

V3057

REPORT NUMBER: CAL-99-13

**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**DAILMER CHRYSLER CORPORATION
1999 JEEP GRAND CHEROKEE
4-DOOR MPV**

NHTSA NUMBER: MX0307

CALSPAN TEST NUMBER: 8413-37

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March 9, 1999

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Performance Standards
Office of Crashworthiness Standards
Mail Code: NPS-10
400 Seventh Street, SW, Room No. 5313
Washington, DC 20590

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March 18, 1999

FINAL REPORT ACCEPTANCE BY OCS:

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NHTSA, Office of Crashworthiness Standards

Date of Report Acceptance

COTR, New Car Assessment Program (NCAP)
NHTSA, Office of Crashworthiness Standards

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. <i>Report No.</i> CAL-99-13		2. <i>Government Accession No.</i>		3. <i>Recipient's Catalog No.</i>	
4. <i>Title and Subtitle</i> Final Report of NEW CAR ASSESSMENT PROGRAM (NCAP) Testing of a 1999 Jeep Grand Cherokee 4-Door MPV NHTSA No. MX0307				5. <i>Report Date</i> March 9, 1999	
				6. <i>Performing Organization Code</i> CAL	
7. <i>Author(s)</i> David J. Travale, Program Manager Patrick G. MacDiarmid, Jr., Project Engineer				8. <i>Performing Organization Report No.</i> 8413-37	
9. <i>Performing Organization Name and Address</i> Calspan Corporation 4455 Genesee Street Buffalo, New York 14225				10. <i>Work Unit No.</i>	
				11. <i>Contract or Grant No.</i> DTNH22-96-D-02010	
12. <i>Sponsoring Agency Name and Address</i> U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NPS-10 400 Seventh , SW, Room 5313 Washington, D.C. 20590				13. <i>Type of Report and Period Covered</i> Final Report March 1999	
				14. <i>Sponsoring Agency Code</i> NPS-10	
15. <i>Supplementary Notes</i>					
16. <i>Abstract</i> A frontal load cell barrier test of a 1999 Jeep Grand Cherokee 4-Door MPV was performed at Calspan Corporation crash test facility in Buffalo, New York, on March 9, 1999. The impact velocity was 56.3 kph and the temperature at the barrier face was 21°C. The maximum post-test vehicle crush was 556 mm. The test vehicle was equipped with 3-point restraint systems, knee bolsters, and next generation airbags at both the driver and right outboard passenger seating positions. With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements.					
17. <i>Key Words</i> 56 kph Frontal Barrier Impact test New Car Assessment Program (NCAP)				18. <i>Distribution Statement</i> <u>Copies of this report are available from:</u> NHTSA Technical Reference Division National Highway Traffic Safety Admin. 400 Seventh St., SW, Room 5108 Washington, DC 20590	
19. <i>Security Classif. (of this report)</i> UNCLASSIFIED		20. <i>Security Classif. (of this page)</i> UNCLASSIFIED		21. <i>No. of Pages</i> 271	
22. <i>Price</i>					

Form DOT F1700.7 (8-69)

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Section 1

PURPOSE AND SUMMARY OF TEST MX0307

PURPOSE

This 56.3 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-96-D-02010. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 56.3 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 1999 Jeep Grand Cherokee 4-Door MPV at a velocity of 56.3 kph. The test was performed at the Calspan Corporation on March 9, 1999. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by 1 real-time camera and 16 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head, chest, and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 064) and the right-front passenger (position 2) ATD (Serial No. 061) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 133 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's HIC was 997.5. The maximum chest deceleration over 3 milliseconds was 55.3 g's and maximum chest deflection was 30.48 mm. Femur loads were 7393.2 Newtons on the left and 7869.8 Newtons on the right.

The right front passenger's HIC was 772.7. Maximum chest deceleration over 3 milliseconds was 53.7 g's and maximum chest deflection was 22.86 mm. Femur loads were 9275.8 Newtons on the left and 7061.7 Newtons on the right.

The driver right lower tibia mx did not record. The driver left ankle z accelerometer did not record. The passenger redundant head x data is not accurate after 80 ms. The passenger redundant head y data is not accurate. The passenger right toe z data is not accurate after 40 ms. The passenger torso belt load cell data is not accurate after 99 ms. The vehicle engine bottom accelerometer (accelerometer #4) data is not accurate after 45 ms. The vehicle instrument panel accelerometer is not accurate after 15 ms.

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA

DATA SHEET NO. 1 CRASH TEST SUMMARY

Vehicle NHTSA No. : MX0307 Test Mode : 56.3 kph Frontal Barrier

Test Date : March 9, 1999 Time: 15:15 Temperature : -4 °C

Vehicle Make/Model/Body Style : 1999 Jeep Grand Cherokee 4-Door MPV

Vehicle Test Weight : 2135.0 kg

Vehicle/Barrier Impact Angle : 0 °

Impact Velocity : 56.3 kph

Maximum Static Crush : 556 mm

Vehicle Rebound : 610.7 mm

DUMMIES:

DRIVER

PASSENGER

Type :

572E

572E

Restraint System :

Seatbelt, Airbag, Knee Bolster

Seatbelt, Airbag, Knee Bolster

Number of Data Channels : 133

Number of Cameras : 1 Real Time

16 High Speed

DOOR OPENING DATA :

Closed/Inoperable - Left Front

Closed/Inoperable - Right Front

Front Seat(s) Data :

DRIVER

PASSENGER

Seat Track Failure :(mm of shift)

22 mm forward

16 mm forward

Seat Back Failure :

None

None

VISIBLE DUMMY CONTACT POINTS :

DRIVER

PASSENGER

Head :

Face to the center of the airbag

Face to the right center of the airbag.

Abdomen :

None

None

Chest

Airbag

Airbag

Knees

Knee Bolster

Knee Bolster/Glove Box Door

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION :

Year/Make/Model/Body Style : 1999 Jeep Grand Cherokee 4-Door MPV
NHTSA No. : MX0307 ; VIN: 1J4GW68S0XC667434 ; Color : Black
Engine Data: 6 cylinders; - CID; 4.0 Liters; - cc
Placement : X Longitudinal or In-Line; - Transverse or Lateral
Transmission Data : 4 speeds; - Manual; X Automatic; X Overdrive
Final Drive : - Rear Wheel Drive; - Front Wheel Drive; X Four Wheel Drive
Major Options : X A/C; X Pwr.Strg.; X Pwr. Brakes
X Pwr. Windows; X Pwr. Door Locks; X Tilt Wheel
Date Received : 2/26/99 ; Odometer Reading 232 km
Selling Dealer : Downing and Hall's Jeep Eagle
& Address: 6179 South Transit Road Lockport, New York 14094-6395

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by : Daimler Chrysler Corporation
Date of Manufacture 2-26
GVWR : 2427 kg; GAWR: 1248 kg FRONT; 1339 kg REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load : 300 kpa FRONT
300 kpa REAR
Recommended Tire Size : P225/75R16
* Recommended Cold Tire Pressure : 248 kpa FRONT; 248 kpa REAR
Size of Tires on Test Vehicle: P225/70R16 ; Manufacturer: Goodyear
Vehicle Capacity Data :
Type of Front Seats: - Bench; X Bucket; - Split Bench
Number of Occupants: 2 Front; 3 Rear; 5 Total
Vehicle Capacity Weight (VCW) = 571.5 kg
No. of Occupants x 68 kg = 340.0 kg
Rated Cargo/Luggage Weight (RCLW) = 231.5 kg

*Tire pressure used for test

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

Right Front	=	<u>514.5</u>	kg	Right Rear	=	<u>415.0</u>	kg
Left Front	=	<u>508.0</u>	kg	Left Rear	=	<u>418.0</u>	kg
TOTAL FRONT	=	<u>1022.5</u>	kg	TOTAL REAR	=	<u>833.0</u>	kg
TOTAL DELIVERED WEIGHT	=	<u>1855.5</u>	kg				
% of Total Front of Vehicle Weight	=	<u>55.1</u>	%	% of Total Rear Weight	=	<u>44.9</u>	%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT :

Total Delivered Weight (UDW)	=	<u>1855.5</u>	kg
Rated Cargo/Luggage Weight (RCLW)	=	<u>136.0</u>	kg (136 kg maximum)
Weight of 2 p.572 Dummies @ 76 each	=	<u>152.0</u>	kg
TARGET TEST WEIGHT	=	<u>2143.5</u>	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 128 KG OF CARGO WEIGHT:

Right Front	=	<u>532.0</u>	kg	Right Rear	=	<u>531.5</u>	kg
Left Front	=	<u>539.5</u>	kg	Left Rear	=	<u>532.0</u>	kg
TOTAL FRONT	=	<u>1071.5</u>	kg	TOTAL REAR	=	<u>1063.5</u>	kg
TOTAL TEST WEIGHT	=	<u>2135.0</u>	kg				
% of Total Front Weight	=	<u>50.2</u>	%	% of Total Rear Weight	=	<u>49.8</u>	%
Weight of Ballast Secured in Vehicle Trunk Area	=	<u>74.3</u>	kg				
Vehicle Components Removed for Weight Reduction:		<u>None</u>					

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED :	RF	<u>828</u>	LF	<u>830</u>	RR	<u>855</u>	LR	<u>855</u>
FULLY LOADED :	RF	<u>817</u>	LF	<u>820</u>	RR	<u>807</u>	LR	<u>814</u>
AS TESTED :	RF	<u>827</u>	LF	<u>825</u>	RR	<u>810</u>	LR	<u>815</u>
Vehicle's Wheel Base :		<u>2700</u>	mm					
Location of Vehicle's C.G. :		<u>1344.9</u>	mm rearward of front wheel center.					

FUEL SYSTEM DATA :

Fuel System Capacity From Owner's Manual	=	<u>77.6</u>	liters
Usable Capacity Figure Furnished by COTR	=	<u>77.6</u>	liters
Test Volume Range (92 to 94% of Usable Capacity)	=	<u>71.4</u>	to <u>72.9</u> liters
ACTUAL TEST VOLUME	=	<u>71.8</u>	liters (with entire fuel system filled)
Test Fluid Type:	<u>Stoddard Solution</u> ;	Spec. Grav.	= <u>0.764</u>
Kinematic Viscosity	=	<u>0.96</u>	centistokes; Color = <u>Orange</u>
Type of Fuel Pump:	Electric- <u>X</u> ;	Mechanical-	<u>-</u>
Does Electric Pump operate with ignition switch "ON" & engine "OFF"		Yes- <u>X</u>	No- <u>-</u>
Details of Fuel System <u>The fuel tank is centered behind the rear axle. The filler neck is located on the left side of the vehicle behind the rear axle. The fuel lines run inside the left frame rail.</u>			

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test : Frontal Barrier Impact Angle : 0°
Test Date : March 9, 1999 Time: 15:15 Temperature: -4 °C
Vehicle NHTSA No. : MX0307
Required Impact Velocity Range : 55.5 to 57.1 kph

BARRIER IMPACT VELOCITY: (Speed traps within 5 feet of impact plane.)

Trap No. 1 = 56.3 kph; Trap No. 2 = 56.3 kph
Distance from vehicle to barrier : (1) entering trap = 813 mm
(2) exiting trap = 305 mm

VEHICLE STATIC CRUSH: (mm) (For frontal and rear impacts only.)

Vehicle Length:

Pre-Test Right = 4622 ; C/L = 4725 ; Left = 4622
Post-Test Right = 4171 ; C/L = 4169 ; Left = 4102
Crush Right = 451.0 ; C/L = 556.0 ; Left = 520.0
AVERAGE = 509.0 mm

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point :

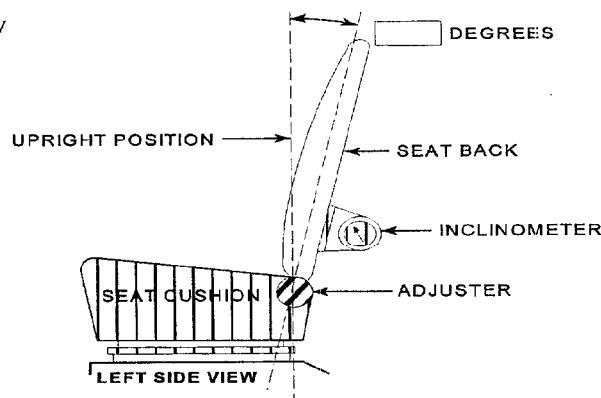
Right = 605 ; C/L = 599 ; Left = 628
AVERAGE = 610.7 mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 1999 Vehicle Model: Jeep Grand Cherokee Body Style : 4-Door MPV

1. 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 ASSEMBLY

Seat back angle for driver's seat : 20.5°
 Measurement instructions : Measure with inclinometer on the headrest post. Rotate rearward electric seat 9.8° from vertical.
 Seat back angle for passenger's seat : 20.5°
 Measurement instructions : Same as the driver's seat.

2. Seat Fore and Aft Positioning

Positioning of the driver's seat : Power seats have 220 mm of travel. Position seats at mid-travel, 110 mm from full forward.
 Positioning of the passenger's seat (if applicable) : Same as the driver's seat.

3. Fuel Tank Capacity Data

3.1

A. "Usable Capacity" of the standard equipment fuel tank is 77.6 liters
 B. "Usable Capacity" of the optional equipment fuel tank is - liters
 C. "Usable Capacity" of the vehicle(s) used for certification testing to requirements of FMVSS 301 = 70.0 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 70.0 liters

3.3 Is vehicle equipped with electric fuel pump? Yes- X ; No- -

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

Fuel pump operates when the vehicle's electrical system is activated.

DATA SHEET NO. 4 TEST VEHICLE INFORMATION (cont.)

4. STEERING COLUMN ADJUSTMENTS :

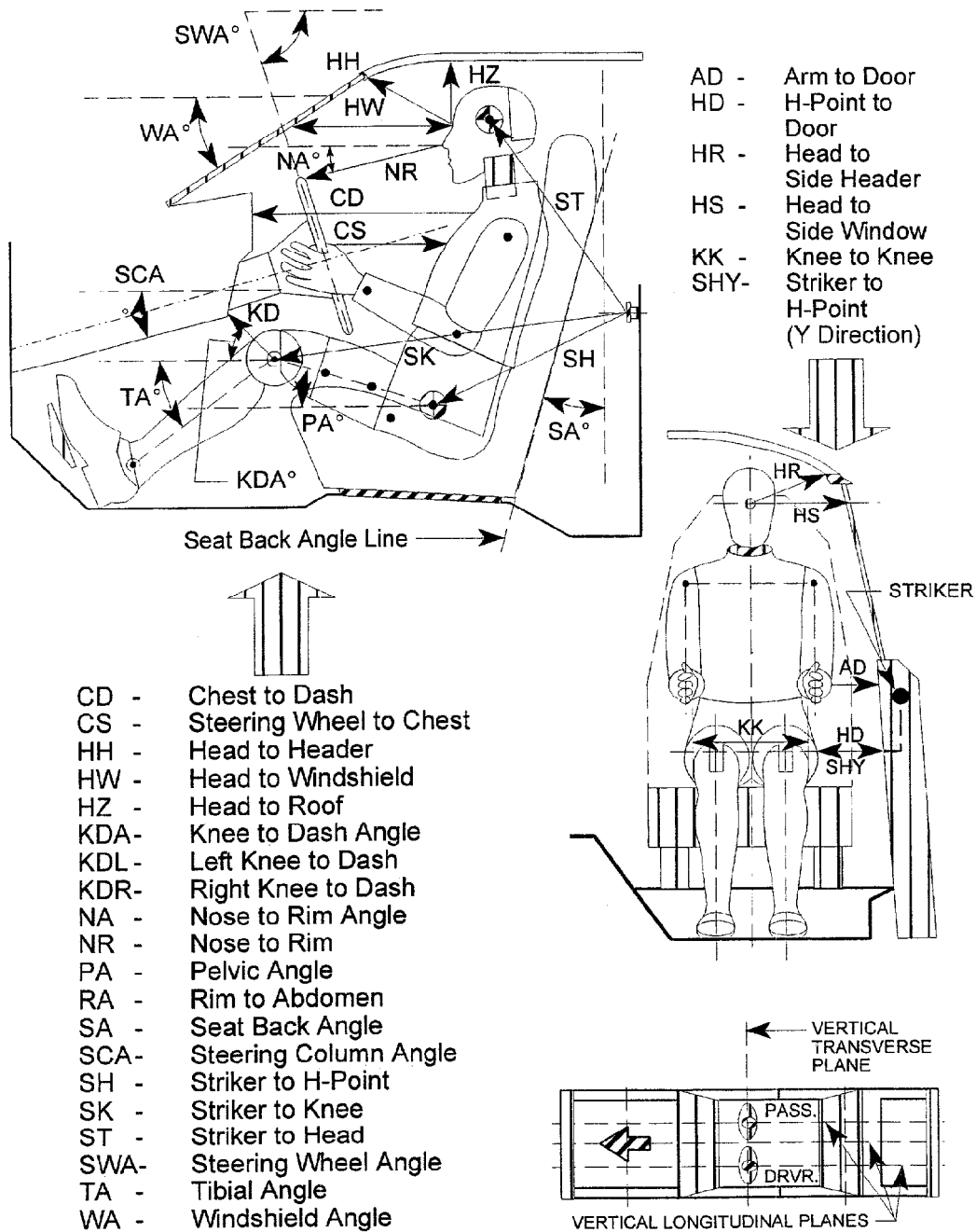
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions: The steering column should be set at 24 degrees up from a
level sill.

5. SEAT BELT UPPER ANCHORAGE

Nominal design riding position: Place the d-ring in the third locking position with the top position
labeled position 1.

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



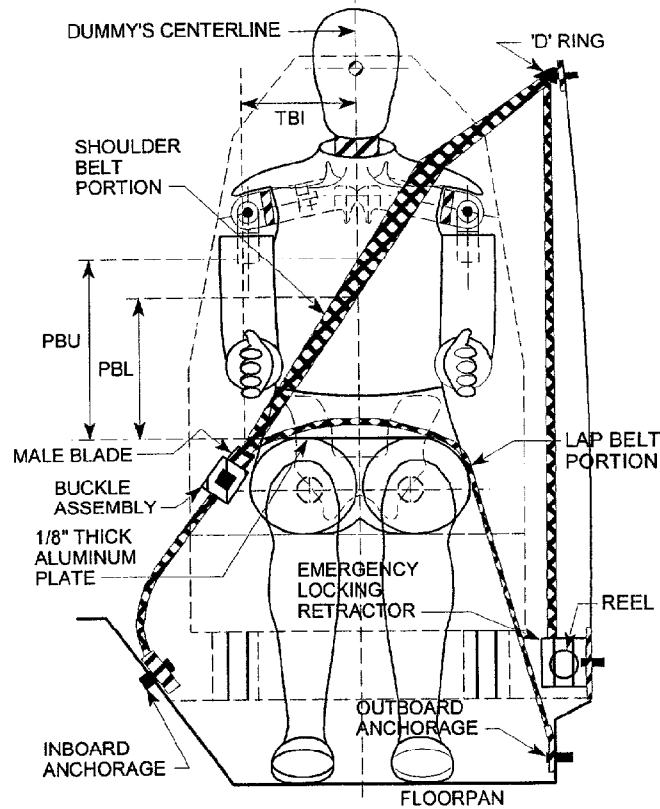
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE

	DRIVER (Serial #064)			PASS. (Serial # 061)		
WA ^o	31.5 deg.			N/A		
SWA ^o	24 deg.			N/A		
SCA ^o	66 deg.			N/A		
SA ^o	20.5 deg.			20.5 deg.		
HZ	162			145		
HH	372			391		
HW	640			607		
HR	189			194		
NR	381	Angle	-16 deg.	N/A		
CD	535			542		
CS	267			N/A		
RA	165			N/A		
KDL	158	Angle (KDA)	29 deg.	140		
KDR	145			145	Angle (KDA)	30 deg.
PA ^o	23.6 deg.			22.5 deg.		
TA ^o	-46 deg.			-50 deg.		
KK	274			265		
ST	590	Angle	2.5 deg.	624	Angle	4 deg.
SK	576	Angle	83.2 deg.	592	Angle	83.7 deg.
SH	199	Angle	107.6 deg.	205	Angle	97 deg.
SHY	201			201		
HS	285			300		
HD	120			128		
AD	85			89		

Dimensions in millimeters

DATA SHEET NO. 6 SEAT BELT POSITIONING DATA

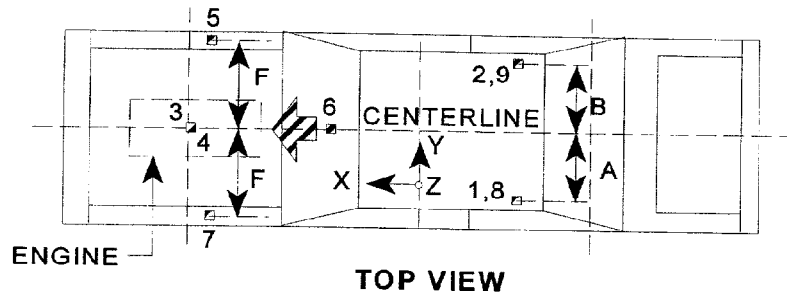
SEAT BELT POSITIONING DATA



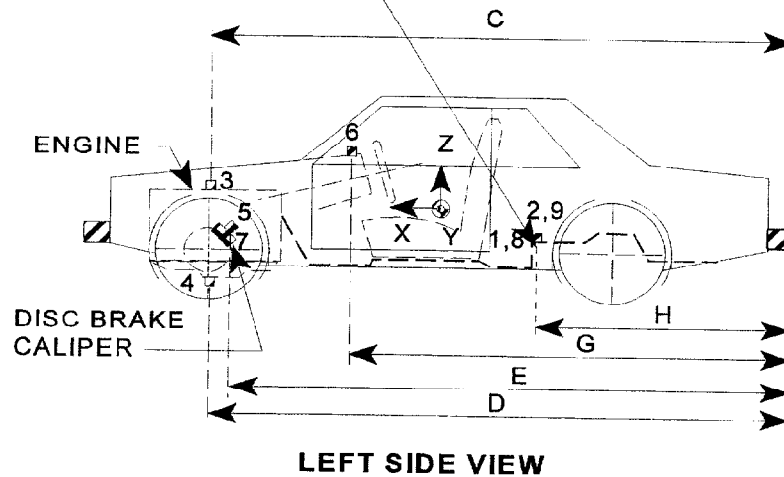
FRONT VIEW OF DUMMY

	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	340	340
PBL-- Top surface of alum. plate to belt lower edge	268	268
<u>LAP BELT TENSION</u>	10 Newtons	10 Newtons
<u>SHOULDER BELT TENSION</u>	Retractor	Retractor

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



REAR SEAT CUSHION
ASSY. FRONT ATTACHMENT
BRACKET SUPPORT



Note: Vehicle accelerometer location and data summary shown in DATA SHEET NO. 7

DATA SHEET NO. 7 VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

DIMENSION	LENGTH (mm)
	PRE-TEST VALUES
A Left Rear Seat Crossmember Y	-636.6
B Right Rear Seat Crossmember Y	618.0
C Top of Engine X	3986.5
D Bottom of Engine X	3099.1
E Disc Brake Calipers X	3802.5
F Disc Brake Calipers Y	791.3
G Instrument Panel X	2968.8
H Rear Seat Crossmembers X	1790.9

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Rear Seat X-Member @ Left Side	1.9	124.7	-57.3	41.5
2	Rear Seat X-Member @ Right Side	1.7	163.2	-62.7	38.4
3	Top of Engine Block	47.5	39.4	-148.7	29.1
4	Bottom of Engine	*	*	*	*
5	Disc Brake Caliper @ Right Side	26.7	54.2	-126.5	46.9
6	Instrument Panel	**	**	**	**
7	Disc Brake Caliper @Left Side	13.3	75.4	-120.8	34.1
8	Rear Seat X-Member @ Left-Redundant	2.1	499.9	-48.5	40.4
9	Rear Seat X-Member @ Right-Redundant	1.6	157.2	-61.8	38.5

* Data is not accurate after 45 ms.

** Data is not accurate after 15 ms.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

NHTSA Test No.: MX0307 Vehicle: 1999 Jeep Grand Cherokee 4-Door MPV

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec.	Neg.	msec.
Pos. 1 Head X	g's	3.8	104.4	-113.0	78.8
Pos. 1 Head Y	g's	2.5	169.8	-21.8	77.1
Pos. 1 Head Z	g's	31.1	48.8	-37.4	77.1
Pos. 1 Head Resultant	g's	116.4	78.9	0.0	12.5
Pos. 2 Head X	g's	6.1	258.0	-61.0	83.0
Pos. 2 Head Y	g's	6.3	62.8	-10.4	91.3
Pos. 2 Head Z	g's	35.4	70.0	-17.3	101.7
Pos. 2 Head Resultant	g's	63.7	82.5	0.0	-54.7
Pos. 1 Chest X	g's	1.8	152.9	-66.1	76.6
Pos. 1 Chest Y	g's	7.6	64.7	-7.7	43.2
Pos. 1 Chest Z	g's	24.3	65.7	-22.2	98.3
Pos. 1 Chest Resultant	g's	66.5	76.6	0.0	-59.0
Pos. 1 Chest Displacement	mm	0.0	-88.2	-31.7	68.4
Pos. 2 Chest X	g's	2.5	151.1	-53.3	62.8
Pos. 2 Chest Y	g's	10.2	81.6	-7.5	65.0
Pos. 2 Chest Z	g's	22.0	69.6	-21.6	104.5
Pos. 2 Chest Resultant	g's	56.0	64.2	0.0	-58.5
Pos. 2 Chest Displacement	mm	0.0	-94.8	-23.8	71.1
Pos. 1 Left Femur	N	226.7	114.5	-7393.2	43.0
Pos. 1 Right Femur	N	184.7	118.7	-7869.8	41.7
Pos. 2 Left Femur	N	586.3	36.2	-9275.8	46.4
Pos. 2 Right Femur	N	463.3	36.6	-7061.7	50.0
Pos. 1 Left Belt Load	N	6730.4	53.4	-4.0	3.2
Pos. 1 Torso Belt Load	N	4948.7	70.3	-22.7	186.7
Pos. 2 Right Belt Load	N	7383.5	51.0	-41.9	105.4
Pos. 2 Torso Belt Load	N	*	*	*	*

* Data is not accurate after 99 ms.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)

NHTSA Test No.: MX0307 Vehicle: 1999 Jeep Grand Cherokee 4-Door MPV

HEAD INJURY CRITERIA (HIC)				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	997.5	58.8	87.1	65.9
Position #2 - Passenger	772.7	62.3	98.3	54.0

** HIC is as defined in FMVSS 208. The maximum time interval from t₁ to t₂ is 36 milliseconds.

CLIP SUMMARY*				
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #1 - Driver	55.3	75.1	78.1	658.5
Position #2 - Passenger	53.7	62.0	65.0	596.7

* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
HYBRID III NECK AND PELVIC DATA SHEET

Vehicle Year/Make/Model/Body Style: 1999 Jeep Grand Cherokee 4-Door MPV
 NHTSA Test No.: MX0307 Test Date: March 9, 1999

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
Pos. 1 Upper Neck Fx	N	216.5	99.6	-586.9	65.2
Pos. 1 Upper Neck Fy	N	182.3	61.0	-245.6	114.4
Pos. 1 Upper Neck Fz	N	3379.5	78.6	-971.7	102.9
Pos. 1 Neck Force Result	N	3392.0	78.6	0.3	16.0
Pos. 1 Upper Neck Mx	N-m	9.1	162.7	-21.5	85.5
Pos. 1 Upper Neck My	N-m	28.3	142.4	-51.9	65.3
Pos. 1 Upper Neck Mz	N-m	15.2	79.3	-8.3	145.1
Pos. 1 Neck Moment Result	N-m	53.0	65.2	0.1	-99.4
Pos. 2 Upper Neck Fx	N	541.1	78.1	-414.3	135.7
Pos. 2 Upper Neck Fy	N	200.7	60.2	-150.1	281.5
Pos. 2 Upper Neck Fz	N	1929.9	70.9	-651.1	102.2
Pos. 2 Neck Force Result	N	1938.9	70.9	1.4	-55.0
Pos. 2 Upper Neck Mx	N-m	8.3	67.7	-19.8	60.2
Pos. 2 Upper Neck My	N-m	40.7	128.5	-15.9	226.8
Pos. 2 Upper Neck Mz	N-m	13.8	113.6	-7.6	160.2
Pos. 2 Neck Moment Result	N-m	41.6	128.0	0.0	-47.8
Pos. 1 Pelvic (X)	g's	2.8	130.5	-89.1	42.9
Pos. 1 Pelvic (Y)	g's	7.6	56.7	-11.5	37.3
Pos. 1 Pelvic (Z)	g's	5.9	43.7	-28.5	96.2
Pos. 1 Pelvic (R)	g's	89.3	42.9	0.0	-63.0
Pos. 2 Pelvic (X)	g's	1.4	139.3	-100.6	47.1
Pos. 2 Pelvic (Y)	g's	15.2	43.5	-13.9	60.0
Pos. 2 Pelvic (Z)	g's	7.8	41.9	-26.5	104.6
Pos. 2 Pelvic (R)	g's	100.7	47.1	0.0	-60.1

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
HYBRID III LOWER LEG DATA SHEET

Vehicle Year/Make/Model/Body Style: 1999 Jeep Grand Cherokee 4-Door MPV

NHTSA Test No.: MX0307 Test Date: March 9, 1999

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
P1 Lt Upper Tibia Mx	N-m	19.0	137.2	-45.2	46.5
P1 Lt Upper Tibia My	N-m	18.1	64.6	-81.5	44.6
P1 Lt Lower Tibia Fz	N	748.1	55.5	-2408.6	98.2
P1 Lt Lower Tibia Mx	N-m	30.0	51.4	-34.5	103.1
P1 Lt Lower Tibia My	N-m	60.8	101.0	-75.1	45.5
P1 Rt Upper Tibia Mx	N-m	47.0	53.9	-38.2	39.7
P1 Rt Upper Tibia My	N-m	48.5	58.3	-82.6	38.2
P1 Rt Lower Tibia Fz	N	145.9	153.0	-4062.1	50.0
P1 Rt Lower Tibia Mx	N-m	*	*	*	*
P1 Rt Lower Tibia My	N-m	111.7	50.3	-106.0	39.3
Pos. 2 Lt Upper Tibia Mx	N-m	46.8	43.5	-63.7	55.0
Pos. 2 Lt Upper Tibia My	N-m	259.7	47.4	-117.0	36.4
Pos. 2 Lt Lower Tibia Fz	N	99.0	253.6	-2856.0	43.9
Pos. 2 Lt Lower Tibia Mx	N-m	130.4	45.8	-64.2	88.8
Pos. 2 Lt Lower Tibia My	N-m	96.1	36.0	-141.2	47.3
Pos. 2 Rt Upper Tibia Mx	N-m	17.7	89.5	-86.3	42.1
Pos. 2 Rt Upper Tibia My	N-m	88.7	50.5	-170.6	40.3
Pos. 2 Rt Lower Tibia Fz	N	763.1	46.6	-3330.0	40.4
Pos. 2 Rt Lower Tibia Mx	N-m	48.2	41.6	-52.5	89.5
Pos. 2 Rt Lower Tibia My	N-m	97.5	41.0	-29.1	83.6

* Did not record

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
HYBRID III ANKLE DATA SHEET

Vehicle Year/Make/Model/Body Style: 1999 Jeep Grand Cherokee 4-Door MPV
 NHTSA Test No.: MX0307 Test Date: March 9, 1999

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
Pos. 1 Left Ankle X	g's	13.0	100.3	-30.3	44.3
Pos. 1 Left Ankle Z	g's	*	*	*	*
Pos. 1 Left Toe Z	g's	3.9	78.0	-28.4	44.1
Pos. 1 Right Ankle X	g's	44.5	49.4	-116.7	39.1
Pos. 1 Right Ankle Z	g's	5.7	73.5	-41.7	36.8
Pos. 1 Right Toe Z	g's	62.2	42.7	-316.5	37.1
Pos. 2 Left Ankle X	g's	74.2	46.5	-212.0	41.2
Pos. 2 Left Ankle Z	g's	36.1	55.0	-86.2	45.4
Pos. 2 Left Toe Z	g's	119.2	33.1	-172.7	38.7
Pos. 2 Right Ankle X	g's	17.1	55.5	-201.1	41.4
Pos. 2 Right Ankle Z	g's	47.4	39.5	-59.1	46.5
Pos. 2 Right Toe Z	g's	**	**	**	**

* Did not record

** Data not accurate after 40 ms.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
REDUNDANT DUMMY DATA

NHTSA Test No.: MX0307 Vehicle: 1999 Jeep Grand Cherokee 4-Door MPV

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
Pos. 1 Head X(R)	g's	3.7	103.3	-110.4	78.9
Pos. 1 Head Y(R)	g's	2.6	191.1	-26.0	77.1
Pos. 1 Head Z(R)	g's	30.3	48.8	-27.4	77.2
Pos. 1 Head Resultant(RR)	g's	112.9	78.9	0.0	12.4
Pos. 2 Head X(R)	g's	*	*	*	*
Pos. 2 Head Y(R)	g's	5.6	62.8	-11.3	59.3
Pos. 2 Head Z(R)	g's	**	**	**	**
Pos. 2 Head Resultant(RR)	g's	**	**	**	**
Pos. 1 Chest X(R)	g's	2.3	146.7	-61.6	76.6
Pos. 1 Chest Y(R)	g's	9.3	64.3	-6.7	42.9
Pos. 1 Chest Z(R)	g's	24.6	65.8	-23.5	100.3
Pos. 1 Chest Resultant(RR)	g's	62.2	76.6	0.0	-60.4
Pos. 2 Chest X(R)	g's	2.6	151.7	-55.8	62.7
Pos. 2 Chest Y(R)	g's	9.5	81.7	-5.6	119.8
Pos. 2 Chest Z(R)	g's	23.7	69.7	-22.1	104.5
Pos. 2 Chest Resultant(RR)	g's	58.0	62.7	0.0	-10.2

* Data is not accurate after 80 ms.

** Data is not accurate.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
REDUNDANT DUMMY DATA

NHTSA Test No.: MX0307 Vehicle: 1999 Jeep Grand Cherokee 4-Door MPV

HEAD INJURY CRITERIA (HIC) REDUNDANT				
	HIC**	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	984.6	59.5	87.2	66.1
Position #2 - Passenger	***	***	***	***

** HIC is as defined in FMVSS 208. The maximum time interval from t₁ to t₂ is 36 milliseconds.

*** The passenger redundant HIC calculation could not be performed due to inaccurate data.

CLIP SUMMARY* REDUNDANT				
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #1 - Driver	52.5	65.4	68.4	612.9
Position #2 - Passenger	55.6	61.9	64.9	618.5

* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

DATA SHEET NO. 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

Belt length from trim panel exit
to bolt hole anchor point for
continuous webbing systems.

Driver

Passenger

2200

2200

Shoulder belt length as measured
on Part 572 Dummy.

890

890

Lap belt length as measured
on Part 572 Dummy.

915

915

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis.

203.2

225.4

As determined mechanically.

197.0

245.0

As determined electronically.

232.3

286.0

BELT STRETCH DATA:

Measured electronically between shoulder
belt load cell and the "D" ring.

0 mm

1 mm

Measured mechanically.

0.3 mm/M

1.3 mm/M

Dimensions in millimeters

DATA SHEET NO.10 SUMMARY OF FMVSS 212 DATA

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place and covered with 22 mm molding.

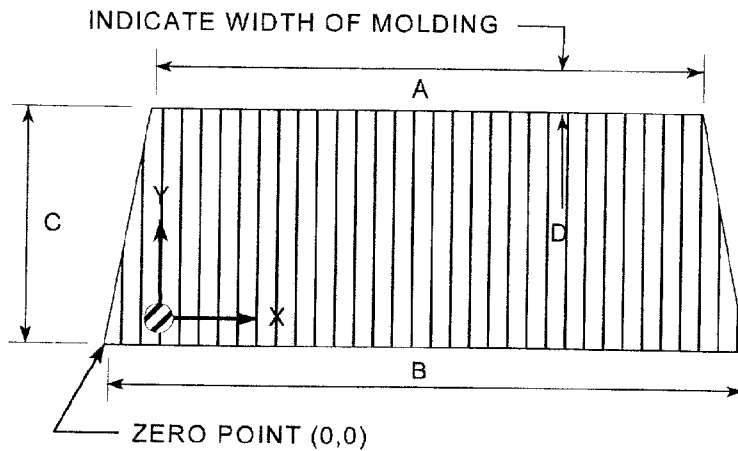
FMVSS 212 REQUIREMENTS:

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants,

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		
	PRE-TEST (mm)	POST-TEST(mm)	% OF RETENTION
RIGHT SIDE	2112.5	2112.5	100
LEFT SIDE	2112.5	2112.5	100
TOTAL	4225.0	4225.0	100

AREA OF RETENTION FAILURE: None



DIMENSIONS (mm)	
A	1295
B	1600
C	665
D	22

FRONT VIEW OF WINDSHIELD

FAILURE DETAILS: None.

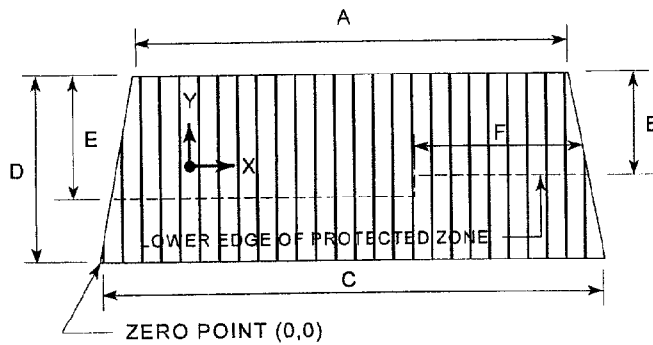
DATA SHEET NO. 11 FMVSS NO. 219 (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 165 mm diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. The locus of points is drawn on the inner surface of the windshield contacted by the sphere across the width of the instrument panel. From the outermost contactable points extend the locus line horizontally to the edges of the windshield, then draw a line on the inner surface of the windshield below and 13 mm distant from the locus line. The **LOWER EDGE OF THE PROTECTED ZONE** is the longitudinal projection of this line onto the outer surface of the windshield.

FMVSS 219 TEST DATA:

(Dimensions in mm)



FRONT VIEW OF WINDSHIELD

DIMENSIONS	
A	1295
B	412
C	1600
D	665
E	466
F	665

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

(Show location of penetration on the above sketch)

	COORDINATES	
	X	Y
1.	-	-
2.	-	-
3.	-	-
4.	-	-

DATA SHEET NO. 12 FMVSS NO. 301-75 "FUEL SYSTEM INTEGRITY" POST IMPACT TEST DATA

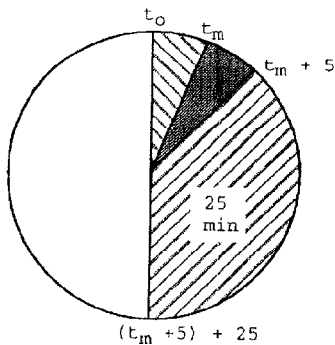
NHTSA TEST No.: MX0307 TEST DATE: March 9, 1999
 VEHICLE MAKE/MODEL: 1999 Jeep Grand Cherokee

The test vehicle was filled from 92% to 94% of the manufacture's "usable" capacity. The electric fuel pump was operating if it will operate without engine operation. Two Part 572 anthropomorphic test devices were located at each of the front designated seating positions.

=====

TEST VEHICLE IMPACT TYPE: X Frontal (56 kph)
- Oblique (48 kph) with _____ deg. barrier face first
 contacting _____
 (driver/passenger) side
- Rear Moving Barrier (48 kph)
- Lateral Moving Barrier (32 kph)

FUEL SPILLAGE MEASUREMENT:



1. From impact until vehicle motion ceases
2. For 5 minute period after vehicle motion ceases
3. For next 25 minutes

ACTUAL	MAX ALLOWED
0	28 g
0	141 g
0	28 g/min.

SOLVENT SPILLAGE DETAILS: None

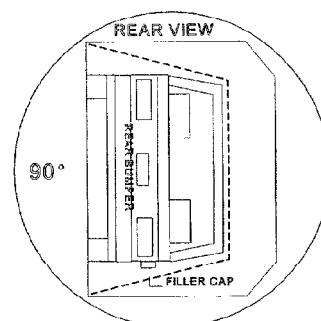
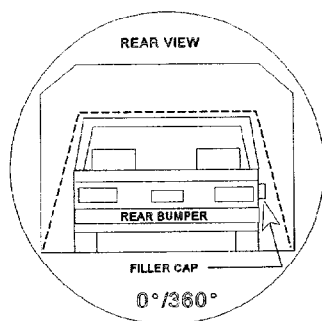
DATA SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

0-90 deg.

NHTSA Test No.:

MX0307



INDETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90 deg. Rotation Time
(Spec. Range = 1 to 3 minutes)

1 minutes

13 seconds

FMVSS 301 Position Hold Time +

5 minutes

00 seconds

TOTAL

6 minutes

13 seconds

Next whole minute interval

7 minutes

00 seconds

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min. from onset of rotation	6th min.	7th min.	8th min. if reqd.
-------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

141 g	28 g	28 g	28 g
-------	------	------	------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATION(S): None.

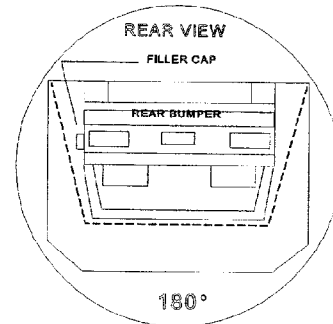
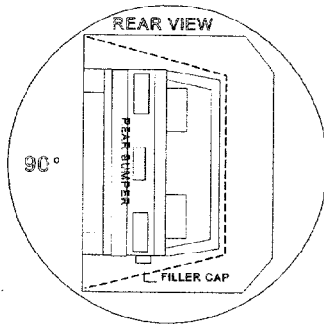
TEST SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:

90-180 deg.

NHTSA Test No.:

MX0307



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90 deg. Rotation Time
(Spec. Range = 1 to 3 minutes)

1 minutes 11 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

TOTAL

6 minutes 11 seconds

Next whole minute interval

7 minutes 00 seconds

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min. from onset of rotation	6th min.	7th min.	8th min. if reqd.
-------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

141 g	28 g	28 g	28 g
-------	------	------	------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATION(S): None

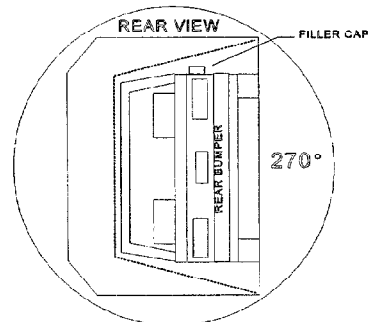
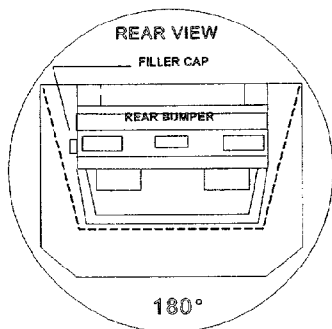
TEST SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:

180-270 deg.

NHTSA Test No.:

MX0307



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90 deg. Rotation Time
(Spec. Range = 1 to 3 minutes)

1 minutes 03 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

TOTAL

6 minutes 3 seconds

Next whole minute interval

7 minutes 00 seconds

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min. from onset of rotation	6th min.	7th min.	8th min. if reqd.
-------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

141 g	28 g	28 g	28 g
-------	------	------	------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

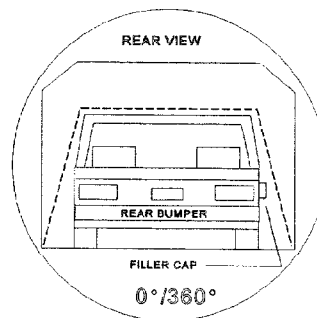
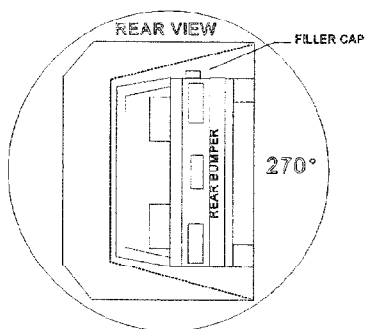
Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S): None

TEST SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:
270-360 deg.

NHTSA Test No.:
MX0307



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90 deg. Rotation Time
(Spec. Range = 1 to 3 minutes)

1 minutes 09 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

TOTAL

6 minutes 9 seconds

Next whole minute interval

7 minutes 00 seconds

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min. from onset of rotation	6th min.	7th min.	8th min. if reqd.
-------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

141 g	28 g	28 g	28 g
-------	------	------	------

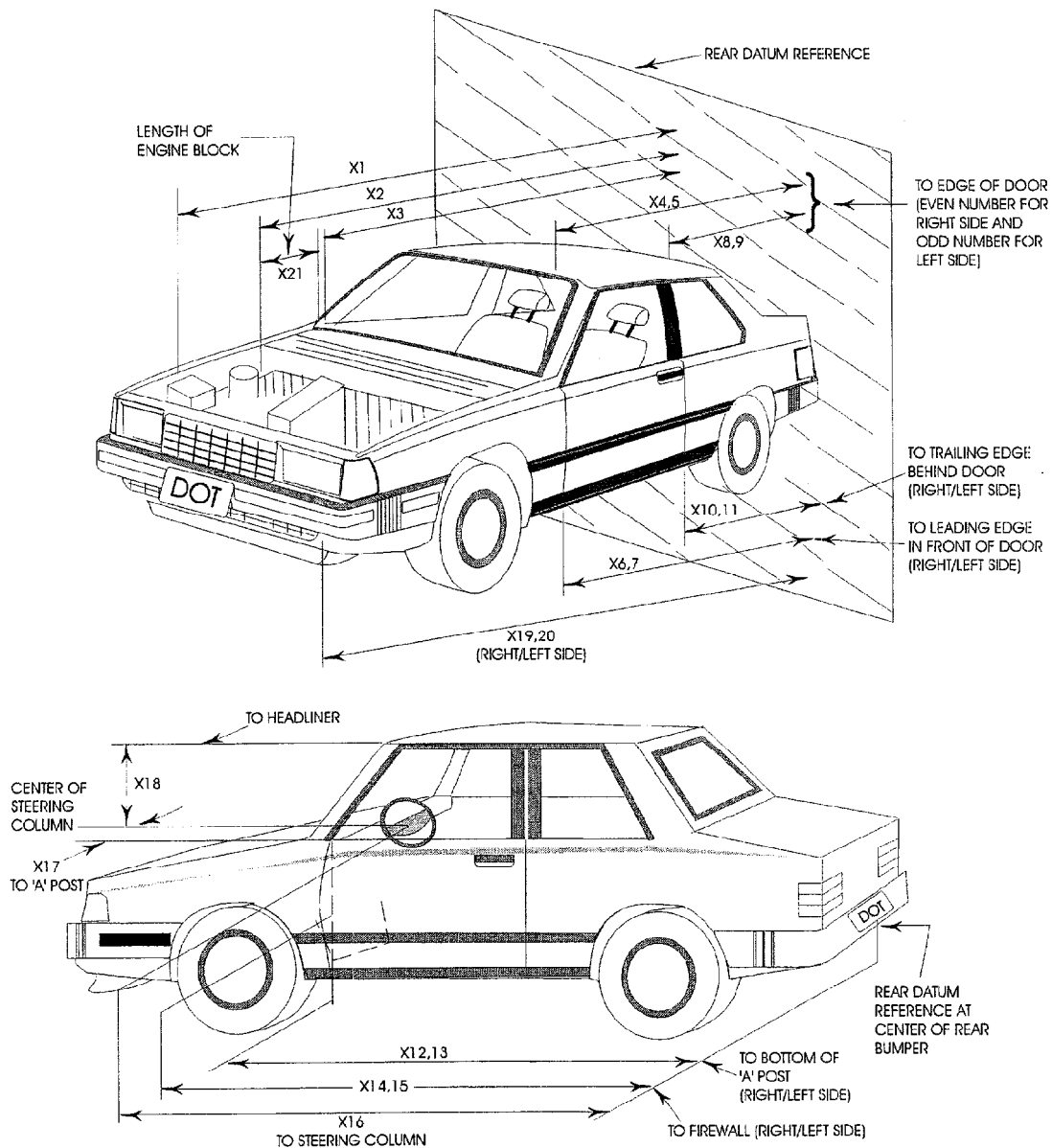
III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATION(S): None

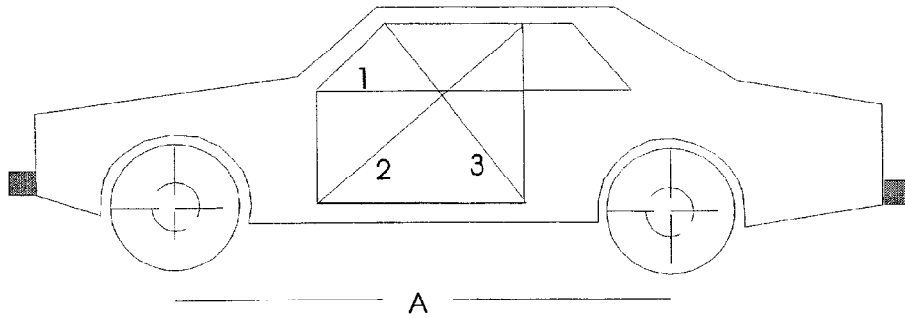
TEST VEHICLE MEASUREMENTS



DATA SHEET NO.14 VEHICLE MEASUREMENTS

No.		All Dimensions in mm		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	4725	4169	556
X2	Rear Surface of Vehicle to Front of Engine	4052	3792	260
X3	Rear Surface of Vehicle to Firewall	3576	3378	198
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3239	3217	22
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3231	3192	39
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3195	3132	63
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3180	3081	99
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2152	2136	16
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2139	2116	23
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2121	2068	53
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2104	2032	72
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3321	3245	76
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3288	3174	114
X14	Rear Surface of Vehicle to Firewall, Right Side	3560	3459	101
X15	Rear Surface of Vehicle to Firewall, Left Side	3553	3427	126
X16	Rear Surface of Vehicle to Steering Column	2709	2696	13
X17	Center of Steering Column to "A" Post	317	286	31
X18	Center of Steering Column to Headliner	417	333	84
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4622	4171	451
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4622	4102	520
X21	Length of Engine Block	635	635	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2975	2953	22
CD	Rear Surface of Vehicle to Center of Dash Panel	2970	2921	49
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2968	2915	53

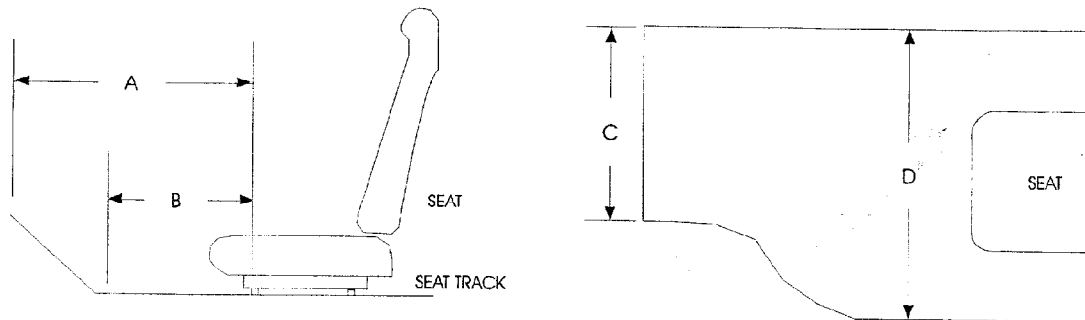
DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
VEHICLE INTRUSION MEASUREMENTS
DOOR OPENING WIDTH



UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	971.6	1452.1	1082.5	994.7	1495.0	1076.0
AFTER TEST	972.0	1480.8	1104.4	985.3	1497.0	1095.5
DIFFERENCE	-0.4	-28.8	-21.9	9.4	-2.0	-19.5

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2701.9	2699.4
AFTER TEST	2572.4	2659.0
DIFFERENCE	129.5	40.4

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
VEHICLE INTRUSION MEASUREMENTS
STATIC FOOTWELL DEFORMATION



DRIVER

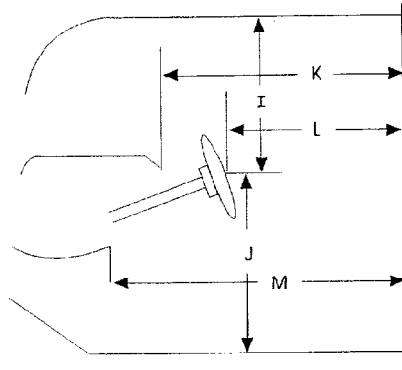
Measurement	Pre-Test	Post-Test	Difference
A	650.5	641.8	8.7
B	580.1	537.1	43.0
C	337.1	350.9	-13.8
D	277.3	277.8	-0.5

PASSENGER

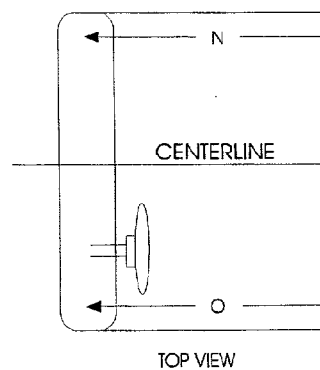
Measurement	Pre-Test	Post-Test	Difference
A	695.8	635.4	60.4
B	586.8	556.5	30.3
C	289.9	308.6	-18.7
D	404.7	390.7	14.0

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
VEHICLE INTRUSION MEASUREMENTS
STATIC PASSENGER COMPARTMENT INTRUSION

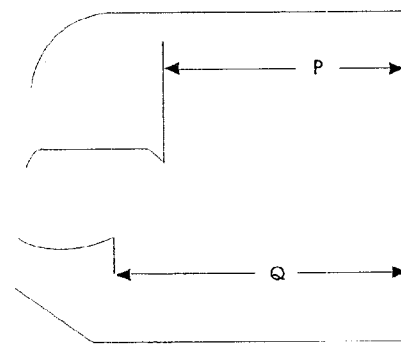


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE

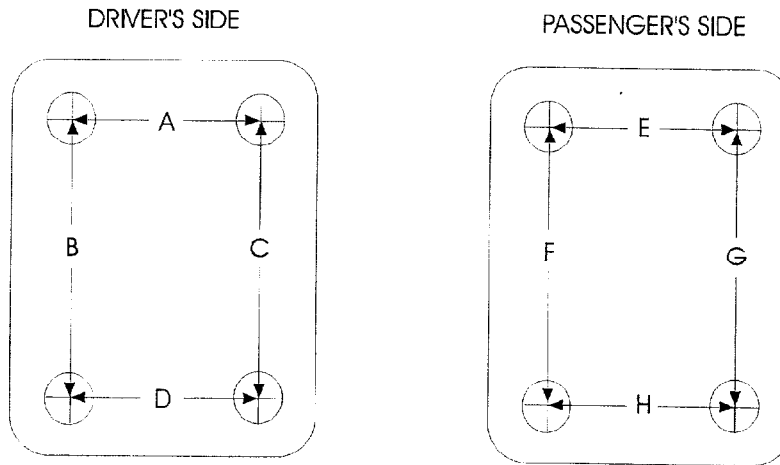


PASSENGER'S SIDE

Measurement	Pre-Test	Post-Test	Difference
I	417.2	332.2	85.0
J	661.9	783.2	-121.3
K	750.2	747.0	3.2
L	518.9	544.5	-25.6
M	783.3	756.1	27.2
N	746.0	747.4	-1.4
O	748.7	716.9	31.8
P = K (PASS.)	749.3	718.3	31.0
Q = M (PASS.)	820.4	805.4	15.0

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
FLOORBOARD DEFORMATION

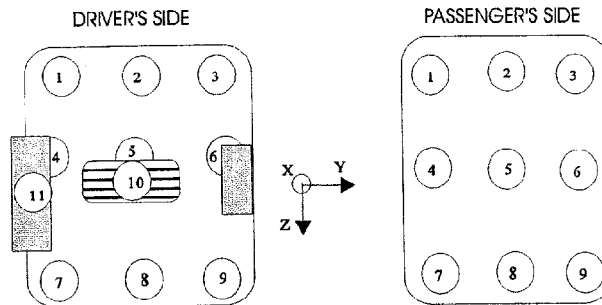


TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	94	88	6
B	305	298	7
C	305	300	5
D	79	79	0
E	98	98	0
F	304	304	0
G	306	306	0
H	94	94	0

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
TOE-PAN INTRUSION



Driver Side Floorpan Measurements

Reference: X = Rear Bumper; Z = Ground

Floorpan Location	X Deformation			Z Deformation		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3369.3	3201.5	167.8	-607.6	-381.3	-226.3
2	3334.8	3223.9	110.9	-552.9	-374.2	-178.7
3	3339	3203.6	135.4	-534.1	-357.7	-176.4
4	3340	3177.8	162.2	-528.7	-339.5	-189.2
5	3277.5	3191.7	85.8	-471.6	-324.6	-147.0
6	3240	3160.7	79.3	-454.5	-292.1	-162.4
7	3240.6	3091.4	149.2	-461	-276.0	-185.0
8	3233.2	3085.8	147.4	-437.7	-267.7	-170.0
9	3209	3080.9	128.1	-424.2	-256.2	-168.0
10	3208.7	3124.1	84.6	-622.3	-374.7	-247.6
11	3271	3053.9	217.1	-570.2	-429.6	-140.6

Passenger Side Floorpan Measurements

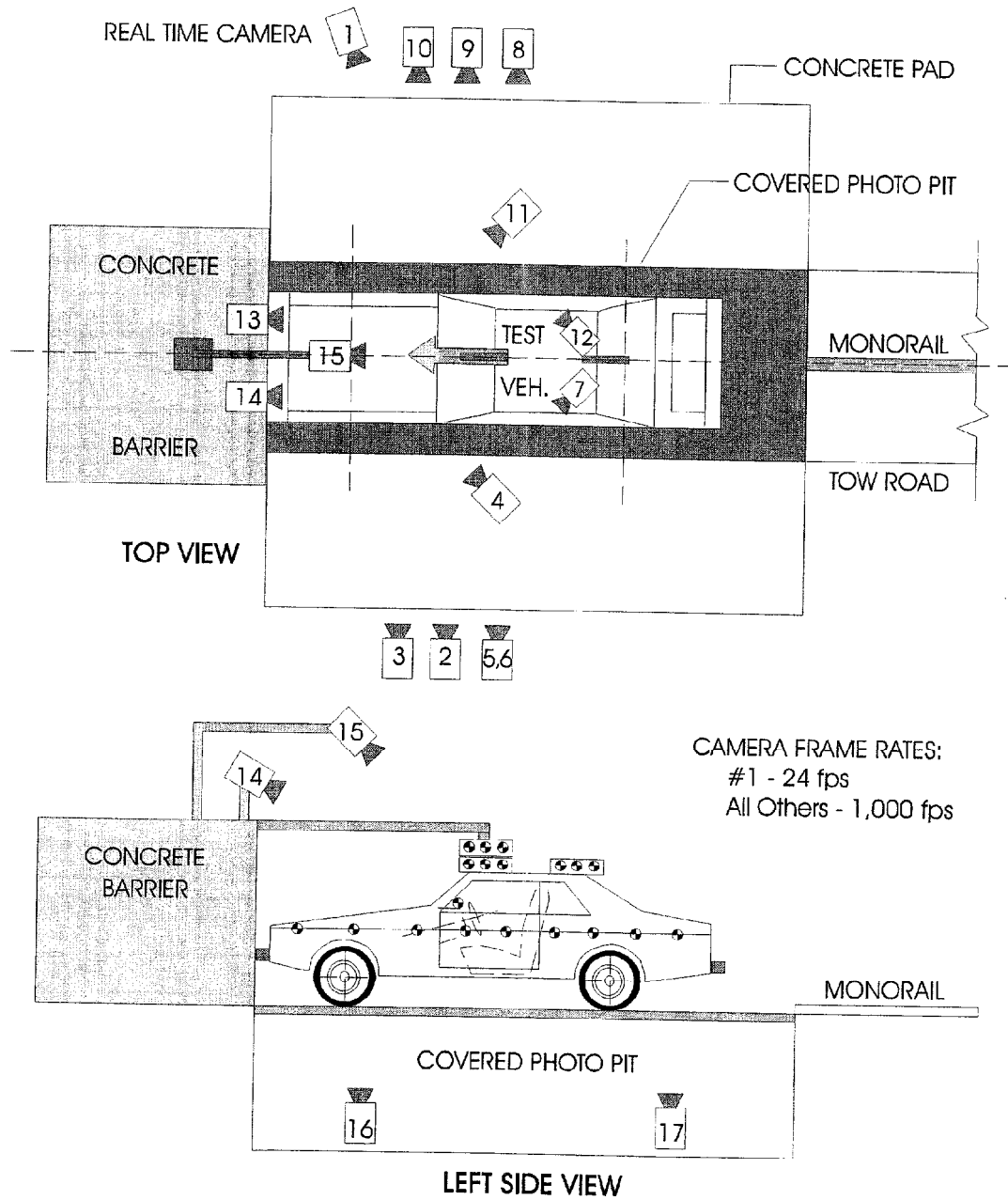
Reference: X = Rear Bumper; Z = Ground

Floorpan Location	X Deformation			Z Deformation		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3396.1	3214.4	181.7	-636.2	-459.2	-177.0
2	3399	3224.4	174.6	-626.9	-459.0	-167.9
3	3400.1	3245.4	154.7	-662.2	-473.3	-188.9
4	3340.6	3188.1	152.5	-541.5	-392.5	-149.0
5	3349.6	3212.5	137.1	-542.5	-385.9	-156.6
6	3366.3	3223.7	142.6	-552.9	-379.2	-173.7
7	3285.2	3134.5	150.7	-500	-325.3	-174.7
8	3305.6	3170.8	134.8	-505.3	-329.0	-176.3
9	3319.3	3188.9	130.4	-510.4	-330.7	-179.7

Units in mm

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera information shown in DATA SHEET NO. 15.



DATA SHEET NO.15 HIGH-SPEED CAMERA LOCATIONS

NHTSA Test No.:

MX0307

Vehicle:

1999 Jeep Grand Cherokee 4-Door MPV

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	6980	1597	1041	-2	6676	12.5	1000
3	Left Side View	8120	740	1085	-2	7816	25	1000
4	Driver and Interior View	4792	2896	2072	-13	-	25	1000
5	Steering Column (Bottom)	7390	1717	1174	-2	7086	25	1000
6	Steering Column (Top)	7390	1717	1774	-8	7086	25	1000
7	Left Belt	-	-	-	-	-	13	1000
8	Overall Right Side	6978	1733	1090	-4	7370	12.5	1000
9	Right Side View	8163	1125	1173	-3	8555	25	1000
10	Right Passenger View	8295	1608	1413	-2	8687	35	1000
11	Passenger and Interior View	4669	2907	1937	-10	-	25	1050
12	Right Belt	-	-	-	-	-	13	1000
13	Passenger Front View	612	-100	1985	-34	-	13	1000
14	Driver Front View	612	-100	1985	-35	-	13	1000
15	Windshield View	0	-530	3374	-52	-	13	1000
16	Pit View of Engine	0	1094	-3048	90	-	13	1000
17	Pit View of Fuel Tank	0	3578	-3048	90	-	13	1000

*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

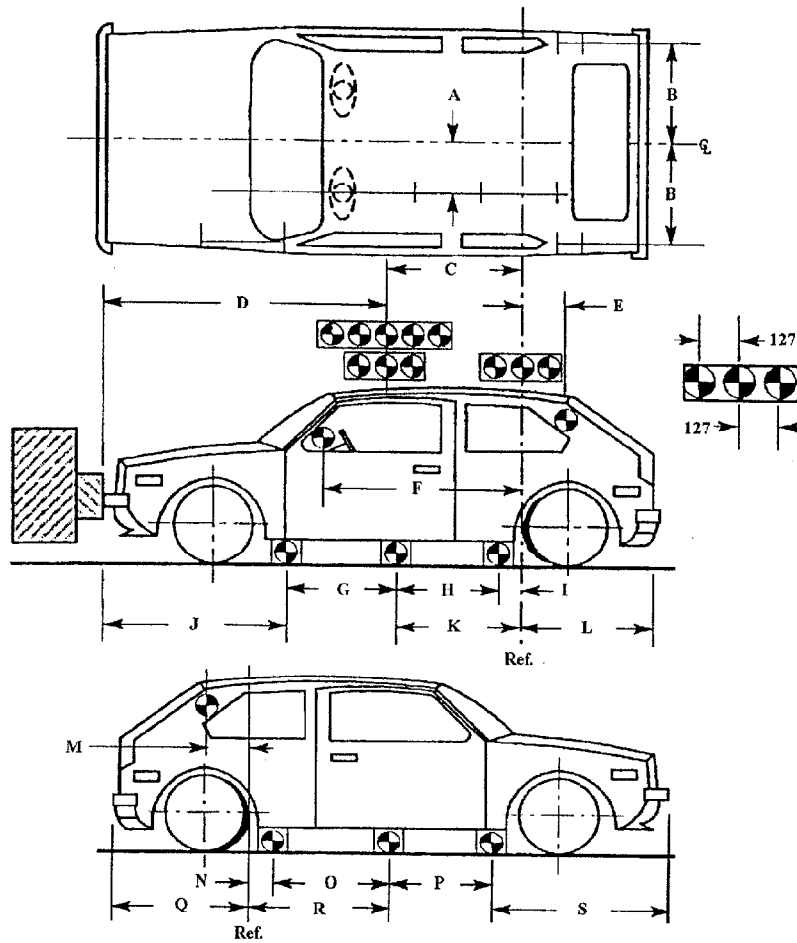
** = referenced to horizontal plane

N.T. indicates No Timing

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

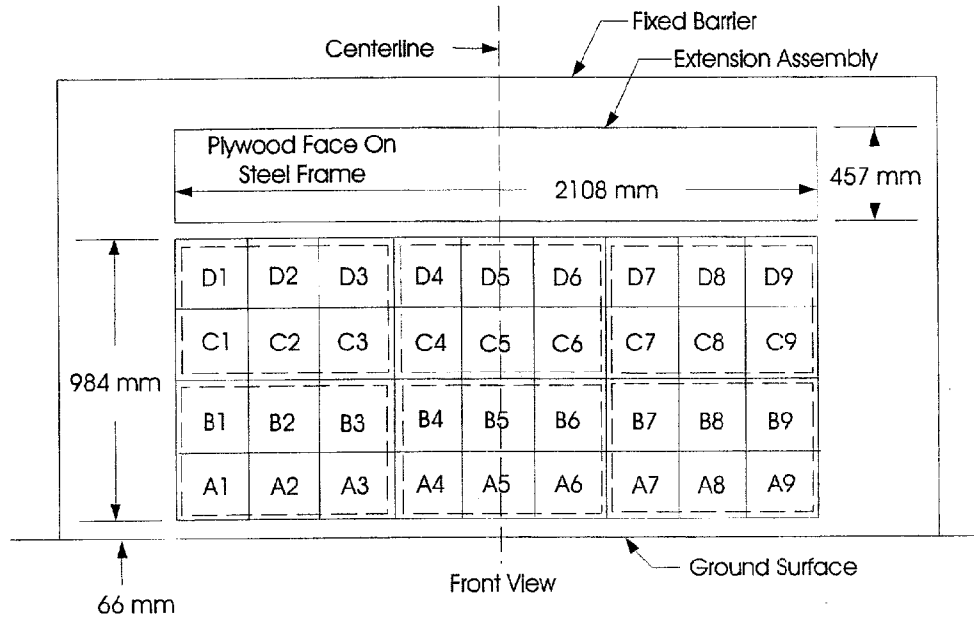
(Dimensions in millimeters)

A	392.2
B	696.5
C	1209.5
D	2069.6
E	371.9
F	1440.8
G	845.0
H	838.9
I	146.9
J	1433.8
K	985.8
L	1469.0
M	409.3
N	147.6
O	841.5
P	848.6
Q	1491.9
R	989.1
S	1404.0



DATA SHEET NO. 17 LOAD CELL LOCATIONS ON FIXED BARRIER

- 36 Load Cells
- 4 Rows
- 9 Columns
- 6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

The following data is presented in Appendix B:

- (1) Data from 36 individual load cells
- (2) Total or Sum of 36 individual load cells
- (3) Data from 6 Groupings shown above (6 cells/group)

DATA SHEET NO. 18 POST TEST AIR BAG DATA

NHTSA No. : MX0307; Test Date: March 9, 1999; Technician: P. MacDiarmid

Vehicle Model Year/Make/Model: 1999 Jeep Grand Cherokee

A. No. of vent holes: 0 -Driver 0 -Passenger

B. Size of vent holes: (mm²) - -Driver - -Passenger

C. Total vent area: (mm²) - -Driver - -Passenger

D. Deflated air bag length and width dimensions or, if round, diameter. (mm)

Driver: 450 -Height; 570 -Width; 200 -Depth

Passenger: 725 -Height; 380 -Width; 650 -Depth

E. Is the air bag tethered?

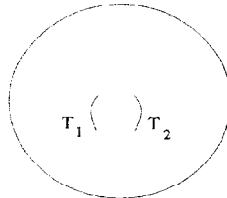
Driver: X -Yes; - -No; If yes, record length of tether- 210

Passenger: - -Yes; X -No; If yes, record length of tether- -

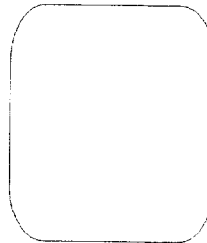
Sketch the air bag showing the location of the vent holes, how the bag is tethered, and where the bag is tethered. Also describe how the tethers are attached to the bag and the steering wheel.

(Note: Not to scale; V_n = Vent hole_n, T_n = Tether_n).

Driver



Passenger



F. Record part numbers and manufacturer name of the air bag and gas generator.

Driver: Air bag: TMK0288G2250 P119858-01H CHRYSLER 609

Generator: CAZ K22 3L EDM TAJDM0419C0271 P5FA39LA2AD CAJKZASCAJR

Passenger: Air bag: TMK0348D1401 P120415-02K 622

Generator: CAK K29 42 BOJ TAKPM040921077 P55115945AC

DATA SHEET NO.19 ACCIDENT INVESTIGATION DIVISION DATA

FOR 56.3 KPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Jeep Grand Cherokee 4-Door MPV

NHTSA Test No.: MX0307 VIN: 1J4GW68S0XC667434

Model Year: 1999 Build Date: 2-26 Test Date: March 9, 1999

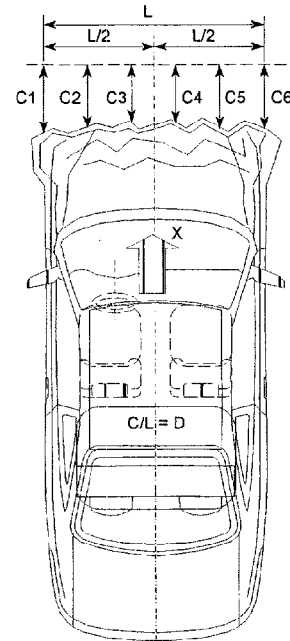
Vehicle Size Category: SUV Test Weight: 2135.0 kg

Vehicle Wheelbase: 2700 mm; Front Overhang: 1433 mm; Overall Width: 2239 mm

Collision Deformation Classification (CDC) Code: 12FDEW2

Crush Depth Dimensions:

	PRE	POST	DIFF	
C1 =	4504.0	4014.6	-489.4	mm
C2 =	4618.7	4068.5	-550.2	mm
C3 =	4667.3	4114.5	-552.8	mm
C4 =	4623.7	4147.0	-476.7	mm
C5 =	4591.4	4150.2	-441.2	mm
C6 =	4516.2	4148.6	-367.6	mm



Midpoint of Damage: $D = \frac{\text{Vehicle Centerline}}{(\text{Longitudinal})}$

Length of Damaged Region:

$L1 = \underline{1400} \text{ mm}$

$L2 = \underline{700} \text{ mm}$

$L3 = \underline{466.7} \text{ mm}$

Appendix A
PHOTOGRAPHS

PHOTOGRAPHS

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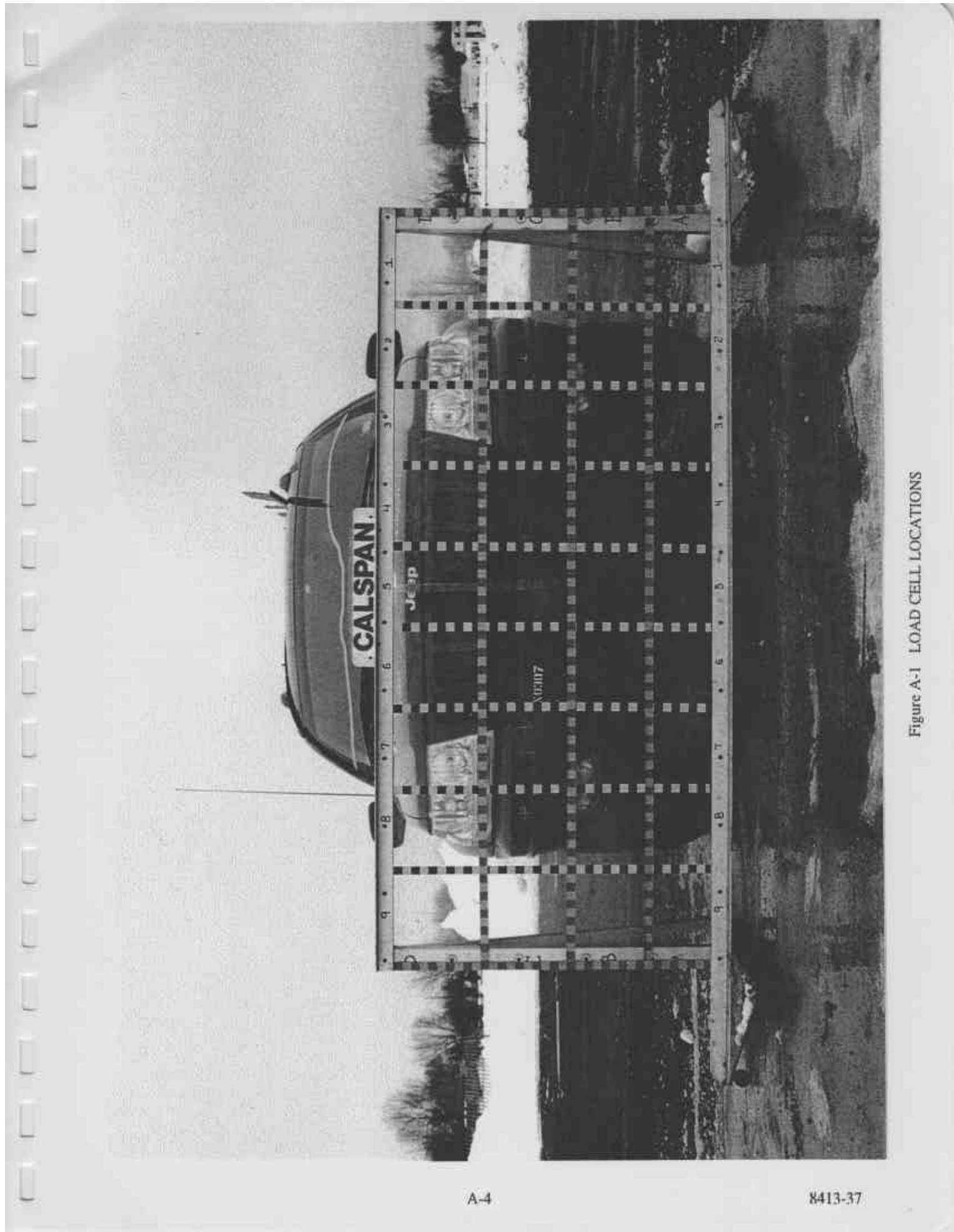


Figure A-1 LOAD CELL LOCATIONS



Figure A-2 PRE-TEST FRONT VIEW

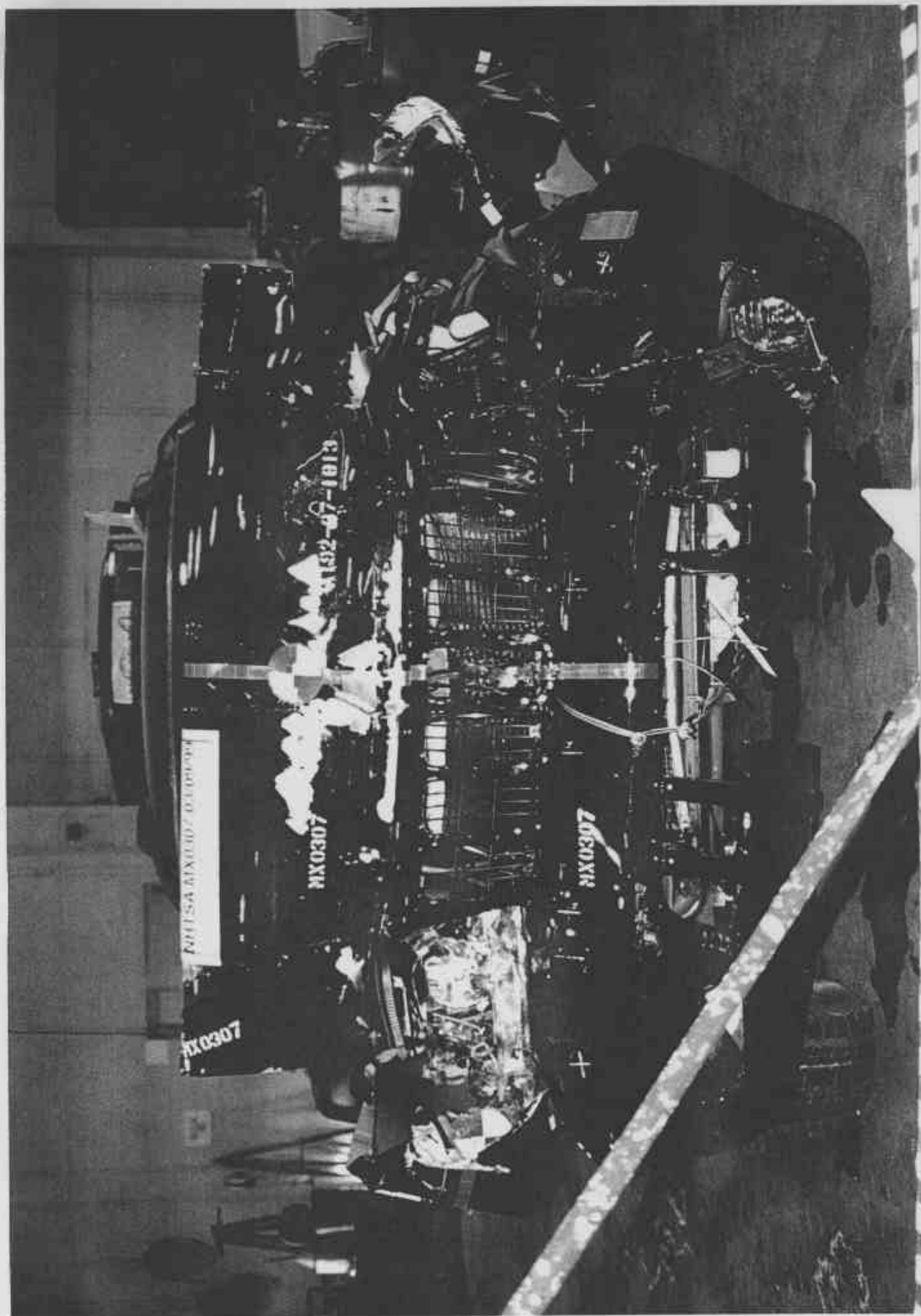


Figure A-3 POST-TEST FRONT VIEW



Figure A-4 PRE-TEST LEFT SIDE VIEW

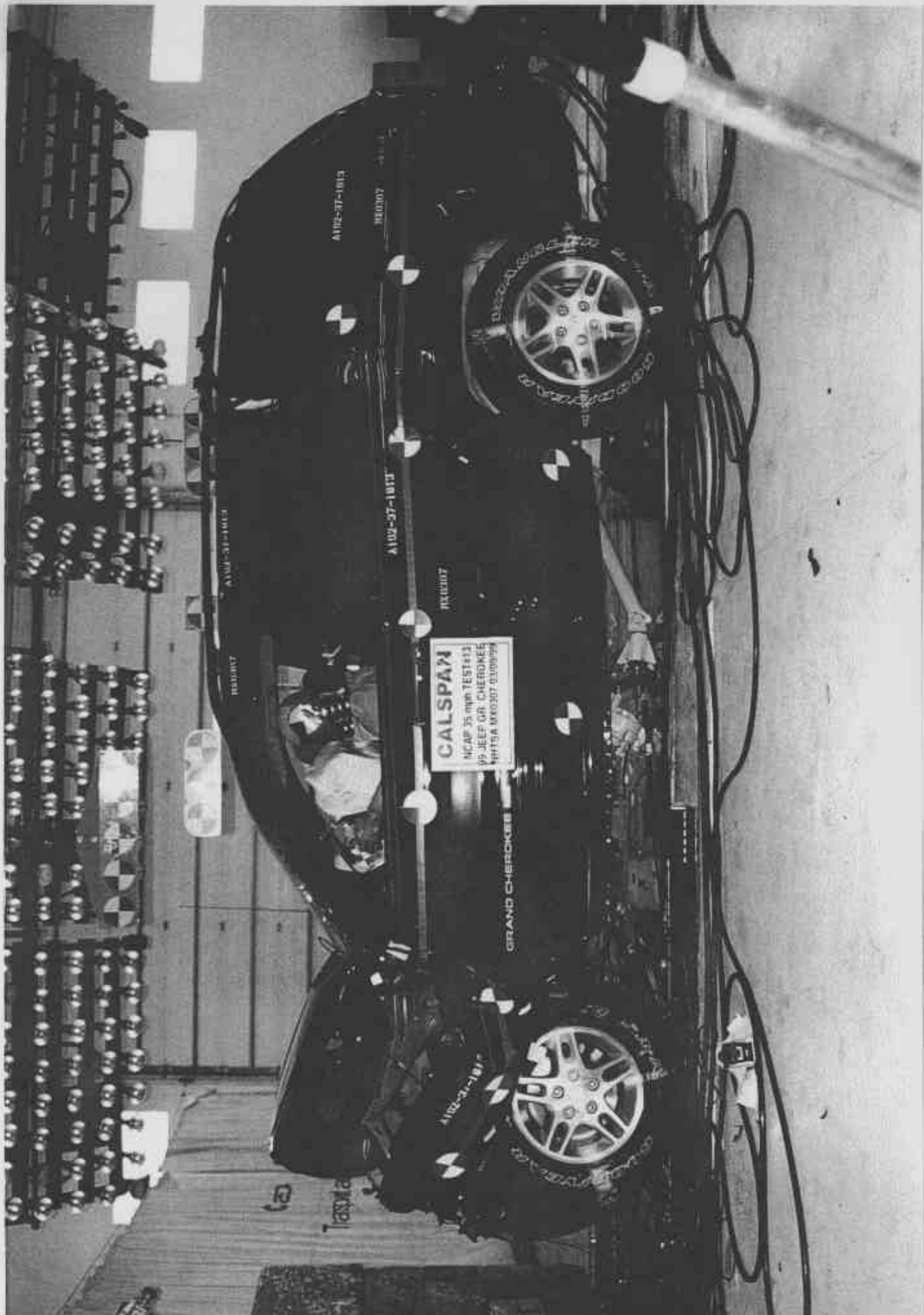


Figure A-5 POST-TEST LEFT SIDE VIEW



Figure A-6 PRE-TEST RIGHT SIDE VIEW

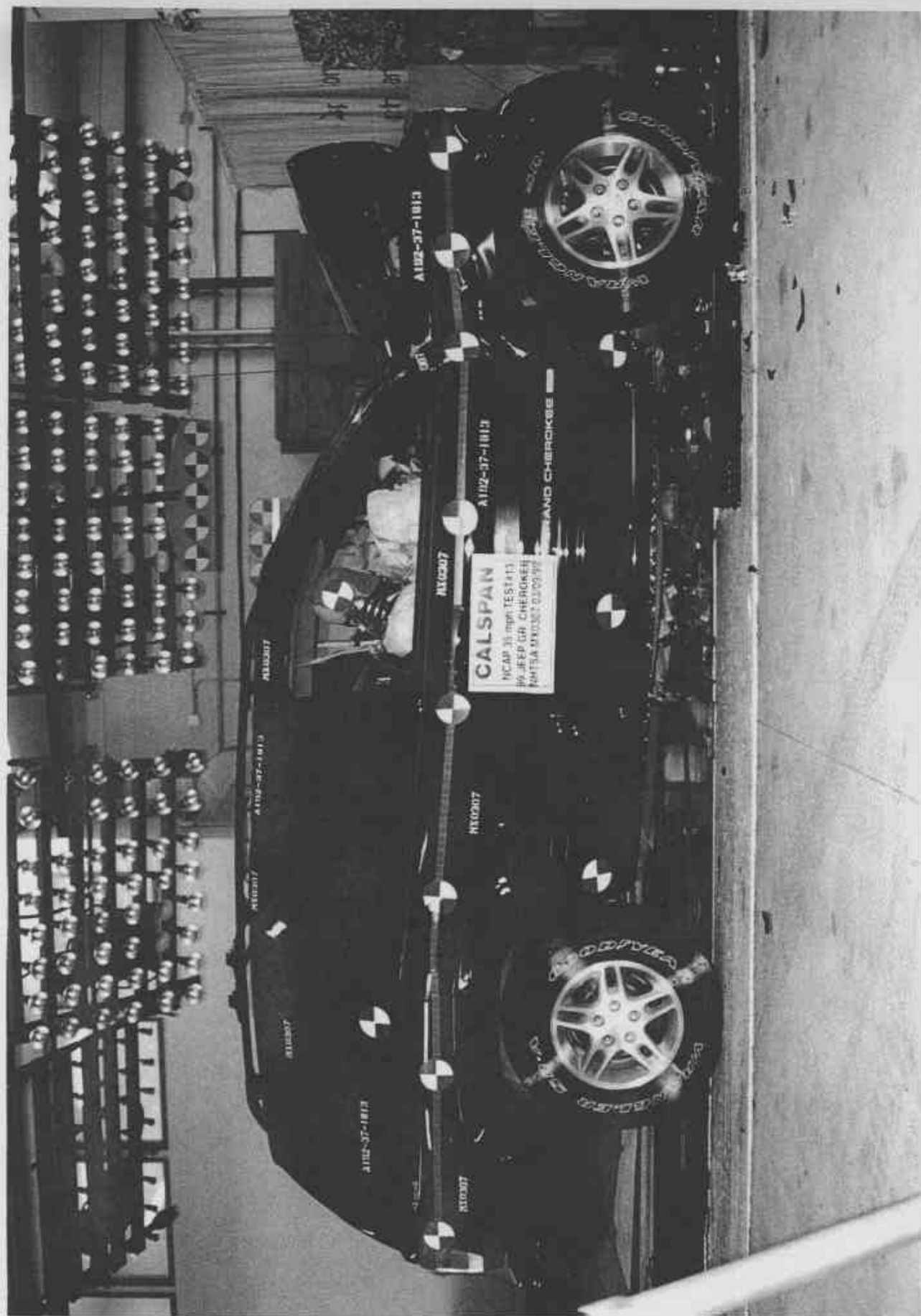


Figure A.7 POST-TEST RIGHT SIDE VIEW

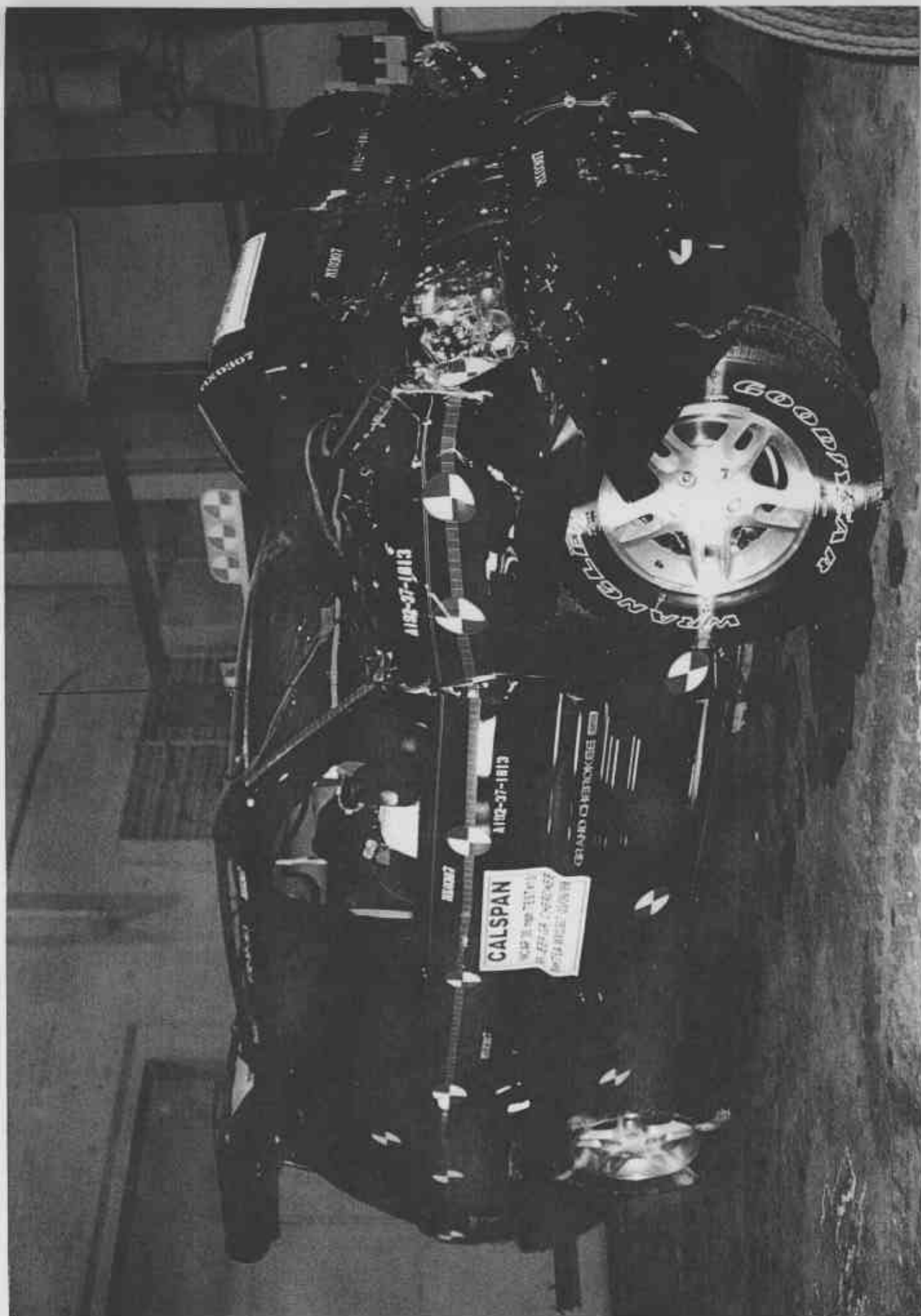


Figure A-9 POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-10 PRE-TEST LEFT REAR THREE-QUARTER VIEW

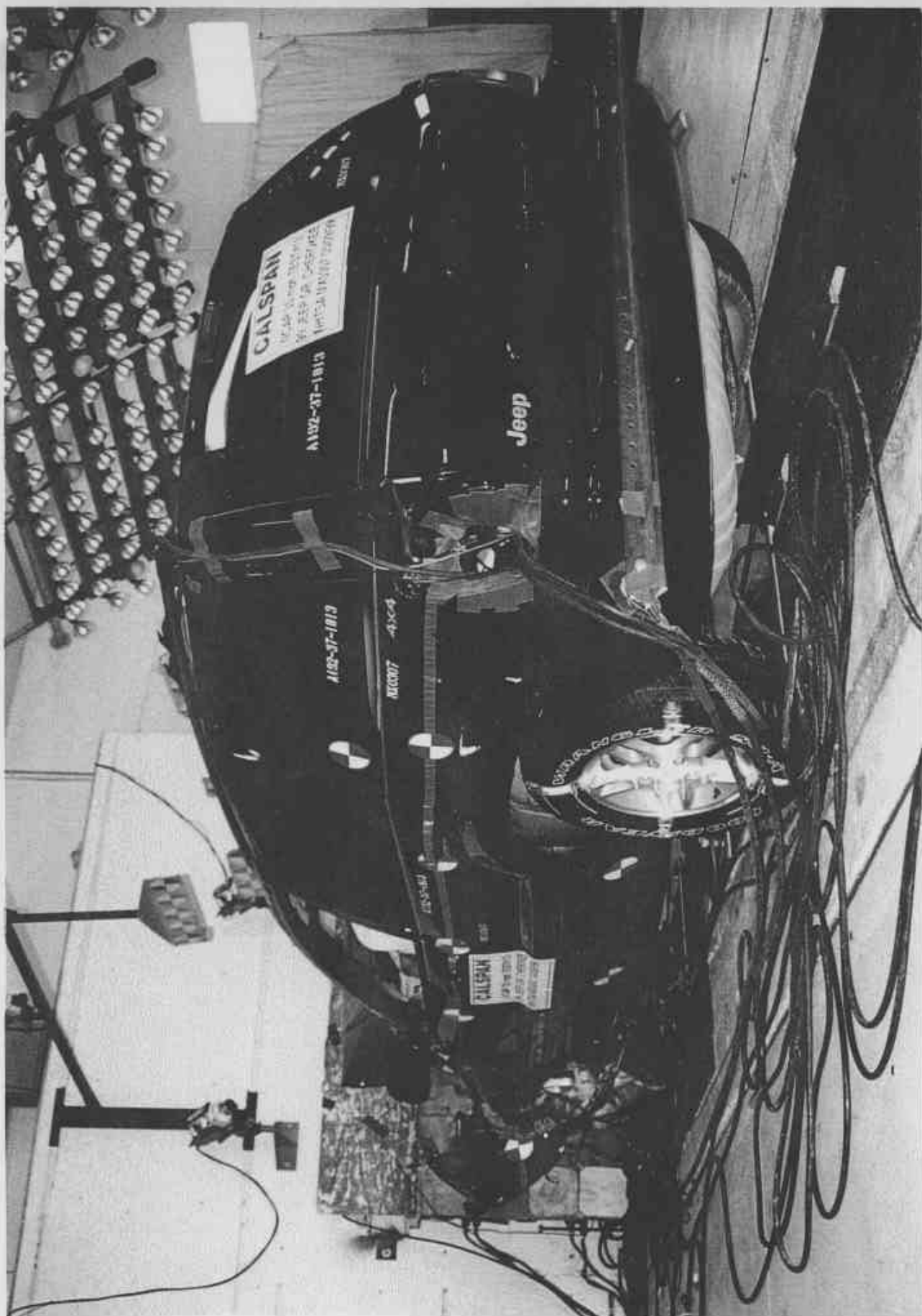


Figure A-11 POST-TEST LEFT REAR THREE-QUARTER VIEW

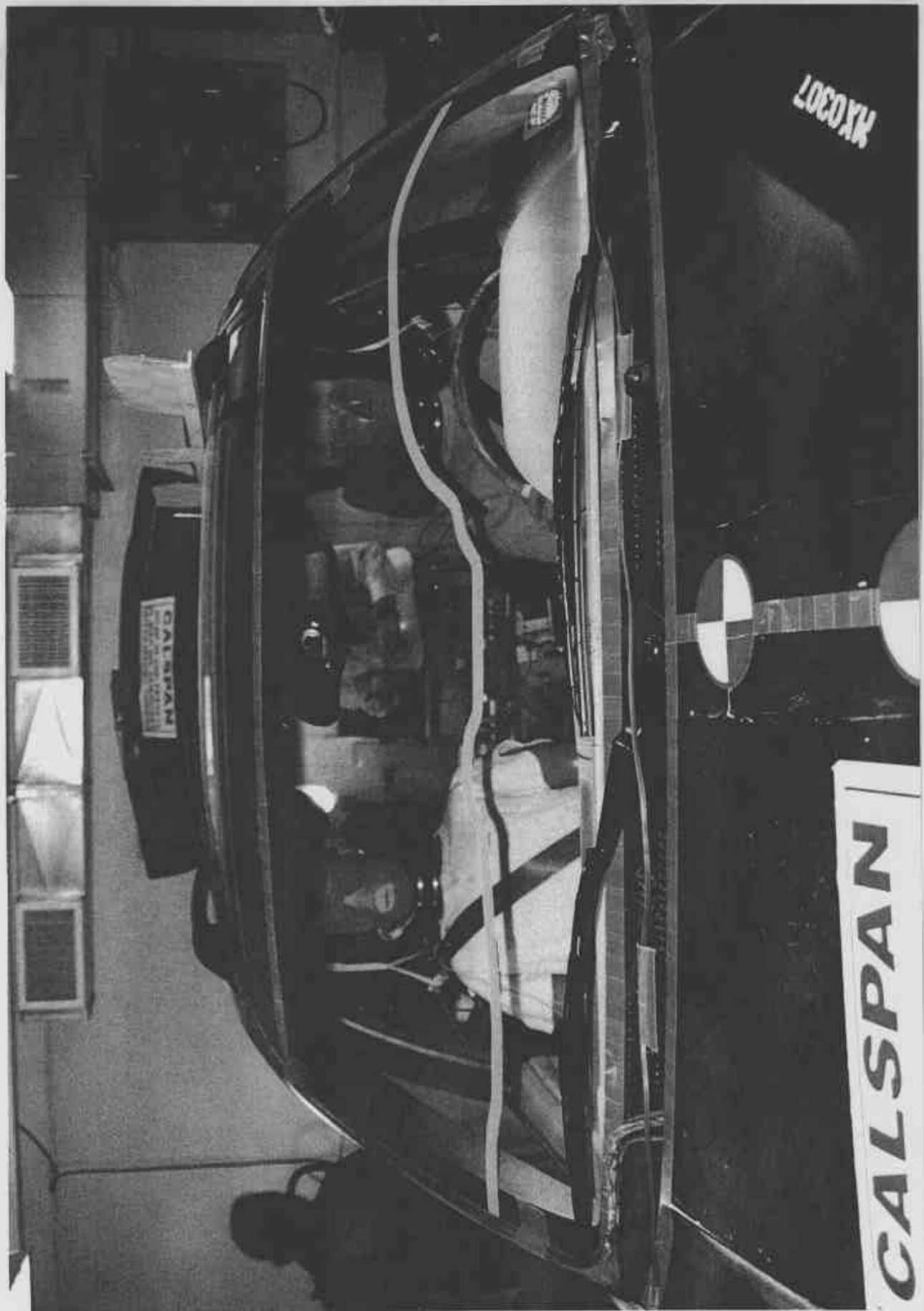


Figure A-12 PRE-TEST WINDSHIELD VIEW



Figure A-13 POST-TEST WINDSHIELD VIEW

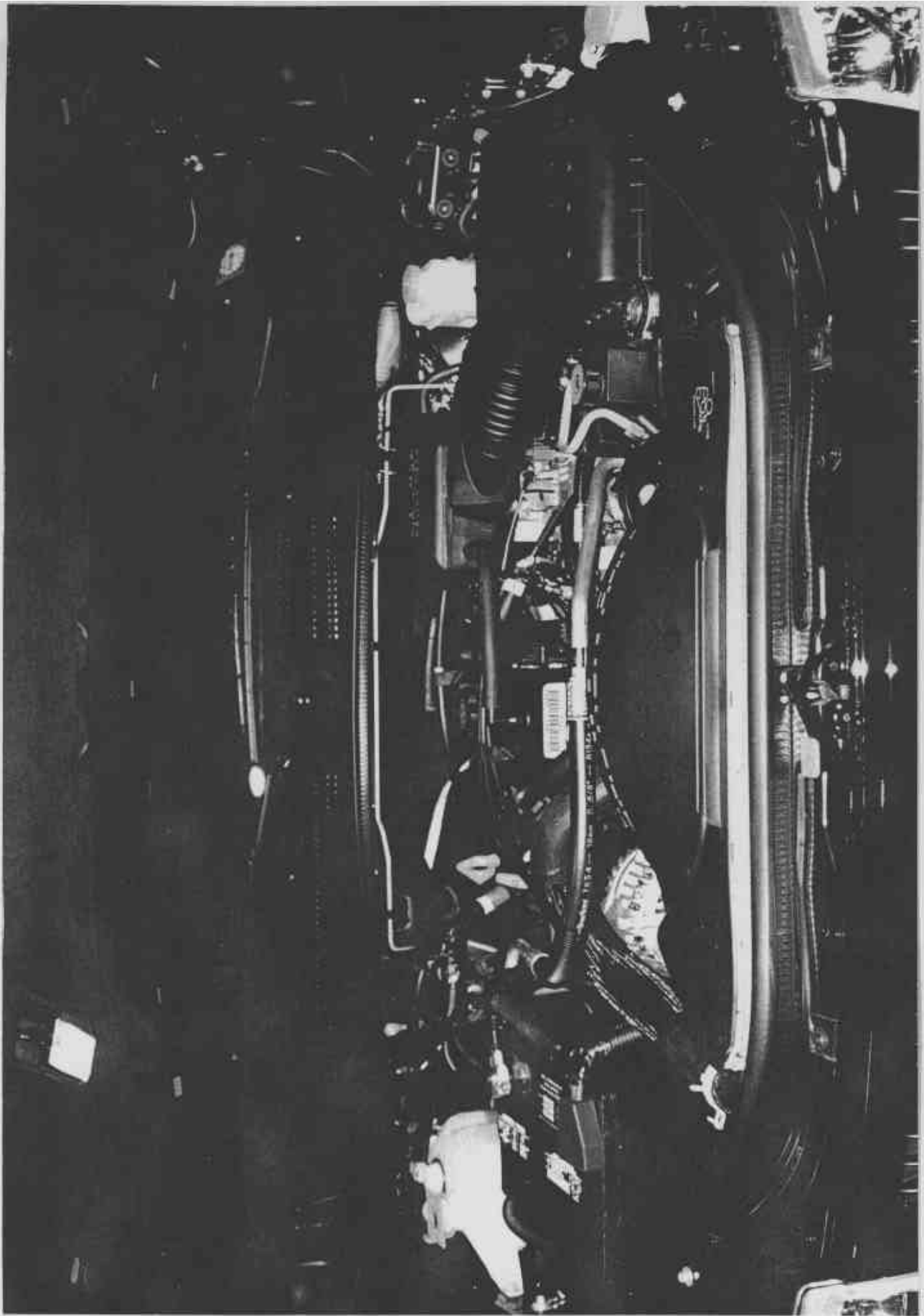


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW



Figure A-15 FUEL CAP VIEW

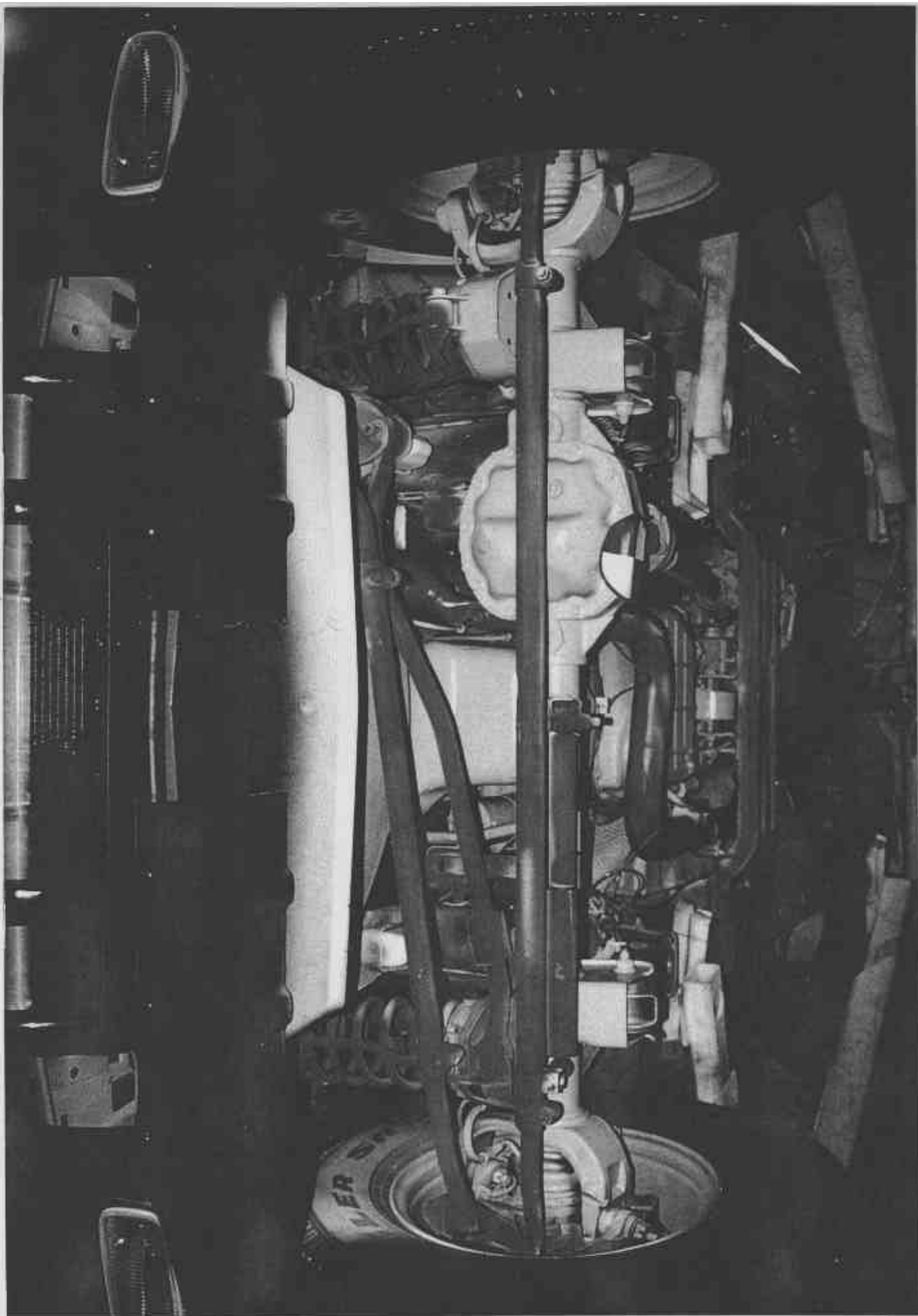


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW



Figure A-17 POST-TEST FRONT UNDERBODY VIEW



Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW



Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW



Figure A-20 PRE-TEST REAR UNDERBODY VIEW



Figure A-21 POST-TEST REAR UNDERBODY VIEW



Figure A-22 PRE-TEST DRIVER POSITION VIEW



Figure A-23 POST-TEST DRIVER POSITION VIEW



Figure A-24 PRE-TEST PASSENGER POSITION VIEW

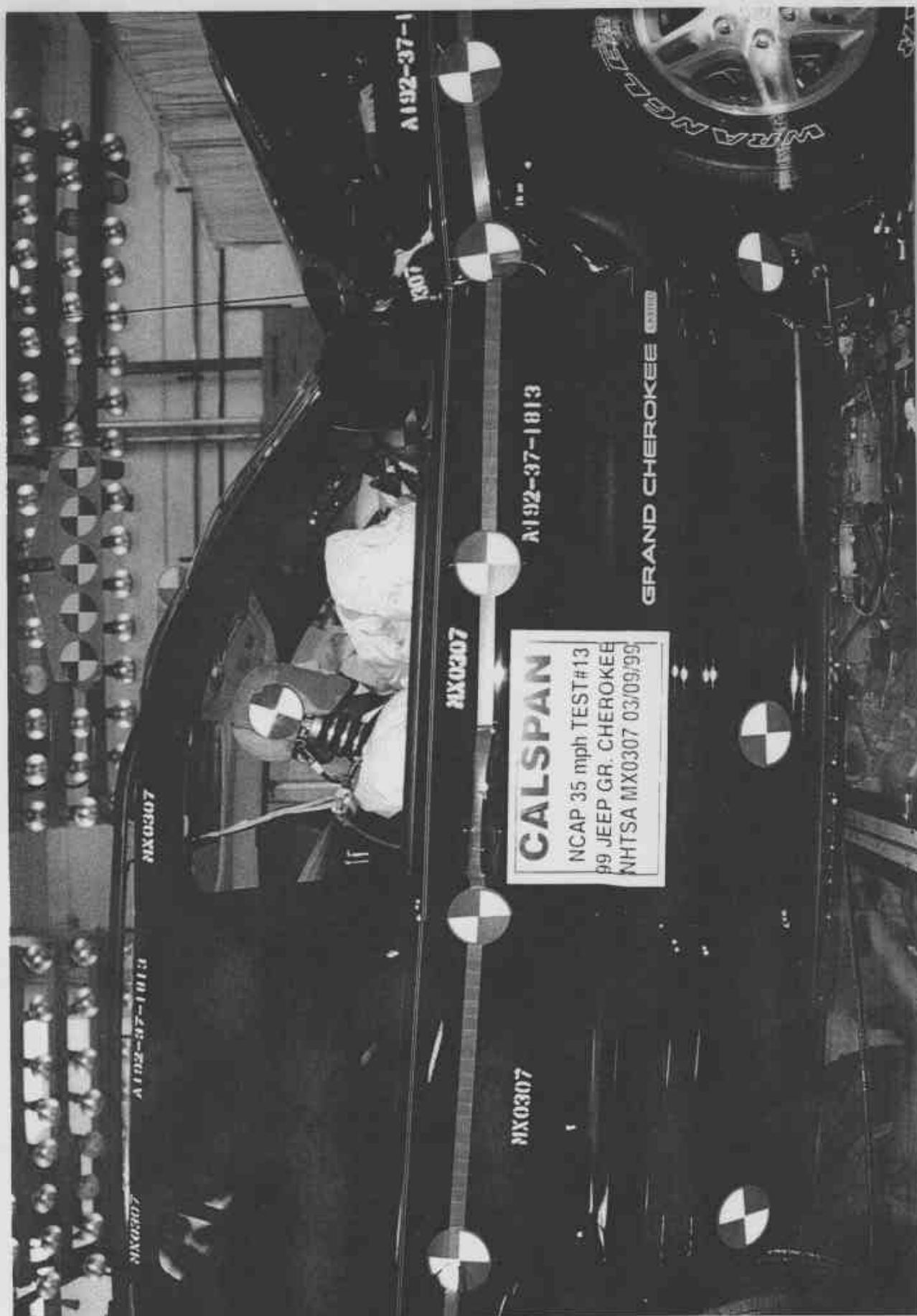


Figure A-25 POST-TEST PASSENGER POSITION VIEW



Figure A-26 PRE-TEST DRIVER AND INTERIOR VIEW



Figure A-27 POST-TEST DRIVER AND INTERIOR VIEW



Figure A-28 PRE-TEST PASSENGER AND INTERIOR VIEW



Figure A-29 POST-TEST PASSENGER AND INTERIOR VIEW

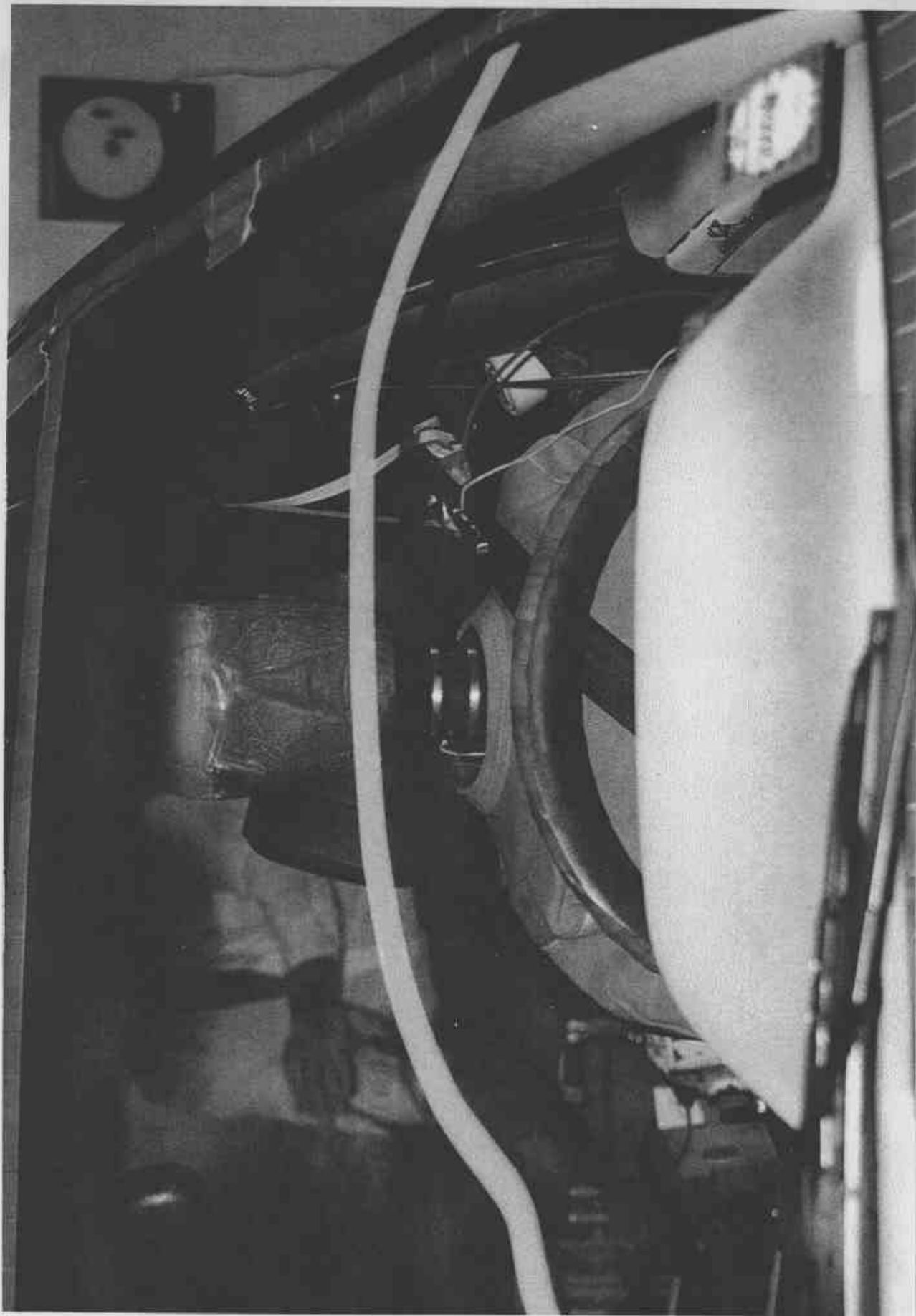


Figure A-30 PRE-TEST DRIVER HEAD LOCATION



Figure A-31 POST-TEST DRIVER HEAD LOCATION



Figure A-32 PRE-TEST PASSENGER HEAD LOCATION

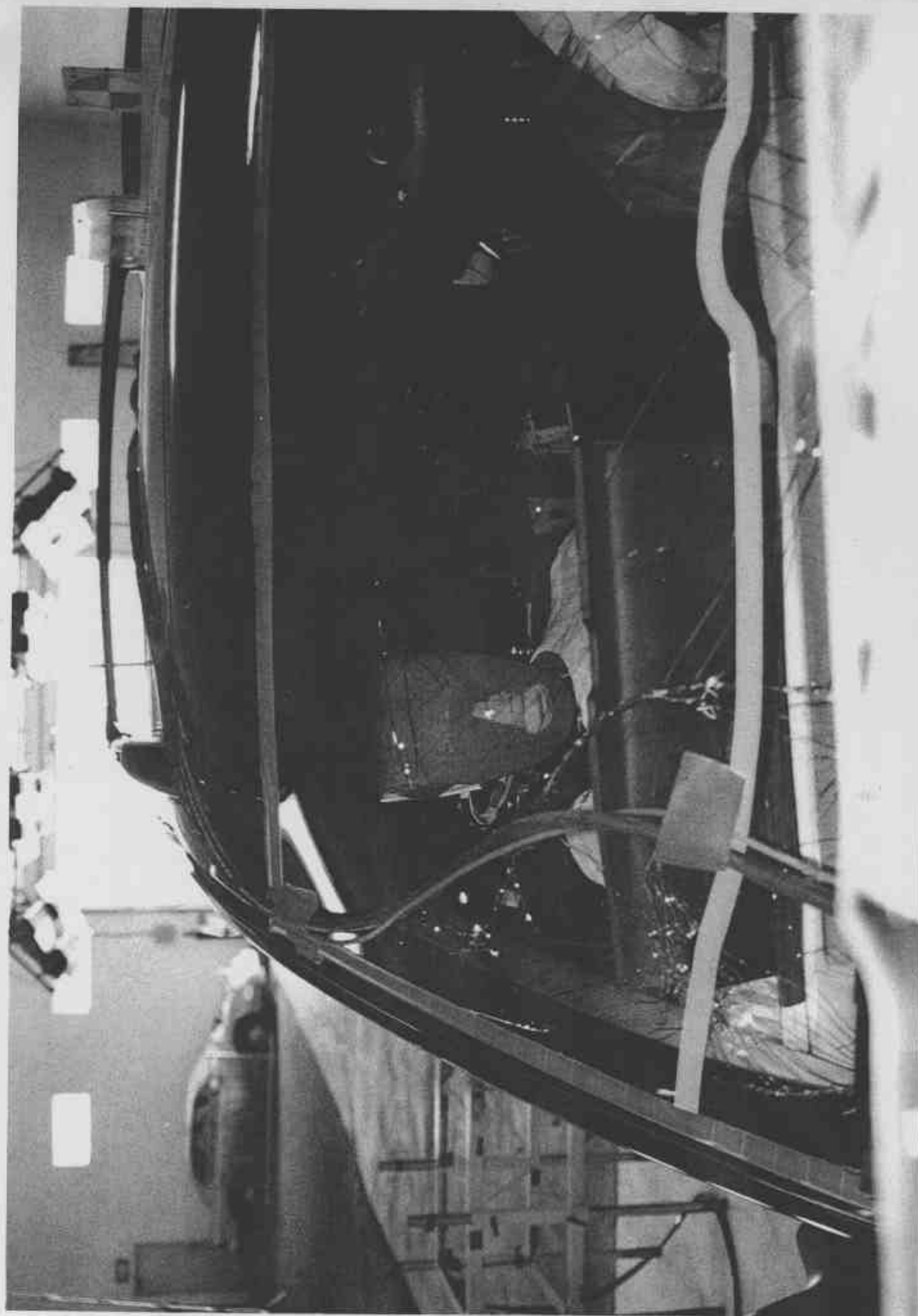


Figure A-33 POST-TEST PASSENGER HEAD LOCATION



Figure A-34 PRE-TEST DRIVER FLOOR PAN VIEW



Figure A-35 POST-TEST DRIVER FLOOR PAN VIEW

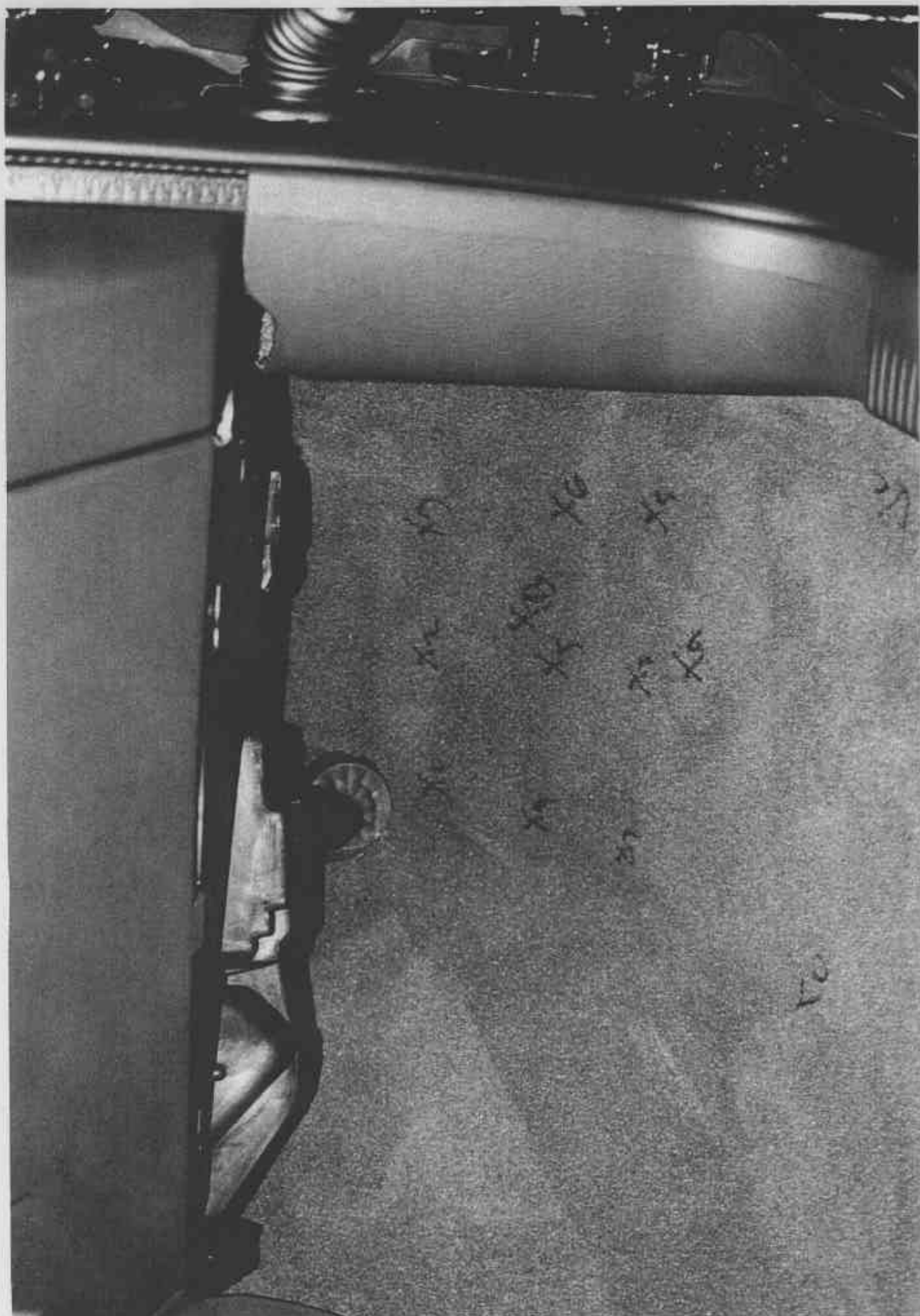


Figure A-36 PRE-TEST PASSENGER FLOOR PAN VIEW

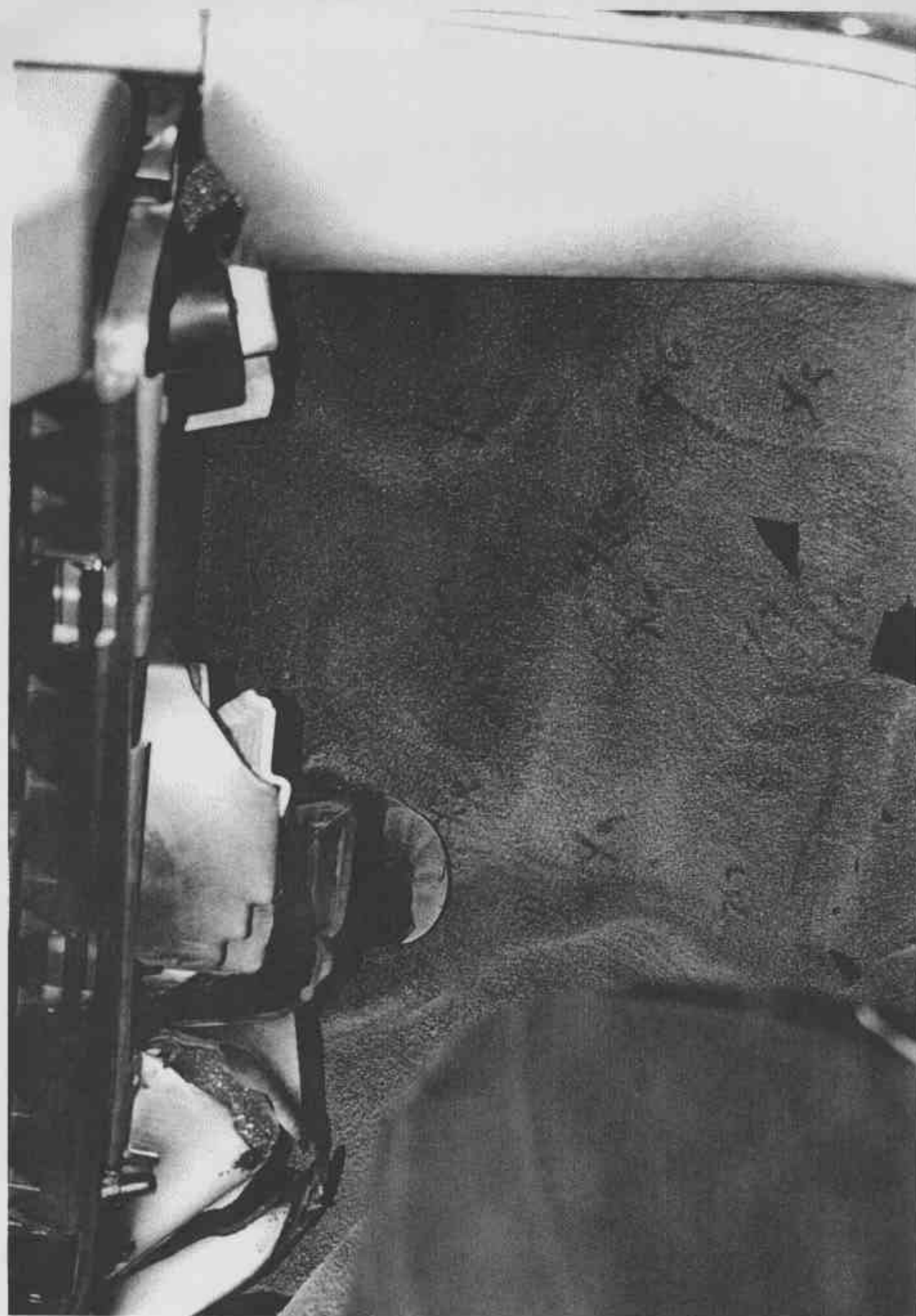


Figure A-37 POST-TEST PASSENGER FLOOR PAN VIEW

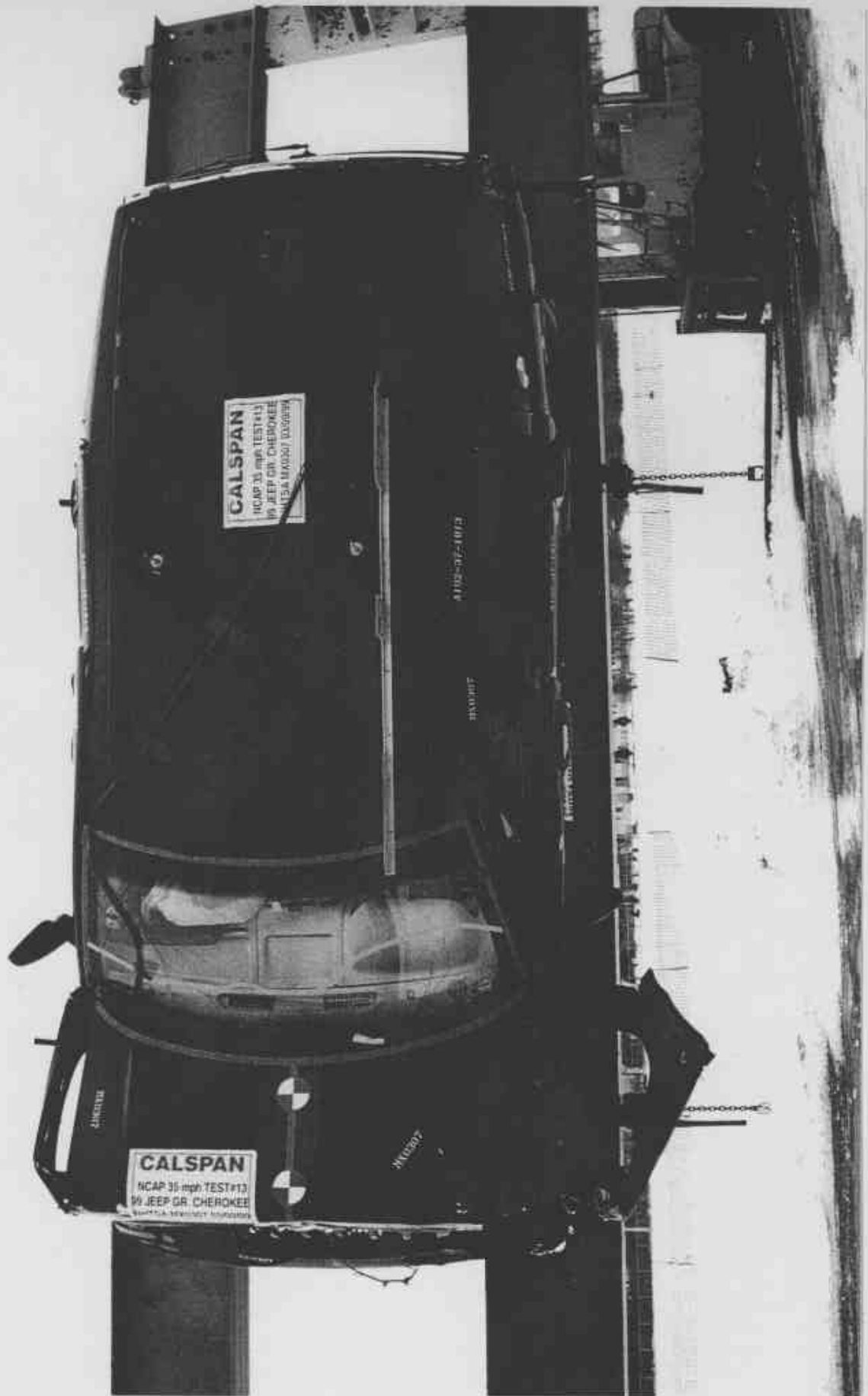


Figure A-38 ROLLOVER VIEW

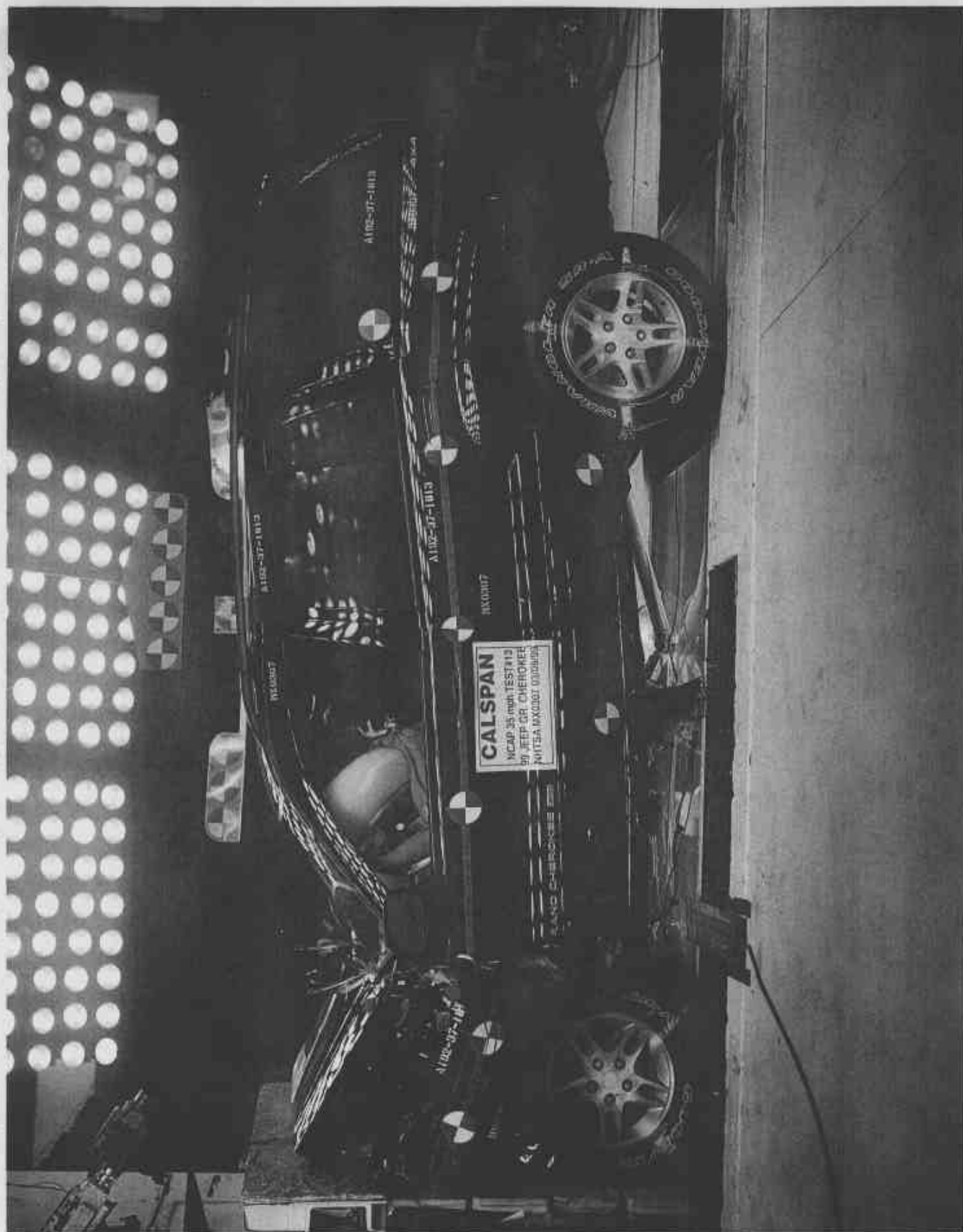


Figure A-39 IMPACT VIEW

Appendix B
DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

**Hybrid III Dummy Sign Conventions
Load Cells and Special Transducers**

Transducer	SAE Sign Convention (positive unless noted)
Upper Neck Load Cell	Fx Head rearward Fy Head left Fz Neck in tension Mx Left ear to left shoulder My Chin to chest (flexion) Mz Chin to left shoulder (look left)
Chest Displacement Potentiometer	Compression is negative
Pelvic Load Cell (Lower Lumbar)	Fx Chest rearward Fy Chest left Fz Spine in tension
Femur Load Cell	Compression is negative
Upper Tibia Load Cell (right and left leg)	Mx Support tibia at ends, load left side center My Support tibia at ends, load front (shin) center
Lower Tibia Load Cell (right and left leg)	Fz Tibia in tension Mx Support tibia at ends, load left side center My Support tibia at ends, load front (shin) center

NHTSA TEST NO. MX0307

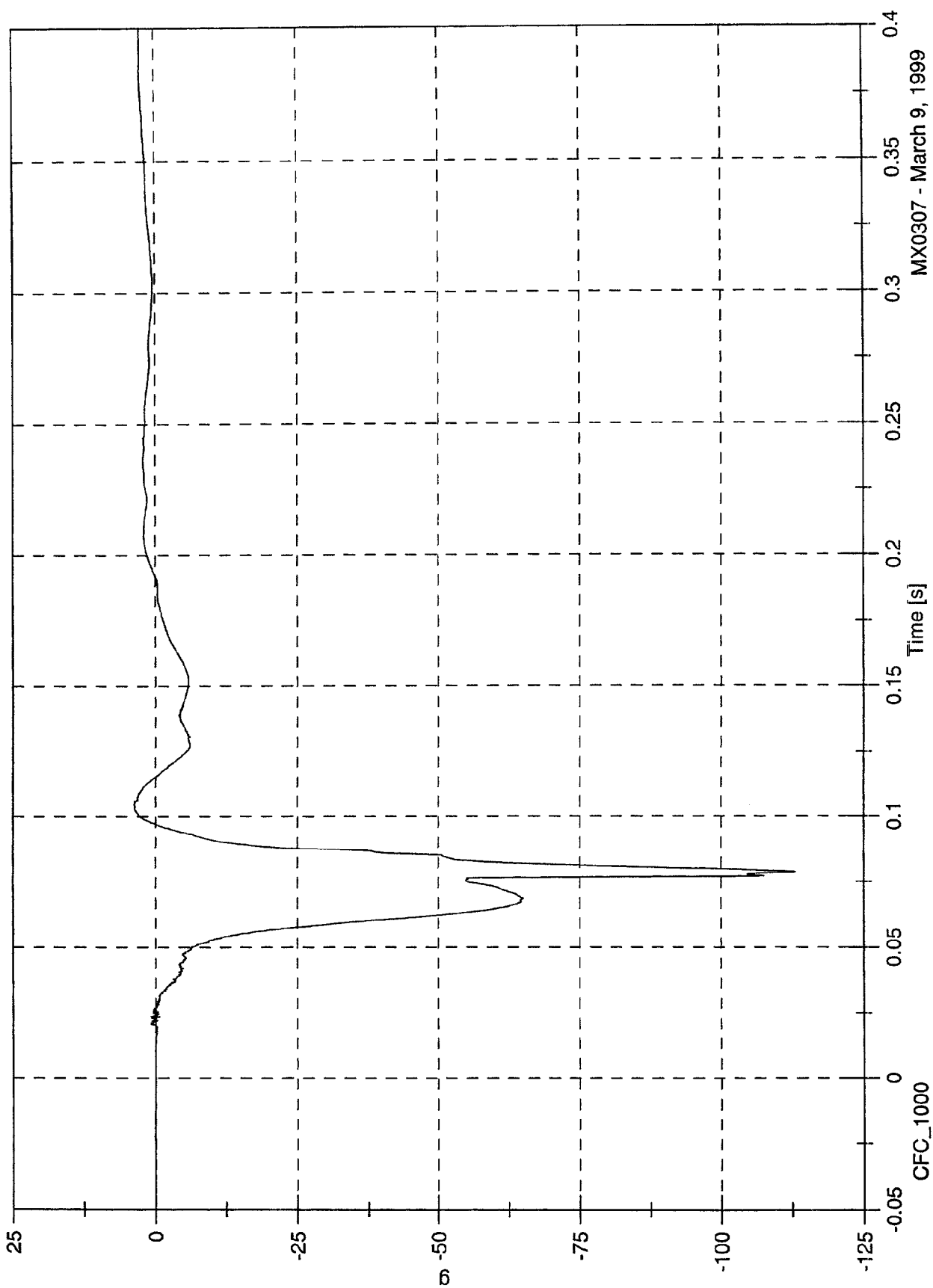
DUMMY DATA

CLASS	FILTER CHANNEL
Head Accelerations	1000
Chest Accelerations	180
Chest Displacements	60
Femur Forces	600
Belt Loads	60
Belt Displacements	180
Neck Forces	1000
Neck Moments	600

NCAP Test #13 - 1999 Jeep Cherokee

Max: 3.8 [g] at 0.104 [s]
Min: -113.0 [g] at 0.079 [s]

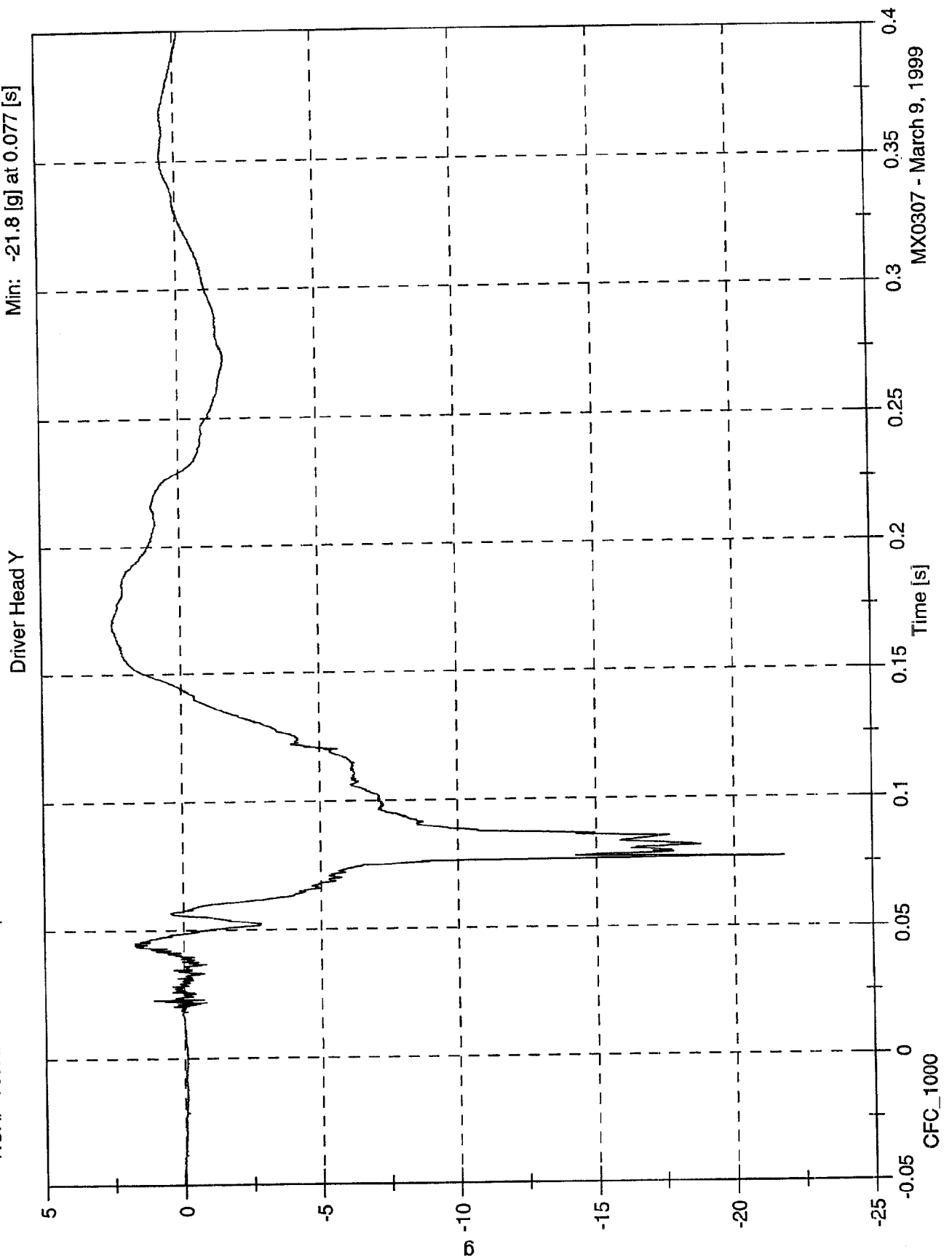
Driver Head X



MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

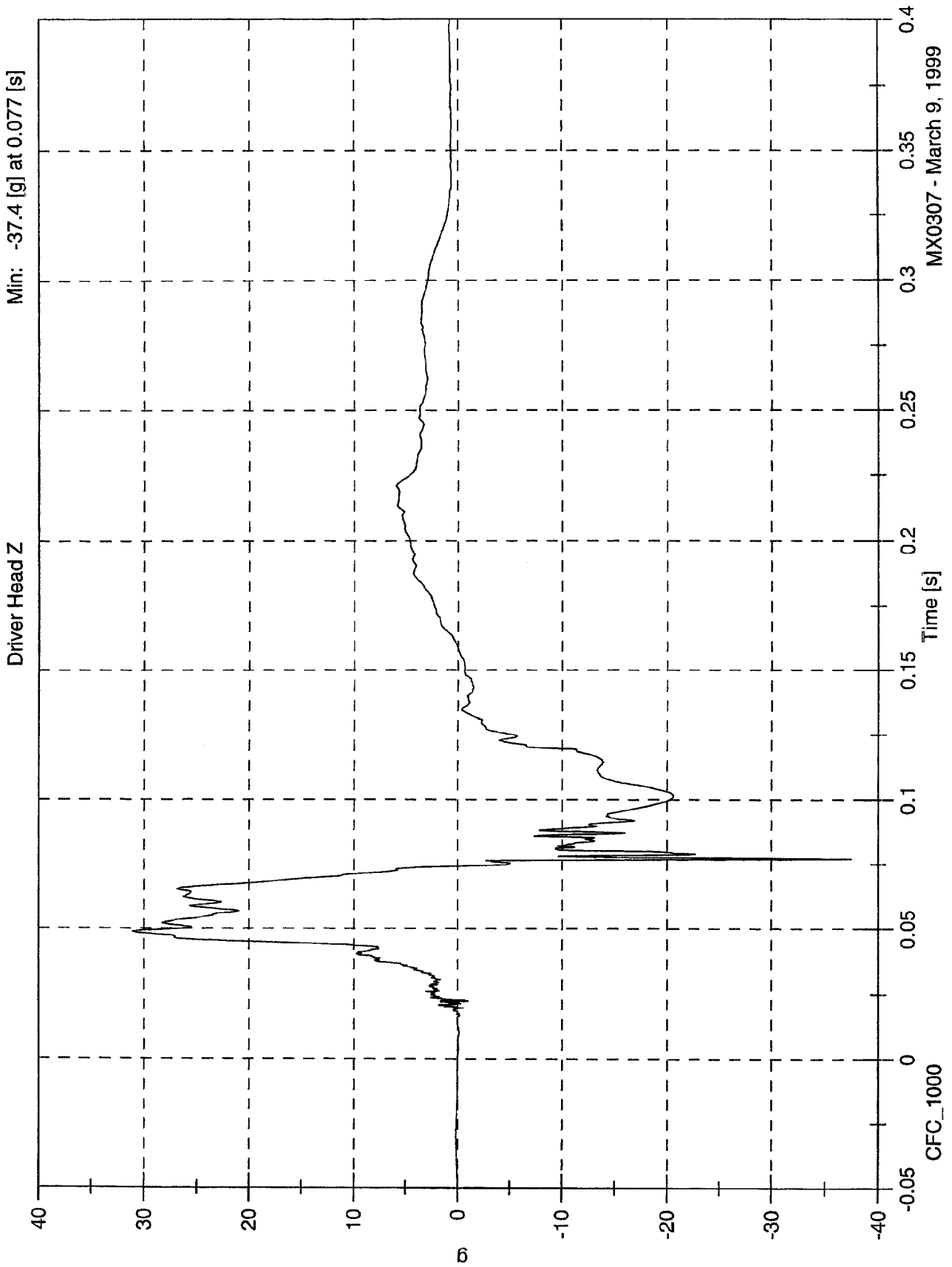
Max: 2.5 [g] at 0.170 [s]
Min: -21.8 [g] at 0.077 [s]



MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 31.1 [g] at 0.049 [s]
Min: -37.4 [g] at 0.077 [s]

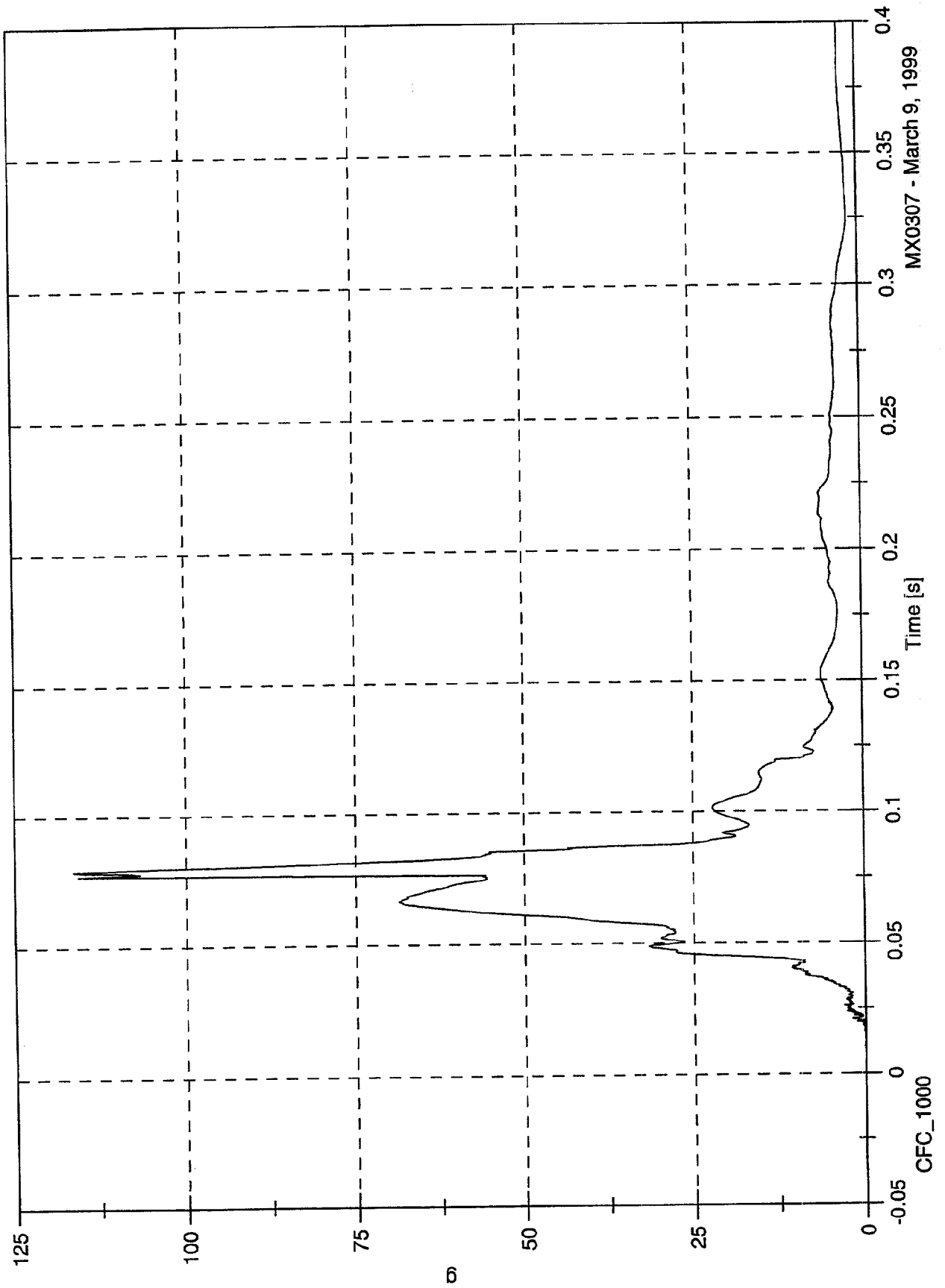


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 116.4 [g] at 0.079 [s]
Min: 0.0 [g] at 0.013 [s]

Driver Head Resultant



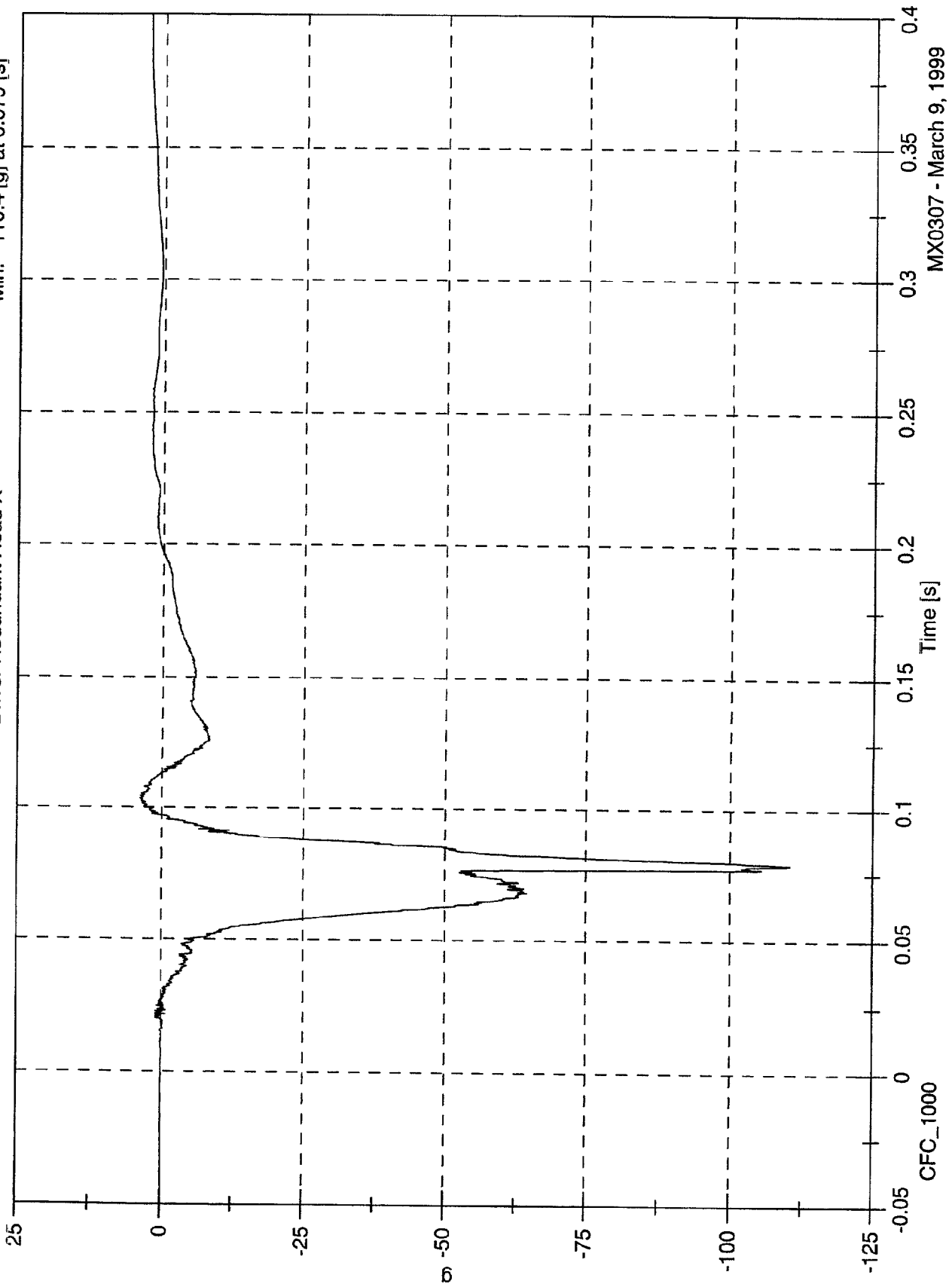
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Driver Redundant Head X

Max: 3.7 [g] at 0.103 [s]

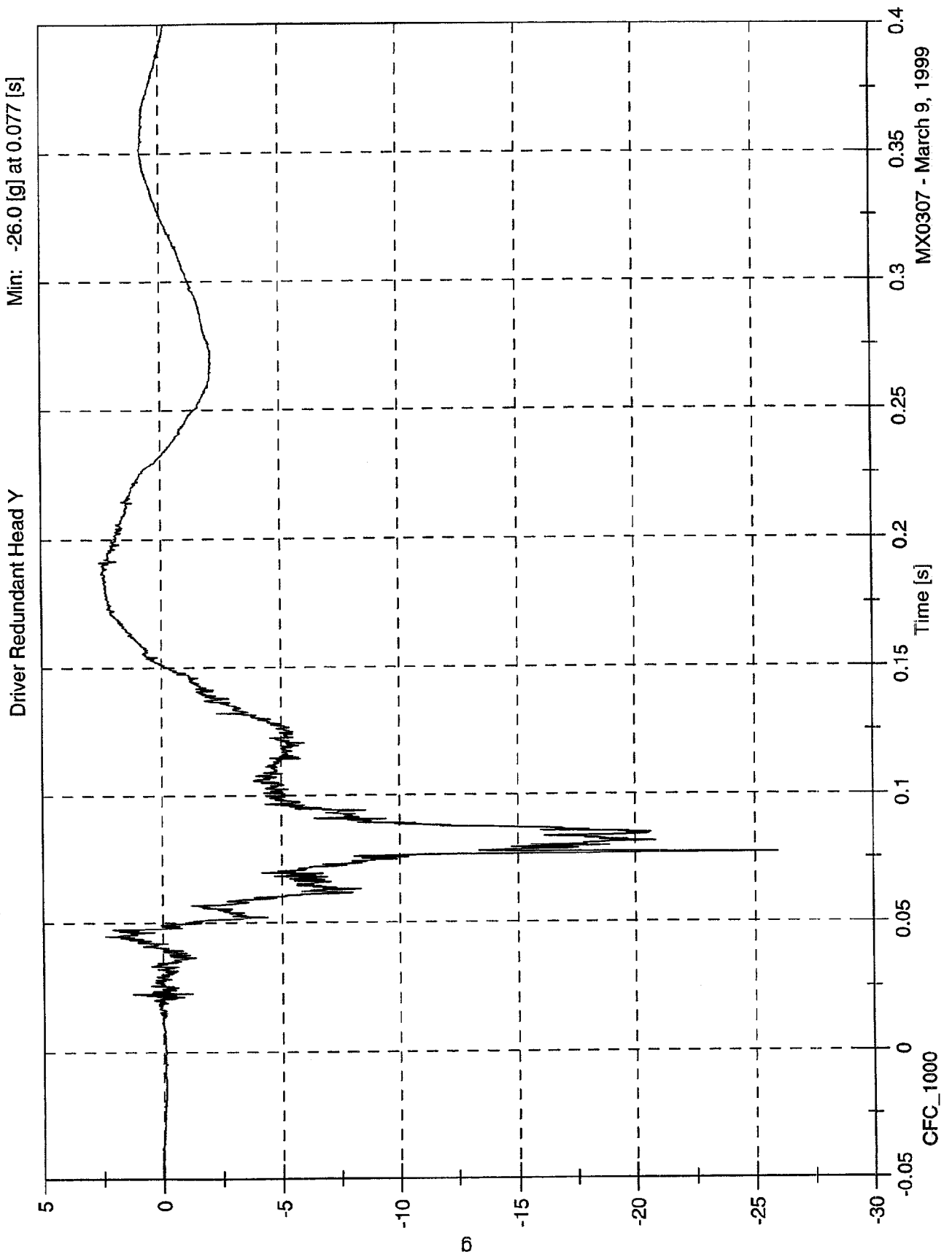
Min: -110.4 [g] at 0.079 [s]



MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 2.6 [g] at 0.191 [s]
Min: -26.0 [g] at 0.077 [s]

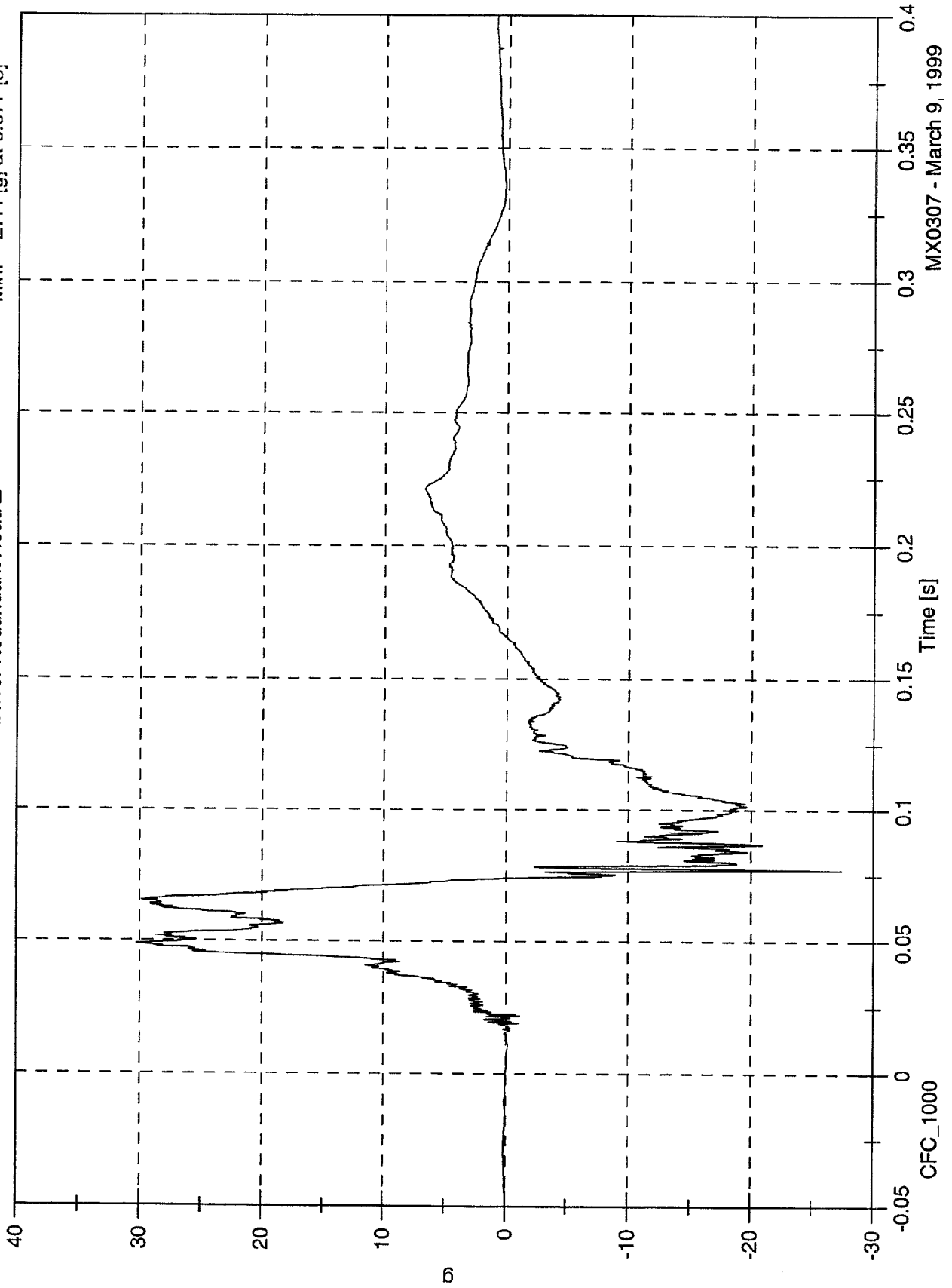


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 30.3 [g] at 0.049 [s]
Min: -27.4 [g] at 0.077 [s]

Driver Redundant Head Z



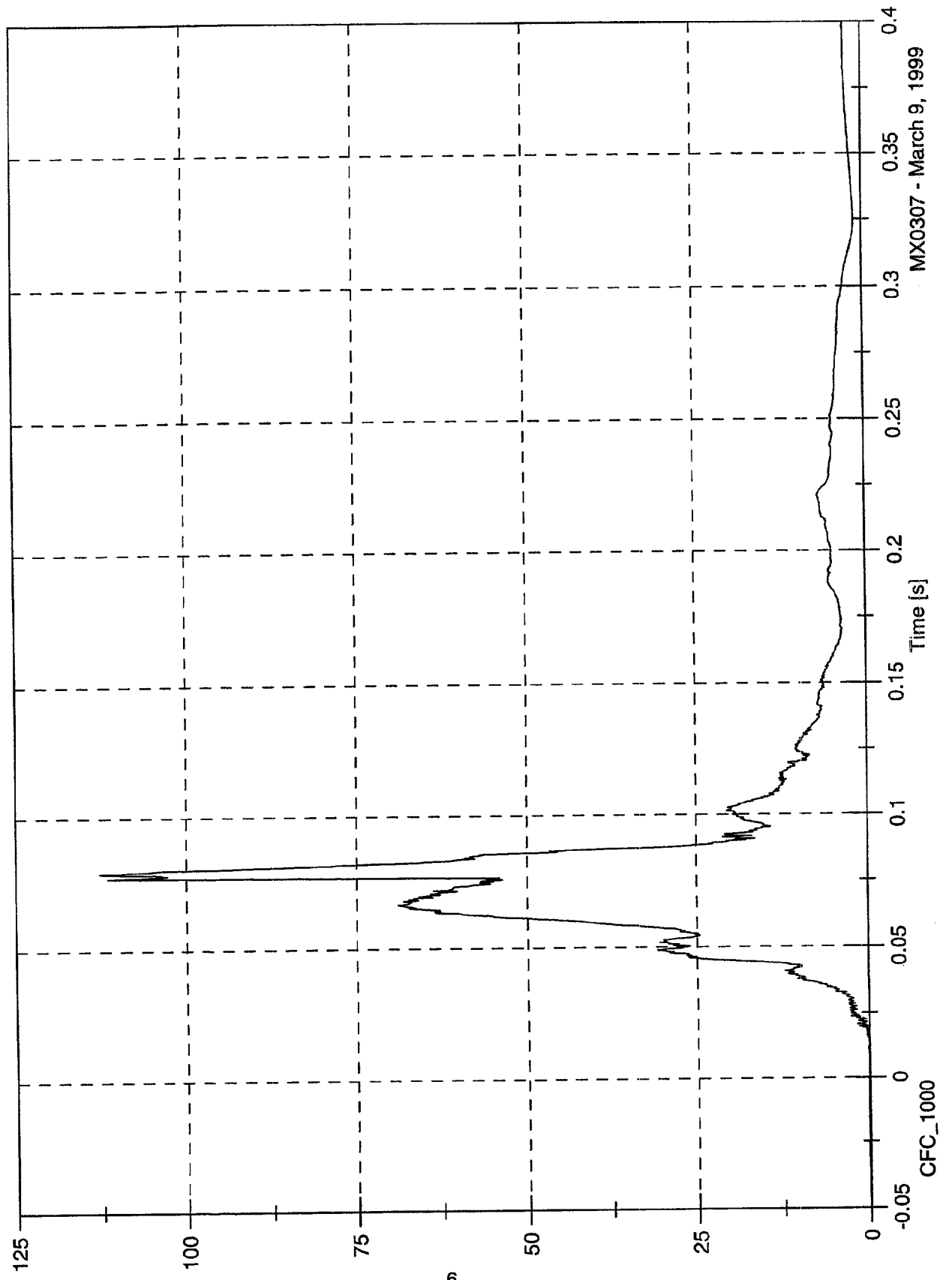
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

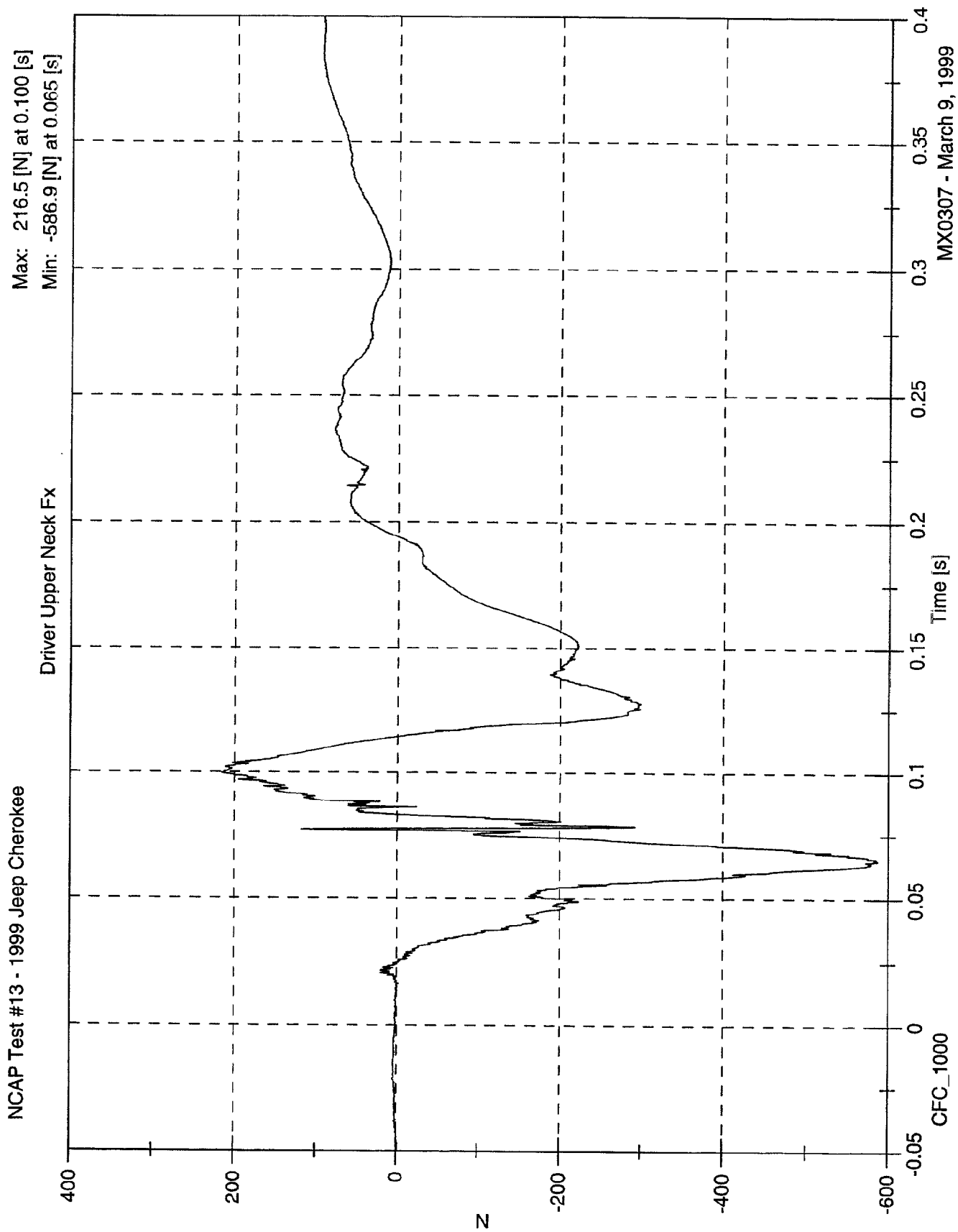
Max: 112.9 [g] at 0.079 [s]

Min: 0.0 [g] at 0.012 [s]

Driver Redundant Head Resultant



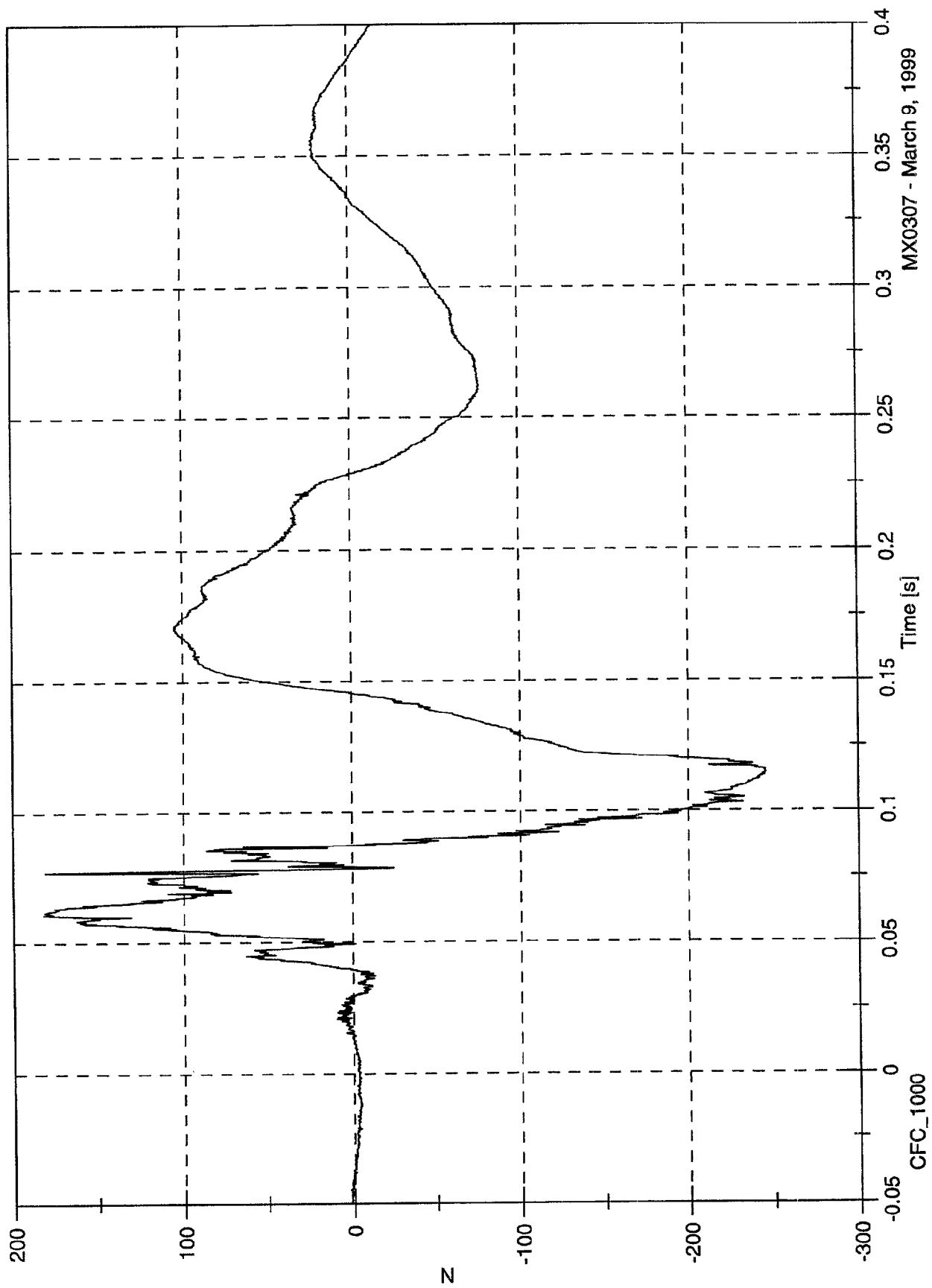
MX0307 - March 9, 1999



NCAP Test #13 - 1999 Jeep Cherokee

Max: 182.3 [N] at 0.061 [s]
Min: -245.6 [N] at 0.114 [s]

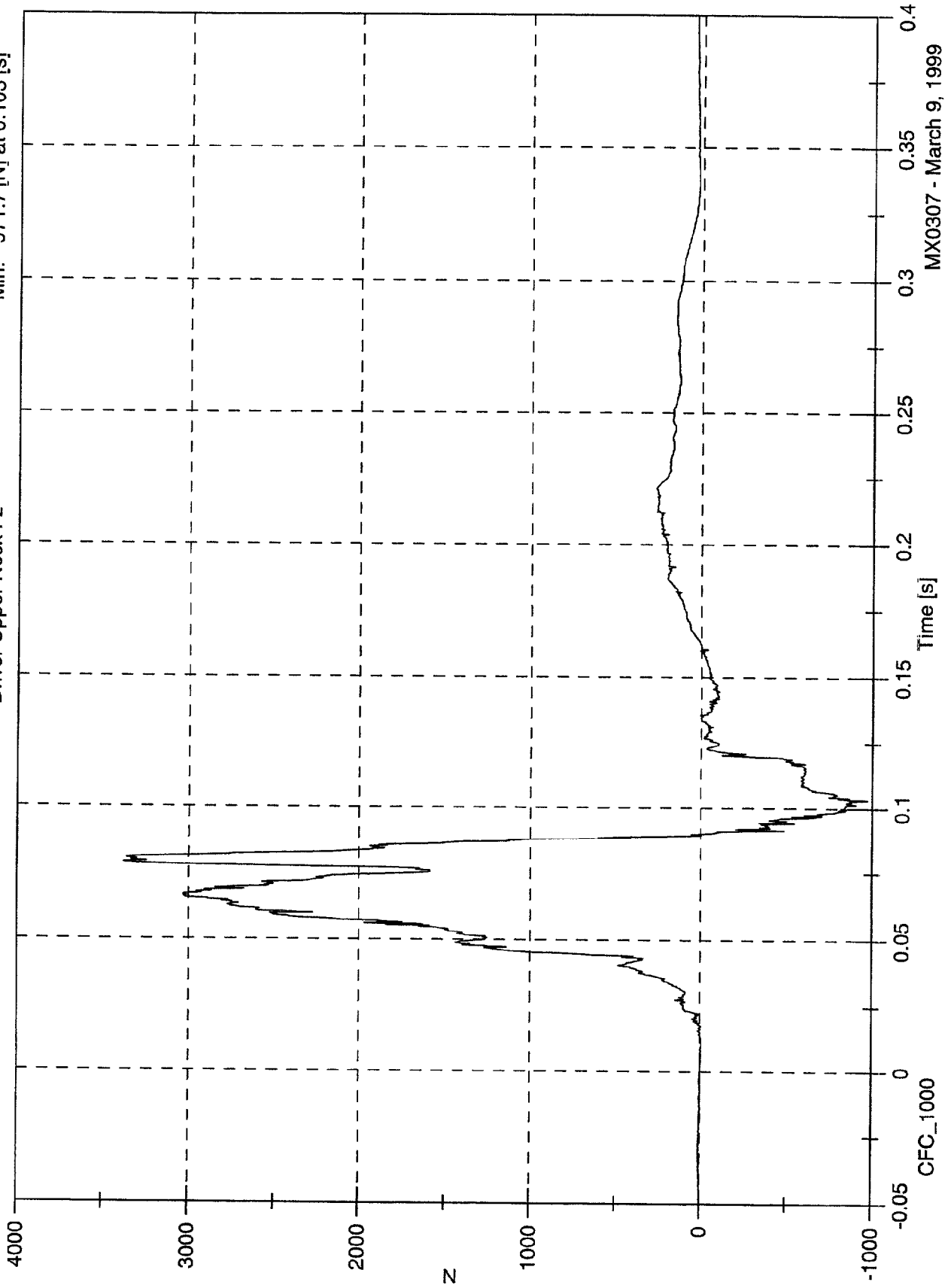
Driver Upper Neck Fy



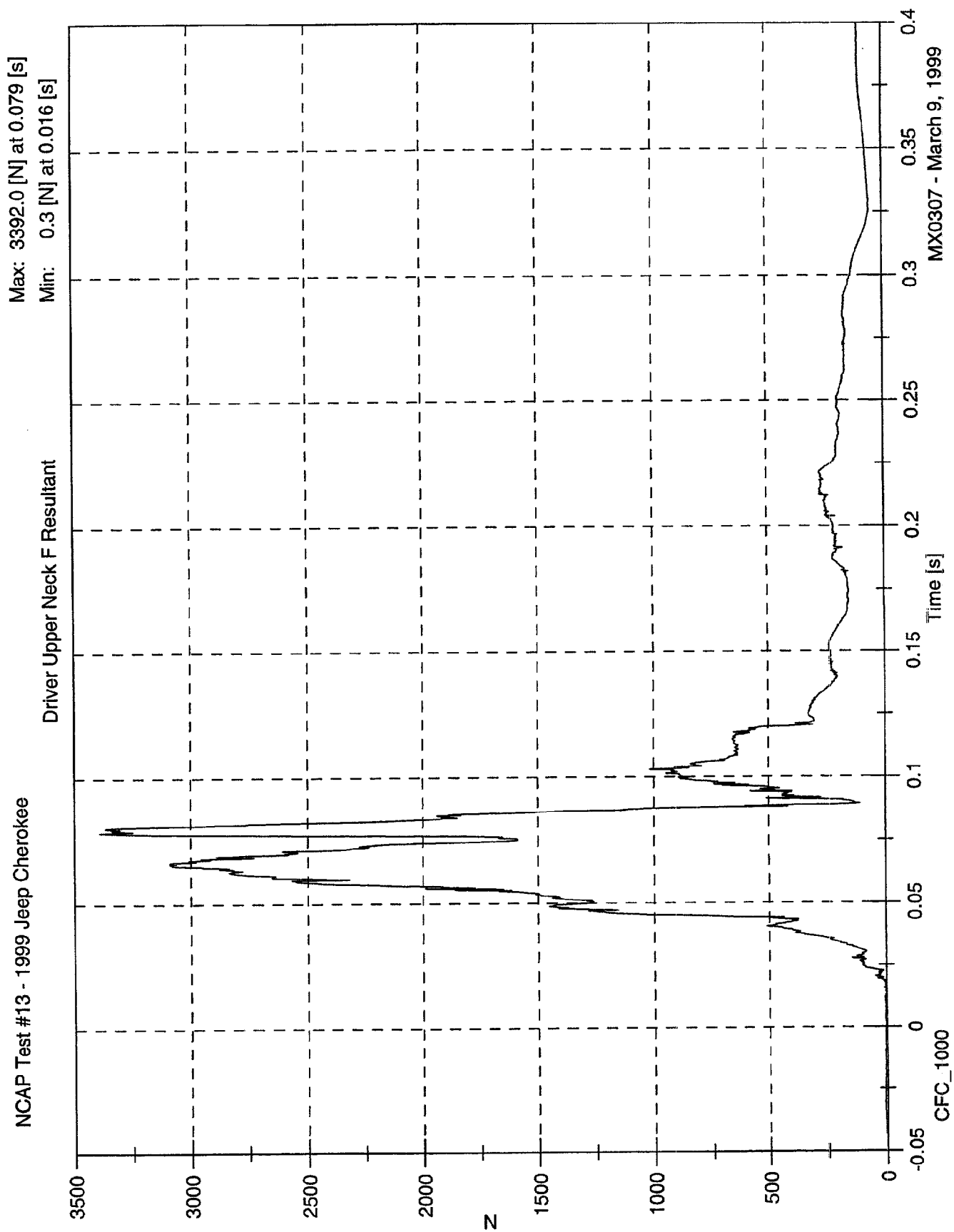
NCAP Test #13 - 1999 Jeep Cherokee

Max: 3379.5 [N] at 0.079 [s]
Min: -971.7 [N] at 0.103 [s]

Driver Upper Neck Fz



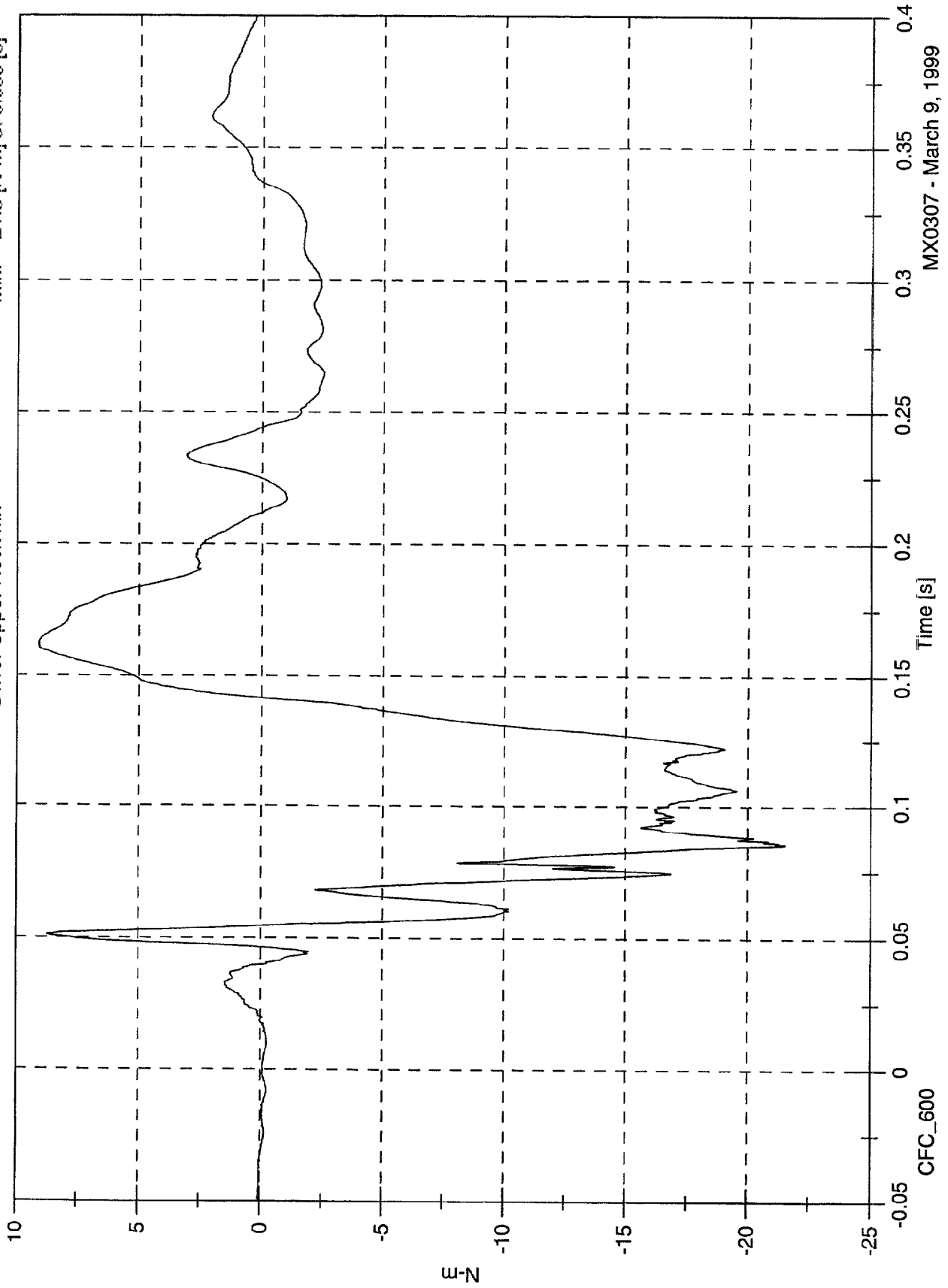
MX0307 - March 9, 1999



NCAP Test #13 - 1999 Jeep Cherokee

Max: 9.1 [N-m] at 0.163 [s]
Min: -21.5 [N-m] at 0.086 [s]

Driver Upper Neck Mx

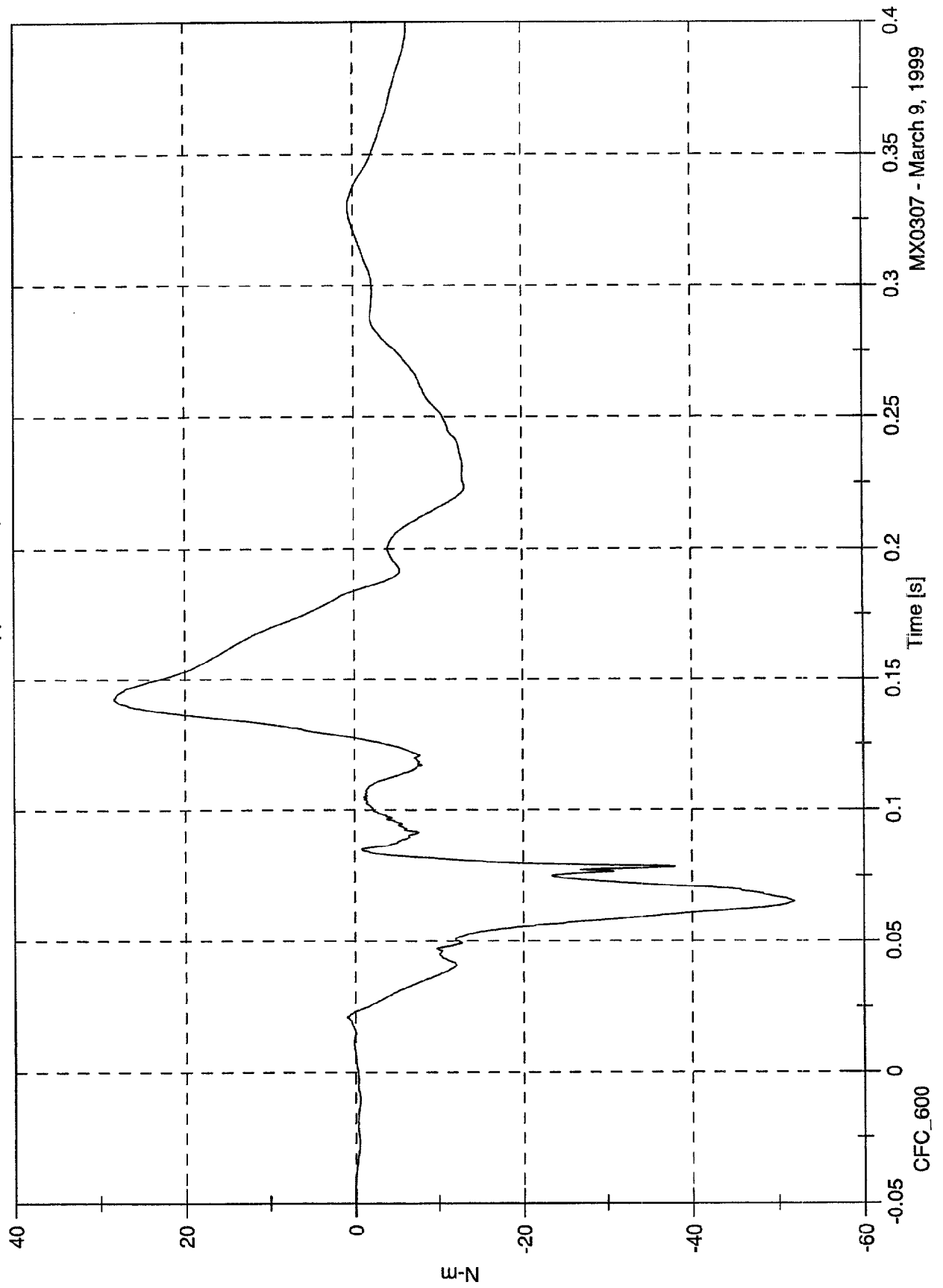


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Driver Upper Neck My

Max: 28.3 [N-m] at 0.142 [s]
Min: -51.9 [N-m] at 0.065 [s]



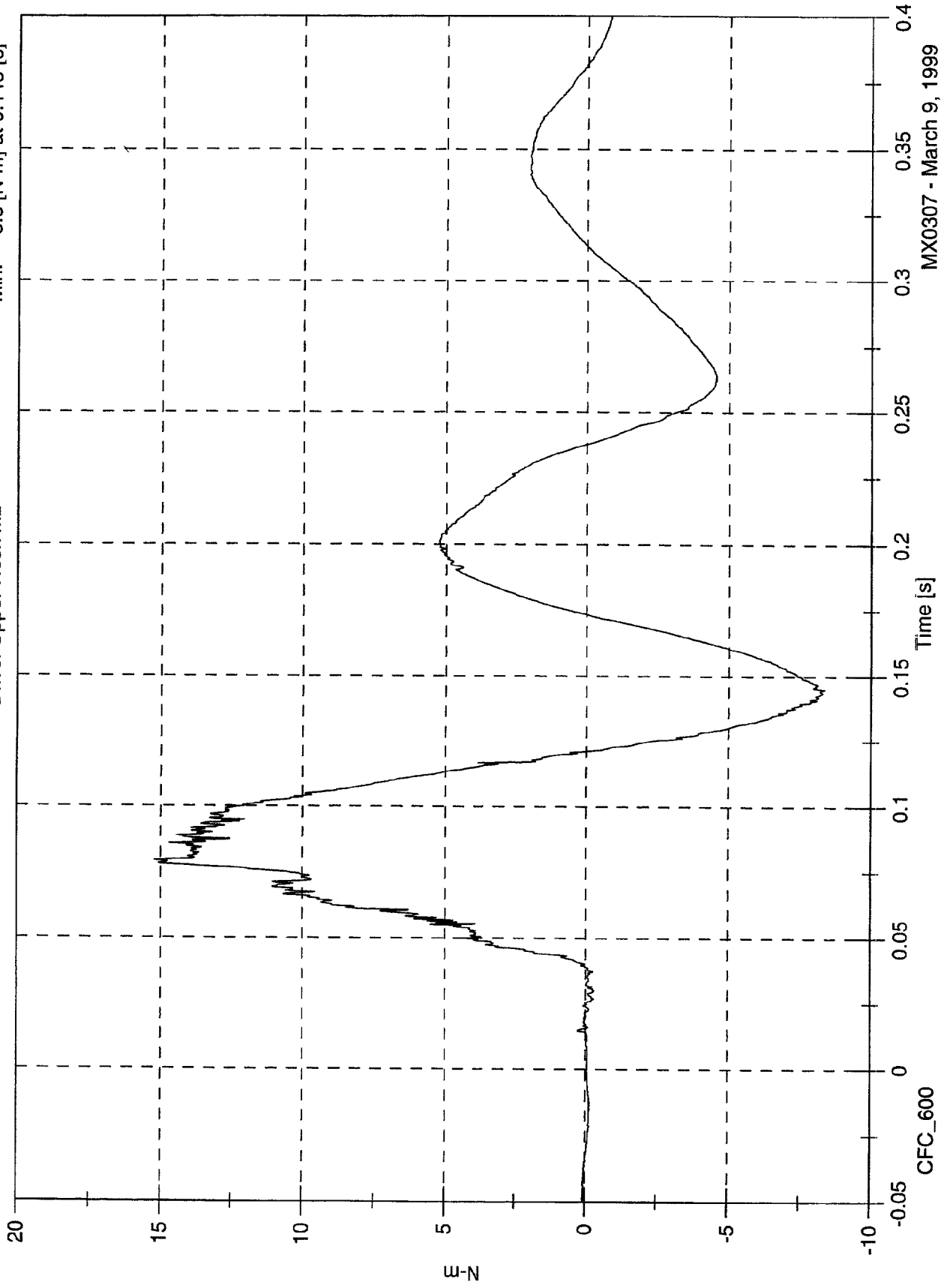
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Driver Upper Neck Mz

Max: 15.2 [N-m] at 0.079 [s]

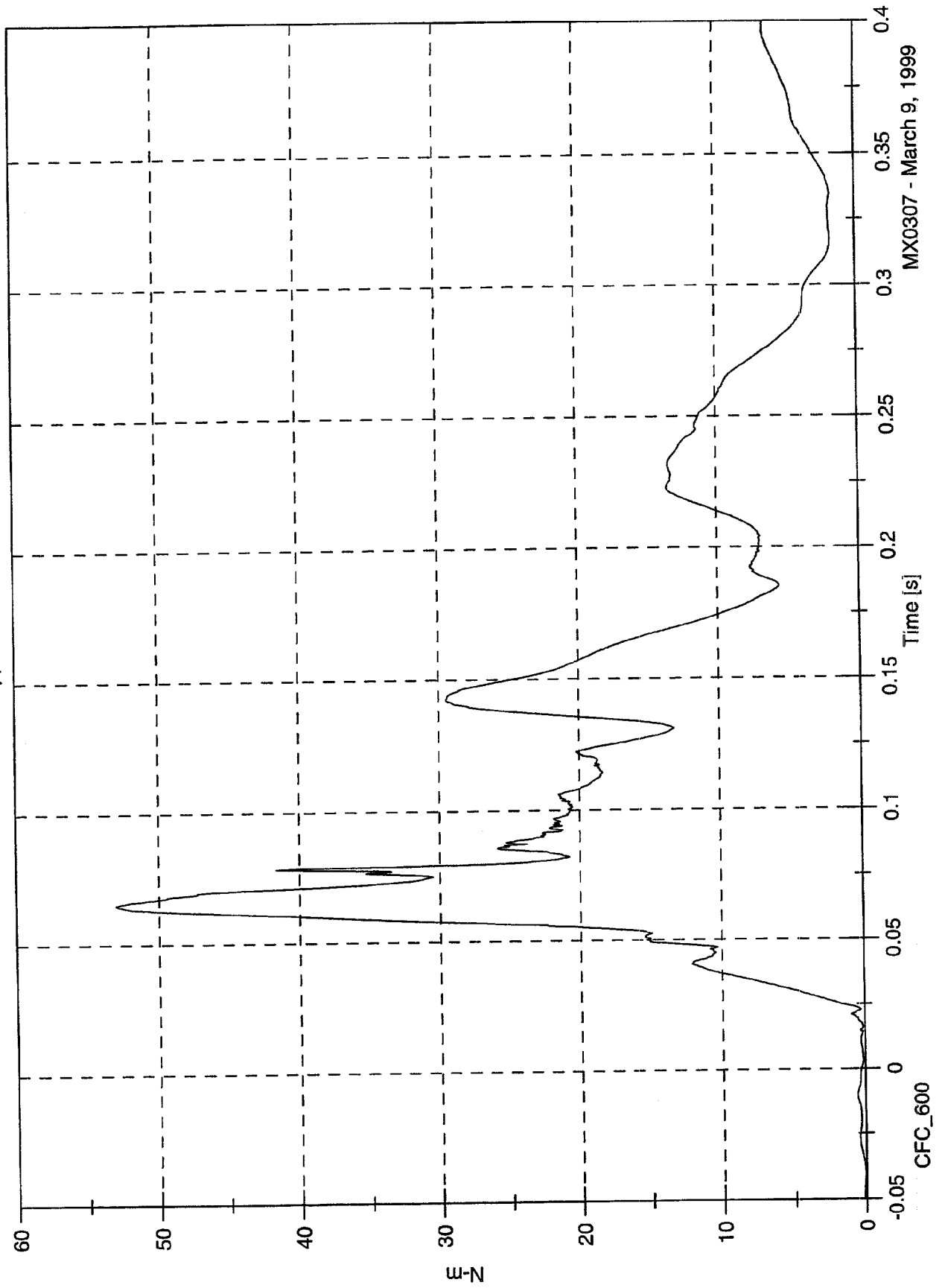
Min: -8.3 [N-m] at 0.145 [s]



NCAP Test #13 - 1999 Jeep Cherokee

Driver Upper Neck M Resultant

Max: 53.0 [N-m] at 0.065 [s]
Min: 0.1 [N-m] at -0.099 [s]

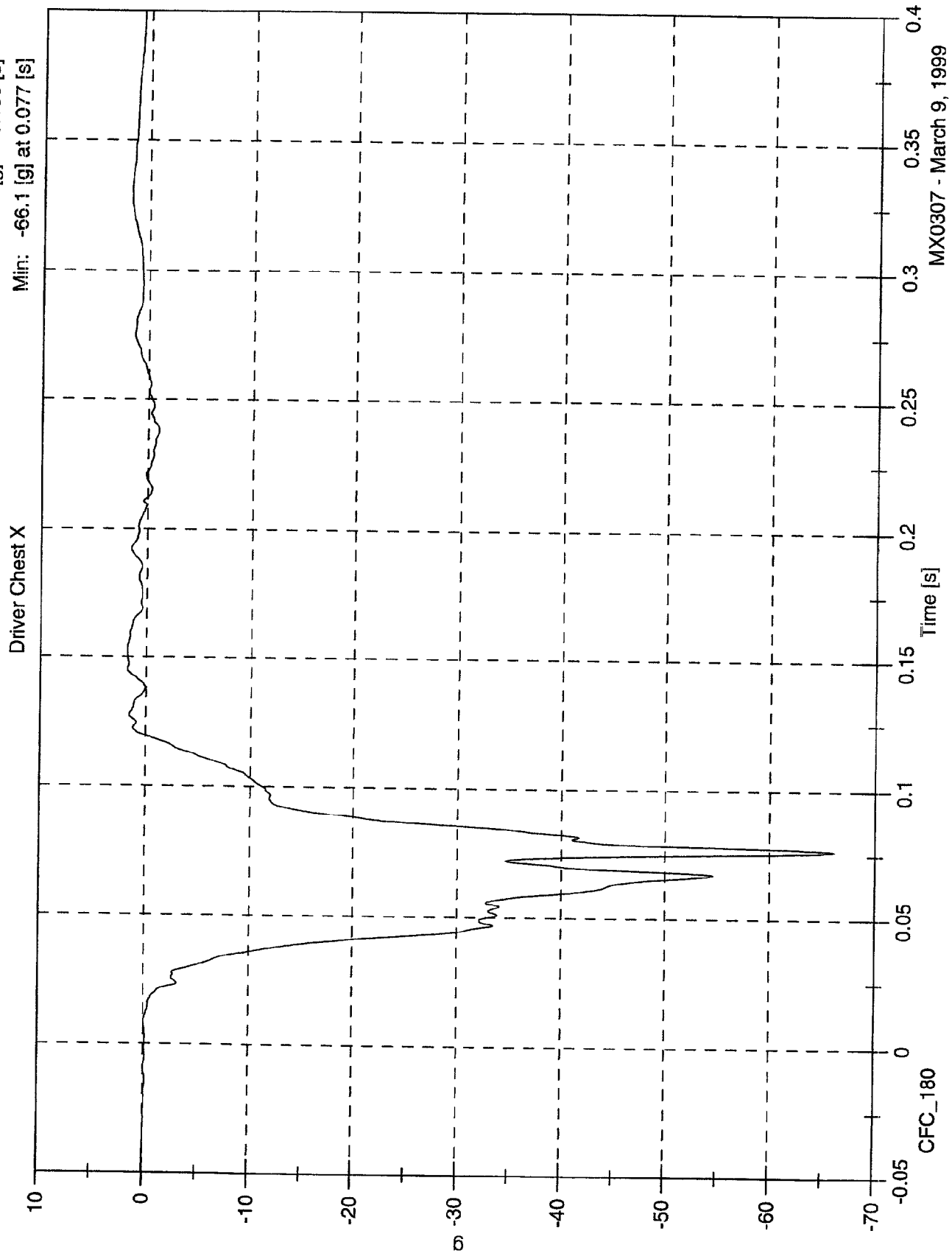


CFC_600

MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

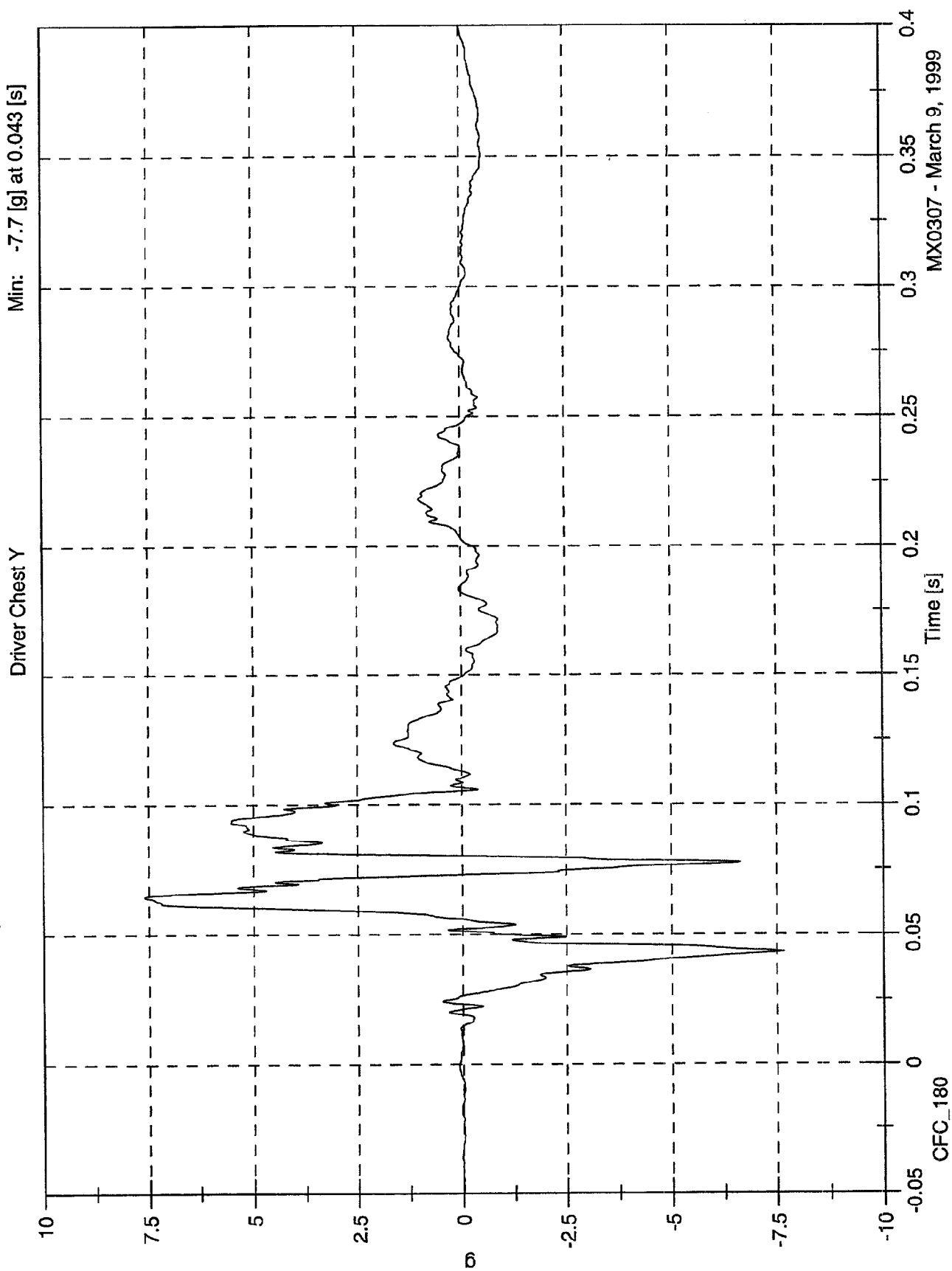
Max: 1.8 [g] at 0.153 [s]
Min: -66.1 [g] at 0.077 [s]



MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

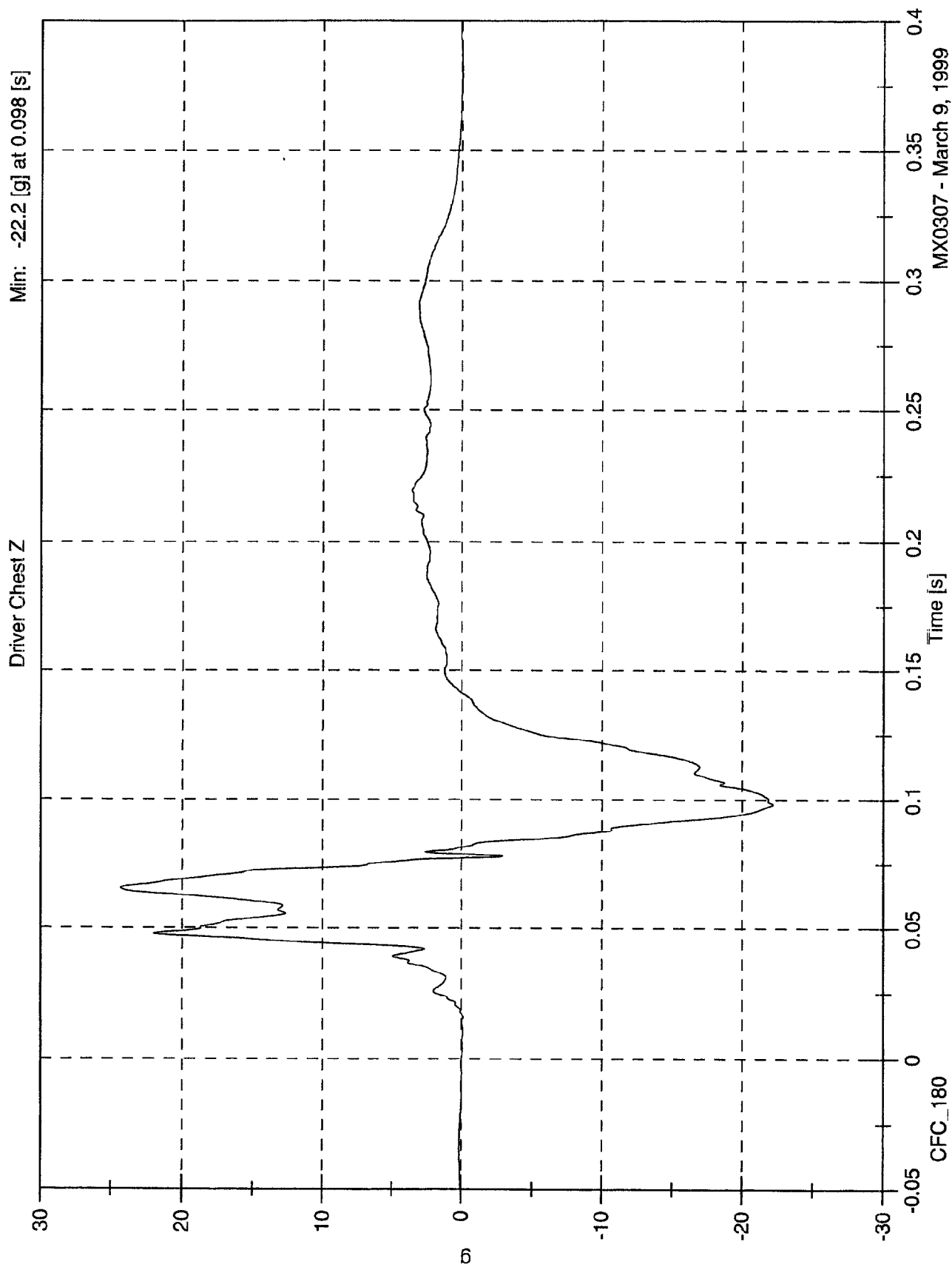
Max: 7.6 [g] at 0.065 [s]
Min: -7.7 [g] at 0.043 [s]



MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 24.3 [g] at 0.066 [s]
Min: -22.2 [g] at 0.098 [s]

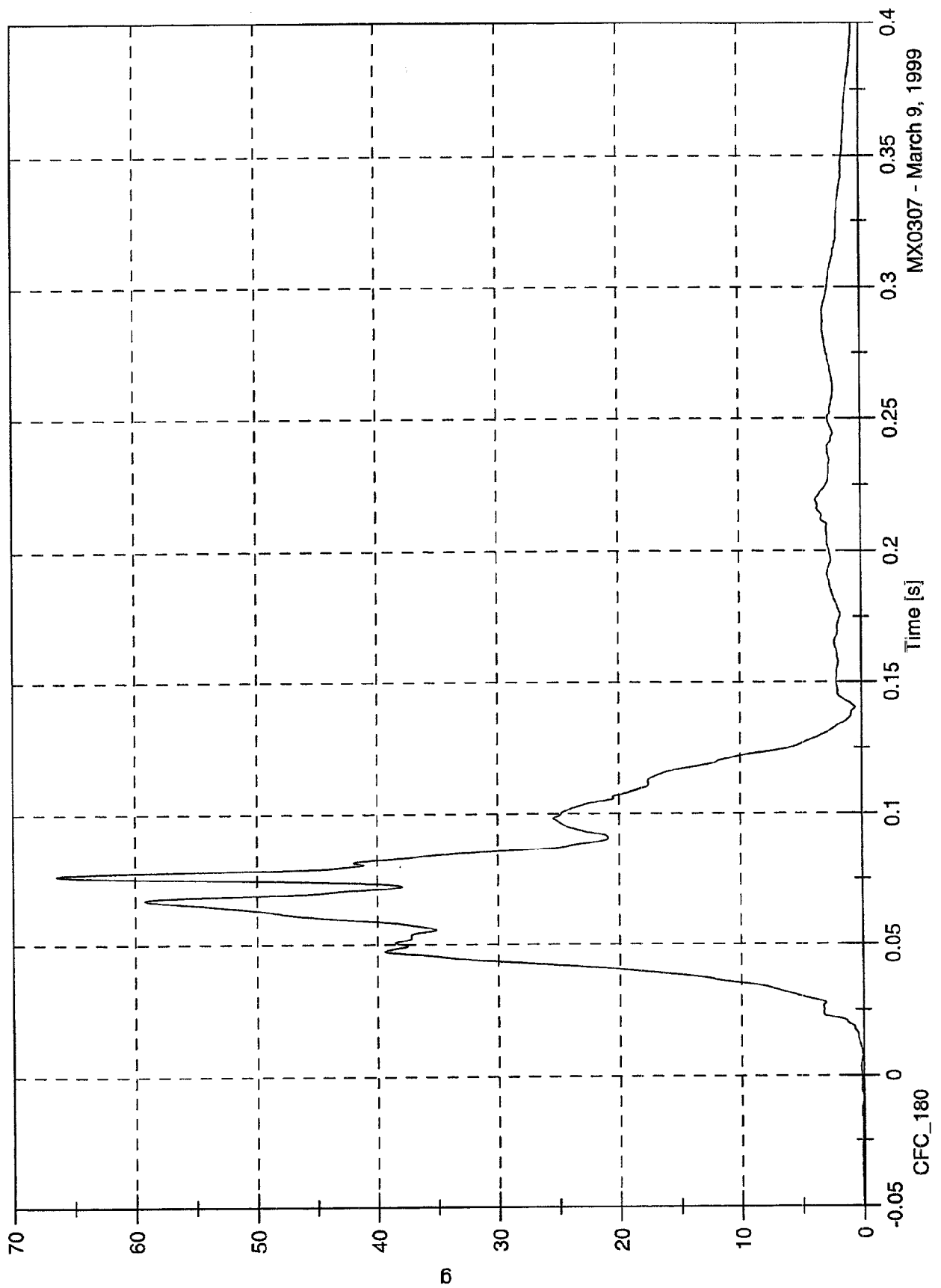


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 66.5 [g] at 0.077 [s]
Min: 0.0 [g] at -0.059 [s]

Driver Chest Resultant

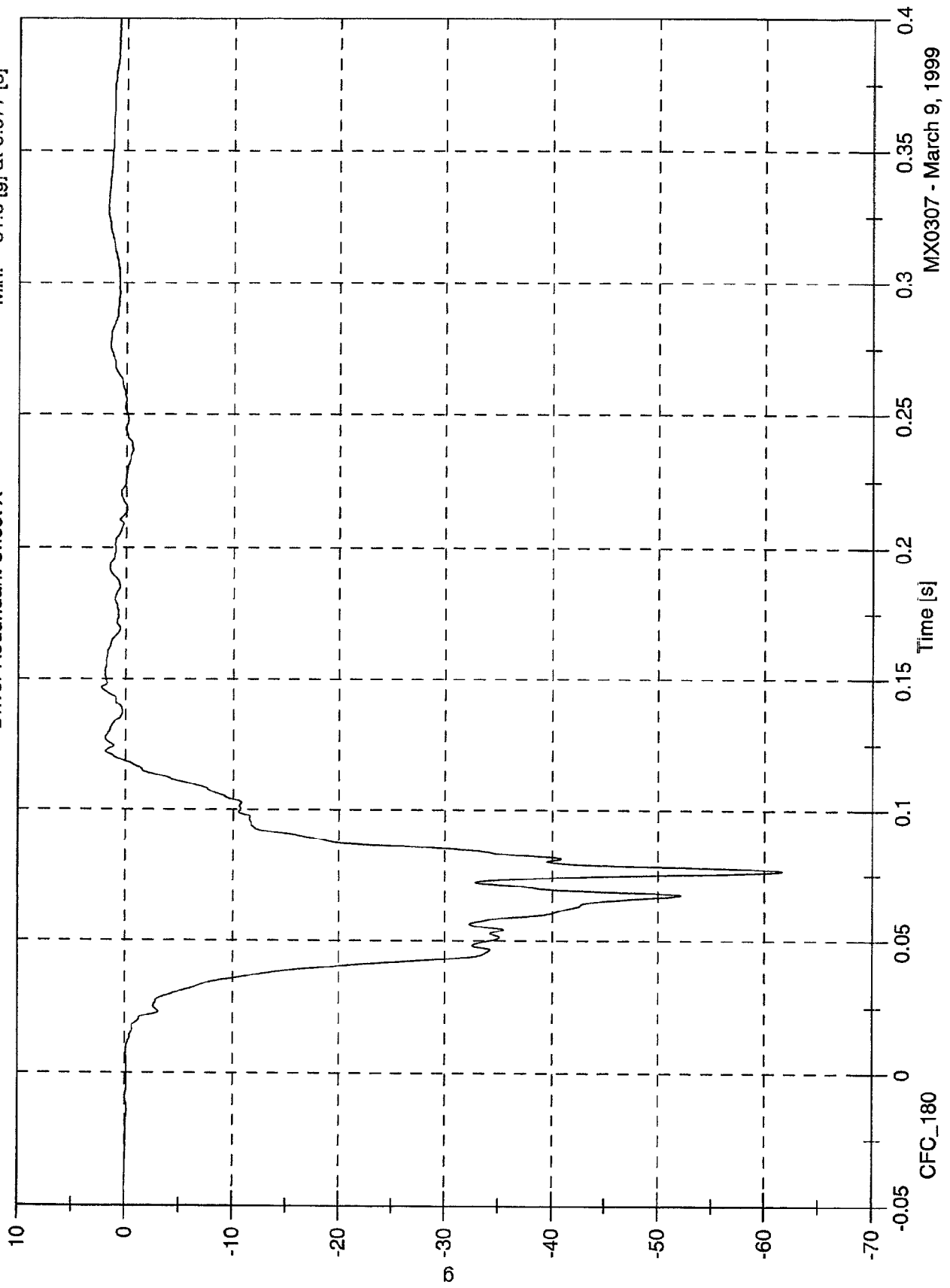


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 2.3 [g] at 0.147 [s]
Min: -61.6 [g] at 0.077 [s]

Driver Redundant Chest X



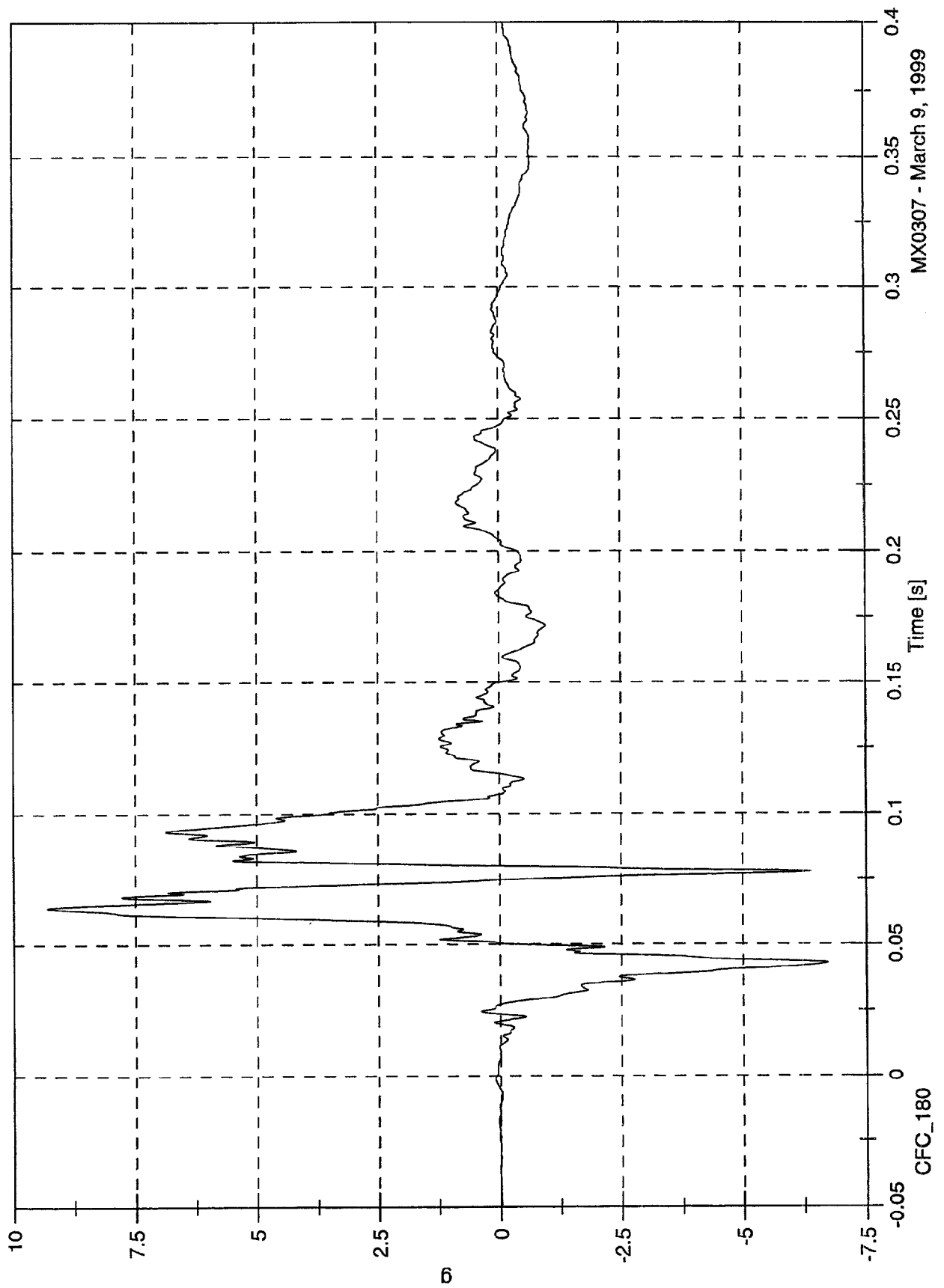
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 9.3 [g] at 0.064 [s]

Min: -6.7 [g] at 0.043 [s]

Driver Redundant Chest Y

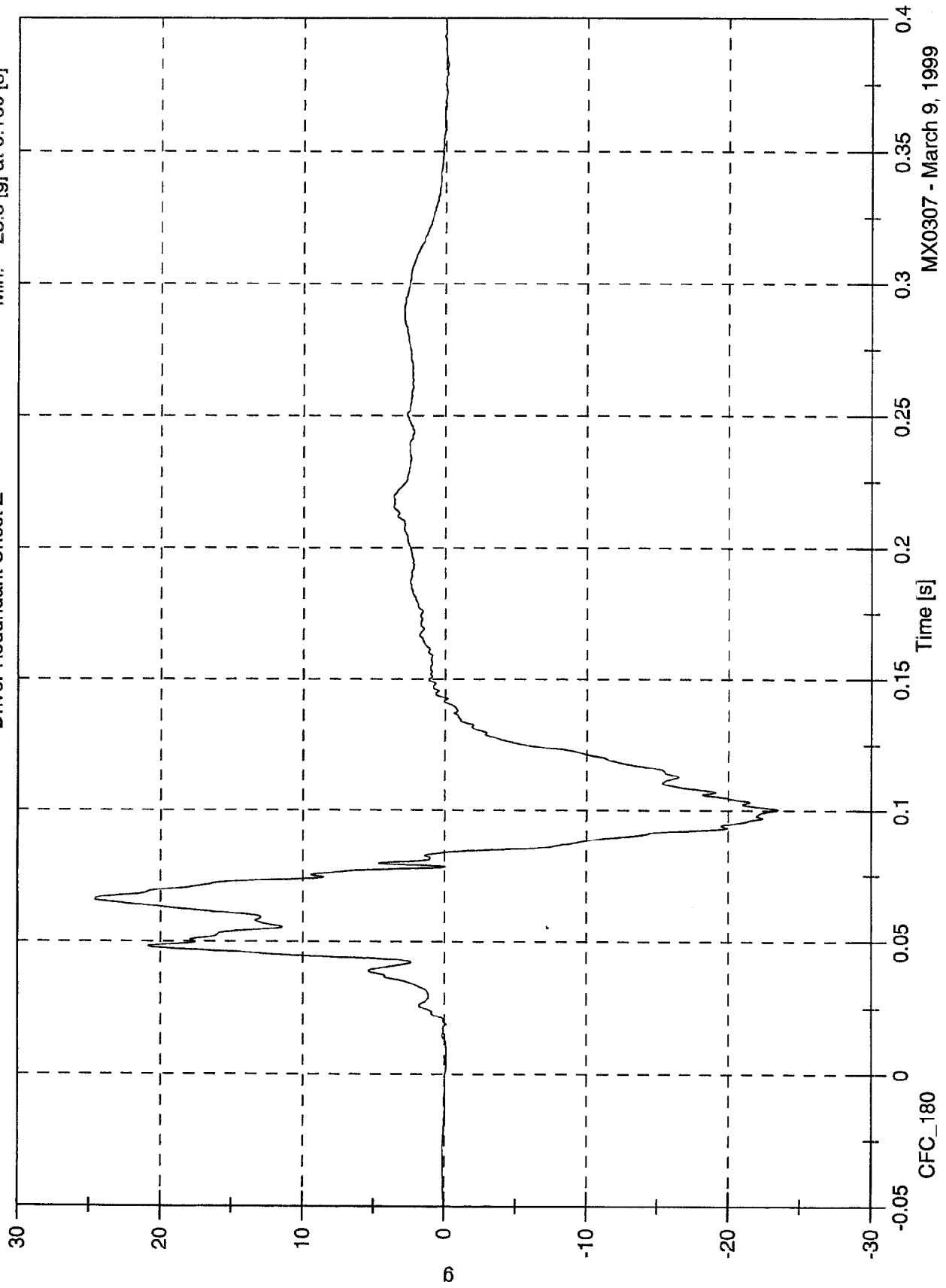


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 24.6 [g] at 0.066 [s]
Min: -23.5 [g] at 0.100 [s]

Driver Redundant Chest Z

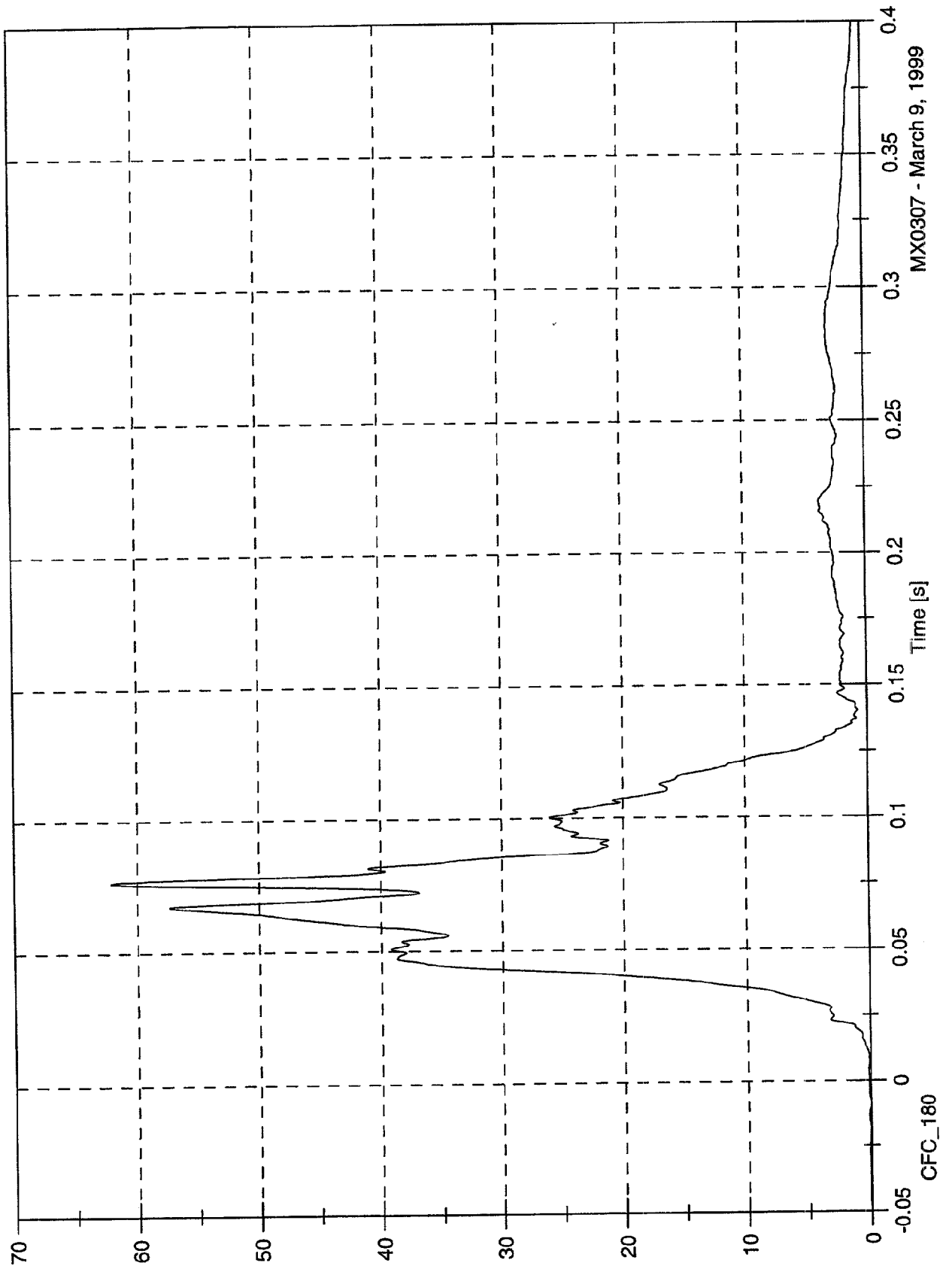


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 62.2 [g] at 0.077 [s]
Min: 0.0 [g] at -0.060 [s]

Driver Redundant Chest Resultant

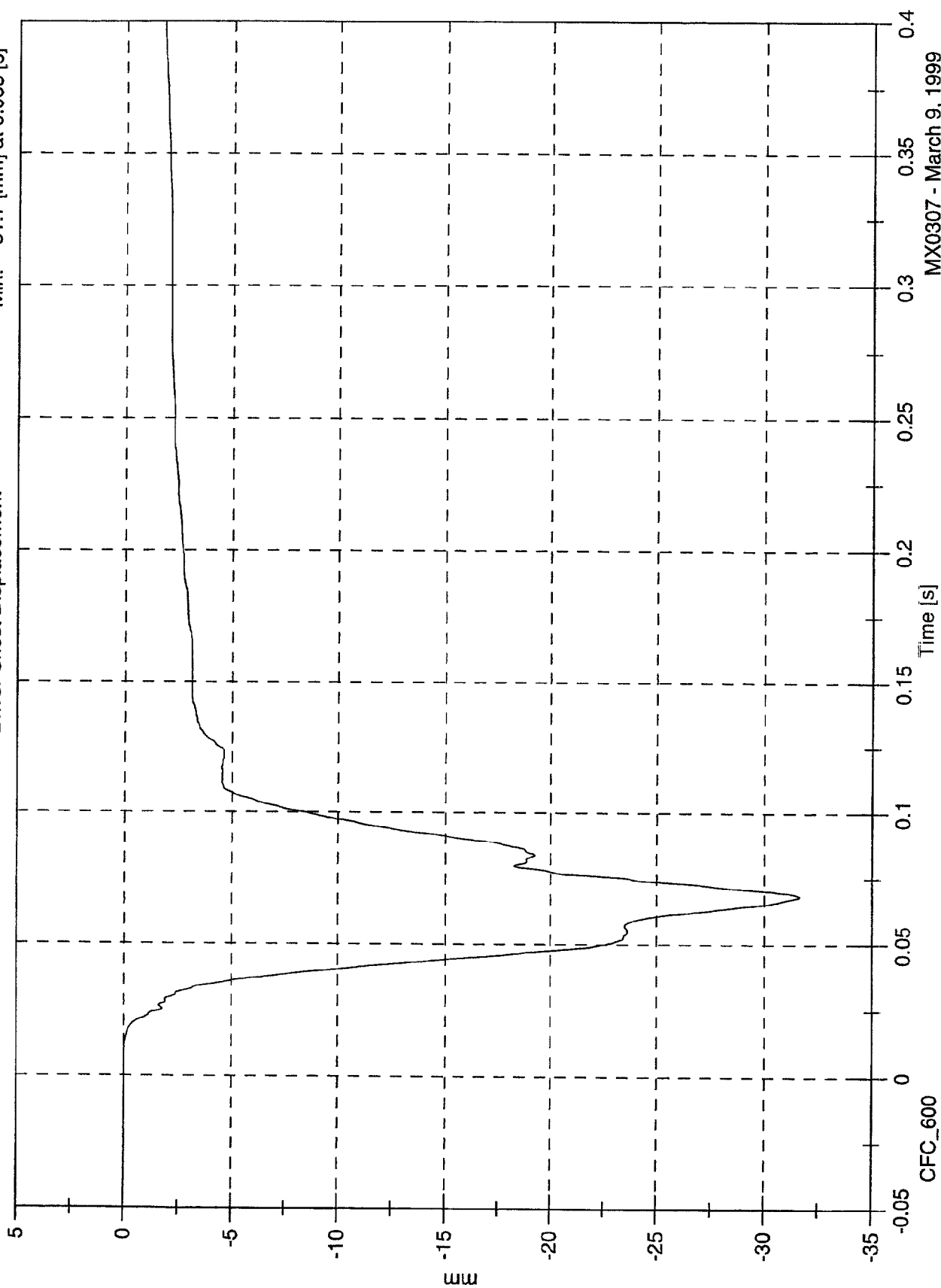


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Driver Chest Displacement

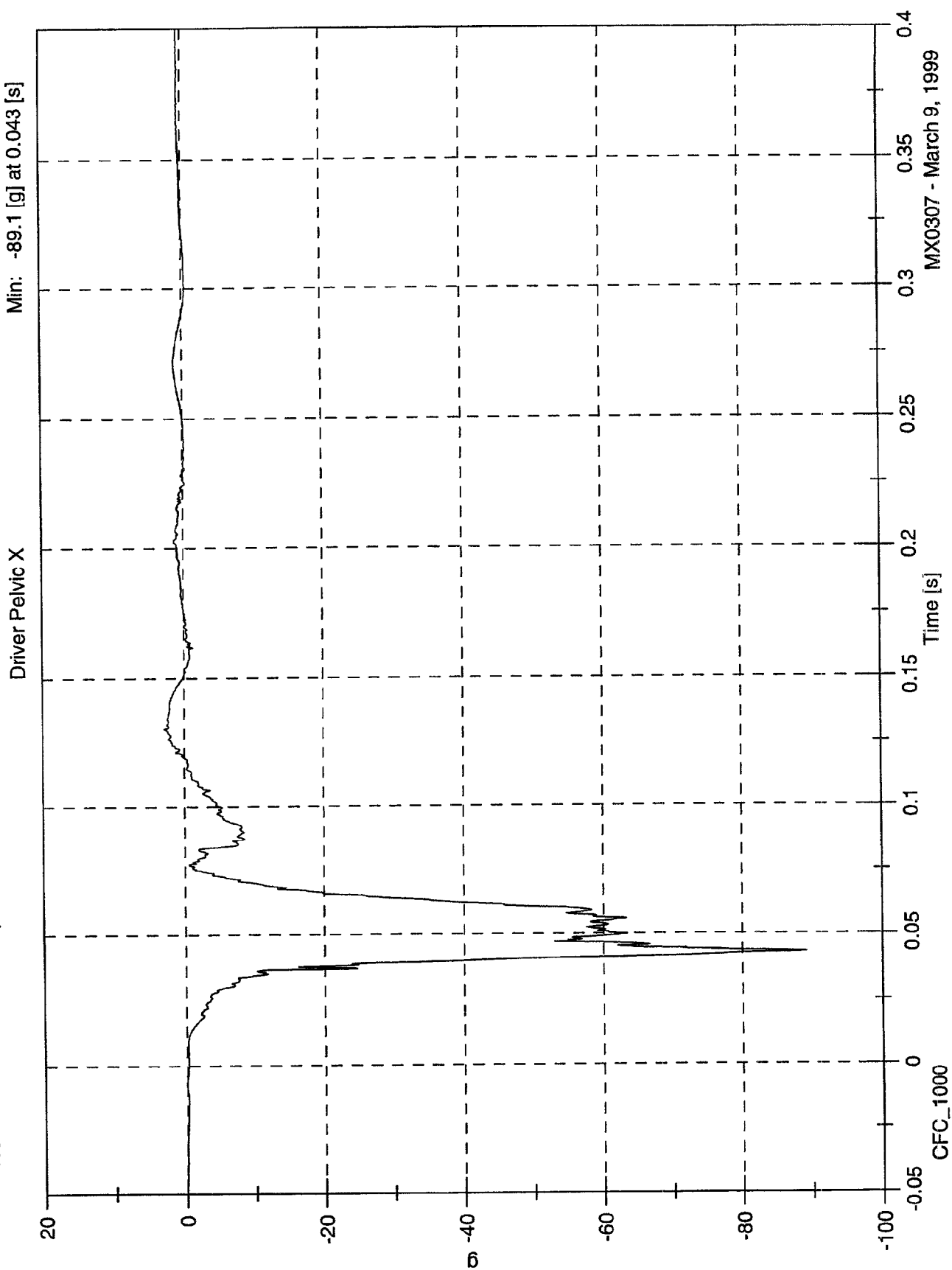
Max: 0.0 [mm] at -0.088 [s]
Min: -31.7 [mm] at 0.068 [s]



MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

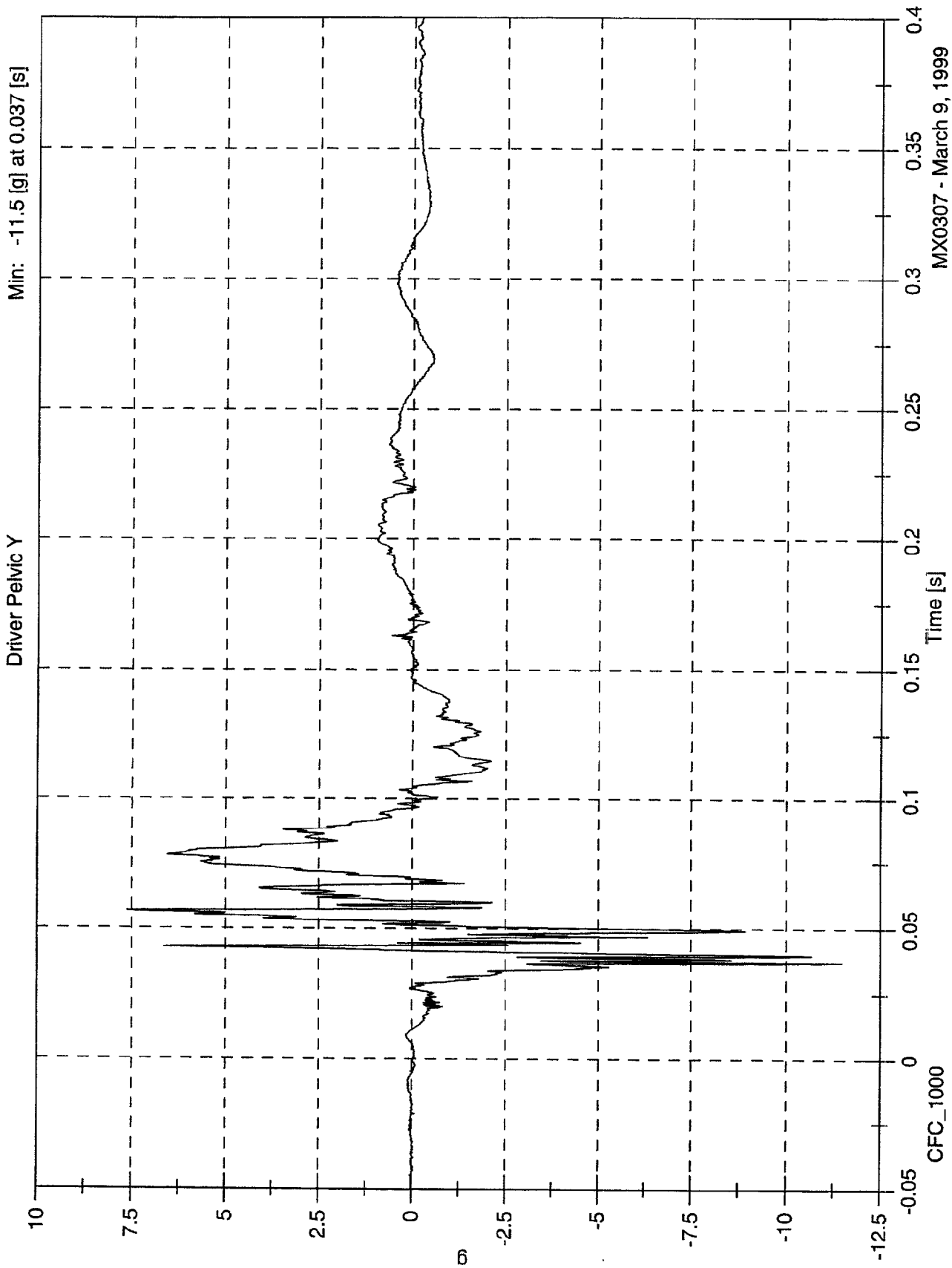
Max: 2.8 [g] at 0.130 [s]
Min: -89.1 [g] at 0.043 [s]



MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

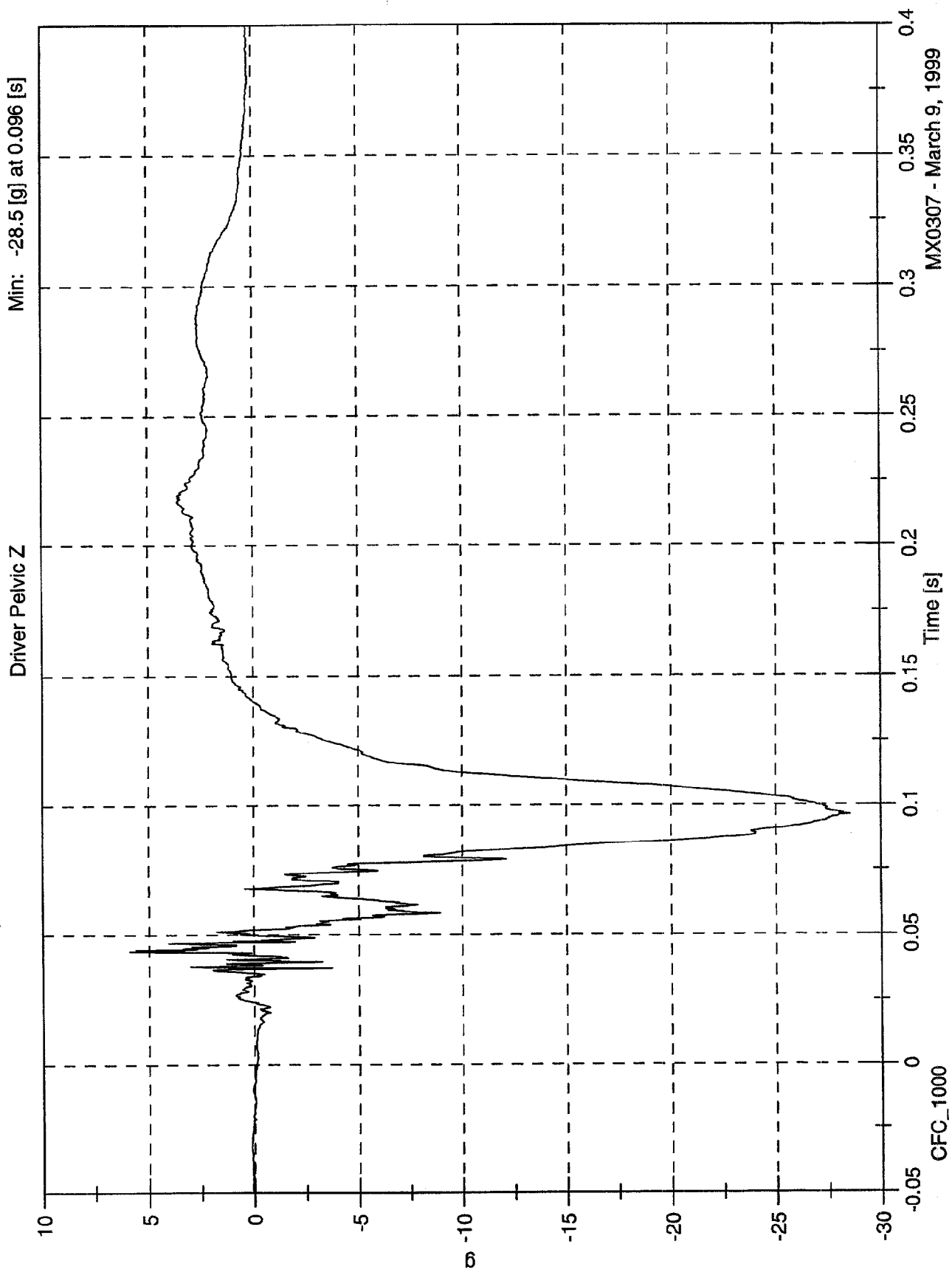
Max: 7.6 [g] at 0.057 [s]
Min: -11.5 [g] at 0.037 [s]



MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 5.9 [g] at 0.044 [s]
Min: -28.5 [g] at 0.096 [s]

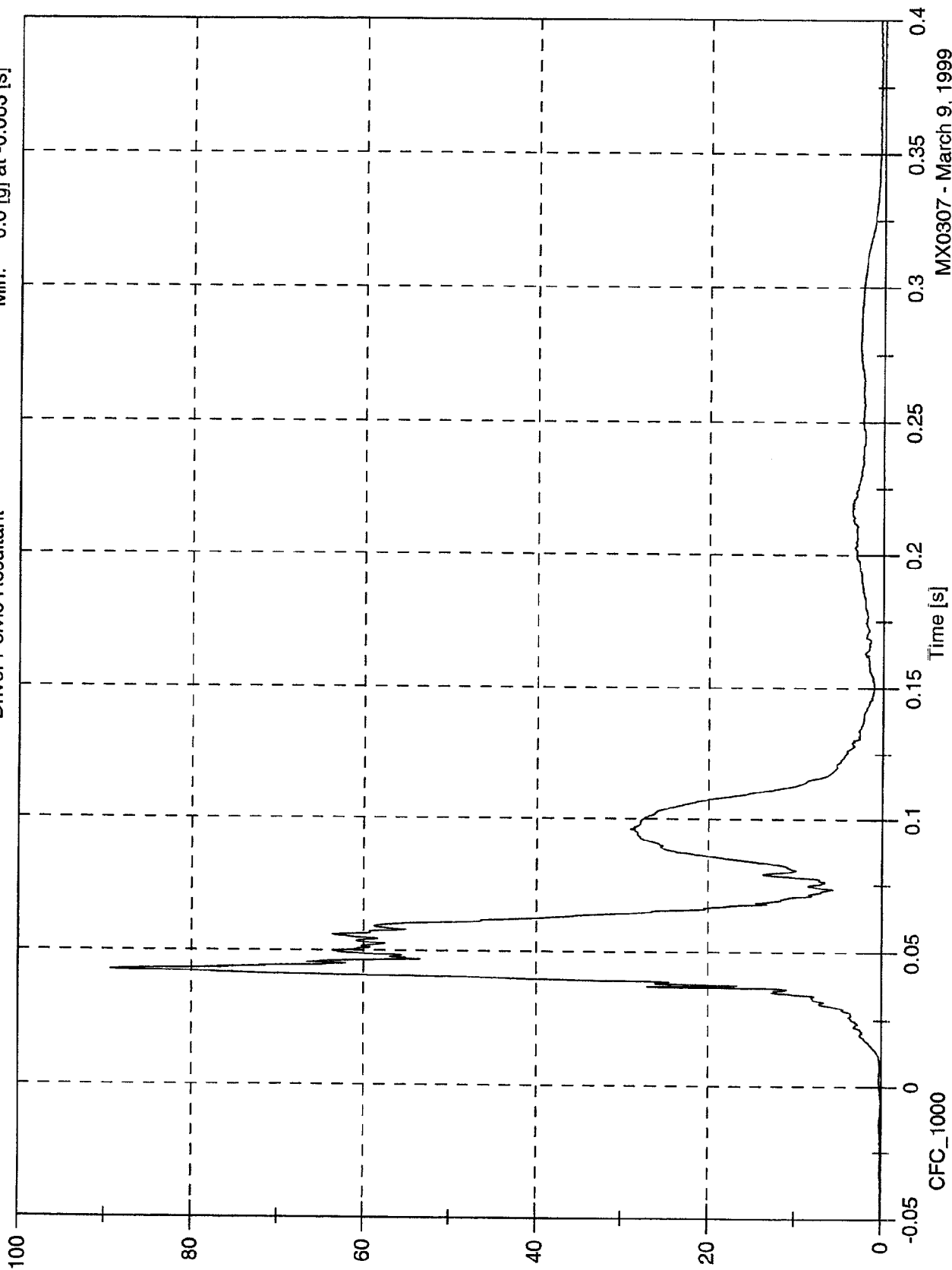


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 89.3 [g] at 0.043 [s]
Min: 0.0 [g] at -0.063 [s]

Driver Pelvic Resultant

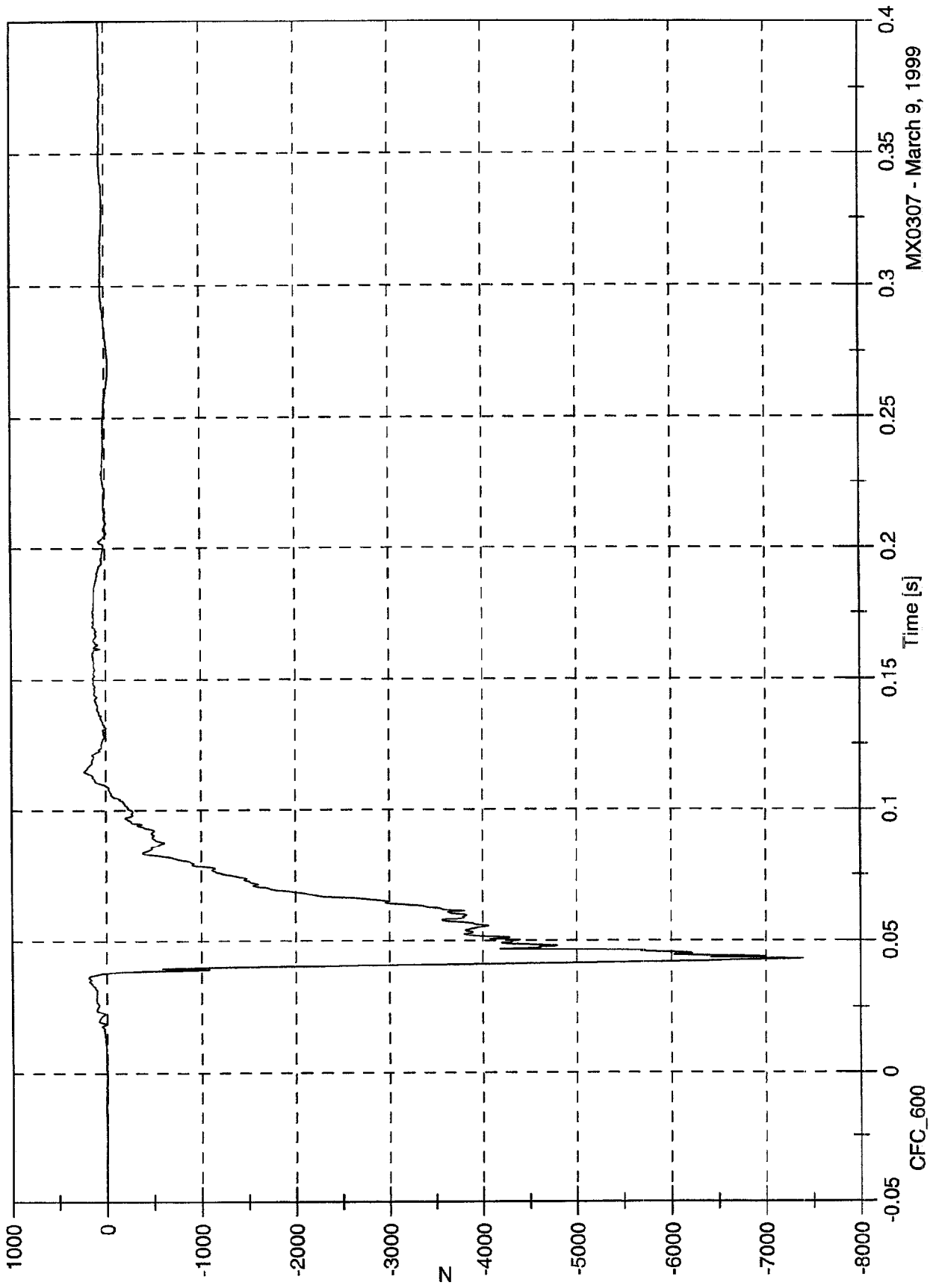


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NCAP Test #13 - 1999 Jeep Cherokee

Max: 226.7 [N] at 0.115 [s]
Min: -7393.2 [N] at 0.043 [s]

Driver Left Femur



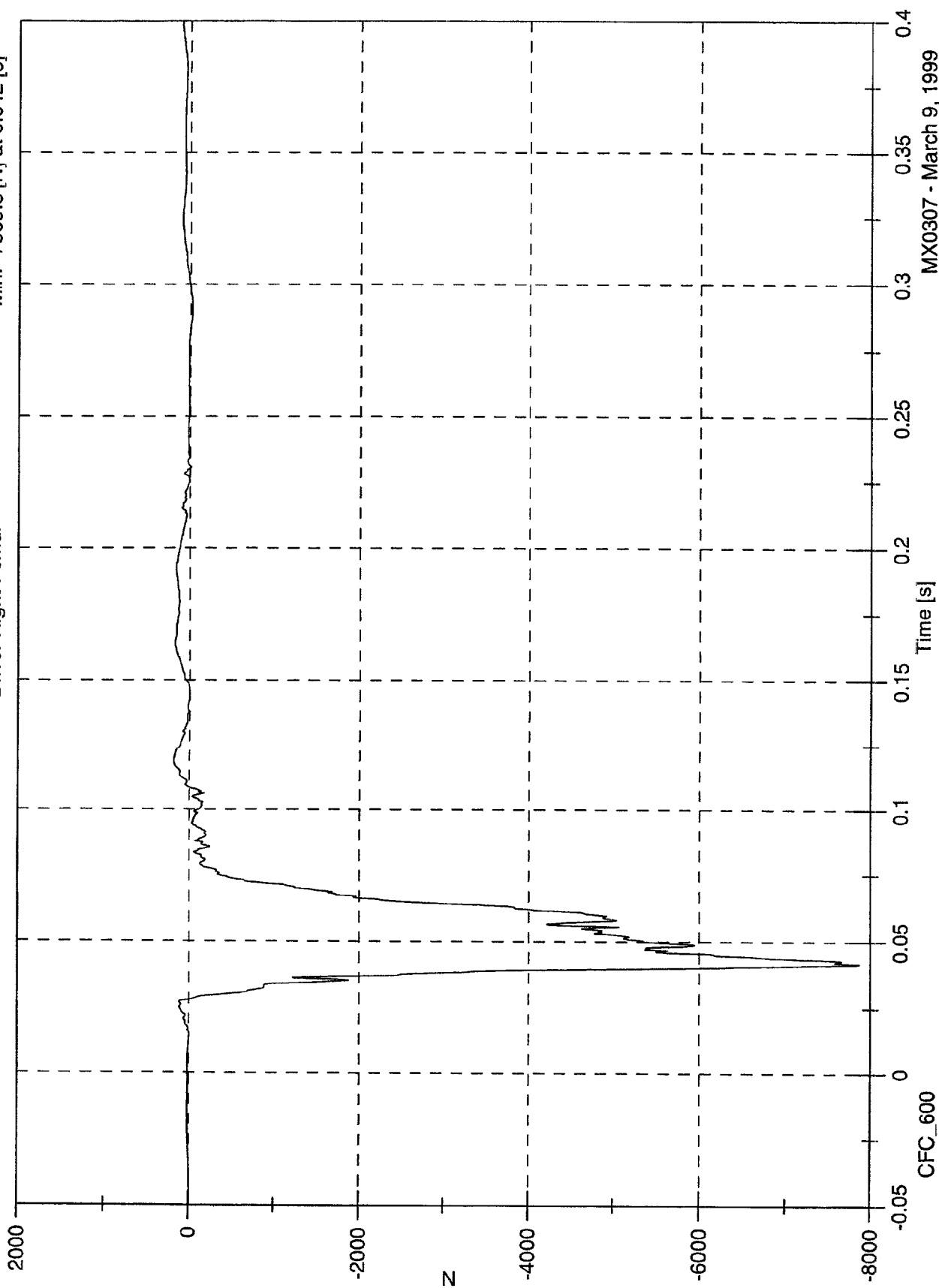
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Driver Right Femur

Max: 184.7 [N] at 0.119 [s]

Min: -7869.8 [N] at 0.042 [s]



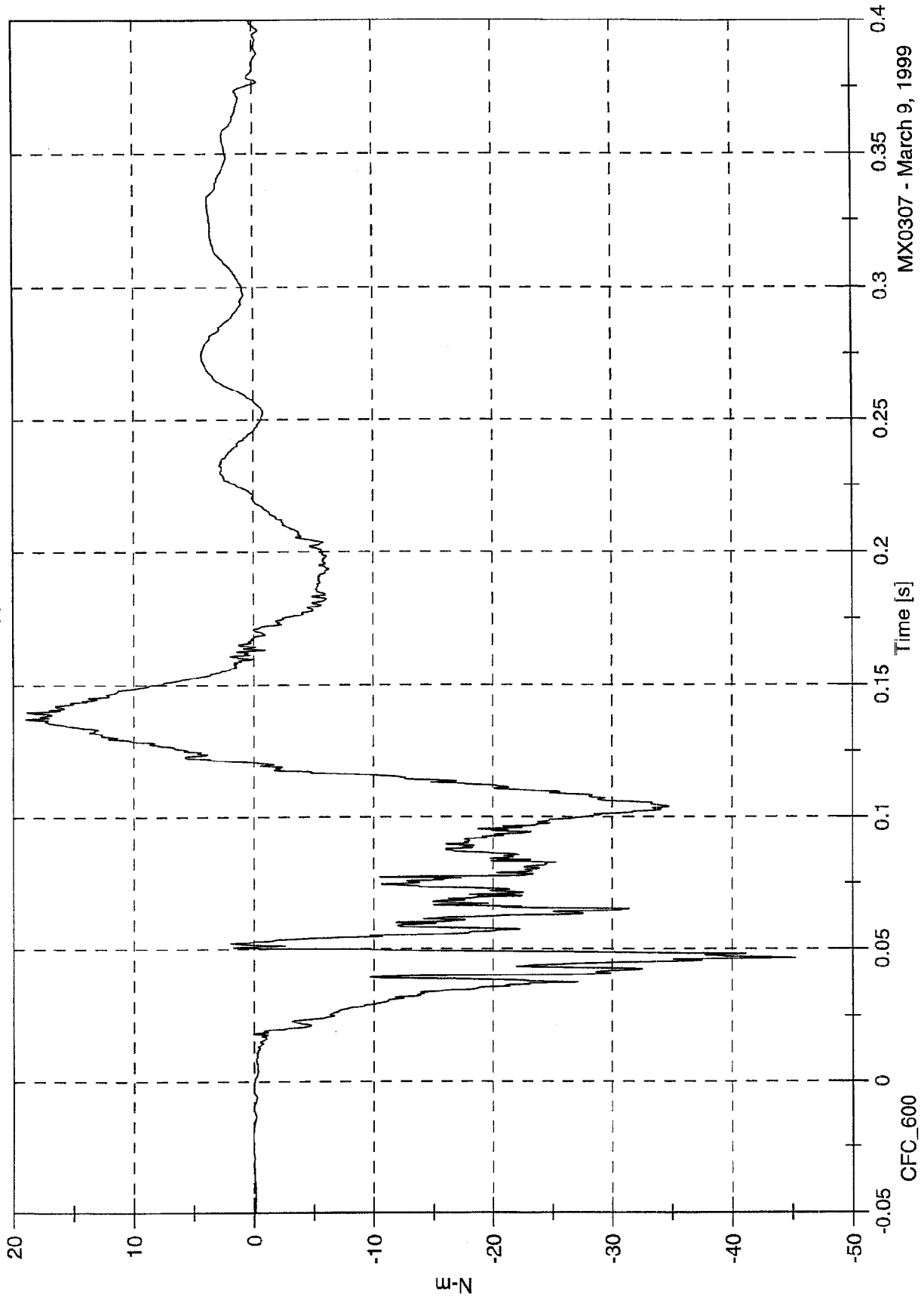
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 19.0 [N-m] at 0.137 [s]

Min: -45.2 [N-m] at 0.046 [s]

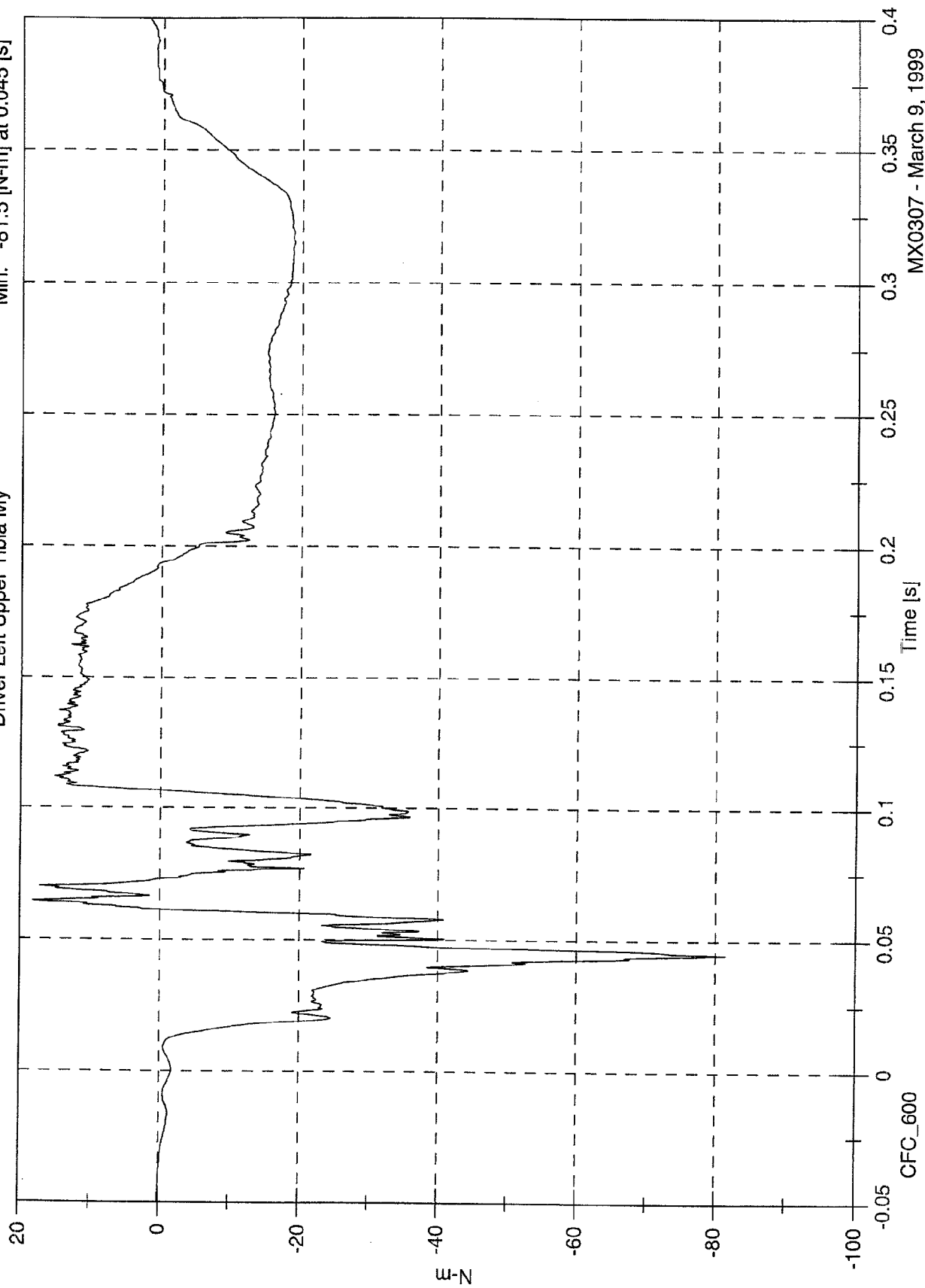
Driver Left Upper Tibia Mx



NCAP Test #13 - 1999 Jeep Cherokee

Max: 18.1 [N-m] at 0.065 [s]
Min: -81.5 [N-m] at 0.045 [s]

Driver Left Upper Tibia My

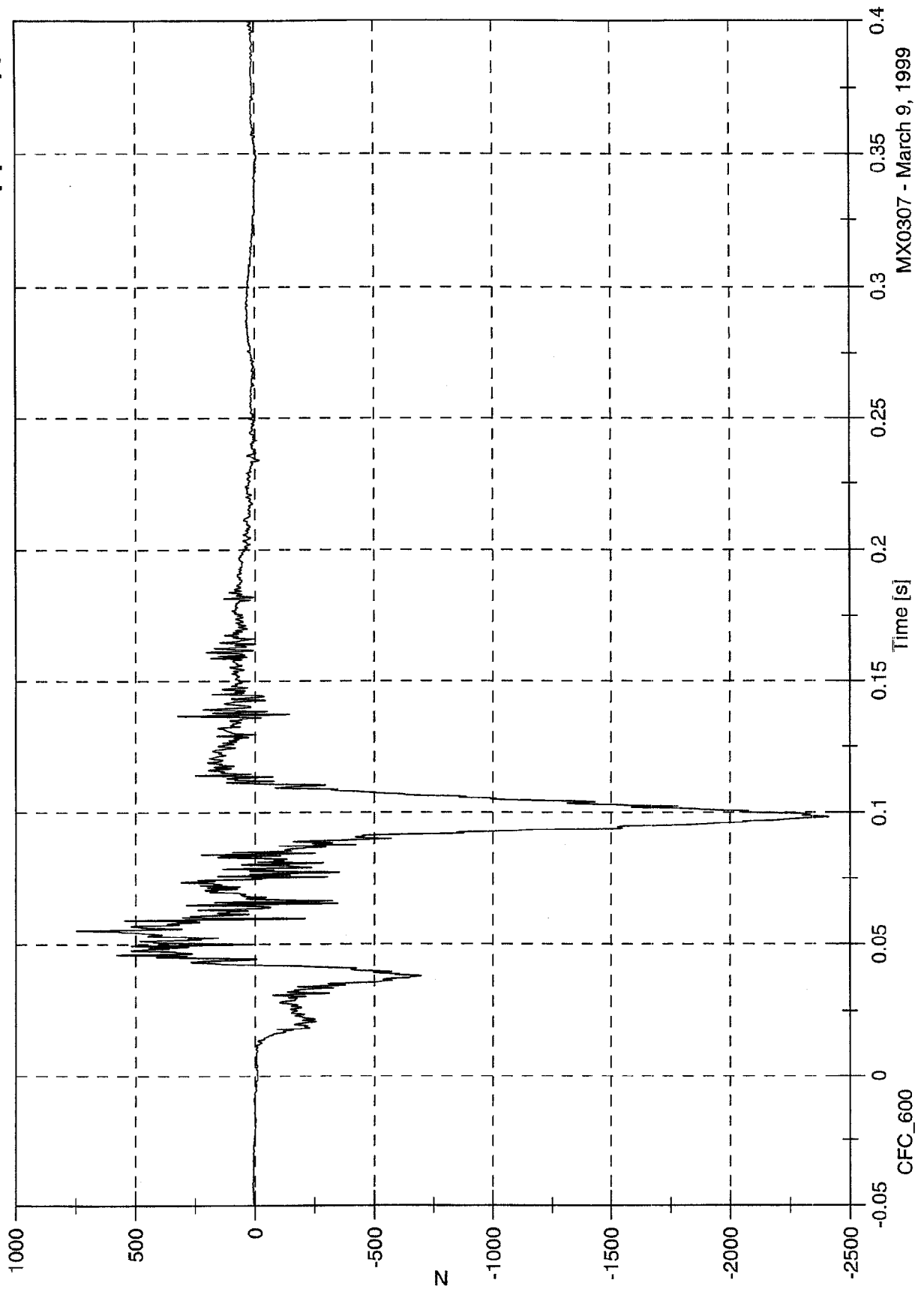


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NCAP Test #13 - 1999 Jeep Cherokee

Max: 748.1 [N] at 0.055 [s]
Min: -2408.6 [N] at 0.098 [s]

Driver Left Lower Tibia Fz



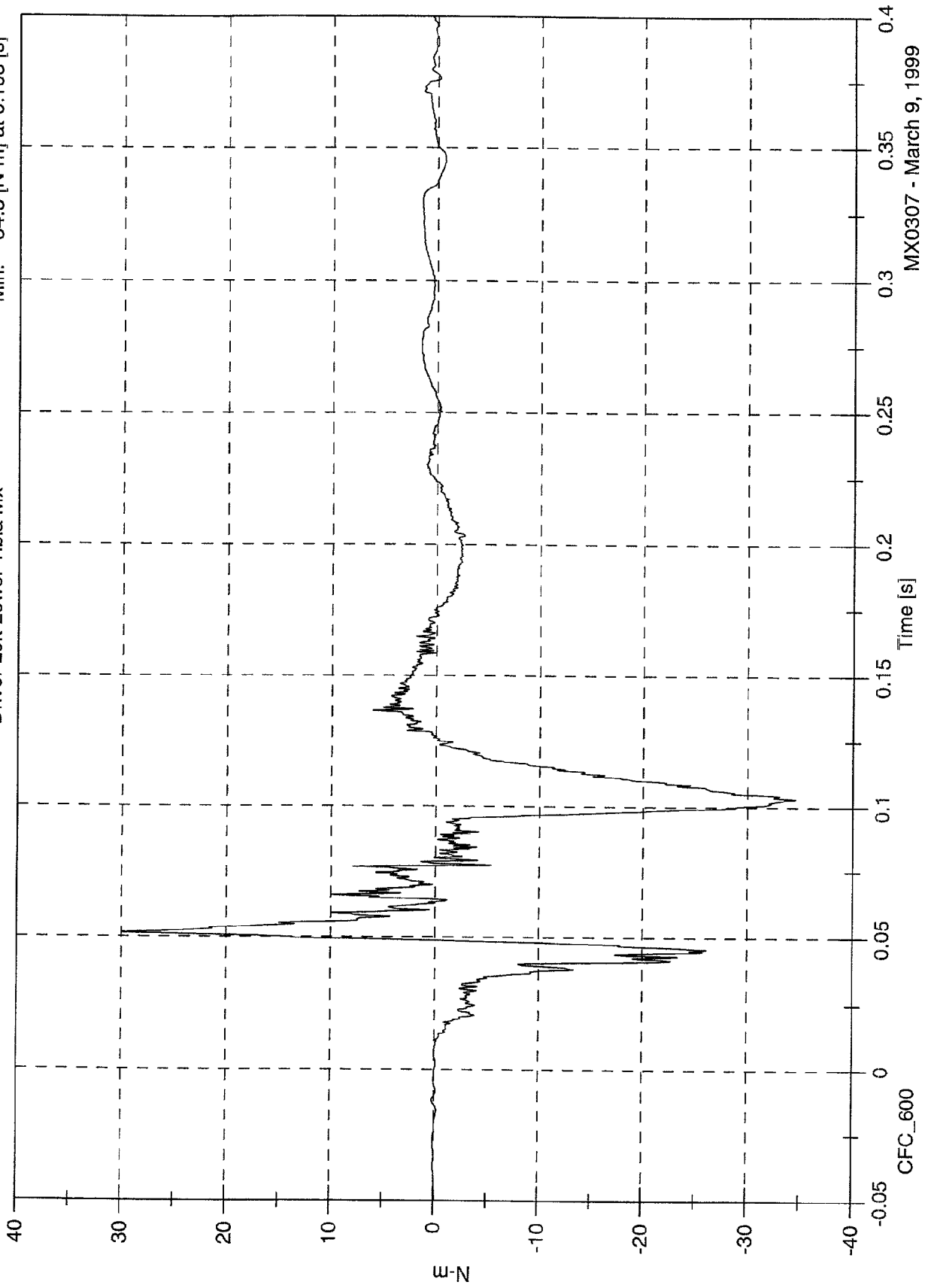
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Driver Left Lower Tibia Mx

Max: 30.0 [N-m] at 0.051 [s]

Min: -34.5 [N-m] at 0.103 [s]



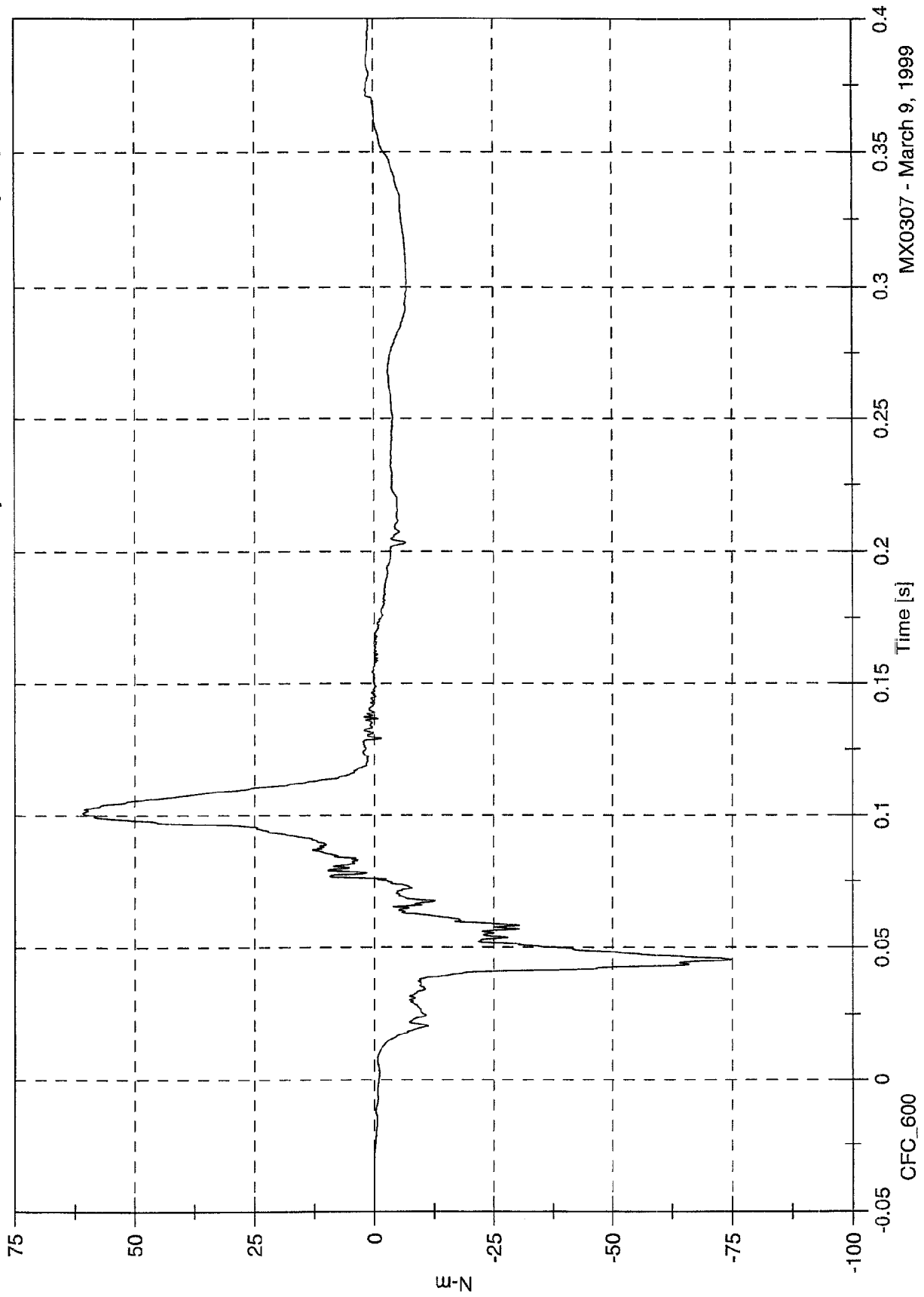
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 60.8 [N-m] at 0.101 [s]

Min: -75.1 [N-m] at 0.046 [s]

Driver Left Lower Tibia My



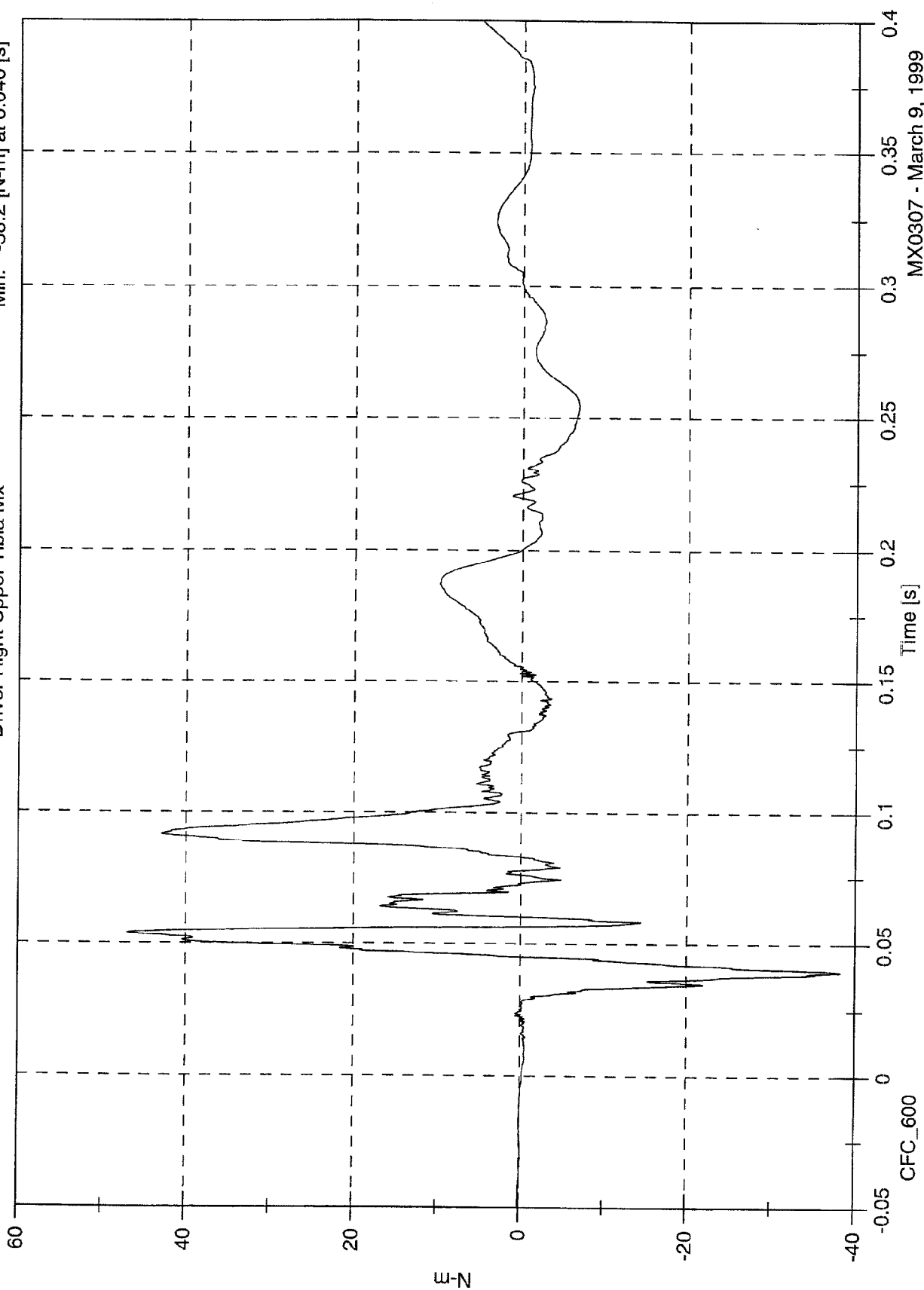
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Driver Right Upper Tibia Mx

Max: 47.0 [N-m] at 0.054 [s]

Min: -38.2 [N-m] at 0.040 [s]

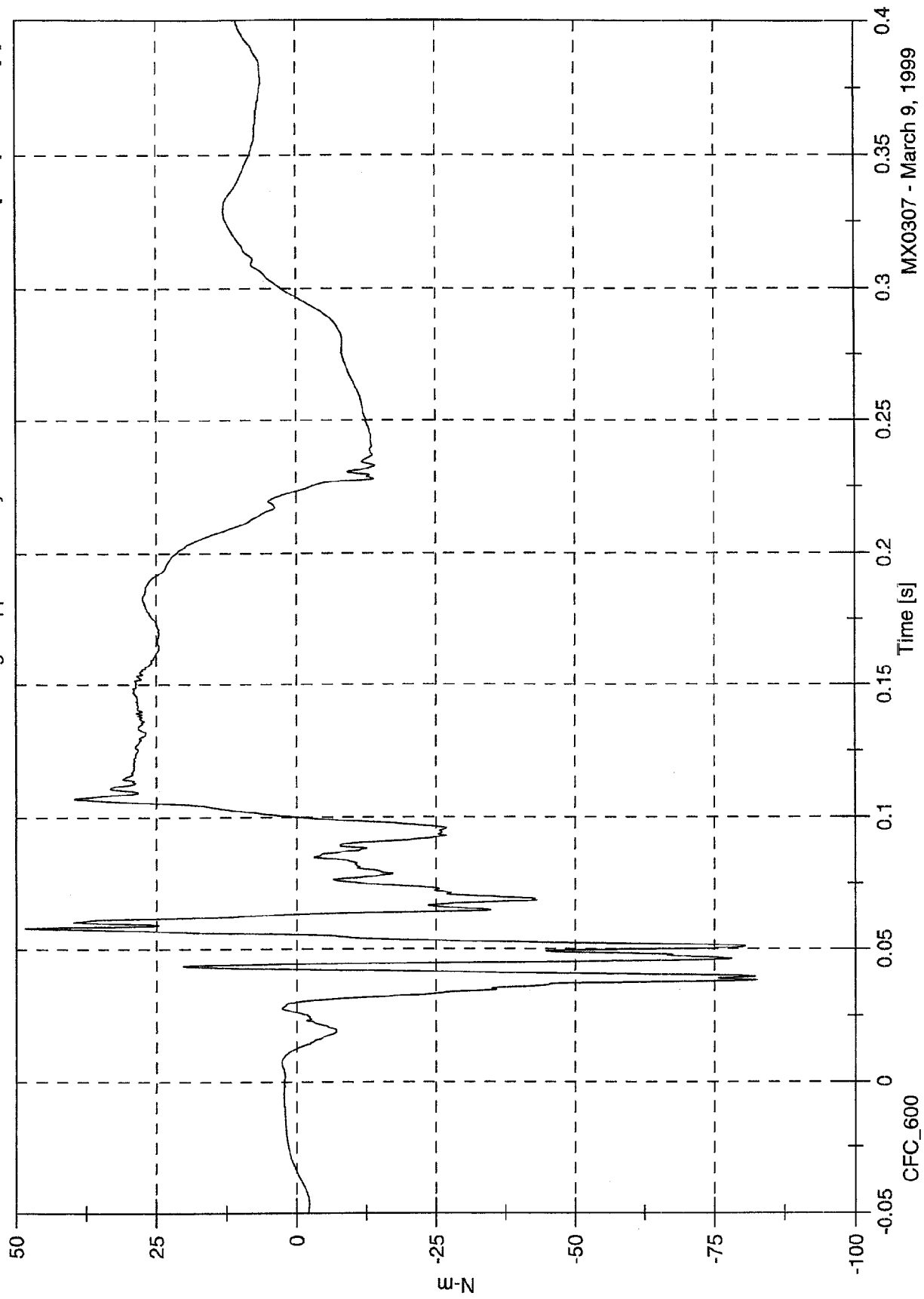


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Driver Right Upper Tibia My

Max: 48.5 [N-m] at 0.058 [s]
Min: -82.6 [N-m] at 0.038 [s]

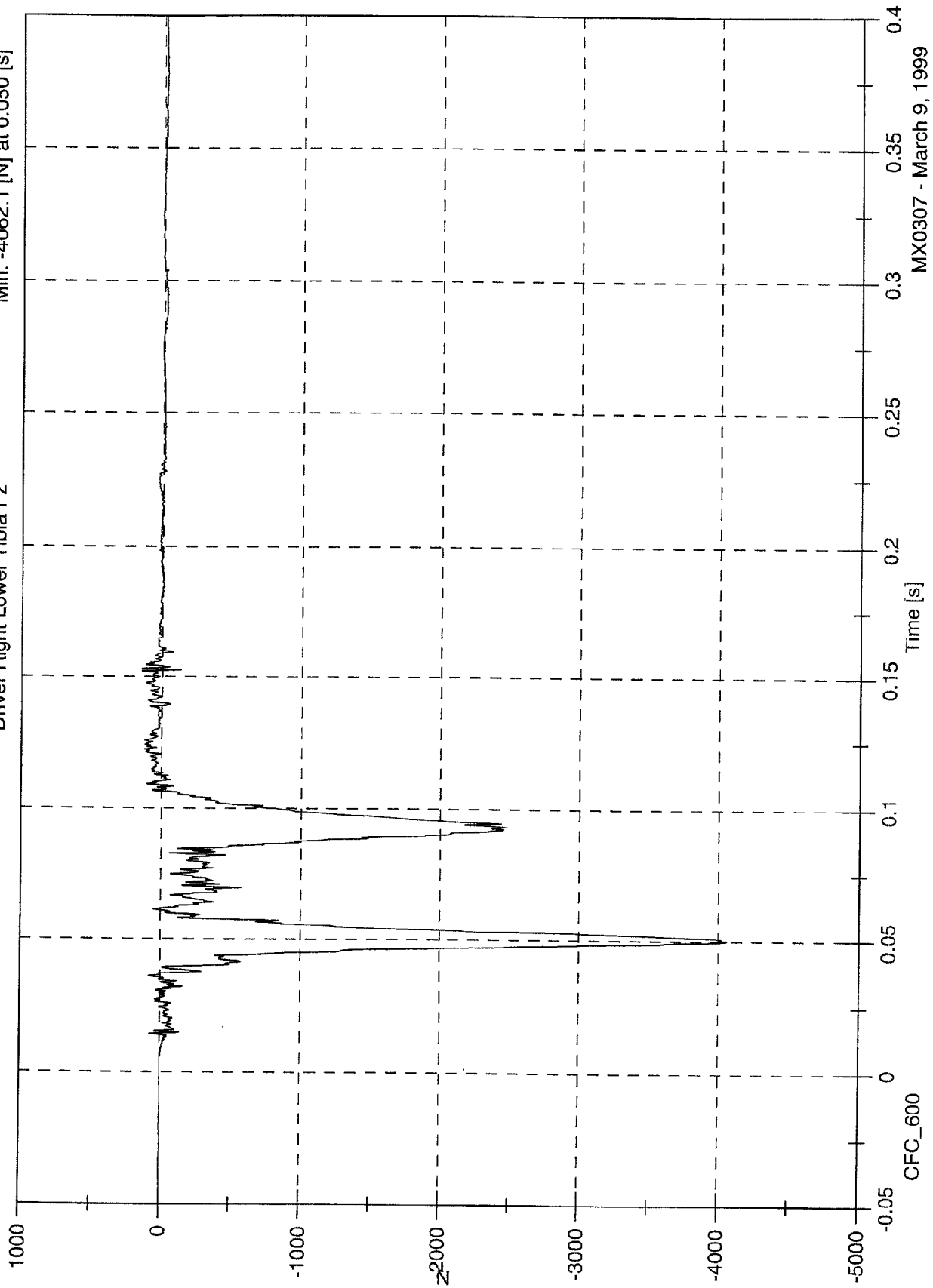


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NCAP Test #13 - 1999 Jeep Cherokee

Max: 145.9 [N] at 0.153 [s]
Min: -4062.1 [N] at 0.050 [s]

Driver Right Lower Tibia Fz

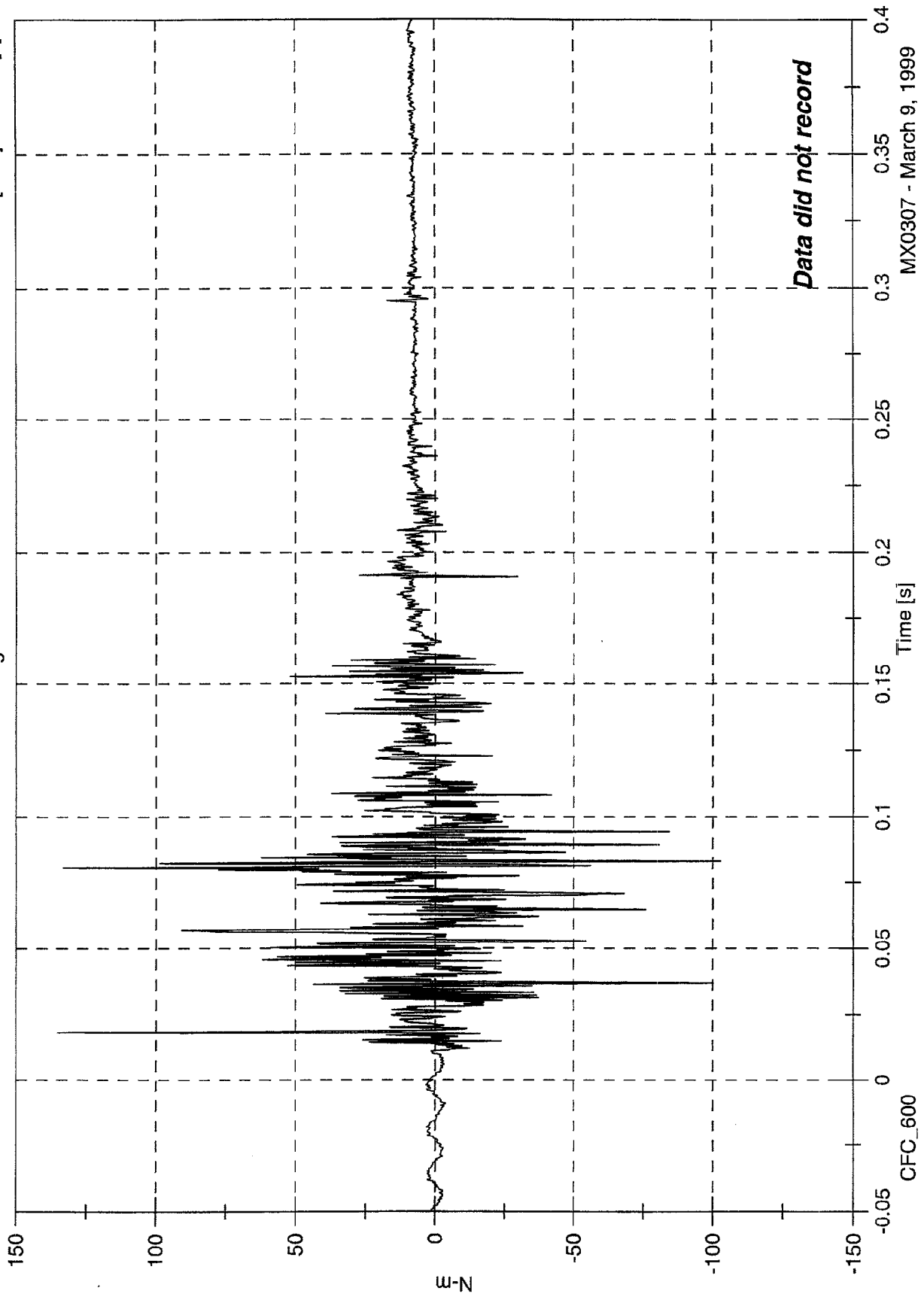


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 135.2 [N-m] at 0.018 [s]
Min: -102.8 [N-m] at 0.083 [s]

Driver Right Lower Tibia Mx



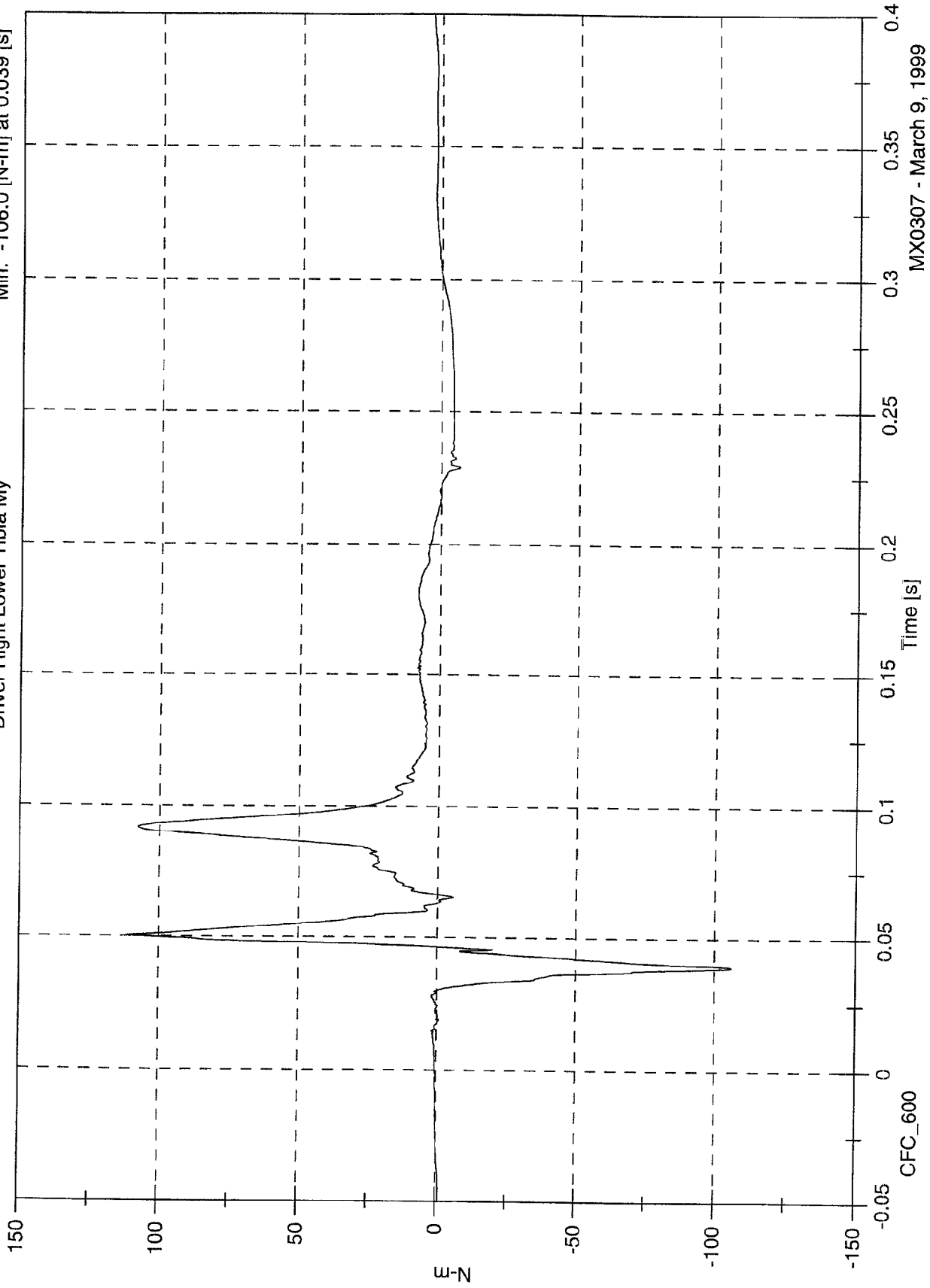
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 111.7 [N-m] at 0.050 [s]

Min: -106.0 [N-m] at 0.039 [s]

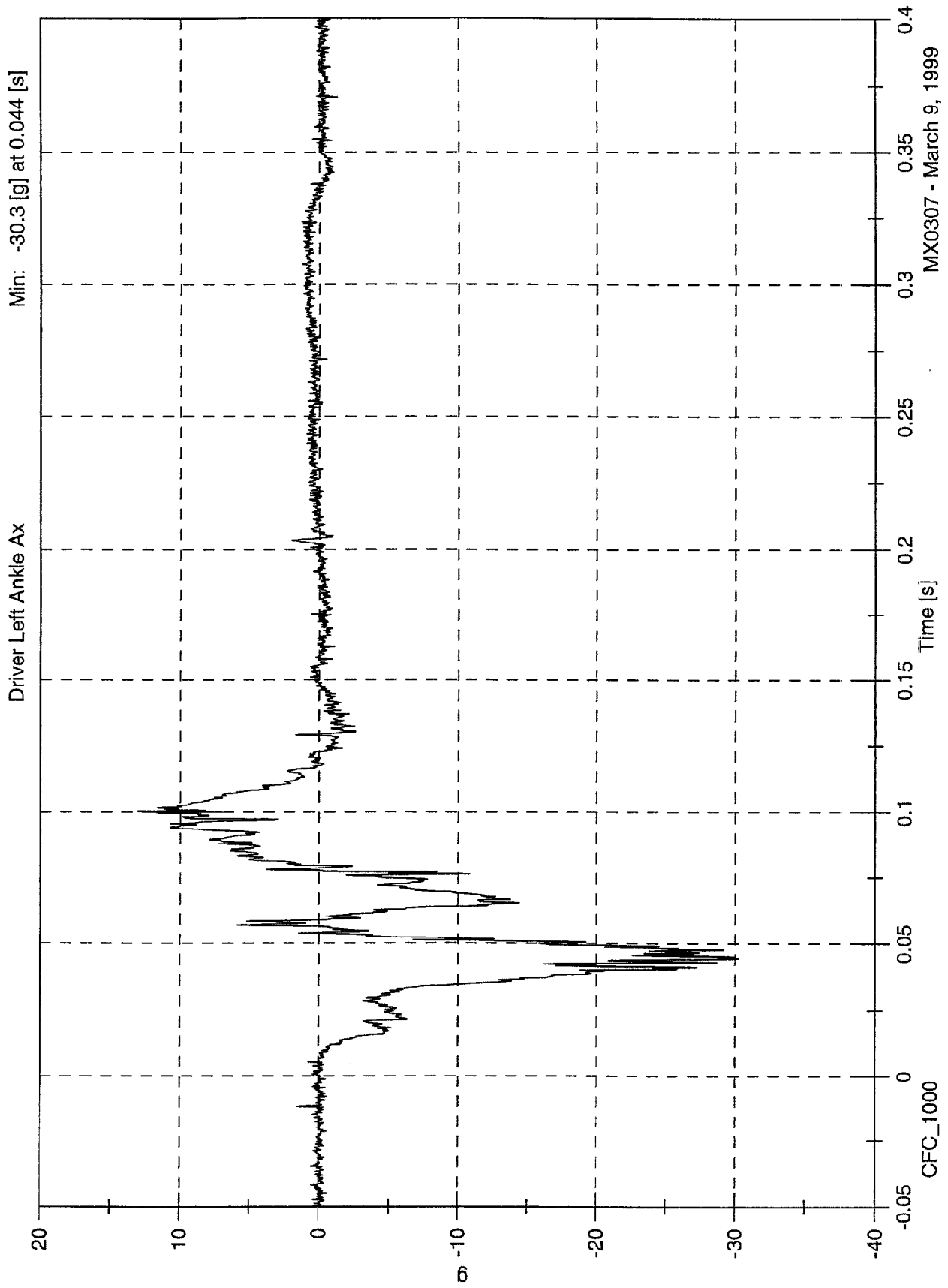
Driver Right Lower Tibia My



MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

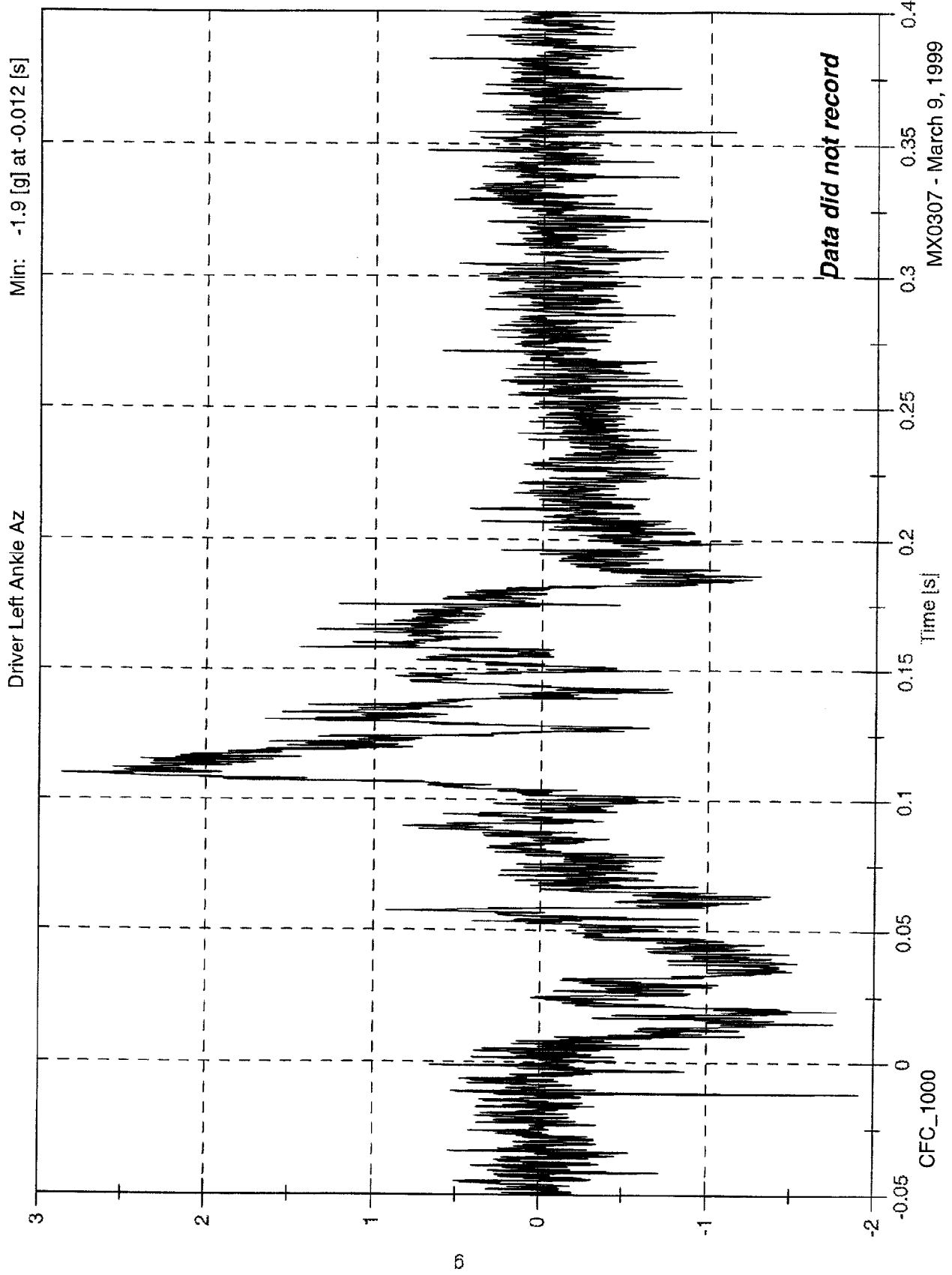
Max: 13.0 [g] at 0.100 [s]
Min: -30.3 [g] at 0.044 [s]



MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 2.9 [g] at 0.110 [s]
Min: -1.9 [g] at -0.012 [s]

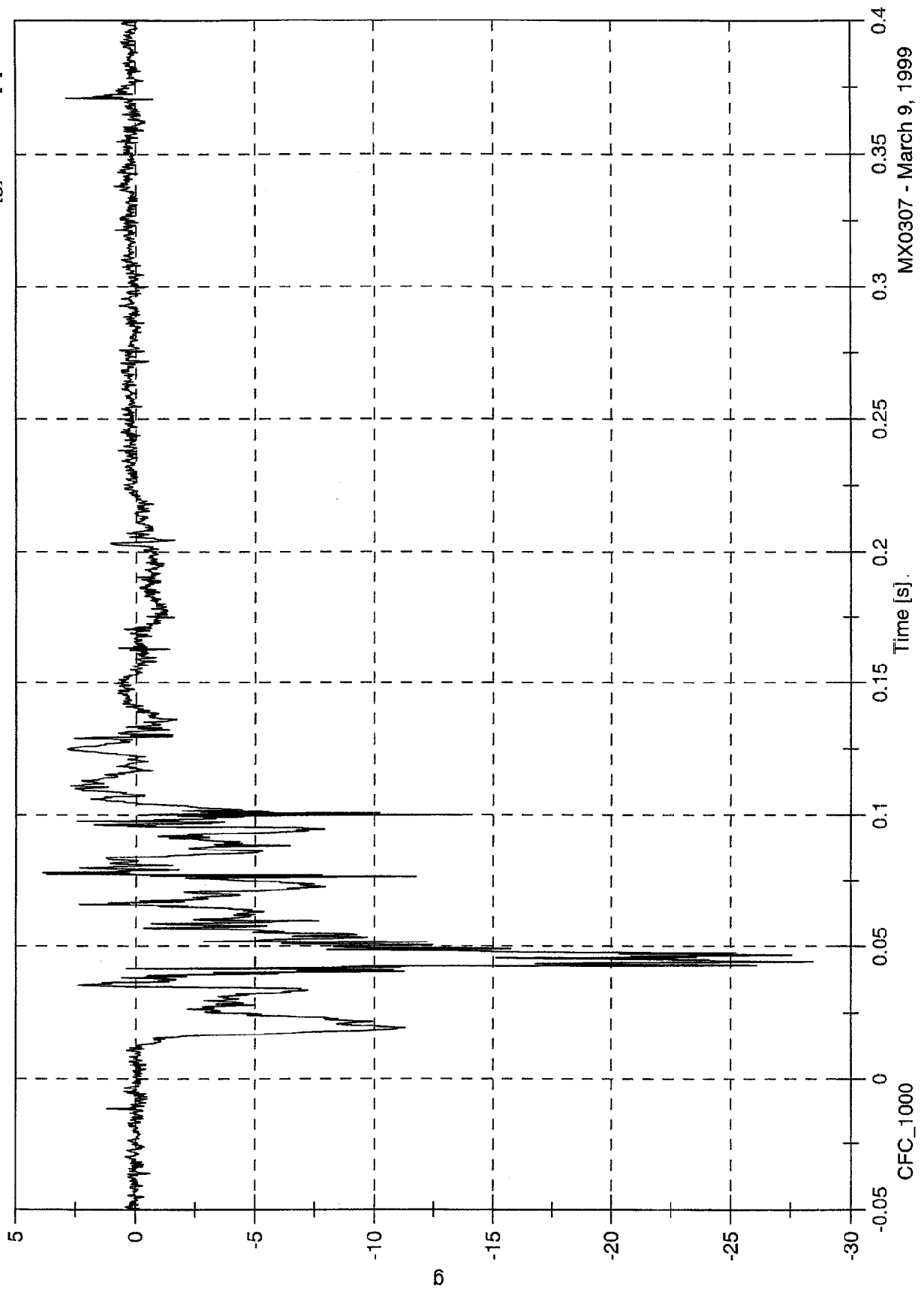


NCAP Test #13 - 1999 Jeep Cherokee

Max: 3.9 [g] at 0.078 [s]

Min: -28.4 [g] at 0.044 [s]

Driver Left Toe Az



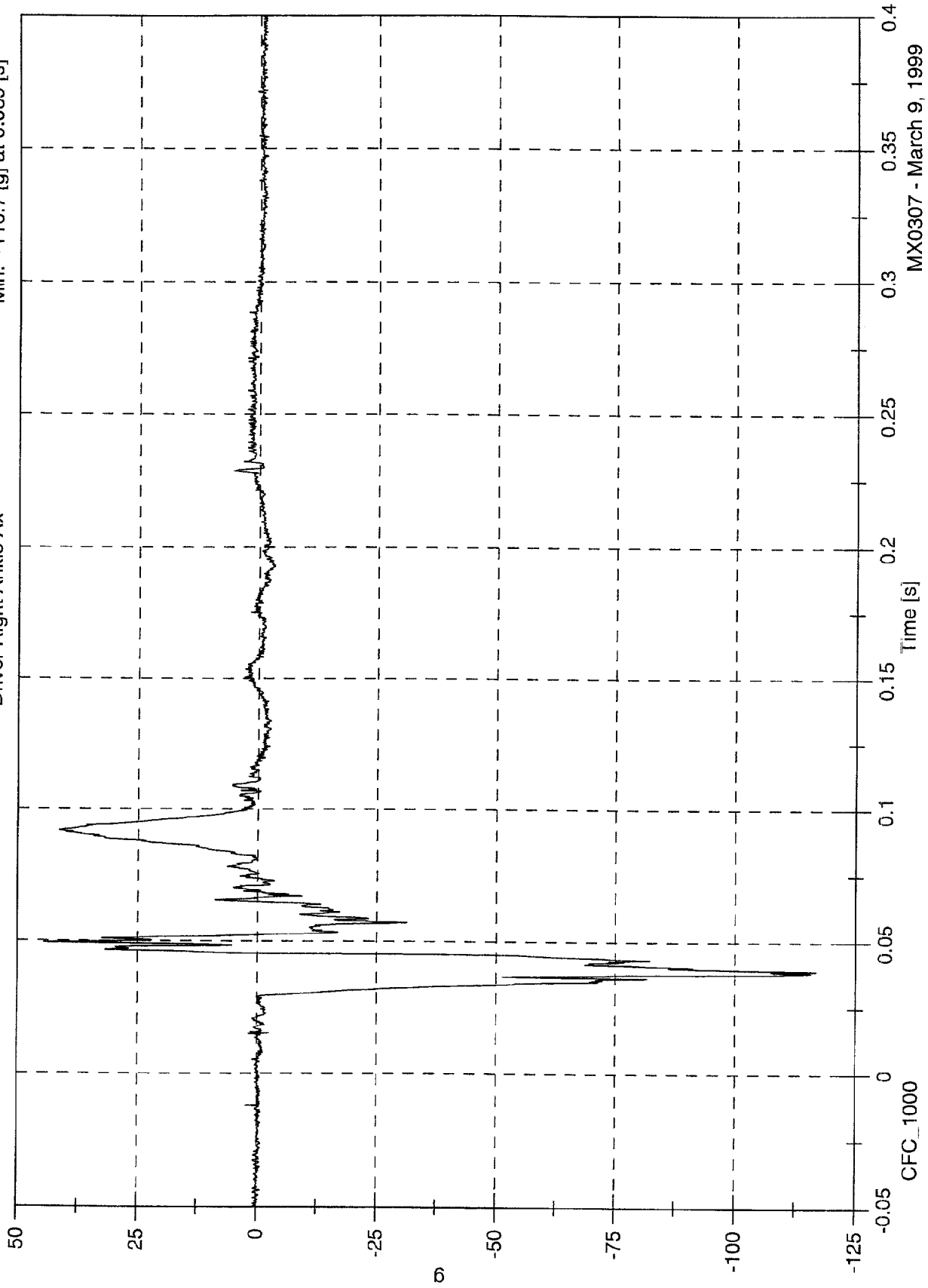
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Driver Right Ankle Ax

Max: 44.5 [g] at 0.049 [s]

Min: -116.7 [g] at 0.039 [s]

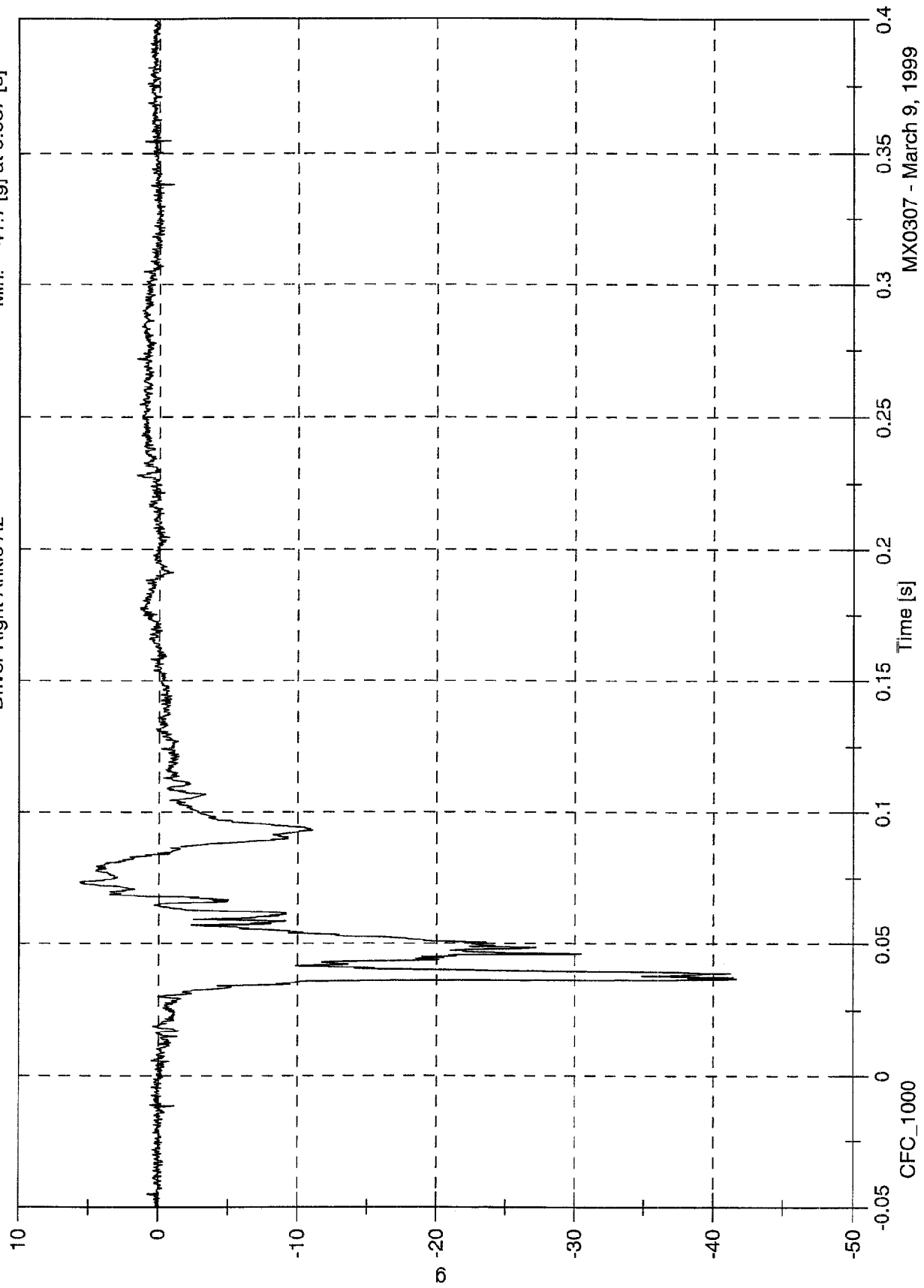


MX0307 - March 9, 1999

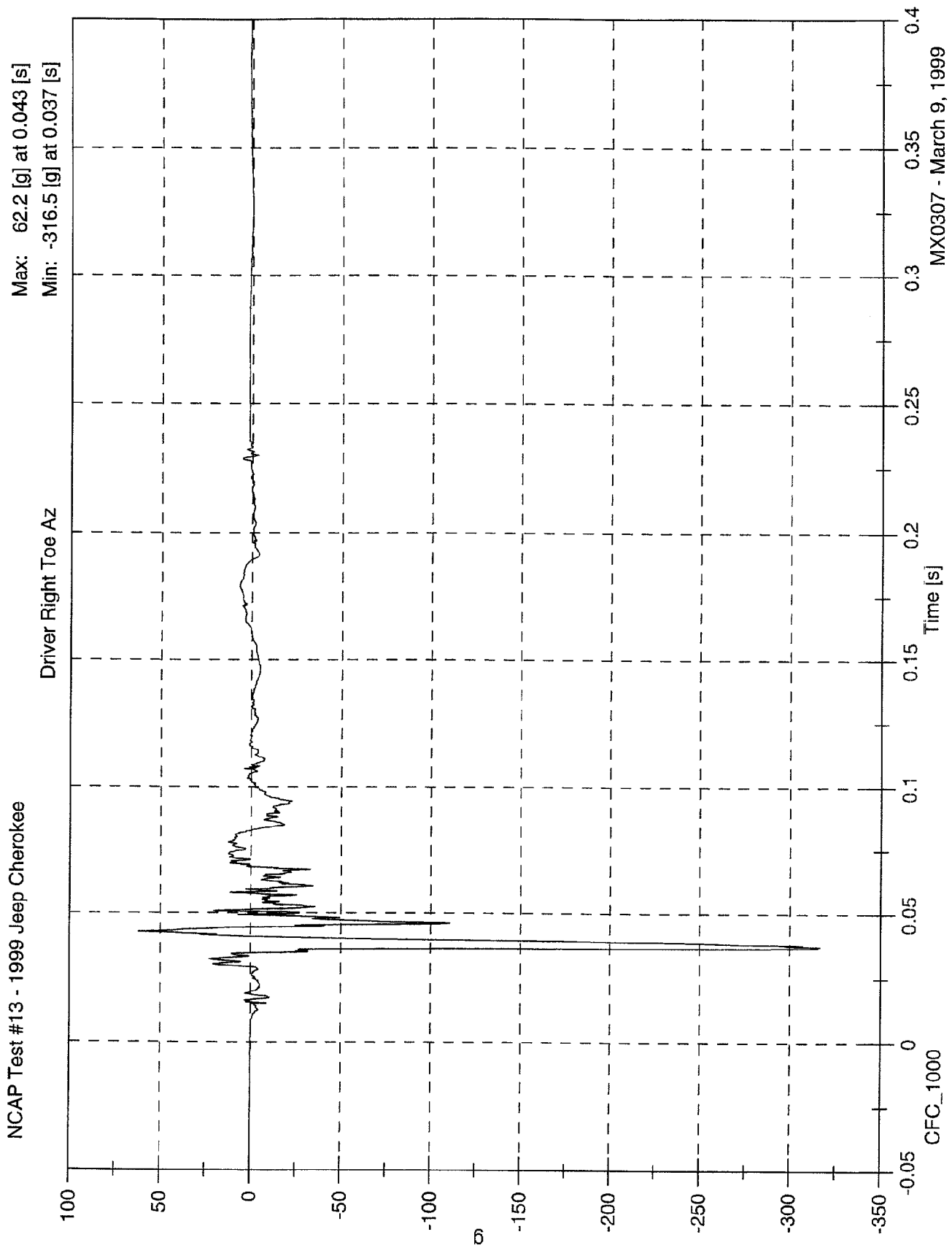
NCAP Test #13 - 1999 Jeep Cherokee

Max: 5.7 [g] at 0.073 [s]
Min: -41.7 [g] at 0.037 [s]

Driver Right Ankle Az



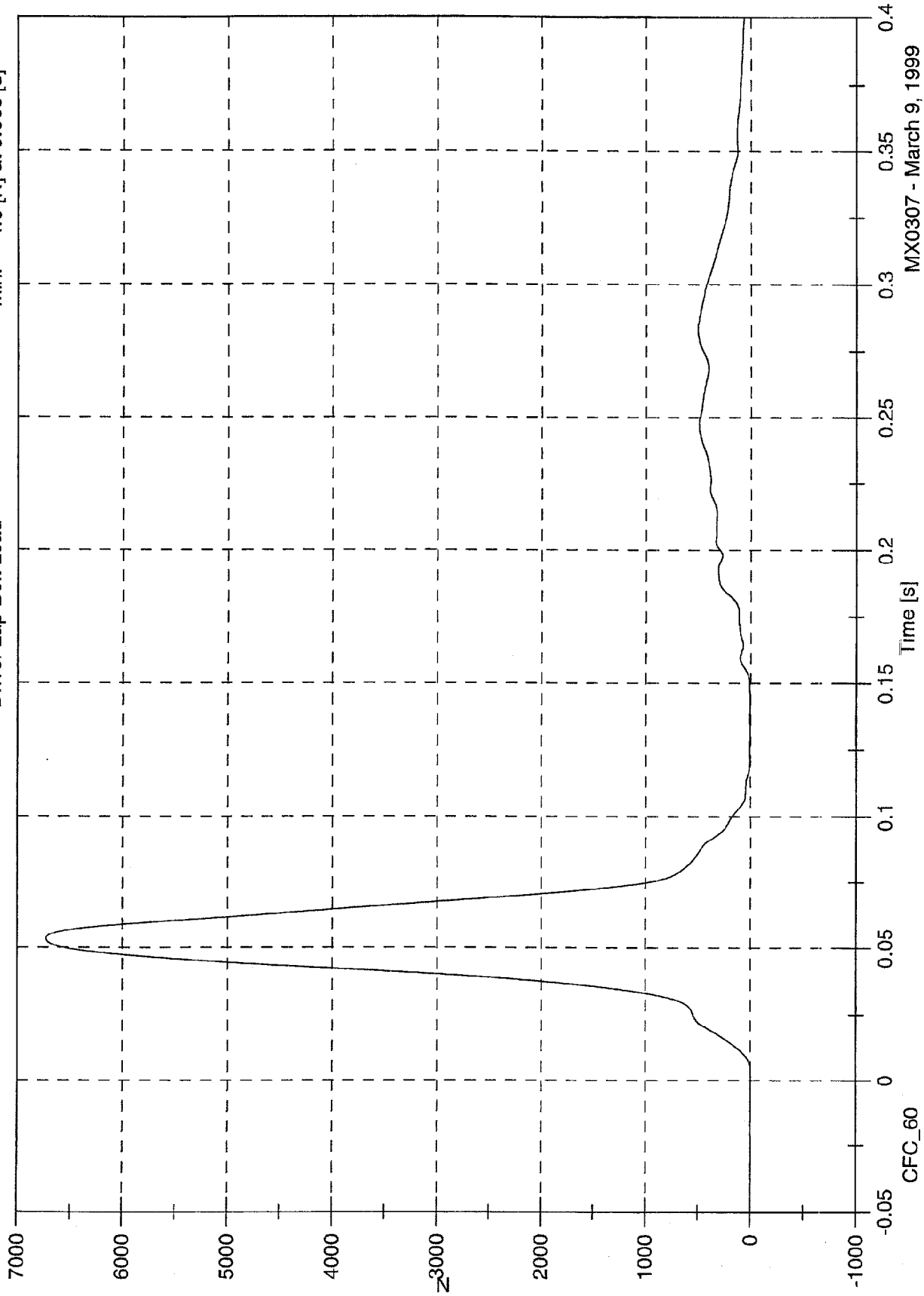
MX0307 - March 9, 1999



NCAP Test #13 - 1999 Jeep Cherokee

Max: 6730.4 [N] at 0.053 [s]
Min: -4.0 [N] at 0.003 [s]

Driver Lap Belt Load

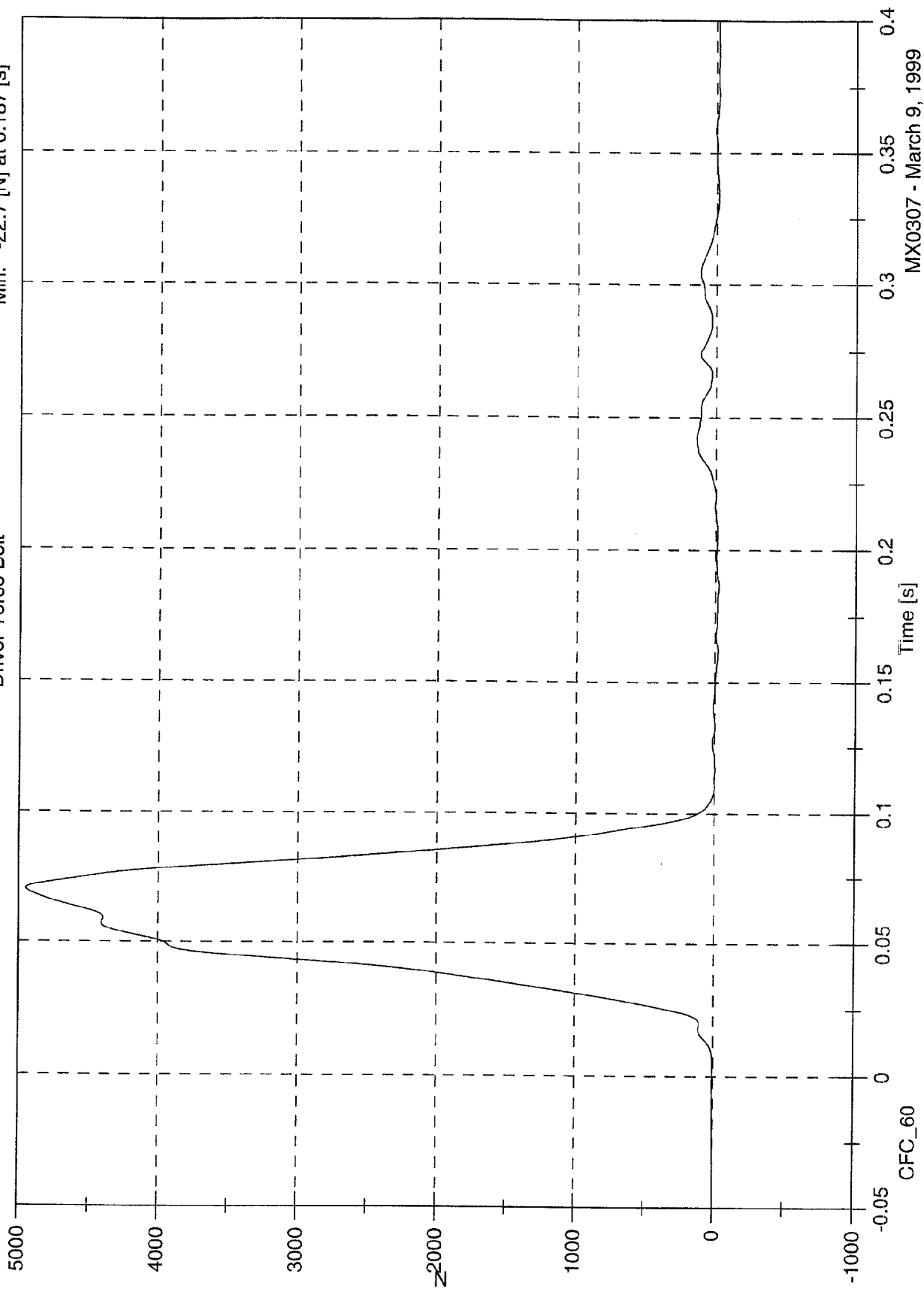


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 4948.7 [N] at 0.070 [s]
 Min: -22.7 [N] at 0.187 [s]

Driver Torso Belt

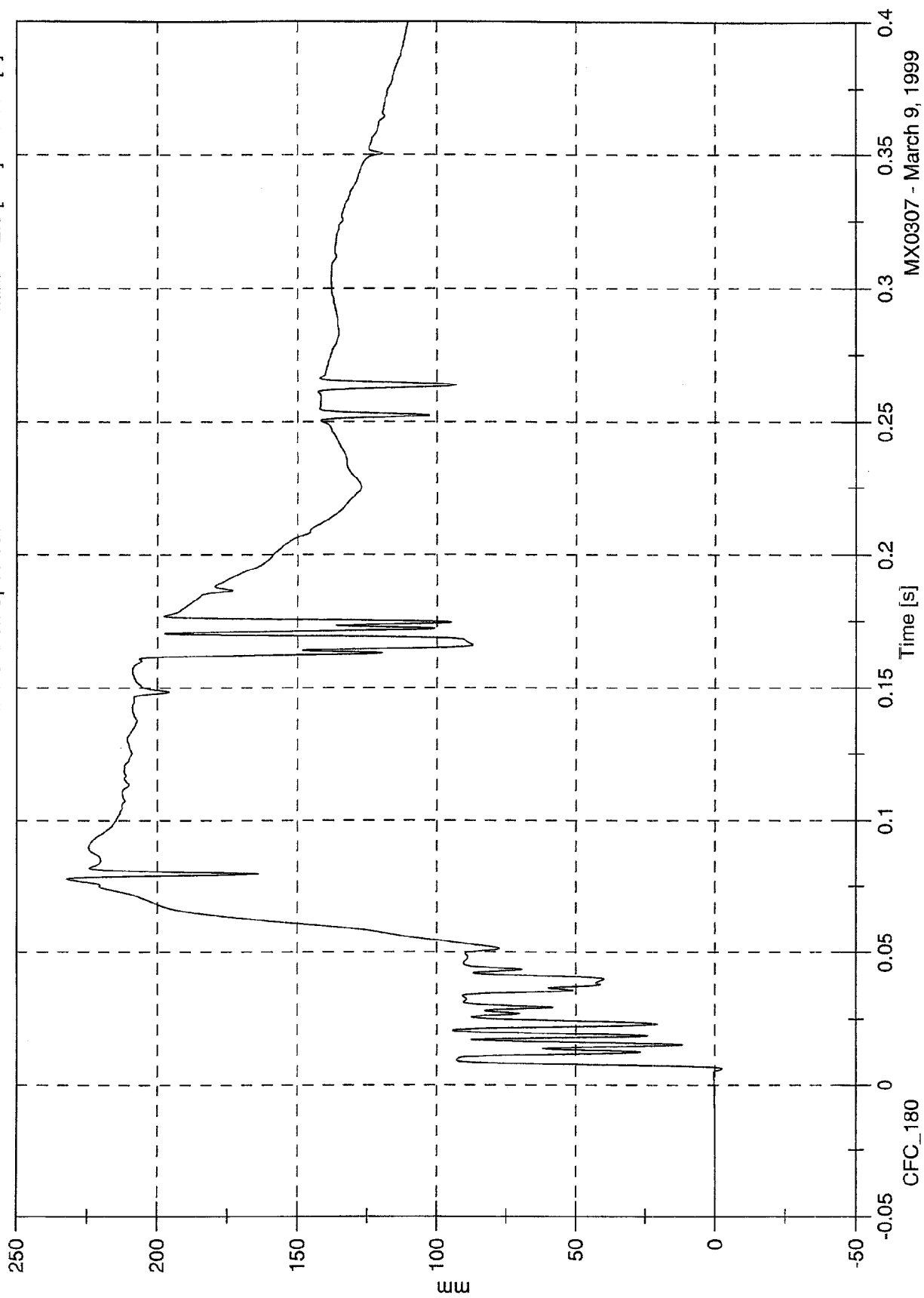


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 232.3 [mm] at 0.078 [s]
Min: -2.6 [mm] at 0.006 [s]

Driver Belt Spoolout

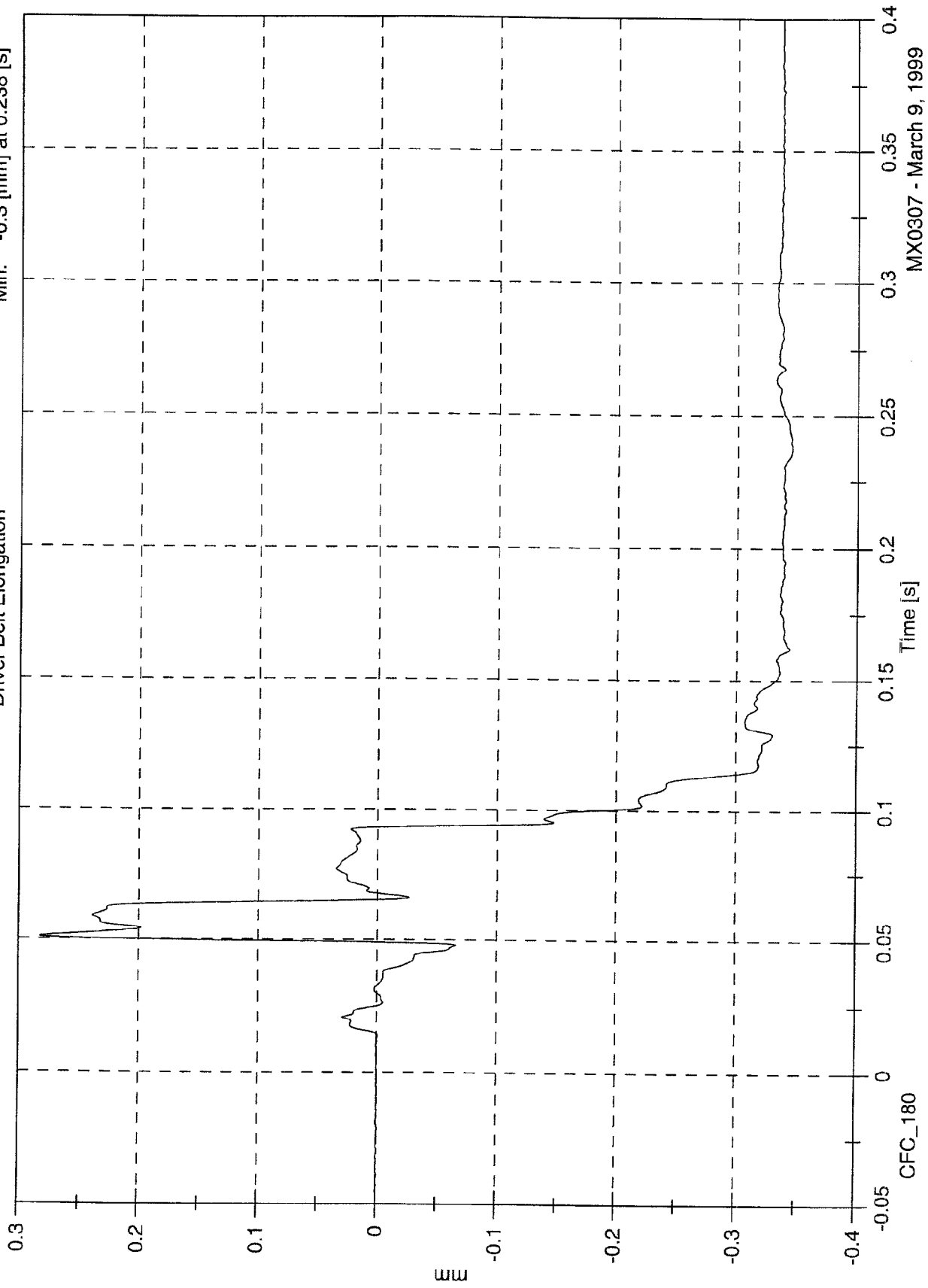


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 0.3 [mm] at 0.051 [s]
Min: -0.3 [mm] at 0.238 [s]

Driver Belt Elongation

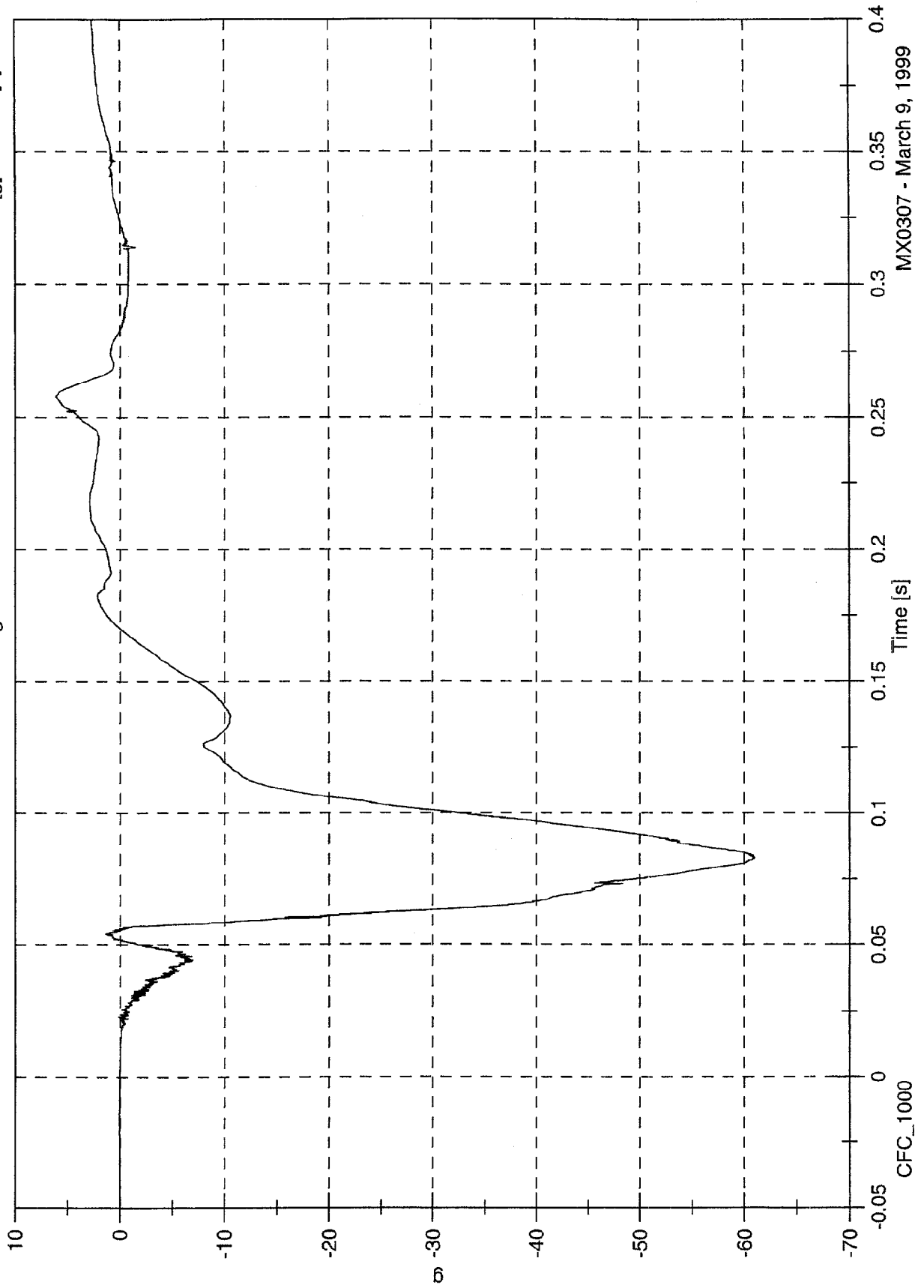


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

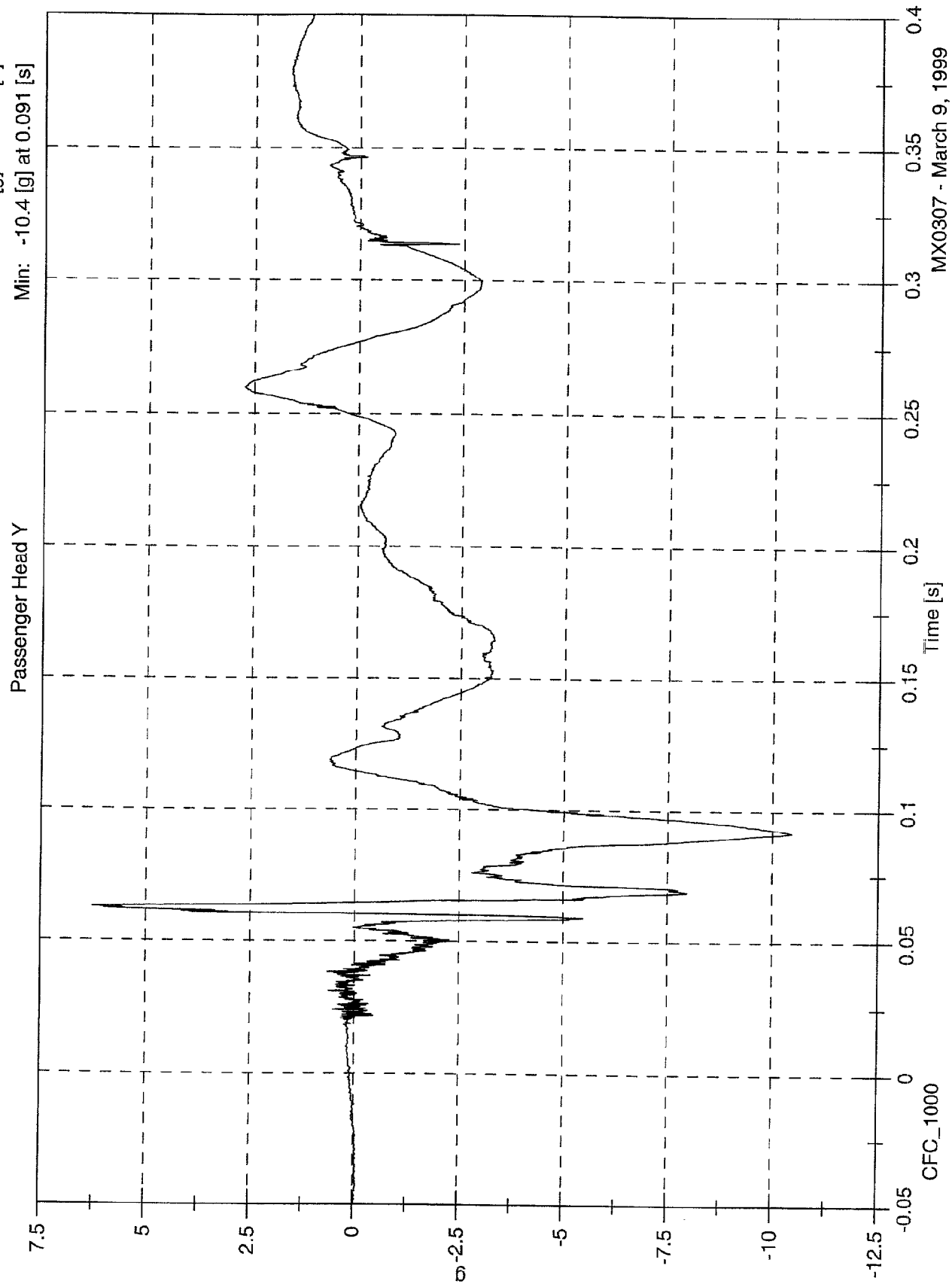
Max: 6.1 [g] at 0.258 [s]
Min: -61.0 [g] at 0.083 [s]

Passenger Head X



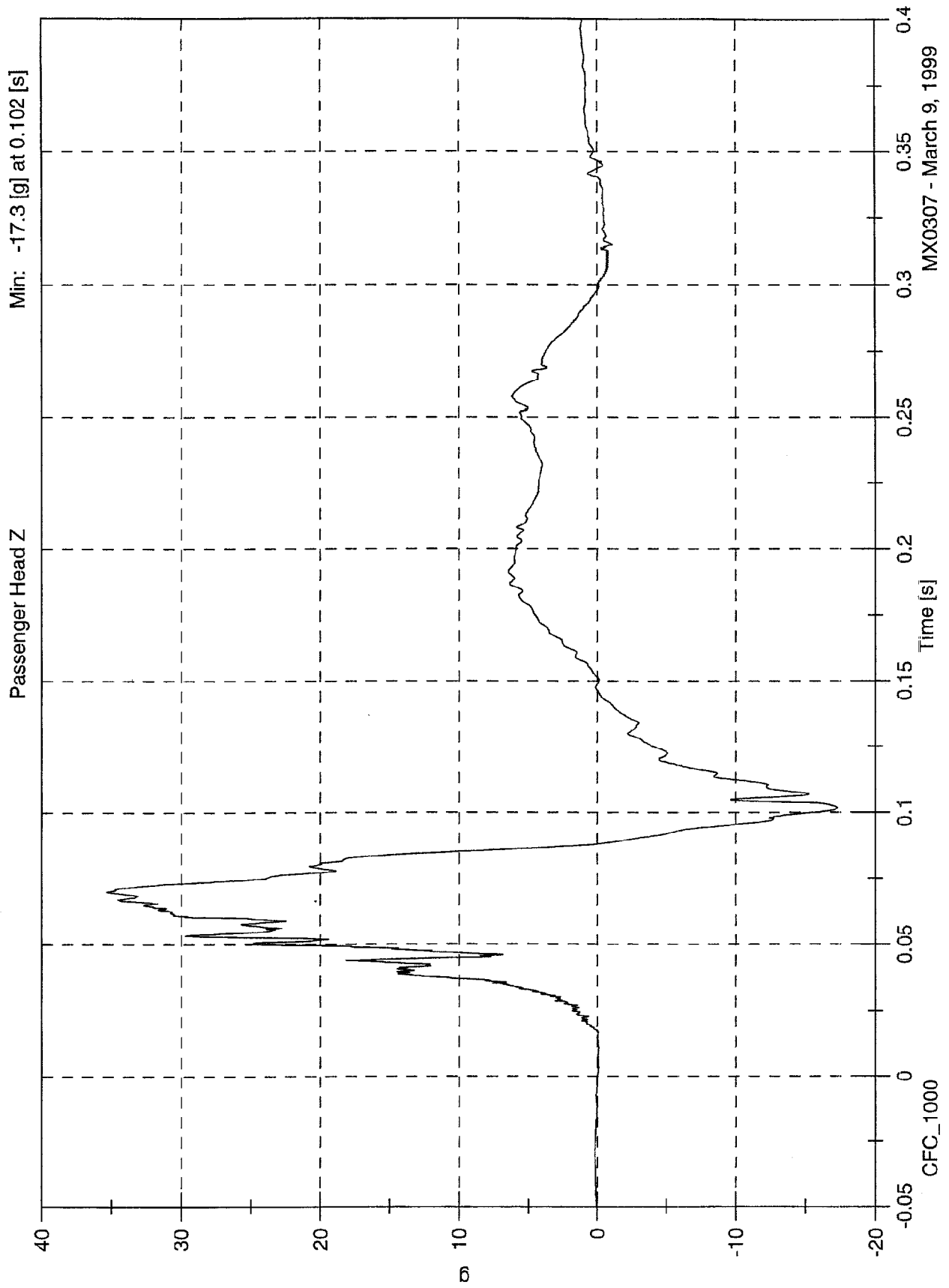
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee



NCAP Test #13 - 1999 Jeep Cherokee

Max: 35.4 [g] at 0.070 [s]
Min: -17.3 [g] at 0.102 [s]

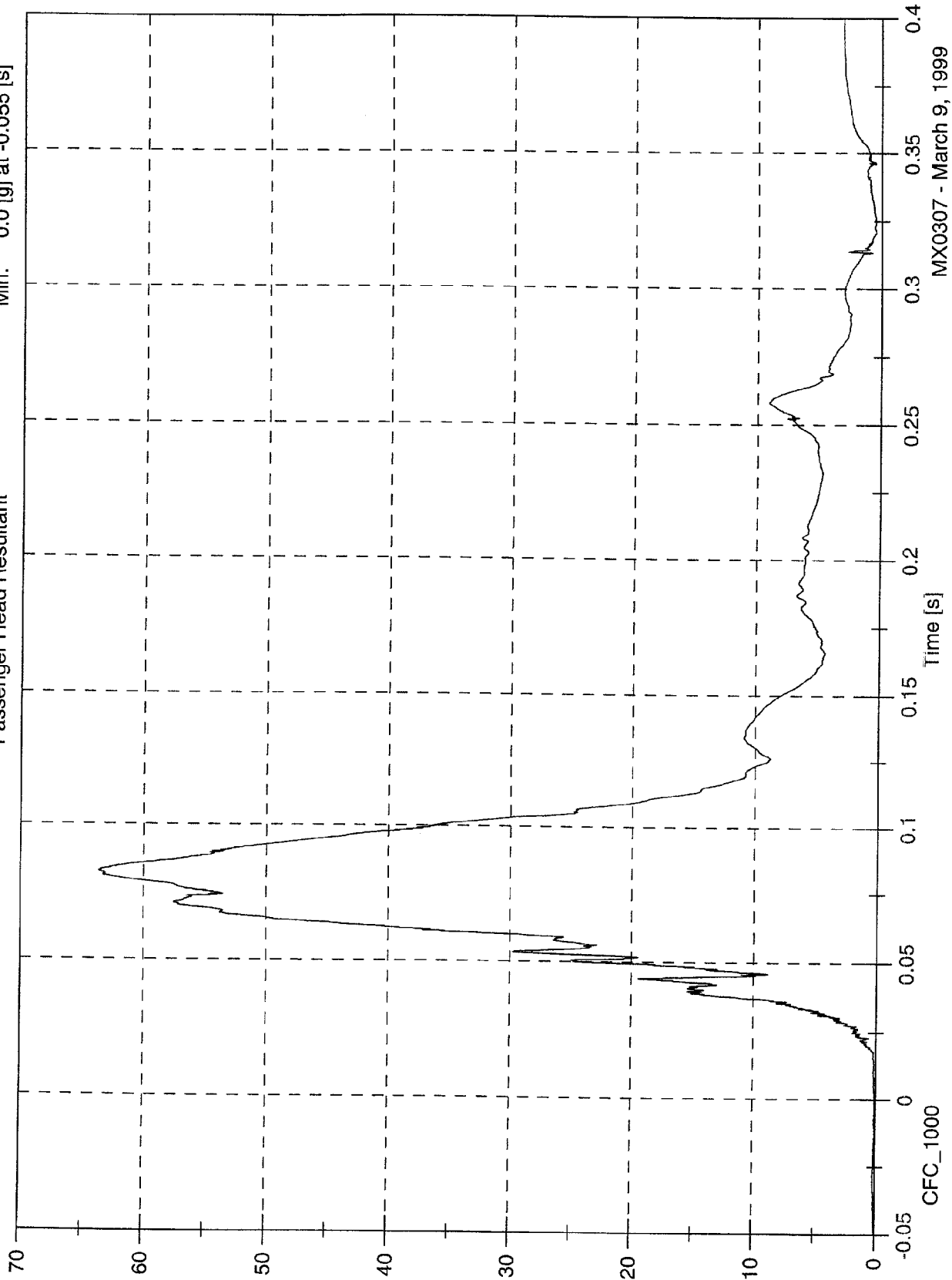


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 63.7 [g] at 0.082 [s]
Min: 0.0 [g] at -0.055 [s]

Passenger Head Resultant

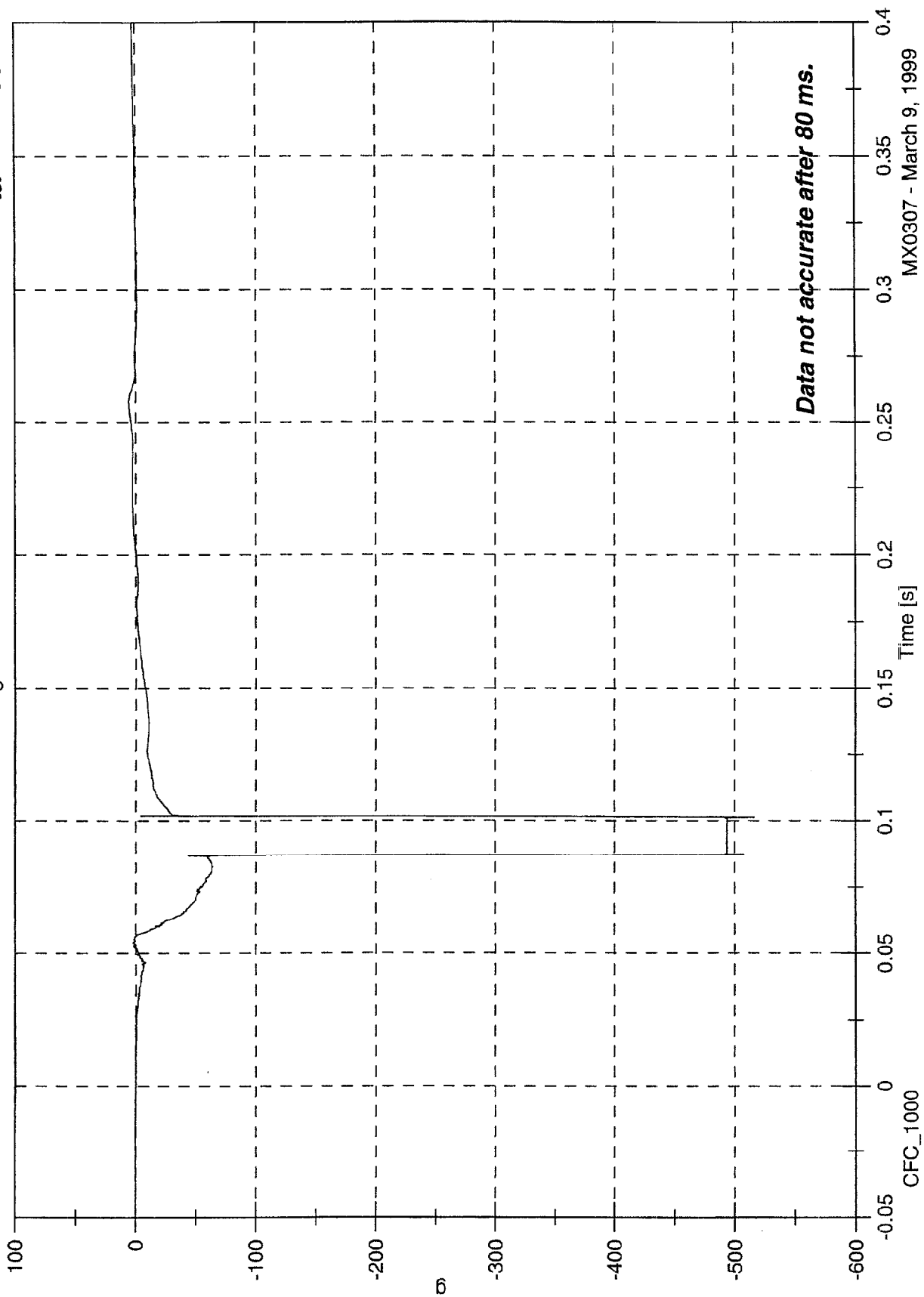


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 5.8 [g] at 0.258 [s]
Min: -516.0 [g] at 0.101 [s]

Passenger Redundant Head X



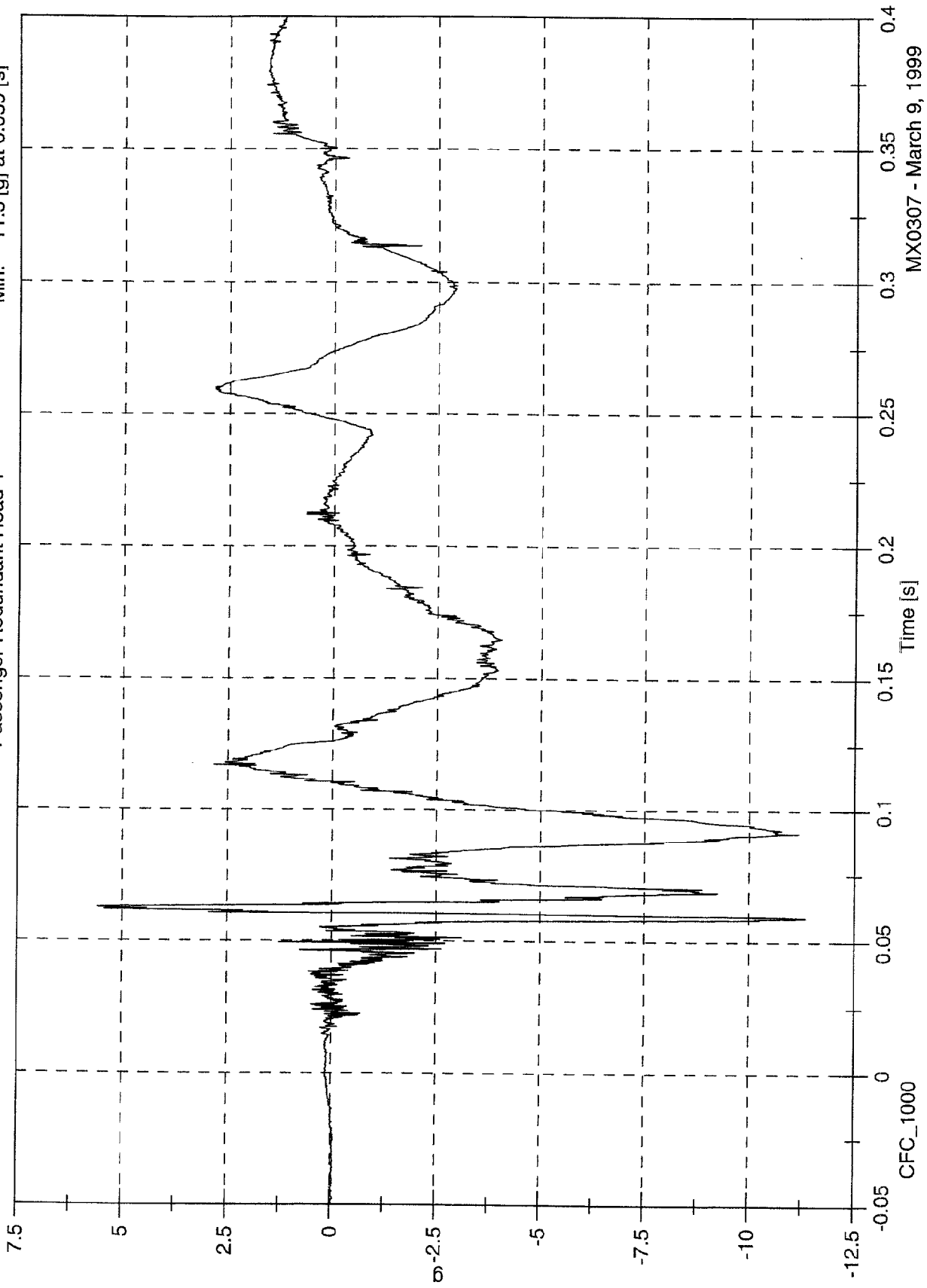
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 5.6 [g] at 0.063 [s]

Min: -11.3 [g] at 0.059 [s]

Passenger Redundant Head Y

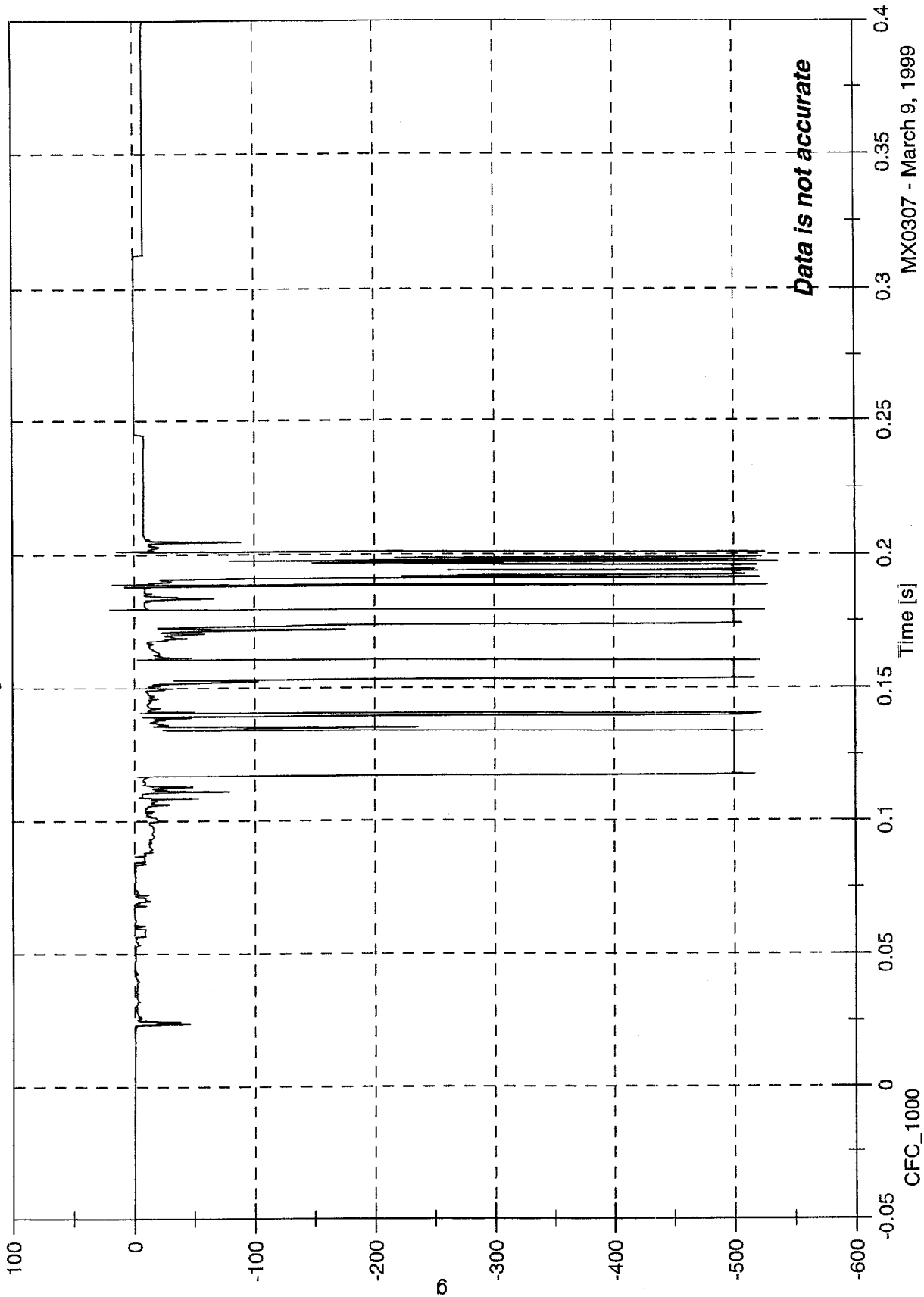


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 19.7 [g] at 0.180 [s]
Min: -536.0 [g] at 0.197 [s]

Passenger Redundant Head Z

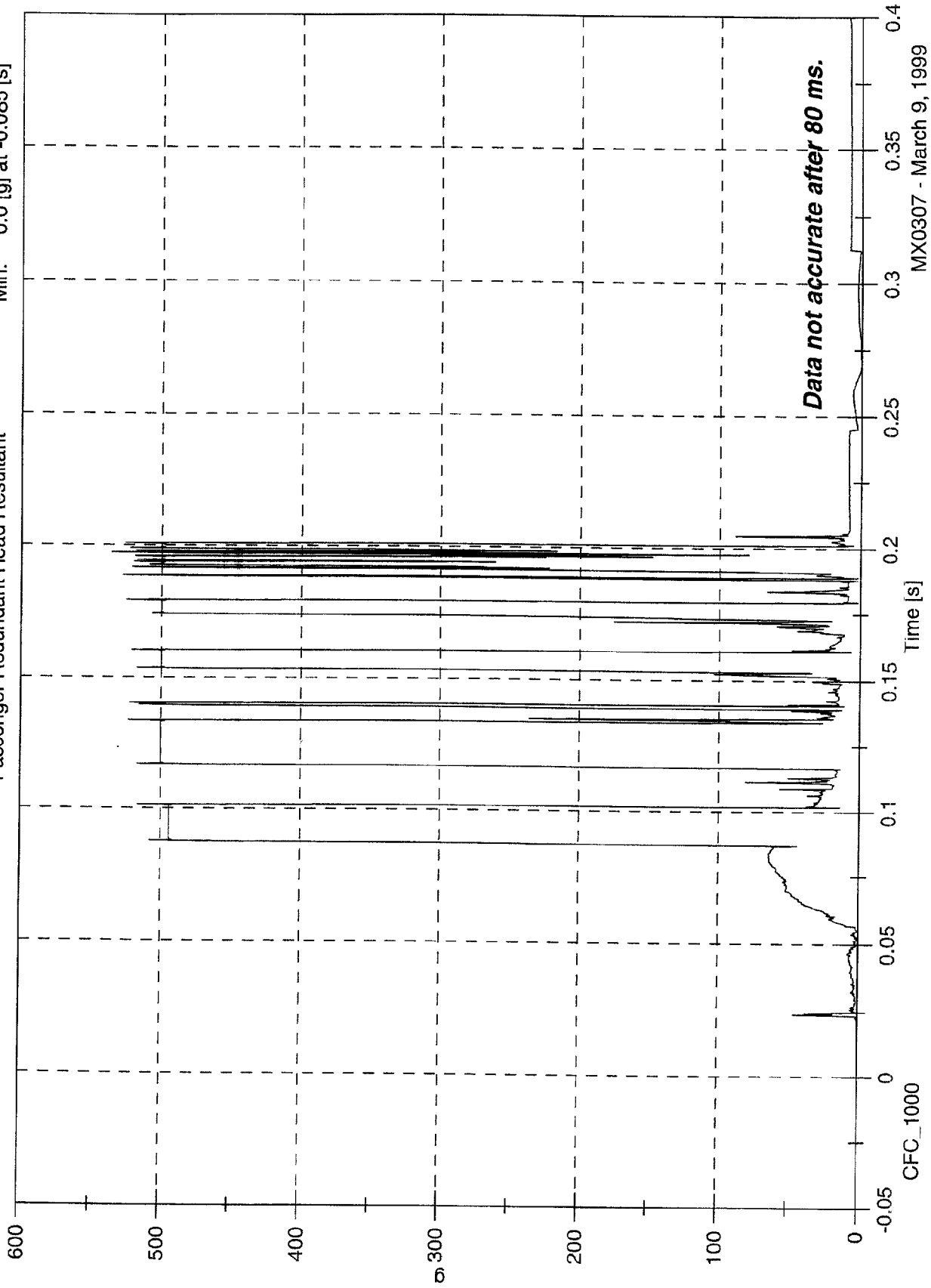


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 536.0 [g] at 0.197 [s]
Min: 0.0 [g] at -0.085 [s]

Passenger Redundant Head Resultant



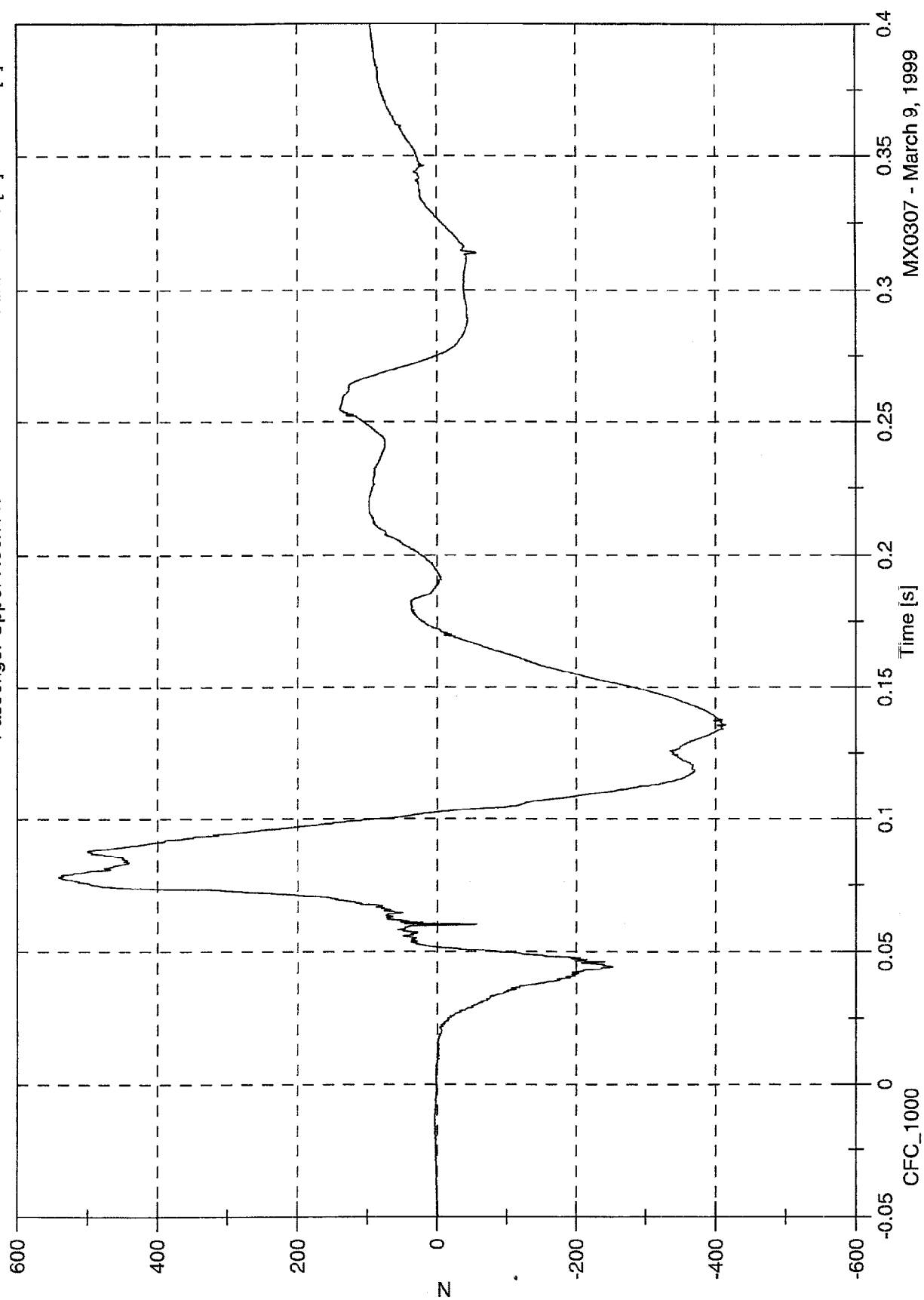
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Upper Neck Fx

Max: 541.1 [N] at 0.078 [s]

Min: -414.3 [N] at 0.136 [s]



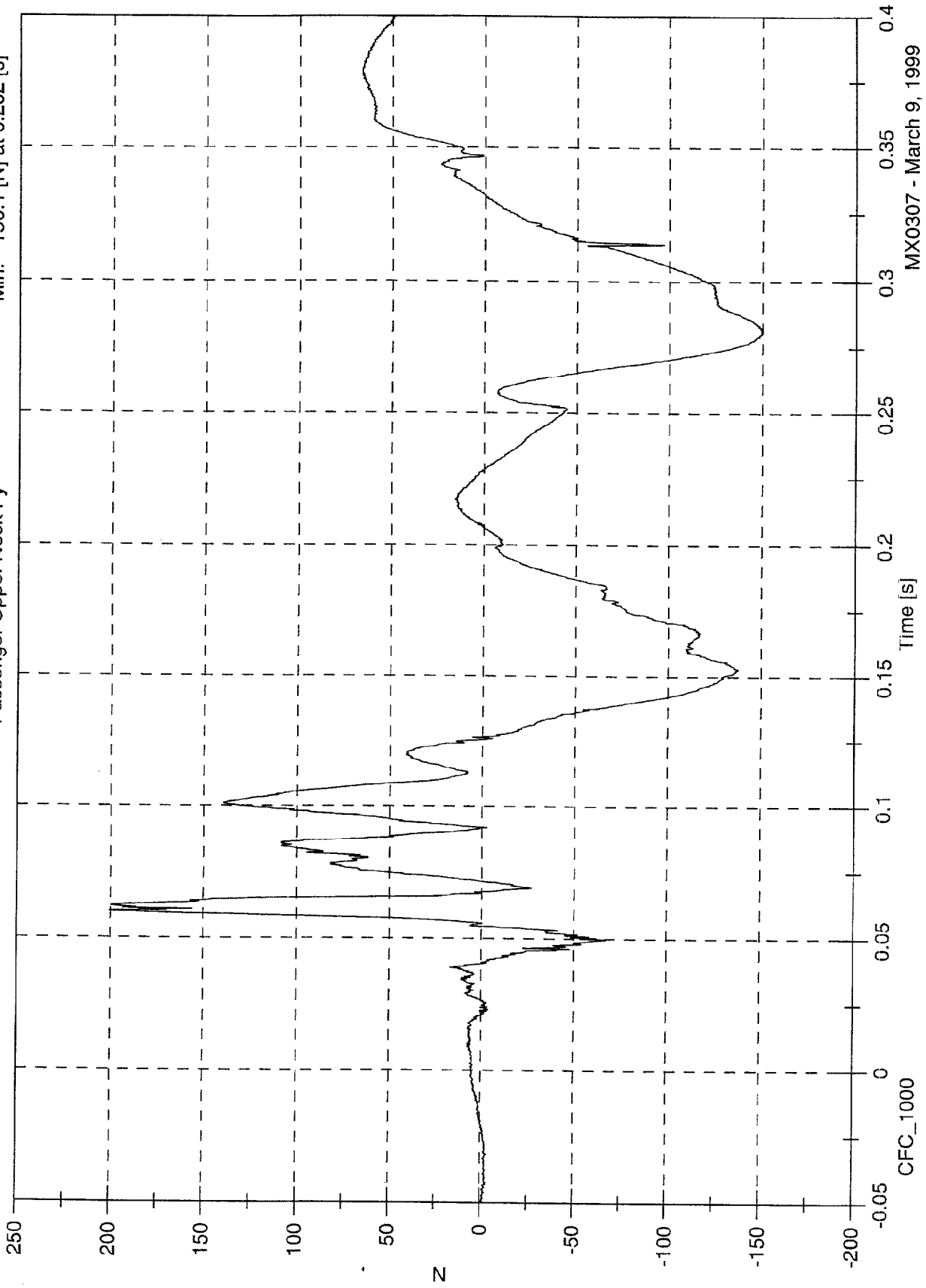
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Upper Neck Fy

Max: 200.7 [N] at 0.060 [s]

Min: -150.1 [N] at 0.282 [s]



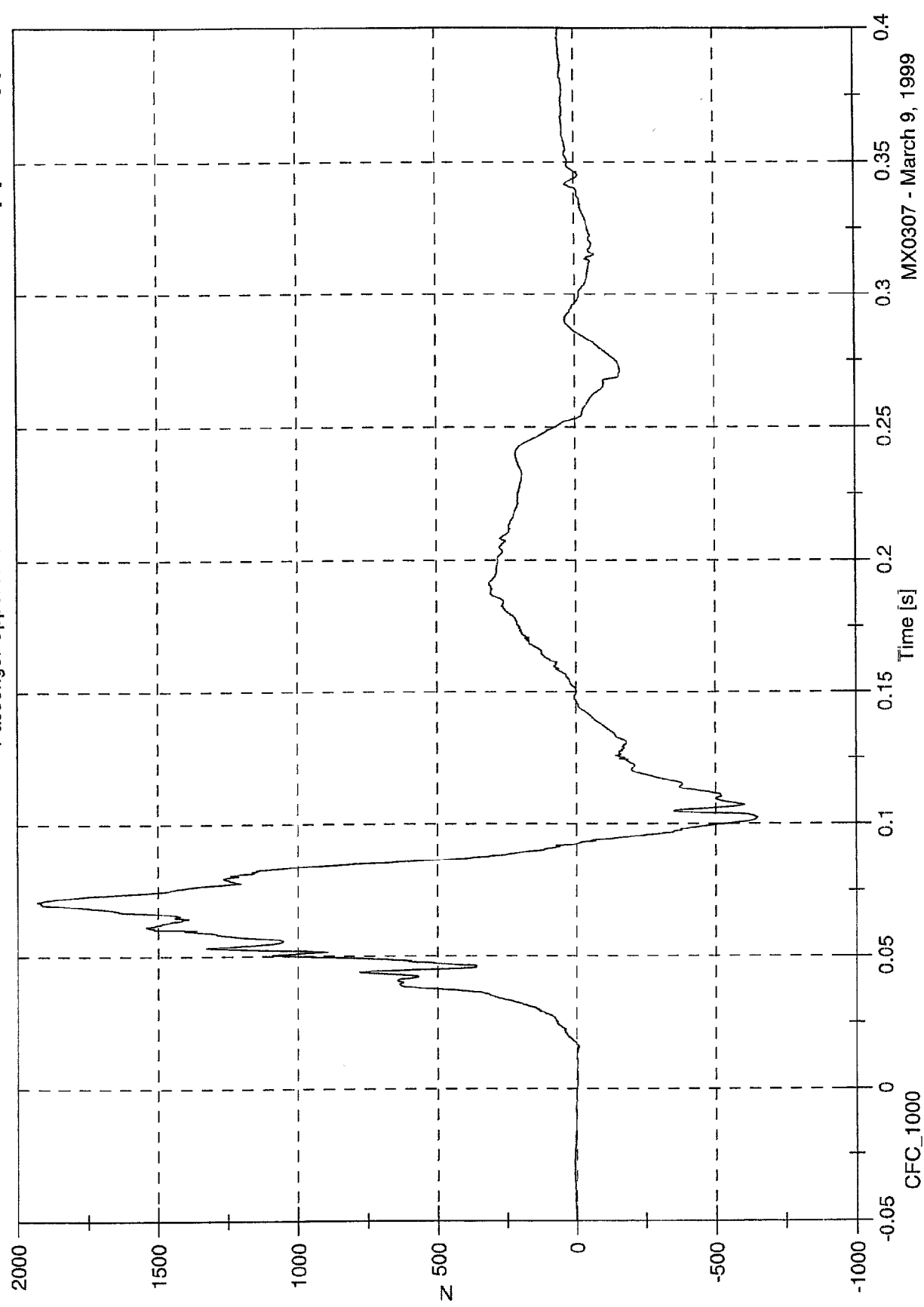
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Upper Neck Fz

Max: 1929.9 [N] at 0.071 [s]

Min: -651.1 [N] at 0.102 [s]

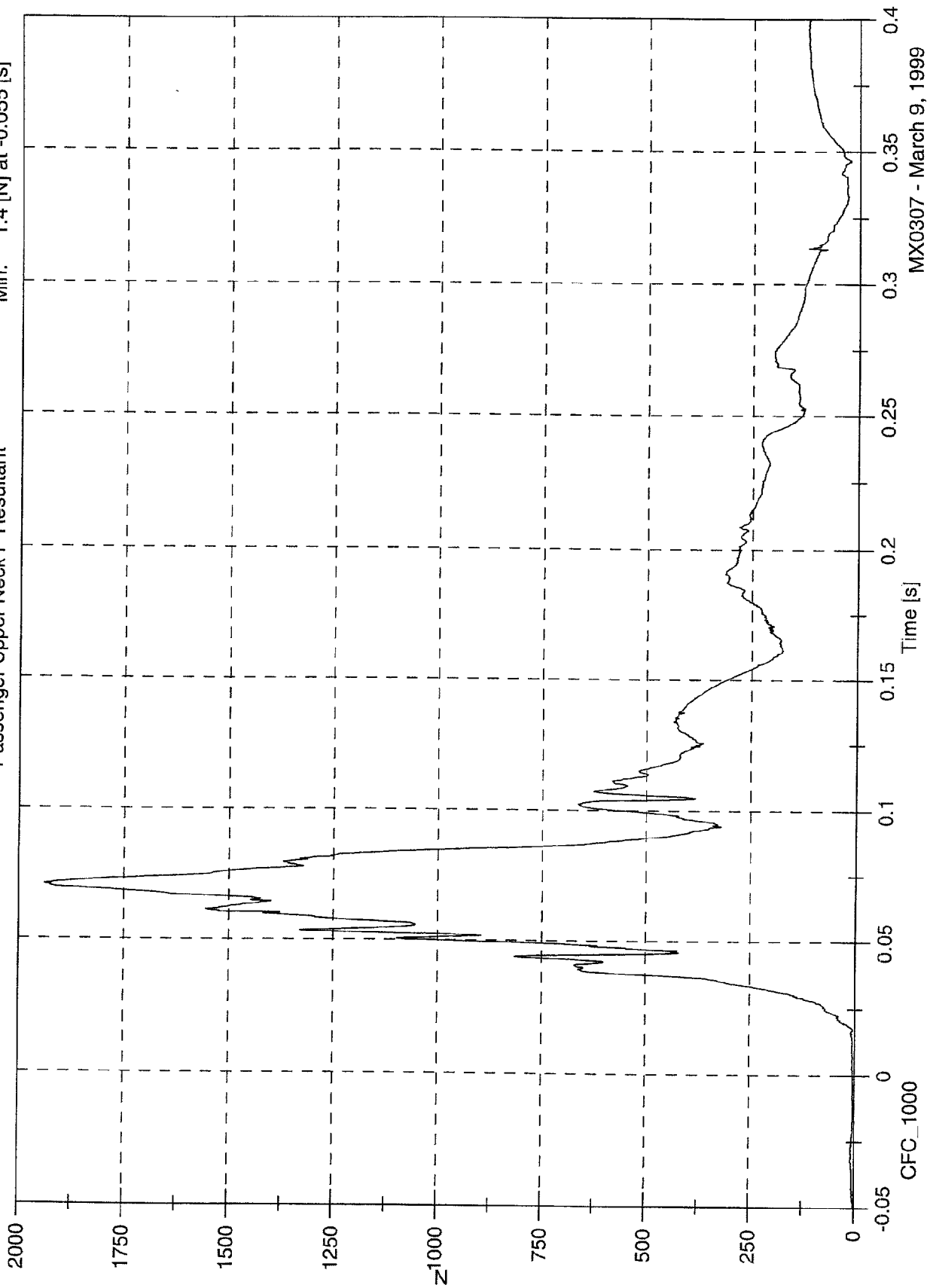


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Upper Neck F Resultant

Max: 1938.9 [N] at 0.071 [s]
Min: 1.4 [N] at -0.055 [s]

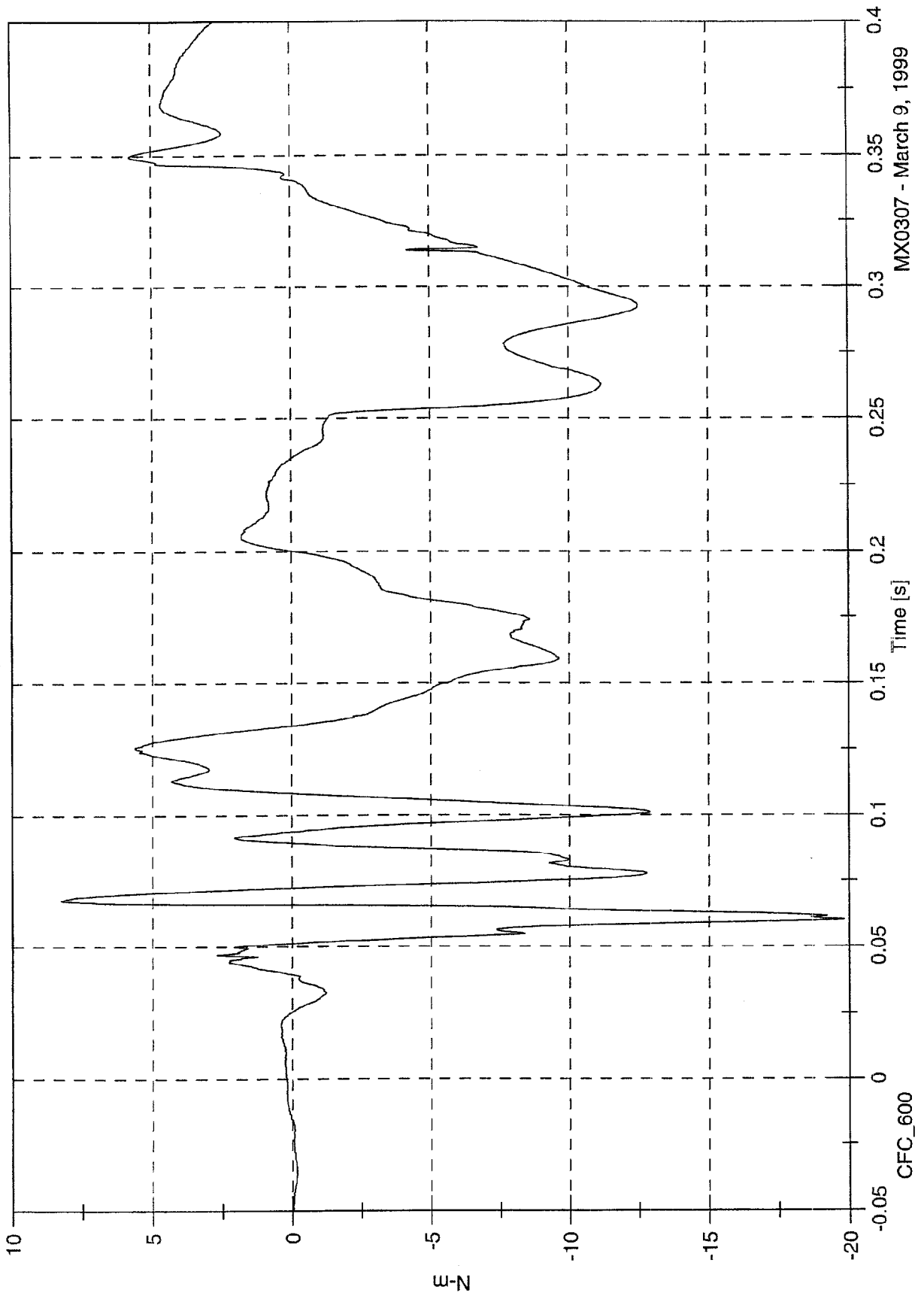


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 8.3 [N-m] at 0.068 [s]
Min: -19.8 [N-m] at 0.060 [s]

Passenger Upper Neck Mix



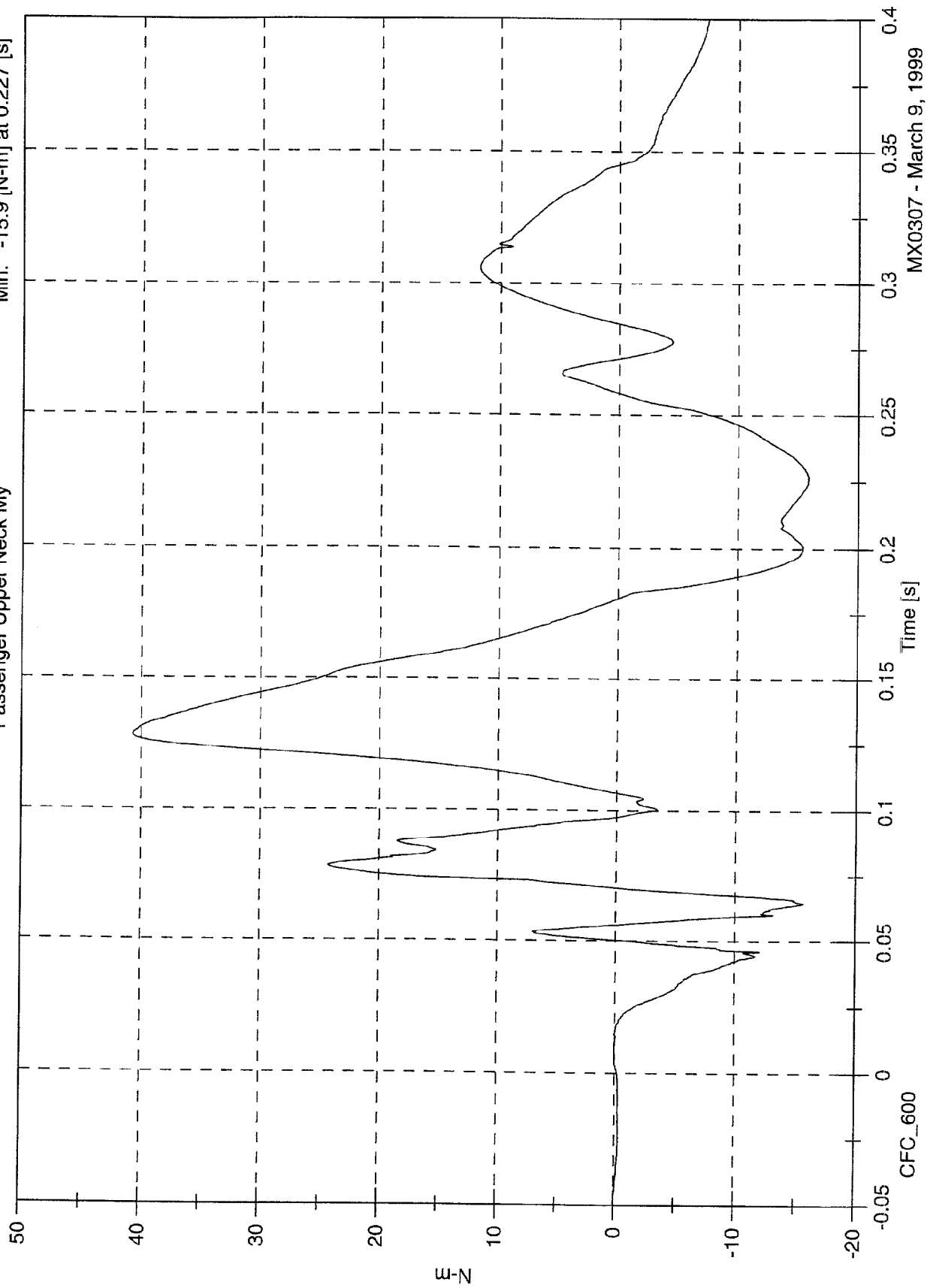
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Upper Neck My

Max: 40.7 [N-m] at 0.129 [s]

Min: -15.9 [N-m] at 0.227 [s]



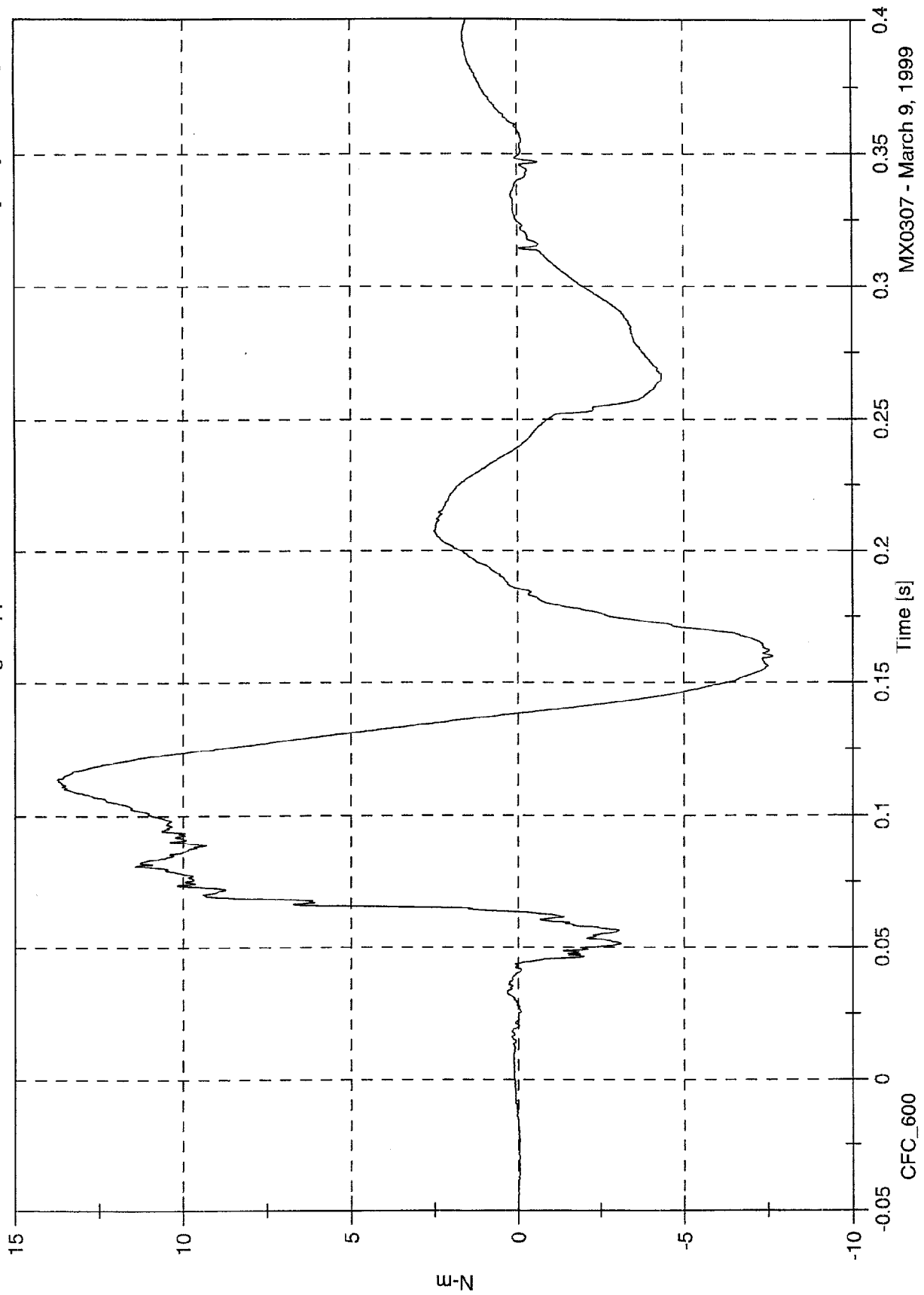
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Upper Neck Mz

Max: 13.8 [N-m] at 0.114 [s]

Min: -7.6 [N-m] at 0.160 [s]



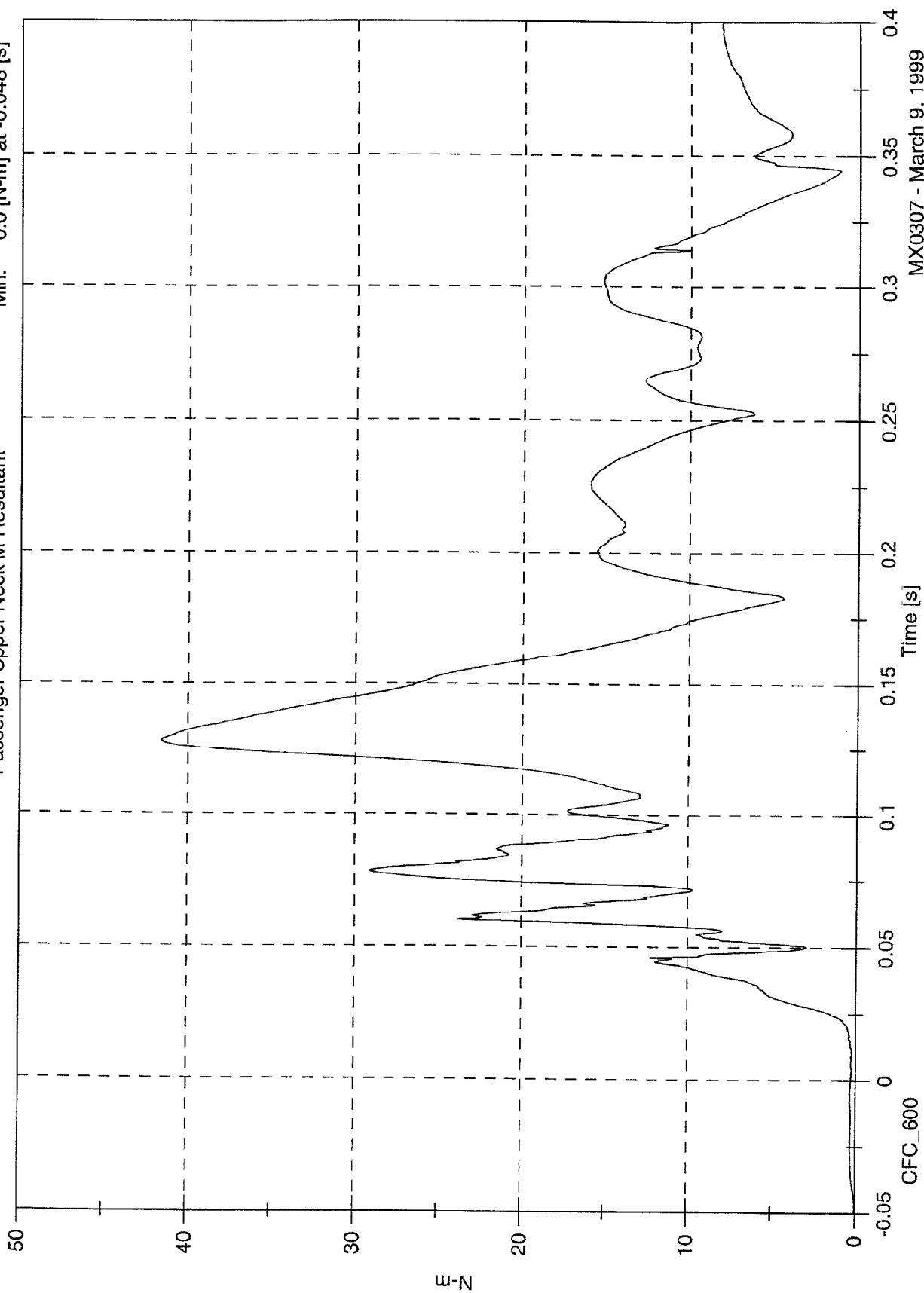
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Upper Neck M Resultant

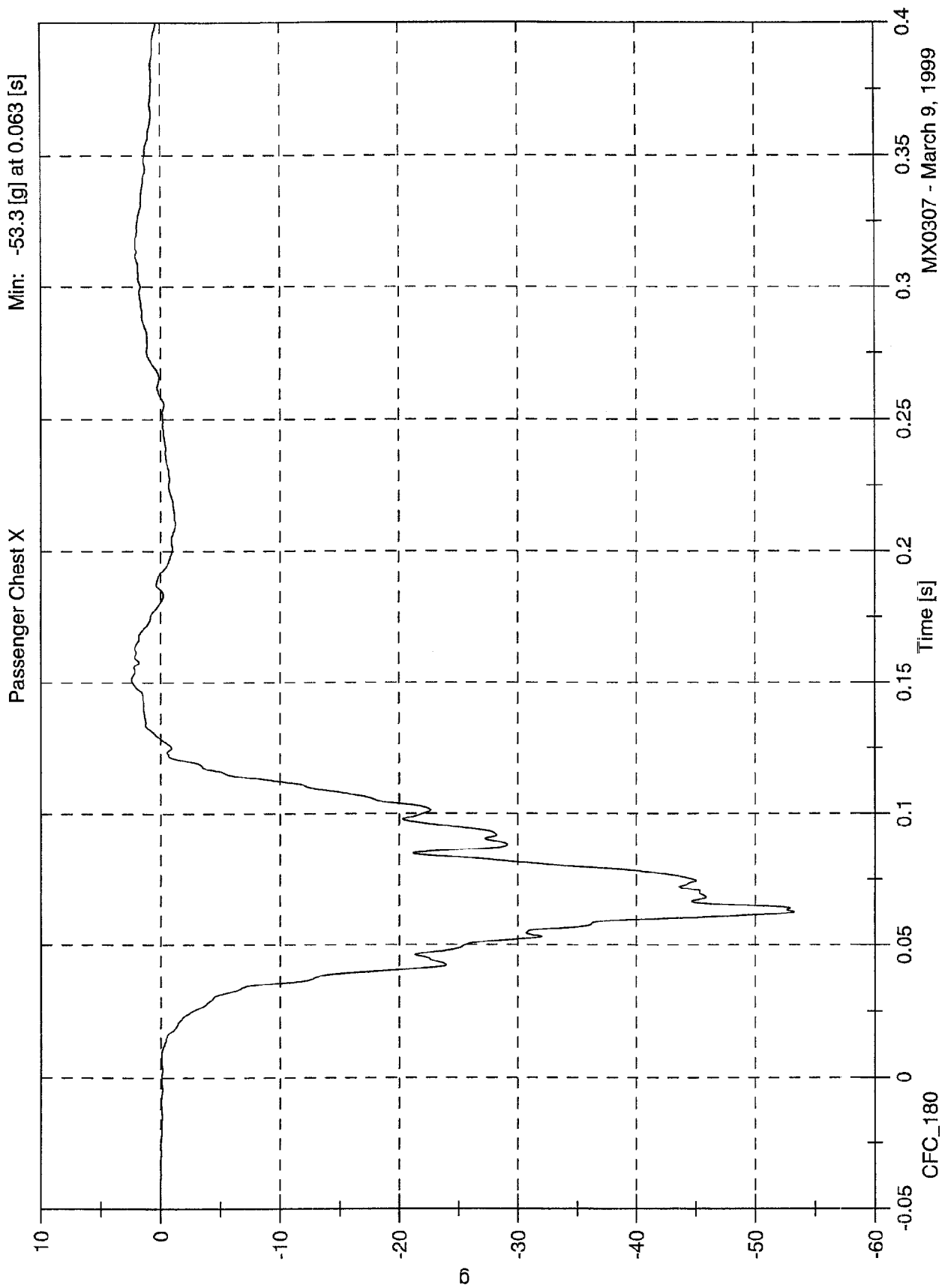
Max: 41.6 [N-m] at 0.128 [s]

Min: 0.0 [N-m] at -0.048 [s]



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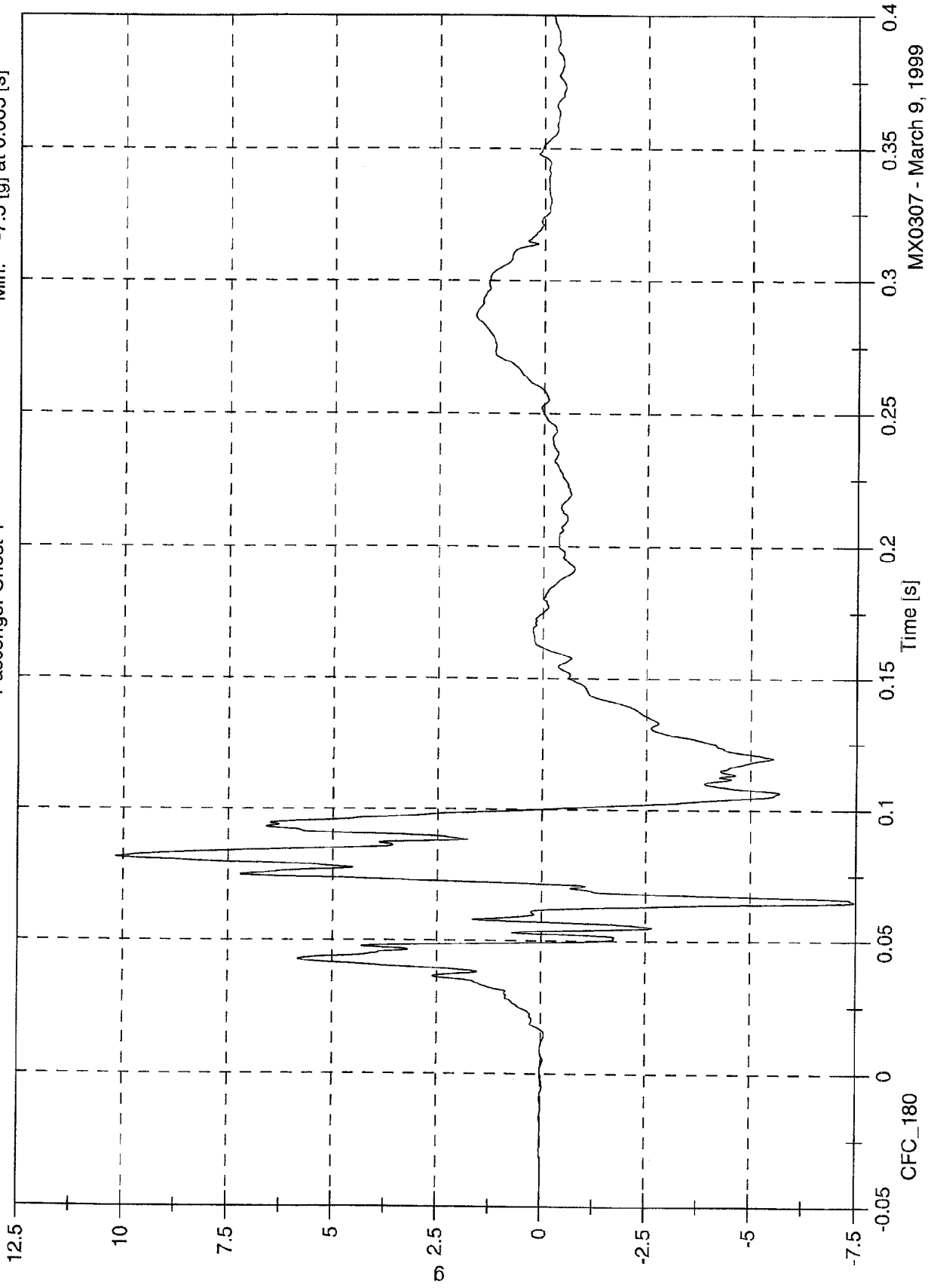


NCAP Test #13 - 1999 Jeep Cherokee

Max: 10.2 [g] at 0.082 [s]

Min: -7.5 [g] at 0.065 [s]

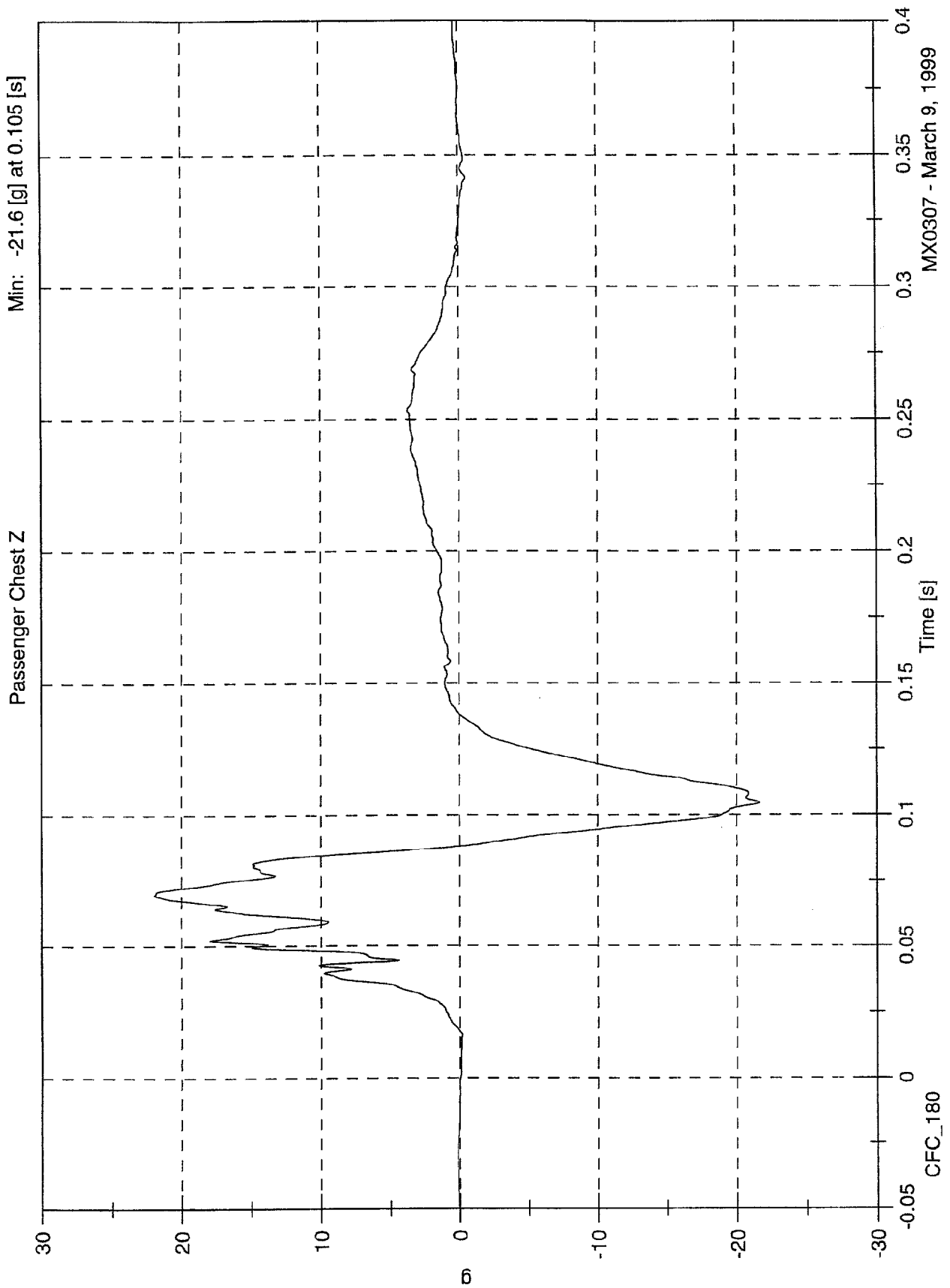
Passenger Chest Y



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NCAP Test #13 - 1999 Jeep Cherokee

Max: 22.0 [g] at 0.070 [s]
Min: -21.6 [g] at 0.105 [s]

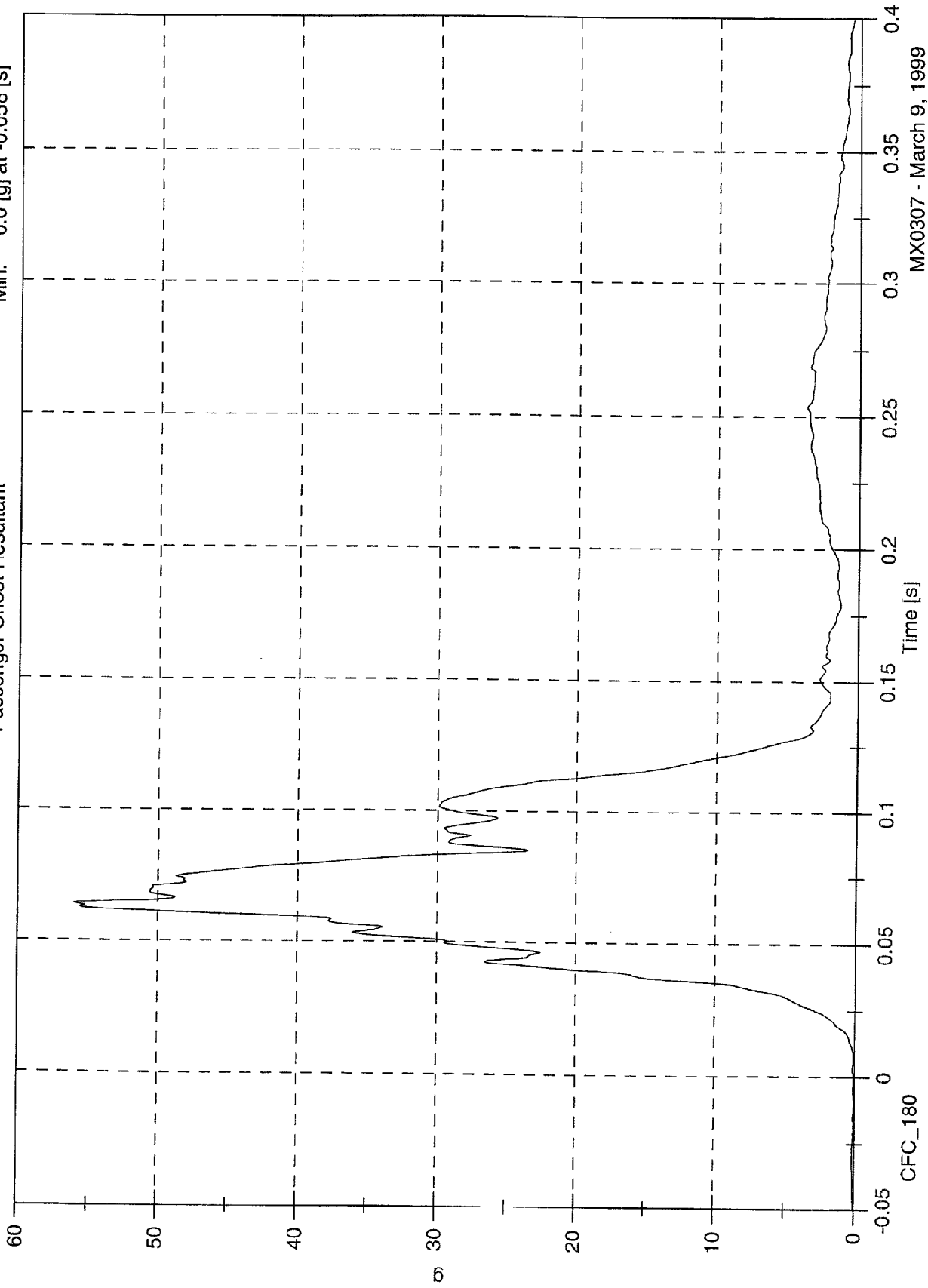


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NCAP Test #13 - 1999 Jeep Cherokee

Max: 56.0 [g] at 0.064 [s]
Min: 0.0 [g] at -0.058 [s]

Passenger Chest Resultant

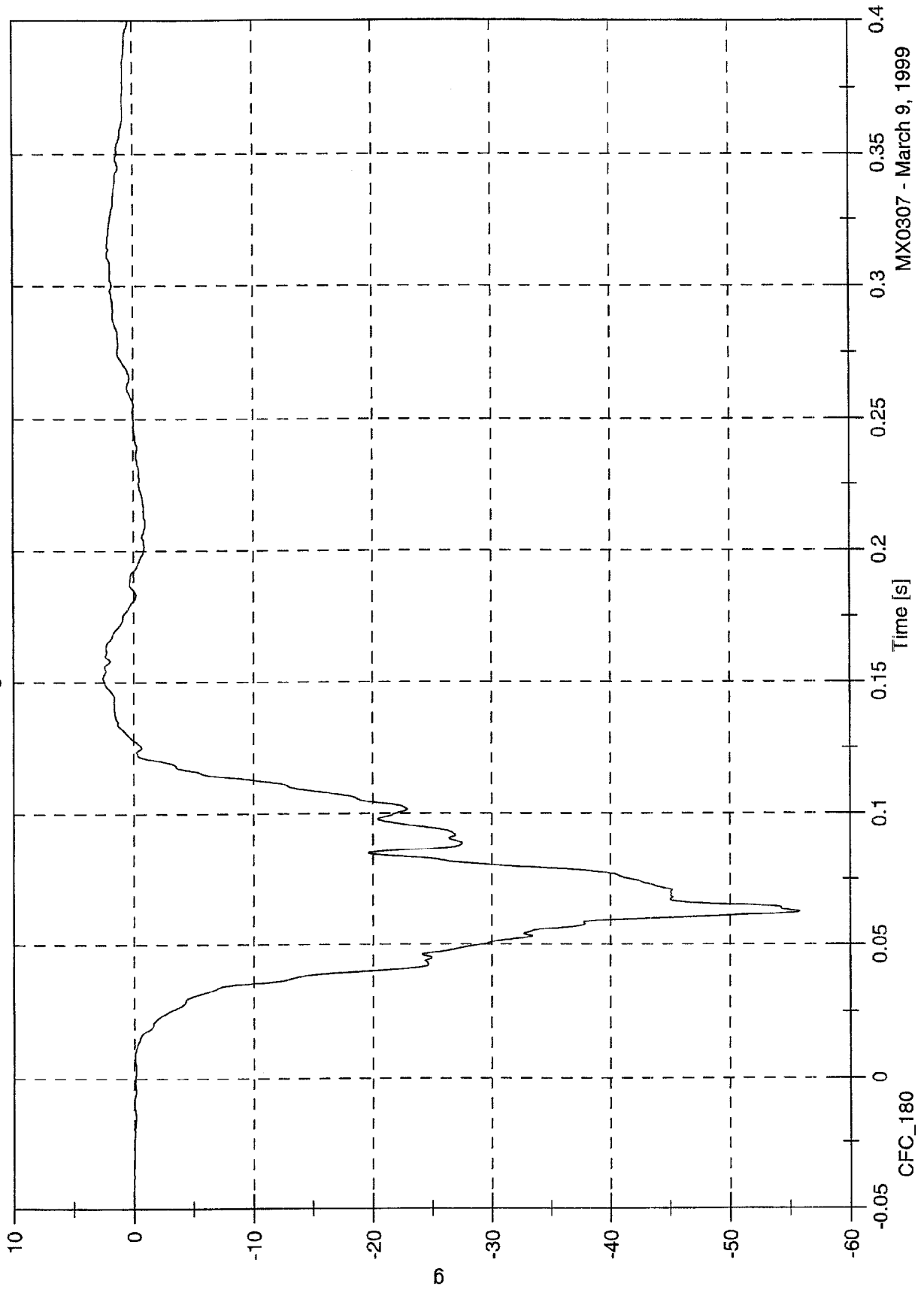


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NCAP Test #13 - 1999 Jeep Cherokee

Max: 2.6 [g] at 0.152 [s]
Min: -55.8 [g] at 0.063 [s]

Passenger Redundant Chest X



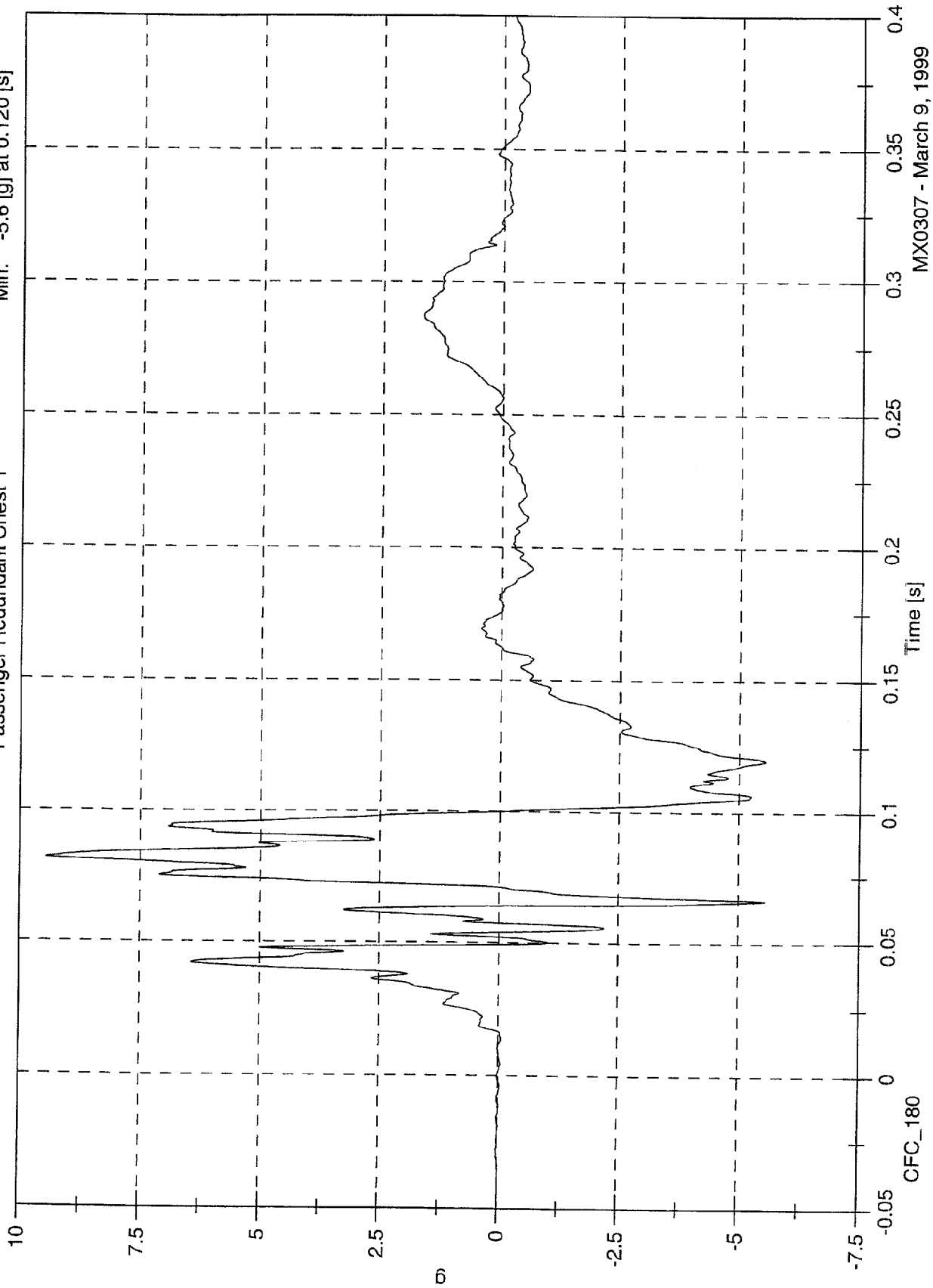
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 9.5 [g] at 0.082 [s]

Min: -5.6 [g] at 0.120 [s]

Passenger Redundant Chest Y

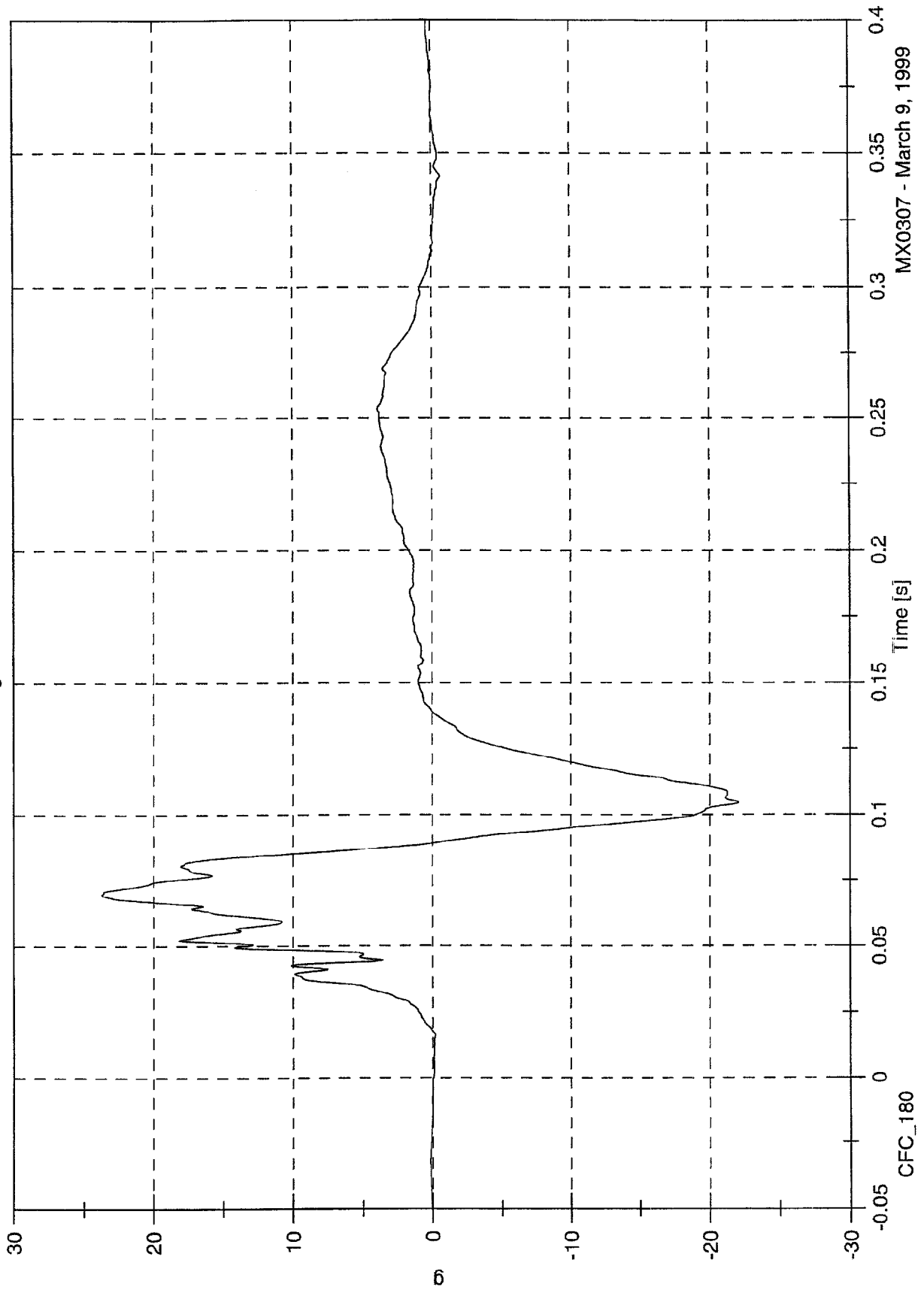


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Redundant Chest Z

Max: 23.7 [g] at 0.070 [s]
Min: -22.1 [g] at 0.105 [s]



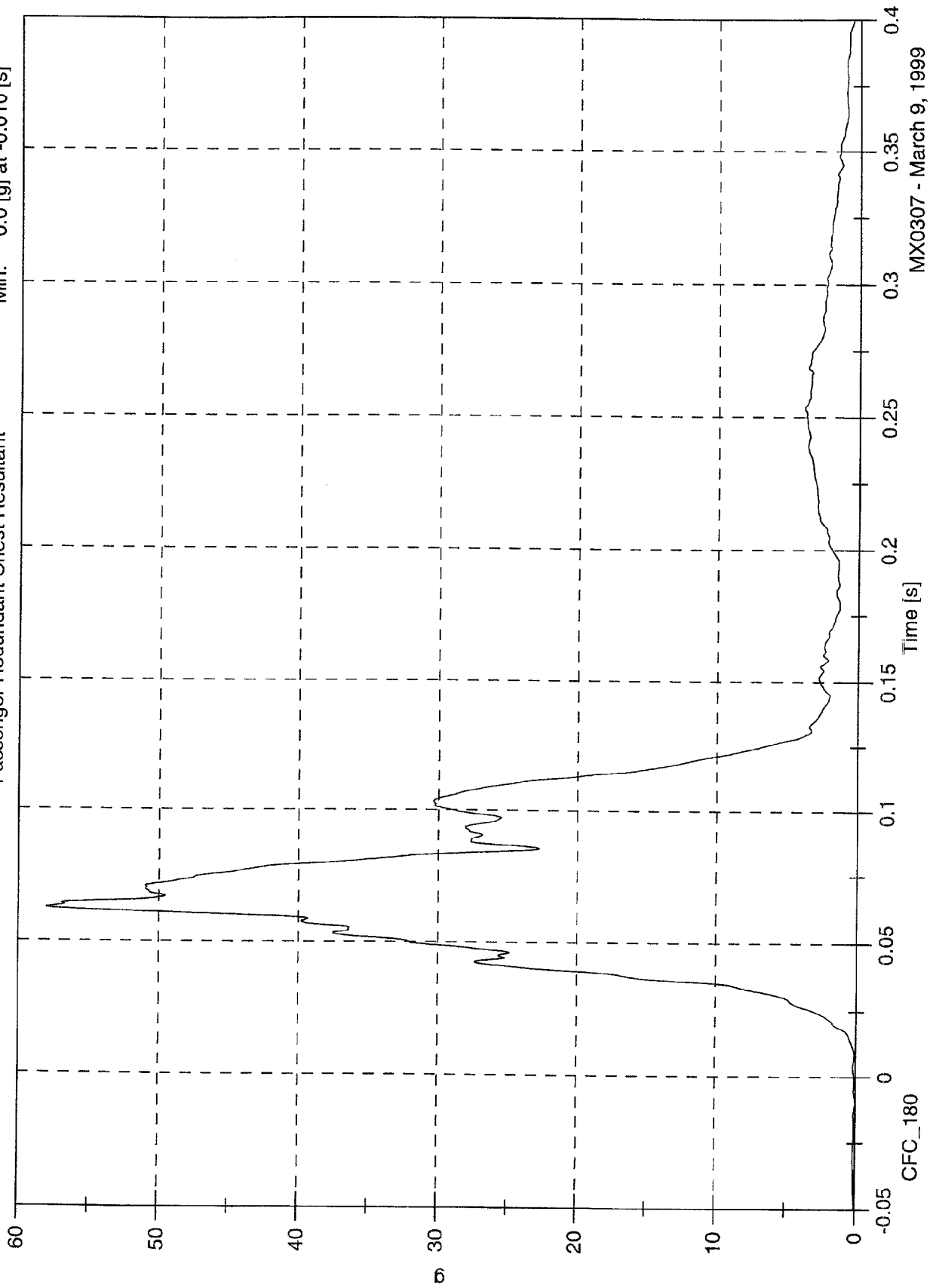
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Redundant Chest Resultant

Max: 58.0 [g] at 0.063 [s]

Min: 0.0 [g] at -0.010 [s]

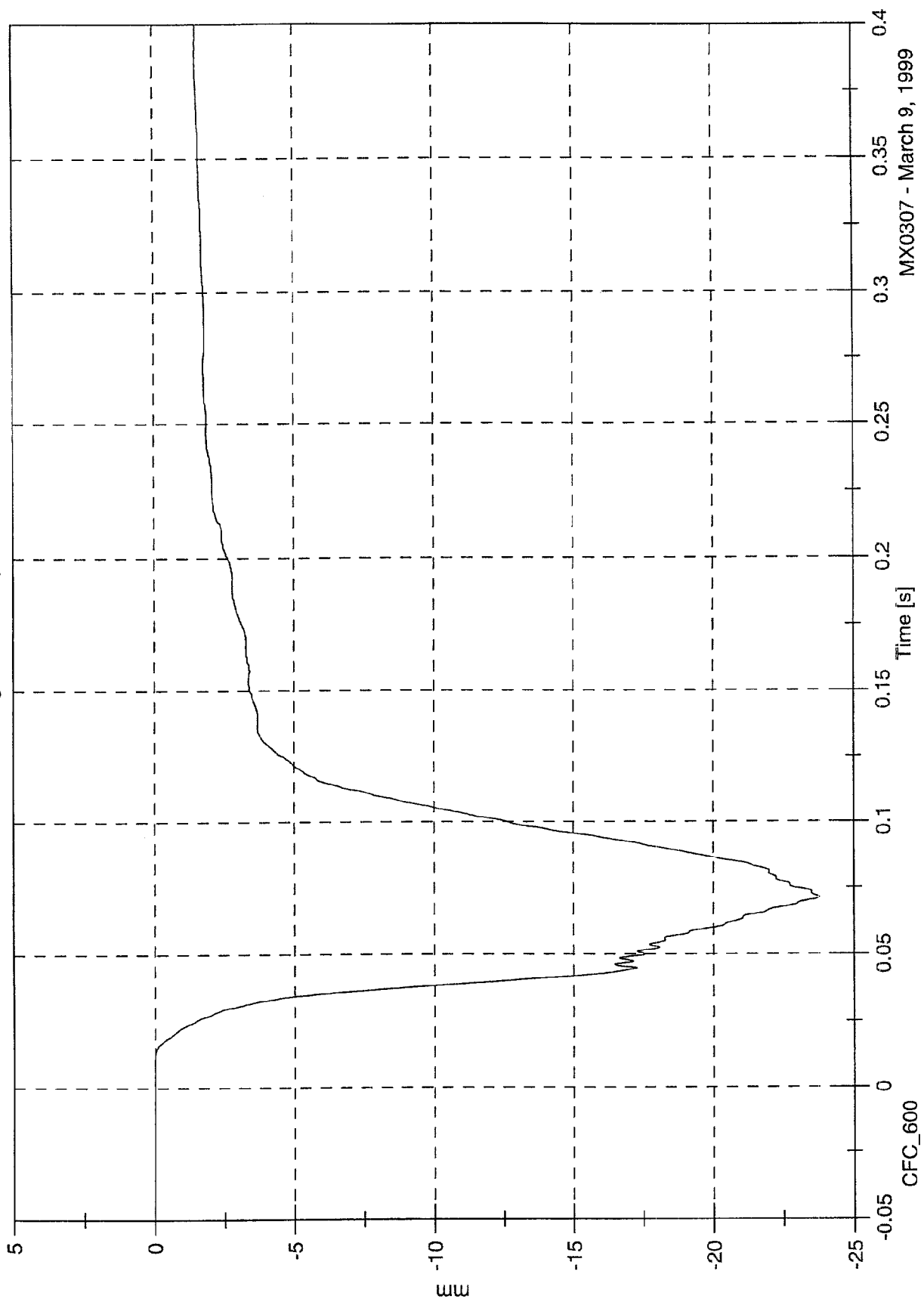


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 0.0 [mm] at -0.095 [s]
 Min: -23.8 [mm] at 0.071 [s]

Passenger Chest Displacement

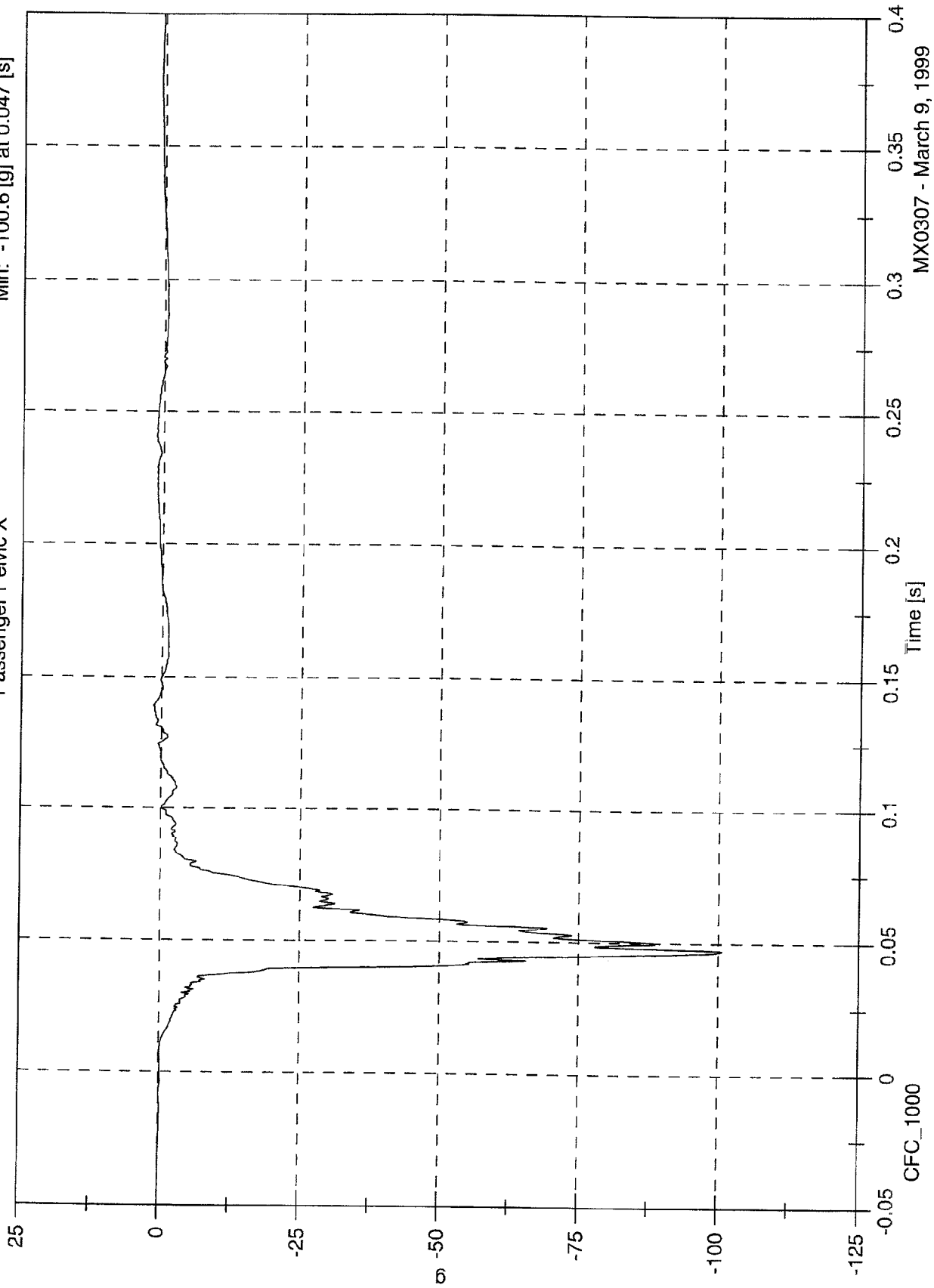


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 1.4 [g] at 0.139 [s]
Min: -100.6 [g] at 0.047 [s]

Passenger Pelvic X

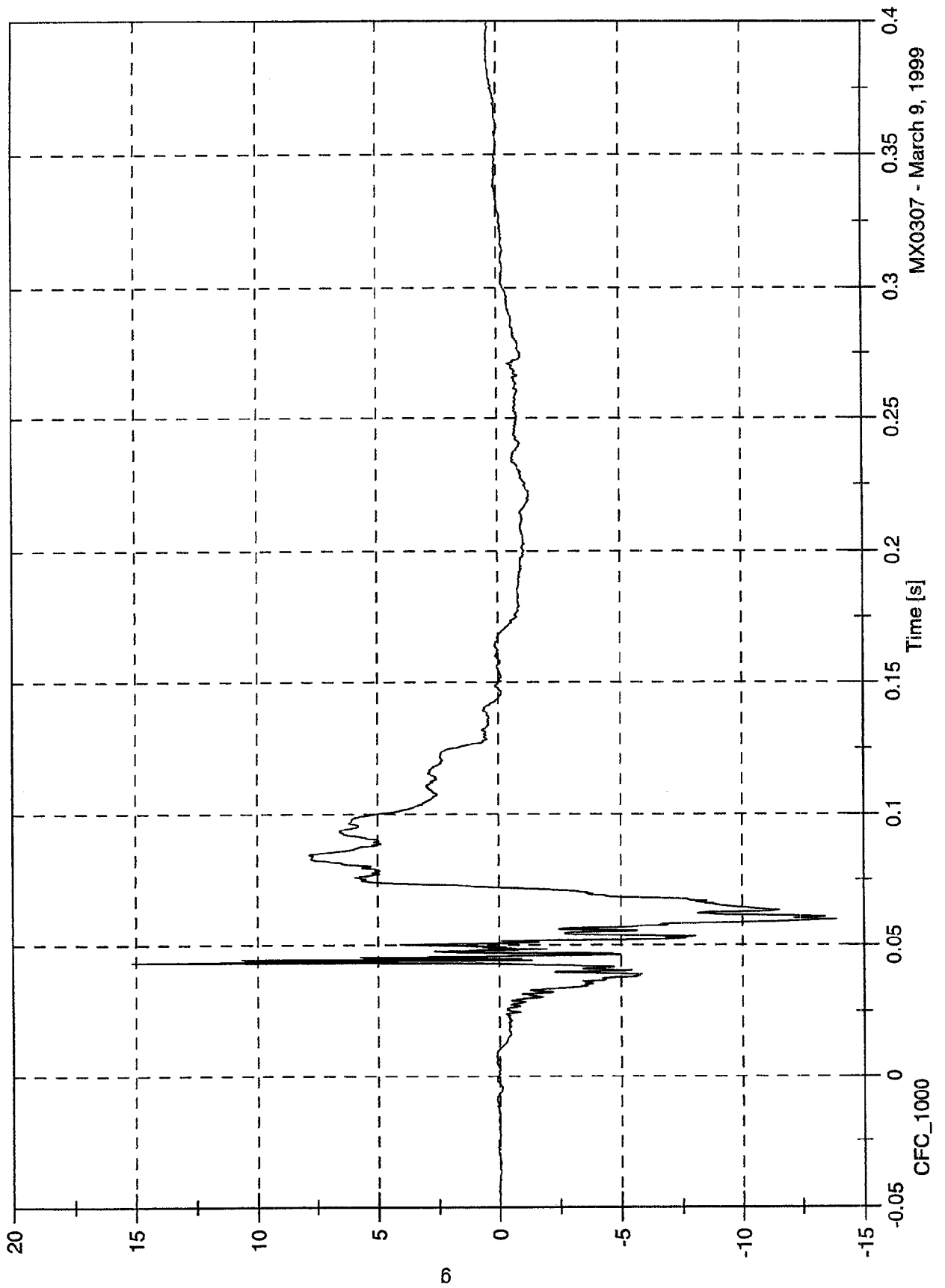


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 15.2 [g] at 0.043 [s]
Min: -13.9 [g] at 0.060 [s]

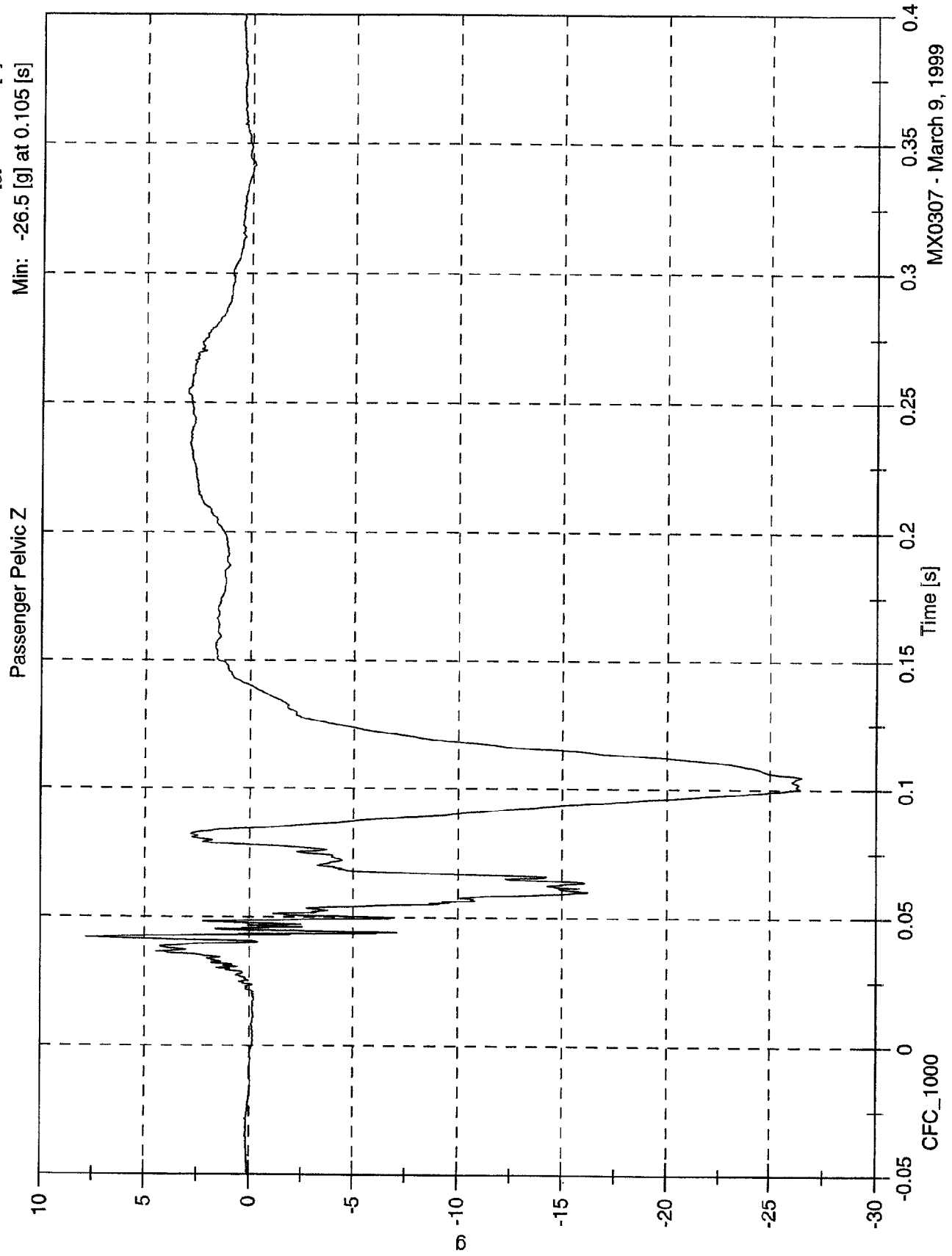
Passenger Pelvic Y



MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 7.8 [g] at 0.042 [s]
Min: -26.5 [g] at 0.105 [s]



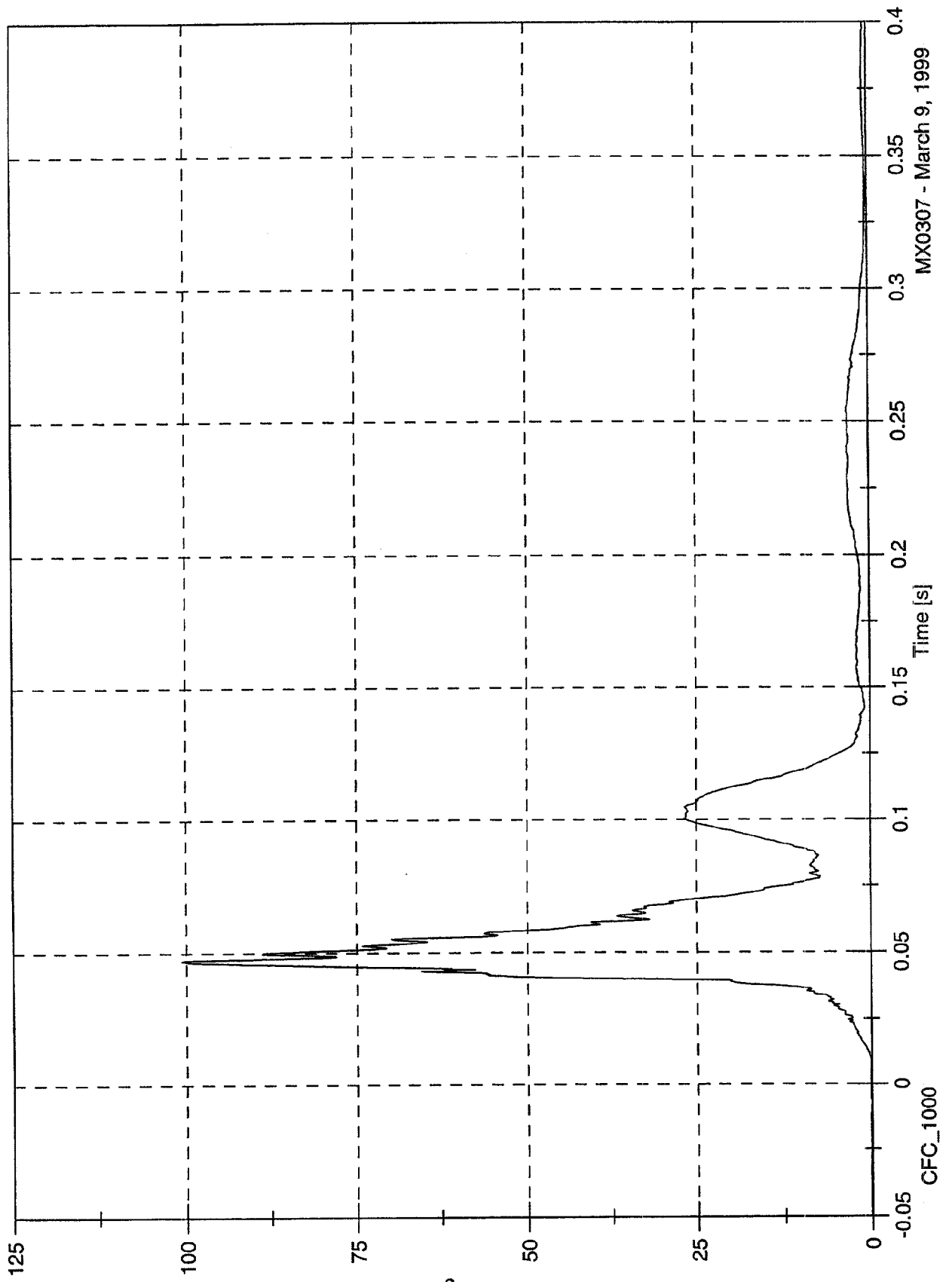
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

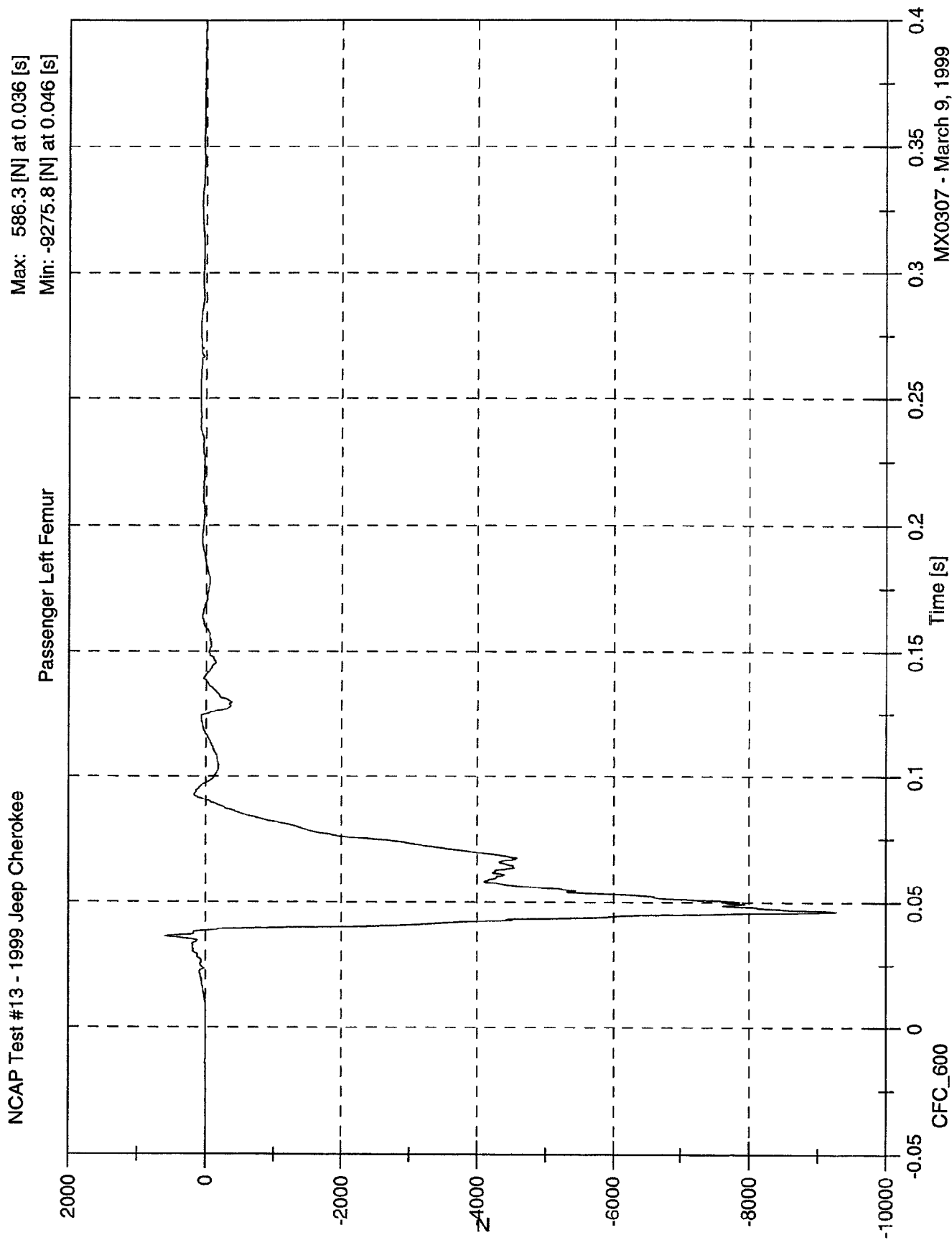
Max: 100.7 [g] at 0.047 [s]

Min: 0.0 [g] at -0.060 [s]

Passenger Pelvic Resultant



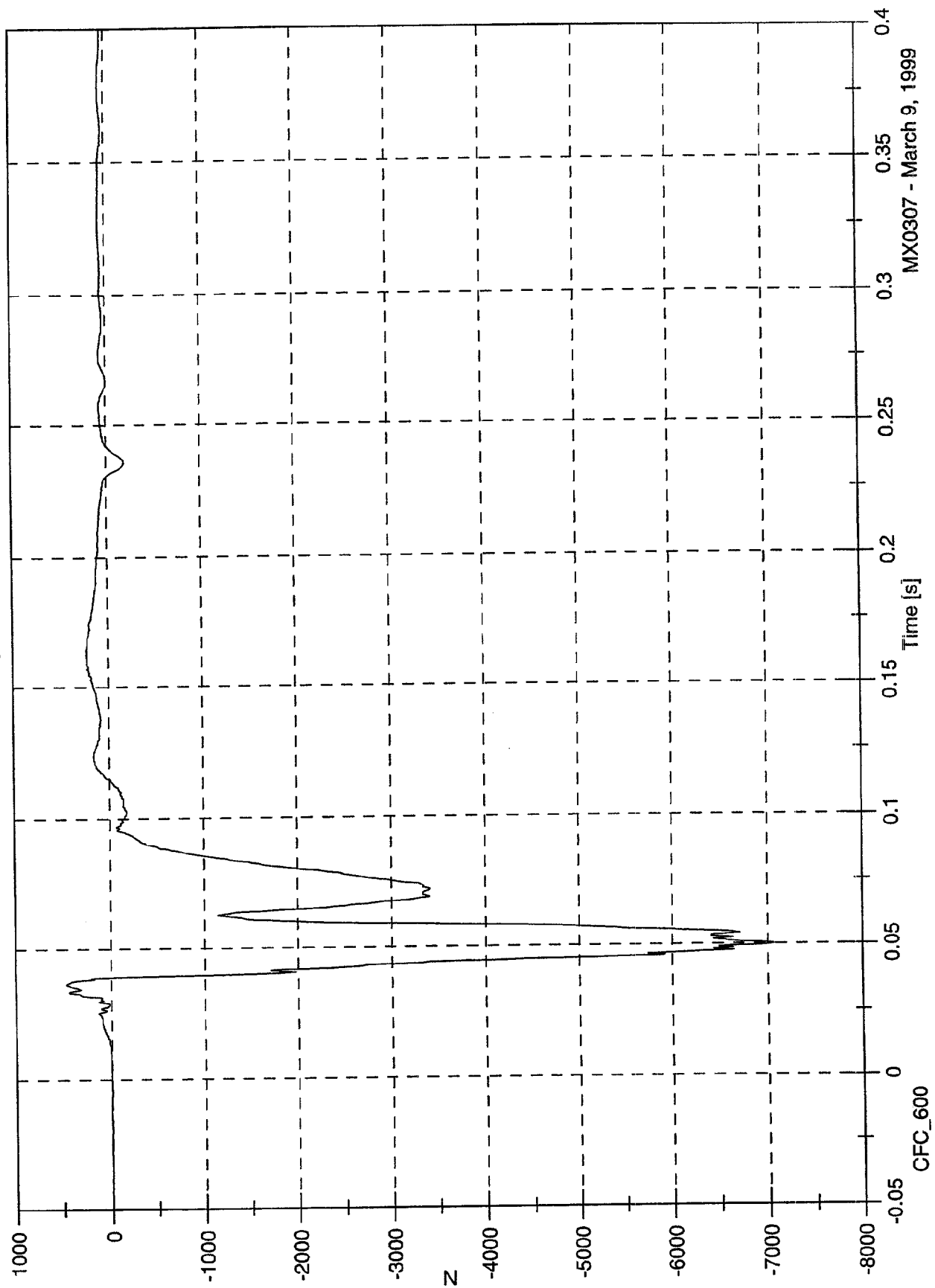
MX0307 - March 9, 1999



NCAP Test #13 - 1999 Jeep Cherokee

Max: 463.3 [N] at 0.037 [s]
Min: -7061.7 [N] at 0.050 [s]

Passenger Right Femur

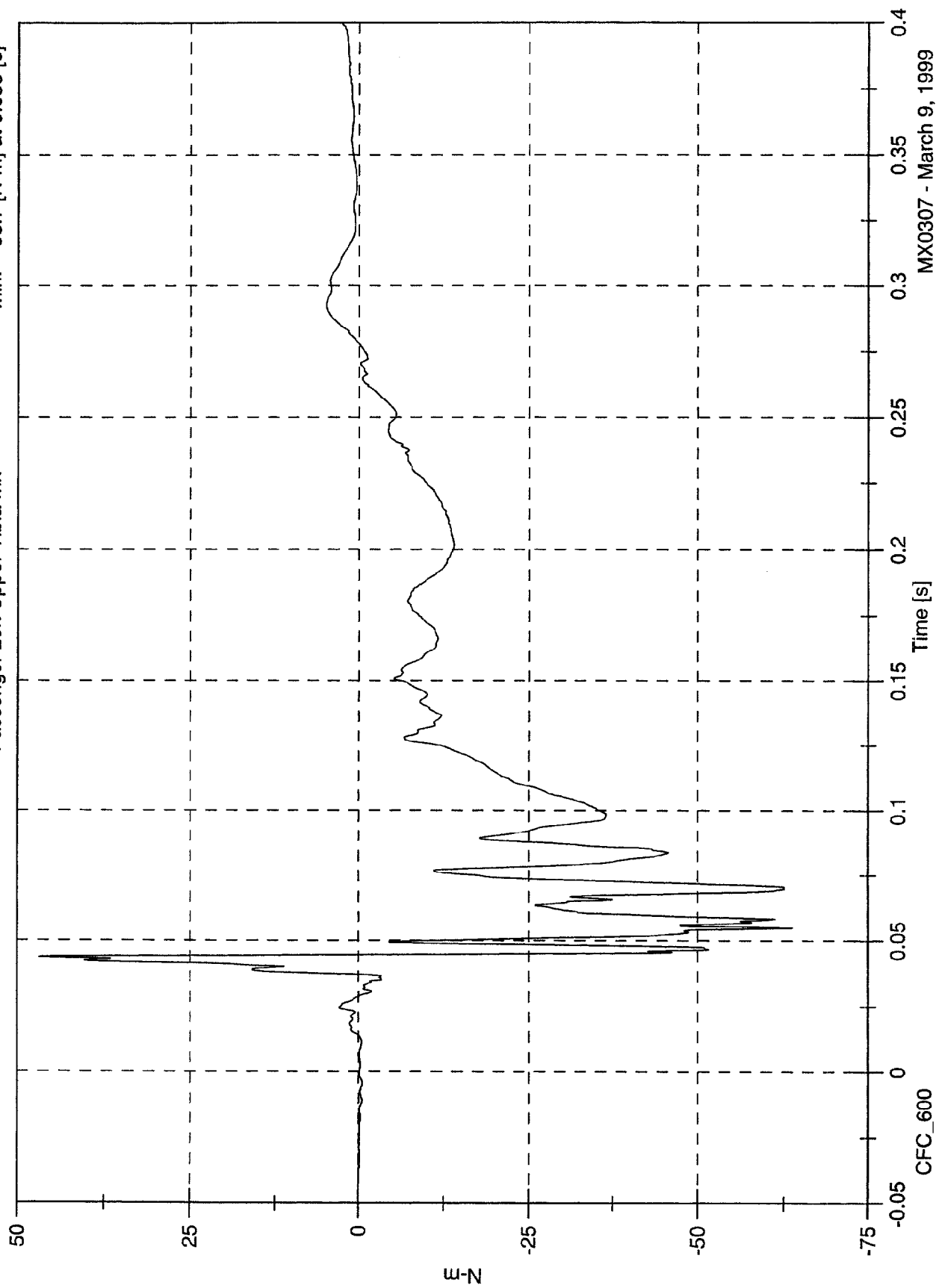


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Left Upper Tibia Mx

Max: 46.8 [N-m] at 0.043 [s]
Min: -63.7 [N-m] at 0.055 [s]

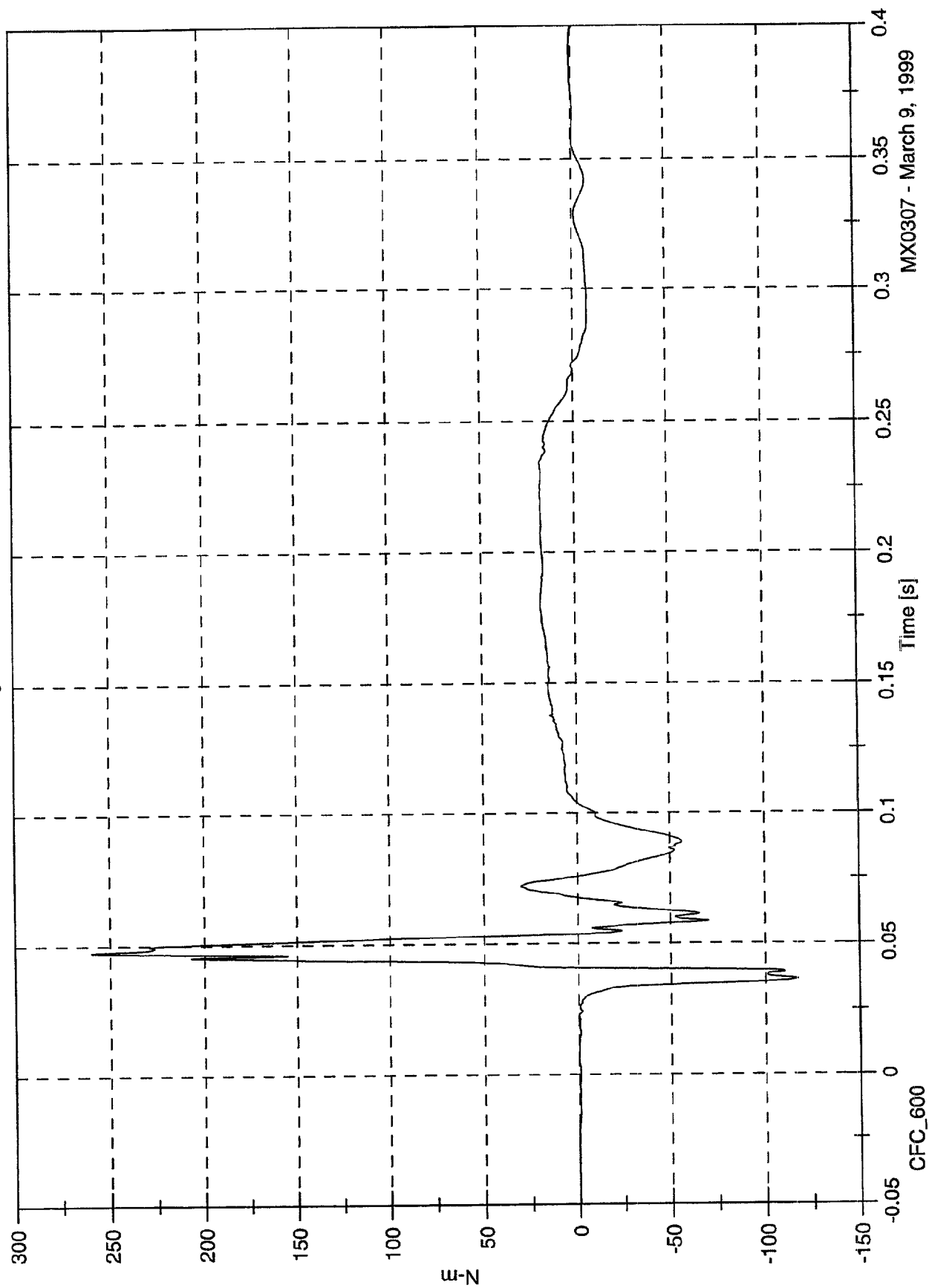


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Left Upper Tibia My

Max: 259.7 [N-m] at 0.047 [s]
Min: -117.0 [N-m] at 0.036 [s]

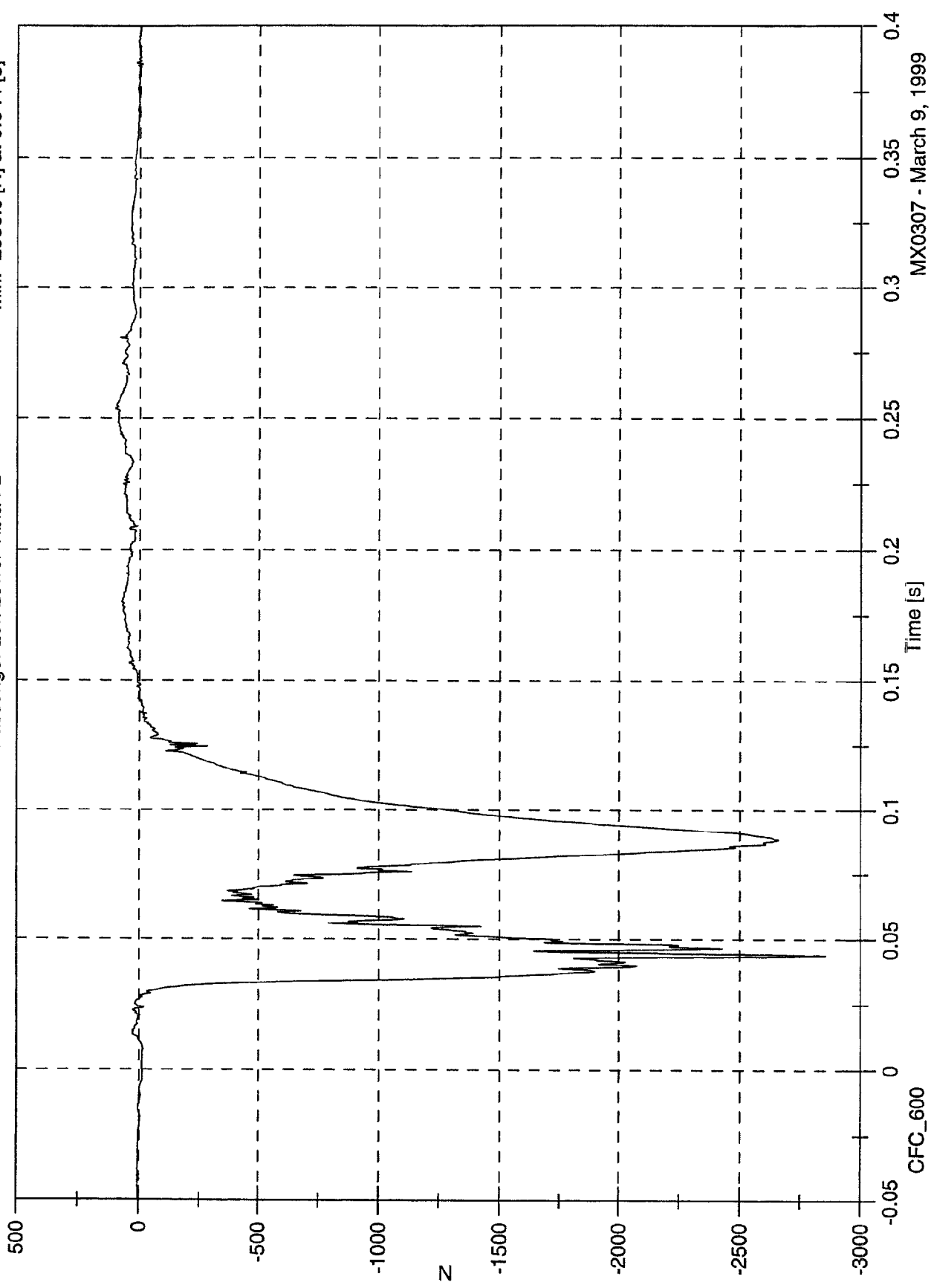


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 99.0 [N] at 0.254 [s]
Min: -2856.0 [N] at 0.044 [s]

Passenger Left Lower Tibia Fz

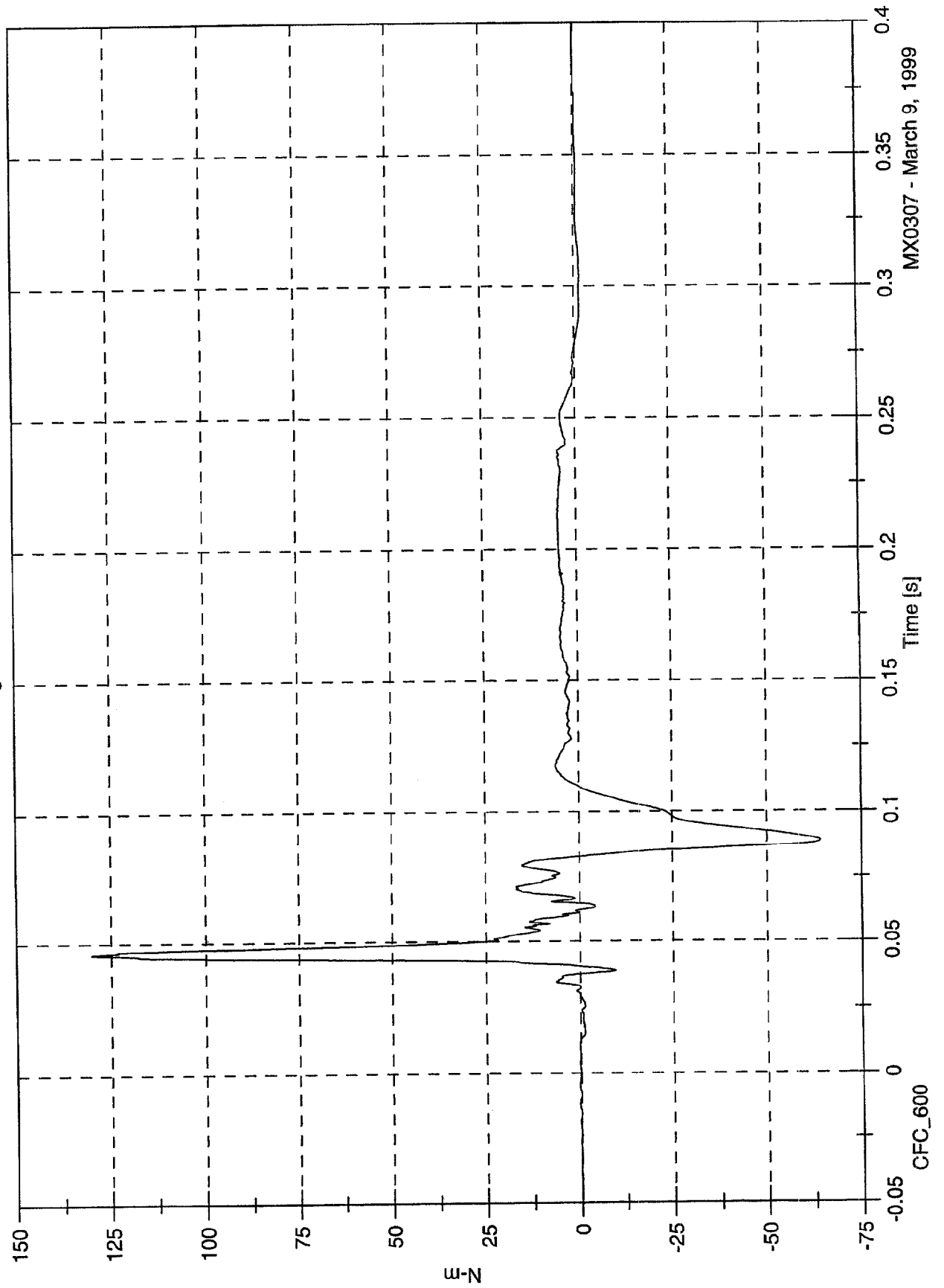


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 130.4 [N-m] at 0.046 [s]
Min: -64.2 [N-m] at 0.089 [s]

Passenger Left Lower Tibia Mx

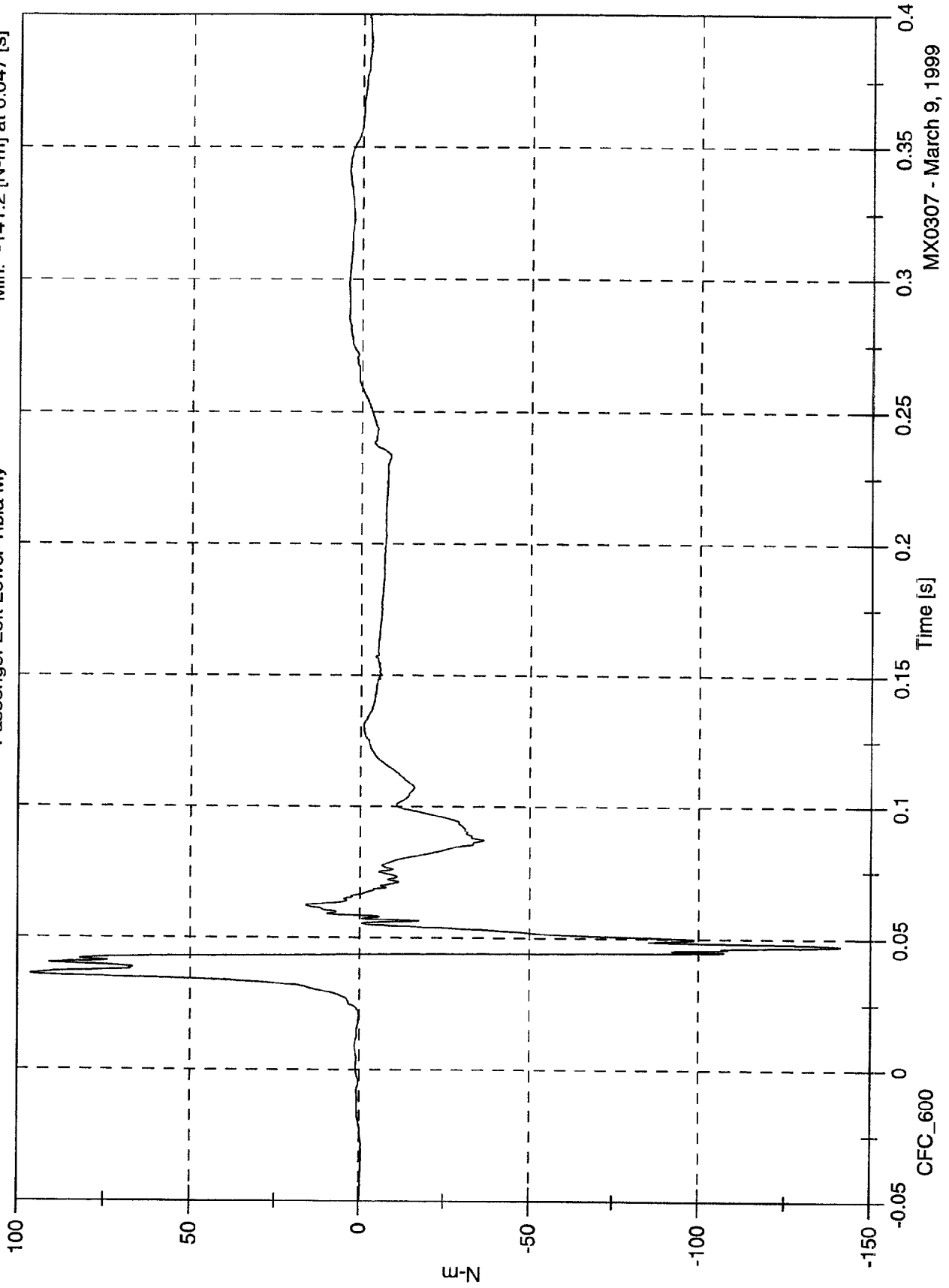


MX0307 - March 9, 1999

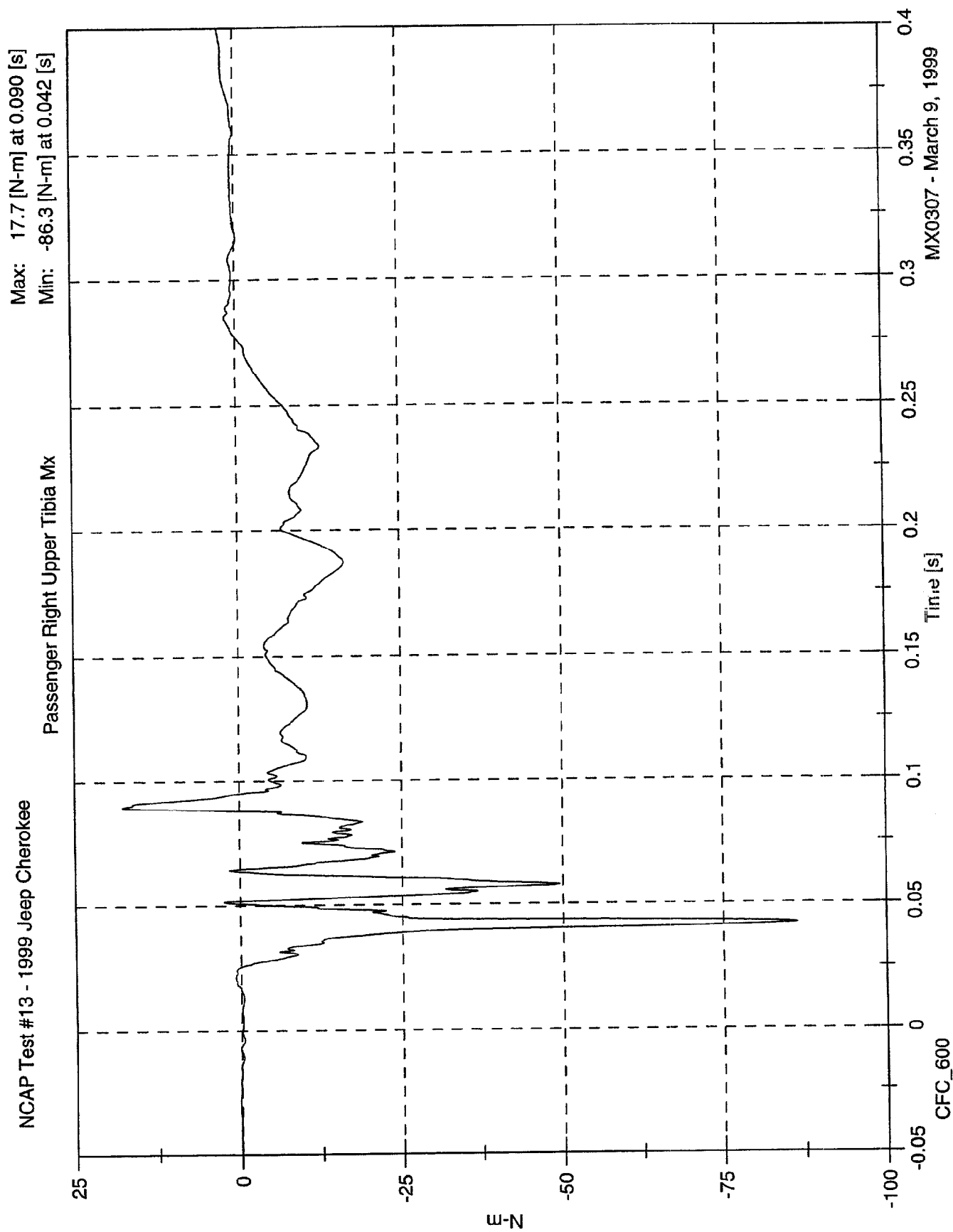
NCAP Test #13 - 1999 Jeep Cherokee

Max: 96.1 [N-m] at 0.036 [s]
 Min: -141.2 [N-m] at 0.047 [s]

Passenger Left Lower Tibia My



MX0307 - March 9, 1999



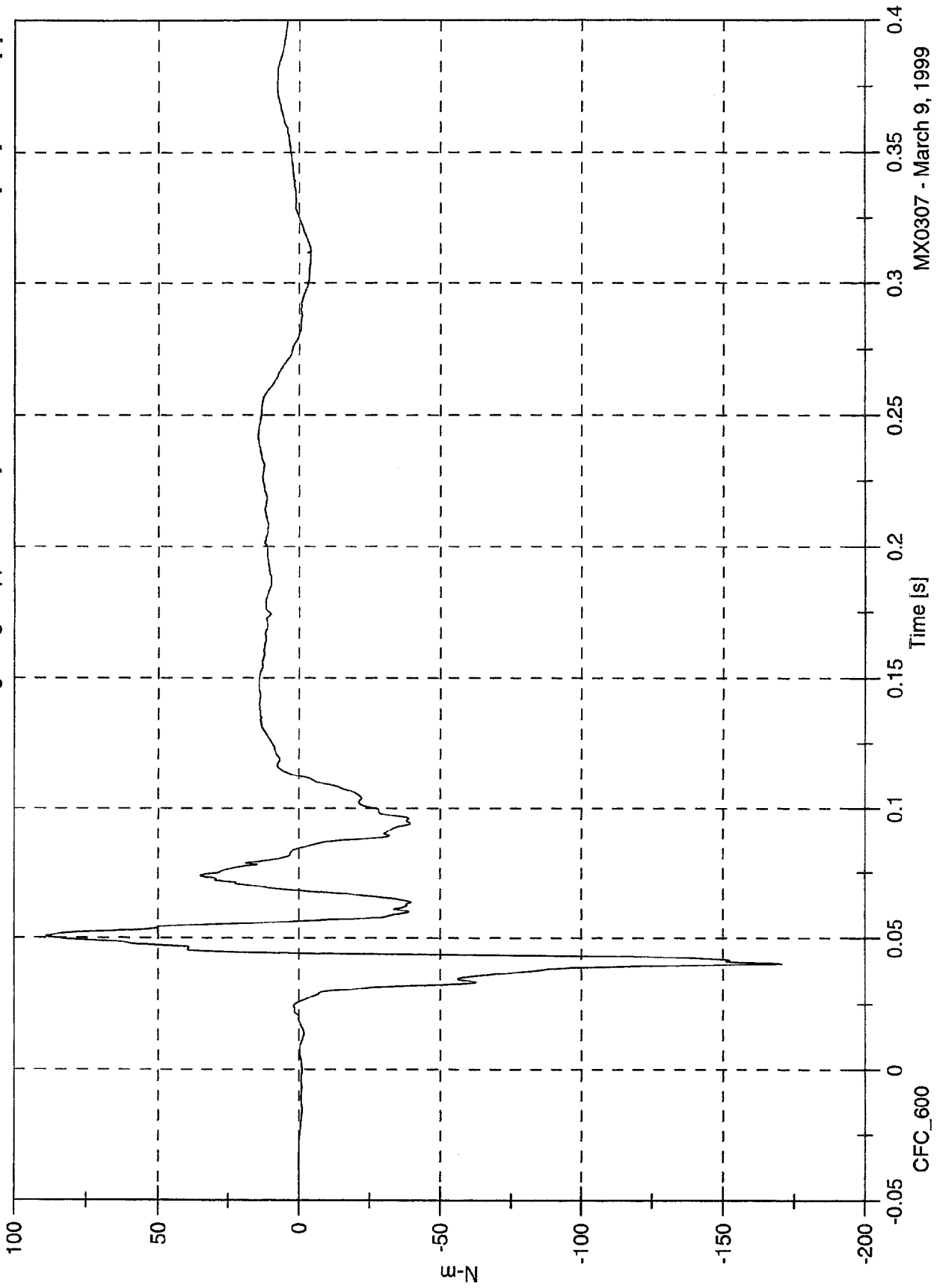
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

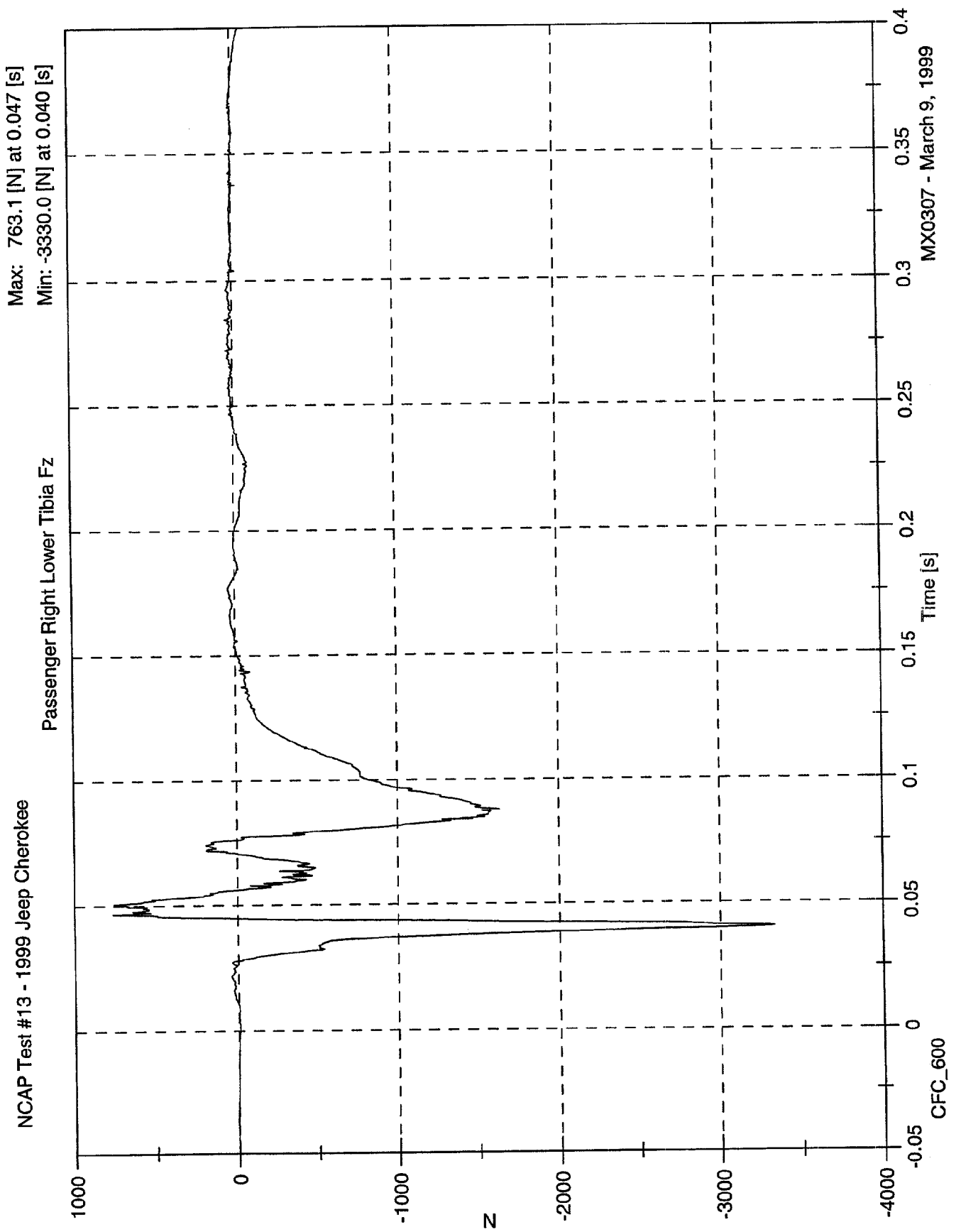
Max: 88.7 [N-m] at 0.050 [s]

Min: -170.6 [N-m] at 0.040 [s]

Passenger Right Upper Tibia My



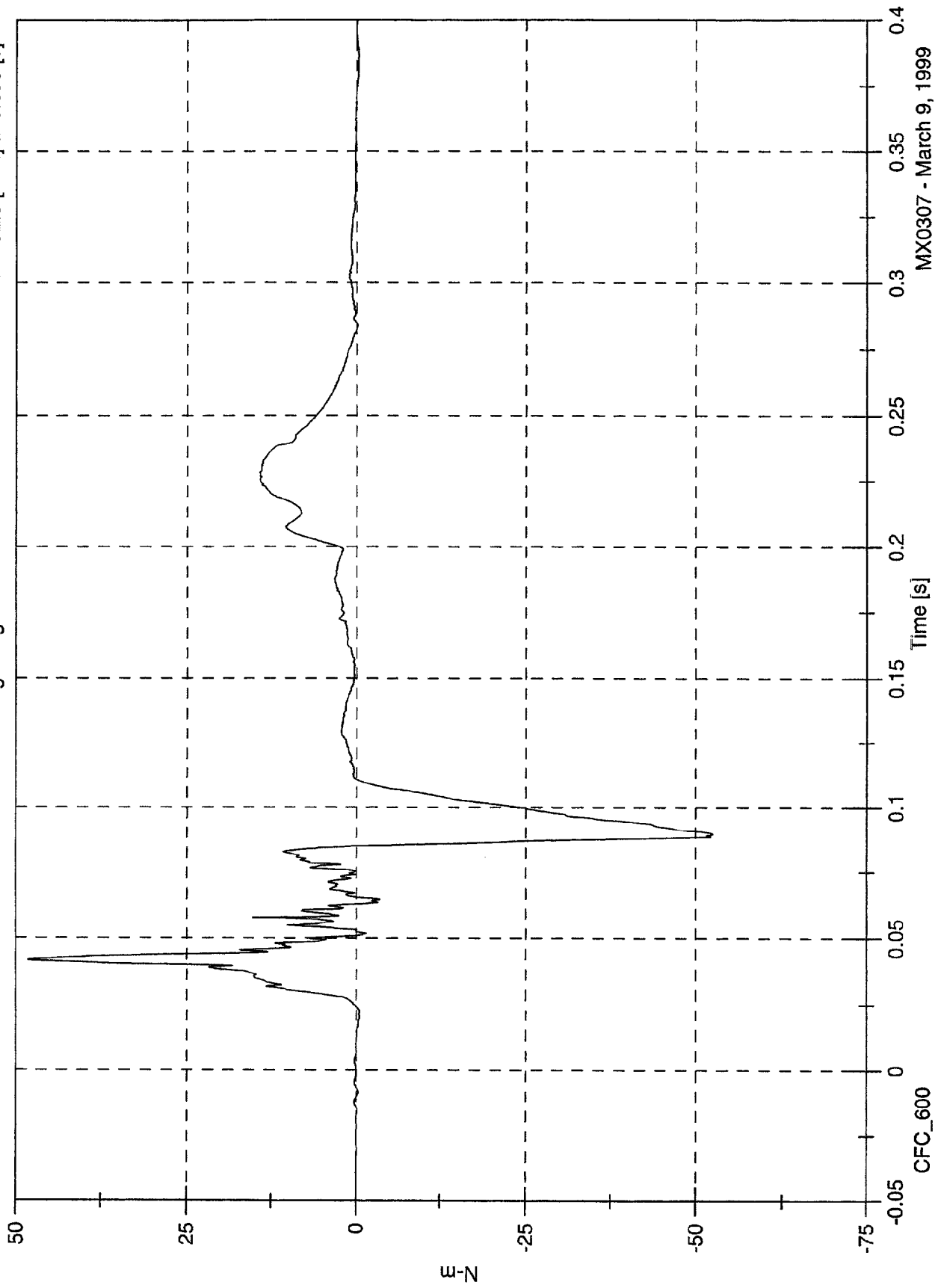
MX0307 - March 9, 1999

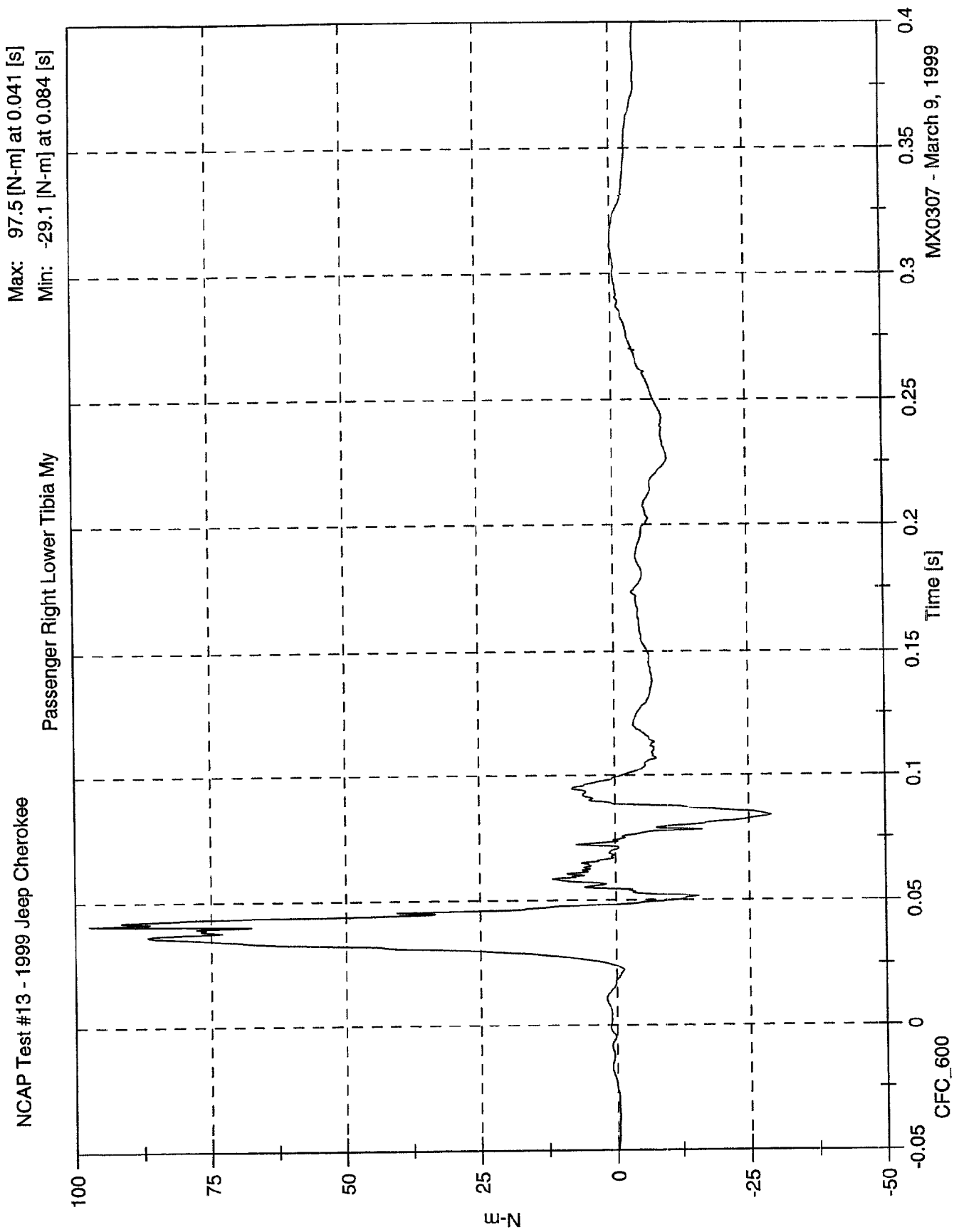


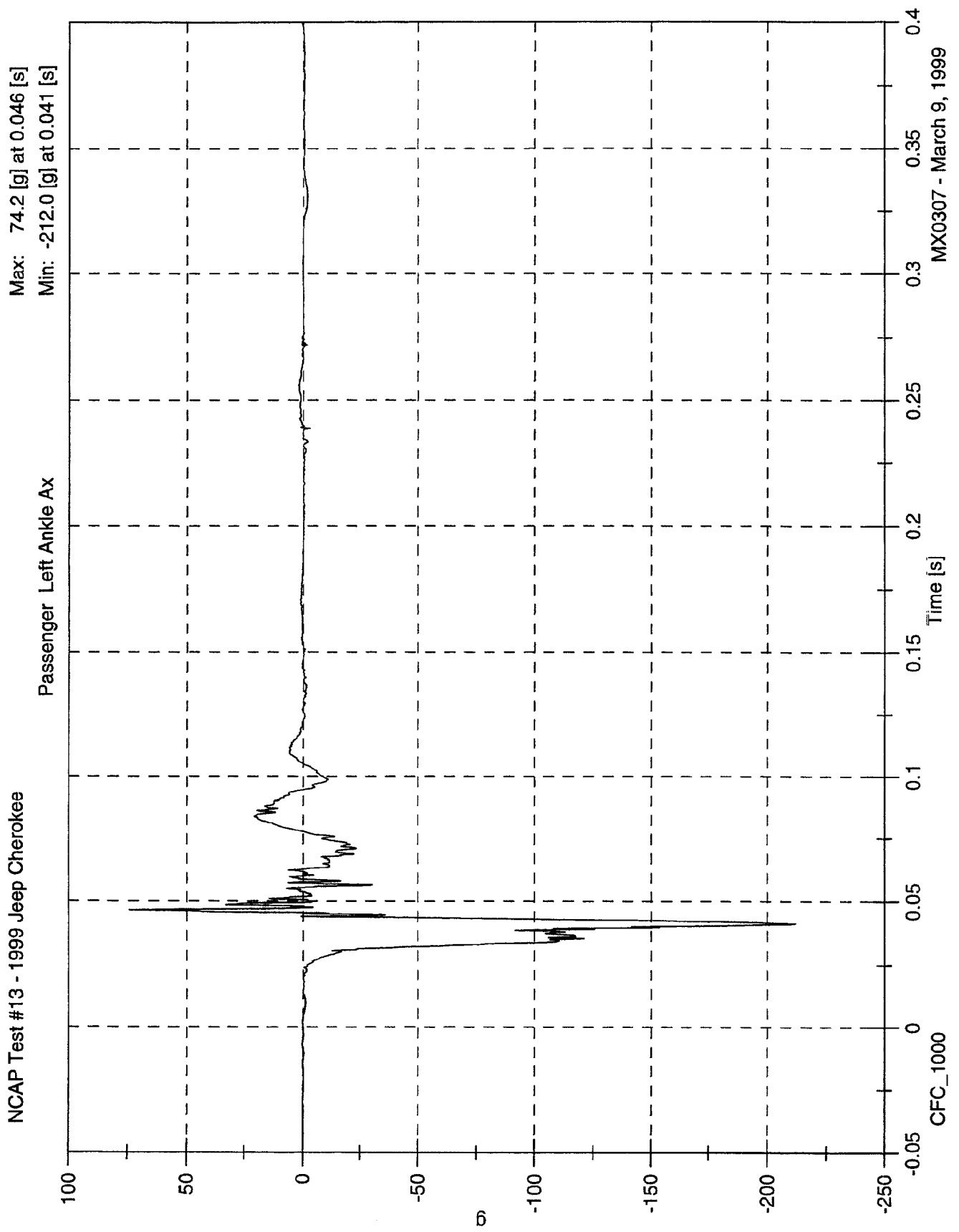
NCAP Test #13 - 1999 Jeep Cherokee

Passenger Right Lower Tibia Mx

Max: 48.2 [N-m] at 0.042 [s]
Min: -52.5 [N-m] at 0.090 [s]



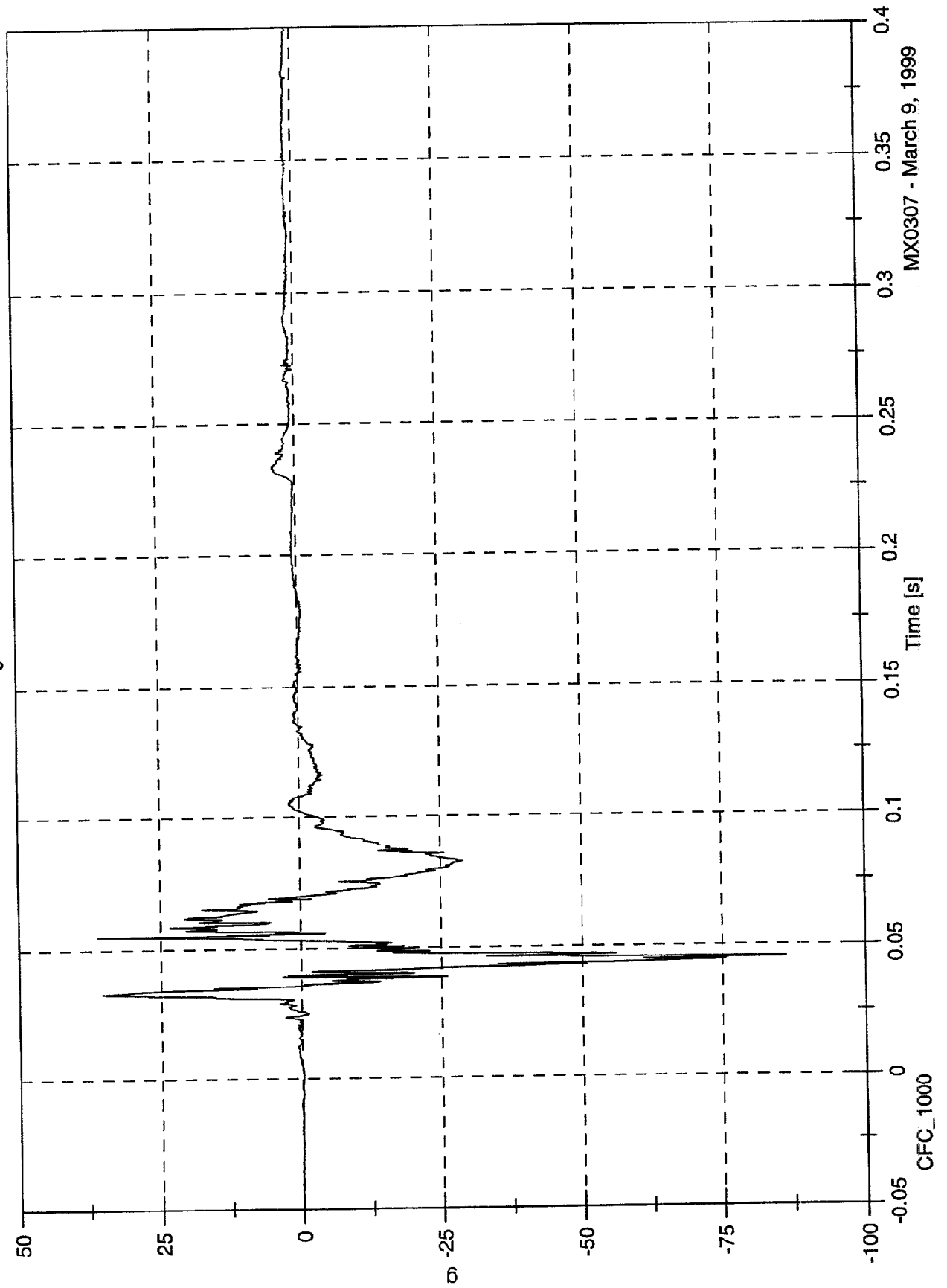




NCAP Test #13 - 1999 Jeep Cherokee

Max: 36.1 [g] at 0.055 [s]
Min: -86.2 [g] at 0.045 [s]

Passenger Left Ankle Az

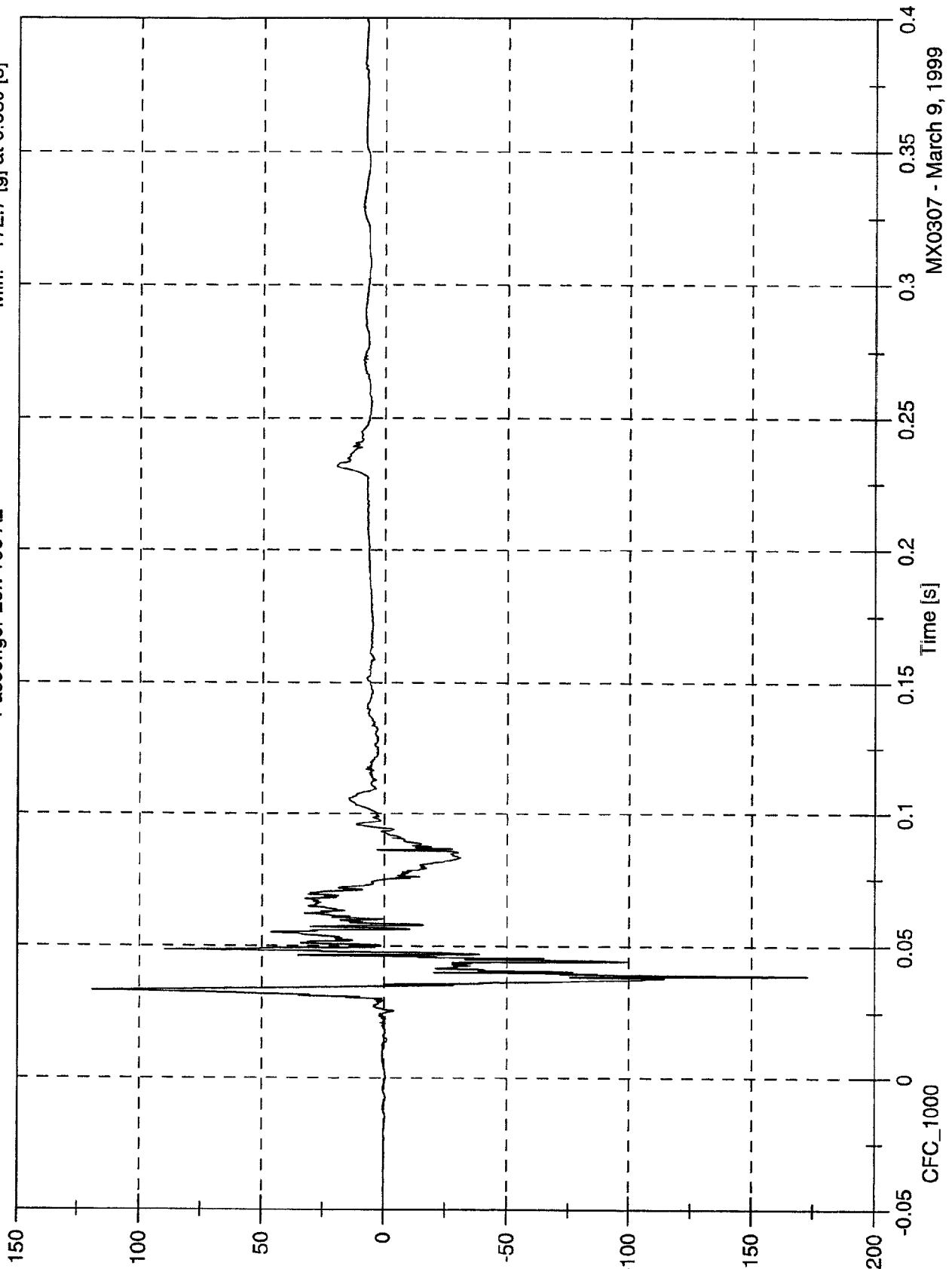


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 119.2 [g] at 0.033 [s]
Min: -172.7 [g] at 0.039 [s]

Passenger Left Toe Az



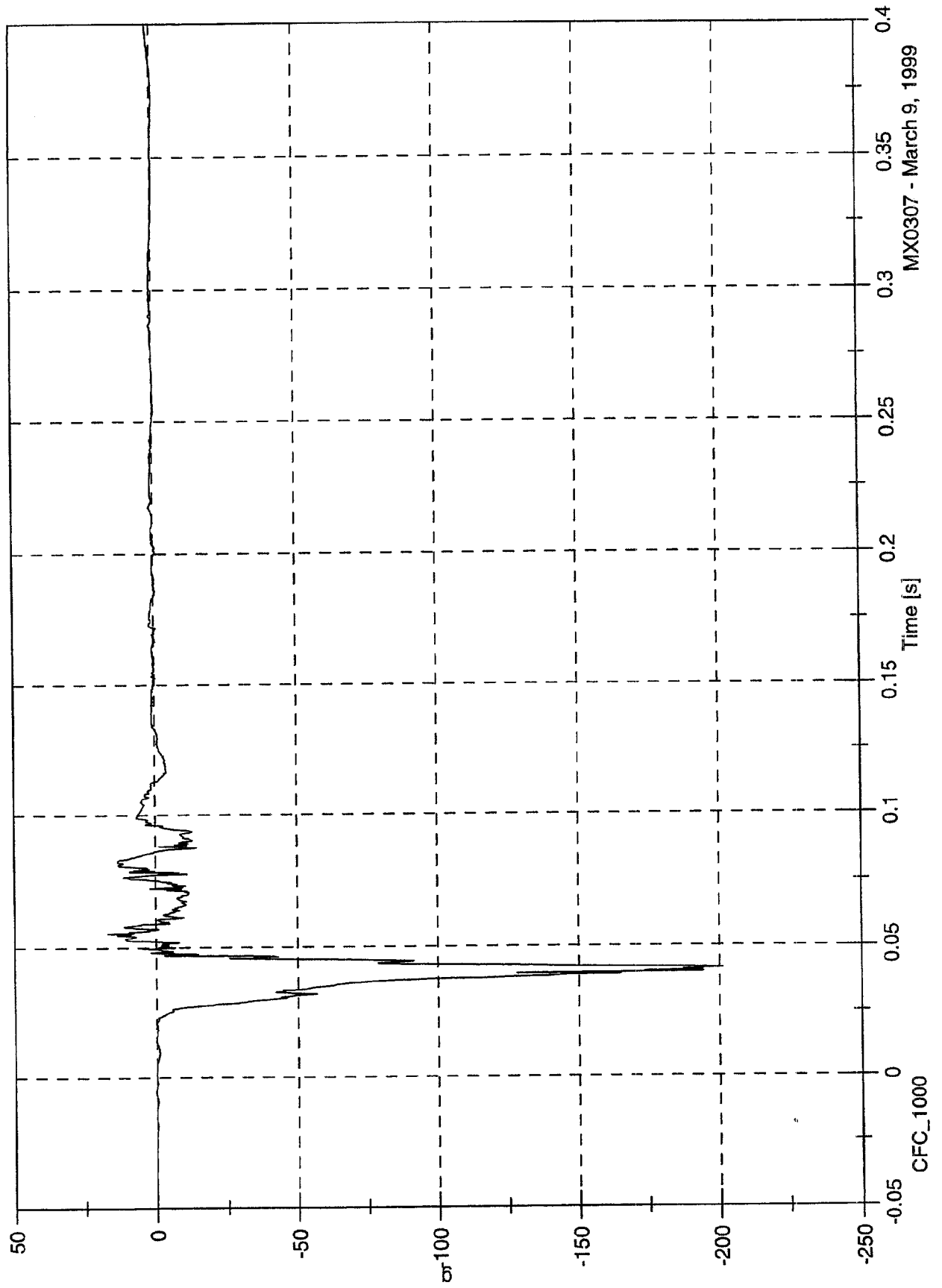
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 17.1 [g] at 0.055 [s]

Min: -201.1 [g] at 0.041 [s]

Passenger Right Ankle Ax



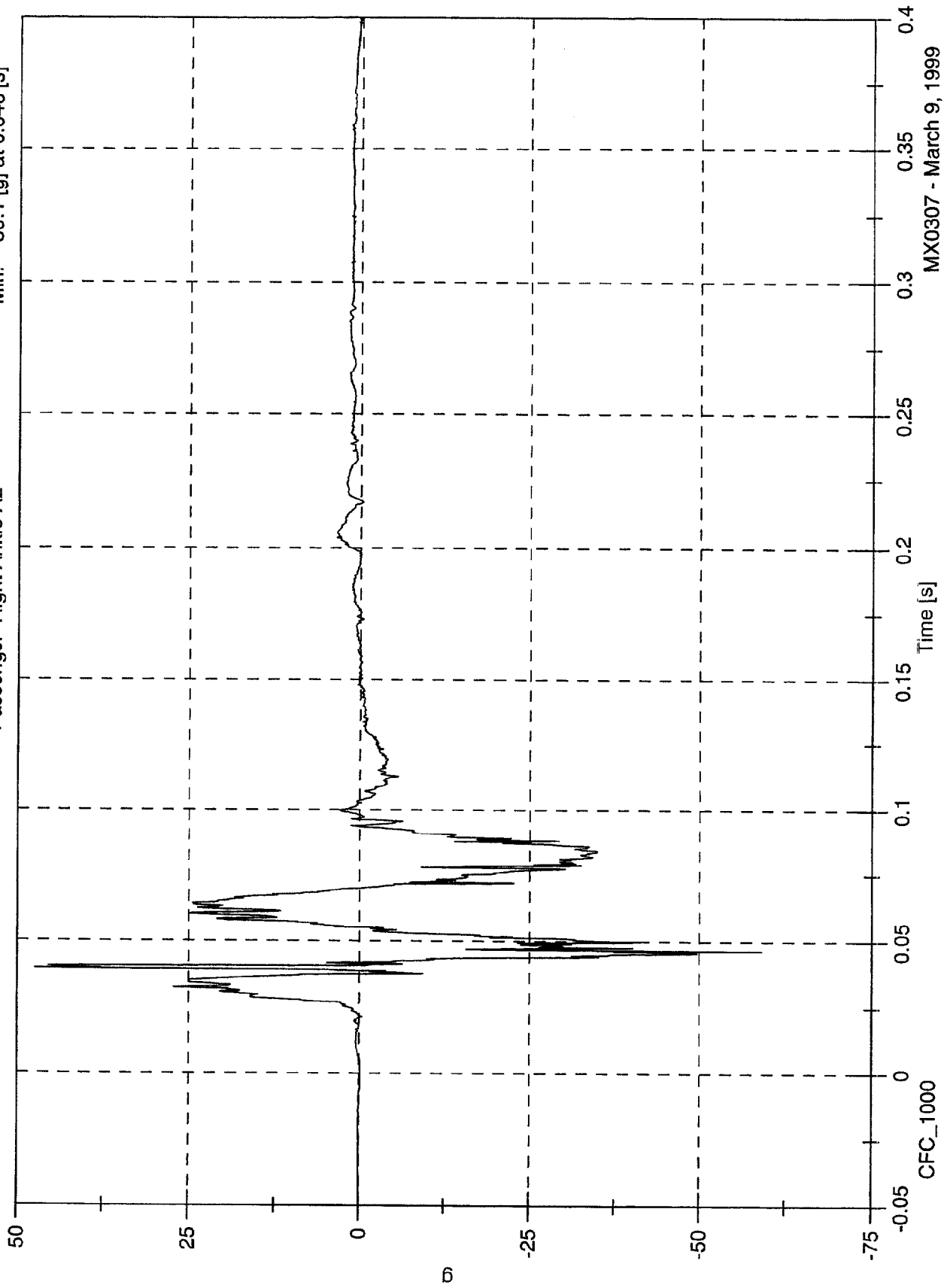
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Passenger Right Ankle Az

Max: 47.4 [g] at 0.039 [s]

Min: -59.1 [g] at 0.046 [s]

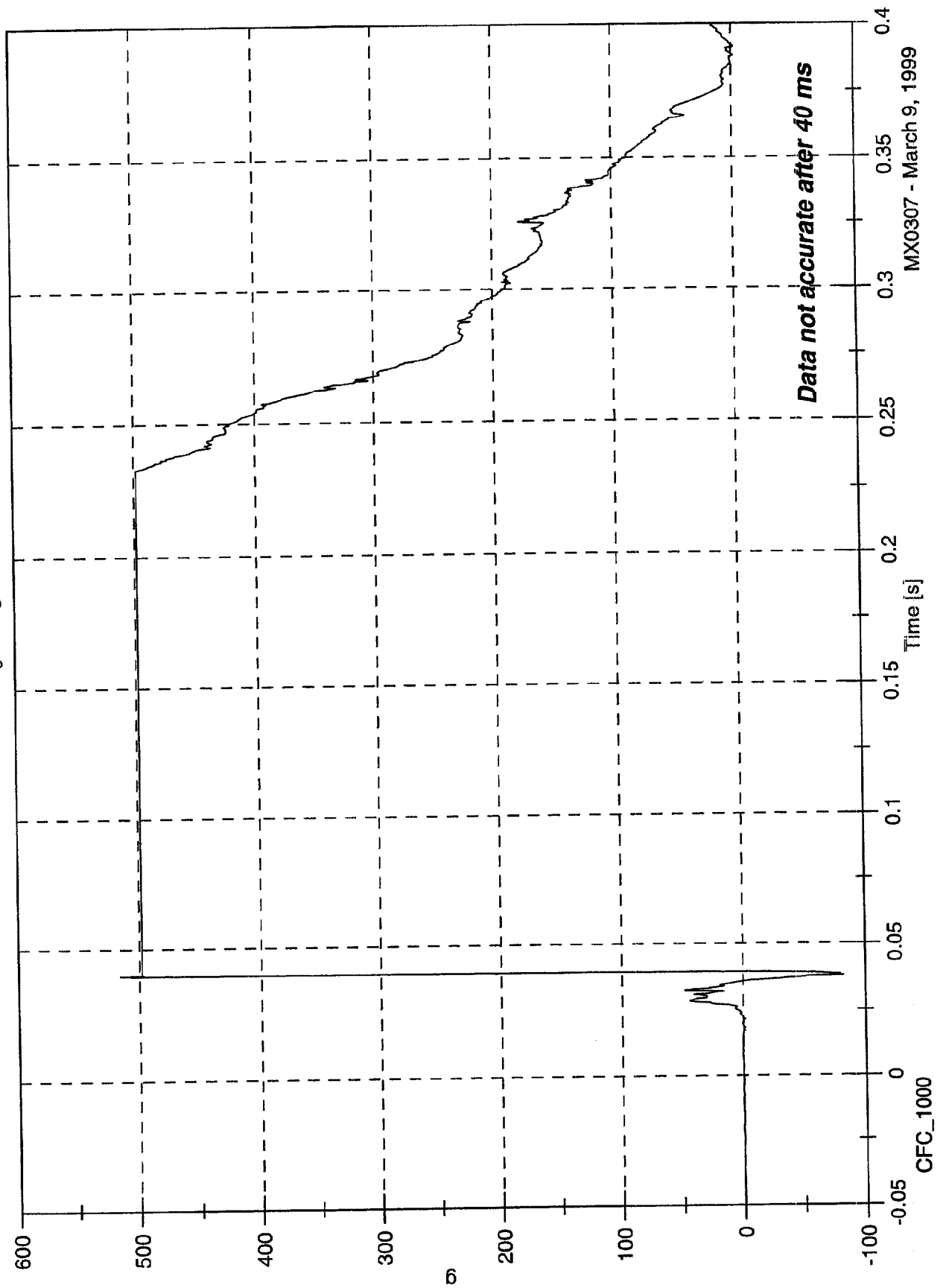


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 515.7 [g] at 0.040 [s]
Min: -81.5 [g] at 0.038 [s]

Passenger Right Toe Az



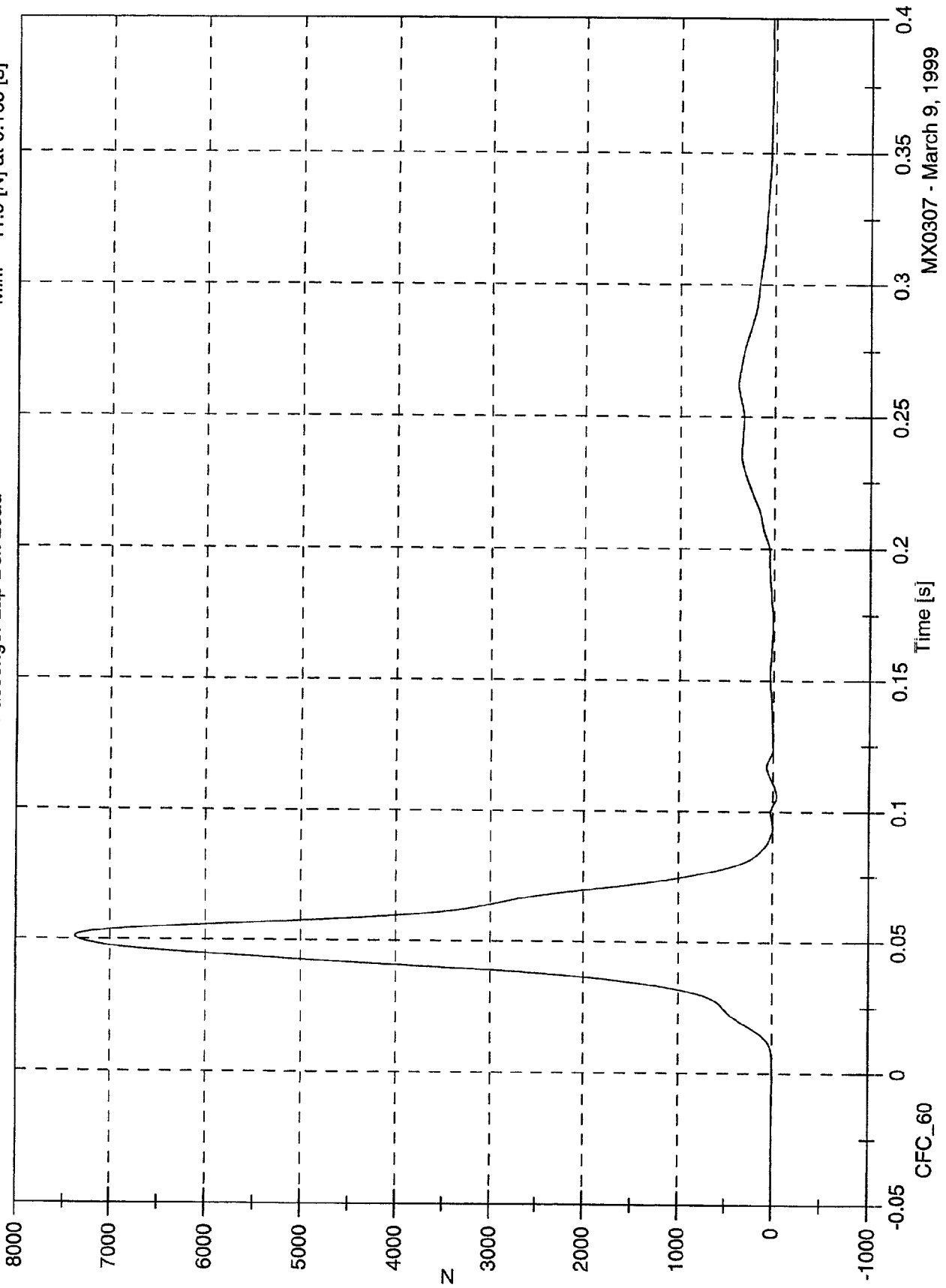
MX0307 - March 9, 1999

Data not accurate after 40 ms

NCAP Test #13 - 1999 Jeep Cherokee

Max: 7383.5 [N] at 0.051 [s]
Min: -41.9 [N] at 0.105 [s]

Passenger Lap Belt Load

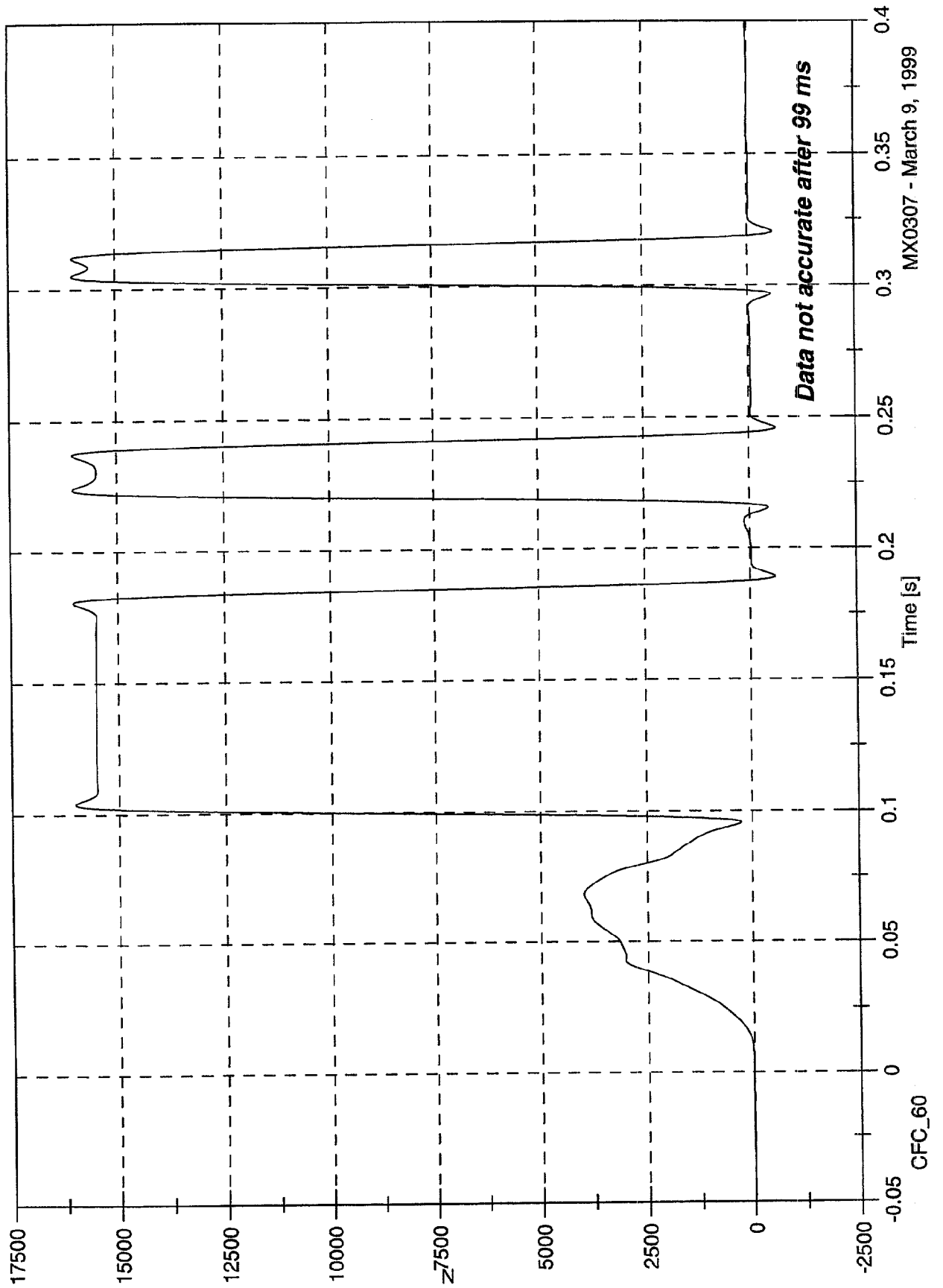


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 16047.1 [N] at 0.180 [s]
Min: -618.9 [N] at 0.246 [s]

Passenger Torso Belt Load

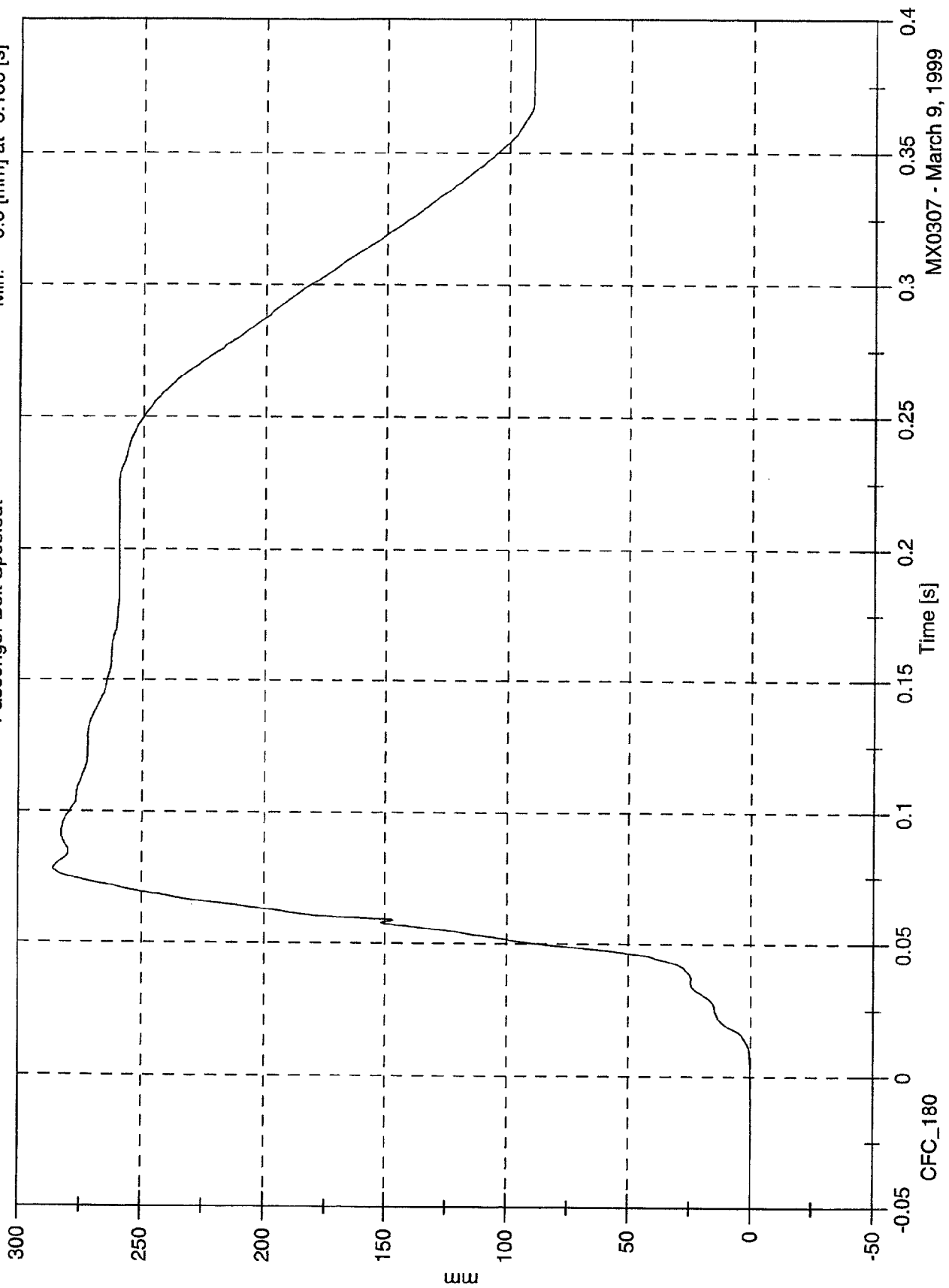


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NCAP Test #13 - 1999 Jeep Cherokee

Max: 286.0 [mm] at 0.078 [s]
Min: -0.0 [mm] at -0.100 [s]

Passenger Belt Spoolout

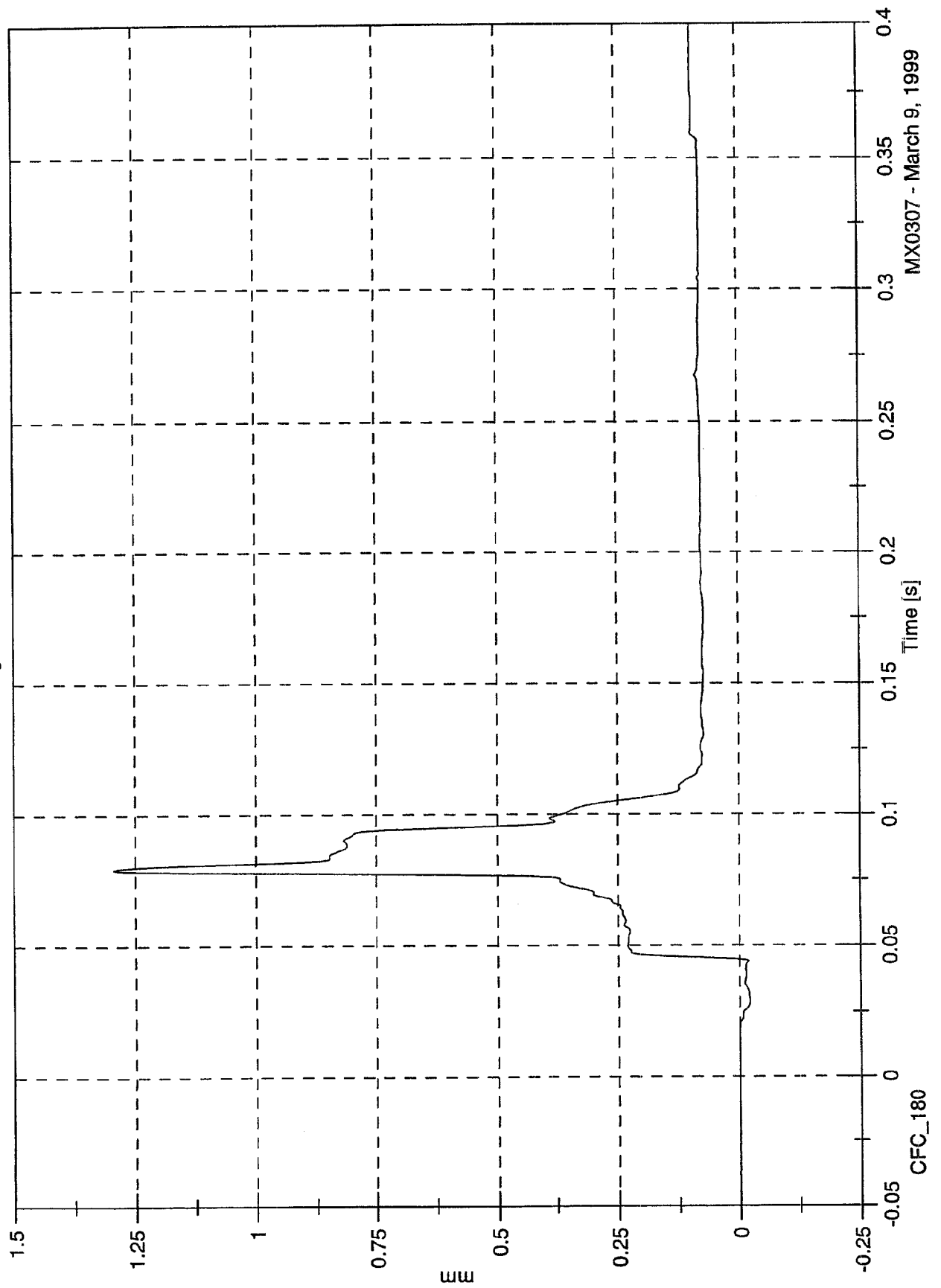


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NCAP Test #13 - 1999 Jeep Cherokee

Max: 1.3 [mm] at 0.079 [s]
 Min: -0.0 [mm] at 0.029 [s]

Passenger Belt Elongation



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NHTSA TEST NO. MX0307

VEHICLE DATA

FILTER CHANNEL CLASS

Acceleration

60

Velocity

180

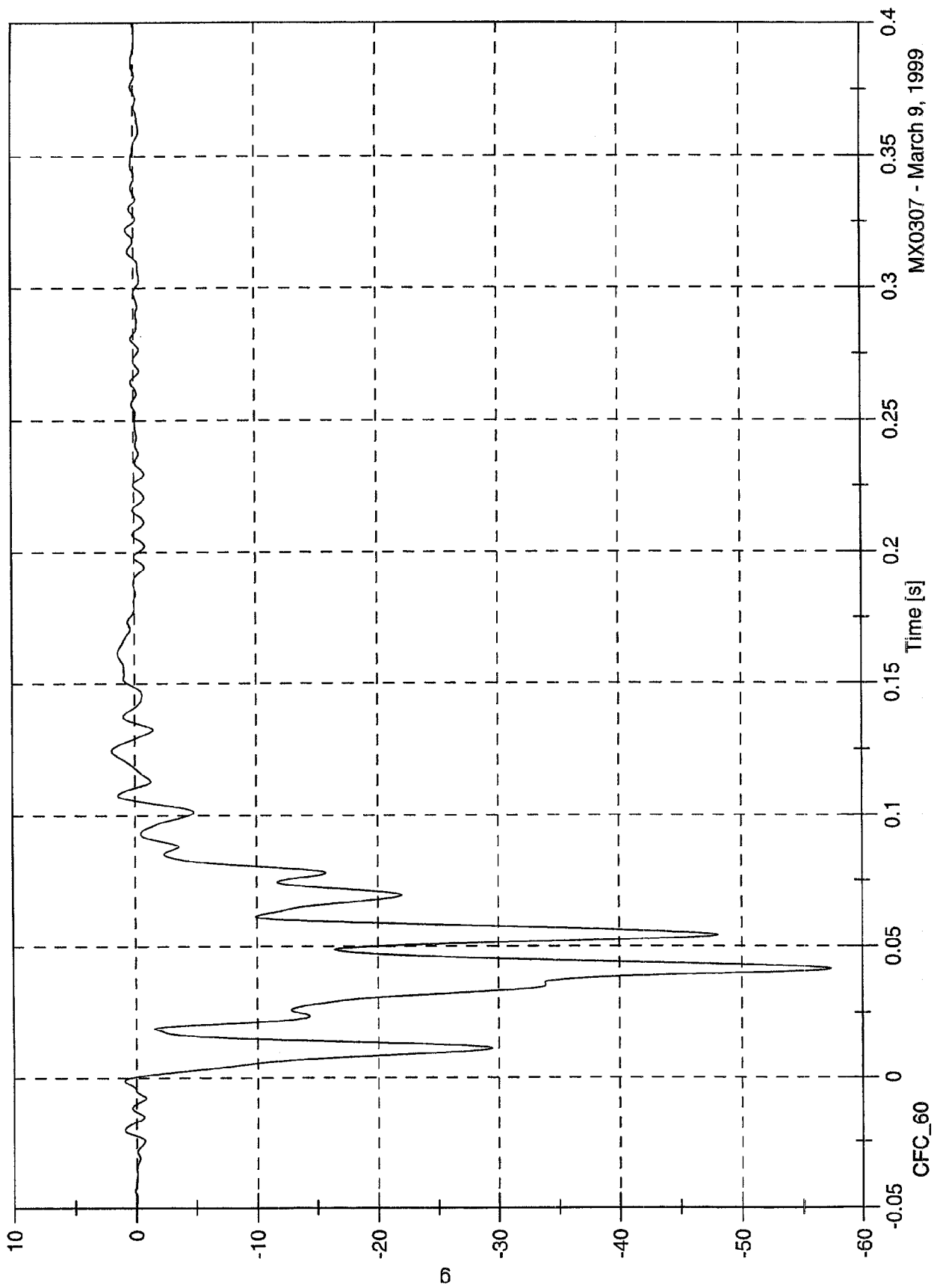
Displacement

180

NCAP Test #13 - 1999 Jeep Cherokee

Max: 1.9 [g] at 0.125 [s]
Min: -57.3 [g] at 0.041 [s]

Acc 1(X) L Rear Crossmember



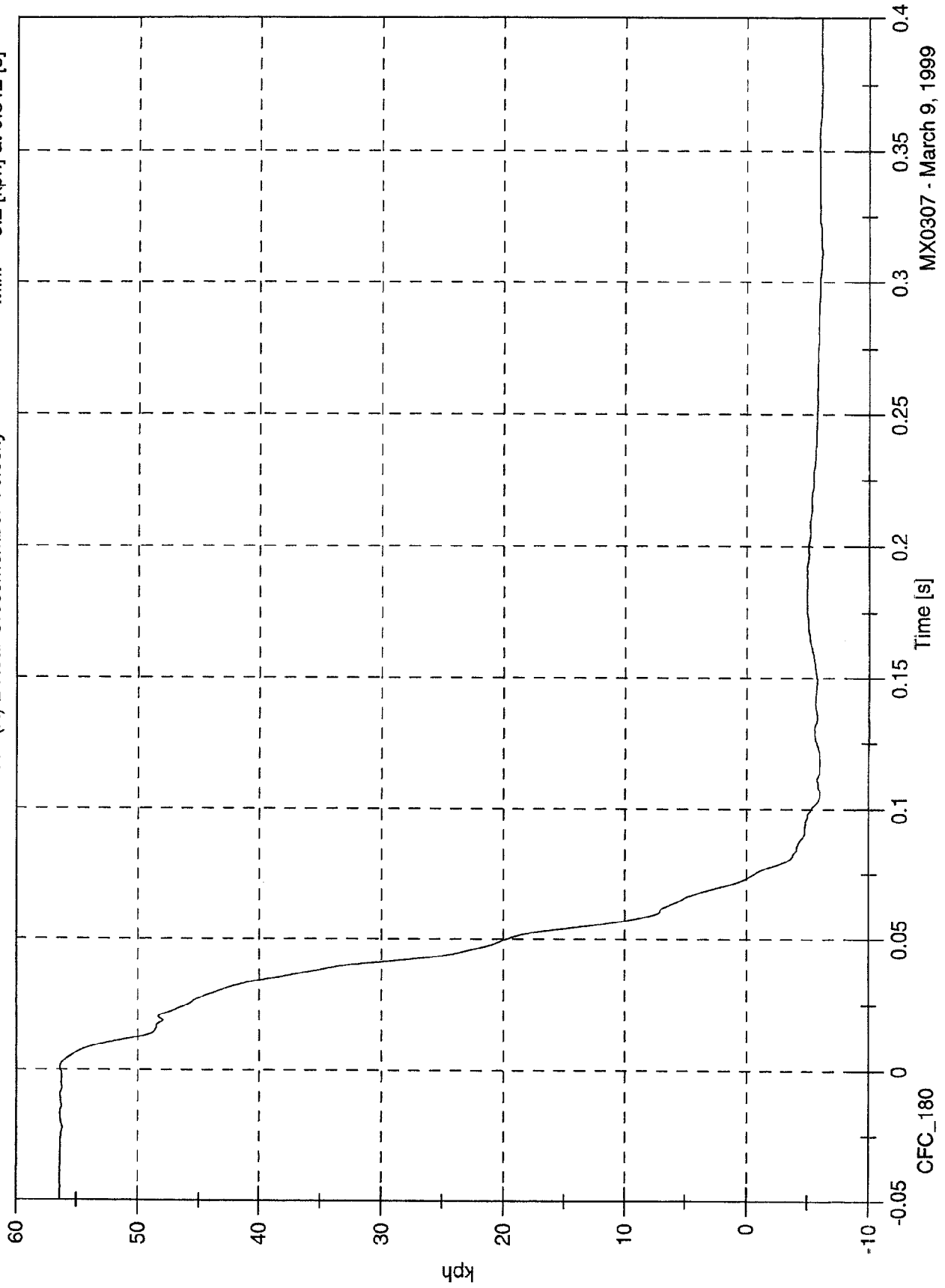
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 56.4 [kph] at 0.043 [s]

Min: -6.2 [kph] at 0.312 [s]

Acc 1(X) L Rear Crossmember Velocity

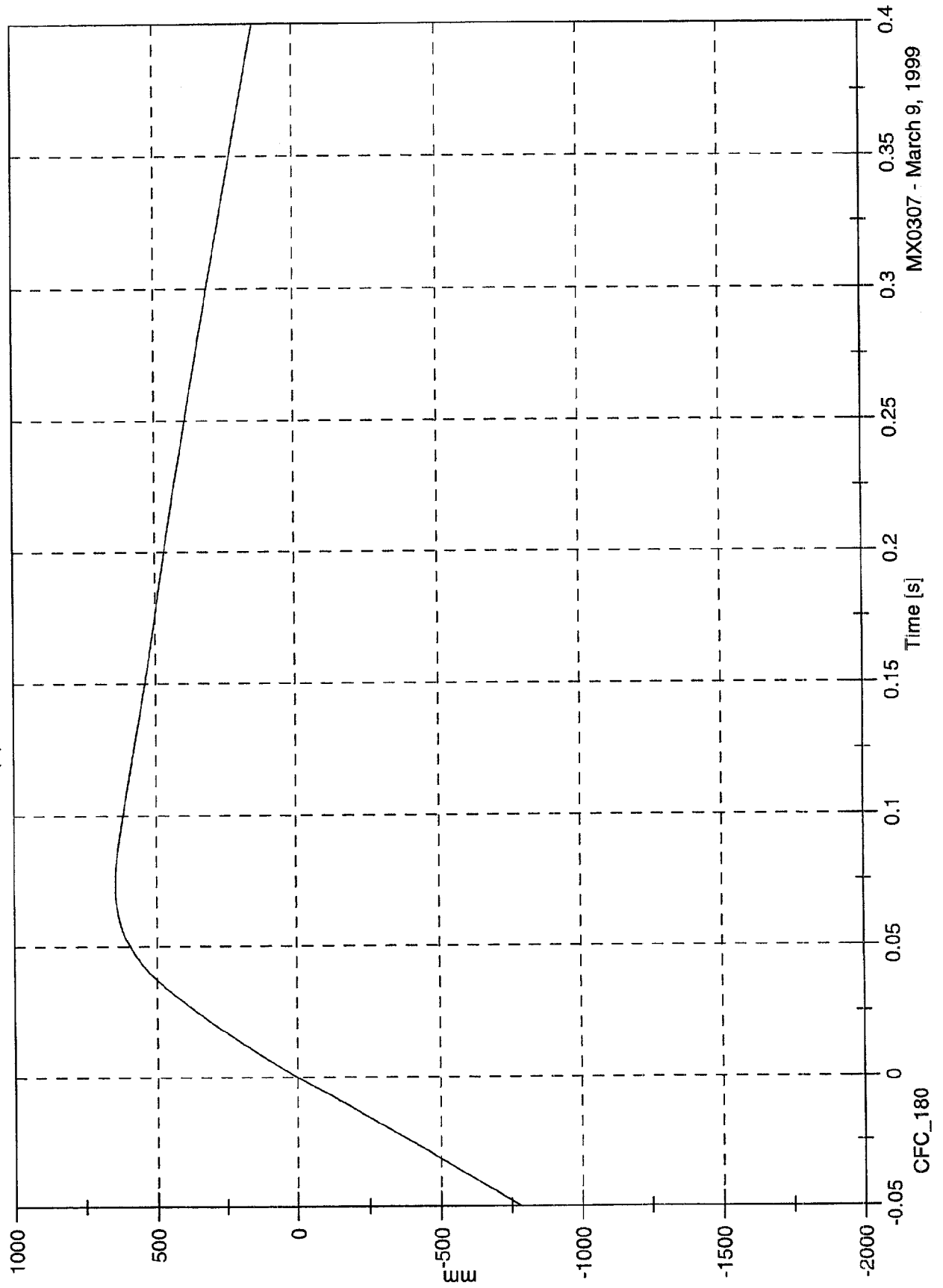


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 645.6 [mm] at 0.073 [s]
Min: -1564.8 [mm] at -0.100 [s]

Acc 1(X) L Rear Crossmember Displacement

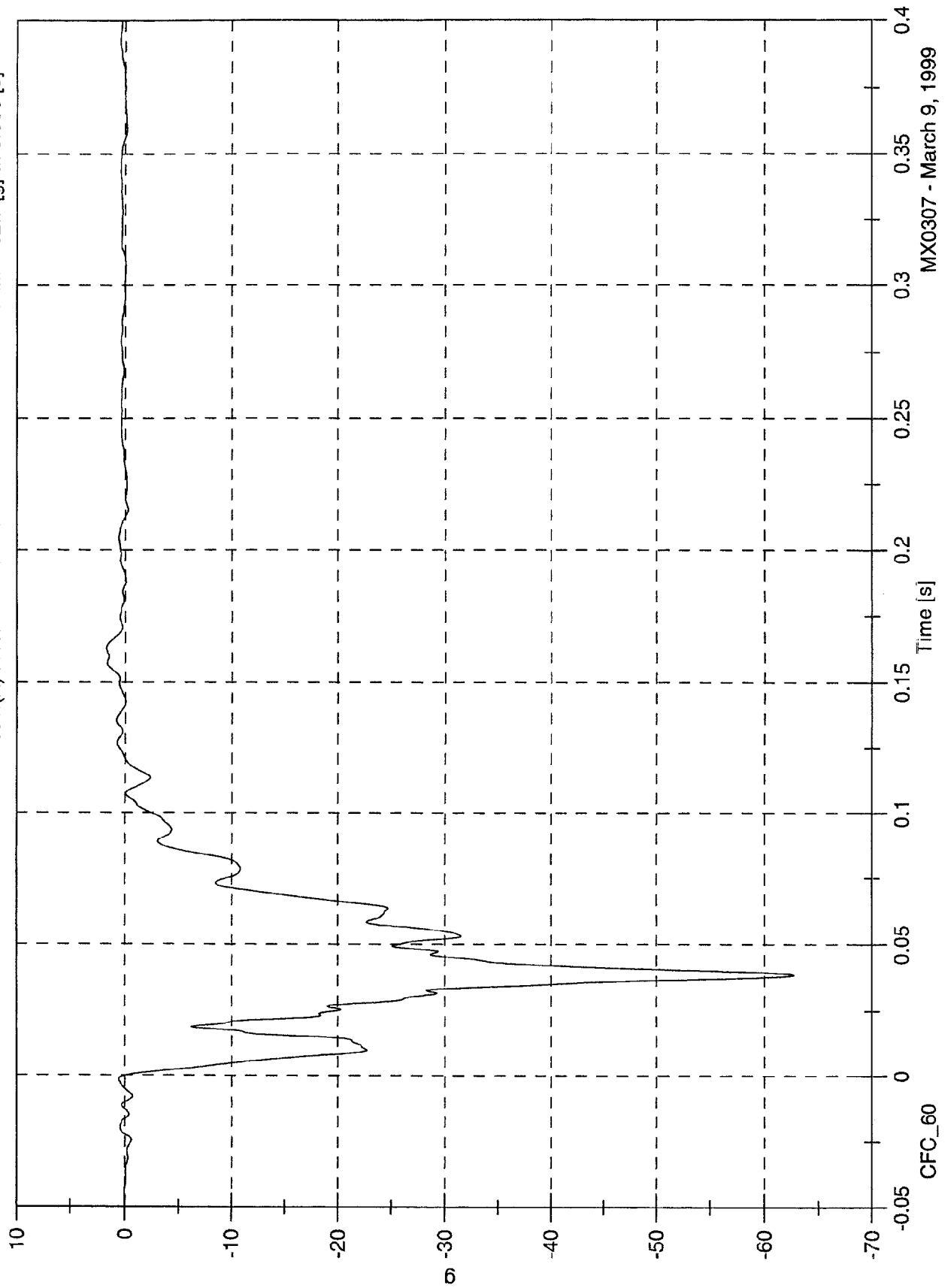


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 1.7 [g] at 0.163 [s]
Min: -62.7 [g] at 0.038 [s]

Acc 2(X) R Rear Crossmember

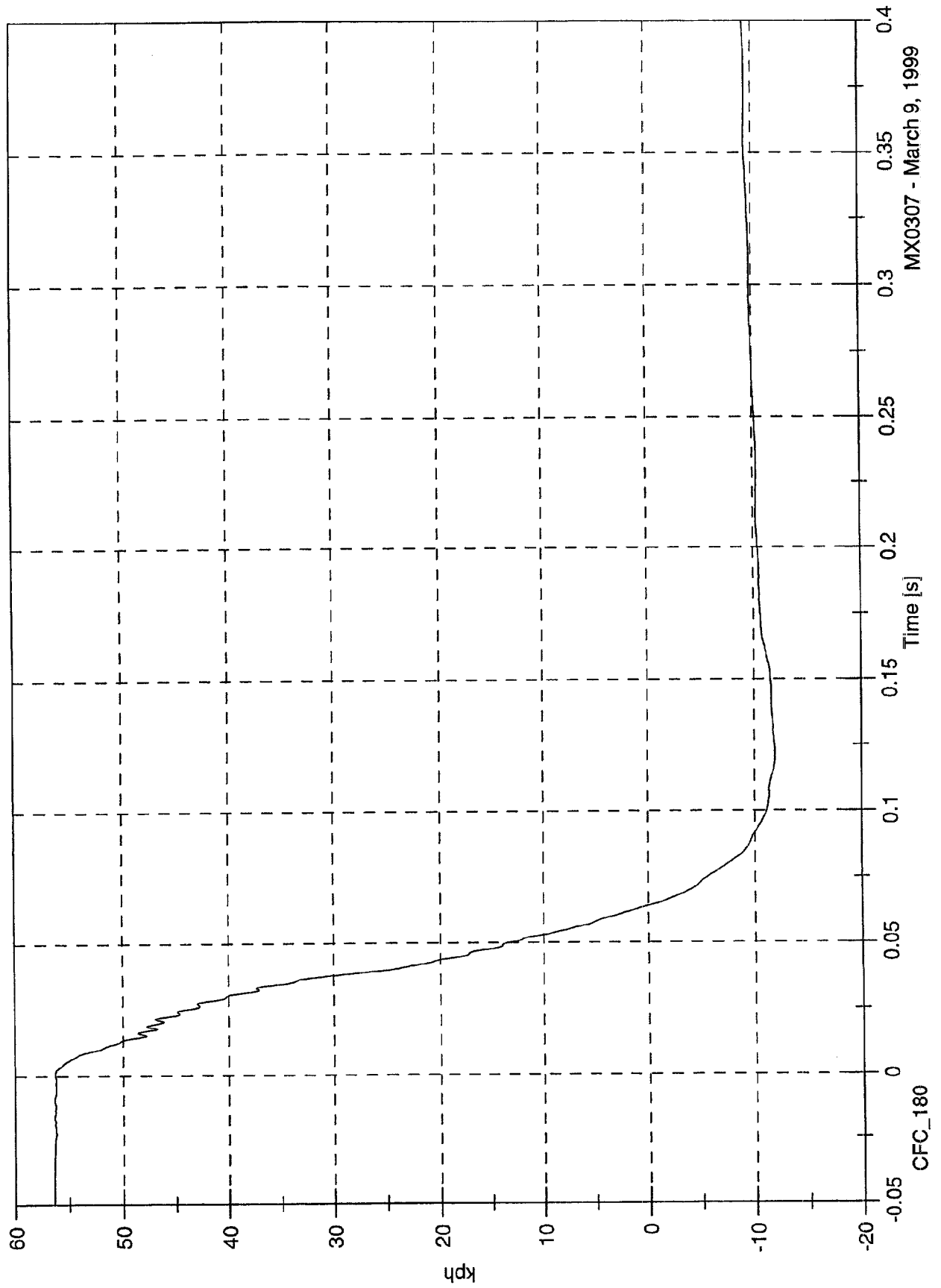


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 56.4 [kph] at -0.042 [s]
 Min: -11.9 [kph] at 0.120 [s]

Acc 2(X) R Rear Crossmember Velocity

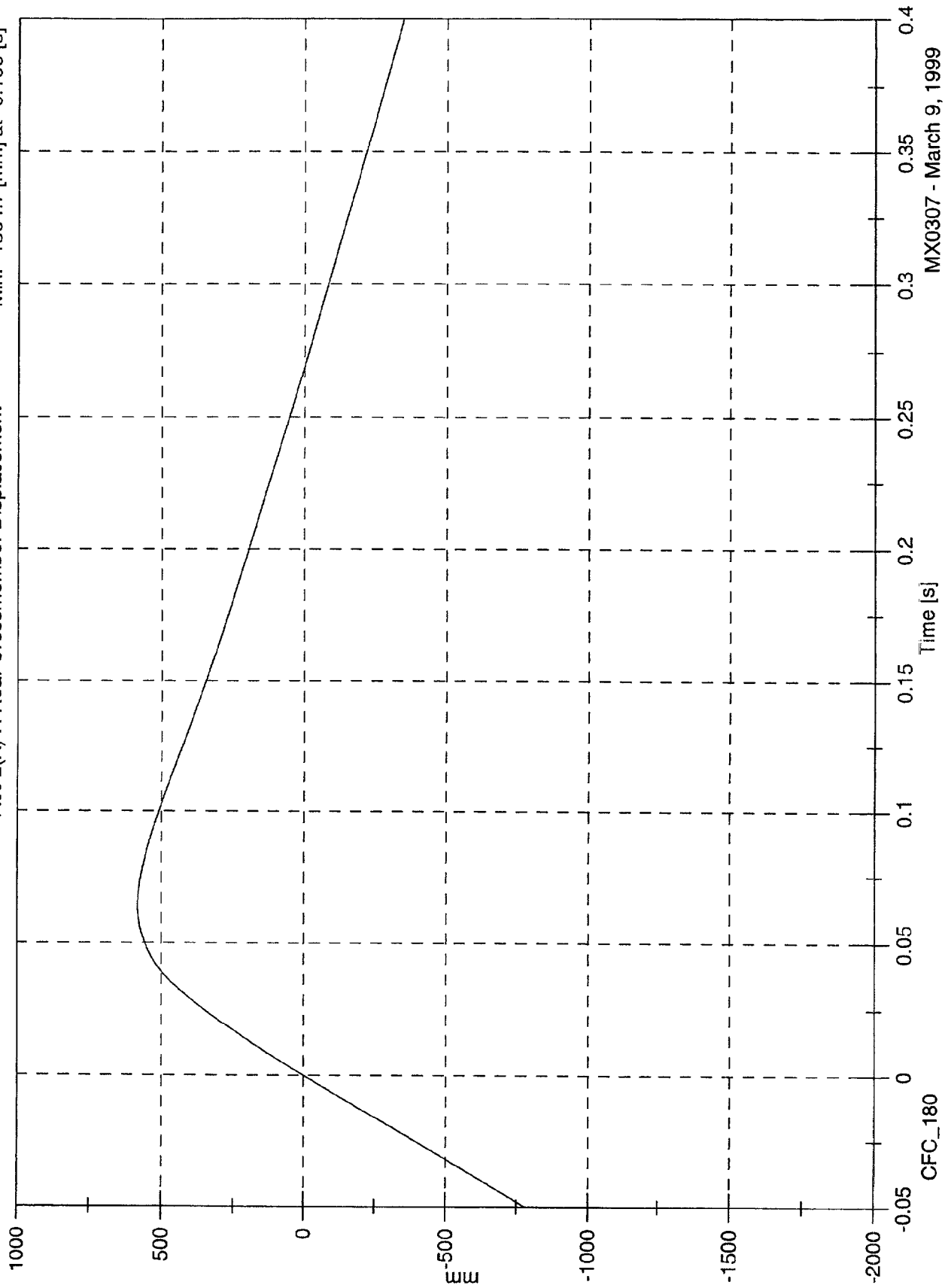


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 580.9 [mm] at 0.064 [s]
Min: -1564.7 [mm] at -0.100 [s]

Acc 2(X) R Rear Crossmember Displacement

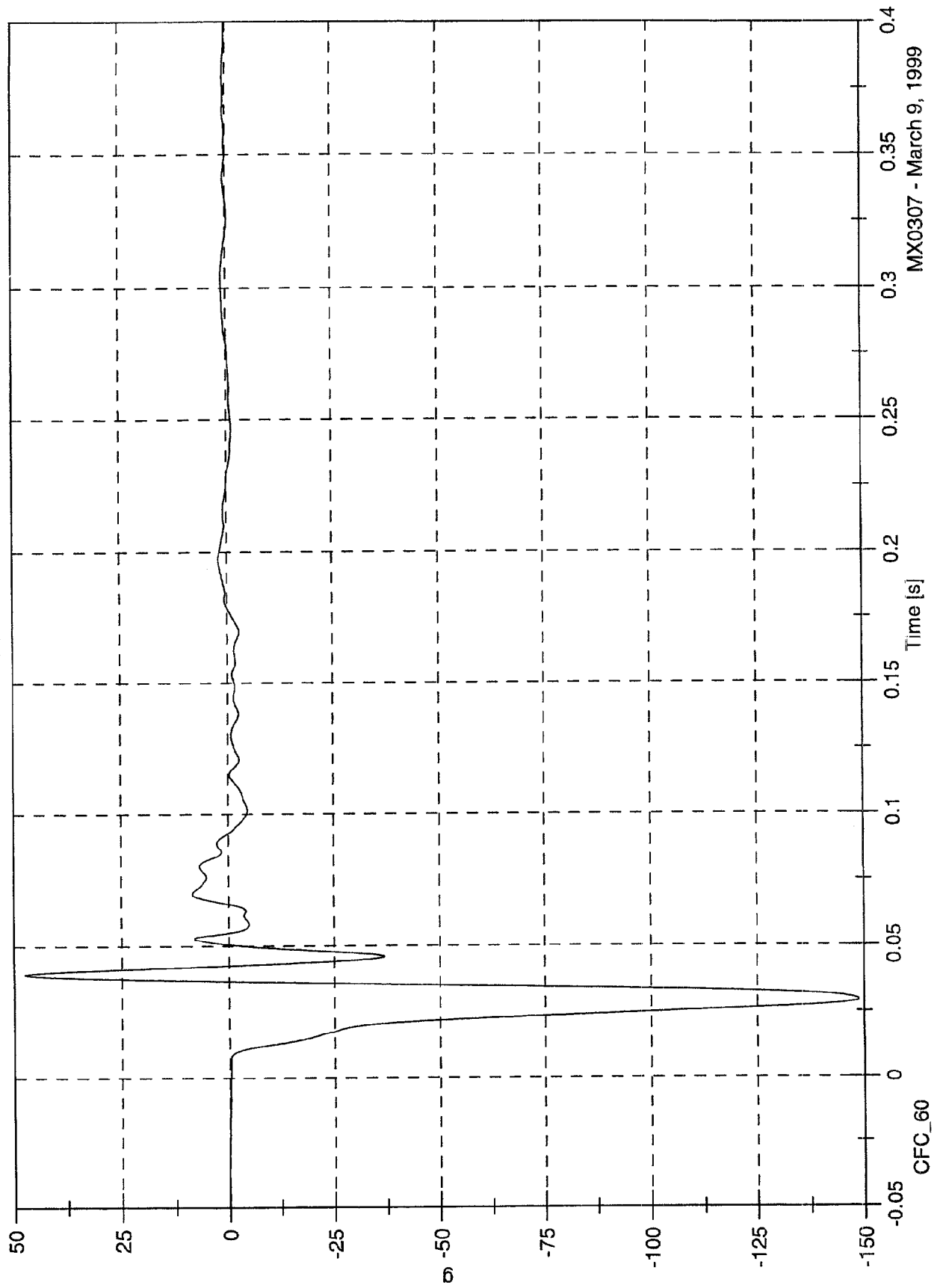


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Acc 3(X) Engine Top

Max: 47.5 [g] at 0.039 [s]
Min: -148.7 [g] at 0.029 [s]

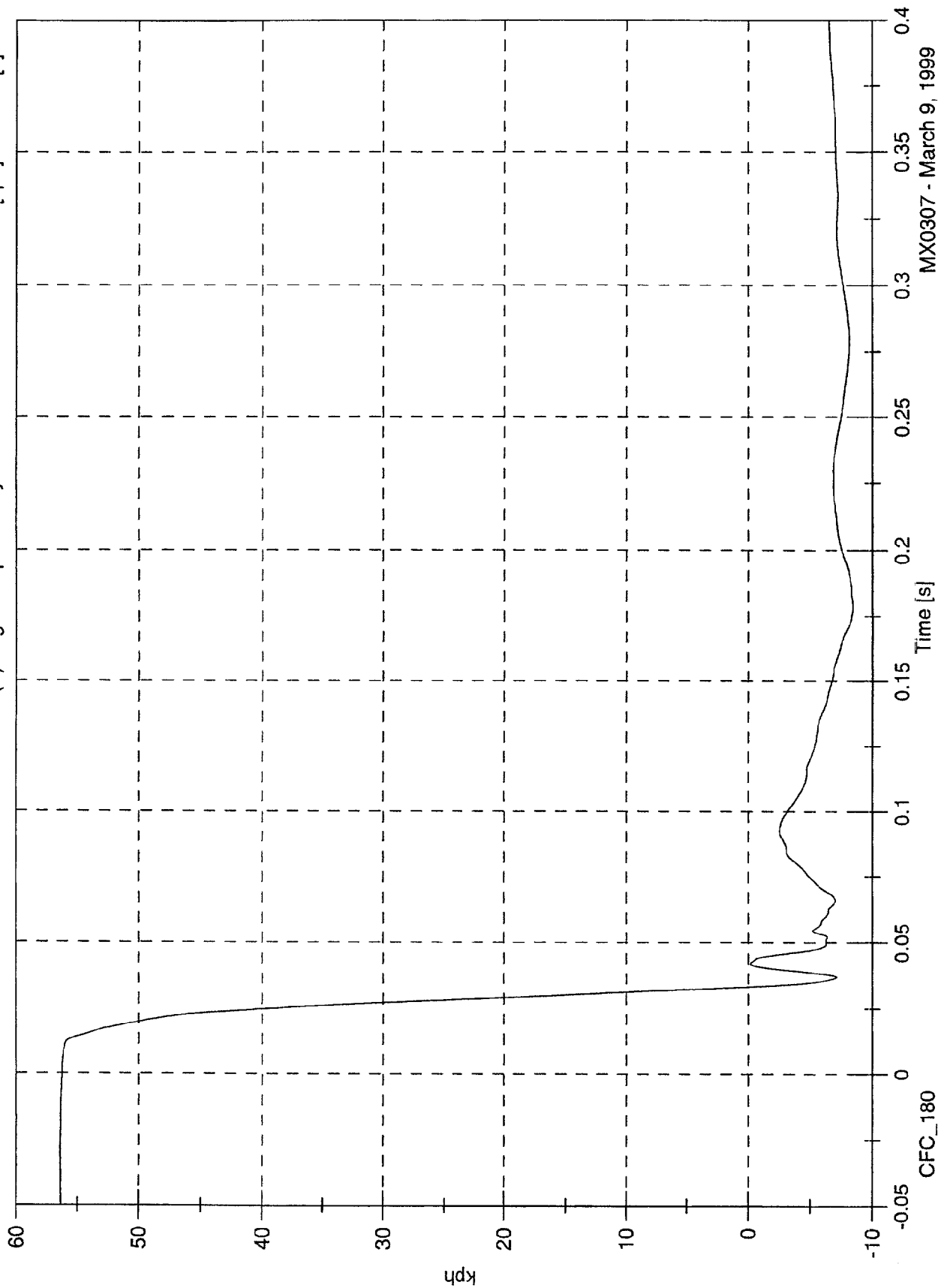


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 56.4 [kph] at -0.029 [s]
Min: -8.4 [kph] at 0.179 [s]

Acc 3(X) Engine Top Velocity

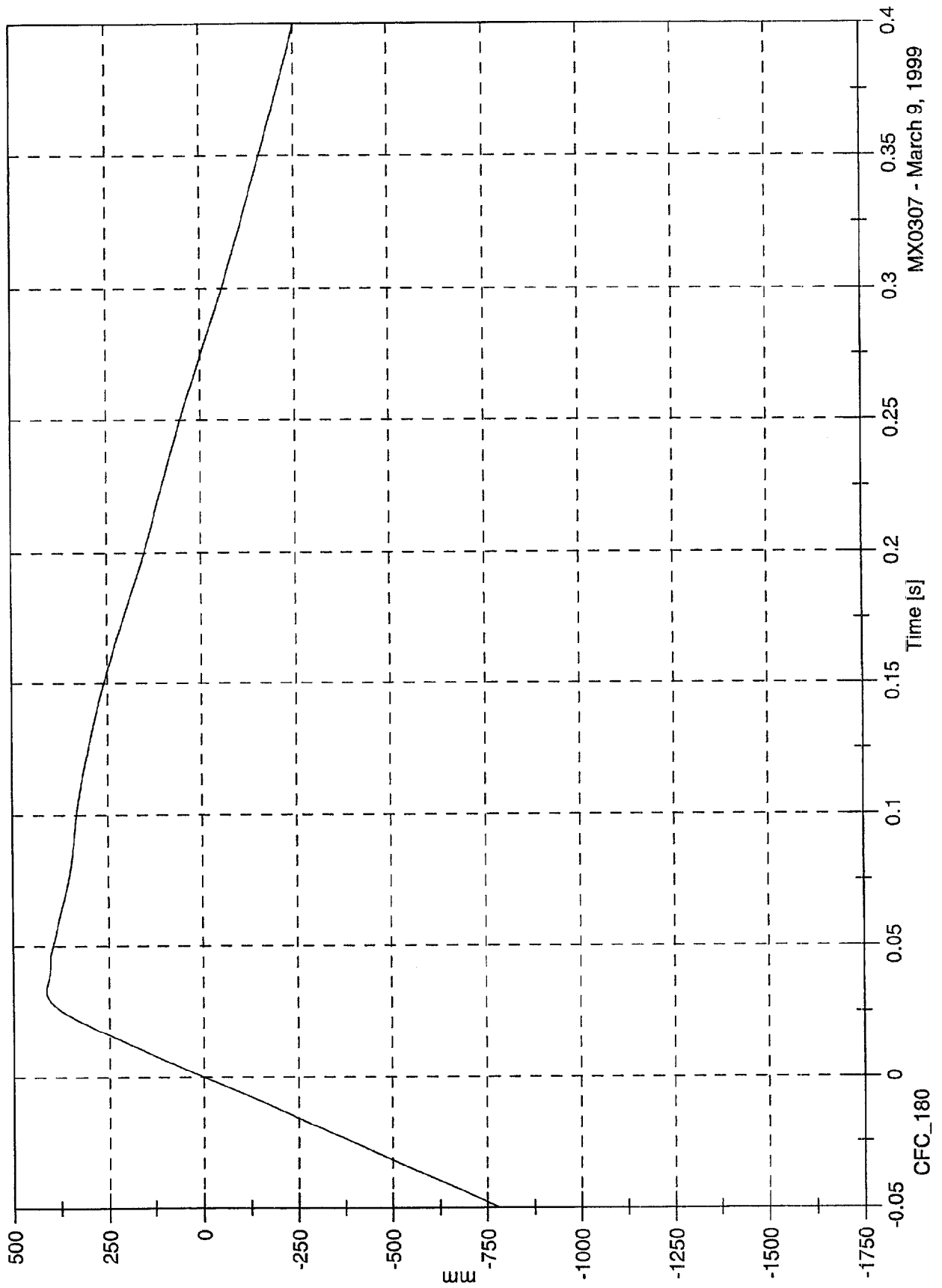


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 413.6 [mm] at 0.033 [s]
Min: -1564.7 [mm] at -0.100 [s]

Acc 3(X) Engine Top Displacement



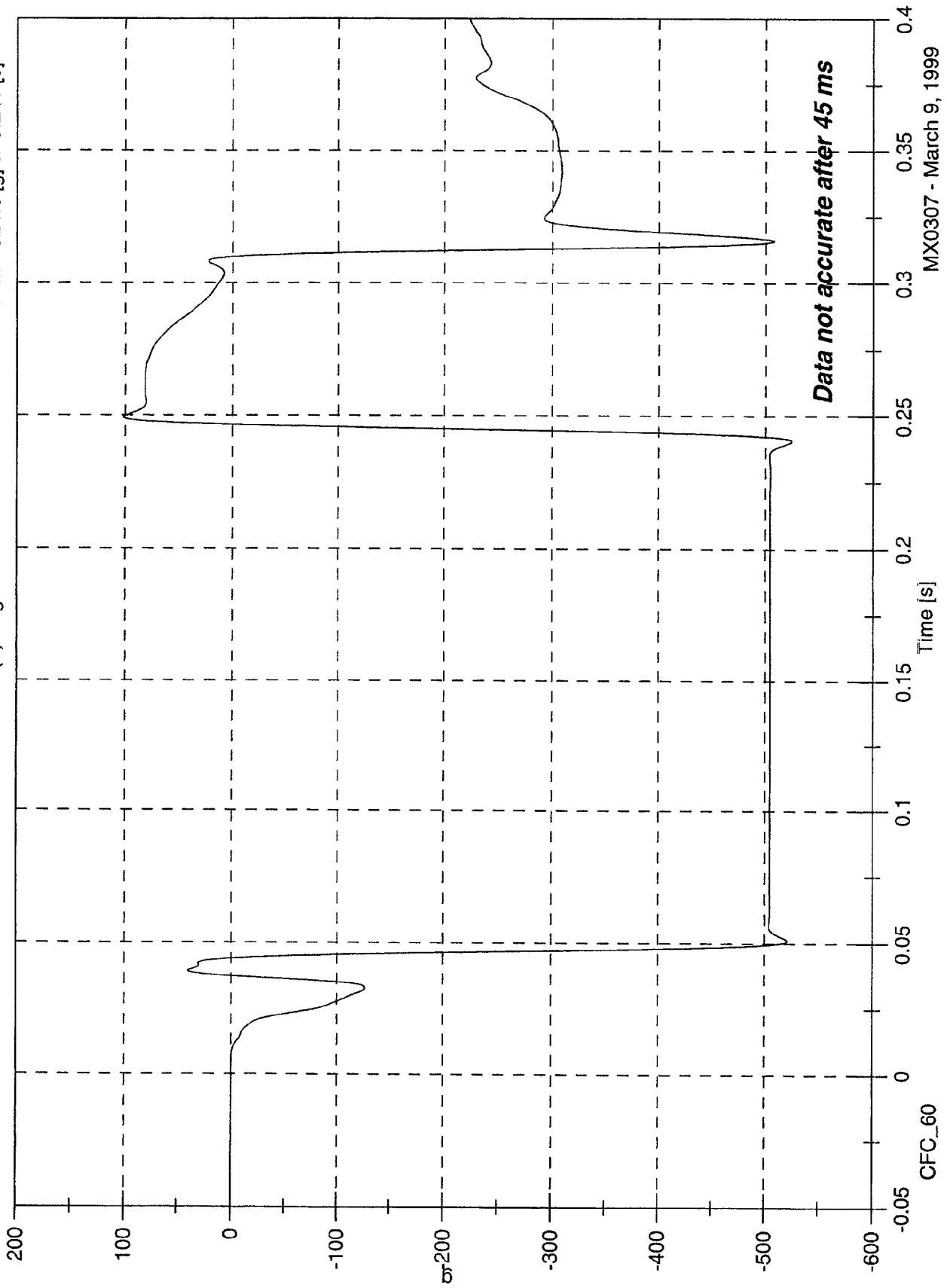
CFC_180

MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Acc 4(X) Engine Bottom

Max: 101.7 [g] at 0.249 [s]
Min: -524.6 [g] at 0.241 [s]

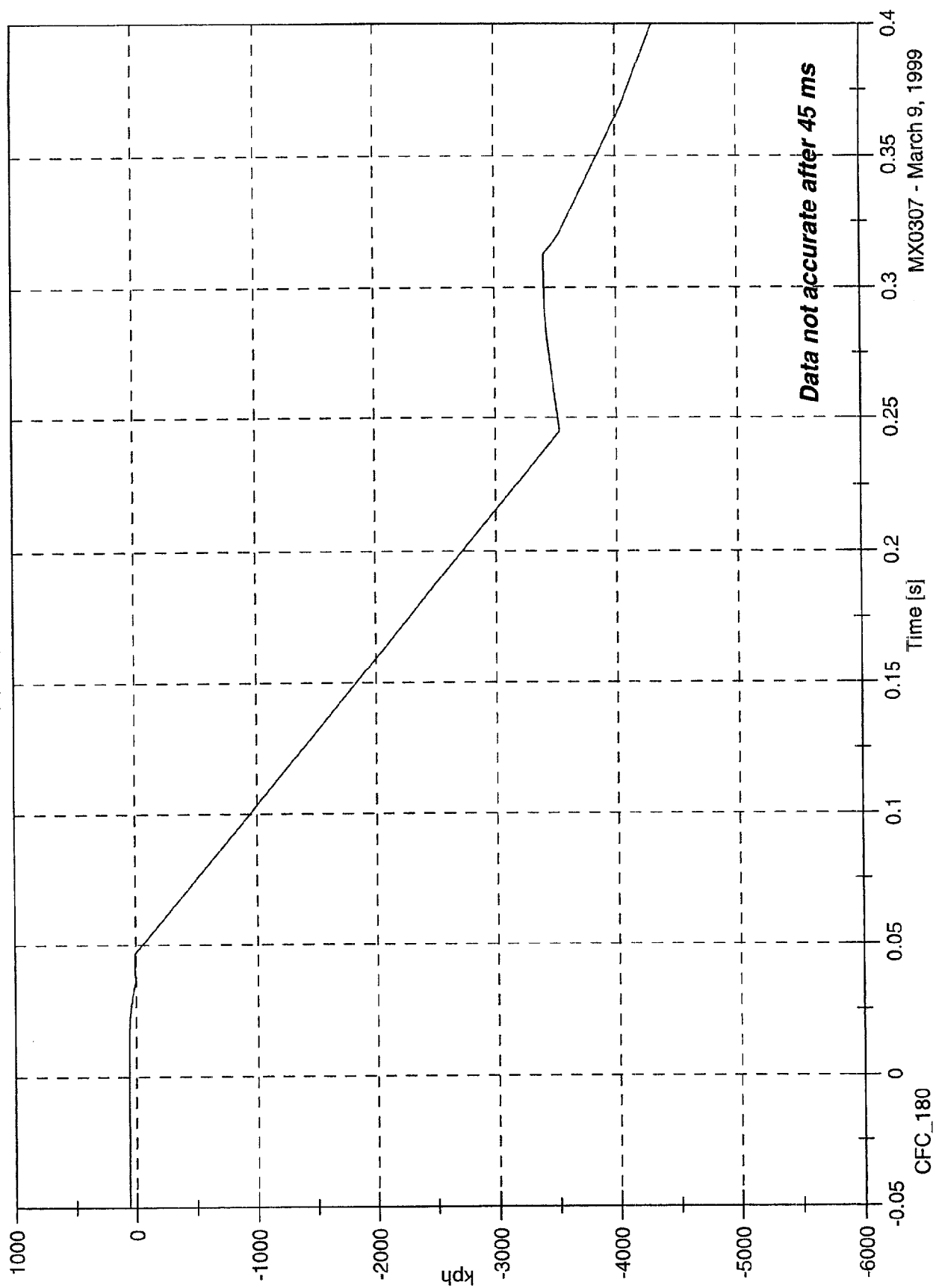


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 56.4 [kph] at -0.025 [s]
 Min: -5727.2 [kph] at 0.500 [s]

Acc 4(X) Engine Bottom Velocity



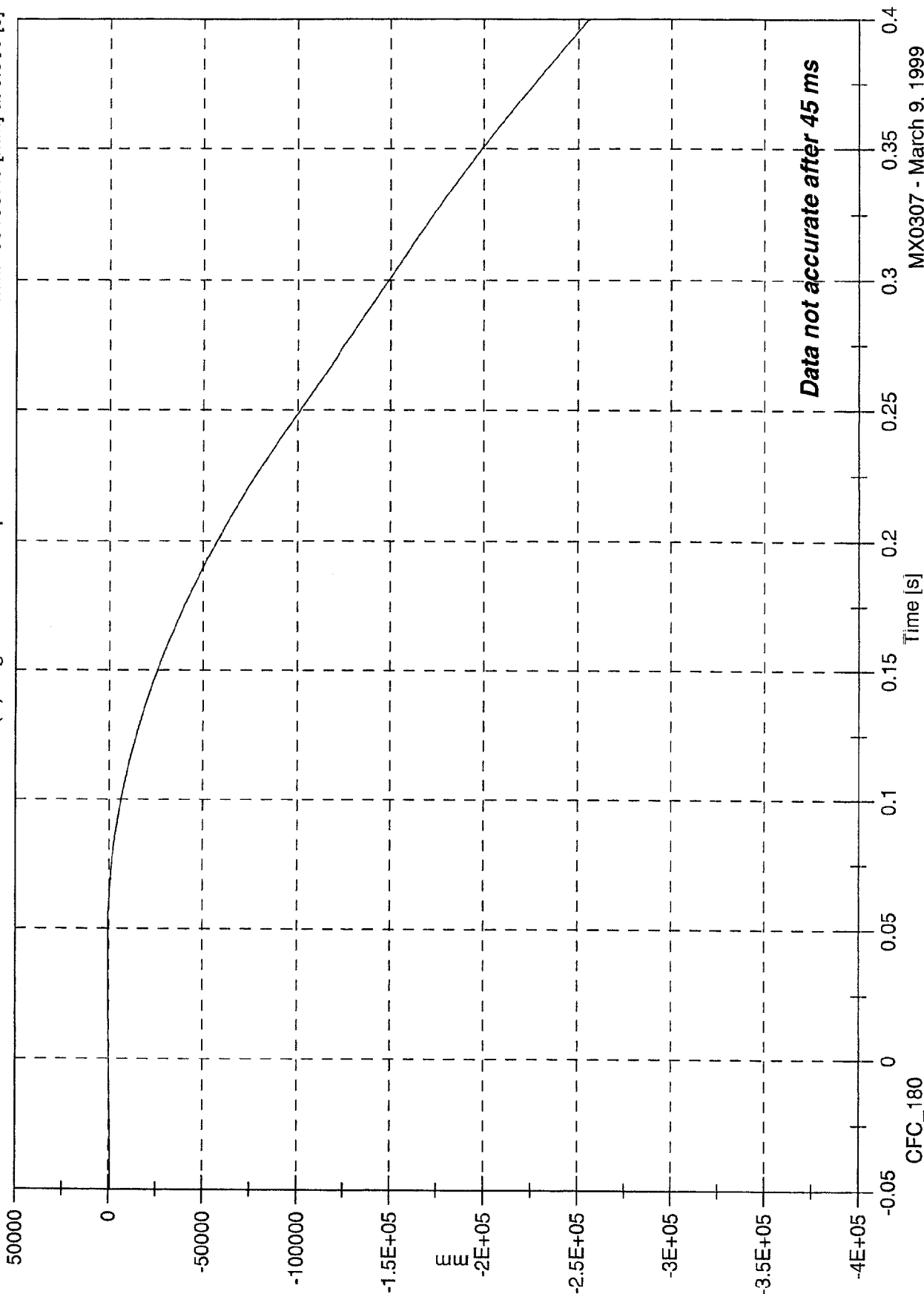
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Acc 4(X) Engine Bottom Displacement

Max: 466.1 [mm] at 0.047 [s]

Min: -391937.9 [mm] at 0.500 [s]



MX0307 - March 9, 1999

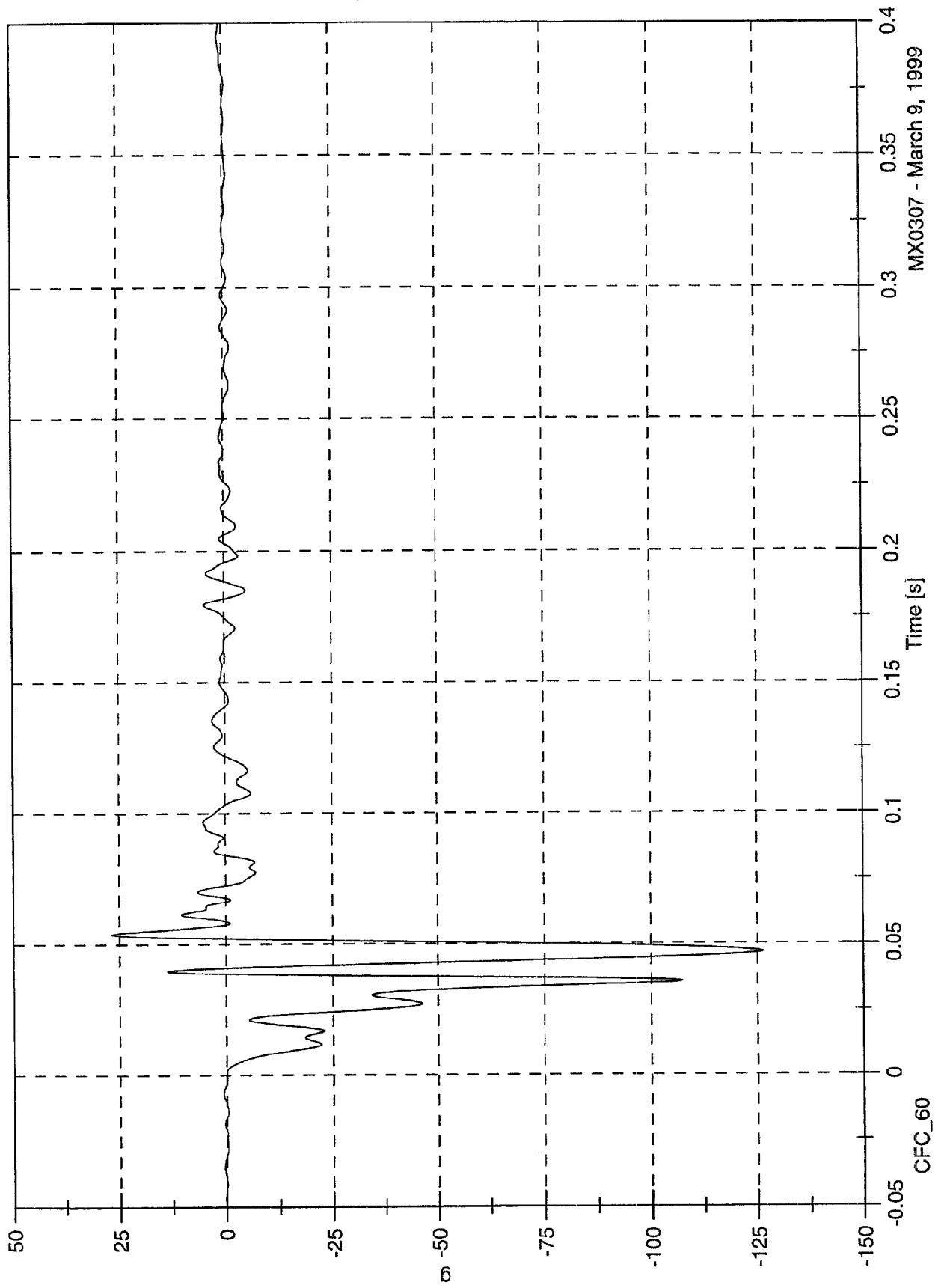
Data not accurate after 45 ms

NCAP Test #13 - 1999 Jeep Cherokee

Max: 26.7 [g] at 0.054 [s]

Min: -126.5 [g] at 0.047 [s]

Acc 5(X) R Caliper



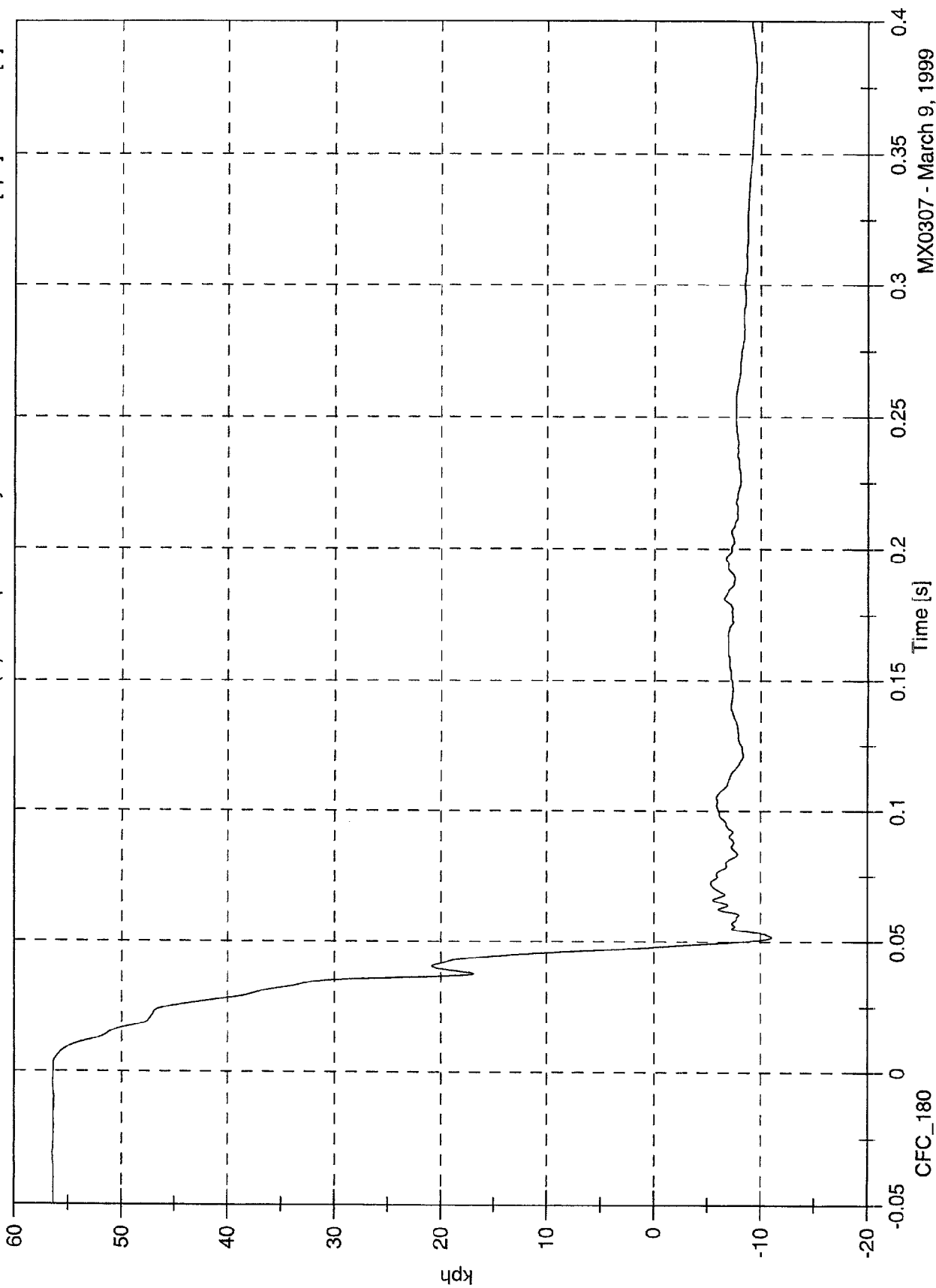
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Acc 5(X) R Caliper Velocity

Max: 56.5 [kph] at -0.031 [s]

Min: -11.0 [kph] at 0.052 [s]

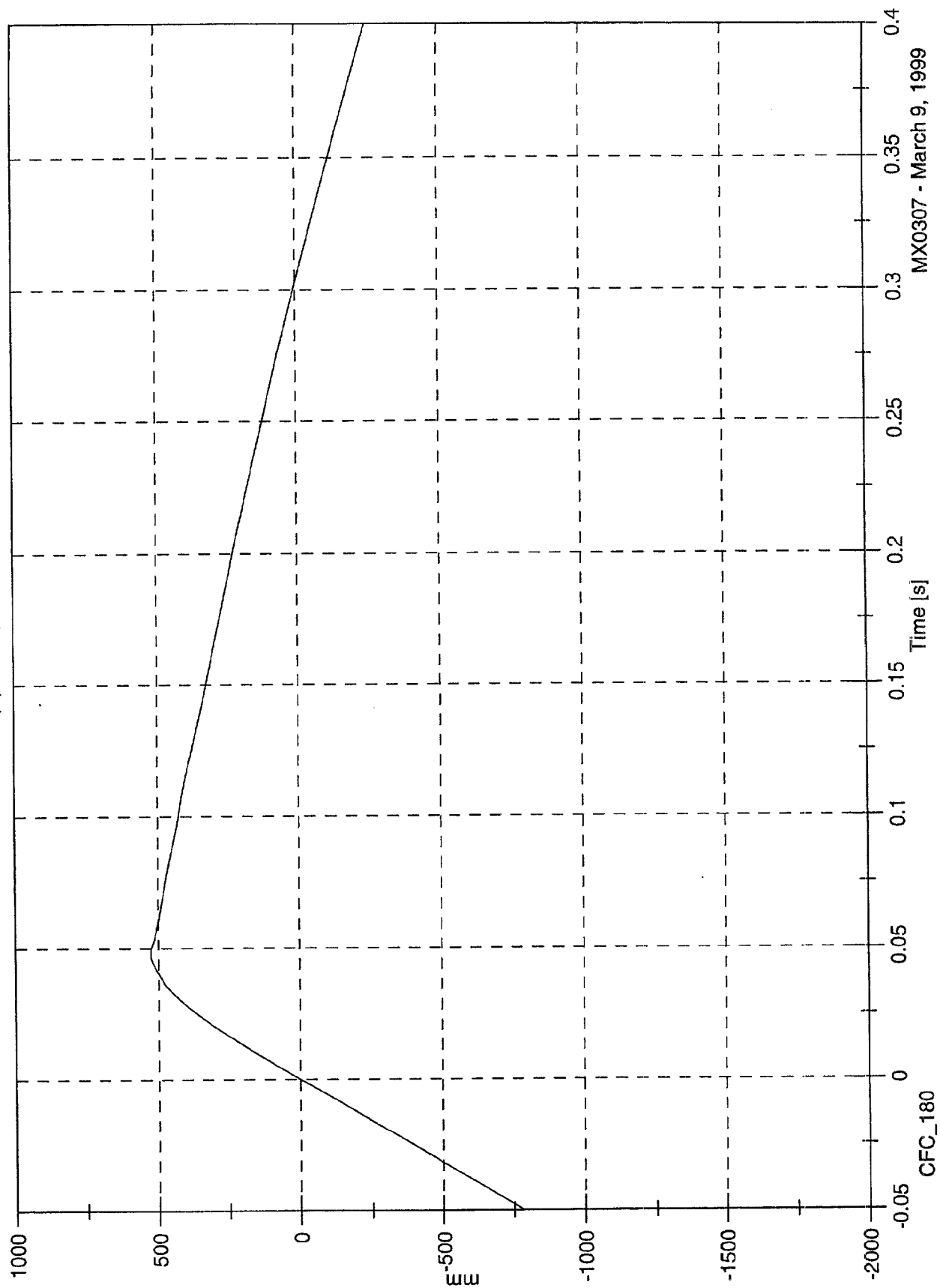


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Acc 5(X) R Caliper Displacement

Max: 527.5 [mm] at 0.048 [s]
Min: -1566.3 [mm] at -0.100 [s]

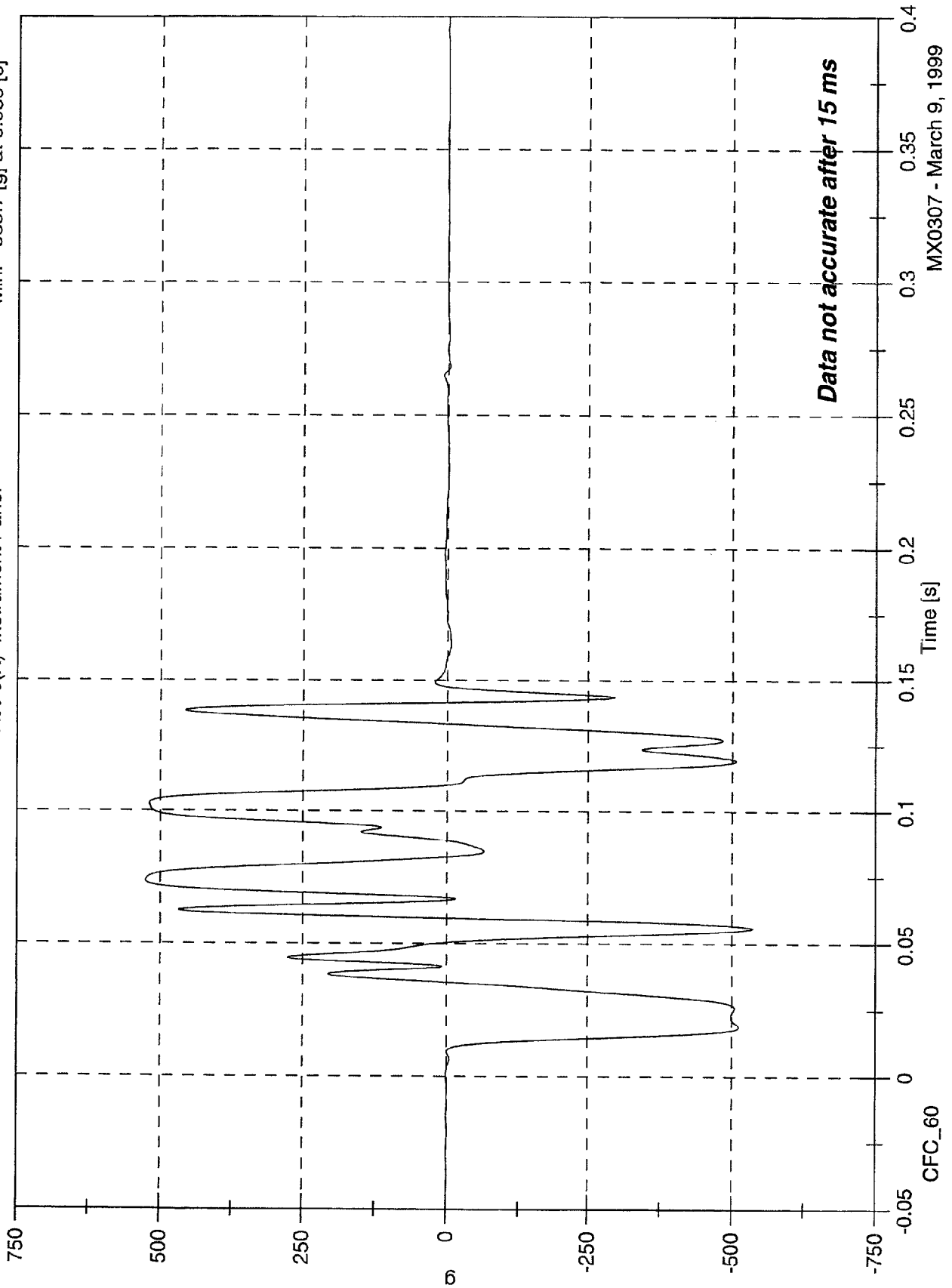


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Acc 6(X) Instrument Panel

Max: 525.1 [g] at 0.073 [s]
Min: -535.7 [g] at 0.056 [s]

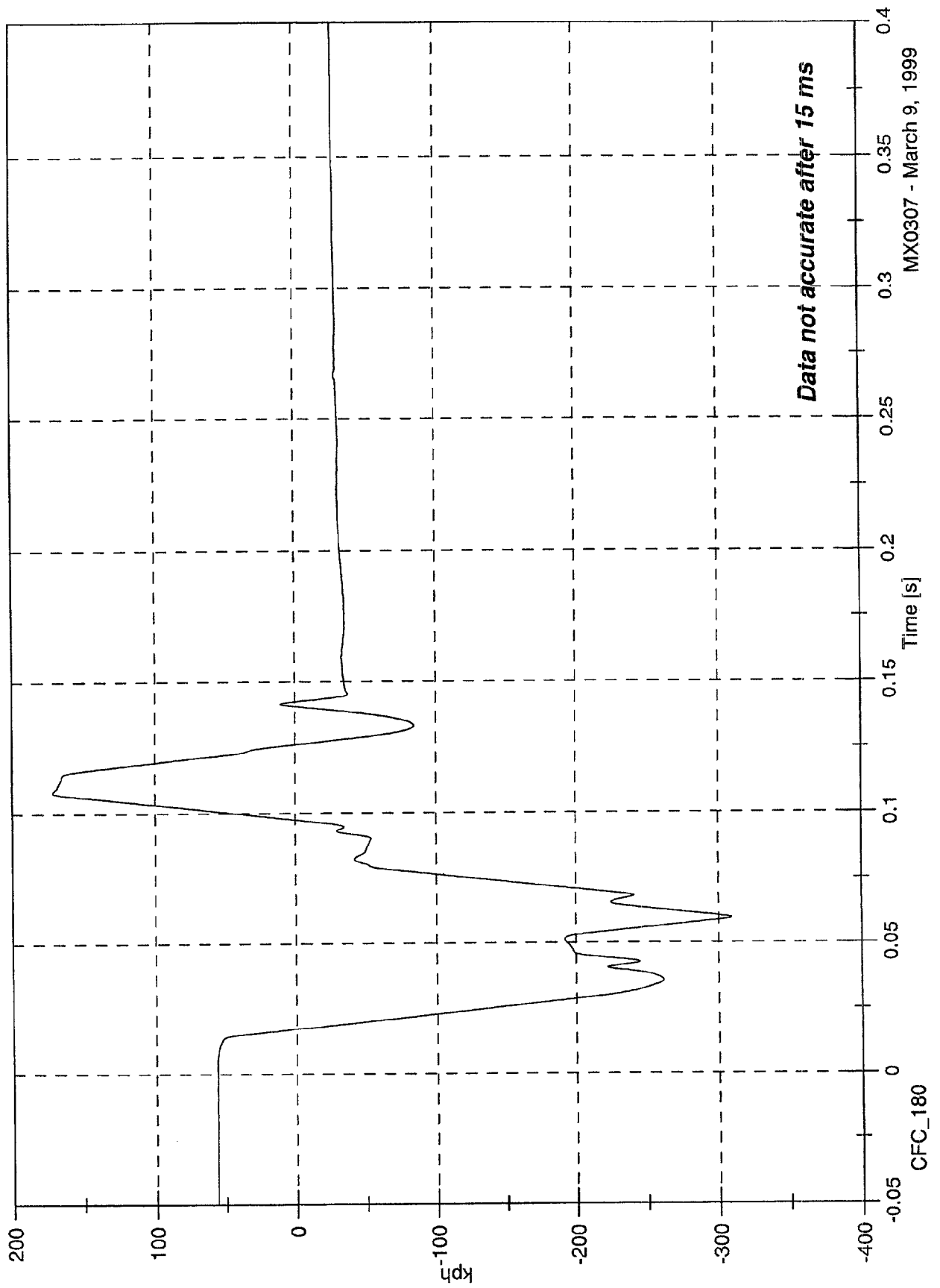


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 171.3 [kph] at 0.108 [s]
Min: -309.1 [kph] at 0.060 [s]

Acc 6(X) Instrument Panel Velocity



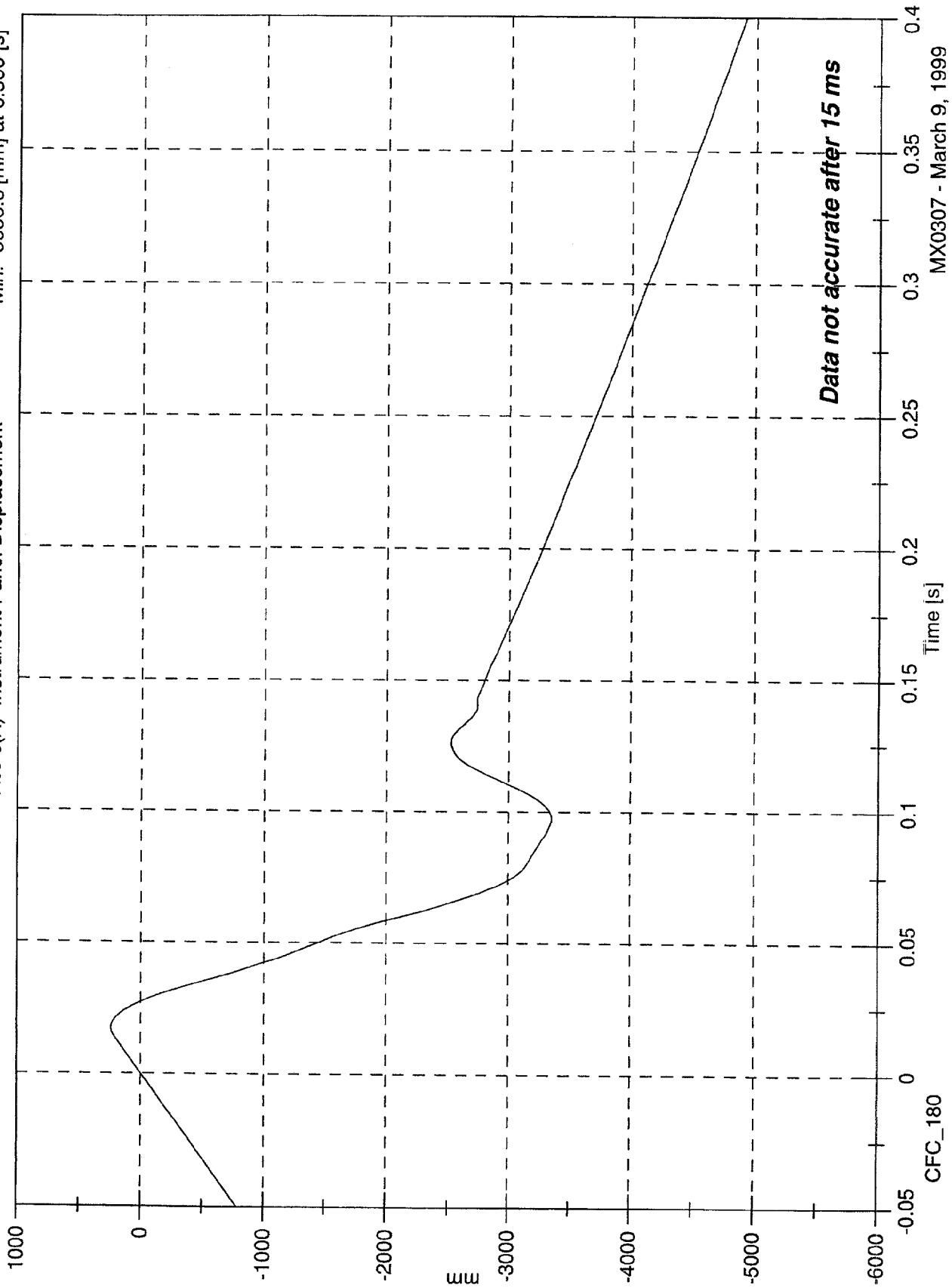
Data not accurate after 15 ms

MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Acc 6(X) Instrument Panel Displacement

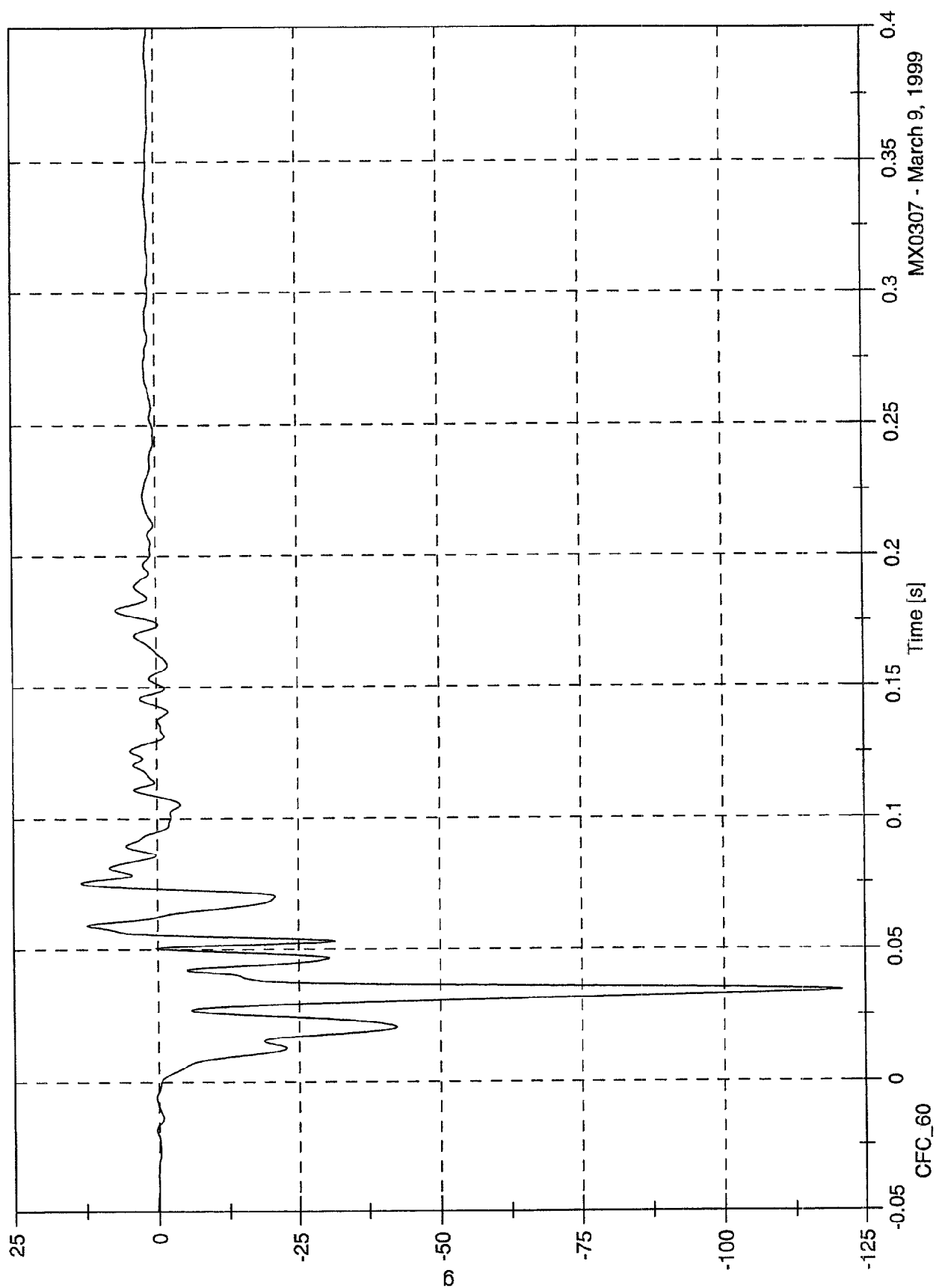
Max: 239.6 [mm] at 0.017 [s]
Min: -5656.8 [mm] at 0.500 [s]



NCAP Test #13 - 1999 Jeep Cherokee

Acc 7(X) L Caliper

Max: 13.3 [g] at 0.075 [s]
Min: -120.8 [g] at 0.034 [s]

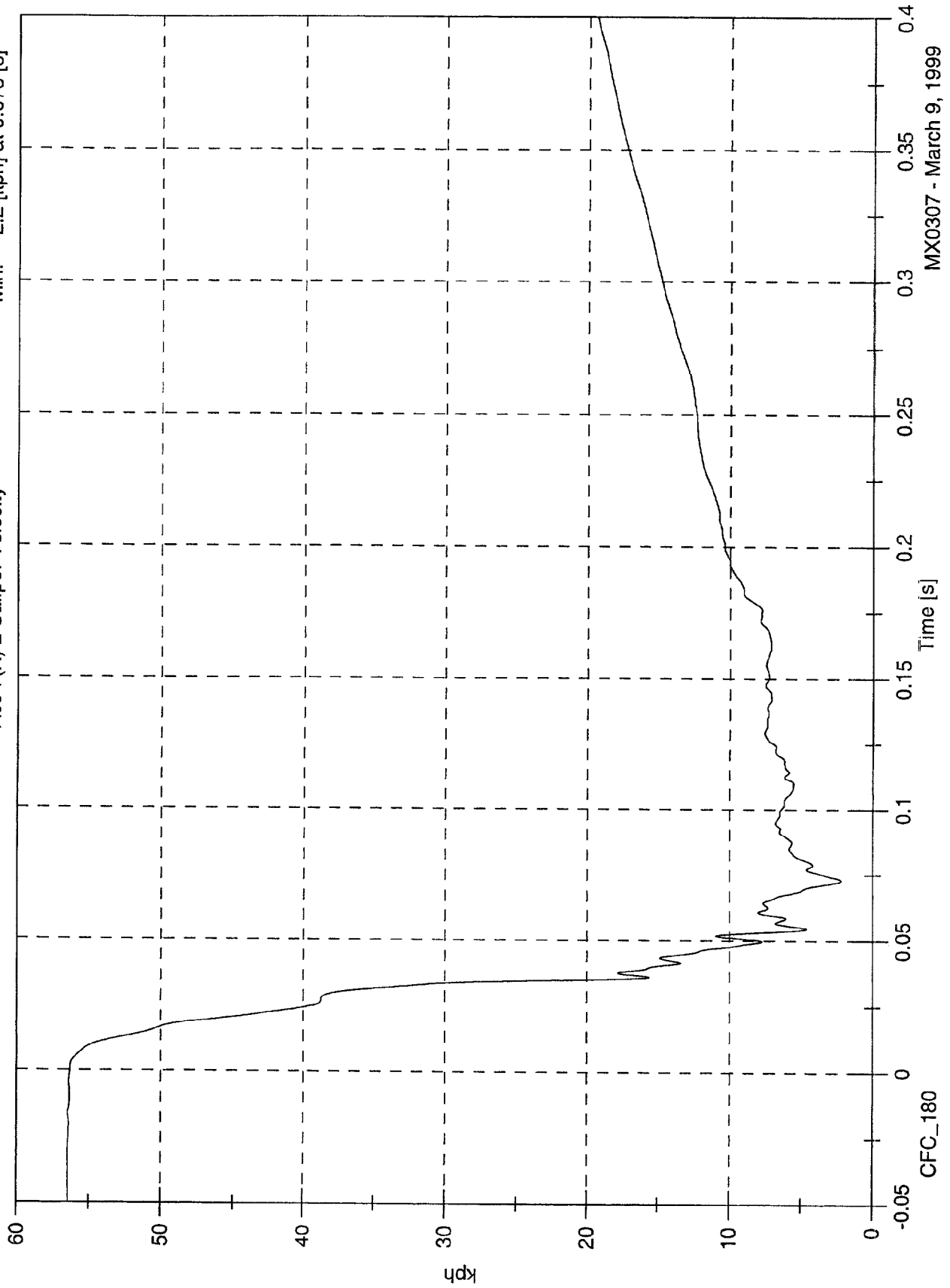


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 56.5 [kph] at -0.033 [s]
Min: 2.2 [kph] at 0.073 [s]

Acc 7(X) L Caliper Velocity

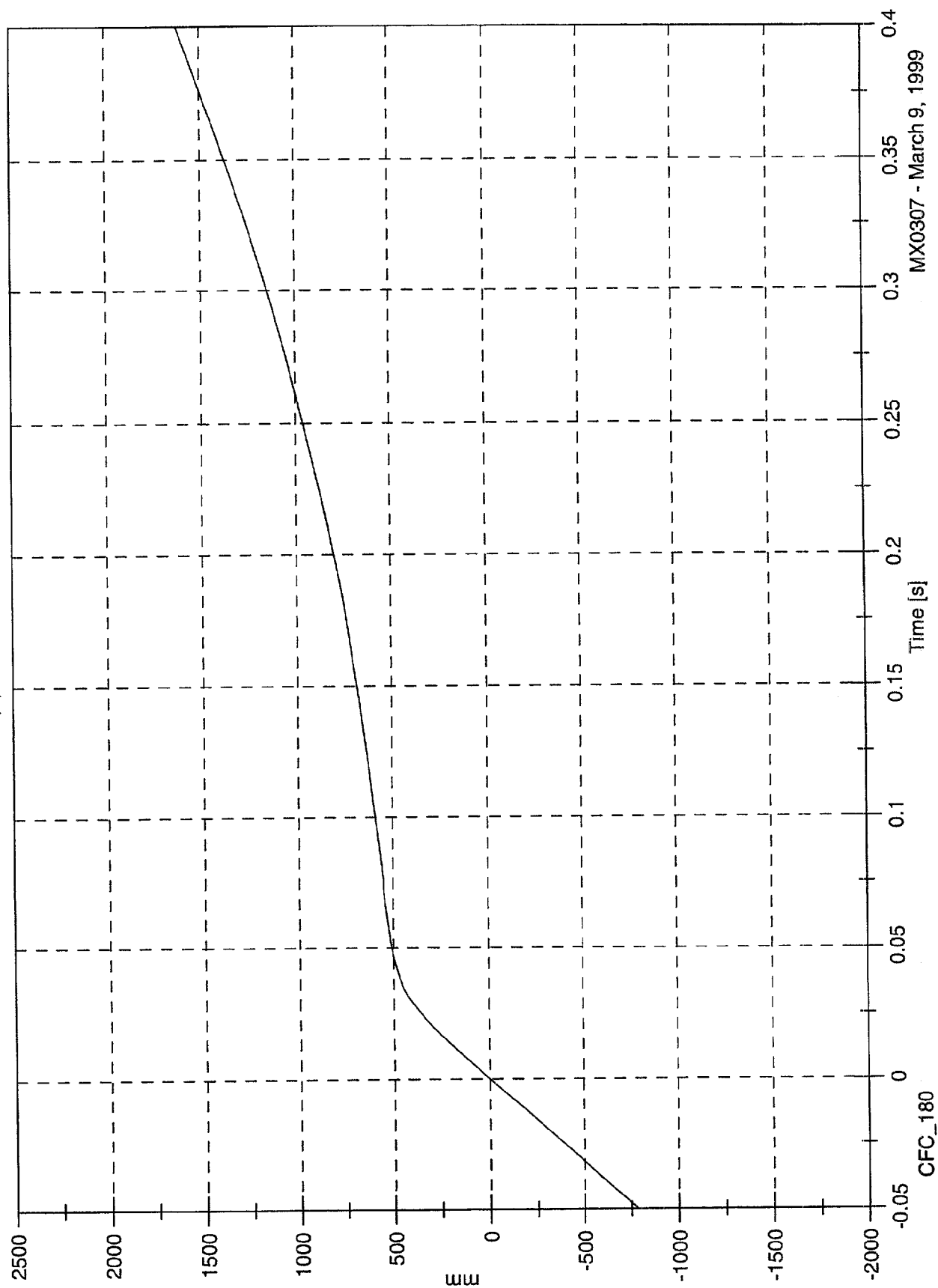


MX0307 - March 9, 1999

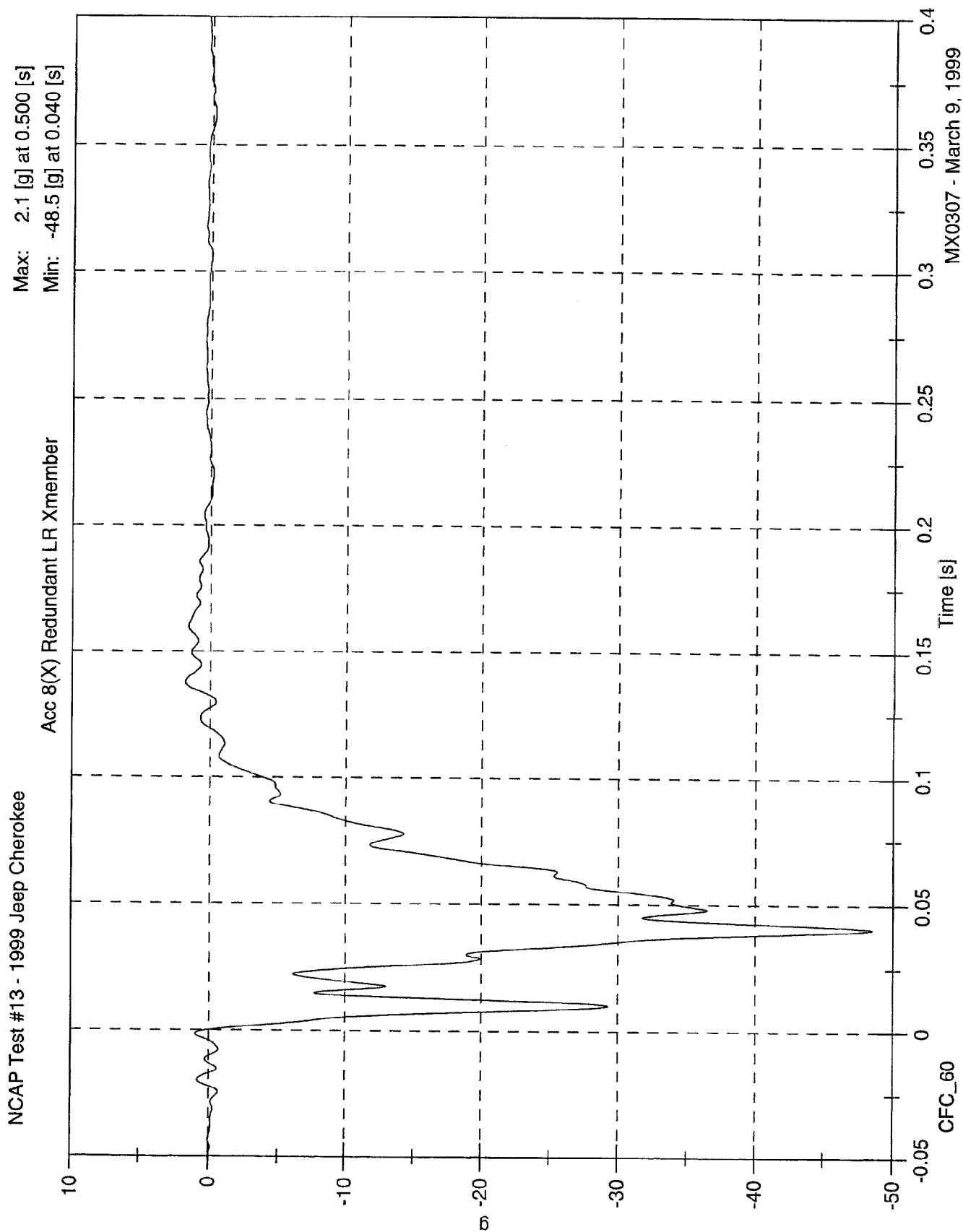
NCAP Test #13 - 1999 Jeep Cherokee

Acc 7(X) L Caliper Displacement

Max: 2263.2 [mm] at 0.500 [s]
Min: -1566.4 [mm] at -0.100 [s]



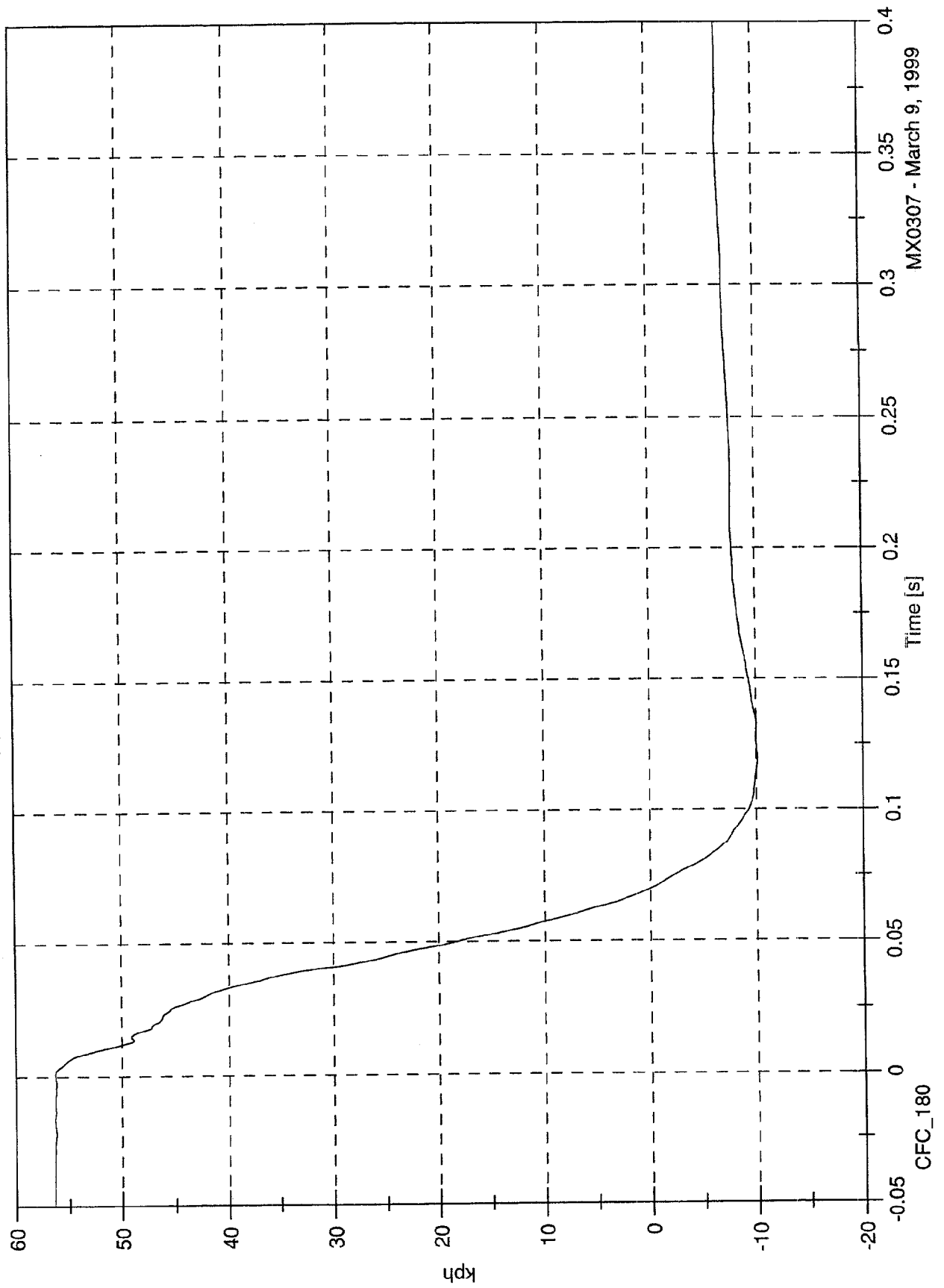
MX0307 - March 9, 1999



NCAP Test #13 - 1999 Jeep Cherokee

Max: 56.4 [kph] at -0.047 [s]
Min: -10.1 [kph] at 0.120 [s]

Acc 8(X) Redundant LR Xmember Velocity

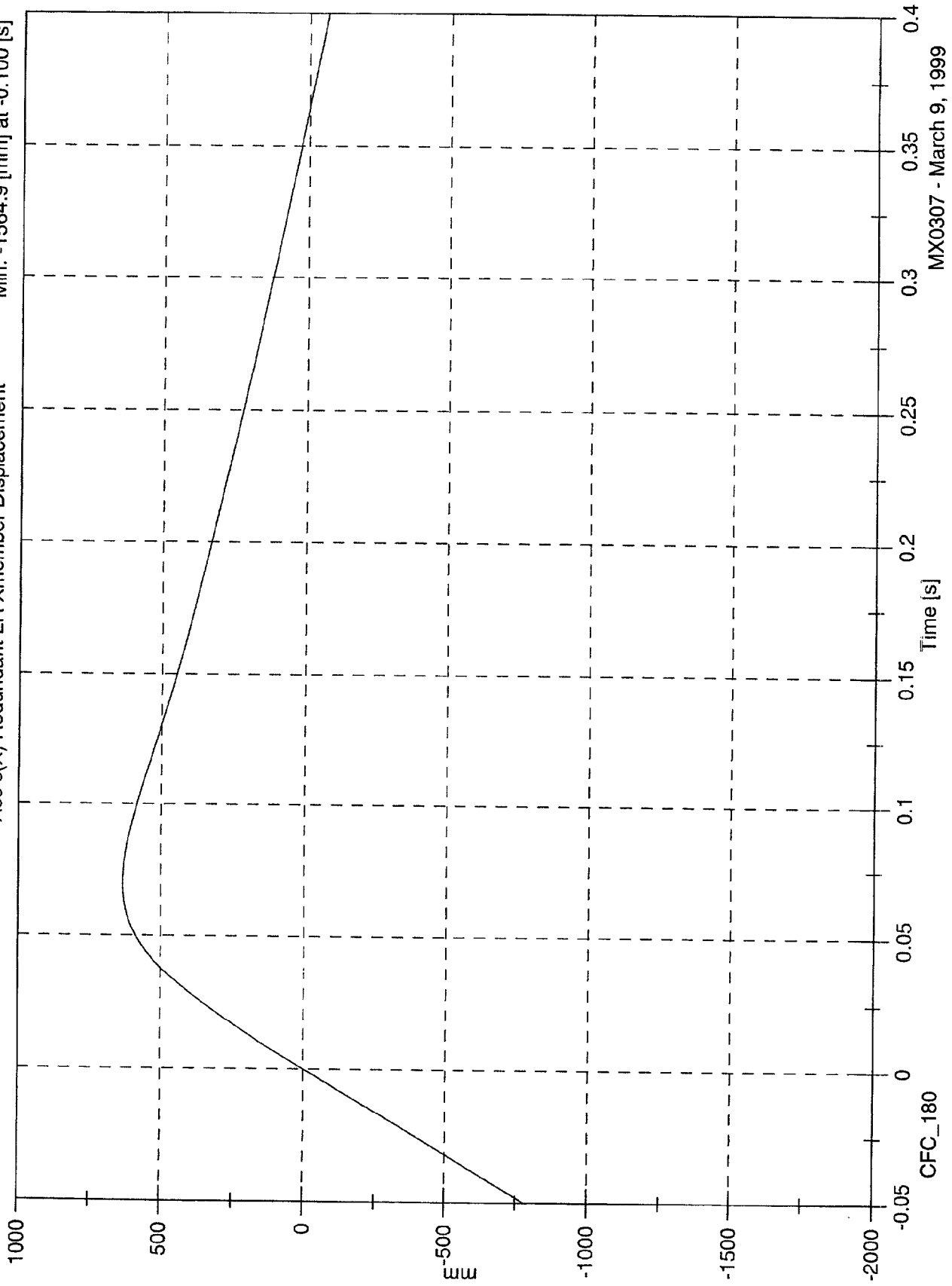


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 632.9 [mm] at 0.070 [s]
Min: -1564.9 [mm] at -0.100 [s]

Acc 8(X) Redundant LR Xmember Displacement

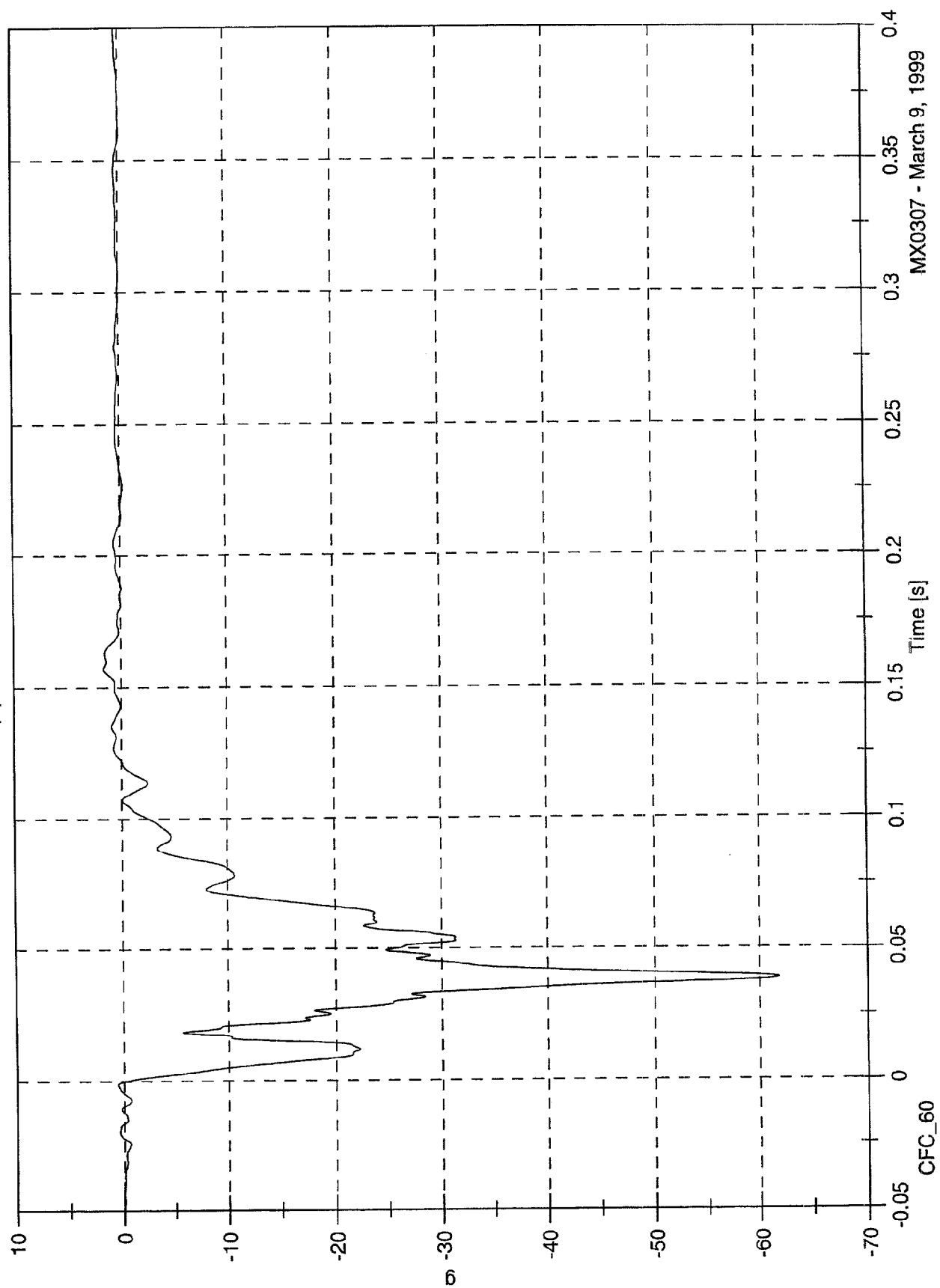


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Acc 9(X) Redundant FR Xmember

Max: 1.6 [g] at 0.157 [s]
Min: -61.8 [g] at 0.038 [s]



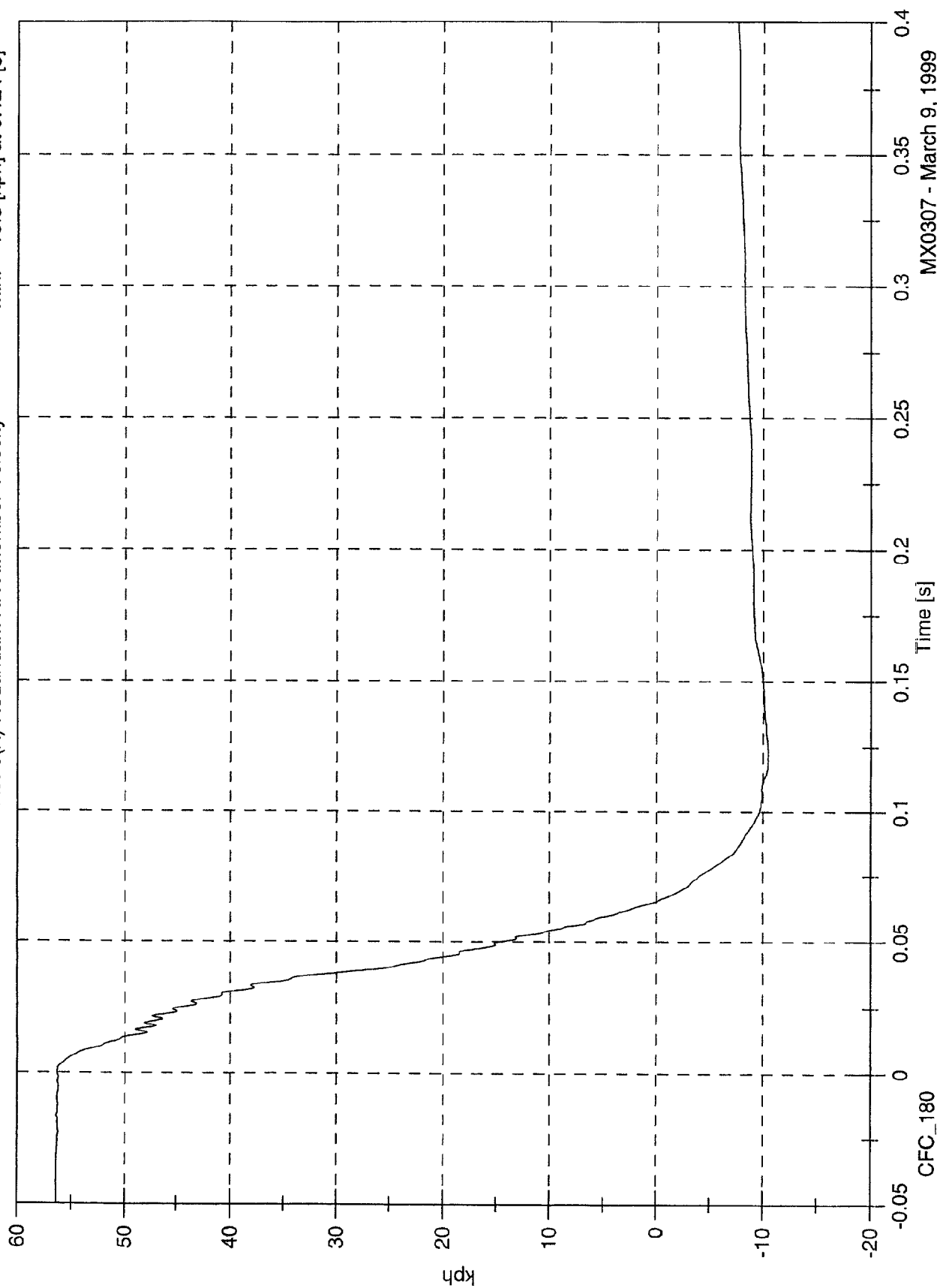
MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Acc 9(X) Redundant RR Xmember Velocity

Max: 56.4 [kph] at -0.042 [s]

Min: -10.5 [kph] at 0.124 [s]

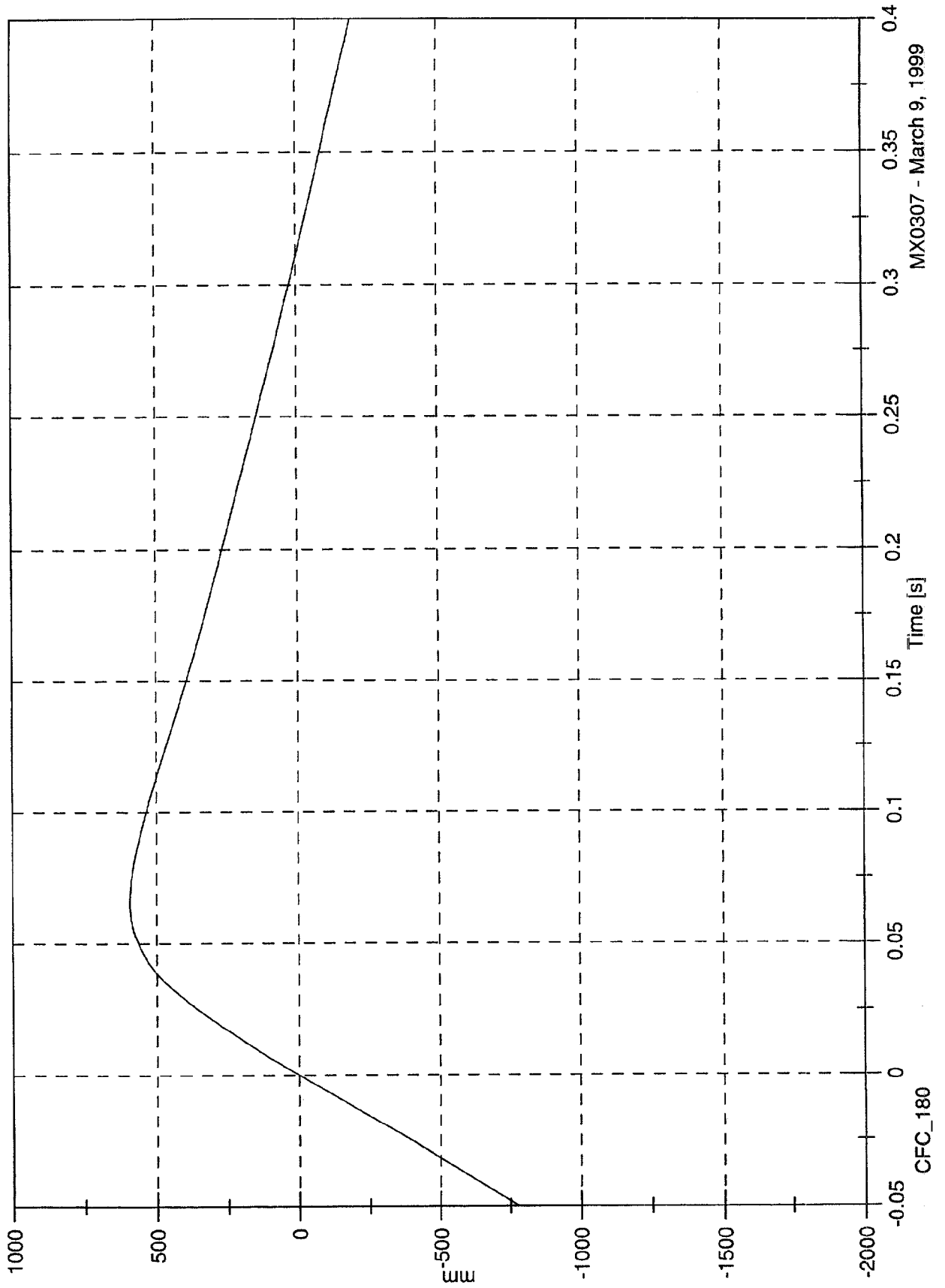


MX0307 - March 9, 1999

NCAP Test #13 - 1999 Jeep Cherokee

Max: 593.1 [mm] at 0.066 [s]
 Min: -1564.8 [mm] at -0.100 [s]

Acc 9(X) Redundant RR Xmember Displacement



MX0307 - March 9, 1999

NHTSA TEST NO. MX0307

LOAD CELL BARRIER DATA

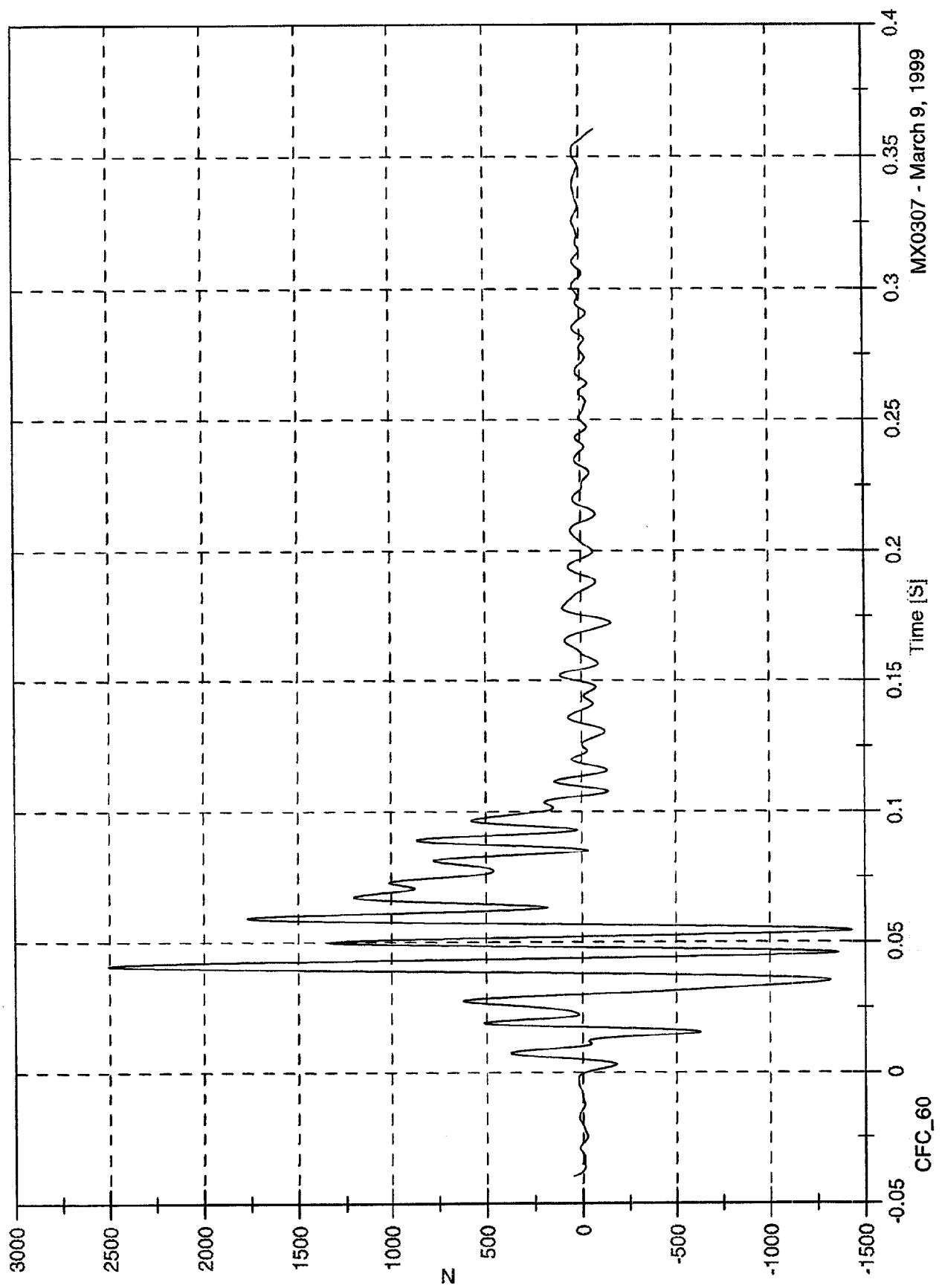
FILTER CHANNEL CLASS

60

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 2509.0 [N] at 0.041 [S]
Min: -1431.5 [N] at 0.055 [S]

Barrier Load Cell A1 Fx

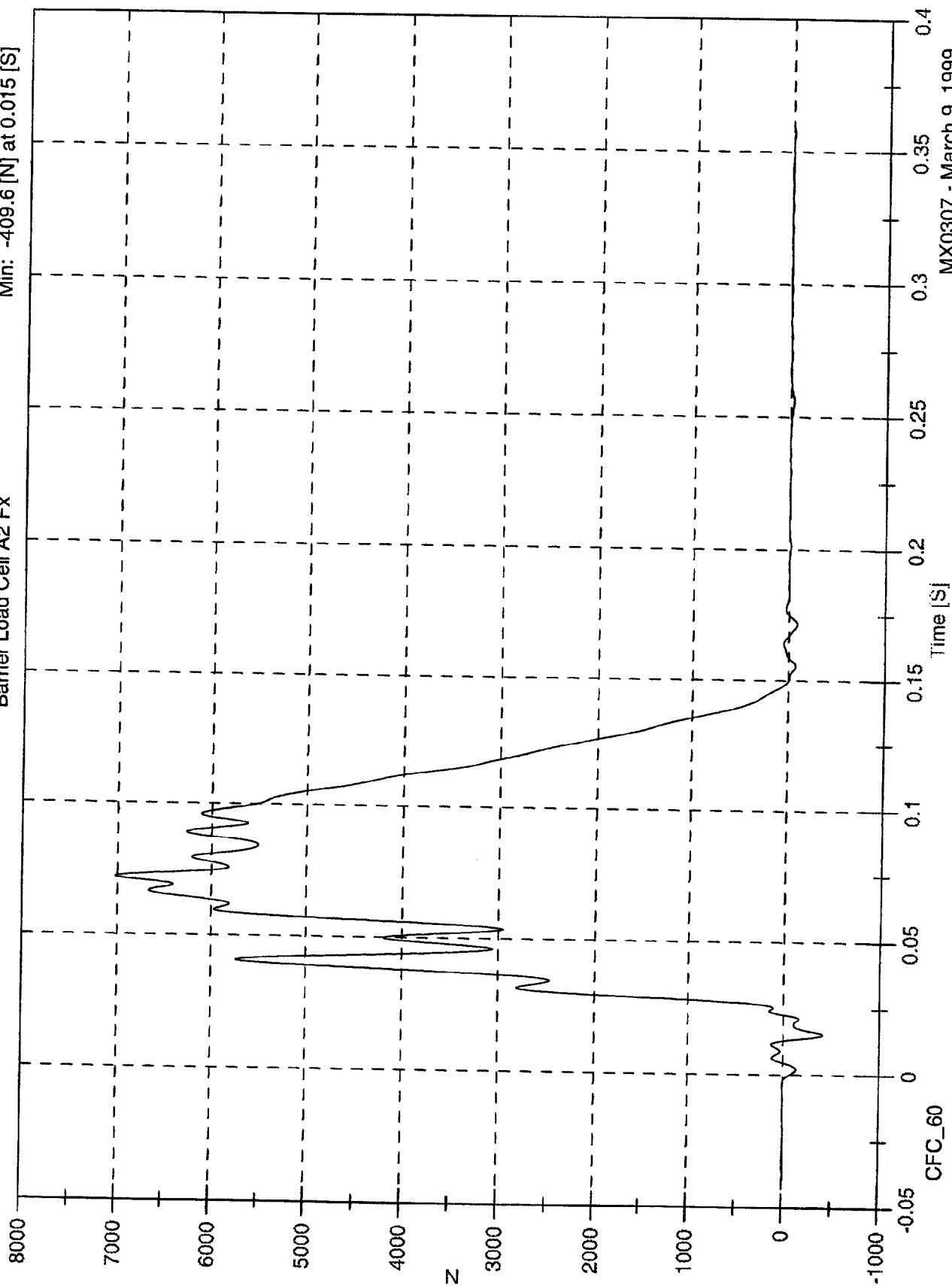


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NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 7021.9 [N] at 0.072 [S]
 Min: -409.6 [N] at 0.015 [S]

Barrier Load Cell A2 Fx



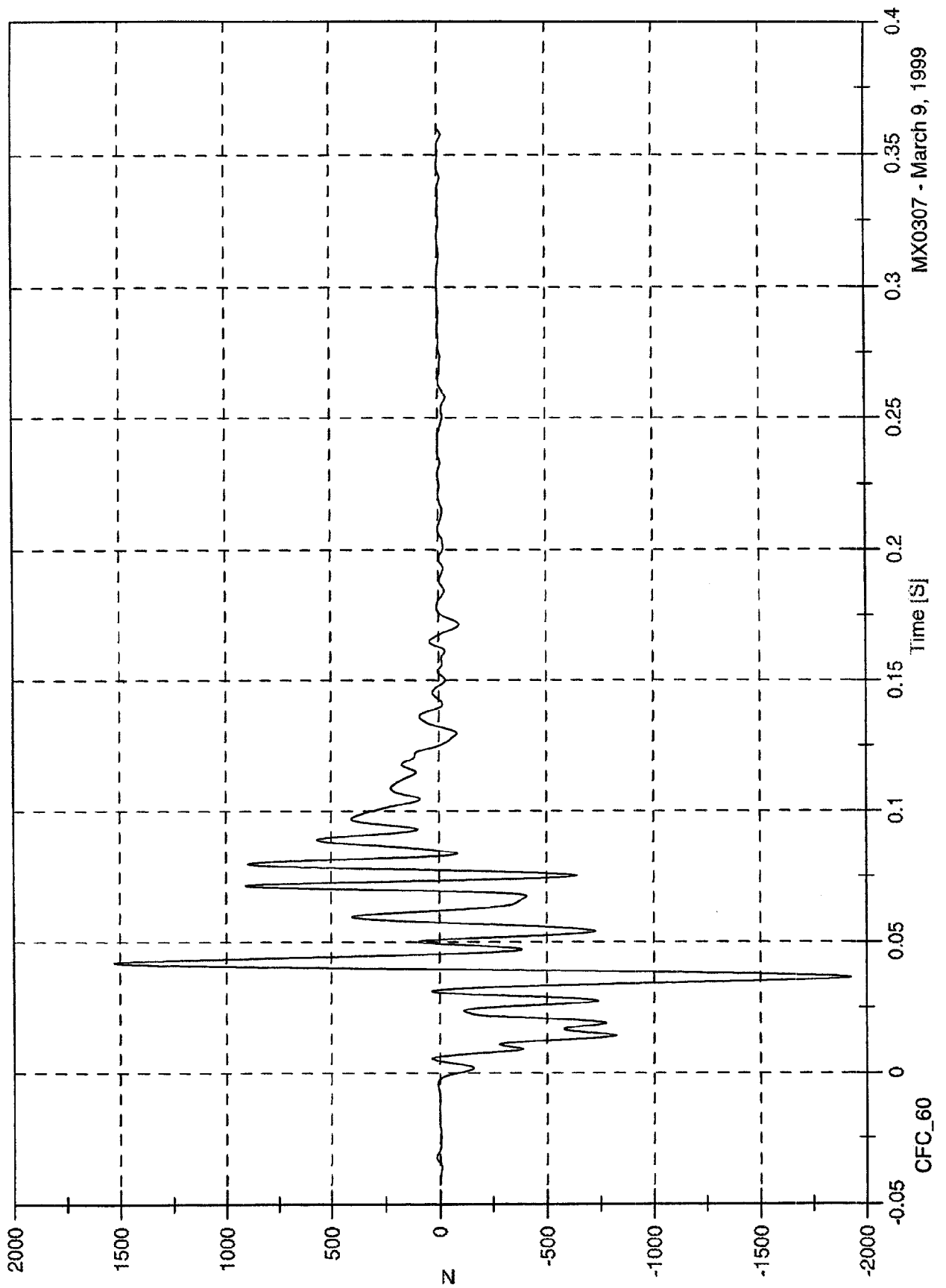
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 1529.4 [N] at 0.042 [S]

Min: -1924.4 [N] at 0.036 [S]

Barrier Load Cell A3 Fx

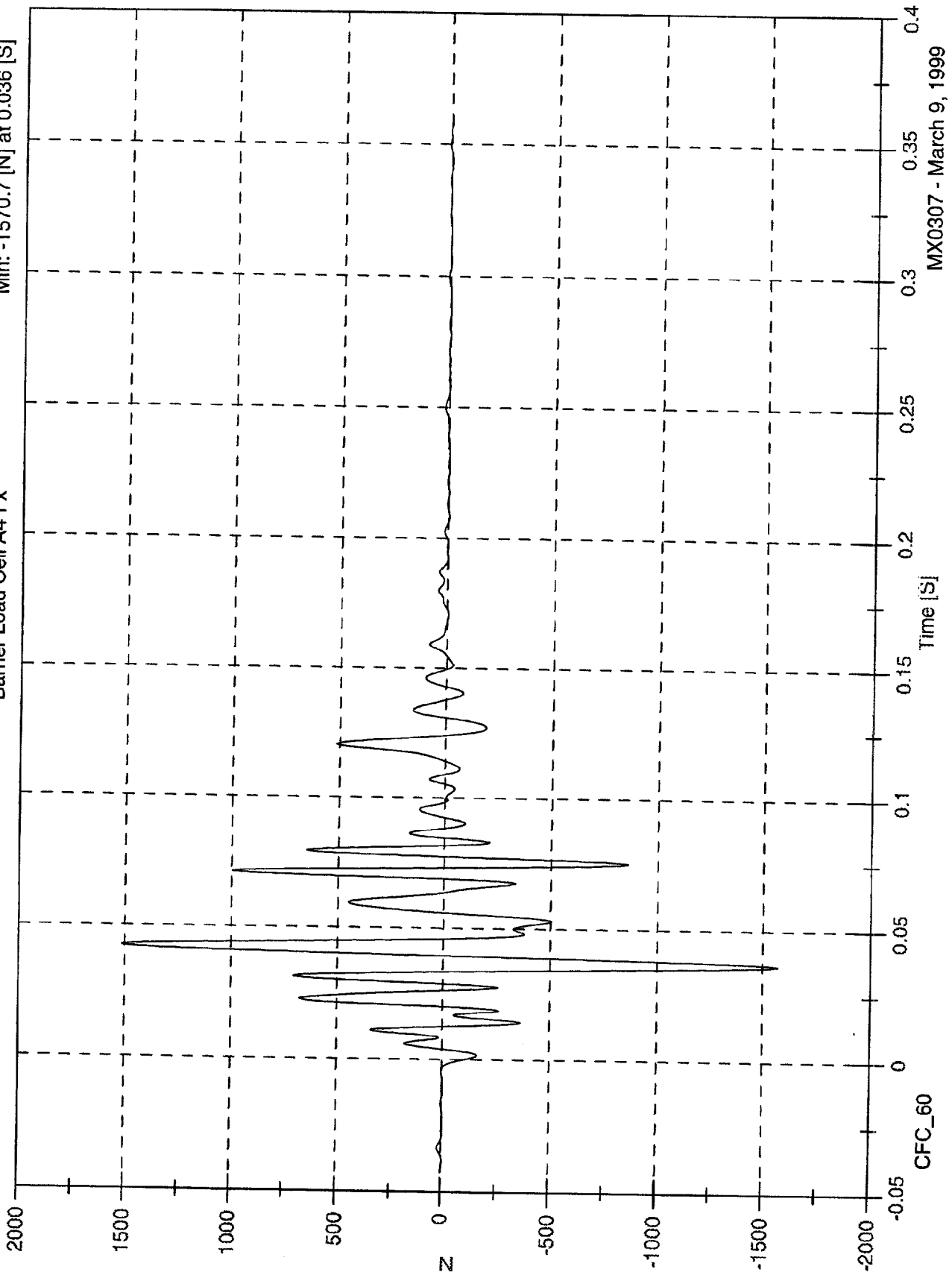


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 1514.3 [N] at 0.042 [S]
Min: -1570.7 [N] at 0.036 [S]

Barrier Load Cell A4 Fx

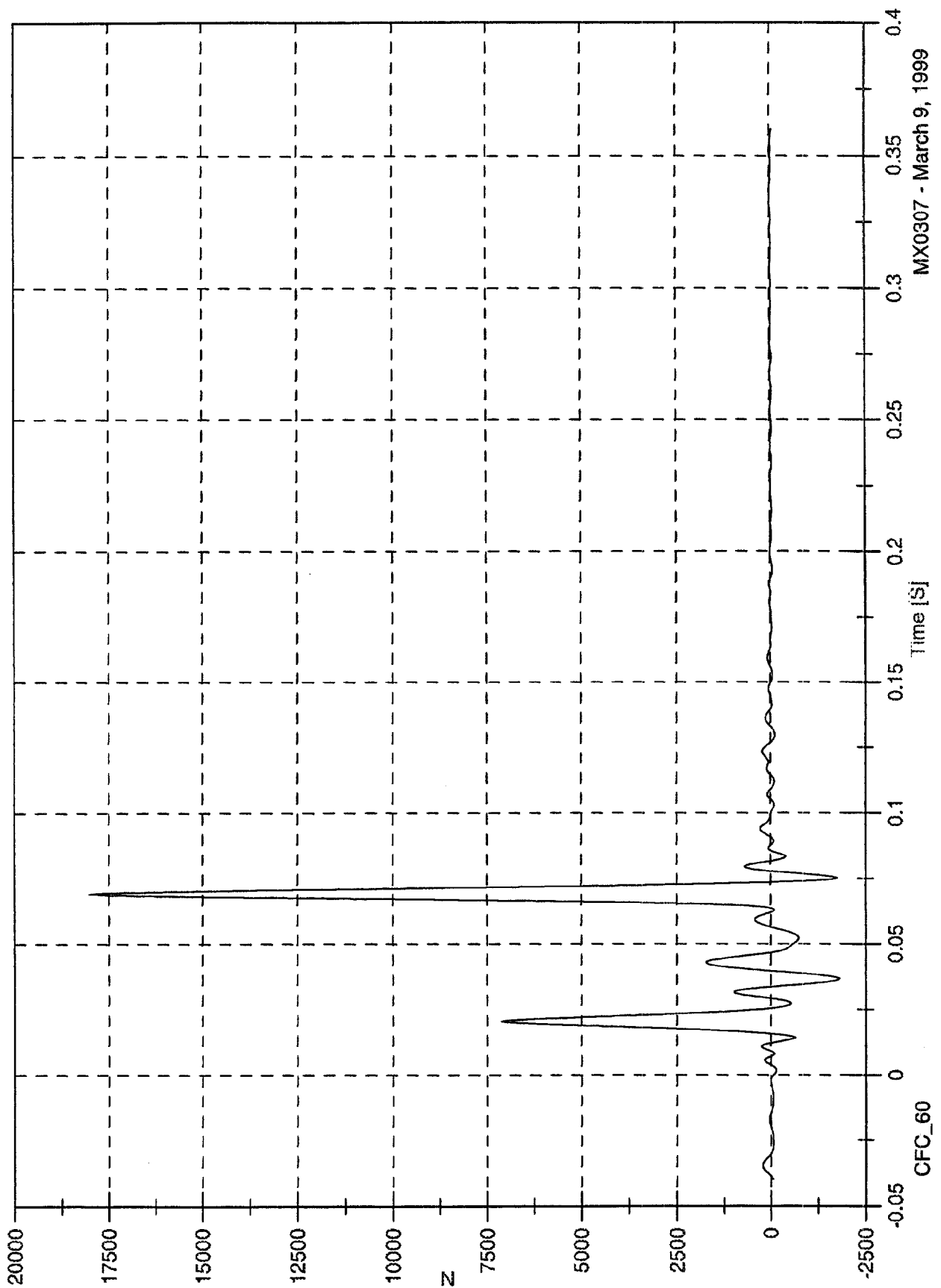


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 18028.8 [N] at 0.069 [S]
Min: -1813.0 [N] at 0.037 [S]

Barrier Load Cell A5 Fx

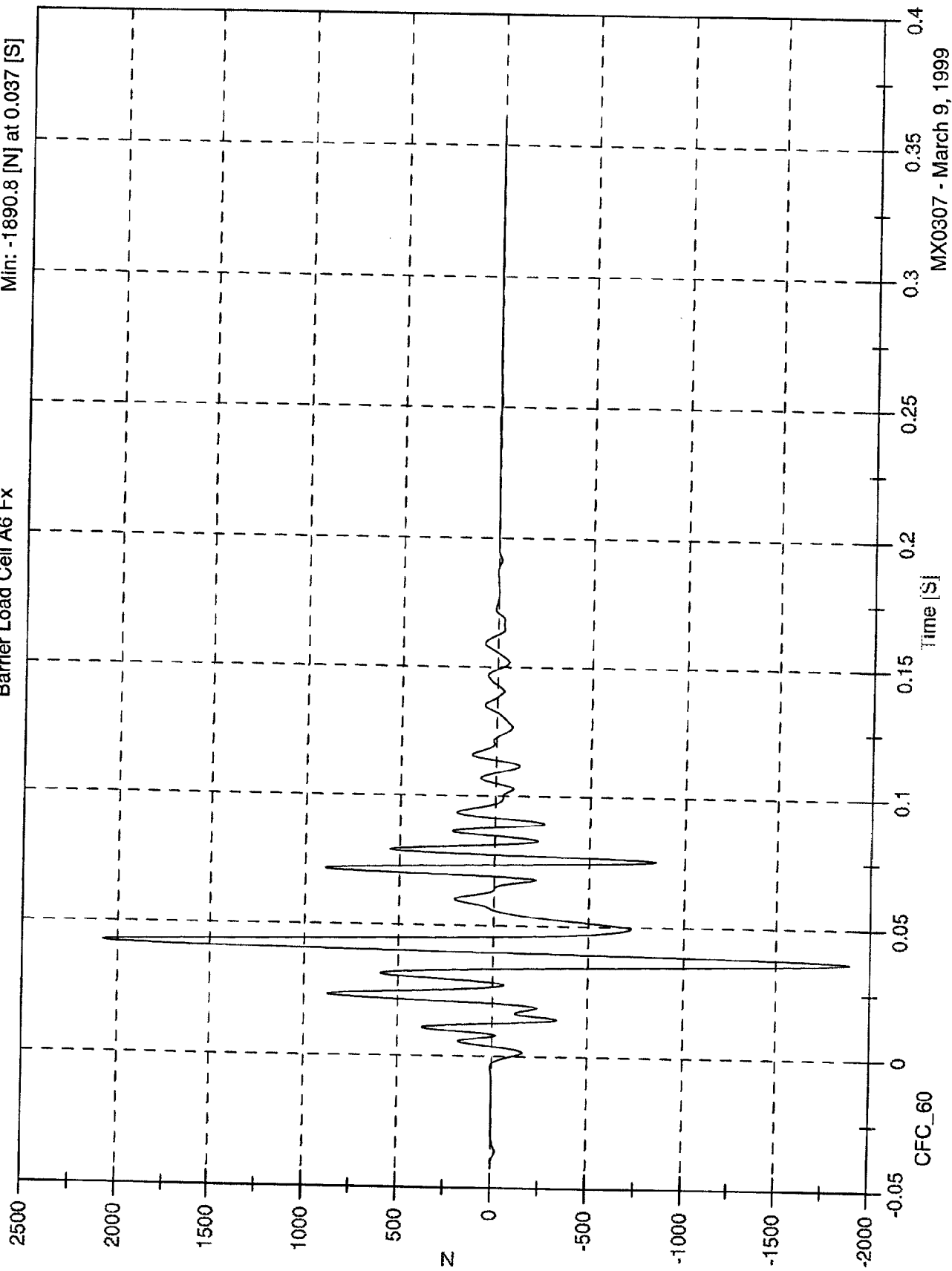


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 2076.4 [N] at 0.043 [S]
Min: -1890.8 [N] at 0.037 [S]

Barrier Load Cell A6 Fx

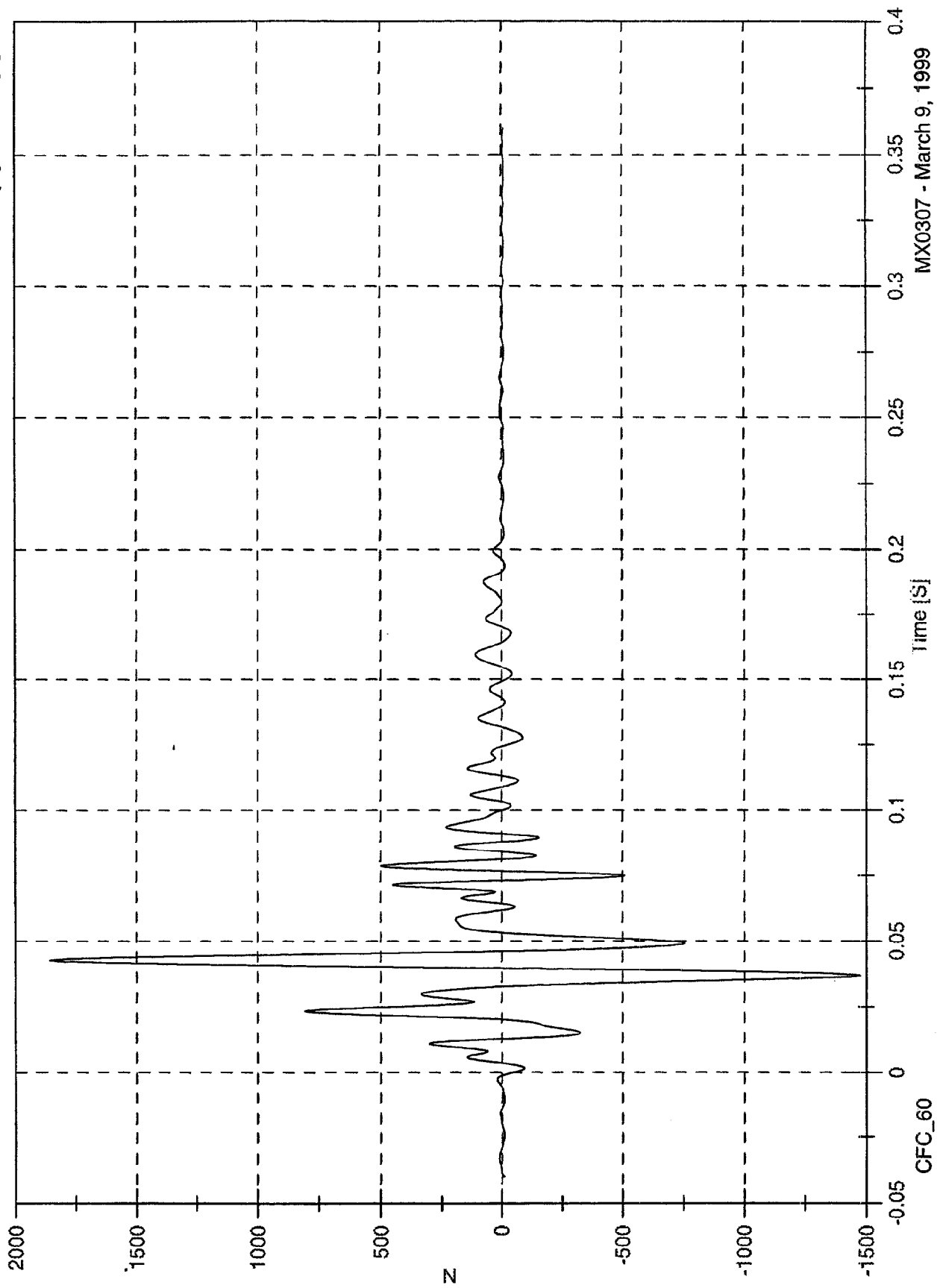


NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 1861.2 [N] at 0.043 [S]

Min: -1474.8 [N] at 0.037 [S]

Barrier Load Cell A7 Fx



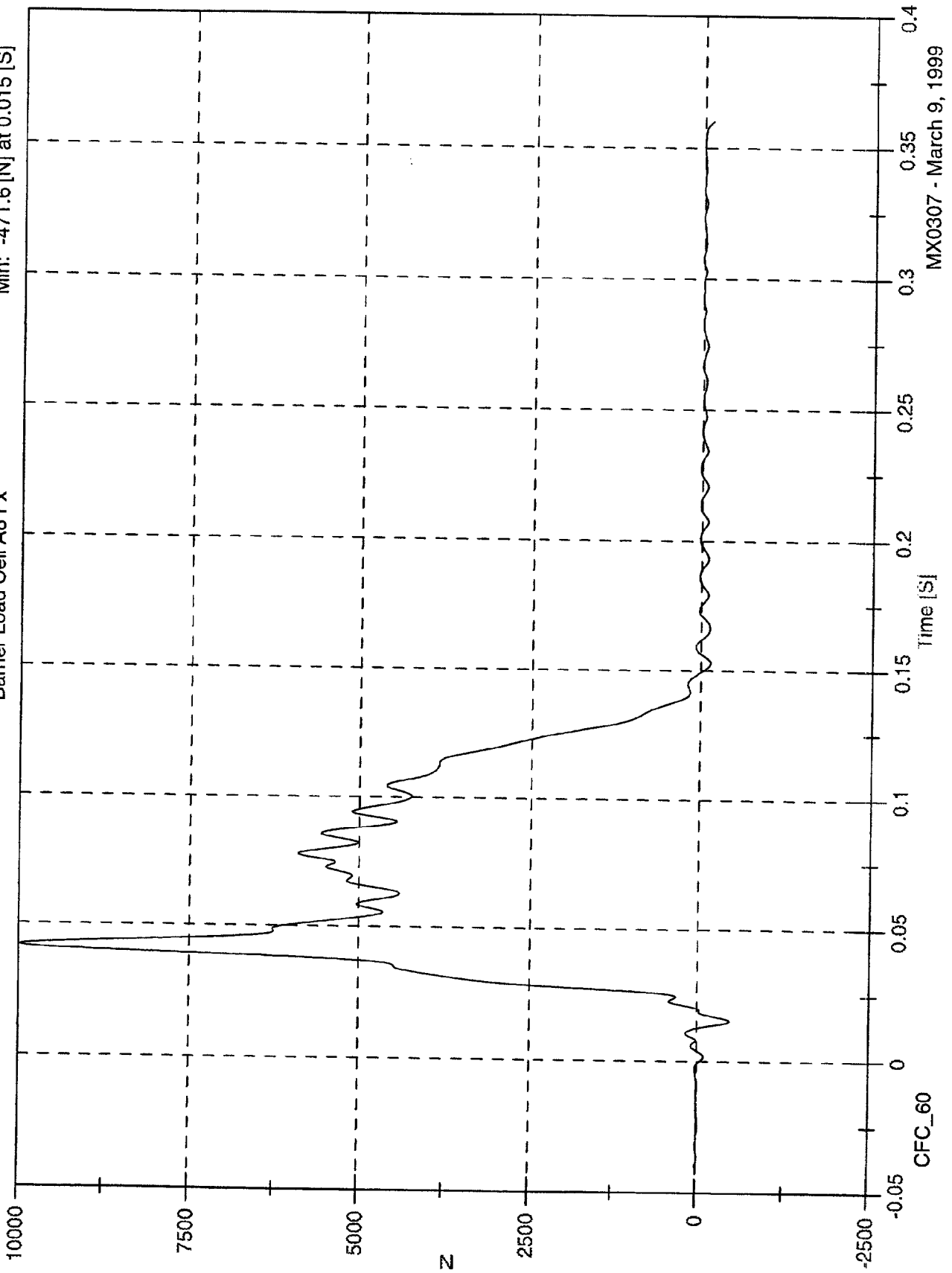
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 9971.6 [N] at 0.042 [S]

Min: -471.6 [N] at 0.015 [S]

Barrier Load Cell A8 Fx

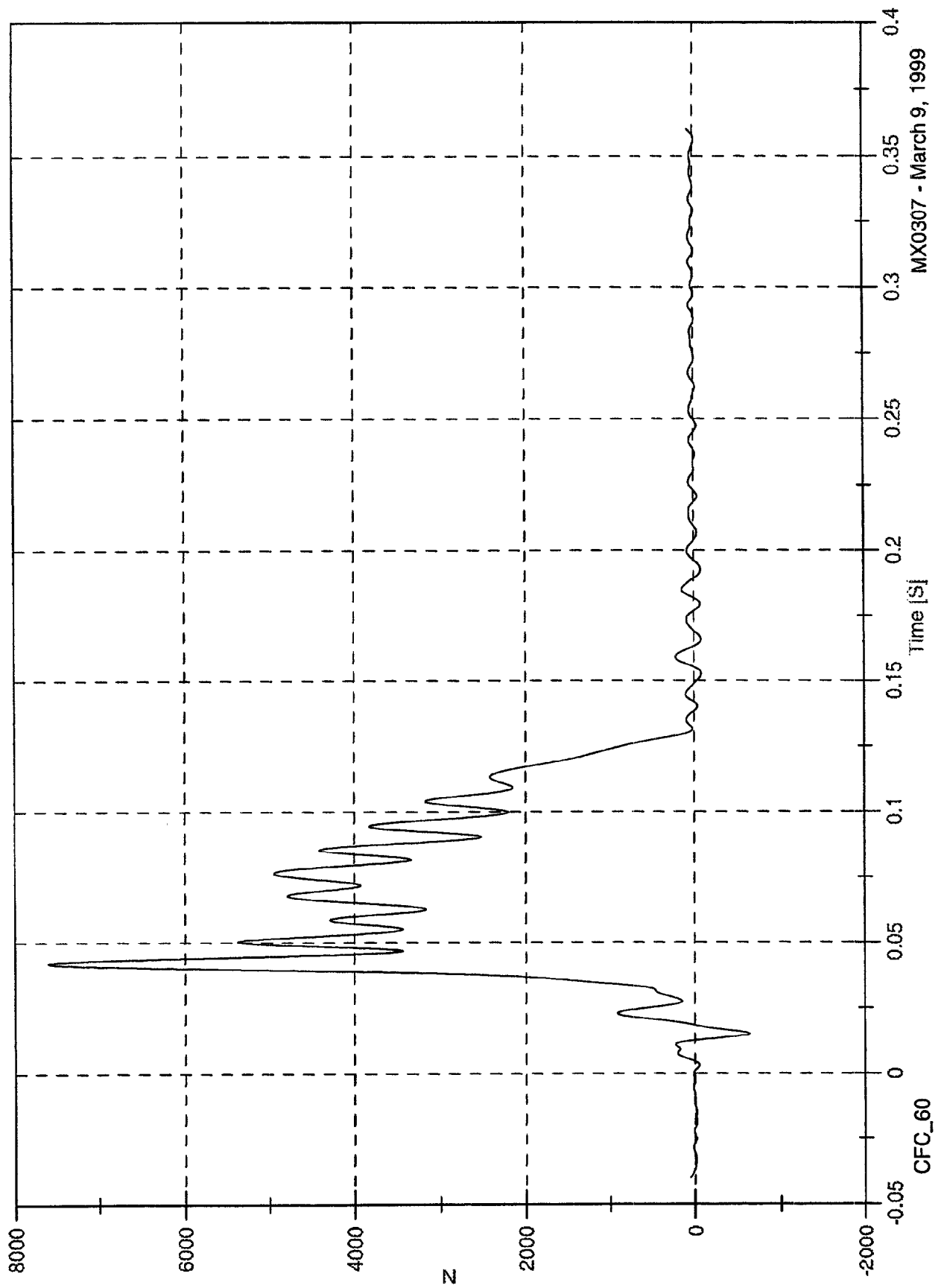


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 7604.2 [N] at 0.042 [S]
Min: -637.3 [N] at 0.015 [S]

Barrier Load Cell A9 Fx

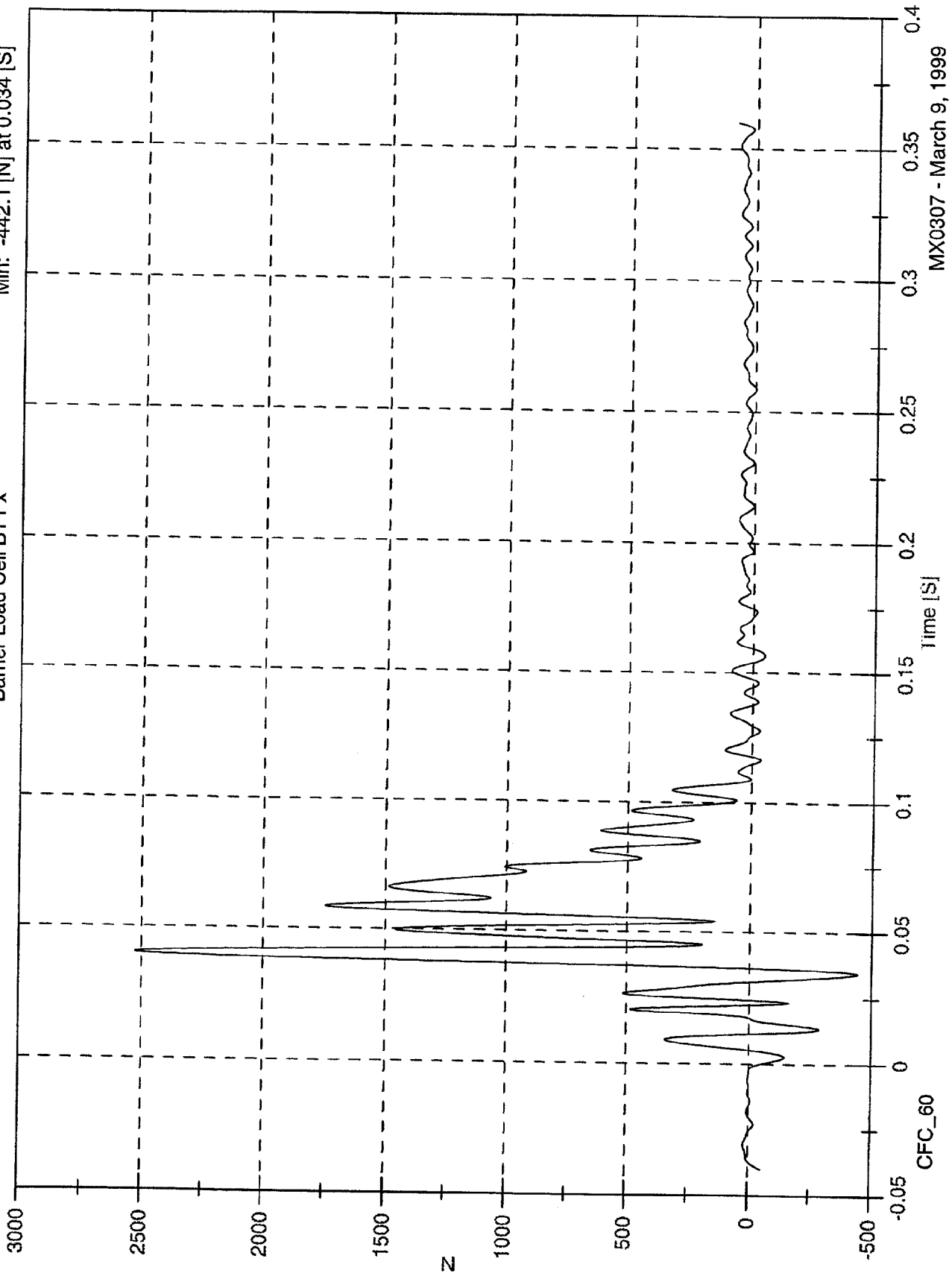


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 2526.2 [N] at 0.040 [S]
 Min: -442.1 [N] at 0.034 [S]

Barrier Load Cell B1 Fx

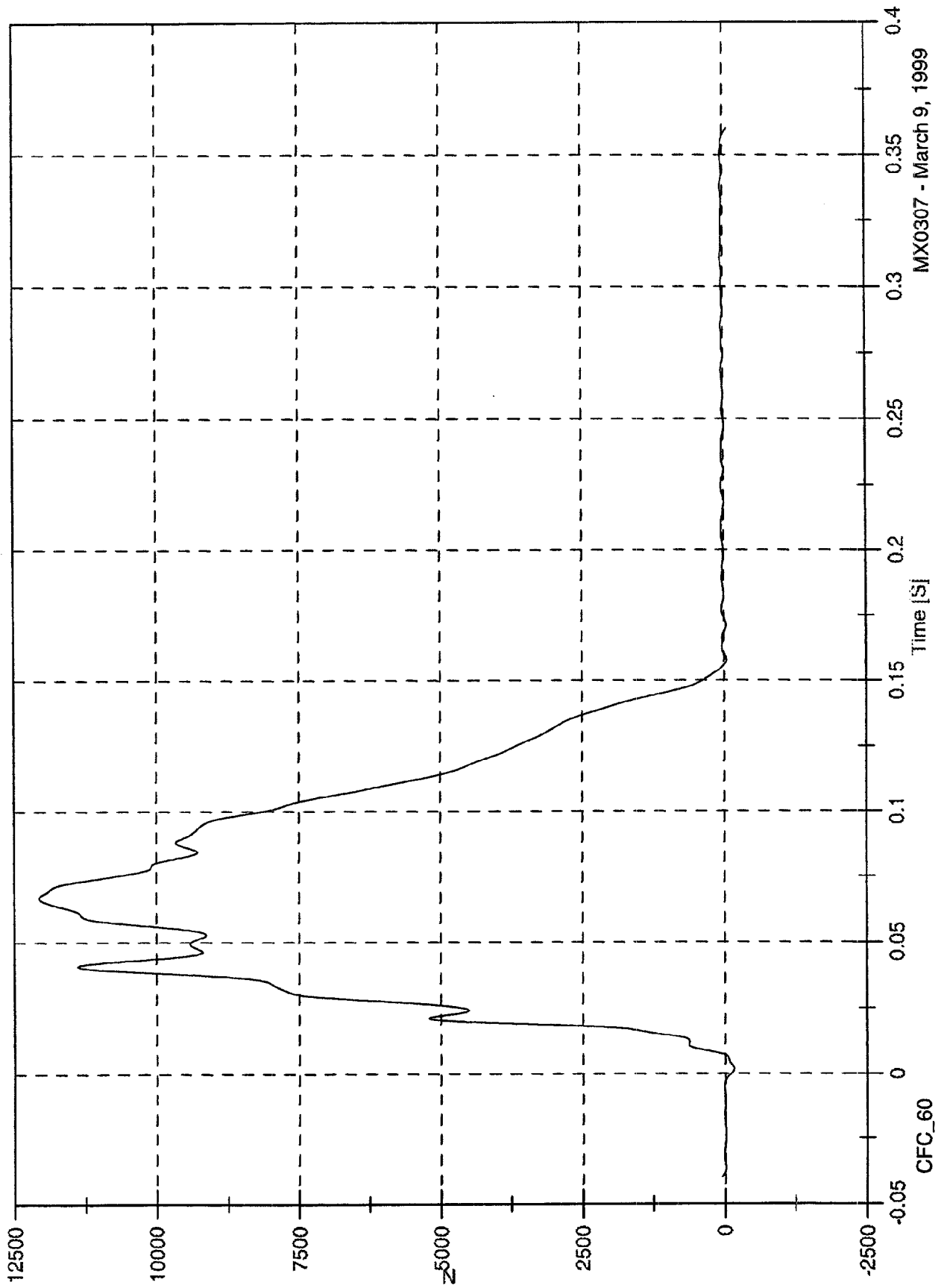


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 12062.7 [N] at 0.067 [S]
Min: -160.5 [N] at 0.002 [S]

Barrier Load Cell B2 Fx



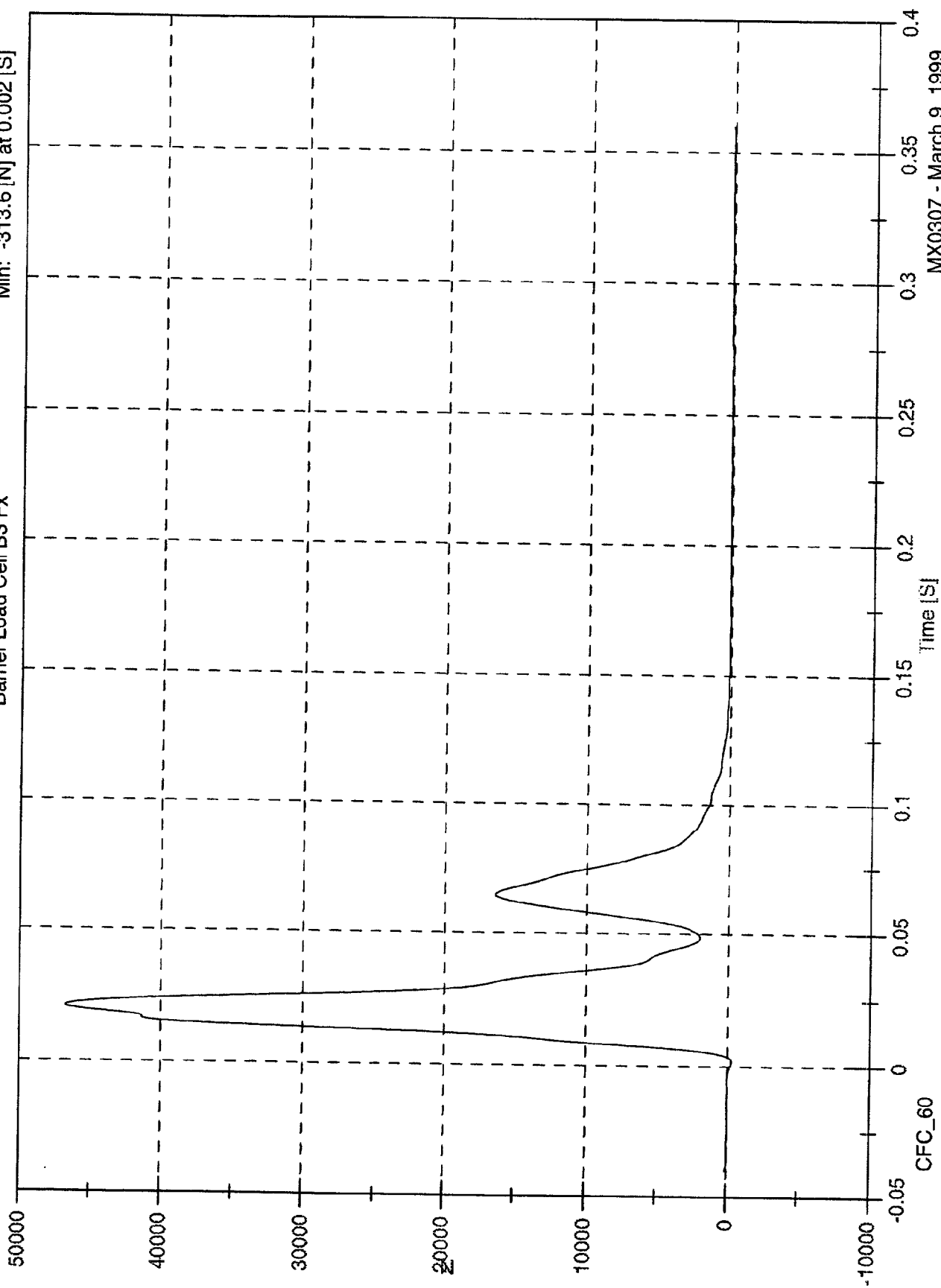
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 46752.1 [N] at 0.021 [S]

Min: -313.6 [N] at 0.002 [S]

Barrier Load Cell B3 Fx



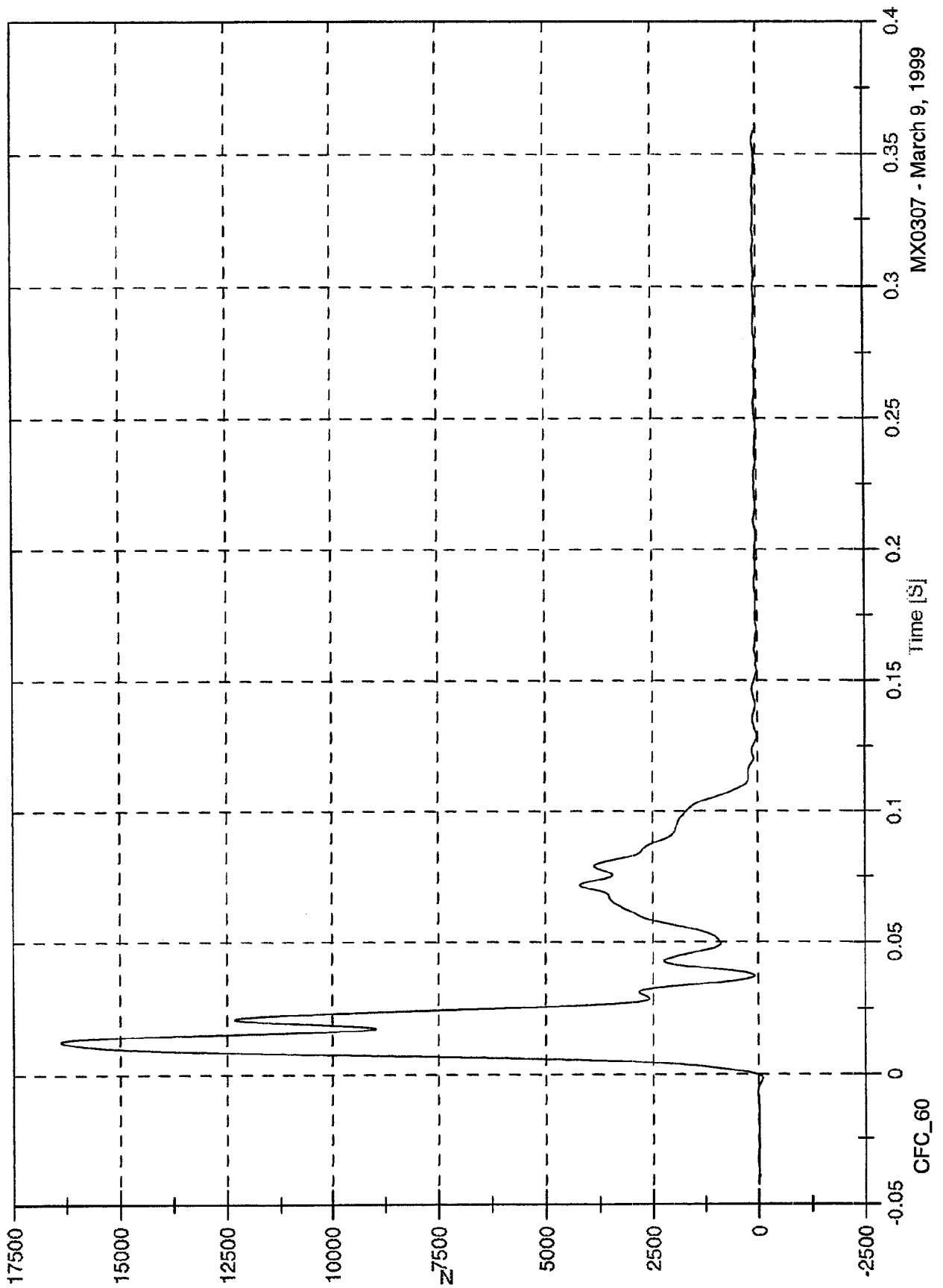
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 16385.1 [N] at 0.013 [S]

Min: -89.1 [N] at -0.002 [S]

Barrier Load Cell B4 Fx

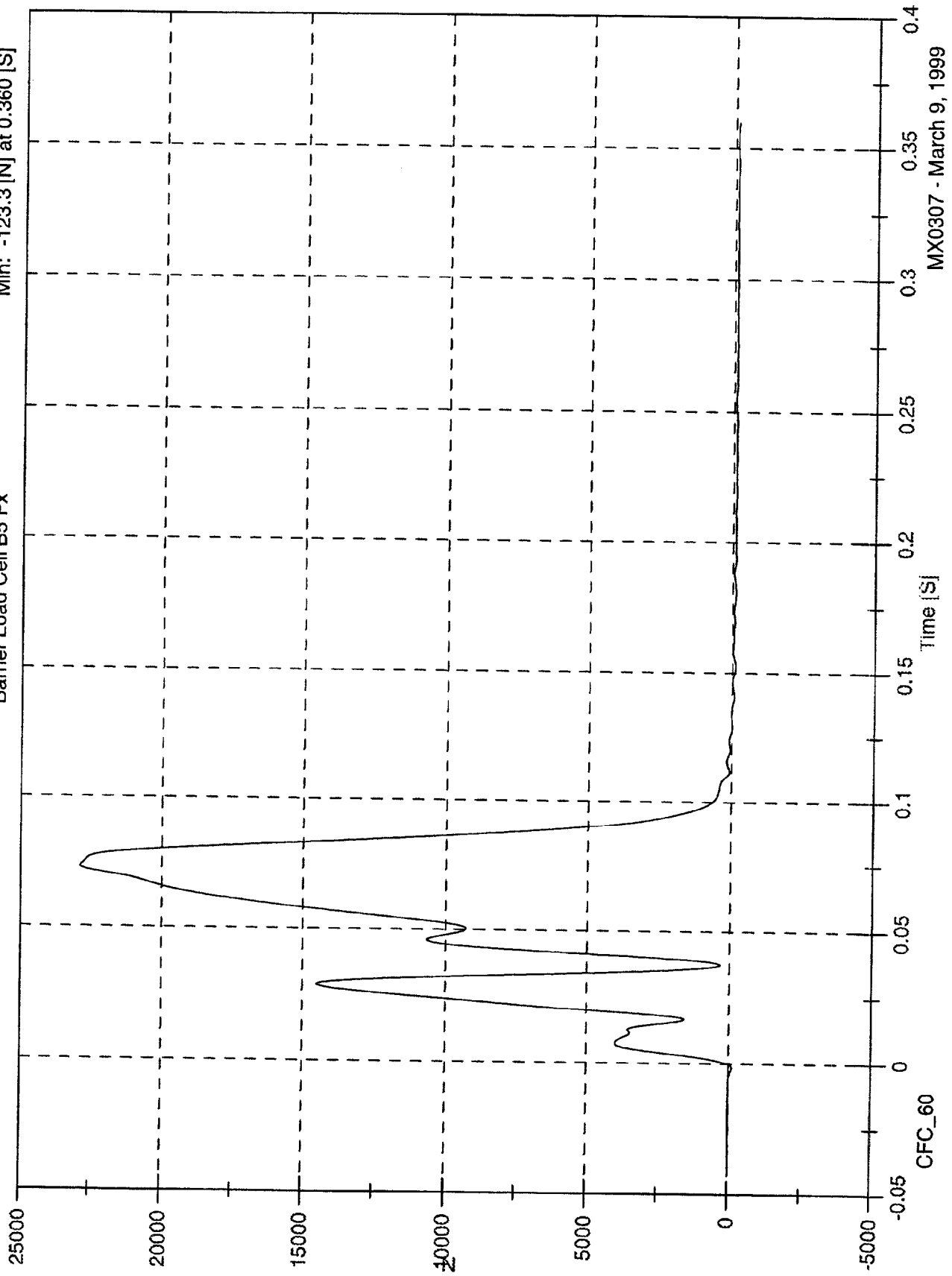


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 22859.1 [N] at 0.073 [S]
 Min: -123.3 [N] at 0.360 [S]

Barrier Load Cell B5 Fx

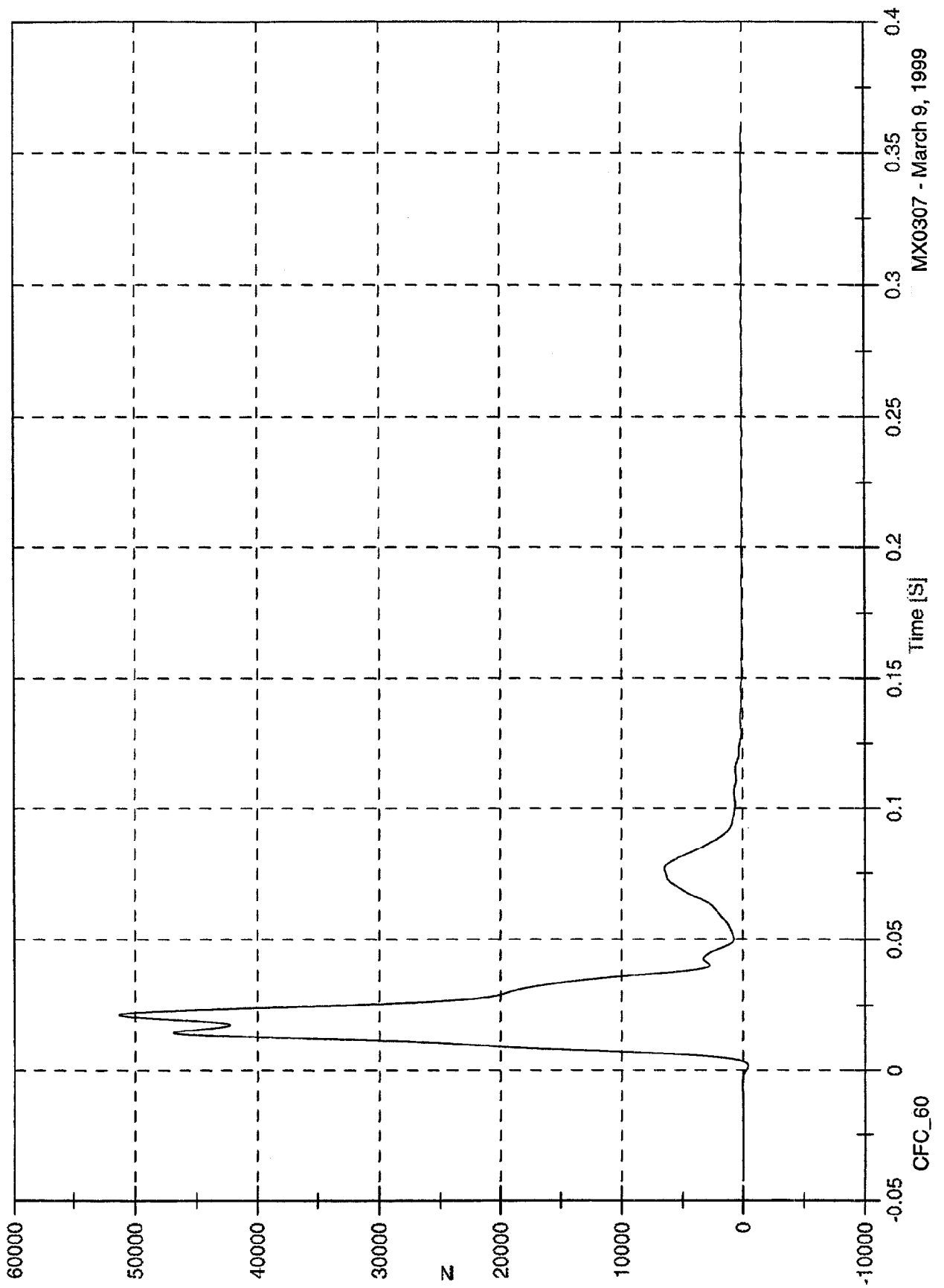


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Barrier Load Cell B6 Fx

Max: 51347.7 [N] at 0.021 [S]
Min: -431.4 [N] at 0.002 [S]

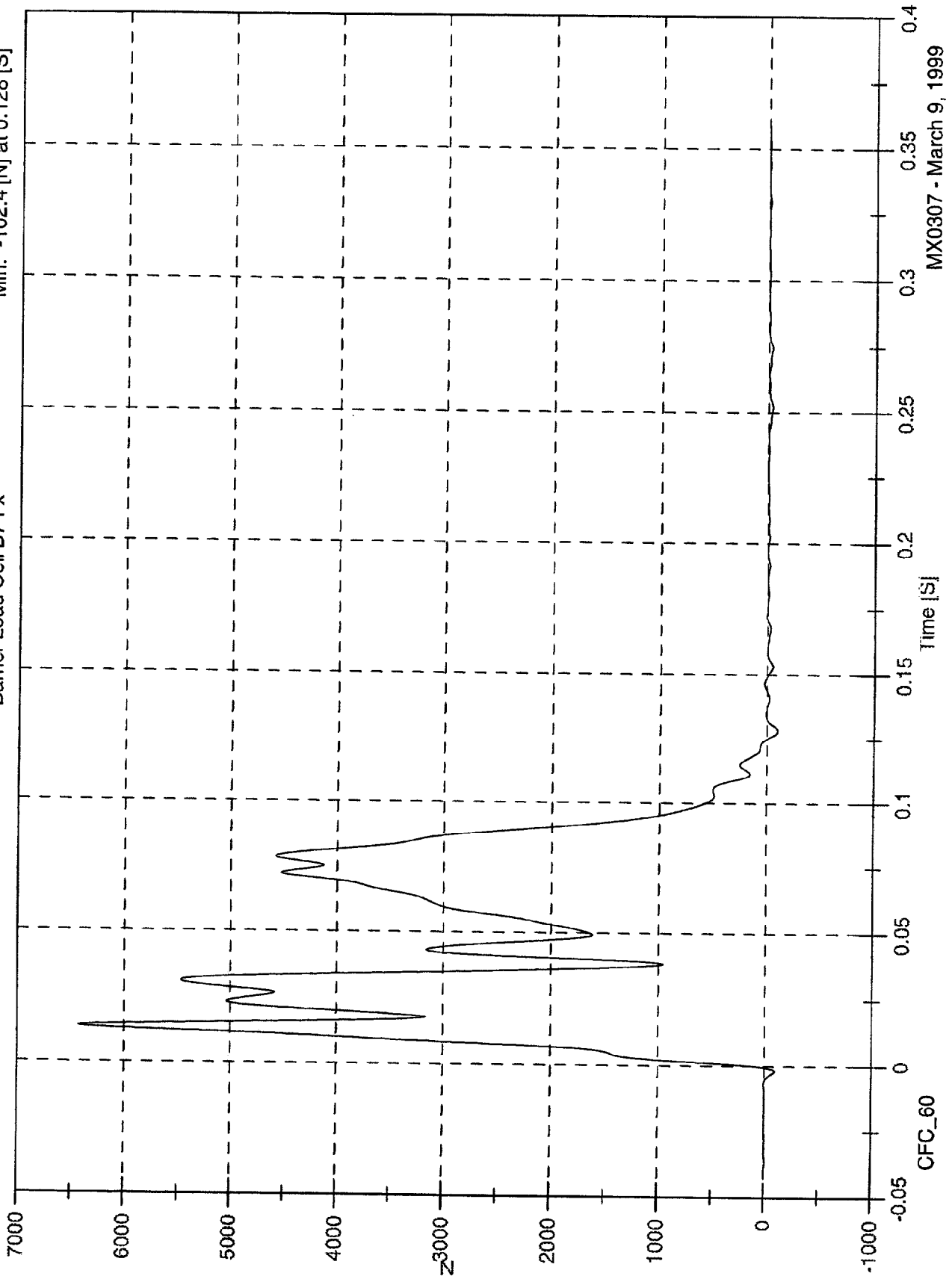


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 6431.1 [N] at 0.013 [S]
 Min: -102.4 [N] at 0.128 [S]

Barrier Load Cell B7 Fx

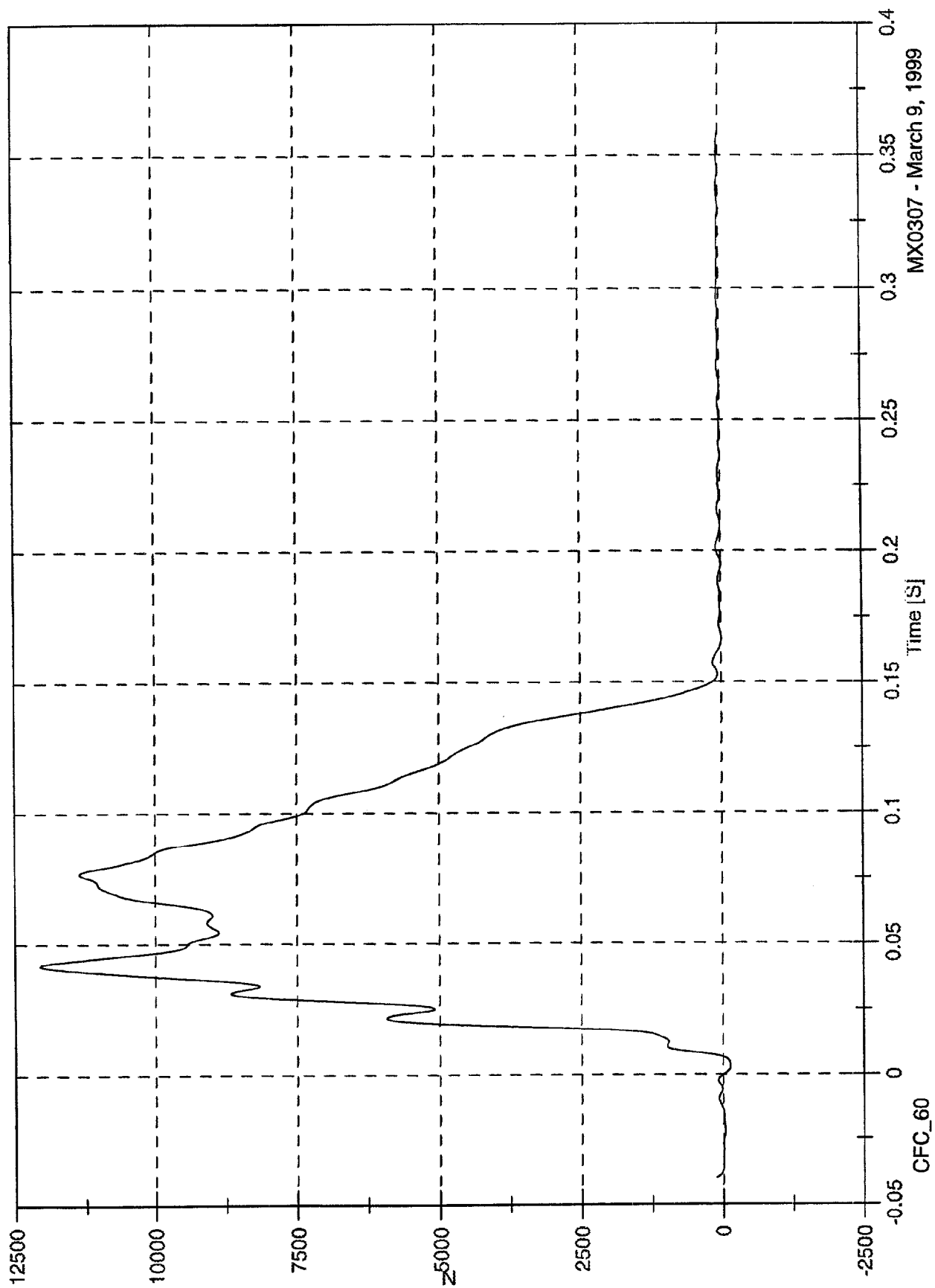


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 12060.2 [N] at 0.042 [S]
Min: -133.6 [N] at 0.003 [S]

Barrier Load Cell B8 Fx

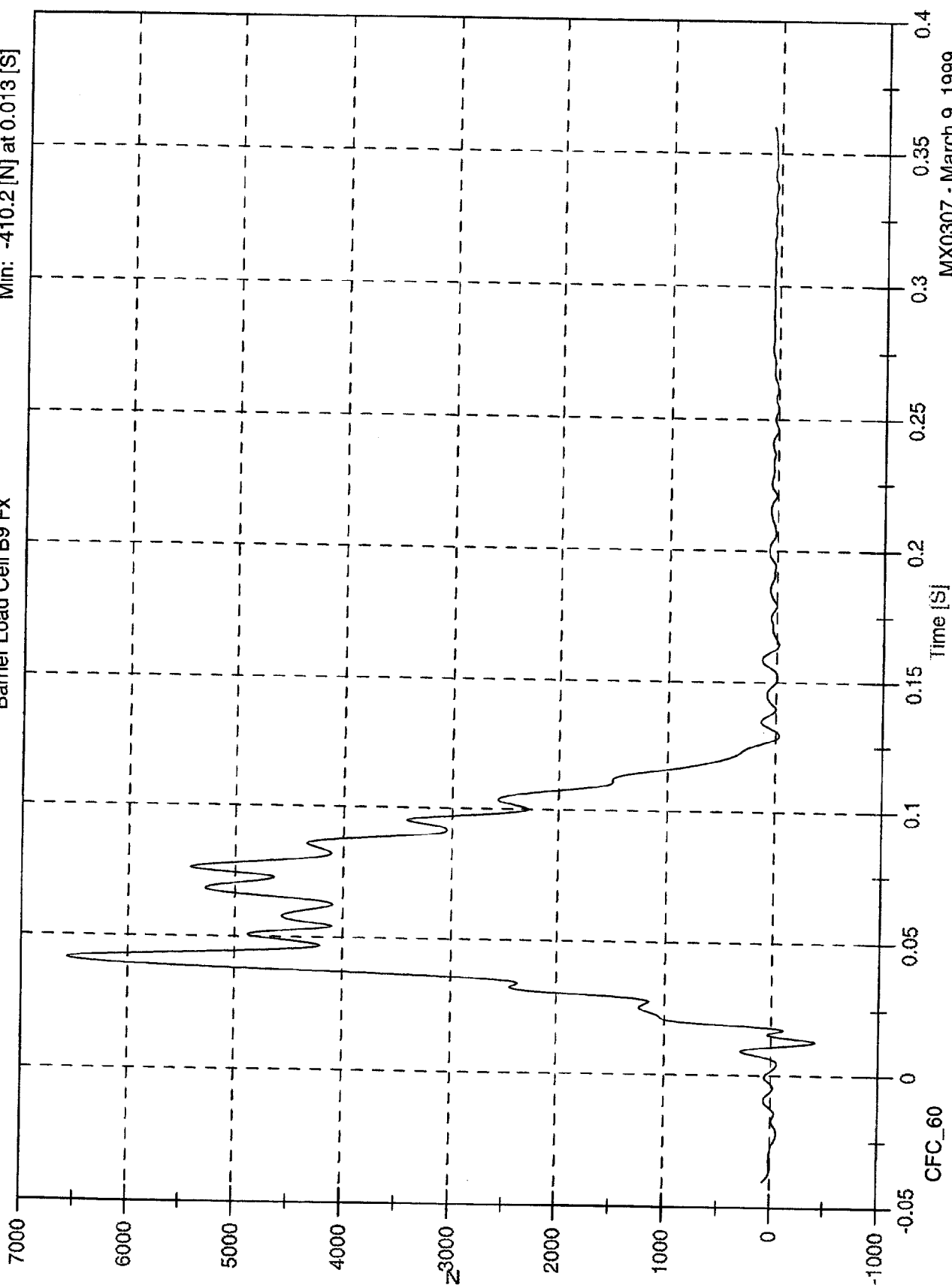


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 6576.5 [N] at 0.041 [S]
Min: -410.2 [N] at 0.013 [S]

Barrier Load Cell B9 Fx



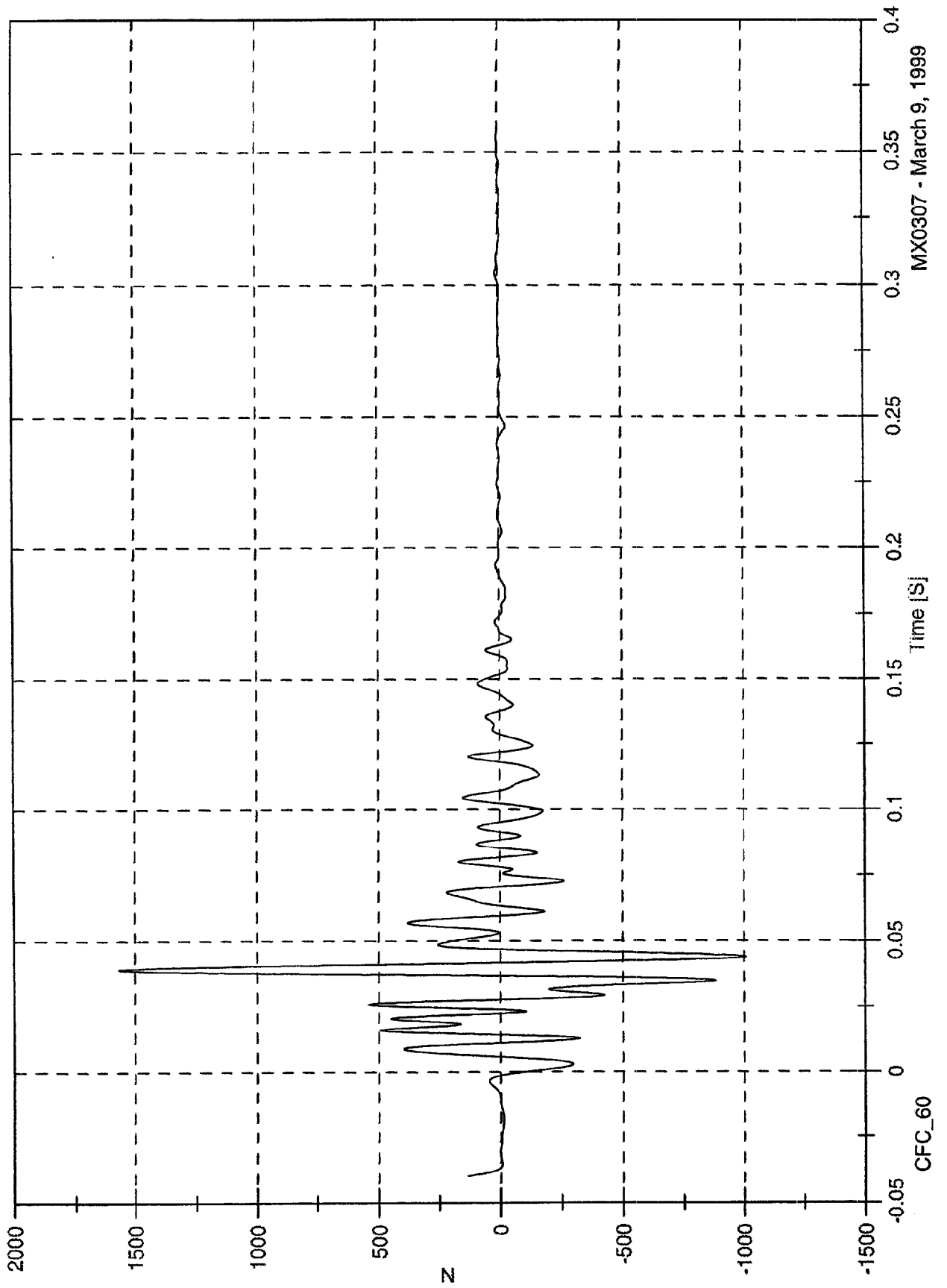
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 1567.6 [N] at 0.039 [S]

Min: -1009.3 [N] at 0.044 [S]

Barrier Load Cell C1 Fx

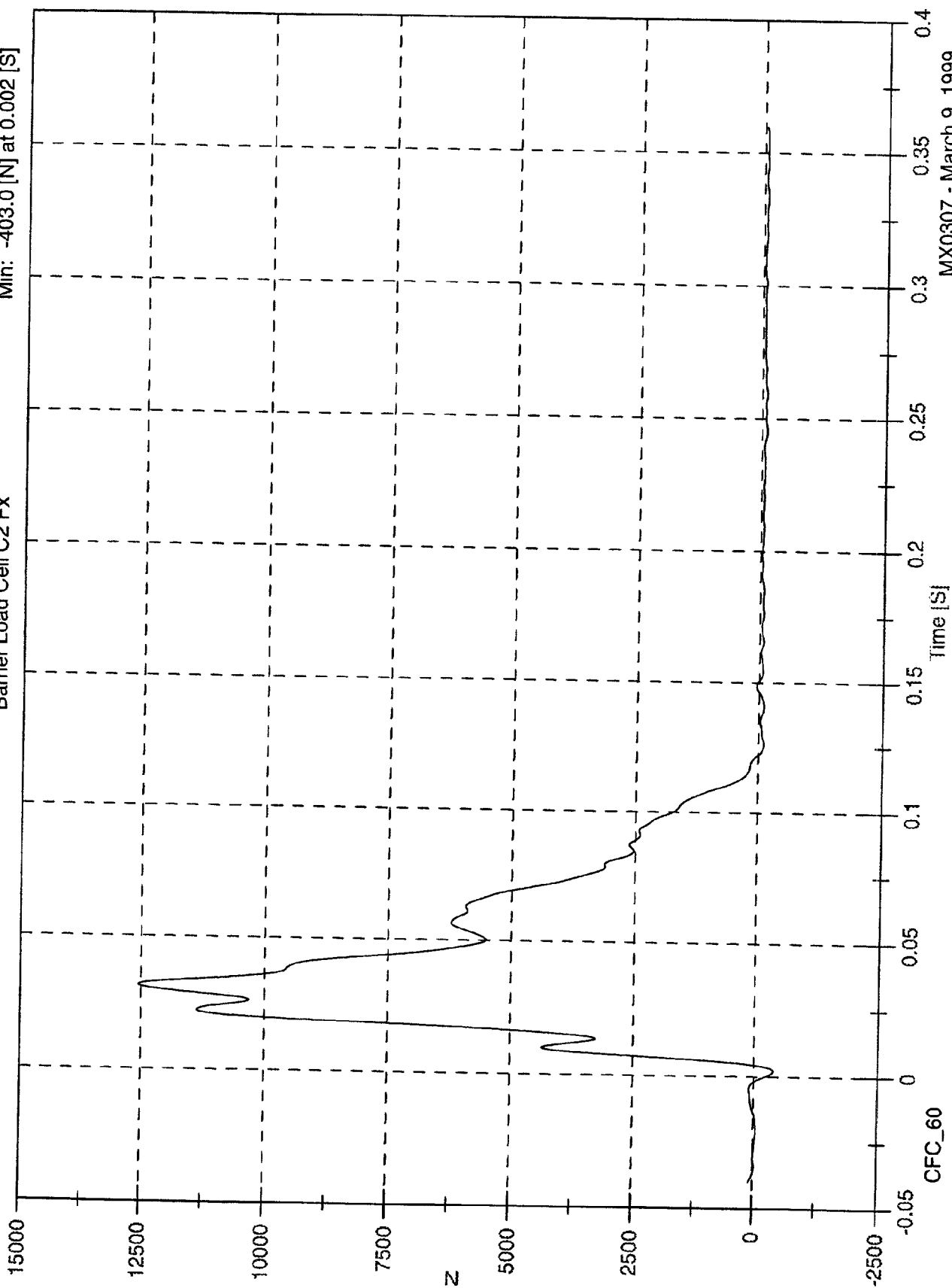


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 12554.3 [N] at 0.032 [S]
Min: -403.0 [N] at 0.002 [S]

Barrier Load Cell C2 Fx

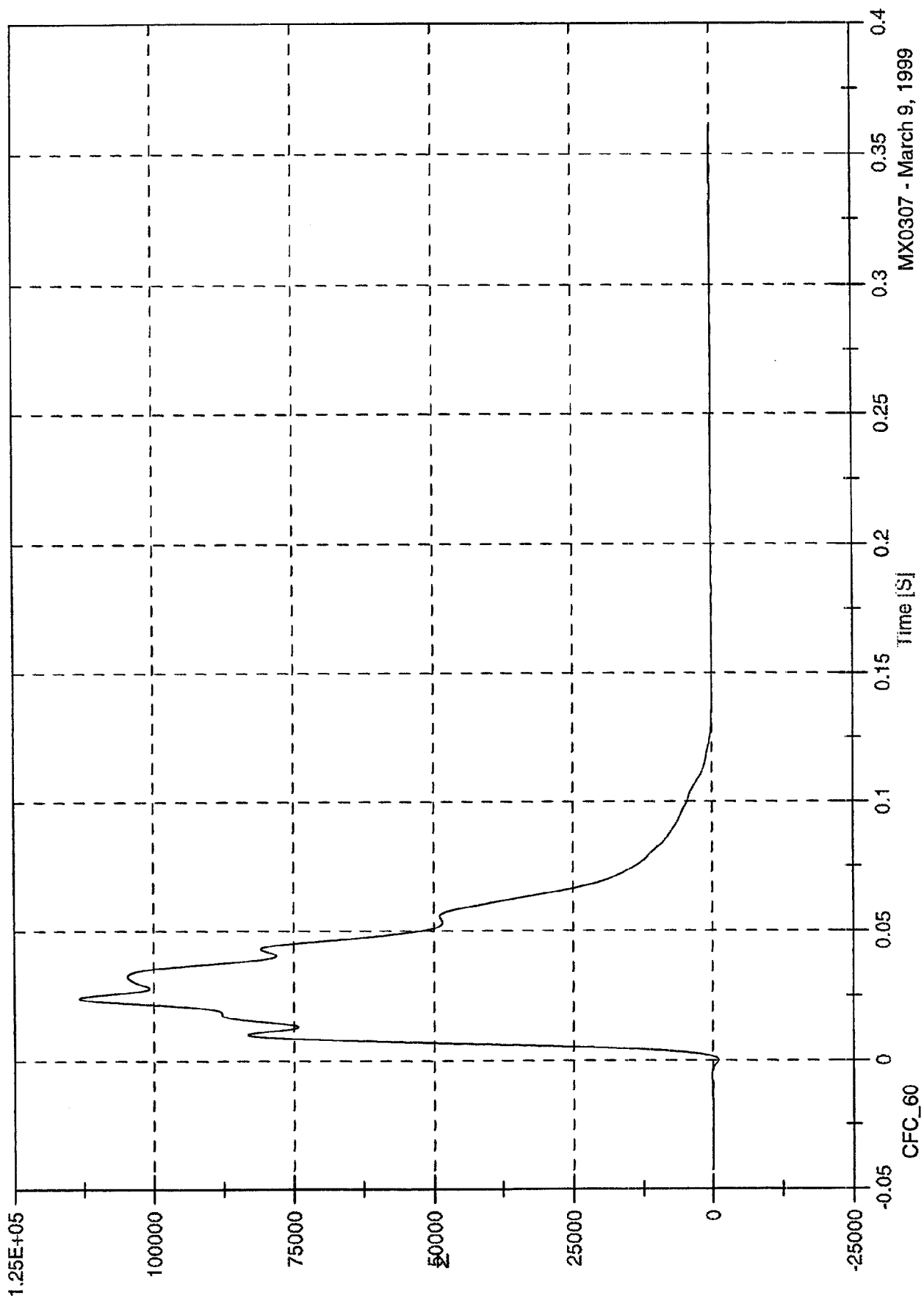


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Barrier Load Cell C3 Fx

Max: 113391.6 [N] at 0.024 [S]
Min: -979.5 [N] at -0.000 [S]

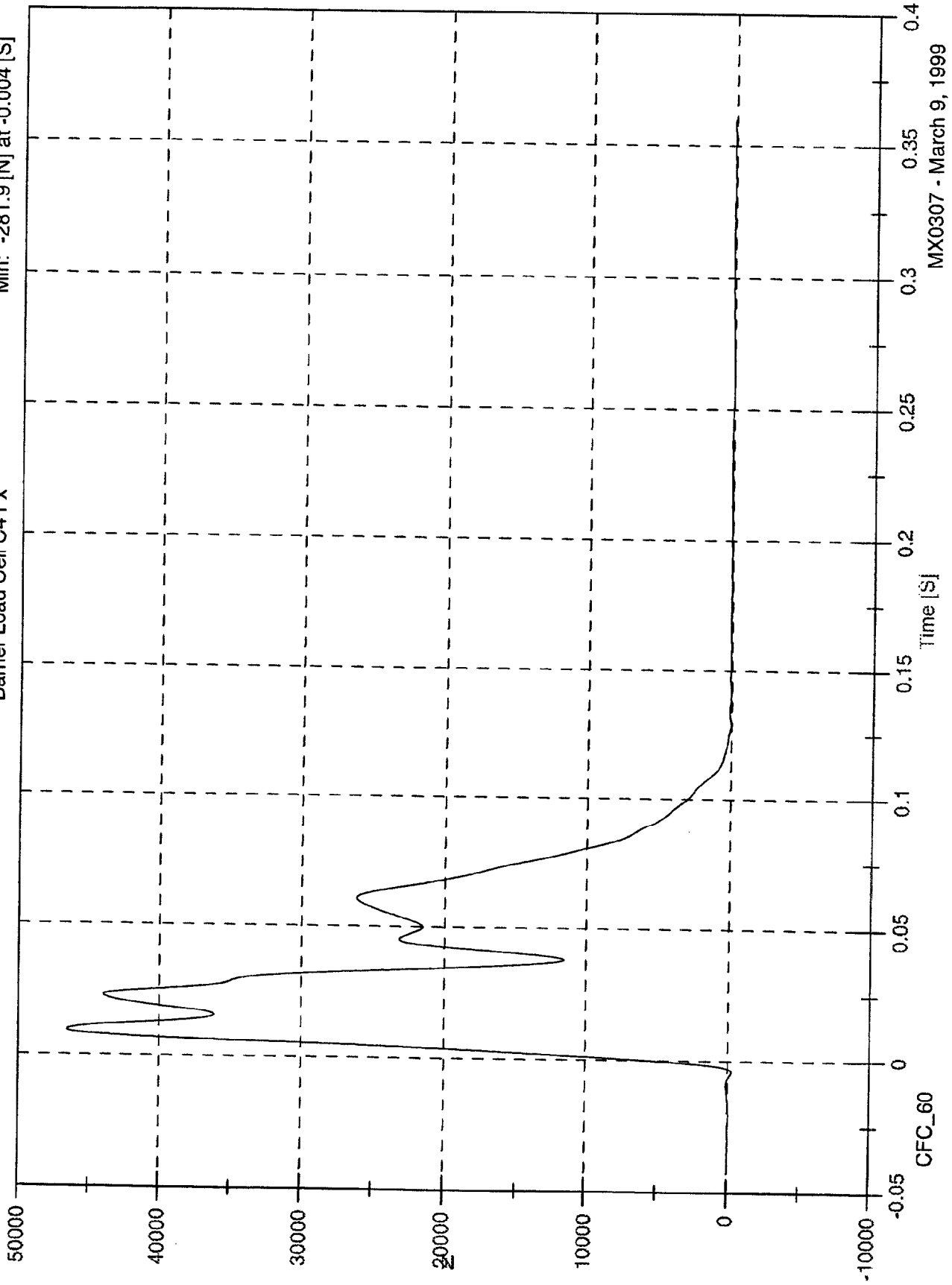


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 46569.6 [N] at 0.009 [S]
Min: -281.9 [N] at -0.004 [S]

Barrier Load Cell C4 Fx

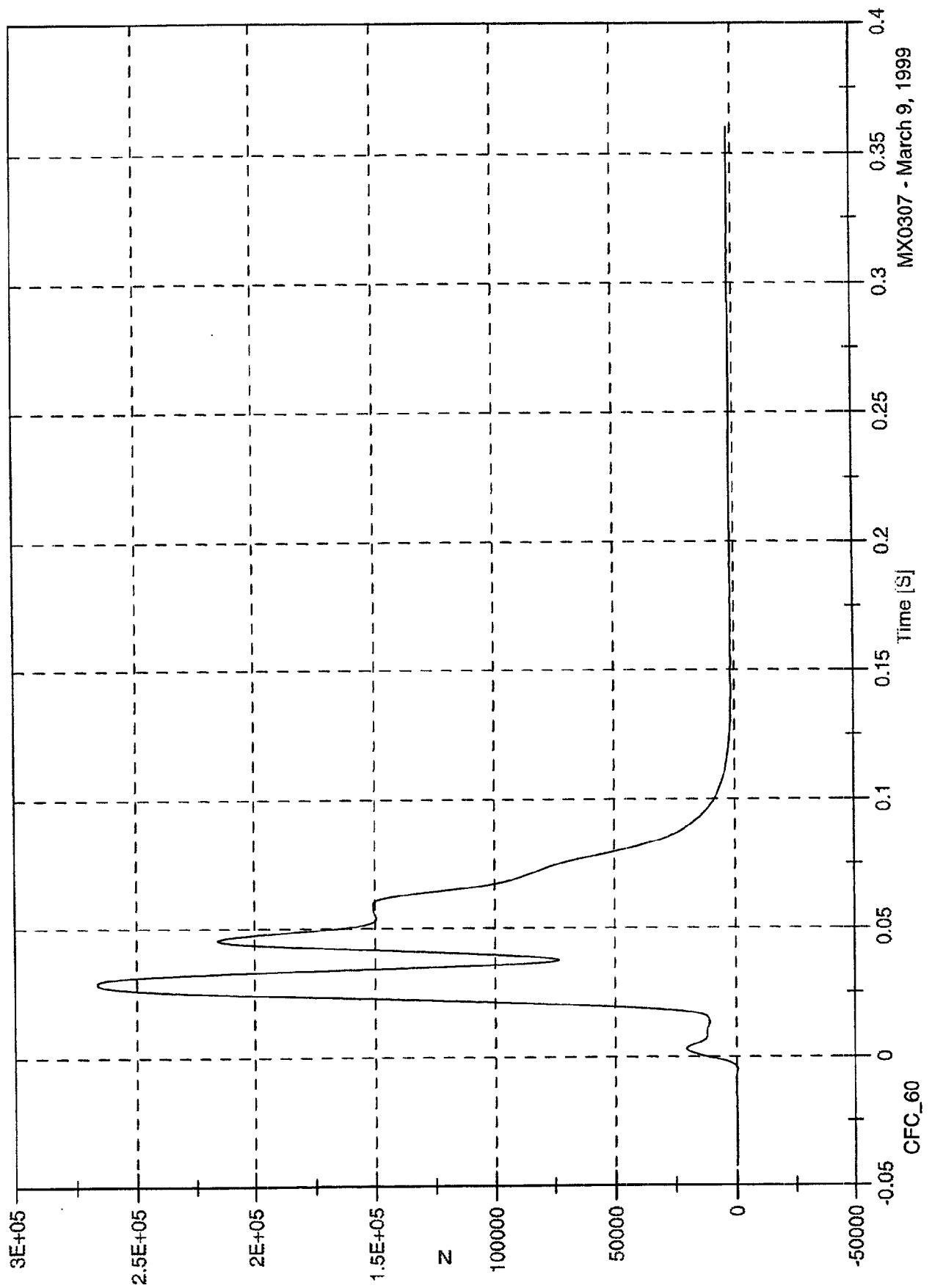


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 266403.4 [N] at 0.029 [S]
 Min: -441.9 [N] at -0.005 [S]

Barrier Load Cell C5 Fx

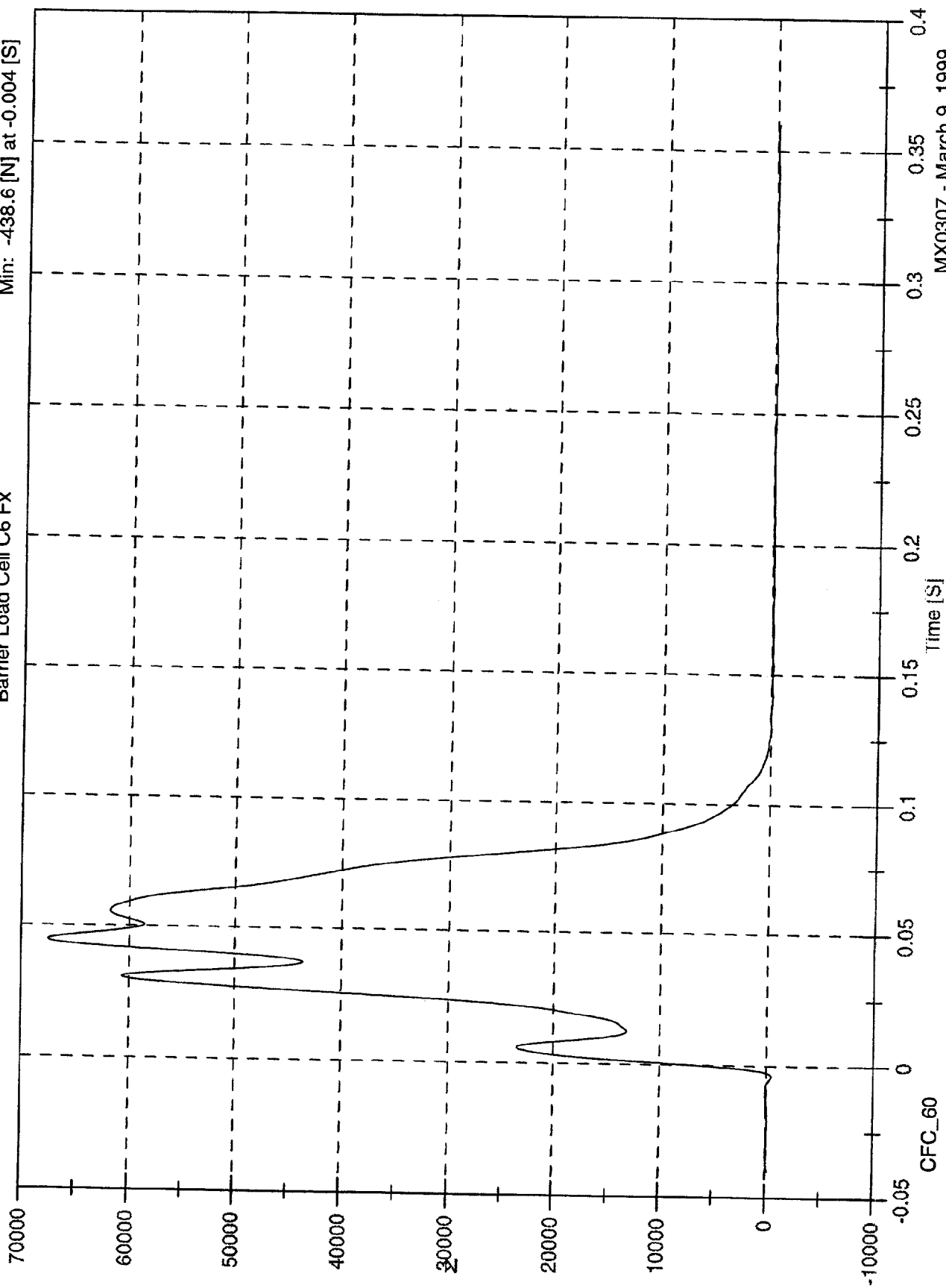


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 67495.3 [N] at 0.045 [S]
Min: -438.6 [N] at -0.004 [S]

Barrier Load Cell C6 Fx

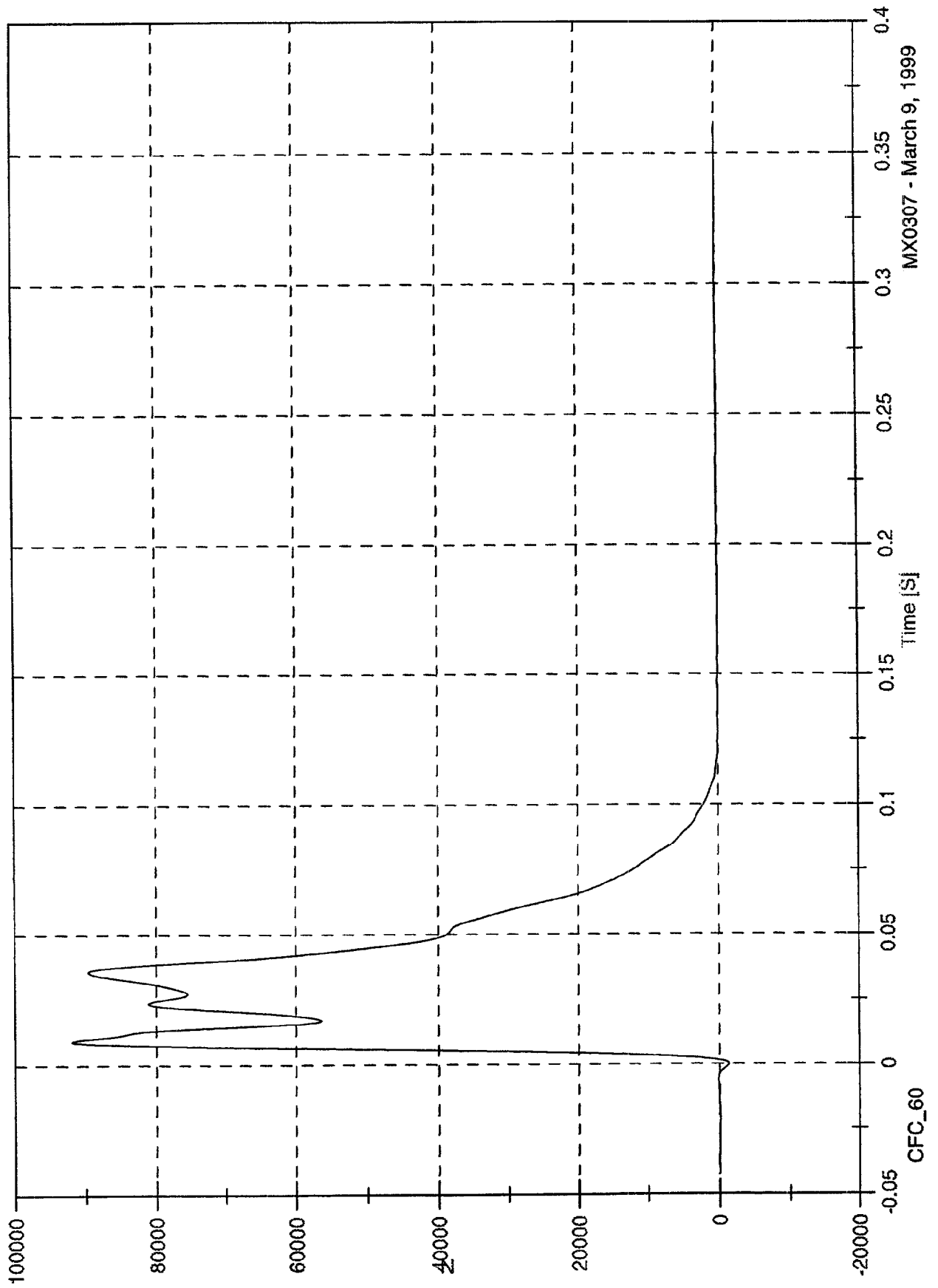


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 91931.6 [N] at 0.009 [S]
Min: -1325.7 [N] at -0.000 [S]

Barrier Load Cell C7 Fx

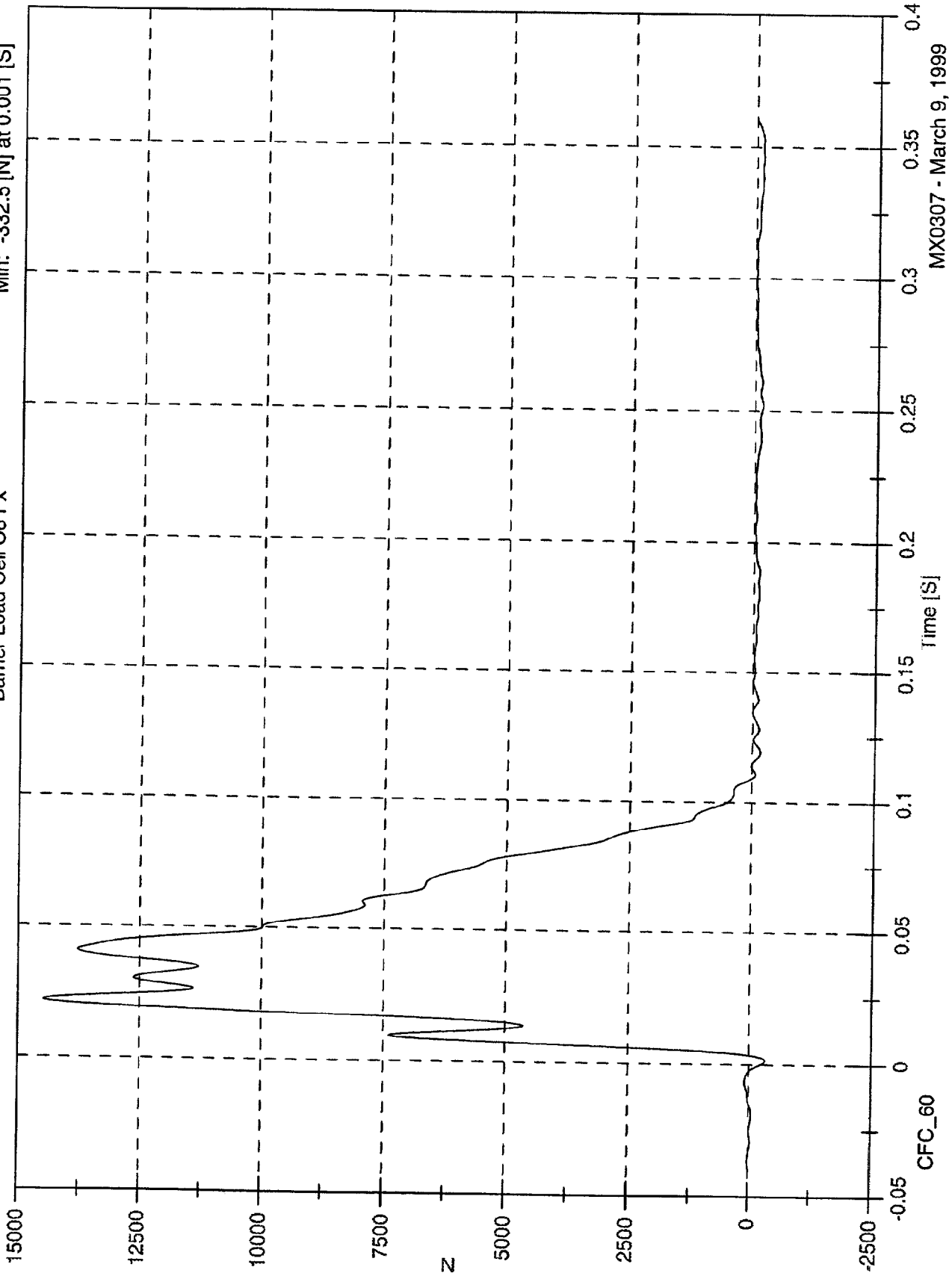


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 14476.6 [N] at 0.022 [S]
Min: -332.5 [N] at 0.001 [S]

Barrier Load Cell C8 Fx

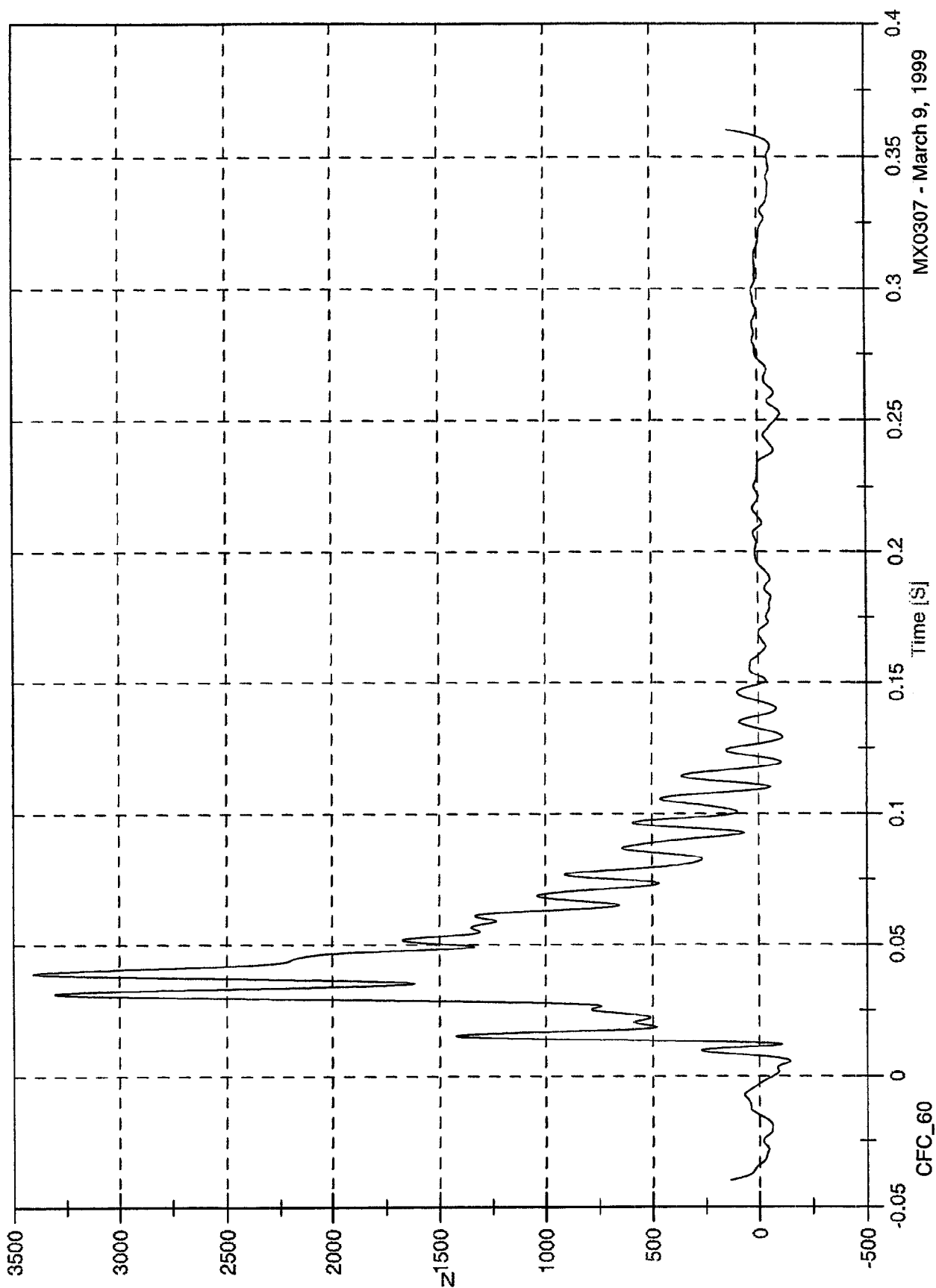


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 3409.8 [N] at 0.039 [S]
 Min: -143.4 [N] at 0.005 [S]

Barrier Load Cell C9 Fx

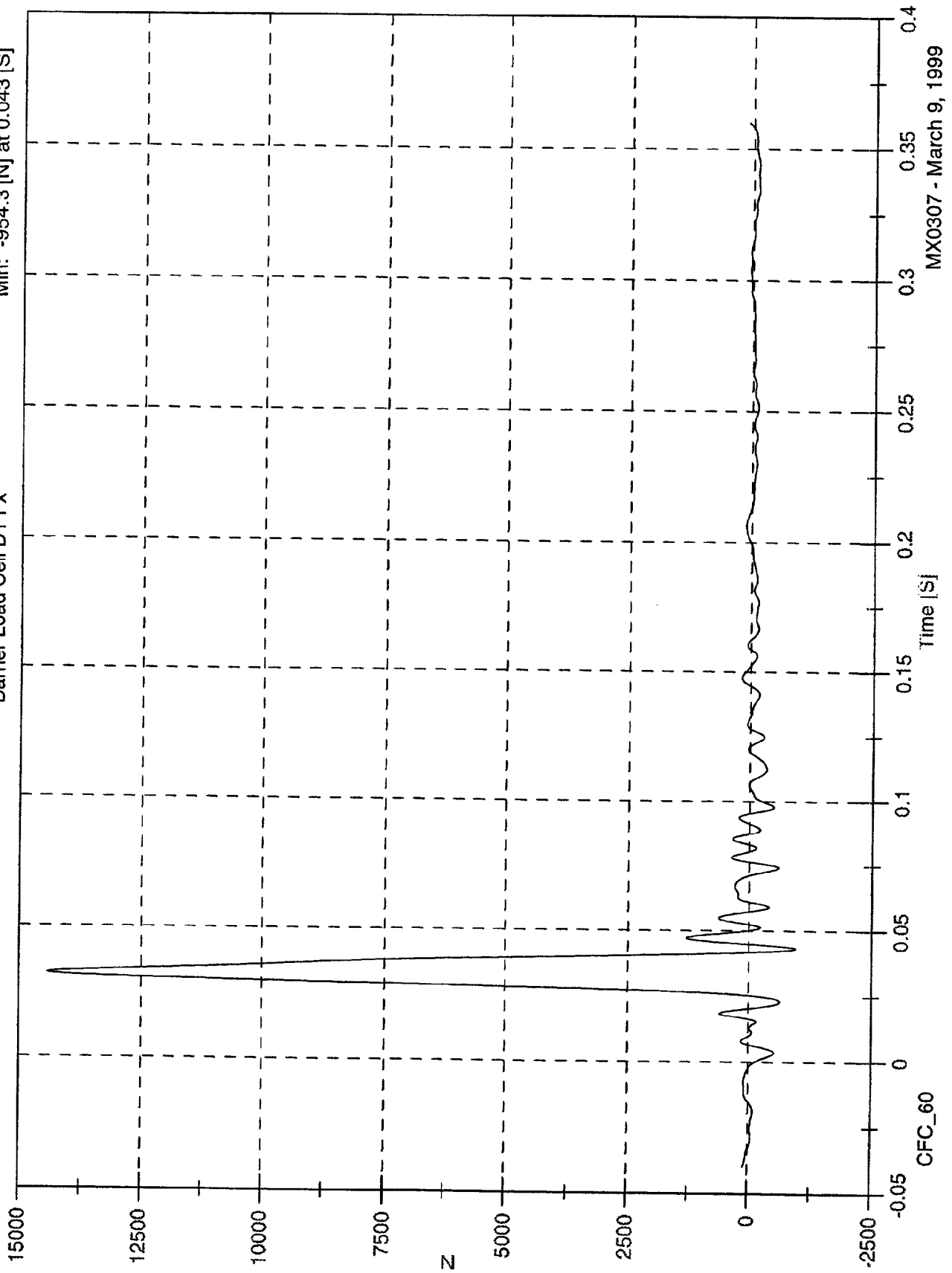


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 14421.4 [N] at 0.032 [S]
 Min: -954.3 [N] at 0.043 [S]

Barrier Load Cell D1 Fx



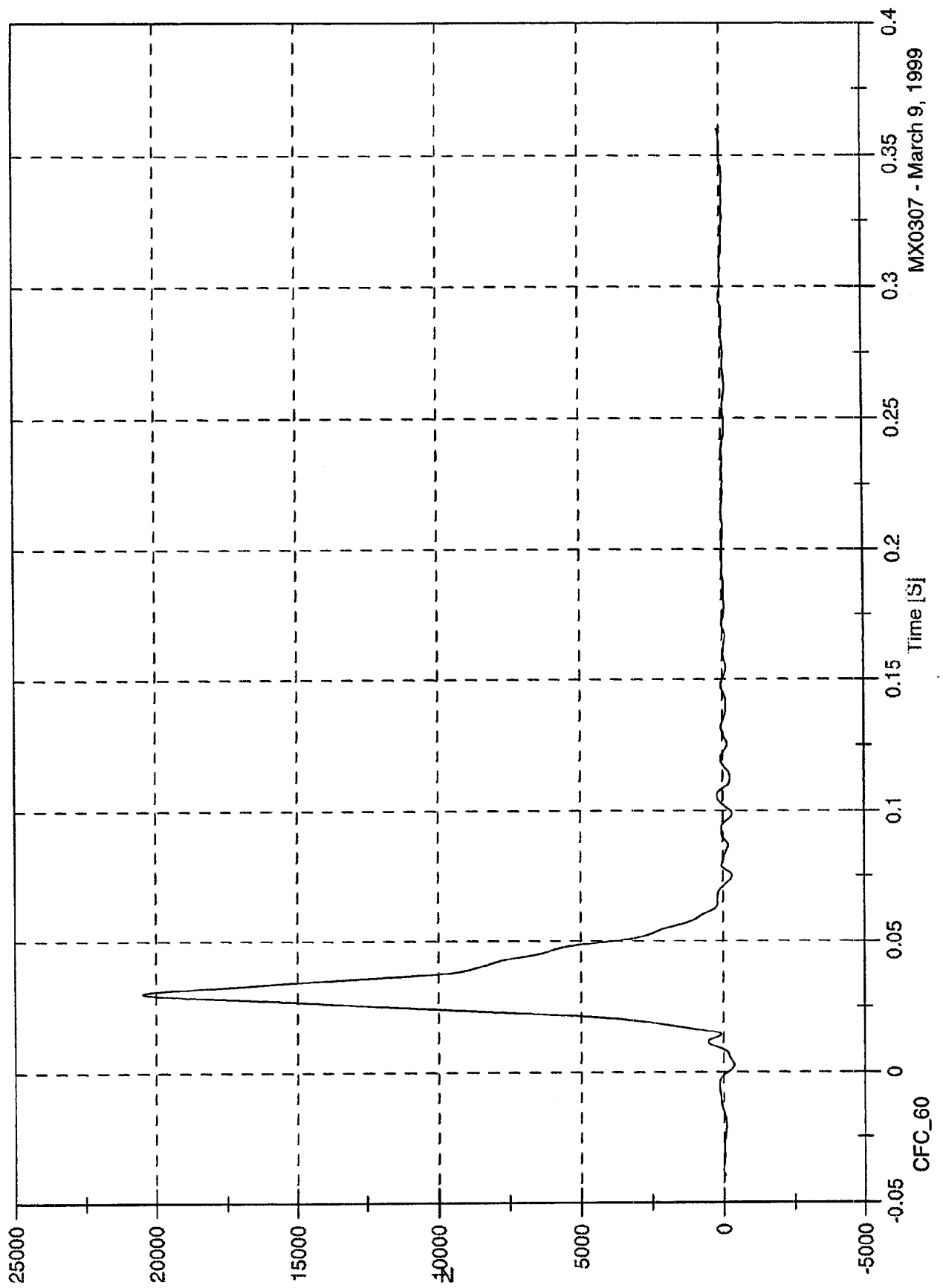
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Barrier Load Cell D2 Fx

Max: 20443.6 [N] at 0.030 [S]

Min: -377.6 [N] at 0.003 [S]

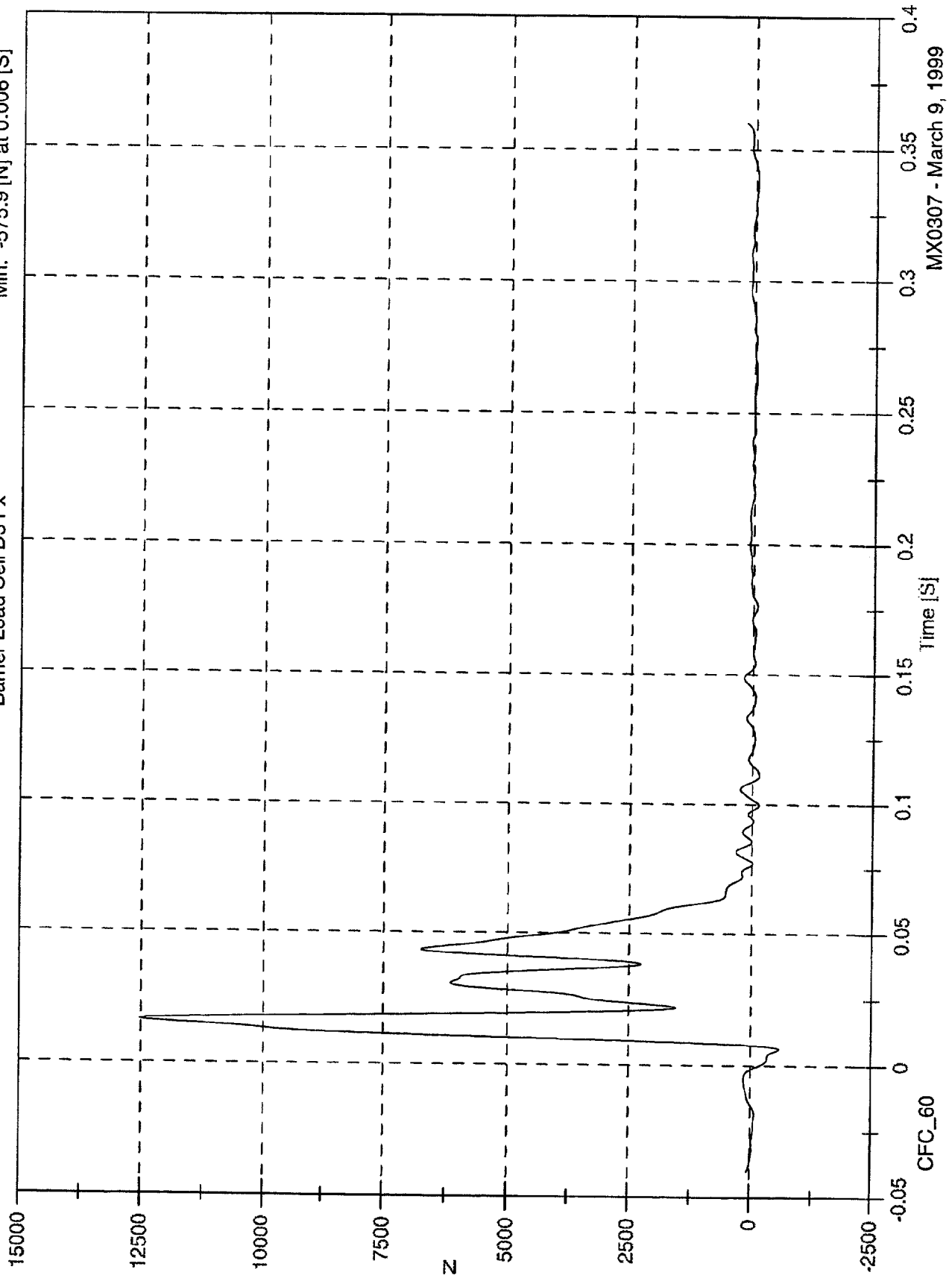


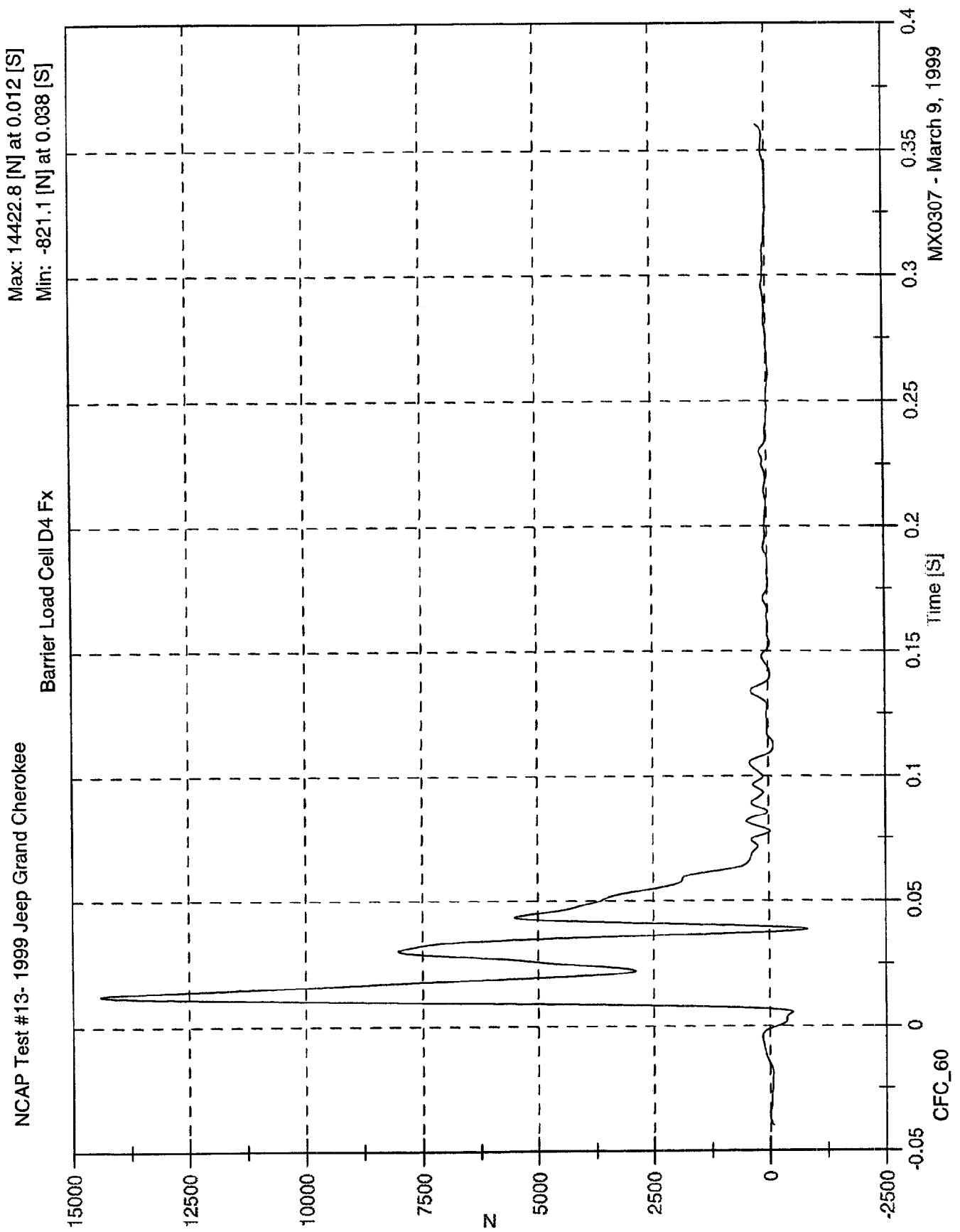
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 12518.8 [N] at 0.016 [S]
Min: -575.9 [N] at 0.006 [S]

Barrier Load Cell D3 Fx

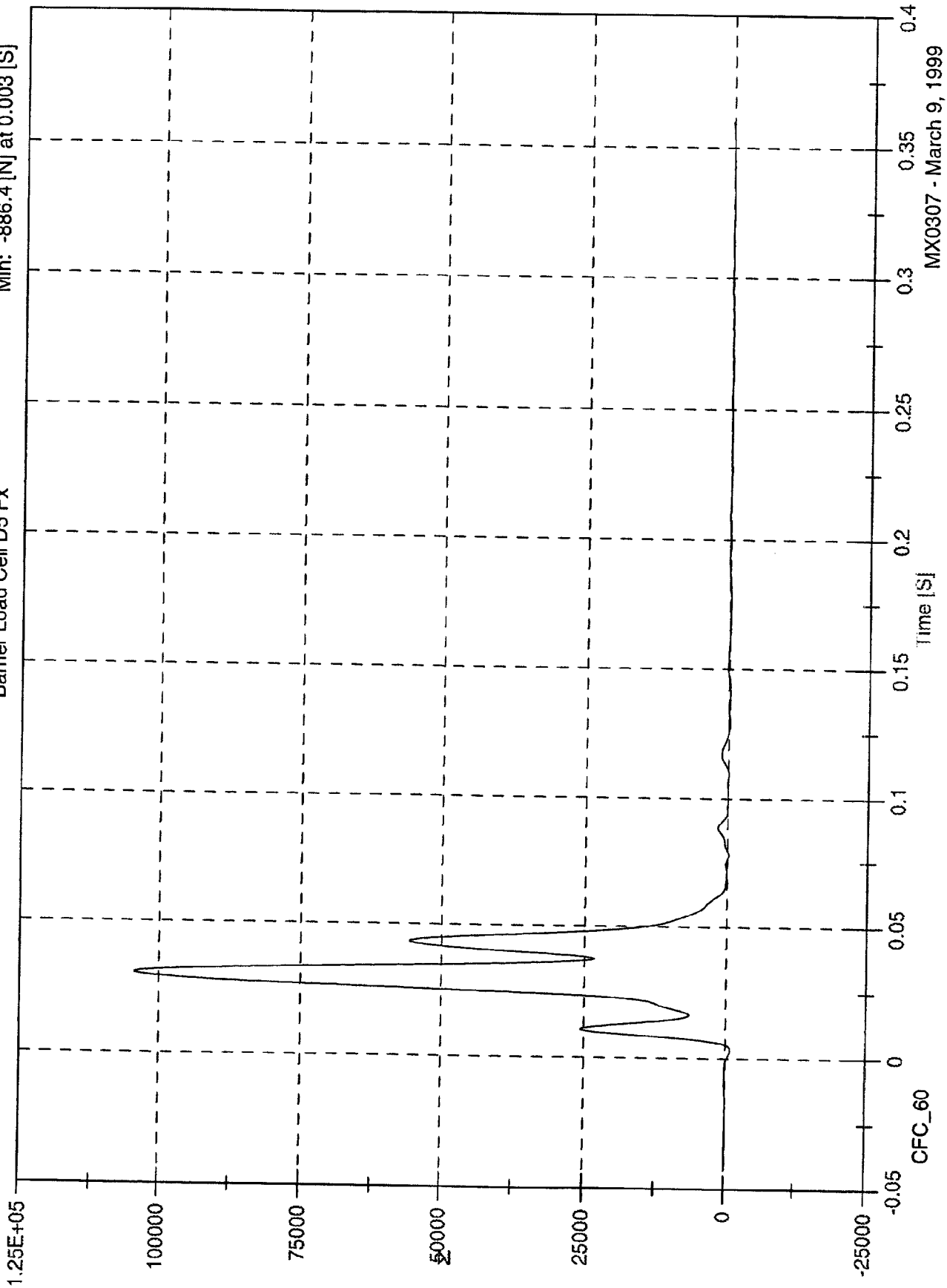




NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 104412.8 [N] at 0.030 [S]
 Min: -886.4 [N] at 0.003 [S]

Barrier Load Cell D5 Fx



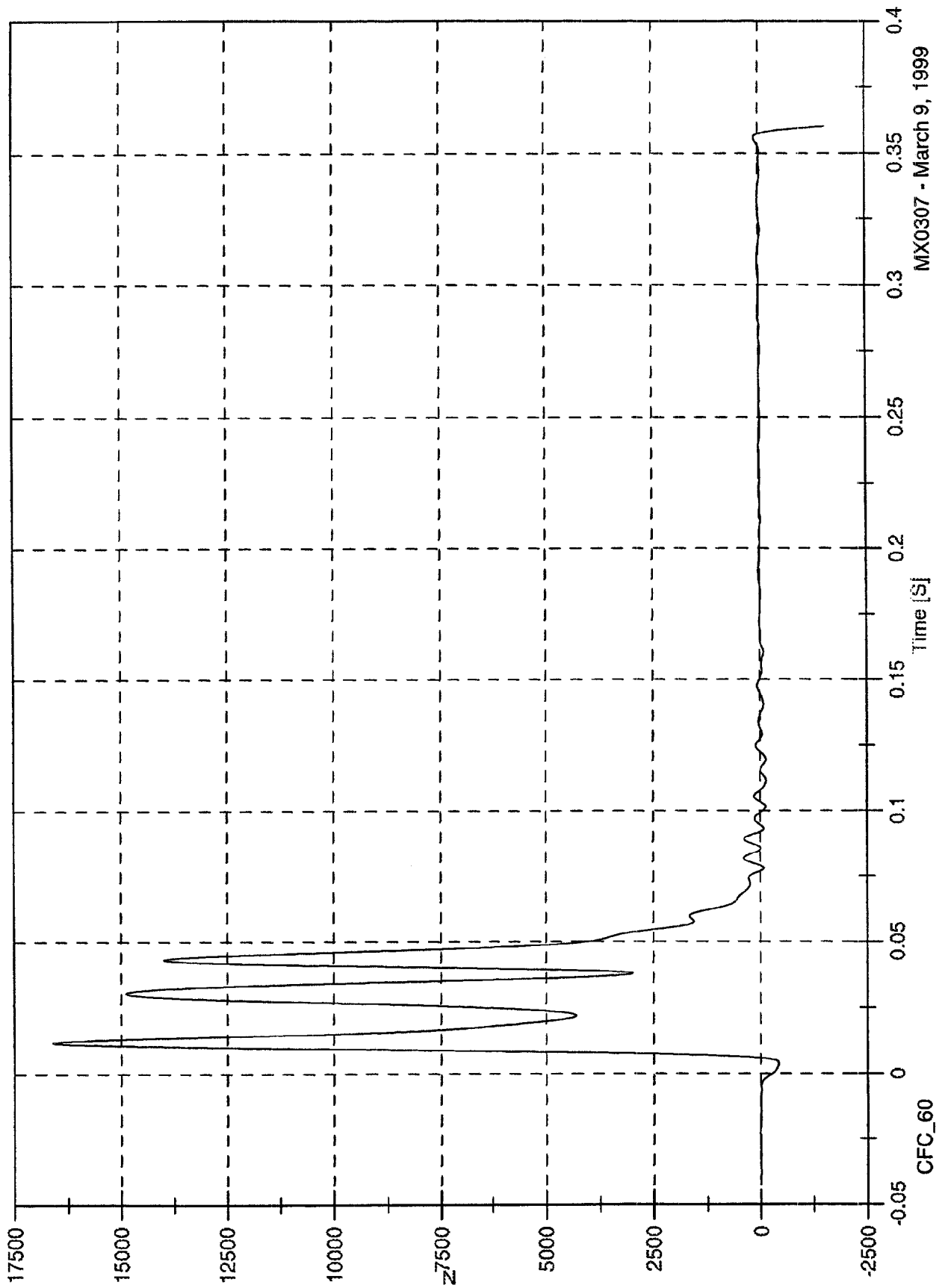
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 16608.7 [N] at 0.012 [S]

Min: -1561.5 [N] at 0.360 [S]

Barrier Load Cell D6 Fx

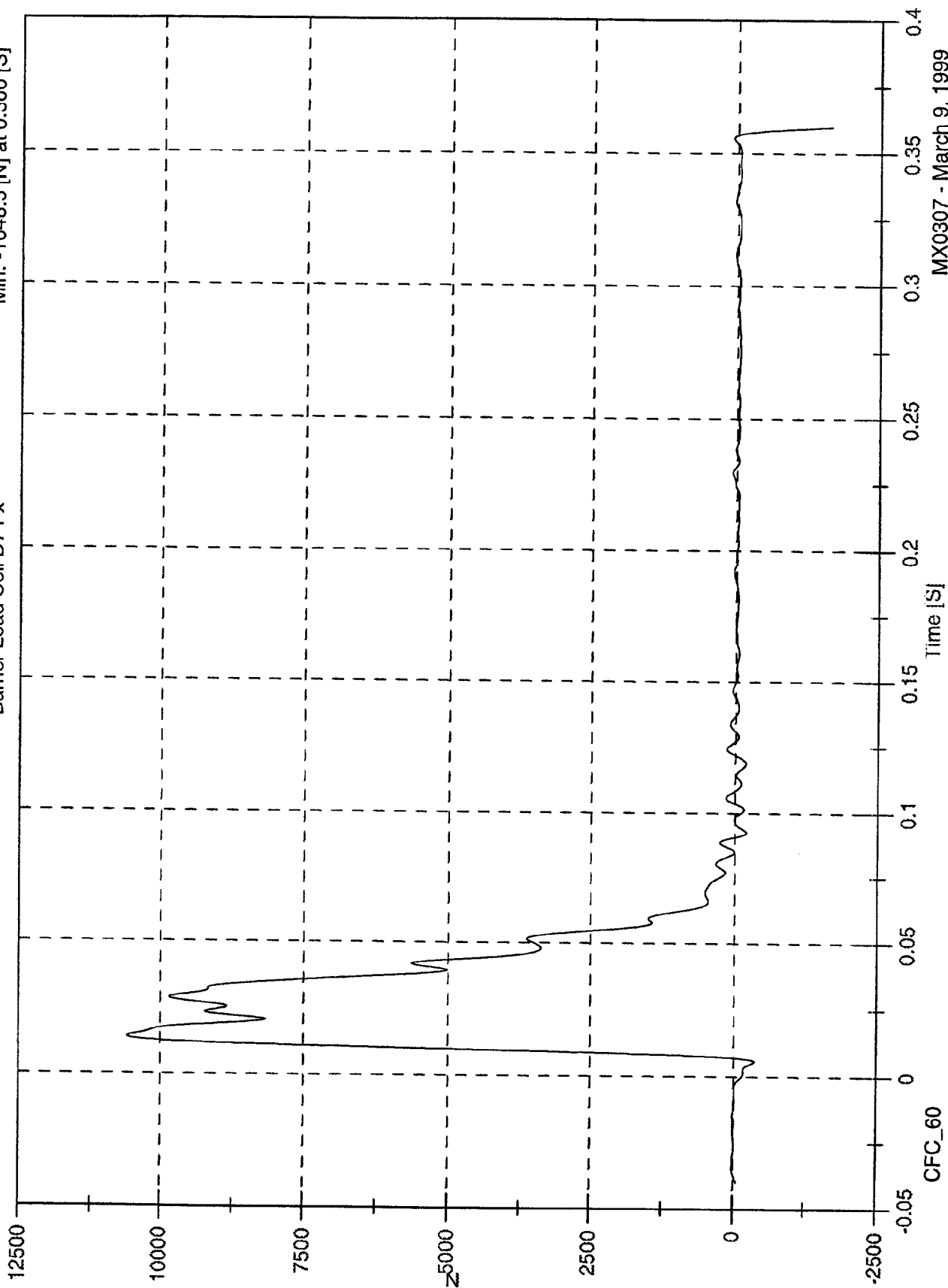


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Barrier Load Cell D7 Fx

Max: 10607.0 [N] at 0.014 [S]
Min: -1648.5 [N] at 0.360 [S]



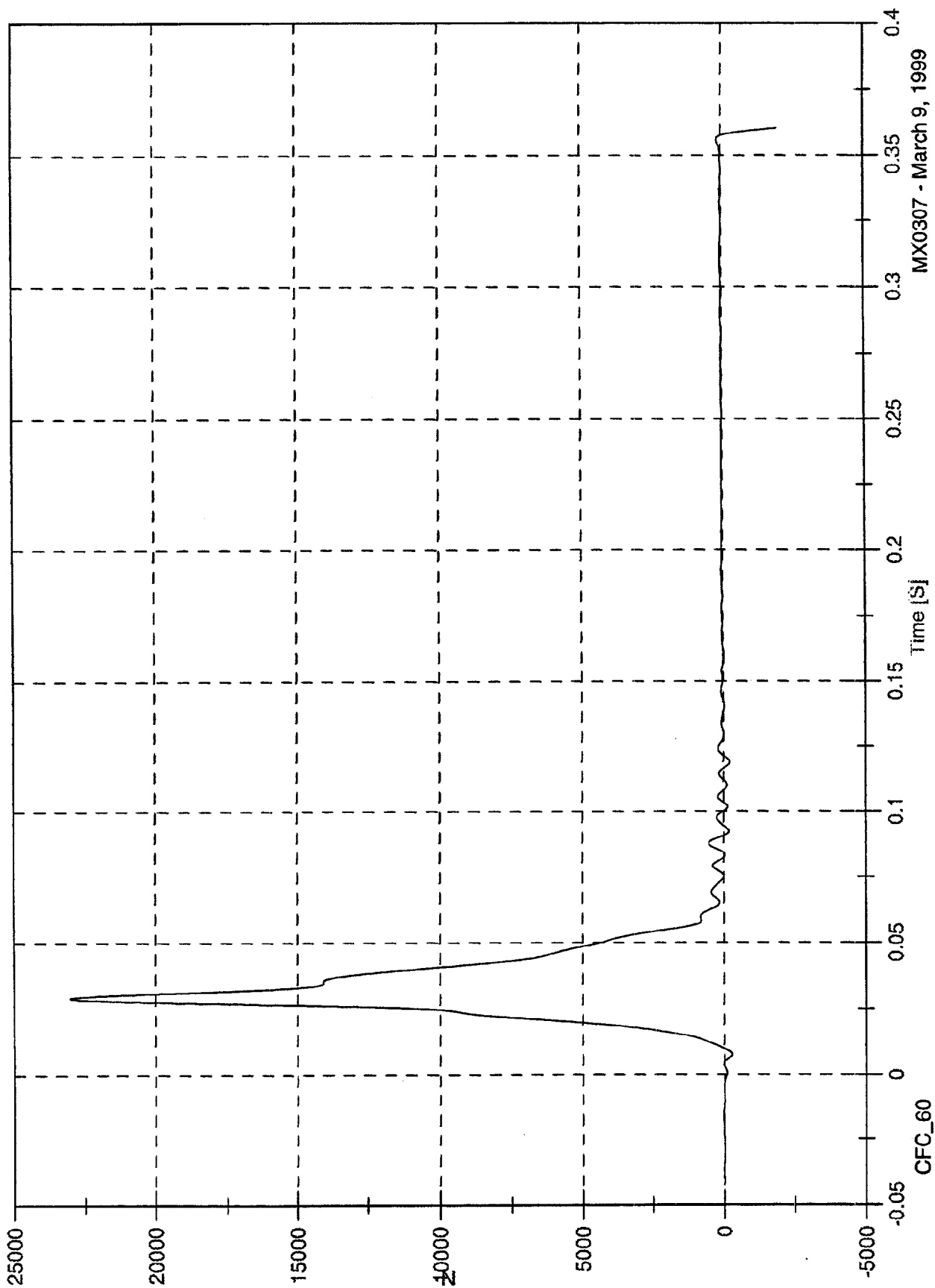
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 23040.6 [N] at 0.029 [S]

Min: -1973.3 [N] at 0.360 [S]

Barrier Load Cell D8 Fx



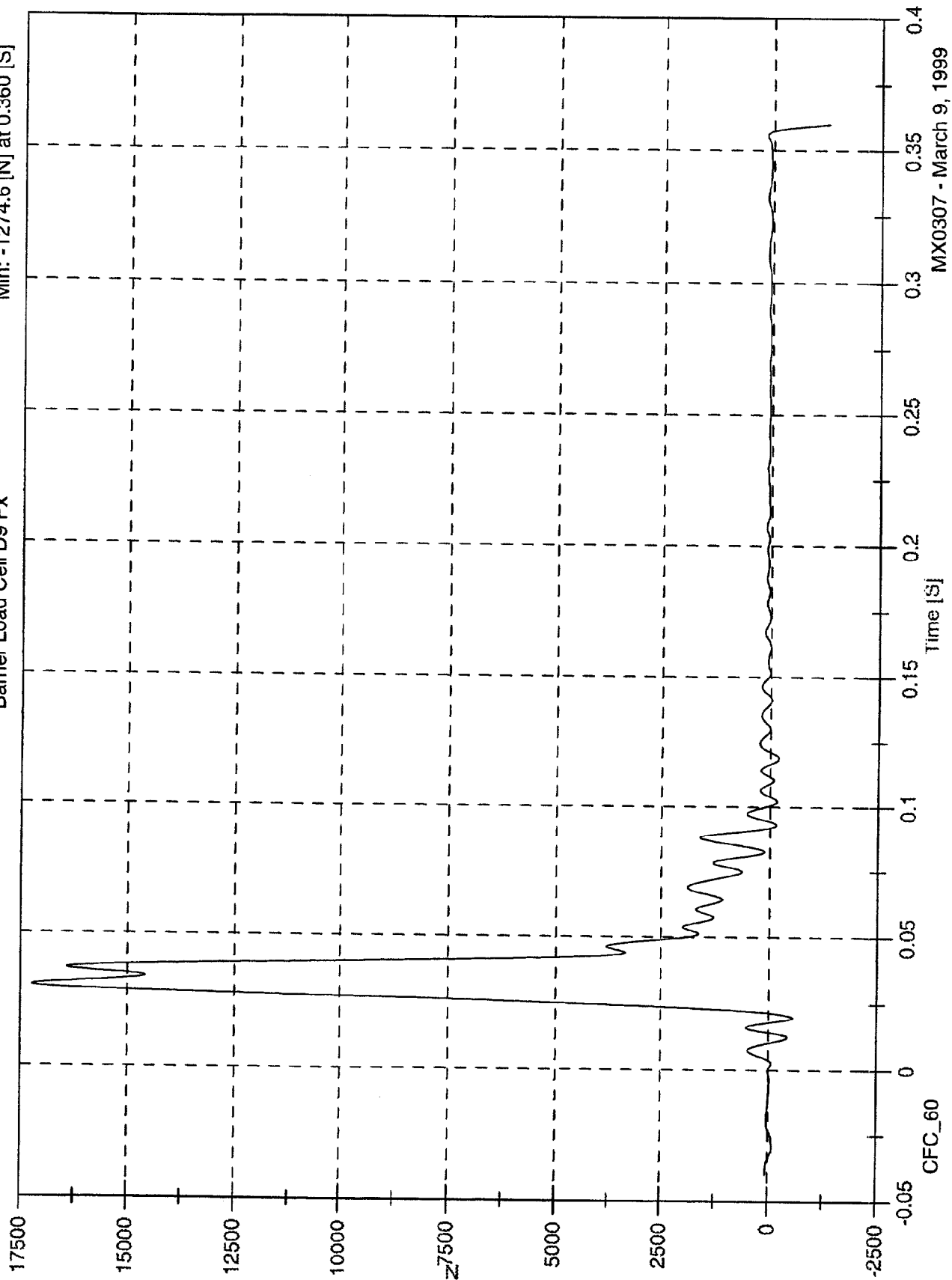
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 17225.1 [N] at 0.030 [S]

Min: -1274.6 [N] at 0.360 [S]

Barrier Load Cell D9 Fx



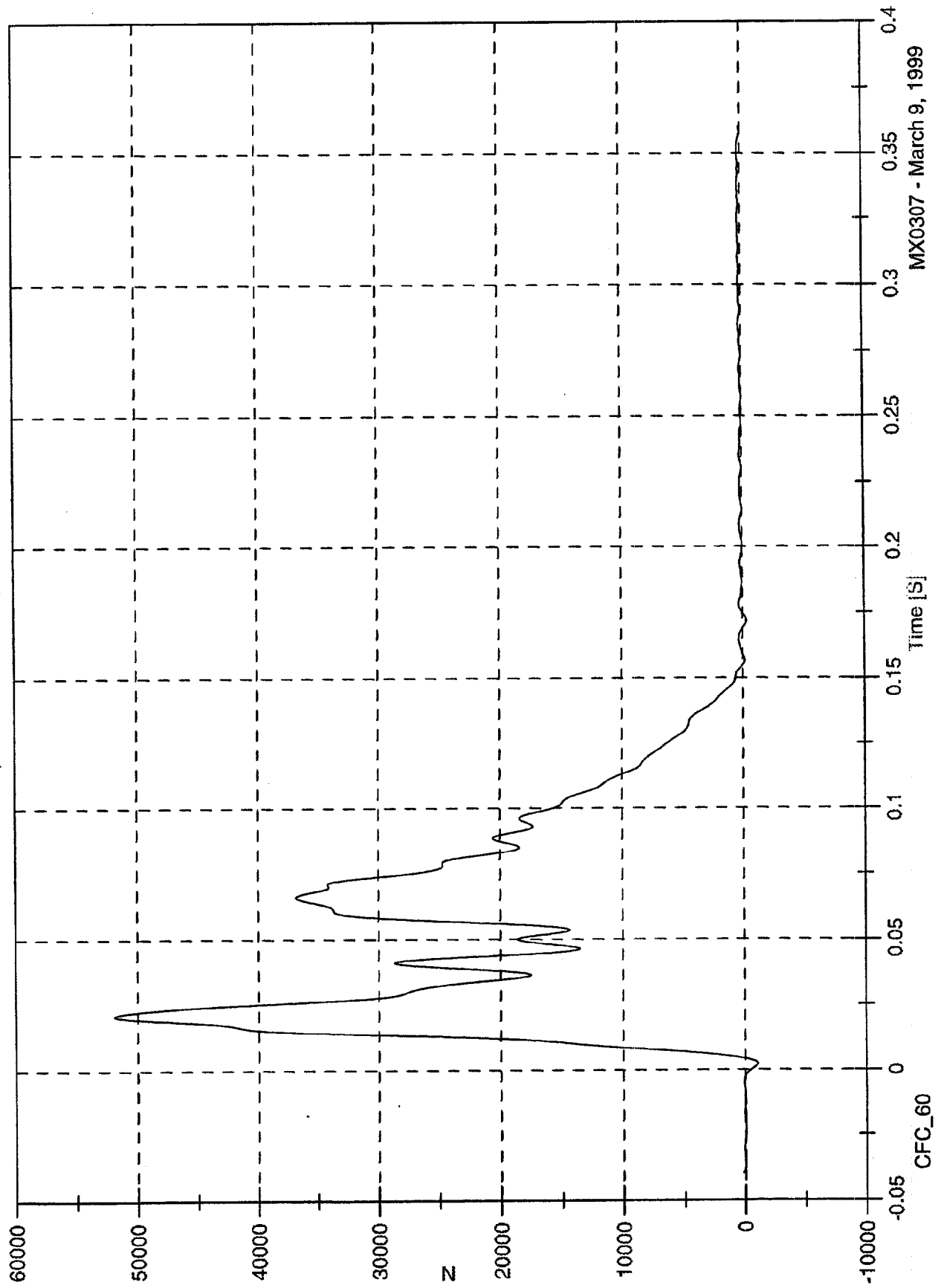
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Group 1 Load Cell Sum (A1,A2,A3,B1,B2,B3)

Max: 51899.8 [N] at 0.021 [S]

Min: -1042.3 [N] at 0.002 [S]

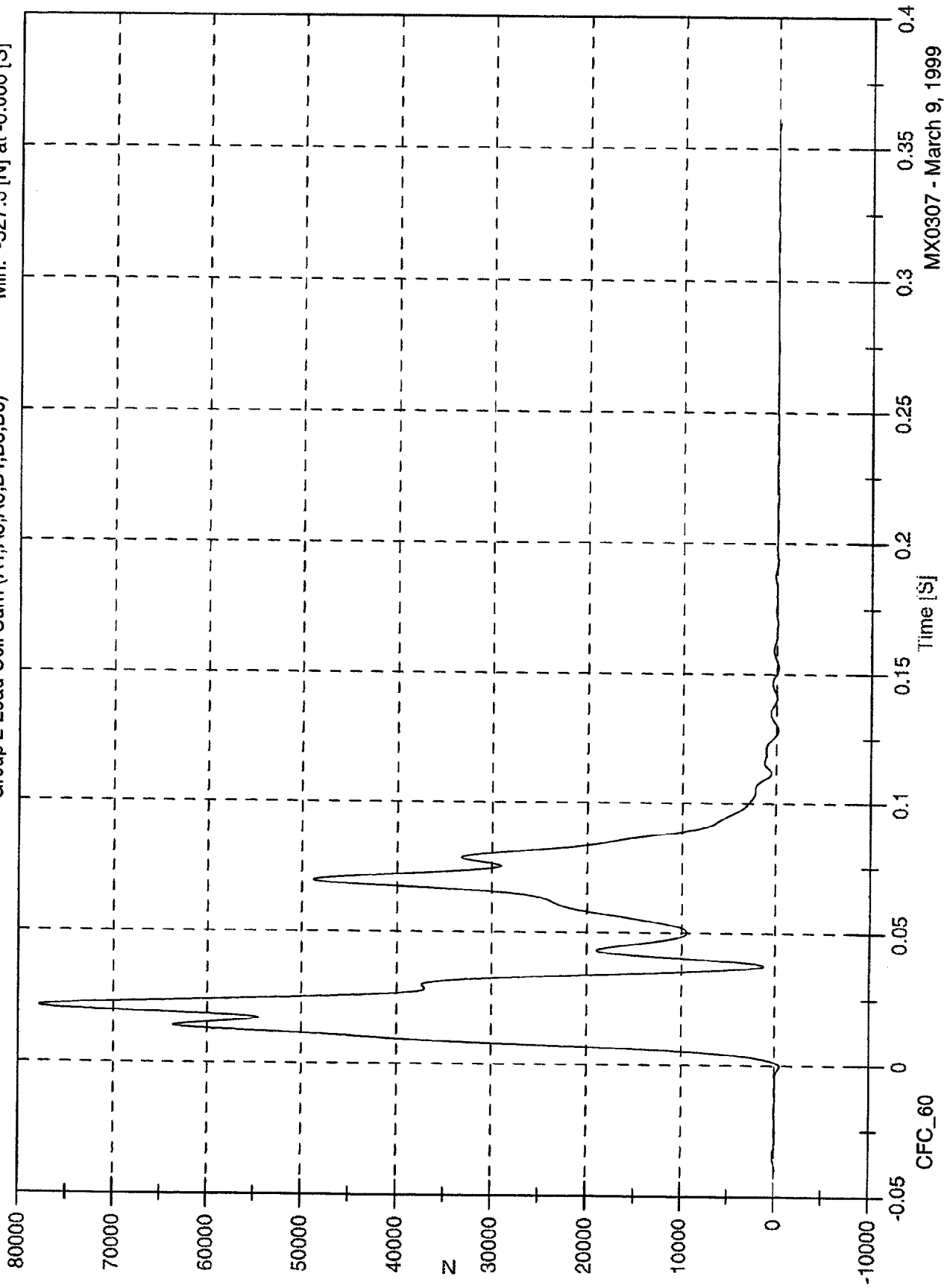


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 77794.5 [N] at 0.021 [S]
 Min: -527.3 [N] at -0.000 [S]

Group 2 Load Cell Sum (A4,A5,A6,B4,B5,B6)

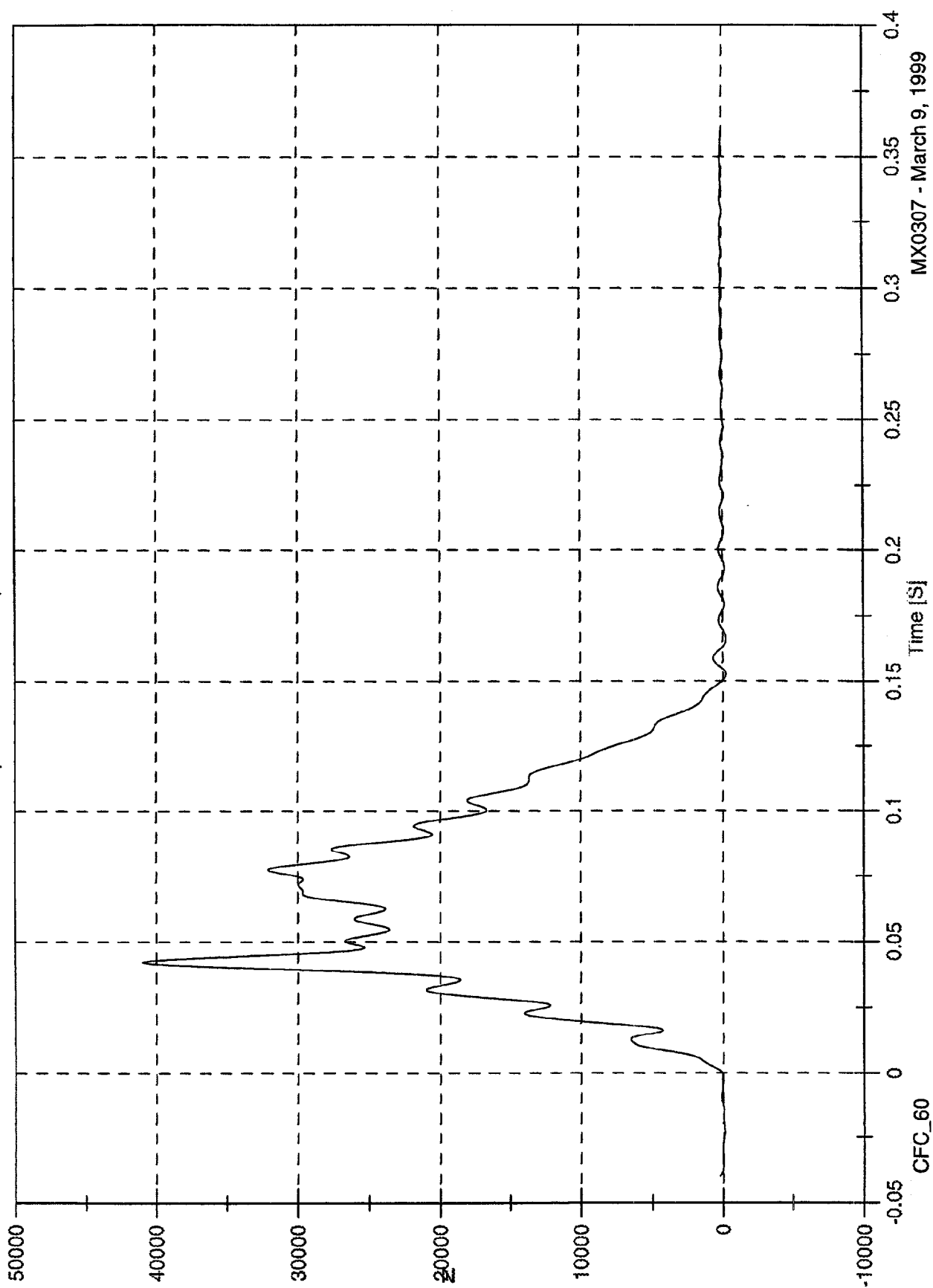


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 40937.9 [N] at 0.042 [S]
 Min: -271.4 [N] at 0.166 [S]

Group 3 Load Cell Sum (A7,A8,A9,B7,B8,B9)

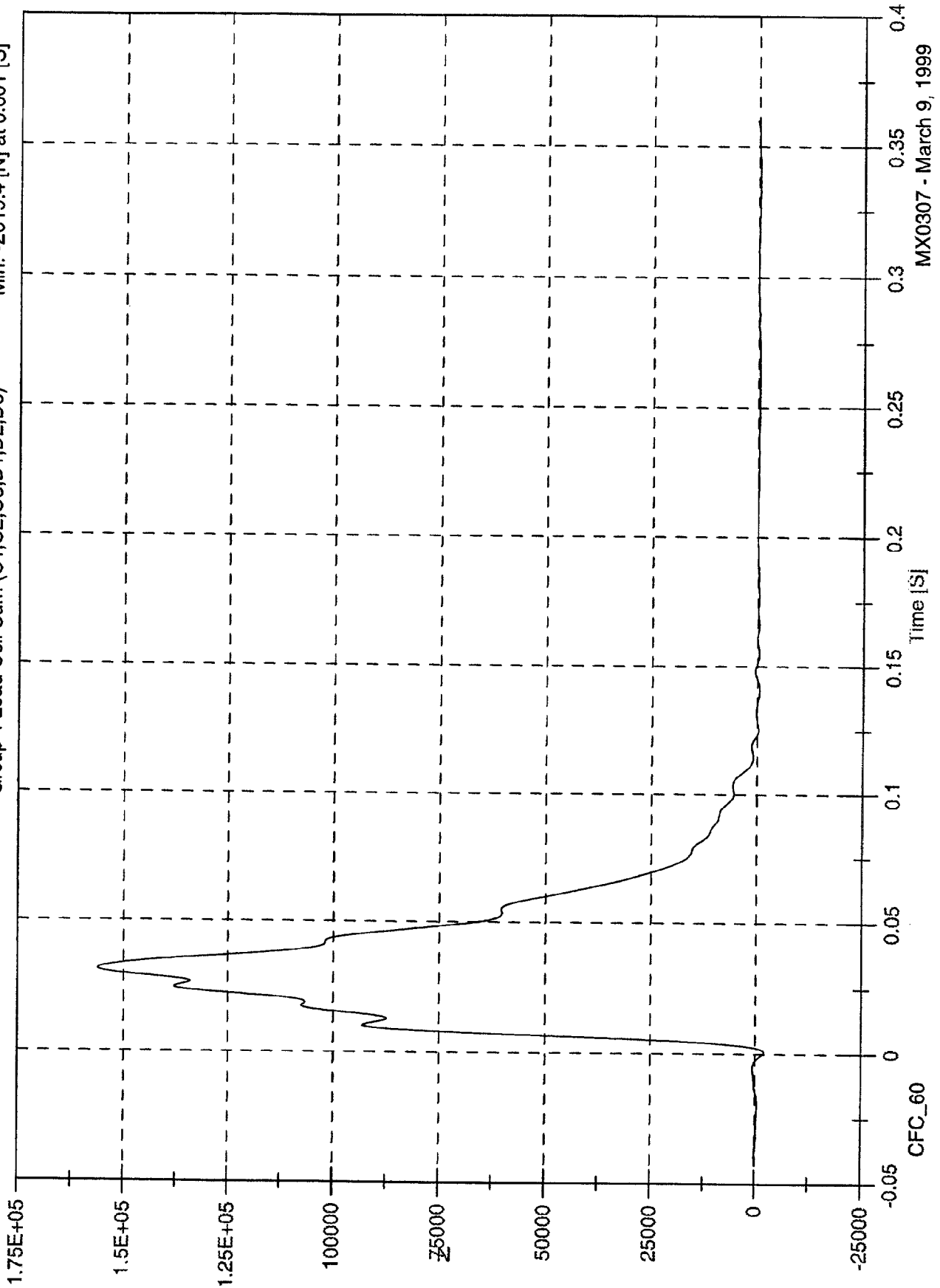


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Group 4 Load Cell Sum (C1,C2,C3,D1,D2,D3)

Max: 156182.7 [N] at 0.031 [S]
Min: -2019.4 [N] at 0.001 [S]



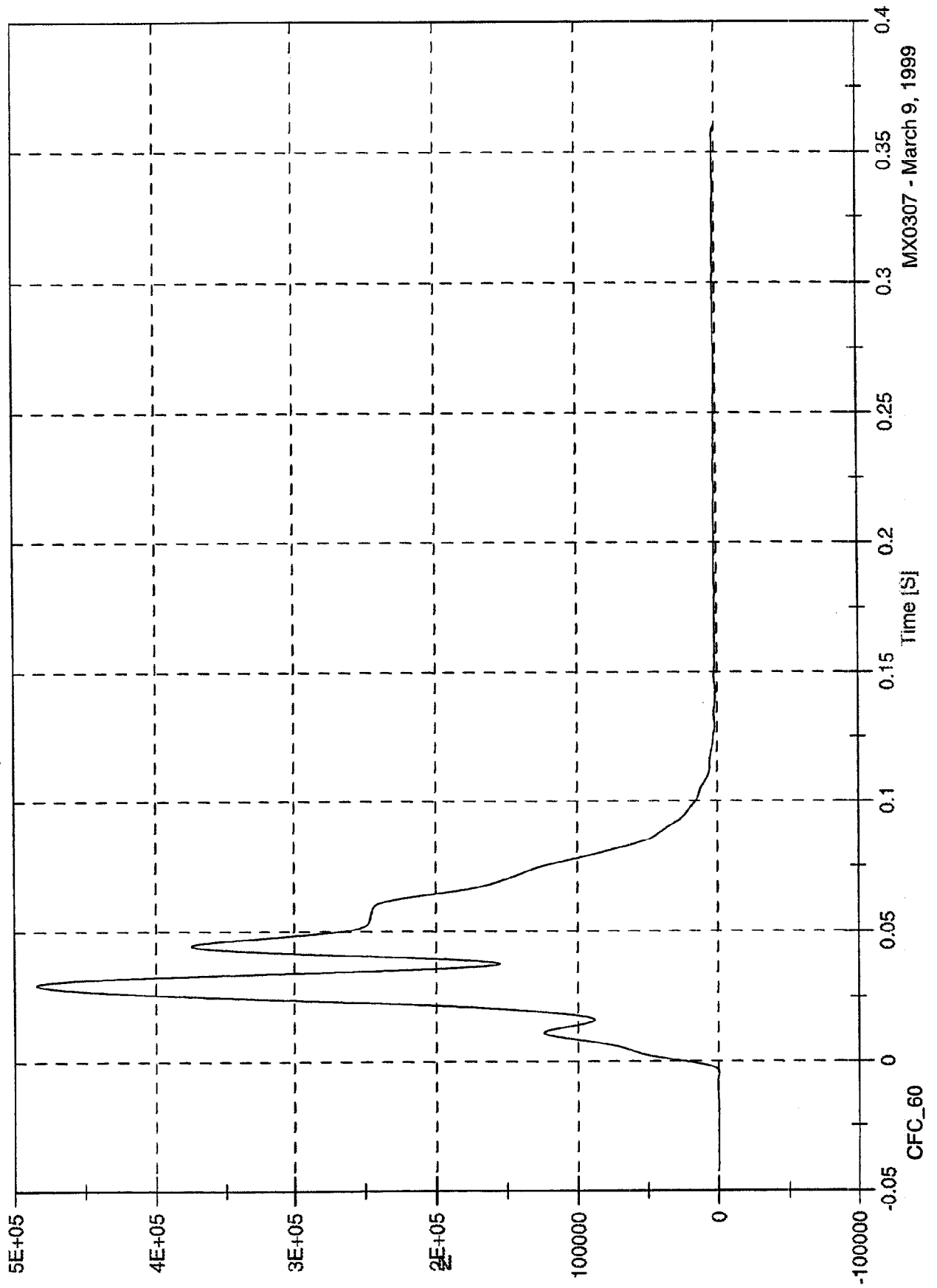
MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Group 5 Load Cell Sum (C4,C5,C6,D4,D5,D6)

Max: 484121.7 [N] at 0.030 [S]

Min: -785.2 [N] at -0.005 [S]

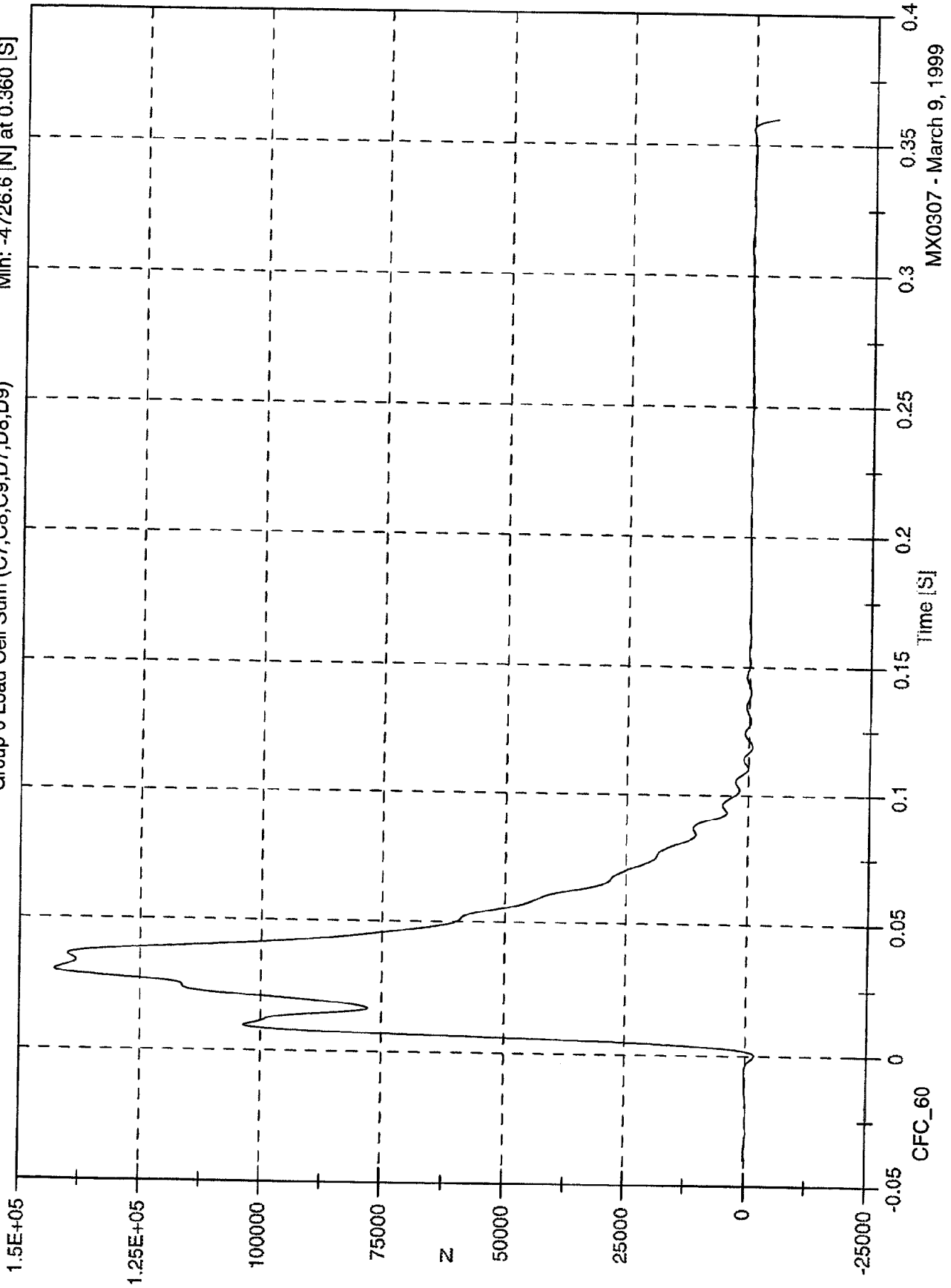


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 142641.0 [N] at 0.030 [S]
 Min: -4726.6 [N] at 0.360 [S]

Group 6 Load Cell Sum (C7,C8,C9,D7,D8,D9)

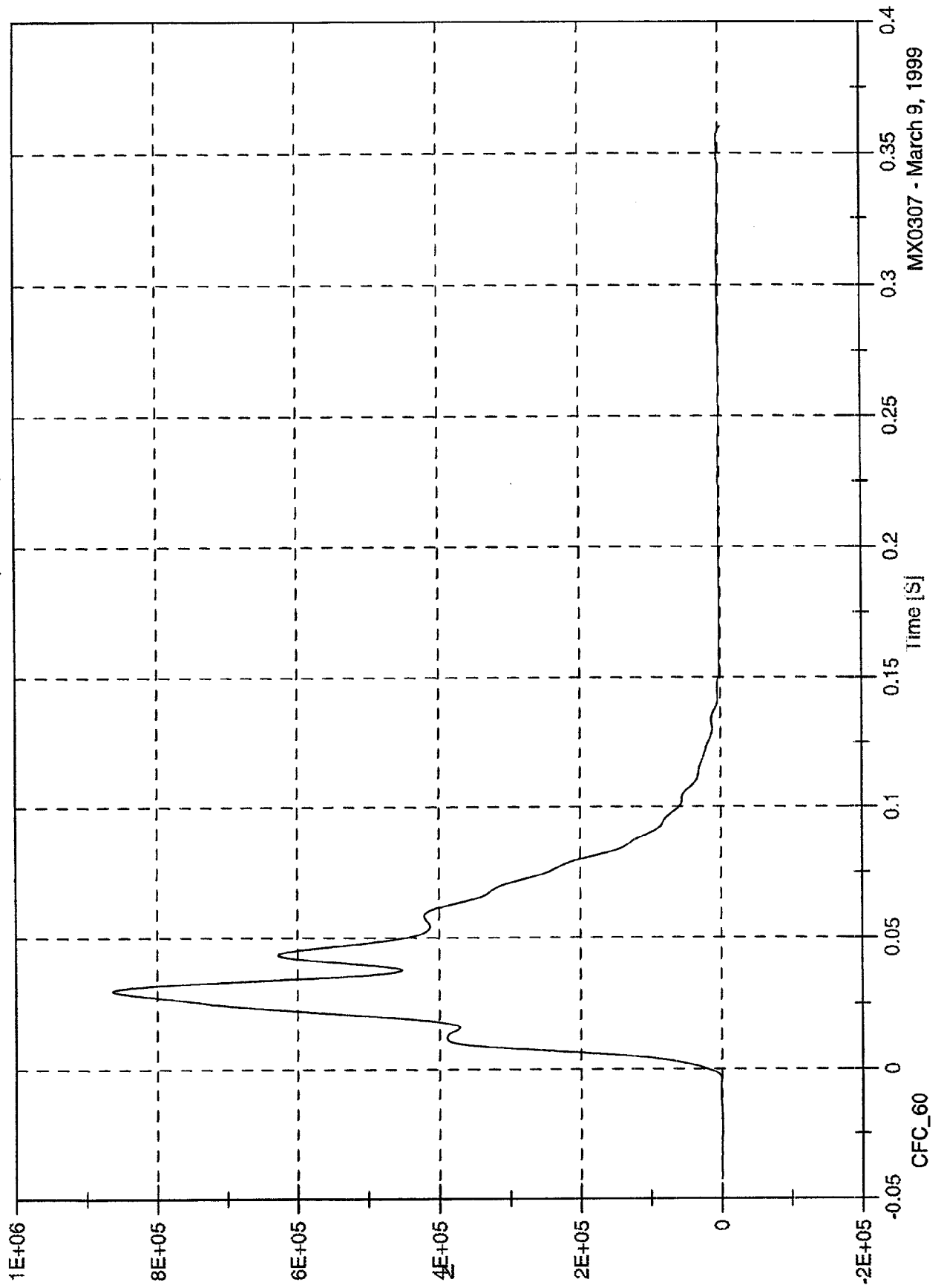


MX0307 - March 9, 1999

NCAP Test #13- 1999 Jeep Grand Cherokee

Max: 863459.5 [N] at 0.030 [S]
Min: -4328.3 [N] at 0.360 [S]

Total Load Cell Sum (All 6 Groups)



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Appendix C
PART 572B/E DUMMY CONFIGURATION
AND PERFORMANCE VERIFICATION DATA SHEETS

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of Calspan Corporation. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

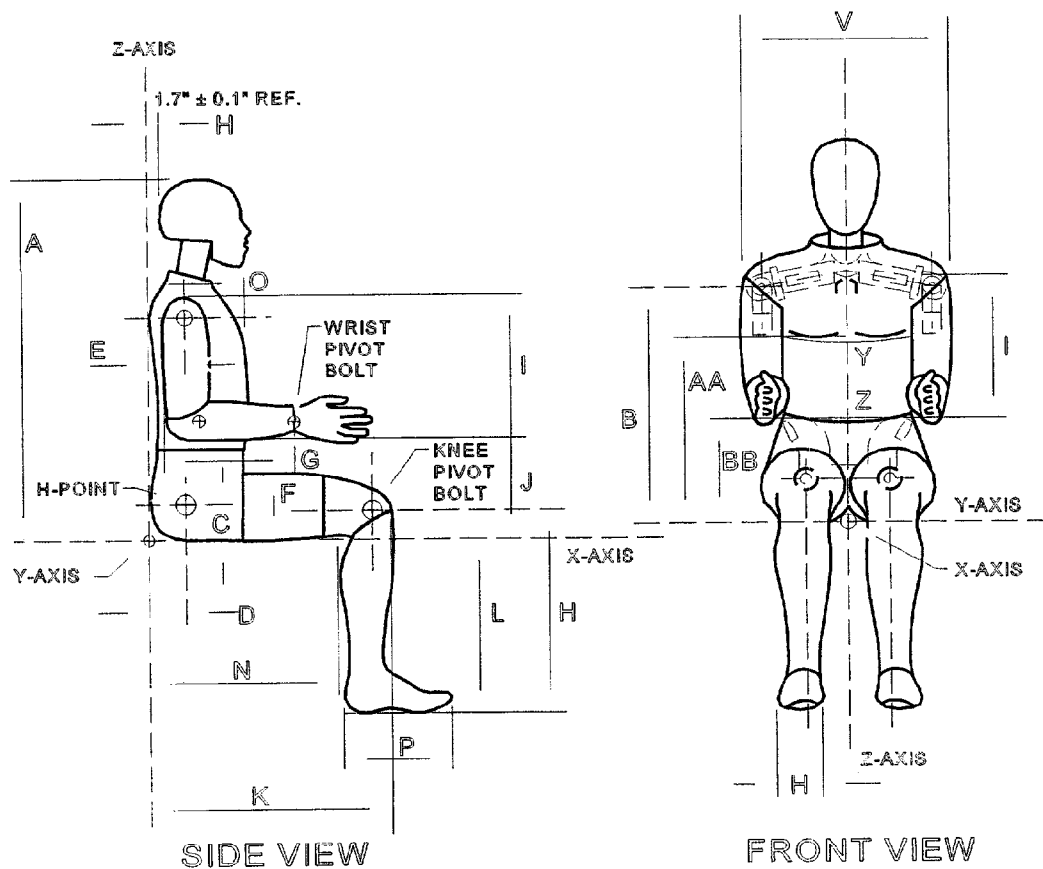
<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	064	02/09/99
#2/Right Front Passenger	061	03/04/99

Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Inducant Testing Final Report No. 6525-V-1.

DUMMY CONFIGURATION DIMENSIONS

EXTERNAL DIMENSIONS SPECIFICATIONS



NOTE: Figure is referenced to the erect seated position. The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude.
(REF: S572.31(A)(6))

PART 572E
HEAD DROP TEST

Dummy Serial Number 064
Calspan Sequential Test Number 2
Date 02/03/99
Workfile 064299.hdp

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70
Relative Humidity	10% - 70%	25
Peak Resultant Acceleration	225-275 G's	234.0
Peak Lateral Acceleration	15 G's Max	13.3
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number 064
Calspan Sequential Test Number 2
Date 02/09/99
Workfile 064299.nfl

6 Axis Neck Transducer

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	24
Impact Velocity		22.60 - 23.40 Ft/s	23.32
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	25.29
	20 ms	17.60 - 22.60 G's	21.04
	30 ms	12.50 - 18.50 G's	12.63
Max Pendulum G's Above 30 ms		29 G's Max	12.63
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	41.25
D Plane Rotation	Max	64 - 78 Deg	75.71
	Time	57 - 64 ms	57.00
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	79.77
	Time	47 - 58 ms	55.00
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	126.38
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	98.88

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number 064
 Calspan Sequential Test Number 2
 Date 02/09/99
 Workfile 064299.nex

6 Axis Neck Transducer

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	24
Impact Velocity		19.50 - 20.30 Ft/s	20.14
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.38
	20 ms	14.00 - 19.00 G's	16.60
	30 ms	11.00 - 16.00 G's	13.62
Max Pendulum G's Above 30 ms		22 G's Max	13.62
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	44.88
D Plane Rotation	Max	81 - 106 Deg	97.32
	Time	72 - 82 ms	72.25
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-58.37
	Time	65 - 79 ms	67.75
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	147.13
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	137.75

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 064
Calspan Sequential Test Number 2
Date 02/09/99
Workfile 064299.th3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70
Relative Humidity	10% - 70%	24
Pendulum Velocity	21.6 - 22.4 Ft/s	21.65
Maximum Deflection	2.50 - 2.86 in	2.51
Maximum Resistive Force	1160 - 1325 Lbs	1186.34
Internal Hysteresis	69 - 85 %	80.7

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 064
Calspan Sequential Test Number 2
Date 02/09/99
Workfile 064299

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	71
Relative Humidity	10% - 70%	20
Probe Velocity	6.8 - 7.0 Ft/s	6.90
Peak Knee Impact Force	1060 - 1300 Lbs	1238.0
RIGHT KNEE		
Temperature	66 - 78 Deg F	70
Relative Humidity	10% - 70%	20
Probe Velocity	6.8 - 7.0 Ft/s	6.98
Peak Knee Impact Force	1060 - 1300 Lbs	1204.0

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 064
Calspan Sequential Test Number 2
Date 02/09/99

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			24
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	38.8
Waist Circumference	Z	32.9 - 34.1 in	33.2
Chest Depth	O	8.4 - 9.0 in	8.6
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.8
Thigh Clearance	F	5.5 - 6.1 in	6.0
Buttock Knee Length	K	22.8 - 23.8 in	23.6
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.3
Knee Pivot Height	M	19.1 - 19.7 in	19.4
Foot Length	P	9.9 - 10.5 in	10.1
Foot Breadth	W	3.6 - 4.2 in	3.8
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.6
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.4
Elbow Rest Height	J	7.5 - 8.3 in	8.0
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.3
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
HEAD DROP TEST

Dummy Serial Number 061
Calspan Sequential Test Number 3
Date 02/03/99
Workfile 061399.hdp

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70
Relative Humidity	10% - 70%	25
Peak Resultant Acceleration	225-275 G's	235.7
Peak Lateral Acceleration	15 G's Max	11.9
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician: B. Swiecicki

**PART 572E
NECK FLEXION TEST**

Dummy Serial Number 061
 Calspan Sequential Test Number 3
 Date 02/09/99
 Workfile 061399.nfl

6 Axis Neck Transducer

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	18
Impact Velocity		22.60 - 23.40 Ft/s	23.13
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	25.45
	20 ms	17.60 - 22.60 G's	21.43
	30 ms	12.50 - 18.50 G's	15.50
Max Pendulum G's Above 30 ms		29 G's Max	15.50
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	38.00
D Plane Rotation	Max	64 - 78 Deg	75.53
	Time	57 - 64 ms	61.50
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	74.25
	Time	47 - 58 ms	53.25
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	121.50
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	101.75

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number 061
 Calspan Sequential Test Number 3
 Date 02/09/99
 Workfile 061399.nex

6 Axis Neck Transducer

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	18
Impact Velocity		19.50 - 20.30 Ft/s	20.14
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.07
	20 ms	14.00 - 19.00 G's	15.89
	30 ms	11.00 - 16.00 G's	13.58
Max Pendulum G's Above 30 ms		22 G's Max	13.58
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	46.00
D Plane Rotation	Max	81 - 106 Deg	86.05
	Time	72 - 82 ms	74.75
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-55.20
	Time	65 - 79 ms	66.13
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	148.88
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	139.88

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 061
Calspan Sequential Test Number 3
Date 02/09/99
Workfile 061399.th3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70
Relative Humidity	10% - 70%	20
Pendulum Velocity	21.6 - 22.4 Ft/s	22.00
Maximum Deflection	2.50 - 2.86 in	2.51
Maximum Resistive Force	1160 - 1325 Lbs	1180.94
Internal Hysteresis	69 - 85 %	77.9

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 061
Calspan Sequential Test Number 3
Date 02/12/99
Workfile 061399

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	70
Relative Humidity	10% - 70%	22
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1293.0
RIGHT KNEE		
Temperature	66 - 78 Deg F	70
Relative Humidity	10% - 70%	22
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1241.0

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 061
Calspan Sequential Test Number 3
Date 03/04/99

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			15
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.2
Waist Circumference	Z	32.9 - 34.1 in	33.5
Chest Depth	O	8.4 - 9.0 in	8.4
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.8
Thigh Clearance	F	5.5 - 6.1 in	6.1
Buttock Knee Length	K	22.8 - 23.8 in	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.7
Knee Pivot Height	M	19.1 - 19.7 in	19.4
Foot Length	P	9.9 - 10.5 in	10.1
Foot Breadth	W	3.6 - 4.2 in	3.8
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.5
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.1
Elbow Rest Height	J	7.5 - 8.3 in	7.7
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.4
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6

Remarks:

Laboratory Technician: B. Swiecicki

Appendix D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY (S/N 064)	Serial #	Manufacturer	Calibration	
			Last	Next
Head X	AD4A9	ENDEVCO	11/98	5/99
Y	AE8T7	ENDEVCO	11/98	5/99
Z	AF5R1	ENDEVCO	11/98	5/99
Chest X	A08A	ENDEVCO	11/98	5/99
Y	ADL42	ENDEVCO	11/98	5/99
Z	A28F	ENDEVCO	11/98	5/99
Right Femur Load Cell	659	GSE	9/98	3/99
Left Femur Load Cell	658	GSE	9/98	3/99
Neck Load Cell X	440	DENTON	9/98	3/99
Y	440	DENTON	9/98	3/99
Z	440	DENTON	9/98	3/99
Neck Moment X	440	DENTON	9/98	3/99
Y	440	DENTON	9/98	3/99
Z	440	DENTON	9/98	3/99
Chest Deflection Gauge	064	HUMANOID	10/98	4/99
Hybrid III Use Only				
Lap Belt Load Cells	706	LEBOW	9/98	3/99
Shoulder Belt Load Cells	707	LEBOW	9/98	3/99
Spool-Out Potentiometer	M11	MAGNETEK	10/98	4/99
Belt Stretch Transducer	E5	CALSPAN	10/98	4/99

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY	Serial #	Manufacturer	Calibration	
			Last	Next
Head				
X (R)	A13924	ENDEVCO	12/98	6/99
Y (R)	A13827	ENDEVCO	11/98	5/99
Z (R)	A13921	ENDEVCO	11/98	5/99
Chest				
X (R)	A14077	ENDEVCO	11/98	5/99
Y (R)	A13882	ENDEVCO	11/98	5/99
Z (R)	ACCW0	ENDEVCO	11/98	5/99
Pelvic				
X	AF480	ENDEVCO	12/98	6/99
Y	AC2M6	ENDEVCO	12/98	6/99
Z	AF5C1	ENDEVCO	12/98	6/99
Left Upper Tibia				
Mx	016	DENTON	9/98	3/99
My	016	DENTON	9/98	3/99
Left Lower Tibia				
Fz	123	DENTON	3/99	9/99
Mx	123	DENTON	3/99	9/99
My	123	DENTON	3/99	9/99
Right Upper Tibia				
Mx	015	DENTON	3/99	9/99
My	015	DENTON	3/99	9/99
Right Lower Tibia				
Fz	122	DENTON	3/99	9/99
Mx	122	DENTON	3/99	9/99
My	122	DENTON	3/99	9/99

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY	Serial #	Manufacture	Calibration	
			Last	Next
Left Foot Front Z	A14307	ENDEVCO	12/98	6/99
Left Foot Rear X	A14510	ENDEVCO	12/98	6/99
Left Foot Rear Z	A14383	ENDEVCO	12/98	6/99
Right Foot Front Z	A14485	ENDEVCO	12/98	6/99
Right Foot Rear X	A14321	ENDEVCO	12/98	6/99
Right Foot Rear Z	A14381	ENDEVCO	12/98	12/98

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY (S/N 061)	Serial #	Manufacturer	Calibration	
			Last	Next
Head				
X	AL553	ENDEVCO	3/99	9/99
Y	A83G	ENDEVCO	12/98	6/99
Z	C14901	ENDEVCO	3/99	9/99
Chest				
X	A26A	ENDEVCO	3/99	9/99
Y	FP90	ENDEVCO	12/98	6/99
Z	AL6H7	ENDEVCO	12/98	6/99
Right Femur Load Cell	955	GSE	9/98	3/99
Left Femur Load Cell	954	GSE	9/98	3/99
Neck Load Cell	205	DENTON	9/98	3/99
X	205	DENTON	9/98	3/99
Y	205	DENTON	9/98	3/99
Z	205	DENTON	9/98	3/99
Neck Moment	205	DENTON	9/98	3/99
X	205	DENTON	9/98	3/99
Y	205	DENTON	9/98	3/99
Z	205	DENTON	9/98	3/99
Chest Deflection Gauge	061	HUMANOID	10/98	4/99
Hybrid III Use Only				
Lap Belt Load Cells	711	LEBOW	9/98	3/99
Shoulder Belt Load Cells	712	LEBOW	9/98	3/99
Spool-Out Potentiometer	M0	MAGNETEK	10/98	4/99
Belt Stretch Transducer	E6	CALSPAN	10/98	4/99

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY	Serial #	Manufacturer	Calibration	
			Last	Next
Head				
X (R)	APBF4	ENDEVCO	10/98	4/99
Y (R)	APBD9	ENDEVCO	10/98	4/99
Z (R)	APIA2	ENDEVCO	10/98	4/99
Chest				
X (R)	B11407	ENDEVCO	12/98	6/99
Y (R)	B11408	ENDEVCO	9/98	3/99
Z (R)	B10827	ENDEVCO	3/99	9/99
Pelvic				
X	ADMB8	ENDEVCO	10/98	4/99
Y	ADL44	ENDEVCO	10/98	4/99
Z	ACT12	ENDEVCO	10/98	4/99
Left Upper Tibia				
Mx	045	DENTON	3/99	9/99
Left Upper Tibia				
My	045	DENTON	3/99	9/99
Left Lower Tibia				
Fz	125	DENTON	3/99	9/99
Left Lower Tibia				
Mx	125	DENTON	3/99	9/99
Left Lower Tibia				
My	125	DENTON	3/99	9/99
Right Upper Tibia				
Mx	038	DENTON	3/99	9/99
Right Upper Tibia				
My	038	DENTON	3/99	9/99
Right Lower Tibia				
Fz	124	DENTON	3/99	9/99
Right Lower Tibia				
Mx	124	DENTON	3/99	9/99
Right Lower Tibia				
My	124	DENTON	3/99	9/99

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY	Serial #	Manufacture	Calibration	
			Last	Next
Left Foot Front Z	A14239	ENDEVCO	12/98	6/99
Left Foot Rear X	A14488	ENDEVCO	12/98	6/99
Left Foot Rear Z	A14306	ENDEVCO	12/98	6/99
Right Foot Front Z	A14484	ENDEVCO	12/98	6/99
Right Foot Rear X	A14481	ENDEVCO	12/98	6/99
Right Foot Rear Z	A14433	ENDEVCO	12/98	6/99

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS

(6 Month Calibration Minimum)

	Serial #	Manufacturer	Calibration	
			Last	Next
Left Seat Rear Crossmember	D57	ICS	2/99	8/99
Right Rear Seat Crossmember	X26	ICS	2/99	8/99
Top of Engine	D71	ICS	2/99	8/99
Bottom of Engine	A171	ICS	2/99	8/99
Left Disc Brake Caliper	A183	CEC	1/99	7/99
Right Disc Brake Caliper	A175	CEC	11/98	5/99
Instrument Panel	D53	ICS	3/99	9/99
Left Seat Rear Crossmember (R)	H20	ENTRAN	3/99	9/99
Right Seat Rear Crossmember (R)	X86	ICS	3/99	9/99