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REPORT NUMBER: 214-CAL-99-03

**SAFETY COMPLIANCE TESTING FOR FMVSS 214
SIDE IMPACT PROTECTION**

SAAB AUTOMOBILE AB
1999 SAAB 9-5
4-DOOR SEDAN

NHTSA NUMBER: CX0500

CALSPAN CORPORATION
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225



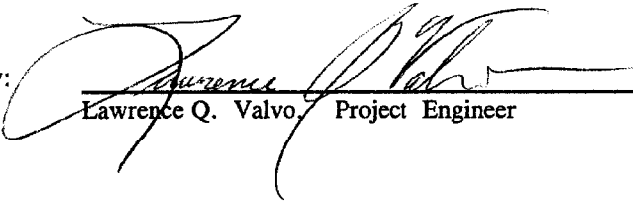
September 25, 1998

FINAL REPORT

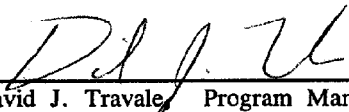
U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Compliance
400 Seventh Street, SW
Room 6115 (NSA-30)
Washington, DC 20590

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Prepared By:


Lawrence Q. Valvo, Project Engineer

Approved By:

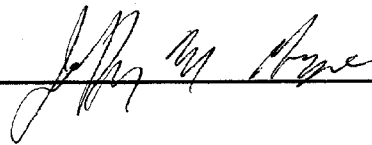

David J. Travale, Program Manager
Transportation Sciences Center

Approval Date:

October 27, 1998

FINAL REPORT ACCEPTANCE BY:

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				14. Sponsoring Agency Code NSA-30																															
15. Supplementary Notes																																			
16. Abstract A 48/24 kph 90° Impact (Moving Deformable Barrier) Compliance Test was conducted on the subject 1999 Saab 9-5 4-Door Sedan in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-214D-04 to determine FMVSS 214 Side Impact Protection compliance. This test was conducted at the Calspan Corporation Crash Test Facility in Buffalo, New York, on September 25, 1998. The impact velocity of the Moving Deformable Barrier (MDB) was 52.8 kph, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 22.2 °C. The target vehicle post-test maximum crush was 284 mm at level 2. The test or target vehicle's performance is given below: <table border="0"> <thead> <tr> <th></th> <th align="center"><u>Front SID</u></th> <th></th> <th align="center"><u>Rear SID</u></th> <th></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib Acceleration:</td> <td align="center"><u>42</u></td> <td align="center">g's</td> <td align="center"><u>42</u></td> <td align="center">g's</td> </tr> <tr> <td>Left Lower Rib Acceleration:</td> <td align="center"><u>49</u></td> <td align="center">g's</td> <td align="center"><u>46</u></td> <td align="center">g's</td> </tr> <tr> <td>Lower Spine Acceleration:</td> <td align="center"><u>38</u></td> <td align="center">g's</td> <td align="center"><u>53</u></td> <td align="center">g's</td> </tr> <tr> <td>Thoracic Trauma Index (TTI):</td> <td align="center"><u>44</u></td> <td align="center">g's</td> <td align="center"><u>49</u></td> <td align="center">g's</td> </tr> <tr> <td>Pelvis Acceleration (PEV):</td> <td align="center"><u>64</u></td> <td align="center">g's</td> <td align="center"><u>50</u></td> <td align="center">g's</td> </tr> </tbody> </table> The left side impact airbag, located in the driver seat back bolster, deployed during the impact. The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.							<u>Front SID</u>		<u>Rear SID</u>		Left Upper Rib Acceleration:	<u>42</u>	g's	<u>42</u>	g's	Left Lower Rib Acceleration:	<u>49</u>	g's	<u>46</u>	g's	Lower Spine Acceleration:	<u>38</u>	g's	<u>53</u>	g's	Thoracic Trauma Index (TTI):	<u>44</u>	g's	<u>49</u>	g's	Pelvis Acceleration (PEV):	<u>64</u>	g's	<u>50</u>	g's
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17. Key Words Compliance Testing Side Impact Protection FMVSS 214 Side Impact Dummy (SID)			18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Reference Division Room 5108 (NAD-52) 400 Seventh st., S.W. Washington, D.C. 20590 Telephone No. (202) 366-4946 ATTN: Robert Hornicle																																
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SECTION 1

PURPOSE AND TEST PROCEDURE

This side impact test is part of the FMVSS 214 Side Impact Protection Compliance Test Program sponsored by the National Highway Safety Administration (NHTSA) under Contract No. DTNH22-97-C-01033. The purpose of this test was to evaluate side impact protection in a 1999 Saab 9-5 4-Door Sedan. The test was conducted in accordance with the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-214D-04, dated September 1, 1995).

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A 1999 Saab 9-5 4-Door Sedan was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 52.8 kph (32.8 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Calspan Corporation Transportation Sciences Center in Buffalo, New York on September 25, 1998. Pre- and post-test photographs of the test vehicle, the moving deformable barrier (MDB), and the side impact dummies (SIDs) are included in appendix A.

Two restrained Side Impact Dummies (SIDs) were placed in the driver (Pos. #1) and left rear (Pos. #4) designated seating positions according to the instructions specified in the OVSC Side Impact Laboratory Test Procedure (TP-214D-04, dated September 1, 1995). Both SIDs were certified prior to this test. The side impact test was documented by one real-time camera and 9 high-speed cameras. Camera locations and other pertinent camera information are included in this report.

The SIDs were instrumented with the following accelerometers:

1. Left Upper Rib (LUR) uniaxial and redundant accelerometer (Y-direction)
2. Left Lower Rib (LLR) uniaxial and redundant accelerometer (Y-direction)
3. Lower Thoracic Spine (T₁₂) uniaxial and redundant accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial and redundant accelerometer (Y-direction)

A summary of the side impact dummy (SID) configuration and verification test data can be found in Appendix C. A total of 41 channels of data were recorded. Appendix B contains the vehicle, MDB and dummy response data traces.

The following table summarizes the results of the test.

Injury Criteria	Front SID	Rear SID
TTI (g)	44	49
PEV (g)	64	50

FMVSS 214D requires that the TTI not exceed 85 for 4 door vehicles and not exceed 90 for 2 door vehicles. Peak lateral pelvis acceleration shall not exceed 130 g's.

SECTION 3

SUMMARY OF TEST RESULTS

DATA SHEET 1

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1999 Saab 9-5 4-Door Sedan
 Vehicle Body Color: Black VIN: YS3ED45E2X3000301
 Vehicle NHTSA No.: CX0500 Month & Year of Manufacture: 01/98
 Engine Data: 4 Cylinders; - CID; 2.3 Liters; - cc
 Engine Placement: - Longitudinal; or X Lateral
 Transmission: 5 Speed; X Manual; - Automatic; - Overdrive
 Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel
 Odometer Reading 106 km
 Options: X A/C; X Power Steering; X Pwr.Brakes; X Pwr. Windows

DATA FROM TIRE PLACARD

Tire Pressure* (at capacity); 220 kPa FRONT
220 kPa REAR
 Recommended Tire Size: 215/55VR16
 Tires on Test Vehicle: 215/55VR16 ; Manufacturer: Michelin
 Vehicle Capacity Data:
 Number of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 Total
 Type of Front Seats: X Bucket; - Bench; - Split Bench
 Type of Front Seat Back: - Fixed; X Adjustable with X Lever or - Knob
 Vehicle Max Capacity Loading = 421.0 kg (A)
 No. of Occupants x 68.04 kg. = 340.2 kg (B)
 Vehicle Cargo Capacity = 80.8 kg (A-B)

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

Left Front	=	<u>475.5</u> kg	Left Rear	=	<u>301.0</u> kg
Right Front	=	<u>470.5</u> kg	Right Rear	=	<u>302.0</u> kg
TOTAL FRONT	=	<u>946.0</u> kg	TOTAL REAR	=	<u>603.0</u> kg
% of Total Weight	=	<u>61.1</u> %	% of Total Weight	=	<u>38.9</u> %
TOTAL WEIGHT	=	<u>1,549.0</u> kg			

* Tire pressure used in test.

DATA SHEET 1 (continued)

GENERAL TEST VEHICLE PARAMETER DATA

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Max. Fluids	=	<u>1549.0</u>	kg (A)
Maximum Cargo Carrying Capacity of Test Vehicle	=	<u>80.8</u>	kg (B)
Weight of instrumented Side Impact Dummies (1 or 2 X <u>81.2</u> kg)	=	<u>162.4</u>	kg (C)
TEST VEHICLE TARGET WEIGHT:	=	<u>1,792.2</u>	kg (A+B+C)

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

Left Front	=	<u>521.5</u>	kg	Left Rear	=	<u>418.0</u>	kg
Right Front	=	<u>467.0</u>	kg	Right Rear	=	<u>385.5</u>	kg
TOTAL FRONT	=	<u>988.5</u>	kg	TOTAL REAR	=	<u>803.5</u>	kg
% of Total Weight	=	<u>55.2</u>	%	% of Total Weight	=	<u>44.8</u>	%
TOTAL TEST WEIGHT	=	<u>1,792.0</u>	kg				

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

Left Front	=	<u>514.0</u>	kg	Left Rear	=	<u>411.0</u>	kg
Right Front	=	<u>479.0</u>	kg	Right Rear	=	<u>381.0</u>	kg
TOTAL FRONT	=	<u>993.0</u>	kg	TOTAL REAR	=	<u>792.0</u>	kg
% of Total Weight	=	<u>55.6</u>	%	% of Total Weight	=	<u>44.4</u>	%
TOTAL TEST WEIGHT	=	<u>1,785.0</u>	kg				

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

AS DELIVERED:

Left Front	<u>685</u>	Right Front	<u>683</u>	Left Rear	<u>686</u>	Right Rear	<u>697</u>
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FULLY LOADED:

Left Front	<u>675</u>	Right Front	<u>682</u>	Left Rear	<u>636</u>	Right Rear	<u>655</u>
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READY FOR TEST:

Left Front	<u>675</u>	Right Front	<u>683</u>	Left Rear	<u>639</u>	Right Rear	<u>655</u>
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Test Vehicle Wheelbase: 2703 millimeters

C.G. = 1,199 millimeters rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side	=	<u>4688</u>	millimeters
Left Side	=	<u>4688</u>	millimeters
Centerline	=	<u>4814</u>	millimeters

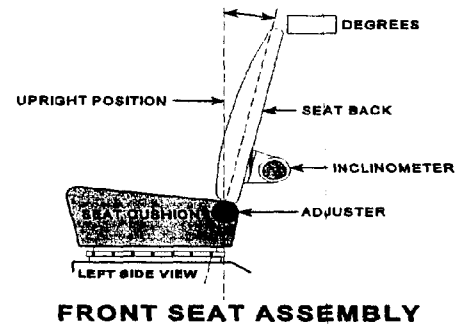
DATA SHEET 1 (continued)

GENERAL TEST VEHICLE PARAMETER DATA

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

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



FRONT SEAT CUSHION PLACEMENT: Mid-position

Total Length of Adjustment Travel: 202 millimeters

Total Number of Adjustment Positions or Detents: Infinite (power seat adjuster)

FRONT SEAT BACK ADJUSTMENT POSITION: Head restraint posts vertical

Seat Back Torso Angle: 18 degrees

SECOND POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: N/A millimeters

Seat Back Adjustment Position: N/A

ADJUSTABLE STEERING COLUMN POSITION: Mid-position, telescoping feature full forward

WINDOW POSITIONS: Left Front: Closed Left Rear: Closed

Right Front: Open Right Rear: Open

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

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

19.8 liters (Fuel Tank Usable Capacity)

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

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

Wheelbase = 2703 millimeters

Impact Point is 412 millimeters rearward of front axle centerline

(which is 940 millimeters forward of the wheelbase midpoint)

Actual Impact Point is 401 millimeters rearward of front axle centerline

DATA SHEET 2

TEST VEHICLE SUMMARY OF RESULTS

VEHICLE IDENTIFICATION:

Vehicle Year/Make/Model: 1999 Saab 9-5

Body Style: 4-Door Sedan

VIN: YS3ED45E2X3000301

NHTSA No.: CX0500

Test Date: September 25, 1998

Overall Length = 4814 millimeters; Overall Width = 1790 millimeters

VEHICLE TEST WEIGHT (Pre-Test):

Left Front = 514.0 kg Left Rear = 411.0 kg

Right Front = 479.0 kg Right Rear = 381.0 kg

TOTAL FRONT = 993.0 kg TOTAL REAR = 792.0 kg

TOTAL VEHICLE WEIGHT 1,785.0 kg

Wheelbase = 2703 millimeters

Longitudinal C.G. from Center of Front Axle = 1,199 millimeters

Impact Angle with Respect to Impactor = 90 degrees

ACTUAL IMPACT POINT

Actual Impact Point is 11 mm forward of nominal impact ref. line (Lateral)

Actual Impact Point is 2 mm above nominal impact point (Vertical)

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (203 mm above ground) = 88 millimeters

2. LEVEL 2 (480 mm above ground) = 284 millimeters

3. LEVEL 3 (574 mm above ground) = 254 millimeters

4. LEVEL 4 (838 mm above ground) = 203 millimeters

5. LEVEL 5 (1327 mm above ground) = 8 millimeters

Maximum Post-Test Intrusion = 284 millimeters

OCCUPANTS:

Front Passenger:

Rear Passenger:

Dummy Identification 015 016

Restraints Used 3-point active seat belt and side impact airbag 3-point active seat belt

INSTRUMENTATION:

Number of Vehicle Data Channels: = 20

Number of Cameras: Onboard = 3

Offboard = 6

TOTAL = 9

DATA SHEET 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

MDB FACE MANUFACTURER AND SERIAL NUMBER:

Plascore, Inc.: 125B0597-4, 134A0497, 4800-01

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to left

MDB DETAILS:

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

MDB WEIGHT:

Left Front	=	<u>409.5</u>	kg	Left Rear	=	<u>281.5</u>	kg
Right Front	=	<u>372.5</u>	kg	Right Rear	=	<u>299.0</u>	kg
TOTAL FRONT	=	<u>782.0</u>	kg	TOTAL REAR	=	<u>580.5</u>	kg
TOTAL MDB WEIGHT	=	<u>1,362.5</u>	kg				
Impact Angle (MDB C/L to Target Vehicle C/L)	=	<u>90</u>	degrees				
Impact Speed	=	<u>52.8</u>	kph				

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A at Center of Bumper Level	=	<u>133</u>	millimeters
2. Row B at Top of Bumper Level	=	<u>100</u>	millimeters
3. Row C at Mid Level	=	<u>106</u>	millimeters
4. Row D at Top of Stack Level	=	<u>138</u>	millimeters

INSTRUMENTATION:

Number of MDB Data Channels	=	<u>5</u>
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DATA SHEET 4

POST-TEST OBSERVATIONS

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

VISIBLE DUMMY CONTACT POINTS:

LEFT FRONT SID

Head: Back of head to head restraint (on rebound)

Upper Torso: Left shoulder to side impact airbag, above armrest

Lower Torso: Pelvis to lower rear portion of door trim panel, below armrest

Left Knee: Left knee to front portion of door trim panel and door pocket

Right Knee: Left knee

LEFT REAR SID

Left side of head to upper C-pillar trim, back of head to head restraint

Left shoulder to rear portion of door trim panel above armrest

Pelvis to left lower seat bolster and to lower rear portion of the door trim panel

Left knee to door trim panel above speaker housing

Left knee

DOOR OPENING:

LEFT DOOR

Front: Closed / Inoperable

Rear: Closed / Inoperable

RIGHT DOOR

Closed / Operable

Closed / Operable

MDB DISTANCE FROM TARGET IMPACT POINT:

Vertical: 2 mm above target

Horizontal: 11 mm forward of target

ARM REST LOCATIONS:

Front: 220 mm below bottom of window opening

Rear: 255 mm below bottom of window opening

SEAT MOVEMENT:

Front: Driver seat was pushed inboard against the center console

Rear: Left seat bolster was deformed upward

GLAZING DAMAGE:

Windshield: Windshield cracked along its left edge

Window: None

PILLAR PERFORMANCE:

No visible tears or separations

SILL SEPARATION:

None

OTHER NOTABLE IMPACT EFFECTS:

Left side impact airbag deployed, frontal airbags and right side impact airbag did not deploy.

SECTION 4

OCCUPANT AND VEHICLE INFORMATION

DATA SHEET 5

SID INSTRUMENTATION DATA

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

	Front Dummy ID# 015				Rear Dummy ID# 016			
	Pos. Direction		Neg. Direction		Pos. Direction		Neg. Direction	
	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
RIB ACCELERATIONS:								
Upper Rib Lateral . Y	41.5	39.4	-10.0	95.6	42.4	48.1	-9.9	115.0
Upper Rib Lateral . Y(R)	44.3	40.0	-9.9	95.6	45.1	48.1	-8.4	115.0
Lower Rib Lateral . Y	49.3	38.1	-9.4	95.7	45.9	50.0	-13.2	115.0
Lower Rib Lateral . Y(R)	48.6	38.7	-9.4	96.2	49.3	50.0	-12.4	114.4
SPINE ACCELERATIONS:								
Lower Lateral Y	38.2	34.4	-7.6	91.3	53.0	54.4	-8.9	77.5
Lower Lateral Y(R)	38.4	34.4	-7.2	91.3	52.6	54.4	-9.1	77.5
PELVIC ACCELERATIONS:								
Lateral Y	63.9	30.6	-14.4	55.0	50.1	43.8	-3.3	118.1
Lateral Y(R)	64.3	30.6	-14.2	55.0	50.0	43.8	-3.5	117.5

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

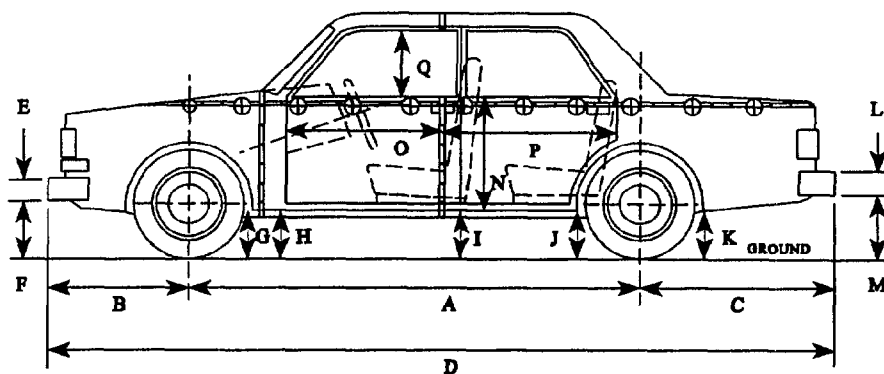
Note: Above data has been FIR filtered, Y(R) denotes redundant Y direction accelerometer.

DATA SHEET 6

VEHICLE SIDE MEASUREMENTS

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500



LEFT SIDE VIEW

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

	PRE-TEST (as delivered)	PRE-TEST (as tested)	POST-TEST (as tested)	Δ CHANGE
A	2703	-	2698	-5
B	998	-	999	1
C	1113	-	1105	-8
D	4814	-	4802	-12
E	202	-	202	0
F	369	375	392	17
G	172	156	157	1
H	197	181	200	19
I	213	180	228	48
J1	210	167	175	8
J2	200	156	190	34
K	262	206	234	28
L	254	-	254	0
M	355	293	320	27
N	669	-	588	-81
O	758	-	749	-9
P	1200	-	1147	-53
Q	414	-	413	-1
R	4688	-	4688	0
S	4688	-	4661	-27
T	1790	-	1632	-158

D = Length at Centerline
T = Width at B-Pillar

E&L = Bumper Thickness
J1 = To Pinch Weld

R = Right Side Length
J2 = To Sill

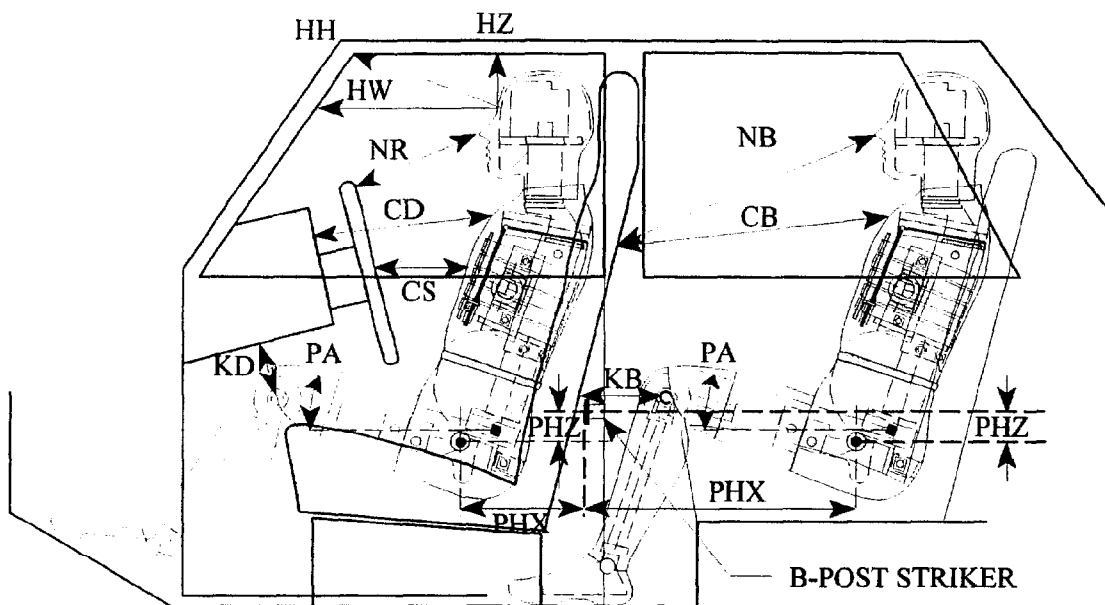
S = Left Side Length

DATA SHEET 7

SID LONGITUDINAL CLEARANCE DIMENSIONS

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500



LEFT SIDE VIEW

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

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

	DRIVER ID# 015	LEFT REAR PASS. ID# 016
HH	430	N/A
HW	600	N/A
HZ	186	158
NR/NB	481	641
CD/CB	553	595
CS	341	N/A
KDL(KDA°)/KBL(KDA°)	173 / (31°)	235 / (17°)
KDR(KBA°)/KBR(KBA°)	168 / (40°)	238 / (17°)
PA°	24°	24°
PHX	178	268
PHZ	104	288

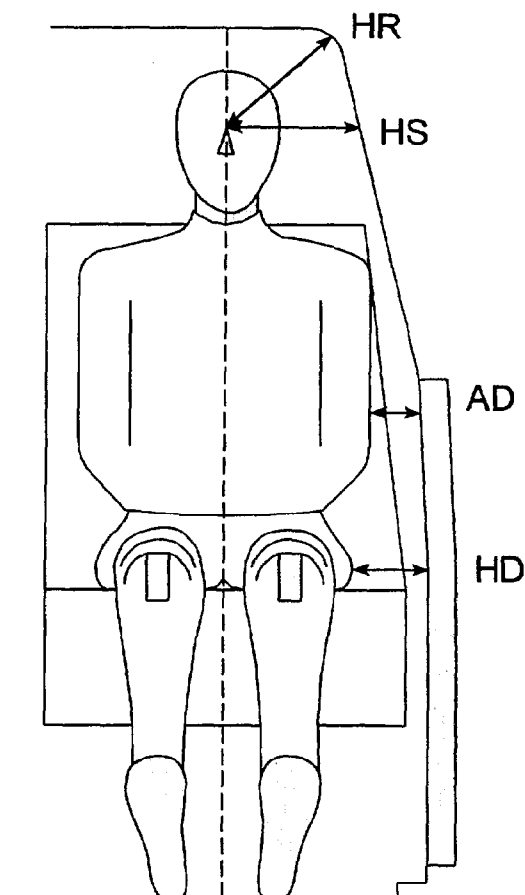
Note: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

DATA SHEET 8

SID LATERAL CLEARANCE DIMENSIONS

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500



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

	DRIVER ID # 015		LEFT REAR PASS. ID # 016	
HR	241		185	
HS	343		218	
AD*	LOWER: 152	UPPER: 142	LOWER: 148	UPPER: 114
HD	178		186	

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

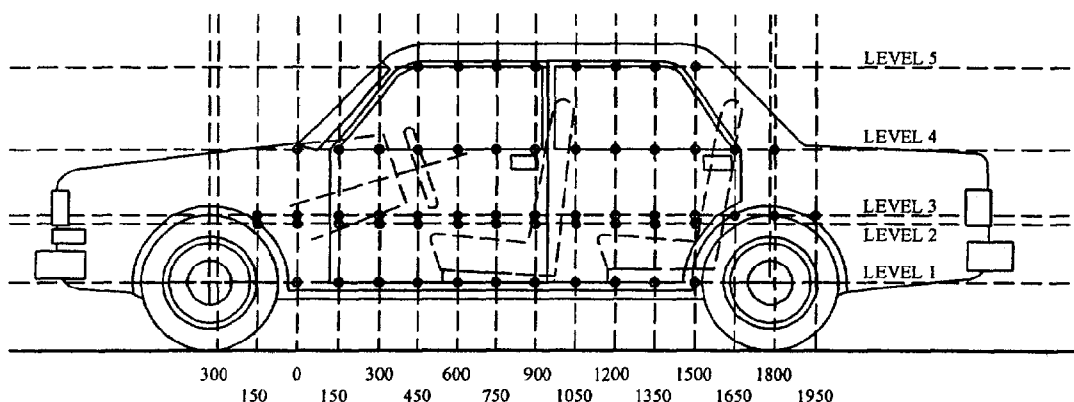
Upper measurement is taken laterally at the center of the upper rib accelerometer height from the SID arm segment to the closest part of the vehicle side.

DATA SHEET 9

VEHICLE SIDE MEASUREMENTS

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500



LEFT SIDE VIEW

NOTE: All measurements are in millimeters (mm)

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

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

Measurements Along the Vertical 750 mm Line Shown Above:

Level 5 @ Window Top	=	<u>1327</u>	millimeters
Level 4 @ Window Sill	=	<u>838</u>	millimeters
Level 3 @ Mid Door	=	<u>574</u>	millimeters
Level 2 @ Occupant H-Point	=	<u>480</u>	millimeters
Level 1 @ Axle Centerline Height (or Sill Top Height)	=	<u>203</u>	millimeters

DATA SHEET 10

VEHICLE EXTERIOR CRUSH PROFILES - ALL LEVELS

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

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

		DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT																											
LEVEL	HEIGHT (mm)	-900	-750	-600	-450	-300	-150		150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700	2850	3000	
LEVEL 1 SIDE SILL	PRE	-	-	-	-	-	-		197	218	228	229	226	225	226	225	224	219	209	186	-	-	-	-	-	-	-		
	POST	-	-	-	-	-	-		268	306	285	283	286	290	298	298	300	274	253	216	-	-	-	-	-	-	-		
	CRUSH	N/A	N/A	N/A	N/A	N/A	N/A		71	88	58	53	59	65	72	72	76	55	44	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
LEVEL 2 H POINT	PRE	192	169	-	-	-	-		124	121	120	118	118	118	118	124	121	122	122	125	131	-	-	-	-	160	177	201	
	POST	175	153	-	-	-	-		337	364	372	381	389	387	385	388	405	377	339	257	190	-	-	-	-	162	183	205	
	CRUSH	-17	-16	N/A	N/A	N/A	N/A		213	243	252	263	271	269	267	264	284	255	217	132	59	N/A	N/A	N/A	N/A	2	6	4	
LEVEL 3 MID DOOR	PRE	209	179	-	-	-	-		122	118	118	116	115	115	114	117	118	120	121	125	128	-	-	-	-	146	181	200	223
	POST	187	167	-	-	-	-		301	312	320	326	333	339	346	371	355	348	316	266	187	-	-	-	-	155	192	204	227
	CRUSH	-22	-11	N/A	N/A	N/A	N/A		180	194	203	211	218	224	232	254	237	228	195	141	60	N/A	N/A	N/A	9	12	3	4	
LEVEL 4 WINDOW SILL	PRE	-	-	-	240	210	191		169	163	158	153	150	147	141	147	148	149	153	158	142	156	179	189	202	215	233	253	
	POST	-	-	-	229	202	186		206	247	284	290	293	312	318	349	347	348	347	305	219	200	201	203	215	224	234	255	
	CRUSH	N/A	N/A	N/A	-11	-8	-6		37	84	126	137	143	165	176	203	198	199	195	147	77	44	22	15	13	8	1	2	
LEVEL 5 WINDOW TOP	PRE	-	-	-	-	-	416		390	392	395	398	403	410	423	487	-	-	-	-	-	-	-	-	-	-	-	-	
	POST	-	-	-	-	-	417		302	331	403	392	375	361	361	488	-	-	-	-	-	-	-	-	-	-	-	-	
	CRUSH	N/A	N/A	N/A	N/A	N/A	1	-117	-89	-61	8	-7	-28	-48	-62	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

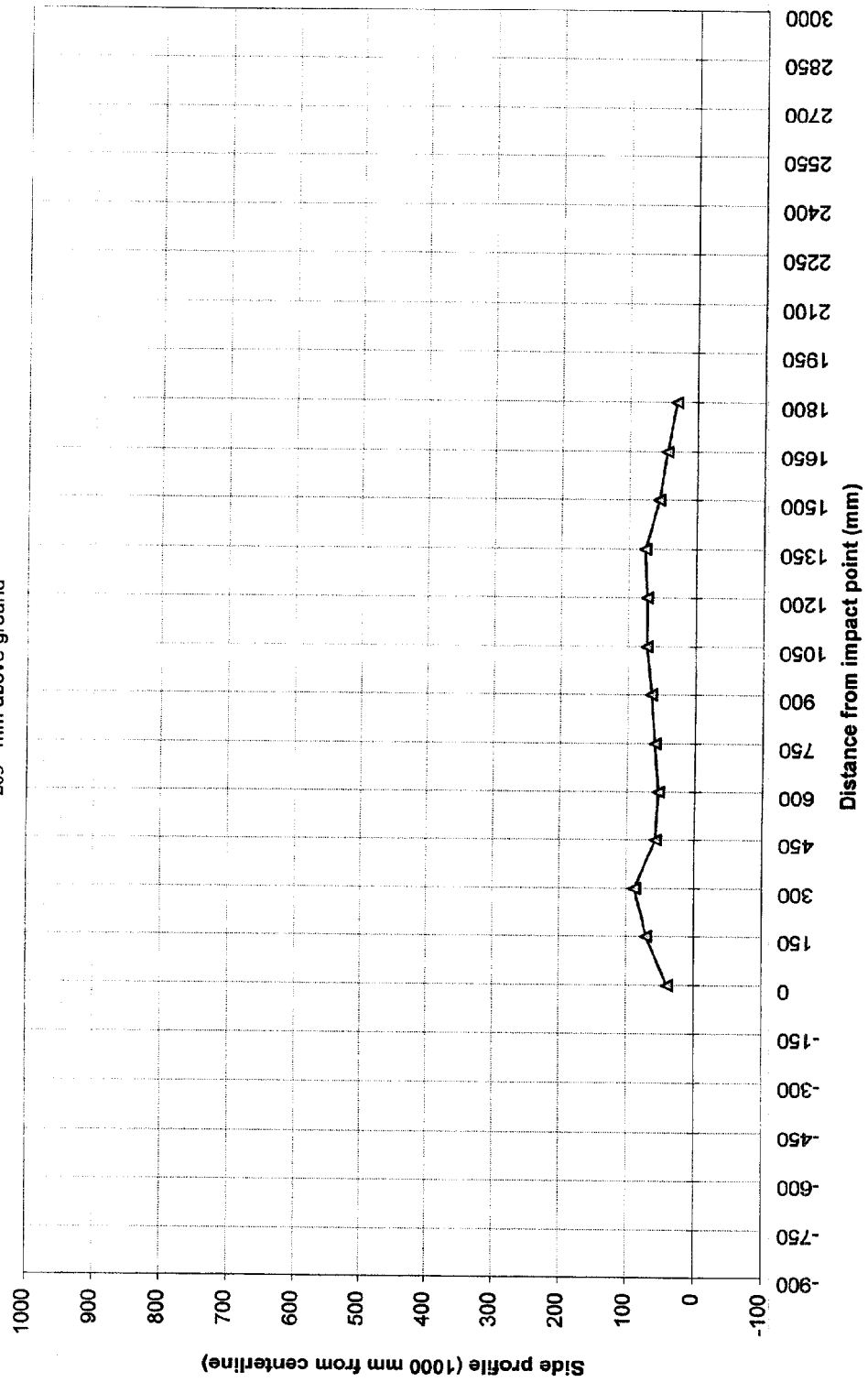
Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

SIDE PROFILE LEVEL 1

203 mm above ground

—▲— CRUSH



DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

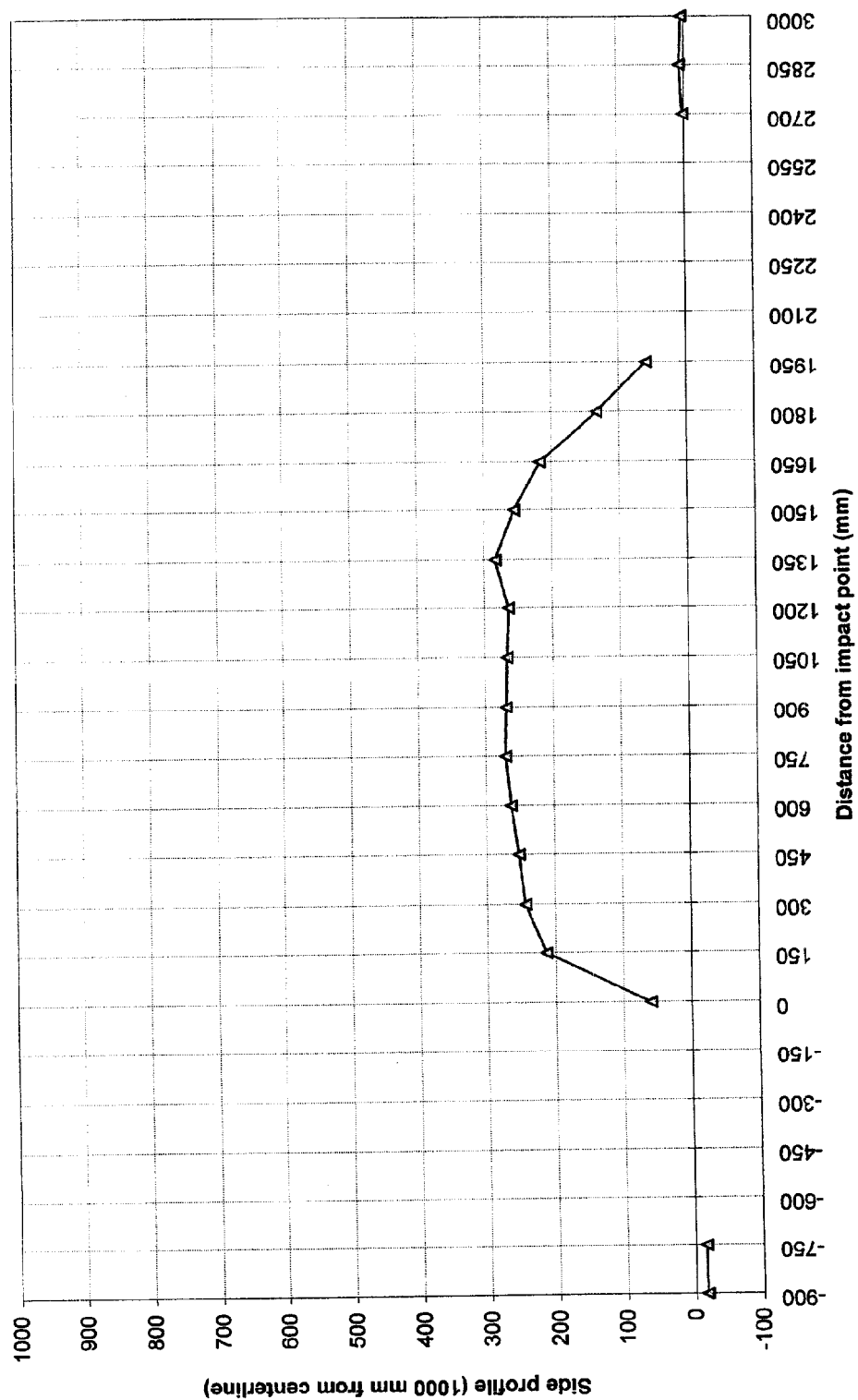
NHTSA No. CX0500

Vehicle: 1999 Saab 9-5

SIDE PROFILE LEVEL 2

480 mm above ground

—▲— CRUSH



DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

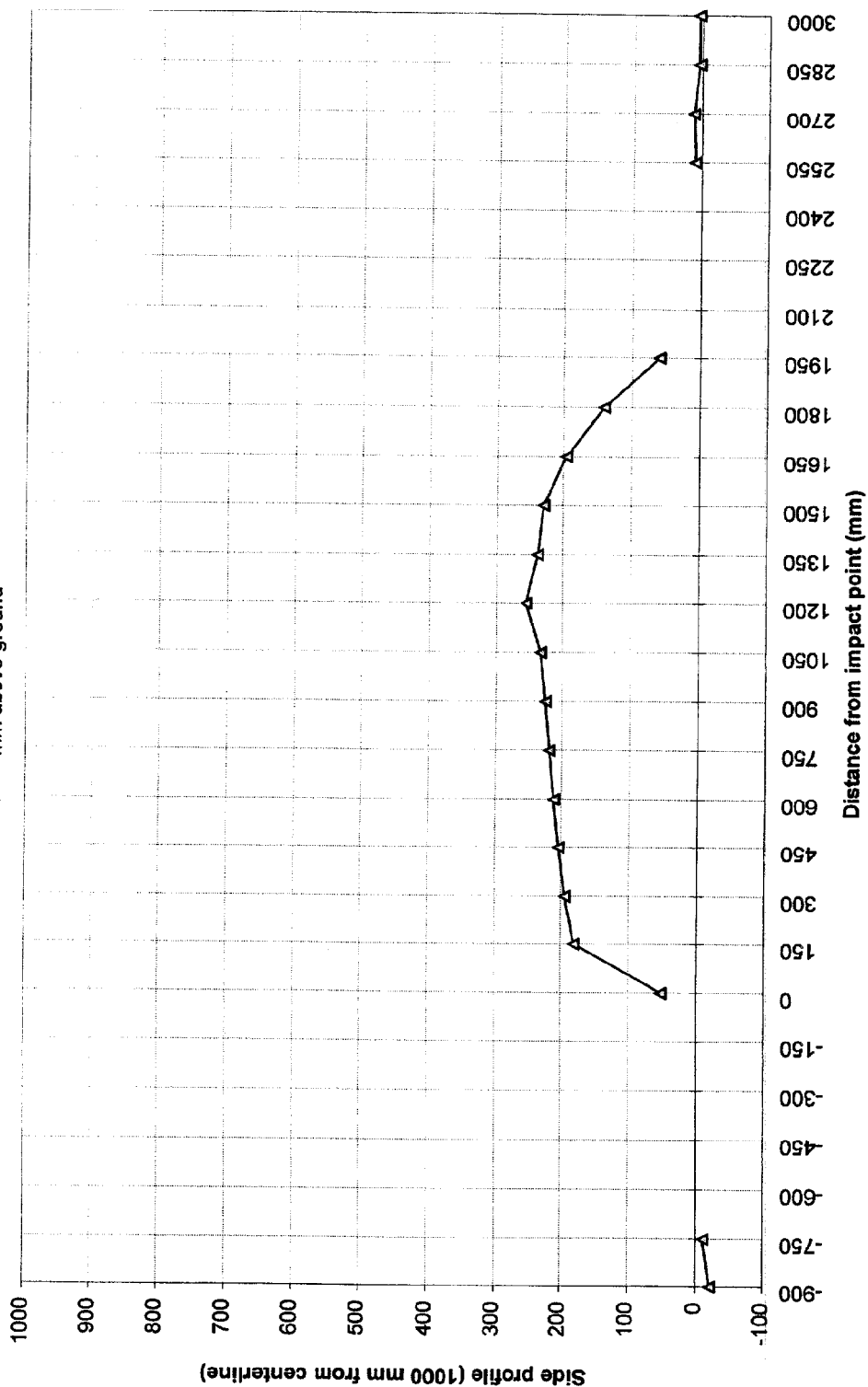
Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

SIDE PROFILE LEVEL 3

574 mm above ground

—▲— CRUSH



DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

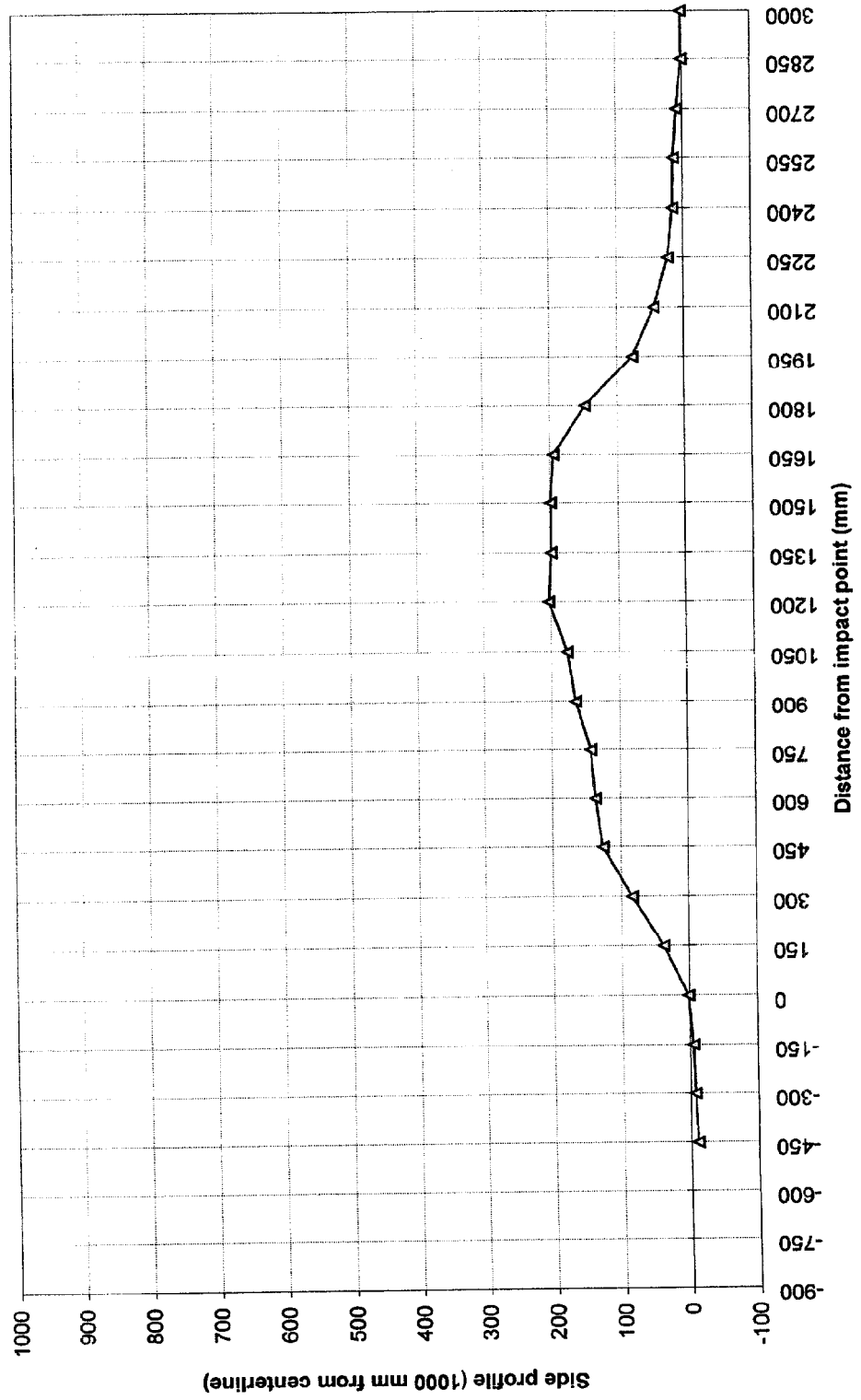
NHTSA No. CX0500

Vehicle: 1999 Saab 9-5

SIDE PROFILE LEVEL 4

838 mm above ground

—▲— CRUSH



DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

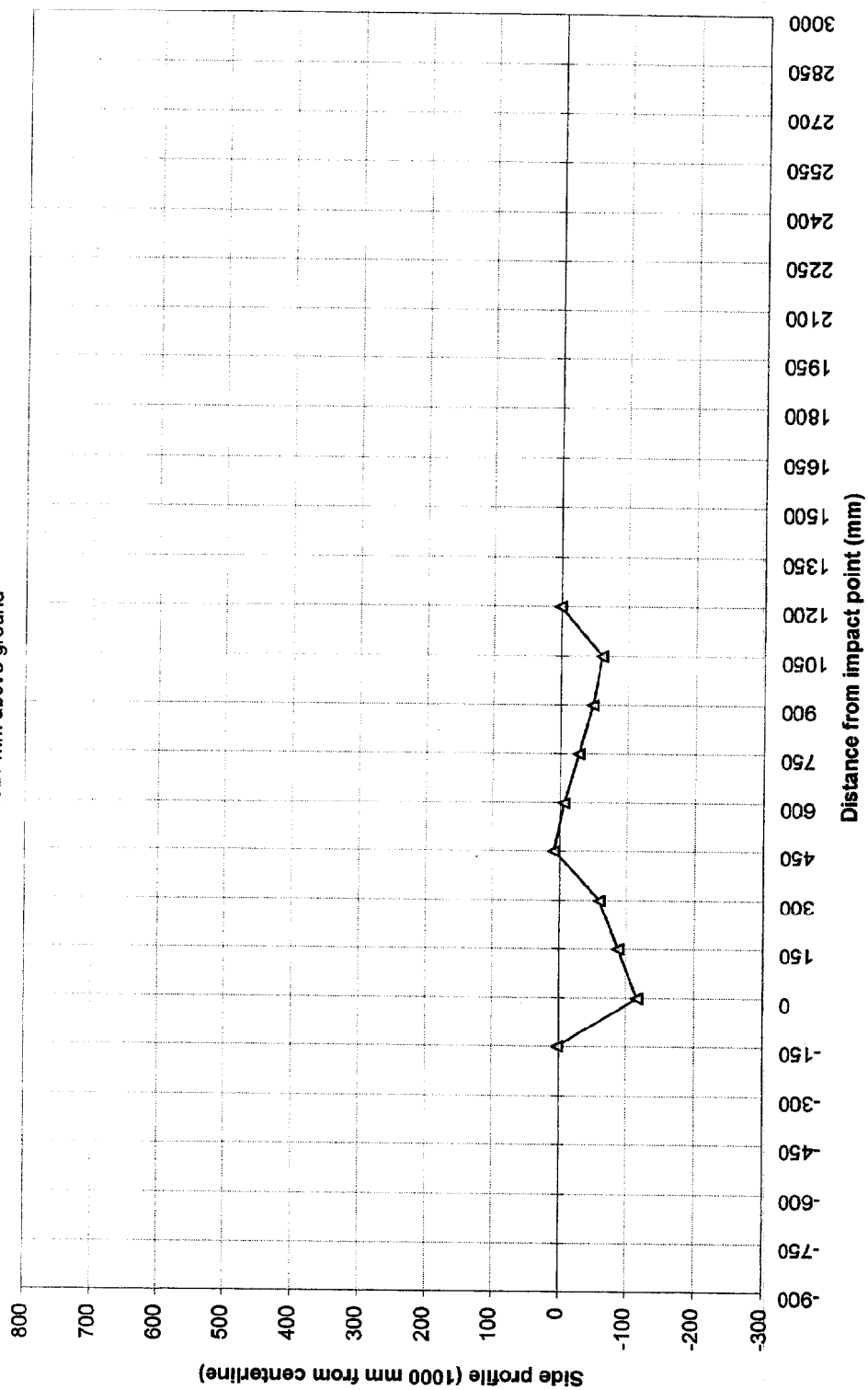
Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

SIDE PROFILE LEVEL 5

1327 mm above ground

—▲— CRUSH

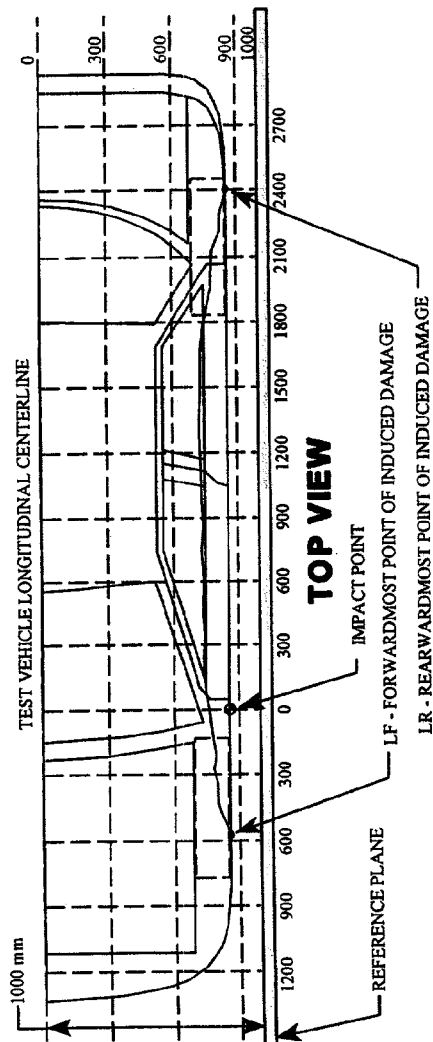


DATA SHEET 11

VEHICLE DAMAGE PROFILE DISTANCES

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500



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

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

DPD MEASUREMENTS		POST TEST (mm)	PRETEST (mm)	STATIC CRUSH (mm)
1	(LF = -75 mm)	183	185	-2
2	428	371	120	251
3	931	387	118	269
4	1434	389	122	267
5	1937	226	143	83
6	(LR = 2440 mm)	207	192	15

DATA SHEET 12

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

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

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

LEVEL	HEIGHT AT CL (mm)*	DISTANCE RIGHT OF CENTER (mm)								DISTANCE LEFT OF CENTER (mm)							
		800	700	600	500	400	300	200	100								
LEVEL 4 TOP STACK	PRE	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619
	POST	648	627	622	611	613	620	627	627	620	624	630	635	649	693	731	756
	CRUSH	29	9	4	-8	-6	1	8	8	1	5	11	17	31	75	113	138
LEVEL 3 MID LEVEL	PRE	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619
	POST	670	645	631	619	621	627	624	624	621	625	625	628	629	641	684	724
	CRUSH	52	27	12	0	2	9	5	5	2	7	7	9	11	22	65	106
LEVEL 2 TOP BUMPER	PRE	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619
	POST	718	694	675	657	653	651	652	651	654	649	654	650	652	652	662	673
	CRUSH	100	75	56	39	35	32	32	32	36	31	36	32	34	33	44	55
LEVEL 1 MID BUMPER	PRE	535	519	518	518	518	518	518	518	518	518	518	518	518	518	519	535
	POST	668	635	606	583	575	571	565	565	565	562	567	564	565	571	588	604
	CRUSH	133	116	88	65	57	53	47	47	47	44	49	46	47	52	69	70

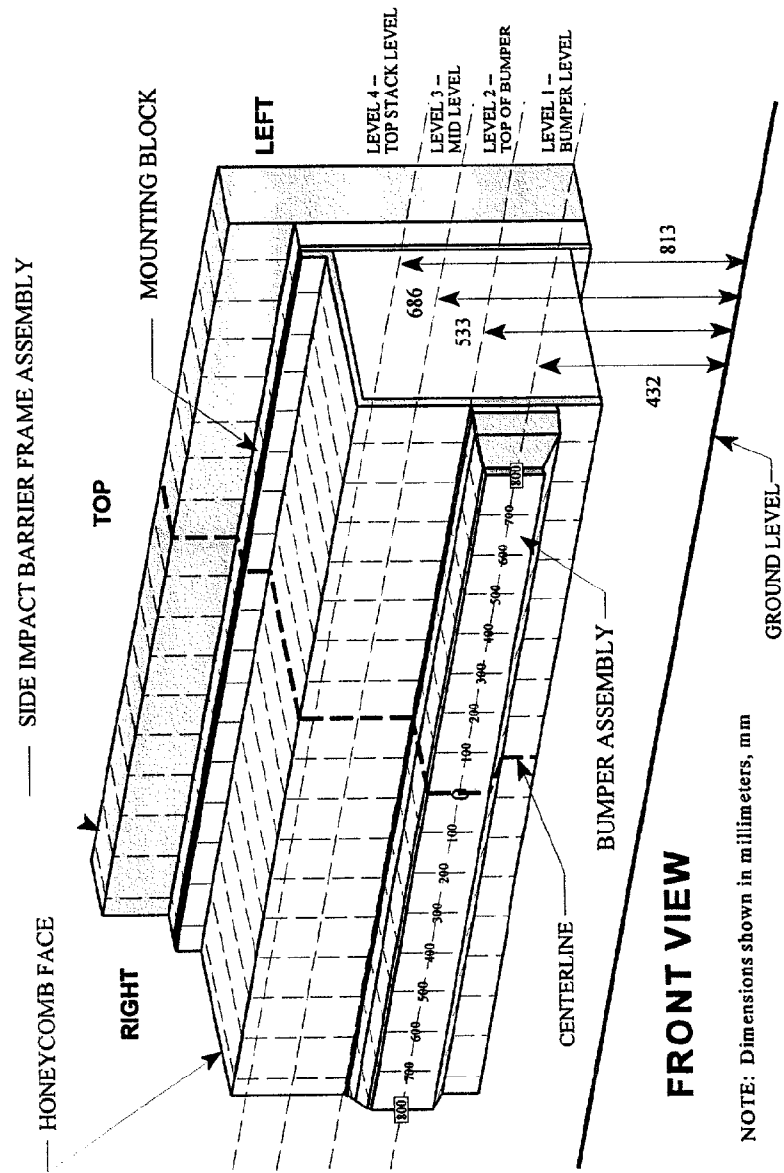
*Heights measured above ground level.

DATA SHEET 12 (continued)

EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

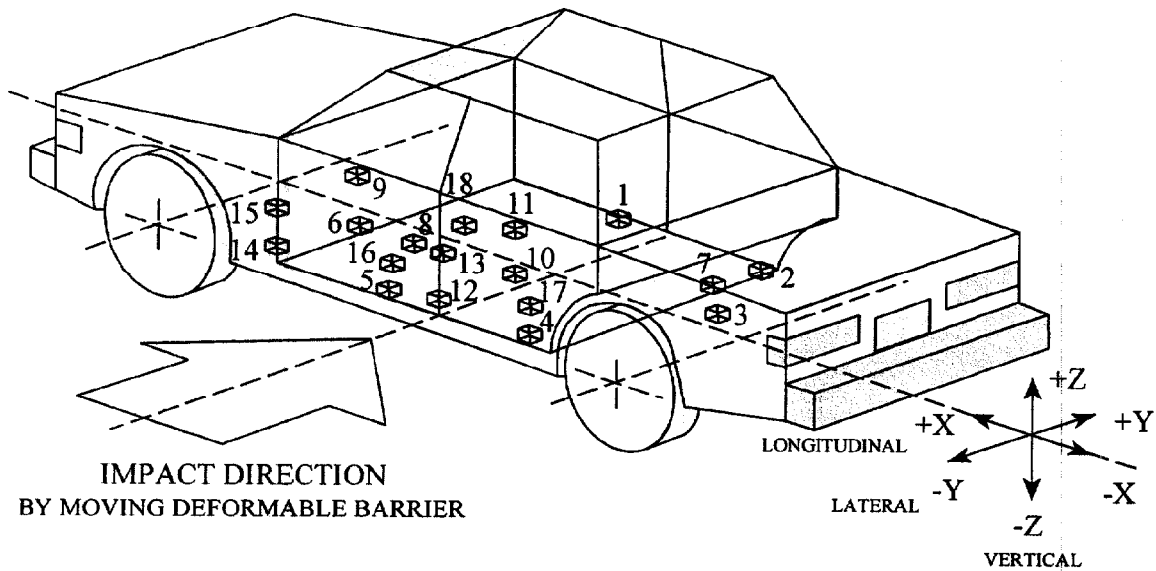


DATA SHEET 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500



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

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

DATA SHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

Accel. No.	Location	Coordinates (mm) ± 3			Long. (x)		Lat. (y)		Vert. (z)		Resultant	
		X*	Y*	Z*	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
1	Right Side Sill at Front Seat	2121	710	190	†	†	18.9 -3.5	7.1 135.1	3.8 -5.3	44.9 10.8	†	†
2	Right Side Sill at Rear Seat	2983	710	193	2.9 -5.2	55.4 17.5	24.5 -2.2	8.0 135.8	3.9 -5.1	37.2 10.9	24.8 -	8.0 -
3	Rear Floorpan Above Axle	1224	0	458	2.0 -7.4	85.0 21.8	21.8 -1.7	7.9 98.8	†	†	†	†
4	Left Side Sill at Rear Seat	2121	-656	247	-	-	39.9 -8.2	7.1 34.2	-	-	-	-
5	Left Side Sill at Front Seat	2983	-655	288	-	-	††	††	-	-	-	-
6**	Left Front Door on Centerline	-	-	-	-	-	-	-	-	-	-	-
7	Right Rear Occupant Compartment	2027	471	217	-	-	23.1 -2.0	7.7 139.7	-	-	-	-
8**	Midrear of Left Front Door	-	-	-	-	-	-	-	-	-	-	-
9**	Left Front Door Upper Centerline	-	-	-	-	-	-	-	-	-	-	-
10**	Midrear of Left Rear Door	-	-	-	-	-	-	-	-	-	-	-
11**	Left Rear Door Upper Centerline	-	-	-	-	-	-	-	-	-	-	-

*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To Right)

Z - Ground Level (+ Up)

**Accelerometer was not requested by COITR.

† Transducer circuit opened during the impact.

†† Data not available, transducer was damaged at impact.

DATA SHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

Accel. No.	Location	Coordinates (mm) ± 3			Long. (x)		Lat. (y)		Vert. (z)		Resultant	
		X*	Y*	Z*	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
12	Left Lower B-Pillar	2353	734	525	pos. neg.	-	++	++	-	-	-	-
13	Left Middle B-Pillar	2270	729	790	pos. neg.	-	146.1 -35.1	3.9 16.5	-	-	-	-
14	Left Lower A-Pillar	3255	749	472	pos. neg.	-	177.1 -48.9	5.4 10.1	-	-	-	-
15	Left Middle A-Pillar	3454	-677	809	pos. neg.	-	15.0 -2.8	14.5 137.0	-	-	-	-
16	Front Seat Track	2372	-519	270	pos. neg.	-	45.2 -20.9	17.0 31.9	-	-	-	-
17	Rear Seat Track	-	-	-	pos. neg.	-	**	**	-	-	-	-
18	Vehicle CG	2348	0	472	pos. neg.	5.3 -7.9	21.4 9.4	111.4 -15.7	19.4 -17.0	26.6 20.1	112.6 -	20.9 -

*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To Right)

Z - Ground Level (+ Up)

** No accessible mounting location.

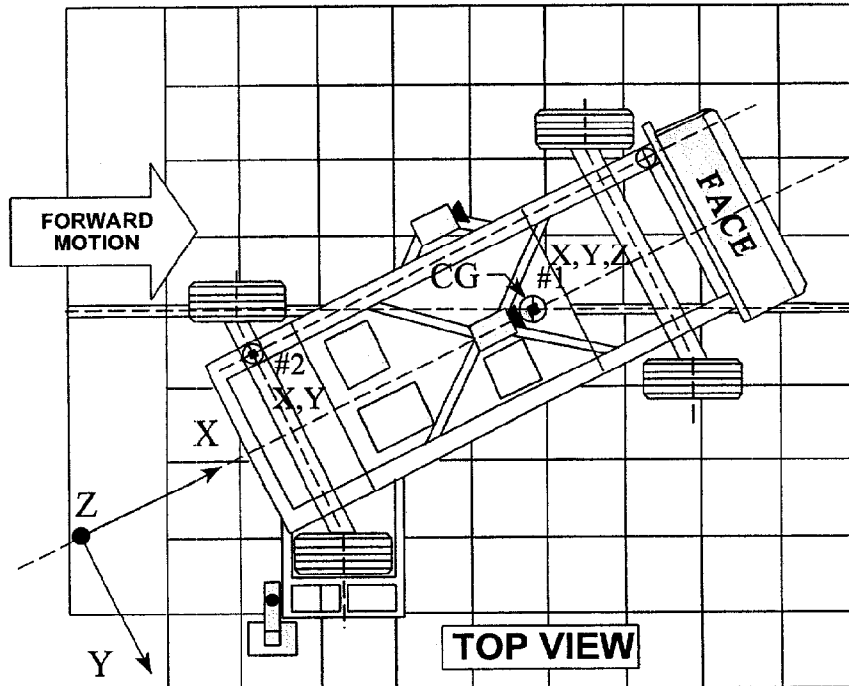
†† Data not available, transducer was damaged at impact.

DATA SHEET 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500



Accel. No.	Location	Coordinates (millimeters)			Pos. Direct.		Neg. Direct.	
		X*	Y*	Z*	Max (g)	Time (msec)	Max (g)	Time (msec)
1	MDB Center of Gravity							
	Longitudinal... X	1859	0	330	1.1	91.5	-18.0	40.8
	Lateral..... Y				2.4	53.1	-7.9	24.4
	Vertical..... Z				12.1	53.6	-11.8	58.0
	Resultant..... R				19.5	47.6	-	-
2	Rear Frame Member							
	Longitudinal... X	386	-660	660	1.6	139.3	-20.7	28.8
	Lateral..... Y				3.8	16.4	-3.3	56.4

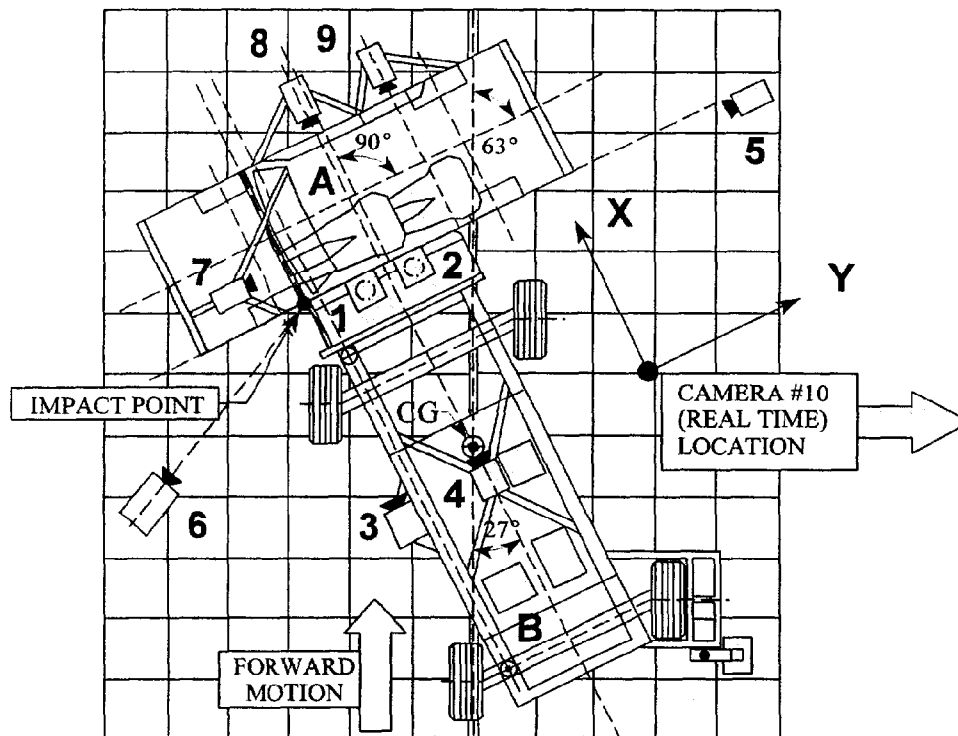
*Reference: X = Rear Bumper (+ Forward)
Y = Vehicle Centerline (+ To Right)
Z = Ground Level (+ Up)
All measurements accurate to within ± 3 mm.

DATA SHEET 15

HIGH SPEED CAMERA LOCATIONS AND DATA SUMMARY

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500



Camera No.	View	Coordinates (millimeters)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Overhead view of test vehicle	509	1020	4880	-88	8	1000
2	Overhead closeup view of impact plane	279	918	4880	-90	12.5	1000
3	MDB onboard closeup view of impact point	1470	0	847	0	13	1010
4	MDB onboard view of driver dummy	1140	838	1586	-17	7.5	1000
5	Right side ground level overall view	-166	9245	1045	-3	25	1000
6	Left side ground level overall view	-1609	-1648	1055	-8	13	1000
7	Test vehicle onboard driver front view	530	-342	1191	-14	13	1000
8	Test vehicle onboard driver side view	1738	799	988	-14	8	1000
9	Test vehicle onboard passenger side view	1738	1672	1008	-11	8	1000
10	Real time film coverage of test	-	-	-	-	-	24

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

+X = Forward

+Y = To Right

+Z = Upward

SECTION 5

FUEL SYSTEM INTEGRITY

DATA SHEET 16

FMVSS 301 FUEL SYSTEM INTEGRITY DATA

NHTSA No.: CX0500

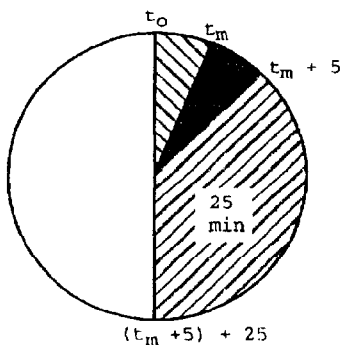
TEST DATE: September 25, 1998

Vehicle Mfgr./Make/Model : 1999 Saab 9-5 4-Door Sedan

TEST VEHICLE IMPACT TYPE :

- Frontal (48.28 kph)
- Oblique (48.28 kph) with ° barrier face first
contacting the side
(driver/passenger)
- Rear Moving Barrier (48.28 kph)
- Lateral Moving Barrier (32.19 kph)
- X Side Impact Moving Deformable Barrier (53.91 kph)
contacting the driver side side
(driver/passenger)

FUEL SPILLAGE MEASUREMENT:



1. From impact until vehicle motion ceases
2. For five minute period after vehicle motion ceases
3. For next 25 minutes

ACTUAL	MAX ALLOWED
0 g	28 g
0 g	142 g
0 g	28 g/1 min.

SOLVENT SPILLAGE DETAILS :

None

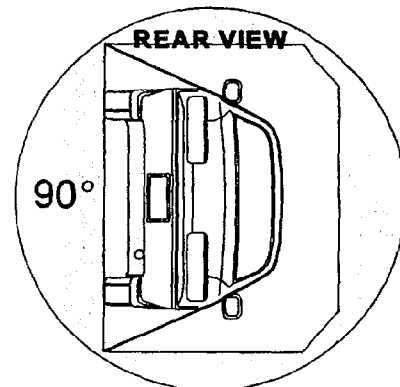
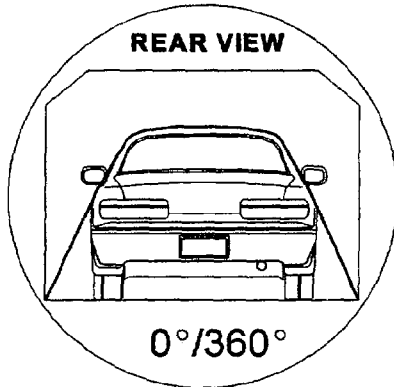
DATA SHEET 17

ROLLOVER DATA

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

0 - 90 Degrees



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time	<u>1</u> minutes <u>11</u> seconds
(Spec. Range = 1 to 3 minutes)	
FMVSS 301 Position Hold Time +	<u>5</u> minutes <u>0</u> seconds
	<u>6</u> minutes <u>11</u> seconds
TOTAL	<u>7</u> minutes
Next whole minute interval	

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

First 5 minutes FROM onset of rotation	6th min.	7th min.	8th min. (if required)
--	----------	----------	------------------------

(2) Maximum Allowable Solvent Spillage

142 g	28 g	28 g	28 g
-------	------	------	------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0 g	0 g	0 g	N/A
-----	-----	-----	-----

Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S) :

None

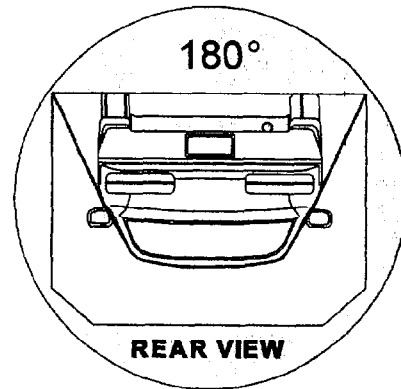
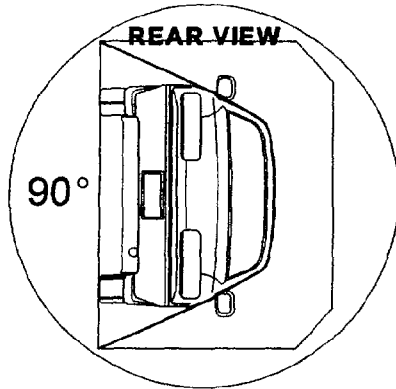
DATA SHEET 17 (continued)

ROLLOVER DATA

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

90 - 180 Degrees



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

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

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

First 5 minutes FROM onset of rotation	6th min.	7th min.	8th min. (if required)
--	----------	----------	------------------------

(2) Maximum Allowable Solvent Spillage

142 g	28 g	28 g	28 g
-------	------	------	------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0 g	0 g	0 g	N/A
-----	-----	-----	-----

Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S) :

None

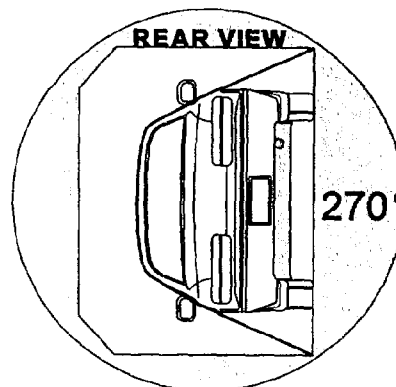
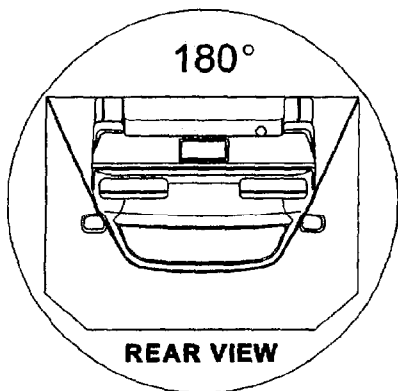
DATA SHEET 17 (continued)

ROLLOVER DATA

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

180 - 270 Degrees



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

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

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

First 5 minutes FROM onset of rotation	6th min.	7th min.	8th min. (if required)
--	----------	----------	------------------------

(2) Maximum Allowable Solvent Spillage

142 g	28 g	28 g	28 g
-------	------	------	------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0 g	0 g	0 g	N/A
-----	-----	-----	-----

Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S) :

None

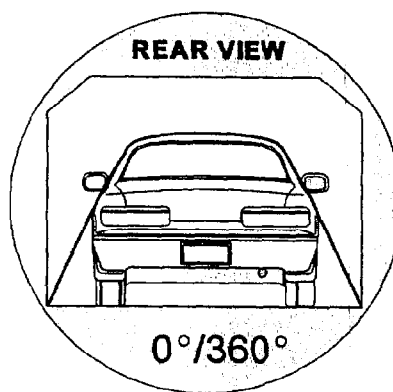
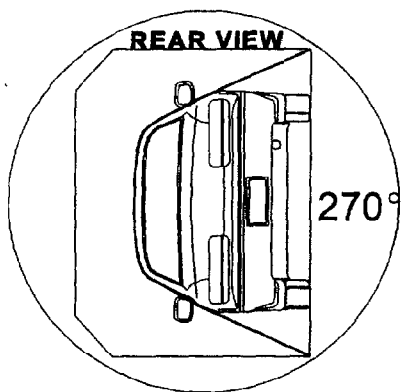
DATA SHEET 17 (continued)

ROLLOVER DATA

Vehicle: 1999 Saab 9-5

NHTSA No. CX0500

270 - 360 Degrees



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

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

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

First 5 minutes FROM onset of rotation	6th min.	7th min.	8th min. (if required)
--	----------	----------	------------------------

(2) Maximum Allowable Solvent Spillage

142 g	28 g	28 g	28 g
-------	------	------	------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0 g	0 g	0 g	N/A
-----	-----	-----	-----

Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S) :

None

APPENDIX A

PHOTOGRAPHS

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Figure A- 3	PRE-TEST REAR VIEW OF TEST VEHICLE	A- 5
Figure A- 4	POST-TEST REAR VIEW OF TEST VEHICLE	A- 6
Figure A- 5	PRE-TEST IMPACTED SIDE VIEW OF TEST VEHICLE	A- 7
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Figure A- 21	PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID	A- 23
Figure A- 22	POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID	A- 24
Figure A- 23	PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID	A- 25
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Figure A- 32	CLOSE-UP VIEW OF VEHICLE'S CERTIFICATION LABEL	A- 34
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Figure A- 35	ROLLOVER 90 DEGREES	A- 37
Figure A- 36	ROLLOVER 180 DEGREES	A- 38
Figure A- 37	ROLLOVER 270 DEGREES	A- 39
Figure A- 38	ROLLOVER 360 DEGREES	A- 40

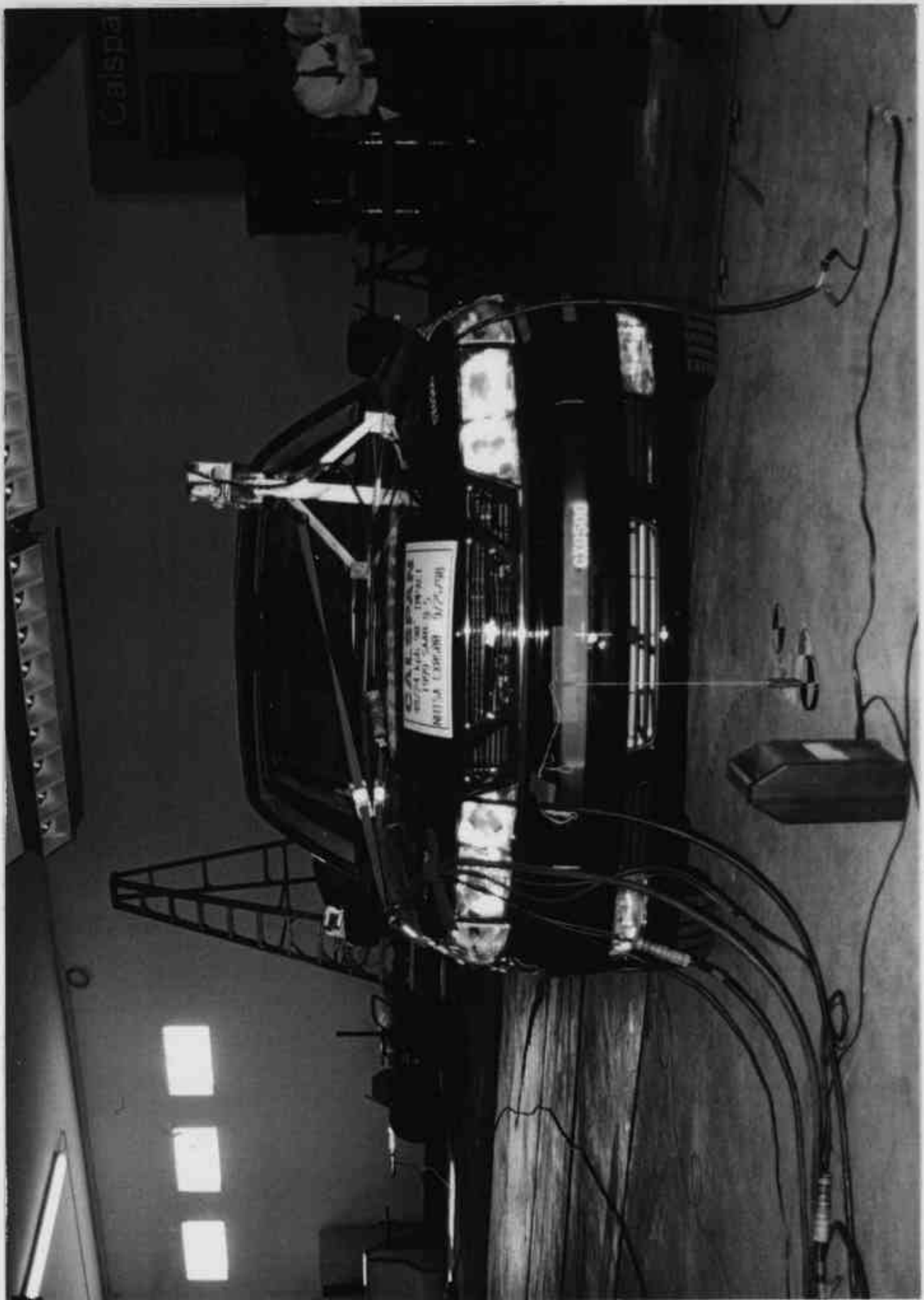


Figure A-1 PRE-TEST FRONTAL VIEW OF TEST VEHICLE



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



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



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

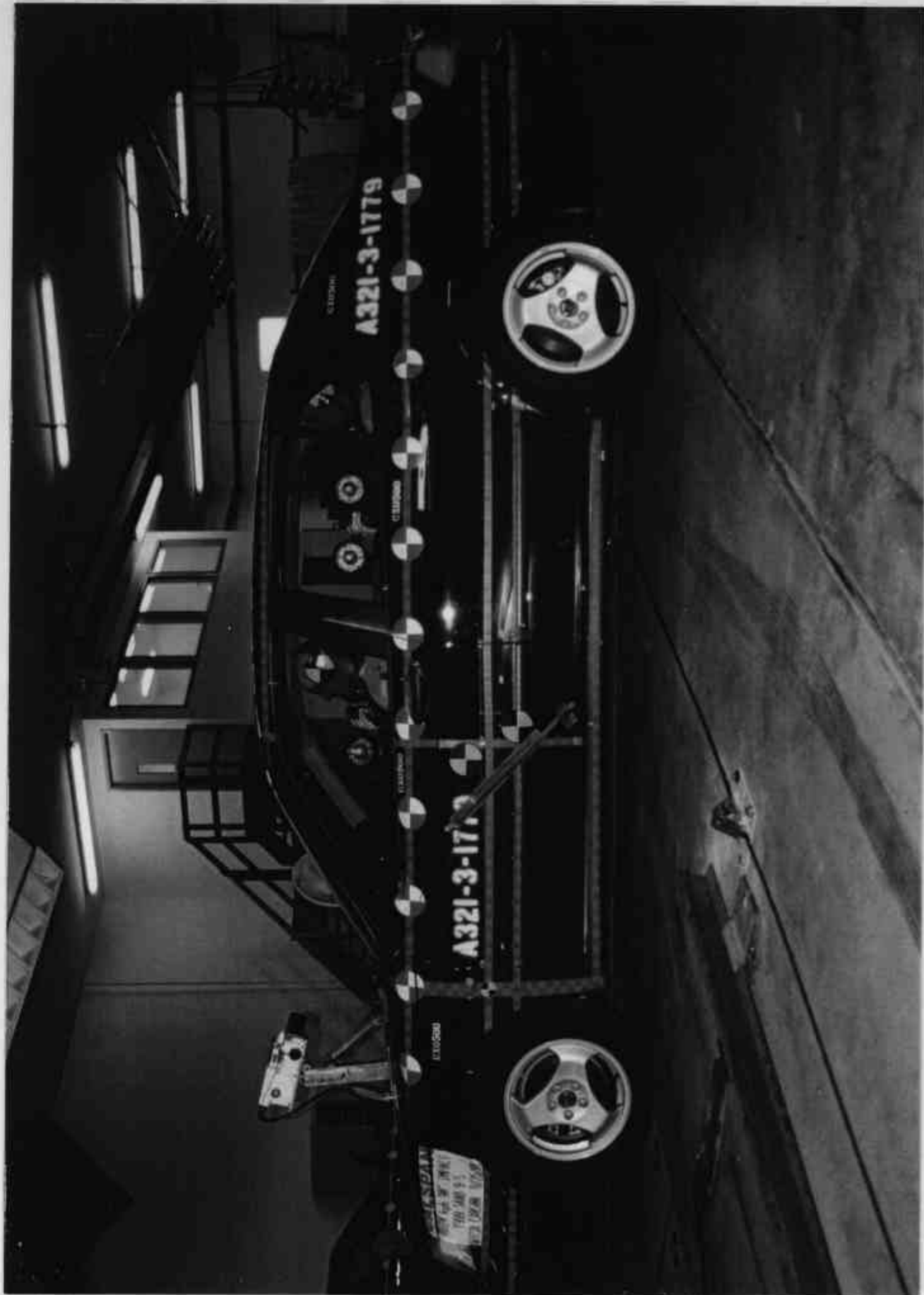


Figure A-5 PRE-TEST IMPACTED SIDE VIEW OF TEST VEHICLE

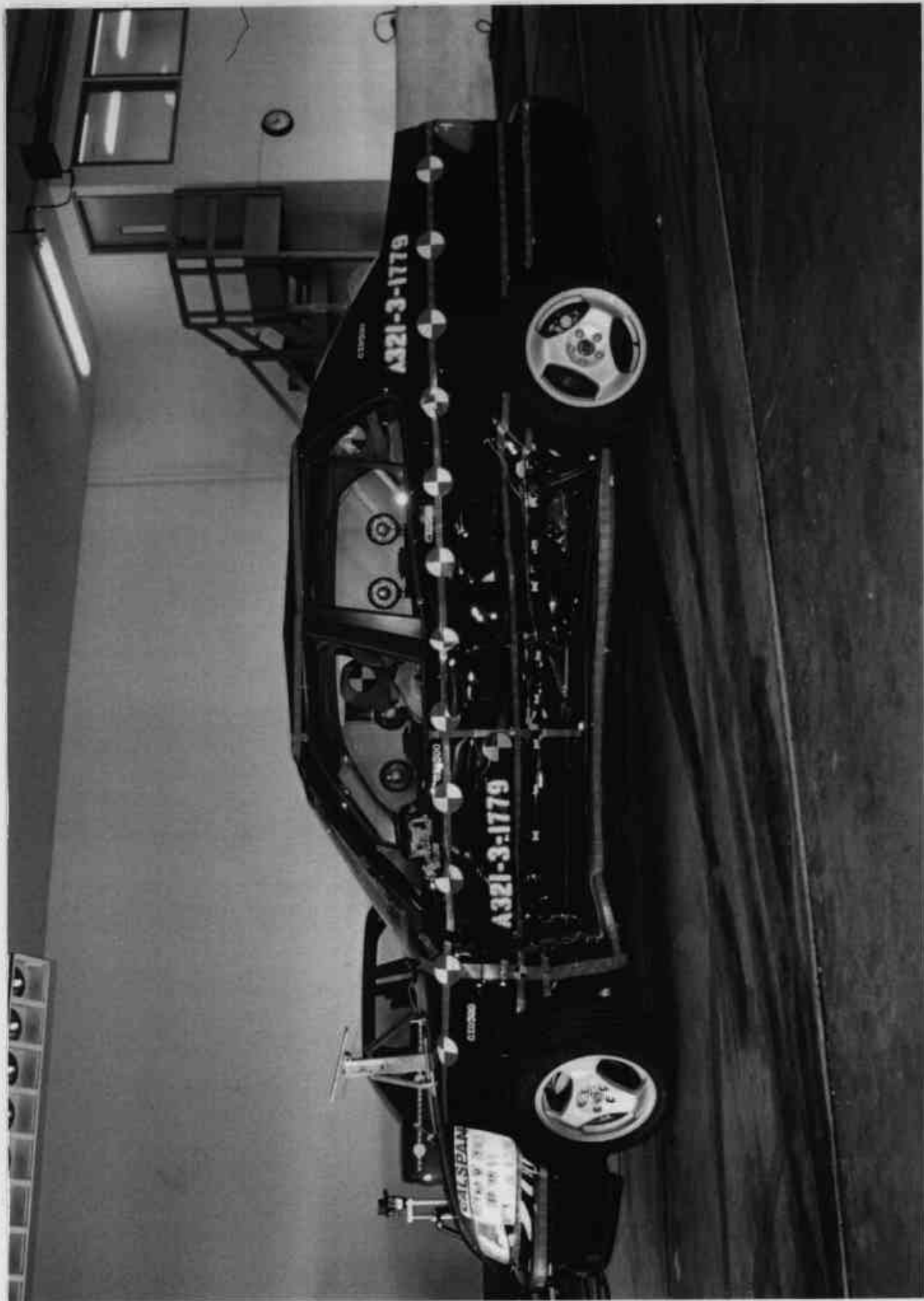


Figure A-6 POST-TEST IMPACTED SIDE VIEW OF TEST VEHICLE



Figure A-7 PRE-TEST FRONTAL VIEW OF IMPACTOR FACE

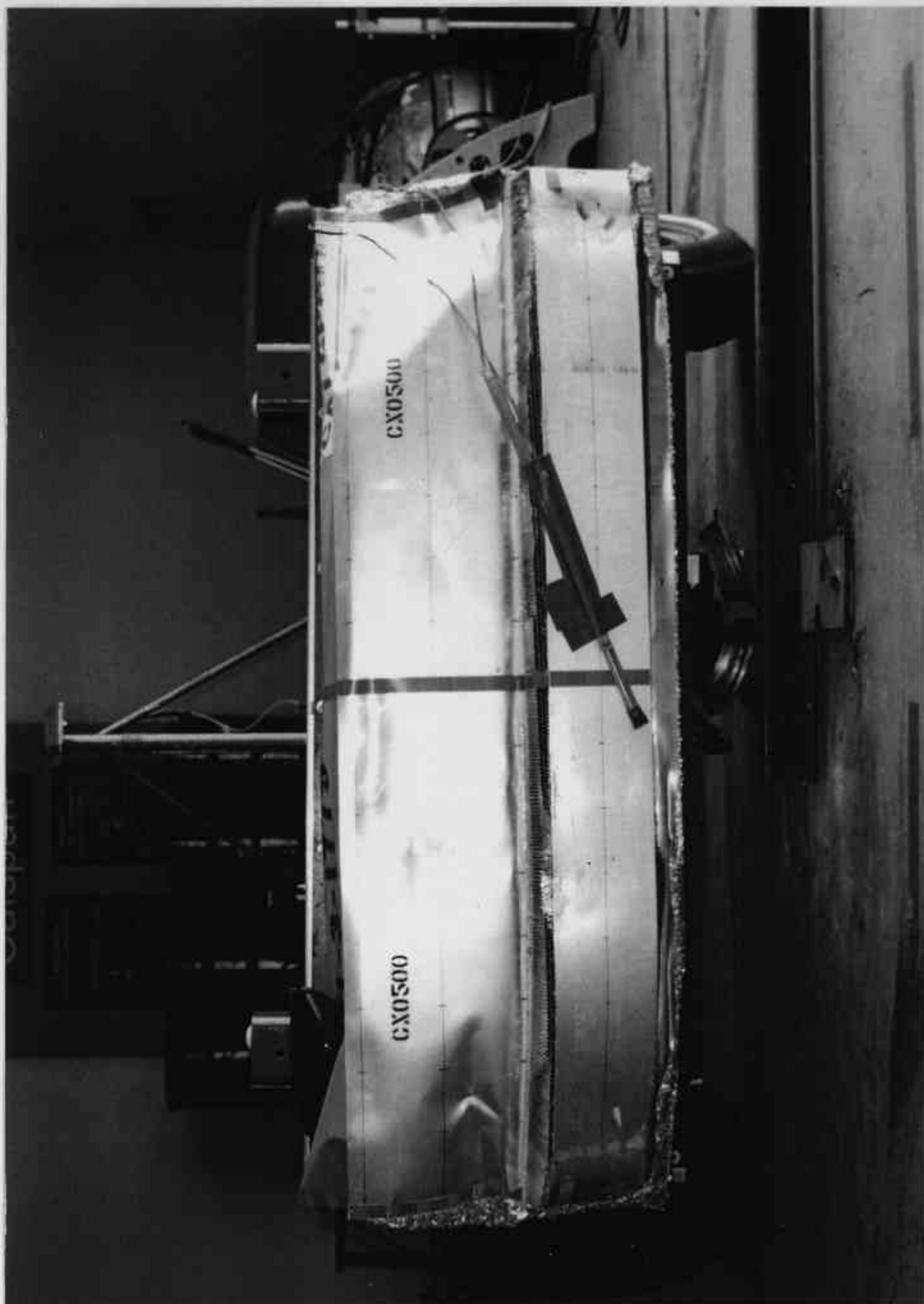


Figure A-8 POST-TEST FRONTAL VIEW OF IMPACTOR FACE

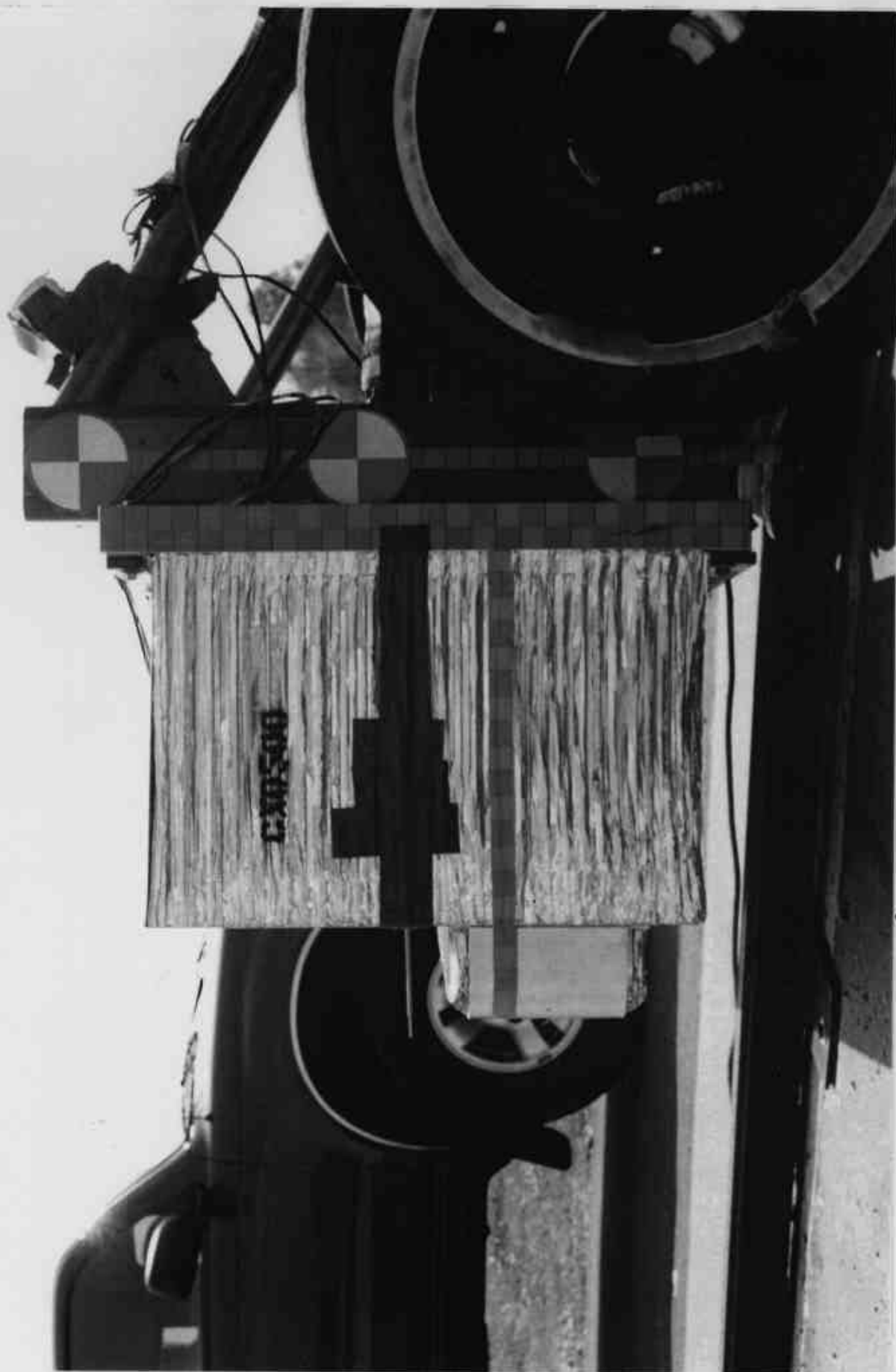


Figure A-9 PRE-TEST LEFT SIDE VIEW OF IMPACTOR FACE

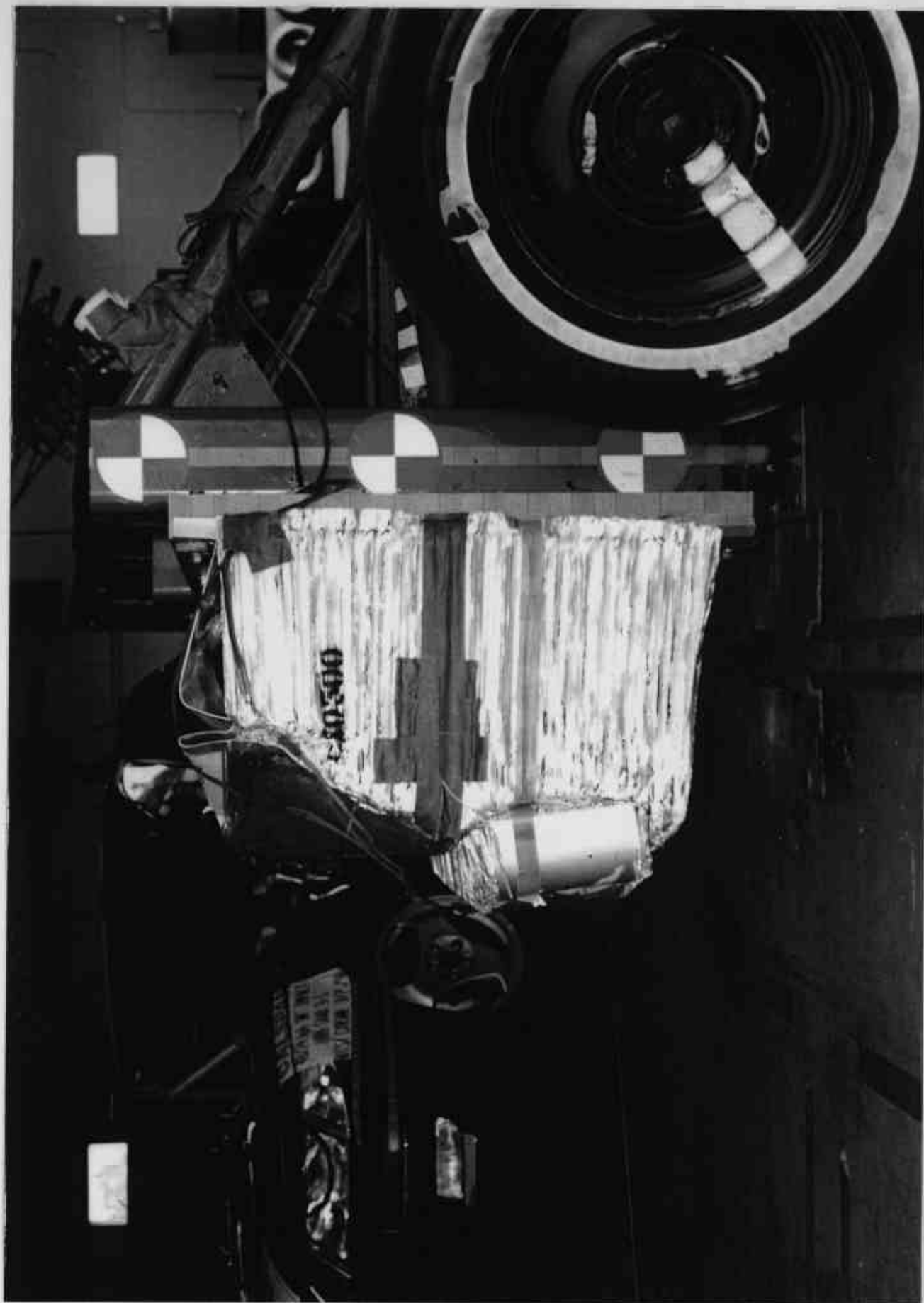


Figure A-10 POST-TEST LEFT SIDE VIEW OF IMPACTOR FACE



Figure A-11 PRE-TEST RIGHT SIDE VIEW OF IMPACTOR FACE



Figure A-12 POST-TEST RIGHT SIDE VIEW OF IMPACTOR FACE



Figure A-13 PRE-TEST TOP VIEW OF IMPACTOR FACE



Figure A-14 POST-TEST TOP VIEW OF IMPACTOR FACE



Figure A-15 PRE-TEST OVERHEAD VIEW OF ALIGNED MDB AND VEHICLE

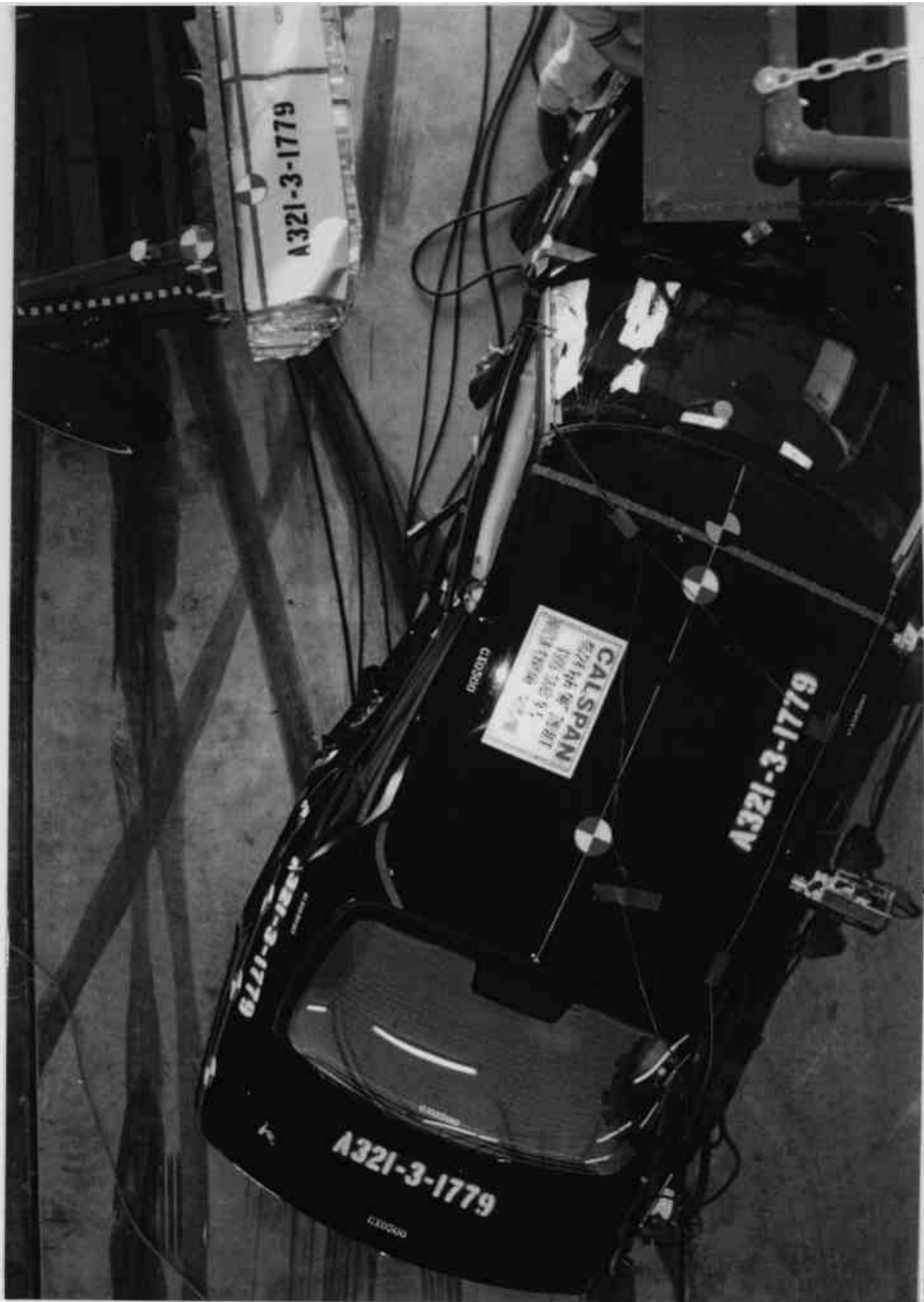


Figure A-16 POST-TEST OVERHEAD VIEW OF MDB AND VEHICLE

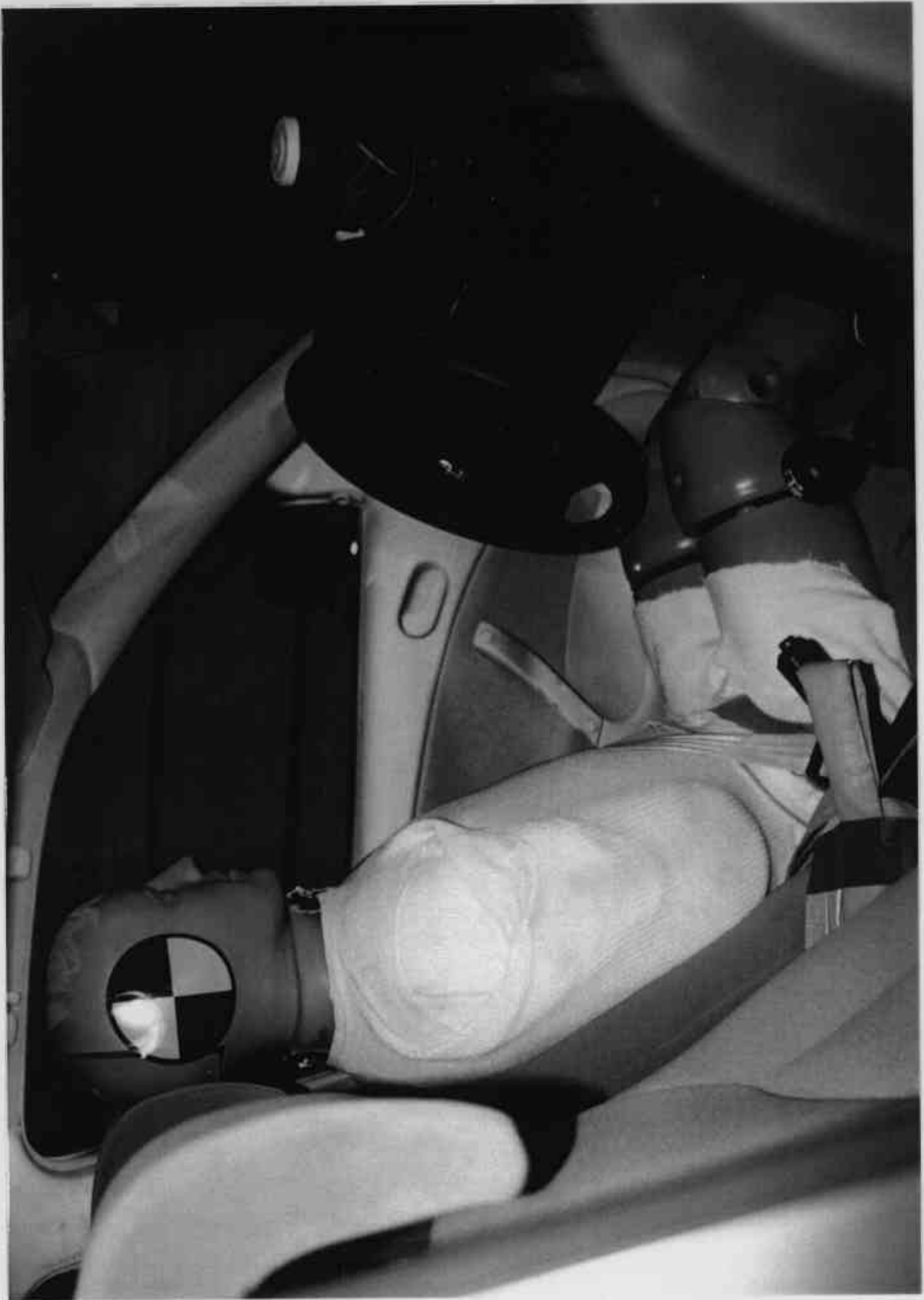


Figure A-17 PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID

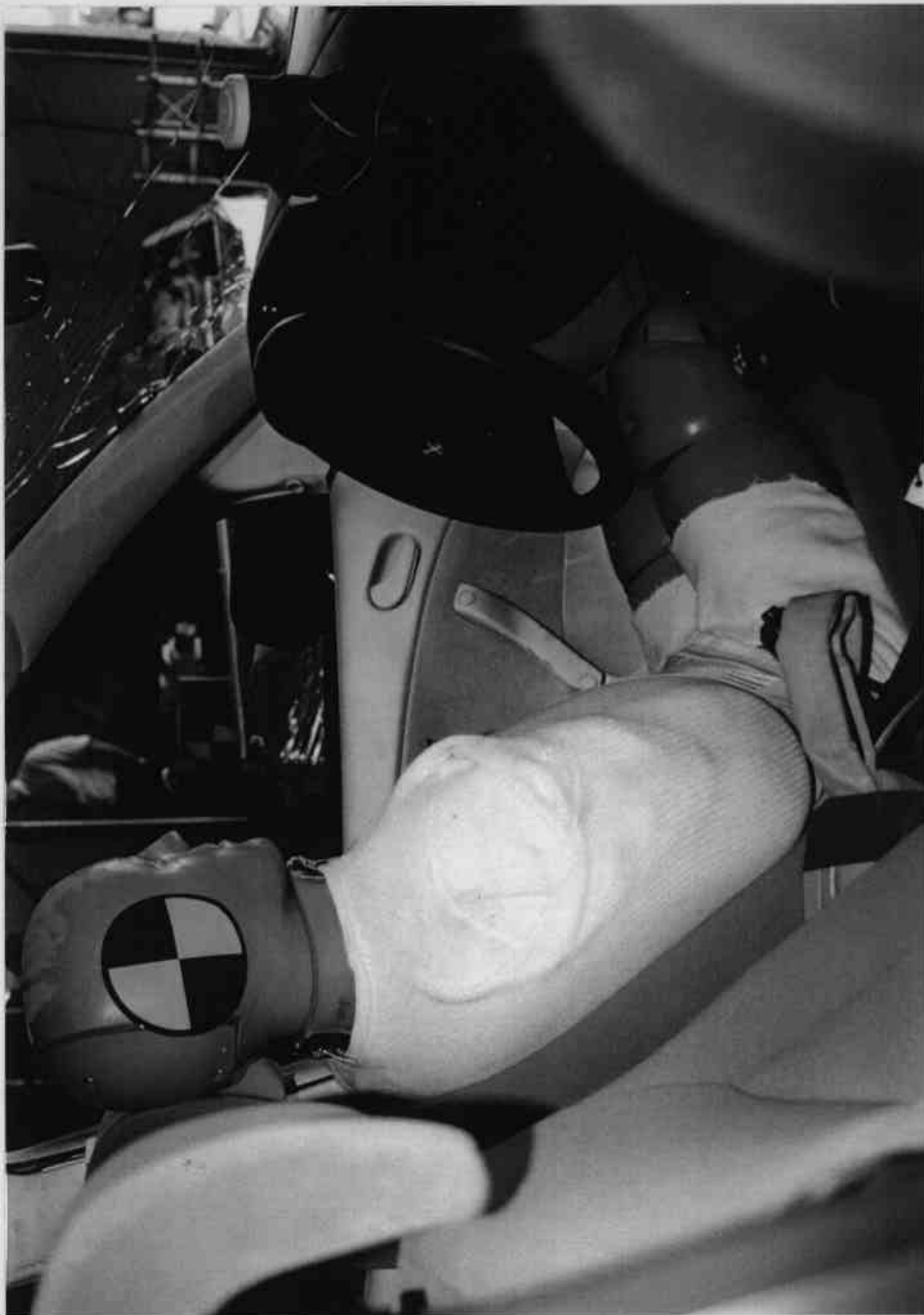


Figure A-18 POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID



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



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



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



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



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



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



Figure A-25 PRE-TEST INTERIOR OF FRONT DOOR

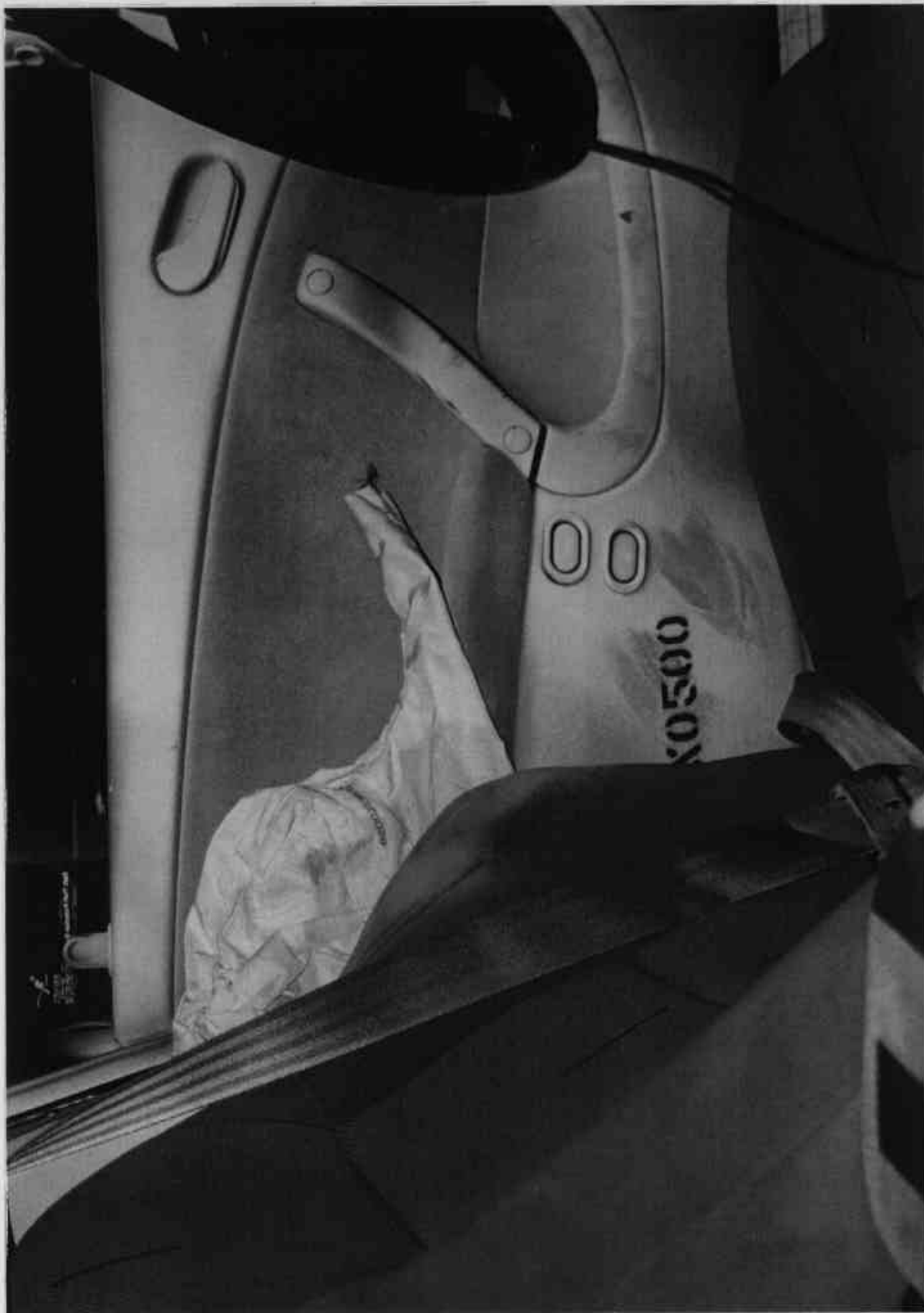


Figure A-26 POST-TEST INTERIOR OF FRONT DOOR SHOWING SID IMPACT LOCATIONS

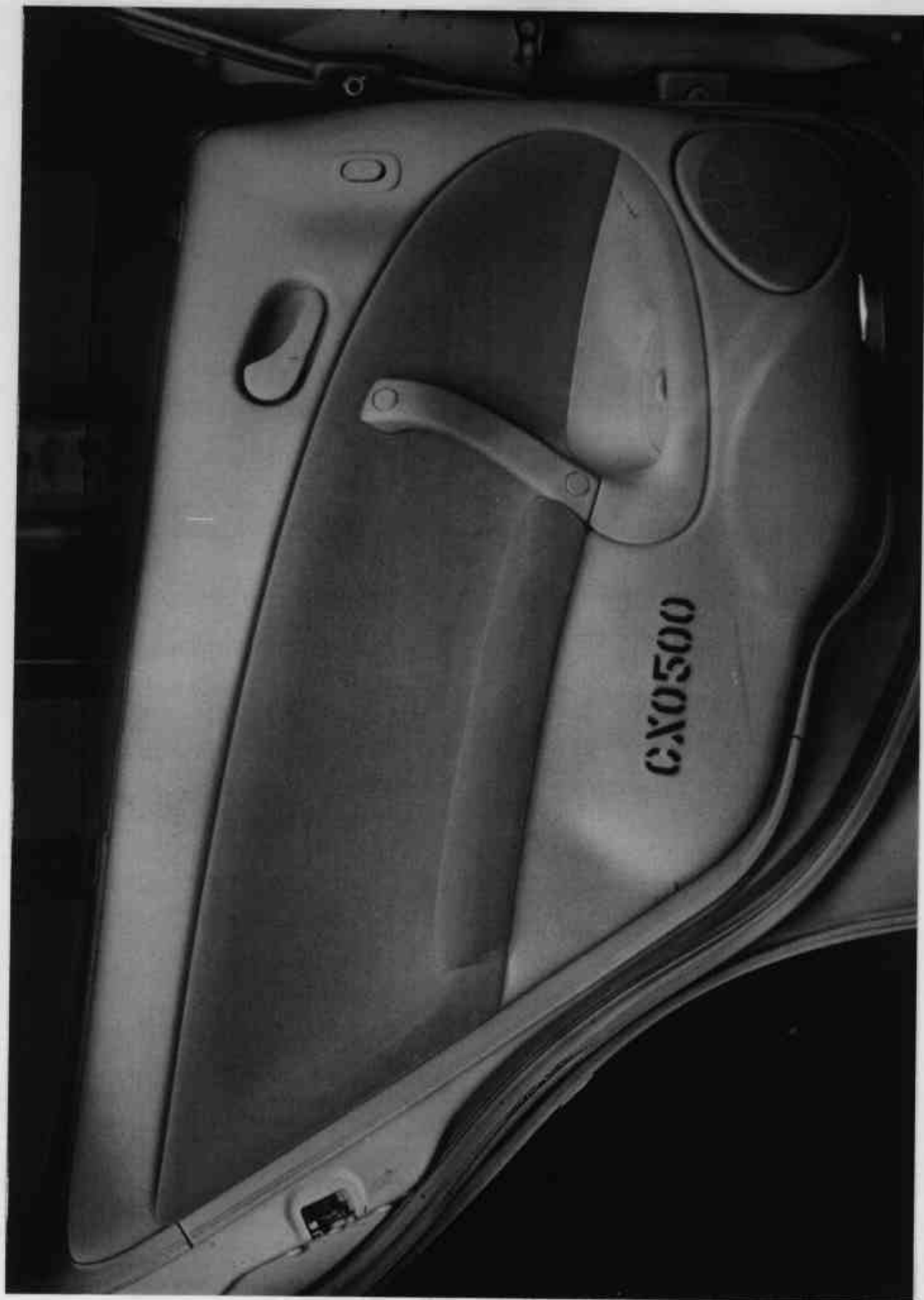


Figure A-27 PRE-TEST INTERIOR OF REAR DOOR



Figure A-28 POST-TEST INTERIOR OF REAR DOOR SHOWING SID IMPACT LOCATIONS



Figure A-29 PRE-TEST LEFT SIDE VIEW OF MDB WITH IMPACTOR FACE IN POSITION

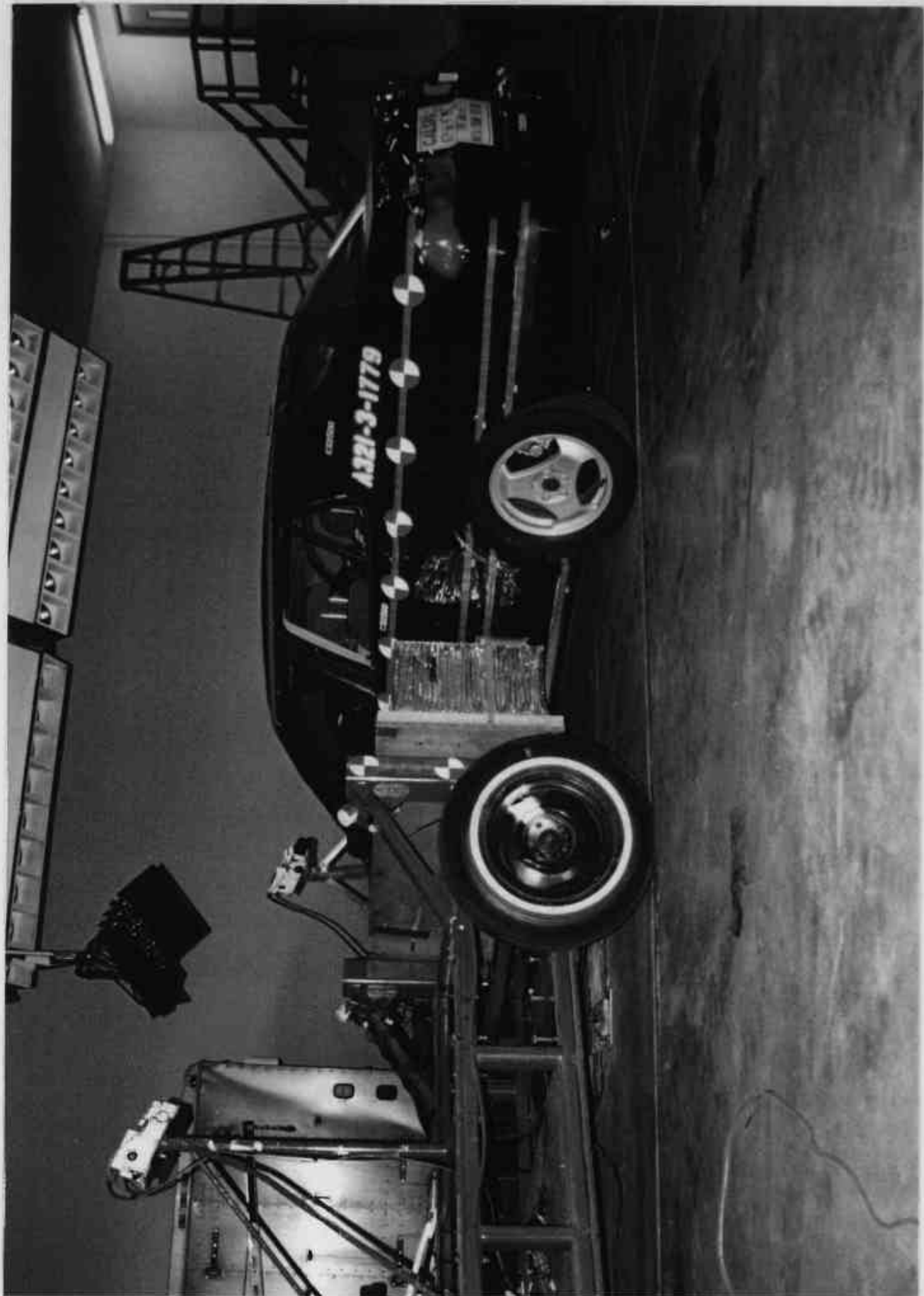


Figure A-30 PRE-TEST RIGHT SIDE VIEW OF MDB WITH IMPACTOR FACE IN POSITION

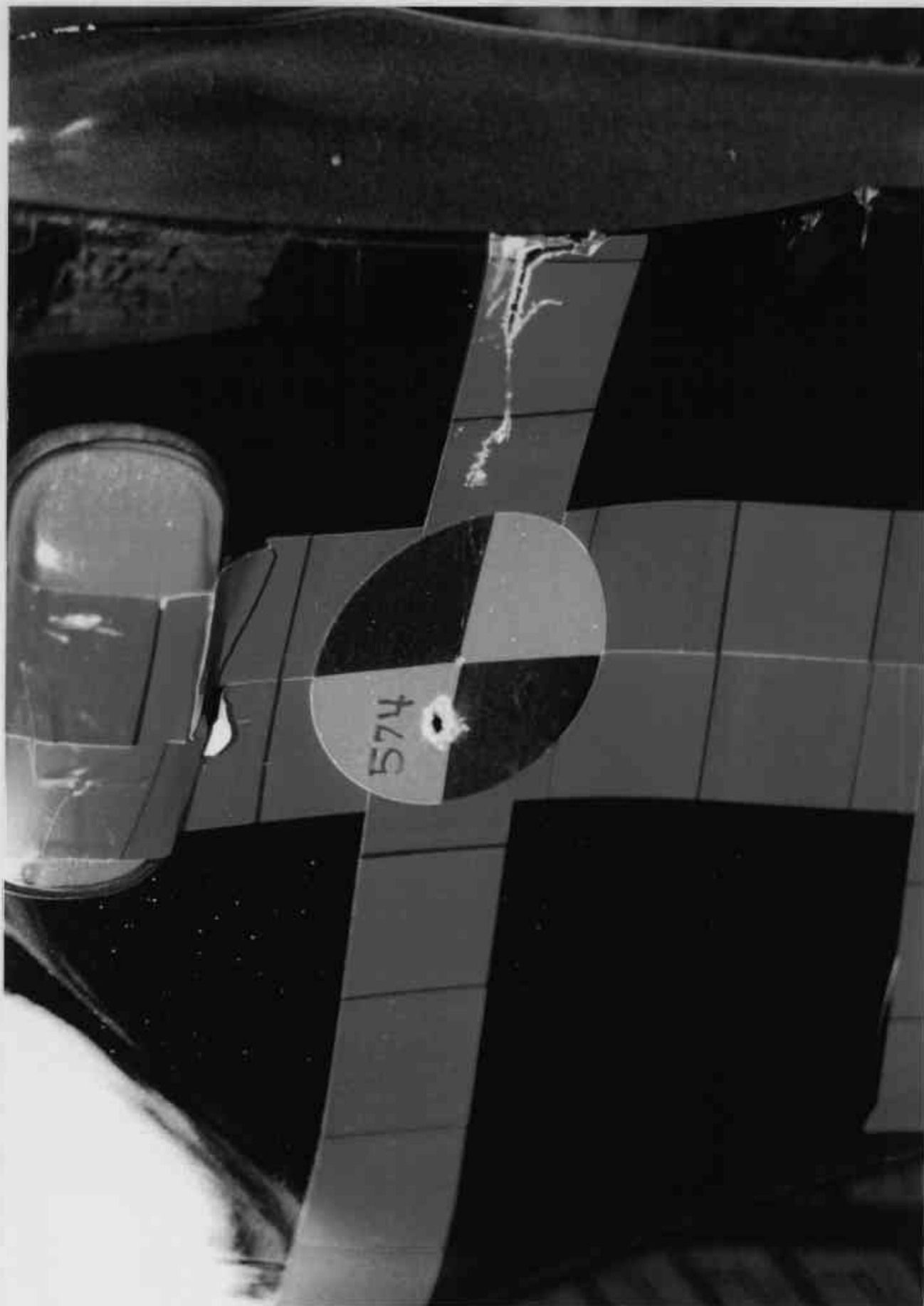


Figure A-31 POST-TEST CLOSE-UP VIEW OF IMPACT POINT TARGET



Figure A-32 CLOSE-UP VIEW OF VEHICLE'S CERTIFICATION LABEL

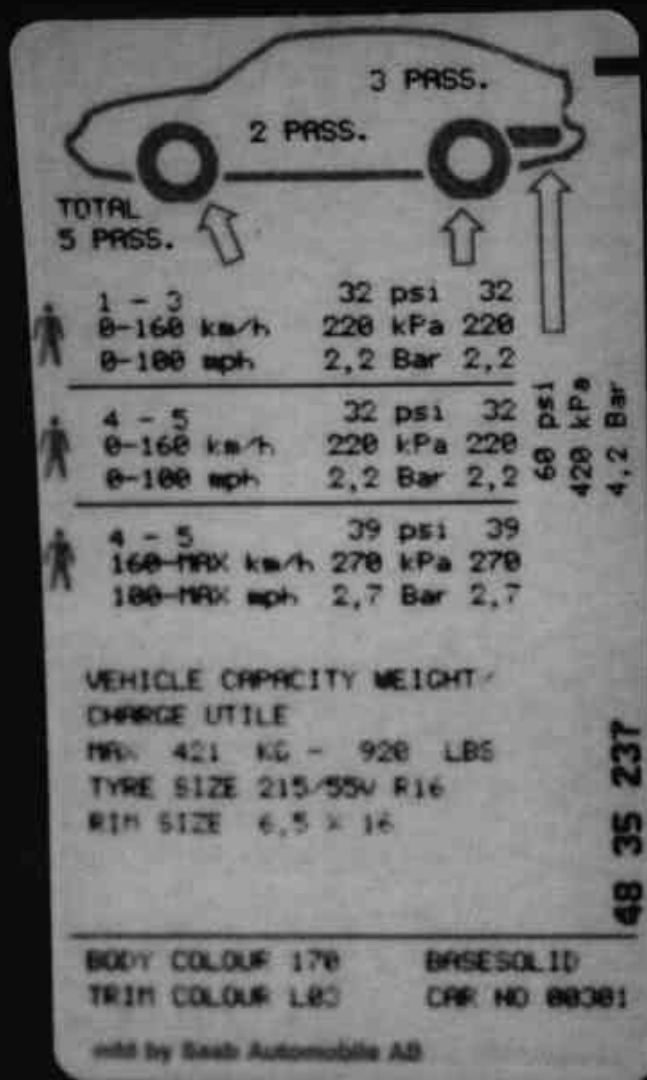


Figure A-33 CLOSE-UP VIEW OF VEHICLE'S TIRE PLACARD LABEL

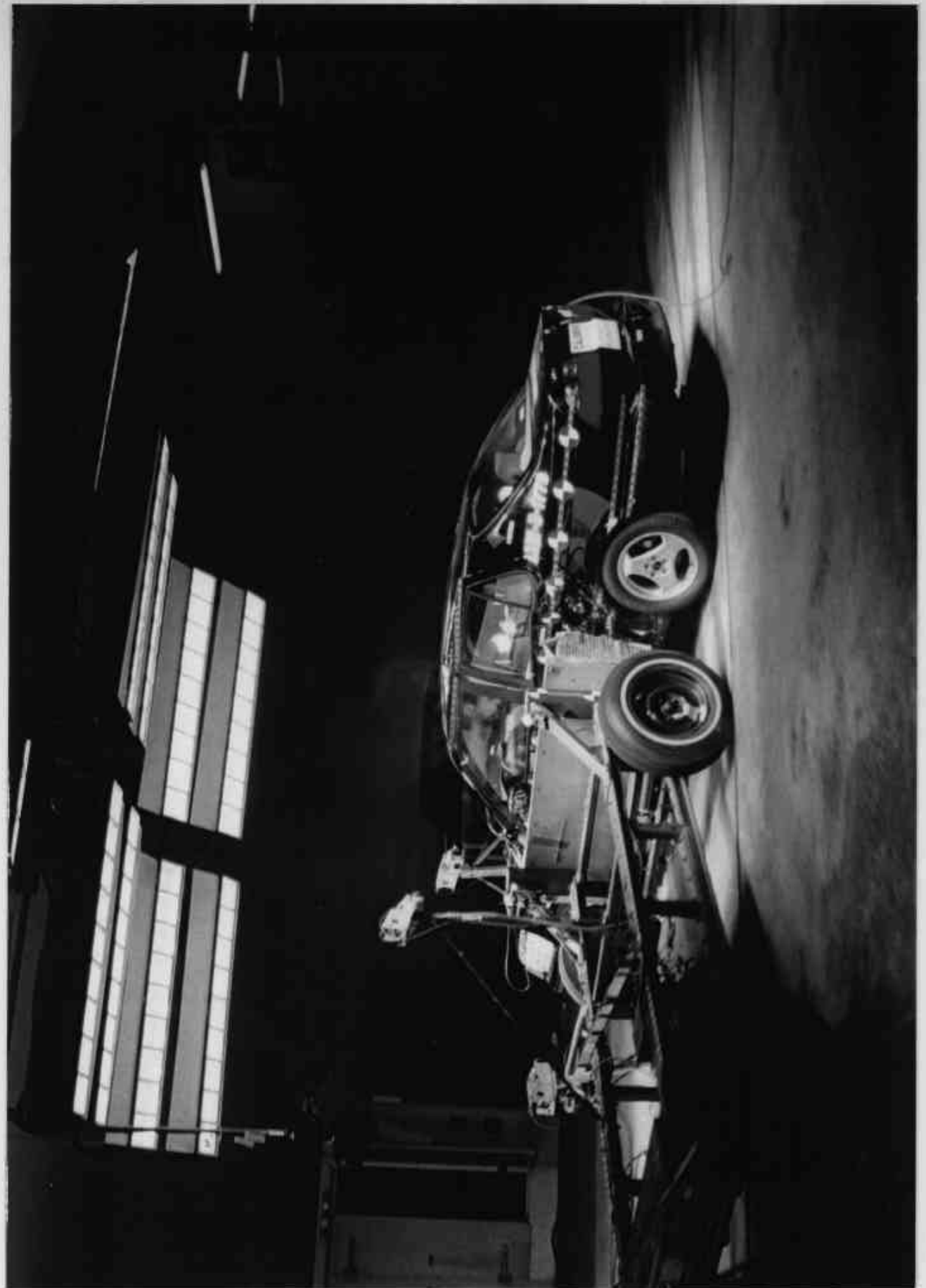


Figure A-34 IMPACT PHOTO



Figure A-35 ROLLOVER 90 DEGREES



Figure A-36 ROLLOVER 180 DEGREES



Figure A-37 ROLLOVER 270 DEGREES



A-40

8502-3

Figure A-38 ROLLOVER 360 DEGREES

APPENDIX B

VEHICLE, MDB AND SID RESPONSE DATA

TABLE OF DATA PLOTS

DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS ACCELERATION DATA - FILTER CLASS 1000 INTEGRATION DATA - FILTER CLASS 180

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
1	DRIVER UPPER RIB (Y) ACCELERATION VS TIME	B- 6
2	DRIVER UPPER RIB (Y) VELOCITY VS TIME	B- 7
3	DRIVER LOWER RIB (Y) ACCELERATION VS TIME	B- 8
4	DRIVER LOWER RIB (Y) VELOCITY VS TIME	B- 9
5	DRIVER LOWER SPINE (Y) ACCELERATION VS TIME	B- 10
6	DRIVER LOWER SPINE (Y) VELOCITY VS TIME	B- 11
7	DRIVER PELVIC (Y) ACCELERATION VS TIME	B- 12
8	DRIVER PELVIC (Y) VELOCITY VS TIME	B- 13
9	PASSENGER UPPER RIB (Y) ACCELERATION VS TIME	B- 14
10	PASSENGER UPPER RIB (Y) VELOCITY VS TIME	B- 15
11	PASSENGER LOWER RIB (Y) ACCELERATION VS TIME	B- 16
12	PASSENGER LOWER RIB (Y) VELOCITY VS TIME	B- 17
13	PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME	B- 18
14	PASSENGER LOWER SPINE (Y) VELOCITY VS TIME	B- 19
15	PASSENGER PELVIC (Y) ACCELERATION VS TIME	B- 20
16	PASSENGER PELVIC (Y) VELOCITY VS TIME	B- 21

DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS ACCELERATION DATA - FIR FILTERED

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
17	DRIVER UPPER RIB (Y) ACCELERATION VS TIME	B- 22
18	DRIVER LOWER RIB (Y) ACCELERATION VS TIME	B- 23
19	DRIVER LOWER SPINE (Y) ACCELERATION VS TIME	B- 24
20	DRIVER PELVIC (Y) ACCELERATION VS TIME	B- 25
21	PASSENGER UPPER RIB (Y) ACCELERATION VS TIME	B- 26
22	PASSENGER LOWER RIB (Y) ACCELERATION VS TIME	B- 27
23	PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME	B- 28
24	PASSENGER PELVIC (Y) ACCELERATION VS TIME	B- 29

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

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
25	RIGHT SIDE SILL AT FRONT SEAT (X) ACCELERATION VS TIME	B- 30
26	RIGHT SIDE SILL AT FRONT SEAT (X) VELOCITY VS TIME	B- 31
27	RIGHT SIDE SILL AT FRONT SEAT (Y) ACCELERATION VS TIME	B- 32
28	RIGHT SIDE SILL AT FRONT SEAT (Y) VELOCITY VS TIME	B- 33
29	RIGHT SIDE SILL AT FRONT SEAT (Z) ACCELERATION VS TIME	B- 34
30	RIGHT SIDE SILL AT FRONT SEAT (Z) VELOCITY VS TIME	B- 35
31	RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION VS TIME	B- 36
32	RIGHT SIDE SILL AT REAR SEAT (X) ACCELERATION VS TIME	B- 37
33	RIGHT SIDE SILL AT REAR SEAT (X) VELOCITY VS TIME	B- 38
34	RIGHT SIDE SILL AT REAR SEAT (Y) ACCELERATION VS TIME	B- 39
35	RIGHT SIDE SILL AT REAR SEAT (Y) VELOCITY VS TIME	B- 40
36	RIGHT SIDE SILL AT REAR SEAT (Z) ACCELERATION VS TIME	B- 41
37	RIGHT SIDE SILL AT REAR SEAT (Z) VELOCITY VS TIME	B- 42
38	RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION VS TIME	B- 43
39	REAR FLOORPAN ABOVE AXLE (X) ACCELERATION VS TIME	B- 44
40	REAR FLOORPAN ABOVE AXLE (X) VELOCITY VS TIME	B- 45
41	REAR FLOORPAN ABOVE AXLE (Y) ACCELERATION VS TIME	B- 46
42	REAR FLOORPAN ABOVE AXLE (Y) VELOCITY VS TIME	B- 47
43	REAR FLOORPAN ABOVE AXLE (Z) ACCELERATION VS TIME	B- 48
44	REAR FLOORPAN ABOVE AXLE (Z) VELOCITY VS TIME	B- 49
45	REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION VS TIME	B- 50
46	LEFT SIDE SILL AT REAR SEAT (Y) ACCELERATION VS TIME	B- 51
47	LEFT SIDE SILL AT REAR SEAT (Y) VELOCITY VS TIME	B- 52
48	LEFT SIDE SILL AT FRONT SEAT (Y) ACCELERATION VS TIME	B- 53
49	LEFT SIDE SILL AT FRONT SEAT (Y) VELOCITY VS TIME	B- 54
50	RIGHT REAR OCCUPANT COMPARTMENT (Y) ACCELERATION VS TIME	B- 55
51	RIGHT REAR OCCUPANT COMPARTMENT (Y) VELOCITY VS TIME	B- 56
52	LOWER B-POST (Y) ACCELERATION VS TIME	B- 57
53	LOWER B-POST (Y) VELOCITY VS TIME	B- 58
54	UPPER B-POST (Y) ACCELERATION VS TIME	B- 59
55	UPPER B-POST (Y) VELOCITY VS TIME	B- 60
56	LOWER A-POST (Y) ACCELERATION VS TIME	B- 61
57	LOWER A-POST (Y) VELOCITY VS TIME	B- 62
58	UPPER A-POST (Y) ACCELERATION VS TIME	B- 63
59	UPPER A-POST (Y) VELOCITY VS TIME	B- 64
60	FRONT SEAT TRACK (Y) ACCELERATION VS TIME	B- 65
61	FRONT SEAT TRACK (Y) VELOCITY VS TIME	B- 66
62	REAR SEAT TRACK (Y) ACCELERATION VS TIME	B- 67
63	REAR SEAT TRACK (Y) VELOCITY VS TIME	B- 68
64	VEHICLE CENTER OF GRAVITY (X) ACCELERATION VS TIME	B- 69
65	VEHICLE CENTER OF GRAVITY (X) VELOCITY VS TIME	B- 70
66	VEHICLE CENTER OF GRAVITY (Y) ACCELERATION VS TIME	B- 71
67	VEHICLE CENTER OF GRAVITY (Y) VELOCITY ACCELERATION VS TIME	B- 72
68	VEHICLE CENTER OF GRAVITY (Z) ACCELERATION VS TIME	B- 73
69	VEHICLE CENTER OF GRAVITY (Z) VELOCITY VS TIME	B- 74
70	VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION VS TIME	B- 75

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

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
71	MDB CENTER OF GRAVITY (X) ACCELERATION VS TIME	B- 76
72	MDB CENTER OF GRAVITY (X) VELOCITY VS TIME	B- 77
73	MDB CENTER OF GRAVITY (Y) ACCELERATION VS TIME	B- 78
74	MDB CENTER OF GRAVITY (Y) VELOCITY VS TIME	B- 79
75	MDB CENTER OF GRAVITY (Z) ACCELERATION VS TIME	B- 80
76	MDB CENTER OF GRAVITY (Z) VELOCITY VS TIME	B- 81
77	MDB CENTER OF GRAVITY RESULTANT ACCELERATION VS TIME	B- 82
78	MDB REAR (X) ACCELERATION VS TIME	B- 83
79	MDB REAR (X) VELOCITY VS TIME	B- 84
80	MDB REAR (Y) ACCELERATION VS TIME	B- 85
81	MDB REAR (Y) VELOCITY VS TIME	B- 86

DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)

ACCELERATION DATA - FILTER CLASS 1000

INTEGRATION DATA - FILTER CLASS 180

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
82	DRIVER UPPER RIB (Y) ACCELERATION VS TIME	B- 87
83	DRIVER UPPER RIB (Y) VELOCITY VS TIME	B- 88
84	DRIVER LOWER RIB (Y) ACCELERATION VS TIME	B- 89
85	DRIVER LOWER RIB (Y) VELOCITY VS TIME	B- 90
86	DRIVER LOWER SPINE (Y) ACCELERATION VS TIME	B- 91
87	DRIVER LOWER SPINE (Y) VELOCITY VS TIME	B- 92
88	DRIVER PELVIC (Y) ACCELERATION VS TIME	B- 93
89	DRIVER PELVIC (Y) VELOCITY VS TIME	B- 94
90	PASSENGER UPPER RIB (Y) ACCELERATION VS TIME	B- 95
91	PASSENGER UPPER RIB (Y) VELOCITY VS TIME	B- 96
92	PASSENGER LOWER RIB (Y) ACCELERATION VS TIME	B- 97
93	PASSENGER LOWER RIB (Y) VELOCITY VS TIME	B- 98
94	PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME	B- 99
95	PASSENGER LOWER SPINE (Y) VELOCITY VS TIME	B- 100
96	PASSENGER PELVIC (Y) ACCELERATION VS TIME	B- 101
97	PASSENGER PELVIC (Y) VELOCITY VS TIME	B- 102

DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)

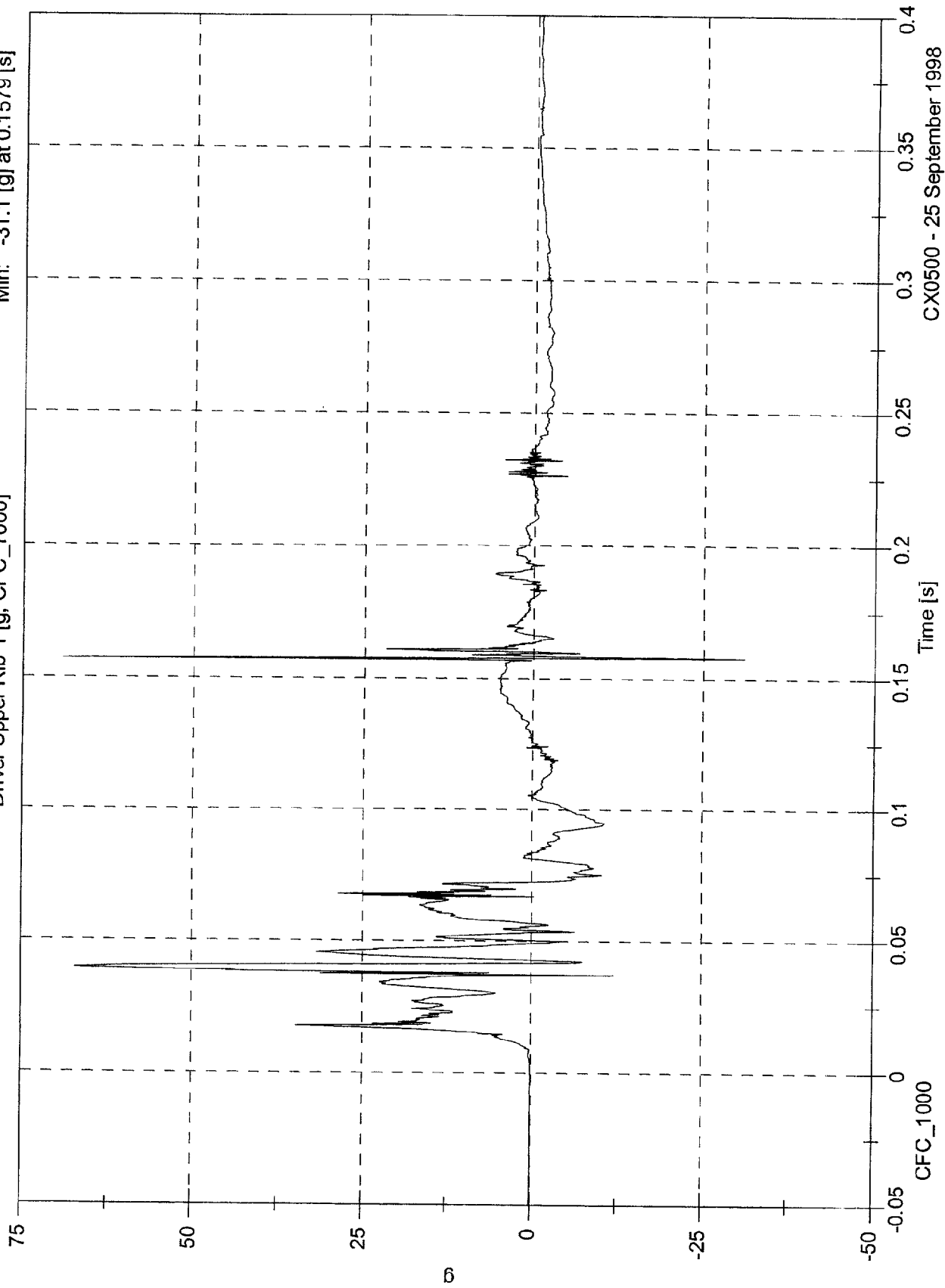
ACCELERATION DATA - FIR FILTERED

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
98	DRIVER UPPER RIB (Y) ACCELERATION VS TIME	B- 103
99	DRIVER LOWER RIB (Y) ACCELERATION VS TIME	B- 104
100	DRIVER LOWER SPINE (Y) ACCELERATION VS TIME	B- 105
101	DRIVER PELVIC (Y) ACCELERATION VS TIME	B- 106
102	PASSENGER UPPER RIB (Y) ACCELERATION VS TIME	B- 107
103	PASSENGER LOWER RIB (Y) ACCELERATION VS TIME	B- 108
104	PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME	B- 109
105	PASSENGER PELVIC (Y) ACCELERATION VS TIME	B- 110

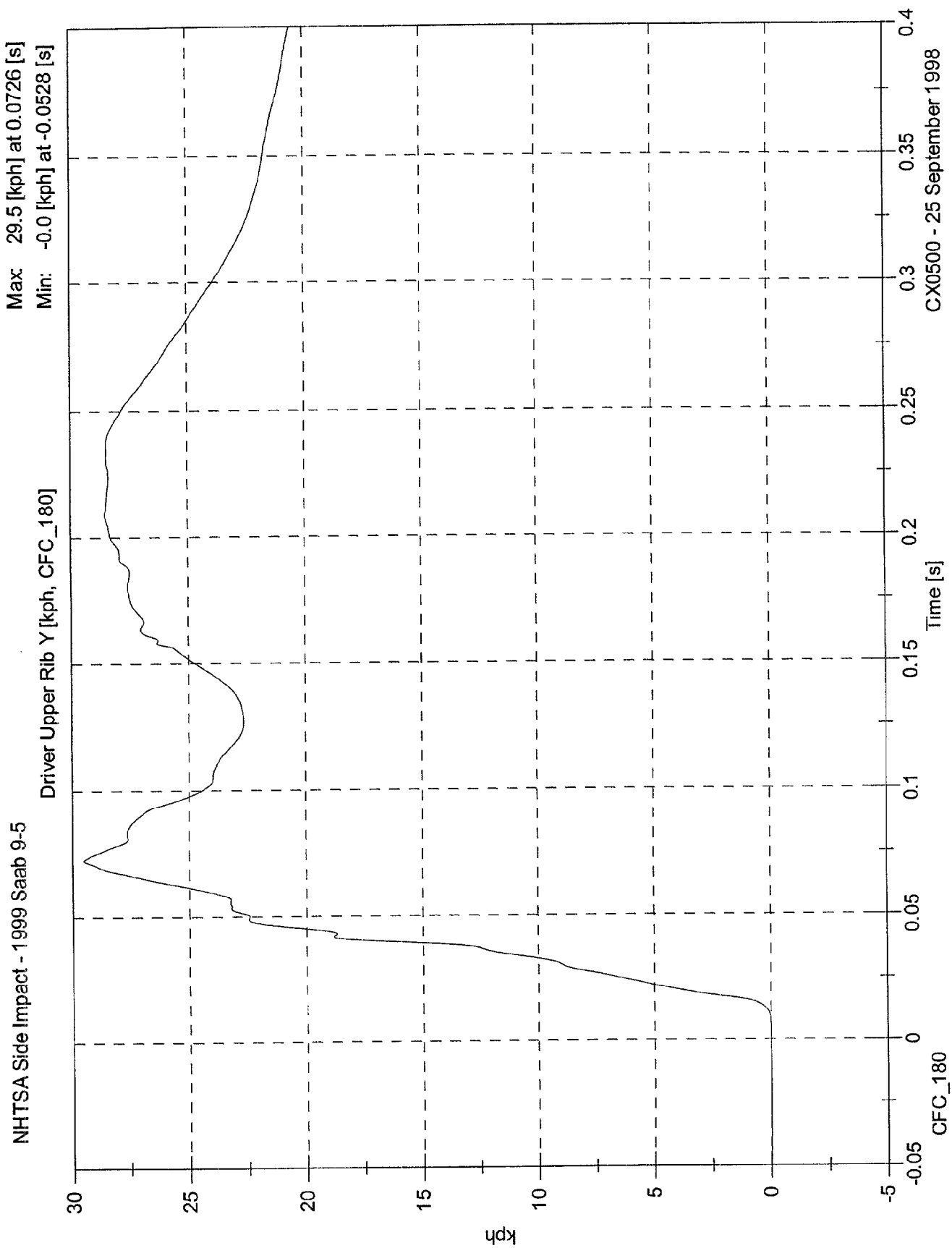
NHTSA Side Impact - 1999 Saab 9-5

Max: 69.2 [g] at 0.1573 [s]
Min: -31.1 [g] at 0.1579 [s]

Driver Upper Rib Y [g, CFC_1000]



CX0500 - 25 September 1998

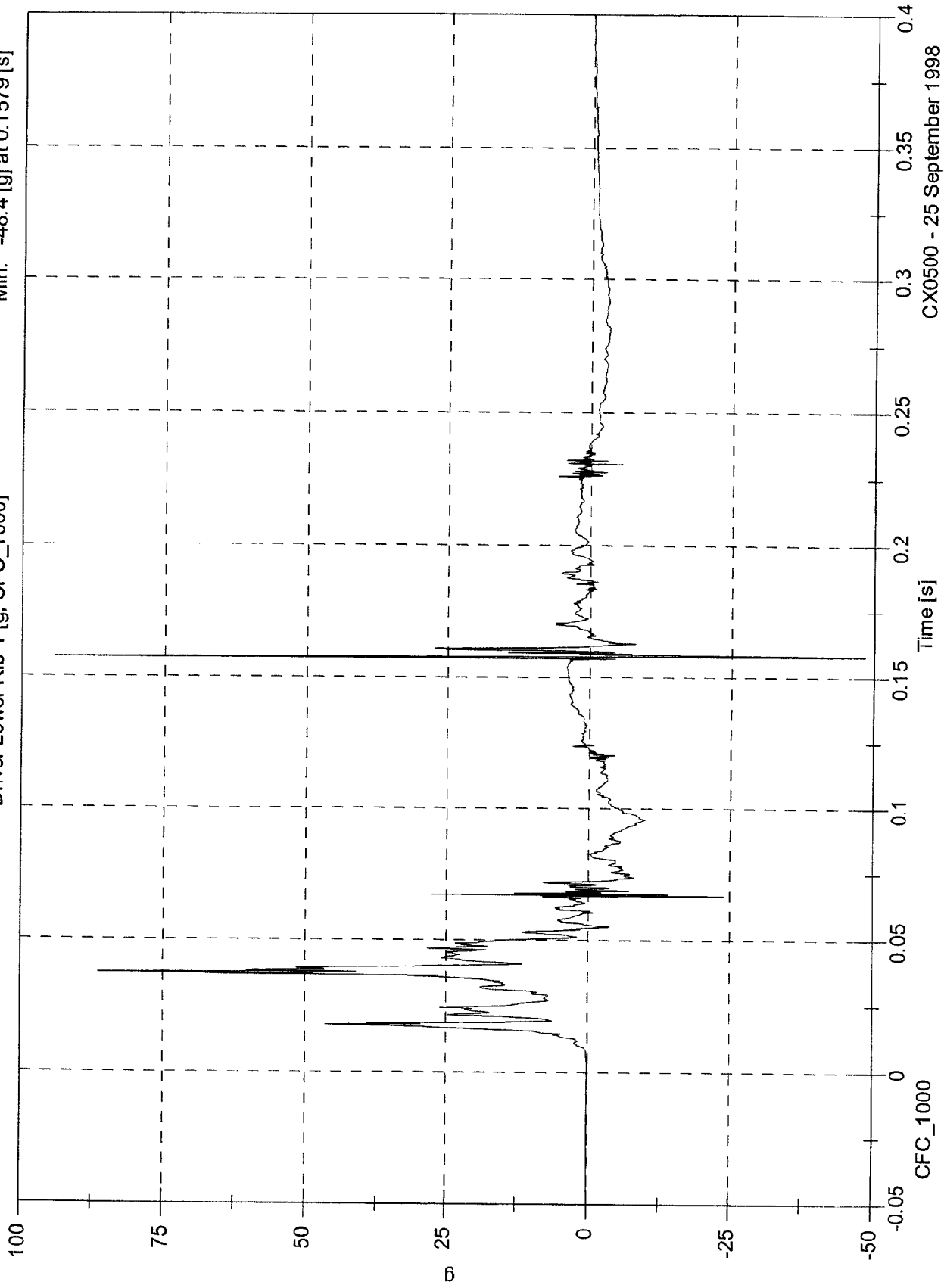


NHTSA Side Impact - 1999 Saab 9-5

Max: 94.2 [g] at 0.1573 [s]

Min: -48.4 [g] at 0.1579 [s]

Driver Lower Rib Y [g, CFC_1000]



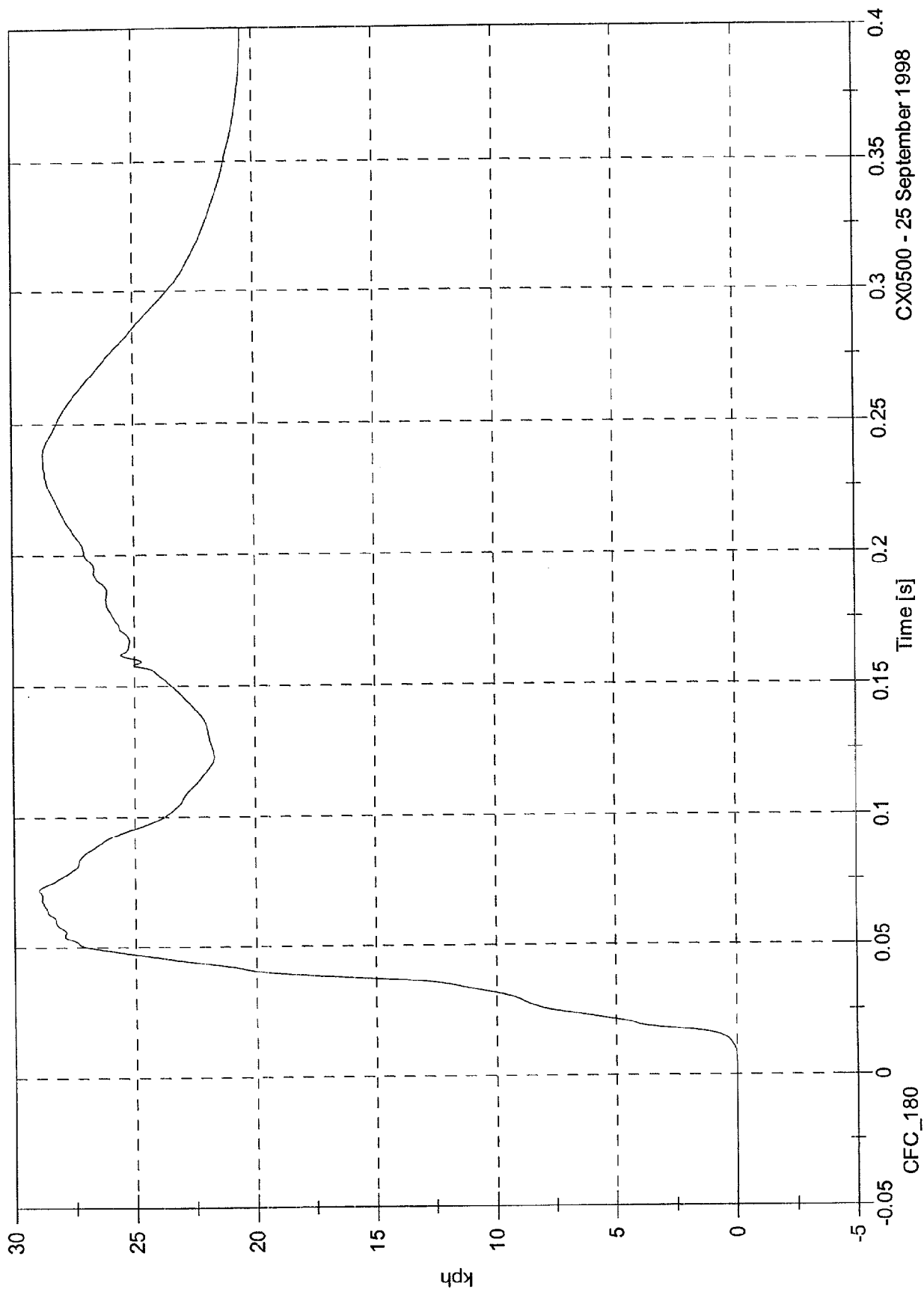
CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 29.0 [kph] at 0.0722 [s]

Min: -0.0 [kph] at -0.0308 [s]

Driver Lower Rib Y [kph, CFC_180]

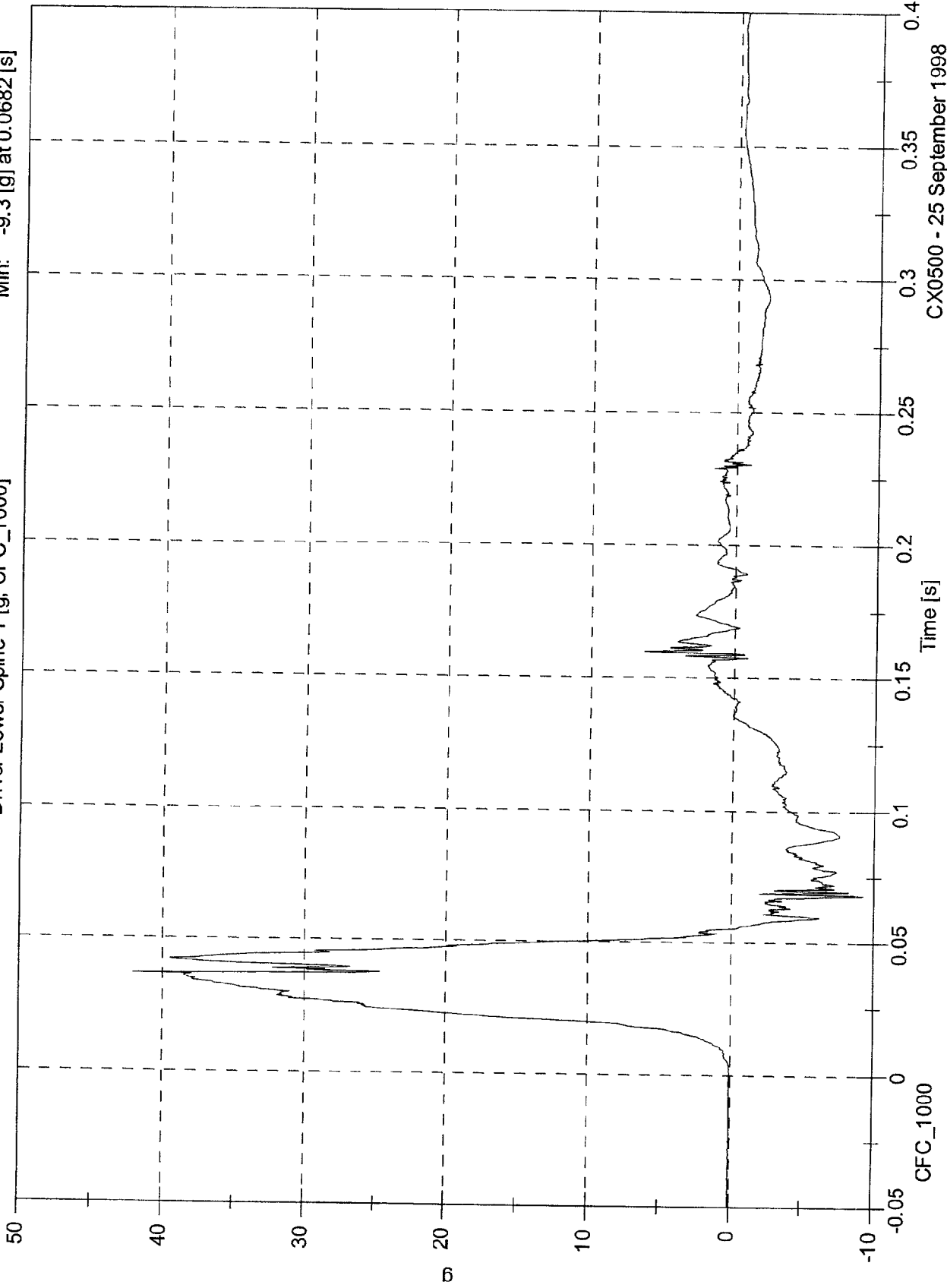


CX0500 - 25 September 1998

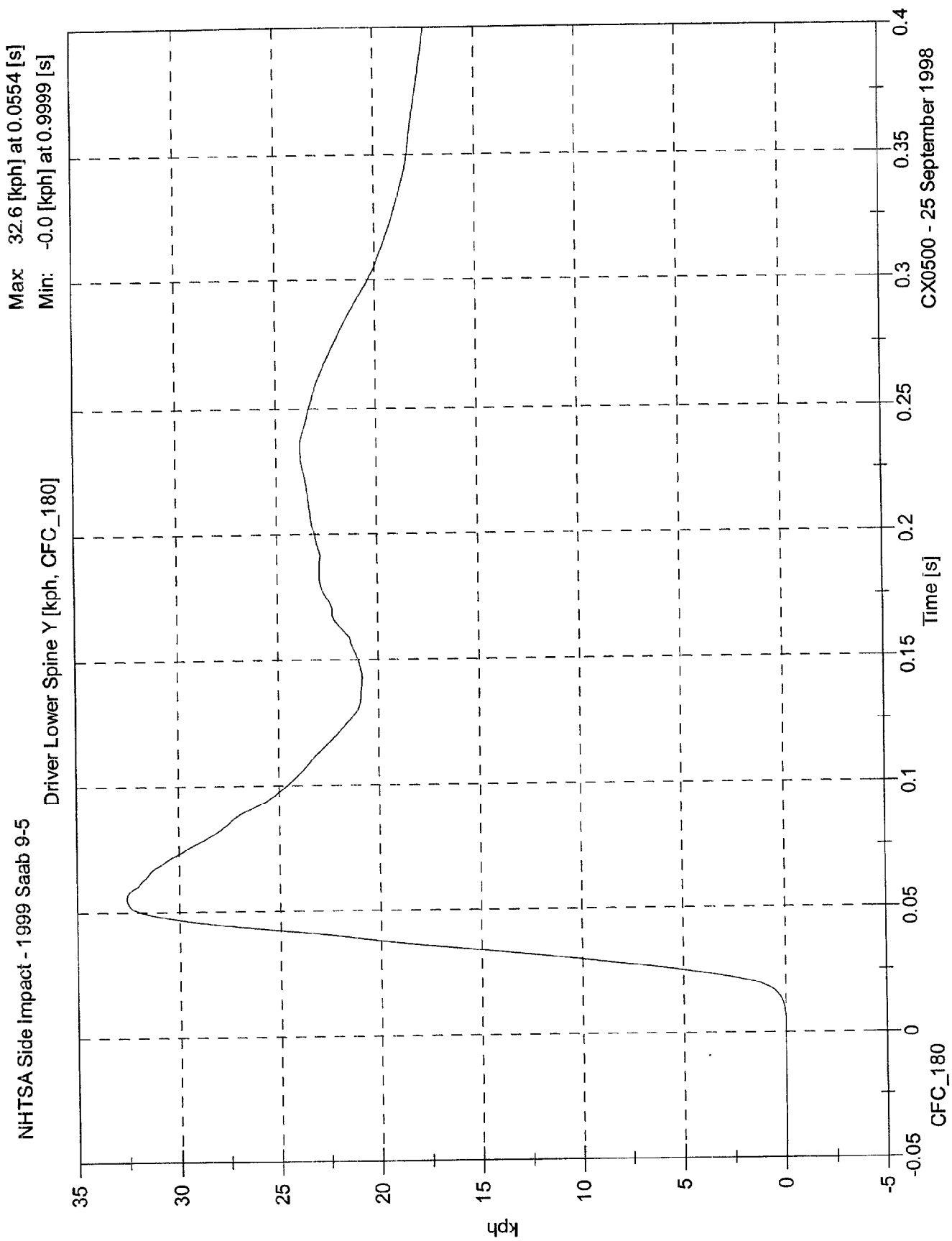
NHTSA Side Impact - 1999 Saab 9-5

Max: 42.1 [g] at 0.0365 [s]
 Min: -9.3 [g] at 0.0682 [s]

Driver Lower Spine Y [g, CFC_1000]



CX0500 - 25 September 1998

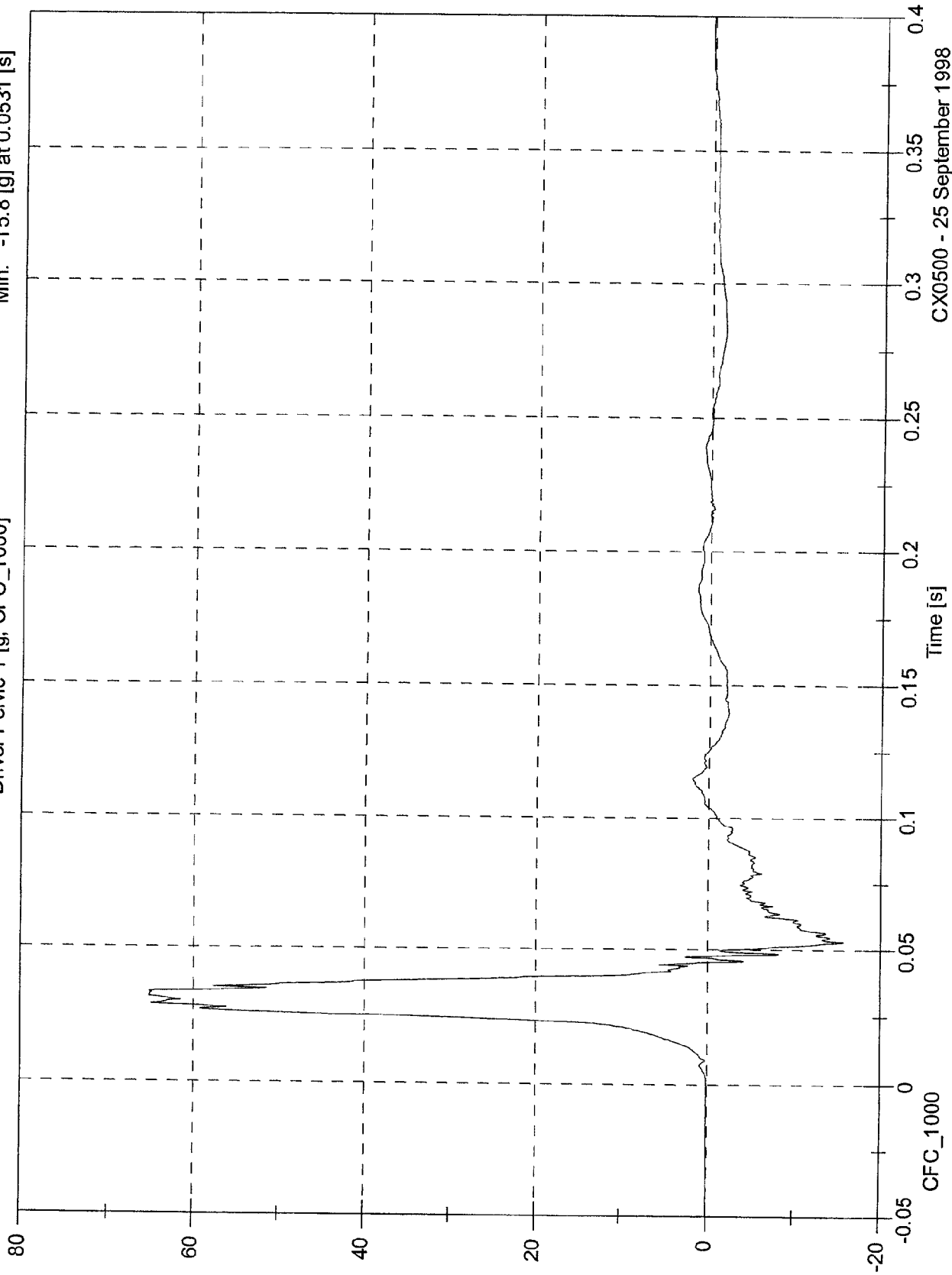


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 65.2 [g] at 0.0316 [s]
Min: -15.8 [g] at 0.0531 [s]

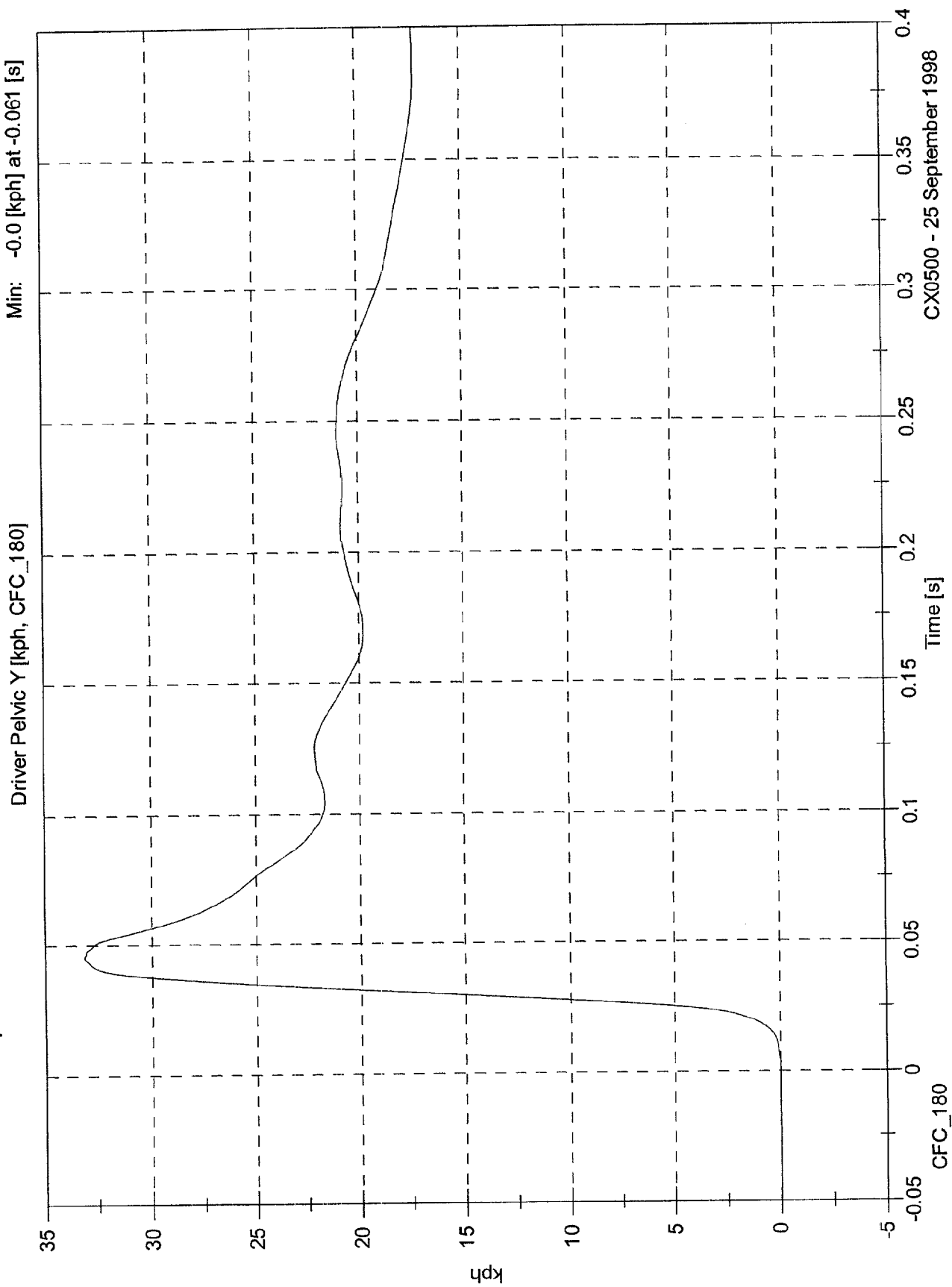
Driver Pelvic Y [g, CFC_1000]



CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 33.1 [kph] at 0.0452 [s]
Min: -0.0 [kph] at -0.061 [s]

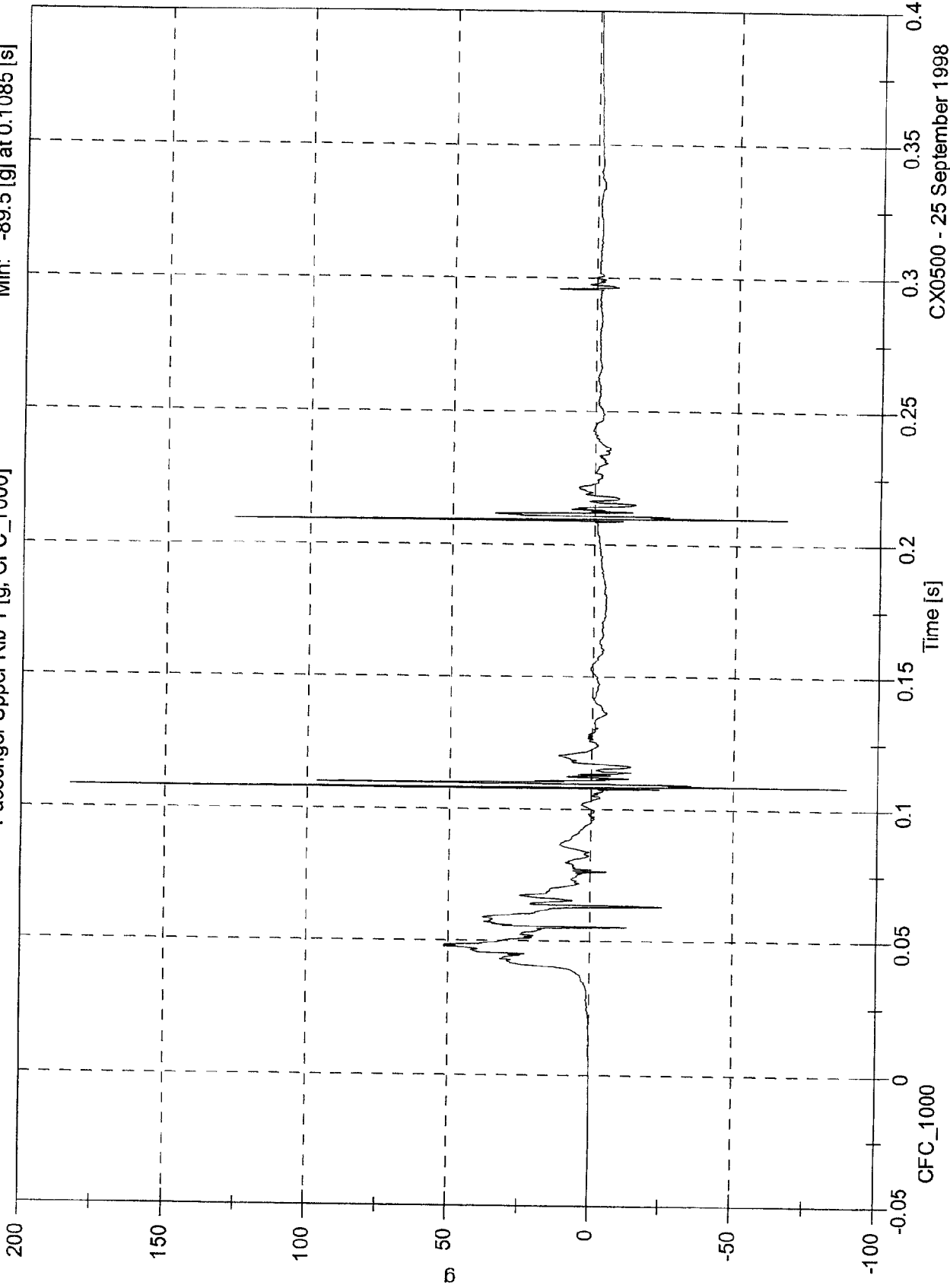


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 183.1 [g] at 0.108 [s]
Min: -89.5 [g] at 0.1085 [s]

Passenger Upper Rib Y [g, CFC_1000]

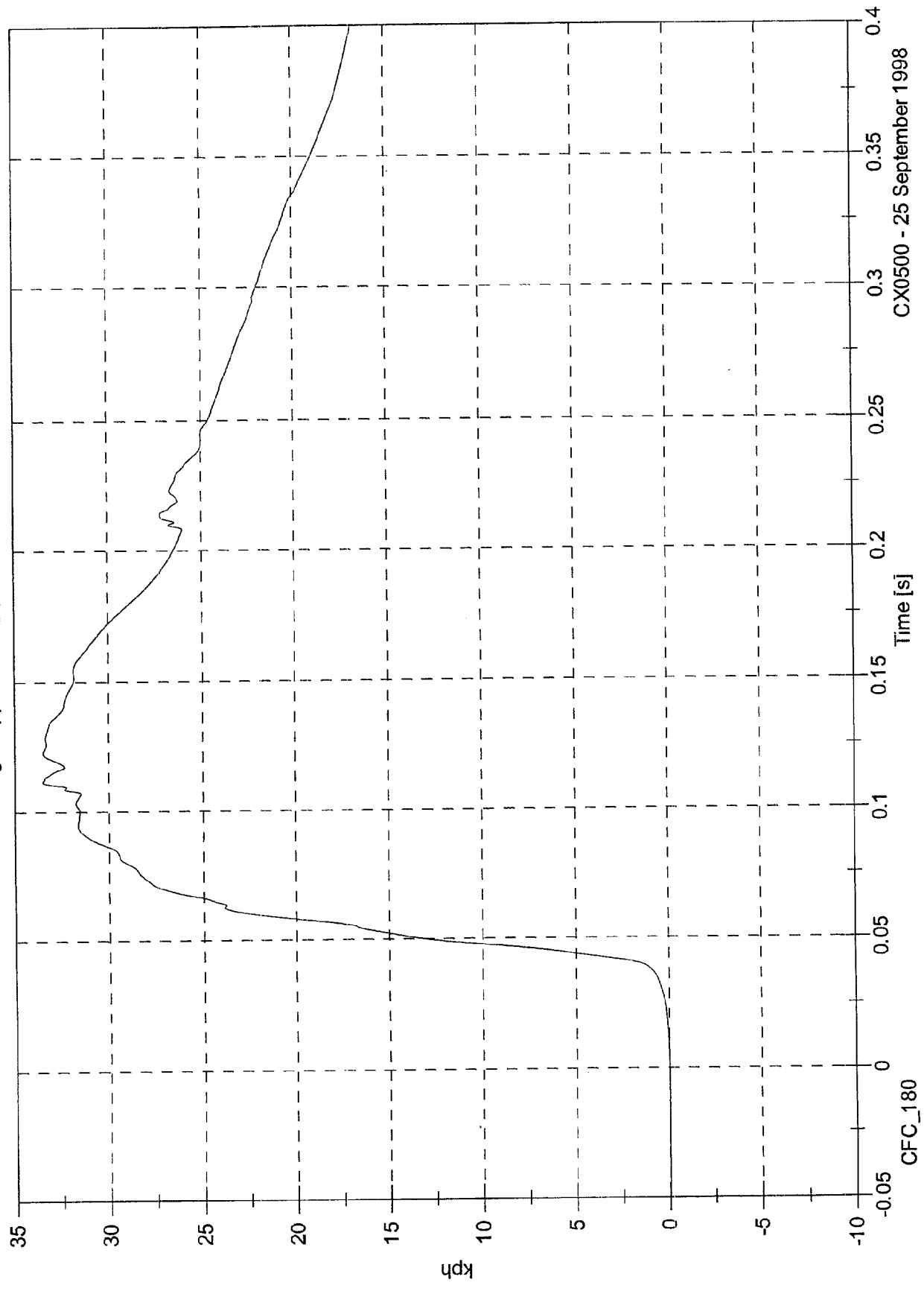


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max 33.5 [kph] at 0.1112 [s]
Min: -6.0 [kph] at 0.9999 [s]

Passenger Upper Rib Y [kph, CFC_180]



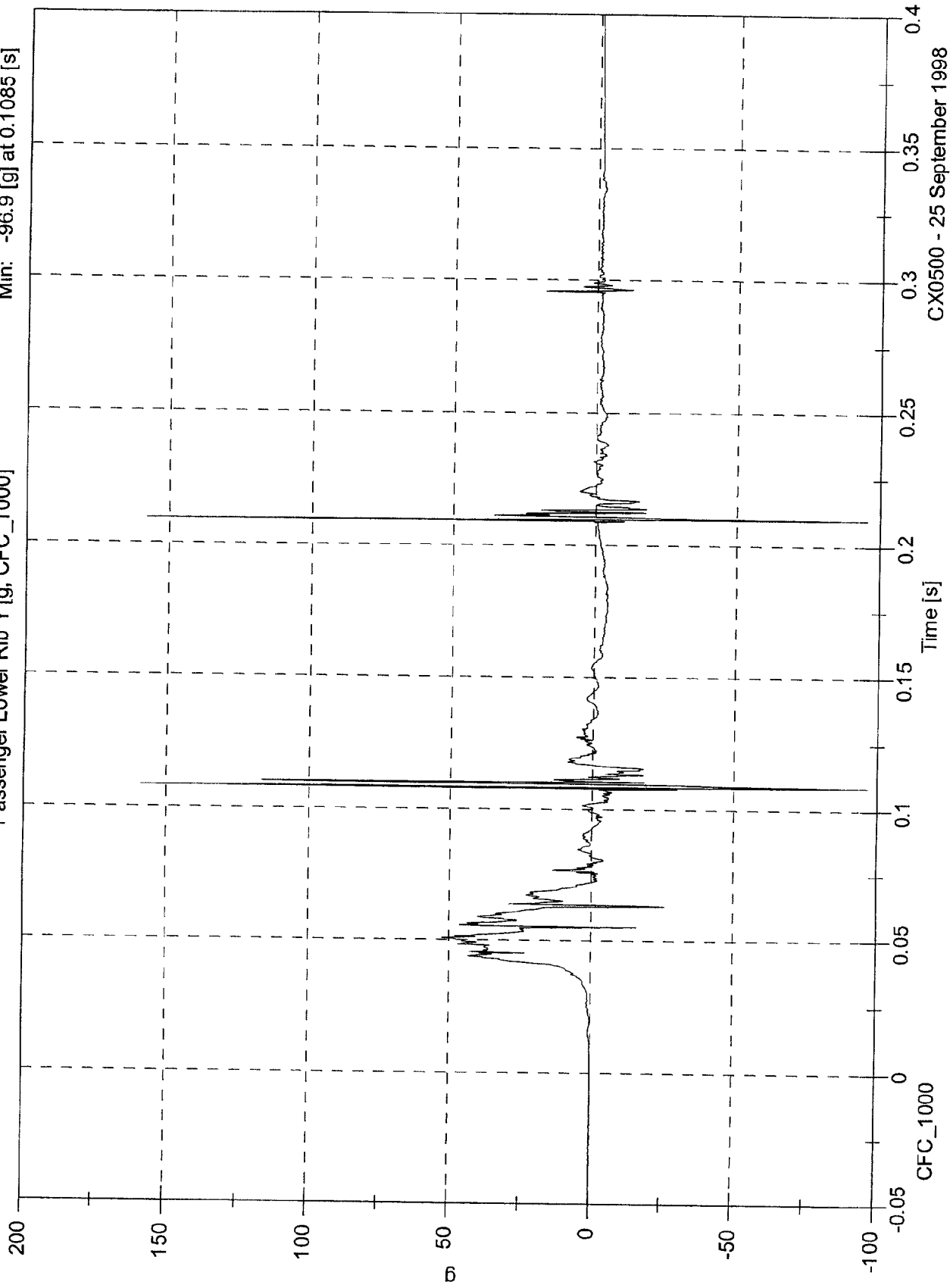
CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

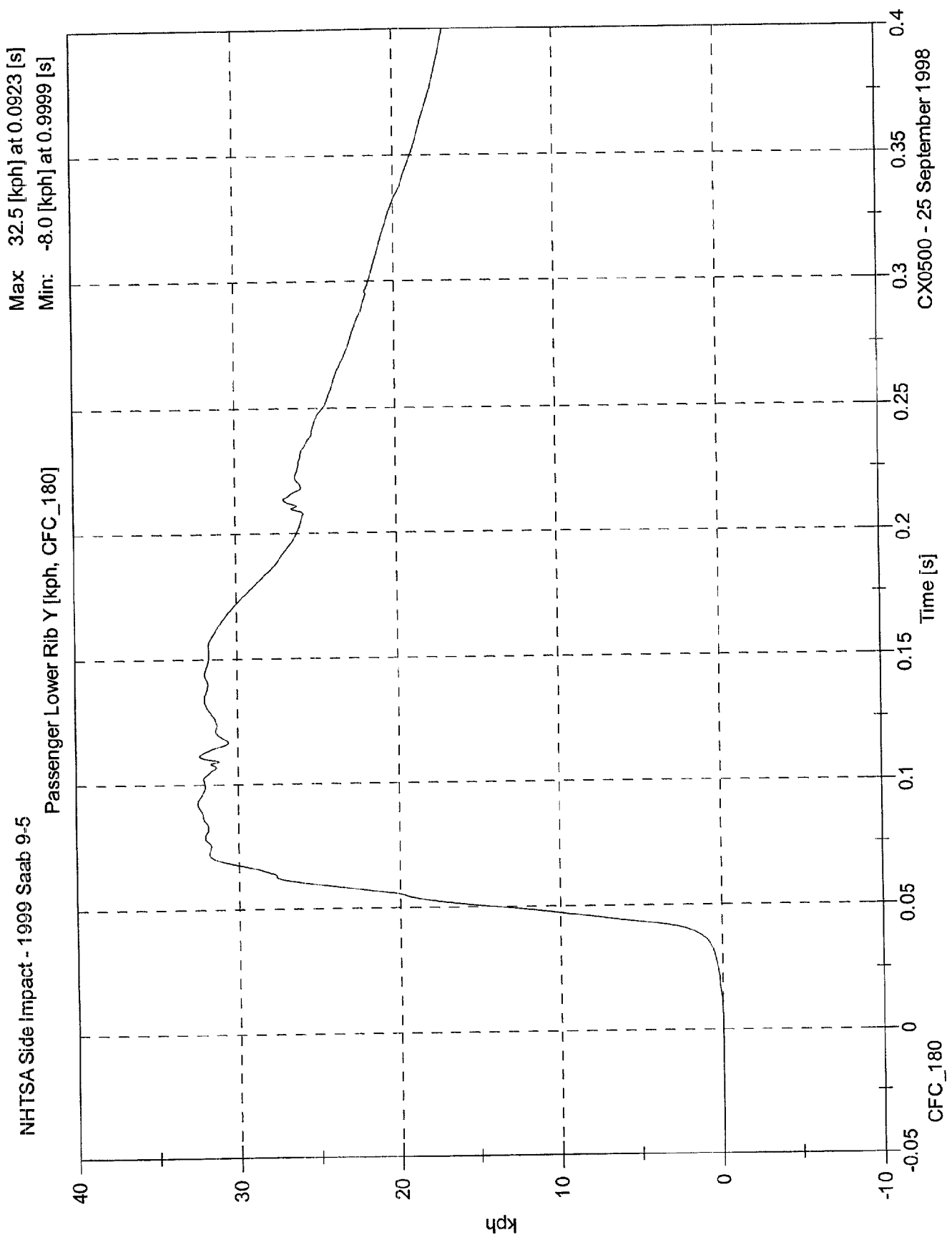
Max: 158.8 [g] at 0.108 [s]

Min: -96.9 [g] at 0.1085 [s]

Passenger Lower Rib Y [g, CFC_1000]



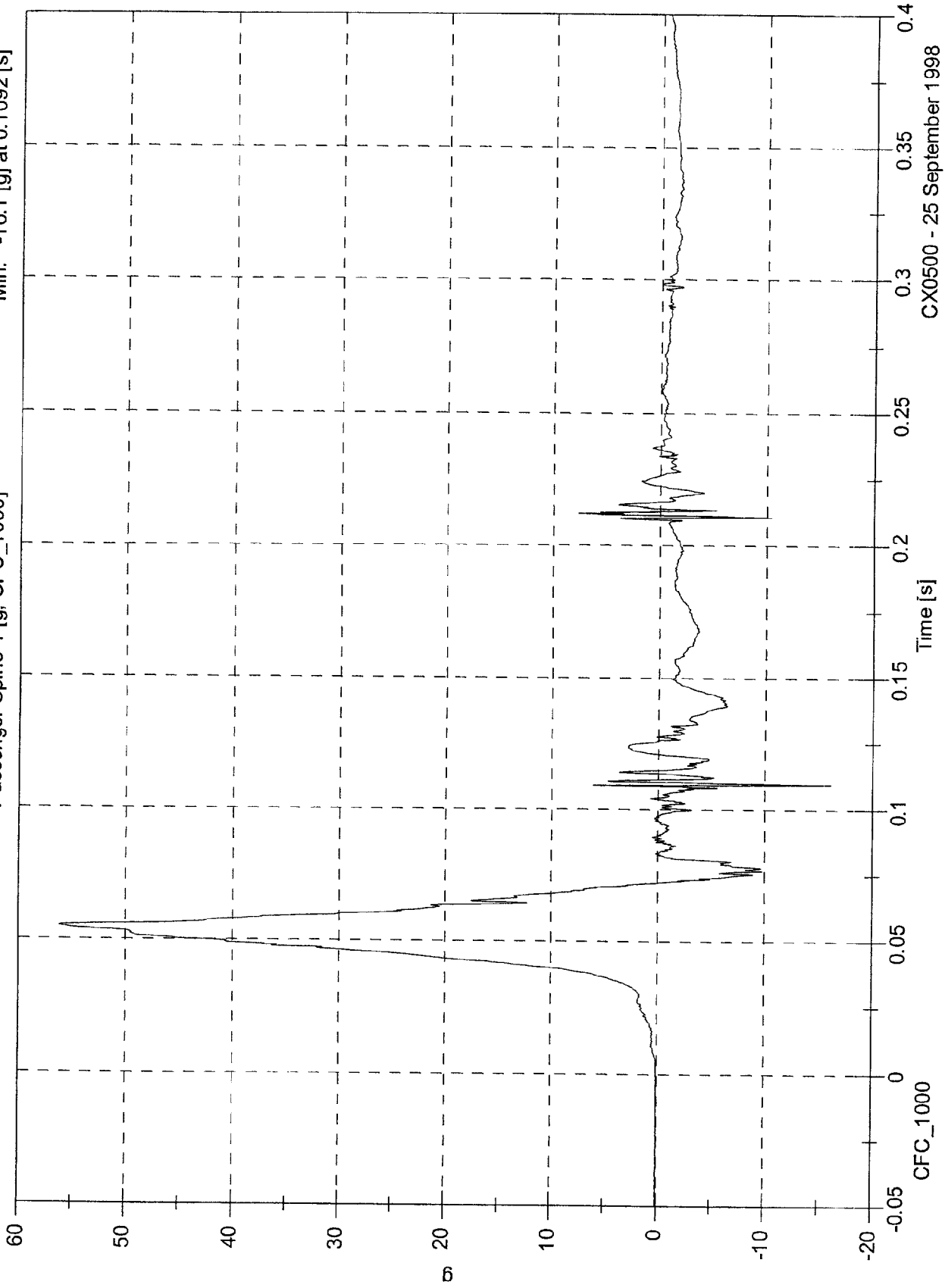
CX0500 - 25 September 1998



NHTSA Side Impact - 1999 Saab 9-5

Max: 56.1 [g] at 0.0549 [s]
Min: -16.1 [g] at 0.1092 [s]

Passenger Spine Y [g, CFC_1000]

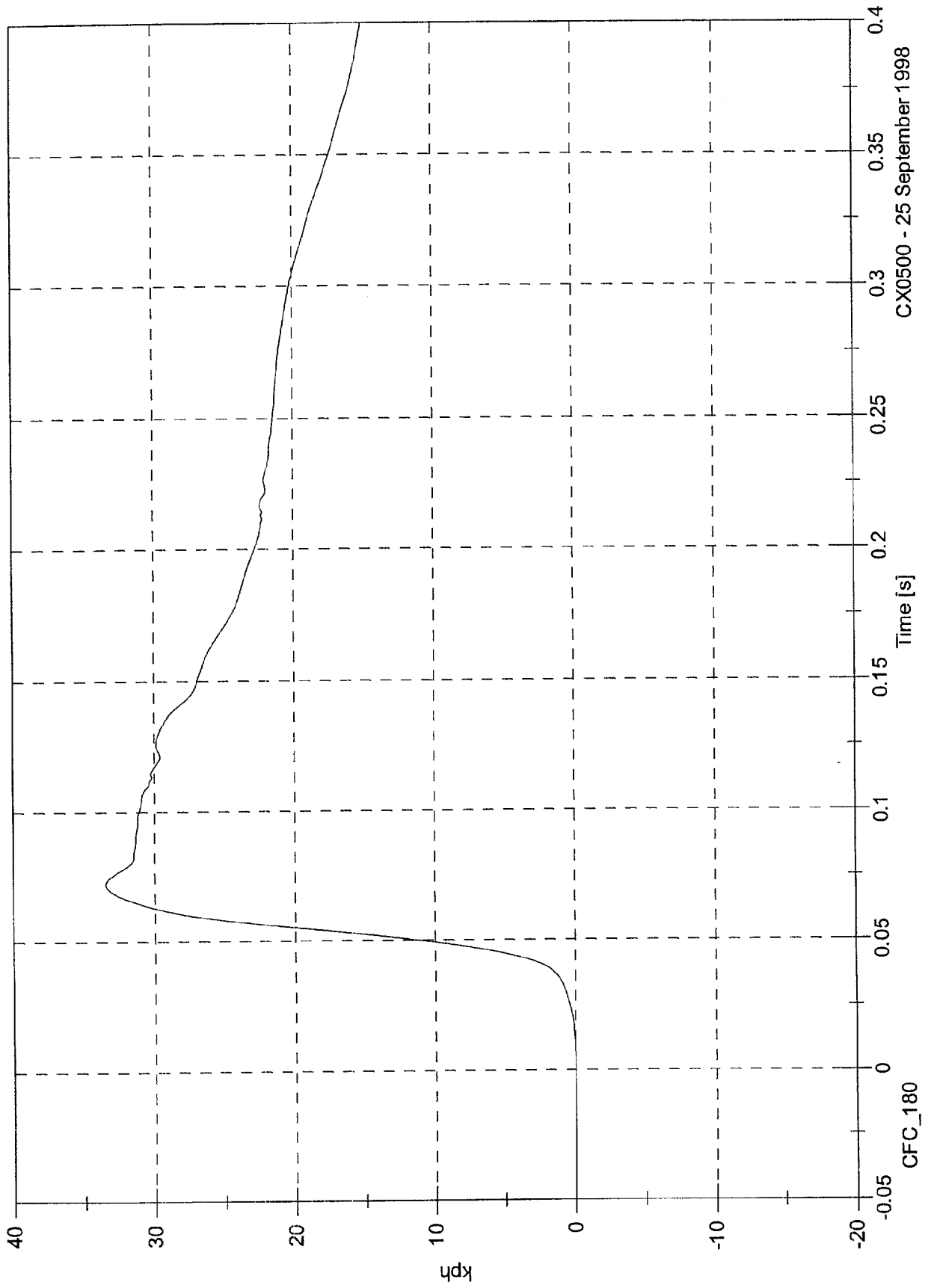


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 33.5 [kph] at 0.0722 [s]
 Min: -10.1 [kph] at 0.9999 [s]

Passenger Spine Y [kph, CFC_180]

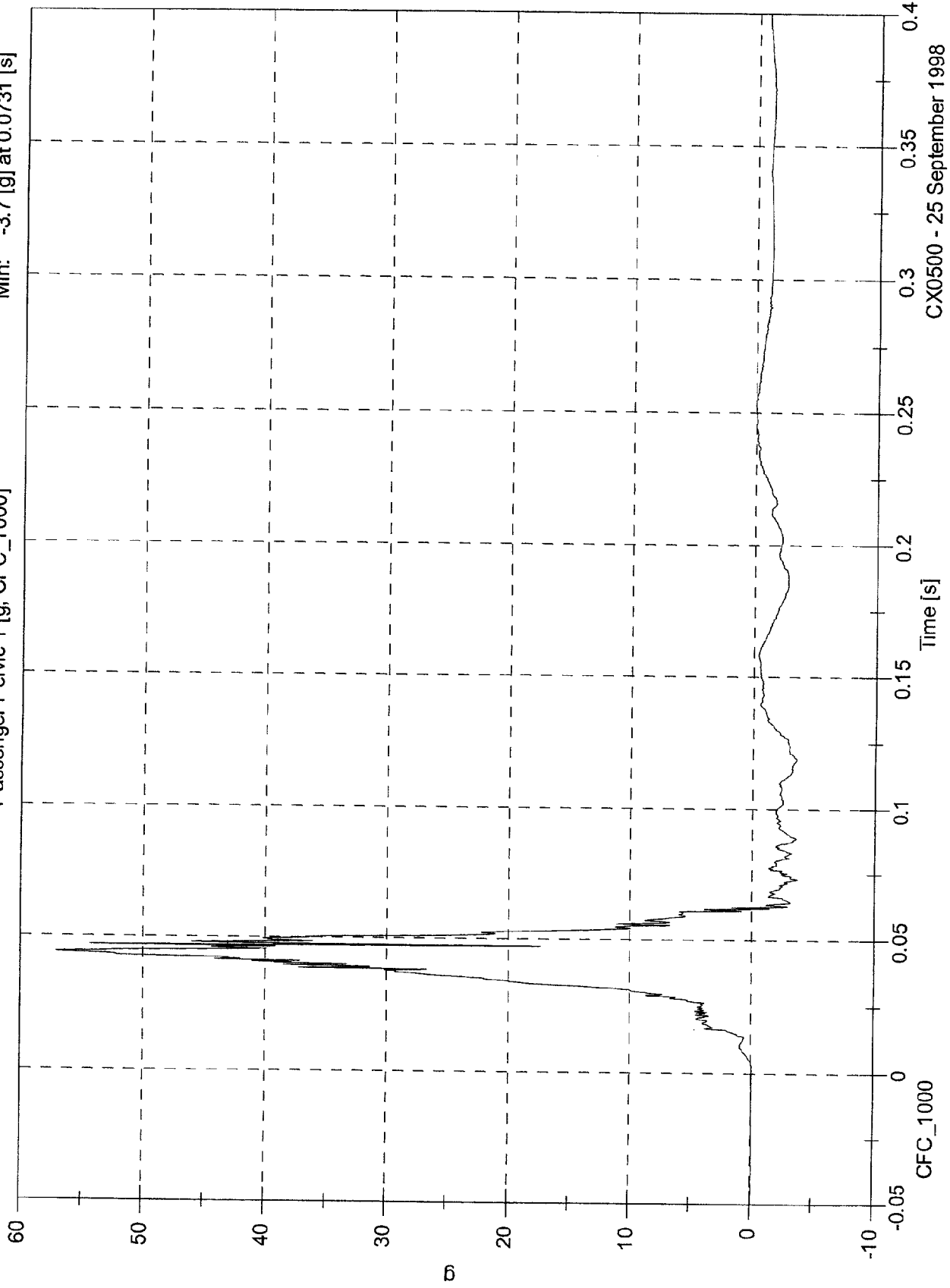


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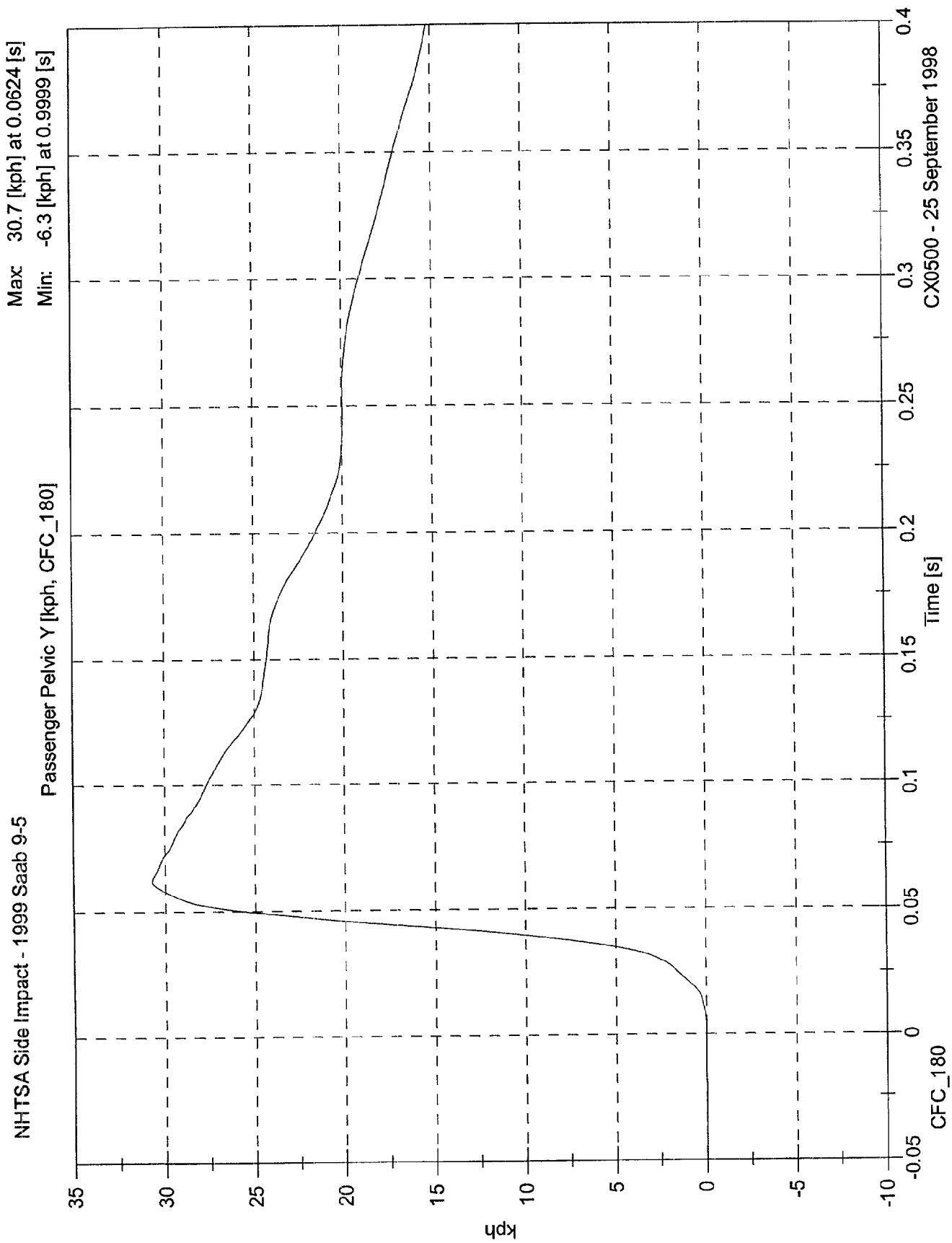
NHTSA Side Impact - 1999 Saab 9-5

Max: 57.1 [g] at 0.044 [s]
Min: -3.7 [g] at 0.0731 [s]

Passenger Pelvic Y [g, CFC_1000]



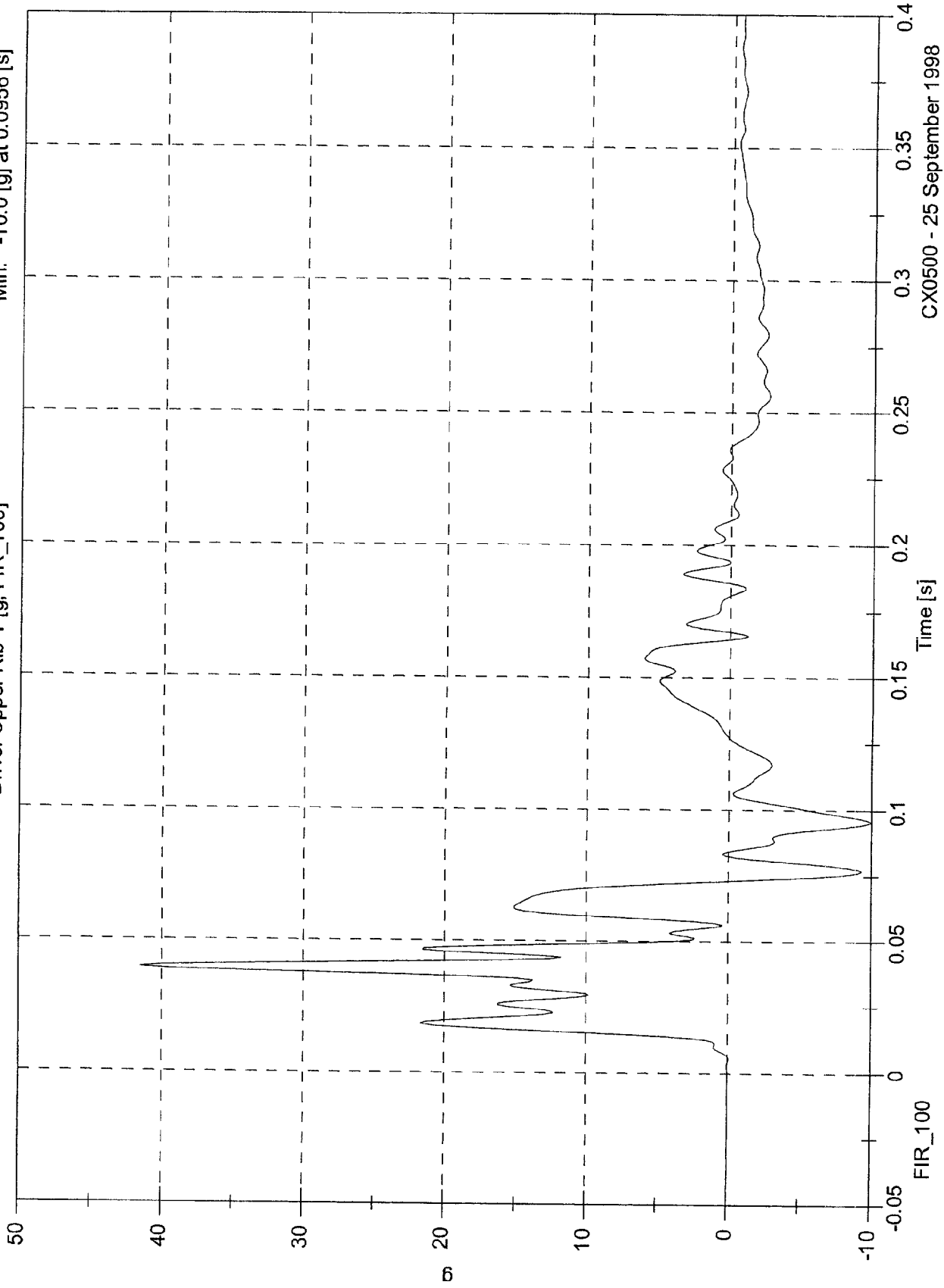
CX0500 - 25 September 1998



NHTSA Side Impact - 1999 Saab 9-5

Max: 41.5 [g] at 0.0394 [s]
 Min: -10.0 [g] at 0.0956 [s]

Driver Upper Rib Y [g, FIR_100]

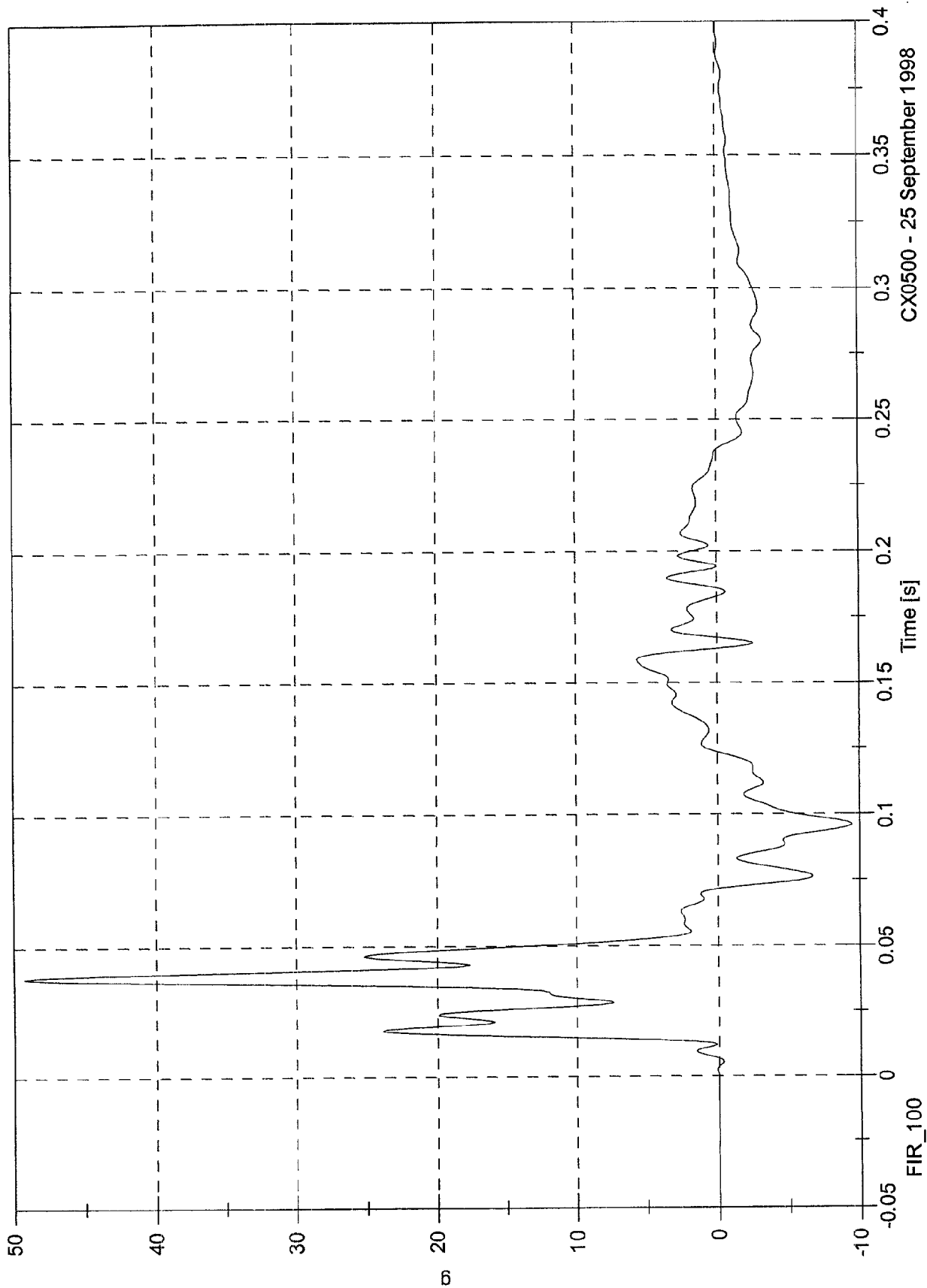


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 49.3 [g] at 0.0381 [s]
Min: -9.4 [g] at 0.0957 [s]

Driver Lower Rib Y [g, FIR_100]

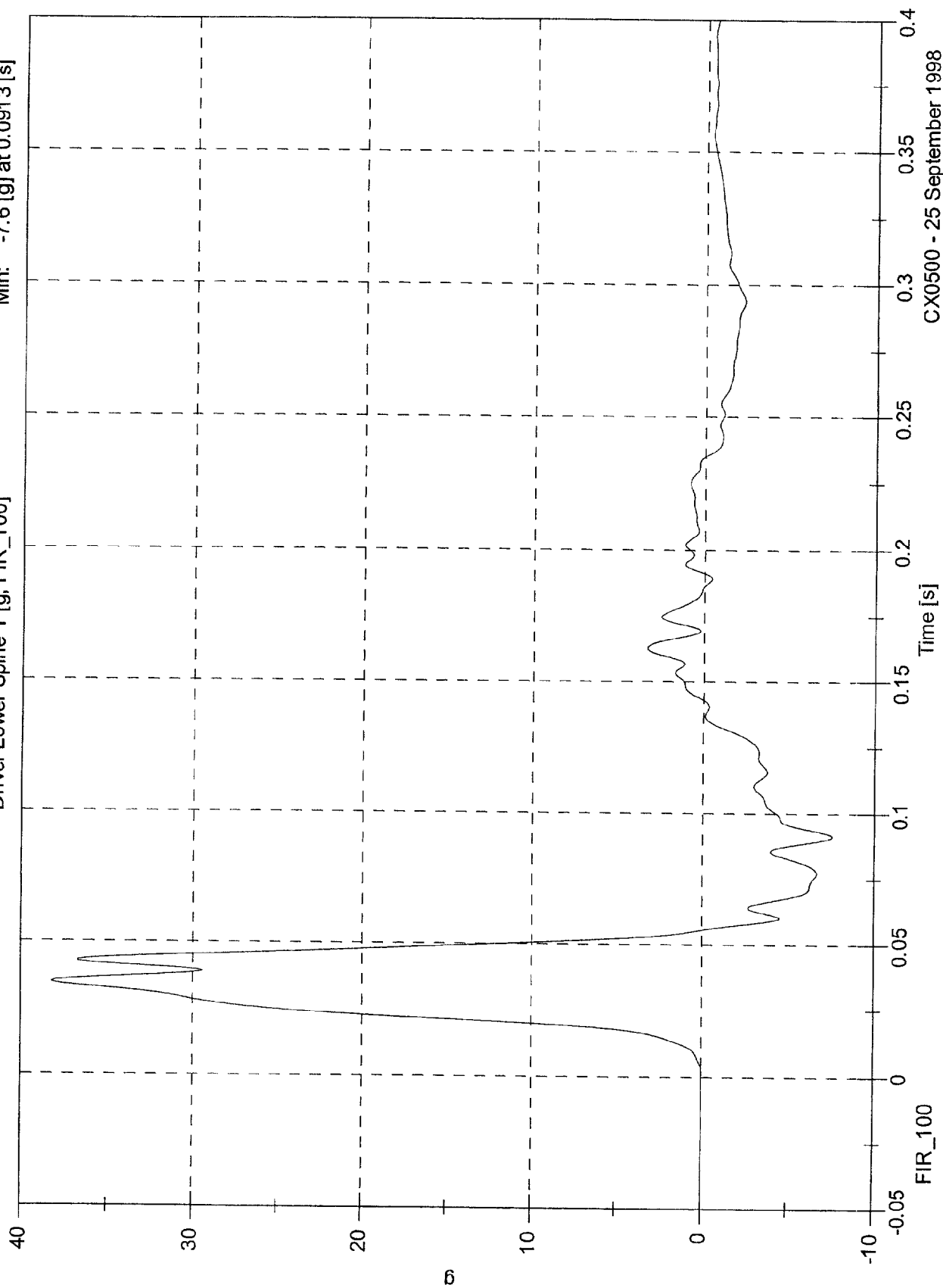


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 38.2 [g] at 0.0344 [s]
 Min: -7.6 [g] at 0.0913 [s]

Driver Lower Spine Y [g, FIR_100]

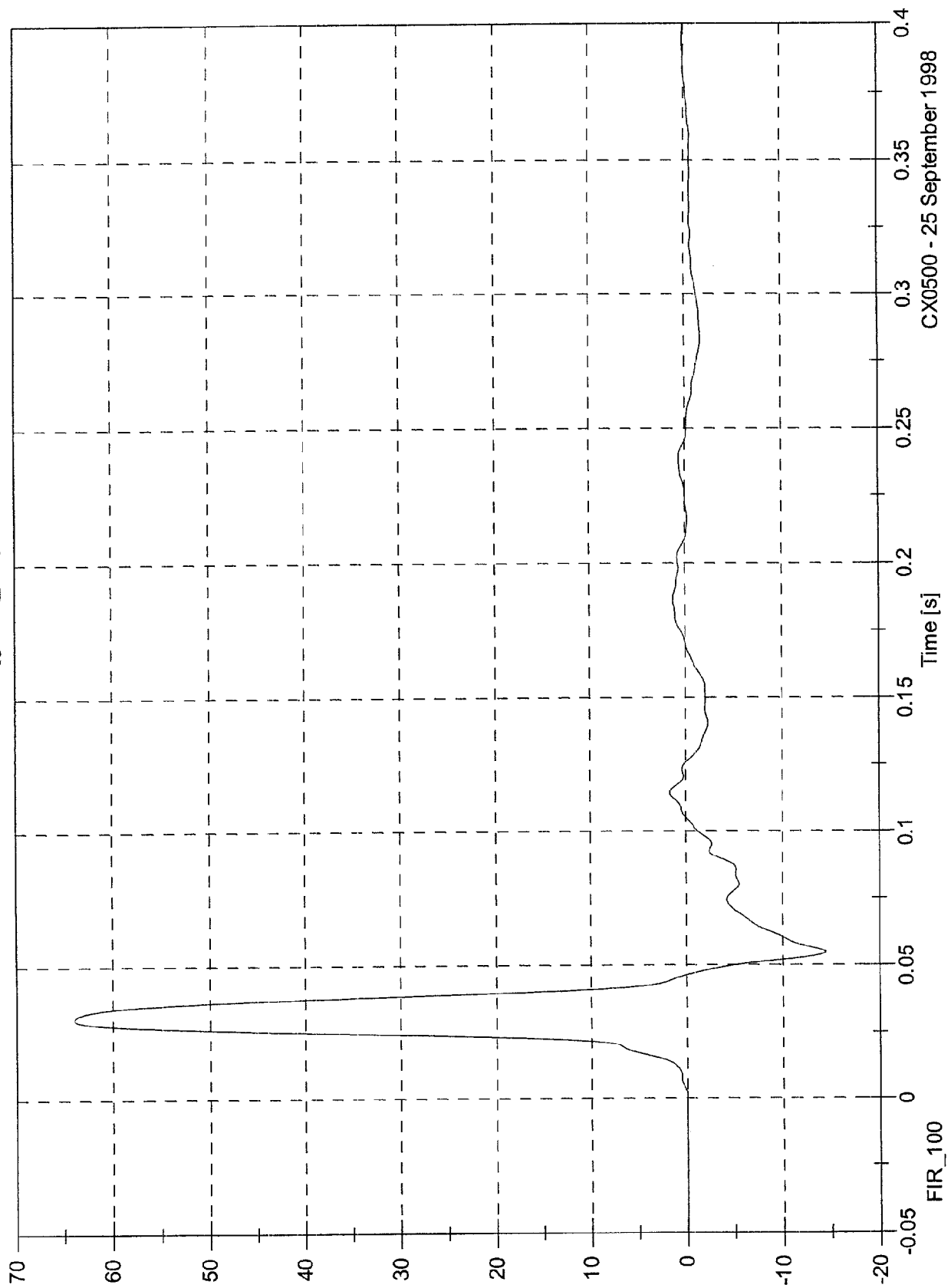


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 63.9 [g] at 0.0306 [s]
Min: -14.4 [g] at 0.055 [s]

Driver Pelvic Y [g, FIR_100]

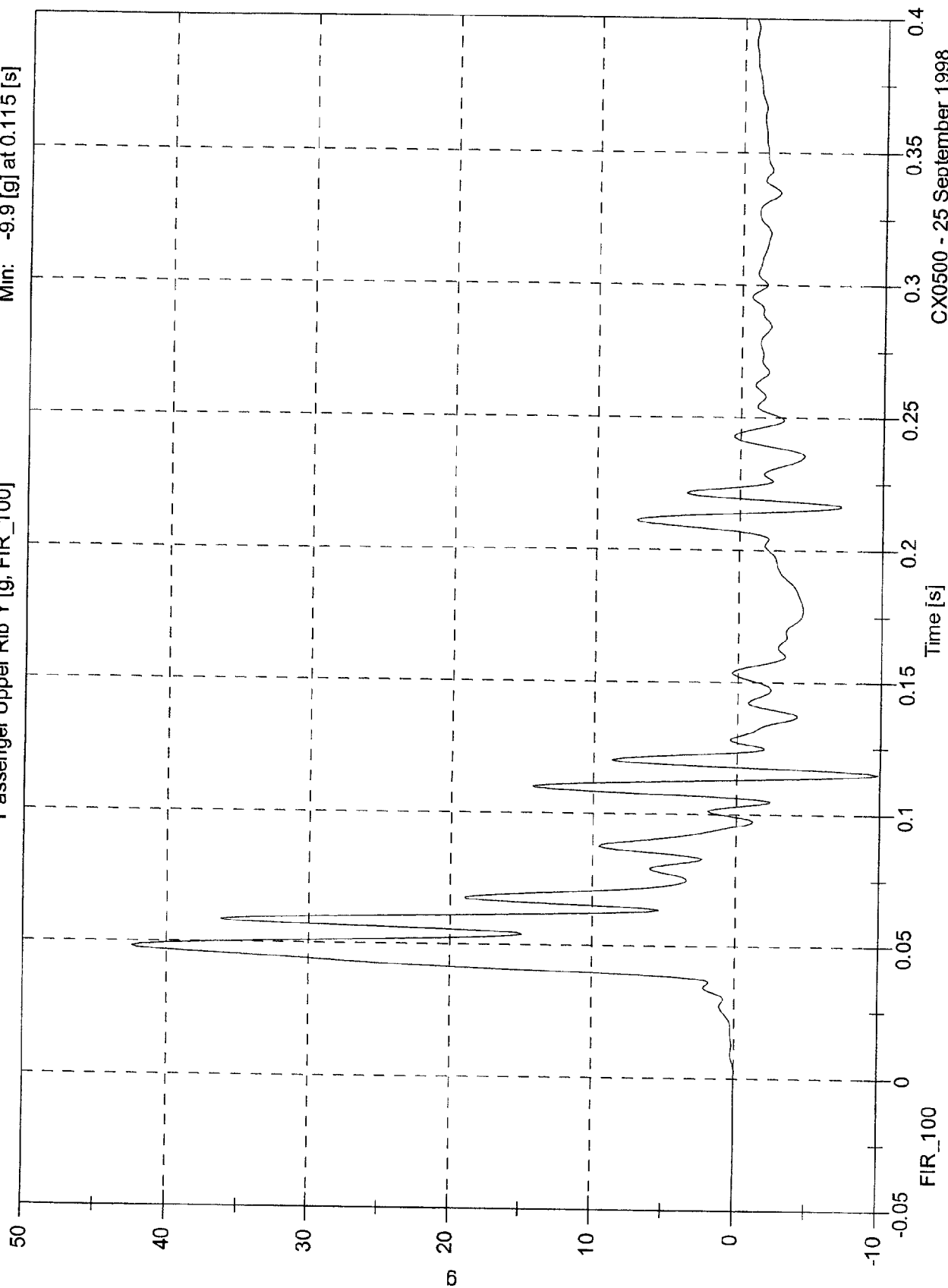


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 42.4 [g] at 0.0481 [s]
 Min: -9.9 [g] at 0.115 [s]

Passenger Upper Rib Y [g, FIR_100]

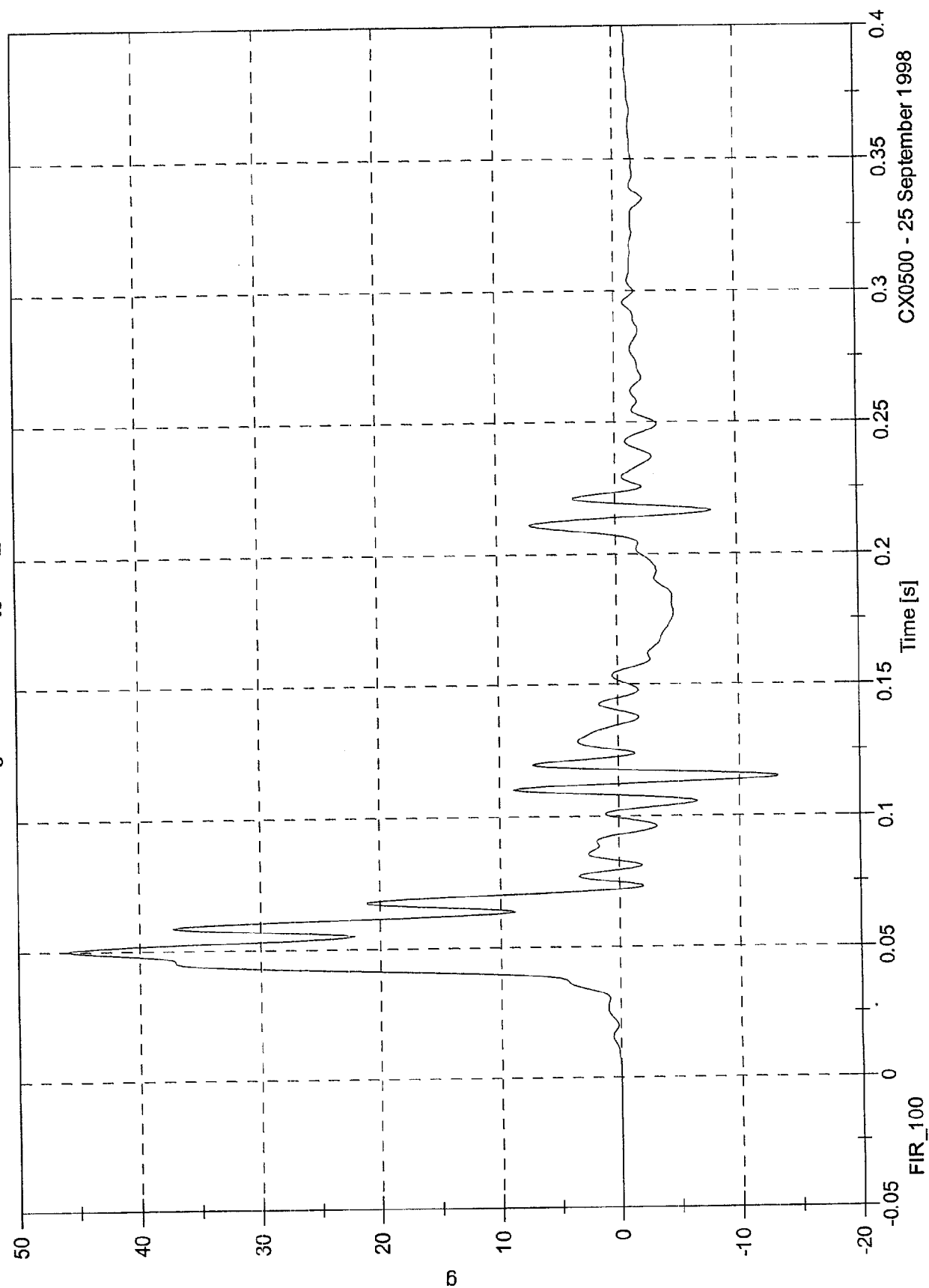


CX0500 - 25 September 1998

Max: 45.9 [g] at 0.05 [s]
Min: -13.2 [g] at 0.115 [s]

NHTSA Side Impact - 1999 Saab 9-5

Passenger Lower Rib Y [g, FIR_100]

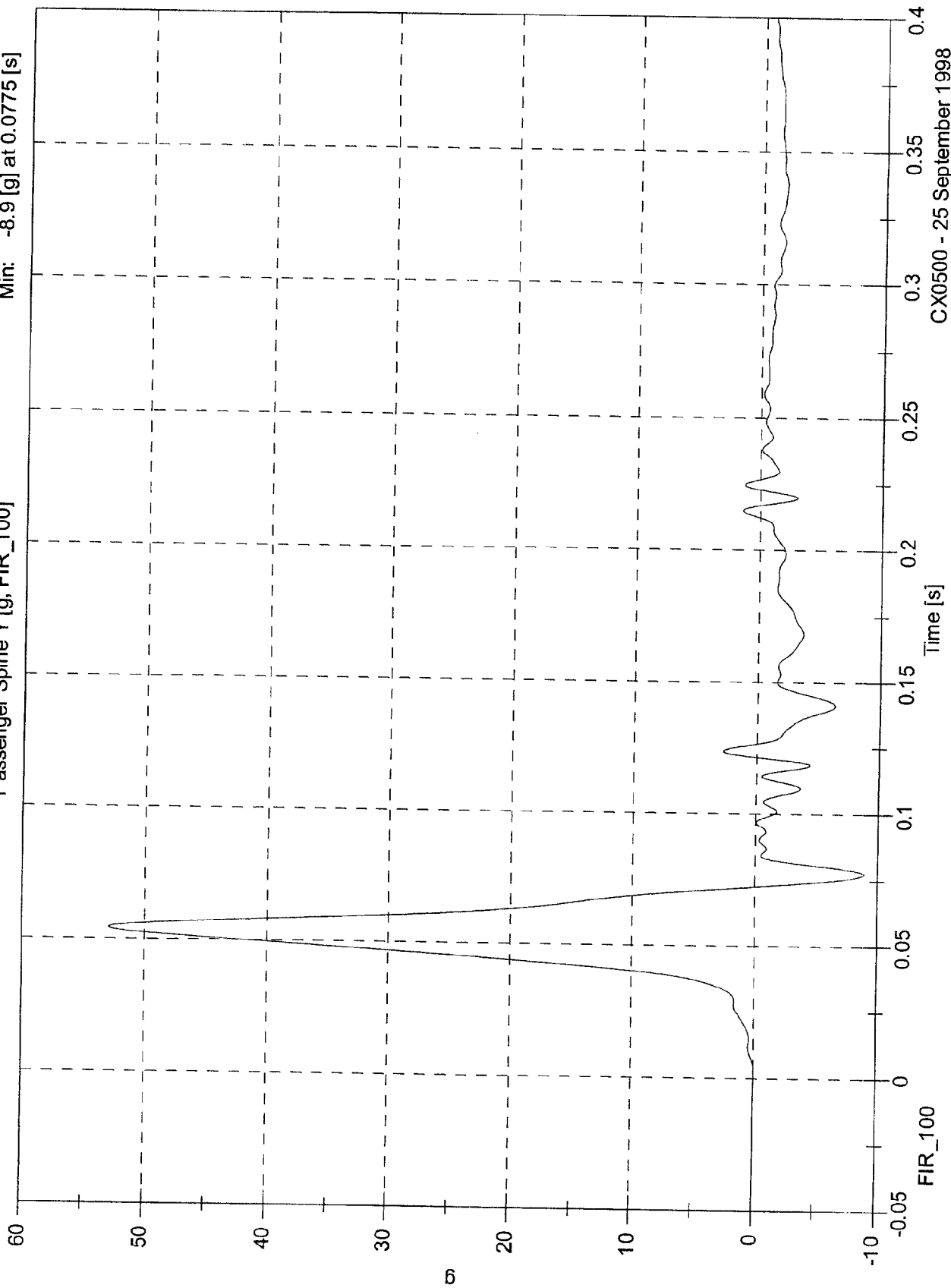


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 53.0 [g] at 0.0544 [s]
 Min: -8.9 [g] at 0.0775 [s]

Passenger Spine Y [g, FIR_100]

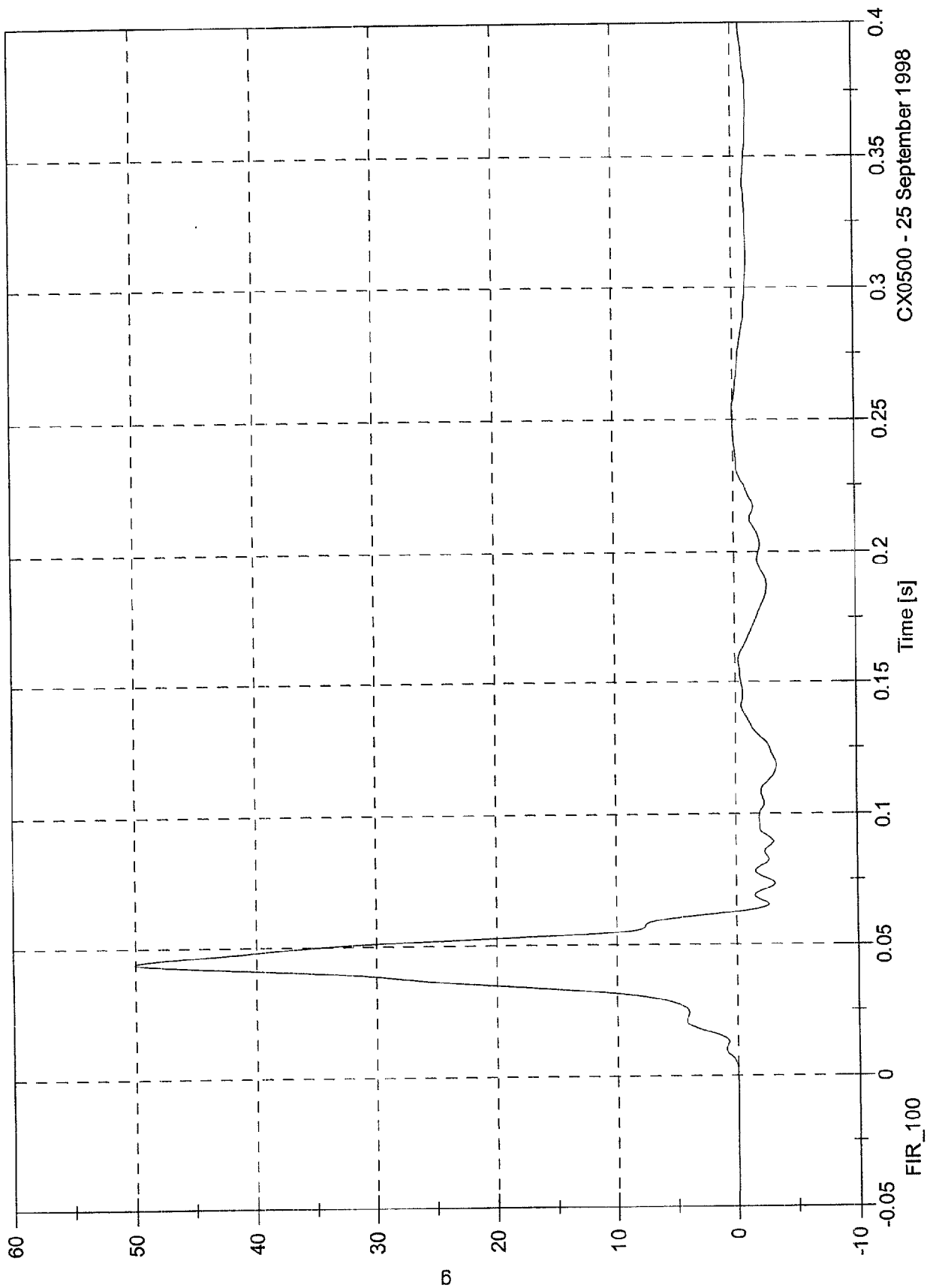


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 50.1 [g] at 0.0438 [s]
Min: -3.3 [g] at 0.1181 [s]

Passenger Pelvic Y [g, FIR_100]

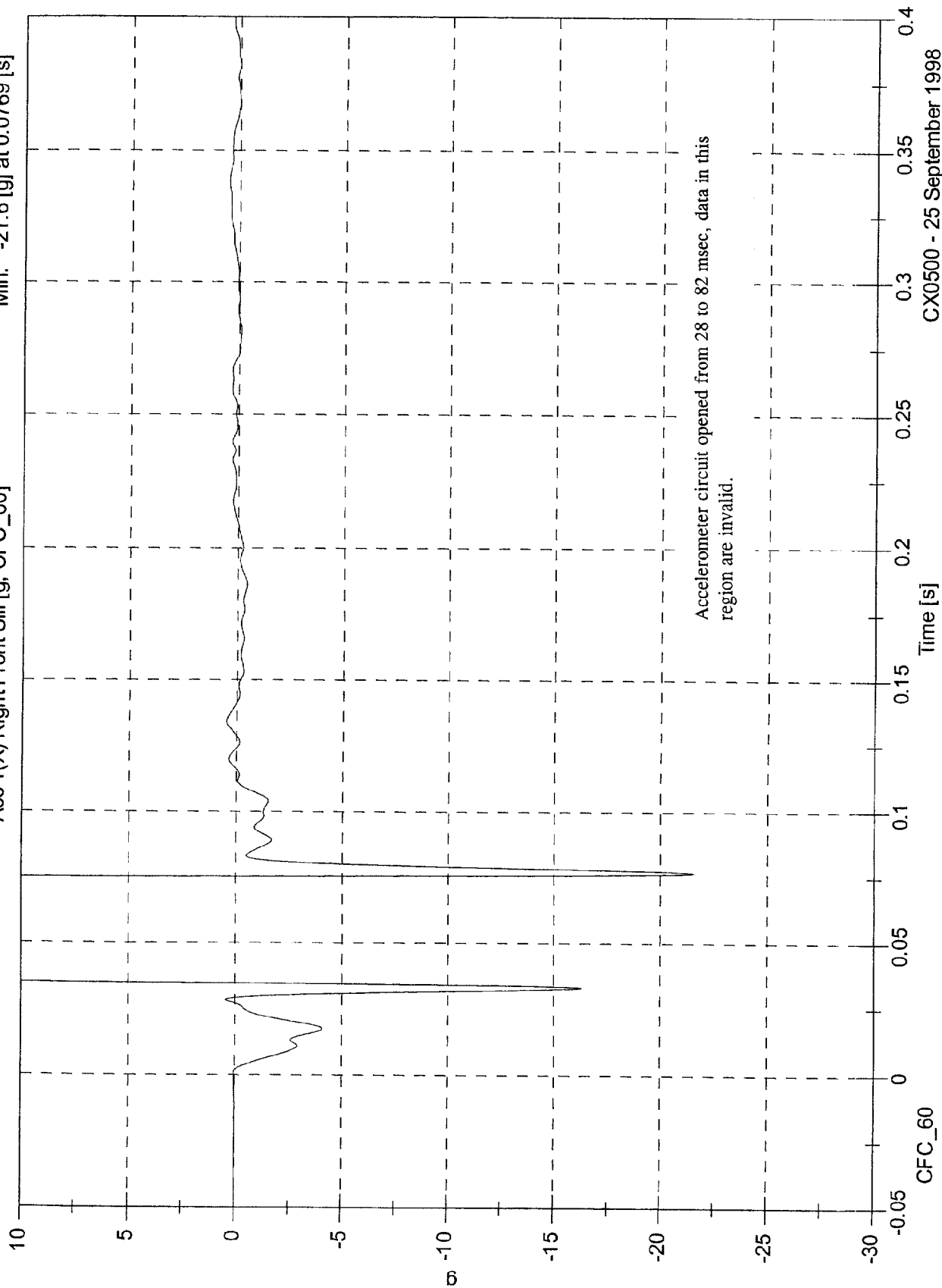


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 525.7 [g] at 0.0685 [s]
 Min: -21.6 [g] at 0.0769 [s]

Acc 1(X) Right Front Sill [g, CFC_60]

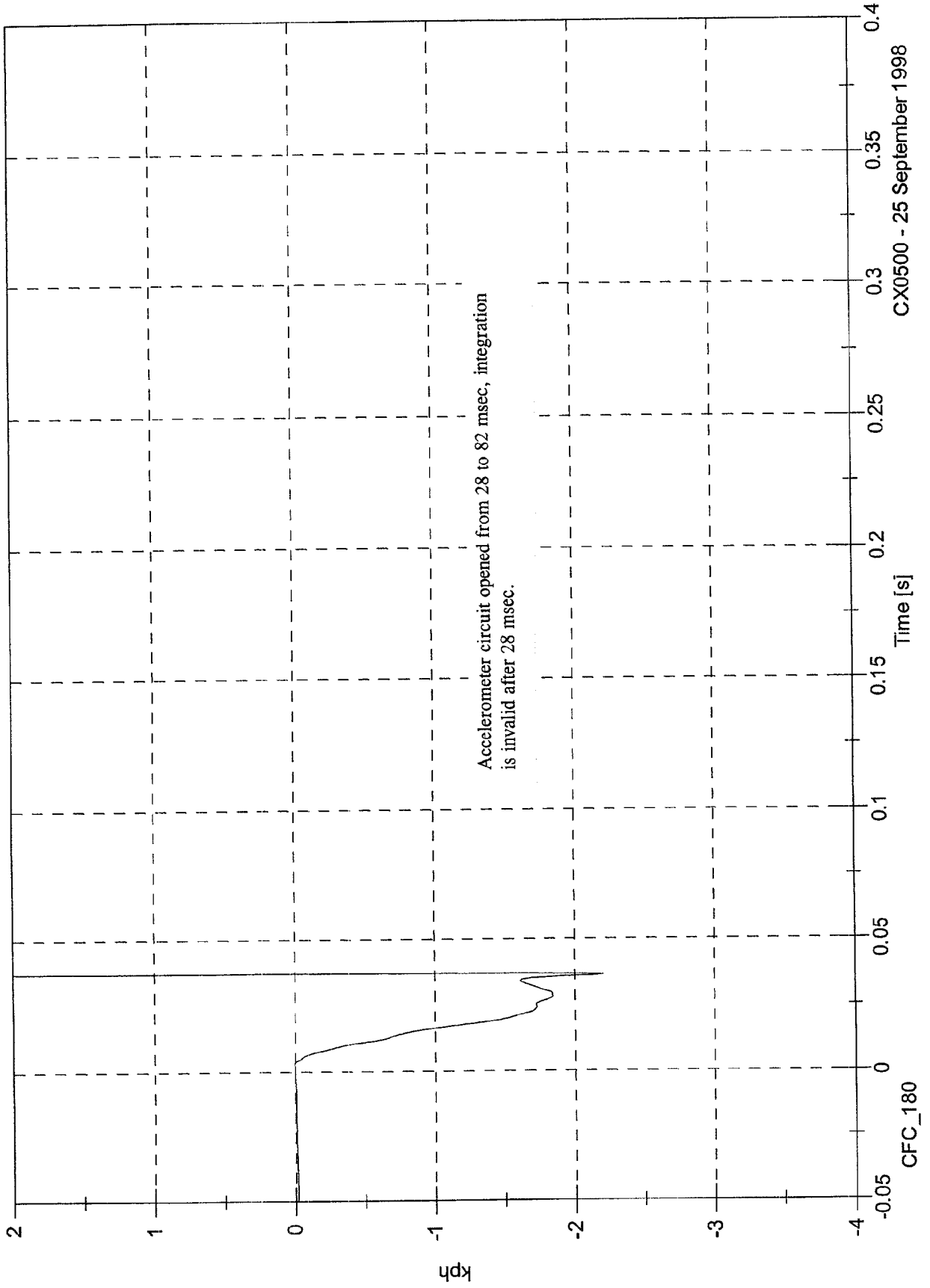


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 637.1 [kph] at 0.9389 [s]
 Min: -2.2 [kph] at 0.0363 [s]

Acc 1(X) Right Front Sill [kph, CFC_180]

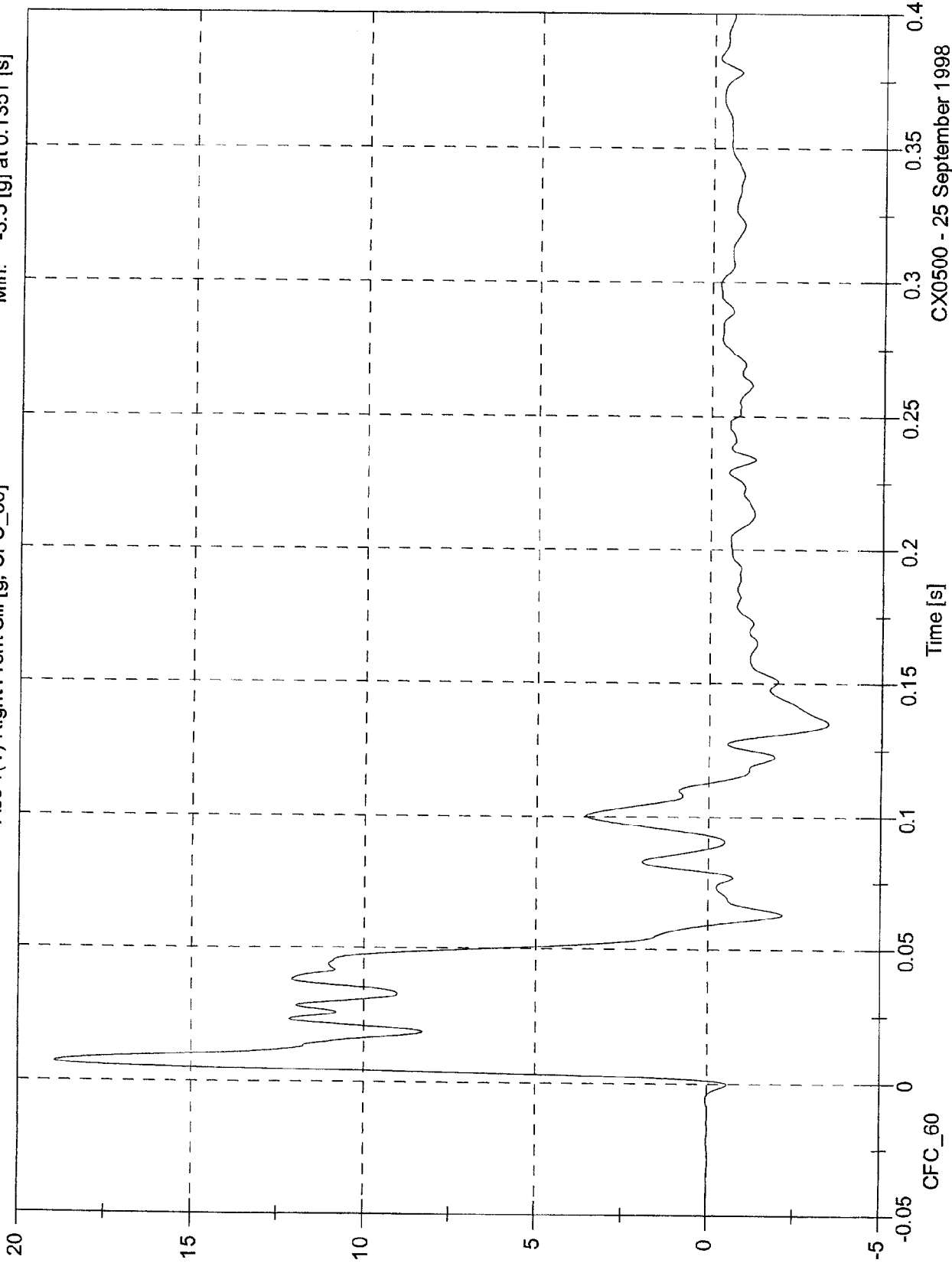


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 18.9 [g] at 0.0071 [s]
 Min: -3.5 [g] at 0.1351 [s]

Acc 1(Y) Right Front Sill [g, CFC_60]

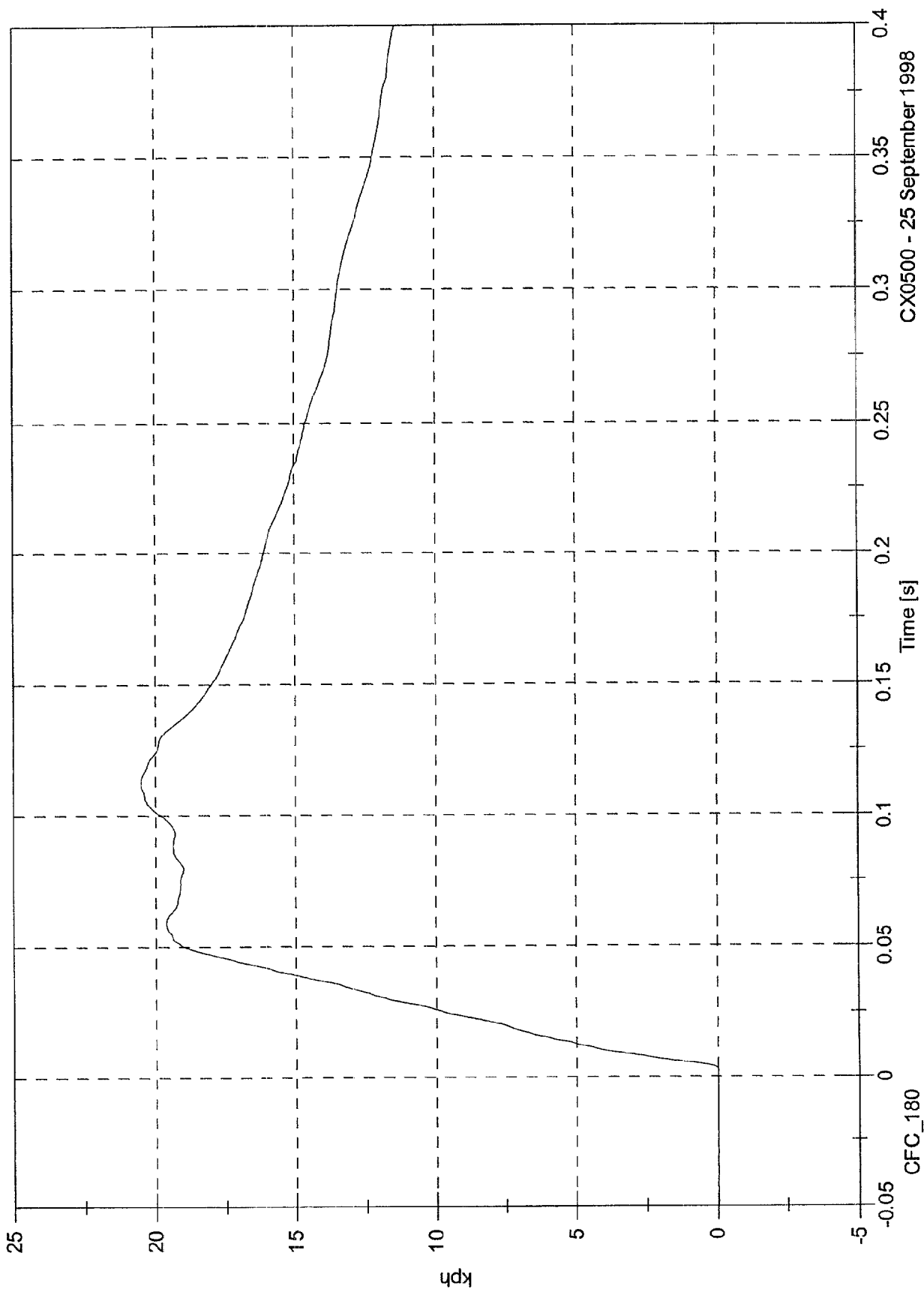


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max 20.5 [kph] at 0.1115 [s]
Min: -3.0 [kph] at 0.9597 [s]

Acc 1(Y) Right Front Sill [kph, CFC_180]

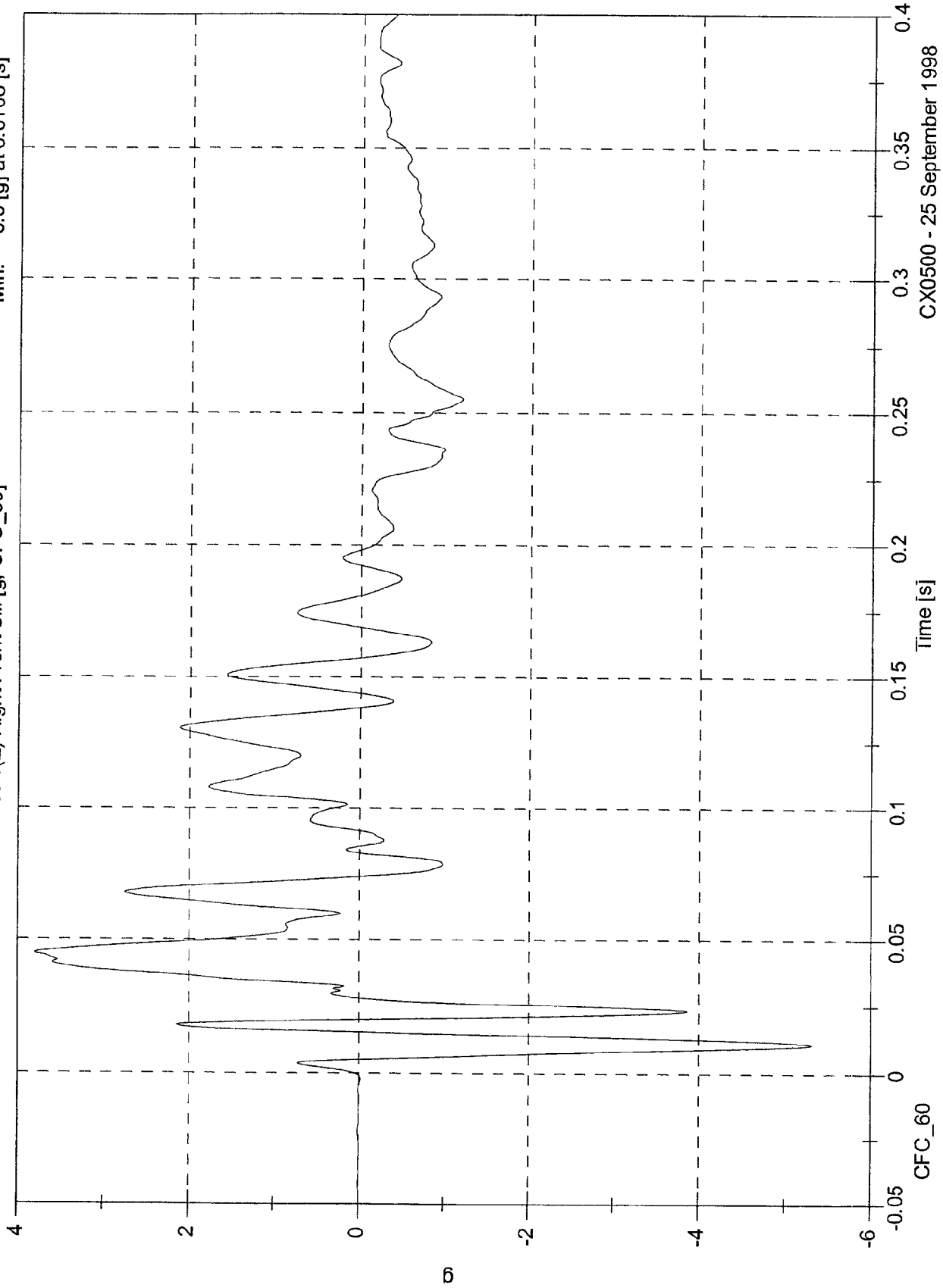


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 3.8 [g] at 0.0449 [s]
 Min: -5.3 [g] at 0.0108 [s]

Acc 1(Z) Right Front Sill [g, CFC_60]

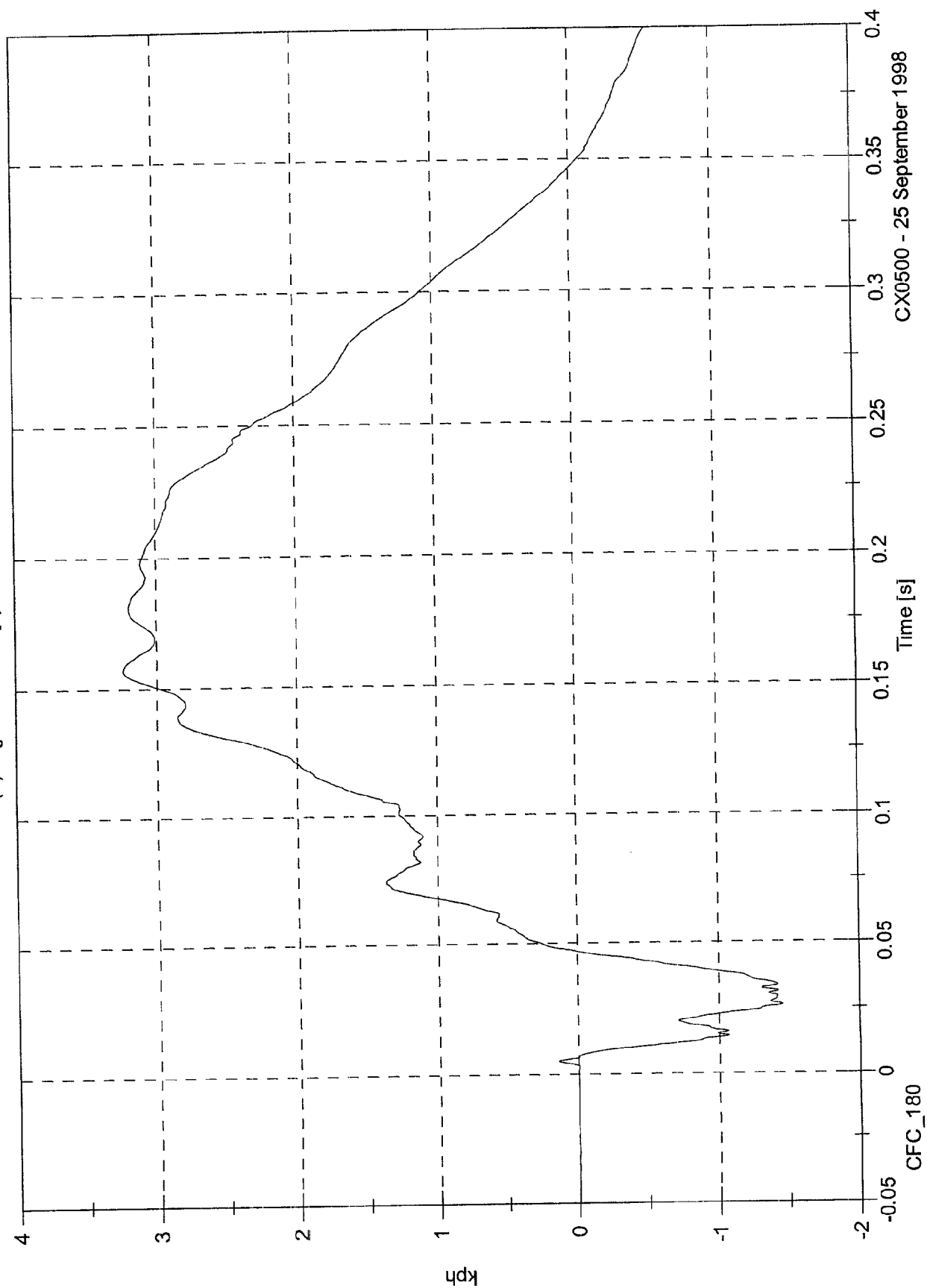


CX0500 - 25 September 1998

Max: 3.4 [kph] at 0.6664 [s]
Min: -1.5 [kph] at 0.0262 [s]

NHTSA Side Impact - 1999 Saab 9-5

Acc 1(Z) Right Front Sill [kph, CFC_180]

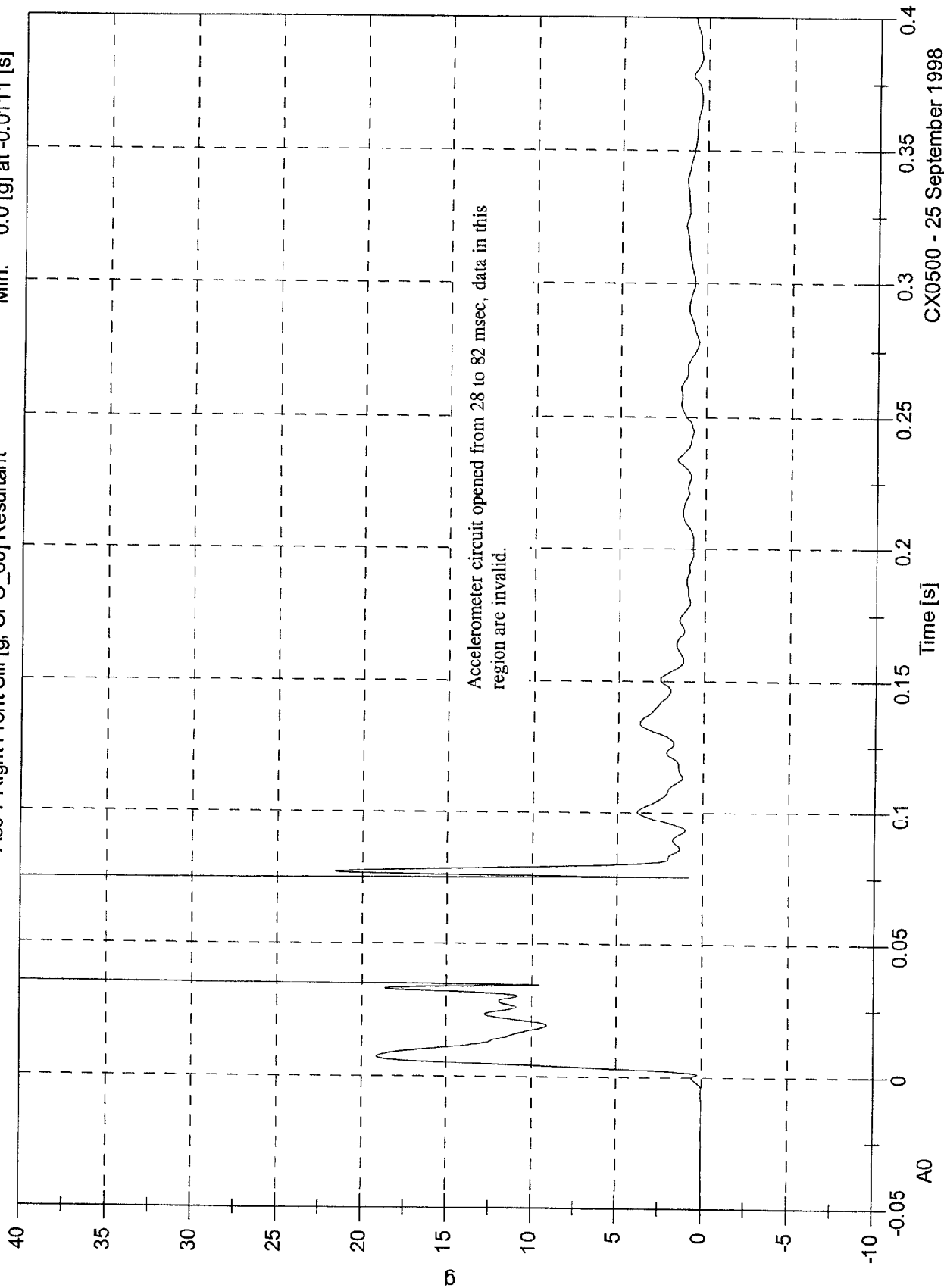


CX0500 - 25 September 1998

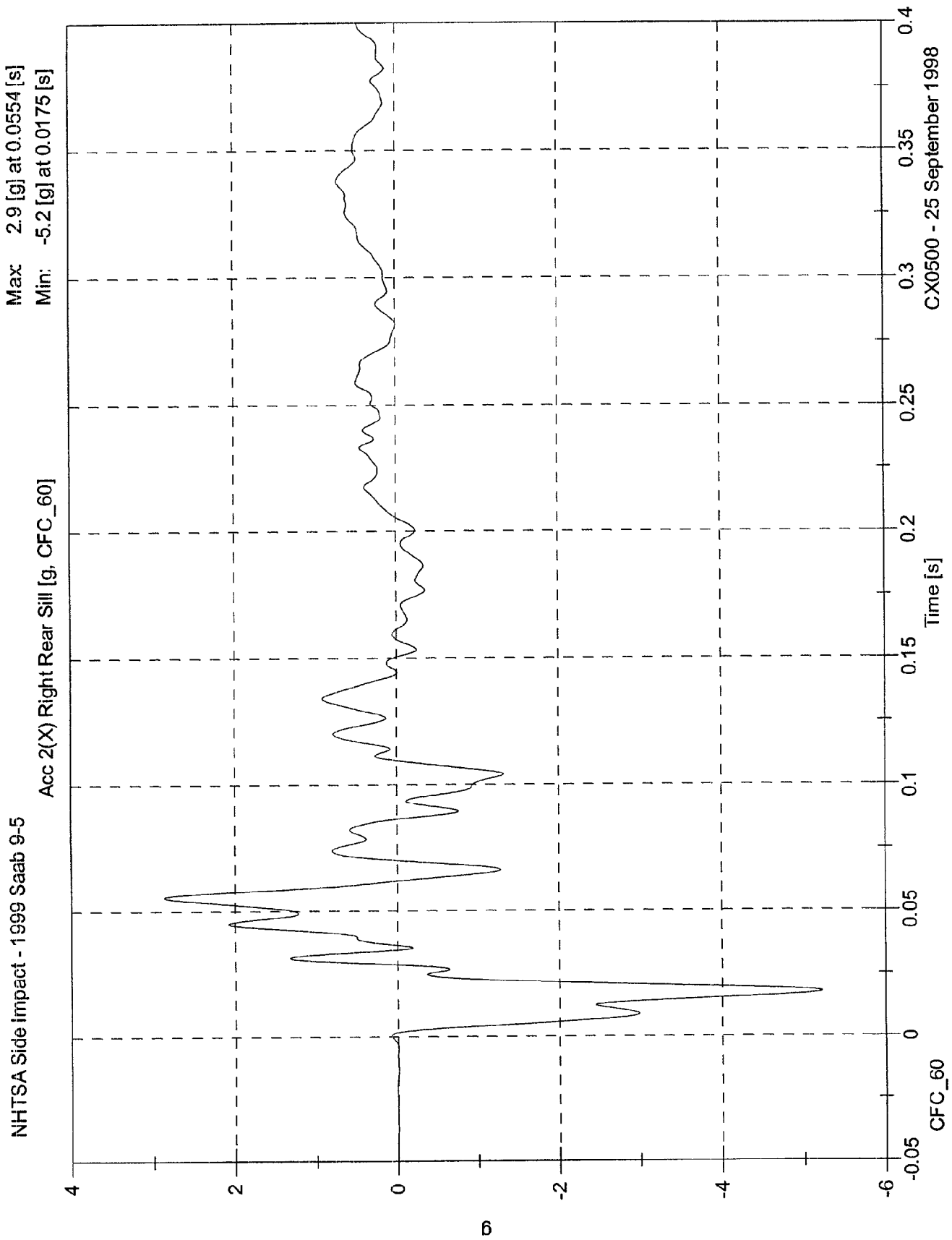
NHTSA Side Impact - 1999 Saab 9-5

Max: 525.7 [g] at 0.0685 [s]
Min: 0.0 [g] at -0.0111 [s]

Acc 1 Right Front Sill [g, CFC_60] Resultant



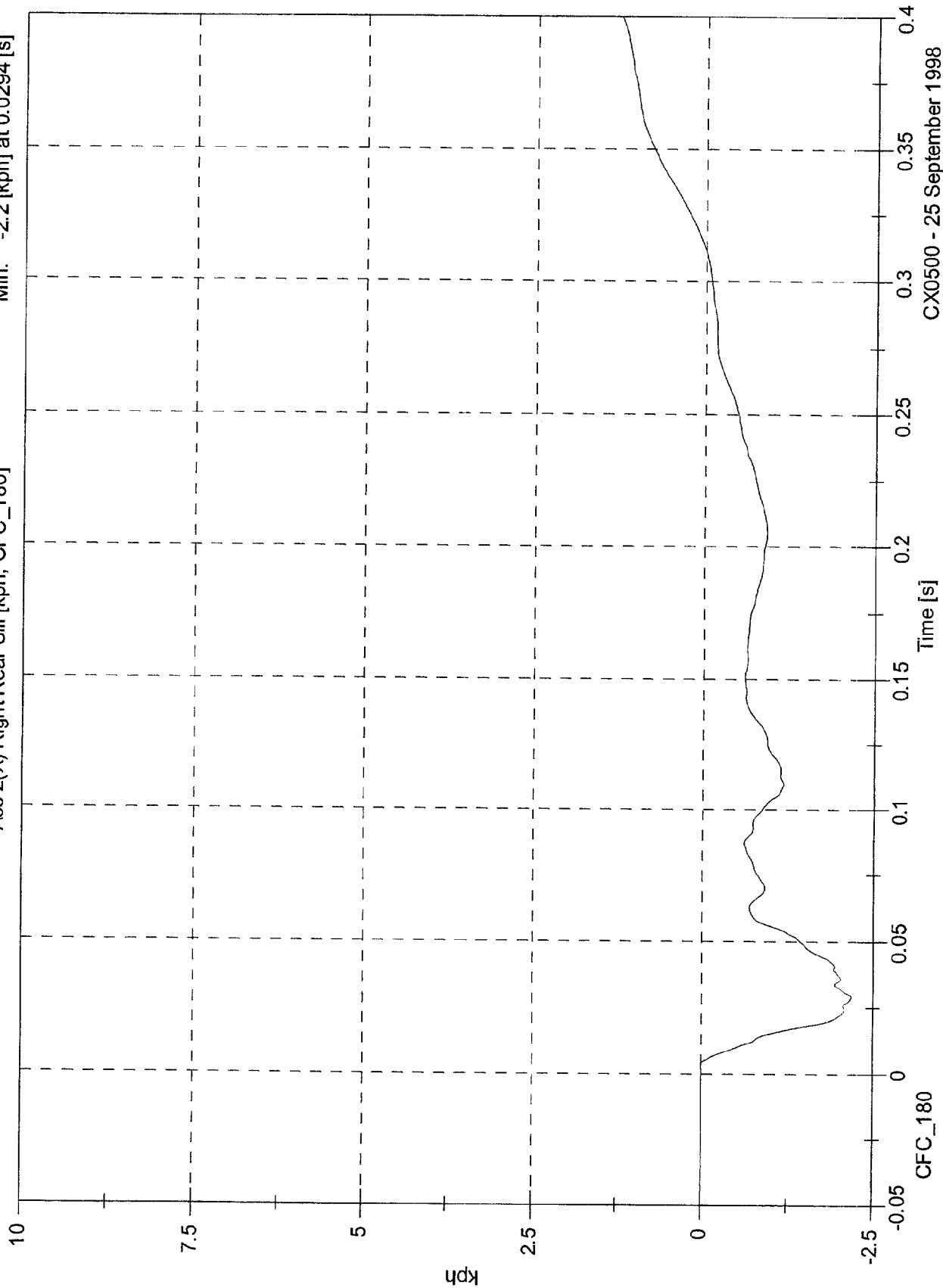
CX0500 - 25 September 1998



NHTSA Side Impact - 1999 Saab 9-5

Max: 8.4 [kph] at 0.9512 [s]
 Min: -2.2 [kph] at 0.0294 [s]

Acc 2(X) Right Rear Sill [kph, CFC_180]

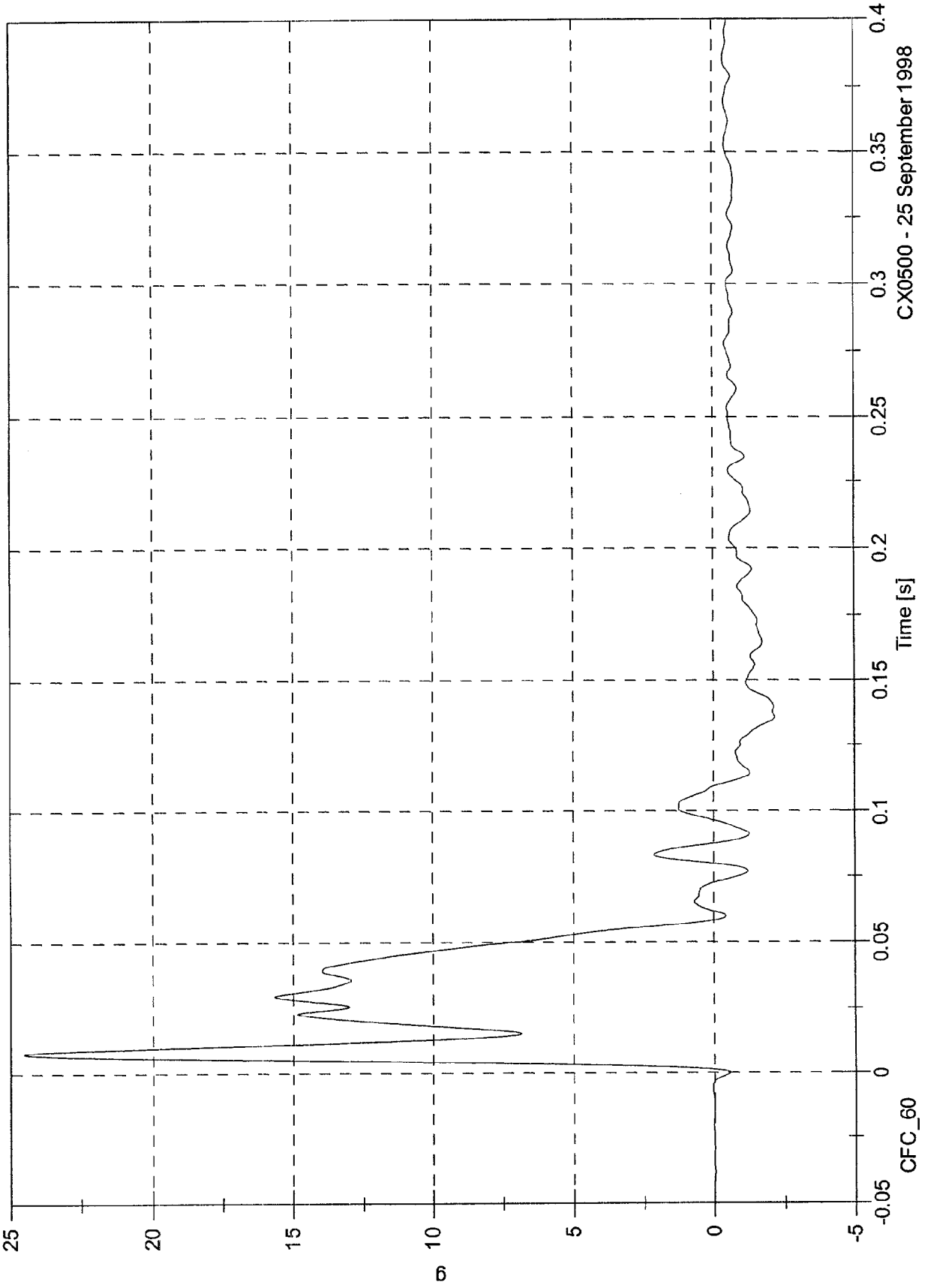


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 24.5 [g] at 0.008 [s]
 Min: -2.2 [g] at 0.1358 [s]

Acc 2(Y) Right Rear Sill [g, CFC_60]

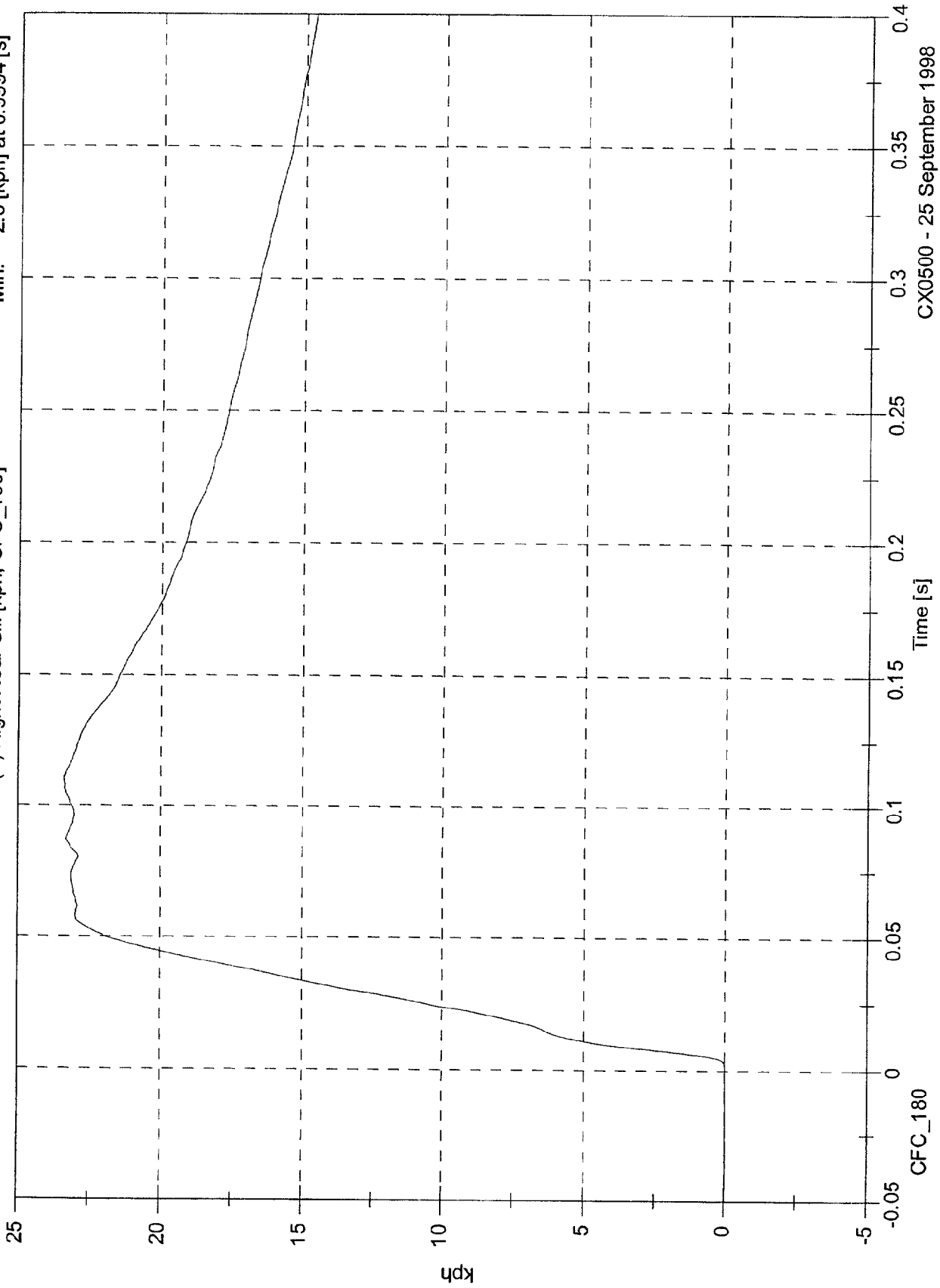


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 23.4 [kph] at 0.1103 [s]
Min: -2.6 [kph] at 0.9994 [s]

Acc 2(Y) Right Rear Sill [kph, CFC_180]

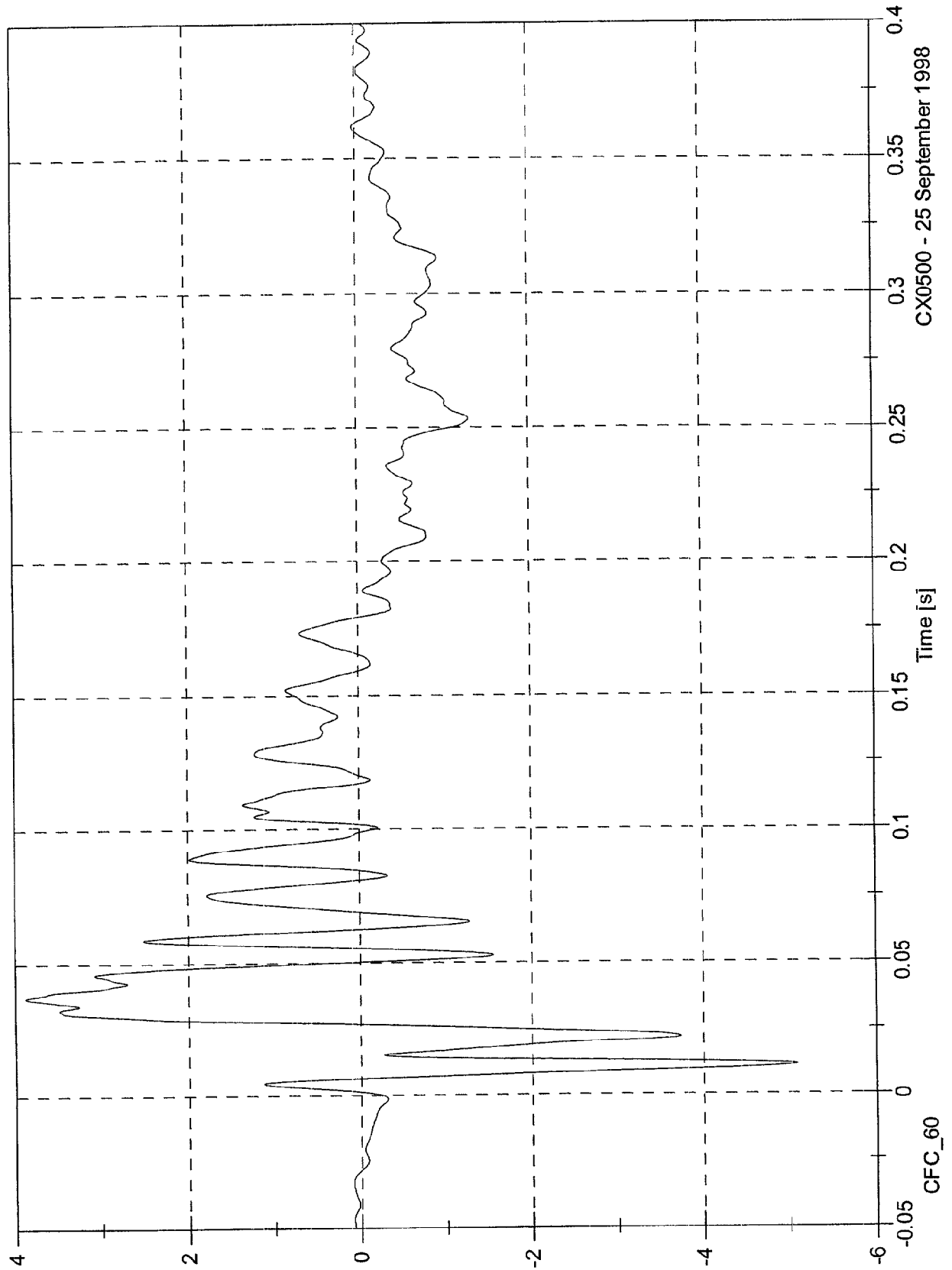


CX0500 - 25 September 1998

Max: 3.9 [g] at 0.0372 [s]
Min: -5.1 [g] at 0.0109 [s]

NHTSA Side Impact - 1999 Saab 9-5

Acc 2(Z) Right Rear Sill [g, CFC_60]

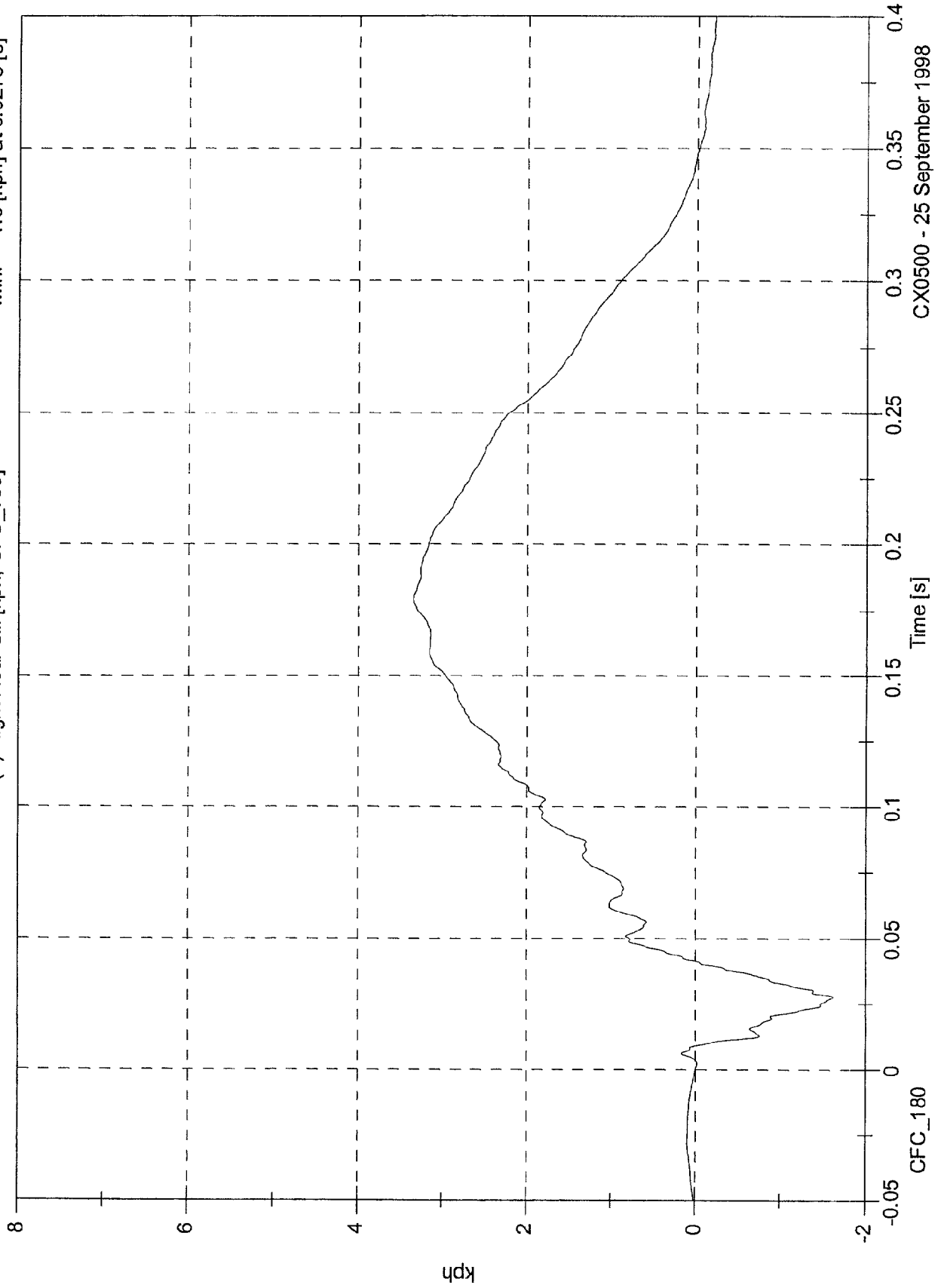


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NHTSA Side Impact - 1999 Saab 9-5

Max: 6.8 [kph] at 0.6842 [s]
Min: -1.6 [kph] at 0.0278 [s]

Acc 2(Z) Right Rear Sill [kph, CFC_180]

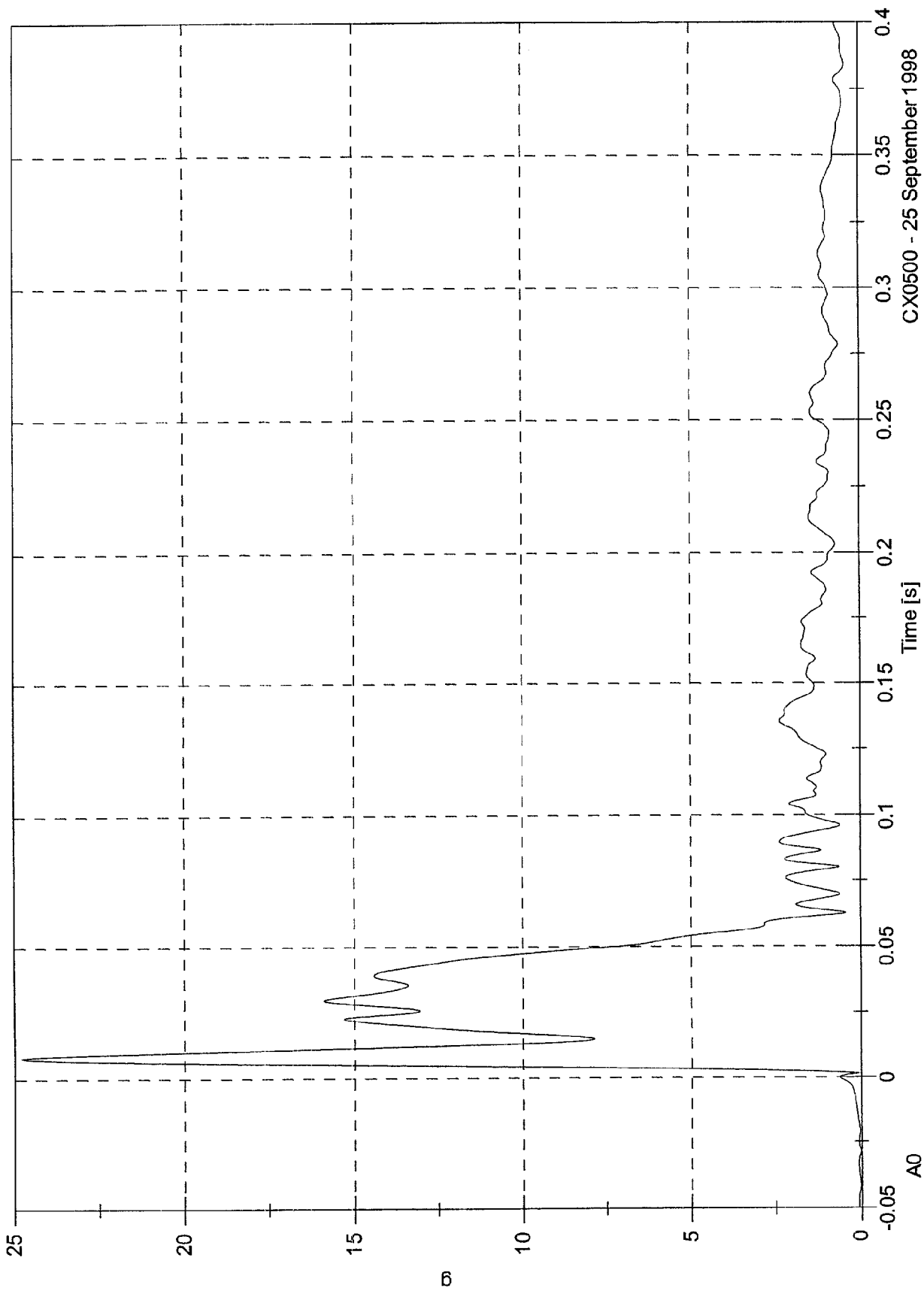


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 24.8 [g] at 0.008 [s]
 Min: 0.0 [g] at -0.0621 [s]

Acc 2 Right Rear Sill [g, CFC_60] Resultant

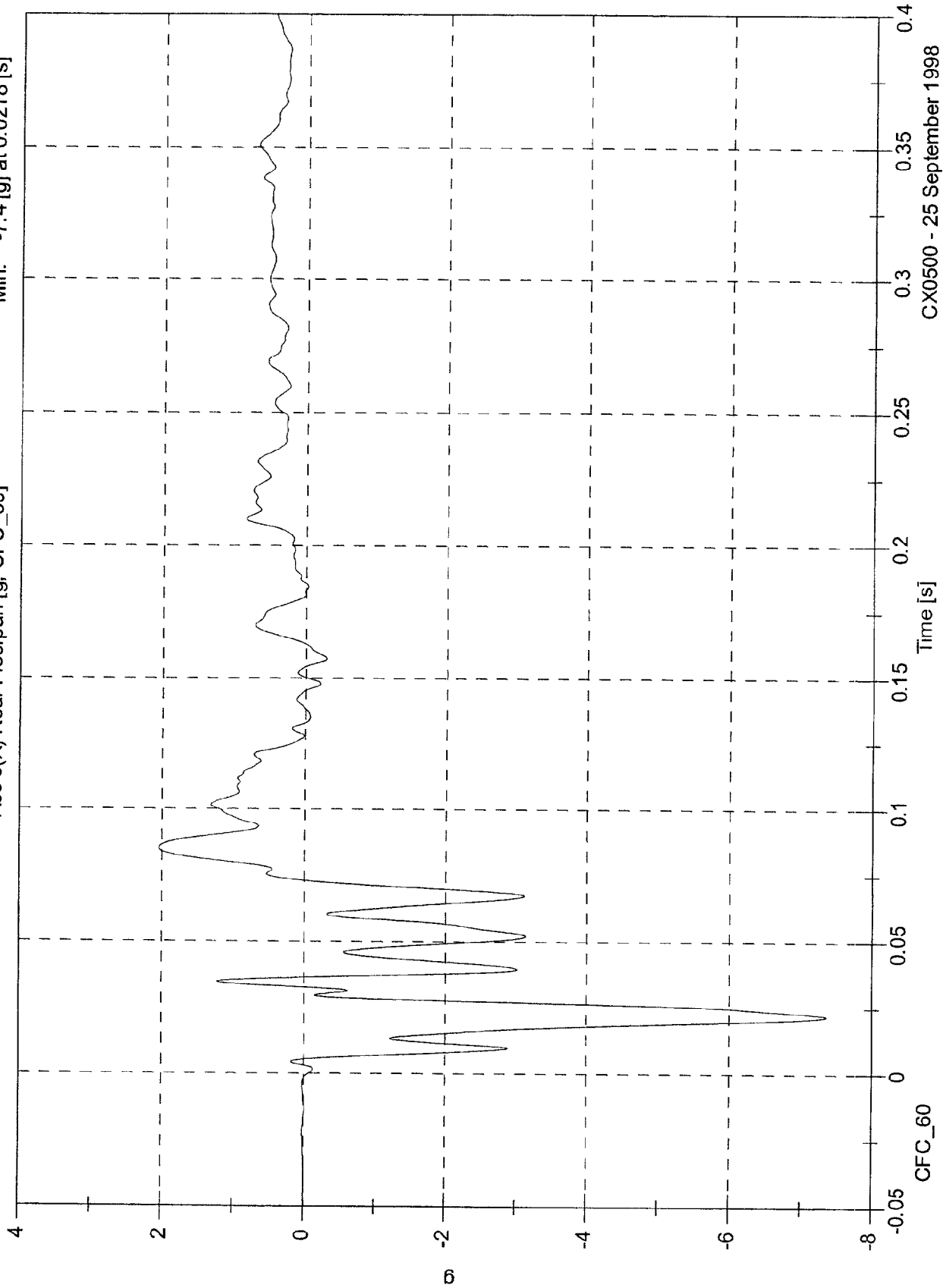


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 2.0 [g] at 0.085 [s]
 Min: -7.4 [g] at 0.0218 [s]

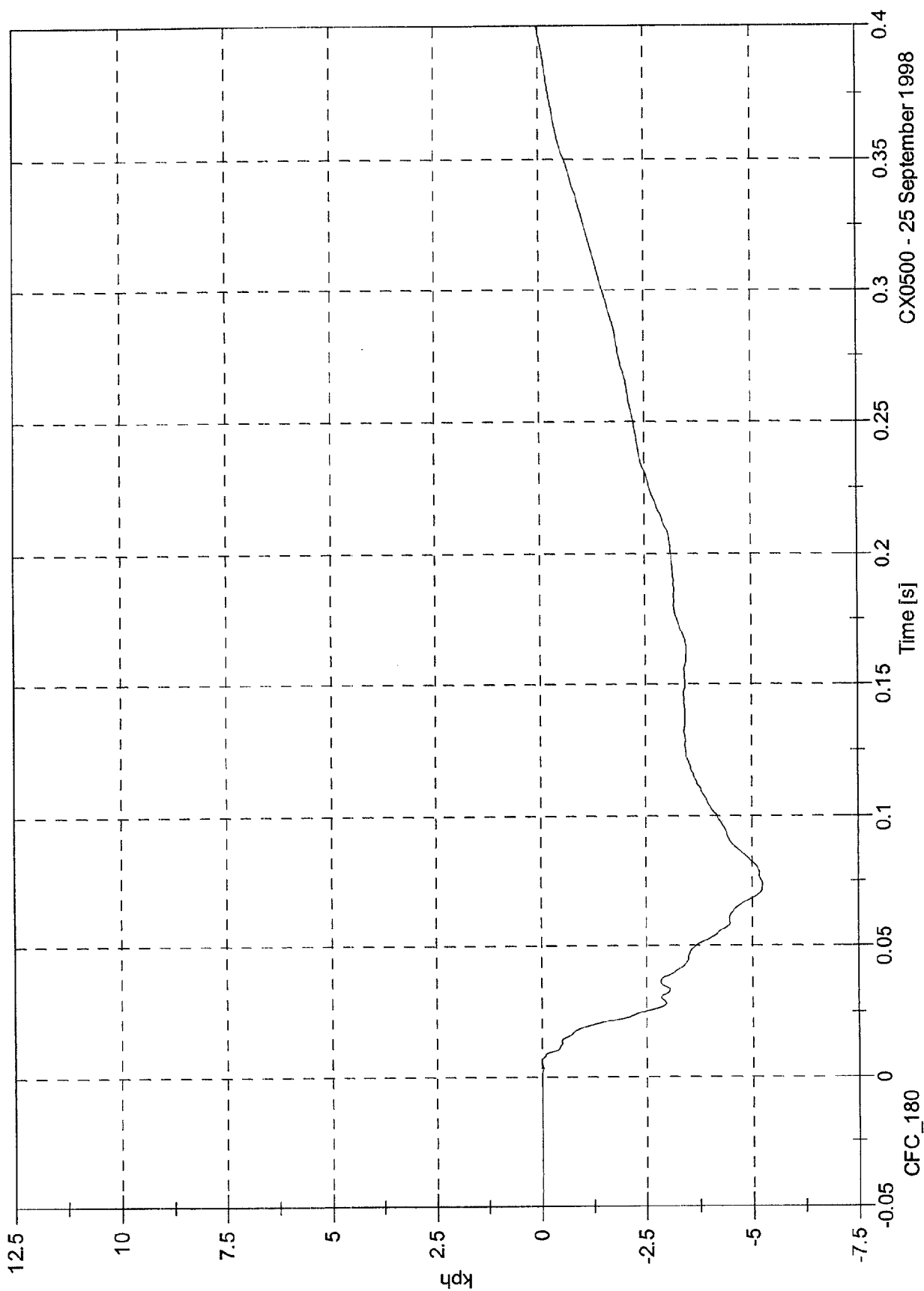
Acc 3(X) Rear Floorpan [g, CFC_60]



NHTSA Side Impact - 1999 Saab 9-5

Acc 3(X) Rear Floorpan [kph, CFC_180]

Max: 10.5 [kph] at 0.9992 [s]
Min: -5.2 [kph] at 0.0738 [s]

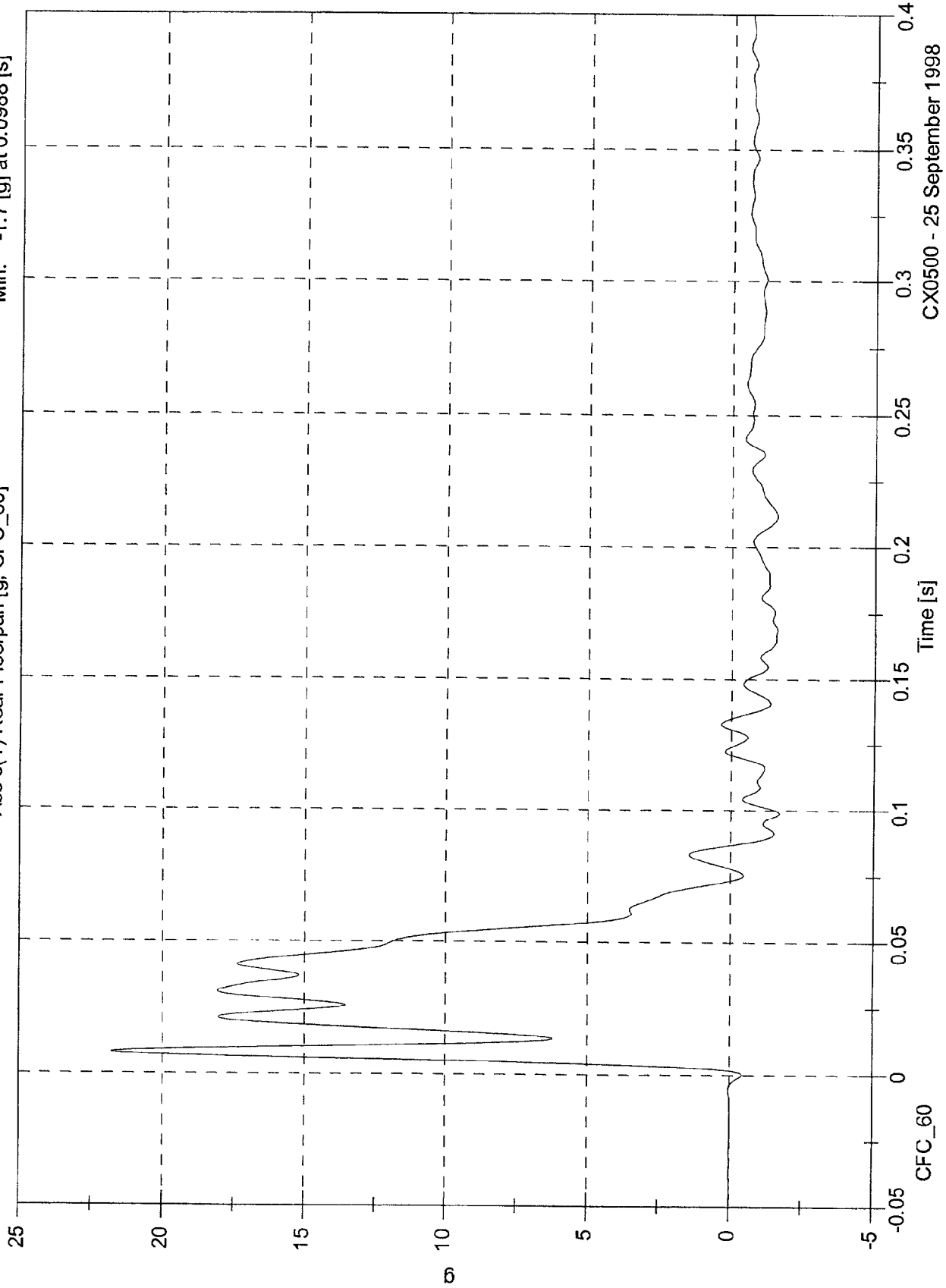


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 21.8 [g] at 0.0079 [s]
 Min: -1.7 [g] at 0.0988 [s]

Acc 3(Y) Rear Floorpan [g, CFC_60]

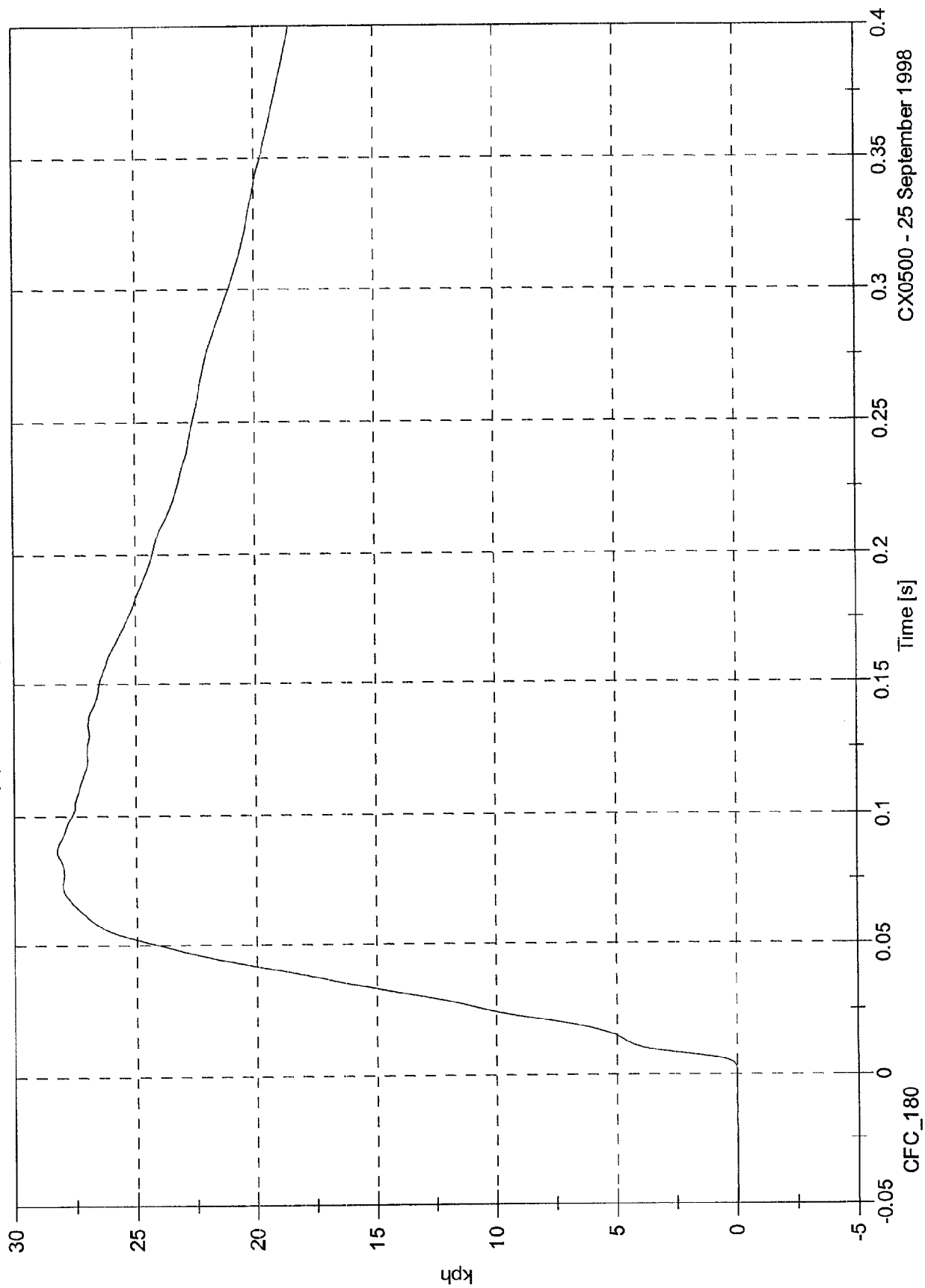


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 28.2 [kph] at 0.0863 [s]
Min: -0.9 [kph] at 0.9999 [s]

Acc 3(Y) Rear Floorpan [kph, CFC_180]

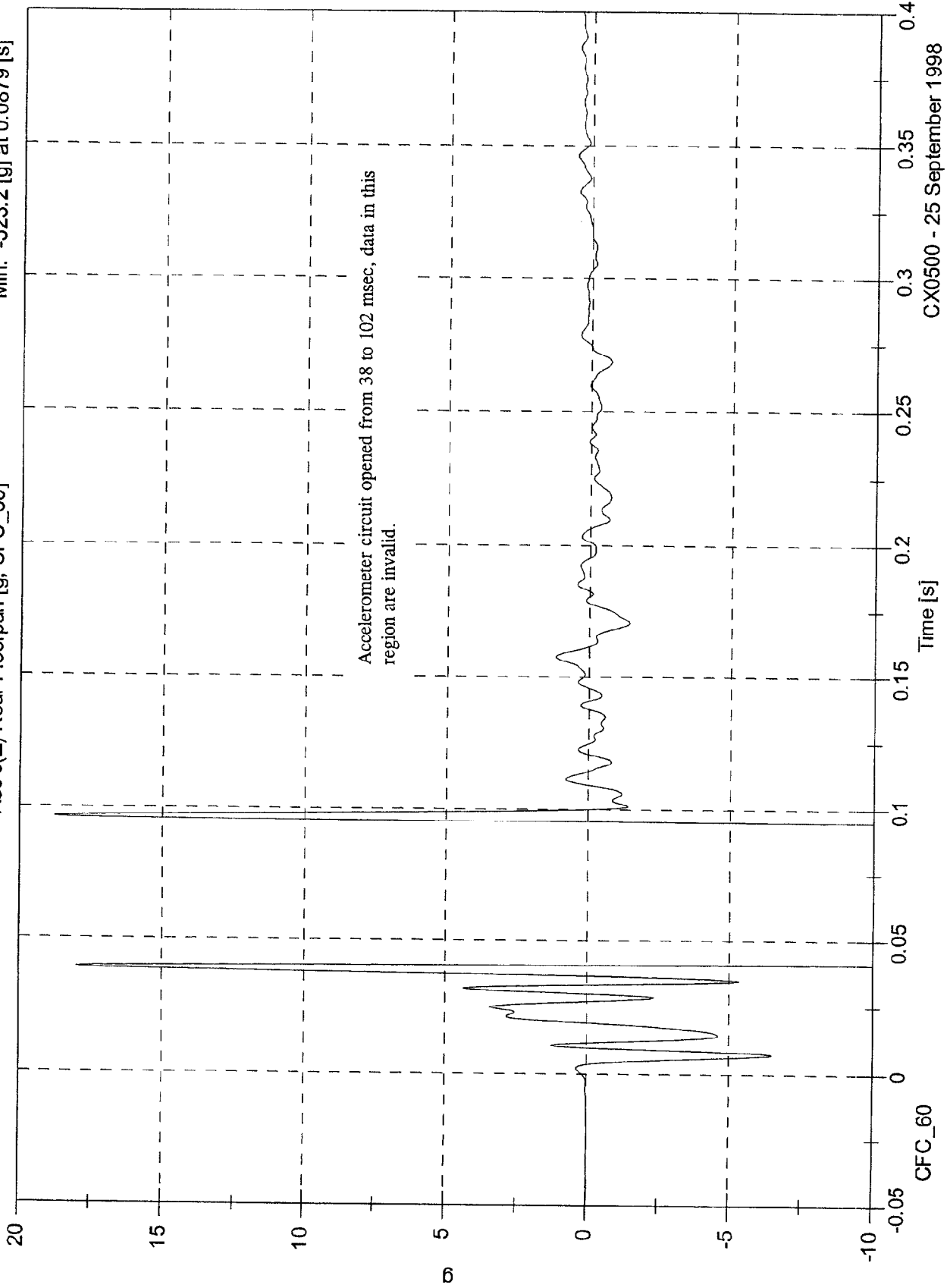


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 18.8 [g] at 0.0963 [s]
Min: -523.2 [g] at 0.0879 [s]

Acc 3(Z) Rear Floorpan [g, CFC_60]



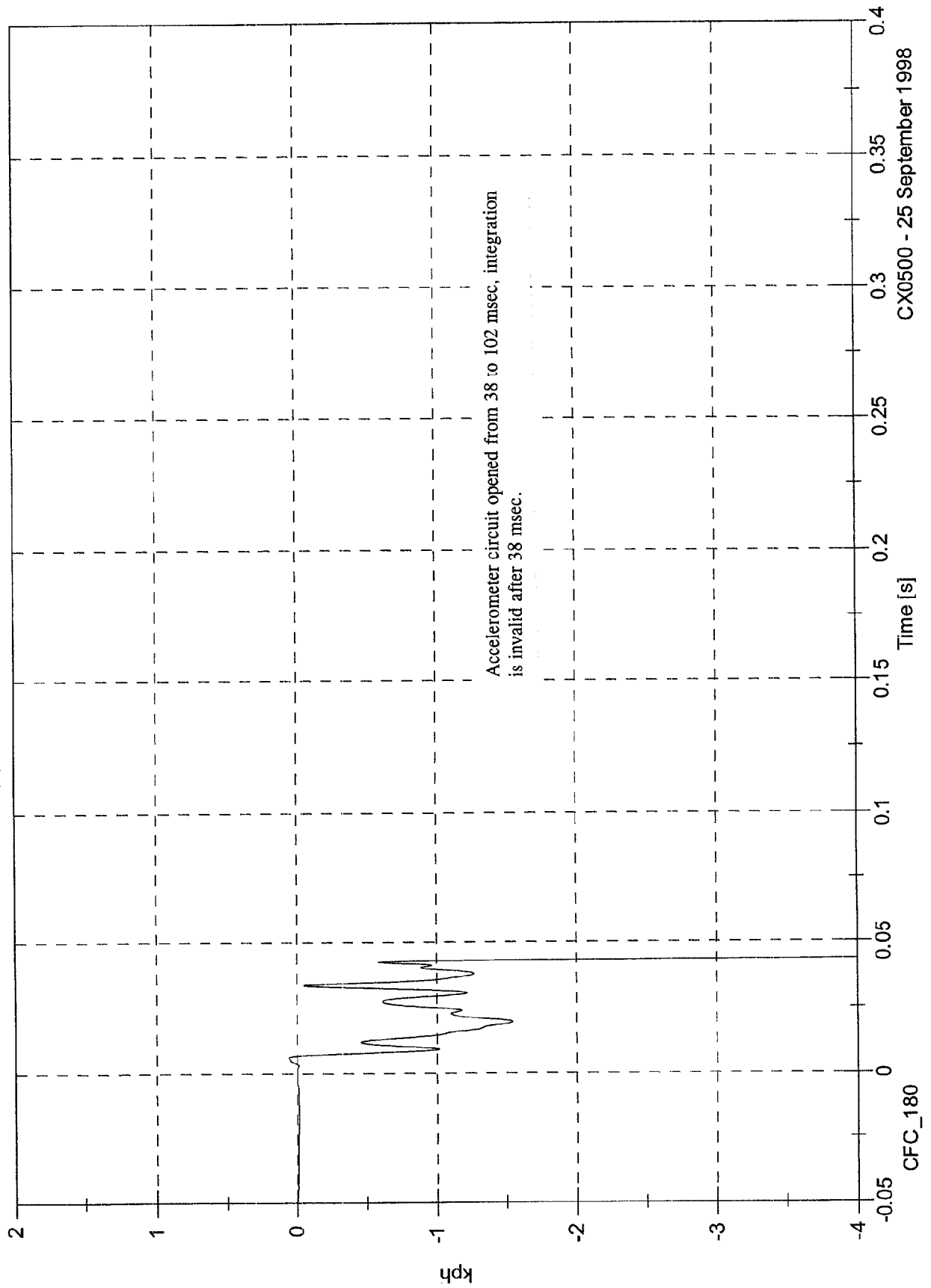
CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Acc 3(Z) Rear Floorpan [kph, CFC_180]

Max: 0.1 [kph] at 0.0059 [s]

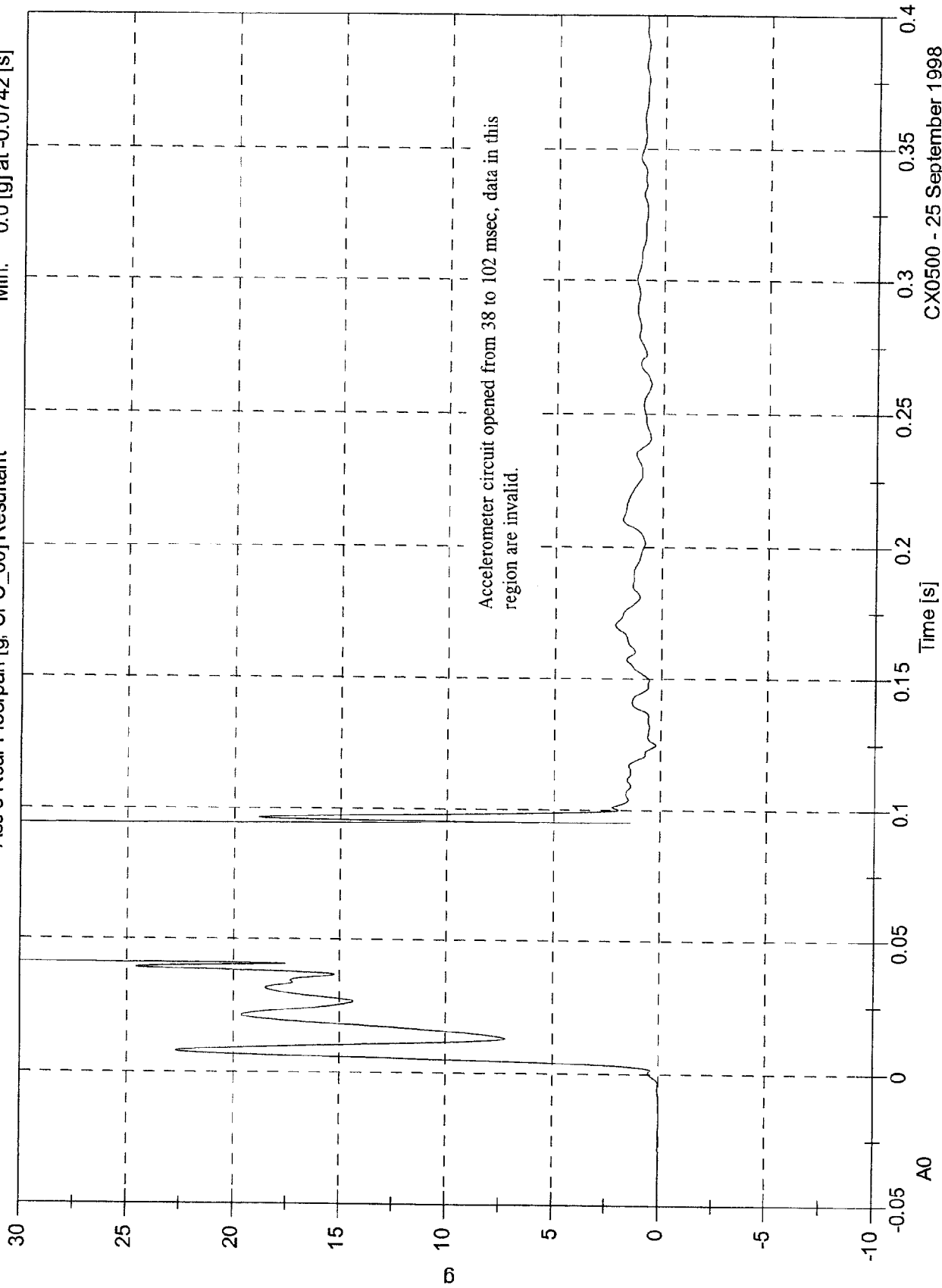
Min: -872.9 [kph] at 0.2759 [s]



NHTSA Side Impact - 1999 Saab 9-5

Max: 523.2 [g] at 0.0879 [s]
 Min: 0.0 [g] at -0.0742 [s]

Acc 3 Rear Floorpan [g, CFC_60] Resultant

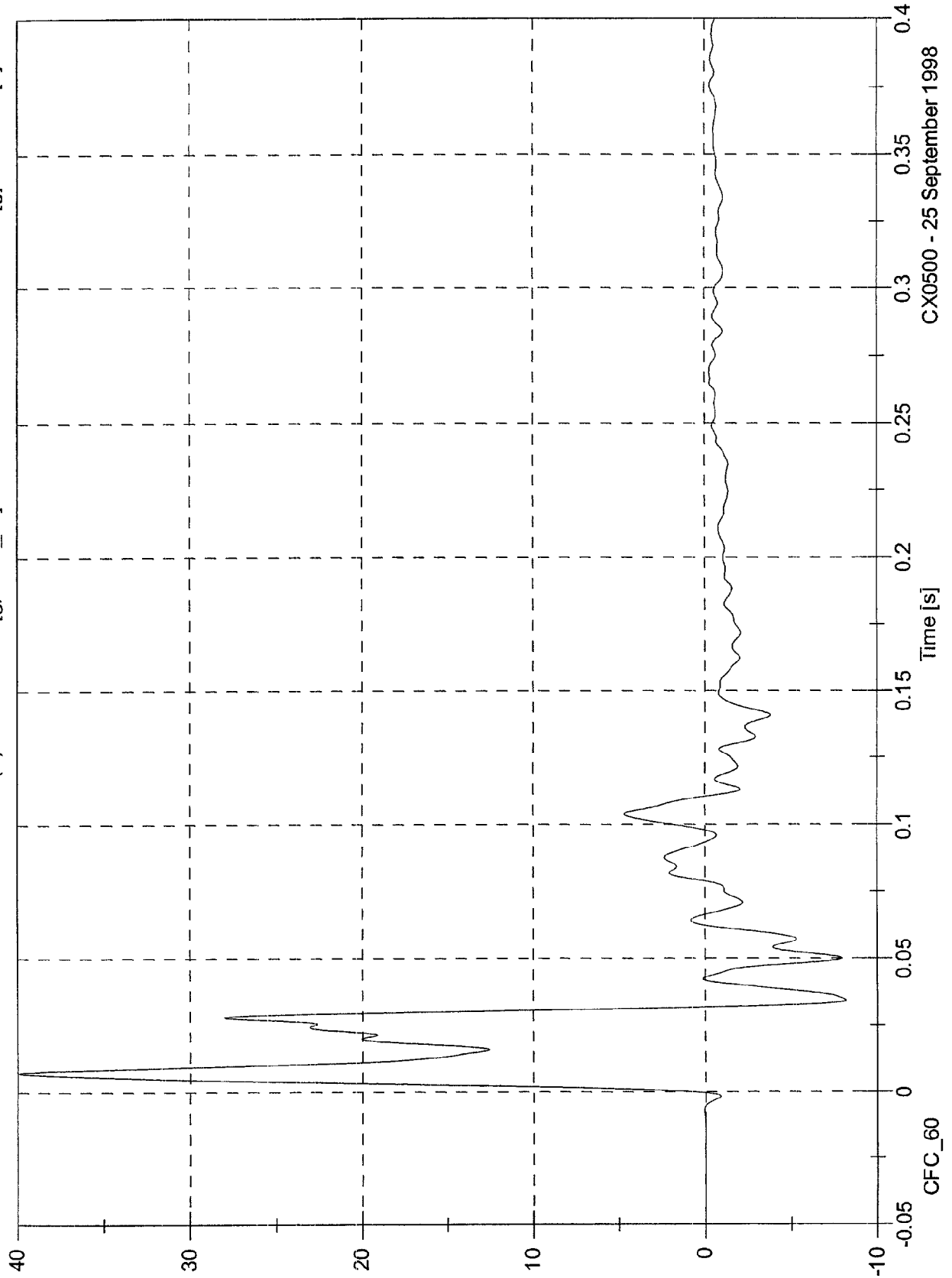


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 39.9 [g] at 0.0071 [s]
 Min: -8.2 [g] at 0.0342 [s]

Acc 4(Y) Left Rear Sill [g, CFC_60]

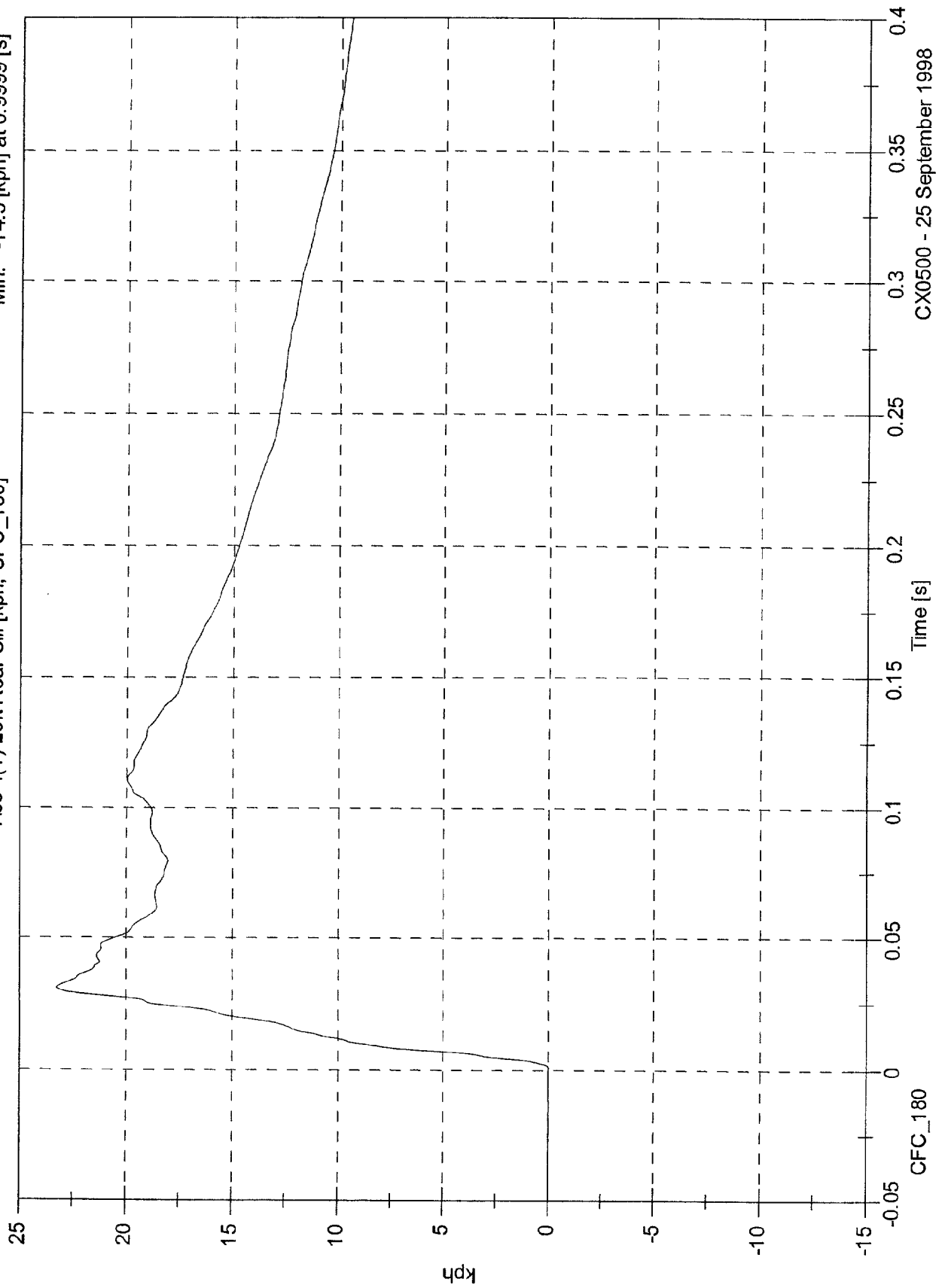


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 23.2 [kph] at 0.0311 [s]
Min: -14.3 [kph] at 0.9999 [s]

Acc 4(Y) Left Rear Sill [kph, CFC_180]



CX0500 - 25 September 1998

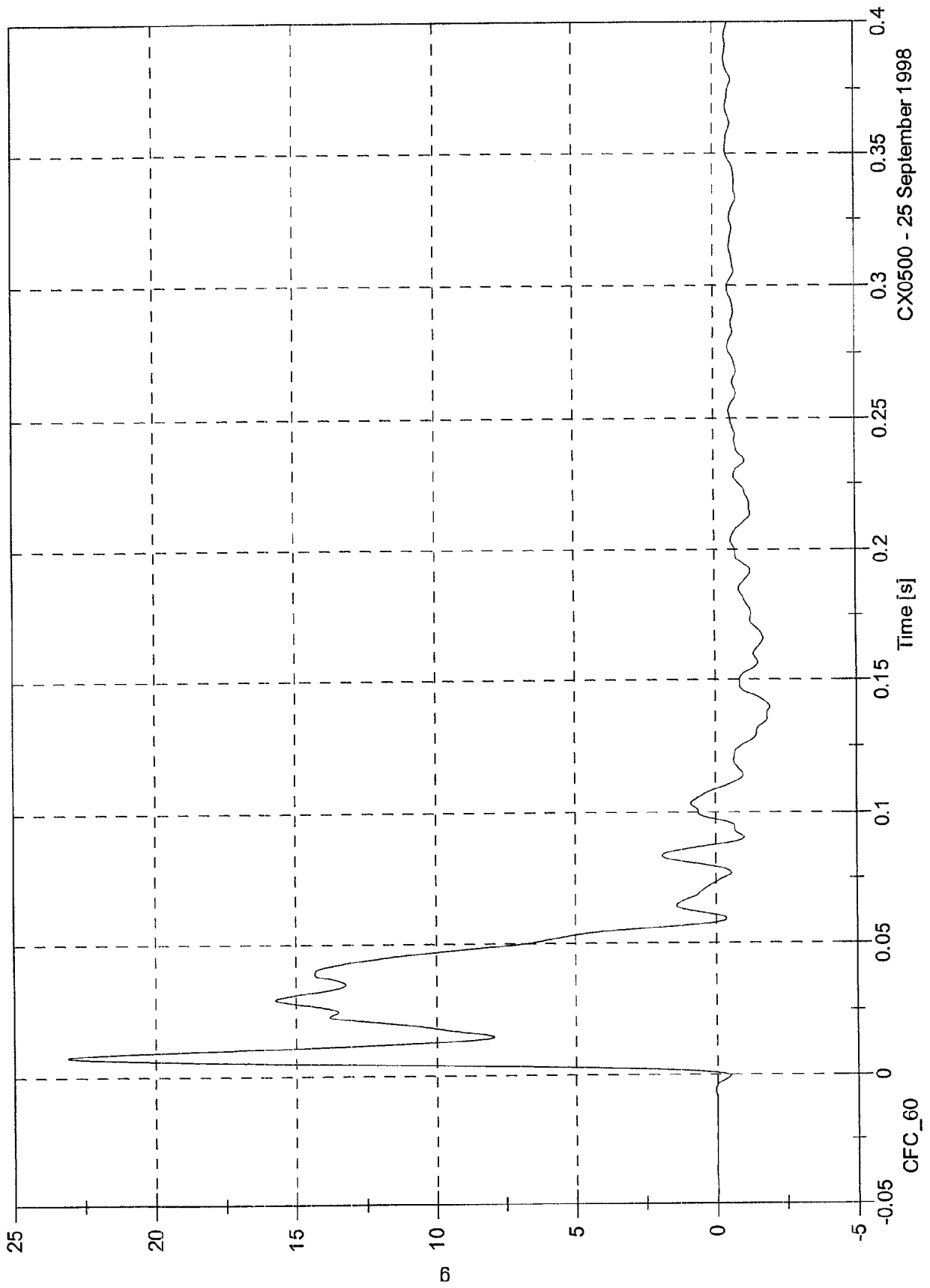
**LEFT SIDE SILL AT FRONT SEAT ACCELEROMETER #5 WAS
DAMAGED AT IMPACT**

LEFT SIDE SILL AT FRONT SEAT ACCELEROMETER #5 WAS
DAMAGED AT IMPACT

NHTSA Side Impact - 1999 Saab 9-5

Max: 23.1 [g] at 0.0077 [s]
Min: -2.0 [g] at 0.1397 [s]

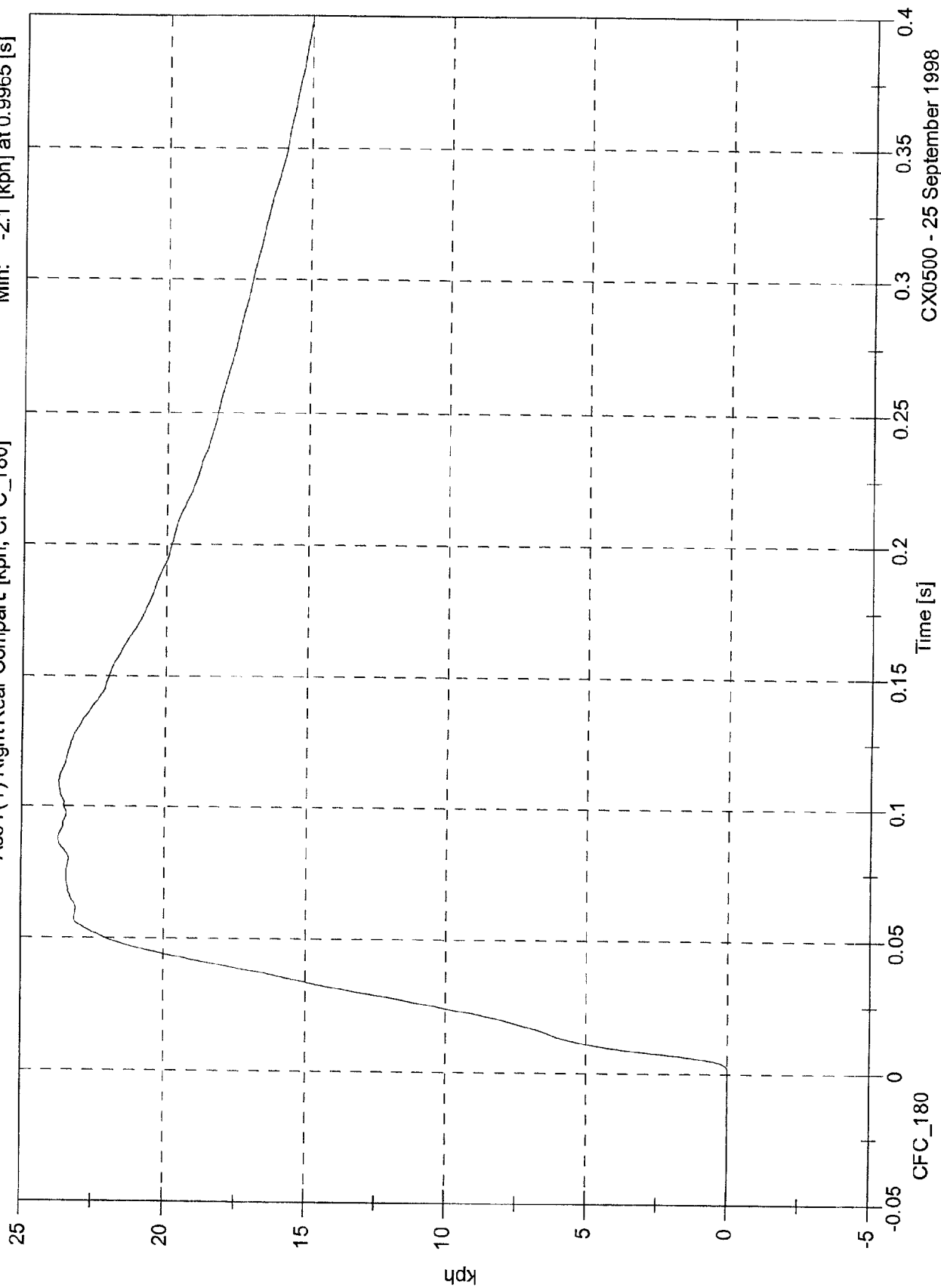
Acc 7(Y) Right Rear Compart [g, CFC_60]



NHTSA Side Impact - 1999 Saab 9-5

Acc 7(Y) Right Rear Compart [kph, CFC_180]

Max: 23.7 [kph] at 0.088 [s]
Min: -2.1 [kph] at 0.9965 [s]



**LEFT LOWER B-POST ACCELEROMETER #12 WAS
DAMAGED AT IMPACT**

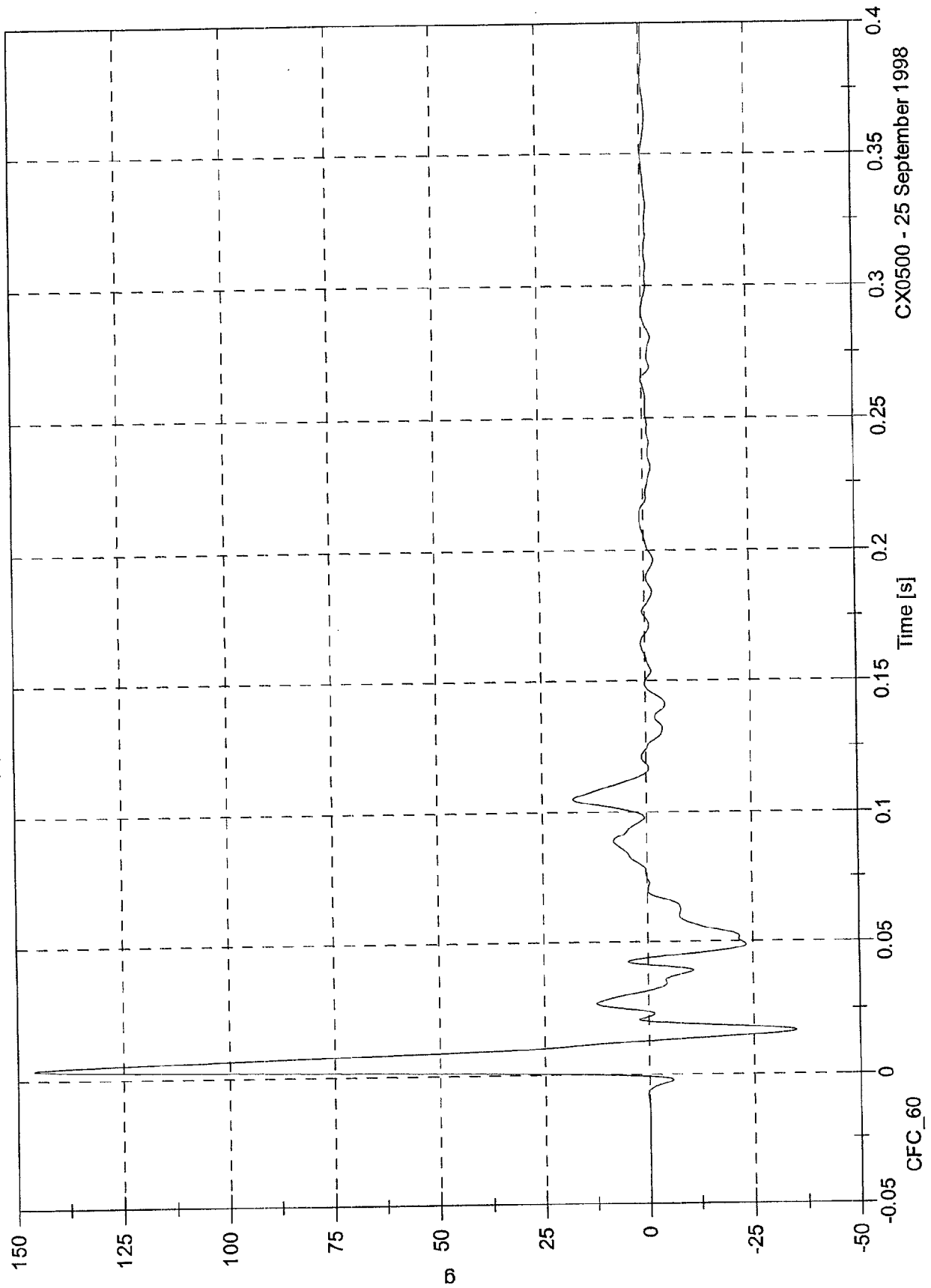
LEFT LOWER B-POST ACCELEROMETER #12 WAS
DAMAGED AT IMPACT

Max: 146.1 [g] at 0.0039 [s]

Min: -35.1 [g] at 0.0165 [s]

NHTSA Side Impact - 1999 Saab 9-5

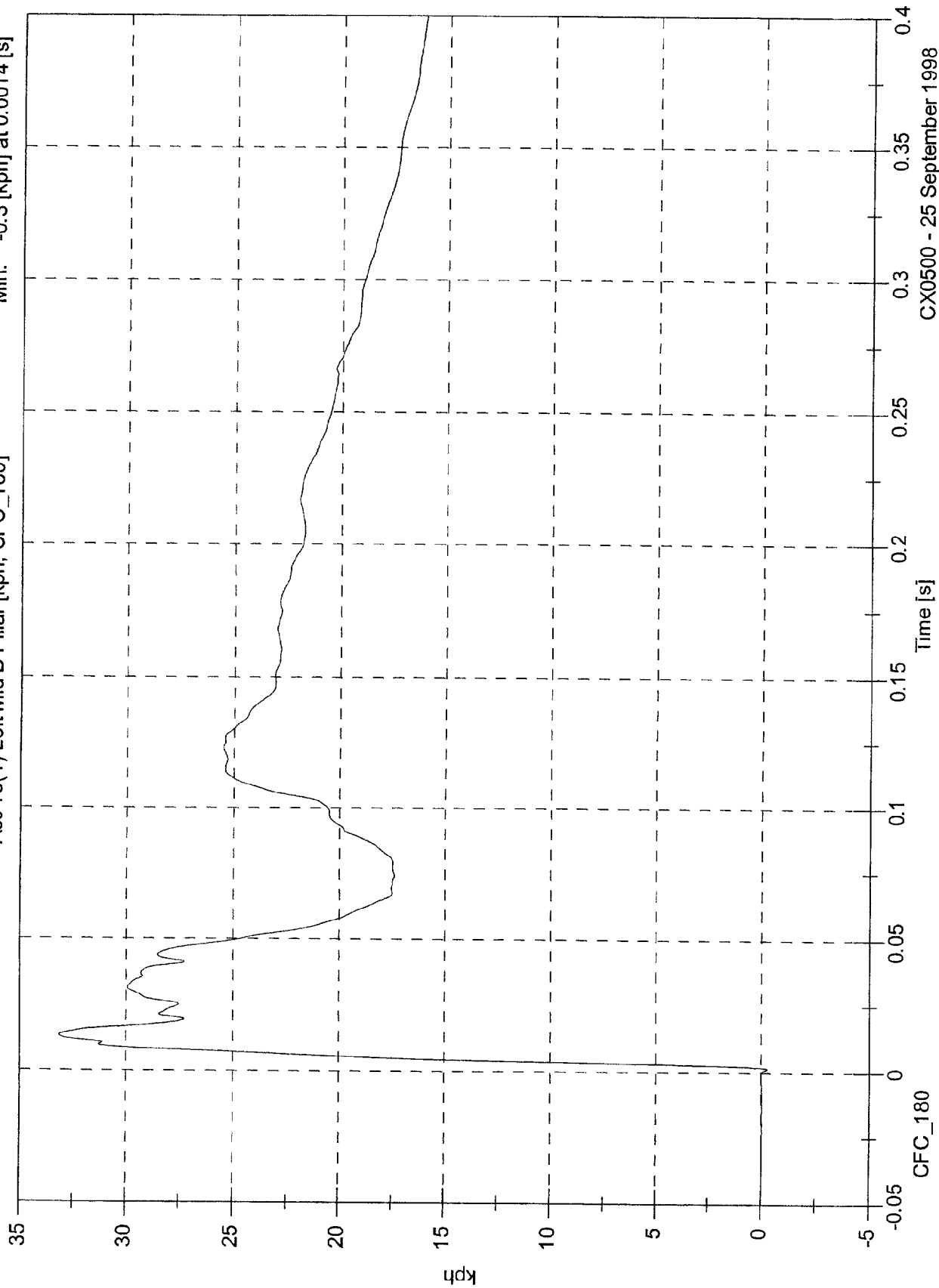
Acc 13(Y) Left Mid B Pillar [g, CFC_60]



NHITSA Side Impact - 1999 Saab 9-5

Max: 33.1 [kph] at 0.0133 [s]
Min: -0.3 [kph] at 0.0014 [s]

Acc 13(Y) Left Mid B Pillar [kph, CFC_180]

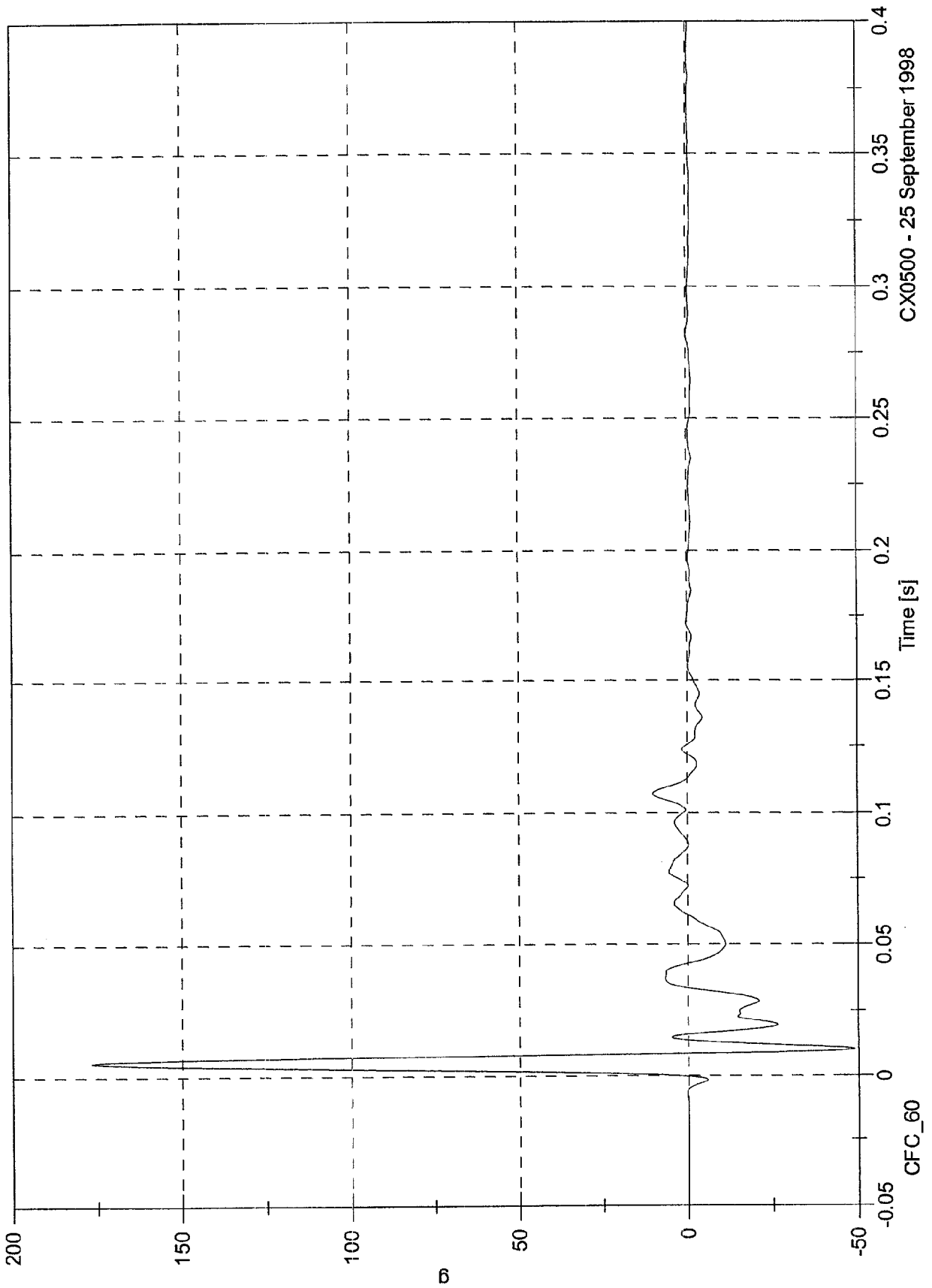


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NHTSA Side Impact - 1999 Saab 9-5

Acc 14(Y) Left Lower A Pillar [g, CFC_60]

Max: 177.1 [g] at 0.0054 [s]
Min: -48.9 [g] at 0.0101 [s]

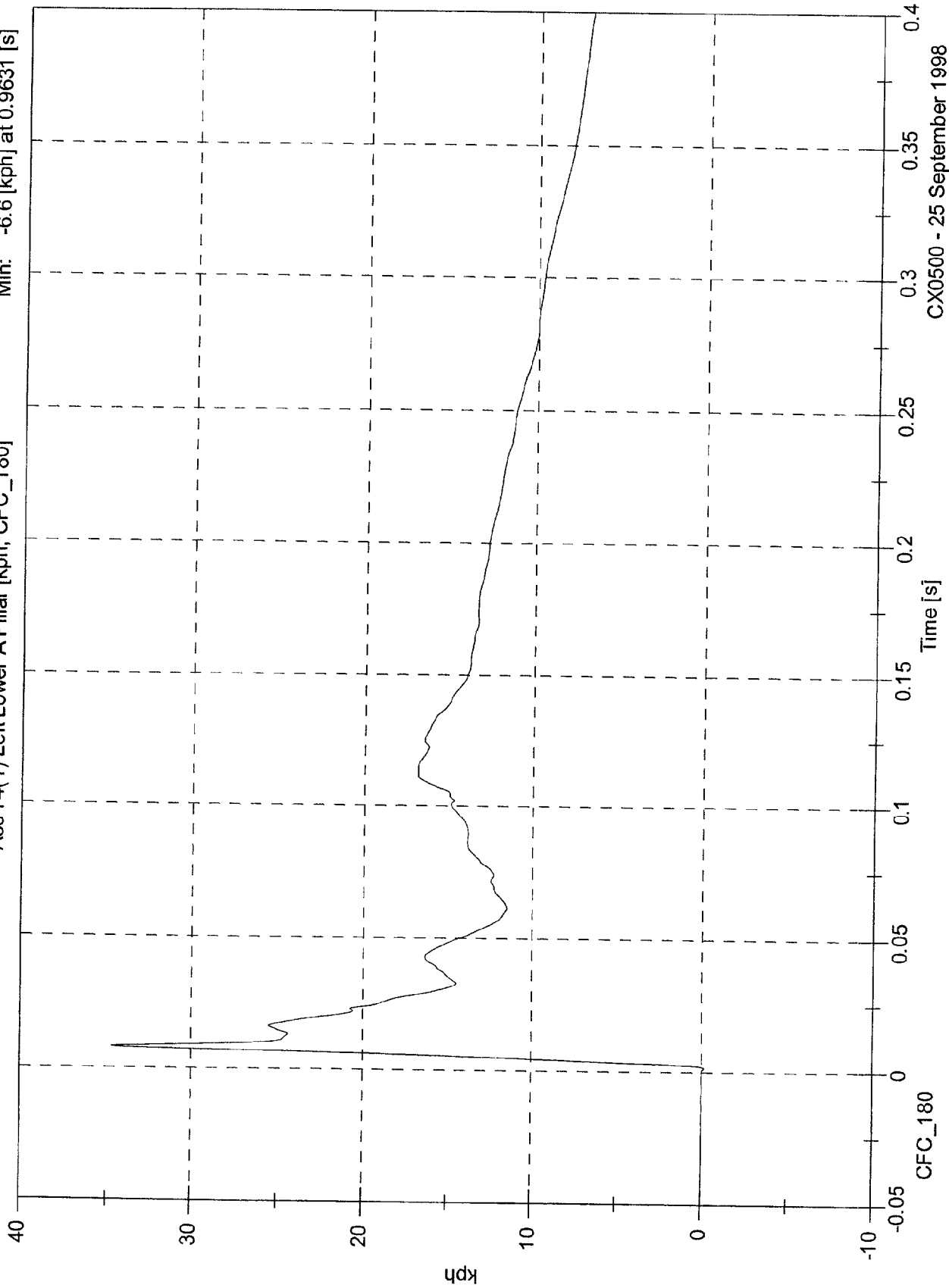


NHTSA Side Impact - 1999 Saab 9-5

Max: 34.7 [kph] at 0.0078 [s]

Min: -6.6 [kph] at 0.9631 [s]

Acc 14(Y) Left Lower A Pillar [kph, CFC_180]



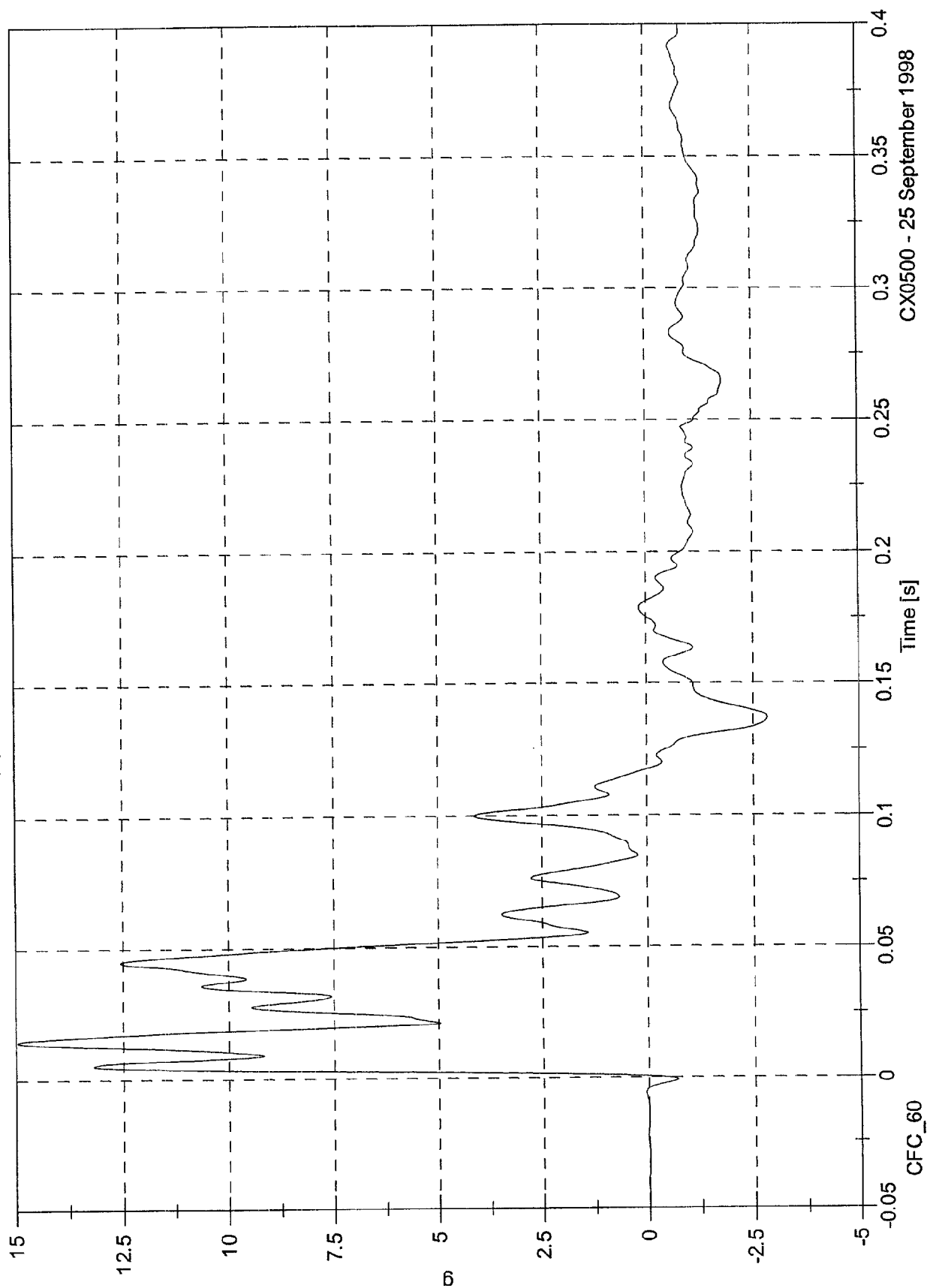
CX0500 - 25 September 1998

Max: 15.0 [g] at 0.0145 [s]

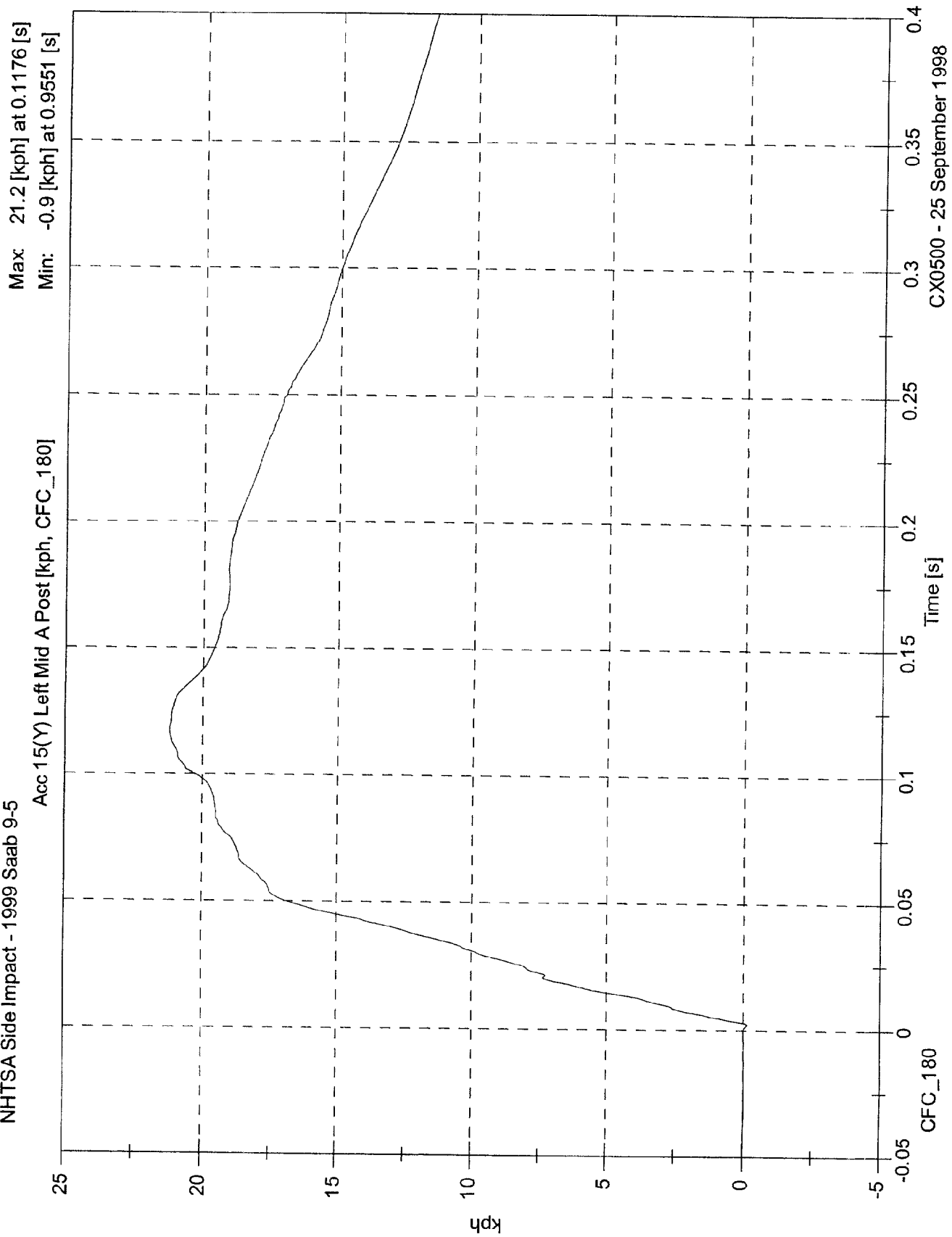
Min: -2.8 [g] at 0.137 [s]

NHTSA Side Impact - 1999 Saab 9-5

Acc 15(Y) Left Mid A Post [g, CFC_60]



NHTSA Side Impact - 1999 Saab 9-5

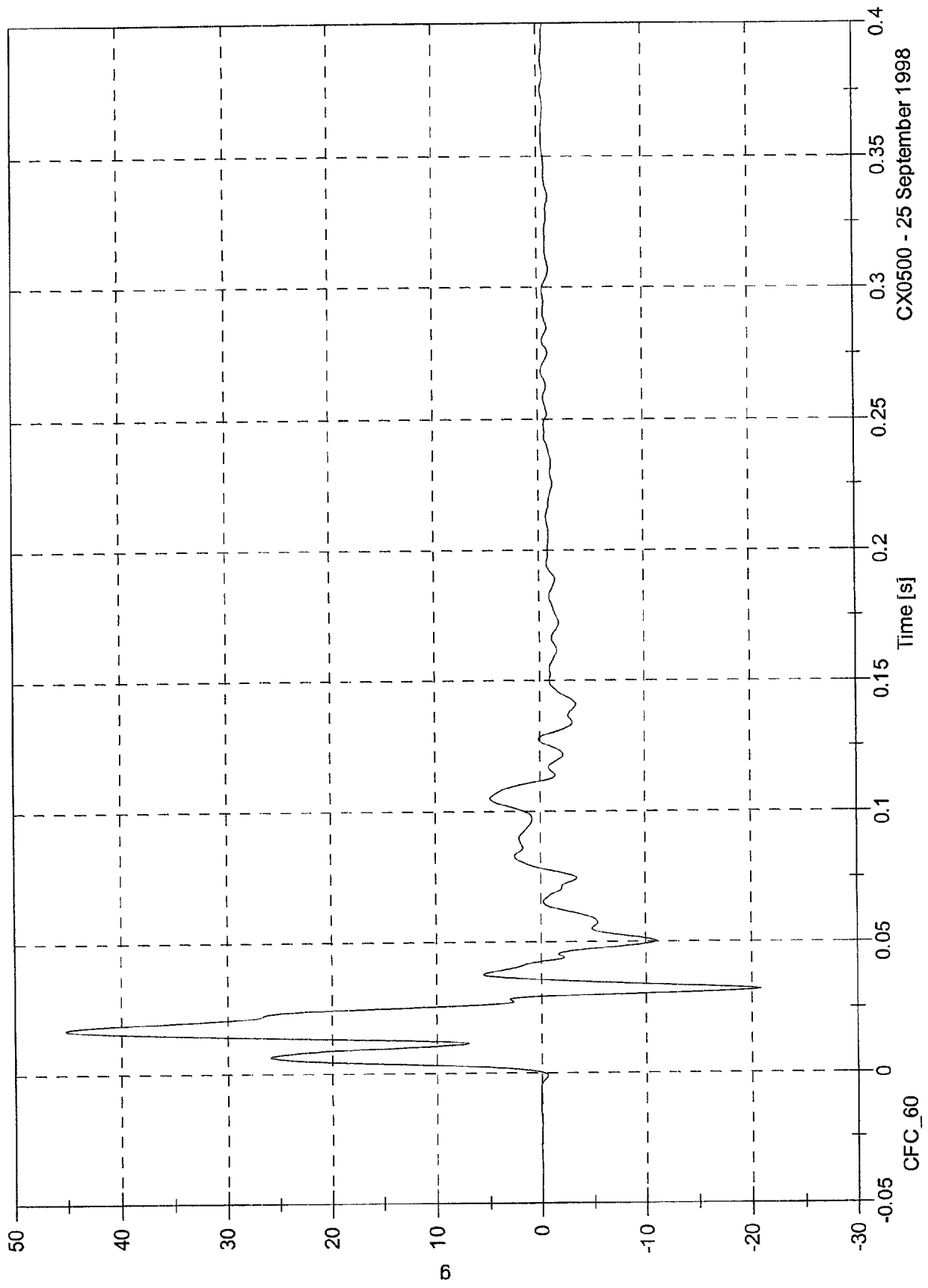


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NHTSA Side Impact - 1999 Saab 9-5

Max 45.2 [g] at 0.017 [s]
Min: -20.9 [g] at 0.0319 [s]

Acc 16(Y) Front Seat Track [g, CFC_60]

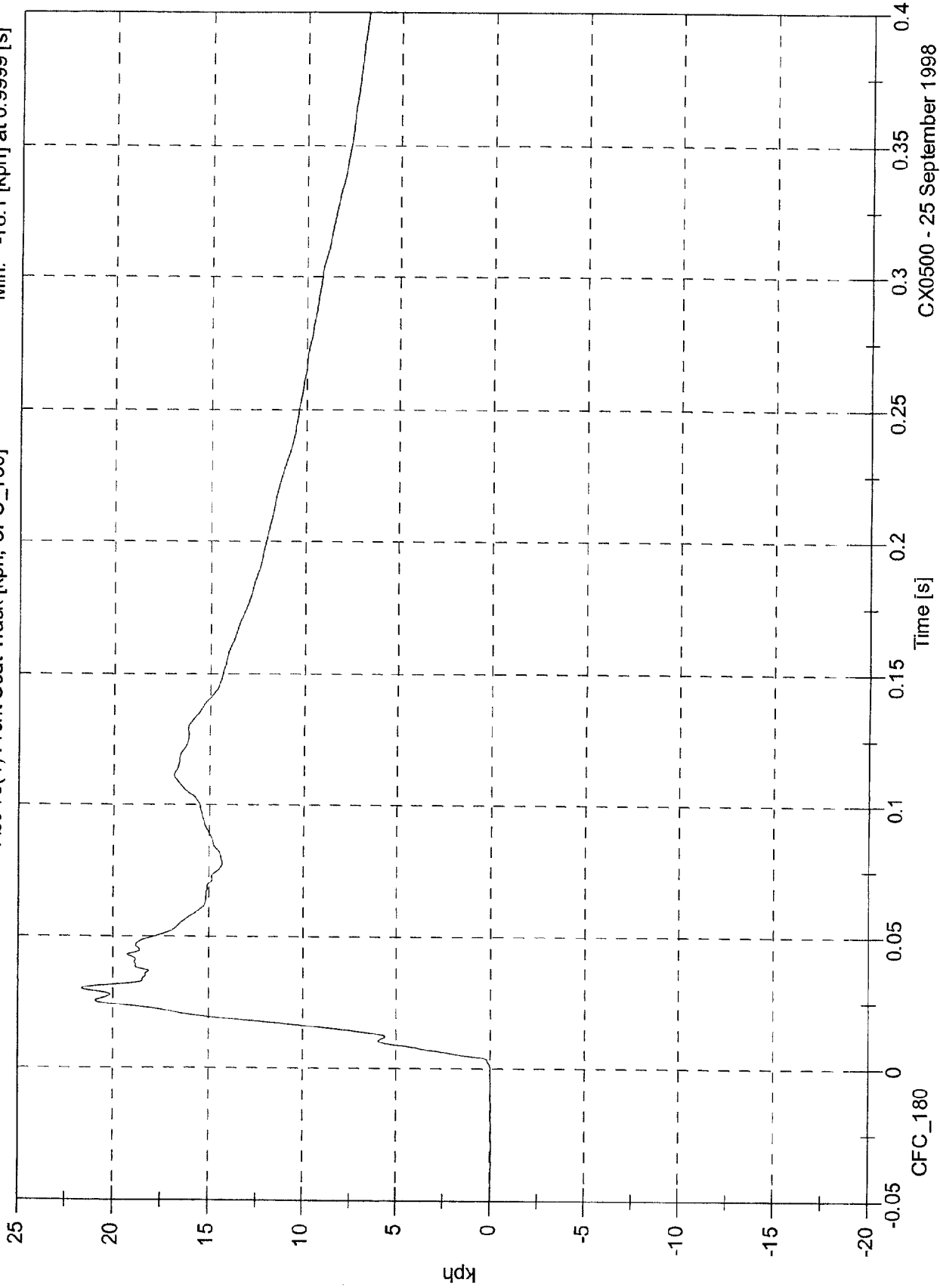


NHTSA Side Impact - 1999 Saab 9-5

Acc 16(Y) Front Seat Track [kph, CFC_180]

Max: 21.6 [kph] at 0.0301 [s]

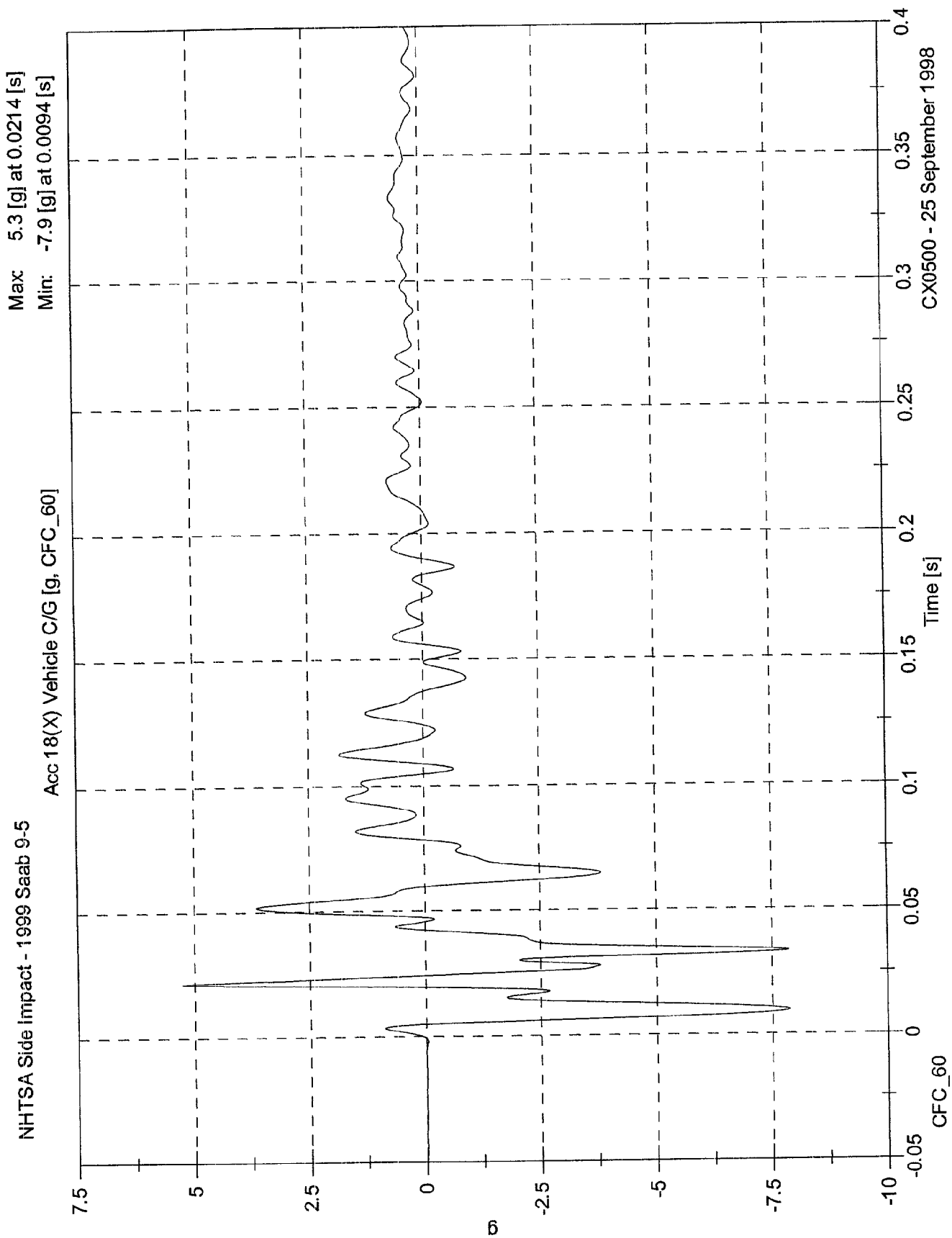
Min: -18.1 [kph] at 0.9999 [s]



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REAR SEAT TRACK ACCELEROMETER #17 WAS NOT INSTALLED
(no accessible mounting location)

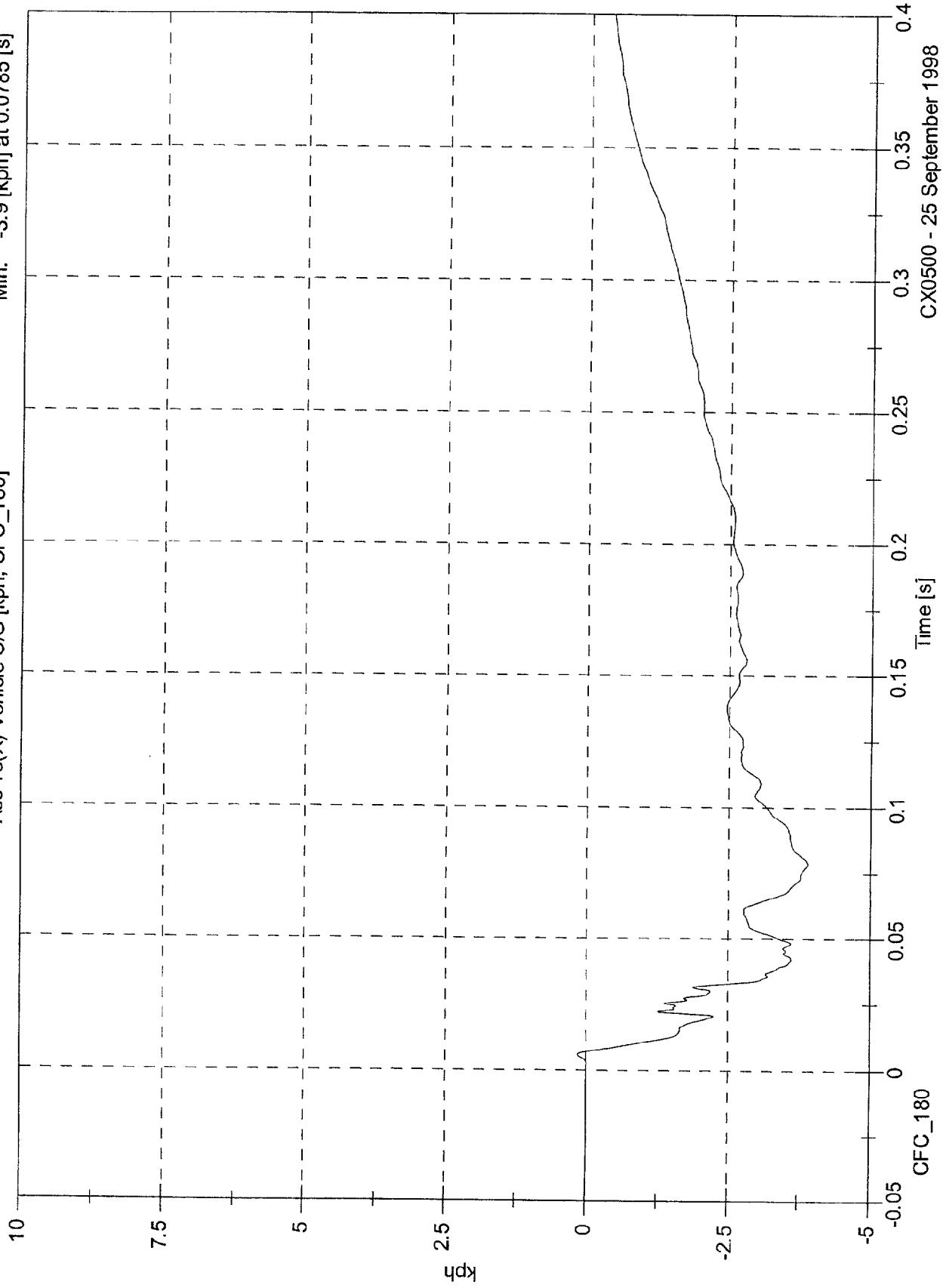
REAR SEAT TRACK ACCELEROMETER #17 WAS NOT INSTALLED
(no accessible mounting location)



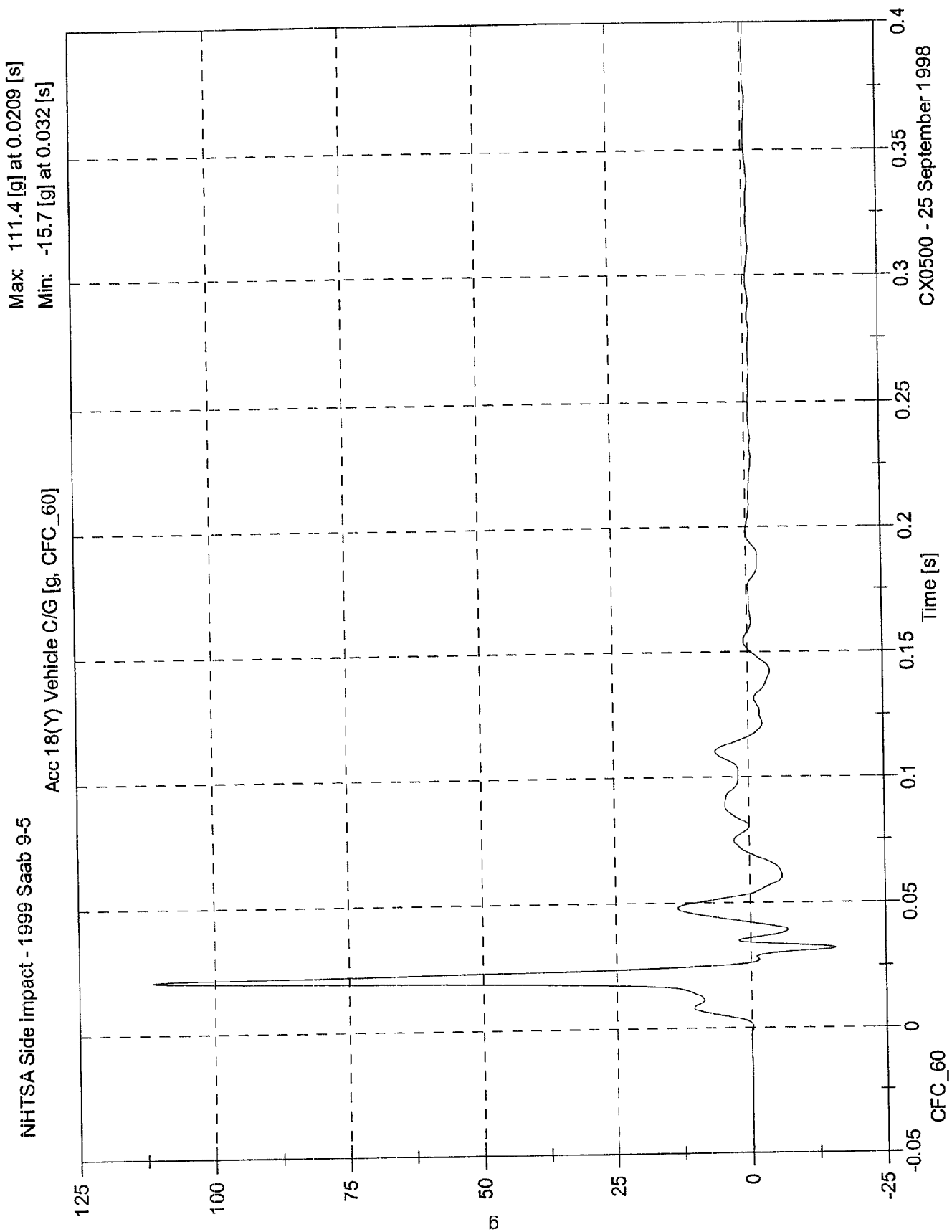
NHTSA Side Impact - 1999 Saab 9-5

Max: 9.0 [kph] at 0.9999 [s]
Min: -3.9 [kph] at 0.0785 [s]

Acc 18(X) Vehicle C/G [kph, CFC_180]



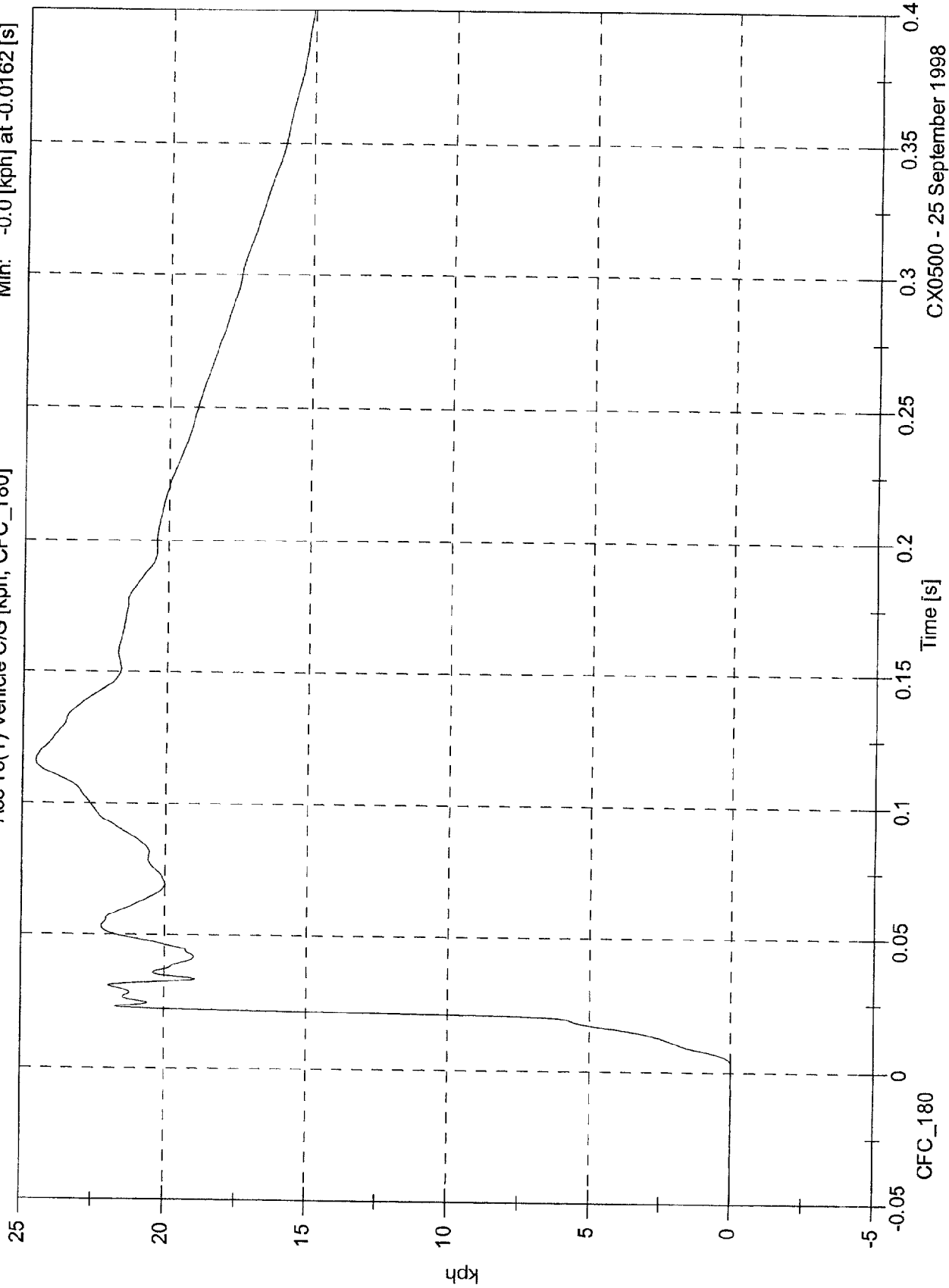
CX0500 - 25 September 1998



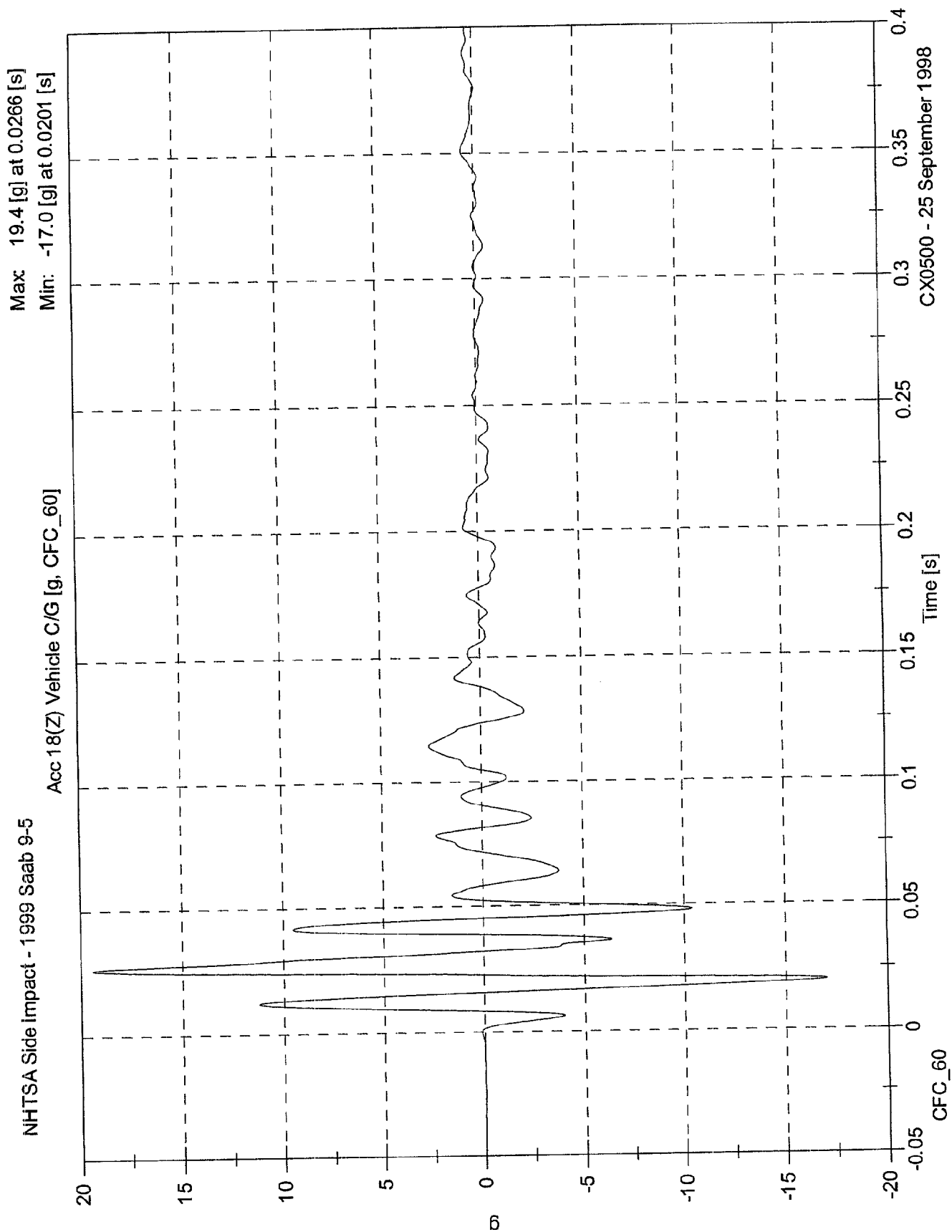
NHTSA Side Impact - 1999 Saab 9-5

Max: 24.5 [kph] at 0.1159 [s]
 Min: -0.0 [kph] at -0.0162 [s]

Acc 18(Y) Vehicle C/G [kph, CFC_180]



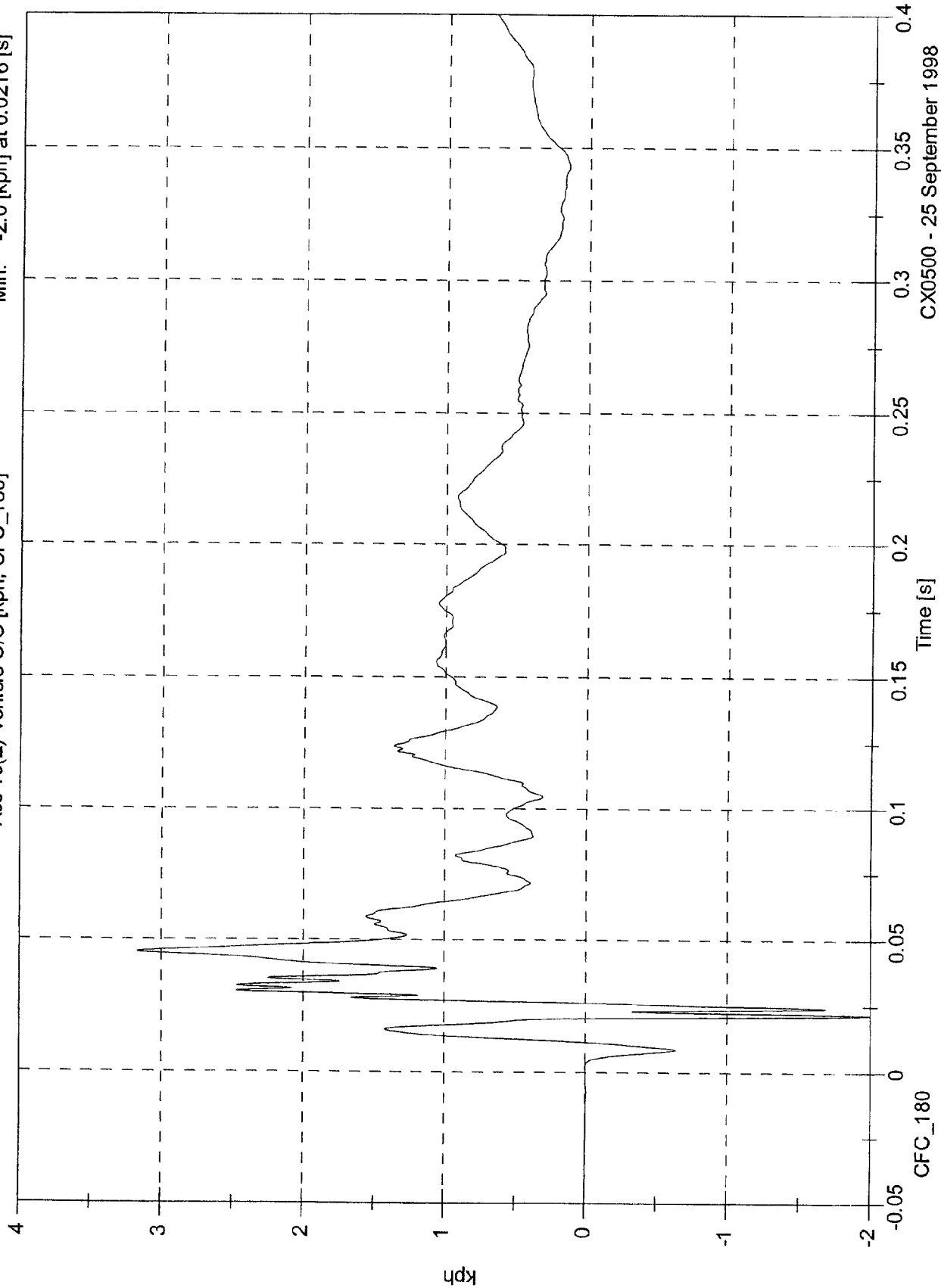
CX0500 - 25 September 1998



NHTSA Side Impact - 1999 Saab 9-5

Max: 3.2 [kph] at 0.0452 [s]
Min: -2.0 [kph] at 0.0216 [s]

Acc 18(Z) Vehicle C/G [kph, CFC_180]



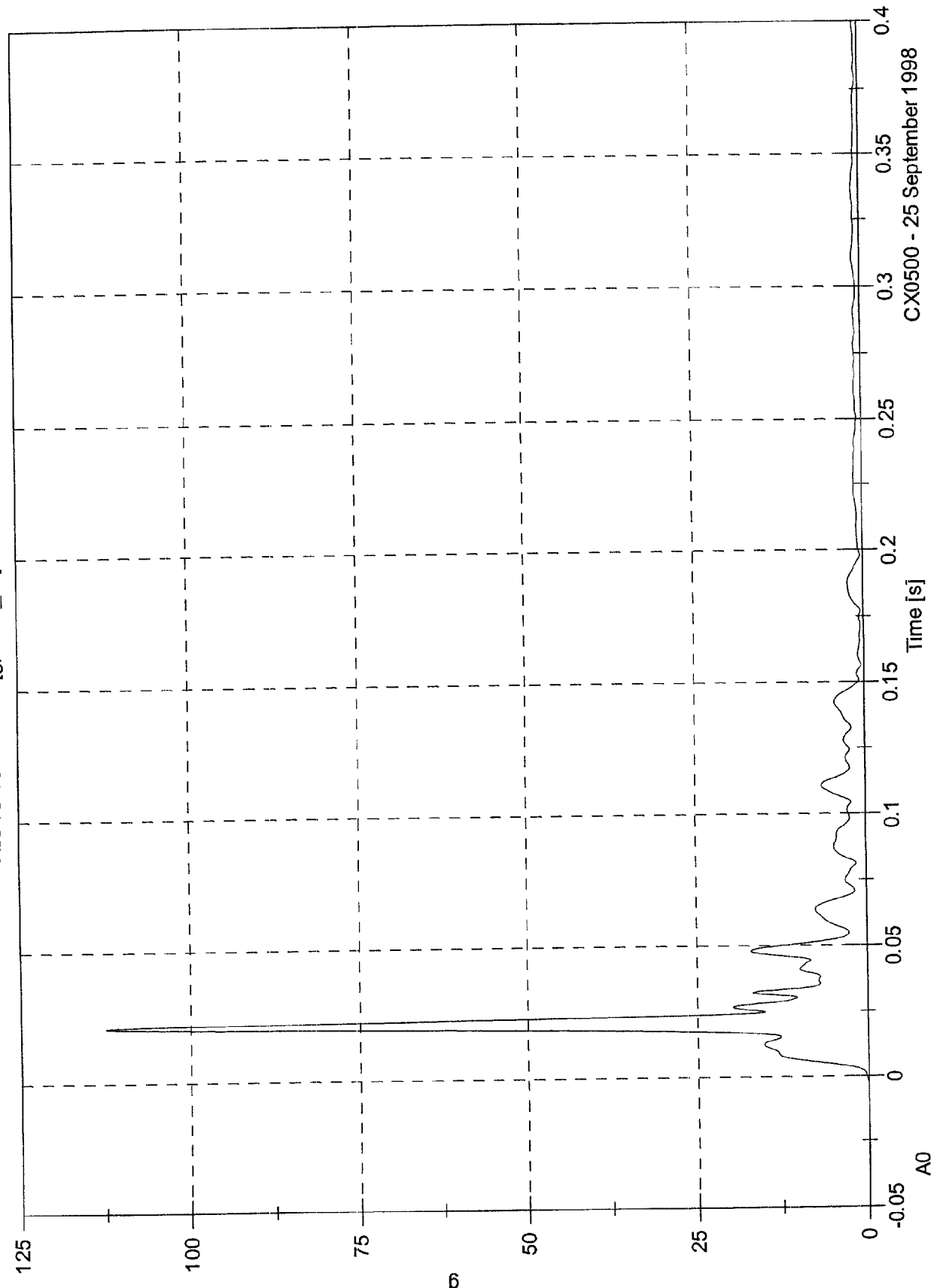
CX0500 - 25 September 1998

Max: 112.6 [g] at 0.0209 [s]

Min: 0.0 [g] at -0.0858 [s]

NHTSA Side Impact - 1999 Saab 9-5

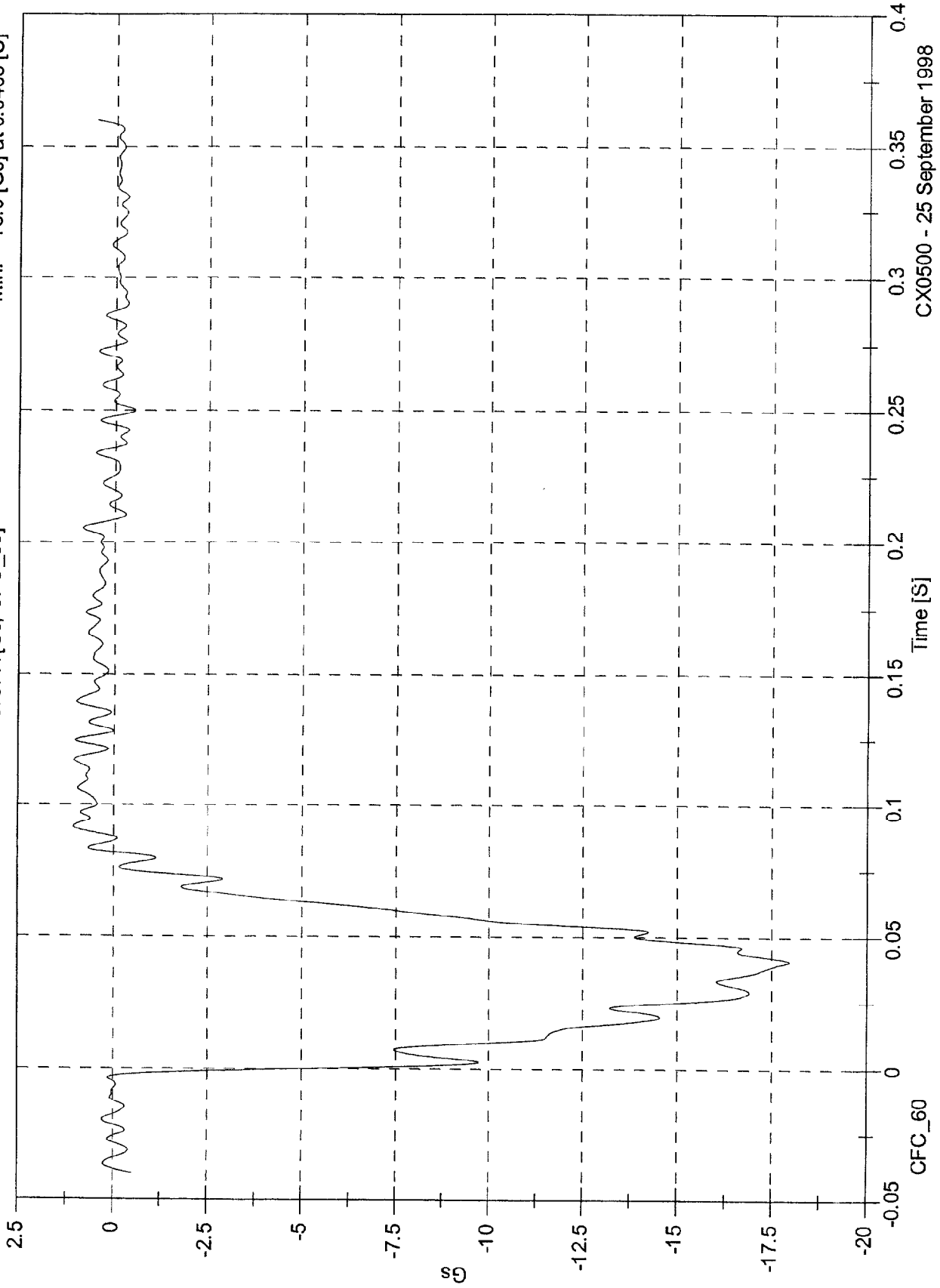
Acc 18 Vehicle C/G [g, CFC_60] Resultant



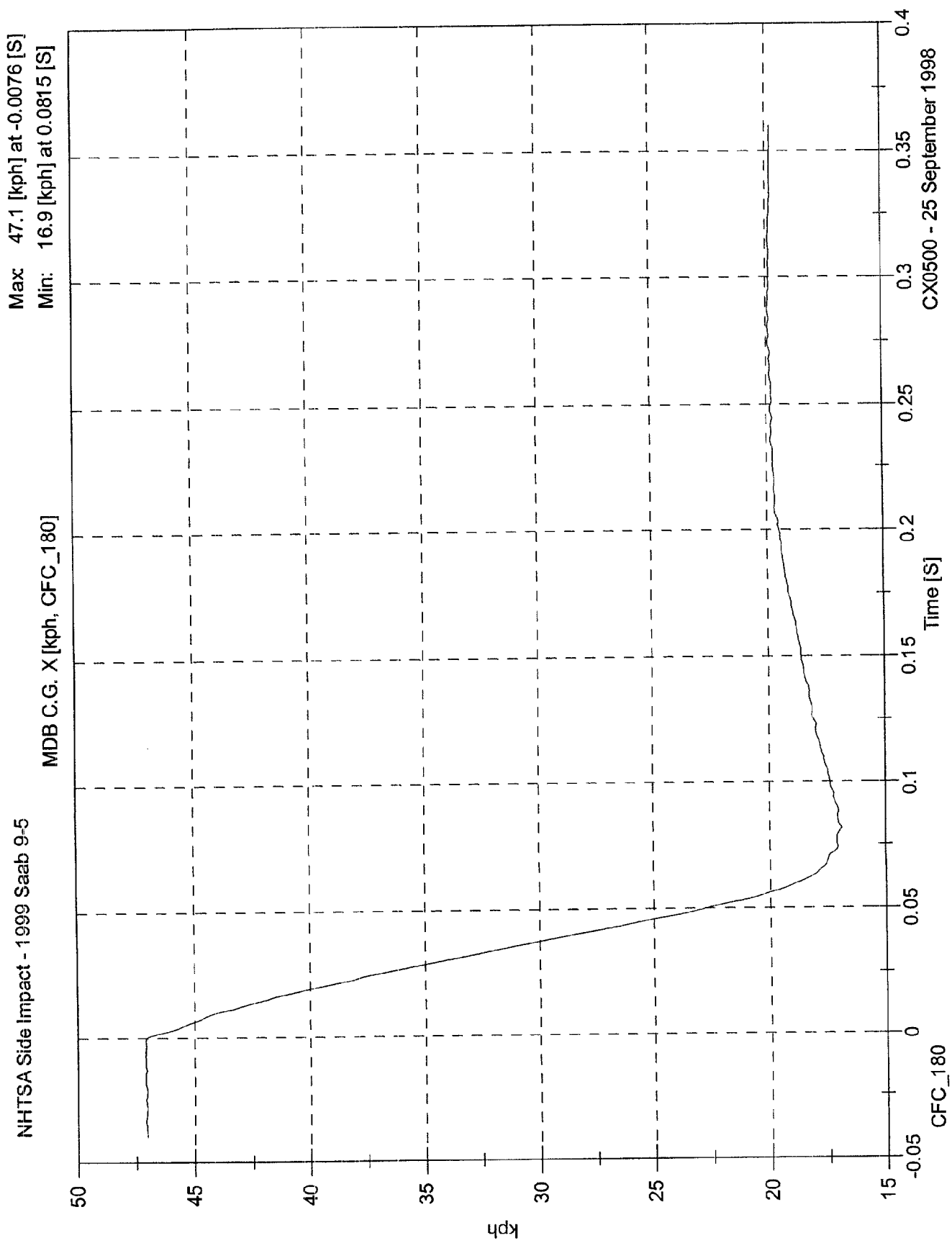
NHTSA Side Impact - 1999 Saab 9-5

Max: 1.1 [Gs] at 0.0915 [S]
Min: -18.0 [Gs] at 0.0408 [S]

MDB C.G. X [Gs, CFC_60]



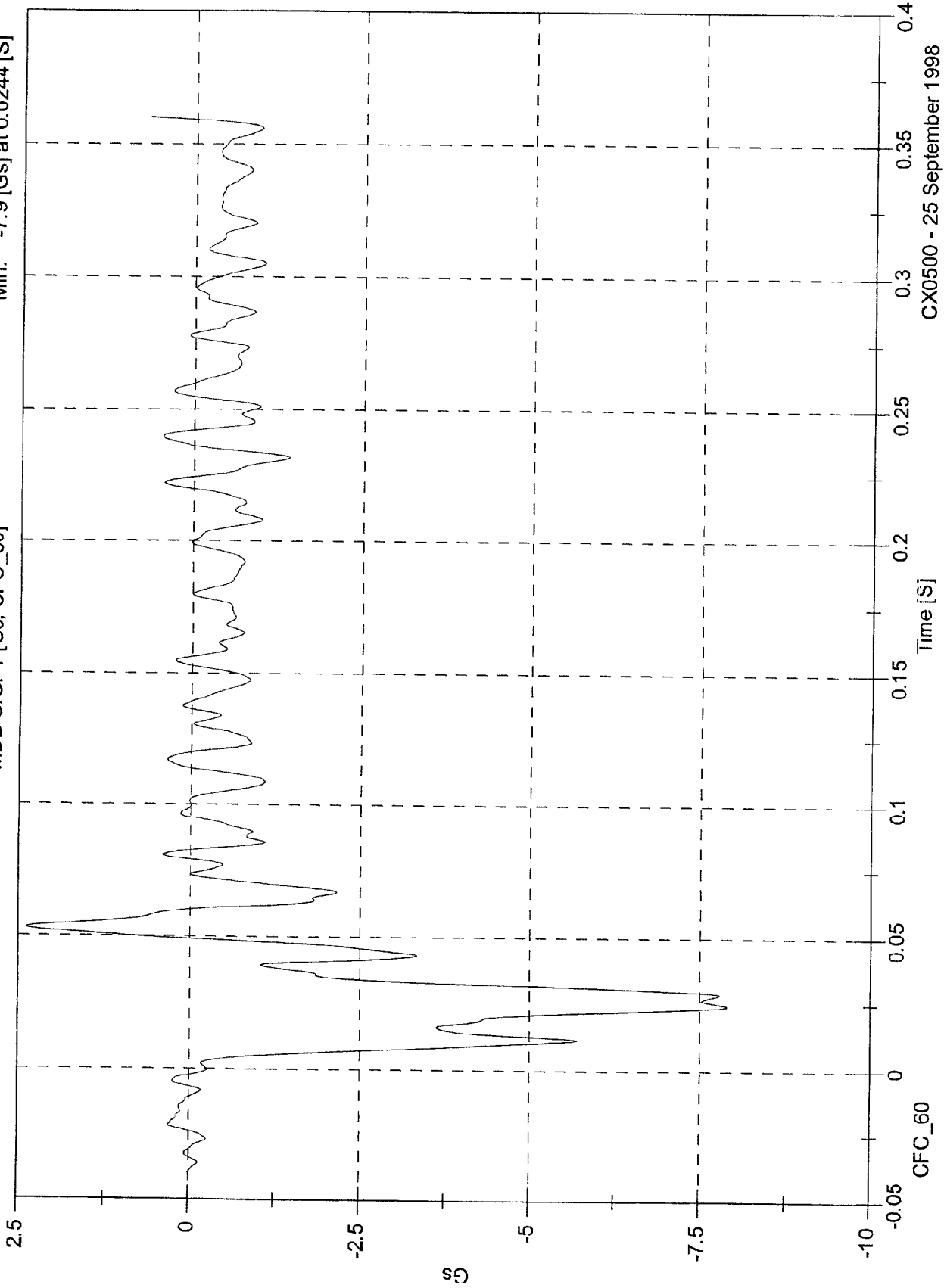
CX0500 - 25 September 1998



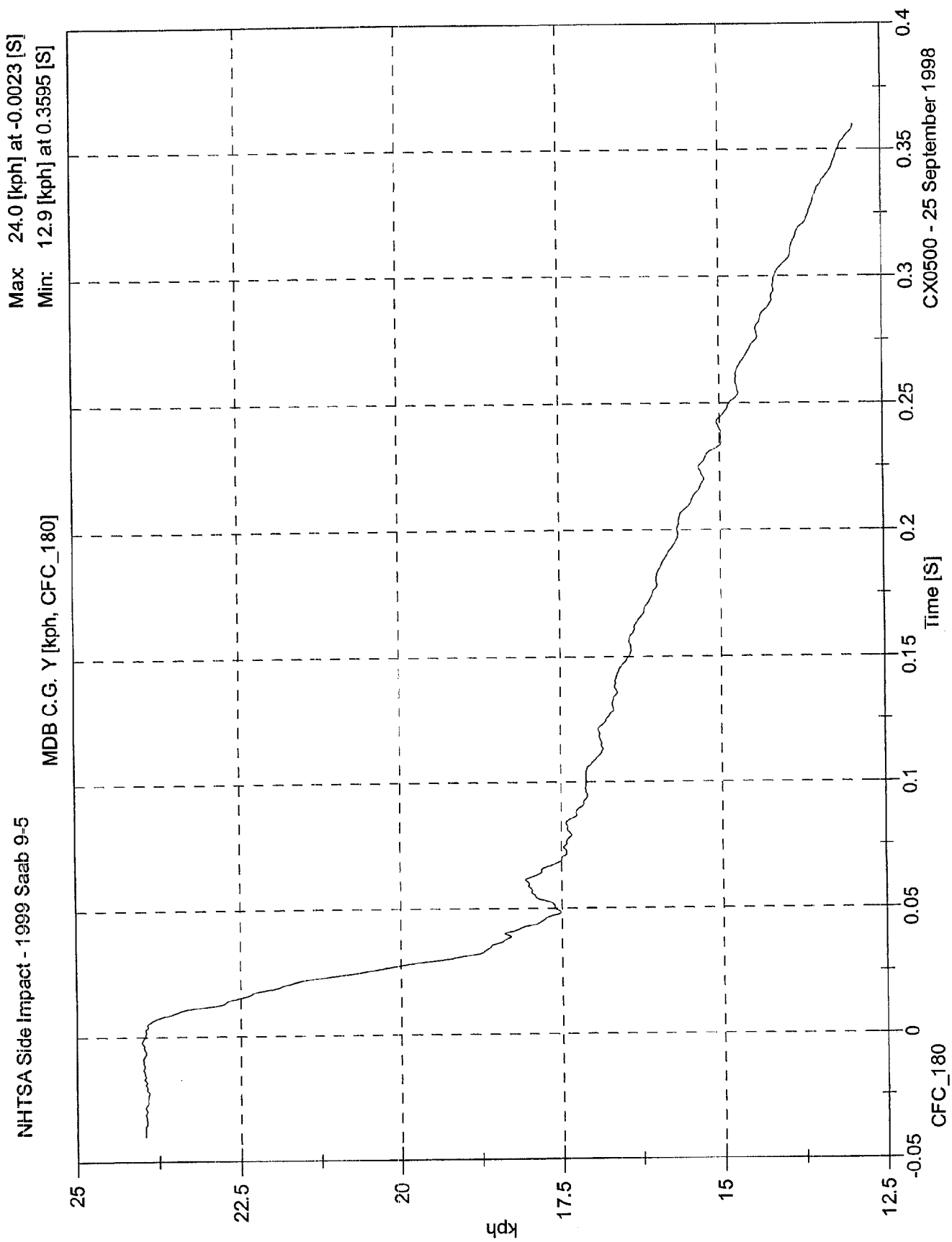
NHTSA Side Impact - 1999 Saab 9-5

Max: 2.4 [Gs] at 0.0531 [S]
 Min: -7.9 [Gs] at 0.0244 [S]

MDB C.G. Y [Gs, CFC_60]



CX0500 - 25 September 1998

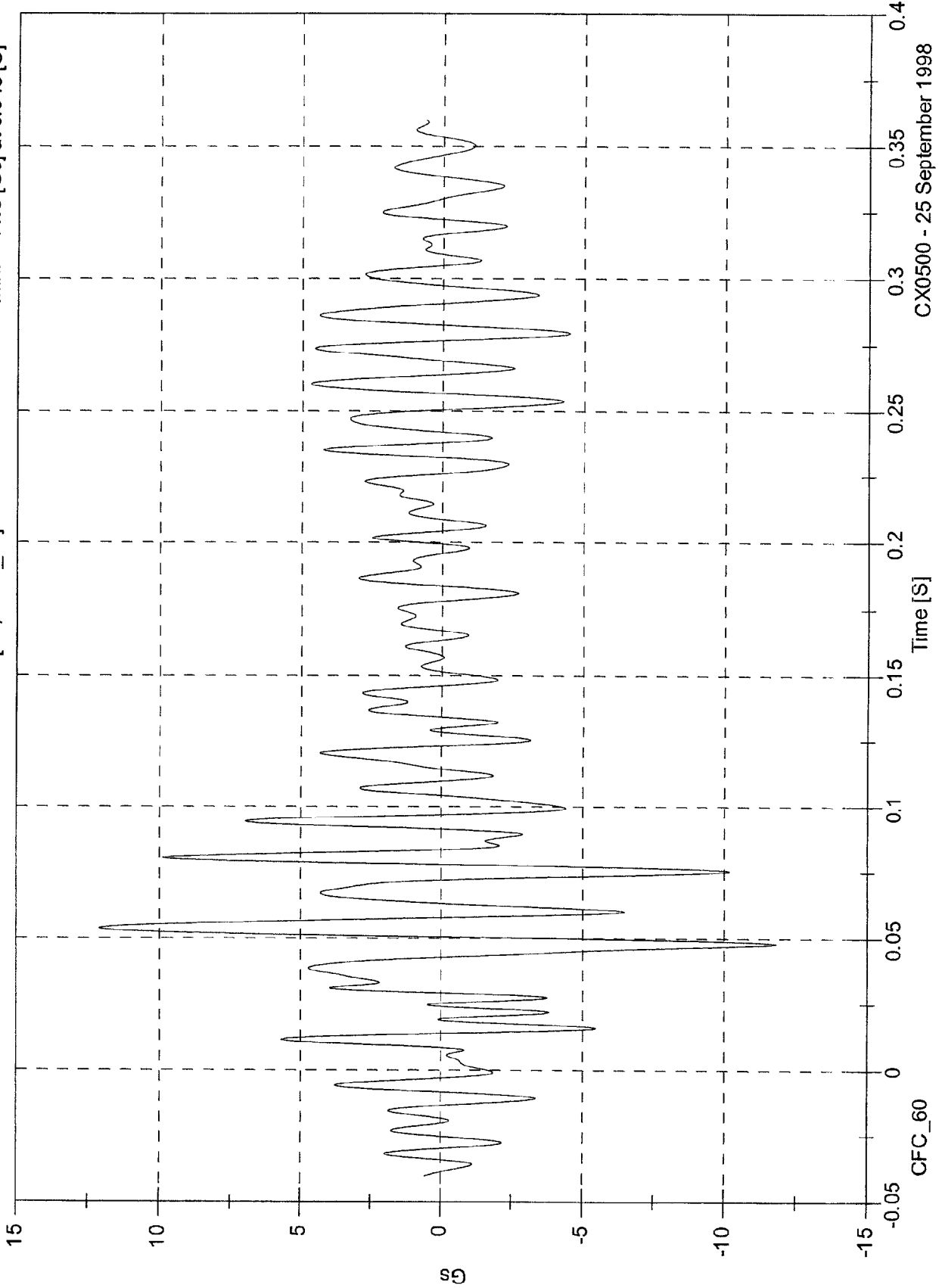


NHTSA Side Impact - 1999 Saab 9-5

MDB C.G. Z [Gs, CFC_60]

Max: 12.1 [Gs] at 0.0536 [S]

Min: -11.8 [Gs] at 0.048 [S]

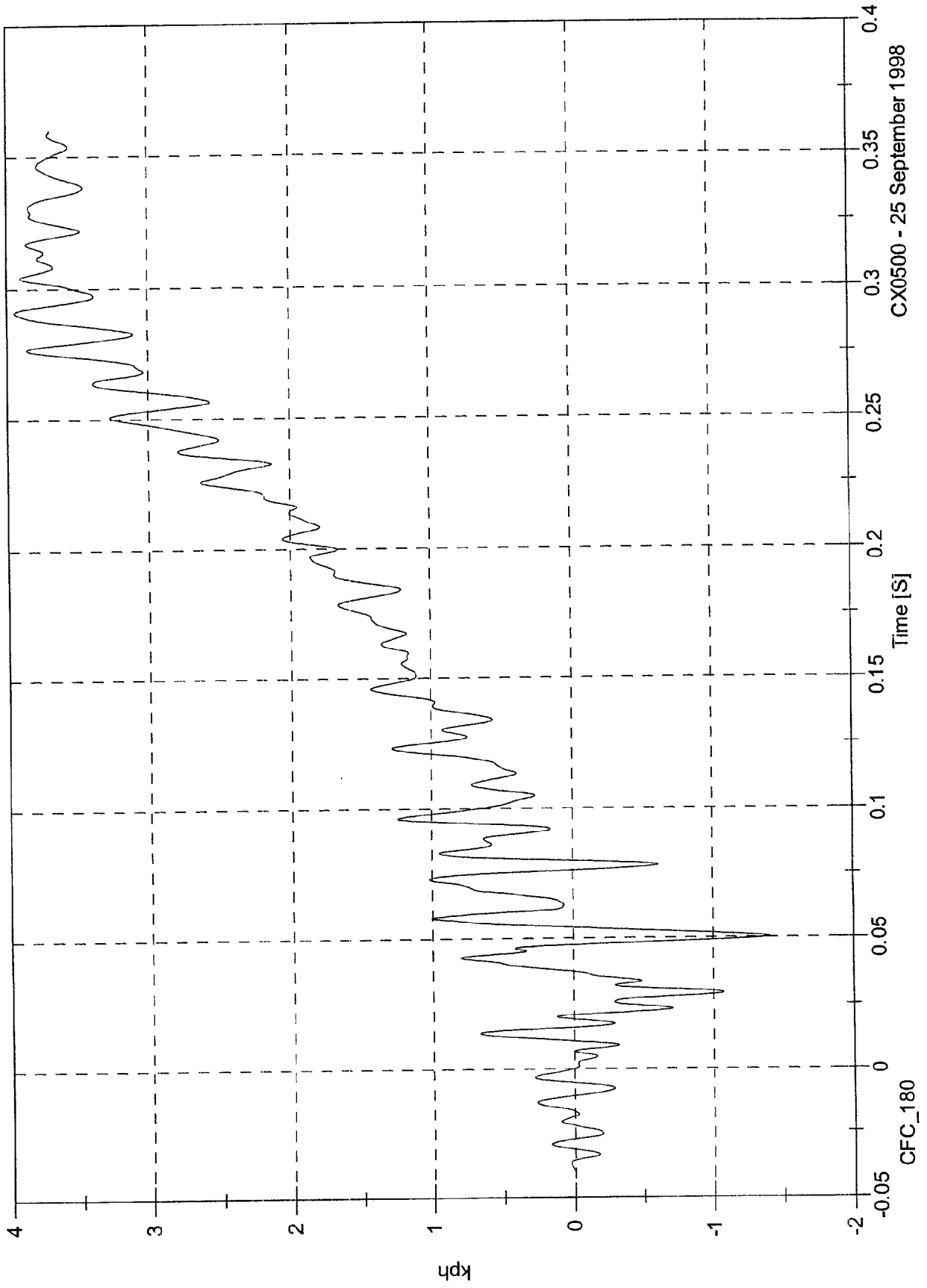


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 3.9 [kph] at 0.291 [S]
Min: -1.4 [kph] at 0.0503 [S]

MDB C.G. Z [kph, CFC_180]

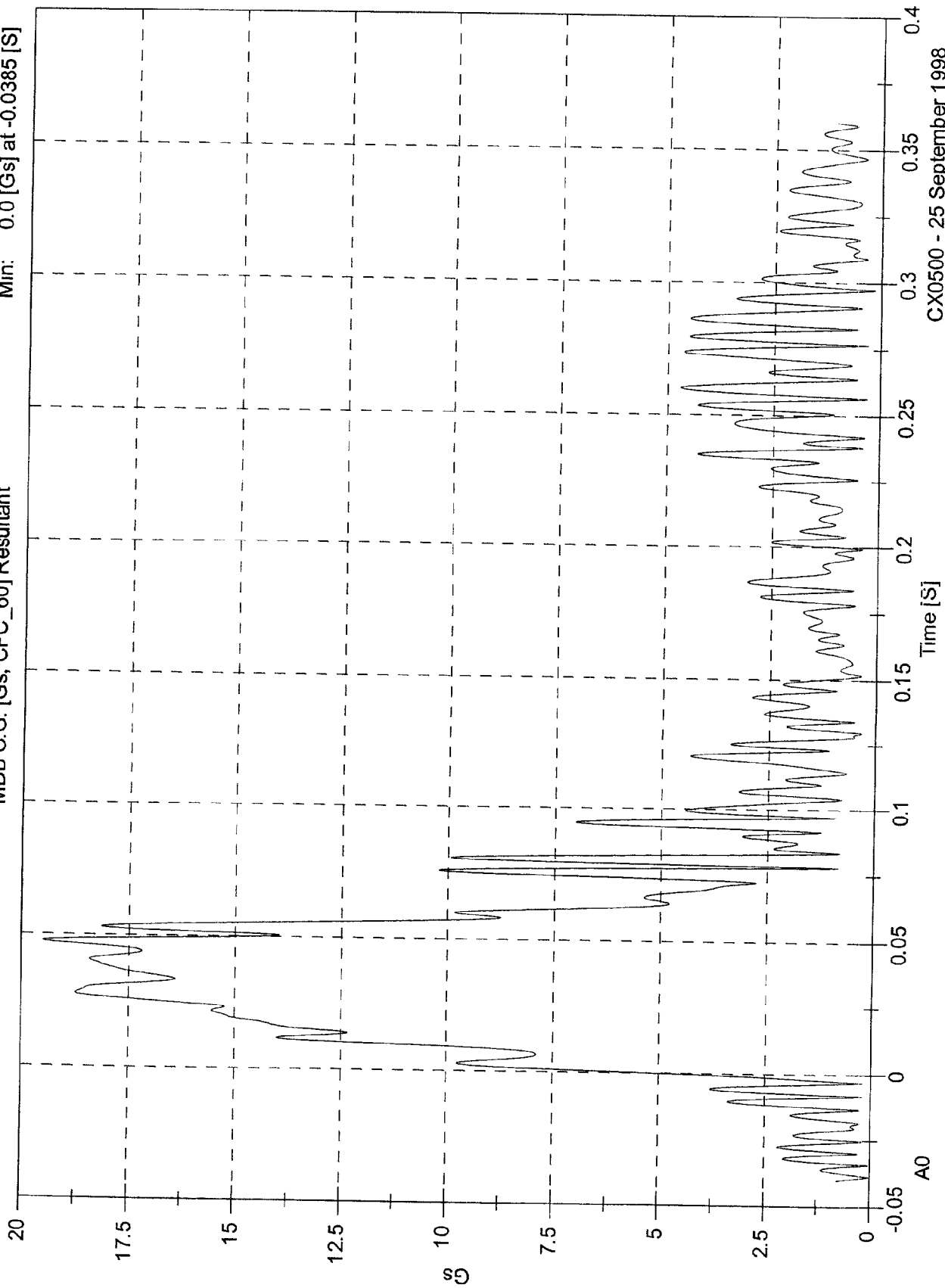


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 19.5 [Gs] at 0.0476 [S]
 Min: 0.0 [Gs] at -0.0385 [S]

MDB C.G. [Gs, CFC_60] Resultant

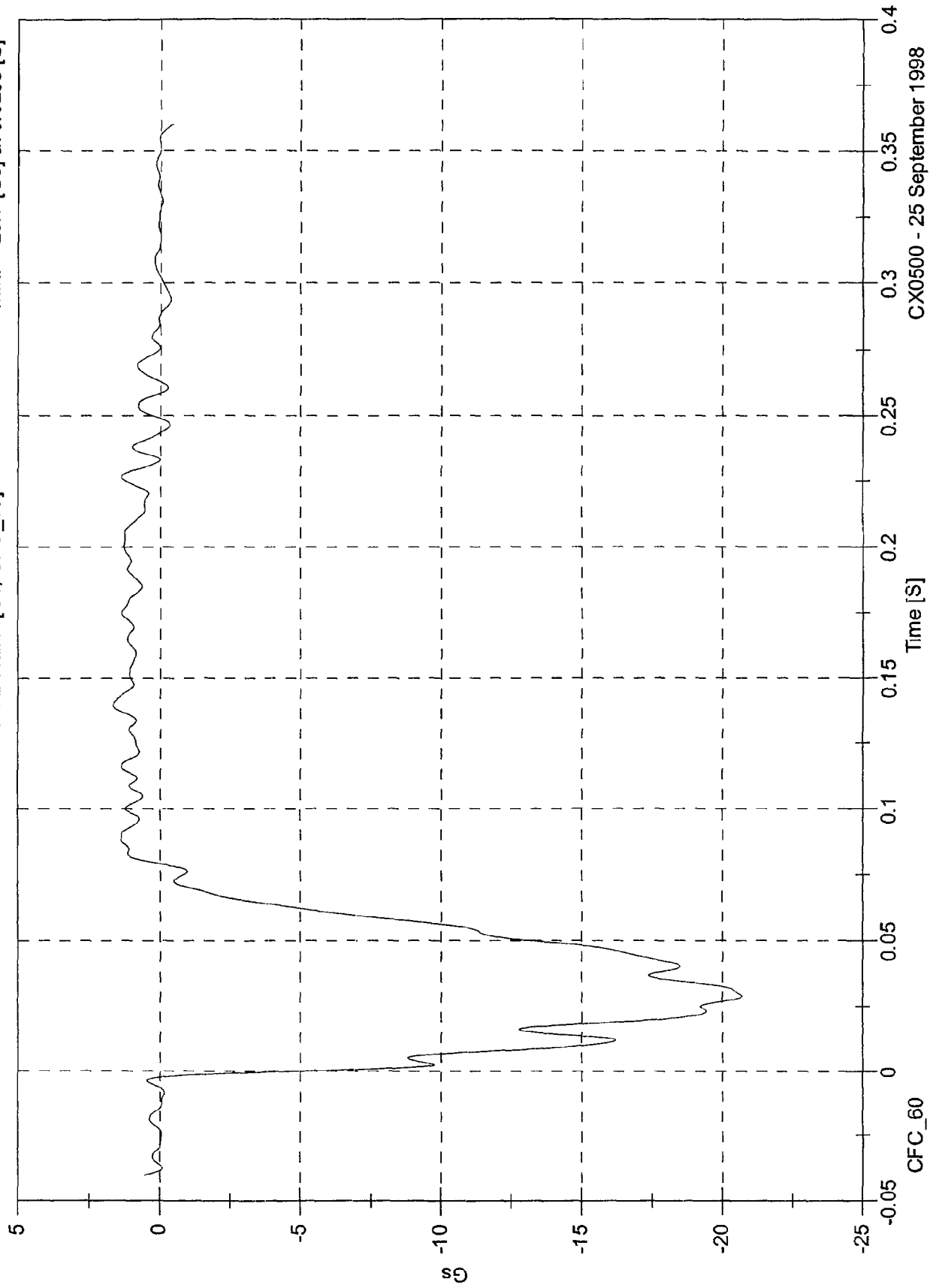


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 1.6 [Gs] at 0.1393 [S]
Min: -20.7 [Gs] at 0.0288 [S]

MDB Left Rear Rail X [Gs, CFC_60]

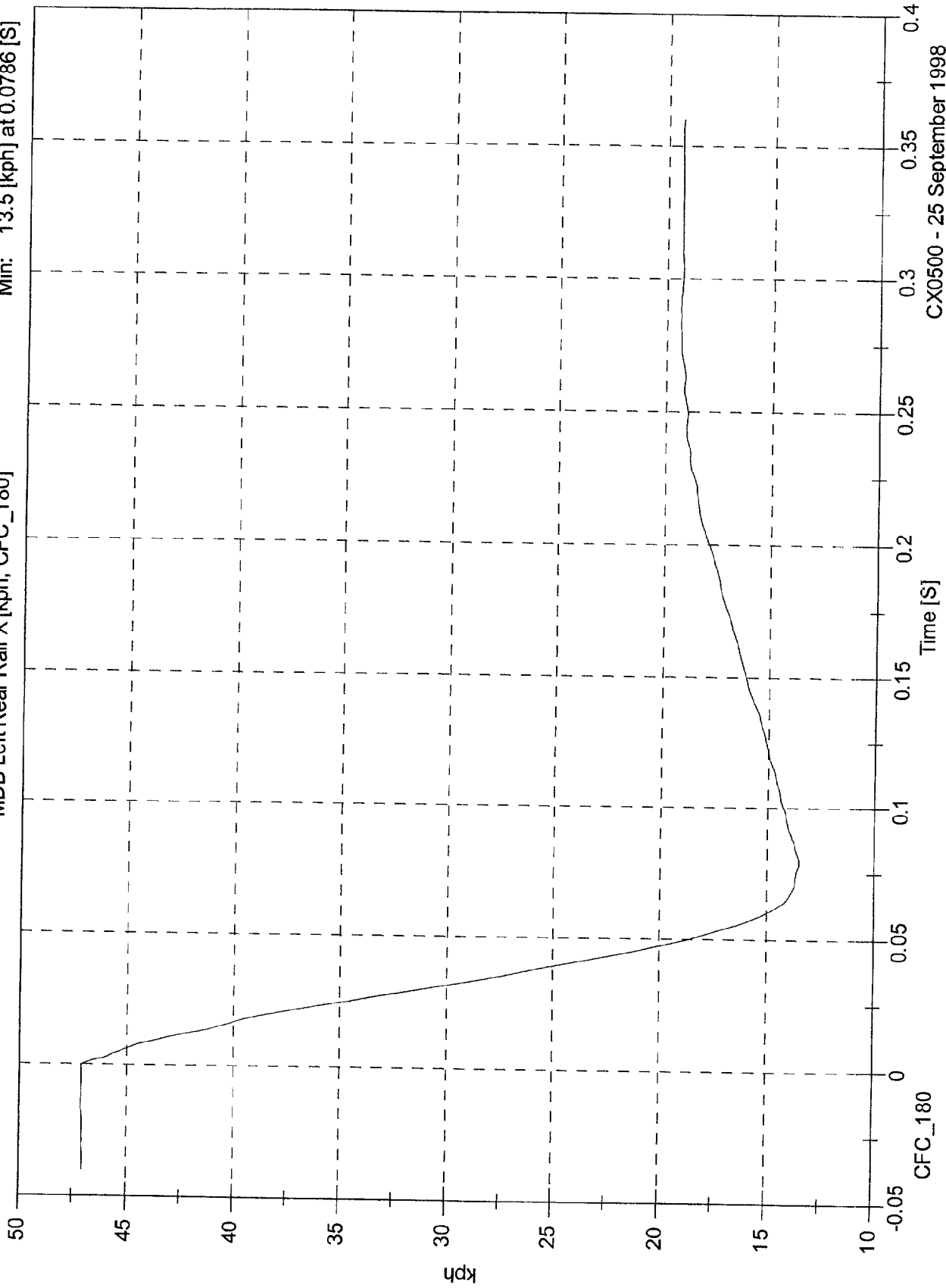


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 47.1 [kph] at -0.0158 [S]
Min: 13.5 [kph] at 0.0786 [S]

MDB Left Rear Rail X [kph, CFC_180]



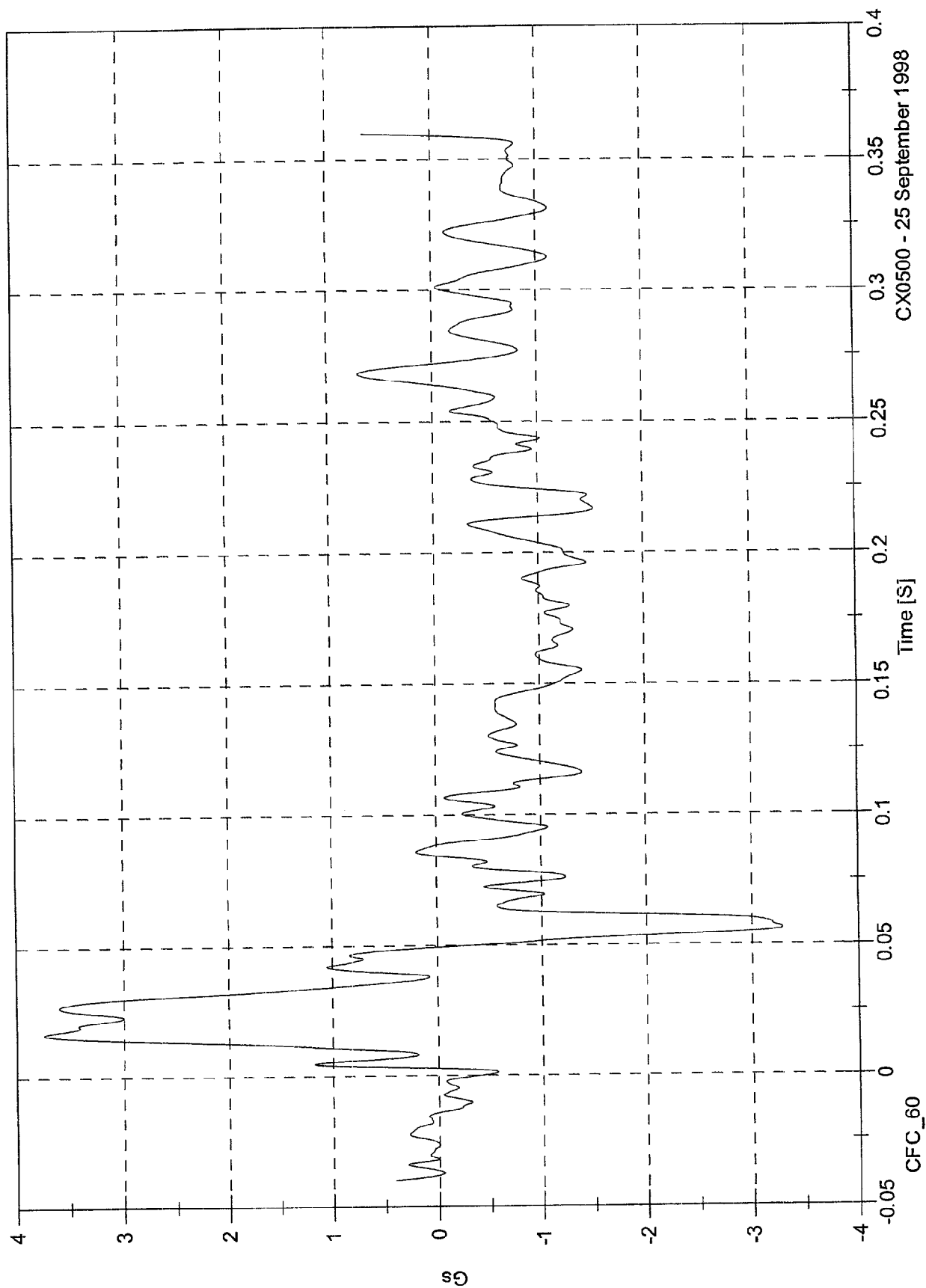
CX0500 - 25 September 1998

Max: 3.8 [Gs] at 0.0164 [S]

Min: -3.3 [Gs] at 0.0564 [S]

NHTSA Side Impact - 1999 Saab 9-5

MDB Left Rear Rail Y [Gs, CFC_60]

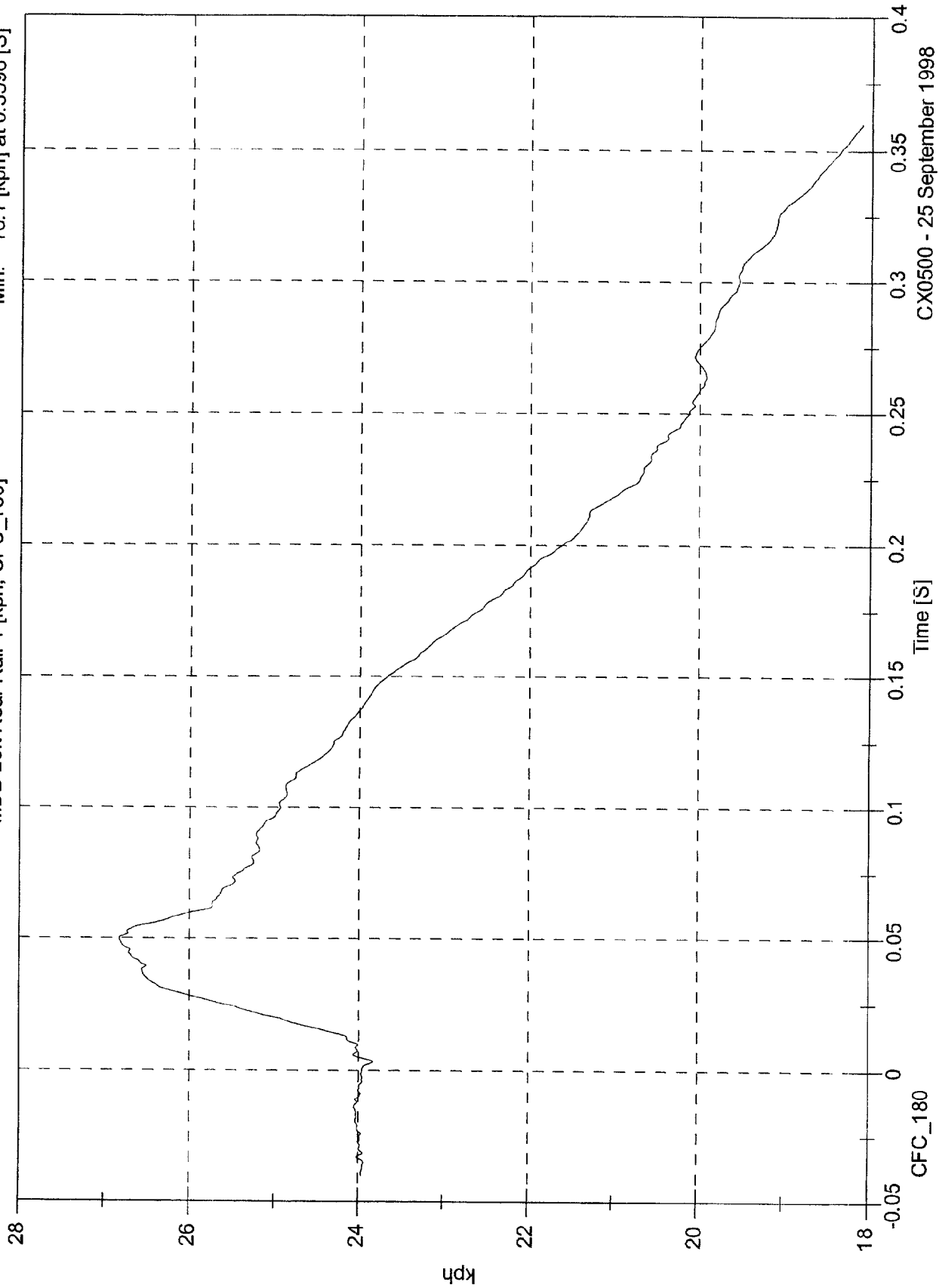


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 26.8 [kph] at 0.05 [S]
Min: 18.1 [kph] at 0.3596 [S]

MDB Left Rear Rail Y [kph, CFC_180]

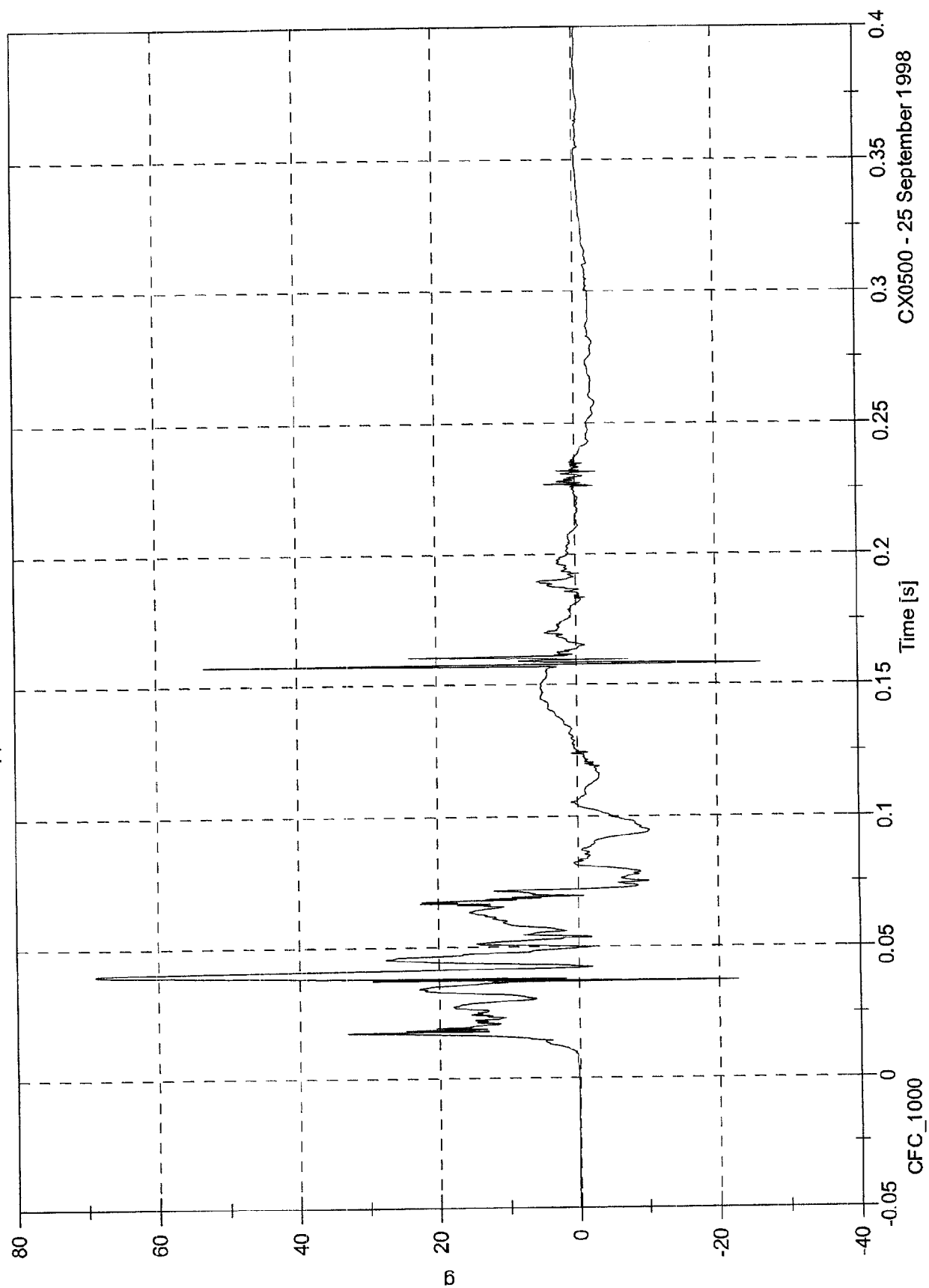


CX0500 - 25 September 1998

Max: 68.9 [g] at 0.0396 [s]
Min: -26.3 [g] at 0.158 [s]

NHTSA Side Impact - 1999 Saab 9-5

Driver Upper Rib Y(R) [g, CFC_1000]

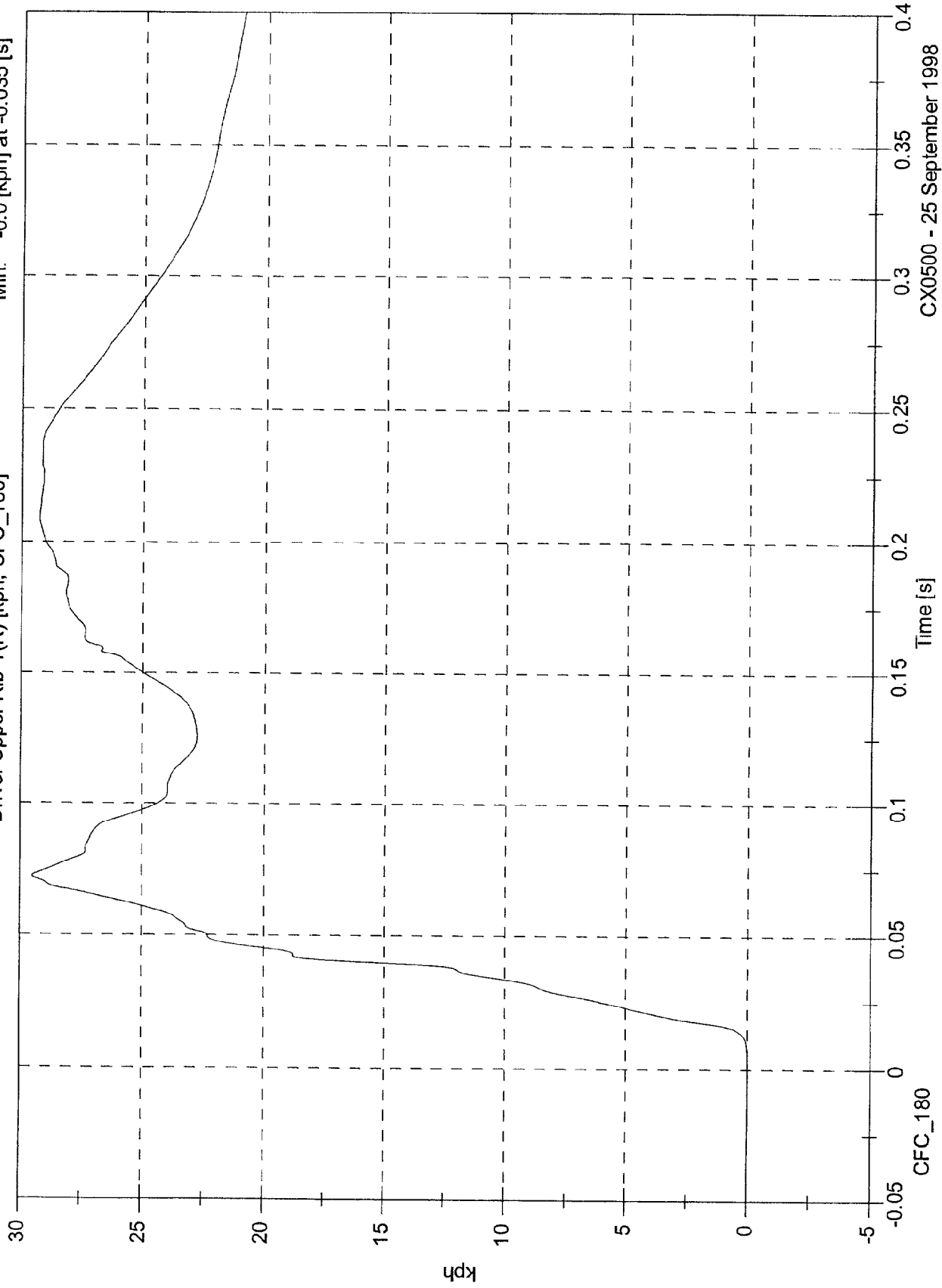


NHTSA Side Impact - 1999 Saab 9-5

Max: 29.5 [kph] at 0.0723 [s]

Min: -0.0 [kph] at -0.035 [s]

Driver Upper Rib Y(R) [kph, CFC_180]

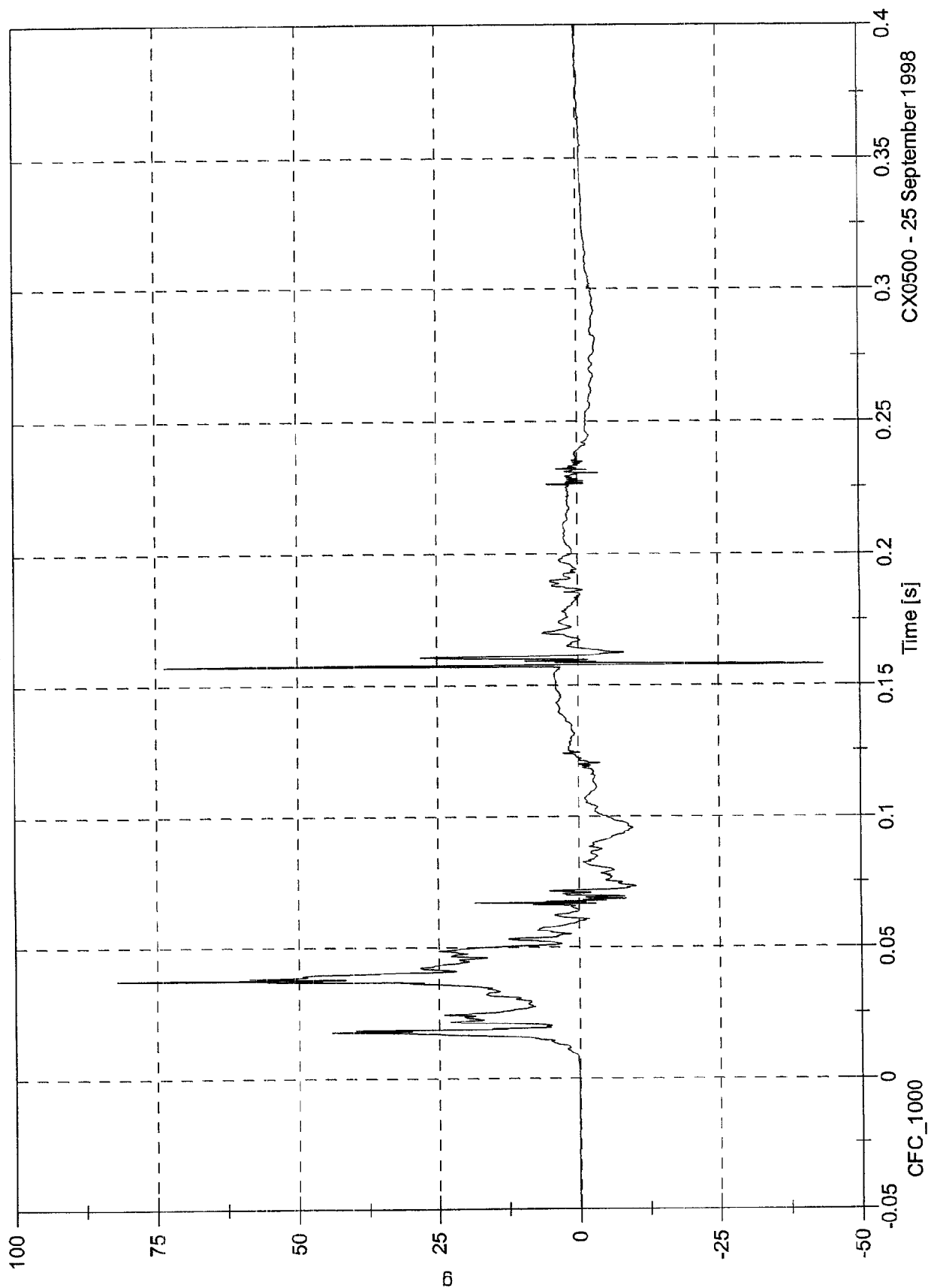


CX0500 - 25 September 1998

Max: 82.1 [g] at 0.0374 [s]
Min: -43.5 [g] at 0.1579 [s]

NHTSA Side Impact - 1999 Saab 9-5

Driver Lower Rib Y(R) [g, CFC_1000]

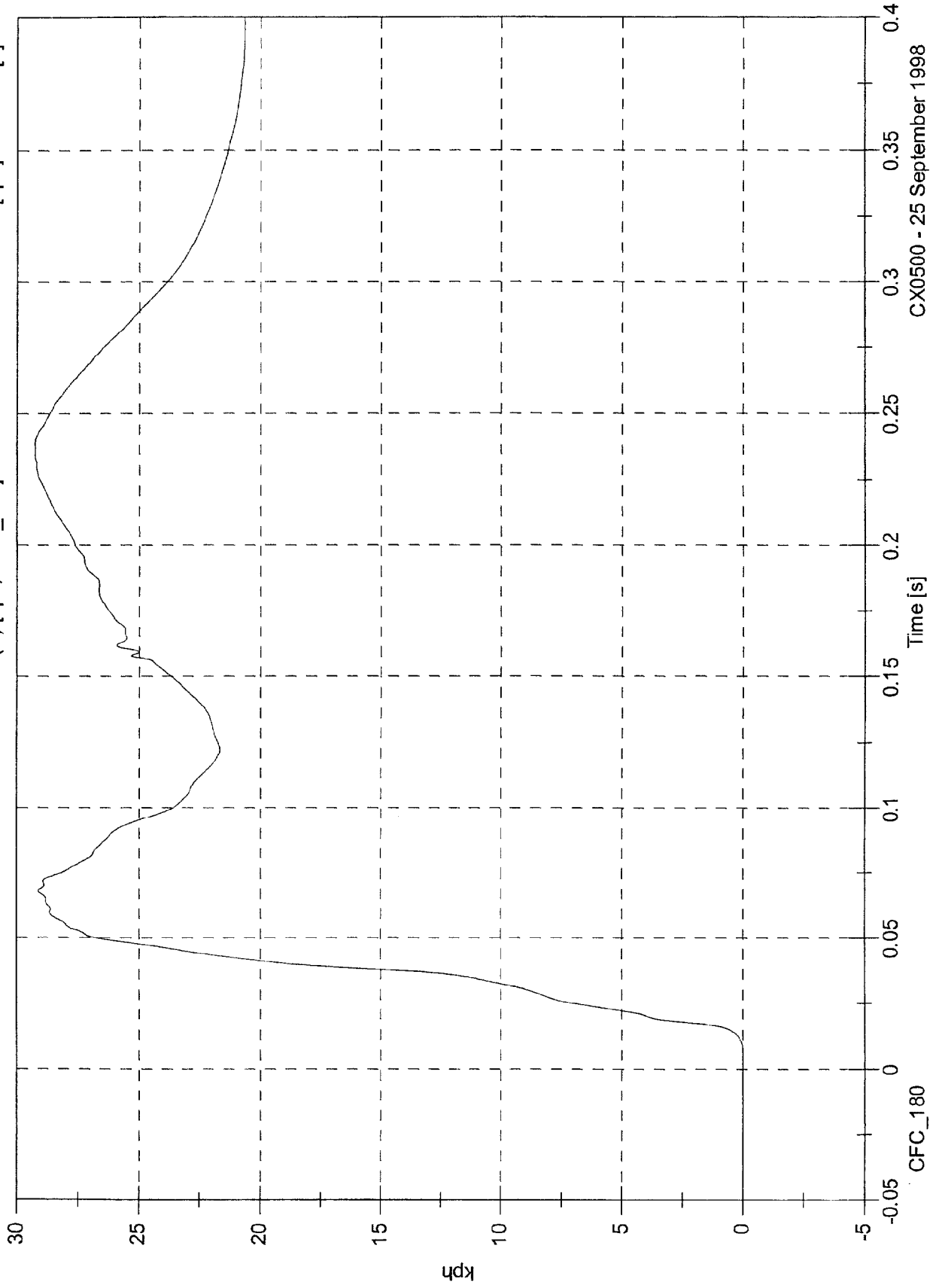


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max 29.3 [kph] at 0.2387 [s]
Min: -0.0 [kph] at -0.015 [s]

Driver Lower Rib Y(R) [kph, CFC_180]

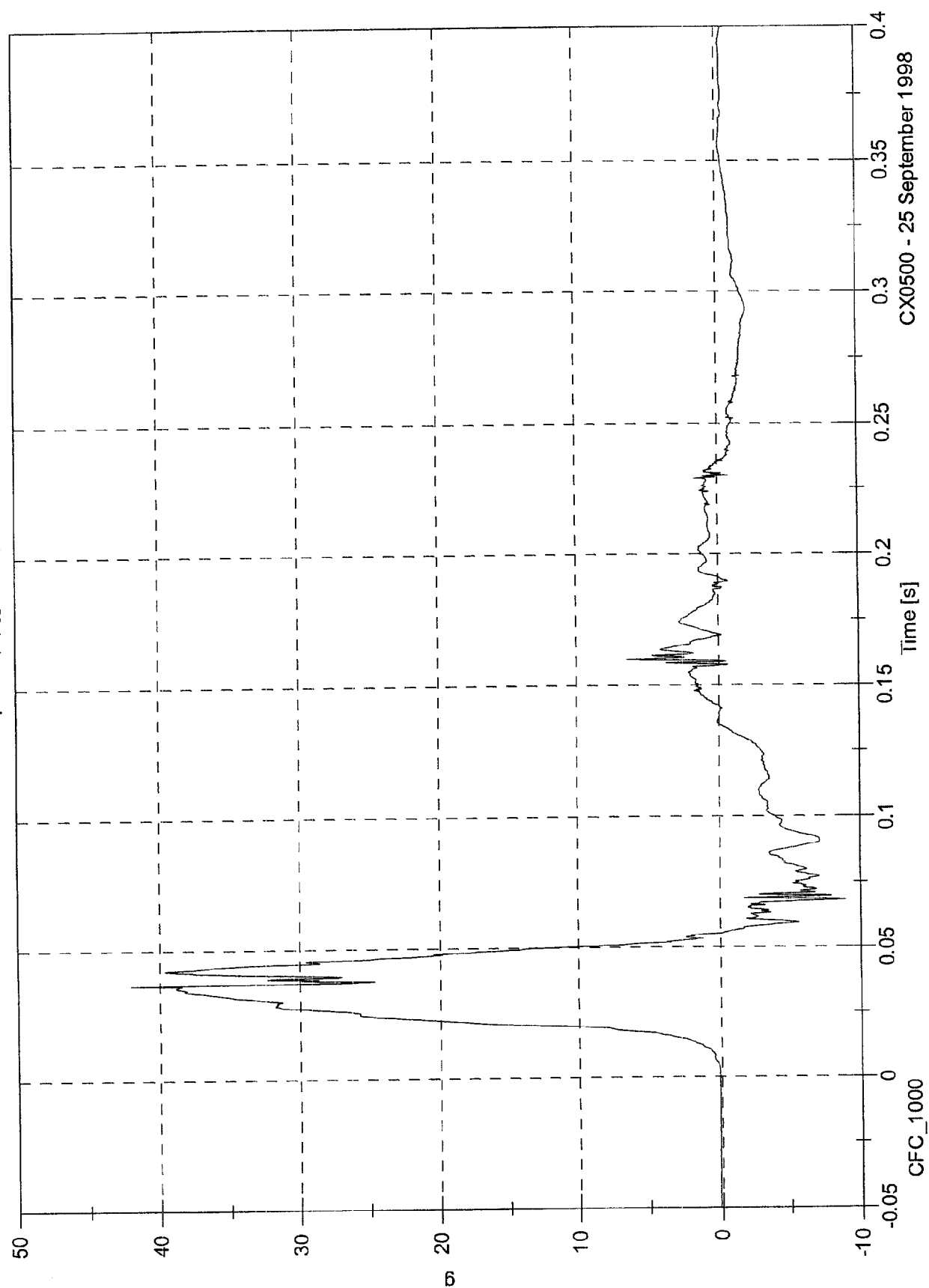


CX0500 - 25 September 1998

Max: 42.1 [g] at 0.0365 [s]
Min: -8.9 [g] at 0.0682 [s]

Driver Lower Spine Y(R) [g, CFC_1000]

NHTSA Side Impact - 1999 Saab 9-5

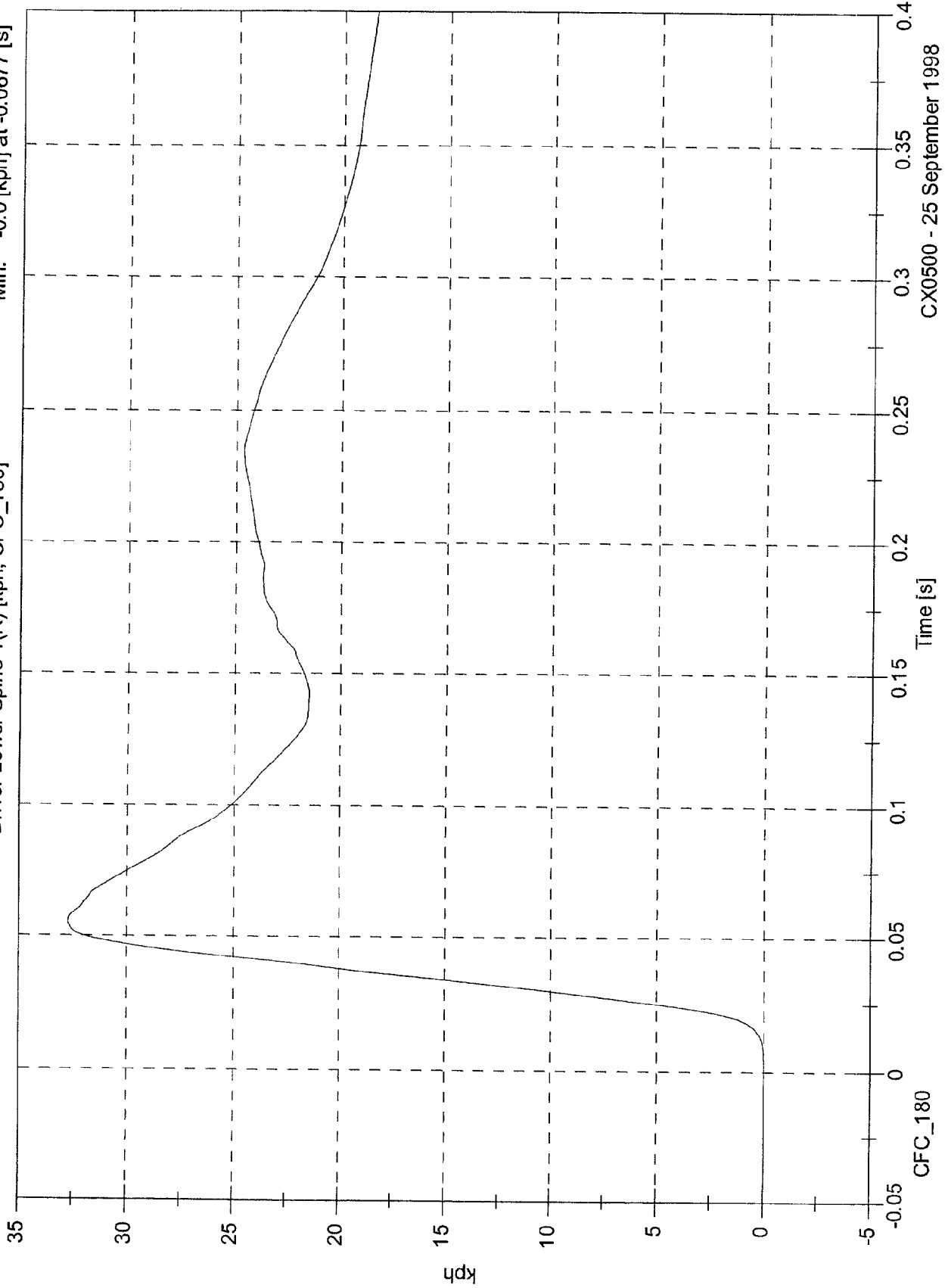


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 32.7 [kph] at 0.0555 [s]
Min: -0.0 [kph] at -0.0677 [s]

Driver Lower Spine Y(R) [kph, CFC_180]

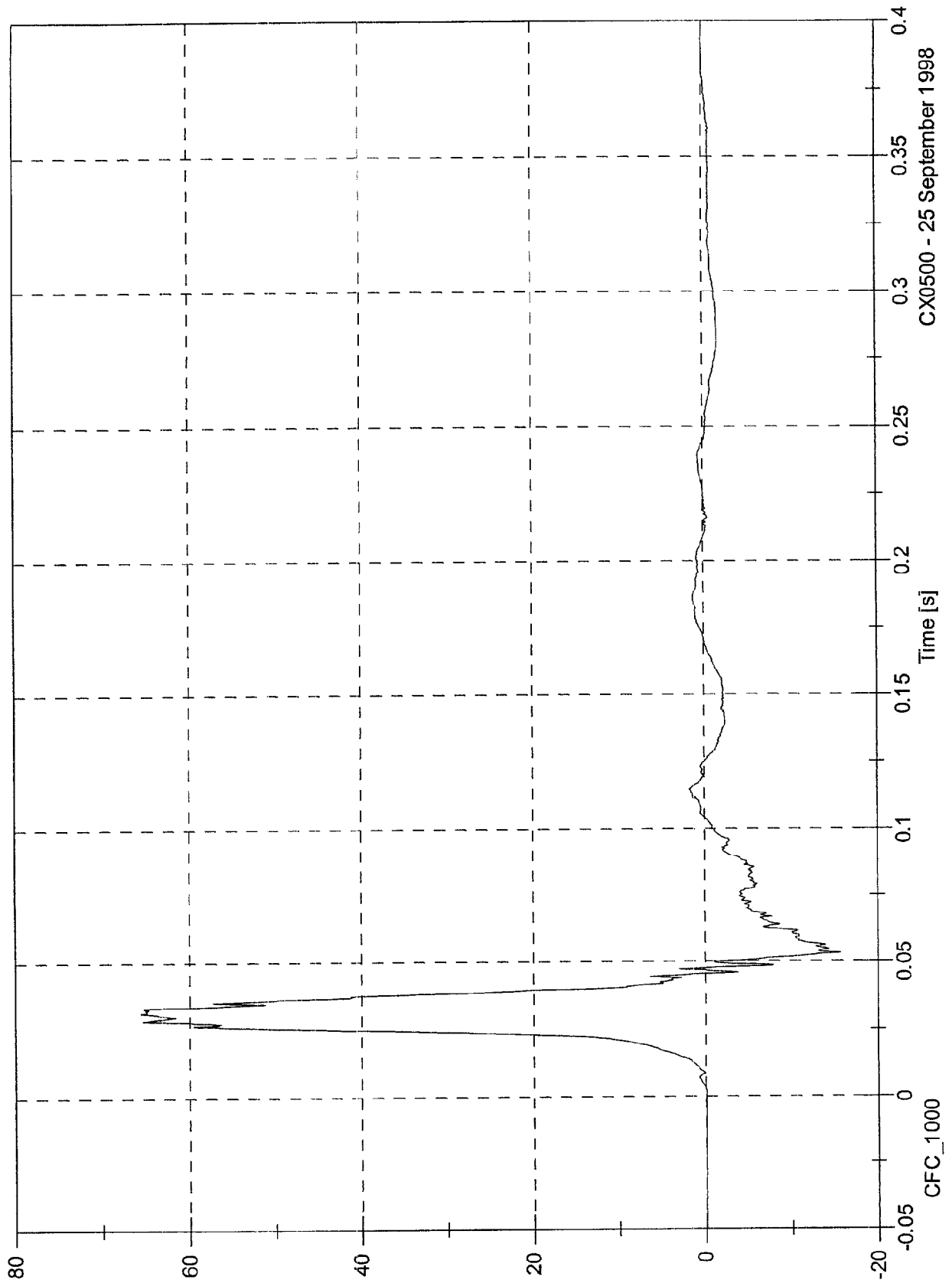


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 65.7 [g] at 0.0316 [s]
Min: -15.6 [g] at 0.0531 [s]

Driver Pelvic Y(R) [g, CFC_1000]

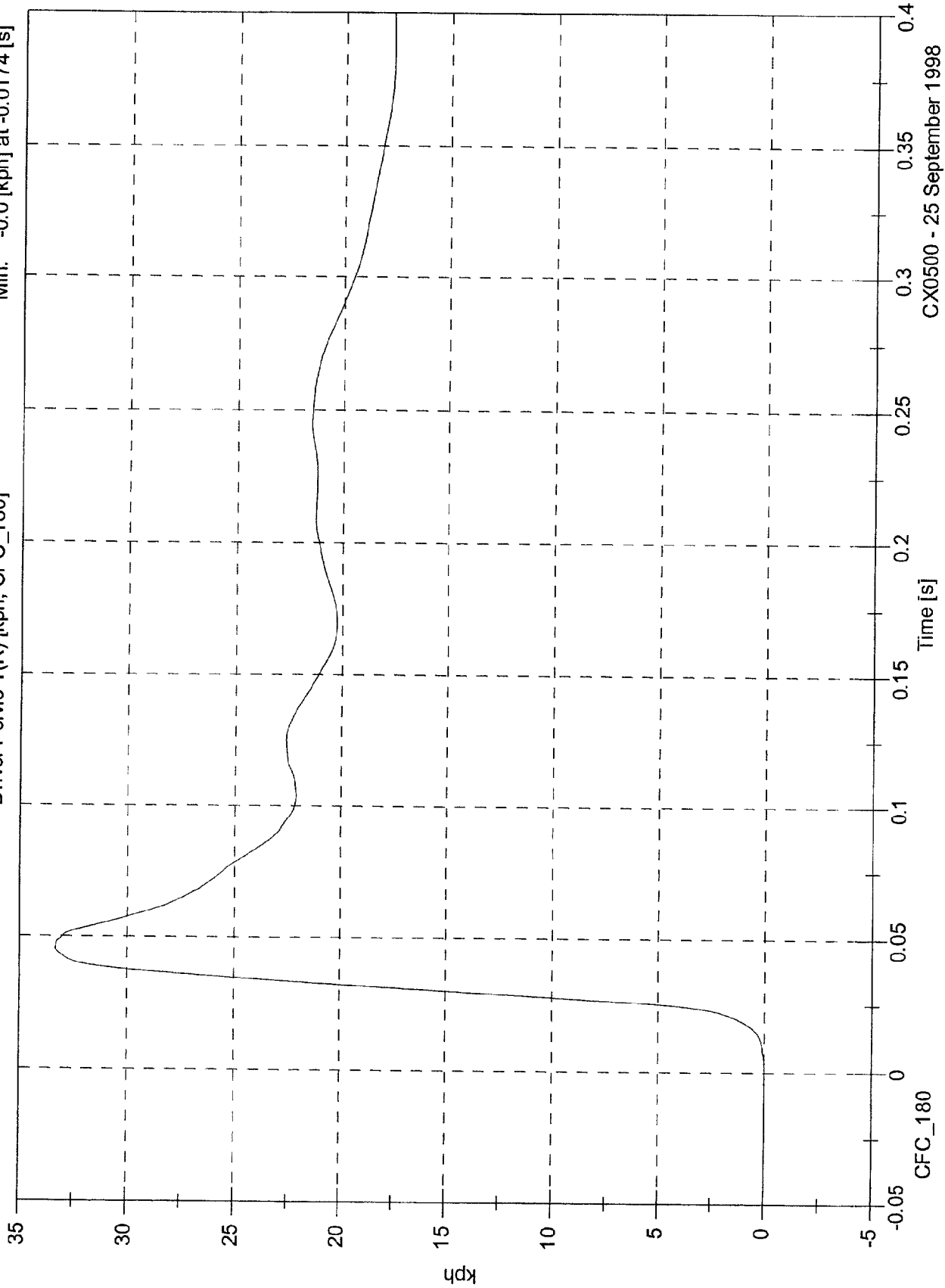


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 33.3 [kph] at 0.0454 [s]
Min: -0.0 [kph] at -0.0174 [s]

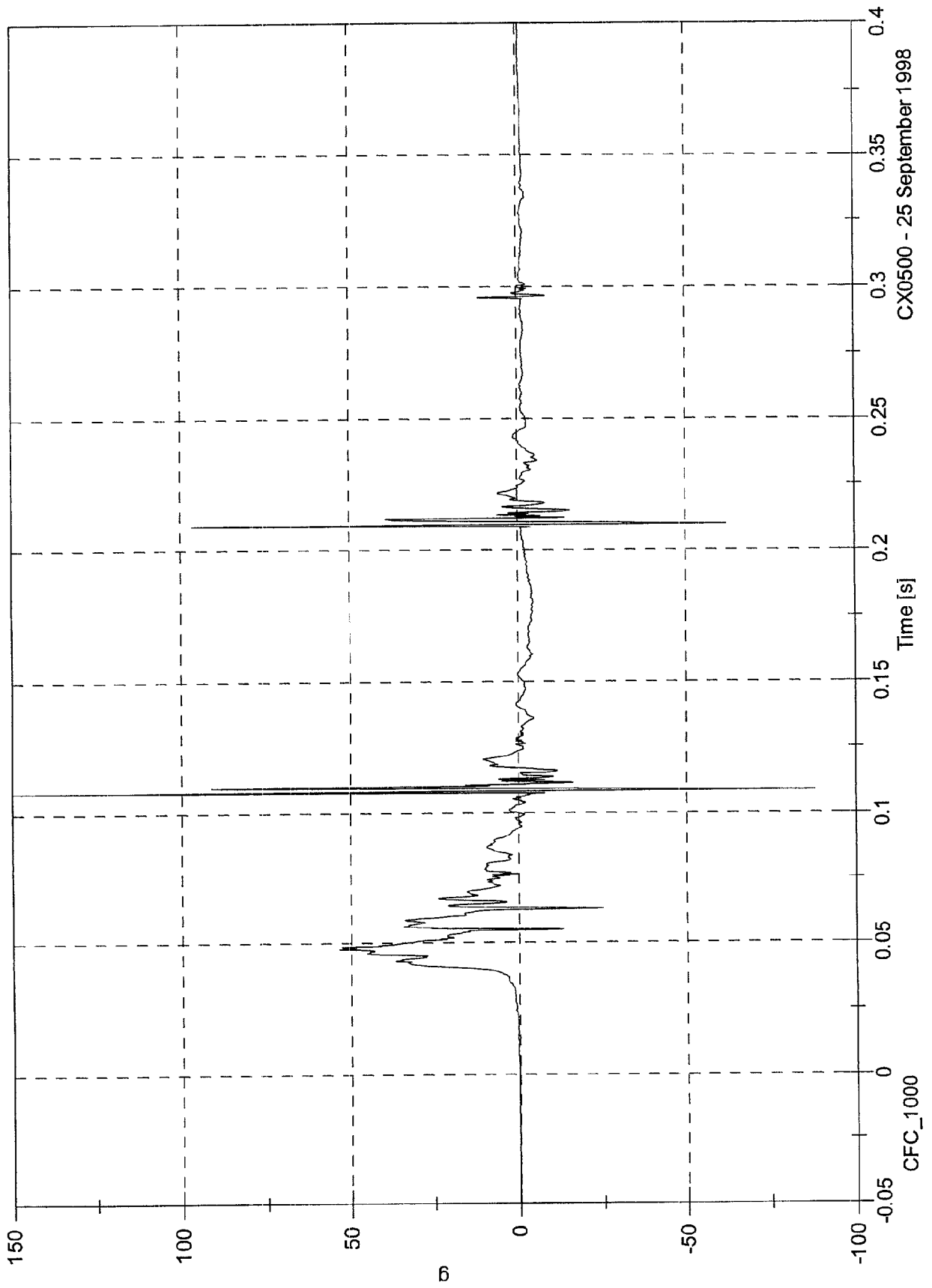
Driver Pelvic Y(R) [kph, CFC_180]



CX0500 - 25 September 1998

Max: 150.0 [g] at 0.1079 [s]
Min: -87.9 [g] at 0.1086 [s]

NHTSA Side Impact - 1999 Saab 9-5
Passenger Upper Rib Y(R) [g, CFC_1000]

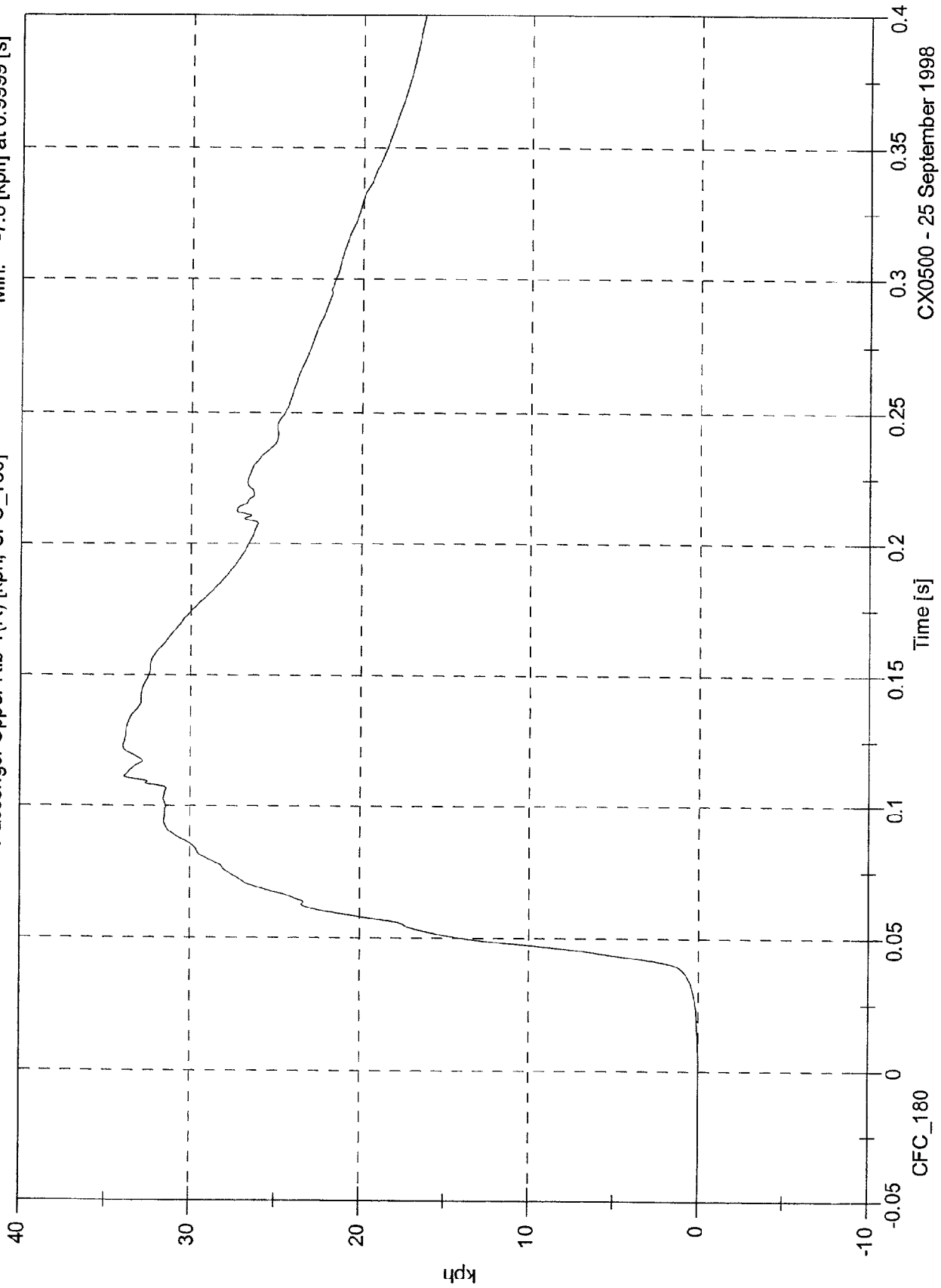


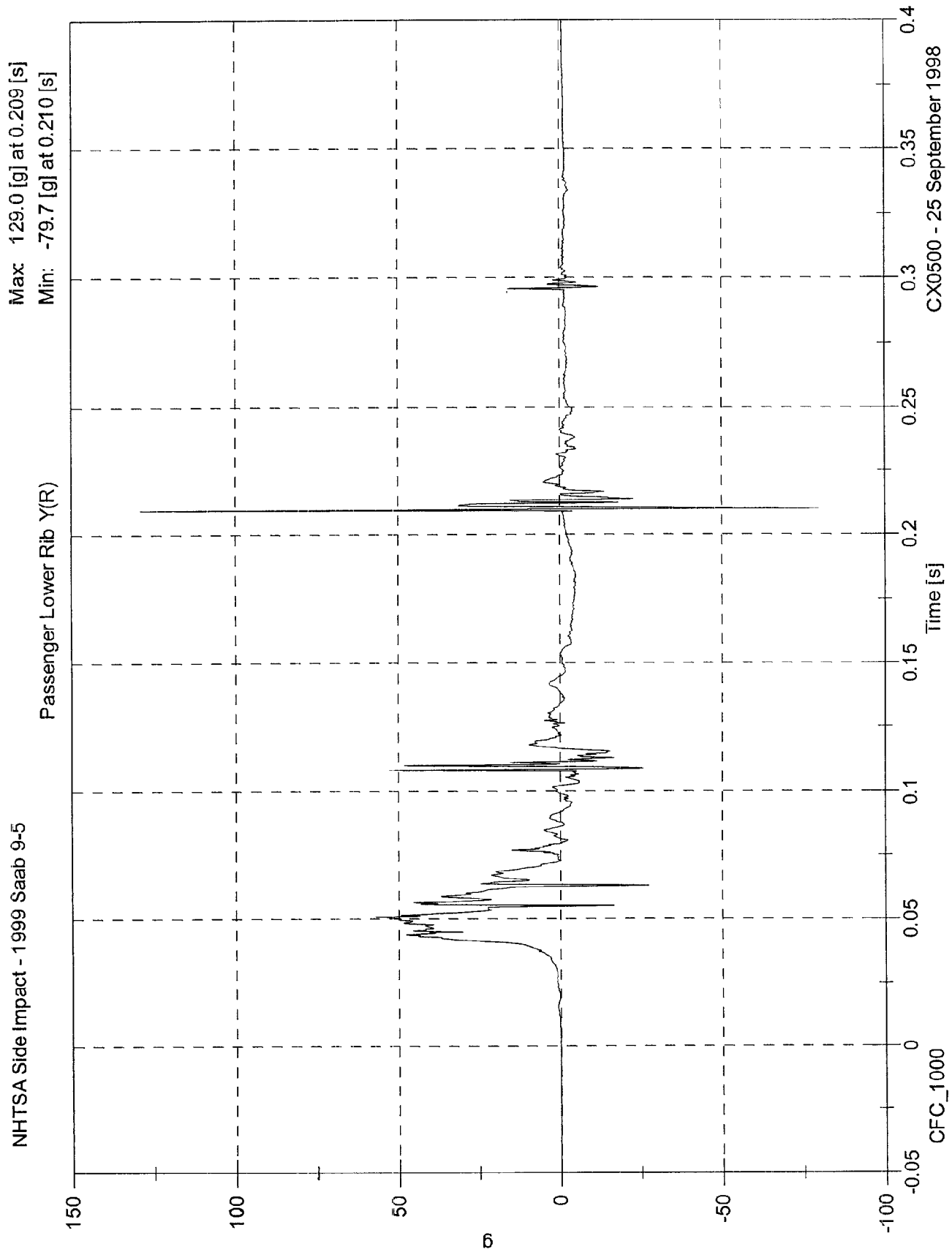
CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 34.0 [kph] at 0.1231 [s]
Min: -7.8 [kph] at 0.9999 [s]

Passenger Upper Rib Y(R) [kph, CFC_180]

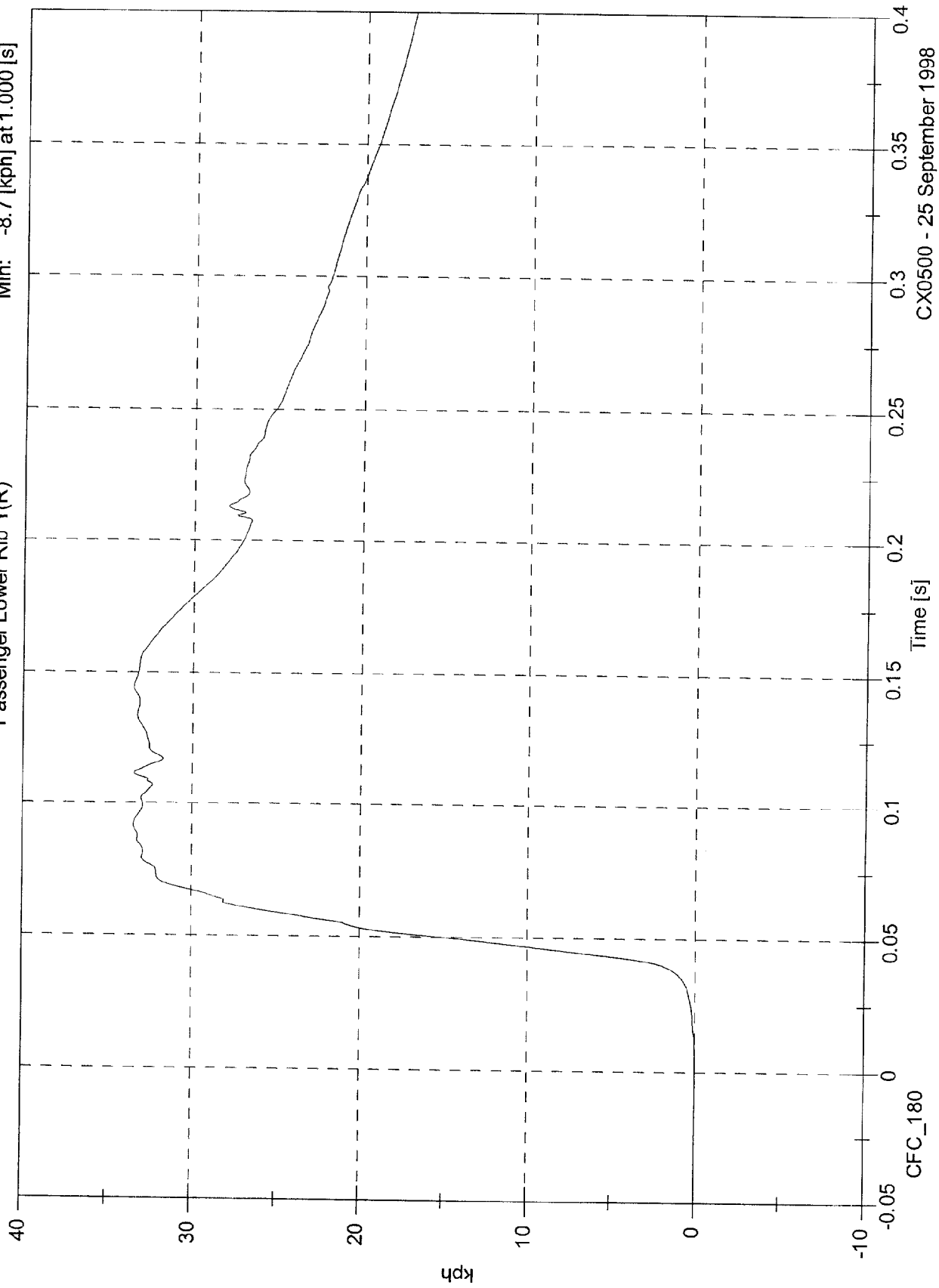




NHTSA Side Impact - 1999 Saab 9-5

Max: 33.5 [kph] at 0.091 [s]
Min: -8.7 [kph] at 1.000 [s]

Passenger Lower Rib Y(R)

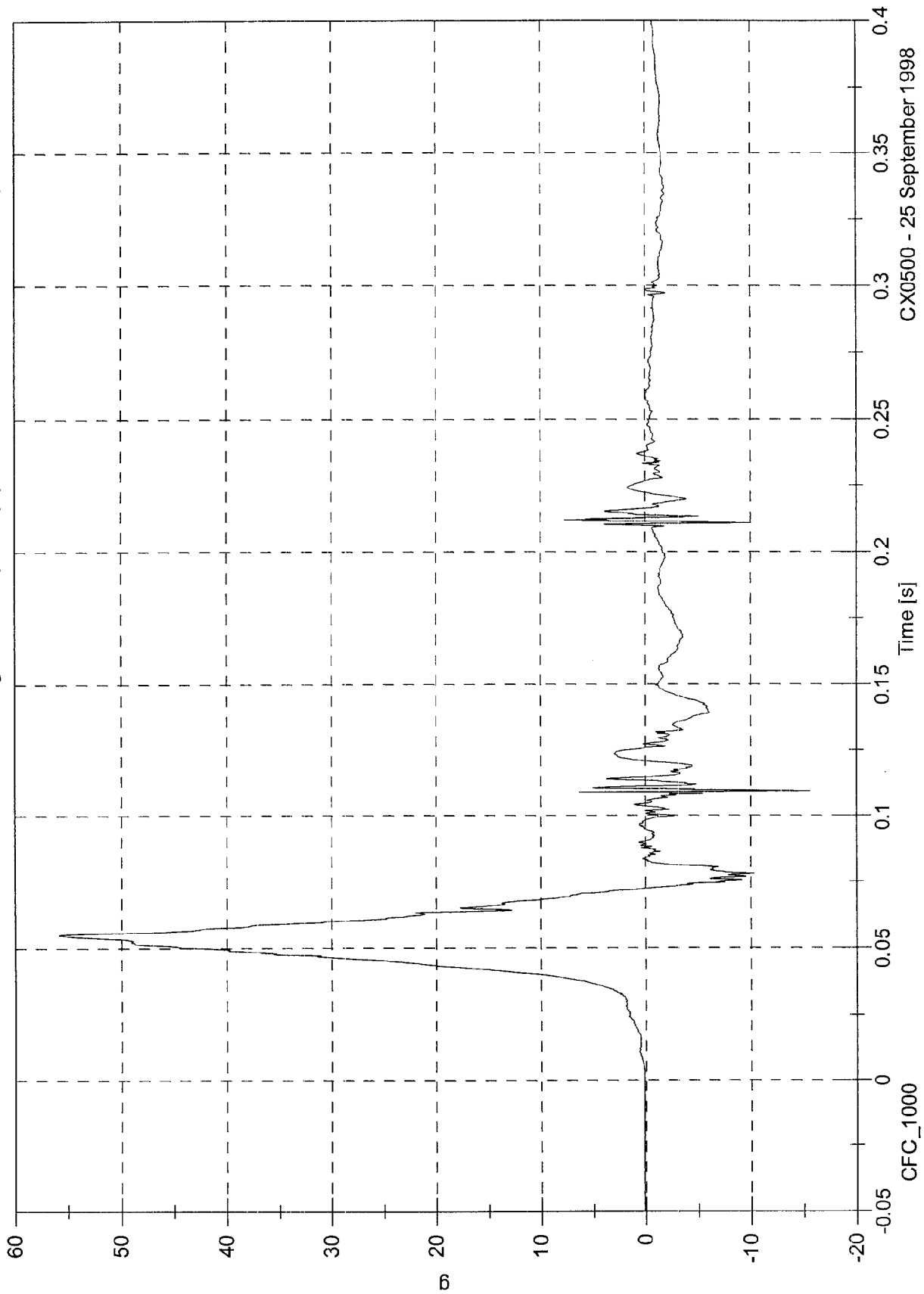


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Passenger Lower Spine Y(R)

Max: 55.9 [g] at 0.055 [s]
Min: -15.6 [g] at 0.109 [s]

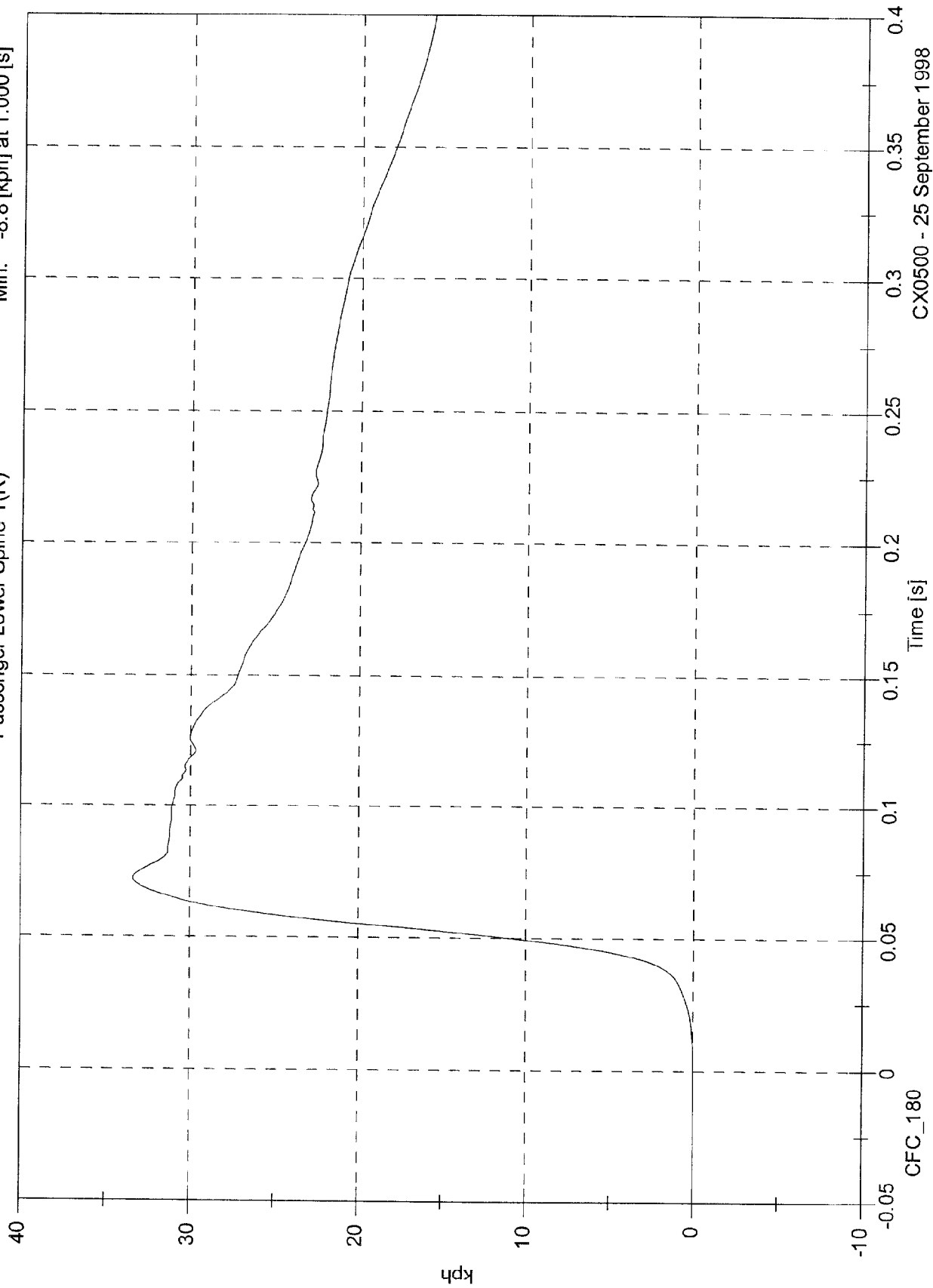


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 33.4 [kph] at 0.072 [s]
Min: -8.8 [kph] at 1.000 [s]

Passenger Lower Spine Y(R)

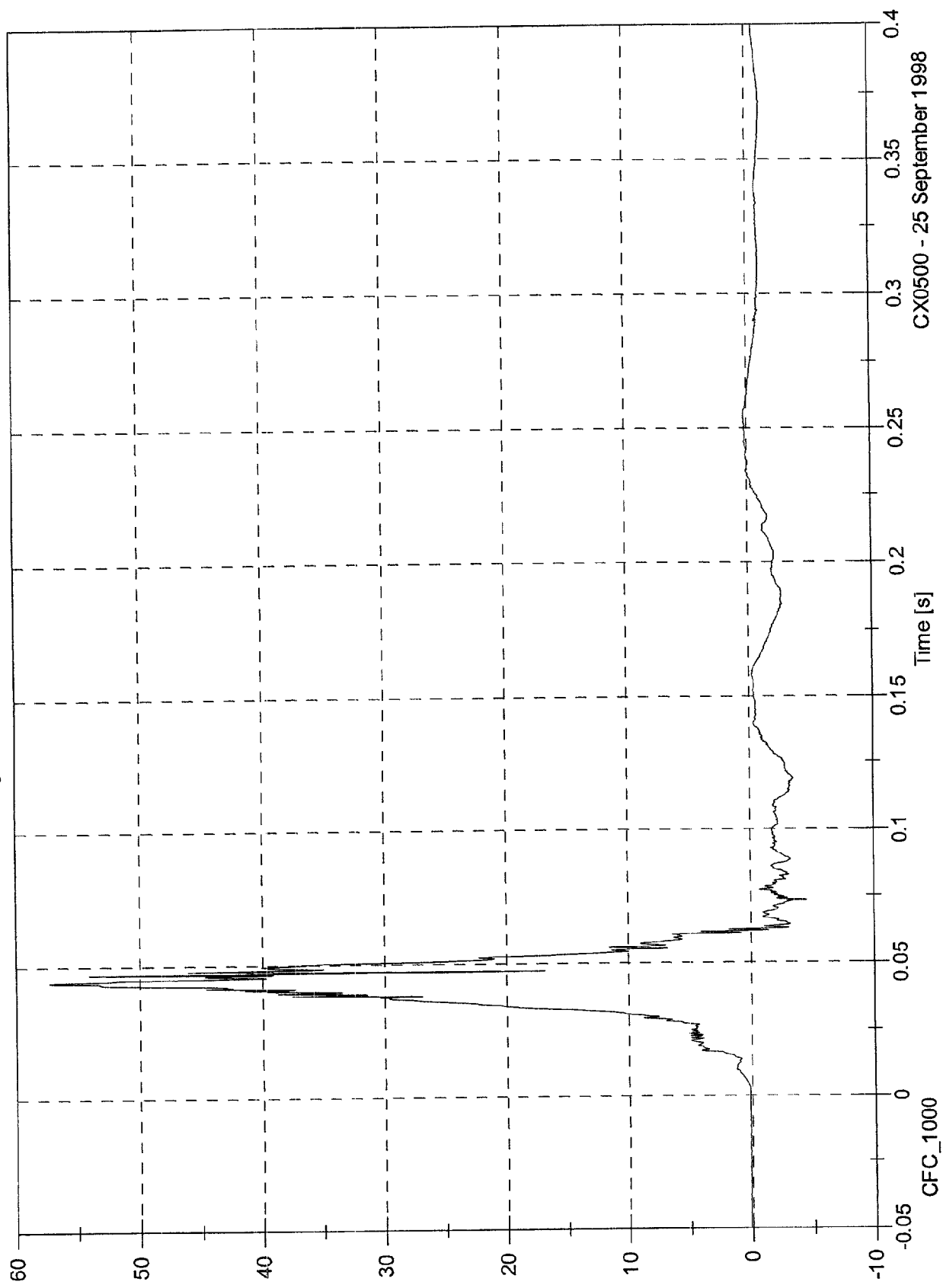


CX0500 - 25 September 1998

Max: 57.3 [g] at 0.044 [s]
Min: -4.6 [g] at 0.0734 [s]

Passenger Pelvic Y(R) [g, CFC_1000]

NHTSA Side Impact - 1999 Saab 9-5



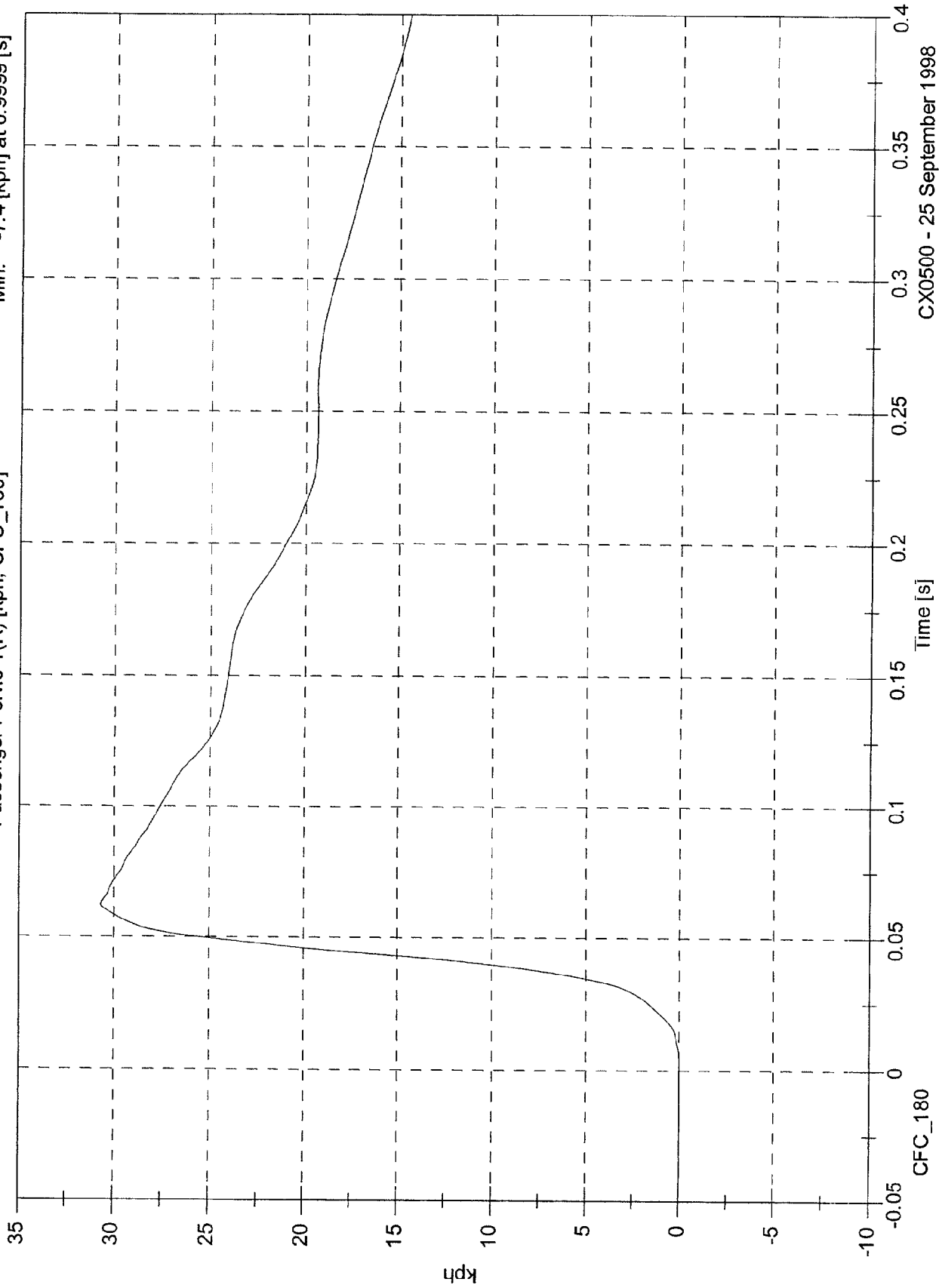
CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 30.7 [kph] at 0.0623 [s]

Min: -7.4 [kph] at 0.9999 [s]

Passenger Pelvic Y(R) [kph, CFC_180]

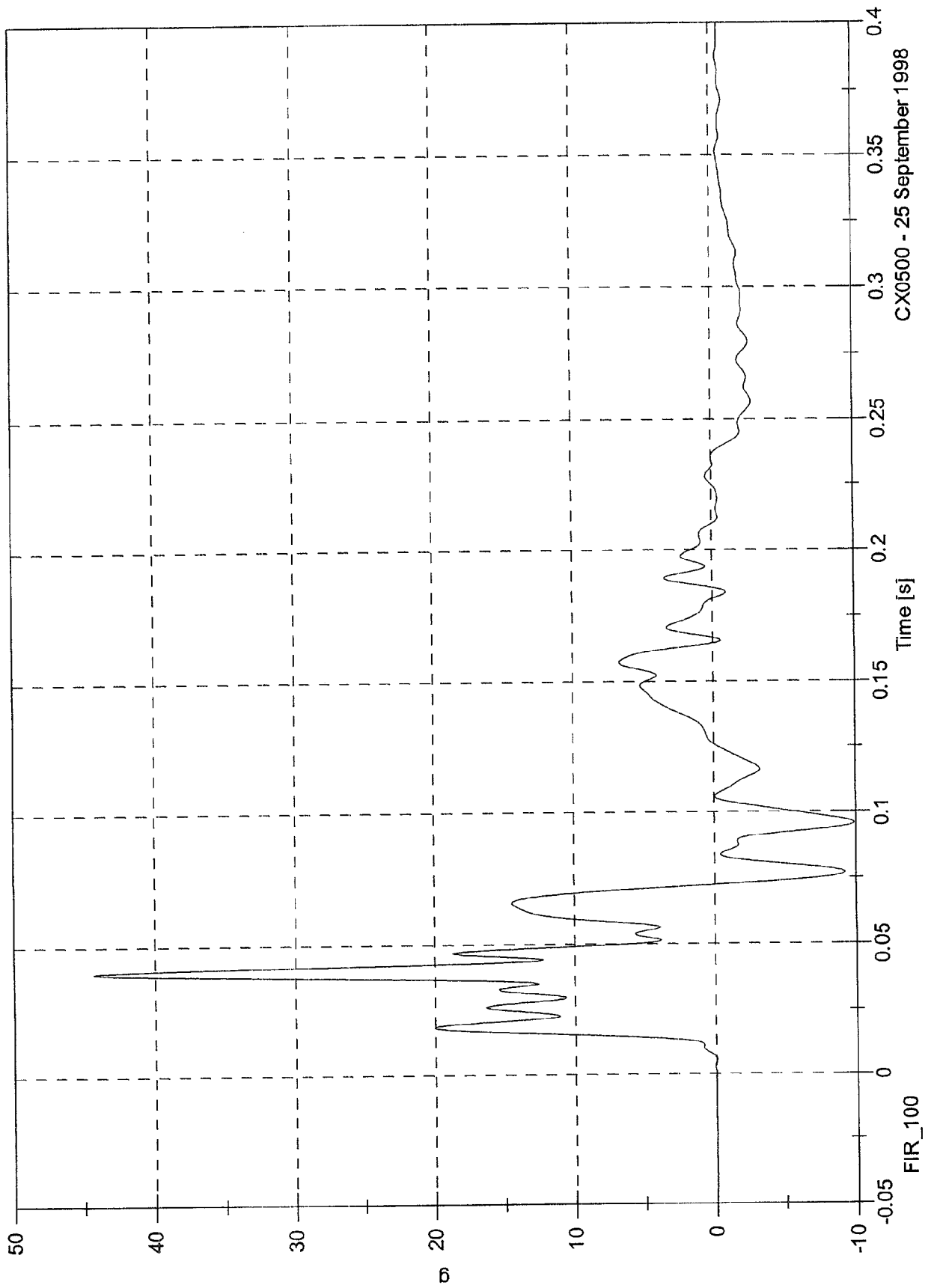


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 44.3 [g] at 0.04 [s]
Min: -9.9 [g] at 0.0956 [s]

Driver Upper Rib Y(R) [g, FIR_100]

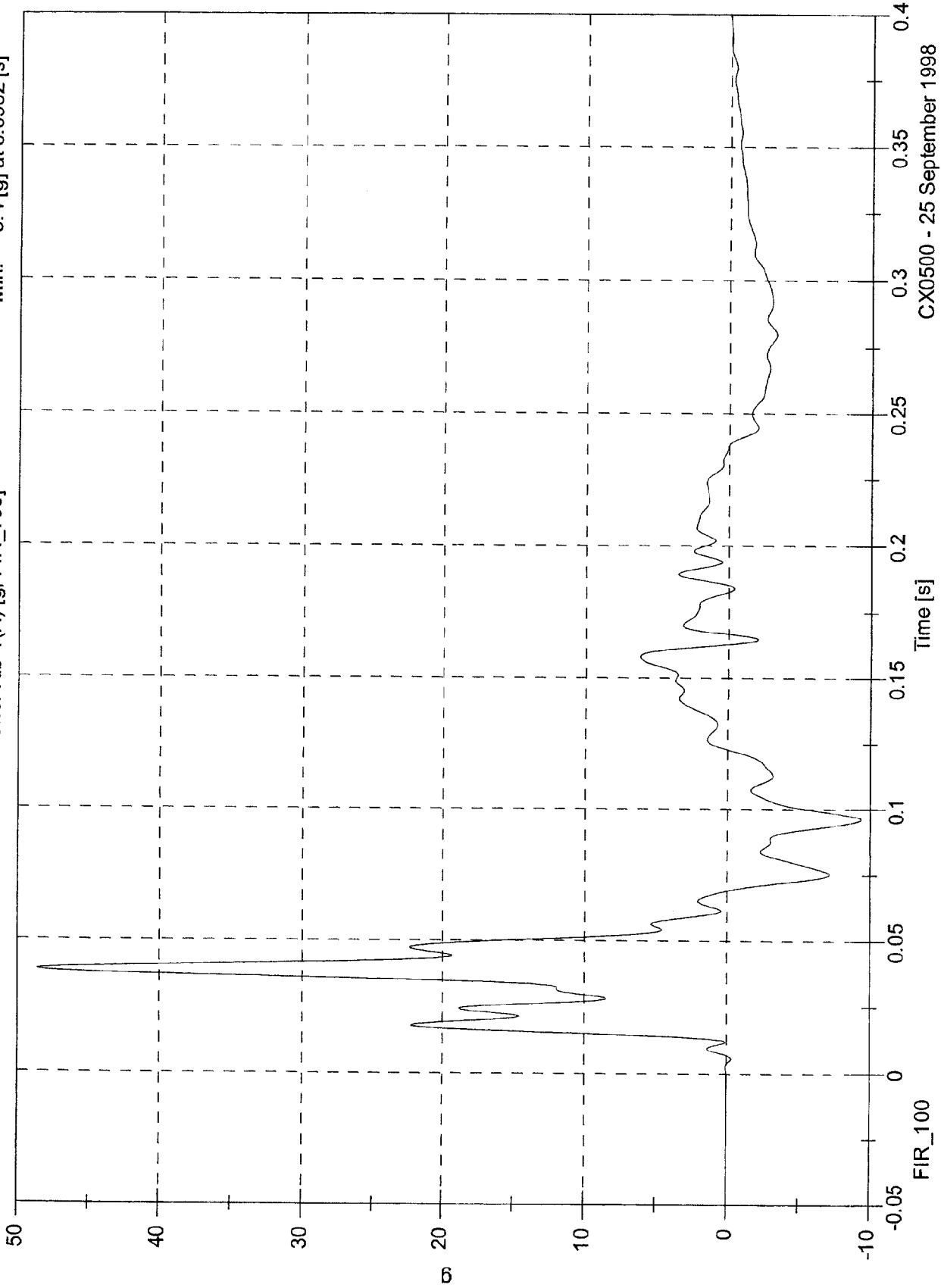


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 48.6 [g] at 0.0387 [s]
Min: -9.4 [g] at 0.0962 [s]

Driver Lower Rib Y(R) [g, FIR_100]

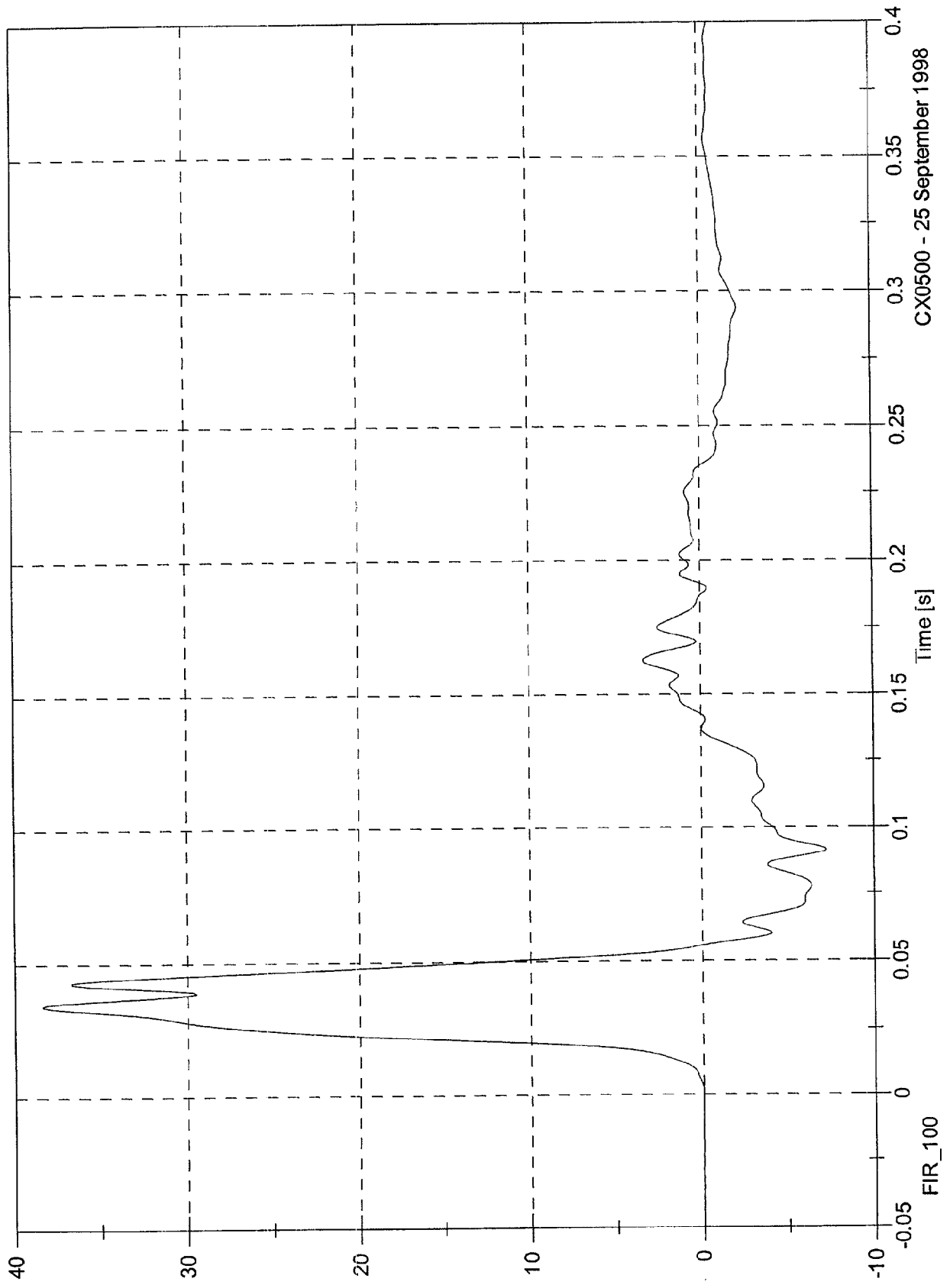


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 38.4 [g] at 0.0344 [s]
Min: -7.2 [g] at 0.0913 [s]

Driver Lower Spine Y(R) [g, FIR_100]



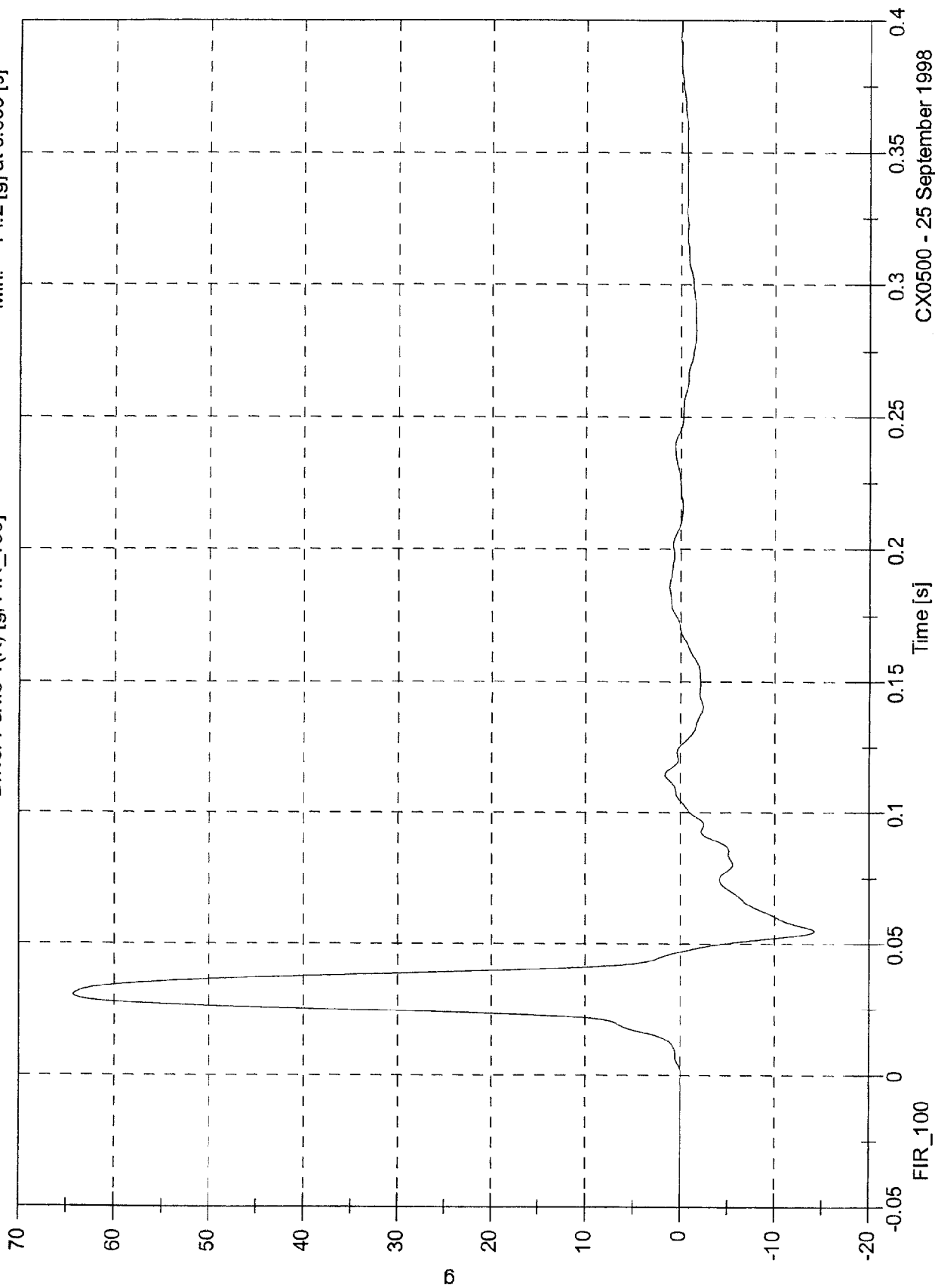
CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 64.3 [g] at 0.0306 [s]

Min: -14.2 [g] at 0.055 [s]

Driver Pelvic Y(R) [g, FIR_100]

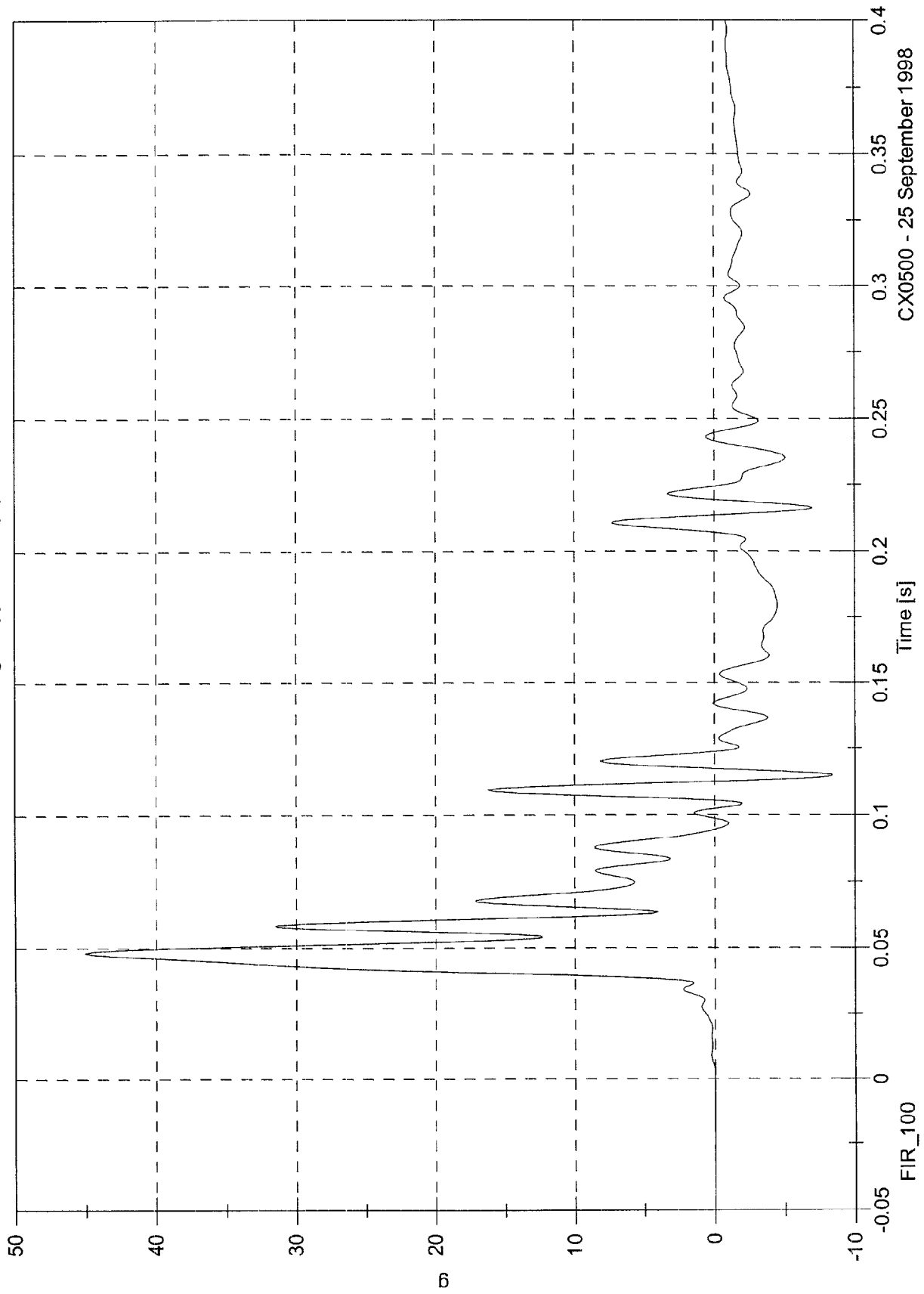


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 45.1 [g] at 0.048 [s]
Min: -8.4 [g] at 0.115 [s]

Passenger Upper Rib Y(R)

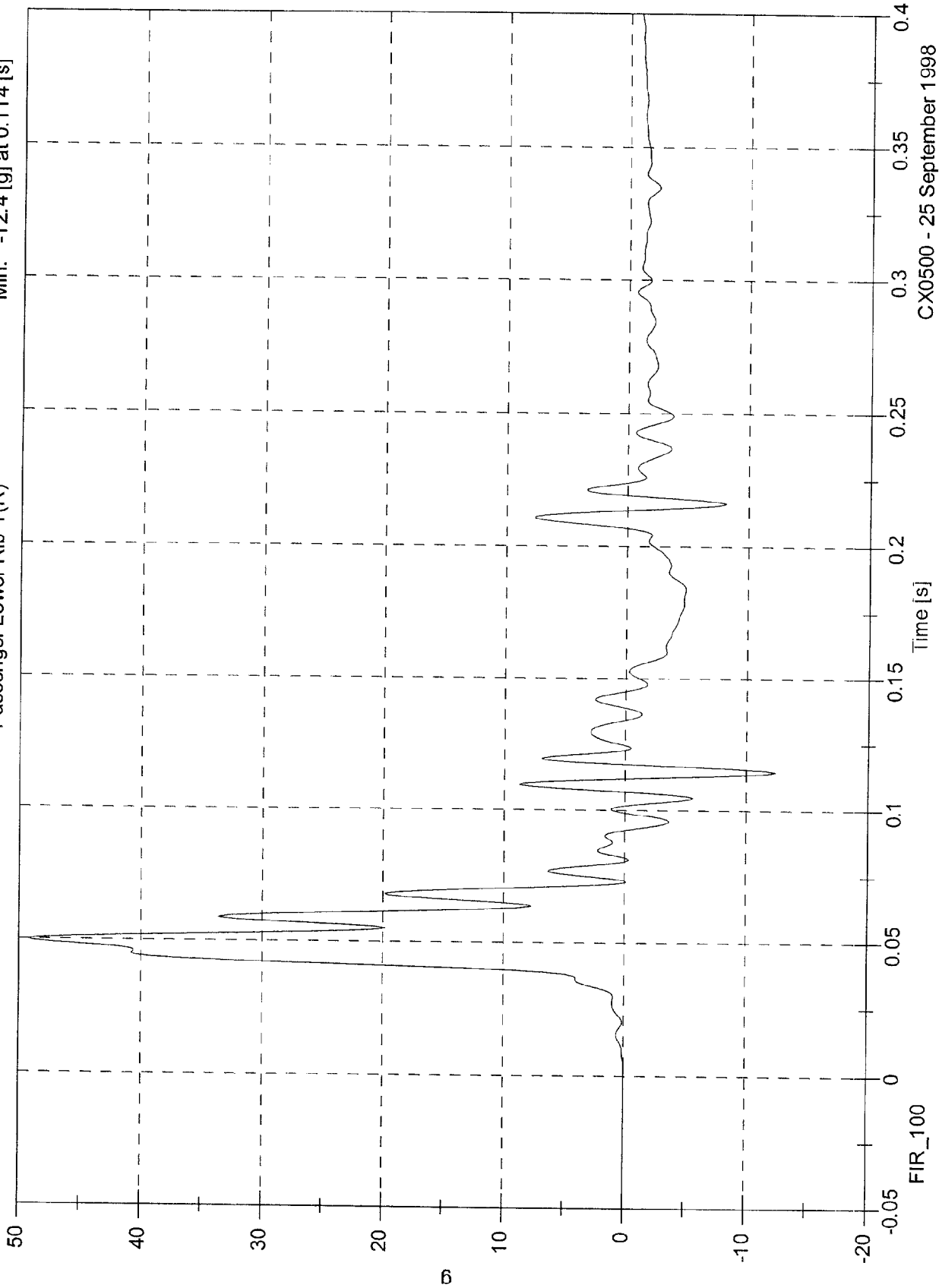


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 49.3 [g] at 0.050 [s]
Min: -12.4 [g] at 0.114 [s]

Passenger Lower Rib Y(R)

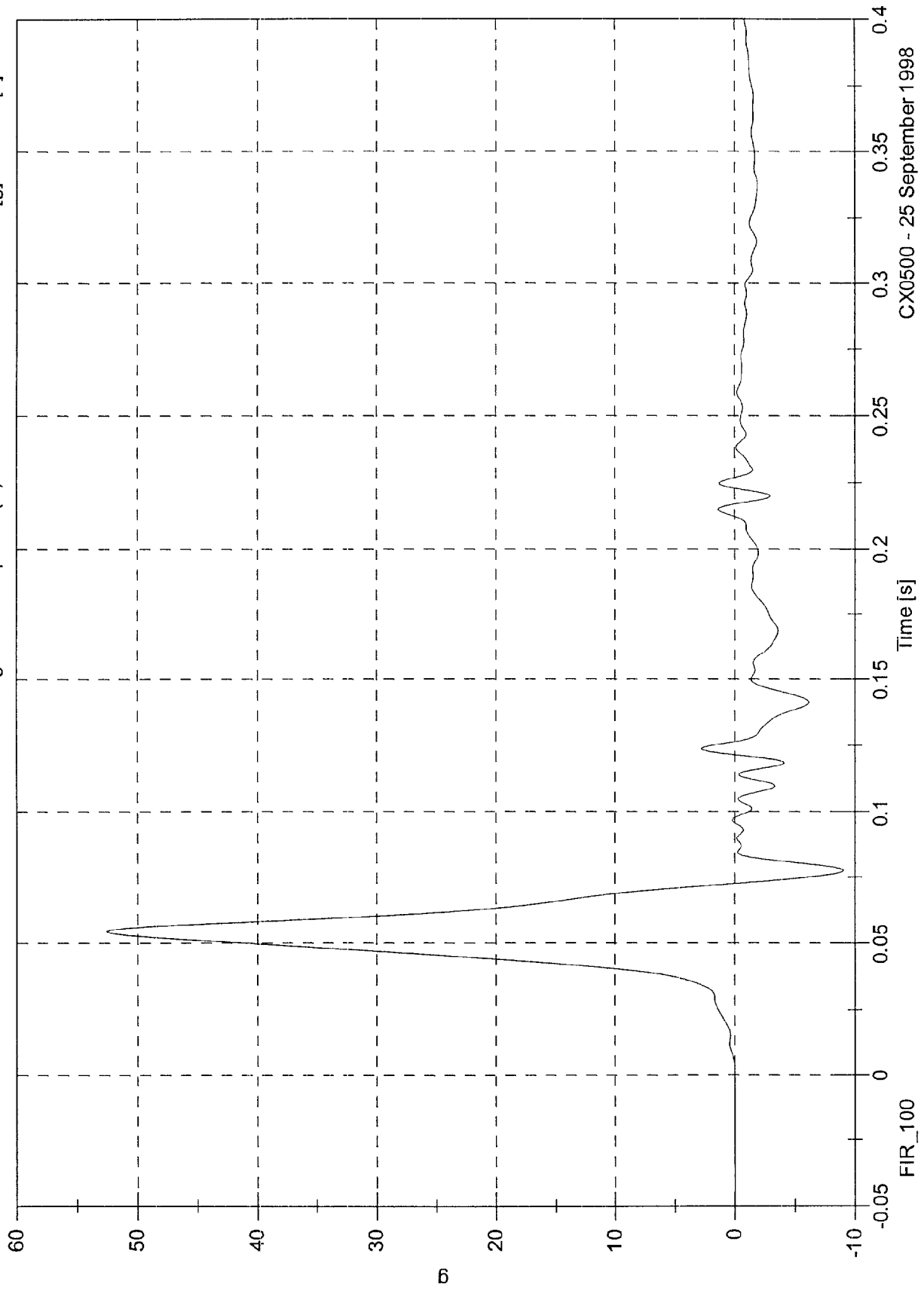


CX0500 - 25 September 1998

NHTSA Side Impact - 1999 Saab 9-5

Max: 52.6 [g] at 0.054 [s]
Min: -9.1 [g] at 0.077 [s]

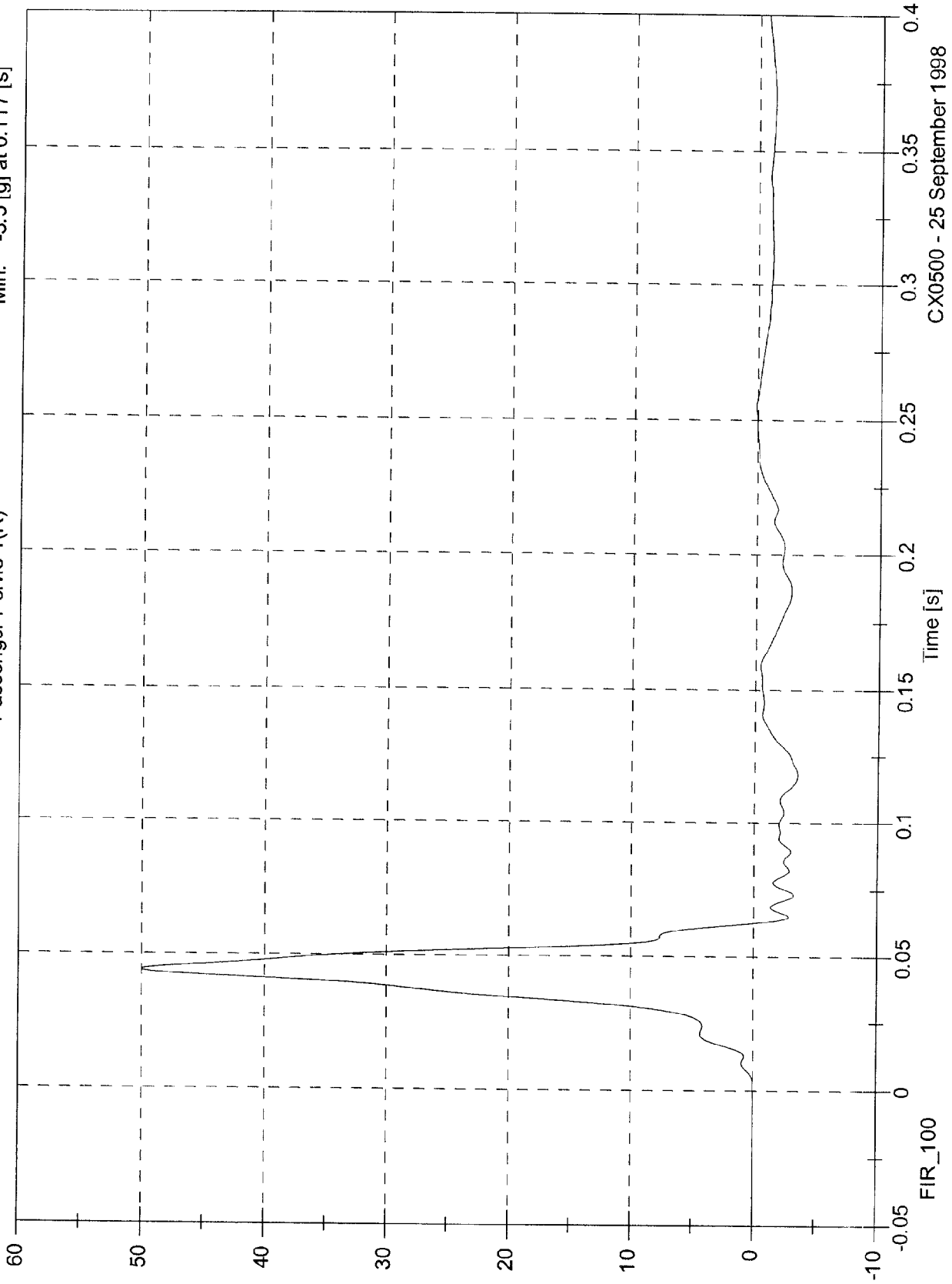
Passenger Lower Spine Y(R)



NHTSA Side Impact - 1999 Saab 9-5

Max: 50.0 [g] at 0.044 [s]
Min: -3.5 [g] at 0.117 [s]

Passenger Pelvic Y(R)



CX0500 - 25 September 1998

APPENDIX C

SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA

SUMMARY
SID PRE & POST TEST CALIBRATION

CONFIGURED FOR LEFT SIDE IMPACT

Date: 9/23/98, 10/1/98

Calspan Sequential Test Number: 2, 3

Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	SID NO.: 015		SID NO.: 016	
		PRE TEST	POST TEST	PRE TEST	POST TEST
SH- Seated Height (mm)	889 - 909	904	904	902	902
RH- Rib Height (mm)	501 - 521	508	508	513	513
HP- Hip Pivot Height (mm)	99 ref.	99	99	99	99
RD- Rib from Back Line (mm)	229 - 241	236	236	240	240
KV- Knee Pivot from Back Line (mm)	511 - 526	521	521	526	525
SW- Knee Pivot to Floor (mm)	490 - 505	493	494	494	494
HW- Hip Width (mm)	356 - 391	368	368	361	362
THORAX IMPACTS					
TEMPERATURE (°C)	18.9 - 25.5	21.1	21.1	21.1	21.1
RELATIVE HUMIDITY (%)	10 - 70	45	45	45	40
PROBE SPEED (m/s)	4.27 - 4.33	4.30	4.31	4.33	4.27
UPPER RIB (g's)	37 - 46	44.2	42.8	45.3	42.5
LOWER RIB (g's)	37 - 46	43.9	42.5	45.3	41.7
LOWER SPINE (g's)	15 - 22	22.0	21.1	15.8	18.5
PELVIS IMPACT					
TEMPERATURE (°C)	18.9 - 25.5	21.1	21.1	21.1	21.1
RELATIVE HUMIDITY (%)	10 - 70	45	45	45	40
PROBE SPEED (m/s)	4.27 - 4.33	4.29	4.32	4.30	4.27
PELVIS (g's)	40 - 60	55.7	46.4	40.6	41.0

REMARKS: None

**CALIBRATION TEST RESULTS
PRE-TEST**

SID NO.: 015

CONFIGURED FOR LEFT SIDE IMPACT

CALIBRATION TEST RESULTS SUMMARY
PRE-TEST

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

Calspan Sequential Test Number: 2

Date: 9/23/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

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

* Test not required for SID certification.

REMARKS: None

**EXTERNAL DIMENSIONS
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015 Calspan Sequential Test Number: 2
Date: 9/23/98 Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
SH- Seated Height (mm)	889 - 909	904
RH- Rib Height (mm)	502 - 520	508
HP- Hip Pivot Height (mm)	99 ref.	99
RD- Rib from Back Line (mm)	229 - 241	236
KH- Knee Pivot from Back Line (mm)	511 - 526	521
KV- Knee Pivot to Floor (mm)	490 - 505	493
HW- Hip Width (mm)	356 - 391	368

REMARKS: None

**THORACIC SHOCK ABSORBER TESTS
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

Calspan Sequential Test Number: 1.2

Date: 9/14/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

DAMPER IDENTIFICATION: 015

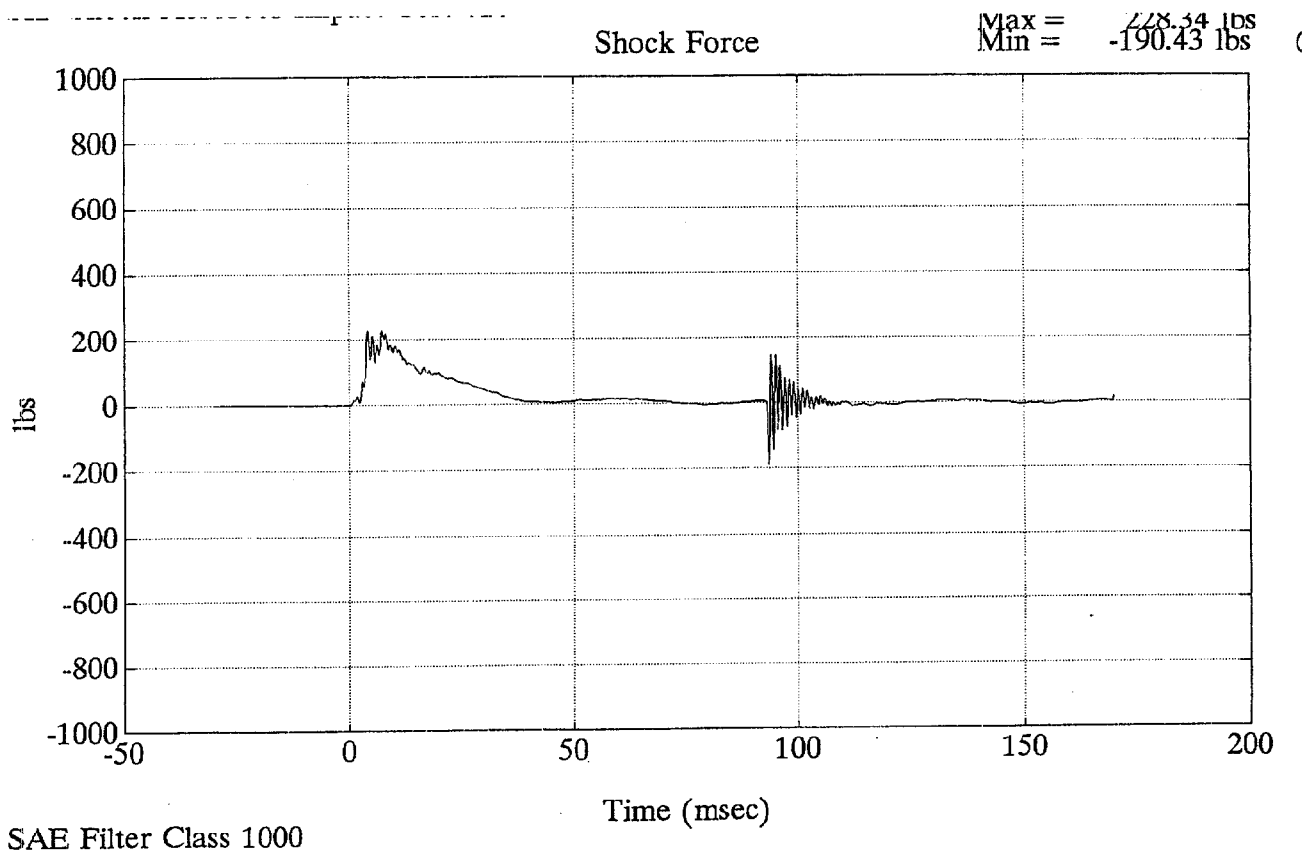
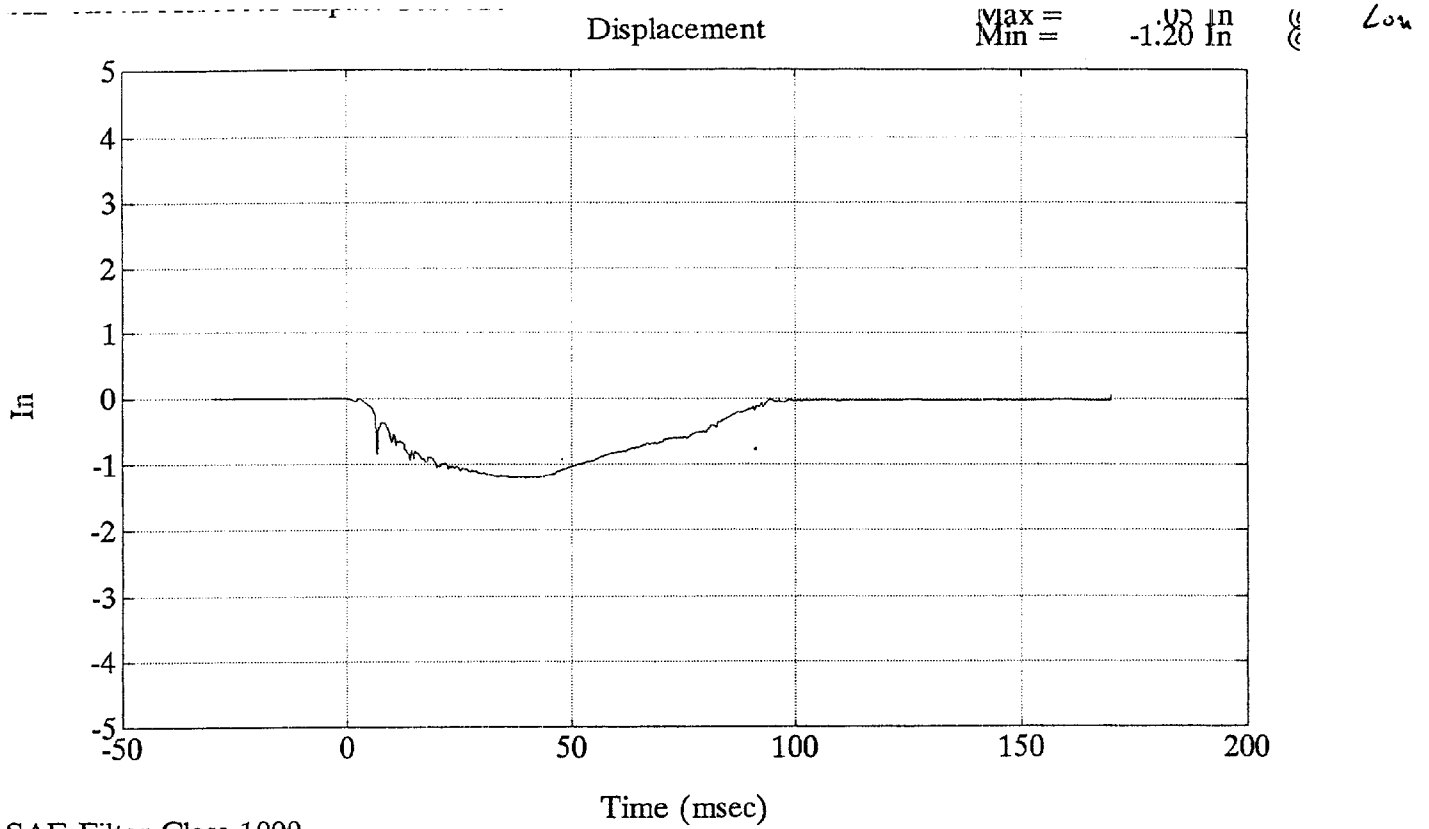
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)		18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)		10 - 70	45
VELOCITY 3.05 m/s	FORCE (N)	836 - 1125	1016
	DISPLACEMENT (mm)	30 - 35	30
VELOCITY 4.27 m/s	FORCE (N)	1730 - 2099	1932
	DISPLACEMENT (mm)	32 - 37	34
VELOCITY 6.10 m/s	FORCE (N)	3741 - 4448	3861
	DISPLACEMENT (mm)	33 - 40	38

DAMPER SETTING: 5.75

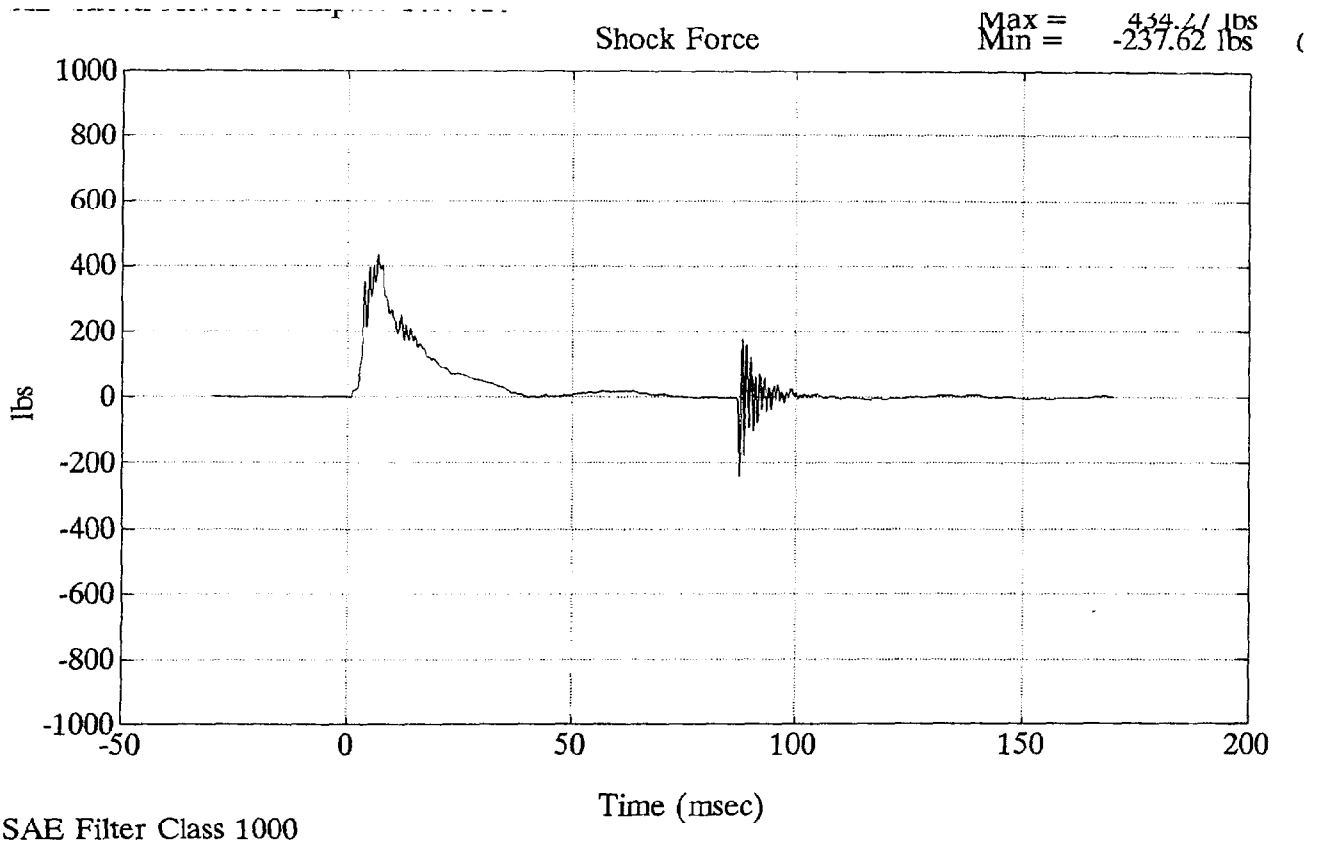
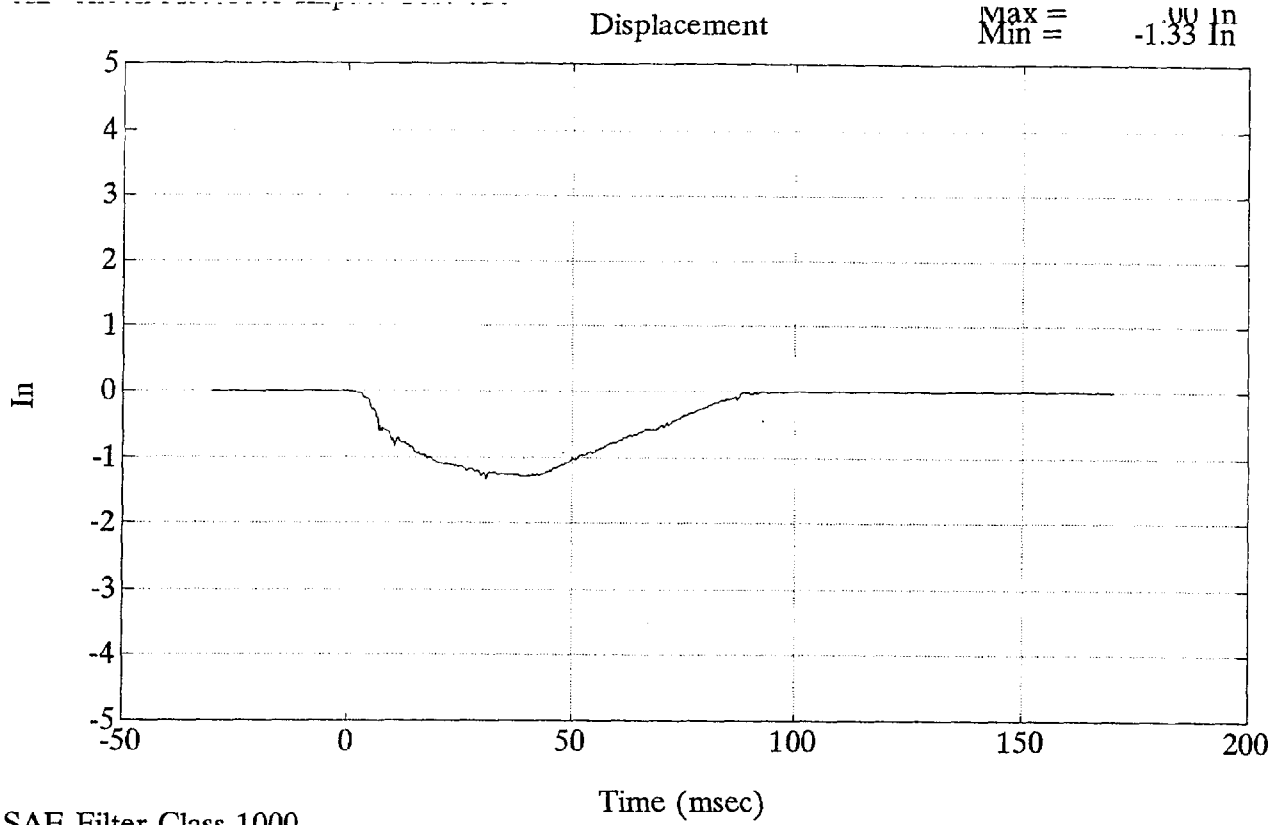
REMARKS: None

PISTON POSITION 5.75

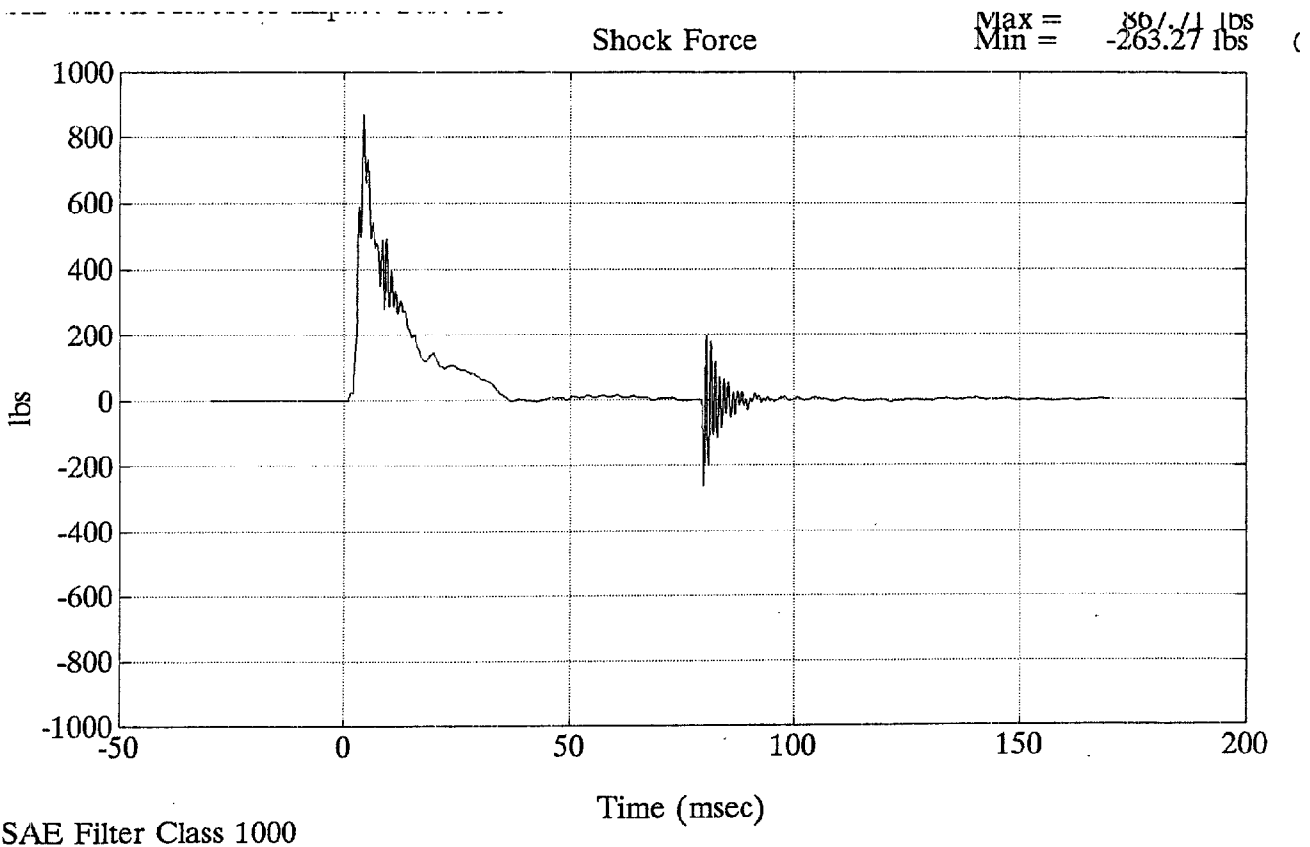
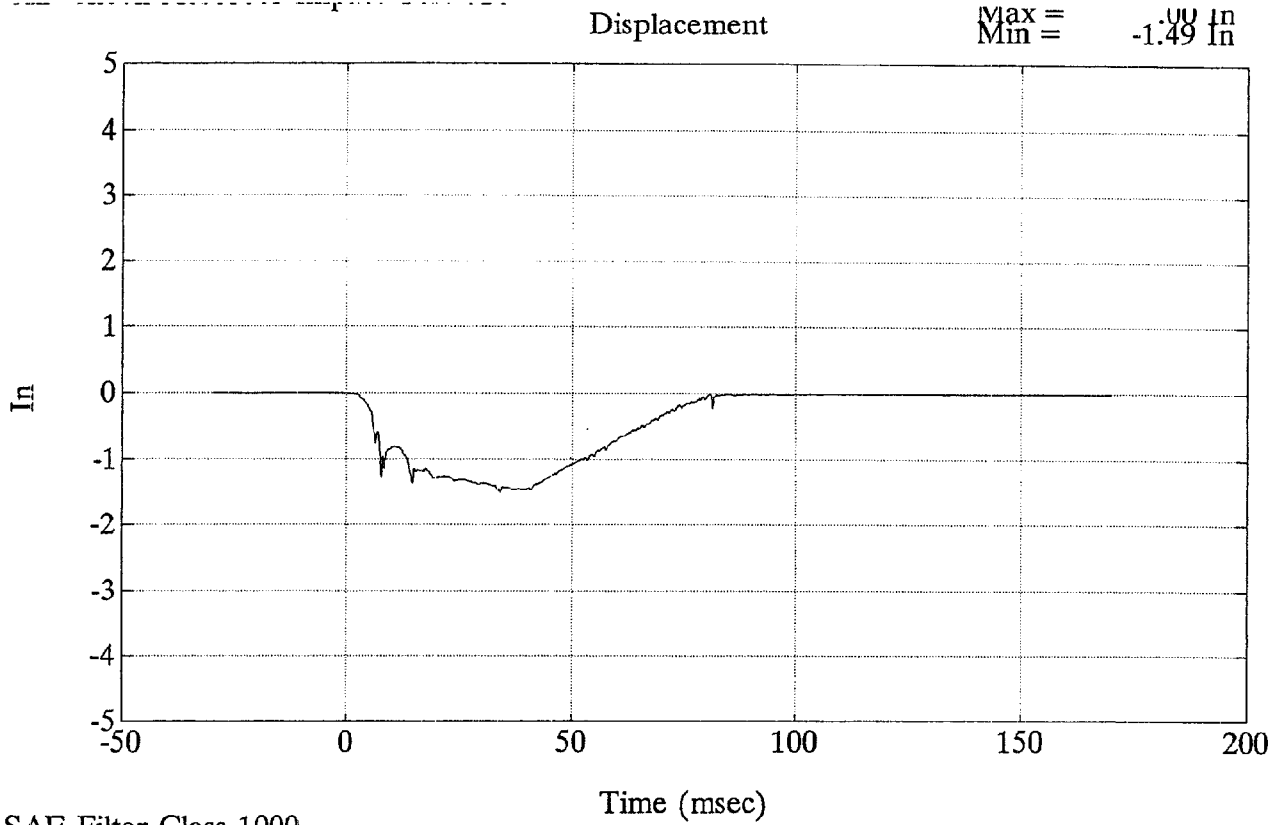
9.98 F/S CE0019A.RAW #013



#15
14.01 F/s CE0020A.RA



20.09 F/5 CE 0021A.RAW #15
Max = 0.00 in
Min = -1.49 in (HIGH.



**LATERAL THORAX IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

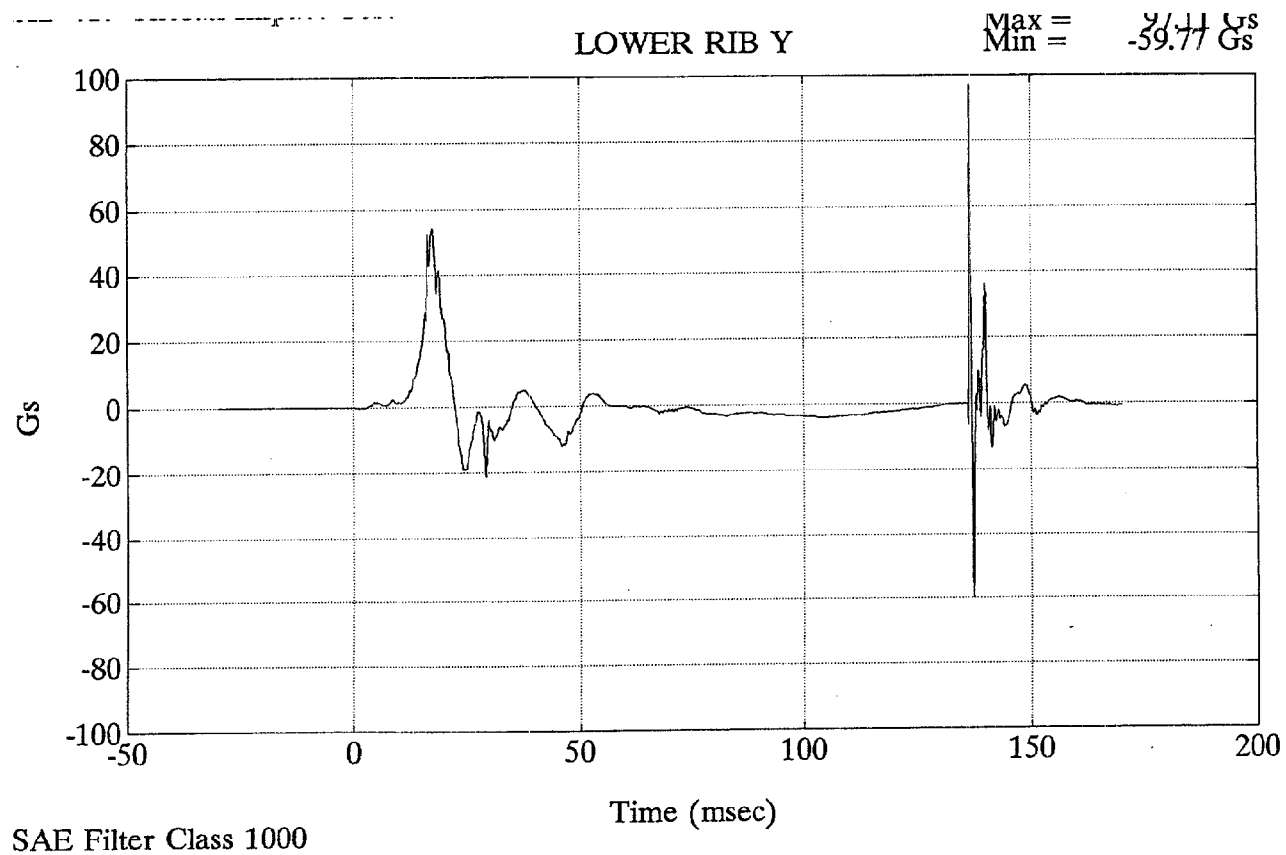
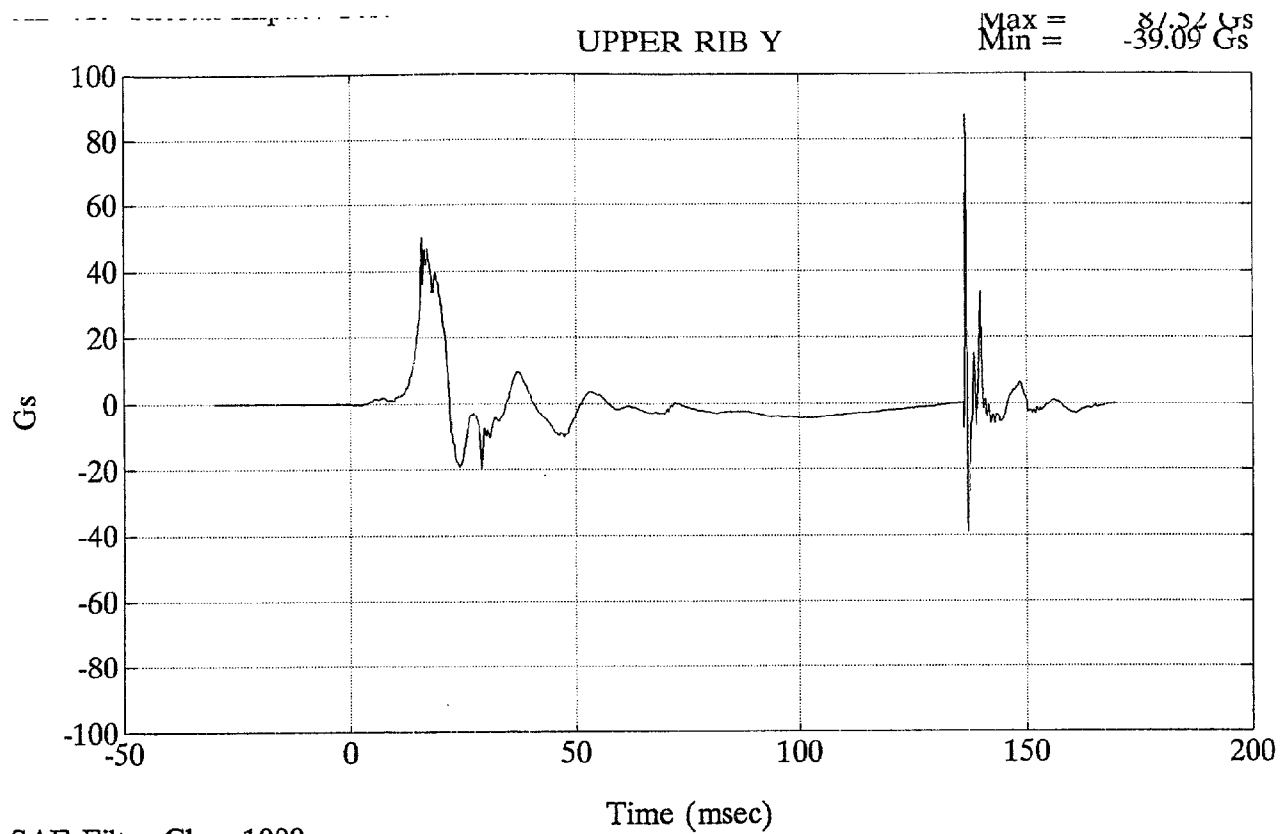
Calspan Sequential Test Number: 2

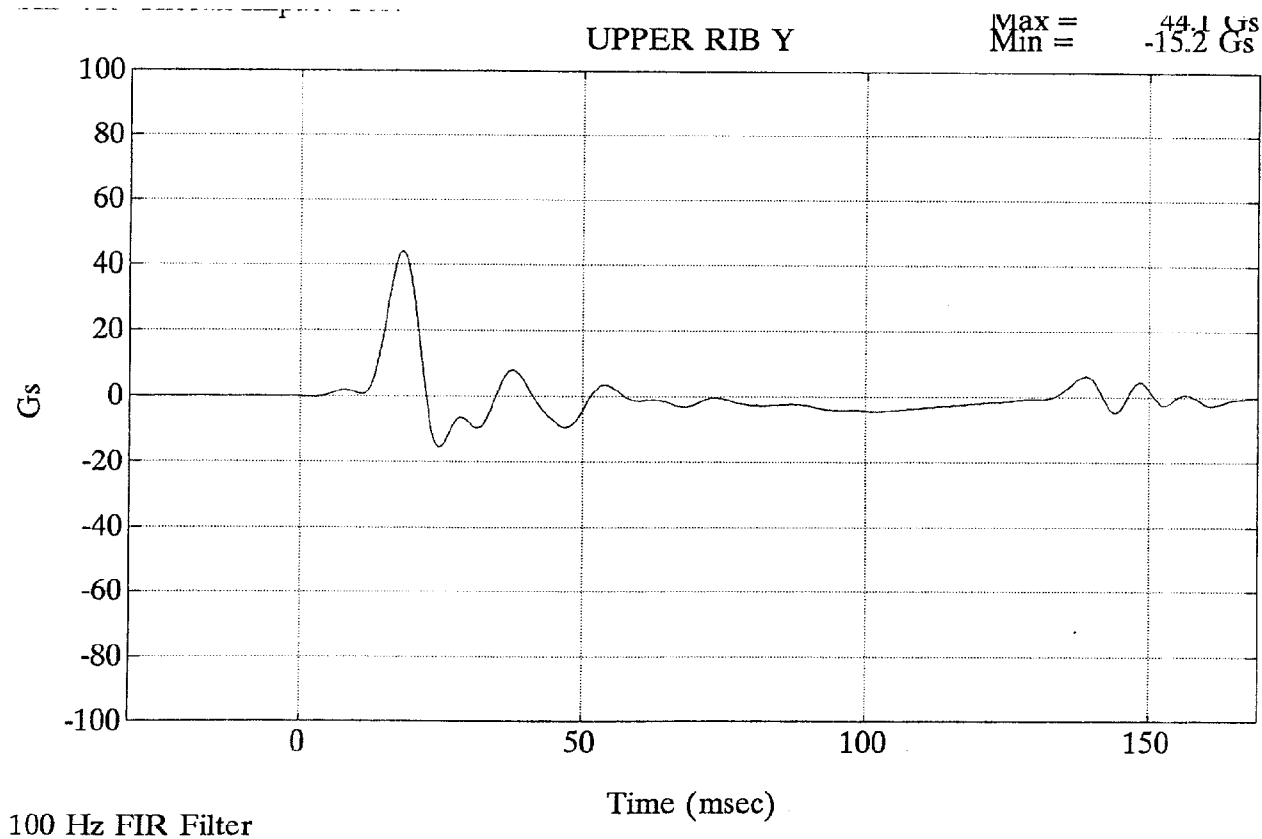
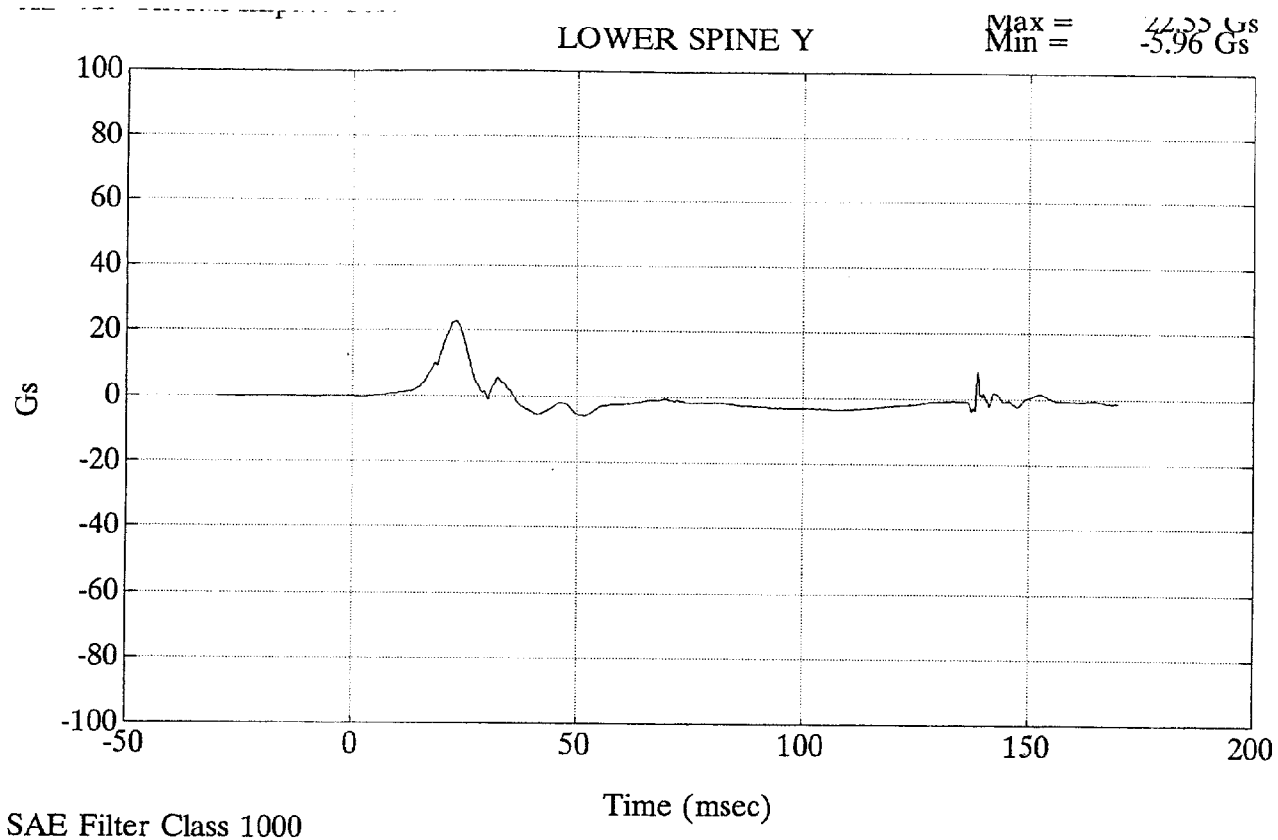
Date: 9/23/98

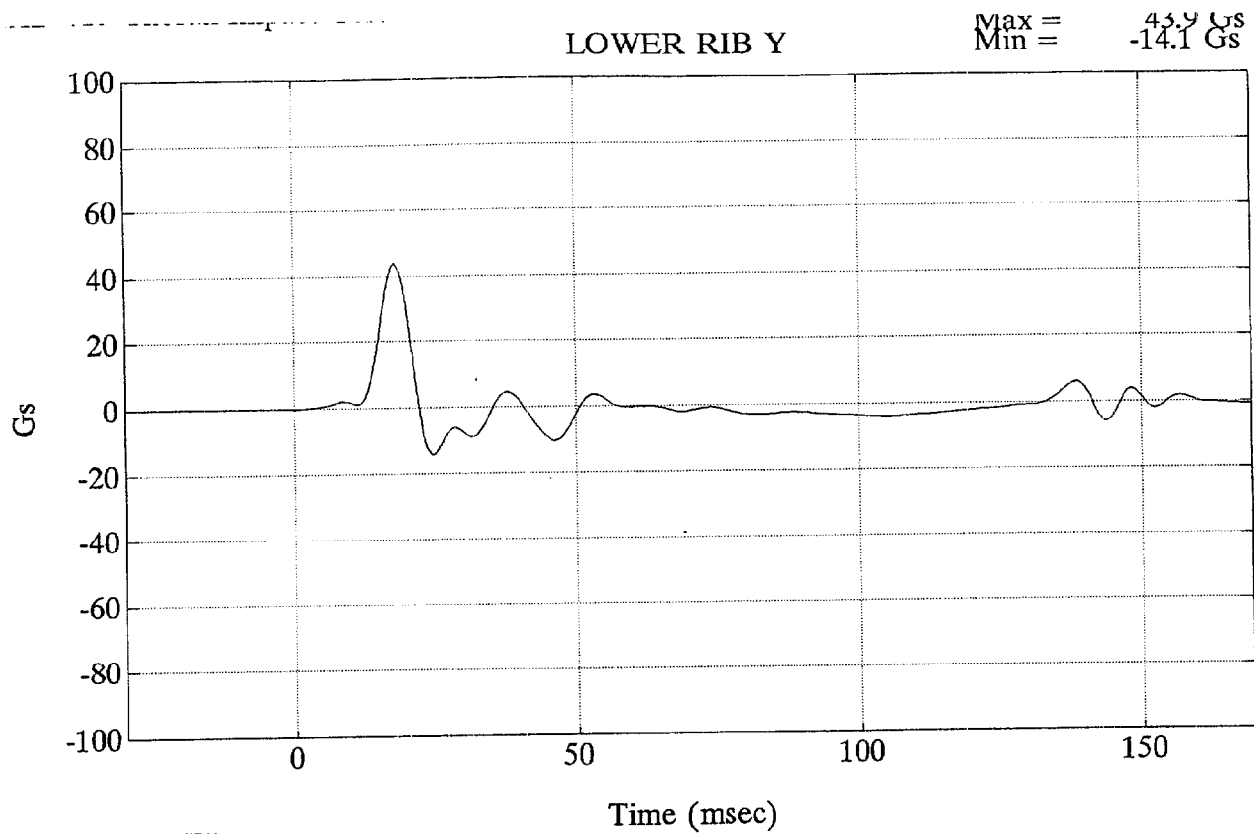
Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
PROBE SPEED (m/s)	4.27 - 4.33	4.30
UPPER RIB (g's)	37 - 46	44.2
LOWER RIB (g's)	37 - 46	43.9
LOWER SPINE (g's)	15 - 22	22.0

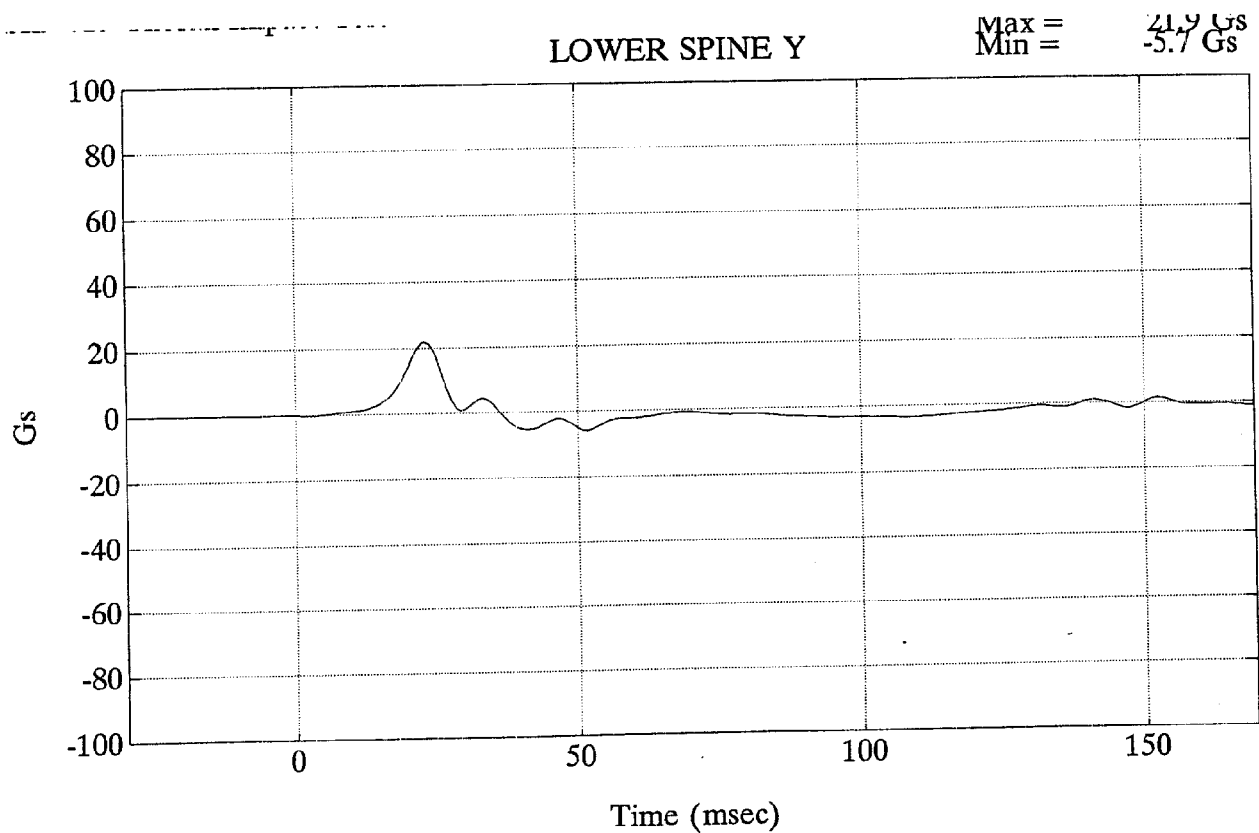
REMARKS: None







100 Hz FIR Filter



100 Hz FIR Filter

**LATERAL PELVIS IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

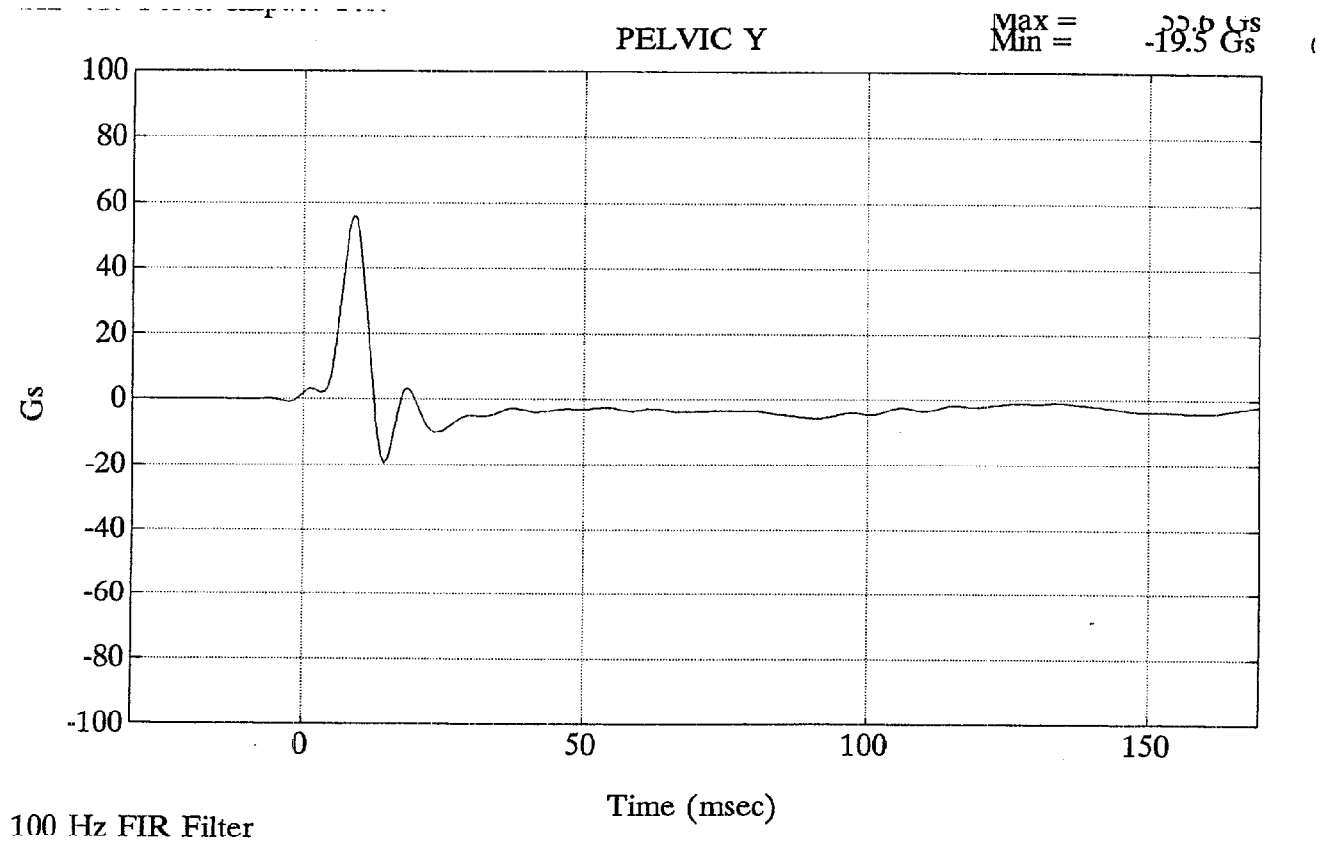
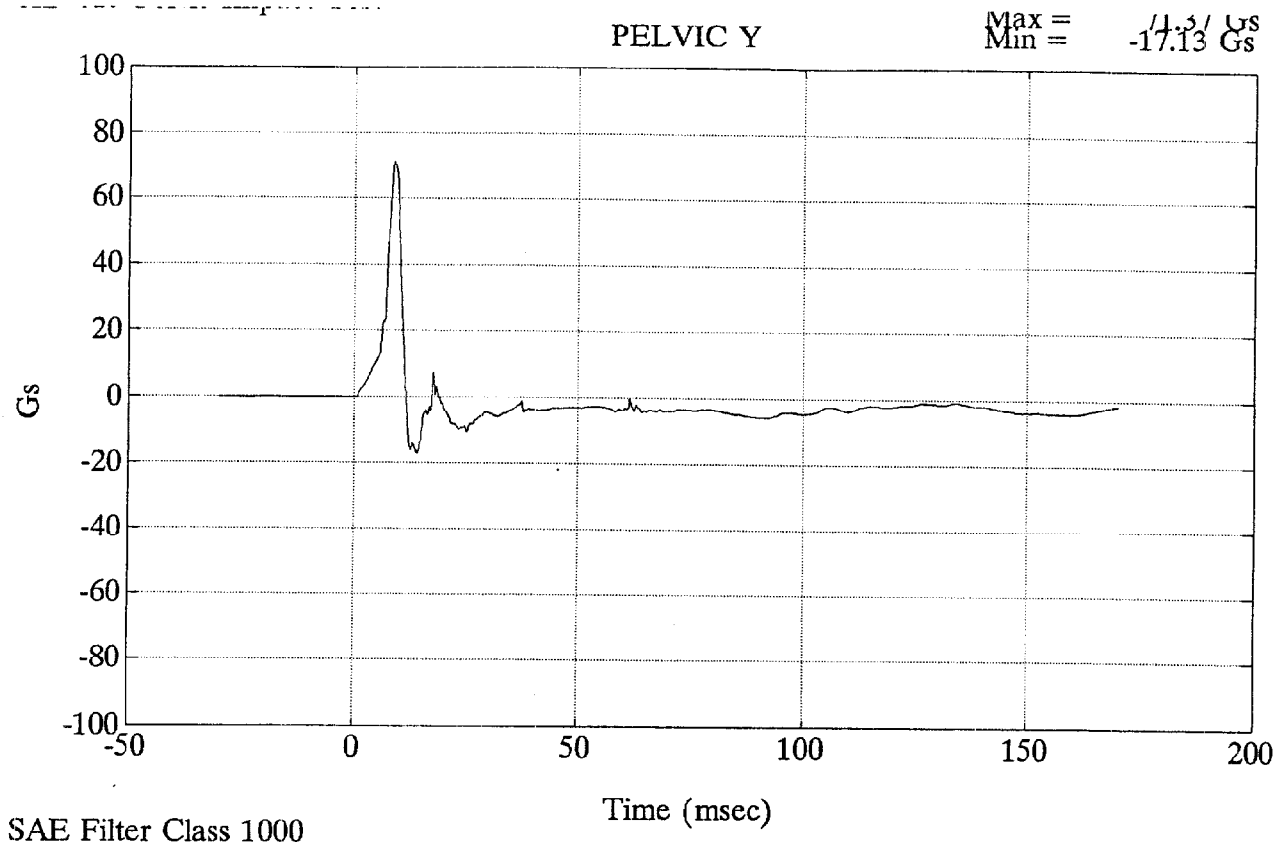
Calspan Sequential Test Number: 2

Date: 9/22/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
PROBE SPEED (m/s)	4.27 - 4.33	4.29
PELVIS ACCELERATION (g's)	40 - 60	55.7

REMARKS: None



**ABDOMINAL COMPRESSION TEST
PRE-TEST**

(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

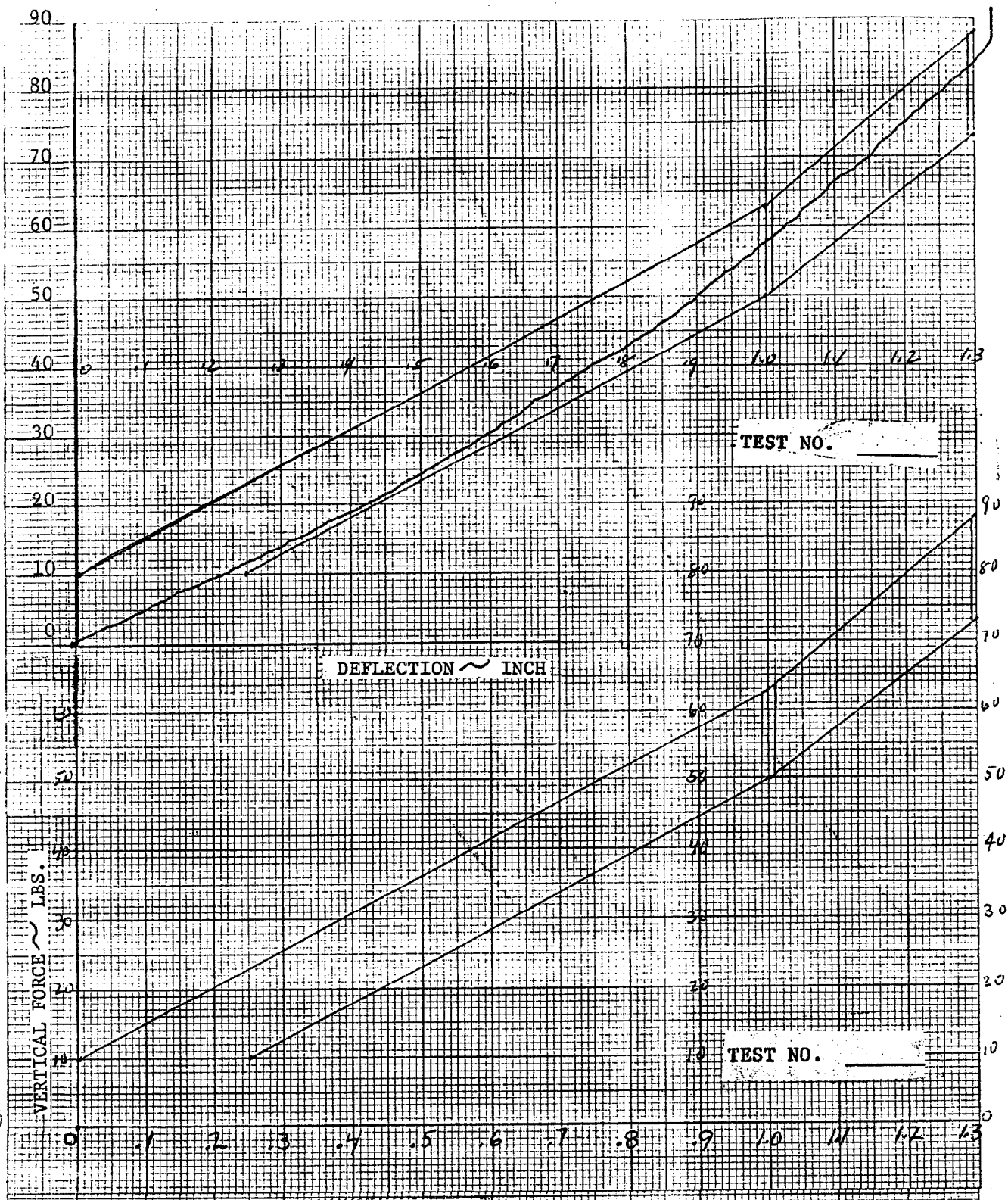
Calspan Sequential Test Number: 2

Date: 9/23/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
FORCE @ 13 mm (N)	104 - 162	108
FORCE @ 19 mm (N)	163 - 221	178
FORCE @ 25 mm (N)	222 - 280	257
FORCE @ 33 mm (N)	325 - 391	371

REMARKS: None



DUMMY S/N	015
DATE	9-23-98
CONTRACT AUTHORIZATION	
TEMP.	70
HUMIDITY	45
PERFORMED BY	

PART 572
ABDOMEN STATIC PRESS
DOT - 13 DEC. '77

DUMMY S/N

TEST NO.

CONTRACT AUTHORIZATION

DATE _____

PERFORMED BY

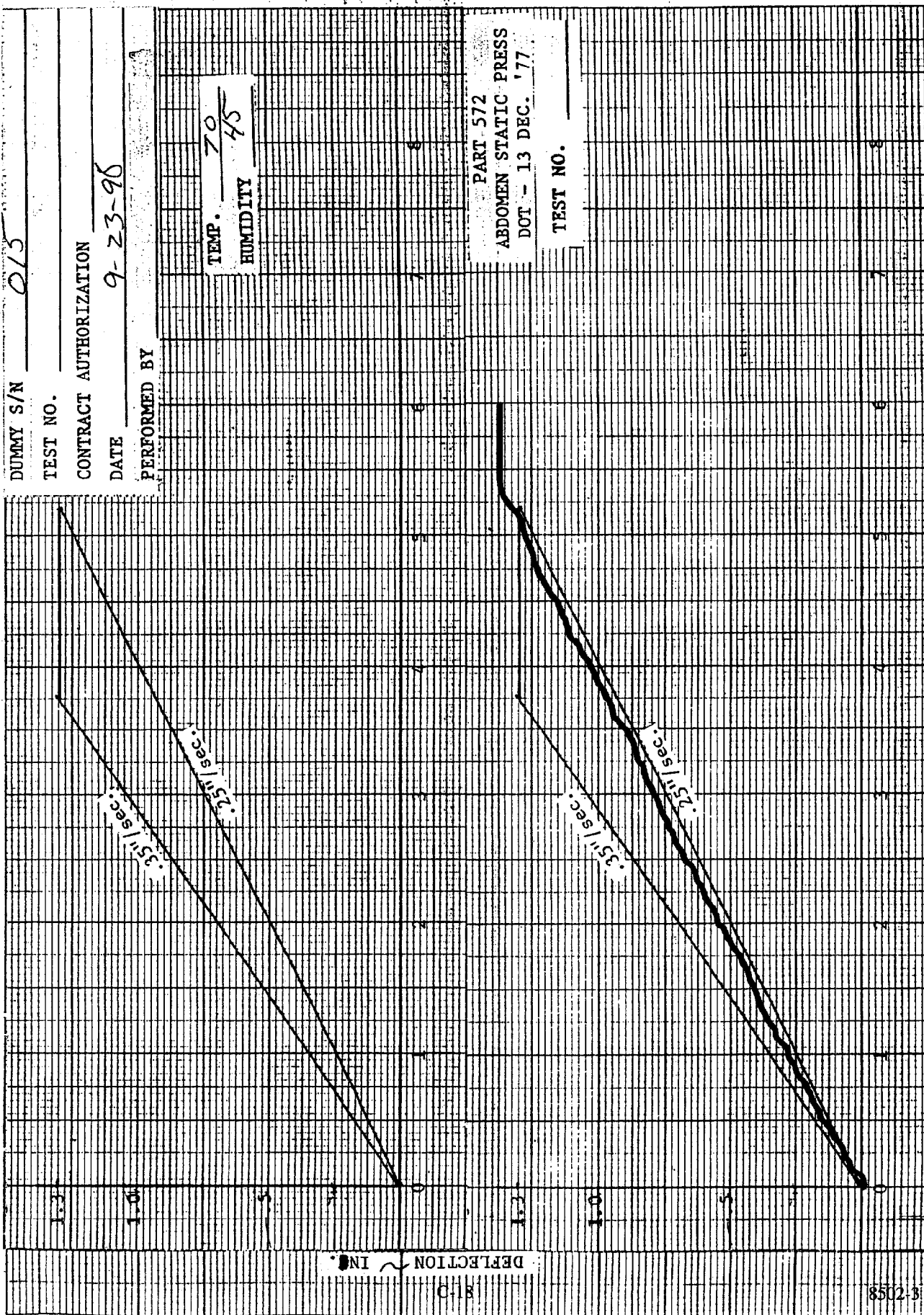
TEMP. _____

HUMIDITY

PART 572

ABDOMEN STATIC PRESS
DOT - 13 DEC. '77

TEST NO.



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

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015
Date: 9/23/98

Calspan Sequential Test Number: 2
Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
FORCE @ 0° (N)	0 - 26.7	0.0
FORCE @ 20° (N)	97.8 - 151.2	134.6
FORCE @ 30° (N)	151.2 - 204.6	186.9
FORCE @ 40° (N)	204.6 - 258	235.8
RETURN ANGLE	12° max.	9.5

REMARKS: None

HUMIDITY

LUMBAR SPINE FLEXION TEST

FLEXION ANGLE $\sim$ DEG.

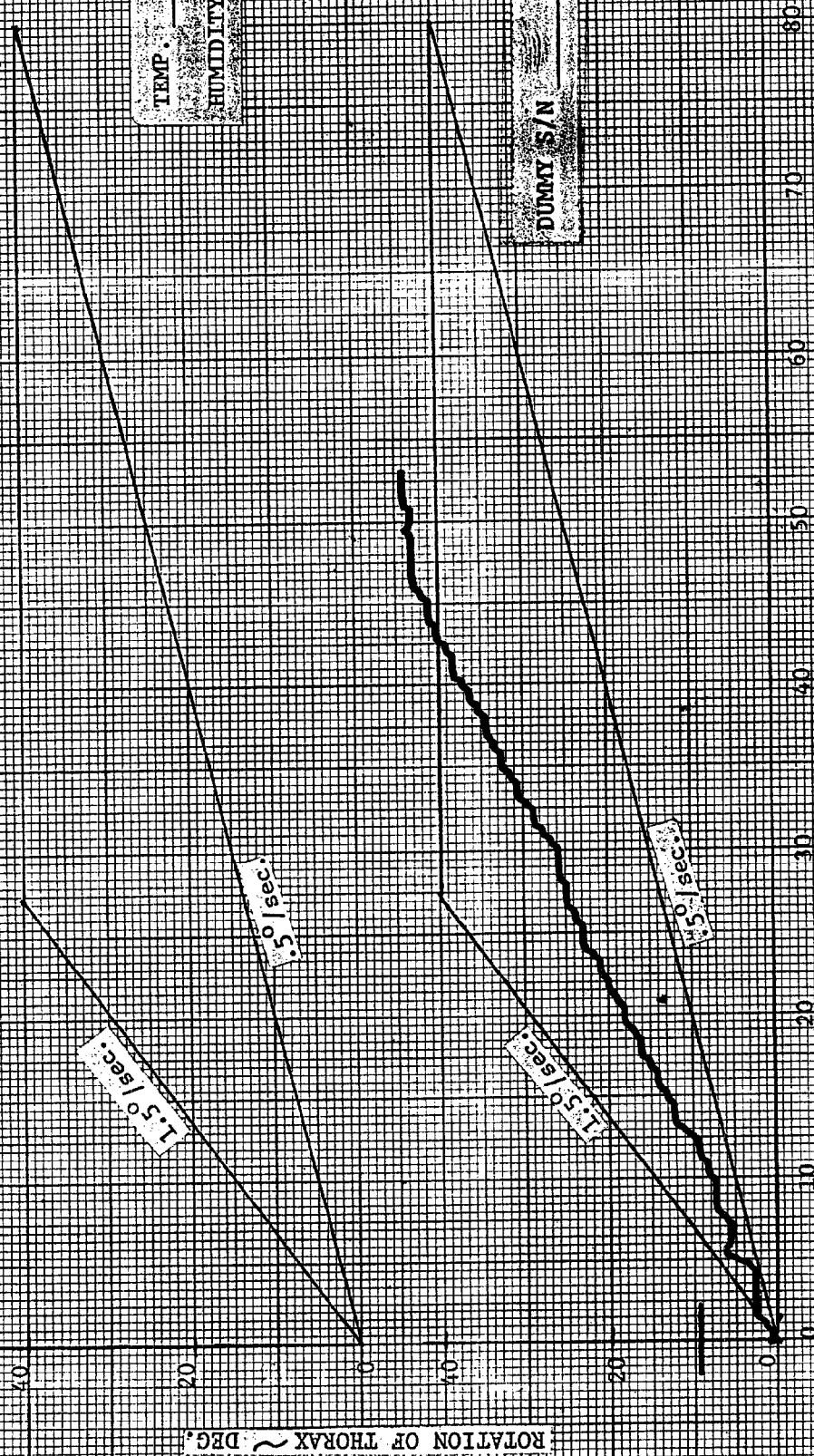
FORCE **LBS.**

DUMMY S/N 015
W/A
DATE 9-23-98
PERFORMED BY RF

TEMP. 70
HUMIDITY 55

DUMMY S/N

LUMBAR SPINE FLEXION TEST



PRE-TEST DUMMY INSPECTION LIST

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

Calspan Sequential Test Number: 2

Date: 9/23/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

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

REMARKS: None

**CALIBRATION TEST RESULTS
PRE-TEST**

SID NO.: 016

CONFIGURED FOR LEFT SIDE IMPACT

**CALIBRATION TEST RESULTS SUMMARY
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016

Calspan Sequential Test Number: 2

Date: 9/23/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

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

* Test not required for SID certification.

REMARKS: None

**EXTERNAL DIMENSIONS
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016 Calspan Sequential Test Number: 2
Date: 9/23/98 Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
SH- Seated Height (mm)	889 - 909	902
RH- Rib Height (mm)	502 - 520	513
HP- Hip Pivot Height (mm)	99 ref.	99
RD- Rib from Back Line (mm)	229 - 241	240
KH- Knee Pivot from Back Line (mm)	511 - 526	526
KV- Knee Pivot to Floor (mm)	490 - 505	494
HW- Hip Width (mm)	356 - 391	361

REMARKS: None

THORACIC SHOCK ABSORBER TESTS
PRE-TEST

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016

Calspan Sequential Test Number: 1.2

Date: 9/14/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

DAMPER IDENTIFICATION: 016

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)		18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)		10 - 70	45
VELOCITY 3.05 m/s	FORCE (N)	836 - 1125	994
	DISPLACEMENT (mm)	30 - 35	31
VELOCITY 4.27 m/s	FORCE (N)	1730 - 2099	2049
	DISPLACEMENT (mm)	32 - 37	35
VELOCITY 6.10 m/s	FORCE (N)	3741 - 4448	3998
	DISPLACEMENT (mm)	33 - 40	37

DAMPER SETTING: 5

REMARKS: None

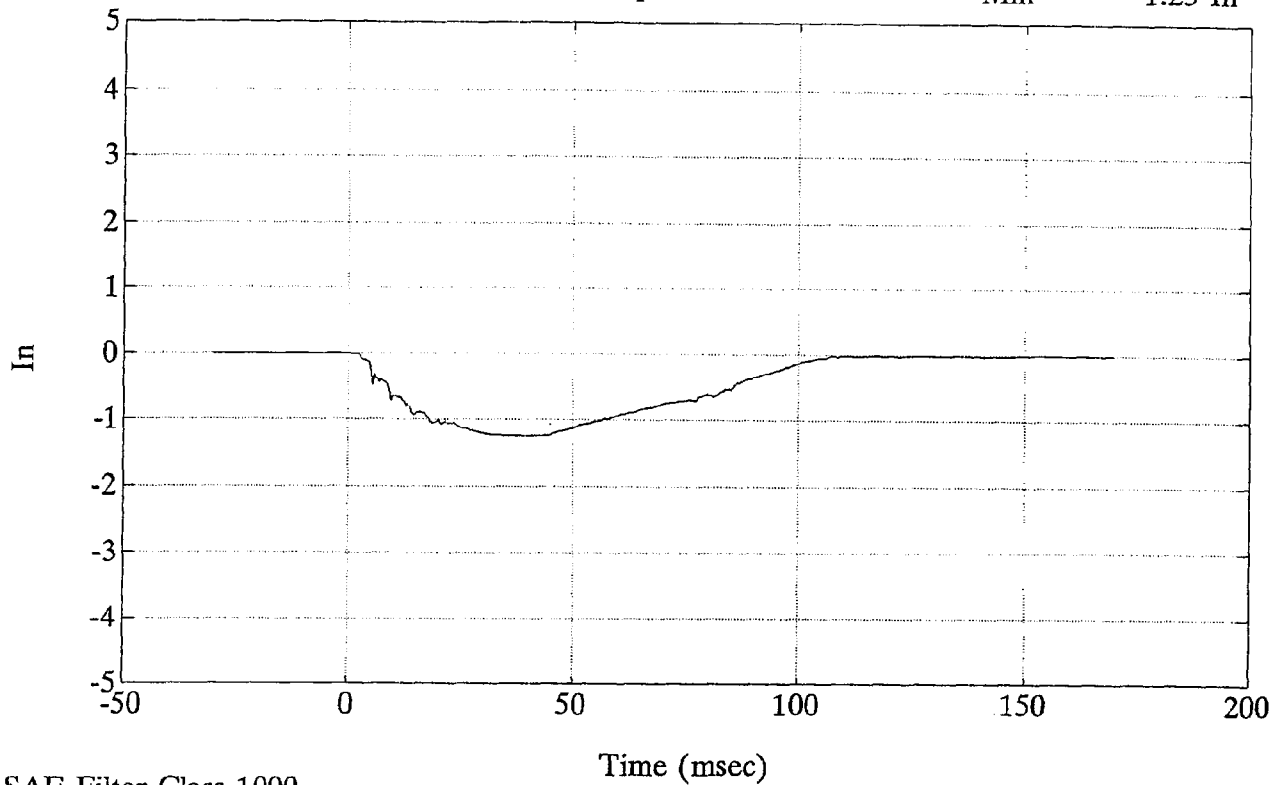
PISTON POSITION 5

10.01 F/s
Displacement

CE0015A.RAW

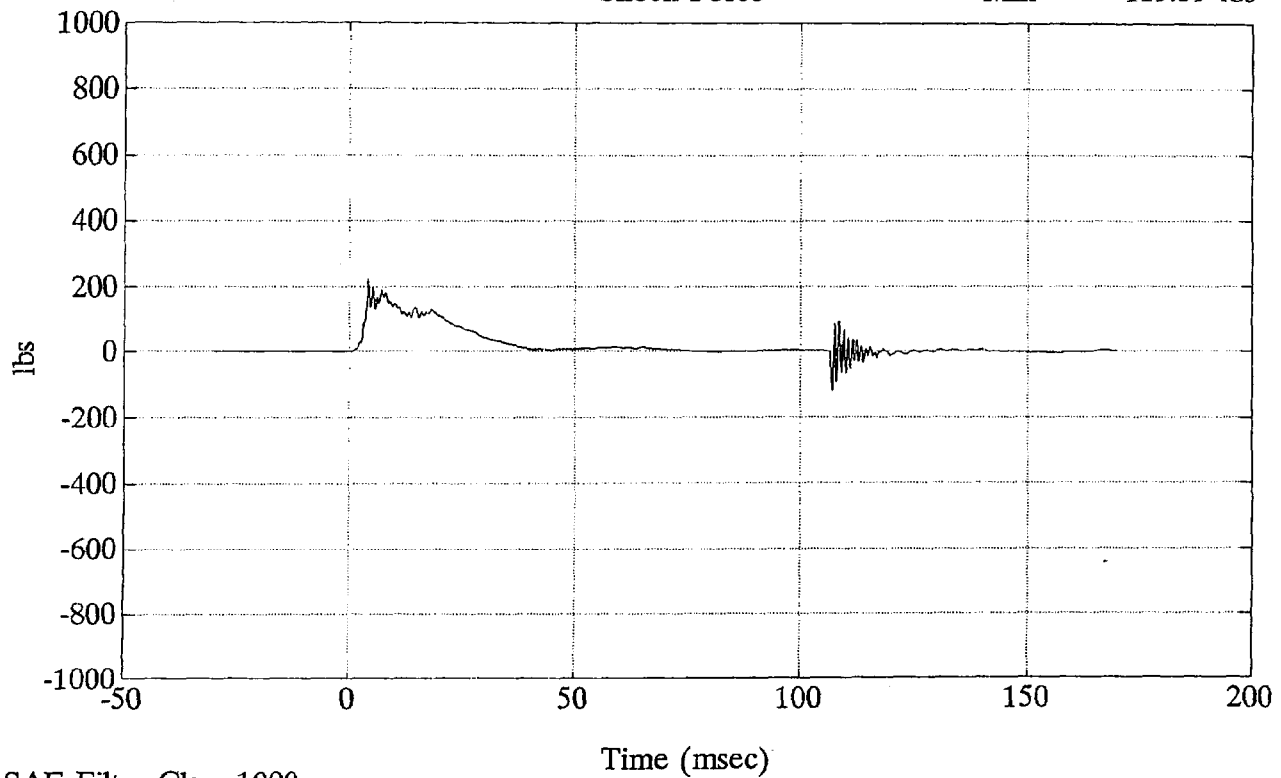
PISTON D16 LOW

Max = .00 In
Min = -1.23 In

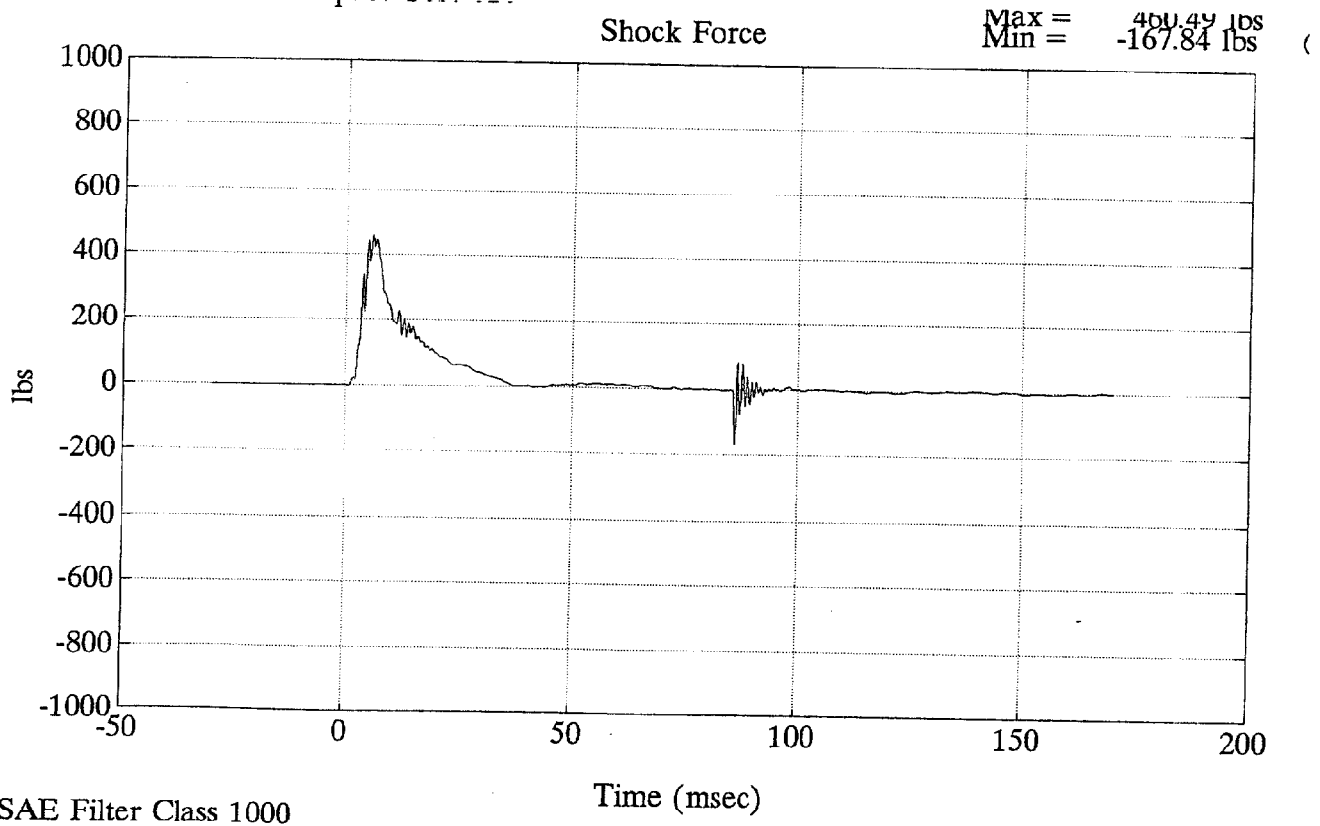
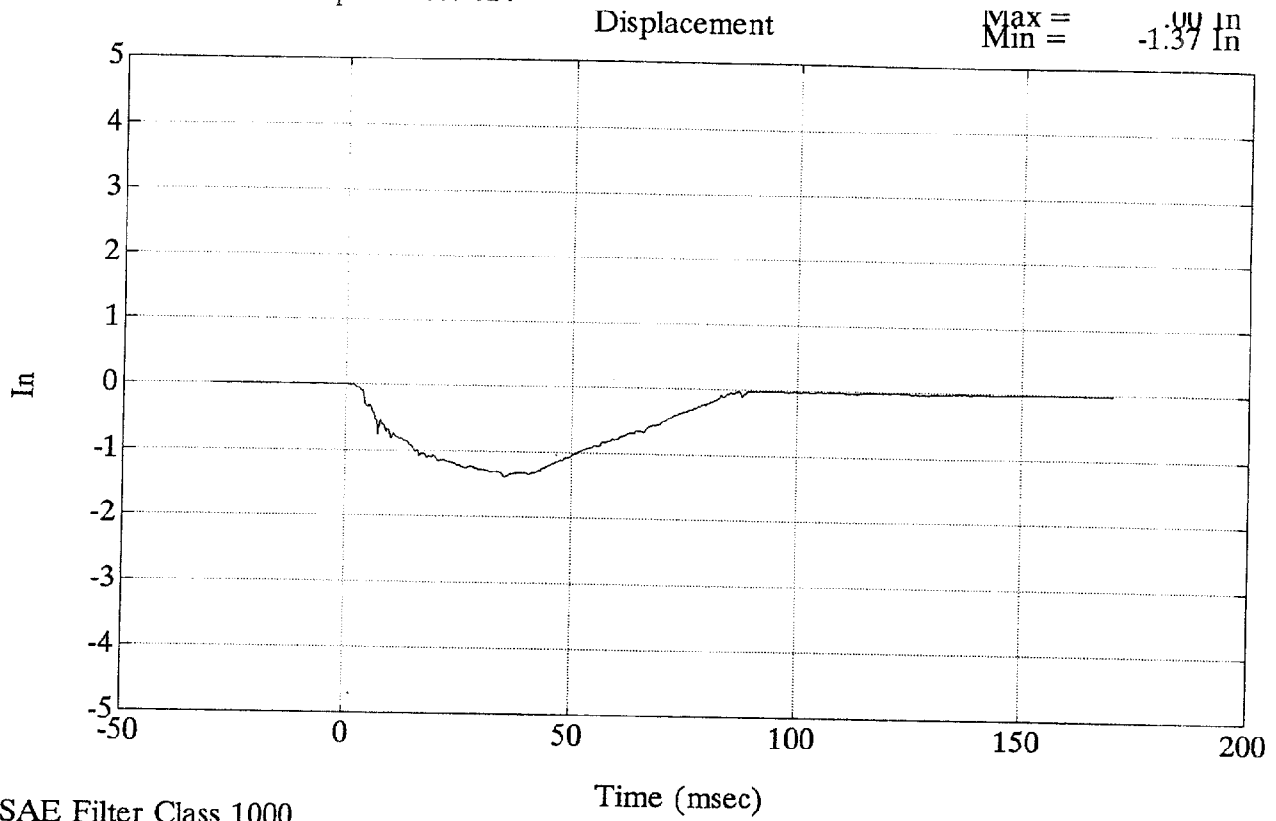


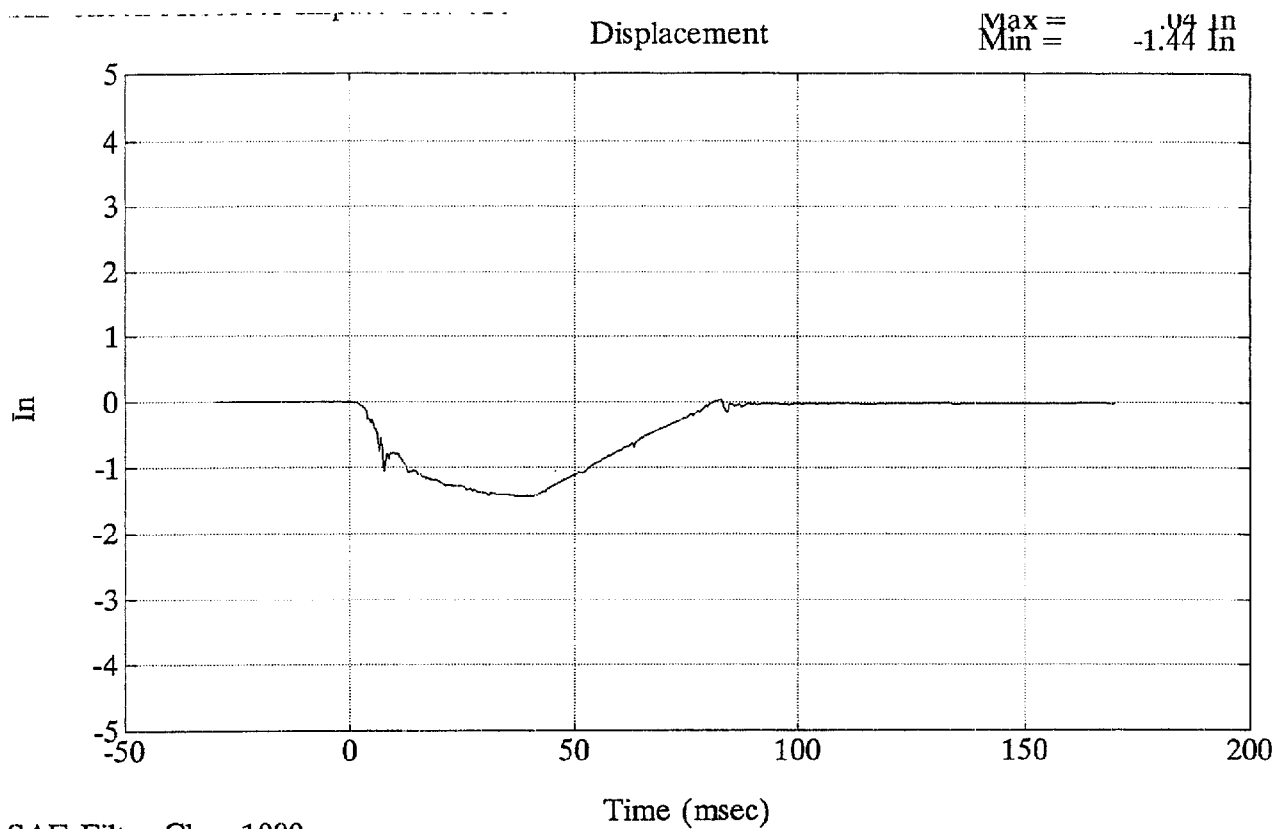
Shock Force

Max = 225.29 lbs
Min = -119.39 lbs

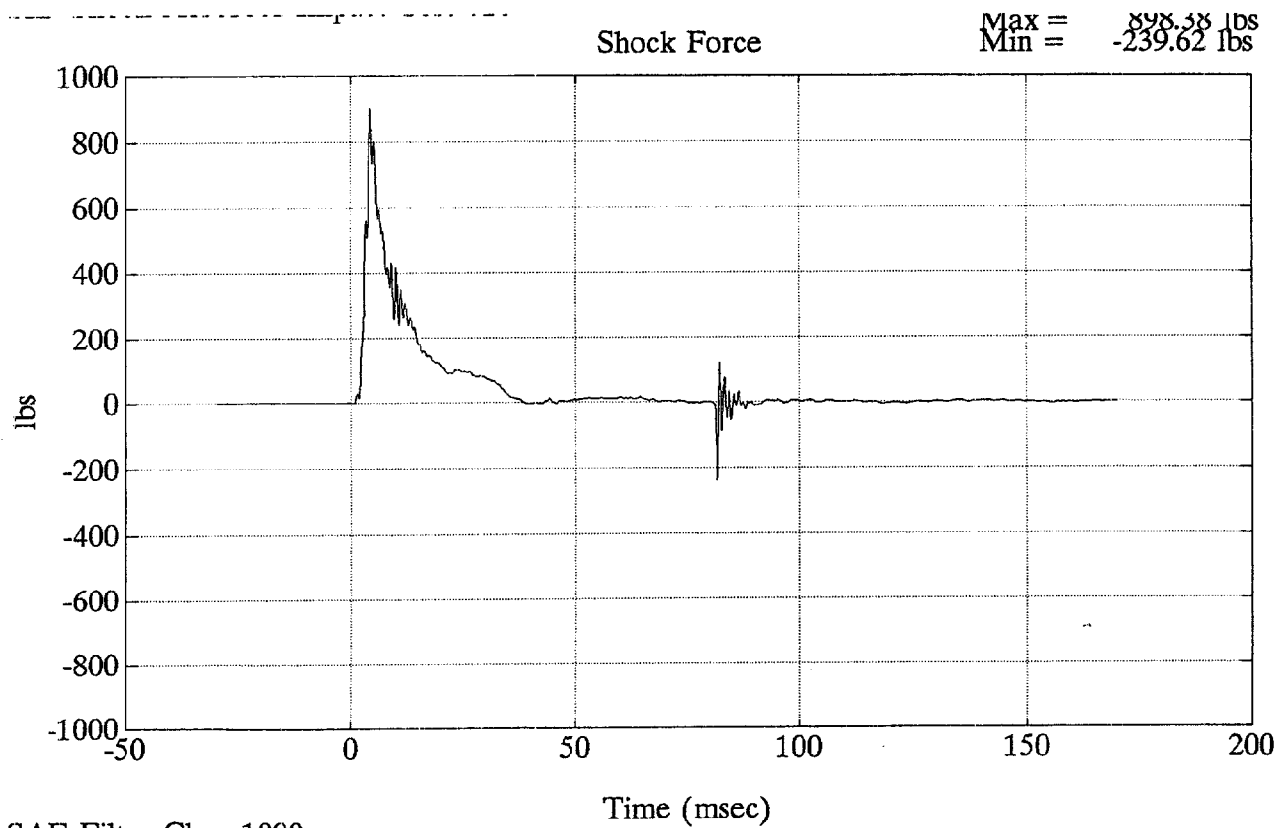


MEN. 13.75 F/s CE0016A.RAW PISTON #1





SAE Filter Class 1000



SAE Filter Class 1000

**LATERAL THORAX IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016

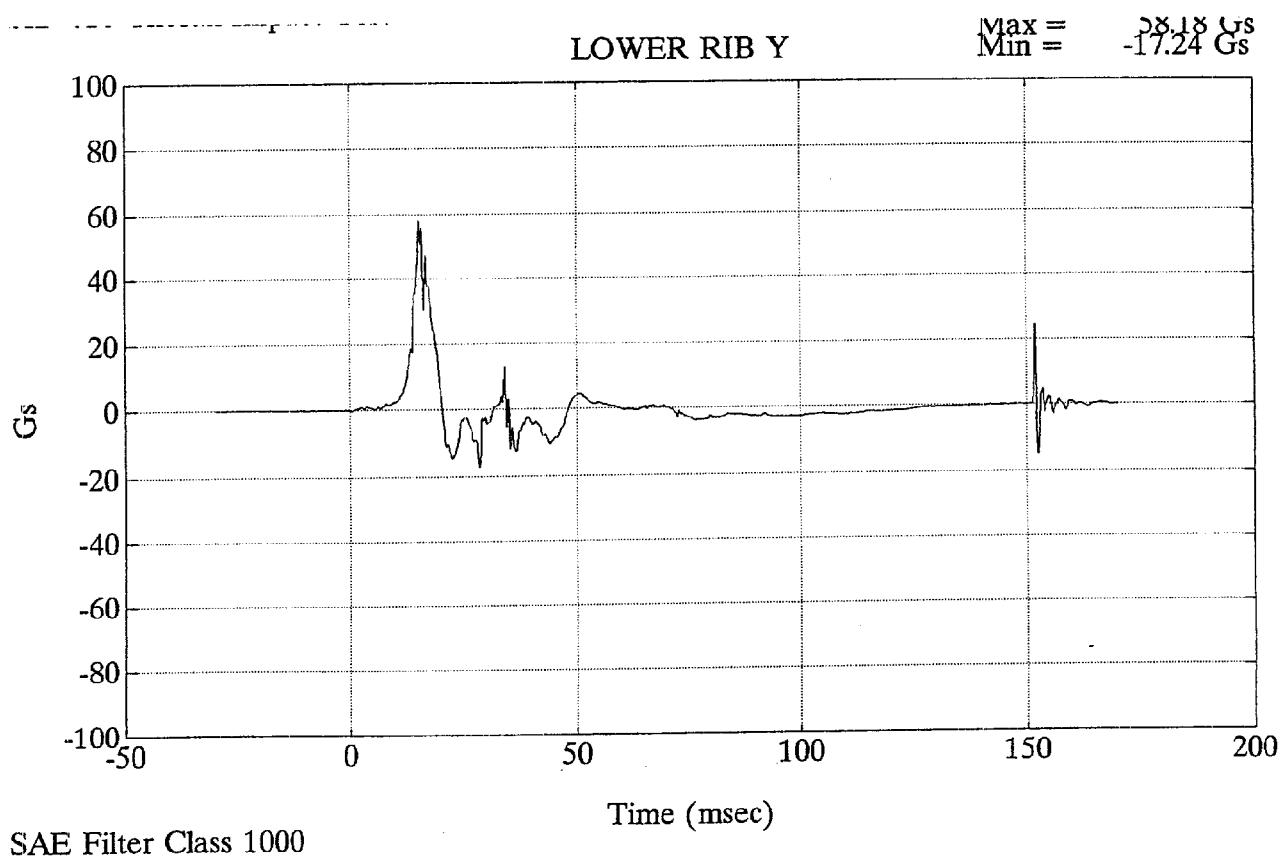
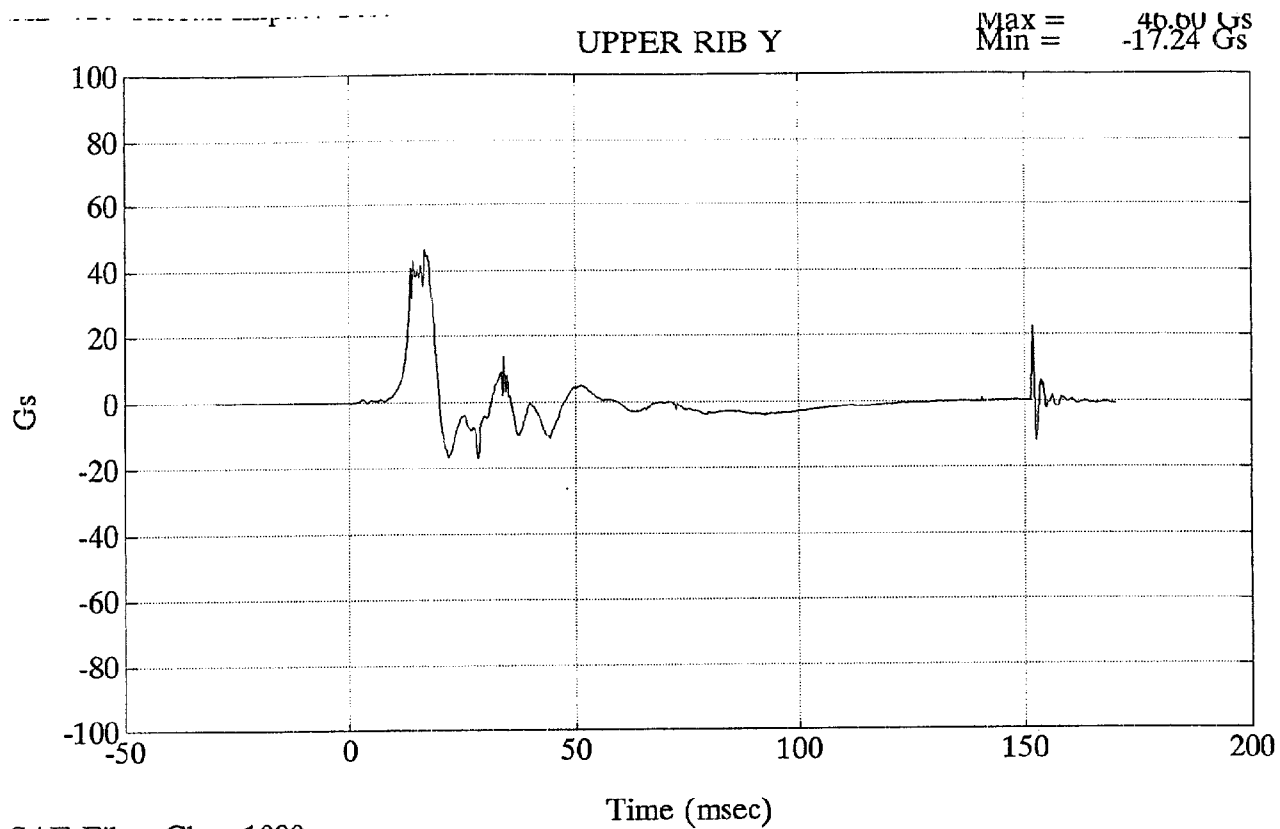
Calspan Sequential Test Number: 2

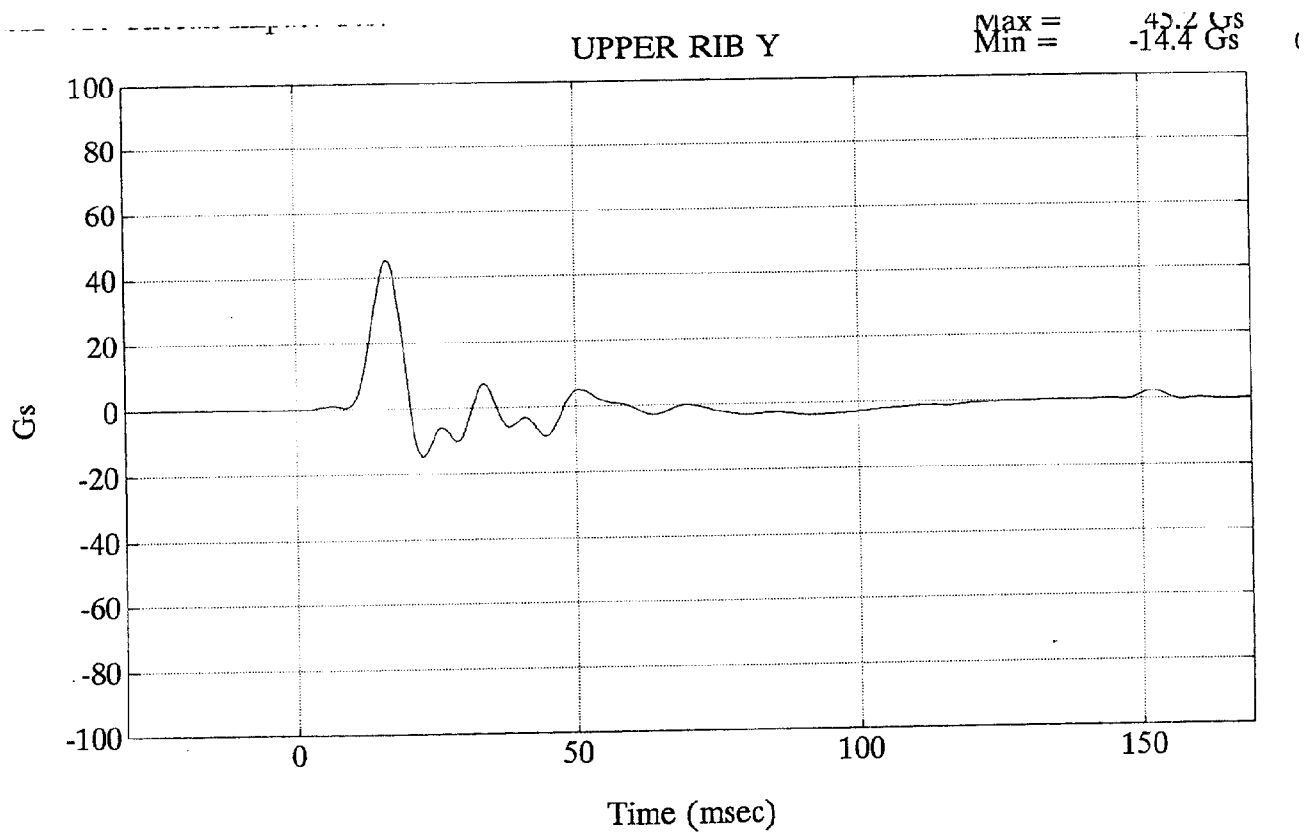
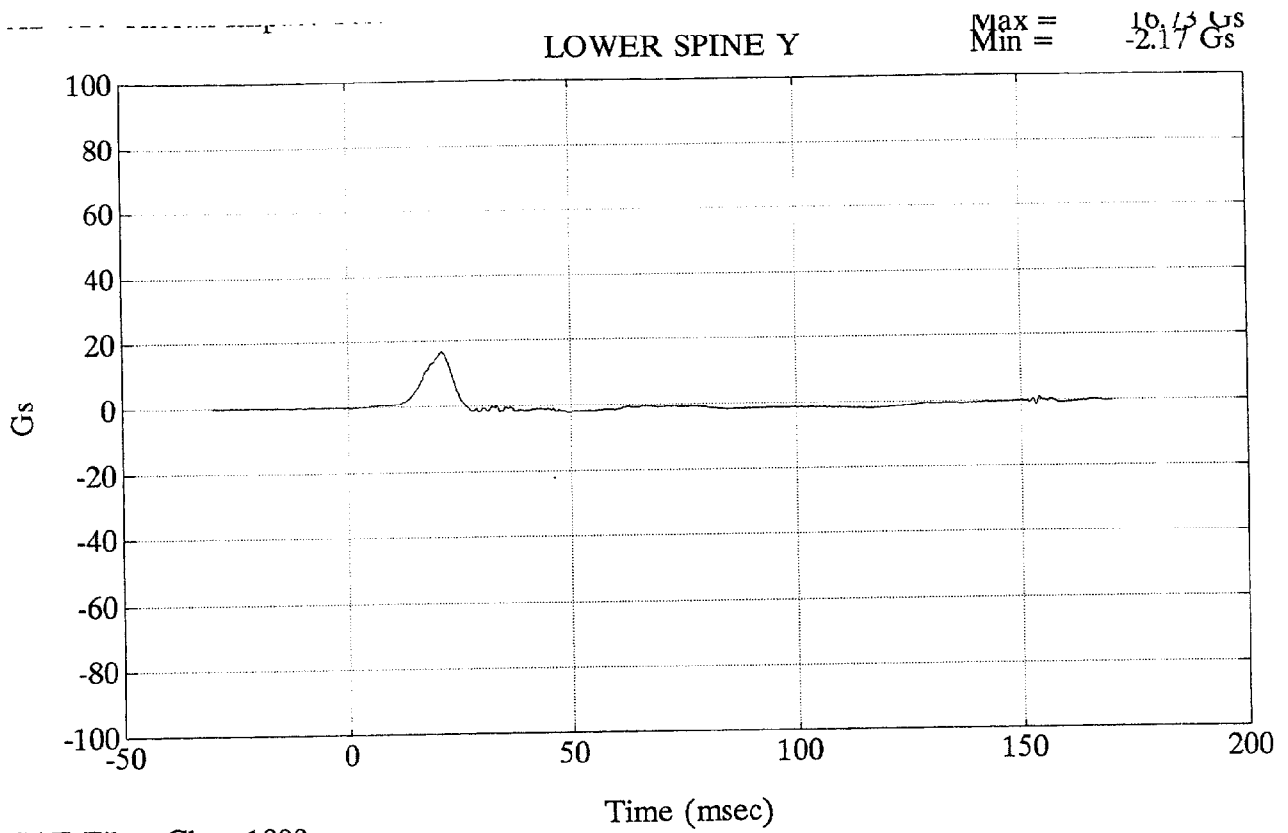
Date: 9/23/98

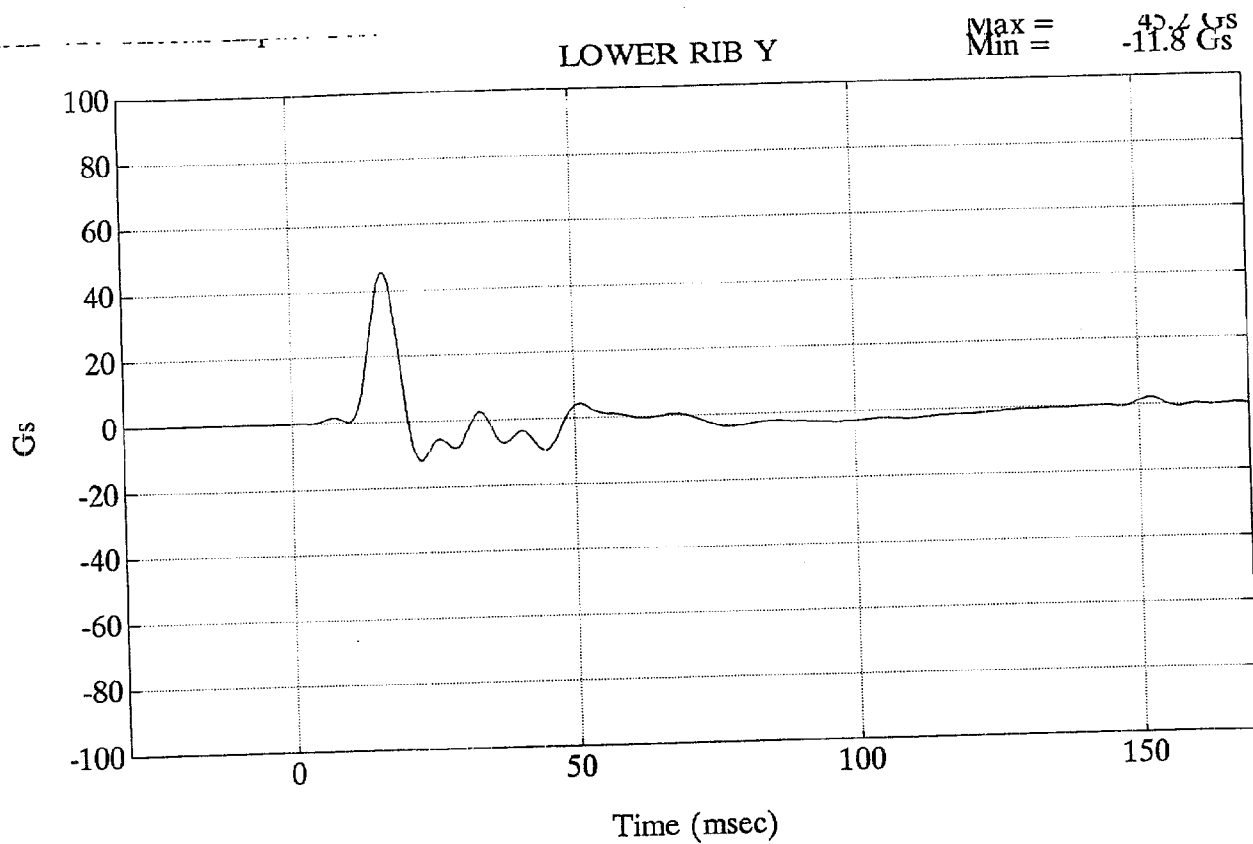
Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
PROBE SPEED (m/s)	4.27 - 4.33	4.33
UPPER RIB (g's)	37 - 46	45.3
LOWER RIB (g's)	37 - 46	45.3
LOWER SPINE (g's)	15 - 22	15.8

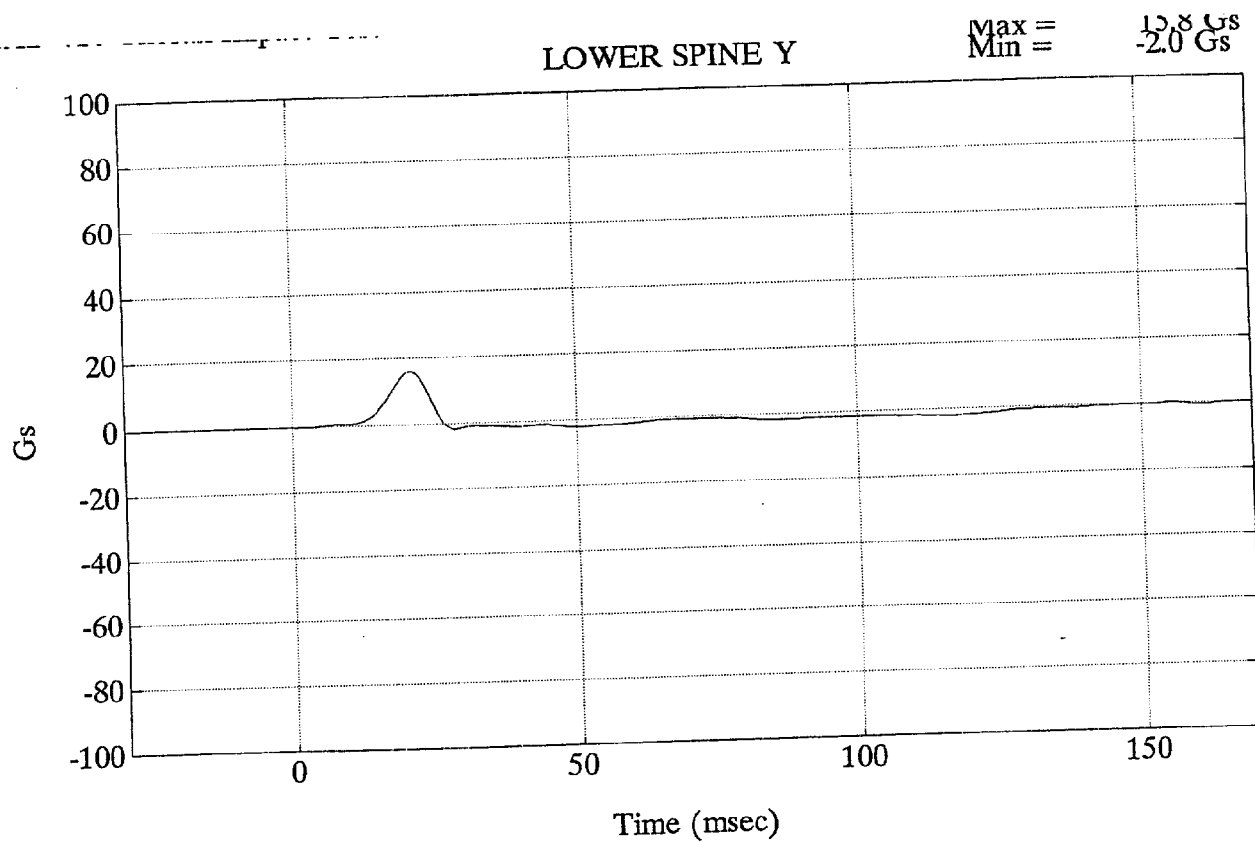
REMARKS: None







100 Hz FIR Filter



100 Hz FIR Filter

**LATERAL PELVIS IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016

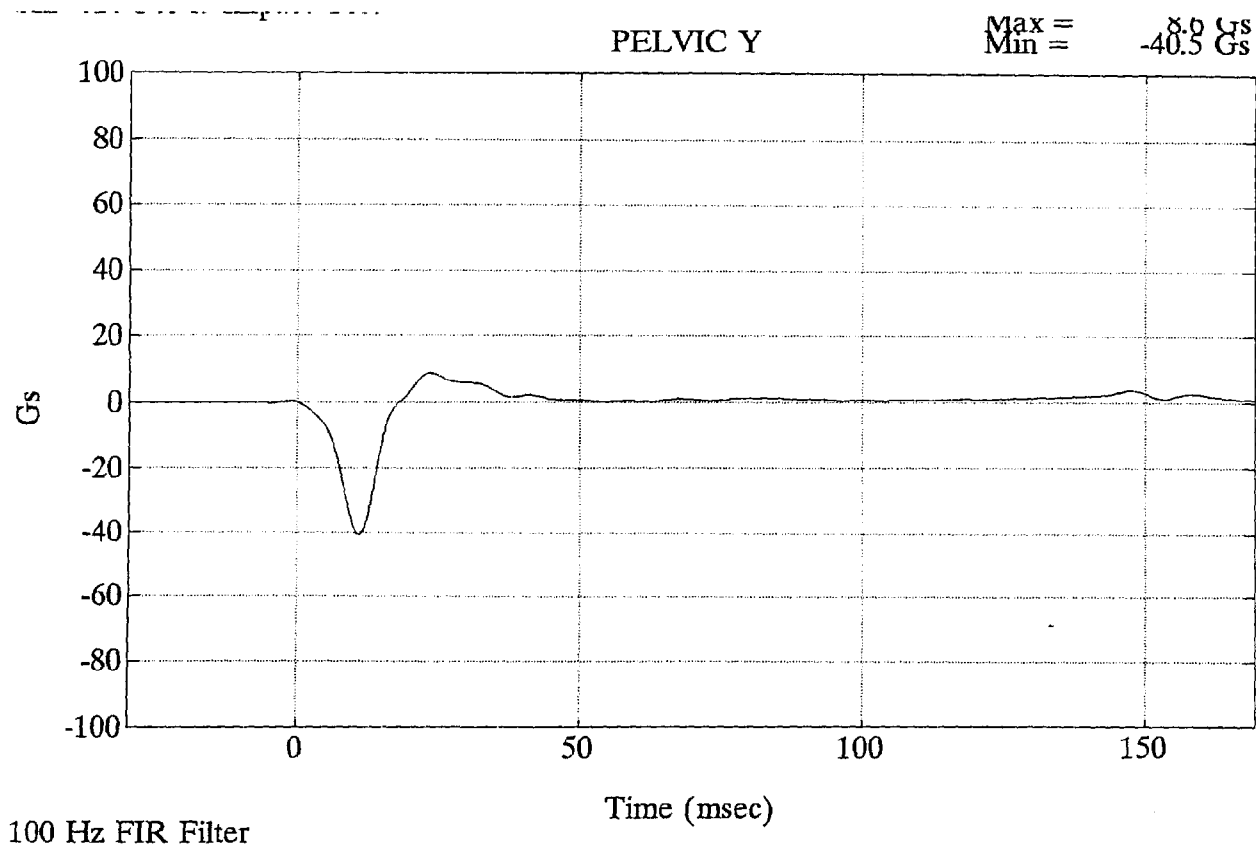
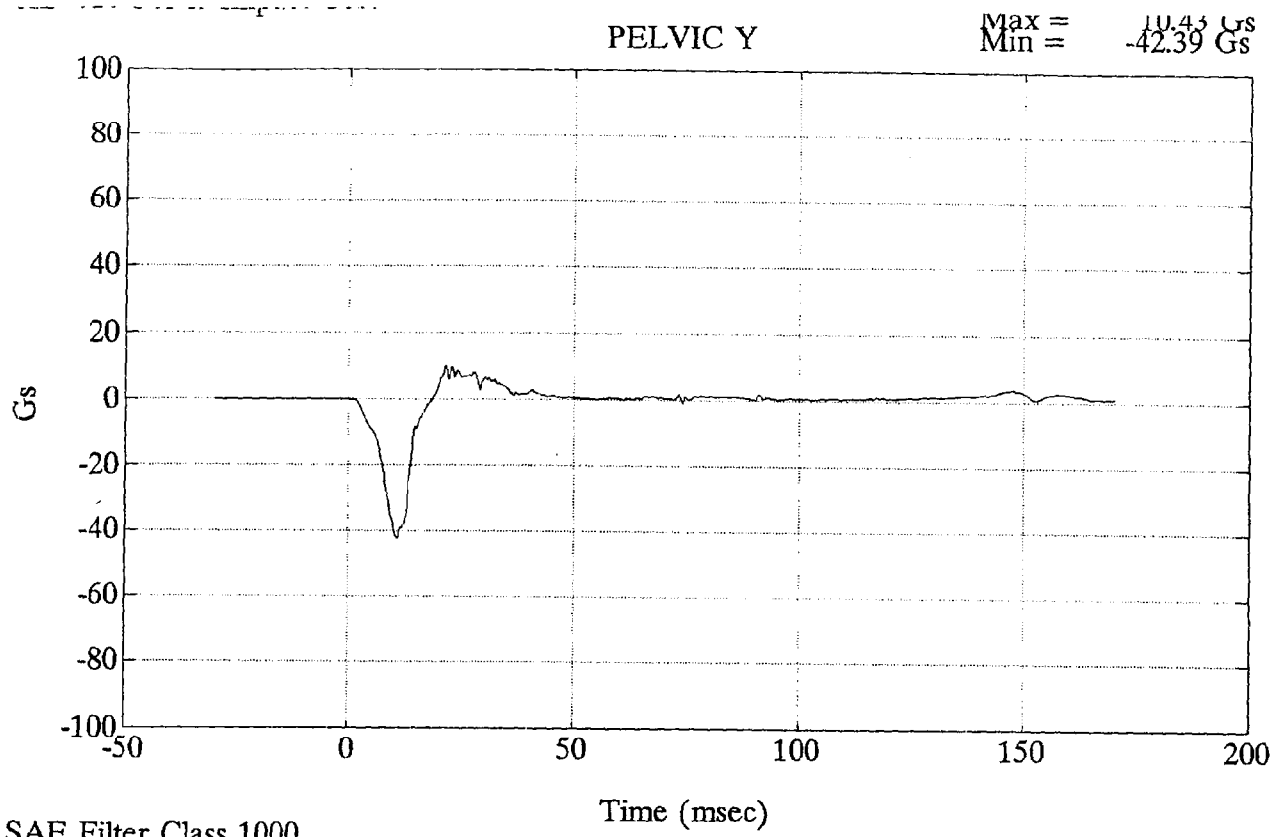
Calspan Sequential Test Number: 2

Date: 9/22/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
PROBE SPEED (m/s)	4.27 - 4.33	4.30
PELVIS ACCELERATION (g's)	40 - 60	40.6

REMARKS: None



**ABDOMINAL COMPRESSION TEST
PRE-TEST**

(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016

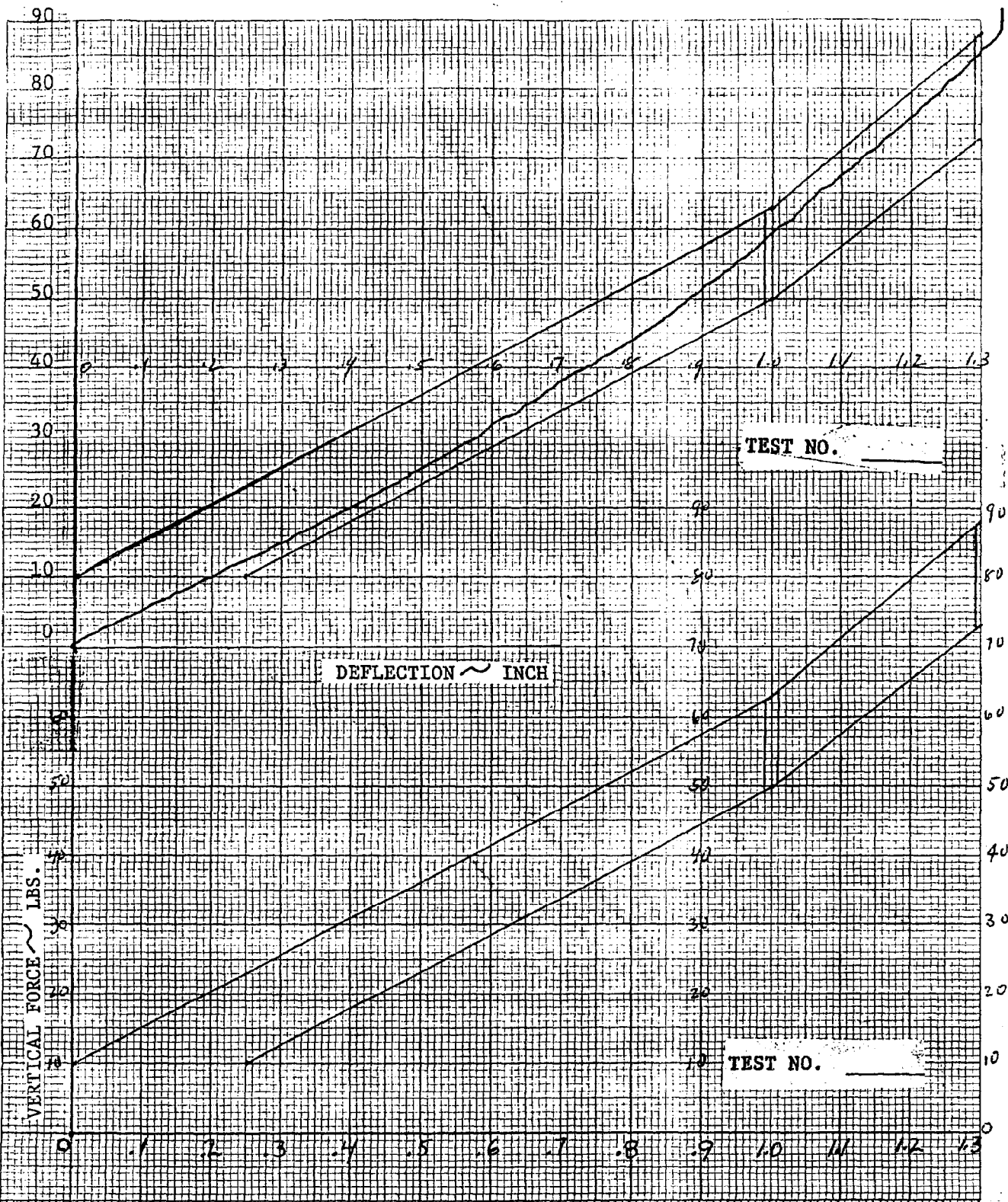
Calspan Sequential Test Number: 2

Date: 9/23/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
FORCE @ 13 mm (N)	104 - 162	114
FORCE @ 19 mm (N)	163 - 221	182
FORCE @ 25 mm (N)	222 - 280	265
FORCE @ 33 mm (N)	325 - 391	381

REMARKS: None



DUMMY S/N - 016
 DATE 9-23-98
 CONTRACT AUTHORIZATION
 TEMP. 70 HUMIDITY 45
 PERFORMED BY *[Signature]*

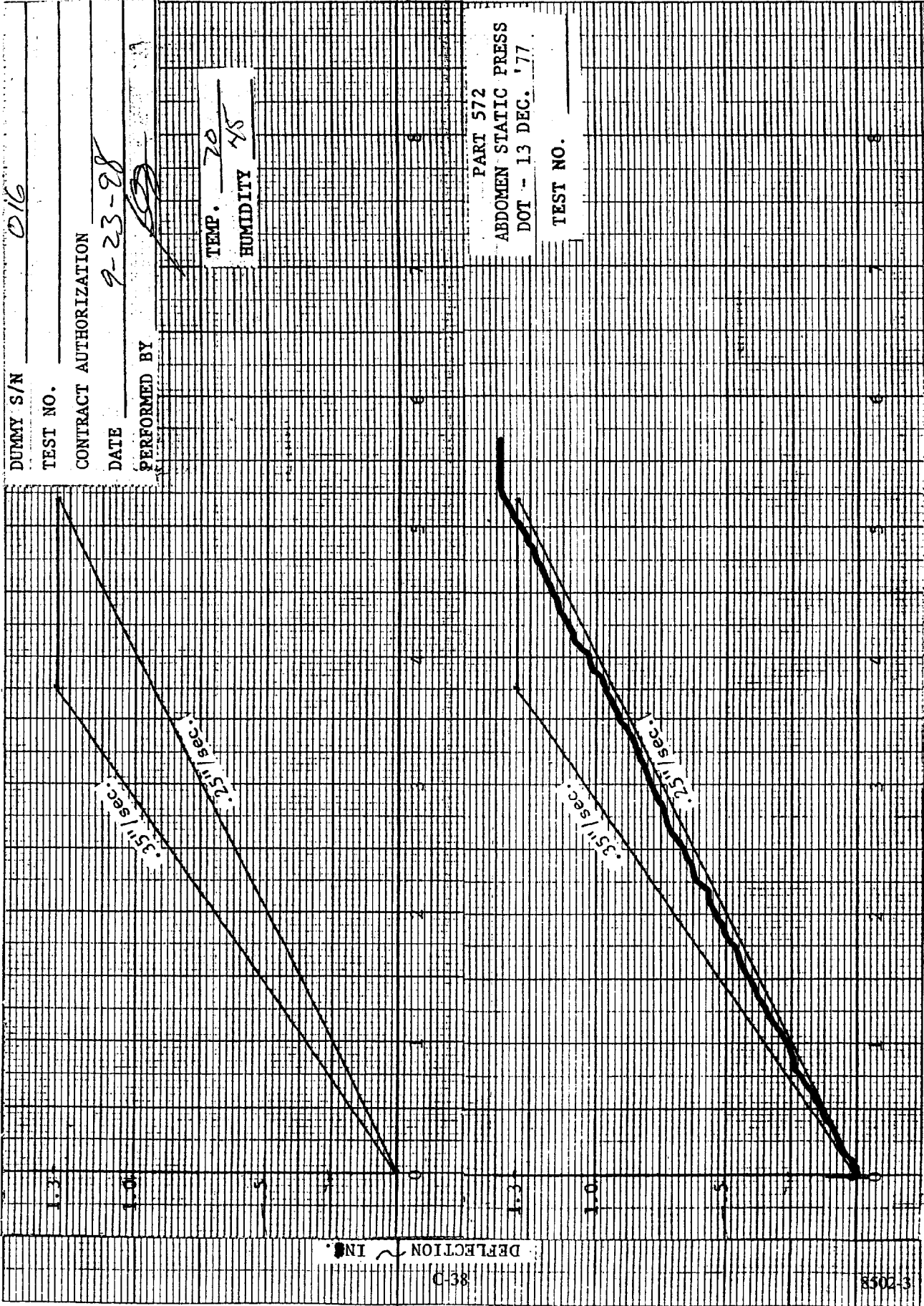
PART 572
 ABDOMEN STATIC PRESS
 DOT - 13 DEC. '77

DUMMY S/N 016
TEST NO. _____
CONTRACT AUTHORIZATION _____
DATE 9-23-98
PERFORMED BY [Signature]

TEMP. 70
HUMIDITY 45

PART 572
ABDOMEN STATIC PRESS
DOT - 13 DEC. '77

TEST NO. _____



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

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016
Date: 9/23/98

Calspan Sequential Test Number: 2
Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
FORCE @ 0° (N)	0 - 26.7	0.0
FORCE @ 20° (N)	97.8 - 151.2	138.5
FORCE @ 30° (N)	151.2 - 204.6	184.6
FORCE @ 40° (N)	204.6 - 258	235.8
RETURN ANGLE	12° max.	10.5

REMARKS: None

DUMMY S/N 0/6 TEST NO.

W/A

DATE _____

PERFORMED BY

TEMP.

HUMIDITY

LUMBAR SPINE FLEXION TEST

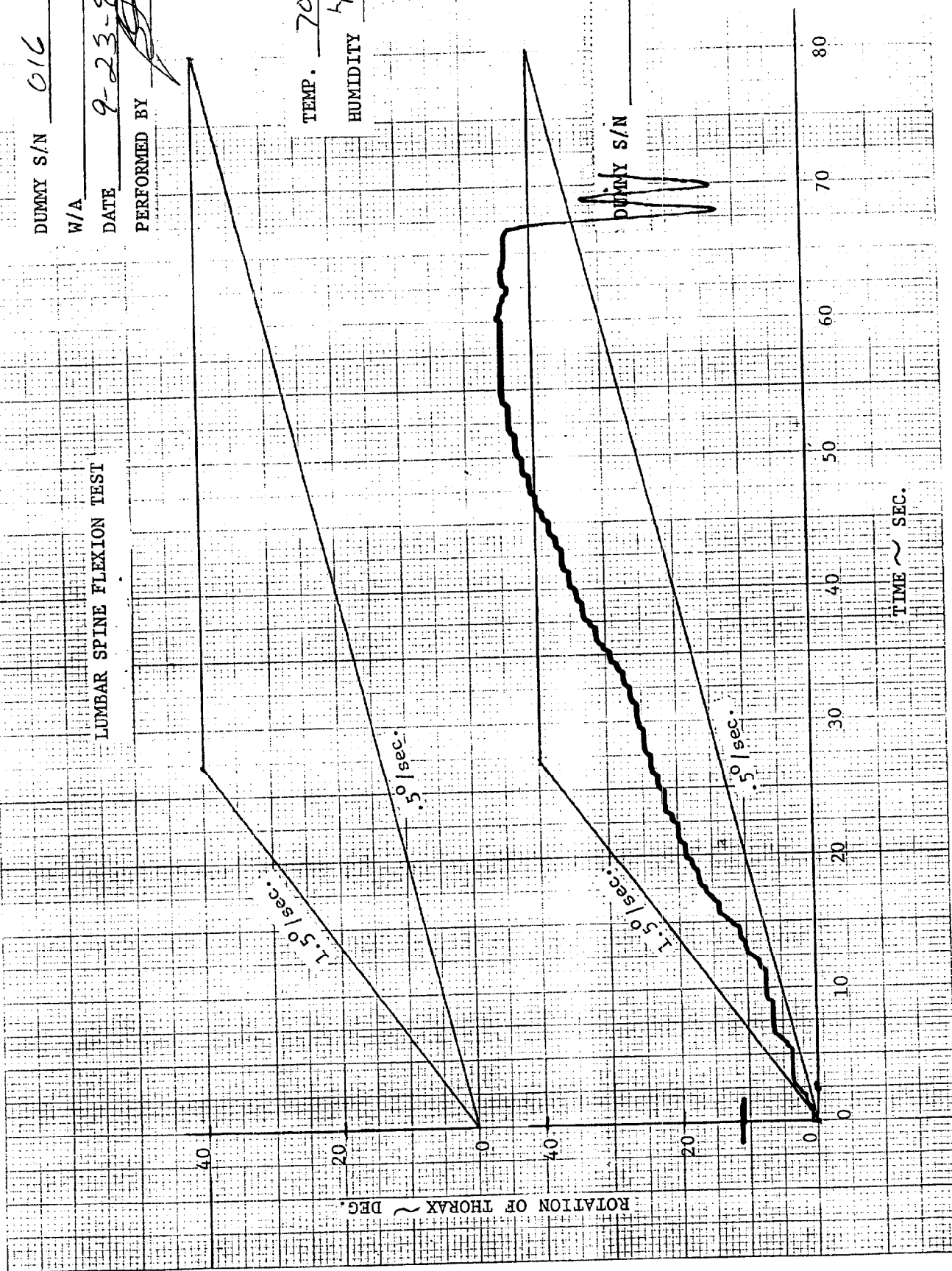
FLEXION ANGLE ~ DEG.

FORCE ~ LBS.

DUMMY S/N 016
 W/A _____
 DATE 9-23-98
 PERFORMED BY [Signature]

TEMP. 70
 HUMIDITY 45

LUMBAR SPINE FLEXION TEST



PRE-TEST DUMMY INSPECTION LIST

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016
Date: 9/23/98

Calspan Sequential Test Number: 2
Laboratory Technician: B. Swiecicki, G. Serbinowski

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

REMARKS: None

**CALIBRATION TEST RESULTS
POST TEST**

SID NO.: 015

CONFIGURED FOR LEFT SIDE IMPACT

**CALIBRATION TEST RESULTS SUMMARY
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015 Calspan Sequential Test Number: 3
Date: 10/1/98 Laboratory Technician: B. Swiecicki, G. Serbinowski

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

* Test not required for SID certification.

REMARKS: None

EXTERNAL DIMENSIONS**POST TEST****CONFIGURED FOR LEFT SIDE IMPACT**SID Serial No.: 015Calspan Sequential Test Number: 3Date: 9/30/98Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
SH- Seated Height (mm)	889 - 909	904
RH- Rib Height (mm)	502 - 520	508
HP- Hip Pivot Height (mm)	99 ref.	99
RD- Rib from Back Line (mm)	229 - 241	236
KH- Knee Pivot from Back Line (mm)	511 - 526	521
KV- Knee Pivot to Floor (mm)	490 - 505	494
HW- Hip Width (mm)	356 - 391	368

REMARKS: None

**LATERAL THORAX IMPACT TEST
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

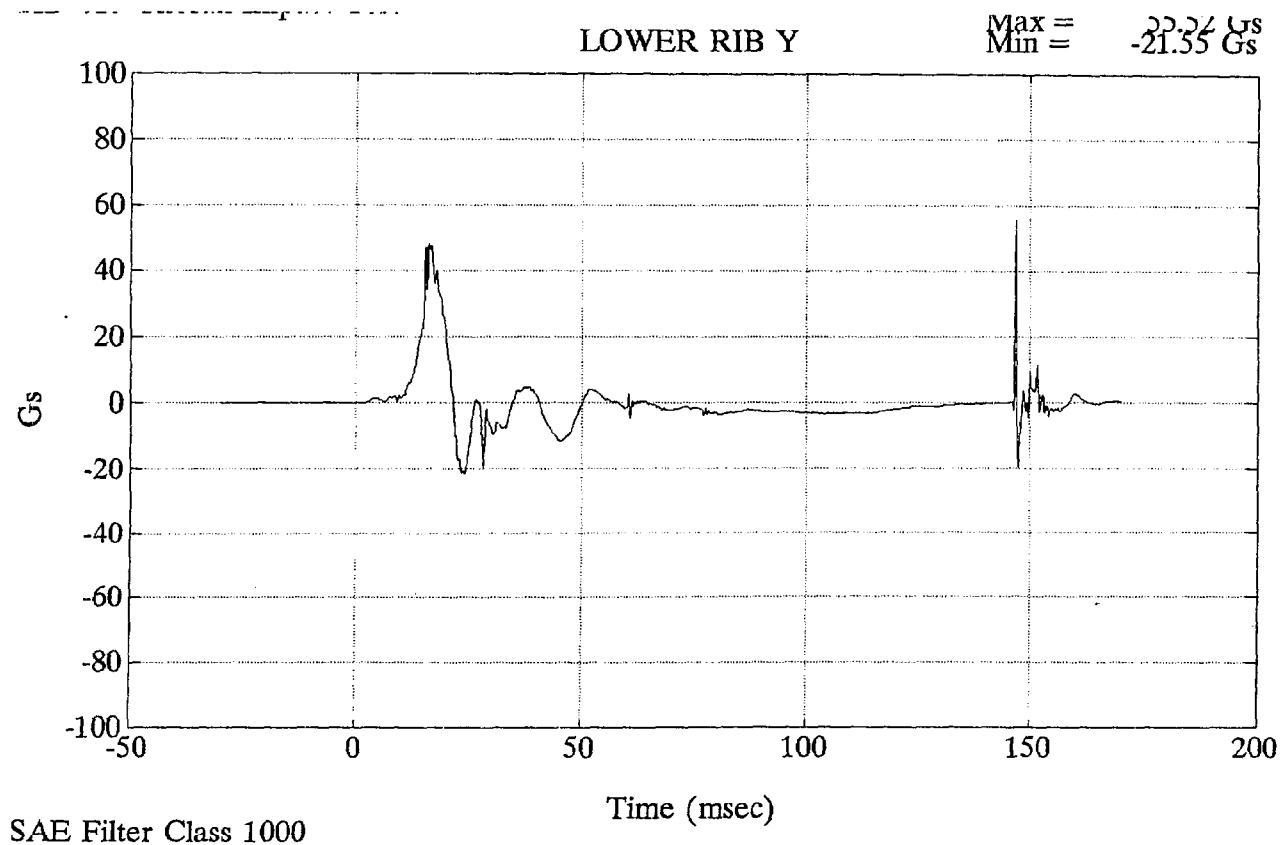
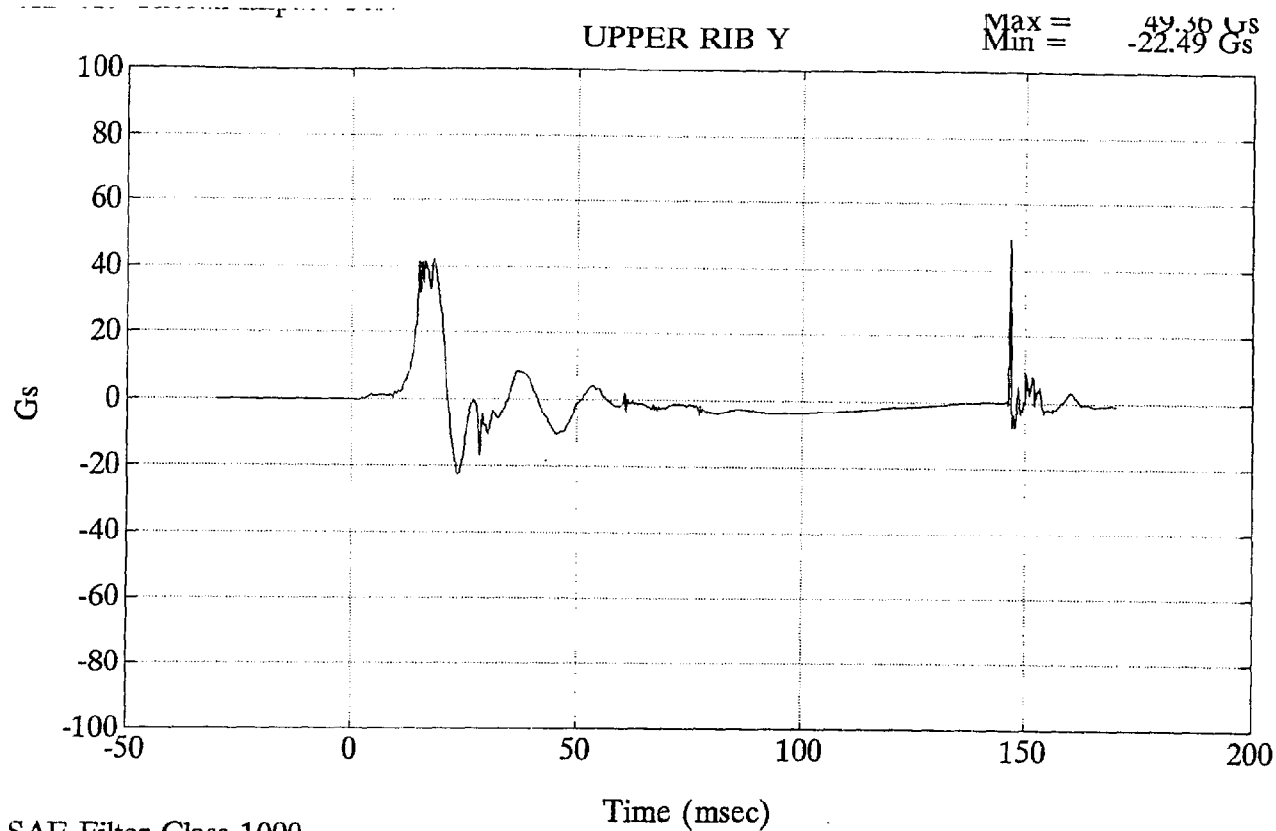
Calspan Sequential Test Number: 3

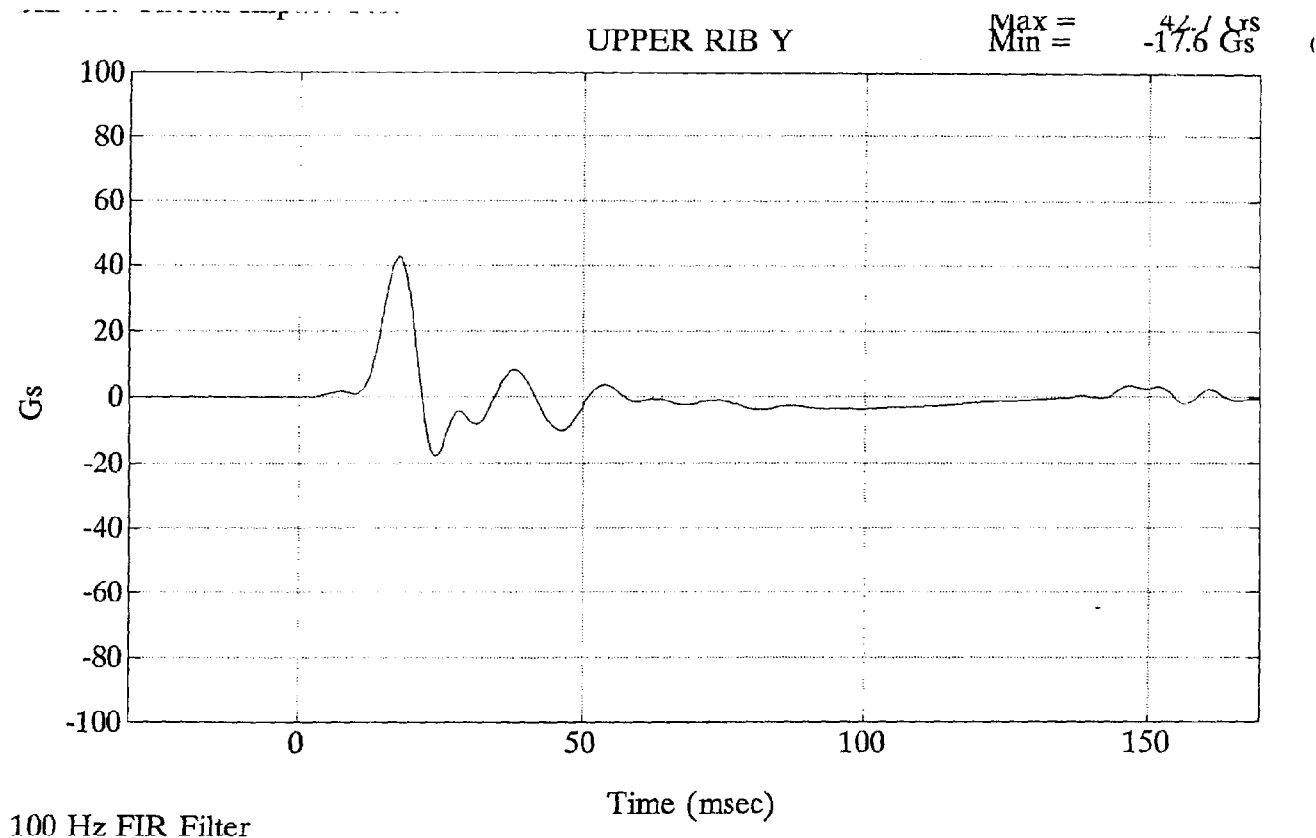
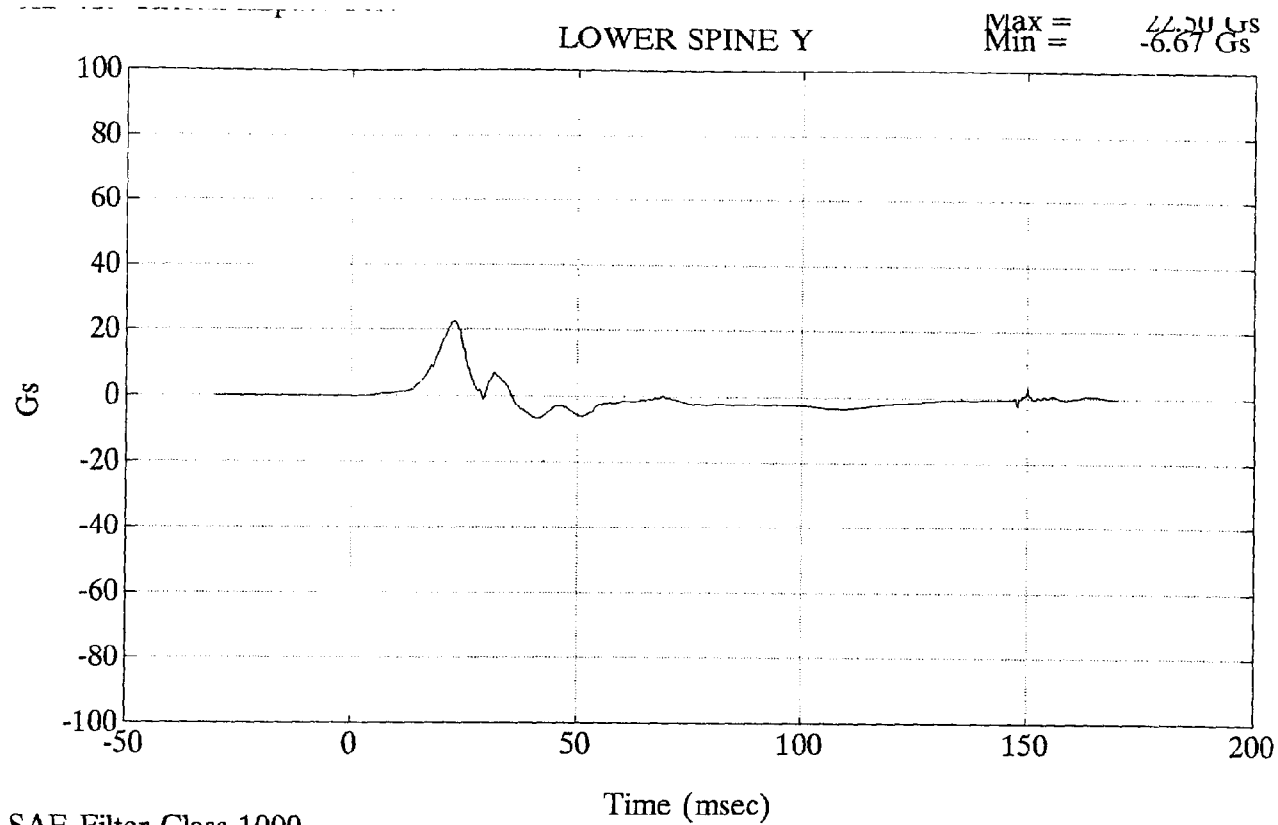
Date: 9/30/98

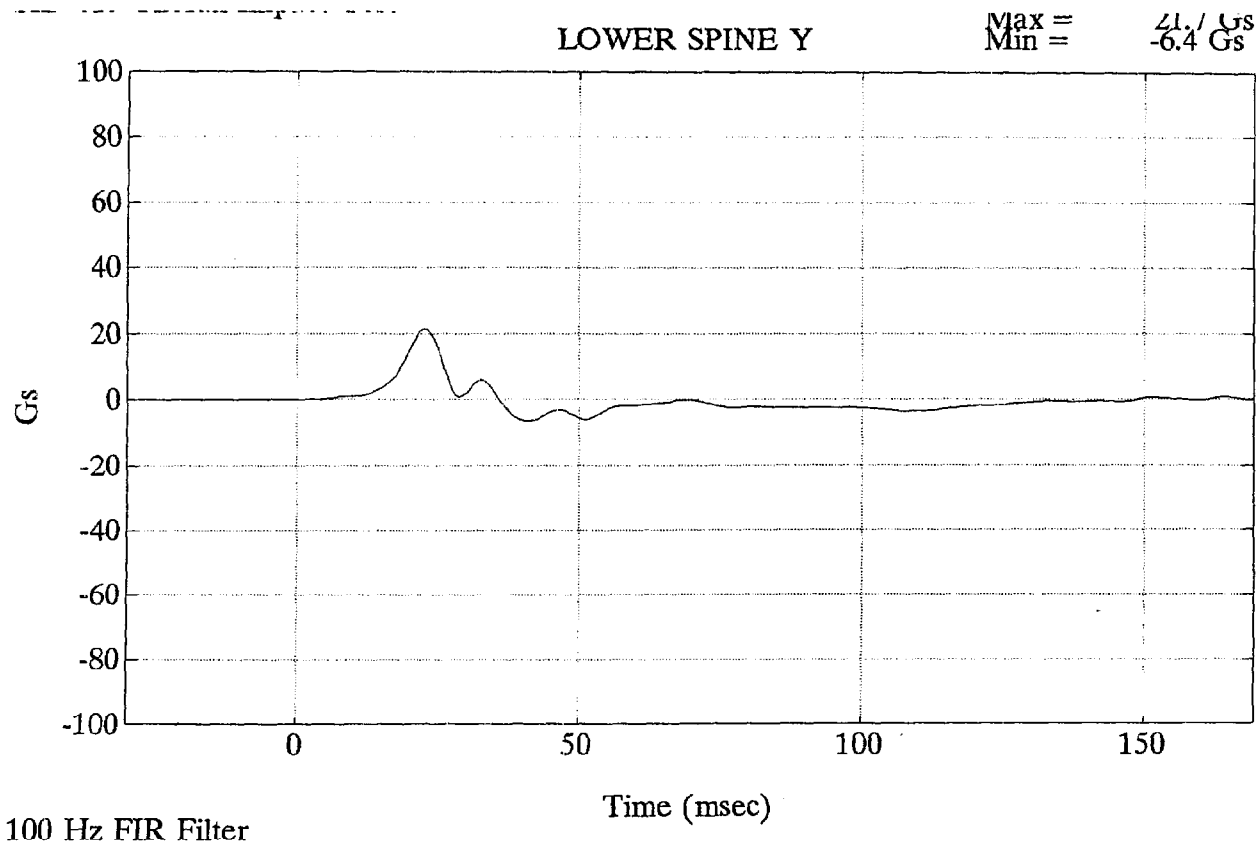
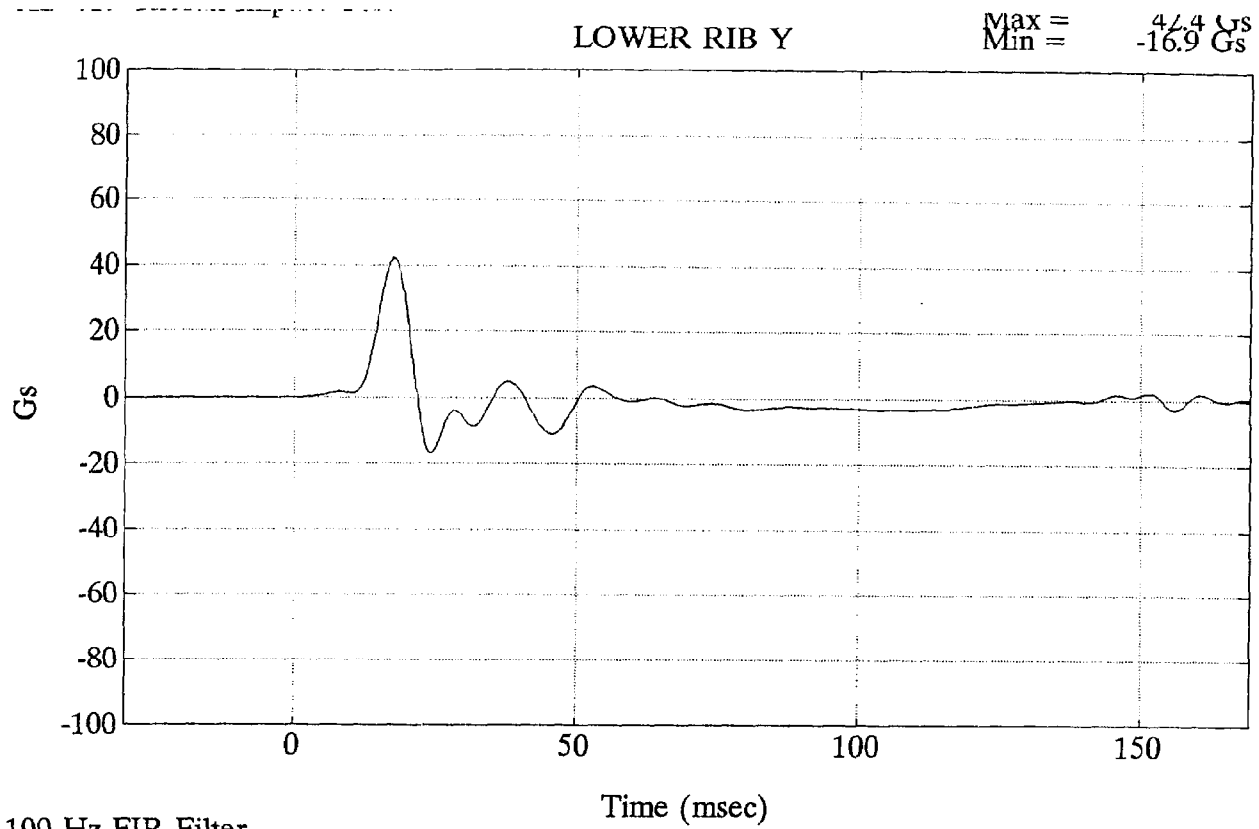
Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
PROBE SPEED (m/s)	4.27 - 4.33	4.31
UPPER RIB (g's)	37 - 46	42.8
LOWER RIB (g's)	37 - 46	42.5
LOWER SPINE (g's)	15 - 22	21.8

REMARKS: None







**LATERAL PELVIS IMPACT TEST
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

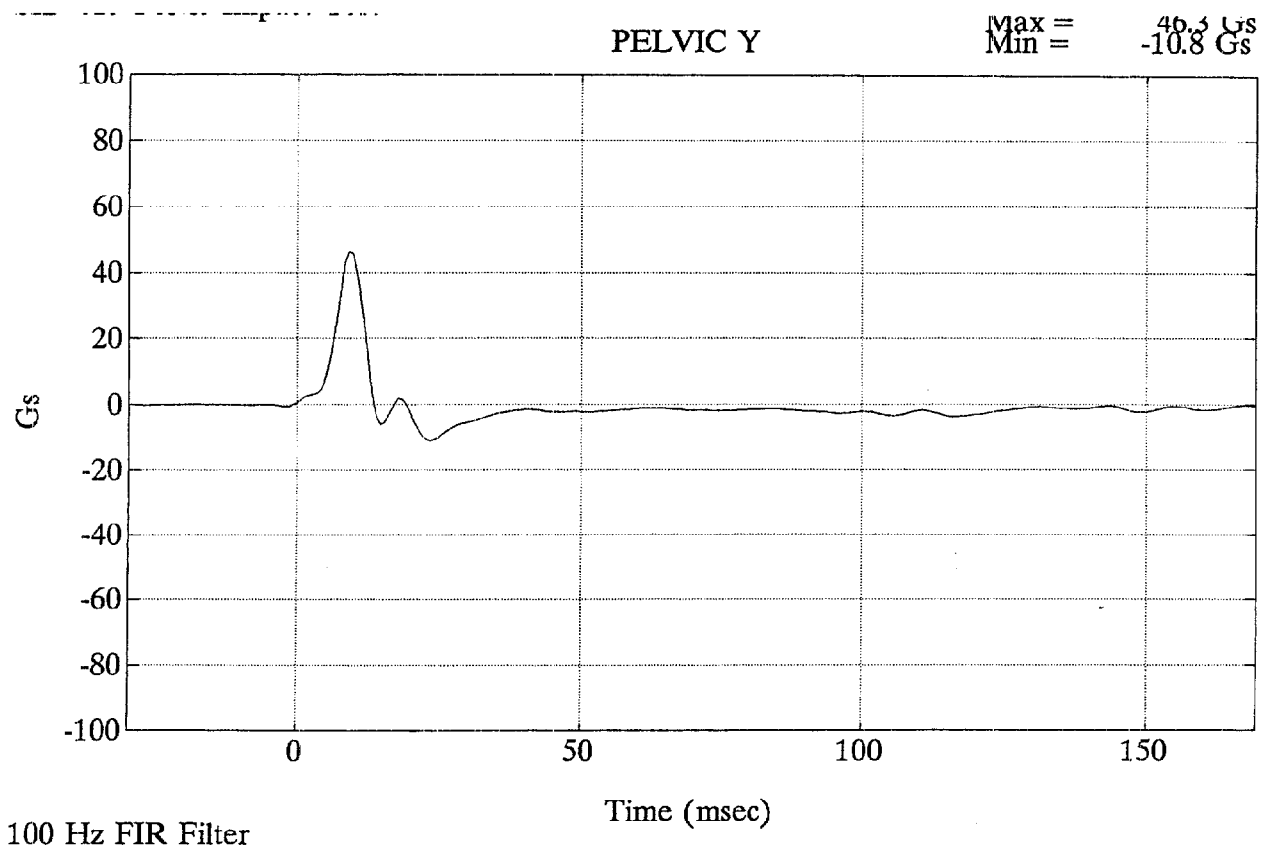
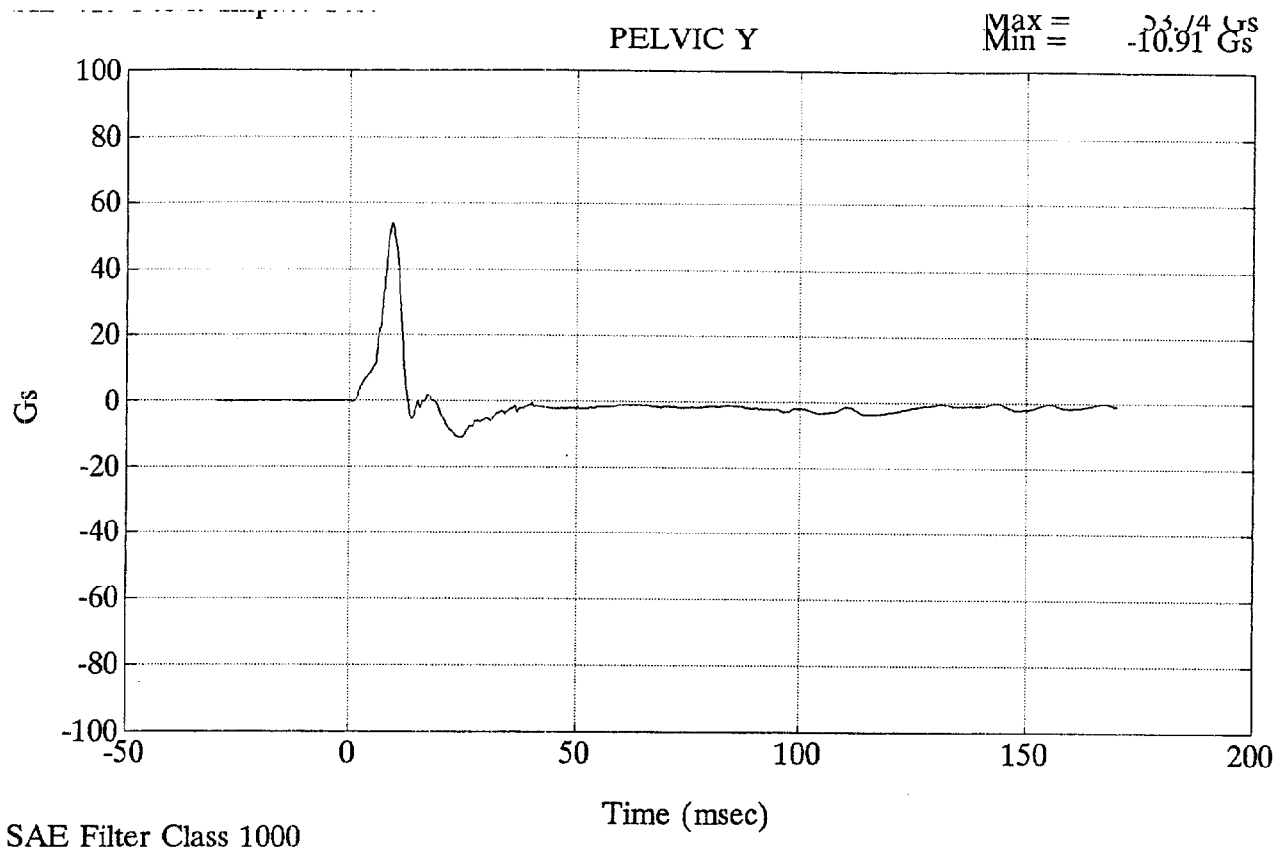
Calspan Sequential Test Number: 3

Date: 9/29/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
PROBE SPEED (m/s)	4.27 - 4.33	4.32
PELVIS ACCELERATION (g's)	40 - 60	46.4

REMARKS: None



**ABDOMINAL COMPRESSION TEST
POST TEST**

(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

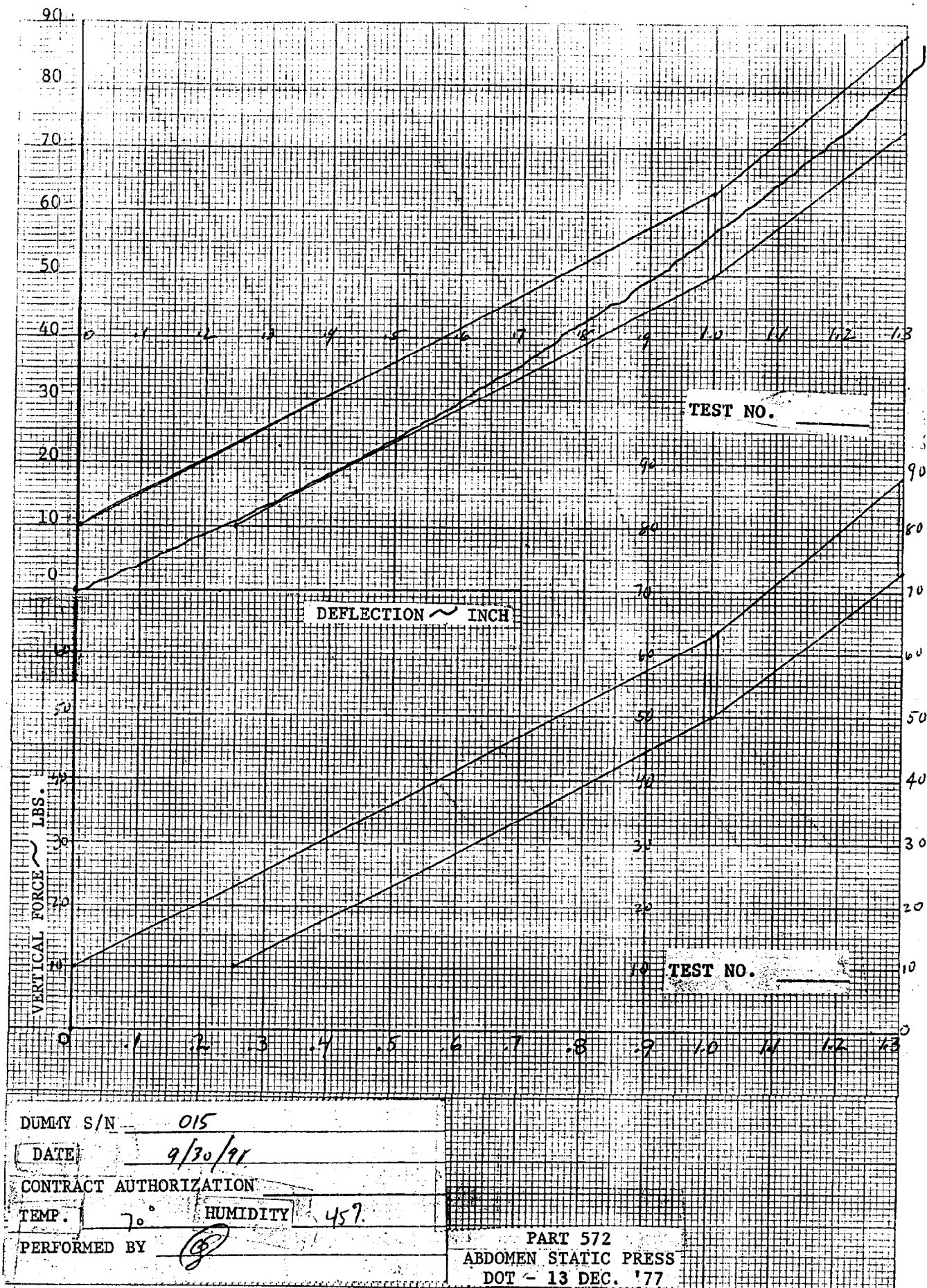
Calspan Sequential Test Number: 3

Date: 9/30/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
FORCE @ 13 mm (N)	104 - 162	106
FORCE @ 19 mm (N)	163 - 221	174
FORCE @ 25 mm (N)	222 - 280	253
FORCE @ 33 mm (N)	325 - 391	364

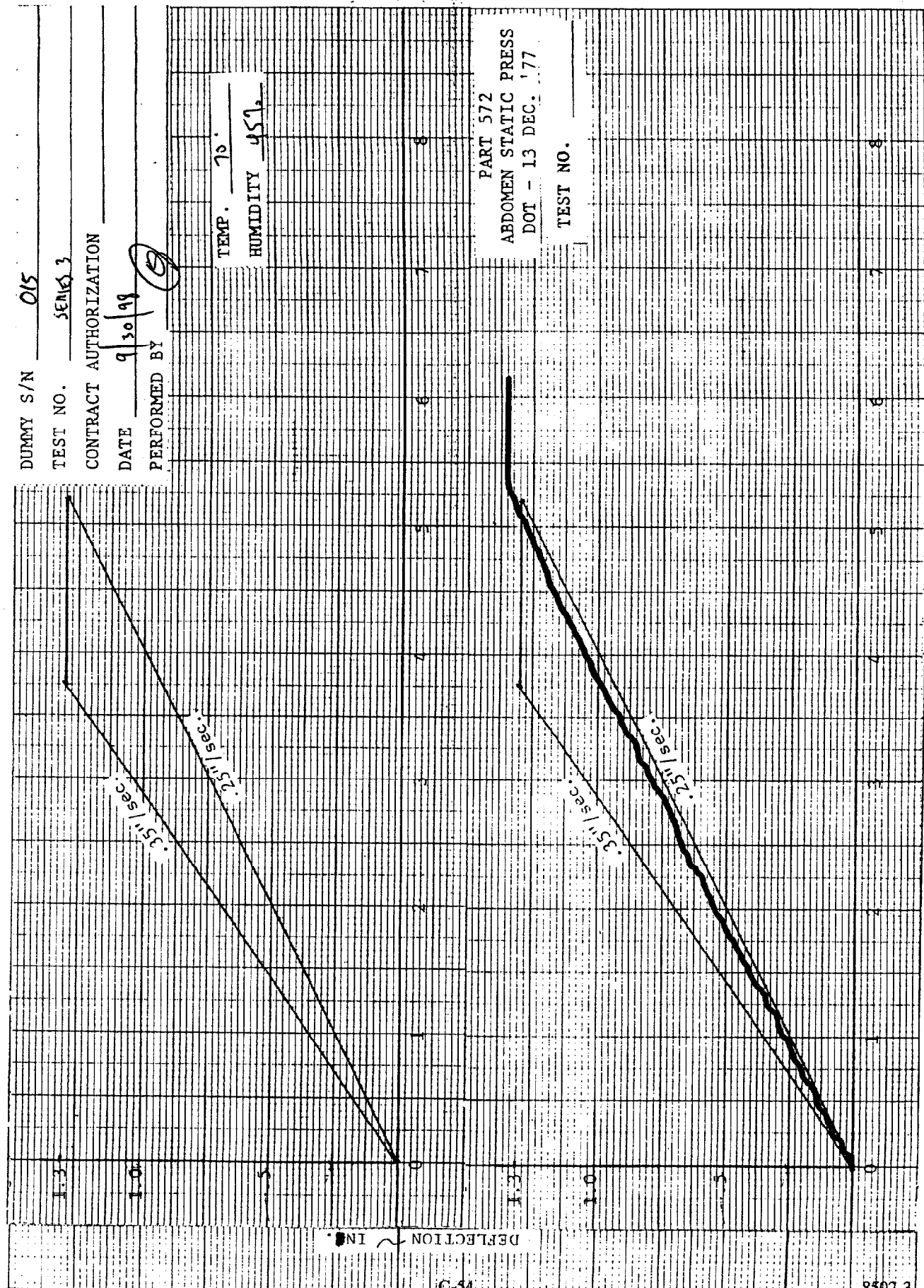
REMARKS: None



DUMMY S/N 015
TEST NO. SENK 3
CONTRACT AUTHORIZATION _____
DATE 9/30/99
PERFORMED BY (signature)

TEMP. 70°
HUMIDITY 45%

PART 572
ABDOMEN STATIC PRESS
DOT - 13 DEC. '77
TEST NO. _____



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

CONFIGURED FOR LEFT SIDE IMPACT

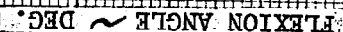
SID Serial No.: 015 Calspan Sequential Test Number: 3
Date: 10/1/98 Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	40
FORCE @ 0° (N)	0 - 26.7	0
FORCE @ 20° (N)	97.8 - 151.2	119.7
FORCE @ 30° (N)	151.2 - 204.6	165.8
FORCE @ 40° (N)	204.6 - 258	216.4
RETURN ANGLE	12° max.	8.5

REMARKS: None

HUMIDITY 40.7

LUMBAR SPINE FLEXION TEST



FORCE  **LBS.**

POST TEST DUMMY INSPECTION LIST

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

Calspan Sequential Test Number: 3

Date: 10/1/98

Laboratory Technician:

B. Swiecicki, G. Serbinowski

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

REMARKS: None

**CALIBRATION TEST RESULTS
POST TEST**

SID NO.: 016

CONFIGURED FOR LEFT SIDE IMPACT

**CALIBRATION TEST RESULTS SUMMARY
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016 Calspan Sequential Test Number: 3
Date: 10/1/98 Laboratory Technician: B. Swiecicki, G. Serbinowski

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

* Test not required for SID certification.

REMARKS: None

EXTERNAL DIMENSIONS**POST TEST****CONFIGURED FOR LEFT SIDE IMPACT**SID Serial No.: 016Calspan Sequential Test Number: 3Date: 10/1/98Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
SH- Seated Height (mm)	889 - 909	902
RH- Rib Height (mm)	502 - 520	513
HP- Hip Pivot Height (mm)	99 ref.	99
RD- Rib from Back Line (mm)	229 - 241	240
KH- Knee Pivot from Back Line (mm)	511 - 526	525
KV- Knee Pivot to Floor (mm)	490 - 505	494
HW- Hip Width (mm)	356 - 391	362

REMARKS: None

**LATERAL THORAX IMPACT TEST
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016

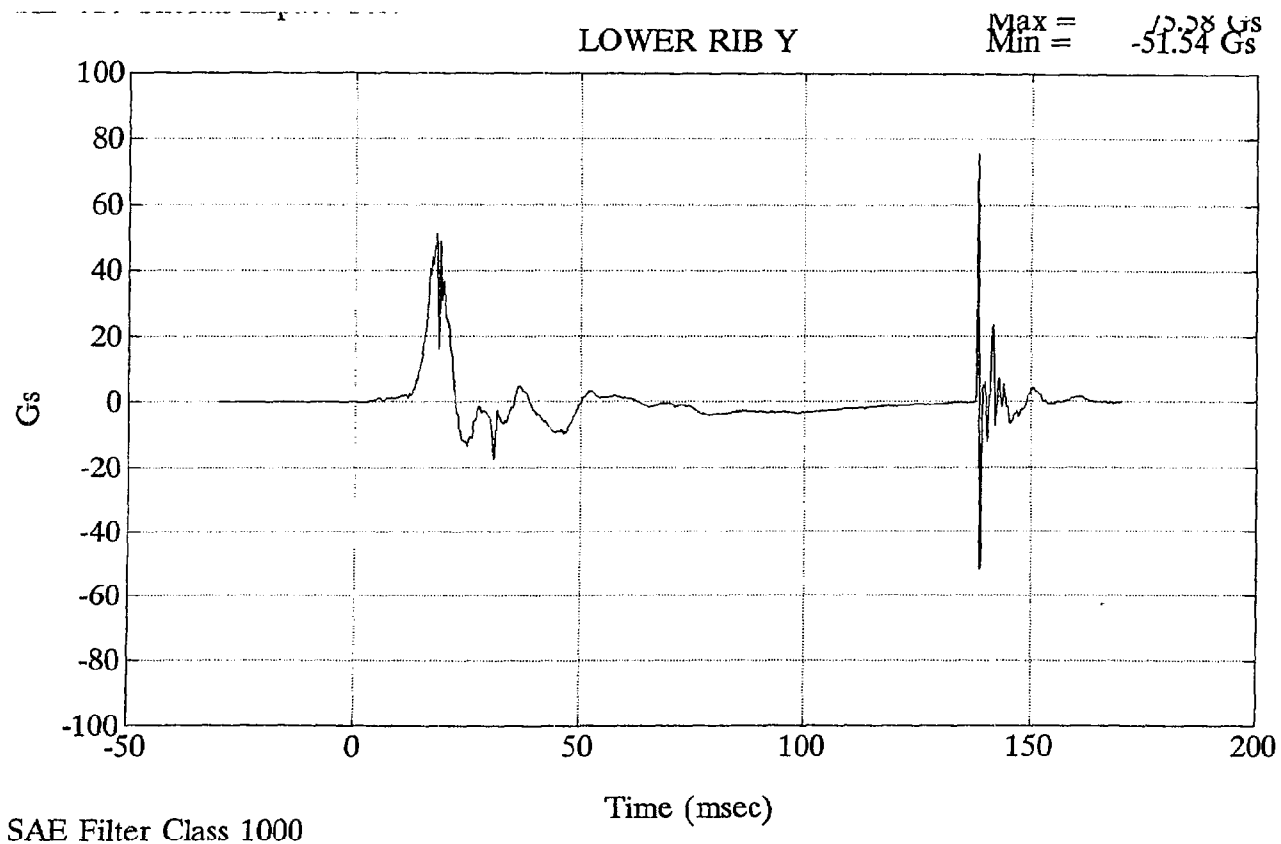
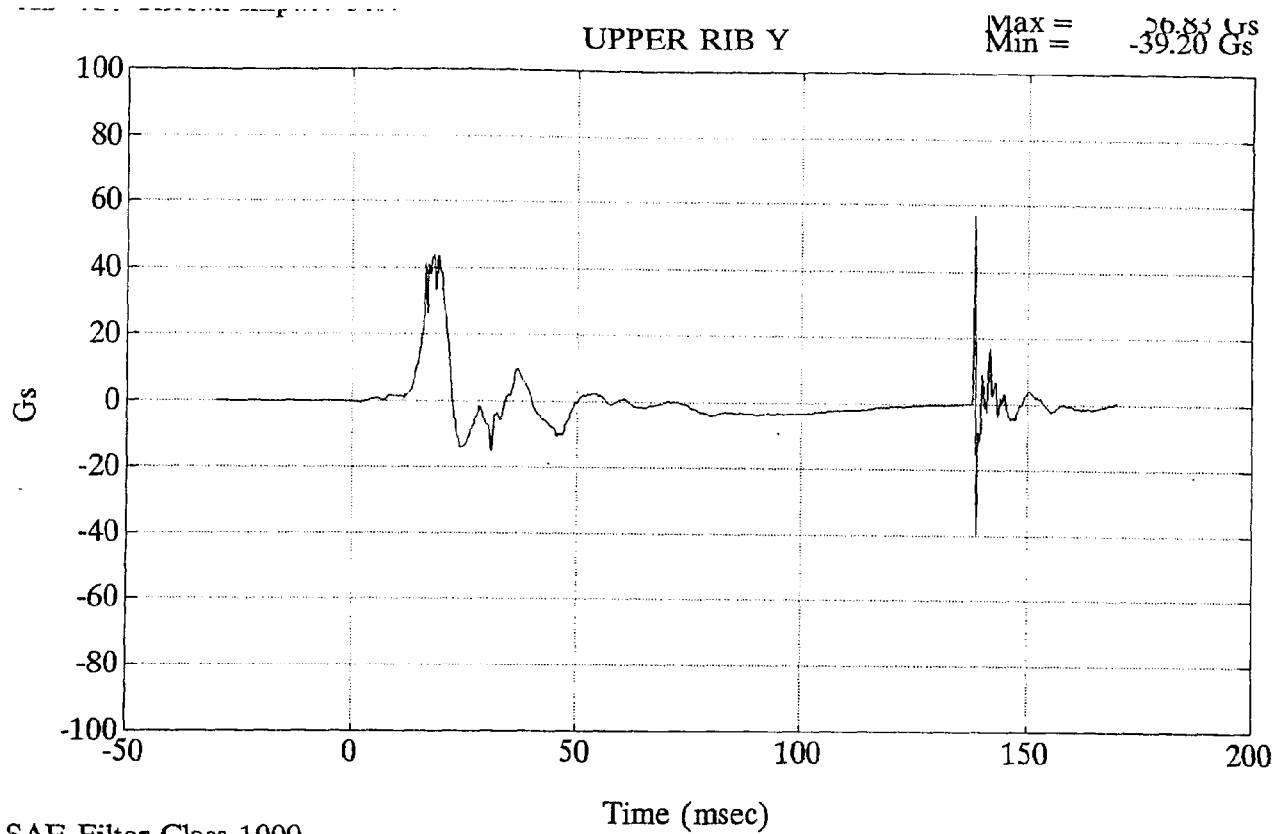
Calspan Sequential Test Number: 3

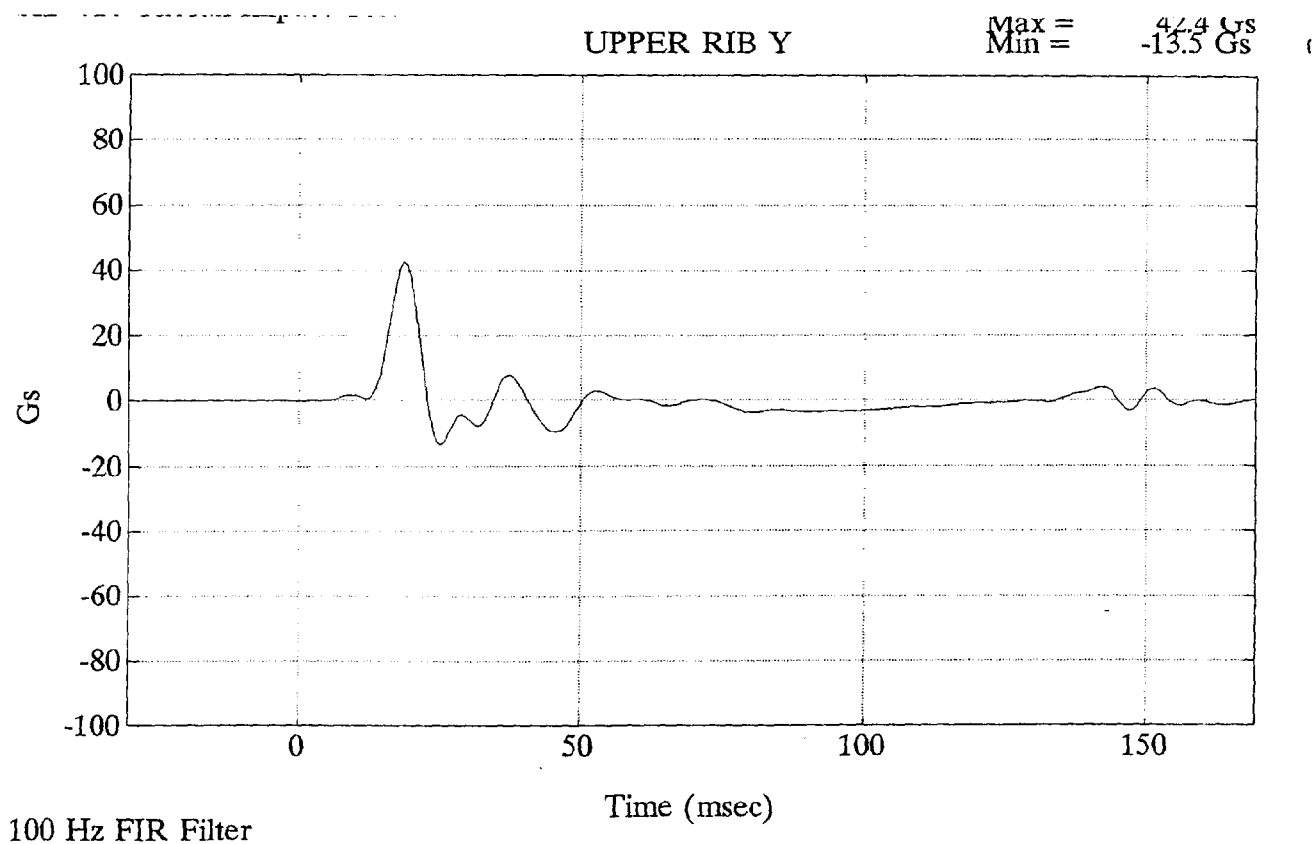
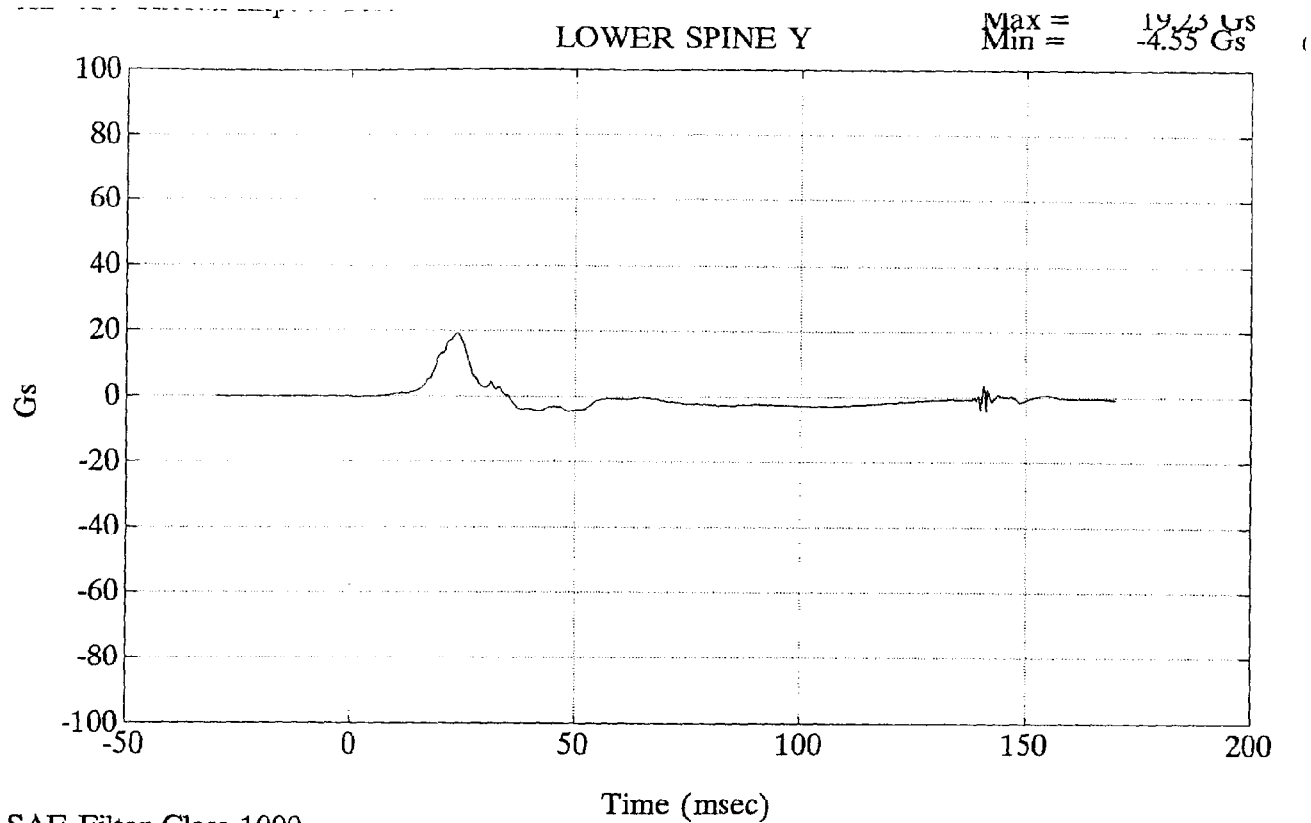
Date: 10/1/98

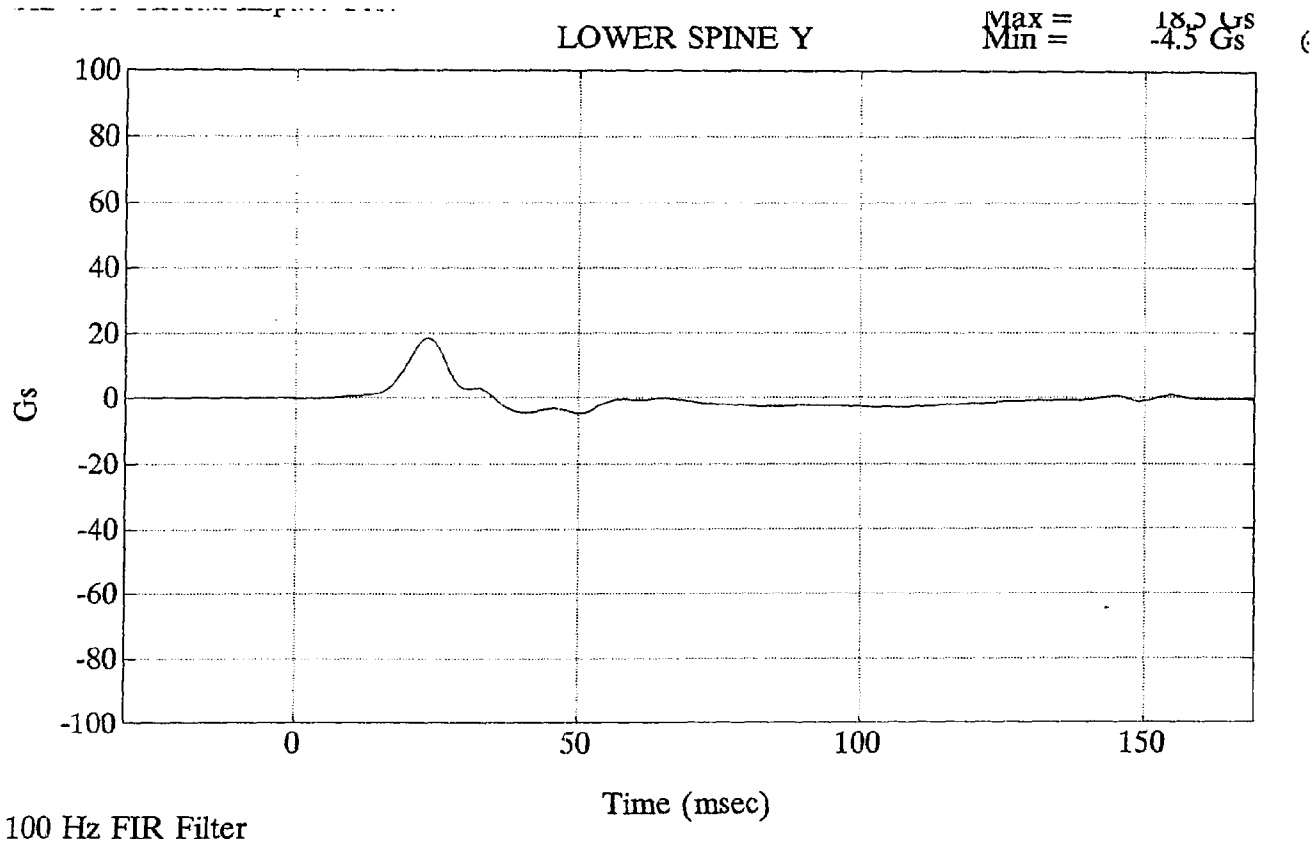
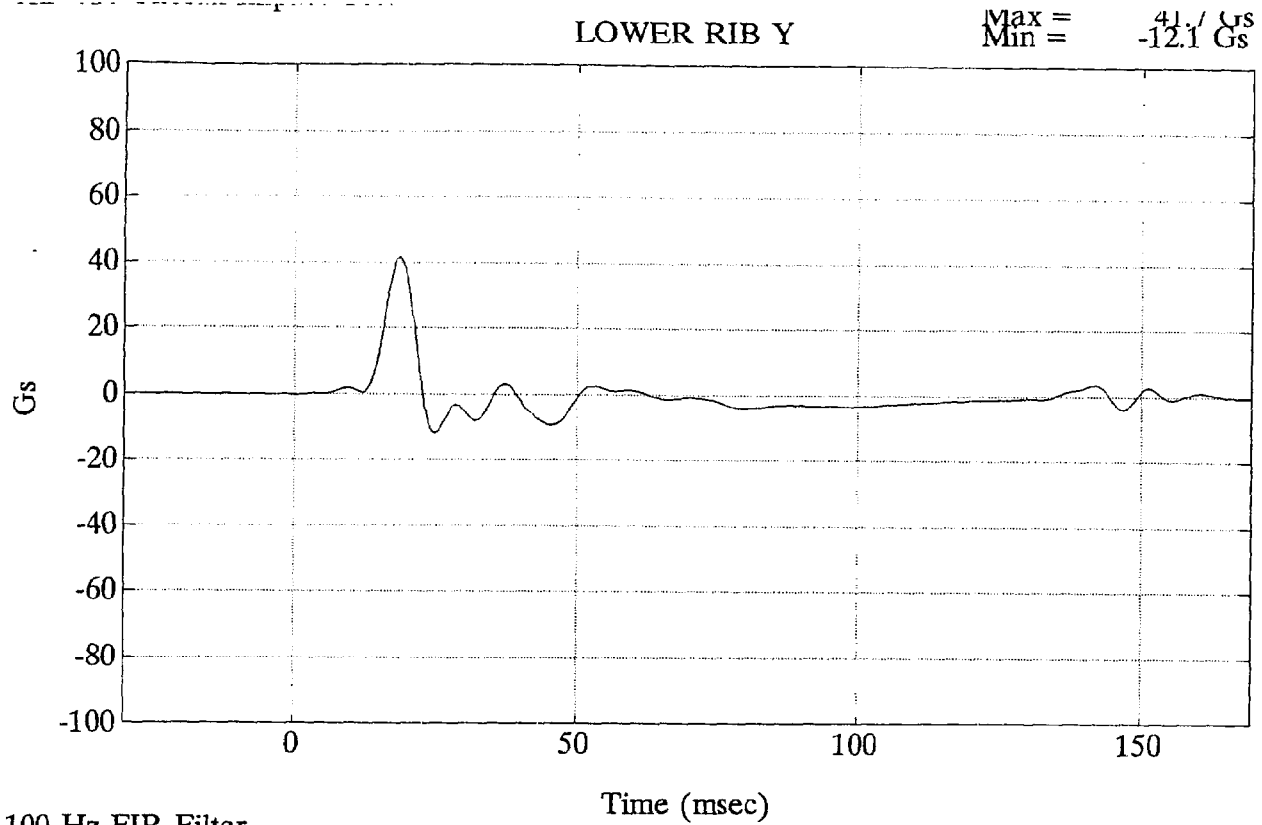
Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	40
PROBE SPEED (m/s)	4.27 - 4.33	4.27
UPPER RIB (g's)	37 - 46	42.5
LOWER RIB (g's)	37 - 46	41.7
LOWER SPINE (g's)	15 - 22	18.5

REMARKS: None







**LATERAL PELVIS IMPACT TEST
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016

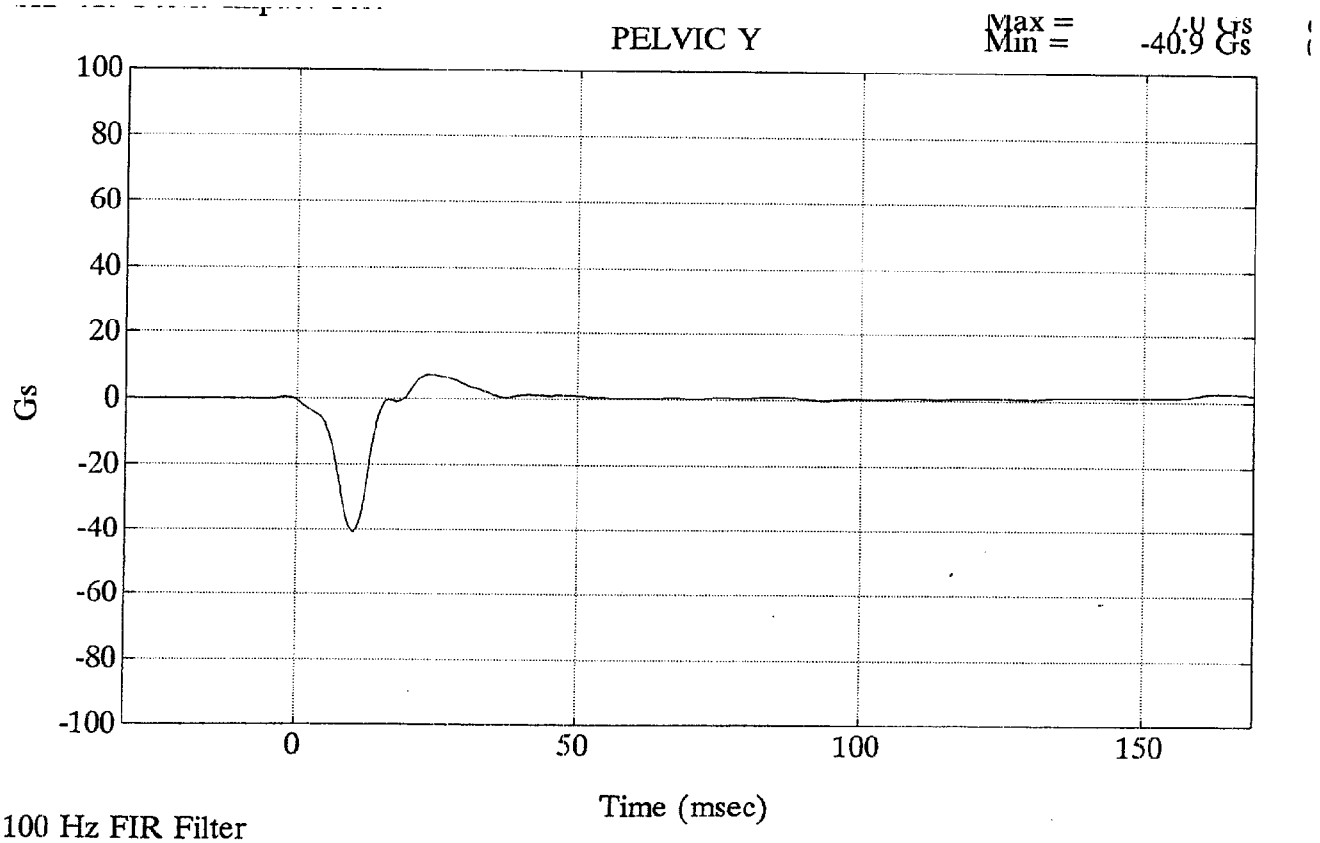
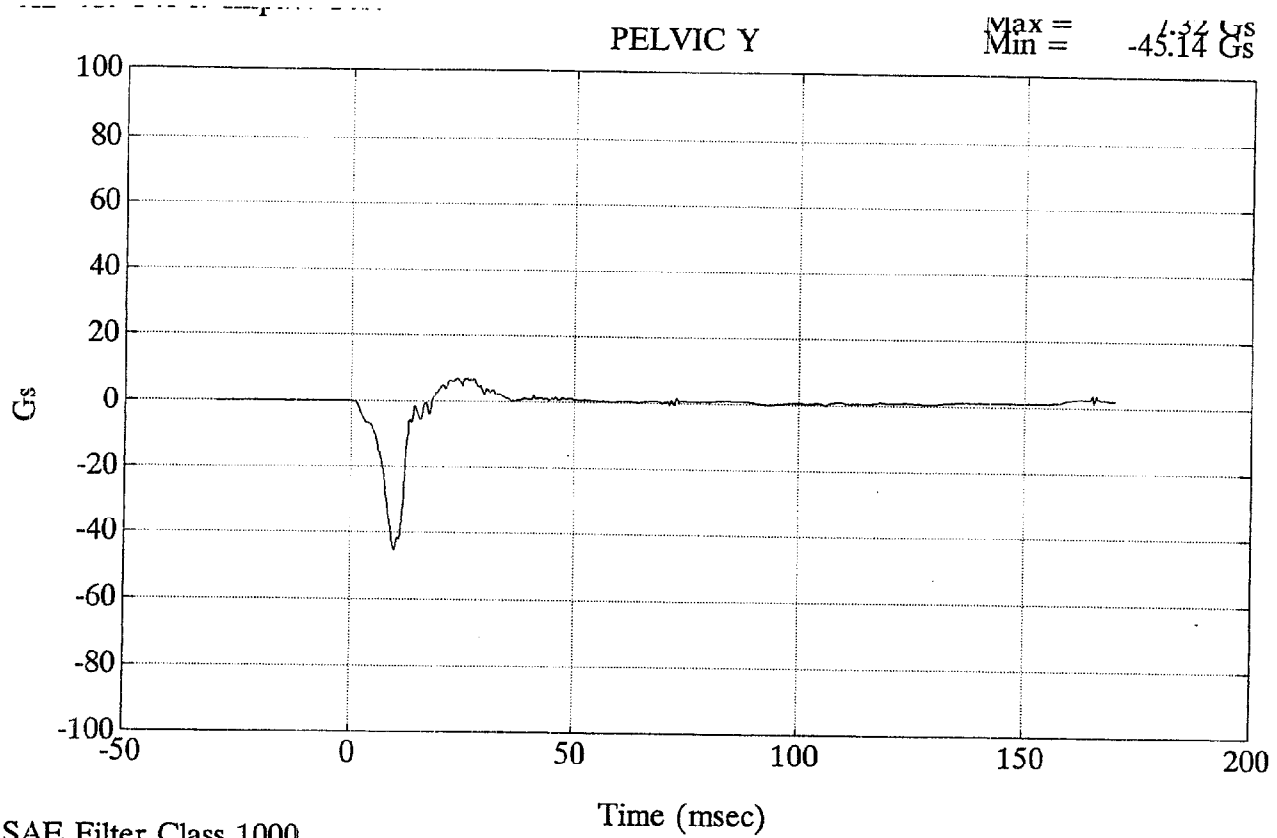
Calspan Sequential Test Number: 3

Date: 9/29/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	40
PROBE SPEED (m/s)	4.27 - 4.33	4.27
PELVIS ACCELERATION (g's)	40 - 60	41.0

REMARKS: None



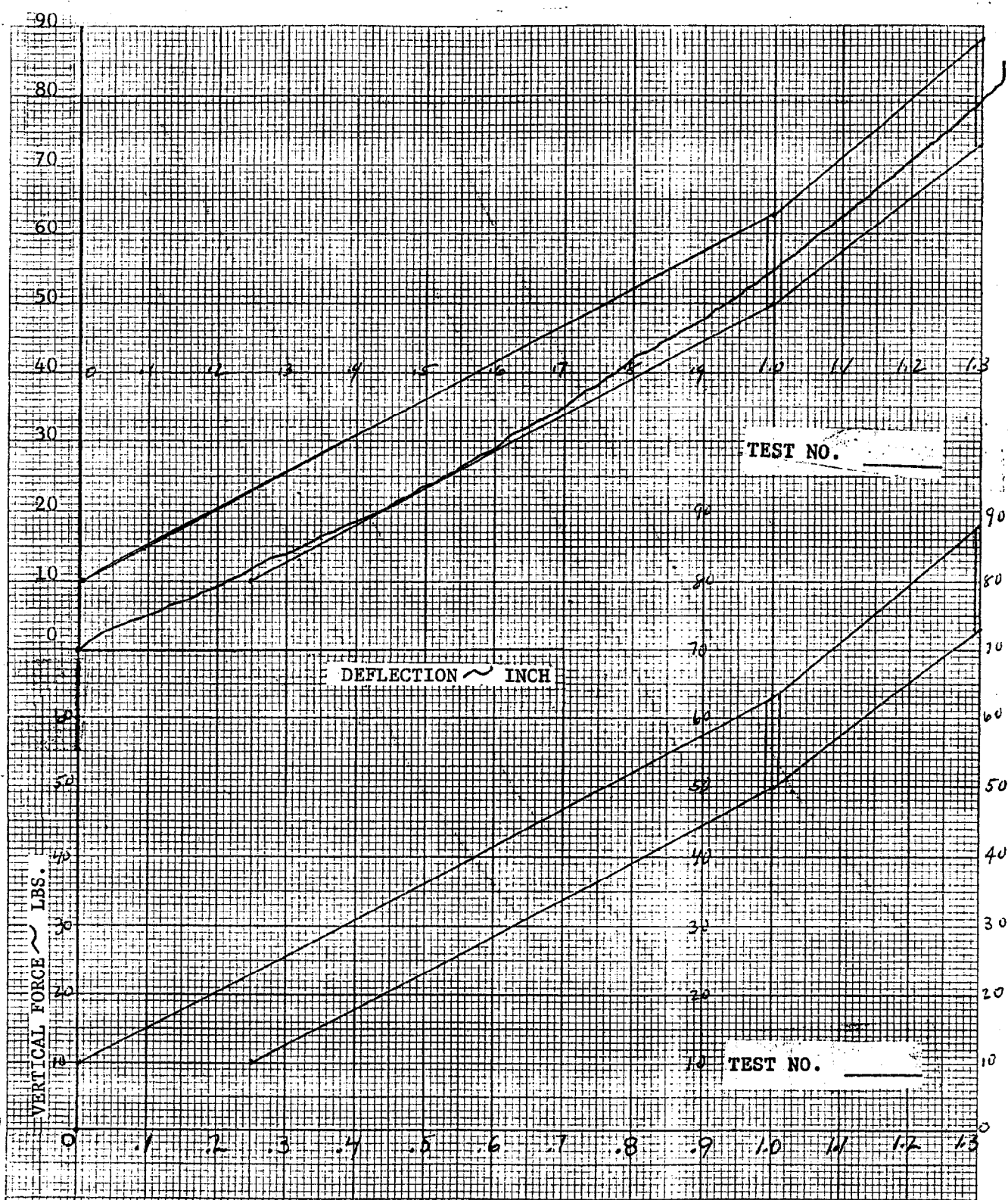
ABDOMINAL COMPRESSION TEST
POST TEST
(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016 Calspan Sequential Test Number: 3
Date: 9/30/98 Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	45
FORCE @ 13 mm (N)	104 - 162	105
FORCE @ 19 mm (N)	163 - 221	171
FORCE @ 25 mm (N)	222 - 280	244
FORCE @ 33 mm (N)	325 - 391	352

REMARKS: None



DUMMY S/N 016

DATE 9/30/98

CONTRACT AUTHORIZATION _____

TEMP. 70° HUMIDITY 45%

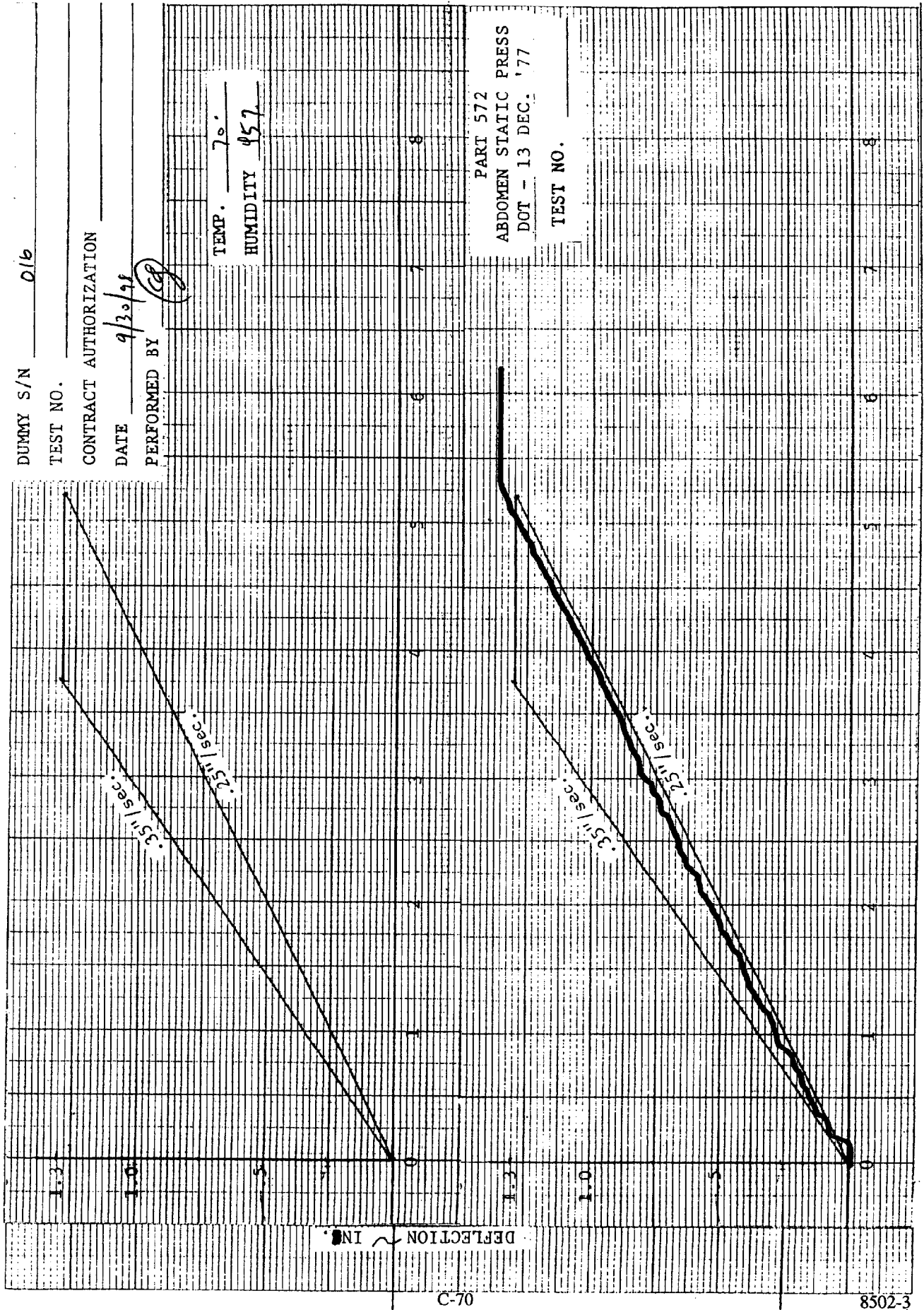
PERFORMED BY [Signature]

PART 572
ABDOMEN STATIC PRESS
DOT - 13 DEC. '77
C-69

DUMMY S/N 016
TEST NO. _____
CONTRACT AUTHORIZATION _____
DATE 9/30/78
PERFORMED BY CG

TEMP. 70°
HUMIDITY 45%

PART 572
ABDOMEN STATIC PRESS
DOT - 13 DEC. '77
TEST NO. _____



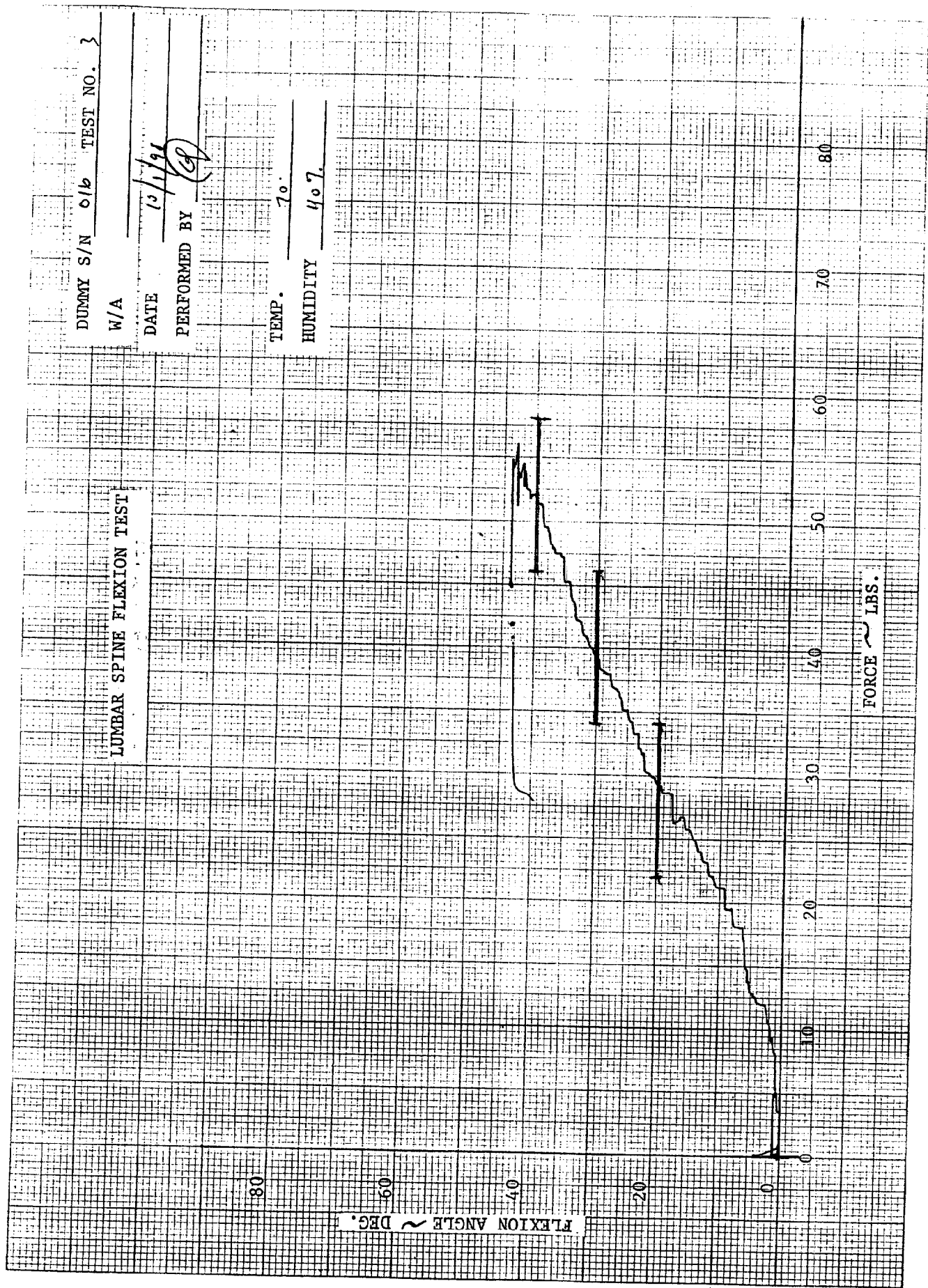
LUMBAR FLEXION TEST
POST TEST
(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016 Calspan Sequential Test Number: 3
Date: 10/1/98 Laboratory Technician: B. Swiecicki, G. Serbinowski

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	40
FORCE @ 0° (N)	0 - 26.7	0.0
FORCE @ 20° (N)	97.8 - 151.2	130.7
FORCE @ 30° (N)	151.2 - 204.6	174.7
FORCE @ 40° (N)	204.6 - 258	230.9
RETURN ANGLE	12° max.	1.1

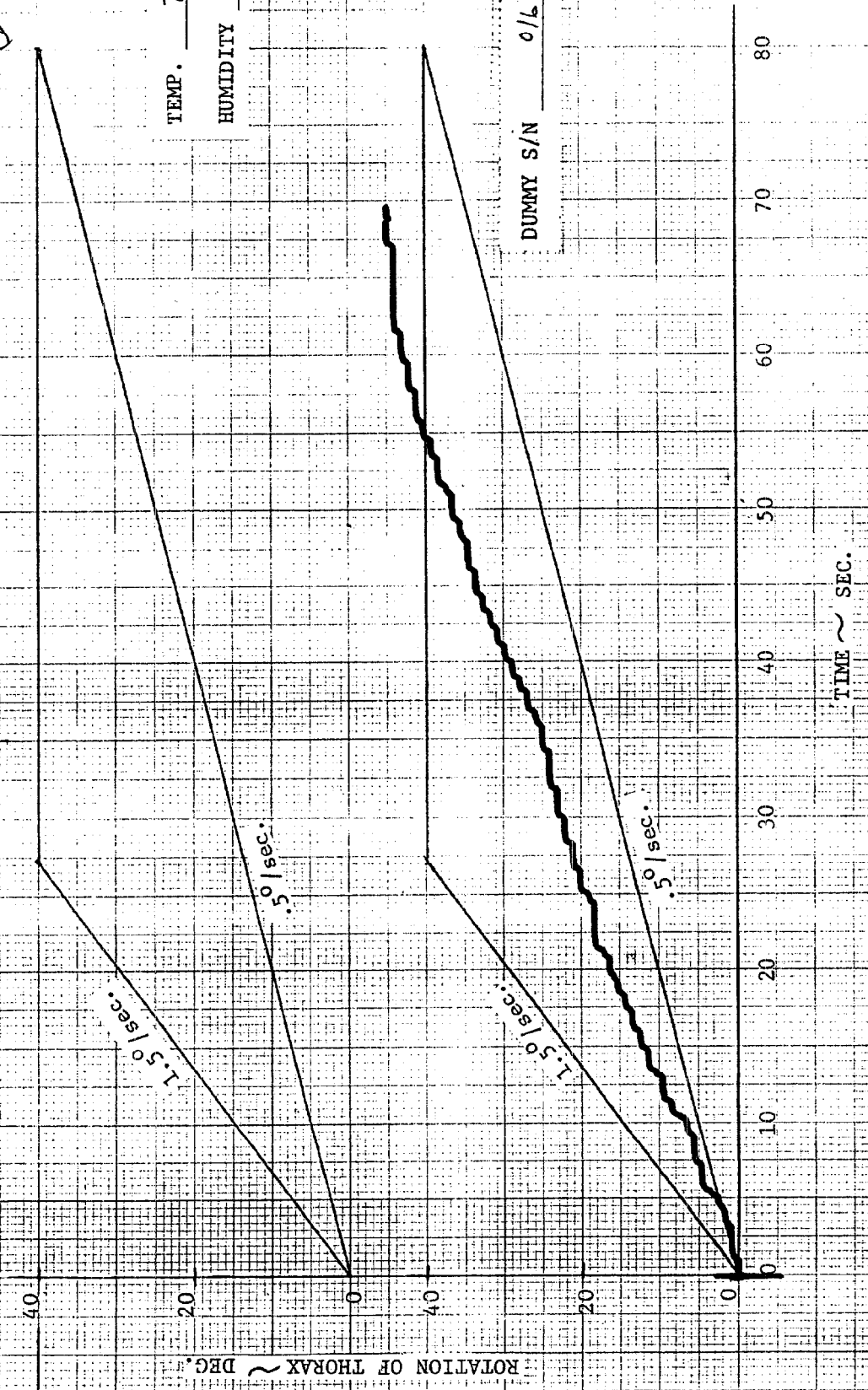
REMARKS: None



DUMMY S/N 0/L
W/A _____
DATE 10/1/74
PERFORMED BY GG

TEMP. 70.0
HUMIDITY 40%

LUMBAR SPINE FLEXION TEST



DUMMY S/N 0/L

POST TEST DUMMY INSPECTION LIST

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016

Calspan Sequential Test Number: 3

Date: 10/1/98

Laboratory Technician: B. Swiecicki, G. Serbinowski

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

REMARKS: None

APPENDIX D

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

SID INSTRUMENTATION

	FRONT SID NO.: 015		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
UPPER RIB	A14173	ENDEVCO	6/98
LOWER RIB	A13568	ENDEVCO	6/98
LOWER SPINE	A13565	ENDEVCO	6/98
PELVIS	A13995	ENDEVCO	6/98
UPPER RIB REDUNDANT	A12776	ENDEVCO	6/98
LOWER RIB REDUNDANT	A12480	ENDEVCO	6/98
LOWER SPINE REDUNDANT	A13599	ENDEVCO	6/98
PELVIS REDUNDANT	A13929	ENDEVCO	7/98

	REAR SID NO.: 016		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
UPPER RIB	A13850	ENDEVCO	6/98
LOWER RIB	A11544	ENDEVCO	6/98
LOWER SPINE	A13858	ENDEVCO	6/98
PELVIS	A13492	ENDEVCO	7/98
UPPER RIB REDUNDANT	A13513	ENDEVCO	6/98
LOWER RIB REDUNDANT	A14158	ENDEVCO	7/98
LOWER SPINE REDUNDANT	B11118	ENDEVCO	9/98
PELVIS REDUNDANT	A13498	ENDEVCO	7/98

REMARKS: None

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

VEHICLE AND MDB INSTRUMENTATION

	VEHICLE AND MDB INSTRUMENTS		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
RIGHT FRONT SILL (X)	APBD9	ENDEVCO	4/98
RIGHT FRONT SILL (Y)	AP064	ENDEVCO	4/98
RIGHT FRONT SILL (Z)	APBB6	ENDEVCO	4/98
RIGHT REAR SILL (X)	A13942	ENDEVCO	9/98
RIGHT REAR SILL (Y)	J18400	ENDEVCO	9/98
RIGHT REAR SILL (Z)	J18649	ENDEVCO	9/98
REAR FLOORPAN ABOVE AXLE (X)	AP1B6	ENDEVCO	5/98
REAR FLOORPAN ABOVE AXLE (Y)	J18650	ENDEVCO	8/98
REAR FLOORPAN ABOVE AXLE (Z)	AN943	ENDEVCO	8/98
LEFT REAR SILL (Y)	AC827	ENDEVCO	4/98
LEFT FRONT SILL (Y)	BA65	ENDEVCO	7/98
RIGHT REAR SEAT OCCUPANT COMP. (Y)	D57	ICS	8/98
LOWER LEFT B- PILLAR (Y)	BB51	ENDEVCO	4/98
MIDDLE LEFT B-PILLAR (Y)	X24	ICS	4/98
LOWER LEFT A-PILLAR (Y)	MB10	ENTRAN	4/98
UPPER LEFT A-PILLAR (Y)	AN25	ENDEVCO	4/98
FRONT SEAT TRACK (Y)	AN15	ENDEVCO	4/98
REAR SEAT TRACK (Y)	-	-	-
VEHICLE CG (X)	J18408	ENDEVCO	8/98
VEHICLE CG (Y)	J18624	ENDEVCO	8/98
VEHICLE CG (Z)	J18555	ENDEVCO	8/98
MDB CG (X)	CL60	ENDEVCO	9/98
MDB CG (Y)	CJ54	ENDEVCO	9/98
MDB CG (Z)	CH35	ENDEVCO	9/98
MDB REAR FRAME MEMBER (X)	FL04	ENDEVCO	9/98
MDB REAR FRAME MEMBER (Y)	GL77	ENDEVCO	9/98

REMARKS: None