Electronic Reporting

Frontal Impact Report

08LF Volkswagen Polo

Test Report

Video Footage

Photographs

COMPATIBLITY TEST

Frontal Impact
100% Overlap into 150mm Deformable Barrier

VOLKSWAGEN POLO

Customer:
EUCAR

Test Date:
26/05/2000

Test Number:
08LF

Test speed:
56km/h

If you have any questions relating to this test please contact your Project Manager:
Mr H Davies direct line + 44 (0)1344 770475
fax: + 44 (0)1344 770356 email: hdavies@trl.co.uk
switchboard: + 44 (0)1344 773131
website: http://www.trl.co.uk

COMPATIBILITY TEST

Frontal Impact

100% Overlap into 150mm Deformable Barrier

VOLKSWAGEN POLO

Customer:
EUCAR

Test Date:
26/05/2000

Test number:
08LF

Report date:
31/05/2000

Author:
L Yooyai

	Approvals
Project Manager	
QARO	Digitally signed by Gavin Williams cn=Gavin Williams, ou=VE, o=TRL, c=UK Date: 2000.06.09 10:51:50 Z Reason: I am the author of this document

The Transport Research Laboratory and TRL are trading names of TRL Limited a member of the Transport Research Foundation Group of Companies.
TRL Limited, Registered in England, Number 3142272
Registered Offices: Old Wokingham Road, Crowthorne, Berkshire, RG

Volkswagen Polo

CONTENTS

ABSTRACT

Test 08LF was a Full Frontal Full Overlap Impact of a Volkswagen Polo MkIII at 56 km/h into a 150mm depth deformable barrier. The test was carried out on by TRL on behalf of EUCAR on the 26th of May 2000. The vehicle tested was LHD with driver and passenger airbags.

Load cells positioned behind the deformable barrier recorded the applied force. The Volkswagen Polo was instrumented with accelerometers at various locations, predominantly around the front of the vehicle, to allow forces, velocities and displacements to be calculated. The driver dummy was a fully instrumented Hybrid III and the passenger a makeweight.

The report includes details of the test set-up and a copy of all the results recorded during and after the test.

TEST DETAILS

Customer	EUCAR	
Test Centre	TRL Impact Test Facility (ITF)	
TRL Test No.	08LF	
Test Date	26/05/2000	
TRL Test Engineer	Huw Davies	
Vehicle	Volkswagen Polo	
VIN	WVWZZZ6NZXY185207	
Test Description	Compatibility Frontal Impact 100% Overlap into 150mm Deformable Barrier	
Test Speed	Protocol	56km/h (+/- 1km/h)
	Actual	55.9km/h
Impact Accuracy	Lateral	0mm
	Vertical	0mm
Vehicle Weight	Front Axle	632.5kg
	Rear Axle	467.5kg
	Total	1100kg
Vehicle Ride Height (Wheel arch)	Front Right	610mm
	Front Left	597mm
	Rear Right	616mm
	Rear Left	600mm
Distance Barrier Bottom to Ground	Recommended	50mm
	Actual	Left: 50mm Right: 50mm

TEST OBSERVATIONS

Post test the steering wheel was found to be jammed in the up-most position. The steering wheel centre was therefore measured in that location.

The data plot for the LHS Strut accelerometer gives an unusual trace after 55ms. Post test the LHS Strut accelerometer was inspected and was found to have no faults. The data plot would suggest that failure of the channel was due to a loose connection. The data up to 55ms can be assumed reliable for use.

The footwell target marker for position FW22 was found to be missing at post digitising and a post test measurement was therefore not taken.

The string potentiometer located underneath the drivers seat was replaced prior to test as the original was found to have failed. The origin point of the new potentiometer was unable to be recorded prior to the test and was calculated from other points in the same location in the following manner.

- The movement of the CoG accelerometer and the LHS B-Post sill was recorded from digitising of the points pre and post impact.
- The average of the above movements were used as the movement of the string potentiometer origin to give a pre test location.

The string potentiometer attached to the dashboard indicated a positive movement for the first part of the impact, the final measurement compares well with the static deformation. It is not known whether the positive displacement was due to interaction of the cable with items within the passenger compartment.

The driver dummy failed the EEVC limits on the following criteria

- Chest compression was 52.22mm compared to a limit of 50mm
- RHS Tibia compression force was 8.19kN compared to a limit of 8kN

A second impact of the drivers head was recorded at approximately 180ms. The secondary impact from video observation was due to the driver's head getting caught at the base of the head restraint upon rebound. This was not the primary impact with the interior of the car and values at this time are disregarded and those from the primary impact are used in the summary table.

TEST RESULTS

		Driver	
Head			
Performance Parameter		**Value**	**Time (msec)**
HIC_{36}		681.00	48.60
Resultant Acceleration (g)		68.58	69.55
3msec Exceedence (g)		67.70	
Upper Neck			
Forces (kN)	Shear (F_x)	-0.44	63.15
	Tension (F_z)	2.75	62.25
Moments (Nm)	Extension (Myoc)	-14.66	47.45
Chest			
Deflection (mm)		-52.22	64.60
Viscous Criterion (m/sec)		0.56	49.75
Femur			
Axial Compression (kN)	Left	-3.01	45.05
	Right	-4.11	42.70
Knee			
Displacement (mm)	Left	-0.16	27.65
	Right	-0.71	52.15
Upper Tibia			
Compression (kN)	Left	-1.45	28.25
	Right	-6.76	42.80
Lower Tibia			
Compression (kN)	Left	-1.86	28.80
	Right	-8.19	42.95
Tibia Index			
Upper	Left	0.37	33.65
	Right	1.57	43.60
Lower	Left	0.35	81.05
	Right	1.36	42.80

Short Name	Description	Unit	Filter	Value		Time	
				Max	Min	Max	Min
DLH00GX0_F	Driver Head Fore/Aft	g	CFC_1000	53.71	-66.03	179.75	69.65
DLH00GY0_F	Driver Head Lateral	g	CFC_1000	9.15	-3.76	77.75	206.15
DLH00GZ0_F	Driver Head Vertical	g	CFC_1000	32.92	-11.69	61.15	99.75
DLH00GR0_F	Driver Head Resultant	g	CFC_1000	68.58	0.02	69.55	-100.00
DLNT0FX0_F	Driver Upper Neck FX	kN	CFC_1000	0.14	-0.44	83.40	63.15
DLNT0FY0_F	Driver Upper Neck FY	kN	CFC_1000	0.10	-0.09	81.75	48.85
DLNT0FZ0_F	Driver Upper Neck FZ	kN	CFC_1000	2.75	-0.43	62.25	99.10
DLNT0MX0_F	Driver Upper Neck MX	Nm	CFC_600	4.23	-10.12	57.45	65.40
DLNTCMX0_F	Driver Upper Neck MXoc	Nm	CFC_600	3.74	-8.54	181.75	65.35
DLNT0MY0_F	Driver Upper Neck MY	Nm	CFC_600	33.30	-24.01	137.45	68.40
DLNTCMY0_F	Driver Upper Neck MYoc	Nm	CFC_600	1.18	-14.66	54.90	47.45
DLNT0MZ0_F	Driver Upper Neck MZ	Nm	CFC_600	6.47	-15.84	138.75	80.30
DLNT0FX0_F_Merz	Driver Upper Neck FX	kN	CFC_1000	0.14	-0.48	299.95	-100.00
DLNT0FZ0_F_Merz	Driver Upper Neck FZ	kN	CFC_1000	2.75	-1.05	299.95	-100.00
DLNT0MY0_F_Merz	Driver Upper Neck MY	Nm	CFC_600	33.30	-42.17	299.95	-100.00
DLR00GX0_F	Driver Chest Fore/Aft	g	CFC_180	5.71	-59.67	140.70	60.90
DLR00GY0_F	Driver Chest Lateral	g	CFC_180	1.64	-7.23	62.50	55.15
DLR00GZ0_F	Driver Chest Vertical	g	CFC_180	12.77	-16.84	46.45	95.30
DLR00GR0_F	Driver Chest Resultant	g	CFC_180	59.83	0.00	60.90	-100.00
DLR00D00_F	Driver Chest Deflection	mm	CFC_180	0.00	-52.22	20.15	64.60
DLR00D00_F_VCF	Driver Chest V*C	m/sec	CFC_180	0.56	-0.26	49.75	89.40
DLP00GX0_F	Driver Pelvis Fore/Aft	g	CFC_1000	12.55	-60.32	99.95	56.30
DLP00GY0_F	Driver Pelvis Lateral	g	CFC_1000	9.09	-12.06	82.55	42.80
DLP00GZ0_F	Driver Pelvis Vertical	g	CFC_1000	6.51	-25.38	44.10	71.45
DLP00GR0_F	Driver Pelvis Resultant	g	CFC_1000	61.23	0.03	56.30	-100.00
DLFL0FZ0_F	Driver Left Leg Femur	kN	CFC_600	0.50	-3.01	38.55	45.05
DLFL0FZ0_F_Merz	Driver Left Leg Femur	kN	CFC_600	0.50	-3.01	299.95	-100.00
DLKL0D00_F	Driver Left Knee Displacement	mm	CFC_180	1.01	-0.16	93.45	27.65
DLFR0FZ0_F	Driver Right Leg Femur	kN	CFC_600	0.25	-4.11	71.90	42.70
DLFR0FZ0_F_Merz	Driver Right Leg Femur	kN	CFC_600	0.25	-4.11	299.95	-100.00
DLKR0D00_F	Driver Right Knee Displacement	mm	CFC_180	0.32	-0.71	47.75	52.15
DLLLTFX0_F	Driver Leftleg Upper Tibia FX	kN	CFC_600	0.18	-0.23	38.90	74.10
DLLLTFZ0_F	Driver Leftleg Upper Tibia FZ	kN	CFC_600	0.14	-1.45	105.25	28.25
DLLLTMX0_F	Driver Leftleg Upper Tibia MX	Nm	CFC_600	33.94	-14.39	62.85	33.35
DLLLTMY0_F	Driver Leftleg Upper Tibia MY	Nm	CFC_600	26.00	-74.45	102.70	33.75
DLLLBFX0_F	Driver Leftleg Lower Tibia FX	kN	CFC_600	0.61	-0.15	33.60	101.85
DLLLBFZ0_F	Driver Leftleg Lower Tibia FZ	kN	CFC_600	0.07	-1.86	108.30	28.80
DLLLBMX0_F	Driver Leftleg Lower Tibia MX	Nm	CFC_600	42.49	-7.78	41.00	30.50
DLLLBMY0_F	Driver Leftleg Lower Tibia MY	Nm	CFC_600	71.35	-25.85	80.90	33.70
DLLLTMR0_F	Driver L.Upperleg Res.Moment	Nm	CFC_600	75.78	0.00	33.75	-94.05
DLLLTMR0_F_TI	Driver L.Upperleg Tibia Index		CFC_600	0.37	0.00	33.65	-94.05
DLLLBMR0_F	Driver L.Lowerleg Res.Moment	Nm	CFC_600	73.34	0.01	80.95	-87.75
DLLLBMR0_F_TI	Driver L.Lowerleg Tibia Index		CFC_600	0.35	0.00	81.05	-87.75
DLLRTFX0_F	Driver Rightleg Upper Tibia FX	kN	CFC_600	0.40	-0.52	46.05	88.50
DLLRTFZ0_F	Driver Rightleg Upper Tibia FZ	kN	CFC_600	0.16	-6.76	106.70	42.80
DLLRTMX0_F	Driver Rightleg Upper Tibia MX	Nm	CFC_600	44.28	-232.32	42.40	43.60
DLLRTMY0_F	Driver Rightleg Upper Tibia MY	Nm	CFC_600	25.00	-210.83	50.40	43.65
DLLRBFX0_F	Driver Rightleg Lower Tibia FX	kN	CFC_600	2.45	-0.38	43.50	50.45
DLLRBFZ0_F	Driver Rightleg Lower Tibia FZ	kN	CFC_600	0.16	-8.19	107.00	42.95
DLLRBMX0_F	Driver Rightleg Lower Tibia MX	Nm	CFC_600	18.12	-254.02	38.75	42.80
DLLRBMY0_F	Driver Rightleg Lower Tibia MY	Nm	CFC_600	120.08	-49.04	88.65	46.30
DLLRTMR0_F	Driver R.Upperleg Res.Moment	Nm	CFC_600	313.23	0.02	43.60	-100.00
DLLRTMR0_F_TI	Driver R.Upperleg Tibia Index		CFC_600	1.57	0.00	43.60	-100.00
DLLRBMR0_F	Driver R.Lowerleg Res.Moment	Nm	CFC_600	254.15	0.02	42.80	-87.55
DLLRBMR0_F_TI	Driver R.Lowerleg Tibia Index		CFC_600	1.36	0.00	42.80	-87.55
DLH00GX0_F	Driver Head Resultant HIC_36	g	CFC_1000	681.00		48.60	84.60
DLH00GR0_F	Driver Head Resultant 3ms Exceed	g	CFC_1000	67.70		67.70	70.70

Short Name	Description	Unit	Filter	Value		Time	
				Max	Min	Max	Min
VLS0BGX0_F	LHS Strut Fore/Aft	g	CFC_60	13.95	-111.74	49.00	40.15
VLS0BGX0_C	LHS Strut Fore/Aft	g	CFC_180	111.59	-1563.38	53.80	56.55
VRS0BGX0_F	RHS Strut Fore/Aft	g	CFC_60	42.92	-90.37	53.60	41.35
VRS0BGX0_C	RHS Strut Fore/Aft	g	CFC_180	55.95	-108.75	53.00	34.00
V0VMTGX0_F	Engine Top Central Fore/Aft	g	CFC_60	16.91	-103.52	41.15	21.10
V0VMTGX0_C	Engine Top Central Fore/Aft	g	CFC_180	57.80	-170.95	40.95	29.60
V0VB0GX0_F	Engine Sump Central Fore/Aft	g	CFC_60	38.59	-120.23	32.15	24.55
V0VB0GX0_C	Engine Sump Central Fore/Aft	g	CFC_180	62.34	-124.72	31.70	24.80
V0GB0GX0_F	Gearbox Fore/Aft	g	CFC_60	3.17	-89.44	66.50	31.25
V0GB0GX0_C	Gearbox Fore/Aft	g	CFC_180	20.03	-141.39	55.30	32.90
VLS0TGX0_F	LHS Turret Fore/Aft	g	CFC_60	12.79	-170.16	59.70	36.80
VLS0TGX0_C	LHS Turret Fore/Aft	g	CFC_180	20.72	-239.50	51.90	37.30
VRS0TGX0_F	RHS Turret Fore/Aft	g	CFC_60	22.23	-93.26	61.95	39.70
VRS0TGX0_C	RHS Turret Fore/Aft	g	CFC_180	38.11	-107.88	61.20	34.90
VLAB0GX0_F	LHS A-Post Bottom Fore/Aft	g	CFC_60	1.77	-50.26	139.30	37.25
VLAB0GX0_C	LHS A-Post Bottom Fore/Aft	g	CFC_180	3.08	-68.11	139.10	39.75
VRAB0GX0_F	RHS A-Post Bottom Fore/Aft	g	CFC_60	1.68	-45.65	154.95	39.50
VRAB0GX0_C	RHS A-Post Bottom Fore/Aft	g	CFC_180	2.22	-52.98	120.20	30.40
VLAM0GX0_F	LHS A-Post Middle Fore/Aft	g	CFC_60	1.06	-60.04	146.55	35.60
VLAM0GX0_C	LHS A-Post Middle Fore/Aft	g	CFC_180	9.51	-69.01	7.40	37.20
VRAM0GX0_F	RHS A-Post Middle Fore/Aft	g	CFC_60	1.61	-44.01	117.90	40.00
VRAM0GX0_C	RHS A-Post Middle Fore/Aft	g	CFC_180	15.63	-50.37	26.10	18.45
VLBB0GX0_F	LHS B-Post Bottom Fore/Aft	g	CFC_60	1.70	-41.93	139.40	32.05
VLBB0GX0_C	LHS B-Post Bottom Fore/Aft	g	CFC_180	2.12	-47.52	139.05	37.25
VRBB0GX0_F	RHS B-Post Bottom Fore/Aft	g	CFC_60	1.52	-43.66	154.75	39.60
VRBB0GX0_C	RHS B-Post Bottom Fore/Aft	g	CFC_180	2.22	-52.49	252.40	30.95
V0T00GX0_F	Tunnel CofG Fore/Aft	g	CFC_60	2.91	-46.21	156.70	30.55
V0T00GX0_C	Tunnel CofG Fore/Aft	g	CFC_180	21.40	-79.01	23.10	30.25
V0XAMGX0_F	Rear Cross Beam Fore/Aft	g	CFC_60	1.66	-44.82	152.80	42.80
V0XAMGX0_C	Rear Cross Beam Fore/Aft	g	CFC_180	2.60	-53.52	102.95	42.25
V0TM0WX0_F	Vehicle Roll Rate	deg/S	CFC_60	30.68	-168.22	156.60	46.10
V0TM0WY0_F	Vehicle Pitch Rate	deg/S	CFC_60	207.45	-183.85	61.95	45.30
V0TM0WZ0_F	Vehicle Yaw Rate	deg/S	CFC_60	26.23	-33.47	62.05	42.35
DRU0TF00_F	Driver Diagonal Seatbelt	kN	CFC_60	8.95	-0.03	66.45	136.35
DRU0BF00_F	Driver Lap Seatbelt	kN	CFC_60	9.80	-0.01	58.95	-58.95
V0JT0E00_F	Airbag Event Current Clamp	A	Unfilter	0.11	-2.39	53.50	19.30
V0TM0GX0_F	Rate Sensor Box Fore/Aft	g	CFC_60	4.14	-47.26	154.70	43.20
V0TM0GX0_C	Rate Sensor Box Fore/Aft	g	CFC_180	17.22	-60.56	251.65	31.45
V0TM0GY0_F	Rate Sensor Box Lateral	g	CFC_60	11.08	-8.95	44.05	37.05
V0TM0GZ0_F	Rate Sensor Box Vertical	g	CFC_60	10.44	-19.44	40.00	24.25
V0Q00DX0_F	Stringpot Facia	mm	CFC_60	21.18	-16.36	94.50	134.15
VLH00DX0_F	Stringpot Footwell	mm	CFC_60	0.01	-62.98	1.10	71.20
V0XAMGY0_F	Rear Cross Beam Lateral	g	CFC_60	2.45	-4.54	75.05	38.85
V0XAMGZ0_F	Rear Cross Beam Vertical	g	CFC_60	9.09	-10.60	32.30	61.20
V0XAMGR0_F	Rear Cross Beam Resultant	g	CFC_60	44.99	0.00	42.75	-100.00
V0TM0GR0_F	Rate Sensor Box Resultant	g	CFC_60	48.67	0.01	43.65	-100.00
VLS0BVX0_C_vel	LHS Strut Fore/Aft	m/sec	CFC_180	15.65	-3.40	6.15	51.50
VLS0BDX0_C_dis	LHS Strut Fore/Aft	mm	CFC_180	509.55	0.00	42.20	-100.00
VLS0TVX0_C_vel	LHS Turret Fore/Aft	m/sec	CFC_180	15.56	-1.47	-17.05	121.40
VLS0TDX0_C_dis	LHS Turret Fore/Aft	mm	CFC_180	474.53	0.00	41.55	-100.00
VLAB0VX0_C_vel	LHS A-Post Bottom Fore/Aft	m/sec	CFC_180	15.56	-0.87	-82.30	109.90
VLAB0DX0_C_dis	LHS A-Post Bottom Fore/Aft	mm	CFC_180	561.00	0.00	71.75	-100.00
VLAM0VX0_C_vel	LHS A-Post Middle Fore/Aft	m/sec	CFC_180	15.62	-1.25	-94.20	122.70
VLAM0DX0_C_dis	LHS A-Post Middle Fore/Aft	mm	CFC_180	604.91	0.00	73.85	-100.00
VLBB0VX0_C_vel	LHS B-Post Bottom Fore/Aft	m/sec	CFC_180	15.56	-0.84	-81.85	100.25
VLBB0DX0_C_dis	LHS B-Post Bottom Fore/Aft	mm	CFC_180	577.94	0.00	73.35	-100.00

Short Name	Description	Unit	Filter	Value		Time	
				Max	Min	Max	Min
VRS0BVX0_C_vel	RHS Strut Fore/Aft	m/sec	CFC_180	15.74	-0.98	-52.80	50.20
VRS0BDX0_C_dis	RHS Strut Fore/Aft	mm	CFC_180	518.16	0.00	63.90	-100.00
VRS0TVX0_C_vel	RHS Turret Fore/Aft	m/sec	CFC_180	15.59	-2.51	-89.85	55.40
VRS0TDX0_C_dis	RHS Turret Fore/Aft	mm	CFC_180	480.69	0.00	43.25	-100.00
VRAB0VX0_C_vel	RHS A-Post Bottom Fore/Aft	m/sec	CFC_180	15.56	-1.23	-94.30	102.20
VRAB0DX0_C_dis	RHS A-Post Bottom Fore/Aft	mm	CFC_180	571.49	0.00	67.25	-100.00
VRAM0VX0_C_vel	RHS A-Post Middle Fore/Aft	m/sec	CFC_180	15.58	-1.30	-91.35	112.20
VRAM0DX0_C_dis	RHS A-Post Middle Fore/Aft	mm	CFC_180	600.29	0.00	74.10	-100.00
VRBB0VX0_C_vel	RHS B-Post Bottom Fore/Aft	m/sec	CFC_180	15.57	-0.93	-94.00	101.65
VRBB0DX0_C_dis	RHS B-Post Bottom Fore/Aft	mm	CFC_180	575.96	0.00	70.35	-100.00
V0VMTVX0_C_vel	Engine Top Central Fore/Aft	m/sec	CFC_180	15.55	-2.06	-55.75	35.20
V0VMTDX0_C_dis	Engine Top Central Fore/Aft	mm	CFC_180	354.72	0.00	31.30	-100.00
V0VB0VX0_C_vel	Engine Sump Central Fore/Aft	m/sec	CFC_180	15.53	-0.17	3.75	117.10
V0VB0DX0_C_dis	Engine Sump Central Fore/Aft	mm	CFC_180	531.56	0.00	220.00	-100.00
V0GB0VX0_C_vel	Gearbox Fore/Aft	m/sec	CFC_180	15.60	-1.01	-86.10	115.40
V0GB0DX0_C_dis	Gearbox Fore/Aft	mm	CFC_180	469.85	0.00	82.25	-100.00
V0T00VX0_C_vel	Tunnel CofG Fore/Aft	m/sec	CFC_180	15.58	-1.62	-91.10	104.35
V0T00DX0_C_dis	Tunnel CofG Fore/Aft	mm	CFC_180	576.93	0.00	70.65	-100.00
V0XAMVX0_C_vel	Rear Cross Beam Fore/Aft	m/sec	CFC_180	15.56	-0.95	-21.10	101.05
V0XAMDX0_C_dis	Rear Cross Beam Fore/Aft	mm	CFC_180	583.37	0.00	72.65	-100.00
V0TM0VX0_C_vel	Rate Sensor Box Fore/Aft	m/sec	CFC_180	15.58	-0.99	-92.05	107.45
V0TM0DX0_C_dis	Rate Sensor Box Fore/Aft	mm	CFC_180	587.53	0.00	75.35	-100.00
V0TM0RX0_F	Vehicle Roll Angle (Euler)	deg	CFC_60	0.07	-6.96	3.65	96.10
V0TM0RY0_F	Vehicle Pitch Angle (Euler)	deg	CFC_60	0.82	-1.13	68.90	49.25
V0TM0RZ0_F	Vehicle Yaw Angle (Euler)	deg	CFC_60	0.70	-0.24	191.70	55.55

POST TEST MEASUREMENTS

Door Opening Forces

Method / Force required

Normal	Opens normally
≤100N	Limited force
>100 - ≤500N	Moderate force
>500N	Extreme hand force
>500N + Tools	Could not be opened even with extreme hand force. Tools had to be used.

Door	Force to Unlatch	Force to 45º
Front Driver's Side	60N	110N
Front Passenger's Side	140N	60N

Dummy Removal and Entrapment

There were no significant problems in the removal of the dummies.

INTRUSION MEASUREMENTS

Point	Pre-Impact			Post-Impact			Displacement		
08LF - Volkswagen Polo Mk III	X	Y	Z	X	Y	Z	X	Y	Z
LHS_B_Pillar_Waist	-464	1217	10	-459	1210	9	5	-7	-1
LHS_B_Pillar_Sill	-440	1262	-380	-434	1255	-380	7	-7	0
LHS_A_Pillar_Waist	-444	2353	9	-433	2339	10	11	-14	1
LHS_A_Pillar_Sill	-439	2343	-381	-426	2334	-379	13	-9	2
RHS_B_Pillar_Waist	1013	1227	-9	1011	1222	-5	-2	-5	4
RHS_B_Pillar_Sill	982	1269	-394	981	1264	-389	-1	-4	5
RHS_A_Pillar_Waist	947	2363	-9	941	2349	0	-5	-14	9
RHS_A_Pillar_Sill	933	2353	-391	929	2345	-383	-5	-8	9
Acc_CofG	254	1801	-436	262	1792	-449	8	-9	-13
Acc_Engine_Top	363	3071	30	375	2811	115	12	-261	85
Acc_Sump	418	2850	-579	431	2768	-518	13	-81	61
Acc_Gearbox	-169	2978	-466	-156	2895	-372	13	-83	94
Acc_LHS_Strut	-352	2765	-456	-332	2702	-377	20	-63	79
Acc_LHS_Turret	-198	2809	26	-164	2681	85	34	-129	59
Acc_LHS_Lower_A_Pillar	-393	2402	-462	-369	2389	-460	24	-13	2
Acc_LHS_Upper_A_Pillar	-380	2337	195	-368	2321	196	12	-16	1
Acc_LHS_Lower_B_Pillar	-378	1286	-521	-372	1278	-521	6	-8	-1
Acc_RHS_Strut	840	2776	-448	826	2740	-432	-14	-36	16
Acc_RHS_Turret	691	2822	20	697	2695	78	7	-126	58
Acc_RHS_Lower_A_Pillar	892	2406	-471	882	2398	-462	-10	-8	9
Acc_RHS_Lower_B_Pillar	887	1296	-537	886	1291	-532	-1	-5	5
Acc_RHS_Upper_A_Pillar	891	2352	178	884	2334	185	-7	-18	7
Accelerator_Pedal	97	2494	-399	114	2433	-396	17	-61	3
Brake_pedal	-11	2454	-372	-4	2374	-357	7	-81	14
Steering wheel was found jammed in upmost position post impact (Digitized at this location post impact)									
Center_of_Steering_Wheel	-67	2062	38	-58	2055	126	9	-7	87
Clutch_Pedal	-122	2447	-371	-112	2378	-358	10	-69	13
D1	-379	2189	104	-367	2186	144	12	-3	41
D2	-279	2168	103	-267	2166	152	12	-2	48
D3	-180	2162	171	-170	2163	222	10	1	51
D4	-78	2166	188	-69	2167	241	9	1	53
D5	26	2163	174	35	2161	230	9	-2	55
D6	125	2160	106	142	2139	161	16	-21	55
D7	-389	2208	-110	-375	2183	-73	14	-24	37
D8	-290	2214	-110	-273	2196	-76	16	-18	33
D9	-189	2214	-113	-171	2196	-86	18	-18	27
D10	-88	2210	-118	-72	2193	-96	16	-17	22
D11	13	2208	-118	26	2194	-105	13	-14	13
D12	113	2188	-109	128	2160	-56	15	-28	53

Please Note: Positive = Right (x), Forwards (y) & Up (z)

Point	Pre-Impact			Post-Impact			Displacement		
08LF - Volkswagen Polo Mk III	X	Y	Z	X	Y	Z	X	Y	Z
Facia_Stringpot_Origin	272	381	461	271	377	464	-1	-4	3
Center_Dash_Stringpot Temination	262	2193	116	276	2182	179	14	-12	63
Footwell Stringpot Origin was not digitised – see Test Observations									
Footwell_Stringpot_Origin	-22	1963	-574	-15	1955	-579	11	-86	-50
Footwell_Stringpot_Termination	-18	2607	-460	10	2525	-437	28	-82	24
FW1	-270	2543	-378	-268	2482	-368	2	-61	10
FW2	-303	2515	-470	-273	2490	-463	29	-26	8
FW3	-309	2441	-523	-282	2423	-520	27	-18	3
FW4	-315	2362	-579	-295	2352	-586	20	-10	-7
FW5	-202	2598	-420	-176	2494	-389	27	-104	30
FW6	-211	2546	-503	-177	2458	-476	33	-87	27
FW7	-215	2464	-561	-187	2441	-556	27	-23	5
FW8	-215	2364	-579	-196	2352	-605	20	-12	-26
FW9	-114	2680	-370	-87	2573	-328	28	-107	42
FW10	-115	2621	-442	-86	2521	-407	29	-100	34
FW11	-114	2548	-512	-87	2478	-500	27	-70	13
FW12	-120	2467	-569	-97	2447	-590	23	-21	-22
FW13	-116	2363	-573	-97	2351	-616	19	-12	-43
FW14	-11	2659	-402	14	2564	-370	26	-95	31
FW15	-13	2548	-514	11	2497	-512	25	-51	2
FW16	-17	2467	-573	1	2443	-605	18	-24	-32
FW17	-12	2372	-581	10	2353	-617	23	-19	-36
FW18	87	2620	-445	111	2553	-430	24	-67	15
FW19	87	2549	-516	109	2517	-522	22	-33	-6
FW20	86	2466	-576	108	2448	-600	22	-18	-24
FW21	85	2369	-591						
Triax_at_Rate_Sensor	252	1411	-453	252	1402	-450	0	-8	3
Rear_Crossbeam_Triax	254	622	-356	253	620	-355	-1	-3	1
Heel_Point	-24	2324	-557						
Ref_Point_Behind_Brake_pedal	-11	2659	-402						
Intrusion_Points (NCAP)				-76	2560	-354			
Intrusion_Points (NCAP)				-37	2558	-384			
Intrusion_Points (NCAP)				30	2568	-399			
Intrusion_Points (NCAP)				-74	2510	-411			
Intrusion_Points (NCAP)				-36	2510	-423			
Intrusion_Points (NCAP)				9	2523	-433			
Intrusion_Points (NCAP)				-81	2498	-437			
Intrusion_Points (NCAP)				-30	2505	-444			
Intrusion_Points (NCAP)				12	2514	-452			

Please Note: Positive = Right (x), Forwards (y) & Up (z)

VEHICLE PREPARATION

At the TRL crash facility, the vehicle was inspected and the preparation was completed by:

- mounting transducer brackets at various points of interest around the vehicle, (see page 4)
- attaching targets for film reference and deformation measurements
- weighting and ballasting of the vehicle
- installing sensors and measuring equipment
- setting dummy H points
- measuring vehicle with Faro 3-D arm measuring equipment

Details

Make	Volkswagen	Body Style	3 Door Hatchback
Model	Polo	Drive (LHD/RHD)	LHD
VIN	WVWZZZ6NZXY185207	Drive (FWD/RWD)	FWD
Engine size/type	1000cc Petrol	Transmission	Manual
Airbag	Driver	☒	
	Passenger	☒	
Seatbelts	Adjustable upper anchorage	☒	
	Pre-tensioners	☒	
	ALR System	☐	
Power Assisted Steering		☐	
Air Conditioning		☐	
Sunroof		☐	
Electric Windows		☐	
Anti-Lock Brakes		☐	

Fuel Tank

The fuel tank was drained and replaced with water to a weight equivalent to 90% of its fuel tank capacity. Subsequently the water was drained until the correct test weight and weight distribution was achieved.

Tyre Pressure

Vehicle Tyre		Target Pressure	Test Pressure
Front	Left	2.3 bar	2.3 bar
	Right	2.3 bar	2.3 bar
Rear	Left	2.3 bar	2.3 bar
	Right	2.3 bar	2.3 bar

Vehicle Weight

The Unladen Kerb Weight was measured.

	Unladen Kerb Weight (kg)
Front Axle	554.5kg
Rear Axle	344kg
Total Weight (kg)	898.5kg

Reference Weight = (Unladen Kerb Weight + Driver & Passenger Dummy + instrumentation) was measured:

	Reference Weight (kg)
Front Axle	624kg
Rear Axle	455.5kg
Total Weight (kg)	1079.5kg

Weight distribution to specification was achieved through the draining of the fuel tank.

Two masses of approximately 10kg each where added to the LHS (10kg) and RHS (10kg) of the passenger compartment on approximately the longitudinal position of the measured CoG to make the required test weight.

	Test Weight (kg)
Front Axle	632.5kg
Rear Axle	467.5kg
Total Weight (kg)	1100kg

Vehicle Centre of Gravity

The centre of gravity of the vehicle was measured with the vehicle at the reference weight. It was agreed with the customer that the Centre of Gravity did not need to be remeasured. Please note that these figures are an approximate indication of the location when the vehicle is at test weight.

	Position
Longitudinal position behind front axle	1.014m
Lateral position to right of centre	0.02m
Height above ground	0.55m

Vehicle Ride Height

The maximum distances between the floor and the wheel arch eyebrows were measured for determining the ride height of the vehicle.

Wheel		Ride Height (mm)
Front	RHS	610 mm
	LHS	597 mm
Rear	RHS	616 mm
	LHS	600 mm

Vehicle Instrumentation

The vehicle was instrumented as follows:

Accelerometers			
Location	X	Y	Z
RHS Strut	✓		
LHS Strut	✓		
RHS Turret	✓		
LHS Turret	✓		
RHS Longitudinal			
LHS Longitudinal			
RHS A-Pillar Lower	✓		
LHS A-Pillar Lower	✓		
RHS A-Pillar above Dash	✓		
LHS A-Pillar above Dash	✓		
Engine Top, Central	✓		
Engine Sump, Central	✓		
Gearbox , Central	✓		
RHS B-Pillar Lower			
LHS B-Pillar Lower	✓		
Rear Cross Beam, Central	✓	✓	✓
Tunnel at C of G	✓		
Tunnel at Rate Sensor	✓	✓	✓
Subframe			
RHS C-Pillar Lower			
LHS C-Pillar Lower			
Rate Sensors			
Tunnel C of G	✓	✓	✓
Seat Belt Gauges			
Driver Dummy	Diagonal	Lap	
String Potentiometers to measure displacement			
Facia Movement			
Footwell Intrusion			
Airbag Event			
Airbag Current Clamp			

Passenger Compartment Adjustments

Adjustment	Required Setting	Notes
Seat Back Angle	Manufacturers design position, otherwise 25^{o}	Yes
Seat Fore/Aft	Mid position	Yes
Seat Height	Lowest	Yes
Seat Base Tilt	Up to mid position	Yes
Head Restraints	Highest	Yes
Head Restraint Tilt	Manufacturers, otherwise mid	Yes
Seat Lumbar Support	Most wither	Yes
Steering Wheel - vertical	Mid position	Yes
Steering Wheel – horizontal	Mid position	Not Adjustable
Rear Seat Fore/Aft (if adj)	Mid position	Not Adjustable
Rear Seat Facing	Forwards	Yes
Arm-rests – Front Seats	Lowered position, otherwise up	N/A
Arm-rests – Rear Seats	Stowed position	Yes
Parking Brake	Disengaged	Yes
Glazing Front	Lowered	Yes
Glazing Rear	Lowered or removed	Not Adjustable
Gear Change Lever	In the neutral position	Yes
Pedals	Normal position of rest	Yes
Doors	Closed, (not locked)	Yes
Sun Visors	Stowed position	Yes
Rear View Mirror	Normal position of use	Yes
Seat Belt Anchorage	Manufacturer's, otherwise mid	Yes

DUMMY PREPARATION

One instrumented Hybrid III dummy was placed in the driver's seat and one makeweight dummy was placed in the passenger's seat. The driver dummy was positioned according to the Euro NCAP Protocol. The passenger dummy was placed in a similar position but not according to the protocol. The driver and passenger dummies were restrained by three point lap and diagonal belts. The vehicle was fitted with both driver and passenger airbags.

Dummy Positioning

Measurements taken before the test using the H-Point manikin

Parameter		Value	Comments
Driver H-Point (manikin)	X (mm)	434mm	
	Z (mm)	221-6 = 215mm	
Measurement relative to: Target markers on sill and B post			

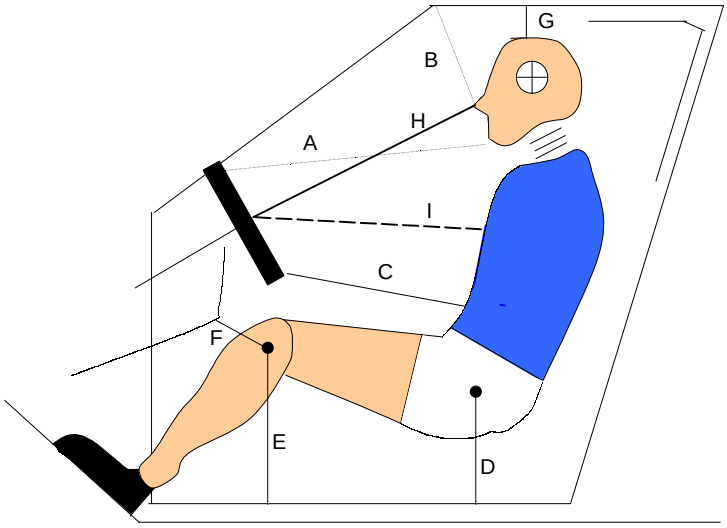
Measurements taken immediately before the test with the Hybrid III dummy in position.

Driver

Parameter		Value	Comments
Driver H-Point	X (mm)	427mm	
	Z (mm)	206mm	
Measurement relative to: Target markers on sill and B post			
Pelvic Angle (deg)		24^{o}	
Head Platform Angle (deg)		0^{o}	
Knee Separation (mm)		270mm	

Dummy Positioning Measurements

	Distance Reference	Driver
Chin to top of rim/facia (mm)	A	415mm
Nose to top edge of glass (mm)	B	365mm
Stomach to rim/facia (mm)	C	193mm
Knee bolt to carpet (mm)	E	405mm
Knee bolt to top edge of bolster (mm)	F	150mm
Head to roof surface (mm)	G	117mm
Nose to steering wheel centre	H	435mm
Chest to steering wheel centre	I	285mm



Dummy Temperature

Before the test, the dummy temperature was recorded over a period of five hours inside the impact test facility.

Time	Dummy Temperature °C
07.53	20.9°C
08.58	21.7°C
10.02	21.5°C
11.02	21.6°C
12.02	21.3°C
13.02	21.3°C

Dummy Instrumentation

The dummy was instrumented with transducers to measure the parameters shown in the following table.

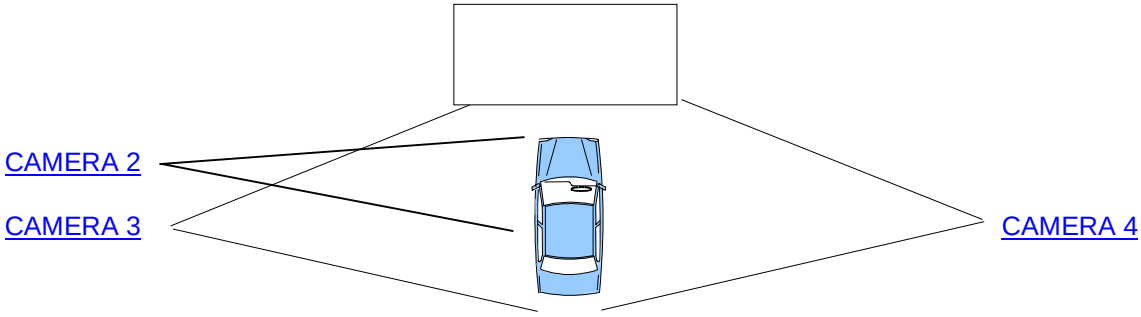
Dummy		Driver		
		X	Y	Z
Head Acceleration		✓	✓	✓
Neck Force		✓	✓	✓
Neck Moments		✓	✓	✓
Chest Acceleration		✓	✓	✓
Chest Deflection		✓		
Pelvis Acceleration		✓	✓	✓
Femur Force	Left	✓		
	Right	✓		
Knee Displacement	Left	✓		
	Right	✓		
Upper Tibia Force	Left	✓		✓
	Right	✓		✓
Upper Tibia Moment	Left	✓	✓	
	Right	✓	✓	
Lower Tibia Force	Left	✓		✓
	Right	✓		✓
Lower Tibia Moment	Left	✓	✓	
	Right	✓	✓	

BARRIER

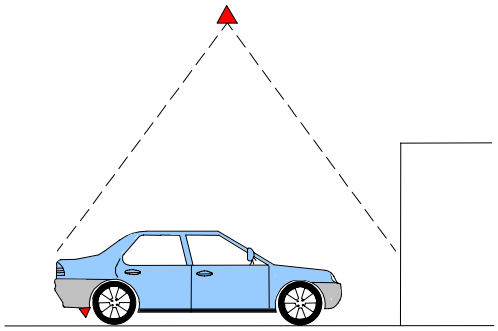
The barrier used for this test was a 2000mm x 750mm x 150mm custom built barrier, serial number (AE002) supplied by Cellbond Composites Ltd.
The barrier was attached to a load cell wall mounted on the impact block, with the barrier at a height of nominally 50mm above the ground.

FILM AND PHOTO DOCUMENTATION

A total of 5 high speed film cameras (views 1,3,4, 5 & 6), running at a speed of 400 frames per second, were positioned to provide the following views:

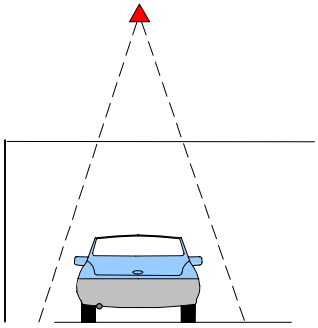


CAMERA 6



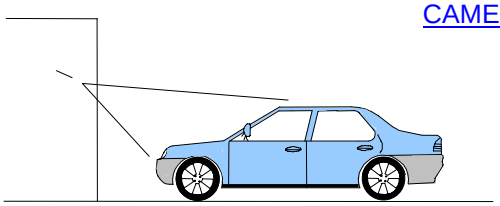
Side View

CAMERA 6

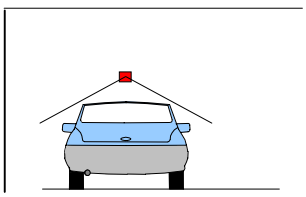


Rear View

CAMERA 5

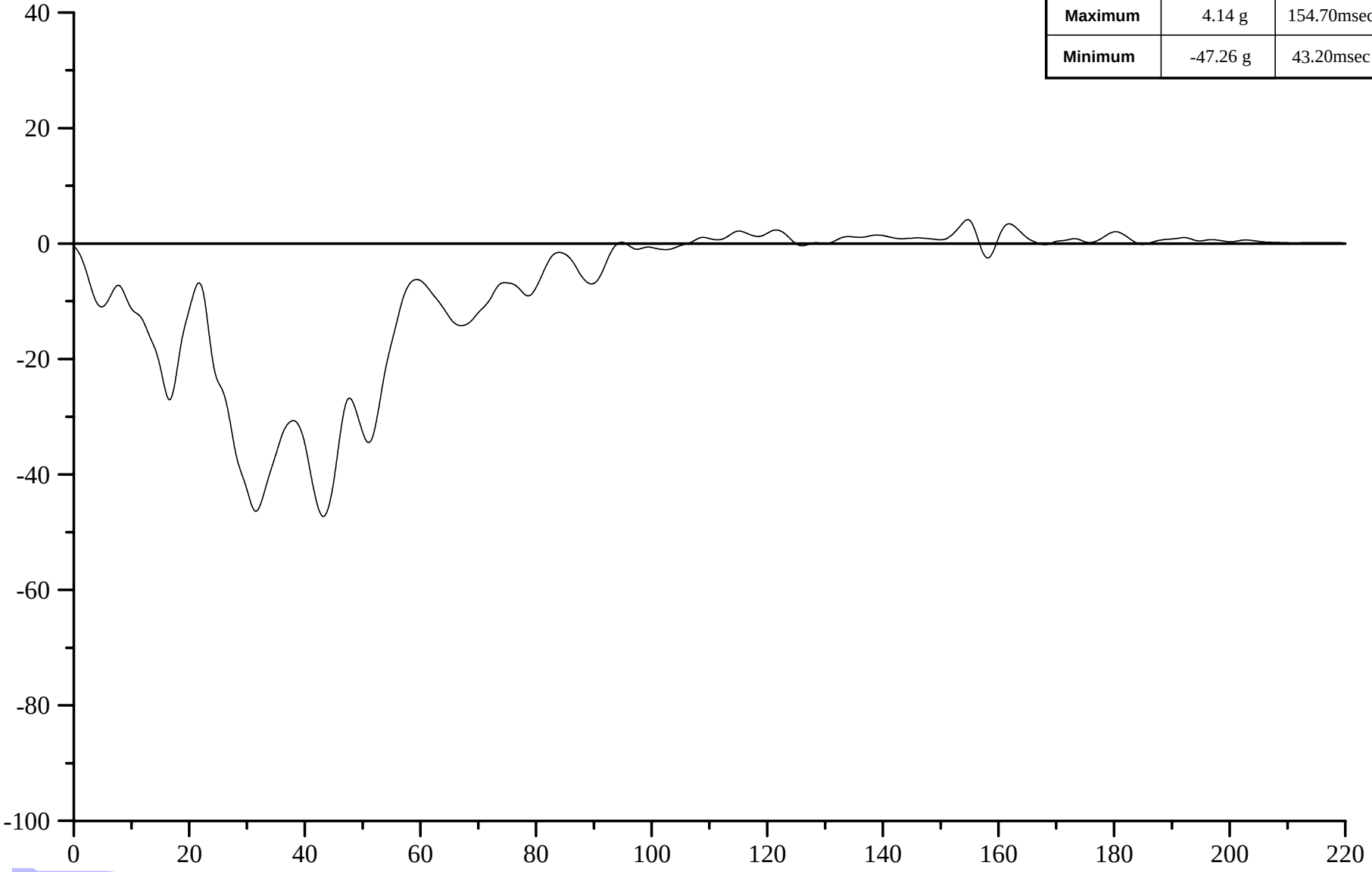


Side View



Rear View

Peak Values / Times		
Maximum	4.14 g	154.70msec
Minimum	-47.26 g	43.20msec



Tunnel CofG Acceleration

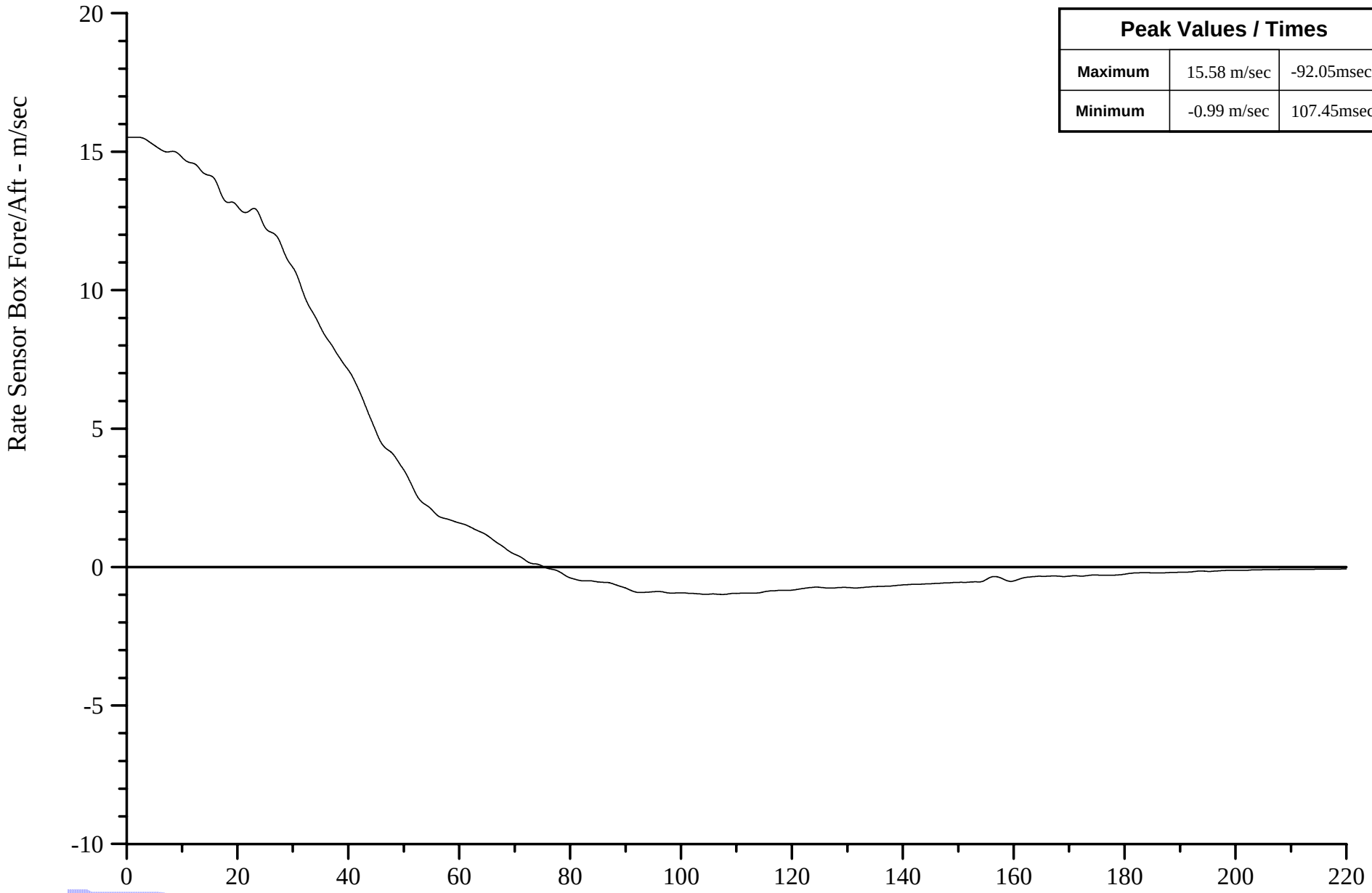
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.58 m/sec	-92.05msec
Minimum	-0.99 m/sec	107.45msec



Tunnel CofG Crude Velocity

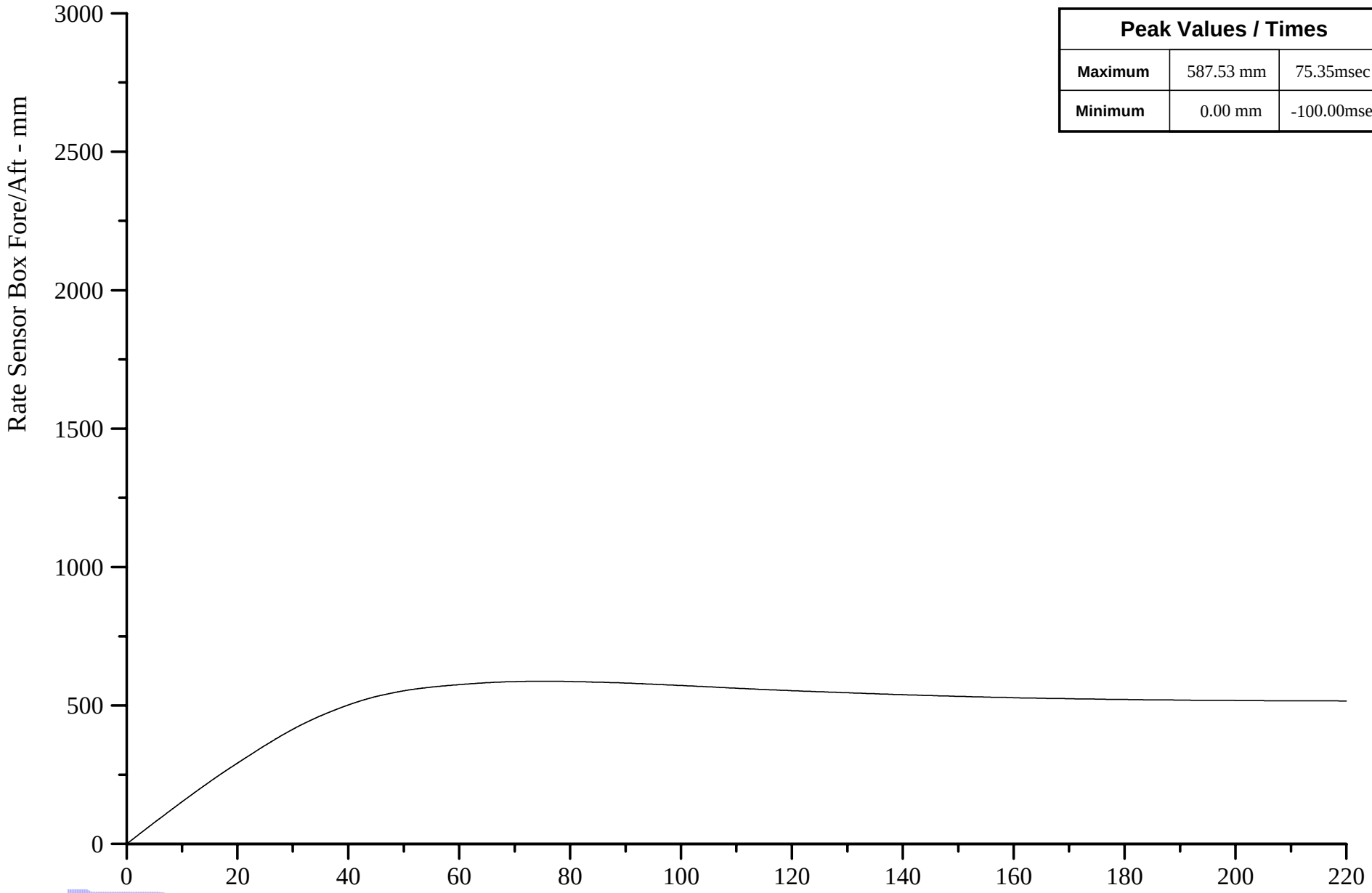
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	587.53 mm	75.35msec
Minimum	0.00 mm	-100.00msec



Tunnel CofG Crude Displacement

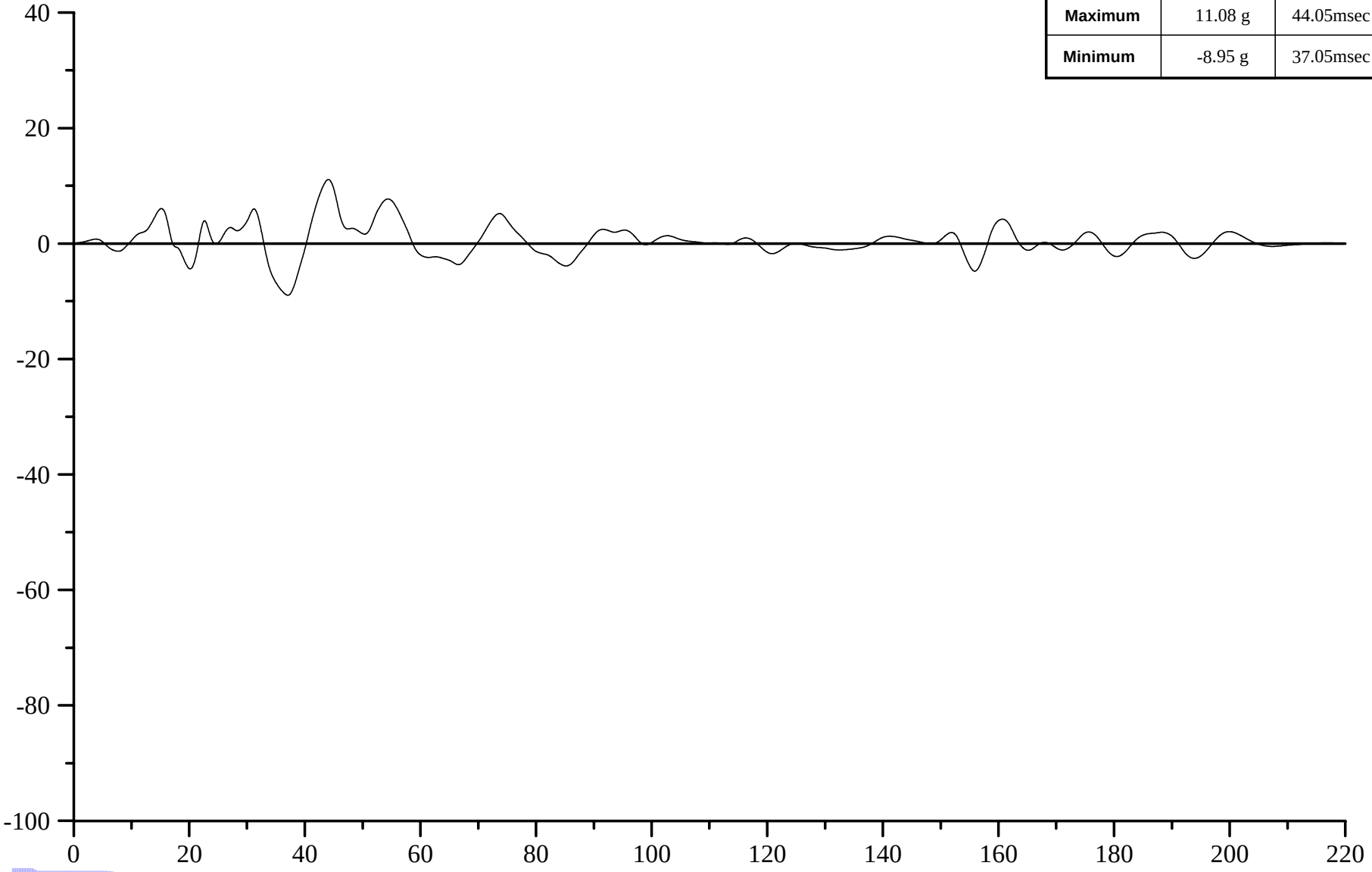
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	11.08 g	44.05msec
Minimum	-8.95 g	37.05msec



TRANSPORT RESEARCH LABORATORY

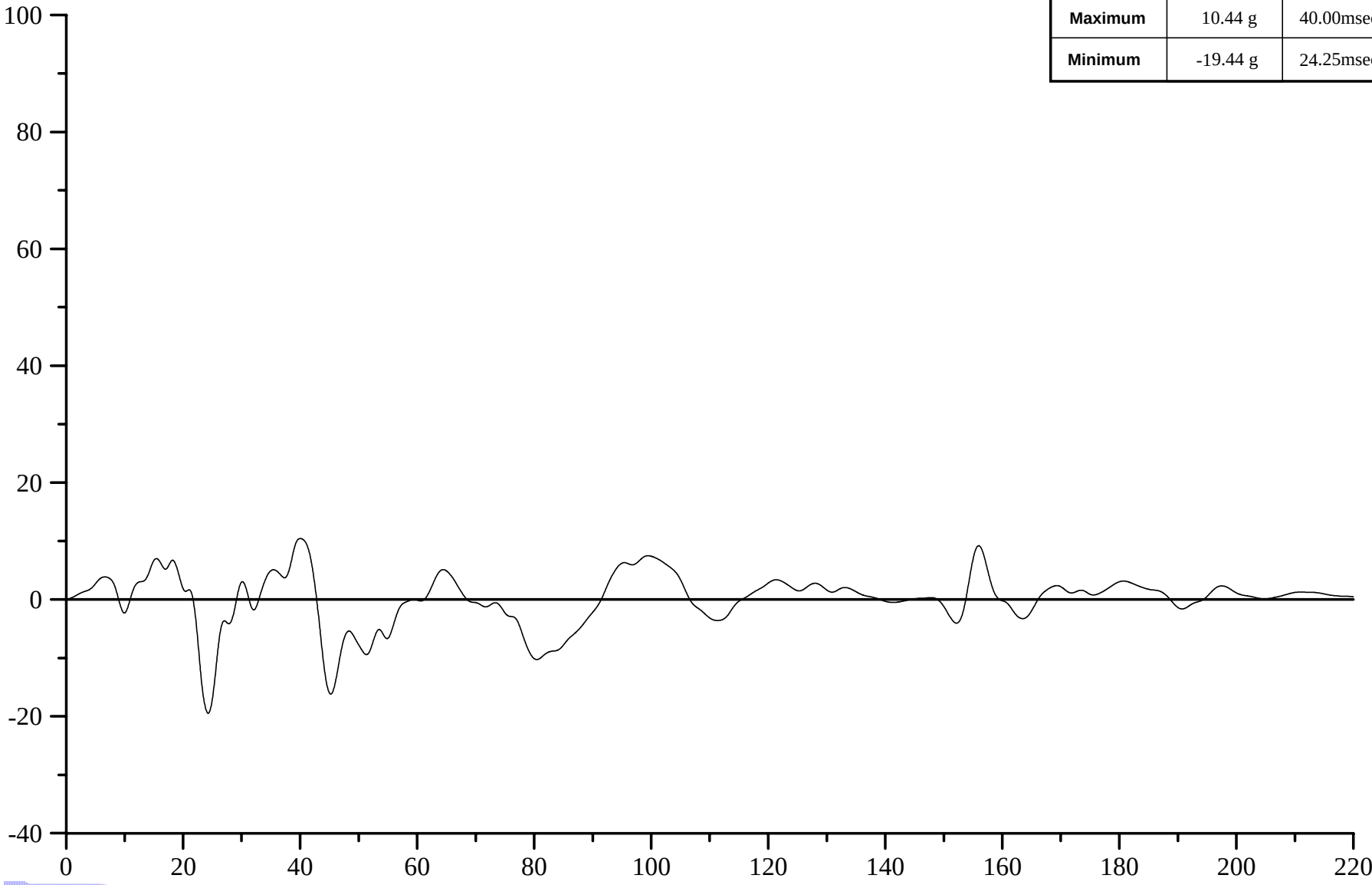
Processed
on 06.06.2000

Tunnel CofG Acceleration

Filtered at CFC_60

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	10.44 g	40.00msec
Minimum	-19.44 g	24.25msec



Tunnel CoG Acceleration

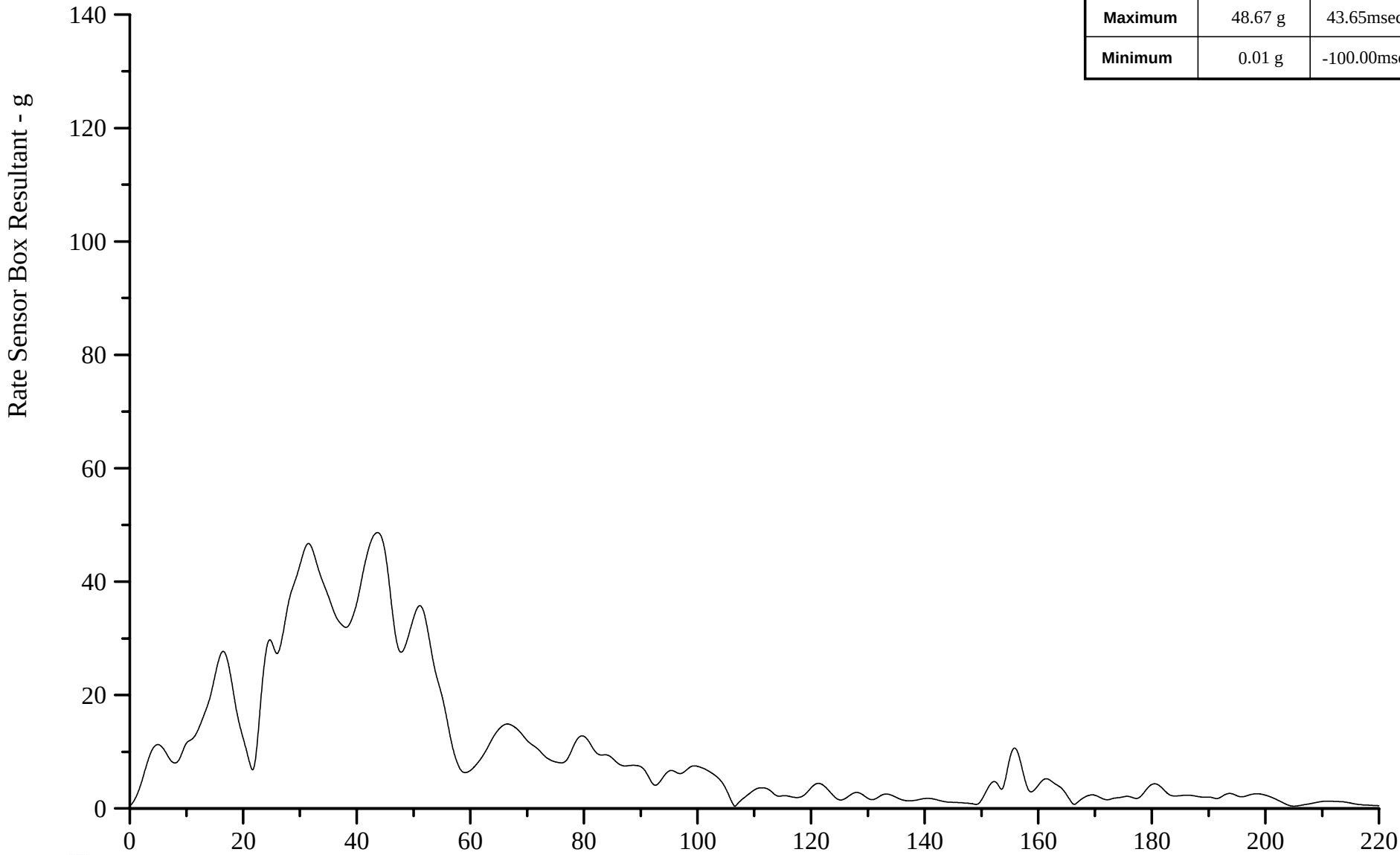
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	48.67 g	43.65msec
Minimum	0.01 g	-100.00msec



Tunnel CofG Acceleration

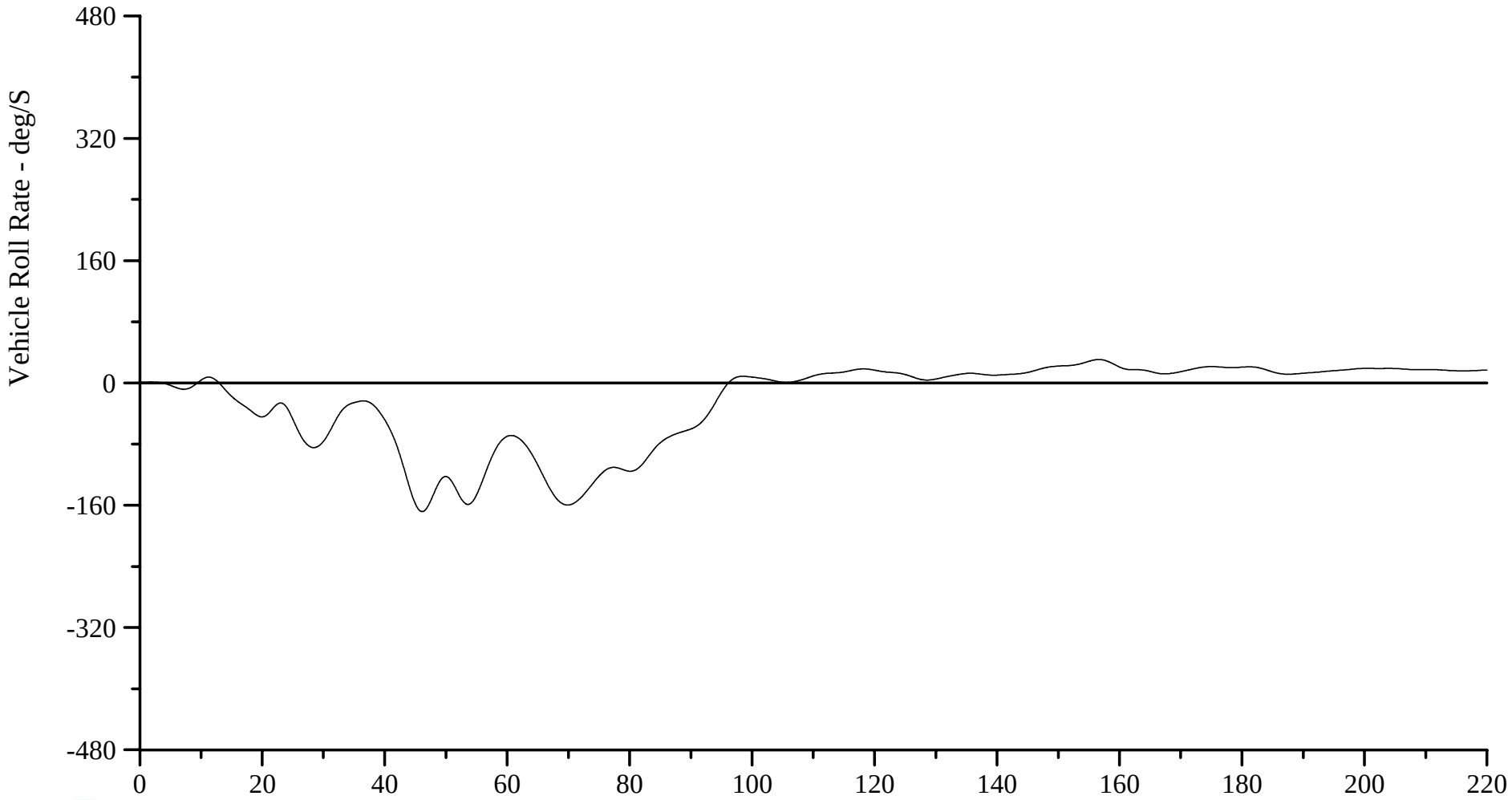
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	30.68 deg/S	156.60msec
Minimum	-168.22 deg/S	46.10msec



Vehicle Roll

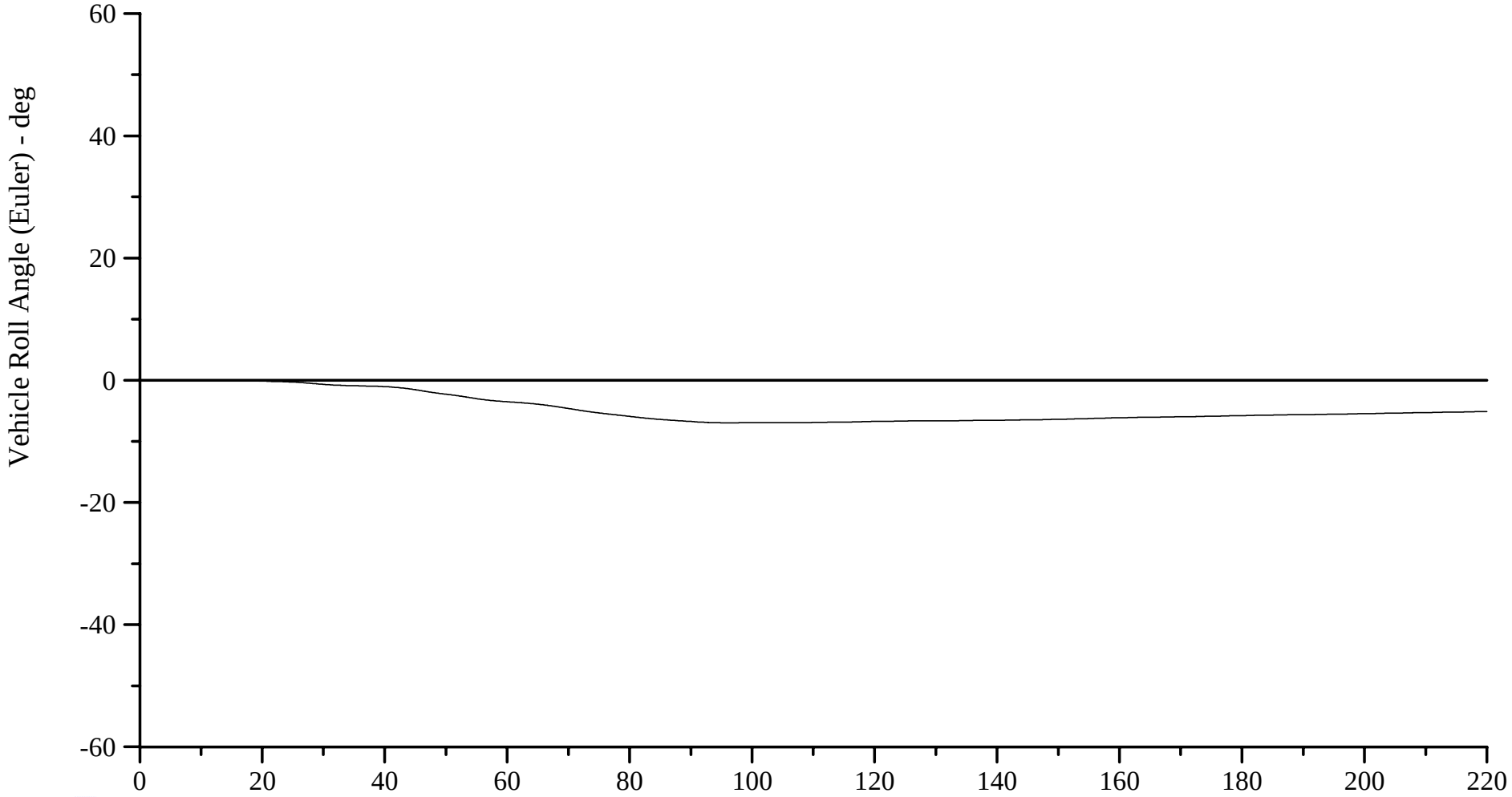
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.07 deg	3.65msec
Minimum	-6.96 deg	96.10msec



Vehicle Roll

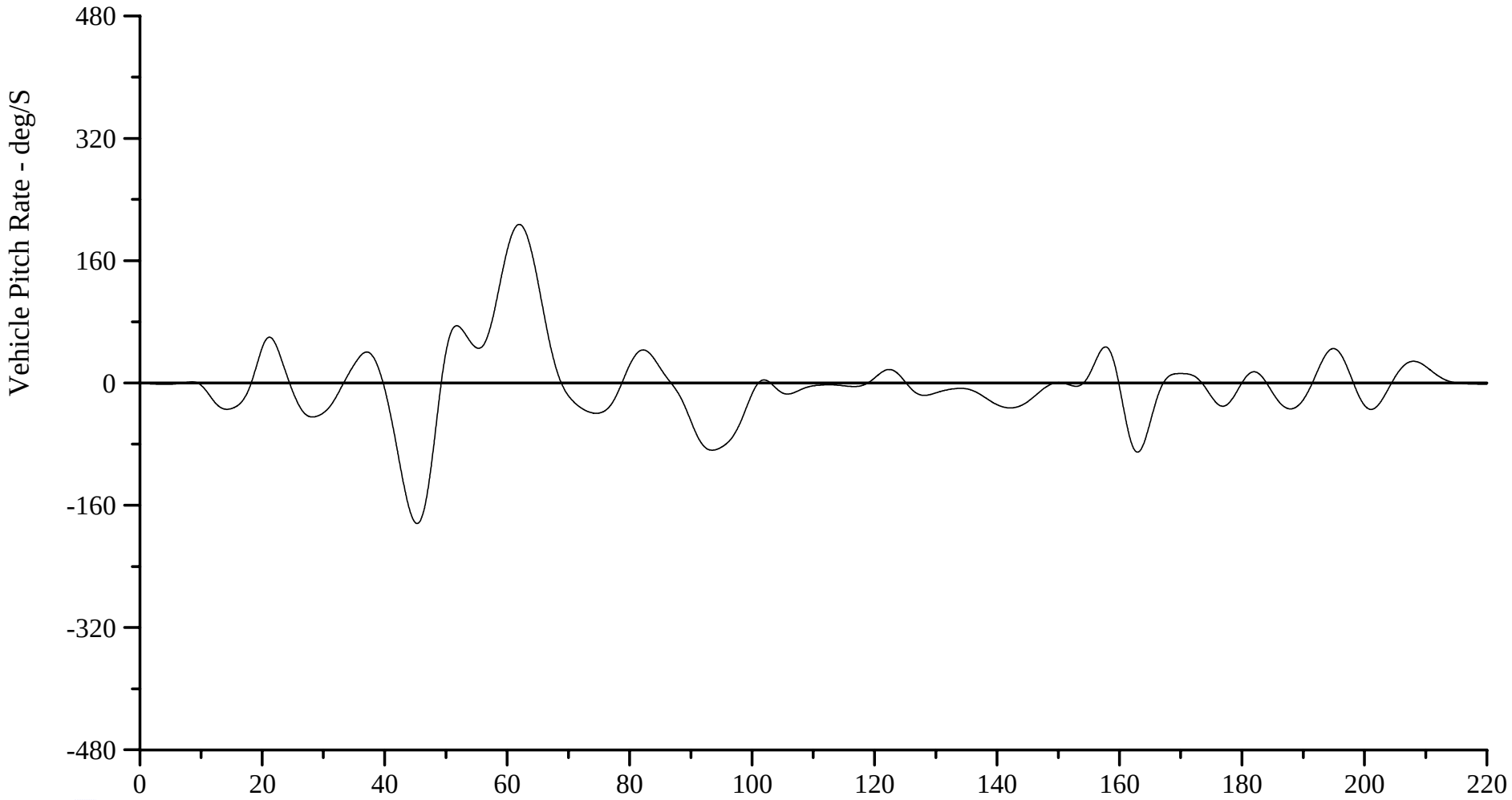
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	207.45 deg/S	61.95msec
Minimum	-183.85 deg/S	45.30msec

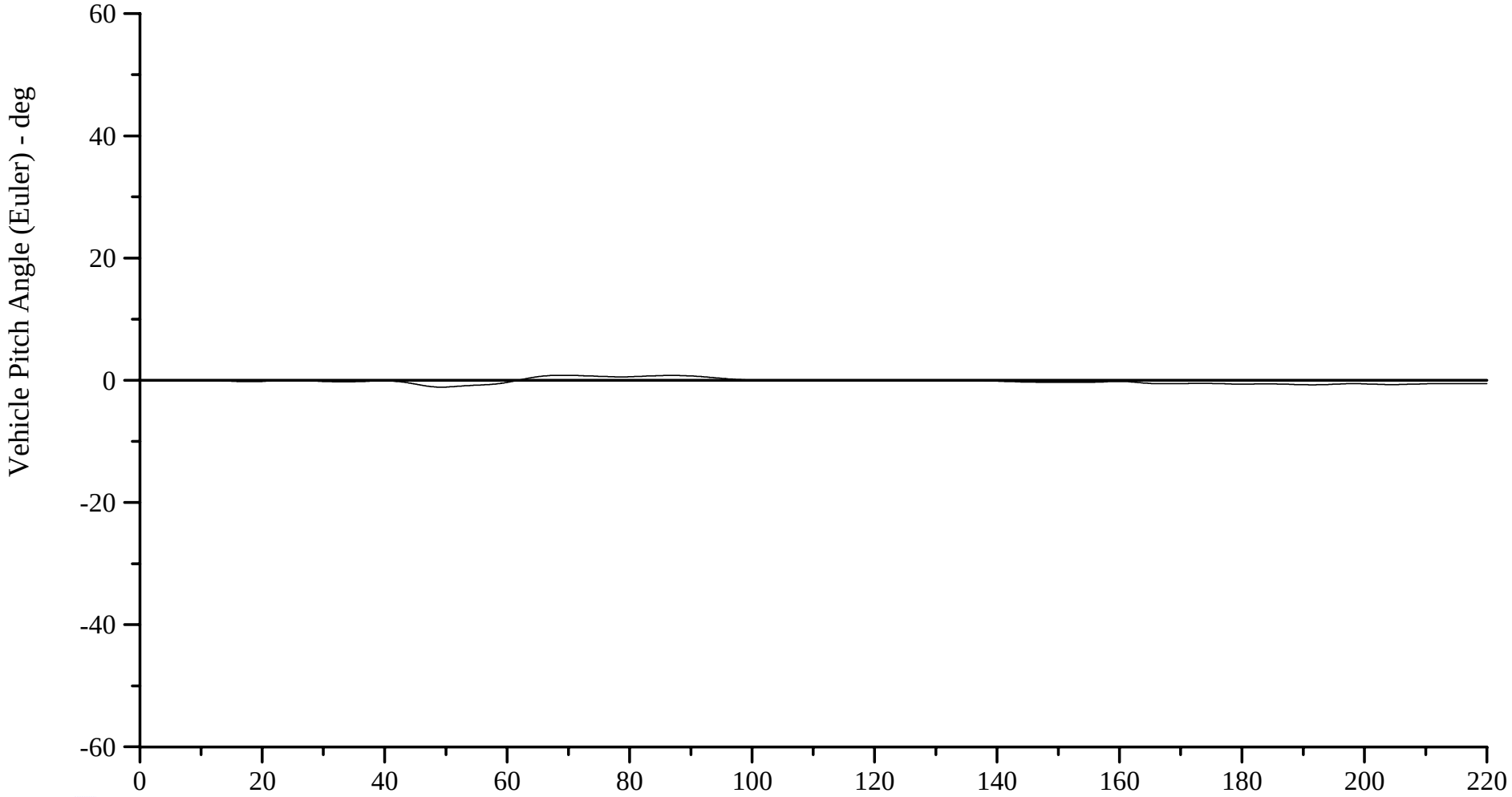


Vehicle Pitch
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY
Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.82 deg	68.90msec
Minimum	-1.13 deg	49.25msec



Vehicle Pitch

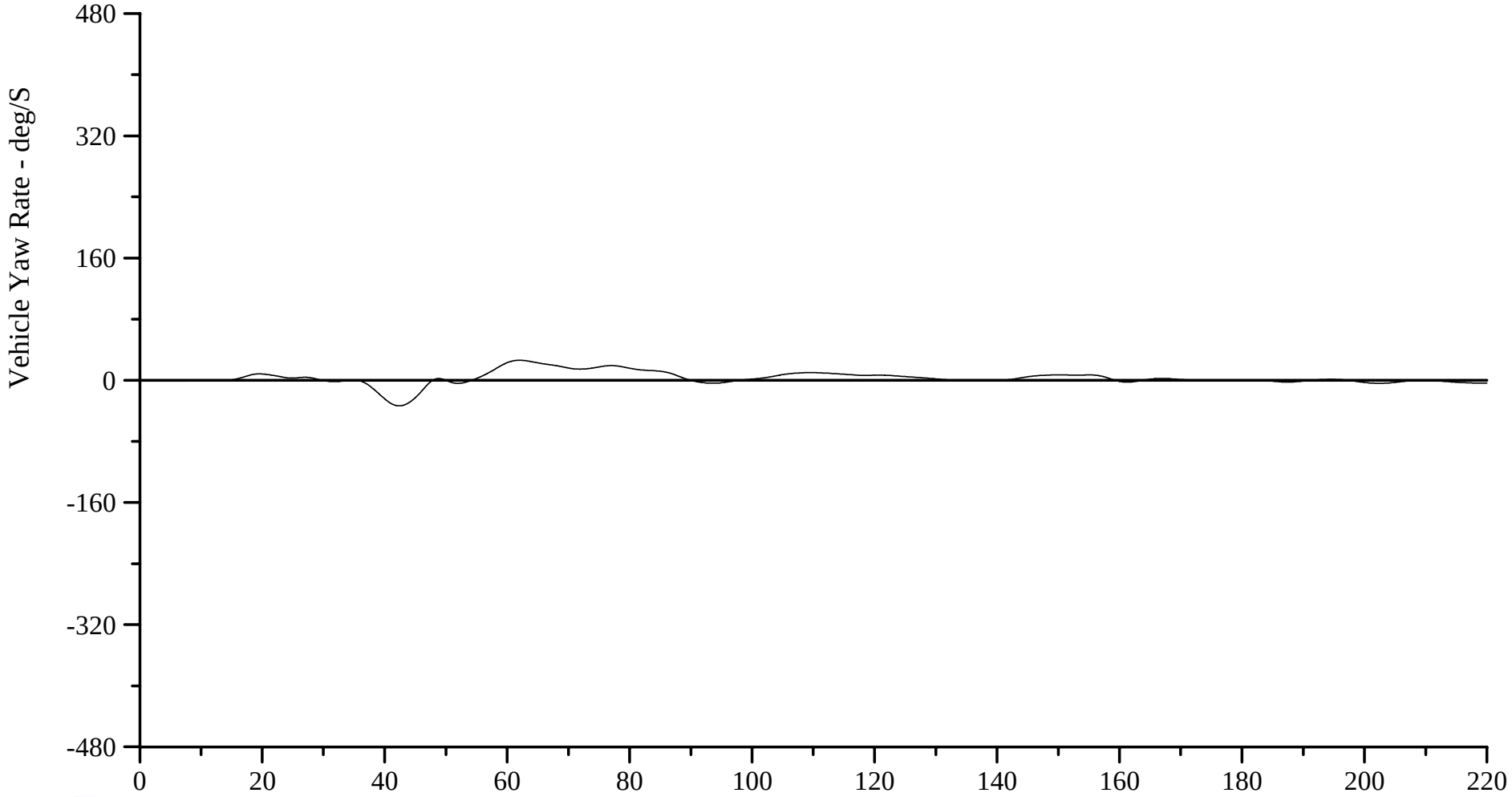
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	26.23 deg/S	62.05msec
Minimum	-33.47 deg/S	42.35msec



Vehicle Yaw

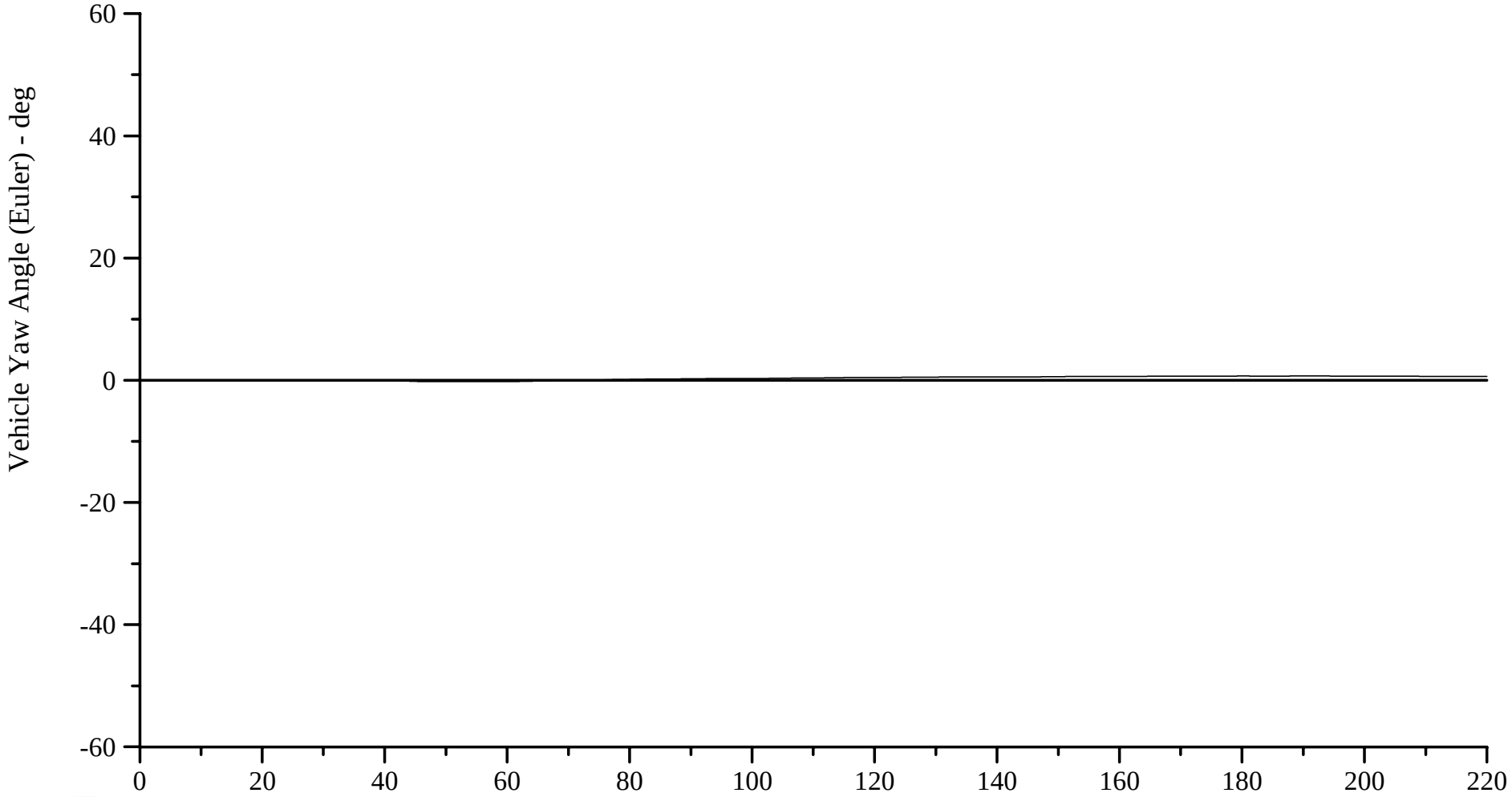
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.69 deg	191.70msec
Minimum	-0.24 deg	55.55msec



Vehicle Yaw

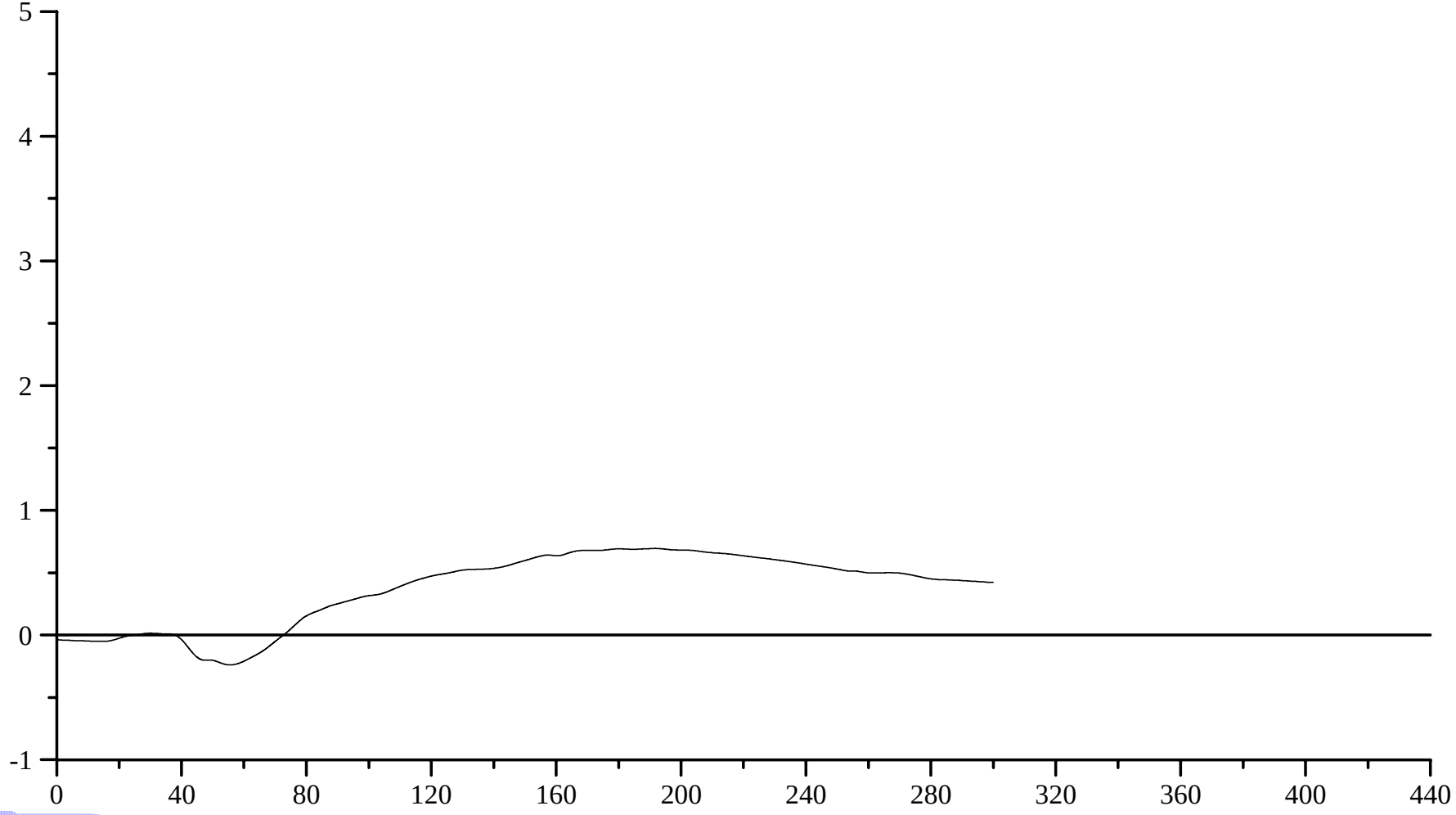
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.69 deg	191.70msec
Minimum	-0.24 deg	55.55msec



Vehicle Yaw

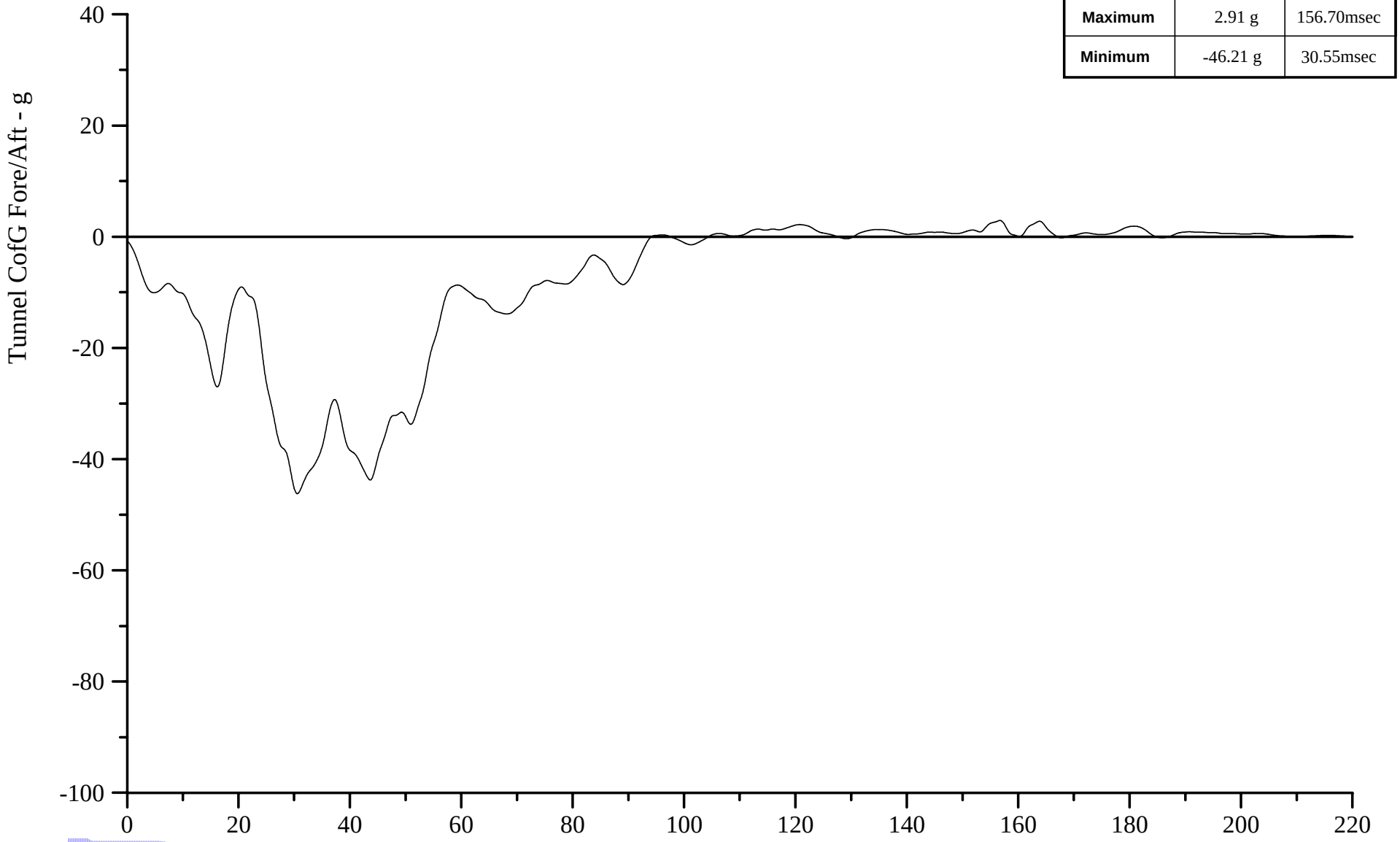
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	2.91 g	156.70msec
Minimum	-46.21 g	30.55msec



Tunnel Acceleration

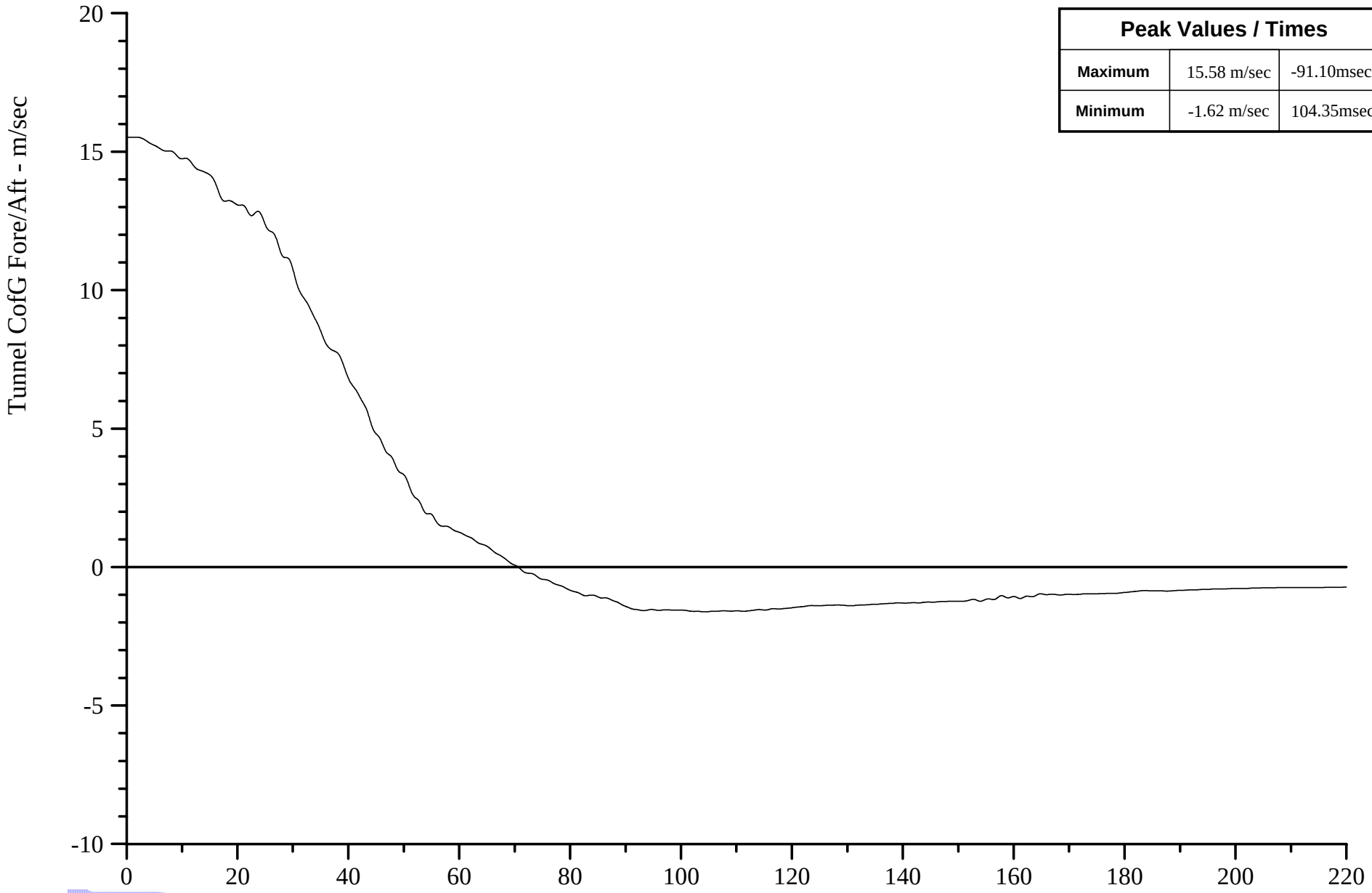
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.58 m/sec	-91.10msec
Minimum	-1.62 m/sec	104.35msec



Tunnel Crude Velocity

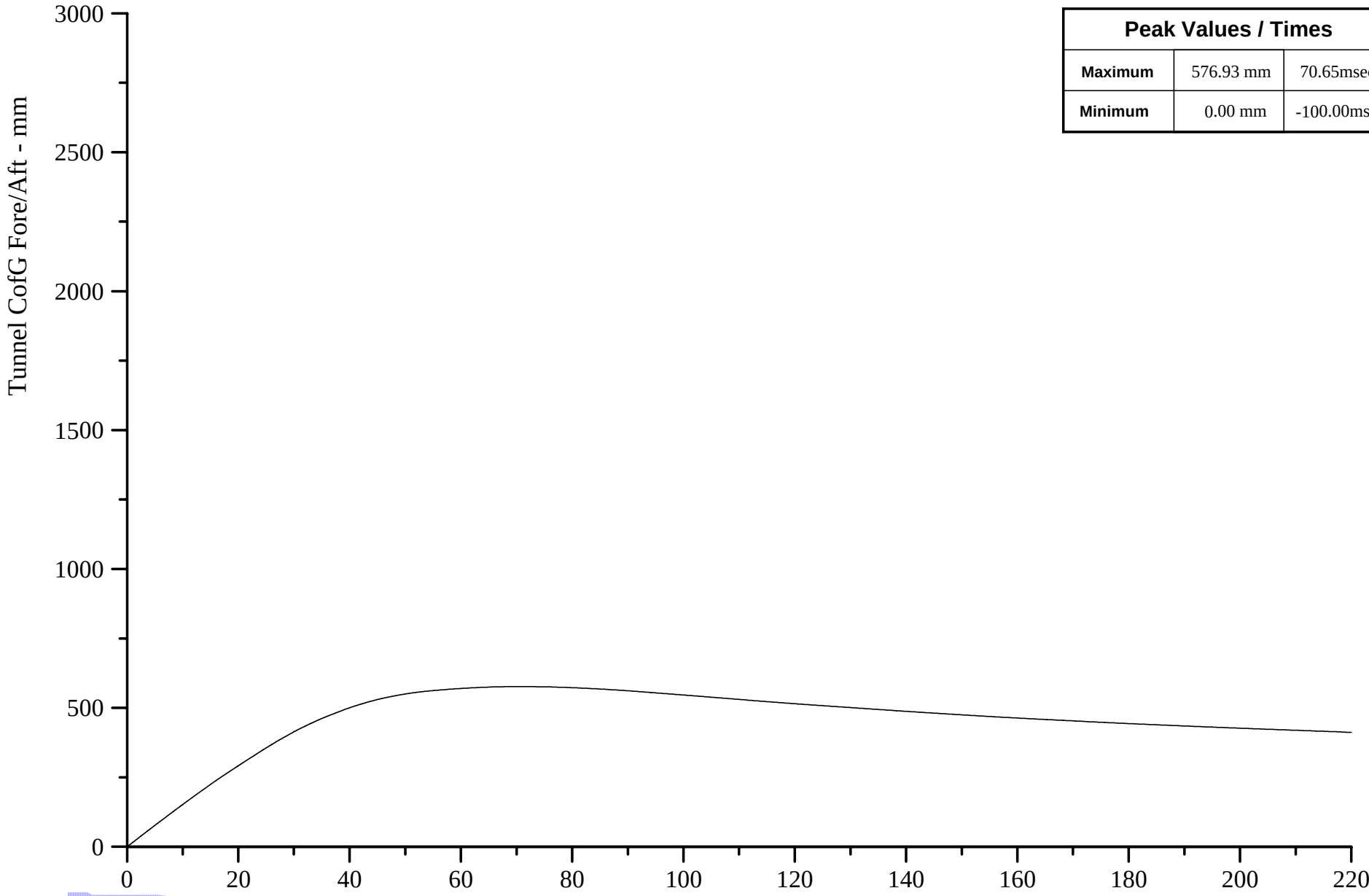
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	576.93 mm	70.65msec
Minimum	0.00 mm	-100.00msec



Tunnel Crude Displacement

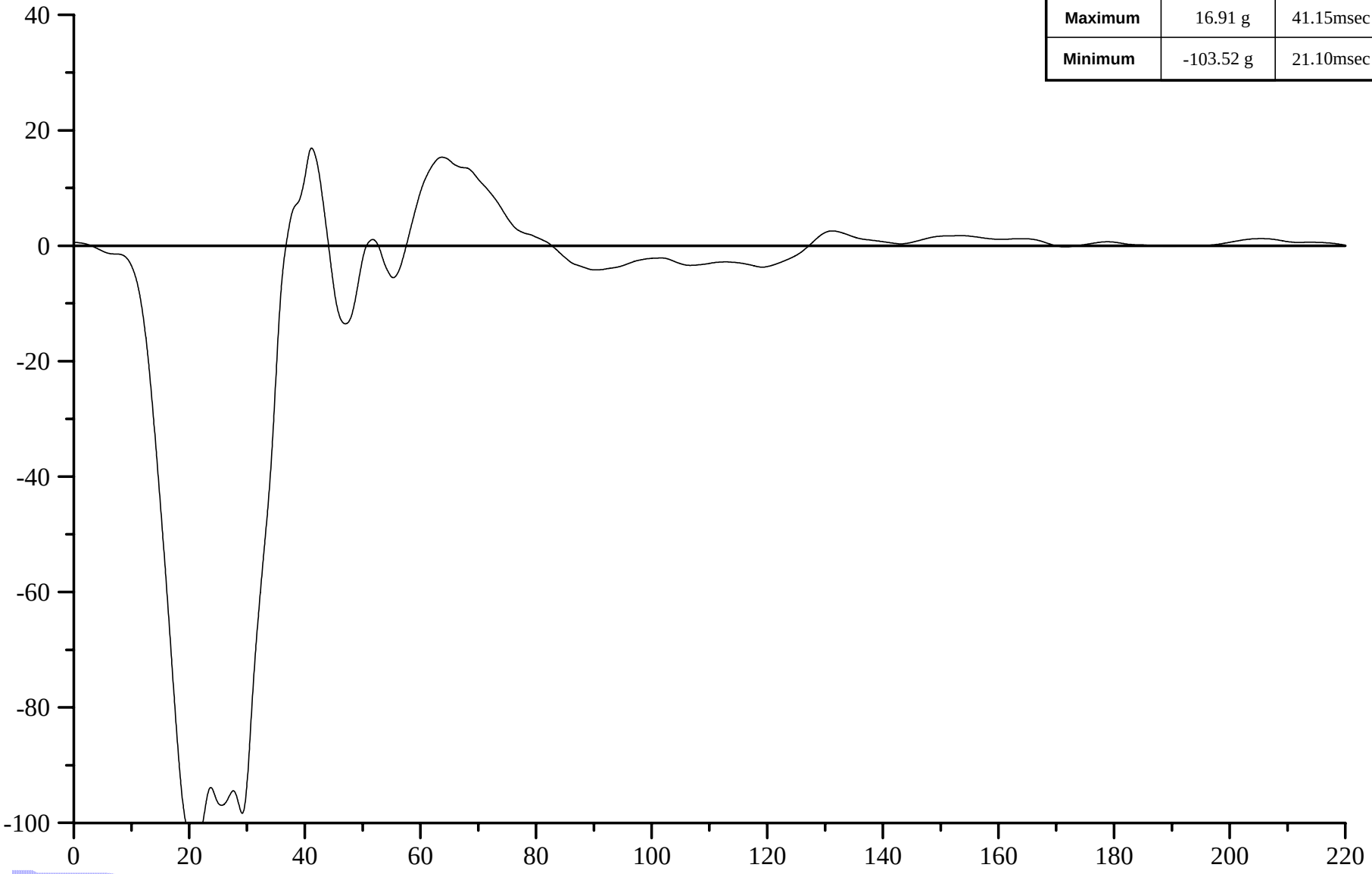
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	16.91 g	41.15msec
Minimum	-103.52 g	21.10msec



Engine Acceleration

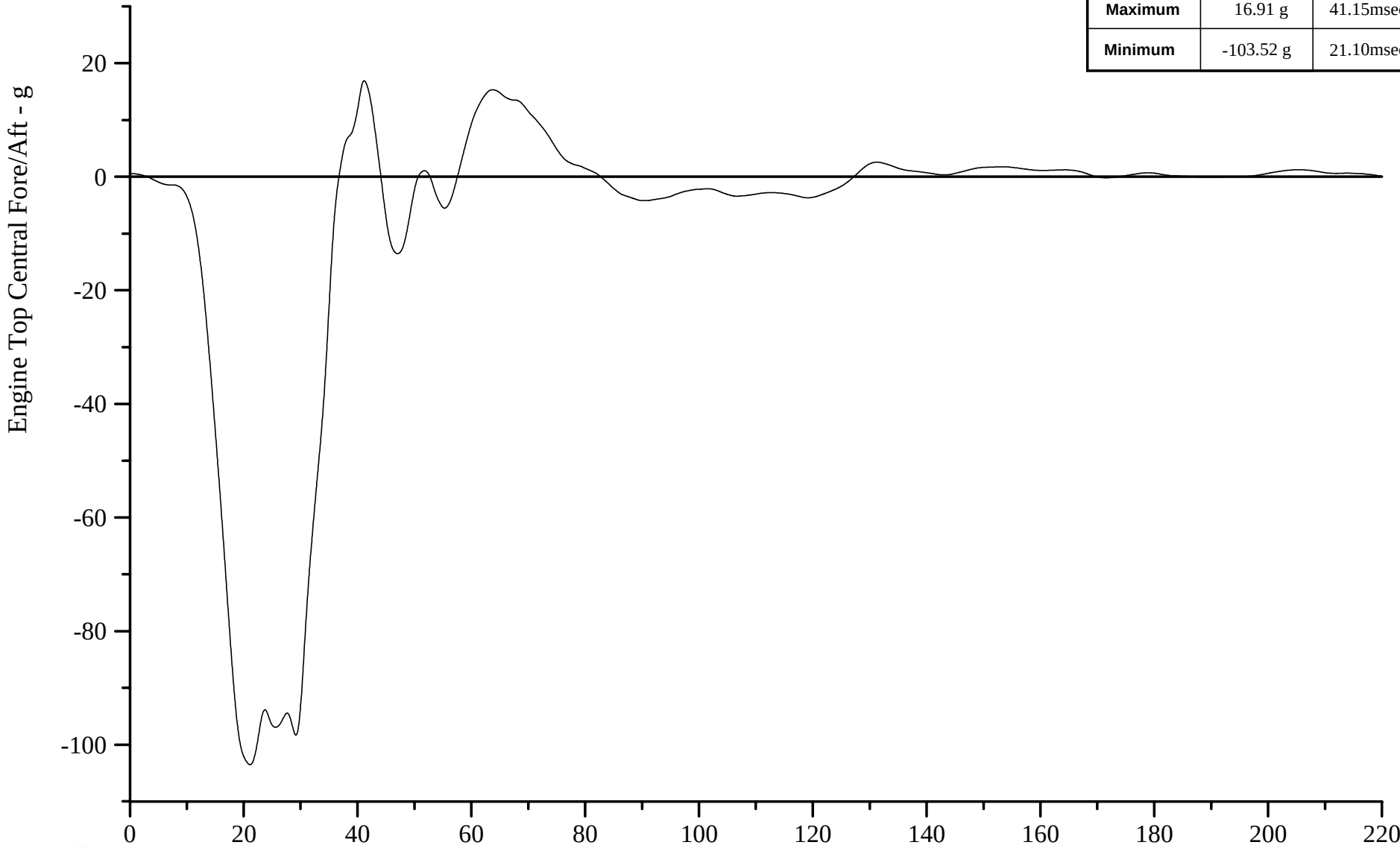
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	16.91 g	41.15msec
Minimum	-103.52 g	21.10msec



Engine Acceleration

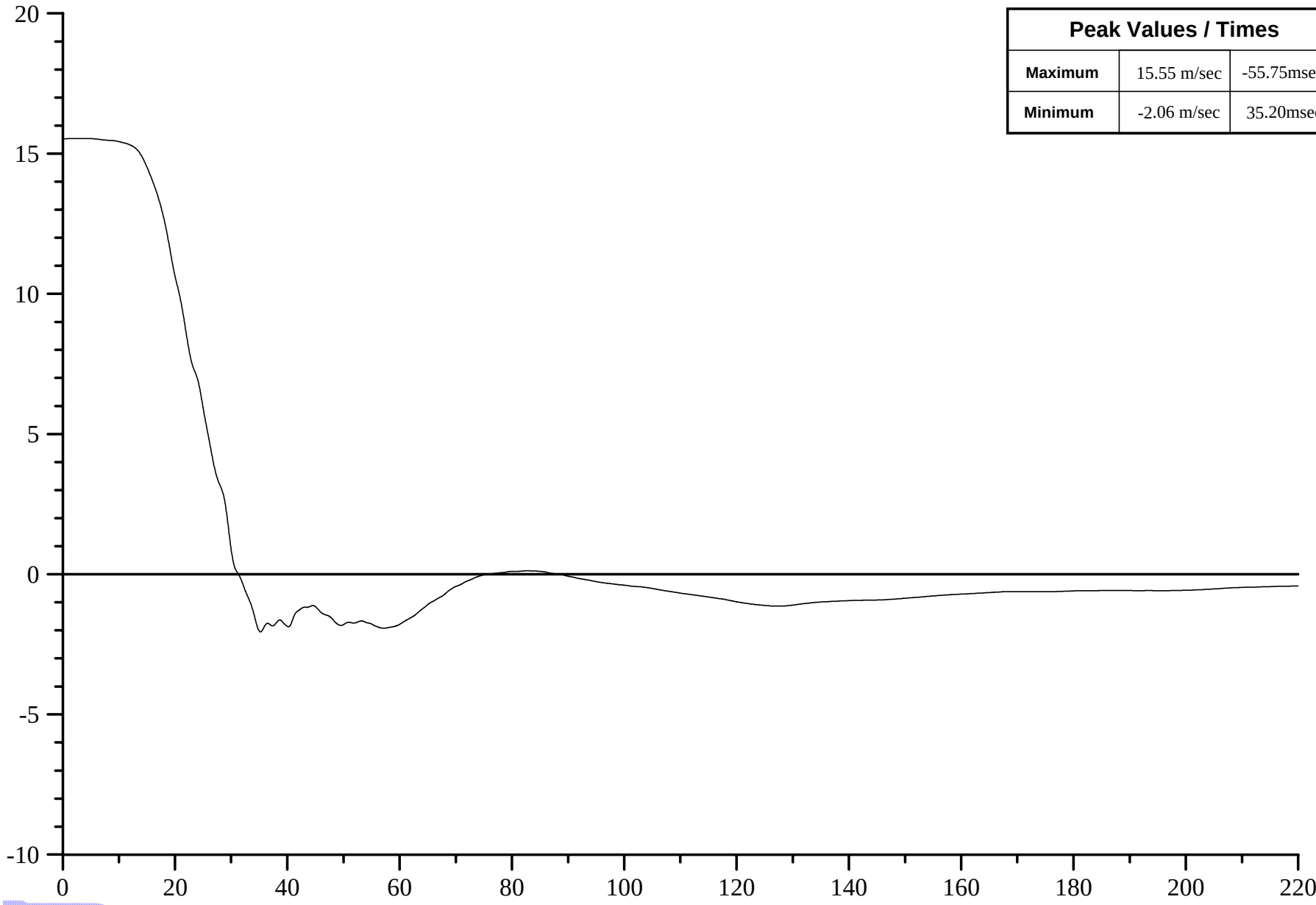
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.55 m/sec	-55.75msec
Minimum	-2.06 m/sec	35.20msec



Engine Crude Velocity

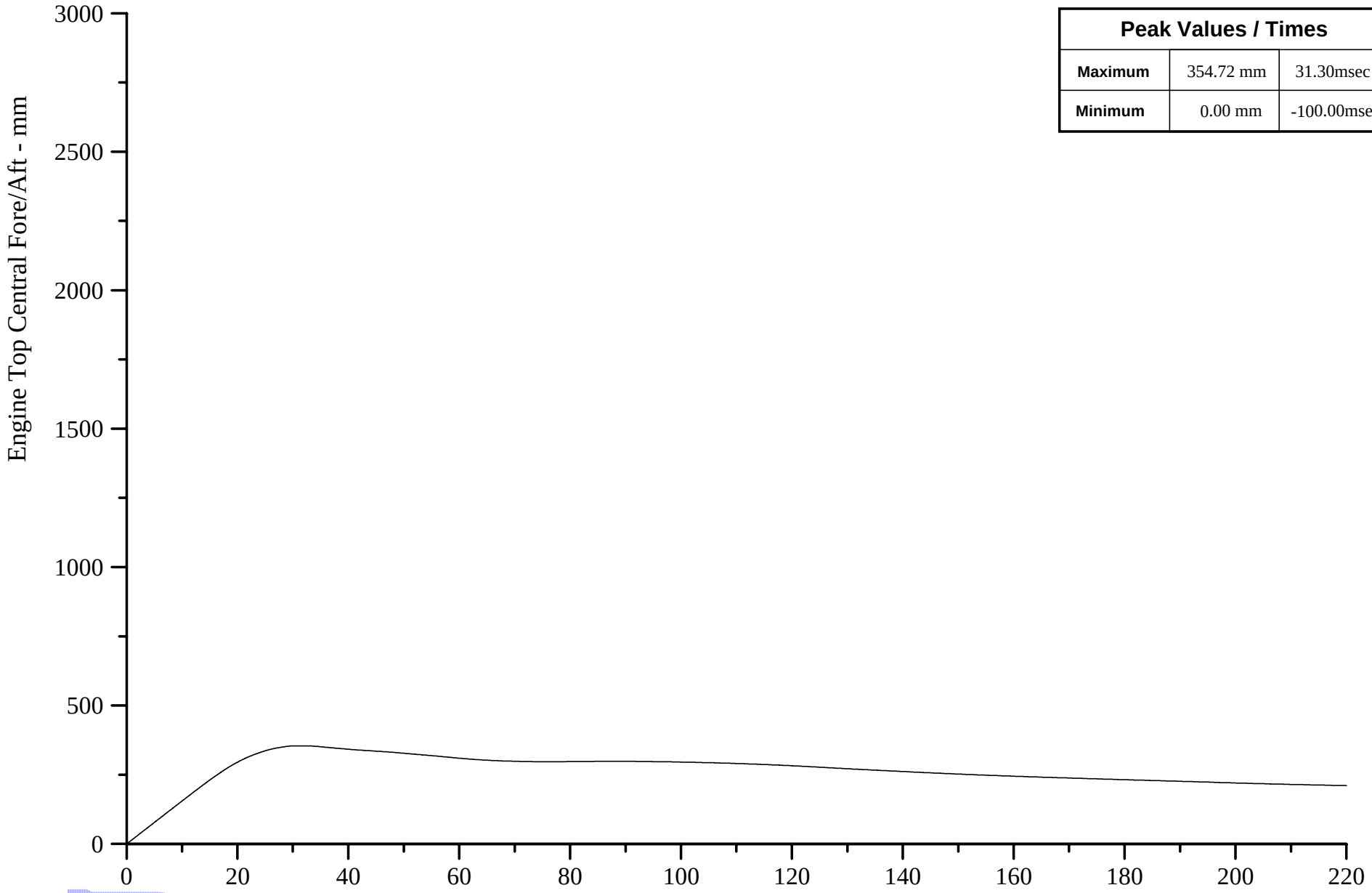
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	354.72 mm	31.30msec
Minimum	0.00 mm	-100.00msec



Engine Crude Displacement

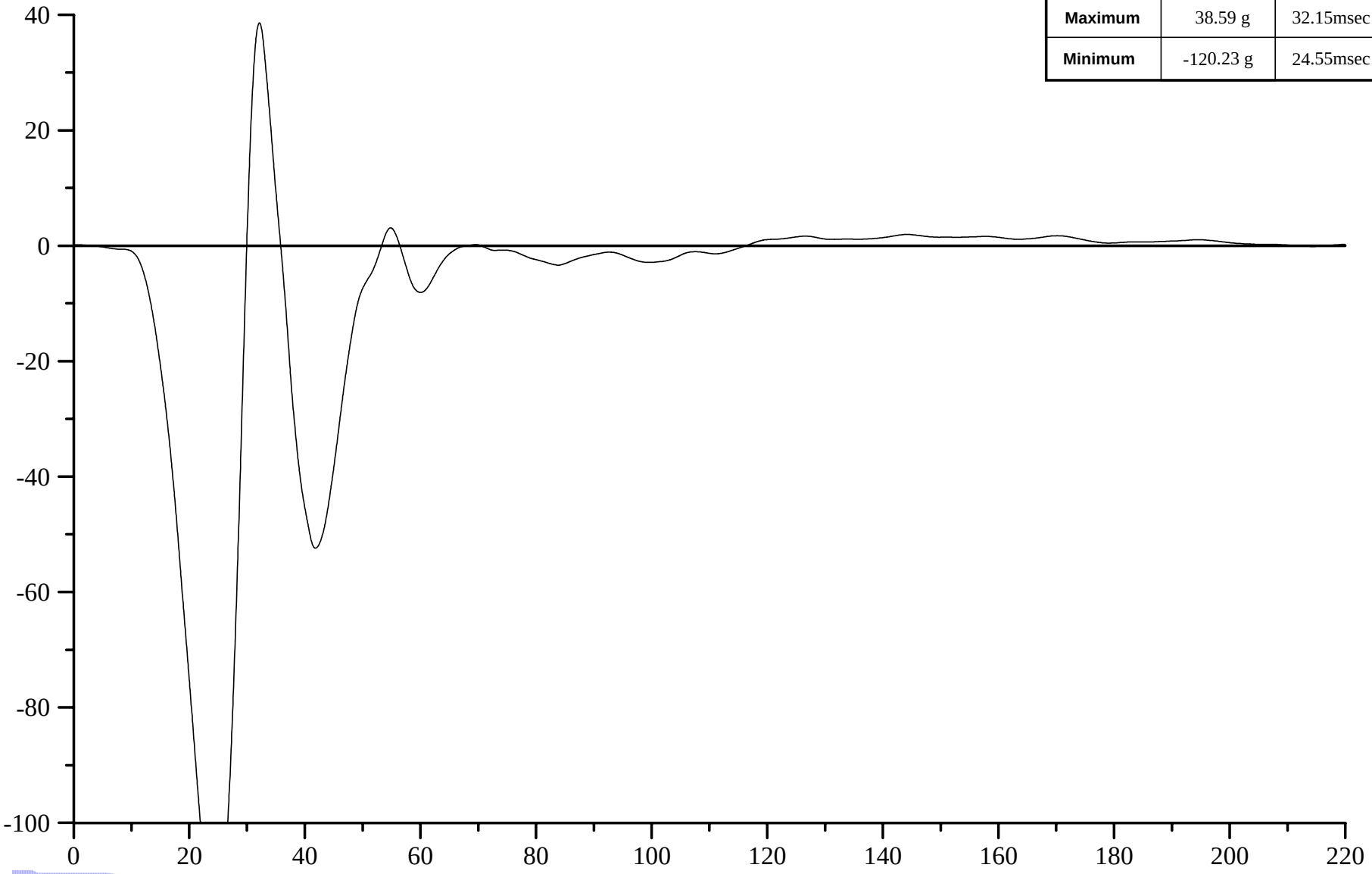
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	38.59 g	32.15msec
Minimum	-120.23 g	24.55msec



Engine Acceleration

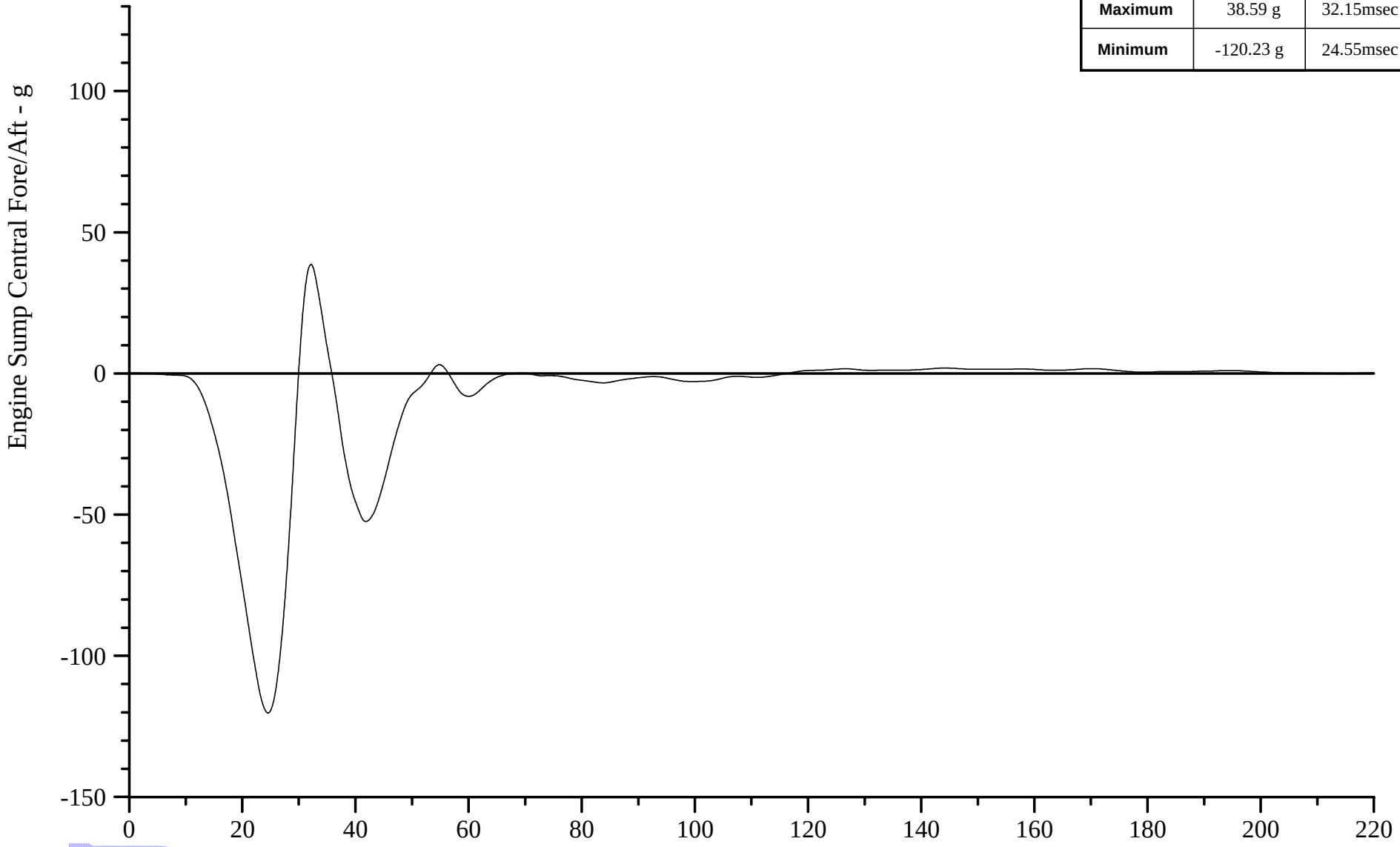
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	38.59 g	32.15msec
Minimum	-120.23 g	24.55msec



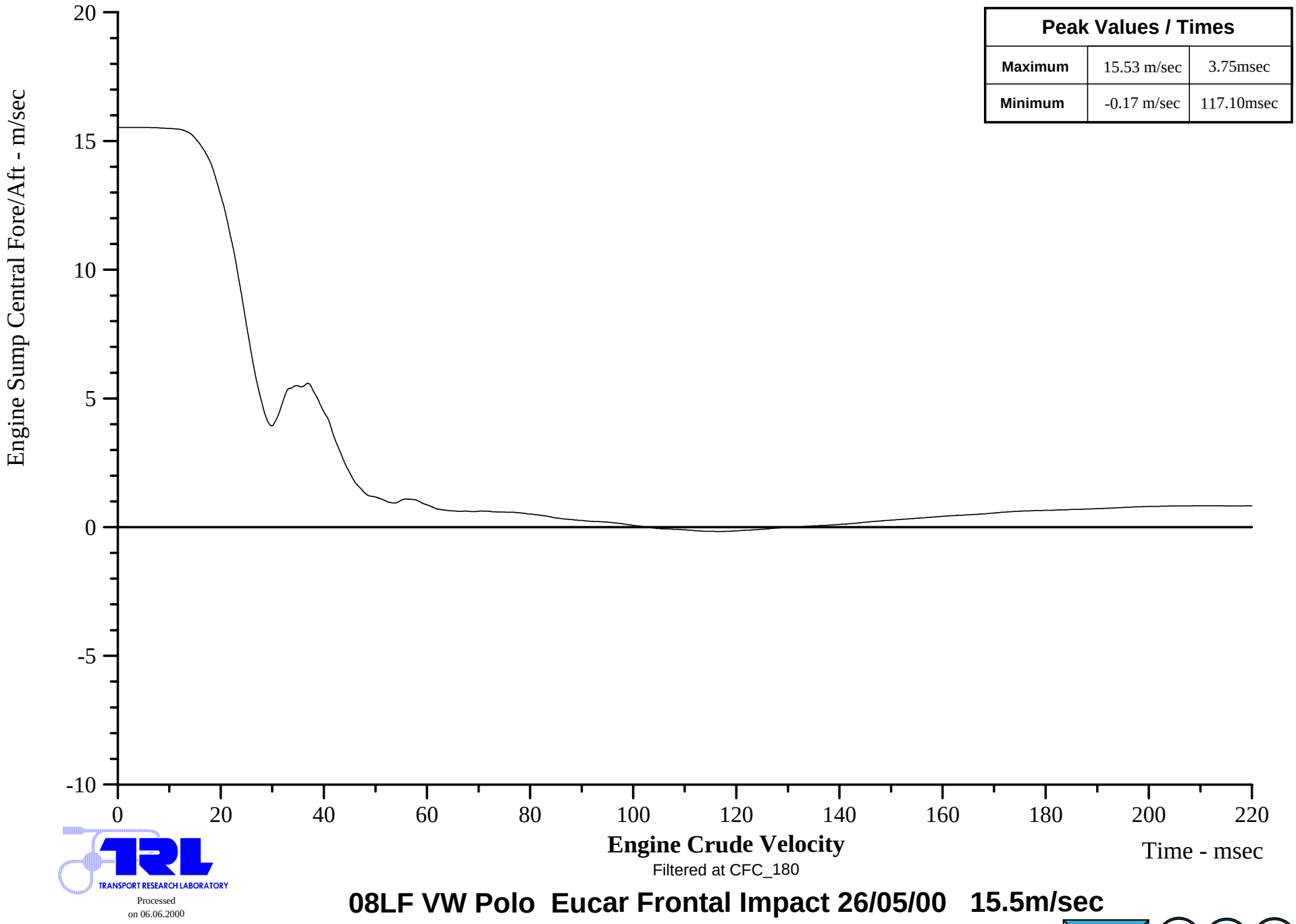
Engine Acceleration

Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



Peak Values / Times		
Maximum	15.53 m/sec	3.75msec
Minimum	-0.17 m/sec	117.10msec

TRANSPORT RESEARCH LABORATORY

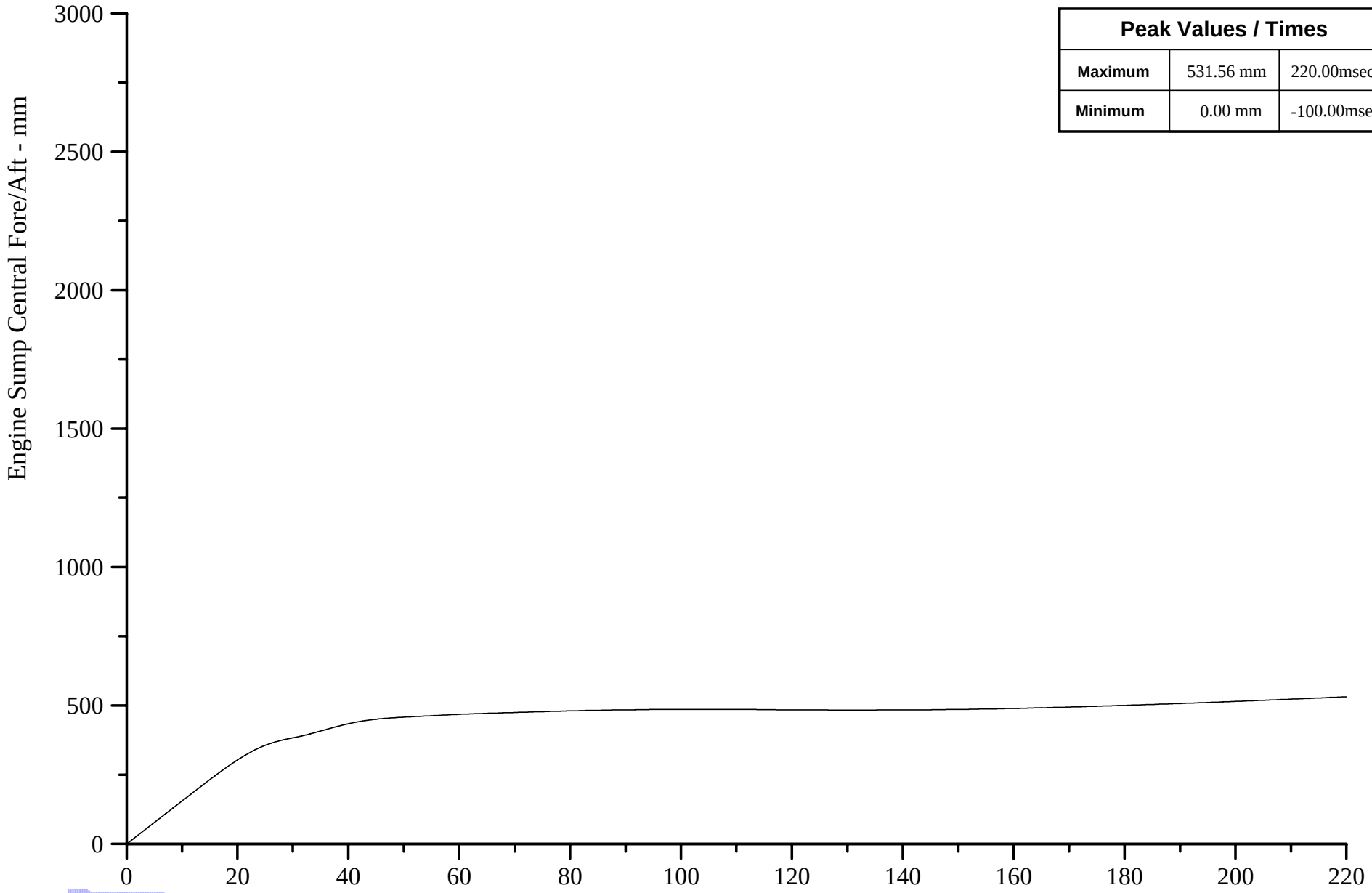
Processed
on 06.06.2000

Engine Crude Velocity

Filtered at CFC_180

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	531.56 mm	220.00msec
Minimum	0.00 mm	-100.00msec



Engine Crude Displacement

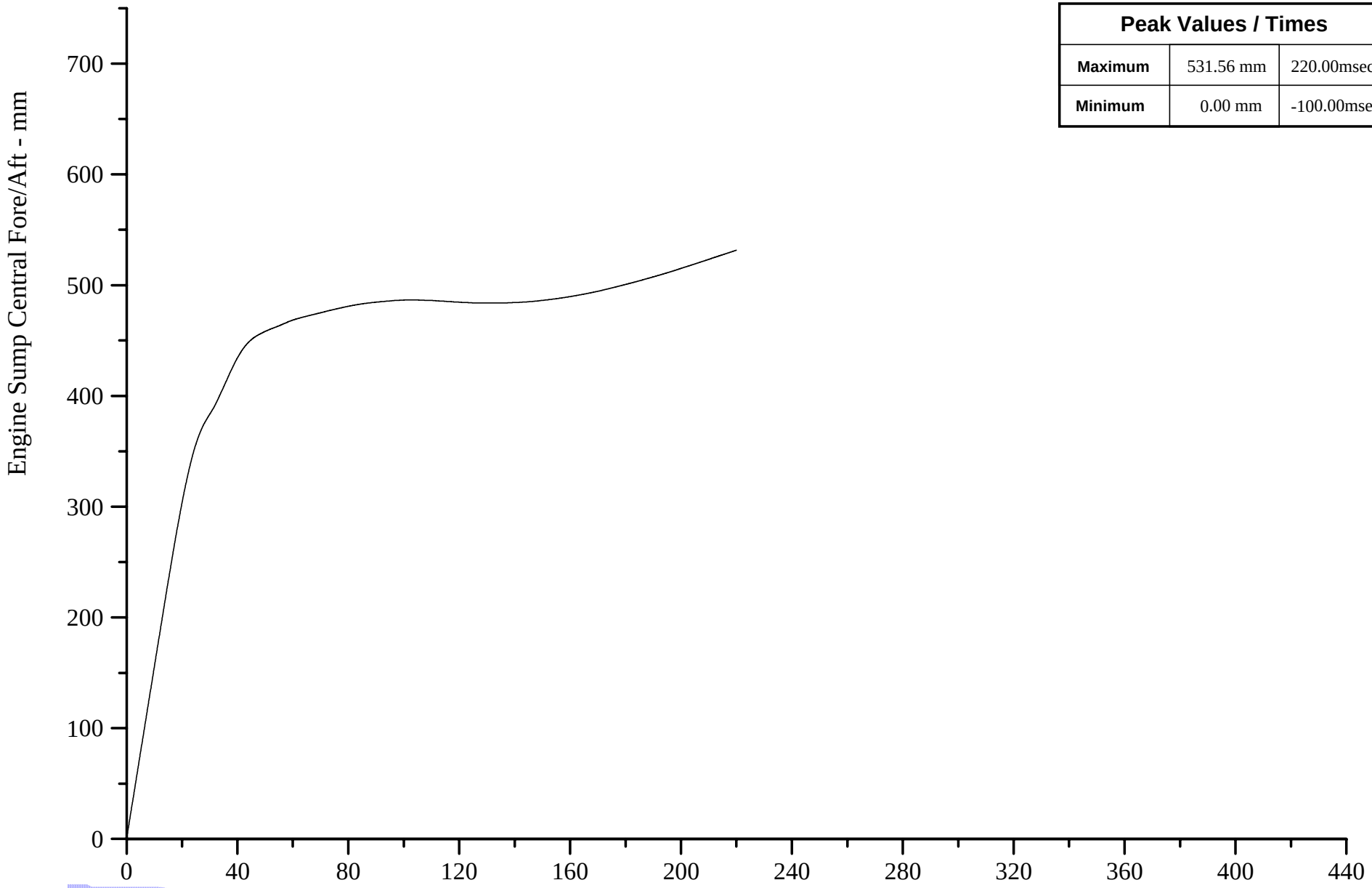
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	531.56 mm	220.00msec
Minimum	0.00 mm	-100.00msec



Engine Crude Displacement

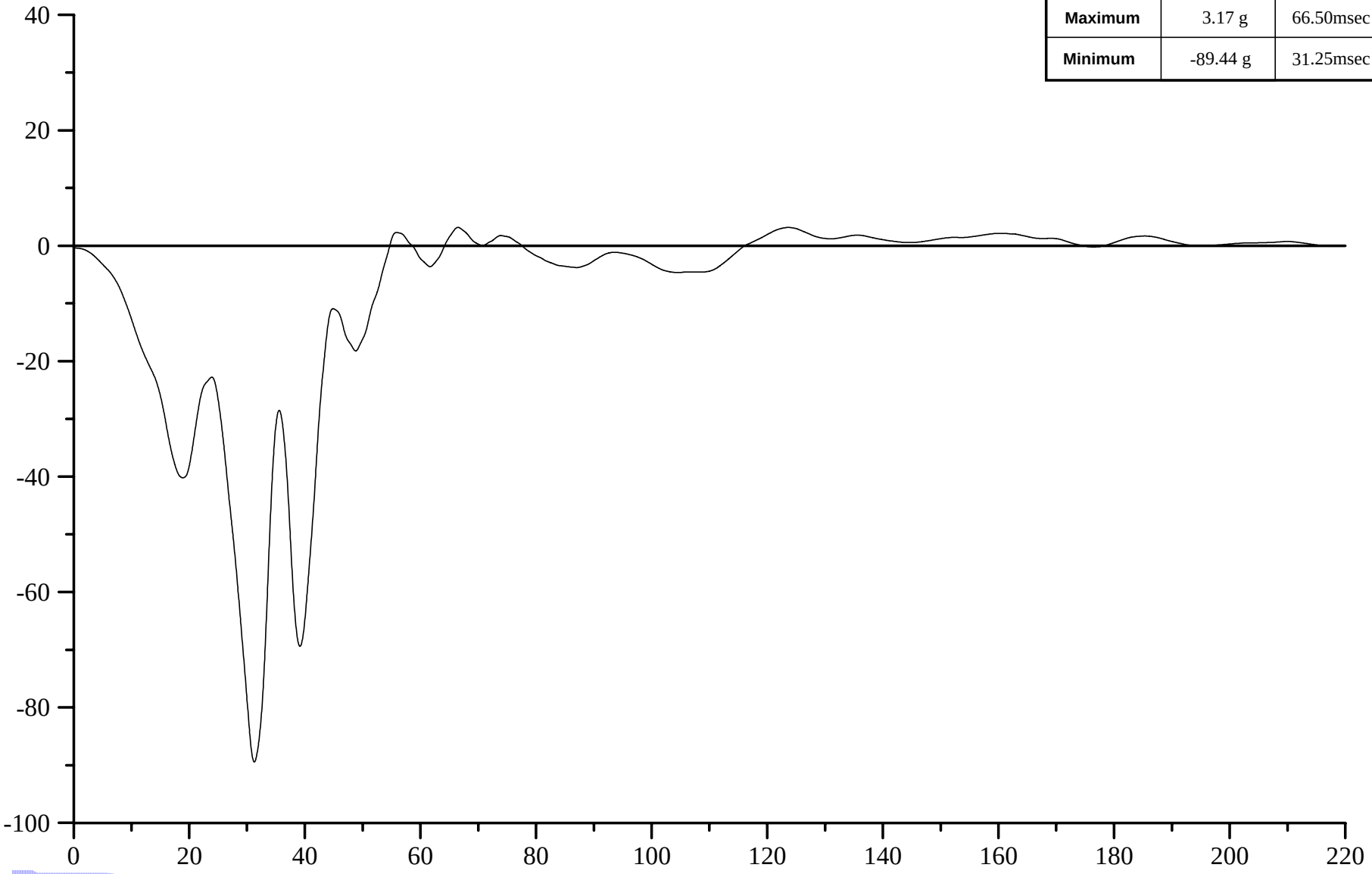
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	3.17 g	66.50msec
Minimum	-89.44 g	31.25msec



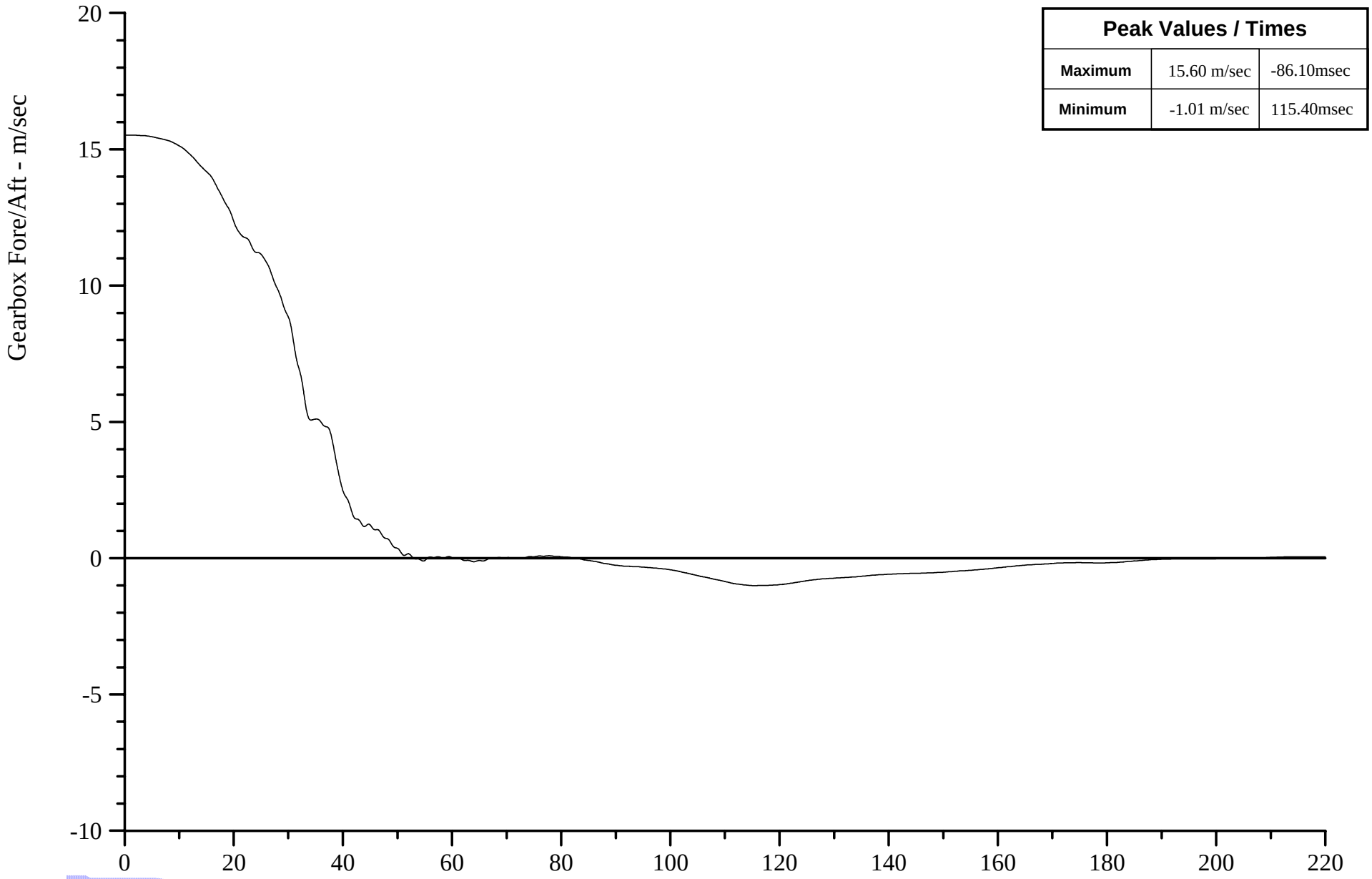
Gearbox Acceleration

Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



Peak Values / Times		
Maximum	15.60 m/sec	-86.10msec
Minimum	-1.01 m/sec	115.40msec

TRANSPORT RESEARCH LABORATORY

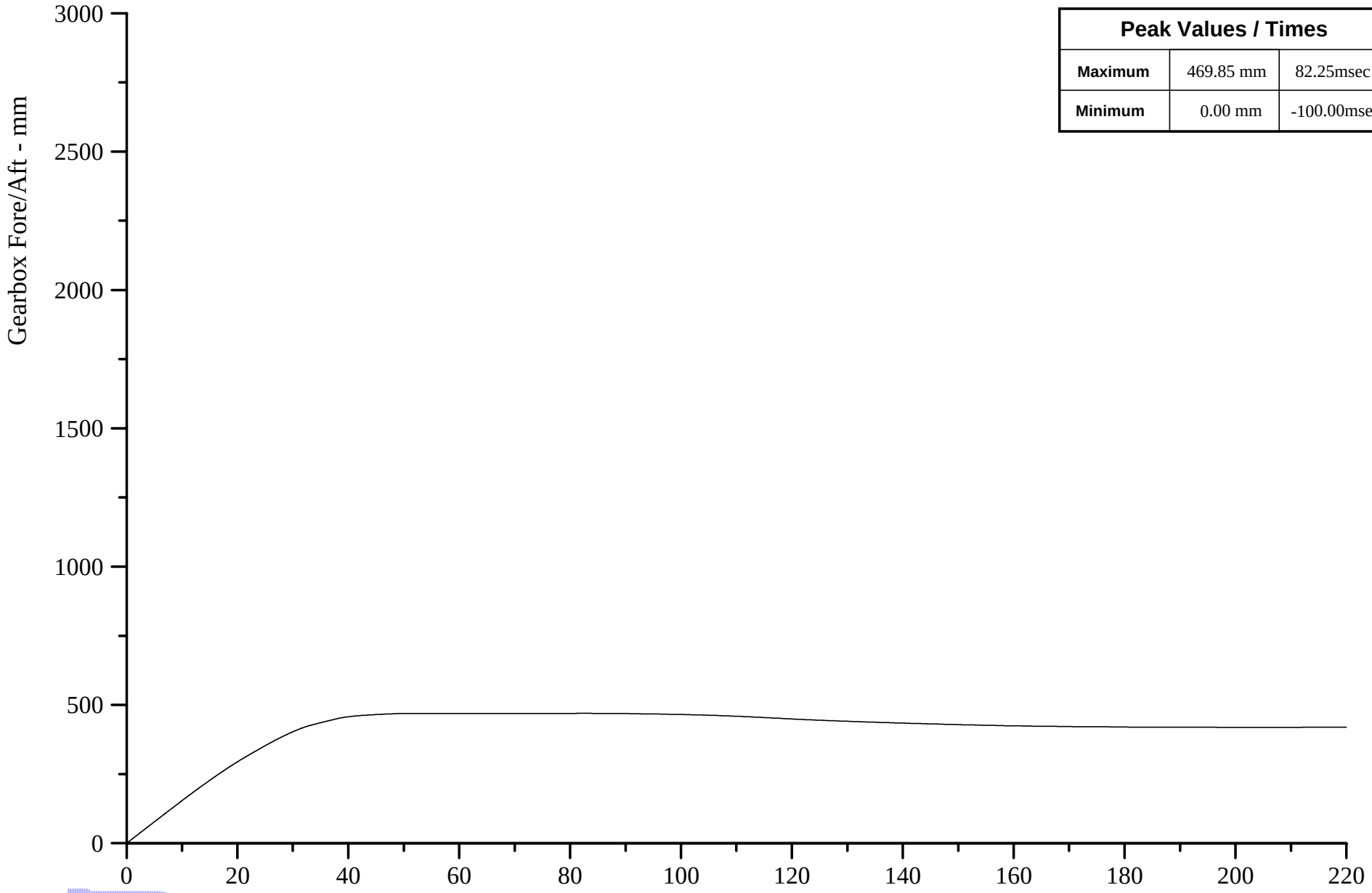
Processed
on 06.06.2000

Gearbox Crude Velocity

Filtered at CFC_180

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	469.85 mm	82.25msec
Minimum	0.00 mm	-100.00msec



Gearbox Crude Displacement

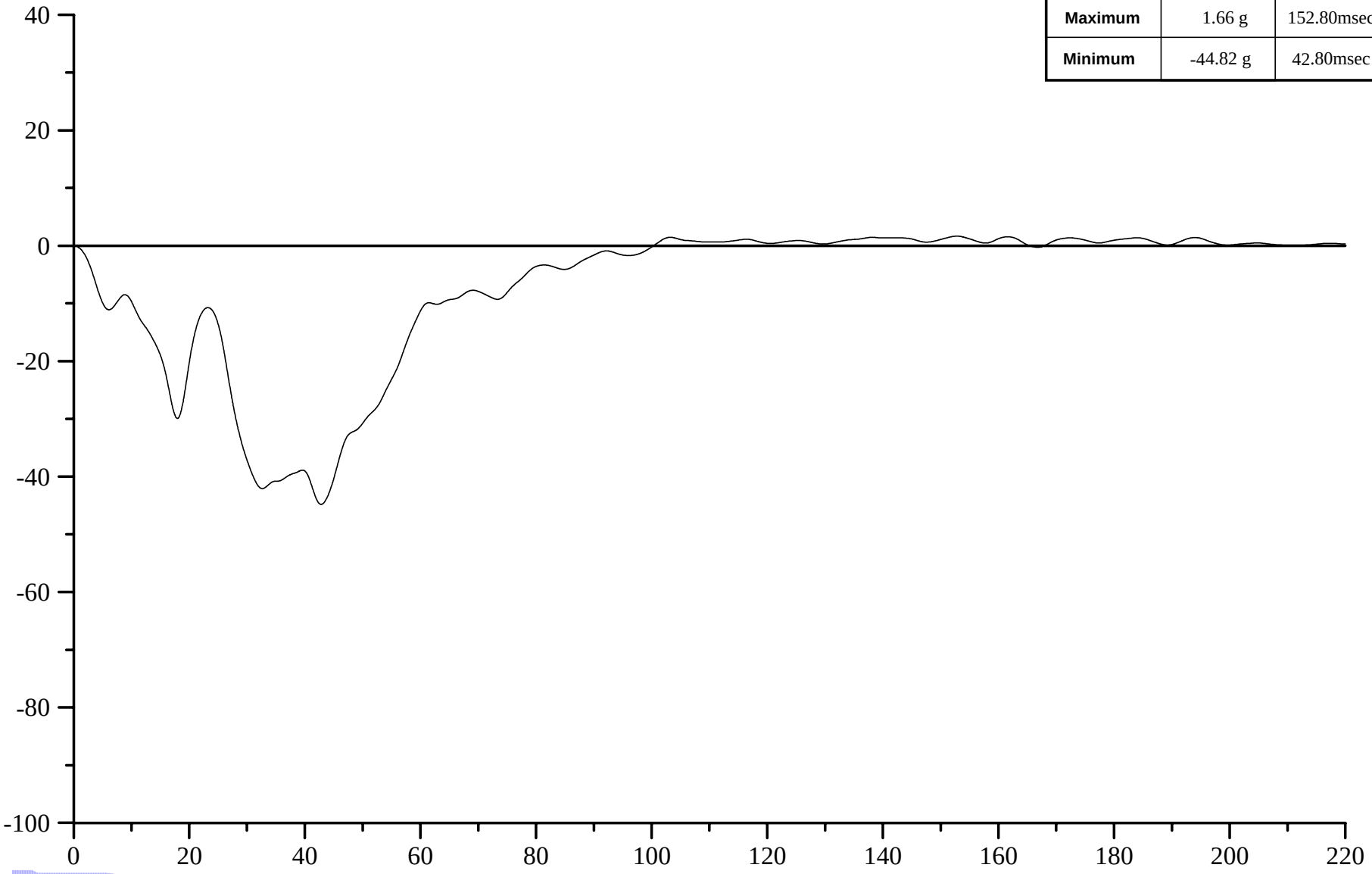
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.66 g	152.80msec
Minimum	-44.82 g	42.80msec



Rear Cross Member Acceleration

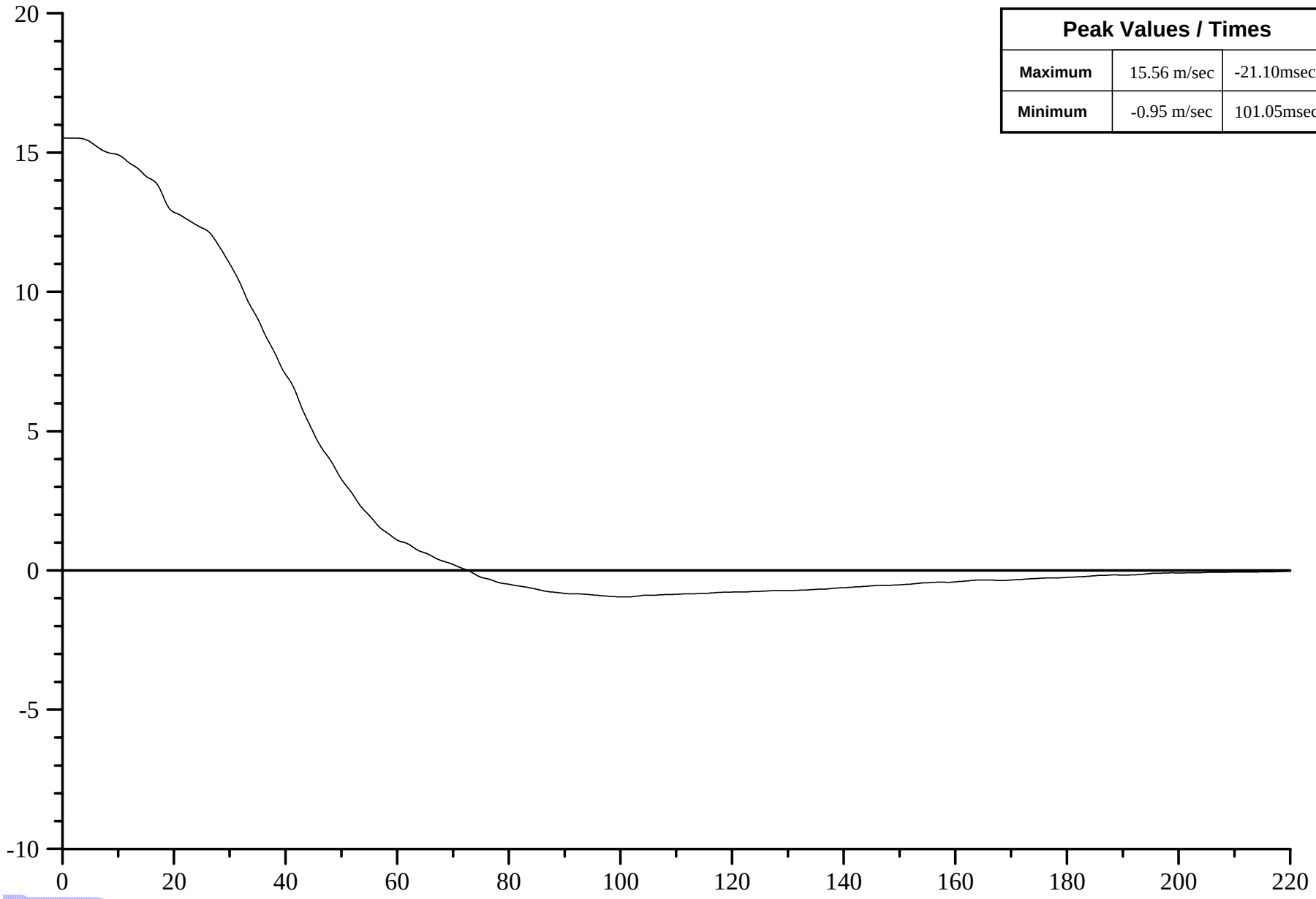
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.56 m/sec	-21.10msec
Minimum	-0.95 m/sec	101.05msec



Rear Cross Member Crude Velocity

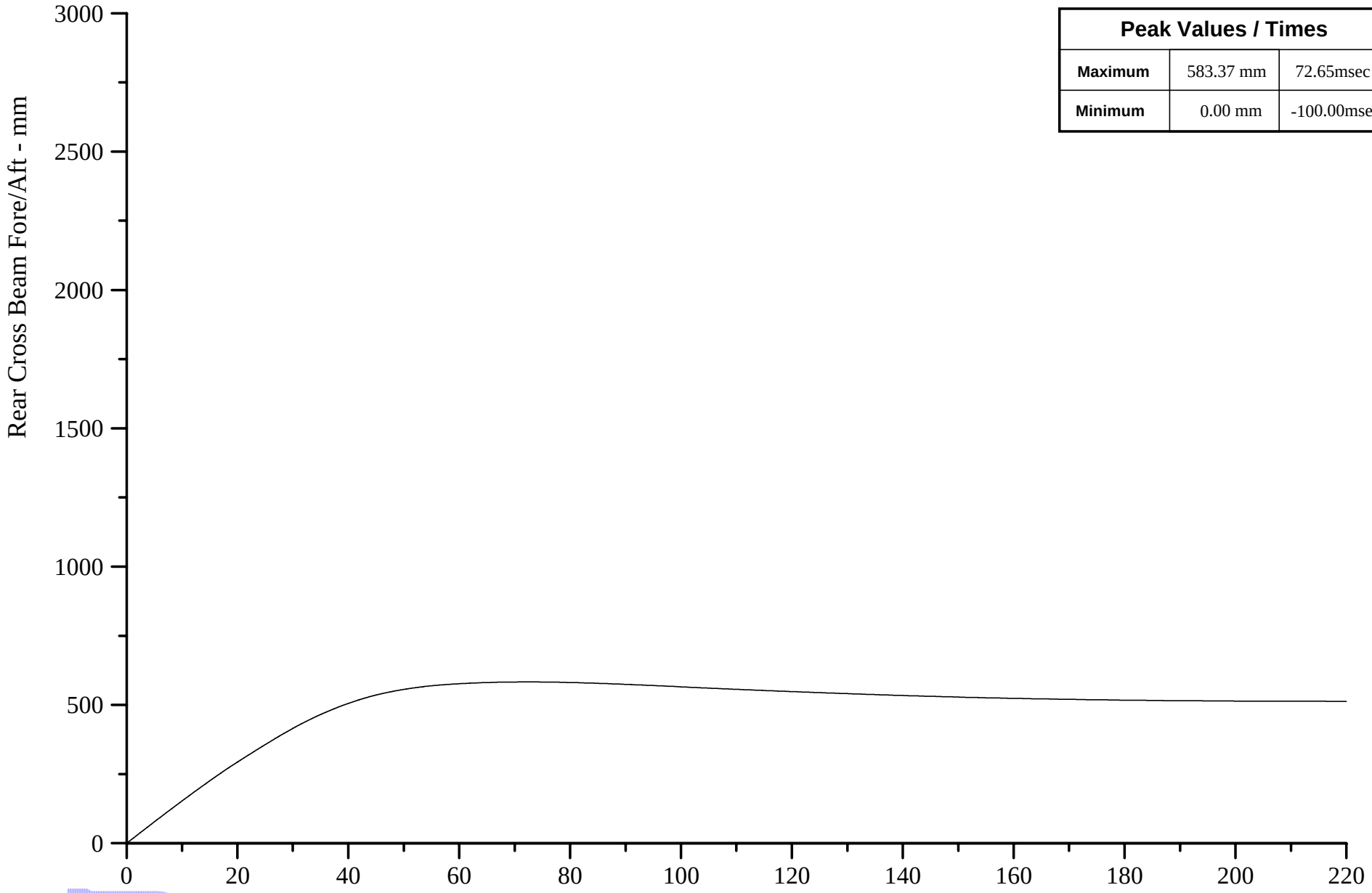
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	583.37 mm	72.65msec
Minimum	0.00 mm	-100.00msec



Rear Cross Member Crude Displacement

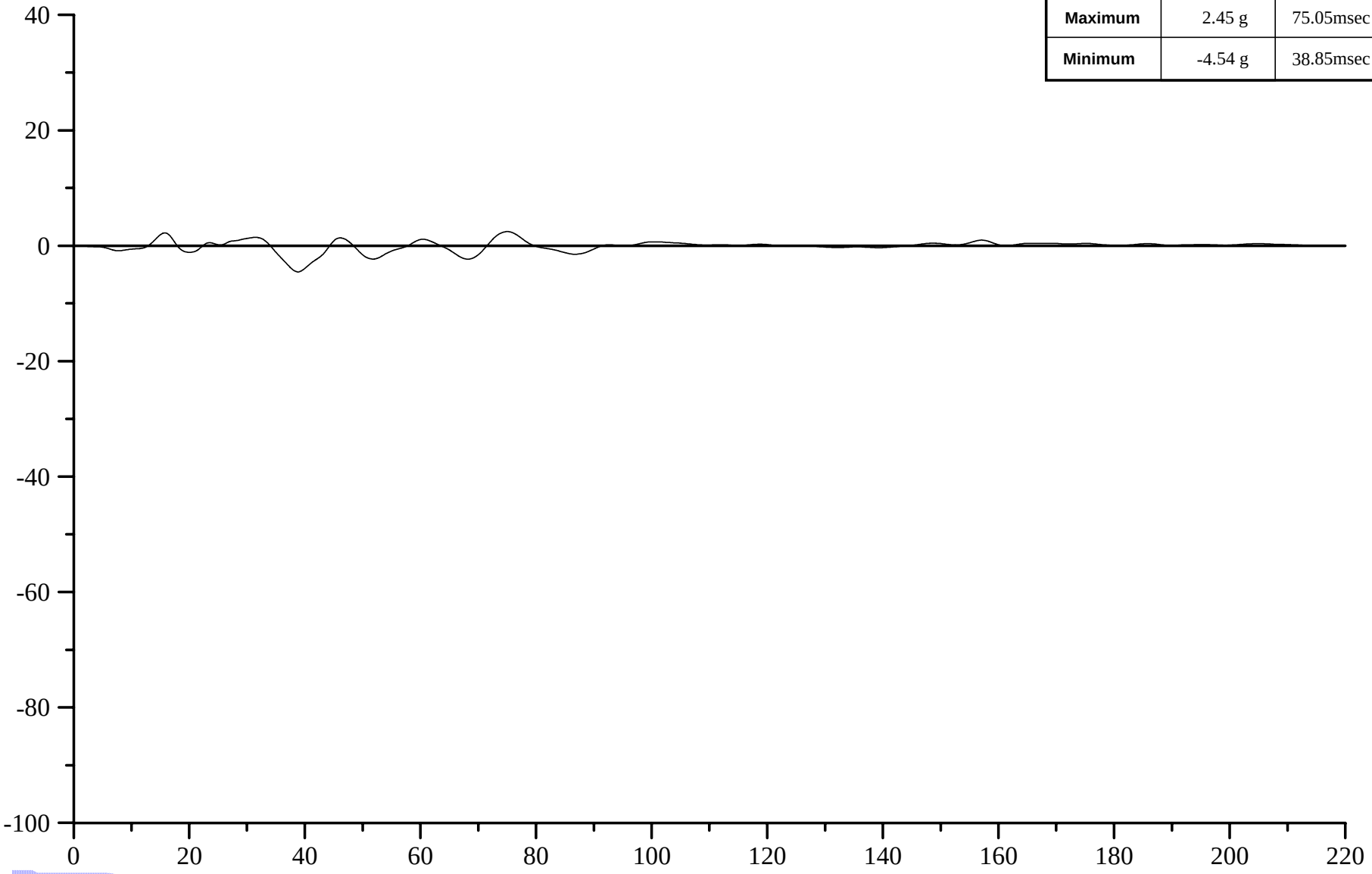
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	2.45 g	75.05msec
Minimum	-4.54 g	38.85msec



TRANSPORT RESEARCH LABORATORY

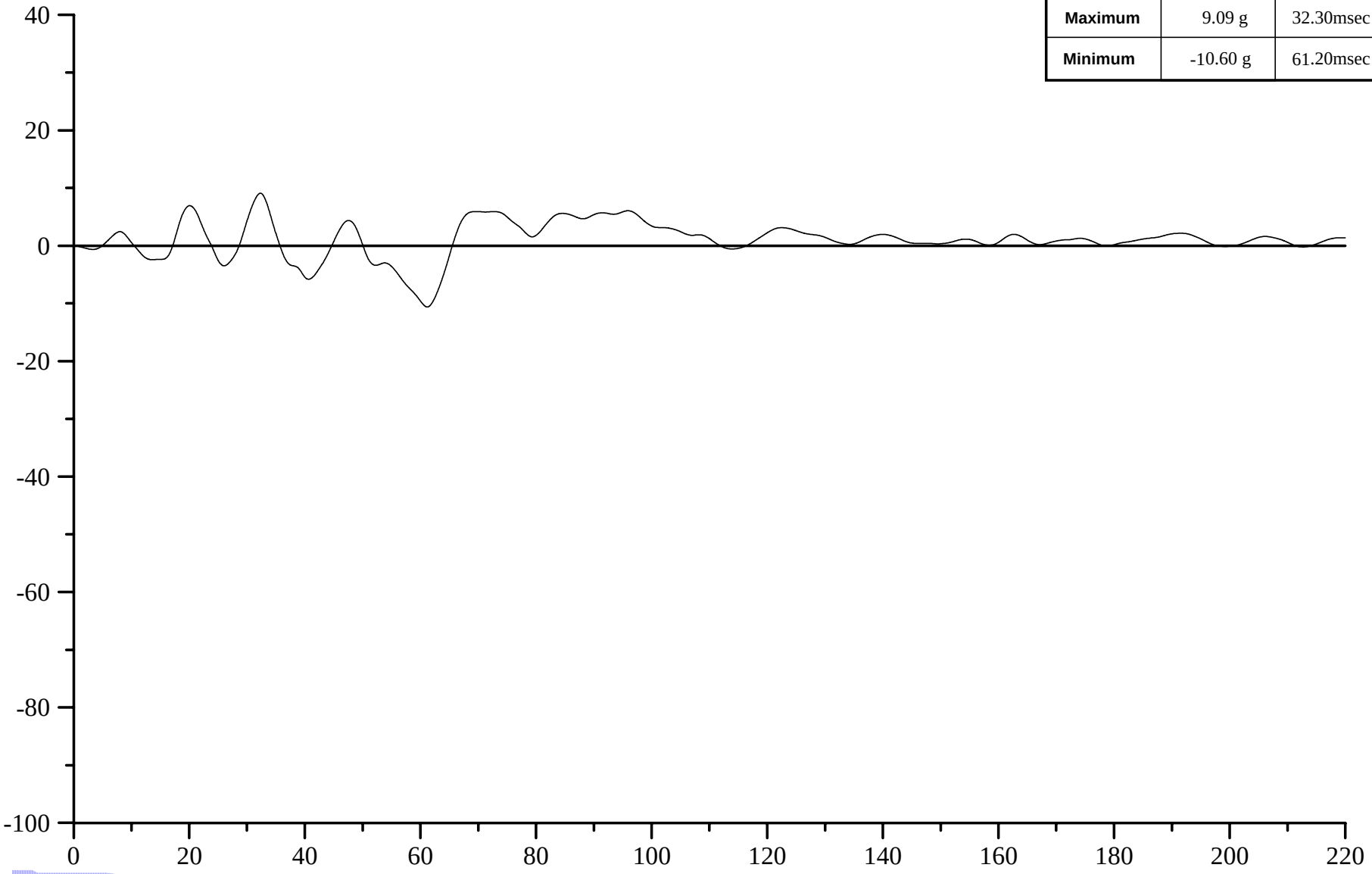
Processed
on 06.06.2000

Rear Cross Member Acceleration

Filtered at CFC_60

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	9.09 g	32.30msec
Minimum	-10.60 g	61.20msec



TRANSPORT RESEARCH LABORATORY

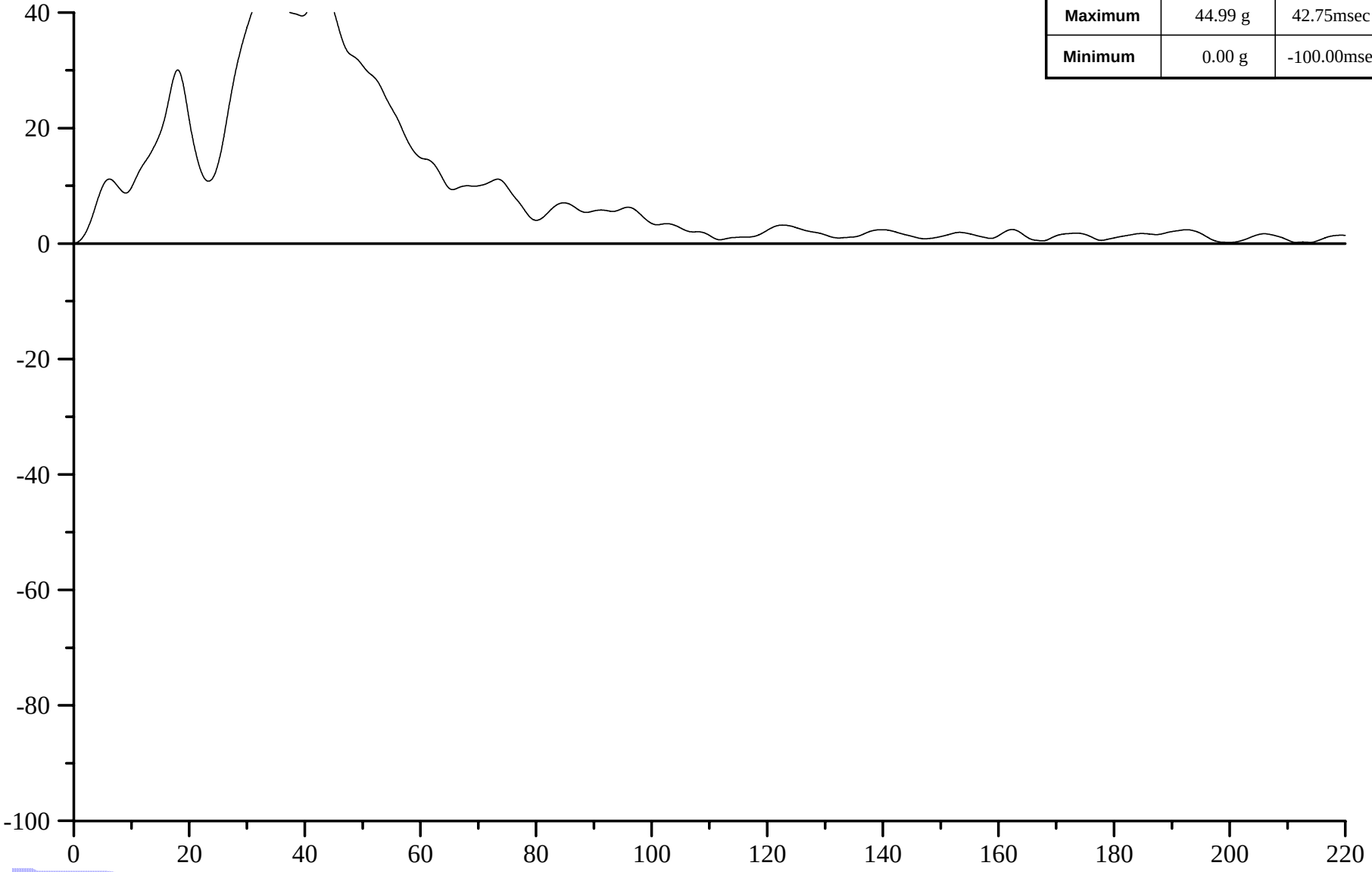
Processed
on 06.06.2000

Rear Cross Member Acceleration

Filtered at CFC_60

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	44.99 g	42.75msec
Minimum	0.00 g	-100.00msec



Rear Cross Member Acceleration

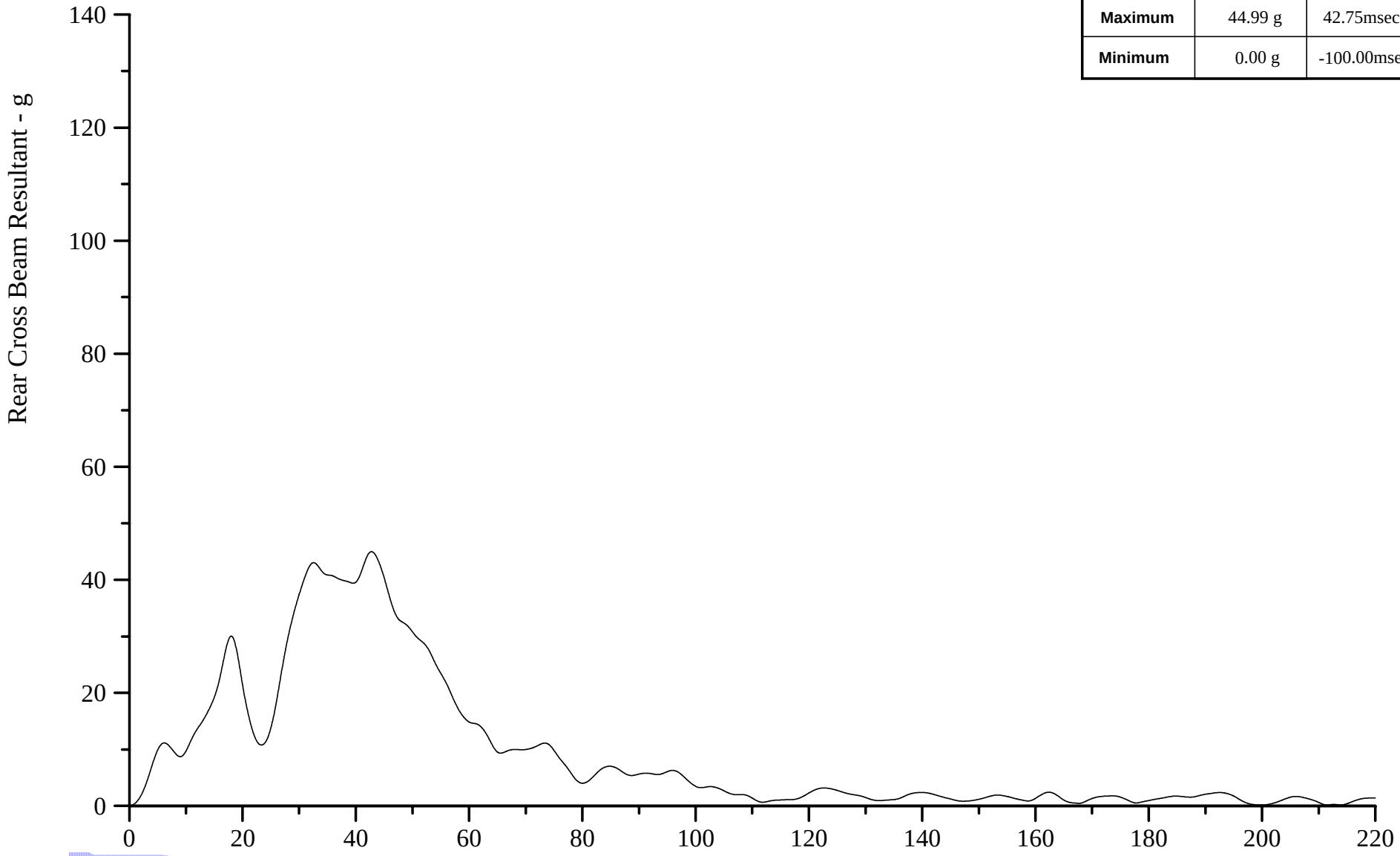
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	44.99 g	42.75msec
Minimum	0.00 g	-100.00msec



Rear Cross Member Acceleration

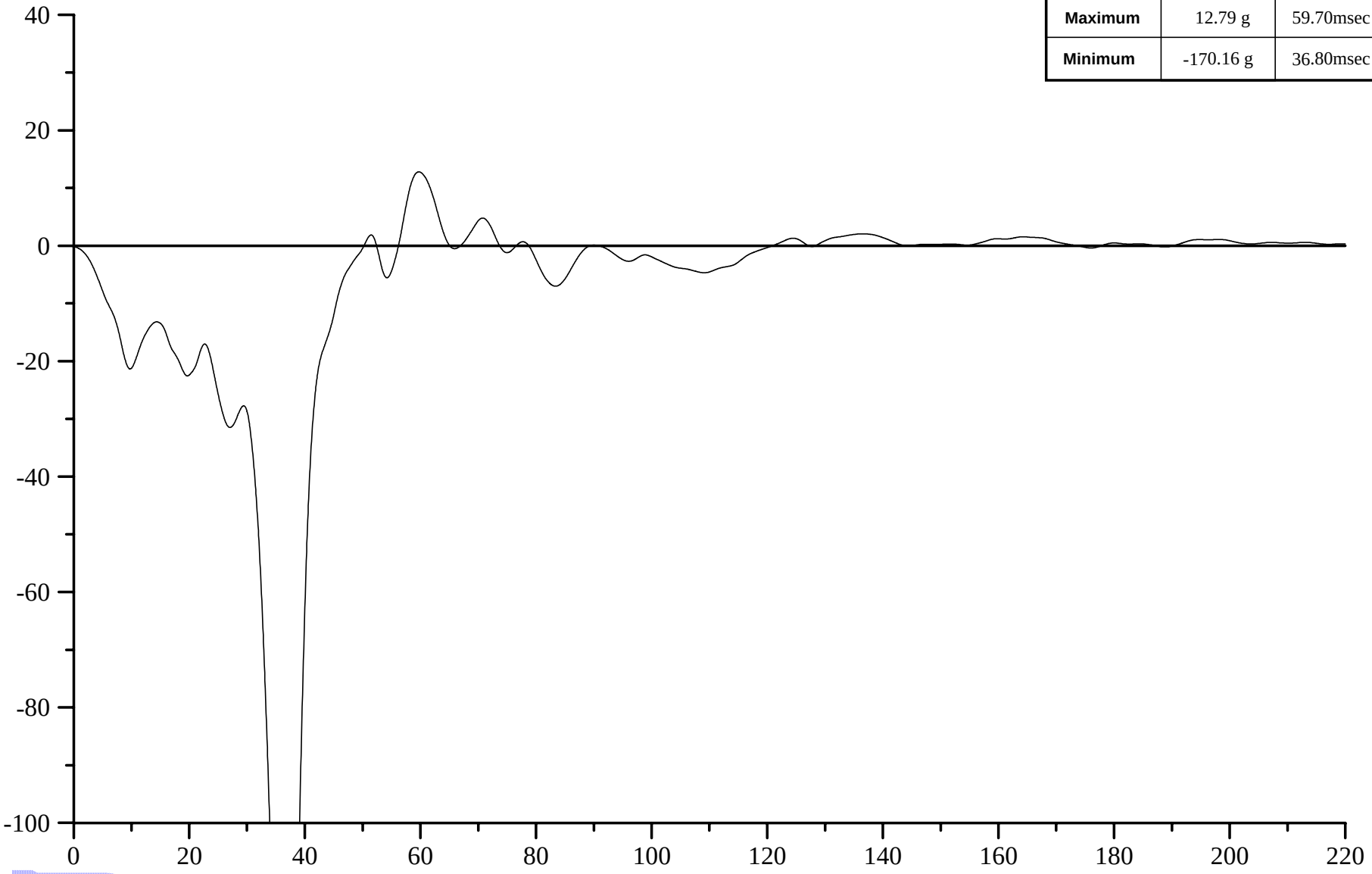
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	12.79 g	59.70msec
Minimum	-170.16 g	36.80msec



Suspension Acceleration

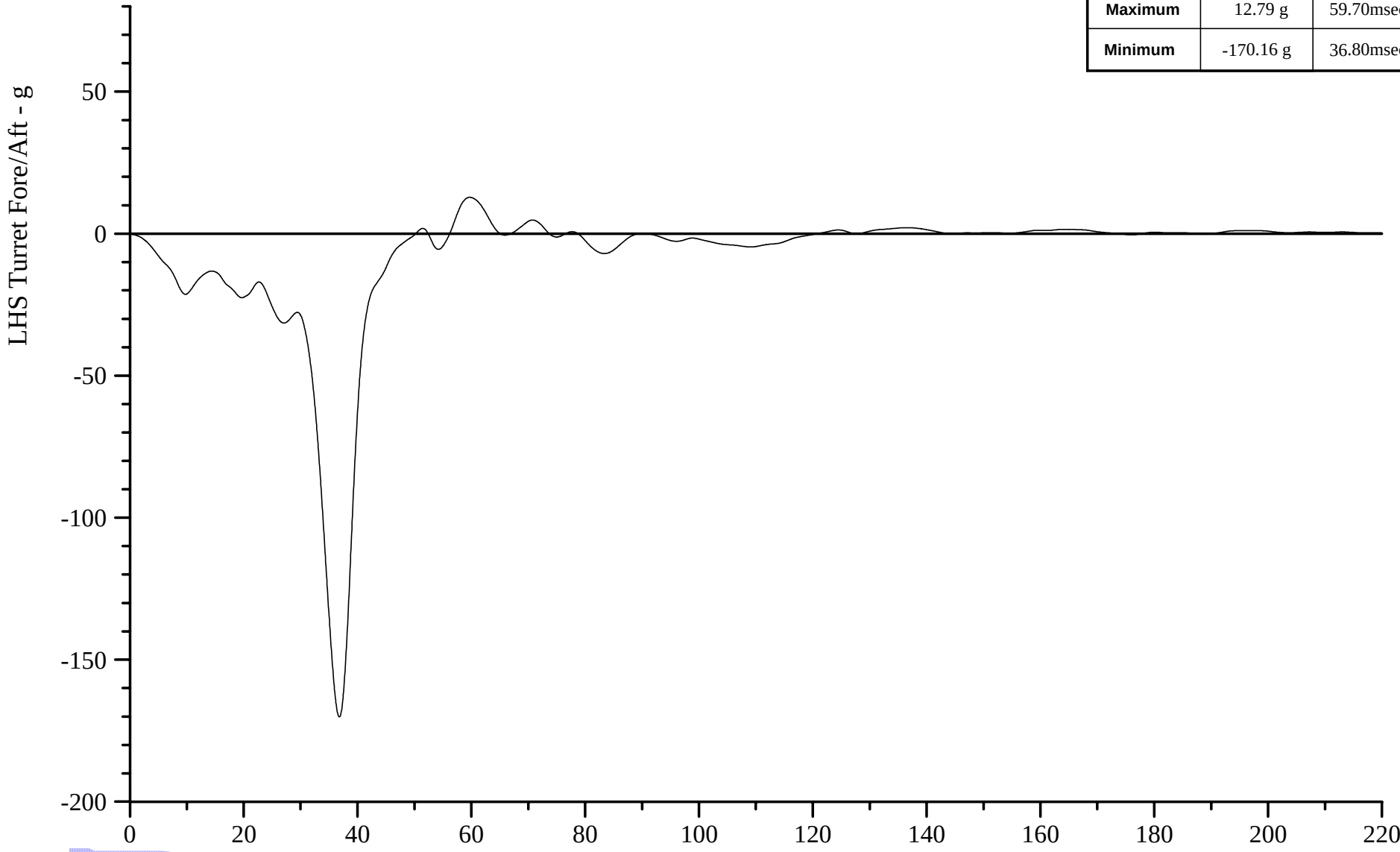
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	12.79 g	59.70msec
Minimum	-170.16 g	36.80msec



Suspension Acceleration

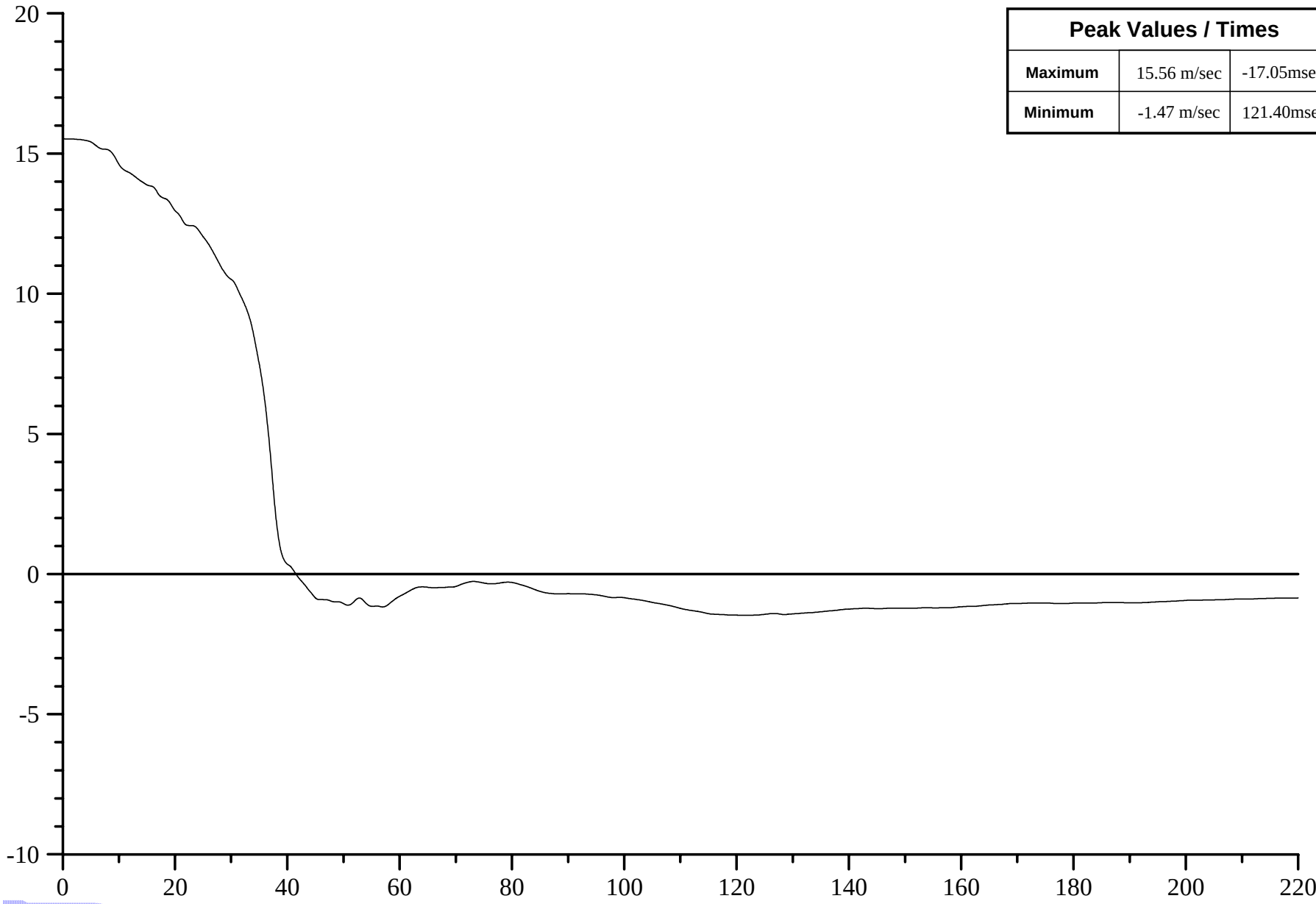
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.56 m/sec	-17.05msec
Minimum	-1.47 m/sec	121.40msec



Suspension Crude Velocity

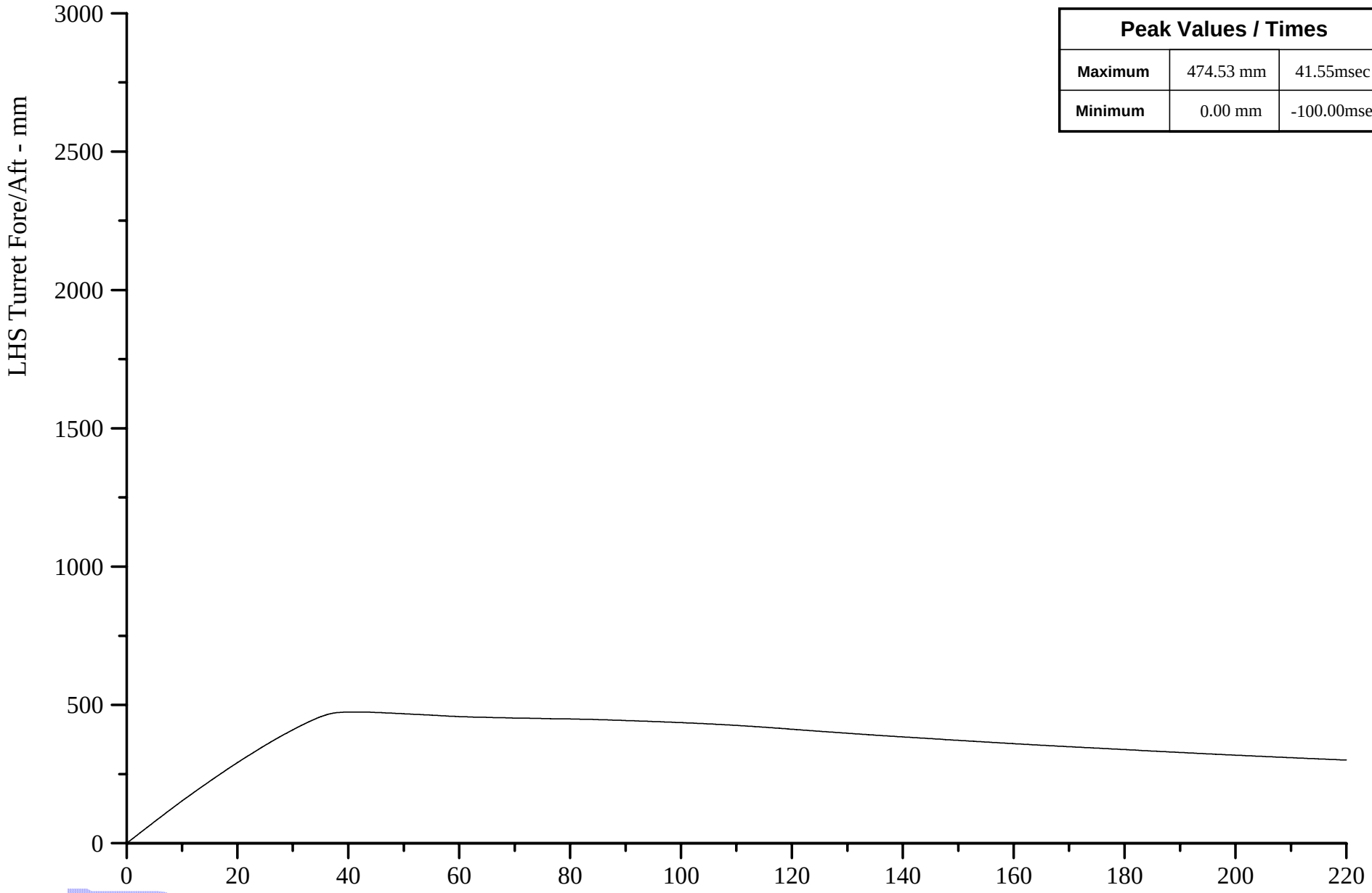
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	474.53 mm	41.55msec
Minimum	0.00 mm	-100.00msec



Suspension Crude Displacement

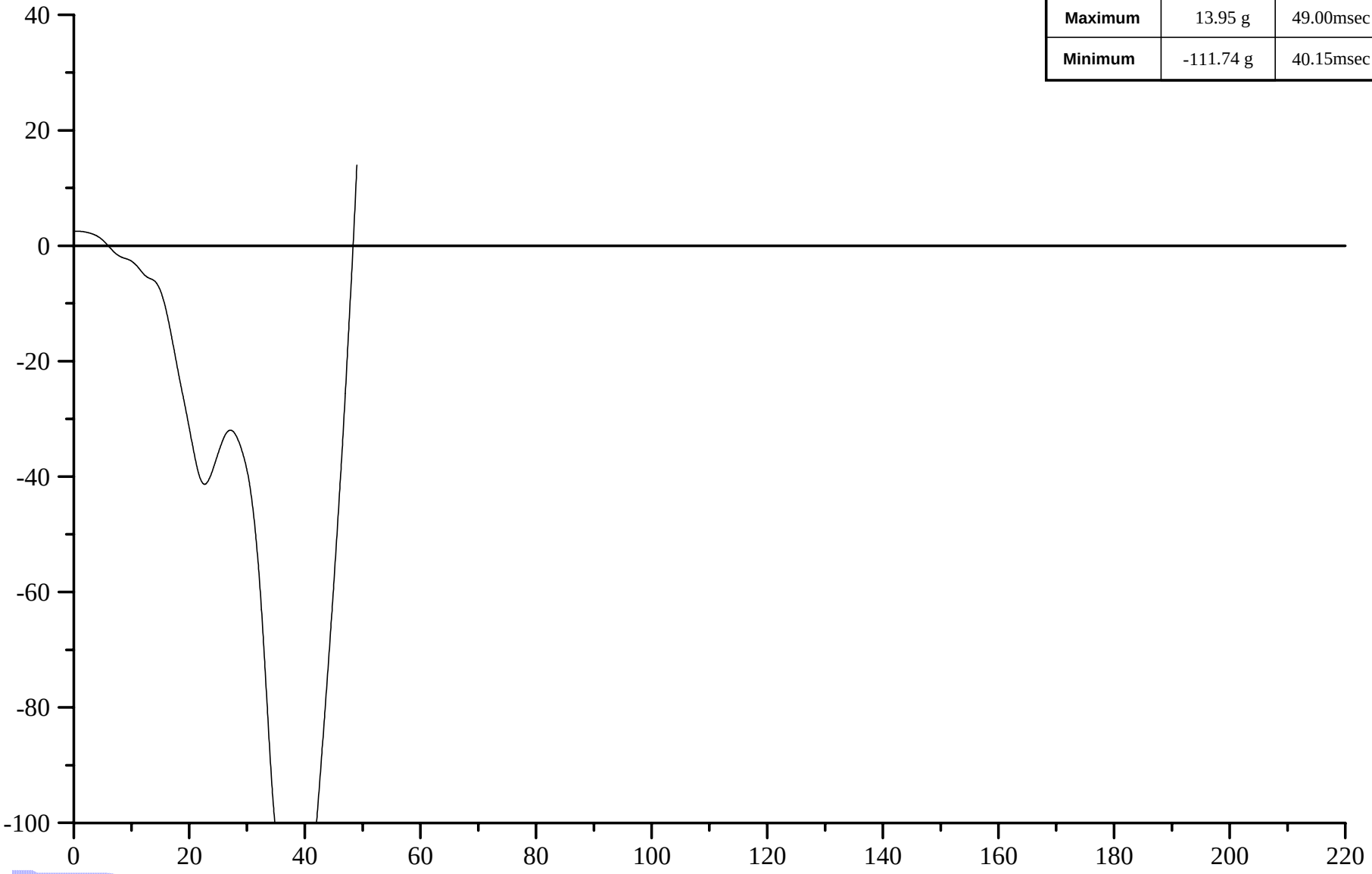
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	13.95 g	49.00msec
Minimum	-111.74 g	40.15msec



Suspension Acceleration

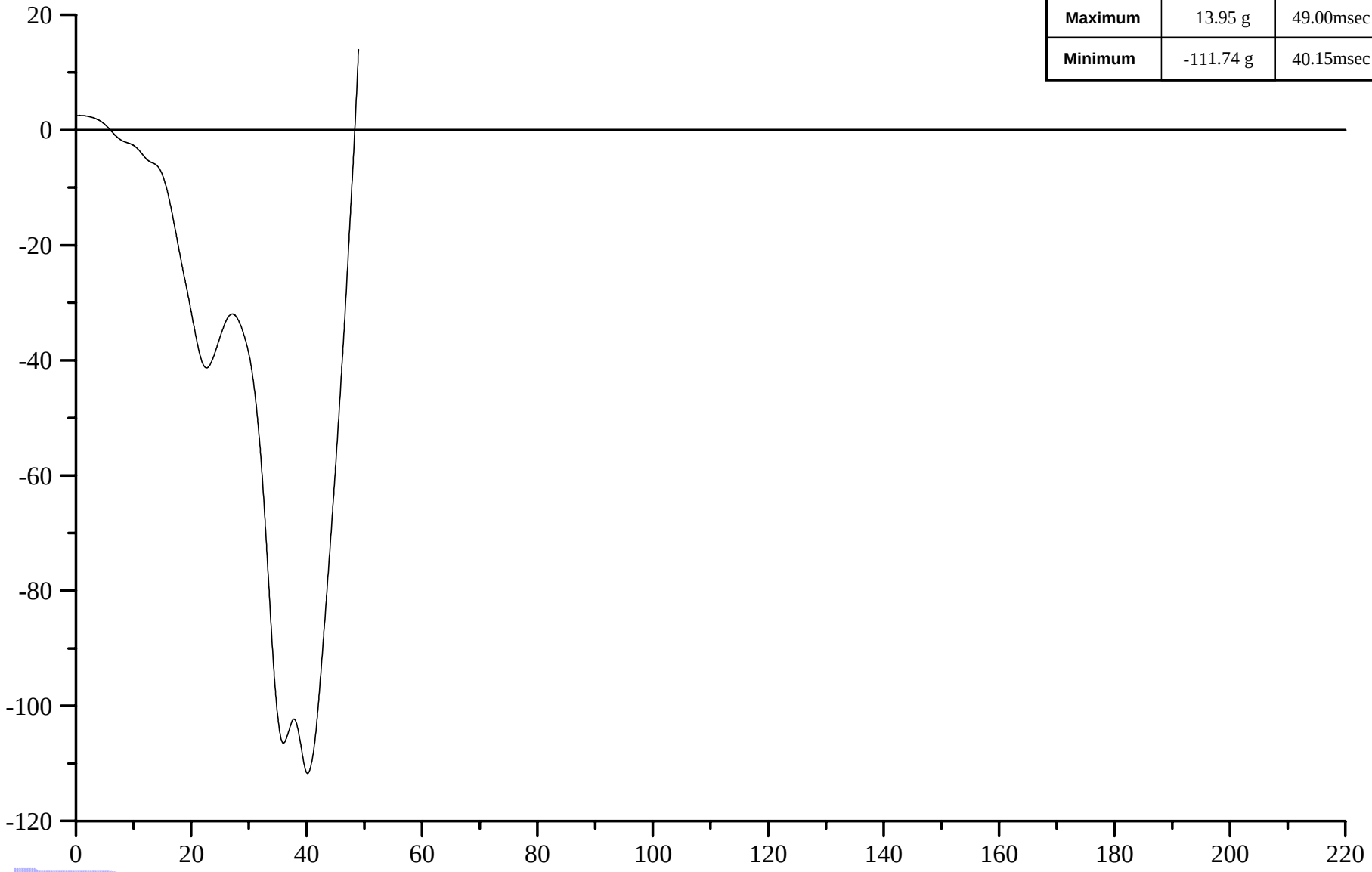
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	13.95 g	49.00msec
Minimum	-111.74 g	40.15msec



Suspension Acceleration

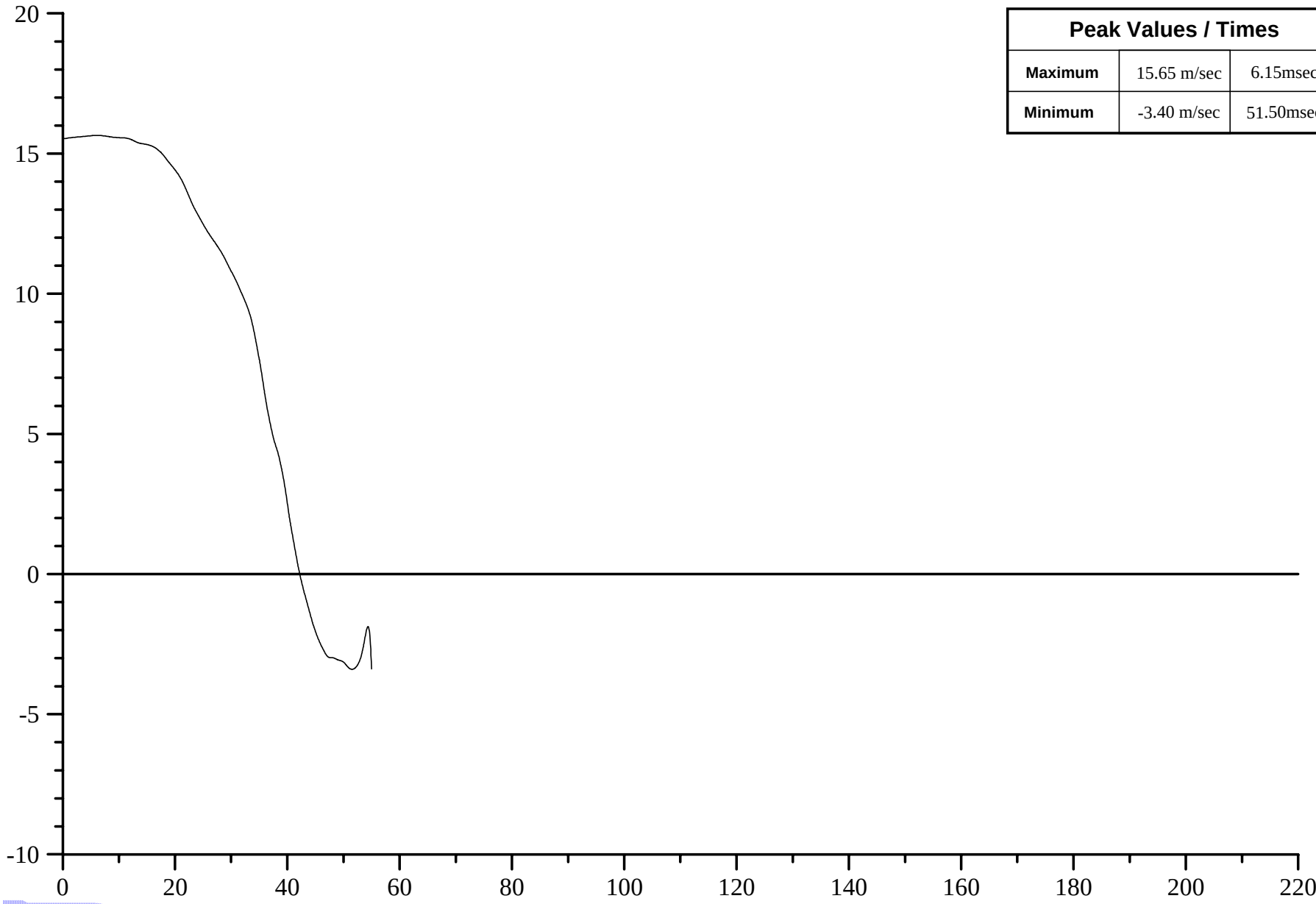
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.65 m/sec	6.15msec
Minimum	-3.40 m/sec	51.50msec



Suspension Crude Velocity

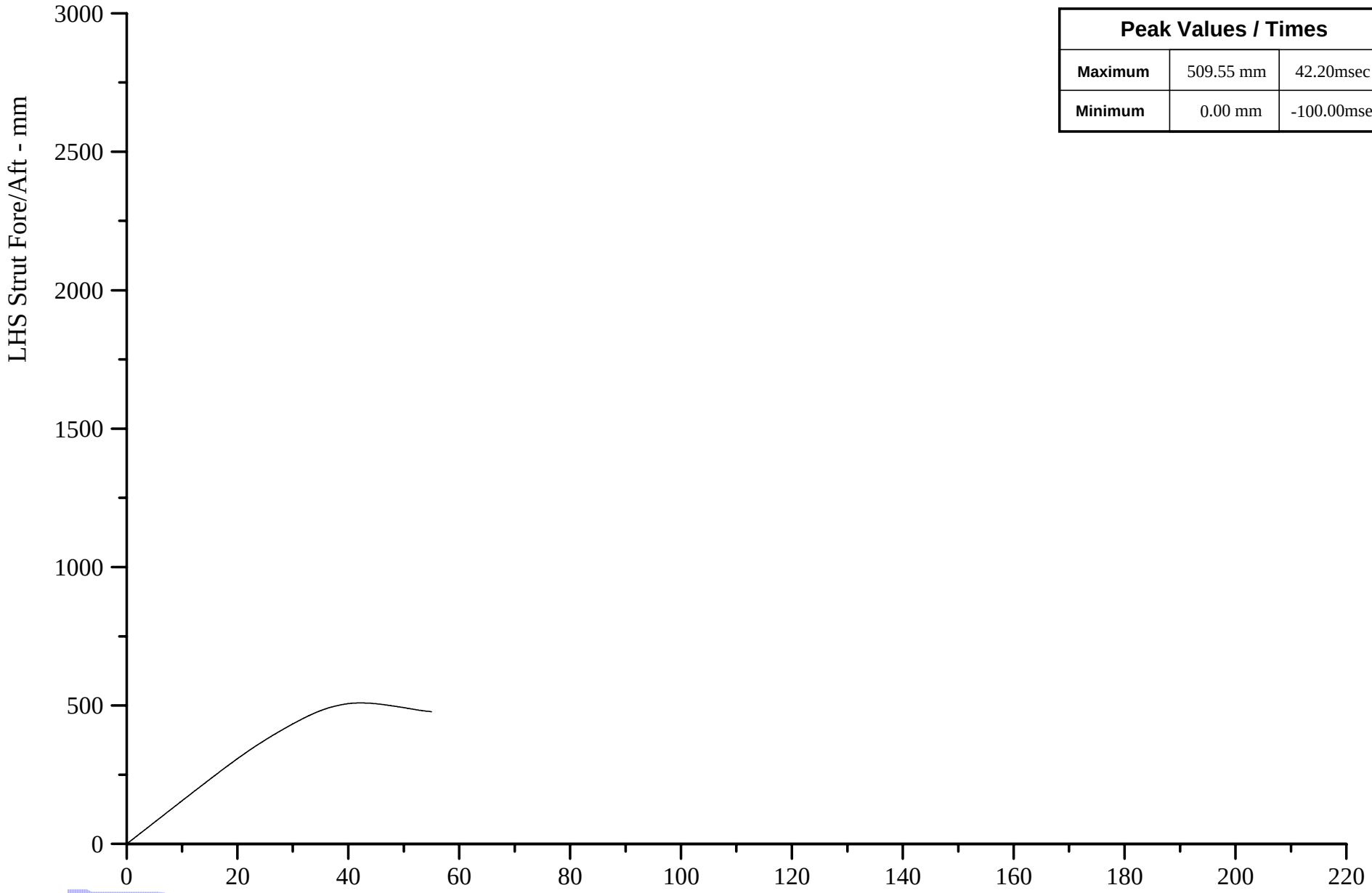
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	509.55 mm	42.20msec
Minimum	0.00 mm	-100.00msec



Suspension Crude Displacement

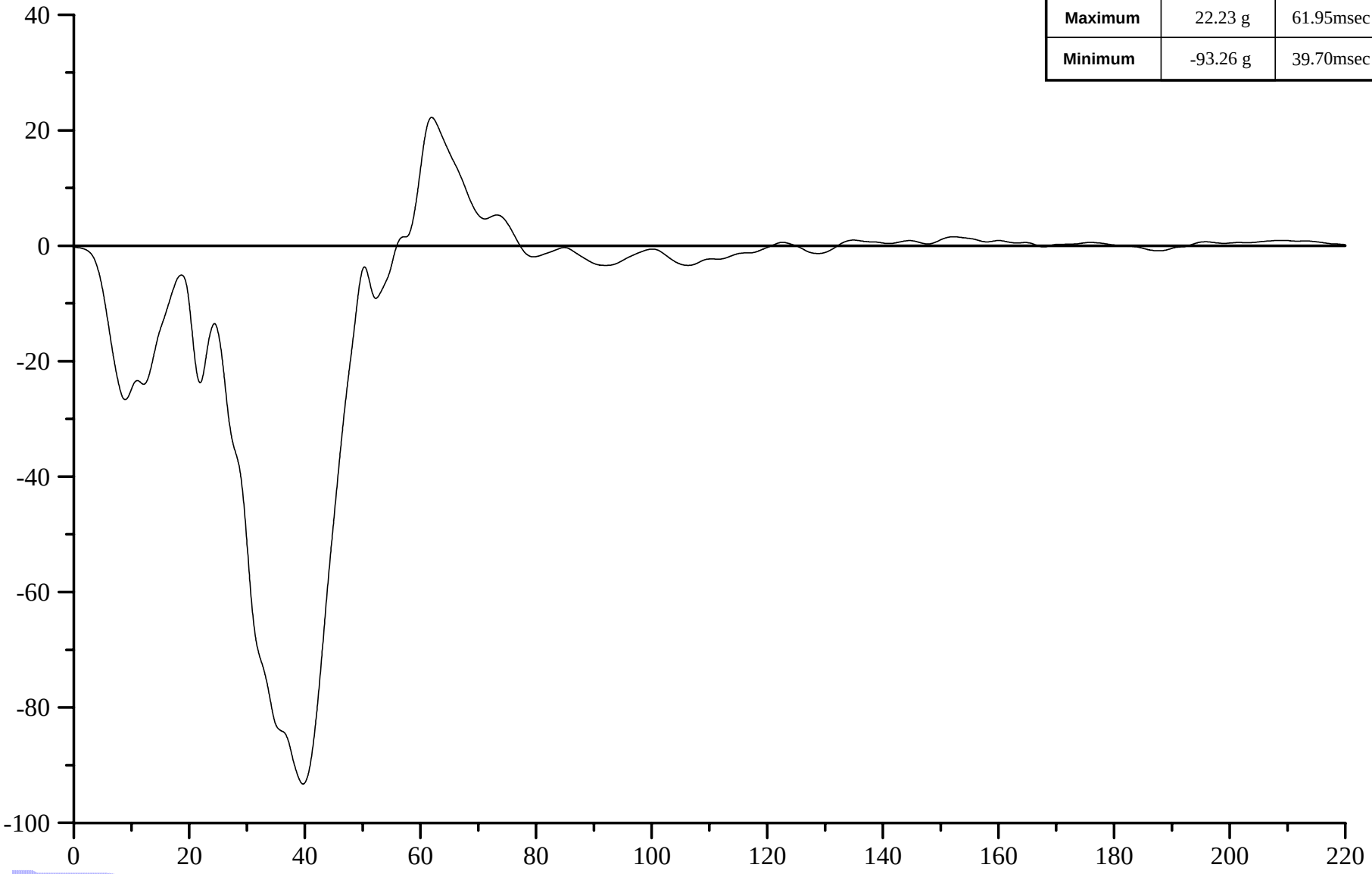
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	22.23 g	61.95msec
Minimum	-93.26 g	39.70msec



Suspension Acceleration

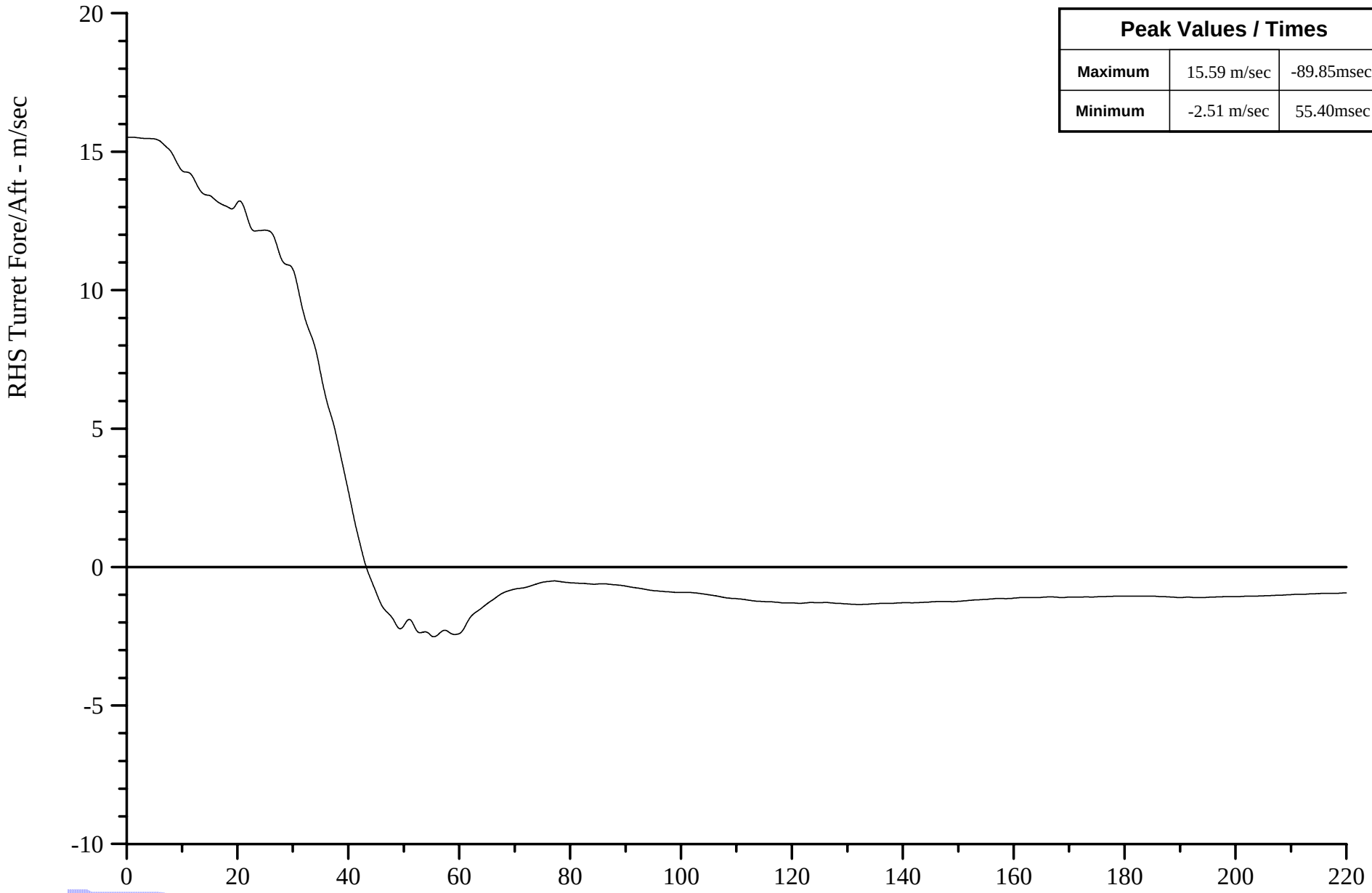
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.59 m/sec	-89.85msec
Minimum	-2.51 m/sec	55.40msec



Suspension Crude Velocity

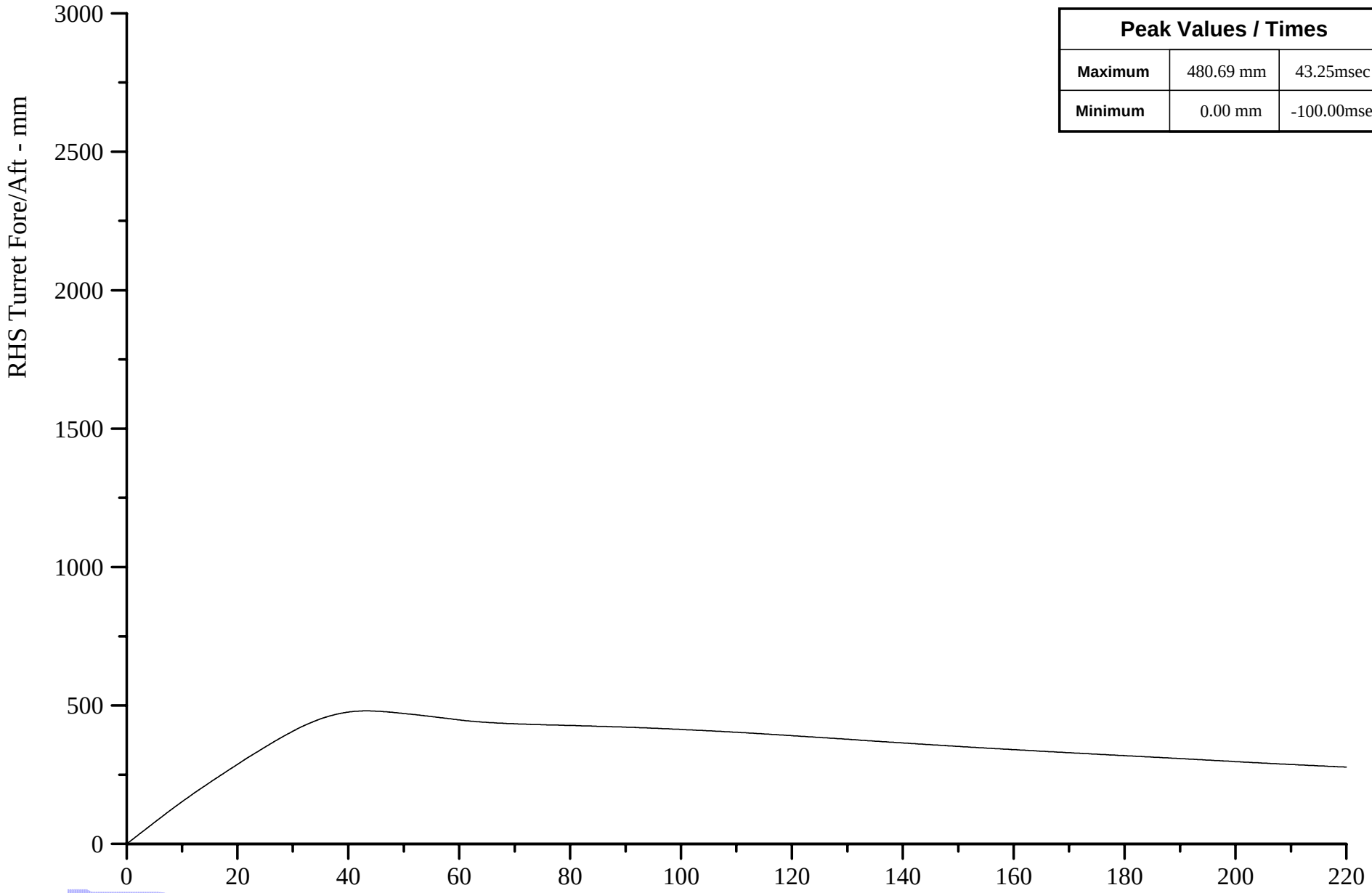
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	480.69 mm	43.25msec
Minimum	0.00 mm	-100.00msec



Suspension Crude Displacement

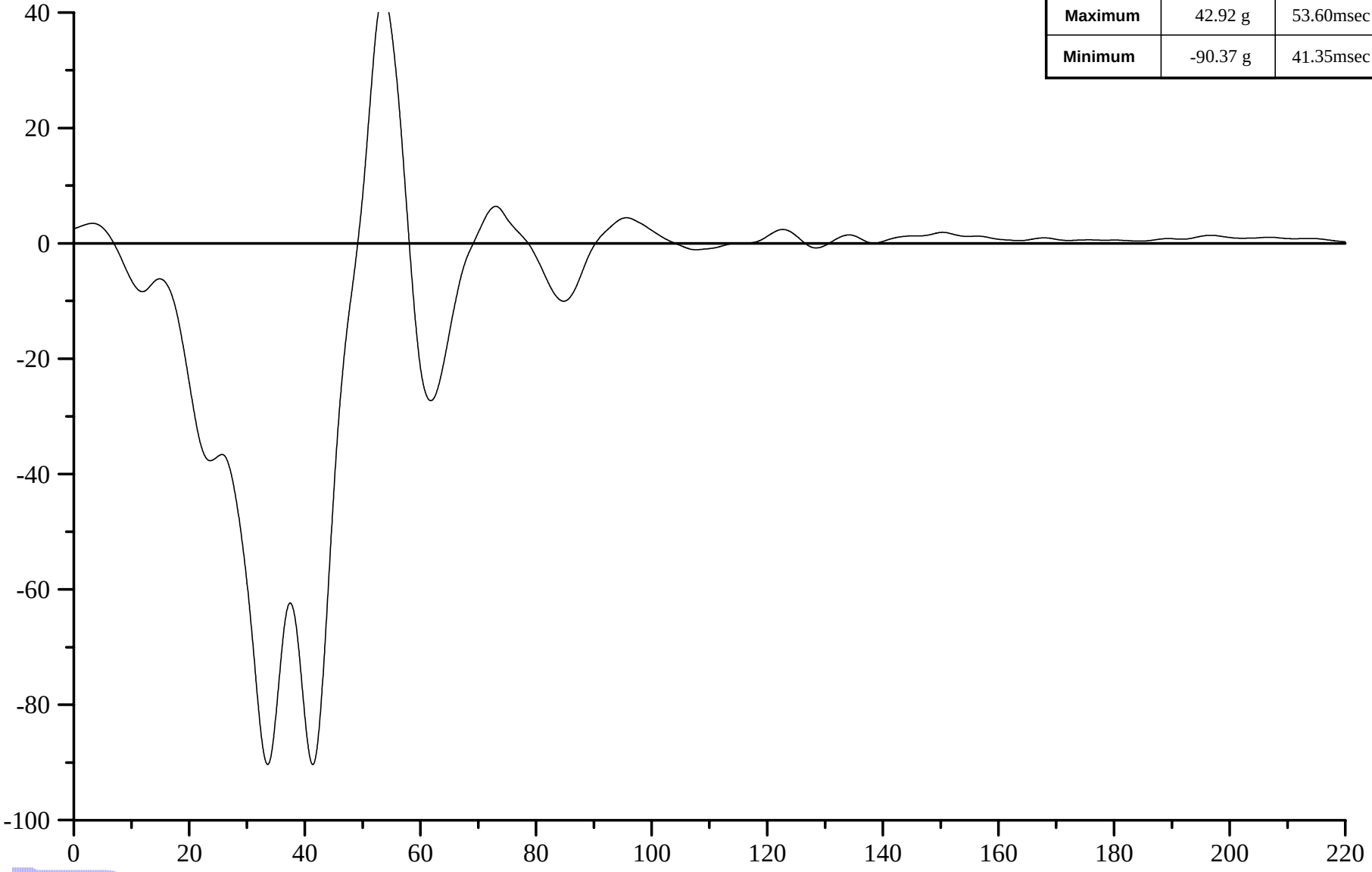
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	42.92 g	53.60msec
Minimum	-90.37 g	41.35msec



Suspension Acceleration

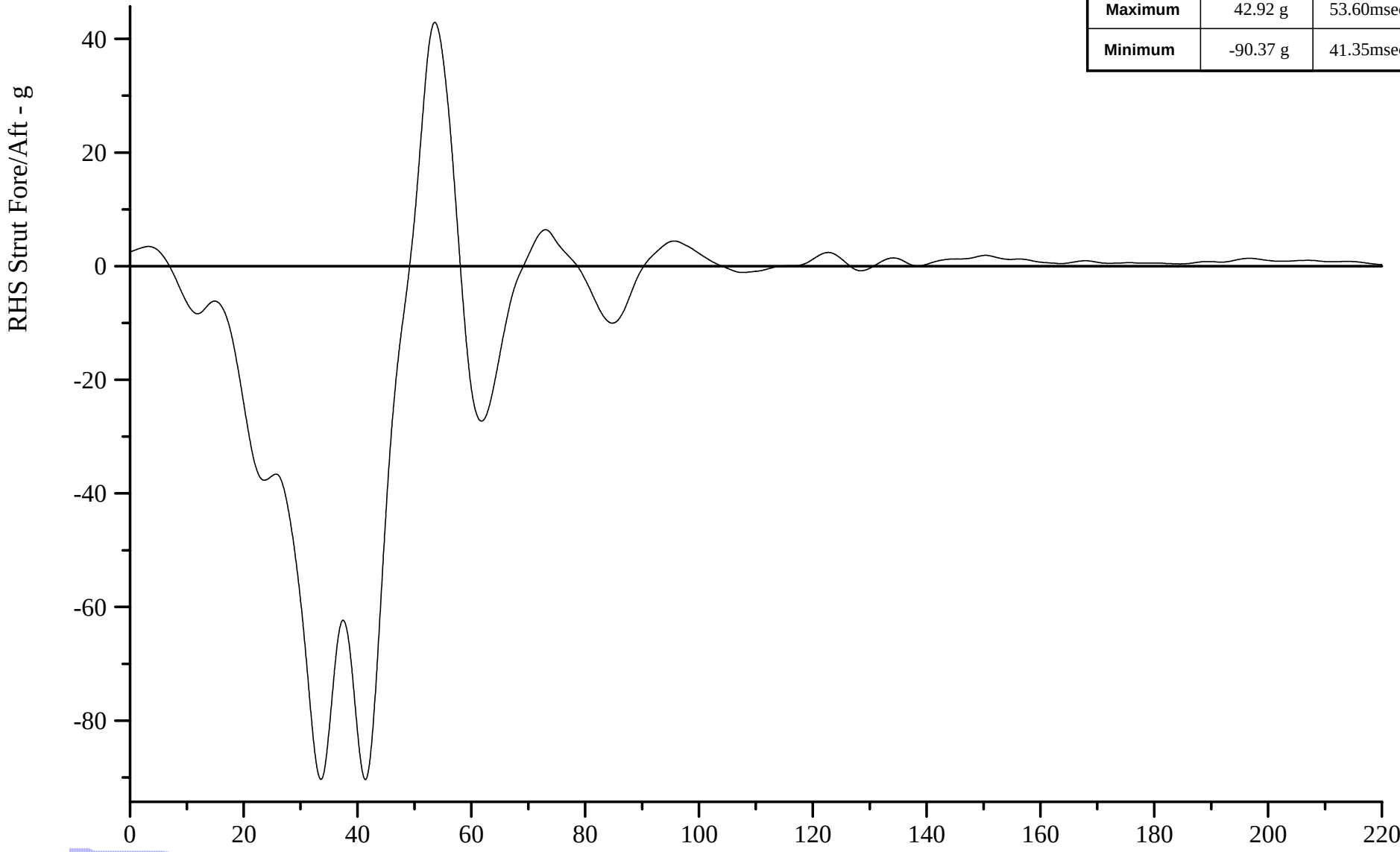
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	42.92 g	53.60msec
Minimum	-90.37 g	41.35msec



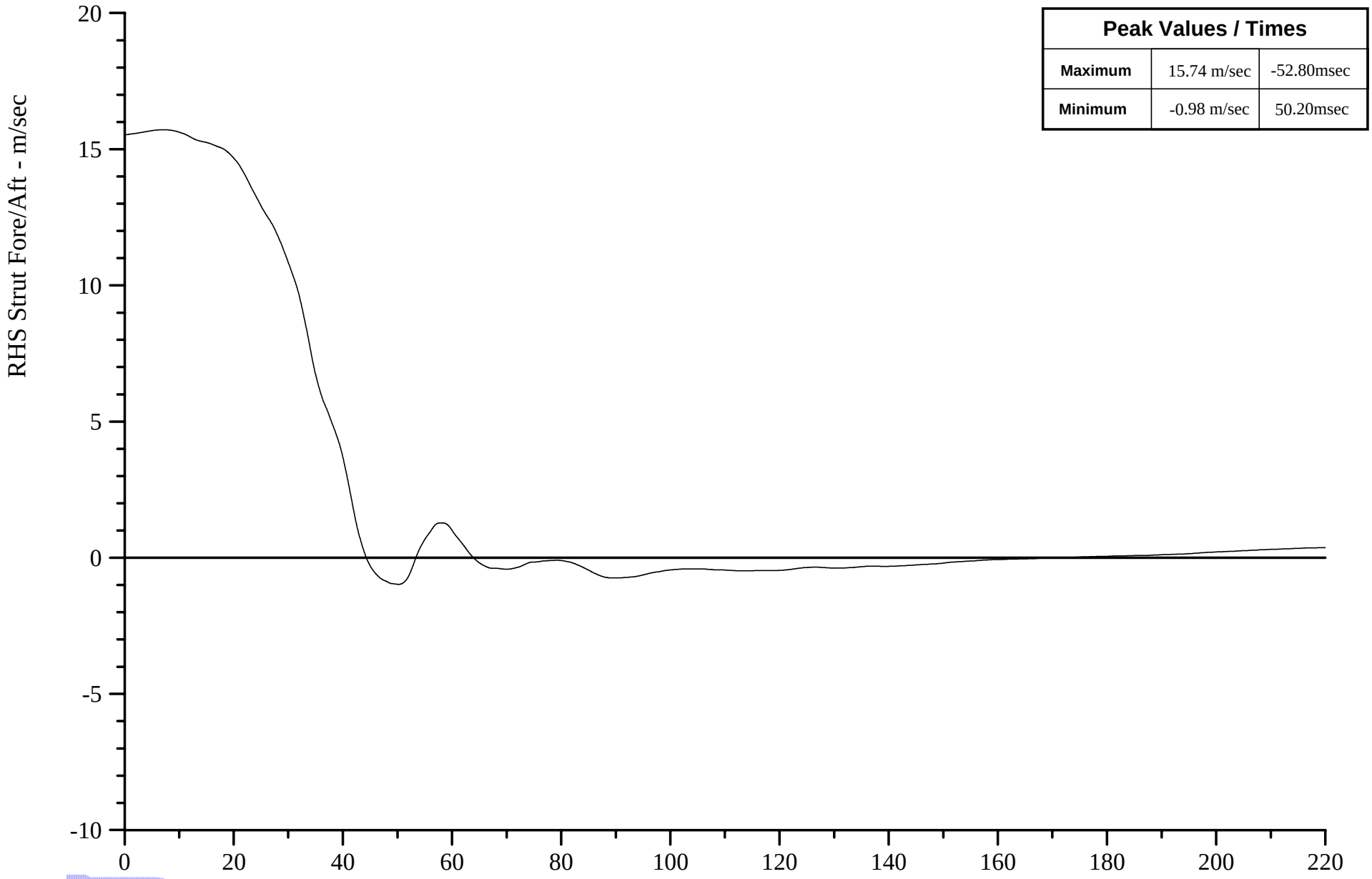
Suspension Acceleration

Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



Peak Values / Times		
Maximum	15.74 m/sec	-52.80msec
Minimum	-0.98 m/sec	50.20msec

TRANSPORT RESEARCH LABORATORY

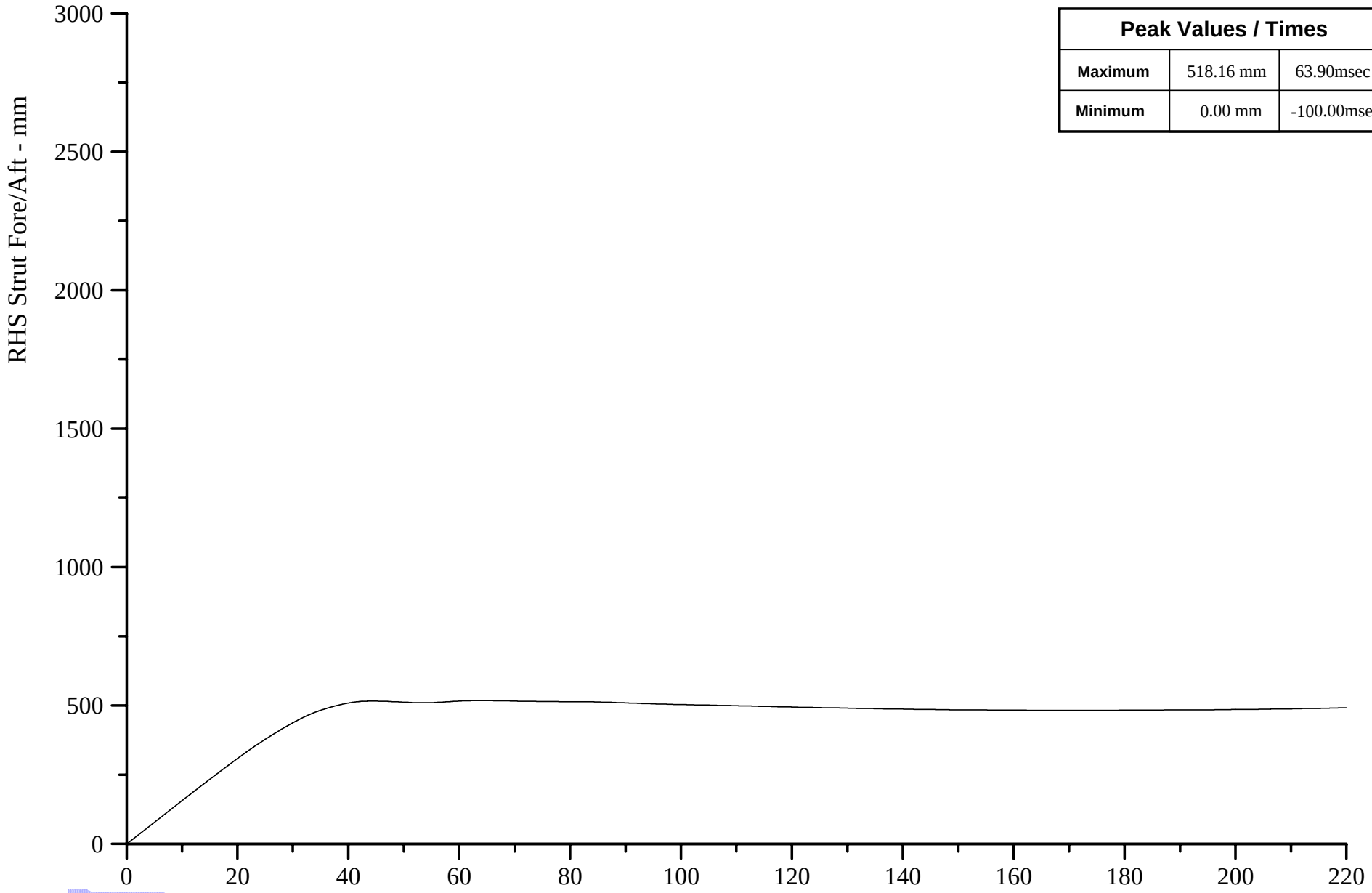
Processed
on 06.06.2000

Suspension Crude Velocity

Filtered at CFC_180

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	518.16 mm	63.90msec
Minimum	0.00 mm	-100.00msec



Suspension Crude Displacement

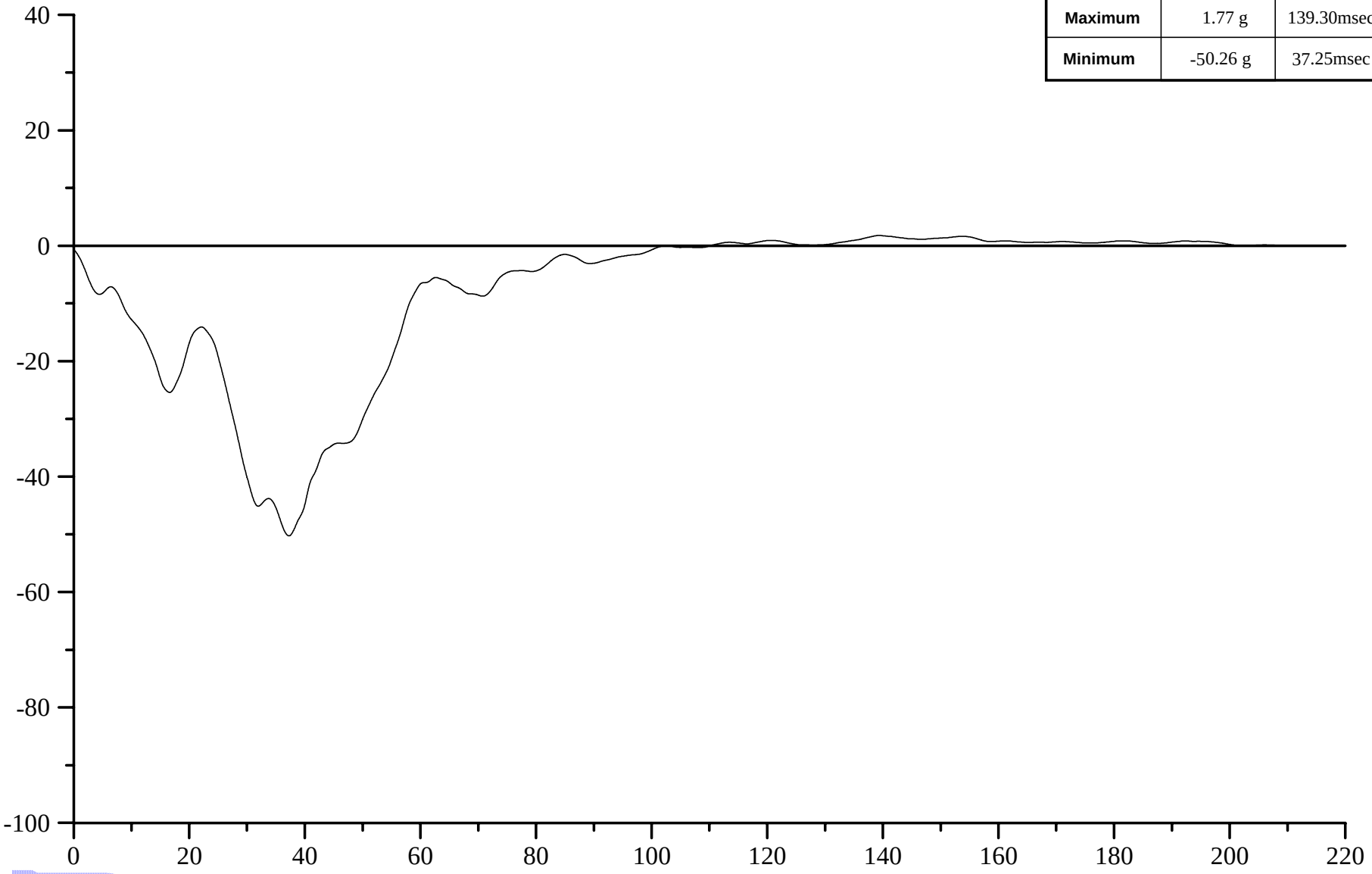
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.77 g	139.30msec
Minimum	-50.26 g	37.25msec



A-Post Acceleration

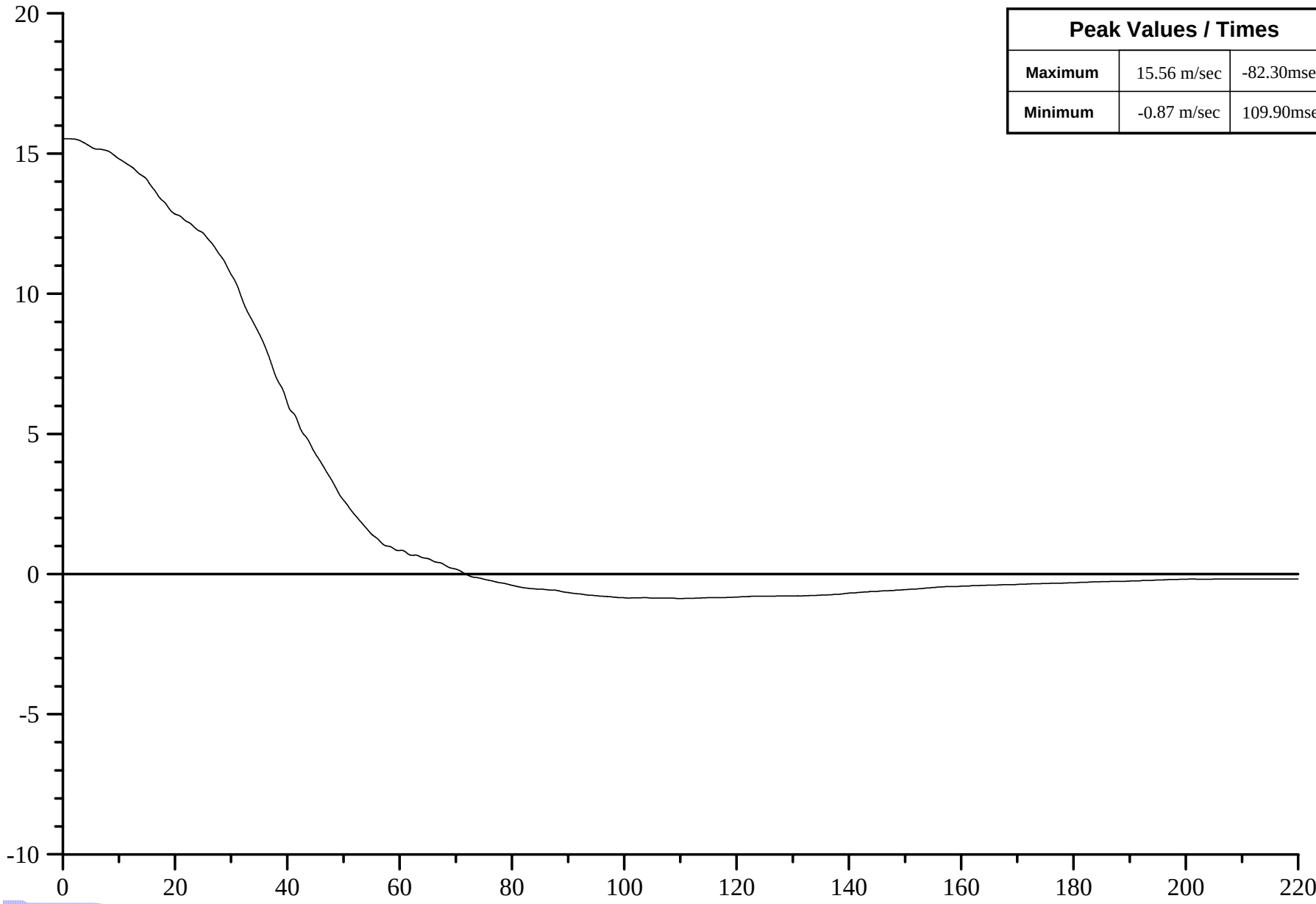
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.56 m/sec	-82.30msec
Minimum	-0.87 m/sec	109.90msec



A-Post Crude Velocity

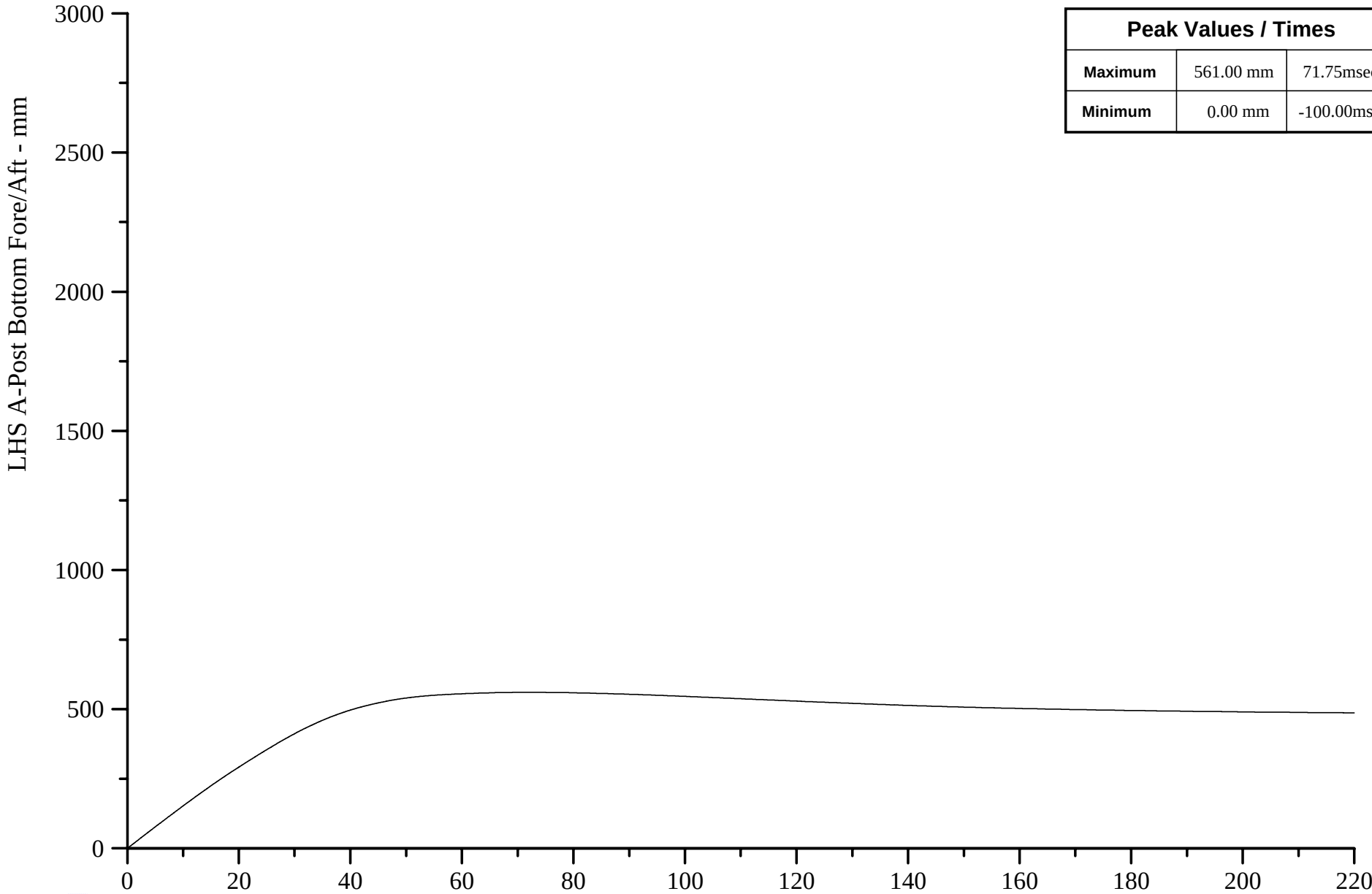
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	561.00 mm	71.75msec
Minimum	0.00 mm	-100.00msec



A-Post Crude Displacement

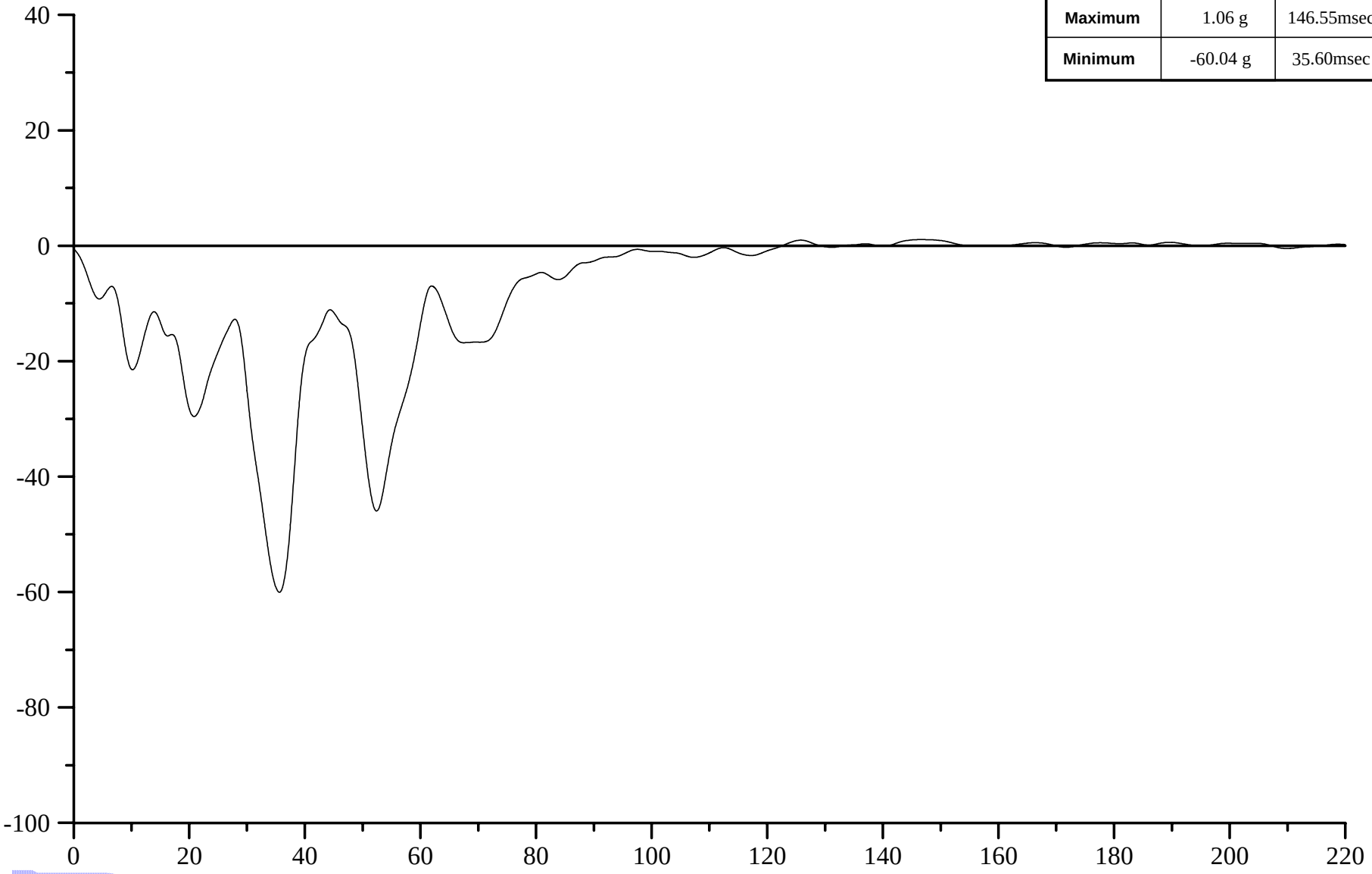
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.06 g	146.55msec
Minimum	-60.04 g	35.60msec

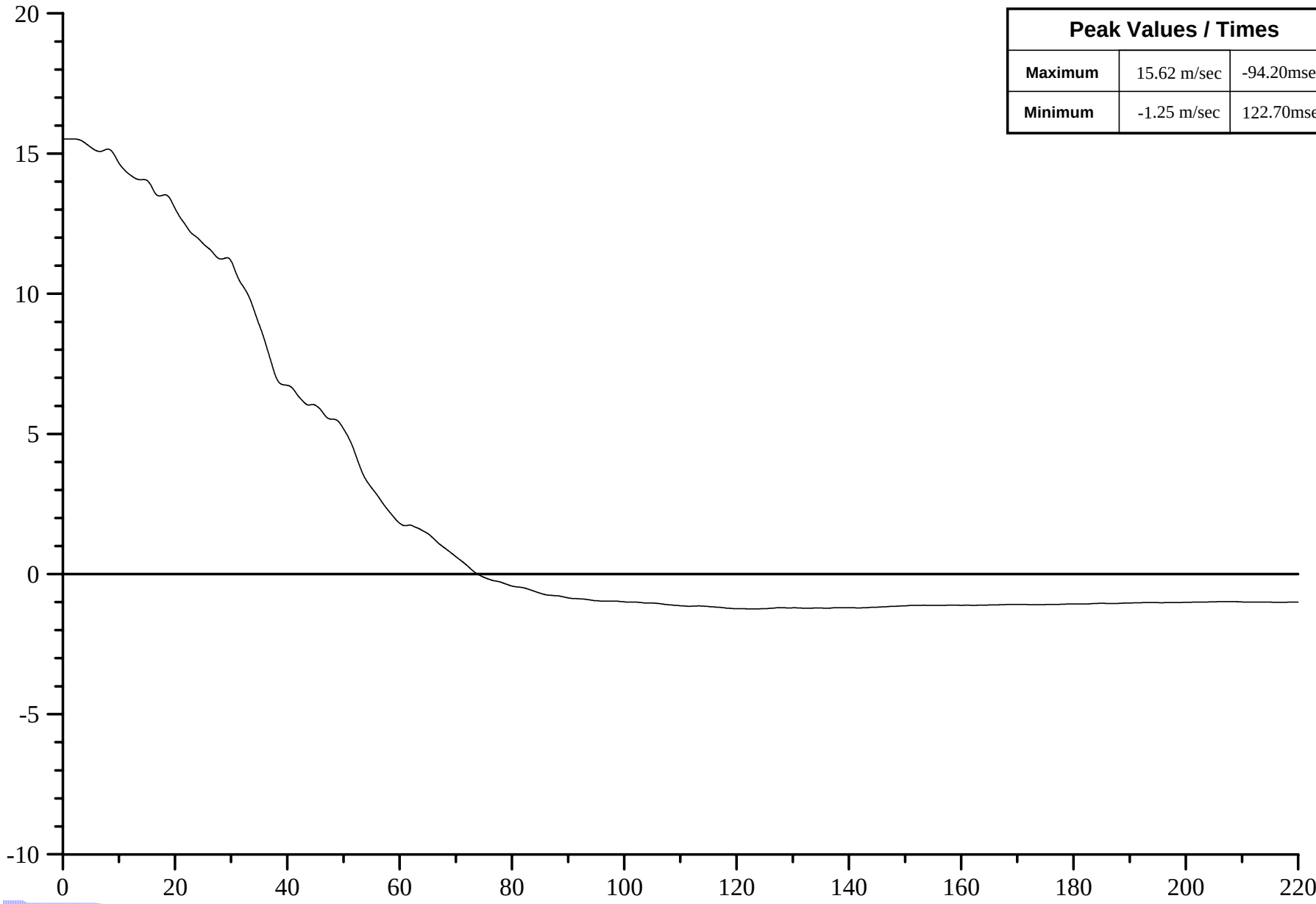


TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.62 m/sec	-94.20msec
Minimum	-1.25 m/sec	122.70msec



A-Post Crude Velocity

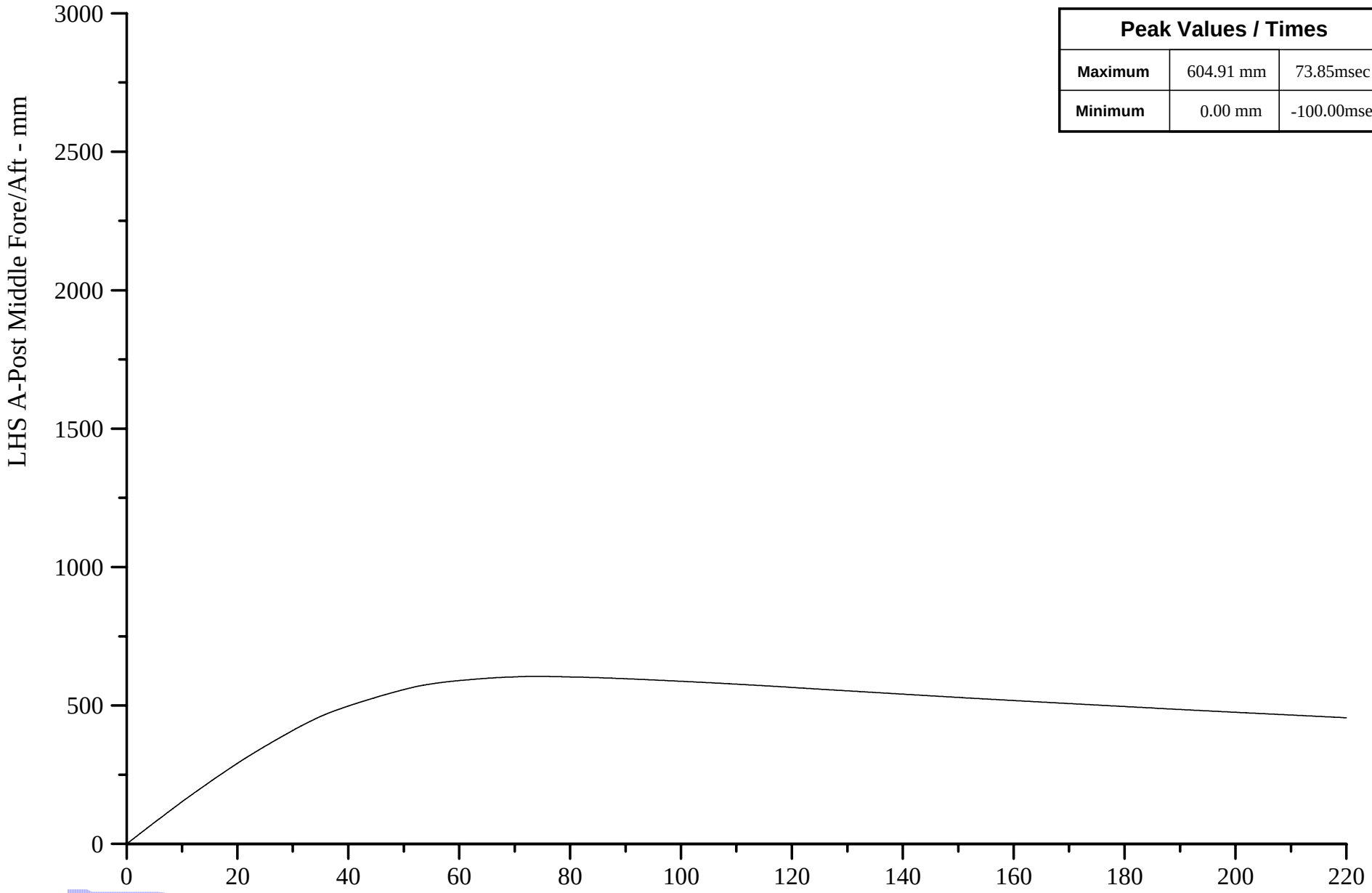
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	604.91 mm	73.85msec
Minimum	0.00 mm	-100.00msec



A-Post Crude Displacement

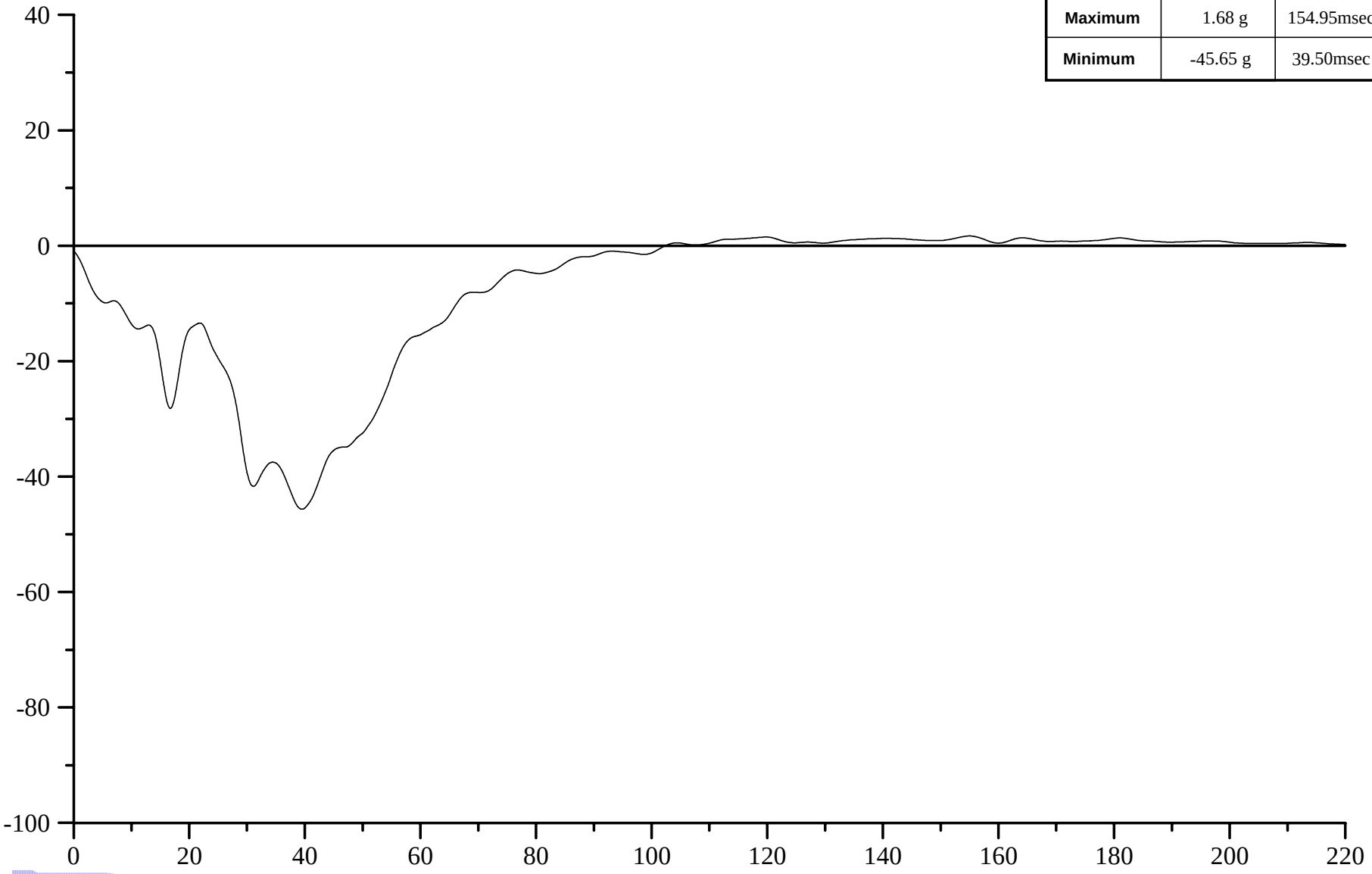
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.68 g	154.95msec
Minimum	-45.65 g	39.50msec



A-Post Acceleration

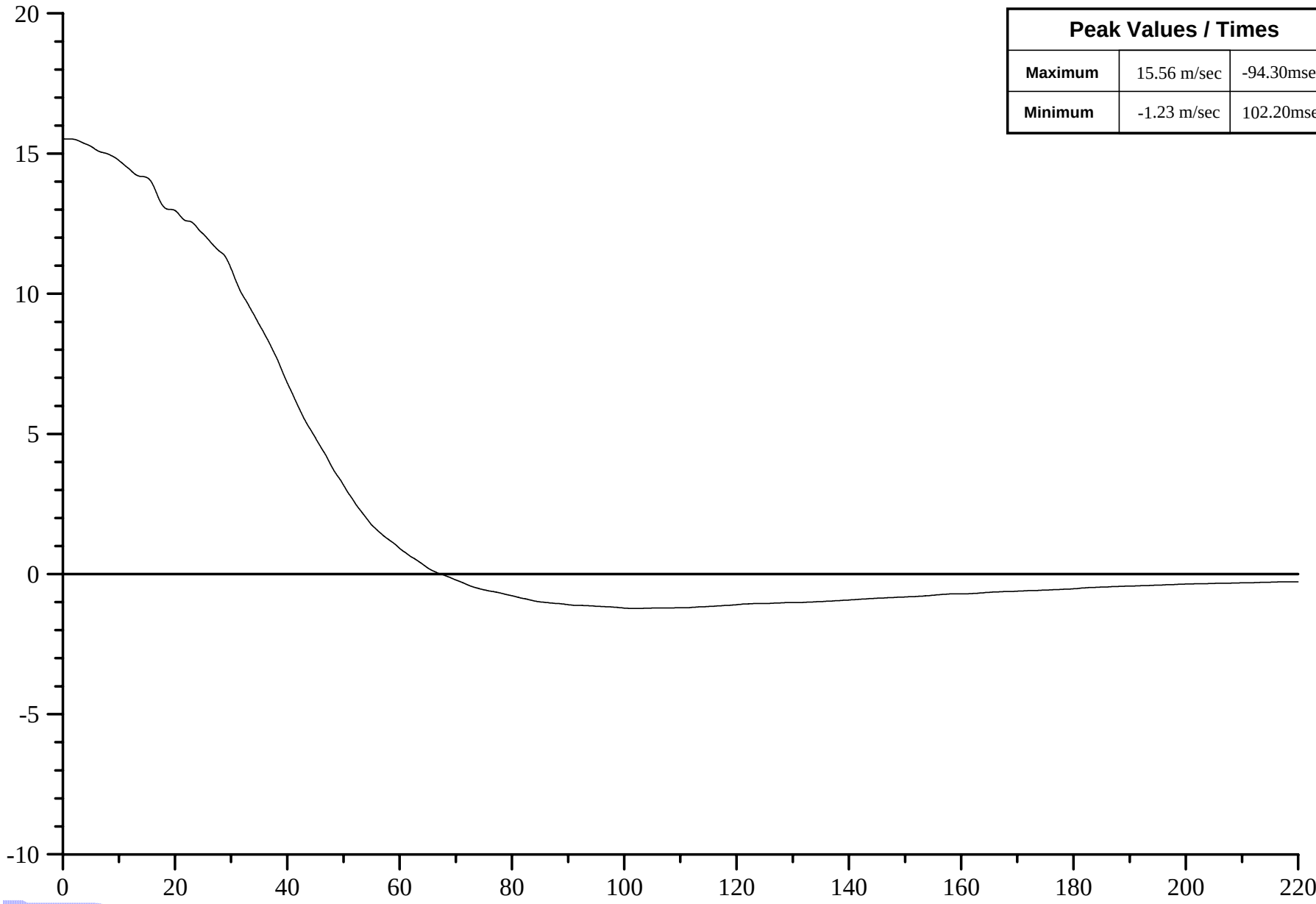
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.56 m/sec	-94.30msec
Minimum	-1.23 m/sec	102.20msec



A-Post Crude Velocity

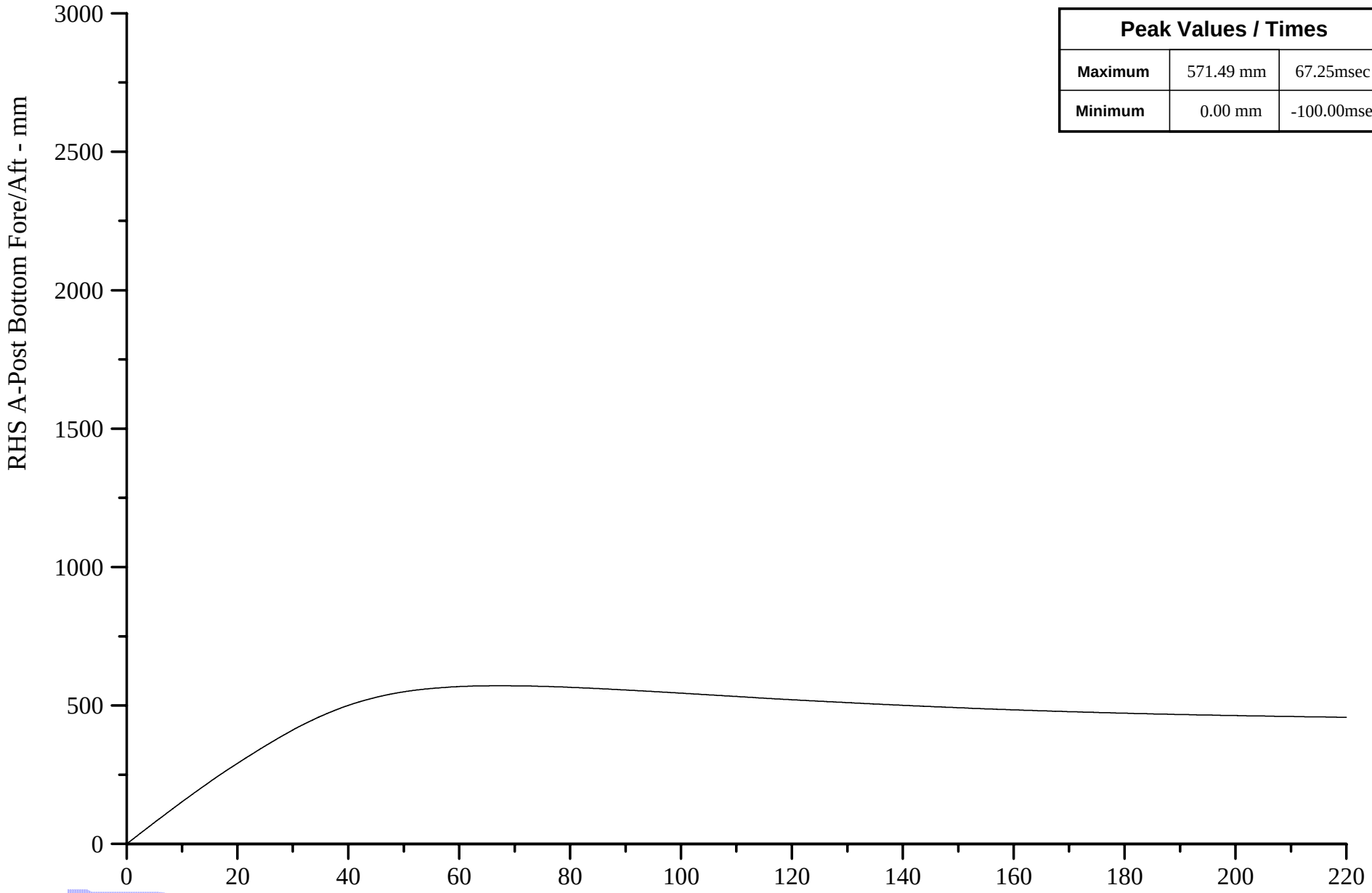
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	571.49 mm	67.25msec
Minimum	0.00 mm	-100.00msec



A-Post Crude Displacement

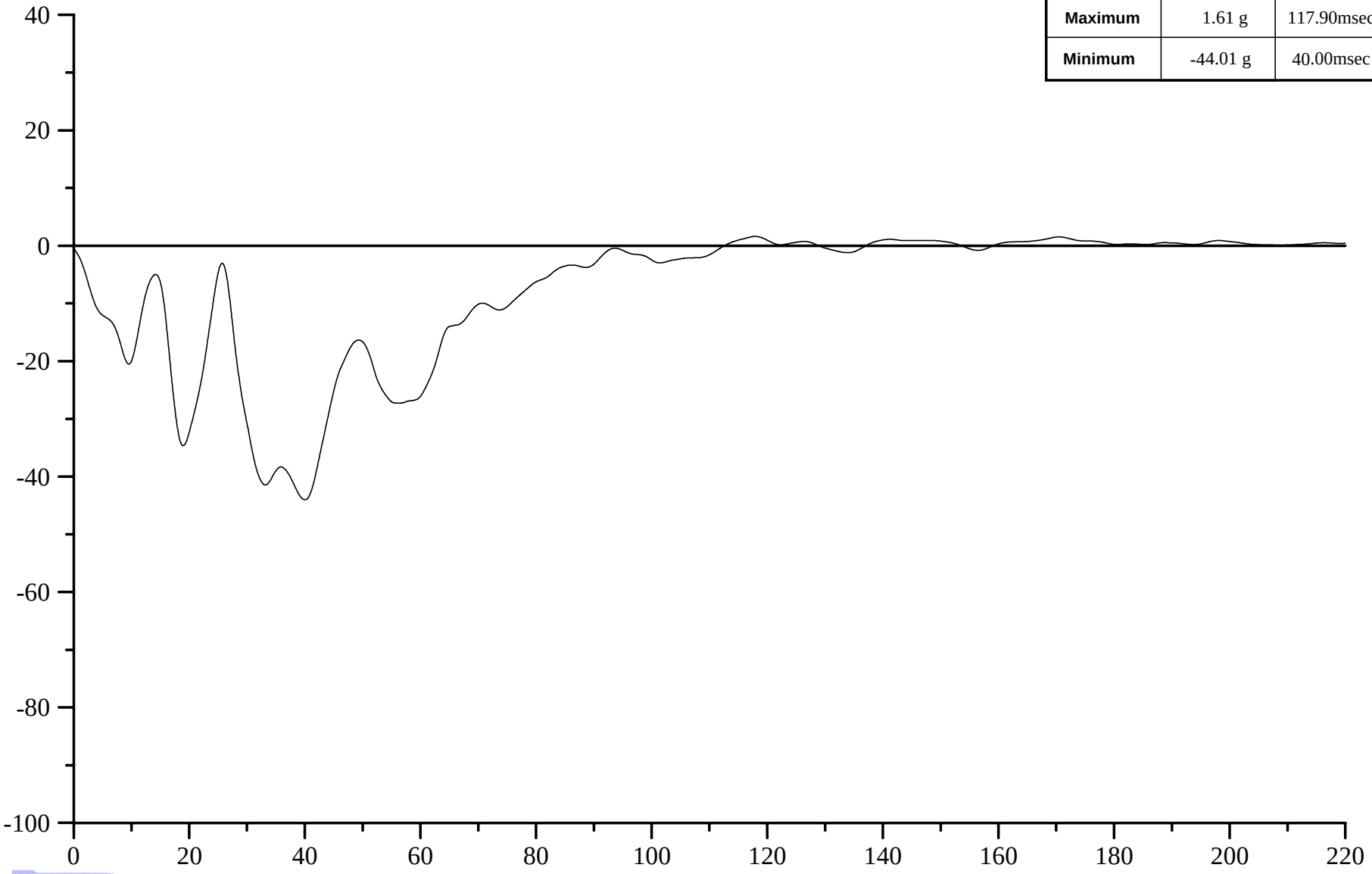
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.61 g	117.90msec
Minimum	-44.01 g	40.00msec



A-Post Acceleration

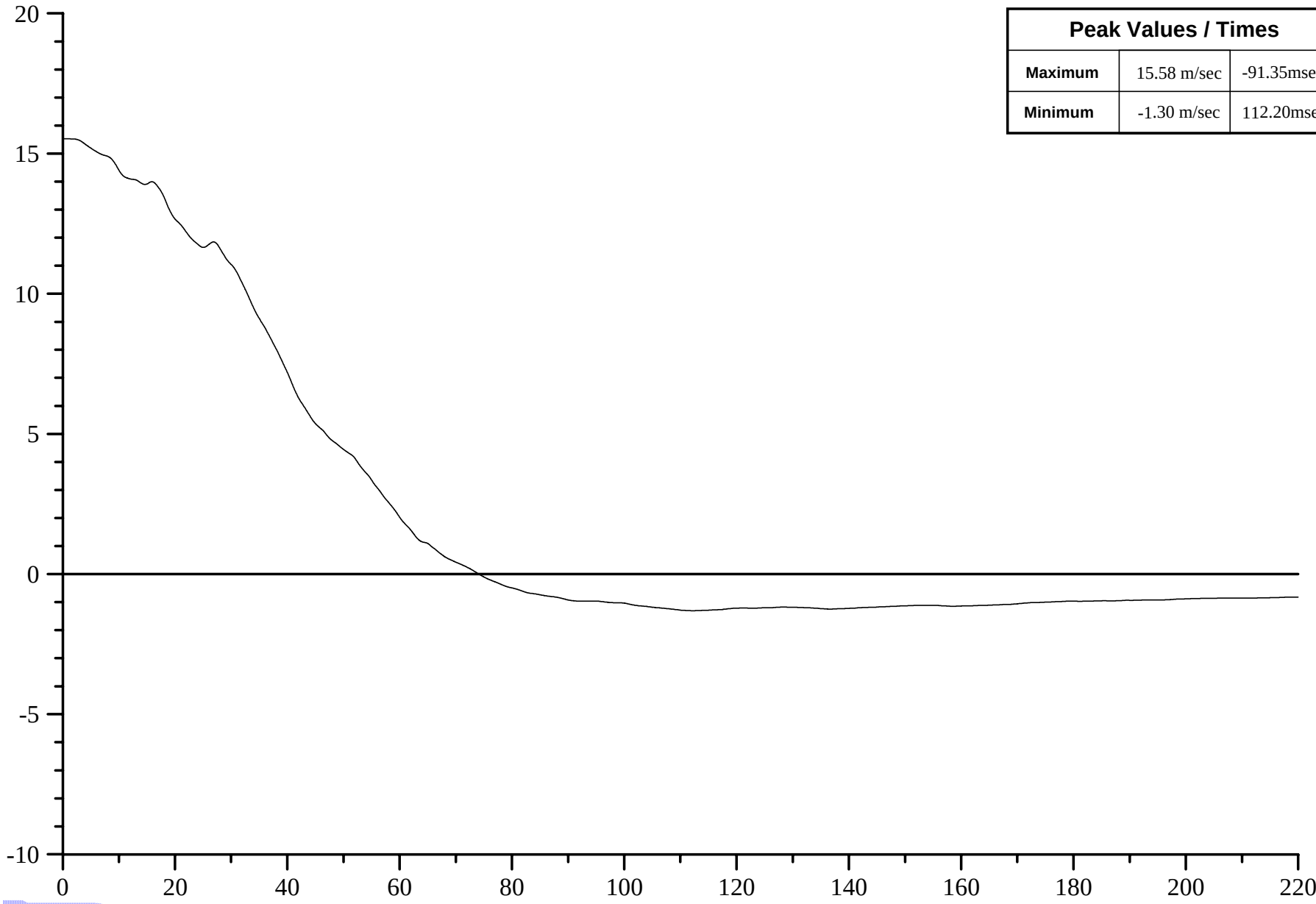
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.58 m/sec	-91.35msec
Minimum	-1.30 m/sec	112.20msec



A-Post Crude Velocity

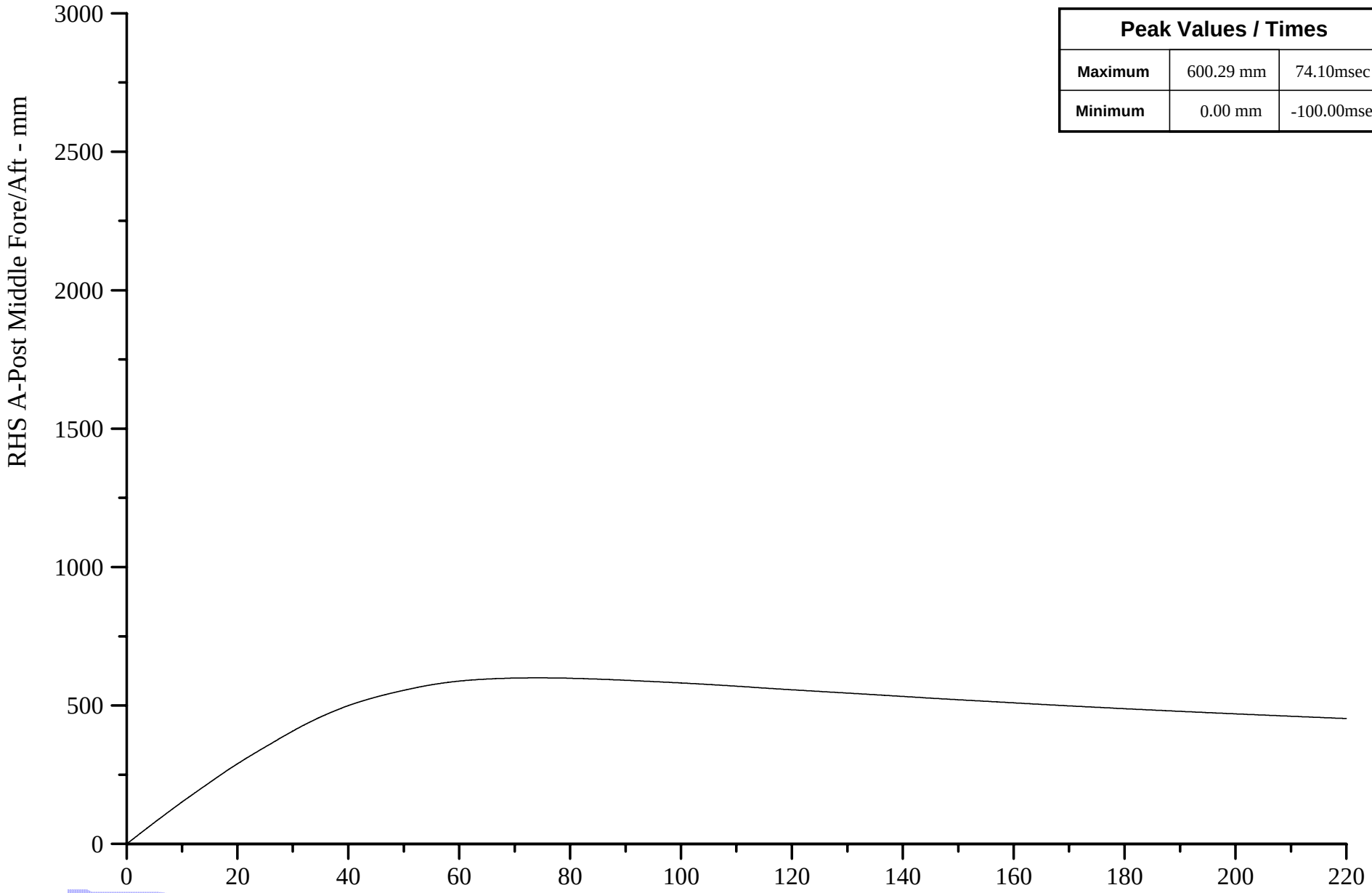
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	600.29 mm	74.10msec
Minimum	0.00 mm	-100.00msec



A-Post Crude Displacement

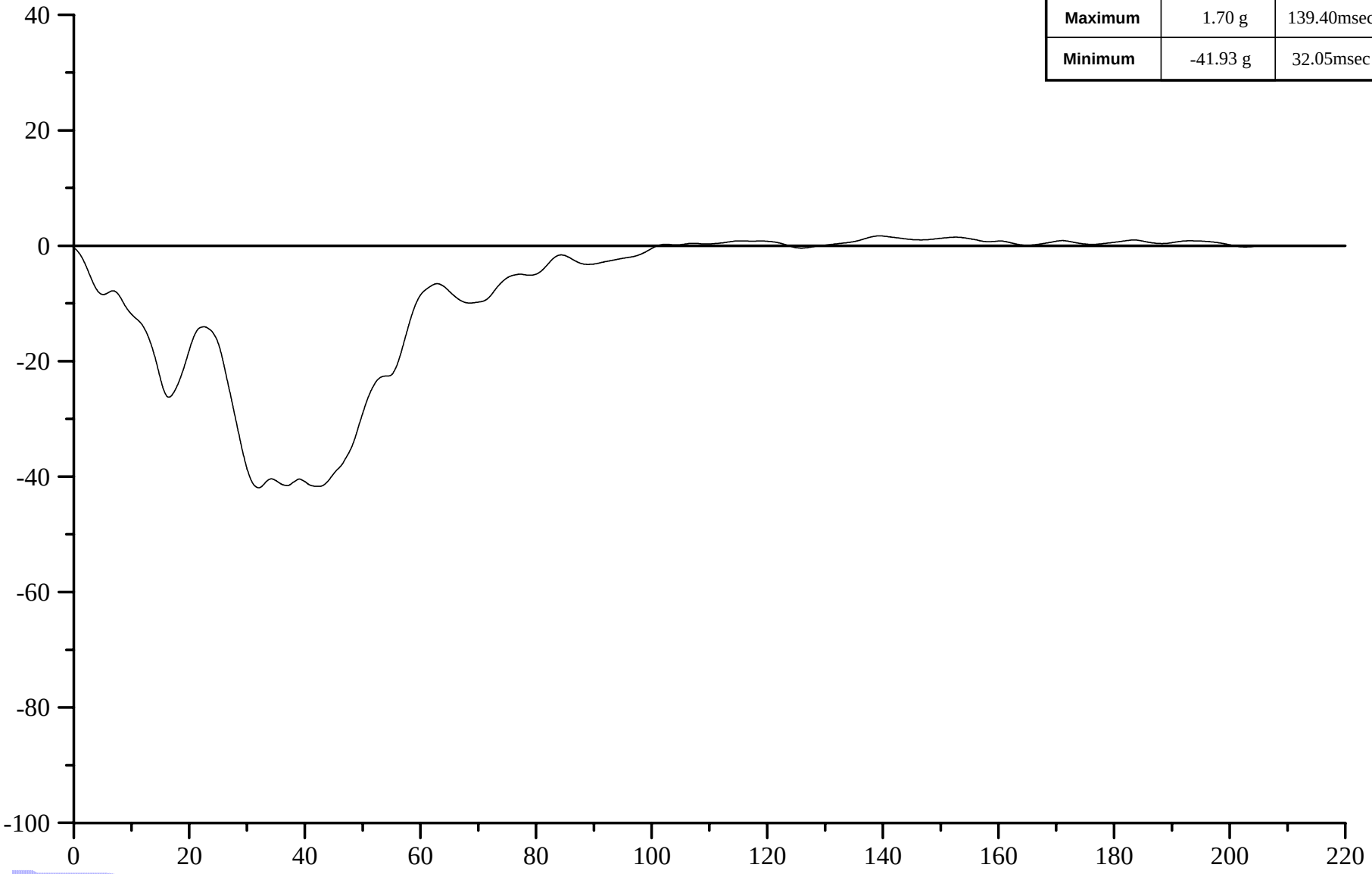
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.70 g	139.40msec
Minimum	-41.93 g	32.05msec



B-Post Acceleration

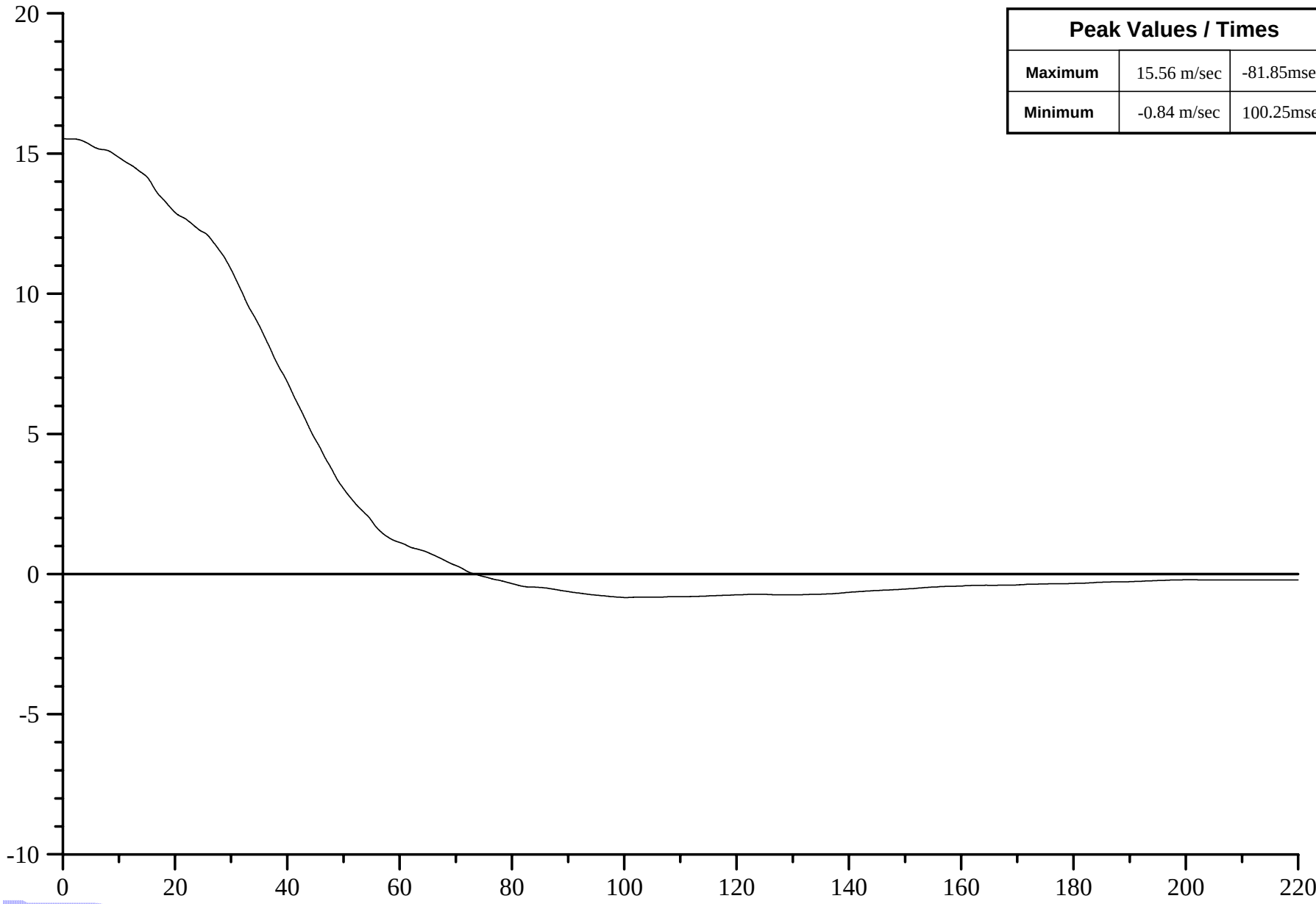
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.56 m/sec	-81.85msec
Minimum	-0.84 m/sec	100.25msec

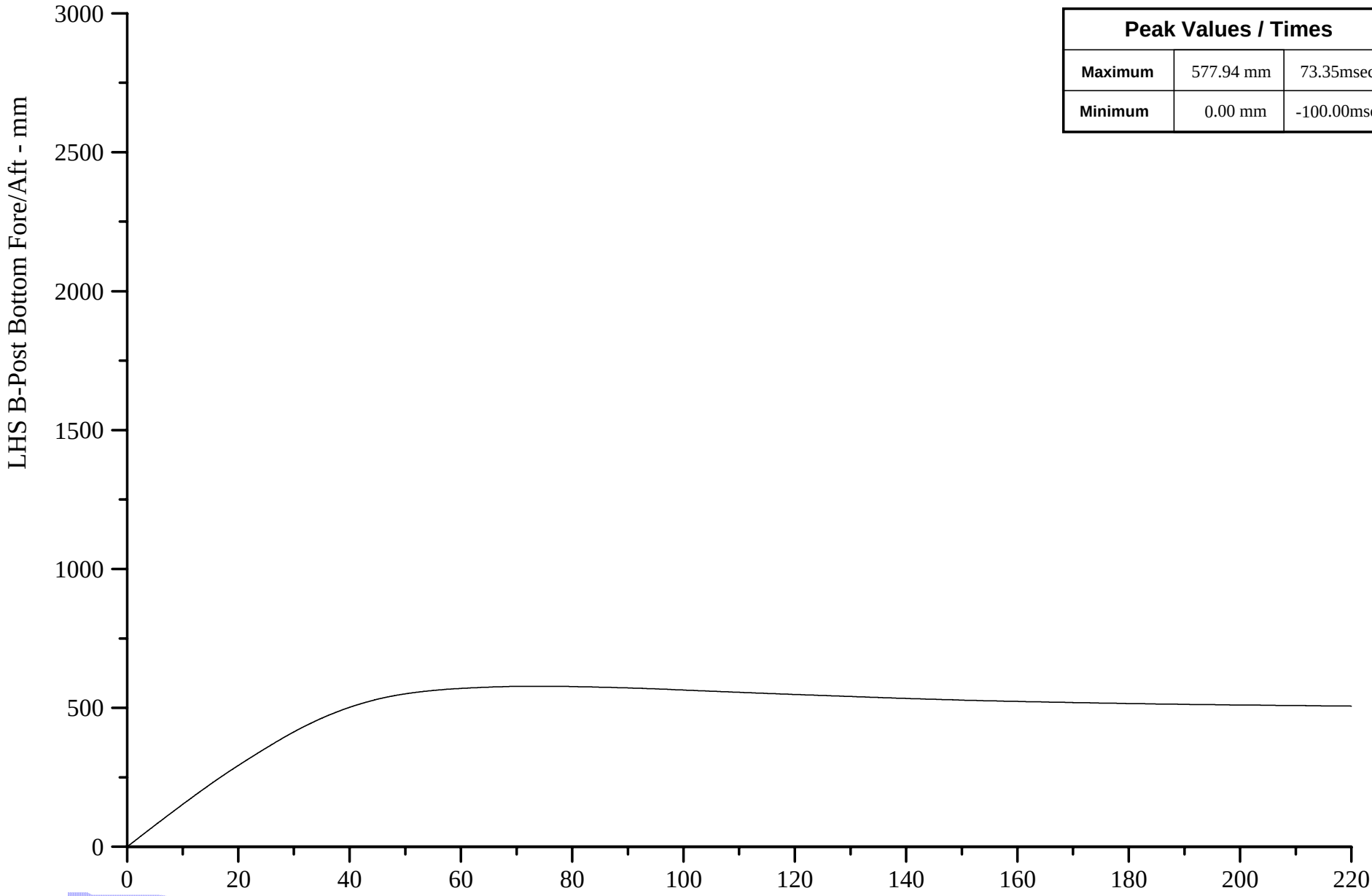


TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	577.94 mm	73.35msec
Minimum	0.00 mm	-100.00msec



B-Post Crude Displacement

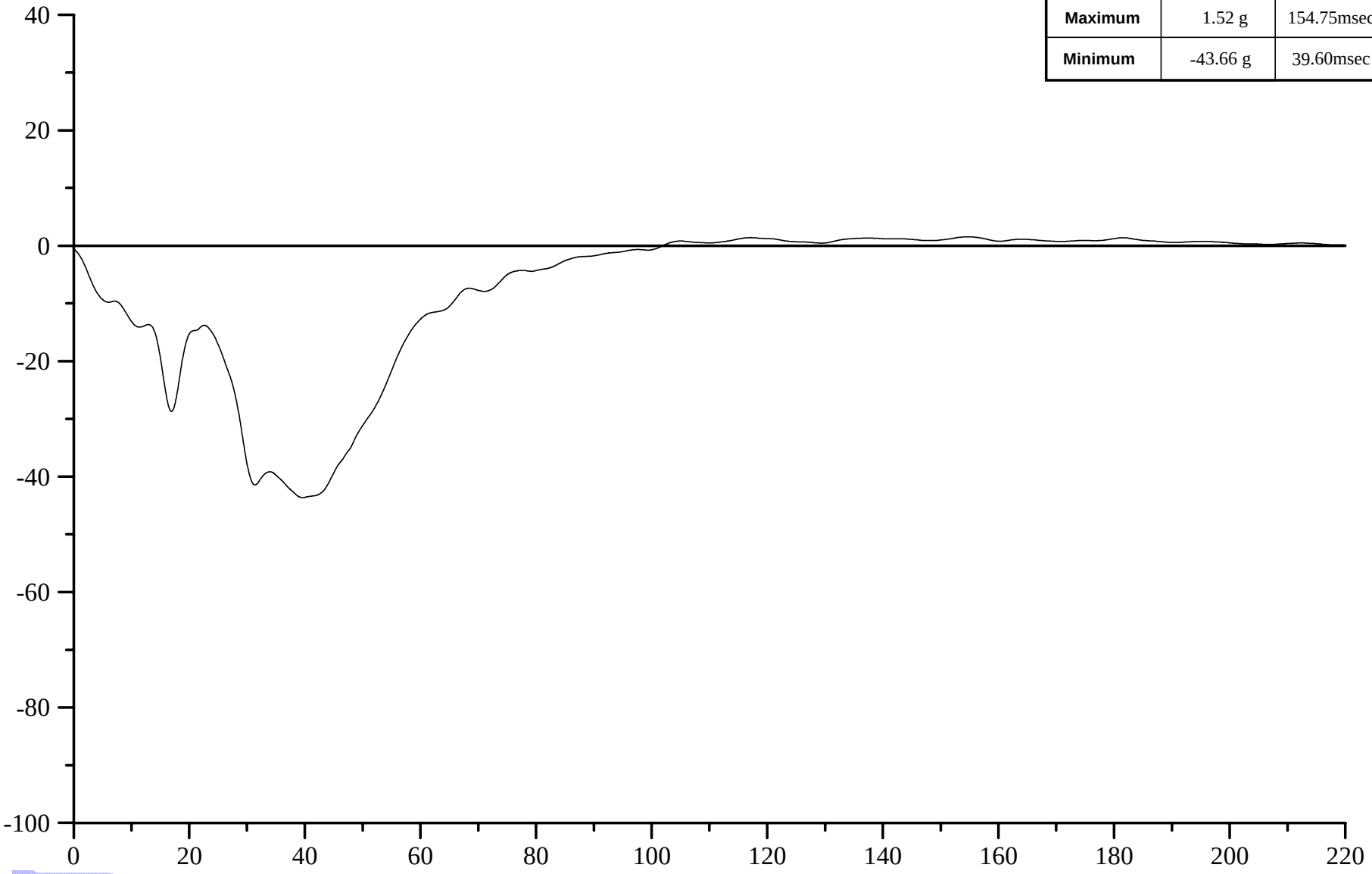
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.52 g	154.75msec
Minimum	-43.66 g	39.60msec



B-Post Acceleration

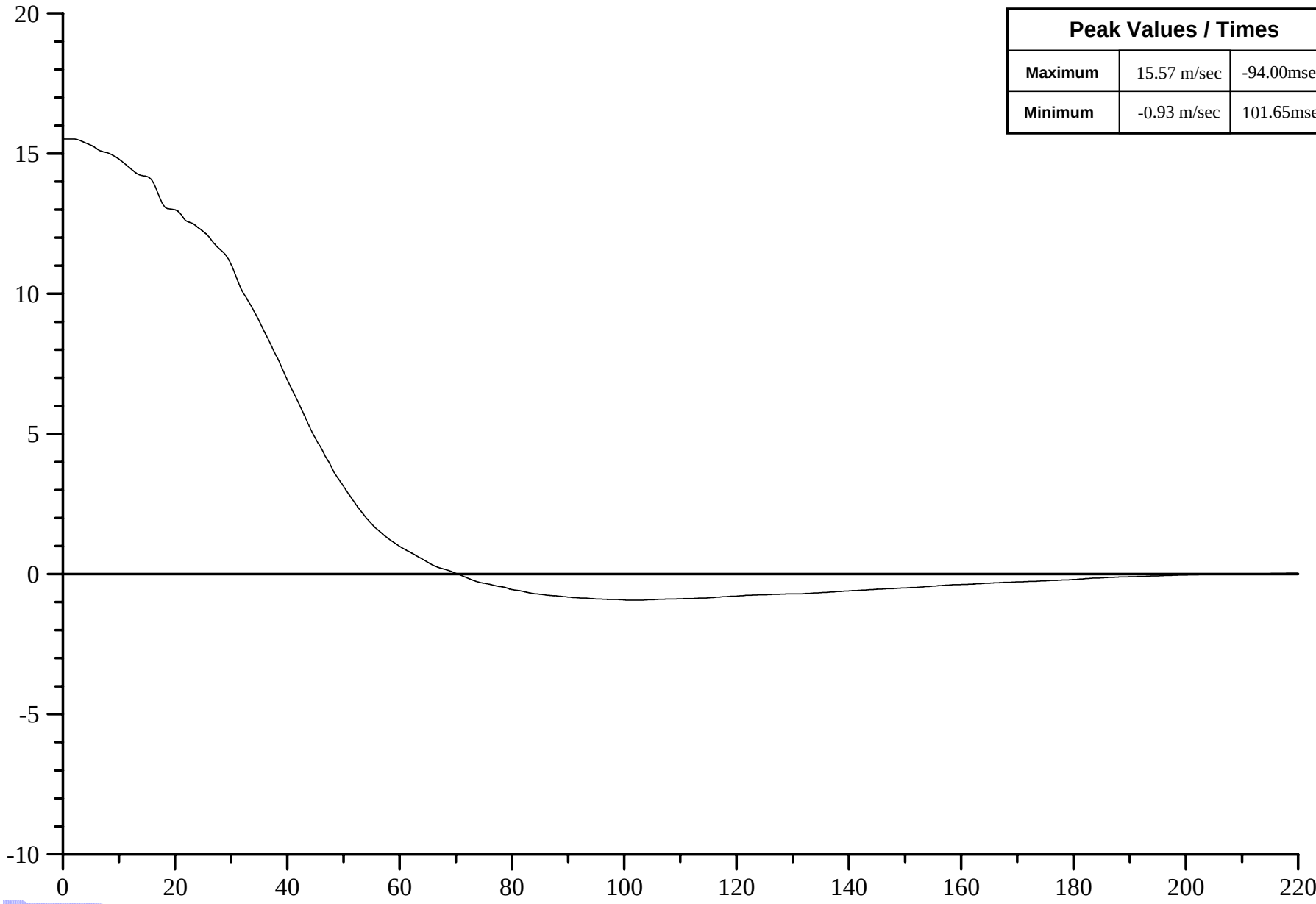
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	15.57 m/sec	-94.00msec
Minimum	-0.93 m/sec	101.65msec



B-Post Crude Velocity

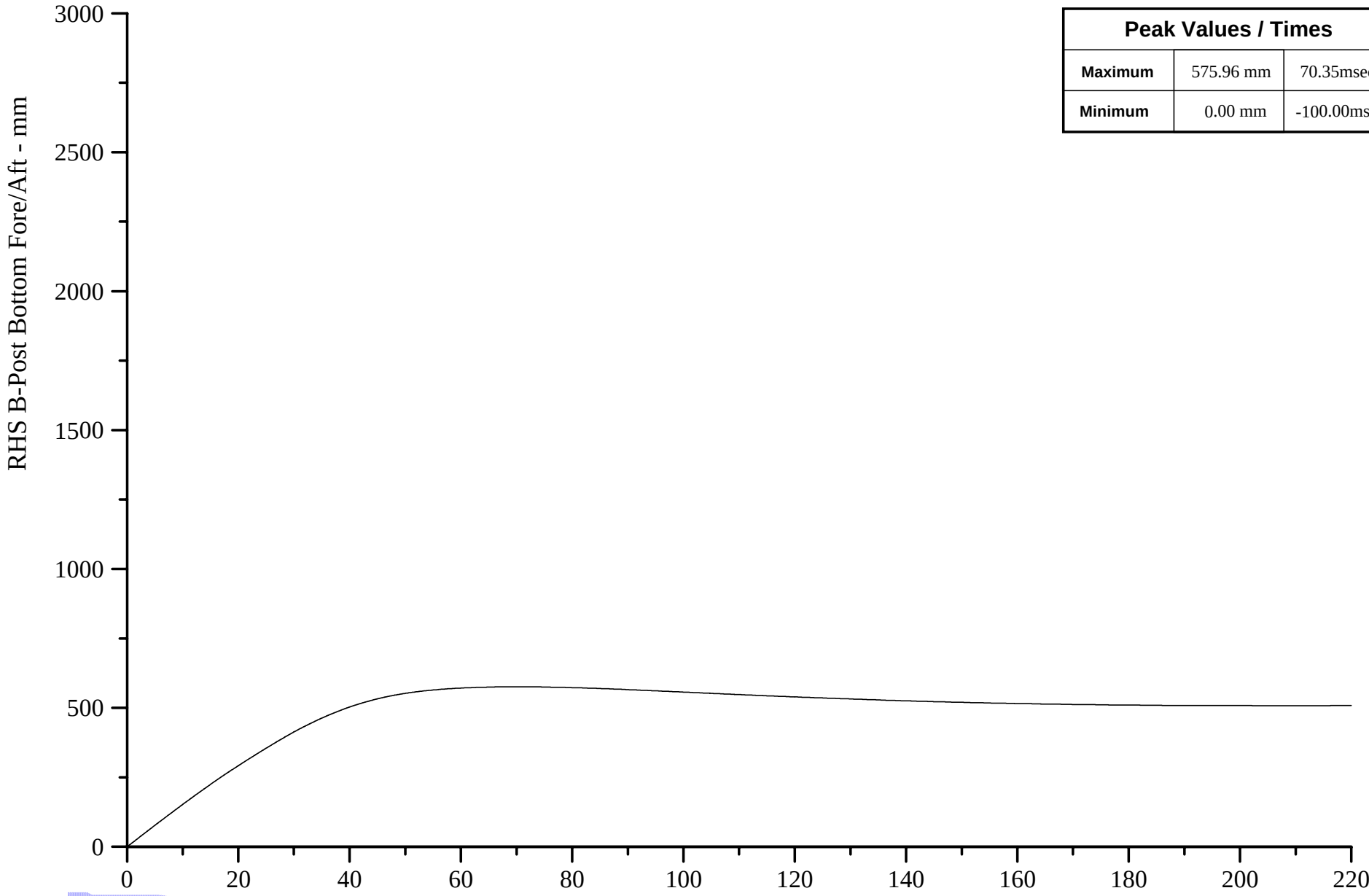
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	575.96 mm	70.35msec
Minimum	0.00 mm	-100.00msec



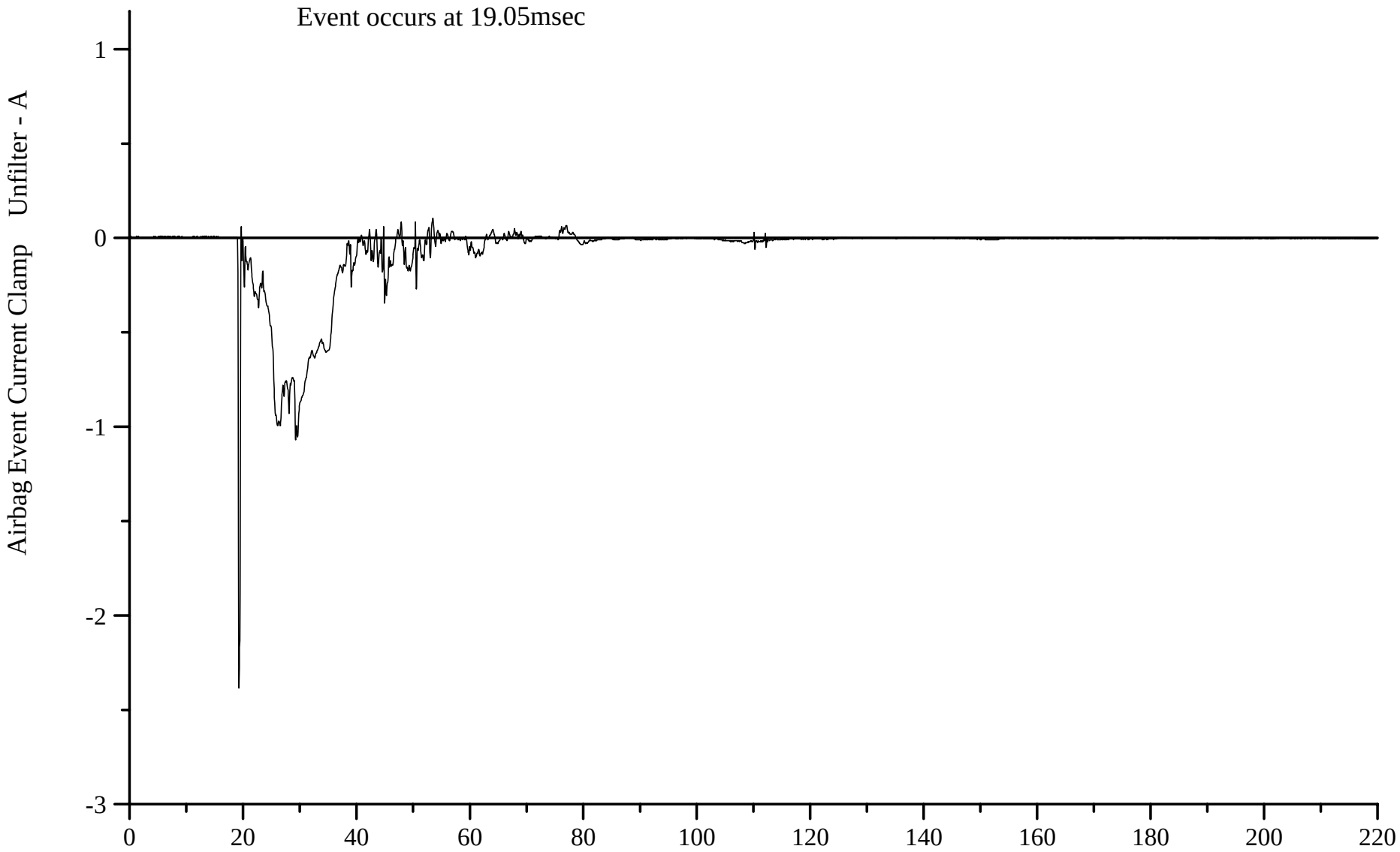
B-Post Crude Displacement

Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

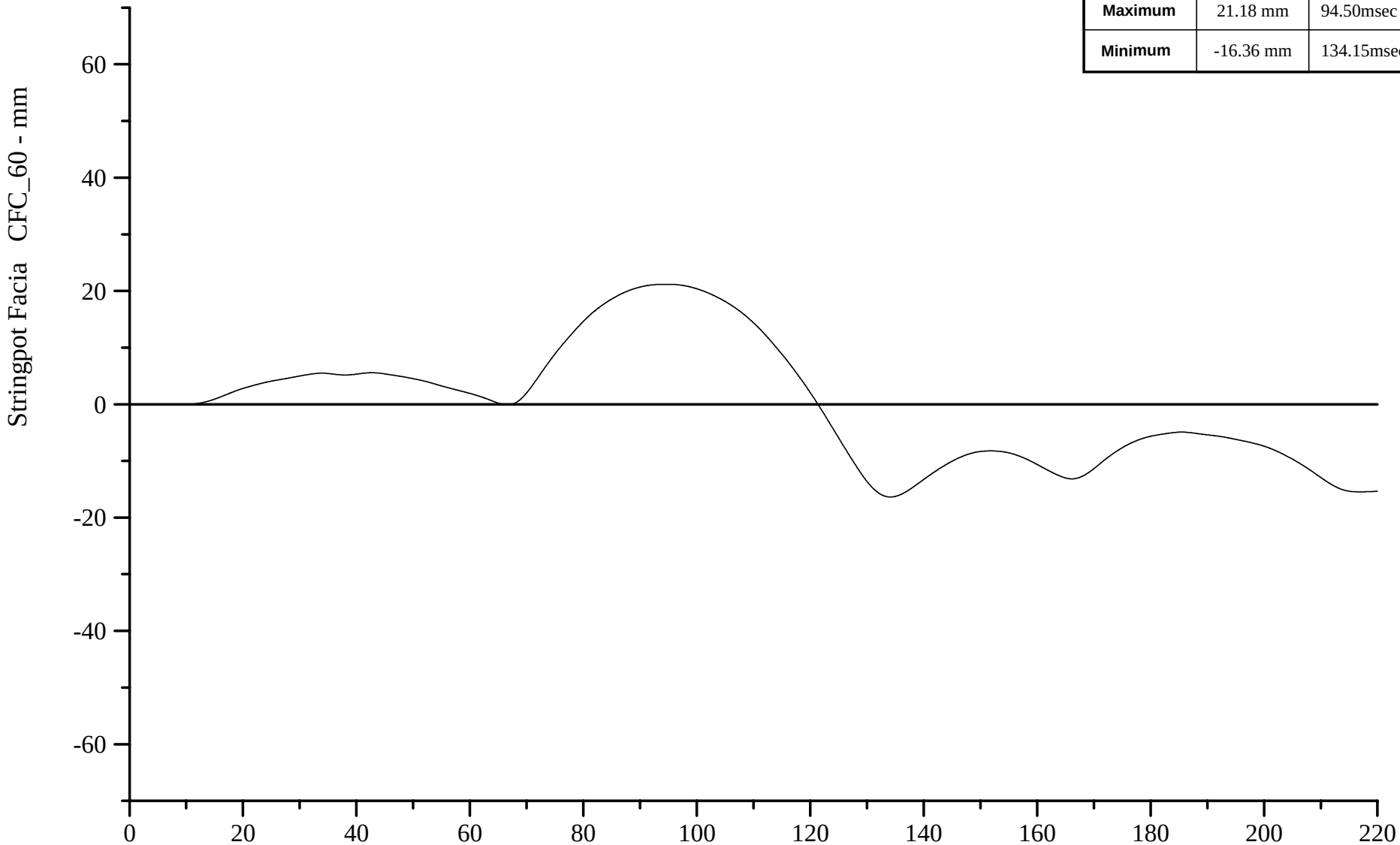


Airbag Event

Unfiltered Data

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	21.18 mm	94.50msec
Minimum	-16.36 mm	134.15msec

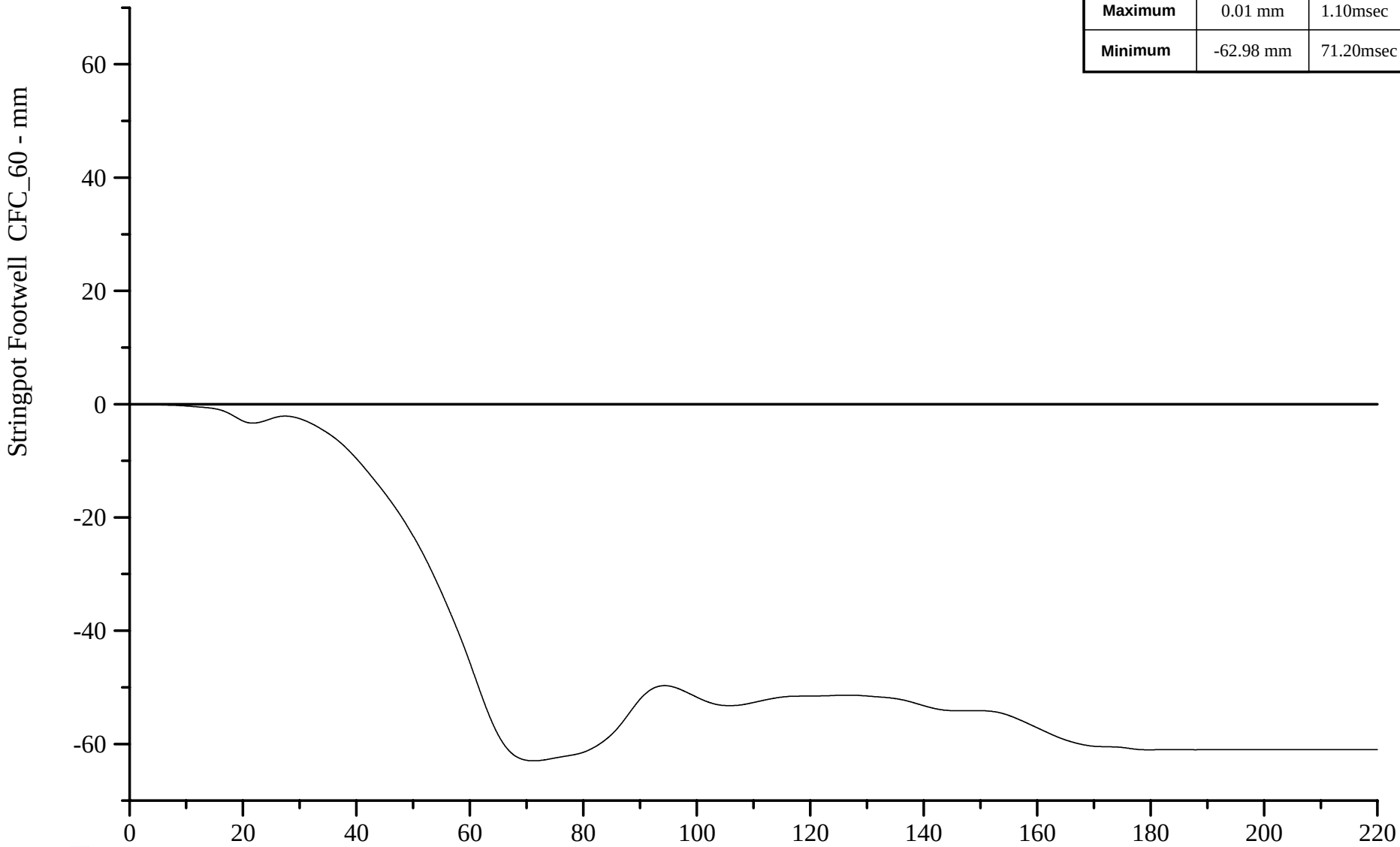


TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.01 mm	1.10msec
Minimum	-62.98 mm	71.20msec



Footwell Intrusion

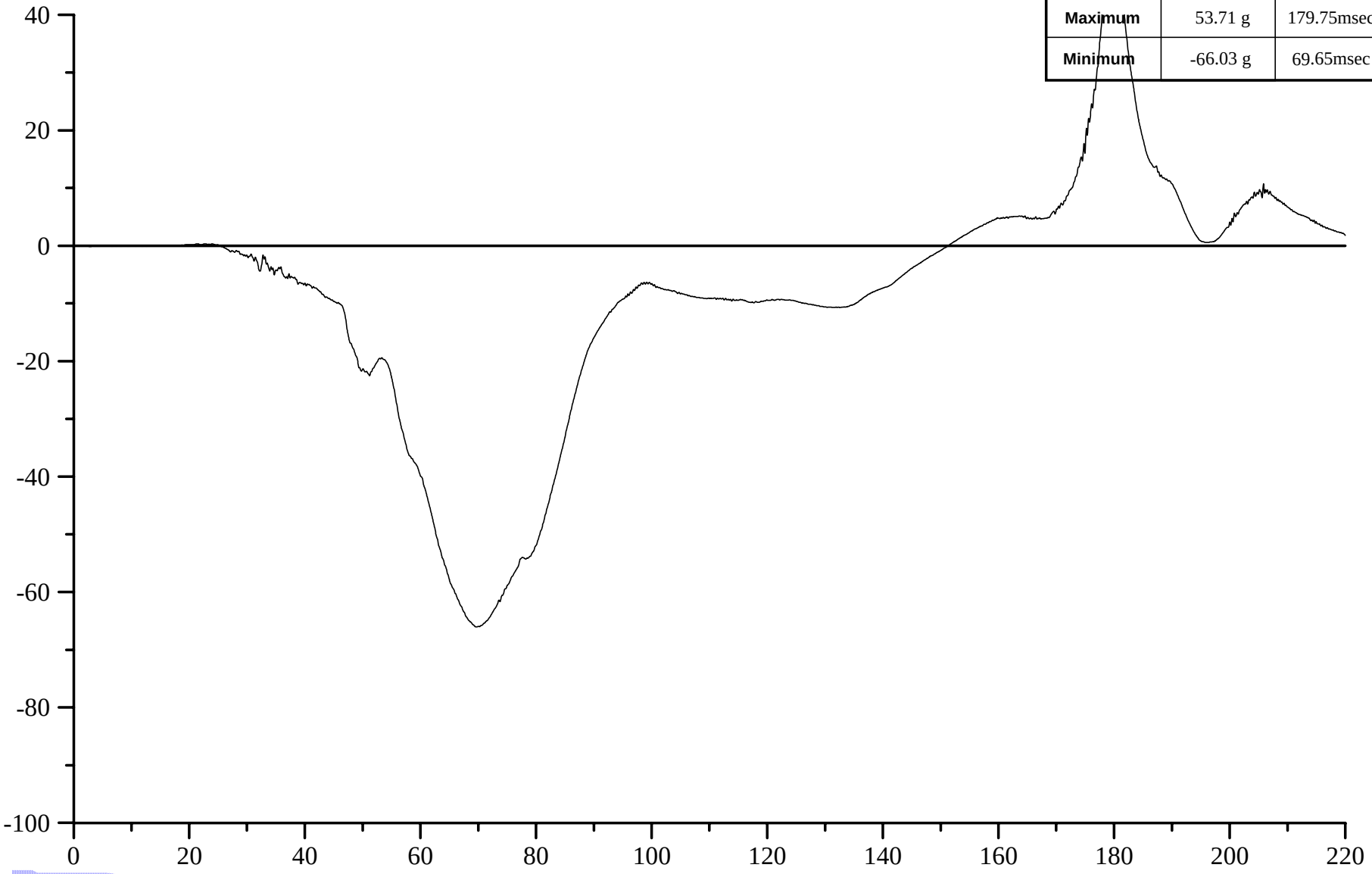
Filtered at CFC_60

TRANSPORT RESEARCH LABORATORY

Processed on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	53.71 g	179.75msec
Minimum	-66.03 g	69.65msec



Head Acceleration

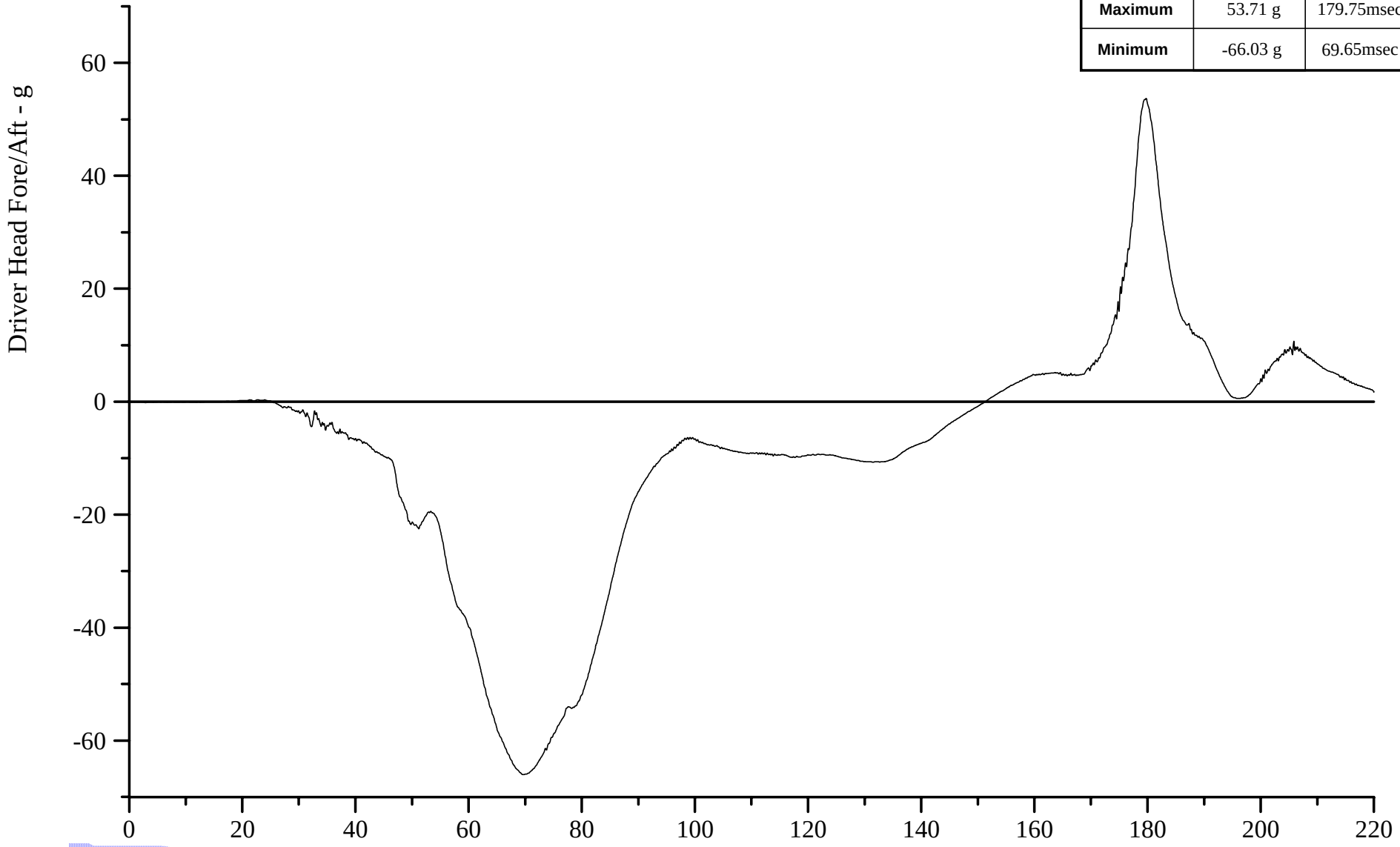
Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	53.71 g	179.75msec
Minimum	-66.03 g	69.65msec



Head Acceleration

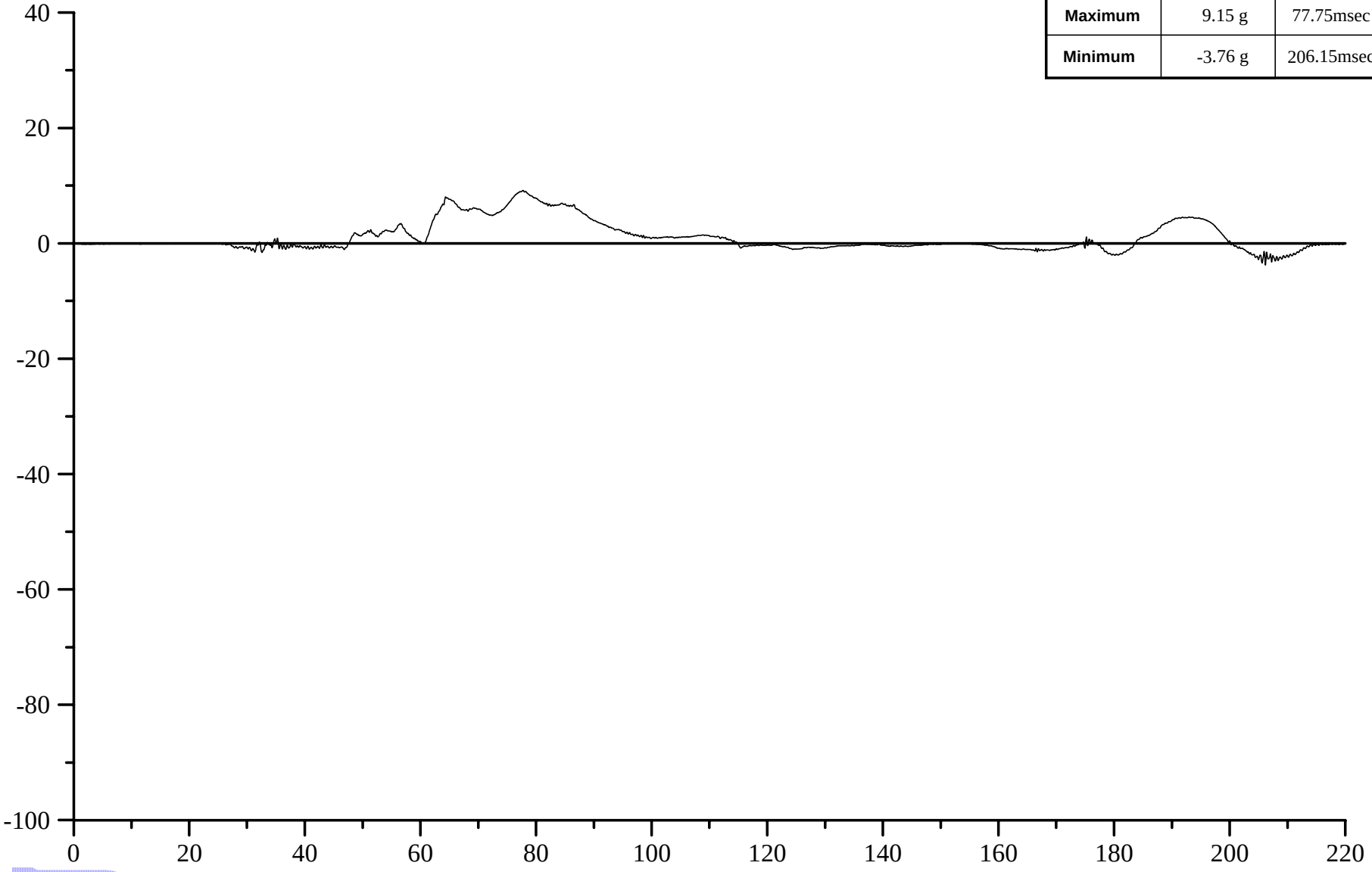
Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	9.15 g	77.75msec
Minimum	-3.76 g	206.15msec



Head Acceleration

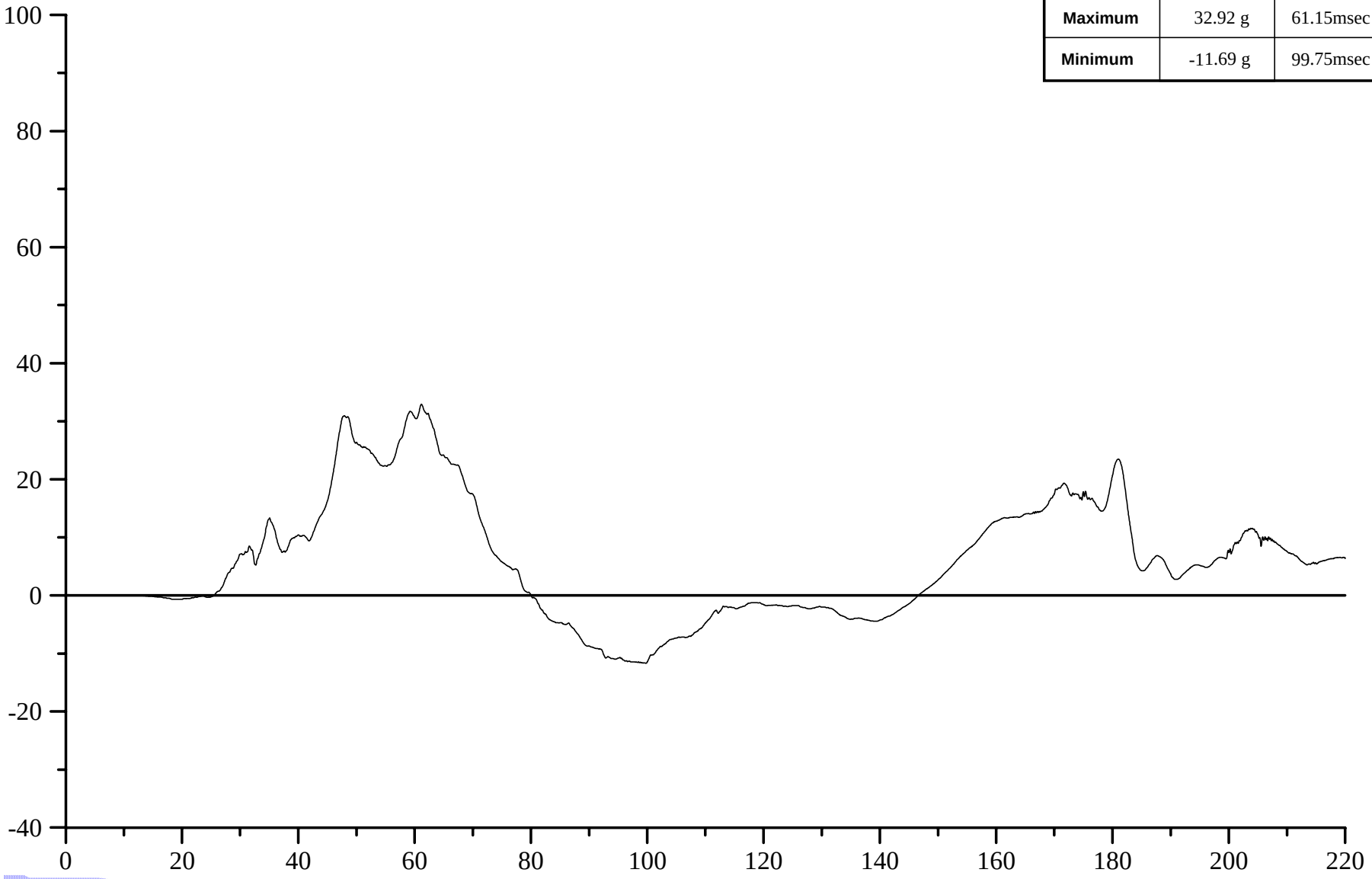
Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	32.92 g	61.15msec
Minimum	-11.69 g	99.75msec



TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

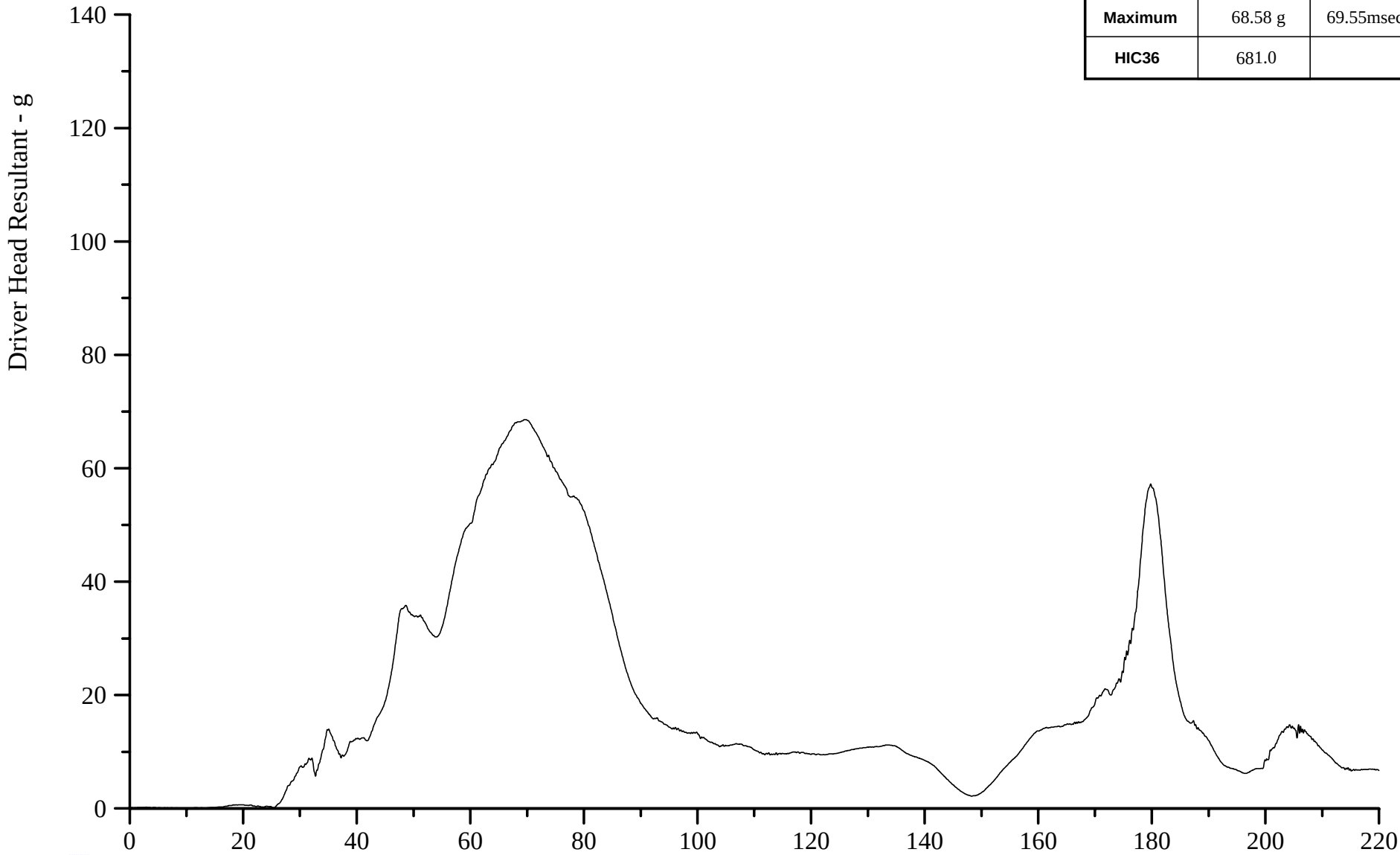
Head Acceleration

Filtered at CFC_1000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

3 msec positive exceedence: 67.7 g

Peak Value / Times / HIC36		
Maximum	68.58 g	69.55msec
HIC36	681.0	



Head Acceleration

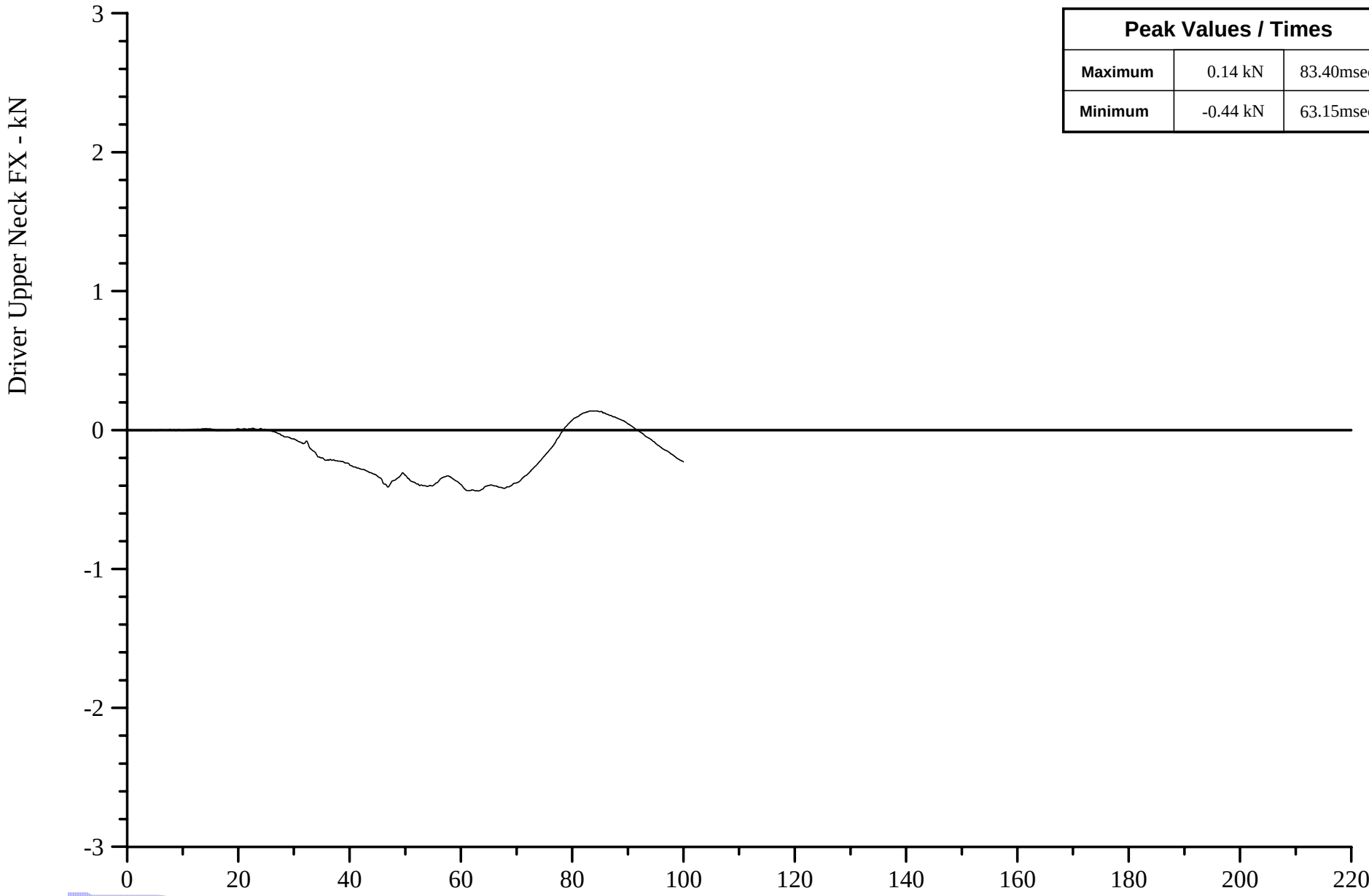
Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.14 kN	83.40msec
Minimum	-0.44 kN	63.15msec



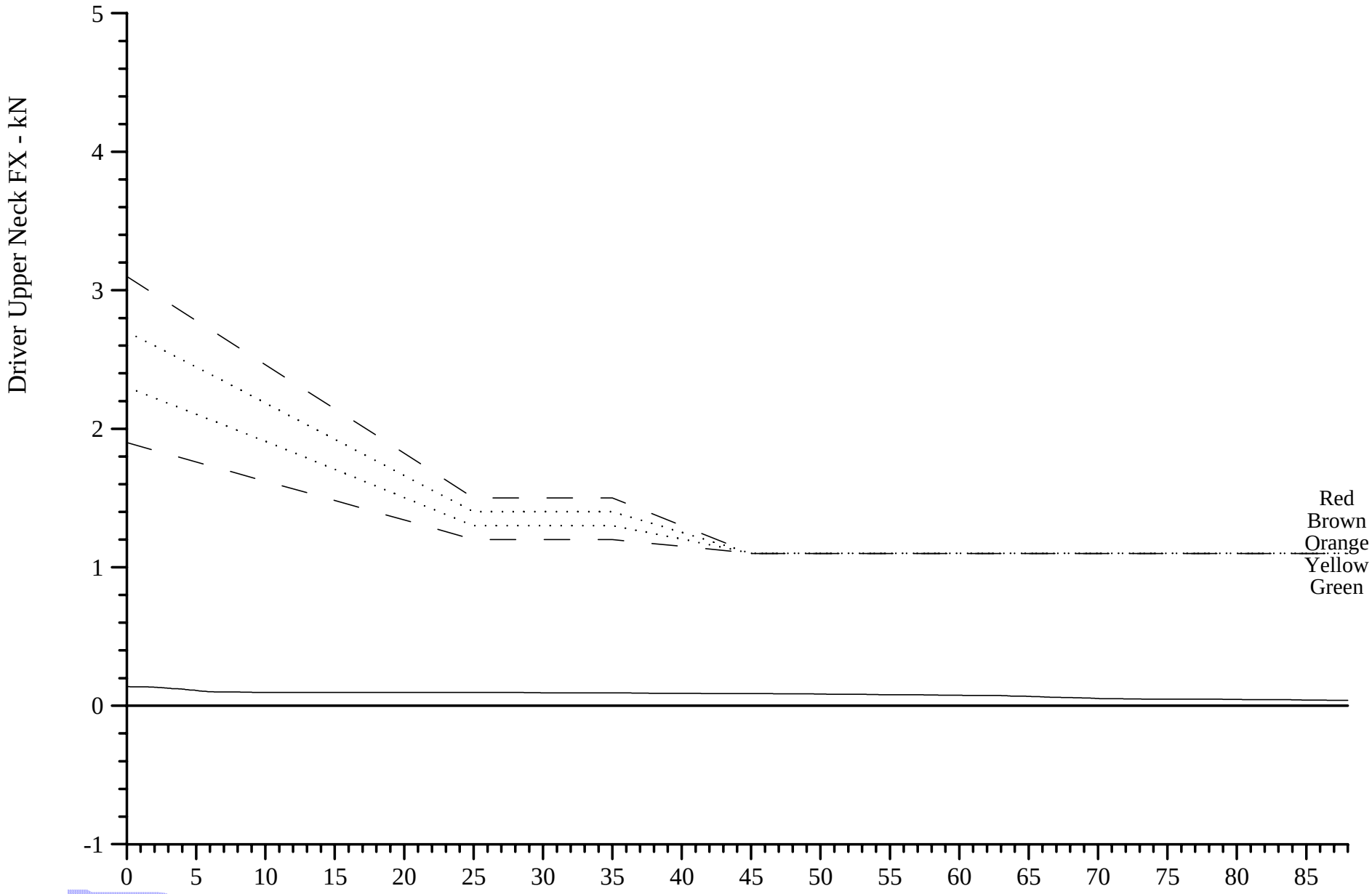
Upper Neck Force

Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

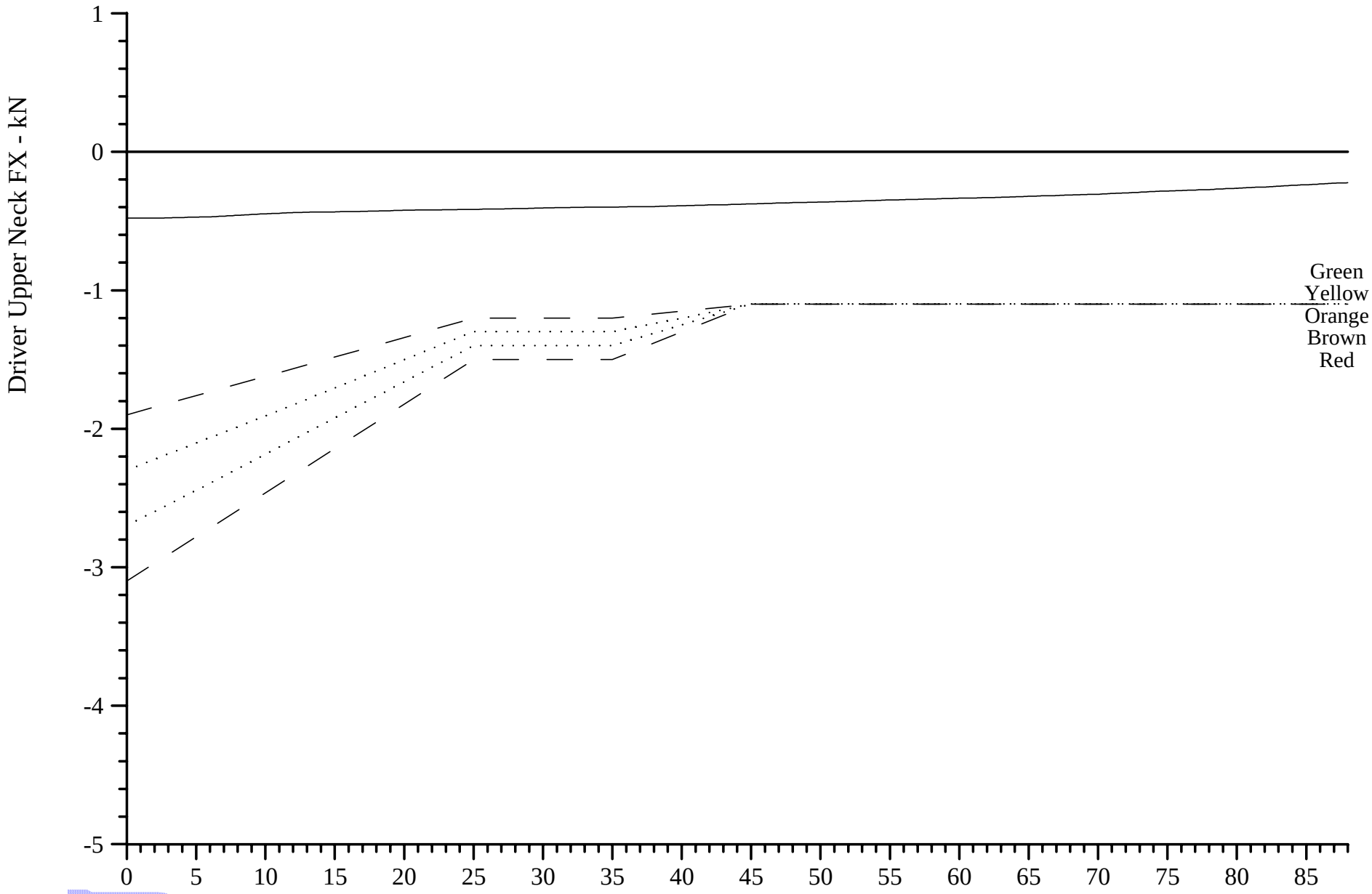


Filtered at CFC_1000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000



Negative Cumulative Exceedence Time

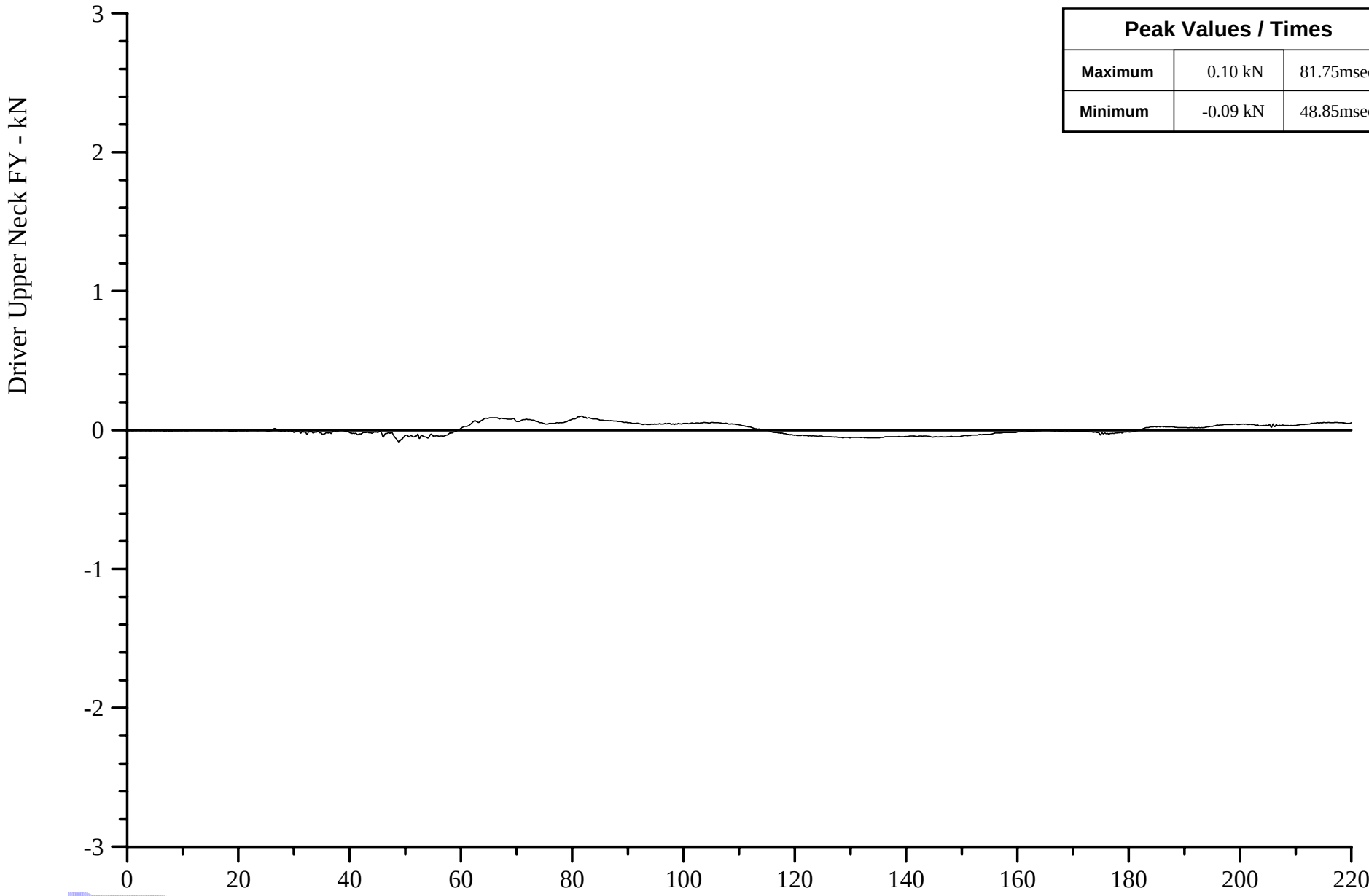
Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.10 kN	81.75msec
Minimum	-0.09 kN	48.85msec



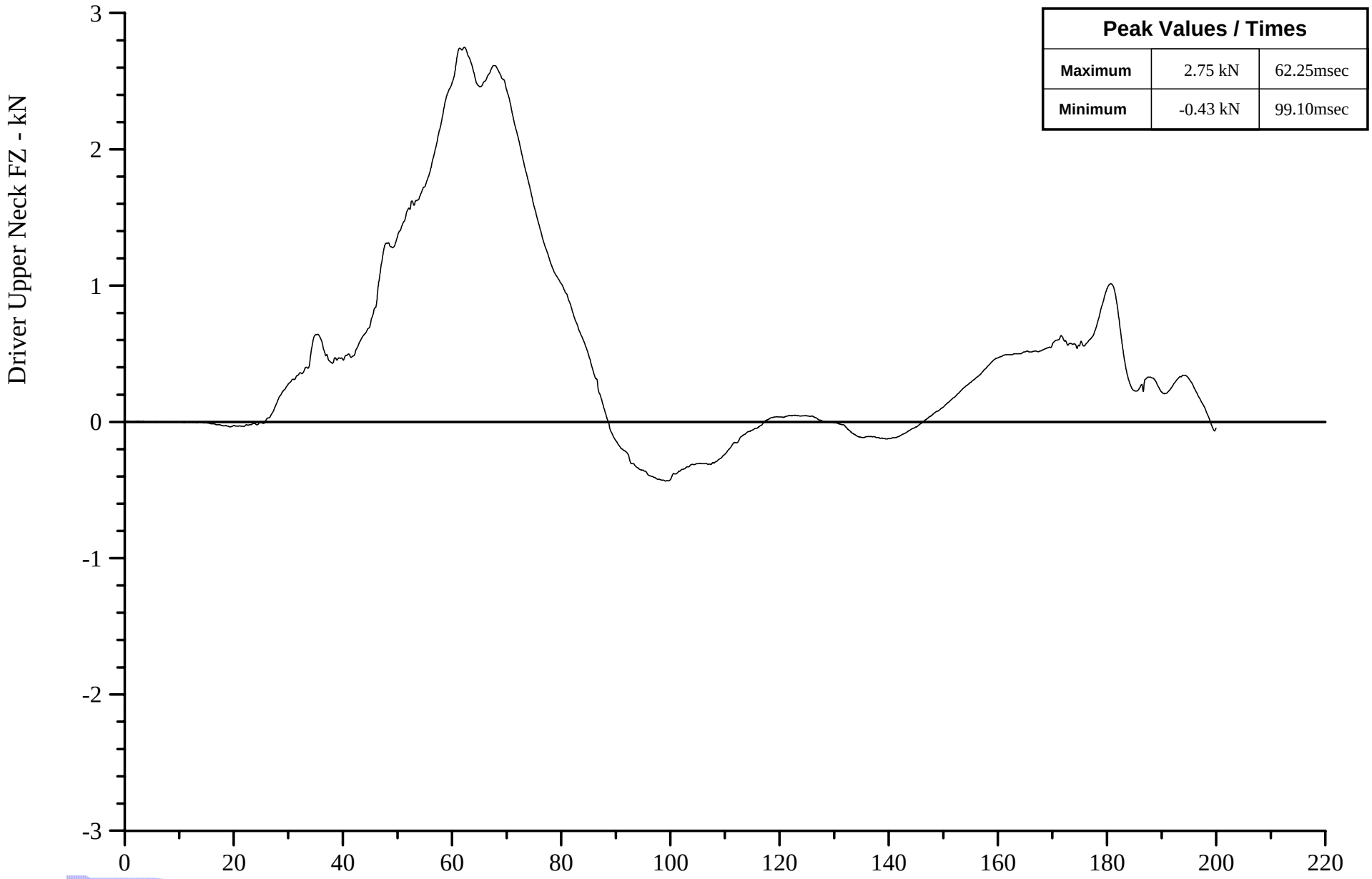
Upper Neck Force

Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



Peak Values / Times		
Maximum	2.75 kN	62.25msec
Minimum	-0.43 kN	99.10msec

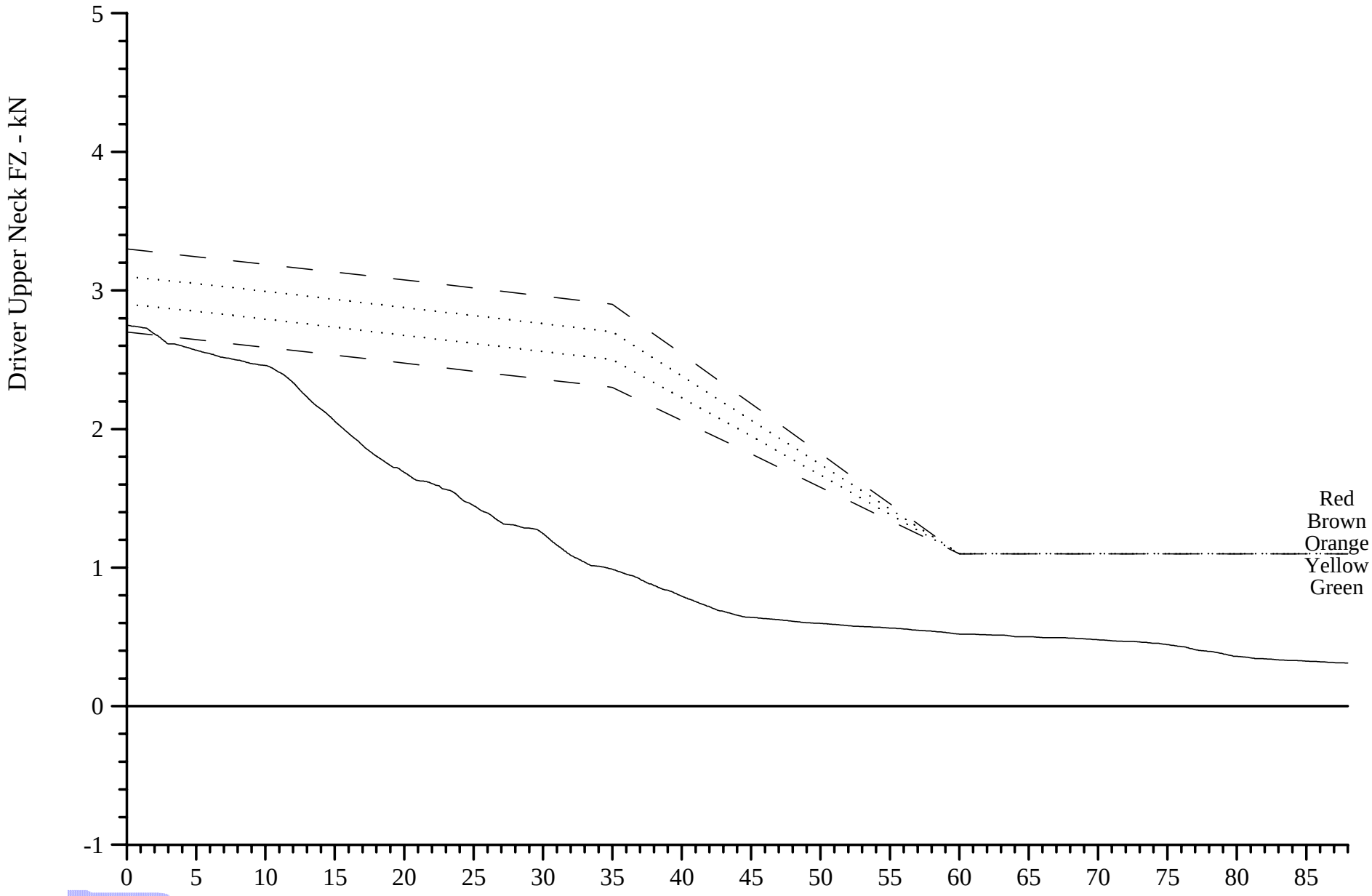
TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

Upper Neck Force

Filtered at CFC_1000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



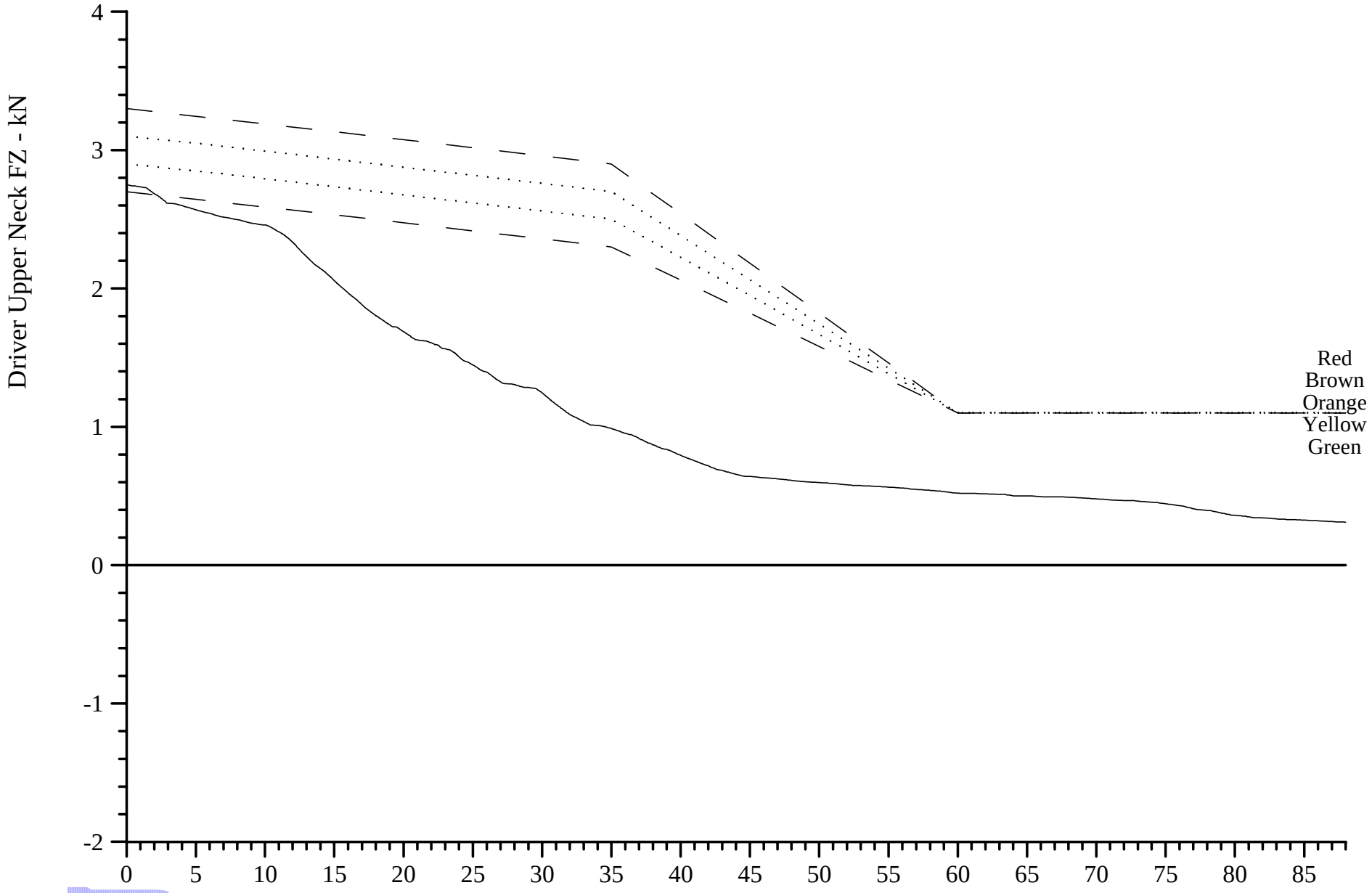
Positive Cumulative Exceedence Time

Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

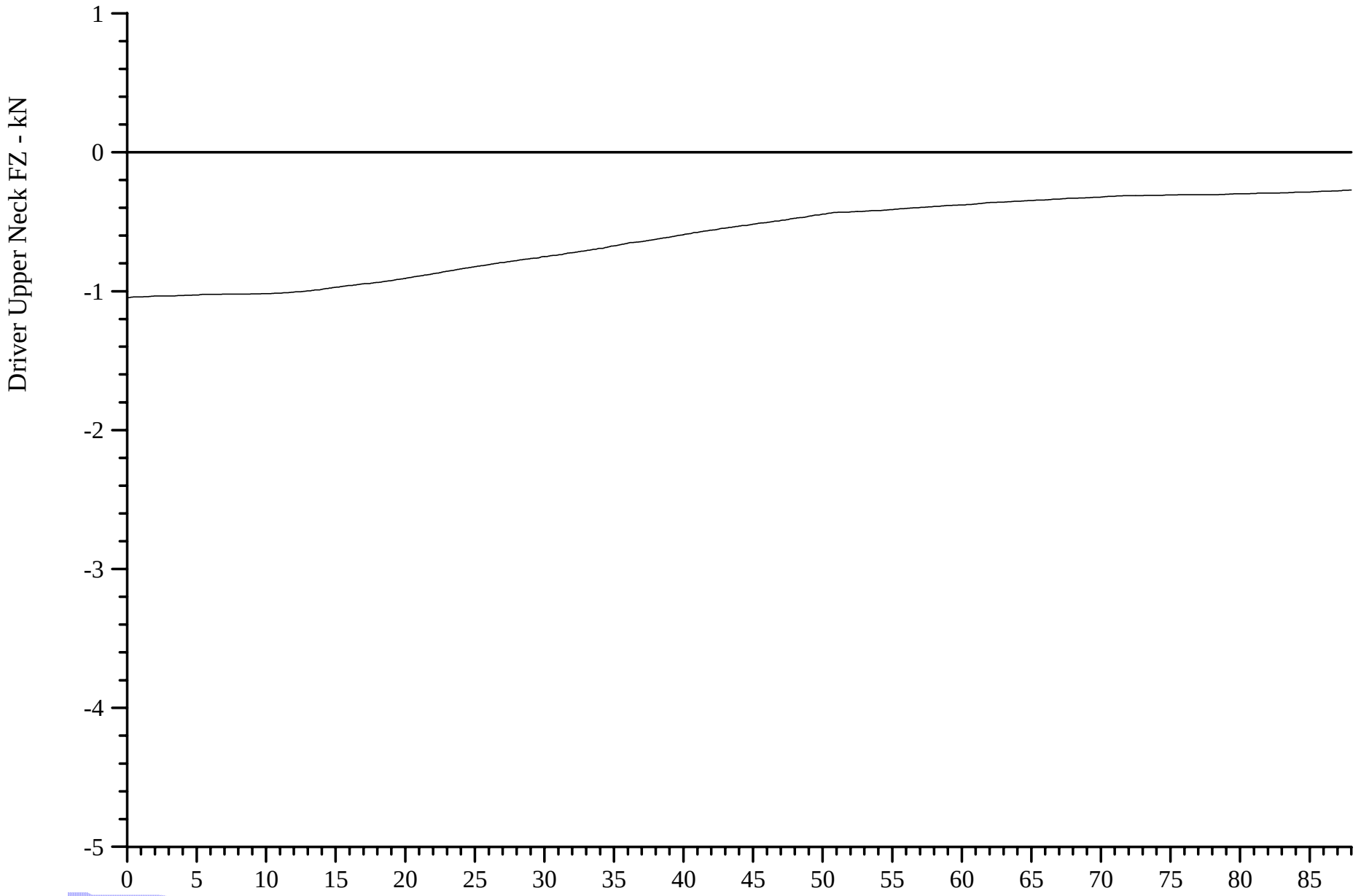


TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

Filtered at CFC_1000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



Negative Cumulative Exceedence Time

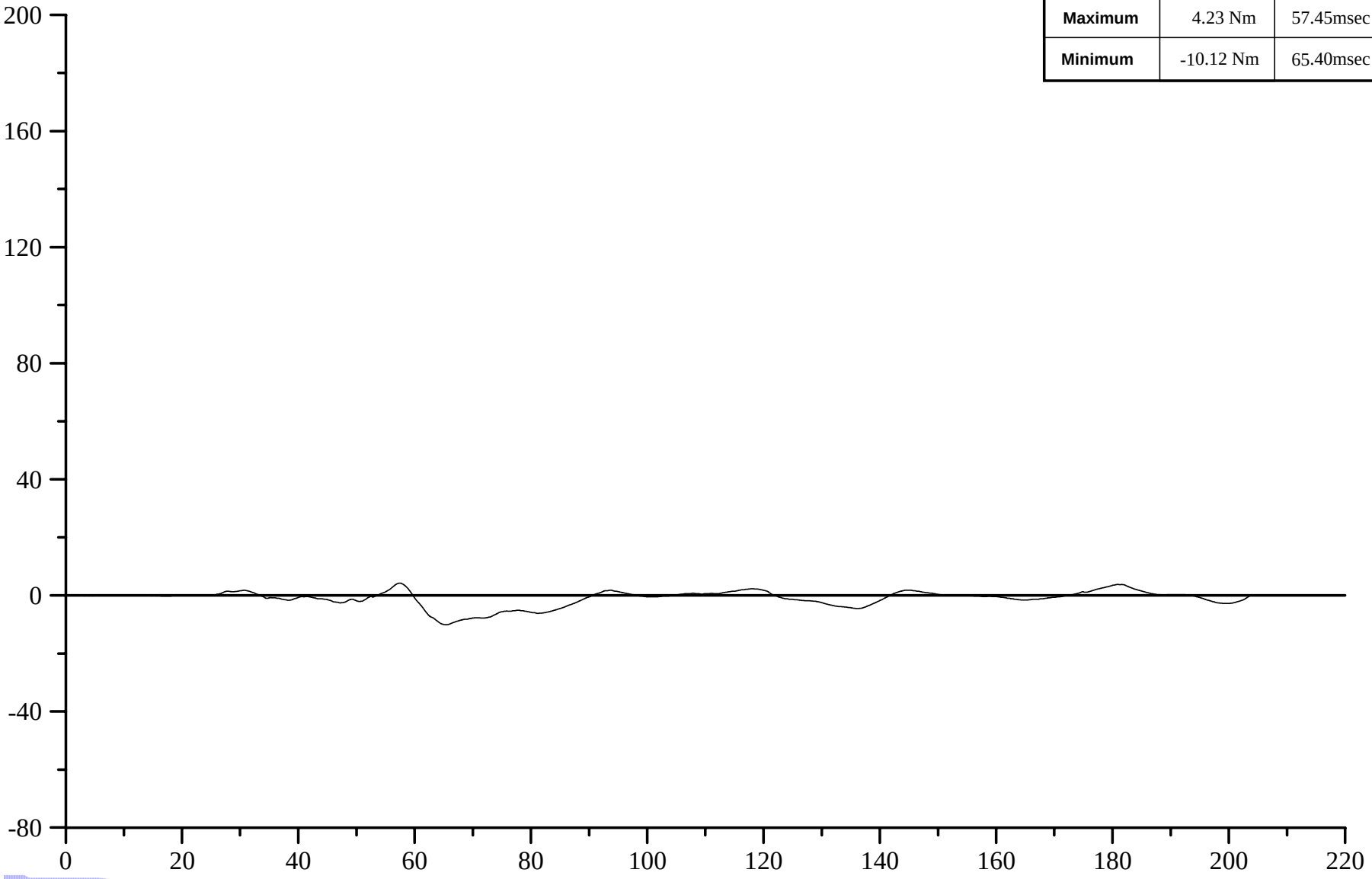
Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	4.23 Nm	57.45msec
Minimum	-10.12 Nm	65.40msec



Upper Neck Moment

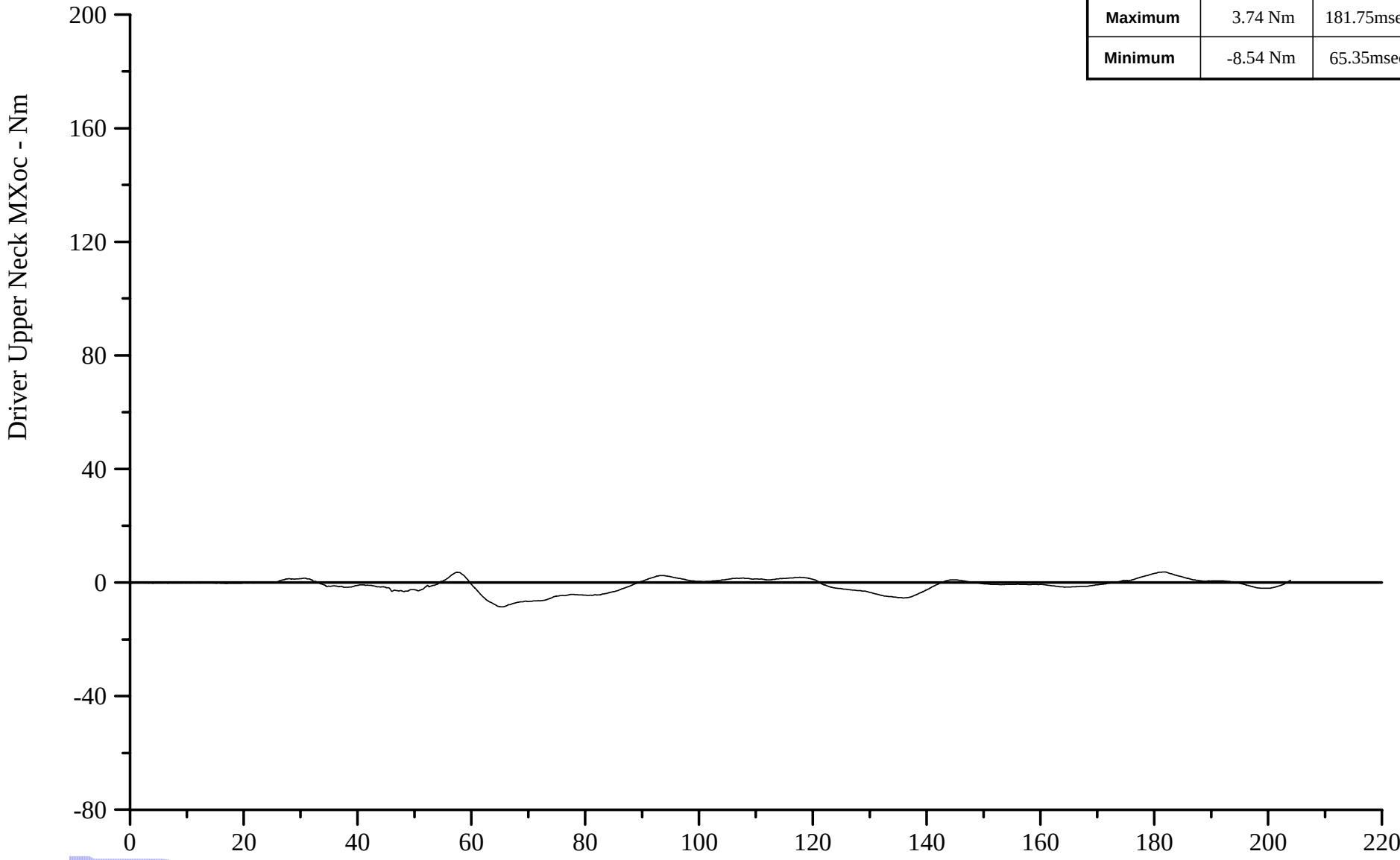
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	3.74 Nm	181.75msec
Minimum	-8.54 Nm	65.35msec



Upper Neck Moment at Occipital Condyle

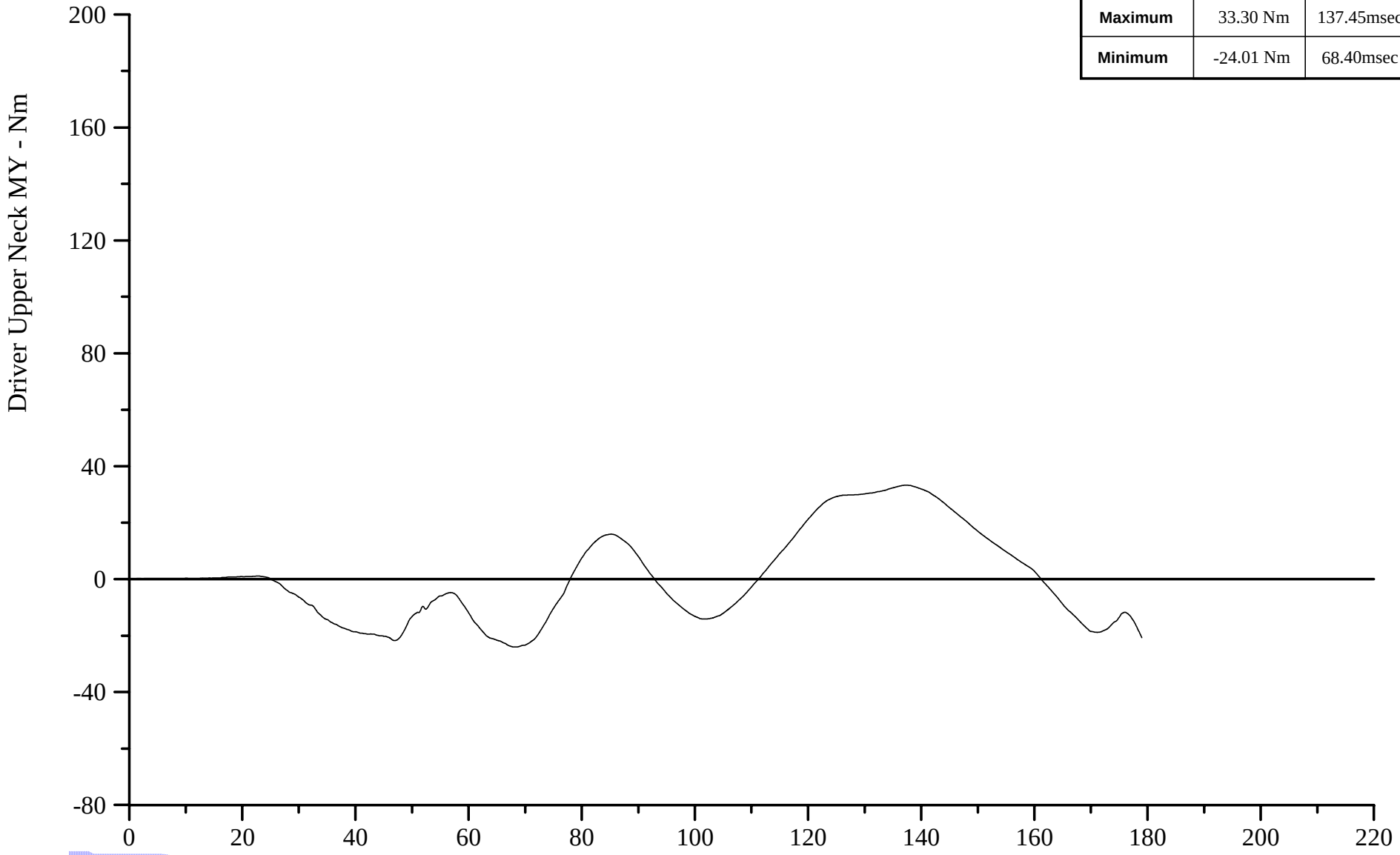
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	33.30 Nm	137.45msec
Minimum	-24.01 Nm	68.40msec



Upper Neck Moment

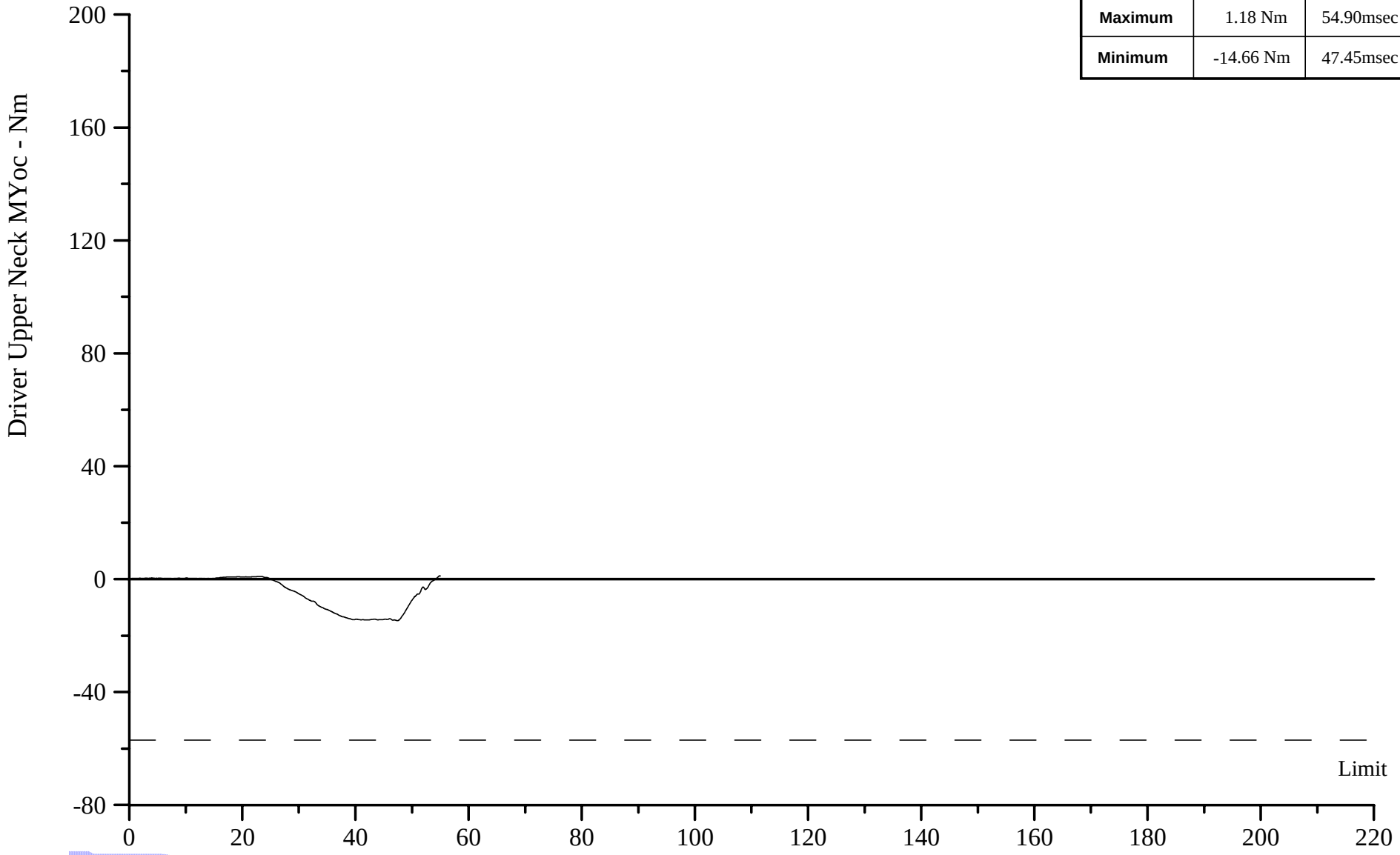
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.18 Nm	54.90msec
Minimum	-14.66 Nm	47.45msec



Upper Neck Moment at Occipital Condyle

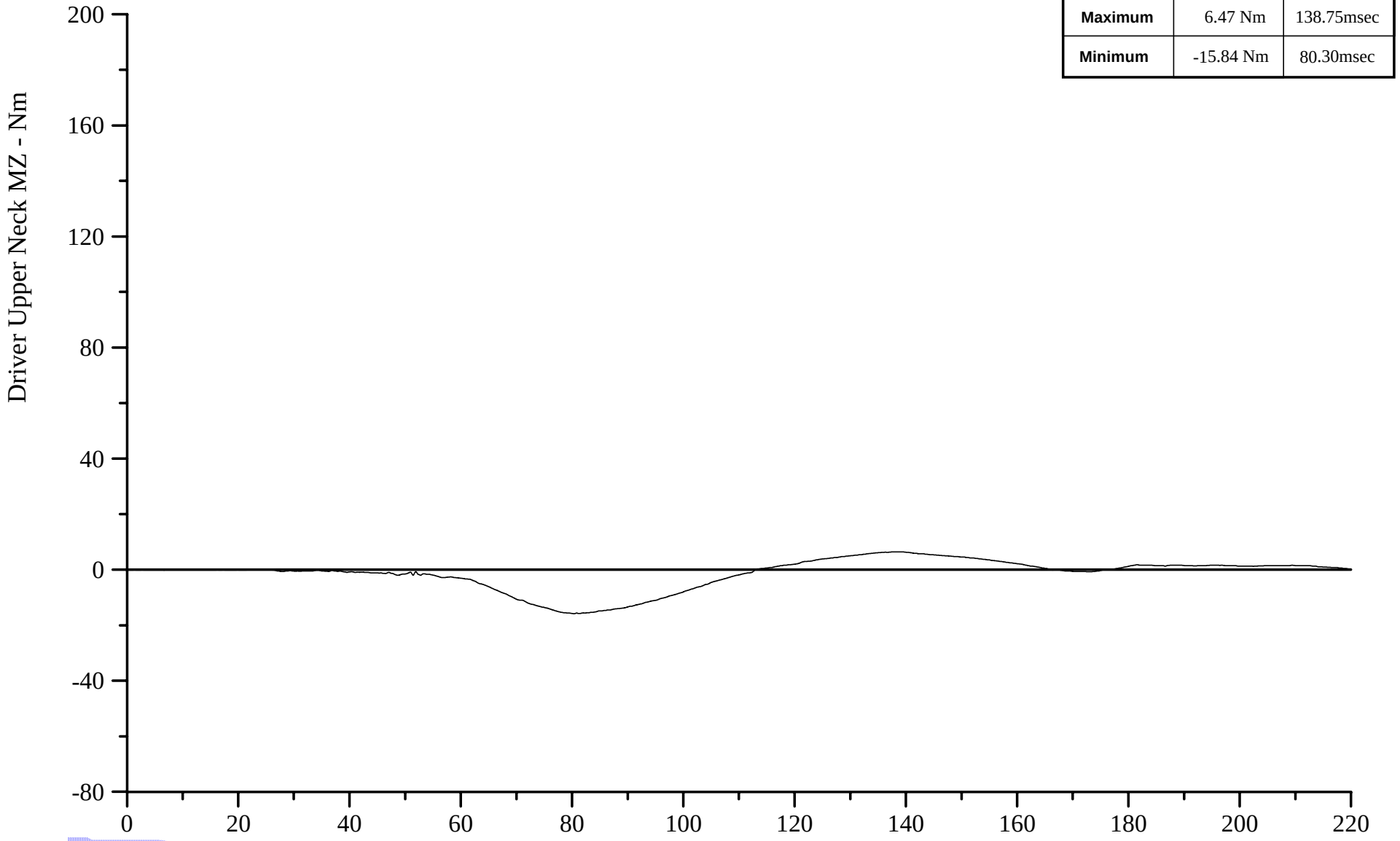
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	6.47 Nm	138.75msec
Minimum	-15.84 Nm	80.30msec



Upper Neck Moment

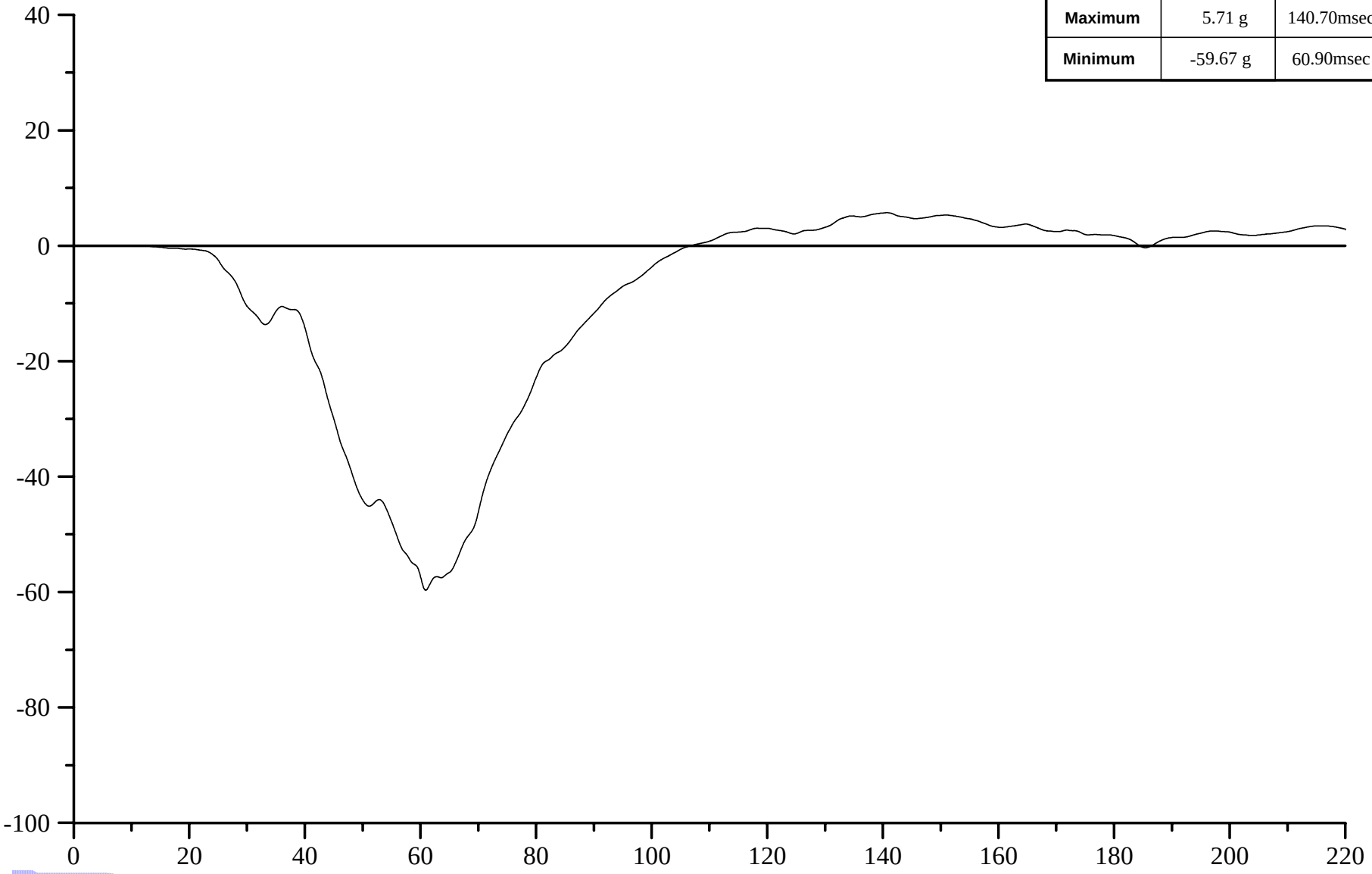
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	5.71 g	140.70msec
Minimum	-59.67 g	60.90msec



Chest Acceleration

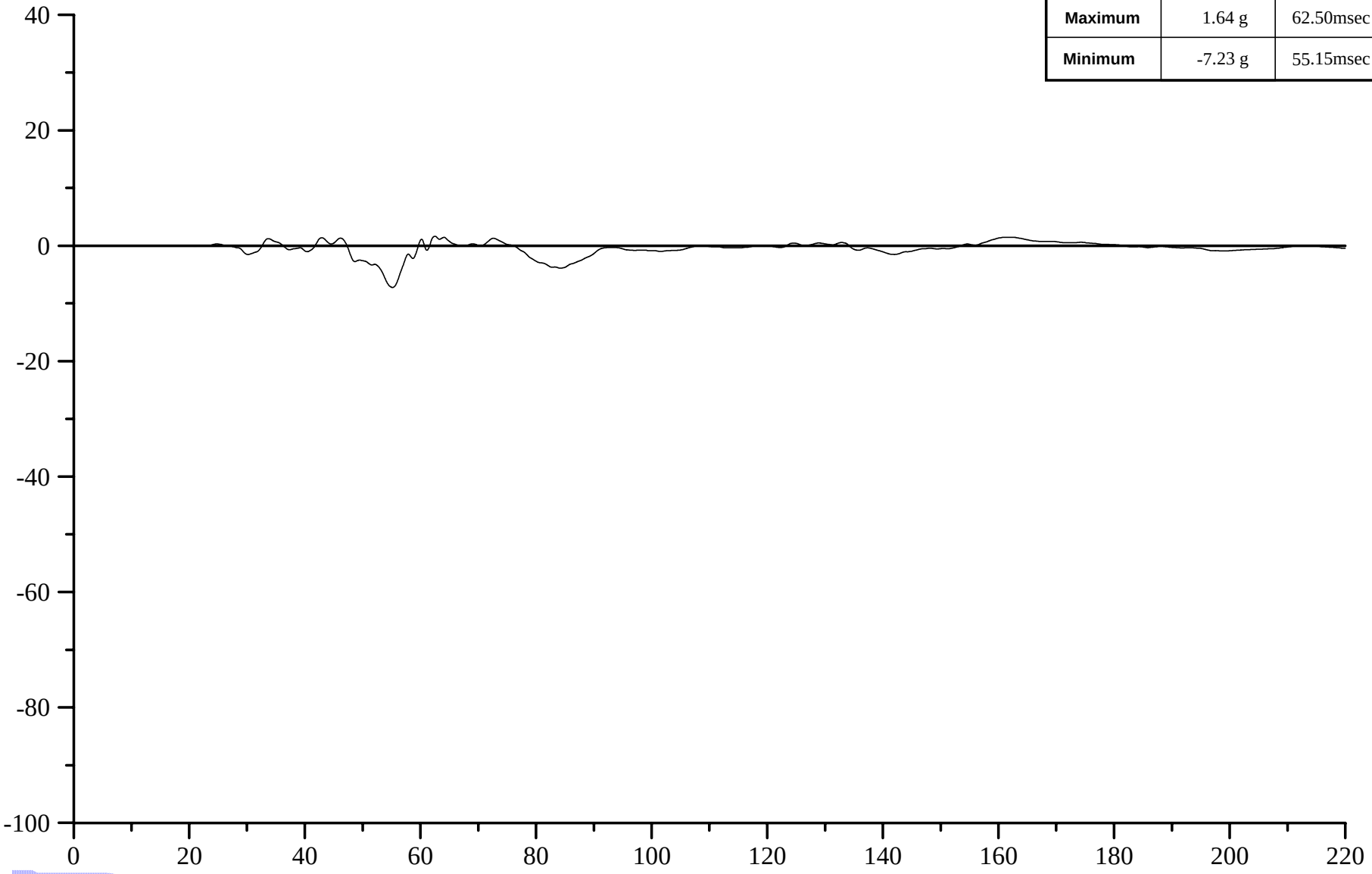
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.64 g	62.50msec
Minimum	-7.23 g	55.15msec



TRANSPORT RESEARCH LABORATORY

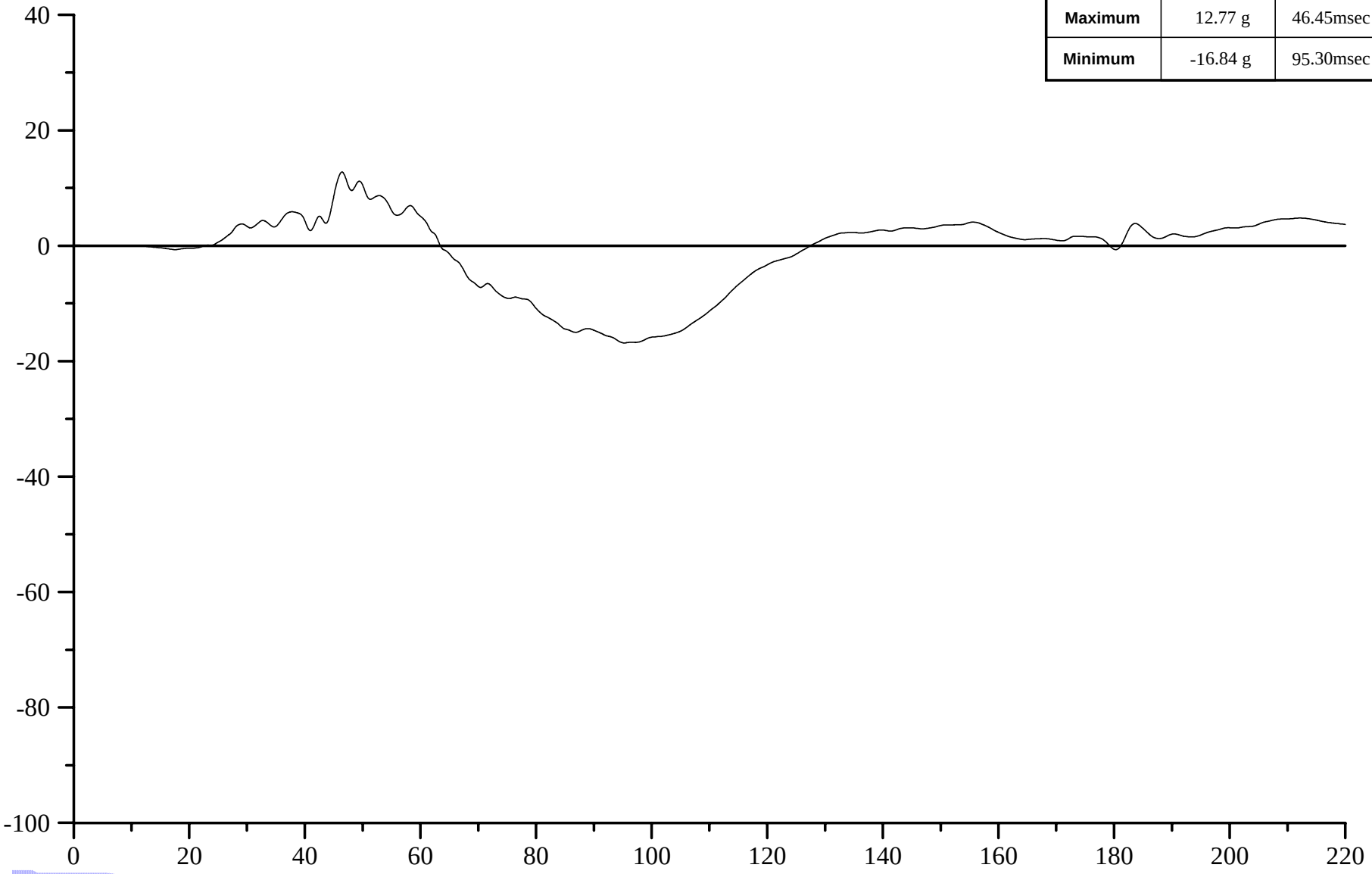
Processed
on 06.06.2000

Chest Acceleration

Filtered at CFC_180

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	12.77 g	46.45msec
Minimum	-16.84 g	95.30msec



Chest Acceleration

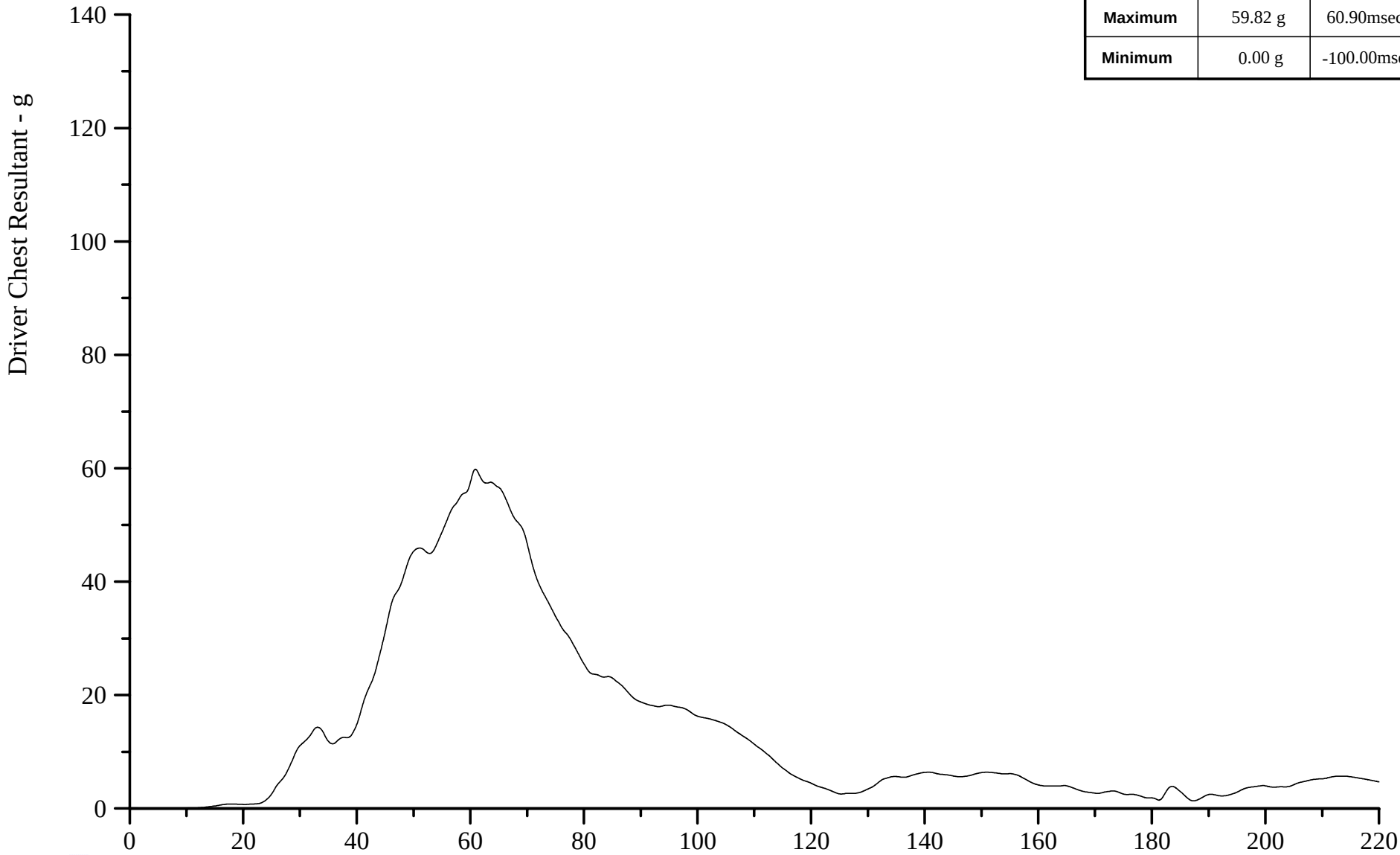
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	59.82 g	60.90msec
Minimum	0.00 g	-100.00msec

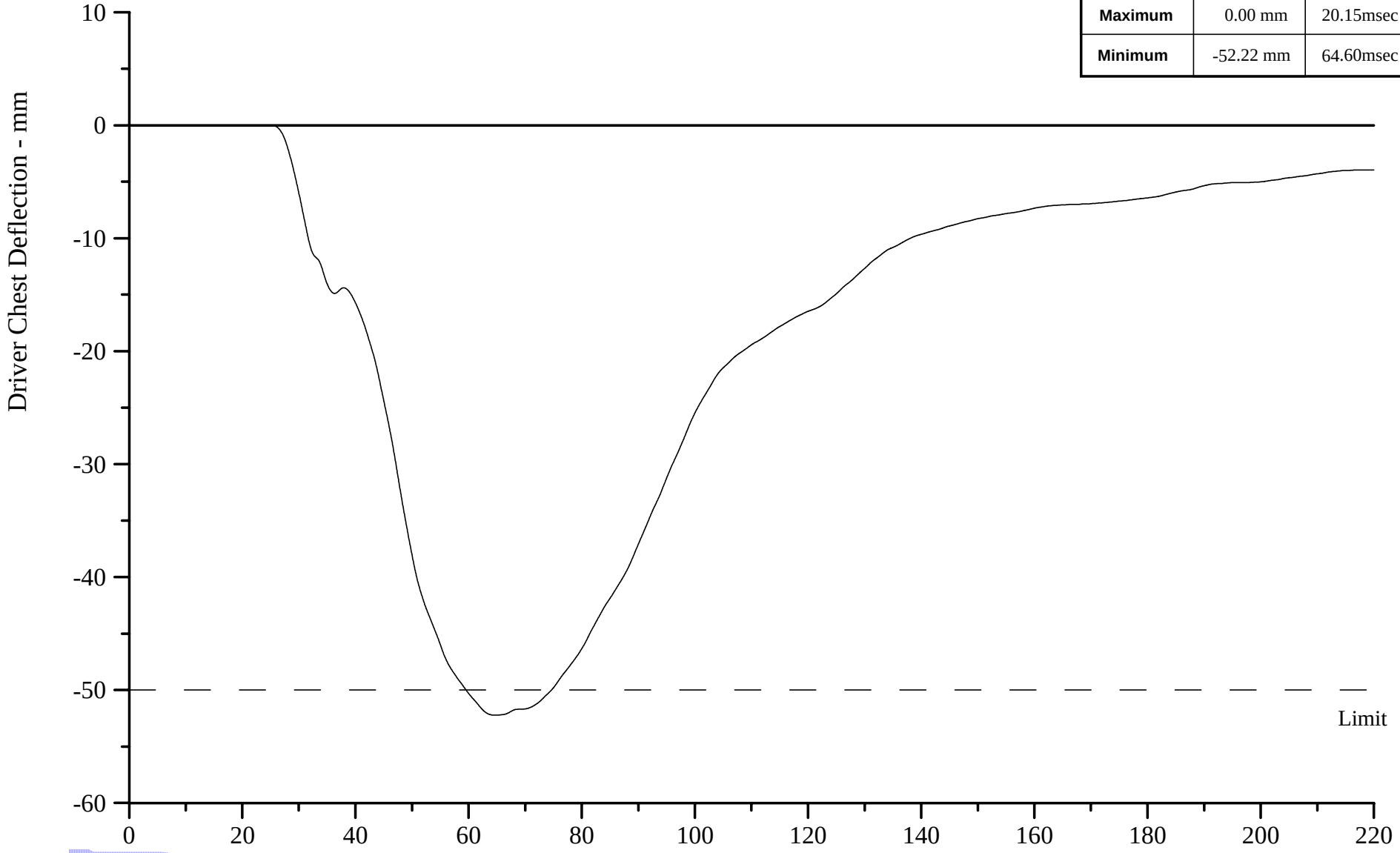


TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.00 mm	20.15msec
Minimum	-52.22 mm	64.60msec



Chest Deflection

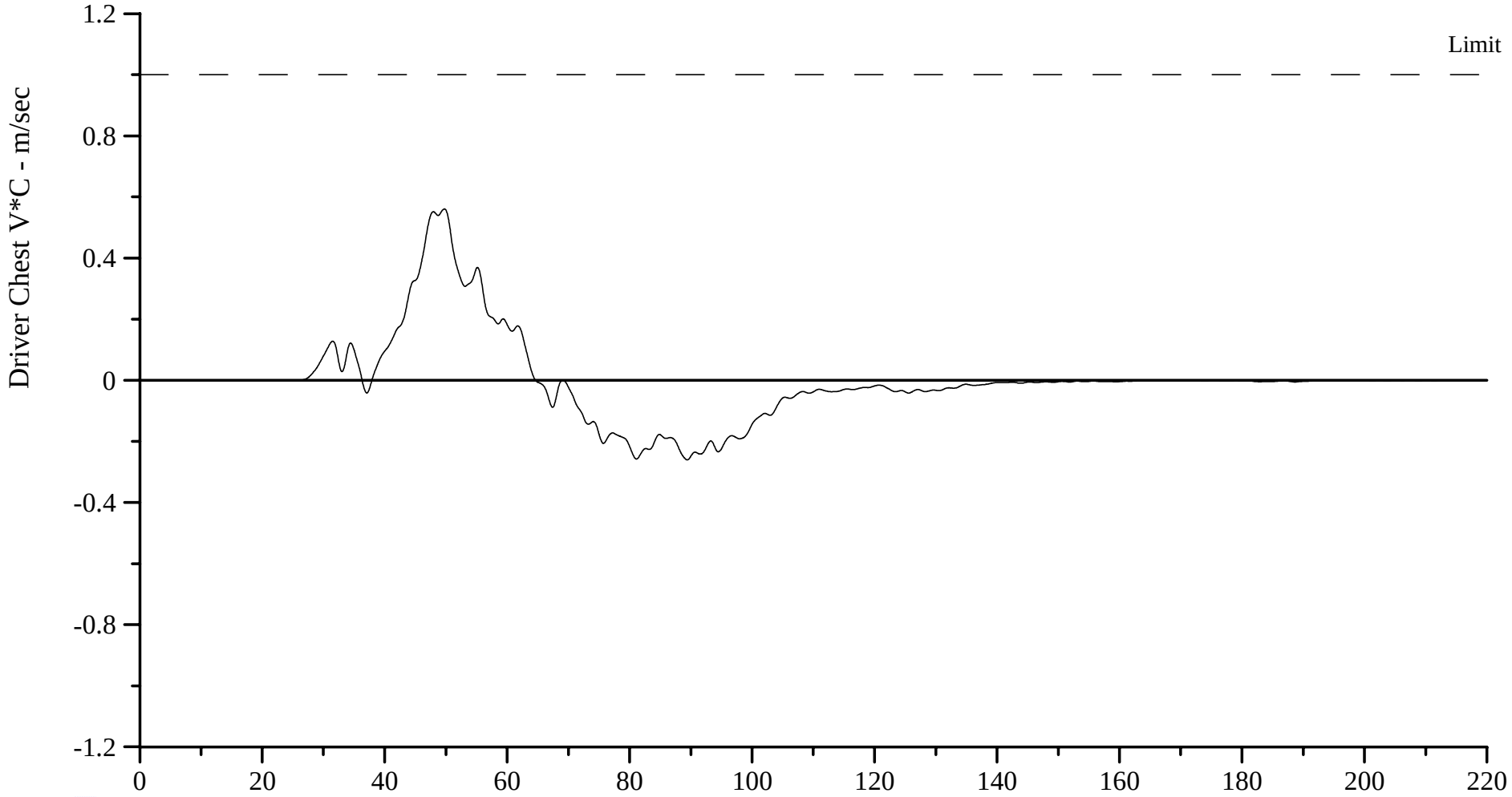
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.56 m/sec	49.75msec
Minimum	-0.26 m/sec	89.40msec



Chest Viscous Criterion

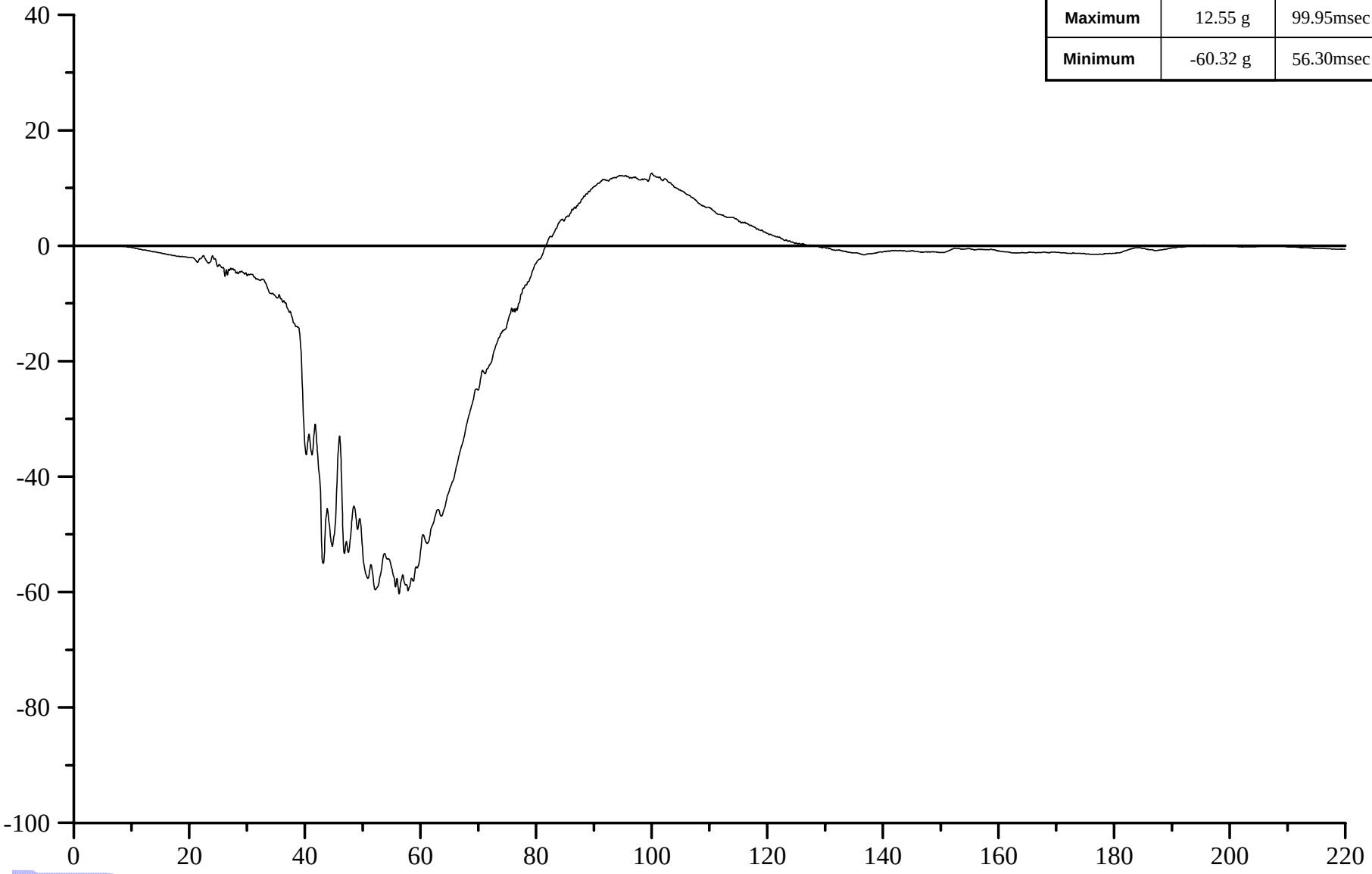
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	12.55 g	99.95msec
Minimum	-60.32 g	56.30msec



Pelvis Acceleration

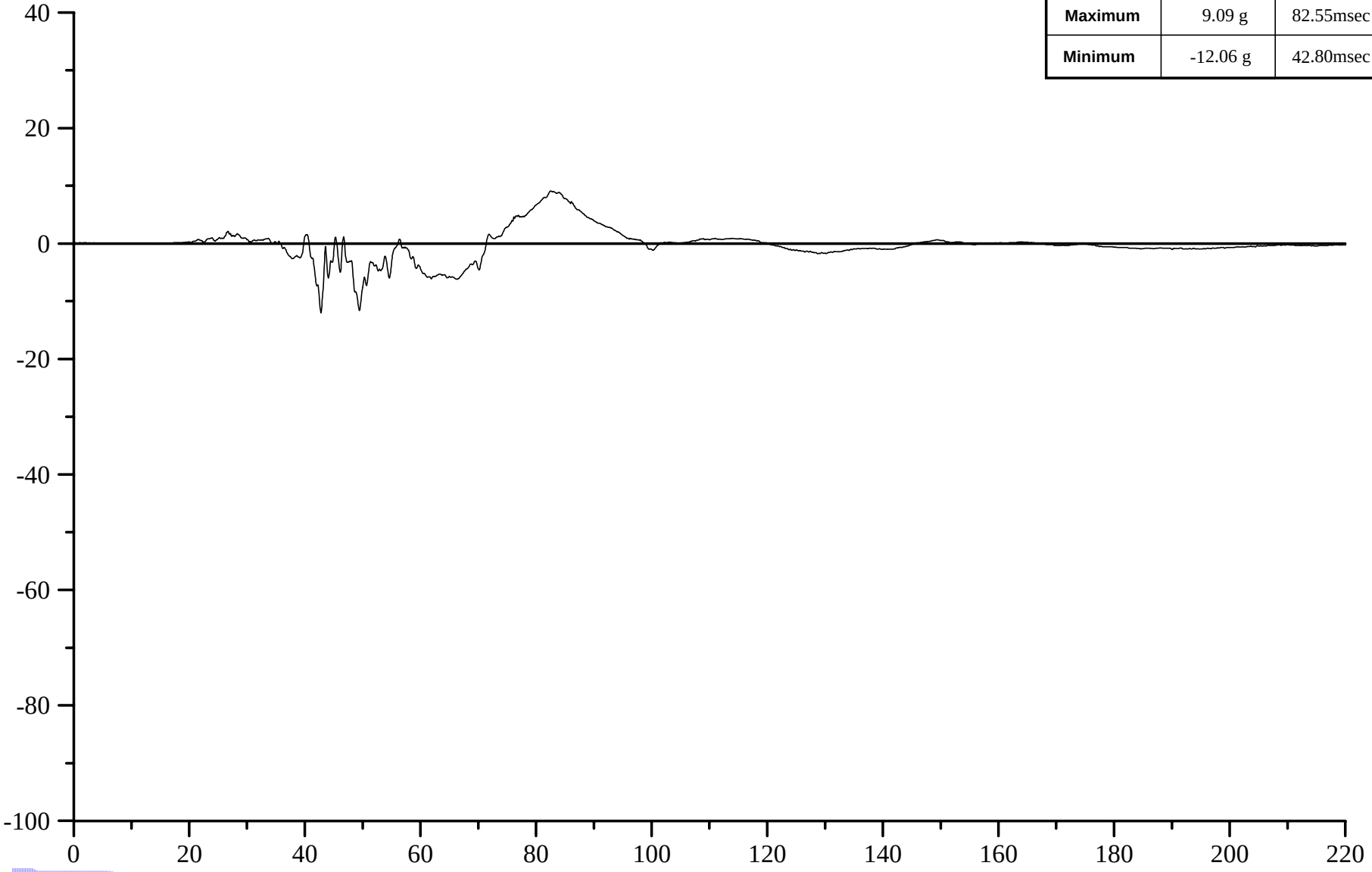
Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	9.09 g	82.55msec
Minimum	-12.06 g	42.80msec



Pelvis Acceleration

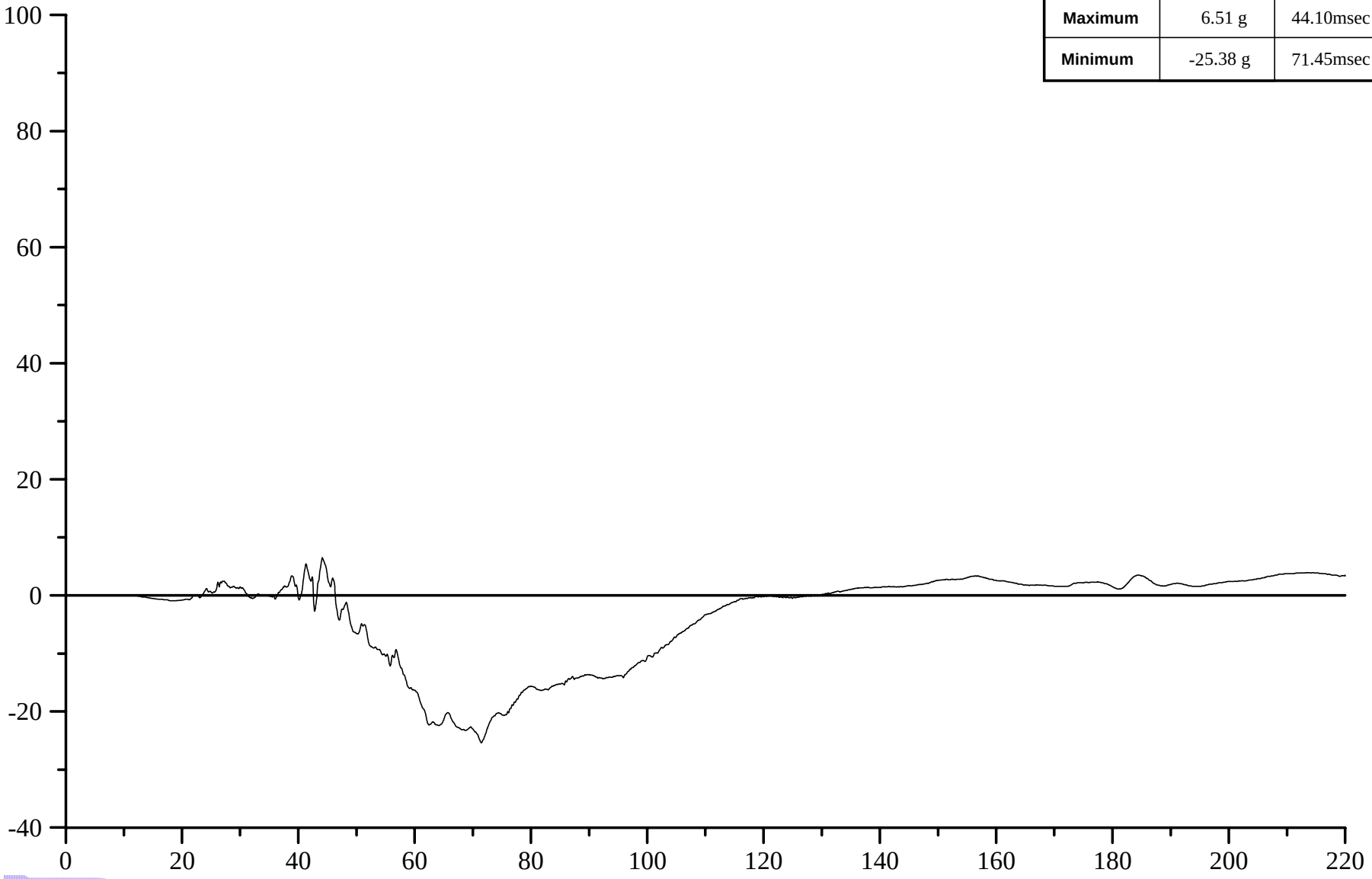
Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	6.51 g	44.10msec
Minimum	-25.38 g	71.45msec



Pelvis Acceleration

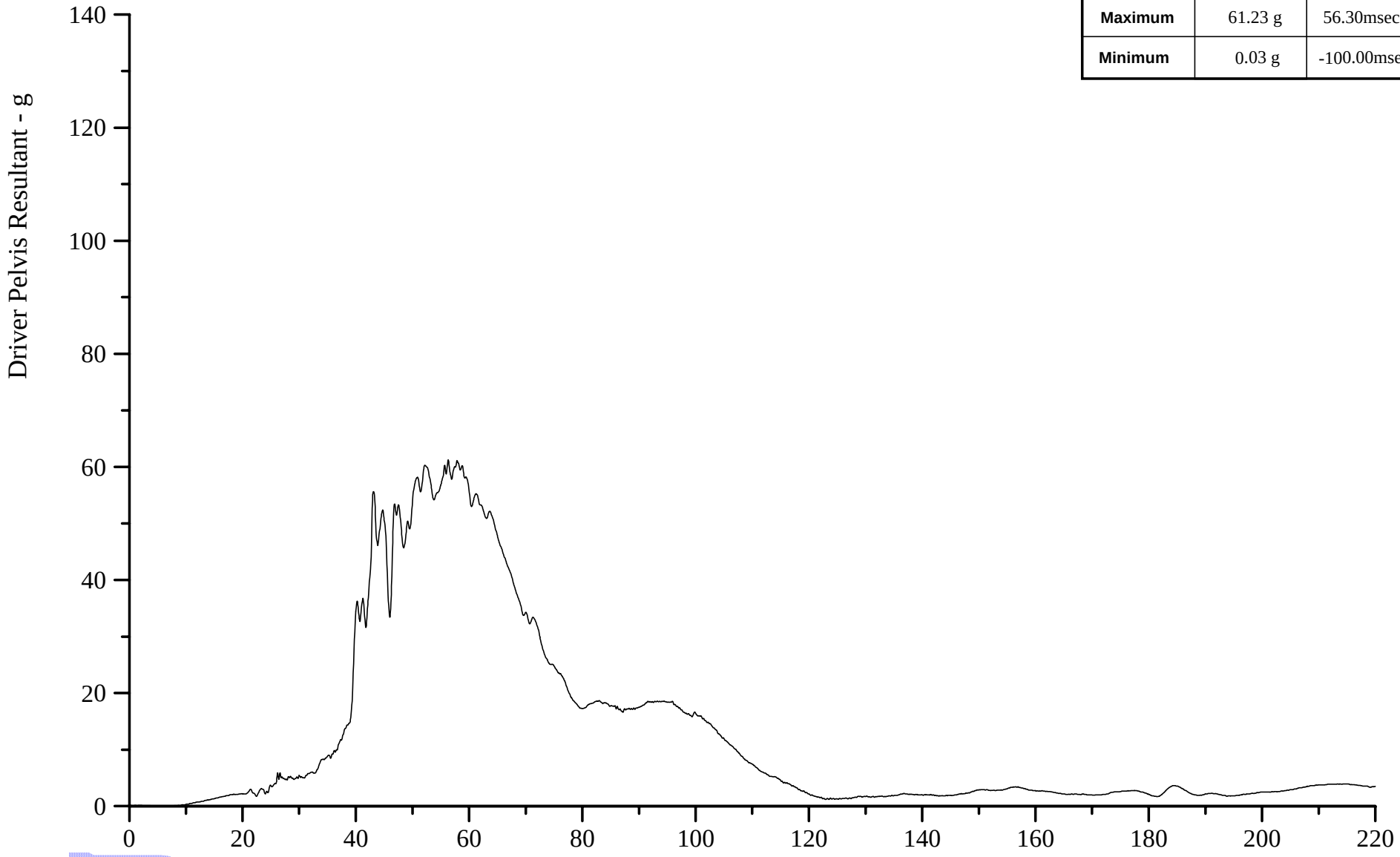
Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	61.23 g	56.30msec
Minimum	0.03 g	-100.00msec



Pelvis Acceleration

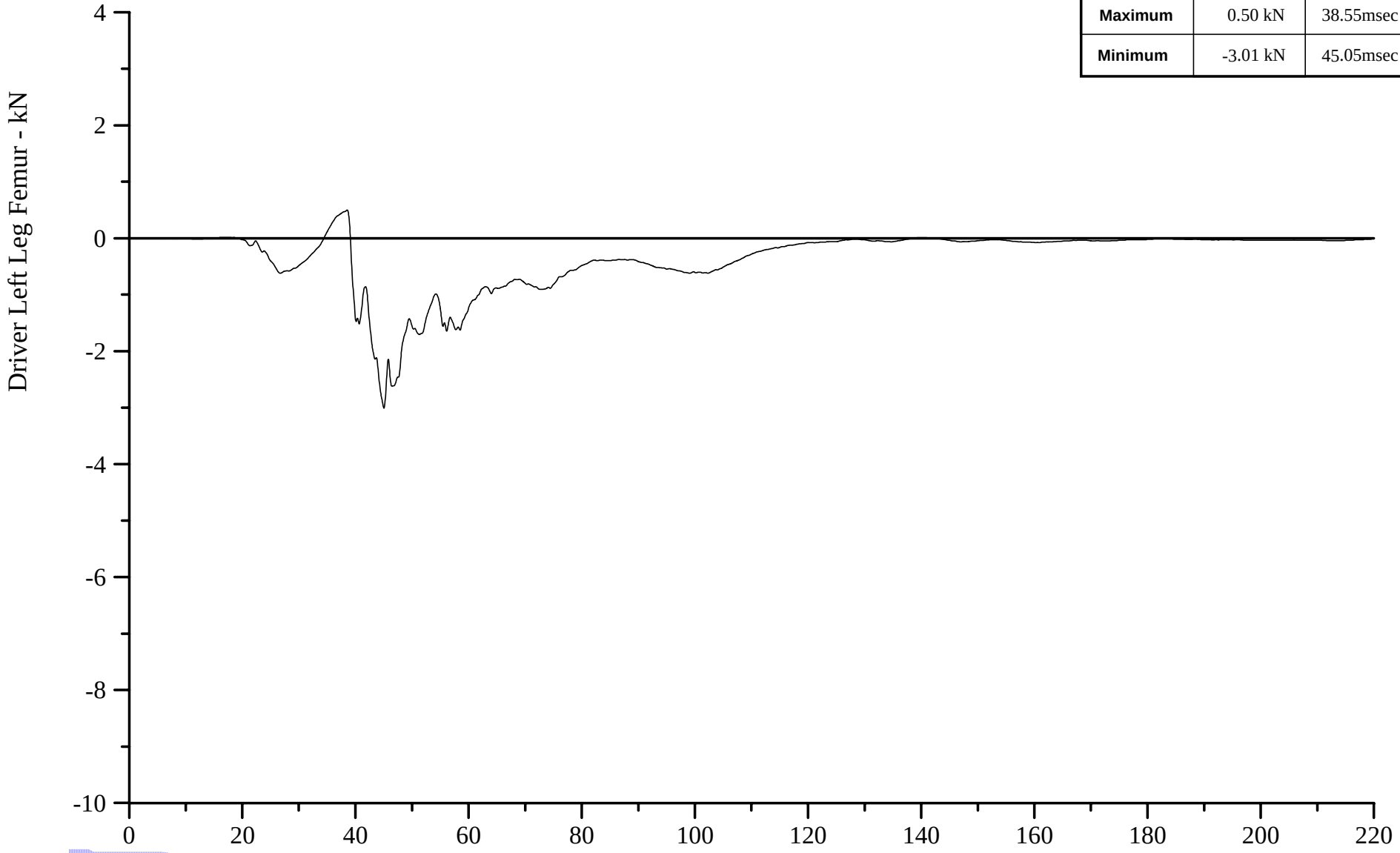
Filtered at CFC_1000

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.50 kN	38.55msec
Minimum	-3.01 kN	45.05msec



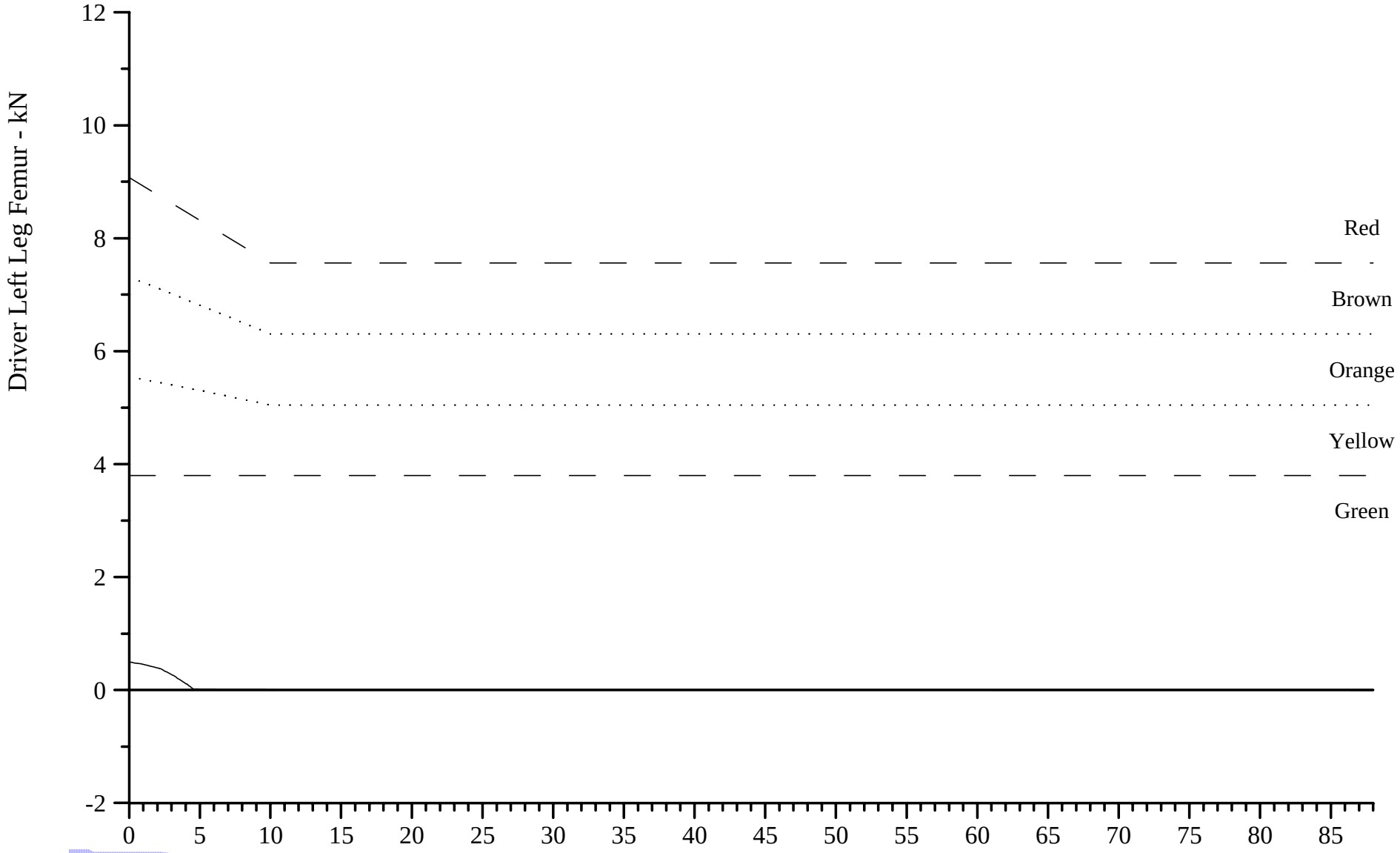
Femur Force

Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



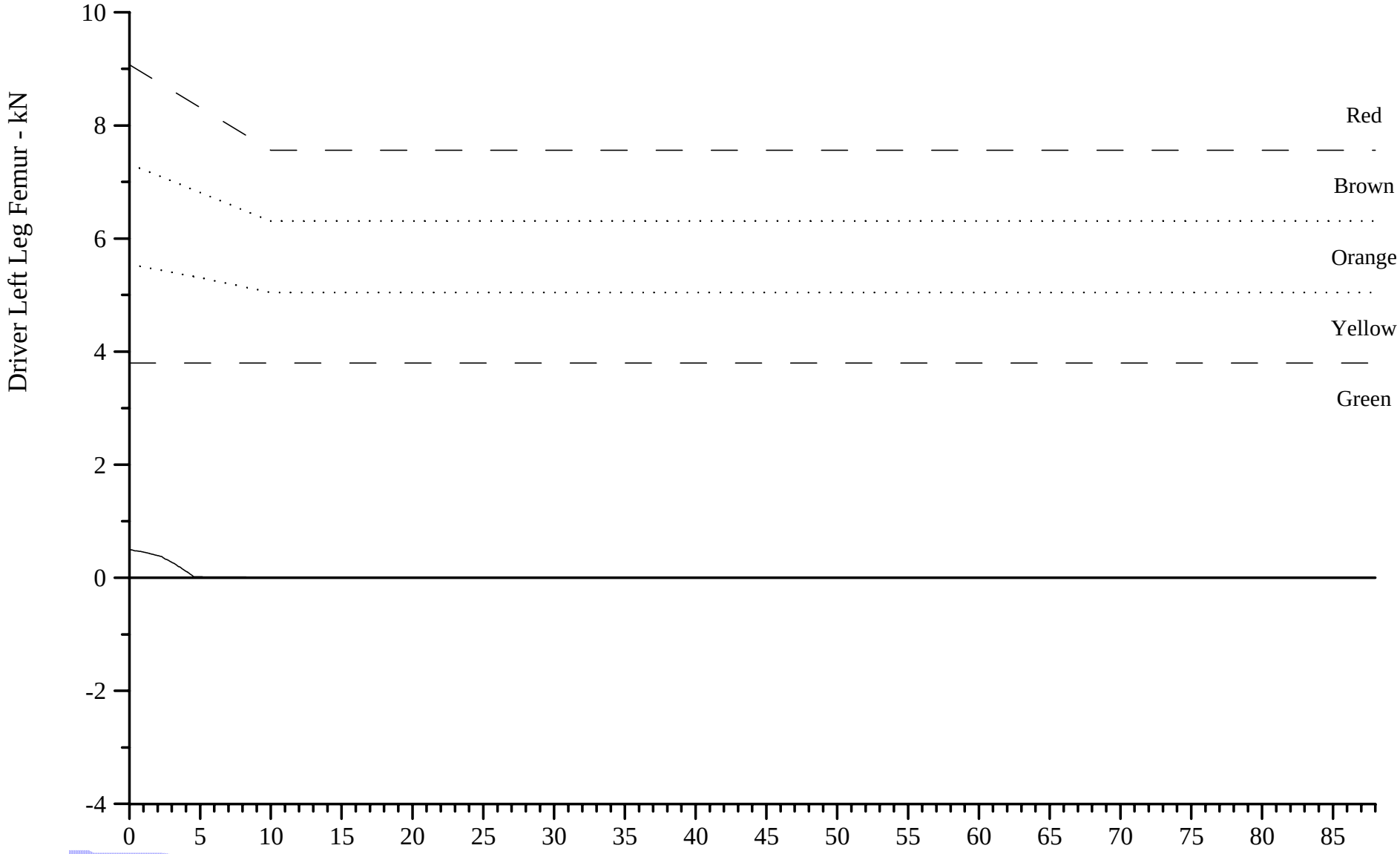
TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

Positive Cumulative Exceedence Time

Filtered at CFC_600

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



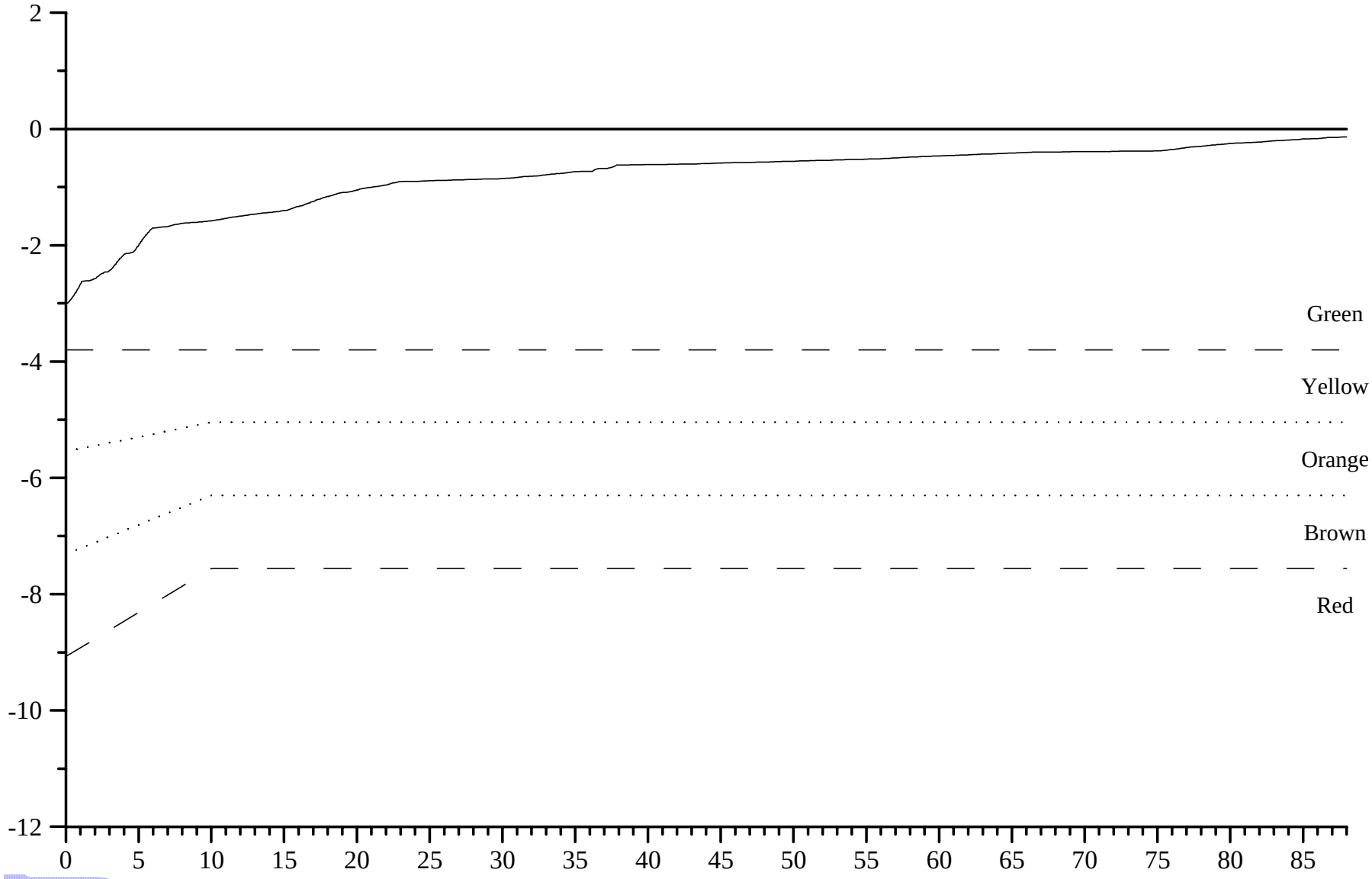
Positive Cumulative Exceedence Time

Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



Negative Cumulative Exceedence Time

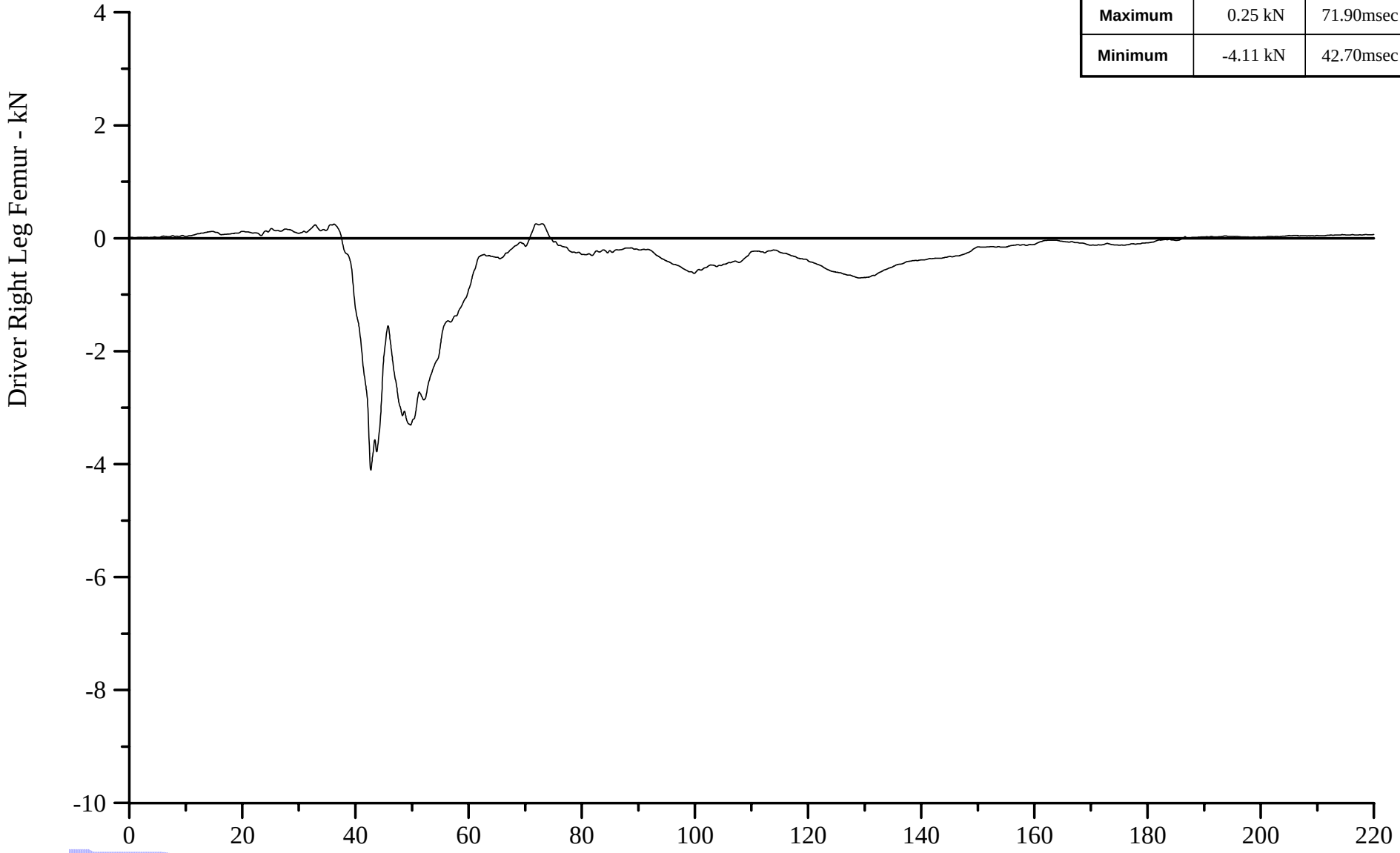
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.25 kN	71.90msec
Minimum	-4.11 kN	42.70msec



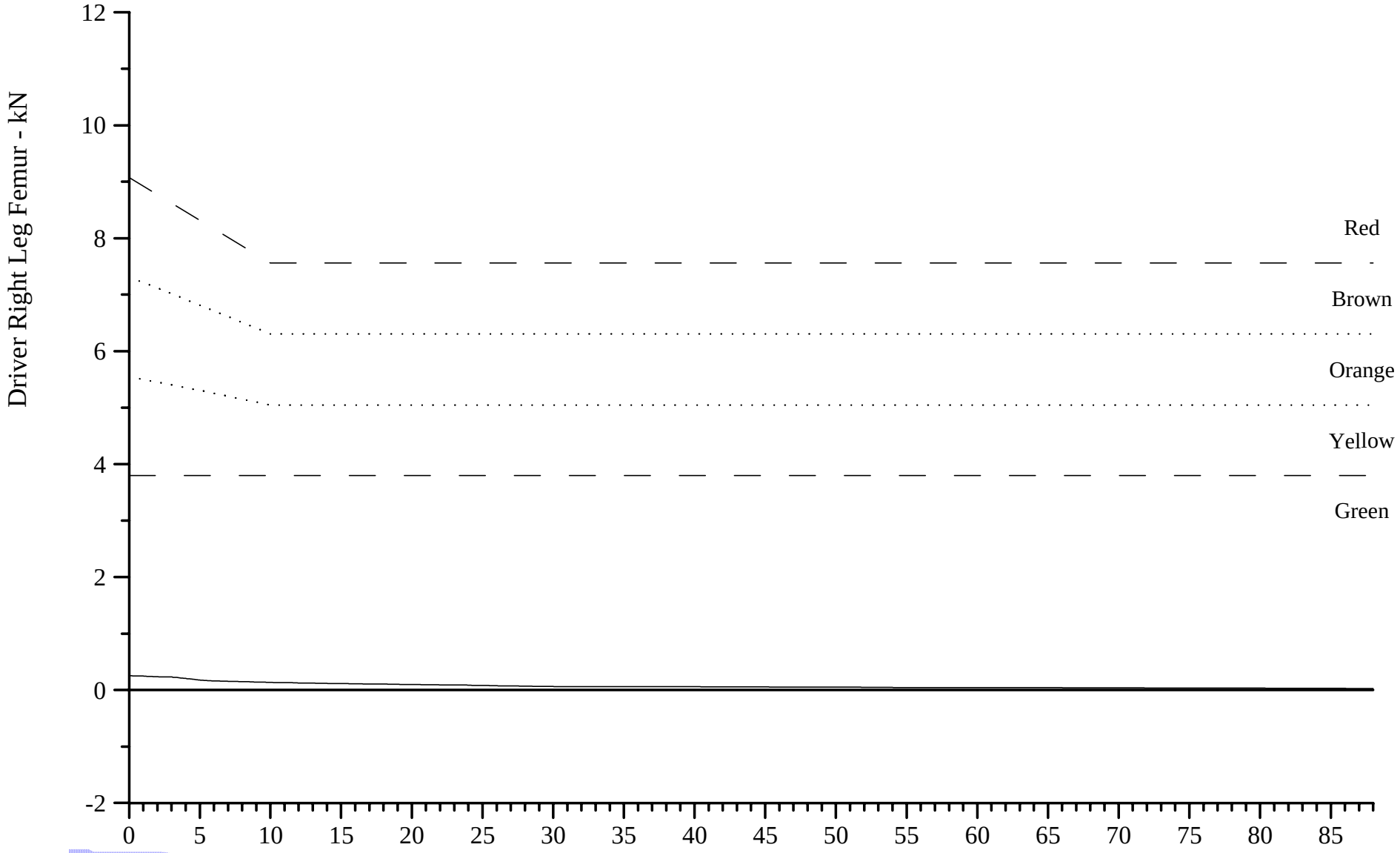
Femur Force

Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



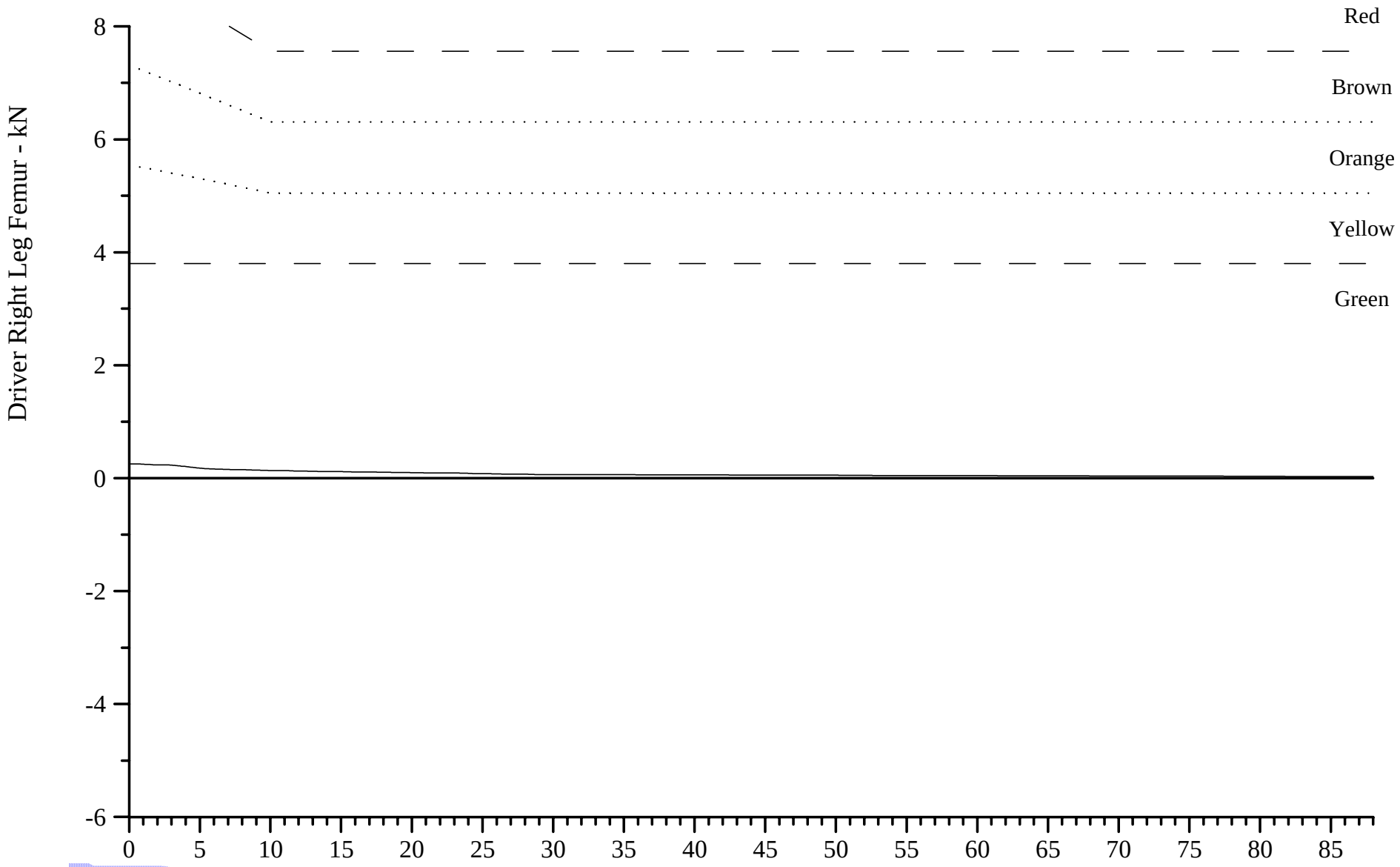
TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

Positive Cumulative Exceedence Time

Filtered at CFC_600

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



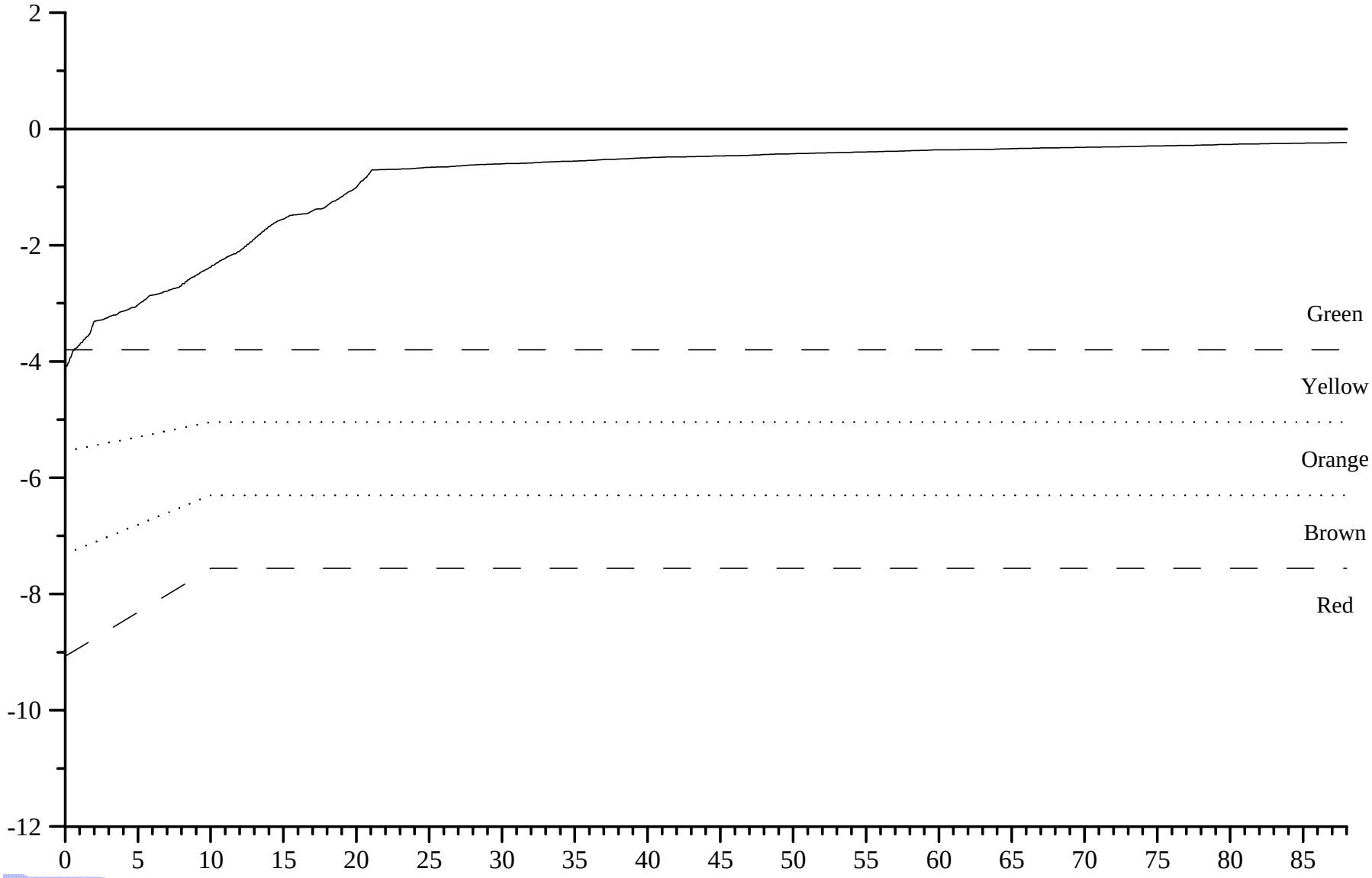
Positive Cumulative Exceedence Time

Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



Negative Cumulative Exceedence Time

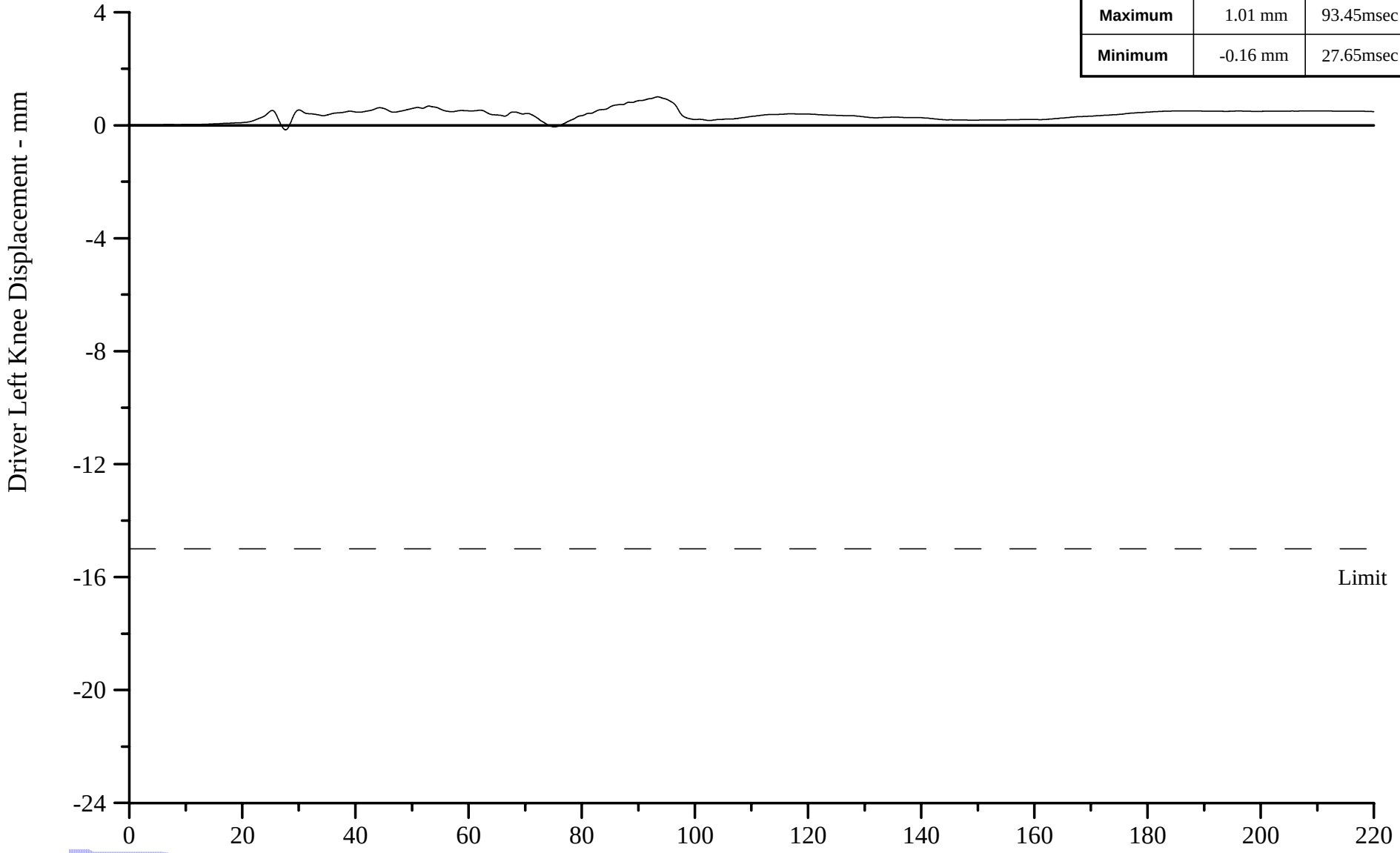
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.01 mm	93.45msec
Minimum	-0.16 mm	27.65msec



Knee Displacement

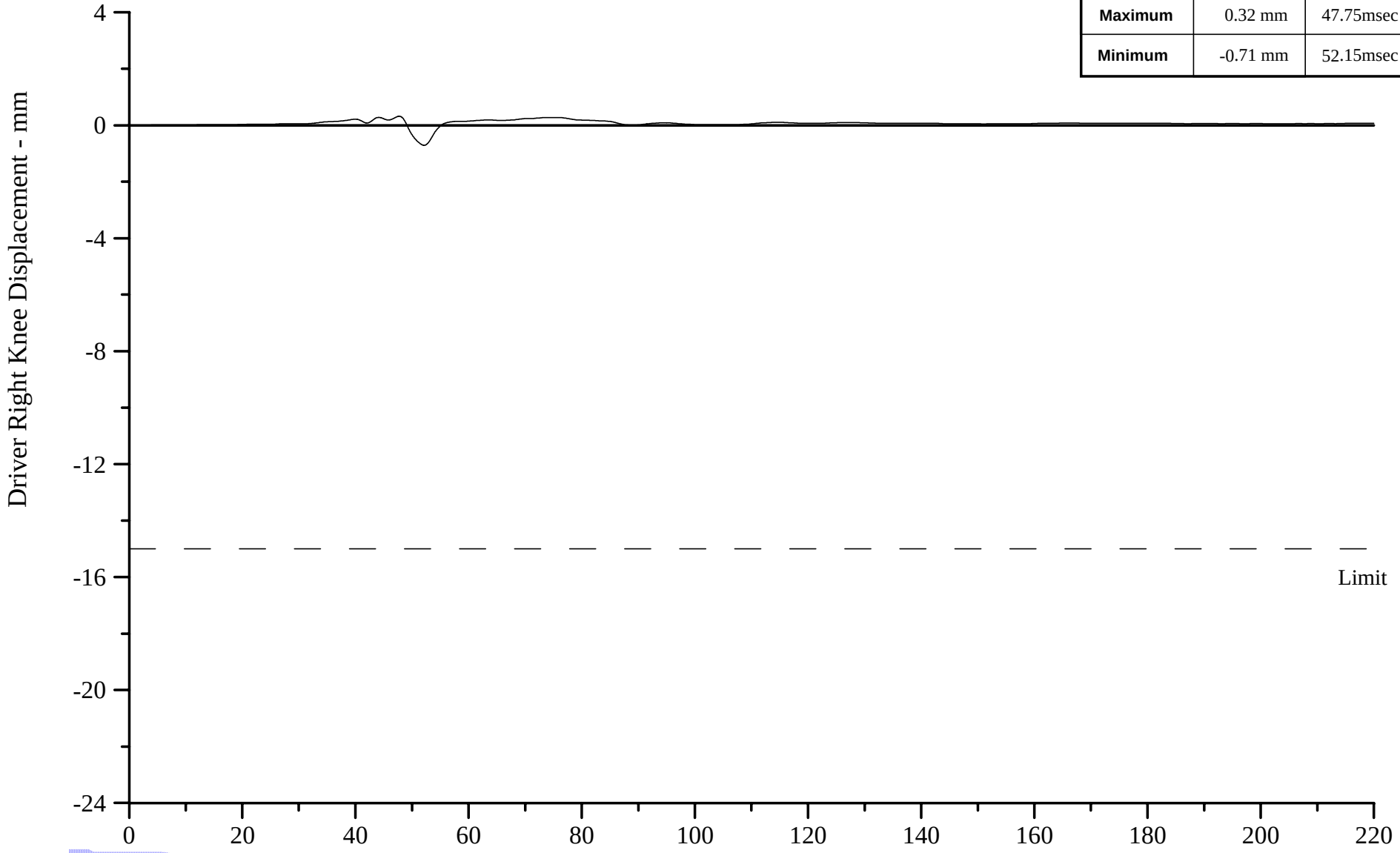
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.32 mm	47.75msec
Minimum	-0.71 mm	52.15msec



Knee Displacement

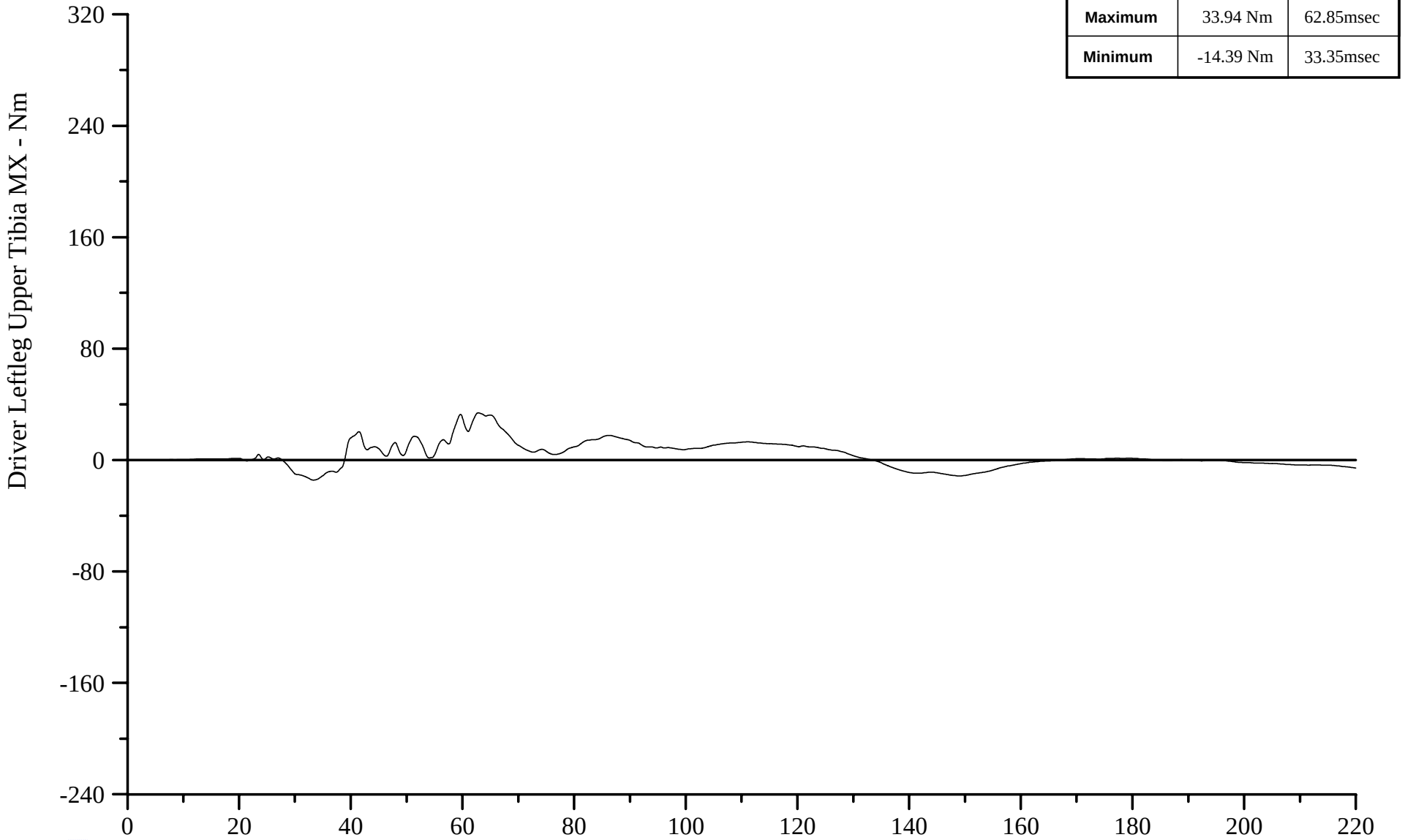
Filtered at CFC_180

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	33.94 Nm	62.85msec
Minimum	-14.39 Nm	33.35msec



Upper Tibia Moment

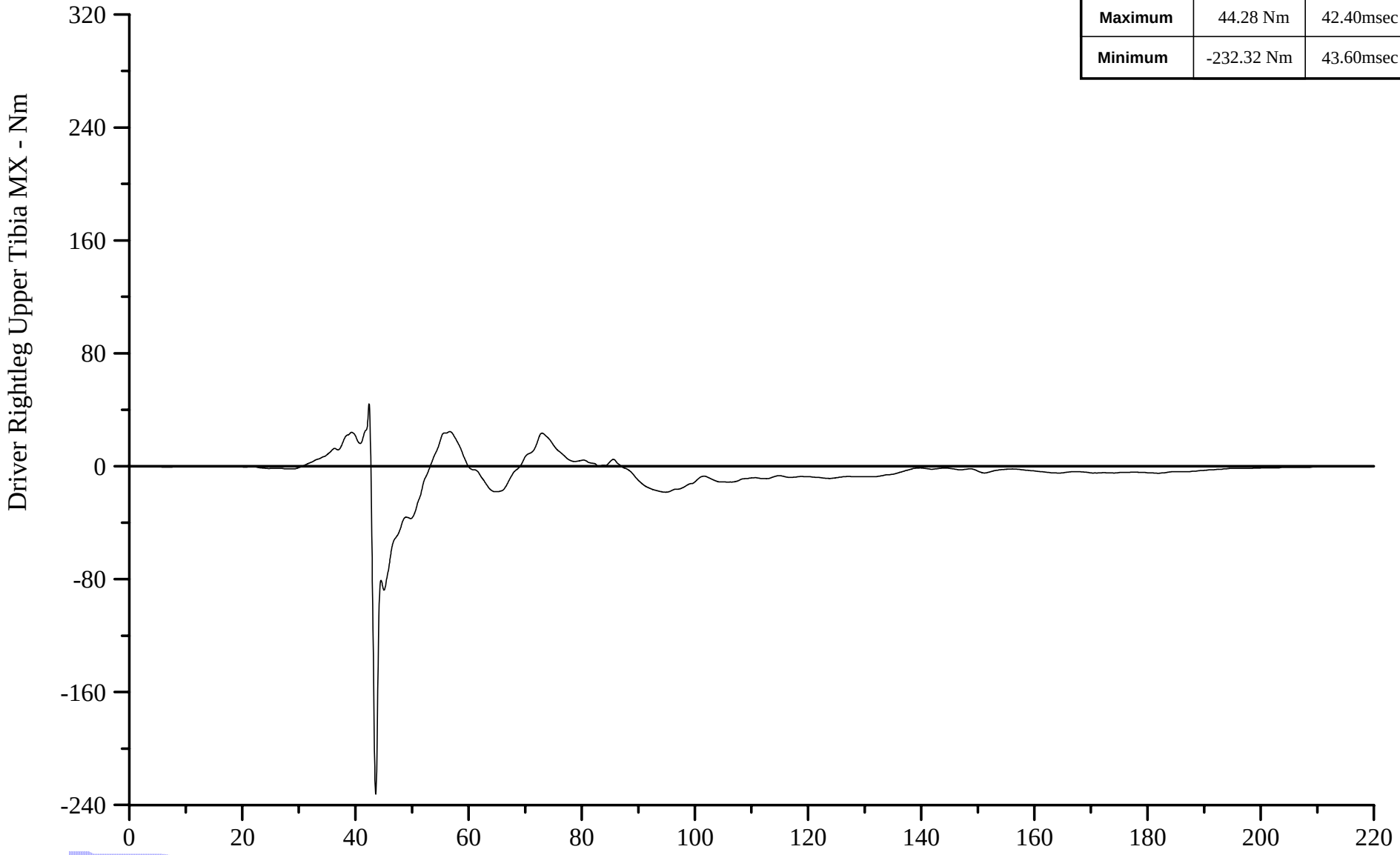
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	44.28 Nm	42.40msec
Minimum	-232.32 Nm	43.60msec



Upper Tibia Moment

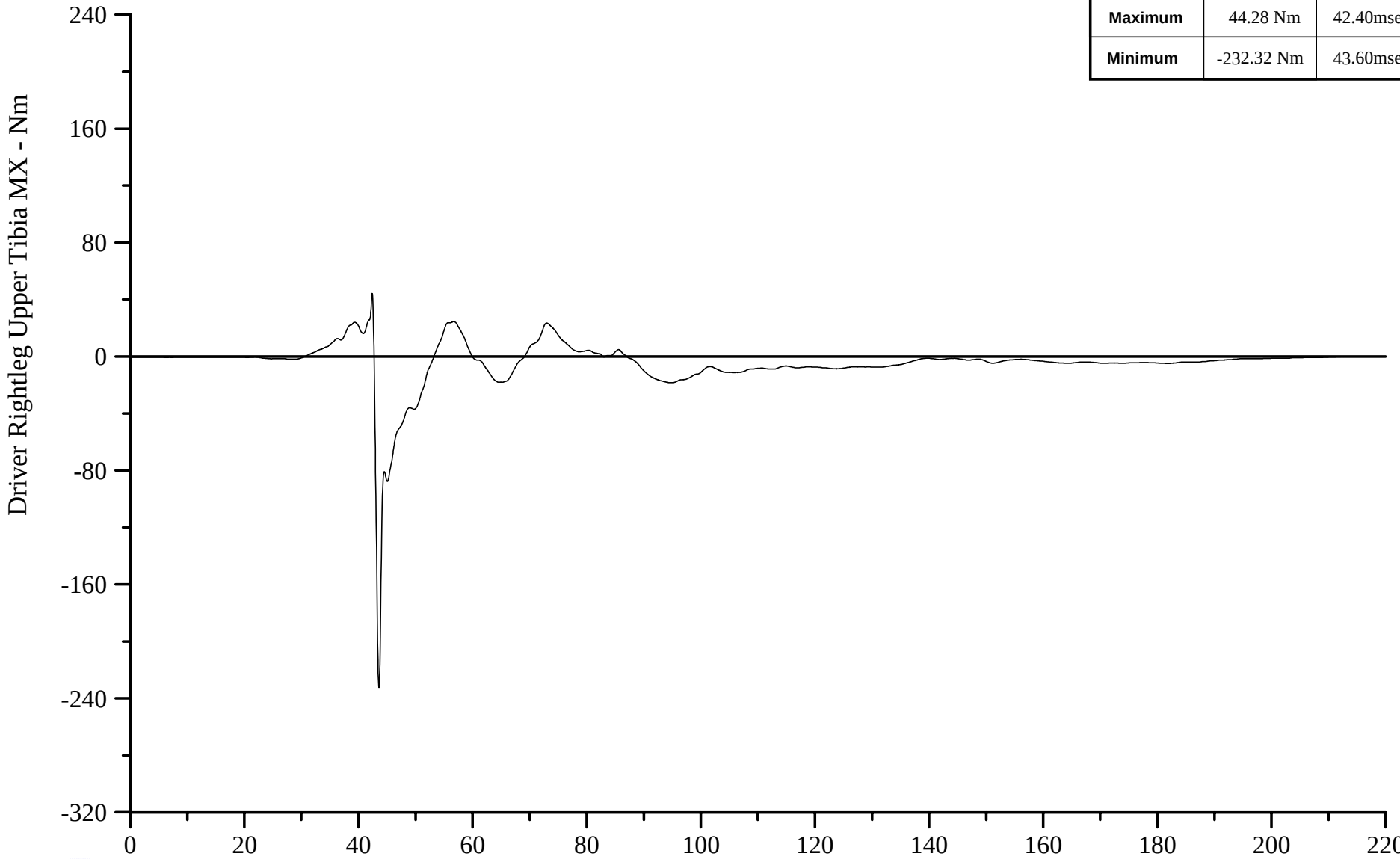
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	44.28 Nm	42.40msec
Minimum	-232.32 Nm	43.60msec



Upper Tibia Moment

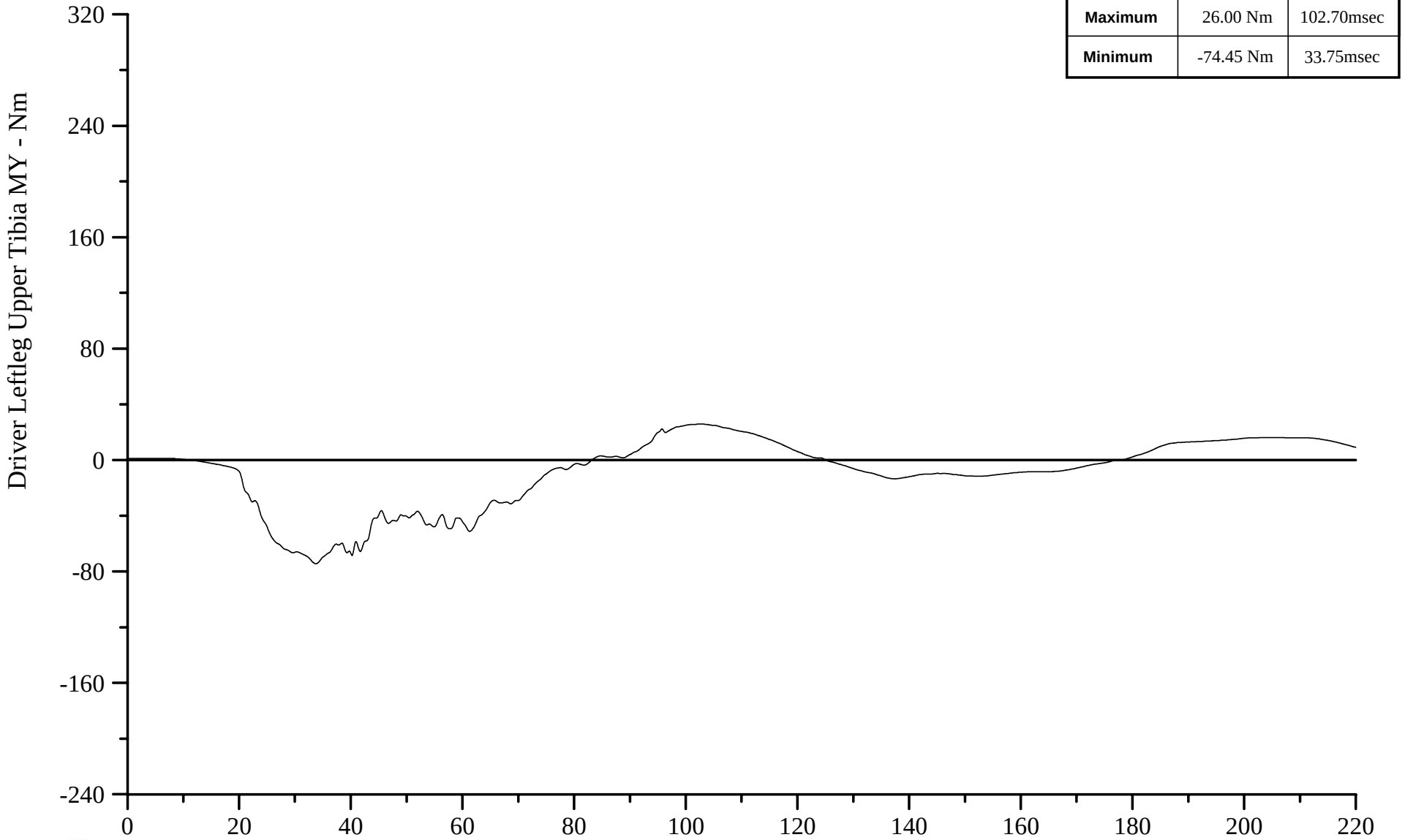
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	26.00 Nm	102.70msec
Minimum	-74.45 Nm	33.75msec



Upper Tibia Moment

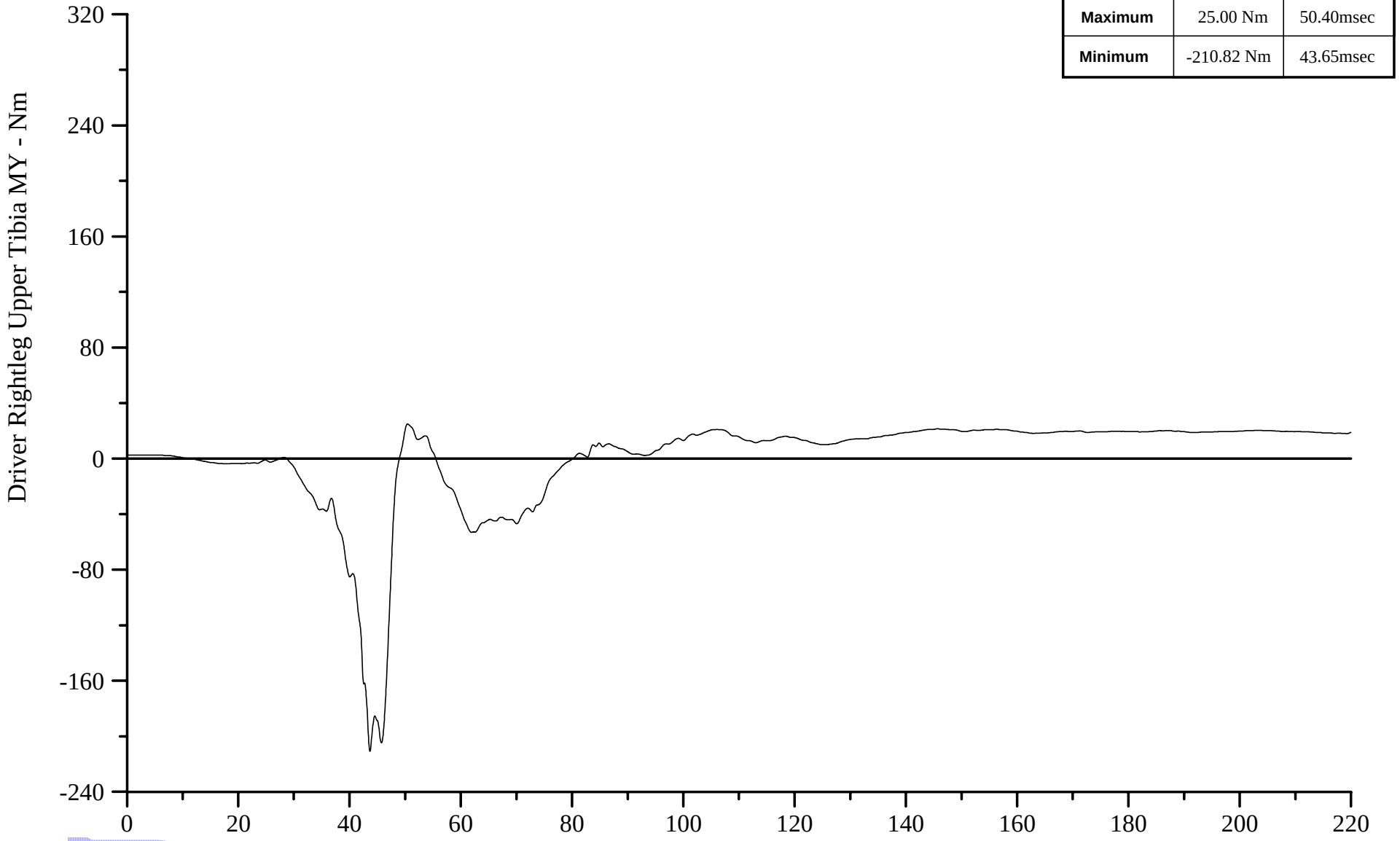
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	25.00 Nm	50.40msec
Minimum	-210.82 Nm	43.65msec



Upper Tibia Moment

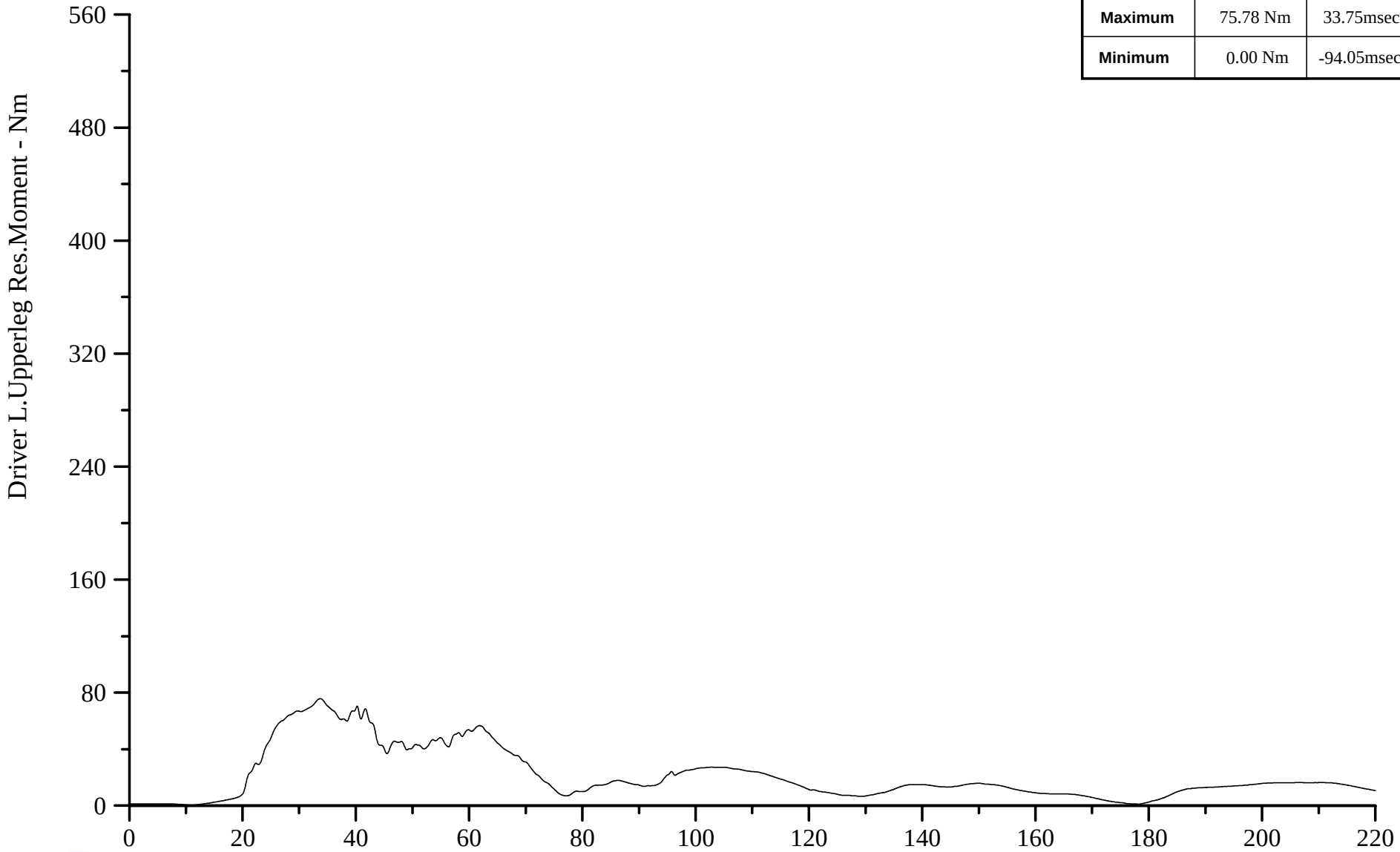
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	75.78 Nm	33.75msec
Minimum	0.00 Nm	-94.05msec



Upper Tibia Moment

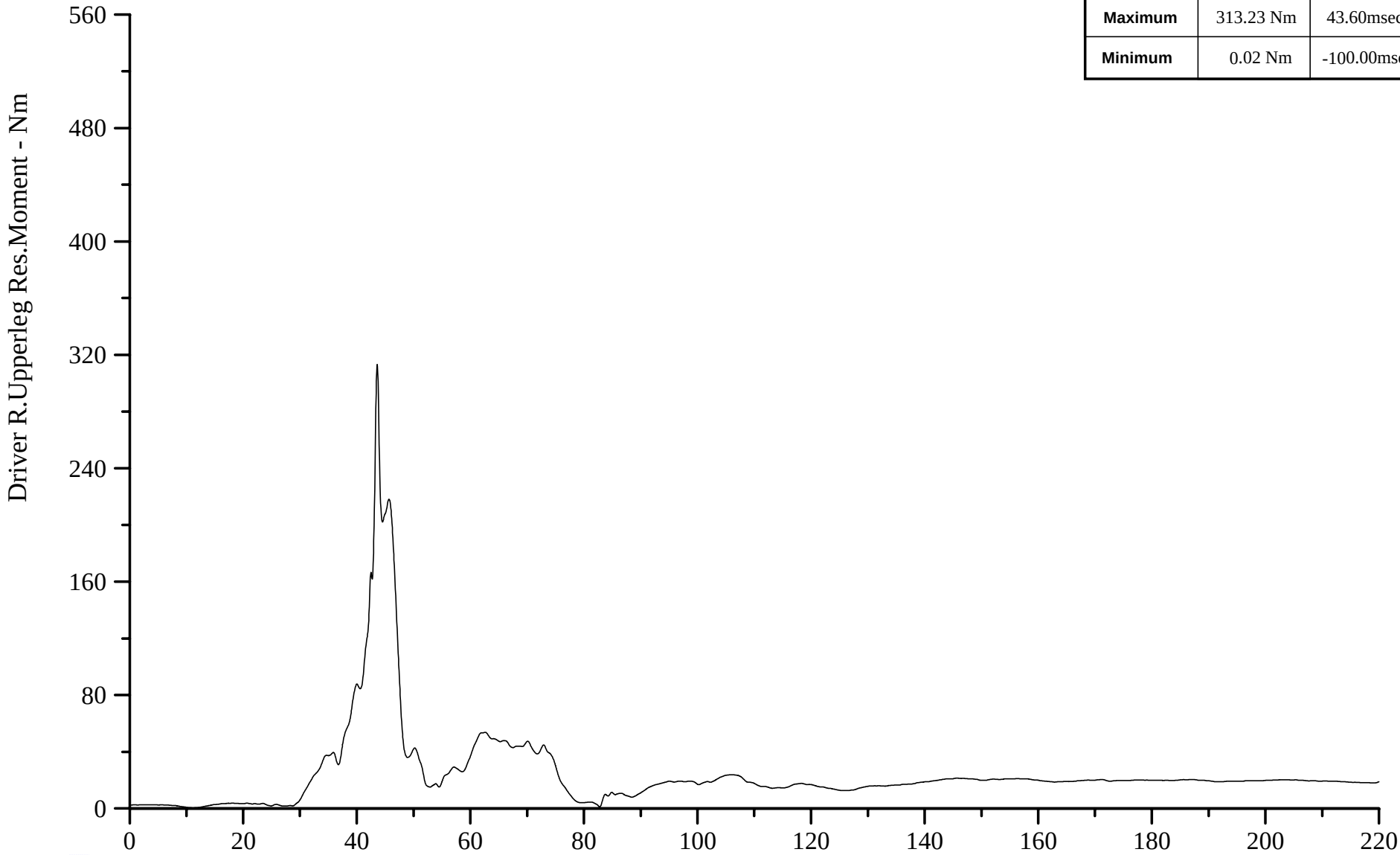
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	313.23 Nm	43.60msec
Minimum	0.02 Nm	-100.00msec

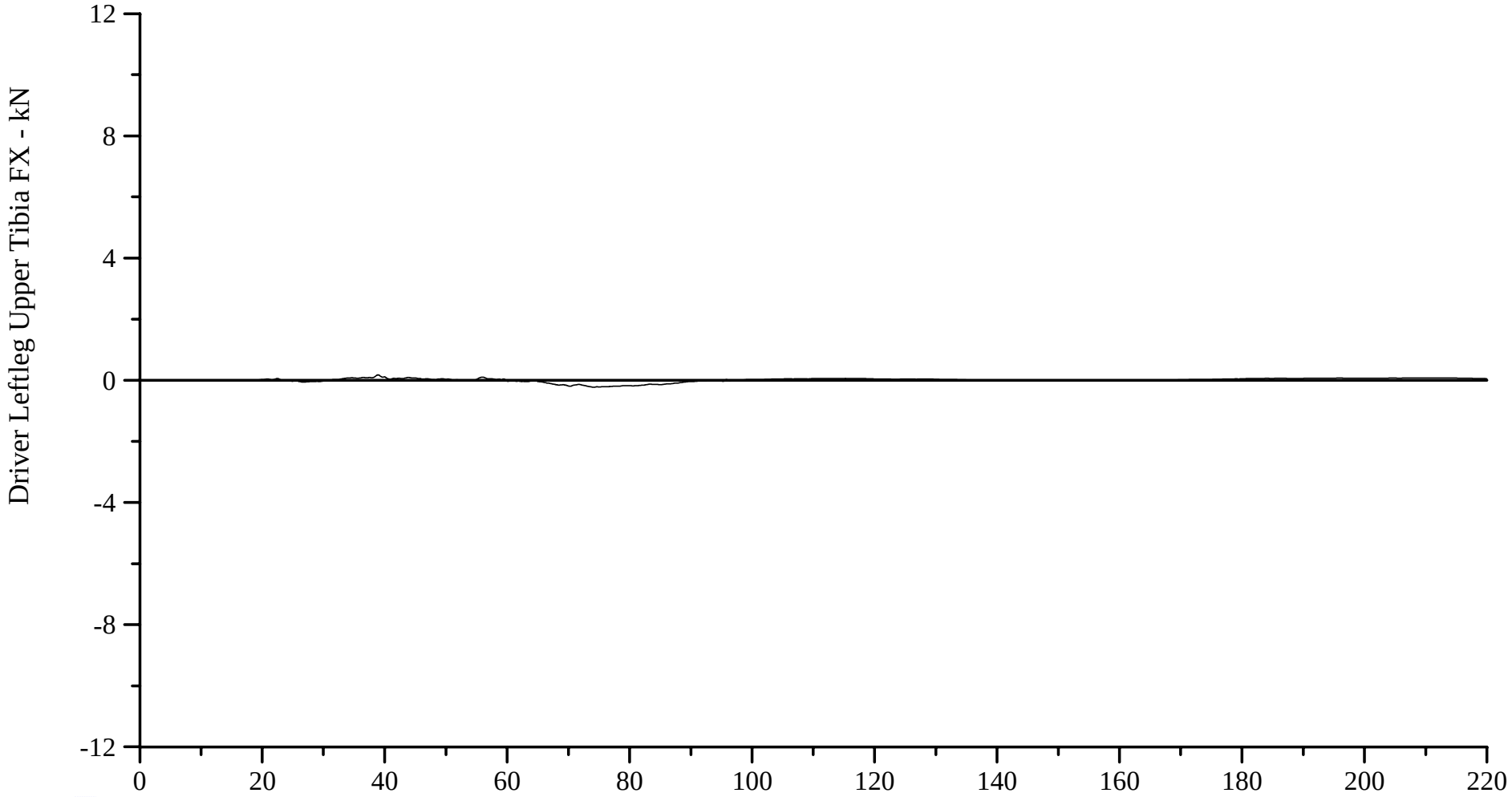


TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.18 kN	38.90msec
Minimum	-0.23 kN	74.10msec



Upper Tibia Force

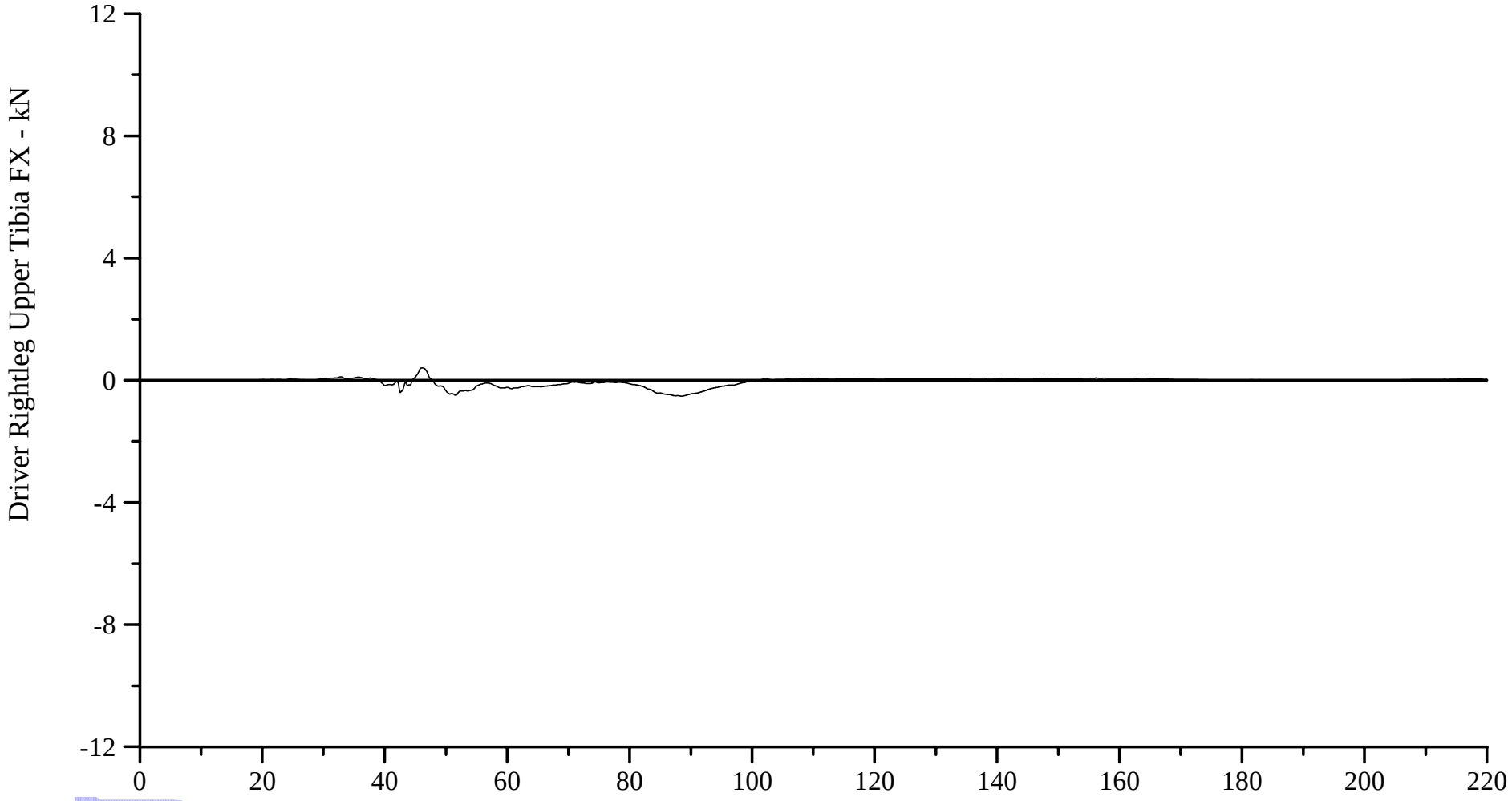
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.40 kN	46.05msec
Minimum	-0.52 kN	88.50msec



Upper Tibia Force

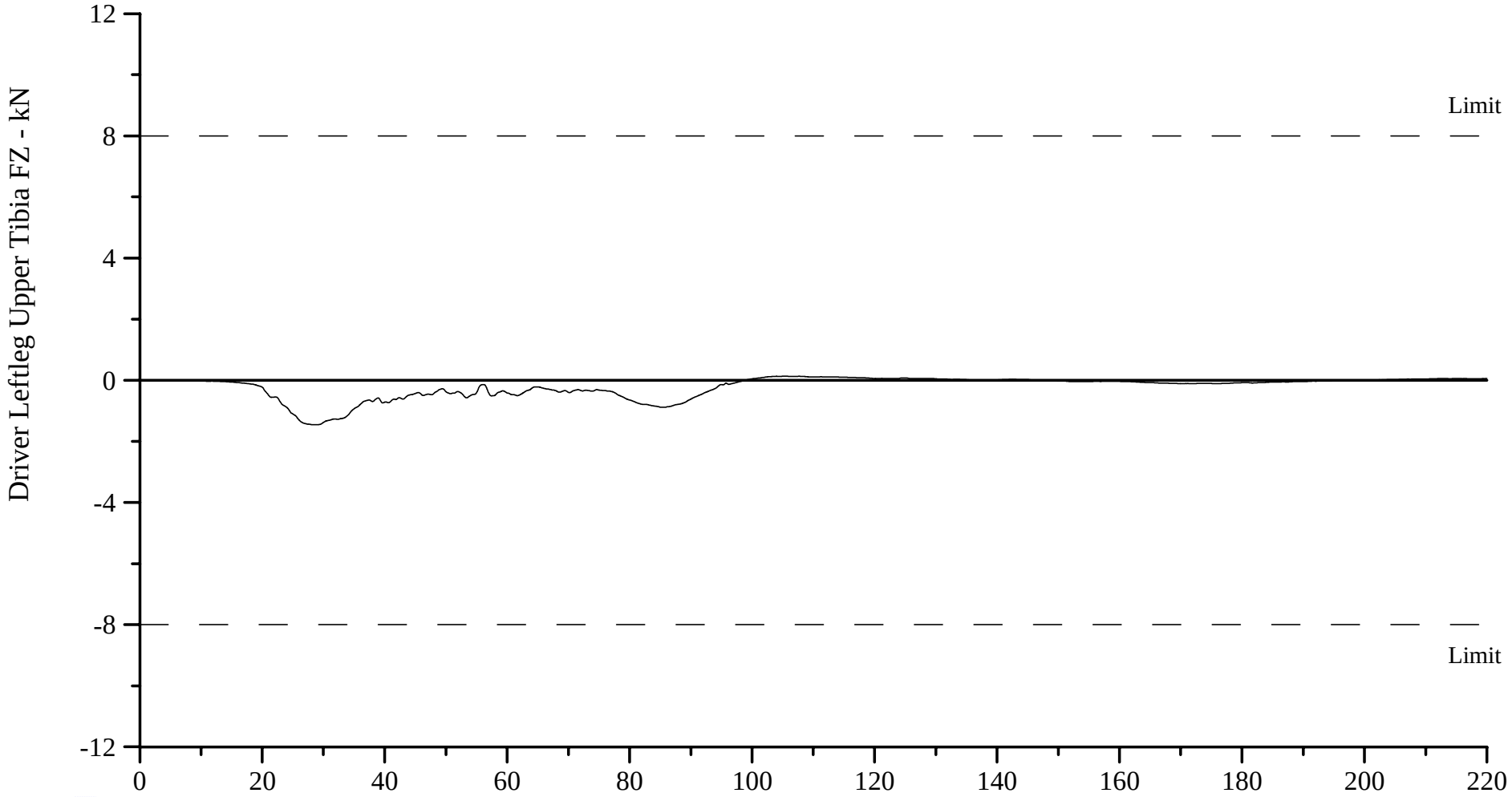
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.14 kN	105.25msec
Minimum	-1.45 kN	28.25msec



Upper Tibia Force

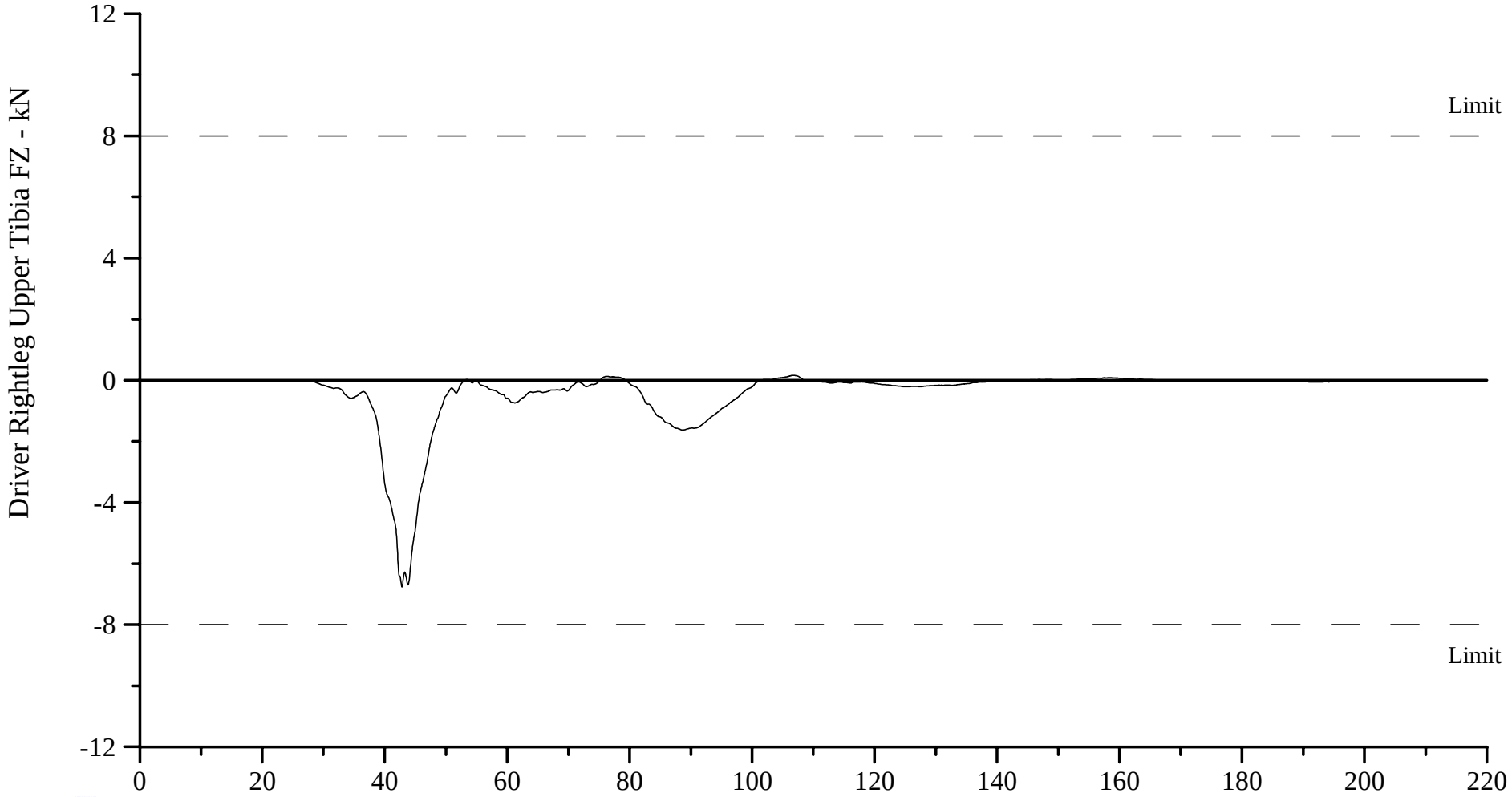
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.16 kN	106.70msec
Minimum	-6.76 kN	42.80msec



Upper Tibia Force

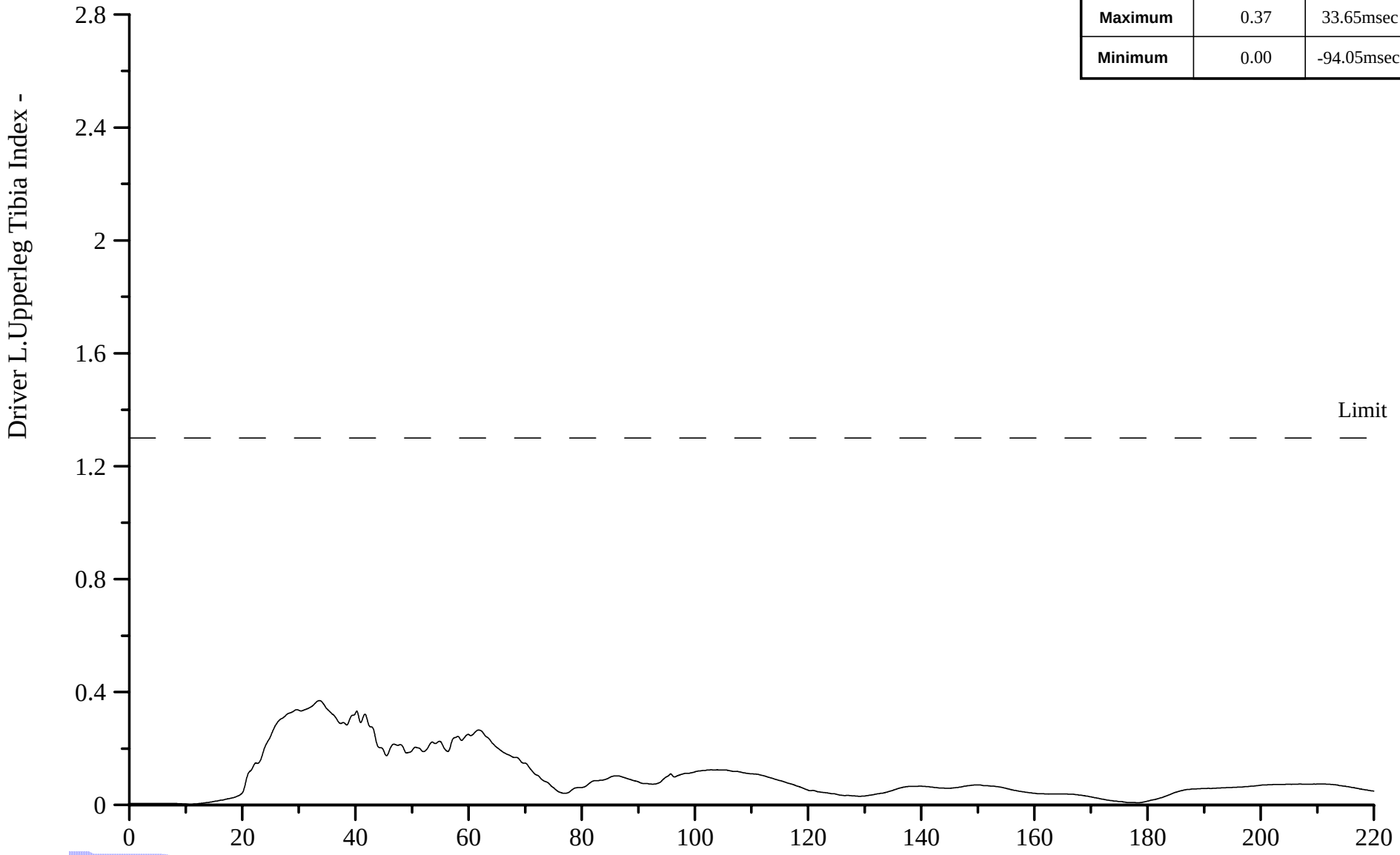
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.37	33.65msec
Minimum	0.00	-94.05msec



Upper Tibia Index

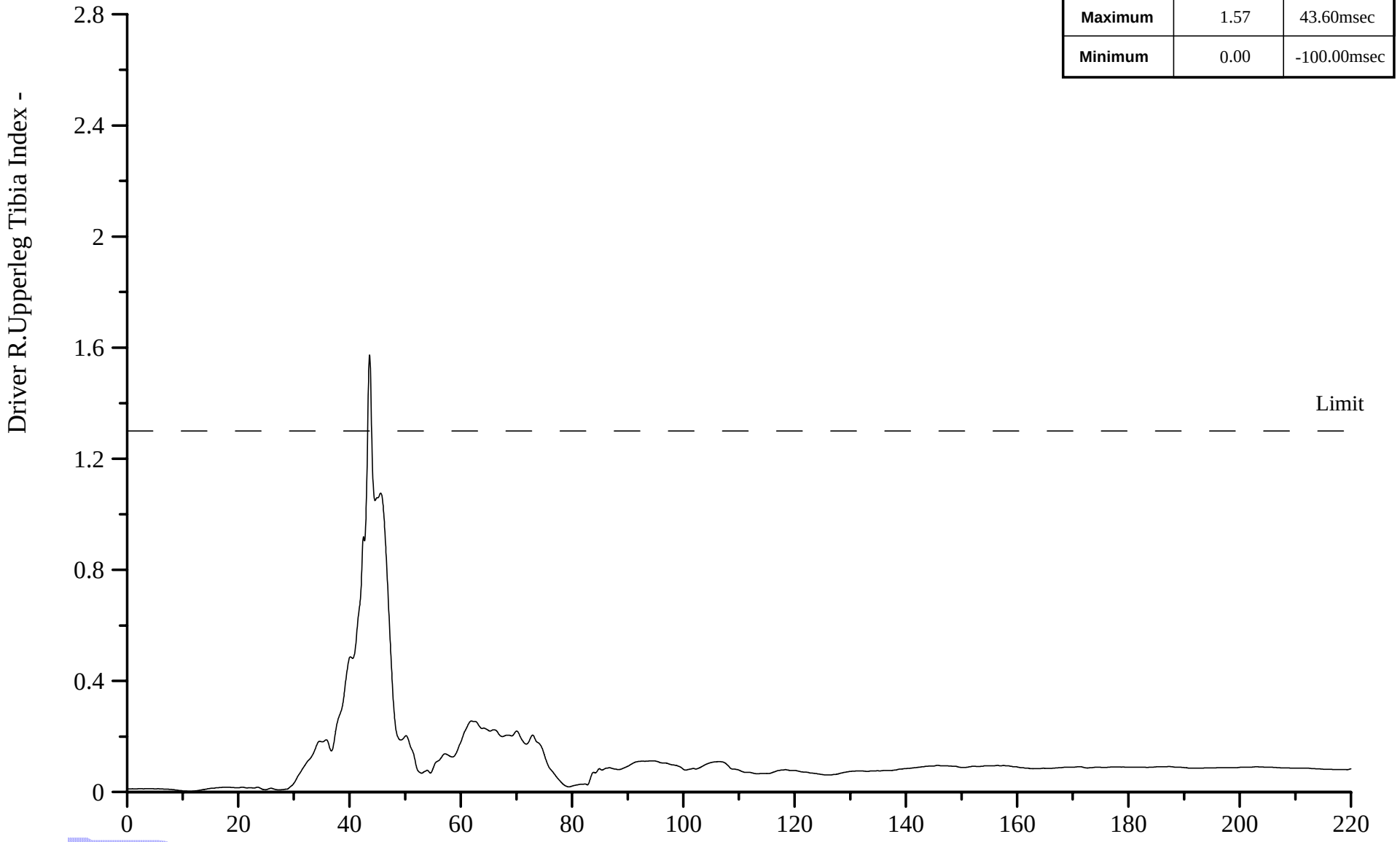
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.57	43.60msec
Minimum	0.00	-100.00msec



Upper Tibia Index

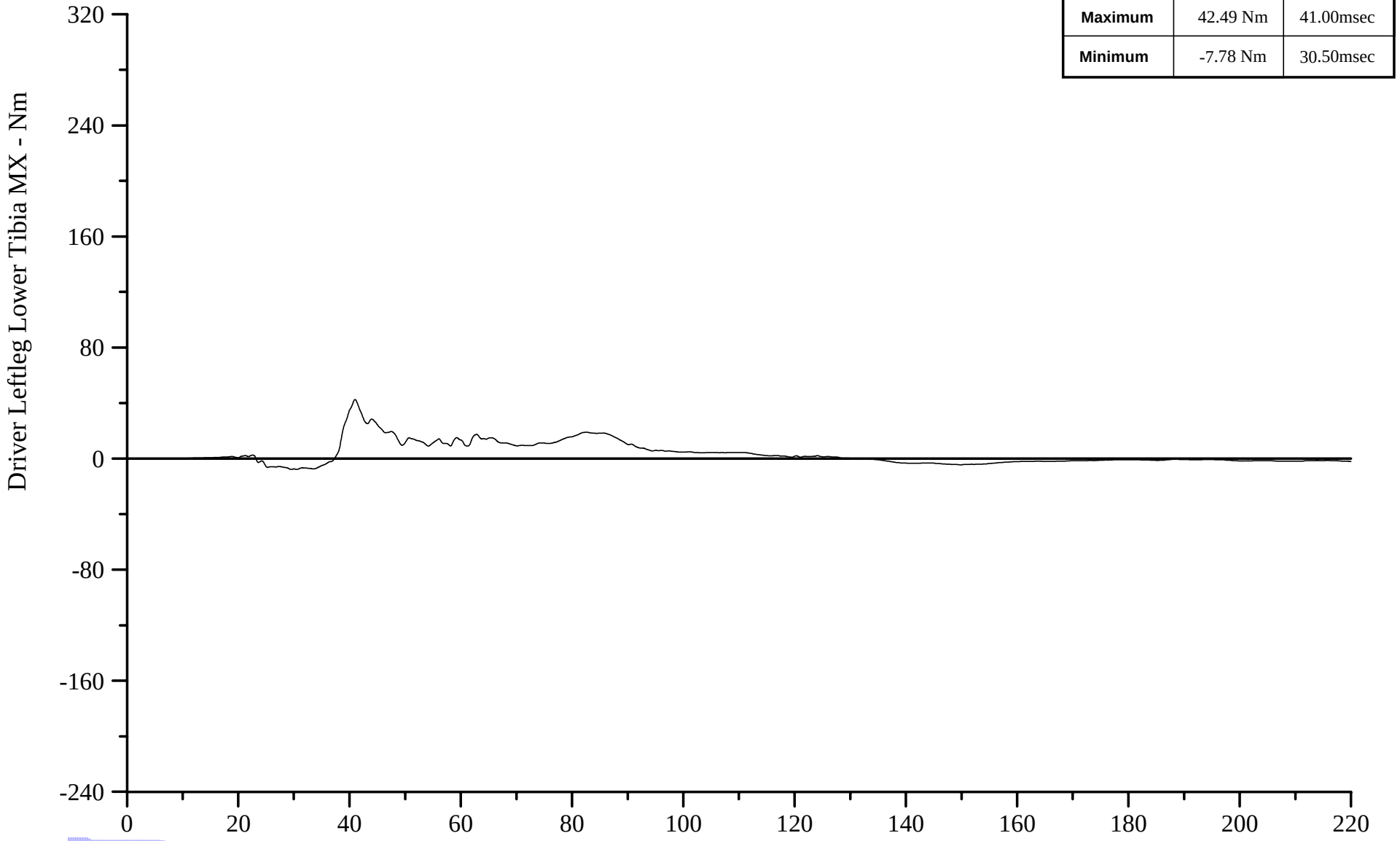
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	42.49 Nm	41.00msec
Minimum	-7.78 Nm	30.50msec



Lower Tibia Moment

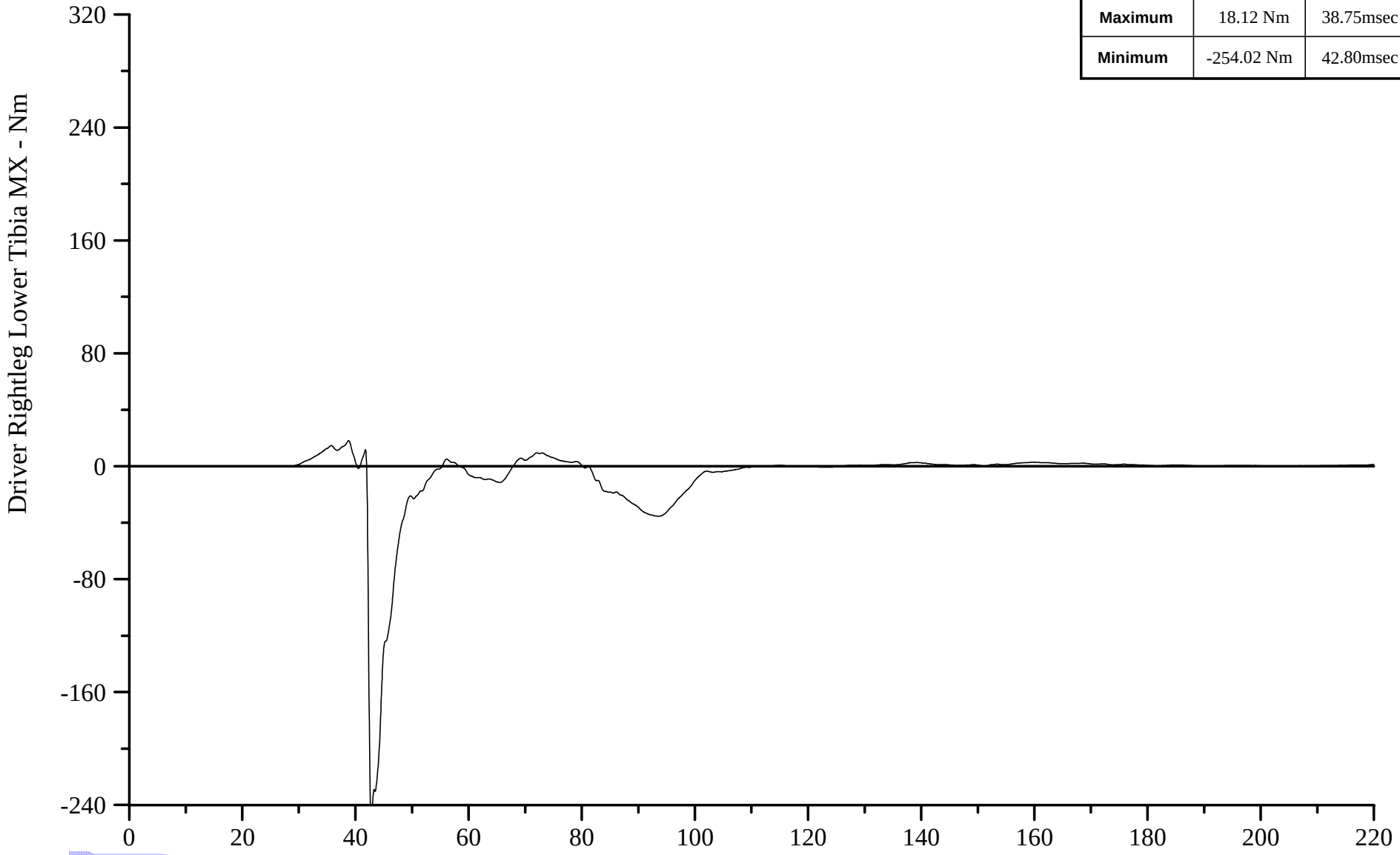
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	18.12 Nm	38.75msec
Minimum	-254.02 Nm	42.80msec



Lower Tibia Moment

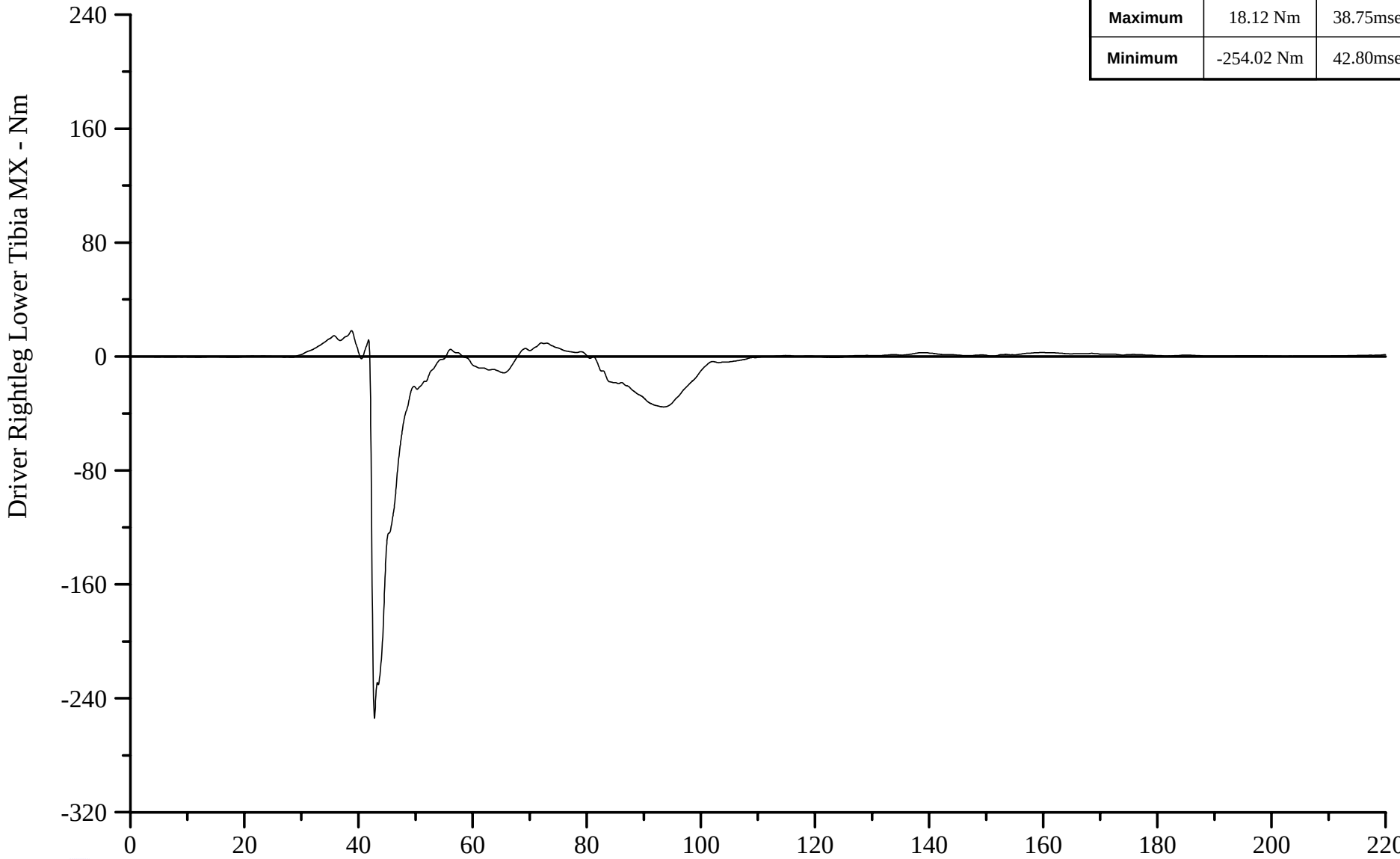
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	18.12 Nm	38.75msec
Minimum	-254.02 Nm	42.80msec



Lower Tibia Moment

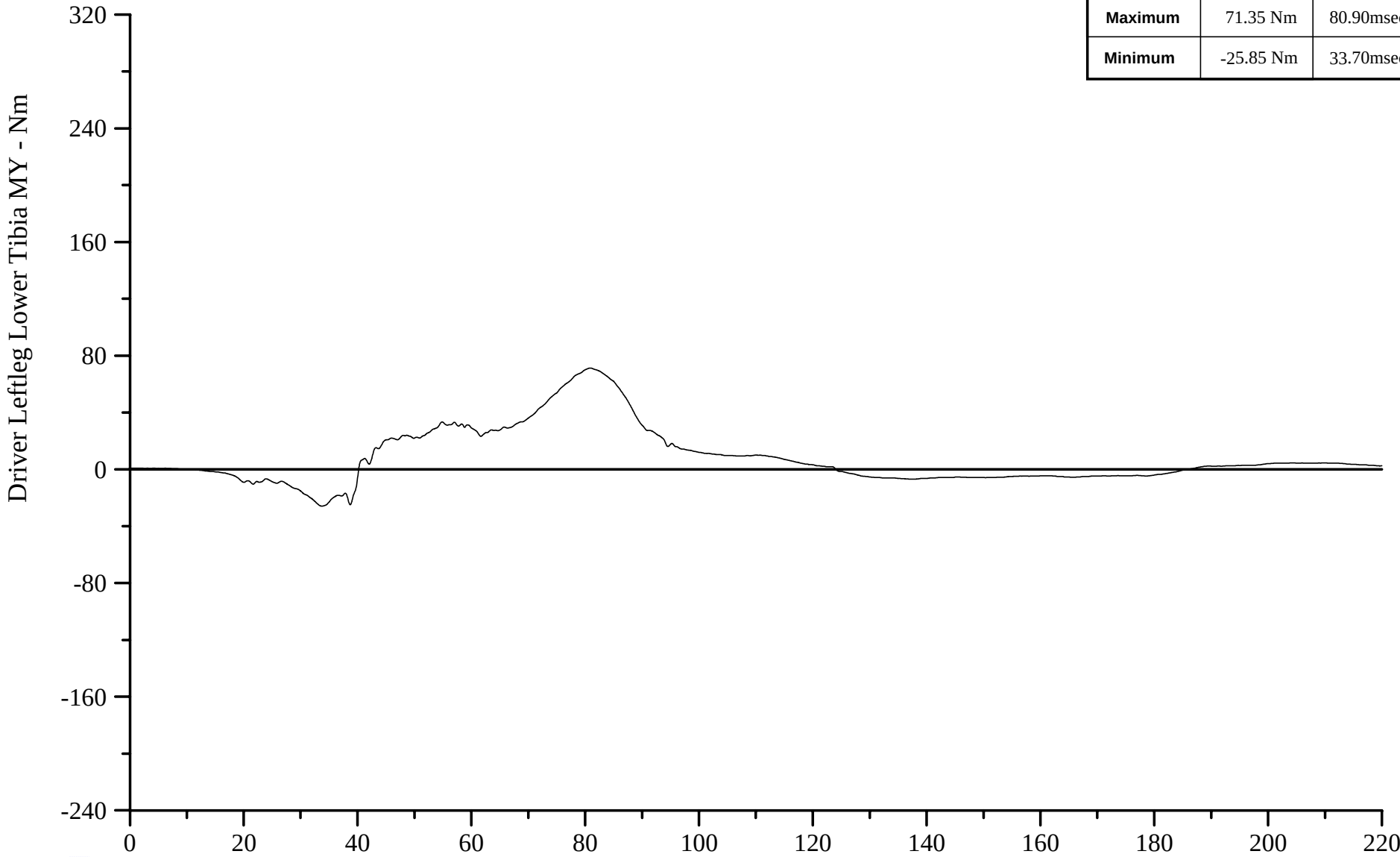
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	71.35 Nm	80.90msec
Minimum	-25.85 Nm	33.70msec



Lower Tibia Moment

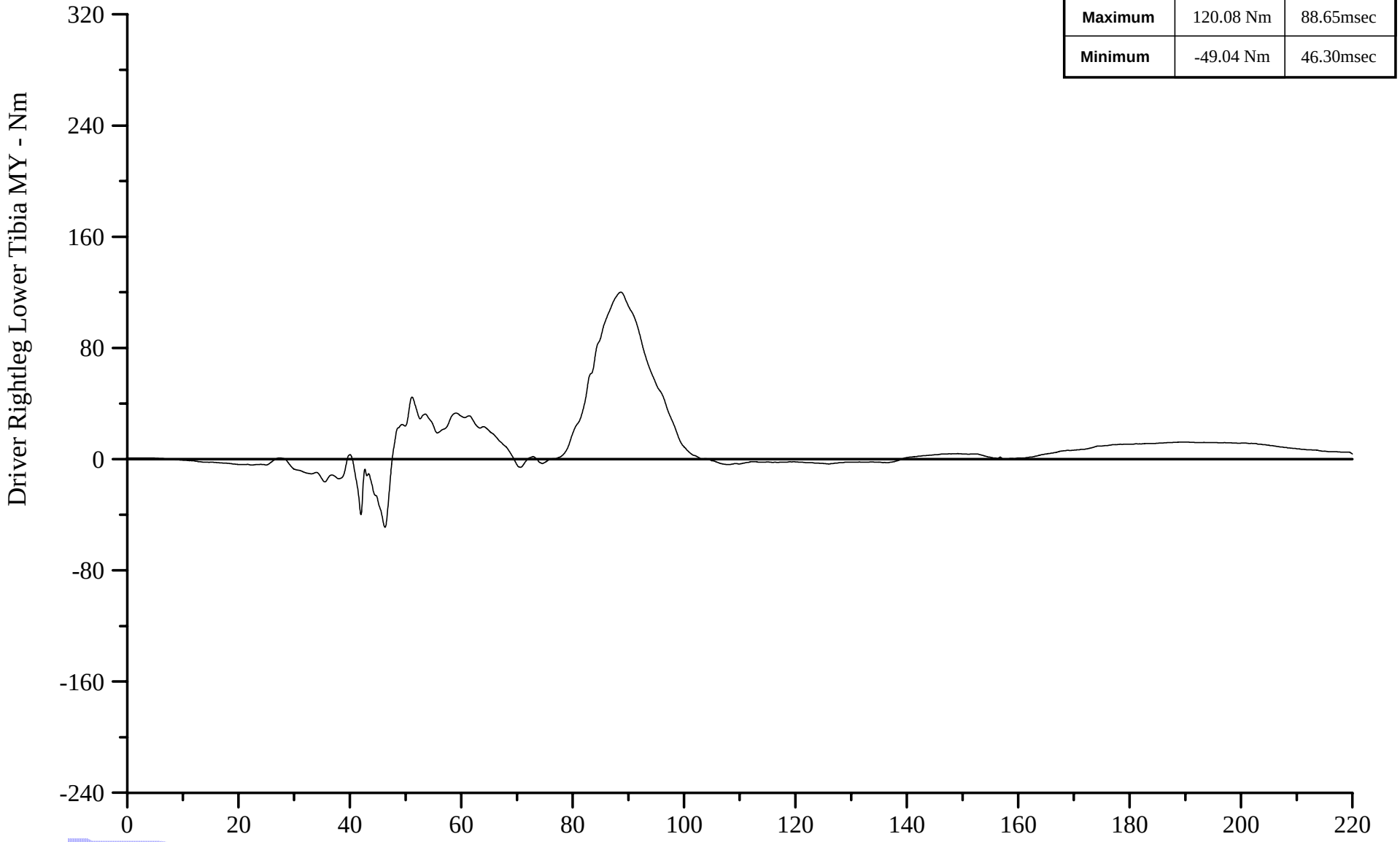
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	120.08 Nm	88.65msec
Minimum	-49.04 Nm	46.30msec



Lower Tibia Moment

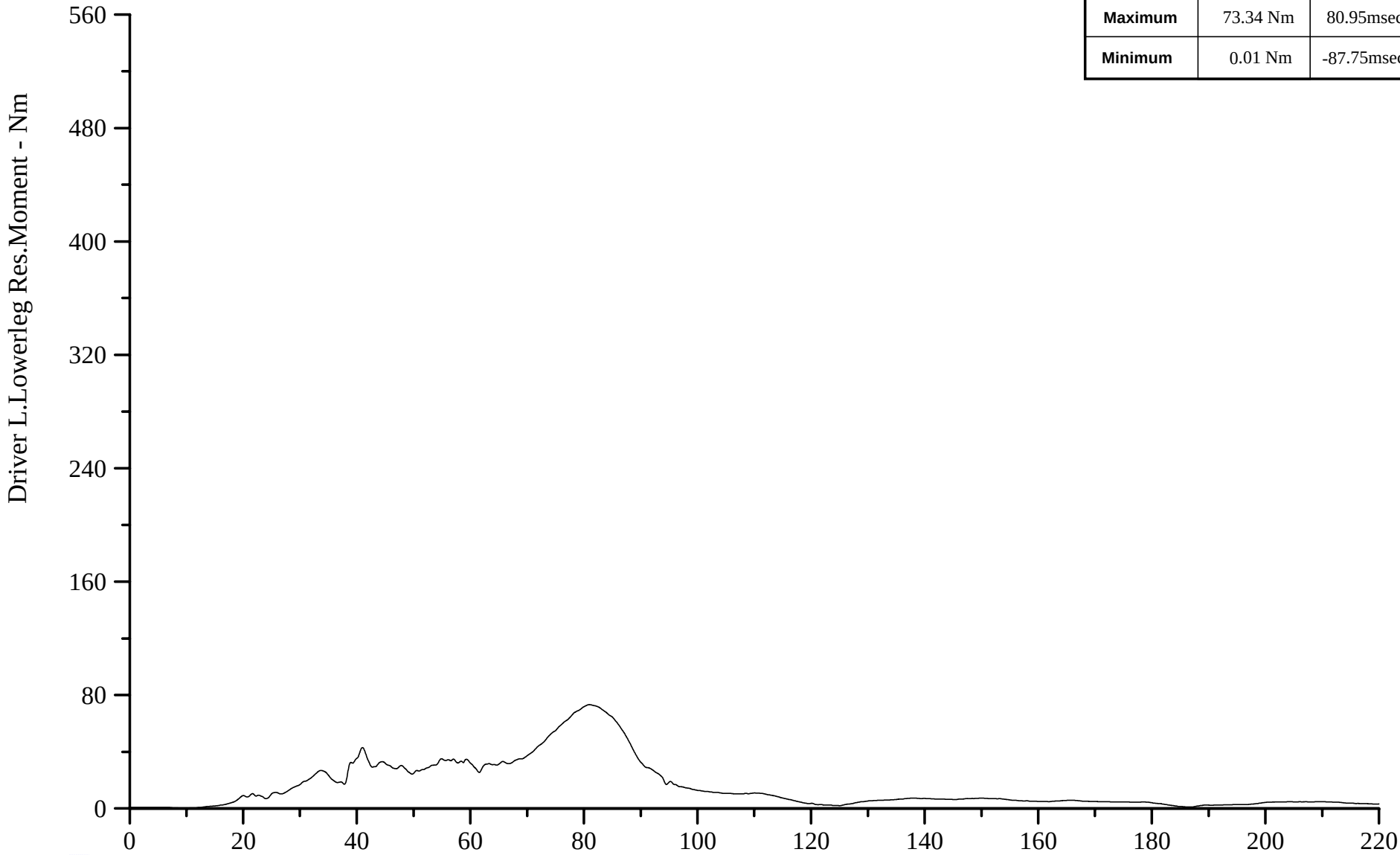
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	73.34 Nm	80.95msec
Minimum	0.01 Nm	-87.75msec



Lower Tibia Moment

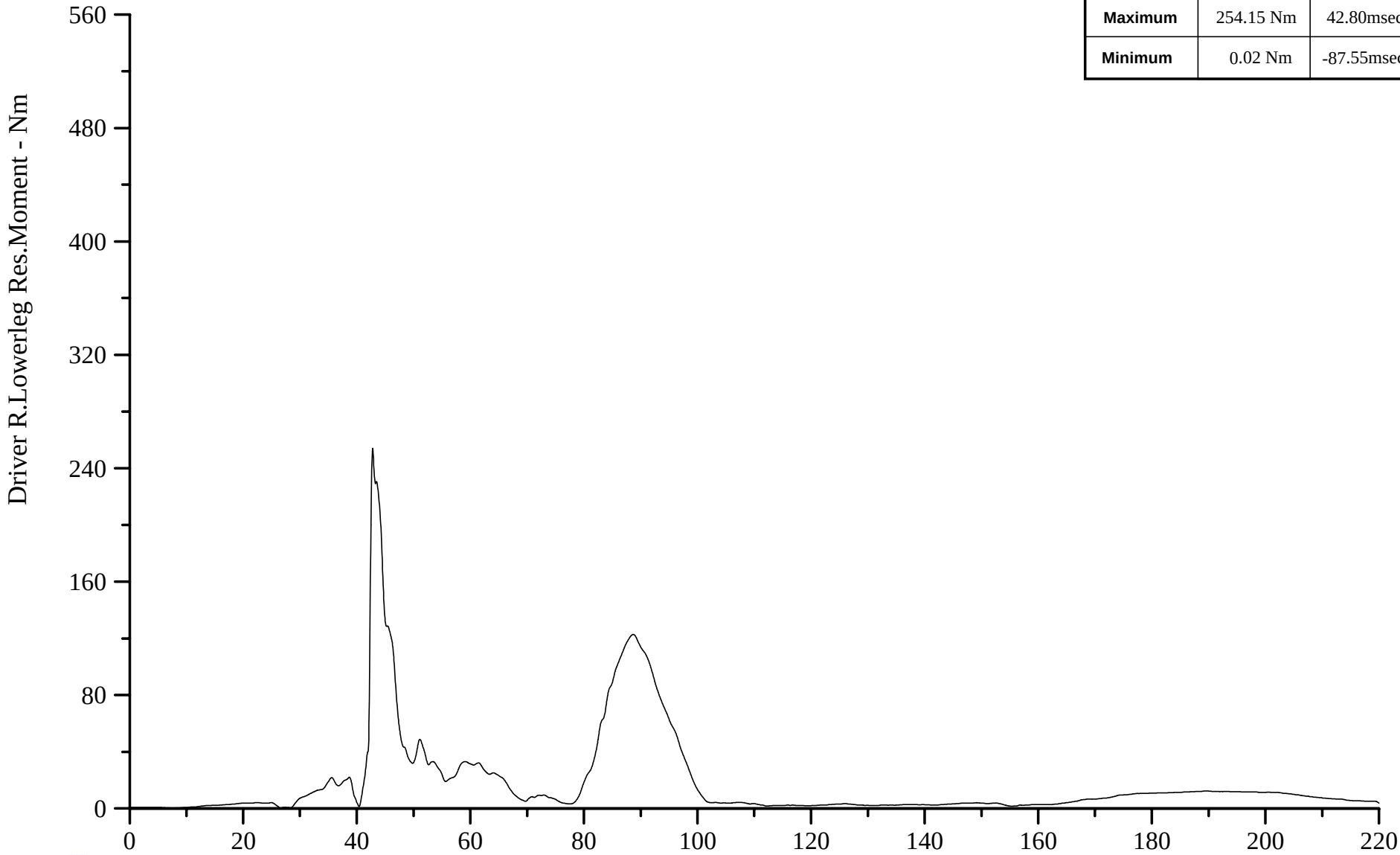
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	254.15 Nm	42.80msec
Minimum	0.02 Nm	-87.55msec



Lower Tibia Moment

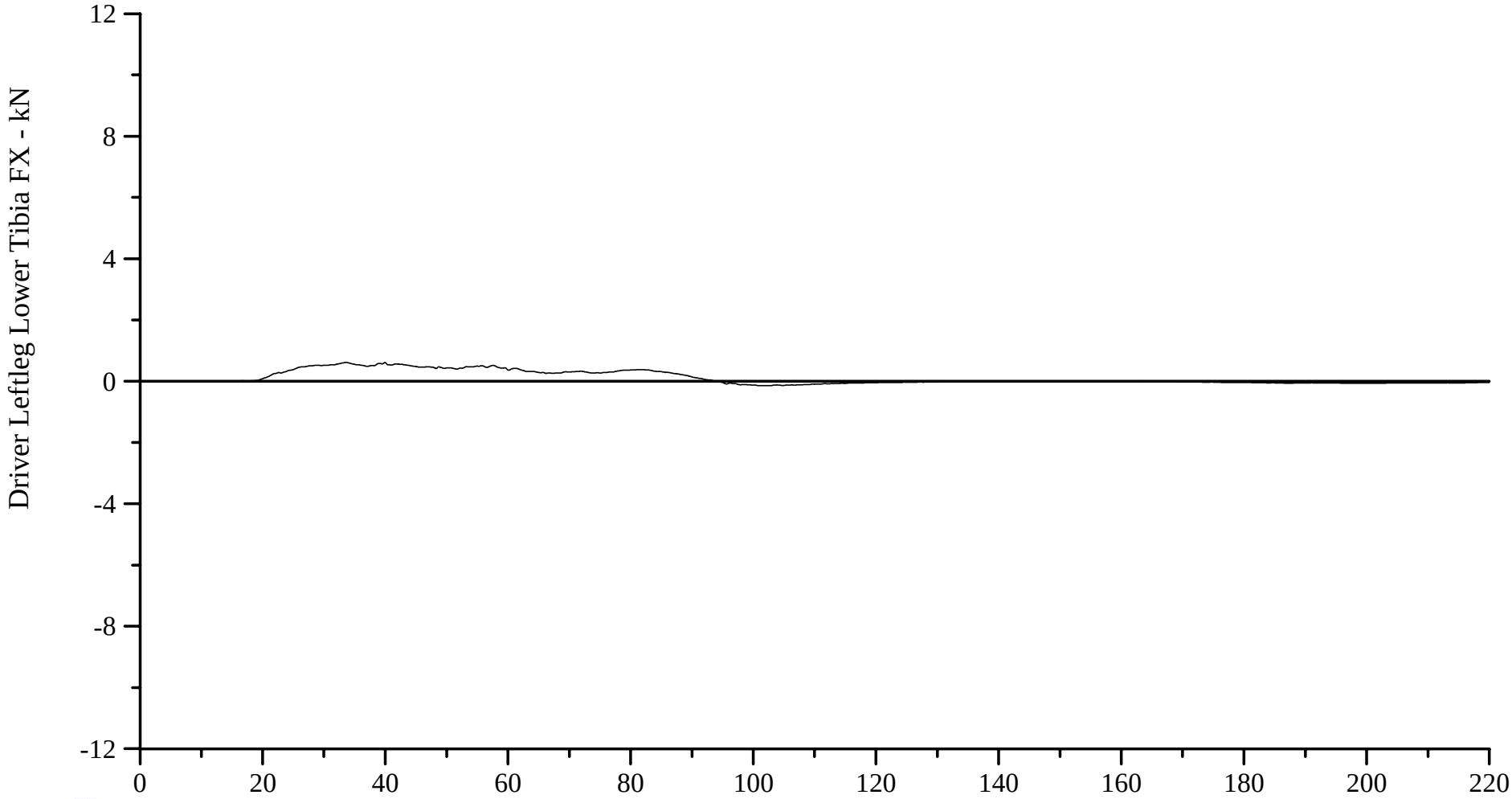
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.61 kN	33.60msec
Minimum	-0.15 kN	101.85msec



Lower Tibia Force

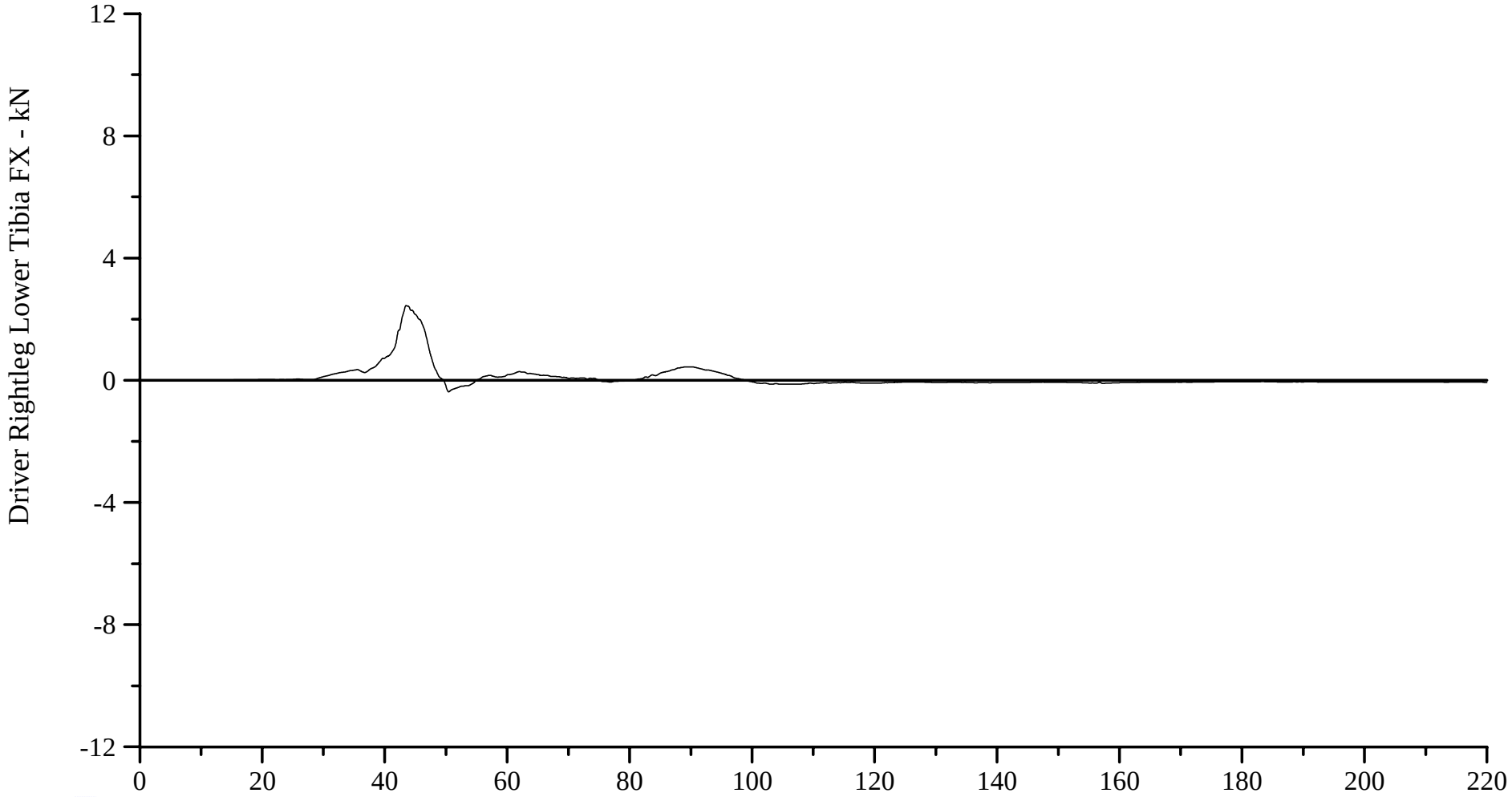
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	2.45 kN	43.50msec
Minimum	-0.38 kN	50.45msec



Lower Tibia Force

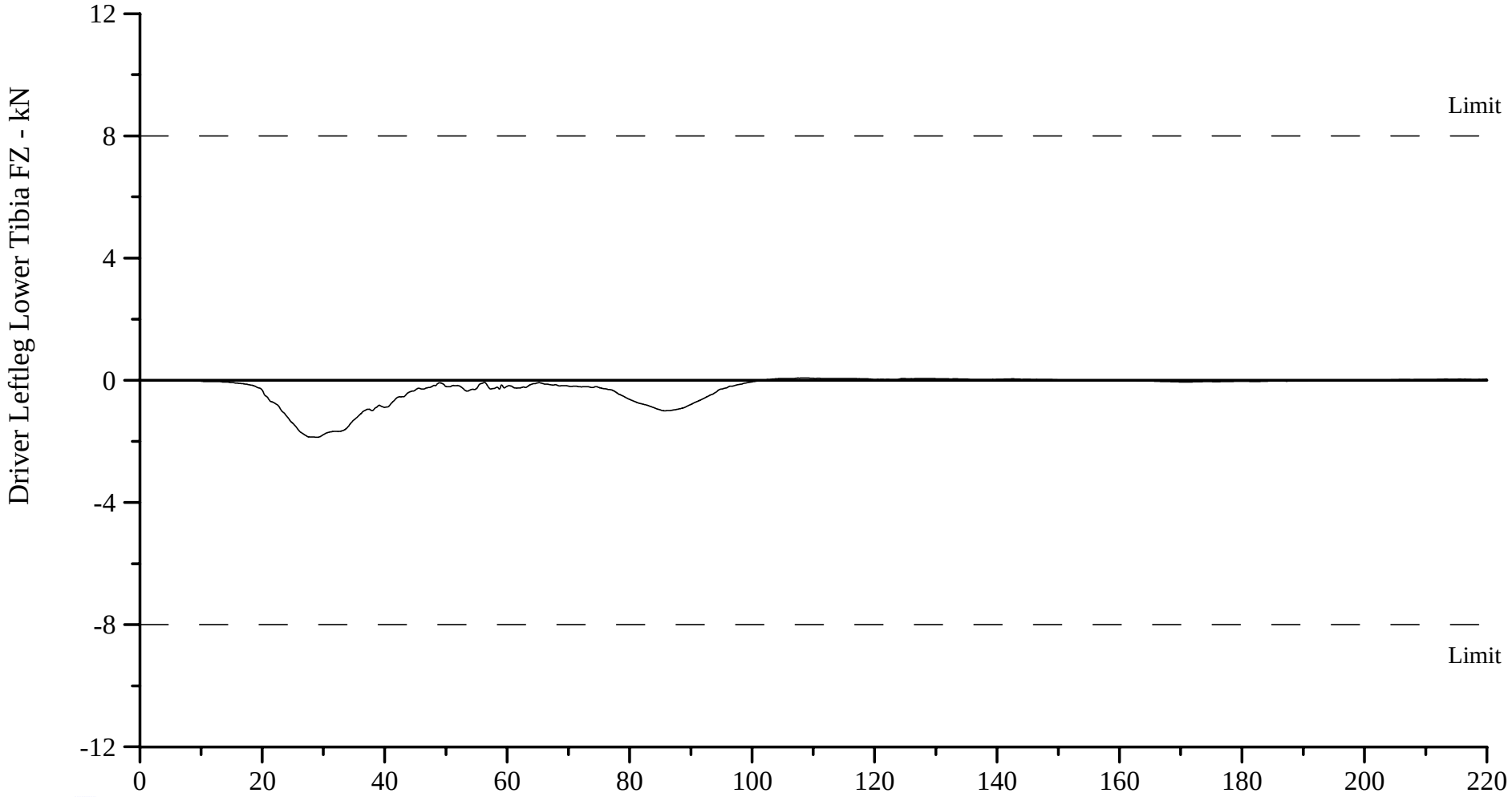
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.07 kN	108.30msec
Minimum	-1.86 kN	28.80msec



Lower Tibia Force

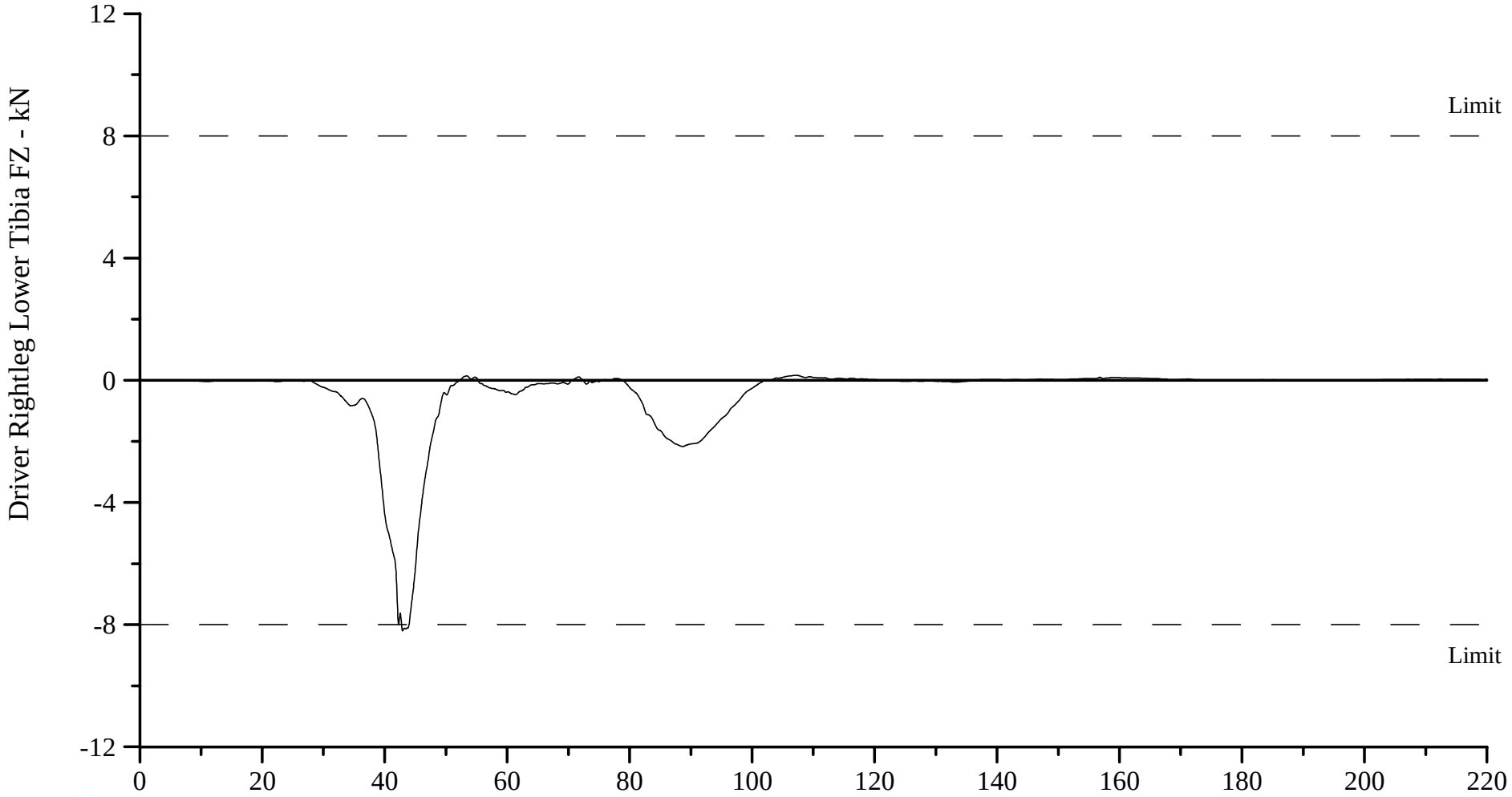
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.16 kN	107.00msec
Minimum	-8.19 kN	42.95msec



Lower Tibia Force

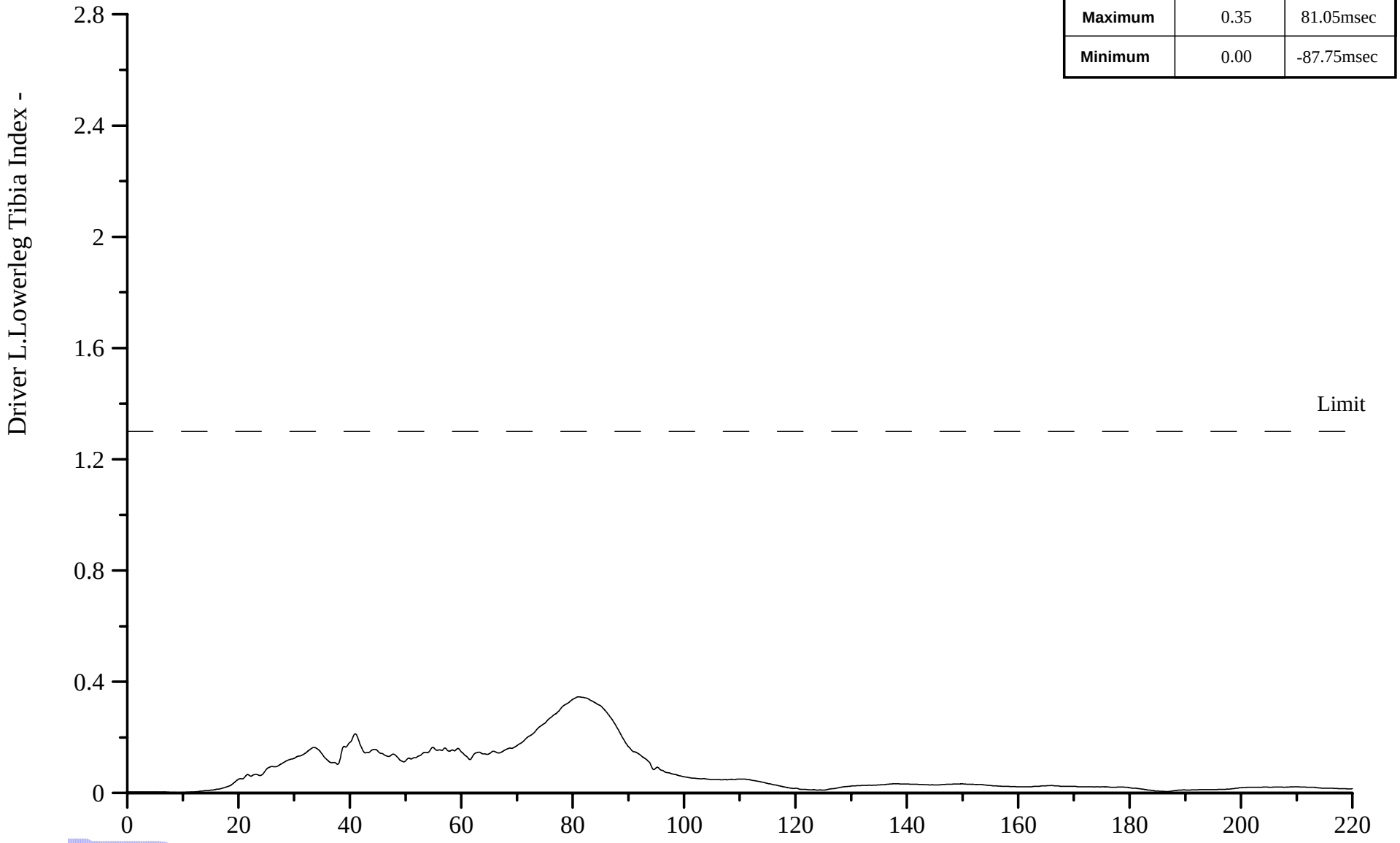
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	0.35	81.05msec
Minimum	0.00	-87.75msec



Lower Tibia Index

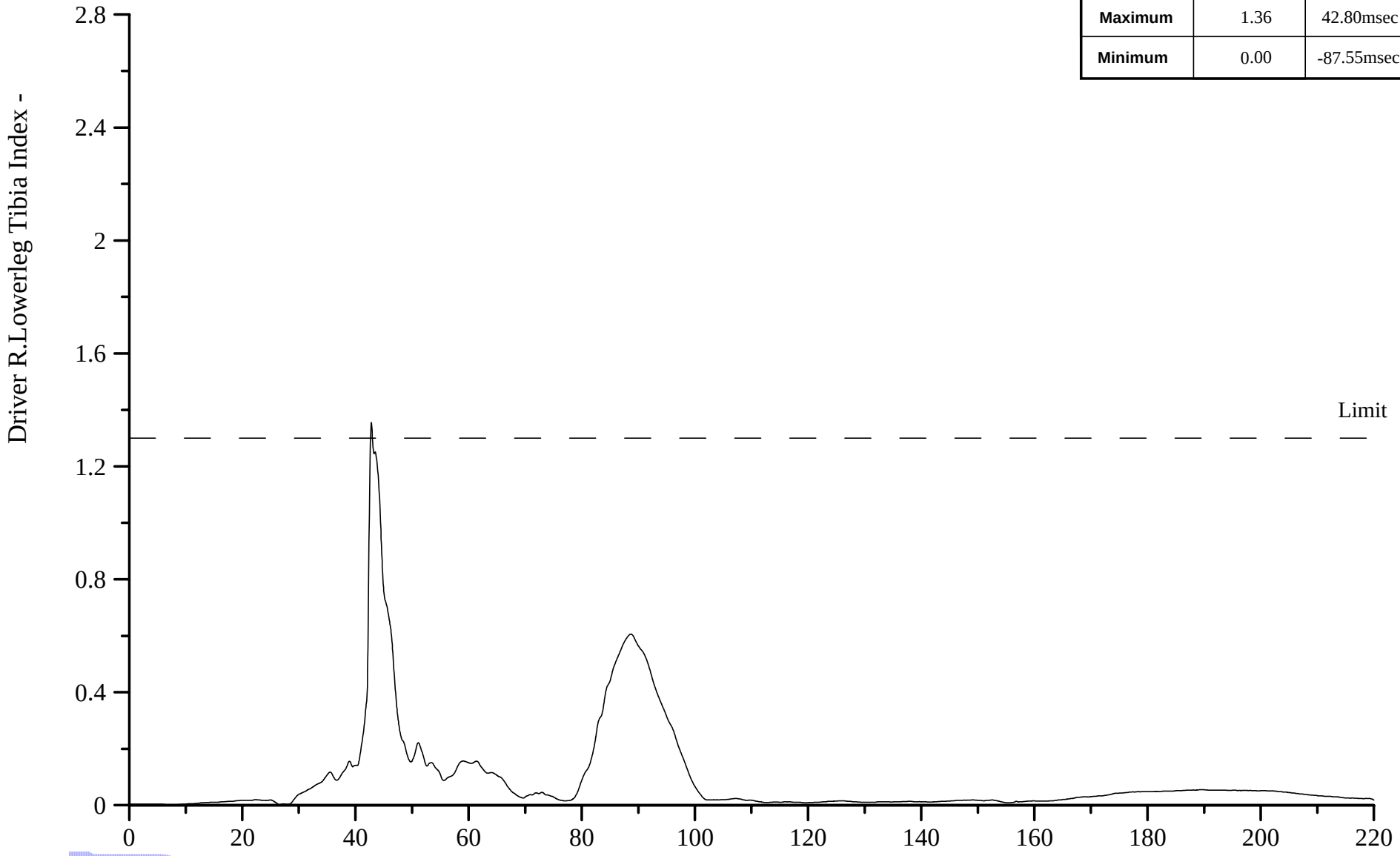
Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

Processed
on 06.06.2000

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

Peak Values / Times		
Maximum	1.36	42.80msec
Minimum	0.00	-87.55msec



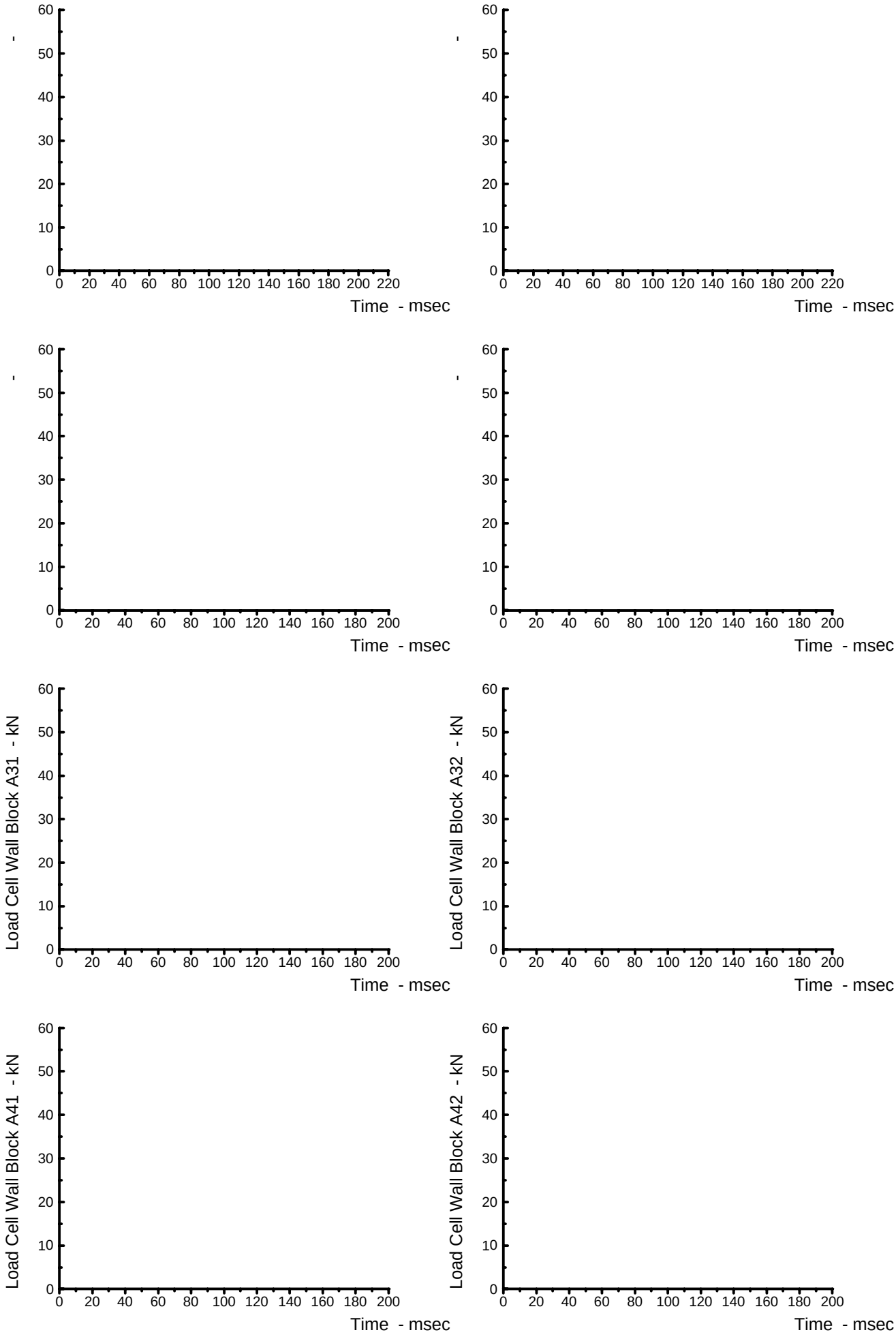
Lower Tibia Index

Filtered at CFC_600

TRANSPORT RESEARCH LABORATORY

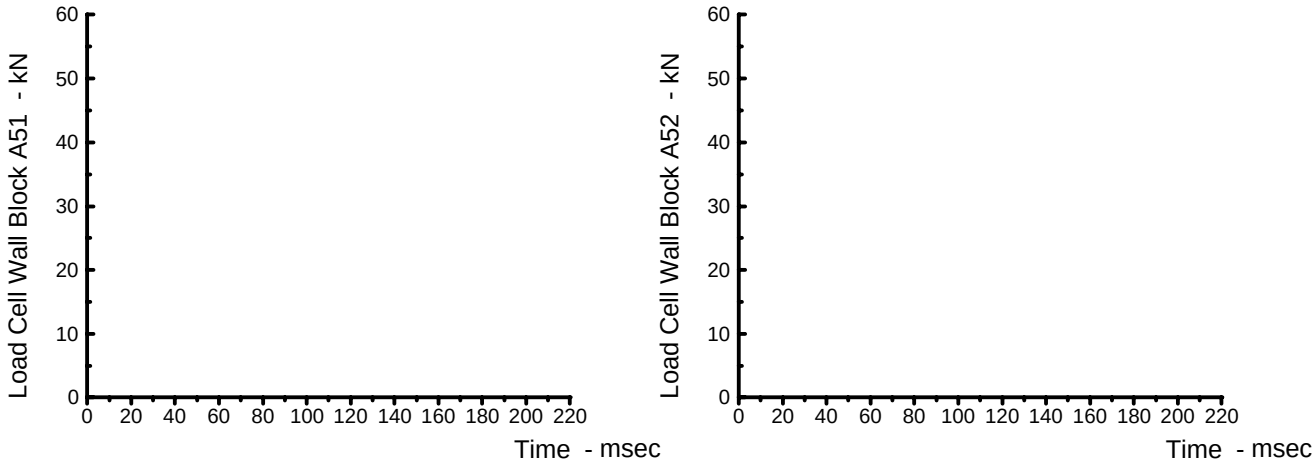
Processed
on 06.06.2000

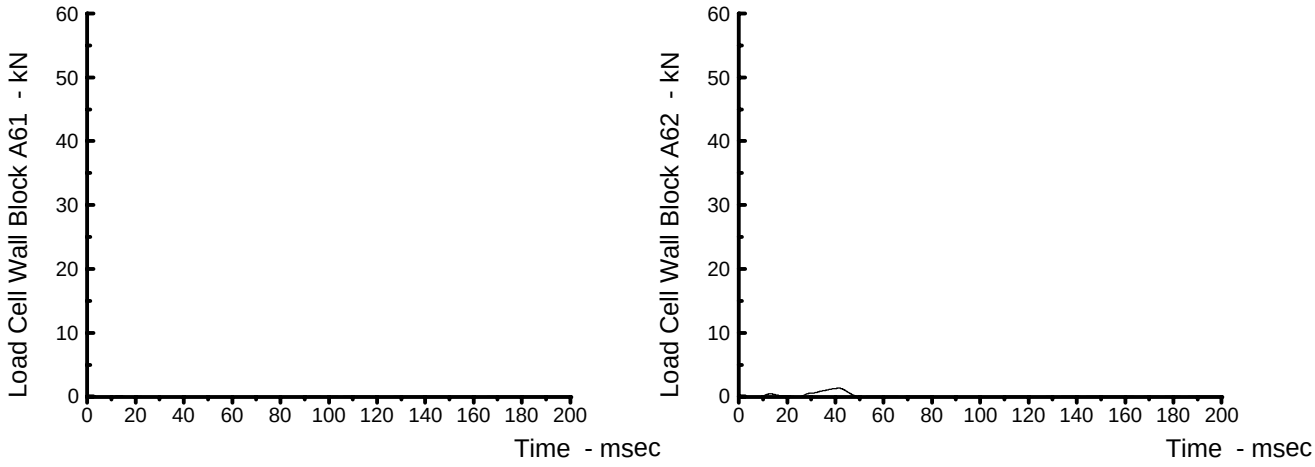
08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

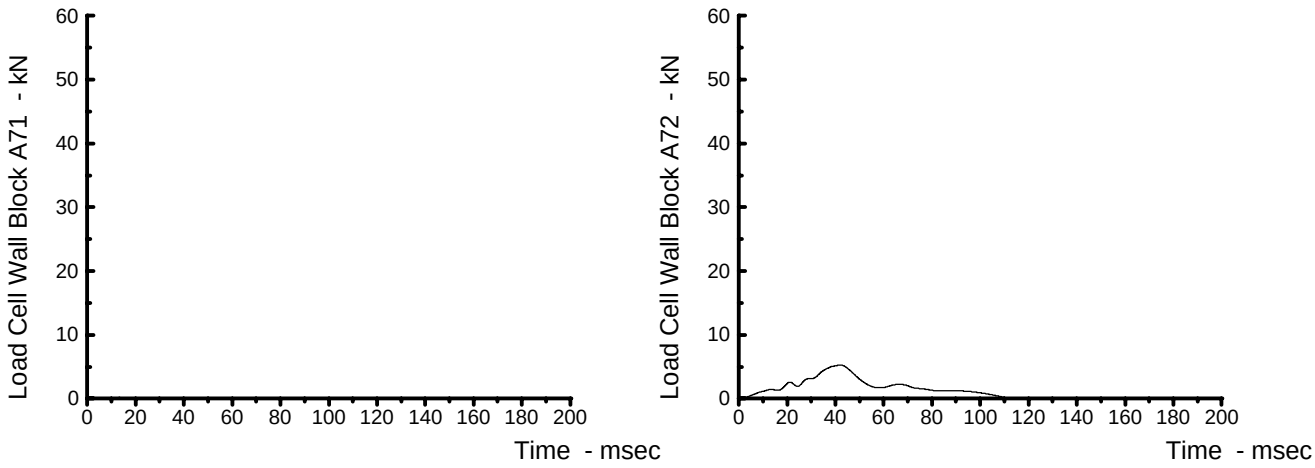


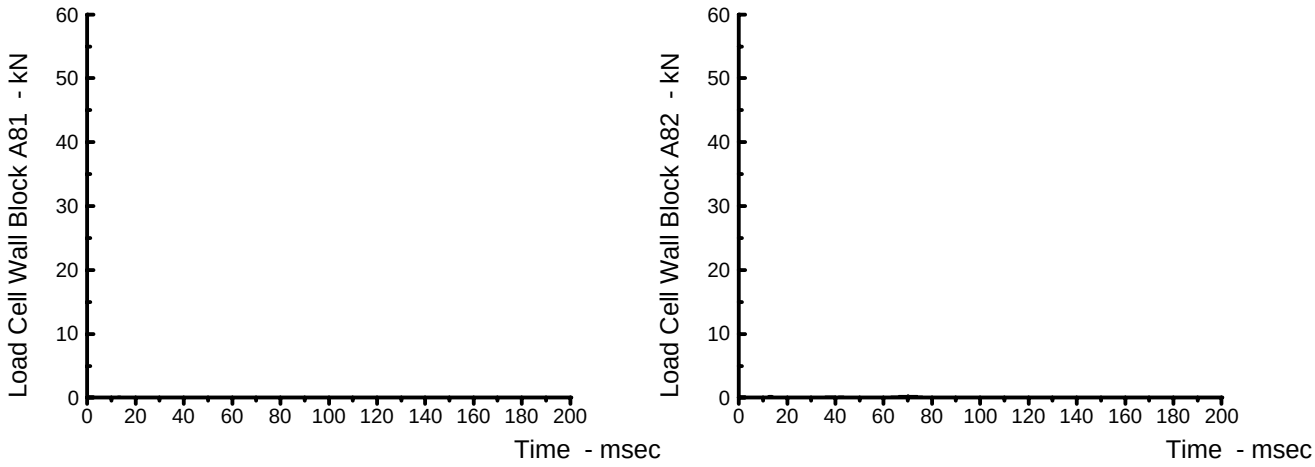
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



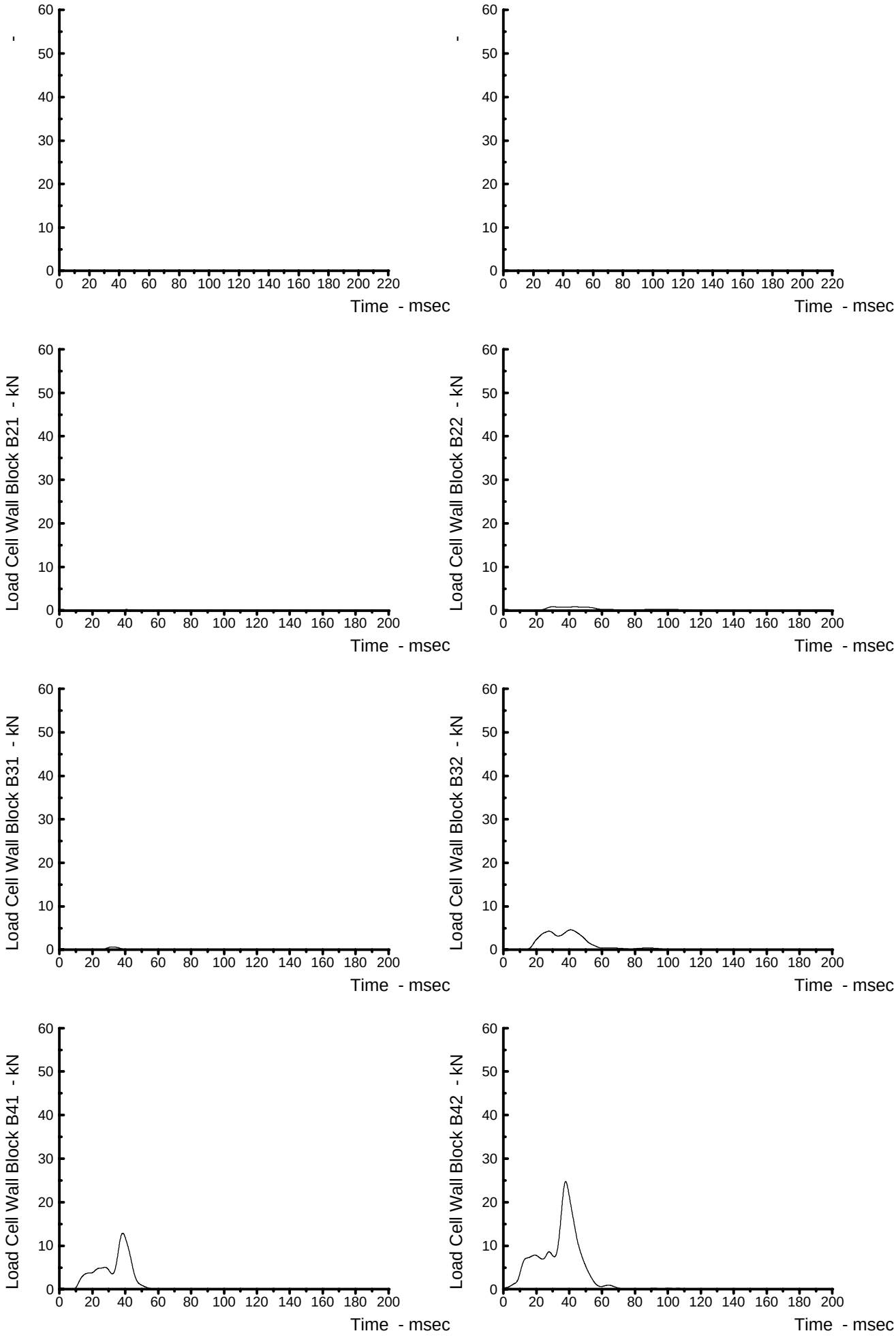






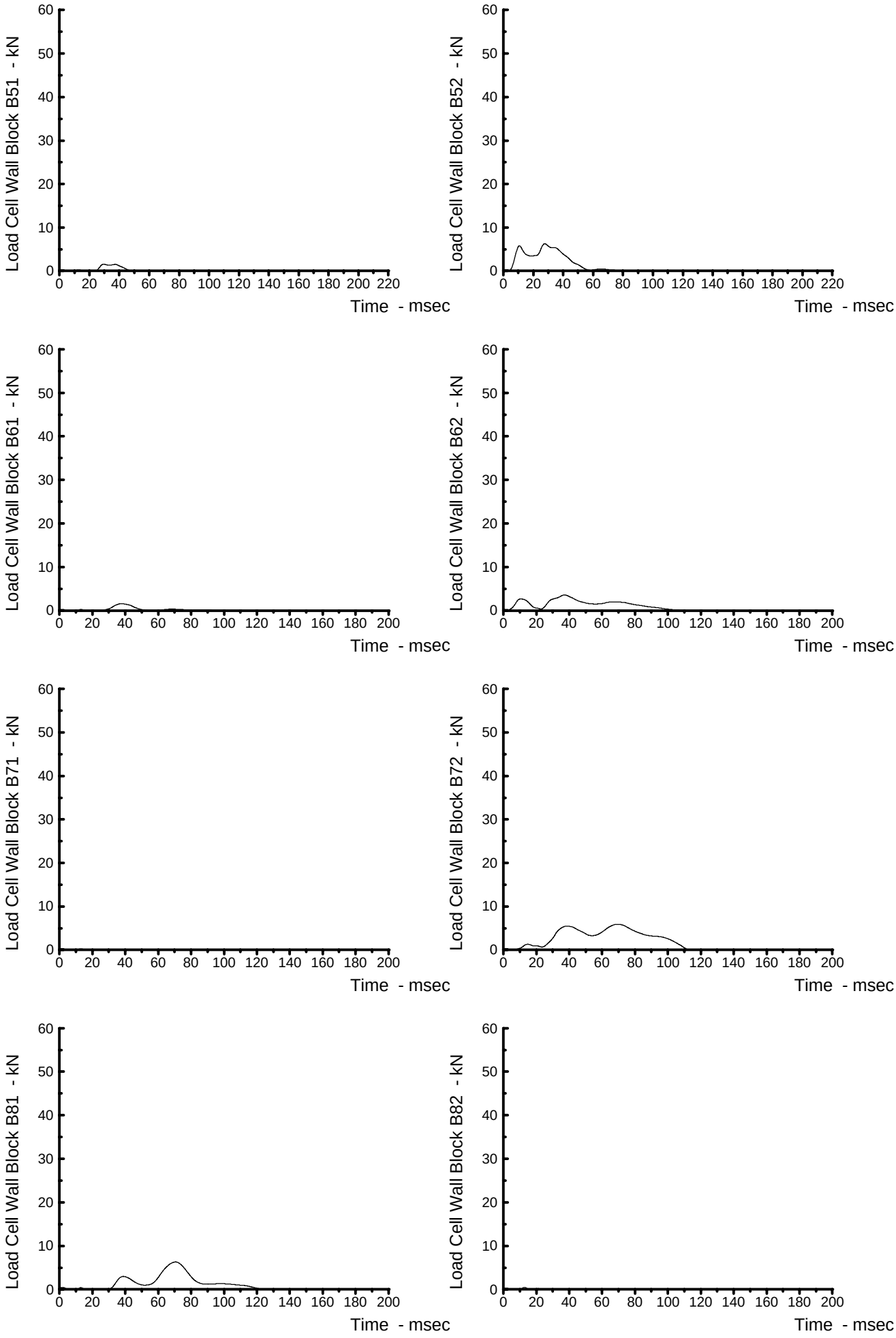
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



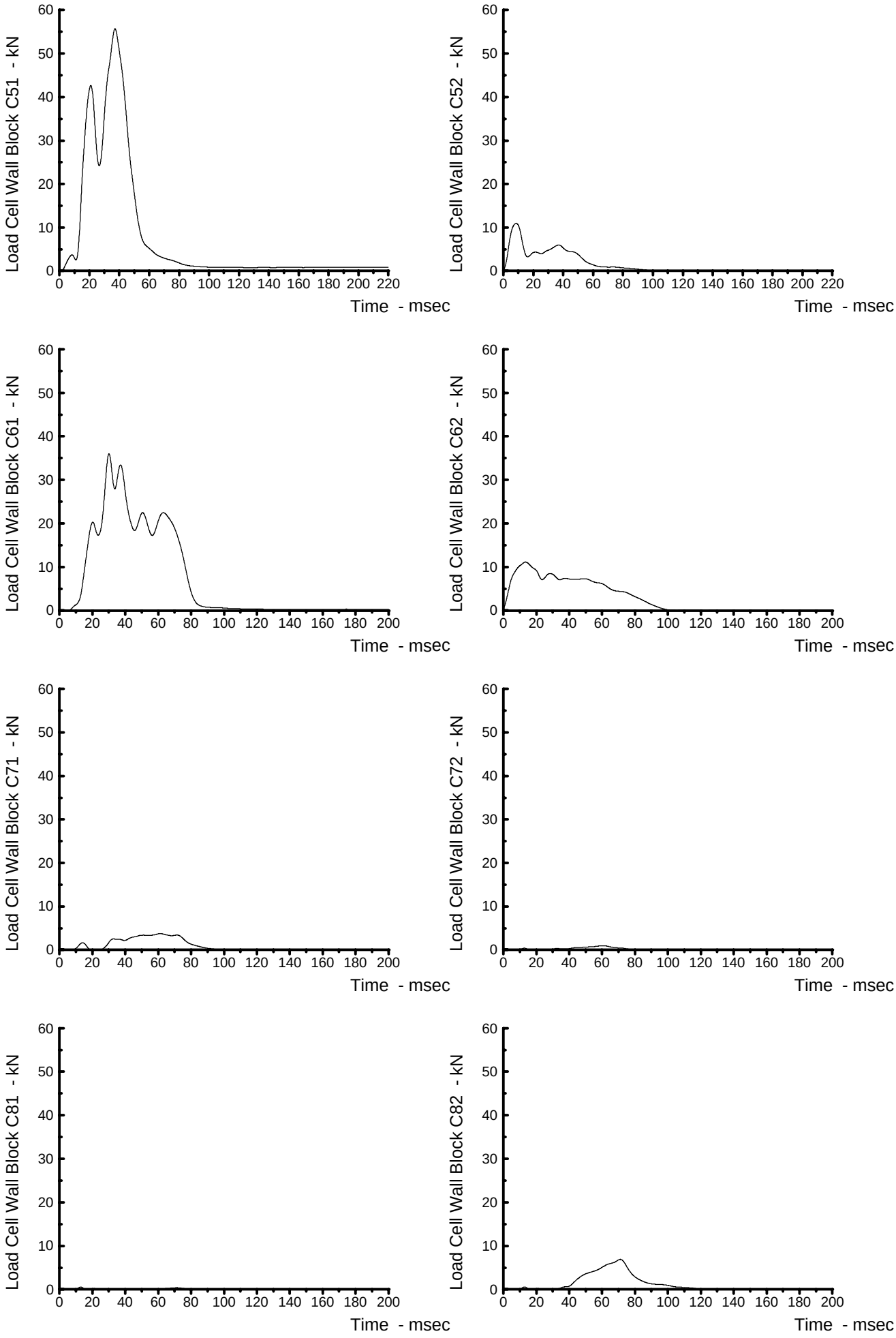
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



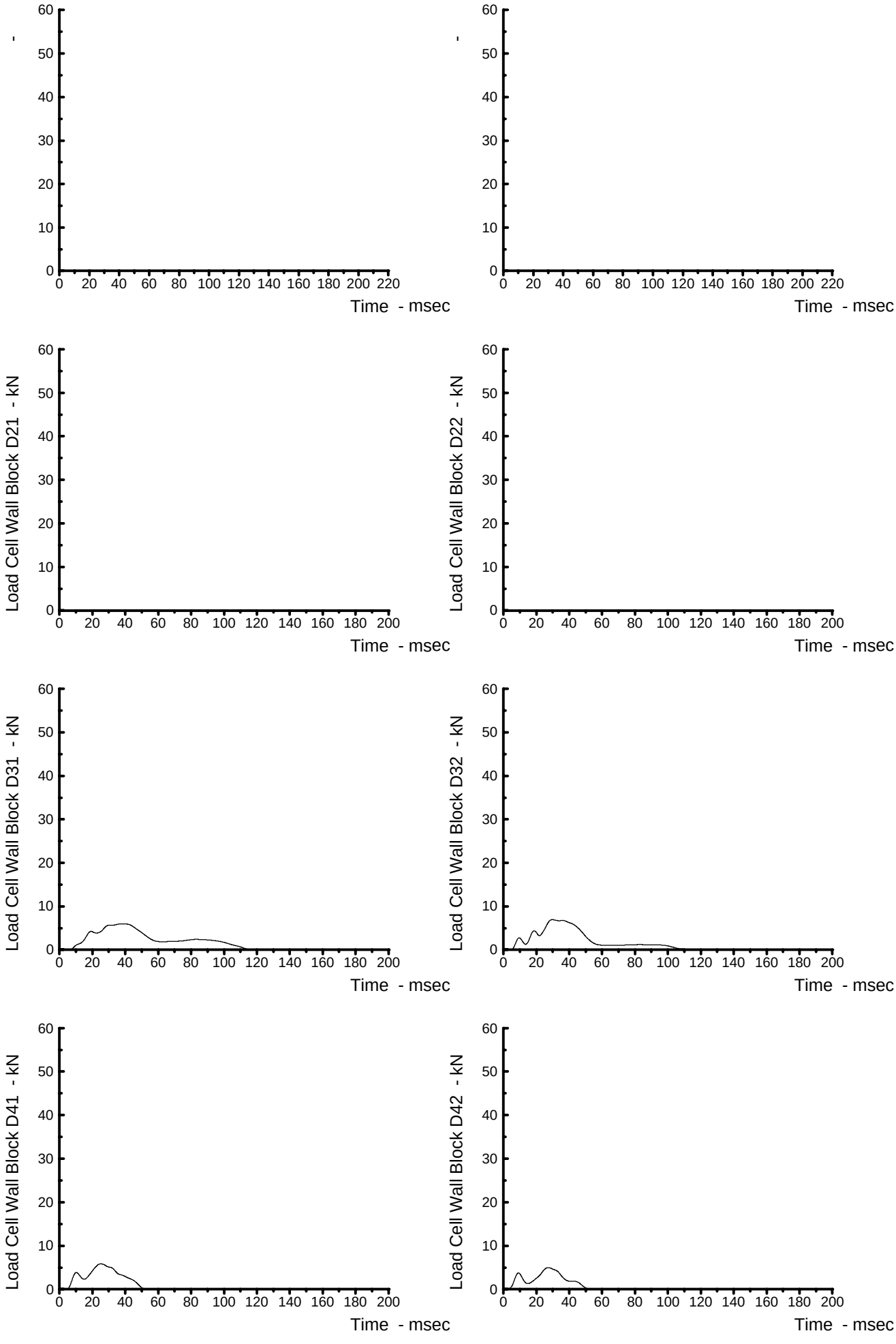
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



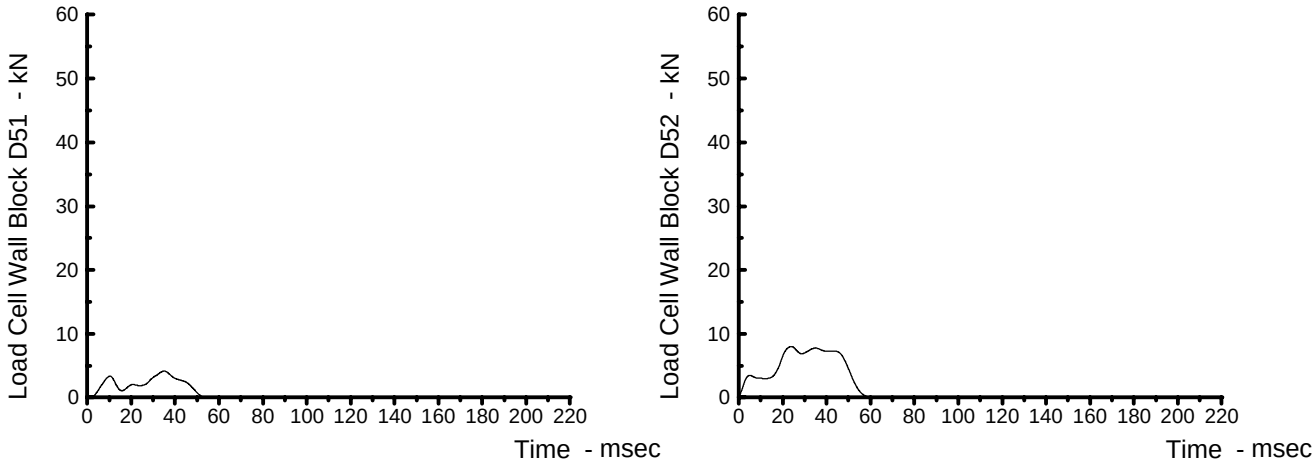
LCW Force - Time

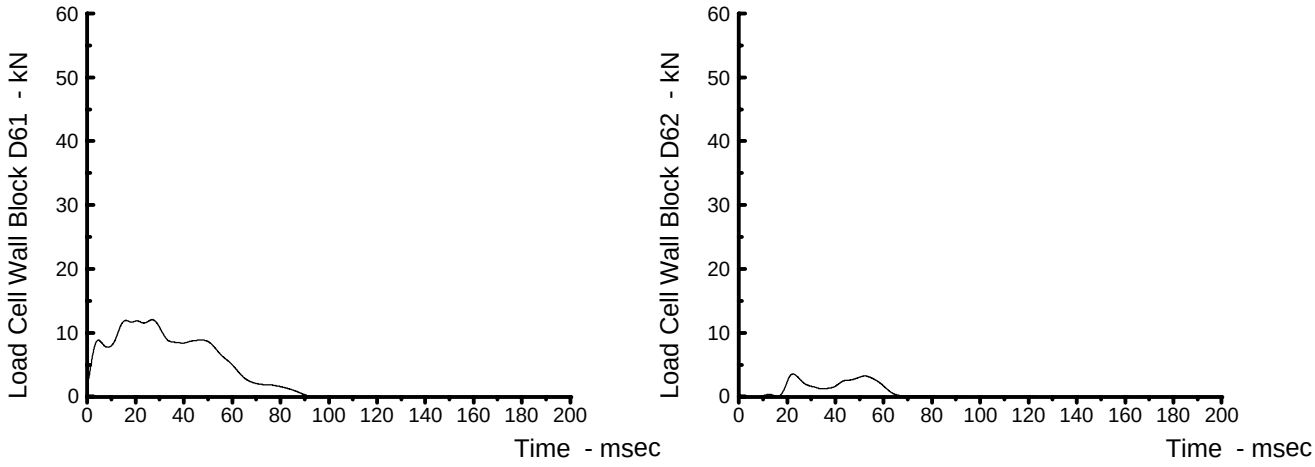
08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

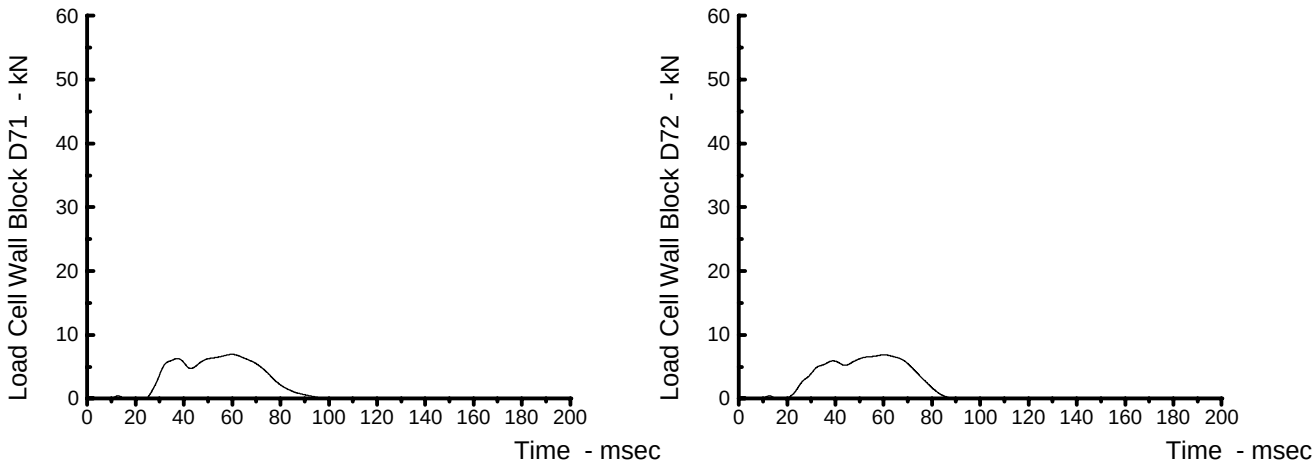


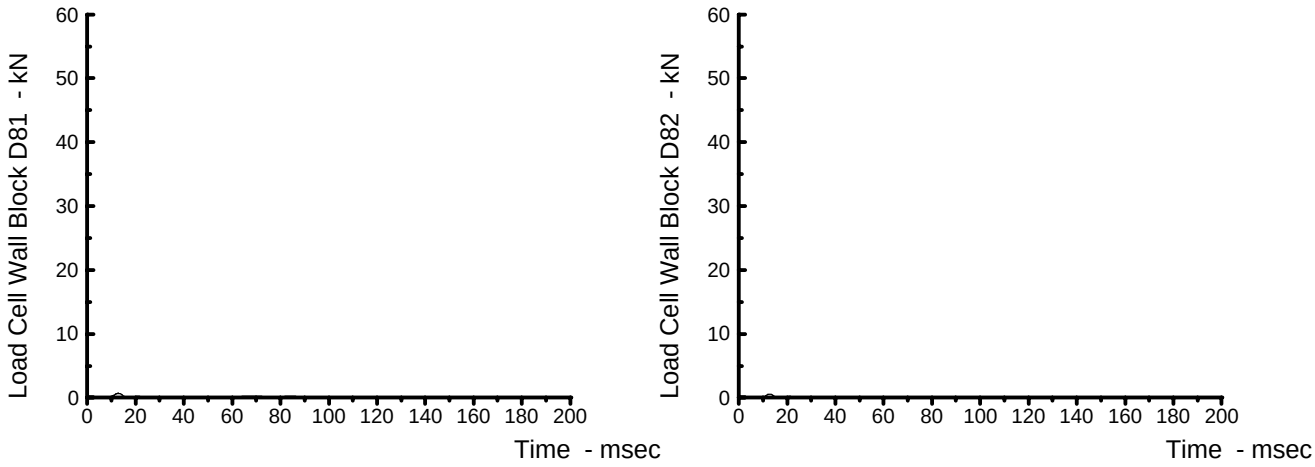
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



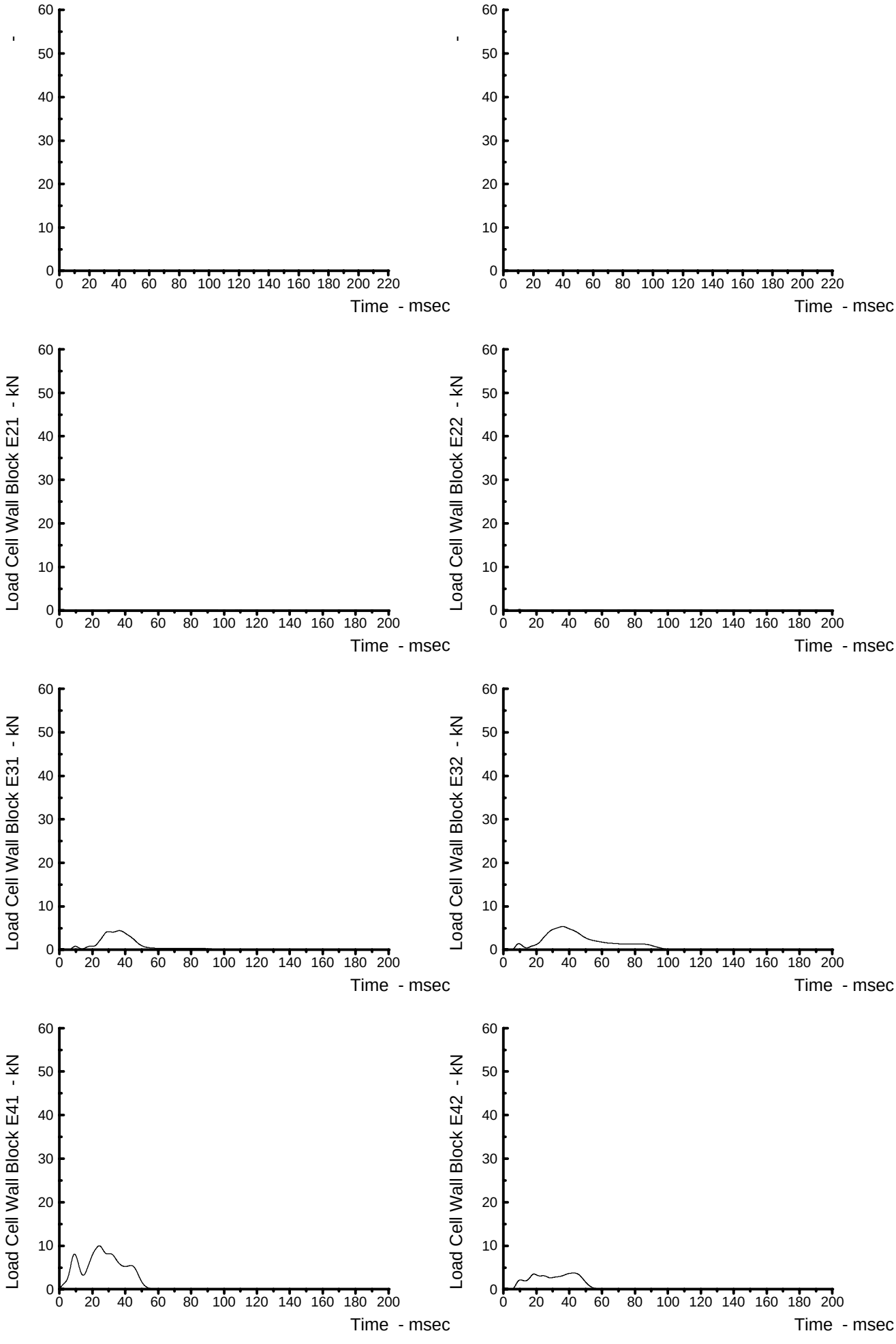






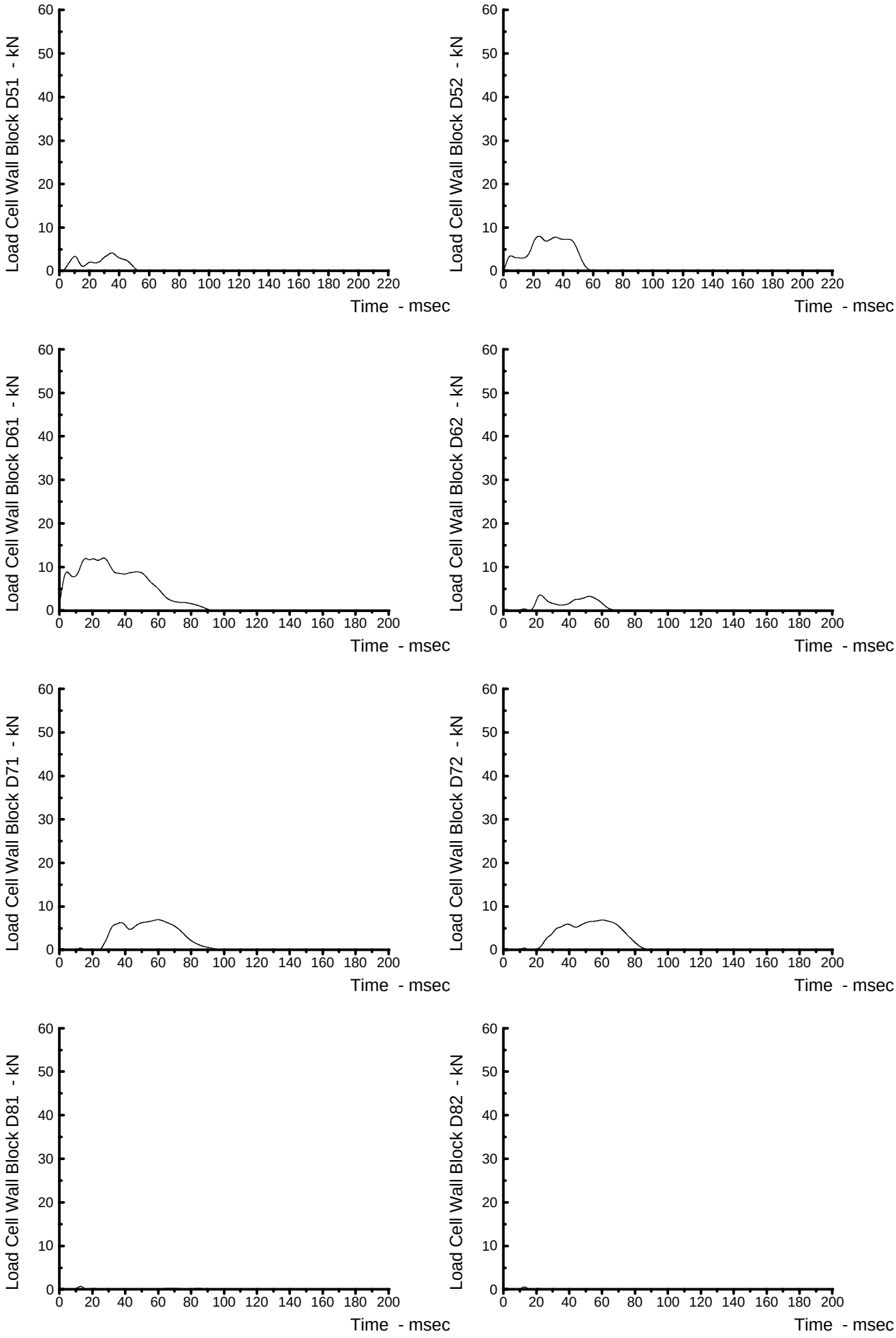
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



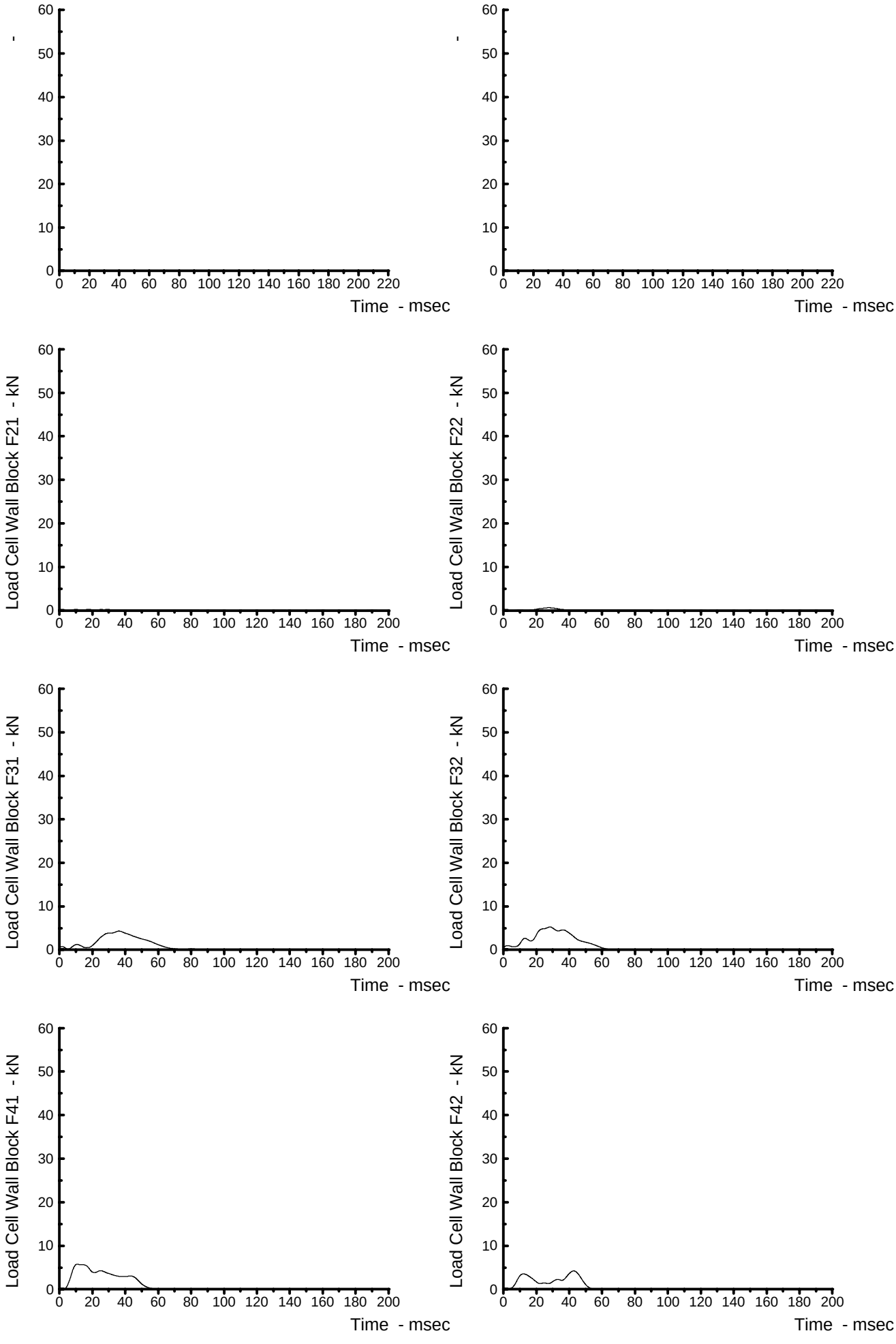
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



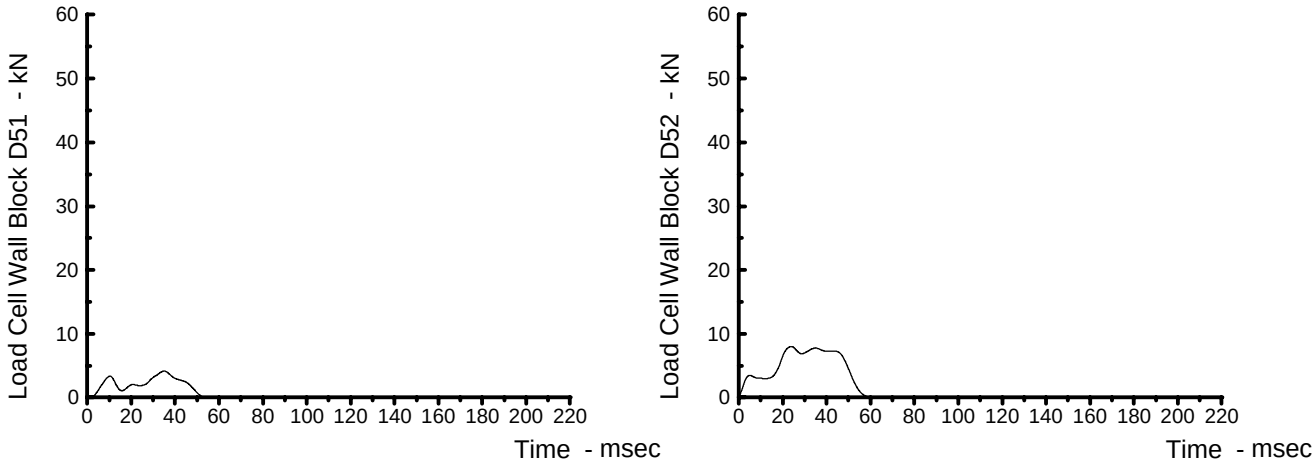
LCW Force - Time

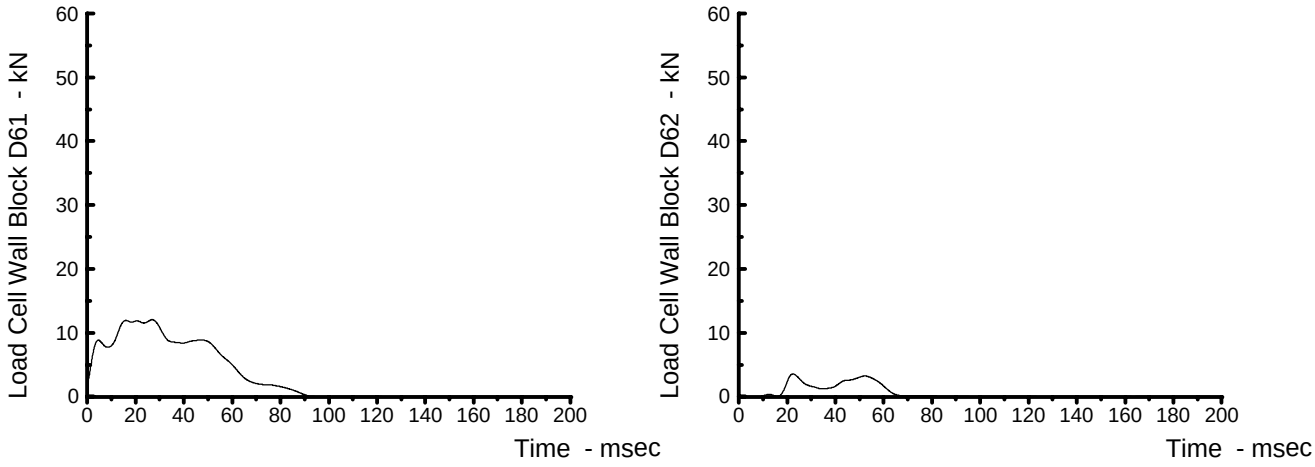
08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

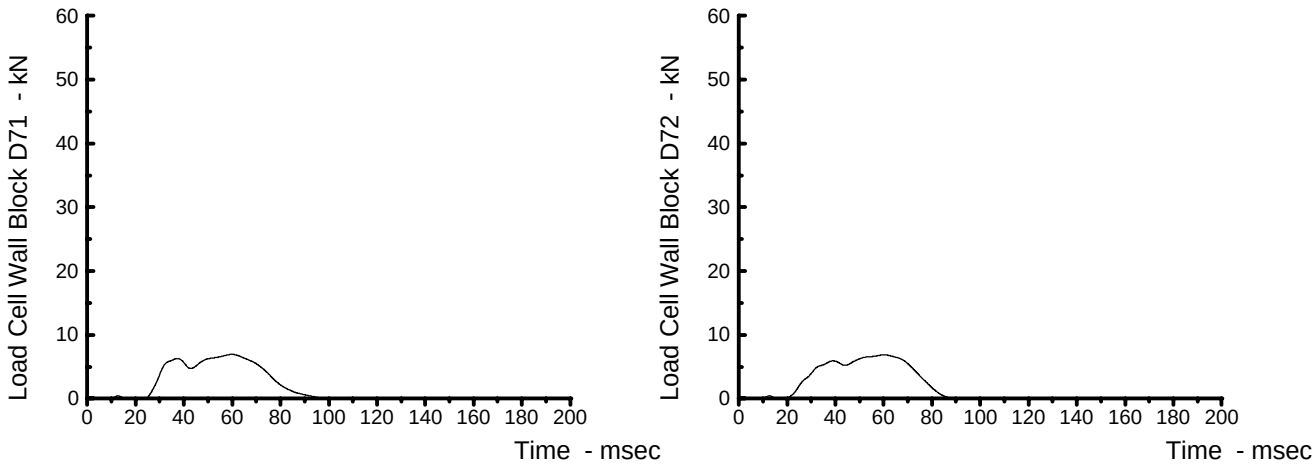


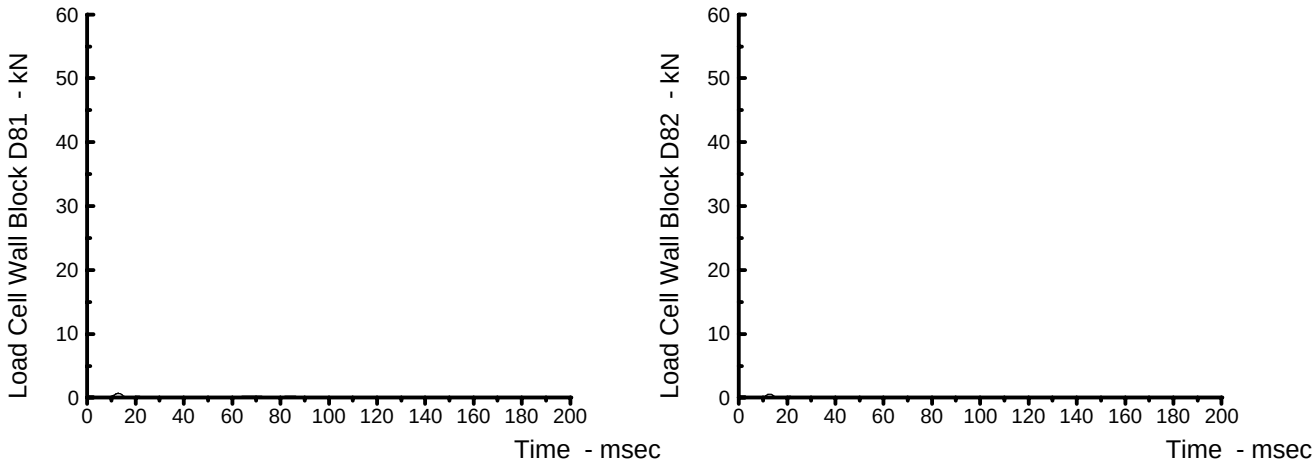
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



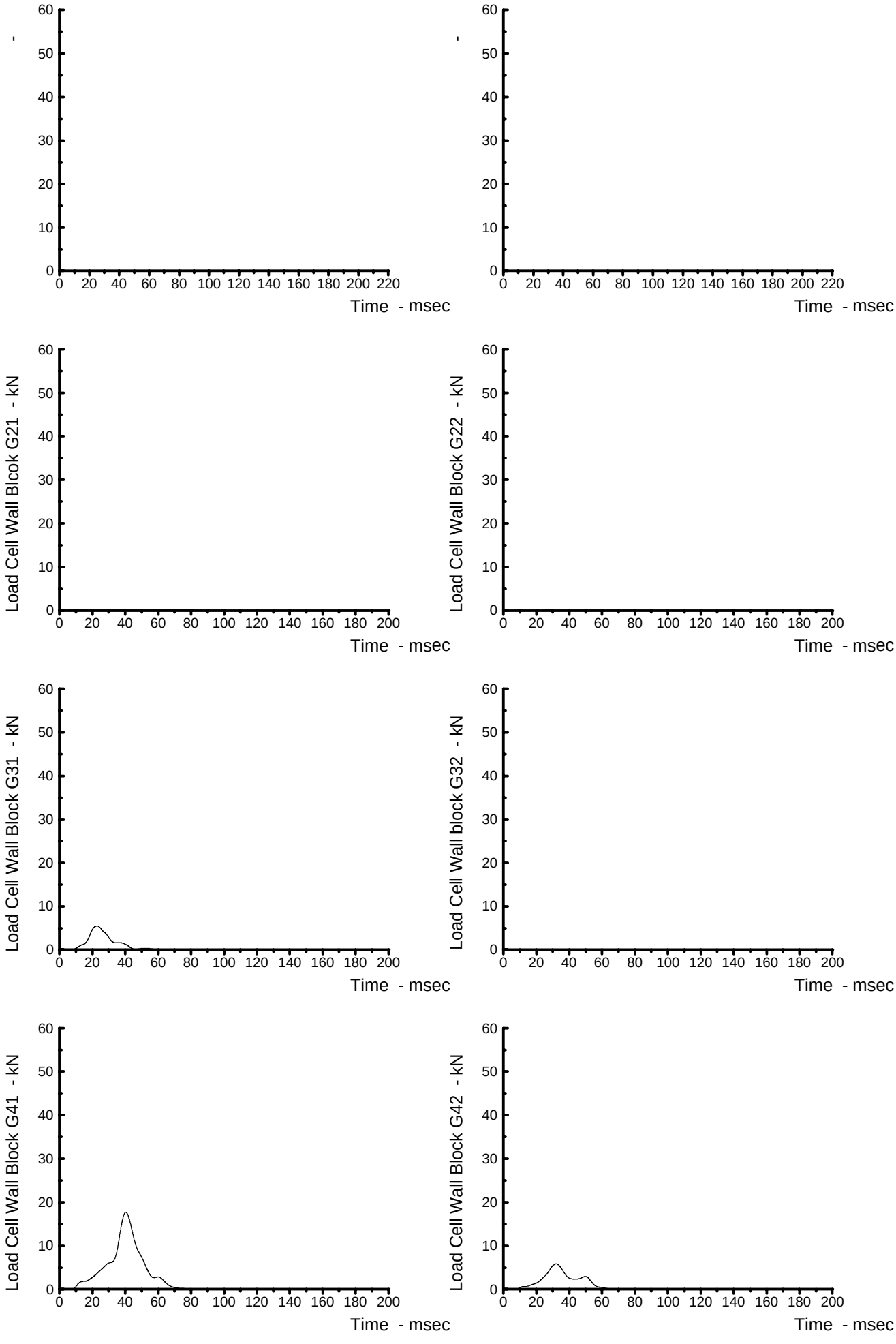






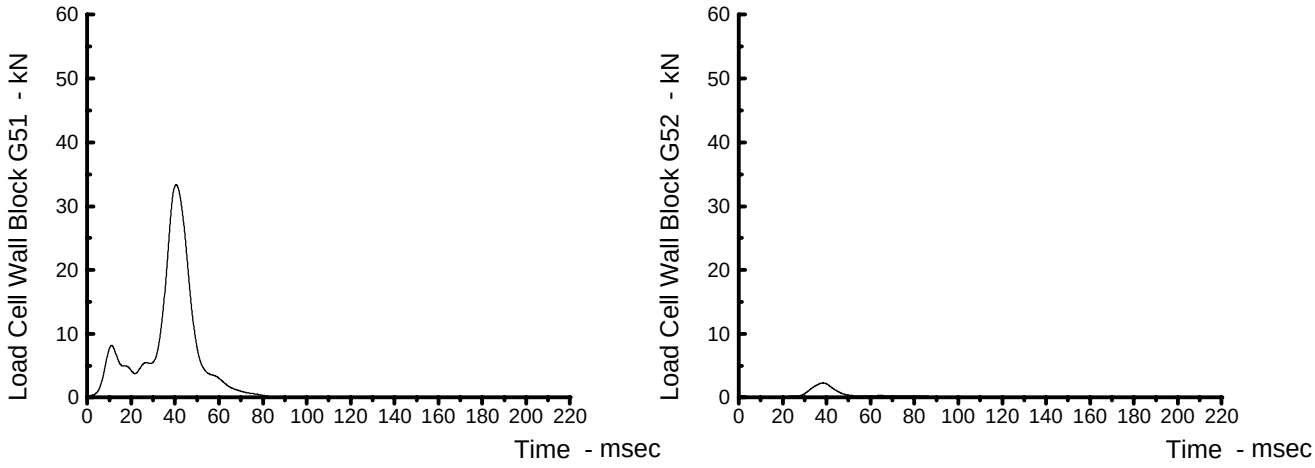
LCW Force - Time

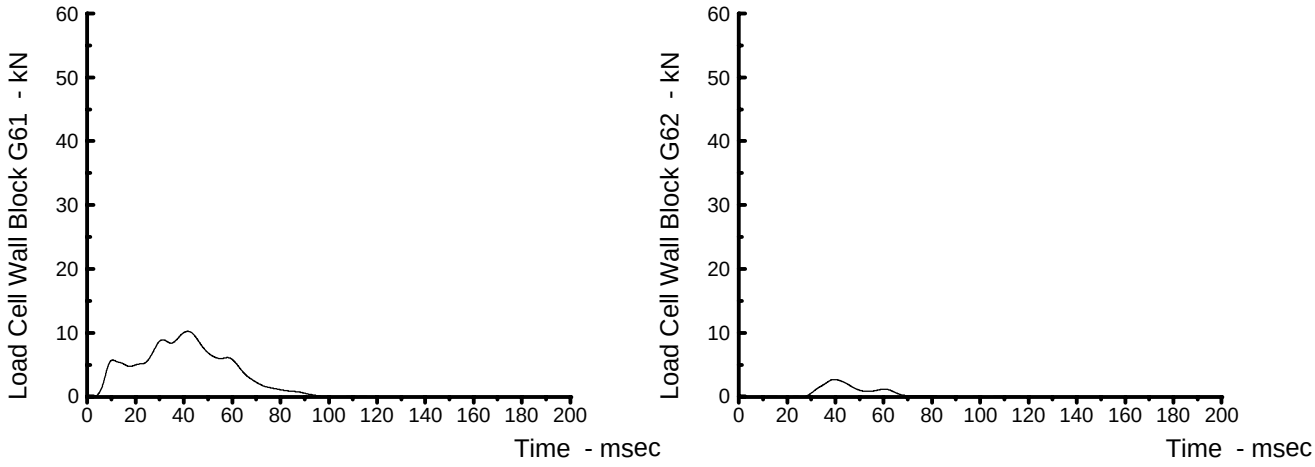
08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

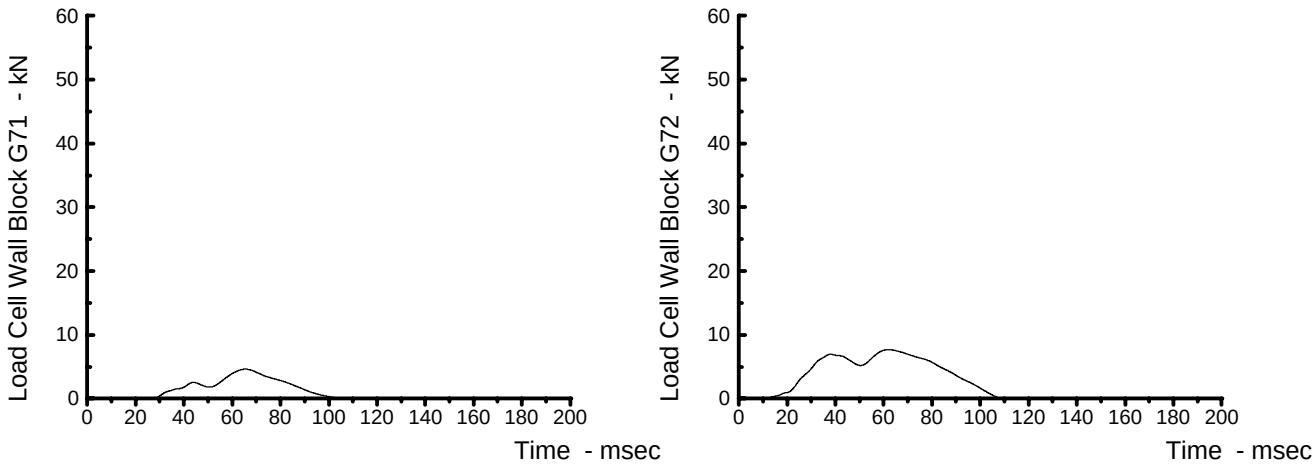


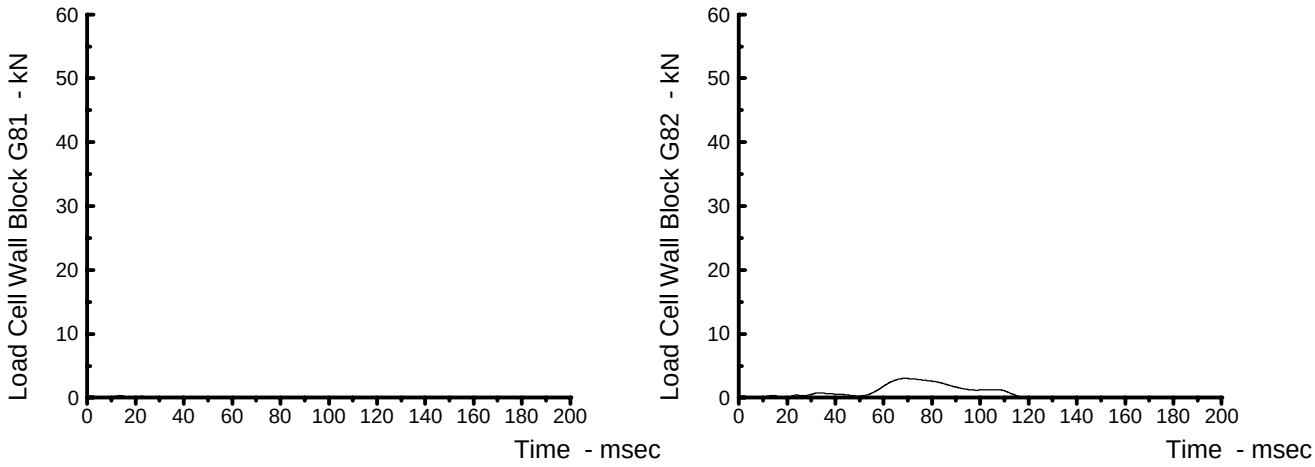
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



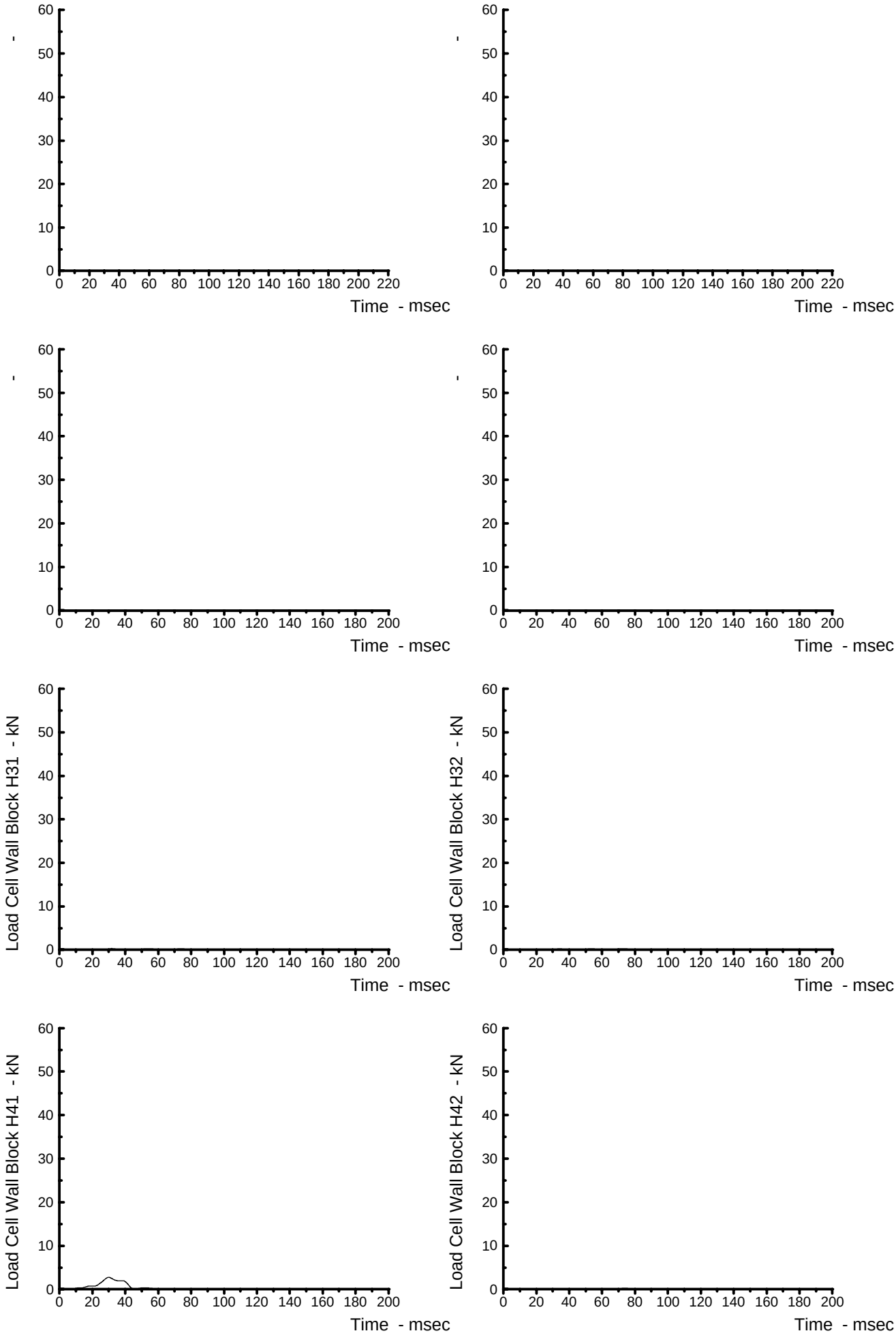






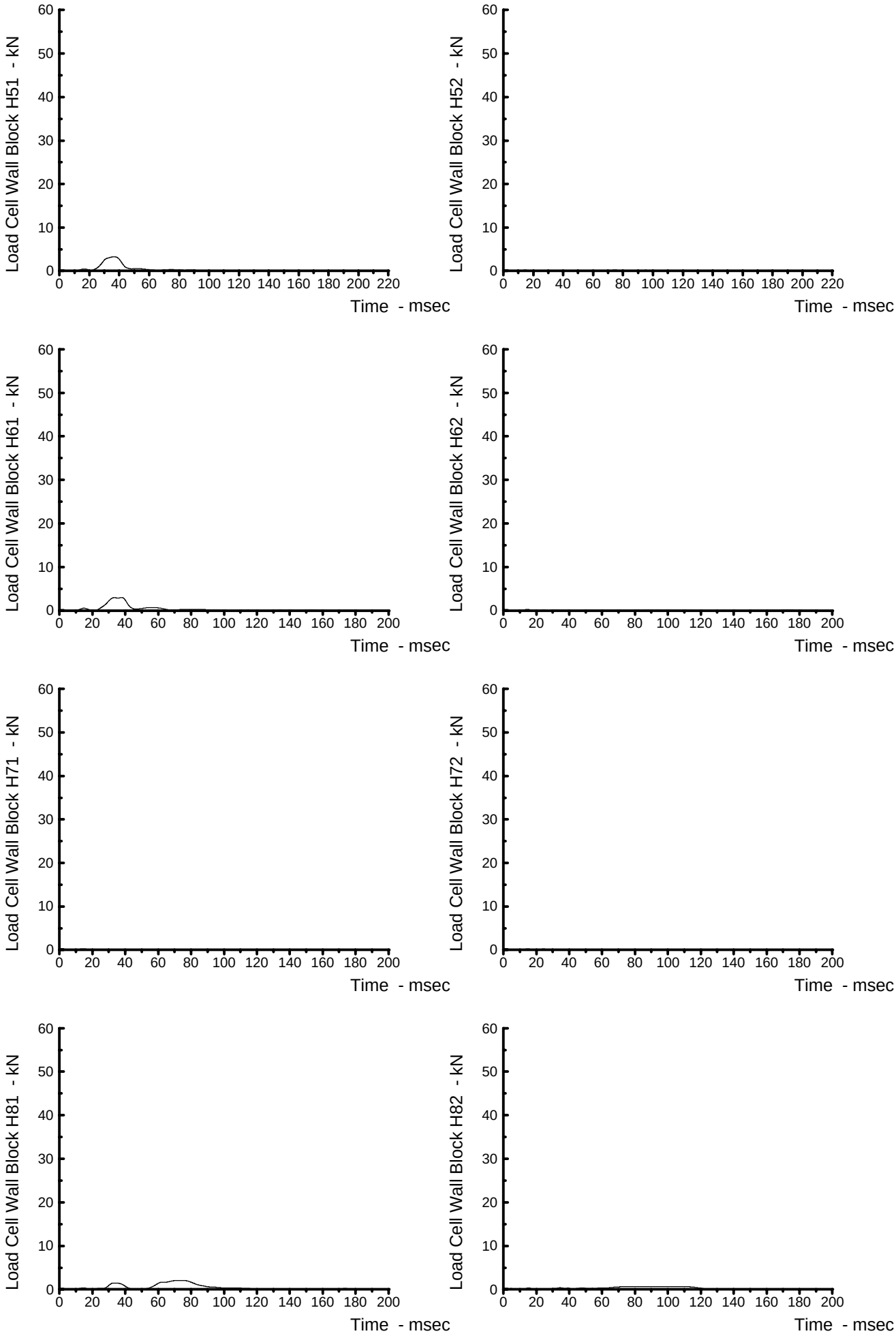
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



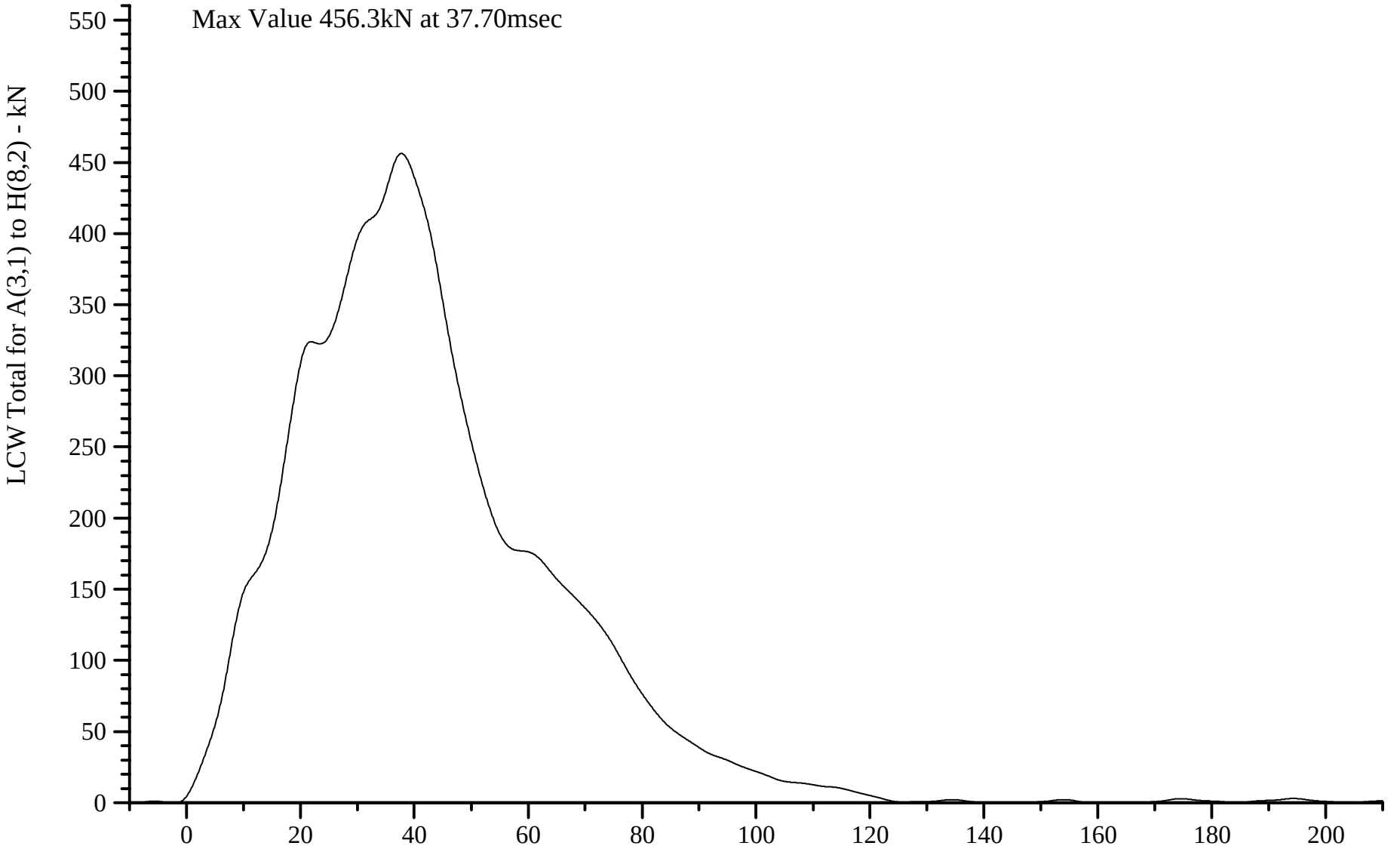
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



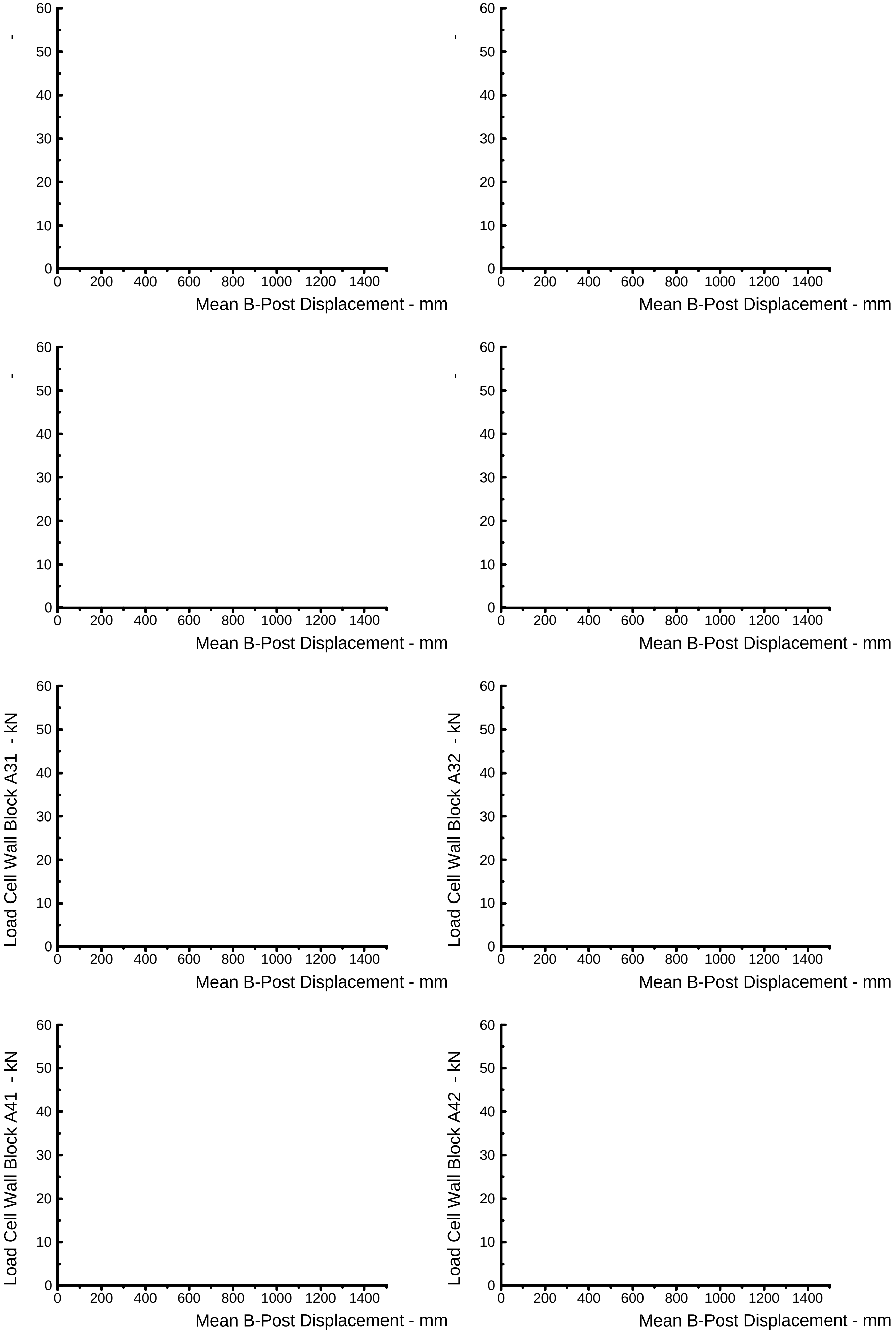
LCW Force - Time

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



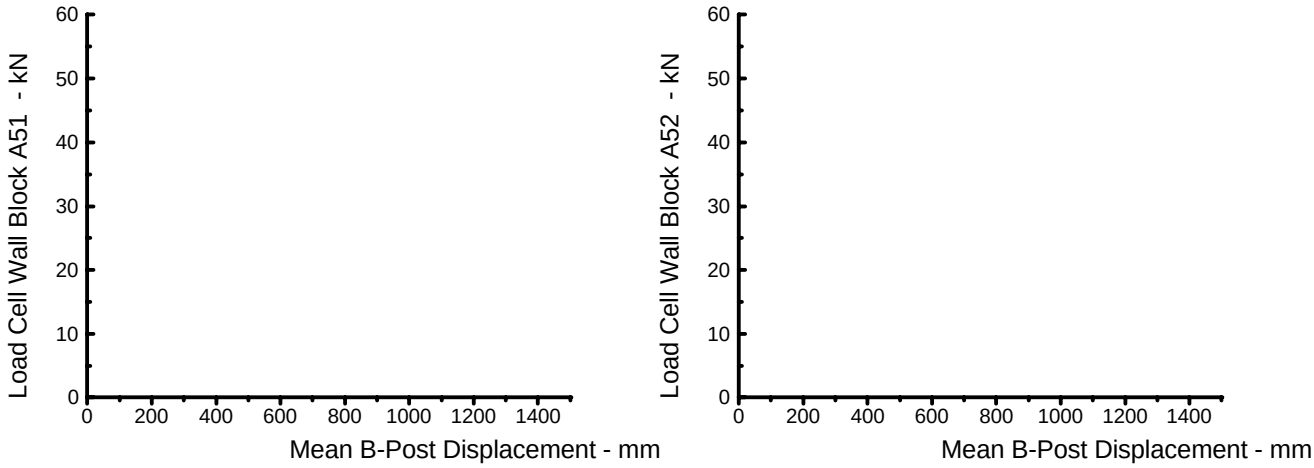
TRANSPORT RESEARCH LABORATORY

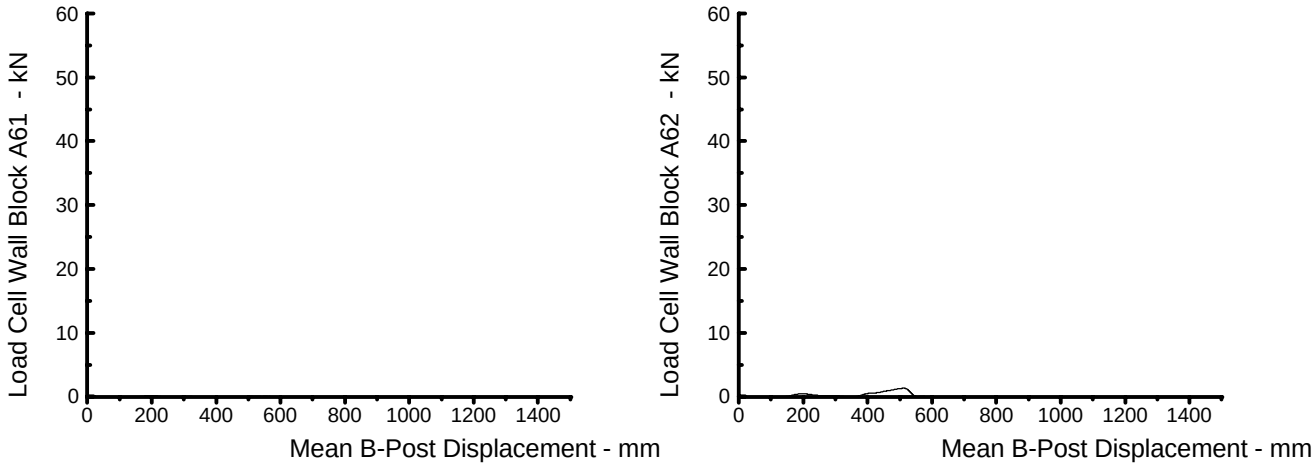
08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

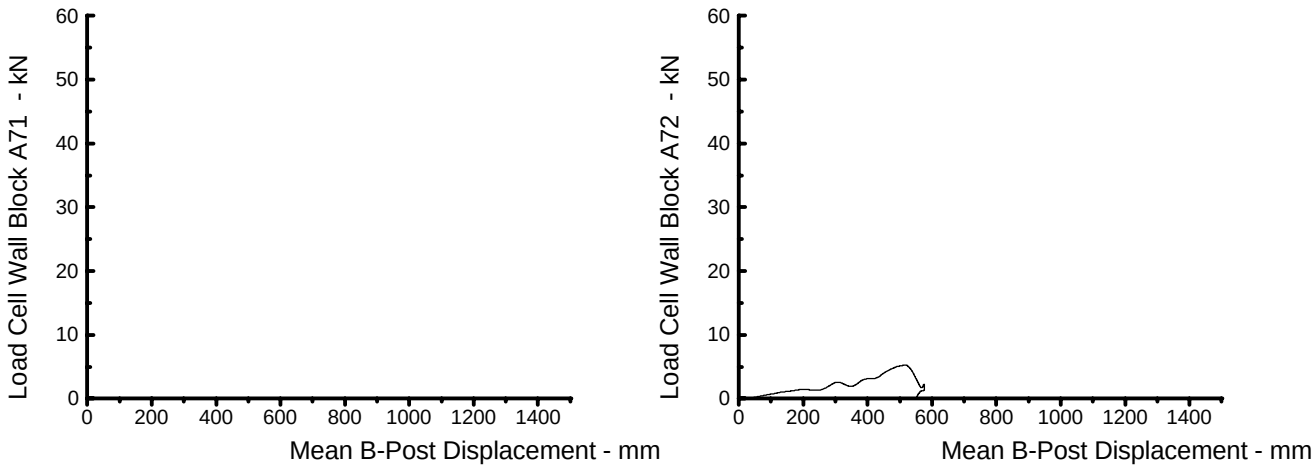


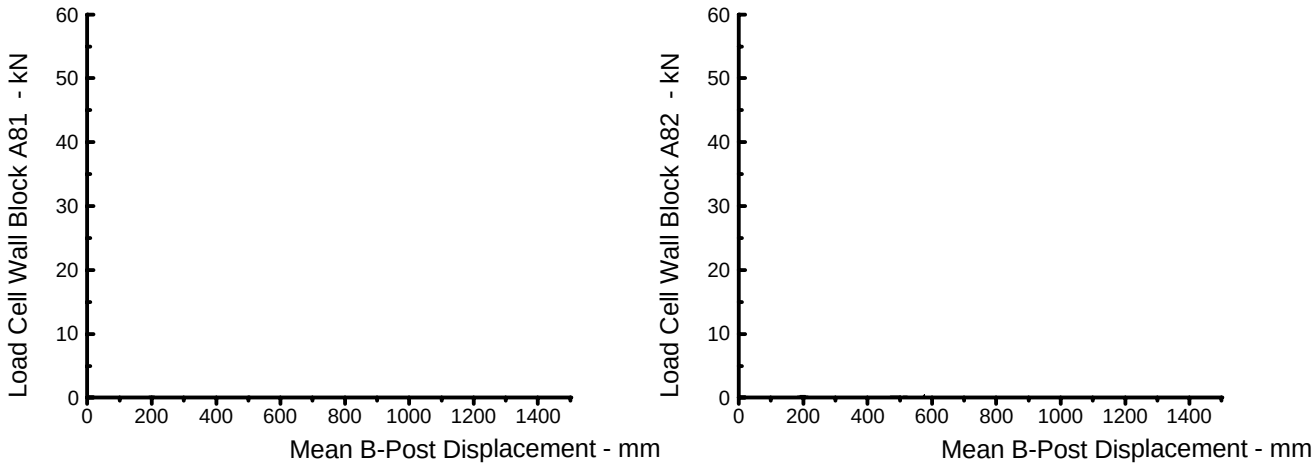
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



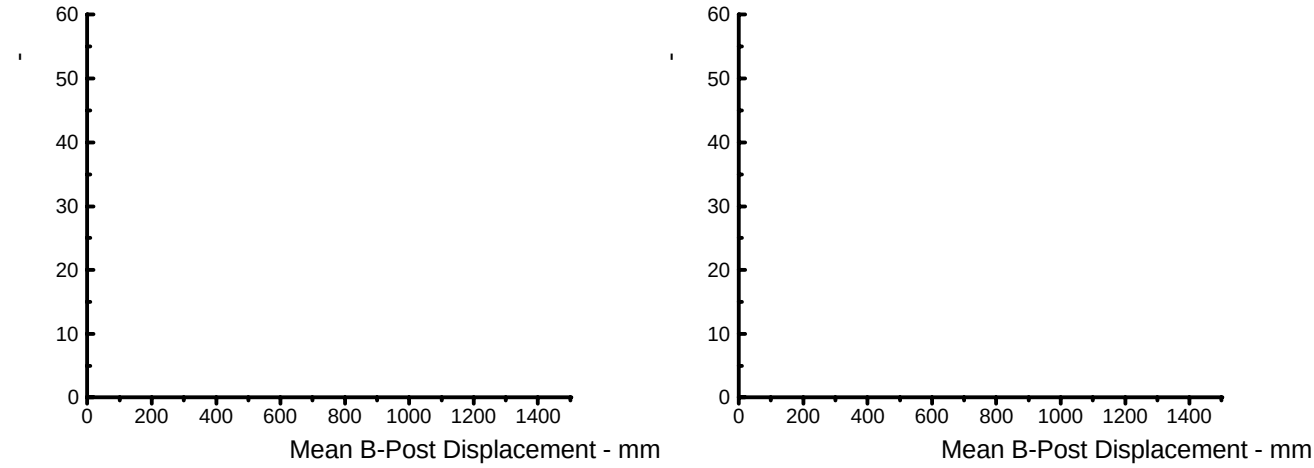


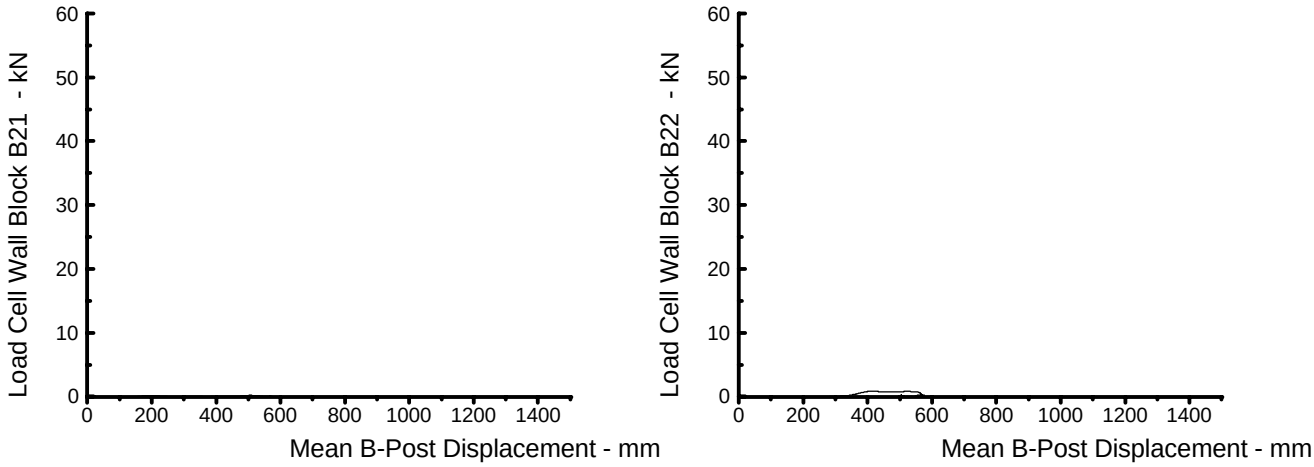


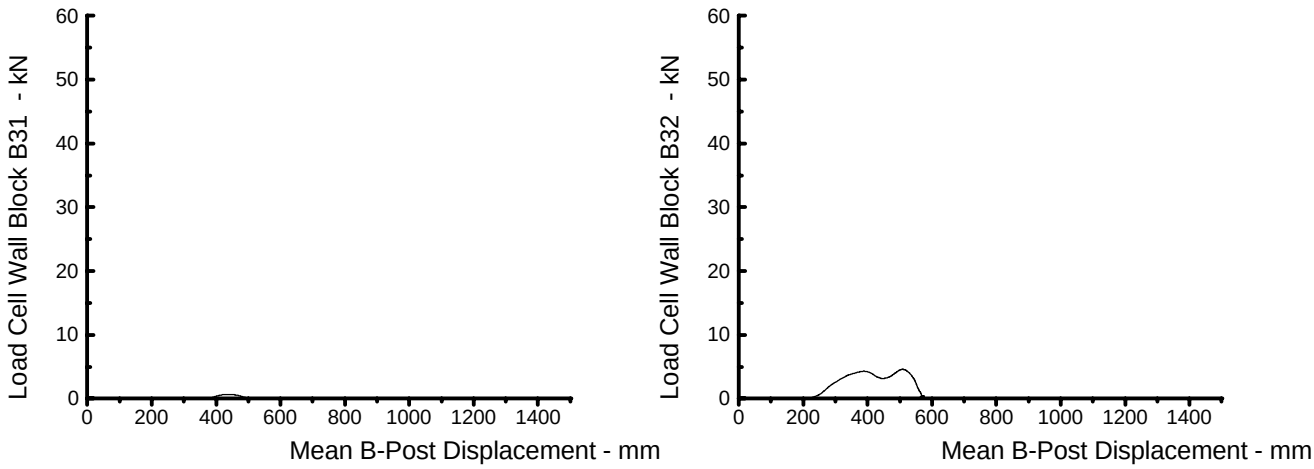


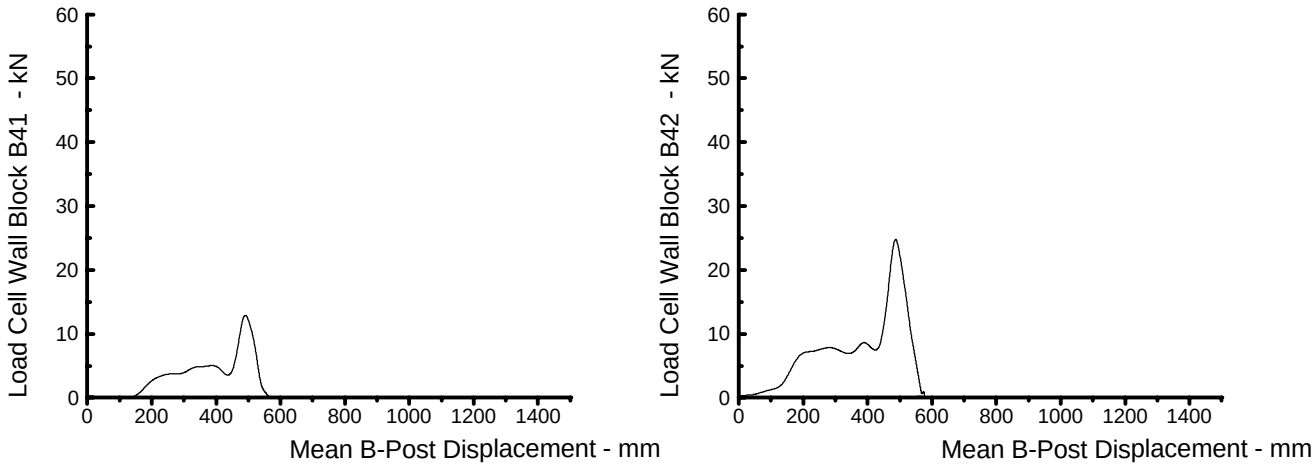
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



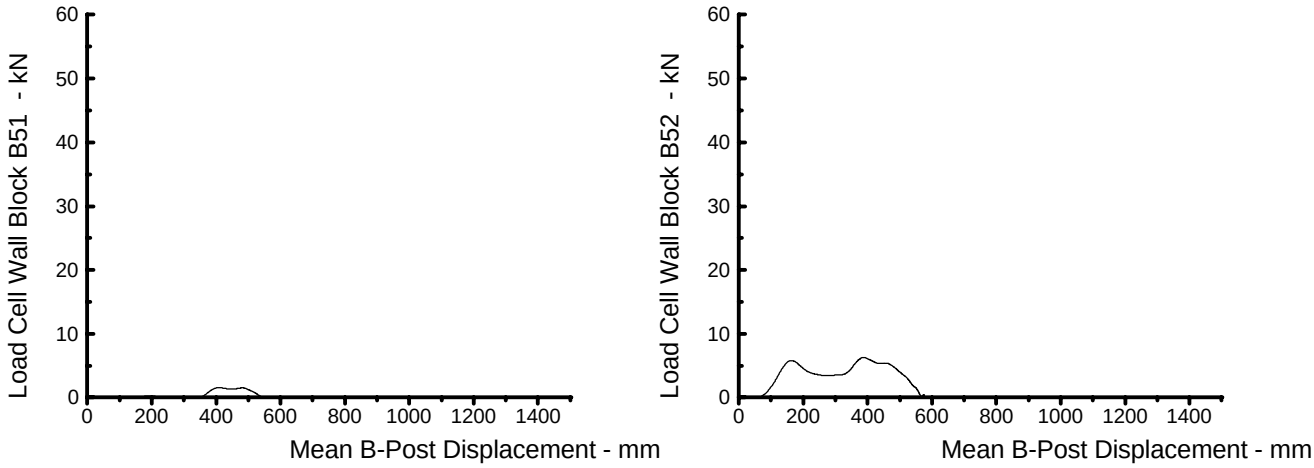


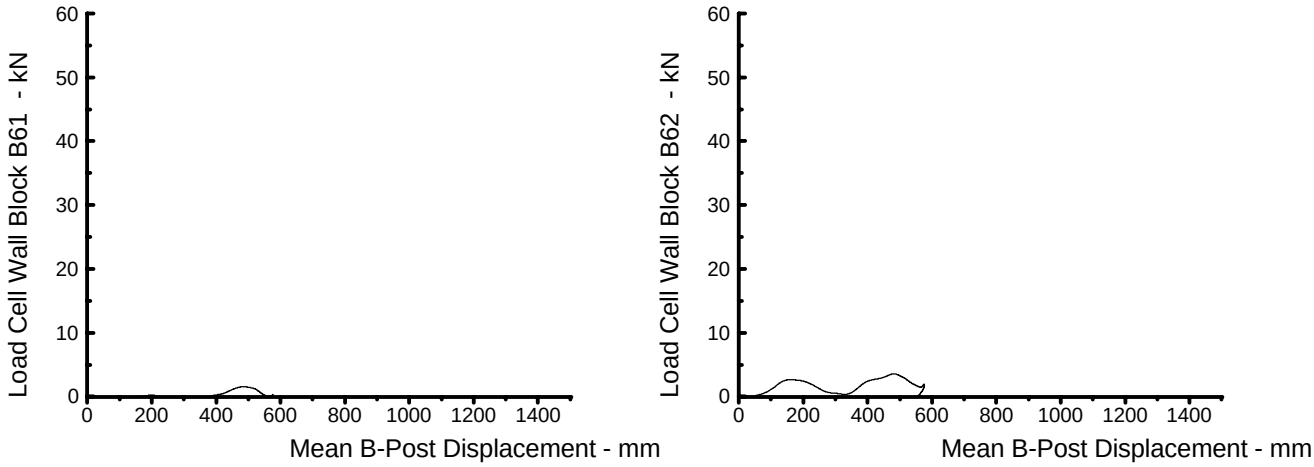


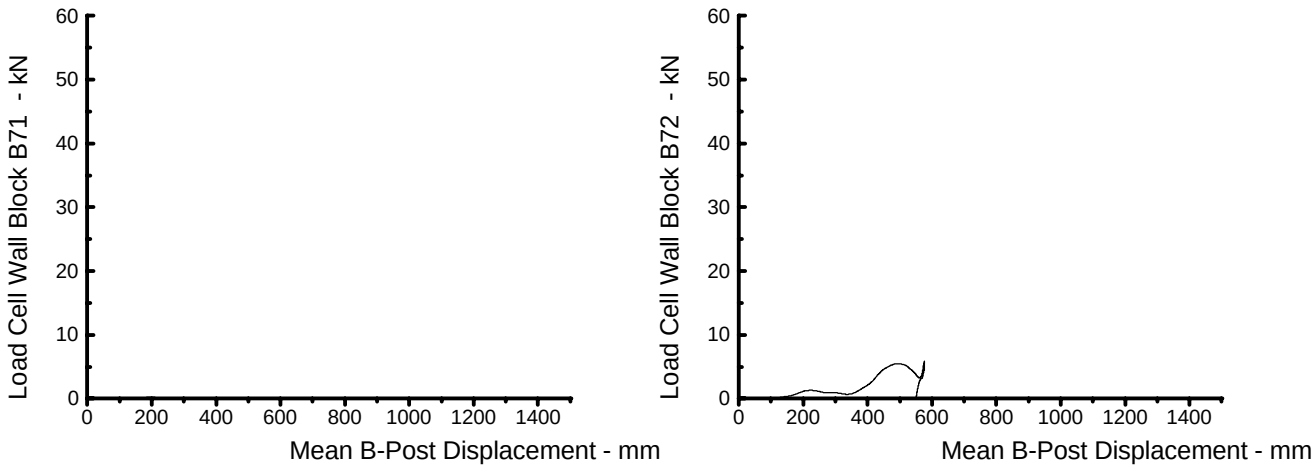


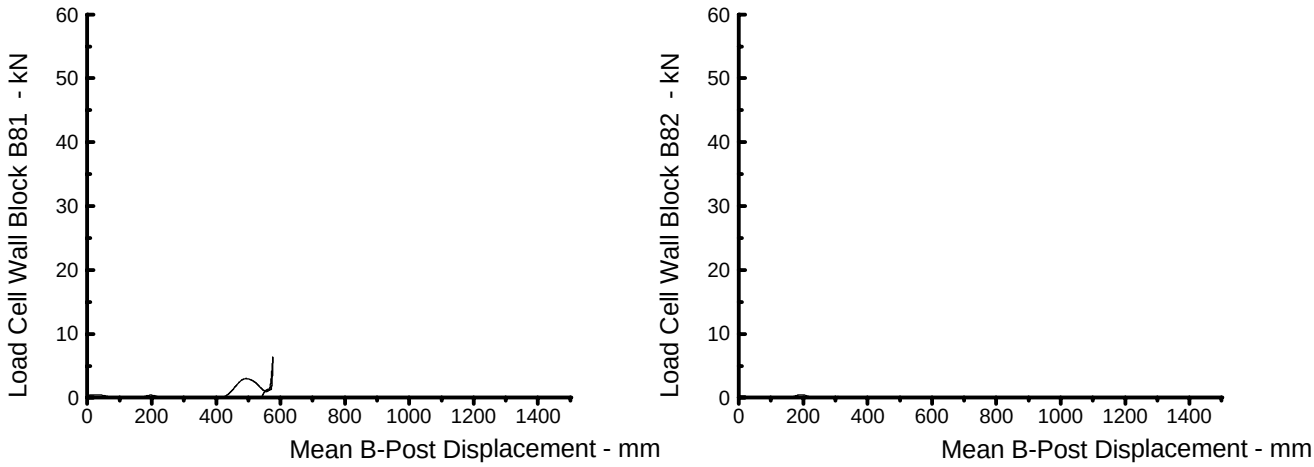
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



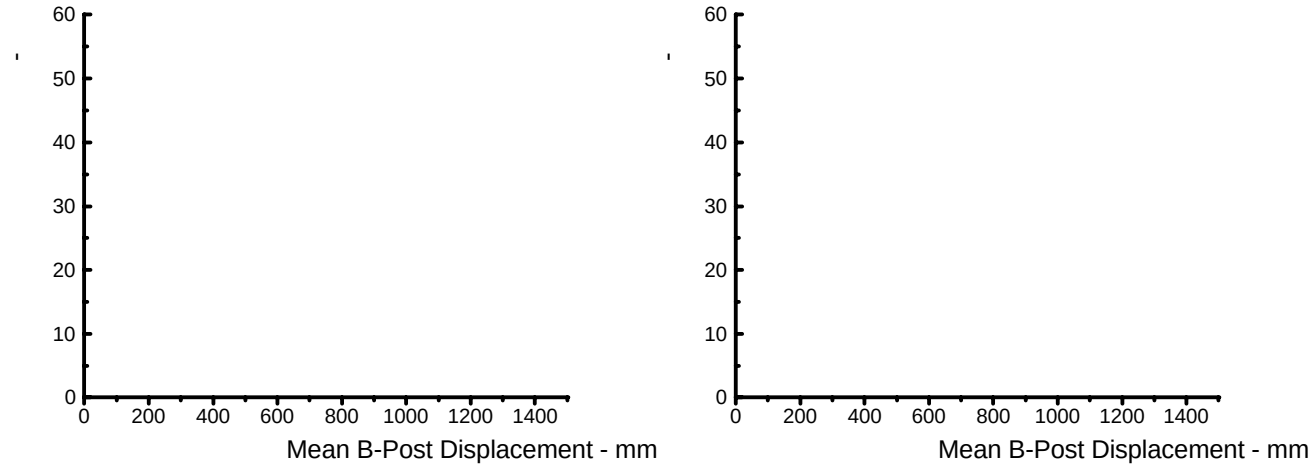


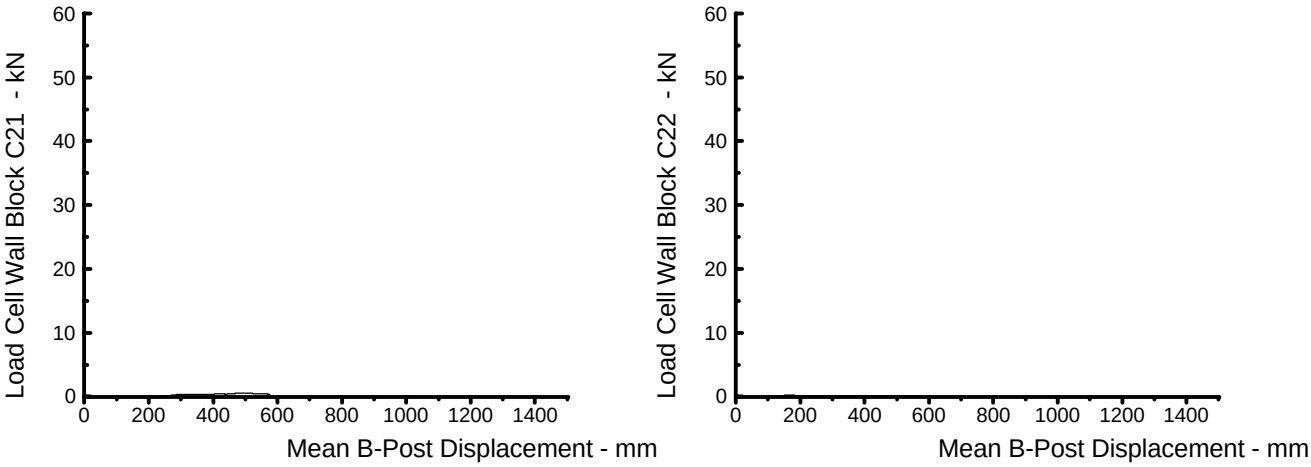


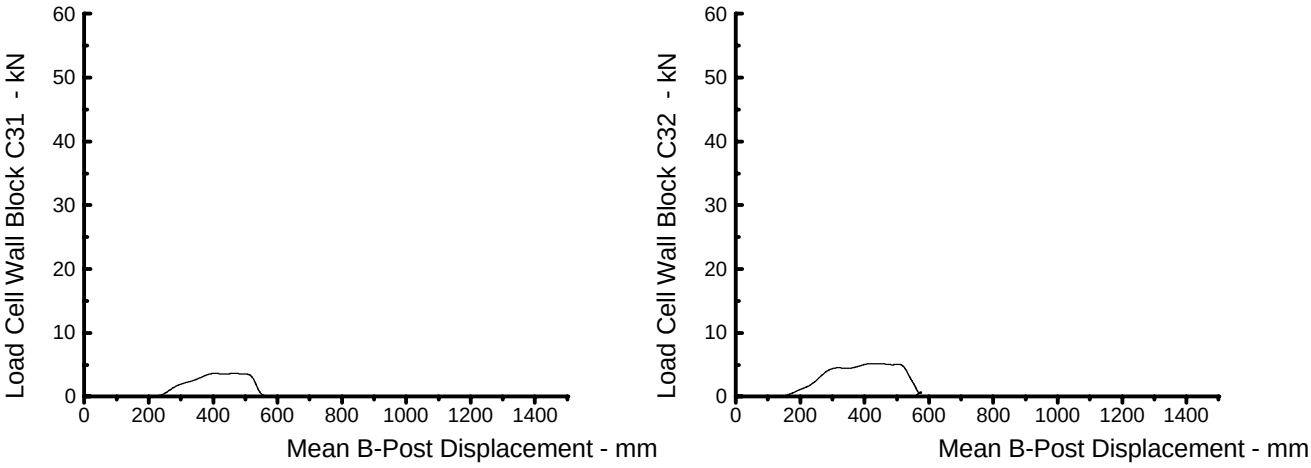


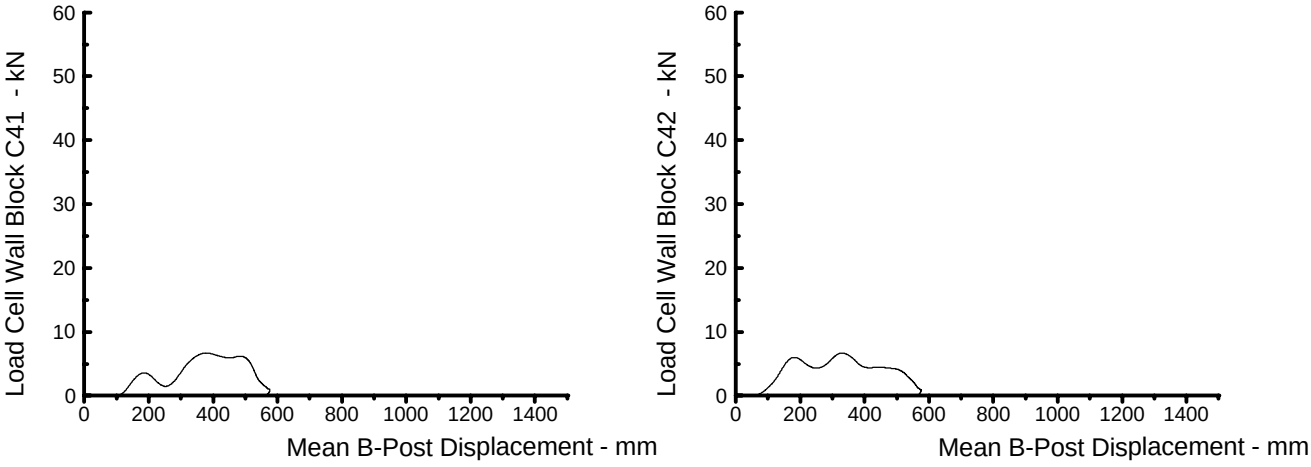
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



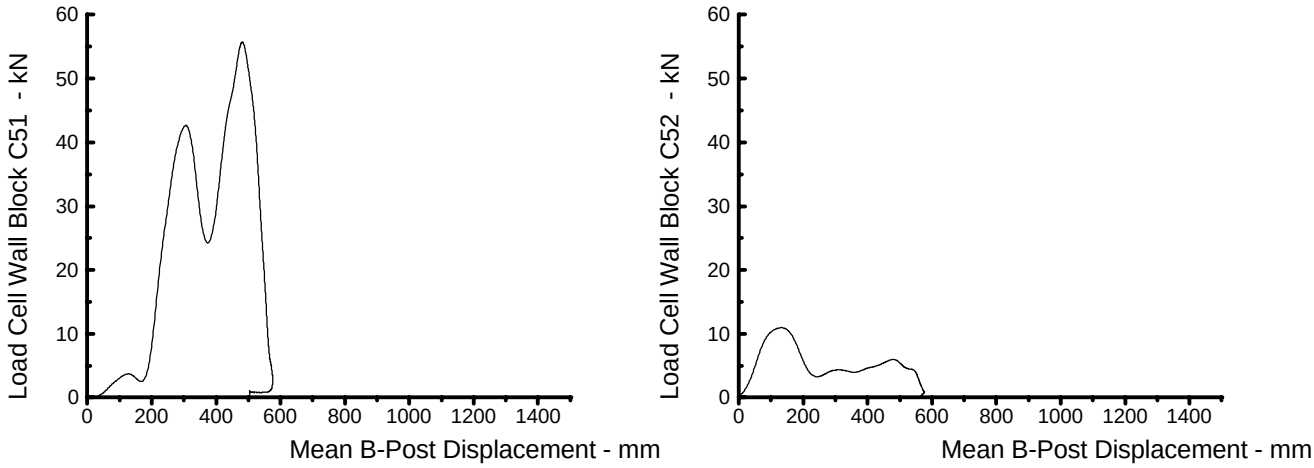


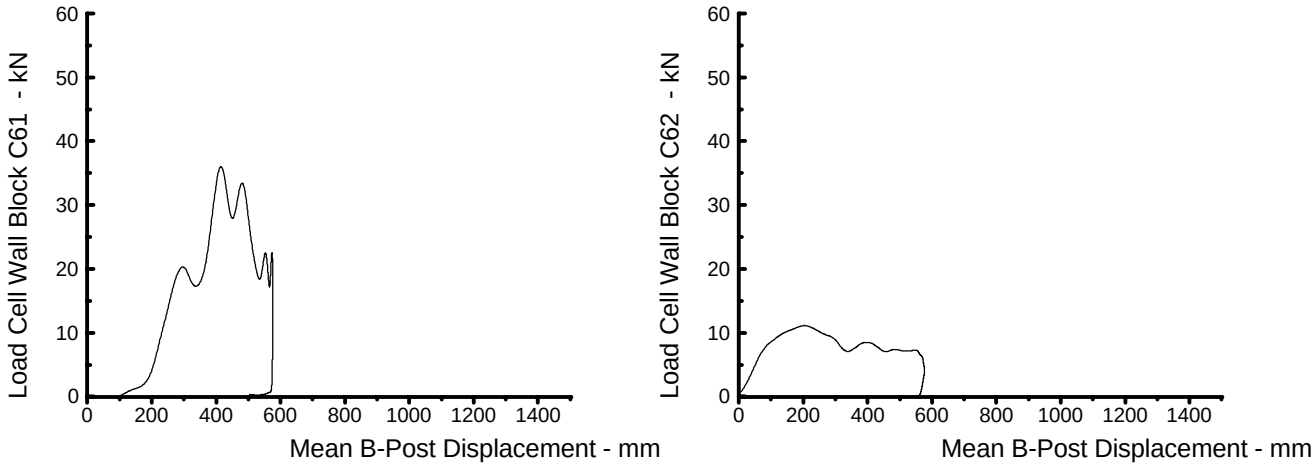


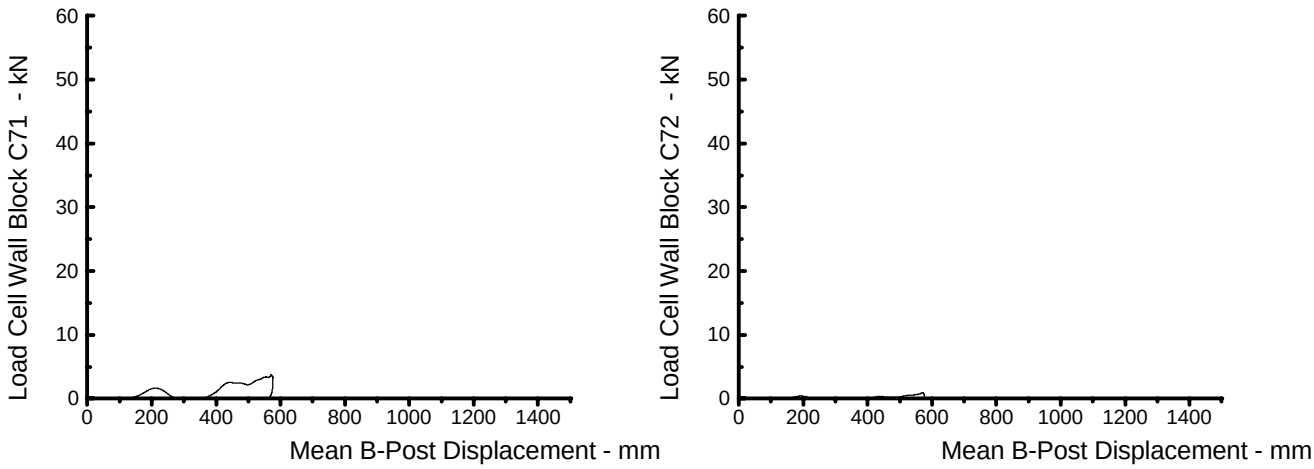


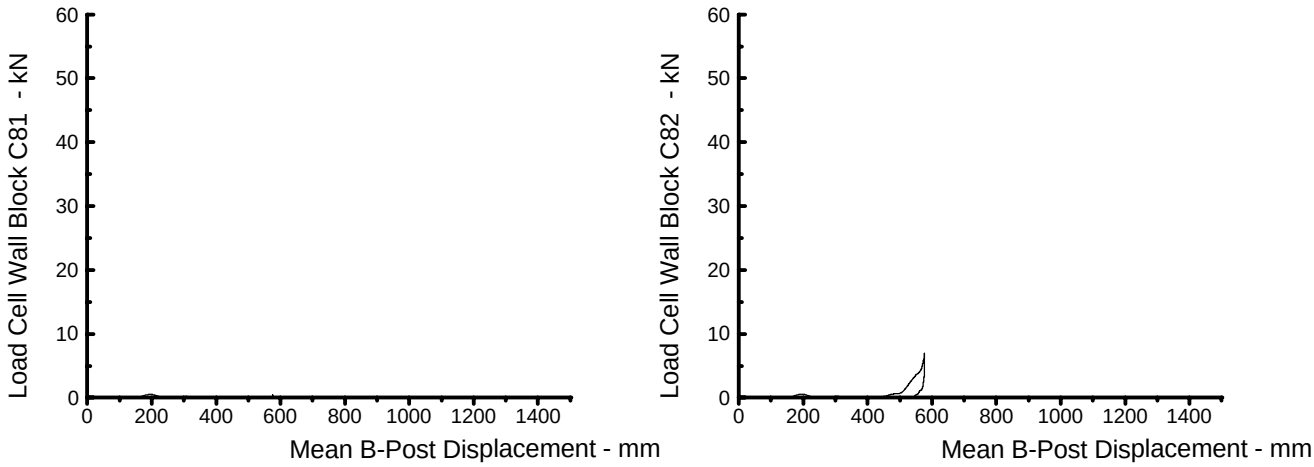
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



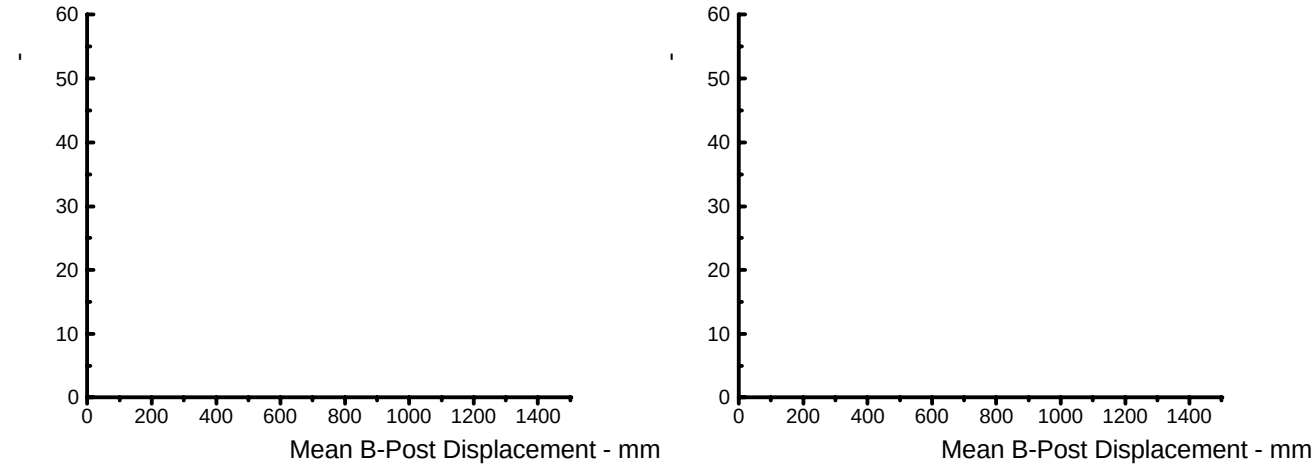


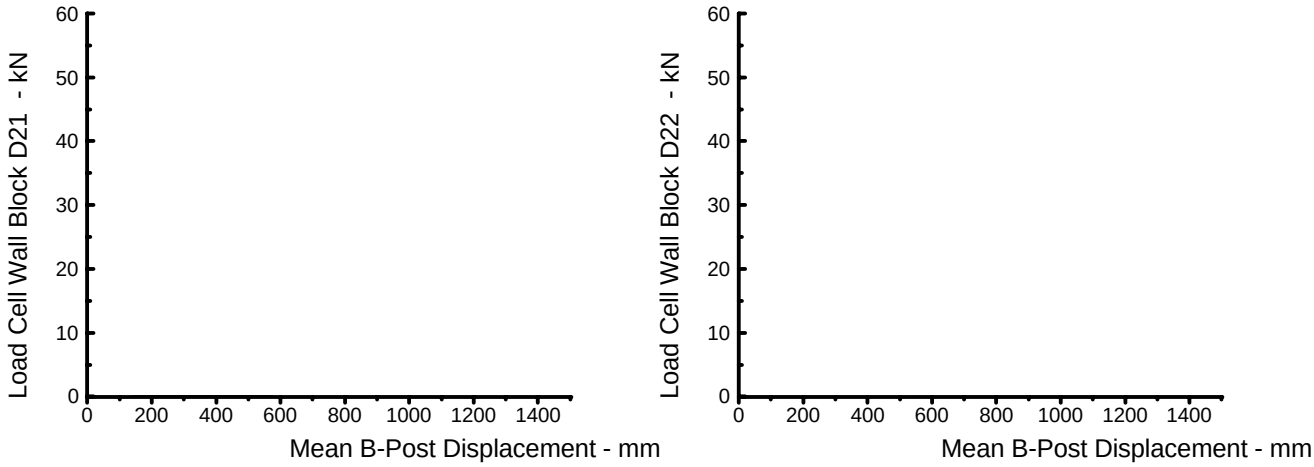


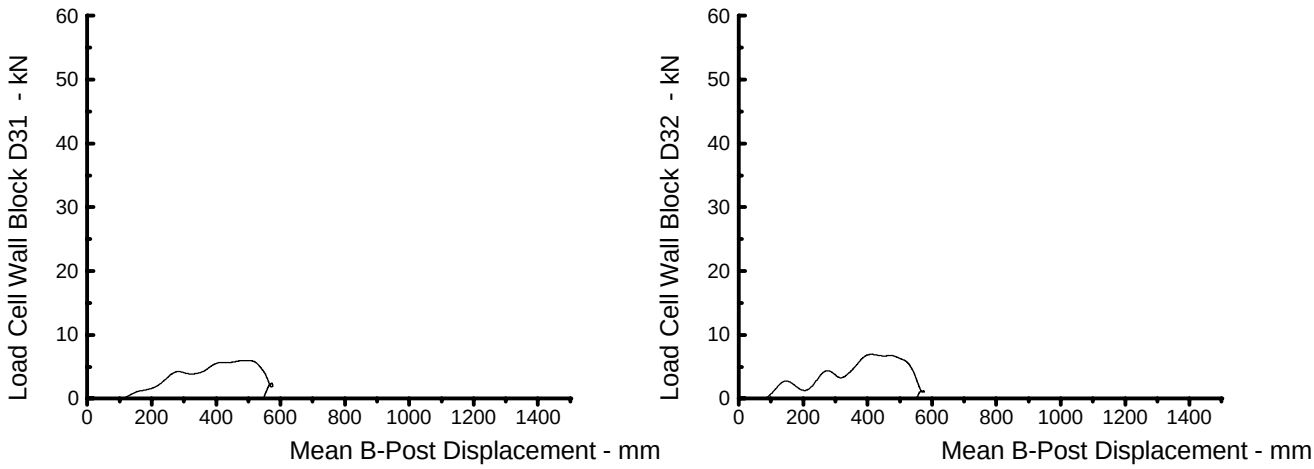


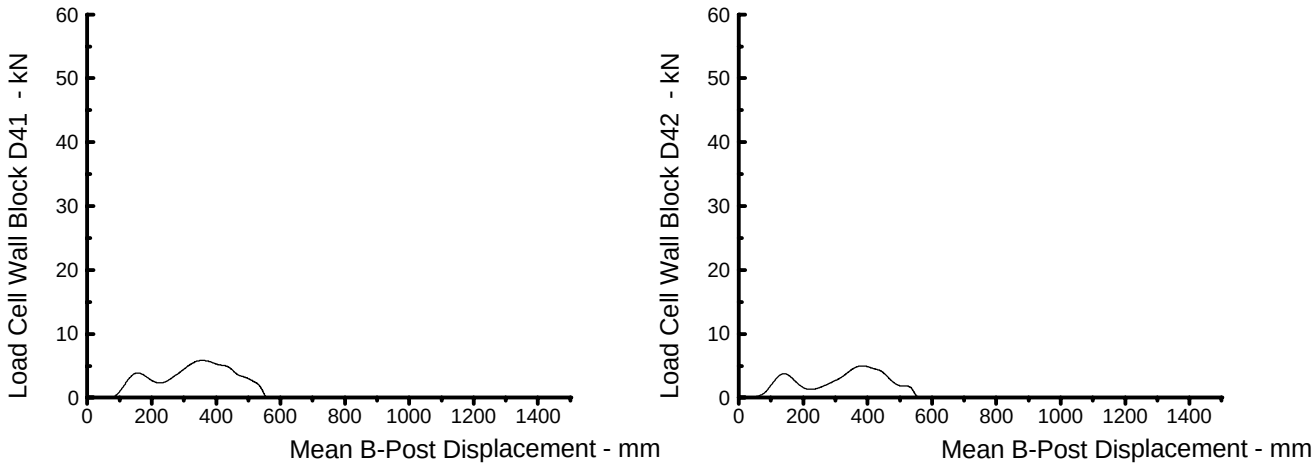
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



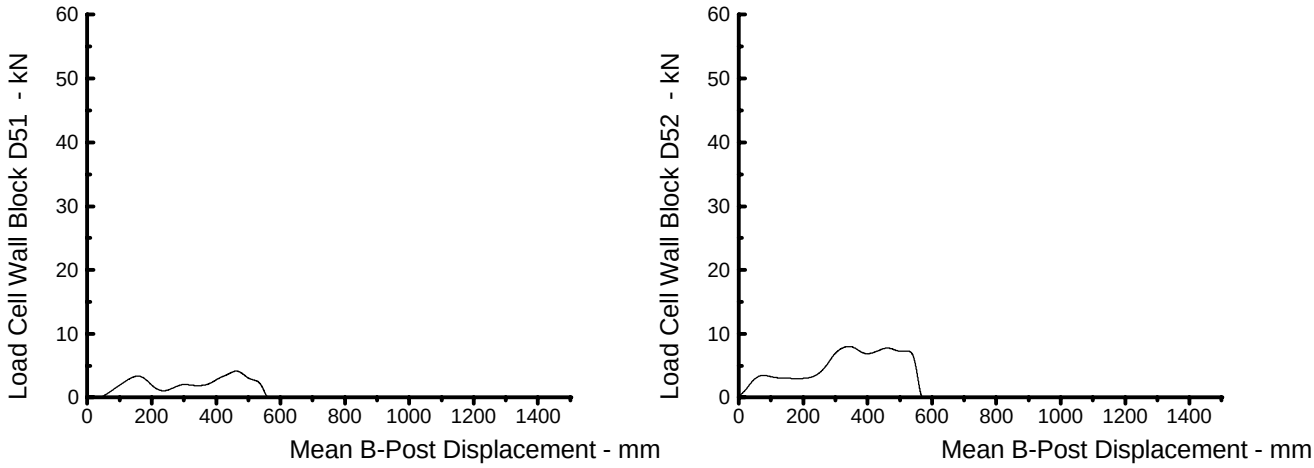


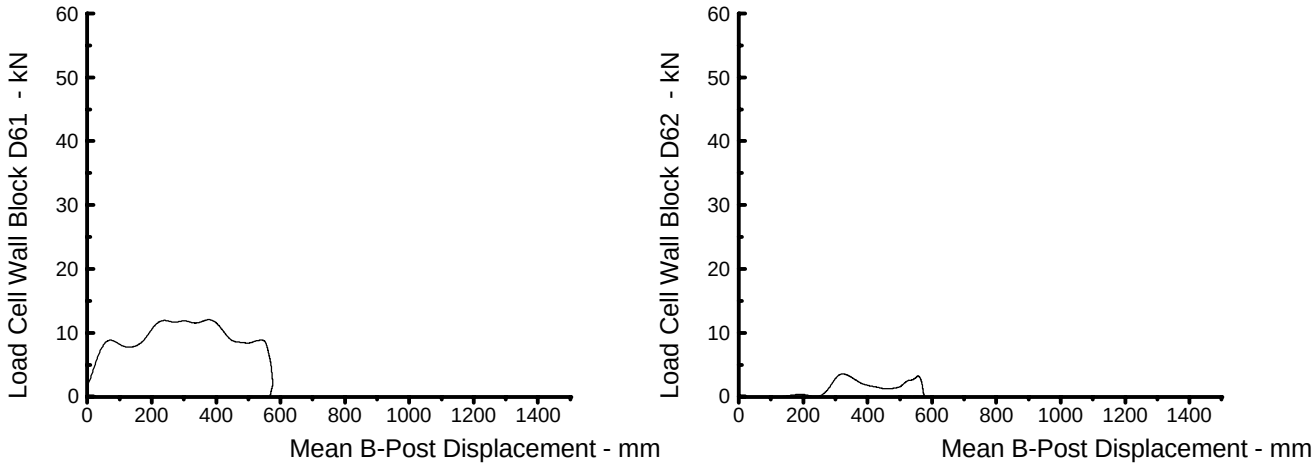


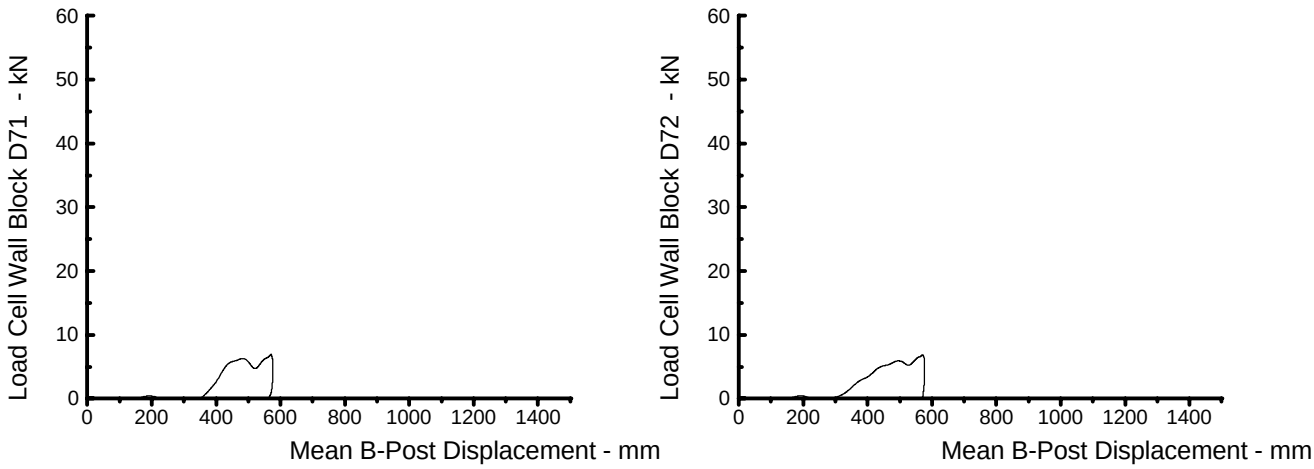


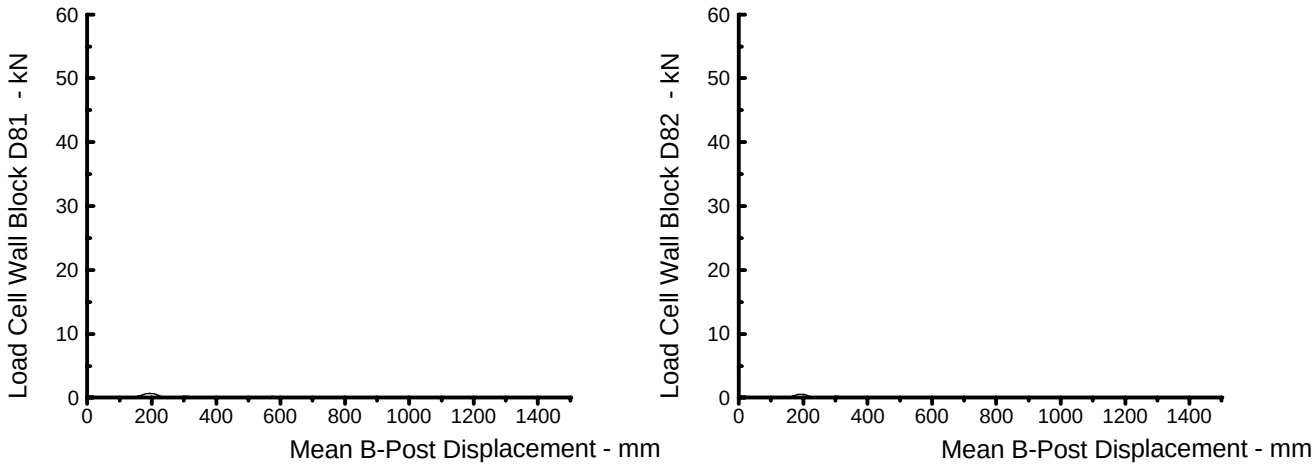
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



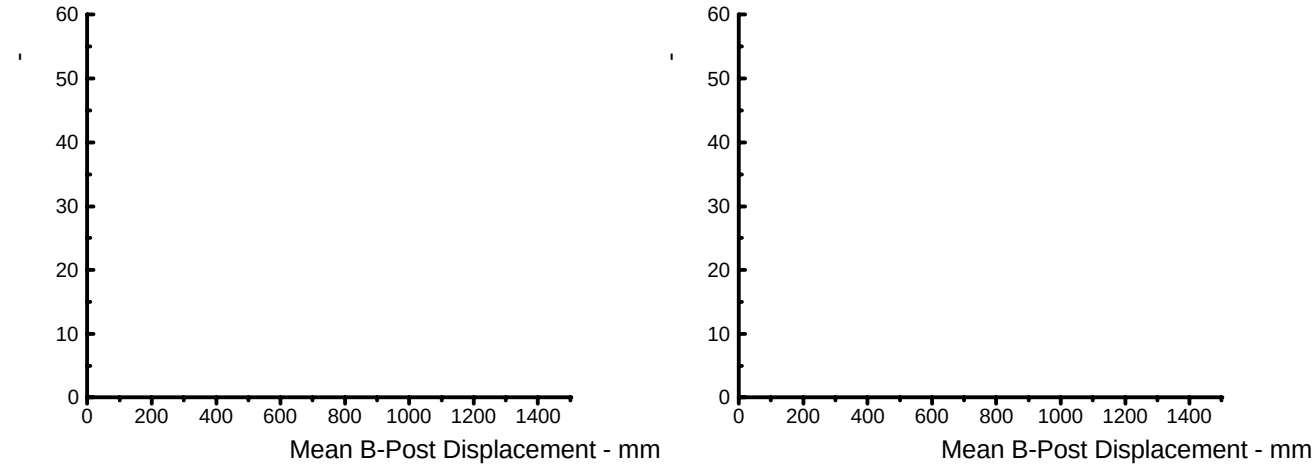


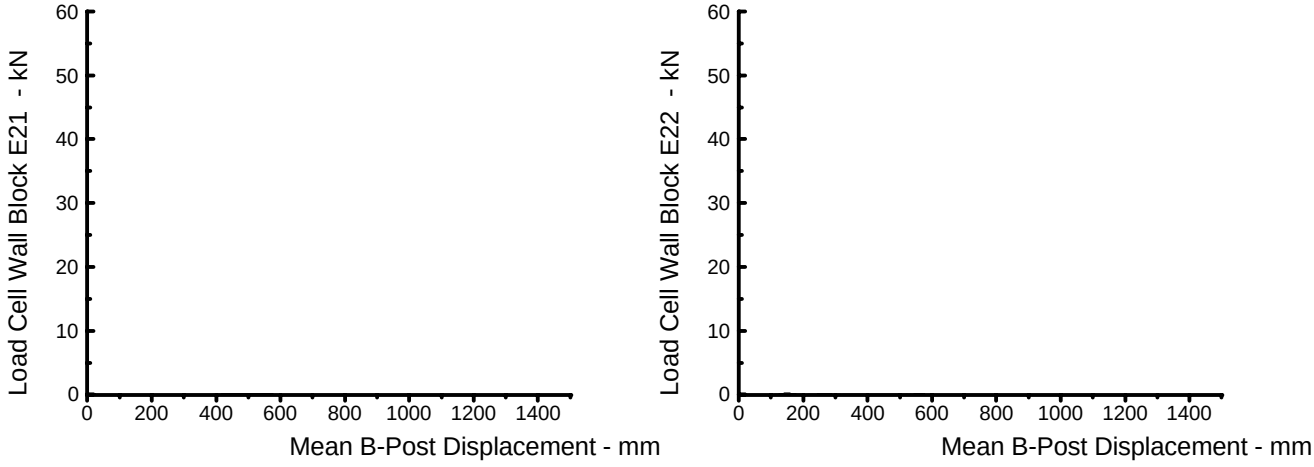


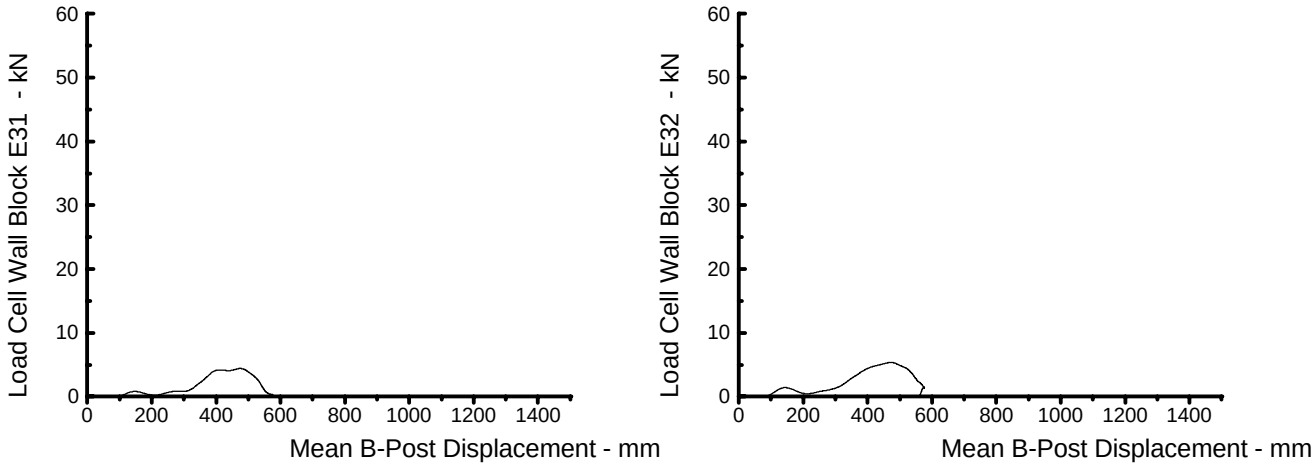


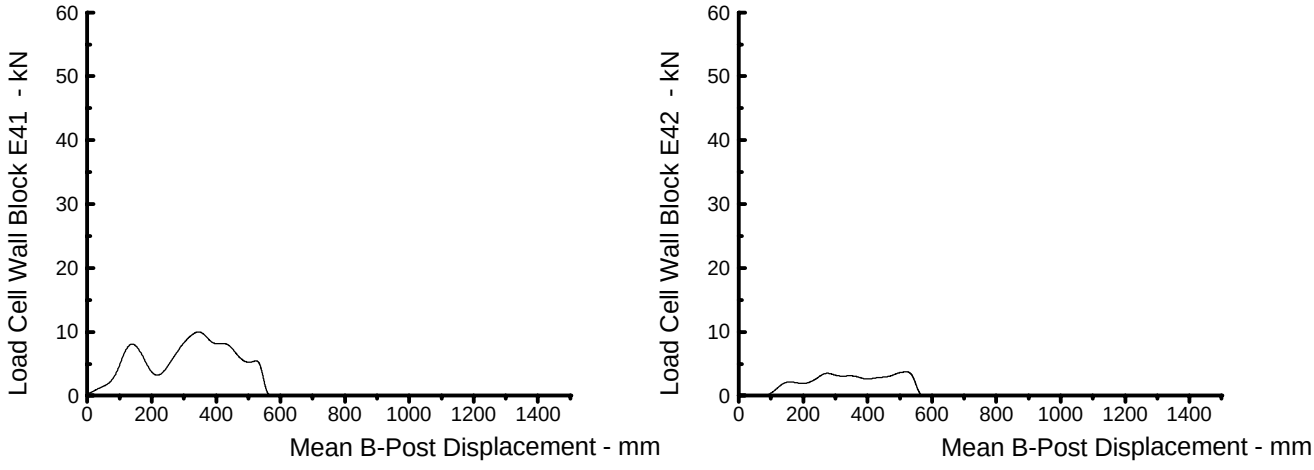
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



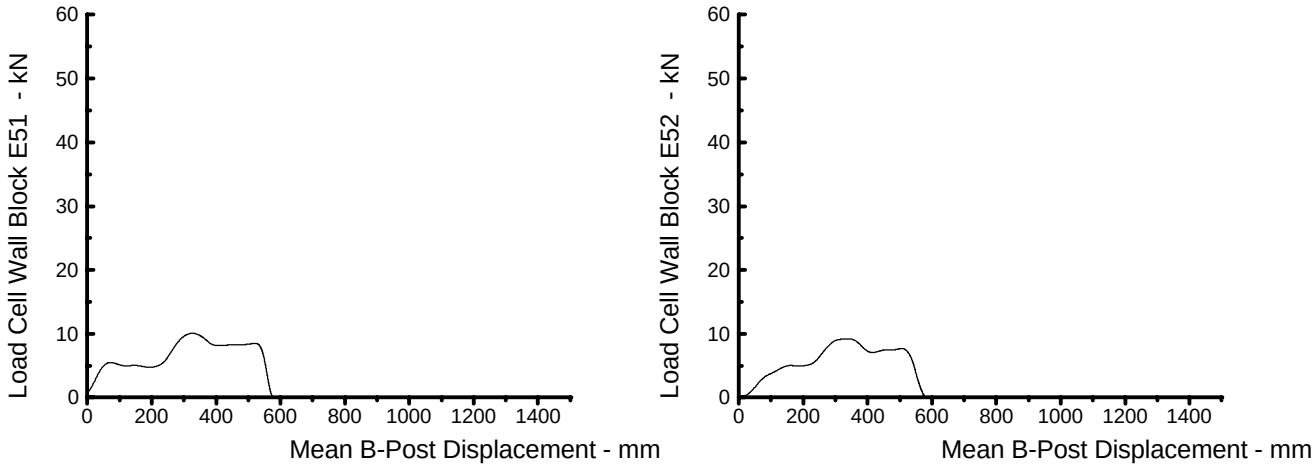


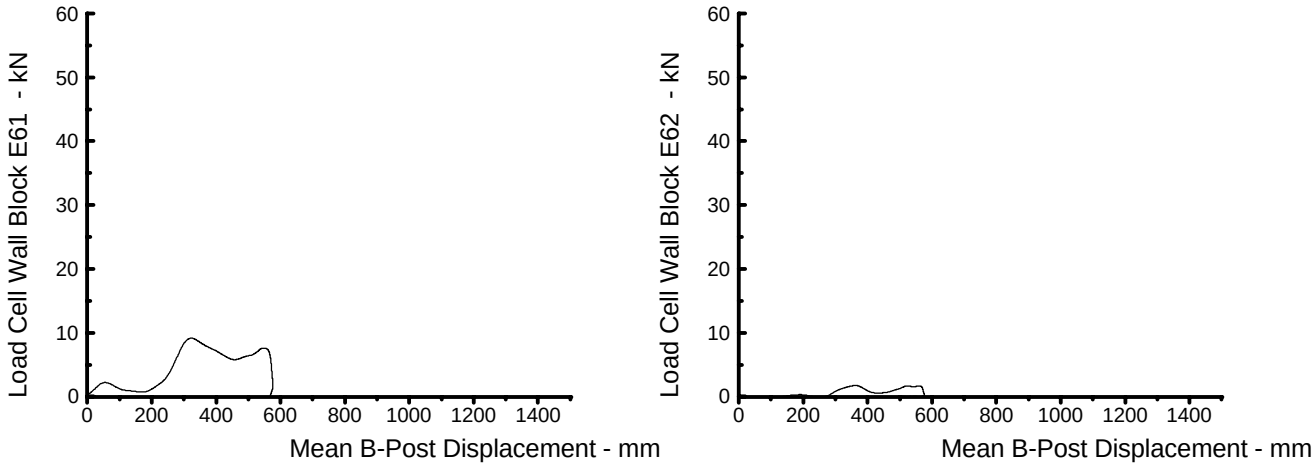


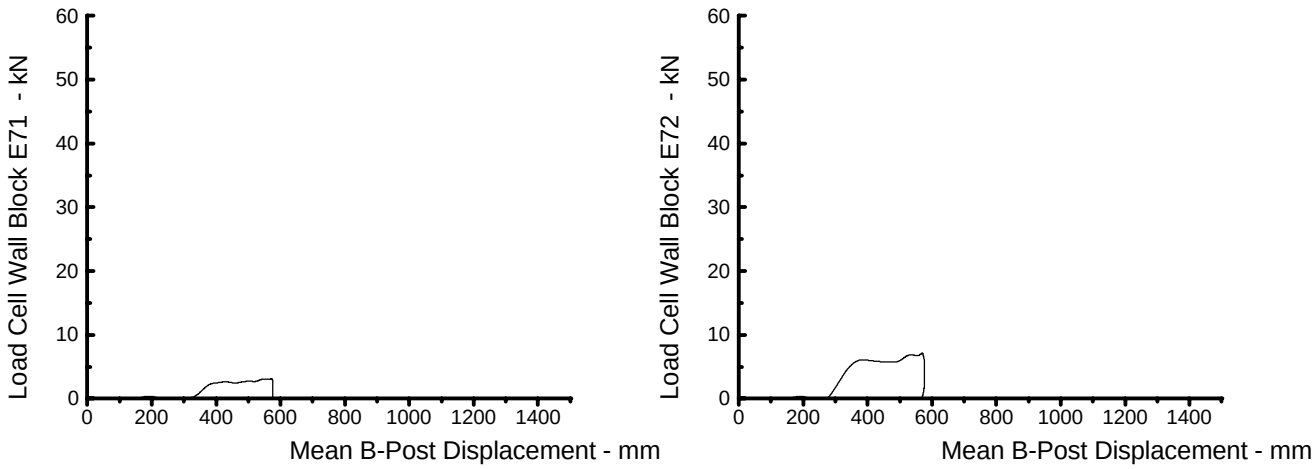


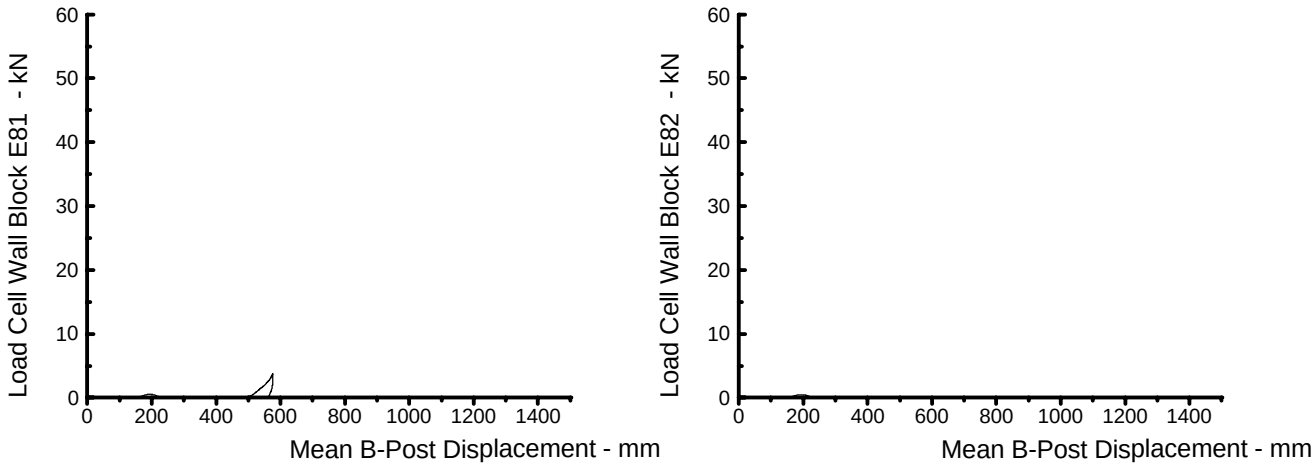
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



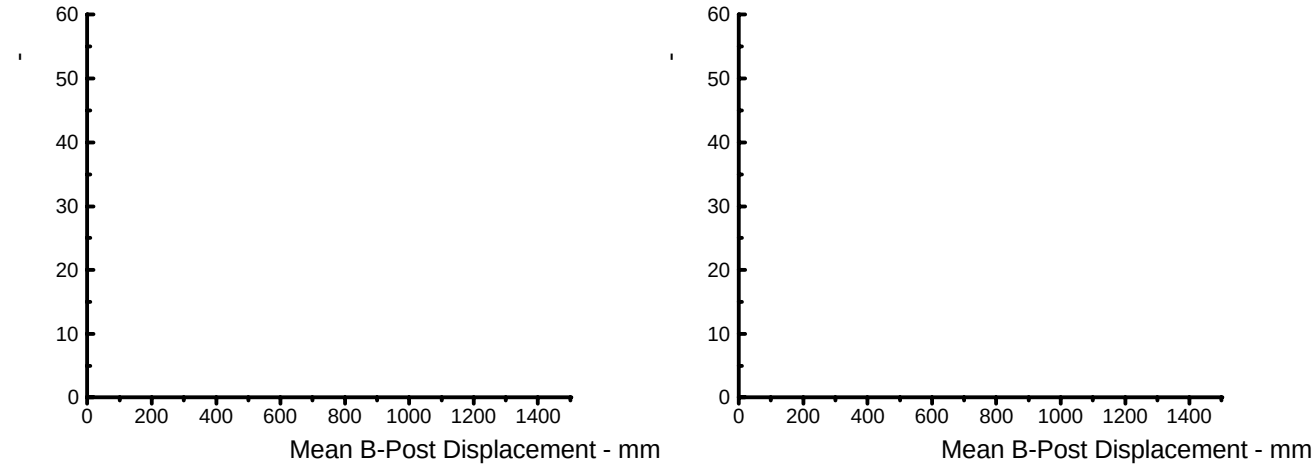


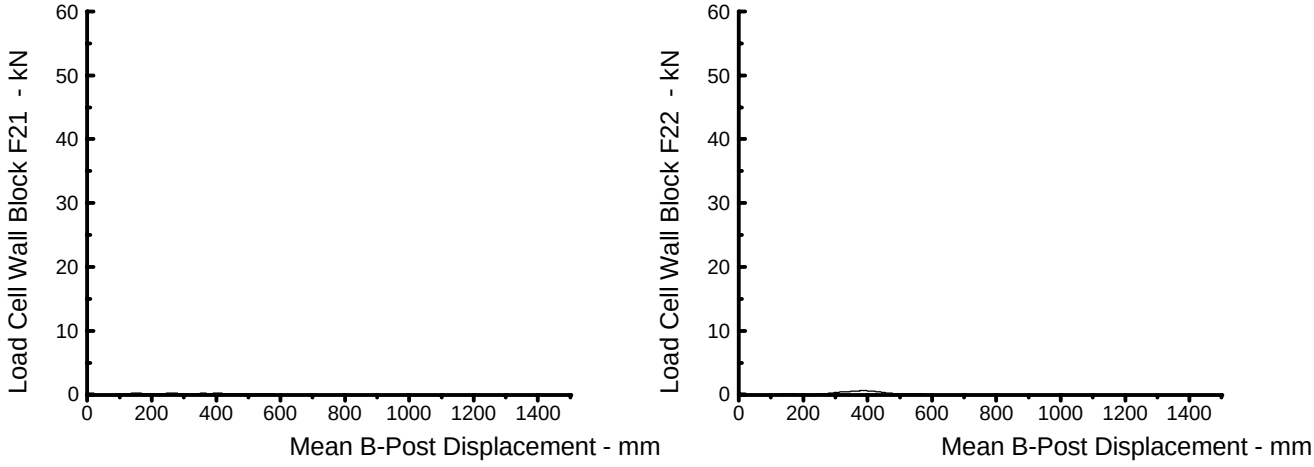


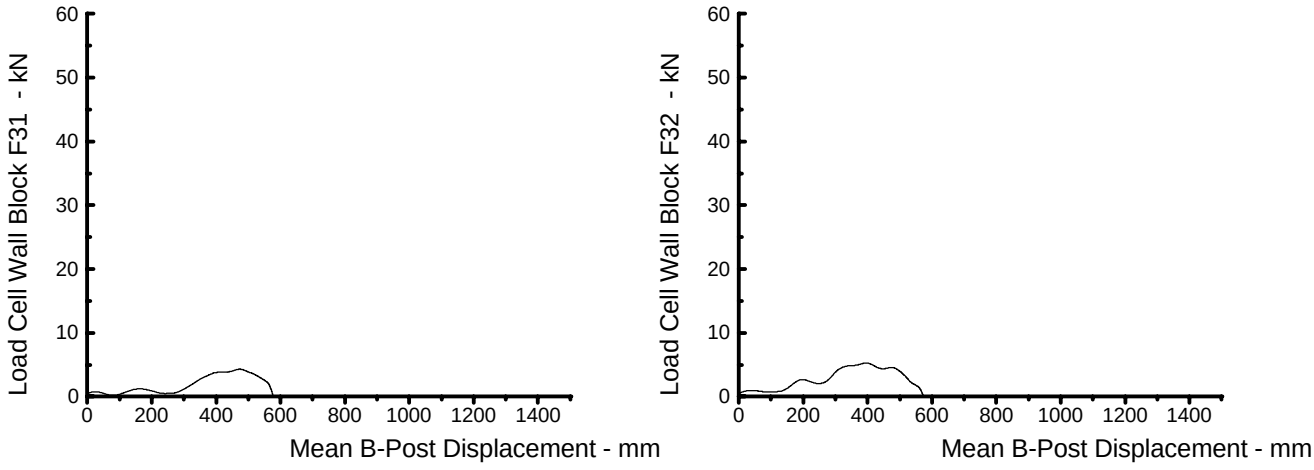


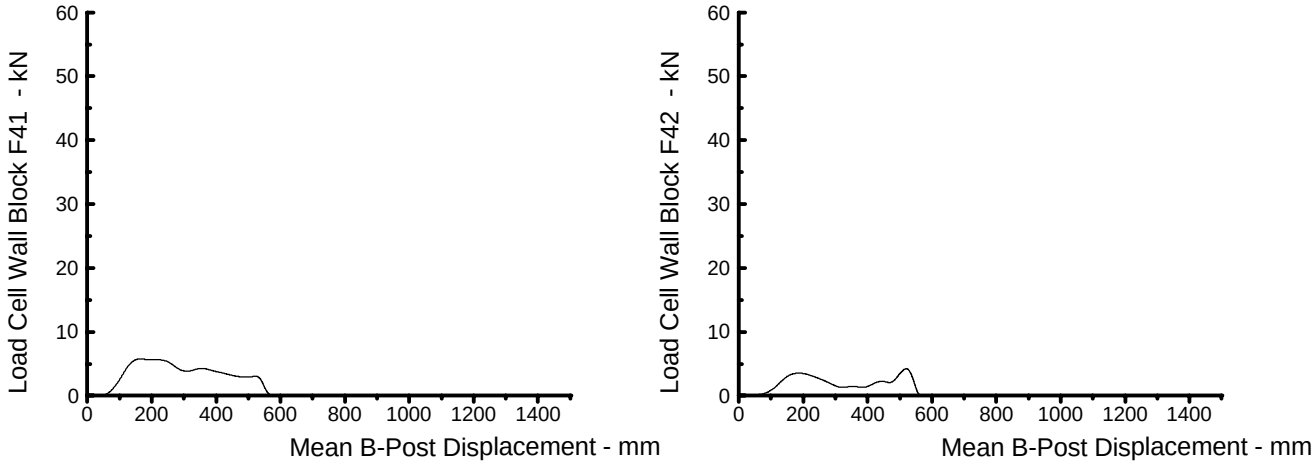
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



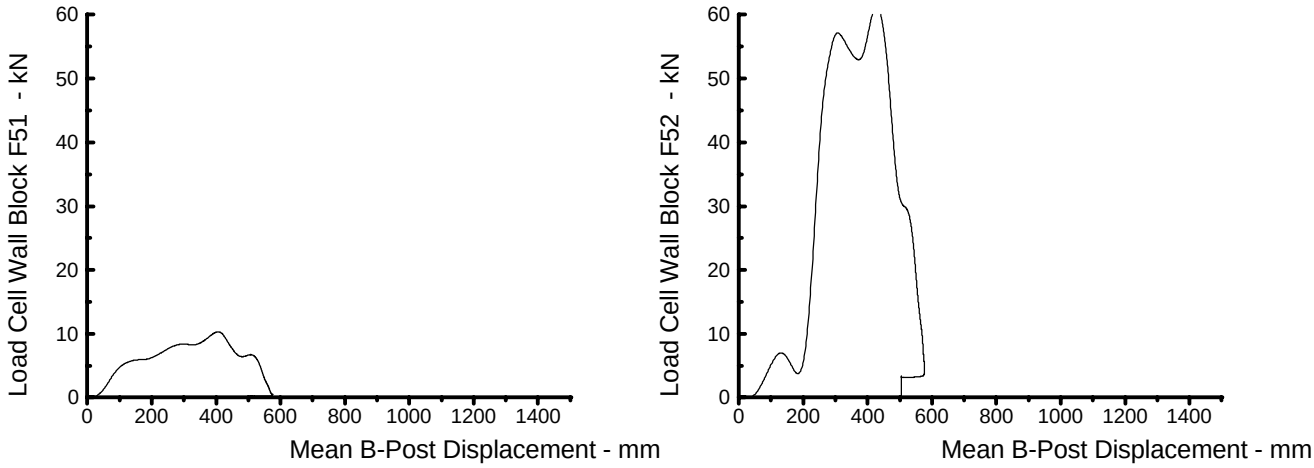


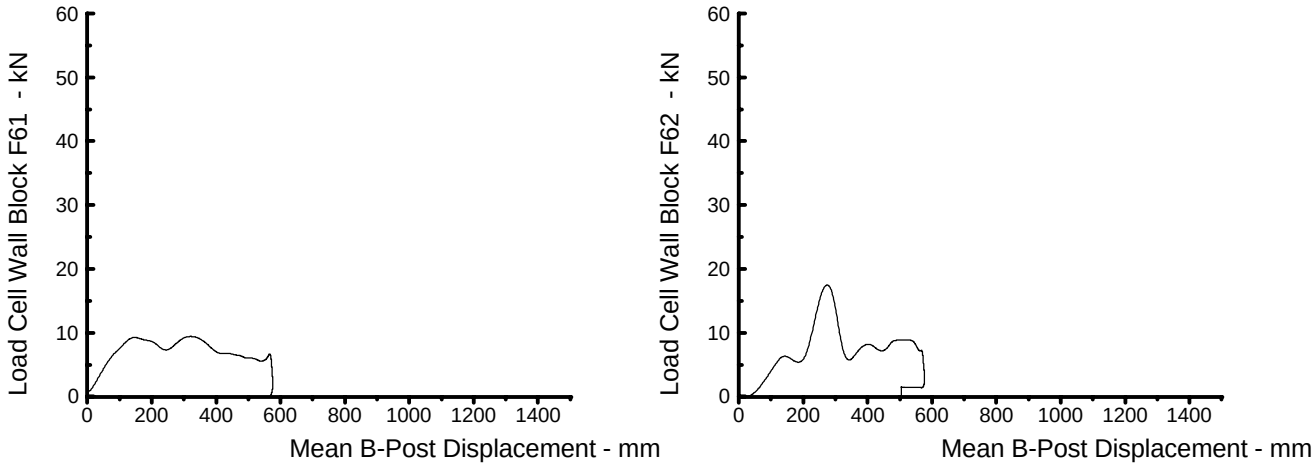


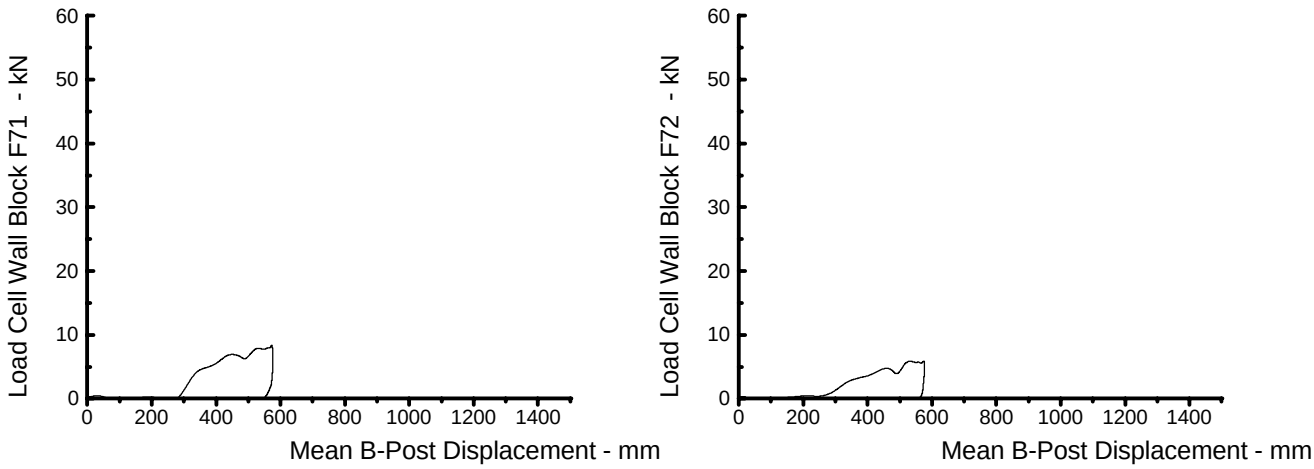


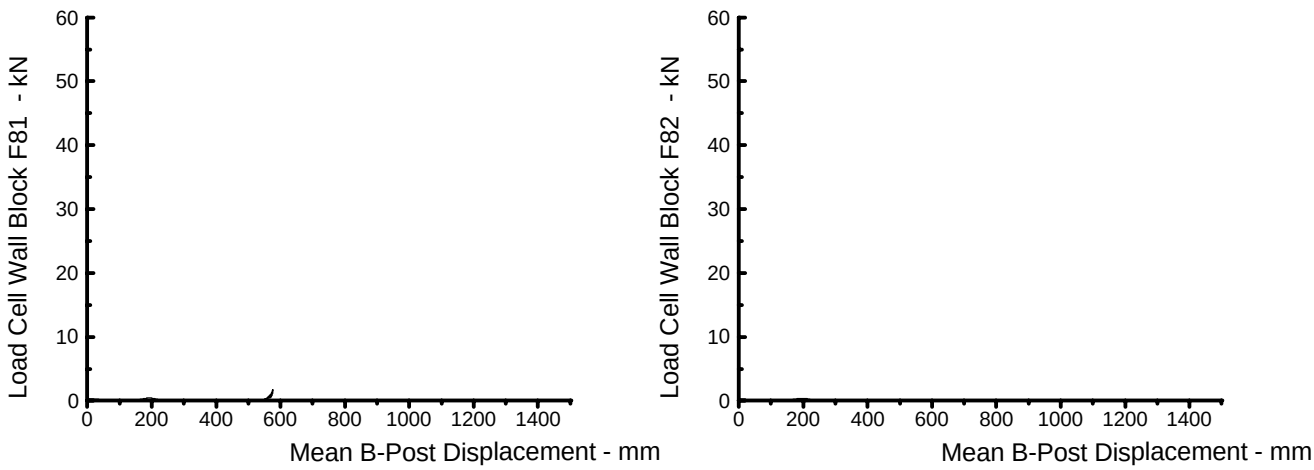
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



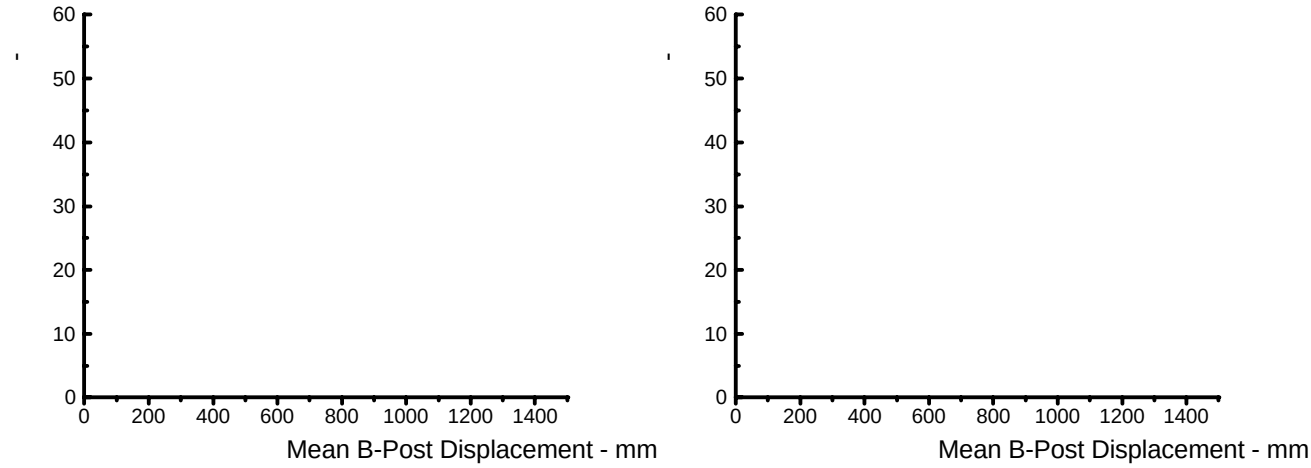


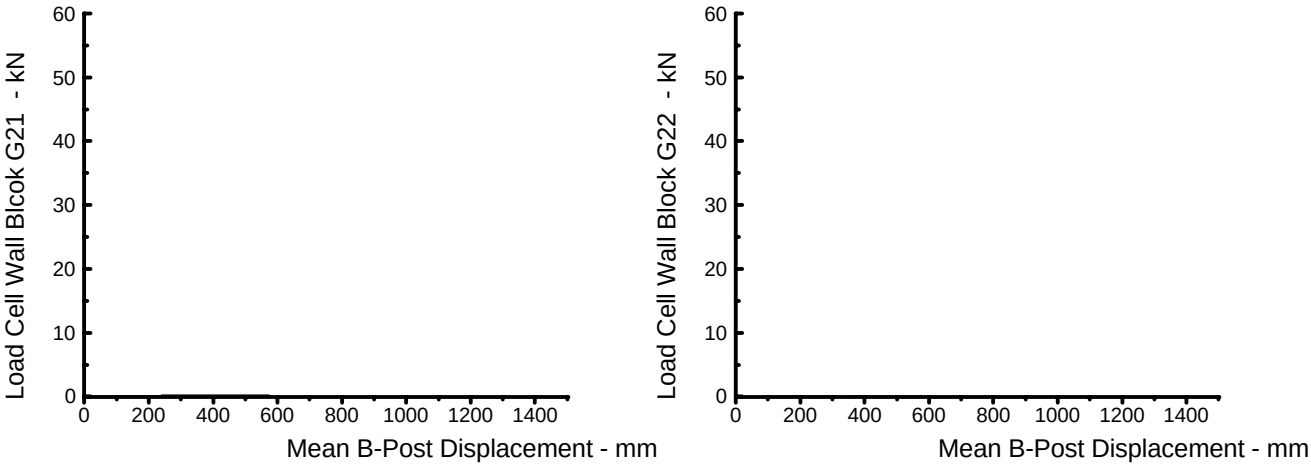


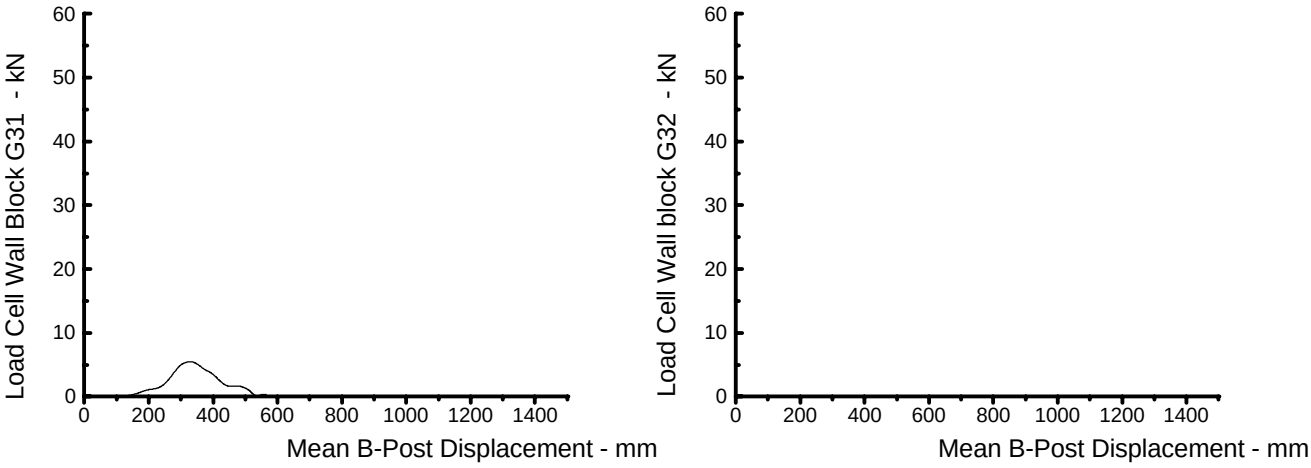


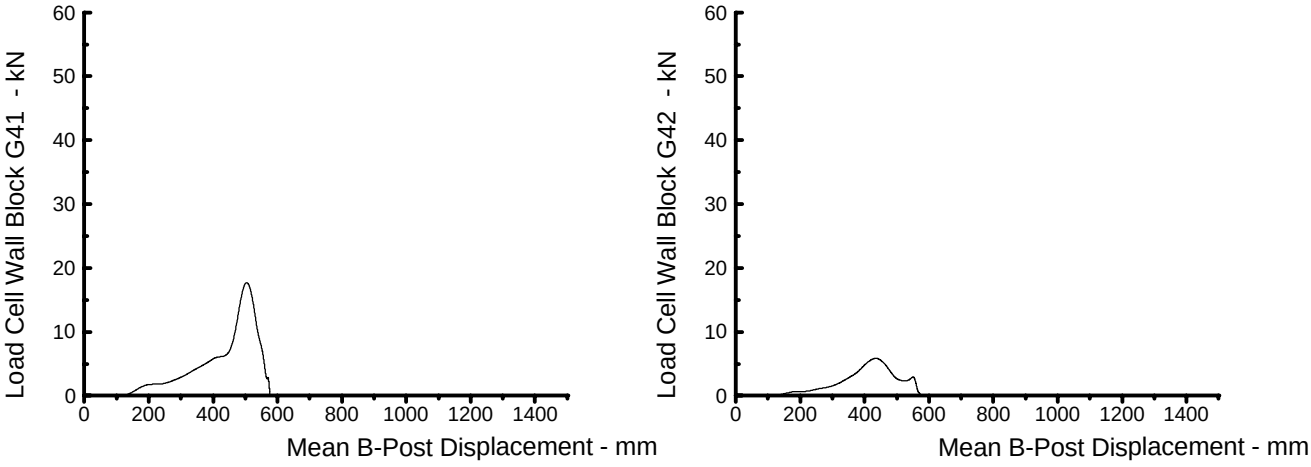
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



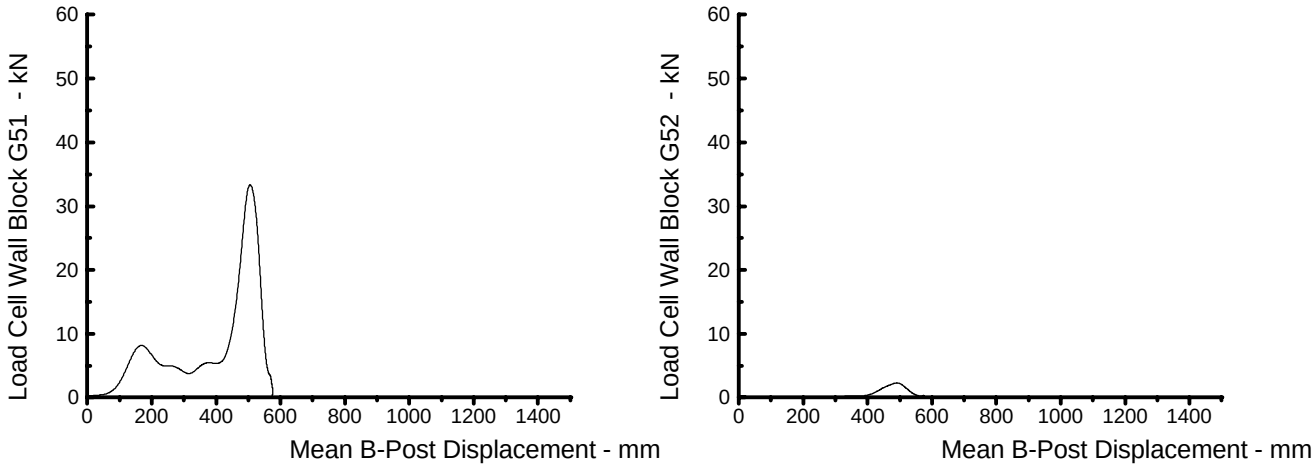


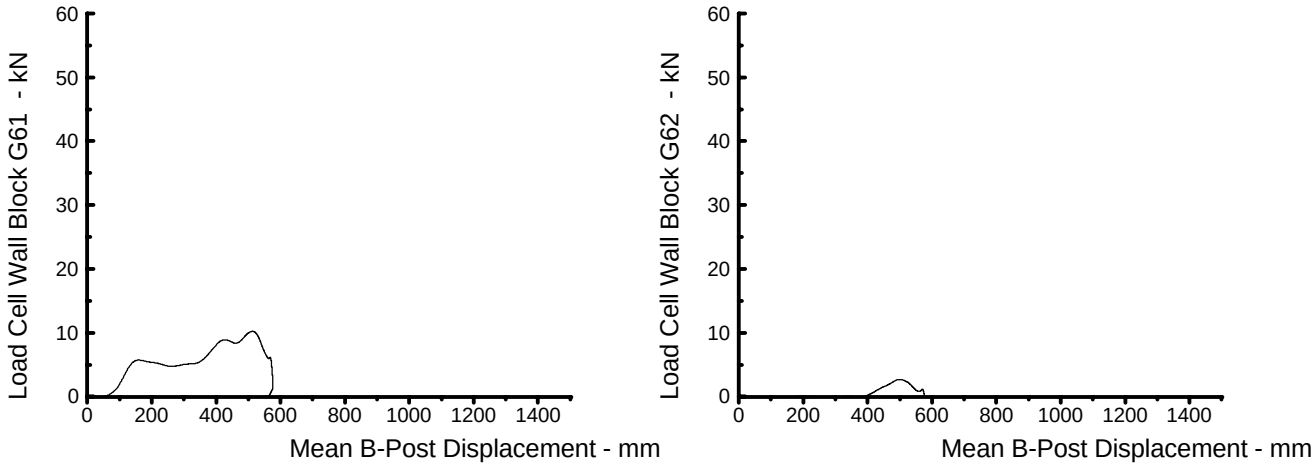


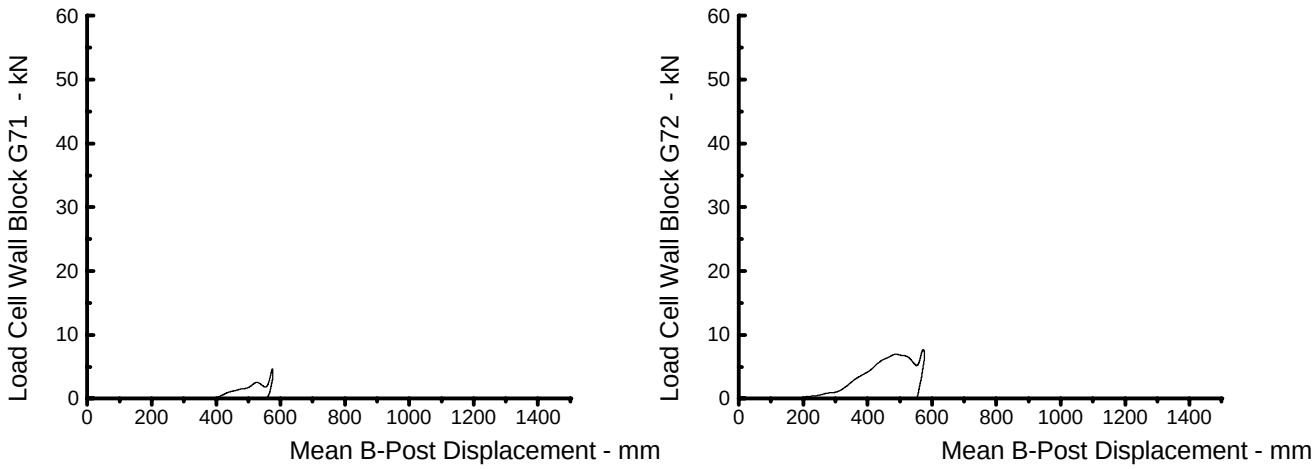


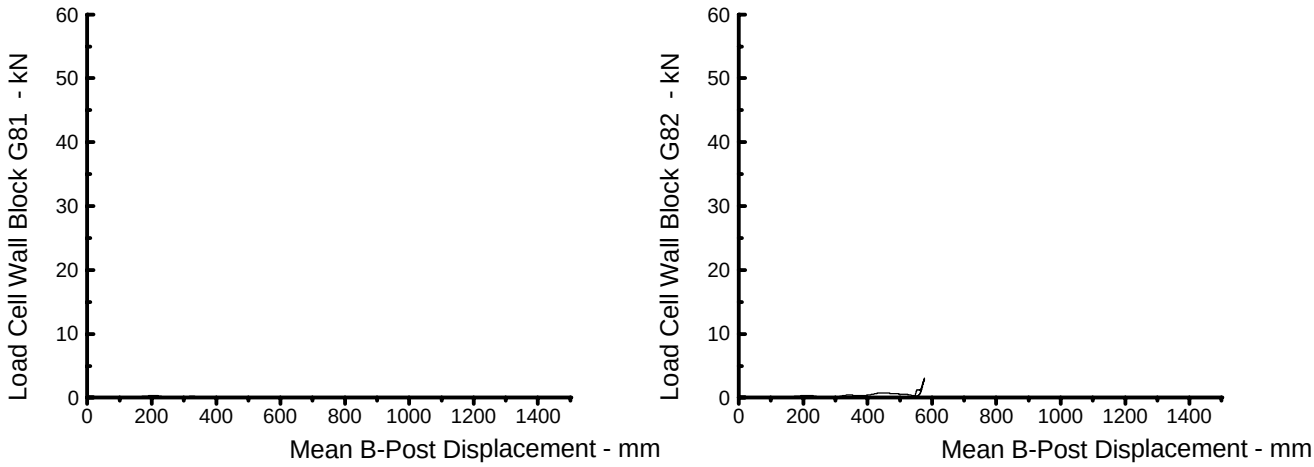
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



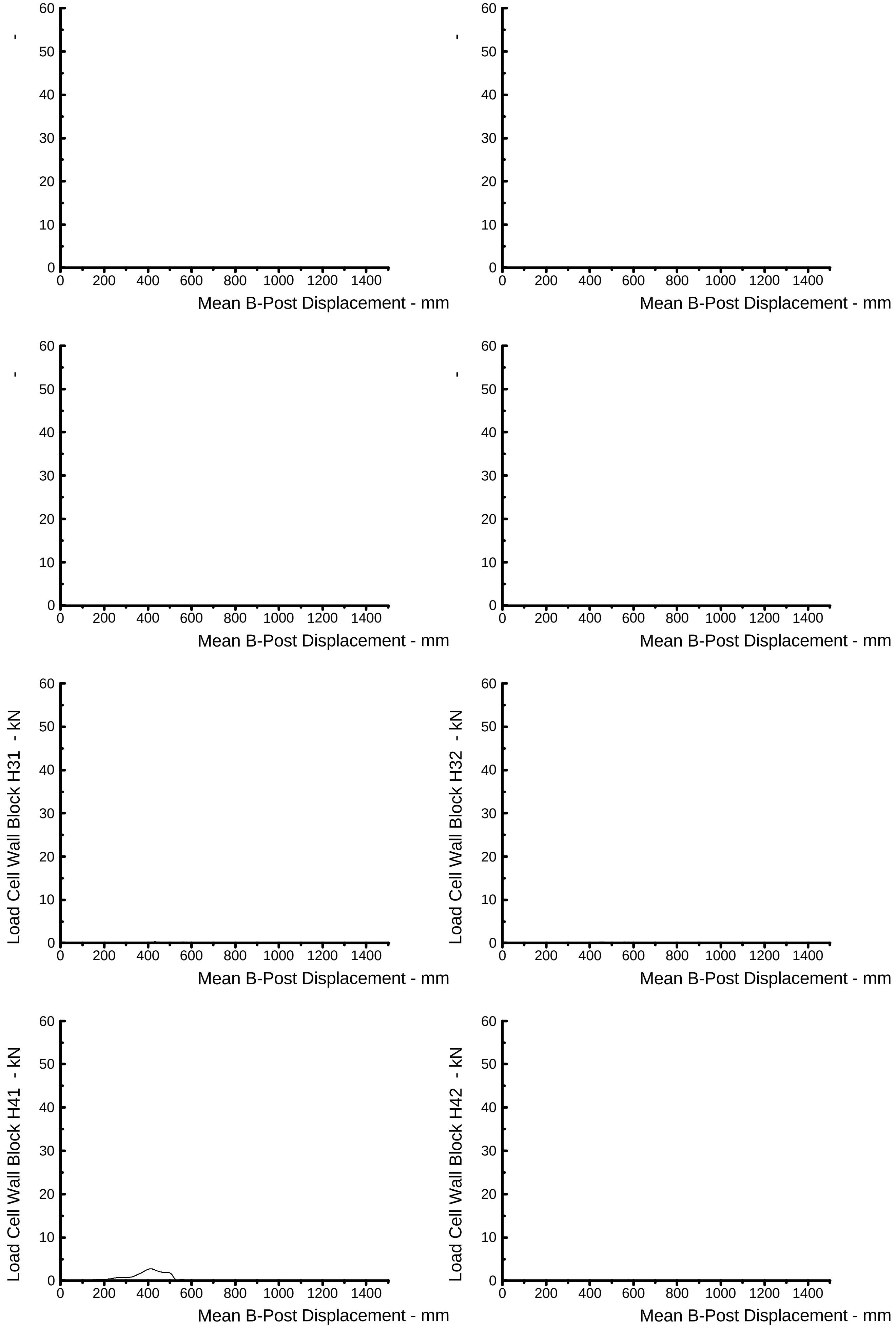






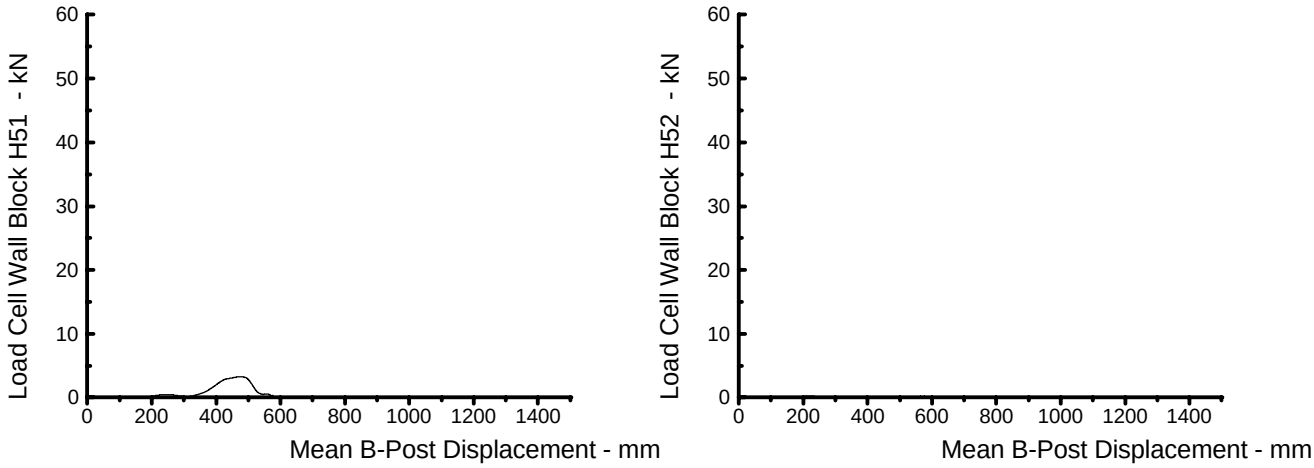
LCW Force - B-Pillar Displacement

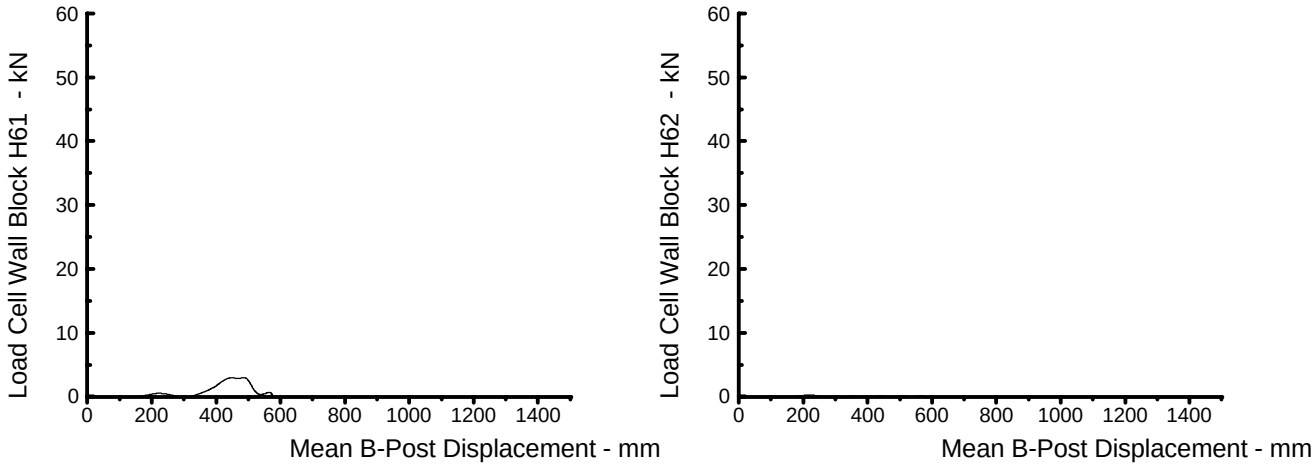
08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec

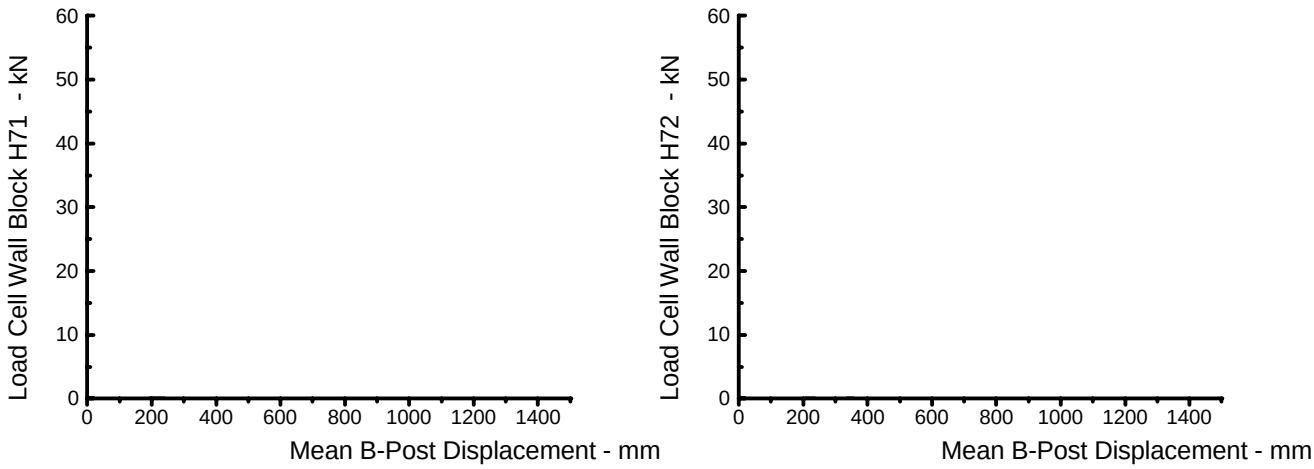


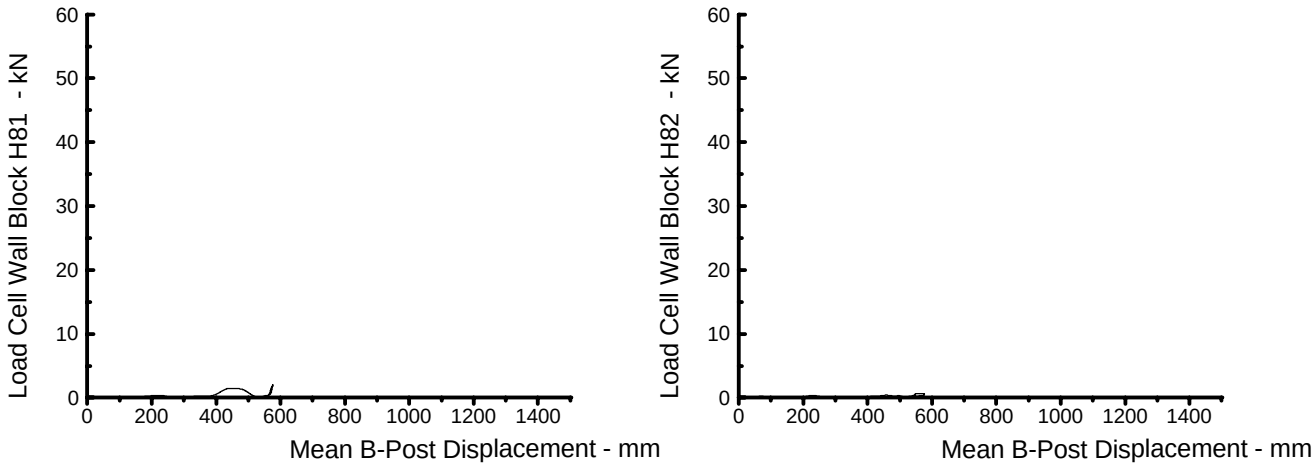
LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



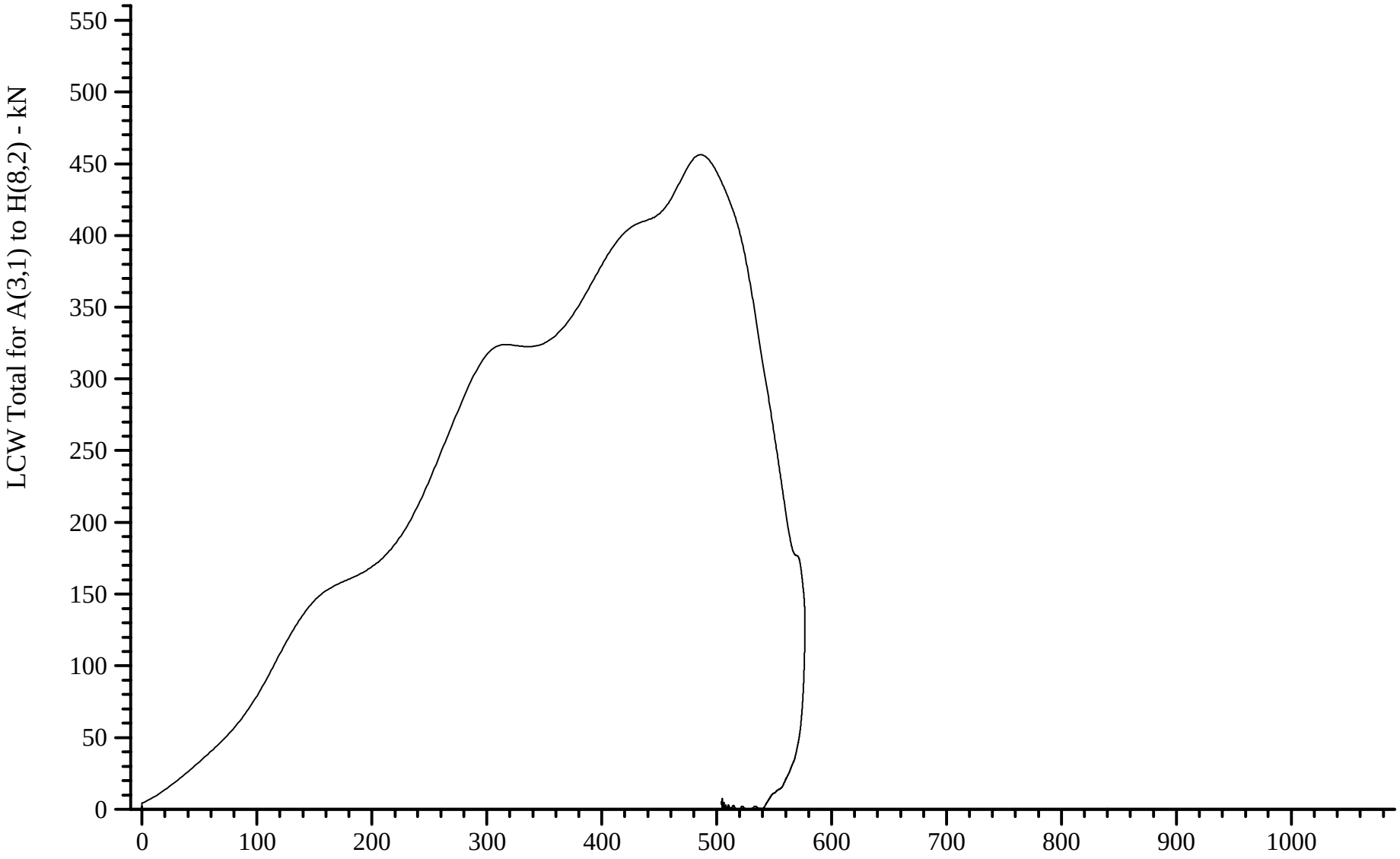






LCW Force - B-Pillar Displacement

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec



TRANSPORT RESEARCH LABORATORY

08LF VW Polo Eucar Frontal Impact 26/05/00 15.5m/sec