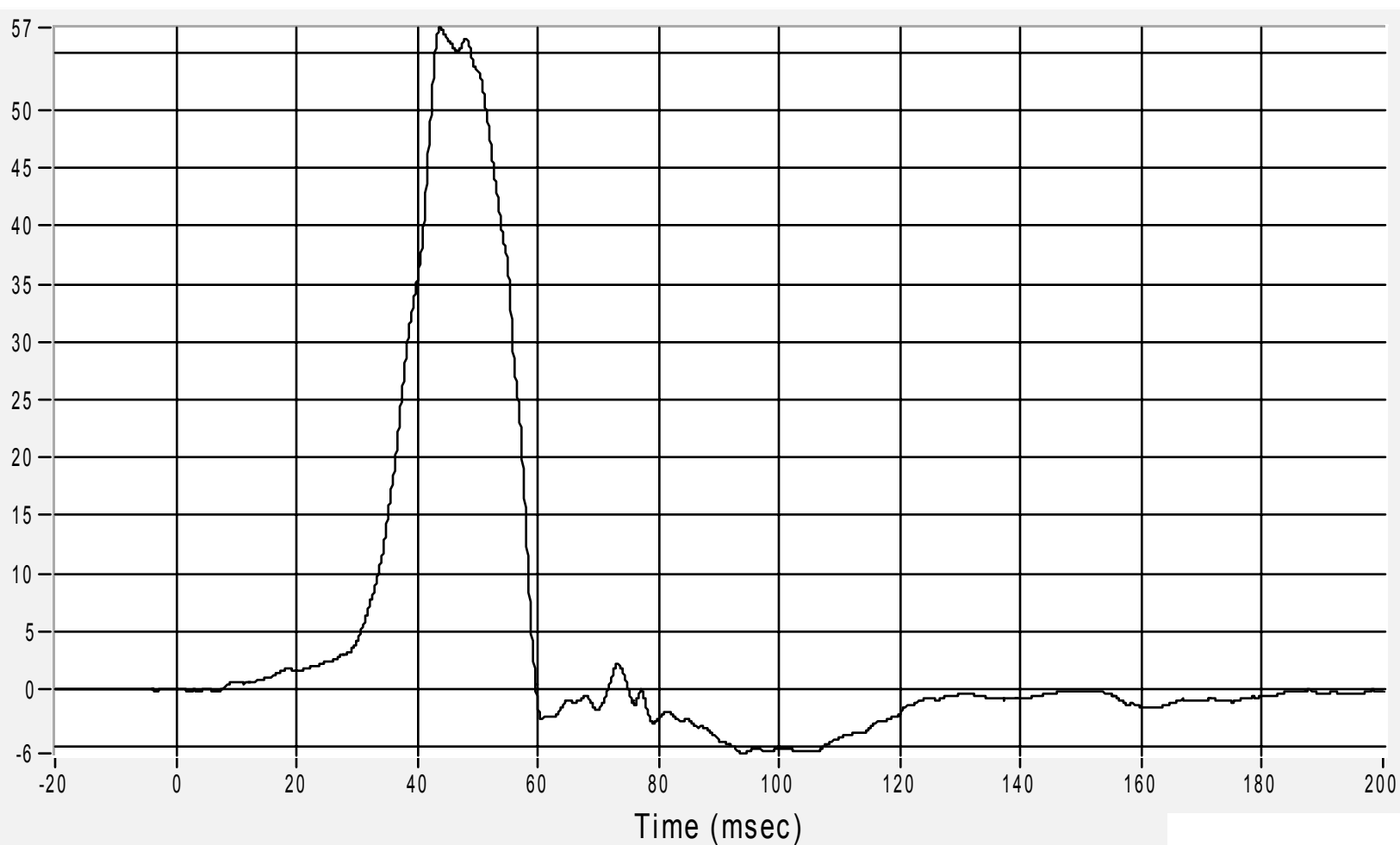
Medical College of Wisconsin
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Passenger Lower Spine (Y) - Redundant Acceleration

Acceleration (G's) CFC180

Max 57.1 G at 43.8 msec

Min -5.5 G at 94.0 msec



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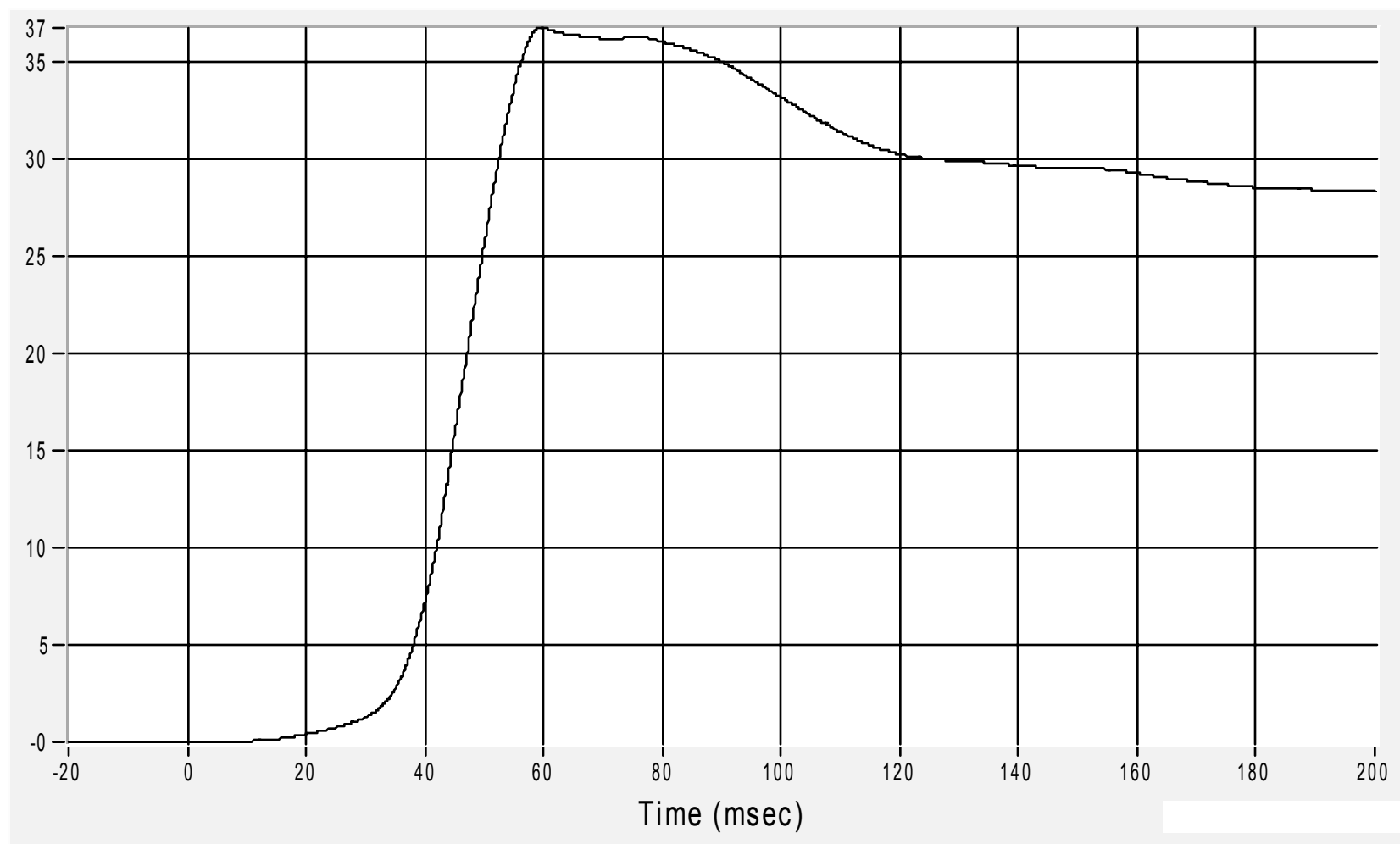
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Lower Spine (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 36.8 km/h at 59.7 msec

Min 0.0 km/h at 7.7 msec



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3 February 2004

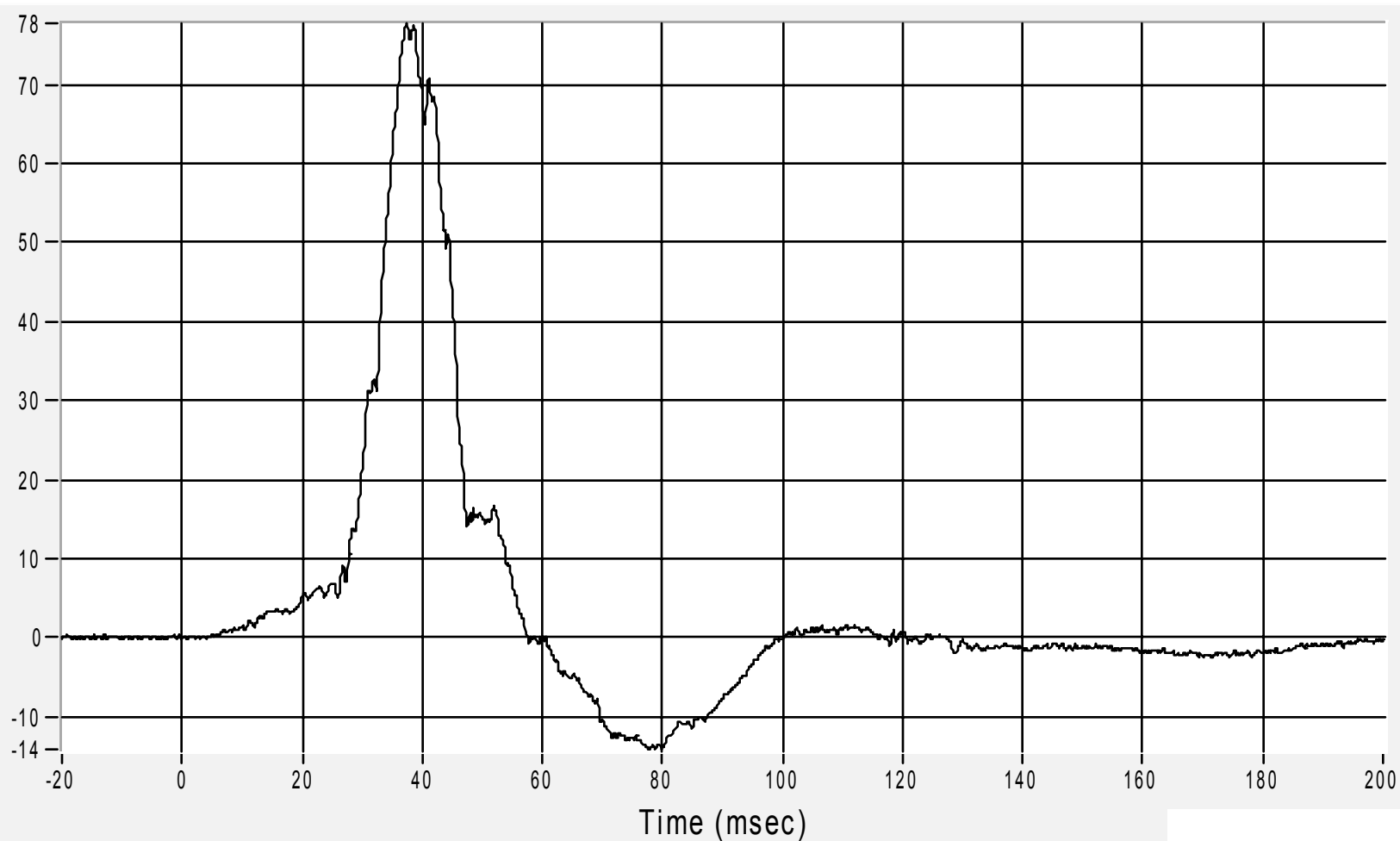
Medical College of Wisconsin
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Passenger Pelvic (Y) - Redundant Acceleration

Acceleration (G's) CFC1000

Max 77.7 G at 37.4 msec

Min -14.1 G at 78.7 msec



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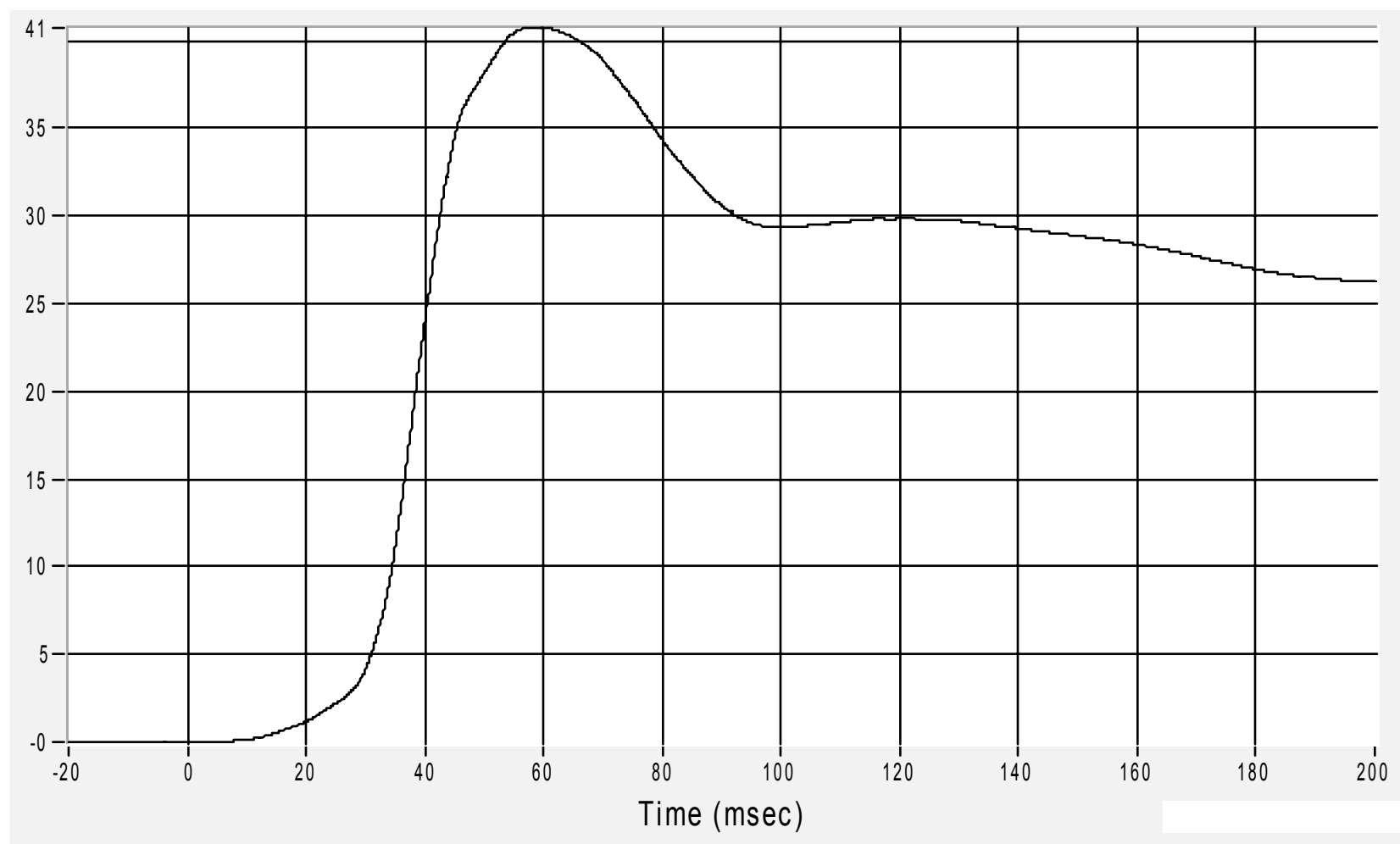
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Pelvic (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 40.7 km/h at 57.7 msec

Min 0.0 km/h at 1.3 msec



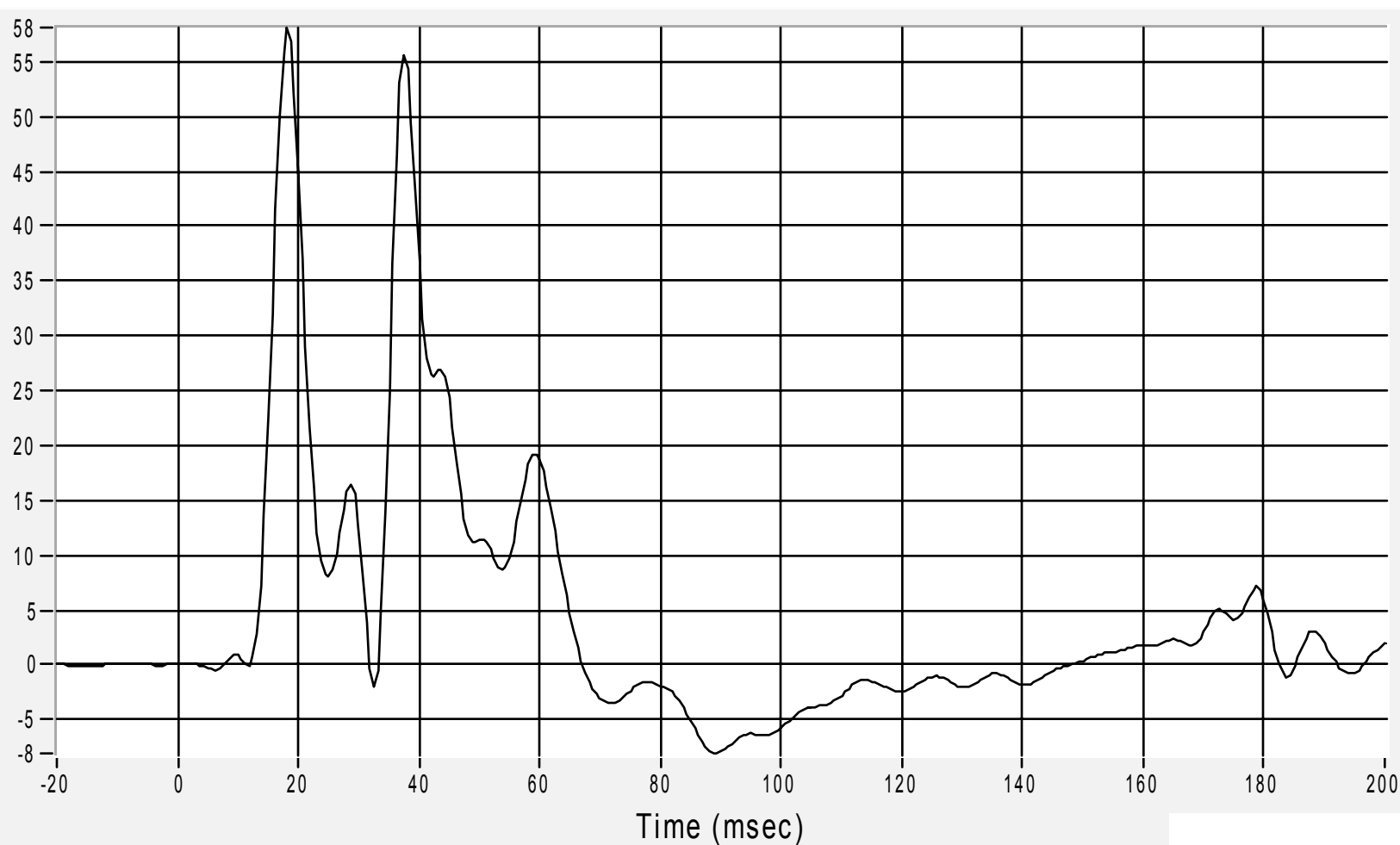
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3 February 2004

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Driver Upper Rib (Y) - Redundant Acceleration

Acceleration (G's) FIR100

Max 58.1 G at 18.1 msec**Min -8.1 G at 89.4 msec**

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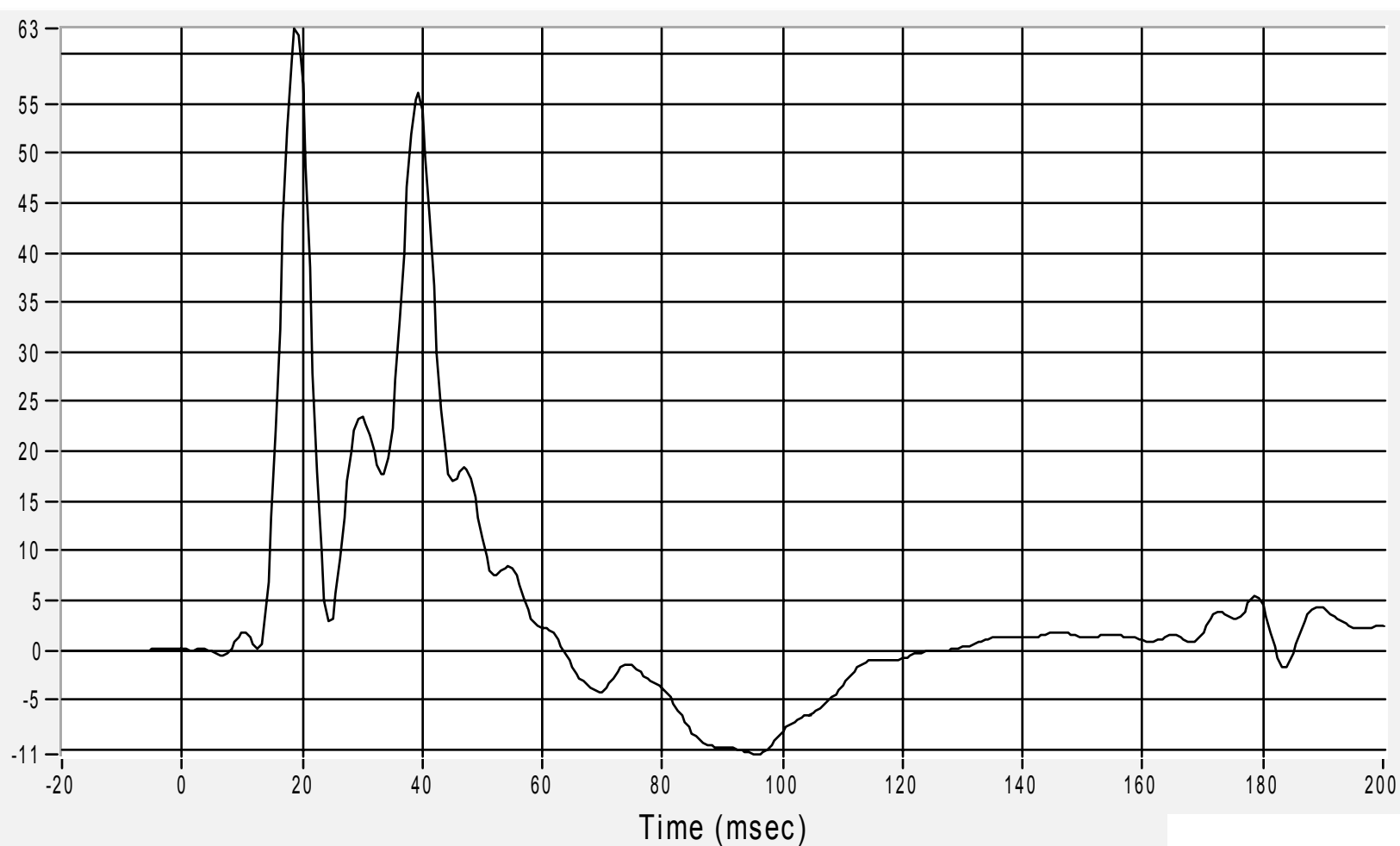
*Medical College of Wisconsin
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Driver Lower Rib (Y) - Redundant Acceleration

Acceleration (G's) FIR100

Max 62.5 G at 18.8 msec

Min -10.5 G at 95.6 msec



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3 February 2004

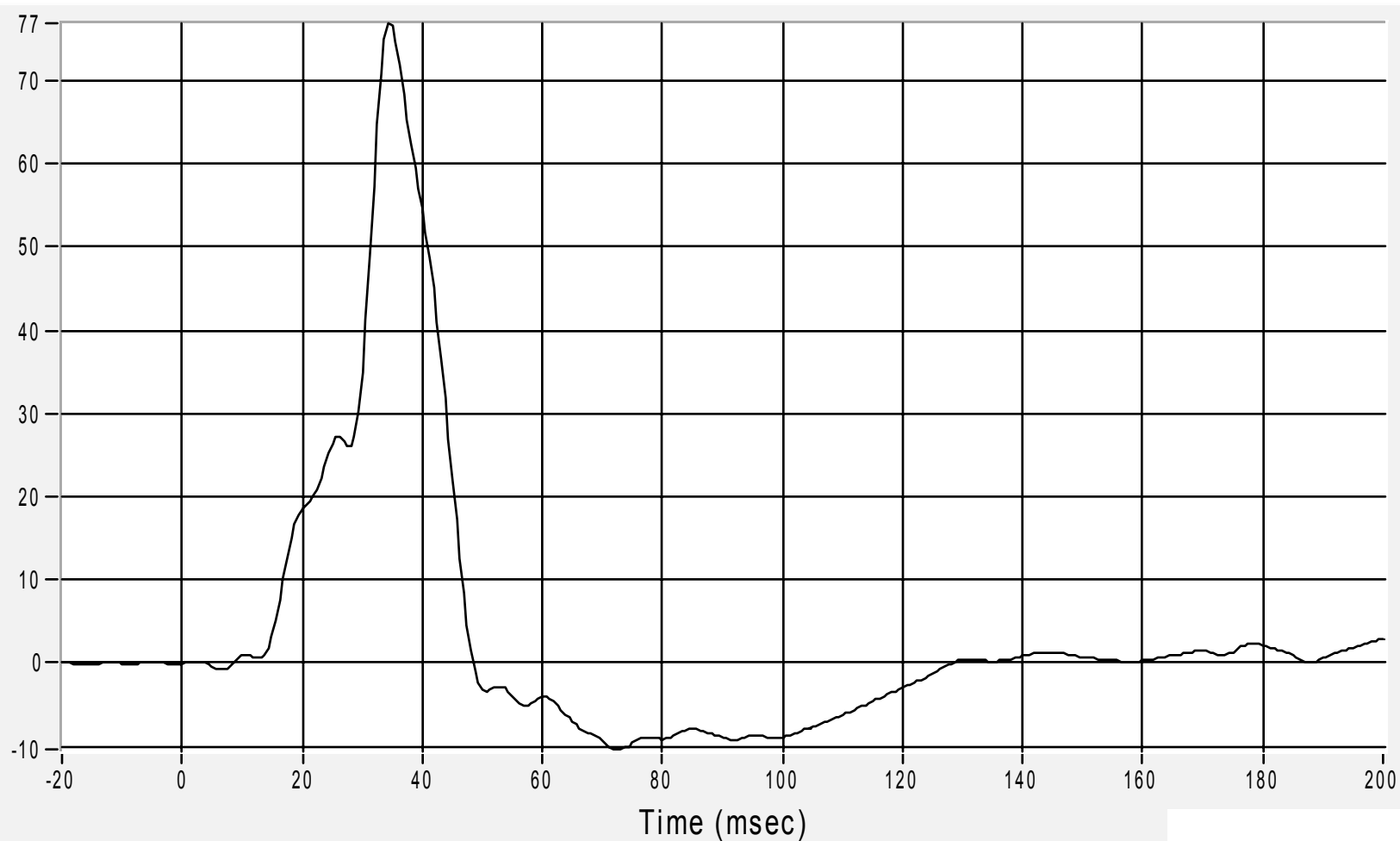
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Lower Spine (Y) - Redundant Acceleration

Acceleration (G's) FIR100

Max 76.8 G at 34.4 msec

Min -10.4 G at 72.5 msec



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3 February 2004

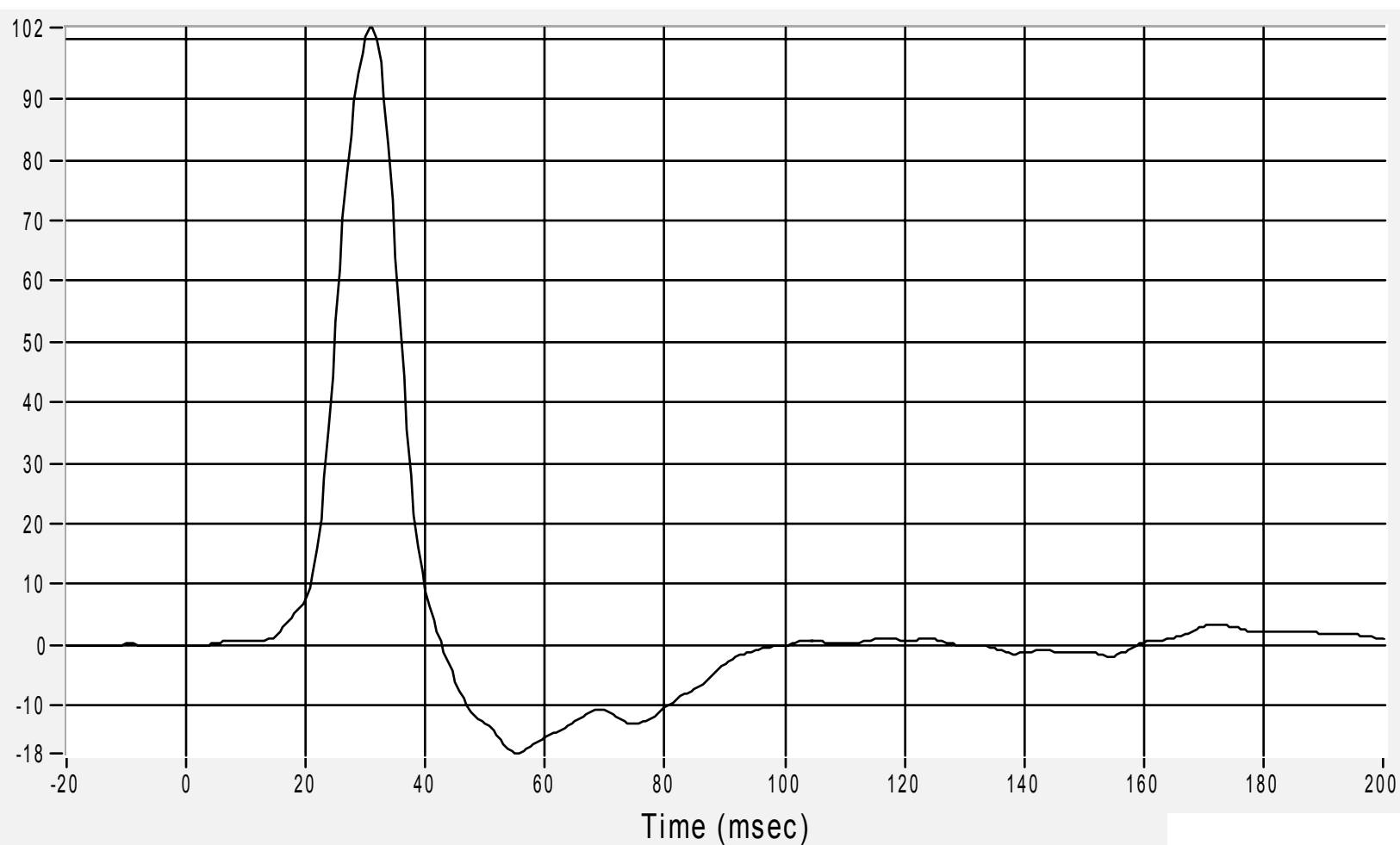
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Pelvic (Y) - Redundant Acceleration

Acceleration (G's) FIR100

Max 101.8 G at 30.6 msec

Min -18.0 G at 55.6 msec



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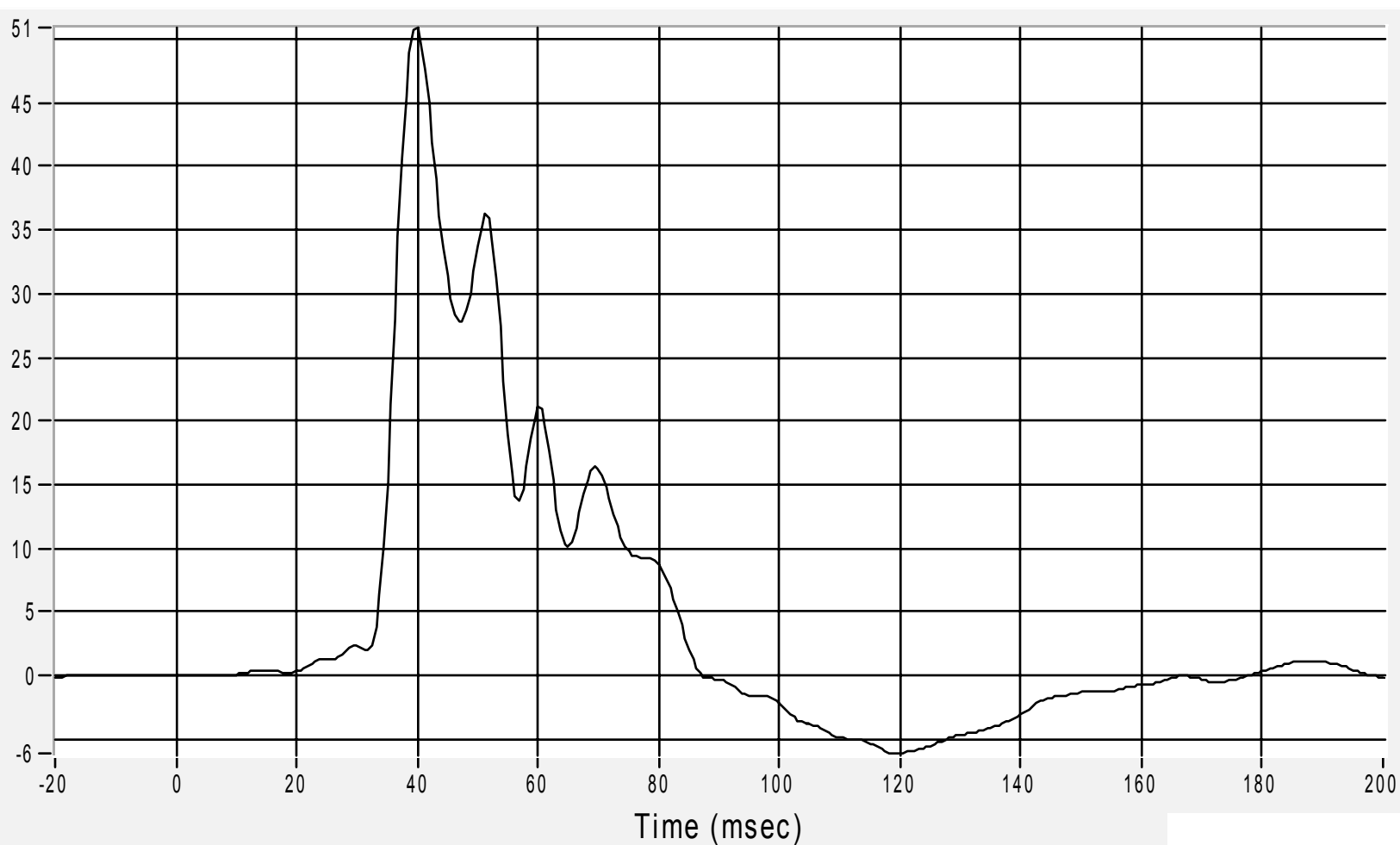
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Passenger Upper Rib (Y) - Redundant Acceleration

Acceleration (G's) FIR100

Max 50.9 G at 40.0 msec

Min -6.1 G at 119.4 msec



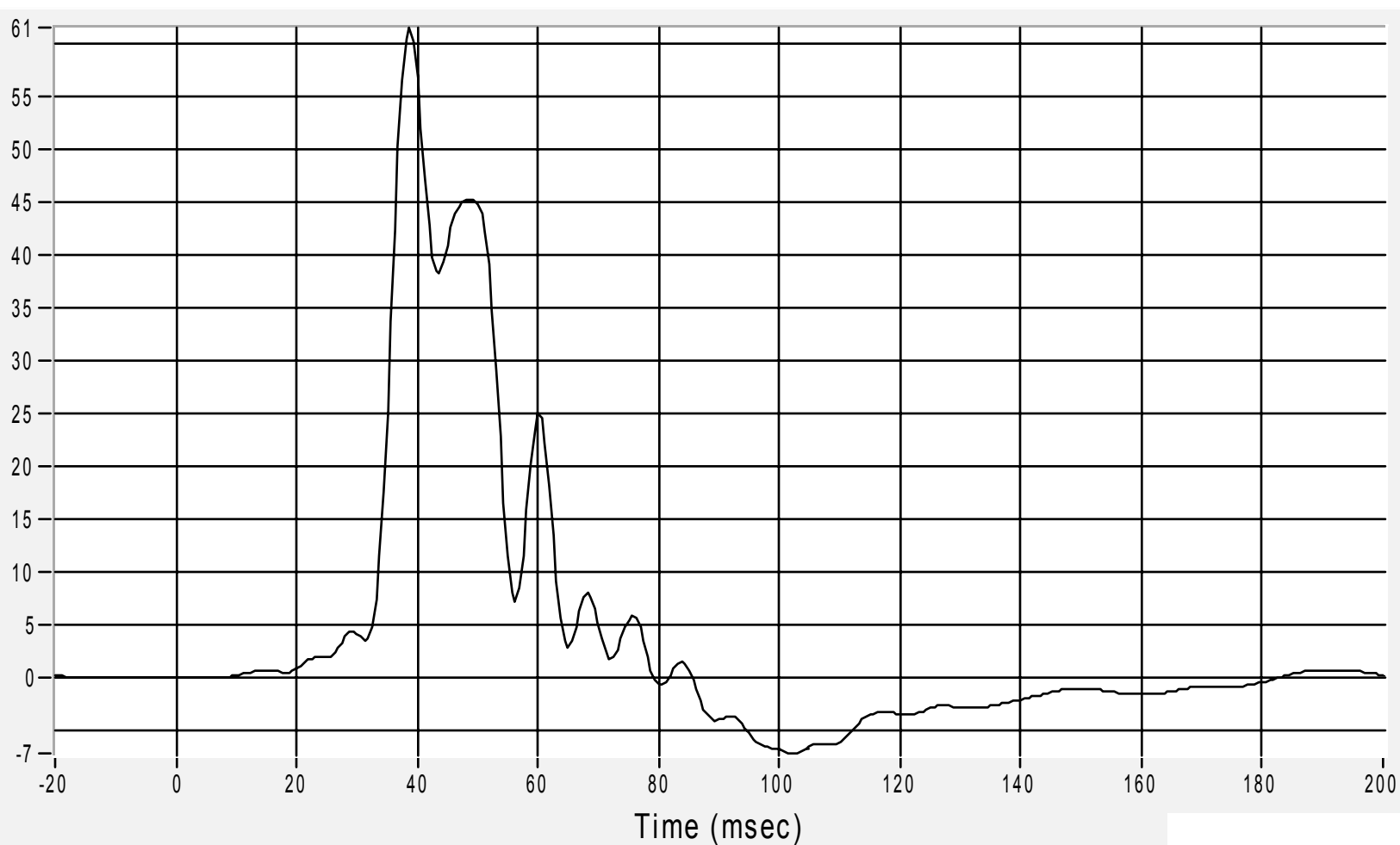
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3 February 2004

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Passenger Lower Rib (Y) - Redundant Acceleration

Acceleration (G's) FIR100

Max 61.4 G at 38.8 msec**Min -7.2 G at 102.5 msec**

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3 February 2004

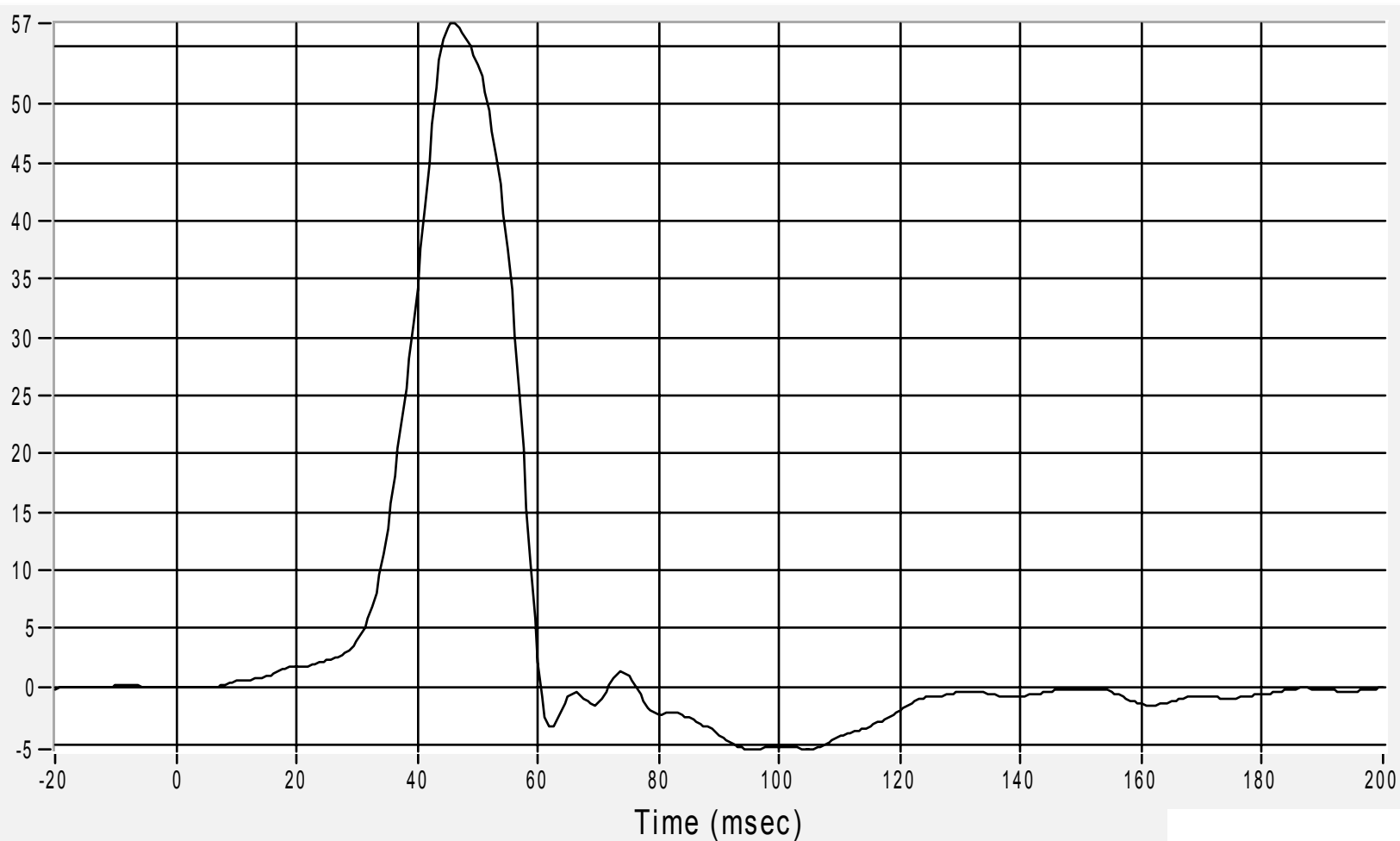
*Medical College of Wisconsin
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Passenger Lower Spine (Y) - Redundant Acceleration

Acceleration (G's) FIR100

Max 57.0 G at 45.6 msec

Min -5.4 G at 105.0 msec



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3 February 2004

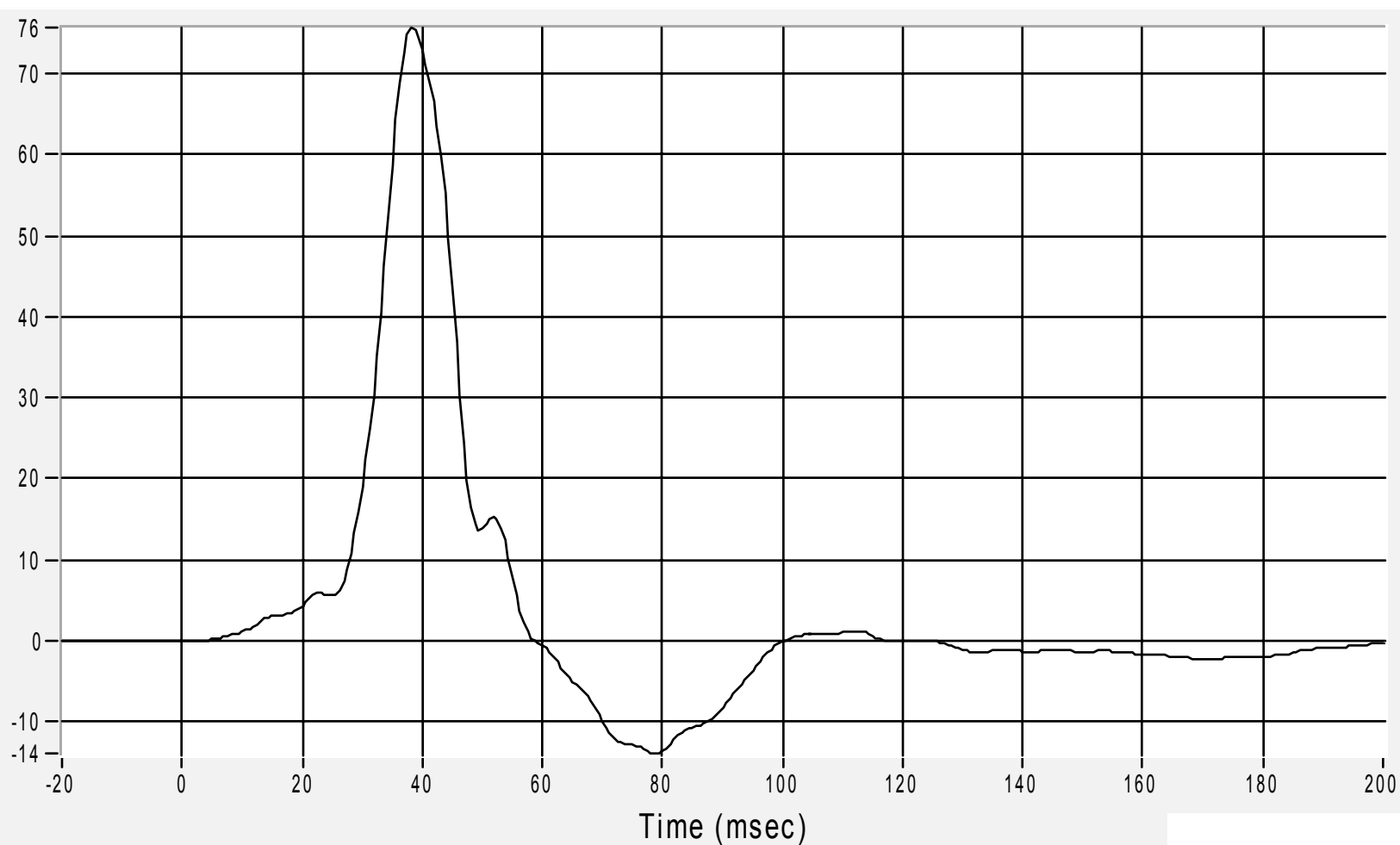
*Medical College of Wisconsin
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Passenger Pelvic (Y) - Redundant Acceleration

Acceleration (G's) FIR100

Max 75.7 G at 38.1 msec

Min -13.9 G at 78.8 msec



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3 February 2004

*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**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number SID H3 056

Test Sequences 05 and 06

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	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	Pass all requirements	Mark Meyer
LUMBAR FLEXION	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
HYBRID III LATERAL NECK TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
HYBRID III LATERAL HEAD DROP	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer

SID Serial Number SID H3 058

Test Sequences 05 and 06

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	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	Pass all requirements	Mark Meyer
LUMBAR FLEXION	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
HYBRID III LATERAL NECK TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
HYBRID III LATERAL HEAD DROP	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer

SUMMARY
SID PRE AND POST VERIFICATION

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number

SID H3 056

Test Sequences

05 and 06

SID H3 058

TEST PARAMETER	SPECIFICATION	SID H3 056		SID H3 058	
		PRE	POST	PRE	POST
MEASUREMENTS					
Date	-	28Jan04	12Feb04	28Jan04	12Feb04
Sequential Test Number	-	05	06	05	06
Temperature (°C)	18.9-25.5	19.6	20.7	19.8	20.6
Relative Humidity (%)	10-70	23.2	31.9	23.3	31.2
SH – Seated Height (mm)	889-909	908	903	908	909
RH – Rib Height (mm)	501-521	507	503	505	507
HP – Hip Pivot Height (mm)	99	99/99	99/99	99/99	99/99
RD – Rib From Back Line (mm)	229-241	229	229	229	229
KH – Knee Pivot from Back Line (mm)	511-526	520/526	522/522	521/525	522/520
KV – Knee Pivot to Floor (mm)	490-505	505/498	504/504	503/495	500/504
HW – Hip Width (mm)	356-391	366	367	357	357
THORAX IMPACTS					
Date	-	29Jan04	12Feb04	28Jan04	12Feb04
Sequential Test Number	-	05	06	05	06
Temperature (°C)	18.9-25.5	19.7	20.5	20.2	20.7
Relative Humidity (%)	10-70	24.2	32.5	23.7	31.0
Probe Speed (m/s)	4.21-4.33	4.27	4.29	4.27	4.30
Upper Rib Acceleration (G)	37-46	40.0	43.4	44.9	45.2
Lower Rib Acceleration (G)	37-46	39.2	41.5	44.6	44.3
Lower Spine Acceleration (G)	15-22	18.4	19.1	20.1	19.0
PELVIS IMPACTS					
Date	-	29Jan04	12Feb04	28Jan04	12Feb04
Sequential Test Number	-	05	06	05	06
Temperature (°C)	18.9-25.5	20.0	20.6	20.2	20.6
Relative Humidity (%)	10-70	24.8	32.2	24.0	31.8
Probe Speed (m/s)	4.21-4.33	4.29	4.27	4.27	4.28
Pelvis Acceleration (G)	40-60	45.6	49.4	49.2	53.0
THORACIC SHOCK ABSORBER					
Shock Absorber ID Number	-	1764	1764	03130164	03130364
Damper Setting	1-10	6-1/4	6-1/4	5	5.5
Date	-	17Oct03	11Feb04	17Oct03	11Feb04
Sequential Test Number	-	01	02	01	02
Temperature	18.9-25.5	23.5	20.7	23.0	19.5
Relative Humidity	10-70	34.0	31.2	35.2	27.9
Probe Speed (m/s) Low	3.05	3.05	3.05	3.05	3.05
Force (N)	836 – 1125	896.7	1020.5	1025.7	846.3
Displacement (mm)	30 – 35	31.2	31.9	30.1	32.1
Probe Speed (m/s) Middle	4.27	4.27	4.27	4.27	4.27
Force (N)	1730 – 2099	1815.9	1785.0	2083.5	1750.5
Displacement (mm)	32 – 37	34.8	34.7	33.2	35.8
Probe Speed (m/s) High	6.10	6.10	6.10	6.10	6.10
Force (N)	3741 – 4448	4116.2	4241.3	4357.4	4052.7
Displacement (mm)	33 - 40	37.2	37.3	36.2	37.1

TEST PARAMETER	SPECIFICATION	SID H3 056		SID H3 058	
		PRE	POST	PRE	POST
ABDOMINAL COMPRESSION					
Date	-	12Oct03	09Feb04	12Oct03	09Feb04
Sequential Test Number	-	01	02	01	02
Temperature (°C)	18.9-25.5	23.0	20.7	22.2	20.7
Relative Humidity (%)	10-70	38.0	25.4	38.4	25.0
Force at 13 mm (N)	104-162	116.8	133.5	114.6	132.6
Force at 19 mm (N)	163-221	163.8	184.9	163.1	180.3
Force at 25 mm (N)	222-280	224.8	243.4	233.8	238.0
Force at 33 mm (N)	325-391	335.1	343.0	362.3	335.5
LUMBAR FLEXION					
Date	-	15Oct03	10Feb04	15Oct03	09Feb04
Sequential Test Number	-	01	02	01	02
Temperature (°C)	18.9-25.5	23.1	20.0	23.4	20.2
Relative Humidity (%)	10-70	35.4	25.4	35.4	25.6
Force at 0° (N)	0-26.7	0	1.8	0	0
Force at 0° (N)	97.8-151.2	113	130.1	116	100.8
Force at 0° (N)	151.2-204.6	152	178.4	174	162.1
Force at 0° (N)	204.6-258	217	229.9	211	207.0
Return Angle	12° Maximum	5	5.6	5	9.2
HYBRID III LATERAL NECK					
Date	-	27Jan04	06Feb04	27Jan04	05Feb04
Sequential Test Number	-	05	06	05	06
Temperature (°C)	18.9-25.5	20.2	20.8	20.5	20.3
Relative Humidity (%)	10-70	21.0	29.2	25.6	21.5
Pendulum Speed (m/s)	6.89-7.13	7.08	7.10	7.13	7.09
Pendulum Pulse 10ms (m/s)	1.96-2.55	2.45	2.10	2.13	2.08
Pendulum Pulse 20ms (m/s)	4.12-5.10	5.00	4.29	4.35	4.68
Pendulum Pulse 30ms (m/s)	5.73-7.01	7.01	6.46	6.42	6.87
Pendulum Pulse 40 –70 ms (m/s)	6.27-7.64	6.96	7.06	7.02	6.87
Max Head rotation (deg)	66-82	71.3	75.9	75.4	80.5
Head angle crosses zero (ms)	58-67	58.6	58.1	62.0	58.1
Peak Moment (Nm)	73-88	74.7	75.5	77.6	81.9
Moment crosses zero (ms)	49-64	50.8	53.7	50.7	50.9
Max rotation wrt peak moment (ms)	2-15	7.9	7.5	7.5	5.3
HYBRID III LATERAL HEAD DROP					
Date	-	26Jan04	05Feb04	26Jan04	05Feb04
Sequential Test Number	-	05	06	05	06
Temperature (°C)	18.9-25.5	20.1	19.7	20.0	19.4
Relative Humidity (%)	10-70	24.5	27.7	24.2	28.4
Resultant Max (G)	120-150	128.0	134.1	139.0	130.8
Longitudinal Max (G)	<15	5.6	7.2	5.1	11.1

**DUMMY INSPECTION LIST
PRE AND POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number

SID H3 056

Test Sequences

05 and 06

SID H3 058

		SID H3 056		SID H3 058	
		PRE	POST	PRE	POST
	Date	30Jan04	13Feb04	30Jan04	13Feb04
	Performed By	Mark Meyer	Mark Meyer	Mark Meyer	Mark Meyer
PART	INSPECTION	Pass	Pass	Pass	Pass
Skin	Visual	Pass	Pass	Pass	Pass
Head	Visual, Ballast, 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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SID INSTRUMENTATION**FRONT SID H3 NO. 056**

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

REAR SID H3 NO. 058

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD X ACCELERATION	P24628	ENDEVCO	08Sep03
HEAD Y ACCELERATION	P21689	ENDEVCO	20Aug03
HEAD Z ACCELERATION	P21704	ENDEVCO	05Sep03
SIX AXIS UPPER NECK LOAD CELL (FX, FY, FZ, MX, MY, MZ)	0452	DENTON	02Sep03
UPPER RIB ACCELERATION	J43513	ENDEVCO	22Aug03
LOWER RIB ACCELERATION	J43481	ENDEVCO	22Aug03
LOWER SPINE ACCELERATION	J43473	ENDEVCO	22Aug03
PELVIS ACCELERATION	J43434	ENDEVCO	22Aug03
UPPER RIB REDUNDANT ACCELERATION	J43479	ENDEVCO	22Aug03
LOWER RIB REDUNDANT ACCELERATION	J43475	ENDEVCO	22Aug03
LOWER SPINE REDUNDANT ACCELERATION	J343491	ENDEVCO	22Aug03
PELVIS REDUNDANT ACCELERATION	J43433	ENDEVCO	22Aug03

VEHICLE INSTRUMENTATION

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
RIGHT FRONT SILL X	P22350	ENDEVCO	07Aug03
RIGHT FRONT SILL Y	P22978	ENDEVCO	19Apr03
RIGHT FRONT SILL Z	P22312	ENDEVCO	27May03
RIGHT REAR SILL X	P19387	ENDEVCO	05Sep03
RIGHT REAR SILL Y	P21788	ENDEVCO	08Sep03
RIGHT REAR SILL Z	P21617	ENDEVCO	08Sep03
REAR FLOORPAN ABOVE AXLE X	98G98E11-K02	ENTRAN	08Sep03
REAR FLOORPAN ABOVE AXLE Y	98B98A26-D05	ENTRAN	29May03
REAR FLOORPAN ABOVE AXLE Z	98G98D22-Z04	ENTRAN	23May03
LEFT REAR SILL Y	P21708	ENDEVCO	20Aug03
LEFT FRONT SILL Y	P22322	ENDEVCO	05Sep03
LEFT FRONT DOOR CENTERLINE Y	P14223	ENDEVCO	05Sep03
RIGHT REAR OCCUPANT COMP Y	P18295	ENDEVCO	05Sep03
MID-REAR OF LEFT FRONT DOOR Y	98F98E11-K11	ENTRAN	20Aug03
LEFT FRONT DOOR UPPER C/L Y	98F98E11-K07	ENTRAN	23May03
MID-REAR OF LEFT REAR DOOR Y	P21661	ENDEVCO	20Aug03
LEFT REAR DOOR UPPER C/L Y	P22230	ENDEVCO	08Sep03
LEFT LOWER B-PILLAR Y	P24165	ENDEVCO	22Aug03
LEFT MIDDLE B-PILLAR Y	P14233	ENDEVCO	03Feb03
LEFT LOWER A-PILLAR Y	P21820	ENDEVCO	07Aug03
LEFT UPPER A-PILLAR	P13839	ENDEVCO	20Aug03
FRONT SEAT TRACK Y	P21151	ENDEVCO	05Sep03
REAR SEAT TRACK Y	P22041	ENDEVCO	05Sep03
VEHICLE CG X	P19287	ENDEVCO	22Apr03
VEHICLE CG Y	P22522	ENDEVCO	21Aug03
VEHICLE CG Z	P19385	ENDEVCO	05Sep03

MDB INSTRUMENTATION

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