

V2996

REPORT NUMBER: CAL-99-1

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

**TOYOTA MOTOR CORPORATION
1999 TOYOTA 4-RUNNER
4-DOOR MPV**

NHTSA NUMBER: MX5100

CALSPAN TEST NUMBER: 8413-25

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



November 24, 1998

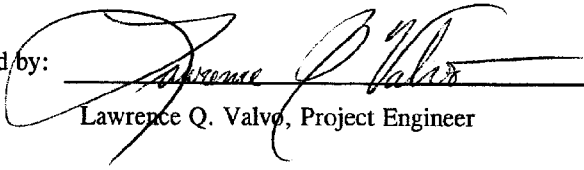
FINAL REPORT

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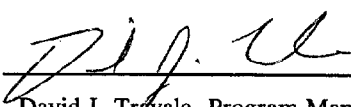
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National Highway Traffic Safety Administration
Safety Performance Standards
Office of Crashworthiness Standards
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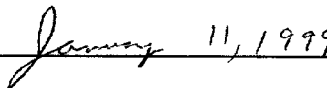
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January 11, 1999

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

Date of Report Acceptance

COTR, New Car Assessment Program (NCAP)
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16. <i>Abstract</i> A frontal load cell barrier test of a 1999 Toyota 4-Runner 4-Door MPV was performed at Calspan Corporation crash test facility in Buffalo, New York, on November 24, 1998. The impact velocity was 56.5 kph and the temperature at the barrier face was 21.5°C. The maximum post-test vehicle crush was 614 mm. The test vehicle was equipped with a 3-point seat belt system with belt pretensioners and supplemental second generation airbags at both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appear comply with the head, chest, and femur requirements.			
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Section 1

PURPOSE AND SUMMARY OF TEST MX5100

PURPOSE

This 56.5 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 56.5 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

SUMMARY

A barrier was impacted by a 1999 Toyota 4-Runner 4-Door MPV at a velocity of 56.5 kph. The test was performed at the Calspan Corporation on November 24, 1998. 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. The driver (position 1) ATD (Serial No. 245) and the right-front passenger (position 2) ATD (Serial No. 150) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 89 channels of data were recorded on a P.C. based data acquisition system. Appendix B contains the vehicle and dummy response data traces.

The driver's HIC was 693.1. The maximum chest deceleration over 3 milliseconds was 44.6 g's and maximum chest deflection was -37.0 mm. Femur loads were -3855.5 Newtons on the left and -3828.8 Newtons on the right.

The right front passenger's HIC was 437.6. Maximum chest deceleration over 3 milliseconds was 43.3 g's and maximum chest deflection was -40.2 mm. Femur loads were -4673.8 Newtons on the left and -2739.8 Newtons on the right.

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA

DATA SHEET NO. 1 CRASH TEST SUMMARY

Vehicle NHTSA No. : MX5100 Test Mode : 56 kph Frontal Barrier

Test Date : November 24, 1998 Time: 14:50 Temperature : 21.5 °C

Vehicle Make/Model/Body Style : 1999 Toyota 4-Runner 4-Door MPV

Vehicle Test Weight : 2070.0 kg

Vehicle/Barrier Impact Angle : 0 °

Impact Velocity : 56.5 kph

Maximum Static Crush : 614 mm

Vehicle Rebound : 280 mm

DUMMIES:

DRIVER

PASSENGER

Type :

572E

572E

Restraint System :

Airbag/3-point belt system
with pretensioner

Airbag/3-point belt system
with pretensioner

Number of Data Channels : 90

Number of Cameras : 1 Real Time

16 High Speed

DOOR OPENING DATA :

Closed/Operable - Left Front

Closed/Operable - Right Front

Front Seat(s) Data :

DRIVER

PASSENGER

Seat Track Failure :(mm of shift)

0

0

Seat Back Failure :

None

None

VISIBLE DUMMY CONTACT POINTS :

DRIVER

PASSENGER

Head :

Face to upper center of
airbag; Back of head to
center of head restraint

Face to upper center of airbag;
Back of head to inboard side of
head restraint

Abdomen :

None

None

Chest

Airbag

Airbag

Knees

Left knee to bolster left of
steering column; Right knee
to bolster right of steering
column

Left knee to left half of glove
compartment; Right knee to
right half of glove
compartment

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION :

Year/Make/Model/Body Style : 1999 Toyota 4-Runner 4-Door MPV
NHTSA No. : MX5100 ; VIN: JT3HM84R5X0030933 ; Color : Jade
Engine Data: 4 cylinders; - CID; 2.7 Liters; - cc
Placement : X Longitudinal or In-Line; - Transverse or Lateral
Transmission Data : 5 speeds; X Manual; - Automatic; - 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 : 11/10/98 ; Odometer Reading 27 km
Selling Dealer : Downing and Hall's Toyota
& Address: 6179 Transit Rd., Lockport, NY 14094

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by : Toyota Motor Corporation
Date of Manufacture 08/98
GVWR : 2381.4 kg; GAWR: 1202.0 kg FRONT; 1360.8 kg REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load : 303 kpa FRONT
303 kpa REAR
Recommended Tire Size : P225/75R15 or P265/70R16
* Recommended Cold Tire Pressure : 221 kpa FRONT; 221 kpa REAR
Size of Tires on Test Vehicle: P265/70R16 ; 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) = 592.4 kg
No. of Occupants x 68 kg = 340 kg
Rated Cargo/Luggage Weight (RCLW) = 252 kg **

* Tire pressure used for test

** Maximum of 136.1 kg used for target weight calculation.

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>466.5</u>	kg	Right Rear	=	<u>417.5</u>	kg
Left Front	=	<u>488.0</u>	kg	Left Rear	=	<u>417.0</u>	kg
TOTAL FRONT	=	<u>954.5</u>	kg	TOTAL REAR	=	<u>834.5</u>	kg
TOTAL DELIVERED WEIGHT = <u>1,789.0</u> kg							
% of Total Front of Vehicle Weight = <u>53.4</u> %				% of Total Rear Weight = <u>46.6</u> %			

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT :

Total Delivered Weight (UDW)	=	<u>1,789.0</u>	kg
Rated Cargo/Luggage Weight (RCLW)	=	<u>136.1</u>	kg
Weight of 2 p.572 Dummies @ 76 each	=	<u>152</u>	kg
TARGET TEST WEIGHT	=	<u>2,077.1</u>	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 129 KG OF CARGO WEIGHT:

Right Front	=	<u>490.0</u>	kg	Right Rear	=	<u>523.0</u>	kg
Left Front	=	<u>520.0</u>	kg	Left Rear	=	<u>537.0</u>	kg
TOTAL FRONT	=	<u>1,010.0</u>	kg	TOTAL REAR	=	<u>1,060.0</u>	kg
TOTAL TEST WEIGHT = <u>2,070.0</u> kg							
% of Total Front Weight = <u>48.8</u> %				% of Total Rear Weight = <u>51.2</u> %			
Weight of Ballast Secured in Vehicle Trunk Area = <u>93.0</u> kg							
Vehicle Components Removed for Weight Reduction: <u>None</u>							

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED :	RF	<u>916</u>	LF	<u>919</u>	RR	<u>932</u>	LR	<u>930</u>
FULLY LOADED :	RF	<u>902</u>	LF	<u>901</u>	RR	<u>873</u>	LR	<u>874</u>
AS TESTED :	RF	<u>904</u>	LF	<u>903</u>	RR	<u>875</u>	LR	<u>875</u>
Vehicle's Wheel Base : <u>2680</u> mm								
Location of Vehicle's C.G. : <u>1,372</u> mm rearward of front wheel center.								

FUEL SYSTEM DATA :

Fuel System Capacity From Owner's Manual	=	<u>70.0</u>	liters
Usable Capacity Figure Furnished by COTR	=	<u>70.0</u>	liters
Test Volume Range (92 to 94 % of Usable Capacity)	=	<u>64.4</u>	to <u>65.8</u> liters
ACTUAL TEST VOLUME	=	<u>65.1</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>Fuel filler aft of rear axle on left quarter panel; Fuel tank fore of rear axle on left side of vehicle underbody; Fuel lines run along left frame rail</u>			

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test : Frontal Barrier Impact Angle : 0°
Test Date : November 24, 1998 Time: 14:50 Temperature: 21.5 °C
Vehicle NHTSA No. : MX5100
Required Impact Velocity Range : 55.5 to 57.1 kph

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

Trap No. 1 = 56.5 kph; Trap No. 2 = 56.5 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 = 4657 ; C/L = 4723 ; Left = 4652
Post-Test Right = 4062 ; C/L = 4109 ; Left = 4074
Crush Right = 595 ; C/L = 614 ; Left = 578
AVERAGE = 596 mm

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point :

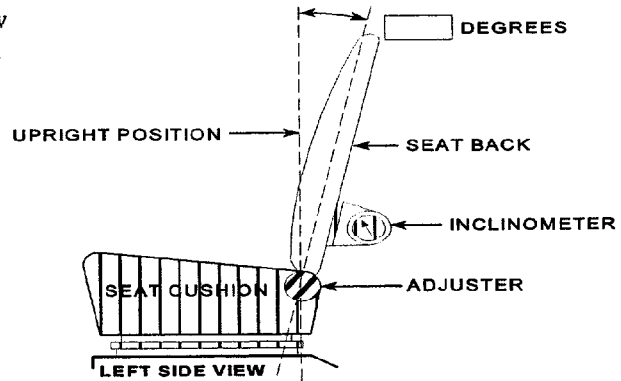
Right = 262 ; C/L = 253 ; Left = 324
AVERAGE = 280 mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 1999 Vehicle Model: Toyota 4-Runner 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 : 12

Measurement instructions : Recline to the 7th notch rearward from the most upright position,
where the most upright position is the 1st notch.

Seat back angle for passenger's seat : 12

Measurement instructions : Recline to the 7th notch rearward from the most upright position,
where the most upright position is the 1st notch.

2. Seat Fore and Aft Positioning

Positioning of the driver's seat : Move to the eighth notch rearward from the foremost
position, where the foremost position is the 1st notch.

Positioning of the passenger's seat (if applicable) : Move to the eighth notch rearward from
the foremost position, where the foremost position is the 1st notch.

3. Fuel Tank Capacity Data

3.1

- A. "Usable Capacity" of the standard equipment fuel tank is 70.0 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) = 65.1 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.

Pump pressurizes fuel system when the ignition is turned on.

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

4. STEERING COLUMN ADJUSTMENTS :

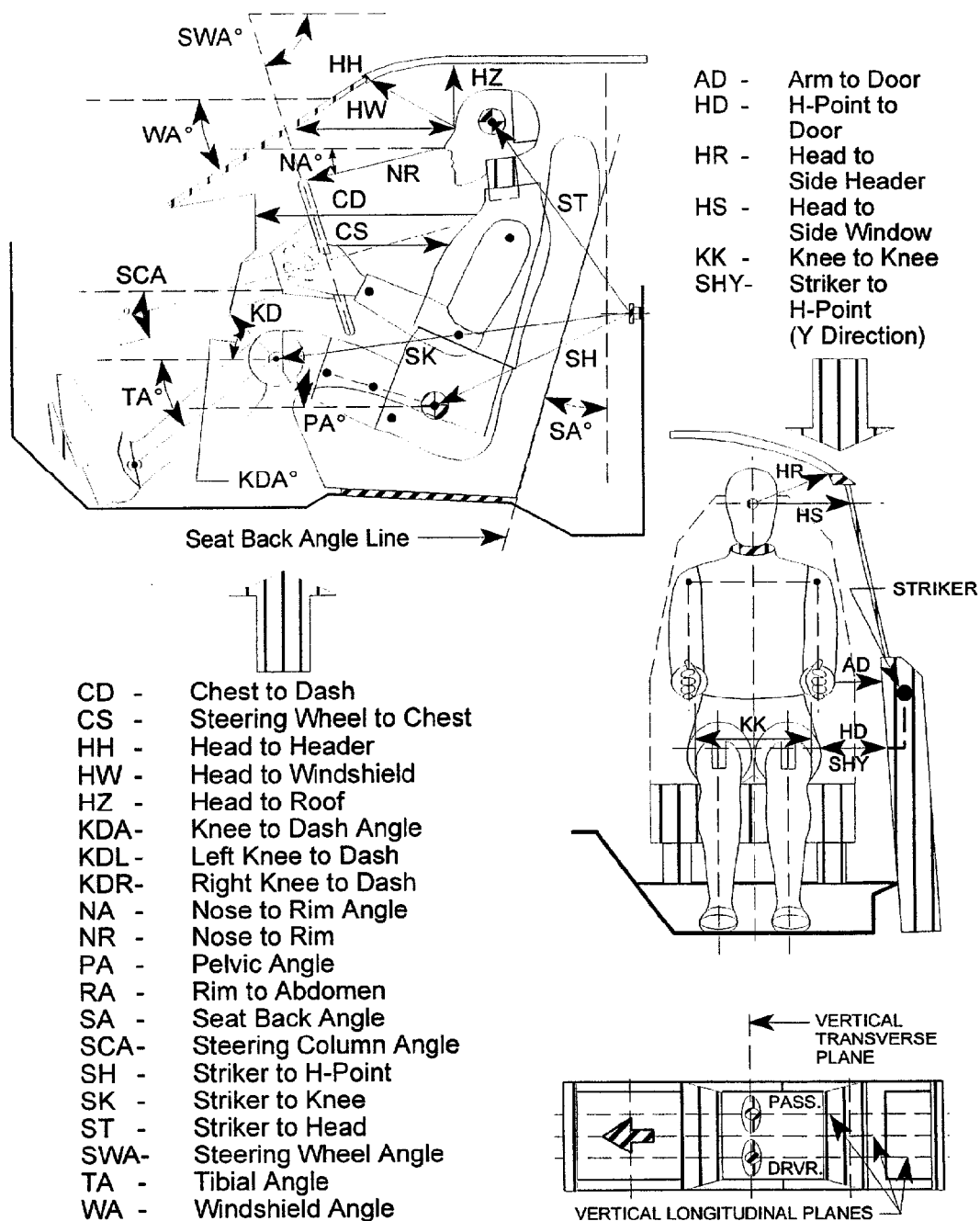
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine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

Operational Instructions: Tilt column to the 4th notch down from the most upright position, where the most upright position is the 1st notch.

5. SEAT BELT UPPER ANCHORAGE

Nominal design riding position: Place in mid-position.

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS

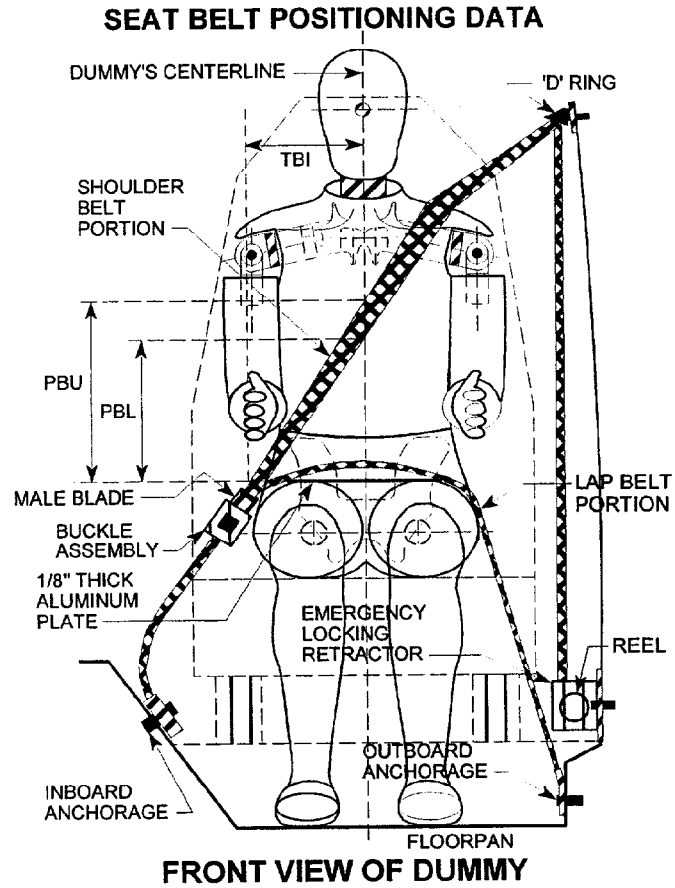


DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE

	DRIVER (Serial #245)			PASS. (Serial # 150)		
WA ^o	38 deg.			N/A		
SWA ^o	65 deg.			N/A		
SCA ^o	25 deg.			N/A		
SA ^o	12 deg.			12 deg.		
HZ	192			188		
HH	391			386		
HW	524			518		
HR	232			232		
NR	397	Angle	8 deg.	N/A		
CD	556			518		
CS	306			N/A		
RA	202			N/A		
KDL	211	Angle (KDA)	30 deg.	170		
KDR	212			168	Angle (KDA)	28 deg.
PA ^o	24.5 deg.			24.5 deg.		
TA ^o	35 deg.			39 deg.		
KK	326			278		
ST	543	Angle	8 deg.	540	Angle	9 deg.
SK	606	Angle	89 deg.	605	Angle	89 deg.
SH	248	Angle	117 deg.	244	Angle	116 deg.
SHY	210			205		
HS	301			304		
HD	120			115		
AD	82			104		

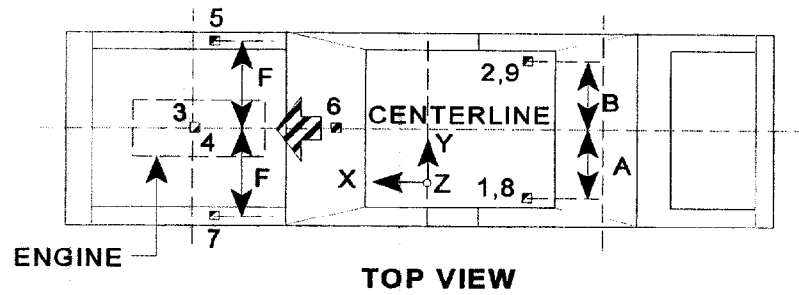
Dimensions in millimeters

DATA SHEET NO. 6 SEAT BELT POSITIONING DATA

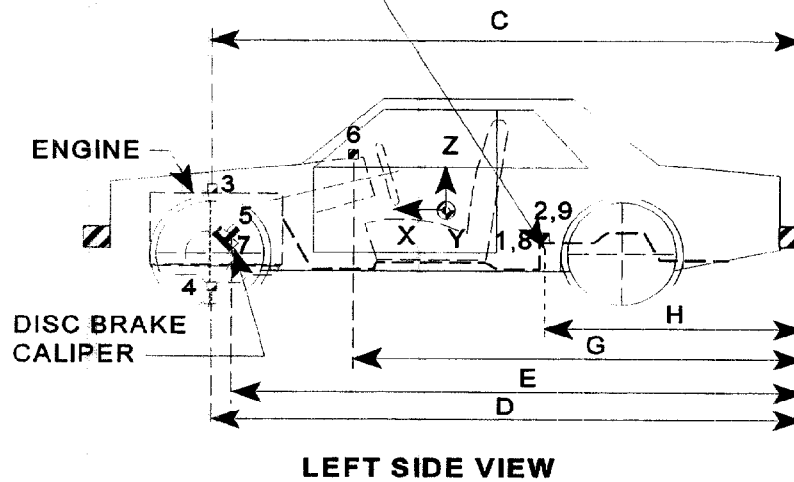


	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	225	226
PBL-- Top surface of alum. plate to belt lower edge	303	307
<u>LAP BELT TENSION</u>	10 N	10 N
<u>SHOULDER BELT TENSION</u>	Retractor	Retractor

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	589
B Right Rear Seat Crossmember Y	615
C Top of Engine X	4041
D Bottom of Engine X	3558
E Disc Brake Calipers X	3958
F Disc Brake Calipers Y	480
G Instrument Panel X	3041
H Rear Seat Crossmembers X	1653

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Rear Seat X-Member @ Left Side	2.8	158.3	-36.0	57.6
2	Rear Seat X-Member @ Right Side	3.7	164.5	-35.5	58.9
3	Top of Engine Block	†	†	†	†
4	Bottom of Engine	22.0	51.6	-75.6	38.9
5	Disc Brake Caliper @ Right Side	39.9	64.5	-83.8	44.7
6	Instrument Panel	58.3	28.0	-77.1	43.1
7	Disc Brake Caliper @Left Side	17.6	83.4	-88.1	42.5
8	Rear Seat X-Member @ Left-Redundant	2.7	158.2	-36.2	57.7
9	Rear Seat X-Member @ Right-Redundant	3.6	164.5	-36.1	59.2

† Accelerometer cable was damaged at approximately 55 msec, data after this time is invalid.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

NHTSA Test No.: **MX5100** Vehicle: **1999 Toyota 4-Runner 4-Door MPV**

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec.	Neg.	msec.
Pos. 1 Head X	g's	17.3	232.1	-60.1	85.6
Pos. 1 Head Y	g's	5.4	230.9	-16.0	91.1
Pos. 1 Head Z	g's	35.0	50.0	-13.1	109.3
Pos. 1 Head Resultant	g's	62.7	85.2	0.0	-76.9
Pos. 2 Head X	g's	8.2	269.9	-43.0	81.7
Pos. 2 Head Y	g's	6.7	58.7	-14.3	87.9
Pos. 2 Head Z	g's	31.0	57.9	-11.7	115.3
Pos. 2 Head Resultant	g's	52.1	77.3	0.1	-67.3
Pos. 1 Chest X	g's	3.7	198.9	-46.2	65.0
Pos. 1 Chest Y	g's	6.1	64.9	-6.0	52.6
Pos. 1 Chest Z	g's	22.4	48.3	-11.7	112.7
Pos. 1 Chest Resultant	g's	48.6	65.0	0.0	-31.4
Pos. 1 Chest Displacement	mm	0.0	26.7	-37.0	74.9
Pos. 2 Chest X	g's	2.4	393.5	-43.5	71.9
Pos. 2 Chest Y	g's	4.7	48.8	-5.1	72.8
Pos. 2 Chest Z	g's	17.7	79.0	-20.0	118.3
Pos. 2 Chest Resultant	g's	46.0	72.0	0.0	-74.4
Pos. 2 Chest Displacement	mm	0.0	13.2	-40.2	77.0
Pos. 1 Left Femur	N	1145.3	50.0	-3855.5	52.5
Pos. 1 Right Femur	N	1179.7	50.5	-3828.8	57.1
Pos. 2 Left Femur	N	921.8	46.1	-4673.8	55.1
Pos. 2 Right Femur	N	665.0	68.7	-2739.8	53.0
Pos. 1 Left Belt Load	N	*	*	*	*
Pos. 1 Torso Belt Load	N	*	*	*	*
Pos. 2 Right Belt Load	N	*	*	*	*
Pos. 2 Torso Belt Load	N	*	*	*	*

* Vehicle seat belt system contained pretensioners. To prevent potential interference with the seat belt system, transducers were not attached to the vehicle seat belts.

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

NHTSA Test No.: MX5100 Vehicle: 1999 Toyota 4-Runner 4-Door MPV

HEAD INJURY CRITERIA (HIC)				
	HIC**	t_1 (msec)	t_2 (msec)	Average Acceleration t_1 to t_2
Position #1 - Driver	693.1	61.1	97.1	51.7
Position #2 - Passenger	437.6	57.7	93.7	43.0

** HIC is as defined in FMVSS 208. The maximum time interval from t_1 to t_2 is 36 milliseconds.

CLIP SUMMARY*				
	CLIP (g's)	t_1 (msec)	t_2 (msec)	CSI
Position #1 - Driver	44.6	63.5	66.5	465.6
Position #2 - Passenger	43.3	70.5	73.5	488.9

* 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 Toyota 4-Runner 4-Door MPV
 NHTSA Test No.: MX5100 Test Date: November 24, 1998

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
Pos. 1 Upper Neck Fx	N	579.6	79.3	-407.5	57.6
Pos. 1 Upper Neck Fy	N	124.4	102.4	-254.8	81.7
Pos. 1 Upper Neck Fz	N	2174.4	69.1	-433.0	120.0
Pos. 1 Neck Force Result	N	2182.0	69.9	3.2	-71.3
Pos. 1 Upper Neck Mx	N-m	18.6	84.3	-6.6	126.2
Pos. 1 Upper Neck My	N-m	30.2	79.0	-28.6	57.5
Pos. 1 Upper Neck Mz	N-m	25.1	108.4	-12.3	169.1
Pos. 1 Neck Moment Result	N-m	35.3	79.2	0.1	-63.1
Pos. 2 Upper Neck Fx	N	578.0	77.7	-548.7	155.9
Pos. 2 Upper Neck Fy	N	136.7	71.7	-221.4	143.7
Pos. 2 Upper Neck Fz	N	1323.2	61.8	-489.4	115.9
Pos. 2 Neck Force Result	N	1419.1	77.4	3.6	-54.9
Pos. 2 Upper Neck Mx	N-m	11.3	93.9	-13.4	134.2
Pos. 2 Upper Neck My	N-m	43.9	163.5	-25.4	294.2
Pos. 2 Upper Neck Mz	N-m	21.5	102.4	-11.1	160.2
Pos. 2 Neck Moment Result	N-m	45.5	163.4	0.1	-55.0
Pos. 1 Pelvic (X)	g's	7.2	127.8	-73.5	57.4
Pos. 1 Pelvic (Y)	g's	16.4	55.1	-19.7	45.9
Pos. 1 Pelvic (Z)	g's	10.1	46.5	-18.7	57.2
Pos. 1 Pelvic (R)	g's	76.1	57.4	0.0	-34.4
Pos. 2 Pelvic (X)	g's	8.1	137.9	-72.9	53.4
Pos. 2 Pelvic (Y)	g's	7.7	71.5	-3.0	97.6
Pos. 2 Pelvic (Z)	g's	5.0	43.3	-15.5	106.9
Pos. 2 Pelvic (R)	g's	73.7	53.4	0.0	-73.0

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

Vehicle Year/Make/Model/Body Style: 1999 Toyota 4-Runner 4-Door MPV
NHTSA Test No.: MX5100 Test Date: November 24, 1998

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
P1 Lt Upper Tibia Mx	N-m	22.9	151.0	-67.3	67.3
P1 Lt Upper Tibia My	N-m	46.4	52.9	-138.4	44.0
P1 Lt Lower Tibia Fz	N	118.7	133.2	-3725.6	43.9
P1 Lt Lower Tibia Mx	N-m	37.0	50.9	-32.5	46.1
P1 Lt Lower Tibia My	N-m	61.9	79.6	-39.5	44.0
P1 Rt Upper Tibia Mx	N-m	52.6	57.8	-20.8	78.4
P1 Rt Upper Tibia My	N-m	47.6	56.0	-281.6	47.5
P1 Rt Lower Tibia Fz	N	609.2	55.1	-9597.1	47.1
P1 Rt Lower Tibia Mx	N-m	29.6	47.4	-15.9	59.7
P1 Rt Lower Tibia My	N-m	83.6	99.7	-70.1	44.2
Pos. 2 Lt Upper Tibia Mx	N-m	43.1	44.9	-28.6	71.3
Pos. 2 Lt Upper Tibia My	N-m	62.3	73.2	-162.3	43.2
Pos. 2 Lt Lower Tibia Fz	N	138.5	74.9	-3535.9	43.7
Pos. 2 Lt Lower Tibia Mx	N-m	43.5	97.9	-23.8	52.9
Pos. 2 Lt Lower Tibia My	N-m	62.5	93.7	-88.5	39.6
Pos. 2 Rt Upper Tibia Mx	N-m	25.3	88.7	-22.6	70.9
Pos. 2 Rt Upper Tibia My	N-m	42.7	66.0	-103.0	44.2
Pos. 2 Rt Lower Tibia Fz	N	336.7	62.0	-2495.5	89.3
Pos. 2 Rt Lower Tibia Mx	N-m	†	†	†	†
Pos. 2 Rt Lower Tibia My	N-m	55.2	88.2	-63.6	44.9

† Transducer was damaged, data is invalid.

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

Vehicle Year/Make/Model/Body Style: 1999 Toyota 4-Runner 4-Door MPV

NHTSA Test No.: MX5100 Test Date: November 24, 1998

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
Pos. 1 Left Ankle X	g's	†	†	†	†
Pos. 1 Left Ankle Z	g's	10.2	58.5	-101.4	45.2
Pos. 1 Left Toe Z	g's	53.0	72.2	-108.7	44.8
Pos. 1 Right Ankle X	g's	32.9	100.6	-230.3	46.0
Pos. 1 Right Ankle Z	g's	49.8	60.7	-237.4	46.3
Pos. 1 Right Toe Z	g's	57.1	61.0	-353.7	43.6
Pos. 2 Left Ankle X	g's	27.2	86.6	-153.5	44.6
Pos. 2 Left Ankle Z	g's	22.1	40.7	-65.4	46.9
Pos. 2 Left Toe Z	g's	42.2	35.3	-172.8	43.6
Pos. 2 Right Ankle X	g's	26.3	88.5	-146.3	46.2
Pos. 2 Right Ankle Z	g's	16.5	69.3	-47.2	45.0
Pos. 2 Right Toe Z	g's	43.9	37.4	-141.2	43.5

† Accelerometer cable was damaged at impact, data is invalid.

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

NHTSA Test No.: MX5100 Vehicle: 1999 Toyota 4-Runner 4-Door MPV

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
Pos. 1 Head X(R)	g's	17.7	231.9	-61.7	85.3
Pos. 1 Head Y(R)	g's	5.4	231.1	-18.8	91.1
Pos. 1 Head Z(R)	g's	36.0	63.8	-12.6	109.3
Pos. 1 Head Resultant(RR)	g's	64.6	85.3	0.0	-70.8
Pos. 2 Head X(R)	g's	9.0	271.3	-53.4	81.3
Pos. 2 Head Y(R)	g's	14.6	58.8	-20.6	87.8
Pos. 2 Head Z(R)	g's	43.6	57.9	-13.5	116.4
Pos. 2 Head Resultant(RR)	g's	61.1	81.3	0.1	-63.1
Pos. 1 Chest X(R)	g's	4.0	198.8	-50.8	53.5
Pos. 1 Chest Y(R)	g's	8.2	65.1	-5.4	52.6
Pos. 1 Chest Z(R)	g's	28.3	48.4	-14.5	112.8
Pos. 1 Chest Resultant(RR)	g's	52.7	65.0	0.0	-74.1
Pos. 2 Chest X(R)	g's	2.3	361.3	-40.9	72.0
Pos. 2 Chest Y(R)	g's	5.0	48.8	-6.1	76.6
Pos. 2 Chest Z(R)	g's	20.9	79.0	-21.5	118.1
Pos. 2 Chest Resultant(RR)	g's	44.8	72.0	0.0	-74.6

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

NHTSA Test No.: MX5100 Vehicle: 1999 Toyota 4-Runner 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	762.2	61.0	97.0	53.7
Position #2 - Passenger	691.7	57.1	93.1	51.7

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

CLIP SUMMARY* REDUNDANT				
	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
Position #1 - Driver	49.4	51.3	54.3	613.1
Position #2 - Passenger	42.1	70.7	73.7	477.6

* 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

2000

2000

Shoulder belt length as measured
on Part 572 Dummy.

865

855

Lap belt length as measured
on Part 572 Dummy.

925

935

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis.

*

*

As determined mechanically.

**

**

As determined electronically.

**

**

BELT STRETCH DATA:

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

**

**

Measured mechanically.

15.7 mm/M

9.8 mm/M

Dimensions in millimeters

* Belt spool out cameras did not run during the test, no camera footage is available.

** Vehicle seat belt system contained pretensioners. To prevent potential interference with the seat belt system, transducers and belt spool-off strings were not attached to the vehicle seat belts.

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 10 mm molding.

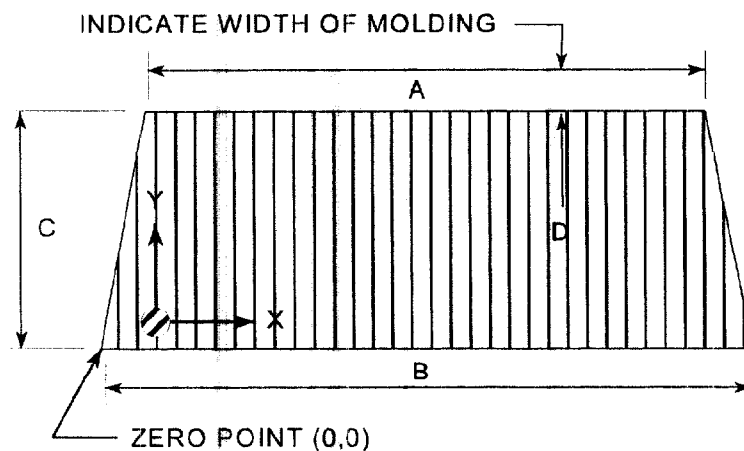
FMVSS 212 REQUIREMENTS:

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		% OF RETENTION
	PRE-TEST (mm)	POST-TEST(mm)	
RIGHT SIDE	1888	1888	100
LEFT SIDE	1888	1888	100
TOTAL	3,776	3,776	100

AREA OF RETENTION FAILURE:



DIMENSIONS (mm)	
A	1146
B	1390
C	620
D	10

FRONT VIEW OF WINDSHIELD

FAILURE DETAILS: None

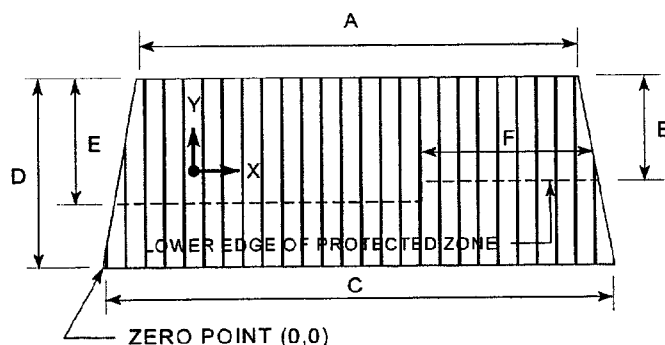
DATA SHEET NO. 11 FMVSS NO. 219 (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA

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	1146
B	355
C	1390
D	620
E	390
F	825

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.: MX5100 TEST DATE: November 24, 1998

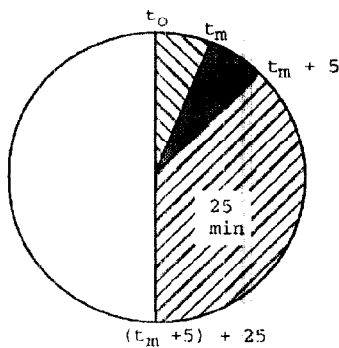
VEHICLE MAKE/MODEL: 1999 Toyota 4-Runner

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

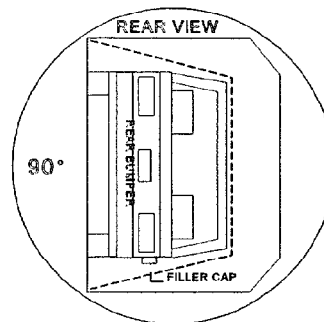
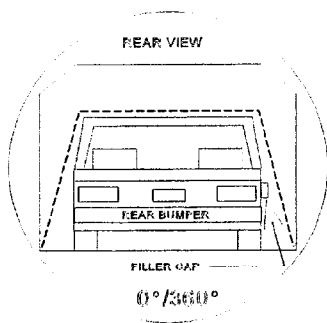
DATA SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

0-90 deg.

NHTSA Test No.:

MX5100



INDETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

1 minutes 17 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

TOTAL

6 minutes 17 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 g	0 g	0 g	N/A
-----	-----	-----	-----

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

IV. **SOLVENT SPILLAGE LOCATION(S):** None

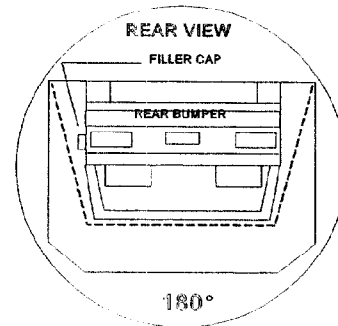
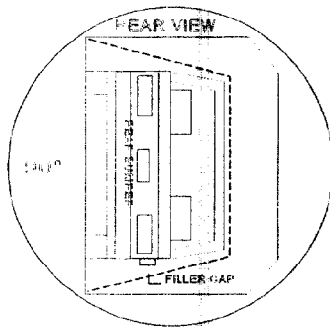
TEST SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:

90-180 deg.

NHTSA Test No.:

MX5100



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

1 minutes

12 seconds

FMVSS 301 Position Hold Time +

5 minutes

00 seconds

TOTAL

6 minutes

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

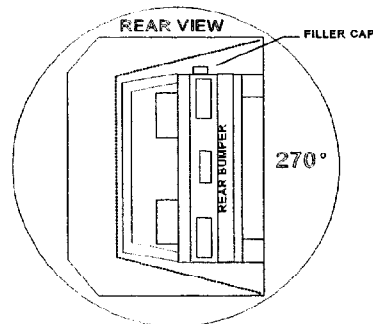
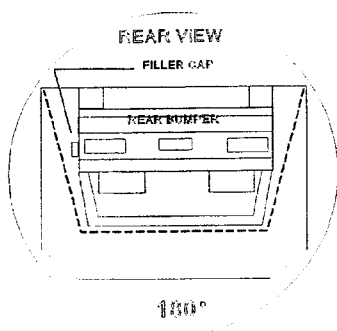
Note: Record spillage for whole minute intervals only as determined above.

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.:
MX5100



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

1 minutes

19 seconds

FMVSS 301 Position Hold Time +

5 minutes

00 seconds

TOTAL

6 minutes

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

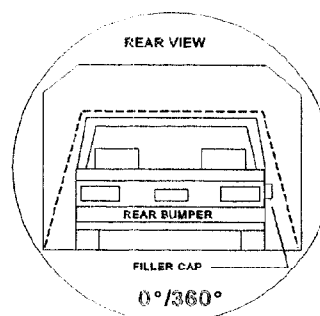
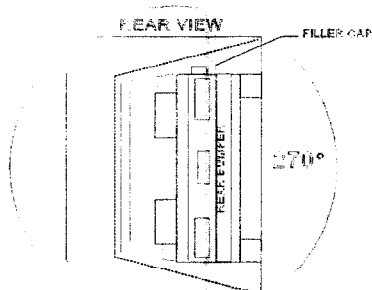
Note: Record spillage for whole minute intervals only as determined above.

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.:
MX5100



I. DETERMINATION 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
-------	------	------	------

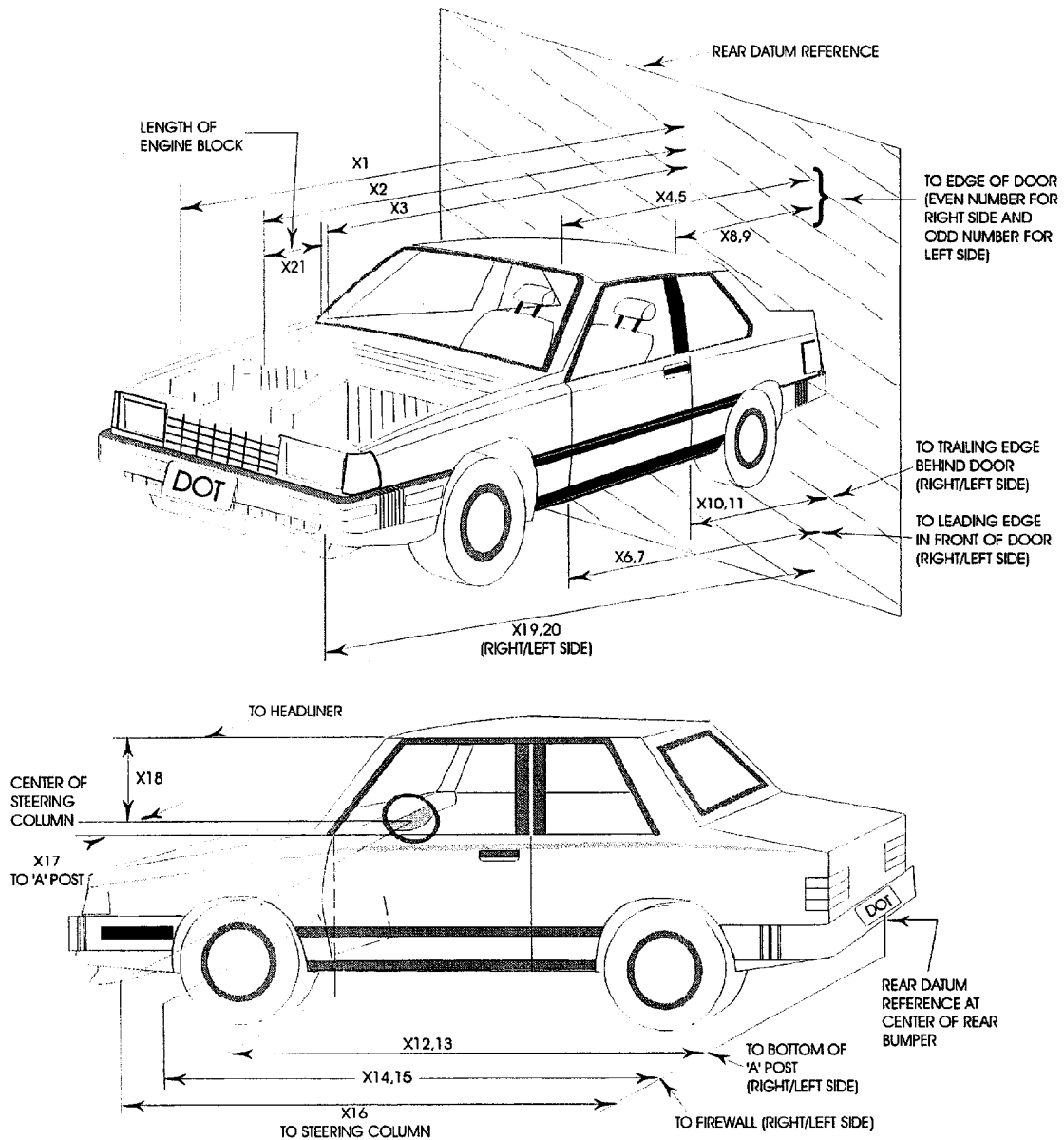
III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATION(S): None

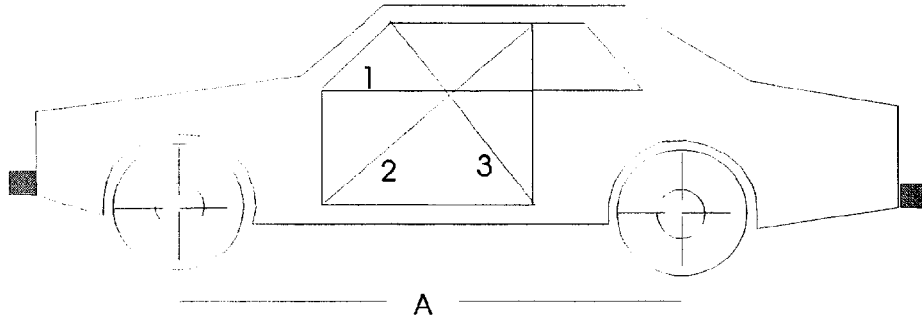
TEST VEHICLE MEASUREMENTS



DATA SHEET NO.14 VEHICLE MEASUREMENTS

No.		All Dimensions in mm		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	4723	4109	614
X2	Rear Surface of Vehicle to Front of Engine	4088	3815	273
X3	Rear Surface of Vehicle to Firewall	3519	3331	188
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3222	3211	11
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3235	3197	38
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3230	3213	17
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3226	3197	29
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2202	2188	14
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2204	2174	30
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2193	2177	16
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2186	2131	55
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3213	3208	5
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3218	3192	26
X14	Rear Surface of Vehicle to Firewall, Right Side	3507	3364	143
X15	Rear Surface of Vehicle to Firewall, Left Side	3522	3367	155
X16	Rear Surface of Vehicle to Steering Column	2836	2824	12
X17	Center of Steering Column to "A" Post	362	320	42
X18	Center of Steering Column to Headliner	422	344	78
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4657	4062	595
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4652	4074	578
X21	Length of Engine Block	497	497	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	3062	3036	26
CD	Rear Surface of Vehicle to Center of Dash Panel	3052	2954	98
LD	Rear Surface of Vehicle to Left Side of Dash Panel	3090	3035	55

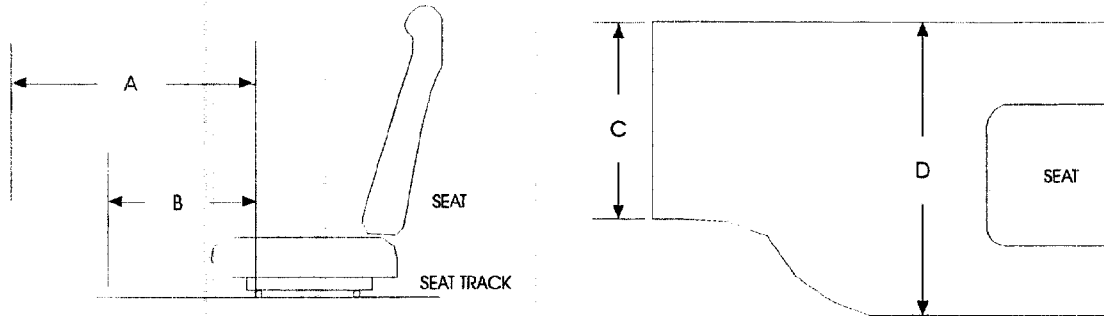
DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
VEHICLE INTRUSION MEASUREMENTS
DOOR OPENING WIDTH



UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	927	1439	1090	945	1454	1078
AFTER TEST	924	1431	1107	922	1427	1113
DIFFERENCE	3	8	-17	23	27	-35

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2680	2679
AFTER TEST	2628	2622
DIFFERENCE	52	57

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



DRIVER

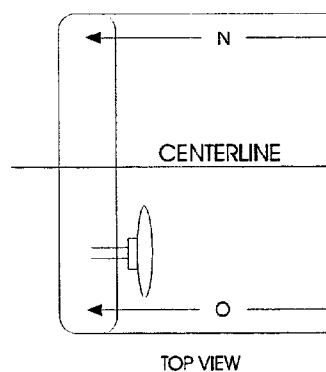
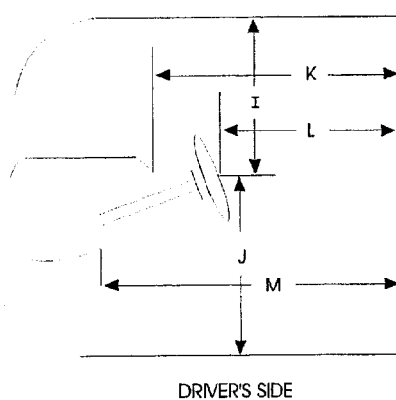
Measurement	Pre-Test	Post-Test	Difference
A	690	617	73
B	591	555	36
C	459	406	53
D	427	431	-4

PASSENGER

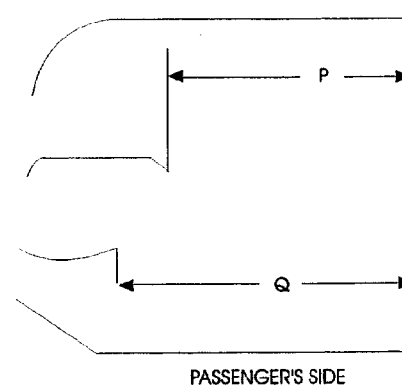
Measurement	Pre-Test	Post-Test	Difference
A	701	597	104
B	577	552	25
C	394	378	16
D	440	435	5

Units = mm

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



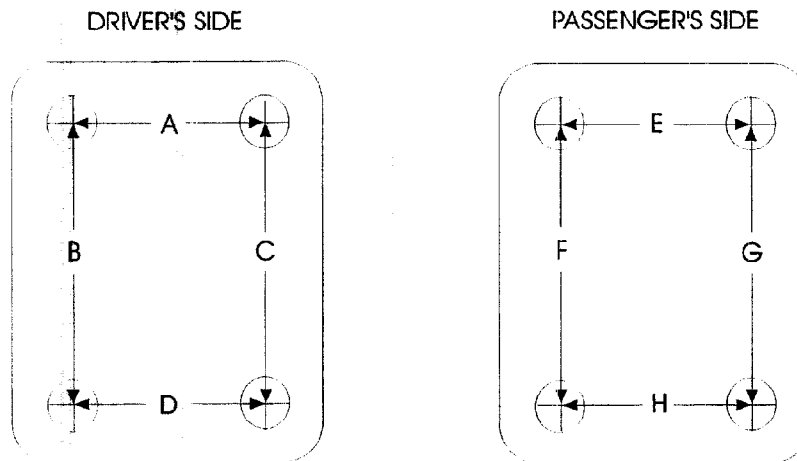
MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



Measurement	Pre-Test	Post-Test	Difference
I	456	381	75
J	641	749	-108
K	1707	1704	3
L	1519	1538	-19
M	1801	1792	9
N	1687	1675	12
O	1732	1702	30
P = K (PASS.)	1688	1663	25
Q = M (PASS.)	1830	1834	-4

Units = mm

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

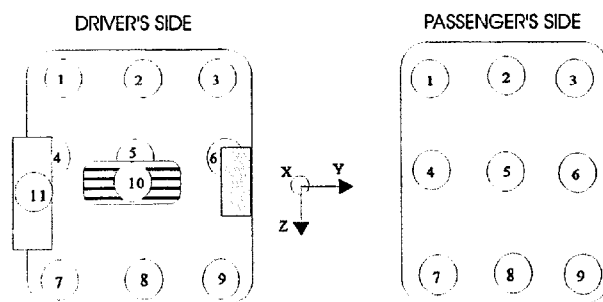


TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	330	324	6
B	610	607	3
C	610	601	9
D	330	330	0
E	330	326	4
F	610	599	11
G	610	605	5
H	330	330	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	3483	3361	122	-757	-764	7
2	3472	3323	149	-762	-783	21
3	3480	3329	151	-751	-764	13
4	3443	3347	96	-707	-701	-6
5	3460	3318	142	-697	-691	-6
6	3446	3298	148	-693	-696	3
7	3404	3334	70	-613	-616	3
8	3404	3326	78	-617	-625	8
9	3402	3306	96	-608	-629	21
10	3408	3348	60	-728	-705	-23
11	3356	3217	139	-794	-757	-37

Passenger Side Floorpan Measurements

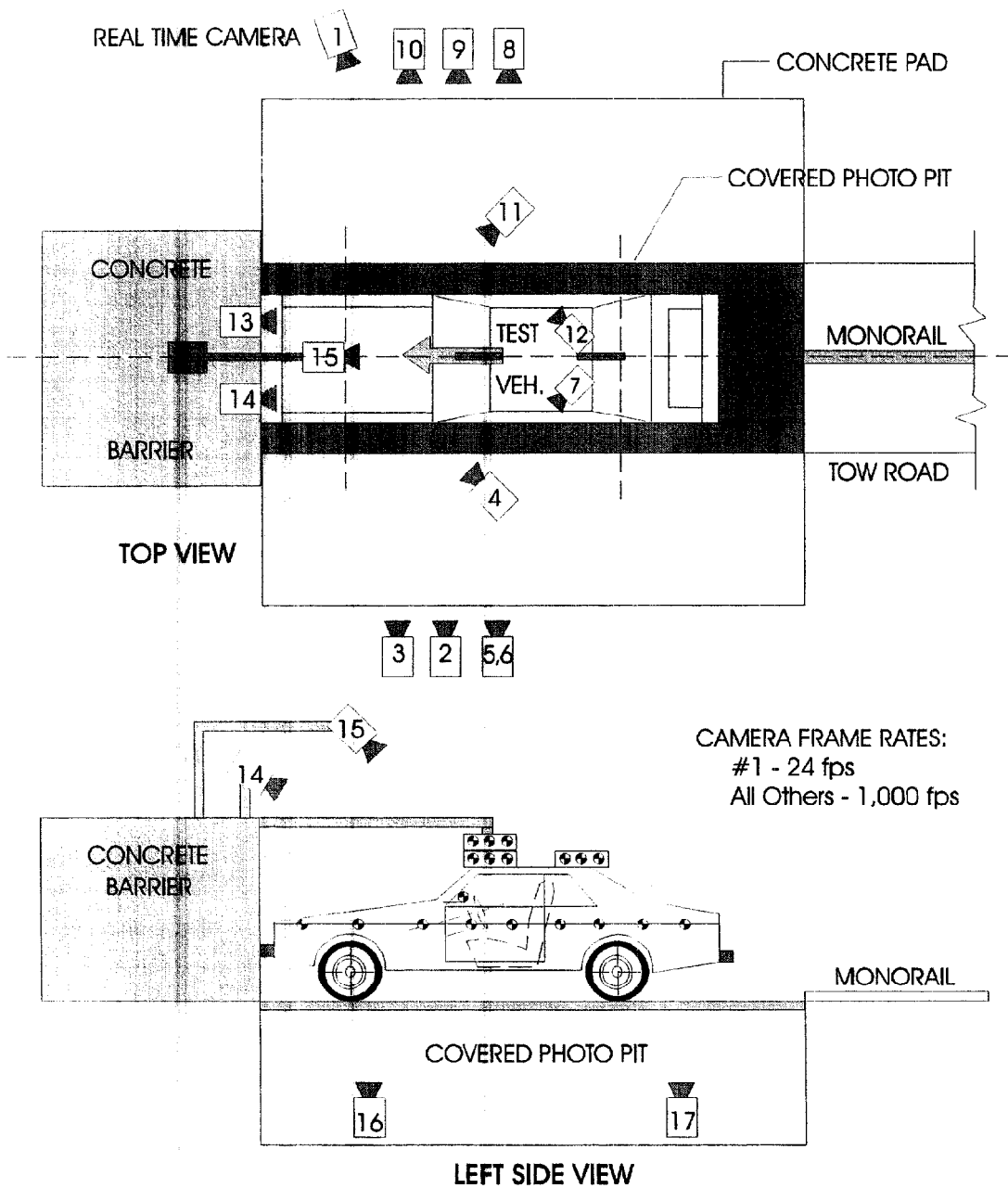
Reference: X = Rear Bumper; Z=Ground

Floorpan Location	X Deformation			Z Deformation		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3474	3323	151	-722	-760	38
2	3510	3365	145	-733	-769	36
3	3486	3376	110	-725	-803	78
4	3465	3342	123	-689	-727	38
5	3473	3355	118	-693	-725	32
6	3447	3357	90	-700	-752	52
7	3407	3297	110	-625	-667	42
8	3398	3297	101	-606	-685	79
9	3437	3329	108	-653	-684	31

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.: MX5100 Vehicle: 1999 Toyota 4-Runner 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	7076	2005	1105	-1	6642	12.5	1000
3	Left Side View	8286	1105	1075	-2	7852	25	1000
4	Driver and Interior View	5304	3000	2020	-8	-	25	1020
5	Steering Column (Bottom)	7321	1722	1180	-1	6887	25	1000
6	Steering Column (Top)	7321	1722	1810	-6	6887	25	1020
7	Left Belt	-	-	-	-	-	13	+
8	Overall Right Side	7251	2156	1050	-2	6817	12.5	1010
9	Right Side View	8461	1298	1083	-2	8027	25	1005
10	Right Passenger View	8331	1930	1048	-3	7897	35	1010
11	Passenger and Interior View	4866	3168	2120	-10	-	25	1010
12	Right Belt	-	-	-	-	-	13	+
13	Passenger Front View	580	-25	1975	-38	-	8	1010
14	Driver Front View	580	-25	1975	-41	-	8	1010
15	Windshield View	0	-92	3558	-56	-	13	1005
16	Pit View of Engine	0	930	-3048	90	-	13	1050
17	Pit View of Fuel Tank	0	2110	-3048	90	-	13	1050

*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

** = referenced to horizontal plane

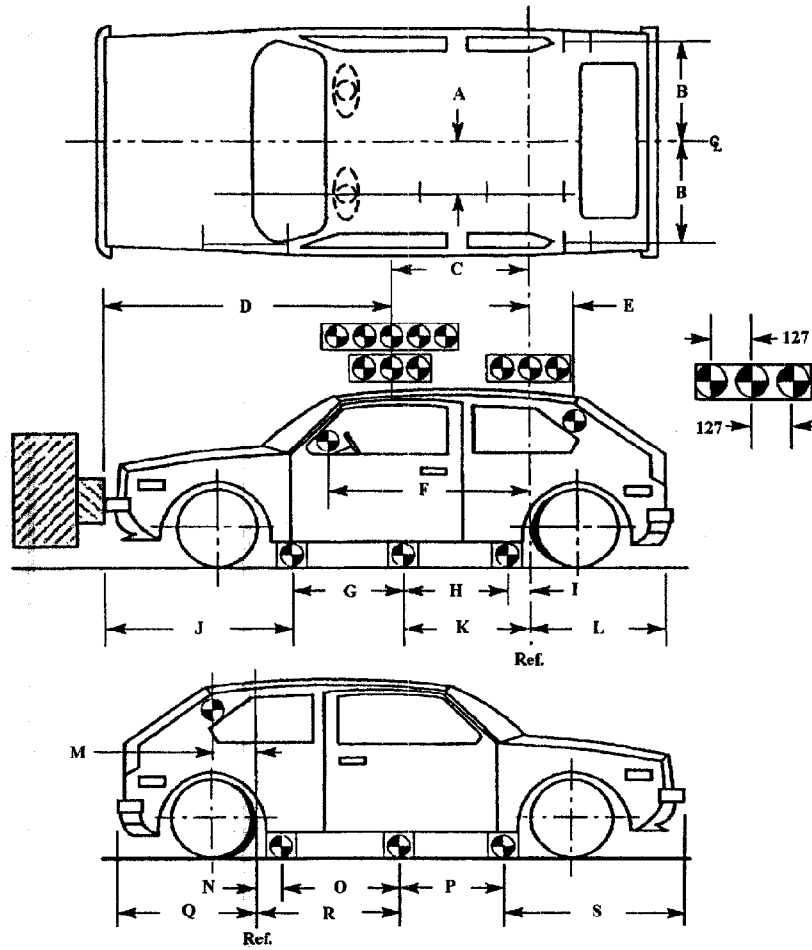
N.T. indicates No Timing

† Camera did not run, trigger circuit malfunctioned

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

(Dimensions in millimeters)

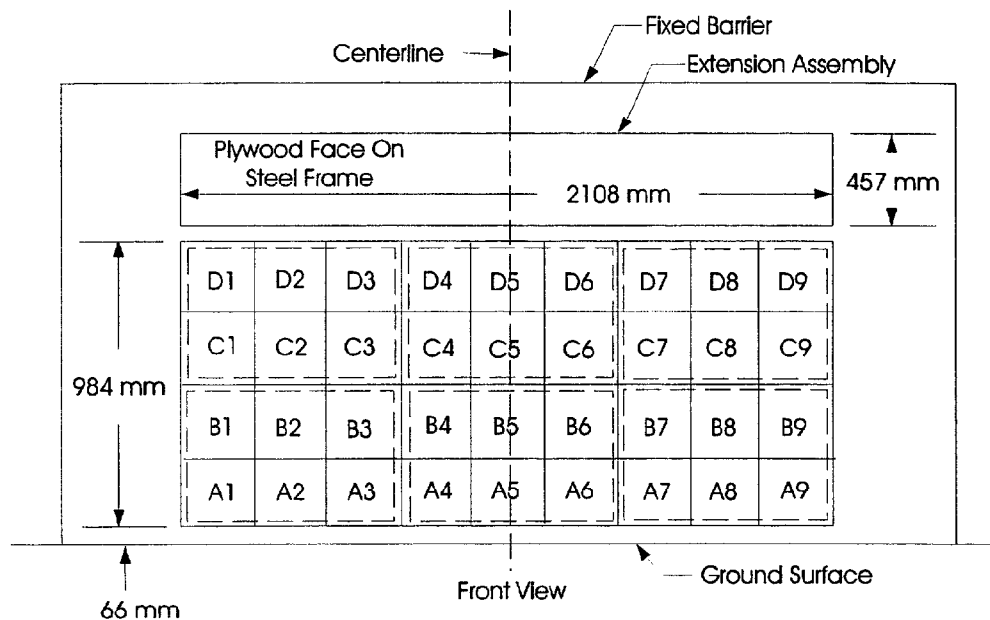
A	358
B	706
C	1218
D	2040
E	392
F	1479
G	742
H	738
I	199
J	1535
K	936
L	1509
M	388
N	200
O	733
P	747
Q	1509
R	933
S	1533



DATA SHEET NO. 17 LOAD CELL LOCATIONS ON FIXED BARRIER

Load Cell Barrier was not used in this test.

- 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. : MX5100; Test Date: November 24, 1998; Technician: LQV

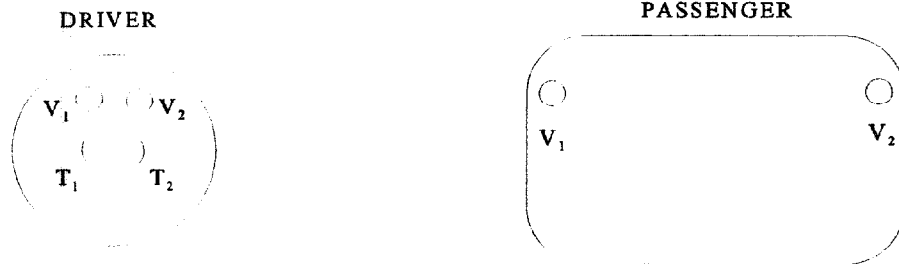
Vehicle Model Year/Make/Model: 1999 Toyota 4-Runner

- A. No. of vent holes: 2 -Driver 2 -Passenger
- B. Size of vent holes: (mm²) 314 -Driver 1590 -Passenger
- C. Total vent area: (mm²) 628 -Driver 3181 -Passenger
- D. Deflated air bag length and width dimensions or, if round, diameter. (mm)
- Driver: - -Length; - -Width; 615 -Diameter
- Passenger: 680 -Height; 710 -Width; 300 -Depth

- E. Is the air bag tethered?
- Driver: X -Yes; - -No; If yes, record length of tether- 190
- 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).



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

Driver: Air bag: 45165-35030; XF8086572

Generator: TDSJ6C1BACR

Passenger: Air bag: P122898-01D; TAC155M11103

Generator: TDCJ552RBSM

FOR 56.3 KPH FRONTAL BARRIER IMPACT

Crush Depth Dimensions:

The diagram shows a top-down view of a car. A horizontal dashed line represents the centerline. Above the car, a dimension line indicates a total width L , divided into two equal segments of $L/2$ on either side of the centerline. Six sensors, labeled C1 through C6, are positioned along the top edge of the car. C1 and C6 are at the outermost corners, while C2, C3, C4, and C5 are positioned closer to the centerline. A vertical dashed line passes through the center of the car, with a coordinate x marked at the top. Below the car, the text $C/L = D$ is written.

$$\begin{aligned} L1 &= \frac{1760}{} \text{ mm} \\ L2 &= \frac{880}{} \text{ mm} \\ L3 &= 352 \text{ mm} \end{aligned}$$

Appendix A
PHOTOGRAPHS

PHOTOGRAPHS

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PHOTOGRAPHS (continued)

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PHOTOGRAPH NOT AVAILABLE

Figure A-2 PRE-TEST FRONT VIEW

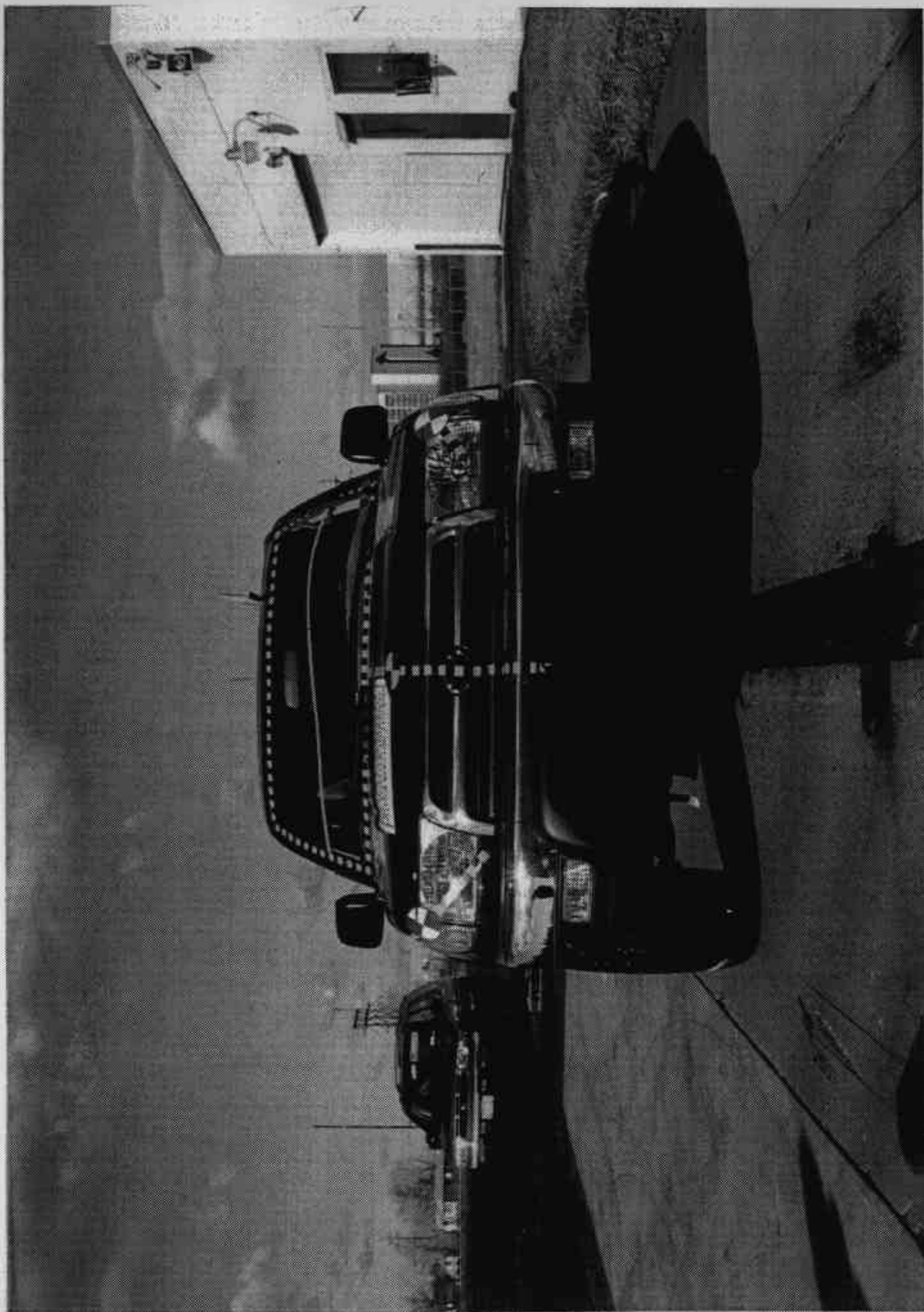




Figure A-3 POST-TEST FRONT VIEW

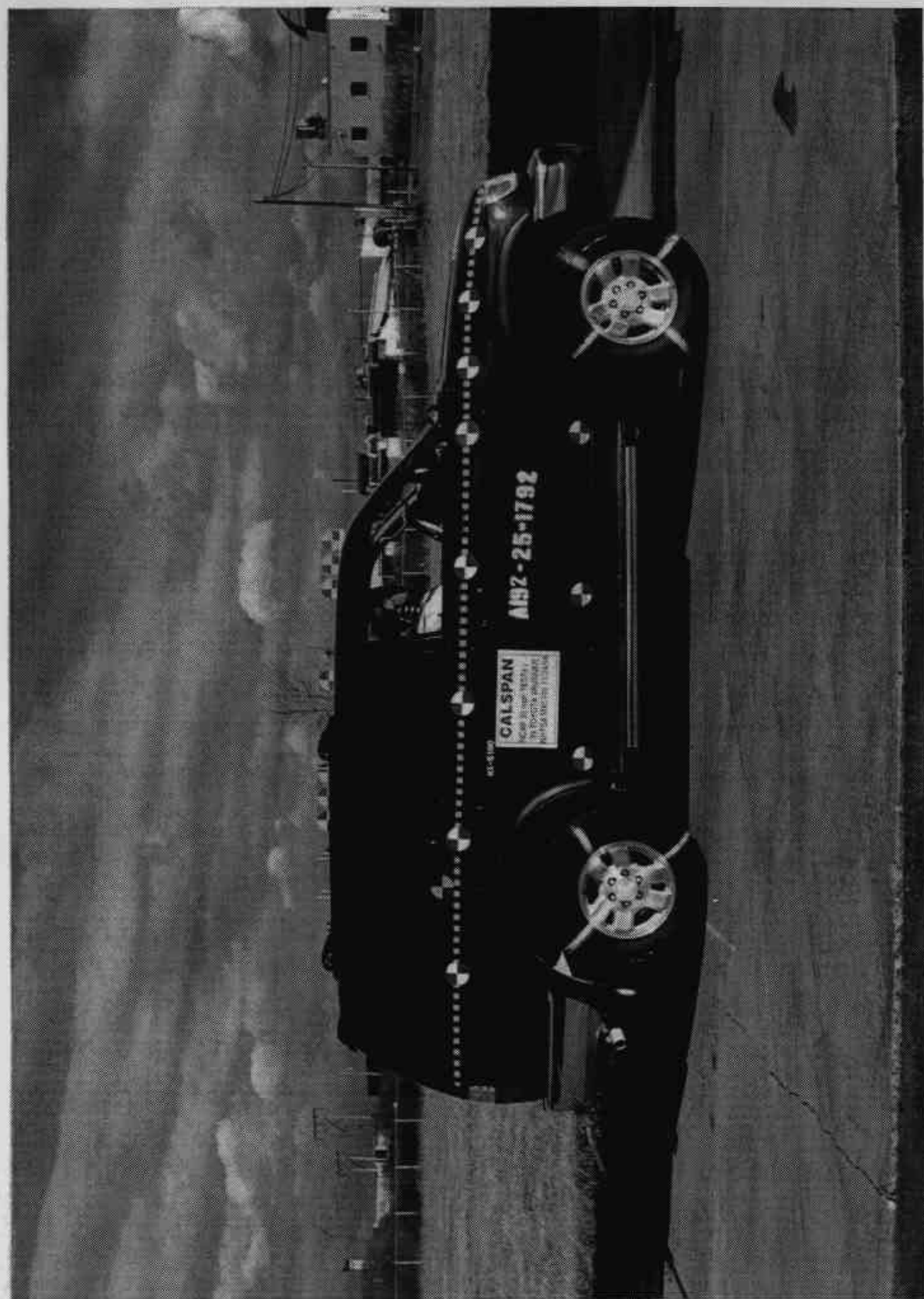


Figure A-4 PRE-TEST LEFT SIDE VIEW

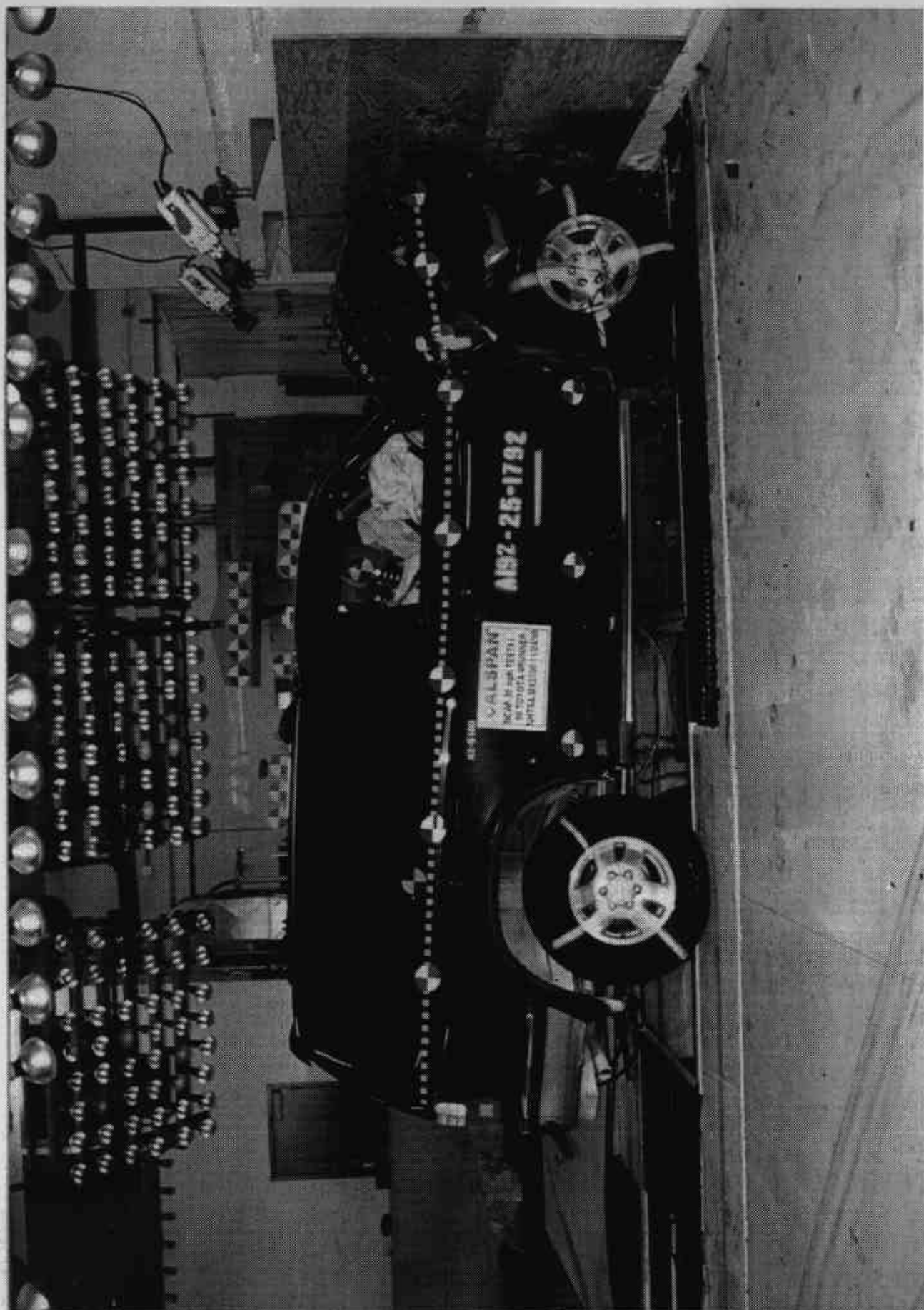


Figure A-5 POST-TEST LEFT SIDE VIEW



Figure A-6 PRE-TEST RIGHT SIDE VIEW



Figure A-7 POST-TEST RIGHT SIDE VIEW

Figure A-8 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

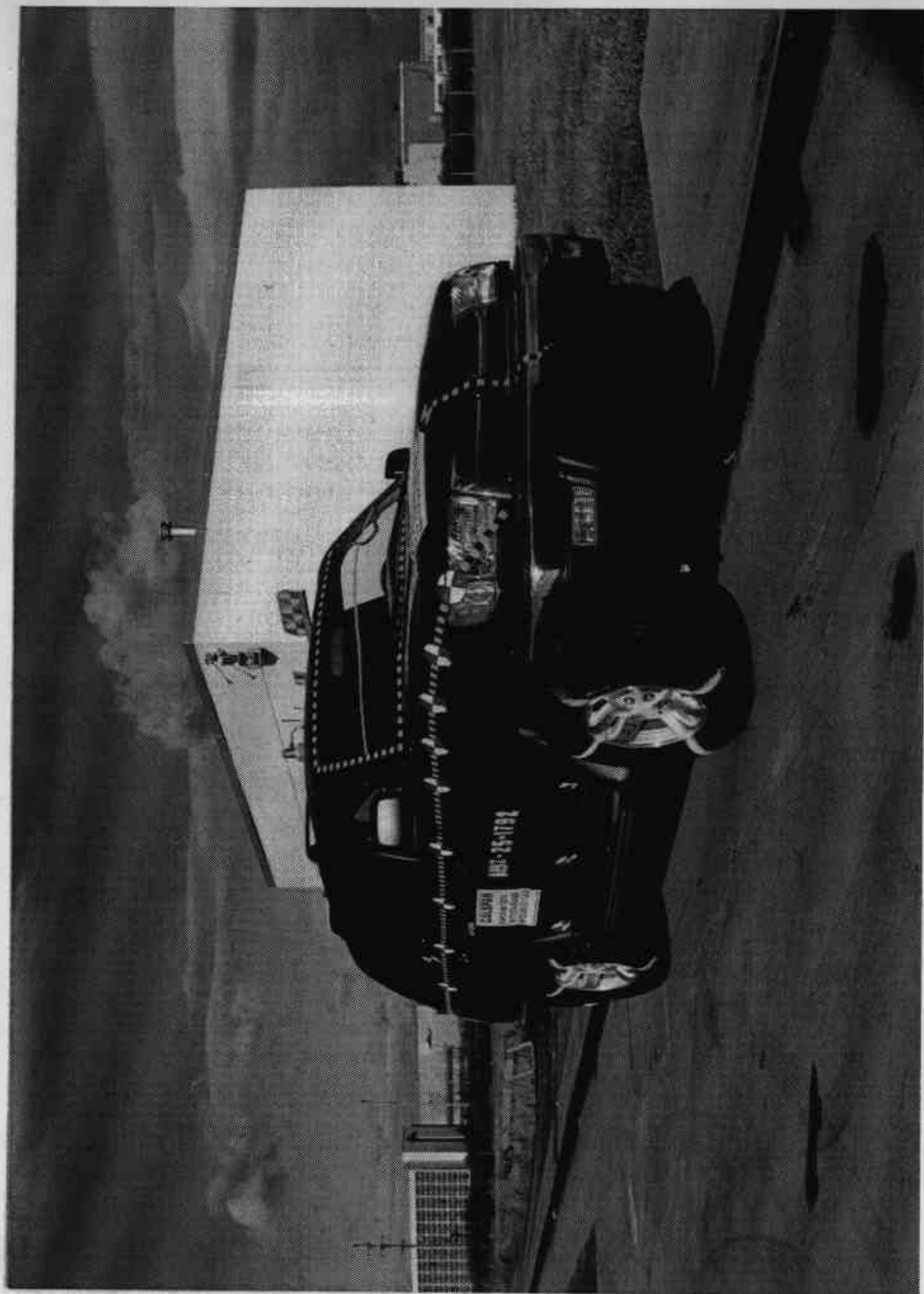




Figure A-9 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

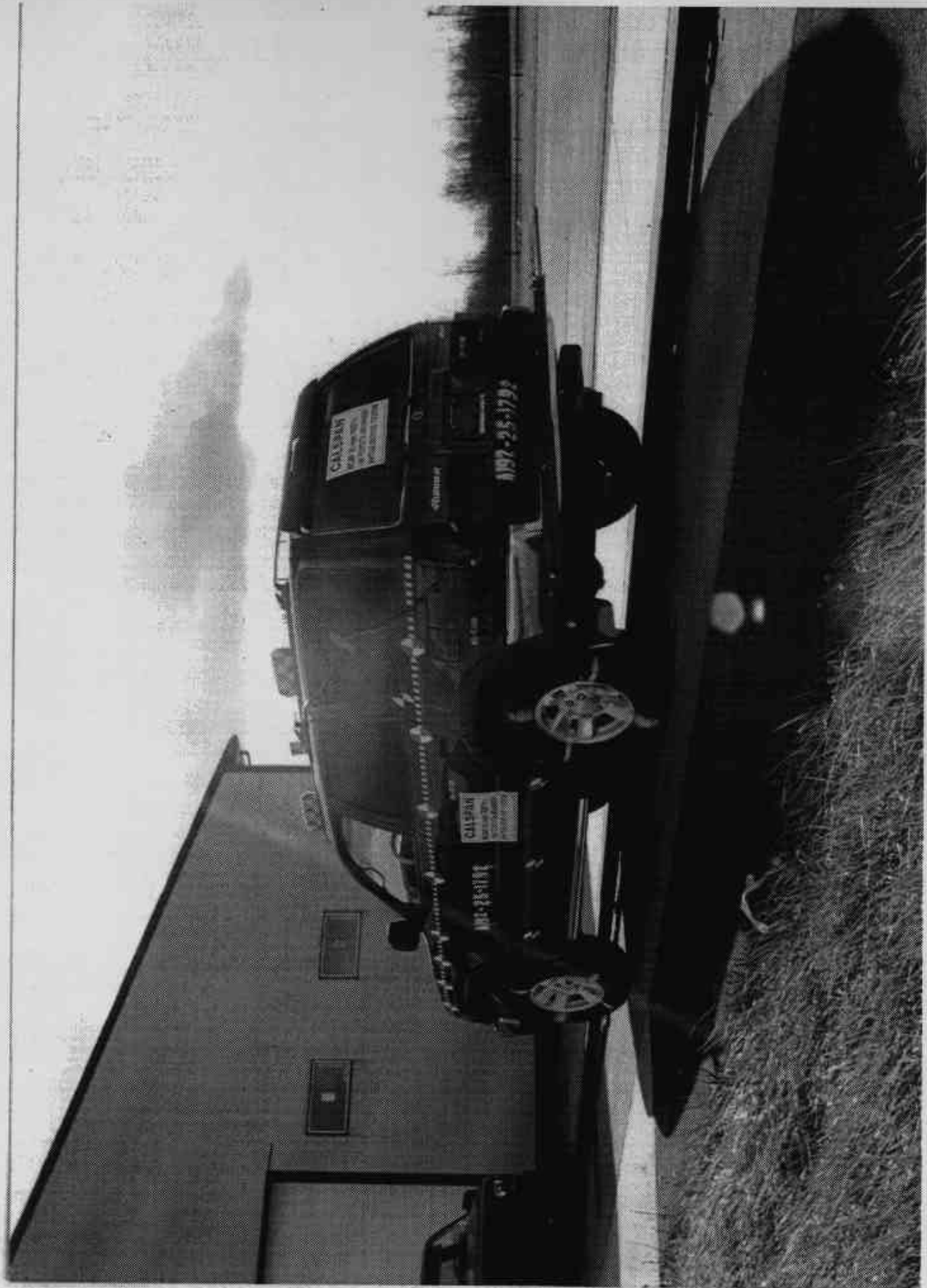


Figure A-10 PRE-TEST LEFT REAR THREE-QUARTER VIEW

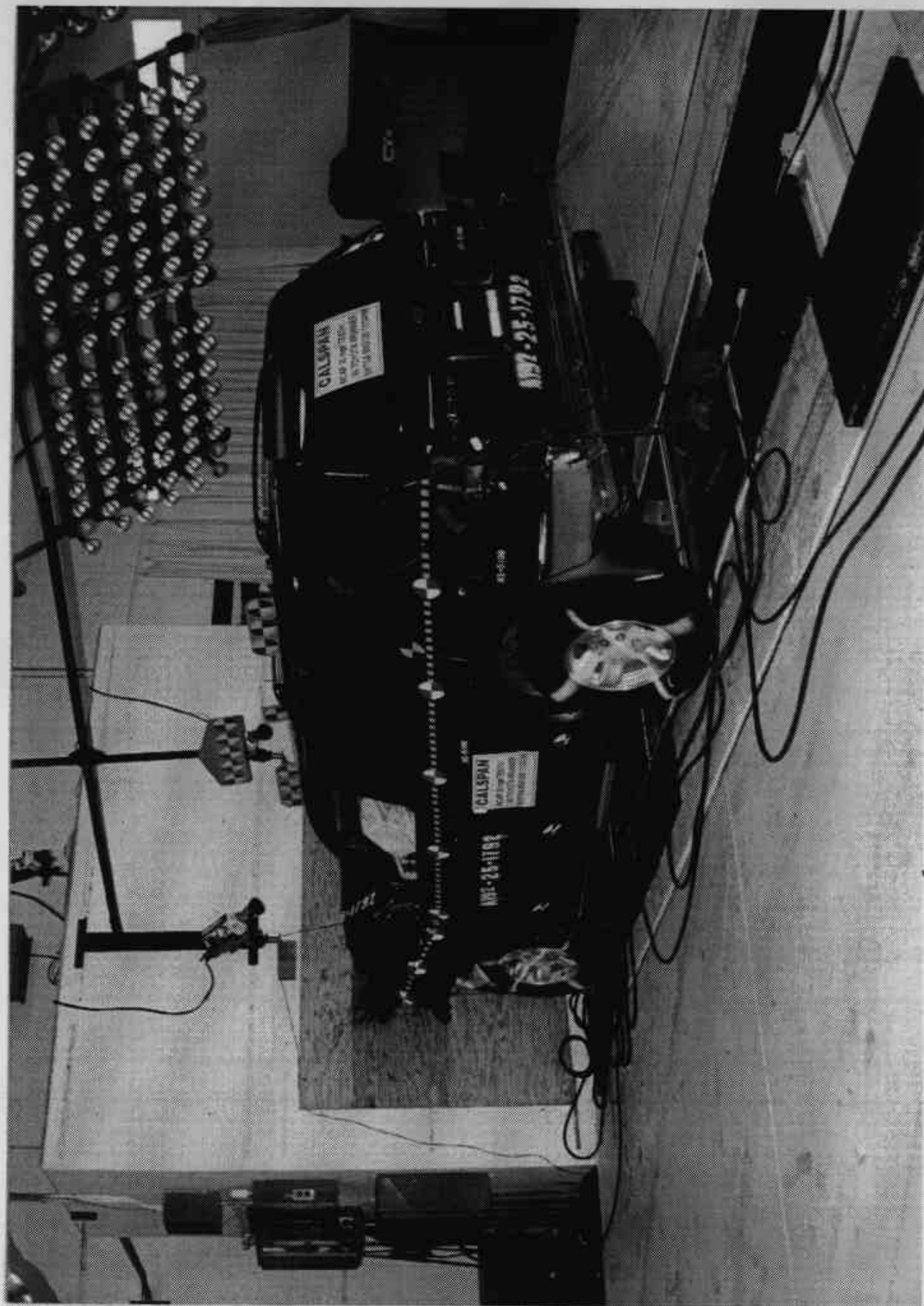


Figure A-11 POST-TEST LEFT REAR THREE-QUARTER VIEW

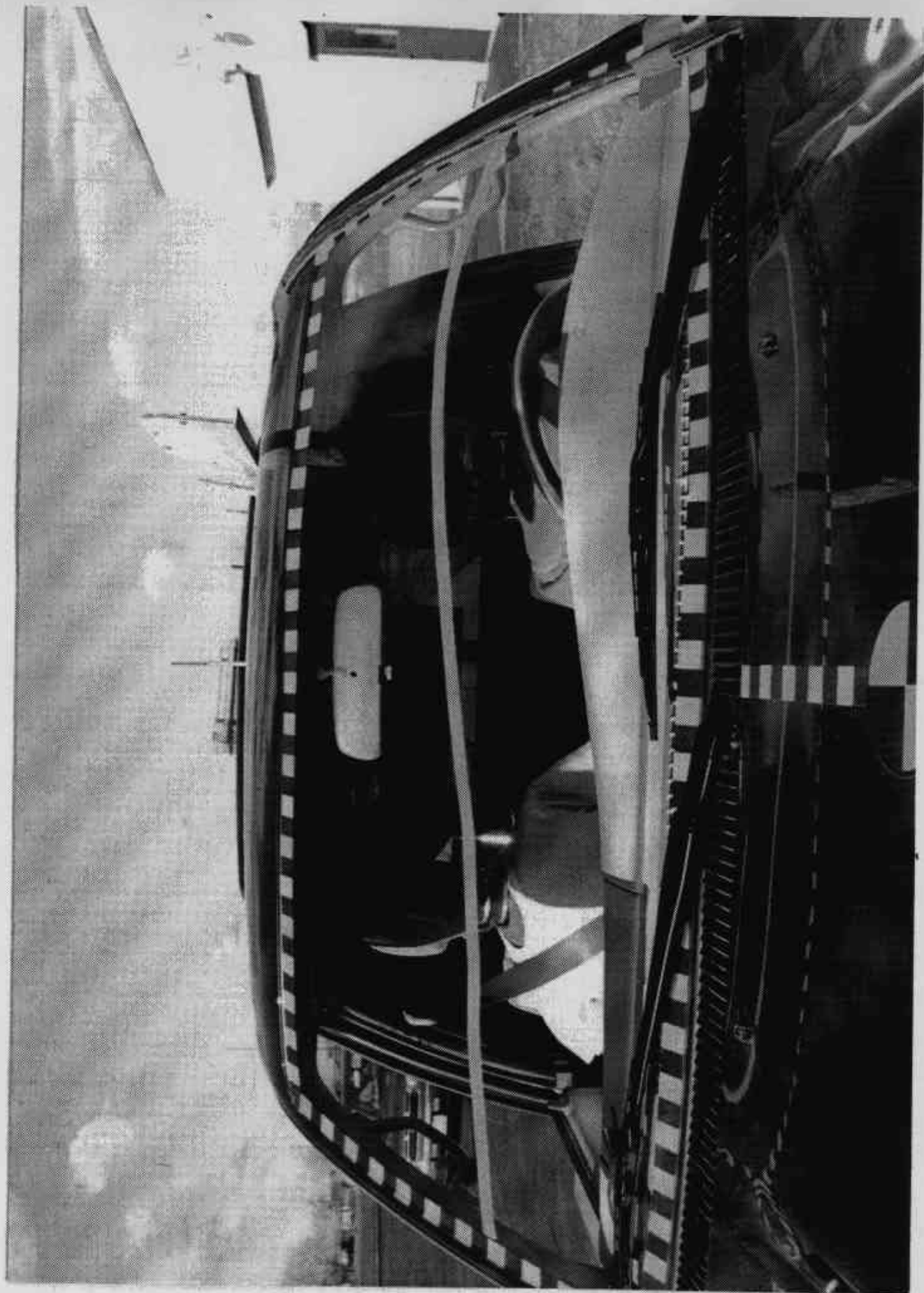


Figure A-12 PRE-TEST WINDSHIELD VIEW

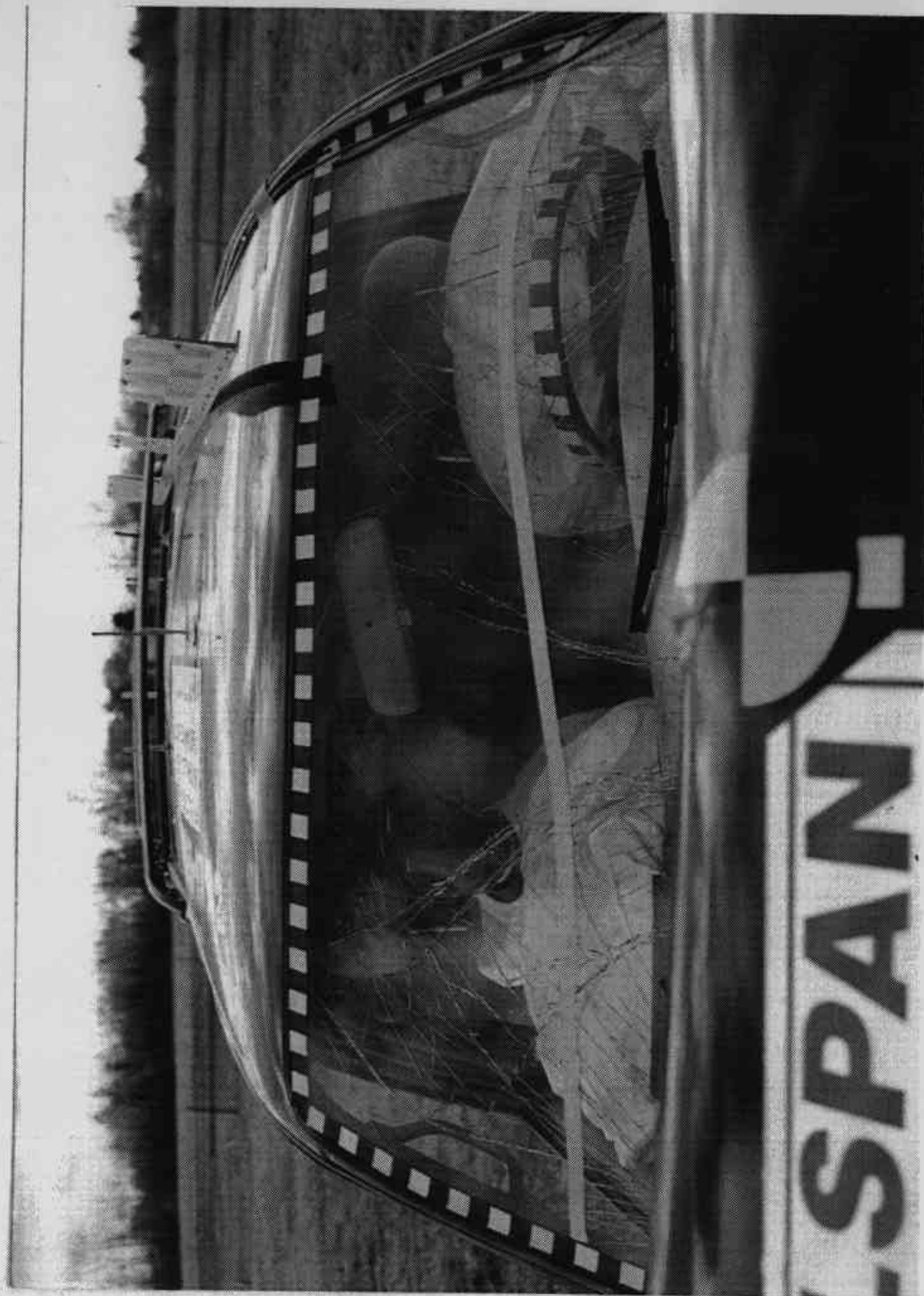


Figure A-13 POST-TEST WINDSHIELD VIEW

Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

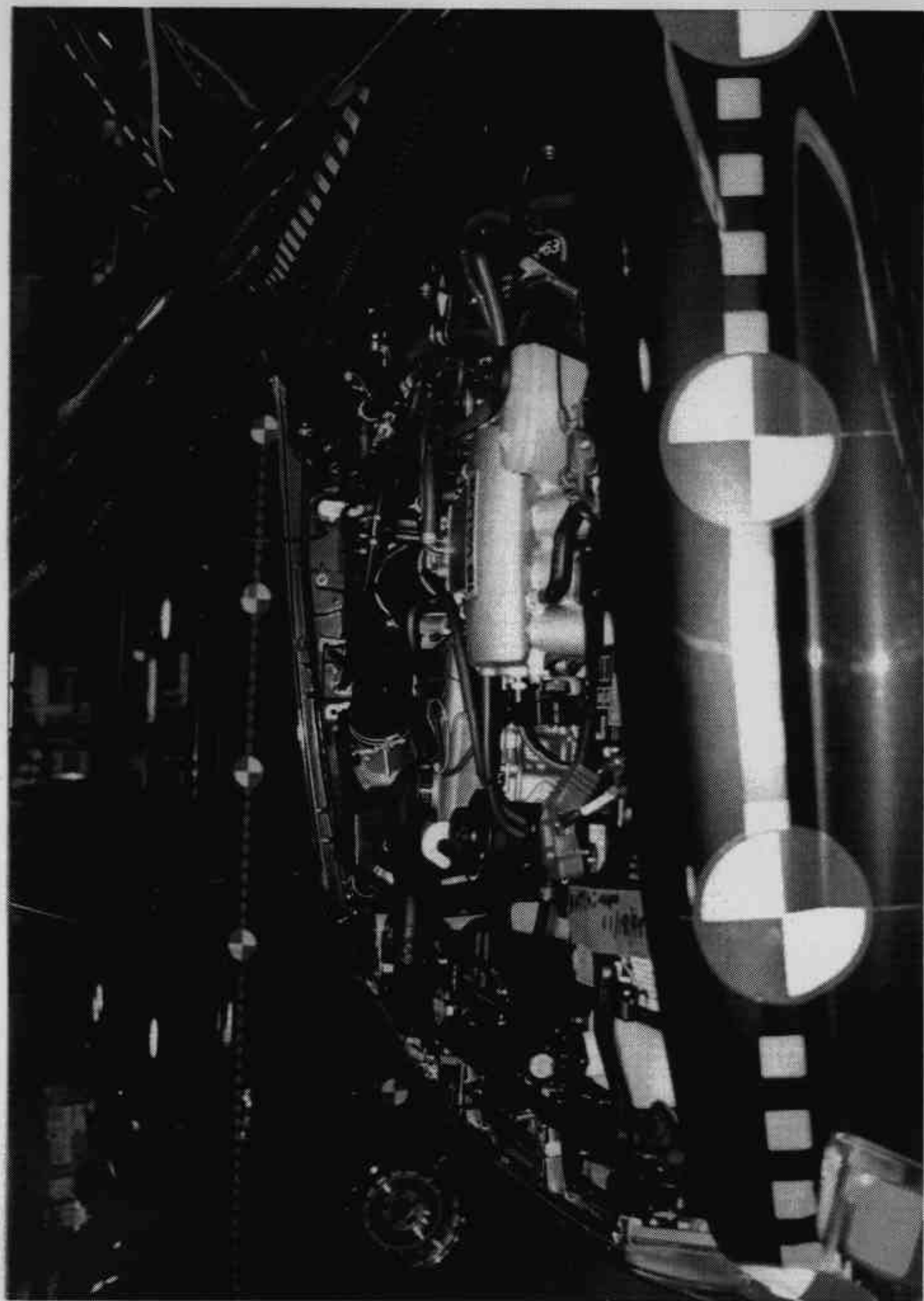




Figure A-15 FUEL CAP VIEW

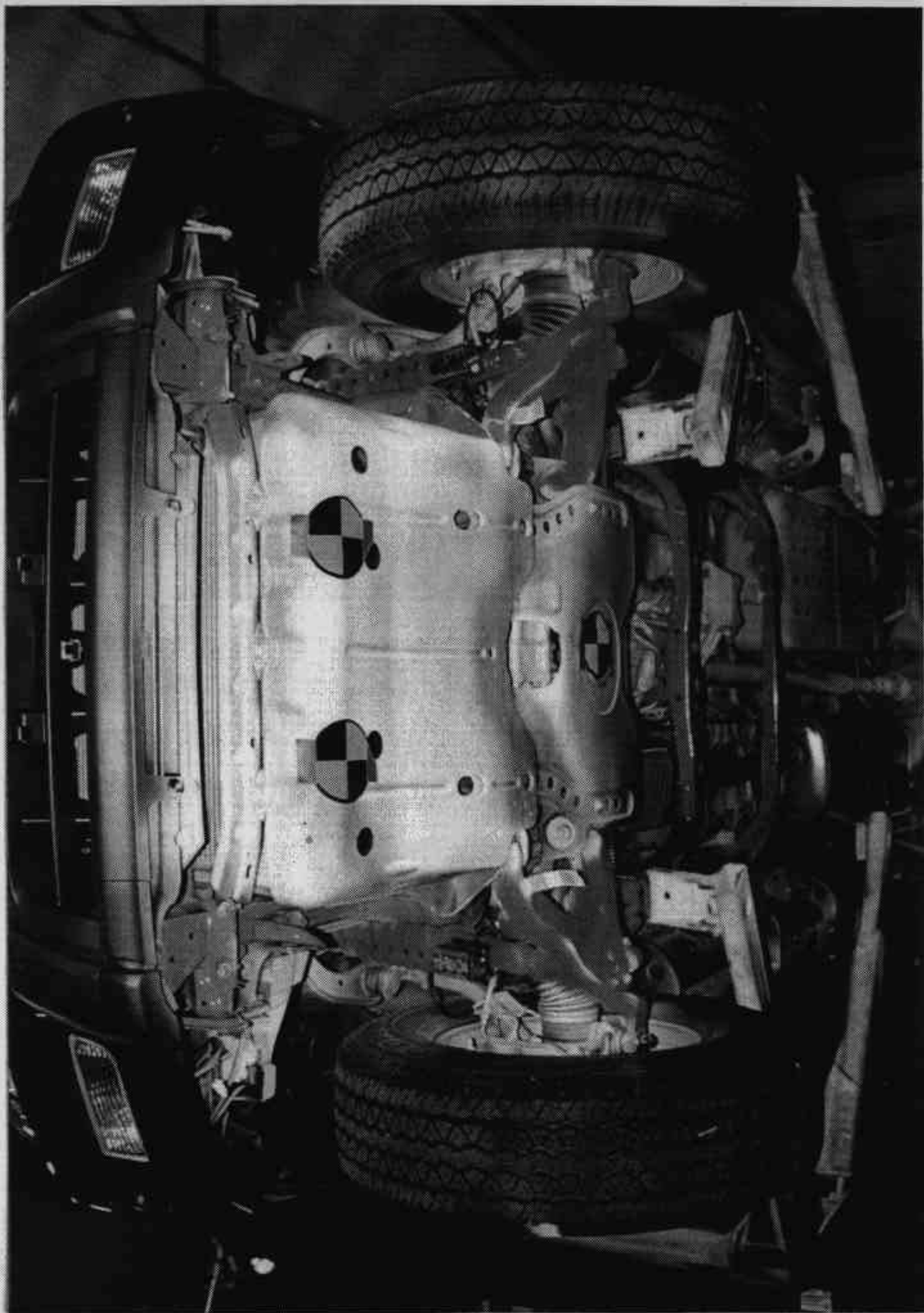


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

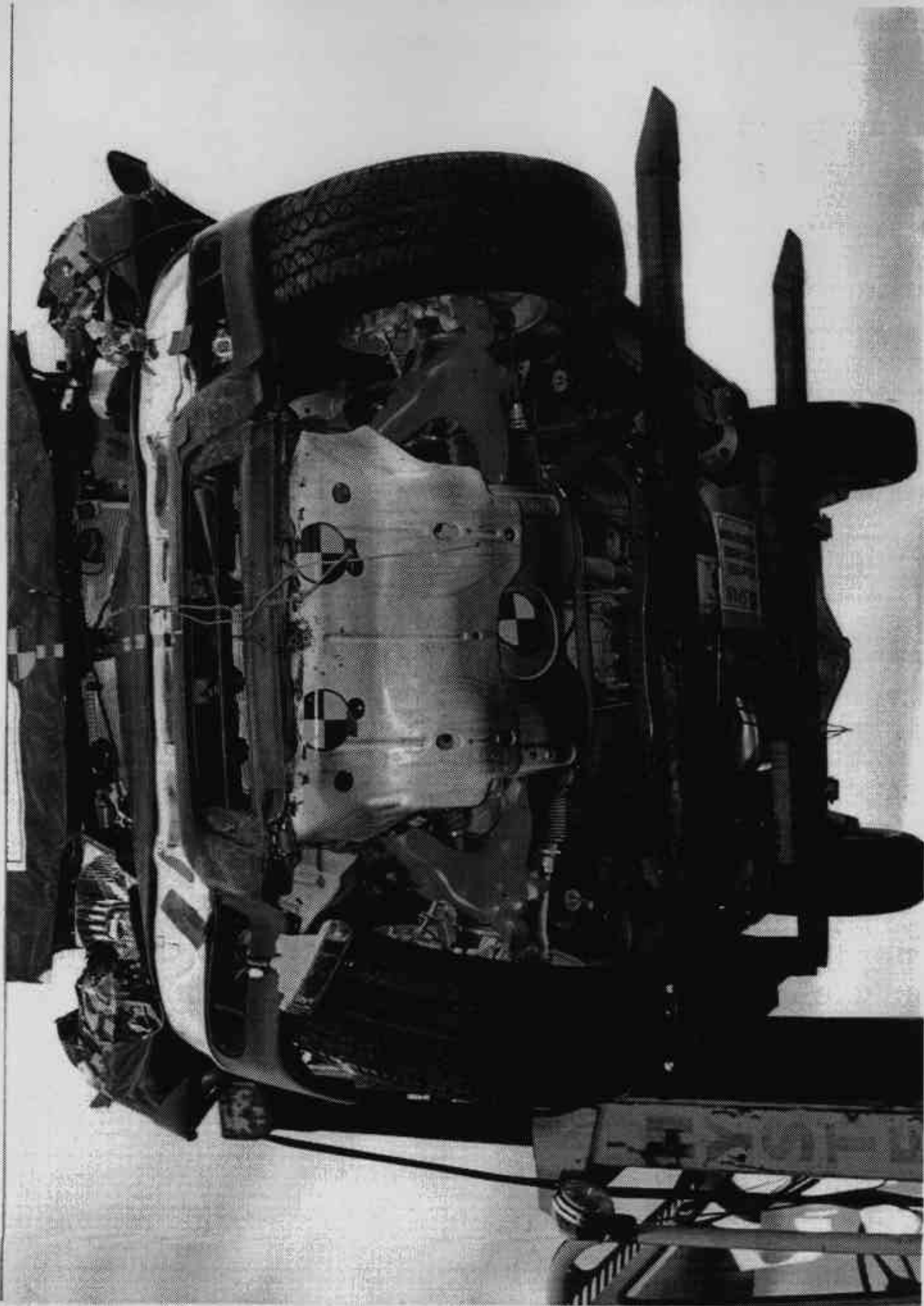


Figure A-17 POST-TEST FRONT UNDERBODY VIEW

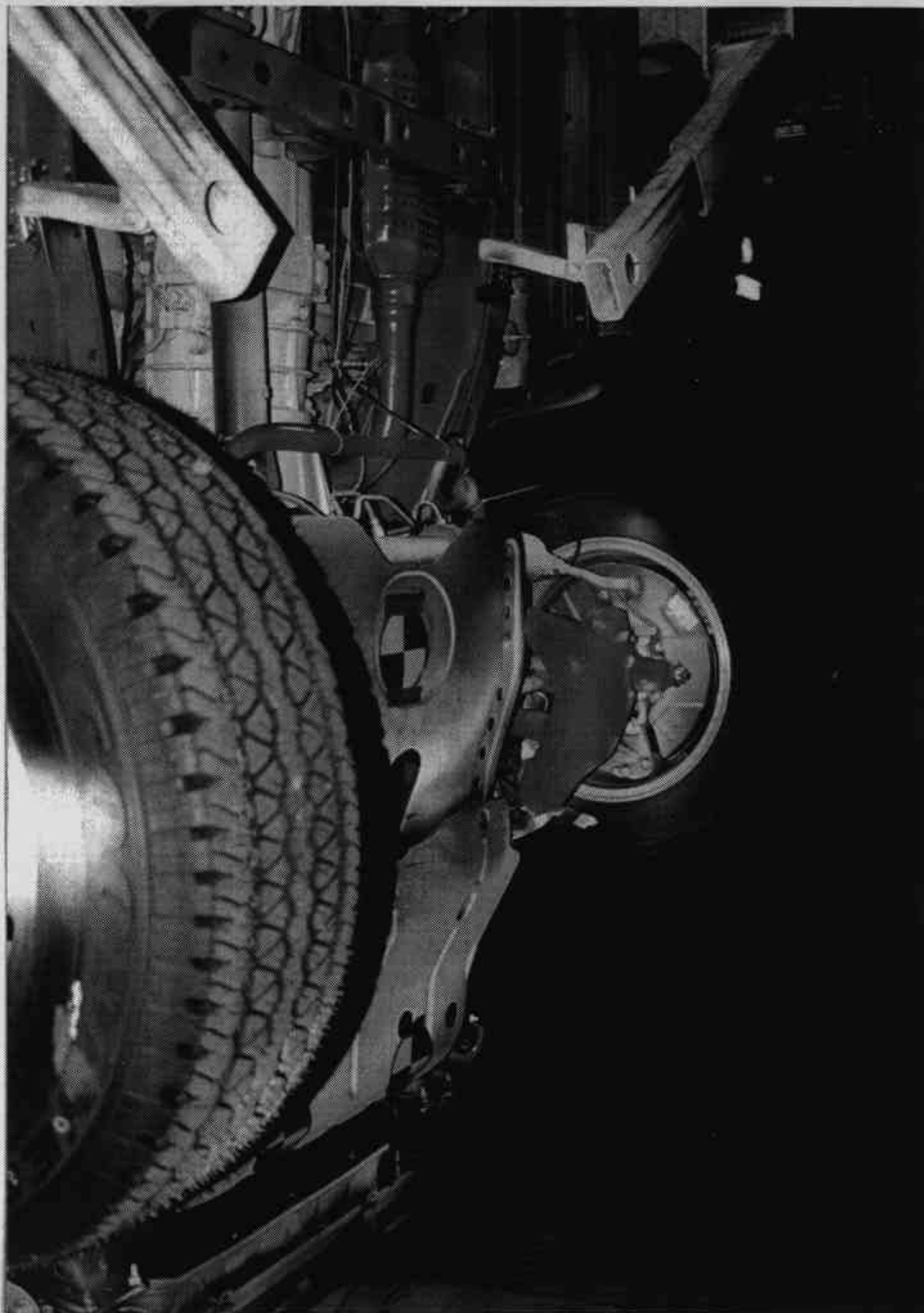


Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW

Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW



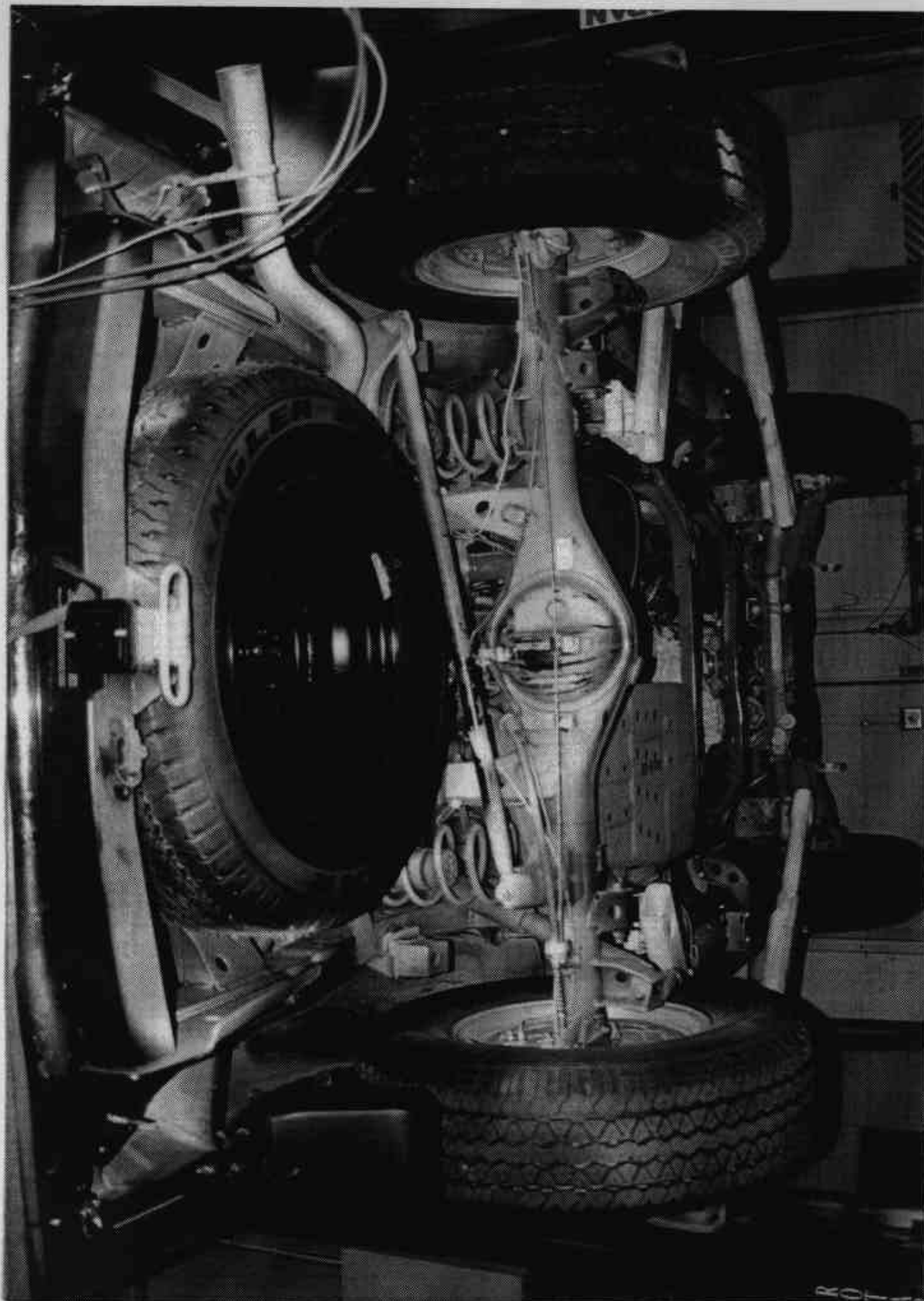


Figure A-20 PRE-TEST REAR UNDERBODY VIEW

Figure A-21 POST-TEST REAR UNDERBODY VIEW



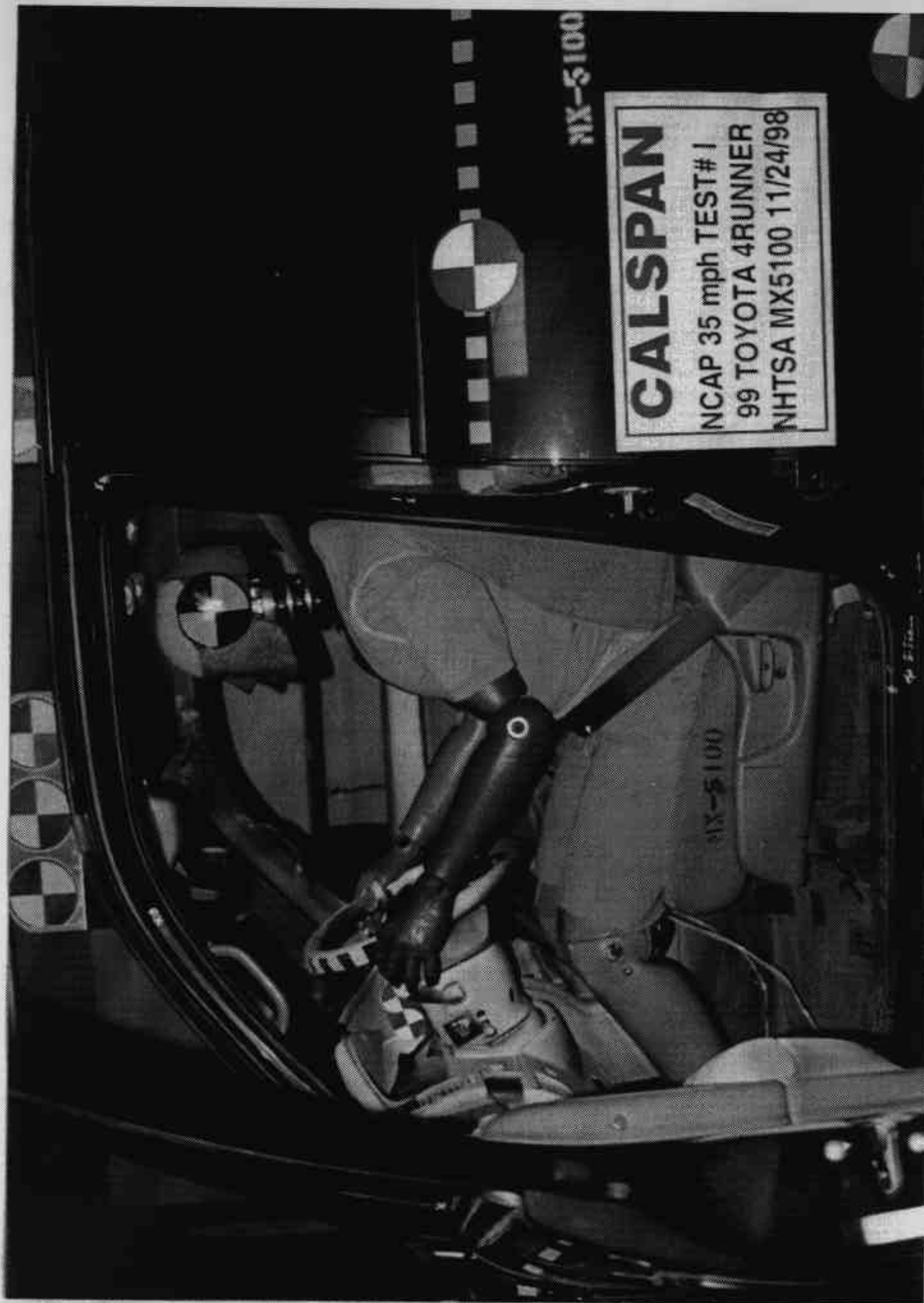


Figure A-22 PRE-TEST DRIVER POSITION VIEW



Figure A-23 POST-TEST DRIVER POSITION VIEW



Figure A-24 PRE-TEST PASSENGER POSITION VIEW

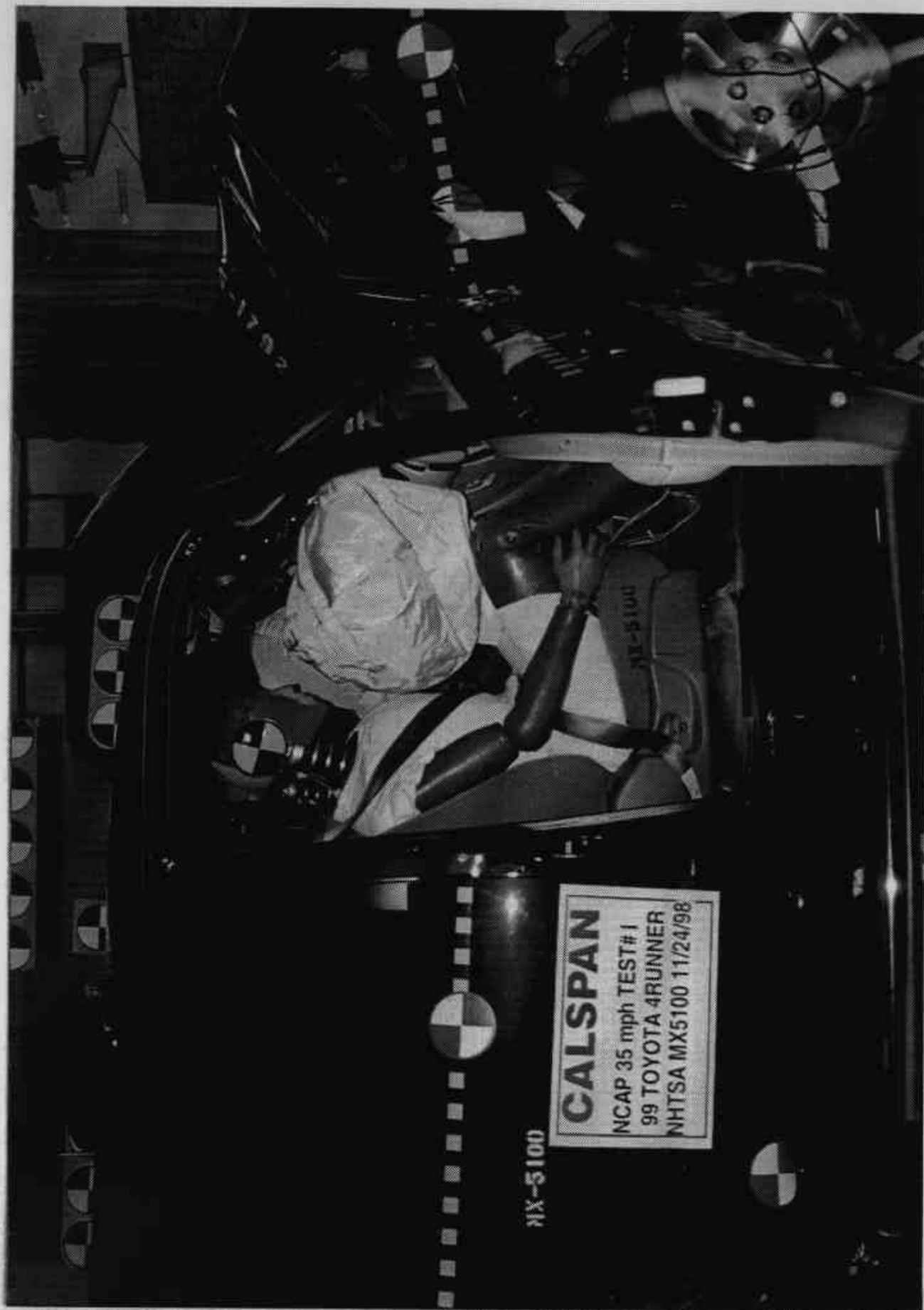


Figure A-25 POST-TEST PASSENGER POSITION VIEW



Figure A-26 PRE-TEST DRIVER AND INTERIOR VIEW

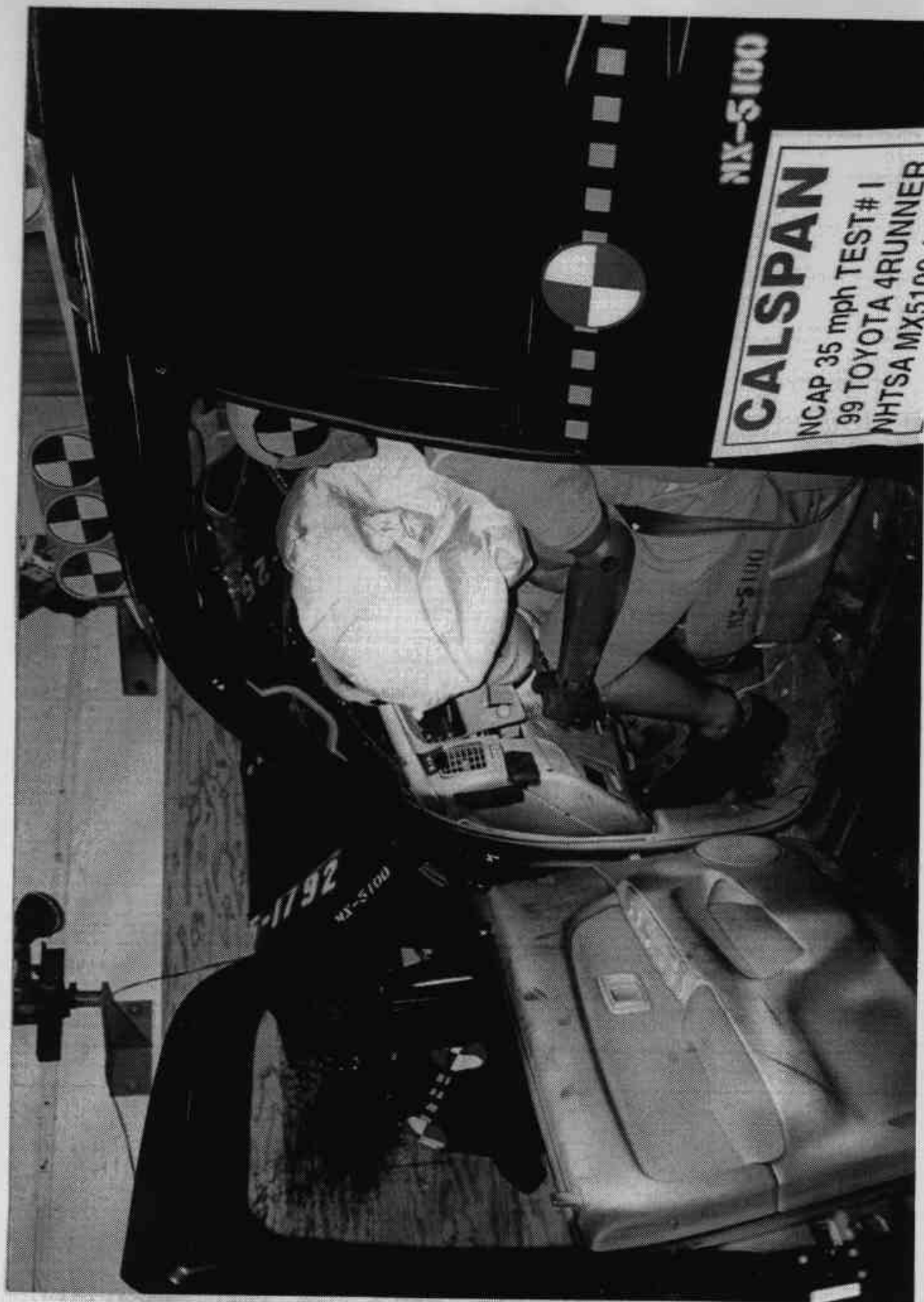


Figure A-27 POST-TEST DRIVER AND INTERIOR VIEW



Figure A-28 PRE-TEST PASSENGER AND INTERIOR VIEW



Figure A-29 POST-TEST PASSENGER AND INTERIOR VIEW

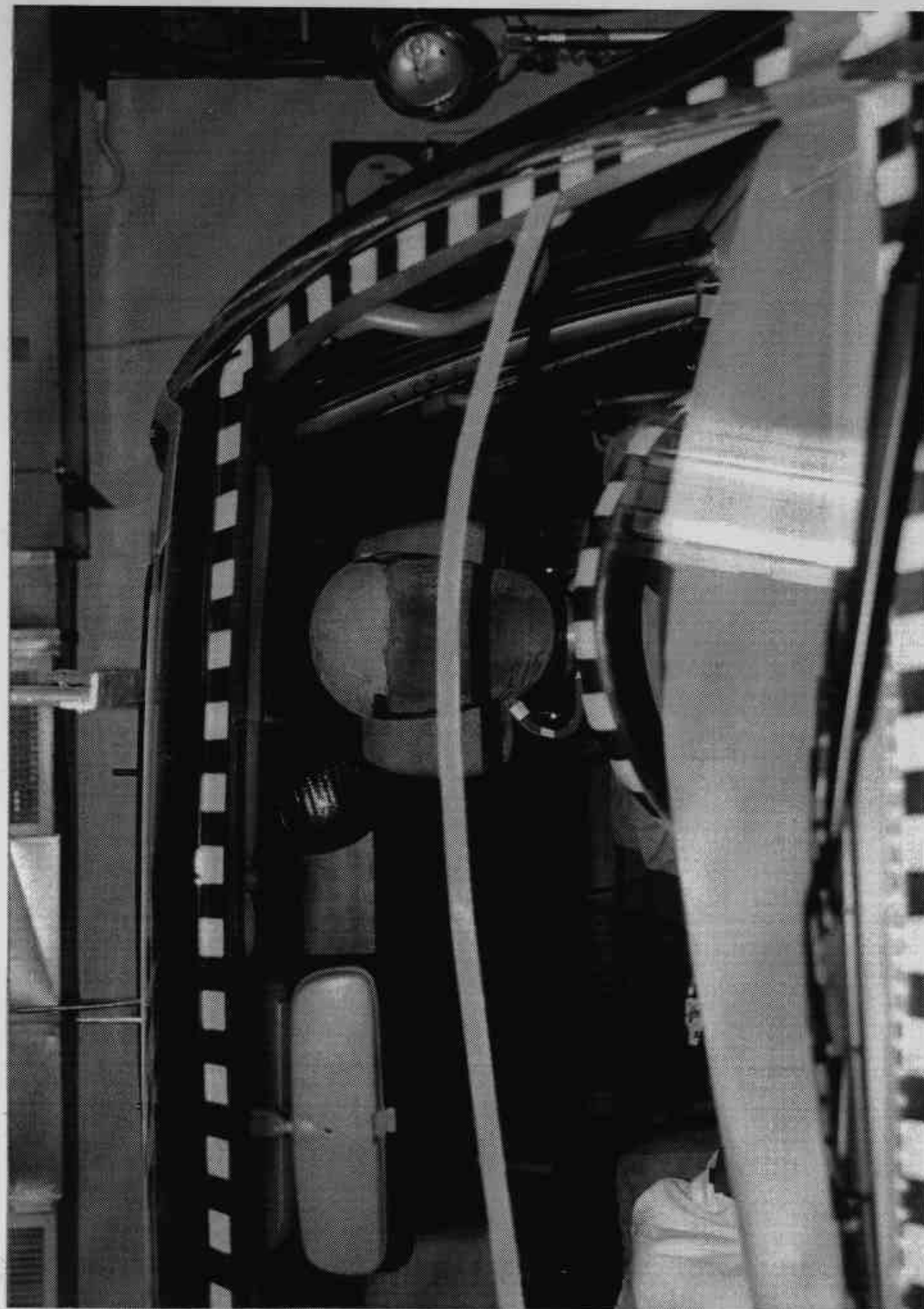


Figure A-30 PRE-TEST DRIVER HEAD LOCATION



Figure A-31 POST-TEST DRIVER HEAD LOCATION

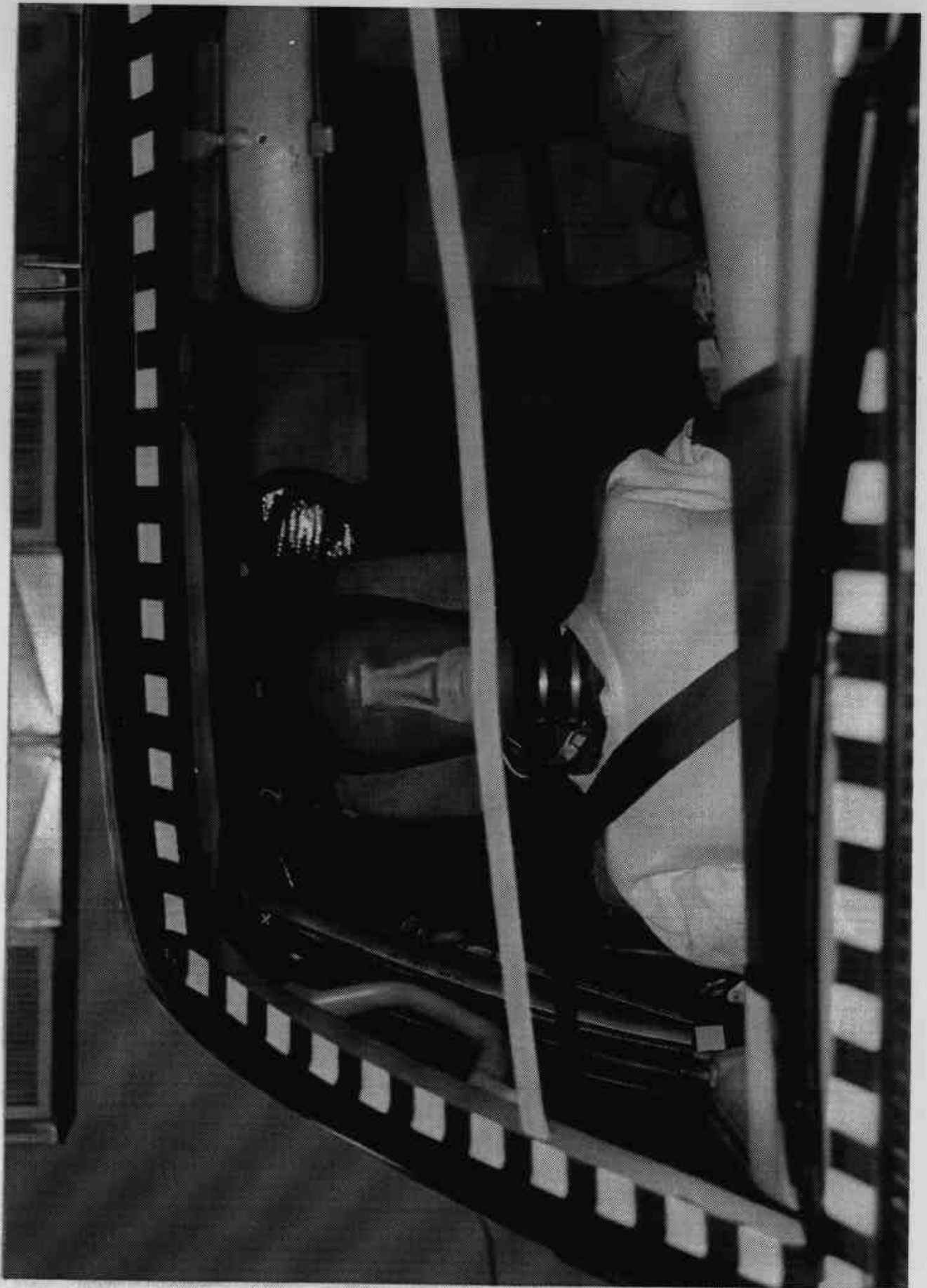


Figure A-32 PRE-TEST PASSENGER HEAD LOCATION



Figure A-33 POST-TEST PASSENGER HEAD LOCATION

Figure A-34 PRE-TEST DRIVER FLOOR PAN VIEW



PHOTOGRAPH NOT AVAILABLE

Figure A-36 PRE-TEST PASSENGER FLOOR PAN VIEW

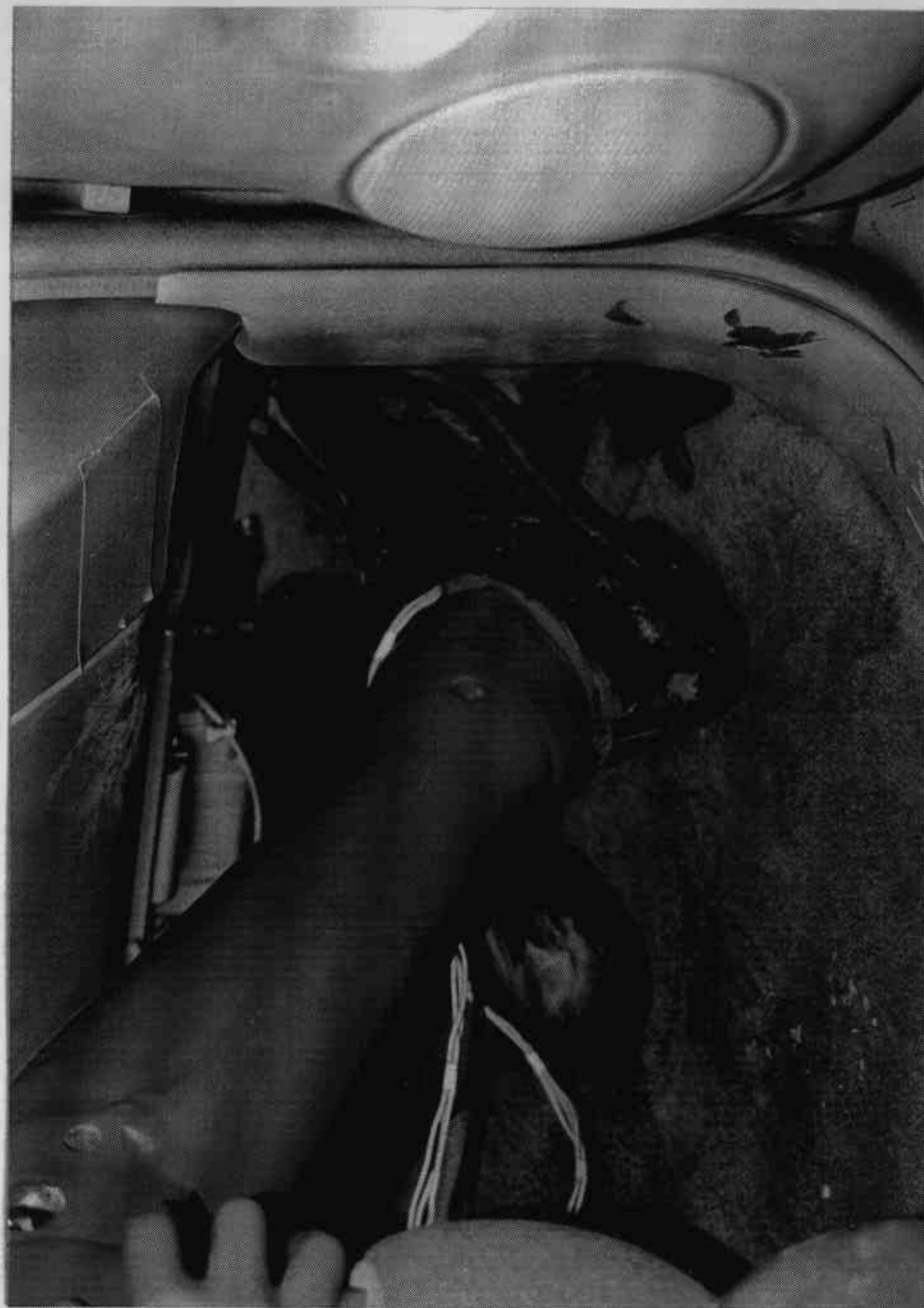
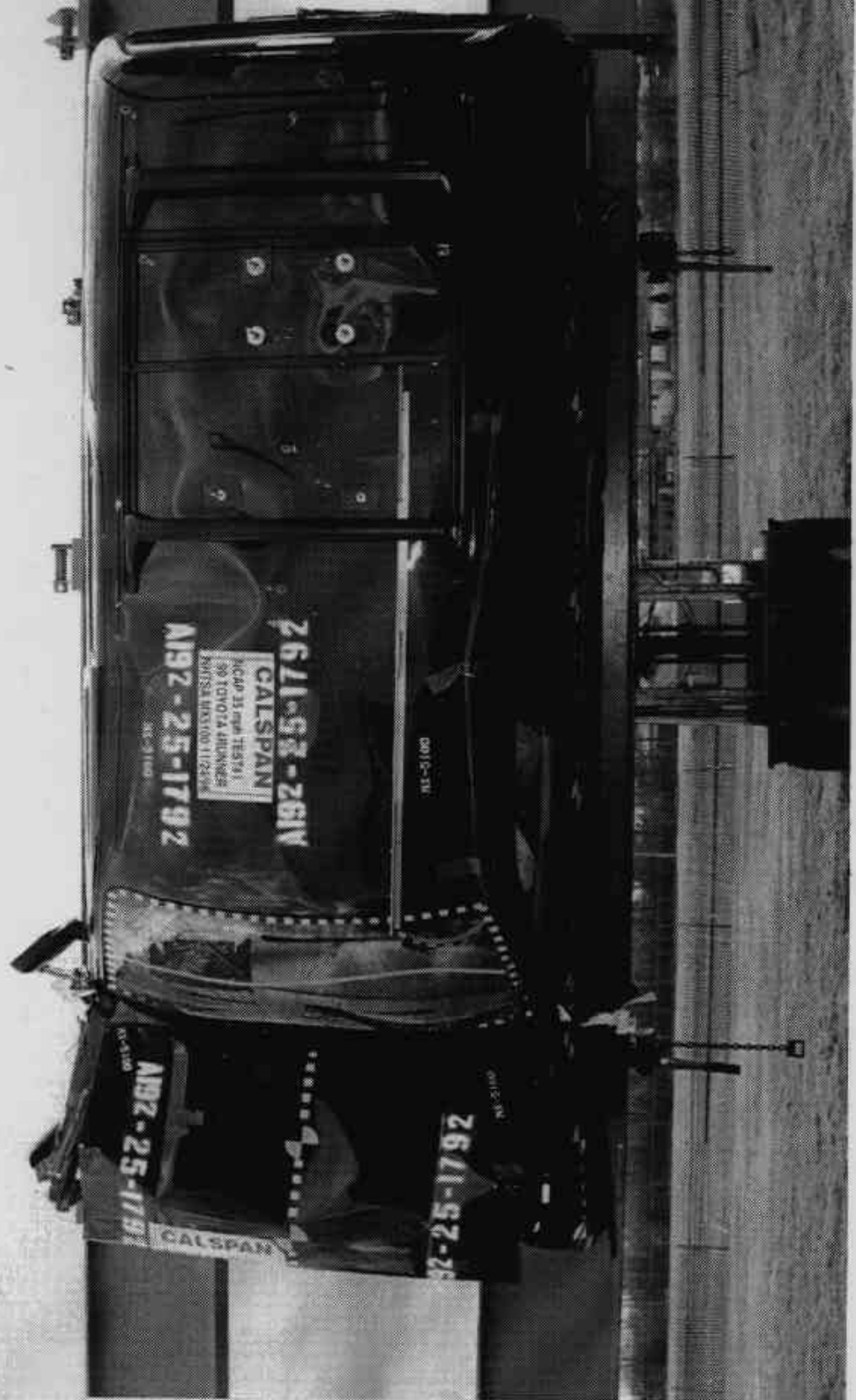




Figure A-37 POST-TEST PASSENGER FLOOR PAN VIEW

Figure A-38 ROLLOVER VIEW



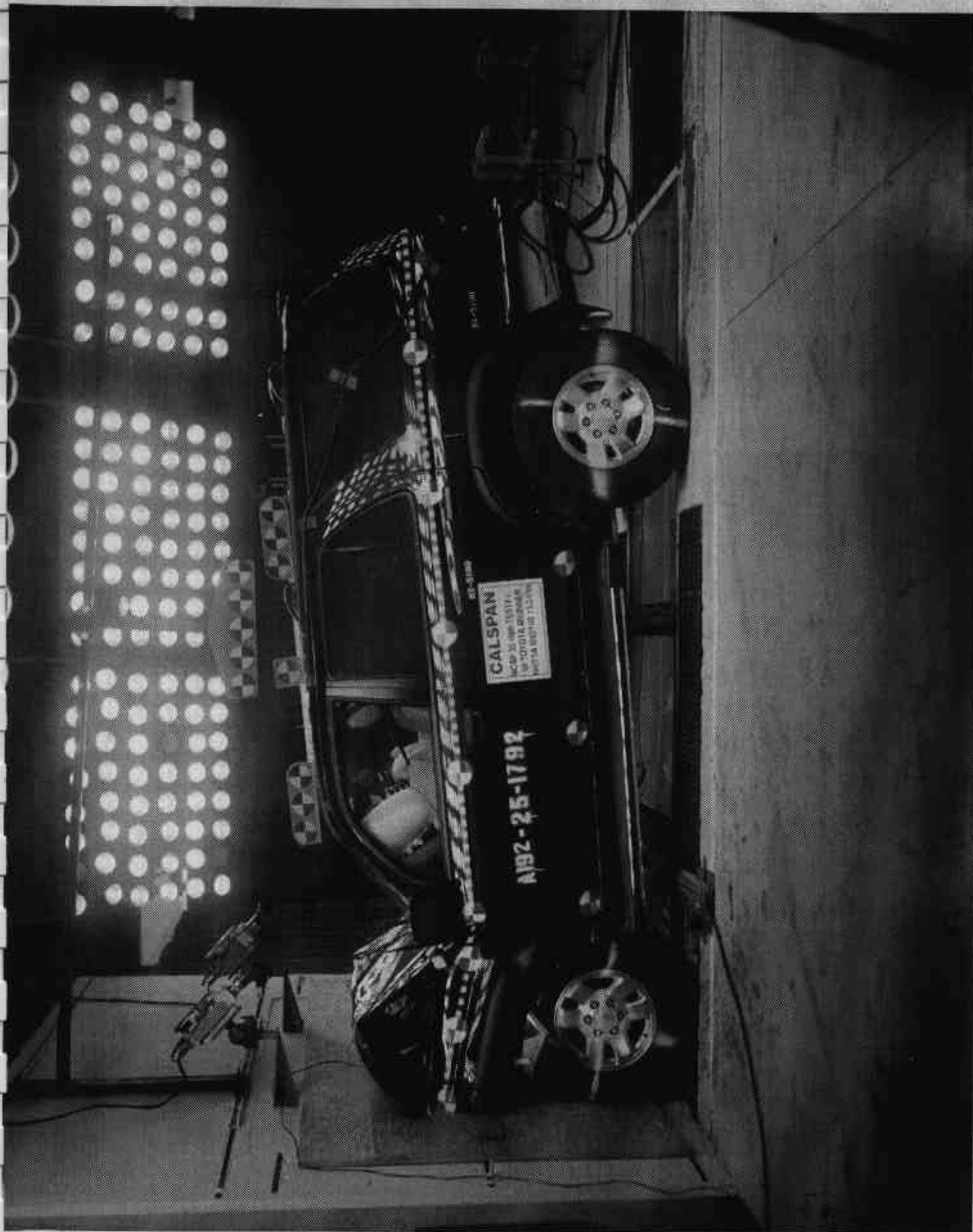


Figure A-39 IMPACT VIEW

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

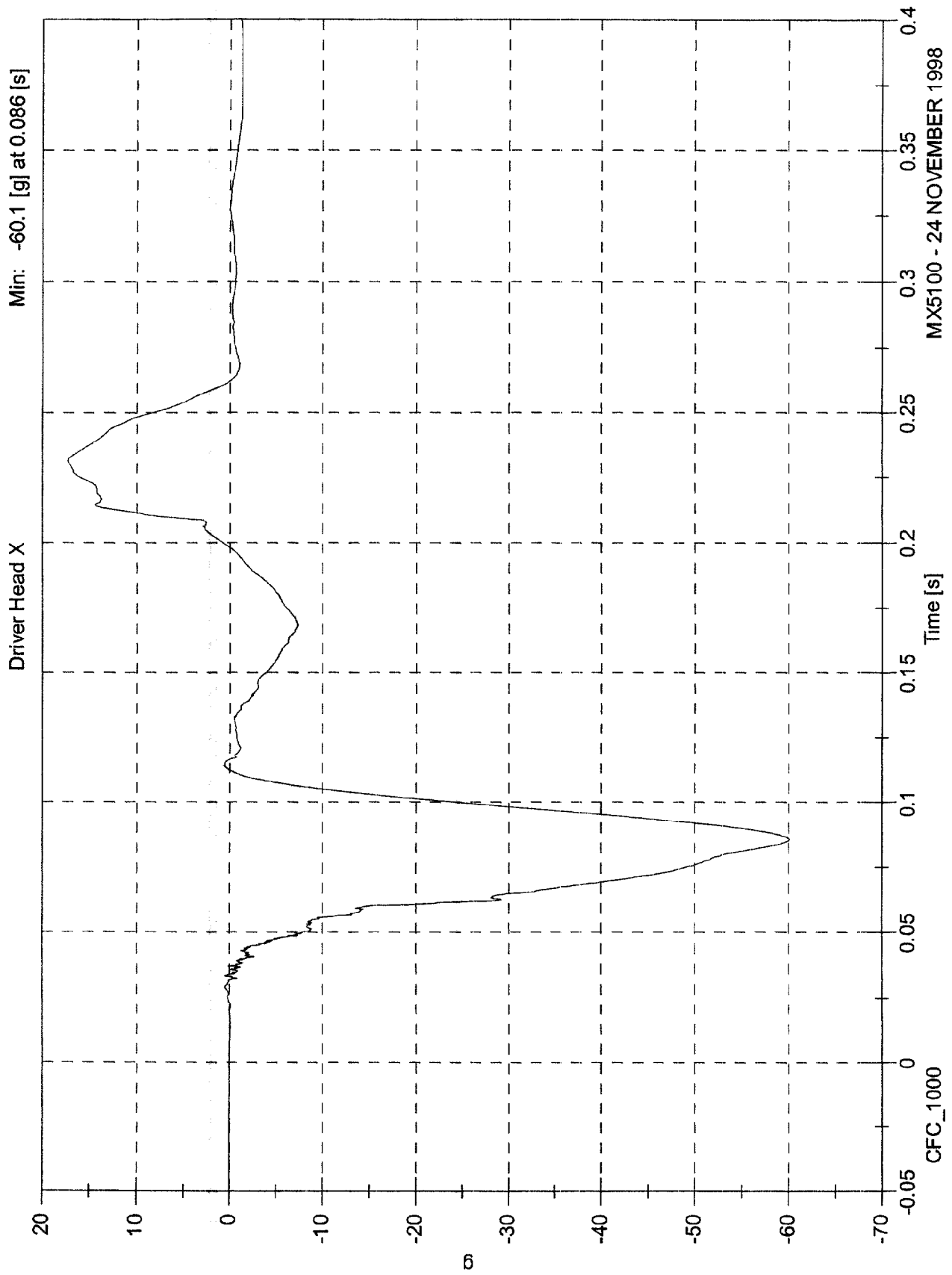
NHTSA TEST NO. MX5100

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

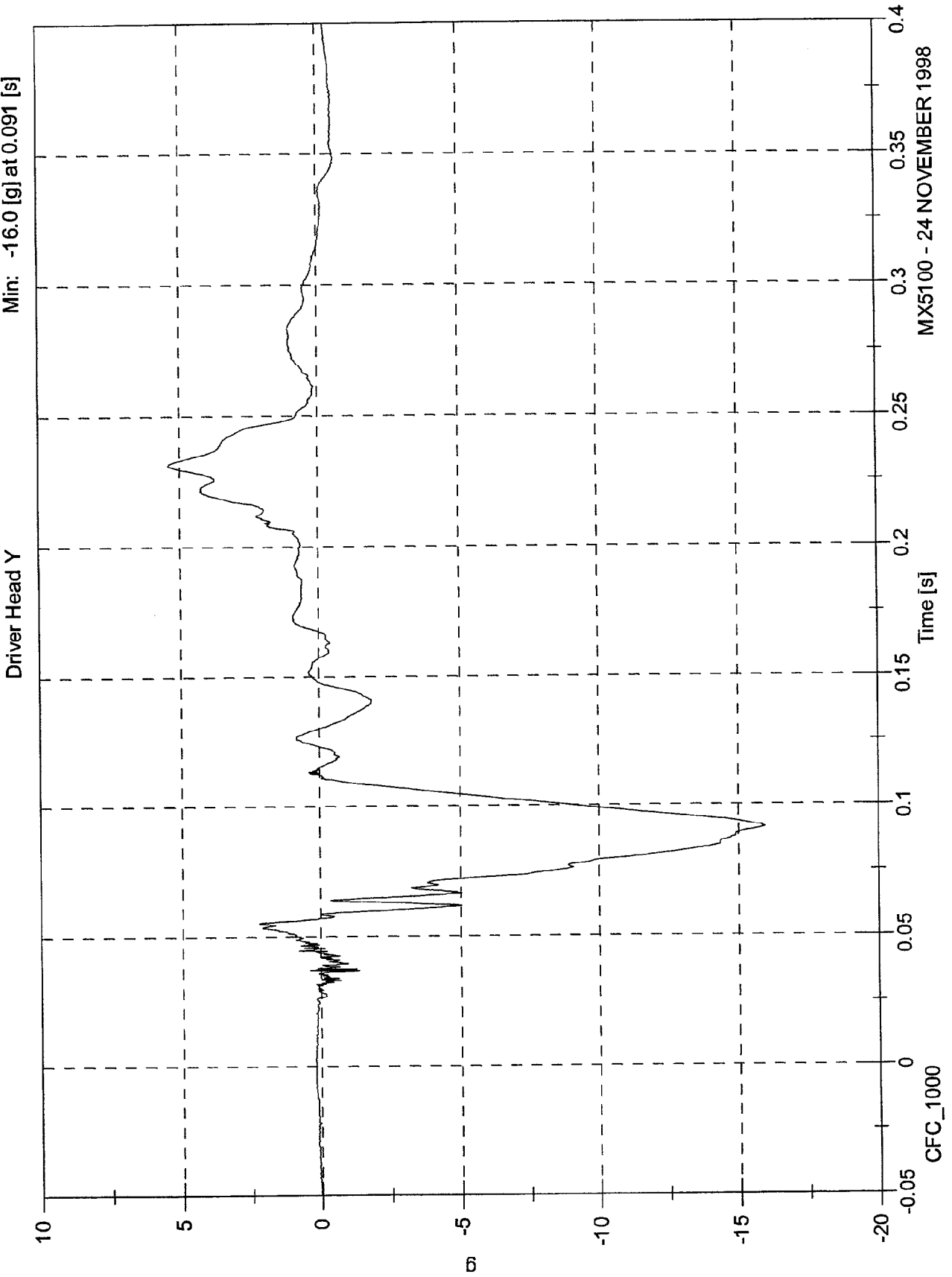
NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 17.3 [g] at 0.232 [s]
Min: -60.1 [g] at 0.086 [s]



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

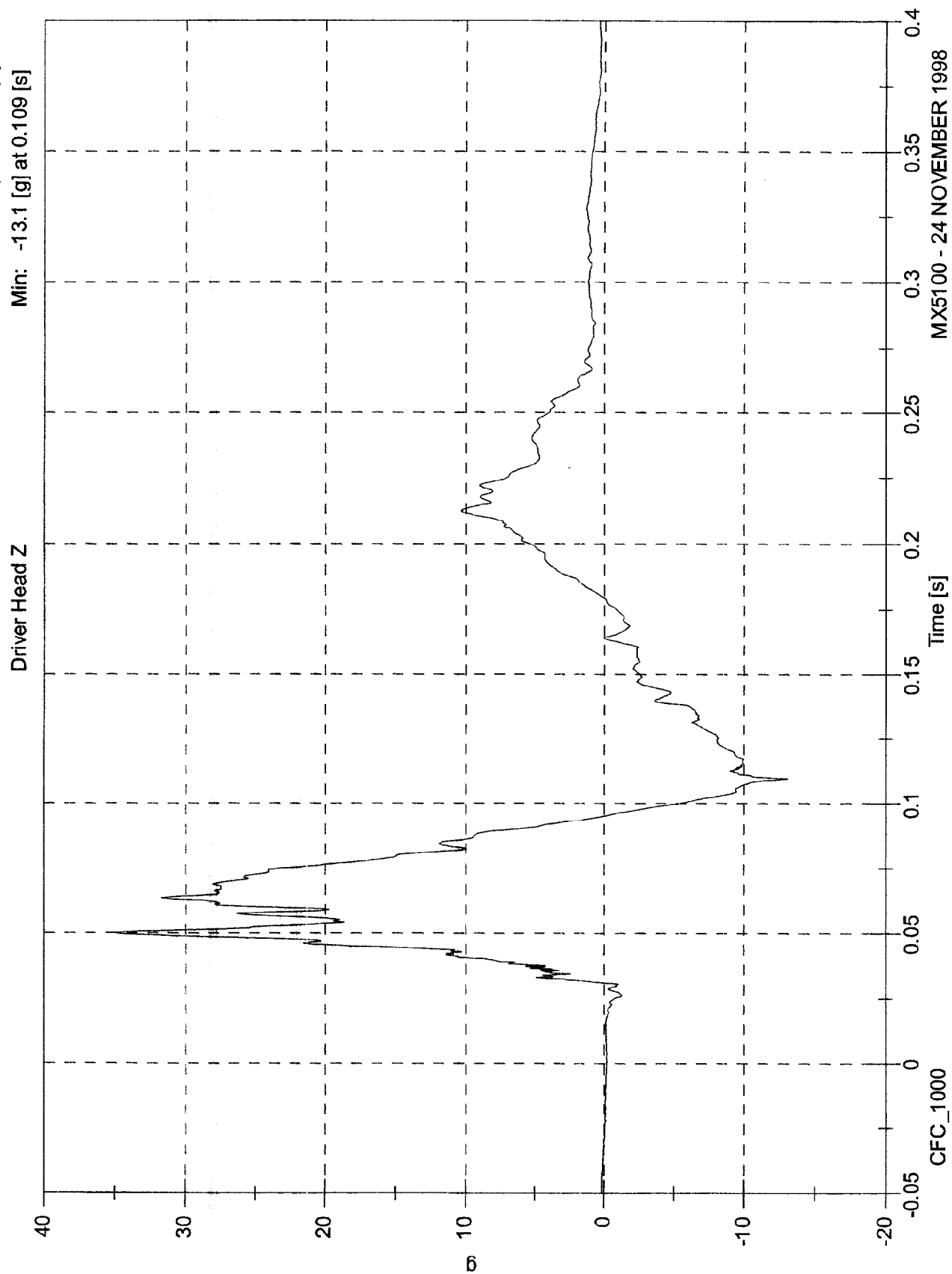
Max: 5.4 [g] at 0.231 [s]
Min: -16.0 [g] at 0.091 [s]



MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 35.0 [g] at 0.050 [s]
Min: -13.1 [g] at 0.109 [s]

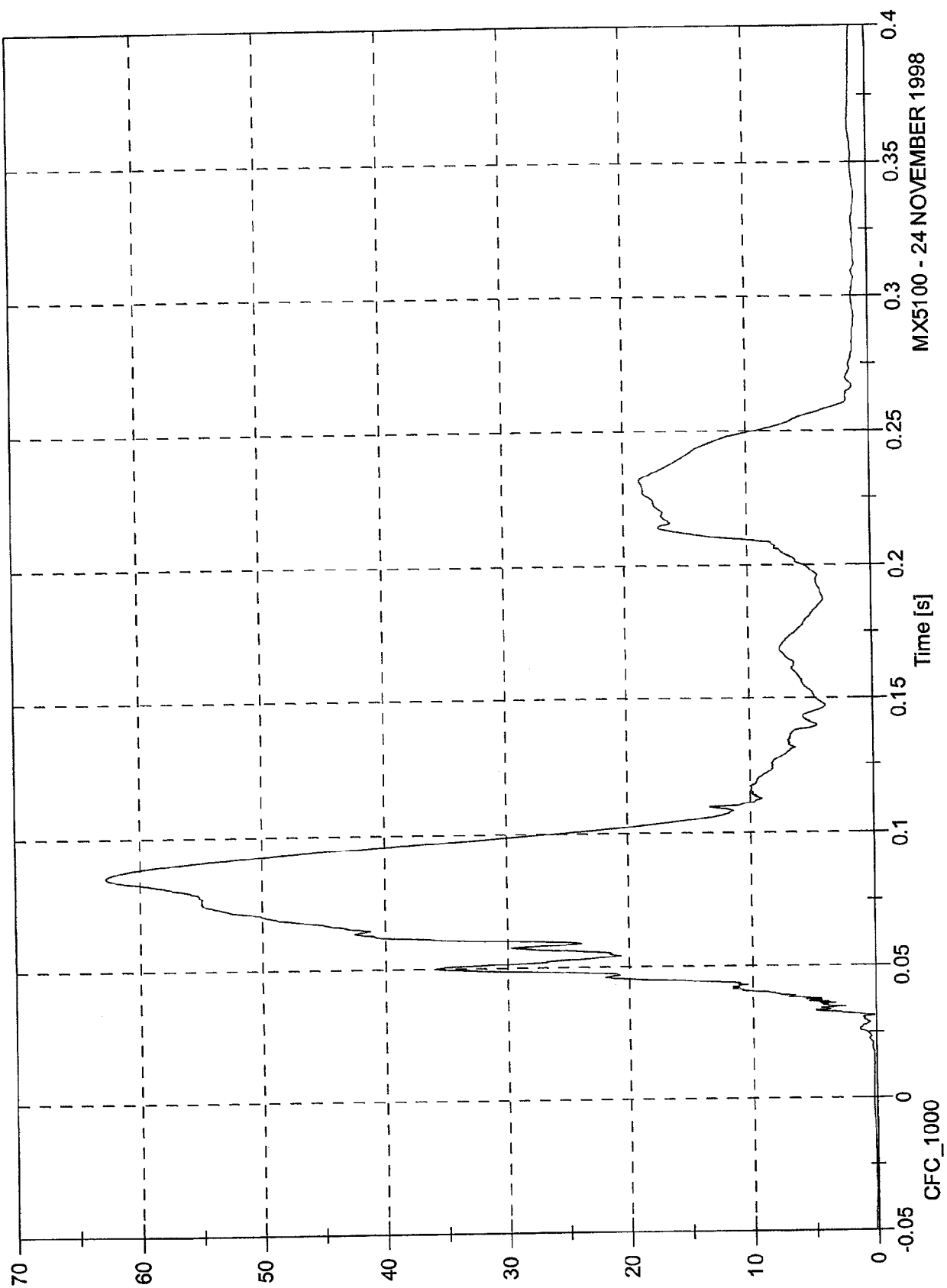


MX5100 - 24 NOVEMBER 1998

Max 62.7 [g] at 0.085 [s]
Min: 0.0 [g] at -0.077 [s]

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

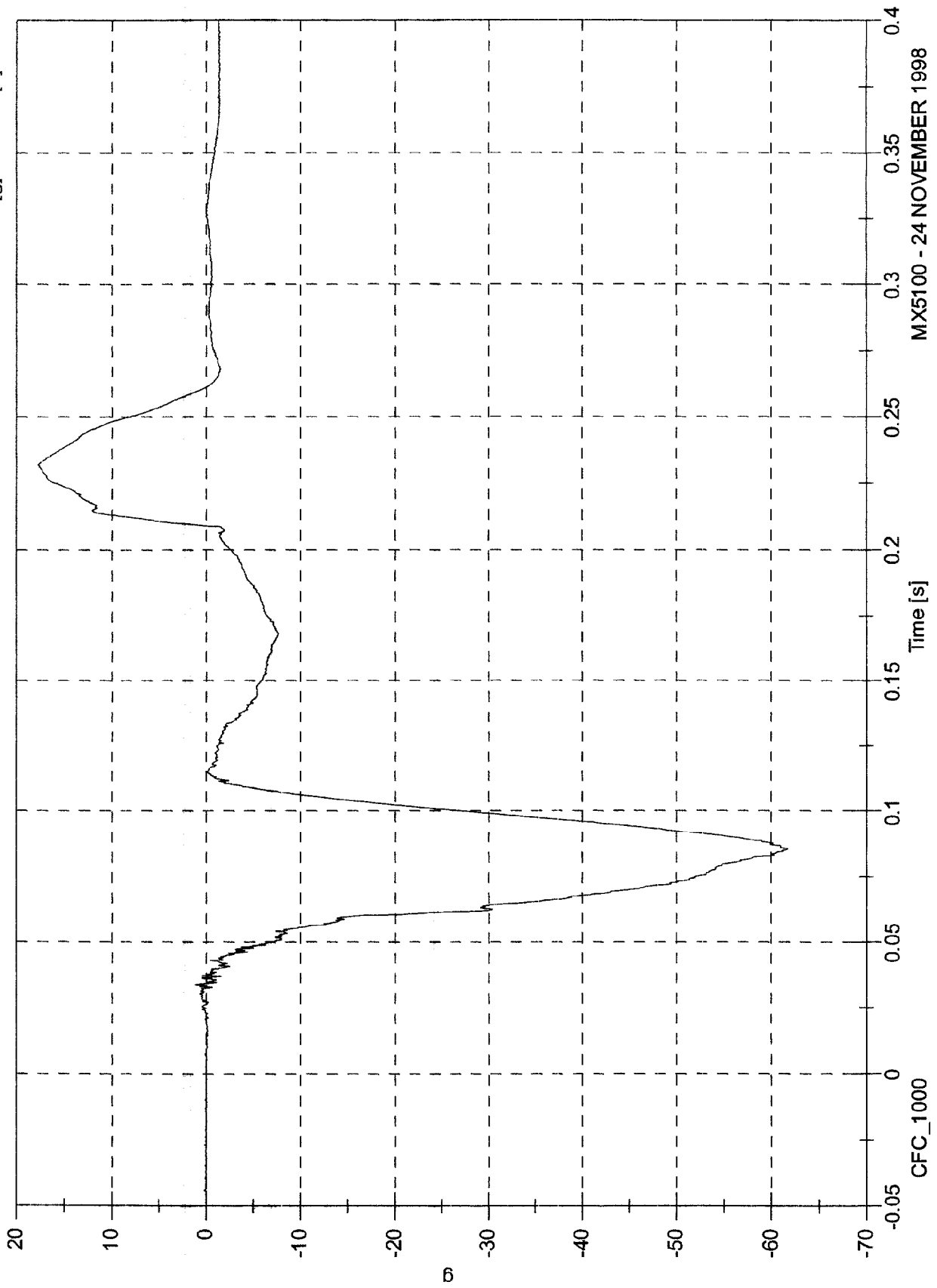
Driver Head Resultant



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 17.7 [g] at 0.232 [s]
Min: -61.7 [g] at 0.085 [s]

Driver Head Redundant X

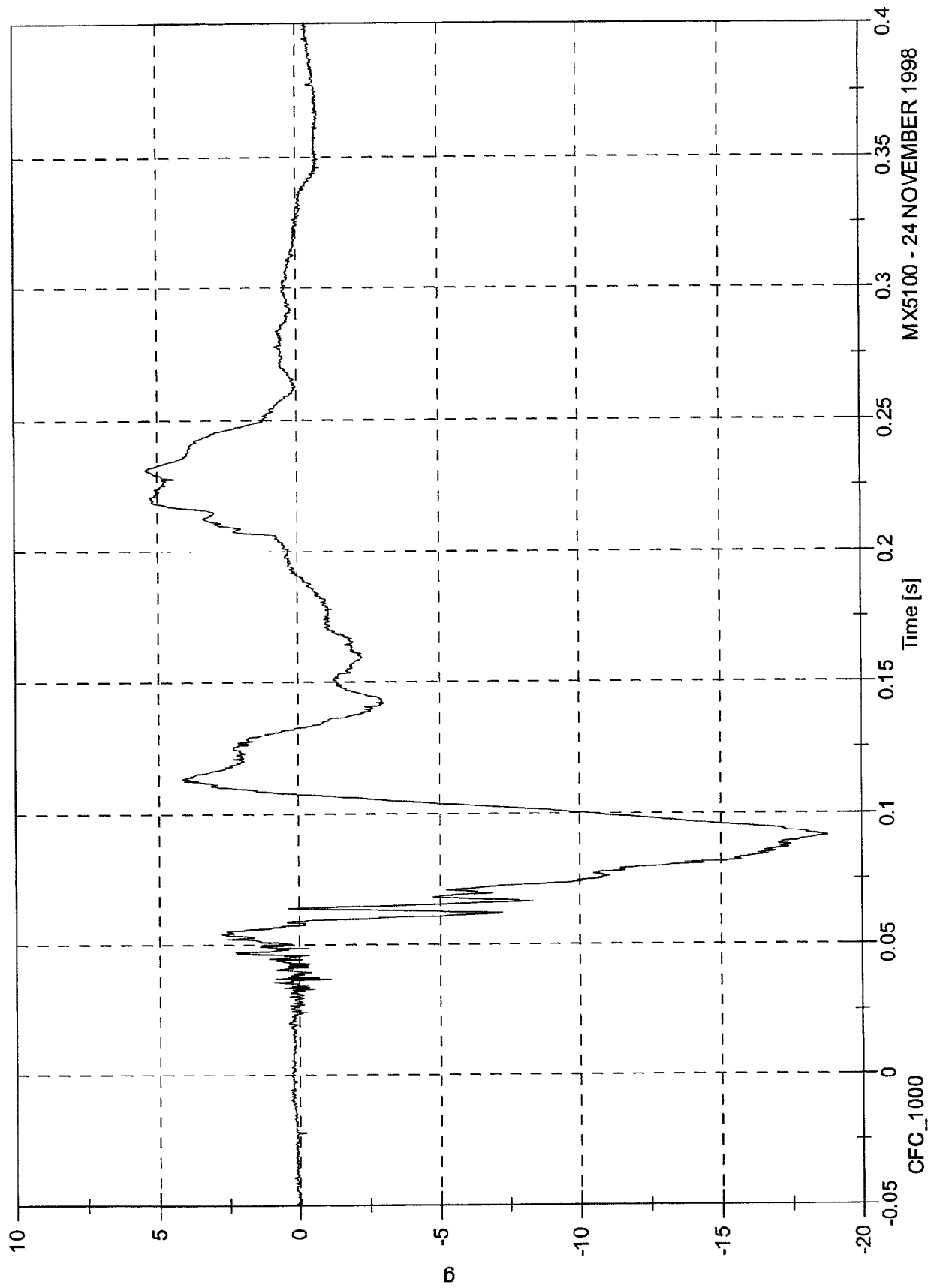


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 5.4 [g] at 0.231 [s]
Min: -18.8 [g] at 0.091 [s]

Driver Head Redundant Y

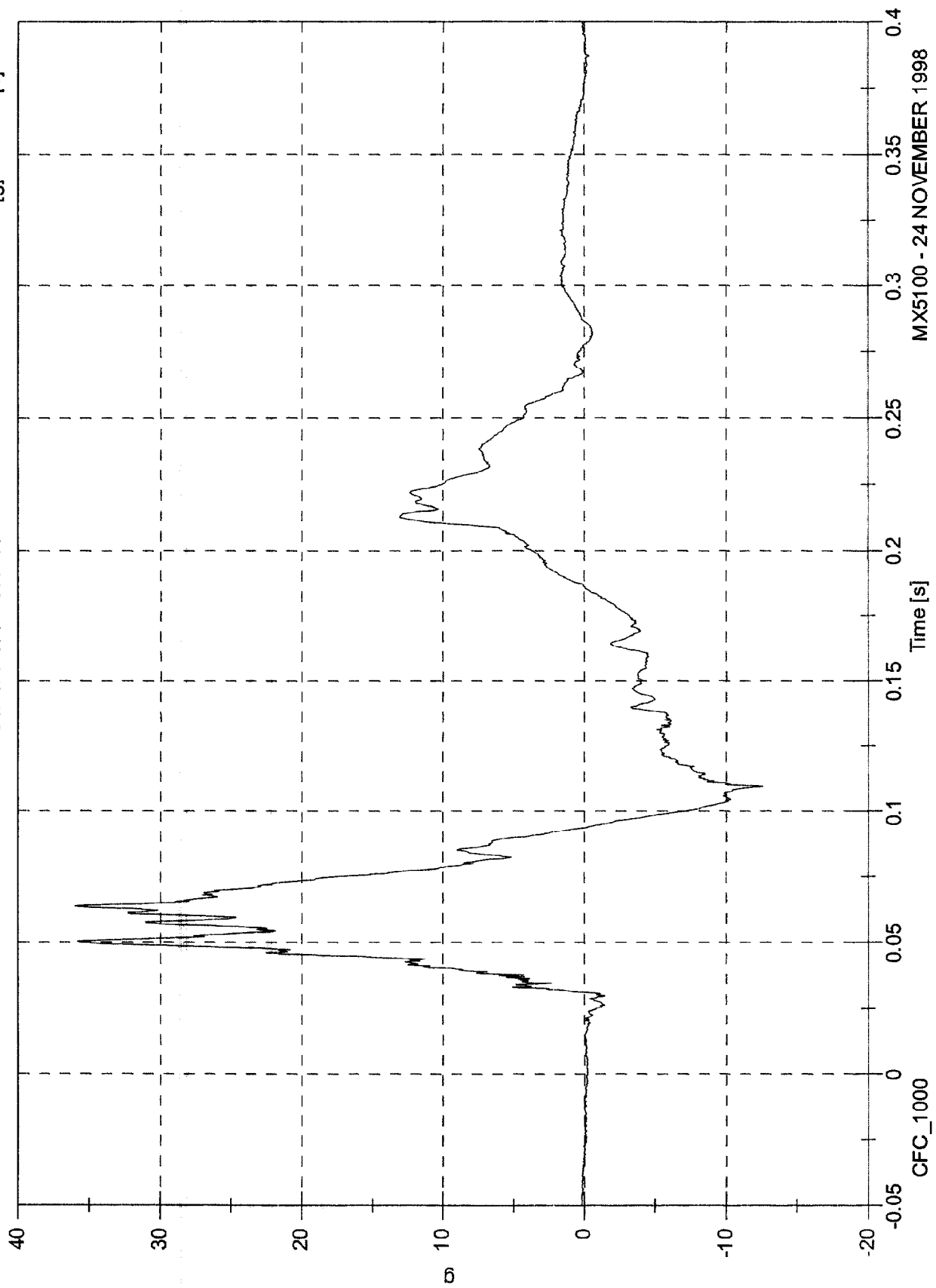


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Head Redundant Z

Max: 36.0 [g] at 0.064 [s]
Min: -12.6 [g] at 0.109 [s]

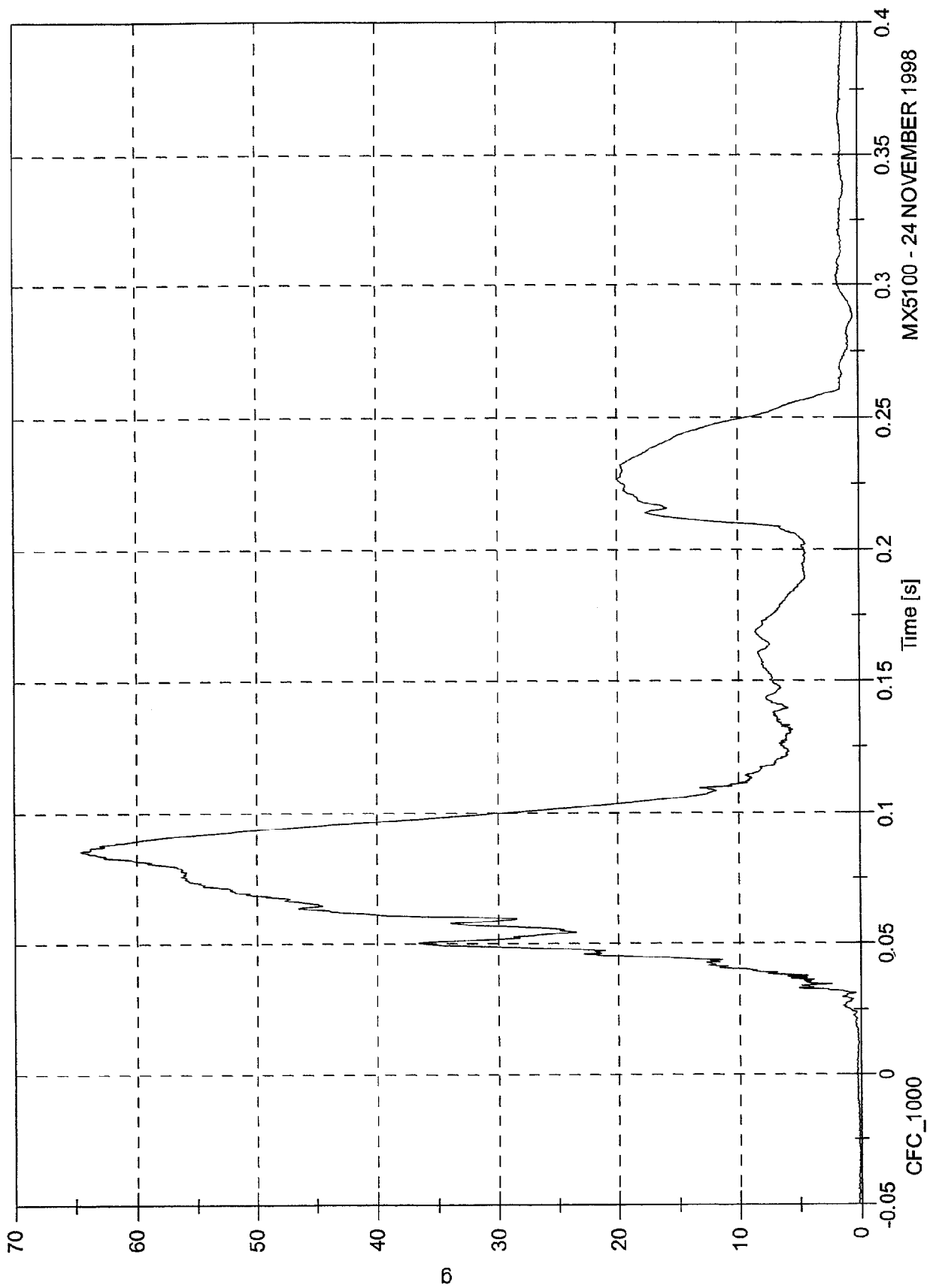


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Head Redundant Resultant

Max: 64.6 [g] at 0.085 [s]
Min: 0.0 [g] at -0.071 [s]



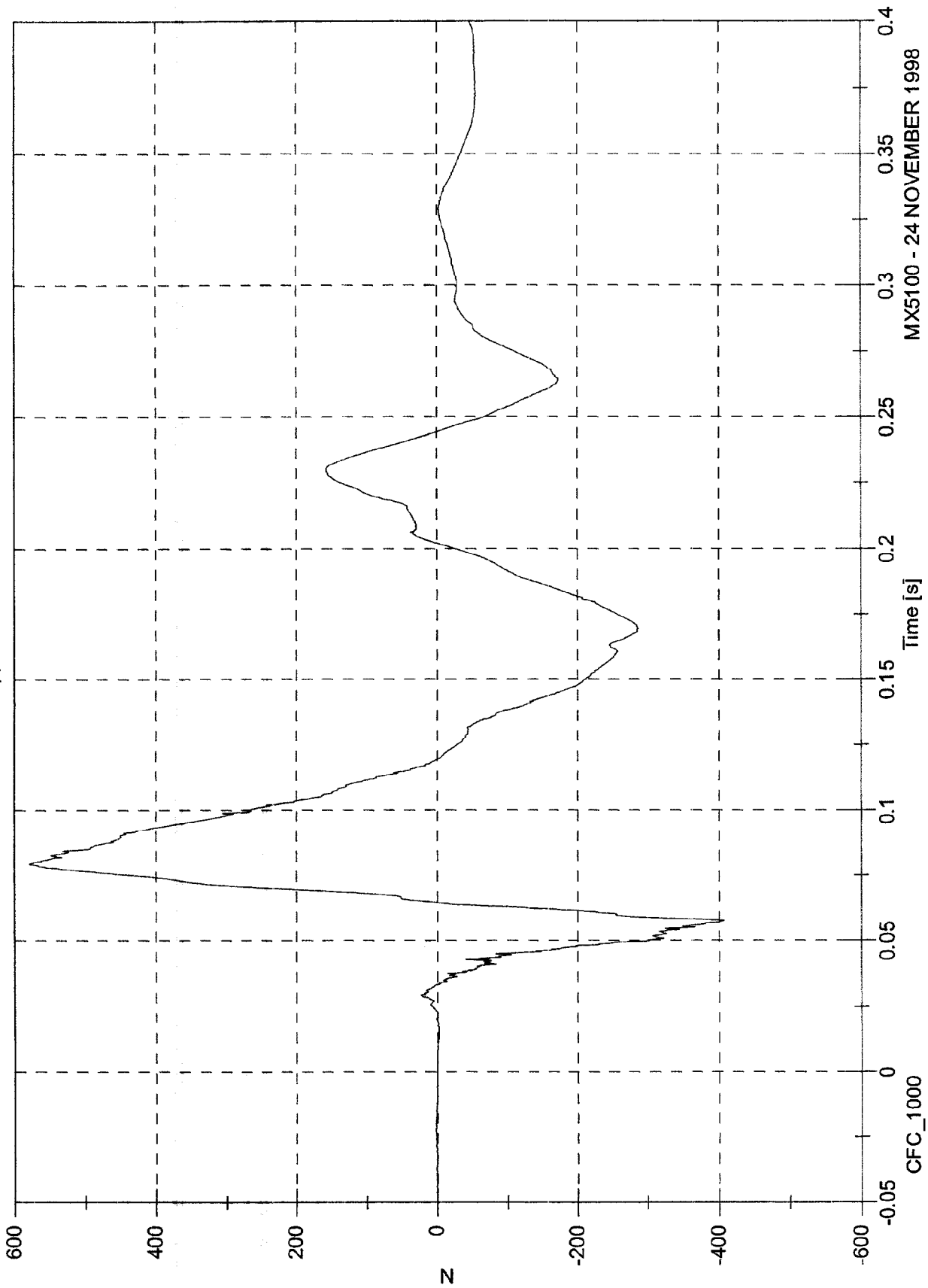
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 579.6 [N] at 0.079 [s]

Min: -407.5 [N] at 0.058 [s]

Driver Upper Neck Load Cell Fx

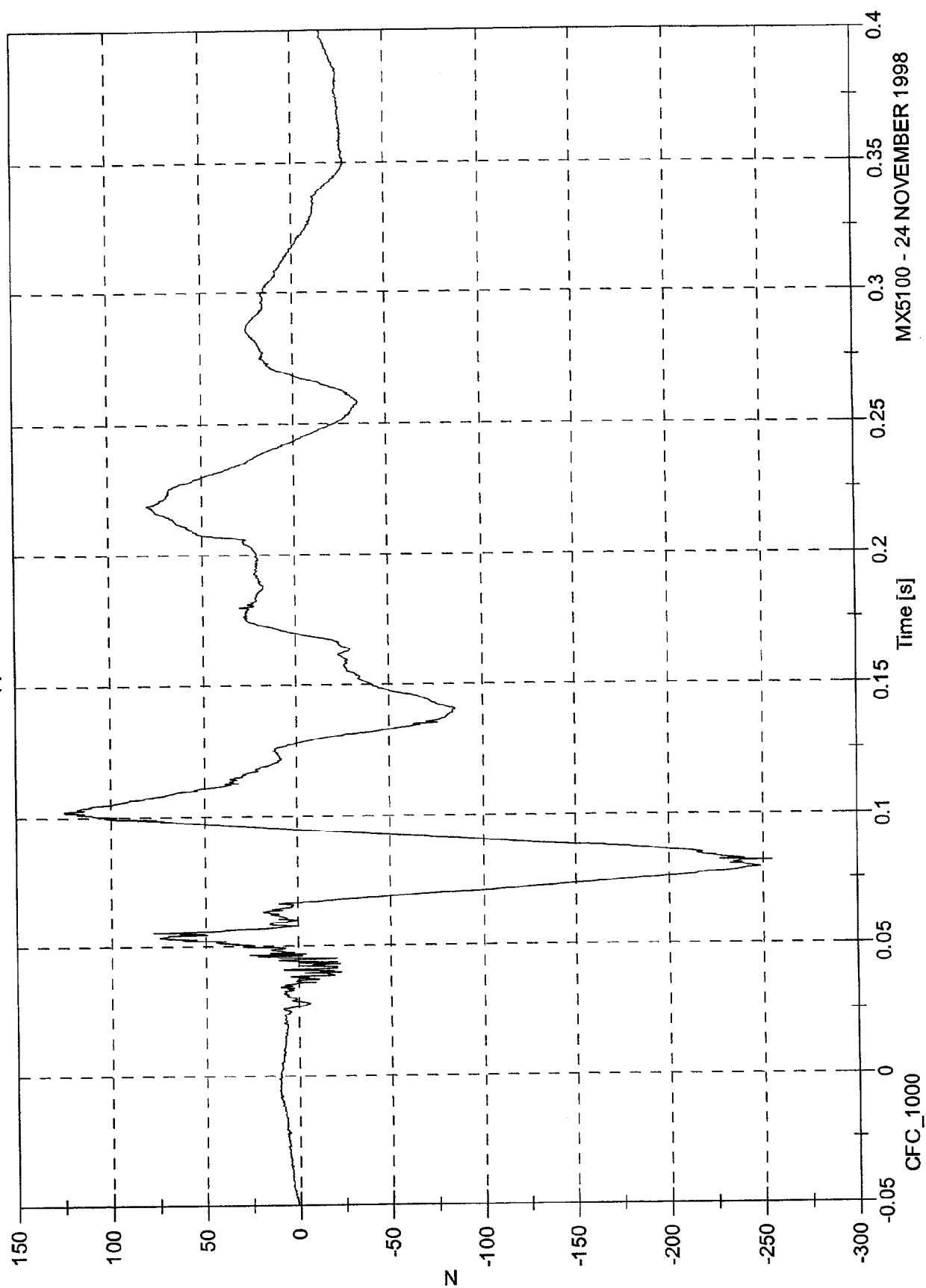


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 124.4 [N] at 0.102 [s]
Min: -254.8 [N] at 0.082 [s]

Driver Upper Neck Load Cell Fy



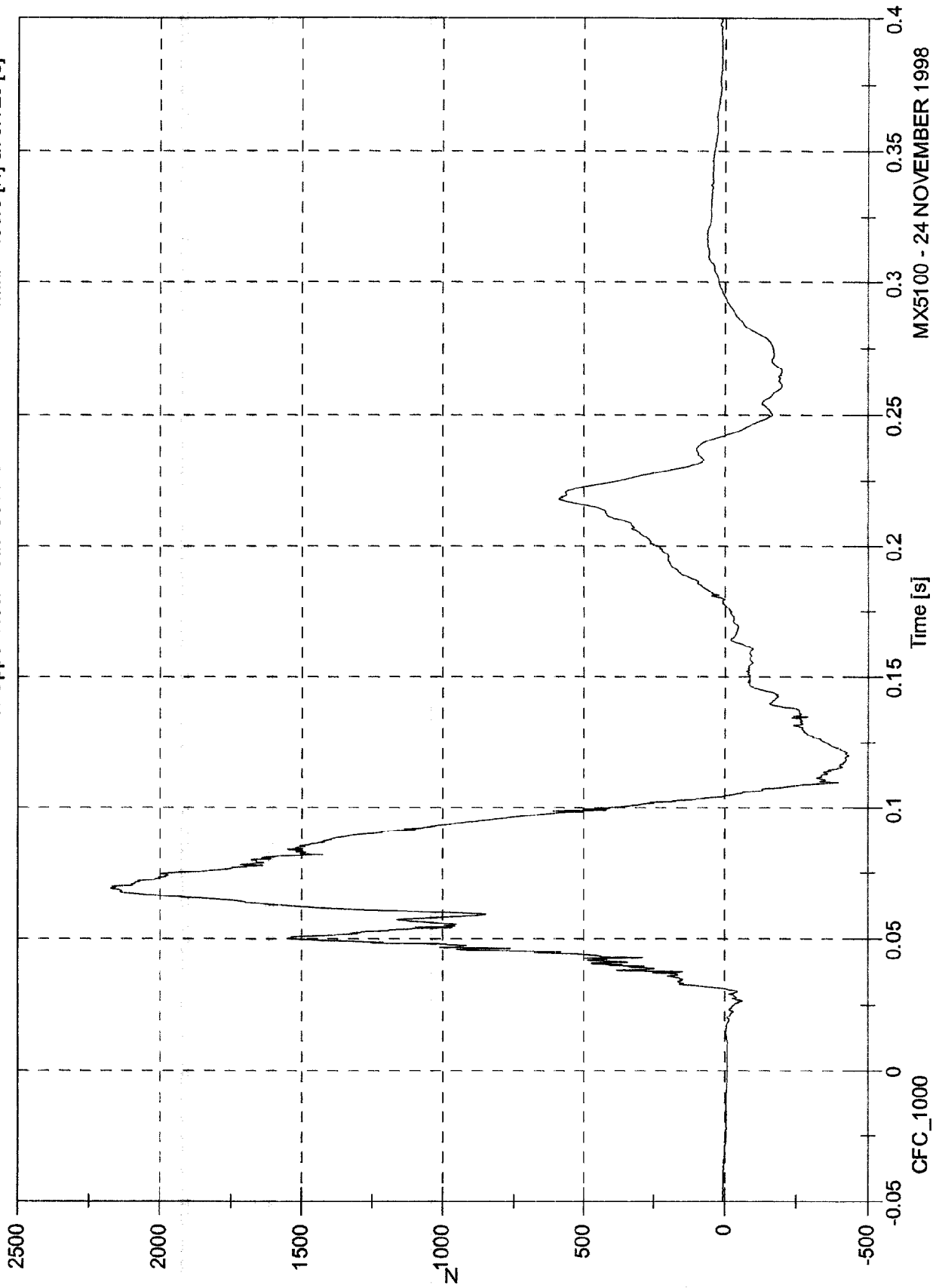
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Upper Neck Load Cell Fz

Max: 2174.4 [N] at 0.069 [s]

Min: -433.0 [N] at 0.120 [s]



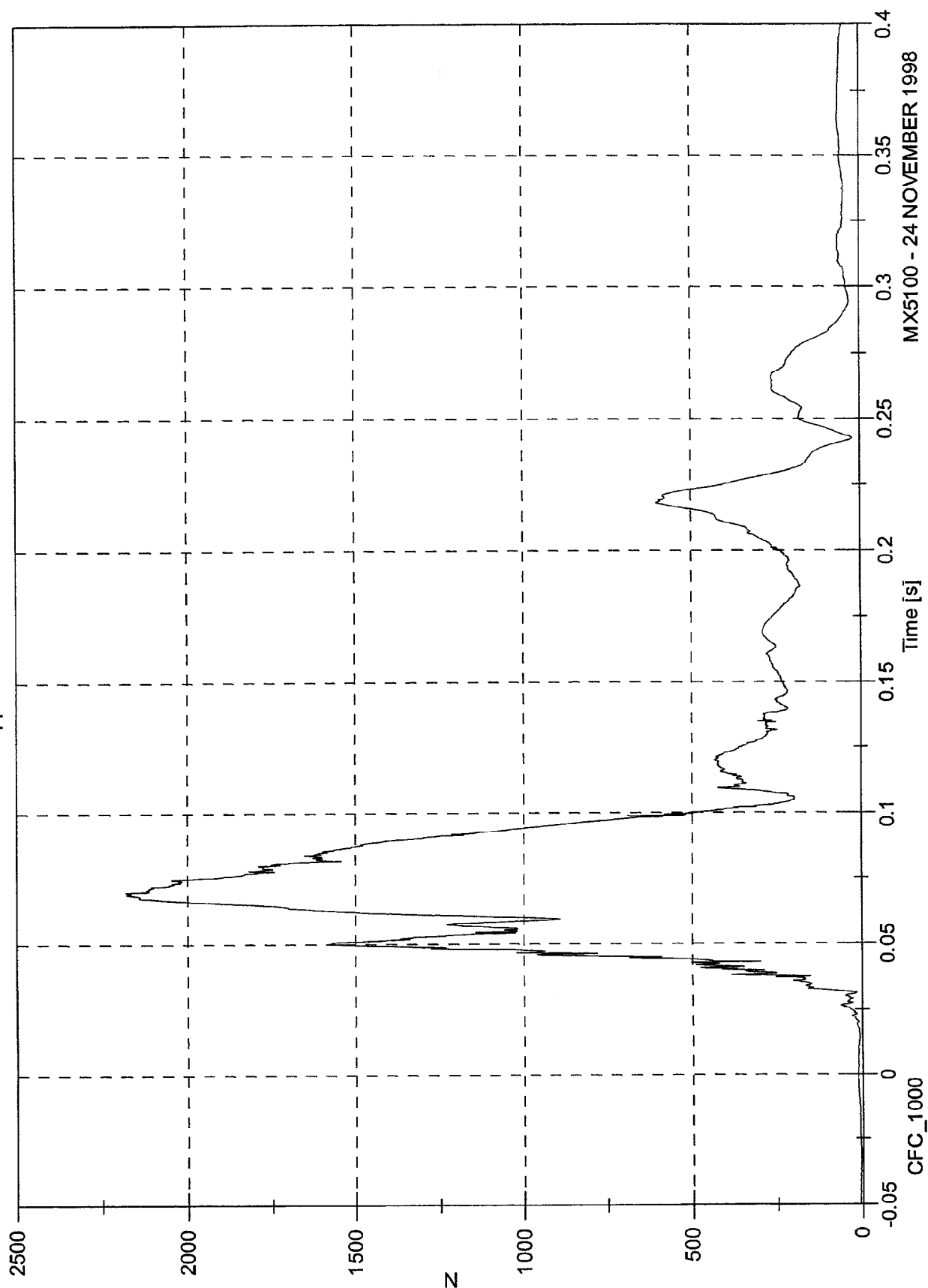
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Upper Neck Load Cell F Resultant

Max: 2182.0 [N] at 0.070 [s]

Min: 3.2 [N] at -0.071 [s]



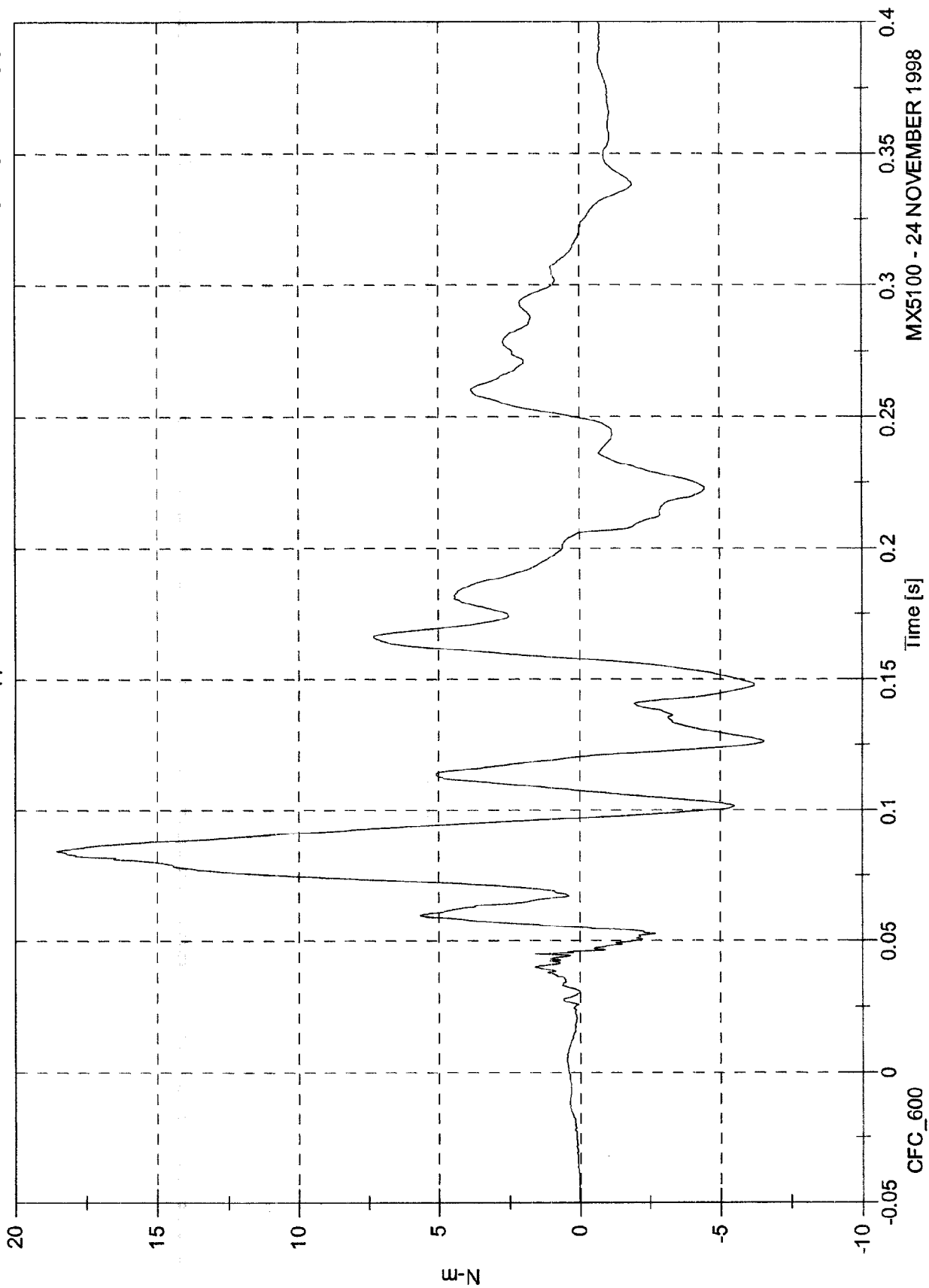
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Upper Neck Load Cell Mx

Max: 18.6 [N-m] at 0.084 [s]

Min: -6.6 [N-m] at 0.126 [s]

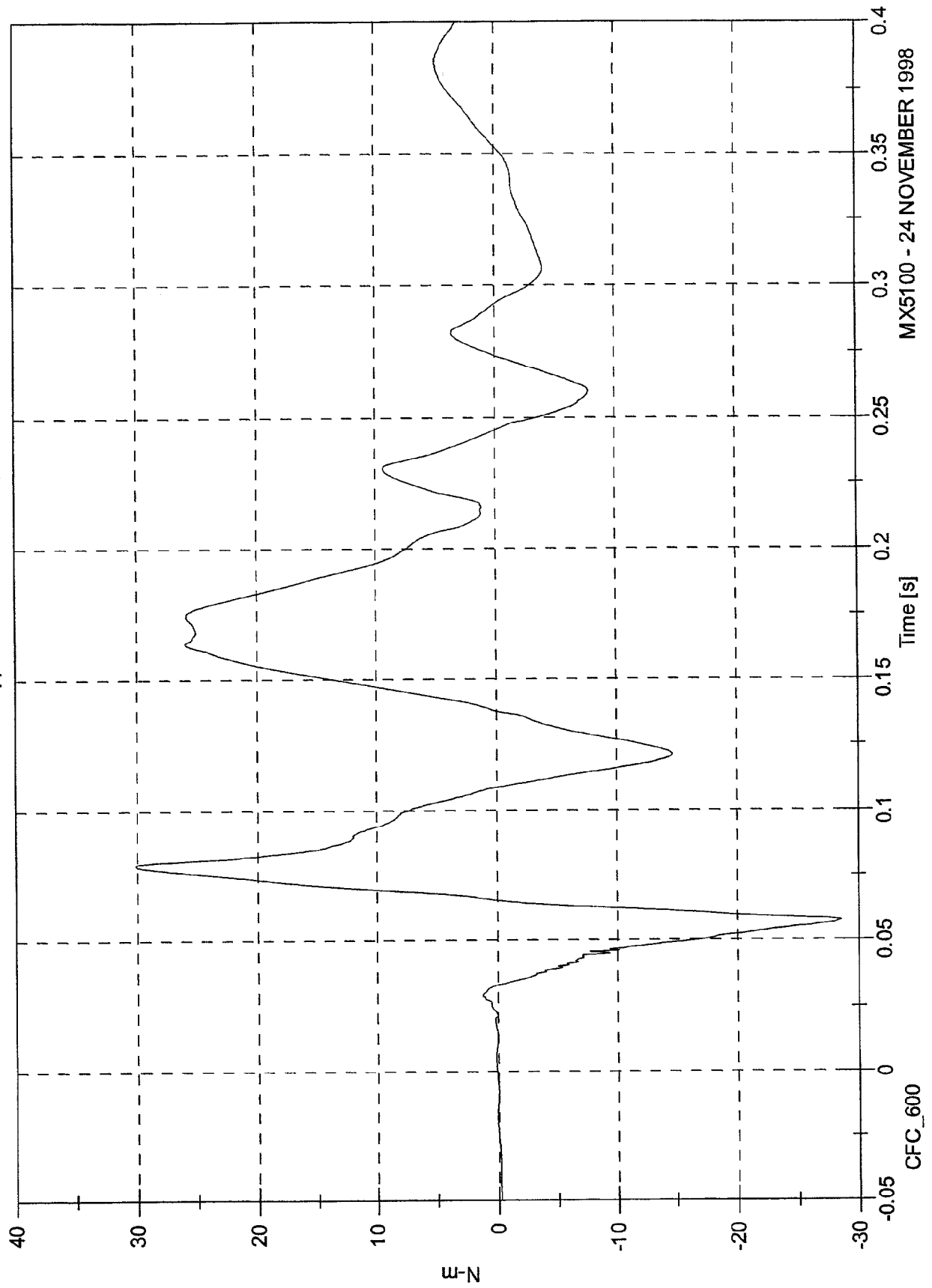


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 30.2 [N-m] at 0.079 [s]
 Min: -28.6 [N-m] at 0.058 [s]

Driver Upper Neck Load Cell My

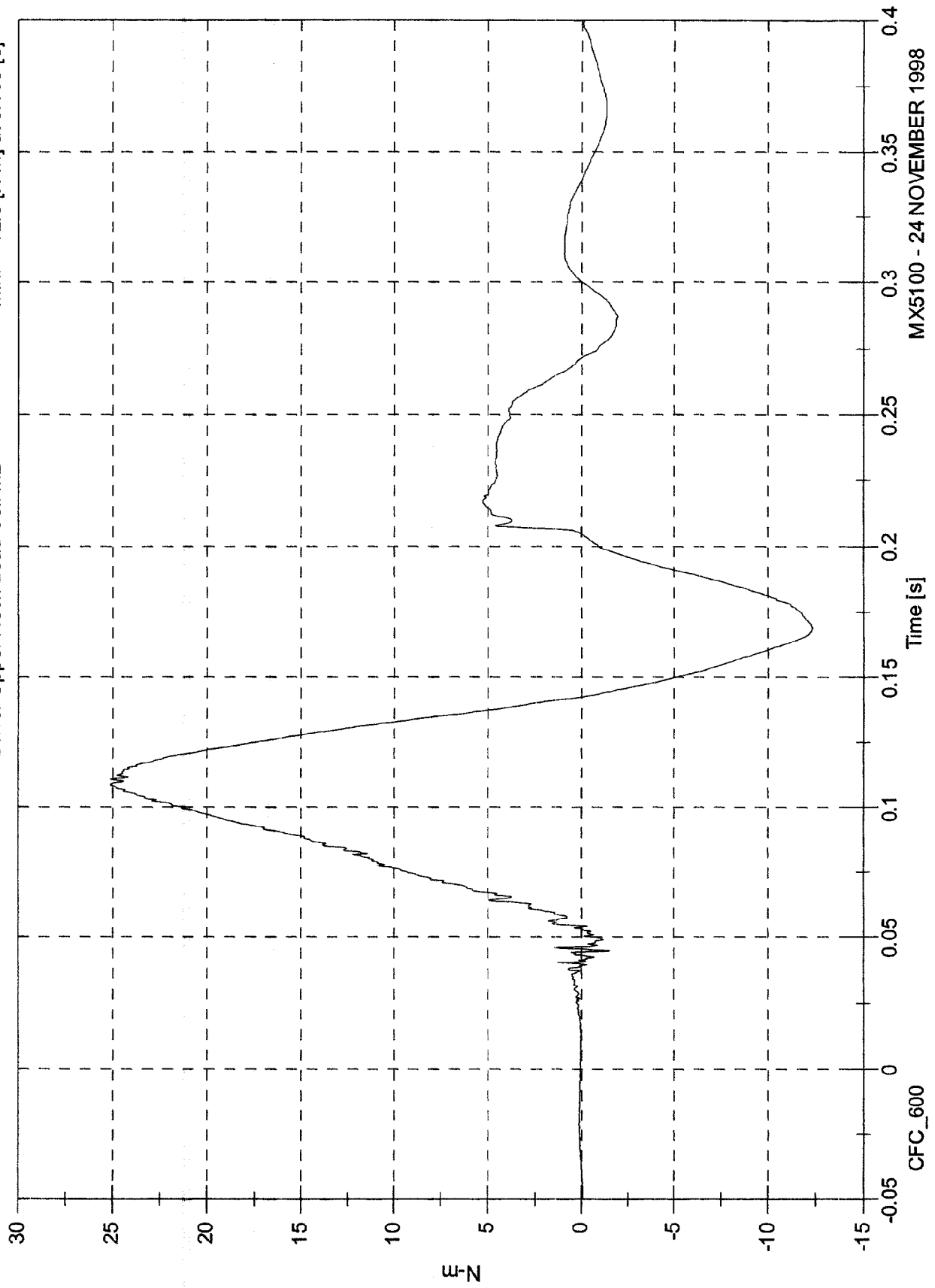


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Upper Neck Load Cell Mz

Max: 25.1 [N-m] at 0.108 [s]
Min: -12.3 [N-m] at 0.169 [s]

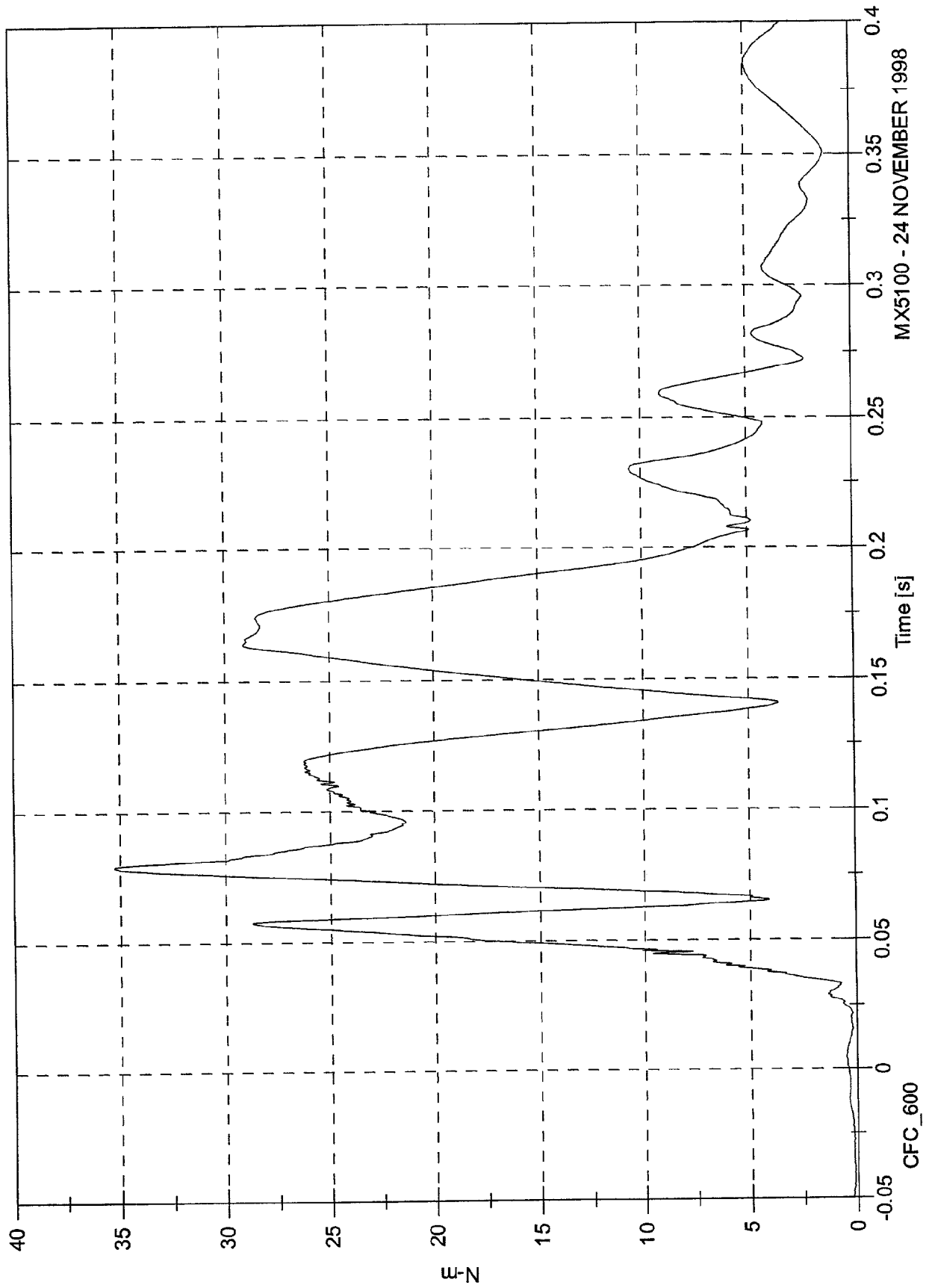


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Upper Neck Load Cell M Resultant

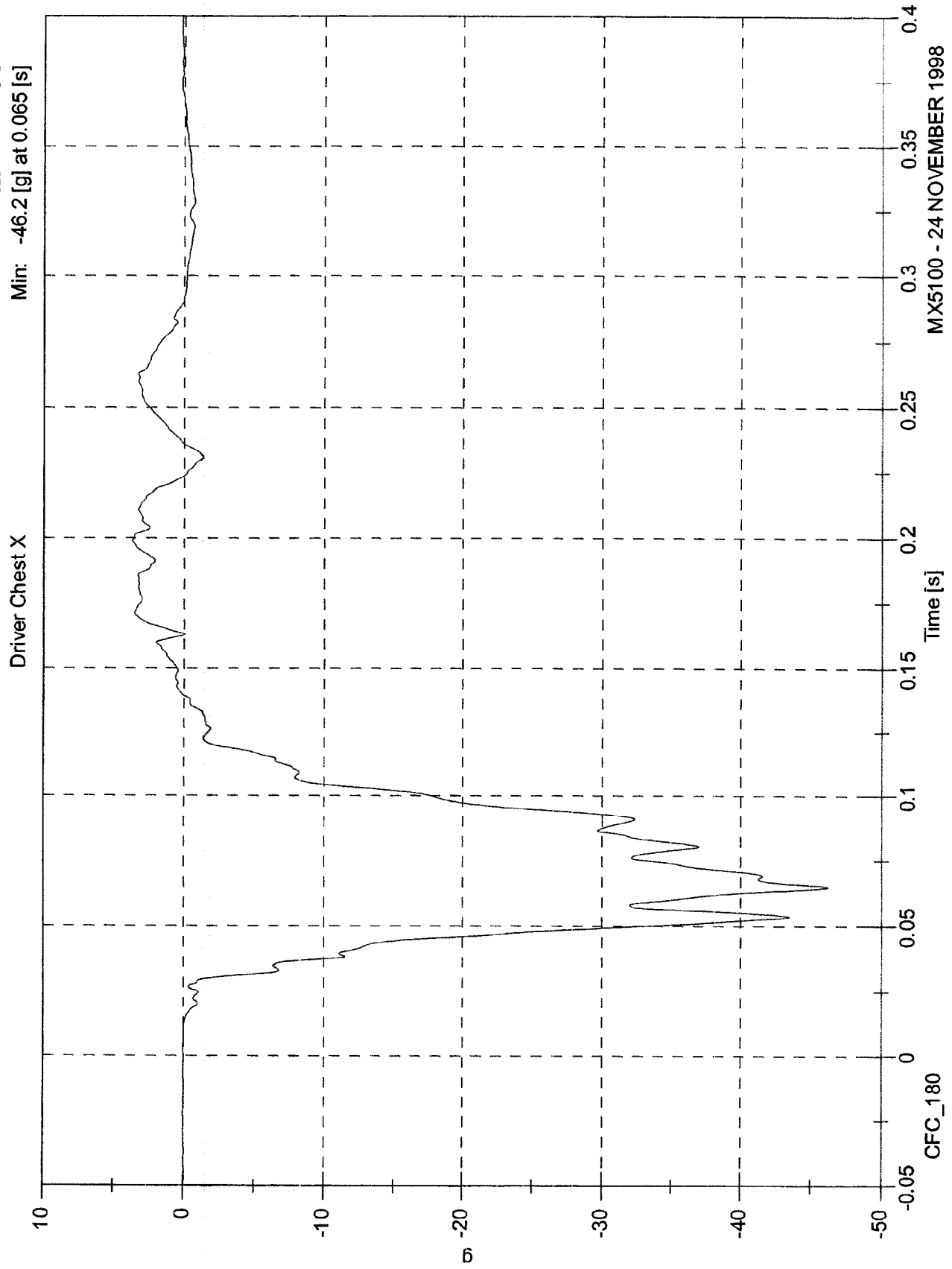
Max: 35.3 [N-m] at 0.079 [s]
Min: 0.1 [N-m] at -0.063 [s]



MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 3.7 [g] at 0.199 [s]
Min: -46.2 [g] at 0.065 [s]

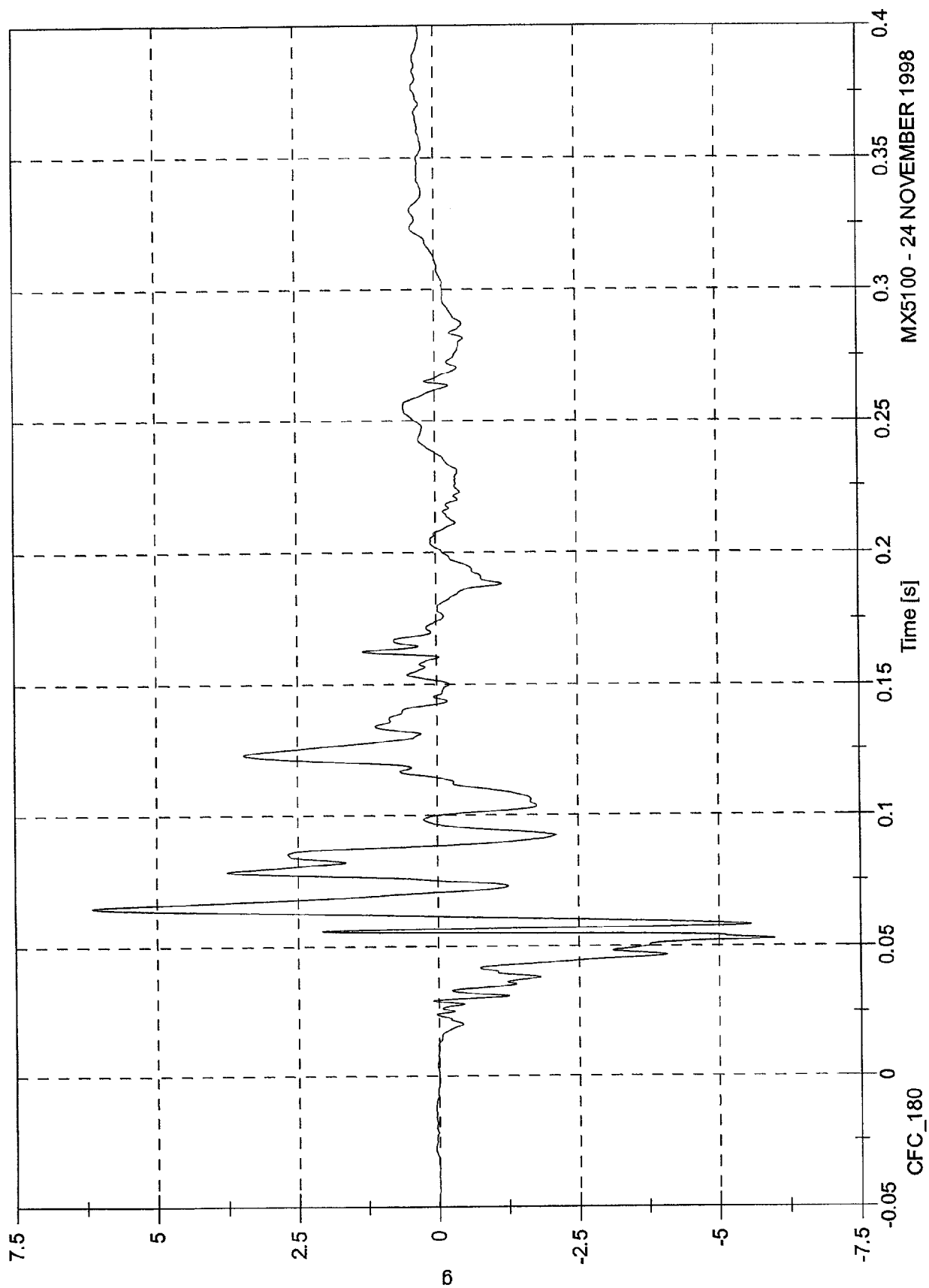


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 6.1 [g] at 0.065 [s]
Min: -6.0 [g] at 0.053 [s]

Driver Chest Y



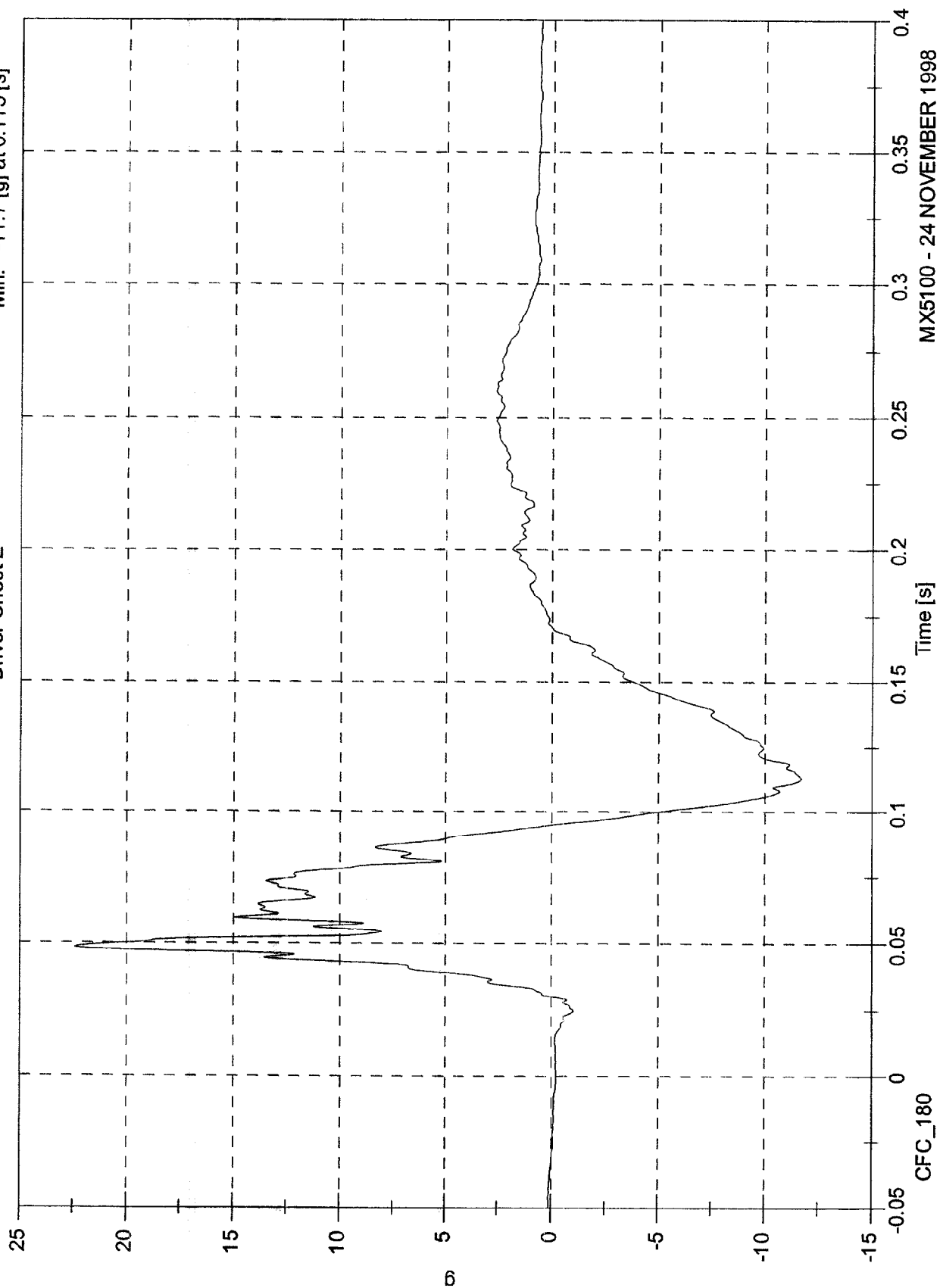
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 22.4 [g] at 0.048 [s]

Min: -11.7 [g] at 0.113 [s]

Driver Chest Z

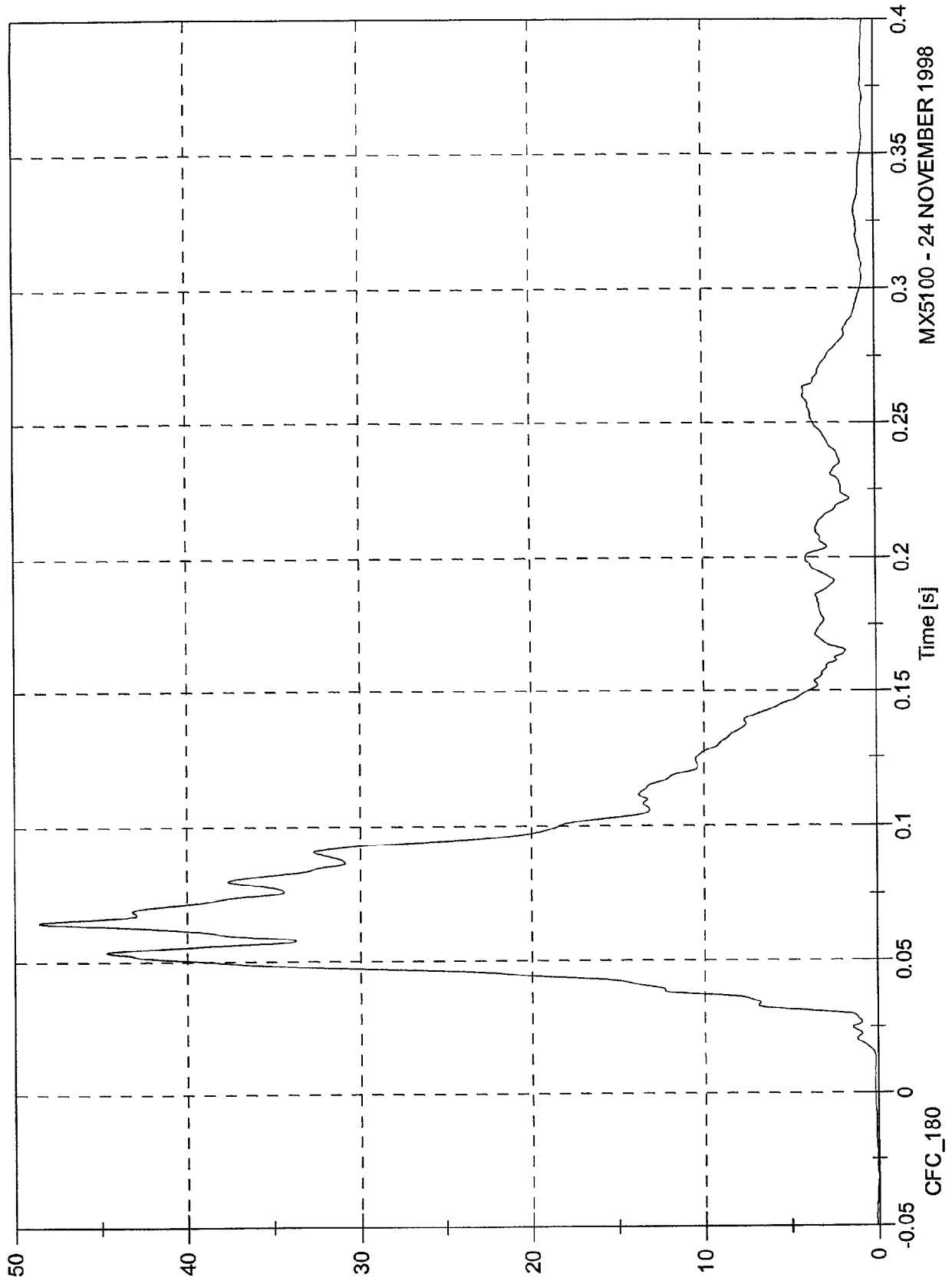


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Chest Resultant

Max: 48.6 [g] at 0.065 [s]
Min: 0.0 [g] at -0.031 [s]

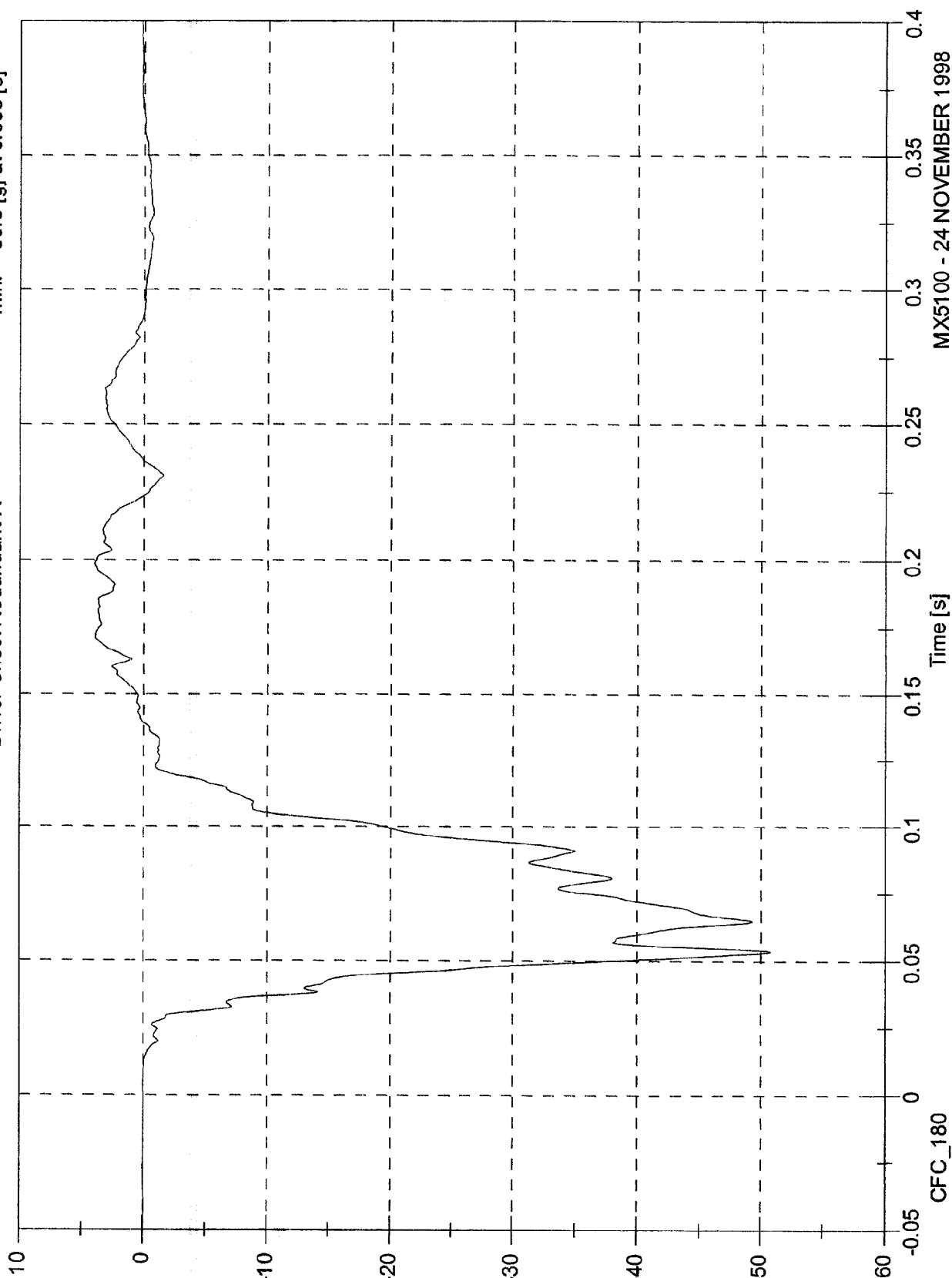


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 4.0 [g] at 0.199 [s]
Min: -50.8 [g] at 0.053 [s]

Driver Chest Redundant X

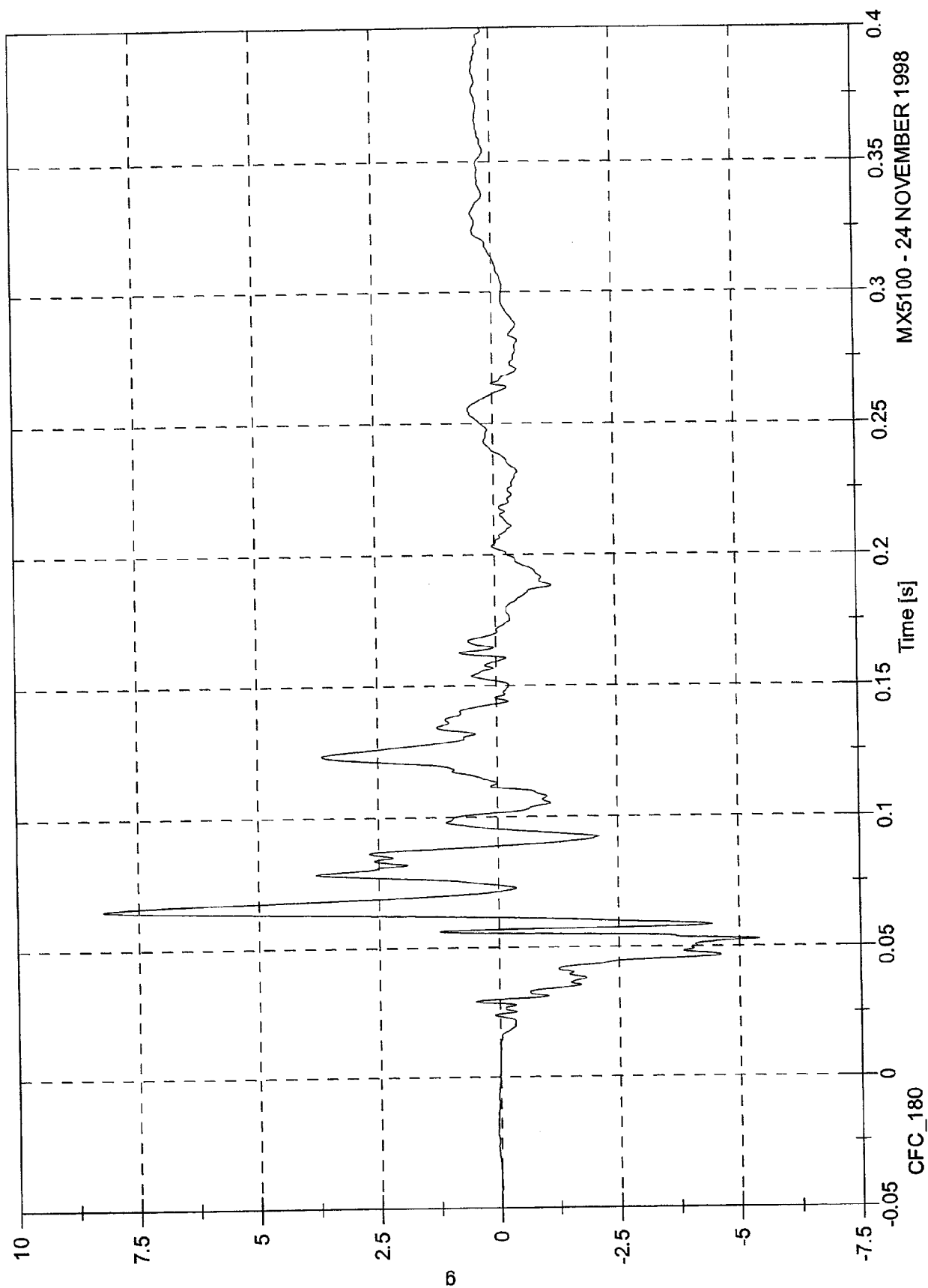


MX5100 - 24 NOVEMBER 1998

Max: 8.2 [g] at 0.065 [s]
Min: -5.4 [g] at 0.053 [s]

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Chest Redundant Y

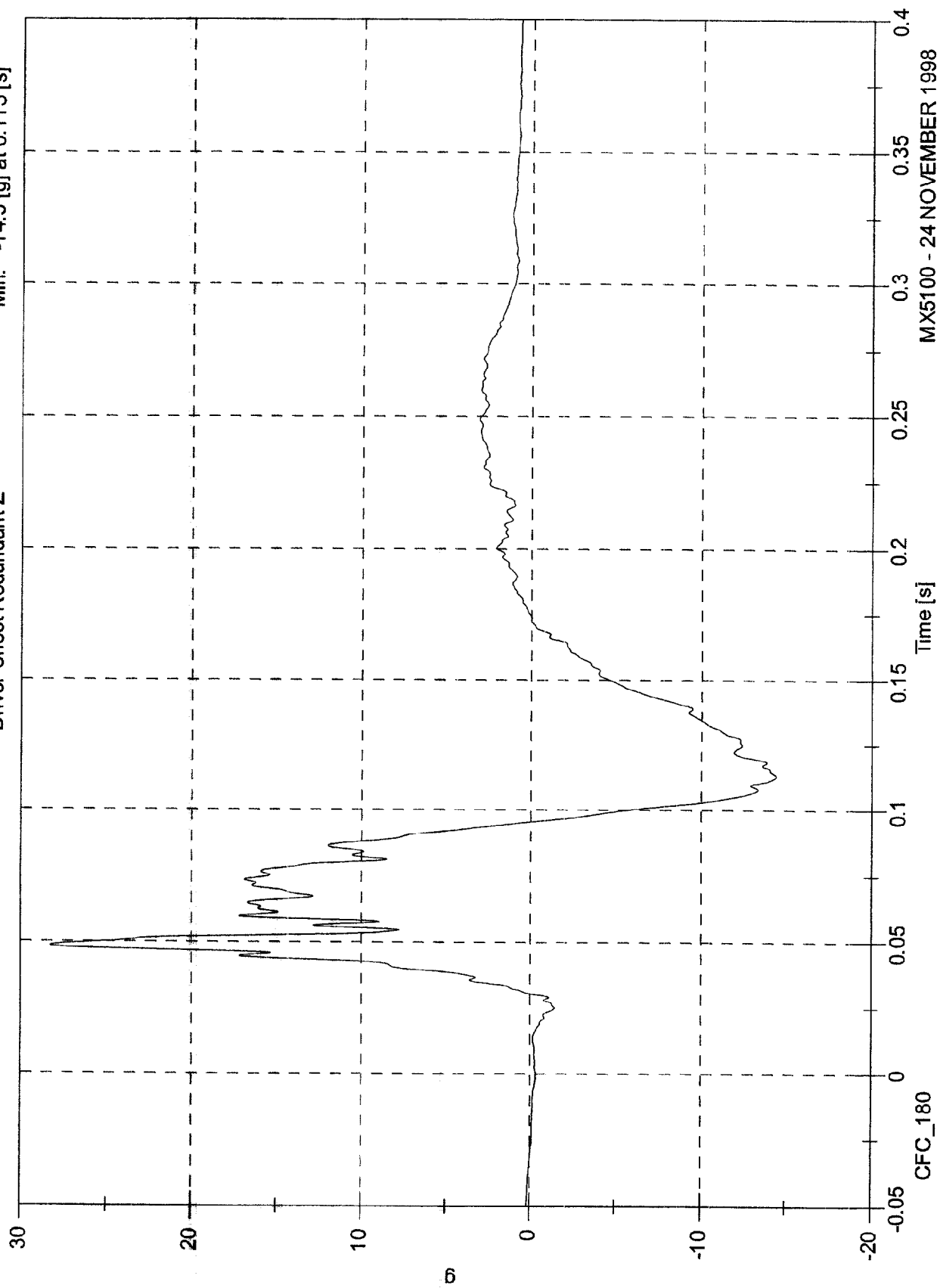


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Chest Redundant Z

Max: 28.3 [g] at 0.048 [s]
Min: -14.5 [g] at 0.113 [s]

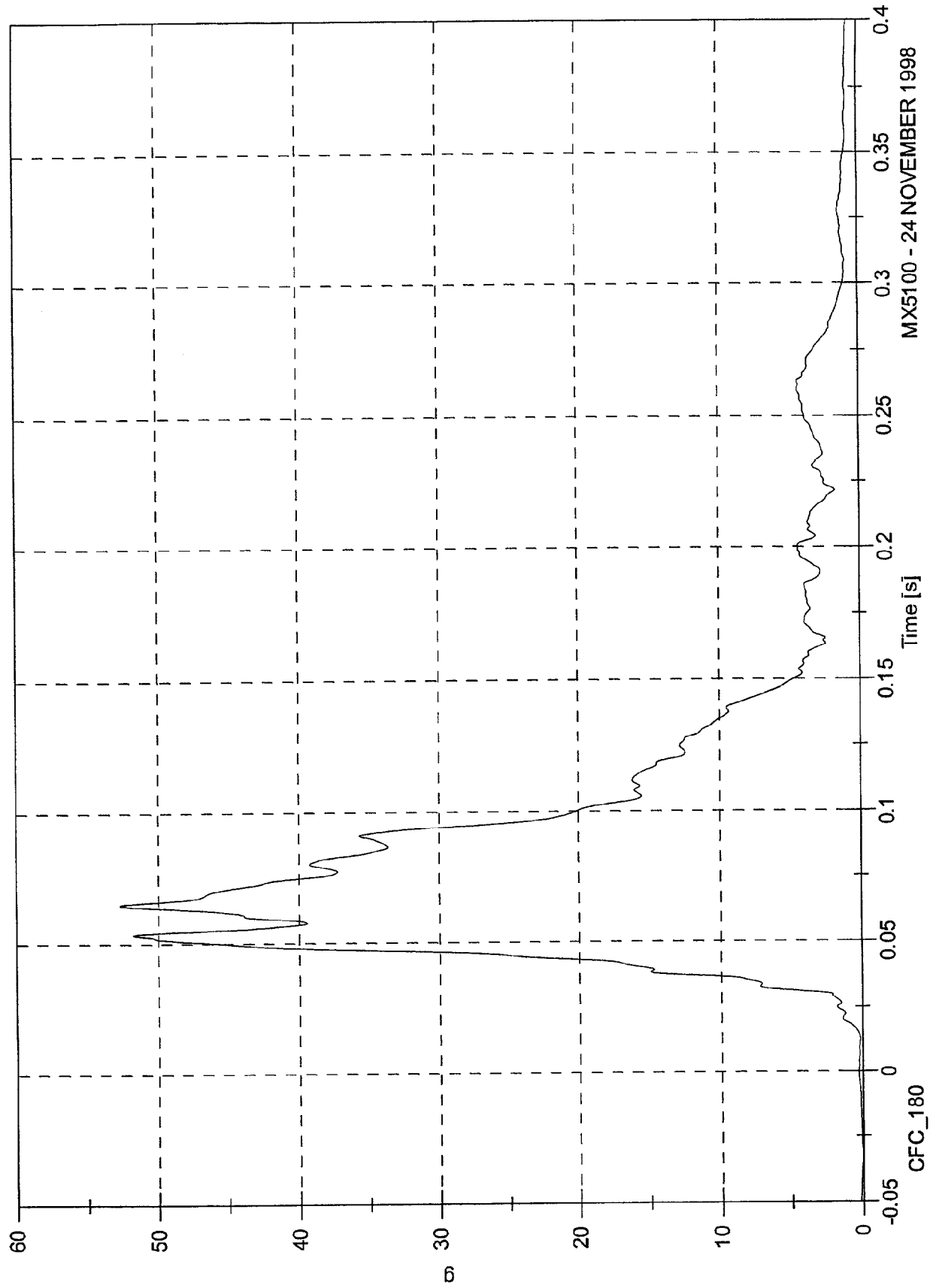


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Chest Redundant Resultant

Max: 52.7 [g] at 0.065 [s]
Min: 0.0 [g] at -0.074 [s]

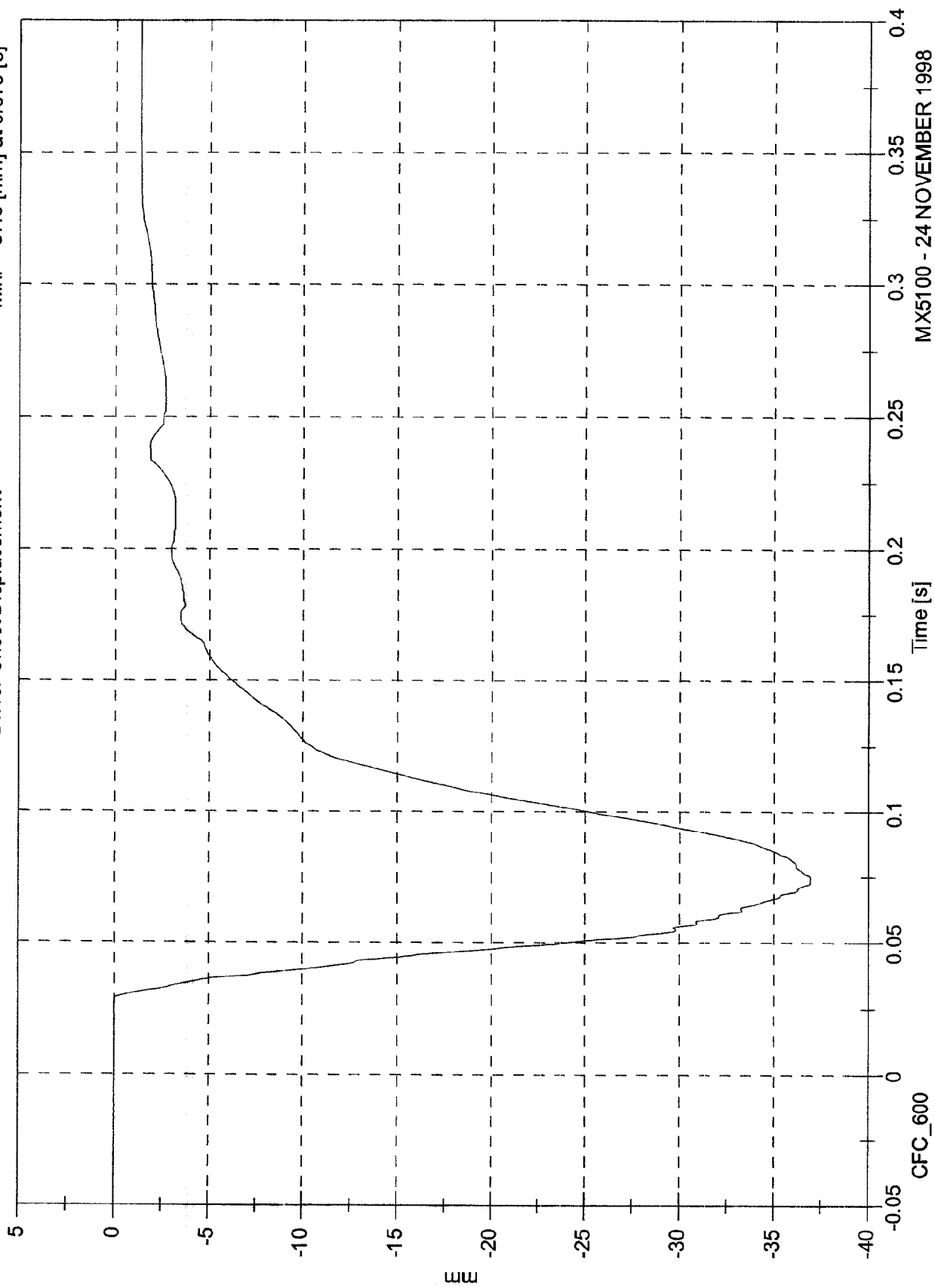


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 0.0 [mm] at 0.027 [s]
Min: -37.0 [mm] at 0.075 [s]

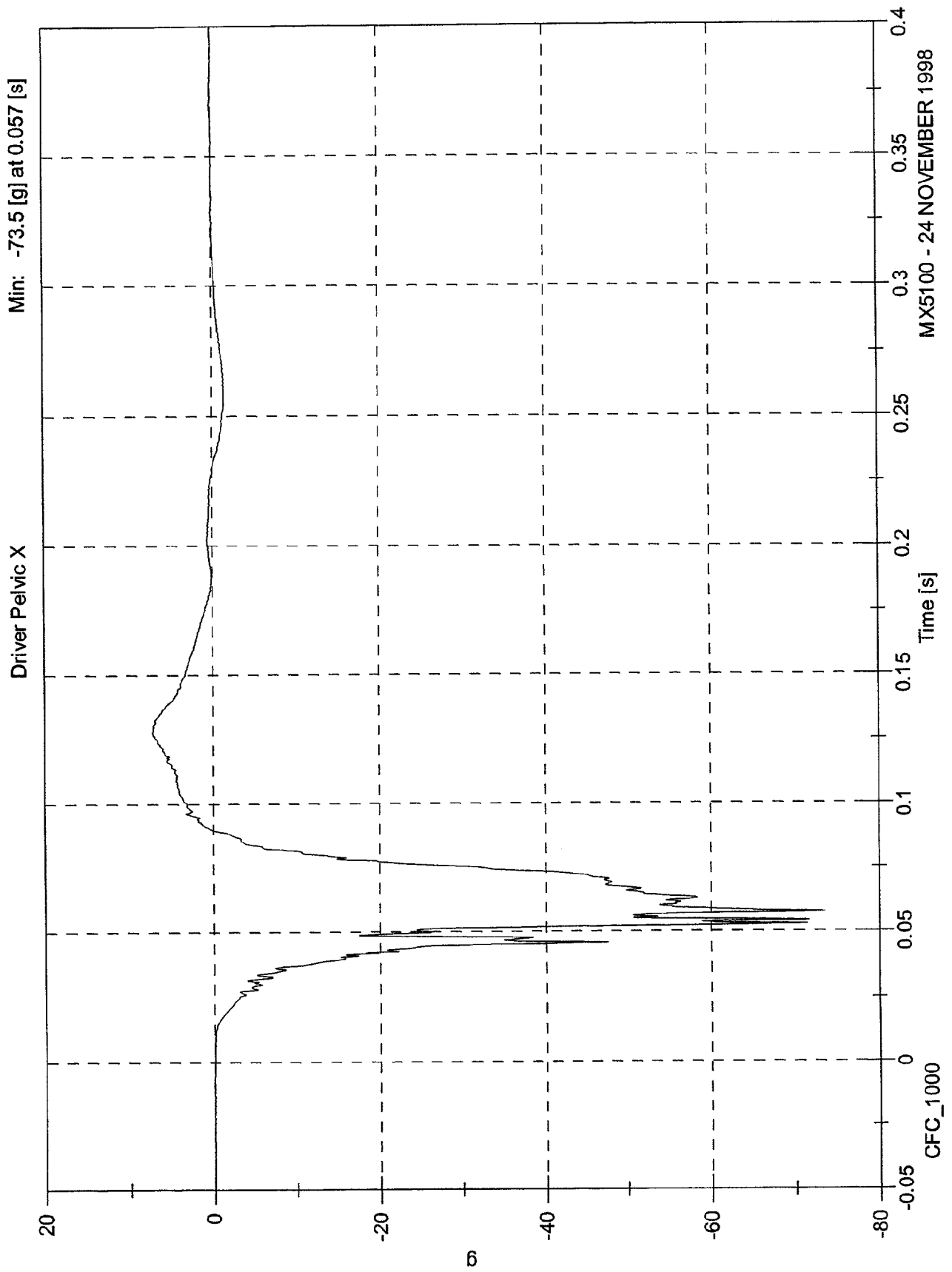
Driver Chest Displacement



MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

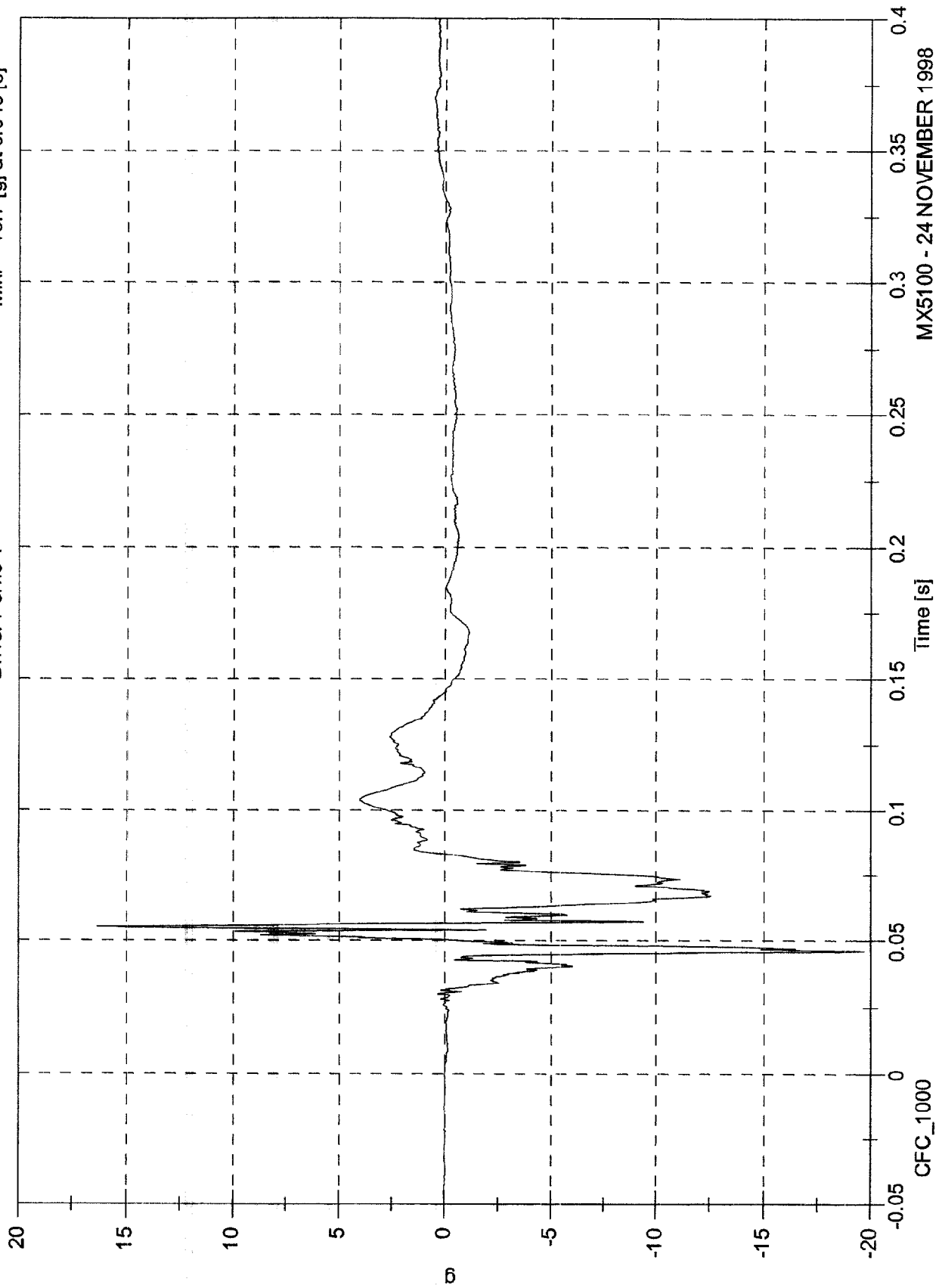
Max: 7.2 [g] at 0.128 [s]
Min: -73.5 [g] at 0.057 [s]



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Pelvic Y

Max: 16.4 [g] at 0.055 [s]
Min: -19.7 [g] at 0.046 [s]

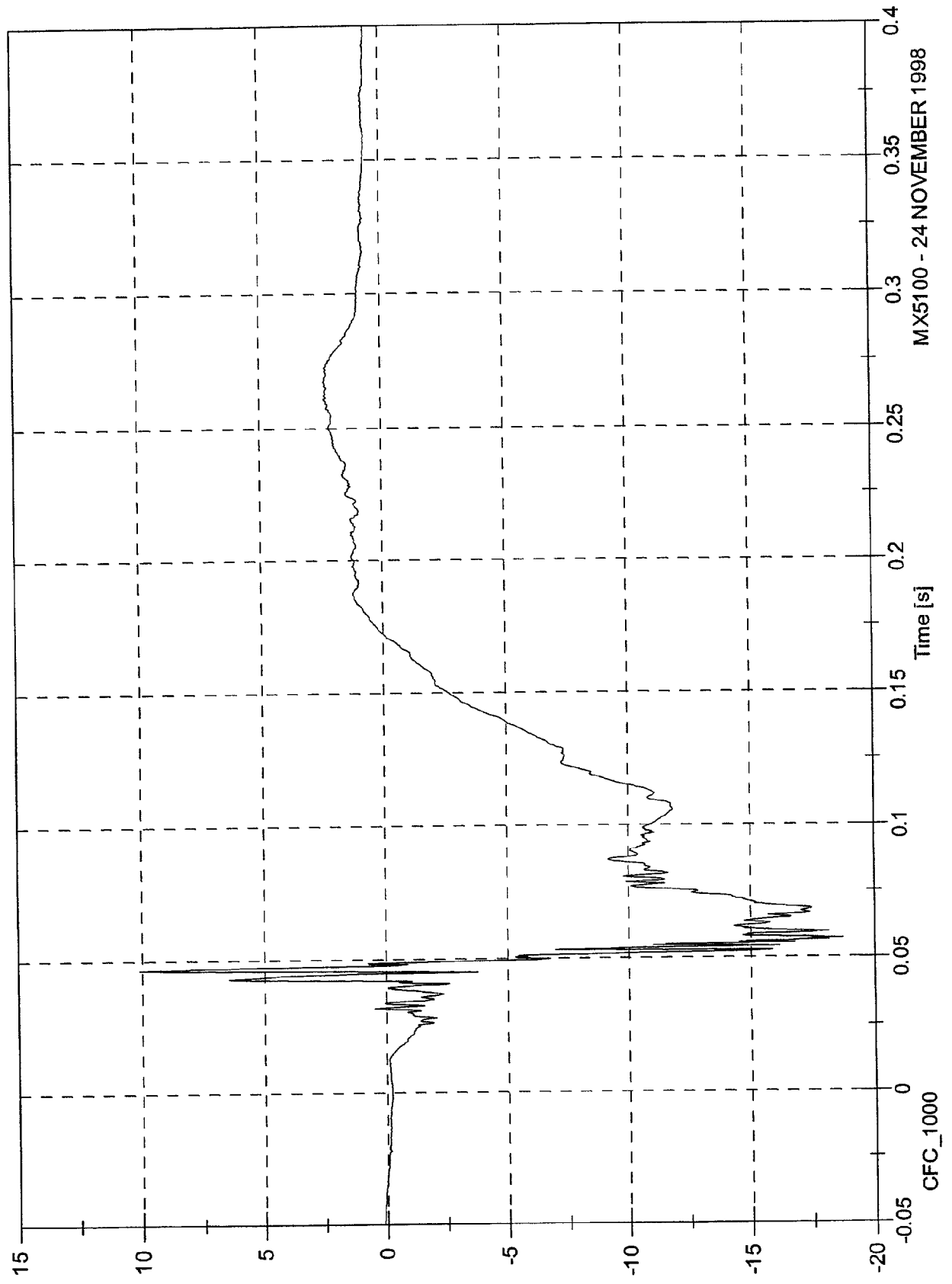


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Pelvic Z

Max: 10.1 [g] at 0.046 [s]
Min: -18.7 [g] at 0.057 [s]

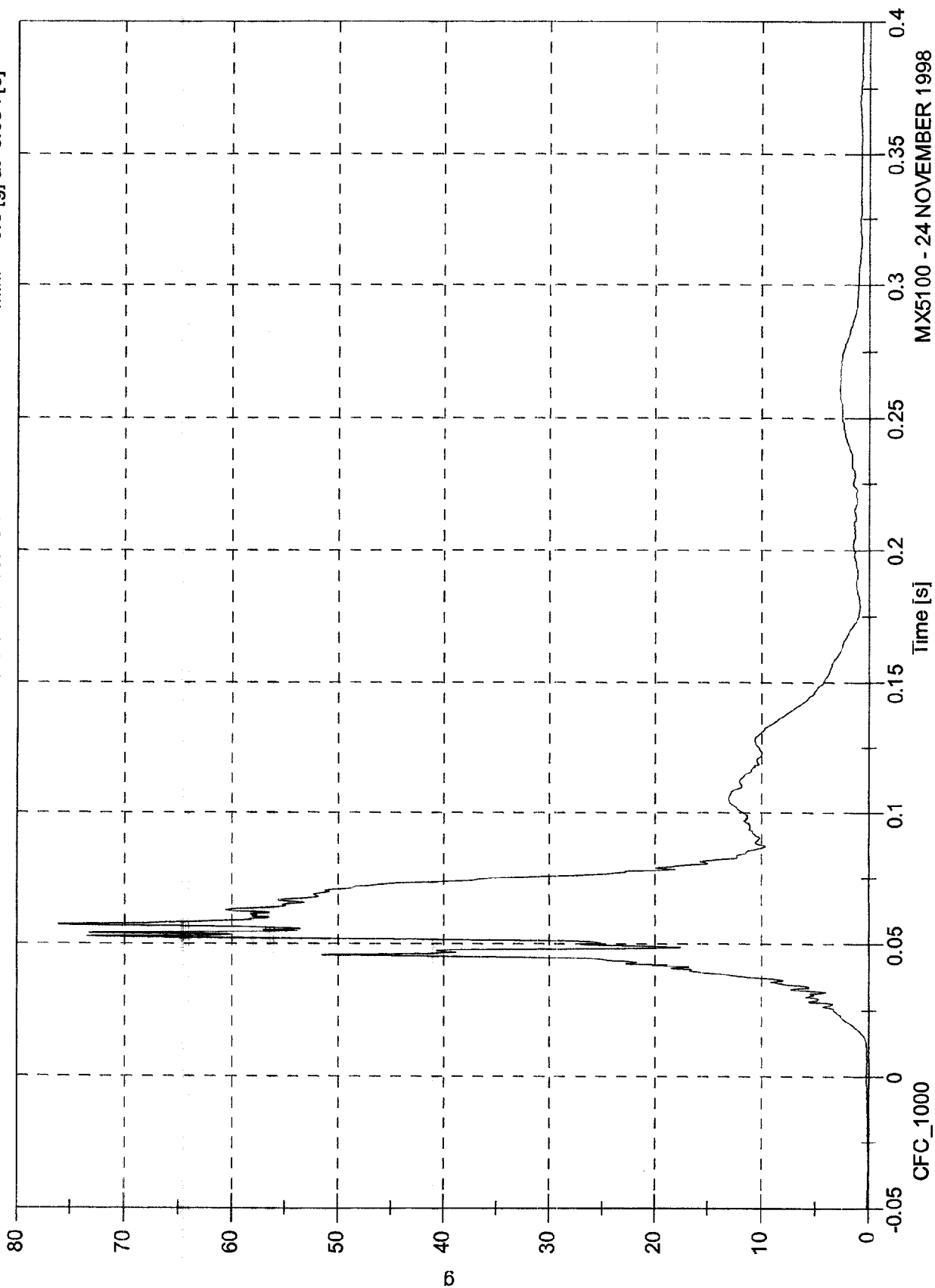


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Pelvic Resultant

Max: 76.1 [g] at 0.057 [s]
Min: 0.0 [g] at -0.034 [s]

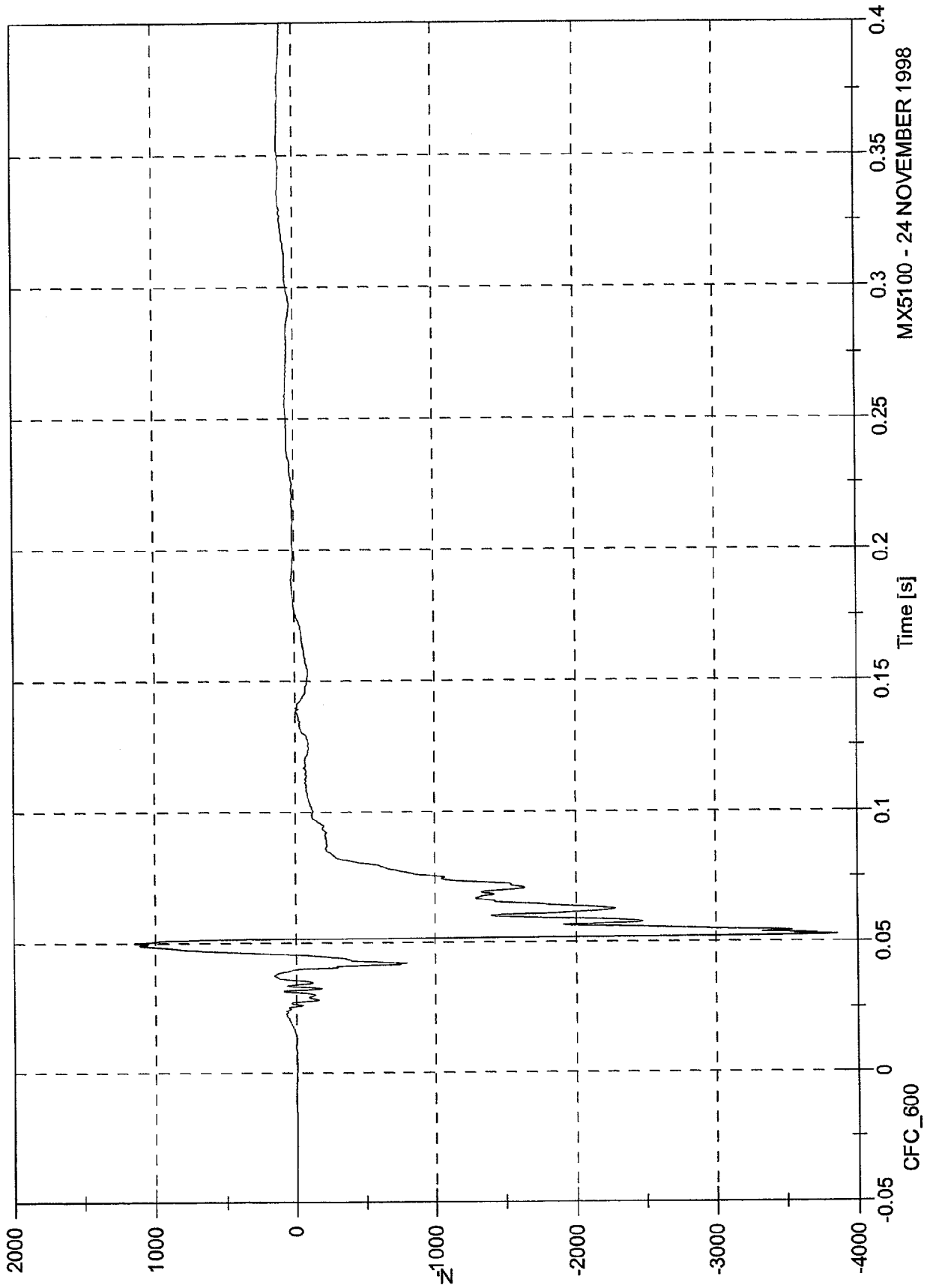


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Left Femur Z

Max: 1145.3 [N] at 0.050 [s]
Min: -3855.5 [N] at 0.053 [s]

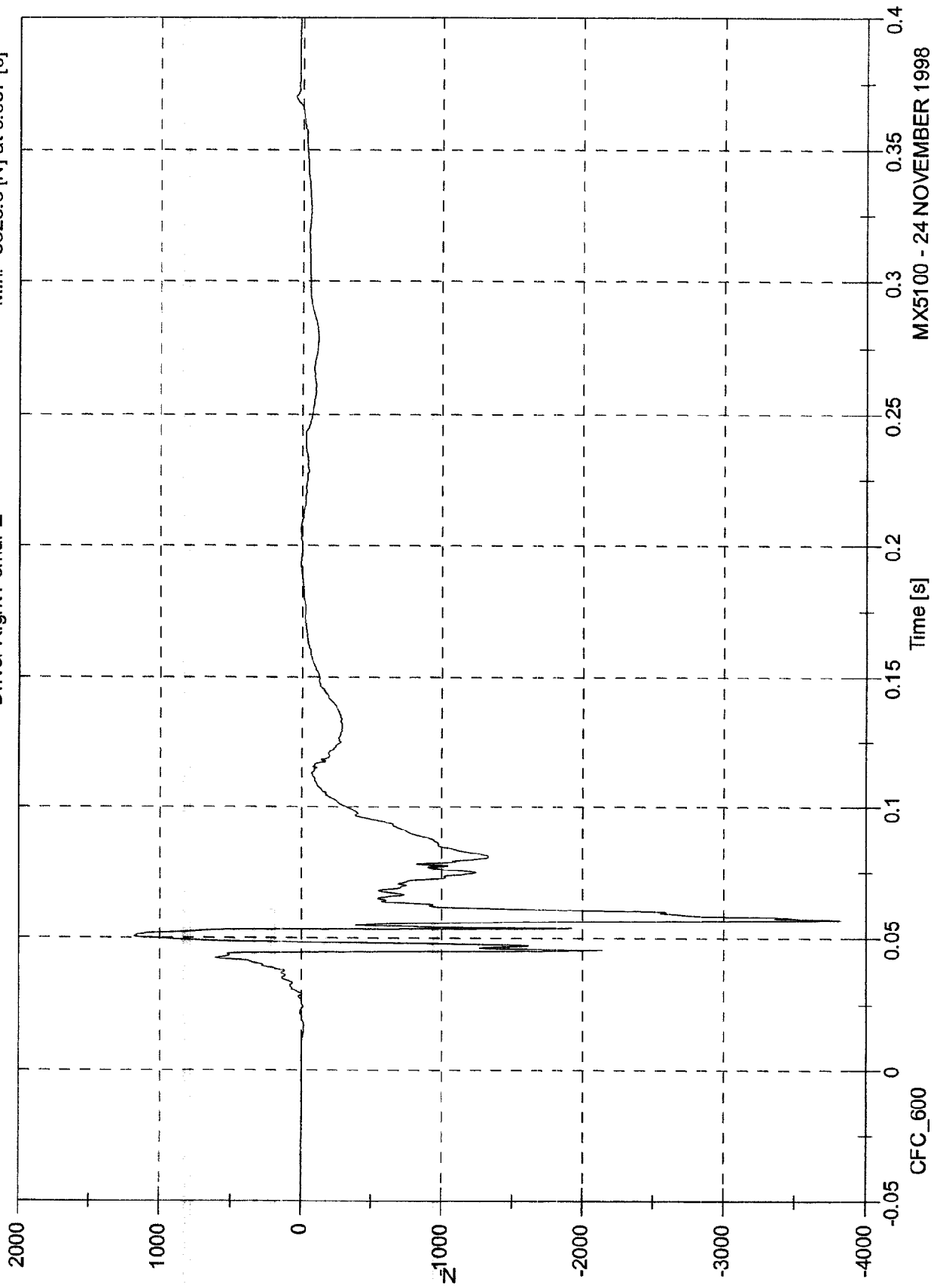


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Right Femur Z

Max: 1179.7 [N] at 0.050 [s]
Min: -3828.8 [N] at 0.057 [s]

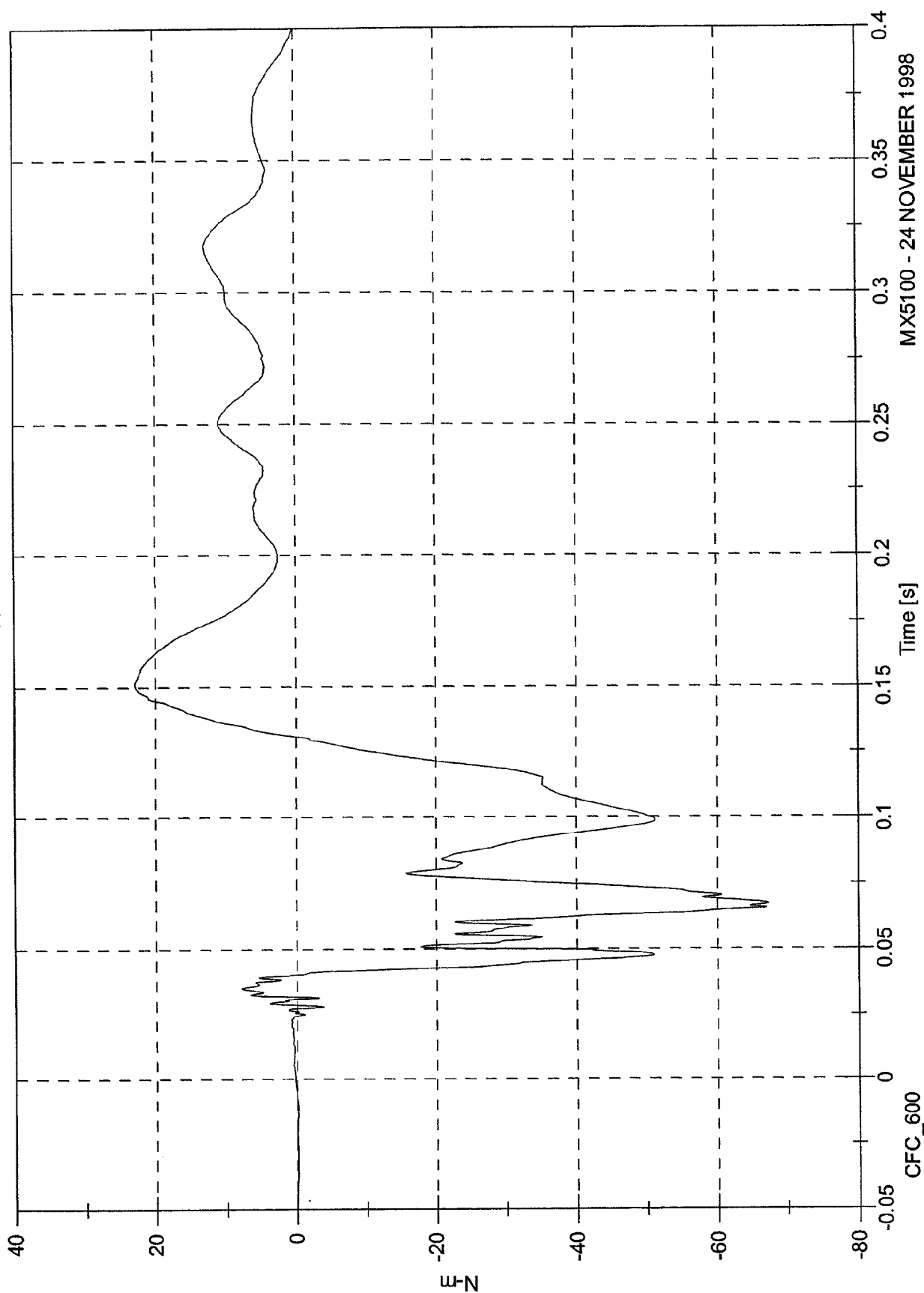


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Left Upper Tibia Mx

Max: 22.9 [N-m] at 0.151 [s]
Min: -67.3 [N-m] at 0.067 [s]



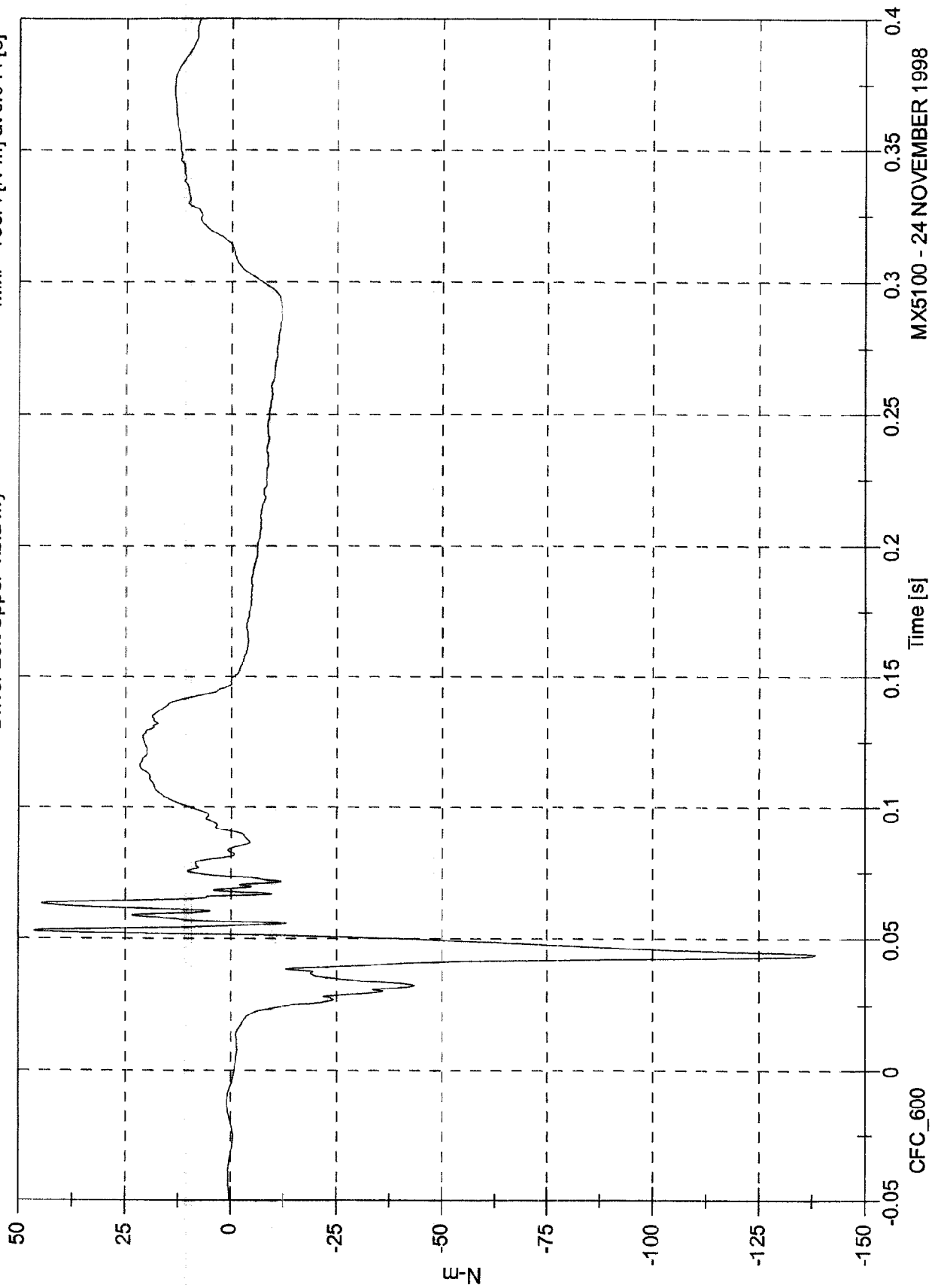
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Left Upper Tibia My

Max: 46.4 [N-m] at 0.053 [s]

Min: -138.4 [N-m] at 0.044 [s]

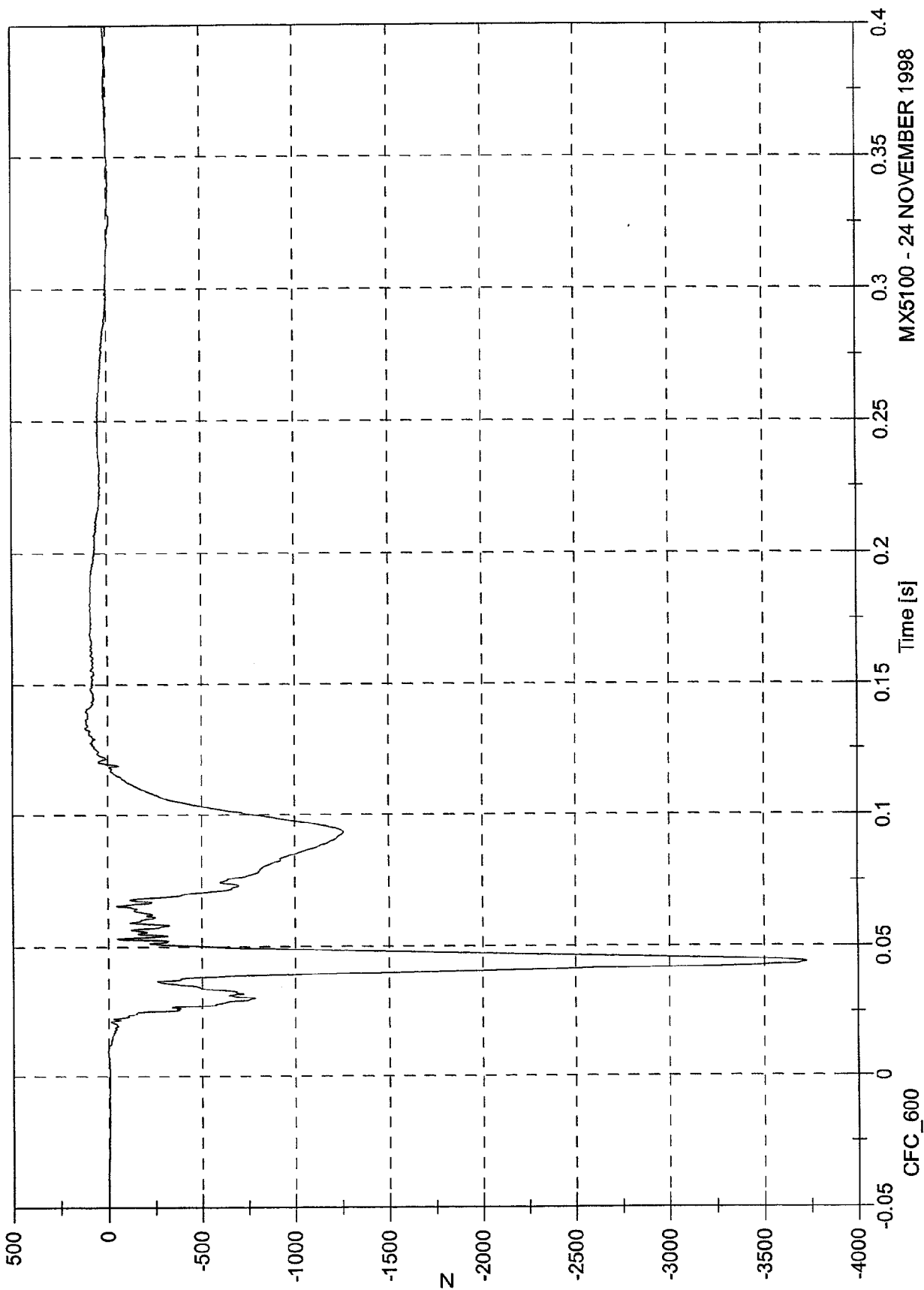


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max 118.7 [N] at 0.133 [s]
Min: -3725.6 [N] at 0.044 [s]

Driver Left Lower Tibia Fz

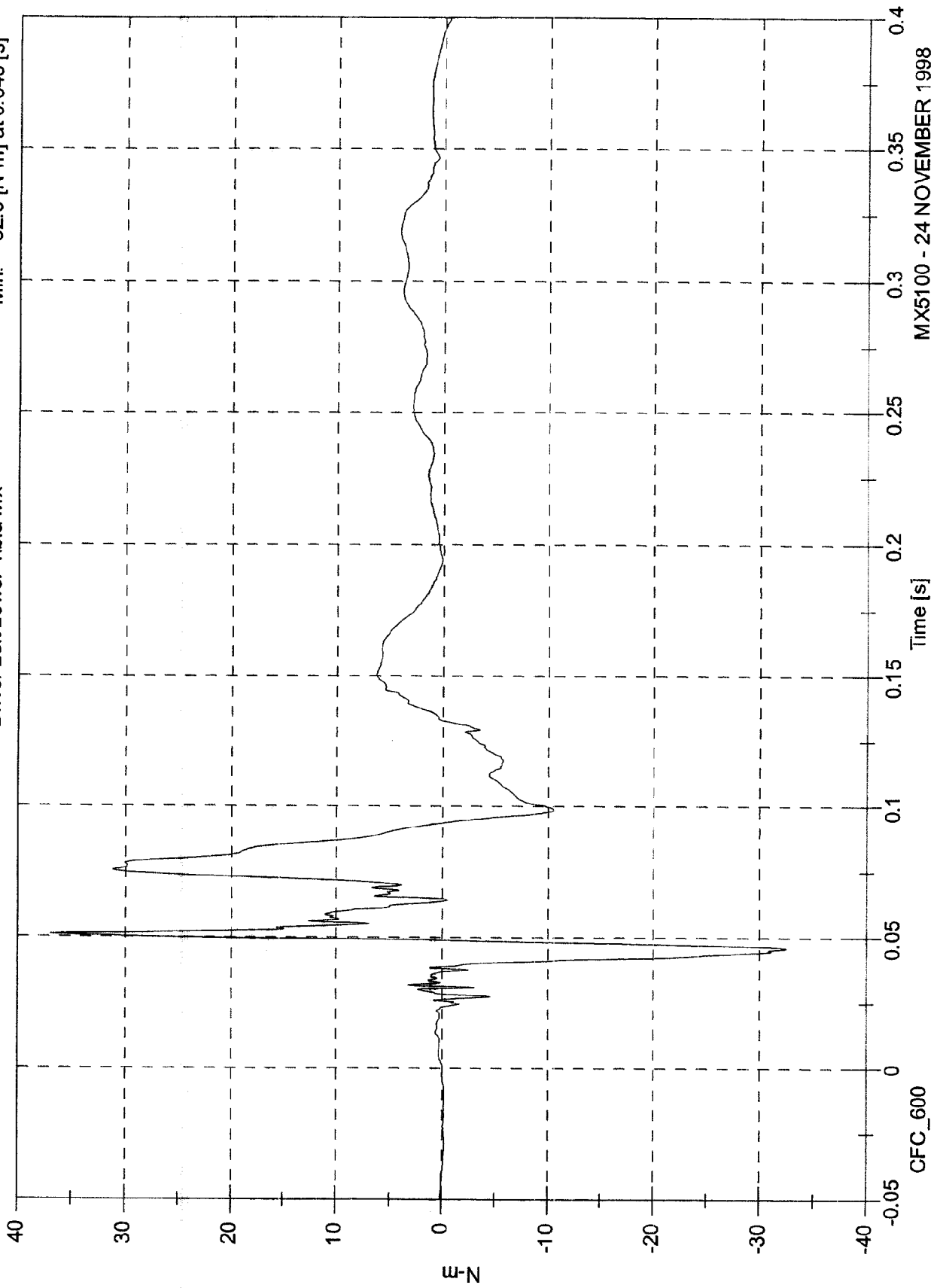


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Left Lower Tibia Mx

Max: 37.0 [N-m] at 0.051 [s]
Min: -32.5 [N-m] at 0.046 [s]

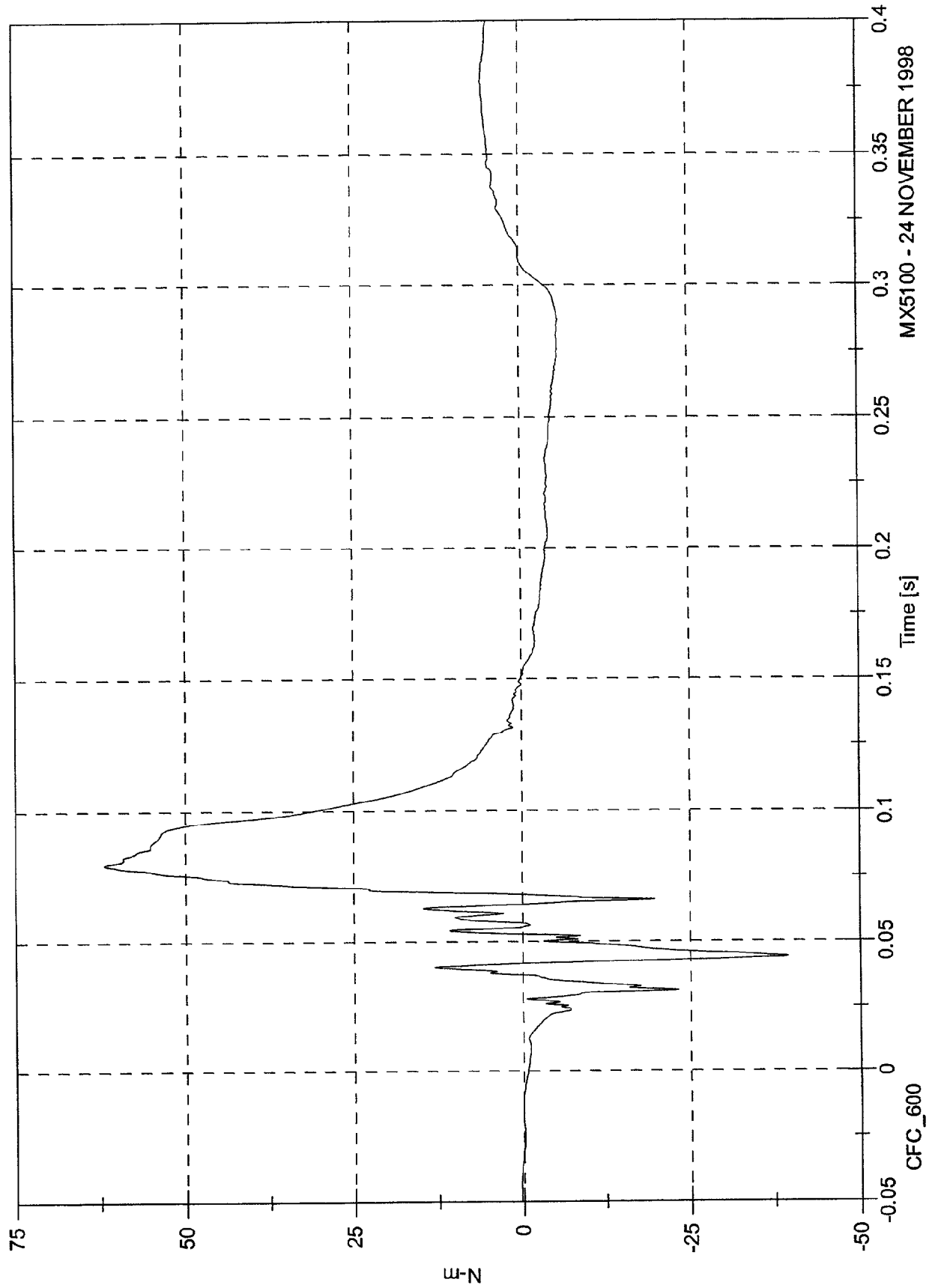


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Left Lower Tibia My

Max: 61.9 [N-m] at 0.080 [s]
Min: -39.5 [N-m] at 0.044 [s]

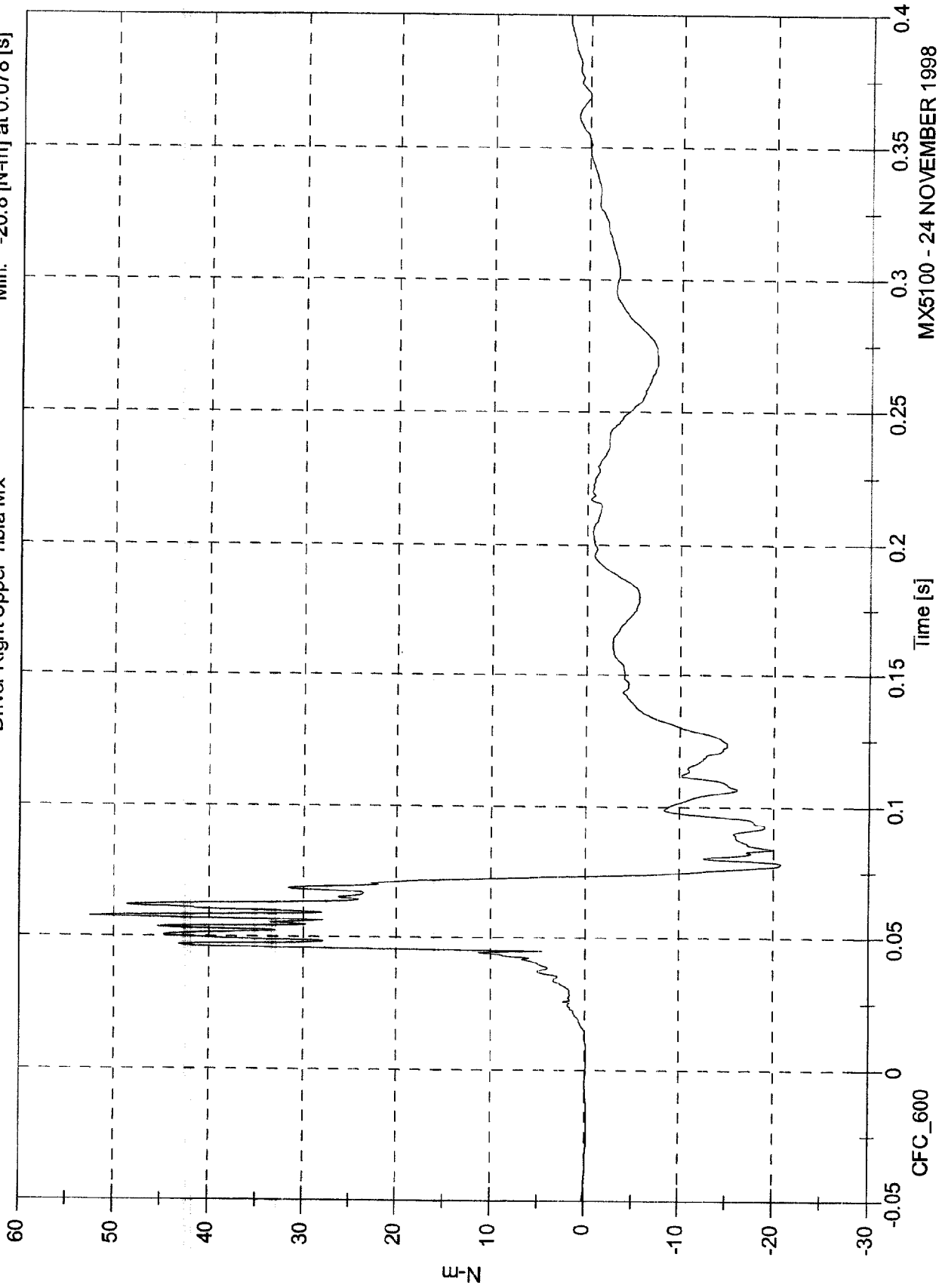


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Right Upper Tibia Mx

Max 52.6 [N-m] at 0.058 [s]
Min: -20.8 [N-m] at 0.078 [s]



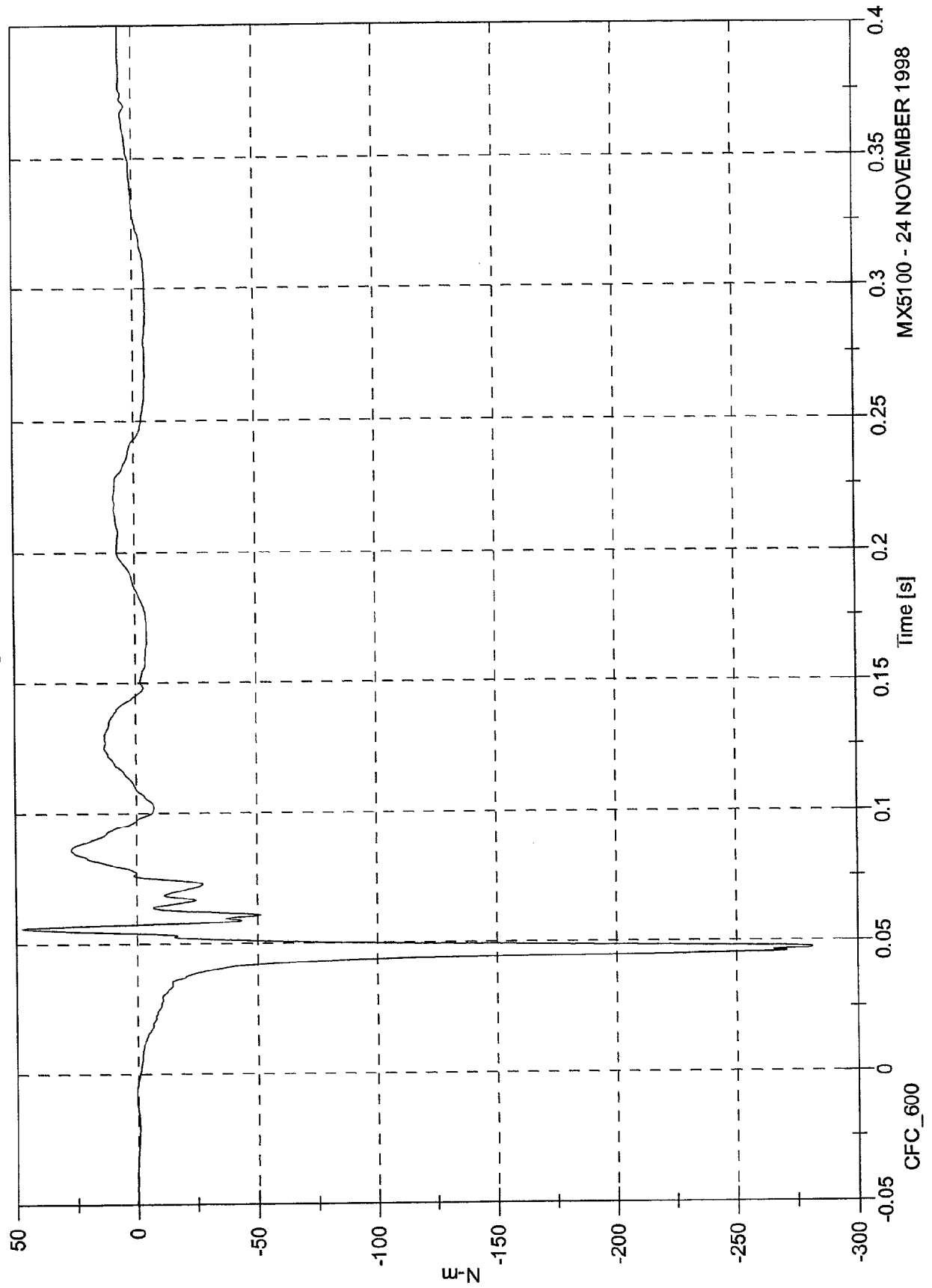
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Right Upper Tibia My

Max 47.6 [N-m] at 0.056 [s]

Min: -281.6 [N-m] at 0.048 [s]

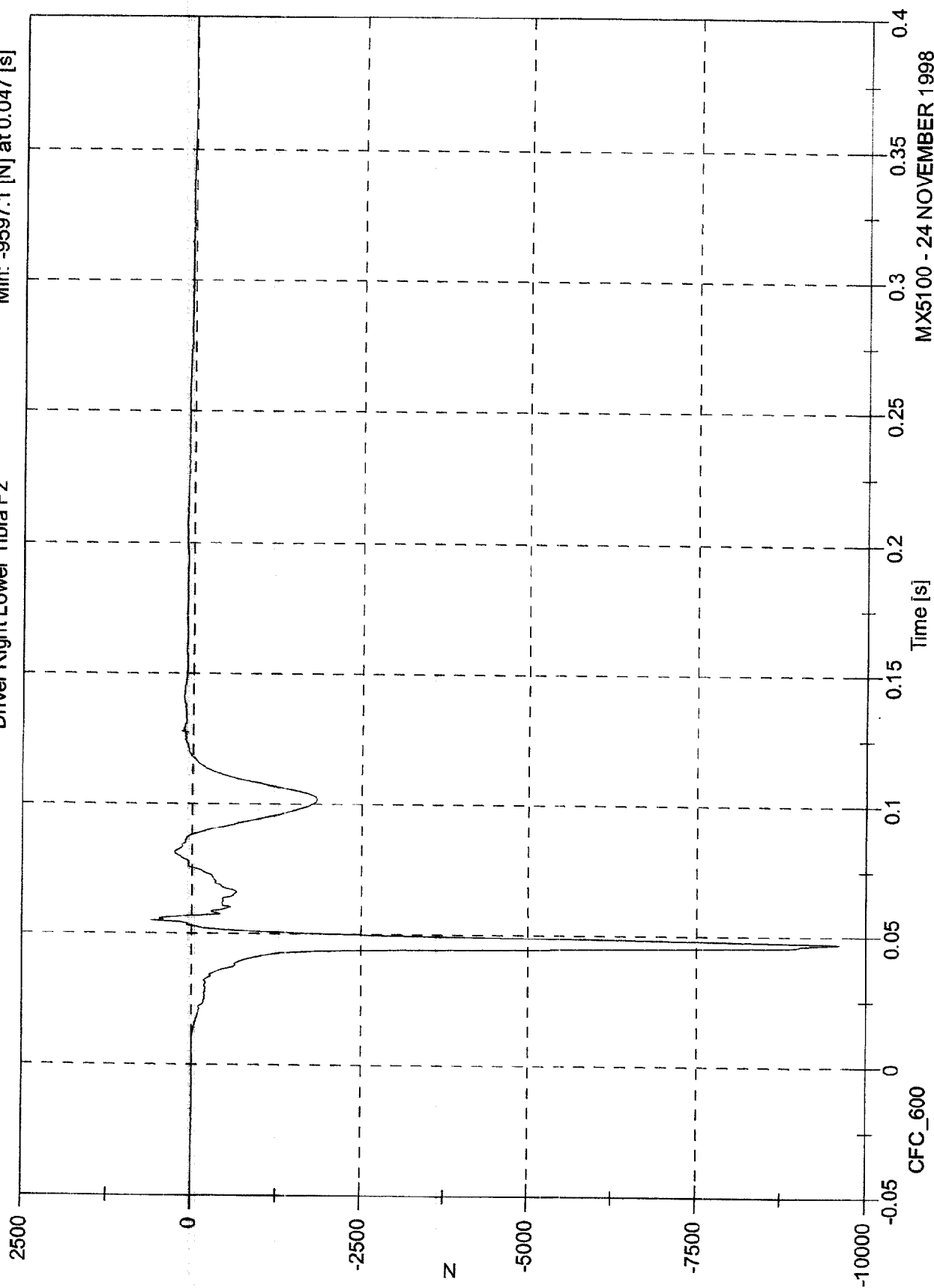


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Right Lower Tibia Fz

Max: 609.2 [N] at 0.055 [s]
Min: -9597.1 [N] at 0.047 [s]

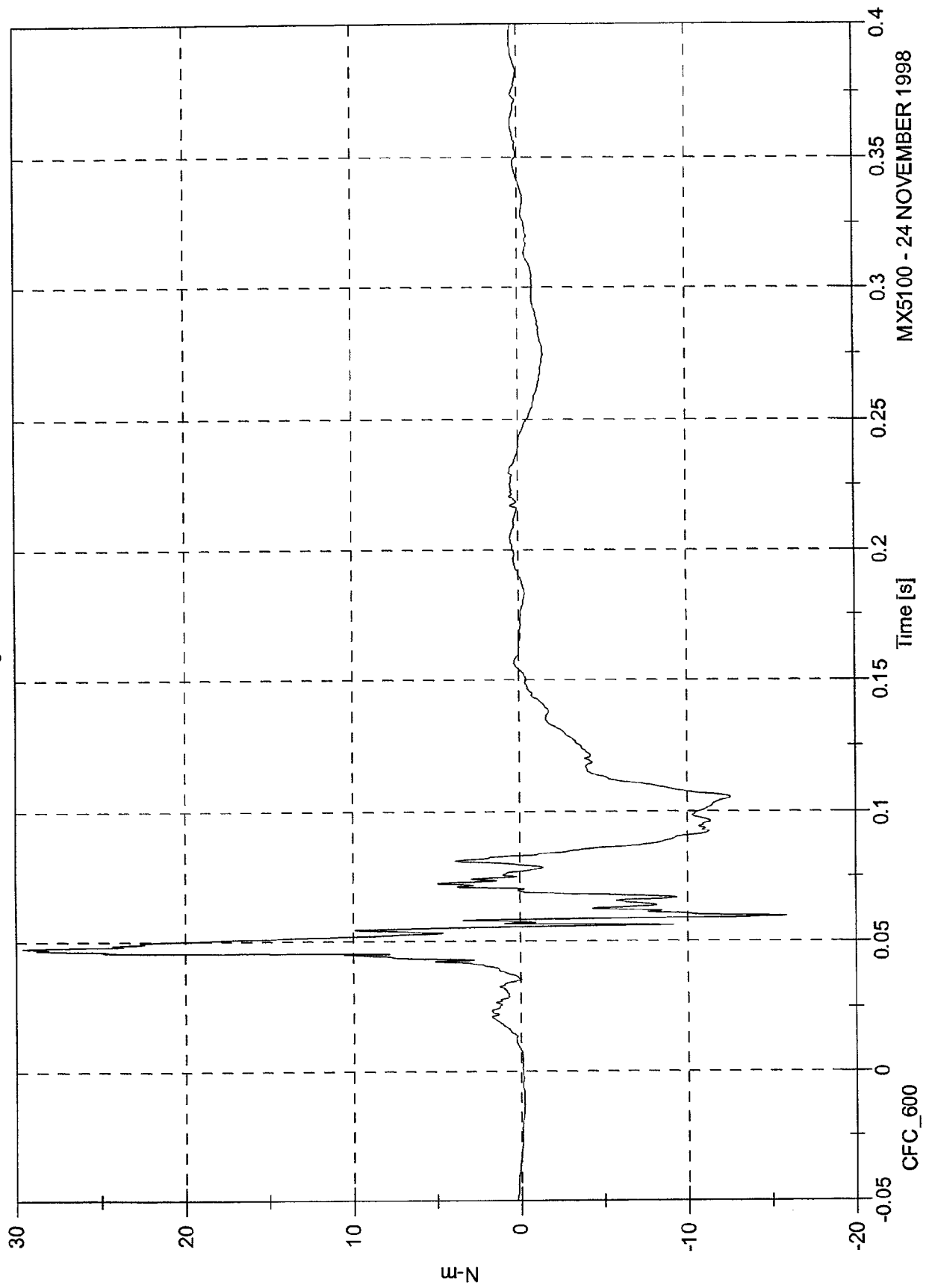


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 29.6 [N-m] at 0.047 [s]
Min: -15.9 [N-m] at 0.060 [s]

Driver Right Lower Tibia Mx



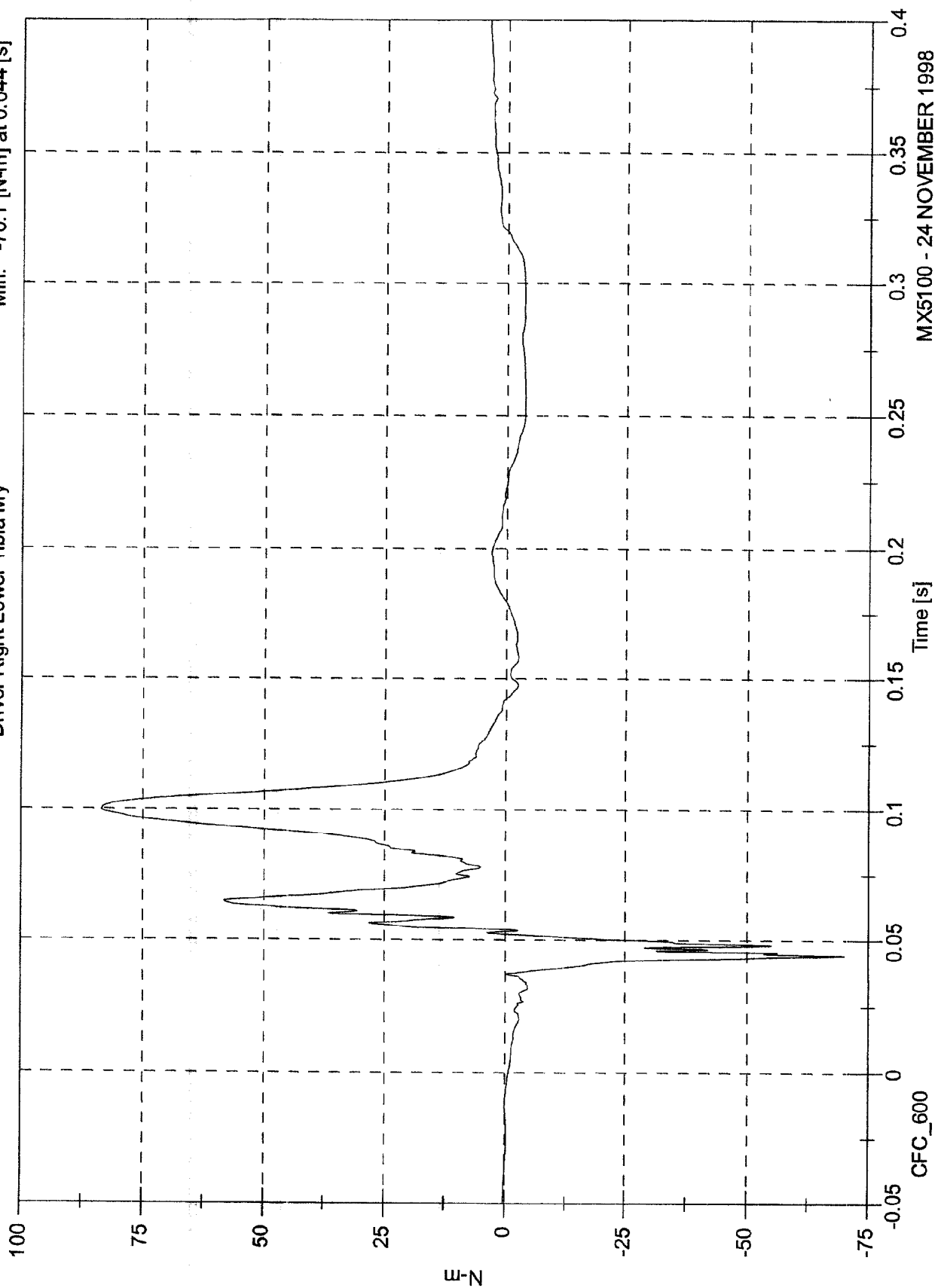
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 83.6 [N-m] at 0.100 [s]

Min: -70.1 [N-m] at 0.044 [s]

Driver Right Lower Tibia My

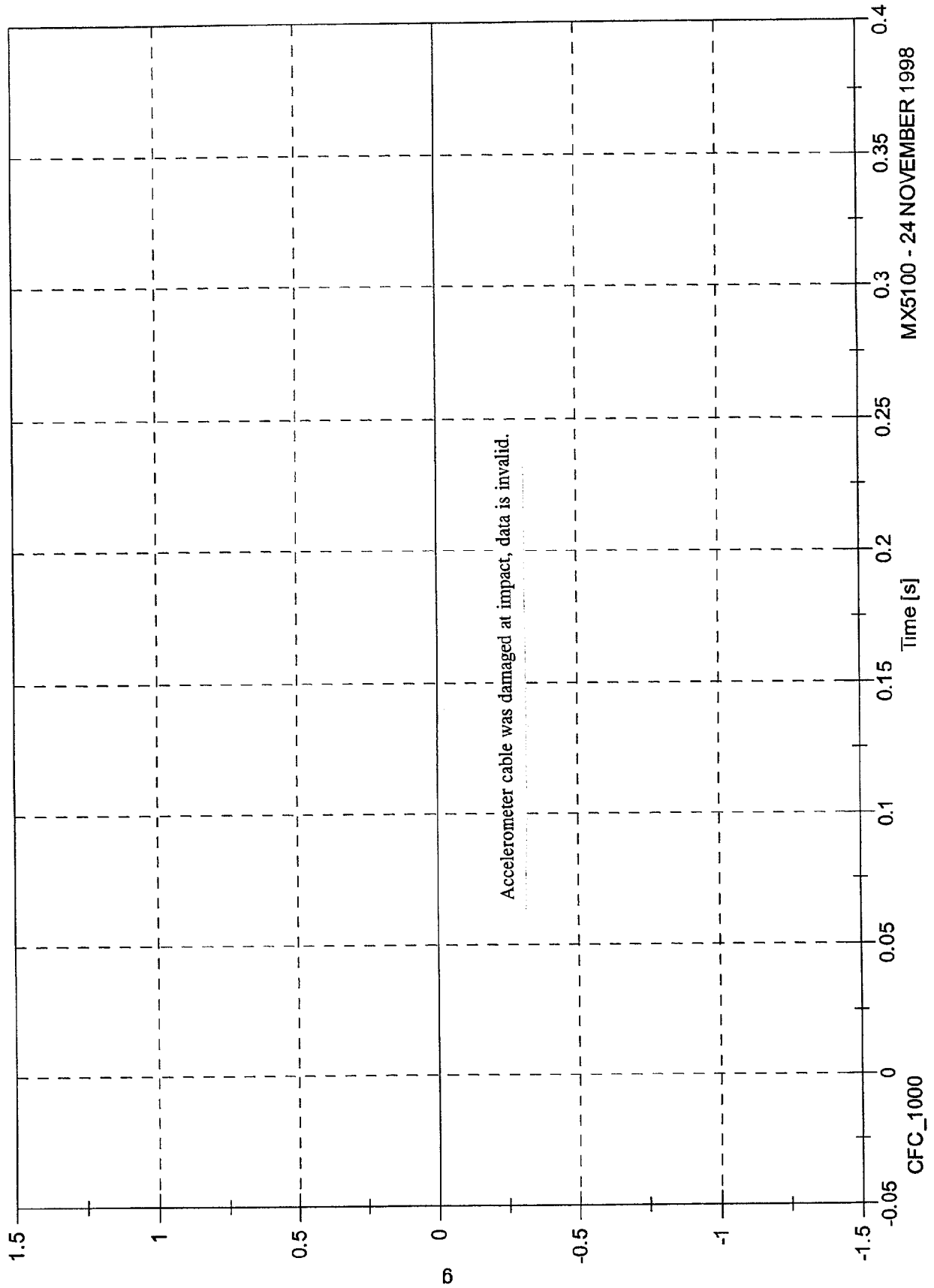


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: -0.0 [g] at -0.100 [s]
Min: -0.0 [g] at -0.100 [s]

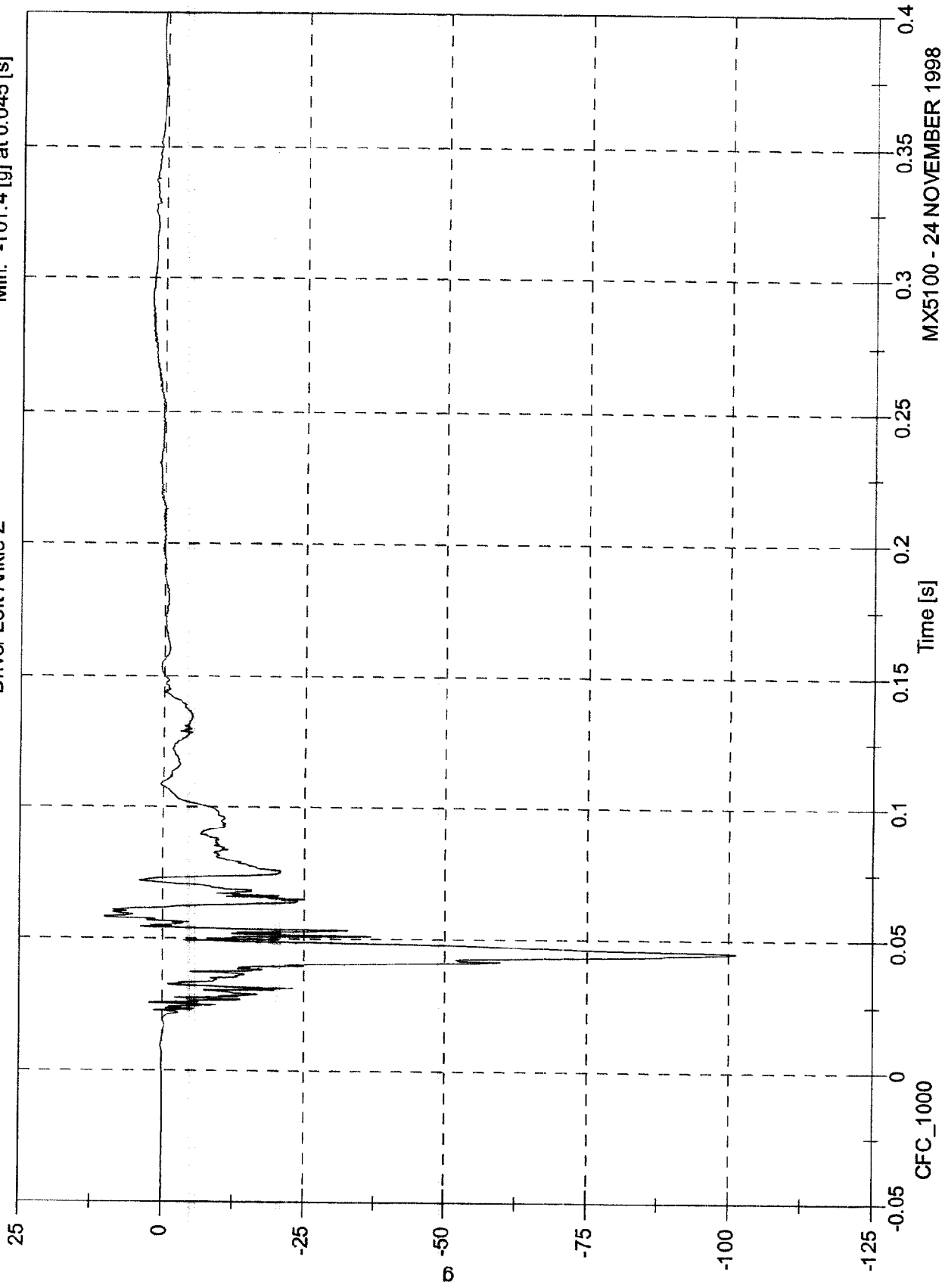
Driver Left Ankle X



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

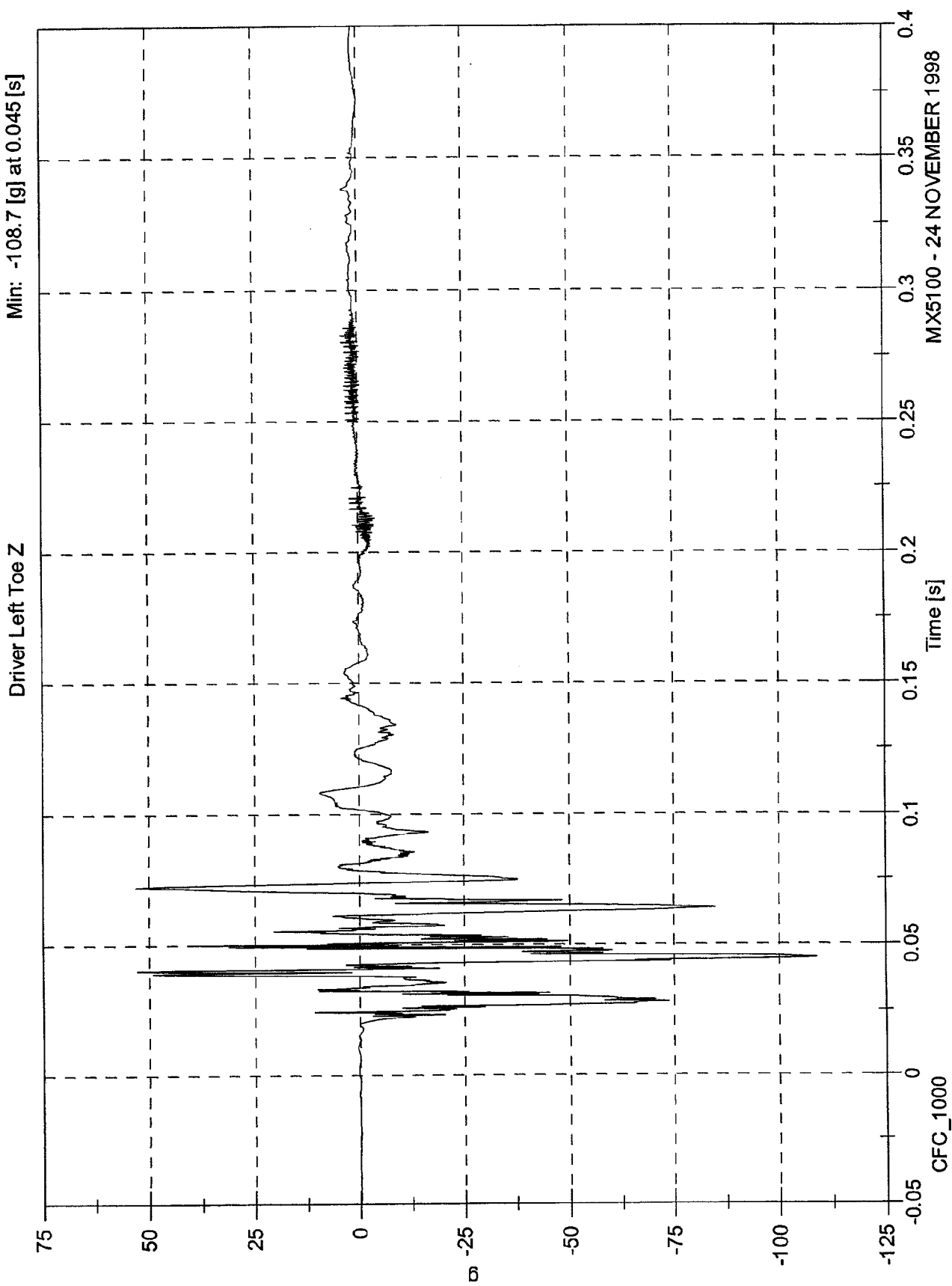
Driver Left Ankle Z

Max: 10.2 [g] at 0.058 [s]
Min: -101.4 [g] at 0.045 [s]



MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4RUNNER

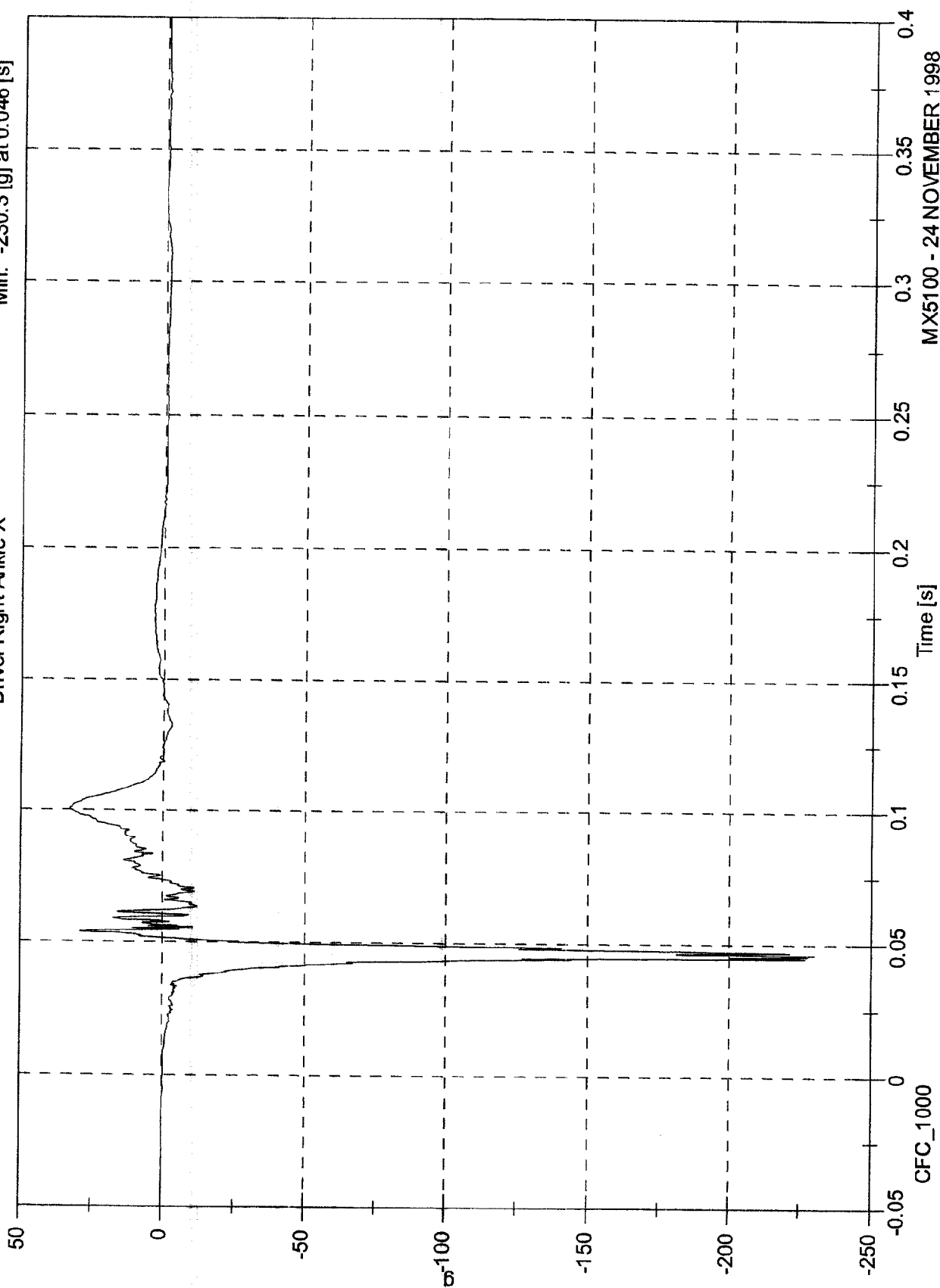


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Driver Right Ankle X

Max: 32.9 [g] at 0.101 [s]
Min: -230.3 [g] at 0.046 [s]

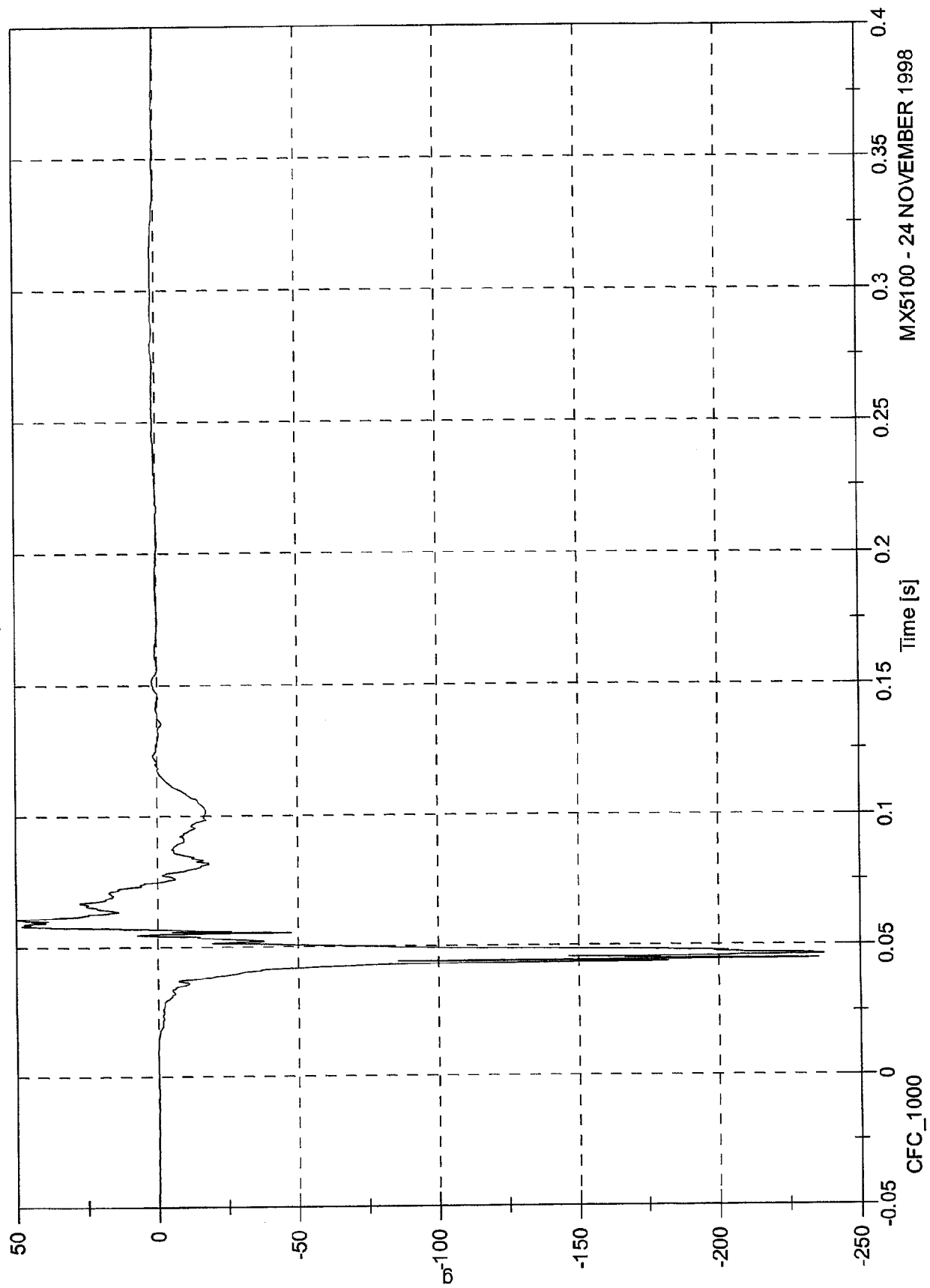


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

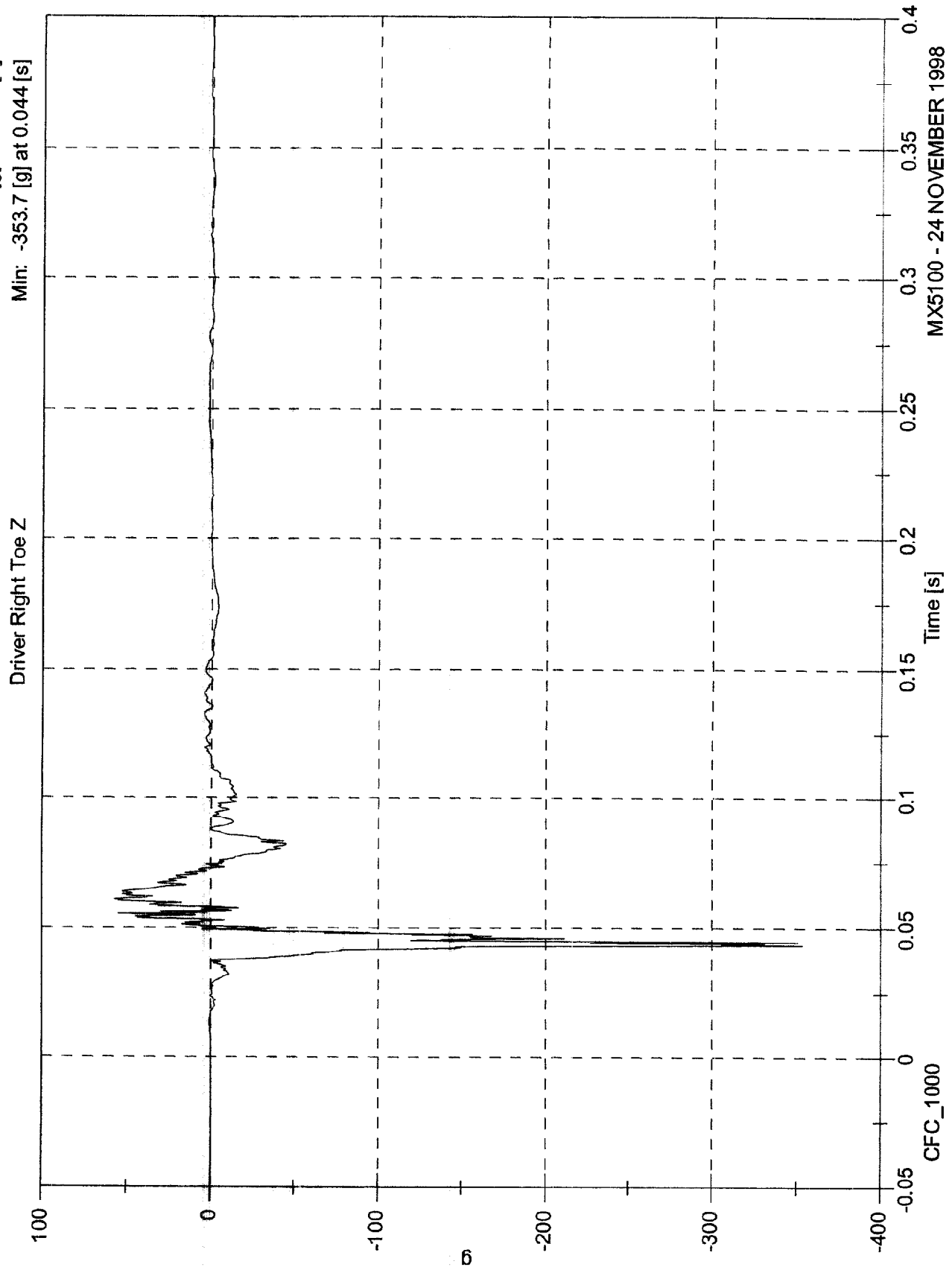
Driver Right Ankle Z

Max: 49.8 [g] at 0.061 [s]
Min: -237.4 [g] at 0.046 [s]



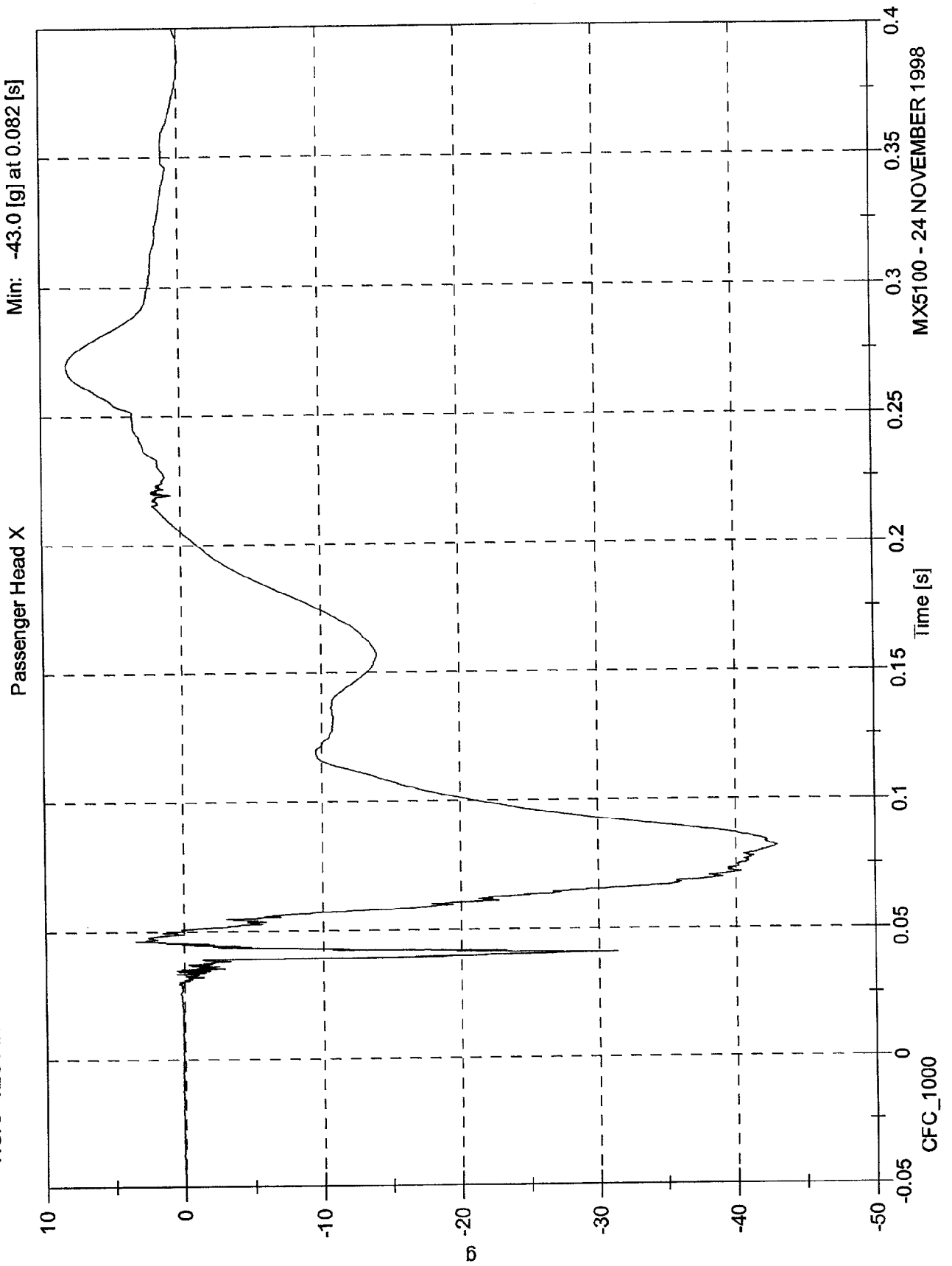
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER



MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

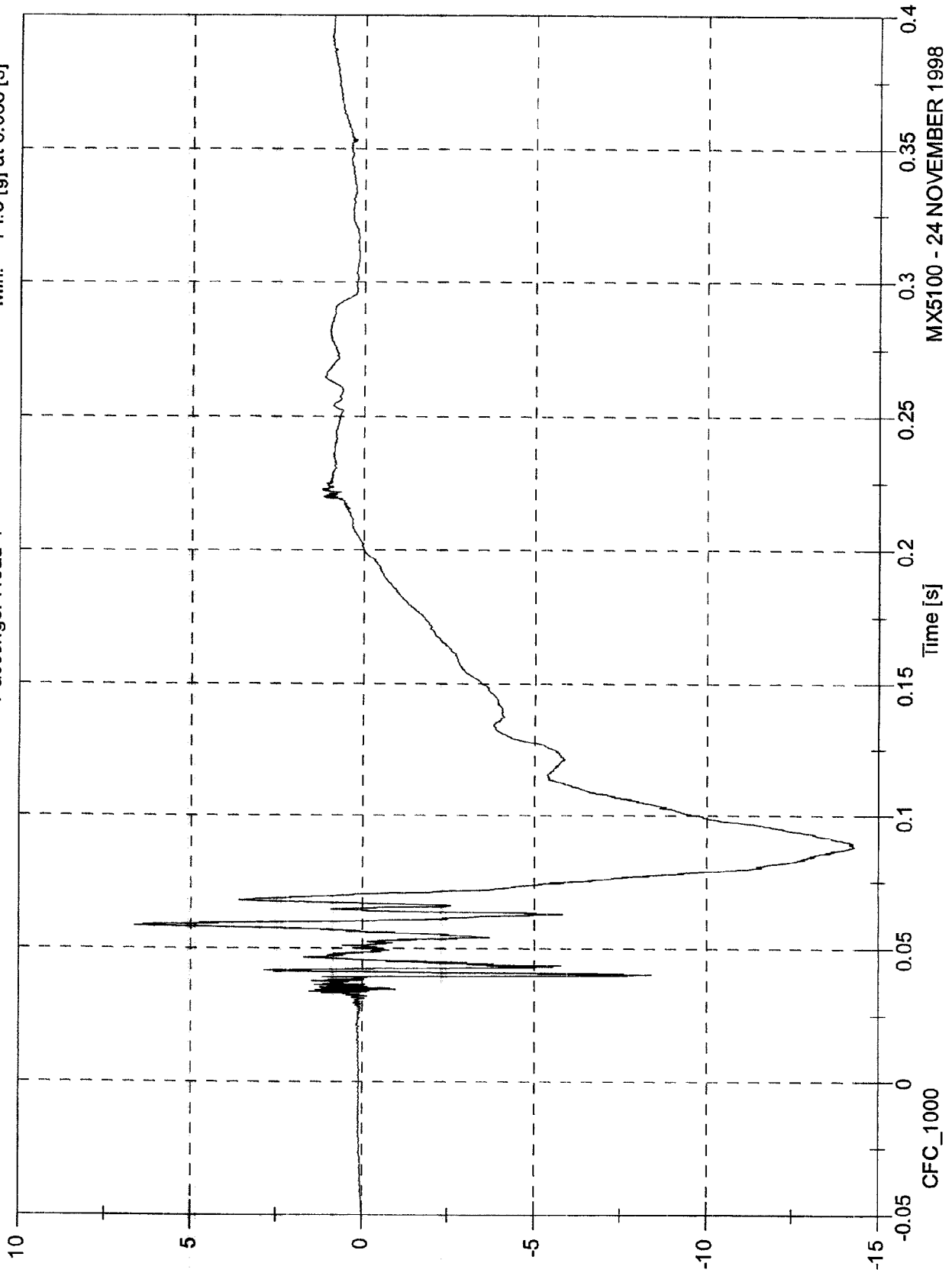


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 6.7 [g] at 0.059 [s]
Min: -14.3 [g] at 0.088 [s]

Passenger Head Y

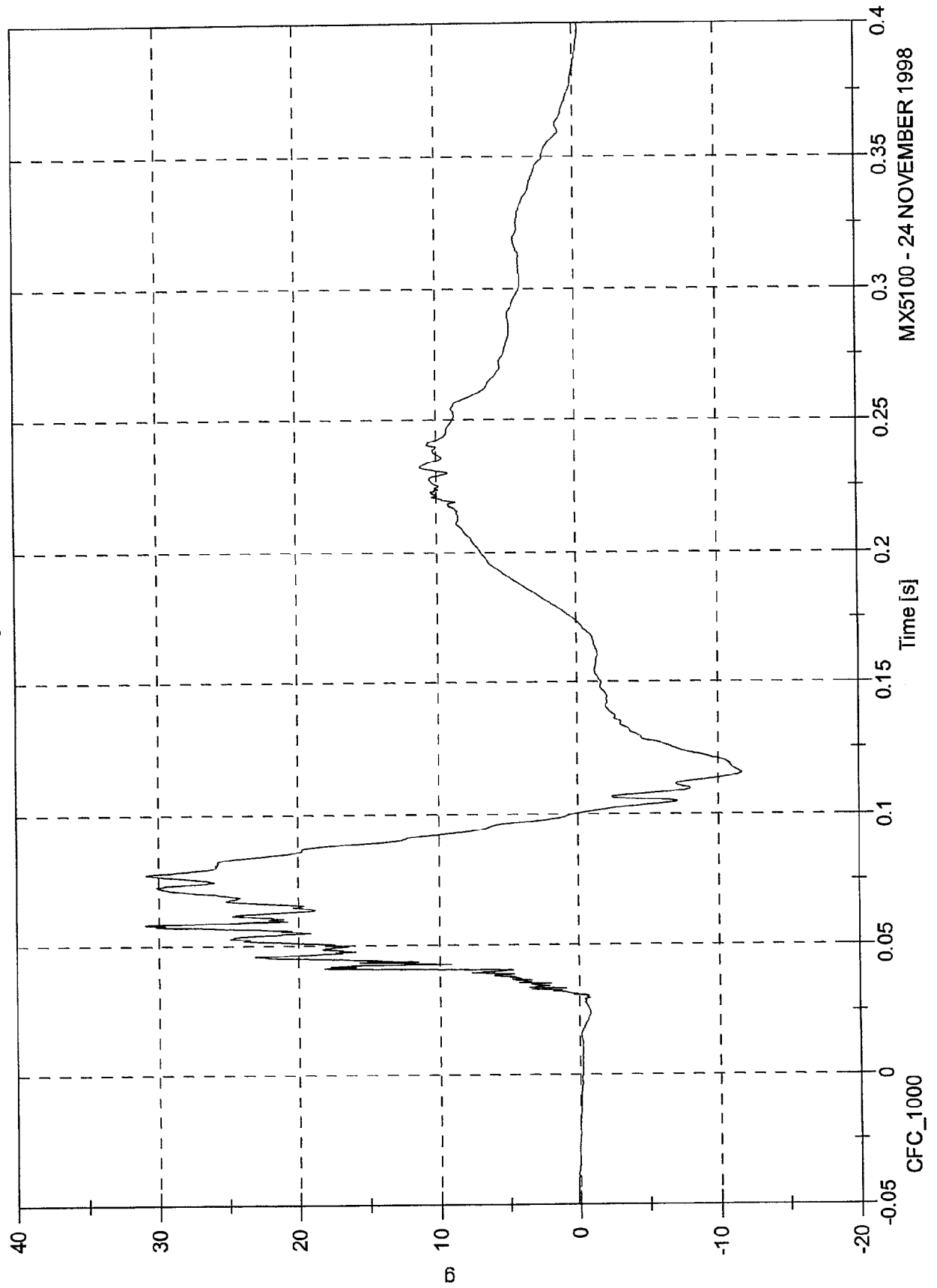


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 31.0 [g] at 0.058 [s]
Min: -11.7 [g] at 0.115 [s]

Passenger Head Z

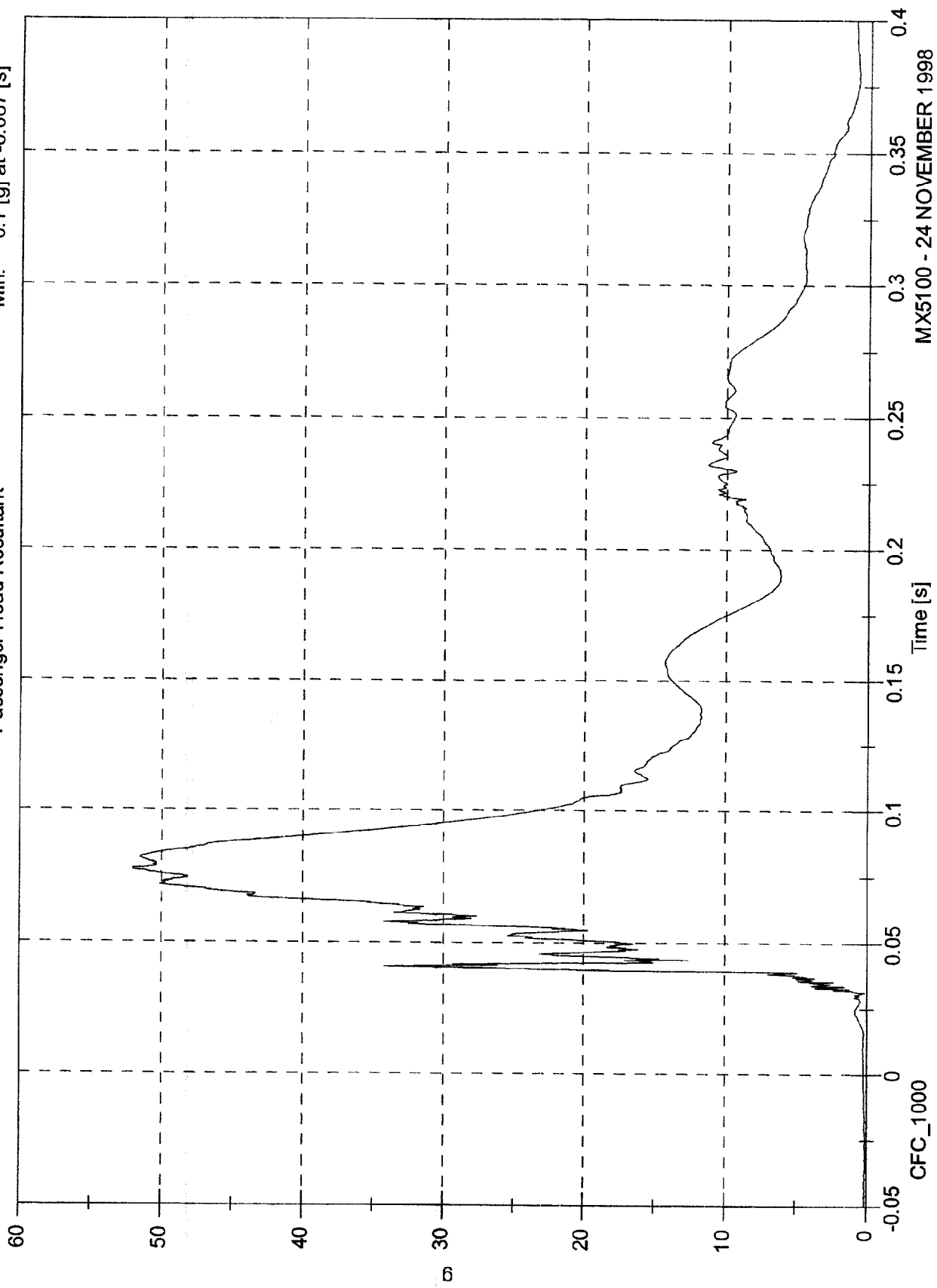


MX5100 - 24 NOVEMBER 1998

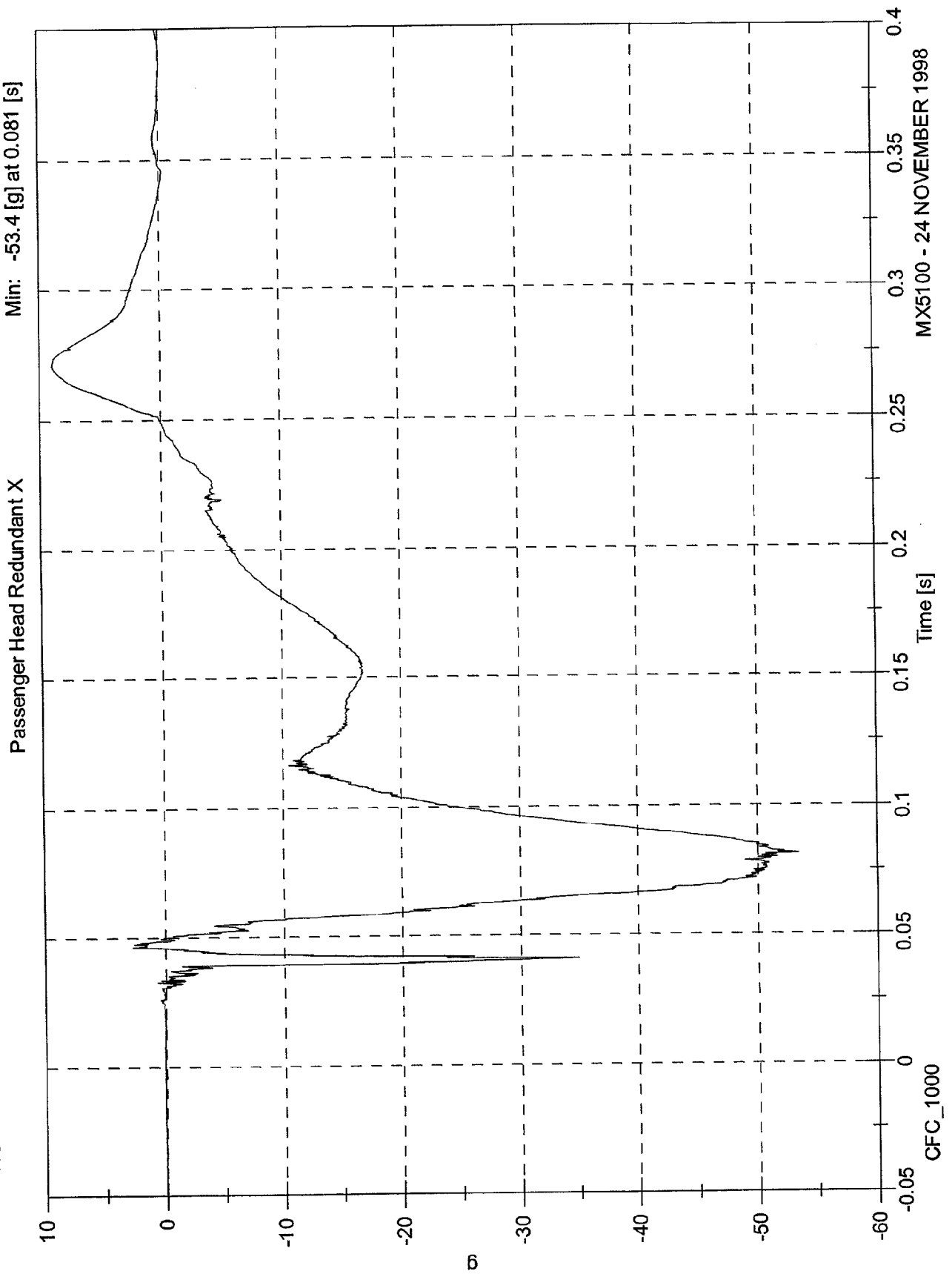
NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Head Resultant

Max: 52.1 [g] at 0.077 [s]
Min: 0.1 [g] at -0.067 [s]



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

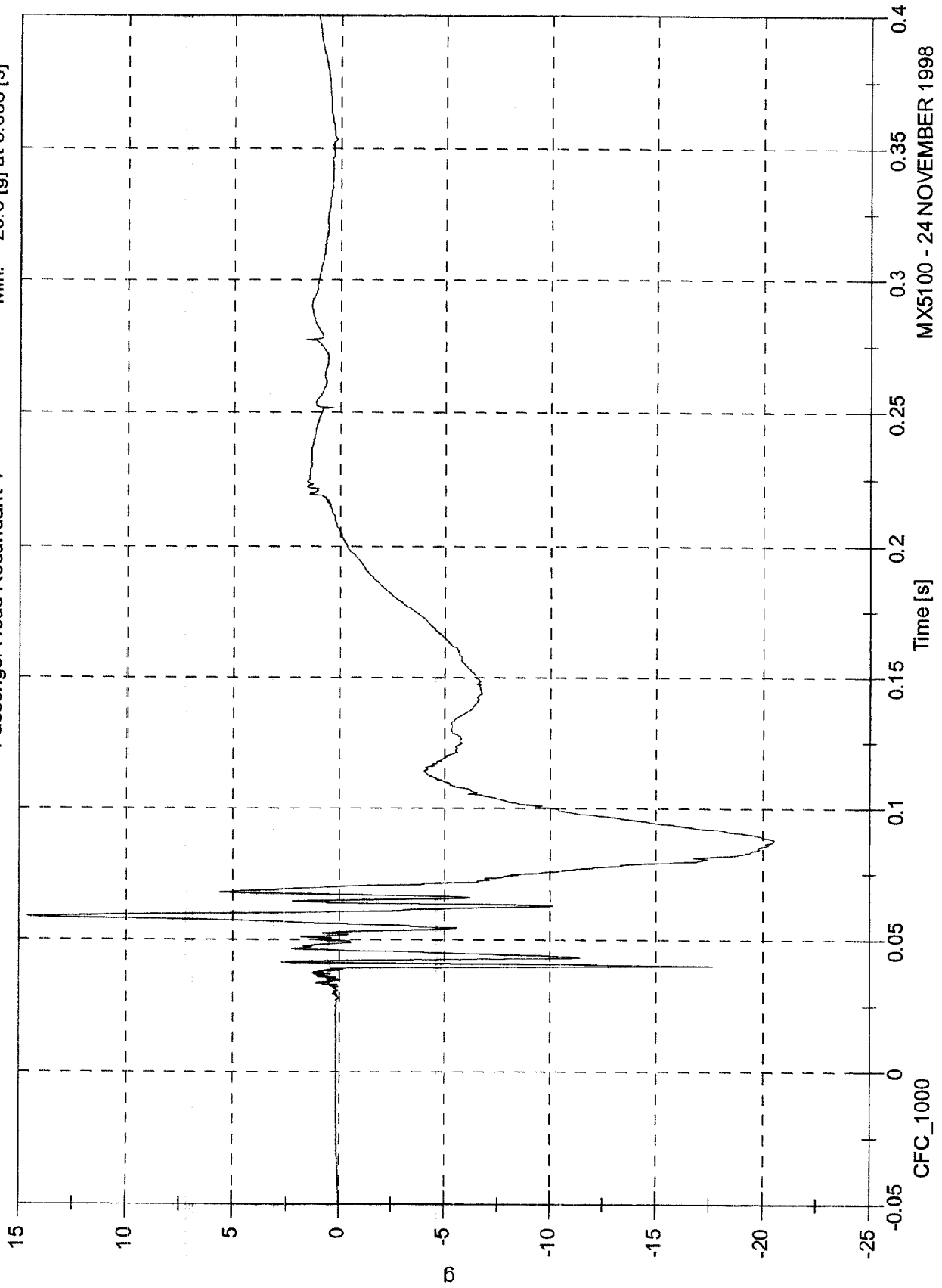


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Head Redundant Y

Max: 14.6 [g] at 0.059 [s]
Min: -20.6 [g] at 0.088 [s]

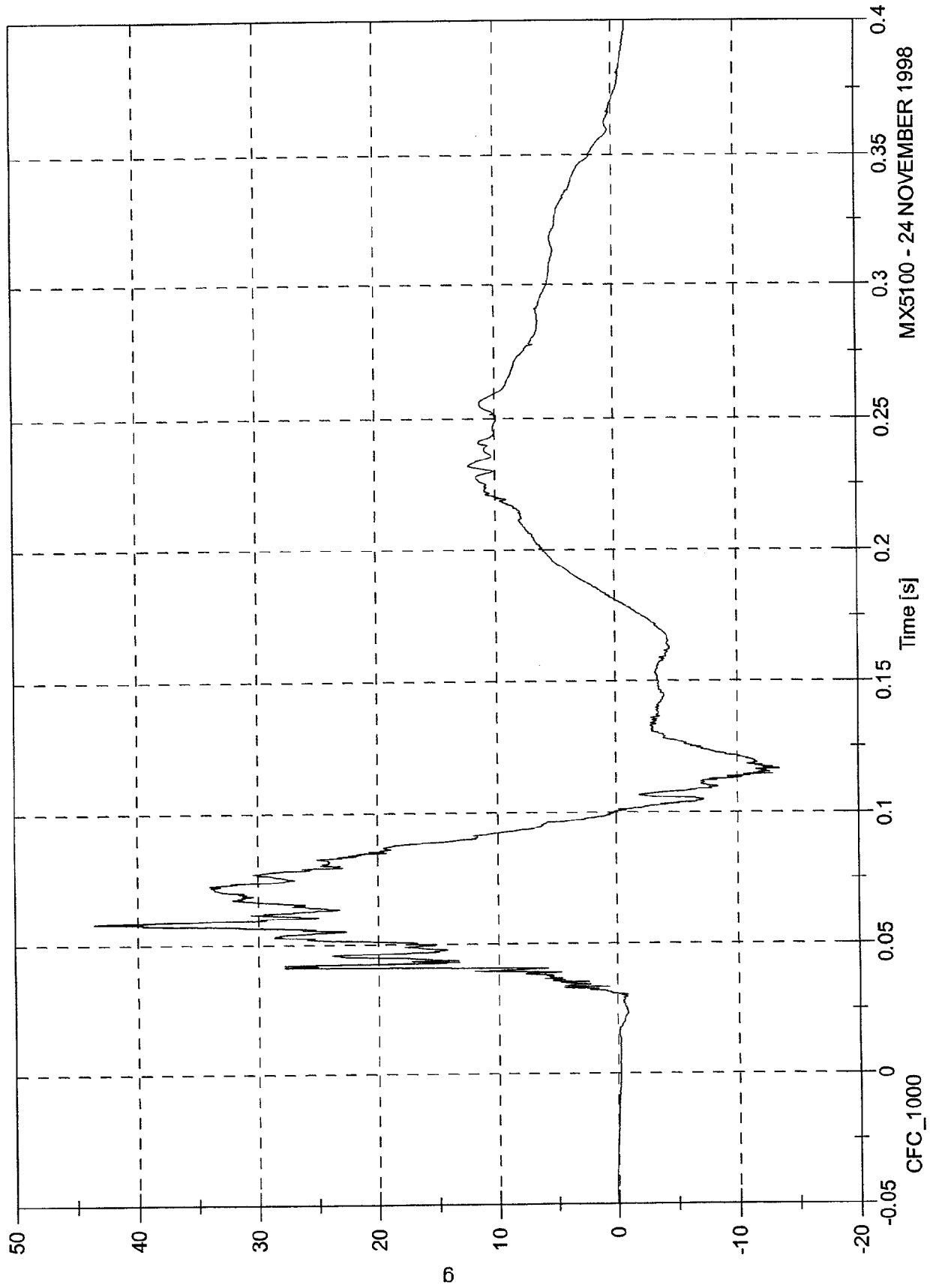


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Head Redundant Z

Max: 43.6 [g] at 0.058 [s]
Min: -13.5 [g] at 0.116 [s]

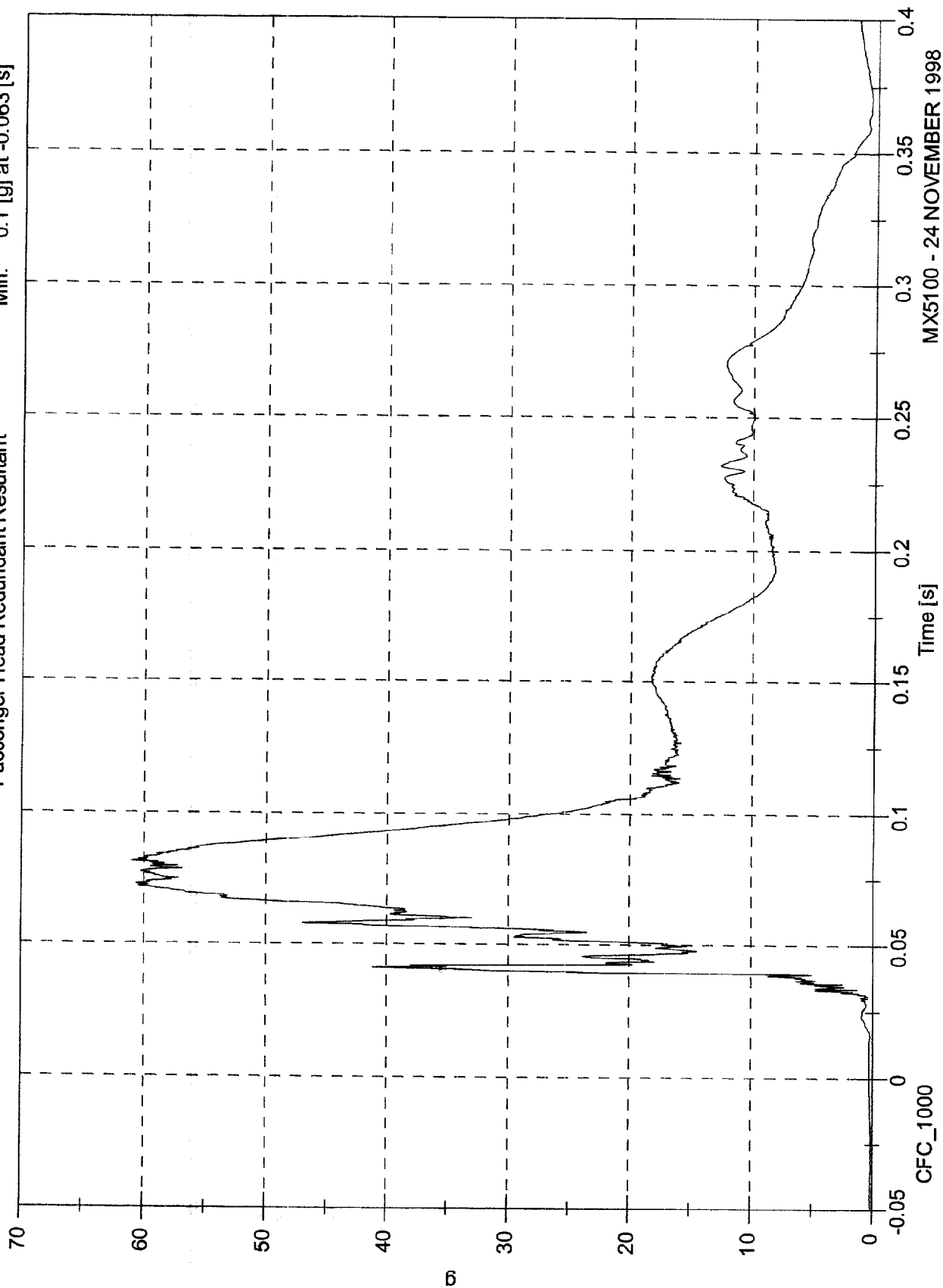


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Head Redundant Resultant

Max: 61.1 [g] at 0.081 [s]
Min: 0.1 [g] at -0.063 [s]

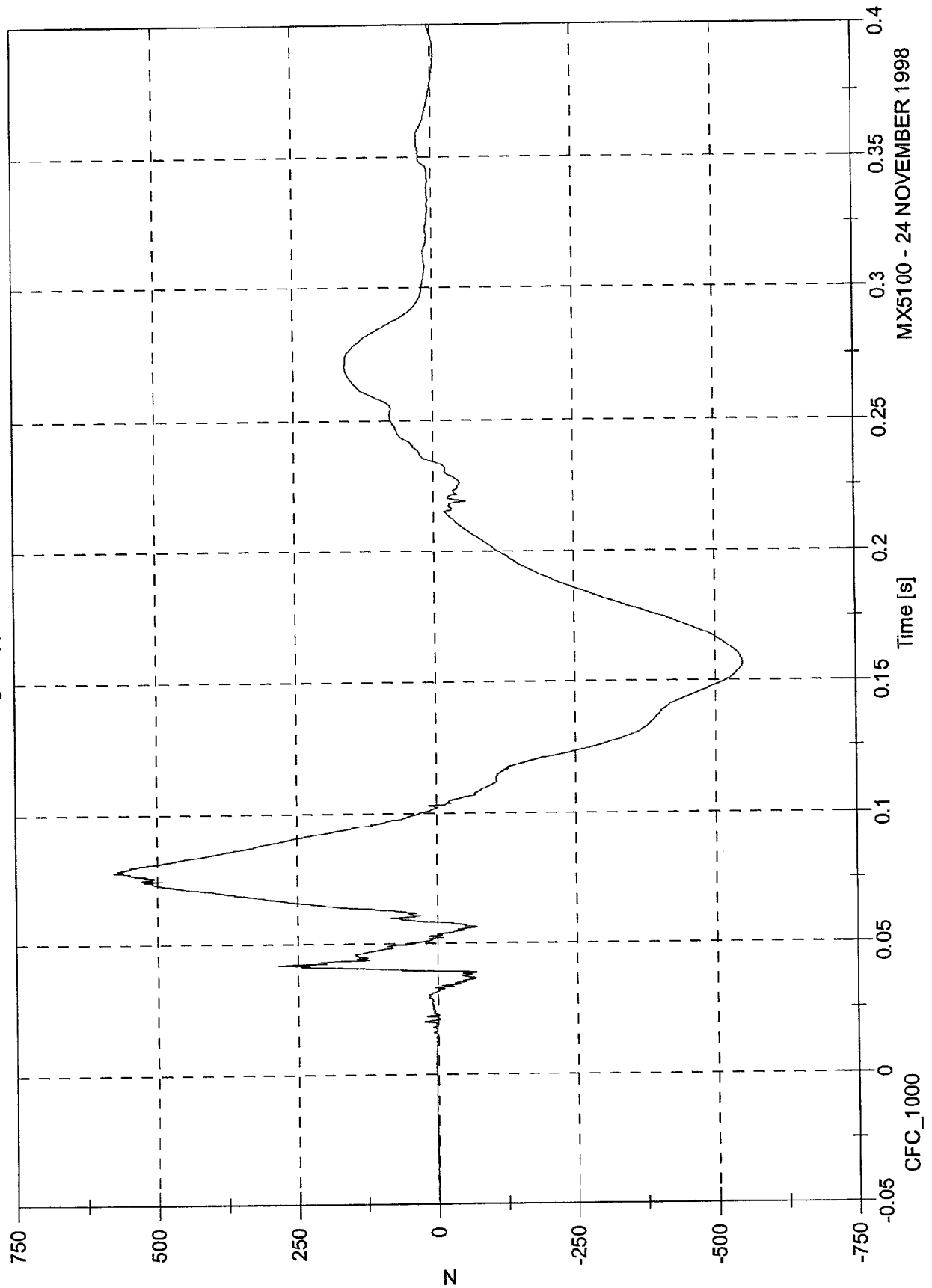


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max 578.0 [N] at 0.078 [s]
Min: -548.7 [N] at 0.156 [s]

Passenger Upper Neck Load Fx

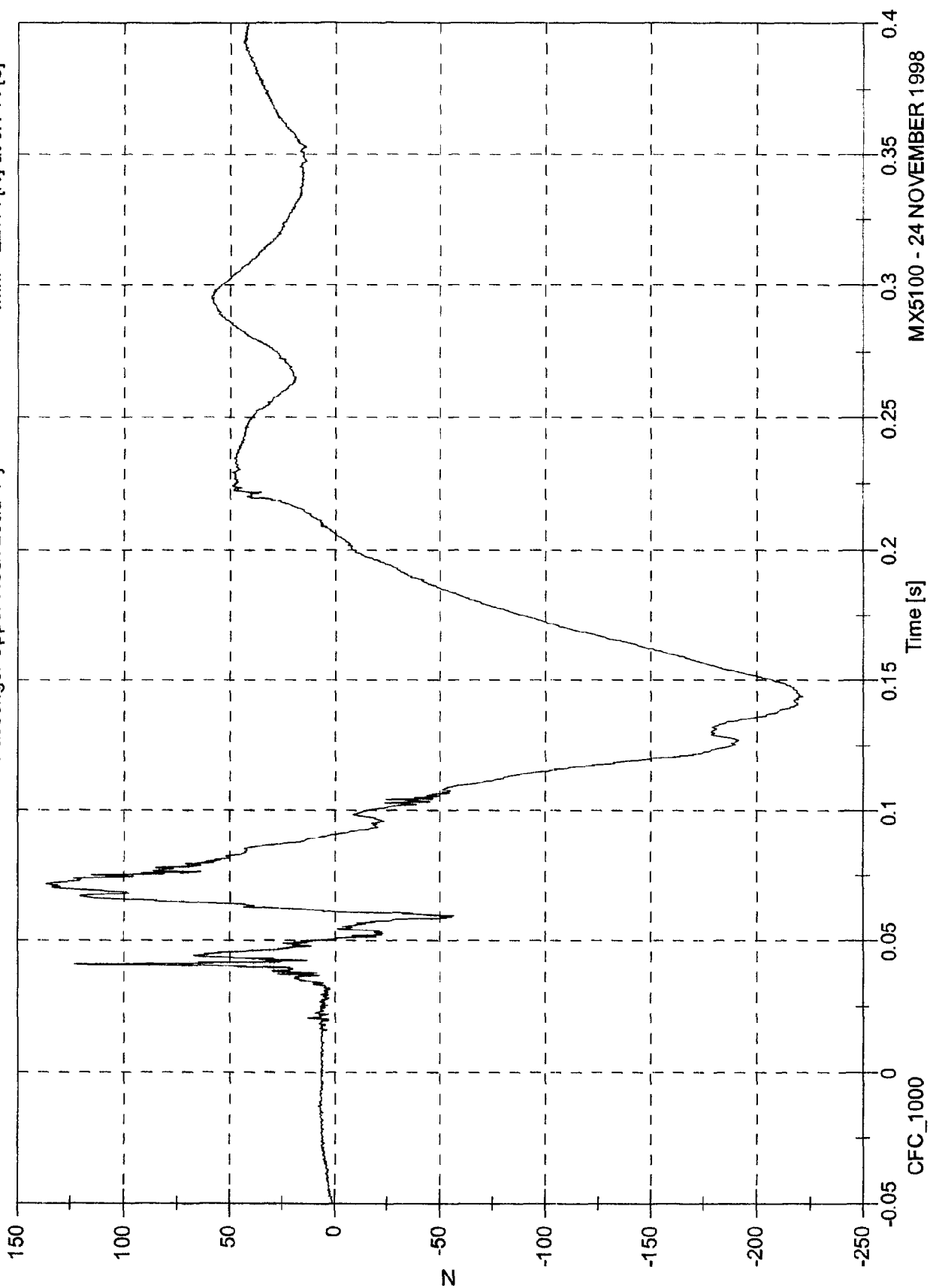


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4RUNNER

Max: 136.7 [N] at 0.072 [s]
Min: -221.4 [N] at 0.144 [s]

Passenger Upper Neck Load Fy



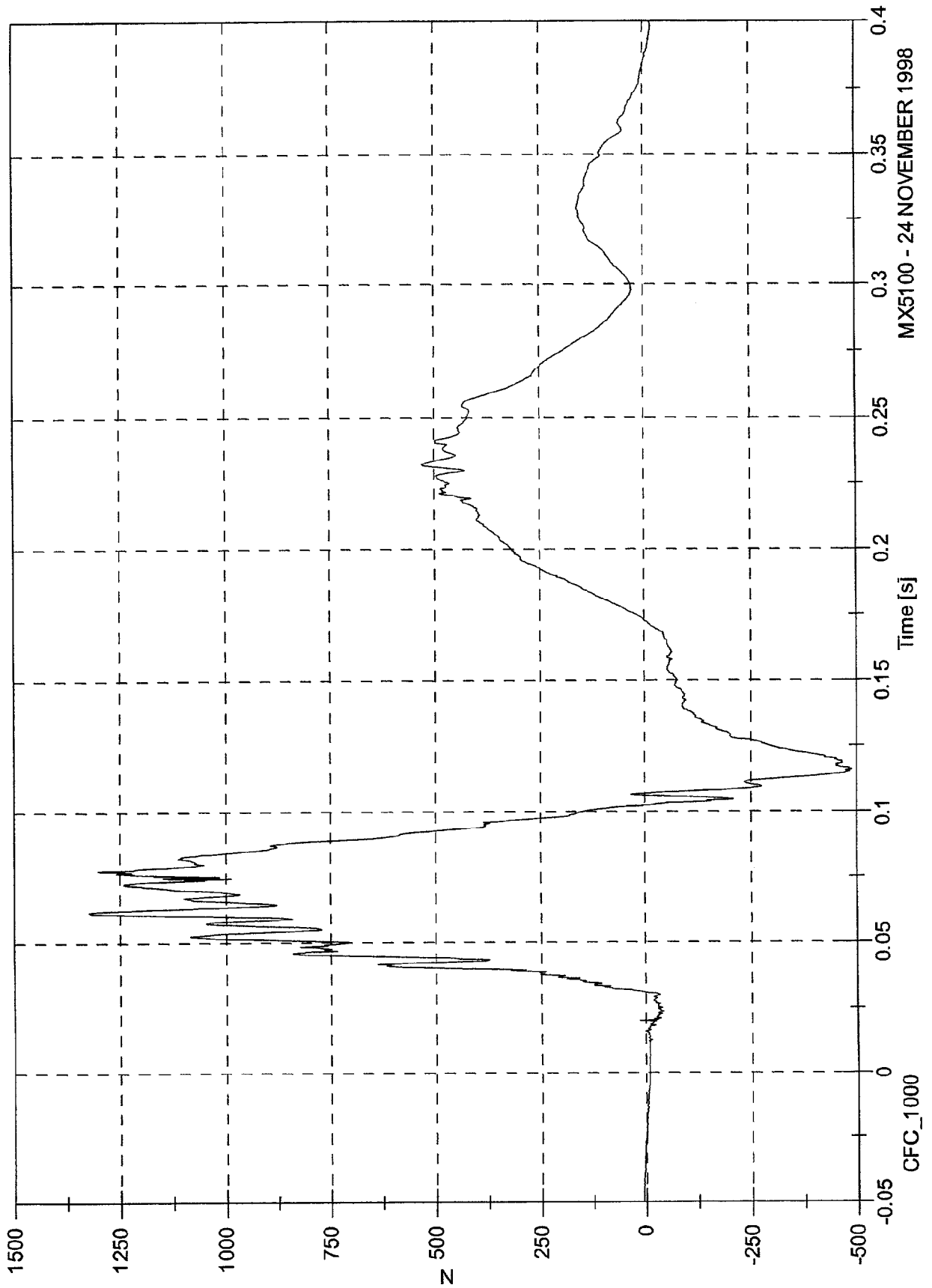
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Upper Neck Load Fz

Max: 1323.2 [N] at 0.062 [s]

Min: -489.4 [N] at 0.116 [s]



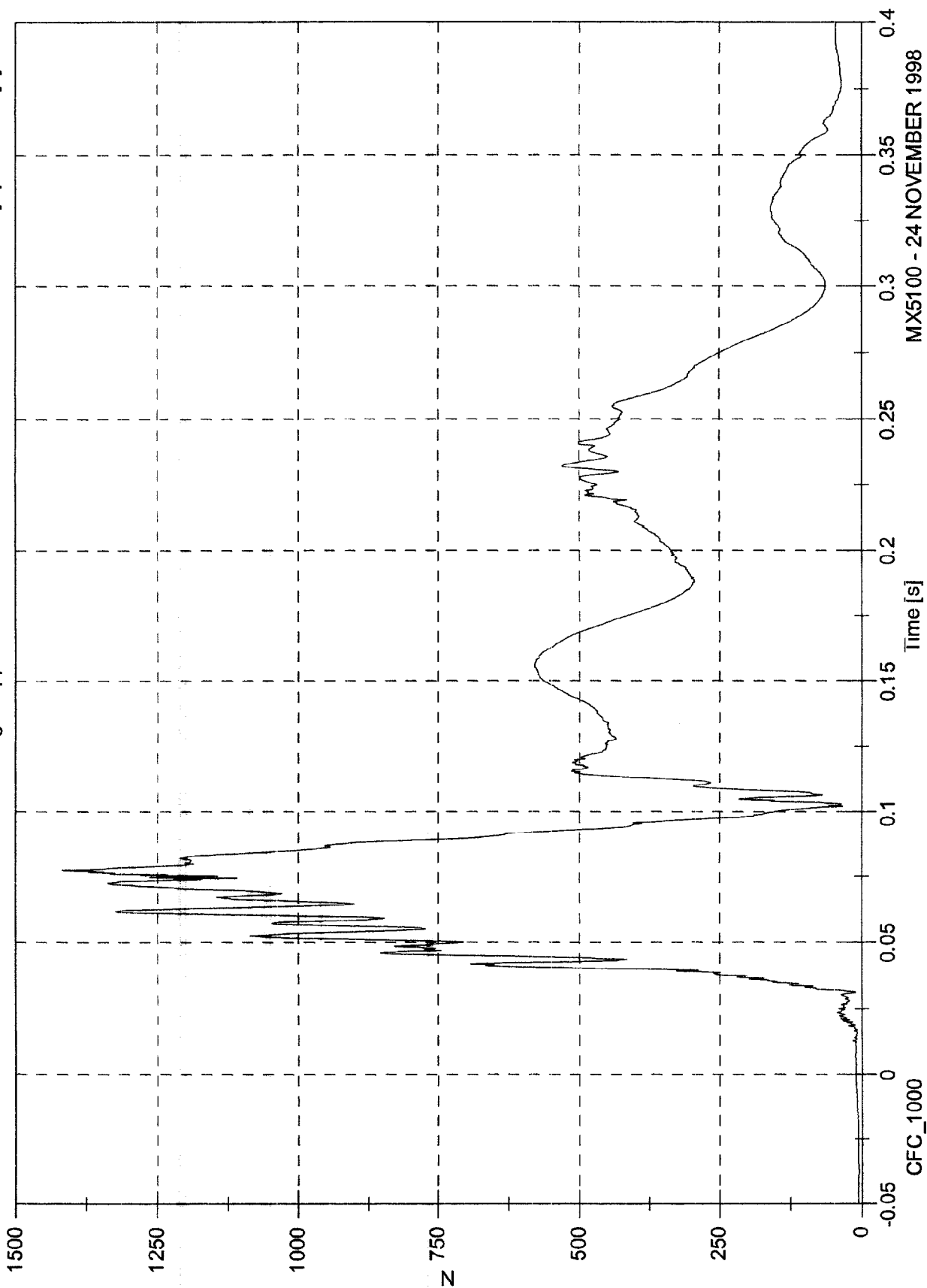
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Upper Neck Load F Resultant

Max: 1419.1 [N] at 0.077 [s]

Min: 3.6 [N] at -0.055 [s]

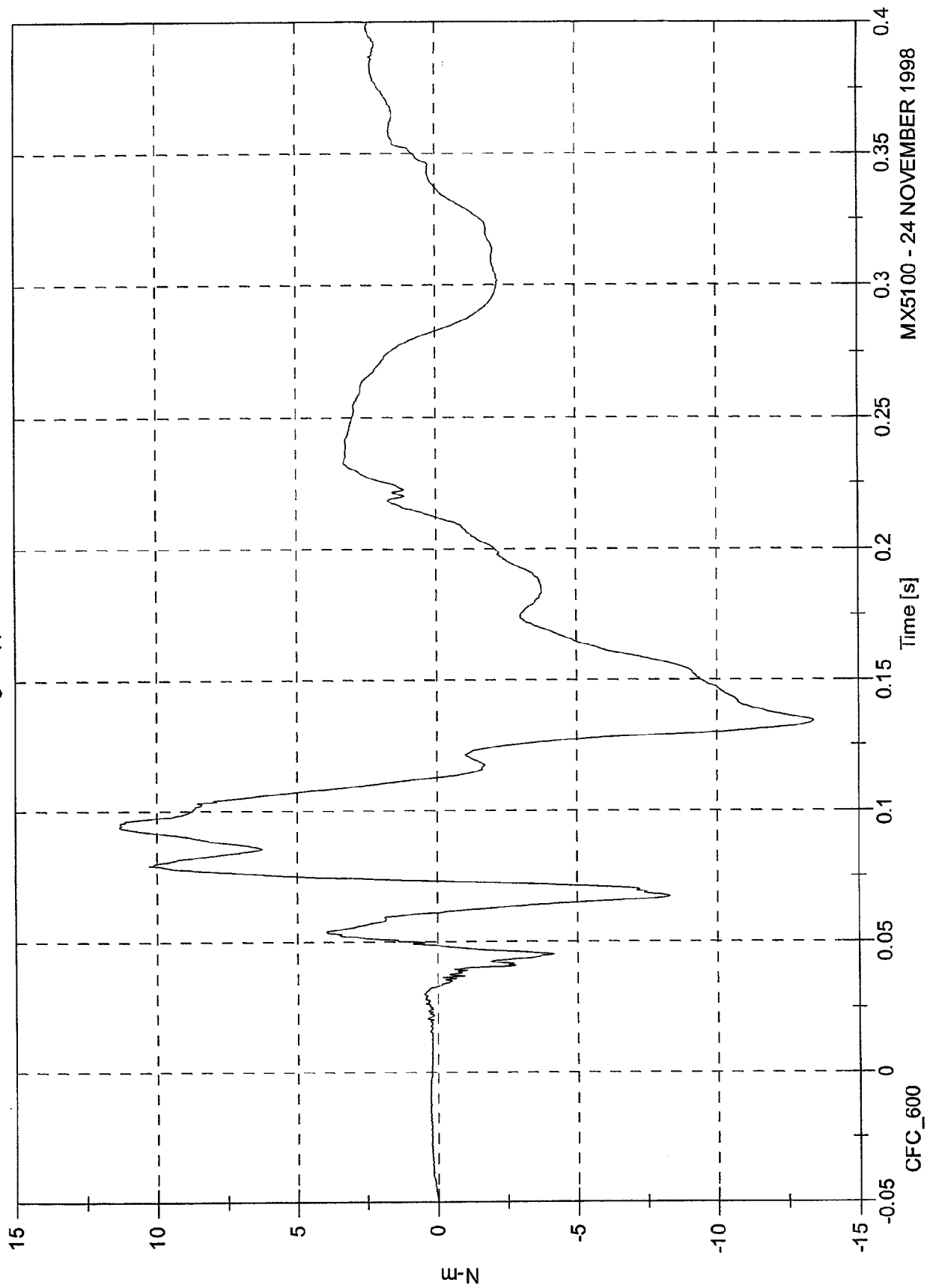


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 11.3 [N-m] at 0.094 [s]
 Min: -13.4 [N-m] at 0.134 [s]

Passenger Upper Neck Load Mx

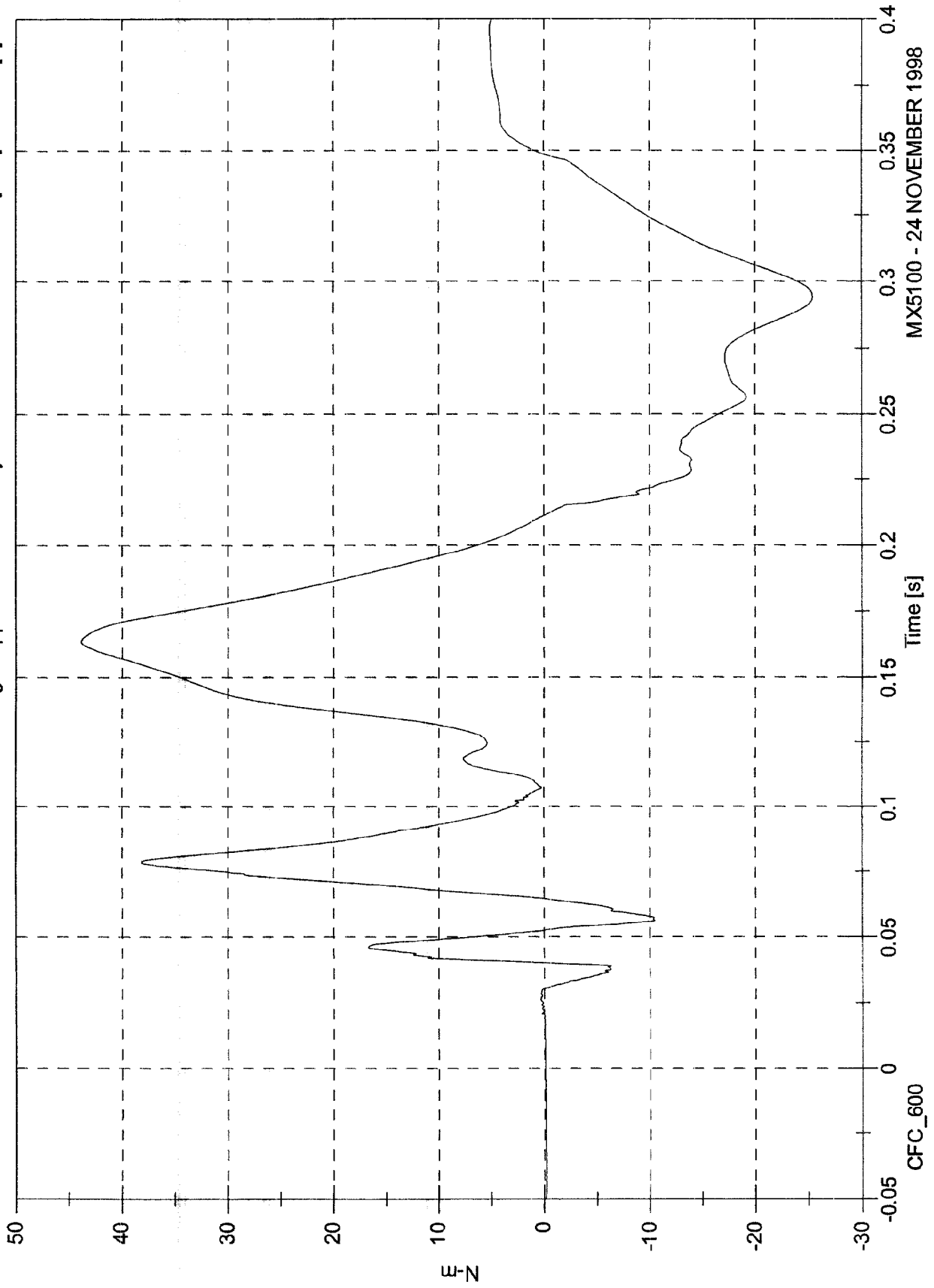


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Upper Neck Load My

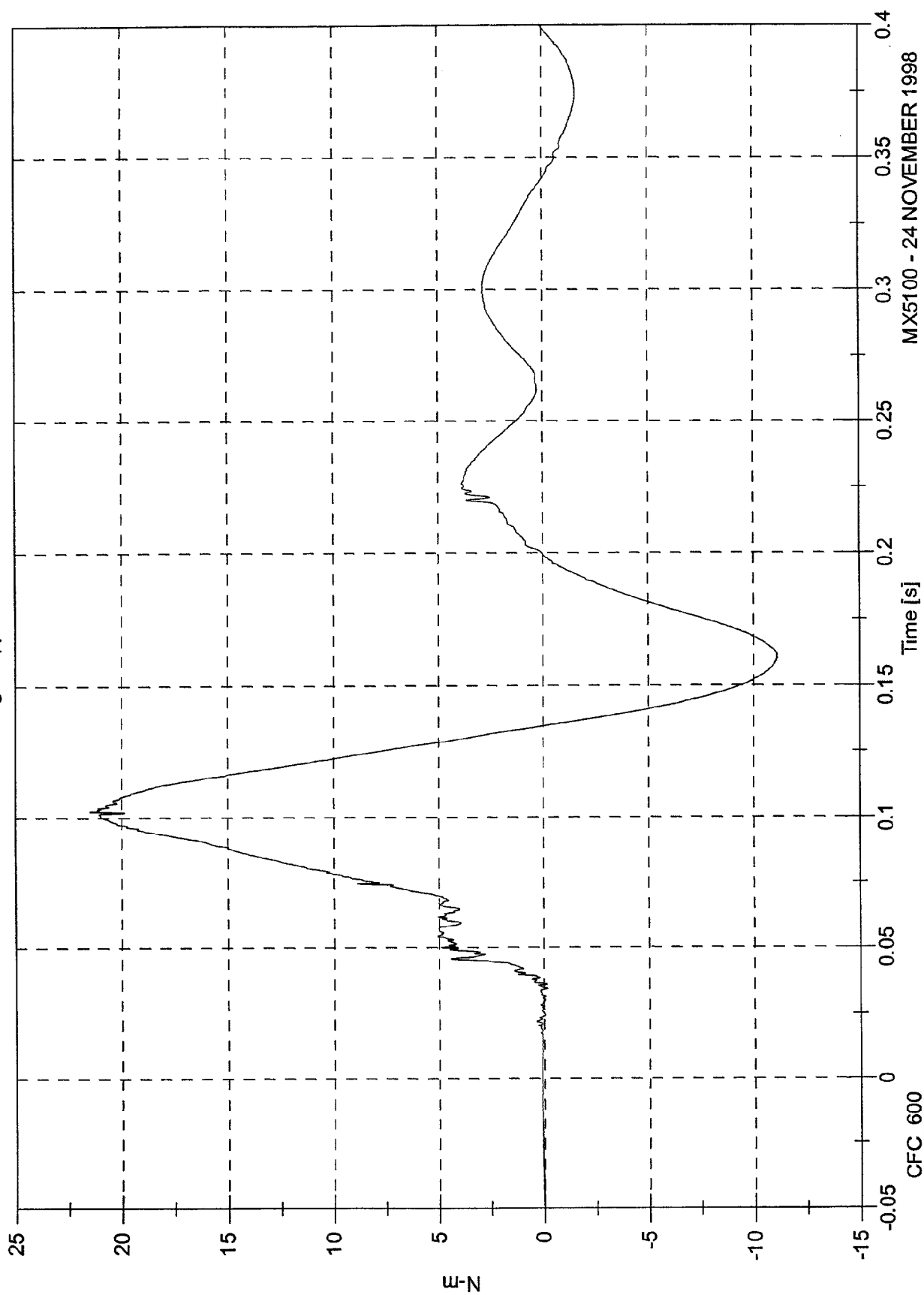
Max 43.9 [N-m] at 0.164 [s]
Min: -25.4 [N-m] at 0.294 [s]



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 21.5 [N-m] at 0.102 [s]
 Min: -11.1 [N-m] at 0.160 [s]

Passenger Upper Neck Load Mz

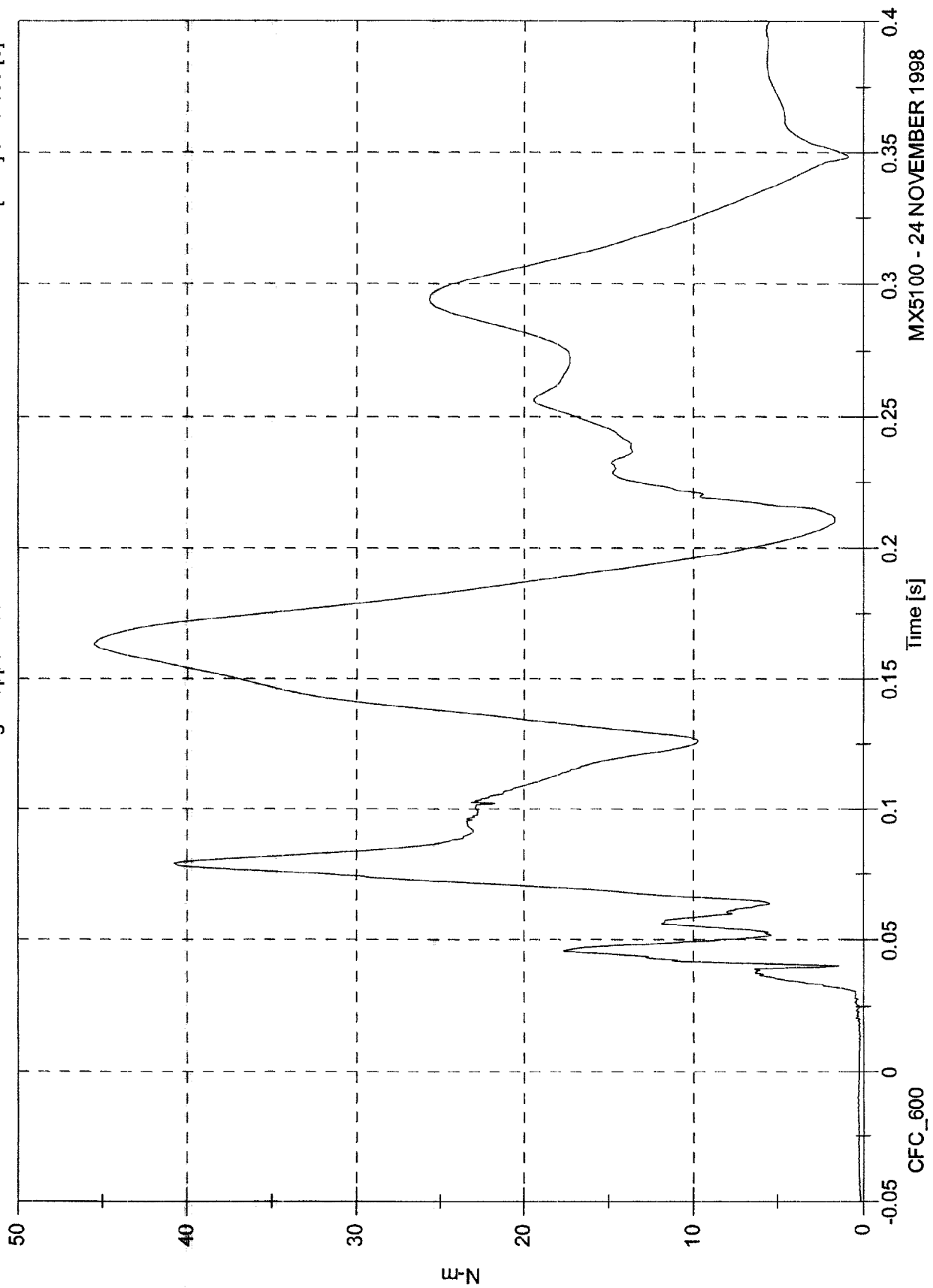


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 45.5 [N-m] at 0.163 [s]
 Min: 0.1 [N-m] at -0.055 [s]

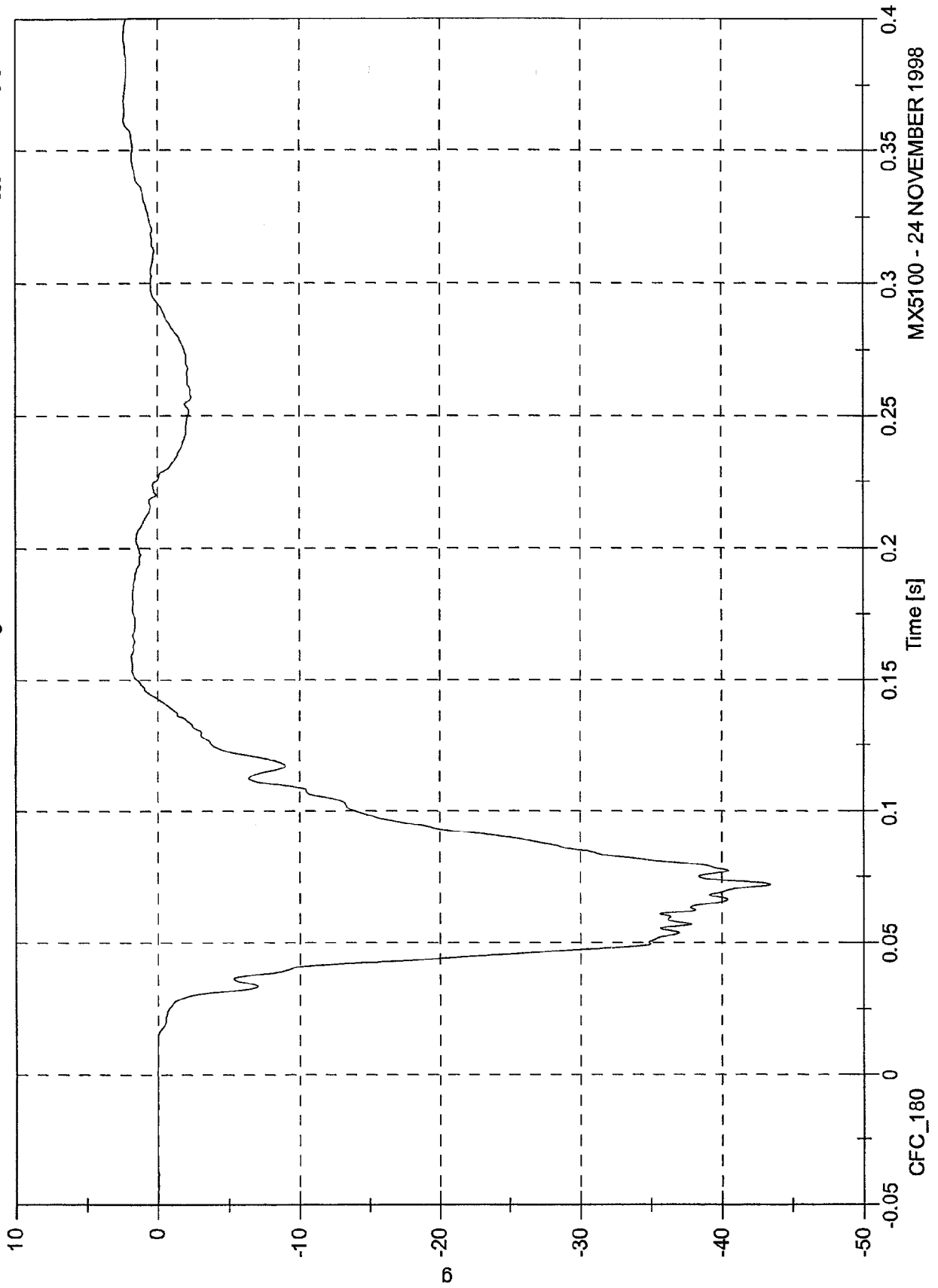
Passenger Upper Neck Load M Resultant



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 2.4 [g] at 0.394 [s]
Min: -43.5 [g] at 0.072 [s]

Passenger Chest X

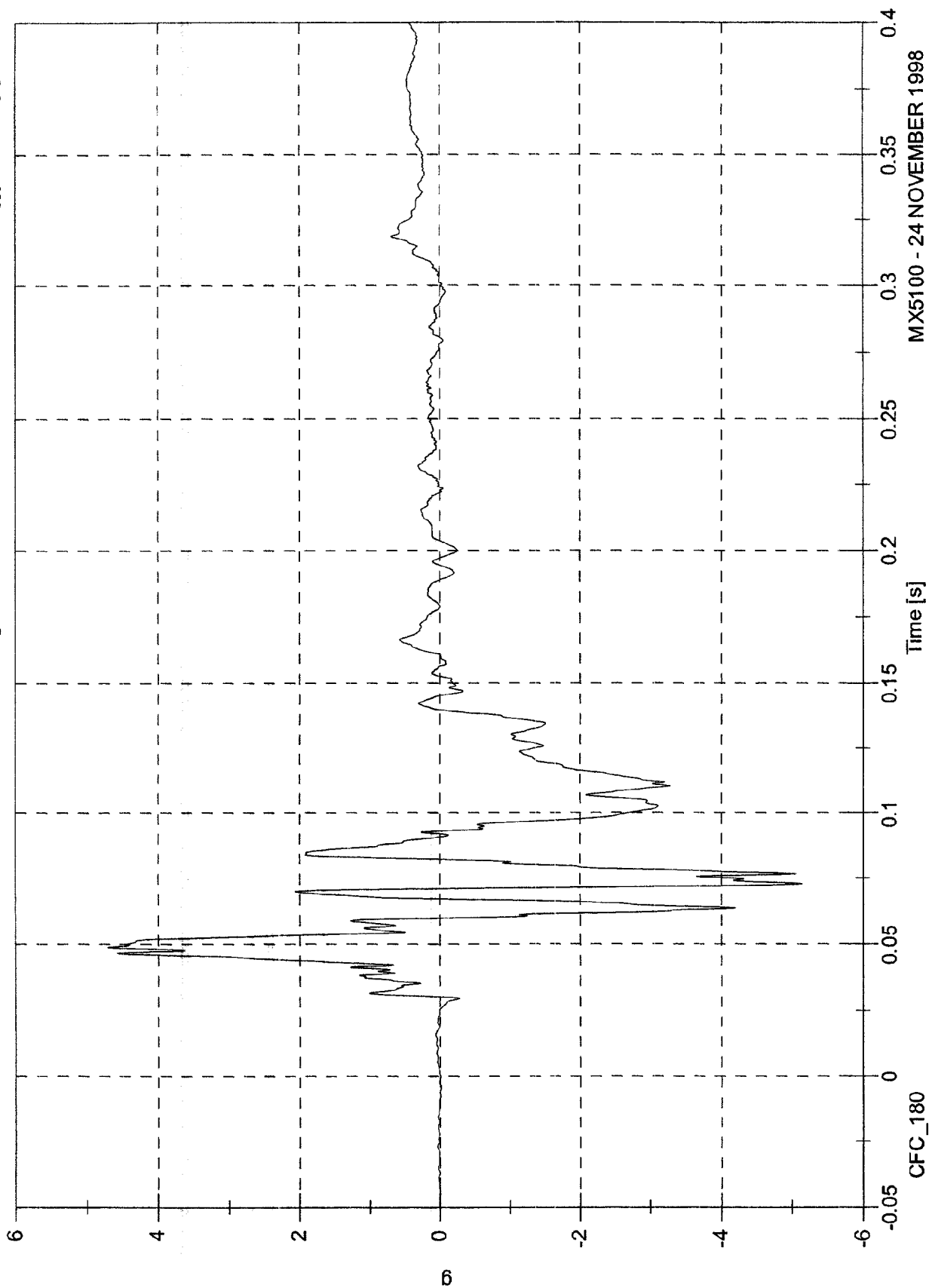


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

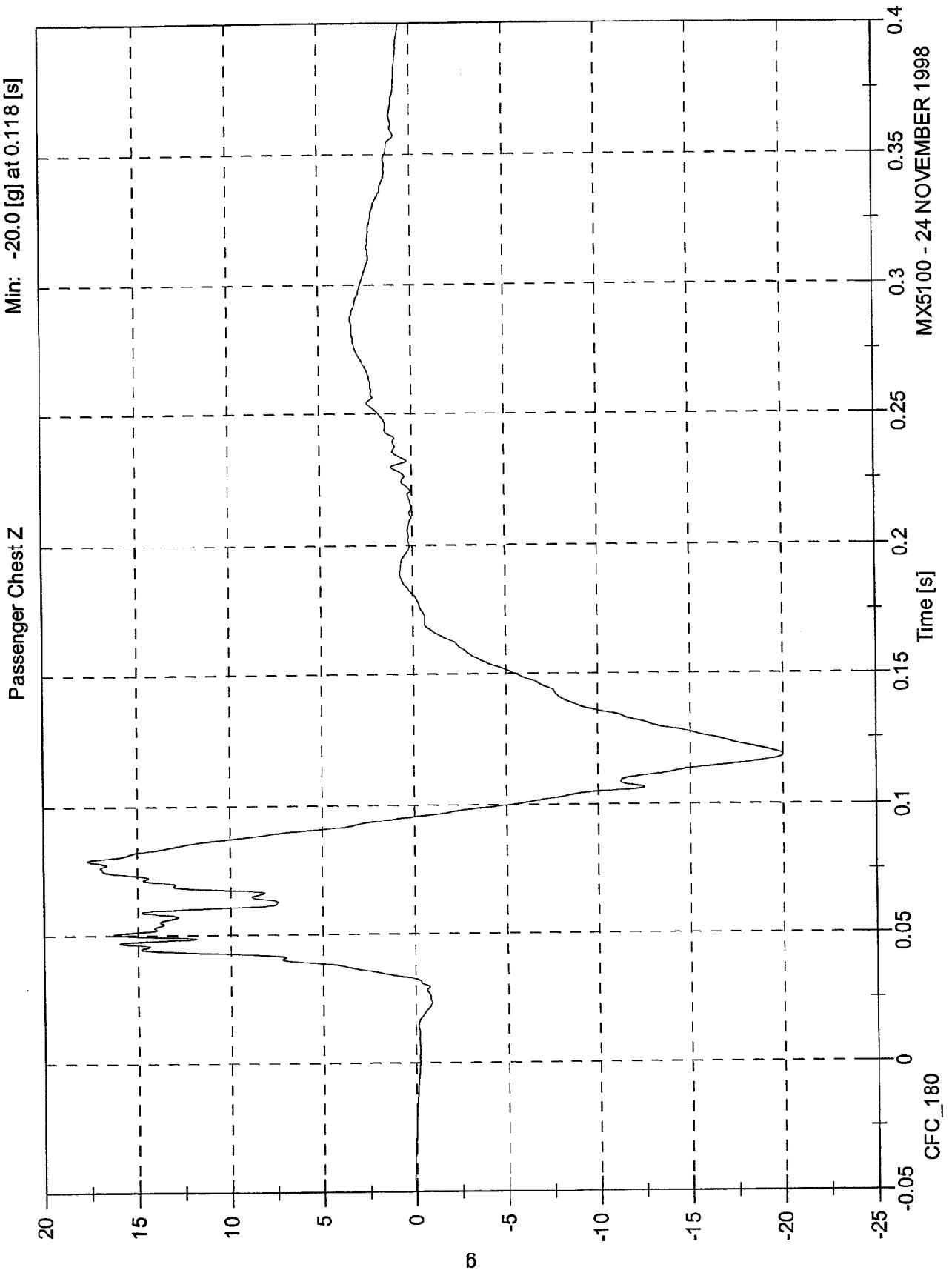
Max: 4.7 [g] at 0.049 [s]
Min: -5.1 [g] at 0.073 [s]

Passenger Chest Y



MX5100 - 24 NOVEMBER 1998

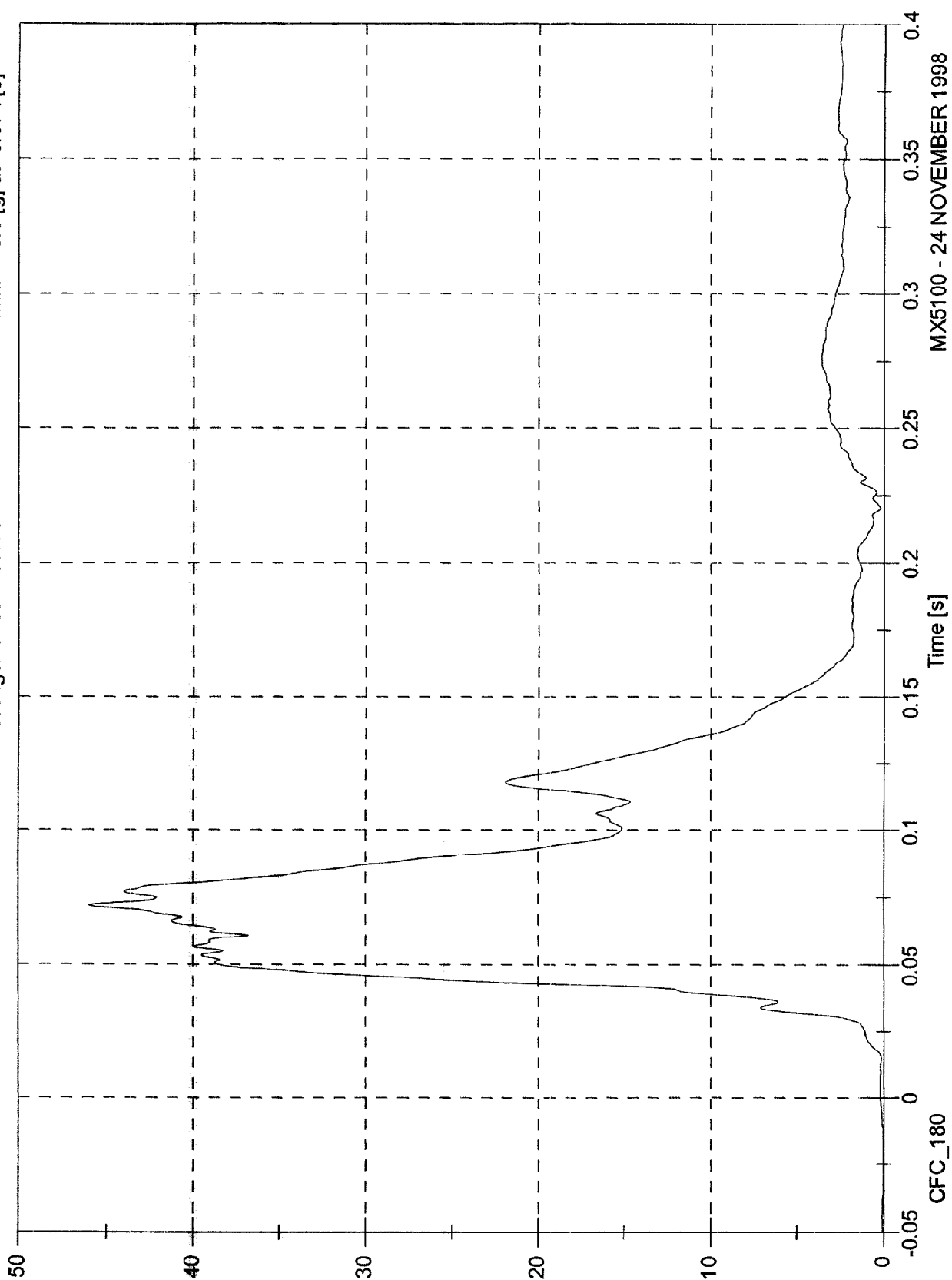
NCAP TEST #1 - 1999 TOYOTA 4-RUNNER



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Chest Resultant

Max: 46.0 [g] at 0.072 [s]
Min: 0.0 [g] at -0.074 [s]

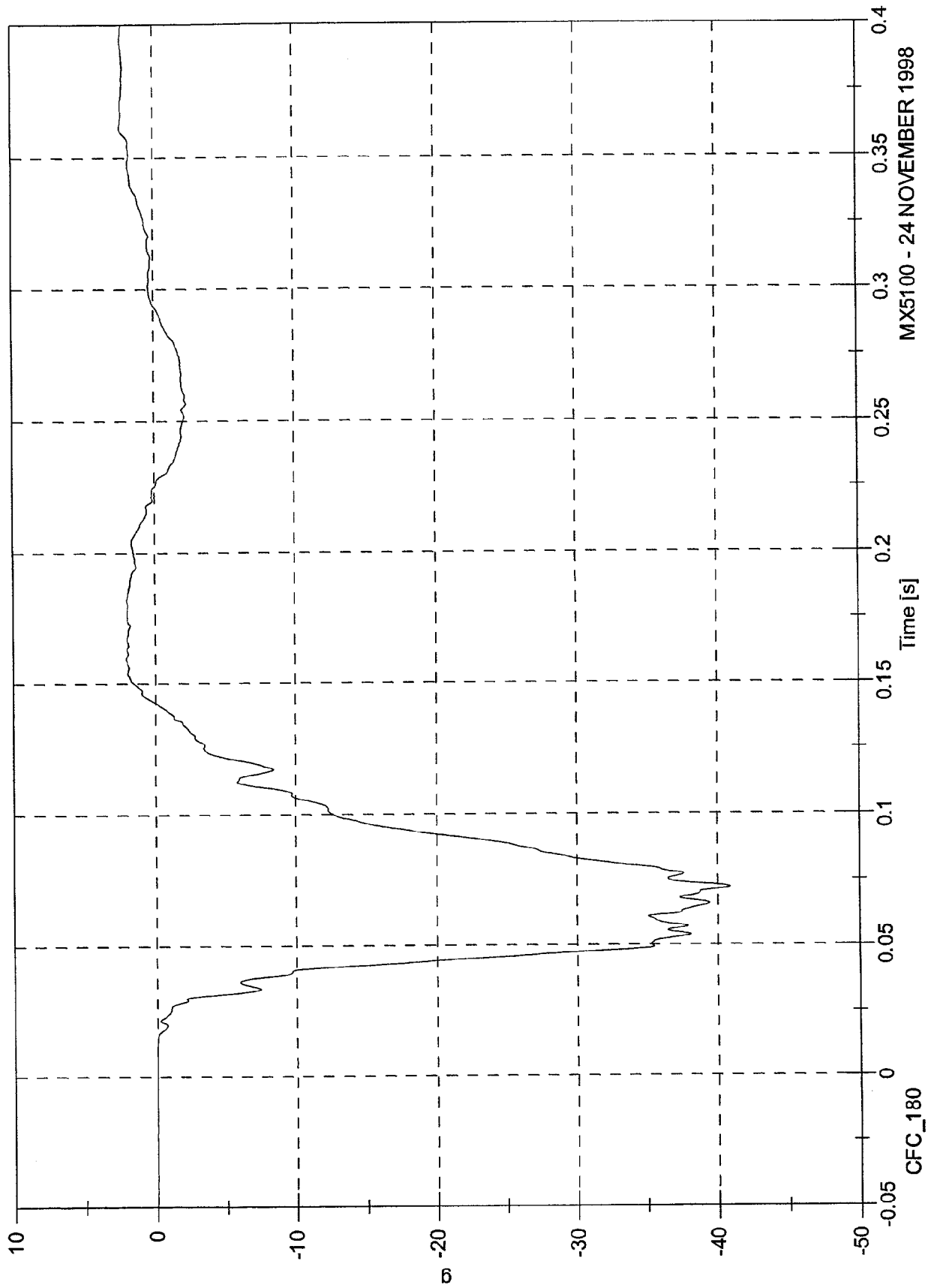


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 2.3 [g] at 0.361 [s]
 Min: -40.9 [g] at 0.072 [s]

Passenger Chest Redundant X

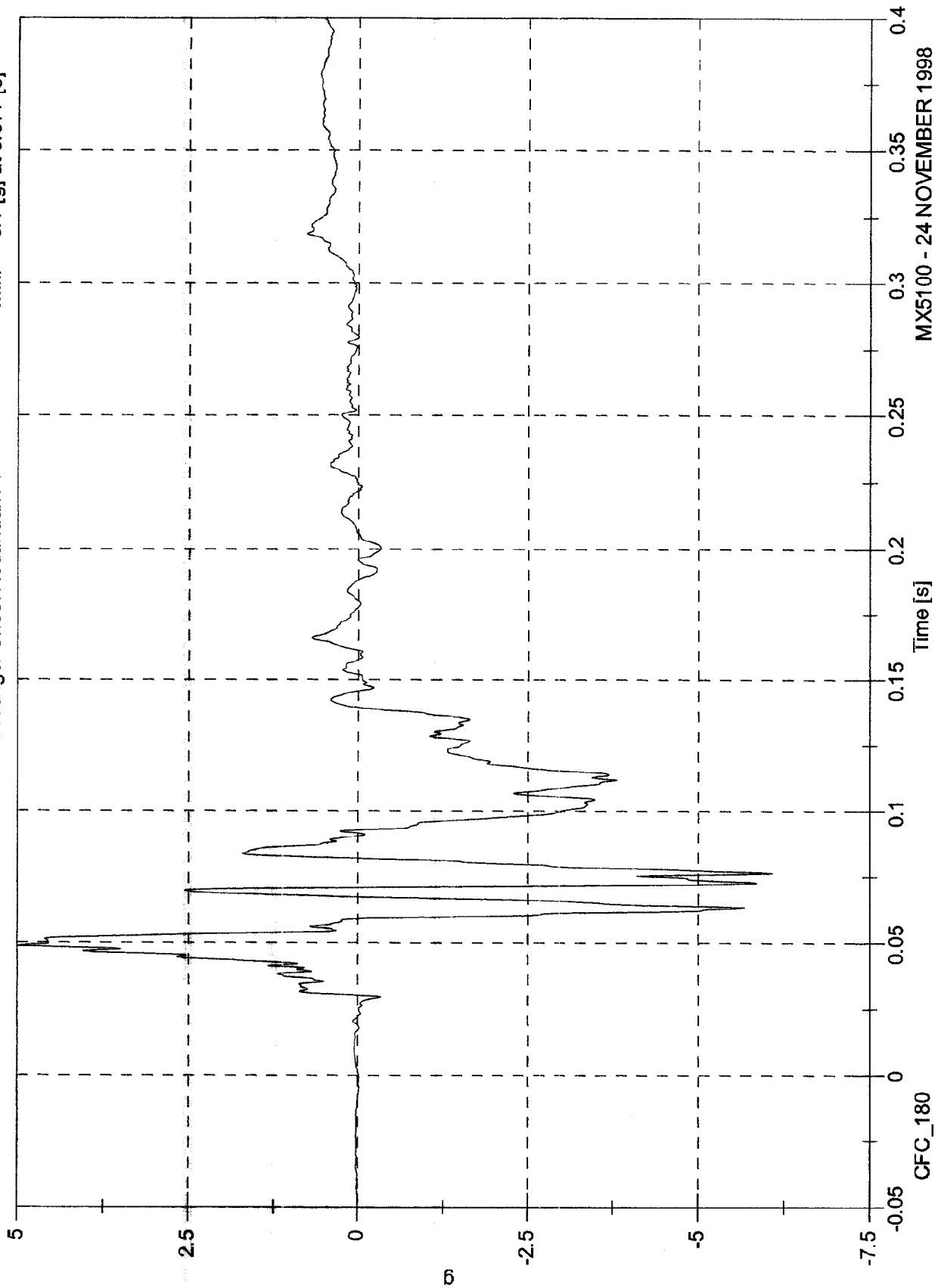


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Chest Redundant Y

Max: 5.0 [g] at 0.049 [s]
Min: -6.1 [g] at 0.077 [s]

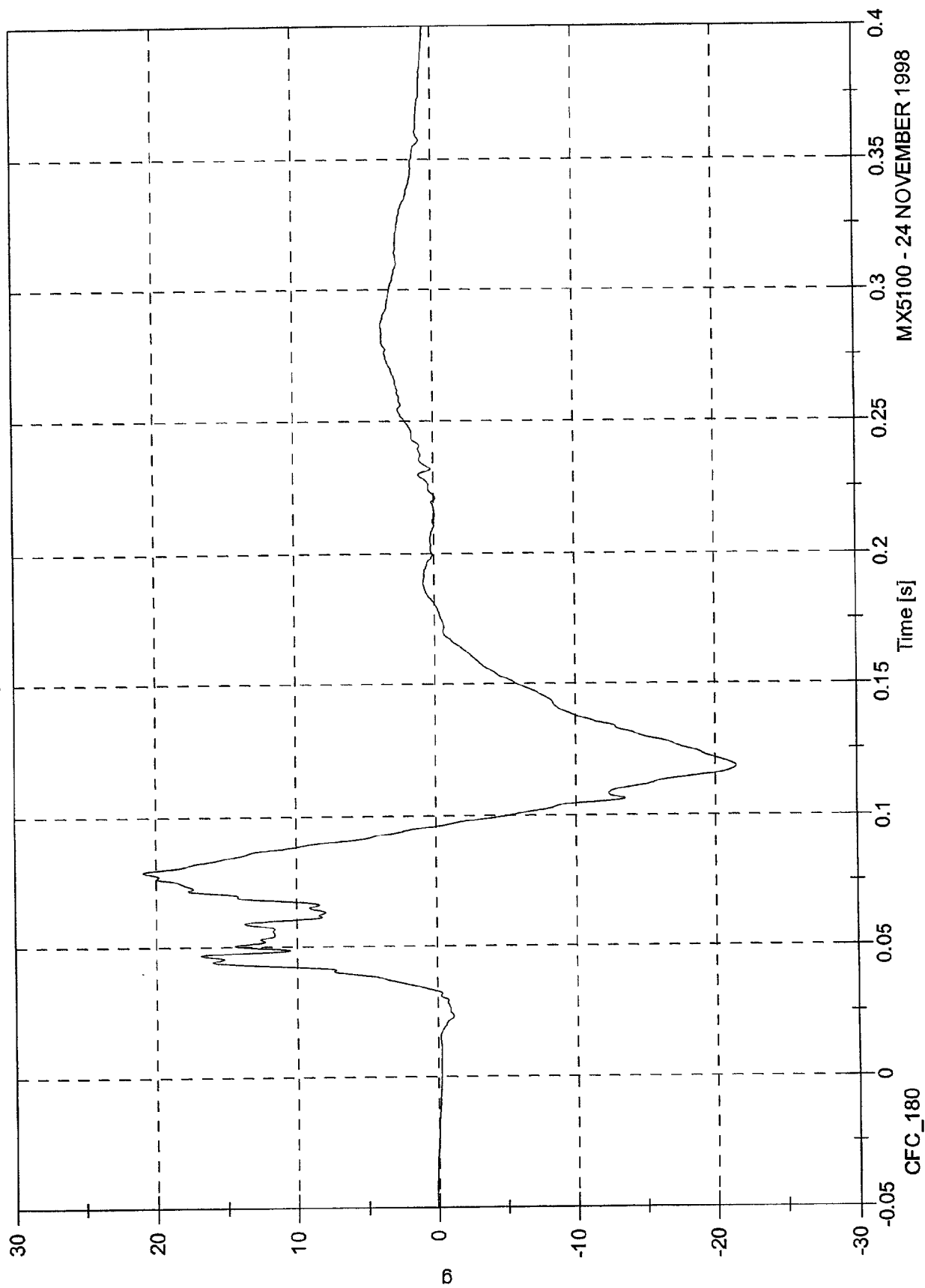


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 20.9 [g] at 0.079 [s]
Min: -21.5 [g] at 0.118 [s]

Passenger Chest Redundant Z

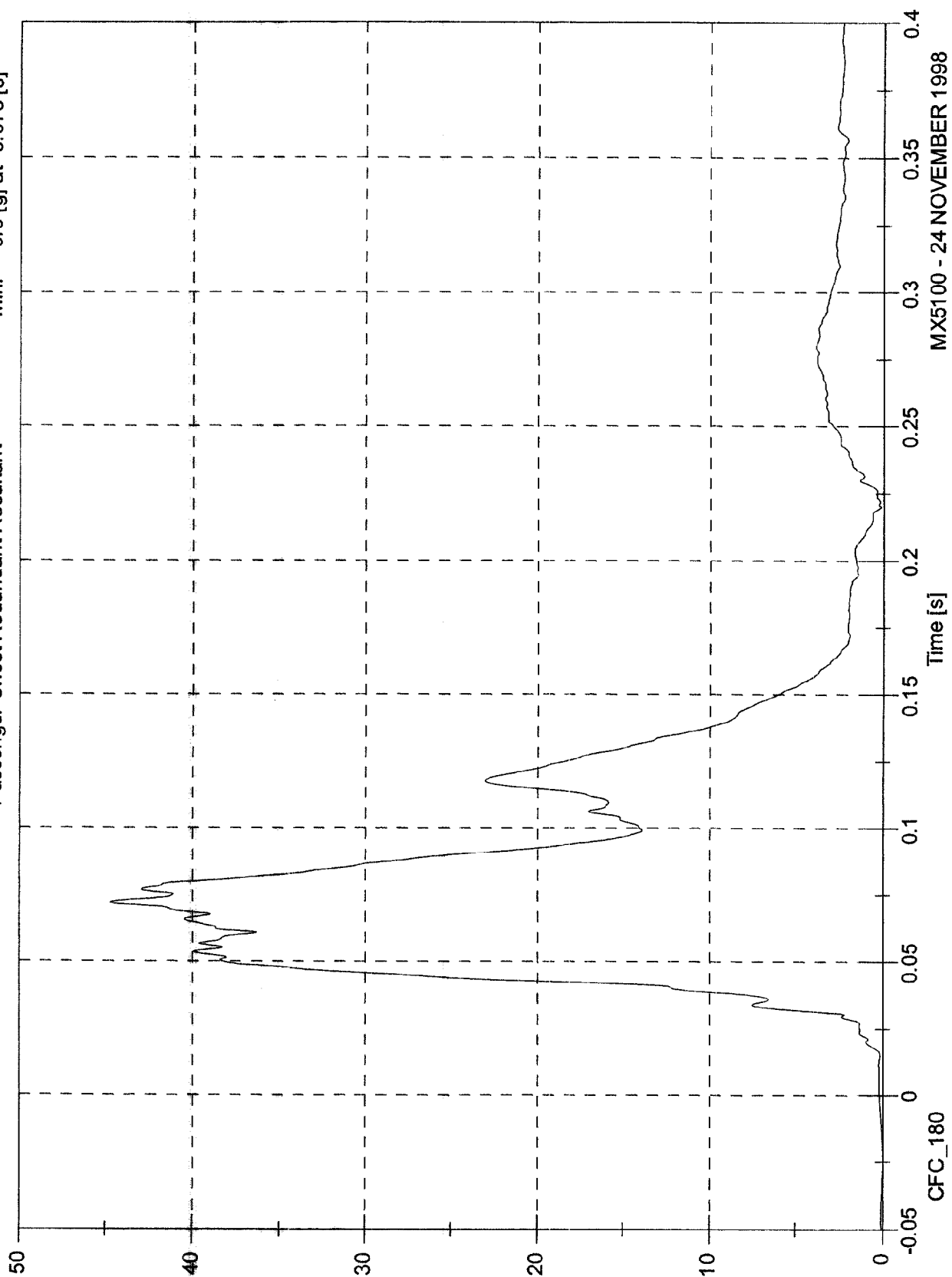


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Chest Redundant Resultant

Max: 44.8 [g] at 0.072 [s]
Min: 0.0 [g] at -0.075 [s]

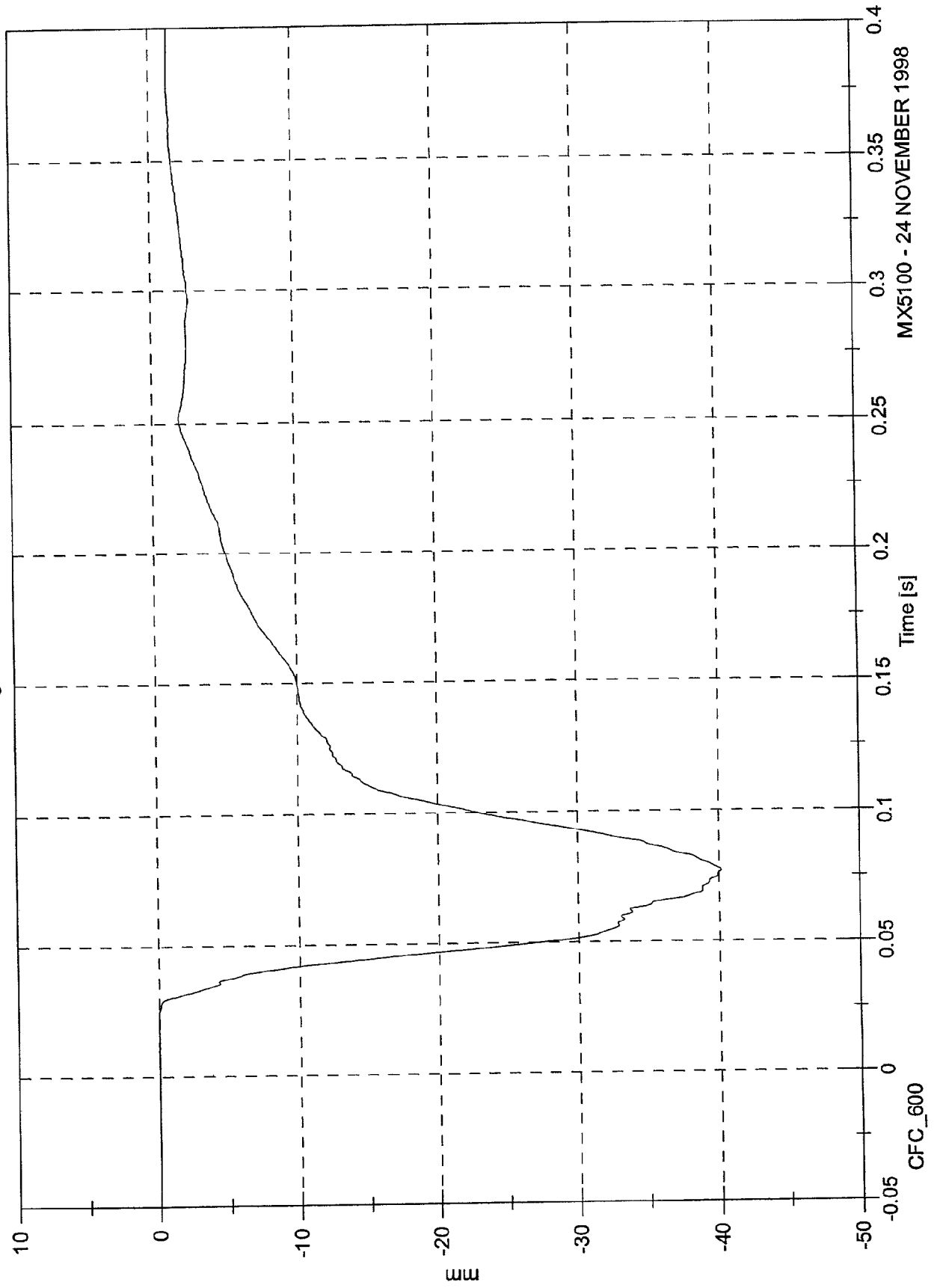


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Chest Displacement

Max: 0.0 [mm] at 0.013 [s]
Min: -40.2 [mm] at 0.077 [s]

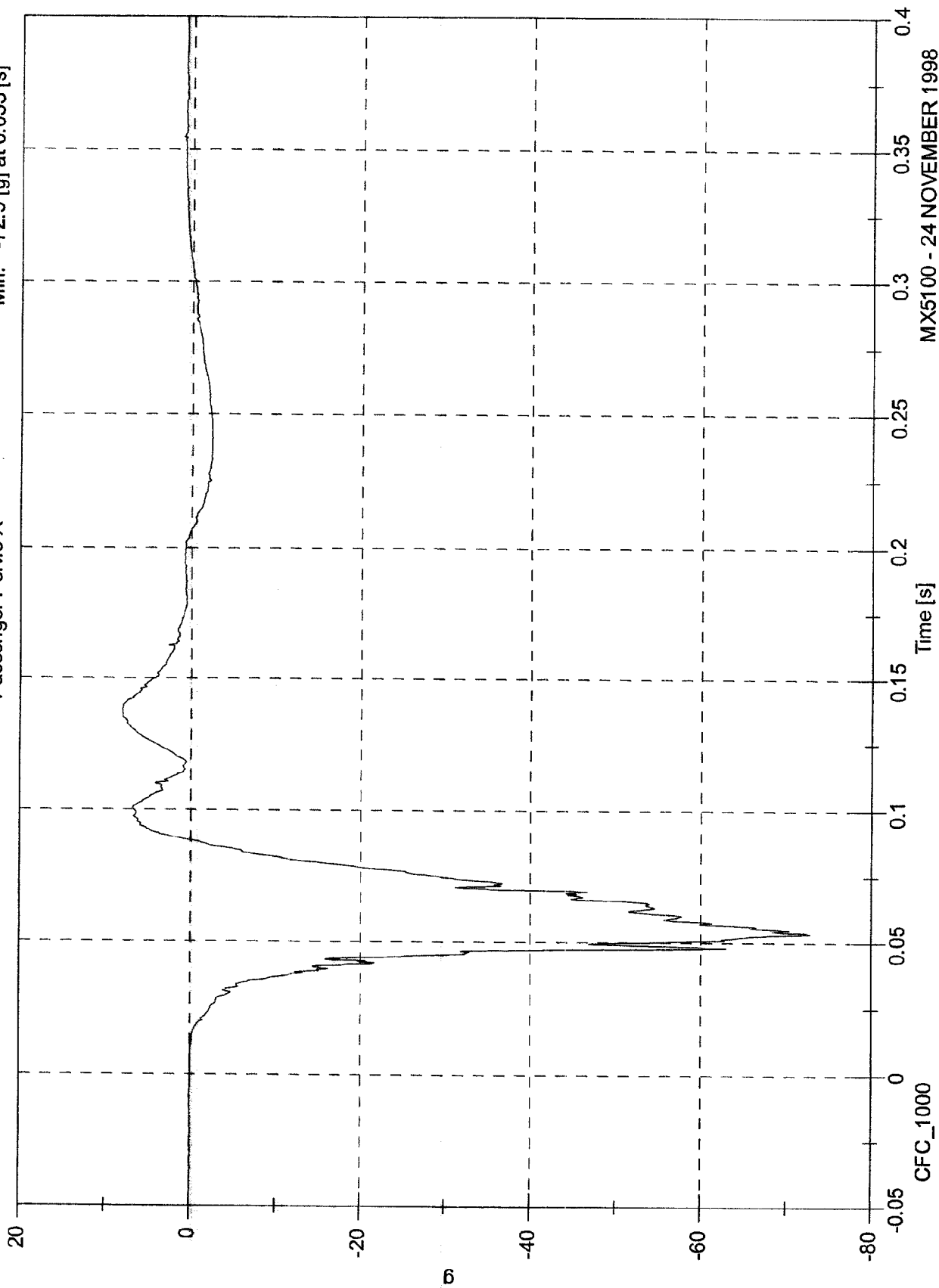


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4RUNNER

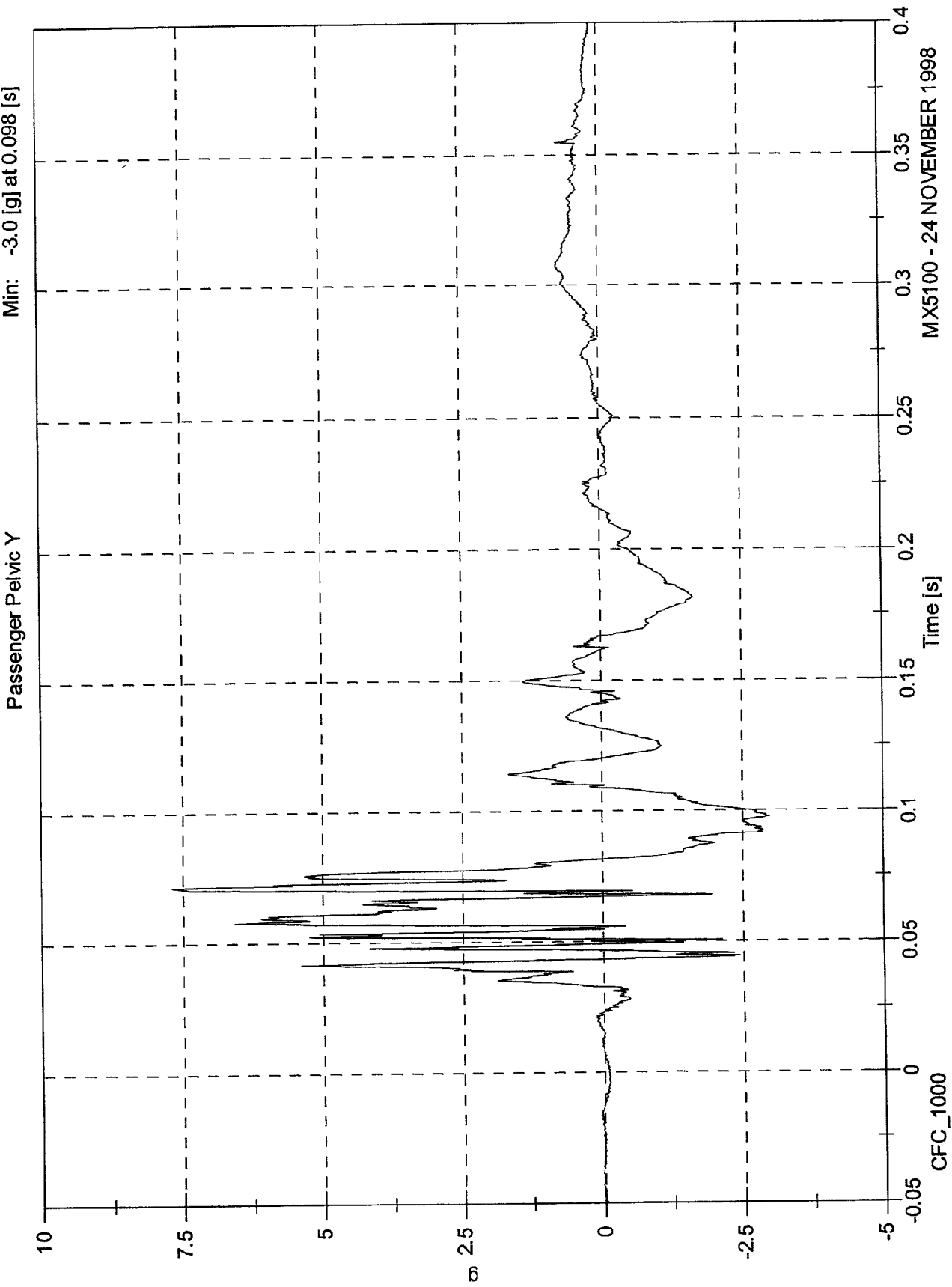
Max: 8.1 [g] at 0.138 [s]
Min: -72.9 [g] at 0.053 [s]

Passenger Pelvic X



MX5100 - 24 NOVEMBER 1998

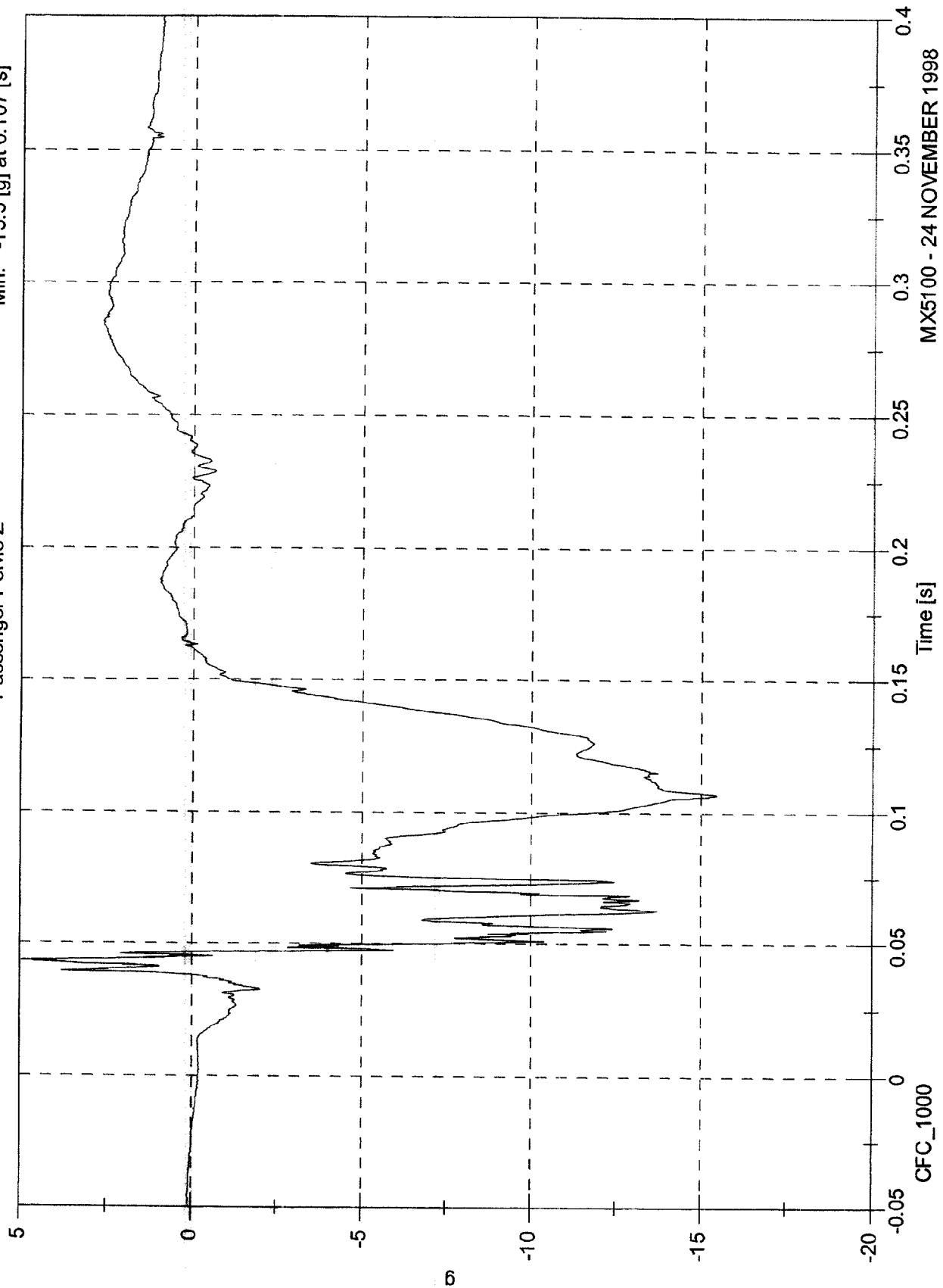
NCAP TEST #1 - 1999 TOYOTA 4-RUNNER



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Pelvic Z

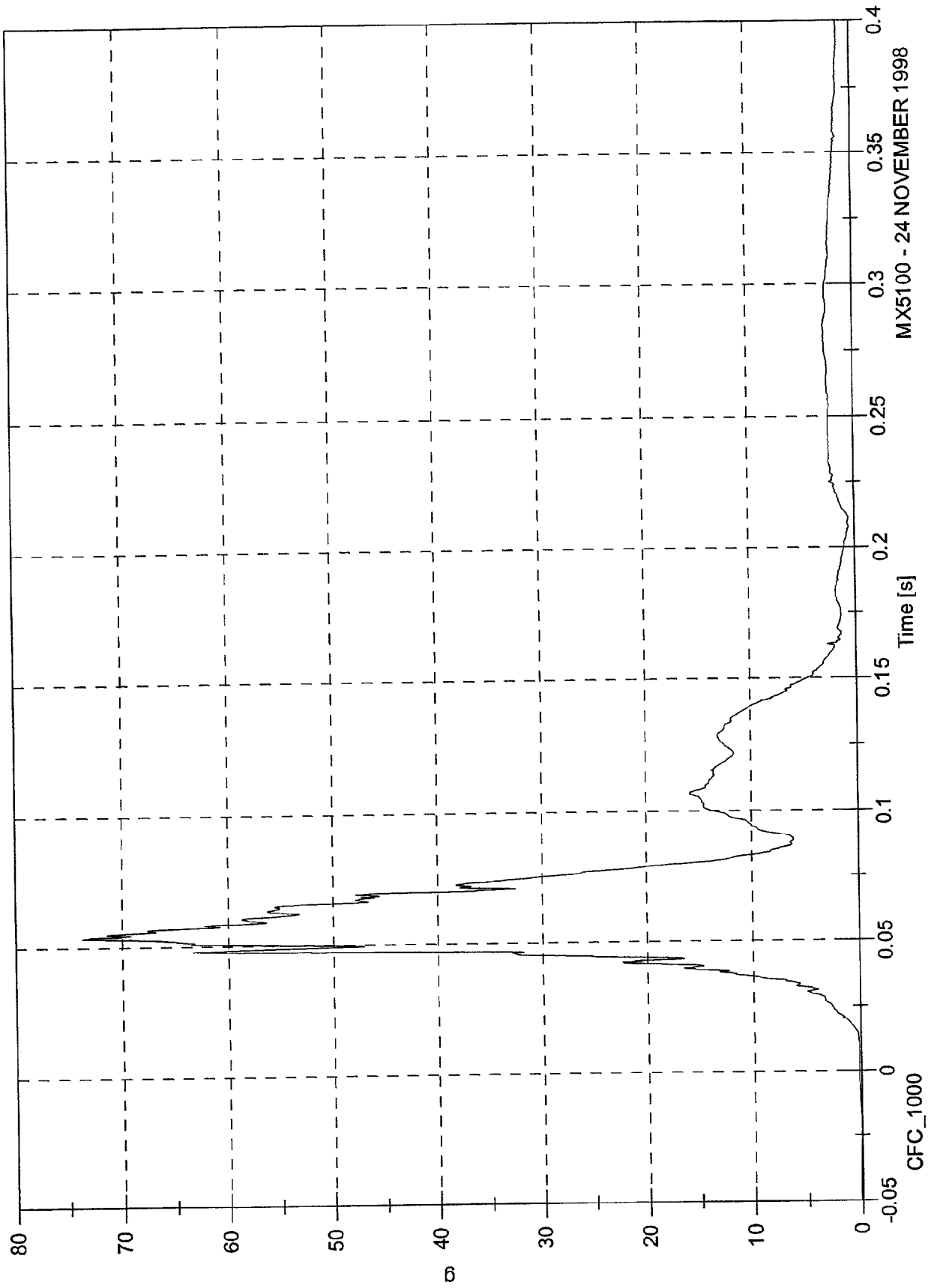
Max: 5.0 [g] at 0.043 [s]
Min: -15.5 [g] at 0.107 [s]



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Pelvic Resultant

Max: 73.7 [g] at 0.053 [s]
Min: 0.0 [g] at -0.073 [s]

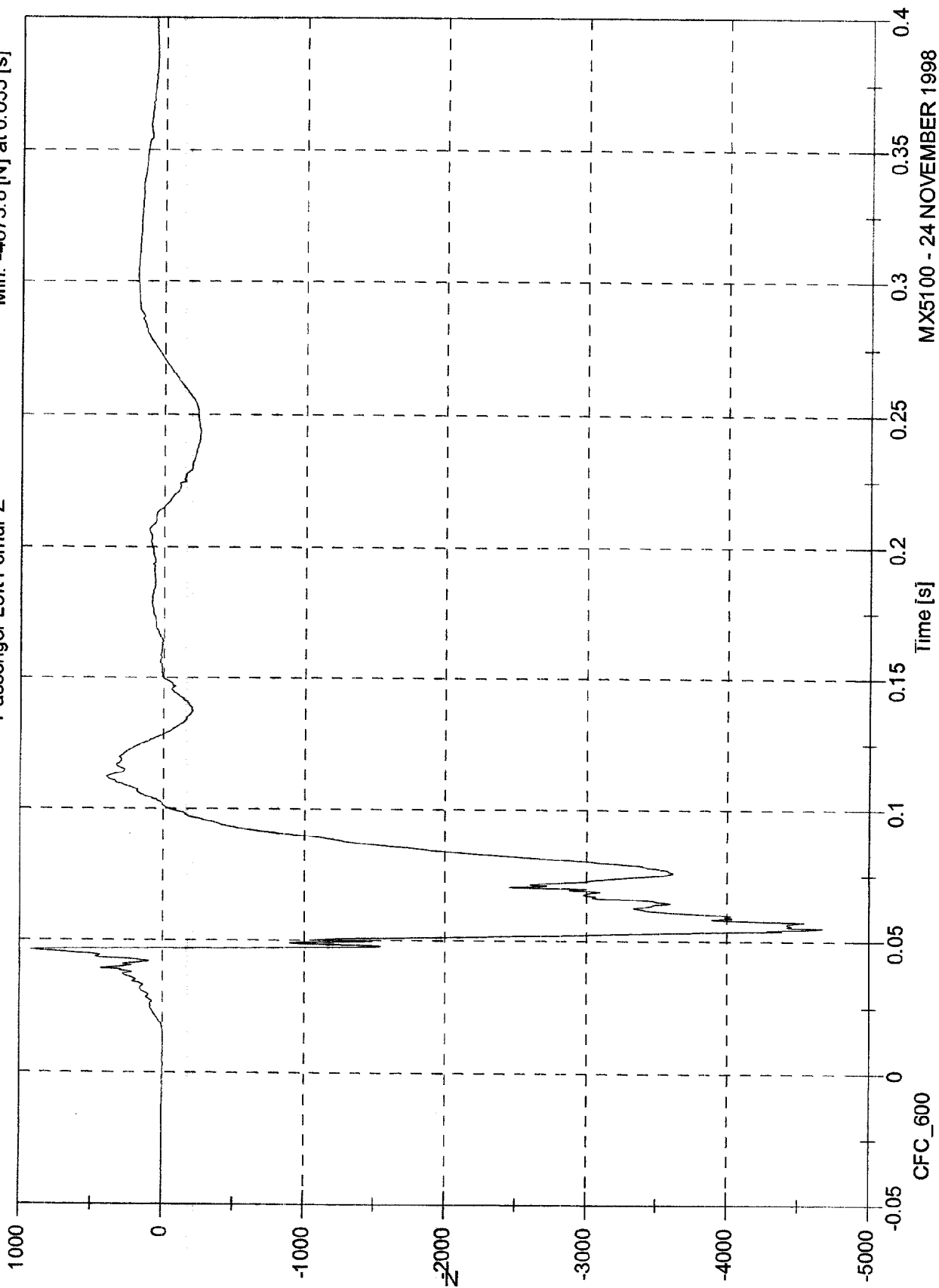


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Left Femur Z

Max: 921.8 [N] at 0.046 [s]
Min: -4673.8 [N] at 0.055 [s]

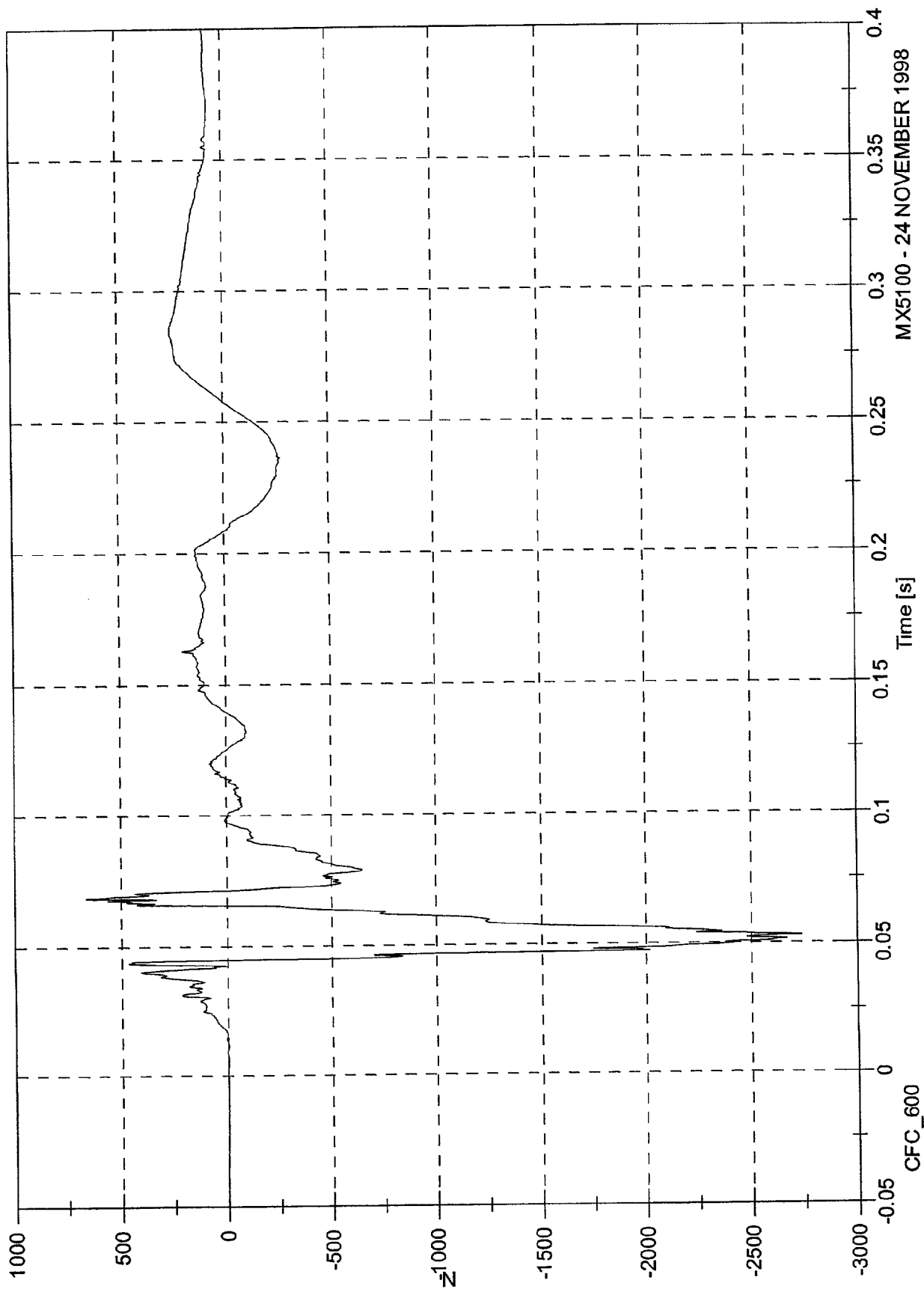


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Right Femur Z

Max: 665.0 [N] at 0.069 [s]
Min: -2739.8 [N] at 0.053 [s]



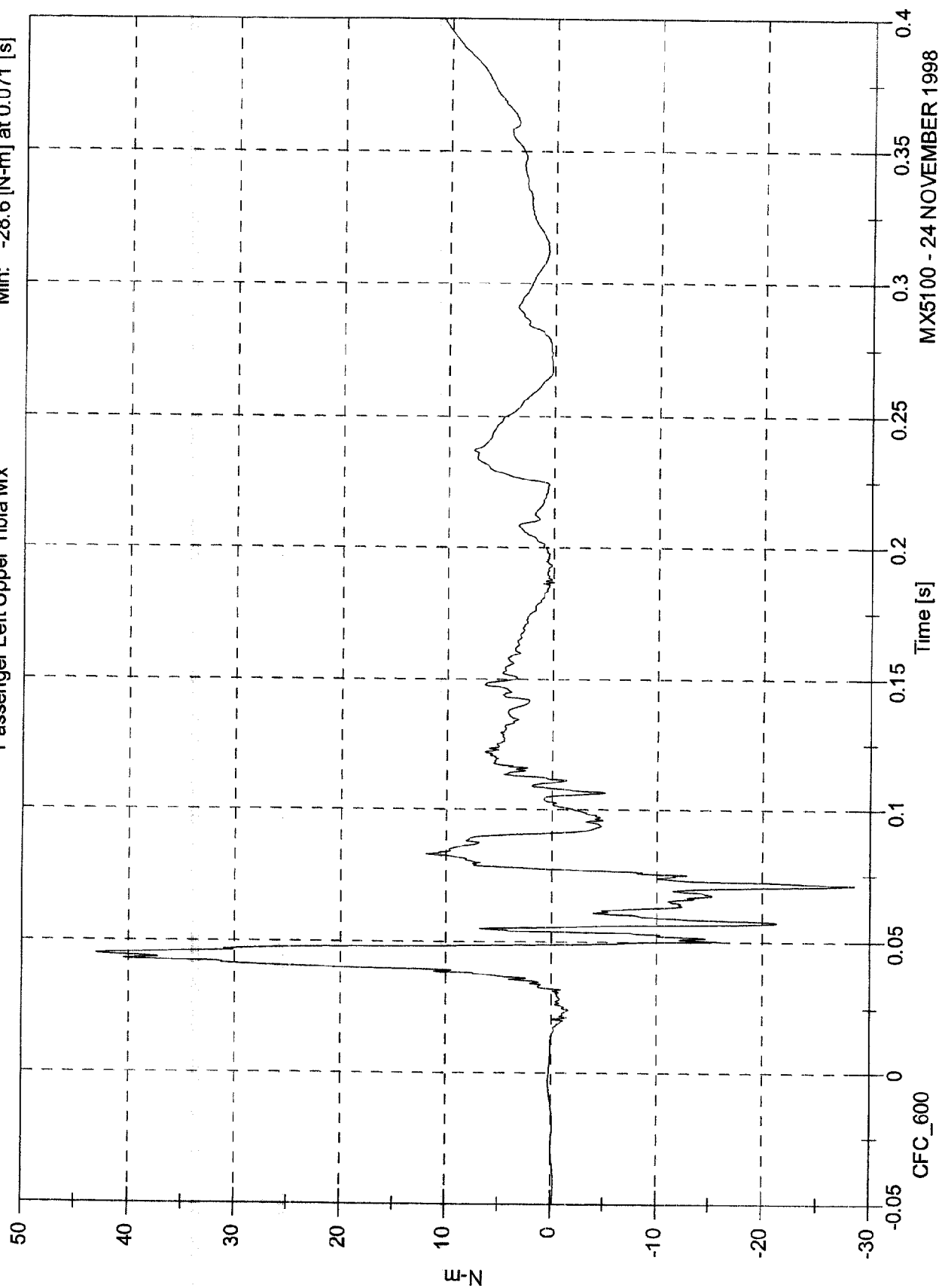
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Left Upper Tibia Mx

Max: 43.1 [N-m] at 0.045 [s]

Min: -28.6 [N-m] at 0.071 [s]

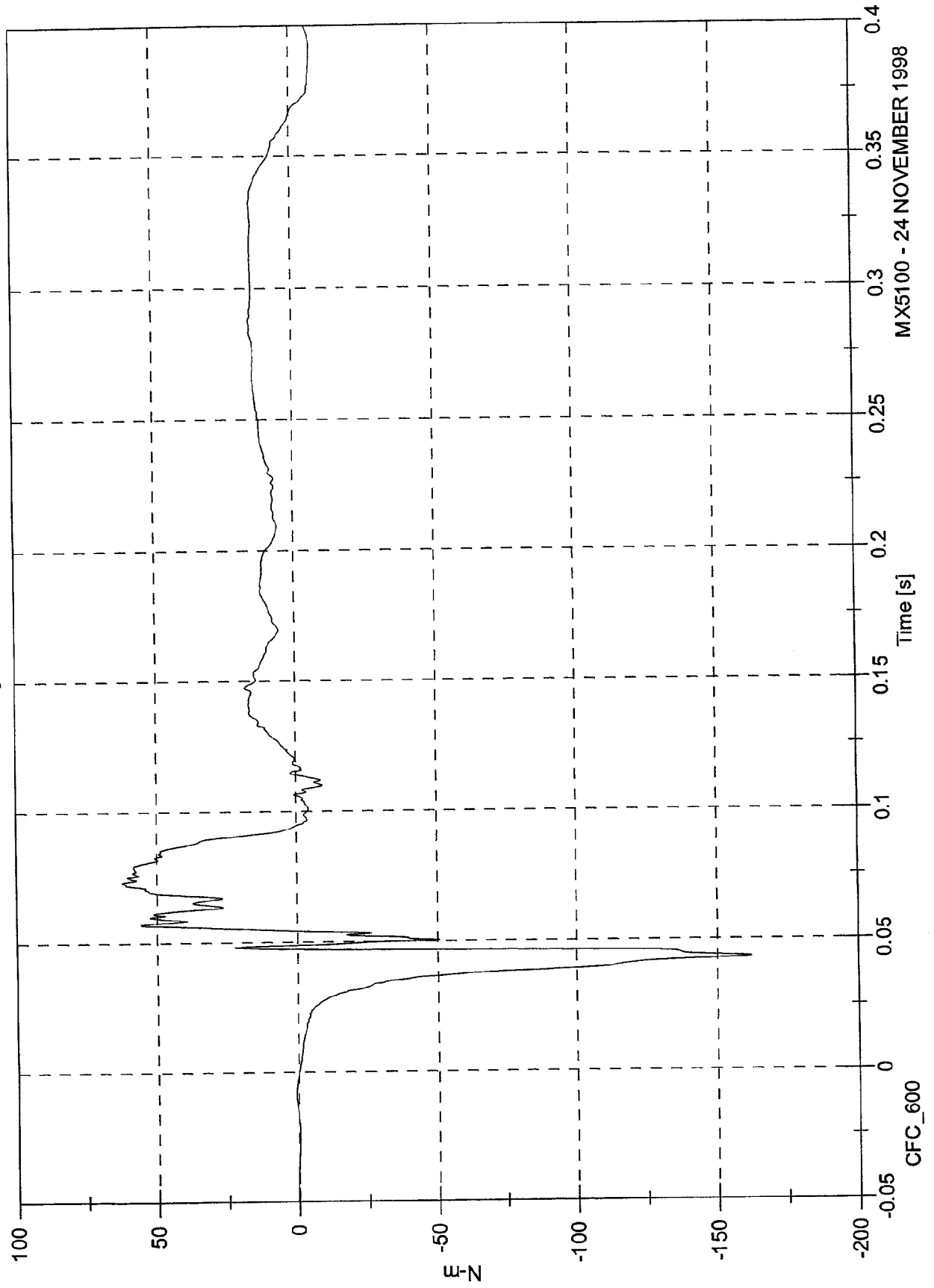


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Left Upper Tibia My

Max 62.3 [N-m] at 0.073 [s]
Min: -162.3 [N-m] at 0.043 [s]

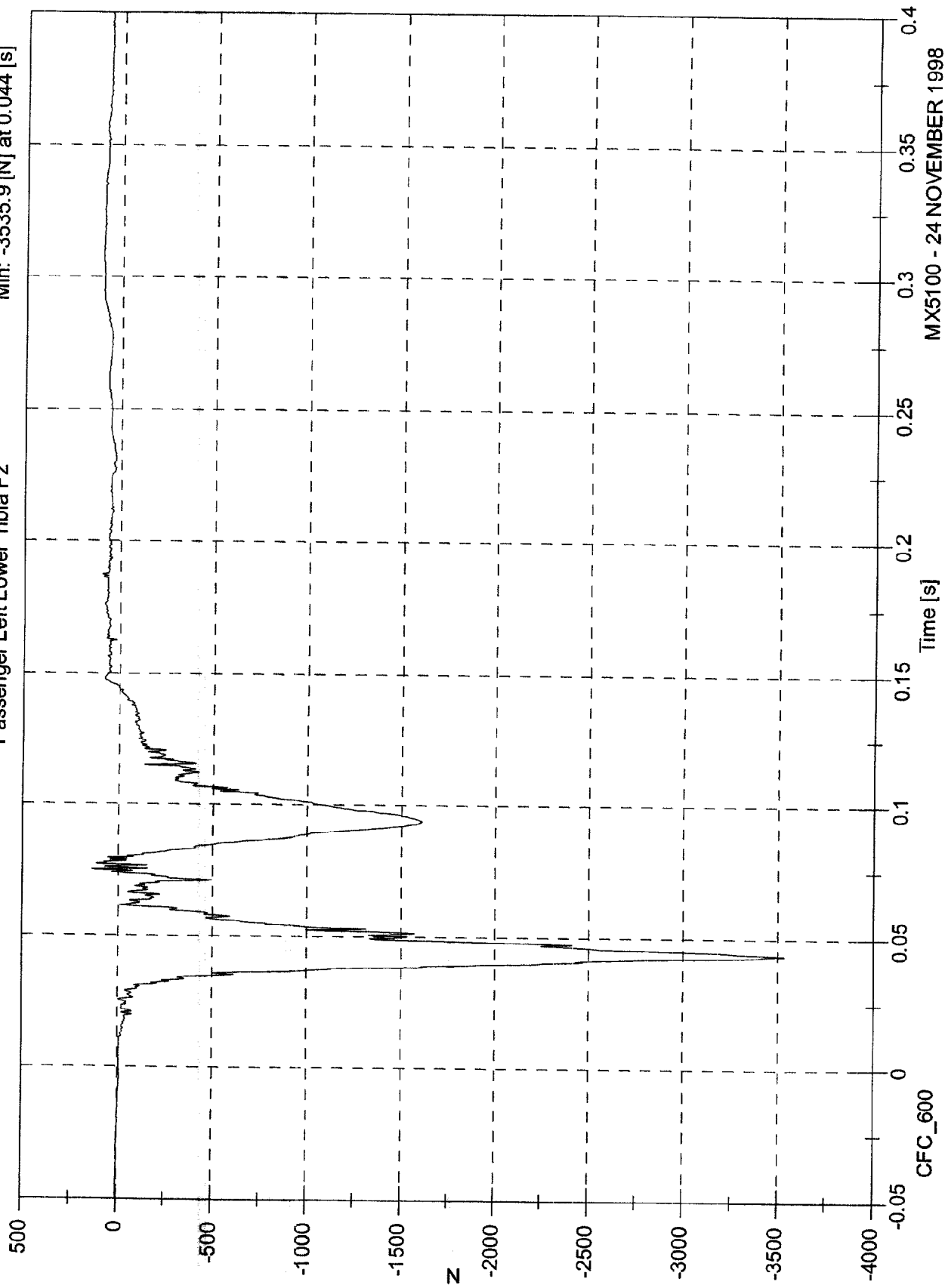


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 138.5 [N] at 0.075 [s]
Min: -3535.9 [N] at 0.044 [s]

Passenger Left Lower Tibia Fz



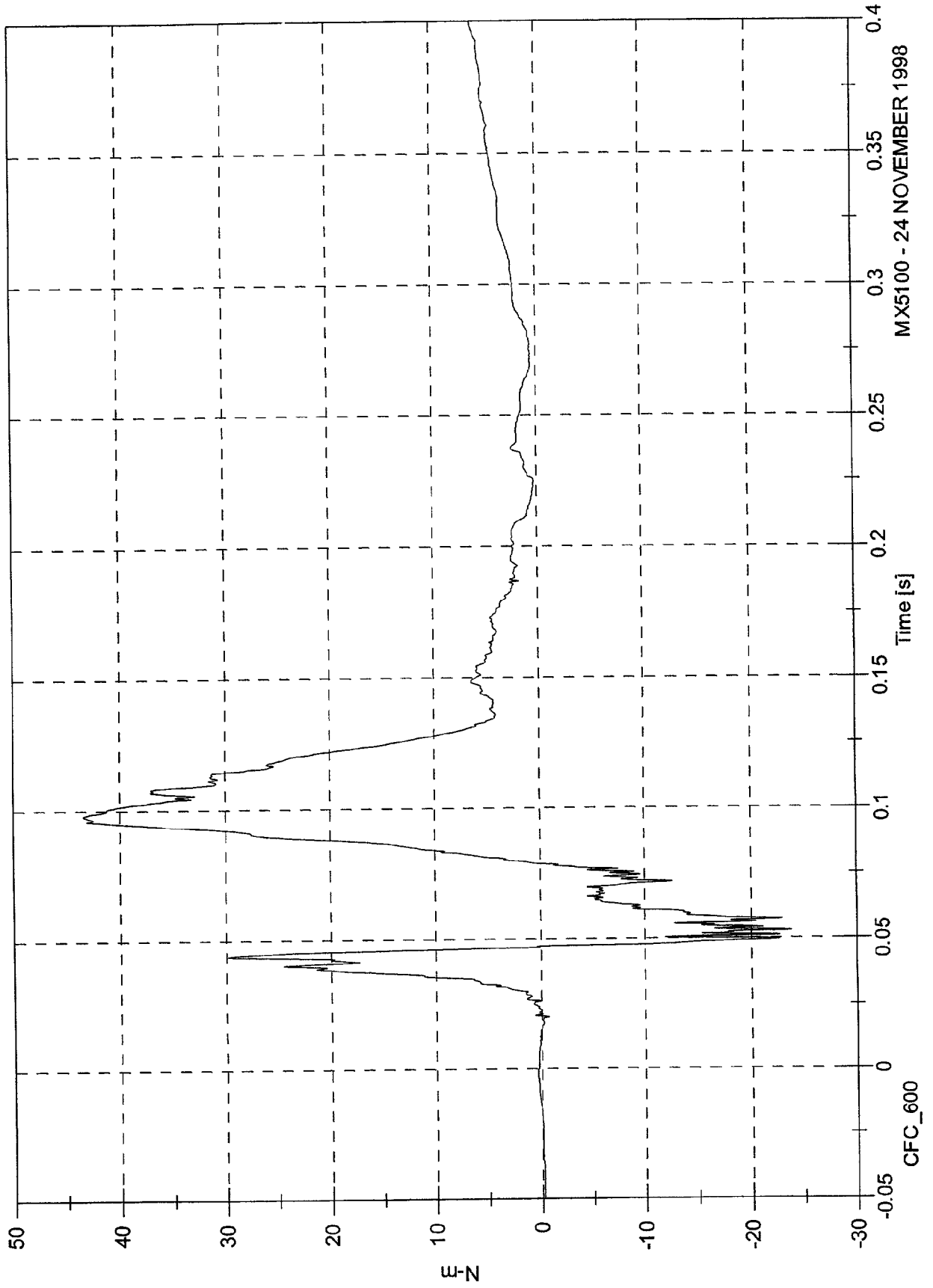
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Left Lower Tibia Mx

Max: 43.5 [N-m] at 0.098 [s]

Min: -23.8 [N-m] at 0.053 [s]

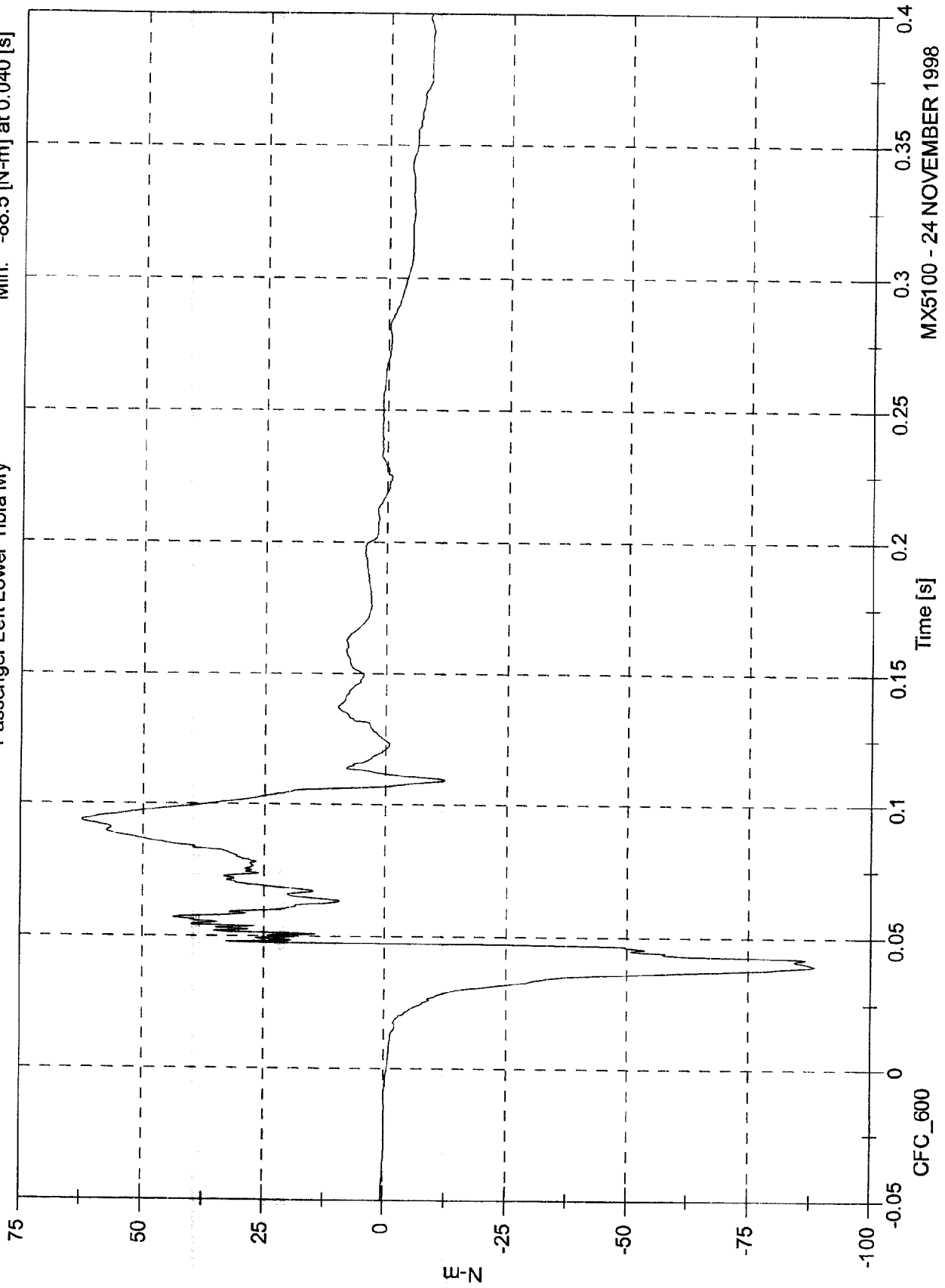


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 62.5 [N-m] at 0.094 [s]
 Min: -88.5 [N-m] at 0.040 [s]

Passenger Left Lower Tibia My

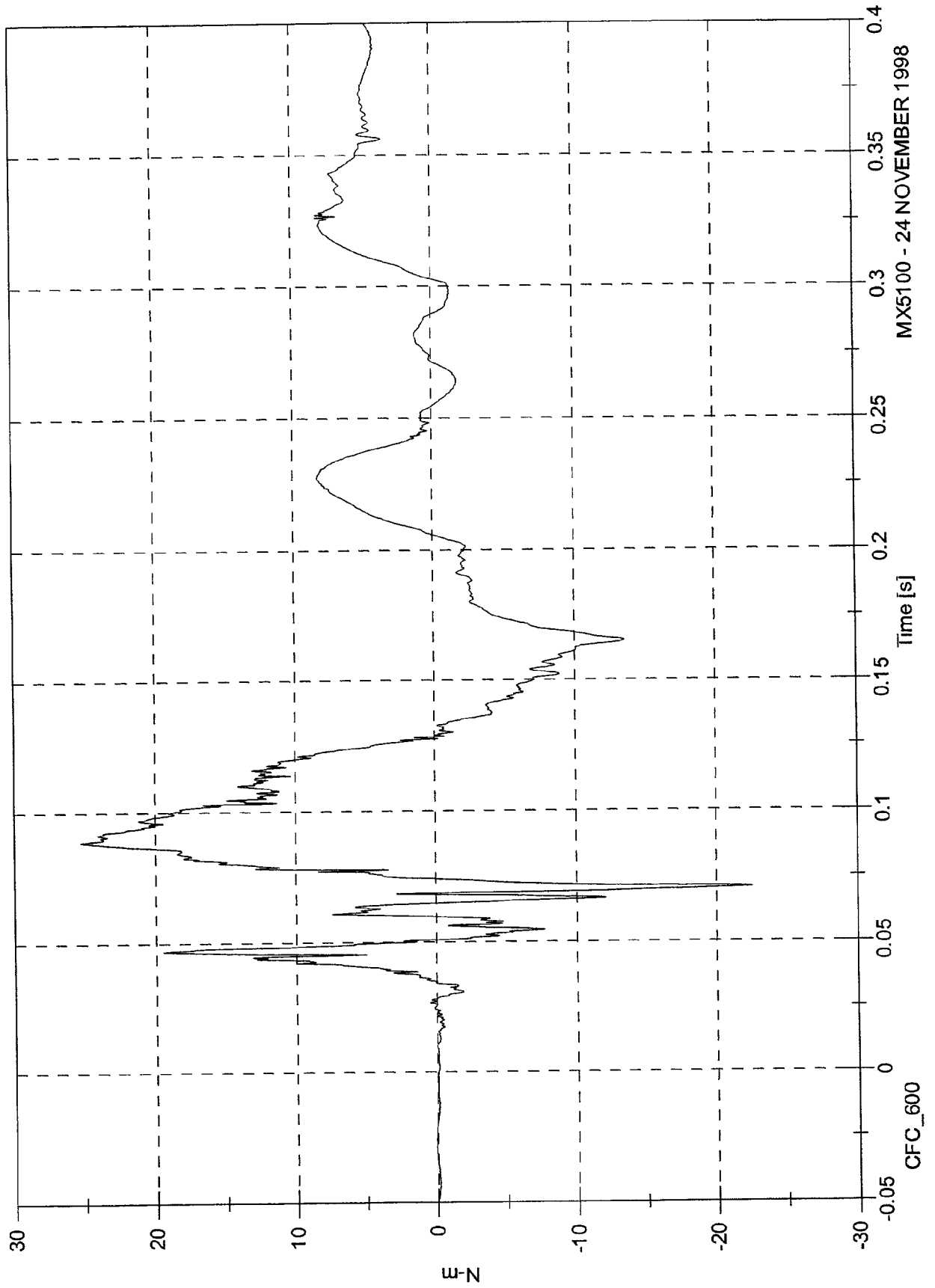


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Right Upper Tibia Mix

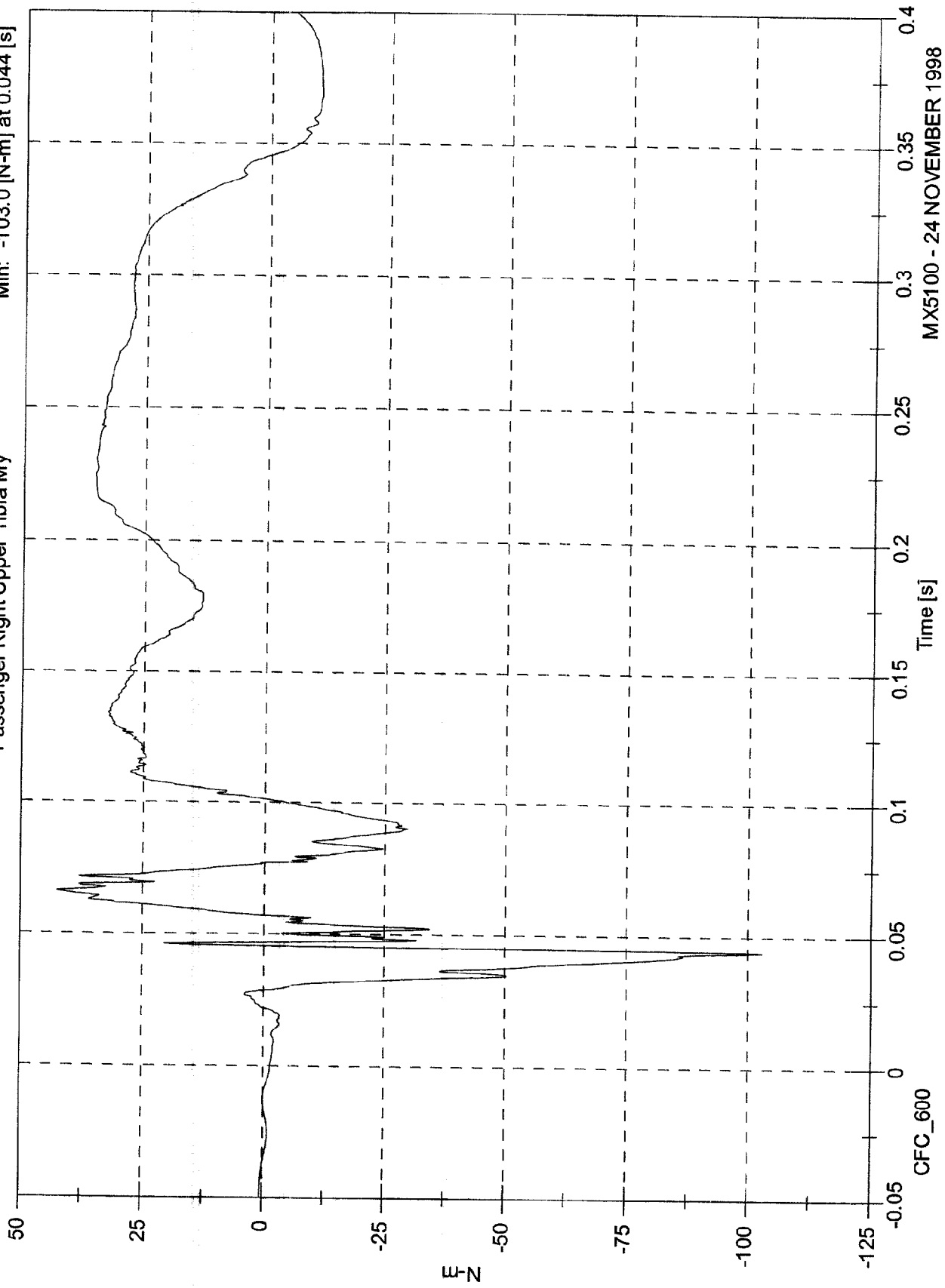
Max: 25.3 [N-m] at 0.089 [s]
Min: -22.6 [N-m] at 0.071 [s]



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Right Upper Tibia My

Max: 42.7 [N-m] at 0.066 [s]
Min: -103.0 [N-m] at 0.044 [s]

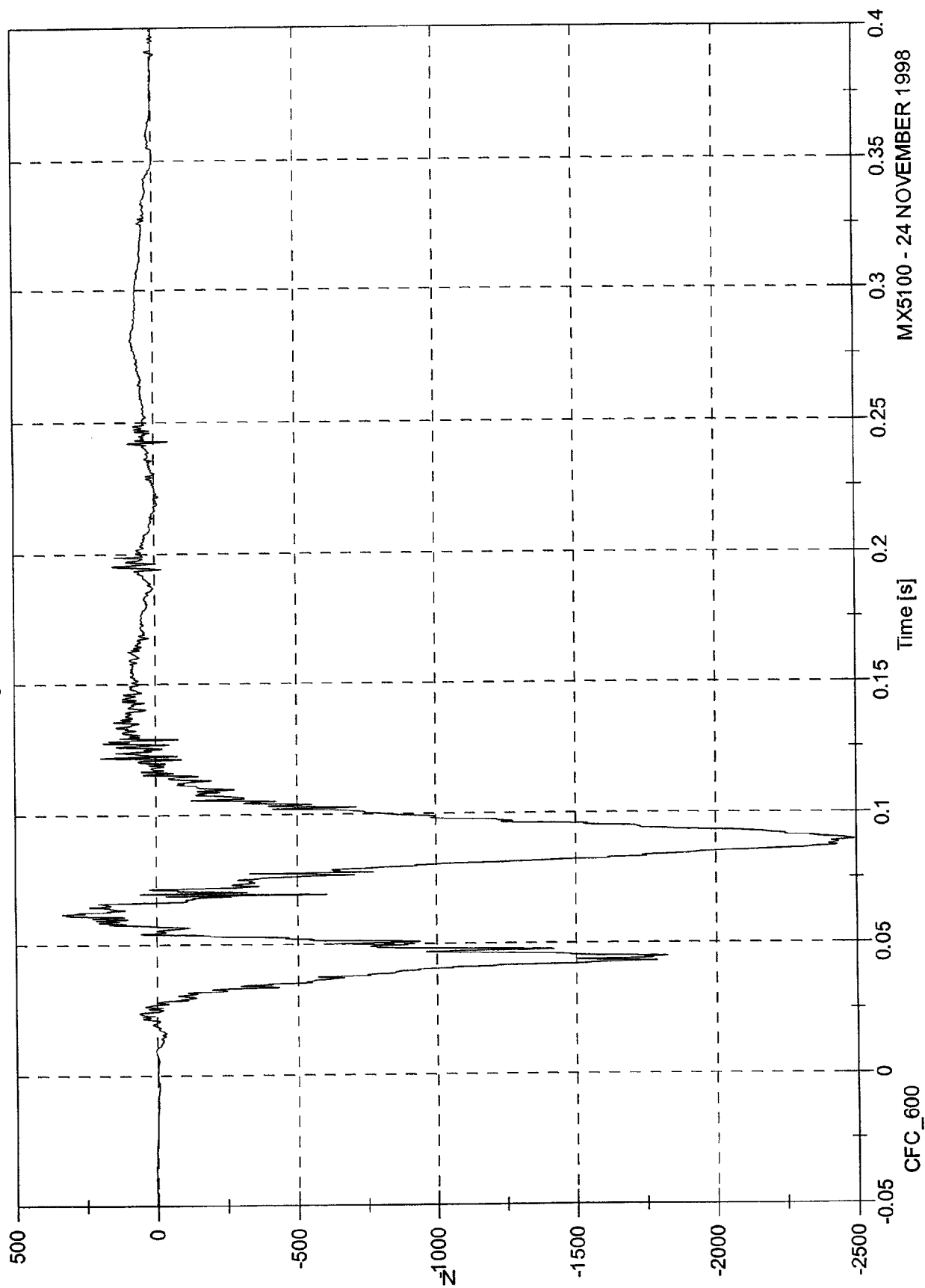


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 336.7 [N] at 0.062 [s]
Min: -2495.5 [N] at 0.089 [s]

Passenger Right Lower Tibia Fz



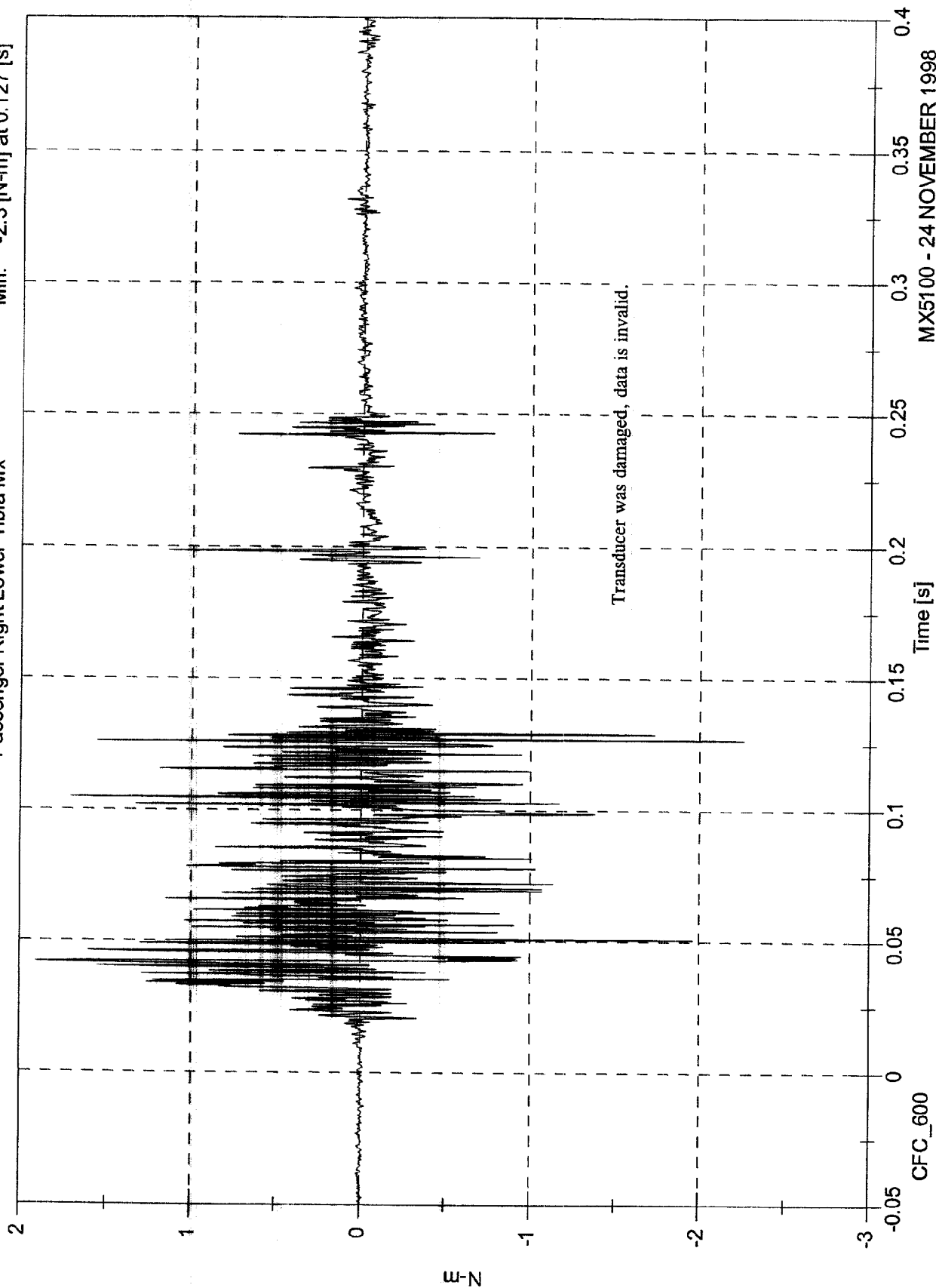
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 1.9 [N-m] at 0.042 [s]

Min: -2.3 [N-m] at 0.127 [s]

Passenger Right Lower Tibia Mx

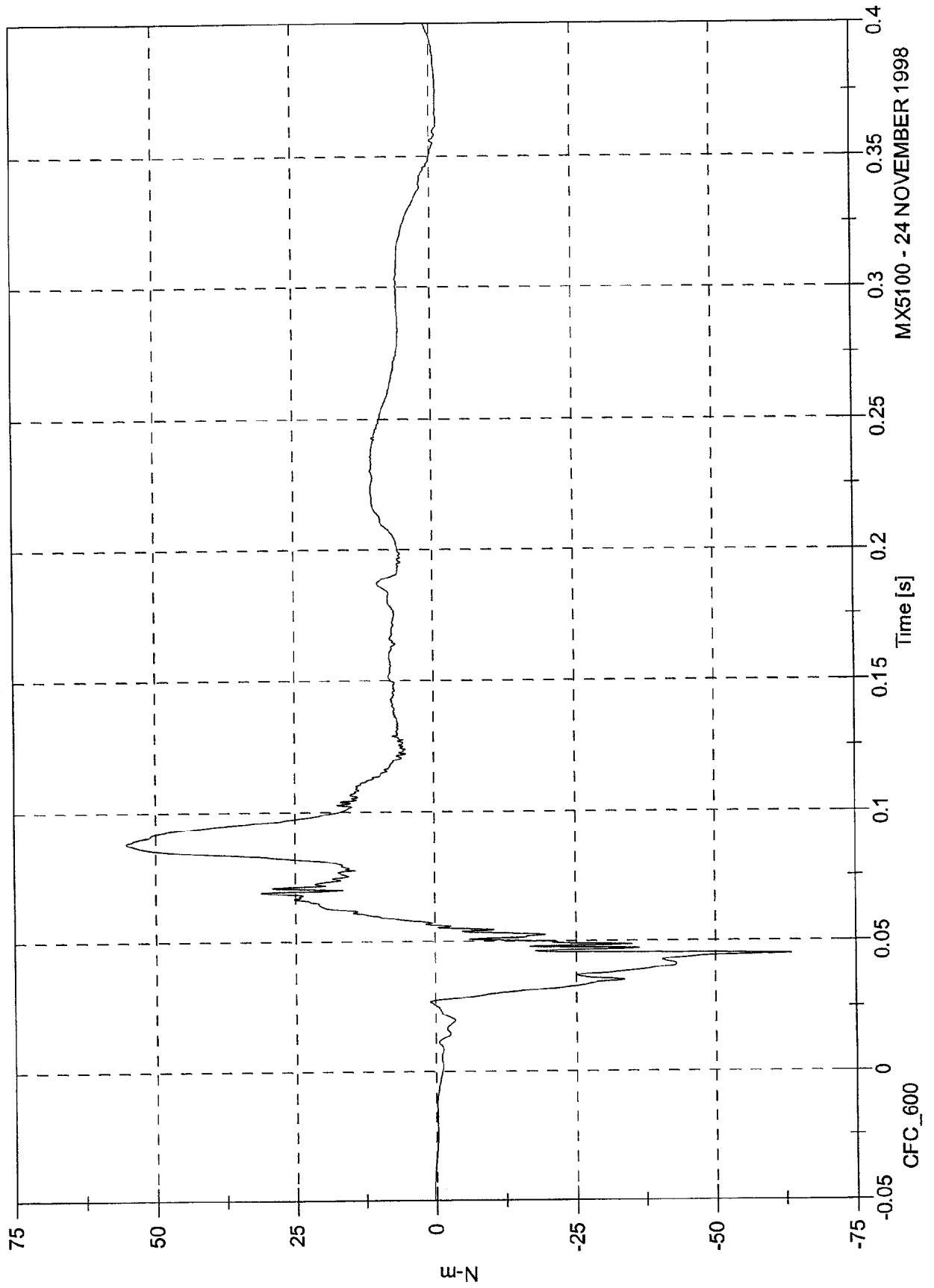


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 55.2 [N-m] at 0.088 [s]
Min: -63.6 [N-m] at 0.045 [s]

Passenger Right Lower Tibia My



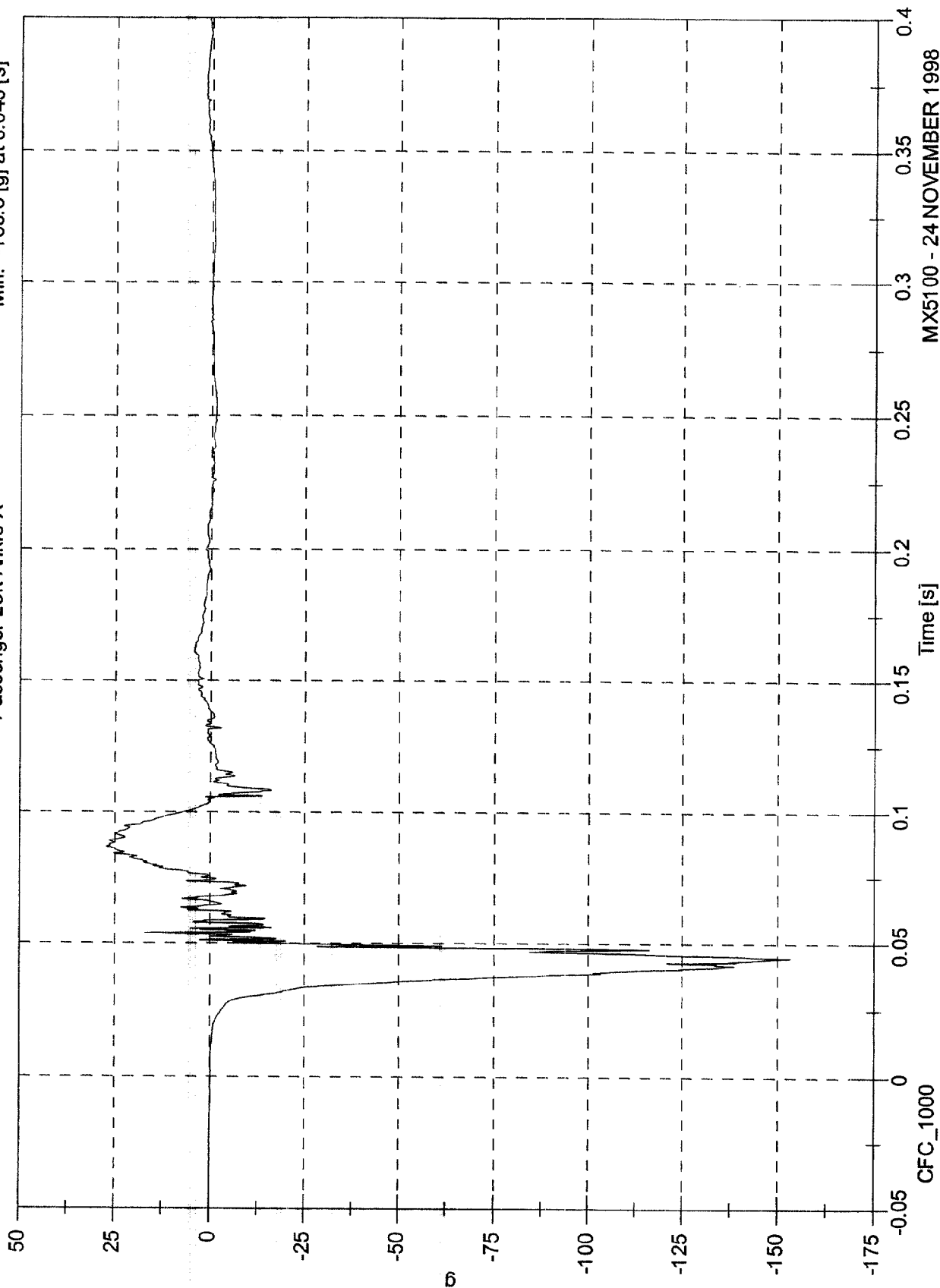
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 27.2 [g] at 0.087 [s]

Min: -153.5 [g] at 0.045 [s]

Passenger Left Ankle X

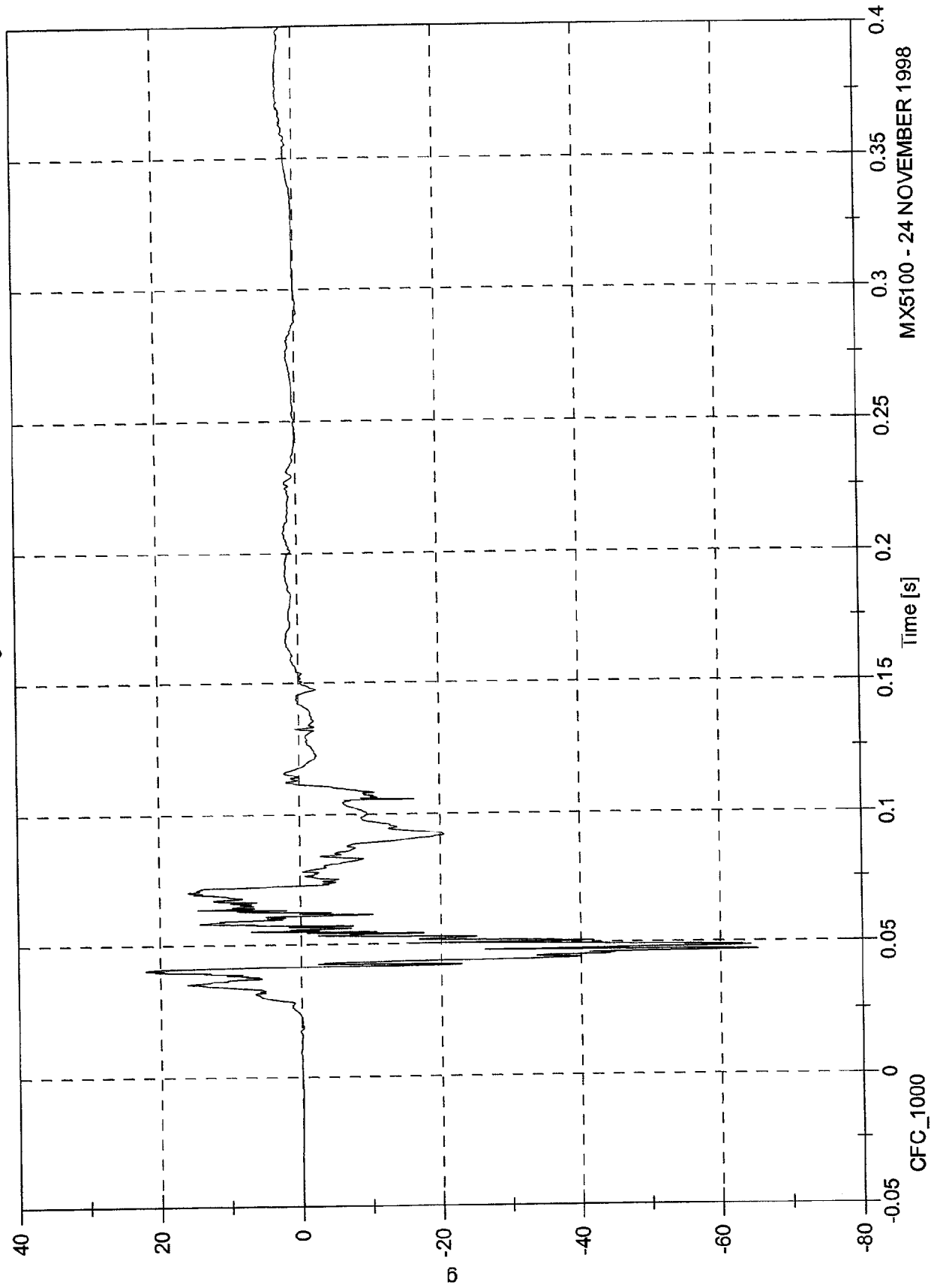


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Left Ankle Z

Max: 22.1 [g] at 0.041 [s]
Min: -65.4 [g] at 0.047 [s]

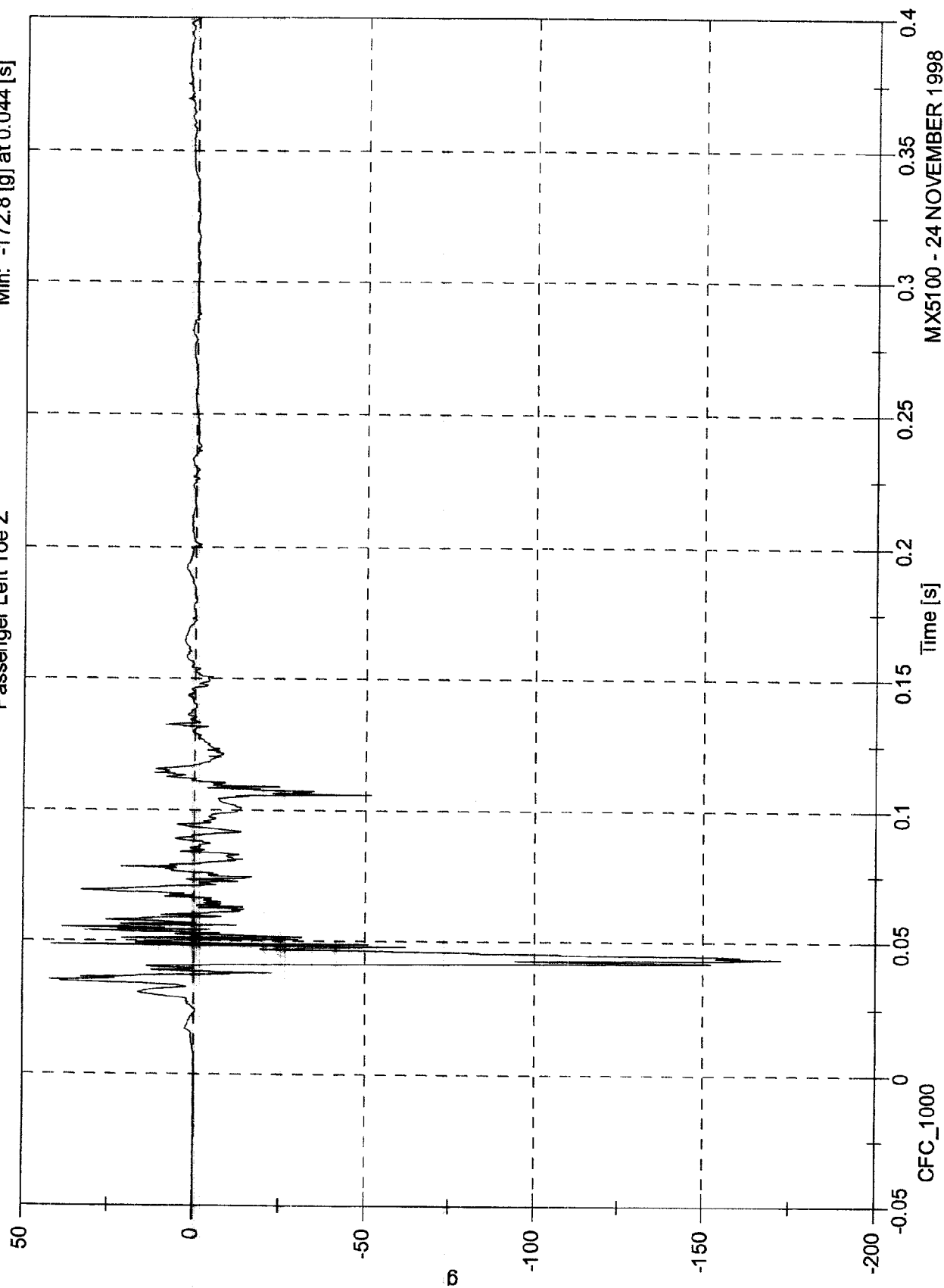


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4RUNNER

Max: 42.2 [g] at 0.035 [s]
Min: -172.8 [g] at 0.044 [s]

Passenger Left Toe Z

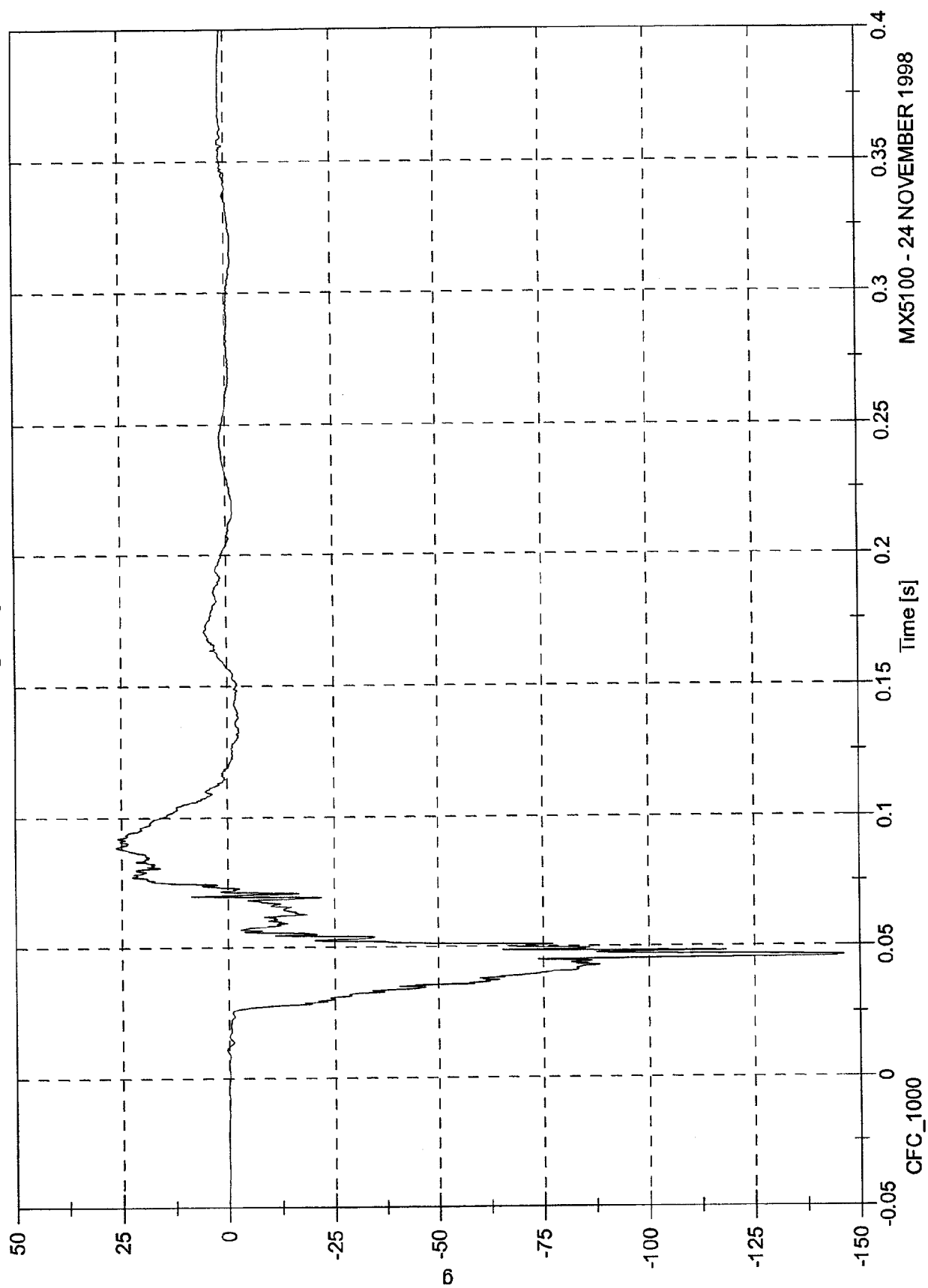


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 26.3 [g] at 0.088 [s]
Min: -146.3 [g] at 0.046 [s]

Passenger Right Ankle X



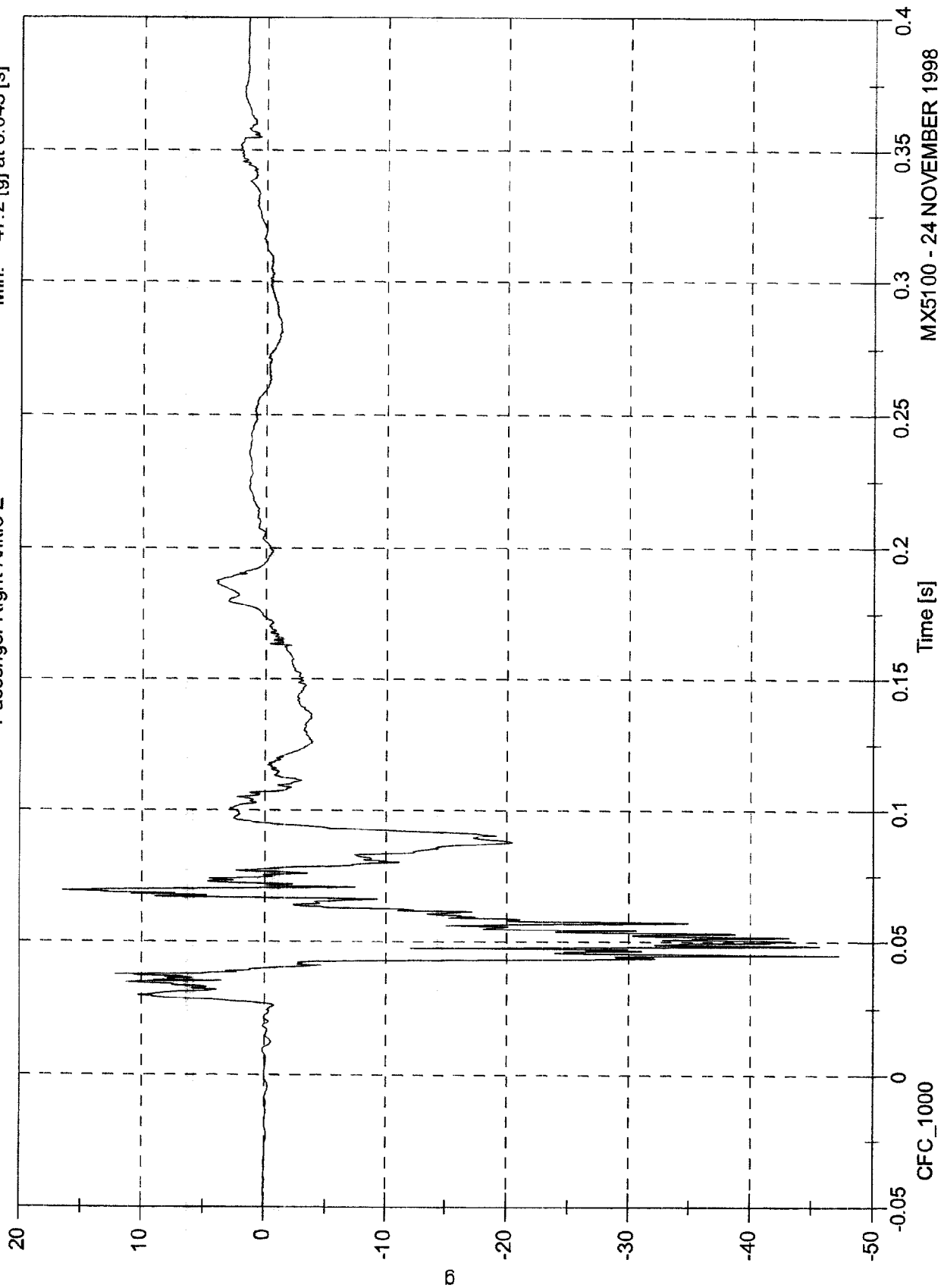
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Passenger Right Ankle Z

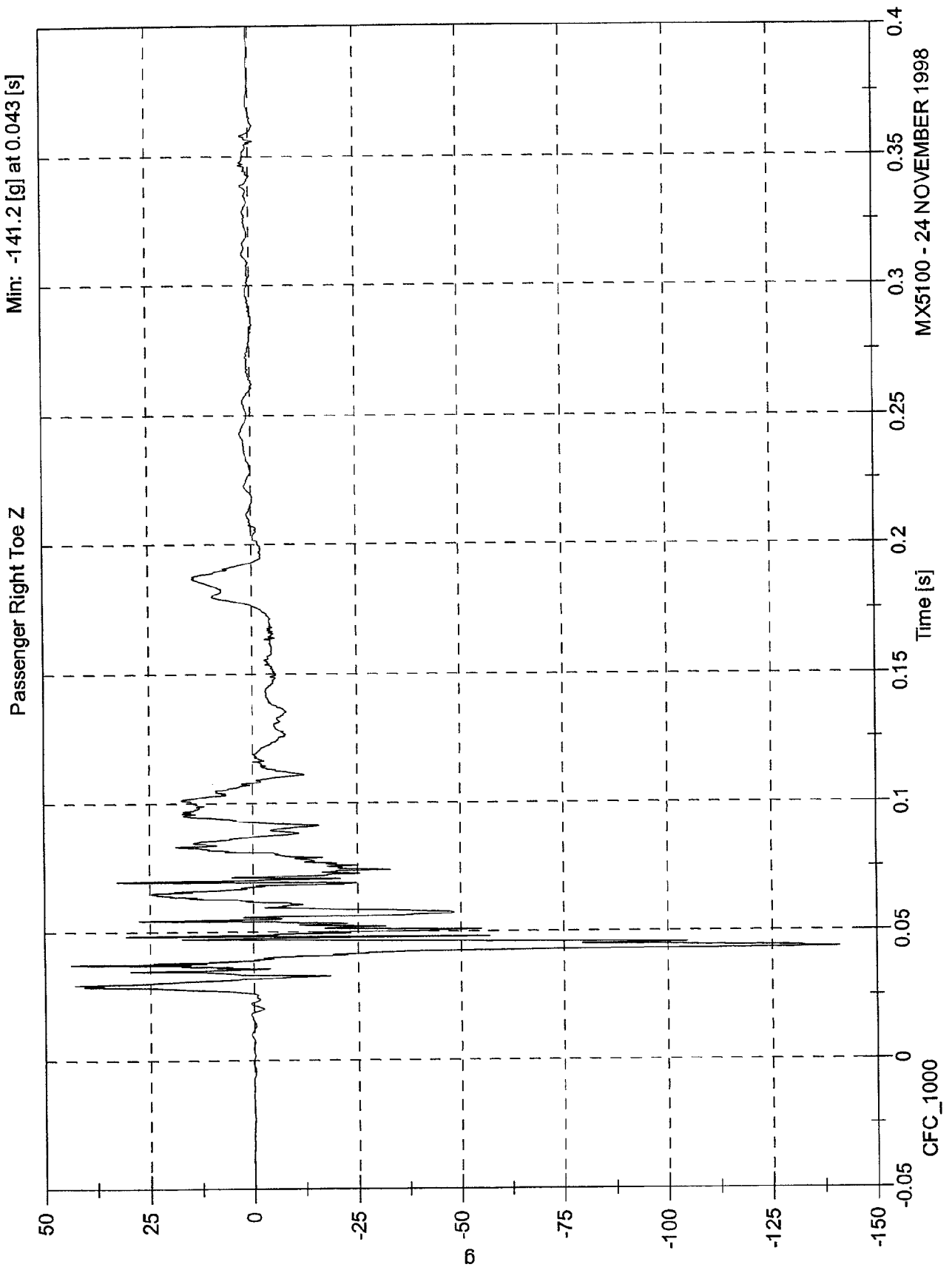
Max: 16.5 [g] at 0.069 [s]

Min: -47.2 [g] at 0.045 [s]



MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER



MX5100 - 24 NOVEMBER 1998

NHTSA TEST NO. MX5100

VEHICLE DATA

Acceleration

Velocity

Displacement

FILTER CHANNEL CLASS

60

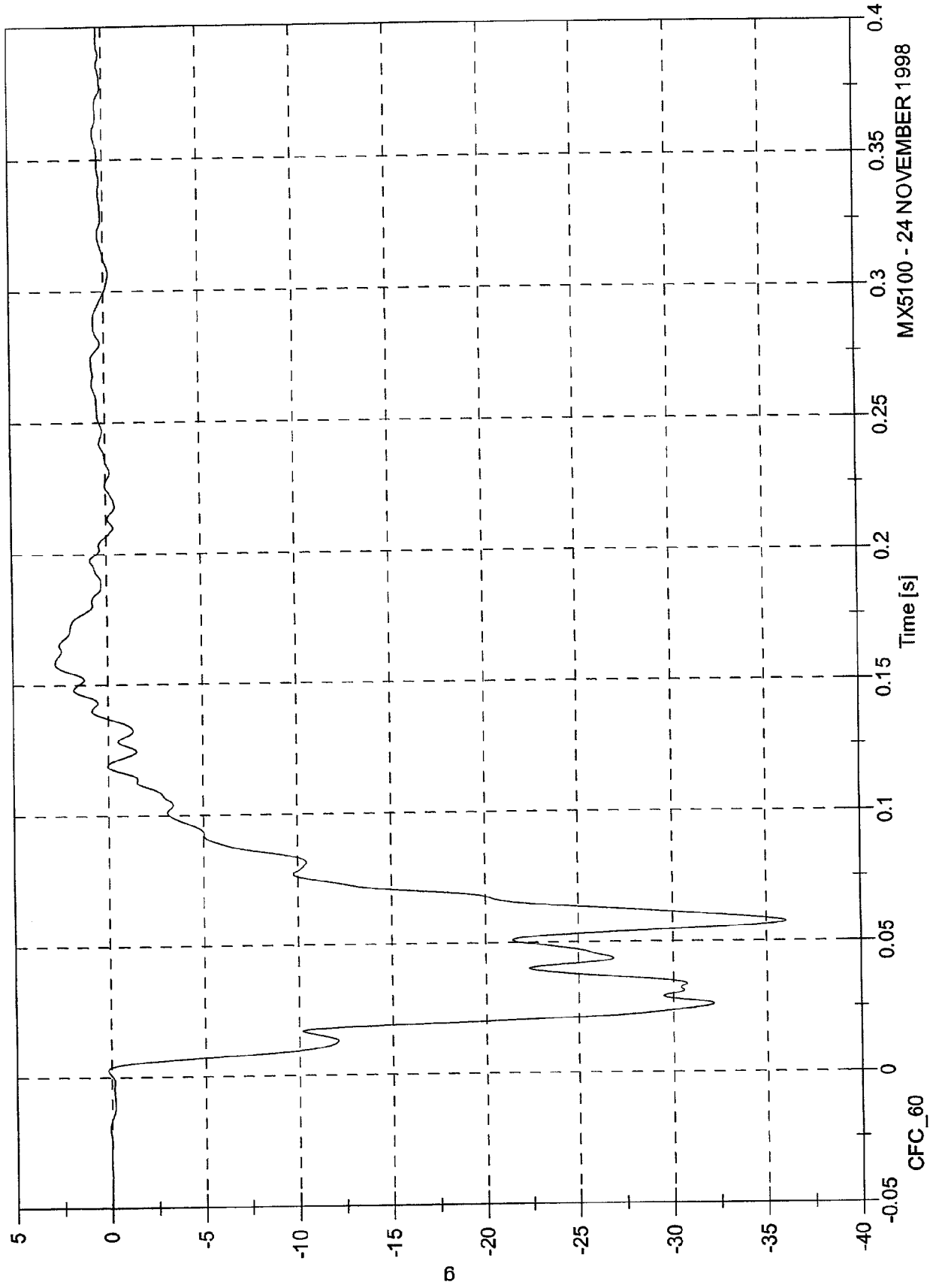
180

180

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 1 L Rear Crossmember X

Max: 2.8 [g] at 0.158 [s]
Min: -36.0 [g] at 0.058 [s]

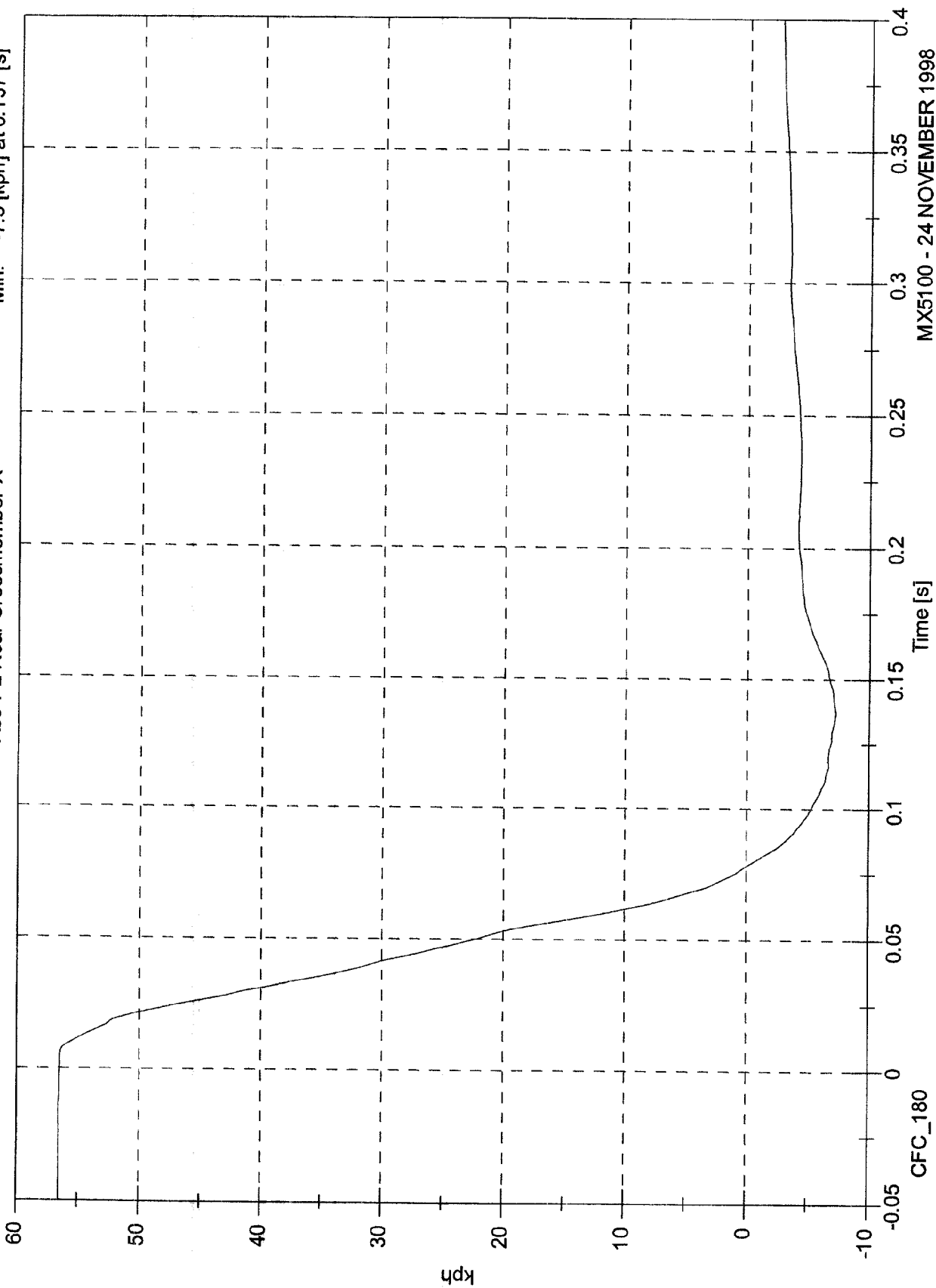


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 1 L Rear Crossmember X

Max: 56.6 [kph] at -0.017 [s]
Min: -7.3 [kph] at 0.137 [s]

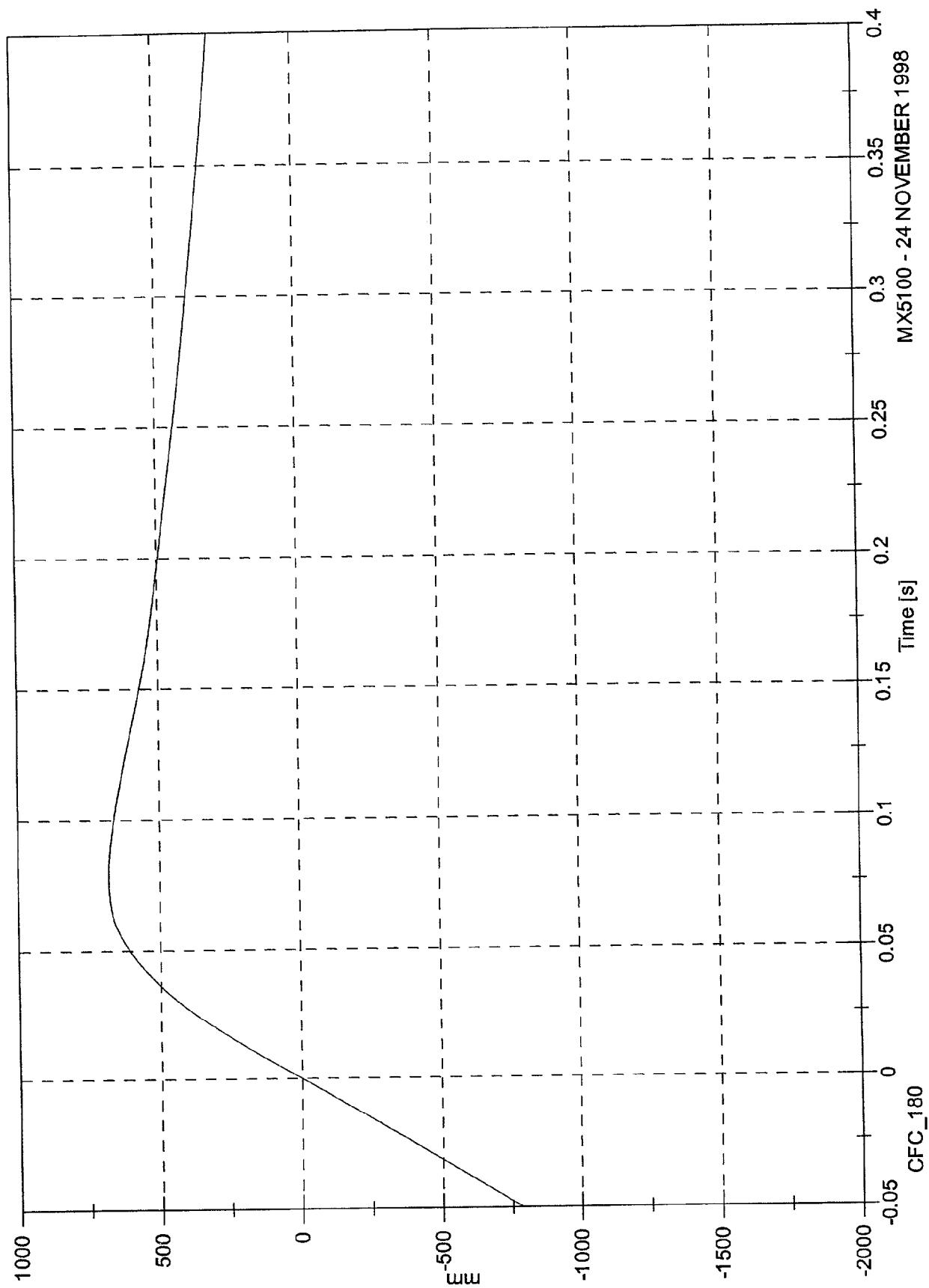


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 1 L Rear Crossmember X

Max: 679.8 [mm] at 0.078 [s]
Min: -1570.2 [mm] at -0.100 [s]

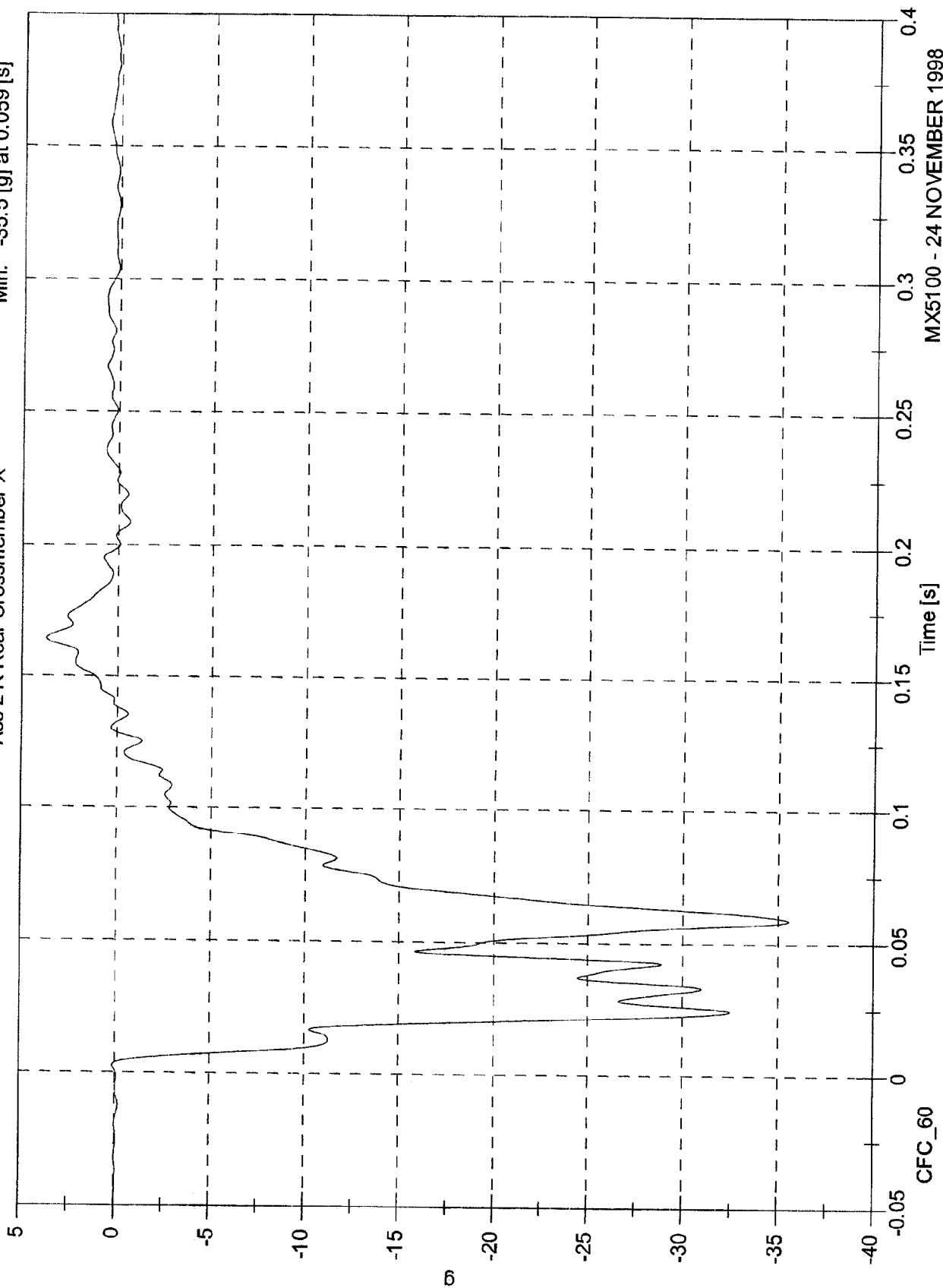


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4RUNNER

Max: 3.7 [g] at 0.165 [s]
Min: -35.5 [g] at 0.059 [s]

Acc 2 R Rear Crossmember X



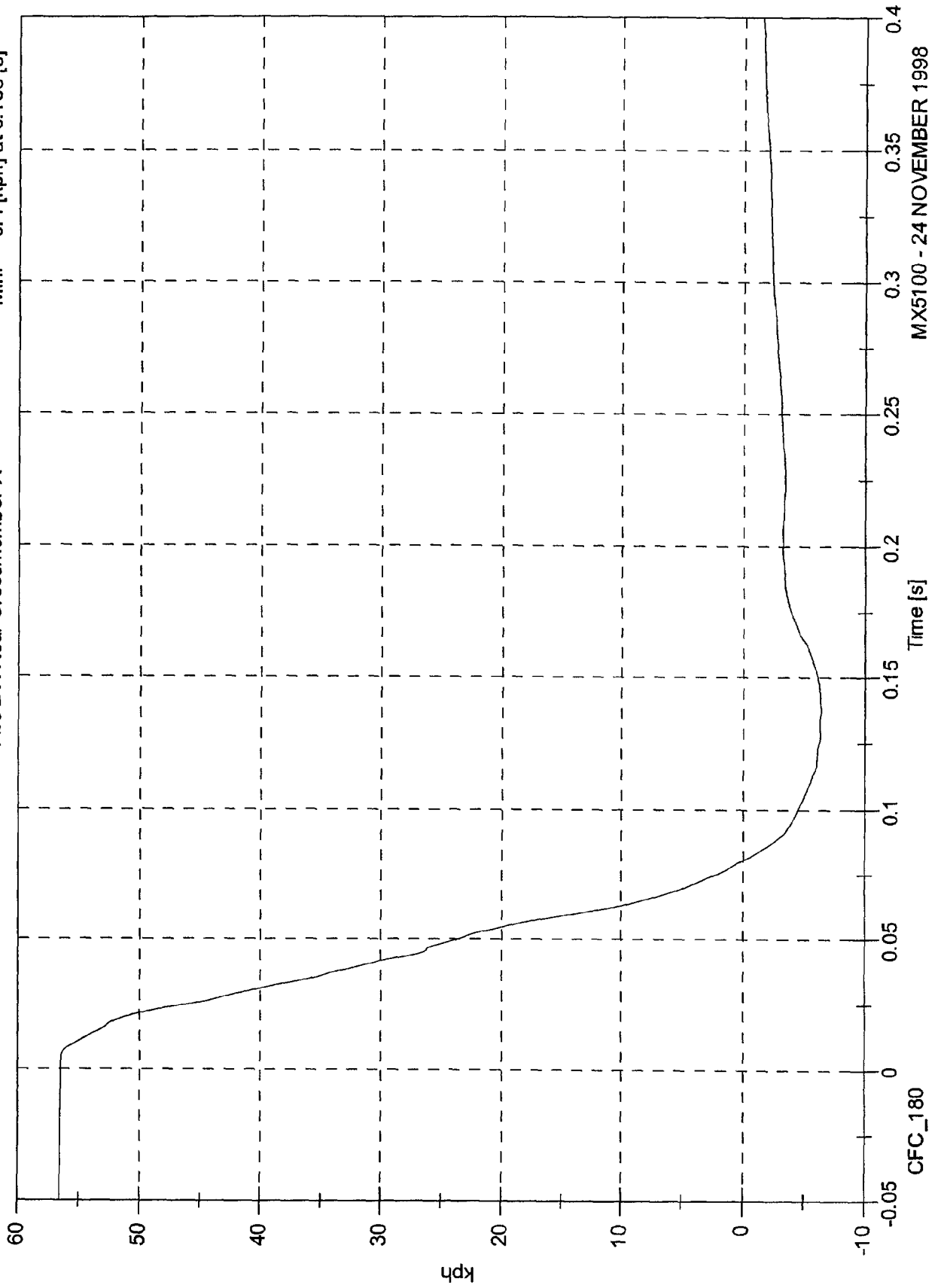
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 2 R Rear Crossmember X

Max: 56.6 [kph] at -0.047 [s]

Min: -6.4 [kph] at 0.138 [s]

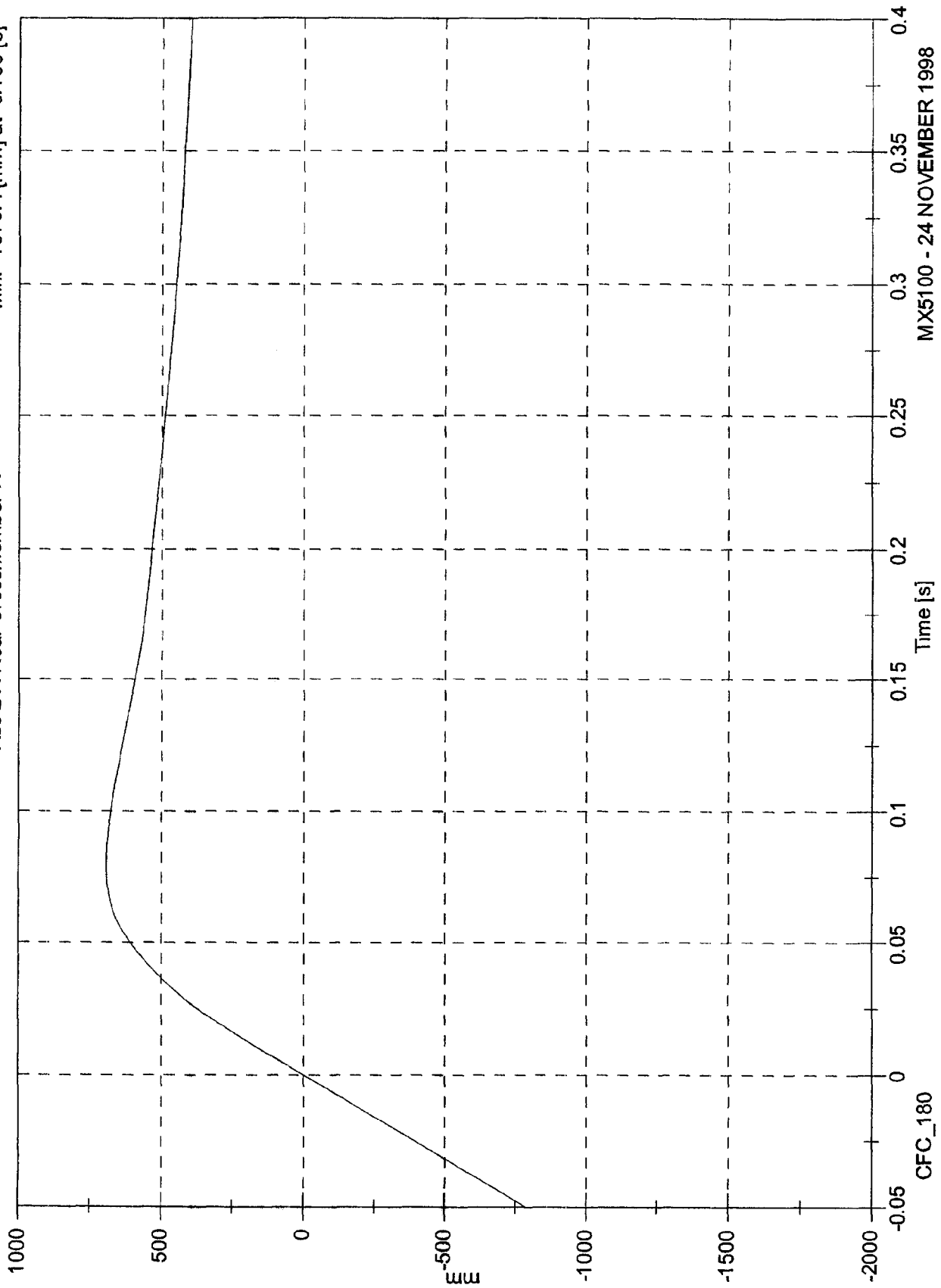


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max 692.9 [mm] at 0.081 [s]
Min: -1570.4 [mm] at -0.100 [s]

Acc 2 R Rear Crossmember X

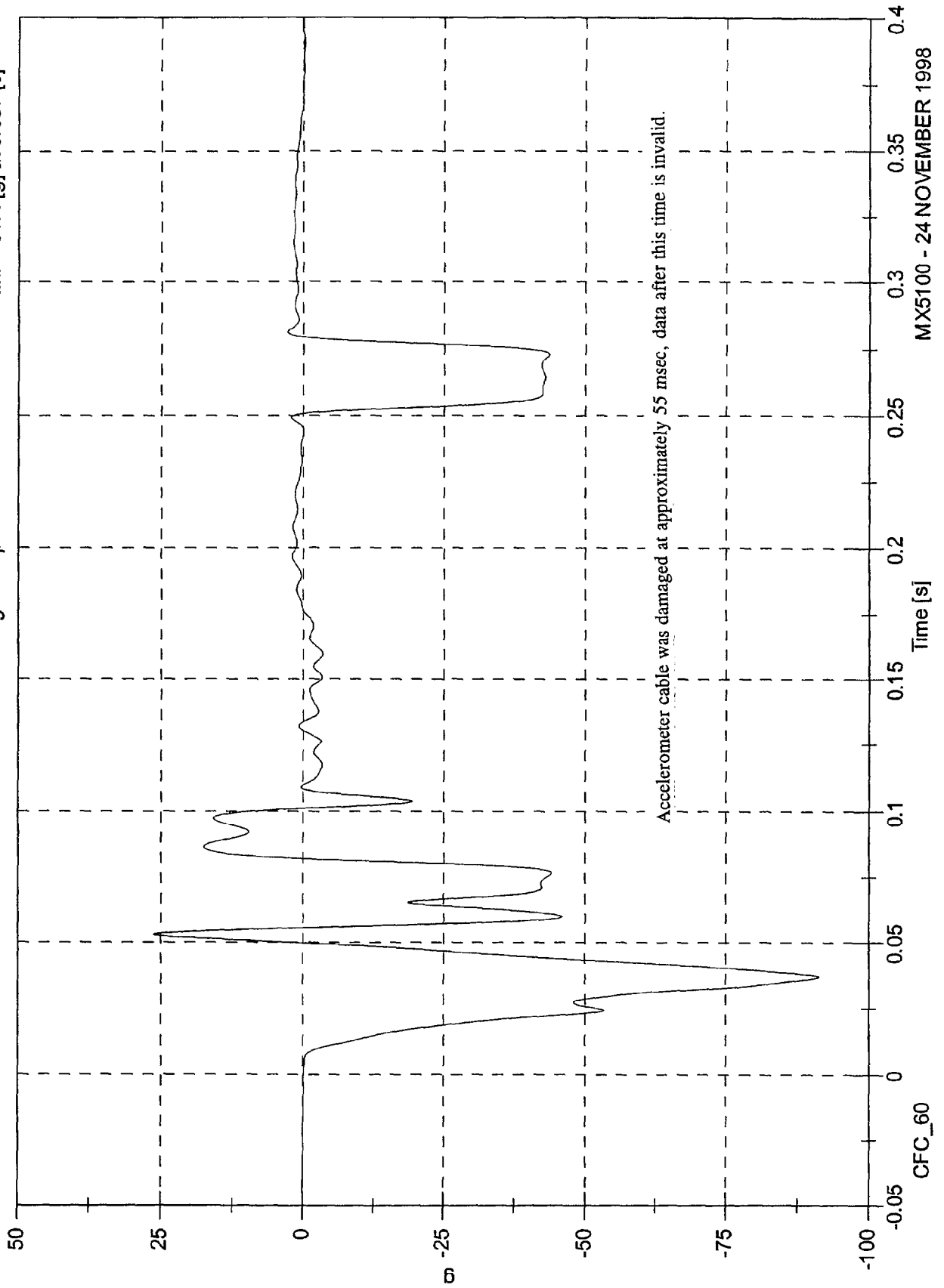


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 3 Engine Top X

Max: 26.2 [g] at 0.053 [s]
Min: -91.4 [g] at 0.037 [s]

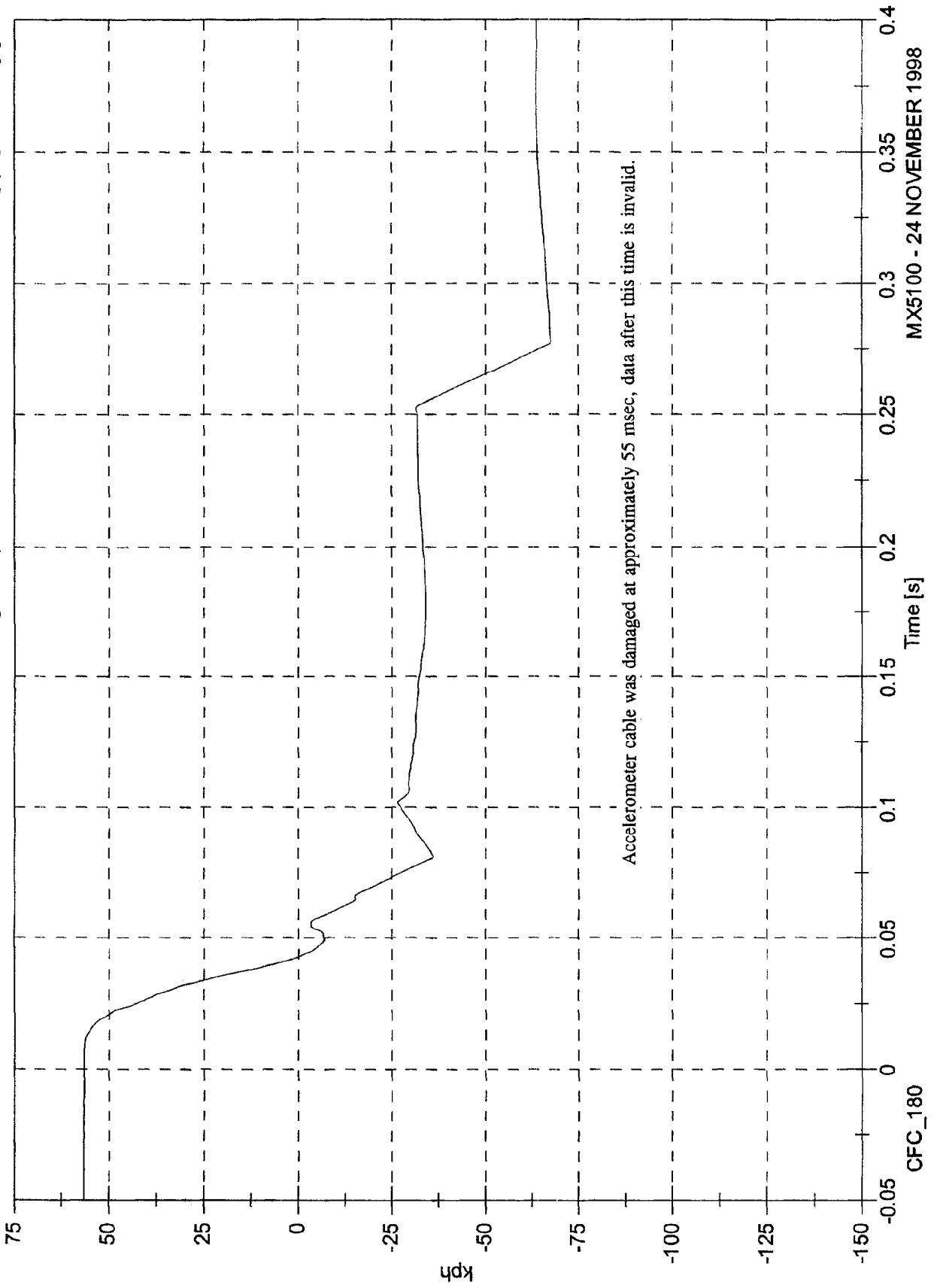


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4RUNNER

Acc 3 Engine Top X

Max: 56.5 [kph] at -0.018 [s]
Min: -138.3 [kph] at 0.470 [s]



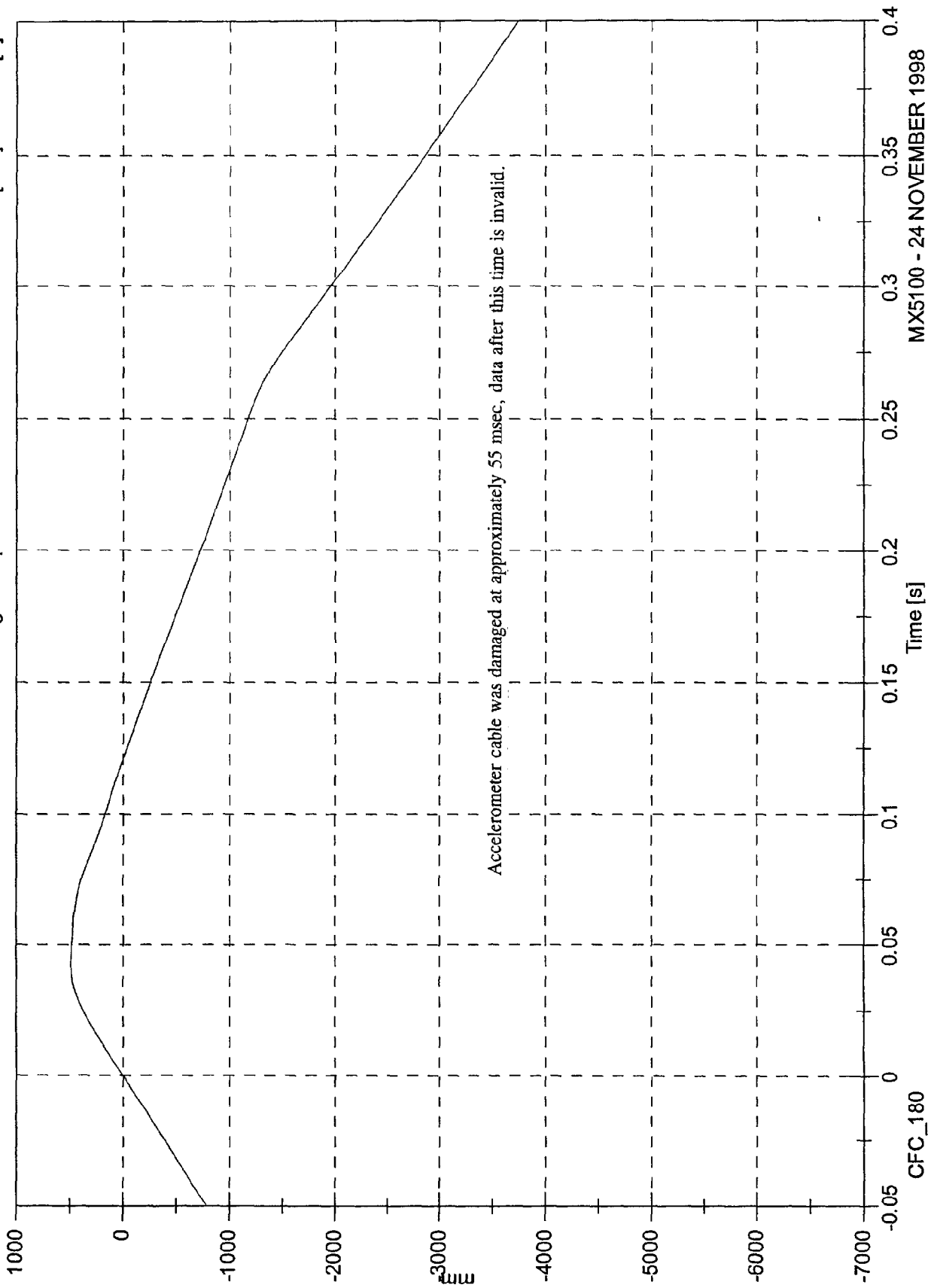
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 3 Engine Top X

Max 489.4 [mm] at 0.043 [s]

Min: -6692.9 [mm] at 0.500 [s]

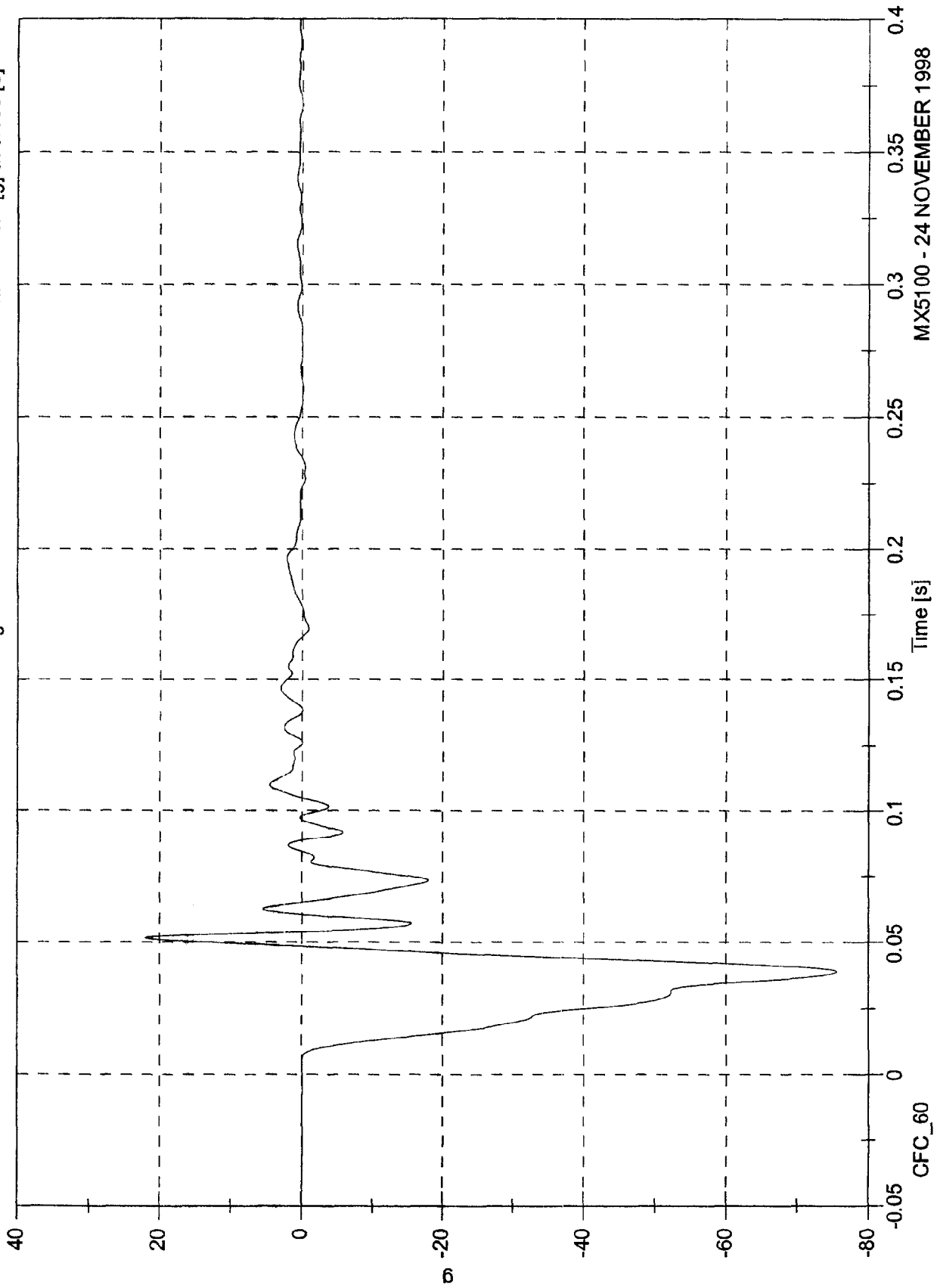


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 4 Engine Bottom X

Max 22.0 [g] at 0.052 [s]
Min: -75.6 [g] at 0.039 [s]

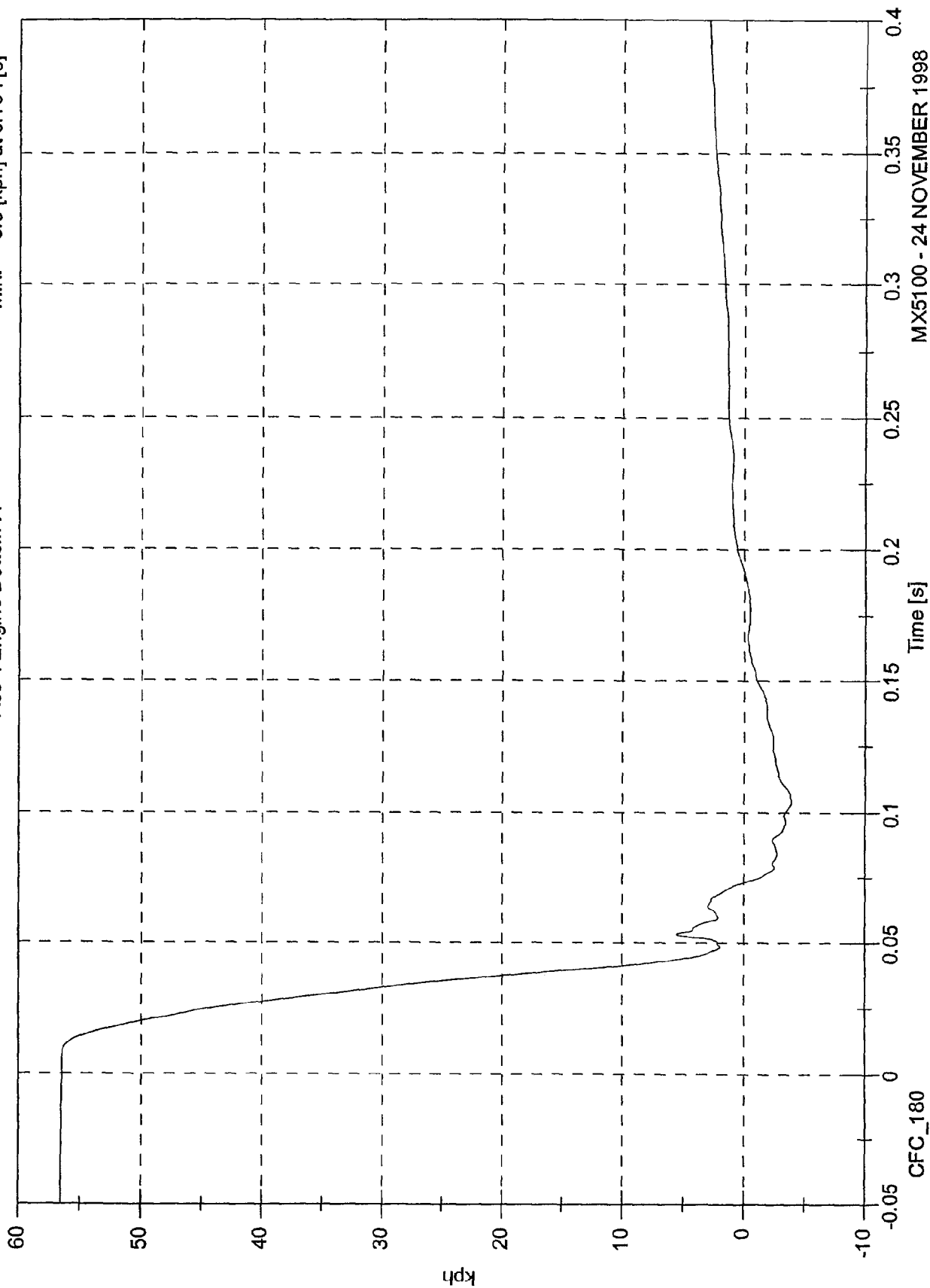


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max 56.6 [kph] at -0.058 [s]
Min: -3.9 [kph] at 0.104 [s]

Acc 4 Engine Bottom X

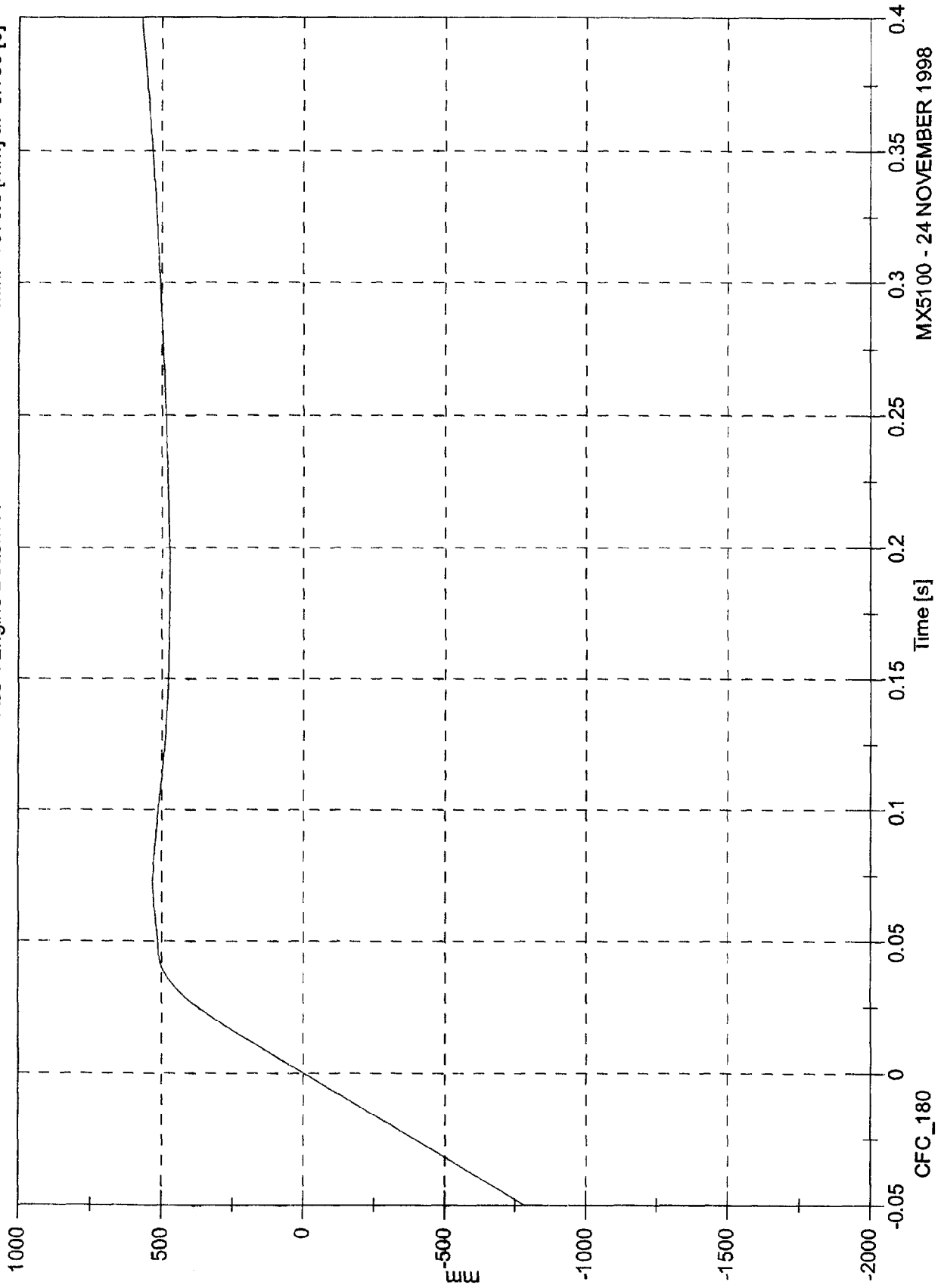


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 4 Engine Bottom X

Max: 675.2 [mm] at 0.500 [s]
Min: -1570.5 [mm] at -0.100 [s]

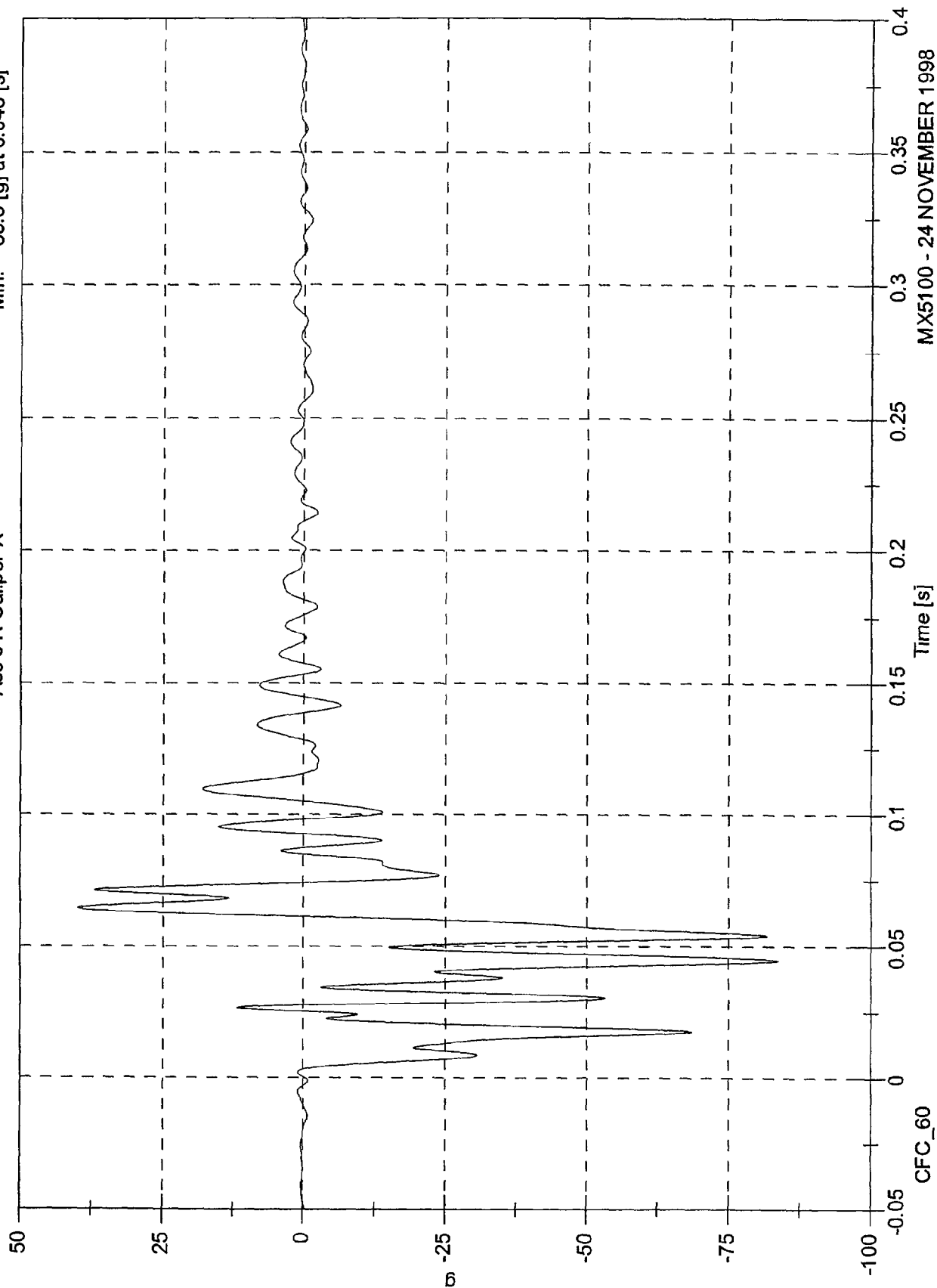


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4RUNNER

Max: 39.9 [g] at 0.064 [s]
Min: -83.8 [g] at 0.045 [s]

Acc 5 R Caliper X



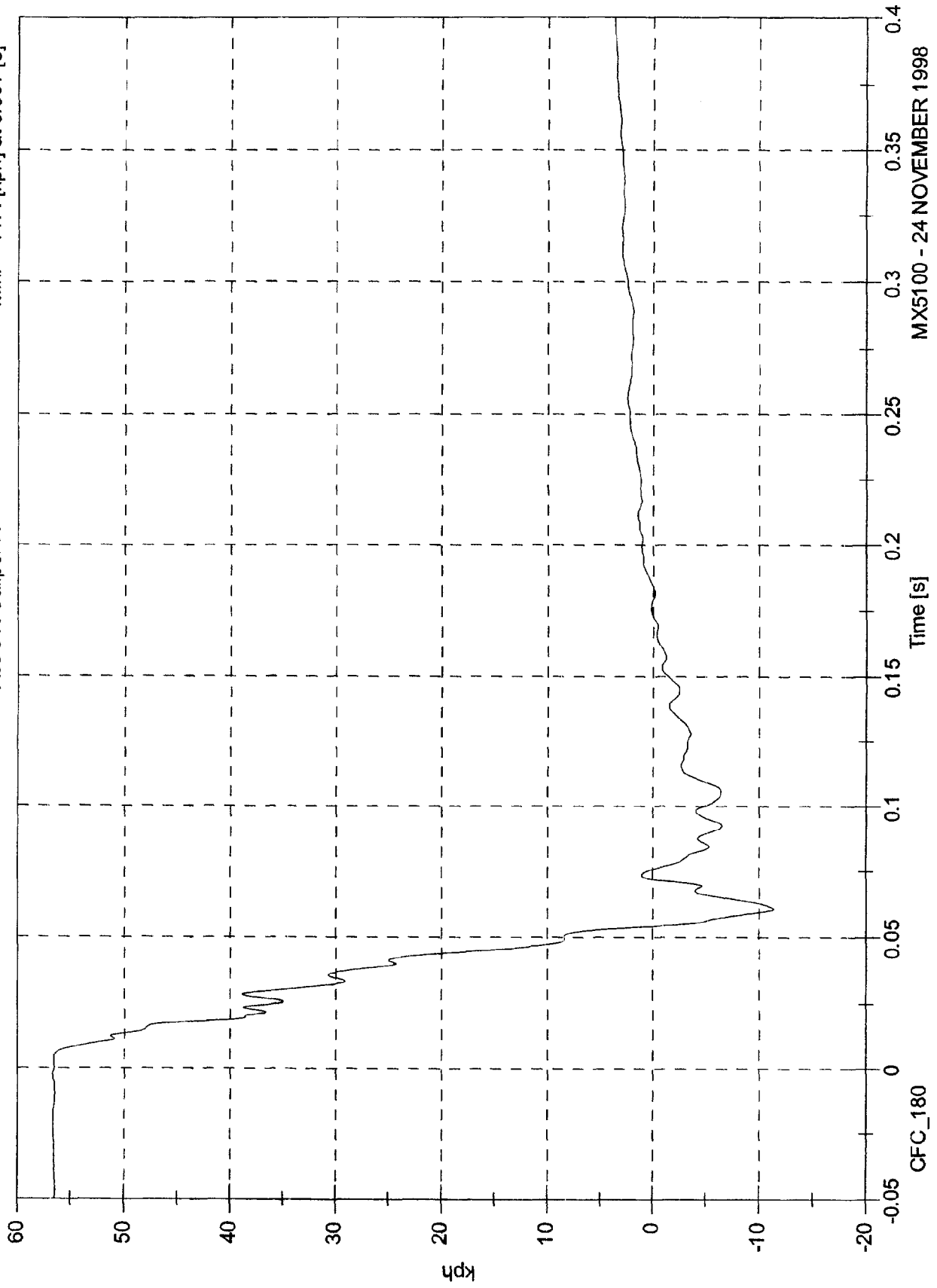
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 5 R Caliper X

Max: 56.7 [kph] at -0.004 [s]

Min: -11.4 [kph] at 0.061 [s]

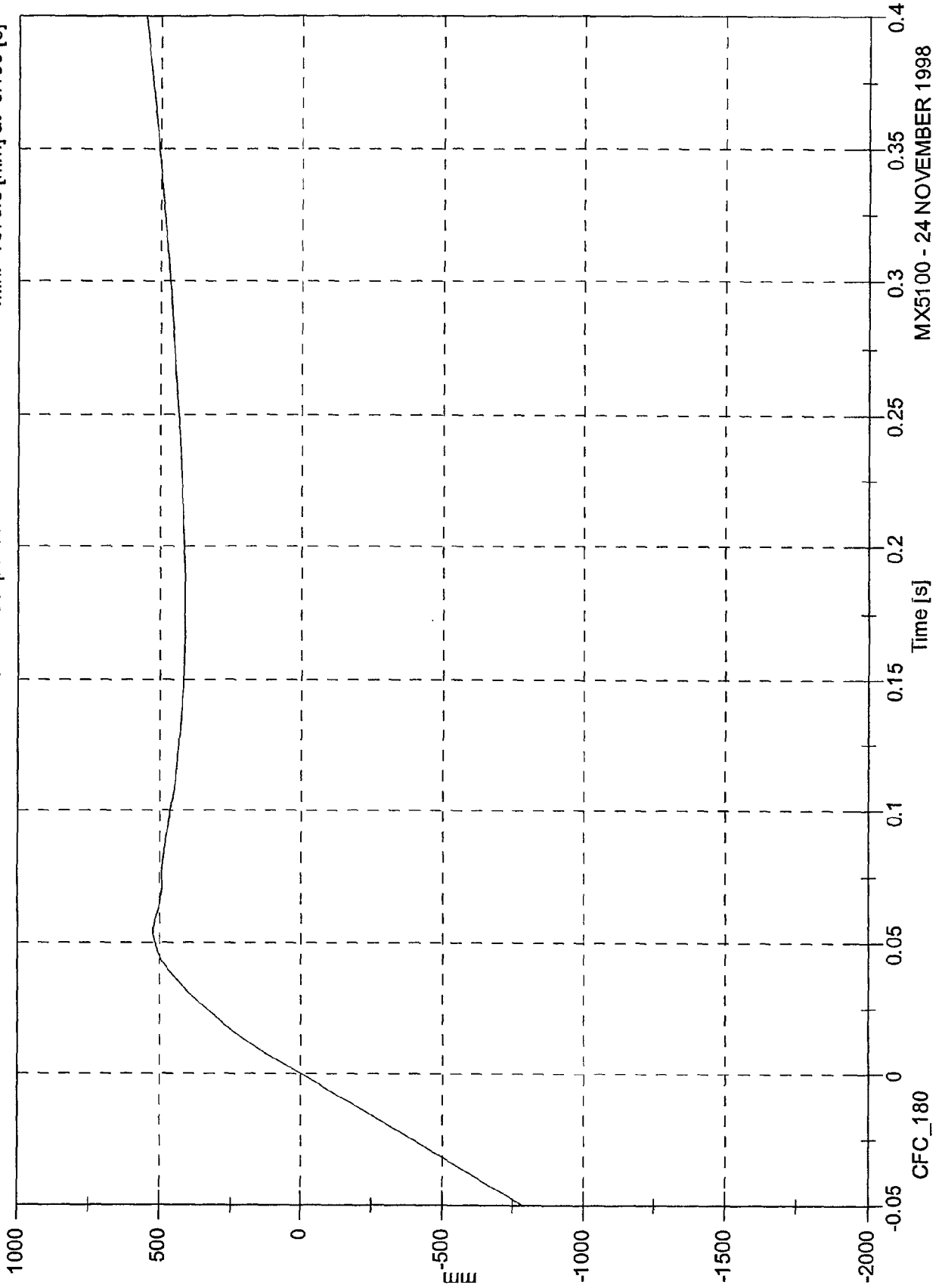


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max 675.4 [mm] at 0.500 [s]
Min: -1570.3 [mm] at -0.100 [s]

Acc 5 R Caliper X

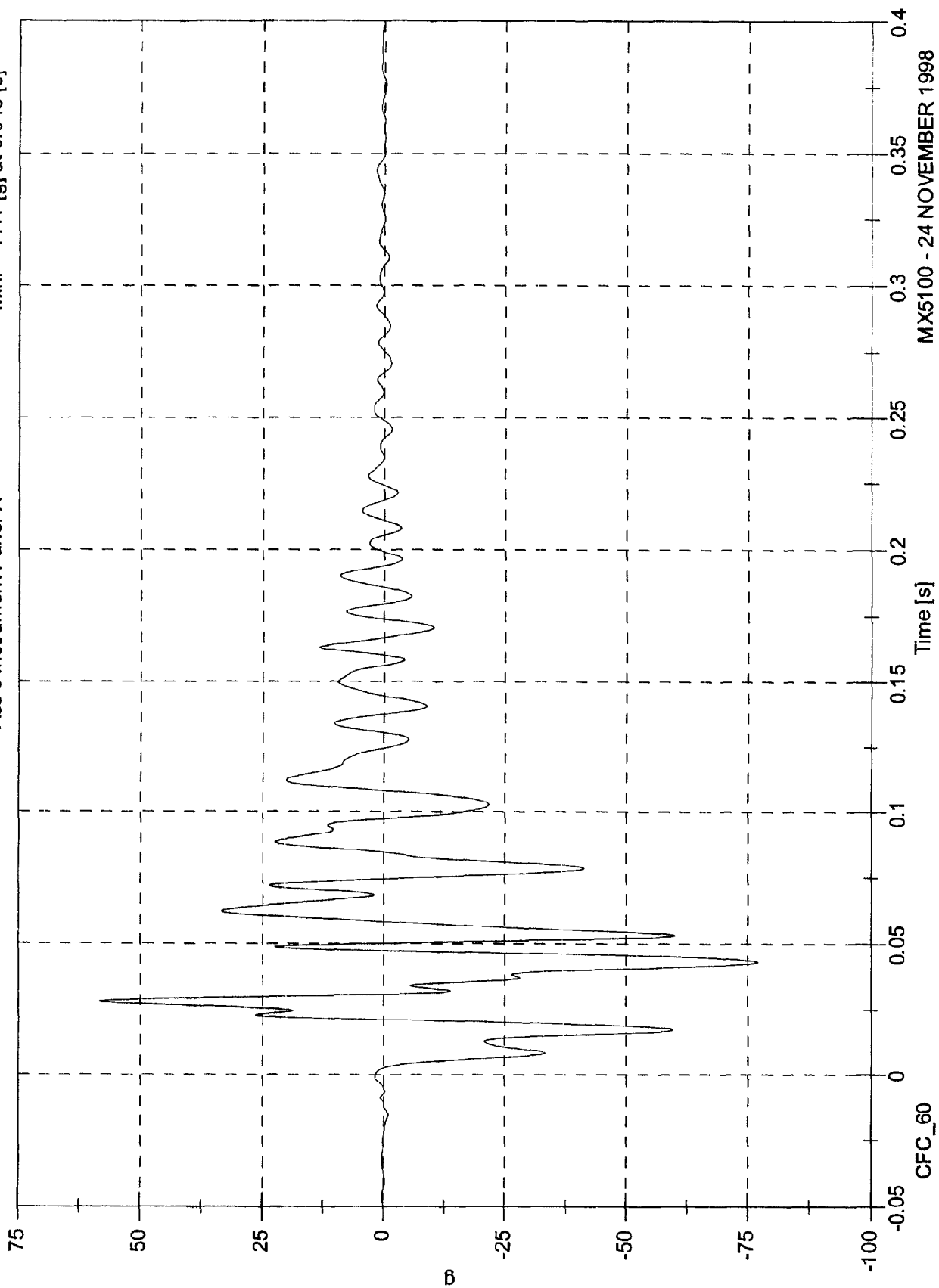


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 6 Instrument Panel X

Max: 58.3 [g] at 0.028 [s]
Min: -77.1 [g] at 0.043 [s]

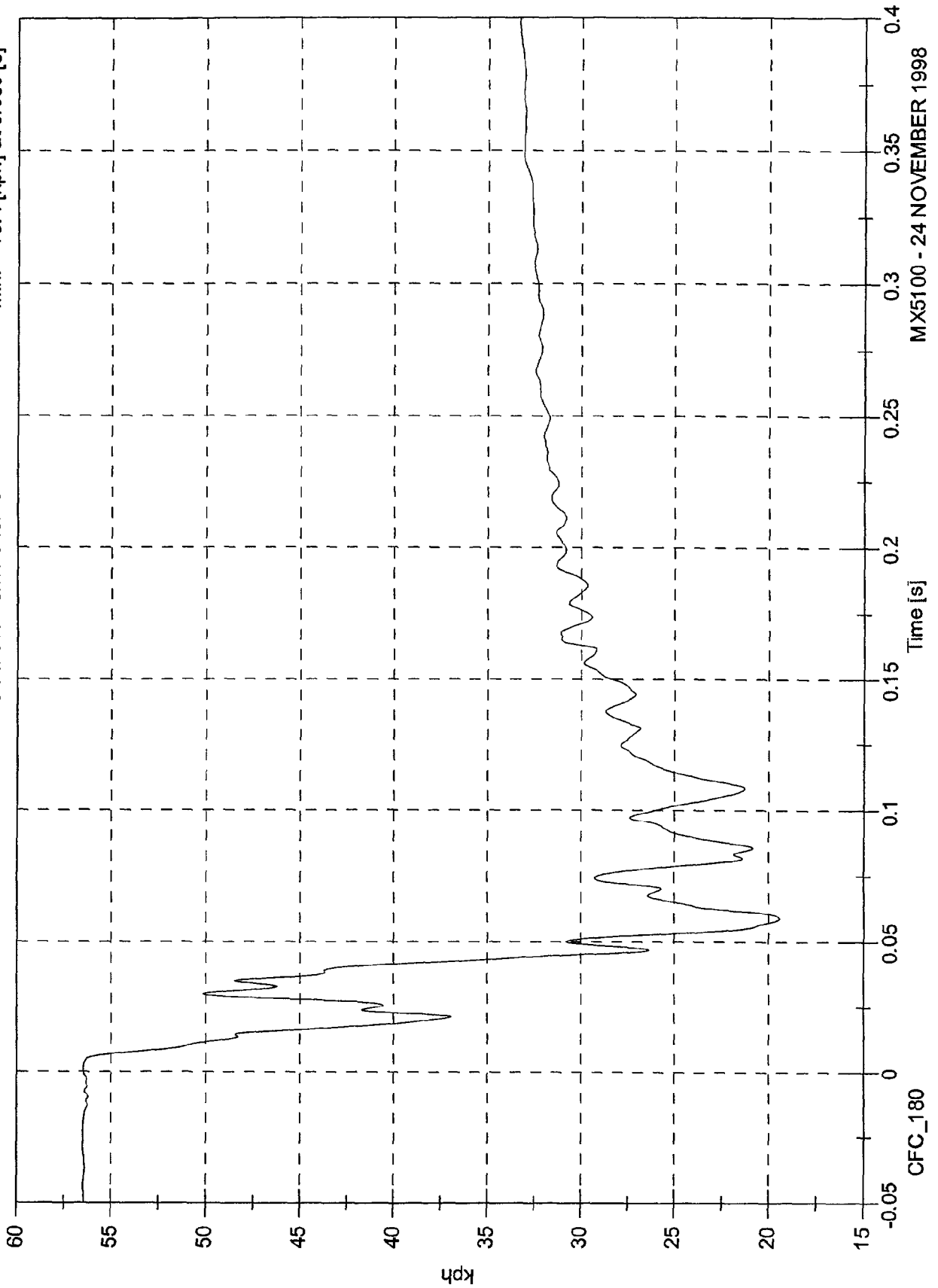


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 6 Instrument Panel X

Max: 56.6 [kph] at -0.057 [s]
Min: 19.4 [kph] at 0.059 [s]

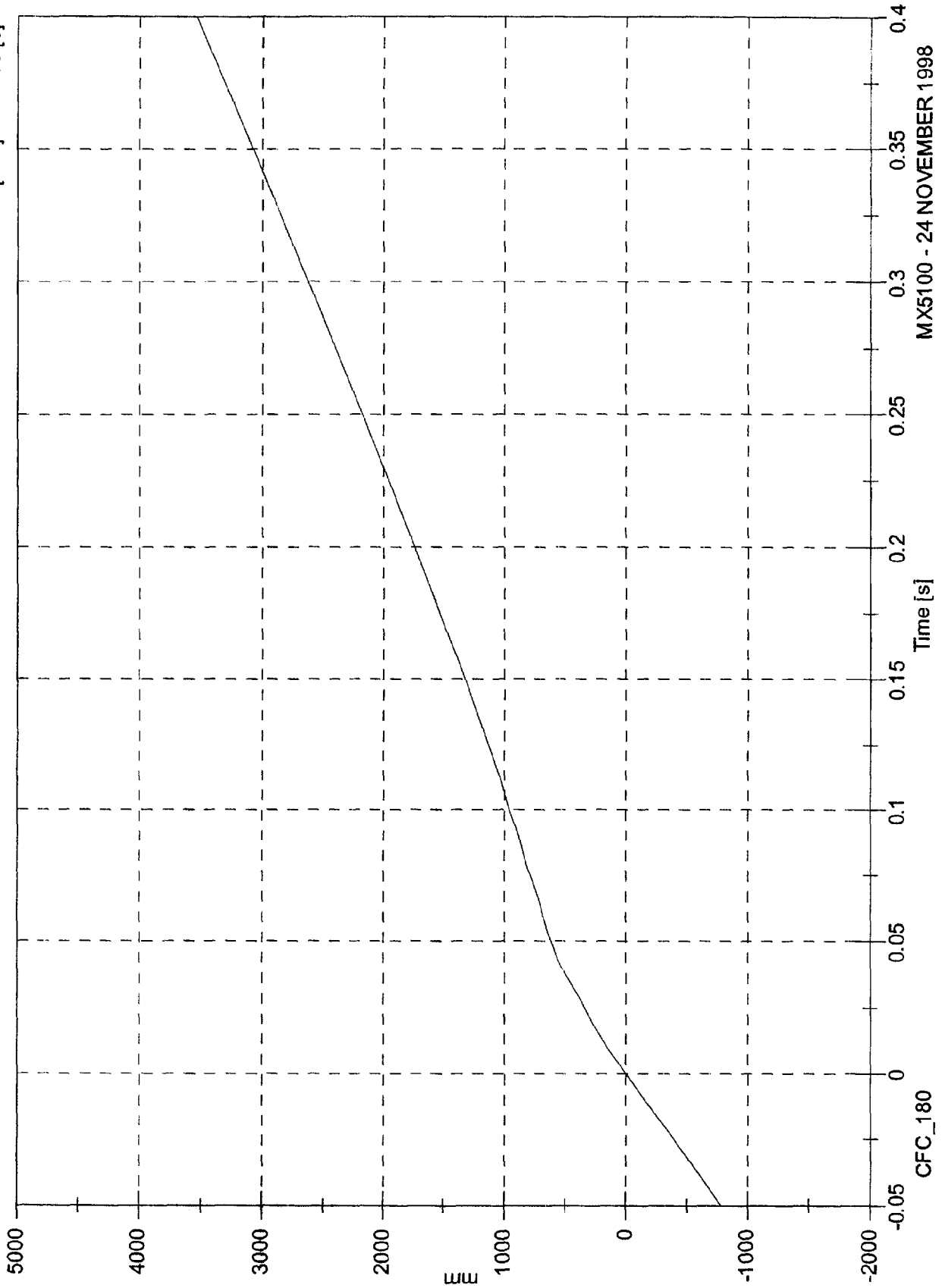


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 6 Instrument Panel X

Max: 4476.4 [mm] at 0.500 [s]
Min: -1567.9 [mm] at -0.100 [s]



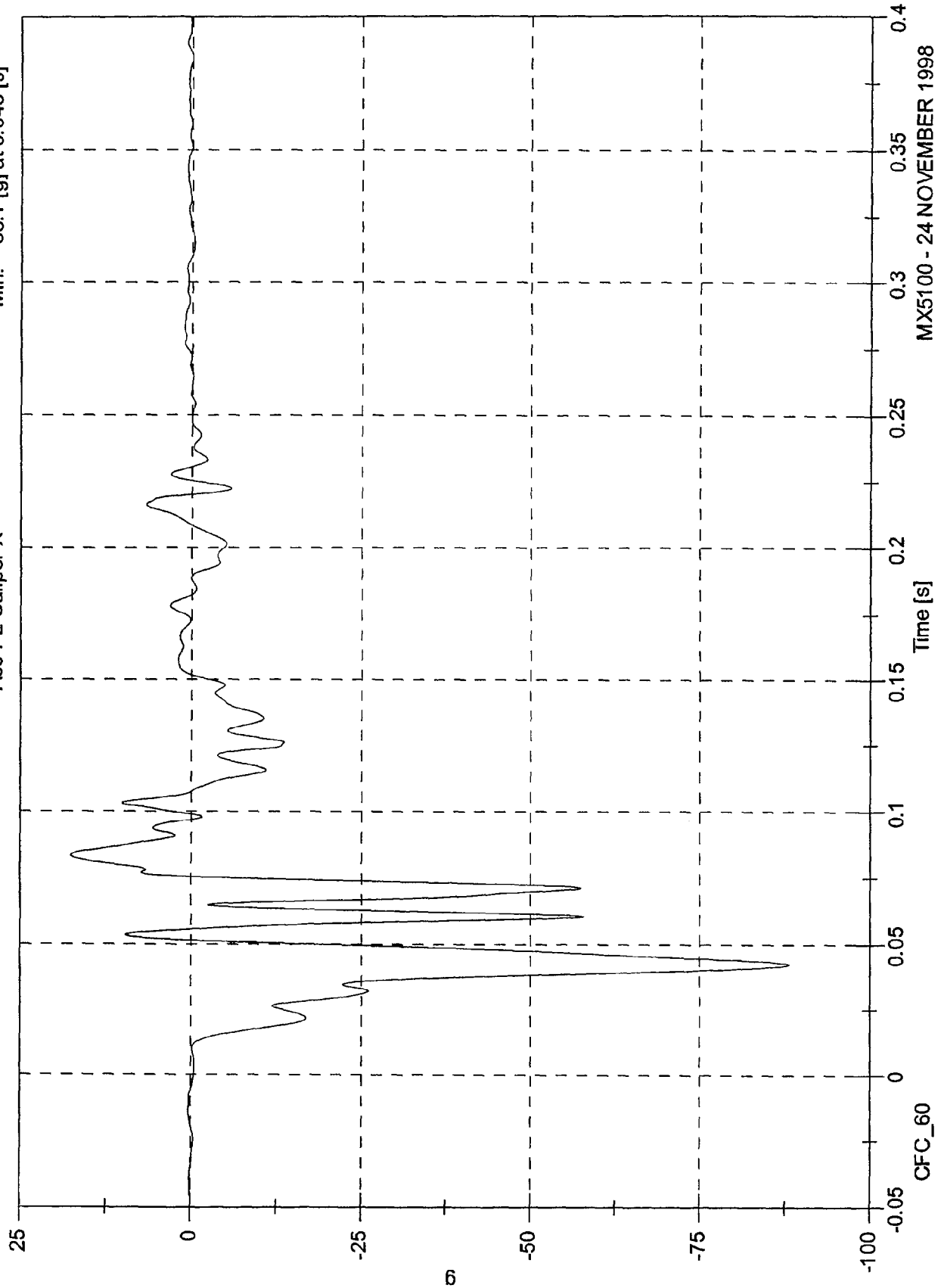
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max 17.6 [g] at 0.083 [s]

Min: -88.1 [g] at 0.043 [s]

Acc 7 L Caliper X

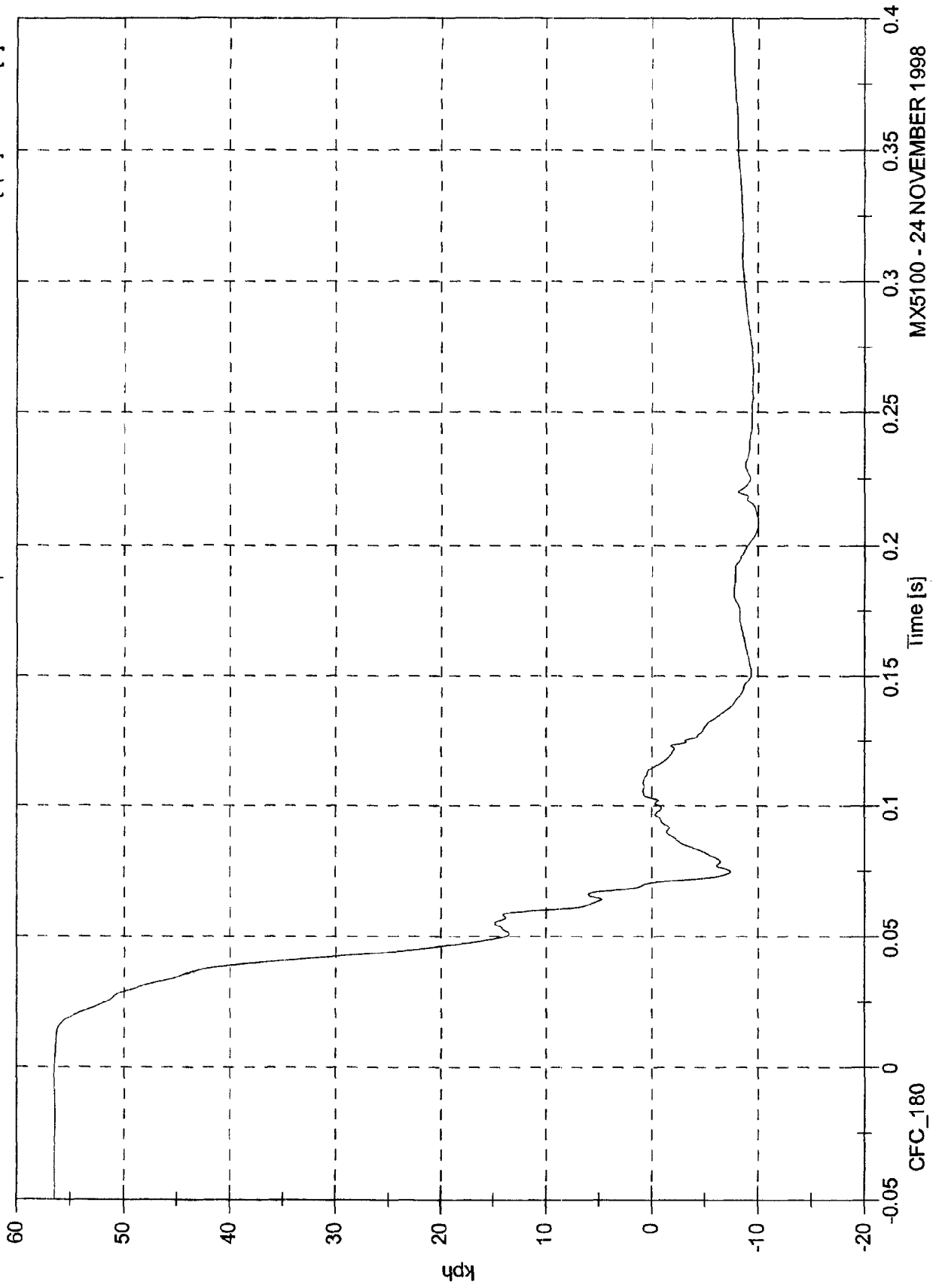


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 7 L Caliper X

Max: 56.5 [kph] at -0.005 [s]
Min: -10.0 [kph] at 0.209 [s]

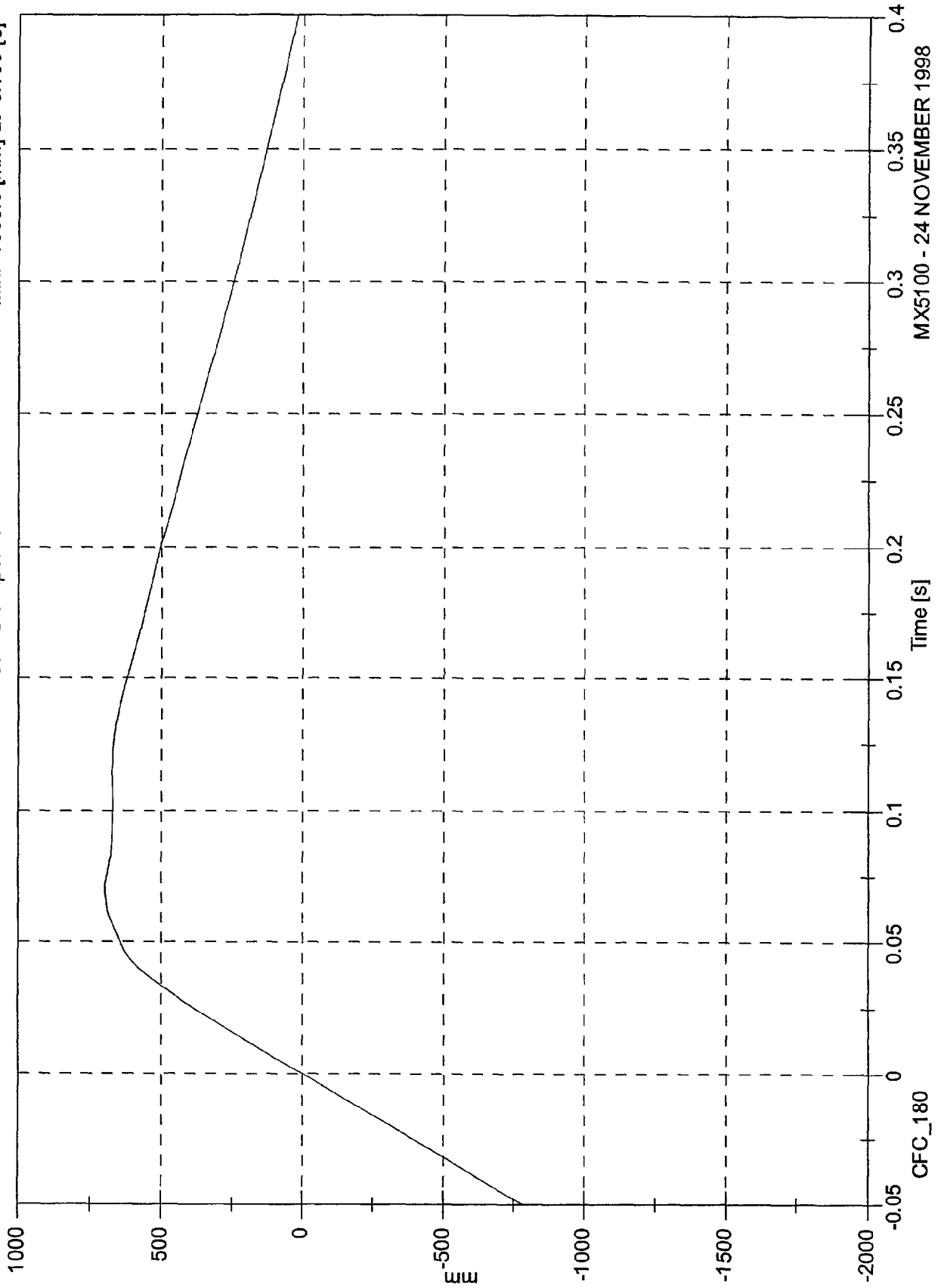


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4RUNNER

Max: 698.6 [mm] at 0.071 [s]
Min: -1568.6 [mm] at -0.100 [s]

Acc 7 L Caliper X

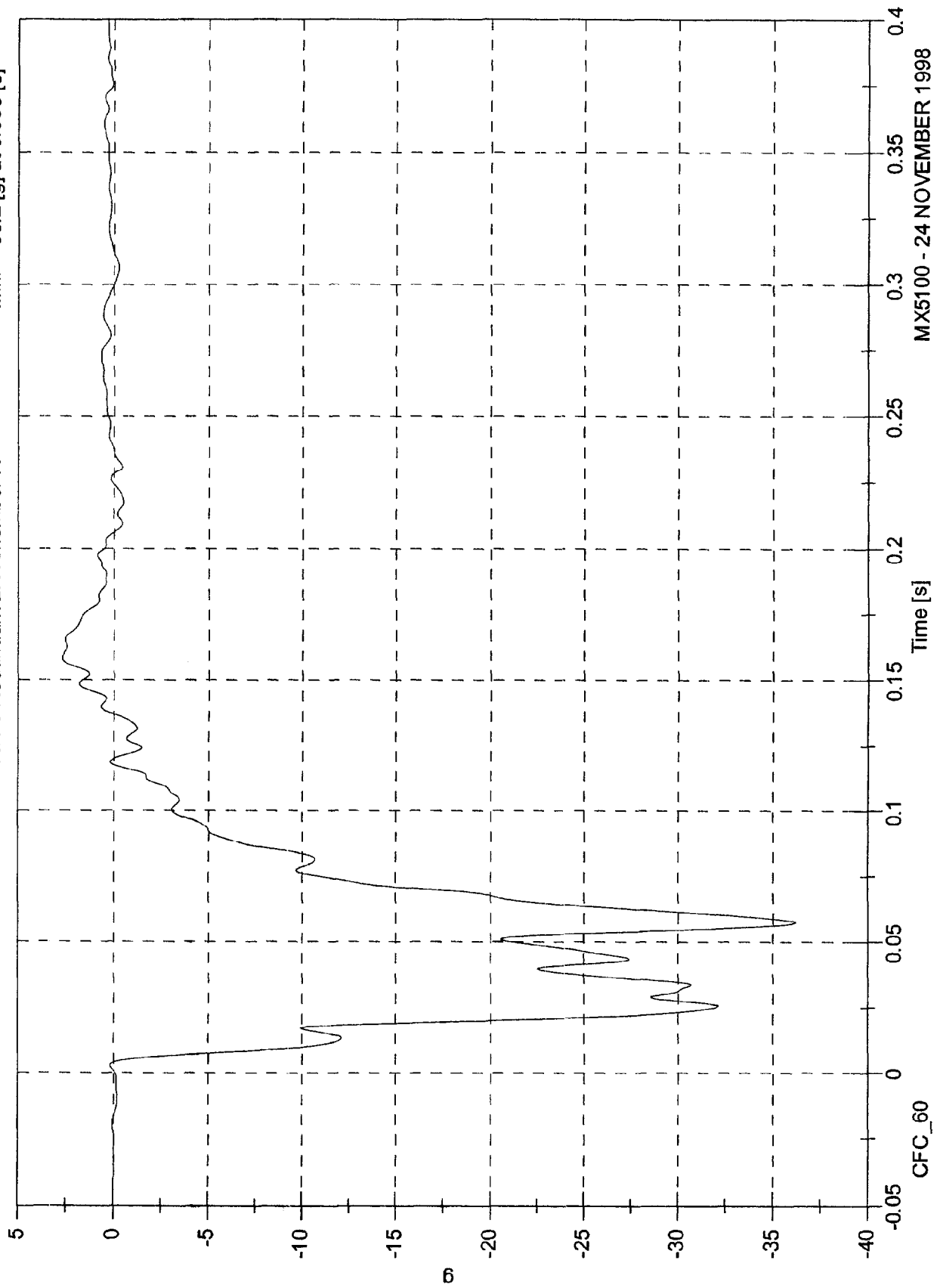


NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 8 Redundant LR Xmember X

Max: 2.7 [g] at 0.158 [s]

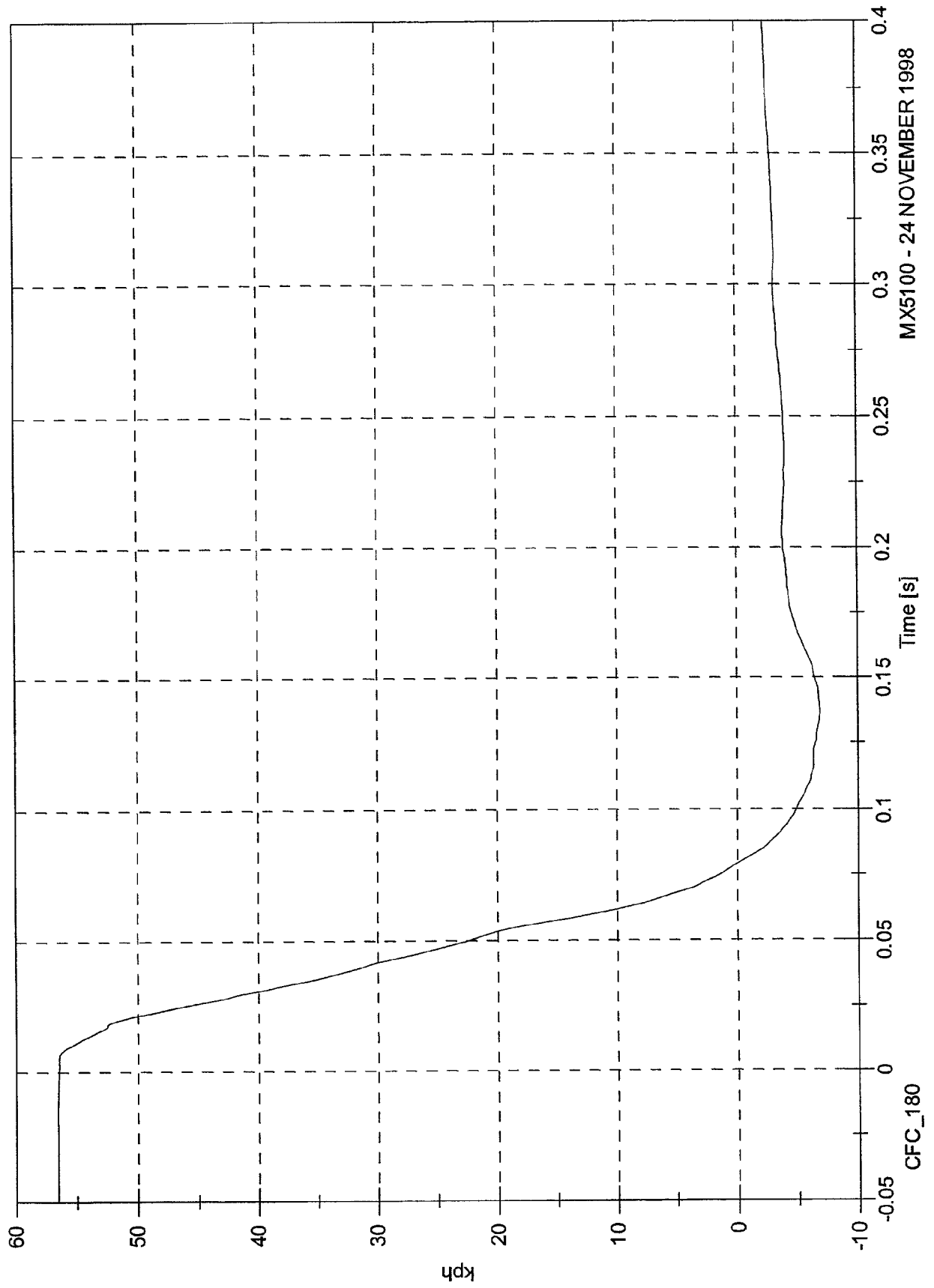
Min: -36.2 [g] at 0.058 [s]



NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 8 Redundant LR Xmember X

Max: 56.6 [kph] at -0.017 [s]
Min: -6.9 [kph] at 0.137 [s]



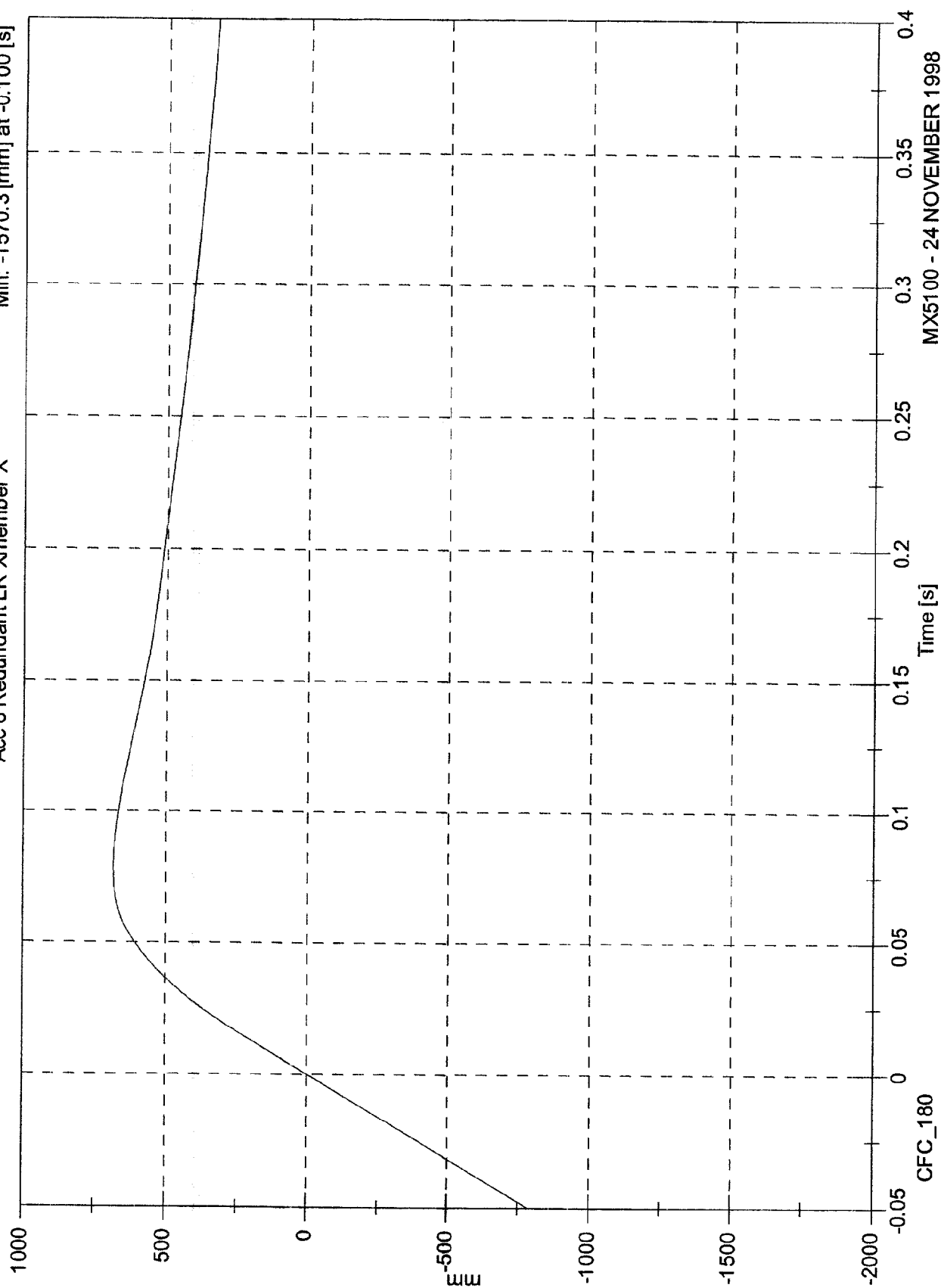
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 8 Redundant LR Xmember X

Max: 683.4 [mm] at 0.079 [s]

Min: -1570.3 [mm] at -0.100 [s]

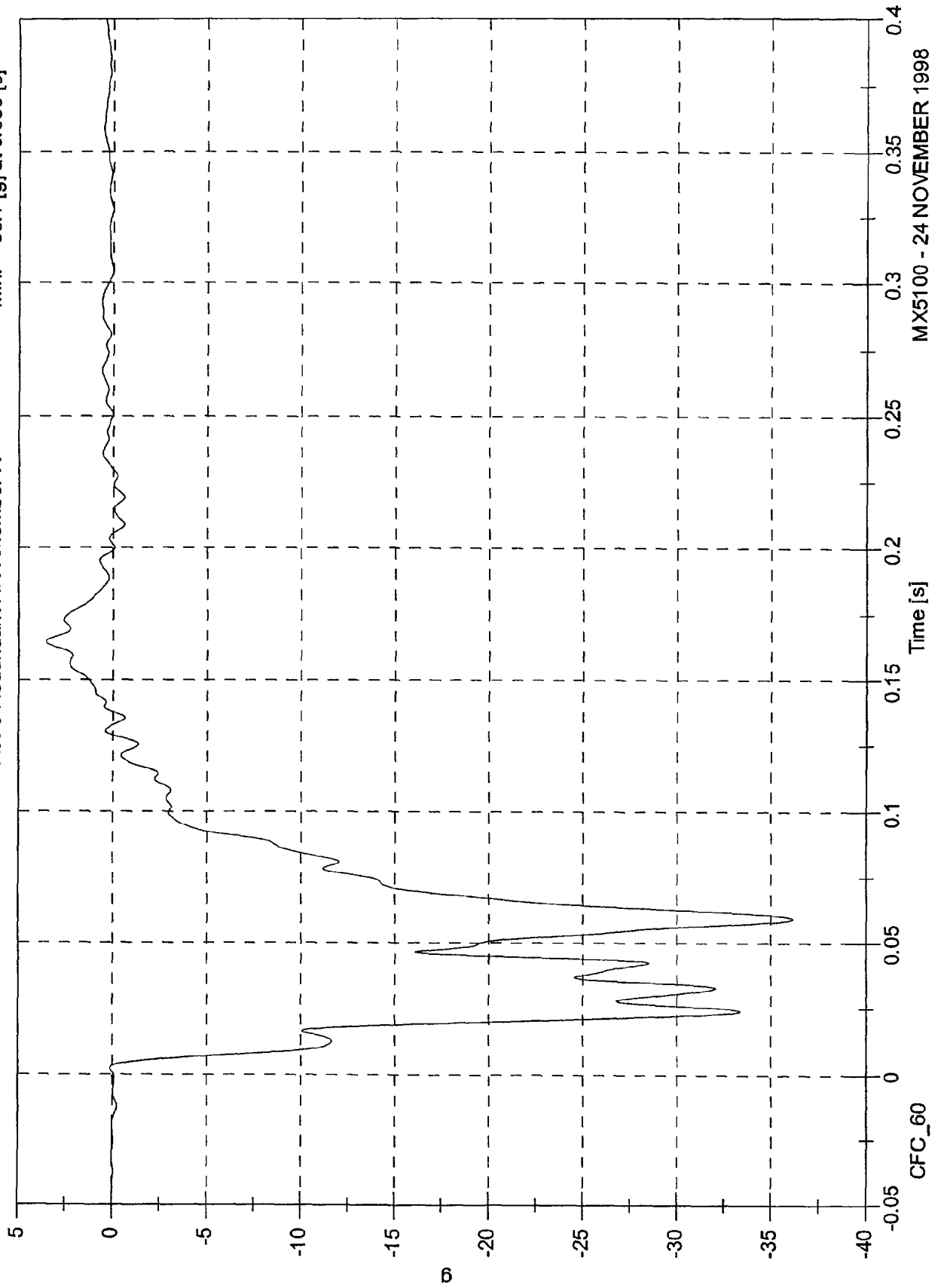


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4RUNNER

Acc 9 Redundant RR Xmember X

Max: 3.6 [g] at 0.165 [s]
Min: -36.1 [g] at 0.059 [s]



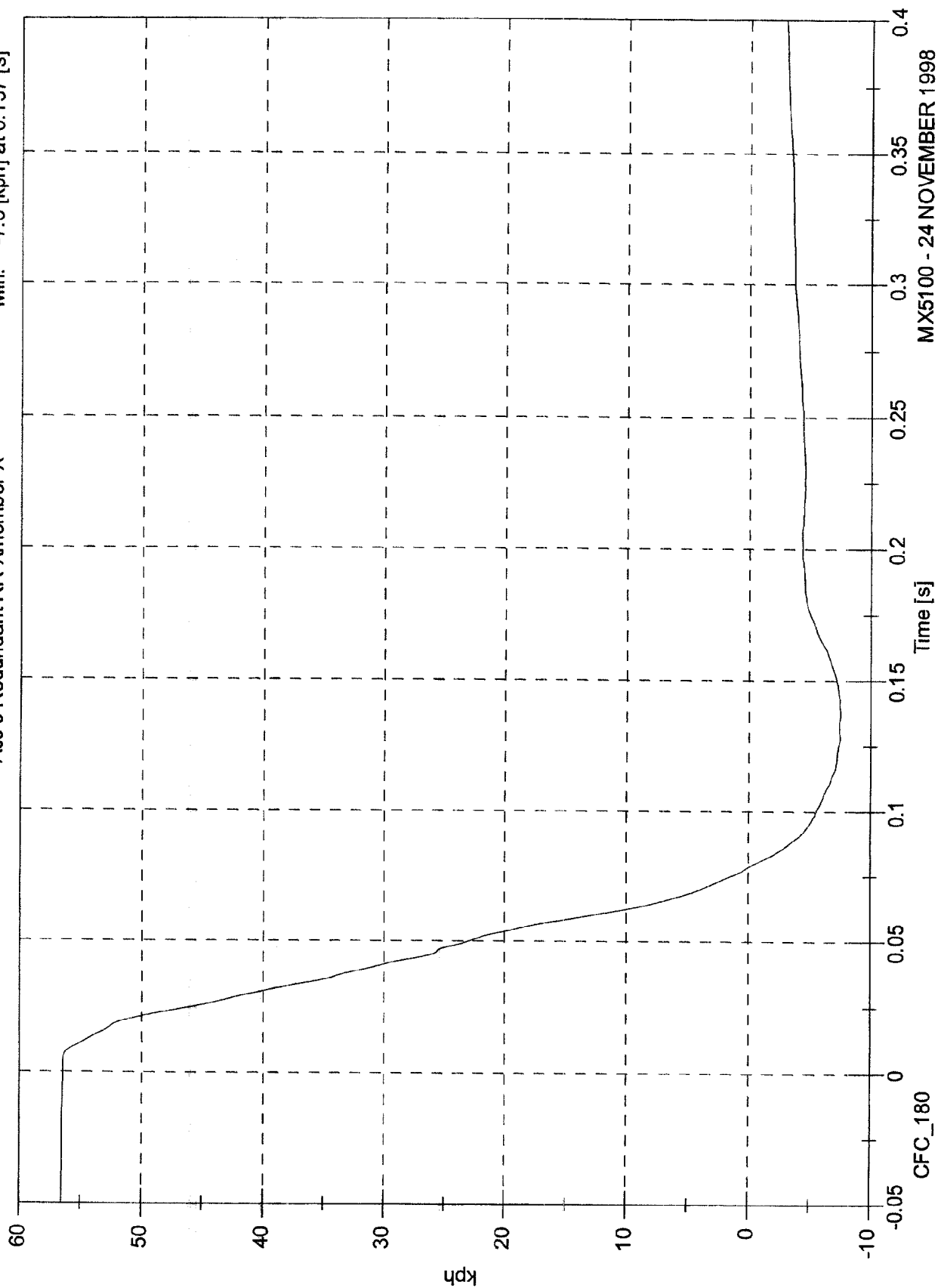
MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Acc 9 Redundant RR Xmember X

Max: 56.6 [kph] at -0.047 [s]

Min: -7.5 [kph] at 0.137 [s]

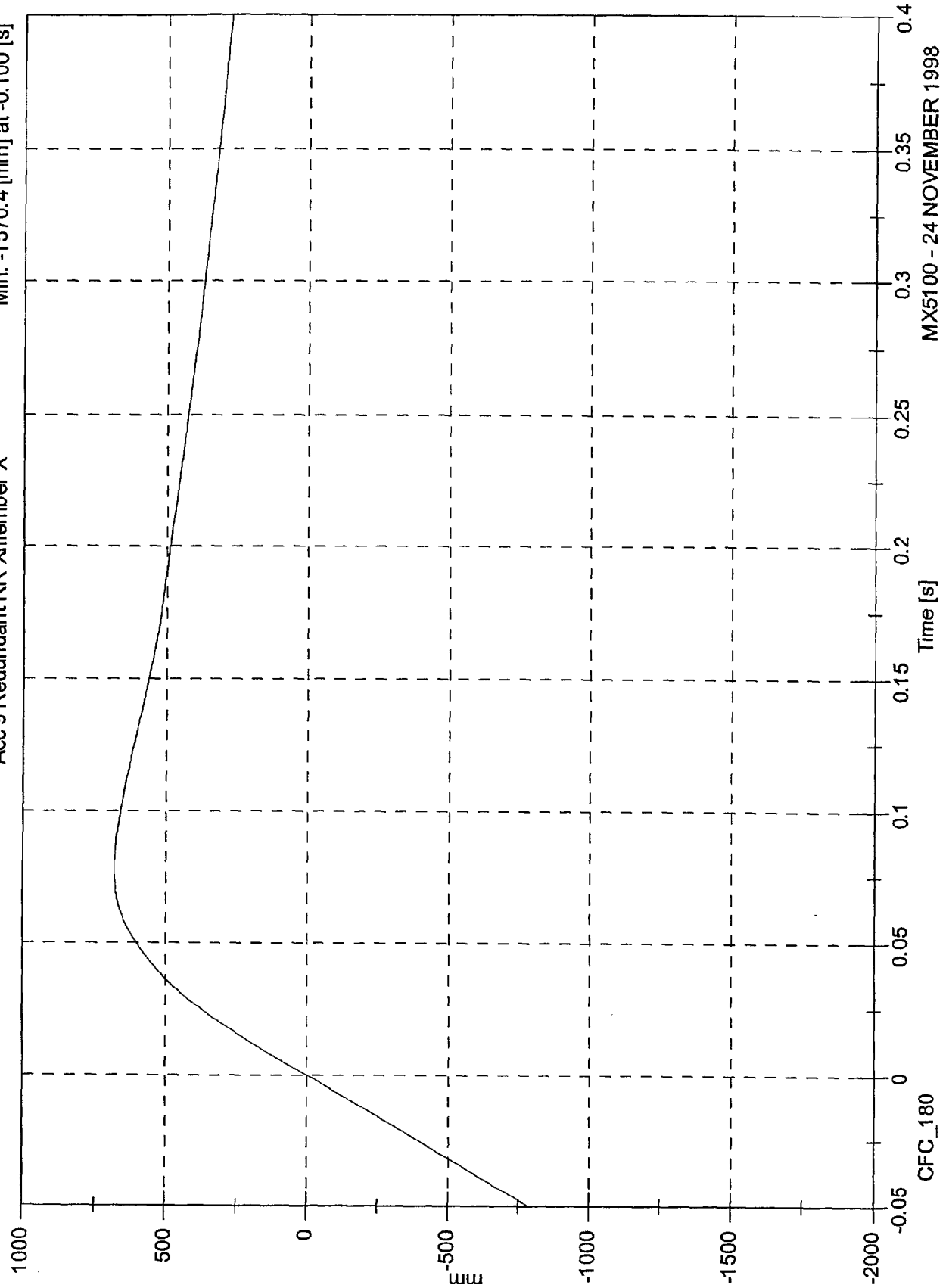


MX5100 - 24 NOVEMBER 1998

NCAP TEST #1 - 1999 TOYOTA 4-RUNNER

Max: 682.7 [mm] at 0.078 [s]
 Min: -1570.4 [mm] at -0.100 [s]

Acc 9 Redundant RR Xmember X



MX5100 - 24 NOVEMBER 1998

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:

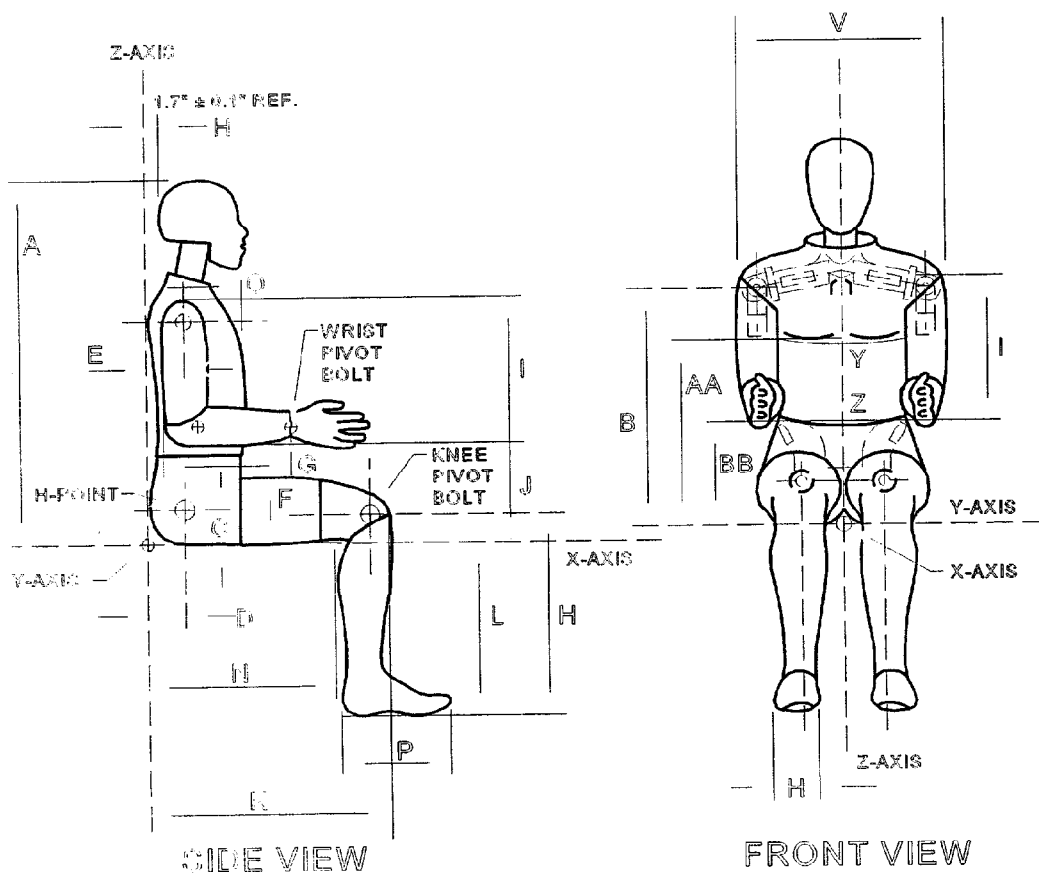
<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	245	11/21/98
#2/Right Front Passenger	150	11/21/98

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: 6672.31(A)(6))

PART 572E
HEAD DROP TEST

Dummy Serial Number 245
Calspan Sequential Test Number 3
Date 11/20/98
Workfile 245398.hdp

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70
Relative Humidity	10% - 70%	35
Peak Resultant Acceleration	225-275 G's	237.3
Peak Lateral Acceleration	15 G's Max	3.3
Is Acceleration Curve Unimodal?	YES	Yes

Remarks:

Laboratory Technician: B. Swiecicki

**PART 572E
NECK FLEXION TEST**

Dummy Serial Number 245
 Calspan Sequential Test Number 3
 Date 11/10/98
 Workfile 245398.nfl

6 Axis Neck Transducer

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	35
Impact Velocity		22.60 - 23.40 Ft/s	23.20
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	24.17
	20 ms	17.60 - 22.60 G's	19.74
	30 ms	12.50 - 18.50 G's	14.85
Max Pendulum G's Above 30 ms		29 G's Max	14.85
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	39.25
D Plane Rotation	Max	64 - 78 Deg	75.60
	Time	57 - 64 ms	62.88
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	66.54
	Time	47 - 58 ms	54.38
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	120.25
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	104.50

Remarks:

Laboratory Technician: B. Swiecicki

**PART 572E
NECK EXTENSION TEST**

Dummy Serial Number 245
 Calspan Sequential Test Number 3
 Date 11/20/98
 Workfile 245398.nex

6 Axis Neck Transducer

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	35
Impact Velocity		19.50 - 20.30 Ft/s	19.70
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	19.66
	20 ms	14.00 - 19.00 G's	16.65
	30 ms	11.00 - 16.00 G's	13.51
Max Pendulum G's Above 30 ms		22 G's Max	13.51
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	41.63
D Plane Rotation	Max	81 - 106 Deg	99.81
	Time	72 - 82 ms	75.13
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-54.24
	Time	65 - 79 ms	71.00
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	148.63
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	135.75

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 245
Calspan Sequential Test Number 3
Date 11/21/98
Workfile 245398.th3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70
Relative Humidity	10% - 70%	32
Pendulum Velocity	21.6 - 22.4 Ft/s	21.70
Maximum Deflection	2.50 - 2.86 in	2.52
Maximum Resistive Force	1160 - 1325 Lbs	1277.75
Internal Hysteresis	69 - 85 %	73.42

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 245
 Calspan Sequential Test Number 3
 Date 11/21/98
 Workfile 245398.lf

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	70
Relative Humidity	10% - 70%	32
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1195
RIGHT KNEE		
Temperature	66 - 78 Deg F	70
Relative Humidity	10% - 70%	32
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1192

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 245
Calspan Sequential Test Number 3
Date 11/21/98

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			31
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	39.0
Waist Circumference	Z	32.9 - 34.1 in	33.7
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	34.9
Thigh Clearance	F	5.5 - 6.1 in	6.0
Buttock Knee Length	K	22.8 - 23.8 in	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.3
Popliteal Height	L	16.9 - 17.9 in	17.5
Knee Pivot Height	M	19.1 - 19.7 in	19.2
Foot Length	P	9.9 - 10.5 in	10.2
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	20.2
Elbow Rest Height	J	7.5 - 8.3 in	8.0
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
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 150
Calspan Sequential Test Number 4
Date 11/20/98
Workfile 150498.hdp

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70
Relative Humidity	10% - 70%	35
Peak Resultant Acceleration	225-275 G's	242.7
Peak Lateral Acceleration	15 G's Max	14.9
Is Acceleration Curve Unimodal?	YES	Yes

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number 150
 Calspan Sequential Test Number 4
 Date 11/ 98
 Workfile 150 .nfl

6 Axis Neck Transducer

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	35
Impact Velocity		22.60 - 23.40 Ft/s	23.10
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	24.64
	20 ms	17.60 - 22.60 G's	20.82
	30 ms	12.50 - 18.50 G's	15.27
Max Pendulum G's Above 30 ms		29 G's Max	15.27
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	39.75
D Plane Rotation	Max	64 - 78 Deg	74.72
	Time	57 - 64 ms	59.13
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	69.18
	Time	47 - 58 ms	53.75
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	122.88
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	102.75

Remarks:

Laboratory Technician: B. Swiecick

PART 572E
NECK EXTENSION TEST

Dummy Serial Number 150
 Calspan Sequential Test Number 4
 Date 11/20/98
 Workfile 150498.nex

6 Axis Neck Transducer

TEST PARAMETERS		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	35
Impact Velocity		19.50 - 20.30 Ft/s	19.90
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.37
	20 ms	14.00 - 19.00 G's	16.65
	30 ms	11.00 - 16.00 G's	13.22
Max Pendulum G's Above 30 ms		22 G's Max	13.22
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	43.38
D Plane Rotation	Max	81 - 106 Deg	99.78
	Time	72 - 82 ms	76.63
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-56.90
	Time	65 - 79 ms	71.25
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	157.75
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	146.00

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 150
Calspan Sequential Test Number 4
Date 11/21/98
Workfile 150498.th3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70
Relative Humidity	10% - 70%	32
Pendulum Velocity	21.6 - 22.4 Ft/s	22.29
Maximum Deflection	2.50 - 2.86 in	2.56
Maximum Resistive Force	1160 - 1325 Lbs	1174.71
Internal Hysteresis	69 - 85 %	71.58

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 150
Calspan Sequential Test Number 4
Date 11/21/98
Workfile 150498.lf, 150498.rf

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	70
Relative Humidity	10% - 70%	32
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1265
RIGHT KNEE		
Temperature	66 - 78 Deg F	70
Relative Humidity	10% - 70%	32
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1278

Remarks:

Laboratory Technician: B. Swiecicki

**PART 572E
EXTERNAL DIMENSIONS**

Dummy Serial Number 150
 Calspan Sequential Test Number 4
 Date 11/21/98

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			31
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	34.0
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	5.7
Buttock Knee Length	K	22.8 - 23.8 in	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.5
Popliteal Height	L	16.9 - 17.9 in	17.8
Knee Pivot Height	M	19.1 - 19.7 in	19.6
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	3.7
Shoulder Breadth	V	16.6 - 17.2 in	16.9
Shoulder Pivot Height	B	19.9 - 20.5 in	20.2
Elbow Rest Height	J	7.5 - 8.3 in	8.1
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.5

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 245)	Serial #	Manufacturer	Calibration	
			Last	Next
Head				
X	C15021	ENDEVCO	9/98	3/99
Y	AL511	ENDEVCO	10/98	4/99
Z	AH5N0	ENDEVCO	10/98	4/99
Chest				
X	AB8K1	ENDEVCO	10/98	4/99
Y	AH5M8	ENDEVCO	11/98	5/99
Z	AF5C4	ENDEVCO	10/98	4/99
Right Femur Load Cell	420	GSE	9/98	3/99
Left Femur Load Cell	723	GSE	9/98	3/99
Neck Load Cell	269	DENTON	10/98	4/99
Y	269	DENTON	10/98	4/99
Z	269	DENTON	10/98	4/99
Neck Moment	269	DENTON	10/98	4/99
X	269	DENTON	10/98	4/99
Y	269	DENTON	10/98	4/99
Z	269	DENTON	10/98	4/99
Chest Deflection Gauge	245	HUMANOID	10/98	4/99
Hybrid III Use Only				
Lap Belt Load Cells	-	LEBOW	-	-
Shoulder Belt Load Cells	-	LEBOW	-	-
Spool-Out Potentiometer	-	MAGNETEK	-	-
Belt Stretch Transducer	-	CALSPAN	-	-

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY	Serial #	Manufacturer	Calibration	
			Last	Next
Head				
X (R)	A14367	ENDEVCO	11/98	5/99
Y (R)	A14501	ENDEVCO	11/98	5/99
Z (R)	A14570	ENDEVCO	11/98	5/99
Chest				
X (R)	A13506	ENDEVCO	10/98	4/99
Y (R)	A14058	ENDEVCO	10/98	4/99
Z (R)	B10481	ENDEVCO	10/98	4/99
Pelvic				
X	AF5B3	ENDEVCO	9/98	3/99
Y	AF5F7	ENDEVCO	9/98	3/99
Z	AC2R5	ENDEVCO	9/98	3/99
Left Upper Tibia	Mx	DENTON	9/98	3/99
Left Upper Tibia	My	DENTON	9/98	3/99
Left Lower Tibia	Fz	DENTON	8/98	2/99
Left Lower Tibia	Mx	DENTON	8/98	2/99
Left Lower Tibia	My	DENTON	8/98	2/99
Right Upper Tibia	Mx	DENTON	9/98	3/99
Right Upper Tibia	My	DENTON	9/98	3/99
Right Lower Tibia	Fz	DENTON	8/98	2/99
Right Lower Tibia	Mx	DENTON	8/98	2/99
Right Lower Tibia	My	DENTON	8/98	2/99

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY	Serial #	Manufacture	Calibration	
			Last	Next
Left Foot Front Z	AN943	ENDEVCO	10/98	4/99
Left Foot Rear X	APIB6	ENDEVCO	10/98	4/99
Left Foot Rear Z	J18650	ENDEVCO	10/98	4/99
Right Foot Front Z	APIB7	ENDEVCO	10/98	4/99
Right Foot Rear X	AN967	ENDEVCO	10/98	4/99
Right Foot Rear Z	J18622	ENDEVCO	10/98	4/99

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY (S/N 150)	Serial #	Manufacturer	Calibration	
			Last	Next
Head X	AF5P8	ENDEVCO	10/98	4/99
Y	C14948	ENDEVCO	10/98	4/99
Z	AH5F3	ENDEVCO	6/98	12/98
Chest X	ADL50	ENDEVCO	6/98	12/98
Y	AC2P5	ENDEVCO	6/98	12/98
Z	AL6C8	ENDEVCO	6/98	12/98
Right Femur Load Cell	551	GSE	9/98	3/99
Left Femur Load Cell	548	GSE	9/98	3/99
Neck Load Cell X	076	DENTON	8/98	2/99
Y	076	DENTON	8/98	2/99
Z	076	DENTON	8/98	2/99
Neck Moment X	076	DENTON	8/98	2/99
Y	076	DENTON	8/98	2/99
Z	076	DENTON	8/98	2/99
Chest Deflection Gauge	CPI150	HUMANOID	9/98	3/99
Hybrid III Use Only				
Lap Belt Load Cells	-	LEBOW	-	-
Shoulder Belt Load Cells	-	LEBOW	-	-
Spool-Out Potentiometer	-	MAGNETEK	-	-
Belt Stretch Transducer	-	CALSPAN	-	-

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY	Serial #	Manufacturer	Calibration	
			Last	Next
Head				
X (R)	A14150	ENDEVCO	10/98	4/99
Y (R)	B10954	ENDEVCO	10/98	4/99
Z (R)	A14126	ENDEVCO	10/98	4/99
Chest				
X (R)	A13939	ENDEVCO	6/98	12/98
Y (R)	A14181	ENDEVCO	10/98	4/99
Z (R)	A14124	ENDEVCO	10/98	4/99
Pelvic				
X	C15018	ENDEVCO	9/98	3/99
Y	C14883	ENDEVCO	9/98	3/99
Z	C14972	ENDEVCO	9/98	3/99
Left Upper Tibia				
Mx	016	DENTON	9/98	3/99
Left Upper Tibia				
My	016	DENTON	9/98	3/99
Left Lower Tibia				
Fz	123	DENTON	8/98	2/99
Left Lower Tibia				
Mx	123	DENTON	8/98	2/99
Left Lower Tibia				
My	123	DENTON	8/98	2/99
Right Upper Tibia				
Mx	015	DENTON	9/98	3/99
Right Upper Tibia				
My	015	DENTON	9/98	3/99
Right Lower Tibia				
Fz	122	DENTON	8/98	2/99
Right Lower Tibia				
Mx	122	DENTON	8/98	2/99
Right Lower Tibia				
My	122	DENTON	8/98	2/99

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY	Serial #	Manufacture	Calibration	
			Last	Next
Left Foot Front Z	AN943	ENDEVCO	10/98	4/99
Left Foot Rear X	AP1B6	ENDEVCO	10/98	4/99
Left Foot Rear Z	J18650	ENDEVCO	10/98	4/99
Right Foot Front Z	AP1B7	ENDEVCO	10/98	4/99
Right Foot Rear X	AN967	ENDEVCO	10/98	4/99
Right Foot Rear Z	J18622	ENDEVCO	10/98	4/99

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS

(6 Month Calibration Minimum)

	Serial #	Manufacturer	Calibration	
			Last	Next
Left Seat Rear Crossmember	D69	ICS	8/98	2/99
Right Rear Seat Crossmember	D61	ICS	8/98	2/99
Top of Engine	D63	ICS	8/98	2/99
Bottom of Engine	J18646	ENDEVCO	8/98	2/99
Left Disc Brake Caliper	A156	CEC	11/98	5/99
Right Disc Brake Caliper	A175	CEC	11/98	5/99
Instrument Panel	D53	ICS	8/98	2/99
Left Seat Rear Crossmember (R)	D59	ICS	8/98	2/99
Right Seat Rear Crossmember (R)	D71	ICS	8/98	2/99