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REPORT NUMBER: 214-CAL-99-01

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

GENERAL MOTORS CORPORATION
1999 OLDSMOBILE Alero
4-DOOR SEDAN

NHTSA NUMBER: CX0100

CALSPAN CORPORATION
TRANSPORTATION SCIENCES CENTER
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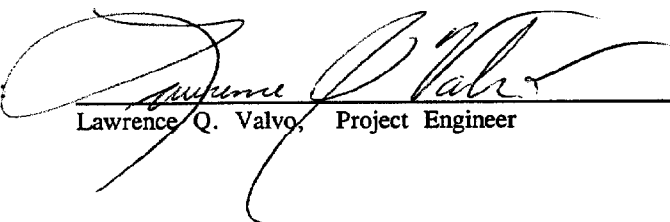
September 21, 1998

FINAL REPORT

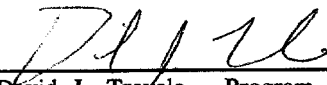
U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Compliance
400 Seventh Street, SW
Room 6115 (NSA-30)
Washington, DC 20590

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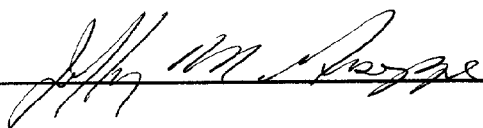

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Transportation Sciences Center

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October 27, 1998

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15. Supplementary Notes																																			
16. Abstract A 48/24 kph 90° Impact (Moving Deformable Barrier) Compliance Test was conducted on the subject 1999 Oldsmobile Alero 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 21, 1998. The impact velocity of the Moving Deformable Barrier (MDB) was 52.9 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 353 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>69</u></td> <td align="center">g's</td> <td align="center"><u>53</u></td> <td align="center">g's</td> </tr> <tr> <td>Left Lower Rib Acceleration:</td> <td align="center"><u>67</u></td> <td align="center">g's</td> <td align="center"><u>55</u></td> <td align="center">g's</td> </tr> <tr> <td>Lower Spine Acceleration:</td> <td align="center"><u>96</u></td> <td align="center">g's</td> <td align="center"><u>68</u></td> <td align="center">g's</td> </tr> <tr> <td>Thoracic Trauma Index (TTI):</td> <td align="center"><u>82</u></td> <td align="center">g's</td> <td align="center"><u>61</u></td> <td align="center">g's</td> </tr> <tr> <td>Pelvis Acceleration (PEV):</td> <td align="center"><u>95</u></td> <td align="center">g's</td> <td align="center"><u>67</u></td> <td align="center">g's</td> </tr> </tbody> </table> 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>69</u>	g's	<u>53</u>	g's	Left Lower Rib Acceleration:	<u>67</u>	g's	<u>55</u>	g's	Lower Spine Acceleration:	<u>96</u>	g's	<u>68</u>	g's	Thoracic Trauma Index (TTI):	<u>82</u>	g's	<u>61</u>	g's	Pelvis Acceleration (PEV):	<u>95</u>	g's	<u>67</u>	g's
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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 Oldsmobile Alero 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 Oldsmobile Alero 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 52.9 kph (32.9 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 21, 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 40 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)	82	61
PEV (g)	95	67

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 Oldsmobile Alero 4-Door Sedan

Vehicle Body Color: Silver VIN: 1G3NL52E8XC300946

Vehicle NHTSA No.: CX0100 Month & Year of Manufacture: 06/98

Engine Data: 6 Cylinders; - CID; 3.4 Liters; - cc

Engine Placement: - Longitudinal; or X Lateral

Transmission: 4 Speed; - Manual; X Automatic; X Overdrive

Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel

Odometer Reading 93 km

Options: X A/C; X Power Steering; X Pwr.Brakes; X Pwr. Windows

DATA FROM TIRE PLACARD

Tire Pressure* (at capacity); 210 kPa FRONT
210 kPa REAR

Recommended Tire Size: 215/60R15

Tires on Test Vehicle: 215/60R15 ; Manufacturer: BF Goodrich

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 = 408.0 kg (A)

No. of Occupants x 68.04 kg. = 340.2 kg (B)

Vehicle Cargo Capacity = 67.8 kg (A-B)

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

Left Front	=	<u>451.0</u> kg	Left Rear	=	<u>251.5</u> kg
Right Front	=	<u>448.5</u> kg	Right Rear	=	<u>247.5</u> kg
TOTAL FRONT	=	<u>899.5</u> kg	TOTAL REAR	=	<u>499.0</u> kg
% of Total Weight	=	<u>64.3</u> %	% of Total Weight	=	<u>35.7</u> %
TOTAL WEIGHT	=	<u>1,398.5</u> kg			

* Tire pressure used in test.

DATA SHEET 1 (continued)

GENERAL TEST VEHICLE PARAMETER DATA

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Max. Fluids	=	<u>1398.5</u>	kg (A)
Maximum Cargo Carrying Capacity of Test Vehicle	=	<u>67.8</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>1,628.7</u>	kg (A+B+C)

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

Left Front	=	<u>498.0</u>	kg	Left Rear	=	<u>358.5</u>	kg
Right Front	=	<u>453.0</u>	kg	Right Rear	=	<u>319.0</u>	kg
TOTAL FRONT	=	<u>951.0</u>	kg	TOTAL REAR	=	<u>677.5</u>	kg
% of Total Weight	=	<u>58.4</u>	%	% of Total Weight	=	<u>41.6</u>	%
TOTAL TEST WEIGHT	=	<u>1,628.5</u>	kg				

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

Left Front	=	<u>495.5</u>	kg	Left Rear	=	<u>347.5</u>	kg
Right Front	=	<u>460.5</u>	kg	Right Rear	=	<u>318.5</u>	kg
TOTAL FRONT	=	<u>956.0</u>	kg	TOTAL REAR	=	<u>666.0</u>	kg
% of Total Weight	=	<u>58.9</u>	%	% of Total Weight	=	<u>41.1</u>	%
TOTAL TEST WEIGHT	=	<u>1,622.0</u>	kg				

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

AS DELIVERED:

Left Front	<u>701</u>	Right Front	<u>705</u>	Left Rear	<u>731</u>	Right Rear	<u>734</u>
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FULLY LOADED:

Left Front	<u>684</u>	Right Front	<u>704</u>	Left Rear	<u>671</u>	Right Rear	<u>690</u>
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READY FOR TEST:

Left Front	<u>688</u>	Right Front	<u>704</u>	Left Rear	<u>678</u>	Right Rear	<u>694</u>
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Test Vehicle Wheelbase: 2726 millimeters

C.G. = 1,119 millimeters rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side	=	<u>4650</u>	millimeters
Left Side	=	<u>4650</u>	millimeters
Centerline	=	<u>4747</u>	millimeters

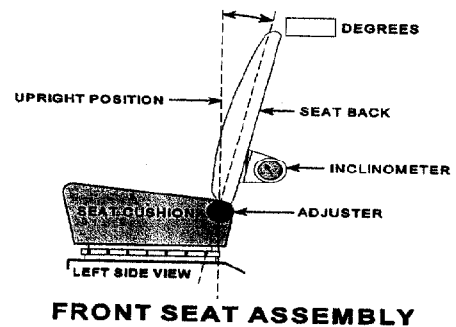
DATA SHEET 1 (continued)

GENERAL TEST VEHICLE PARAMETER DATA

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

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: 240 millimeters

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

FRONT SEAT BACK ADJUSTMENT POSITION: Position seat back to 26.5°, measured on seat back frame
above adjuster, with an ATD in the seat

Seat Back Torso Angle: 26.5 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 (detent number 3 of 5)

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:

57.4 liters (Fuel Tank Usable Capacity)

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

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

Wheelbase = 2726 millimeters

Impact Point is 423 millimeters rearward of front axle centerline

(which is 940 millimeters forward of the wheelbase midpoint)

Actual Impact Point is 417 millimeters rearward of front axle centerline

DATA SHEET 2

TEST VEHICLE SUMMARY OF RESULTS

VEHICLE IDENTIFICATION:

Vehicle Year/Make/Model: 1999 Oldsmobile Alero

Body Style: 4-Door Sedan

NHTSA No.: CX0100

VIN: 1G3NL52E8XC300946

Test Date: September 21, 1998

Overall Length = 4747 millimeters; Overall Width = 1718 millimeters

VEHICLE TEST WEIGHT (Pre-Test):

Left Front = 495.5 kg Left Rear = 347.5 kg

Right Front = 460.5 kg Right Rear = 318.5 kg

TOTAL FRONT = 956.0 kg TOTAL REAR = 666.0 kg

TOTAL VEHICLE WEIGHT 1,622.0 kg

Wheelbase = 2726 millimeters

Longitudinal C.G. from Center of Front Axle = 1,119 millimeters

Impact Angle with Respect to Impactor = 90 degrees

ACTUAL IMPACT POINT

Actual Impact Point is 6 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 (235 mm above ground) = 187 millimeters

2. LEVEL 2 (469 mm above ground) = 353 millimeters

3. LEVEL 3 (583 mm above ground) = 317 millimeters

4. LEVEL 4 (841 mm above ground) = 255 millimeters

5. LEVEL 5 (1309 mm above ground) = -3 millimeters

Maximum Post-Test Intrusion = 353 millimeters

OCCUPANTS:

Front Passenger:

Rear Passenger:

Dummy Identification 015

016

Restraints Used 3-point active seat belt

3-point active seat belt

INSTRUMENTATION:

Number of Vehicle Data Channels: = 19

Number of Cameras: Onboard = 3

Offboard = 6

TOTAL = 9

DATA SHEET 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

MDB FACE MANUFACTURER AND SERIAL NUMBER:

Plascore, Inc.: 125B0597-2, 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>52.9</u>	kph				

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A at Center of Bumper Level	=	<u>63</u>	millimeters
2. Row B at Top of Bumper Level	=	<u>40</u>	millimeters
3. Row C at Mid Level	=	<u>79</u>	millimeters
4. Row D at Top of Stack Level	=	<u>106</u>	millimeters

INSTRUMENTATION:

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

POST-TEST OBSERVATIONS

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

VISIBLE DUMMY CONTACT POINTS:

LEFT FRONT SID

Head: Back of head to head restraint (on rebound)
Upper Torso: Upper portion of left shoulder form to upper door trim
Lower Torso: Lower portion of left shoulder form to door trim above arm rest
Left Knee: Left knee to door trim rear of speaker housing
Right Knee: Left knee

LEFT REAR SID

Left side of head to upper C-pillar trim
Upper portion of left shoulder form to upper door trim
Lower portion of left shoulder form to door trim above arm rest
Left knee to forward portion of door trim at mid door height
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: 6 mm forward of target

ARM REST LOCATIONS:

Front: 240 mm below the bottom of the window
Rear: 295 mm below the bottom of the window

SEAT MOVEMENT:

Front: Seat was pushed inboard against the center console
Rear: None

GLAZING DAMAGE:

Windshield: Left edge of windshield cracked during impact
Window: Left driver window and left rear passenger window shattered at impact

PILLAR PERFORMANCE:

No visible tears or separations

SILL SEPARATION:

None

OTHER NOTABLE IMPACT EFFECTS:

Driver and passenger frontal airbags did not deploy during the impact.

SECTION 4

OCCUPANT AND VEHICLE INFORMATION

DATA SHEET 5

SID INSTRUMENTATION DATA

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

	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	68.7	30.0	-14.2	71.3	52.9	41.8	-5.1	98.7
Upper Rib Lateral . Y(R)	64.9	30.6	-16.7	71.9	51.8	42.5	-4.8	153.7
Lower Rib Lateral . Y	66.7	31.2	-25.4	69.4	54.8	40.6	-13.6	70.6
Lower Rib Lateral . Y(R)	64.8	31.9	-25.0	69.4	58.0	45.6	-12.6	70.0
SPINE ACCELERATIONS:								
Lower Lateral Y	95.9	33.1	-17.6	64.4	67.6	42.5	-24.4	74.4
Lower Lateral Y(R)	96.3	33.1	-17.1	64.4	67.4	42.5	-24.0	74.3
PELVIC ACCELERATIONS:								
Lateral Y	94.7	28.7	-35.7	46.2	66.8	37.5	-11.2	62.5
Lateral Y(R)	94.7	28.7	-35.0	46.3	66.8	37.5	-11.3	63.1

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

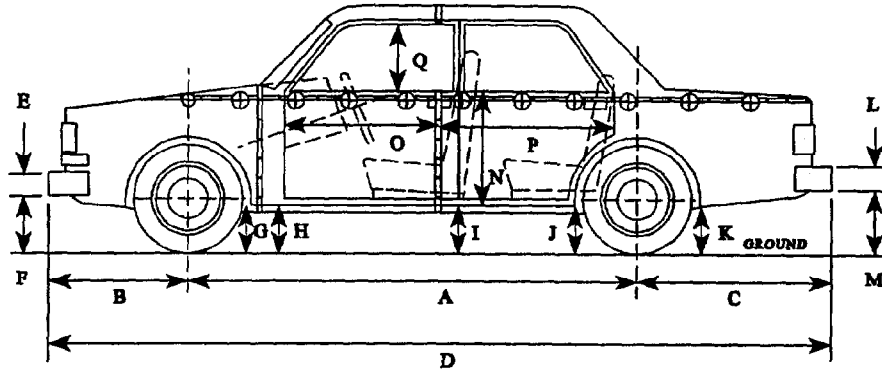
Note: Above data has been FIR filtered, Y(R) denotes redundant Y direction accelerometer.

DATA SHEET 6

VEHICLE SIDE MEASUREMENTS

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100



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	2726	-	2683	-43
B	1003	-	1045	42
C	1018	-	1002	-16
D	4747	-	4730	-17
E	211	-	211	0
F	361	355	371	16
G	232	215	202	-13
H	232	213	198	-15
I	240	212	154	-58
J1	220	185	175	-10
J2	235	200	190	-10
K	273	237	246	9
L	364	-	364	0
M	320	283	310	27
N	645	-	525	-120
O	767	-	762	-5
P	1173	-	1097	-76
Q	400	-	381	-19
R	4650	-	4648	-2
S	4650	-	4620	-30
T	1718	-	1531	-187

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

E&L = Bumper Thickness
J1 = To Pinch Weld

R = Right Side Length
J2 = To Sill

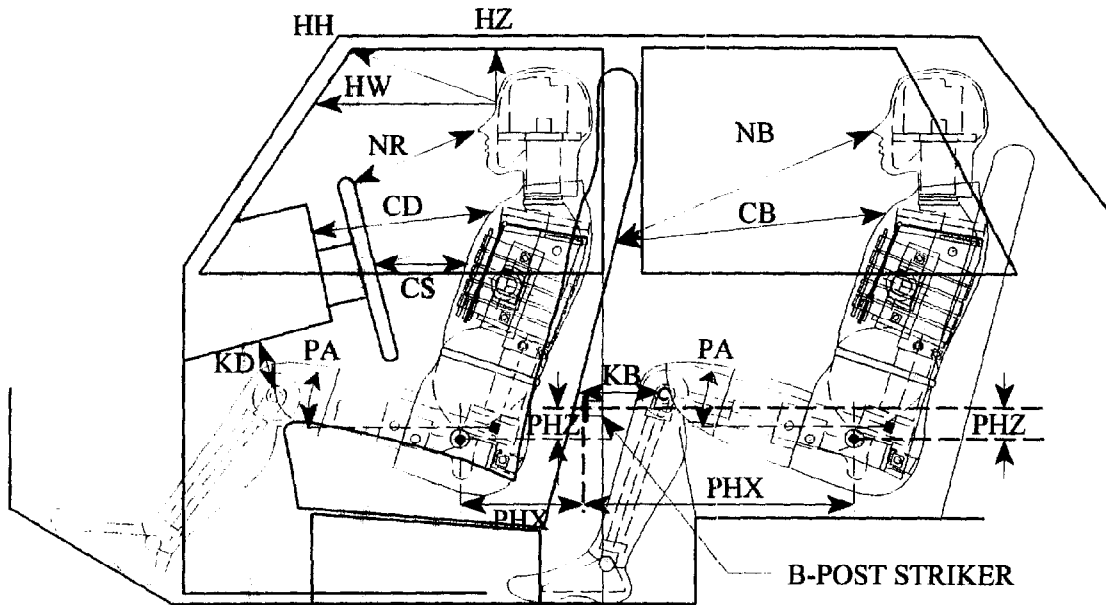
S = Left Side Length

DATA SHEET 7

SID LONGITUDINAL CLEARANCE DIMENSIONS

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100



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# Q15	LEFT REAR PASS. ID# Q16
HH	228	N/A
HW	531	N/A
HZ	145	170
NR/NB	414	600
CD/CB	529	536
CS	276	N/A
KDL(KDA°)/KBL(KDA°)	173 / (34°)	258 / (27°)
KDR(KBA°)/KBR(KBA°)	171 / (34°)	258 / (28°)
PA°	24°	24°
PHX	232	255
PHZ	134	312

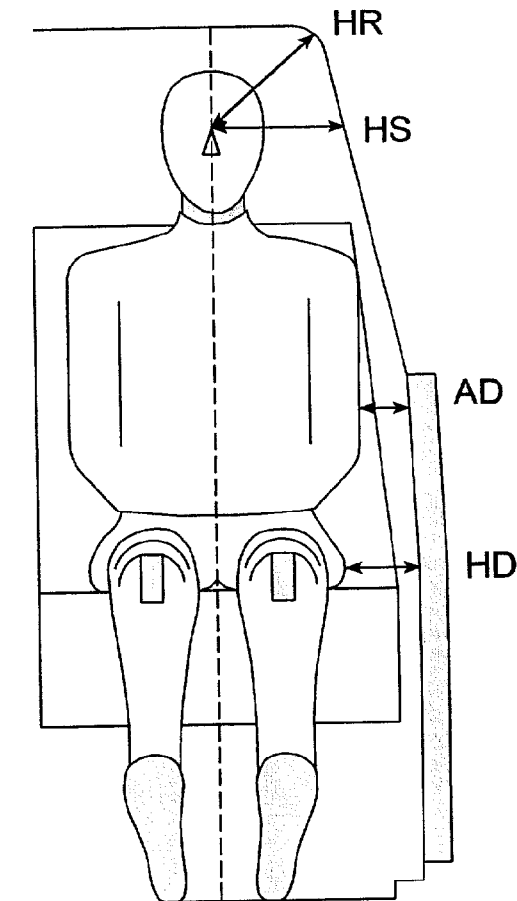
Note: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

DATA SHEET 8

SID LATERAL CLEARANCE DIMENSIONS

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100



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

	DRIVER ID # 015		LEFT REAR PASS. ID # 016	
HR	147		169	
HS	287		288	
AD*	LOWER: 132	UPPER: 100	LOWER: 104	UPPER: 69
HD	133		135	

* 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.

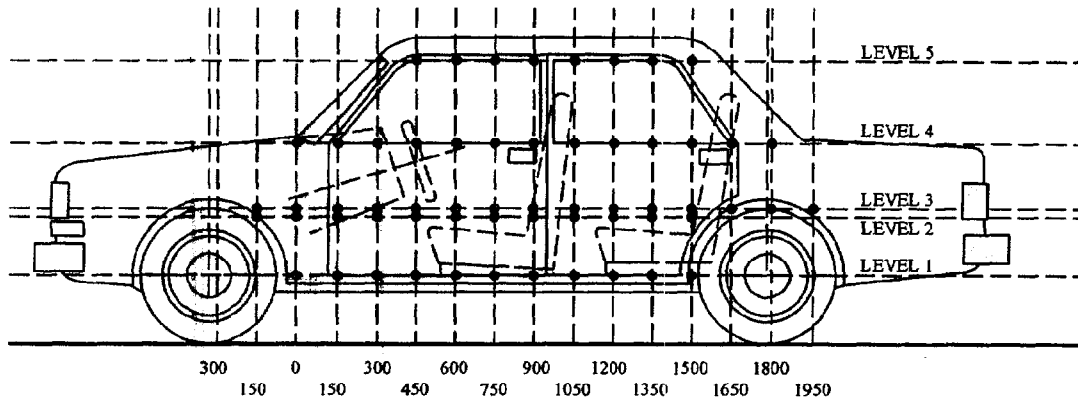
Upper measurement is taken laterally at the center of the upper rib accelerometer height from the SID arm segment to the closest part of the vehicle side.

DATA SHEET 9

VEHICLE SIDE MEASUREMENTS

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100



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>1309</u>	millimeters
Level 4 @ Window Sill	=	<u>841</u>	millimeters
Level 3 @ Mid Door	=	<u>583</u>	millimeters
Level 2 @ Occupant H-Point	=	<u>469</u>	millimeters
Level 1 @ Axle Centerline Height (or Sill Top Height)	=	<u>235</u>	millimeters

DATA SHEET 10

VEHICLE EXTERIOR CRUSH PROFILES - ALL LEVELS

NHTSA No. CX0100

Vehicle: 1999 Oldsmobile Alero

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	0	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700	2850	3000
LEVEL 1 SIDE SILL	235	PRE	-	-	-	-	-	182	201	201	202	204	199	202	202	201	202	201	200	194	-	-	-	-	-	-	-	-
		POST	-	-	-	-	-	246	316	328	341	354	363	374	383	388	364	321	278	239	-	-	-	-	-	-	-	
		CRUSH	N/A	N/A	N/A	N/A	N/A	5	116	127	139	150	164	172	181	187	162	120	78	44	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LEVEL 2 H POINT	469	PRE	195	-	-	-	-	159	165	164	158	163	162	161	160	163	164	165	169	155	145	-	-	-	-	167	212	-
		POST	168	-	-	-	-	253	418	451	464	482	491	500	511	516	512	485	448	343	187	-	-	-	-	184	221	-
		CRUSH	-27	N/A	N/A	N/A	N/A	73	254	287	306	319	330	339	352	353	348	320	279	178	42	N/A	N/A	N/A	N/A	17	9	N/A
LEVEL 3 MID DOOR	583	PRE	206	162	-	-	-	138	158	158	155	153	153	153	151	152	151	155	158	156	146	-	-	-	137	173	195	-
		POST	185	149	-	-	-	180	358	374	389	401	416	424	443	469	447	423	391	336	241	-	-	-	147	178	198	-
		CRUSH	-21	-14	N/A	N/A	N/A	42	199	216	234	249	264	271	292	317	296	268	233	180	95	N/A	N/A	N/A	11	5	2	N/A
LEVEL 4 WINDOW SILL	841	PRE	-	-	-	260	235	220	208	203	197	192	187	182	180	179	176	173	171	170	170	169	175	177	181	191	199	-
		POST	-	-	-	242	230	226	298	365	364	374	379	389	400	424	423	427	404	330	229	143	189	188	190	189	195	-
		CRUSH	N/A	N/A	N/A	-18	-5	6	90	162	167	181	192	207	220	245	246	255	233	160	58	-27	14	11	8	-3	-5	N/A
LEVEL 5 WINDOW TOP	1309	PRE	-	-	-	-	-	-	-	-	-	-	554	460	455	452	452	454	459	504	-	-	-	-	-	-	-	-
		POST	-	-	-	-	-	-	-	-	-	-	-	551	337	353	372	411	369	336	501	-	-	-	-	-	-	-
		CRUSH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-3	-122	-102	-80	-41	-85	-123	-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

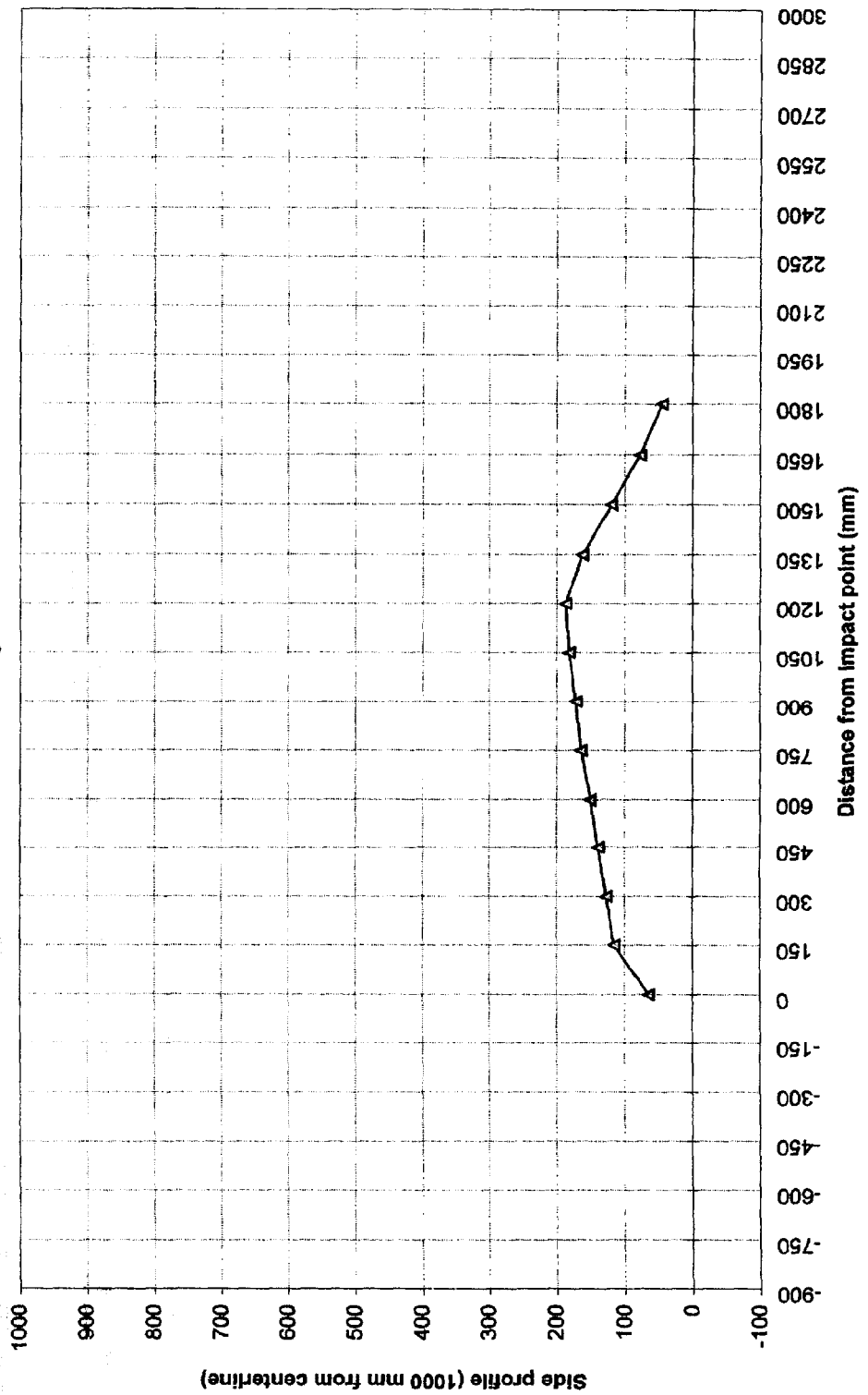
Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

SIDE PROFILE LEVEL 1

→ CRUSH

235 mm above ground



DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

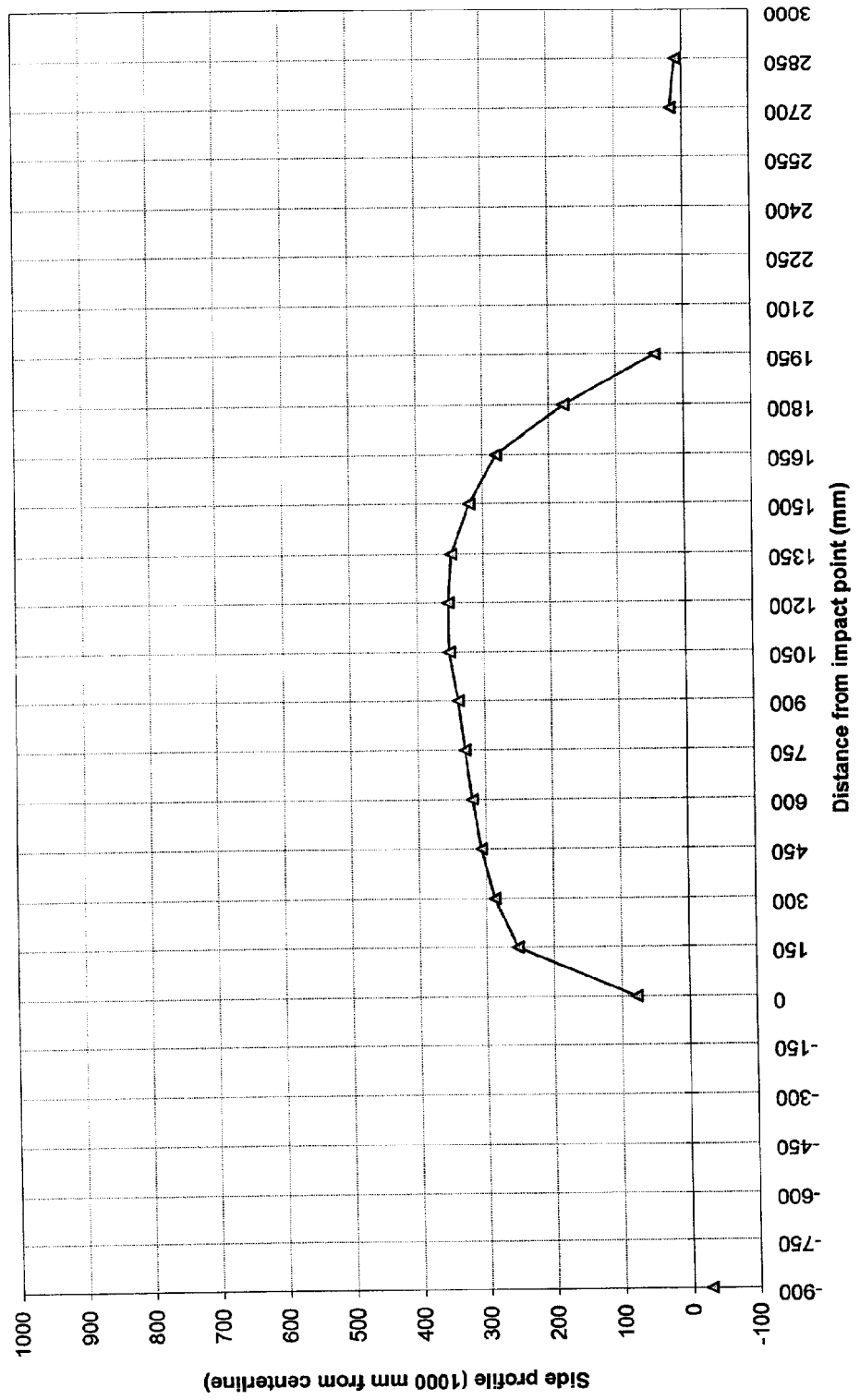
NHTSA No. CX0100

Vehicle: 1999 Oldsmobile Alero

SIDE PROFILE LEVEL 2

469 mm above ground

—▲— CRUSH



DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

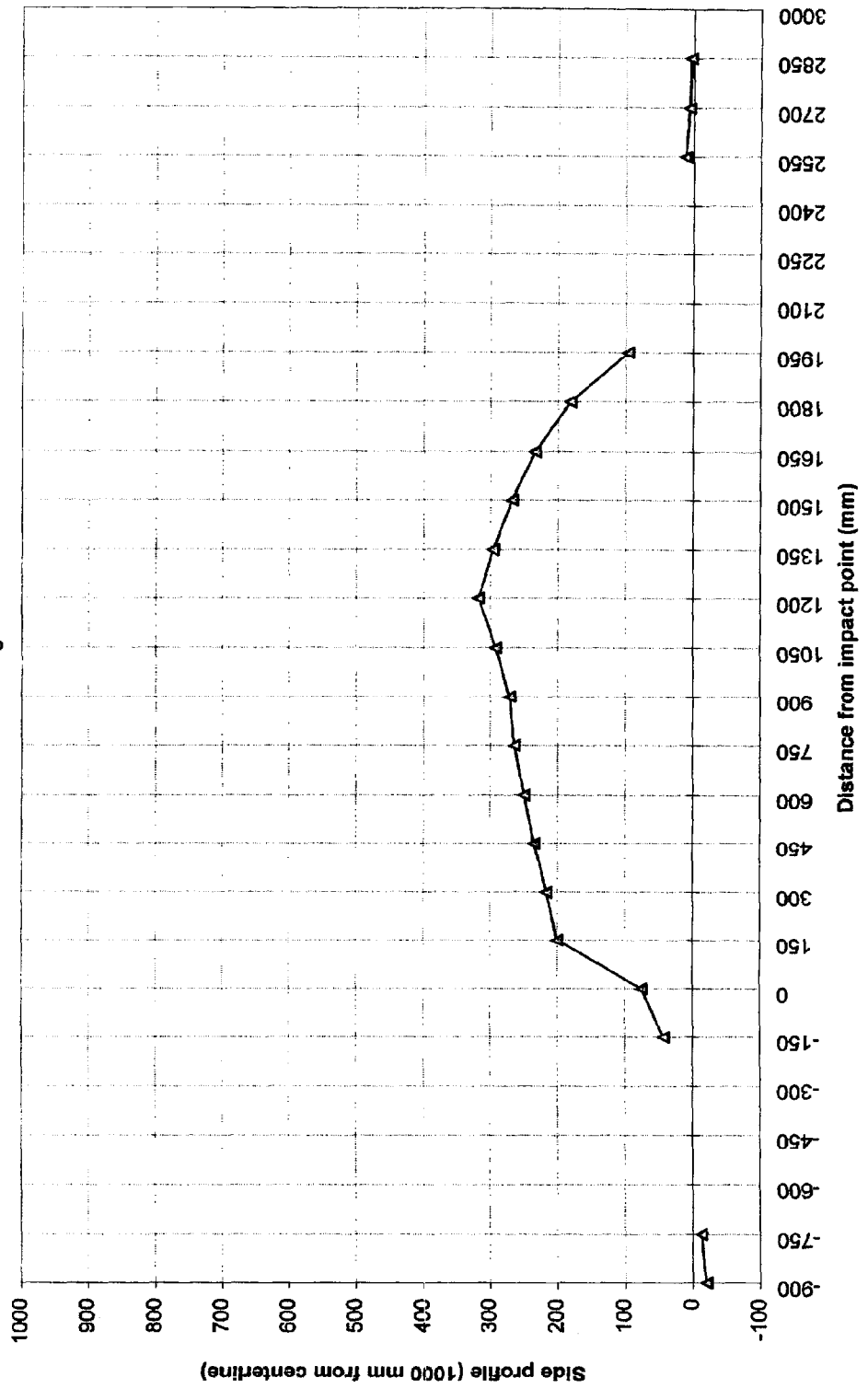
Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

SIDE PROFILE LEVEL 3

583 mm above ground

—▲— CRUSH



DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

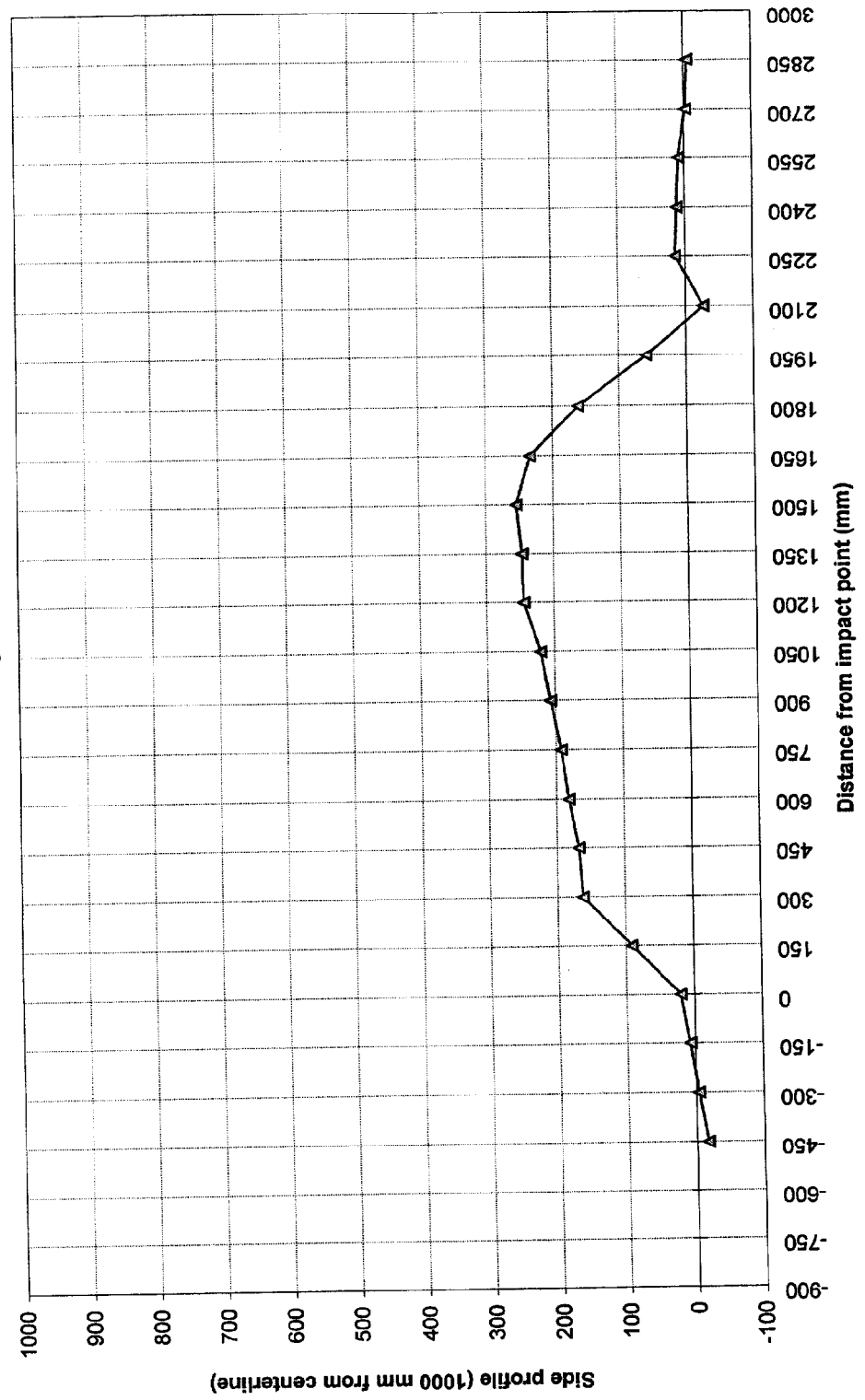
NHTSA No. CX0100

Vehicle: 1999 Oldsmobile Alero

—▲— CRUSH

SIDE PROFILE LEVEL 4

841 mm above ground



DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

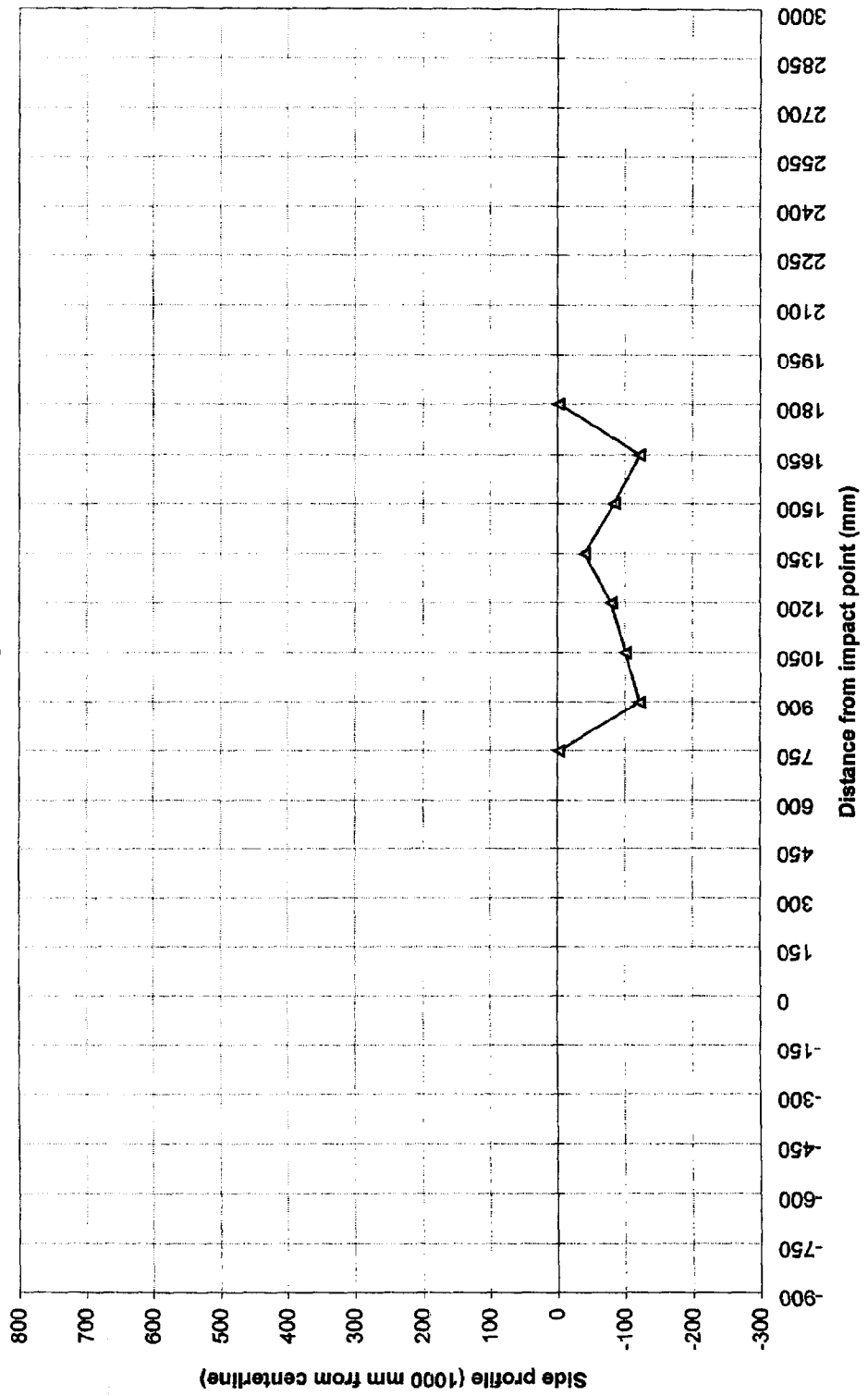
Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

SIDE PROFILE LEVEL 5

—▲— CRUSH

1309 mm above ground

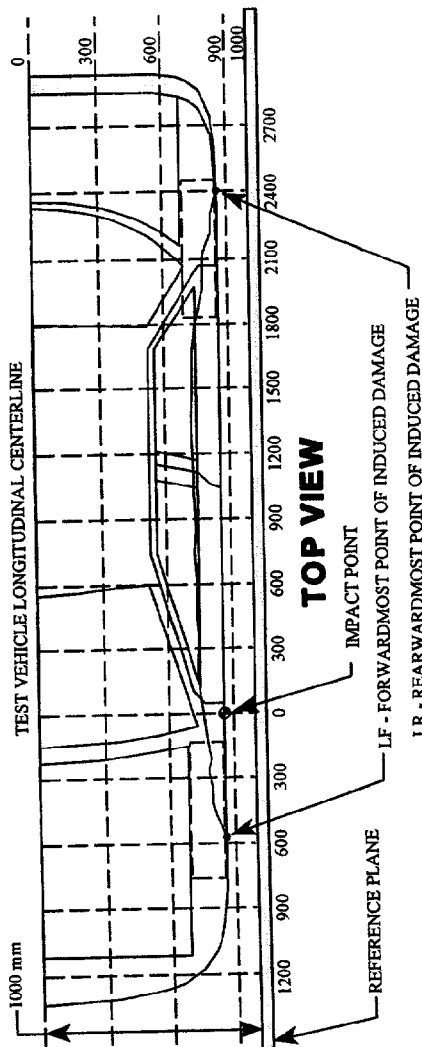


DATA SHEET 11

VEHICLE DAMAGE PROFILE DISTANCES

NHTSA No. CX0100

Vehicle: 1999 Oldsmobile Alero



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 = -200 mm)	227	225	2
2	280	447	164	283
3	760	492	162	330
4	1240	515	164	351
5	1720	399	167	232
6	(LR = 2200 mm)	174	173	1

DATA SHEET 12

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

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

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	100	200	300	400	500	600	700	800
LEVEL 4 TOP STACK	813																
		PRE	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619
		POST	648	620	614	615	616	618	617	618	619	619	621	624	630	676	725
LEVEL 3 MID LEVEL	686	CRUSH	30	2	-4	-4	-3	-1	-1	-1	1	1	3	5	11	58	106
		PRE	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619
		POST	639	614	613	615	617	614	615	616	615	616	617	616	618	637	698
LEVEL 2 TOP BUMPER	533	CRUSH	21	-5	-5	-4	-2	-4	-4	-2	-3	-2	-1	-3	-1	18	79
		PRE	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619
		POST	659	636	619	614	612	613	613	620	622	625	625	630	634	641	650
LEVEL 1 MID BUMPER	432	CRUSH	40	17	1	-5	-6	-7	-5	-5	2	4	7	6	12	23	31
		PRE	535	519	518	518	518	518	518	518	518	518	518	518	518	519	535
		POST	597	564	544	526	517	523	519	521	526	527	532	535	540	557	571
		CRUSH	63	45	26	8	-1	4	3	3	8	9	14	14	17	22	38

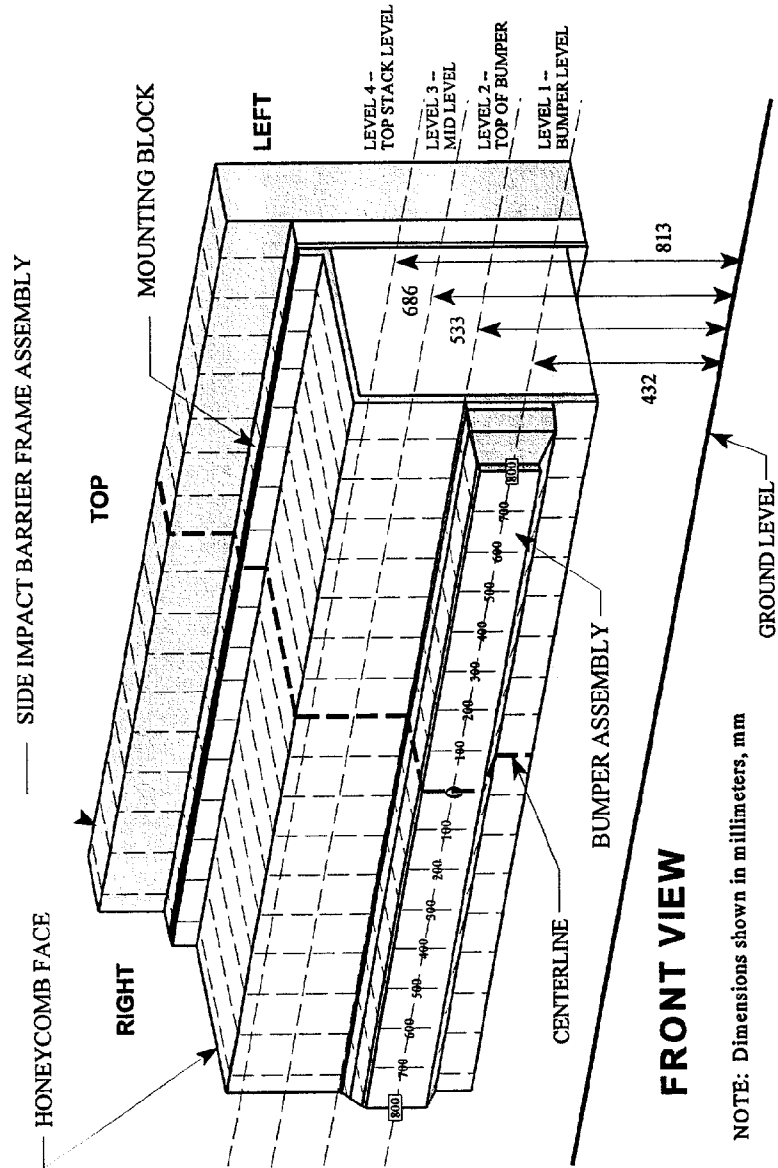
*Heights measured above ground level.

DATA SHEET 12 (continued)

EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

NHTSA No. CX0100

Vehicle: 1999 Oldsmobile Alero

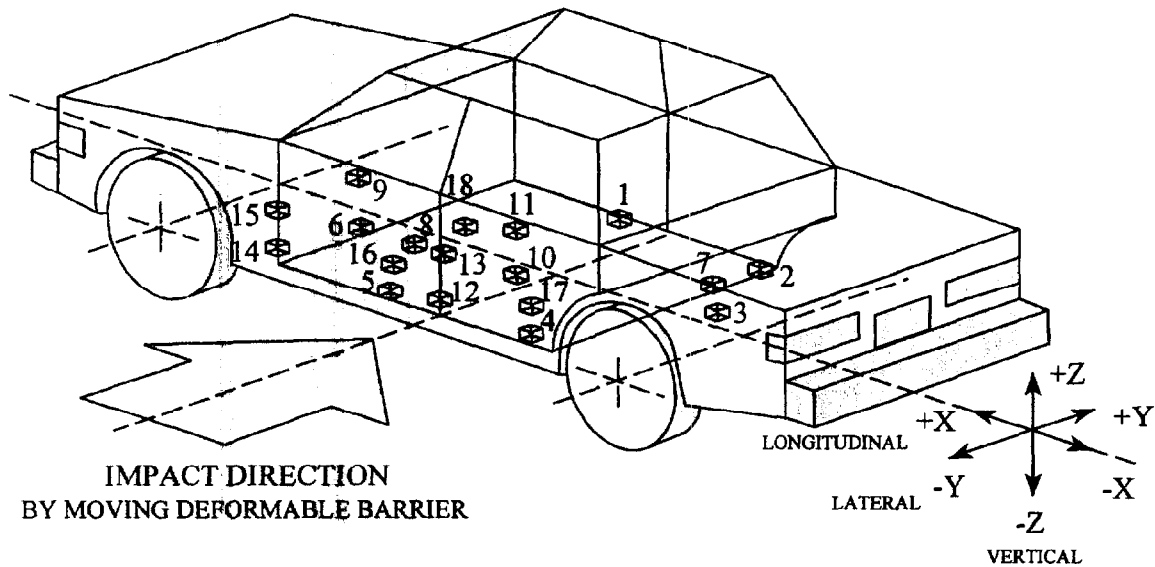


DATA SHEET 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100



- 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

NHTSA No. CX0100

Vehicle: 1999 Oldsmobile Alero

Accel. No.	Location	Coordinates (mm) ± 3			Long. (x)		Lat. (y)		Vert. (z)		Resultant	
		mm			Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
		X*	Y*	Z*								
1	Right Side Sill at Front Seat	2805	794	269	pos. neg.	†	19.6 -2.0	8.2 172.4	3.2 -3.9	60.0 25.2	† -	† -
2	Right Side Sill at Rear Seat	1959	792	265	pos. neg.	36.8 19.7	17.8 -2.3	19.0 122.5	4.3 -8.6	43.6 16.0	19.2 -	18.8 -
3	Rear Floorpan Above Axle	1124	0	455	pos. neg.	†	19.3 -2.1	33.6 121.0	28.2 -4.6	71.2 7.2	† -	† -
4	Left Side Sill at Rear Seat	1959	-633	257	pos. neg.	-	58.3 -35.7	13.7 27.9	-	-	-	-
5	Left Side Sill at Front Seat	2805	-635	255	pos. neg.	-	61.4 -15.2	15.4 27.4	-	-	-	-
6**	Left Front Door on Centerline	-	-	-	pos. neg.	-	-	-	-	-	-	-
7	Right Rear Occupant Compartment	1944	302	180	pos. neg.	-	18.1 -2.1	17.6 120.4	-	-	-	-
8**	Midrear of Left Front Door	-	-	-	pos. neg.	-	-	-	-	-	-	-
9**	Left Front Door Upper Centerline	-	-	-	pos. neg.	-	-	-	-	-	-	-
10**	Midrear of Left Rear Door	-	-	-	pos. neg.	-	-	-	-	-	-	-
11**	Left Rear Door Upper Centerline	-	-	-	pos. neg.	-	-	-	-	-	-	-

*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To Right)

Z - Ground Level (+ Up)

**Accelerometer was not requested by COTR.

† Accelerometer opened during impact.

DATA SHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

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	2110	-717	448	-	-	190.2 -34.7	4.3 10.1	-	-	-	-
13	Left Middle B-Pillar	2106	-717	662	-	-	†	†	-	-	-	-
14	Left Lower A-Pillar	3320	-726	458	-	-	52.2 -11.6	14.7 27.7	-	-	-	-
15**	Left Middle A-Pillar	-	-	-	-	-	-	-	-	-	-	-
16	Front Seat Track	2312	-480	315	-	-	69.9 -17.3	17.9 44.7	-	-	-	-
17**	Rear Seat Track	-	-	-	-	-	-	-	-	-	-	-
18	Vehicle CG	2346	0	371	7.0 -14.6	39.9 18.3	21.0 -2.3	48.0 100.3	17.8 -11.6	44.0 20.7	23.1 -	19.6 -

*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To Right)

Z - Ground Level (+ Up)

**No accessible mounting location.

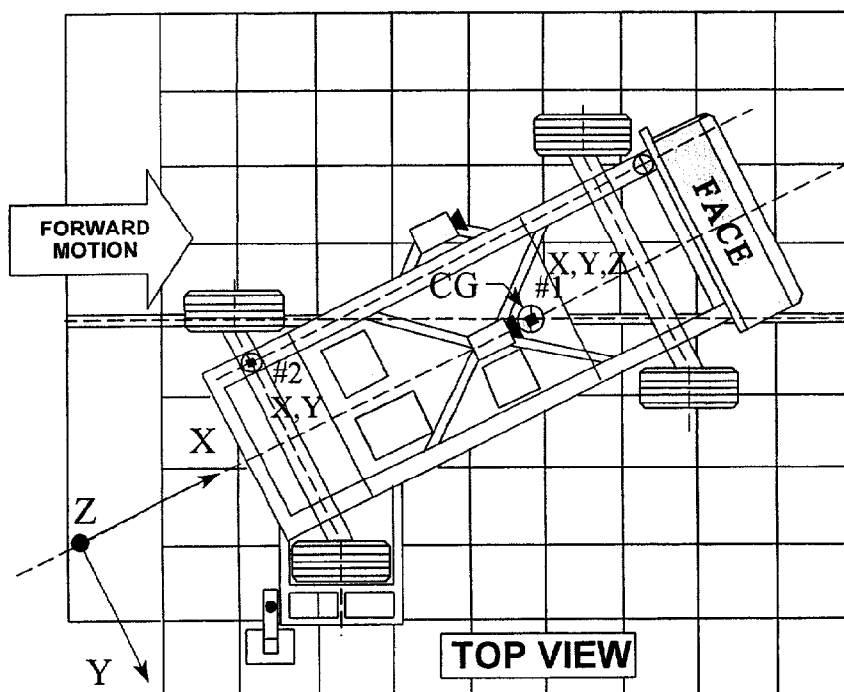
† Accelerometer was damaged at impact.

DATA SHEET 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100



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	1.5	269.8	-16.3	32.0
	Lateral..... Y				2.5	54.7	-9.0	27.6
	Vertical..... Z				9.9	357.1	-1.7	29.3
	Resultant..... R				19.9	31.7	-	-
2	Rear Frame Member							
	Longitudinal... X	386	-660	660	1.4	119.5	-20.0	27.3
	Lateral..... Y				4.7	26.0	-1.3	244.7

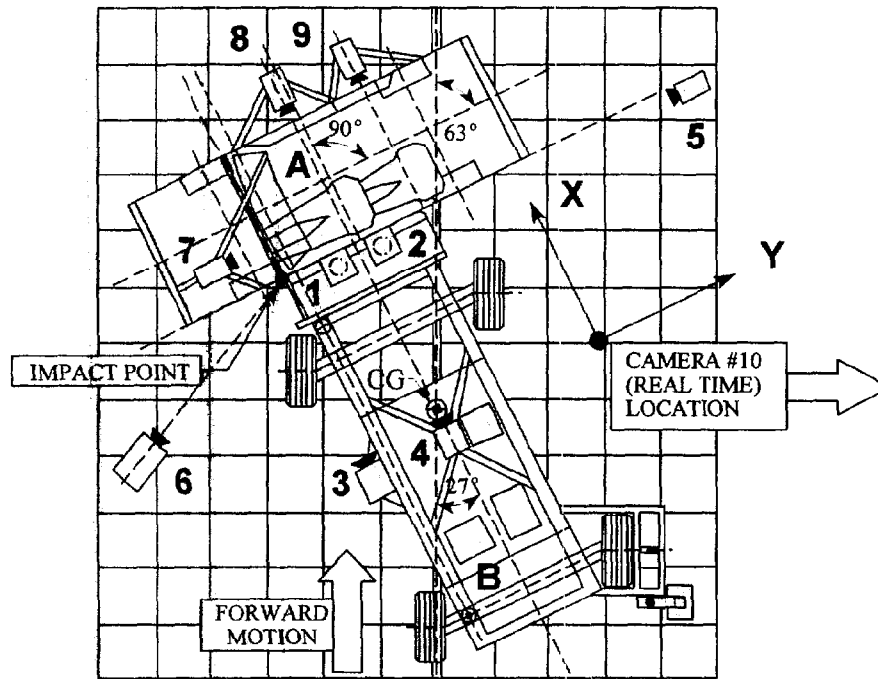
*Reference: X = Rear Bumper (+ Forward)
Y = Vehicle Centerline (+ To Right)
Z = Ground Level (+ Up)
All measurements accurate to within ± 3 mm.

DATA SHEET 15

HIGH SPEED CAMERA LOCATIONS AND DATA SUMMARY

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100



Camera No.	View	Coordinates (millimeters)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Overhead view of test vehicle	418	991	4880	-90	8	1000
2	Overhead closeup view of impact plane	188	890	4880	-90	12.5	1000
3	MDB onboard closeup view of impact point	1470	0	847	0	13	**
4	MDB onboard view of driver dummy	1140	838	1586	-17	7.5	**
5	Right side ground level overall view	-236	9188	1045	-3	25	1000
6	Left side ground level overall view	-1679	-1705	1055	-5	13	1000
7	Test vehicle onboard driver front view	476	-306	1248	-17	13	1000
8	Test vehicle onboard driver side view	1657	764	965	-12	8	†
9	Test vehicle onboard passenger side view	1623	1603	1025	-13	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

** Camera view not available due to faulty trigger switch.

† The onboard vehicle lights grounded against the camera body during the impact. As a result, the timing mark oscillations did not occur at the 10 ms intervals. Timing is not available for this camera.

SECTION 5

FUEL SYSTEM INTEGRITY

DATA SHEET 16

FMVSS 301 FUEL SYSTEM INTEGRITY DATA

NHTSA No.: CX0100

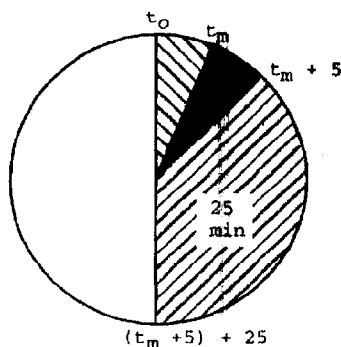
TEST DATE: September 21, 1998

Vehicle Mfgr./Make/Model : 1999 Oldsmobile Alero 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)
- ☒ 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

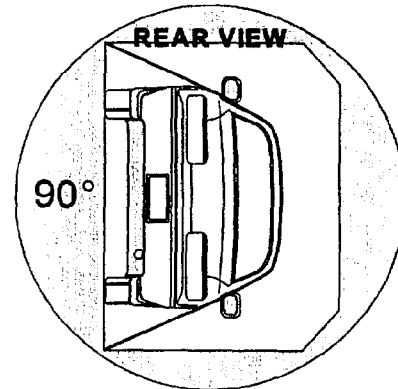
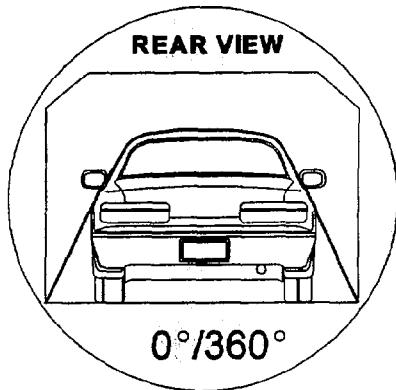
DATA SHEET 17

ROLLOVER DATA

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

0 - 90 Degrees



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time	<u>1</u> minutes <u>14</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>14</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

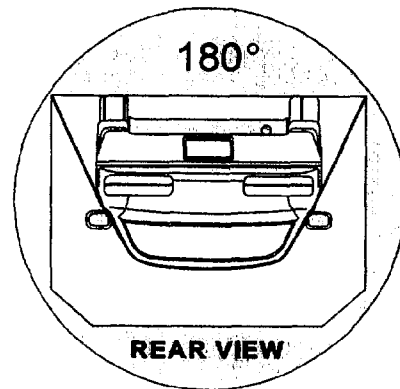
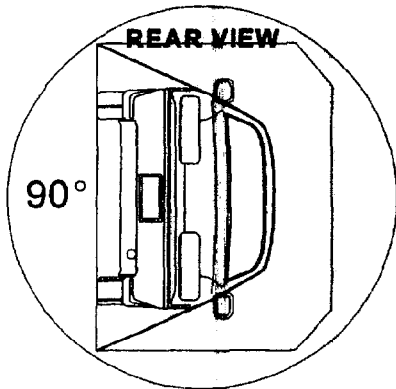
DATA SHEET 17 (continued)

ROLLOVER DATA

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

90 - 180 Degrees



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

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

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

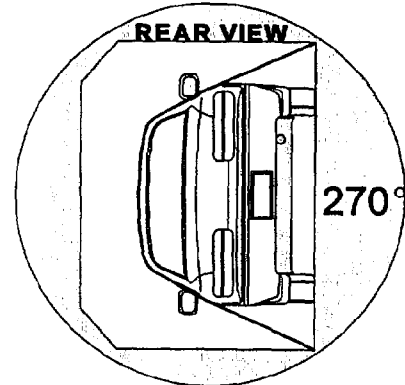
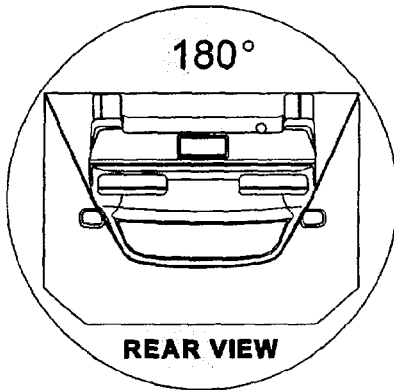
DATA SHEET 17 (continued)

ROLLOVER DATA

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

180 - 270 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

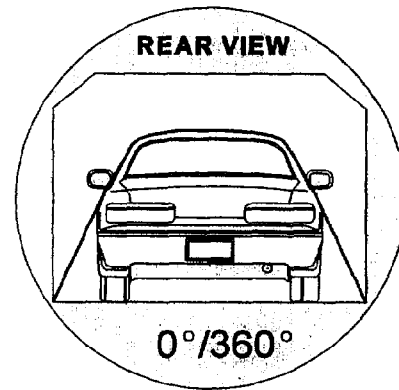
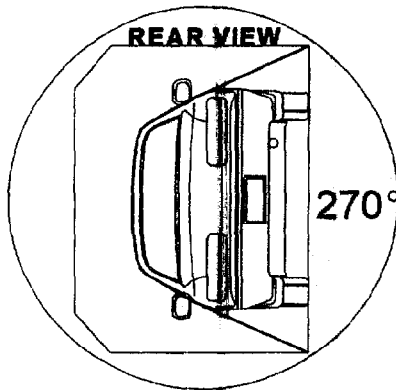
DATA SHEET 17 (continued)

ROLLOVER DATA

Vehicle: 1999 Oldsmobile Alero

NHTSA No. CX0100

270 - 360 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

APPENDIX A

PHOTOGRAPHS

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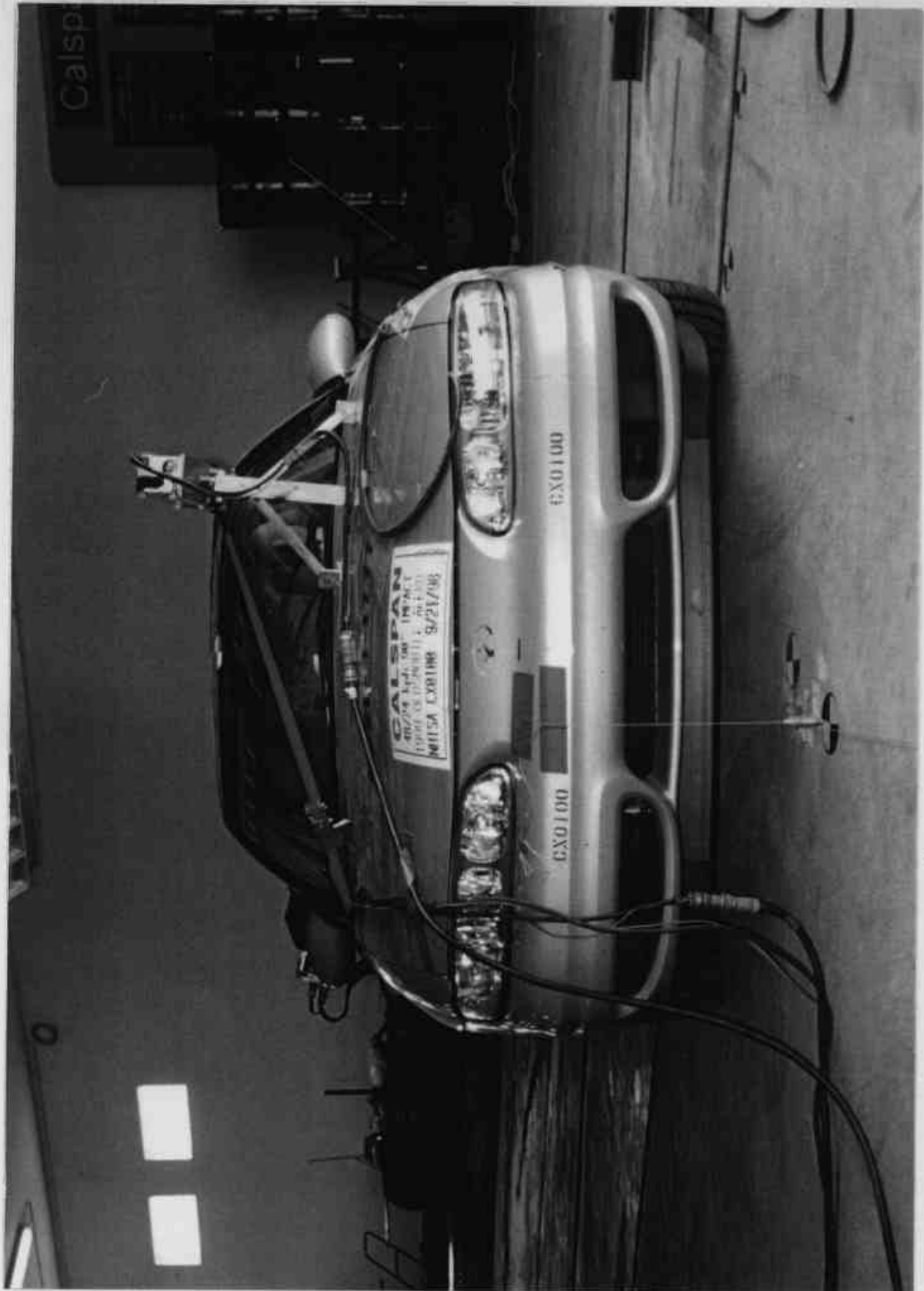


Figure A-1 PRE-TEST FRONTAL VIEW OF TEST VEHICLE



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



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



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

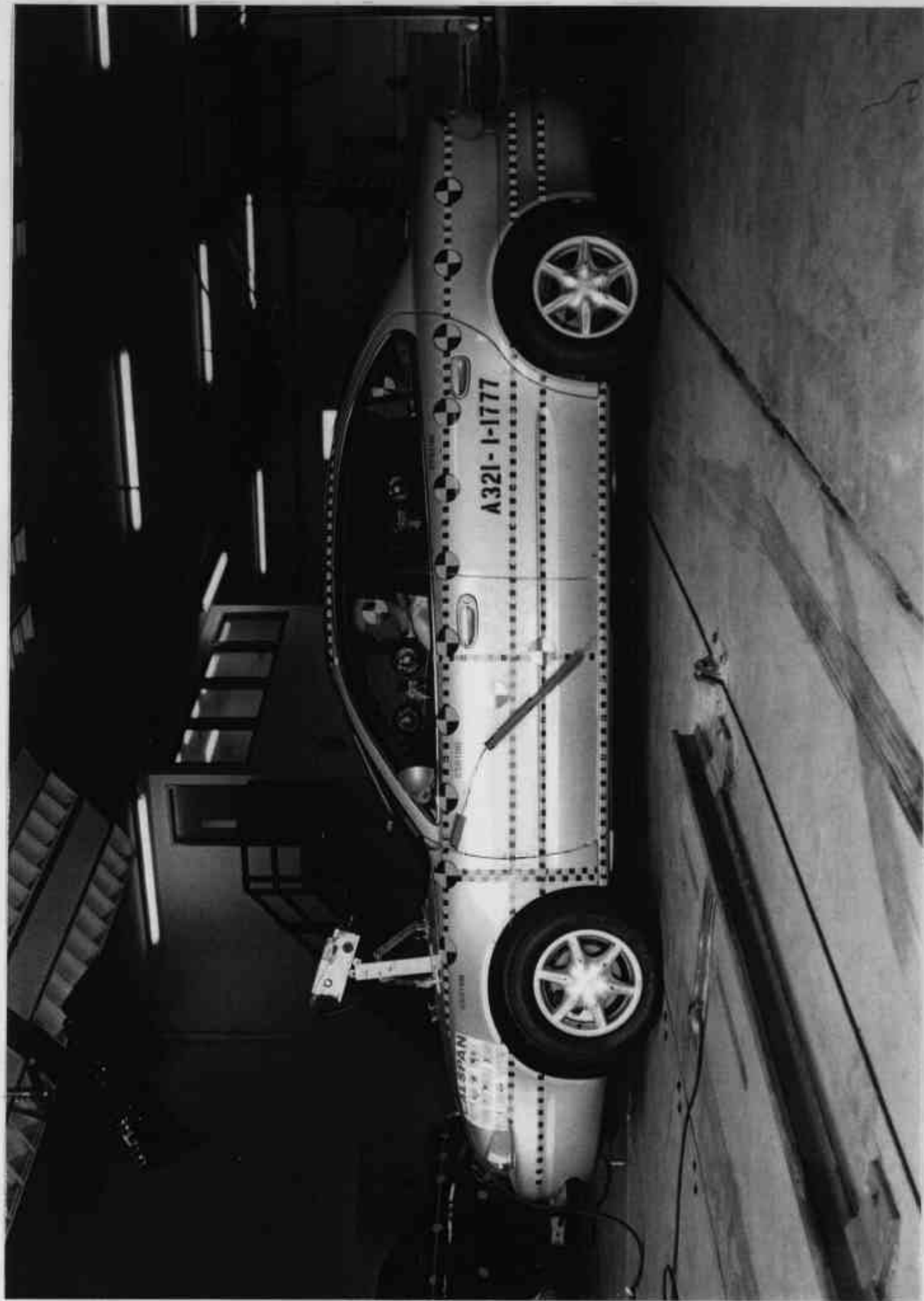


Figure A-5 PRE-TEST IMPACTED SIDE VIEW OF TEST VEHICLE

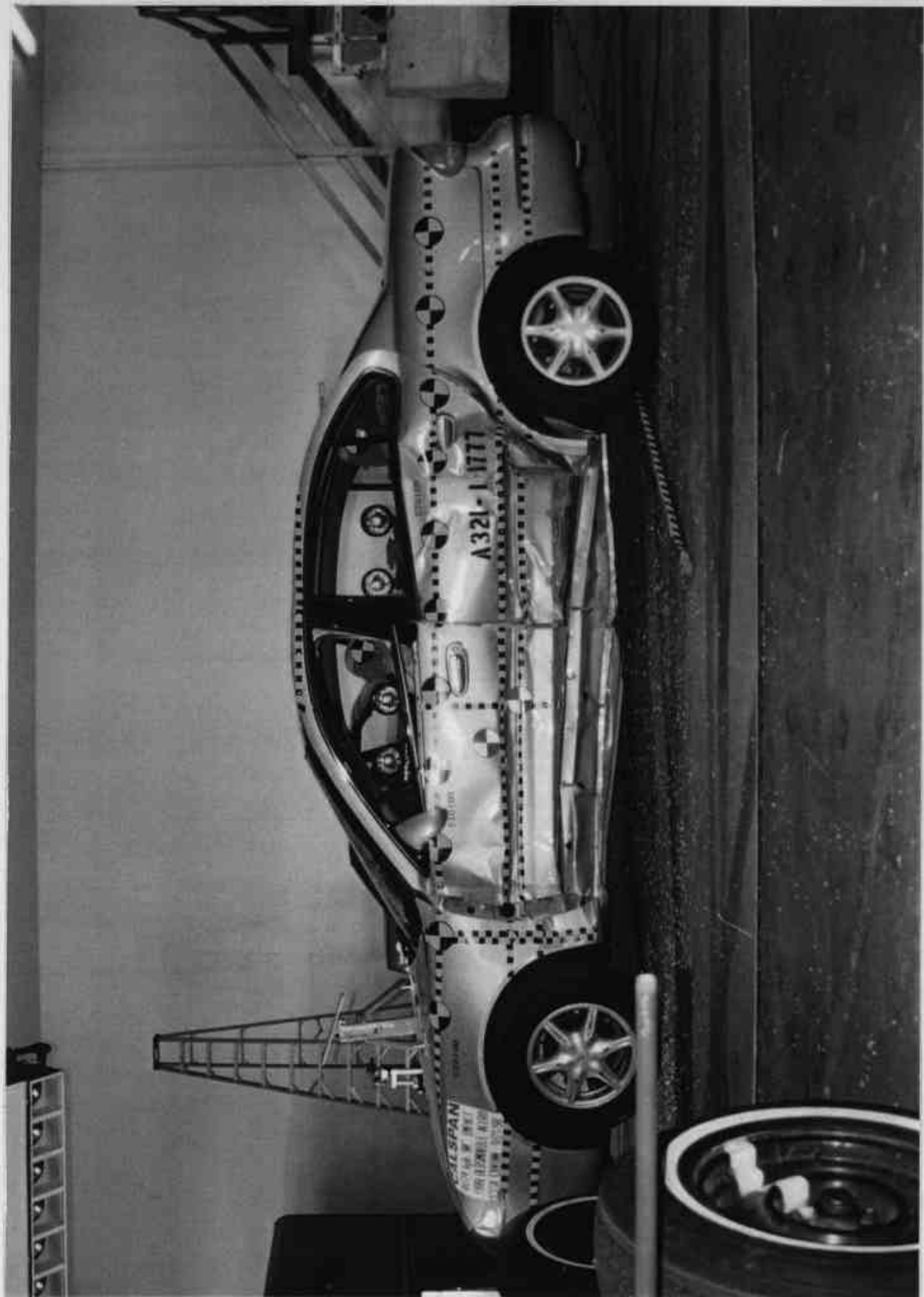


Figure A-6 POST-TEST IMPACTED SIDE VIEW OF TEST VEHICLE

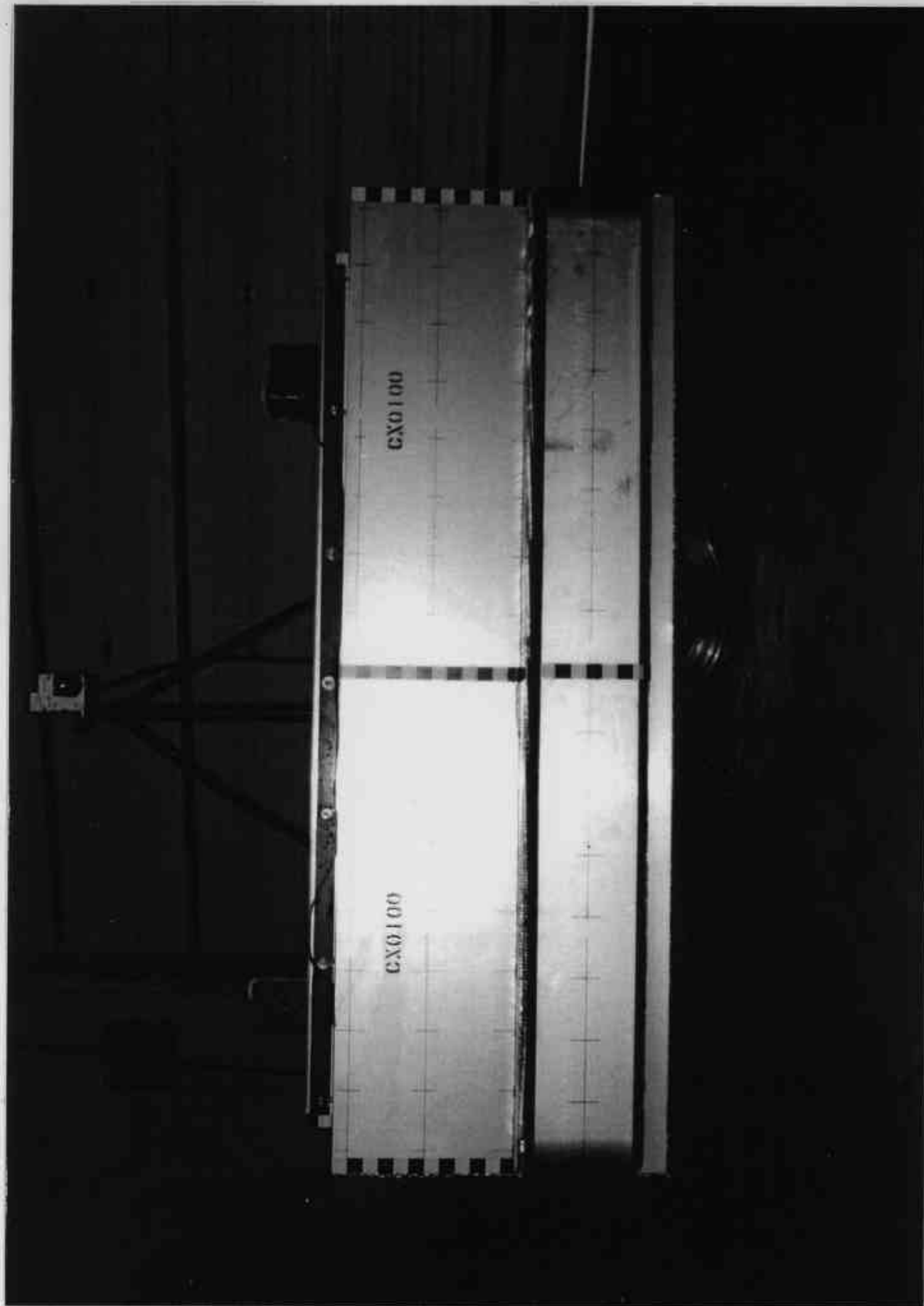


Figure A-7 PRE-TEST FRONTAL VIEW OF IMPACTOR FACE

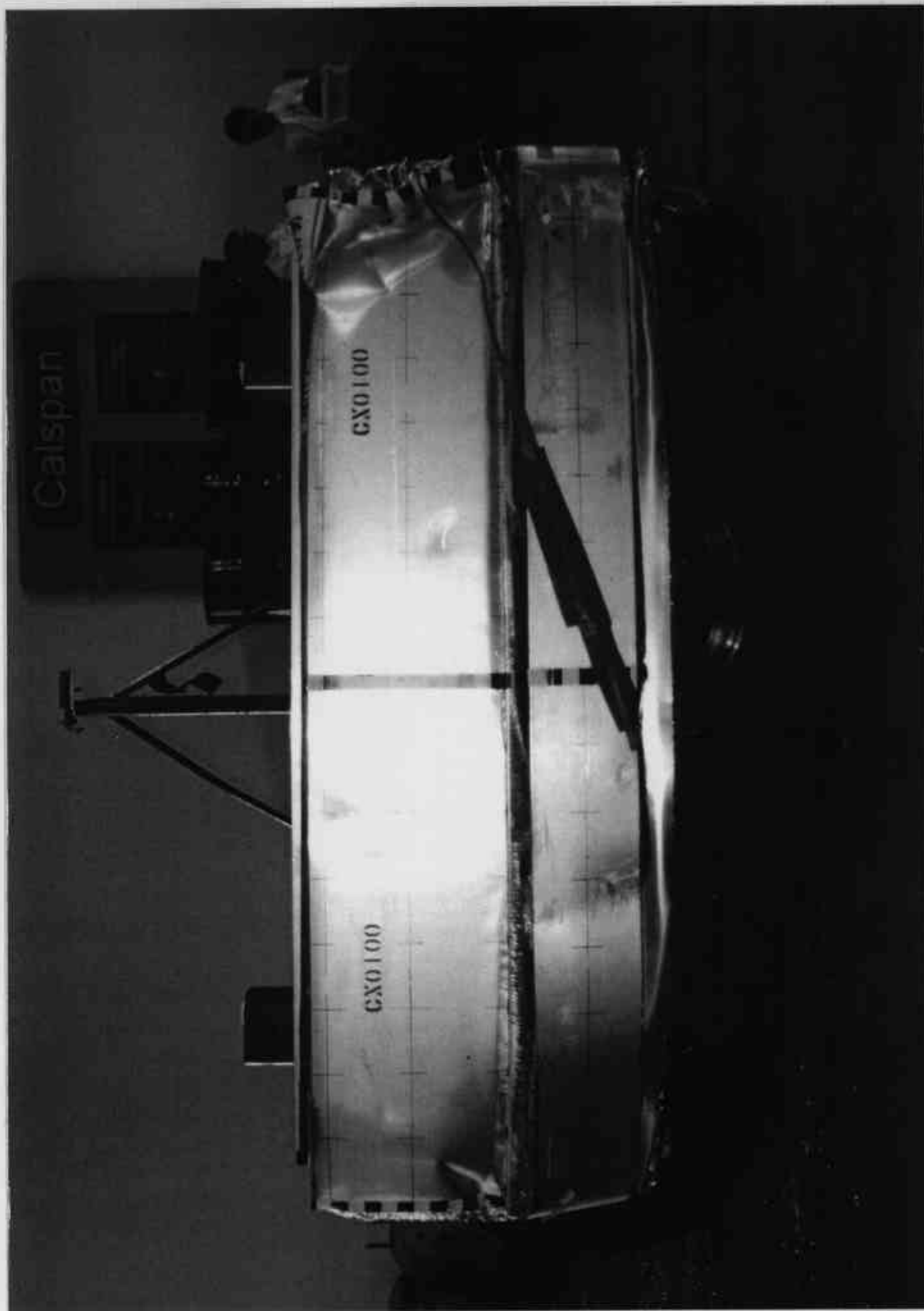


Figure A-8 POST-TEST FRONTAL VIEW OF IMPACTOR FACE

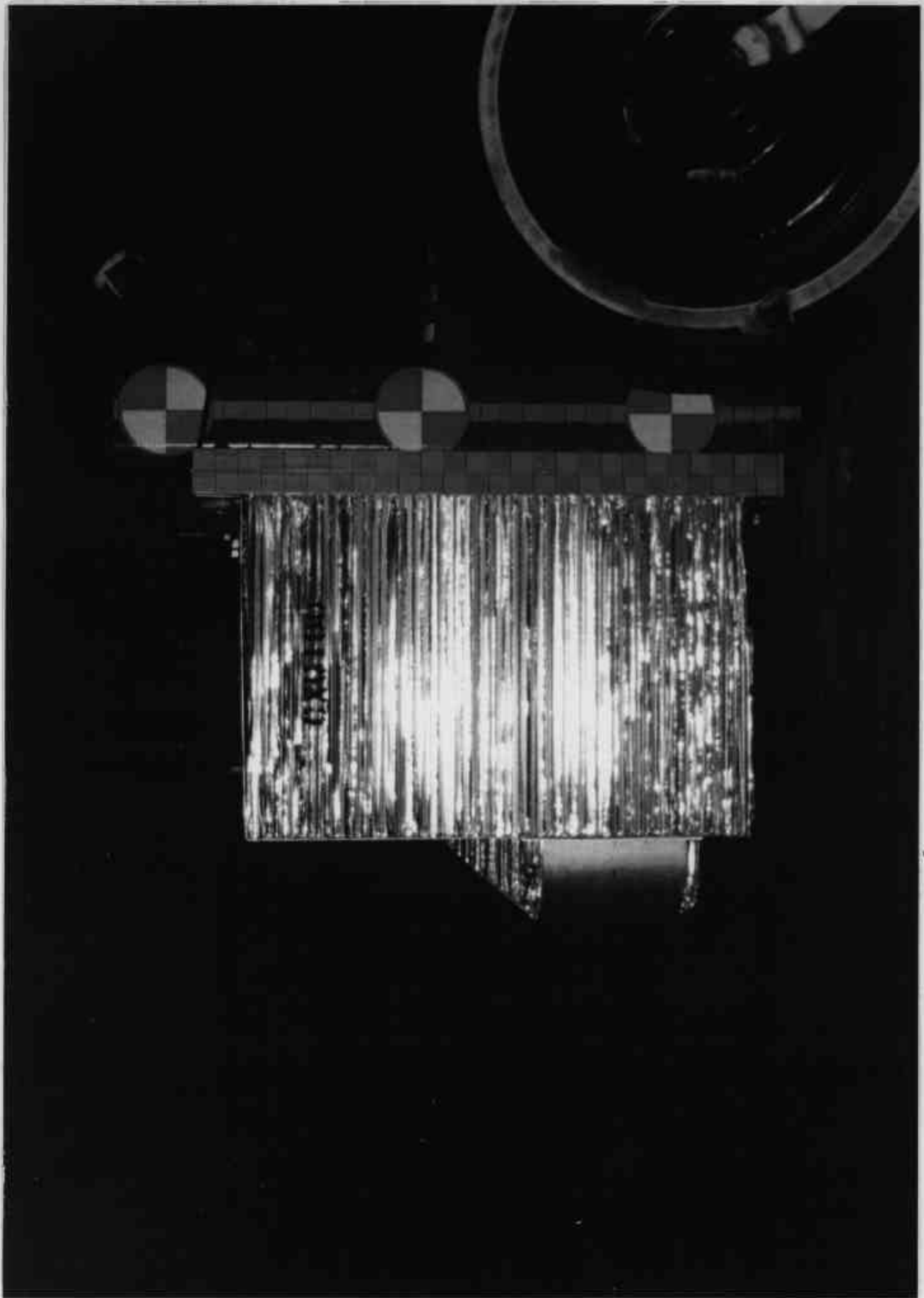


Figure A-9 PRE-TEST LEFT SIDE VIEW OF IMPACTOR FACE



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

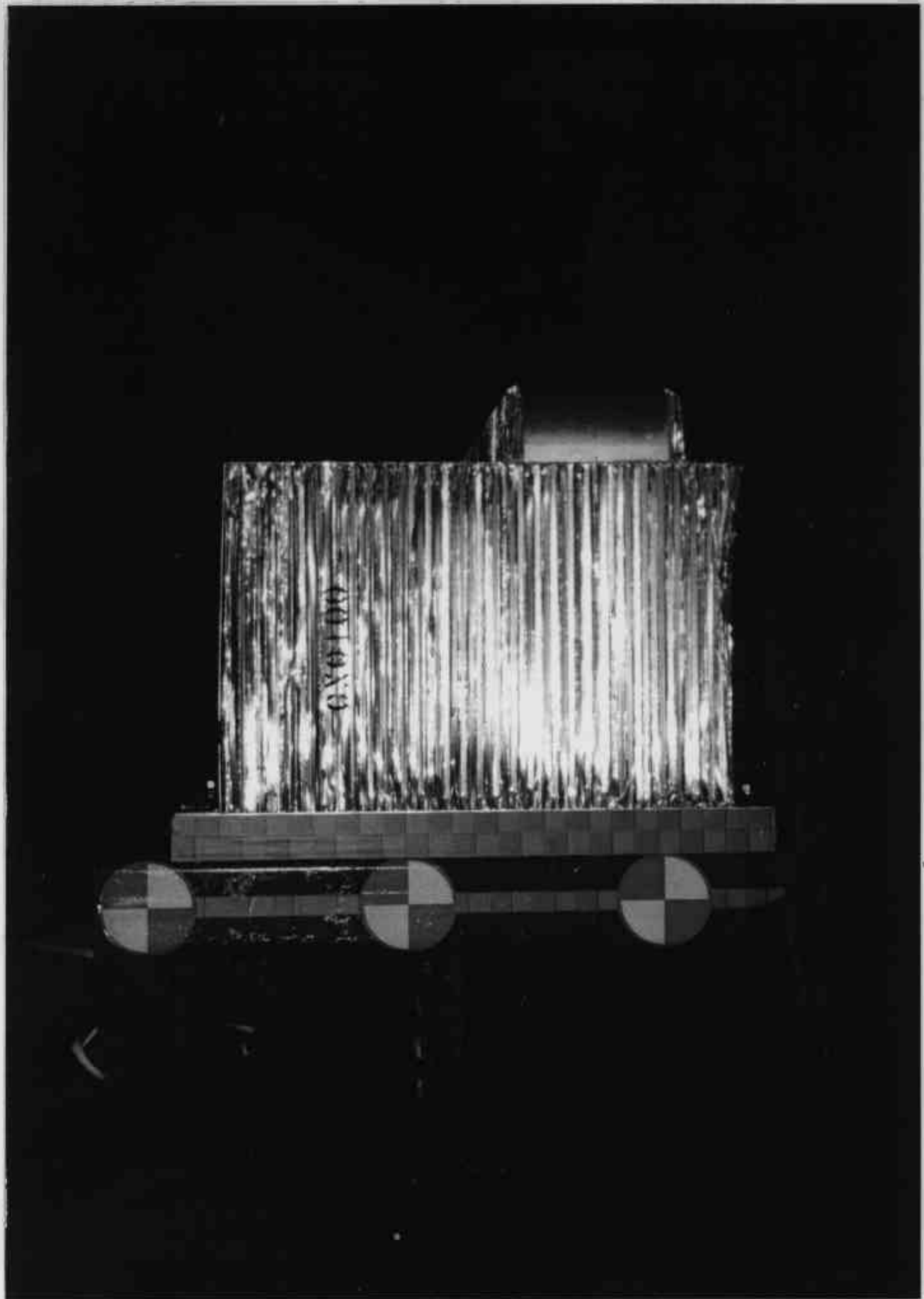


Figure A-11 PRE-TEST RIGHT SIDE VIEW OF IMPACTOR FACE



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



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

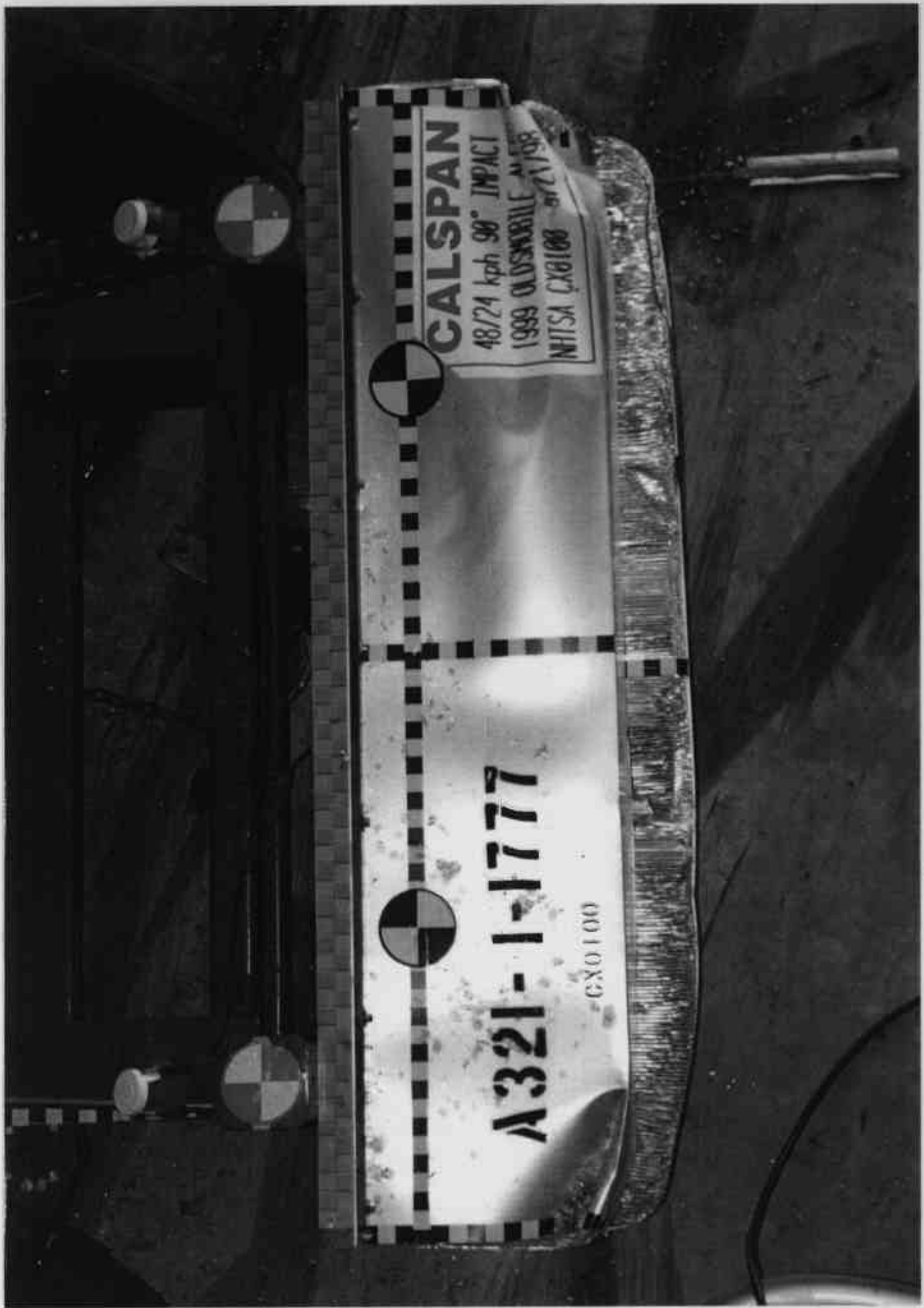


Figure A-14 POST-TEST TOP VIEW OF IMPACTOR FACE

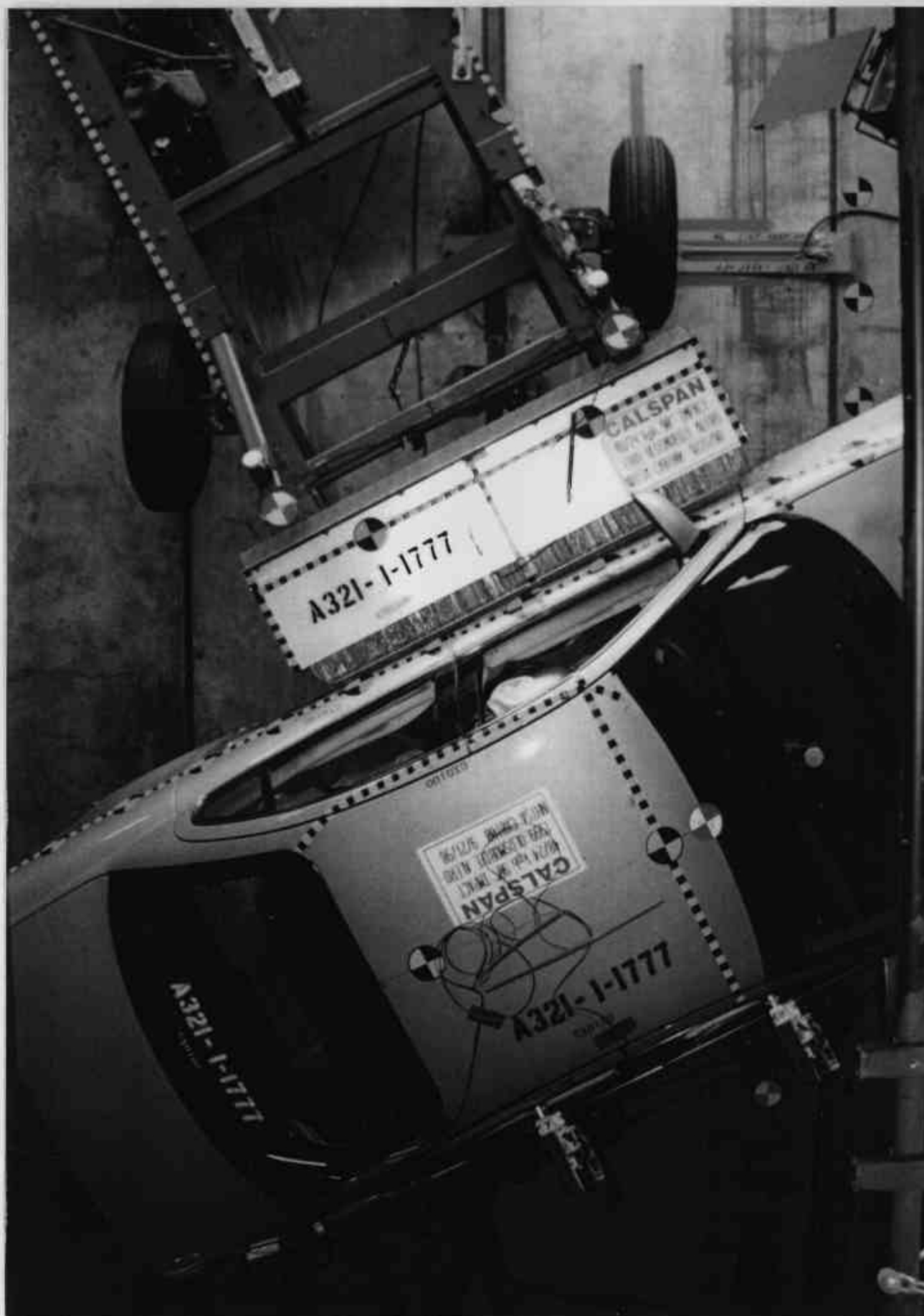


Figure A-15 PRE-TEST OVERHEAD VIEW OF ALIGNED MDB AND VEHICLE



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



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

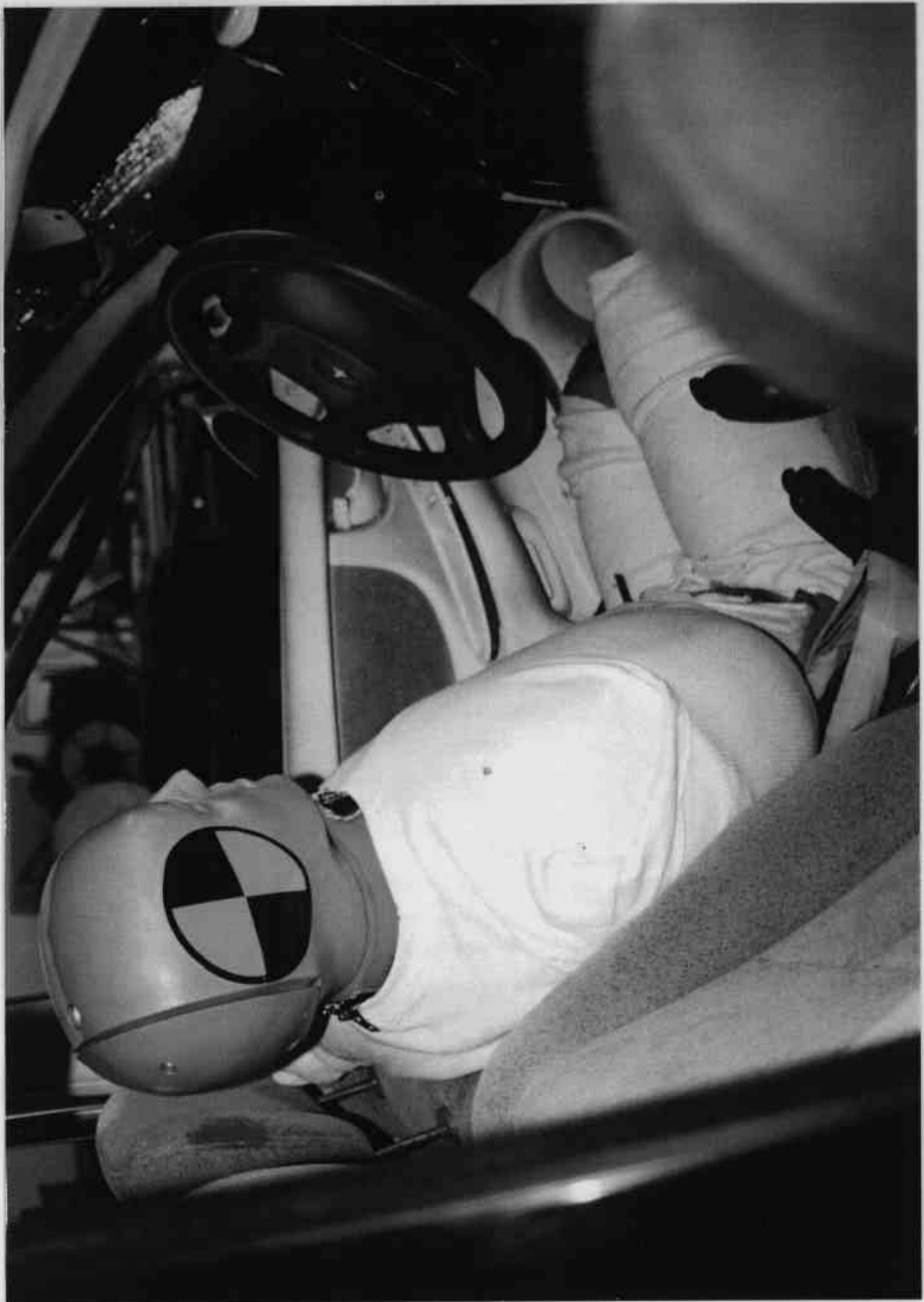


Figure A-18 POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID



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

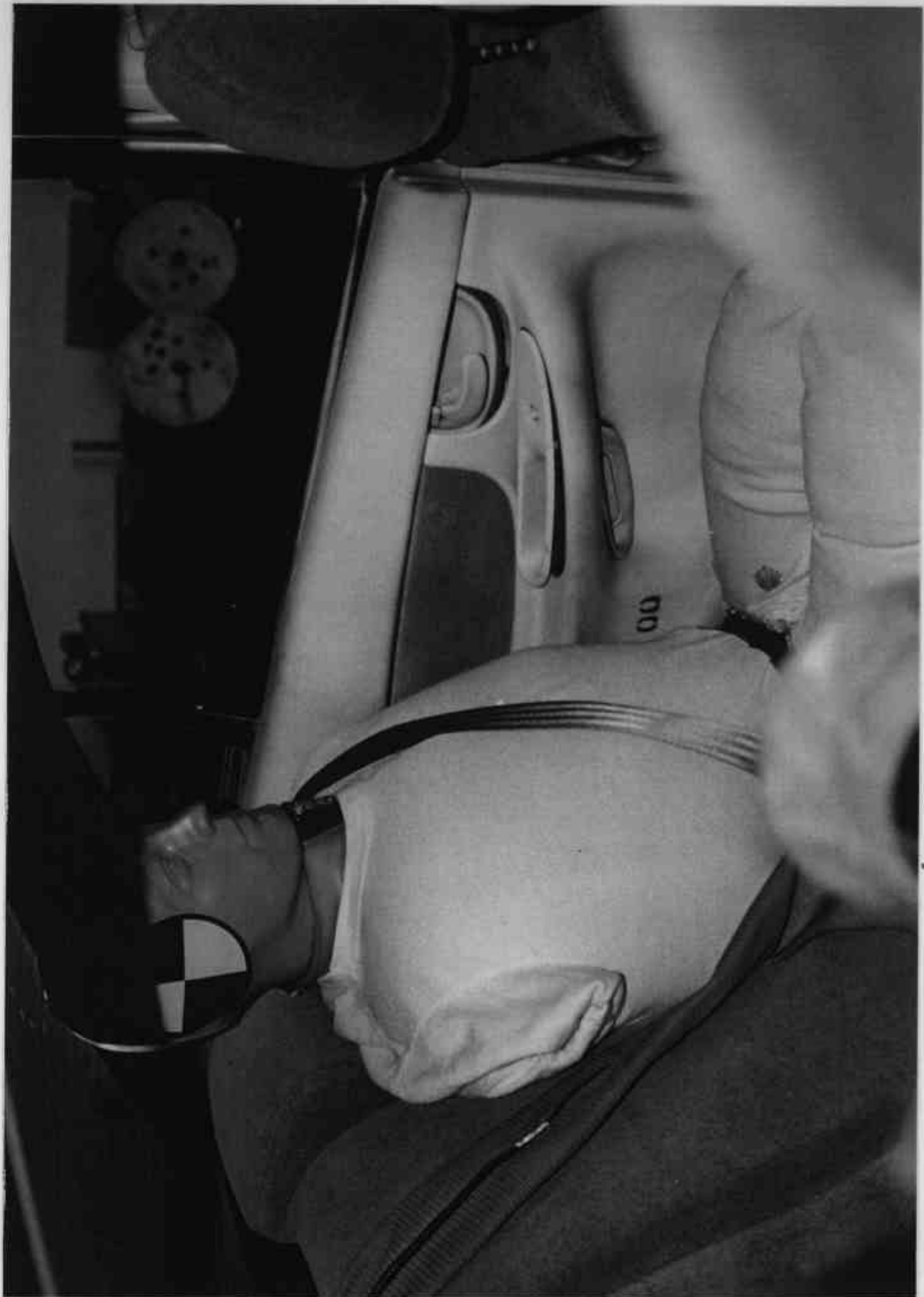


Figure A-20 POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID



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-25 PRE-TEST INTERIOR OF FRONT DOOR

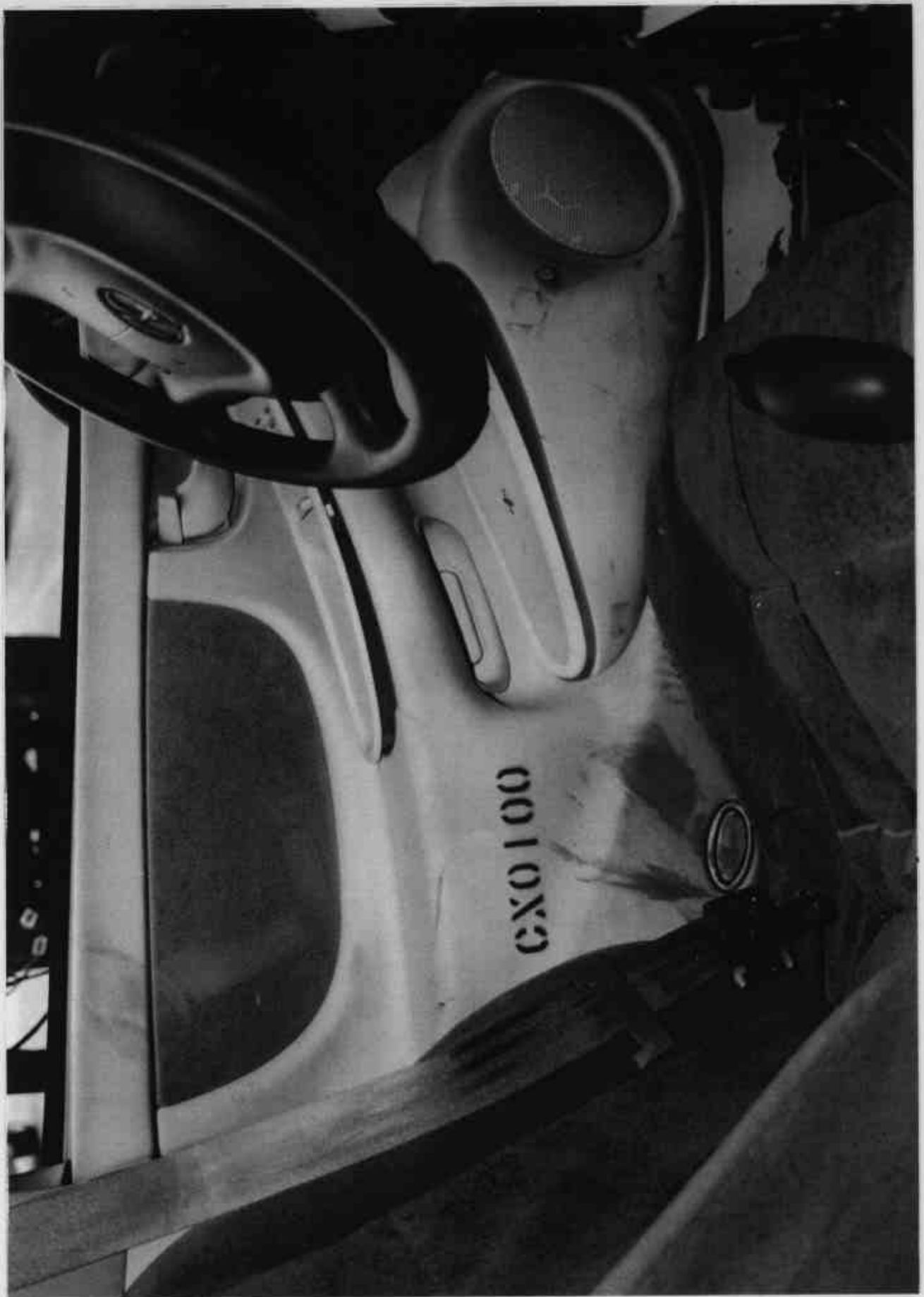


Figure A-26 POST-TEST INTERIOR OF FRONT DOOR SHOWING SID IMPACT LOCATIONS



Figure A-27 PRE-TEST INTERIOR OF REAR DOOR



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

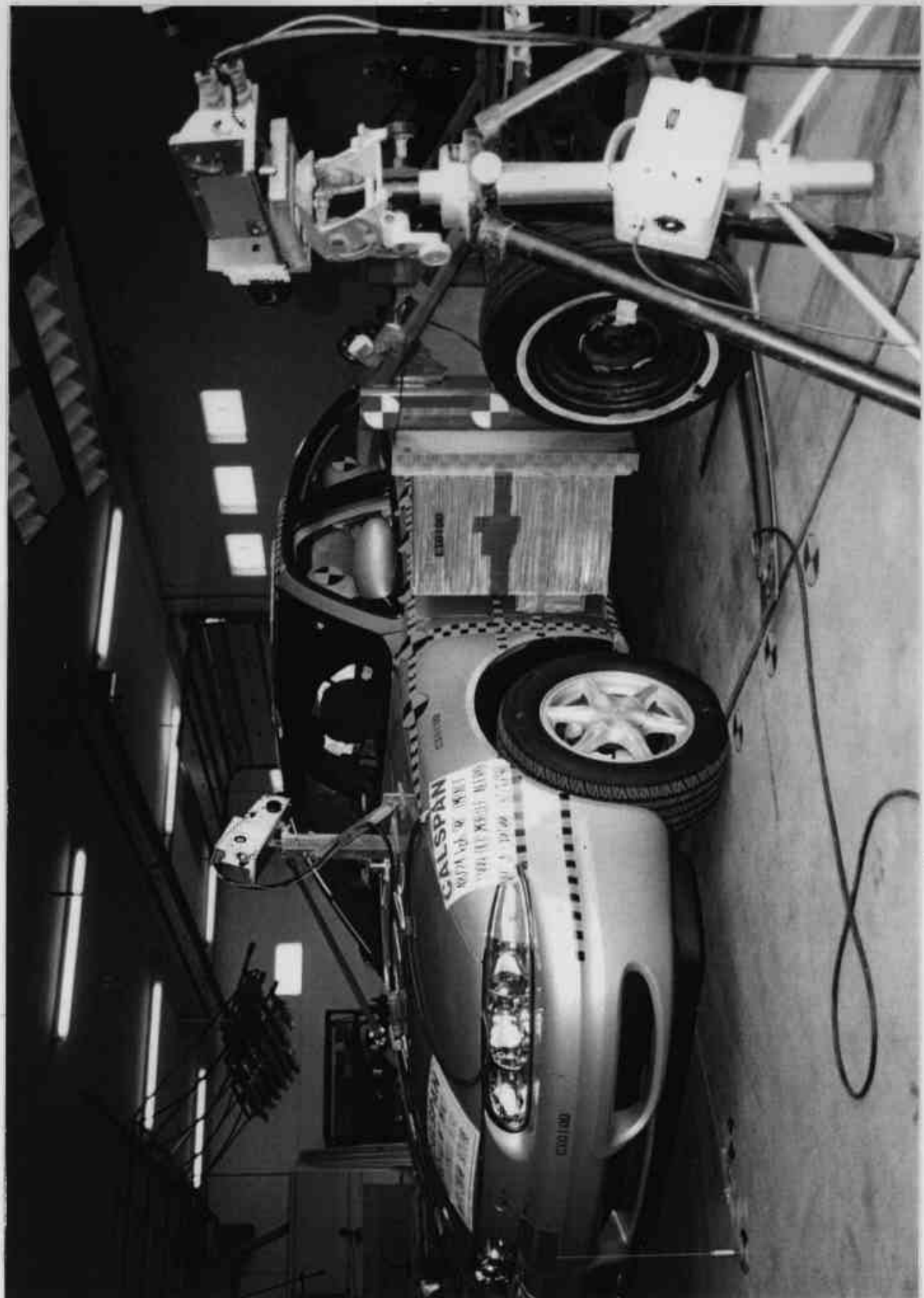
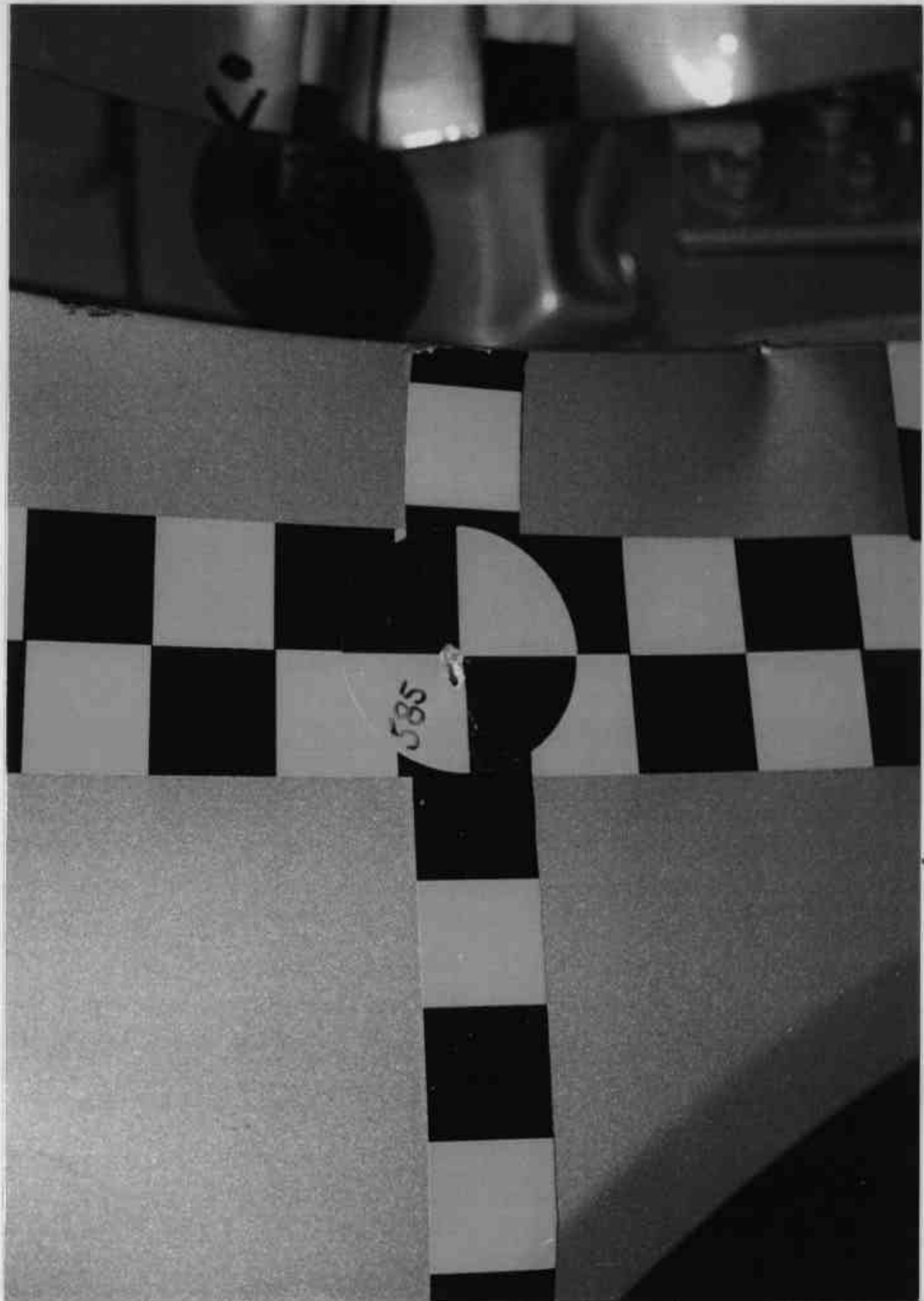


Figure A-29 PRE-TEST LEFT SIDE VIEW OF MDB WITH IMPACTOR FACE IN POSITION



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



SPA T125/70D15 M 420KPA(60PSI)
IF TIRES ARE HOT, ADD 28KPA(4PSI)
SEE OWNER'S MANUAL FOR MORE INFORMATION



MFD BY GENERAL MOTORS CORP

DATE	GVWR	GAWR FRT	GAWR RR
06/98	1809 KG	1019 KG	790 KG
	3588 LB	2245 LB	1742 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR
VEHICLE SAFETY STANDARDS, AND THEFT PREVENTION STANDARDS IN
EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE

1G3NL52E0XC300946

TYPE: PASS CAR

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

TIRE - LOADING INFORMATION

OCCUPANTS		VEHICLE CAP. WT.	
FRT.	RR.	KG	LBS
2	0	408	899

MAX. LOADING @ GVWR SAME AS VEHICLE CAPACITY WEIGHT.
1G3NL52E8XC300946
 MODEL: NL89 NBJ

TIRE SIZE	SPEED RTG	COLD TIRE PRESSURE
FRT P215/60R15	S	210KPA(30PSI)
RR P215/60R15	S	210KPA(30PSI)
SPA T125/70D15	M	420KPA(60PSI)

IF TIRES ARE HOT, ADD 28KPA(4PSI)
 SEE OWNER'S MANUAL FOR MORE INFORMATION

GM

MFD BY GENERAL MOTORS CORP	
DATE	GVWR
06/98	1809 KG
	3988 LB

CAWR RR	
GVWR FRT	GVWR RR
1019 KG	790 KG
2245 LB	1742 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE

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



Figure A-34 IMPACT PHOTO



Figure A-35 ROLLOVER 90 DEGREES

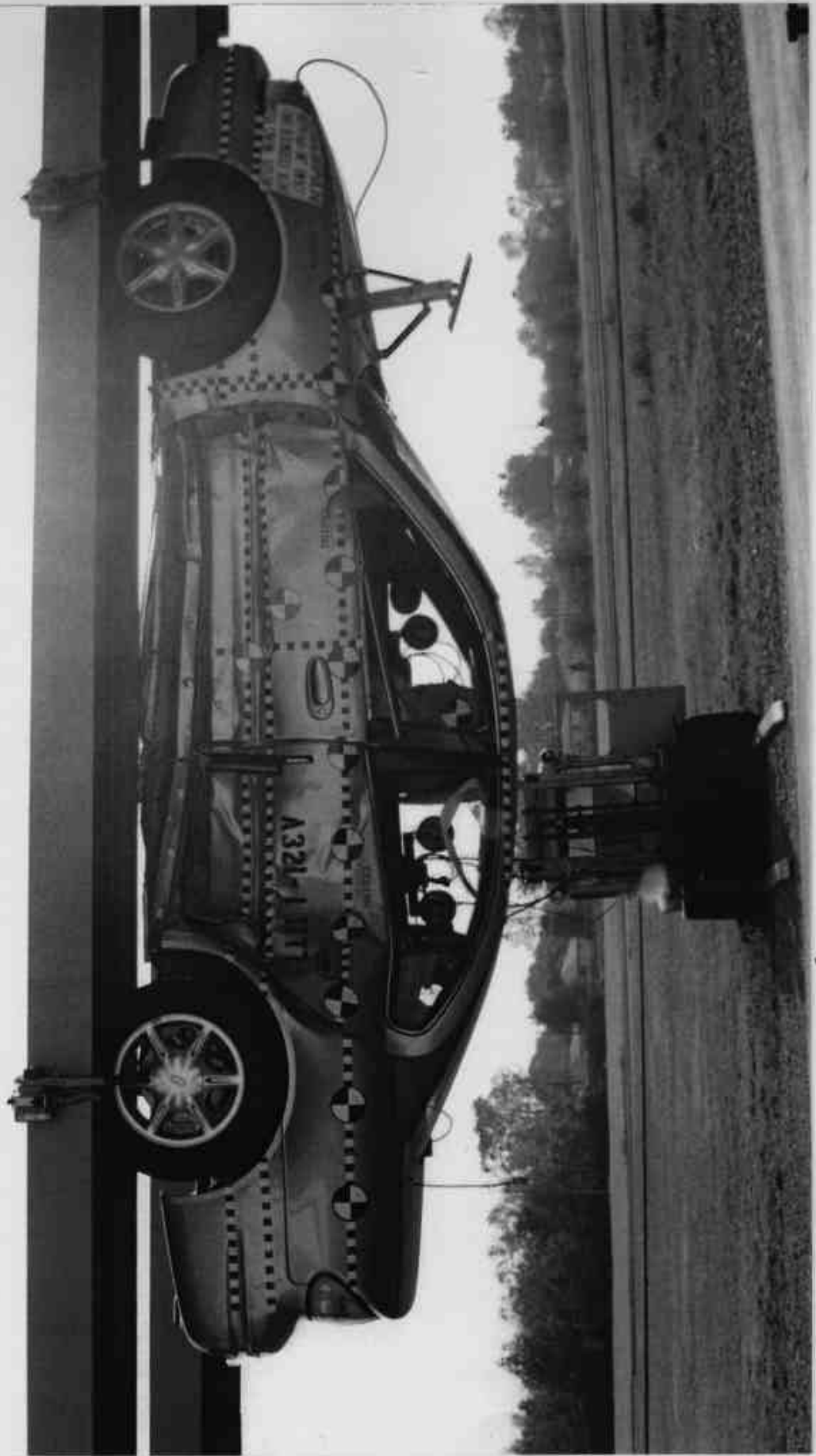


Figure A-36 ROLLOVER 180 DEGREES



Figure A-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
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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
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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

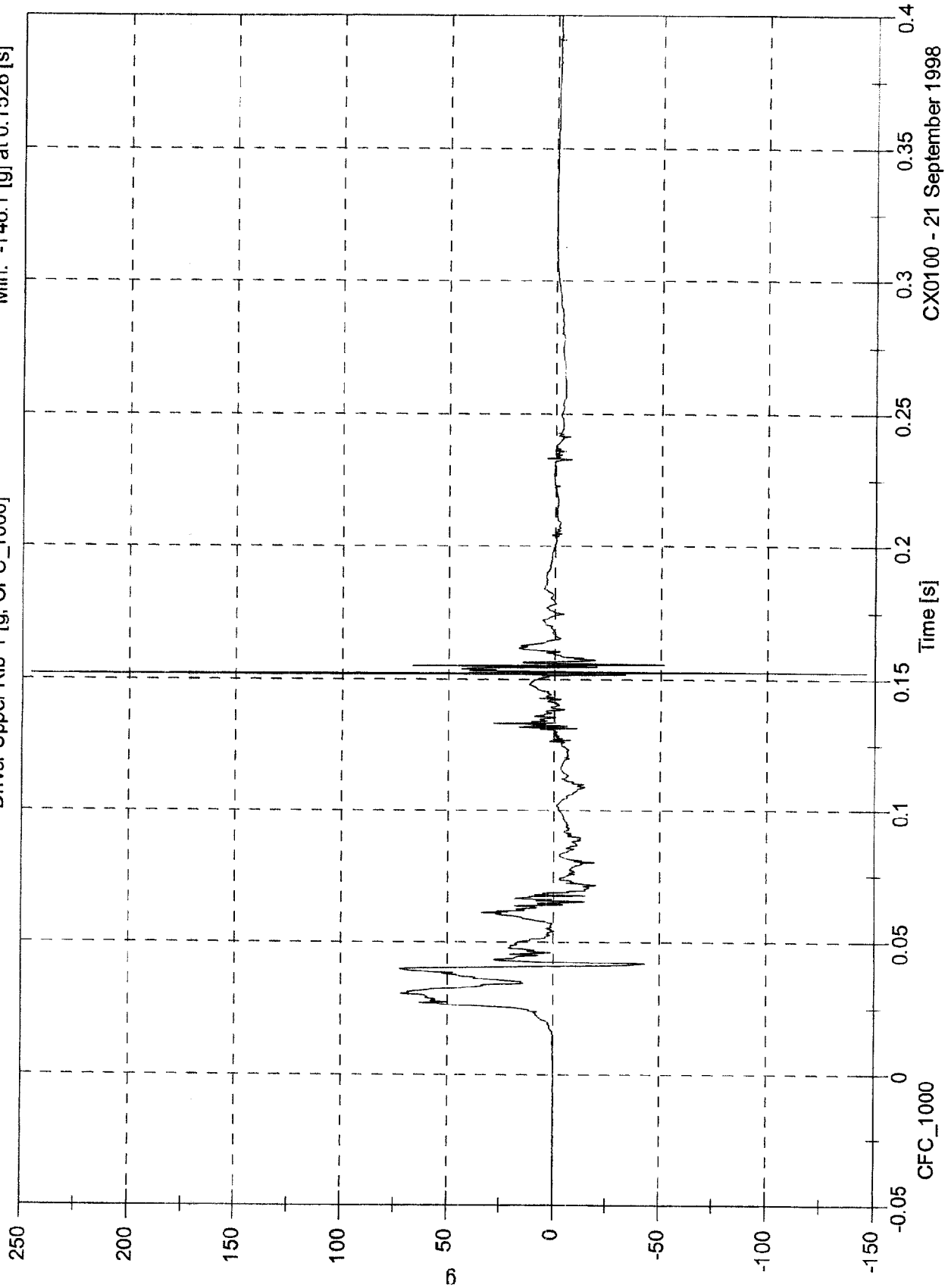
<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
98	DRIVER UPPER RIB (Y) ACCELERATION VS TIME	B- 103
99	DRIVER LOWER RIB (Y) ACCELERATION VS TIME	B- 104
100	DRIVER LOWER SPINE (Y) ACCELERATION VS TIME	B- 105
101	DRIVER PELVIC (Y) ACCELERATION VS TIME	B- 106
102	PASSENGER UPPER RIB (Y) ACCELERATION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

Driver Upper Rib Y [g, CFC_1000]

Max: 245.9 [g] at 0.1521 [s]

Min: -146.1 [g] at 0.1526 [s]



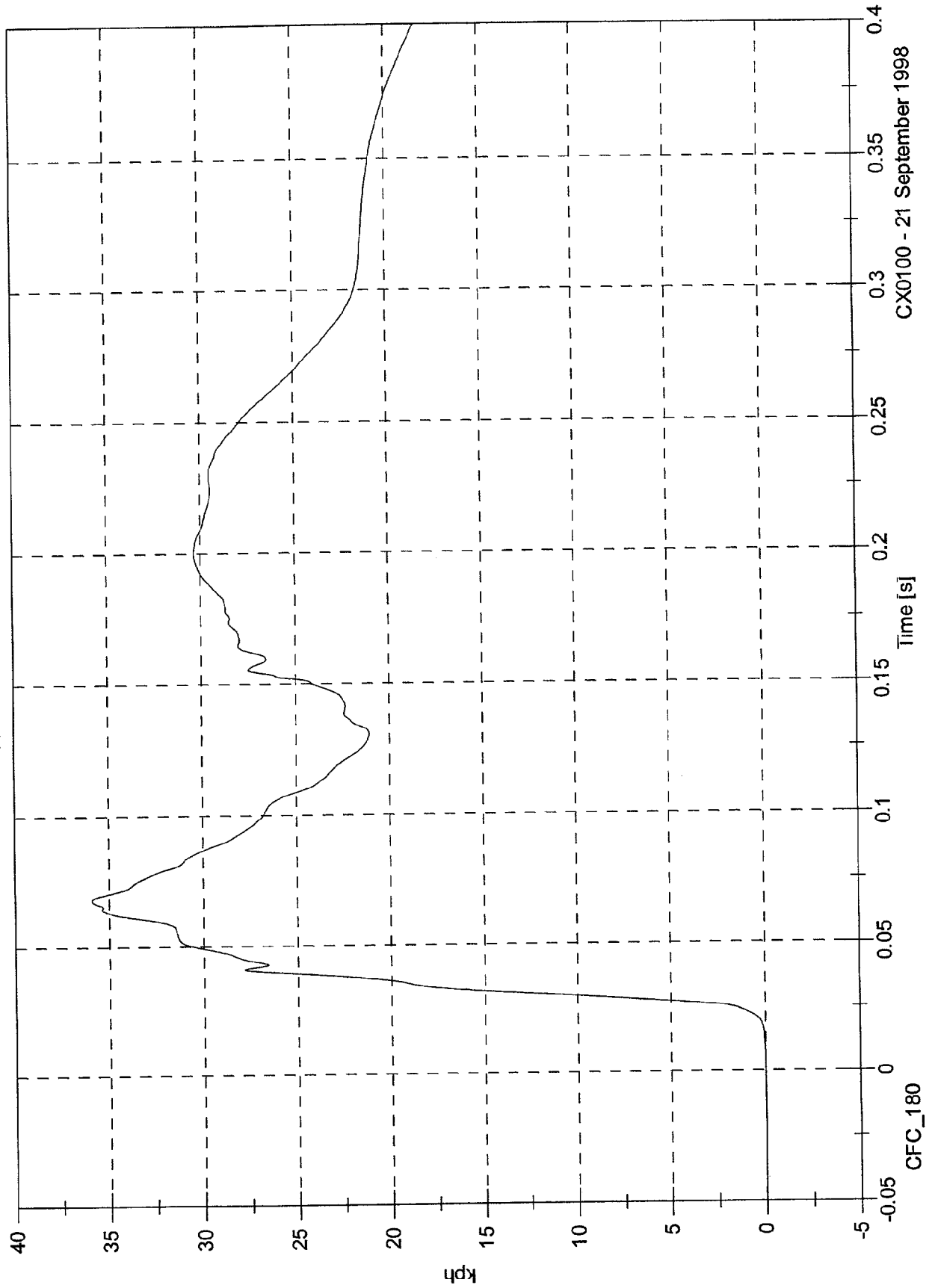
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Driver Upper Rib Y [kph, CFC_180]

Max: 35.9 [kph] at 0.0682 [s]

Min: -0.0 [kph] at -0.0903 [s]



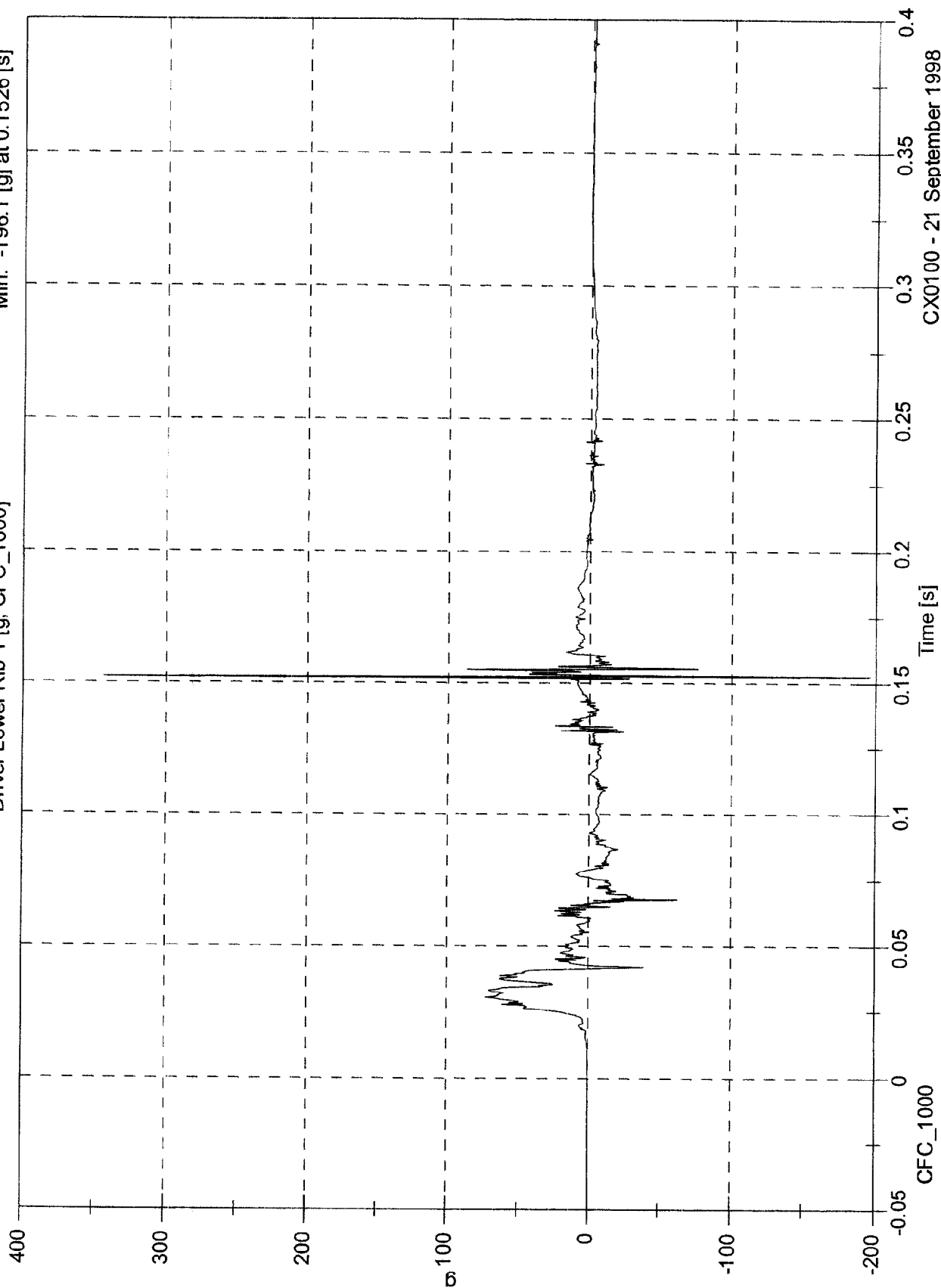
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 343.4 [g] at 0.1521 [s]

Min: -196.1 [g] at 0.1526 [s]

Driver Lower Rib Y [g, CFC_1000]



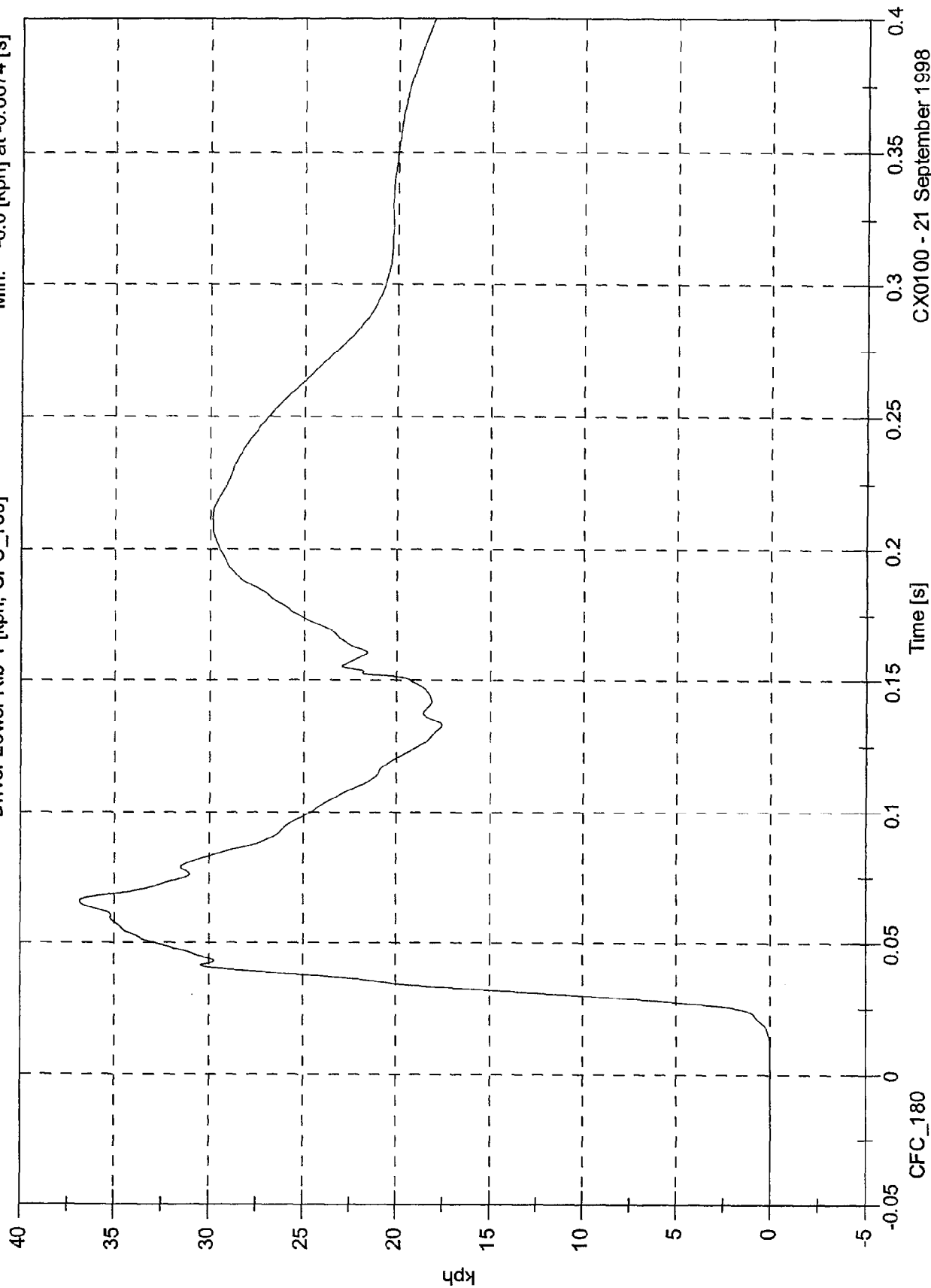
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Driver Lower Rib Y [kph, CFC_180]

Max: 36.9 [kph] at 0.0661 [s]

Min: -0.0 [kph] at -0.0674 [s]



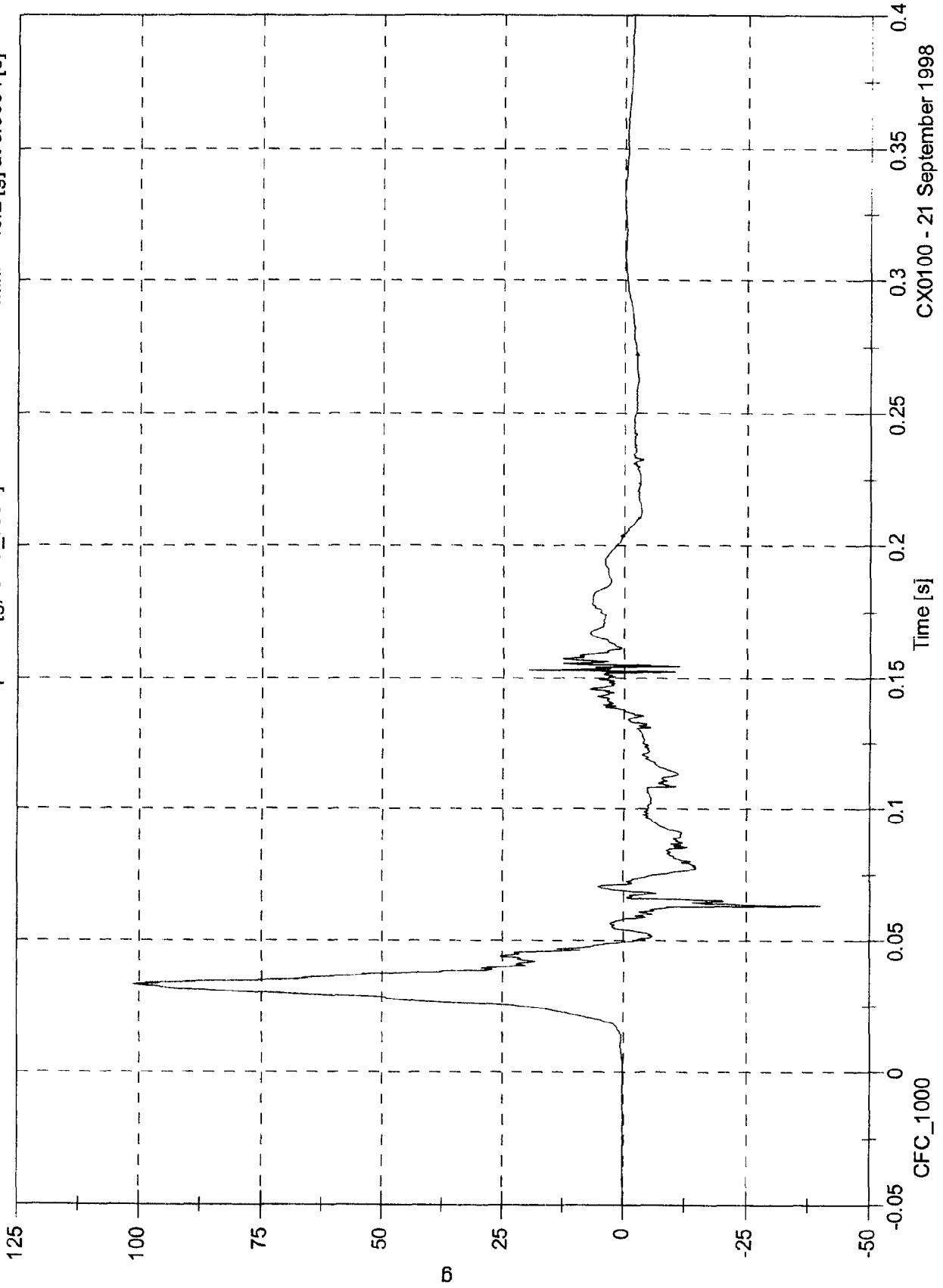
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Driver Lower Spine Y [g, CFC_1000]

Max: 101.2 [g] at 0.033 [s]

Min: -40.2 [g] at 0.0634 [s]

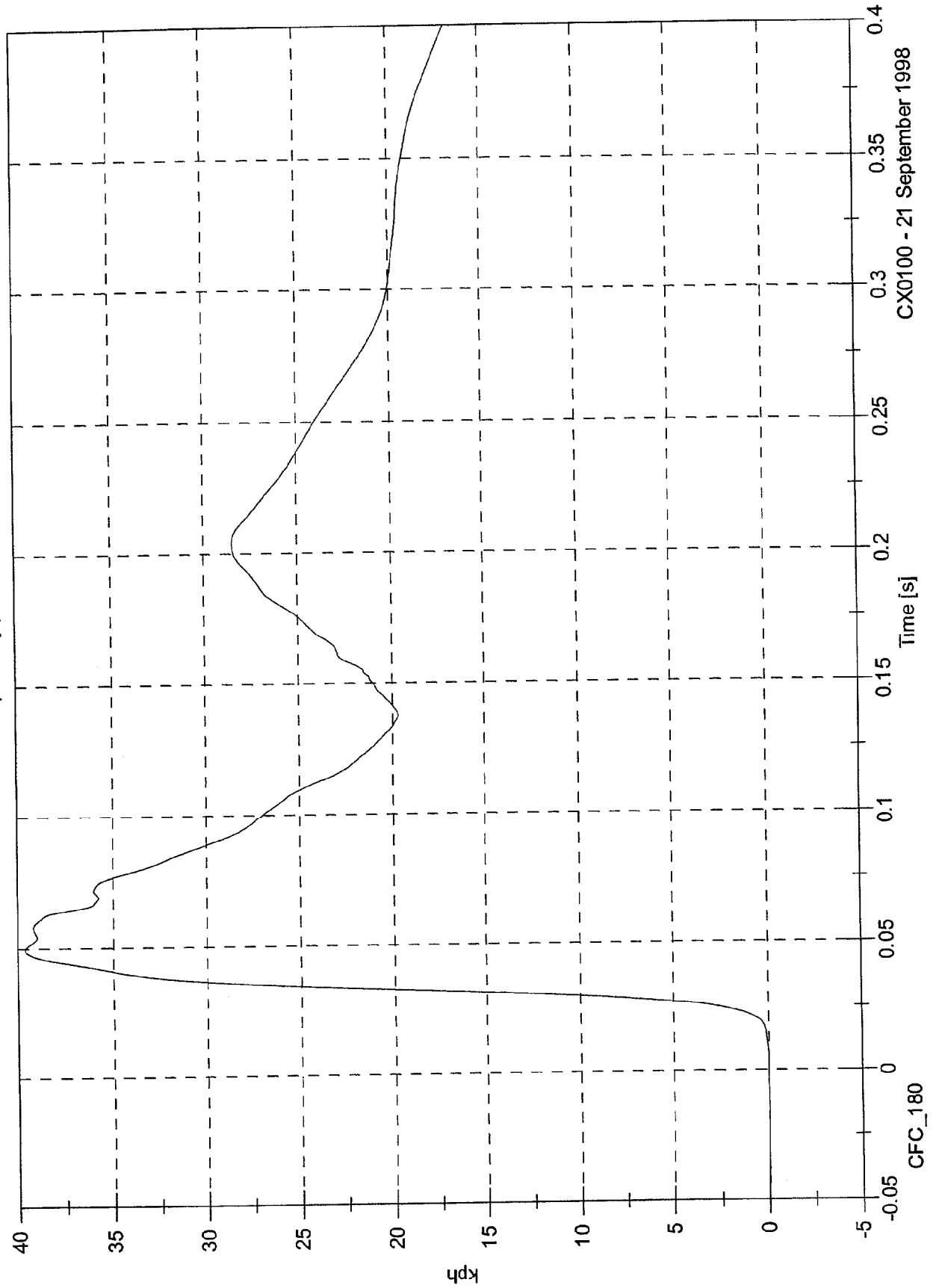


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Driver Lower Spine Y [kph, CFC_180]

Max: 39.6 [kph] at 0.0493 [s]
Min: -0.0 [kph] at -0.0165 [s]



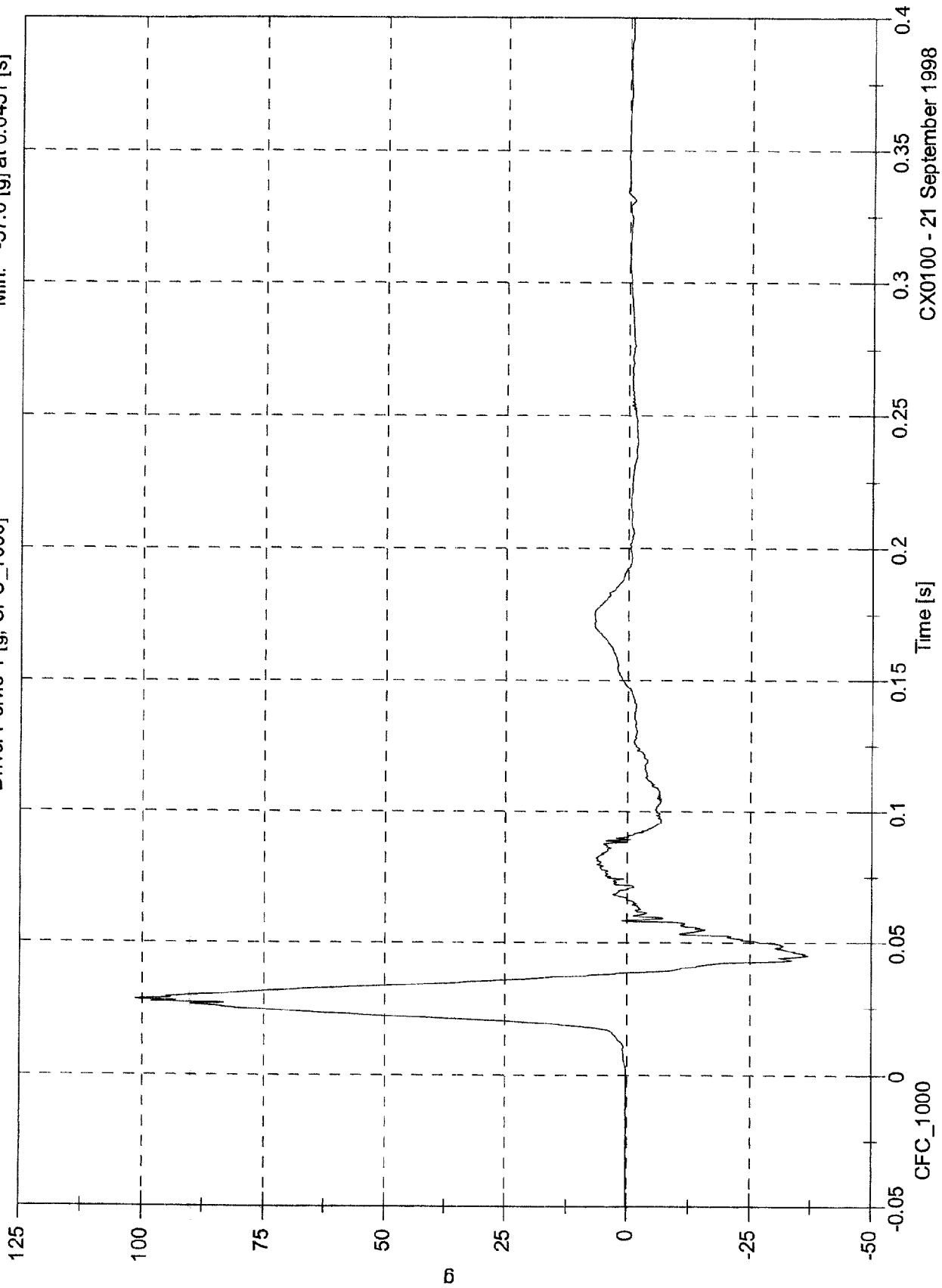
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 101.6 [g] at 0.0285 [s]

Min: -37.0 [g] at 0.0451 [s]

Driver Pelvic Y [g, CFC_1000]



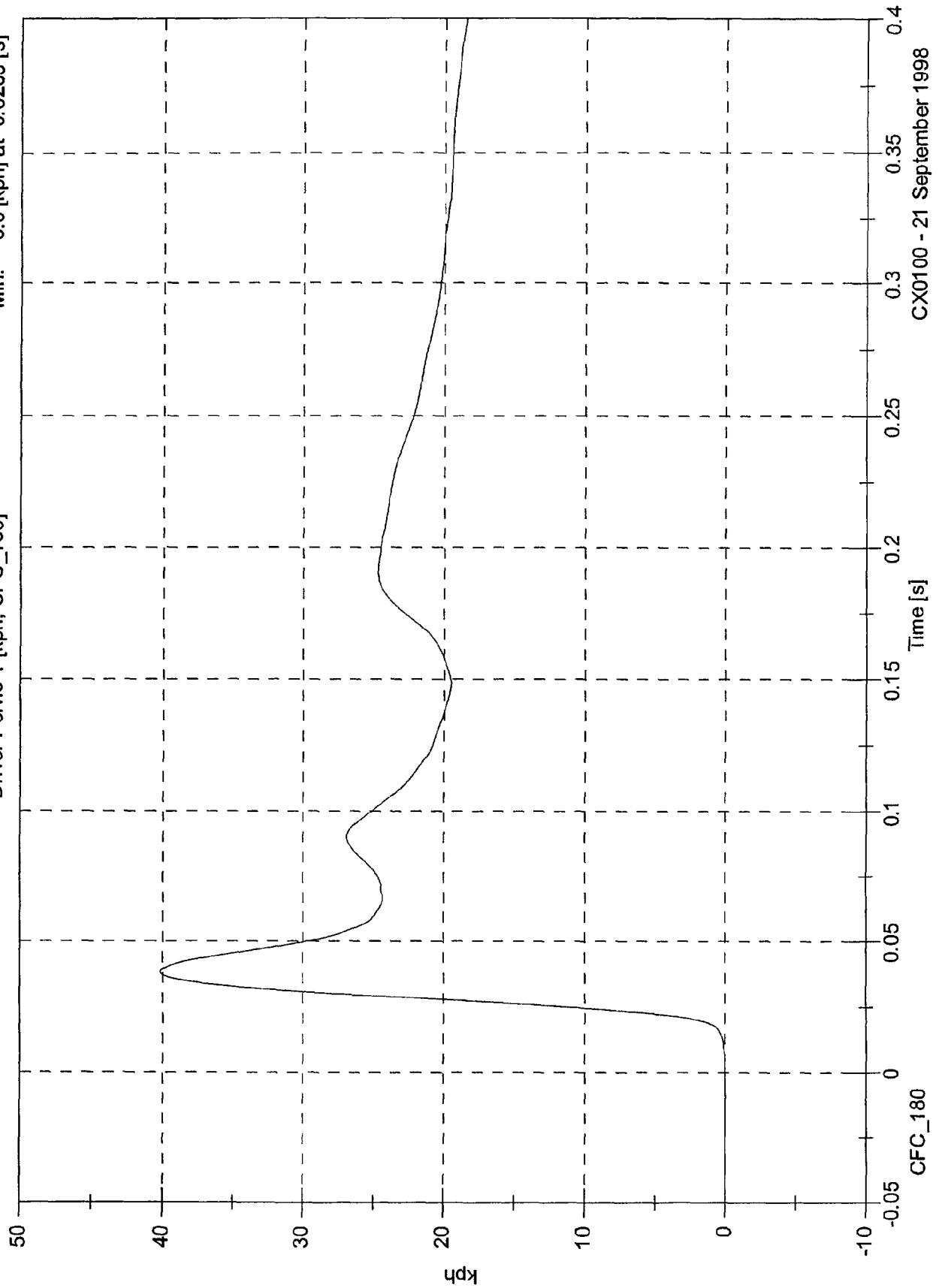
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 40.2 [kph] at 0.0383 [s]

Min: -0.0 [kph] at -0.0255 [s]

Driver Pelvic Y [kph, CFC_180]



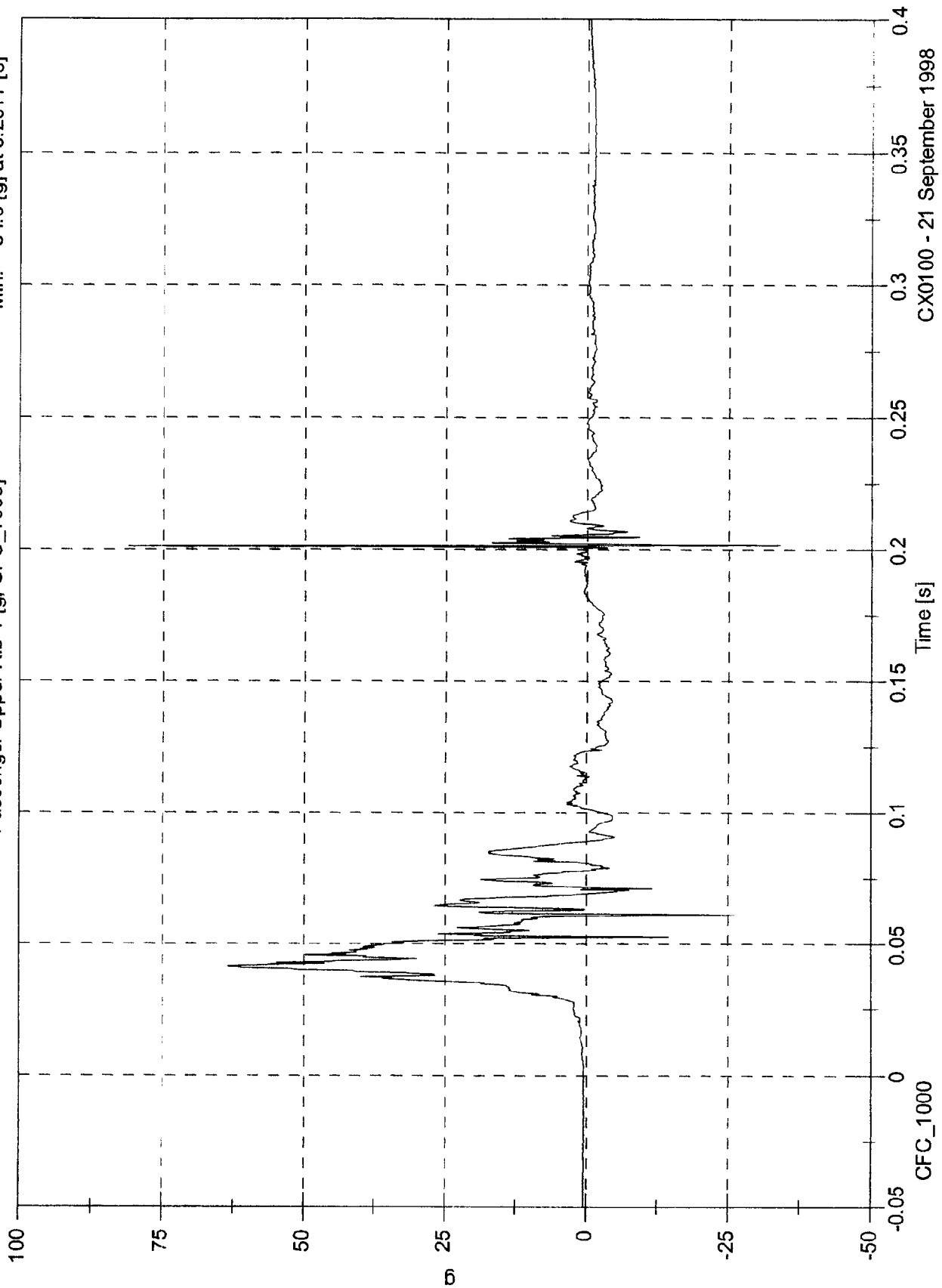
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Passenger Upper Rib Y [g, CFC_1000]

Max: 81.1 [g] at 0.2012 [s]

Min: -34.0 [g] at 0.2017 [s]

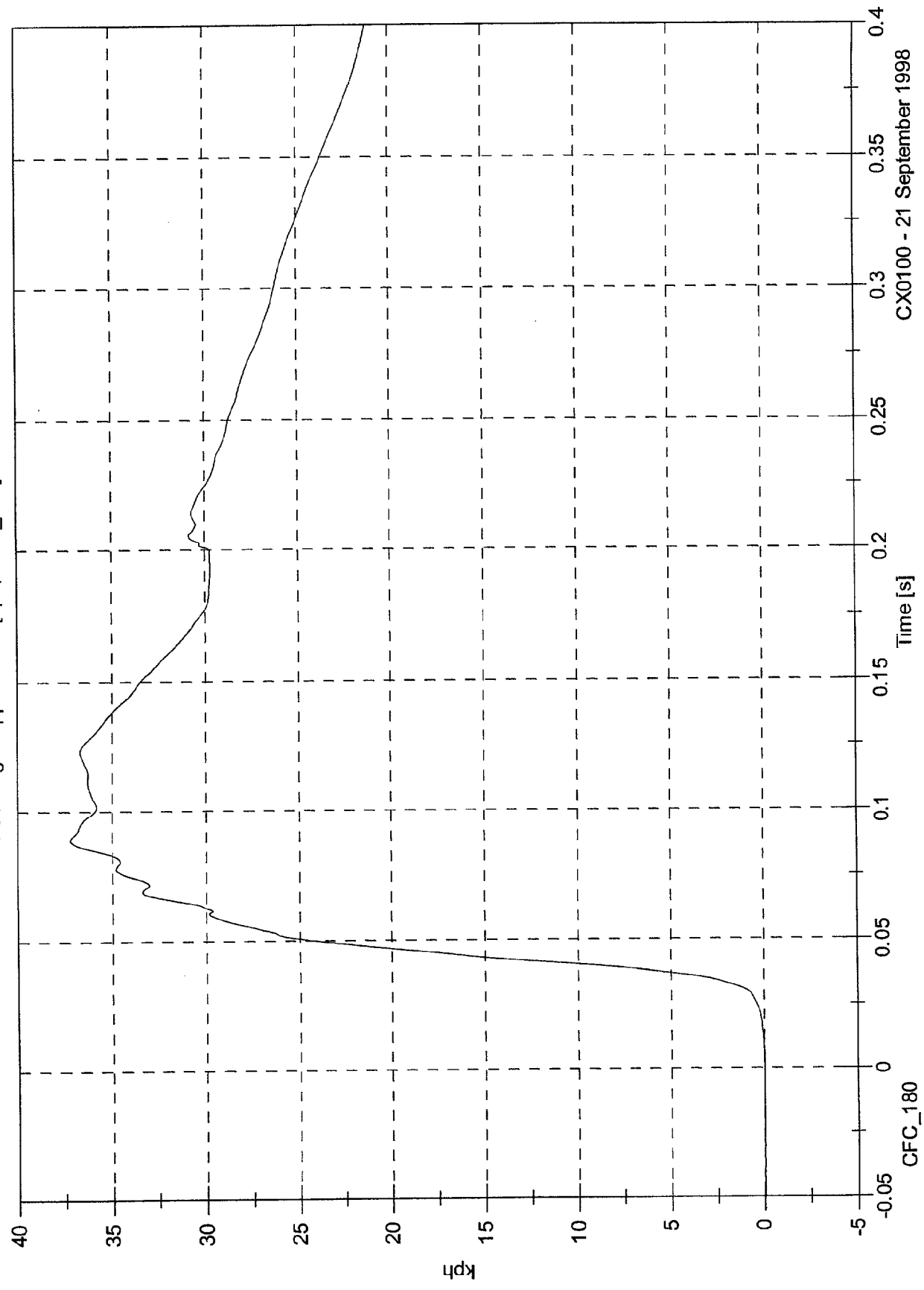


NHTSA Side Impact - 1999 Oldsmobile Alero

Passenger Upper Rib Y [kph, CFC_180]

Max: 37.2 [kph] at 0.0889 [s]

Min: -0.0 [kph] at -0.0538 [s]



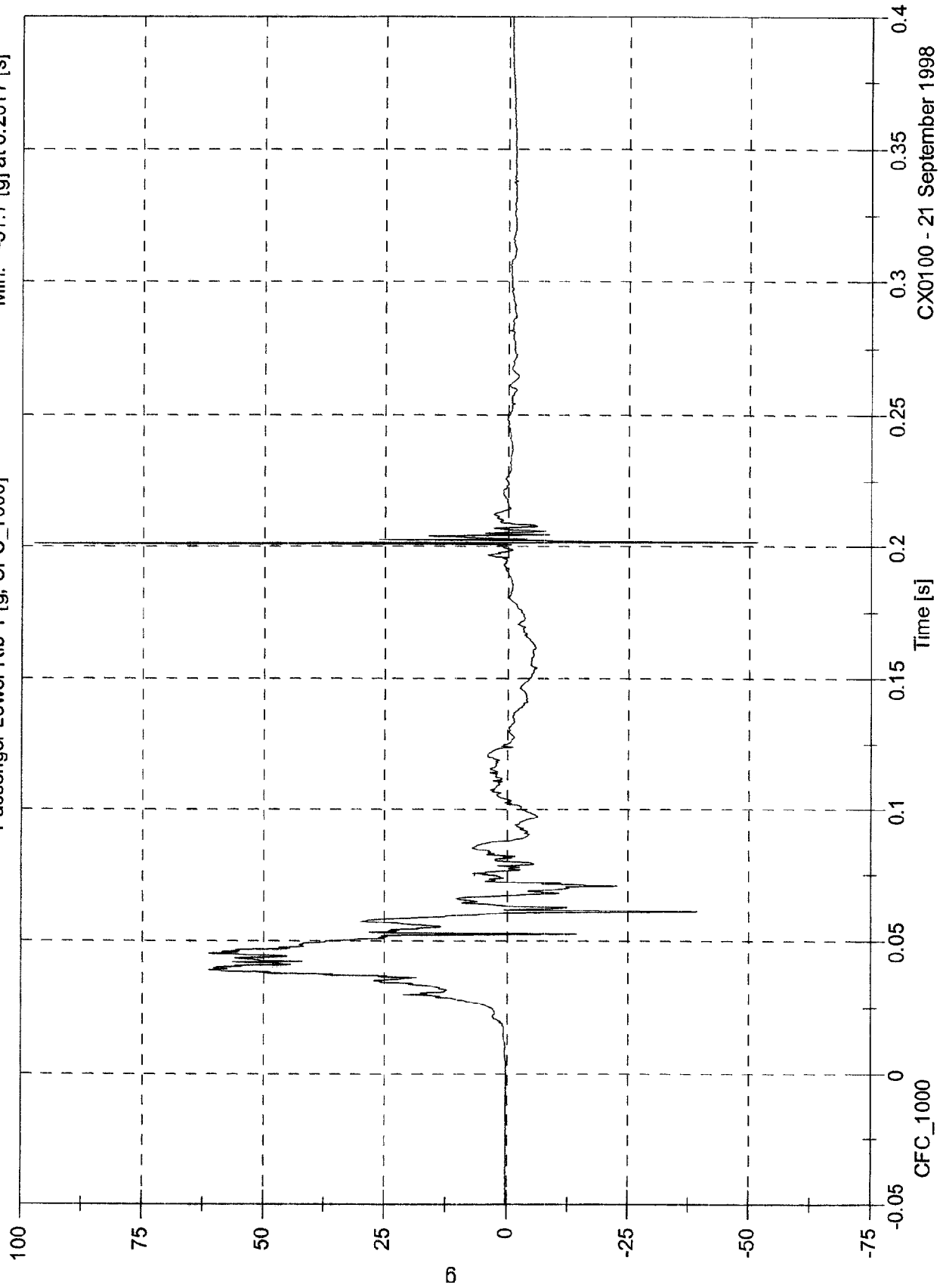
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Passenger Lower Rib Y [g, CFC_1000]

Max: 97.5 [g] at 0.2012 [s]

Min: -51.7 [g] at 0.2017 [s]



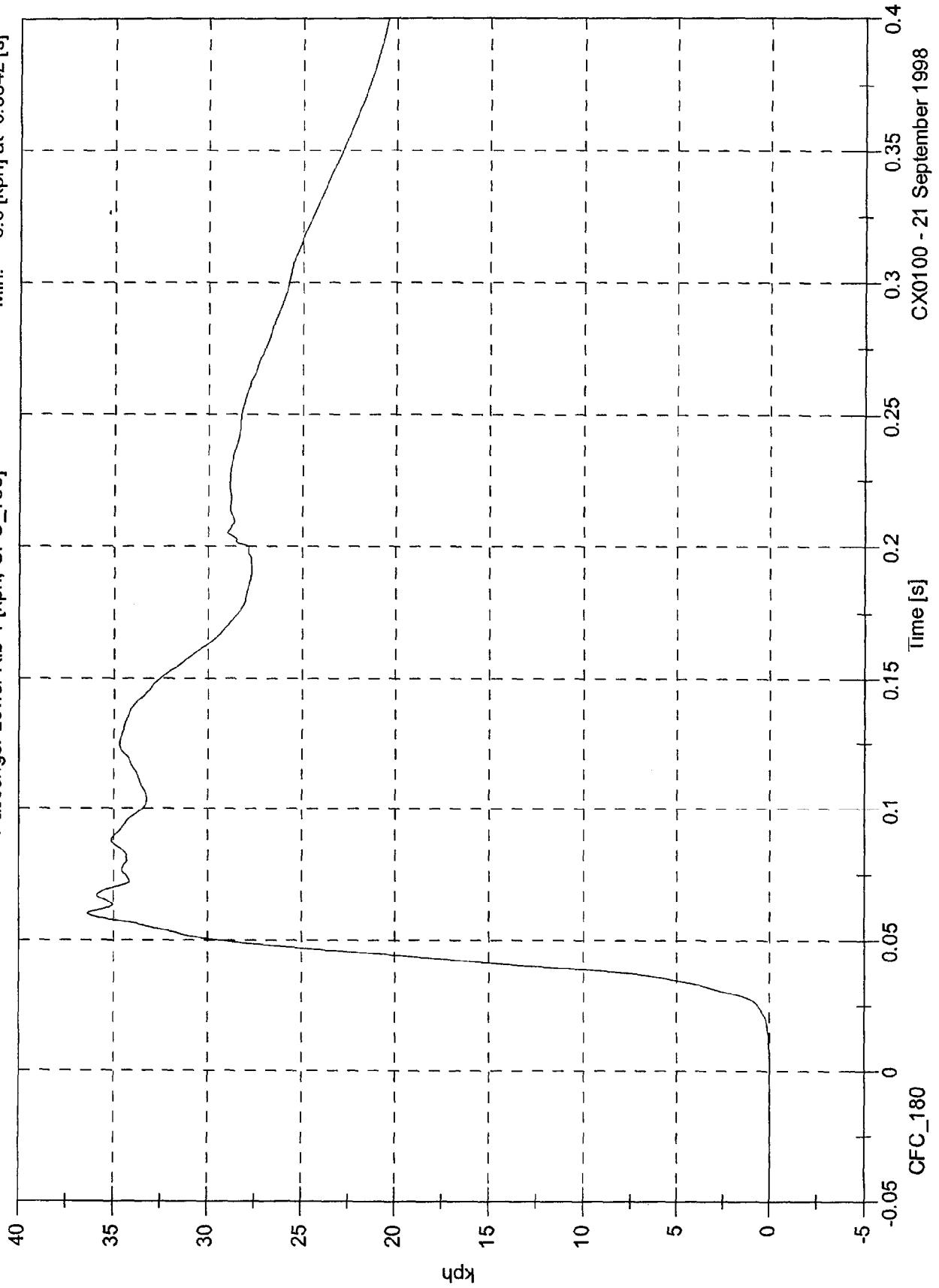
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Passenger Lower Rib Y [kph, CFC_180]

Max: 36.4 [kph] at 0.0601 [s]

Min: -0.0 [kph] at -0.0542 [s]

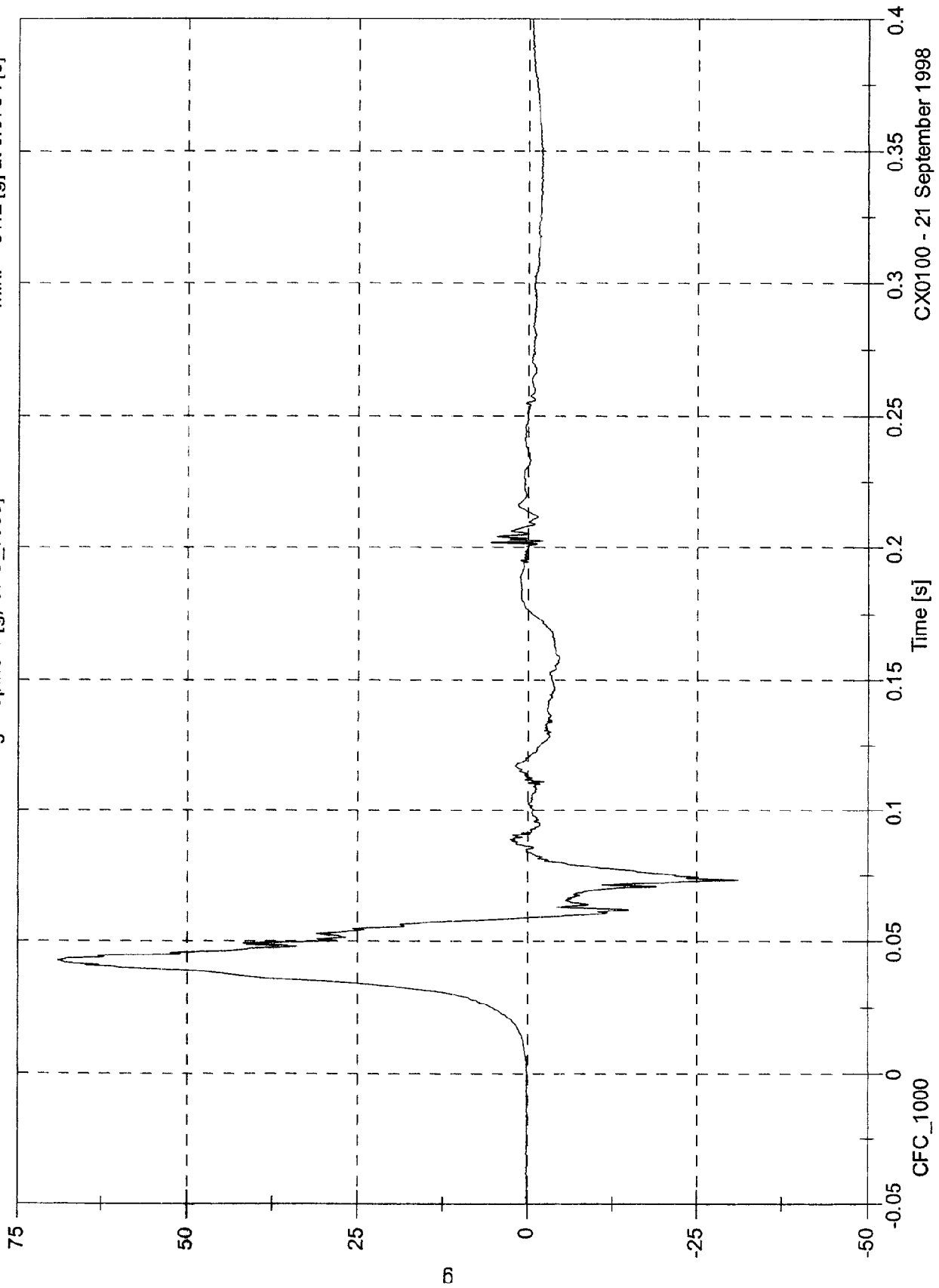


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 69.2 [g] at 0.0427 [s]
Min: -31.2 [g] at 0.0734 [s]

Passenger Spine Y [g, CFC_1000]



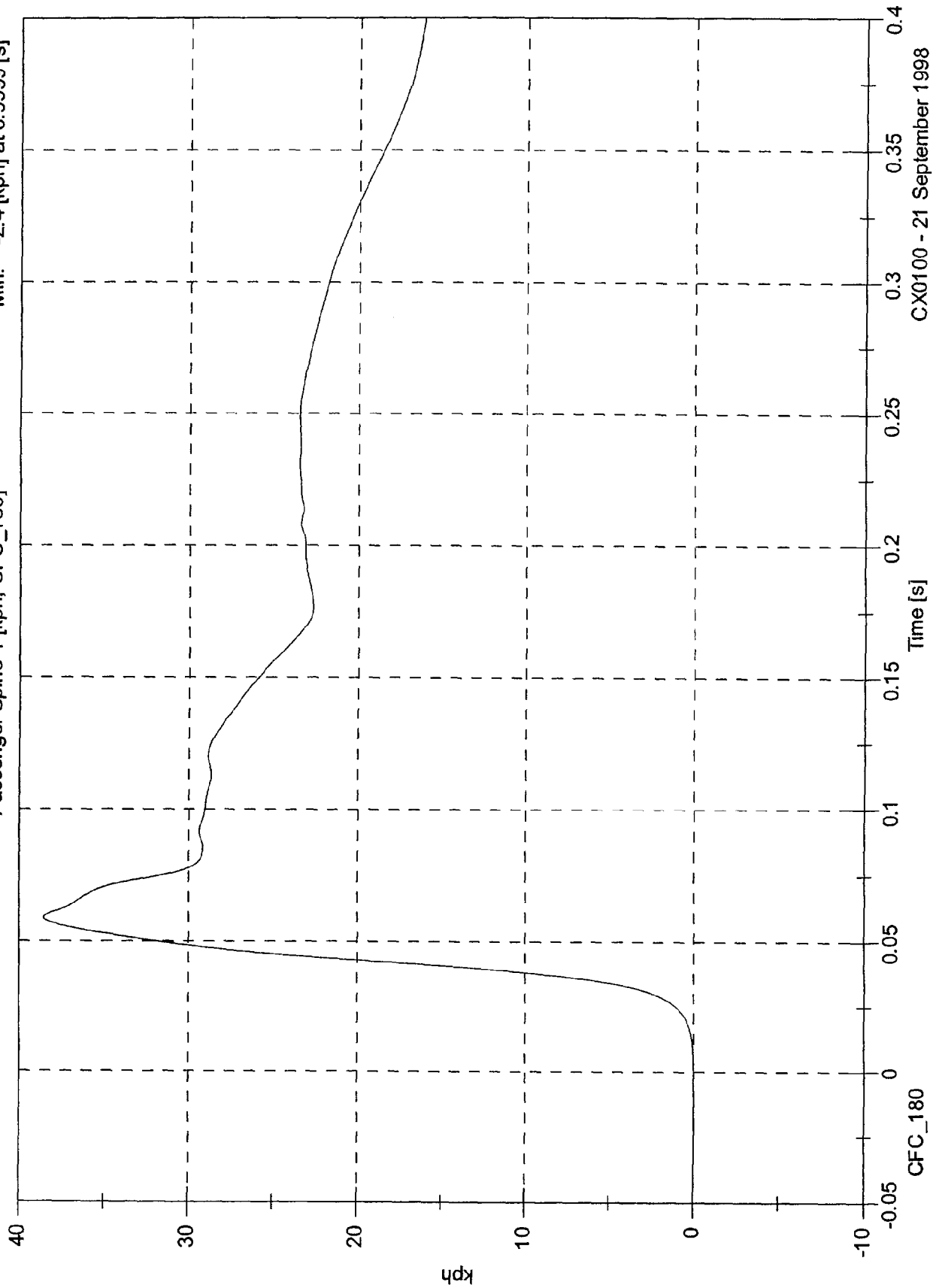
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Passenger Spine Y [kph, CFC_180]

Max: 38.6 [kph] at 0.0587 [s]

Min: -2.4 [kph] at 0.9999 [s]



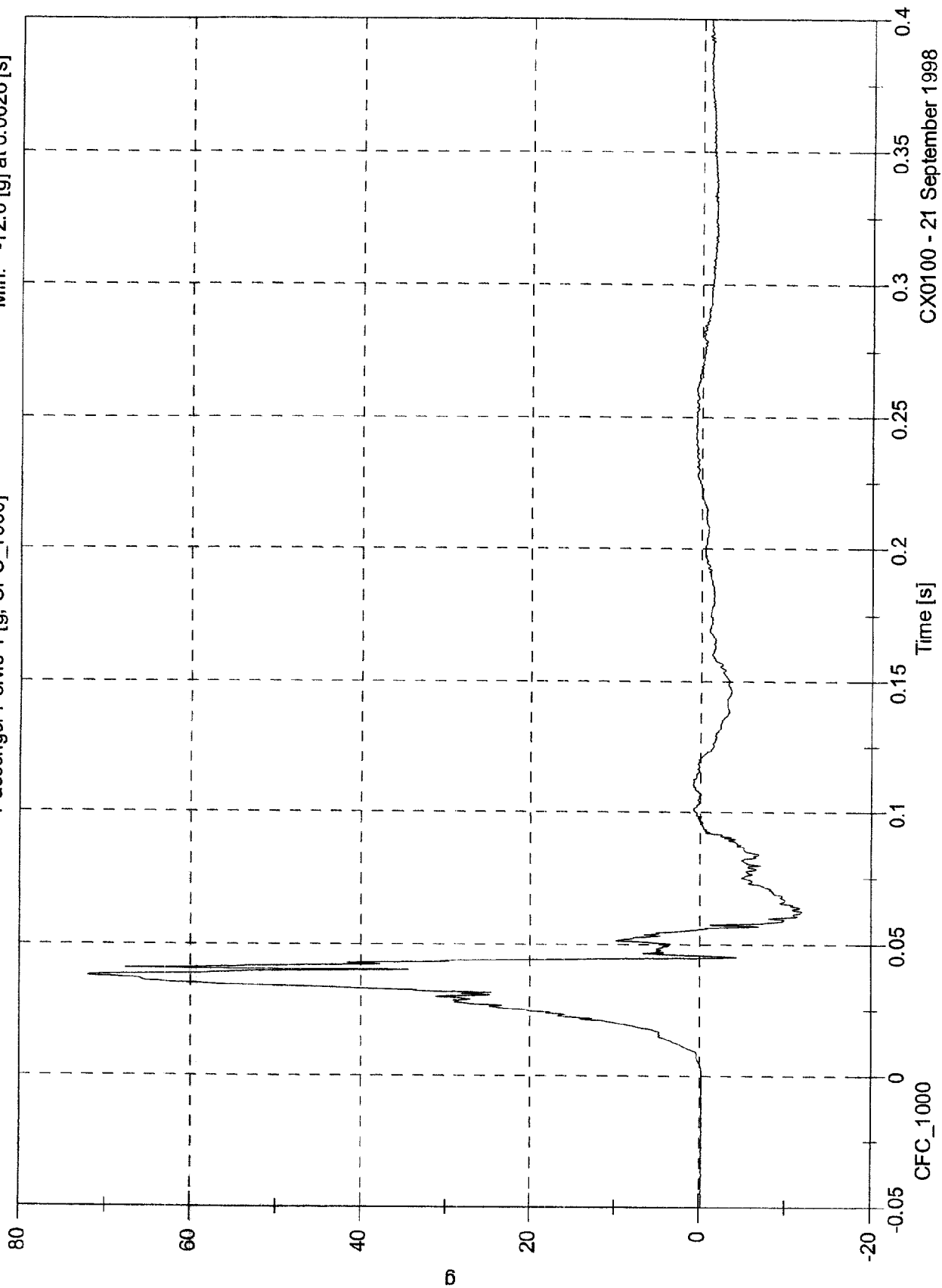
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 72.1 [g] at 0.038 [s]

Min: -12.0 [g] at 0.0626 [s]

Passenger Pelvic Y [g, CFC_1000]



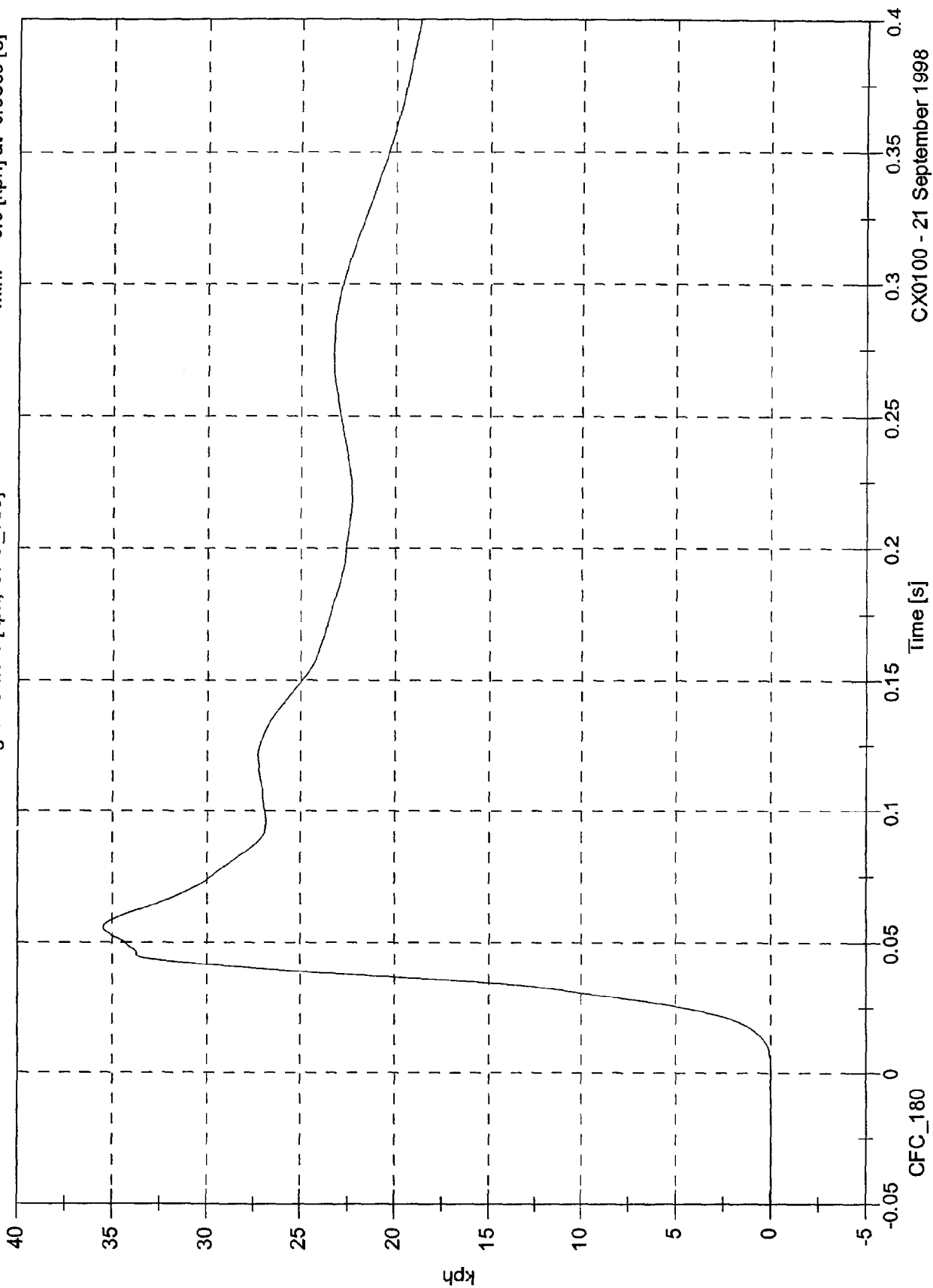
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

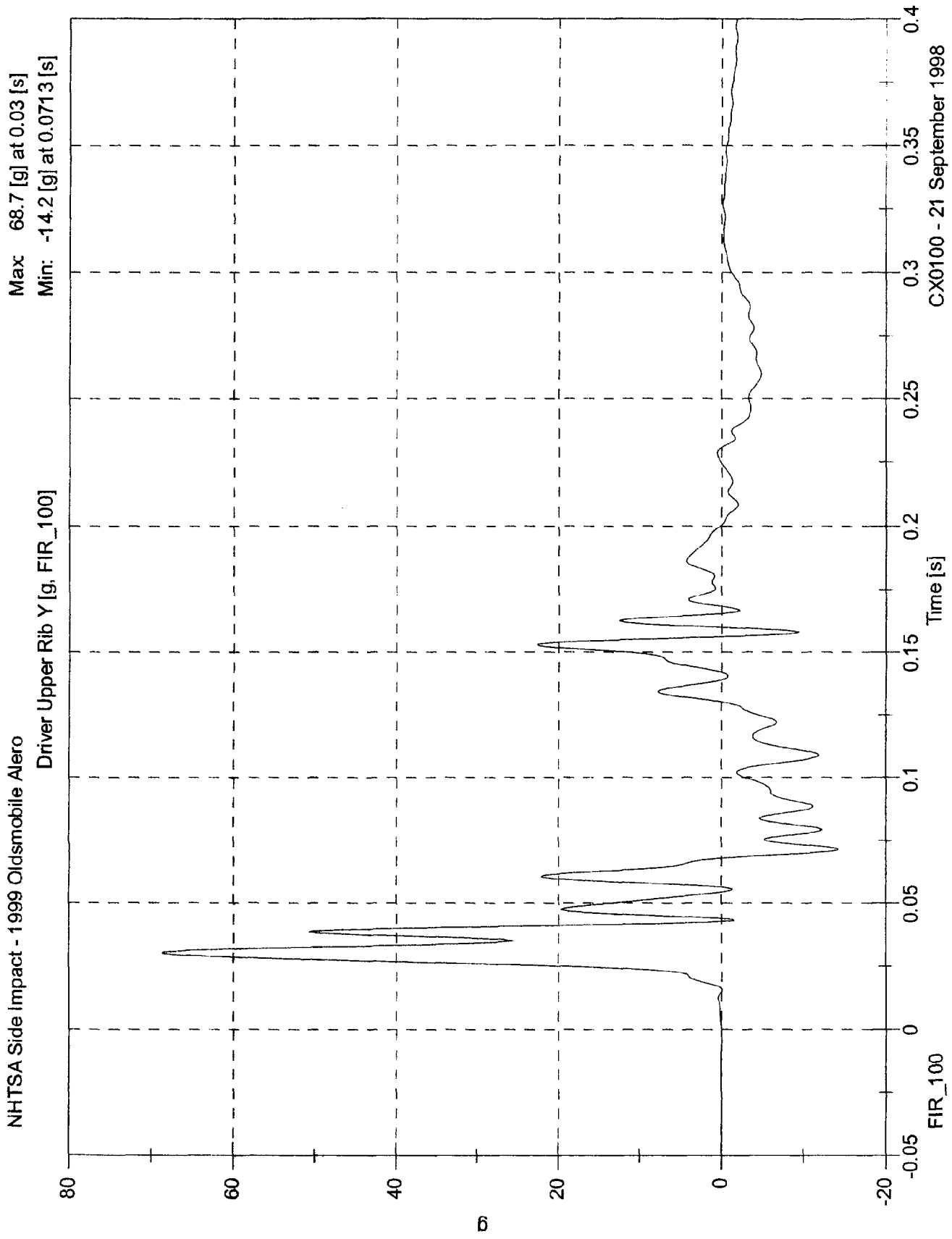
Max: 35.5 [kph] at 0.0557 [s]

Min: -0.0 [kph] at -0.0365 [s]

Passenger Pelvic Y [kph, CFC_180]



CX0100 - 21 September 1998

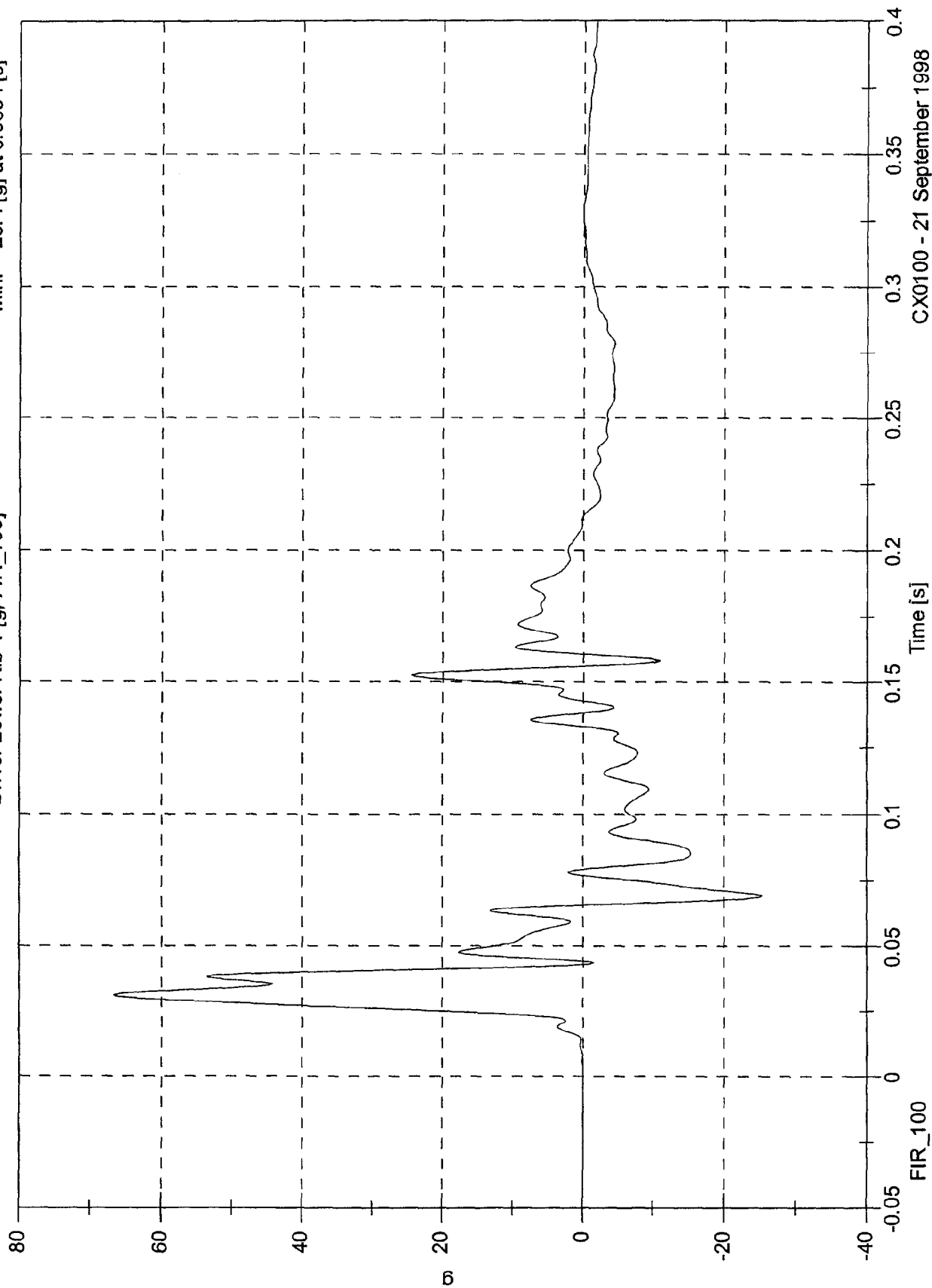


NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 66.7 [g] at 0.0312 [s]

Min: -25.4 [g] at 0.0694 [s]

Driver Lower Rib Y [g, FIR_100]



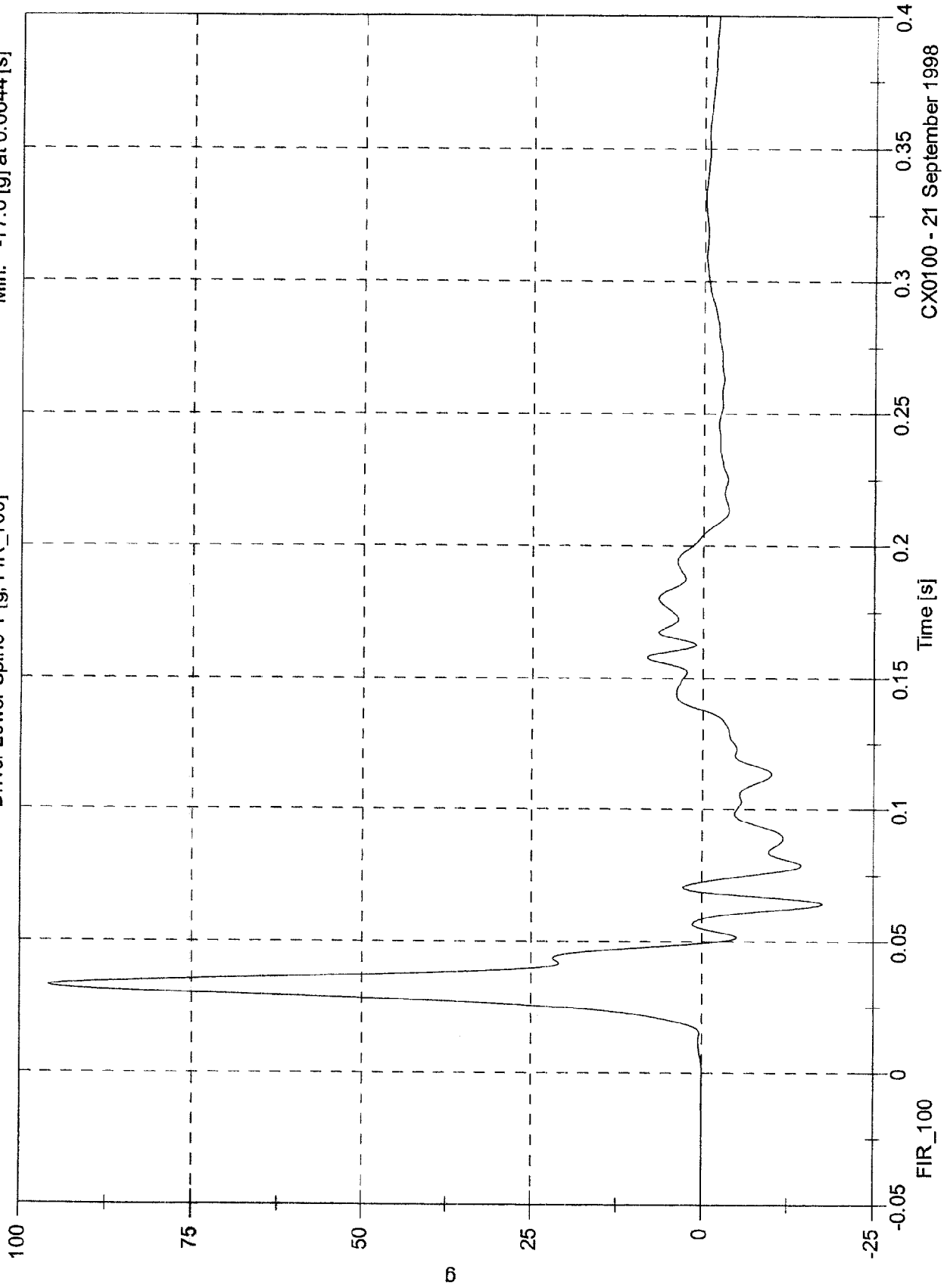
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max 95.9 [g] at 0.0331 [s]

Min: -17.6 [g] at 0.0644 [s]

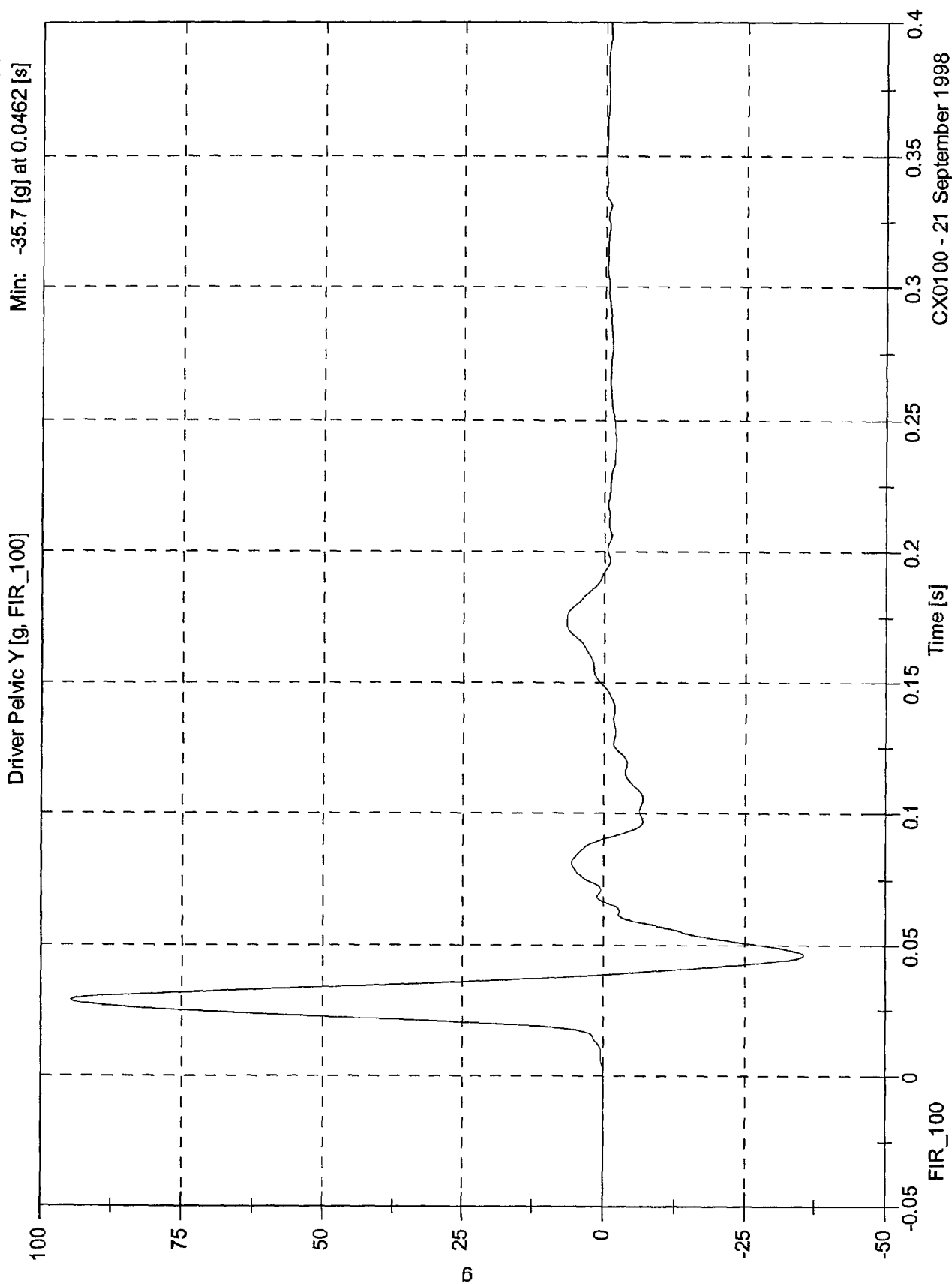
Driver Lower Spine Y [g, FIR_100]



CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 94.7 [g] at 0.0287 [s]
Min: -35.7 [g] at 0.0462 [s]

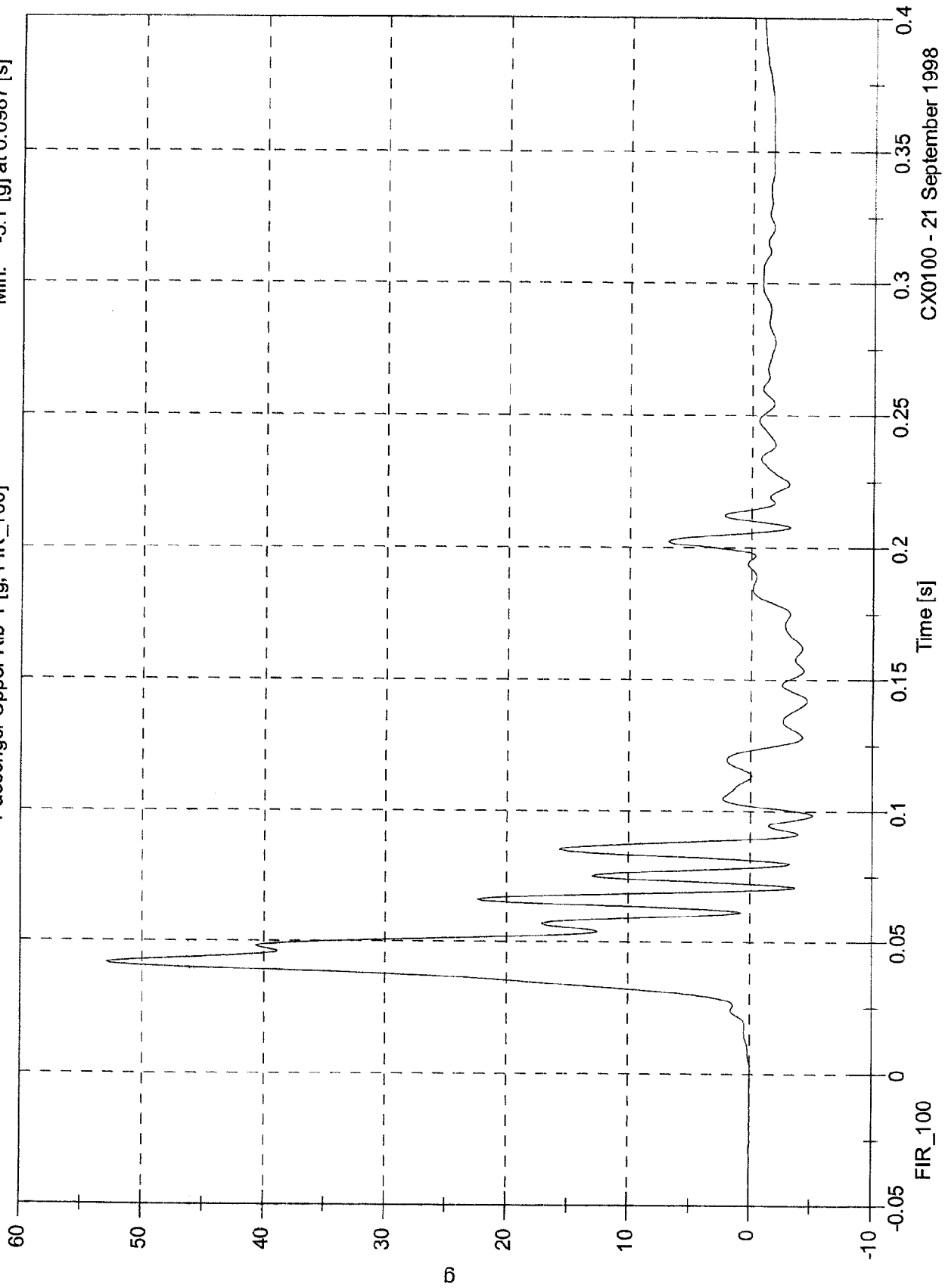


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Passenger Upper Rib Y [g, FIR_100]

Max: 52.9 [g] at 0.0418 [s]
Min: -5.1 [g] at 0.0987 [s]



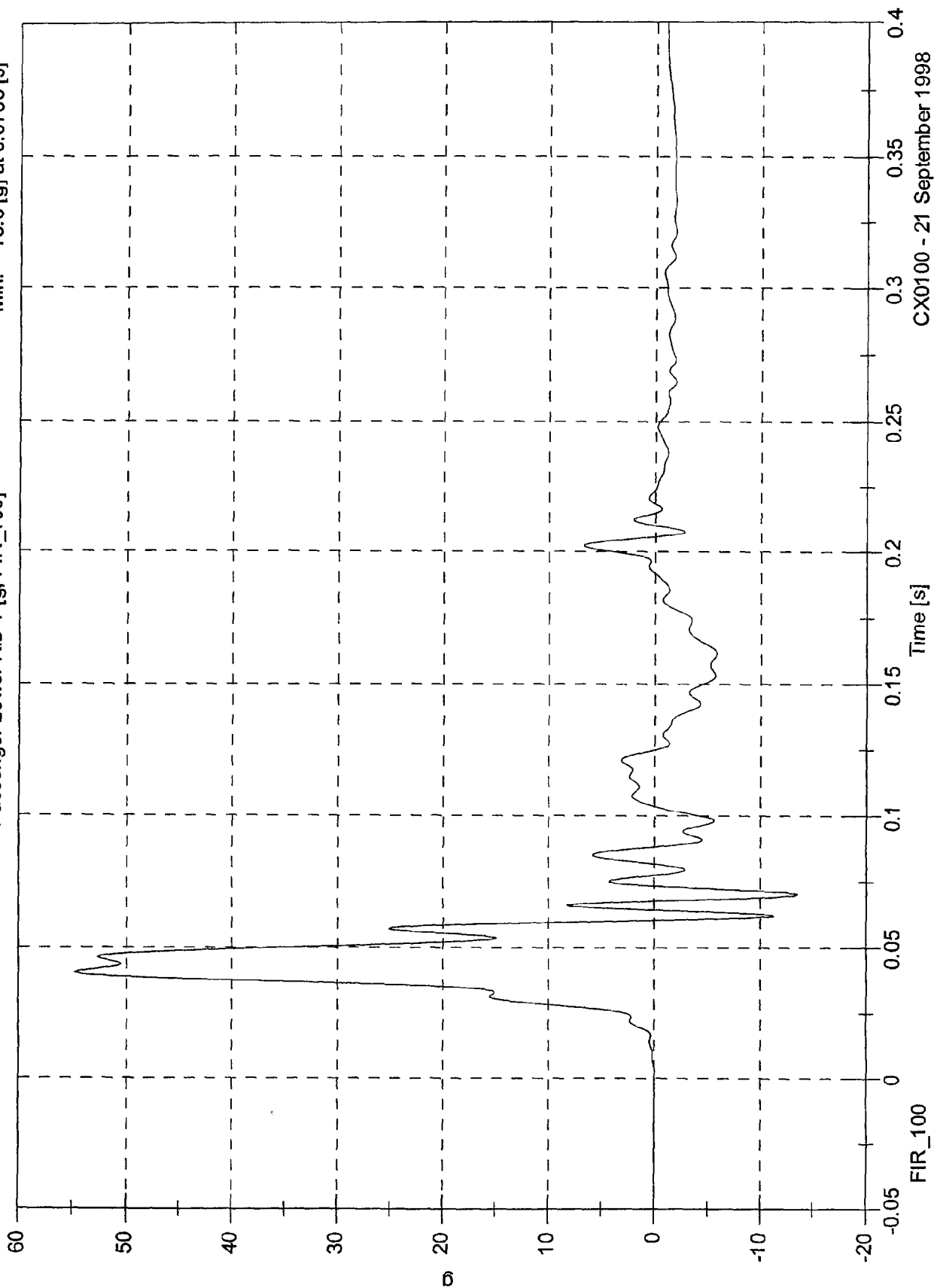
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Passenger Lower Rib Y [g, FIR_100]

Max 54.8 [g] at 0.0406 [s]

Min: -13.6 [g] at 0.0706 [s]

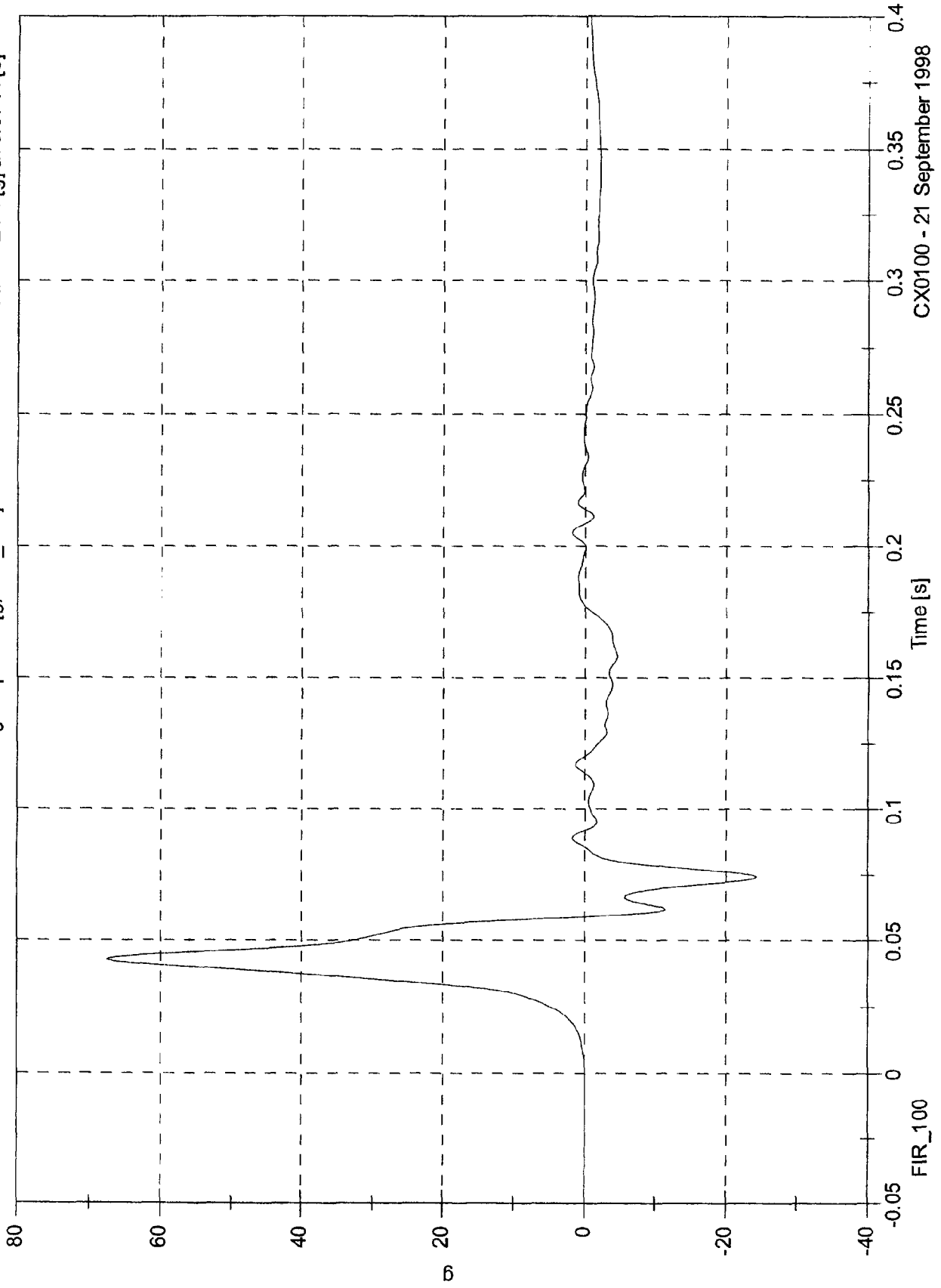


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Passenger Spine Y [g, FIR_100]

Max: 67.6 [g] at 0.0425 [s]
Min: -24.4 [g] at 0.0744 [s]



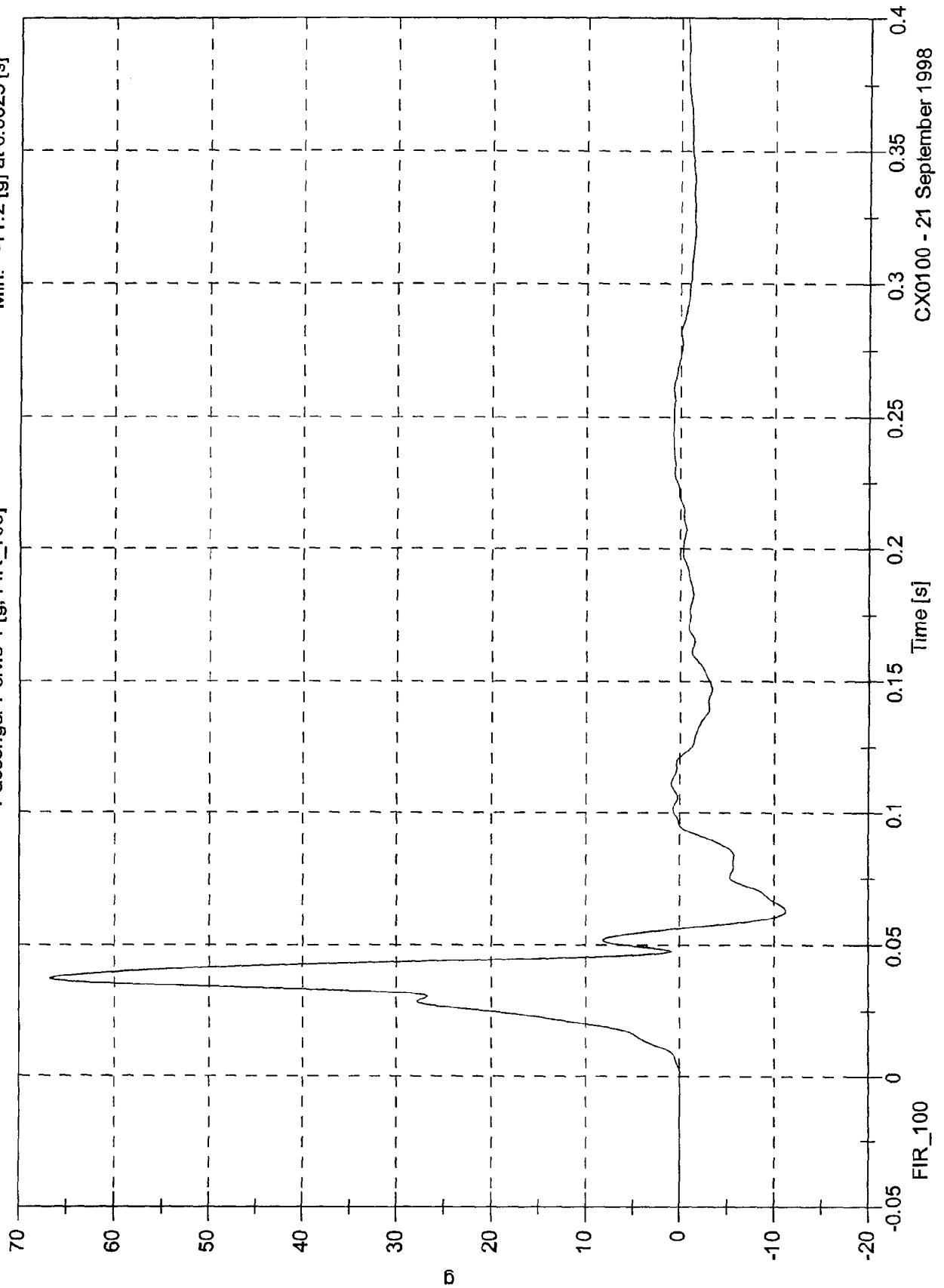
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 66.8 [g] at 0.0375 [s]

Min: -11.2 [g] at 0.0625 [s]

Passenger Pelvic Y [g, FIR_100]



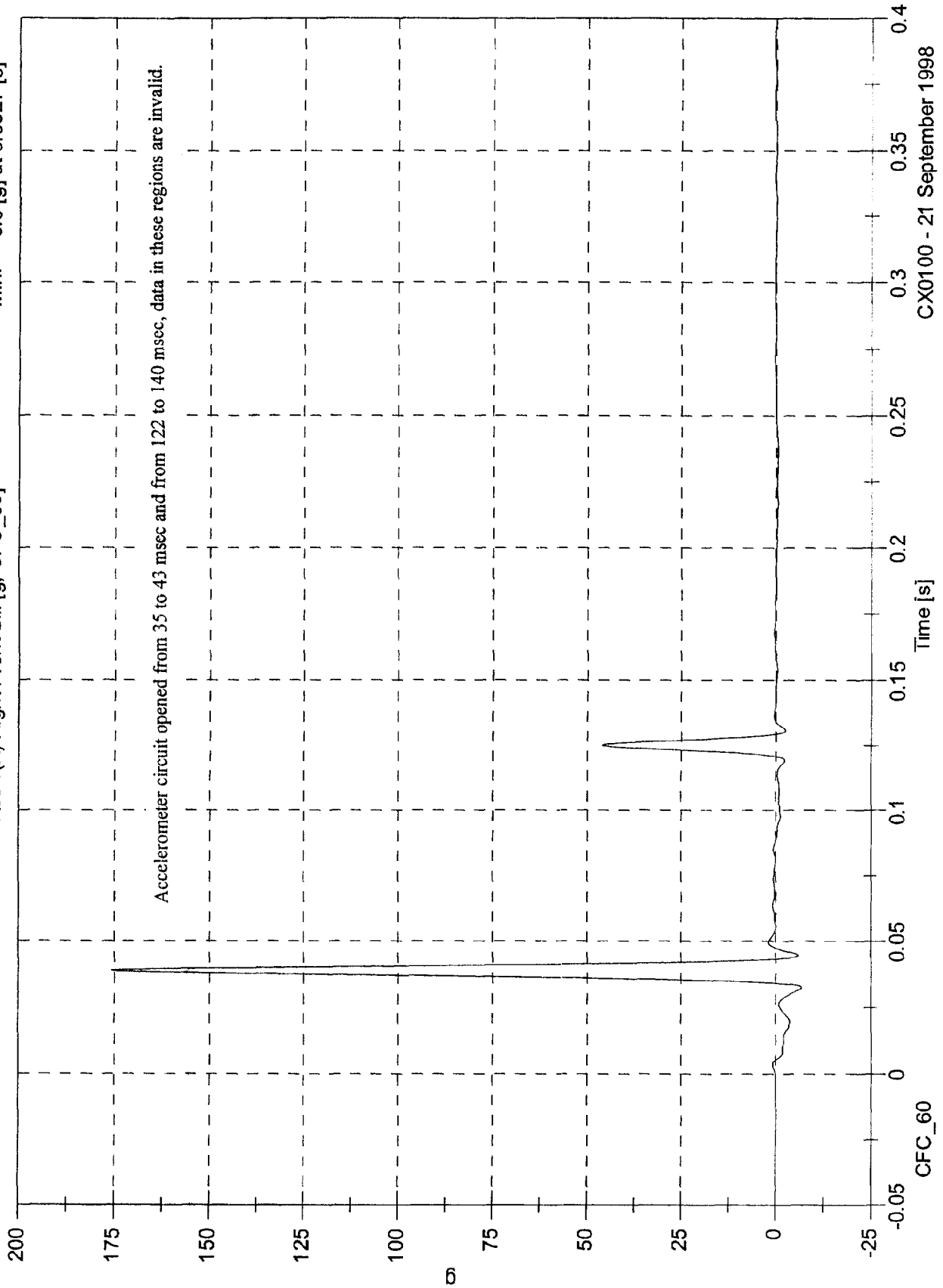
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max 175.8 [g] at 0.0389 [s]

Min: -6.9 [g] at 0.0327 [s]

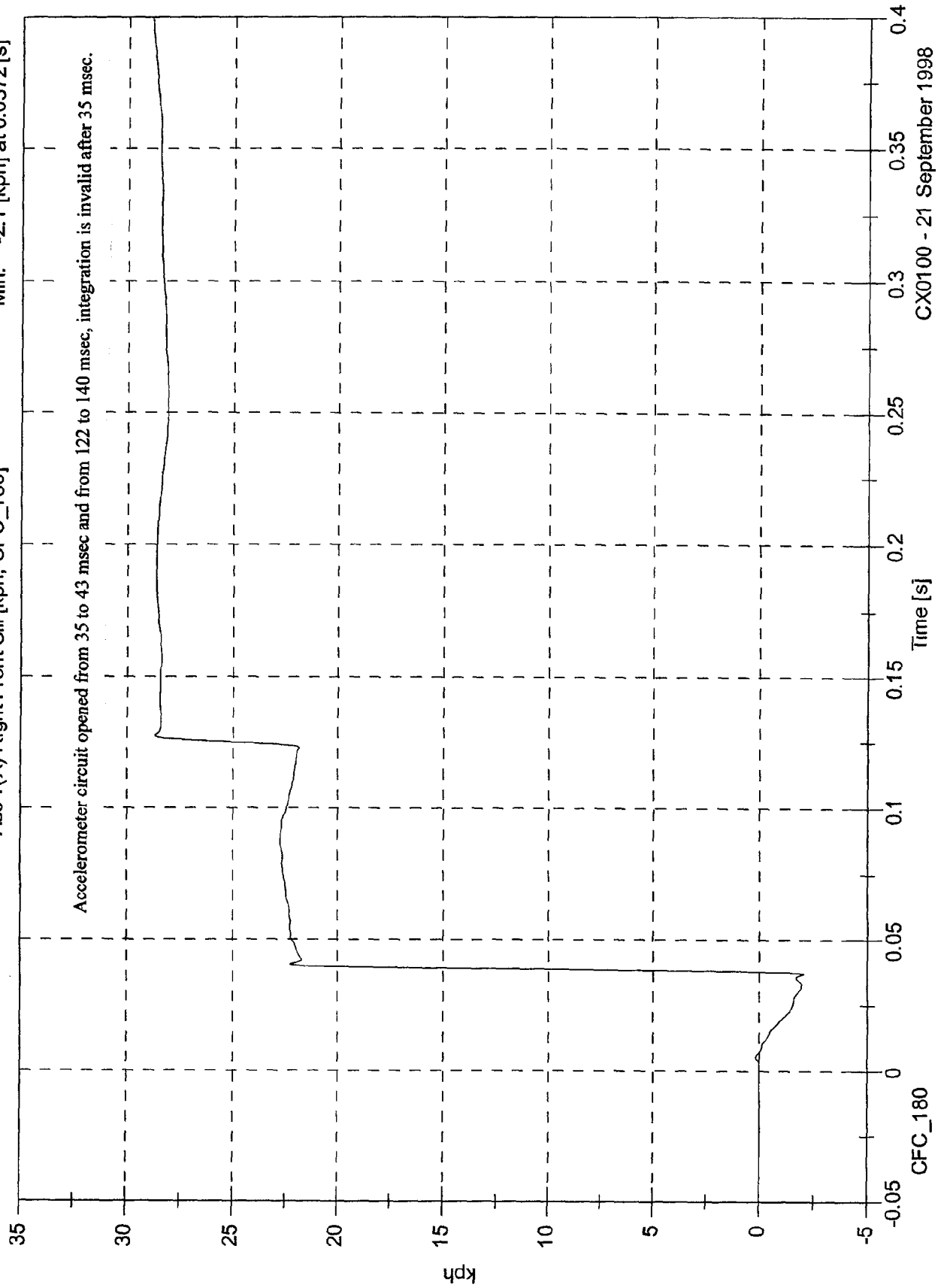


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NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 31.0 [kph] at 0.727 [s]
Min: -2.1 [kph] at 0.0372 [s]



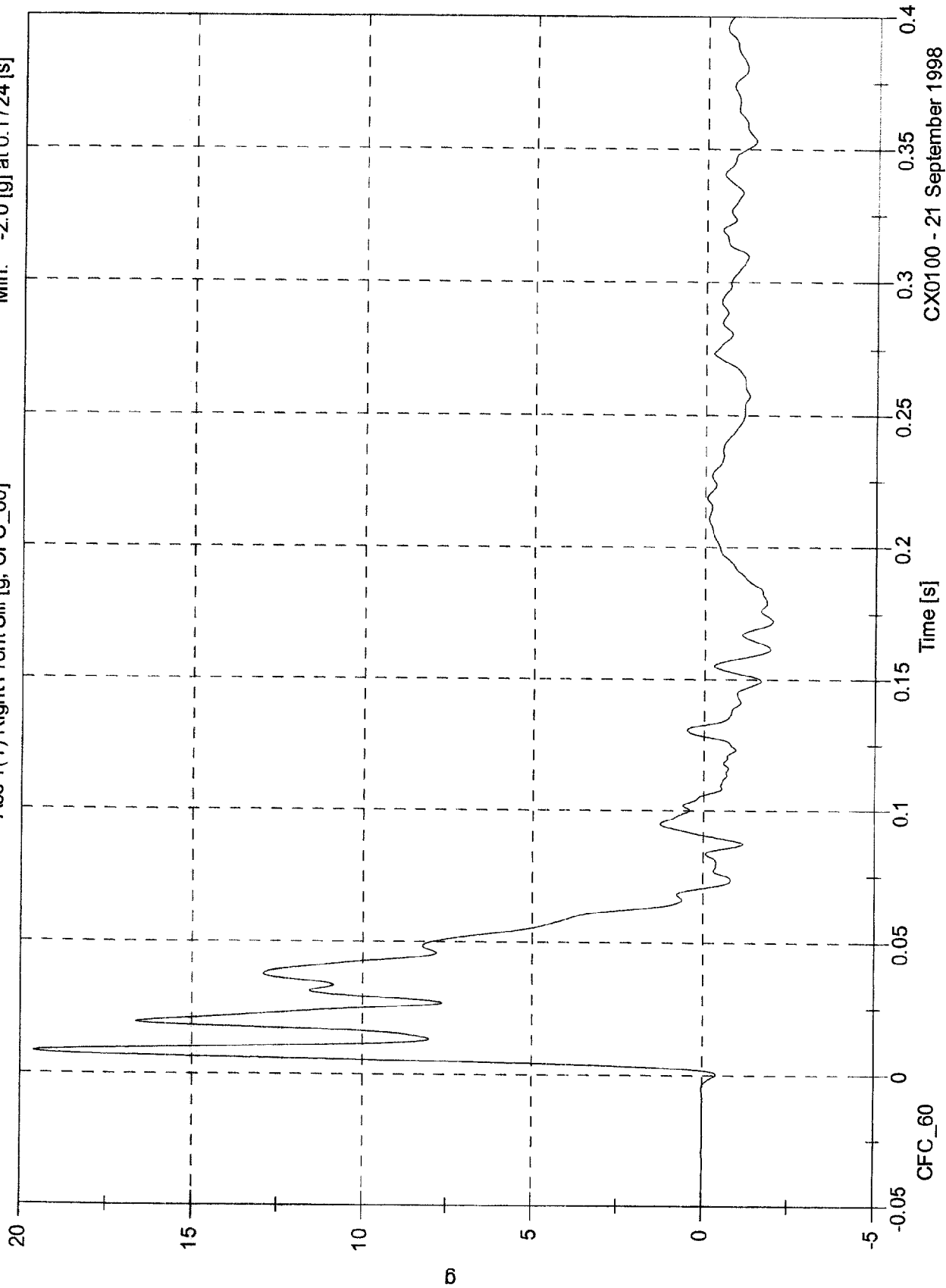
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 19.6 [g] at 0.0082 [s]

Min: -2.0 [g] at 0.1724 [s]



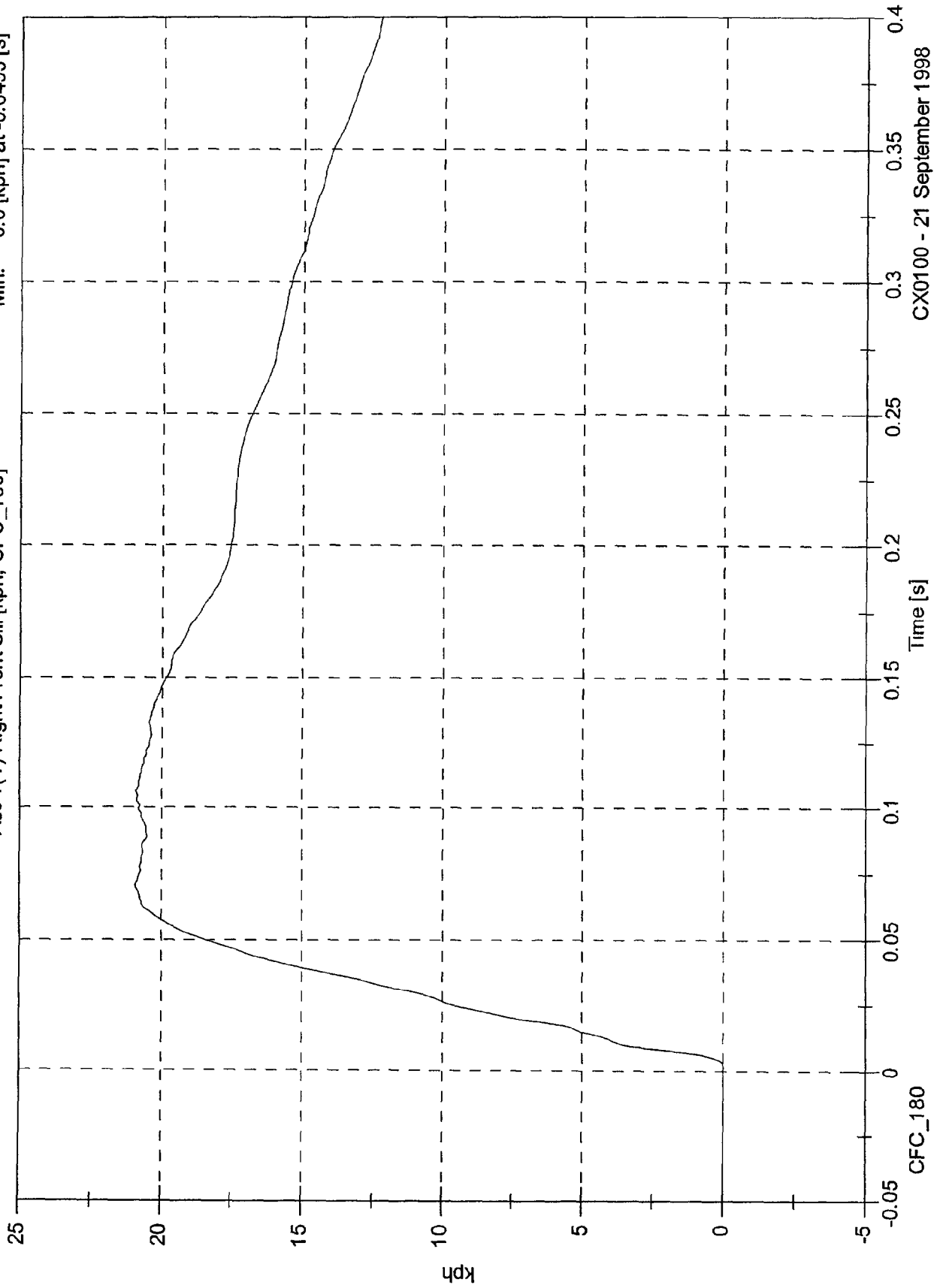
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 20.9 [kph] at 0.0706 [s]

Min: -0.0 [kph] at -0.0495 [s]

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

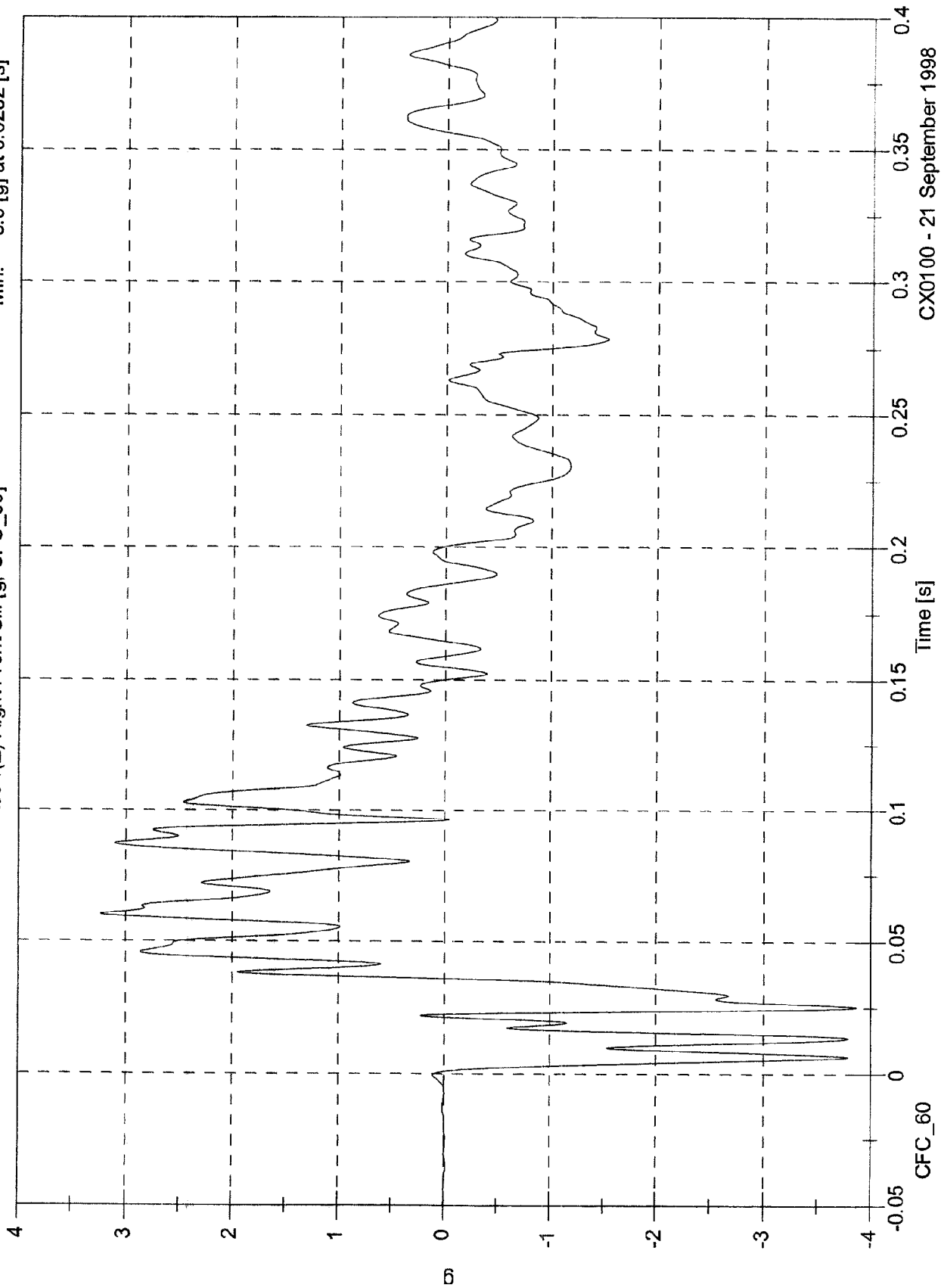


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 3.2 [g] at 0.06 [s]
Min: -3.9 [g] at 0.0252 [s]

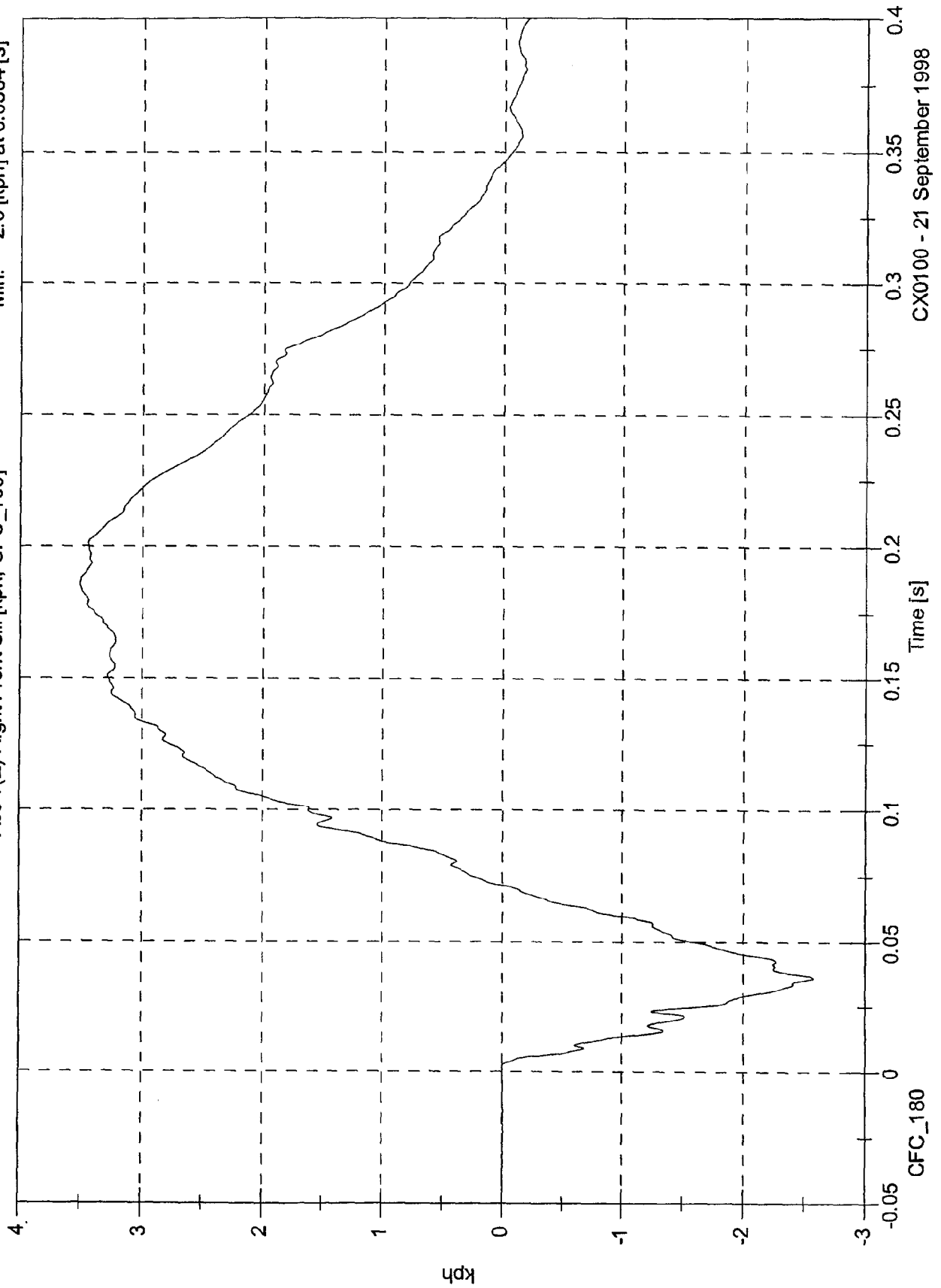


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NHTSA Side Impact - 1999 Oldsmobile Alero

Max 3.5 [kph] at 0.1859 [s]
 Min: -2.6 [kph] at 0.0364 [s]

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

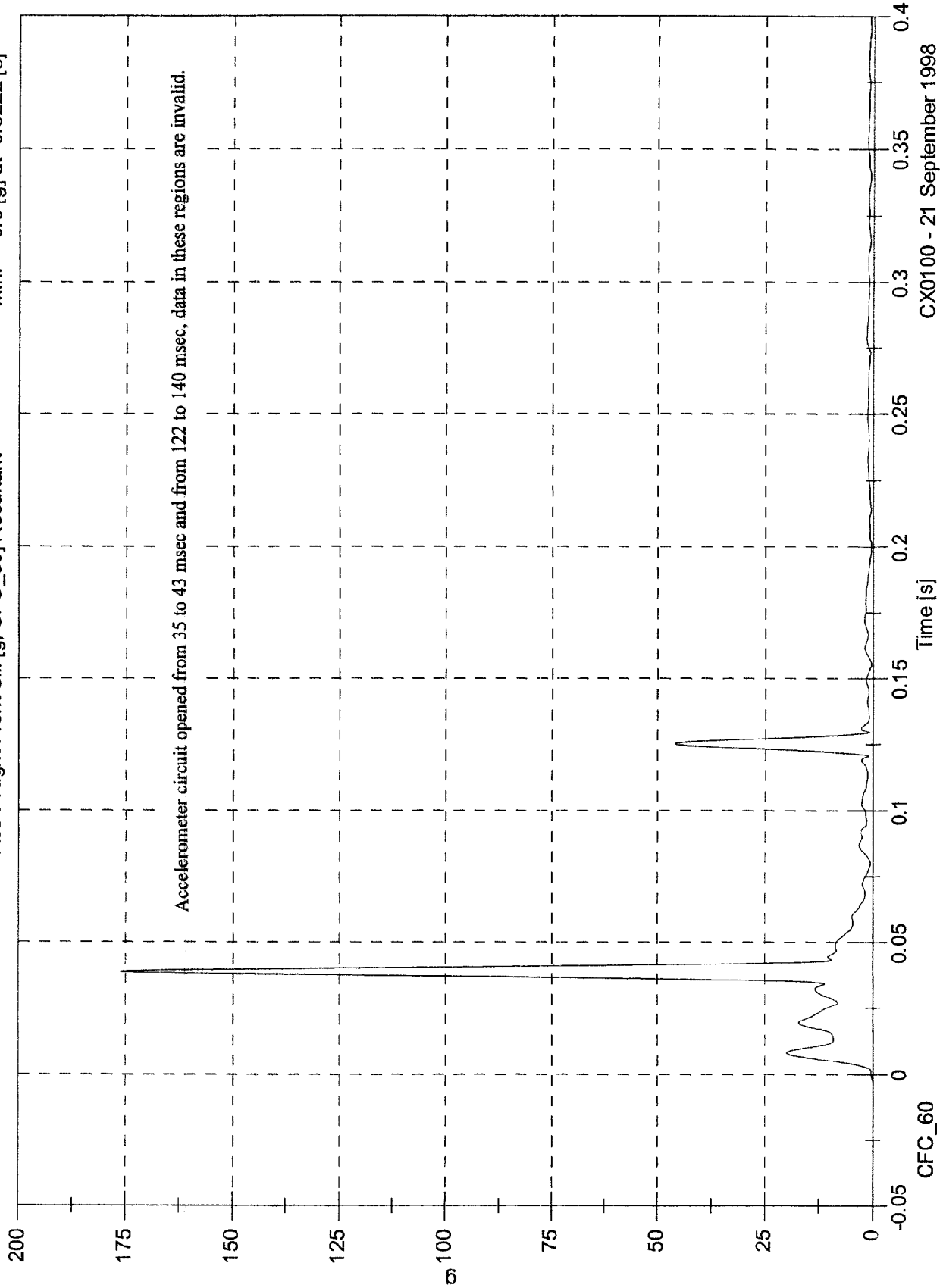


NHTSA Side Impact - 1999 Oldsmobile Alero

Acc 1 Right Front Sill [g, CFC_60] Resultant

Max: 176.3 [g] at 0.0388 [s]

Min: 0.0 [g] at -0.0222 [s]



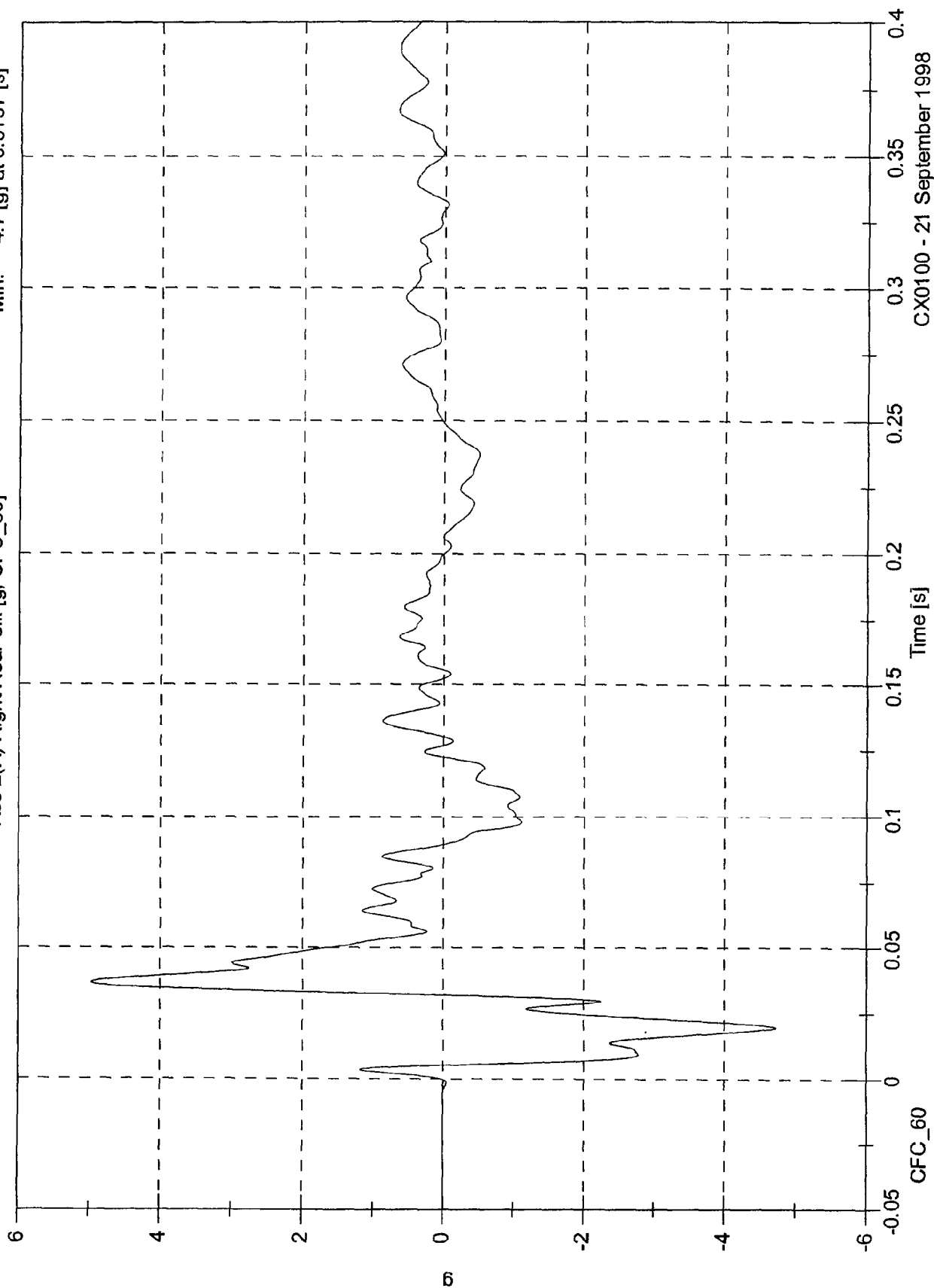
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 5.0 [g] at 0.0368 [s]

Min: -4.7 [g] at 0.0197 [s]

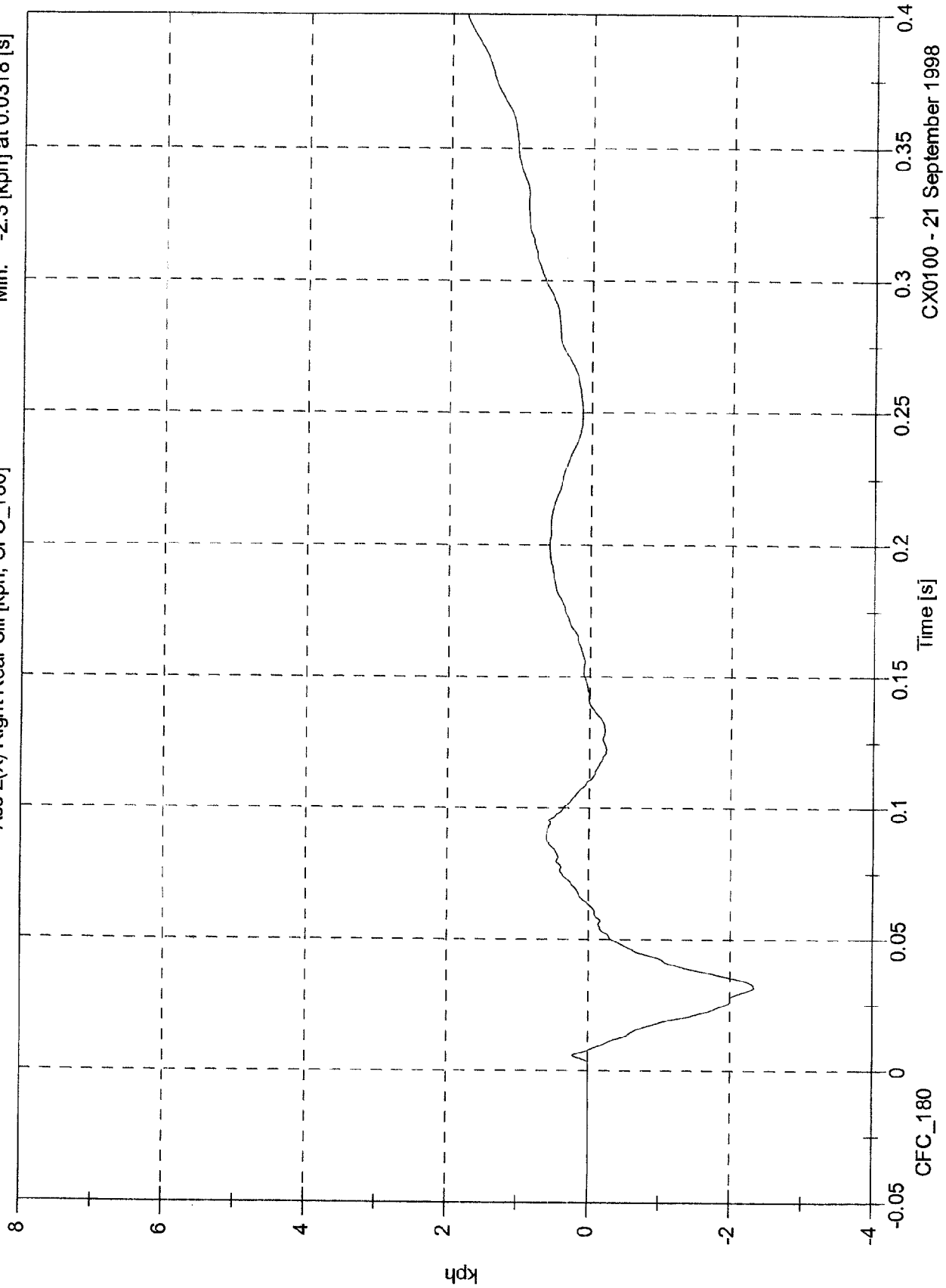


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 6.2 [kph] at 0.9996 [s]
Min: -2.3 [kph] at 0.0318 [s]

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



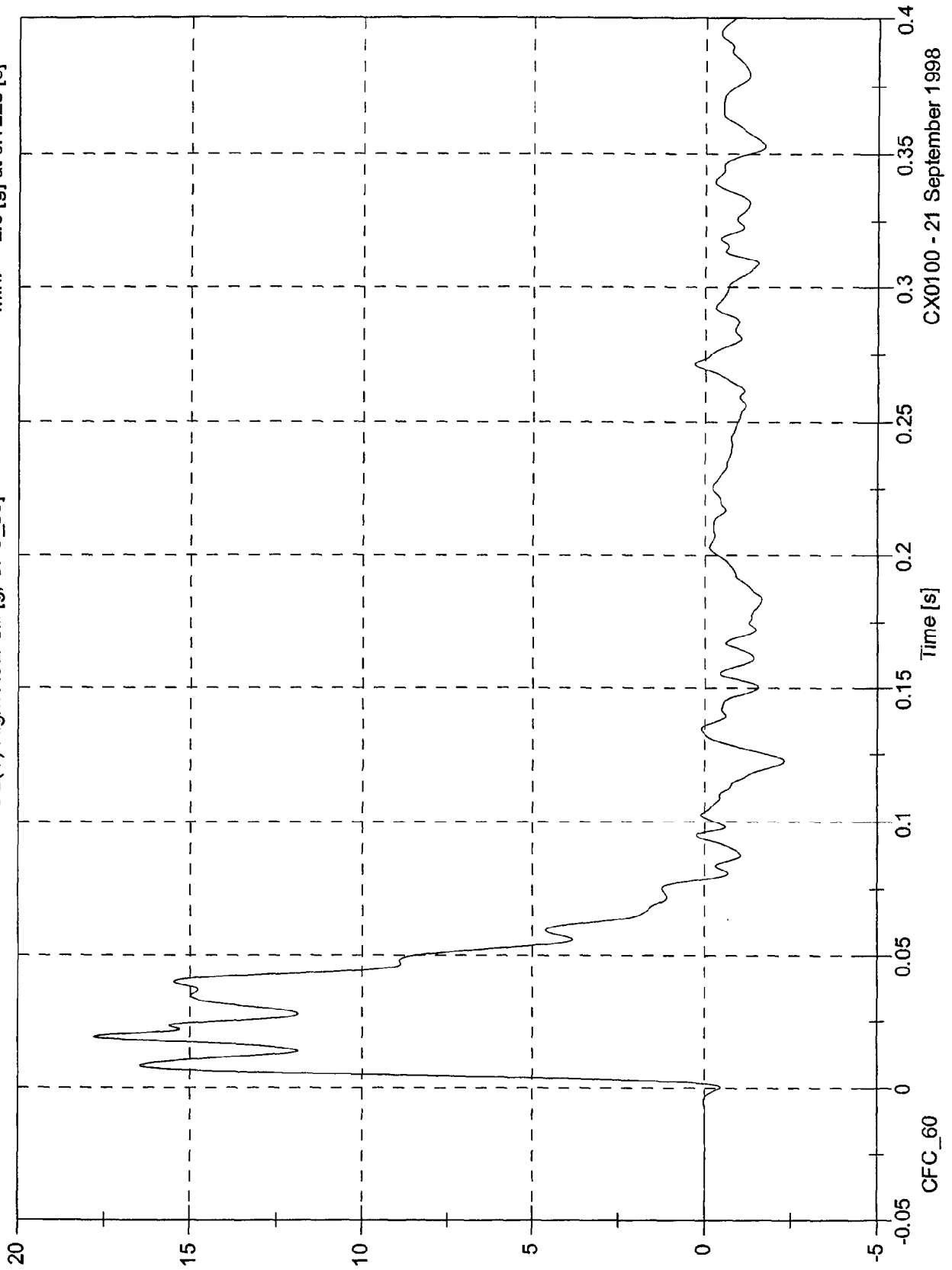
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 17.8 [g] at 0.019 [s]

Min: -2.3 [g] at 0.1225 [s]

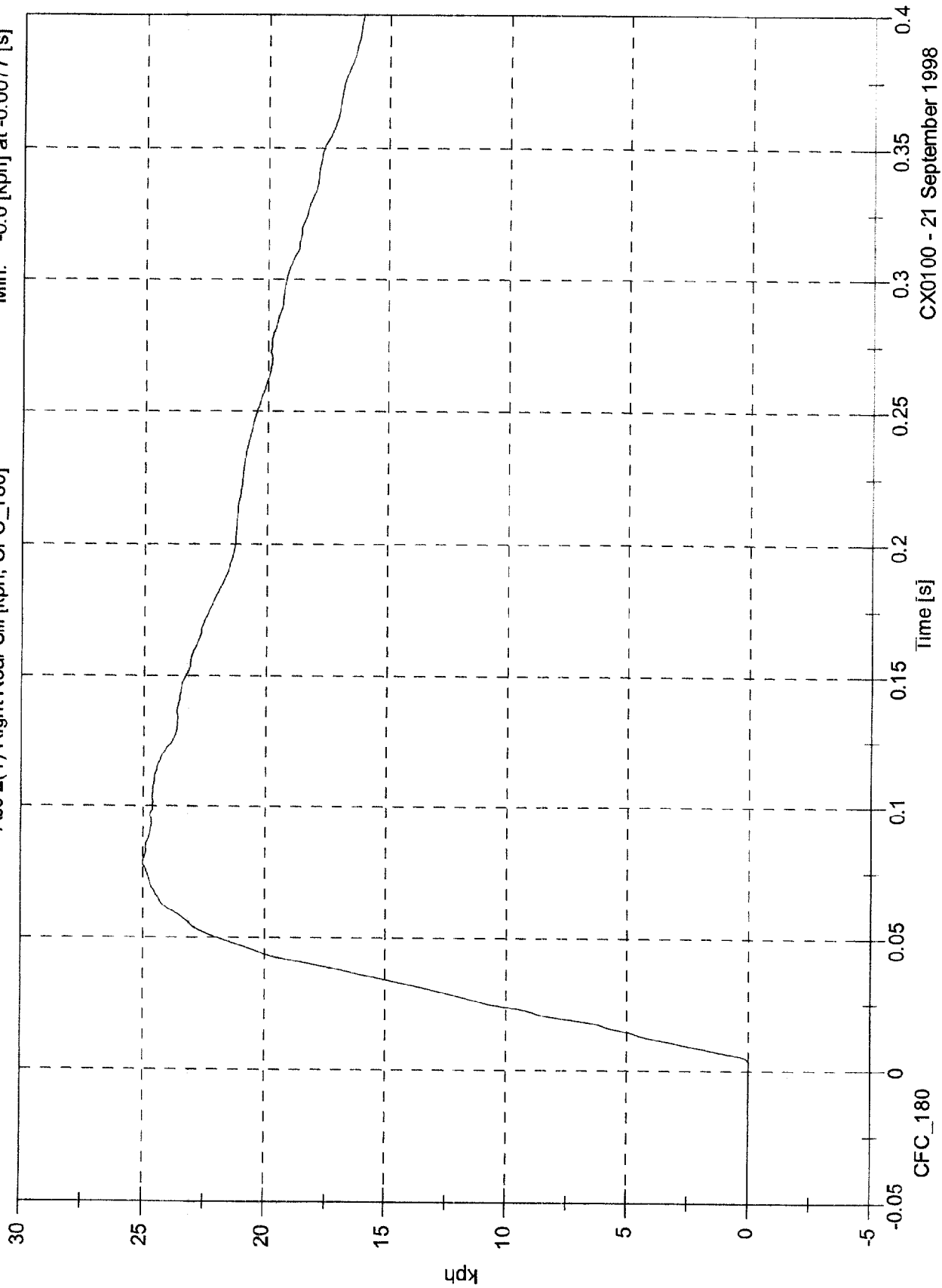


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

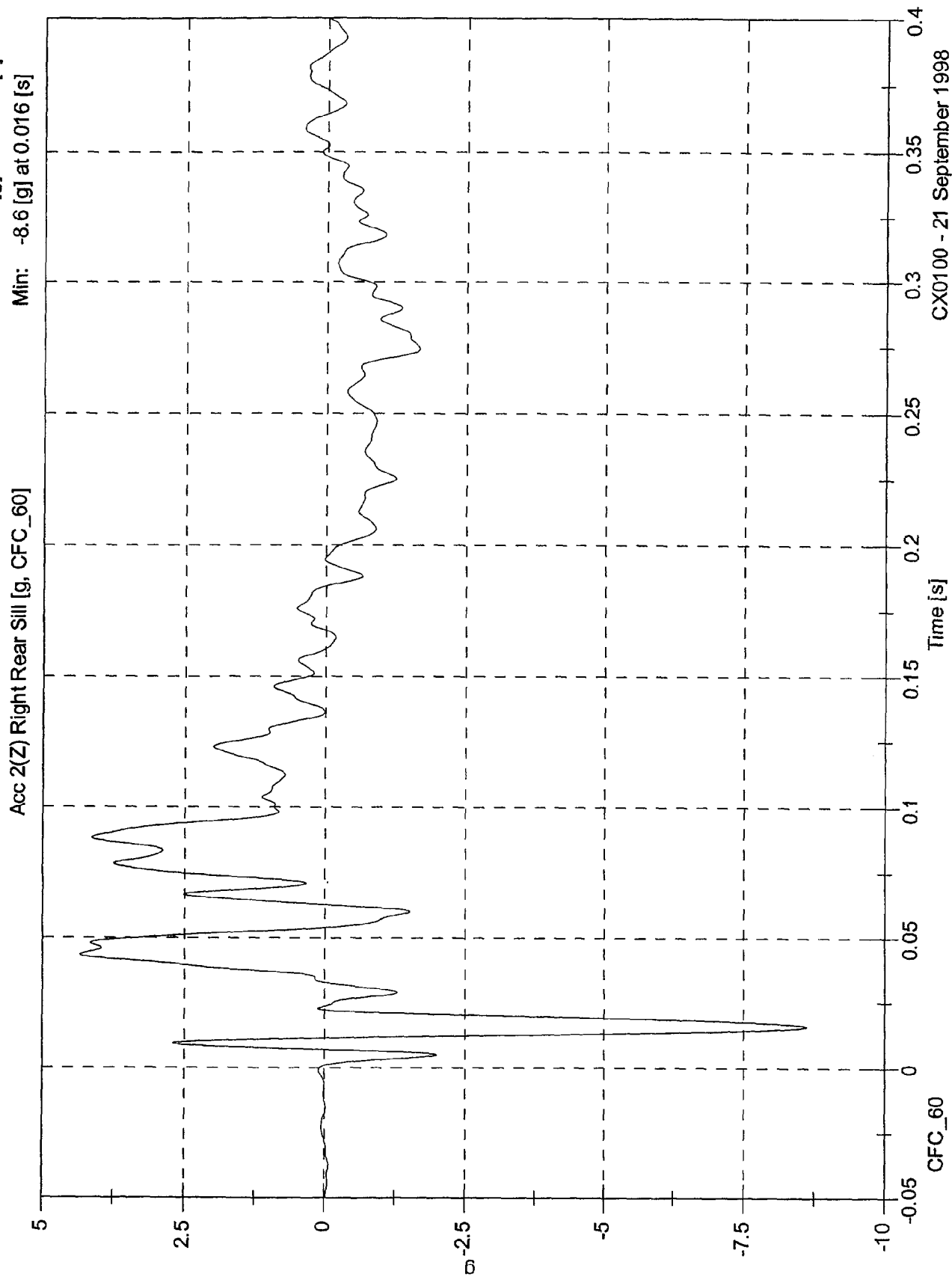
Acc 2(Y) Right Rear Sill [kph, CFC_180]

Max: 25.0 [kph] at 0.0784 [s]
Min: -0.0 [kph] at -0.0077 [s]



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NHTSA Side Impact - 1999 Oldsmobile Alero



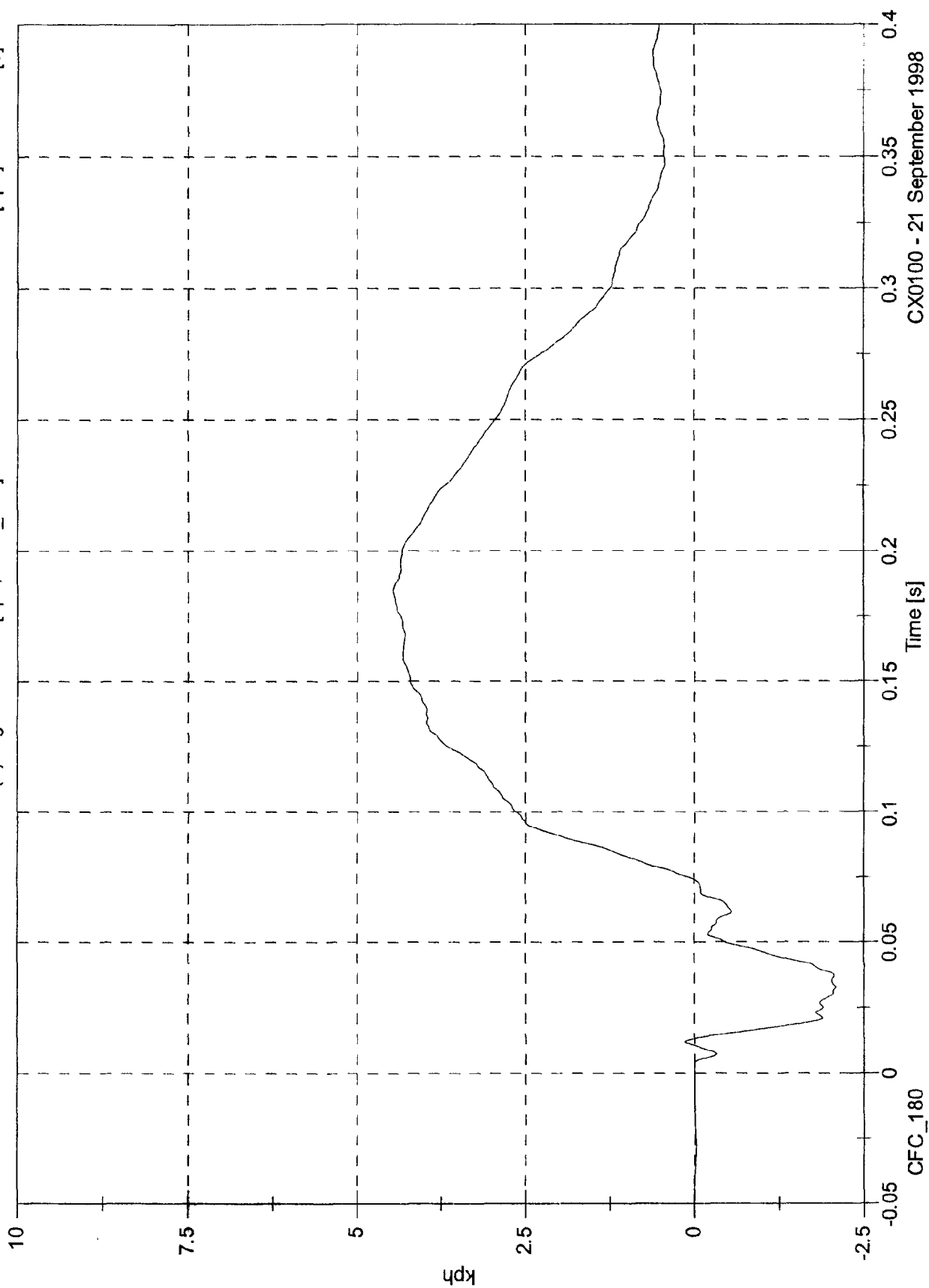
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 8.2 [kph] at 0.9999 [s]

Min: -2.1 [kph] at 0.0326 [s]



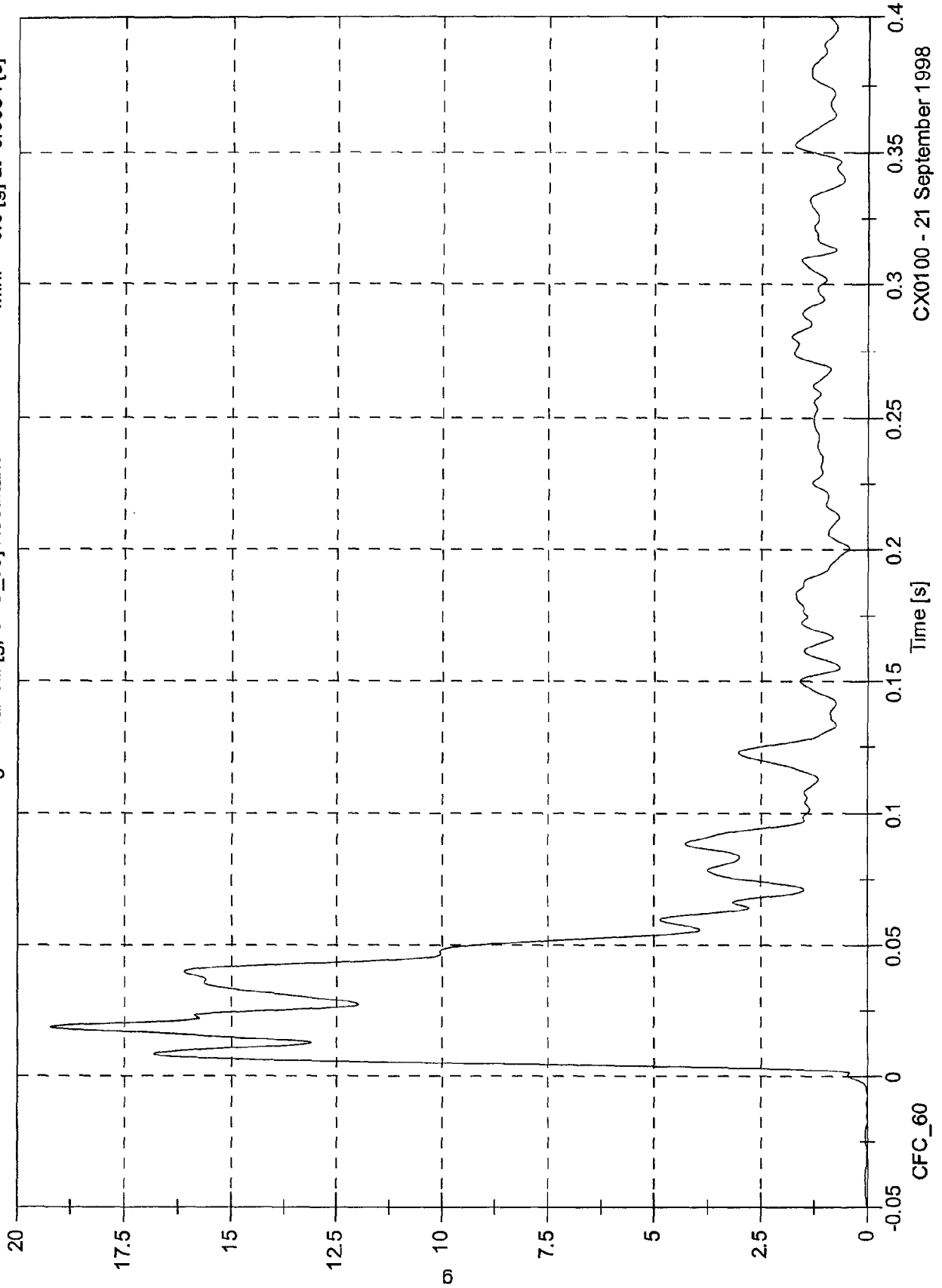
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 19.2 [g] at 0.0188 [s]

Min: 0.0 [g] at -0.0634 [s]

Acc 2 Right Rear Sill [g, CFC_60] Resultant



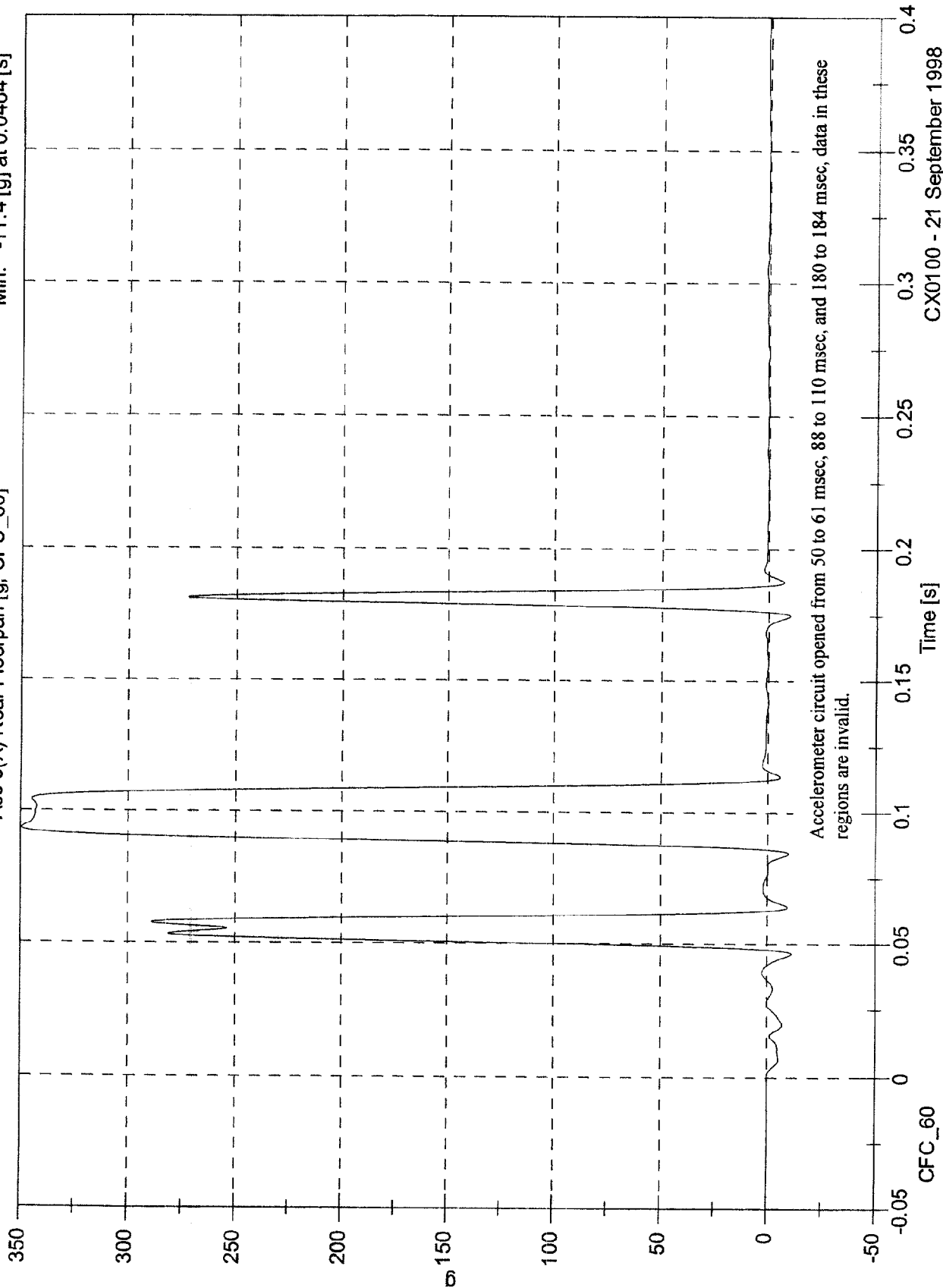
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 349.6 [g] at 0.0933 [s]

Min: -11.4 [g] at 0.0464 [s]

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

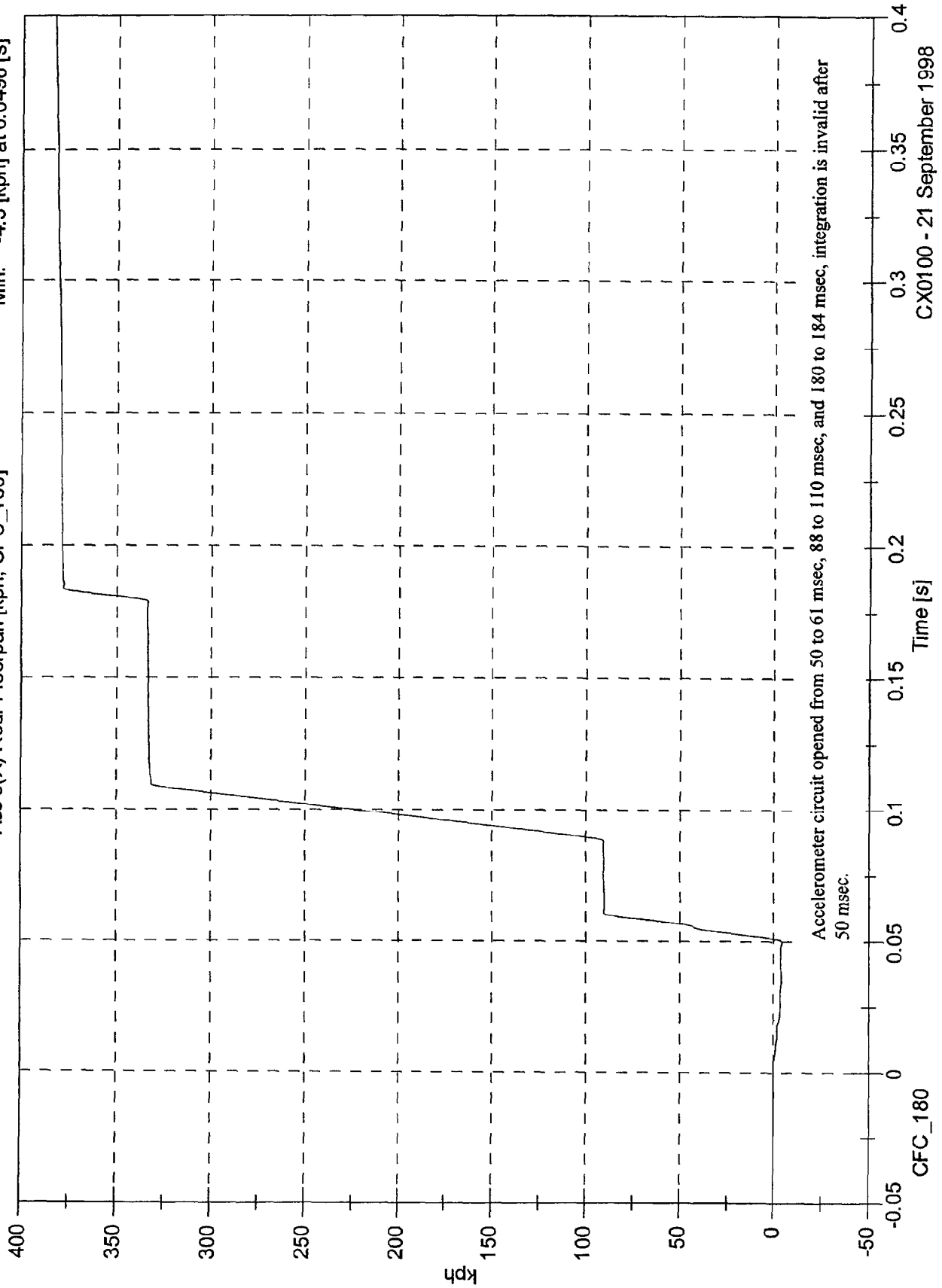


NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 395.5 [kph] at 0.9999 [s]

Min: -4.3 [kph] at 0.0498 [s]

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

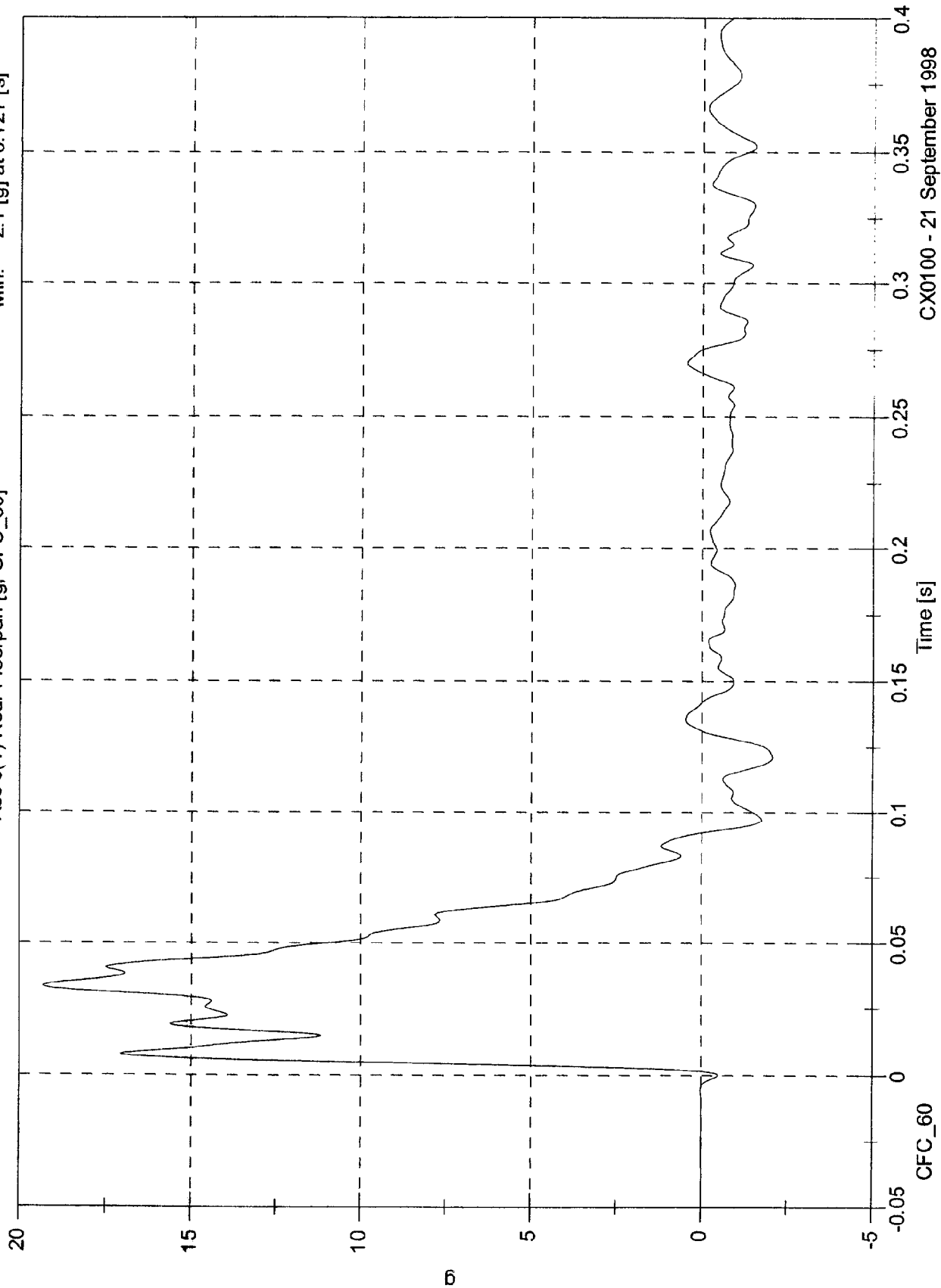


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 19.3 [g] at 0.0336 [s]
Min: -2.1 [g] at 0.121 [s]



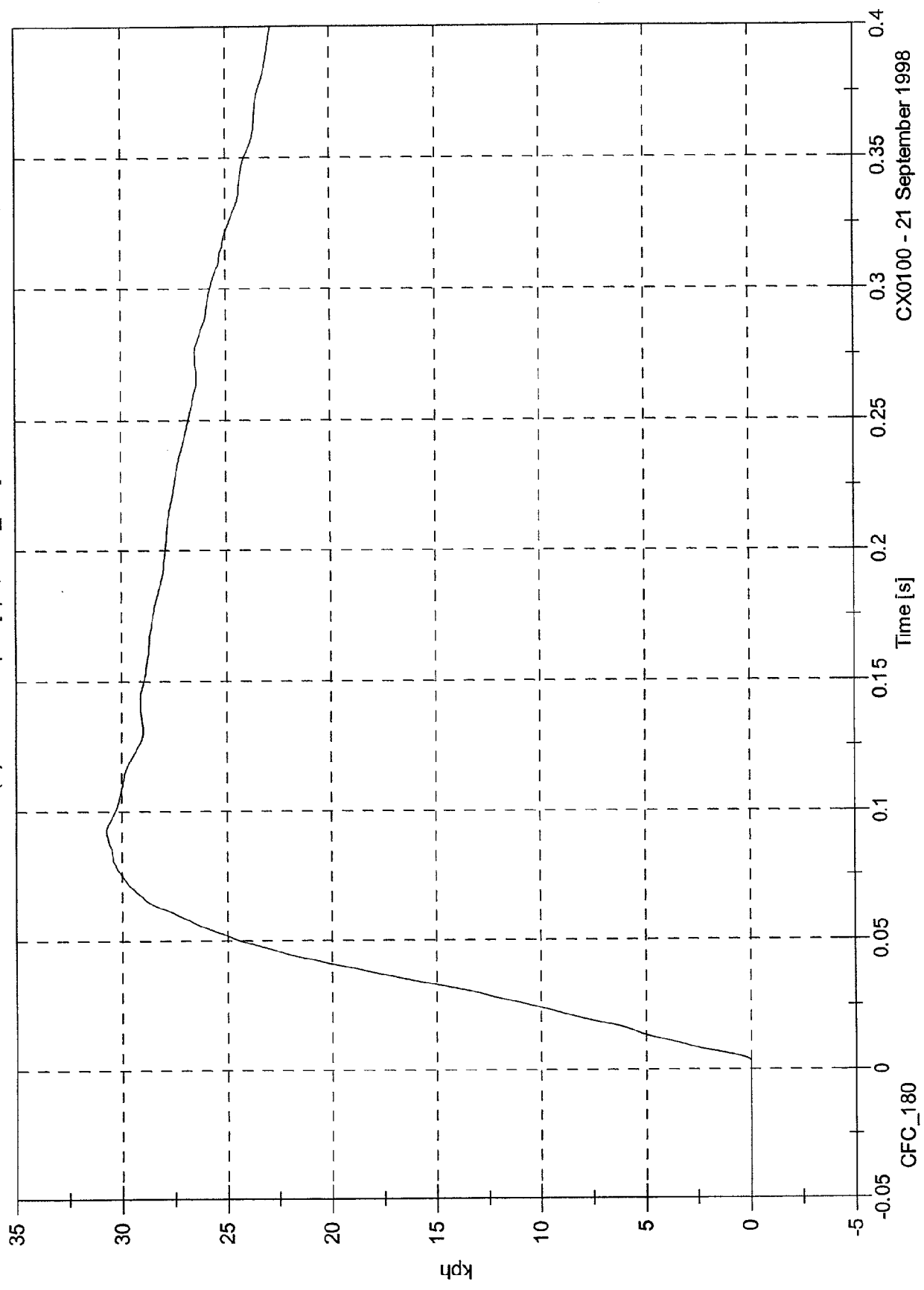
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 30.7 [kph] at 0.0923 [s]

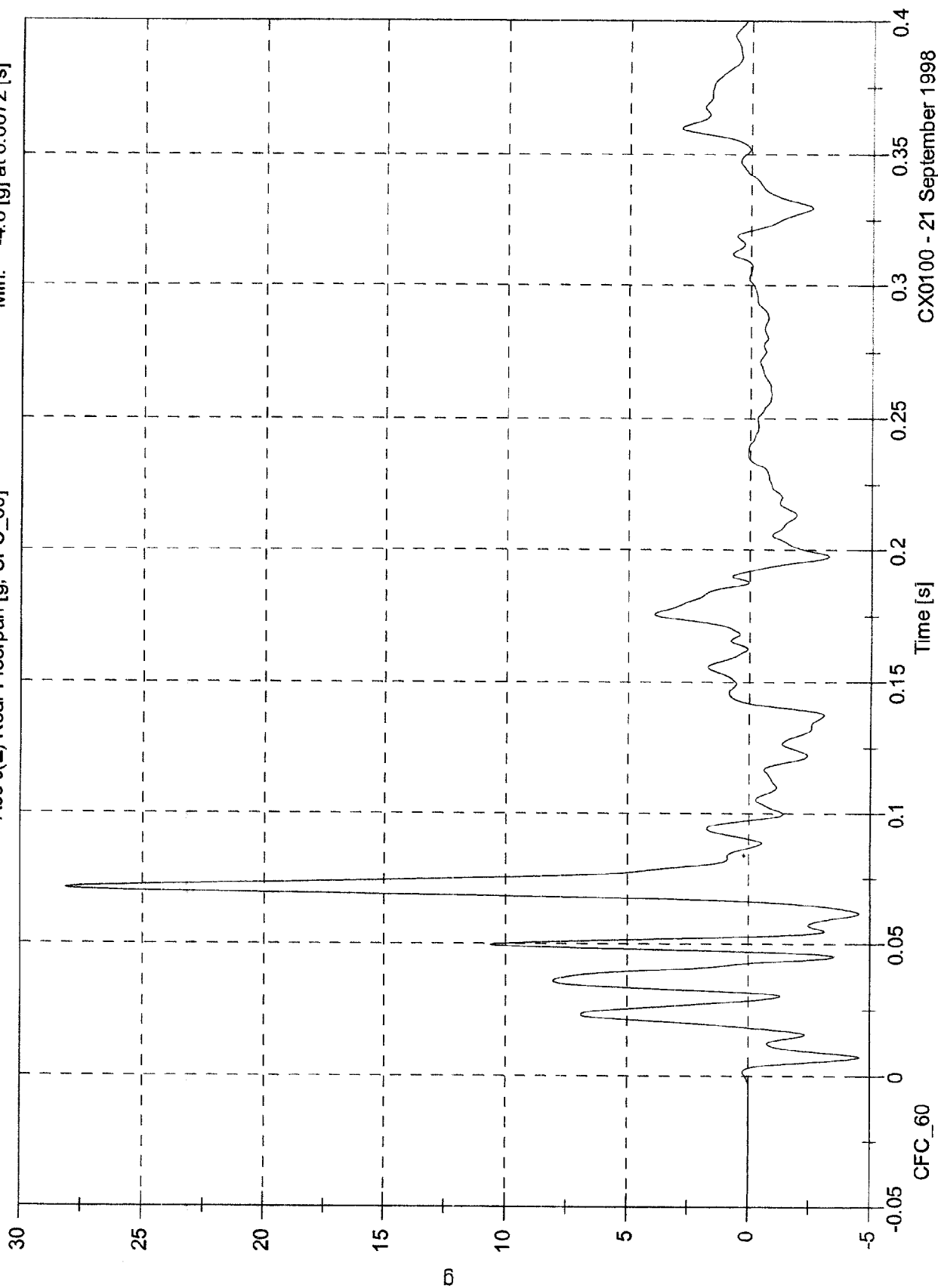
Min: -0.0 [kph] at -0.0356 [s]



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NHTSA Side Impact - 1999 Oldsmobile Alero
Acc 3(Z) Rear Floorpan [g, CFC_60]

Max: 28.2 [g] at 0.0712 [s]
Min: -4.6 [g] at 0.0072 [s]



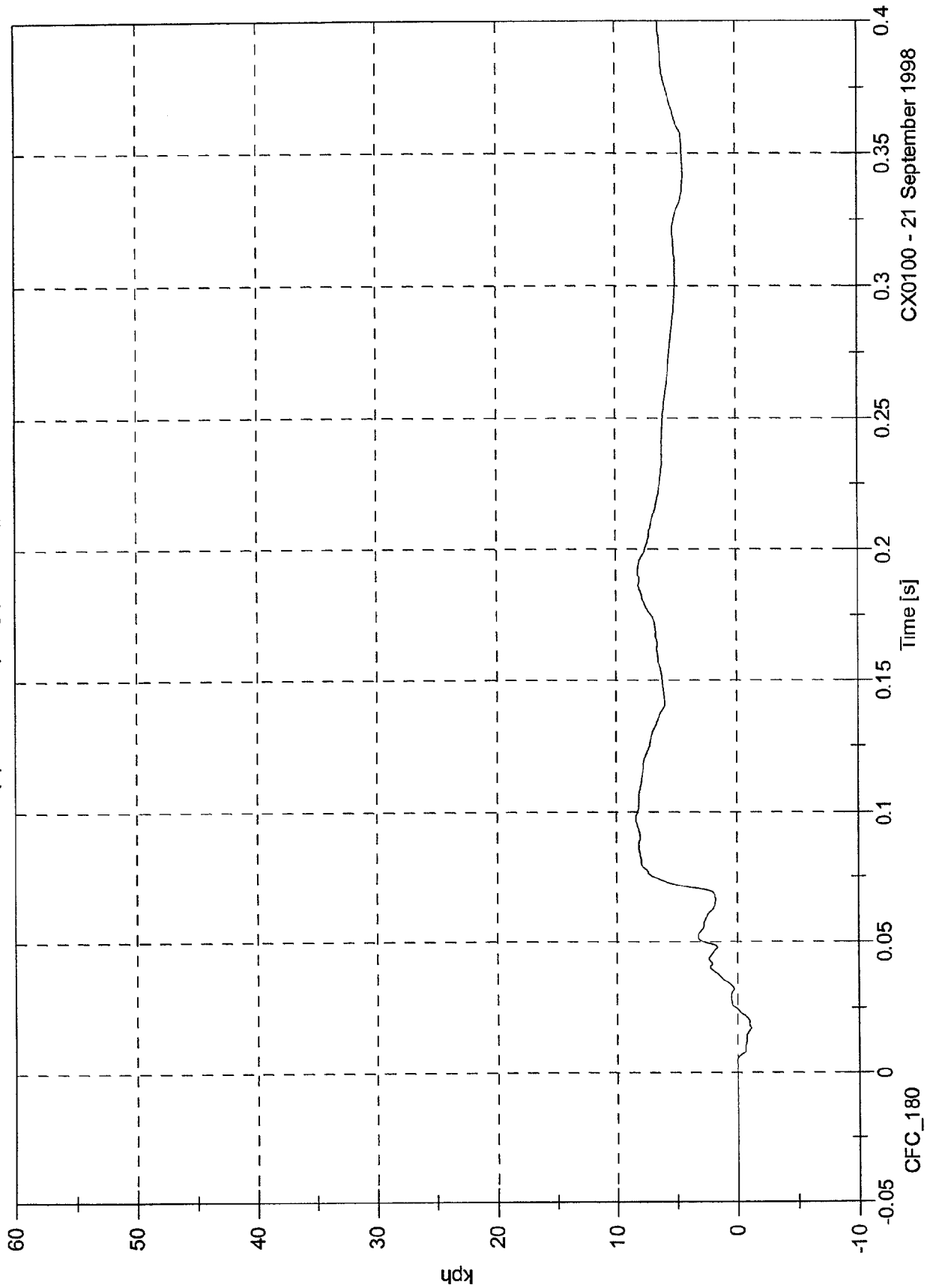
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 56.5 [kph] at 0.9999 [s]

Min: -1.1 [kph] at 0.0174 [s]



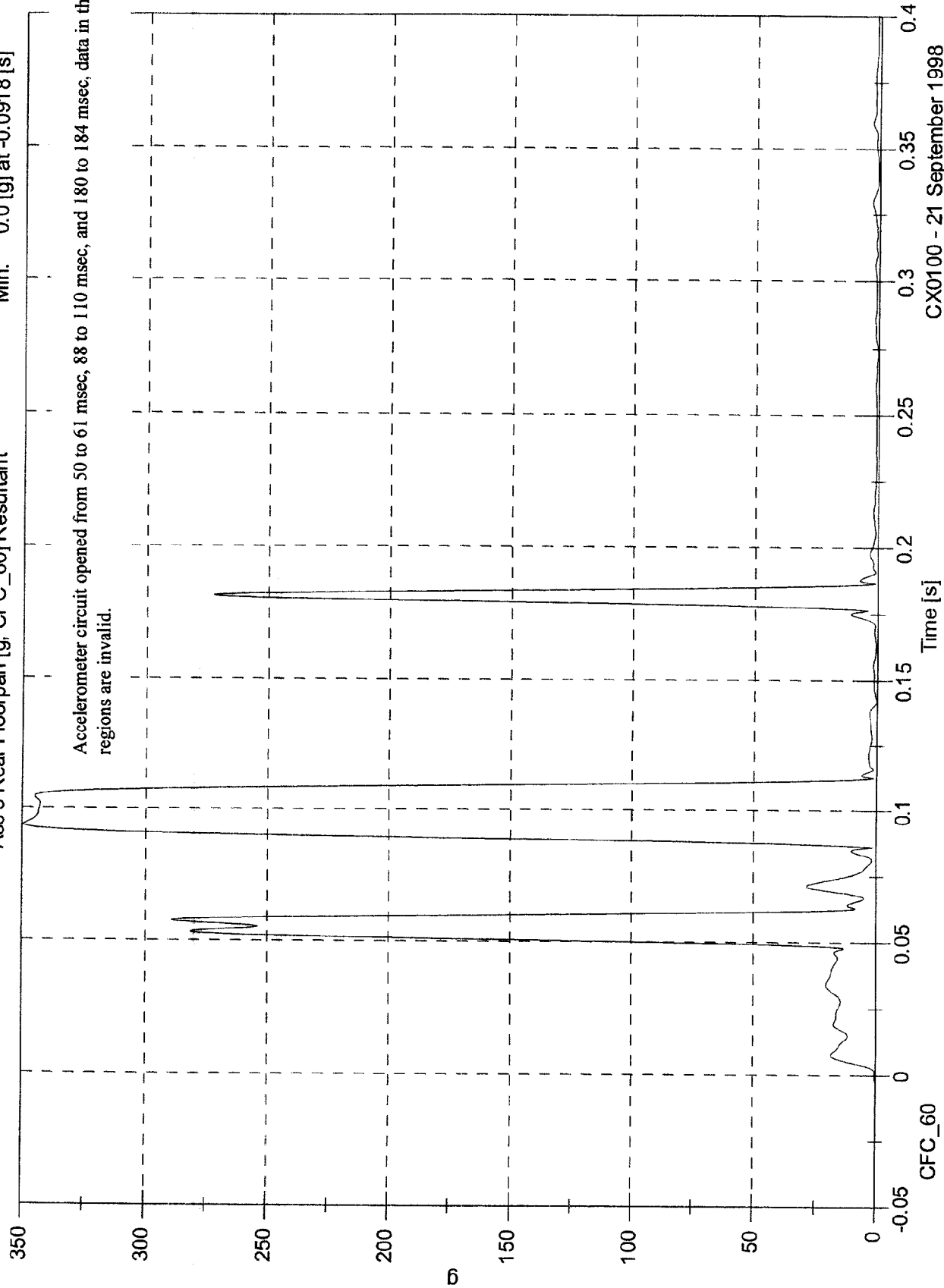
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 349.6 [g] at 0.0933 [s]

Min: 0.0 [g] at -0.0918 [s]

Acc 3 Rear Floorpan [g, CFC_60] Resultant

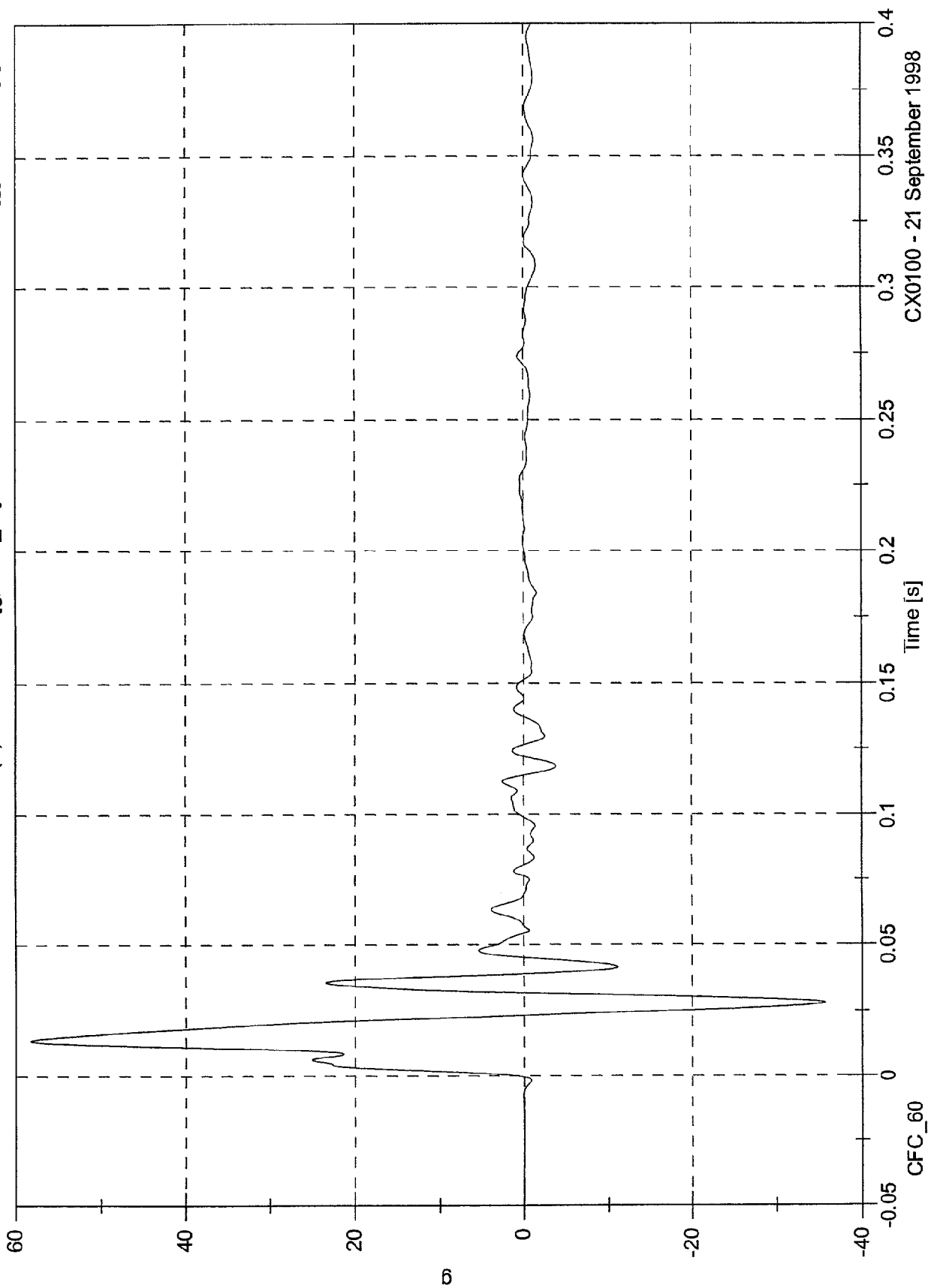


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 58.3 [g] at 0.0137 [s]
Min: -35.7 [g] at 0.0279 [s]



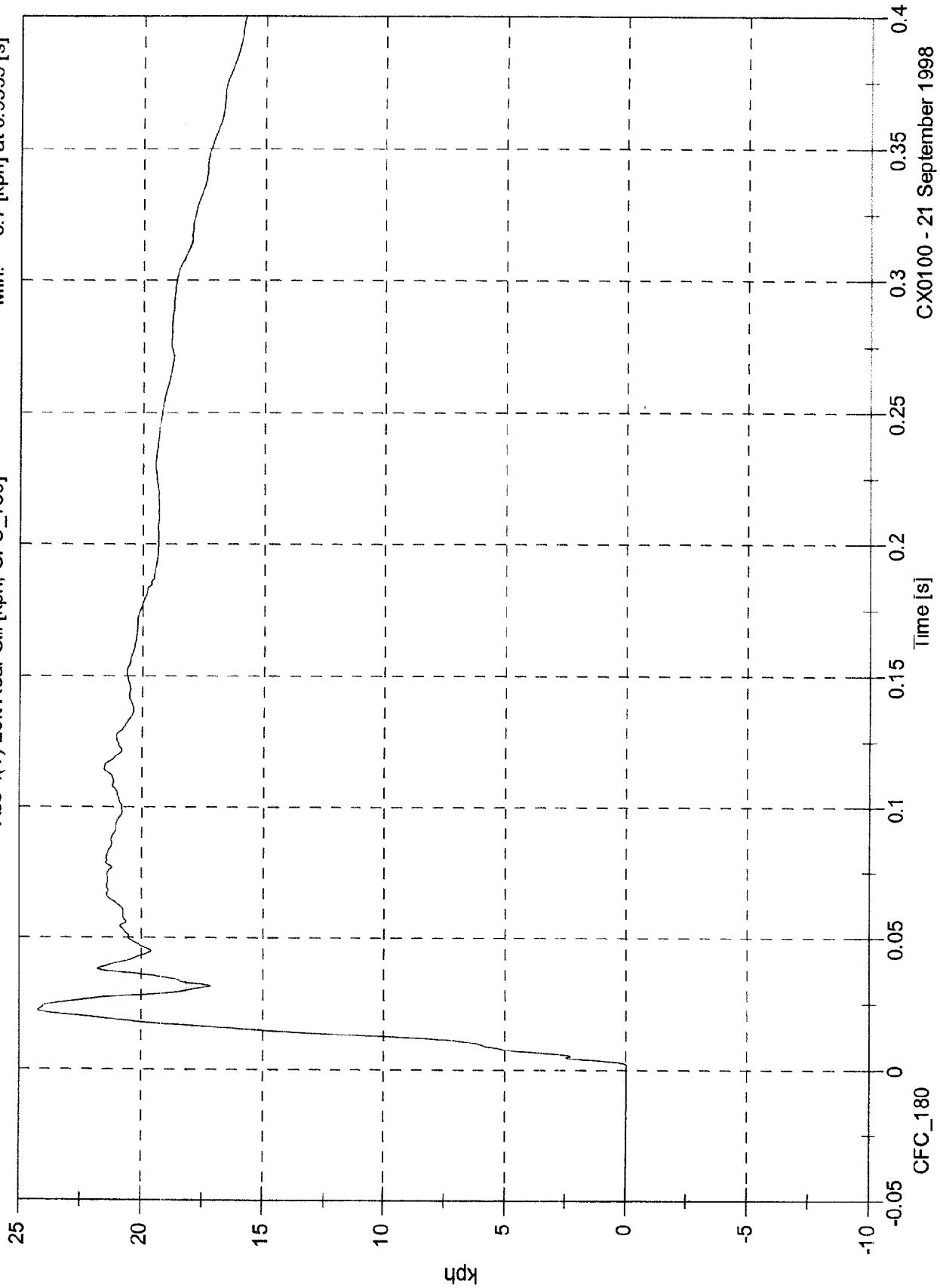
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 24.2 [kph] at 0.0222 [s]

Min: -6.7 [kph] at 0.9999 [s]



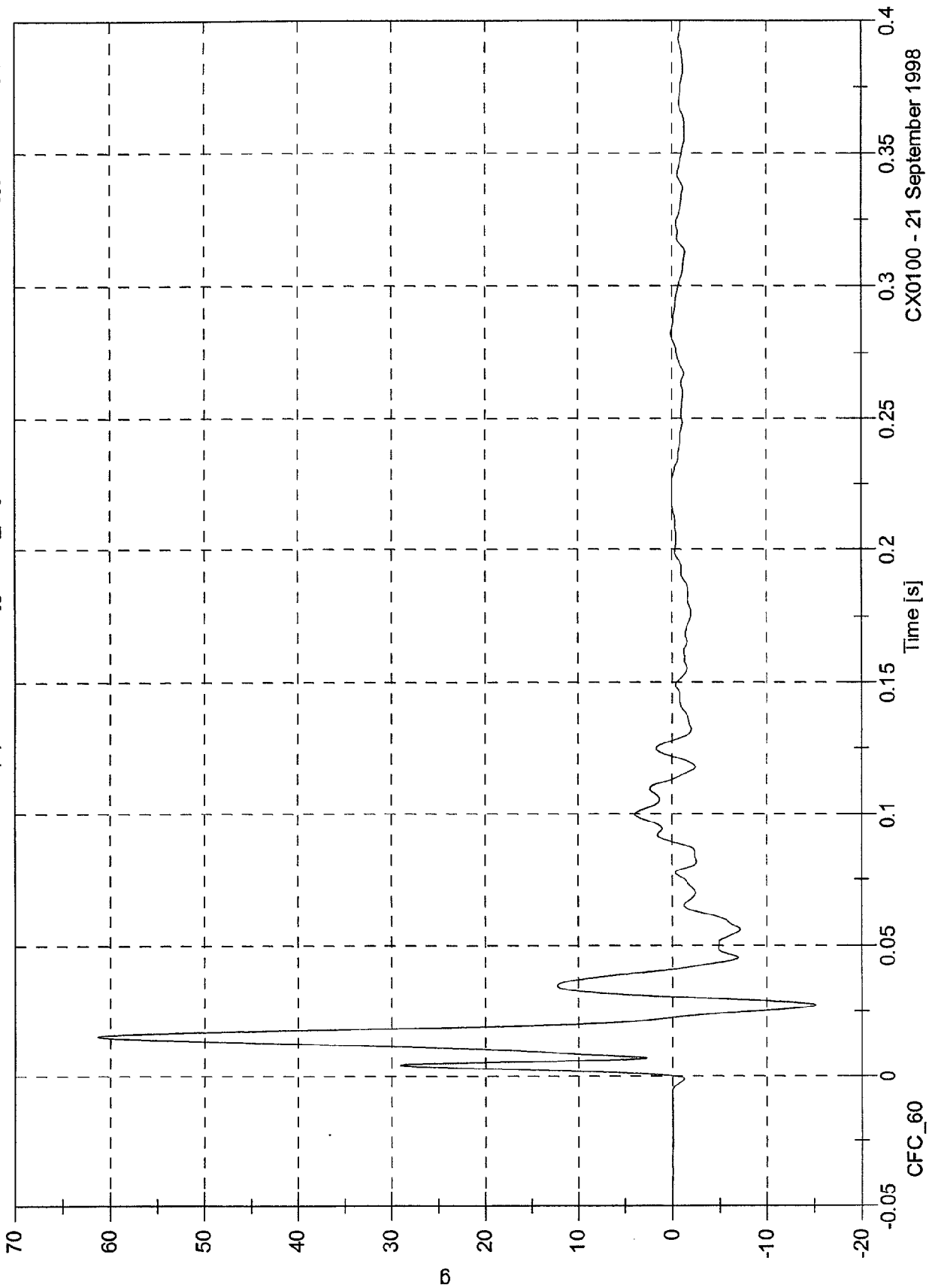
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Acc 5(Y) Left Front Sill [g, CFC_60]

Max: 61.4 [g] at 0.0154 [s]

Min: -15.2 [g] at 0.0274 [s]



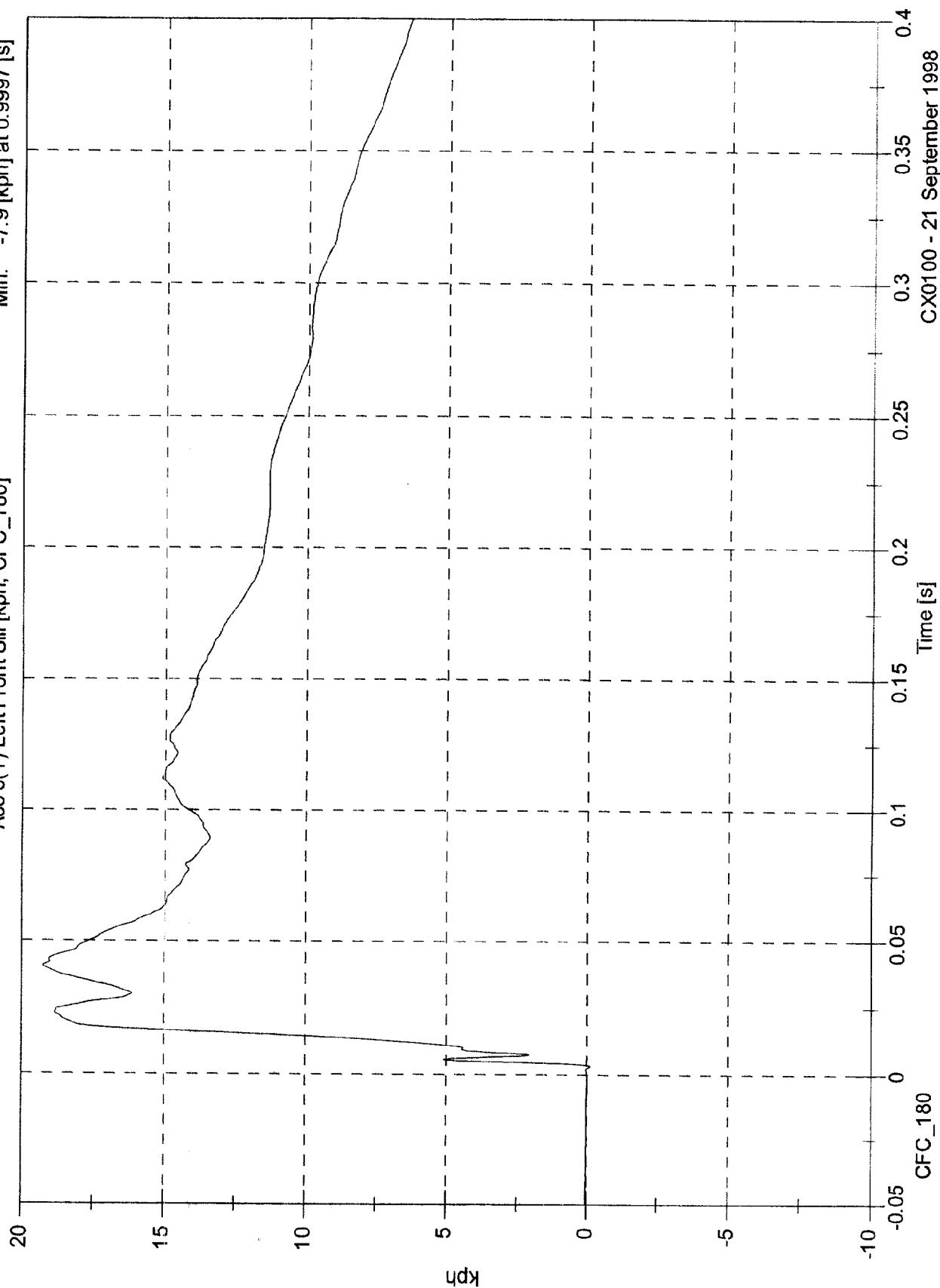
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Acc 5(Y) Left Front Sill [kph, CFC_180]

Max: 19.2 [kph] at 0.0407 [s]

Min: -7.9 [kph] at 0.9997 [s]



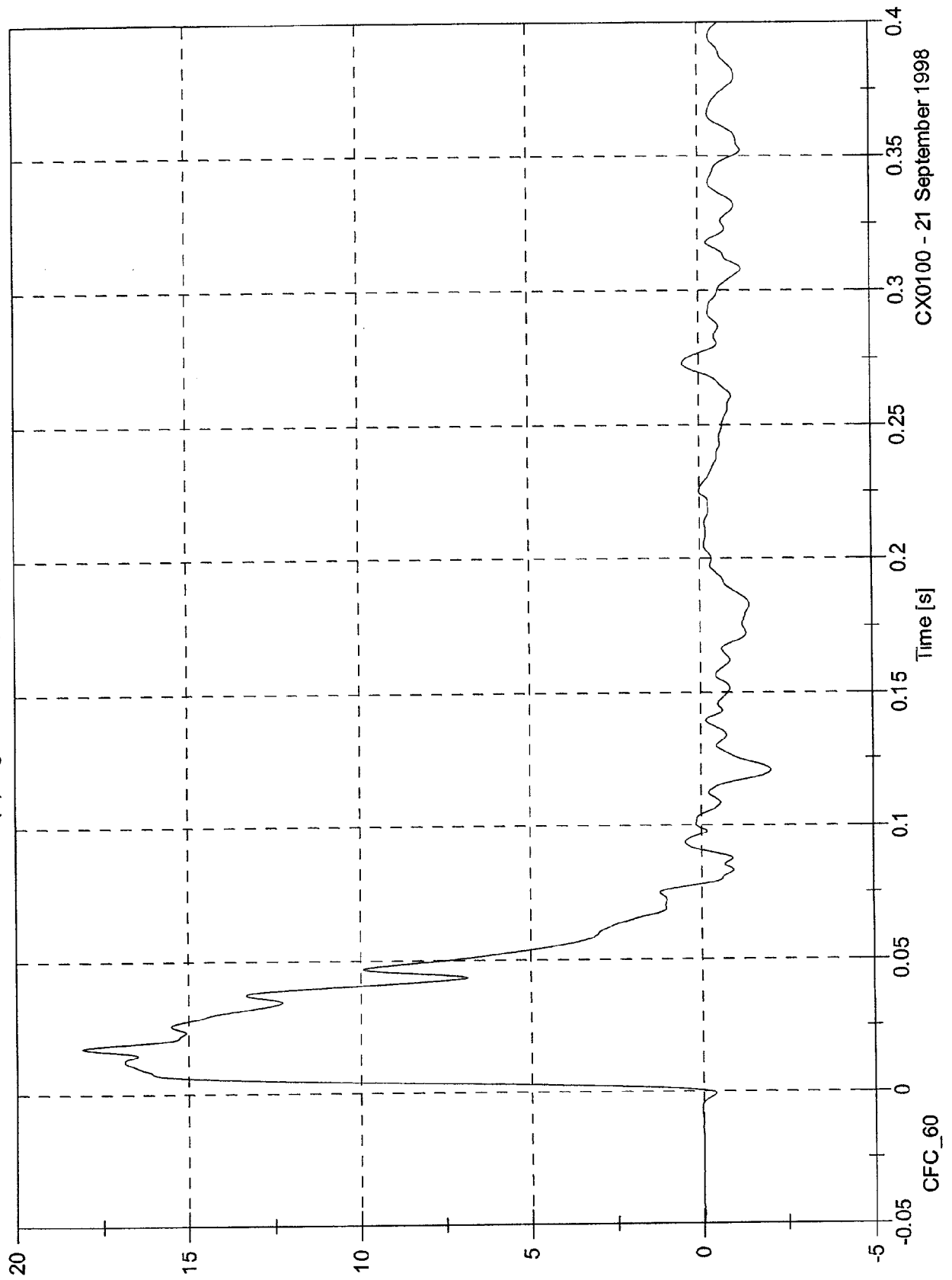
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 18.1 [g] at 0.0176 [s]

Min: -2.1 [g] at 0.1204 [s]

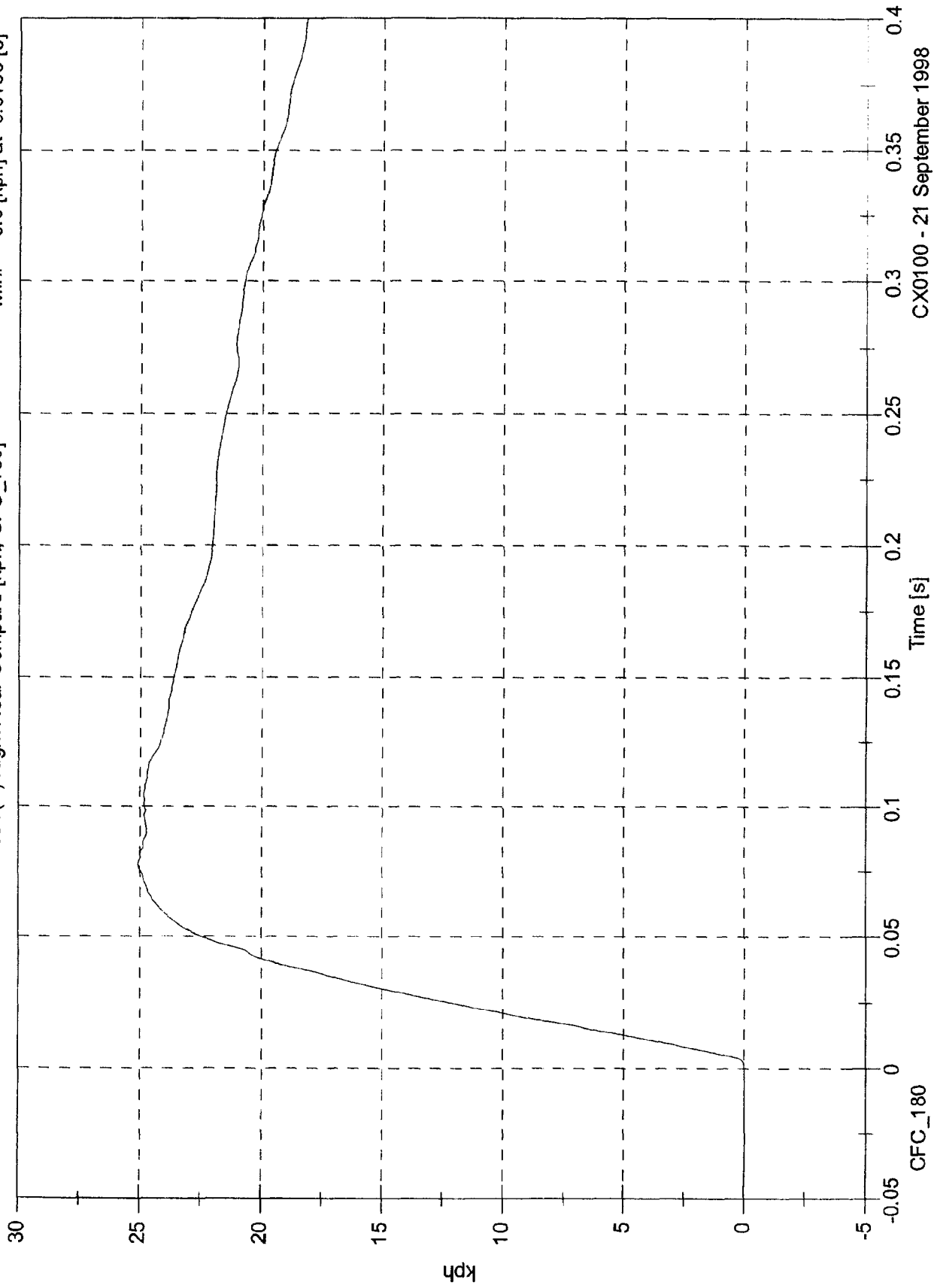


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 25.1 [kph] at 0.0778 [s]
Min: -0.0 [kph] at -0.0166 [s]

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



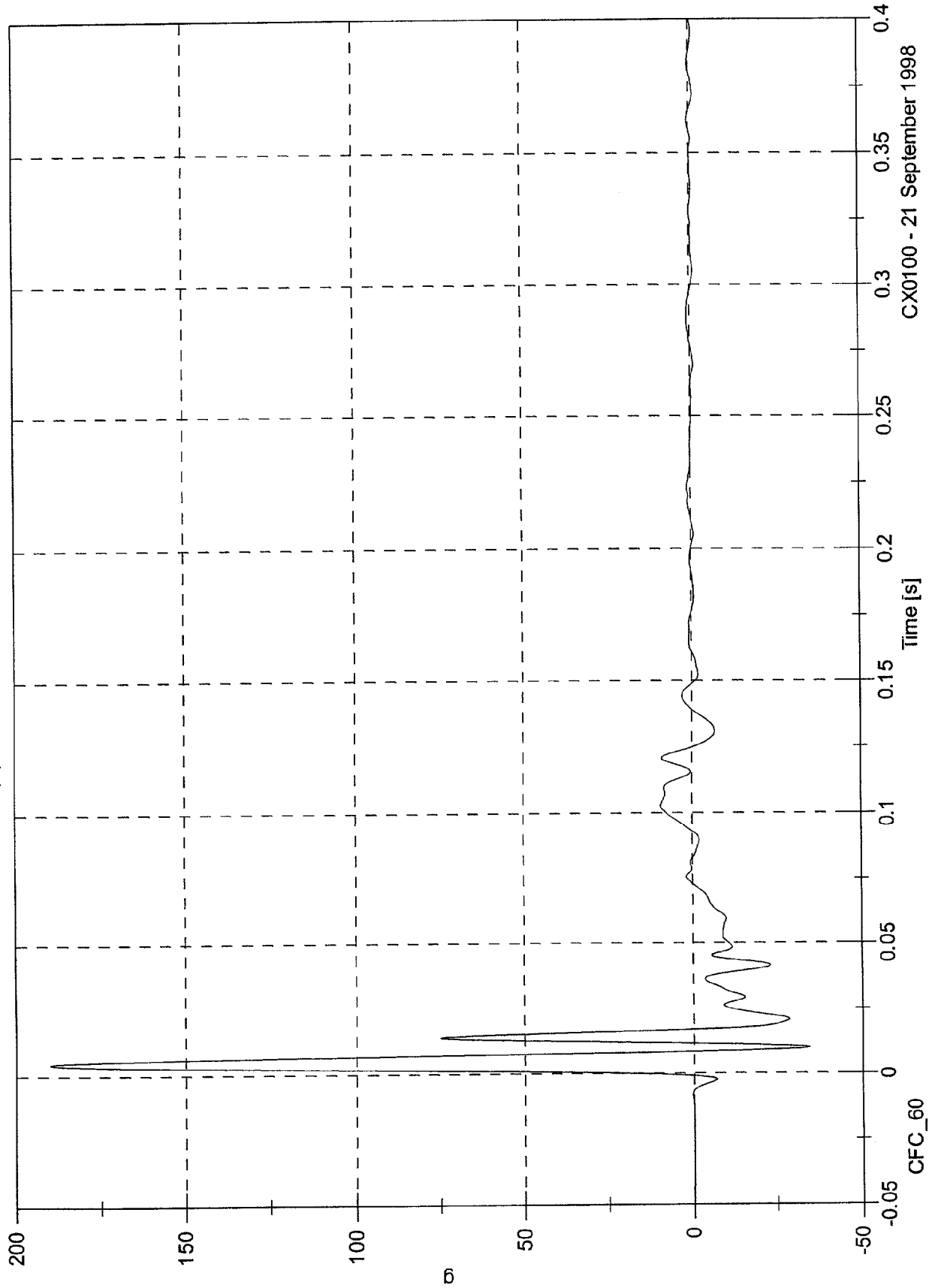
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Acc 12(Y) Left Lower B Pillar [g, CFC_60]

Max: 190.2 [g] at 0.0043 [s]

Min: -34.7 [g] at 0.0101 [s]



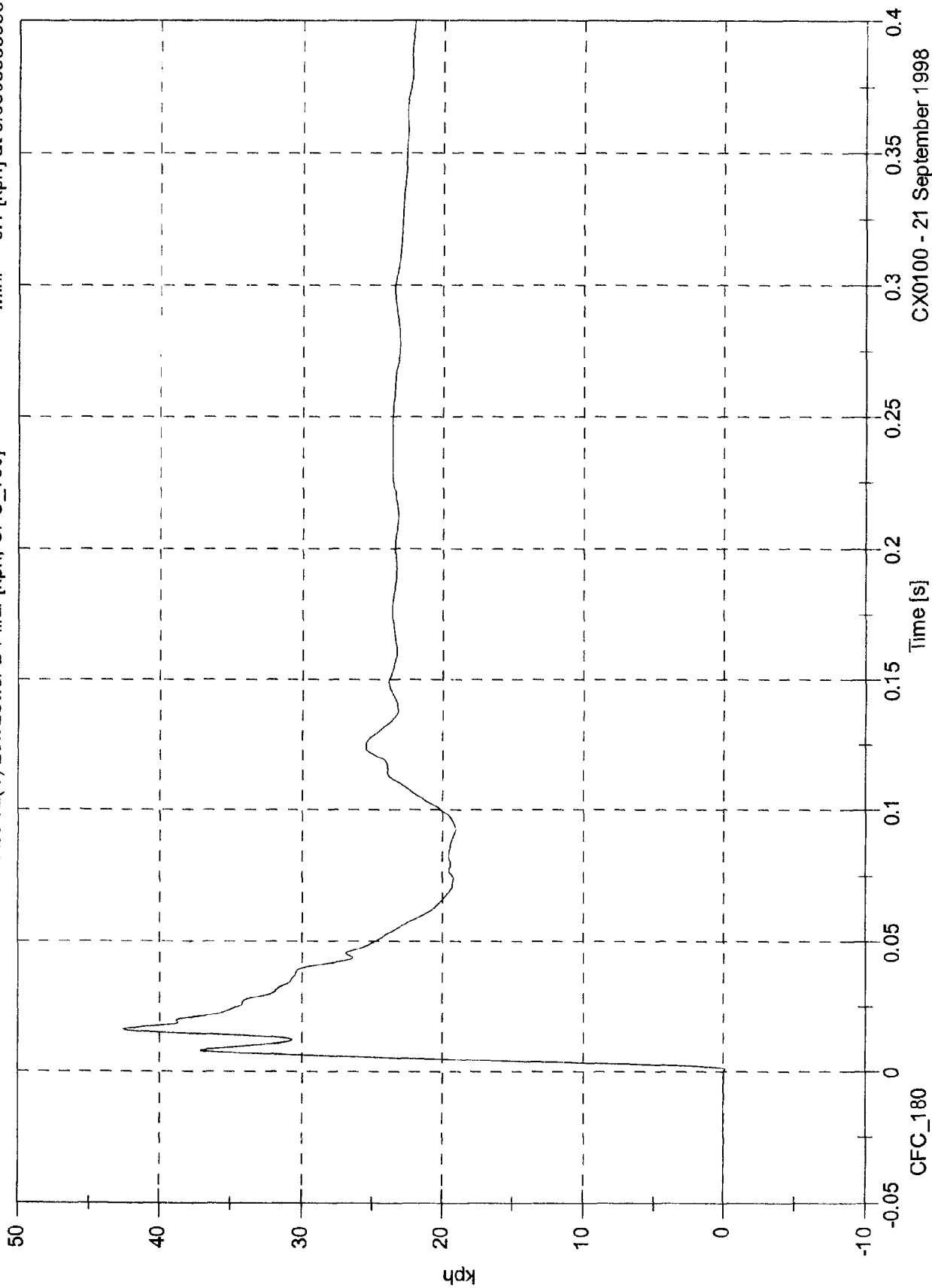
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Acc 12(Y) Left Lower B Pillar [kph, CFC_180]

Max: 42.6 [kph] at 0.0159 [s]

Min: -0.1 [kph] at 0.000899999999999 [s]



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UPPER B-POST ACCELEROMETER #13 WAS
DAMAGED AT IMPACT

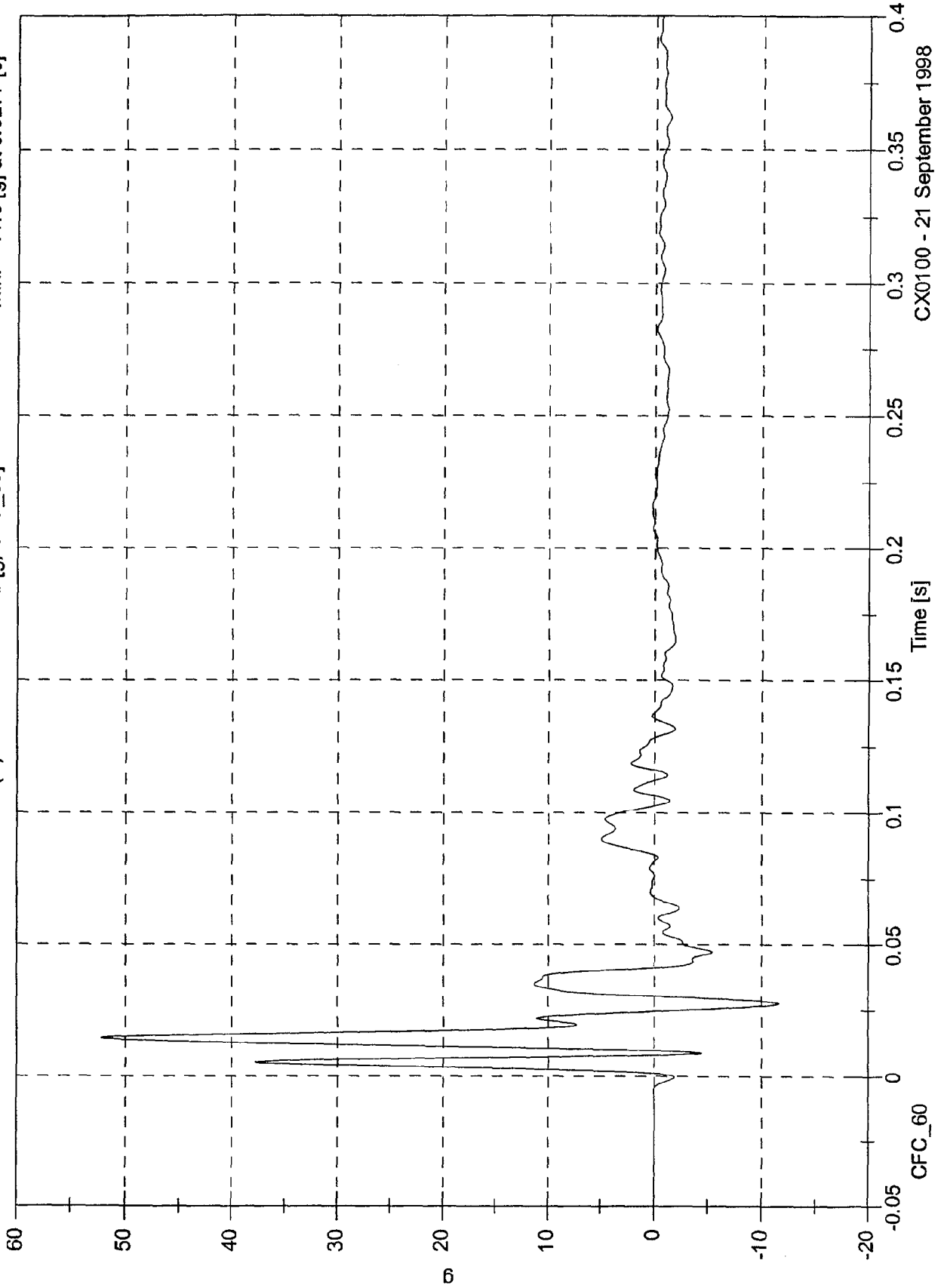
UPPER B-POST ACCELEROMETER #13 WAS
DAMAGED AT IMPACT

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max 52.2 [g] at 0.0147 [s]

Min: -11.6 [g] at 0.0277 [s]



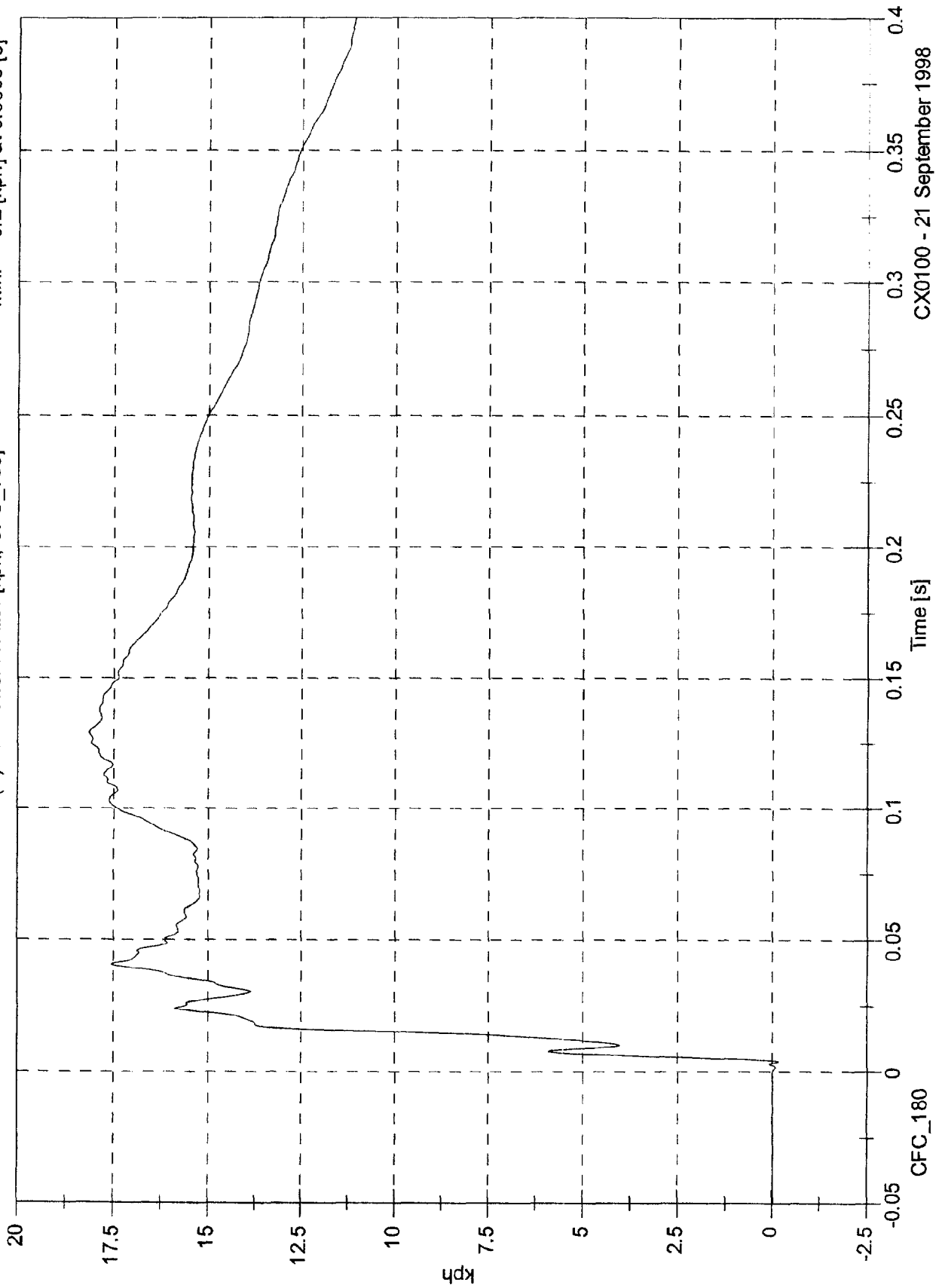
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 18.1 [kph] at 0.1291 [s]

Min: -0.2 [kph] at 0.0039 [s]



CX0100 - 21 September 1998

UPPER A-POST ACCELEROMETER #15 WAS NOT INSTALLED
(no accessible mounting location)

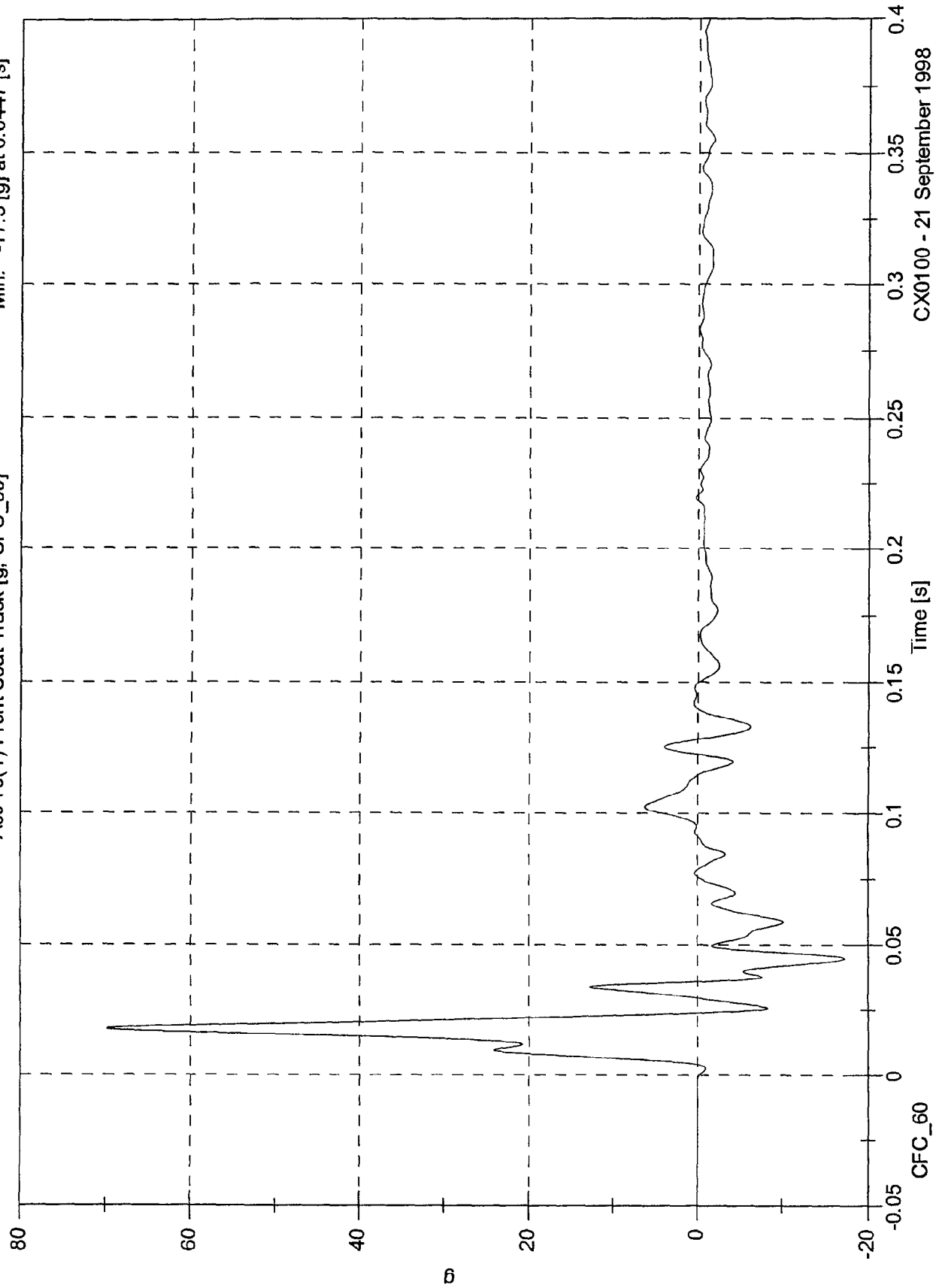
UPPER A-POST ACCELEROMETER #15 WAS NOT INSTALLED
(no accessible mounting location)

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 69.9 [g] at 0.0179 [s]

Min: -17.3 [g] at 0.0447 [s]

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

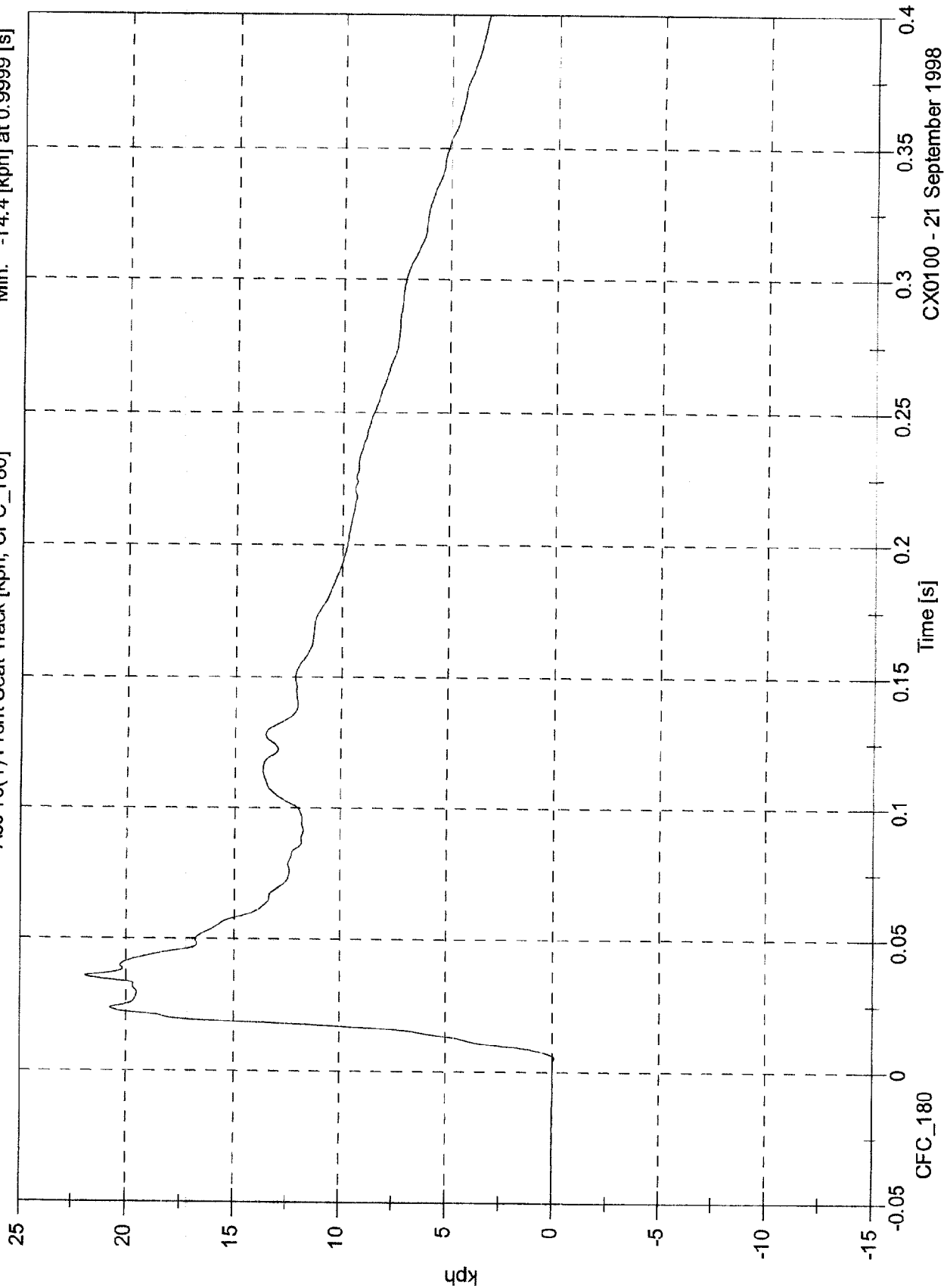


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 21.9 [kph] at 0.0357 [s]
Min: -14.4 [kph] at 0.9999 [s]



CX0100 - 21 September 1998

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

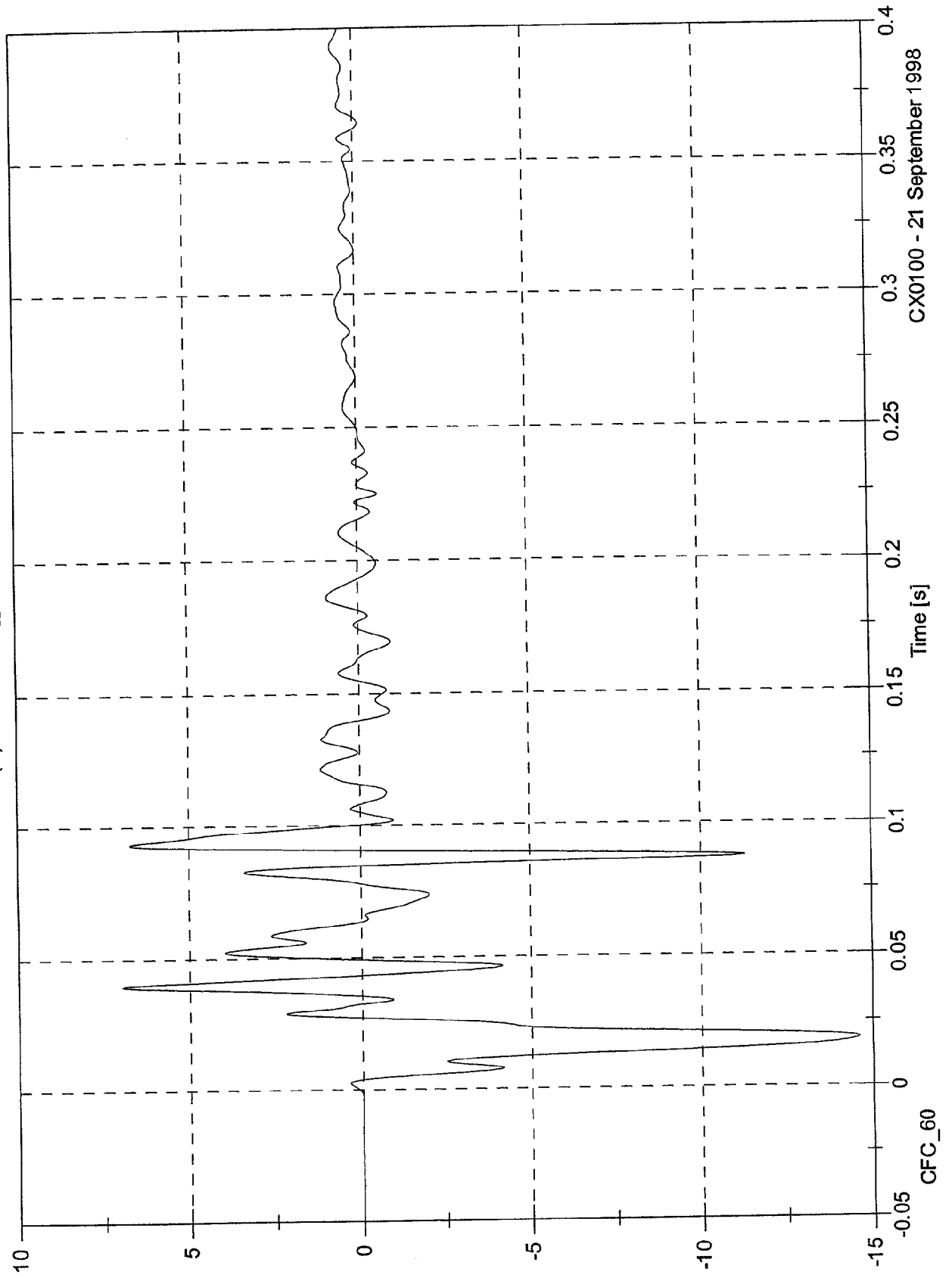
REAR SEAT TRACK #17 WAS NOT INSTALLED
(no accessible mounting location)

NHTSA Side Impact - 1999 Oldsmobile Alero

Acc 18(X) Vehicle C/G [g, CFC_60]

Max: 7.0 [g] at 0.0399 [s]

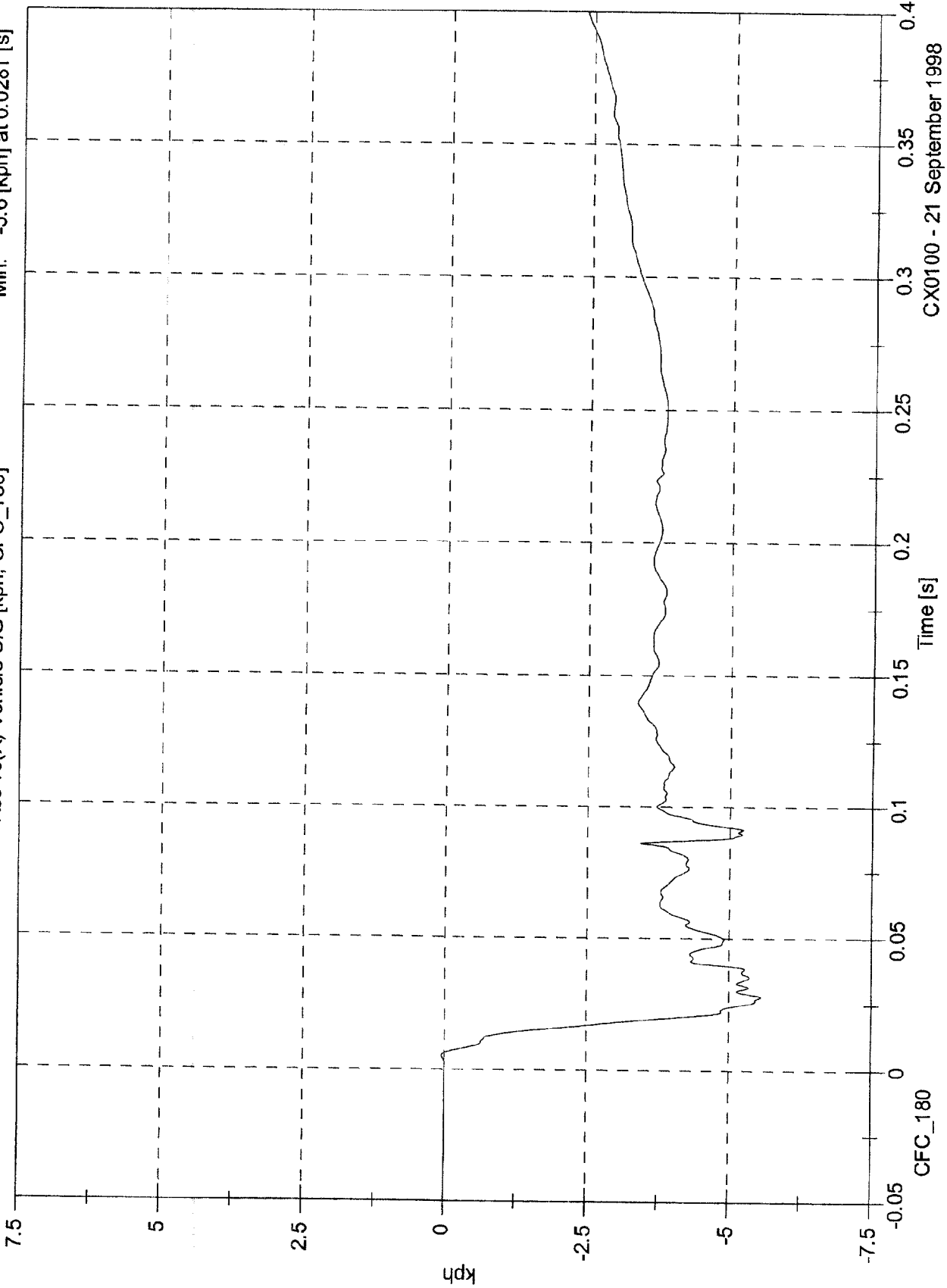
Min: -14.6 [g] at 0.0183 [s]



NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 5.1 [kph] at 0.9999 [s]
Min: -5.6 [kph] at 0.0281 [s]

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

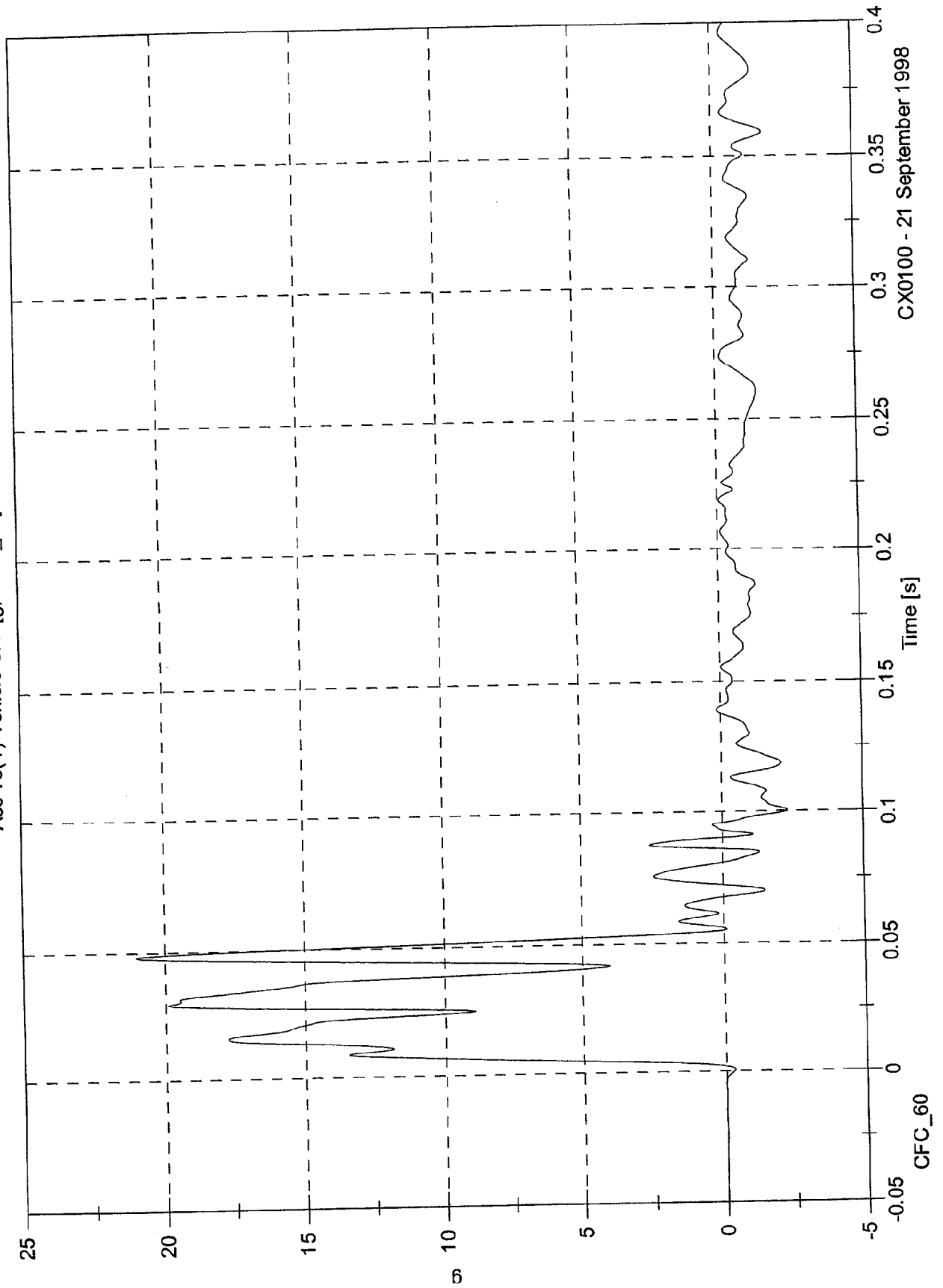


CX0100 - 21 September 1998

Max: 21.0 [g] at 0.048 [s]
Min: -2.3 [g] at 0.1003 [s]

NHTSA Side Impact - 1999 Oldsmobile Alero

Acc 18(Y) Vehicle C/G [g, CFC_60]

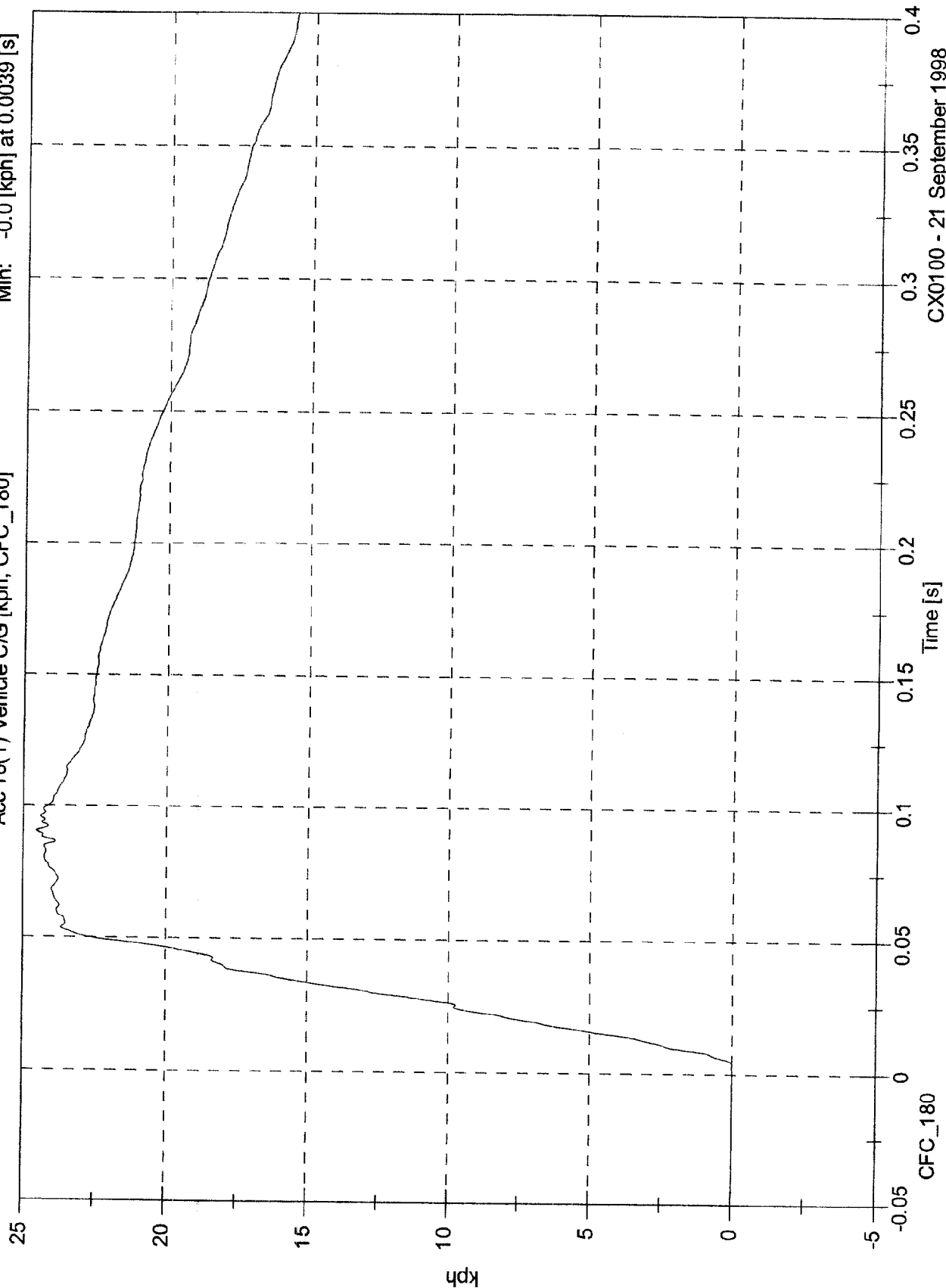


NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 24.6 [kph] at 0.0901 [s]

Min: -0.0 [kph] at 0.0039 [s]

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

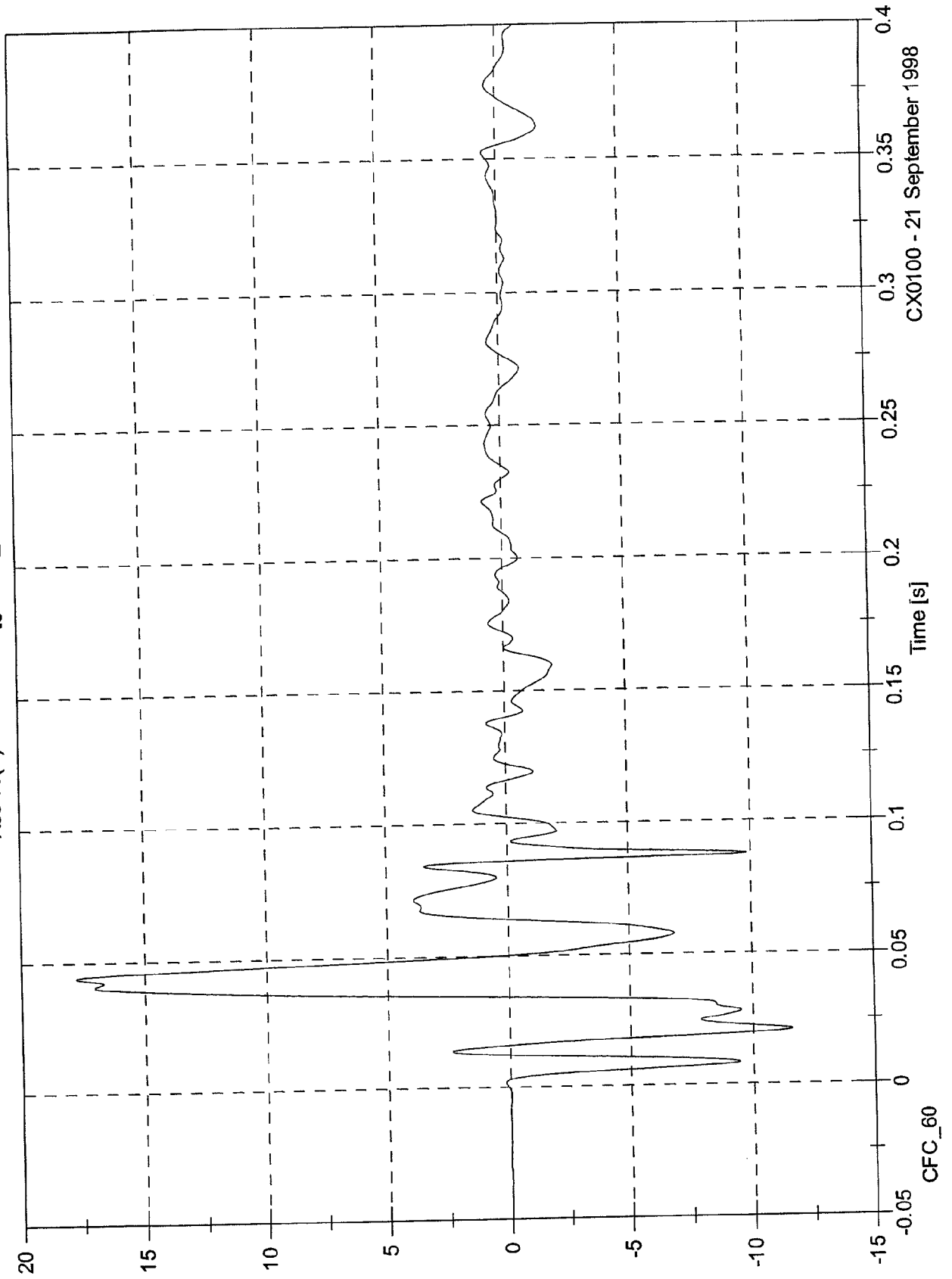


CX0100 - 21 September 1998

Max: 17.8 [g] at 0.044 [s]
Min: -11.6 [g] at 0.0207 [s]

NHTSA Side Impact - 1999 Oldsmobile Alero

Acc 18(Z) Vehicle C/G [g, CFC_60]

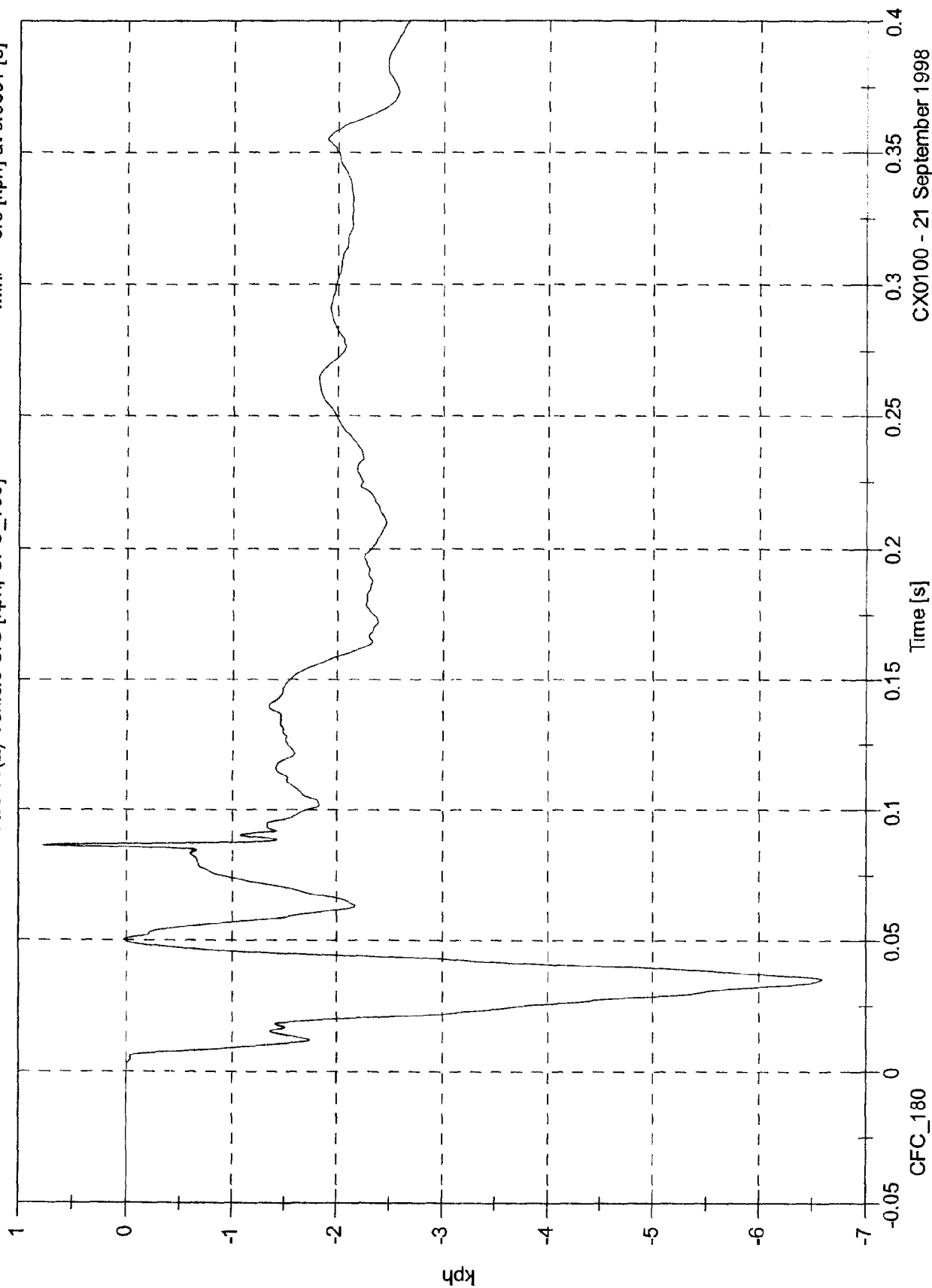


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 0.8 [kph] at 0.0863 [s]
Min: -6.6 [kph] at 0.0351 [s]



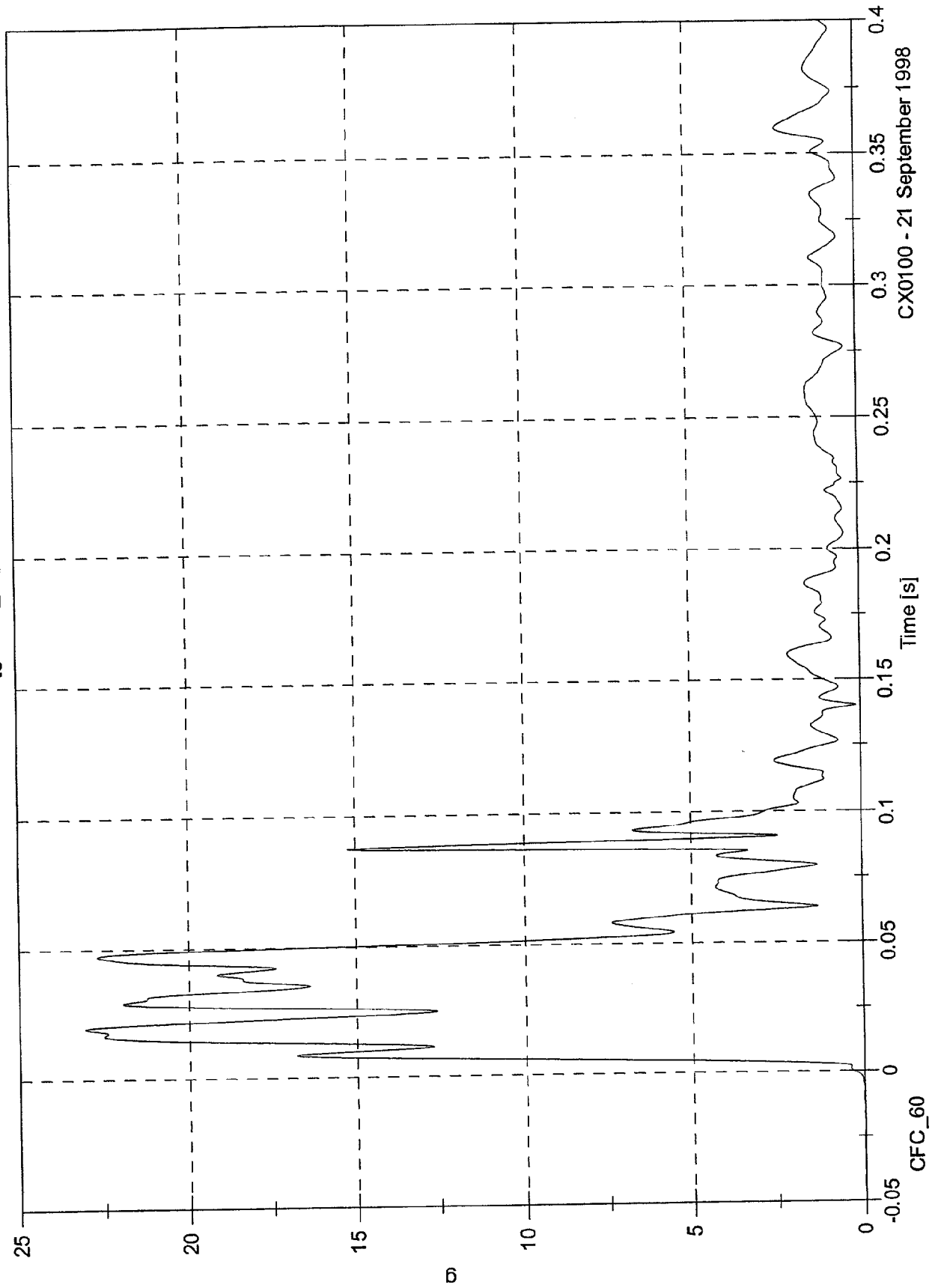
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 23.1 [g] at 0.0196 [s]

Min: 0.0 [g] at -0.0068 [s]

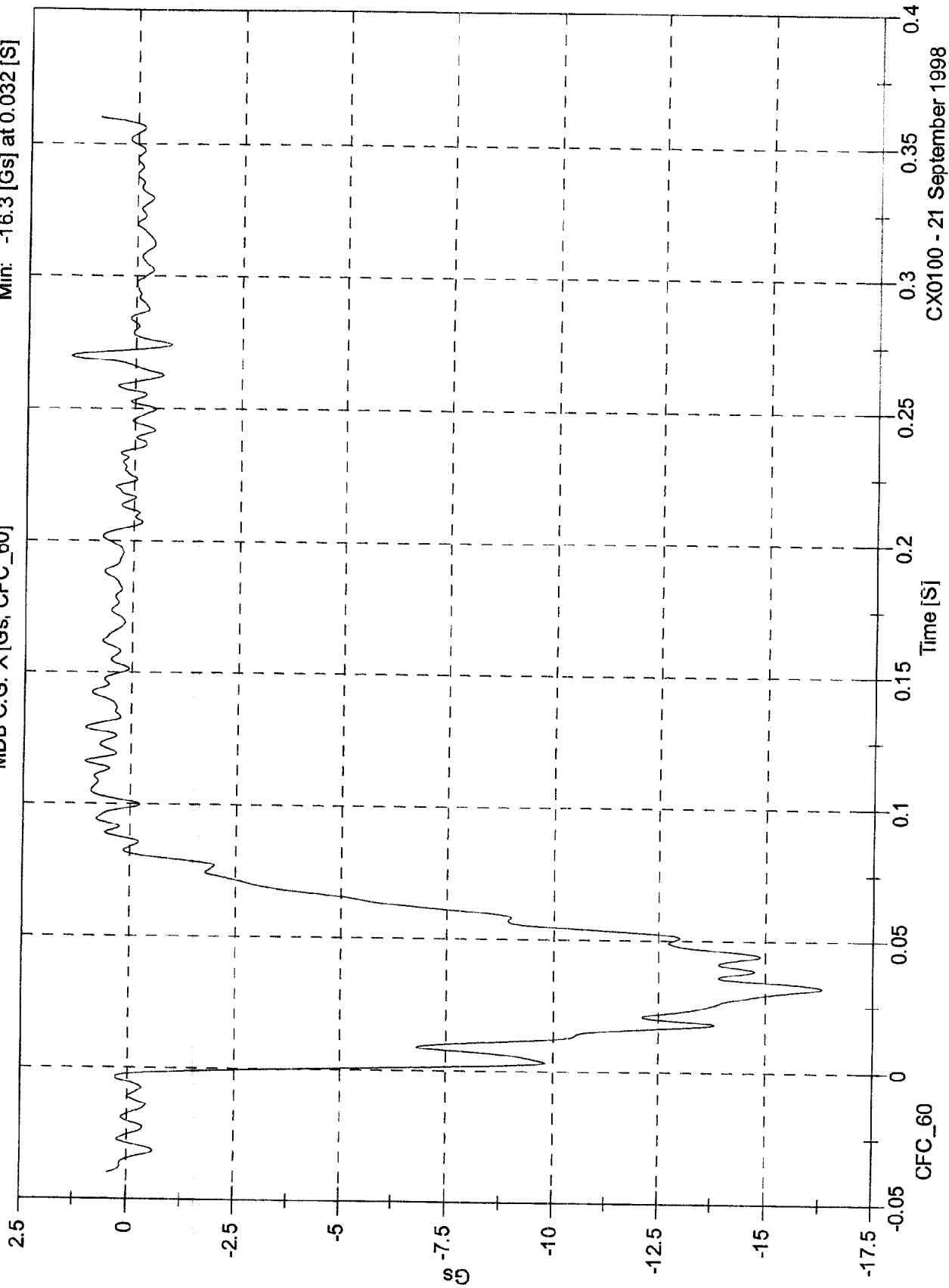


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

MDB C.G. X [Gs, CFC_60]

Max: 1.5 [Gs] at 0.2698 [S]
Min: -16.3 [Gs] at 0.032 [S]



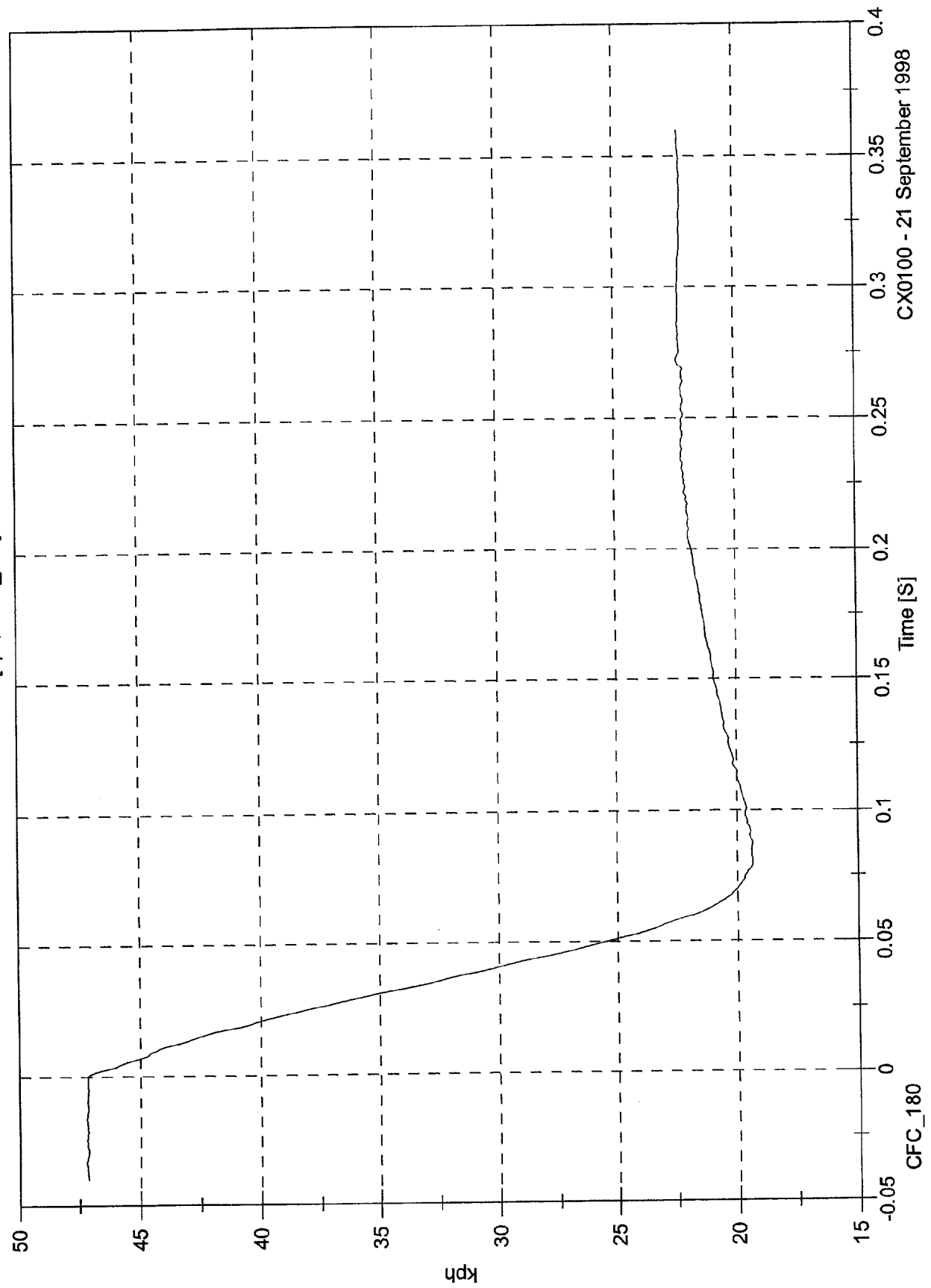
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

MDB C.G. X [kph, CFC_180]

Max: 47.2 [kph] at -0.0332 [S]

Min: 19.3 [kph] at 0.0875 [S]

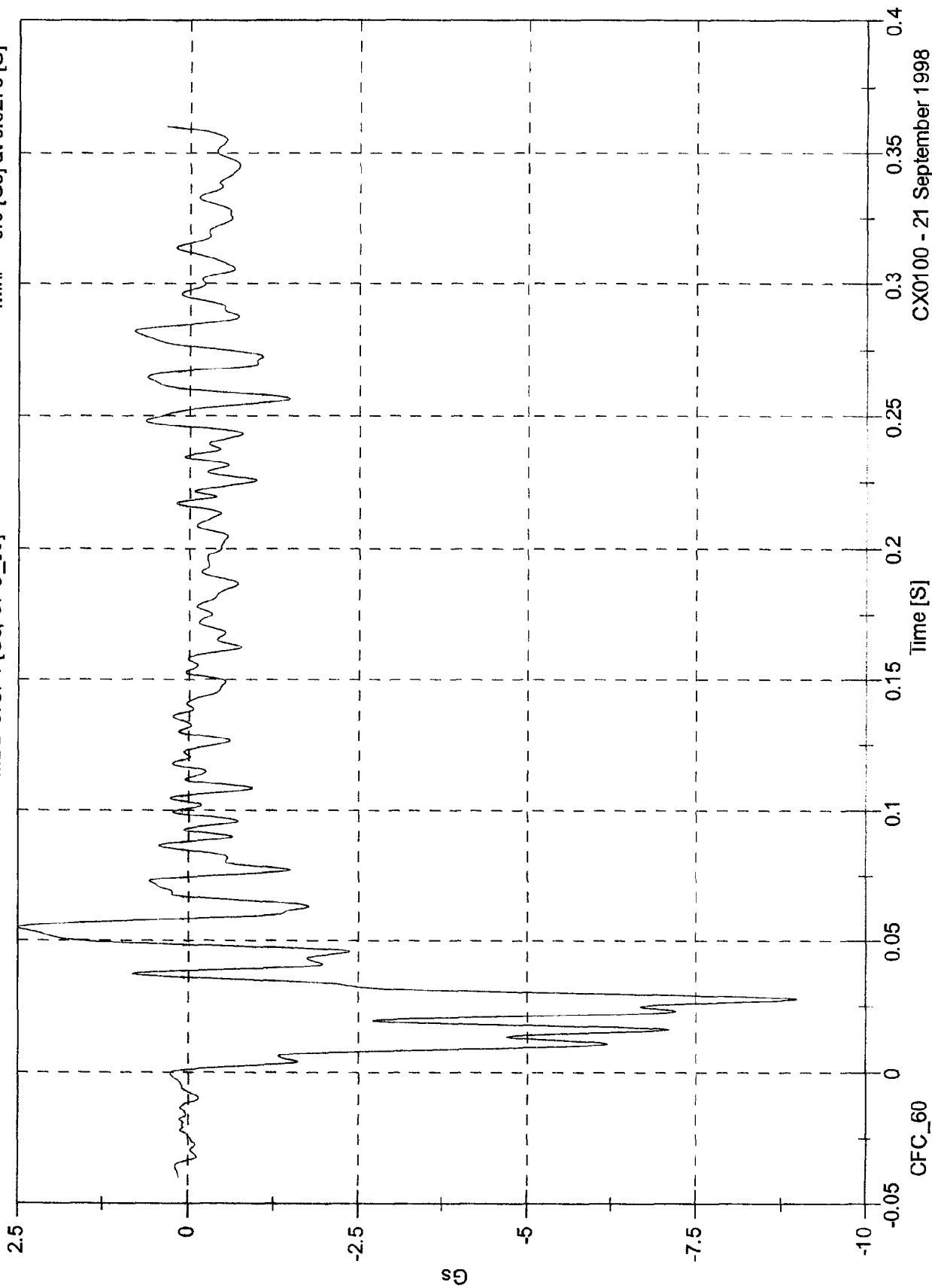


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

MDB C.G. Y [Gs, CFC_60]

Max: 2.5 [Gs] at 0.0547 [S]
Min: -9.0 [Gs] at 0.0276 [S]

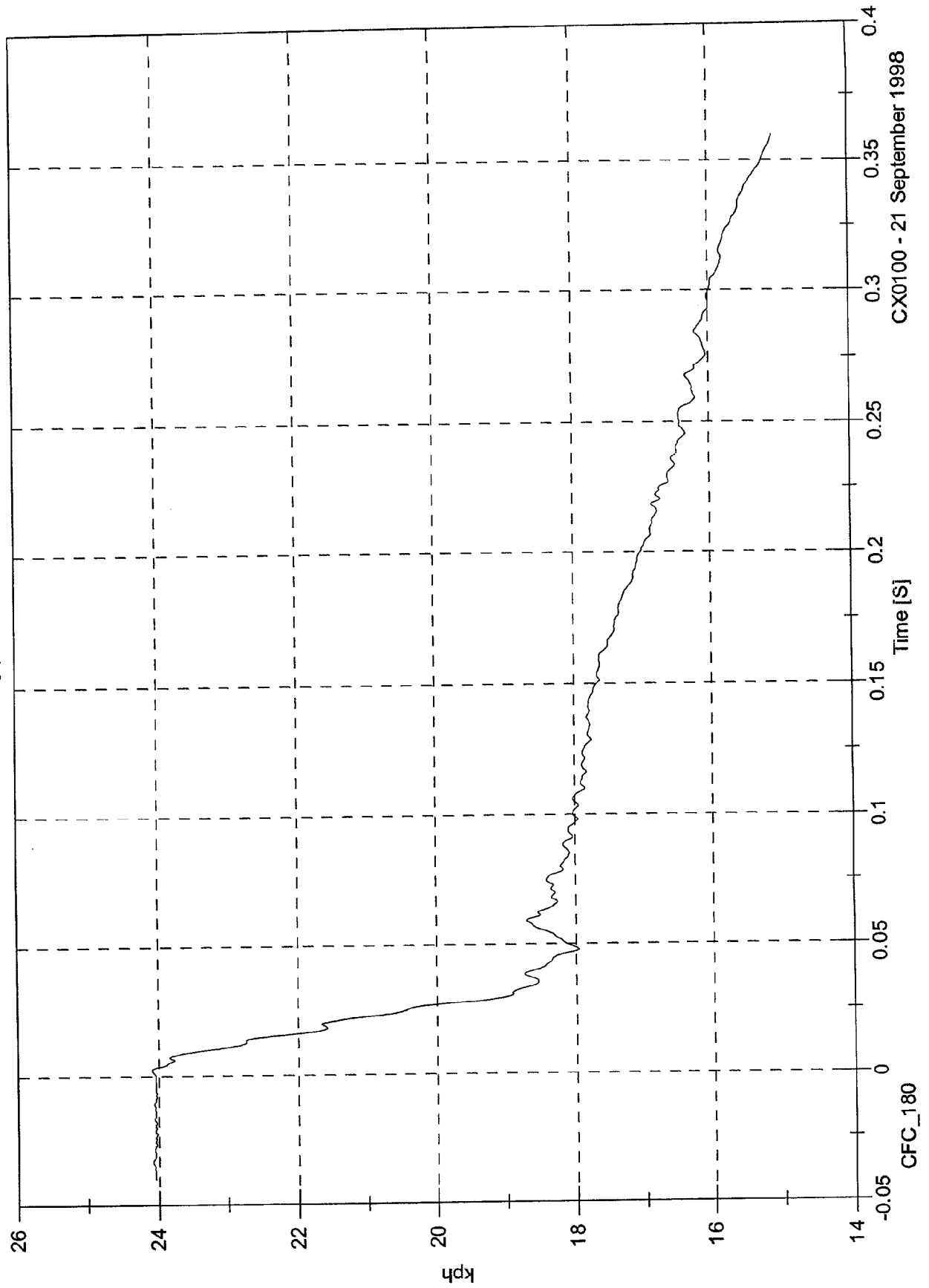


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

MDB C.G. Y [kph, CFC_180]

Max: 24.1 [kph] at 0.0025 [S]
Min: 15.1 [kph] at 0.3596 [S]

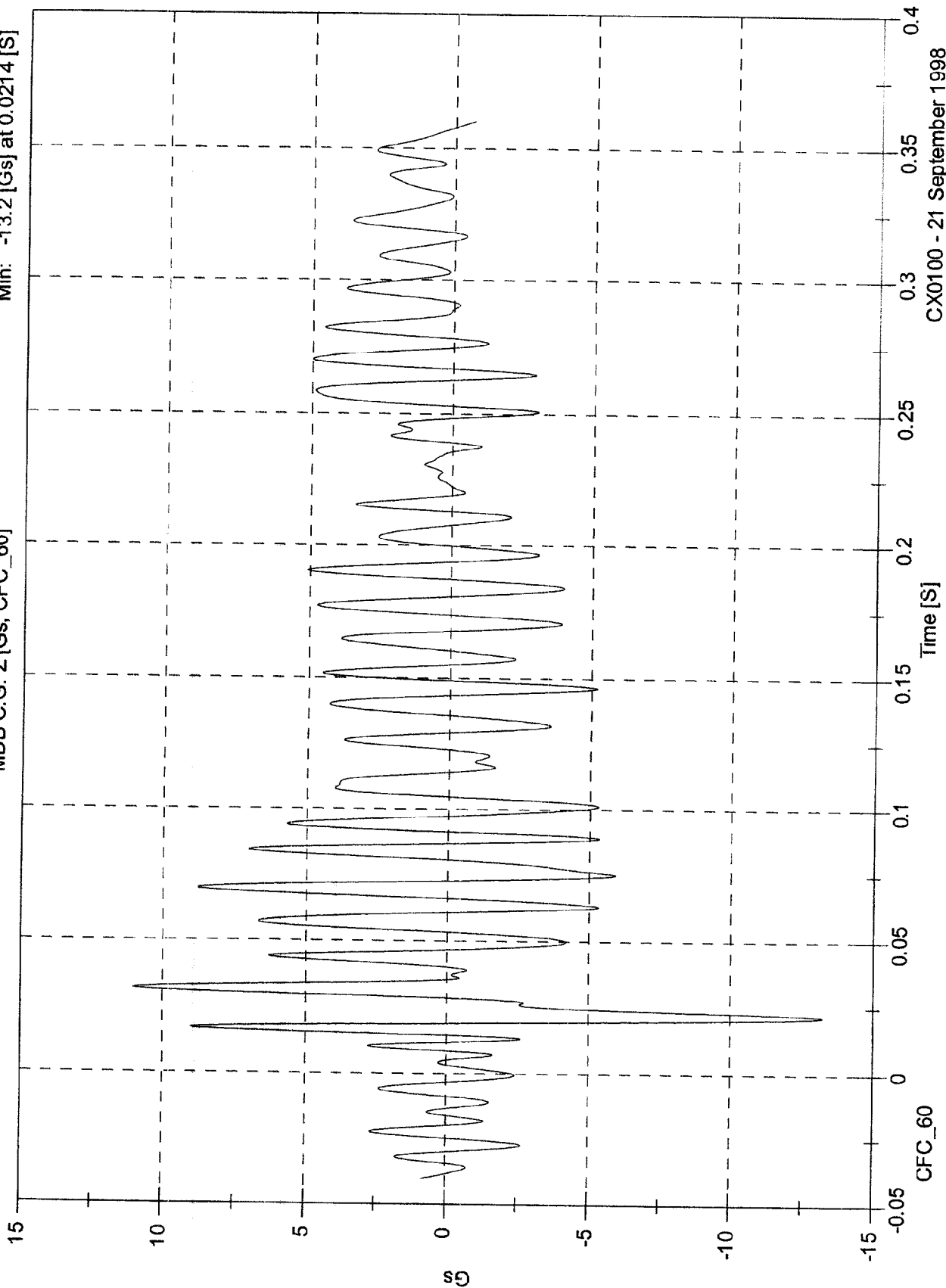


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

MDB C.G. Z [Gs, CFC_60]

Max: 11.0 [Gs] at 0.0317 [S]
Min: -13.2 [Gs] at 0.0214 [S]

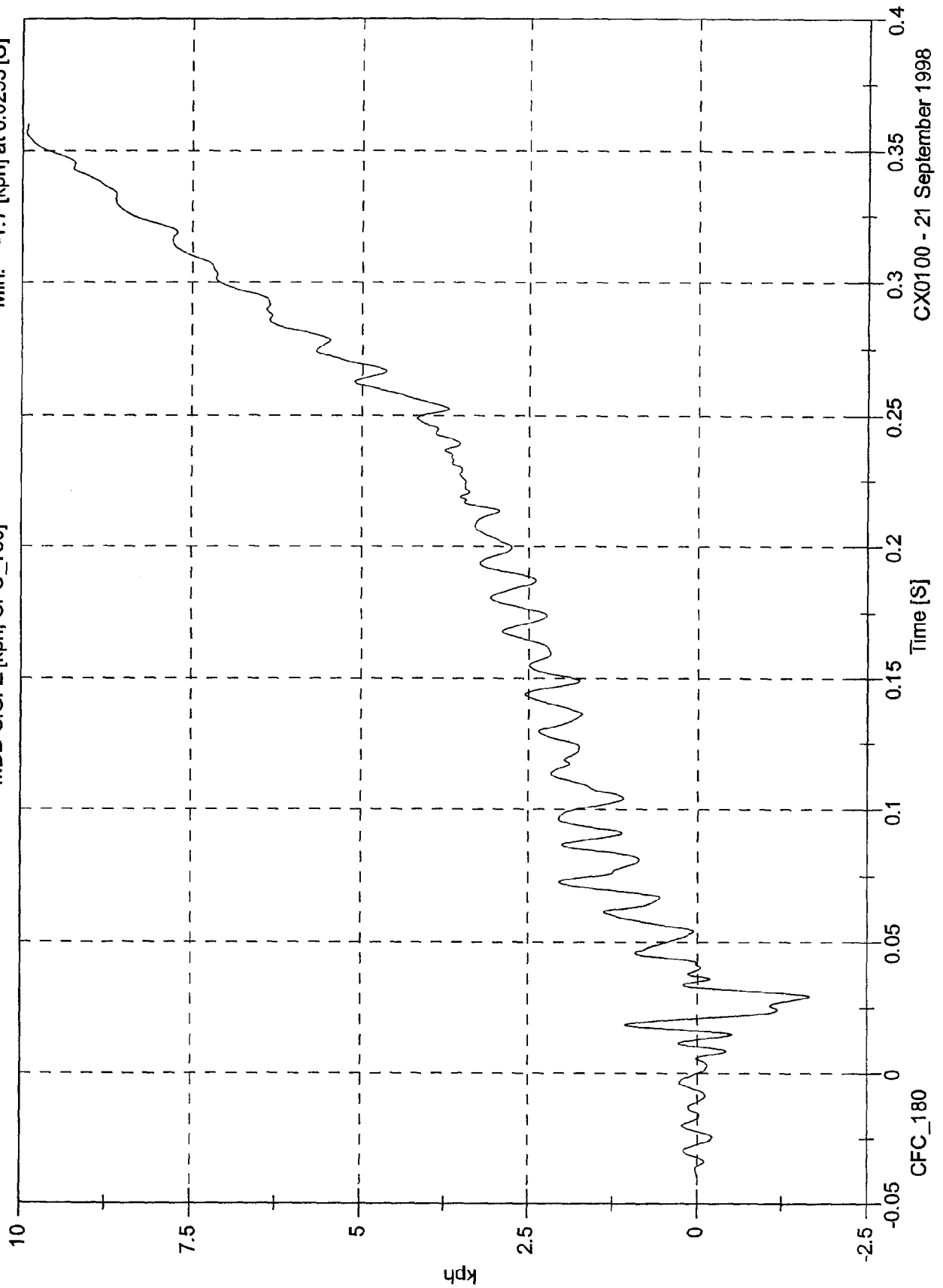


NHTSA Side Impact - 1999 Oldsmobile Alero

MDB C.G. Z [kph, CFC_180]

Max 9.9 [kph] at 0.3571 [S]

Min: -1.7 [kph] at 0.0293 [S]

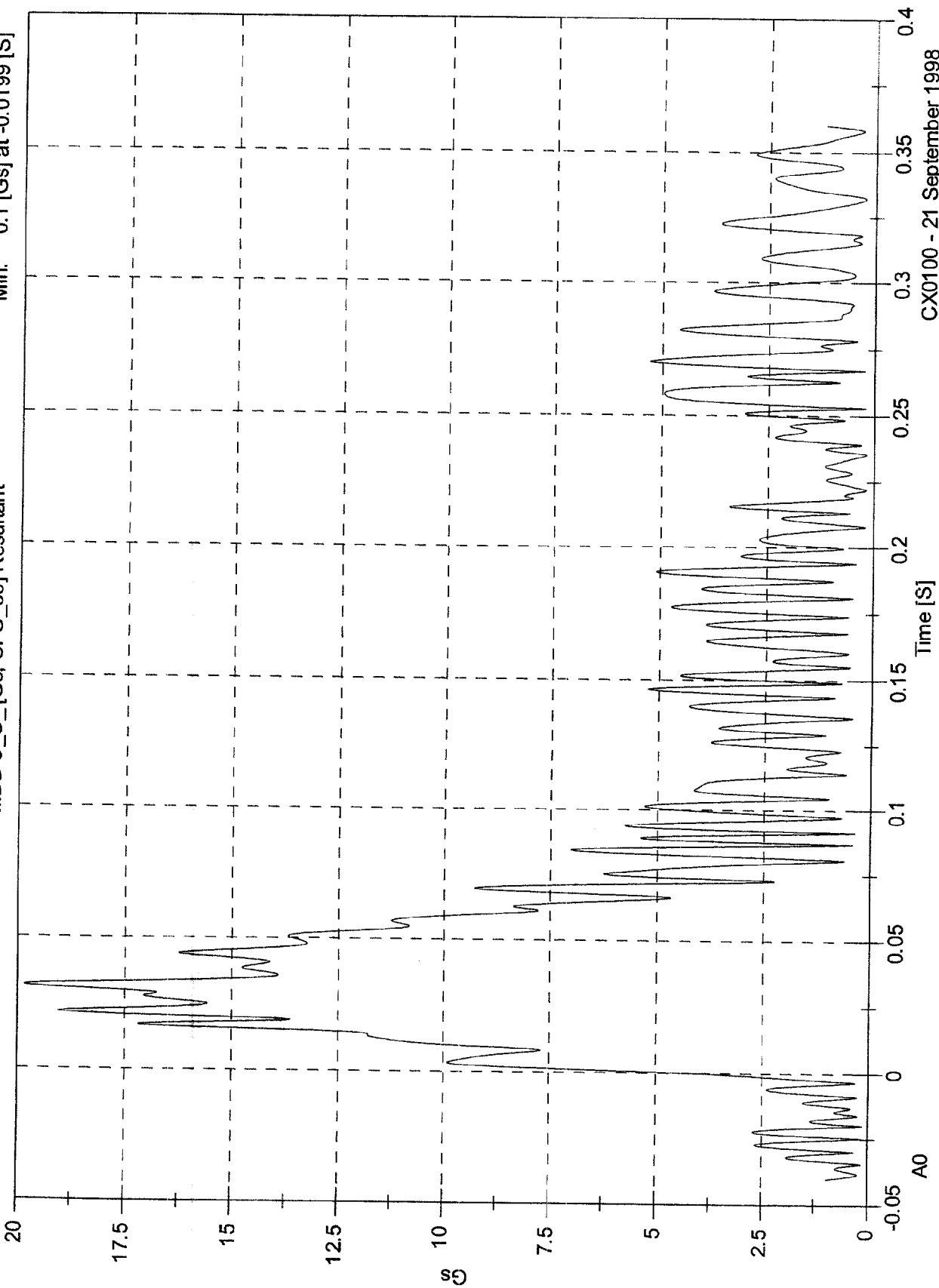


CX0100 - 21 September 1998

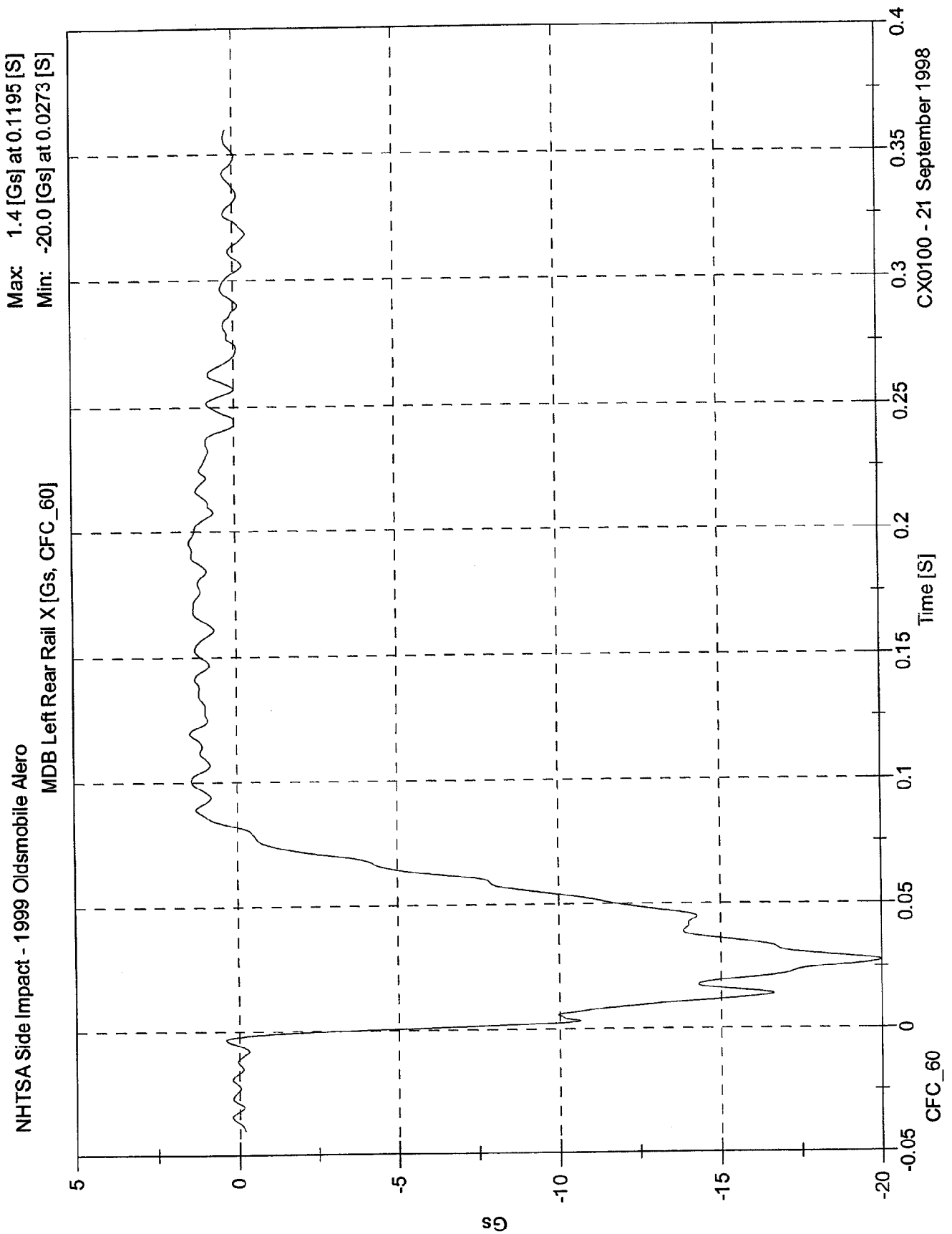
NHTSA Side Impact - 1999 Oldsmobile Alero

MDB C_G_[Gs, CFC_60] Resultant

Max: 19.9 [Gs] at 0.0317 [S]
Min: 0.1 [Gs] at -0.0199 [S]



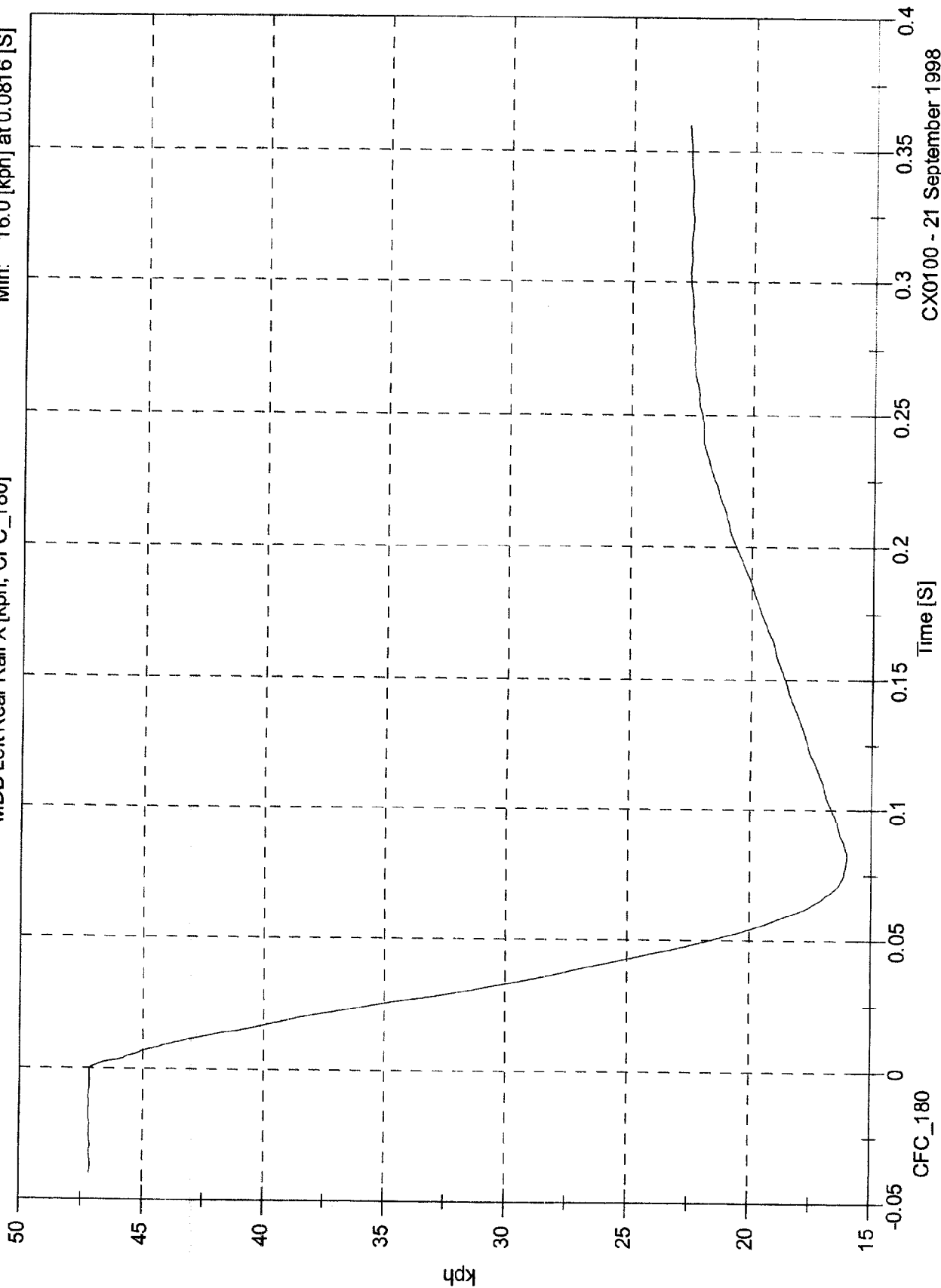
CX0100 - 21 September 1998



NHTSA Side Impact - 1999 Oldsmobile Alero

MDB Left Rear Rail X [kph, CFC_180]

Max: 47.2 [kph] at -0.0169 [S]
Min: 16.0 [kph] at 0.0816 [S]

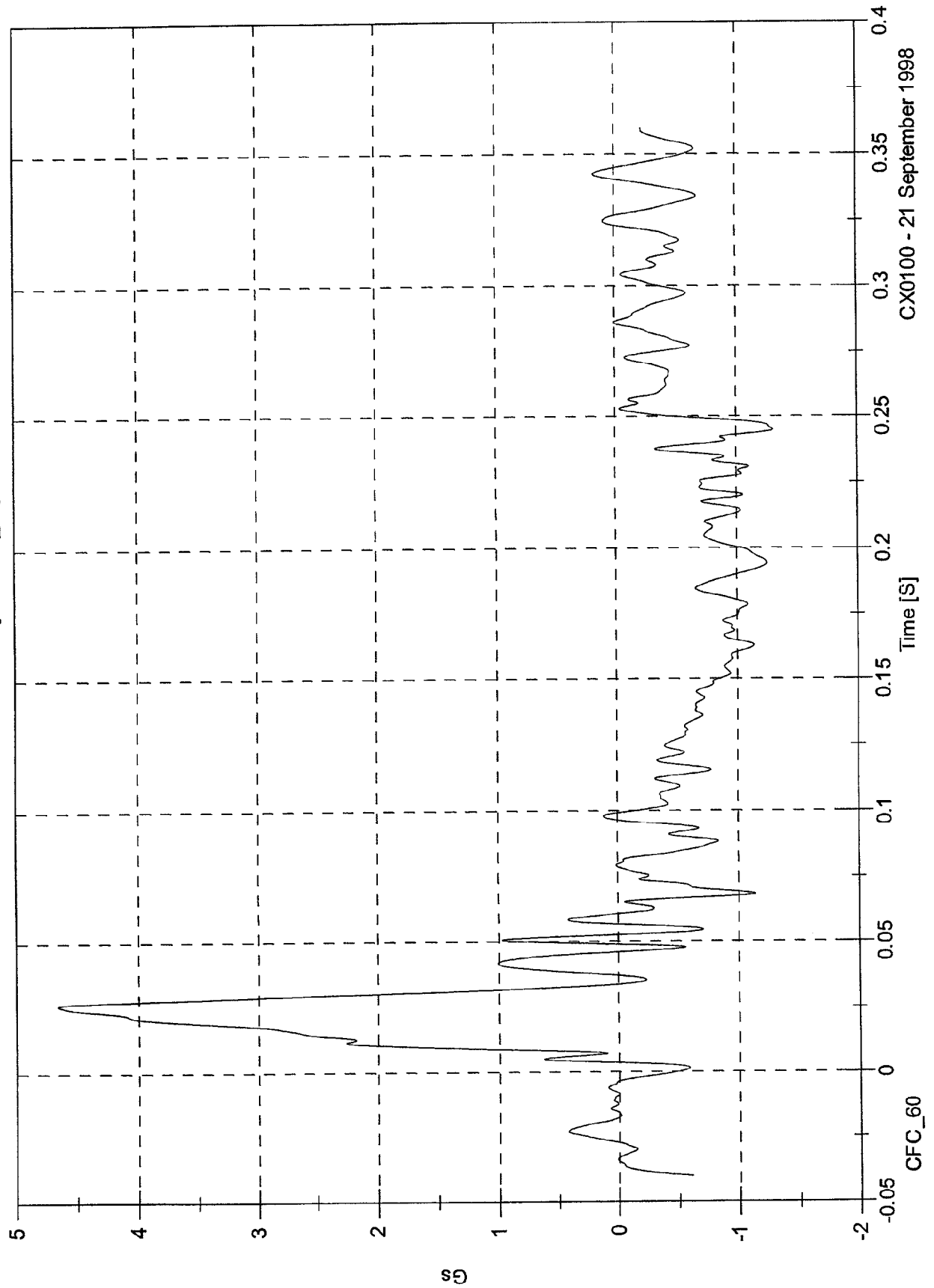


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 4.7 [Gs] at 0.026 [S]
Min: -1.3 [Gs] at 0.2447 [S]

MDB Left Rear Rail Y [Gs, CFC_60]

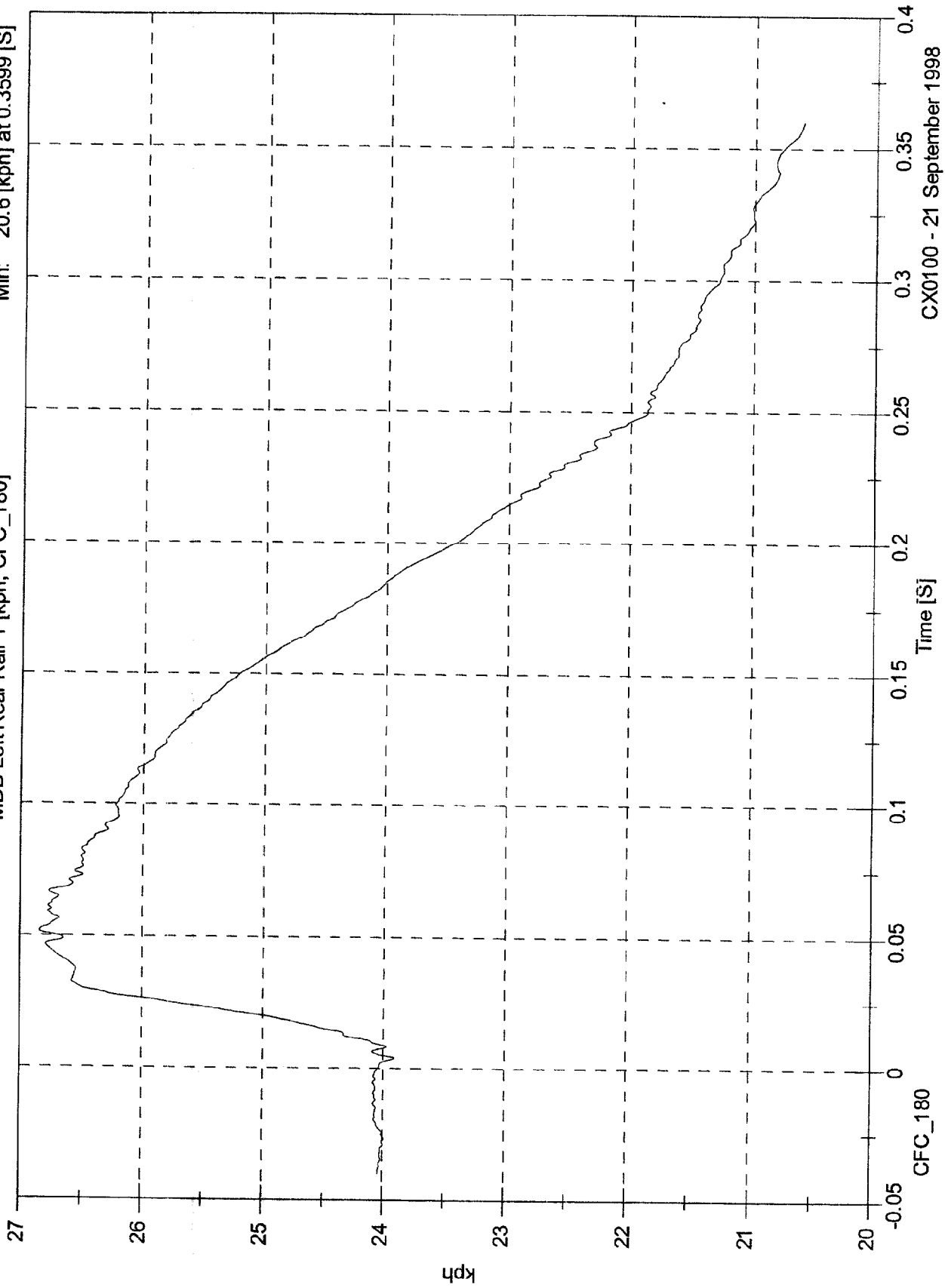


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

MDB Left Rear Rail Y [kph, CFC_180]

Max: 26.8 [kph] at 0.0517 [S]
Min: 20.6 [kph] at 0.3599 [S]

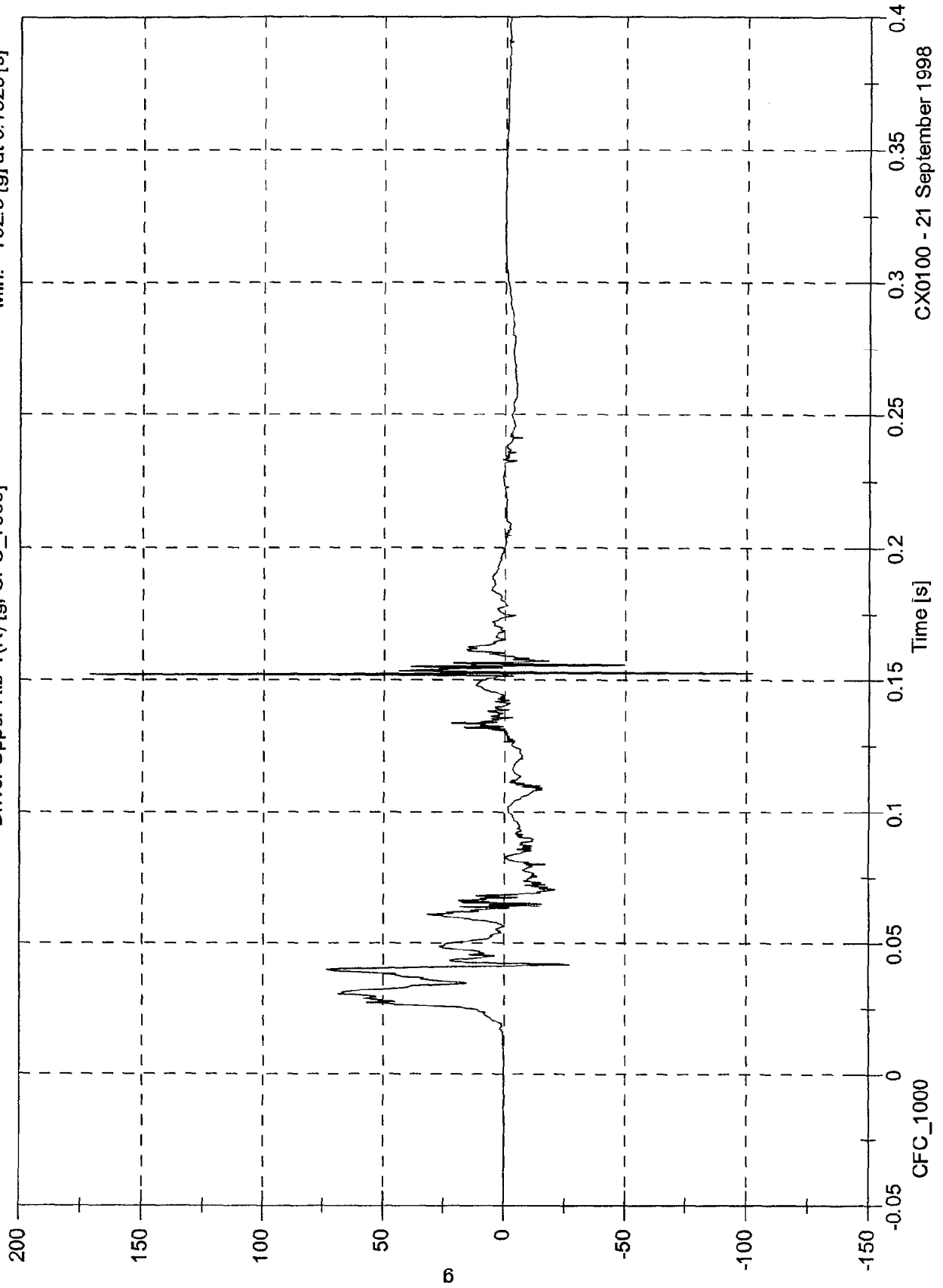


NHTSA Side Impact - 1999 Oldsmobile Alero

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

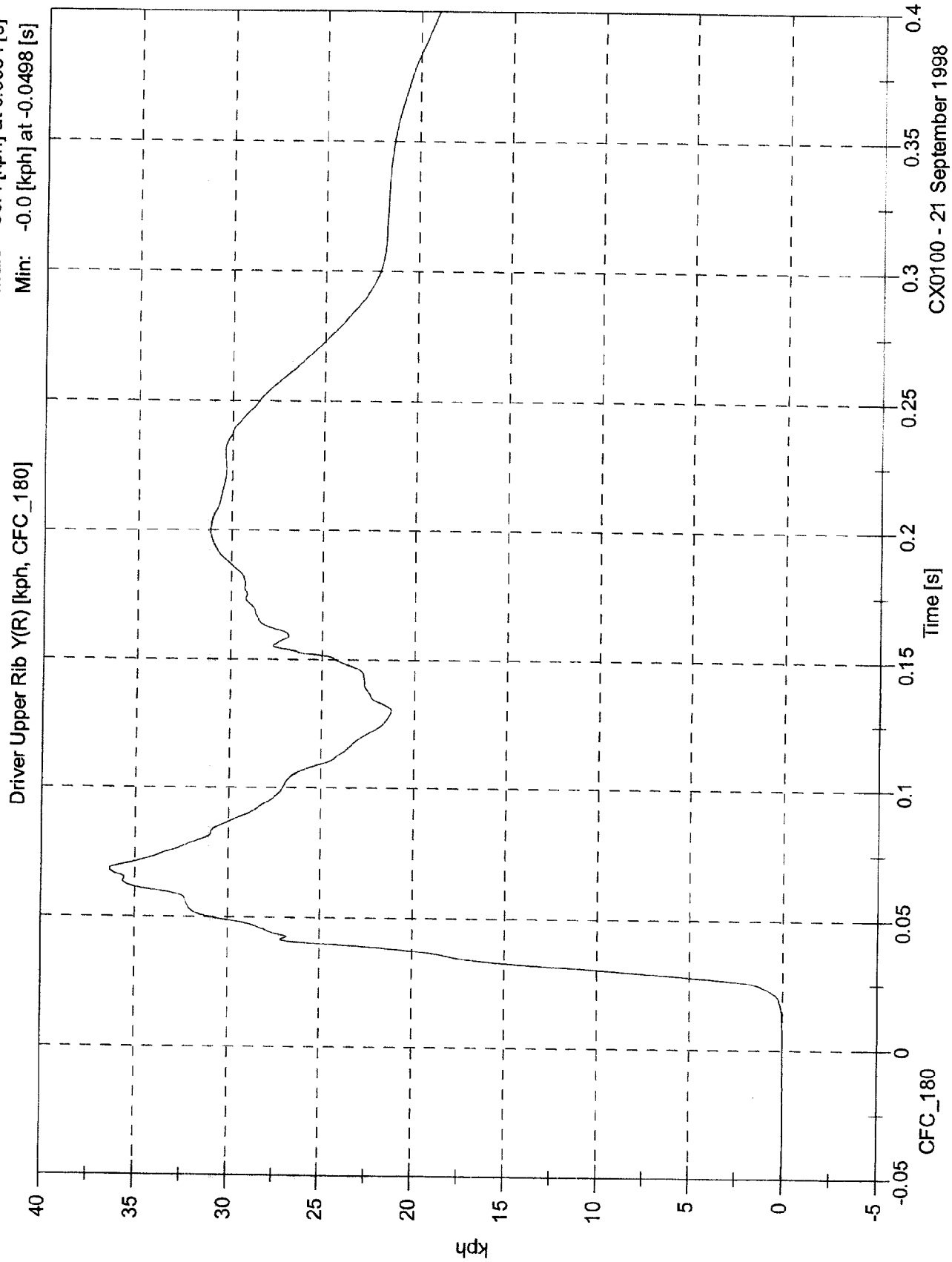
Max: 171.8 [g] at 0.152 [s]

Min: -102.5 [g] at 0.1526 [s]



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NHTSA Side Impact - 1999 Oldsmobile Alero

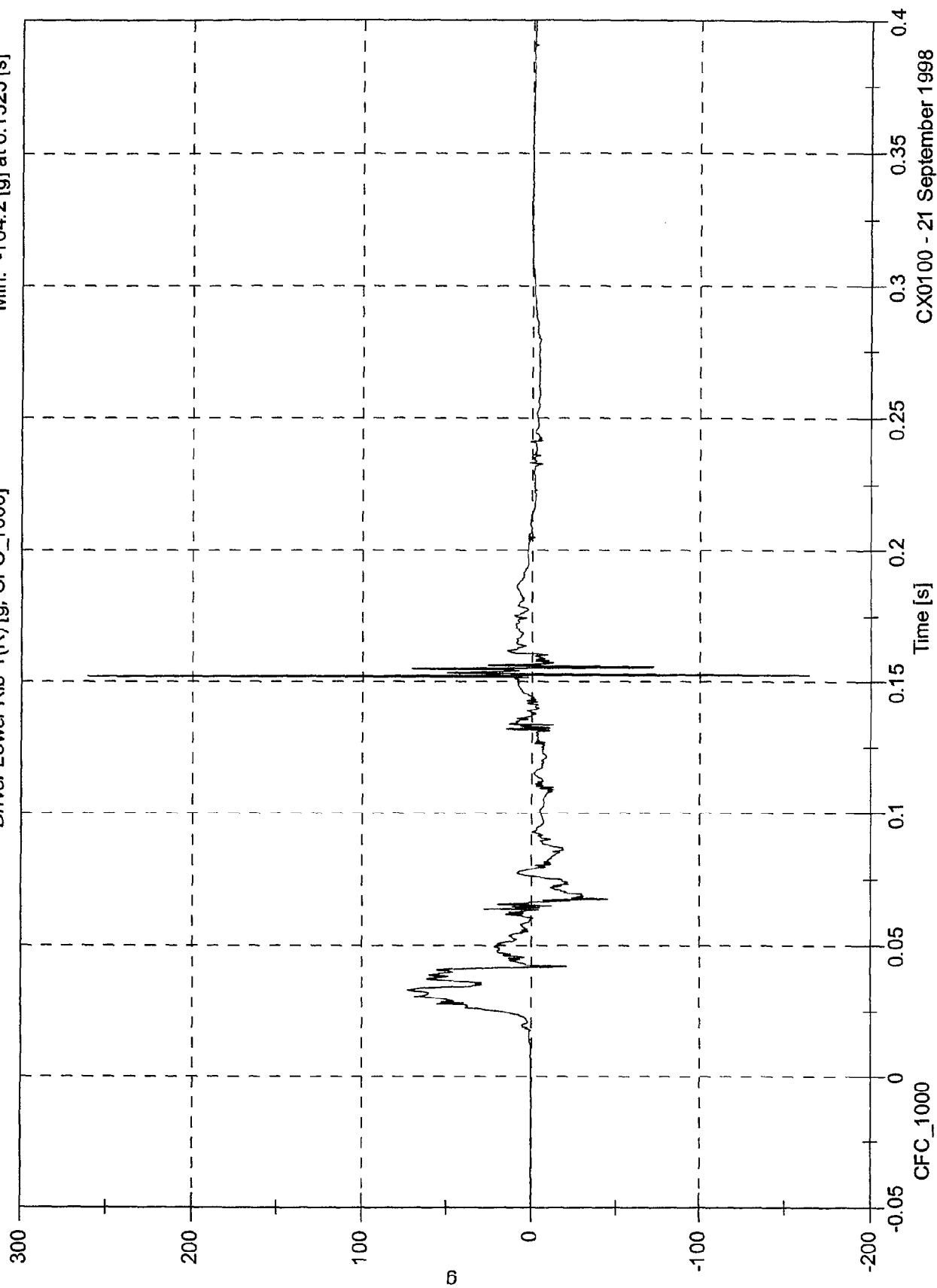


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max 261.2 [g] at 0.152 [s]
Min: -164.2 [g] at 0.1525 [s]

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

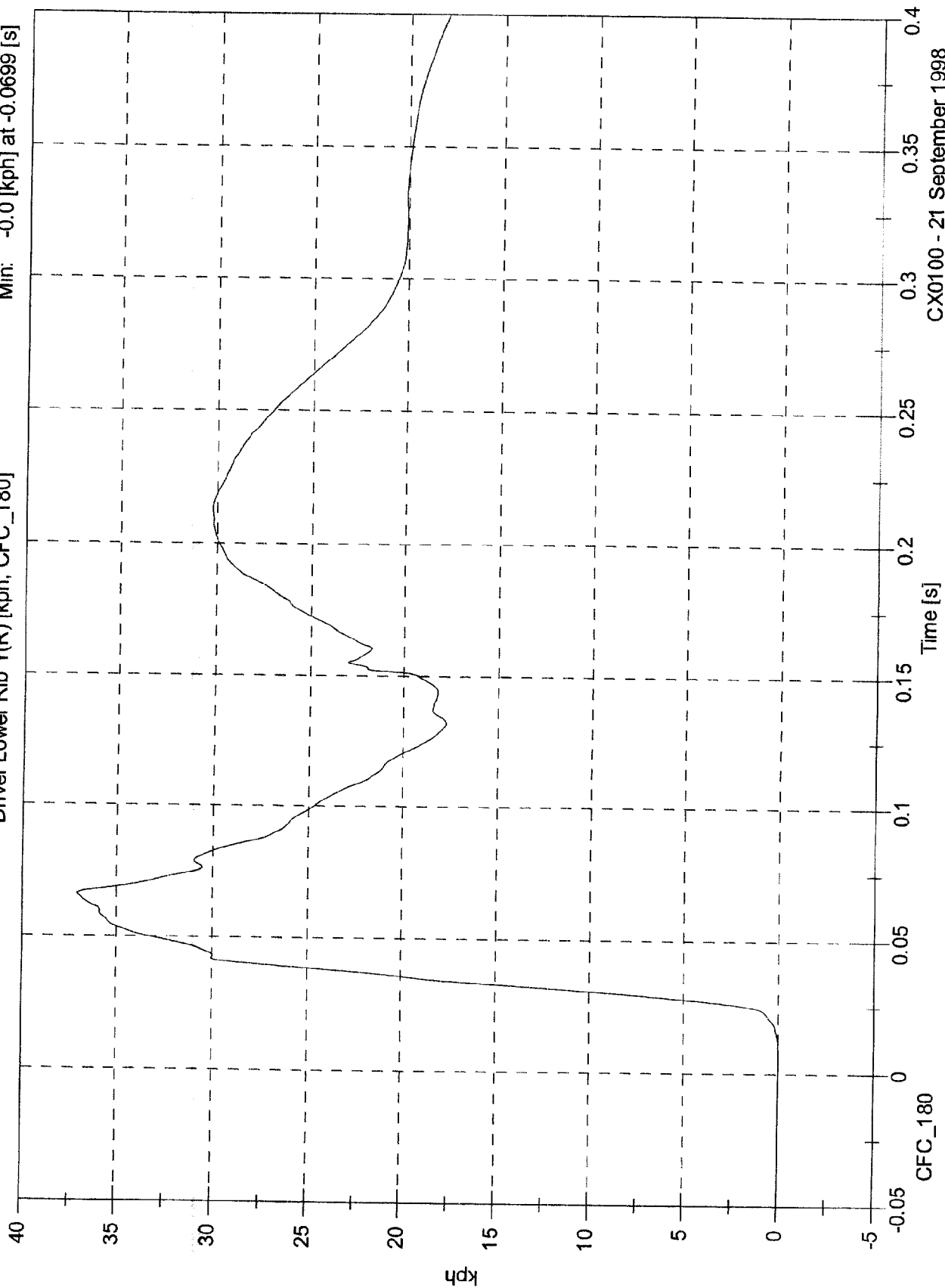


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 37.1 [kph] at 0.0662 [s]
Min: -0.0 [kph] at -0.0699 [s]



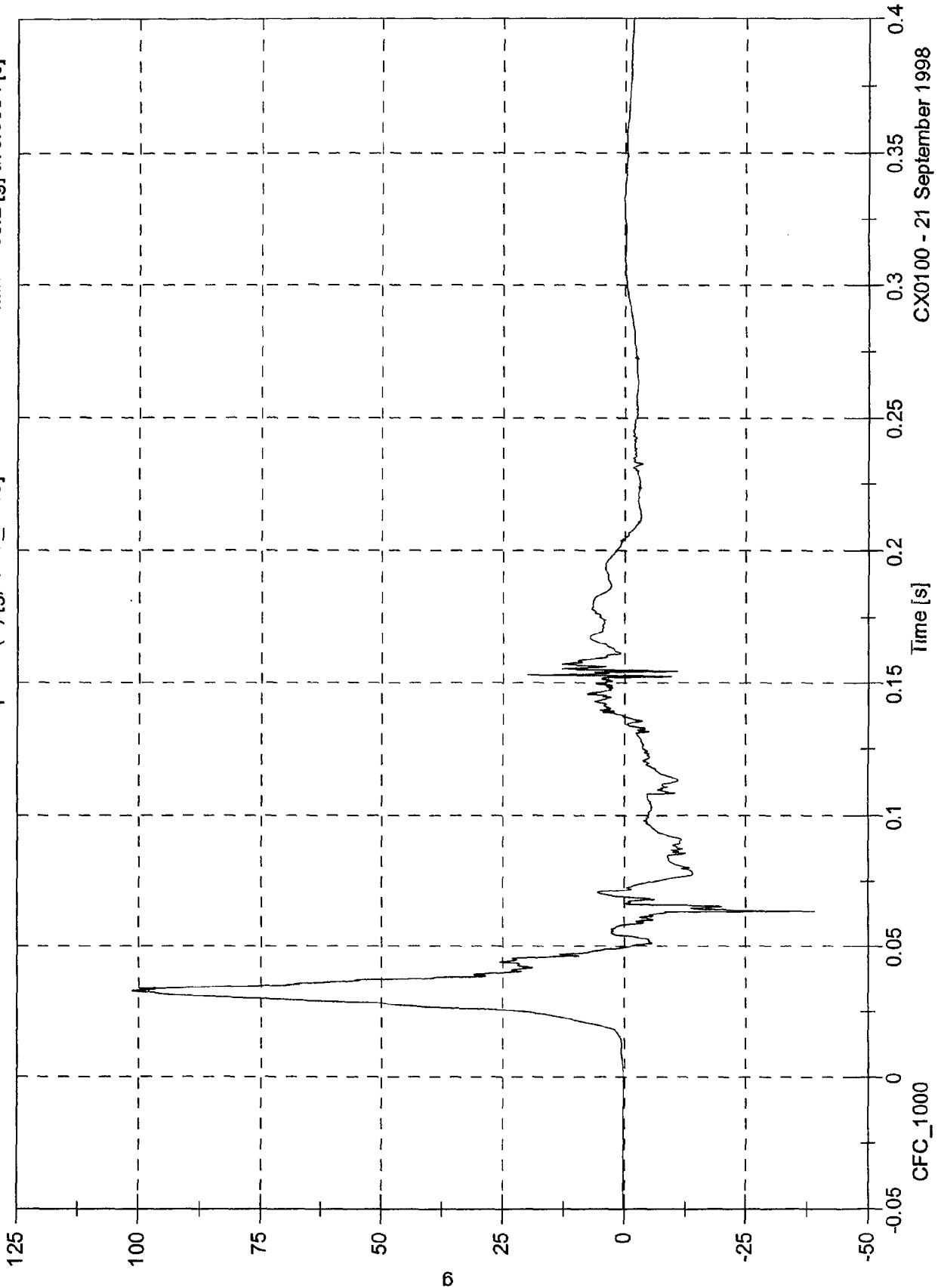
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 101.5 [g] at 0.033 [s]

Min: -39.2 [g] at 0.0634 [s]

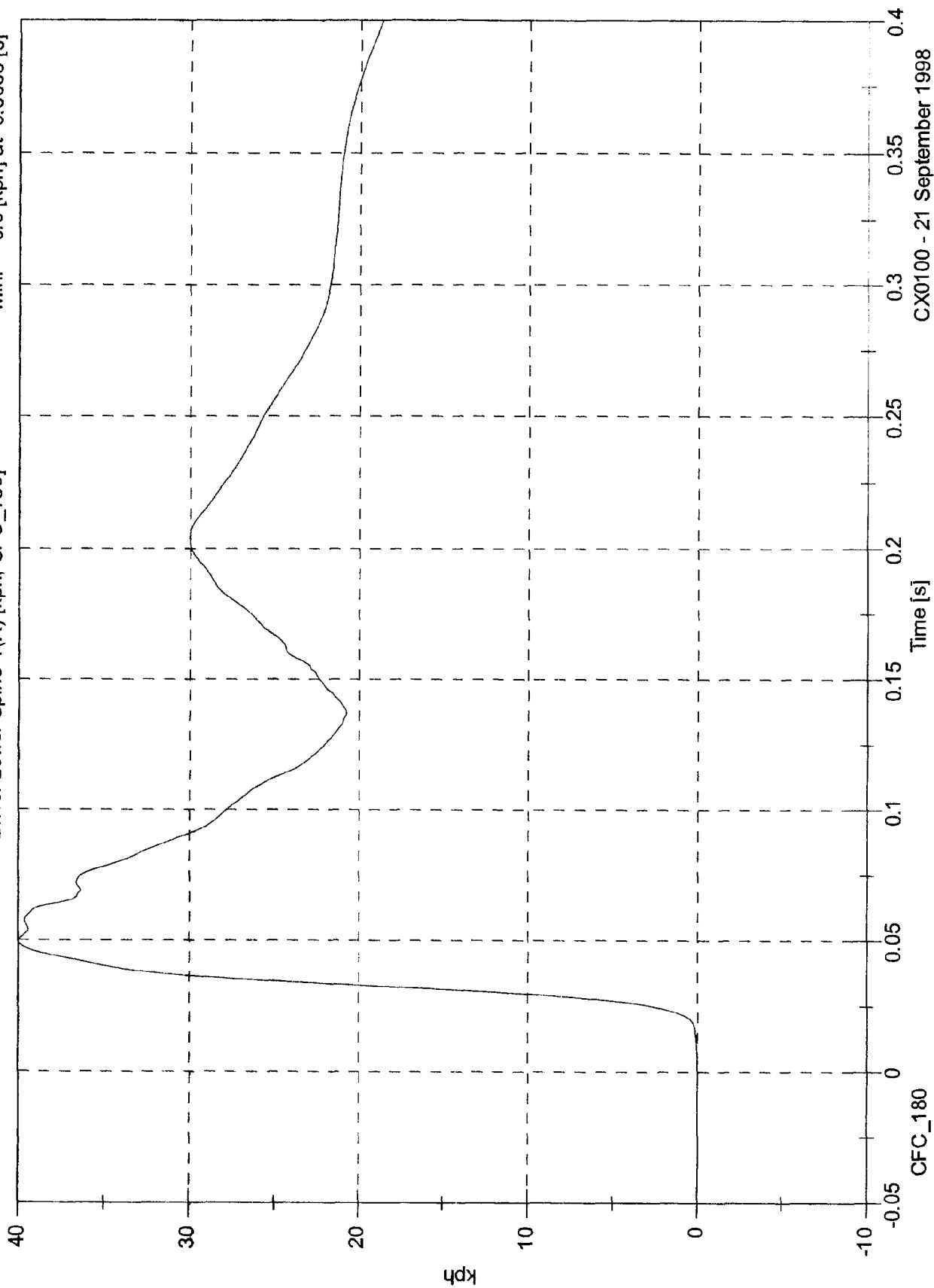


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 40.0 [kph] at 0.0494 [s]
Min: -0.0 [kph] at -0.0666 [s]

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



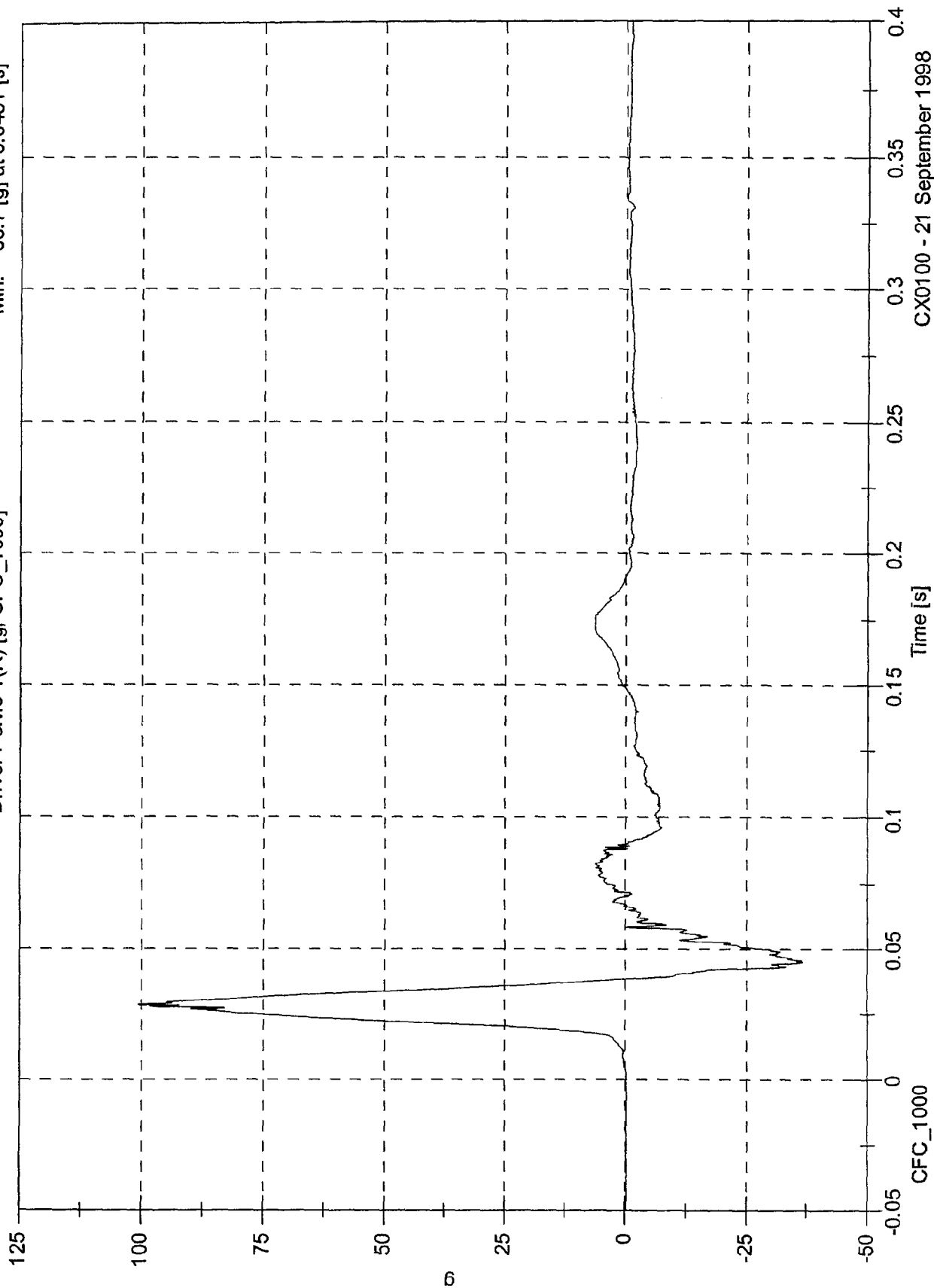
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max 100.6 [g] at 0.0285 [s]

Min: -36.7 [g] at 0.0451 [s]

Driver Pelvic Y(R) [g, CFC_1000]

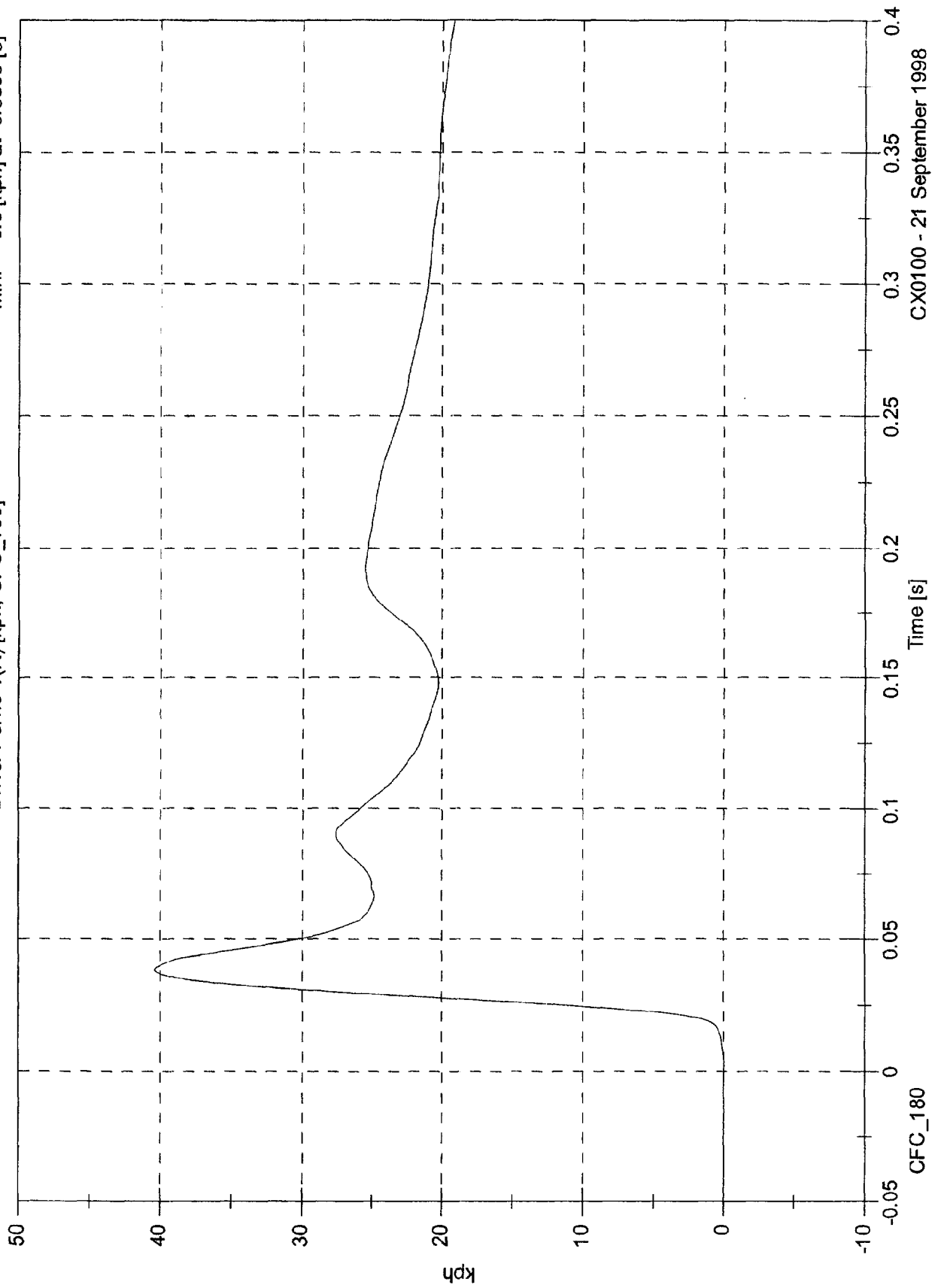


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Driver Pelvic Y(R) [kph, CFC_180]

Max: 40.4 [kph] at 0.0384 [s]
Min: -0.0 [kph] at -0.0309 [s]



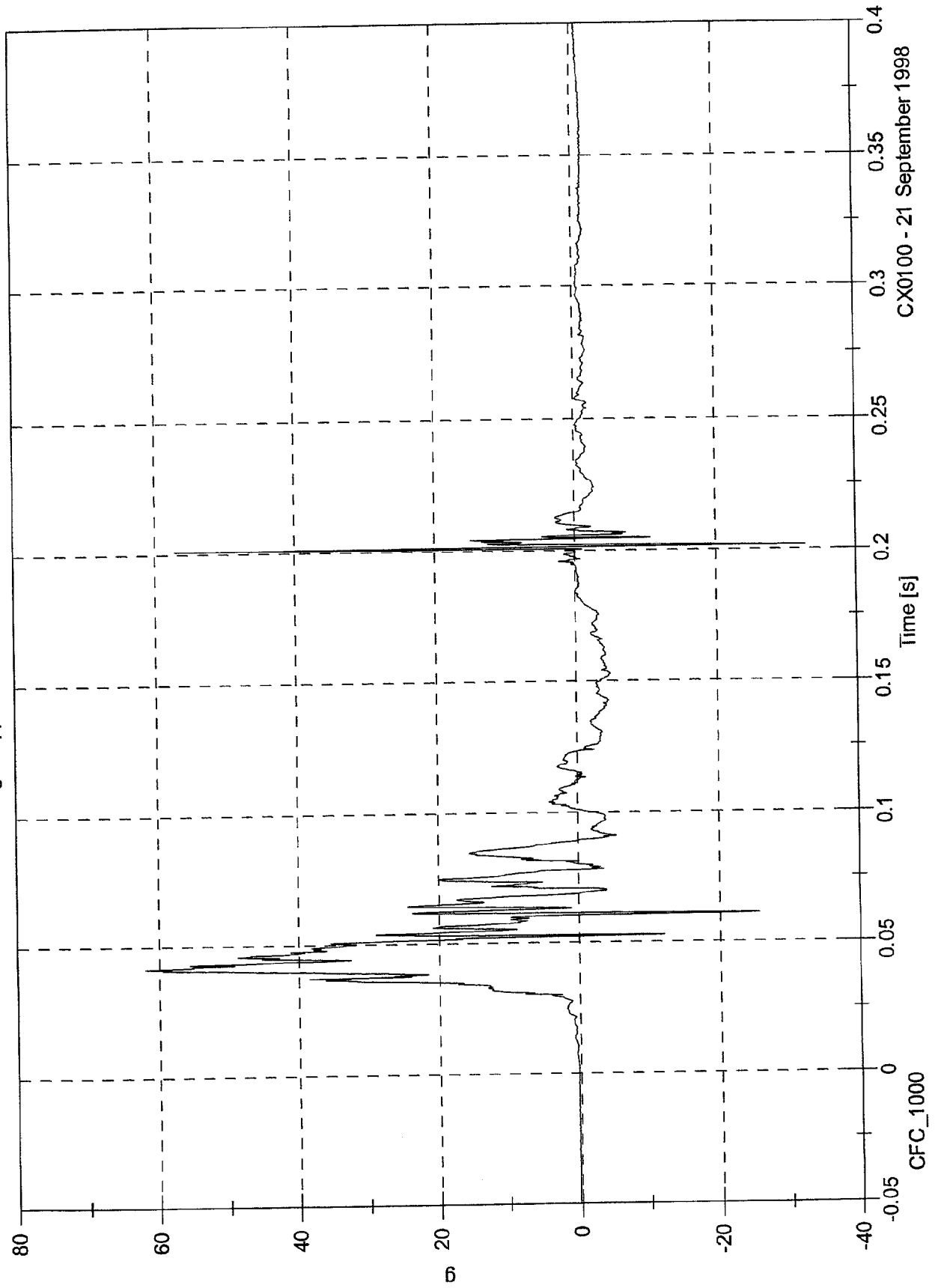
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 62.1 [g] at 0.0414 [s]

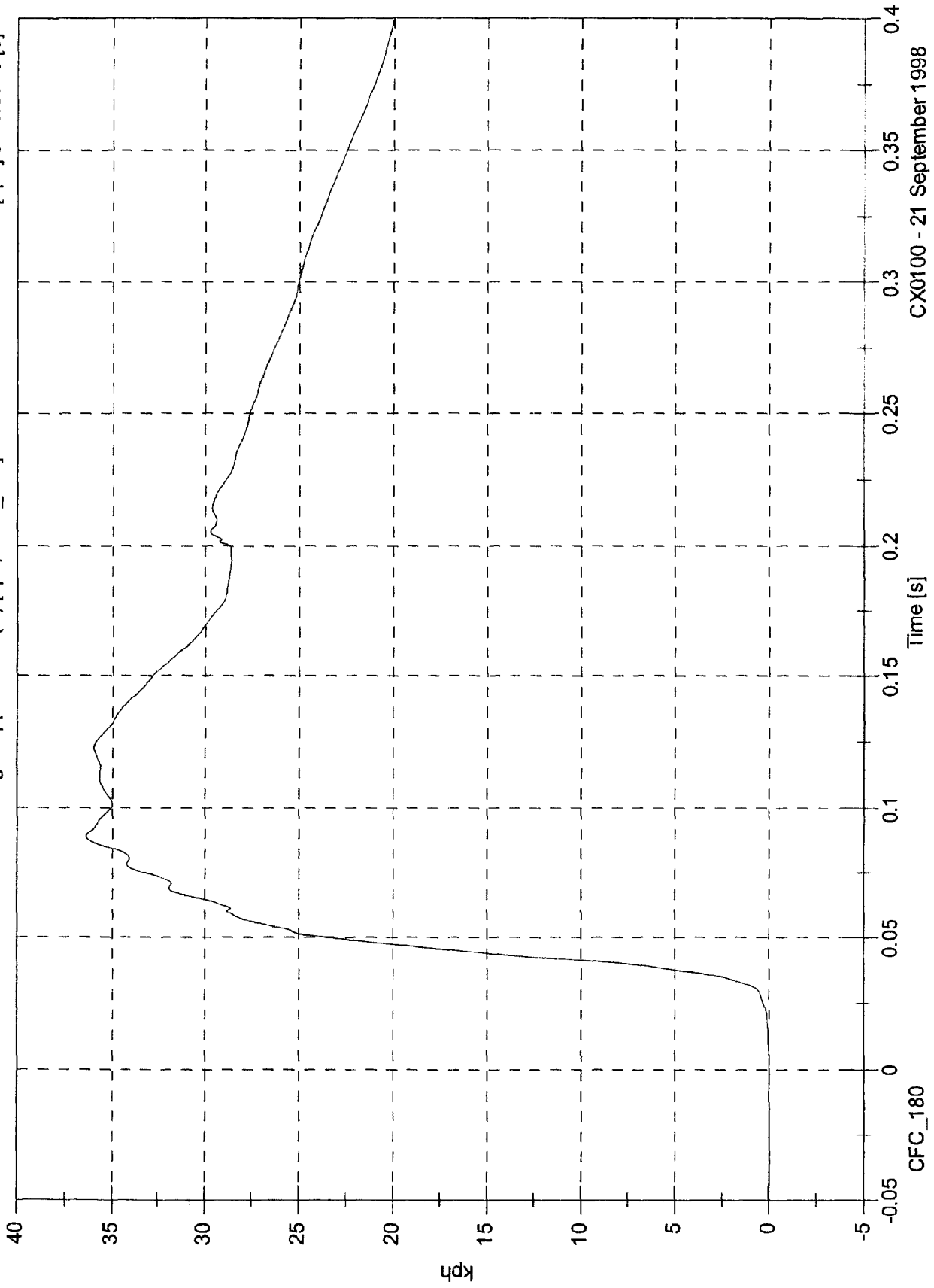
Min: -32.9 [g] at 0.2017 [s]



NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 36.4 [kph] at 0.0889 [s]
Min: -0.0 [kph] at -0.0546 [s]



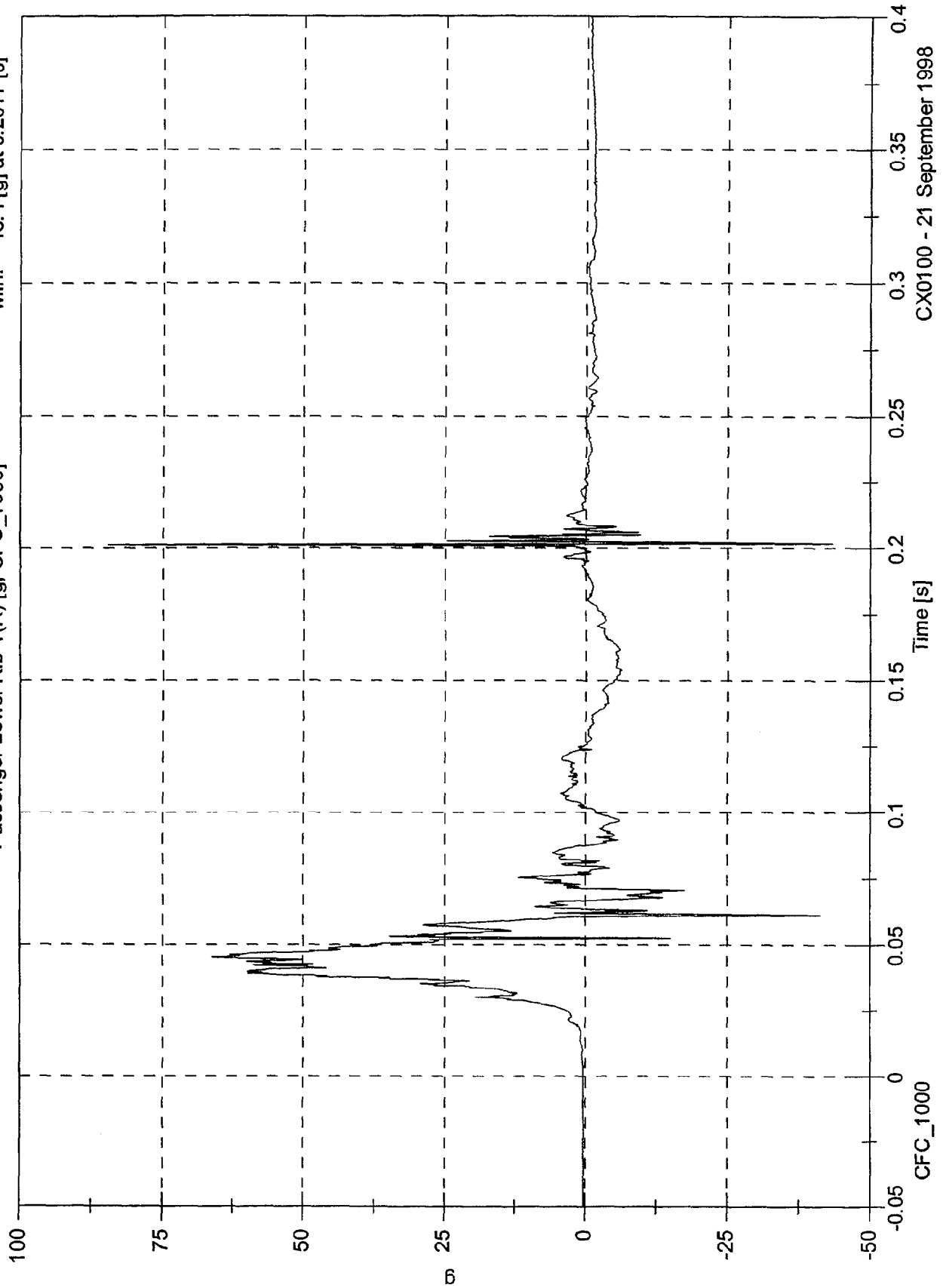
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 84.7 [g] at 0.2011 [s]

Min: -43.4 [g] at 0.2017 [s]



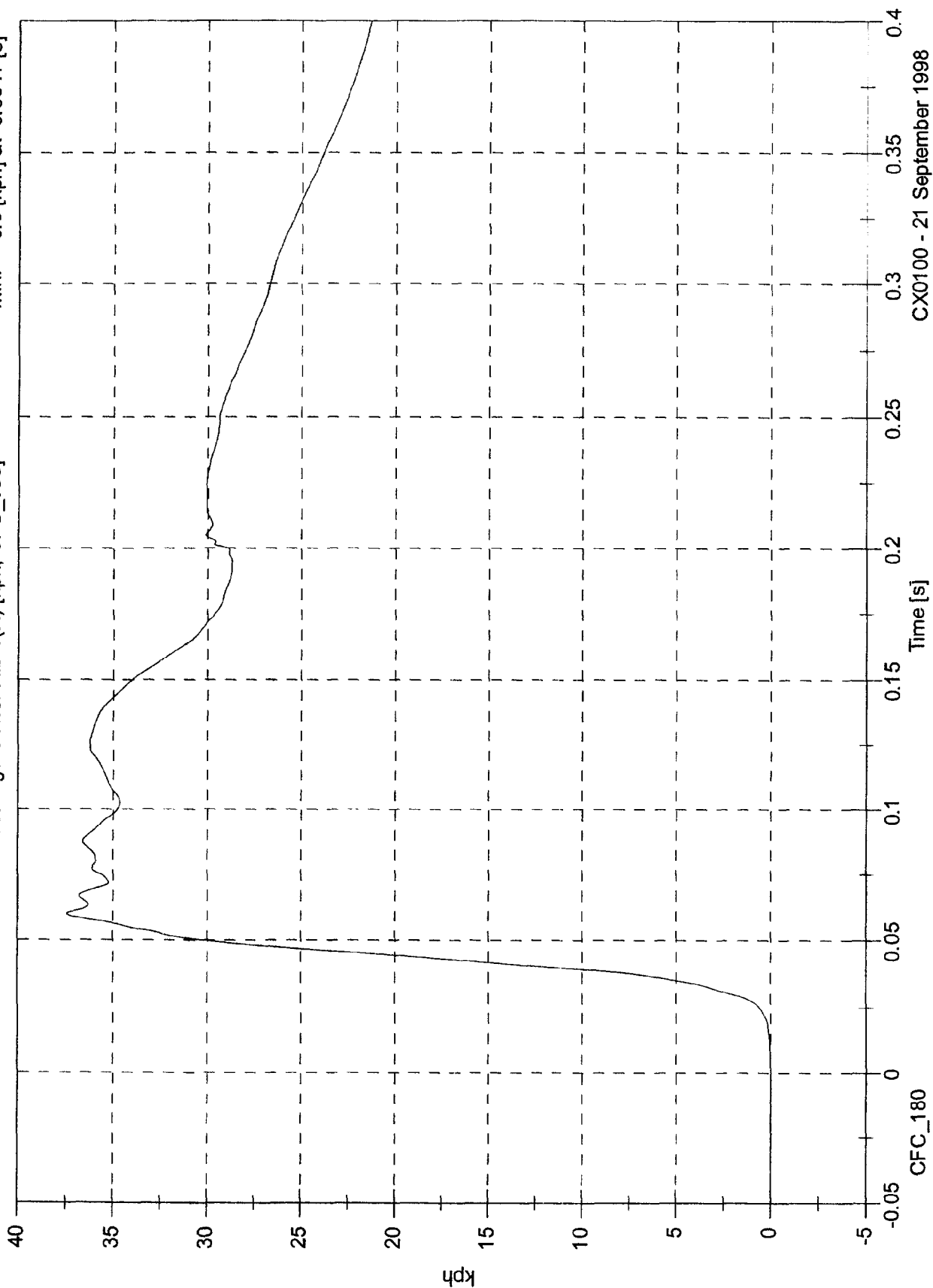
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

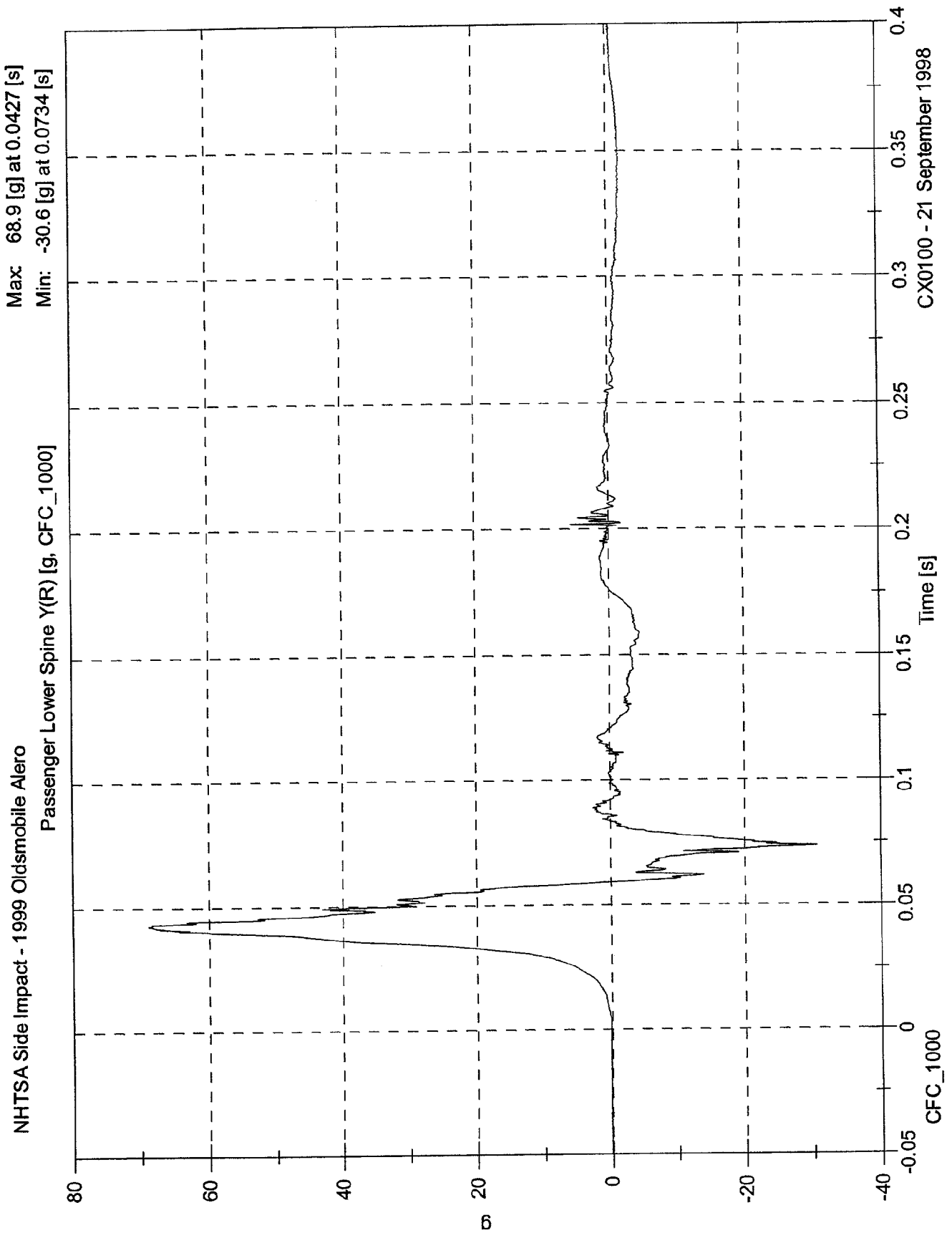
Passenger Lower Rib Y(R) [kph, CFC_180]

Max: 37.5 [kph] at 0.0601 [s]

Min: -0.0 [kph] at -0.0541 [s]



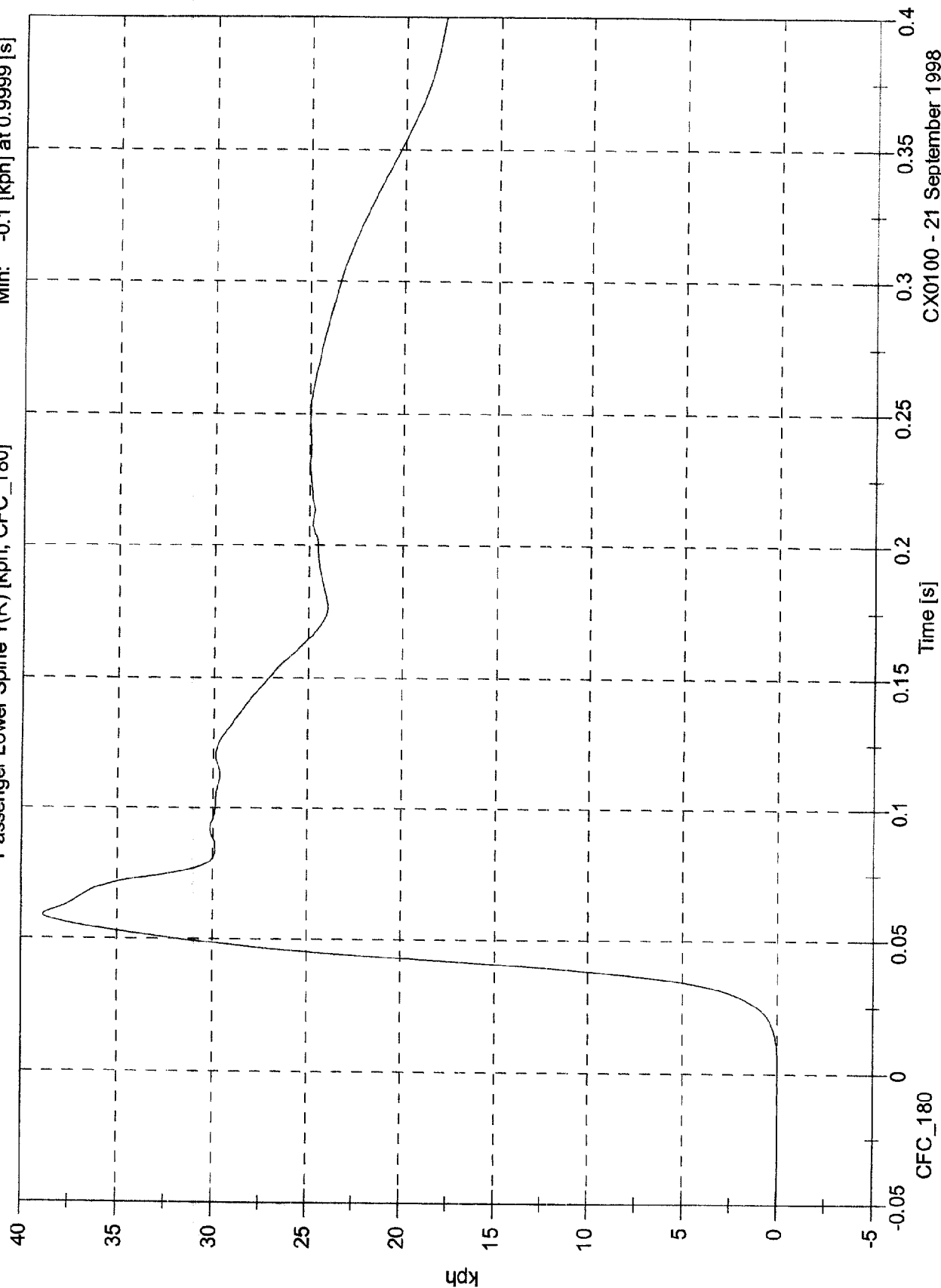
CX0100 - 21 September 1998



NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 38.9 [kph] at 0.0589 [s]
Min: -0.1 [kph] at 0.9999 [s]

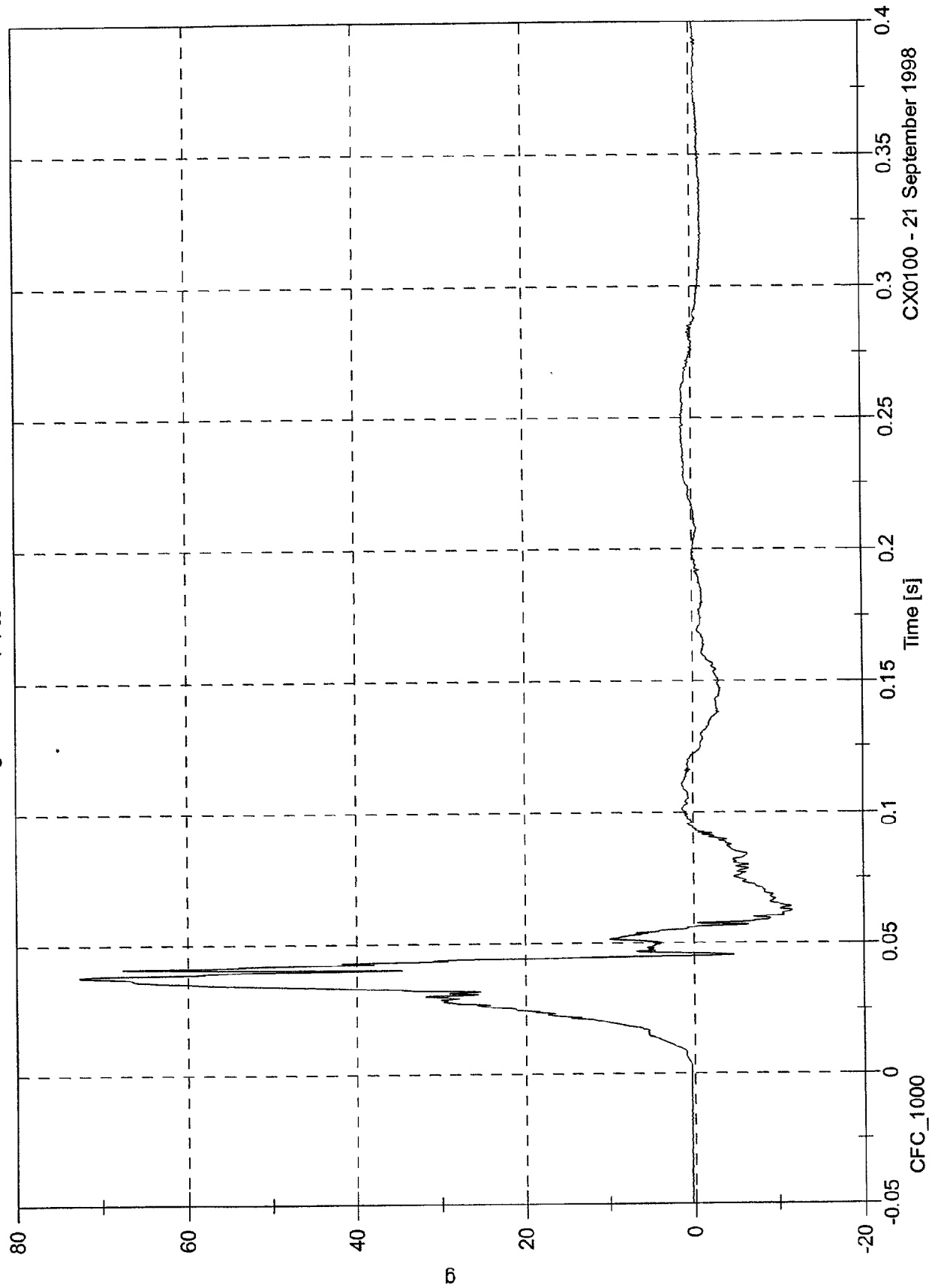


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Passenger Pelvic Y(R) [g, CFC_1000]

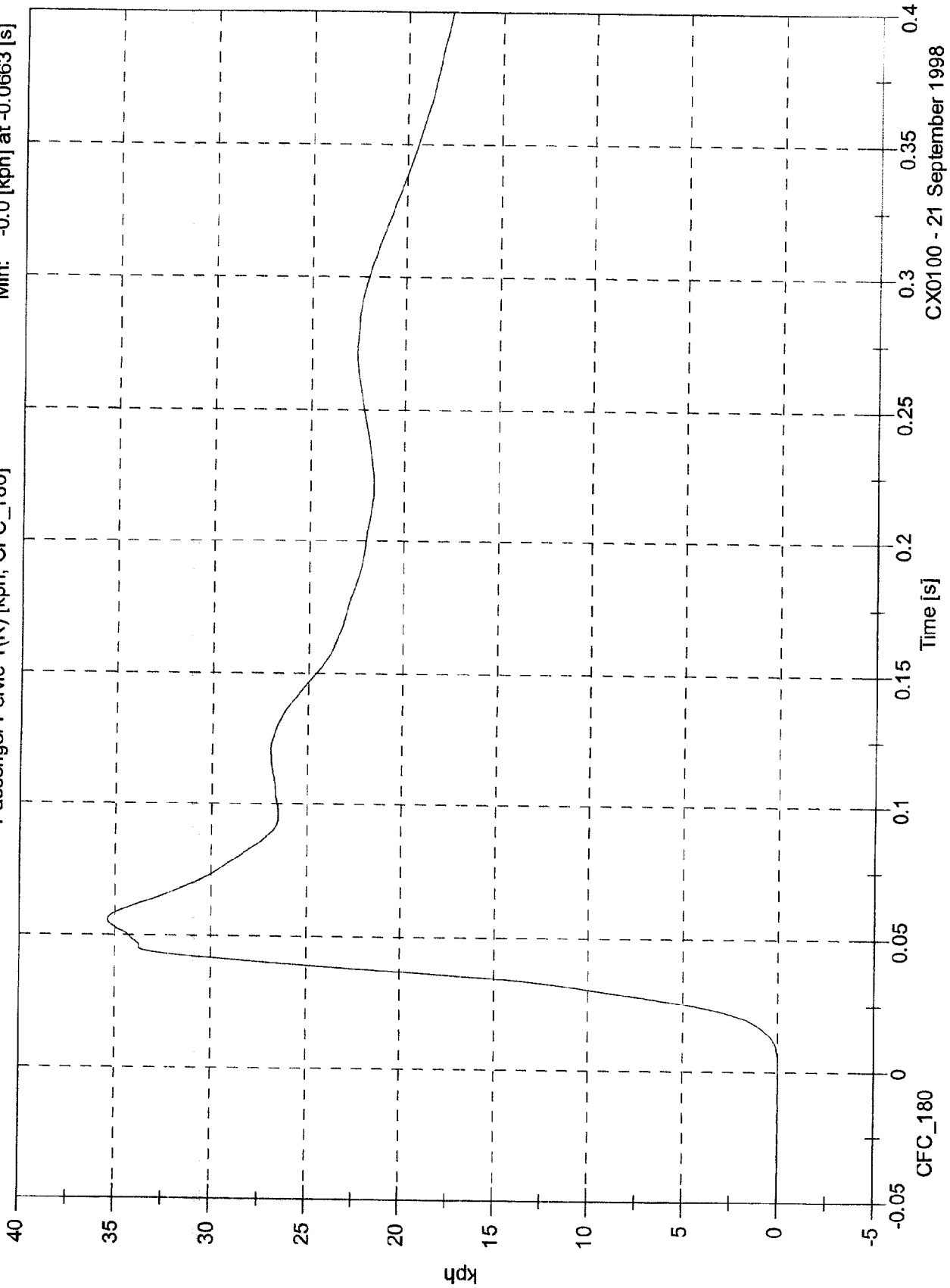
Max: 72.7 [g] at 0.038 [s]
Min: -11.6 [g] at 0.0626 [s]



NHTSA Side Impact - 1999 Oldsmobile Alero

Passenger Pelvic Y(R) [kph, CFC_180]

Max: 35.4 [kph] at 0.0557 [s]
Min: -0.0 [kph] at -0.0663 [s]

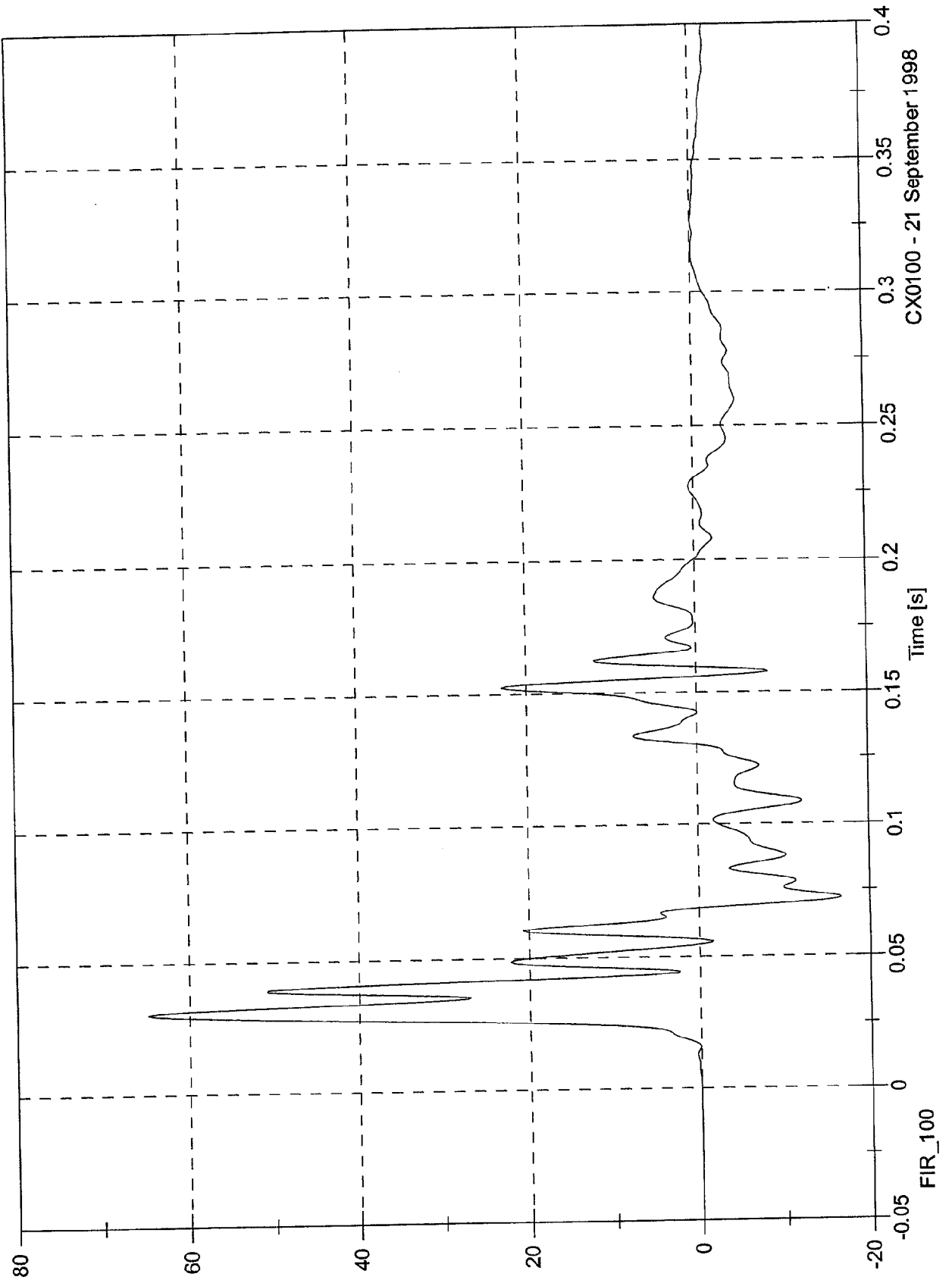


CX0100 - 21 September 1998

Max 64.9 [g] at 0.0306 [s]
Min: -16.7 [g] at 0.0719 [s]

NHTSA Side Impact - 1999 Oldsmobile Alero

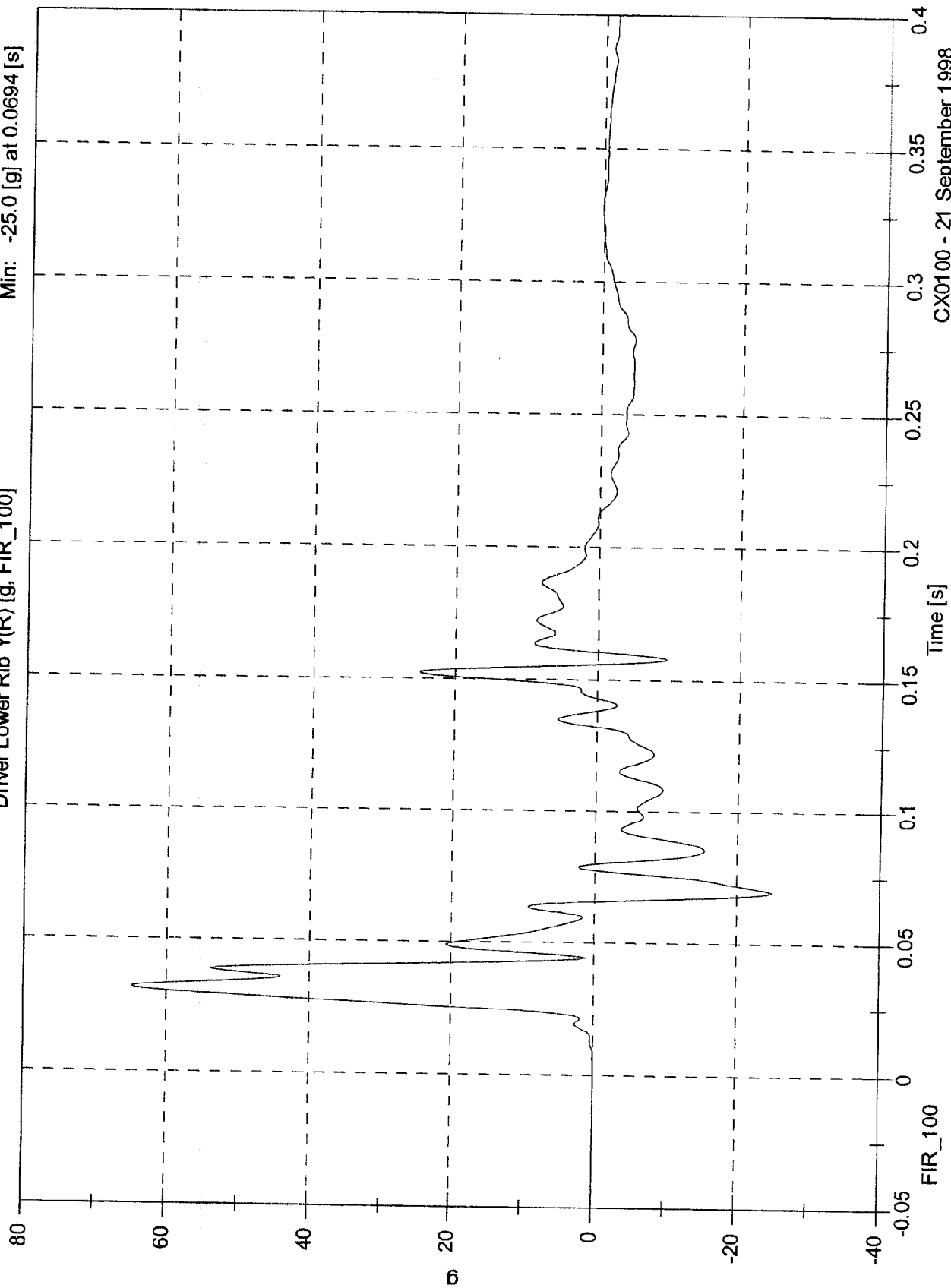
Driver Upper Rib Y(R) [g, FIR_100]



NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 64.8 [g] at 0.0319 [s]
Min: -25.0 [g] at 0.0694 [s]

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

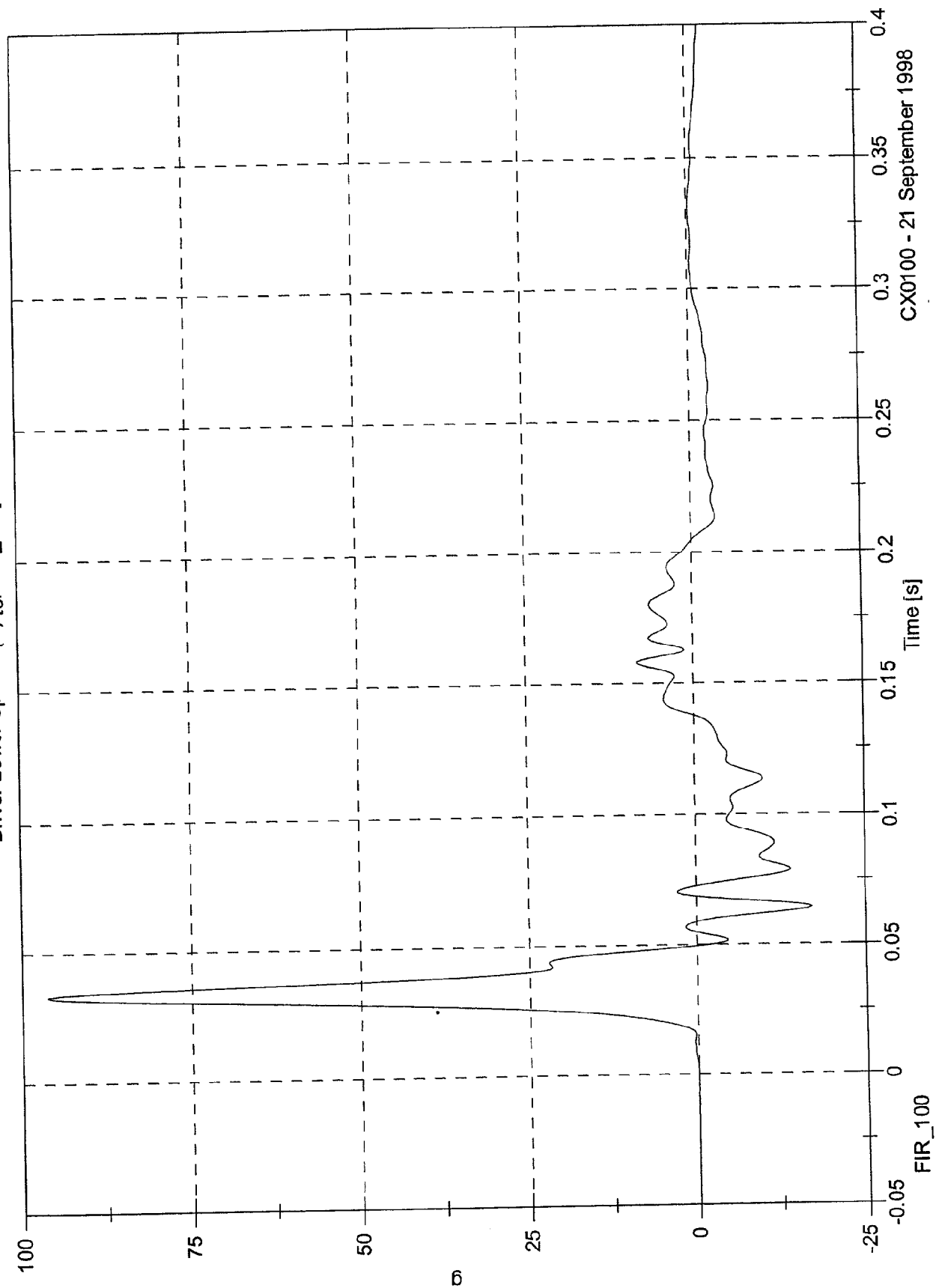


CX0100 - 21 September 1998

Max: 96.3 [g] at 0.0331 [s]
Min: -17.1 [g] at 0.0644 [s]

NHTSA Side Impact - 1999 Oldsmobile Alero

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



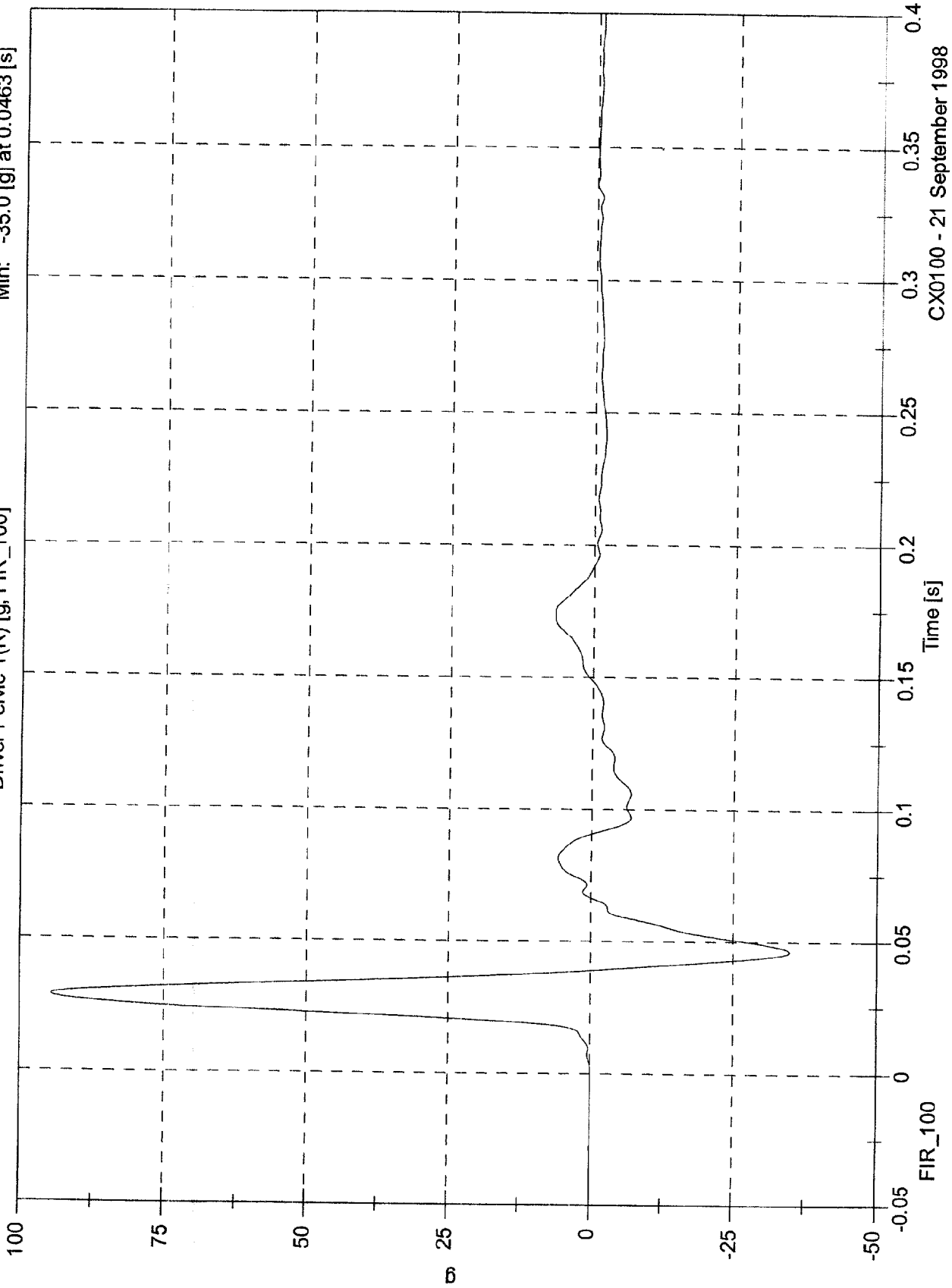
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 94.7 [g] at 0.0287 [s]

Min: -35.0 [g] at 0.0463 [s]

Driver Pelvic Y(R) [g, FIR_100]



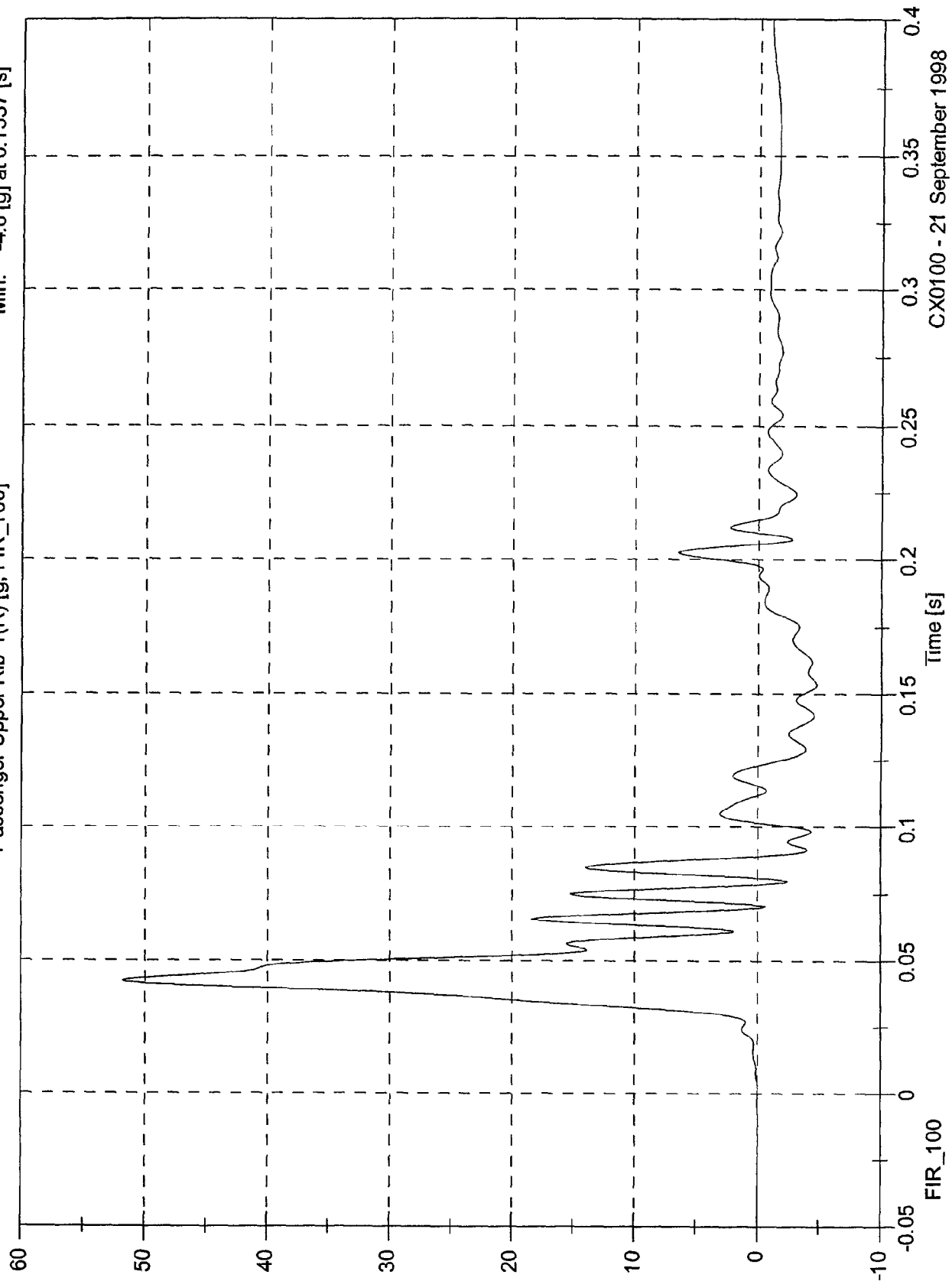
CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

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

Max: 51.8 [g] at 0.0425 [s]

Min: -4.8 [g] at 0.1537 [s]

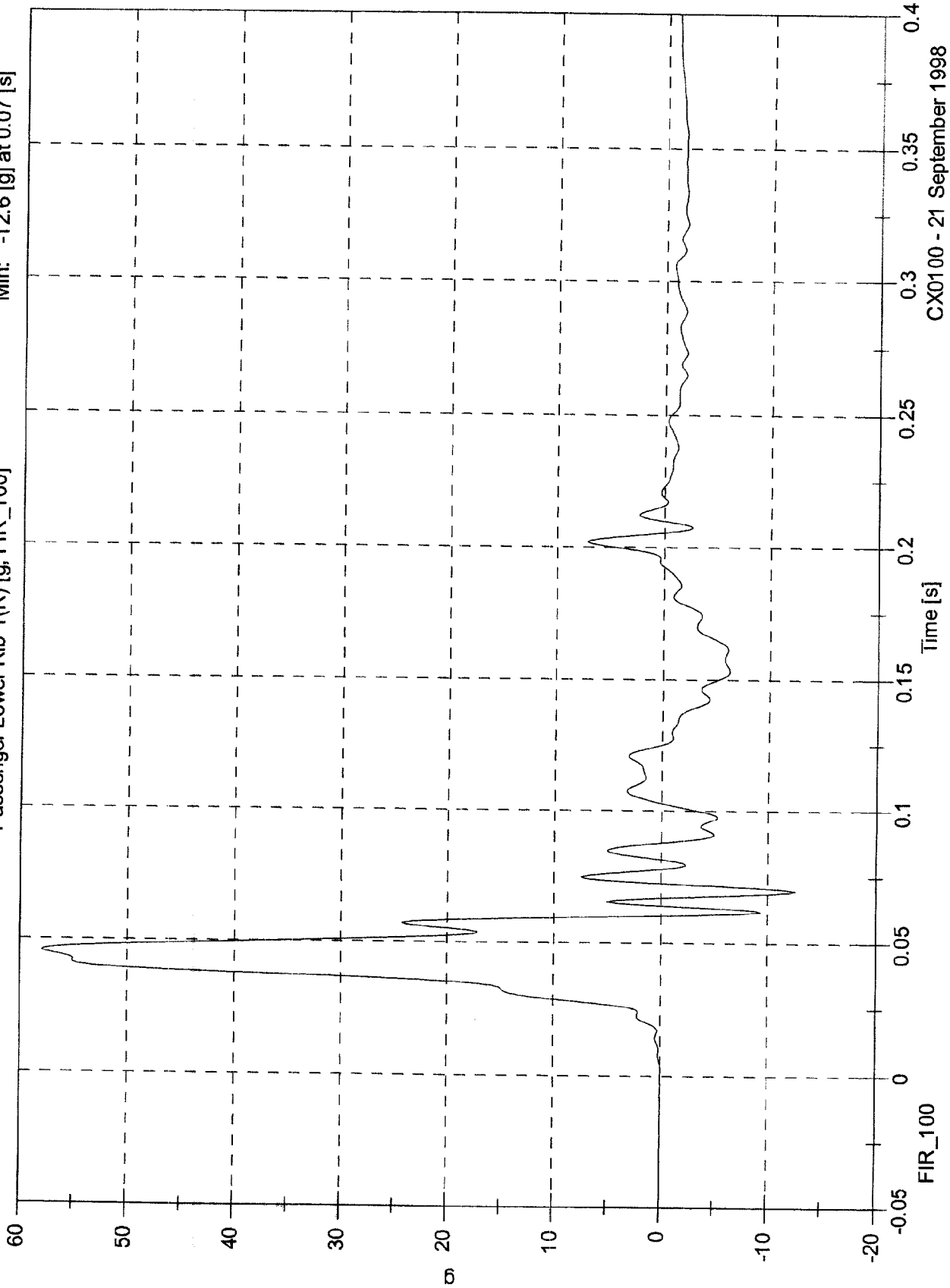


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 58.0 [g] at 0.0456 [s]
 Min: -12.6 [g] at 0.07 [s]

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

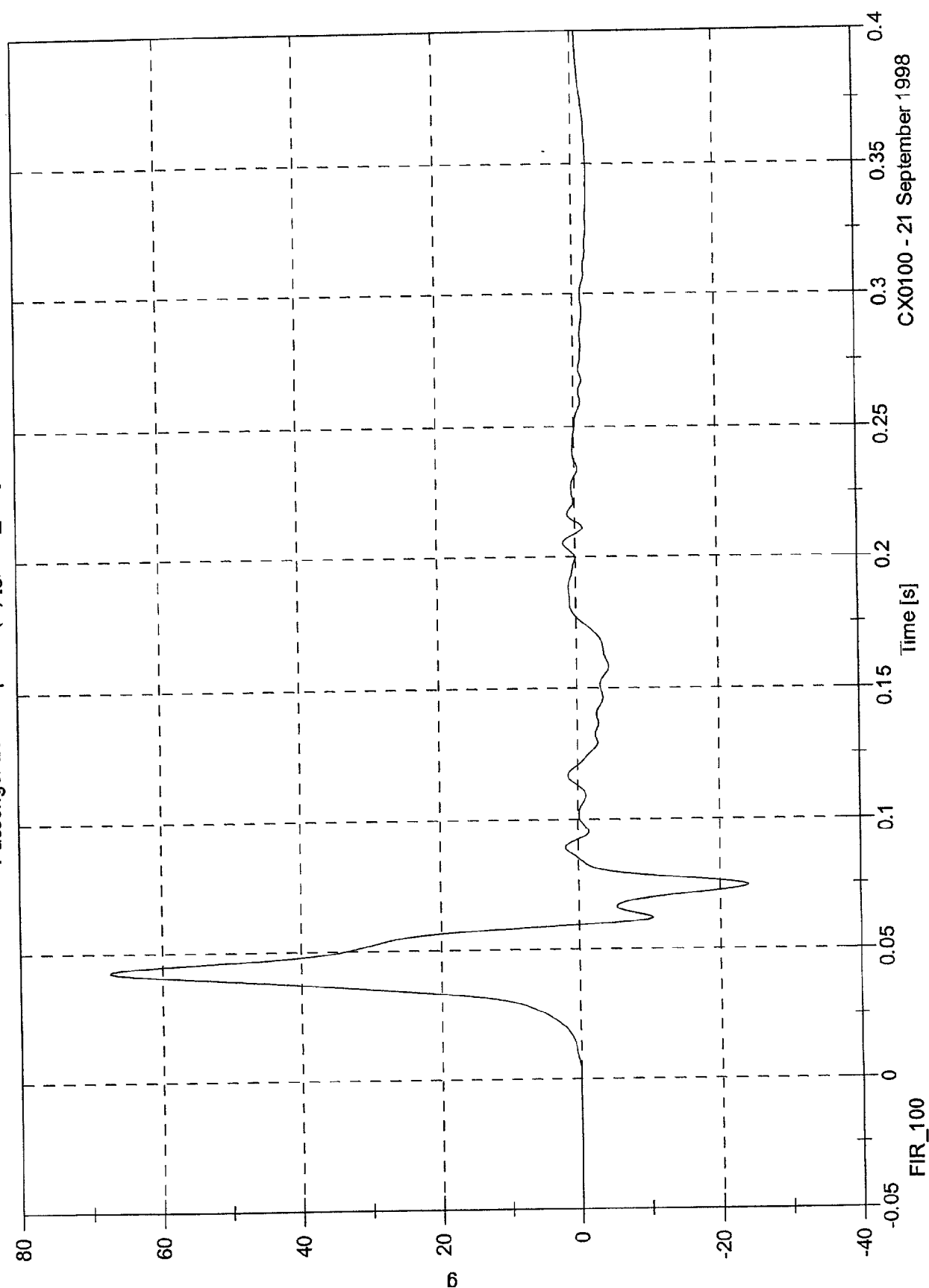


CX0100 - 21 September 1998

Max: 67.4 [g] at 0.0425 [s]
Min: -24.0 [g] at 0.0743 [s]

NHTSA Side Impact - 1999 Oldsmobile Alero

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

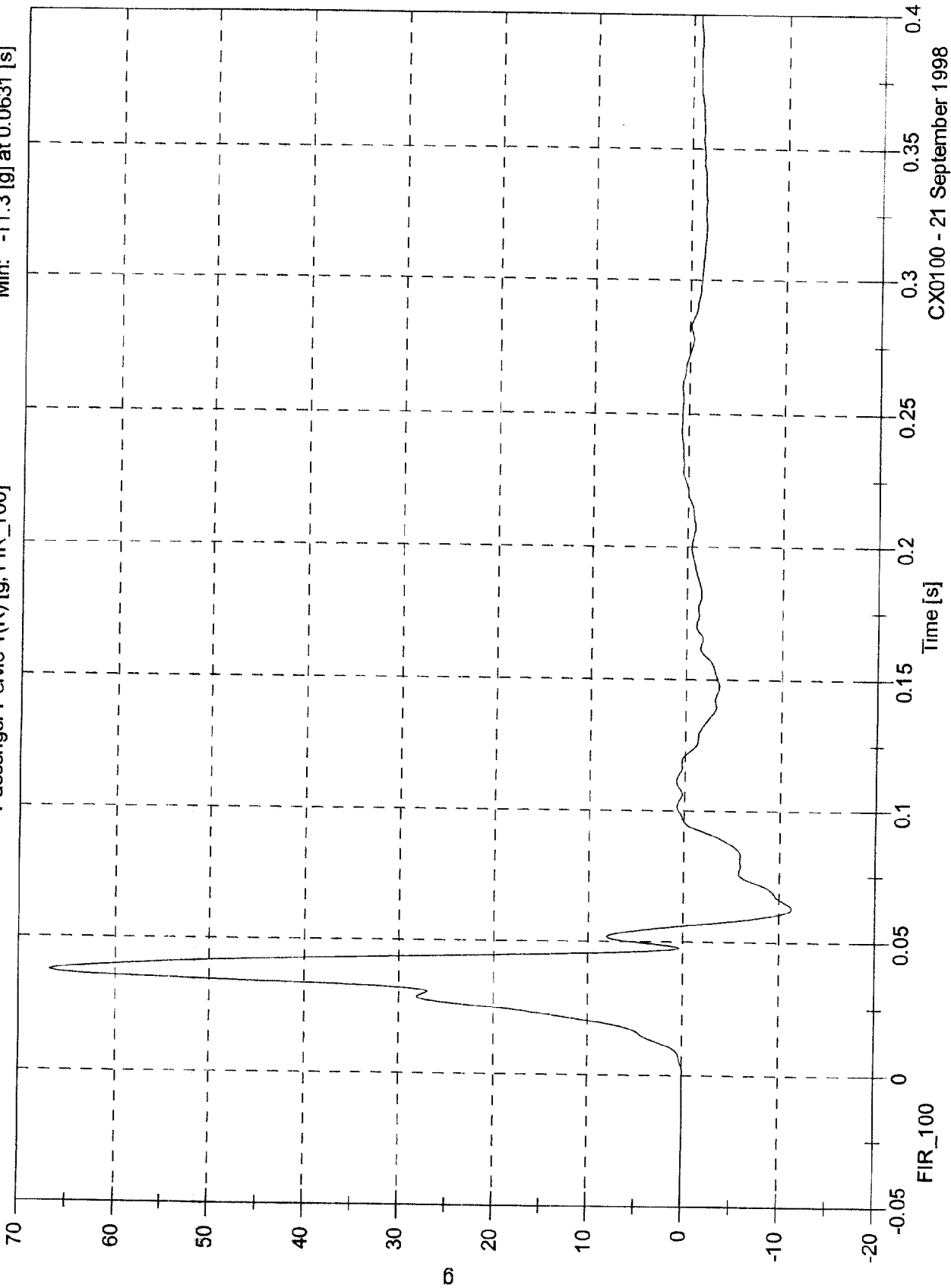


CX0100 - 21 September 1998

NHTSA Side Impact - 1999 Oldsmobile Alero

Max: 66.8 [g] at 0.0375 [s]
Min: -11.3 [g] at 0.0631 [s]

Passenger Pelvic Y(R) [g, FIR_100]



CX0100 - 21 September 1998

APPENDIX C

SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA

SUMMARY
SID PRE & POST TEST CALIBRATION

CONFIGURED FOR LEFT SIDE IMPACT

Date: 9/17/98, 9/23/98

Calspan Sequential Test Number: 1, 2

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	525	526
SW- Knee Pivot to Floor (mm)	490 - 505	493	493	494	494
HW- Hip Width (mm)	356 - 391	367	368	361	361
THORAX IMPACTS					
TEMPERATURE (°C)	18.9 - 25.5	21.1	21.1	21.1	21.1
RELATIVE HUMIDITY (%)	10 - 70	45	45	45	45
PROBE SPEED (m/s)	4.27 - 4.33	4.32	4.30	4.29	4.33
UPPER RIB (g's)	37 - 46	41.9	44.2	42.1	45.3
LOWER RIB (g's)	37 - 46	41.7	43.9	41.6	45.3
LOWER SPINE (g's)	15 - 22	21.3	21.1	15.3	15.8
PELVIS IMPACT					
TEMPERATURE (°C)	18.9 - 25.5	21.1	21.1	21.1	21.1
RELATIVE HUMIDITY (%)	10 - 70	45	45	45	45
PROBE SPEED (m/s)	4.27 - 4.33	4.32	4.29	4.28	4.30
PELVIS (g's)	40 - 60	53.1	55.7	44.0	40.6

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
Date: 9/17/98

Calspan Sequential Test Number: 1
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
Date: 9/17/98

Calspan Sequential Test Number: 1
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	367

REMARKS: None

**THORACIC SHOCK ABSORBER TESTS
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015 Calspan Sequential Test Number: 1.1
Date: 9/14/98 Laboratory Technician: B. Swiecicki, G. Serbinowski

DAMPER IDENTIFICATION: 015

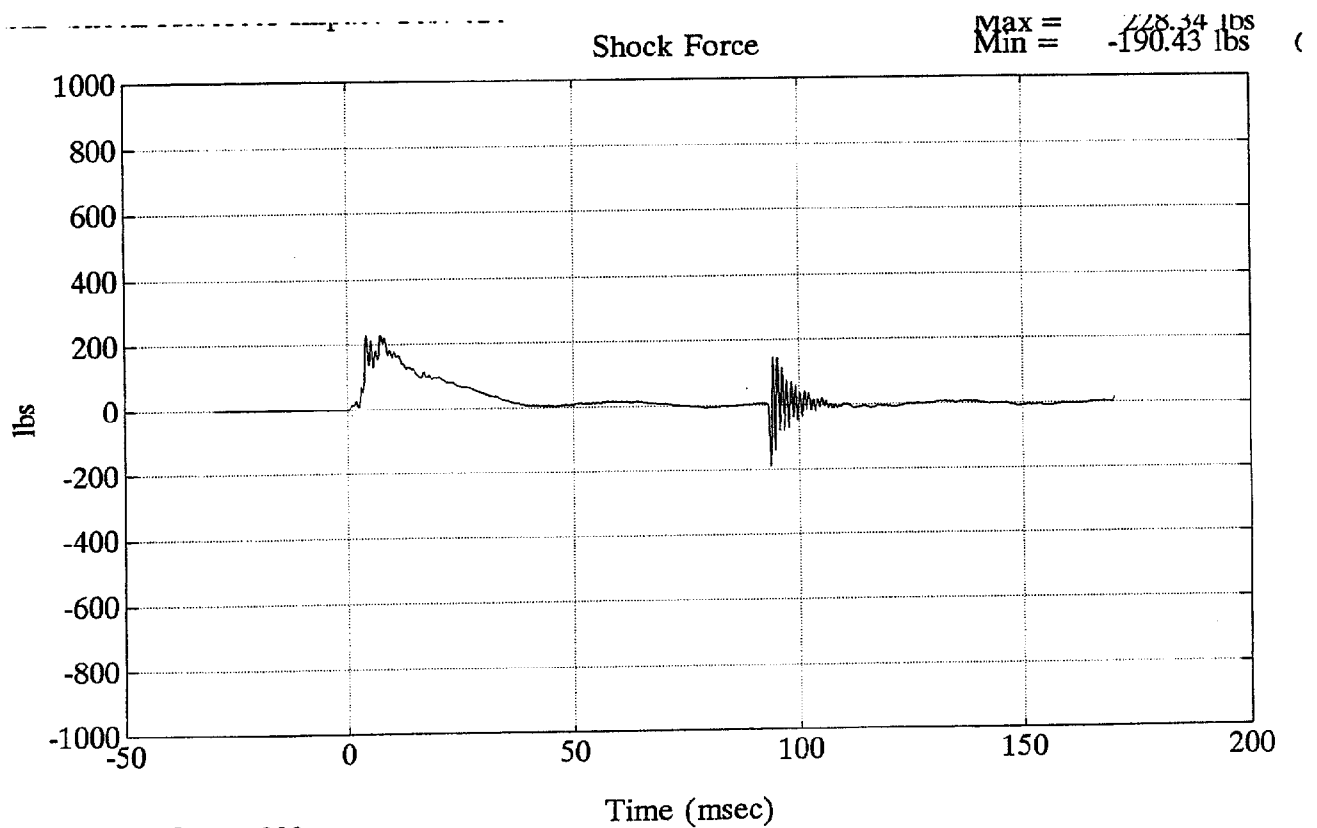
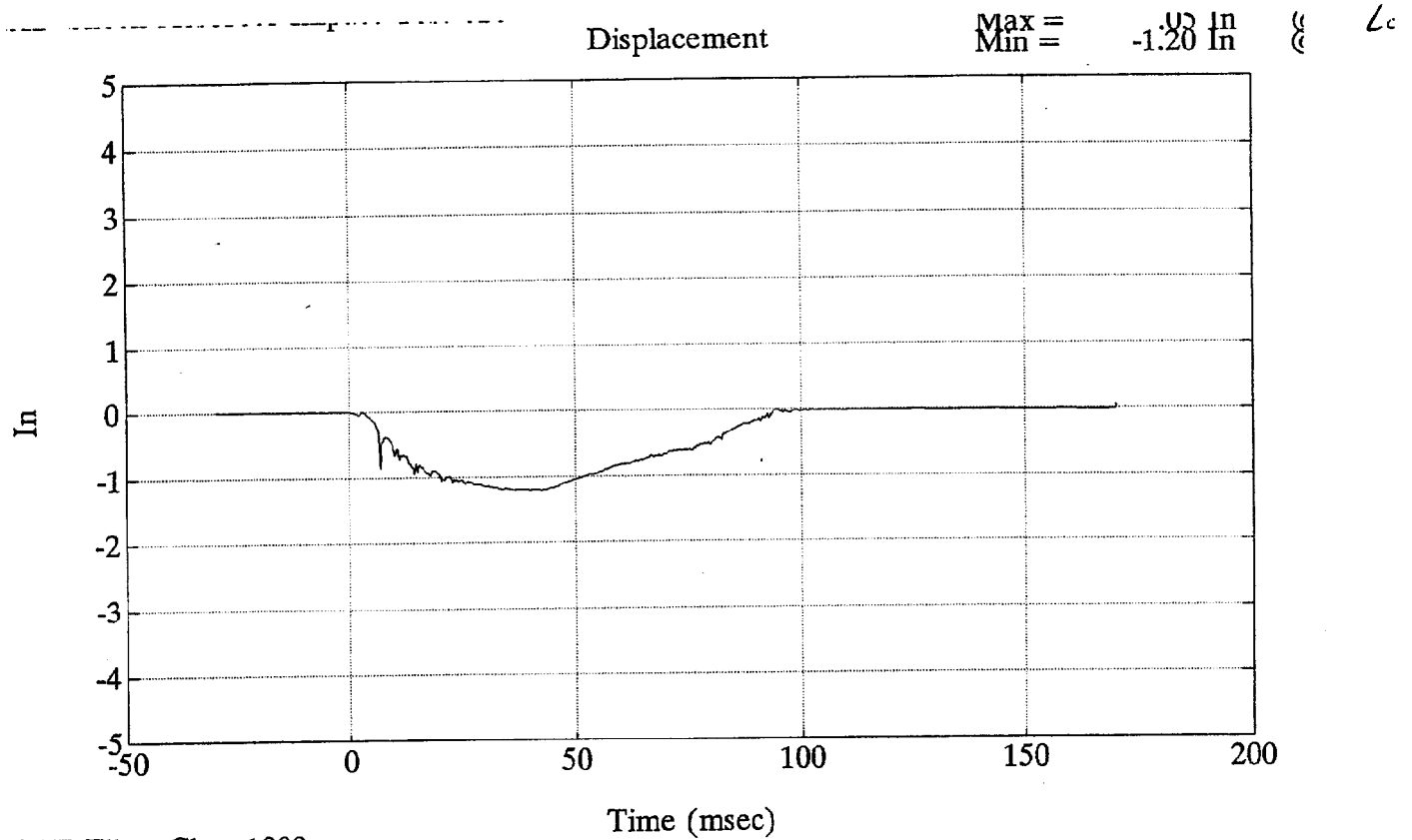
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)		18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)		10 - 70	45
VELOCITY 3.05 m/s	FORCE (N)	836 - 1125	1016
	DISPLACEMENT (mm)	30 - 35	30
VELOCITY 4.27 m/s	FORCE (N)	1730 - 2099	1932
	DISPLACEMENT (mm)	32 - 37	34
VELOCITY 6.10 m/s	FORCE (N)	3741 - 4448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

DAMPER SETTING: 5.75

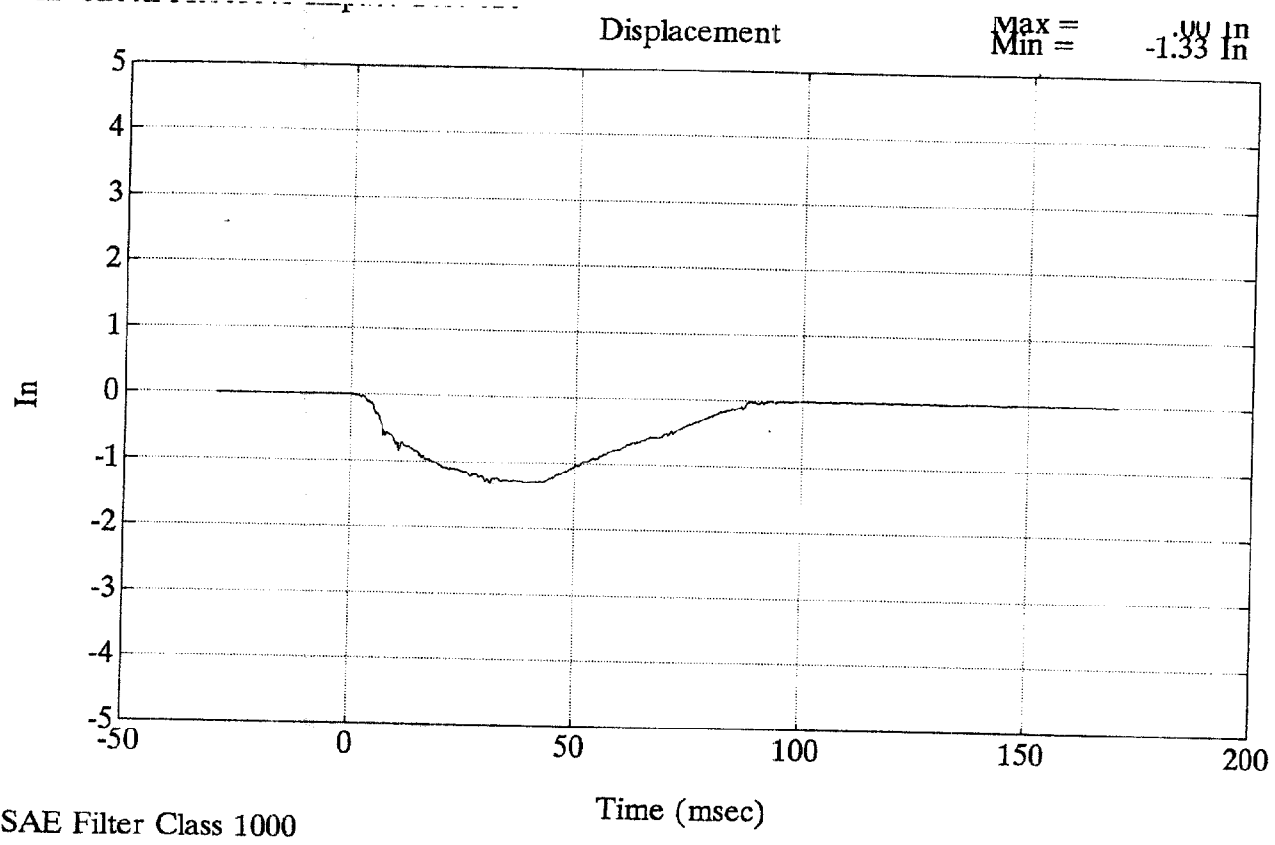
REMARKS: None

Piston Position 5.75

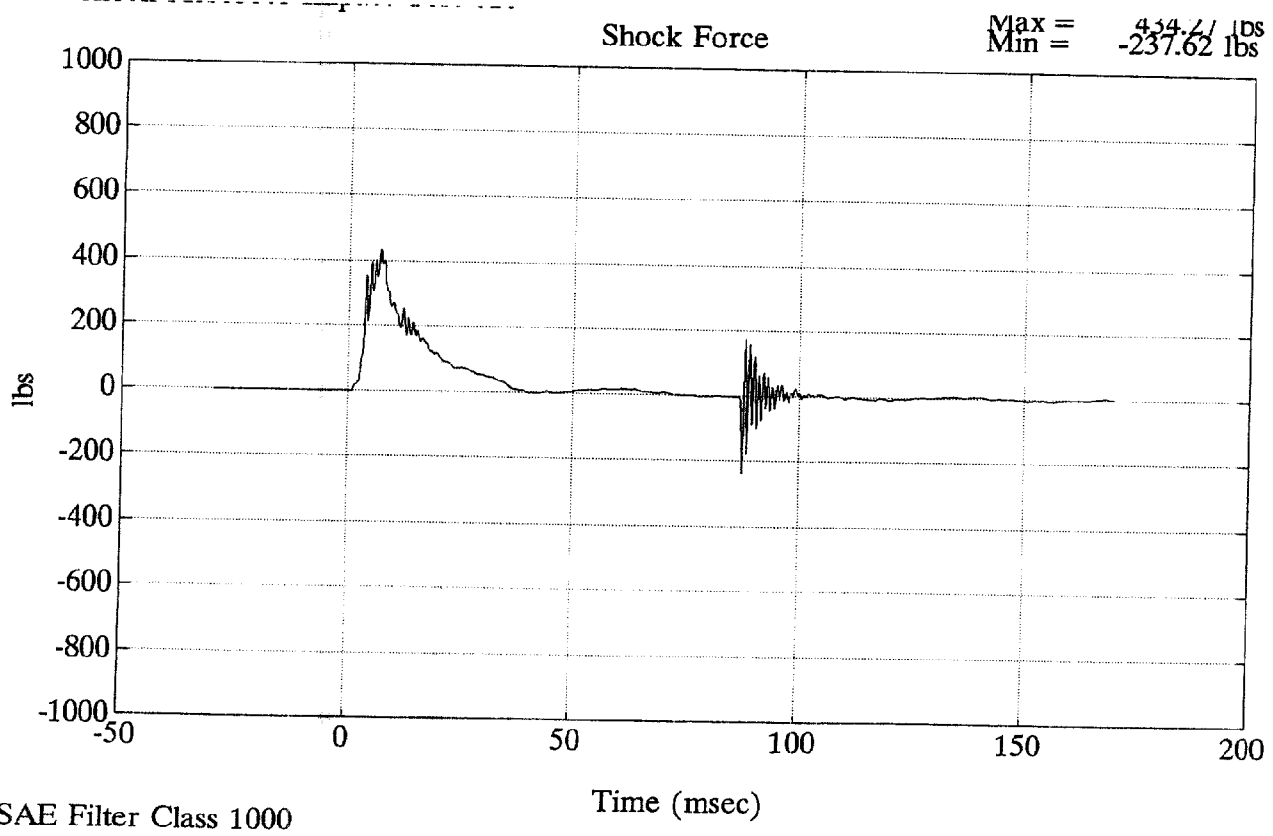
9.98 F/5 CE0019A.RAW #0



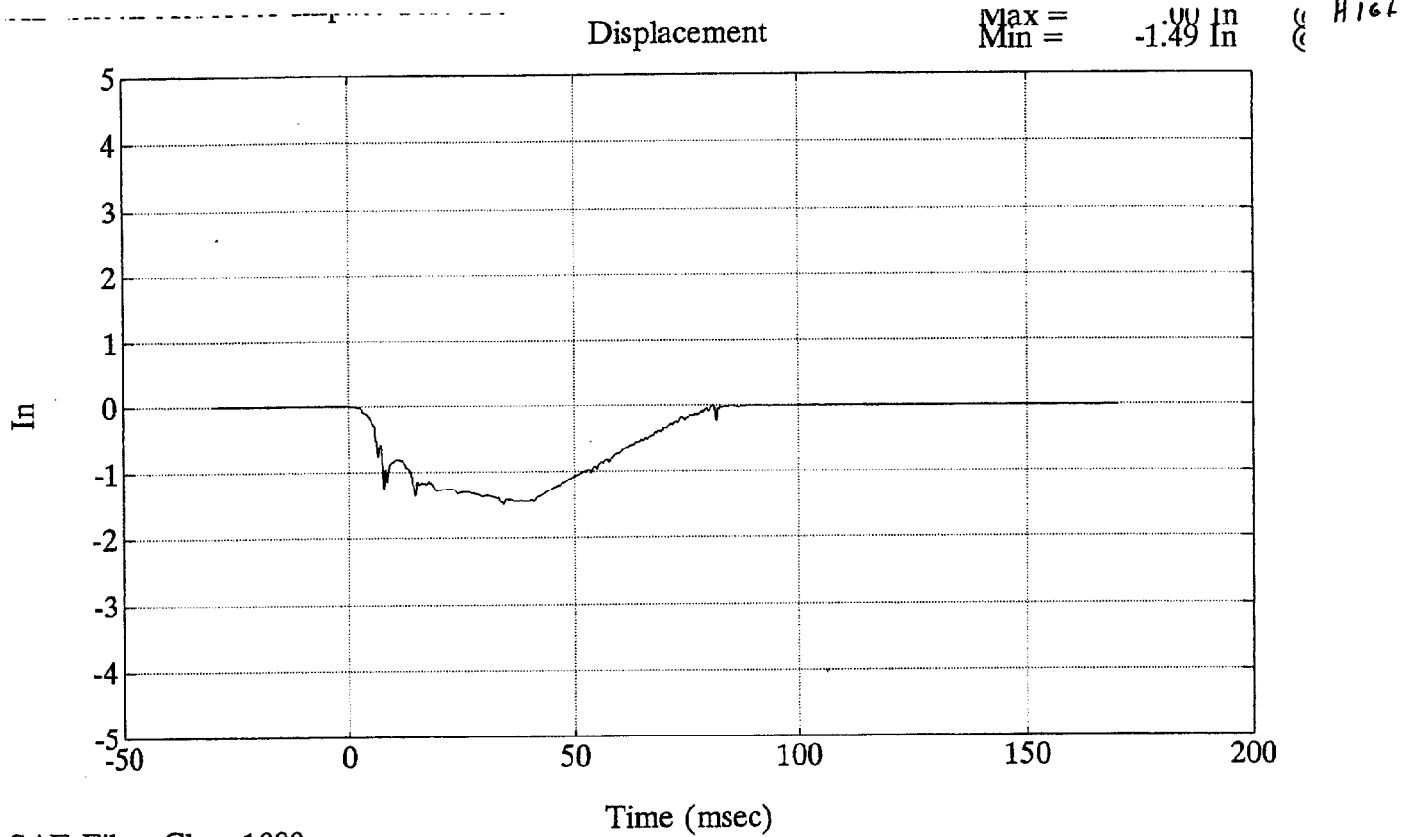
14.01 F/5 # 3
CE0020A.RAW
Max = 0.00 in
Min = -1.33 in



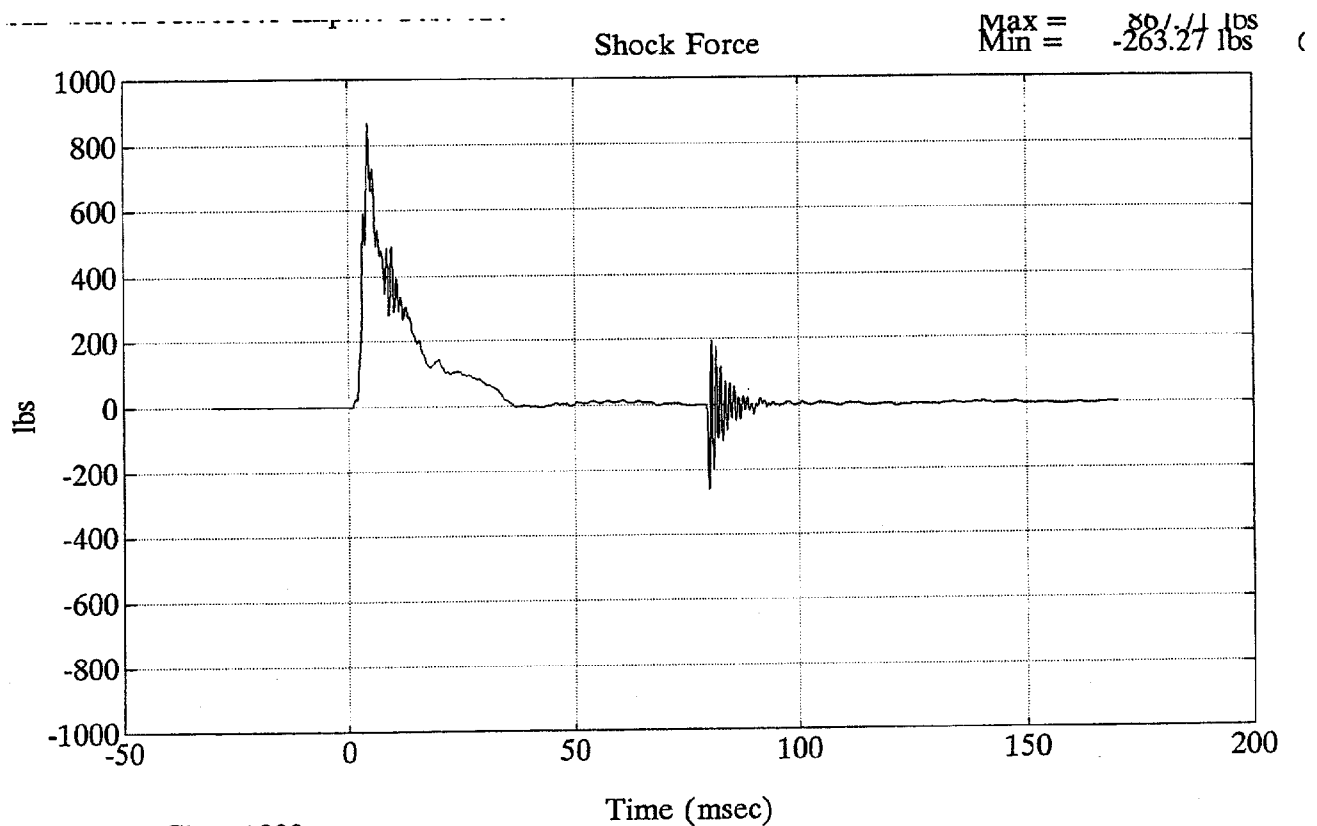
Max = 434.77 lbs
Min = -237.62 lbs



20.09 F/s CE 0021A.RAW #15



SAE Filter Class 1000



SAE Filter Class 1000

**LATERAL THORAX IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

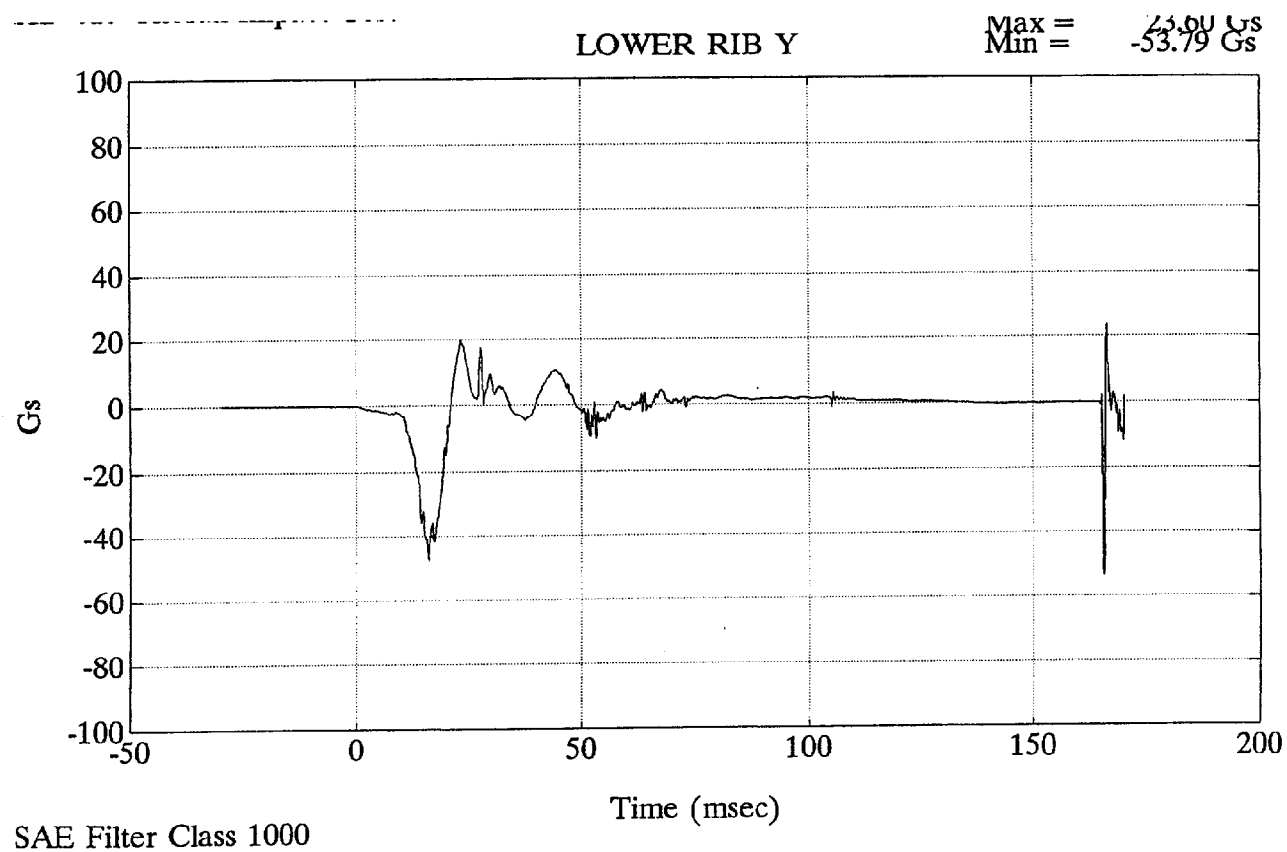
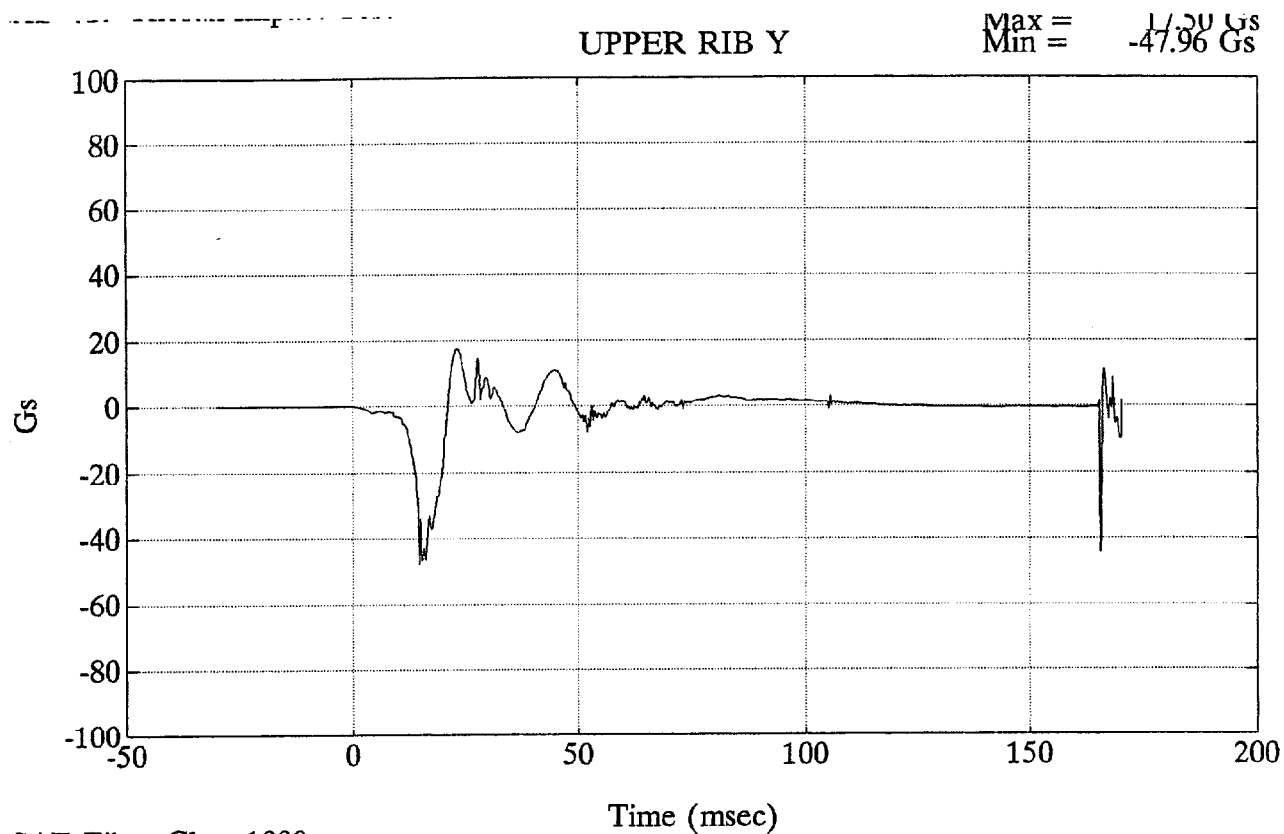
Calspan Sequential Test Number: 1

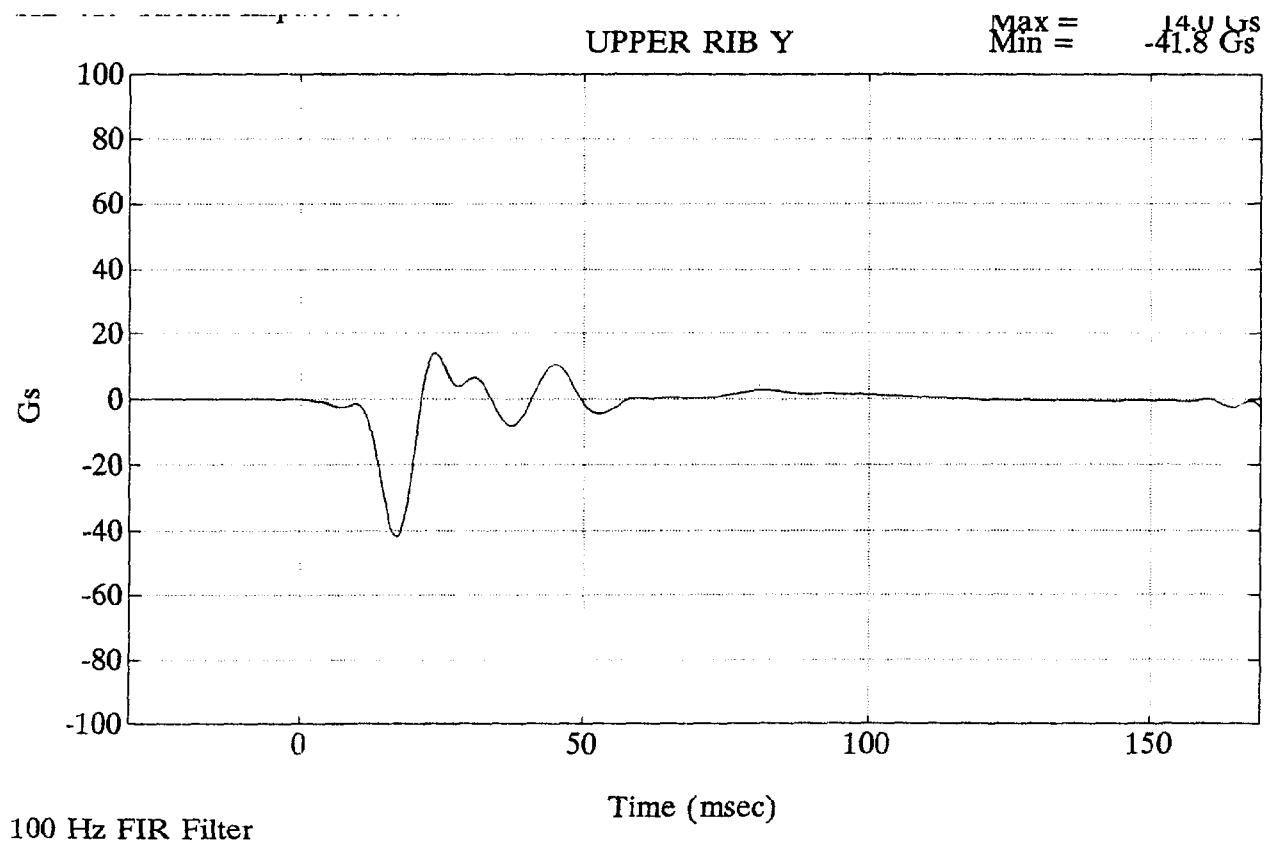
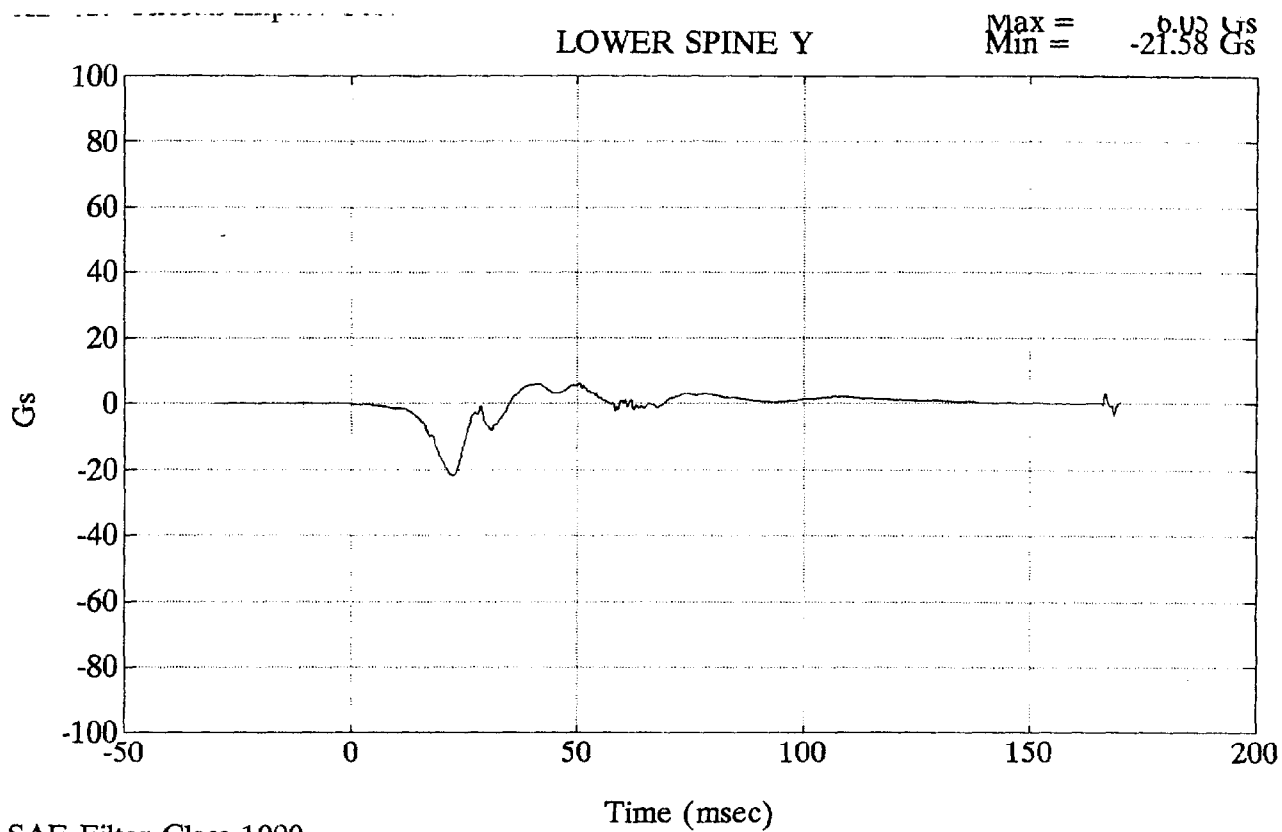
Date: 9/17/98

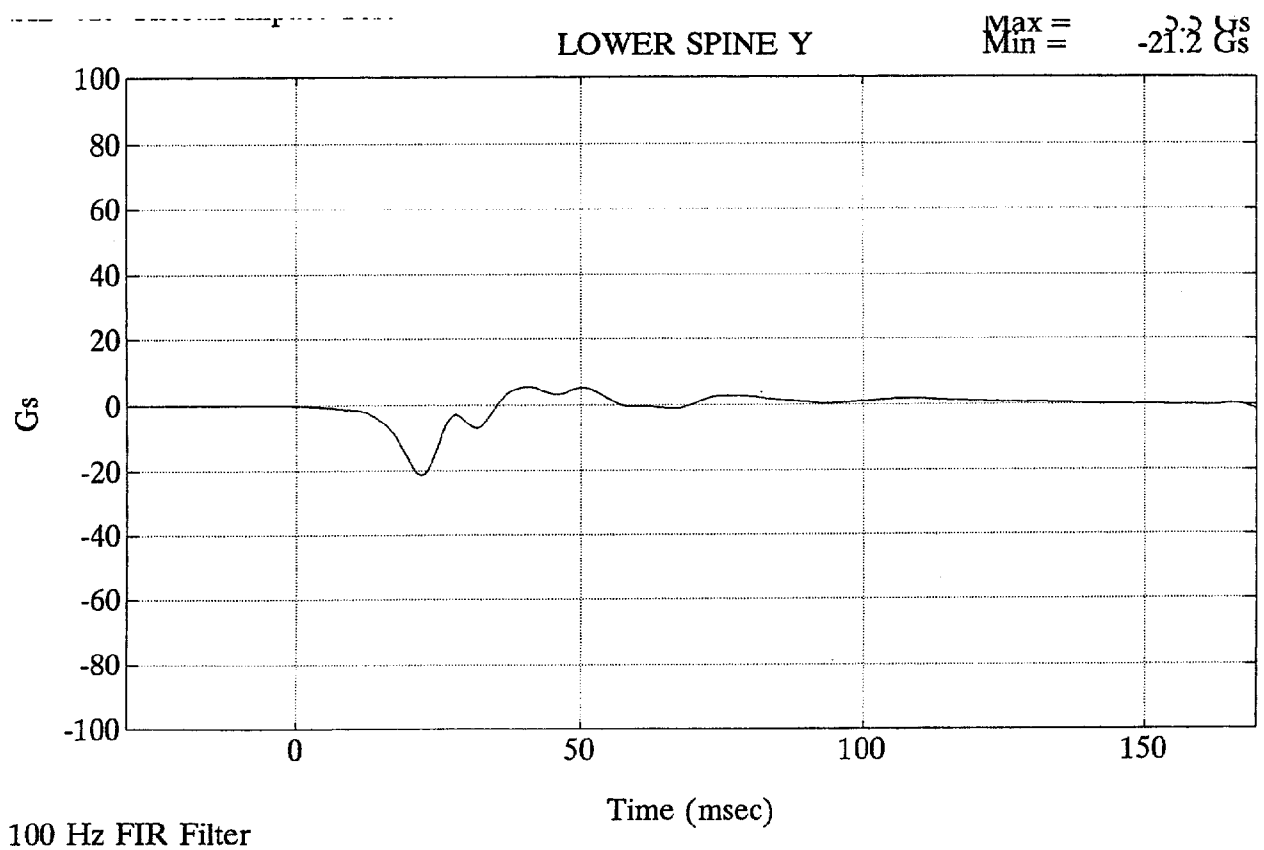
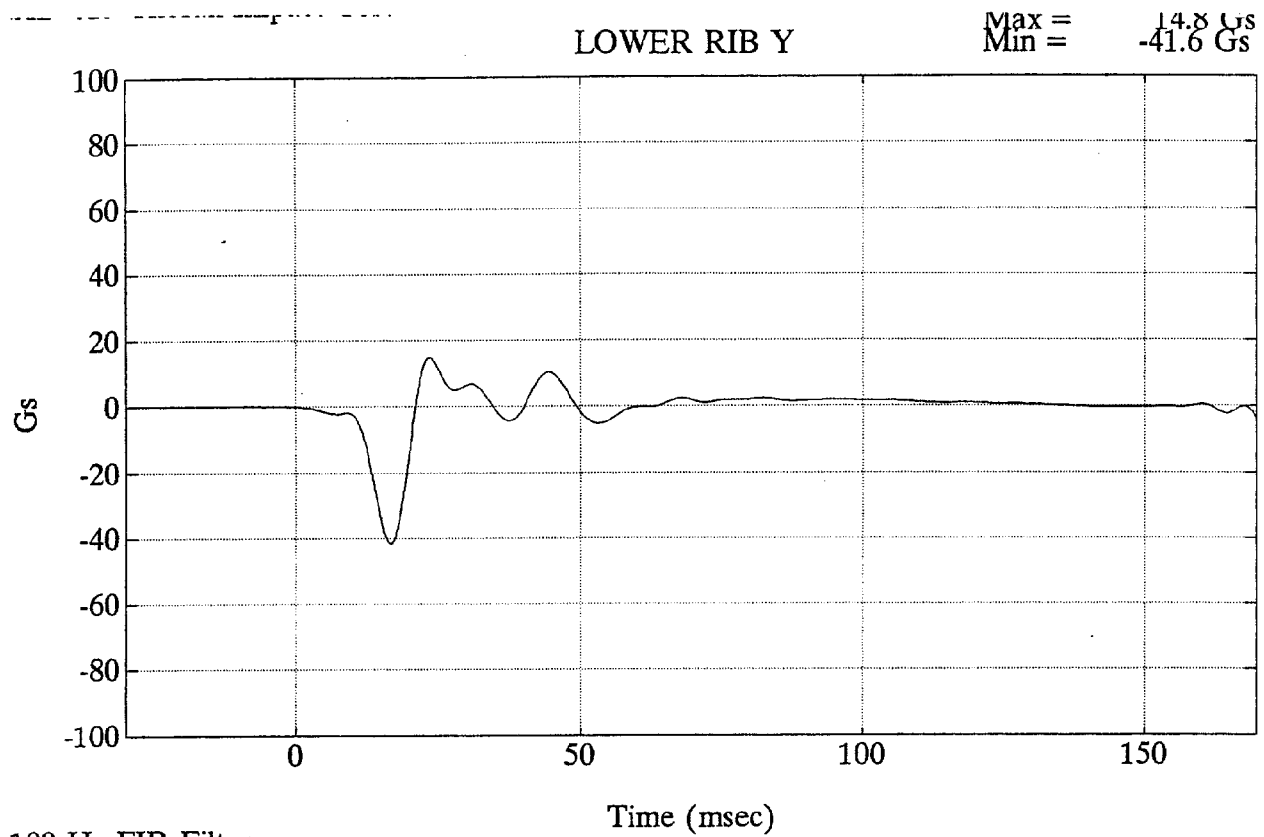
Laboratory Technician: B. Swiecicki, G. Serbinowski

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
UPPER RIB (g's)	37 - 46	41.9
LOWER RIB (g's)	37 - 46	41.7
LOWER SPINE (g's)	15 - 22	21.3

REMARKS: None







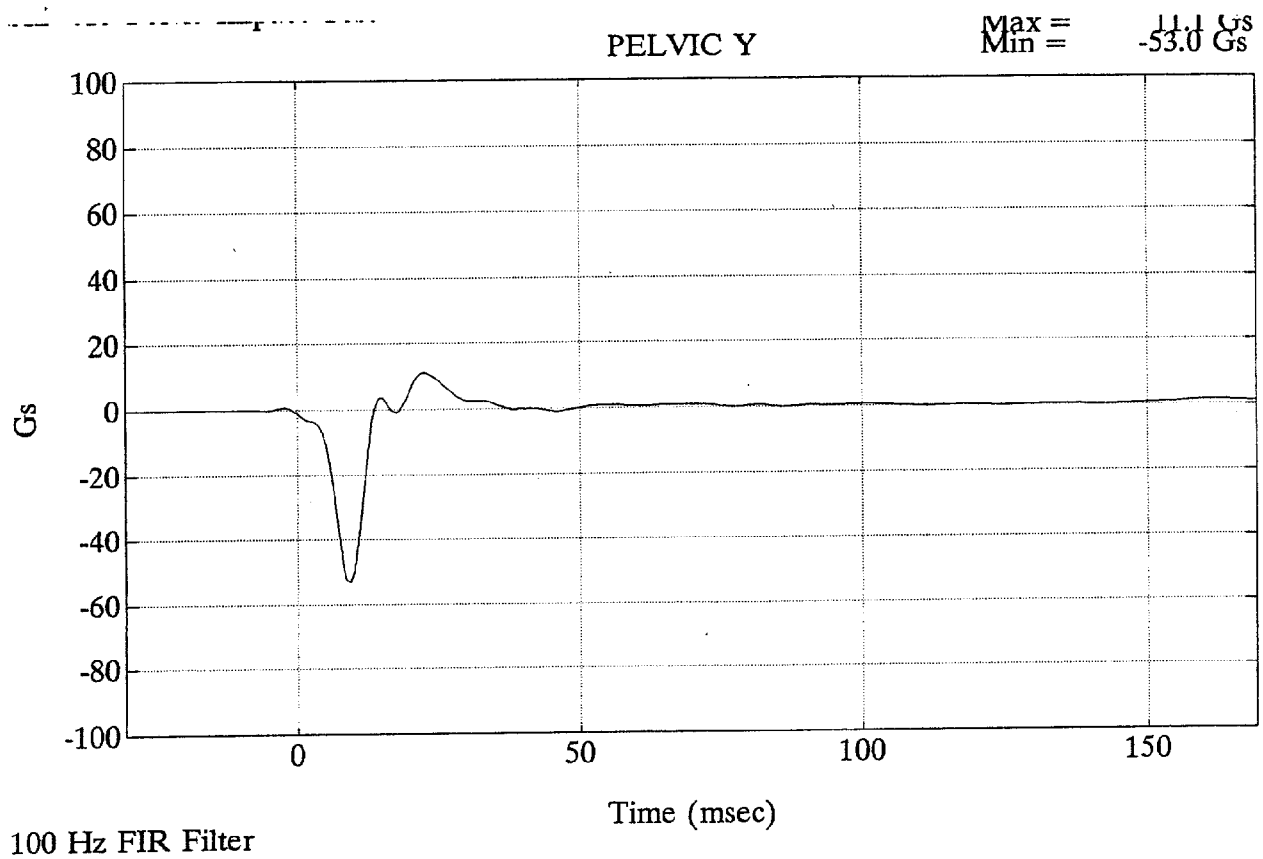
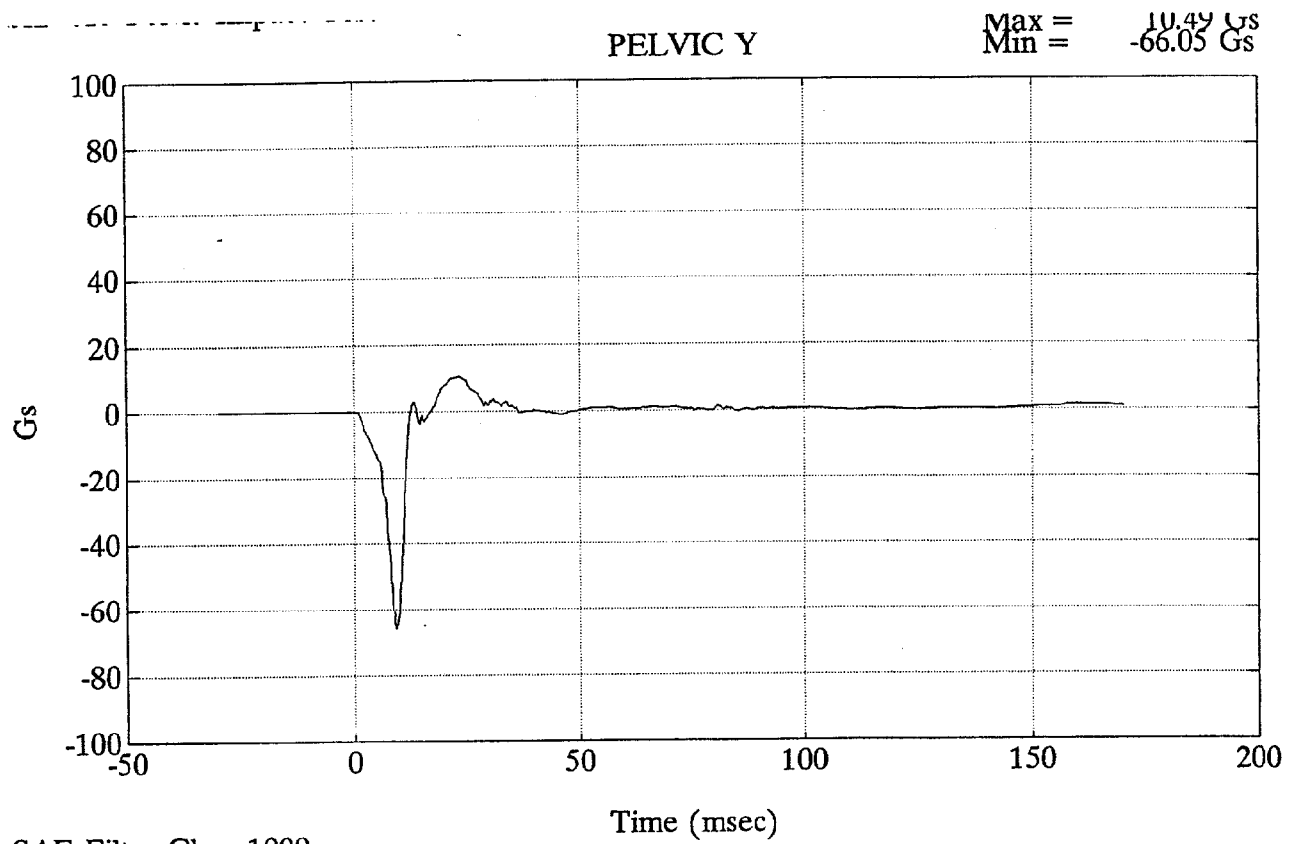
**LATERAL PELVIS IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015 Calspan Sequential Test Number: 1
Date: 9/17/98 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	53.1

REMARKS: None



ABDOMINAL COMPRESSION TEST
PRE-TEST

(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

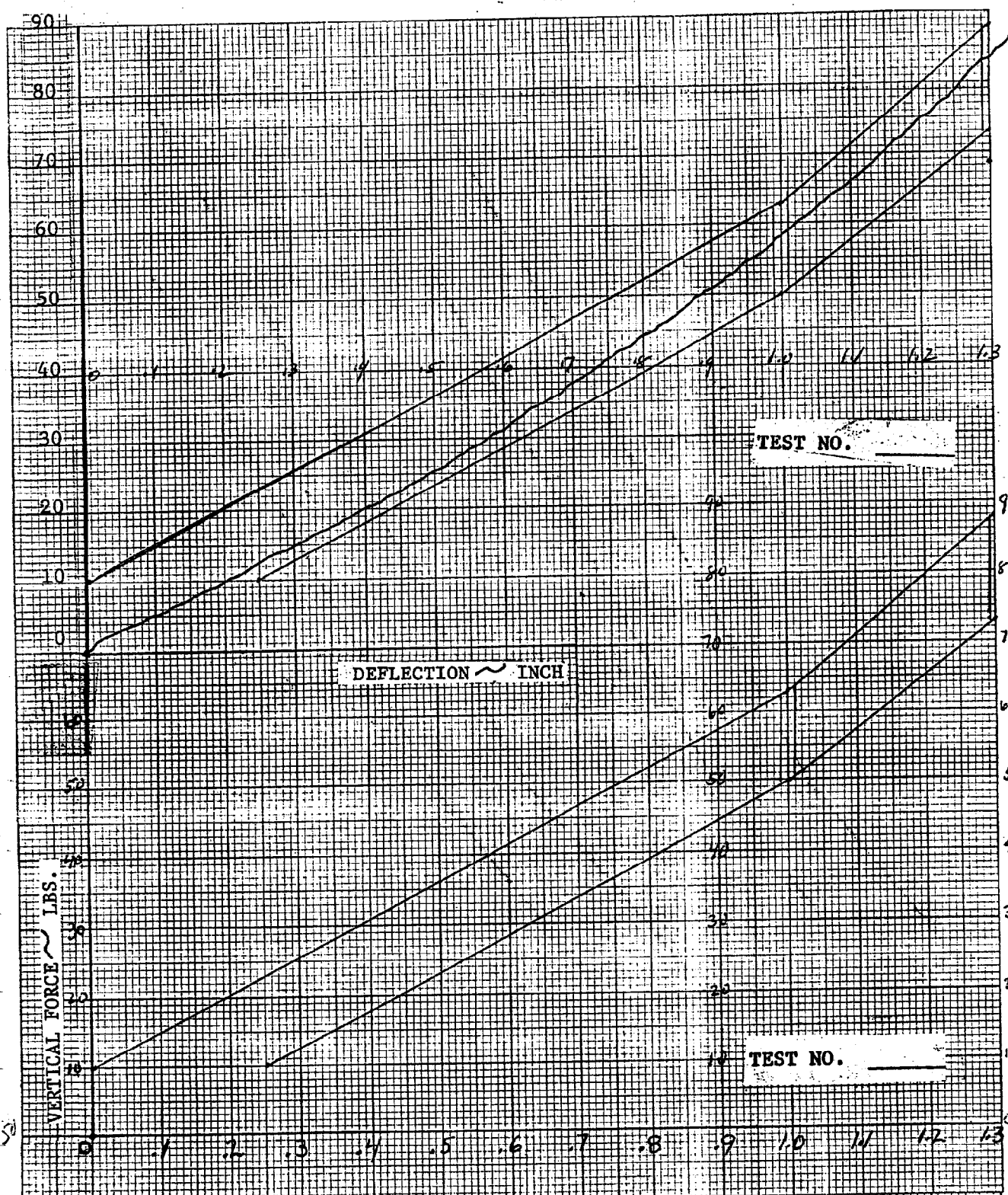
Calspan Sequential Test Number: 1

Date: 9/15/98

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	113
FORCE @ 19 mm (N)	163 - 221	184
FORCE @ 25 mm (N)	222 - 280	259
FORCE @ 33 mm (N)	325 - 391	371

REMARKS: None



DUMMY S/N 015

DATE 9-15-98

CONTRACT AUTHORIZATION _____

TEMP. 70° HUMIDITY 45%

PERFORMED BY [Signature]

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

015

TEST NO.

CONTRACT AUTHORIZATION

DATE _____

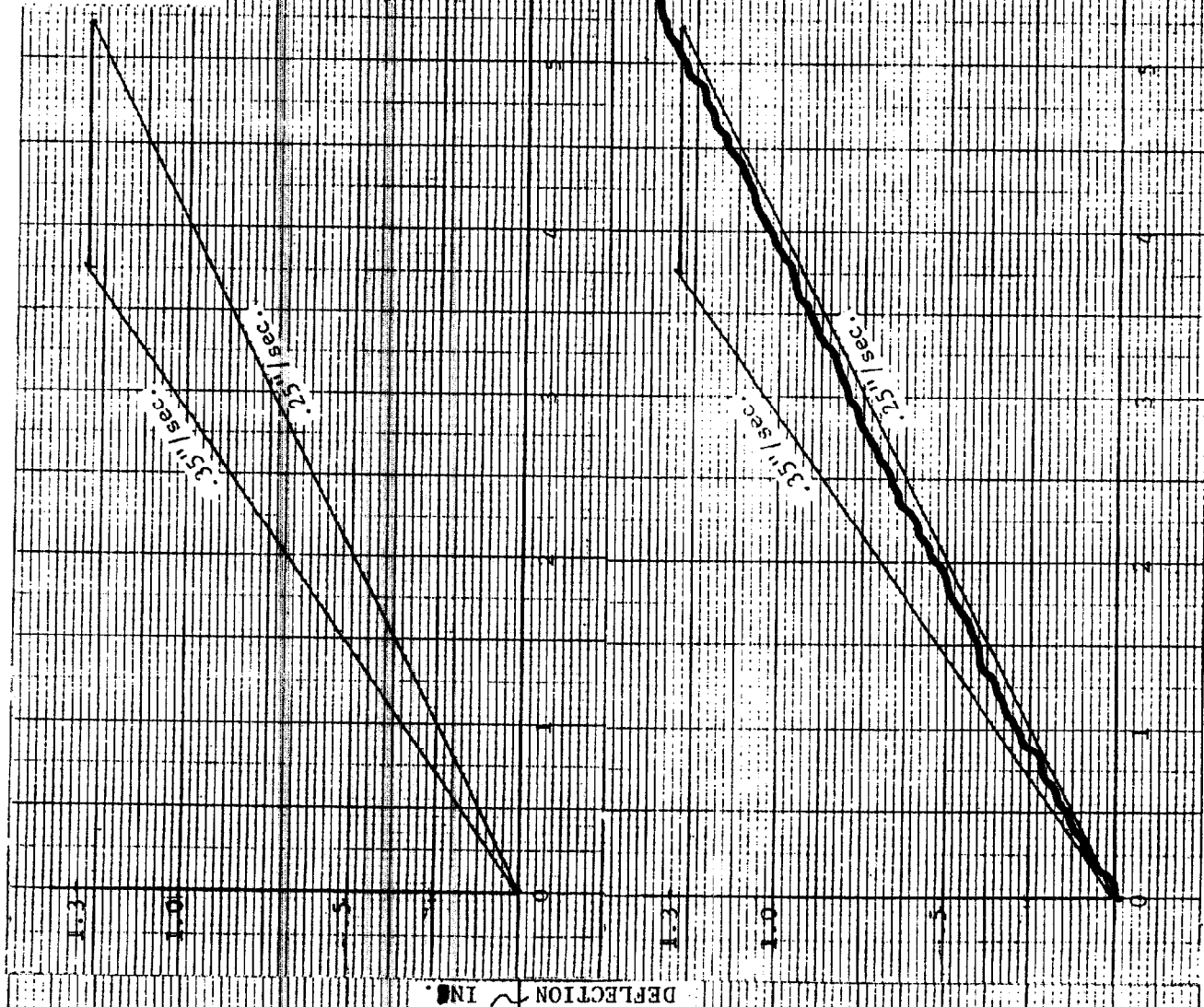
9-15-98

PERFORMED BY

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.: 015

Calspan Sequential Test Number: 1

Date: 9/15/98

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 @ 0° (N)	0 - 26.7	0.0
FORCE @ 20° (N)	97.8 - 151.2	122.4
FORCE @ 30° (N)	151.2 - 204.6	168.0
FORCE @ 40° (N)	204.6 - 258	219.2
RETURN ANGLE	12° max.	9.5

REMARKS: None

LUMBAR SPINE FLEXION TEST

DUMMY S/N 015

W/A

DATE _____

PERFORMED BY

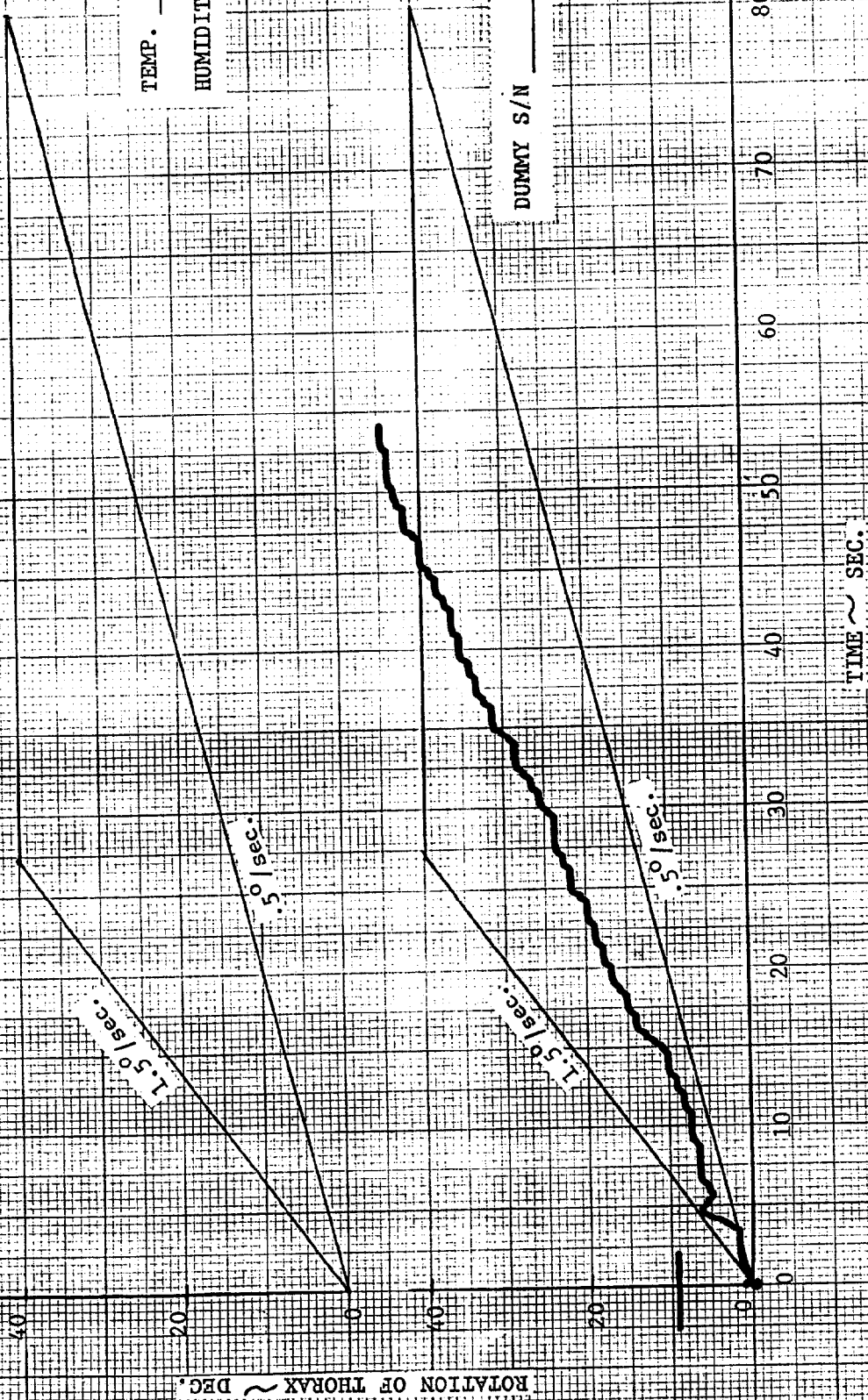
9-15-98



TEMP. 70°

HUMIDITY

DUMMY S/N



PRE-TEST DUMMY INSPECTION LIST

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

Calspan Sequential Test Number: 1

Date: 9/17/98

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: 1

Date: 9/17/98

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.: 016Calspan Sequential Test Number: 1Date: 9/17/98Laboratory 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	361

REMARKS: None

THORACIC SHOCK ABSORBER TESTS
PRE-TEST

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016
Date: 9/14/98

Calspan Sequential Test Number: 1.1
Laboratory Technician: B. Swiecicki, G. Serbinowski

DAMPER IDENTIFICATION: 016

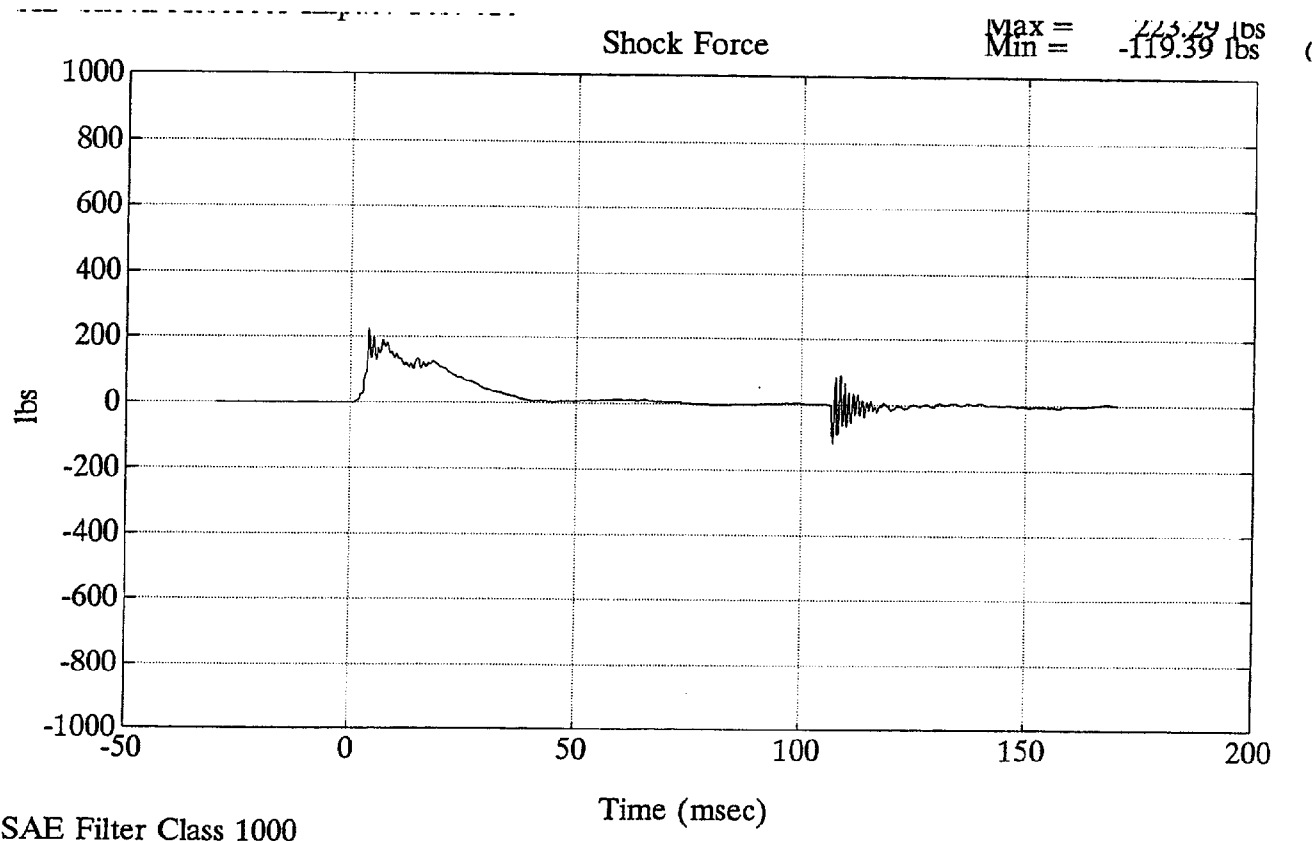
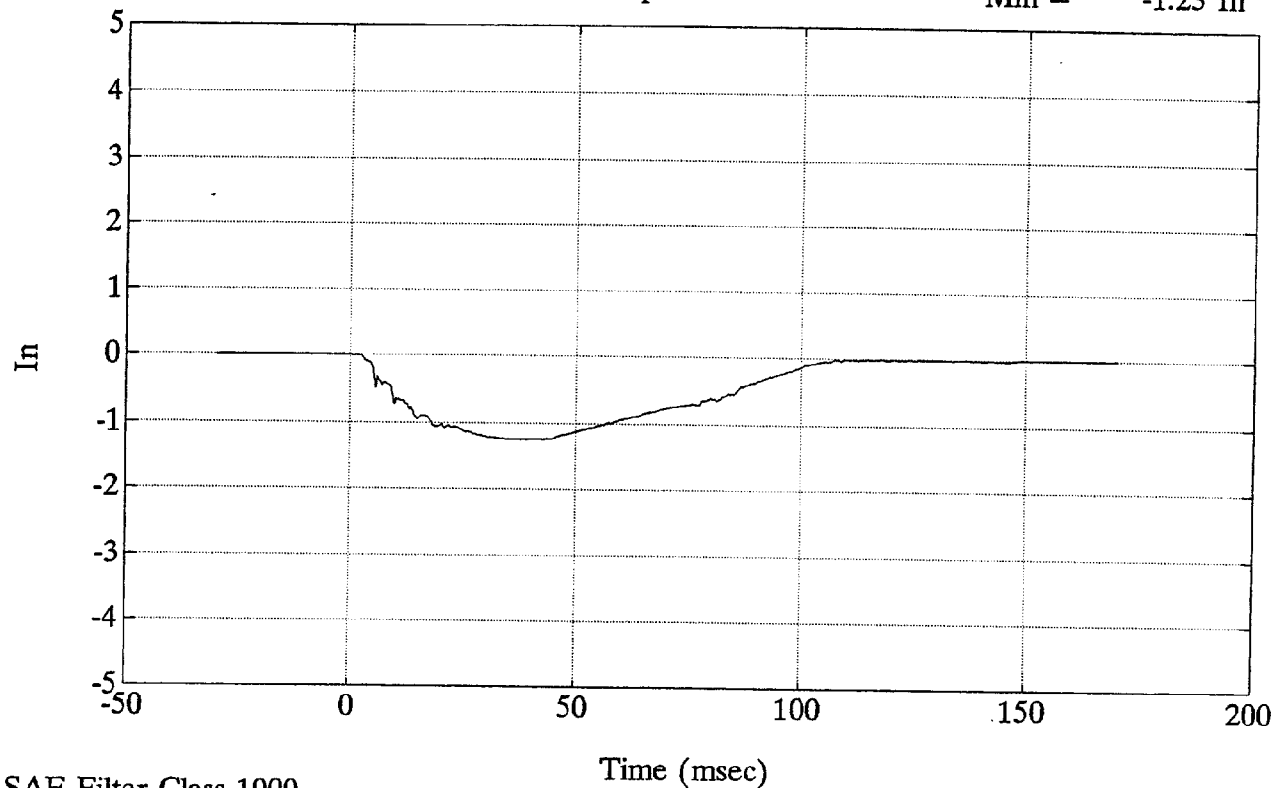
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)		18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)		10 - 70	45
VELOCITY 3.05 m/s	FORCE (N)	836 - 1125	994
	DISPLACEMENT (mm)	30 - 35	31
VELOCITY 4.27 m/s	FORCE (N)	1730 - 2099	2049
	DISPLACEMENT (mm)	32 - 37	35
VELOCITY 6.10 m/s	FORCE (N)	3741 - 4448	3998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

DAMPER SETTING: 5

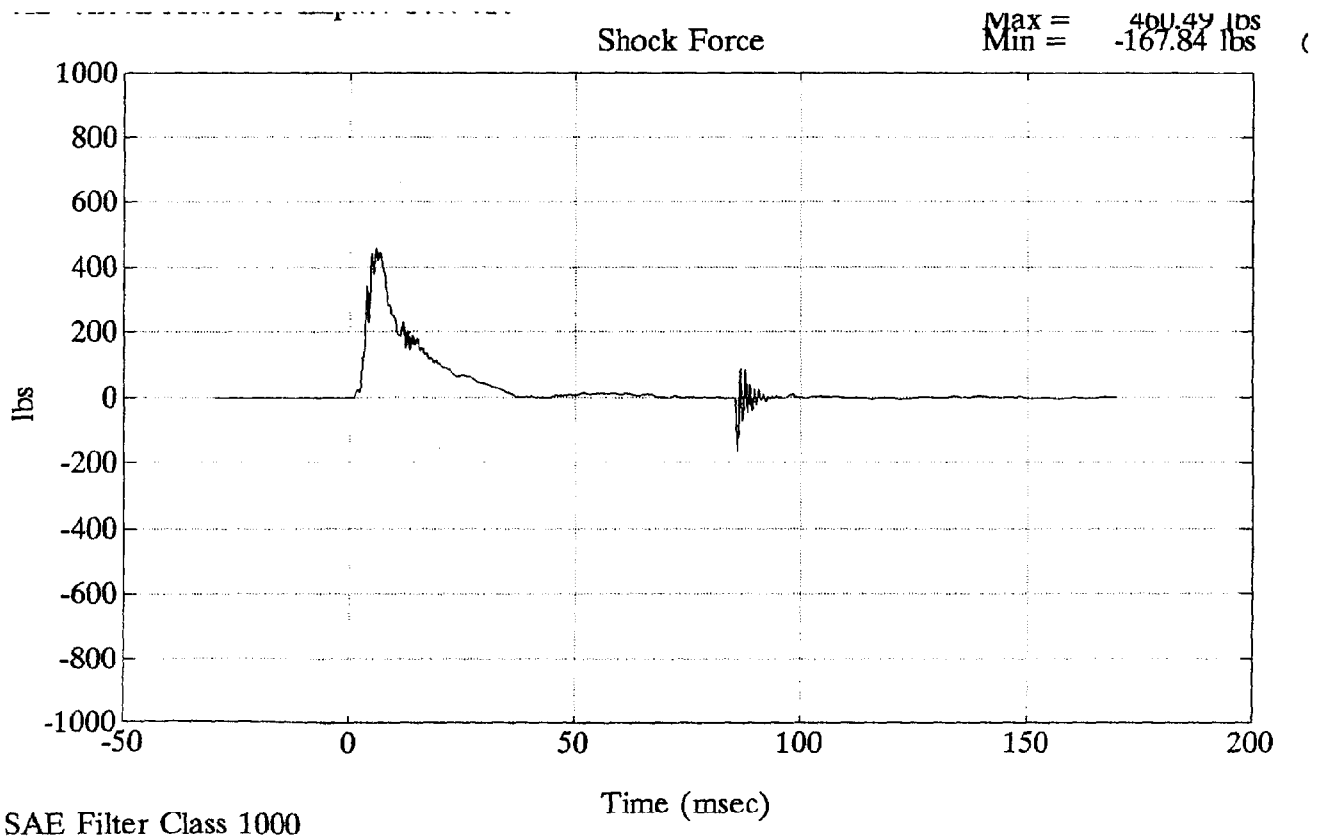
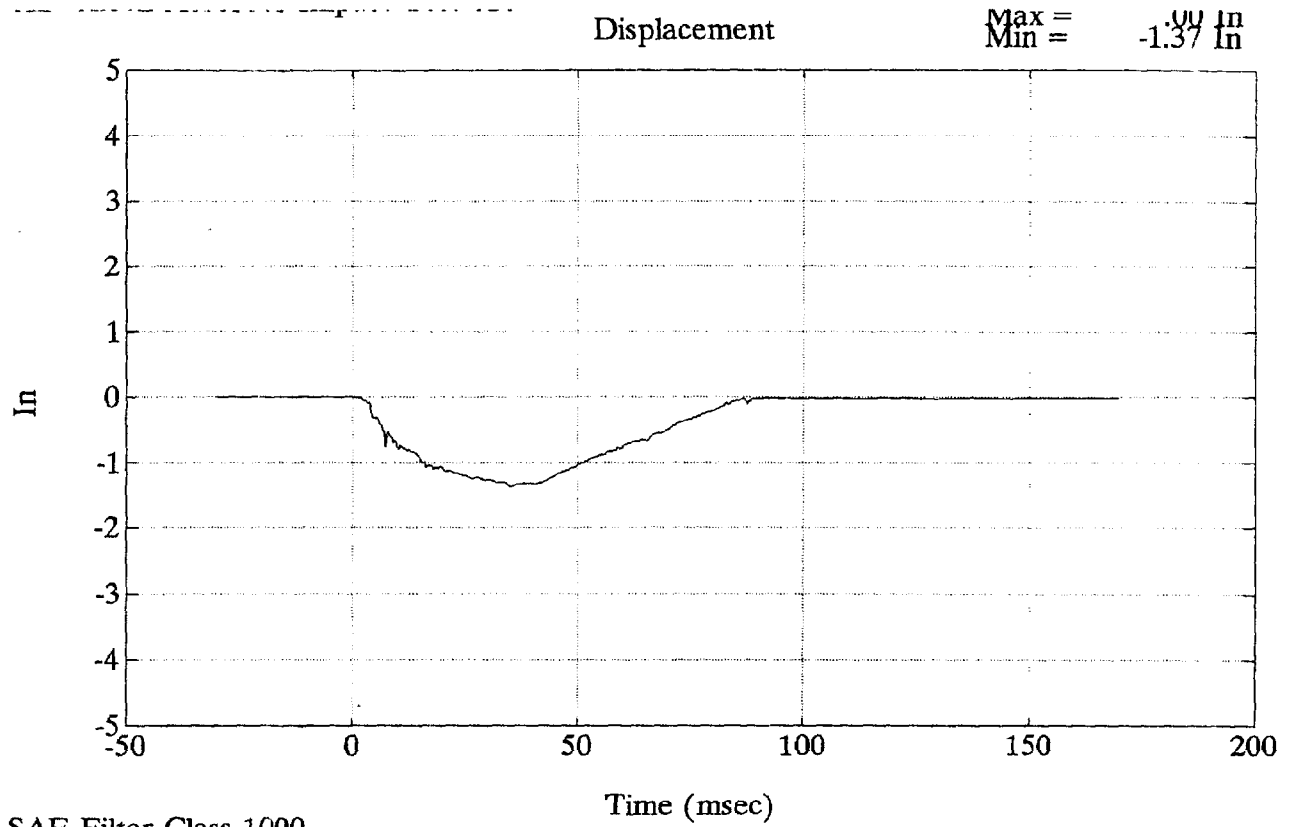
REMARKS: None

PISTON POSITION 5 10.01 F/s CE0015A.RAW PISTON 016 LOW

Displacement Max = Min = -1.23 in



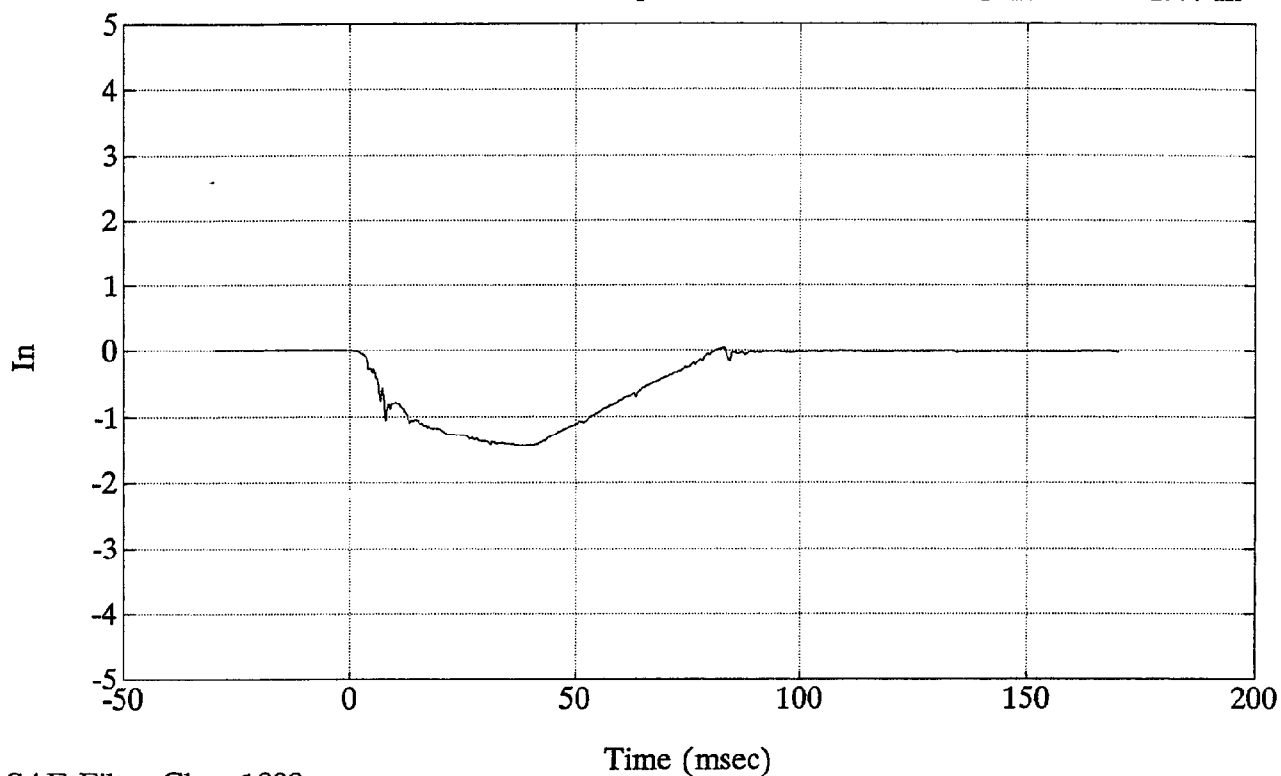
MED. 13.95 F/s CE0016A RAW PISTON # 6



1164. 20.13 F/S CE0018A.RAW Piston #16

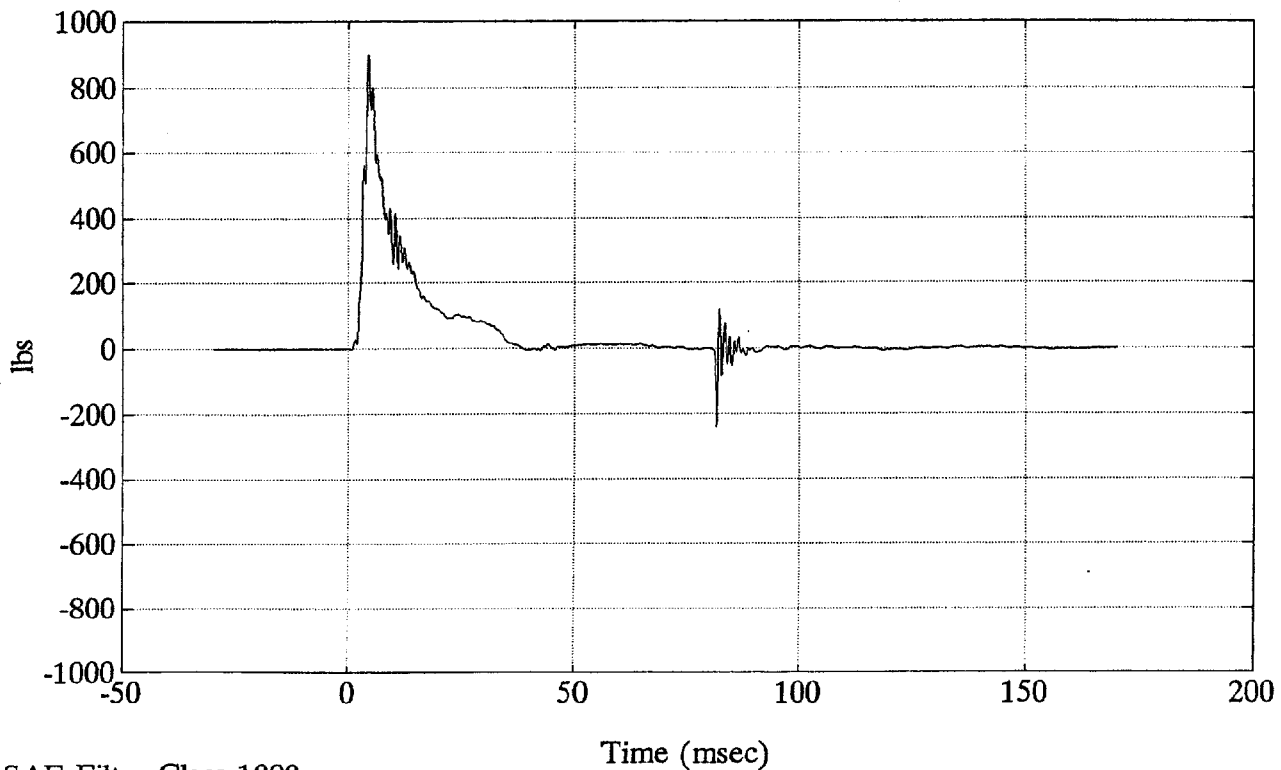
Displacement

Max = 0.94 In
Min = -1.44 In



Shock Force

Max = 898.58 lbs
Min = -239.62 lbs



**LATERAL THORAX IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016

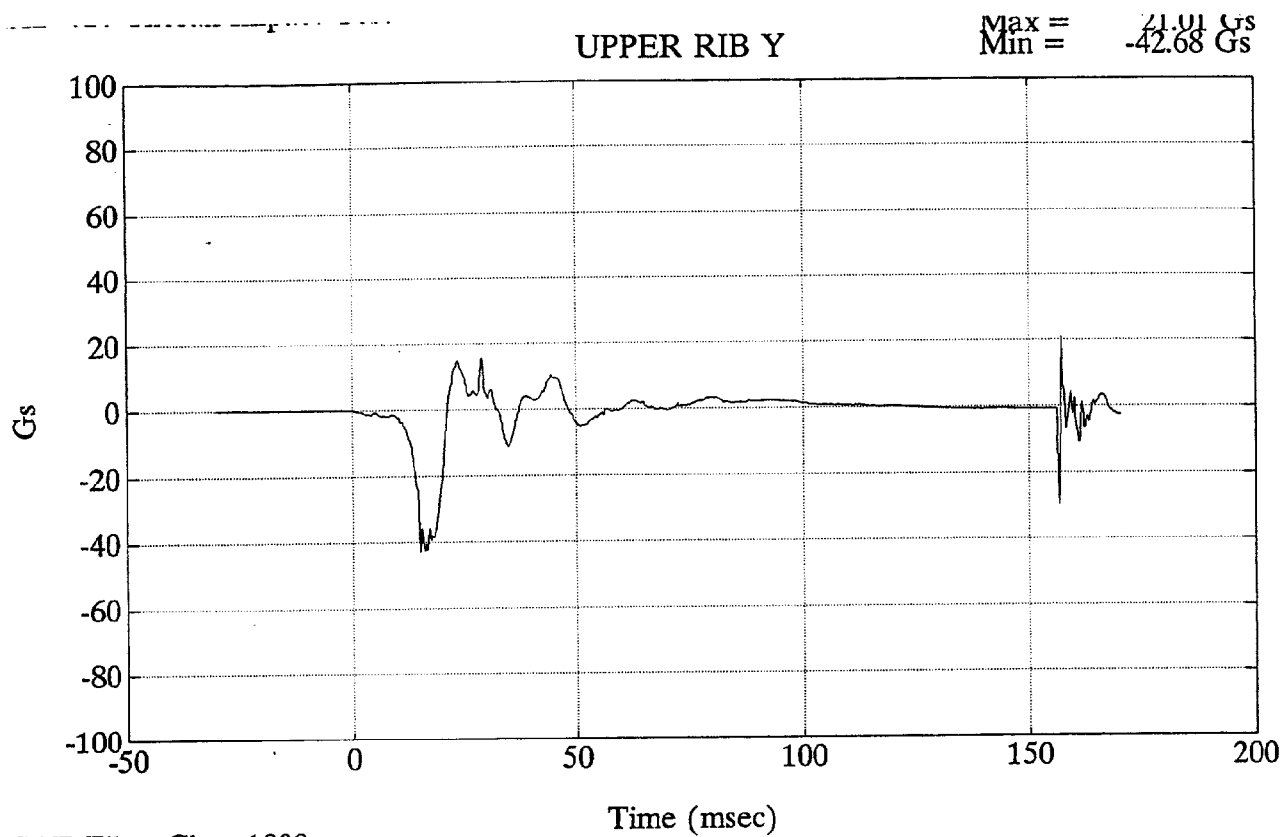
Calspan Sequential Test Number: 1

Date: 9/17/98

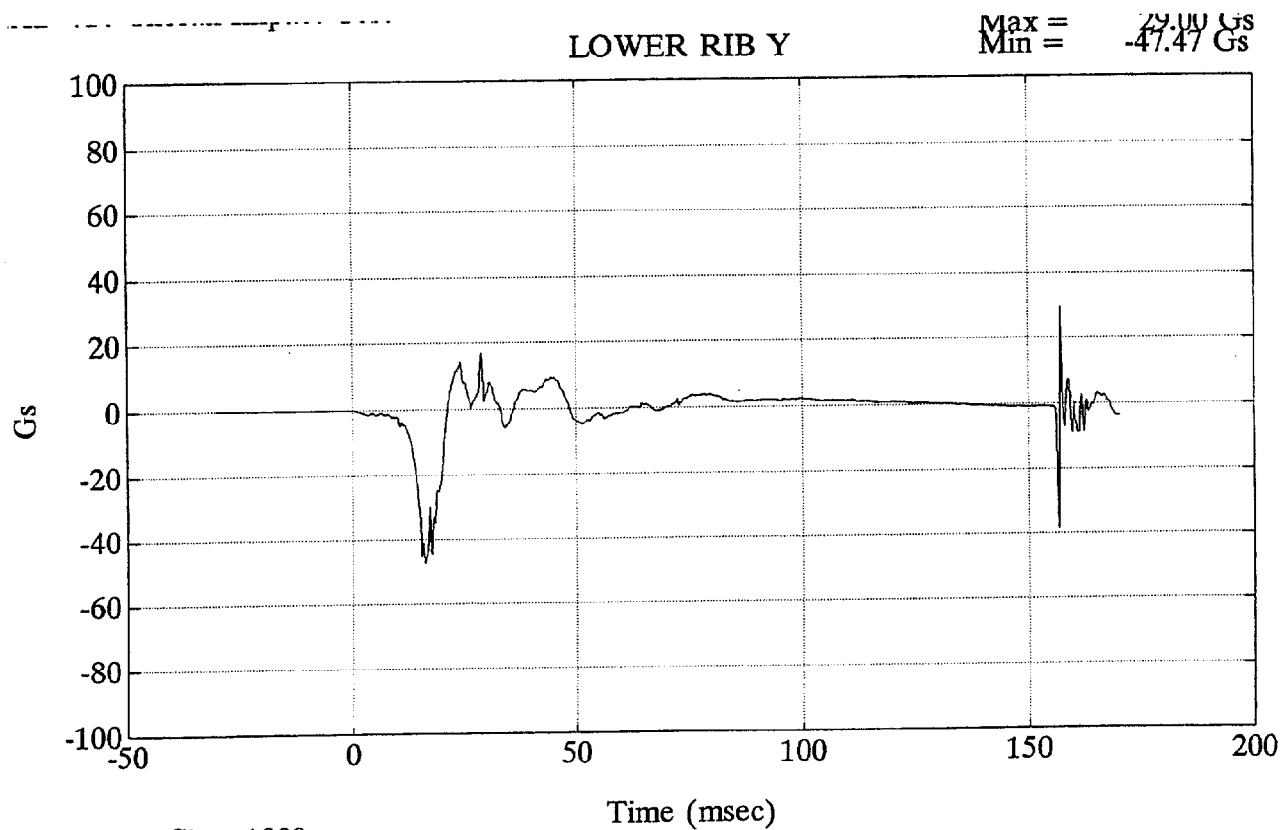
Laboratory Technician: B. Swiecicki, G. Serbinowski

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
UPPER RIB (g's)	37 - 46	42.1
LOWER RIB (g's)	37 - 46	41.6
LOWER SPINE (g's)	15 - 22	15.3

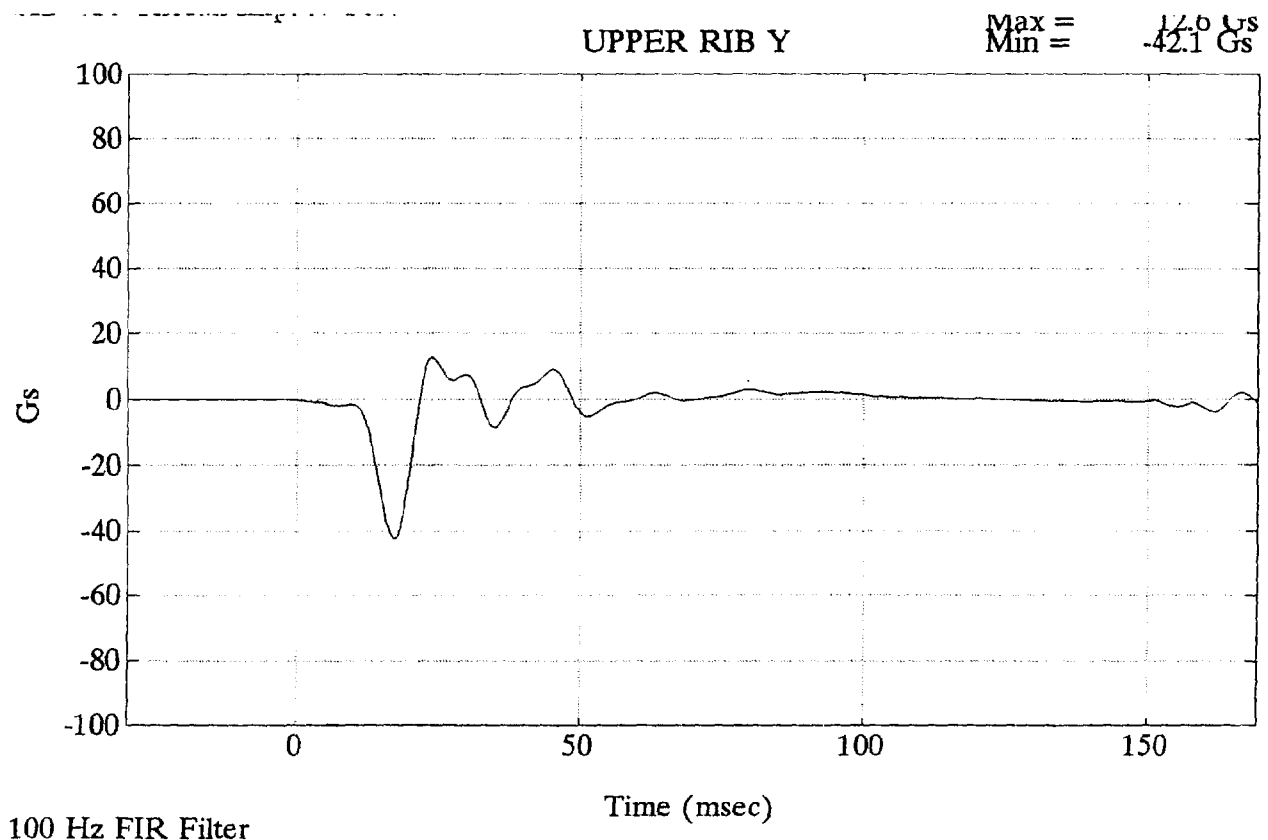
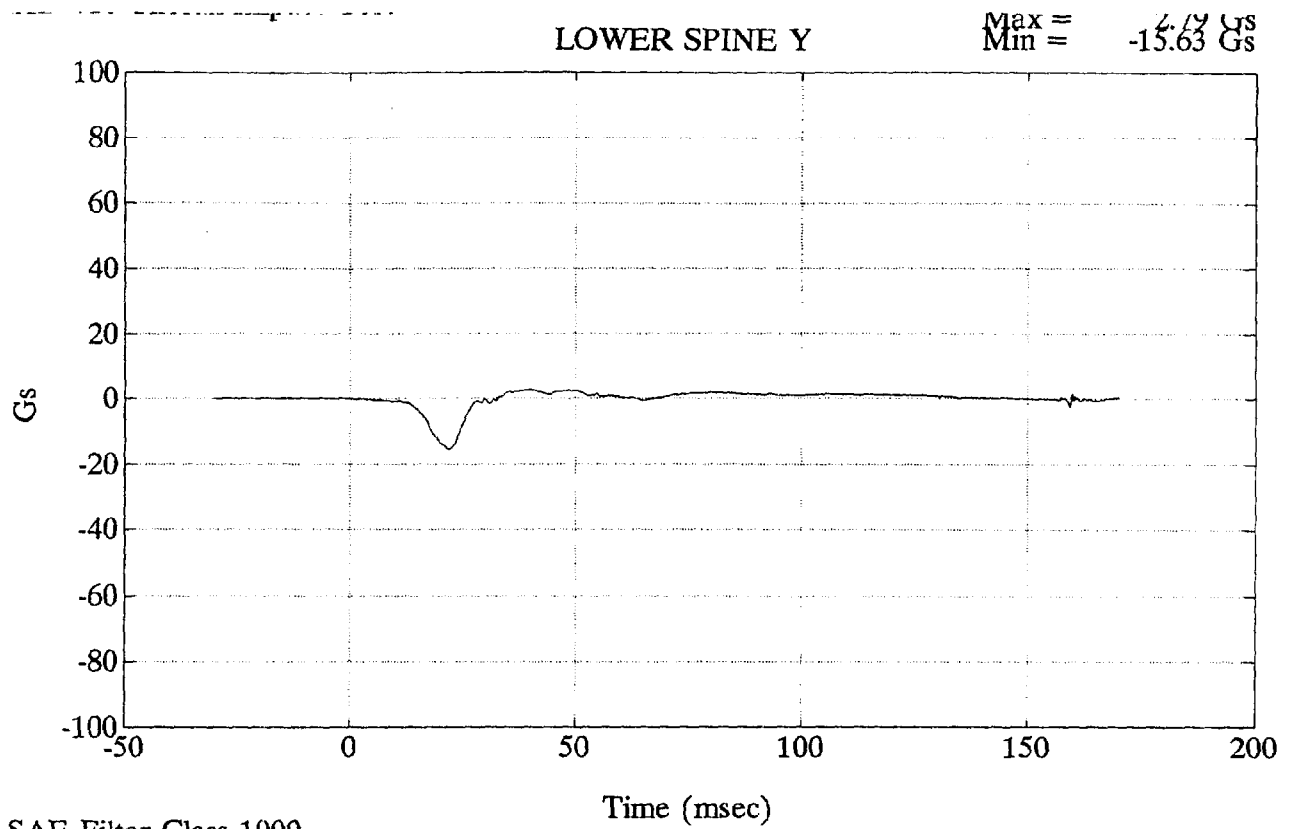
REMARKS: None

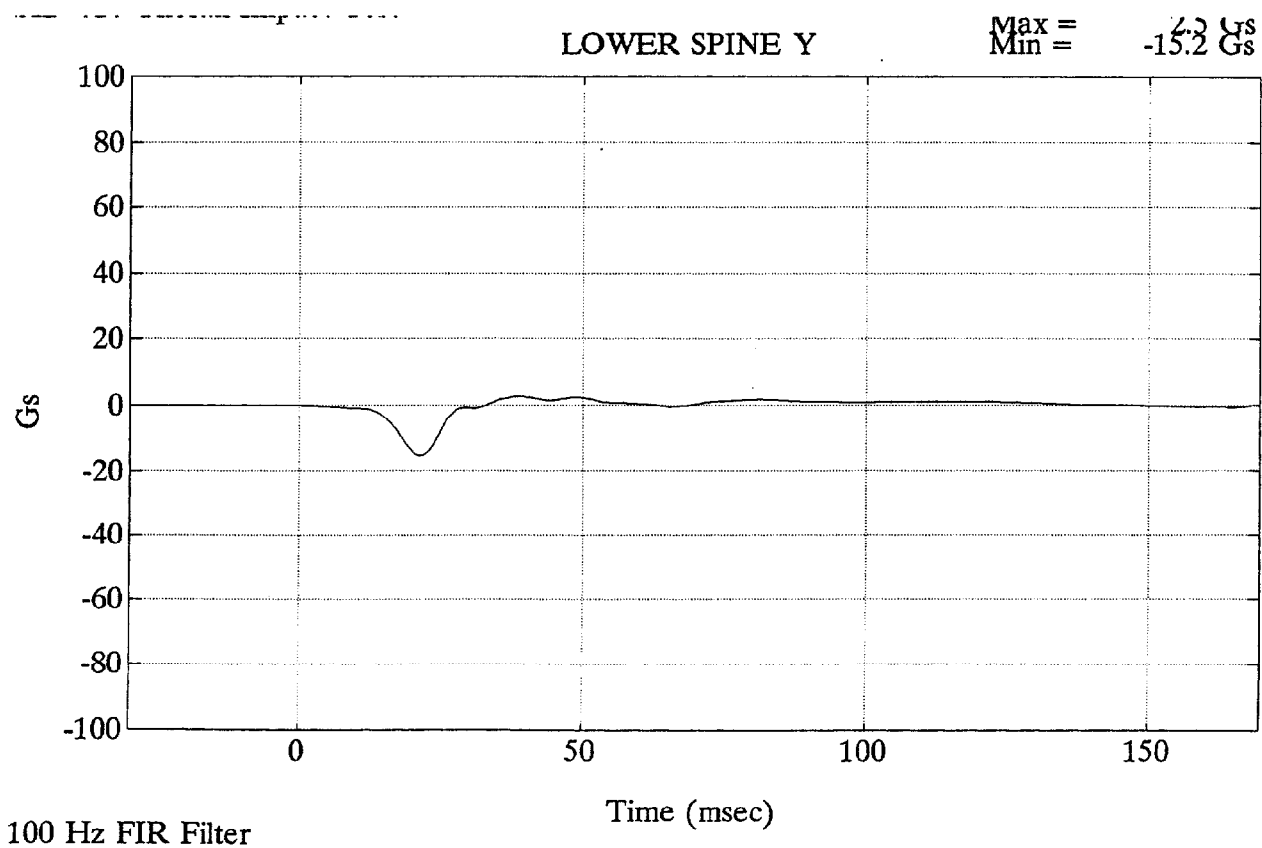
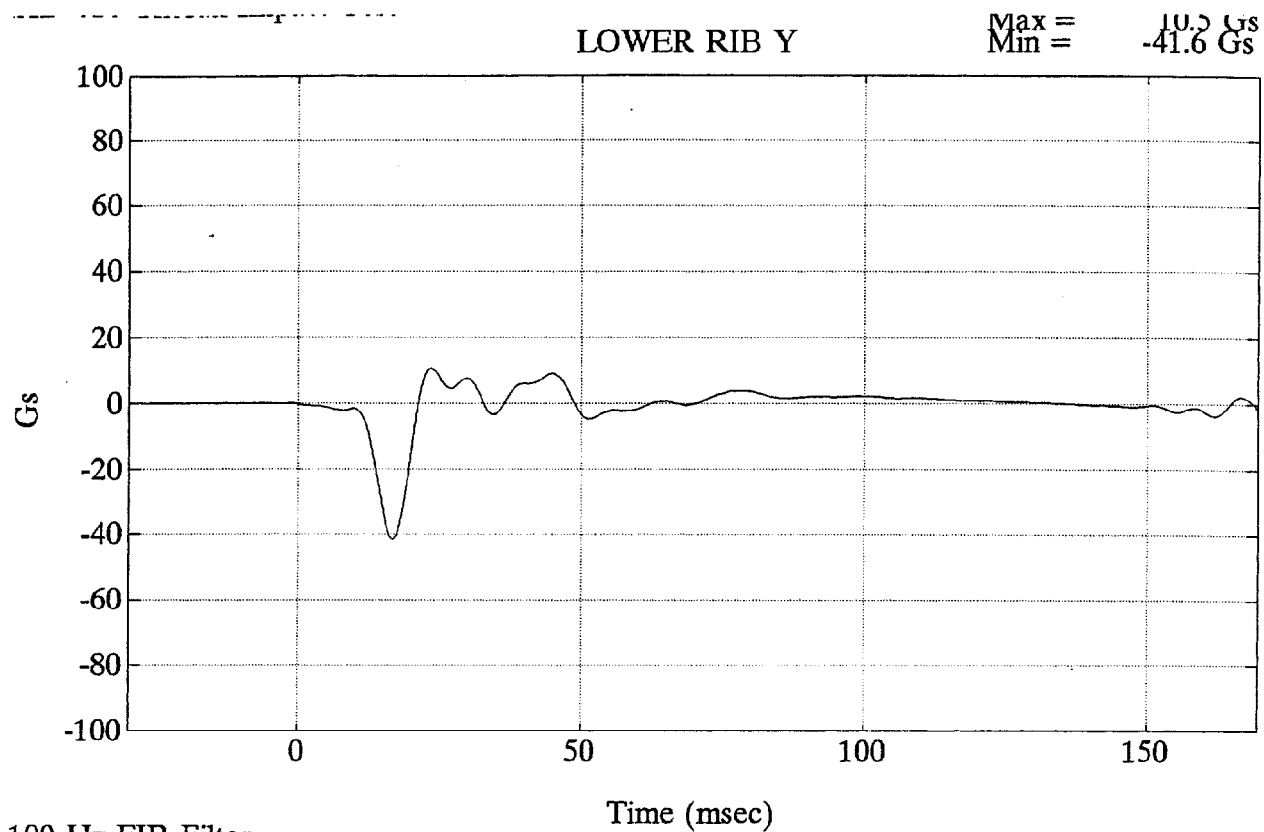


SAE Filter Class 1000



SAE Filter Class 1000





**LATERAL PELVIS IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016

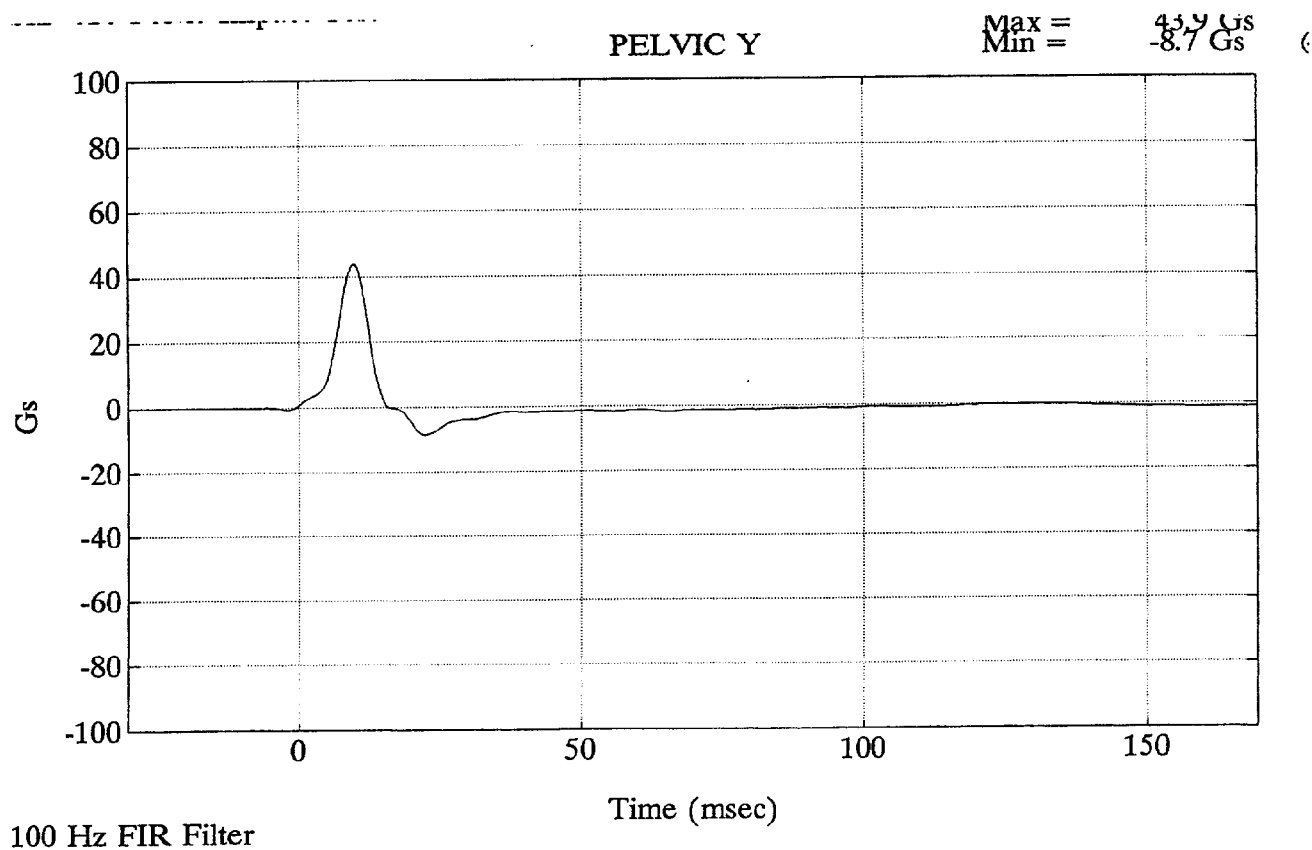
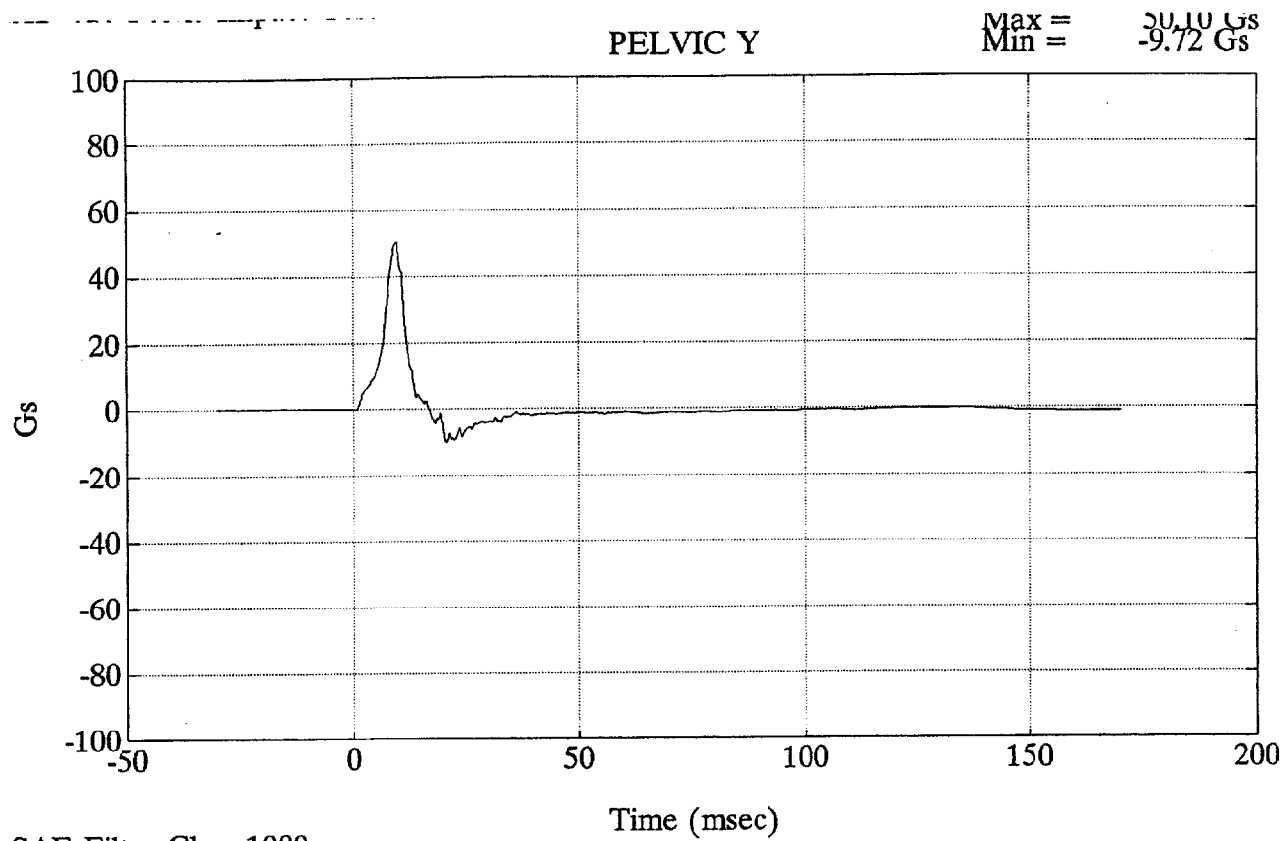
Calspan Sequential Test Number: 1

Date: 9/17/98

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	4.28
PELVIS ACCELERATION (g's)	40 - 60	44.0

REMARKS: None



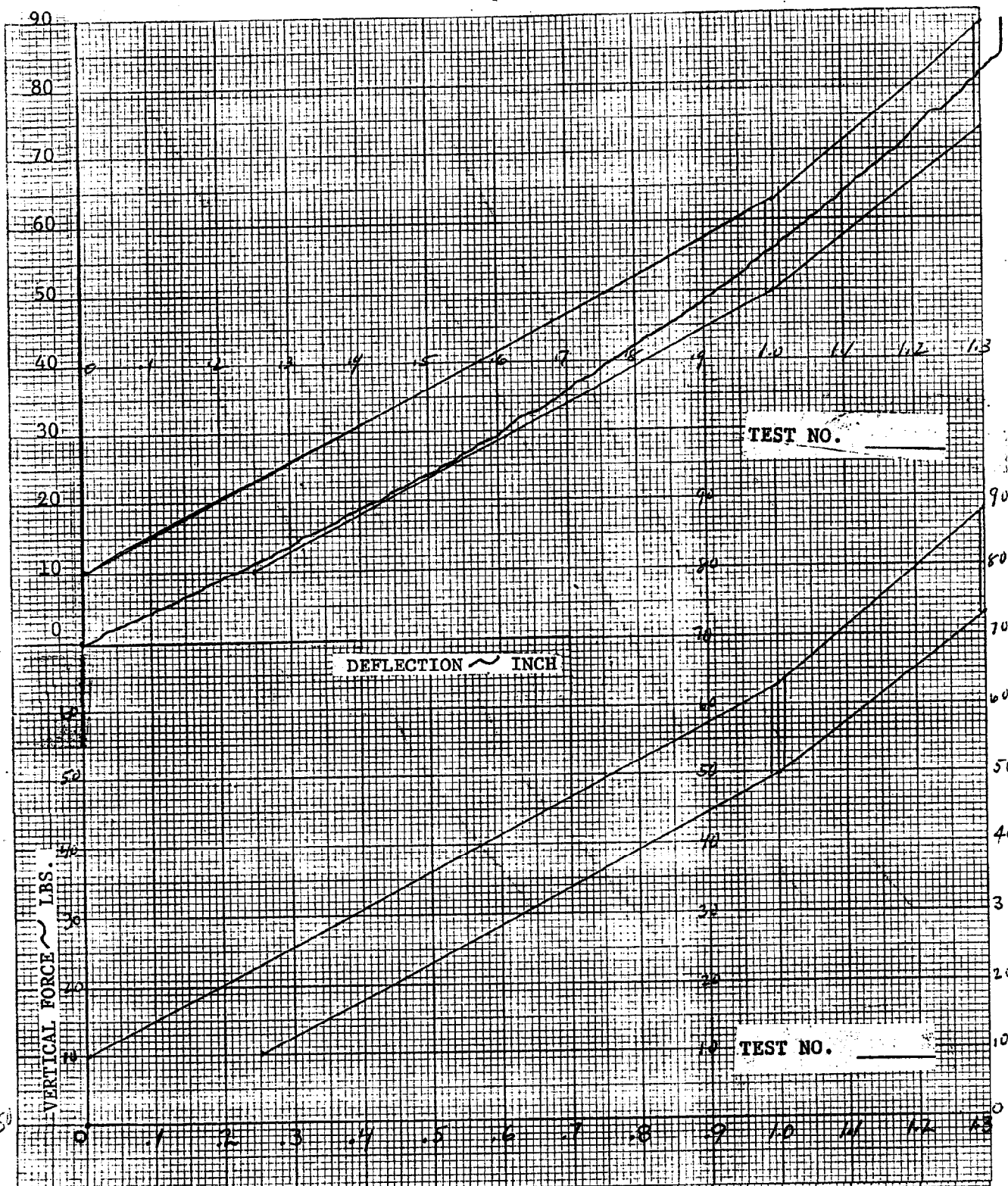
ABDOMINAL COMPRESSION TEST**PRE-TEST**

(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACTSID Serial No.: 016Calspan Sequential Test Number: 1Date: 9/15/98Laboratory 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	167
FORCE @ 25 mm (N)	222 - 280	249
FORCE @ 33 mm (N)	325 - 391	361

REMARKS: None



DUMMY S/N - 016

DATE

9-15-98

CONTRACT AUTHORIZATION

TEMP. 70° HUMIDITY 45%

PERFORMED BY

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

C-37

8502-1

DUMMY S/N

016

TEST NO.

CONTRACT AUTHORIZATION

DATE

9-15-98

PERFORMED BY

BZ

TEMP.

70°

HUMIDITY

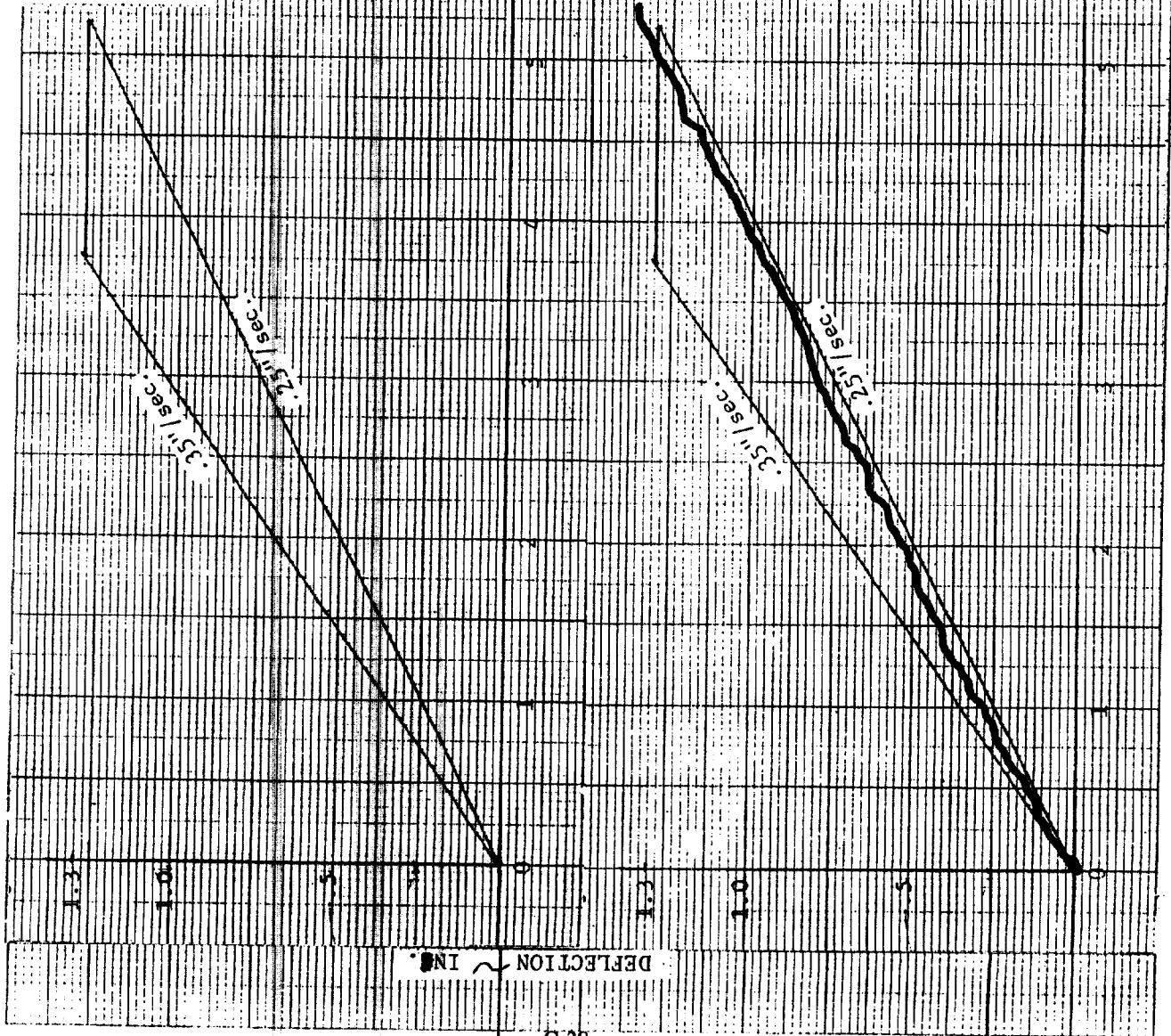
45%

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

Calspan Sequential Test Number: 1

Date: 9/15/98

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 @ 0° (N)	0 - 26.7	0.0
FORCE @ 20° (N)	97.8 - 151.2	118
FORCE @ 30° (N)	151.2 - 204.6	159
FORCE @ 40° (N)	204.6 - 258	216
RETURN ANGLE	12° max.	9.0

REMARKS: None

LUMBAR SPINE FLEXION TEST

DUMMY S/N 016 TEST NO.

W/A

DATE 9-15-98

PERFORMED BY

TEMP. 70°

HUMIDITY 45%

80

60

40

20

0

FLEXION ANGLE ~ DEG.

10

20

30

40

50

60

70

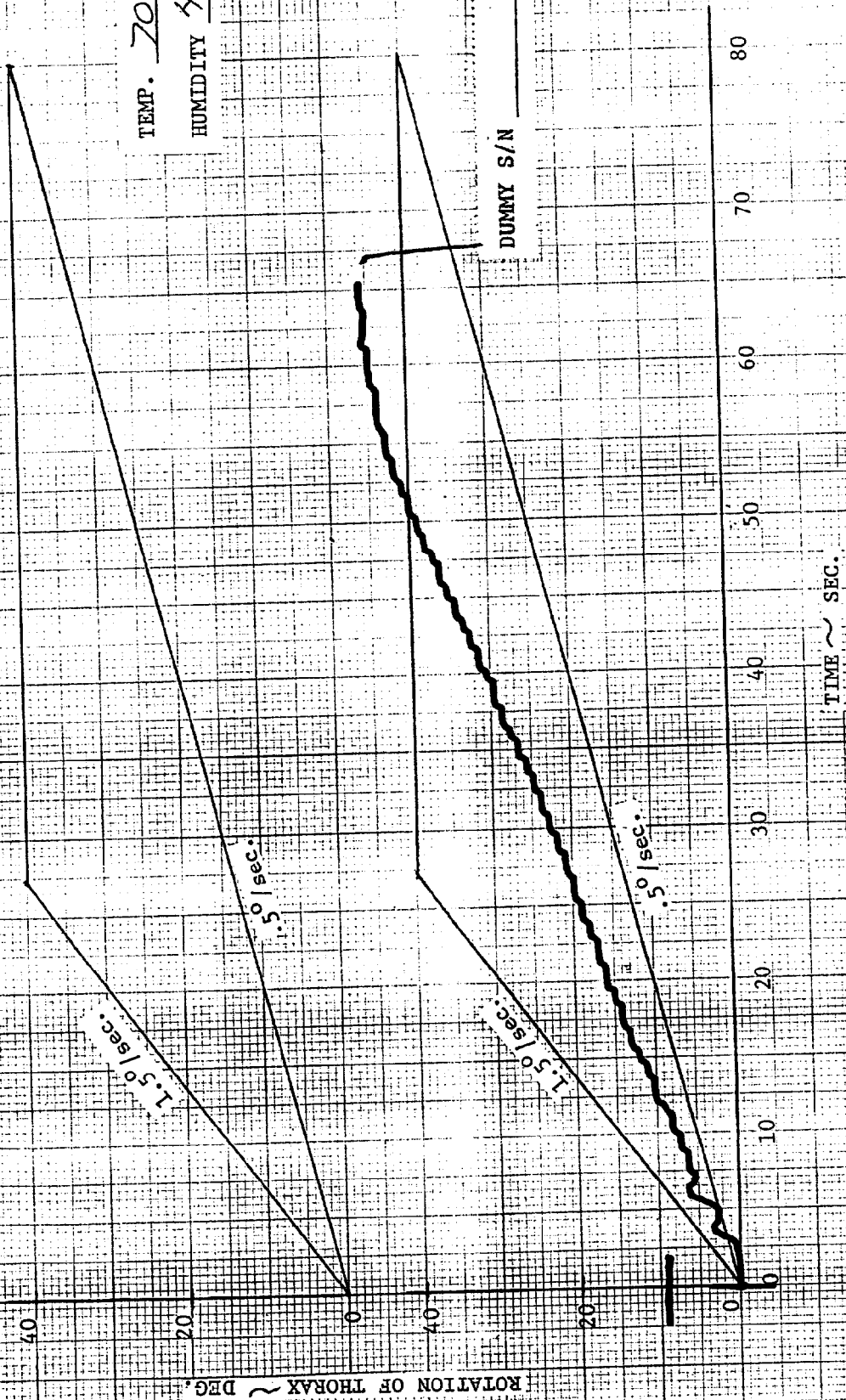
80

FORCE ~ LBS.

DUMMY S/N 016
 W/A _____
 DATE 9-15-98
 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

Calspan Sequential Test Number: 1

Date: 9/17/98

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.: 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: 2

Date: 9/23/98

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.: 015
Date: 9/23/98

Calspan Sequential Test Number: 2
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

**LATERAL THORAX IMPACT TEST
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

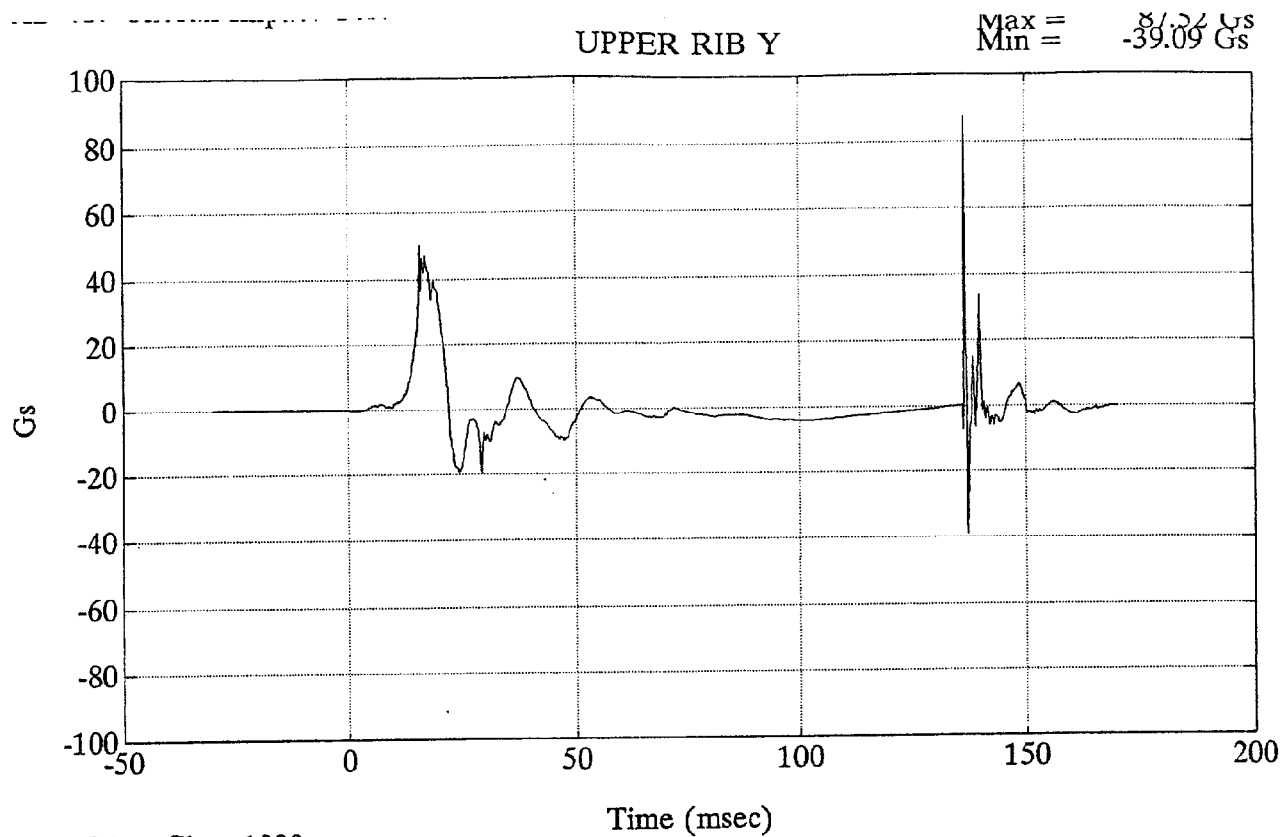
Calspan Sequential Test Number: 2

Date: 9/23/98

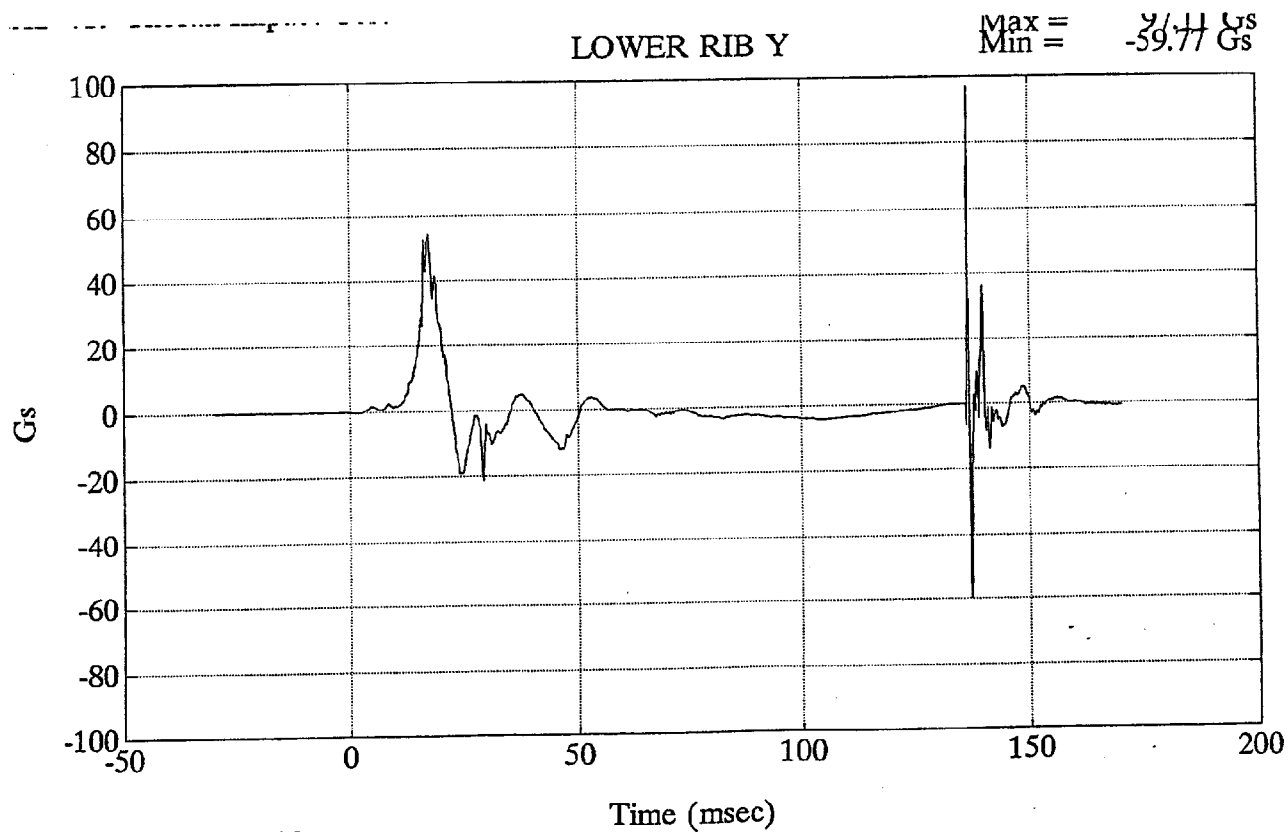
Laboratory Technician: B. Swiecicki, G. Serbinowski

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

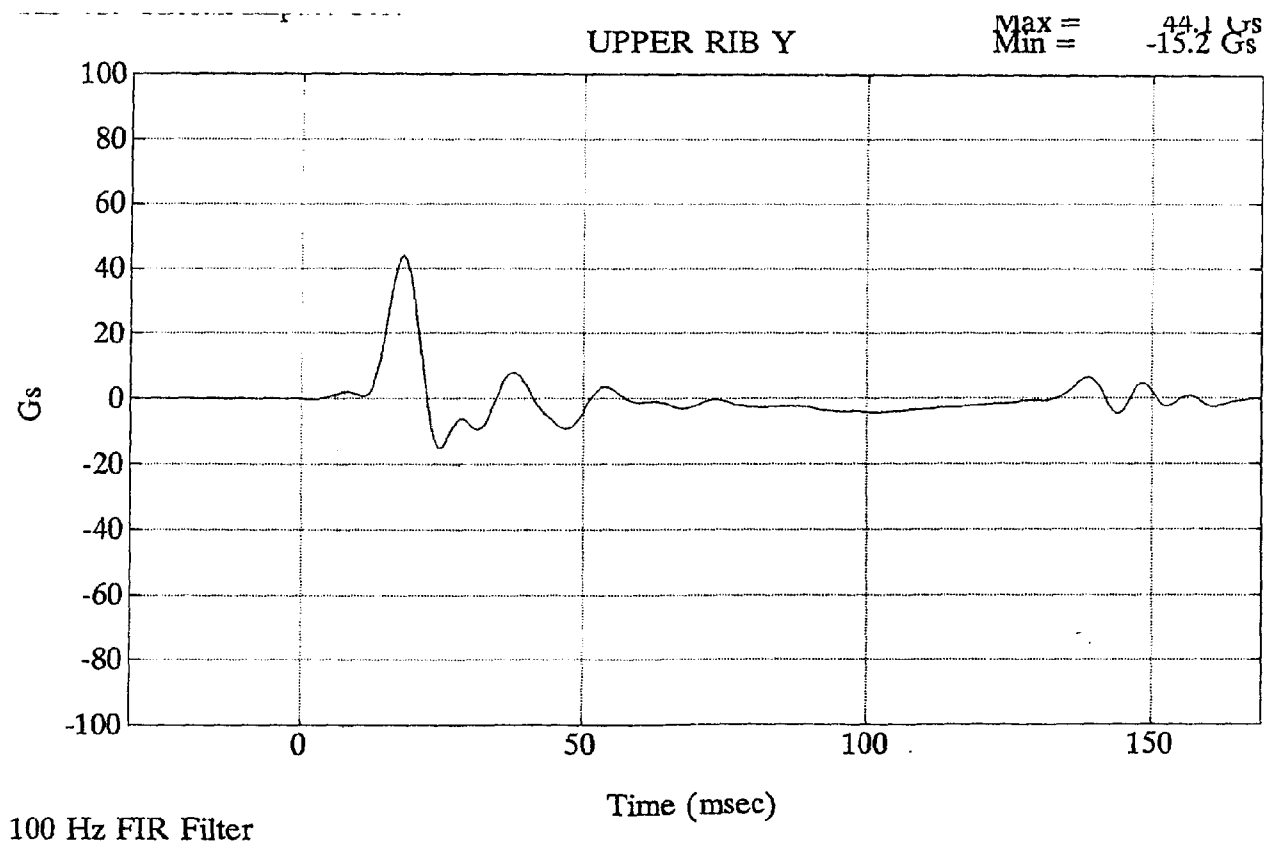
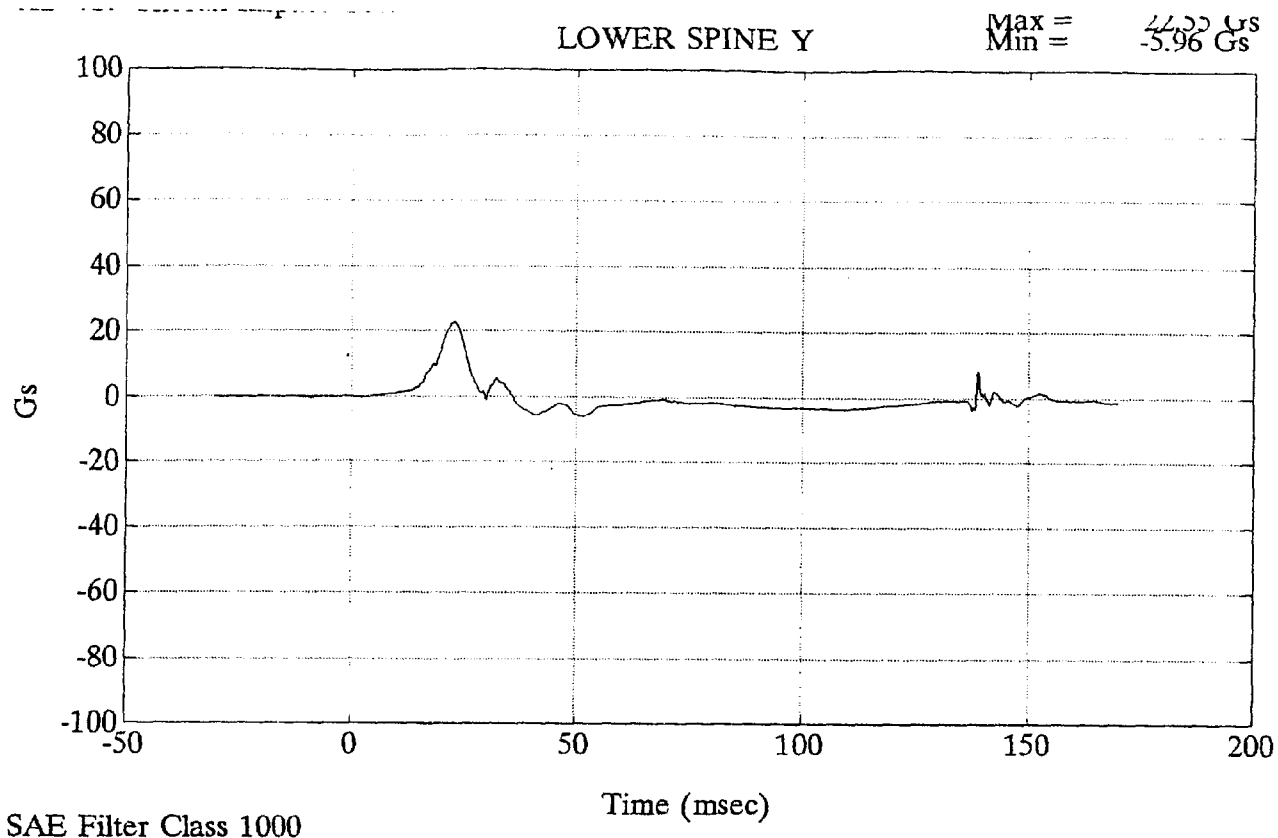
REMARKS: None

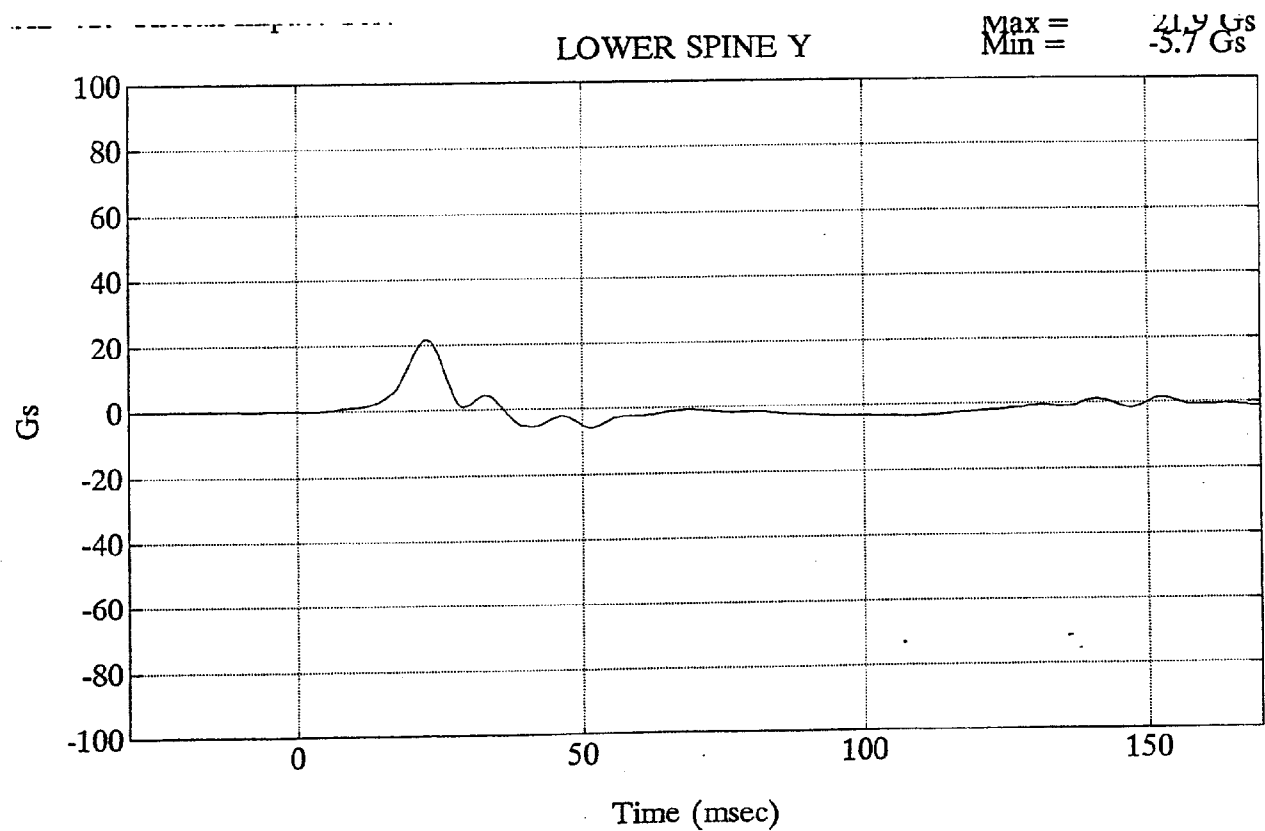
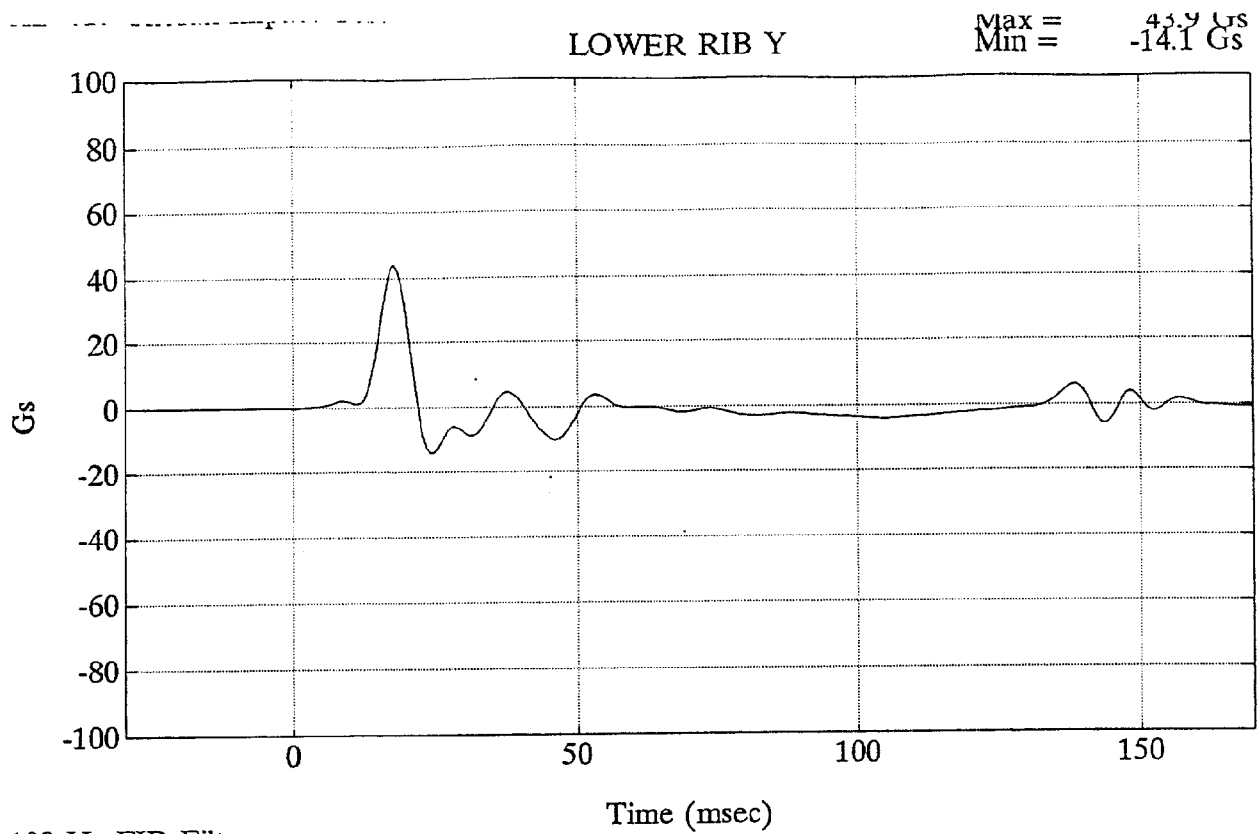


SAE Filter Class 1000



SAE Filter Class 1000





**LATERAL PELVIS IMPACT TEST
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015

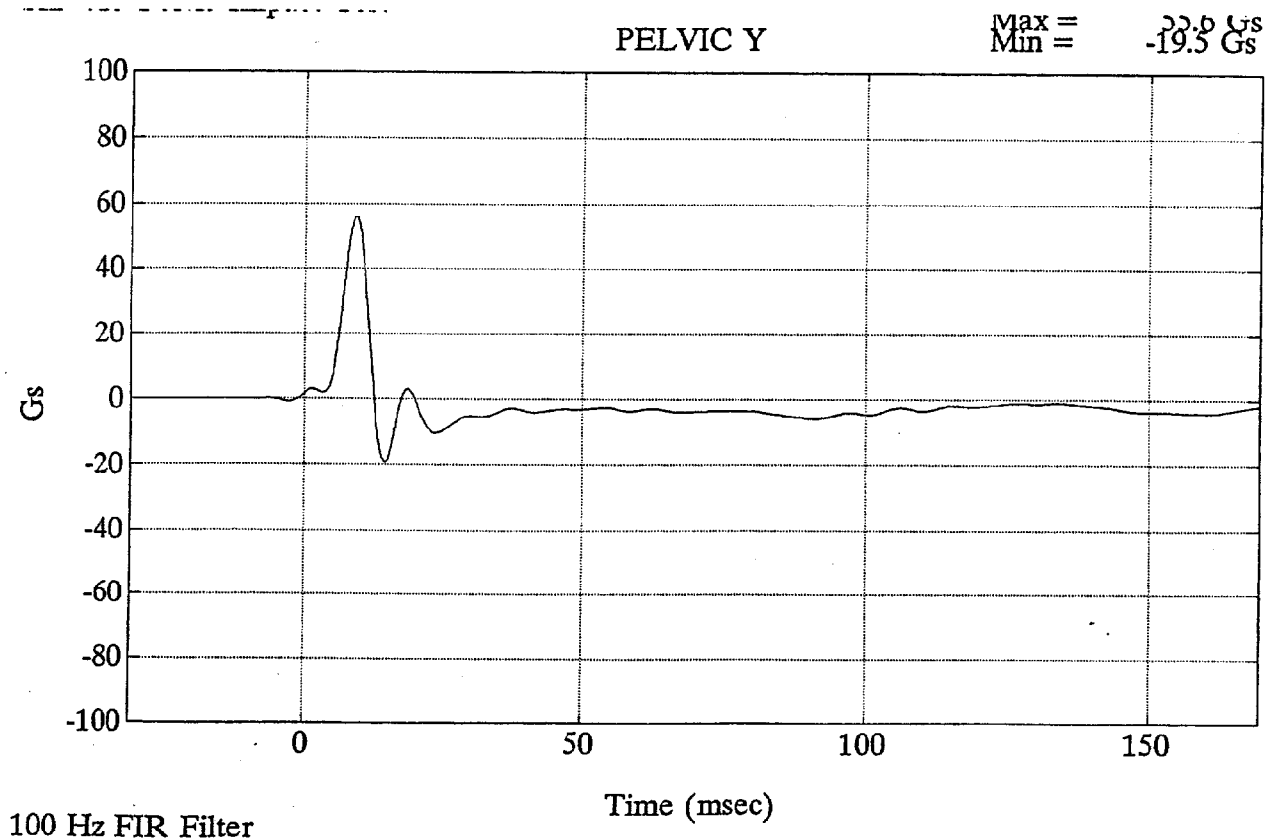
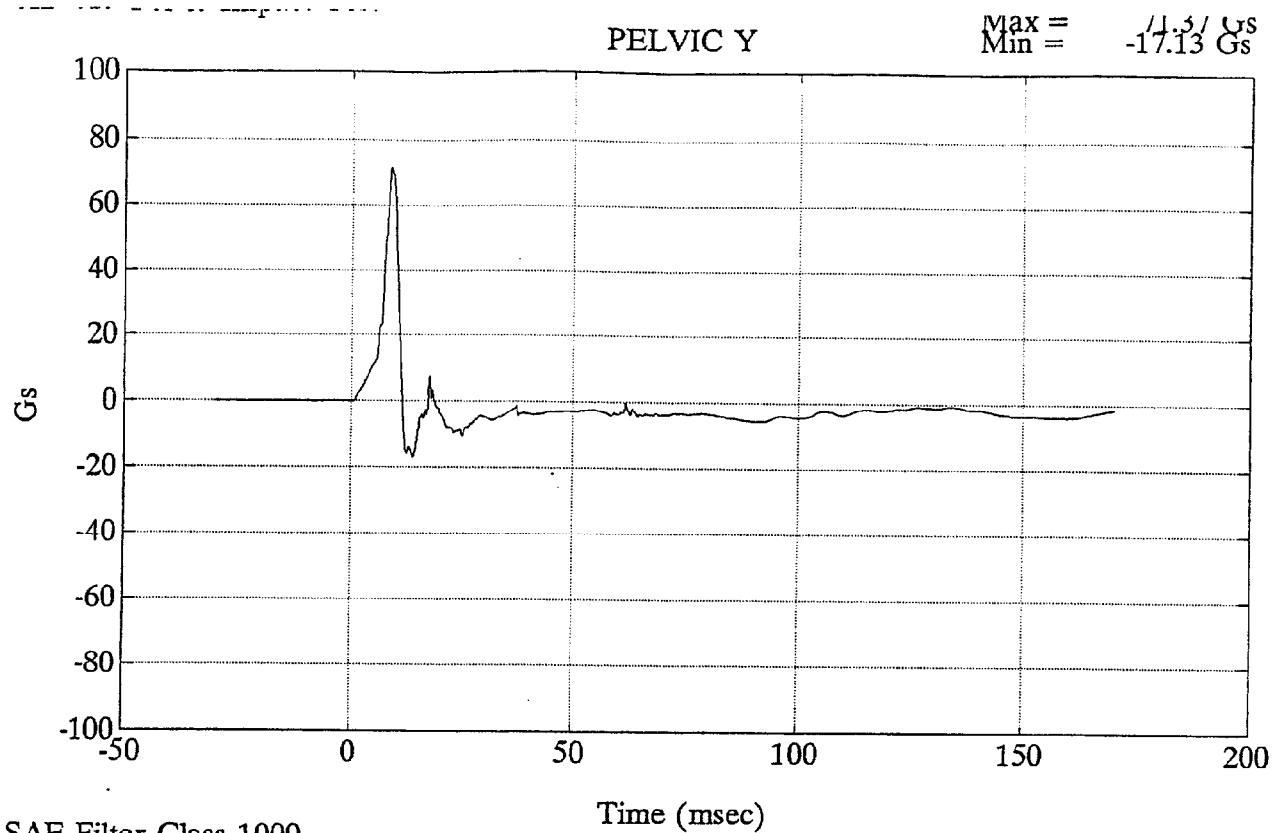
Calspan Sequential Test Number: 2

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
POST TEST**

(Test not required for SID certification)

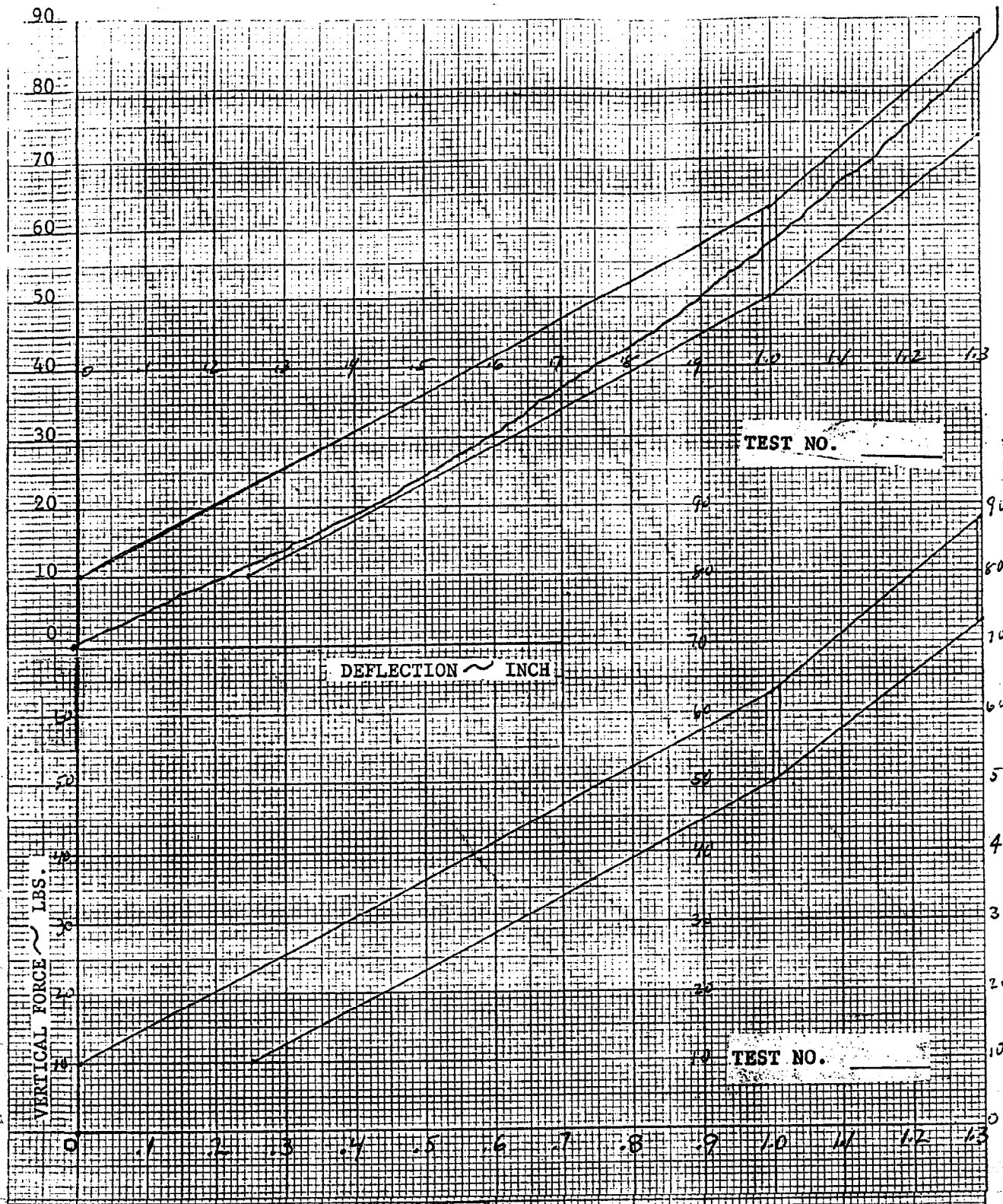
CONFIGURED FOR LEFT SIDE IMPACT

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 @ 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

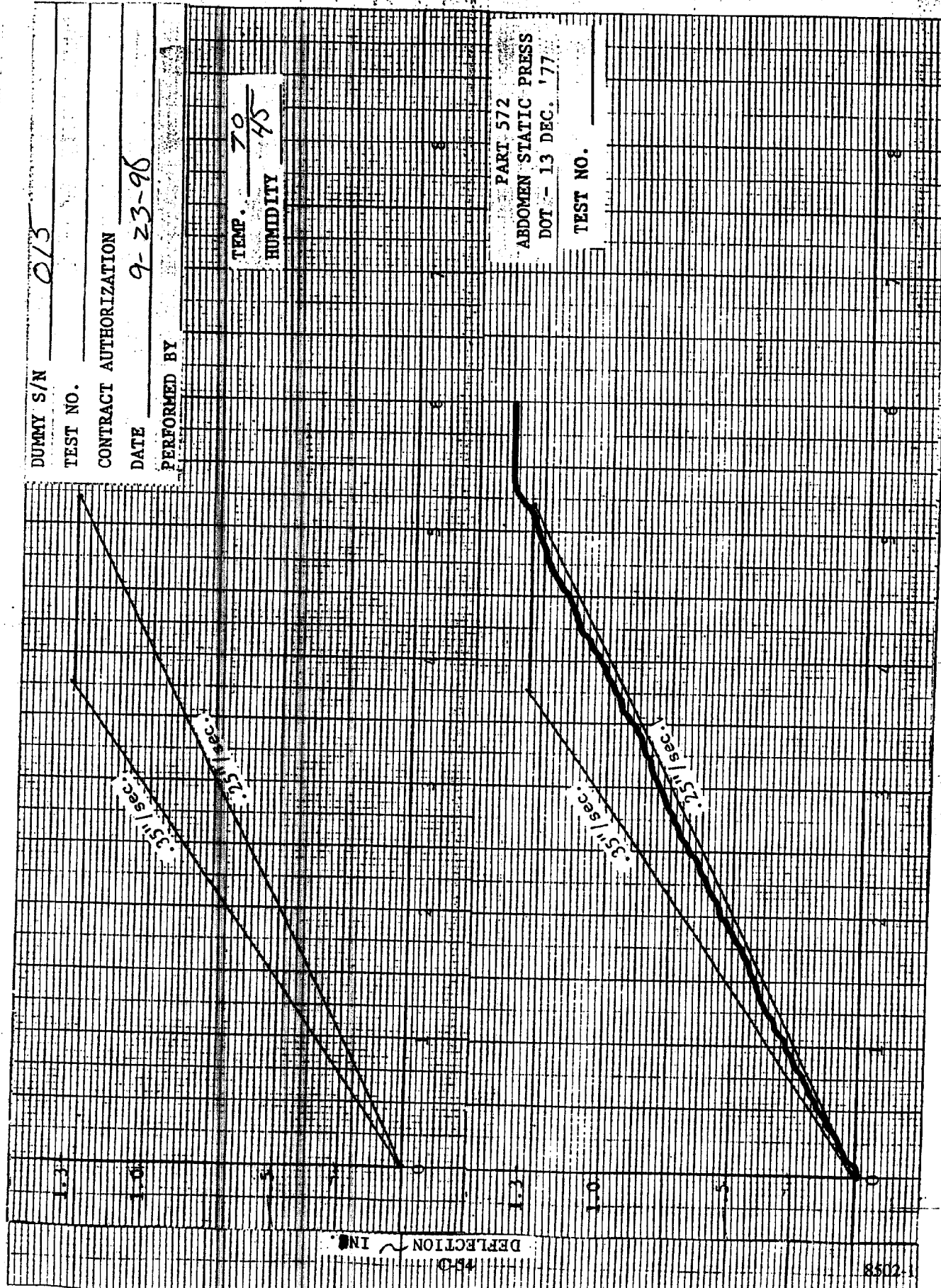
#2

DUMMY S/N 013
TEST NO. _____
CONTRACT AUTHORIZATION _____
DATE 9-23-96
PERFORMED BY _____

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: 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 @ 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

DUMMY S/N 0/5 TEST NO.

W/A

DATE _____

PERFORMED BY

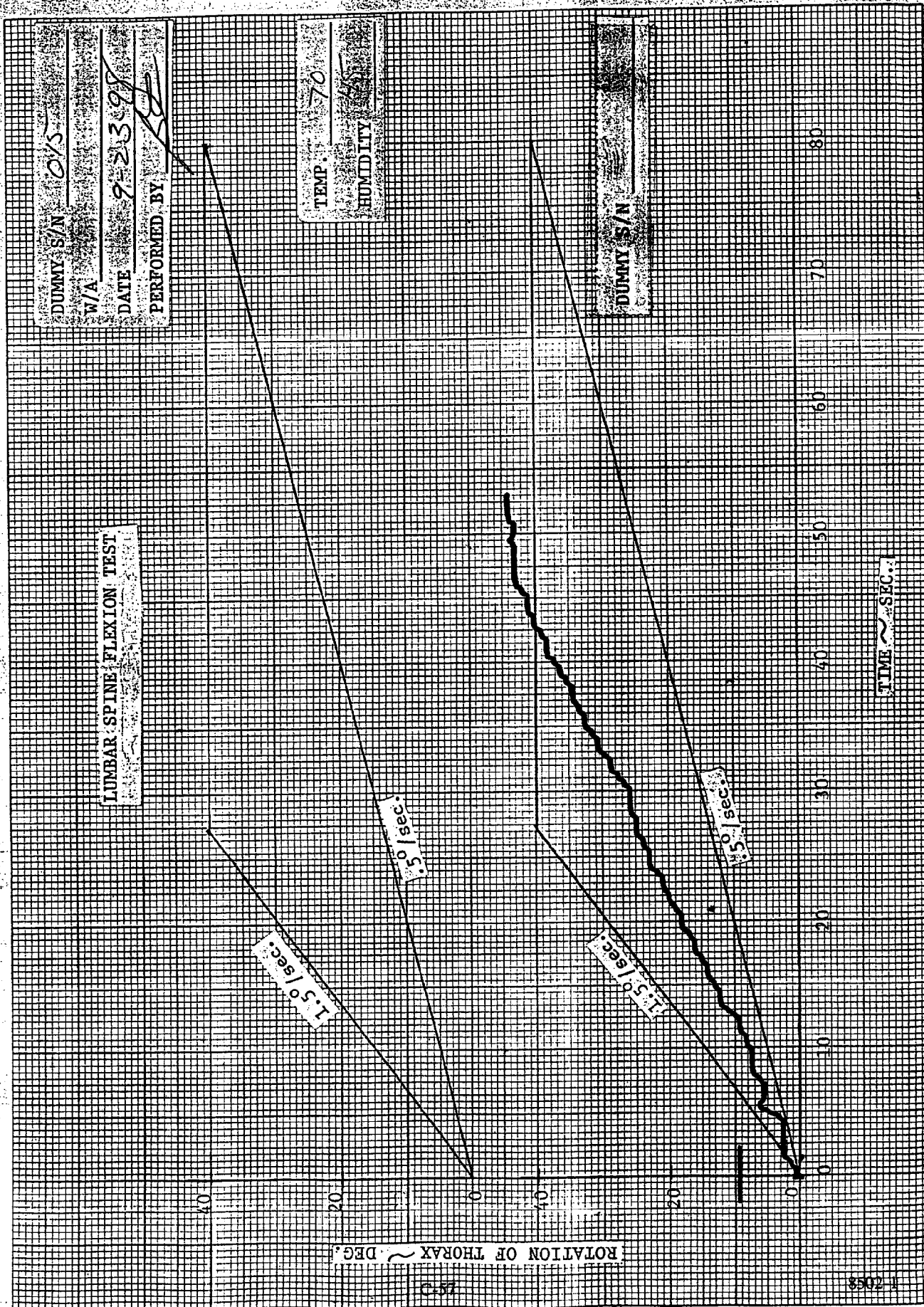
TEMP.

HUMIDITY

LUMBAR SPINE FLEXION TEST

EXTENSION ANGLE ~ DEG.

FORCE **LBS.**



POST 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
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
Date: 9/23/98

Calspan Sequential Test Number: 2
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.: 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

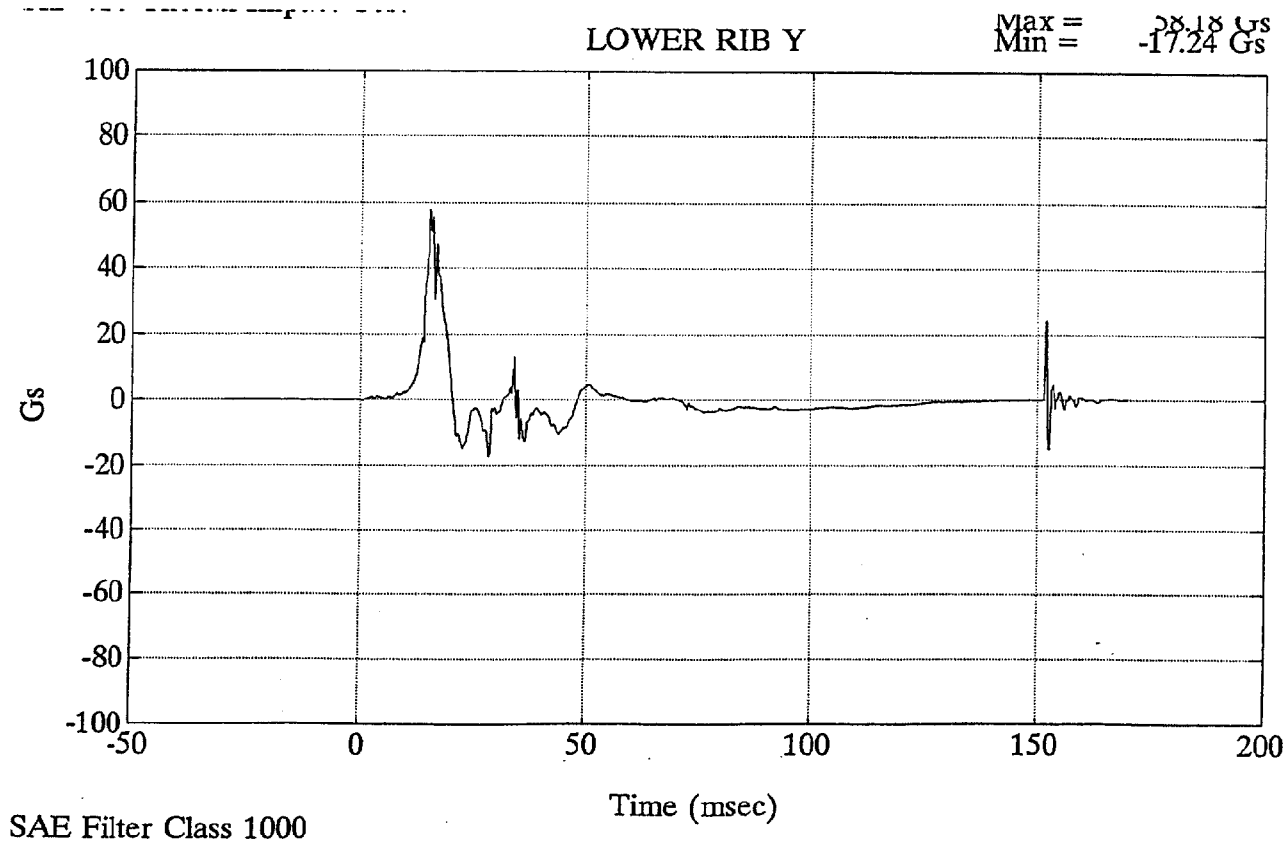
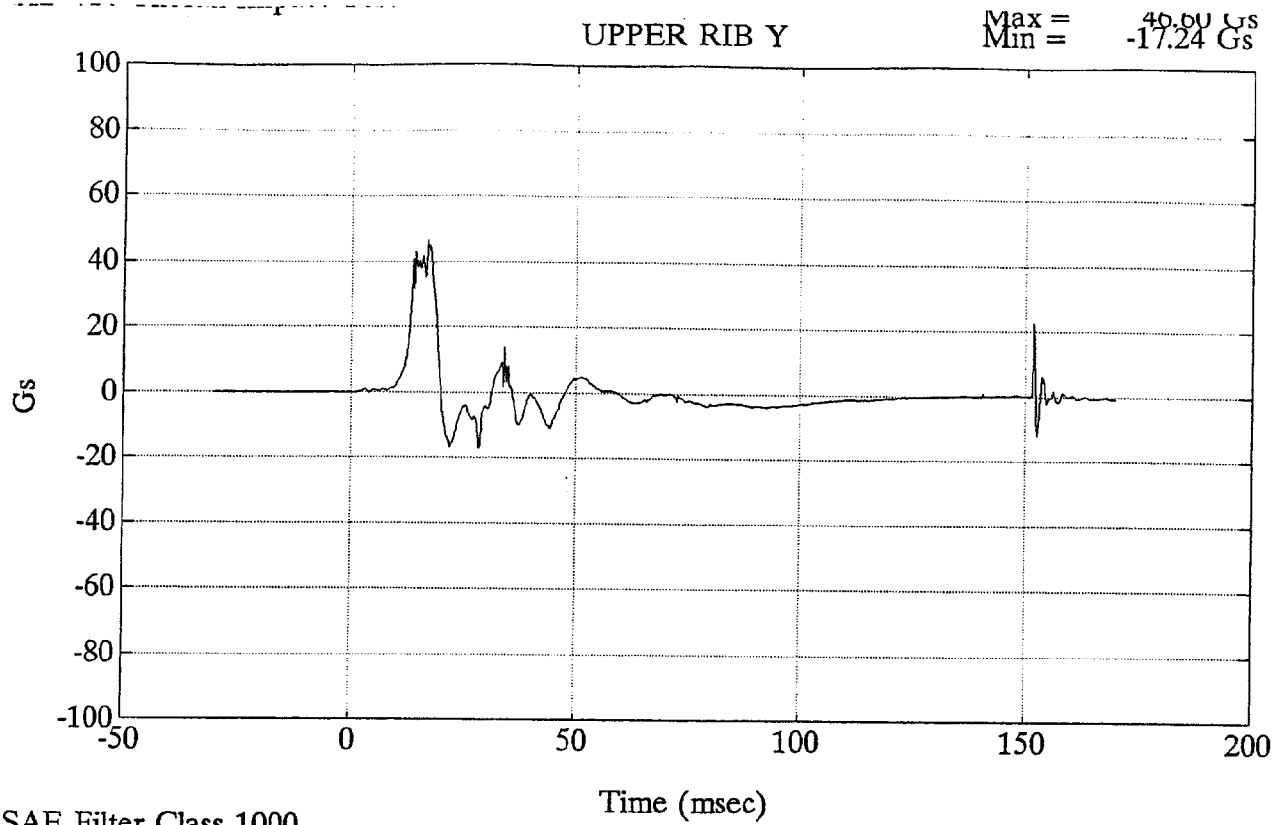
**LATERAL THORAX IMPACT TEST
POST TEST**

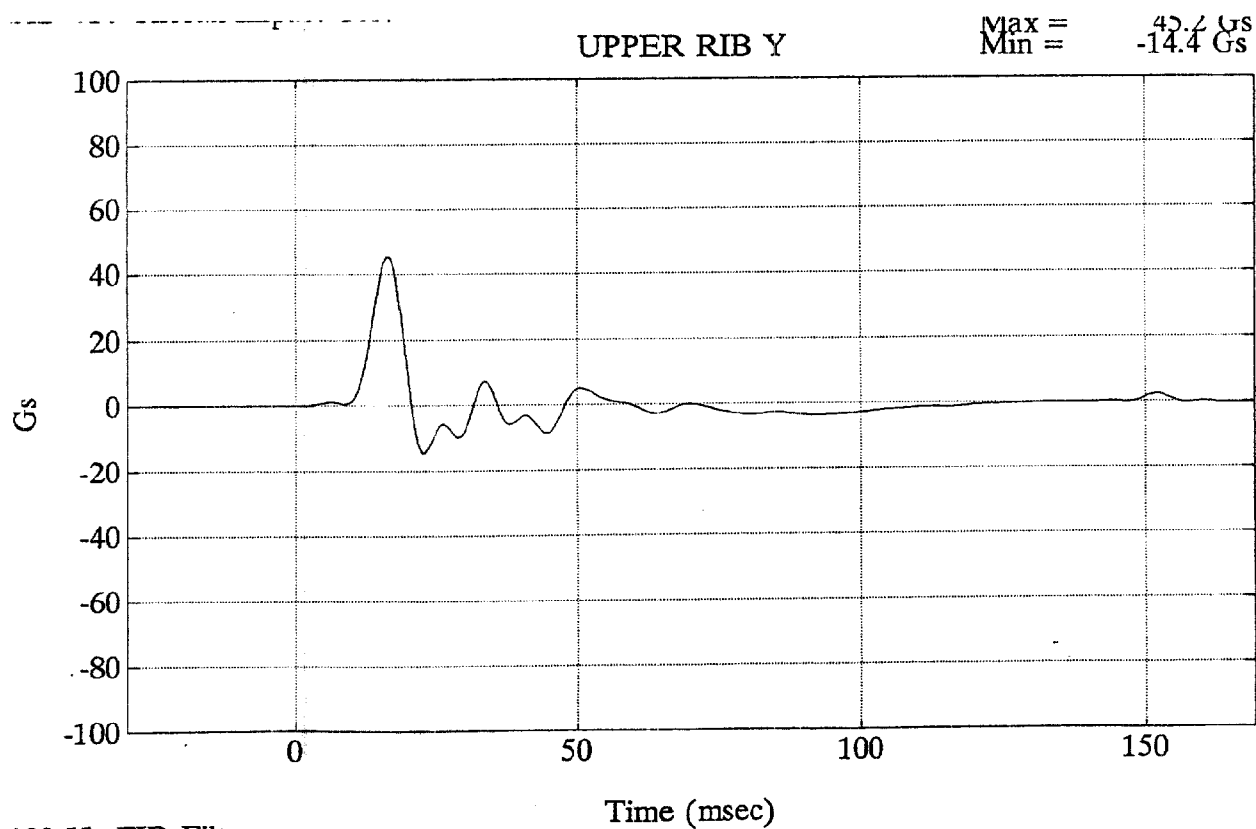
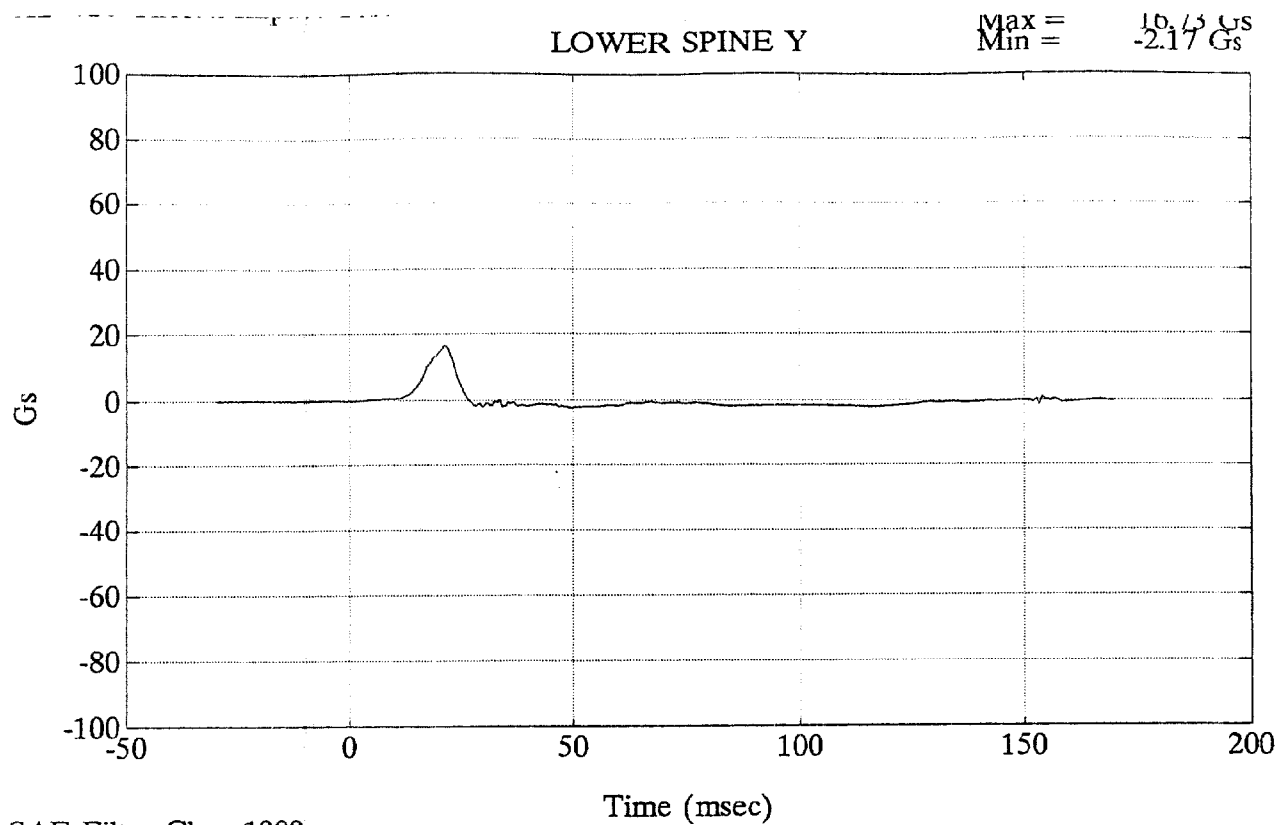
CONFIGURED FOR LEFT SIDE IMPACT

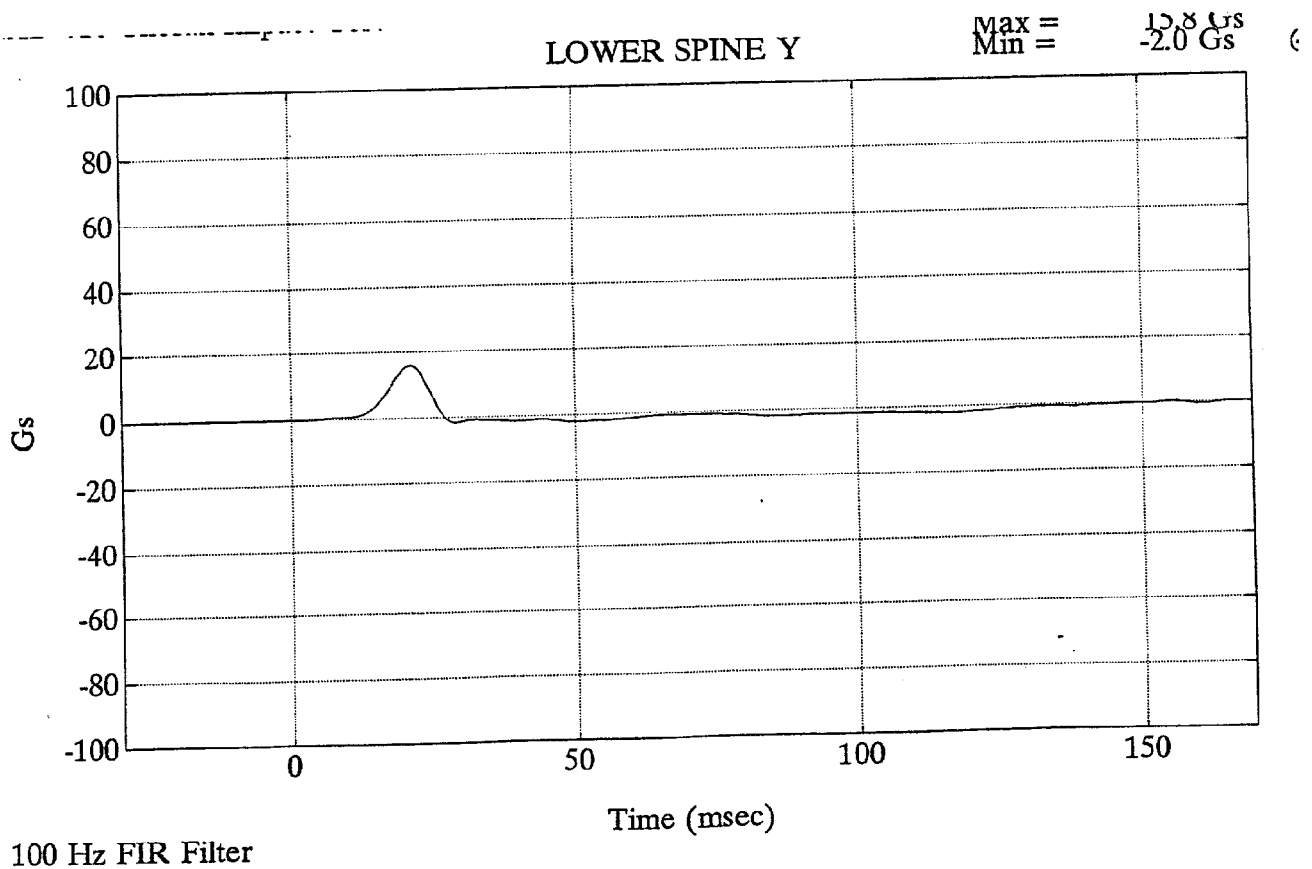
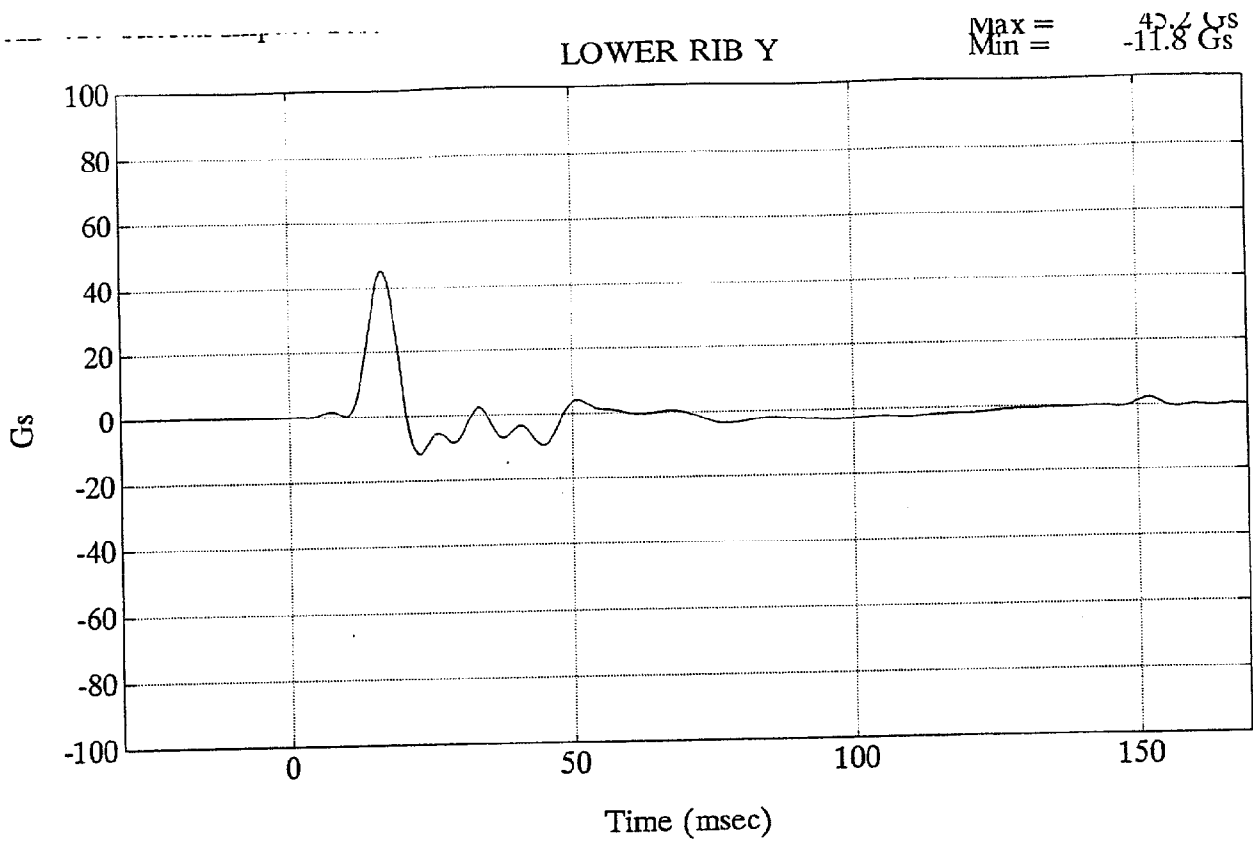
SID Serial No.: 016 Calspan Sequential Test Number: 2
Date: 9/23/98 Laboratory Technician: B. Swiecicki, G. Serbinowski

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







**LATERAL PELVIS IMPACT TEST
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016

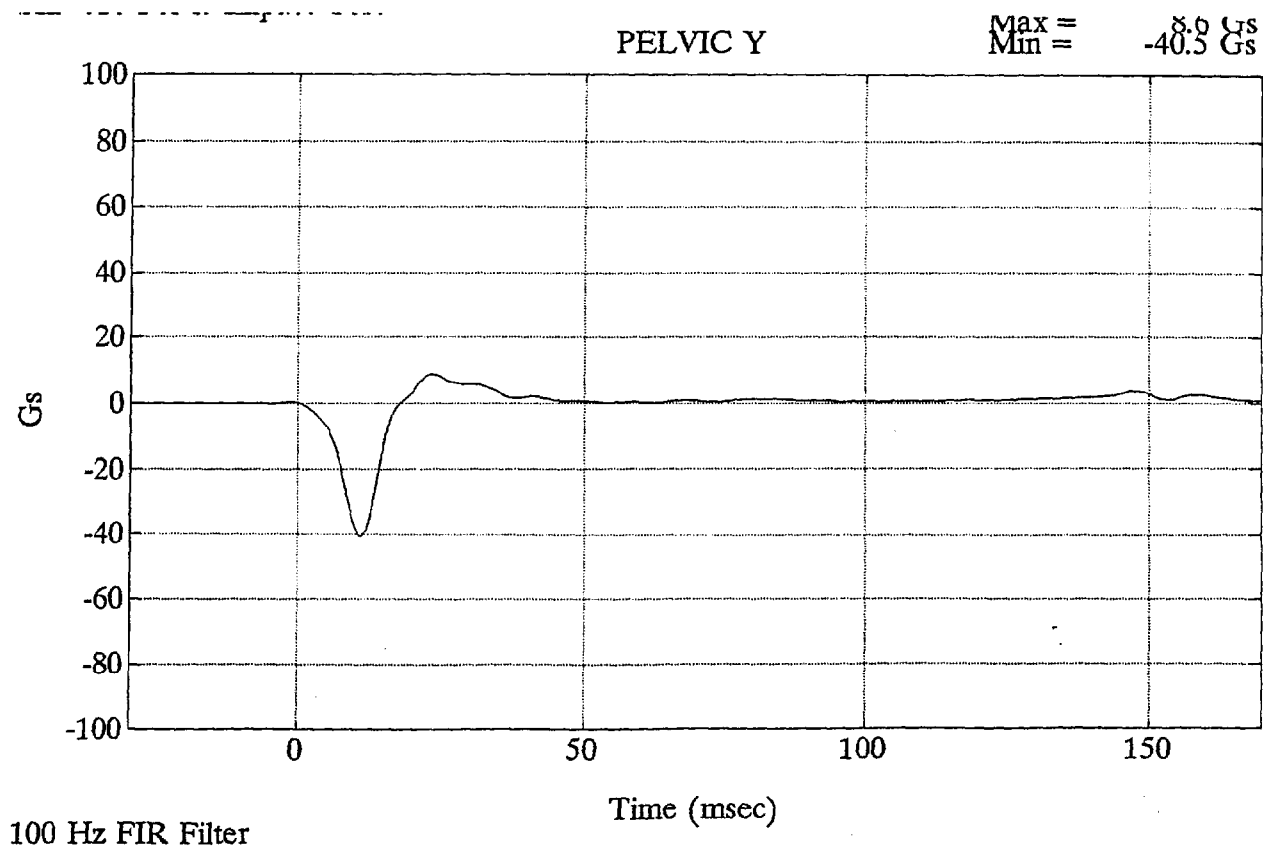
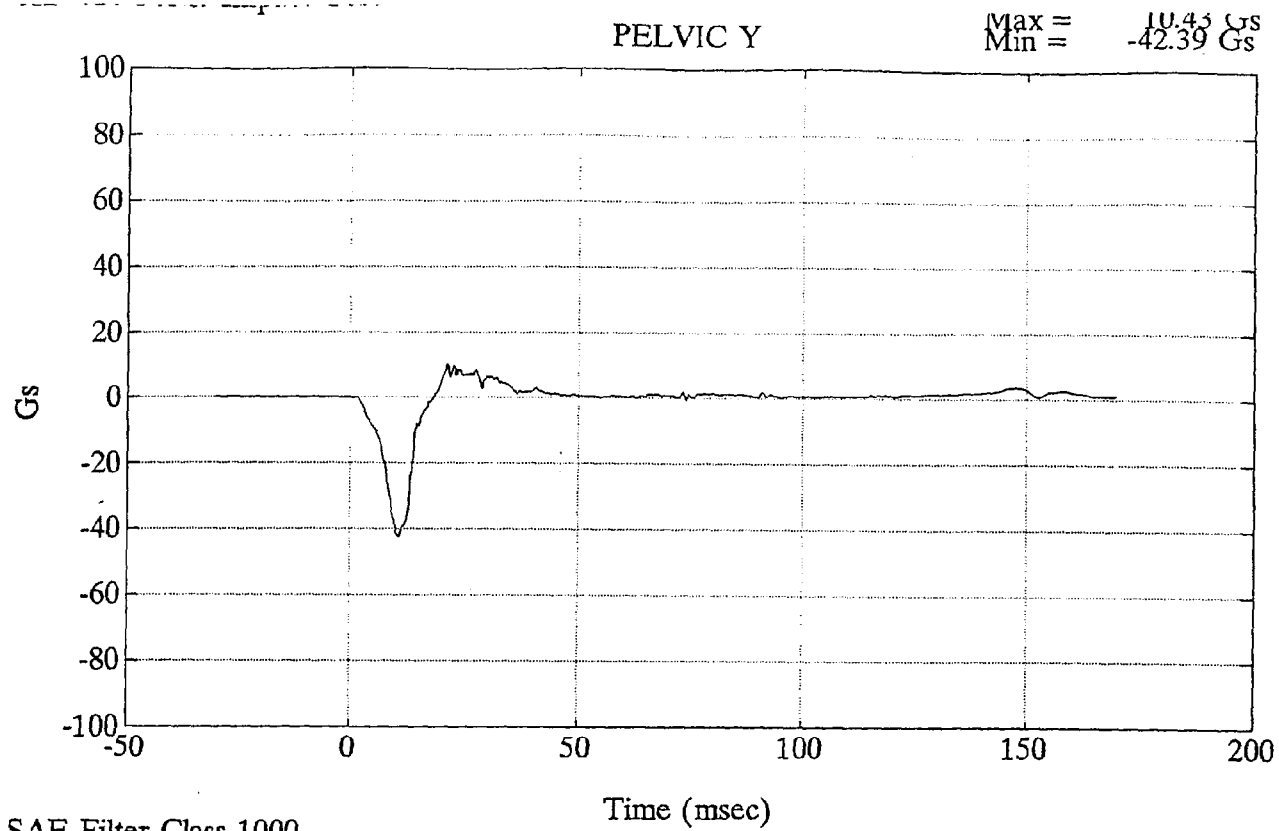
Calspan Sequential Test Number: 2

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
POST TEST**

(Test not required for SID certification)

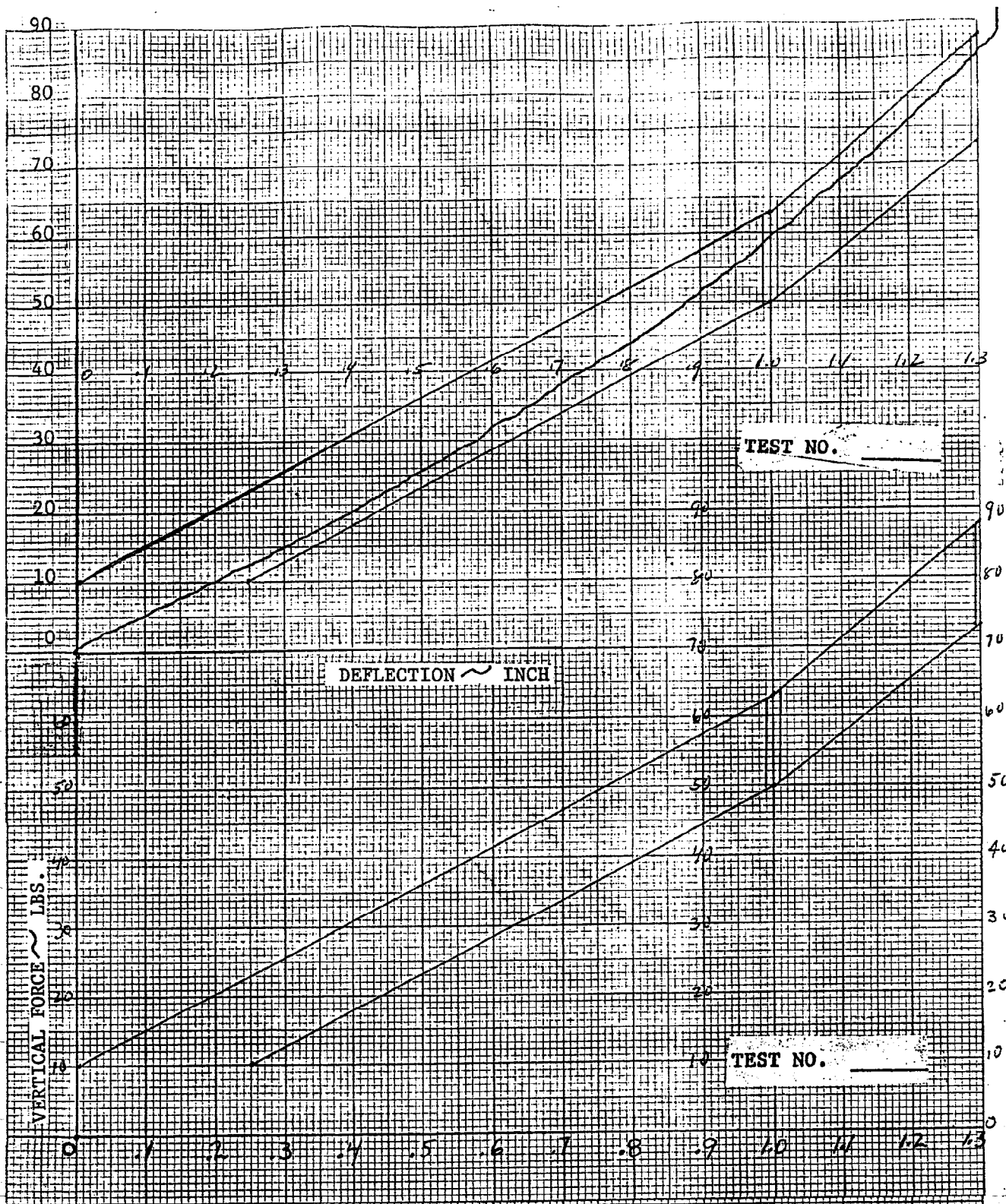
CONFIGURED FOR LEFT SIDE IMPACT

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 @ 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]

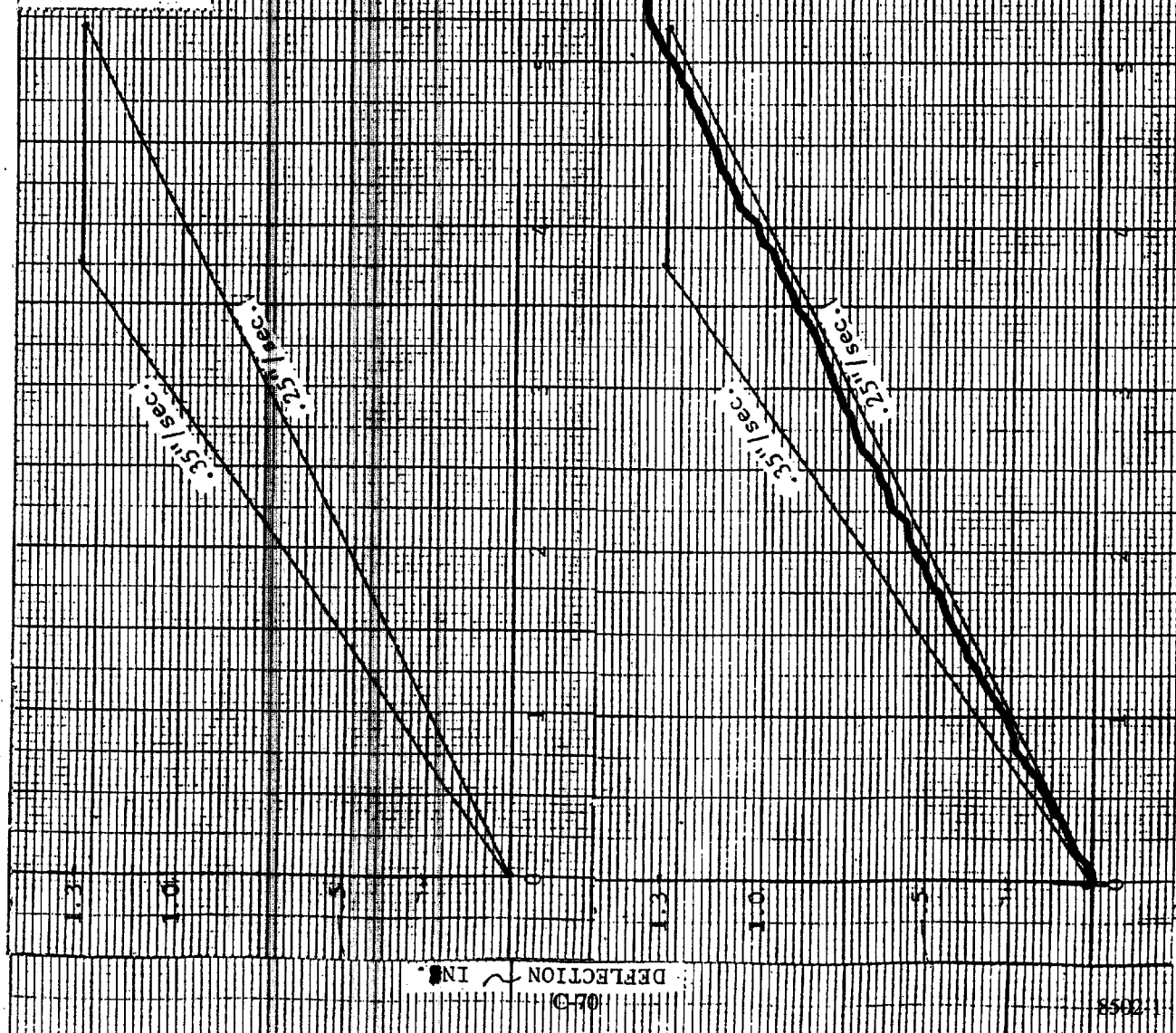
PART 572
ABDOMEN STATIC PRESS
DOT - 13 DEC. '77

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
POST 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

8502-1

DUMMY S/N 016

W/A

DATE

9-23-98

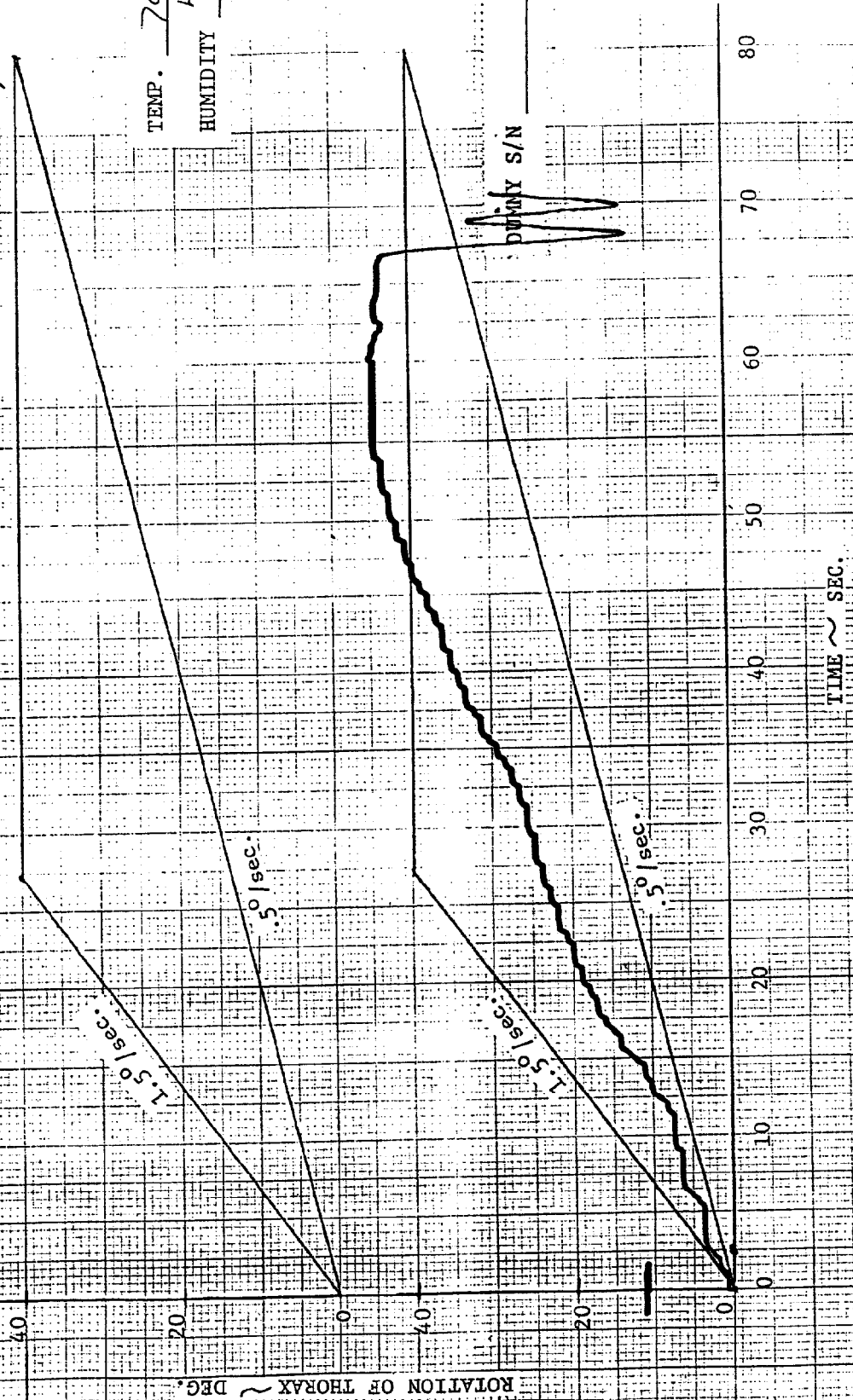
PERFORMED BY

[Signature]

TEMP. 70

HUMIDITY 45

LUMBAR SPINE FLEXION TEST



DUMMY S/N

POST 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

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	AA4P6	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)	J18515	ENDEVCO	8/98
REAR FLOORPAN ABOVE AXLE (Y)	J18650	ENDEVCO	8/98
REAR FLOORPAN ABOVE AXLE (Z)	AN943	ENDEVCO	8/98
LEFT REAR SILL (Y)	BC48	ENDEVCO	4/98
LEFT FRONT SILL (Y)	AN15	ENDEVCO	4/98
RIGHT REAR SEAT OCCUPANT COMP. (Y)	D57	ICS	8/98
LOWER LEFT B- PILLAR (Y)	Z02	ENTRAN	4/98
MIDDLE LEFT B-PILLAR (Y)	D12	ENTRAN	4/98
LOWER LEFT A-PILLAR (Y)	D03	ENTRAN	4/98
UPPER LEFT A-PILLAR (Y)	-	-	-
FRONT SEAT TRACK (Y)	J18577	ENDEVCO	6/98
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