

V3237

REPORT NUMBER: 301-CAL-99-10

**SAFETY COMPLIANCE TESTING FOR FMVSS 301
FUEL SYSTEM INTEGRITY**

CAMI Automotive Inc.
1999 Chevrolet Tracker
4-door MPV

NHTSA NUMBER: CX0111

VERIDIAN TEST NUMBER: 8480-10

VERIDIAN ENGINEERING
P.O. BOX 400
BUFFALO, NEW YORK 14225



June 15, 1999

FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
ENFORCEMENT
Office of Vehicle Safety Compliance
400 Seventh Street, S. W.
Room No. 6115 (NEF-30)
Washington, DC 20590

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By:

Patrick G. MacDiarmid, Jr.
Patrick G. MacDiarmid, Jr., Project Engineer

Approved By:

David L. Travale
David L. Travale, Program Manager
Transportation Sciences Center

Approval Date:

August 4, 1997

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____

Acceptance Date: _____

RECEIVED
FBI
JUL 17 1997

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 301-CAL-99-10		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of FMVSS 301 Compliance Testing of a 1999 Chevrolet Tracker 4-door MPV NHTSA No. CX0111				5. Report Date June 15, 1999	
				6. Performing Organization Code CAL	
7. Author(s) Patrick G. MacDiarmid, Jr., Project Engineer David J. Travale, Program Manager				8. Performing Organization Report No. 8480-10	
9. Performing Organization Name and Address Veridian Engineering 4455 Genesee Street Buffalo, New York 14225				10. Work Unit No.	
				11. Contract or Grant No. DTNH22-95-D-11000	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance (NEF-30) 400 Seventh St , S.W., Rm. 6115, Washington, D.C. 20590				13. Type of Report and Period Covered Final Test Report June 1999- July 1999	
				14. Sponsoring Agency Code NEF-30	
15. Supplementary Notes					
16. Abstract Compliance tests were conducted on the subject 1999 Chevrolet Tracker 4-door MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301-01 for the determination of FMVSS 301 compliance. Test failures identified were as follows: The test vehicle appeared to comply with all requirements of FMVSS 301 "Fuel System Integrity."					
17. Key Words Compliance Testing Safety Engineering FMVSS 301			18. Distribution Statement		
			Copies of this report are available from: NHTSA Technical Reference Division Room 5108 (NAD-52), 400 Seventh , S.W., Washington, D.C. 20590 Telephone No. (202) 366-4946		
19. Security Classif. (of this report) UNCLASSIFIED		20. Security Classif. (of this page) UNCLASSIFIED		21. No. of Pages	
				22. Price	

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	PURPOSE OF COMPLIANCE TEST	1-1
2	SUMMARY OF COMPLIANCE TEST RESULTS	2-1
3	COMPLIANCE TEST DATA	3-1
4	NONCOMPLIANCE DATA	4-1
APPENDIX A	PHOTOGRAPHS	A-1
APPENDIX B	VEHICLE AND DUMMY RESPONSE DATA (REAR IMPACT ONLY)	B-1

LIST OF FIGURES

<u>Figure No.</u>		<u>Page No.</u>
1	PART 572 DUMMY IN-VEHICLE POSITION	3-2
2	CAMERA POSITION FOR REAR IMPACT	3-9

LIST OF TABLES

<u>Table No.</u>		<u>Page No.</u>
1	CRASH TEST SUMMARY	2-2
2	GENERAL TEST AND VEHICLE PARAMETER DATA	2-3
3	MOVING BARRIER PARAMETER DATA	2-6
4	POST-IMPACT DATA	2-7
5	FRONT SEAT OCCUPANT MEASUREMENTS	3-3
6	FMVSS NO. 301 - "FUEL SYSTEM INTEGRITY" POST-IMPACT TEST DATA	3-4
7	FMVSS NO. 301 - STATIC ROLLOVER DATA SHEET	3-5
8	HIGH-SPEED CAMERA LOCATIONS	3-10

Section 1

PURPOSE OF COMPLIANCE TEST

This 30 mph rear moving barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 301 Compliance Test Program conducted for the National Highway Traffic Safety Administration (NHTSA) by Veridian Engineering under Contract No. DTNH22-95-D-11000. The purpose of this test was to determine if the subject vehicle, a 1999 Chevrolet Tracker 4-door MPV, meets the performance requirements of FMVSS No. 301, "Fuel System Integrity." This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-301-01, dated March 28, 1994.

Section 2

COMPLIANCE TEST RESULTS SUMMARY

A 3300 pound 1999 Chevrolet Tracker 4-door MPV was impacted from the rear by a 3961 pound moving barrier at a velocity of 29.8 mph. The test was performed by Veridian Engineering on June 15, 1999.

One instrumented Part 572 E and non-instrumented Part 572 B, 50th percentile male Anthropomorphic Test Device (ATD) were placed in the driver and right-front passenger seating positions respectively. Additional ballast (100 pounds) was secured in the vehicle.

Average longitudinal crush was 10.0 inches when measured between the front and rear bumpers. Pre- and post-test photographs of the vehicle can be found in appendix A.

The 14.7 gallon fuel tank was filled to 92 percent capacity with orange Stoddard fluid prior to the impact. After the impact, there was no fluid leakage for the first 30 minutes nor during any phase of the rollover test. The vehicle appeared to comply with all the requirements of FMVSS No. 301 "Fuel System Integrity." Section 3 presents the results of these tests.

The crash event was recorded by one real-time and eight high-speed cameras. Camera locations and other pertinent camera information are found on pages 3-9 and 3-10 of this report.

Table 1

CRASH TEST SUMMARY

Vehicle NHTSA No.: CX0111 Test Mode: 30 mph Rear Barrier
 Test Date: June 15, 1999 Time: 12:30 Temperature: 60 °F
 Vehicle Make/Model/Body Style: 1999 Chevrolet Tracker 4-door MPV
 Vehicle Test Weight: 3300 lbs Impact Velocity: 29.8 mph
 Static Crush: Left Side = 8.6 inches
 Right Side = 10.0 inches
 Centerline = 11.5 inches
 Average Crush: 10.0 inches

TYPE OF FRONT OCCUPANT RESTRAINT SYSTEM INSTALLED IN TEST VEHICLE:

Driver's DSP: Air Bag with 3 point belt system
 Right Passenger's DSP: Air Bag with 3 point belt system

VISIBLE DUMMY CONTACT POINTS:

Driver: Rear of head with headrest.

 Passenger: Rear of head with headrest

DOOR OPENING DATA:

closed-operable - Left Front
closed-operable - Right Front

Stoddard Solvent Spillage from Vehicle's Fuel System: None

Remarks: Rear doors would not open by hand. Front seat backs fully reclined, approximate angle change of 32
degrees. Rear hatch glass shattered on impact. Air bags did not deploy.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATATEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1999 Chevrolet Tracker 4-door MPV

NHTSA No.: CX0111; VIN: 2CNBE13C8X6903631; Color: red

Engine Data: 4 cylinders; CID; 2.0 Liters; cc

Placement: X Longitudinal or In-Line; Transverse or Lateral

Transmission Data: 4 speeds; Manual; X Automatic; Overdrive

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

Major Options: X A/C; X Pwr.Strg.; X Pwr. Brakes

 Pwr. Windows; Pwr. Door Locks; Tilt Wheel

Date Received: 3/2/99; Odometer Reading 126 miles

Selling Dealer:

& Address:

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: CAMI Automotive Inc.

Date of Manufacture: 11/98

GVWR: 3814 lbs.; GAWR: 1764 lbs. FRONT; 2205 lbs. REAR

DATA FROM TIRE PLACARD:

Location of Placard on Vehicle: Left side "B" pillar

Tire Pressure with Maximum Capacity Vehicle Load: 26 psi FRONT 26 psi REAR

Recommended Tire Size: P195/75R15

* Recommended Cold Tire Pressure: 26 psi FRONT; 26 psi REAR

Size of Tires on Test Vehicle: P195/75R15

Type of Spare Tire: Full size

Vehicle Capacity Data:

Type of Front Seats:	<u> </u> Bench;	<u>X</u> Bucket;	<u> </u> Split Bench
Number of Occupants:	<u>2</u> Front;	<u>3</u> Rear;	<u>5</u> Total
Vehicle Capacity Weight (VCW) =	<u>915</u>	lbs.	
No. of Occupants x 150 lbs. =	<u>750</u>	lbs.	
Rated Cargo/Luggage Weight (RCLW) =	<u>165</u>		

*Tire pressure used for test

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

Right Front	=	<u>751</u>	lbs.	Right Rear	=	<u>666</u>	lbs.
Left Front	=	<u>704</u>	lbs.	Left Rear	=	<u>699</u>	lbs.
TOTAL FRONT	=	<u>1,455</u>	lbs.	TOTAL REAR	=	<u>1,365</u>	lbs.
TOTAL DELIVERED WEIGHT	=	<u>2,820</u>	lbs.				
% of Total Front of Vehicle Weight	=	<u>52</u>	%	% of Total Rear Weight	=	<u>48</u>	%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight	=	<u>2,820</u>	lbs.
Rated Cargo/Luggage Weight (RCLW)	=	<u>165</u>	lbs.
Weight of 2 p.572 Dummies, 167 & 164 lbs	=	<u>331</u>	lbs.
TARGET TEST WEIGHT	=	<u>3,316</u>	lbs.

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 150 POUNDS OF CARGO WEIGHT:

Right Front	=	<u>868</u>	lbs.	Right Rear	=	<u>775</u>	lbs.
Left Front	=	<u>863</u>	lbs.	Left Rear	=	<u>795</u>	lbs.
TOTAL FRONT	=	<u>1,731</u>	lbs.	TOTAL REAR	=	<u>1,570</u>	lbs.
TOTAL TEST WEIGHT	=	<u>3,301.0</u>	lbs.				
% of Total Front Weight	=	<u>52.4</u>	%	% of Total Rear Weight	=	<u>47.6</u>	%

* Weight of Ballast Secured in Vehicle Trunk Area = 100 lbs.

Type of Ballast: lead shot

Method of Securing Ballast: location in vehicle and duct tape

Vehicle Components Removed for Weight Reduction: none

VEHICLE ATTITUDE (all dimension in inches):

AS DELIVERED:	RF	<u>31.0</u>	LF	<u>31.0</u>	RR	<u>31.2</u>	LR	<u>31.1</u>
AS TESTED:	RF	<u>30.0</u>	LF	<u>30.0</u>	RR	<u>30.6</u>	LR	<u>30.4</u>
Vehicle's Wheel Base:		<u>97.7</u>	in.					
Location of Vehicle's C.G.:		<u>46.5</u>	inches rearward of front wheel center.					

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual	=	<u>14.7</u>	gallons
Usable Capacity Figure Furnished by COTR	=	<u>14.7</u>	gallons
Test Volume Range (91 to 94% of Usable Capacity)	=	<u>13.4</u>	to <u>13.8</u> gallons
ACTUAL TEST VOLUME	=	<u>13.4</u>	gallons (with entire fuel system filled)

* Ballast weight includes the RCLW, the weight of drained vehicle fluids and the weight of any removed vehicle components less the weight of onboard instrumentation, cameras, and hardware.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)FUEL SYSTEM DATA (continued):

Test Fluid Type:	Stoddard Solution
Test Fluid Specific Gravity:	0.764
Test Fluid Kinematic Viscosity:	0.96 centistokes
Test Fluid Color:	Orange ("red" is preferred)
Type of Vehicle Fuel Pump:	Electric
Electric Fuel Pump Operation with Ignition Switch ON and Engine OFF - Fuel pump operated.	
Details of Fuel System:	Fuel filler in right rear quarter panel. Fuel lines run along right inside frame rail.
Fuel tank located behind rear axle, is covered by a shield and centered laterally.	

Table 3

MOVING BARRIER PARAMETER DATAWEIGHT OF MOVING BARRIER:

Right Front	=	<u>1113</u>	lbs.	Right Rear	=	<u>868</u>	lbs.
Left Front	=	<u>1102</u>	lbs.	Left Rear	=	<u>878</u>	lbs.
TOTAL FRONT	=	<u>2,215</u>	lbs.	TOTAL REAR	=	<u>1,746</u>	lbs.
TOTAL BARRIER WEIGHT	=	<u>3,961</u>	lbs.				

MOVING BARRIER DIMENSIONS:

Barrier Face Height:	<u>60.0</u>	in.
Barrier Face Width:	<u>78.0</u>	in.
Barrier Face		
Ground Clearance:	<u>5.0</u>	in.
Tread Width:	<u>59.5</u>	in.
Wheel Base:	<u>120.0</u>	in.
Location of C.G.:	X: <u>52.9</u> inches rearward of front wheel center.	
	Y: <u>0.0</u> inches from longitudinal-vertical plane of symmetry.	
	Z: <u>16.3</u> inches above ground.	

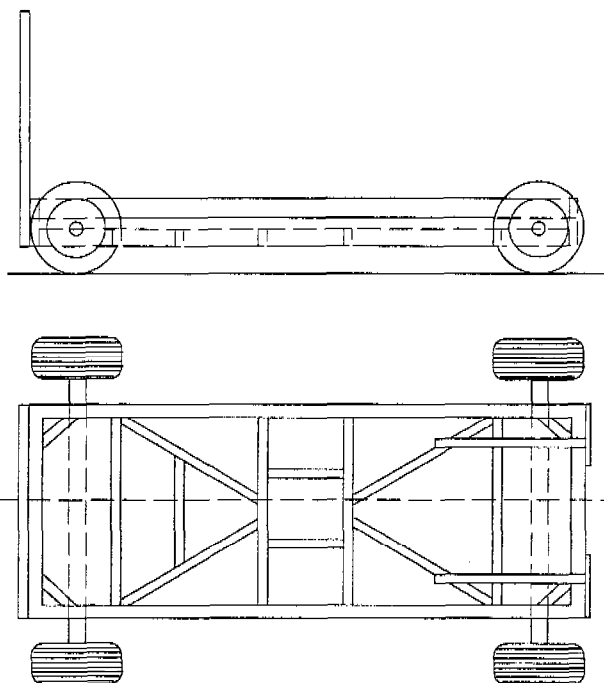


Table 4

POST IMPACT DATATYPE OF TEST:

Type of Test: Rear Barrier Impact Angle: 0°
 Test Date: June 15, 1999 Time: 12:30 Temperature: 60 °F
 Vehicle NHTSA No.: CX0111
 Required Impact Velocity Range: 28.9 to 29.9 mph

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

Trap No. 1 = 29.8 mph; Trap No. 2 = 29.8 mph
 Average Impact Speed = 0.0 mph

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

Vehicle Length:

Pre-Test	Right =	<u>157.4</u>	; C/L =	<u>159.8</u>	; Left =	<u>157.4</u>
Post-Test	Right =	<u>147.4</u>	; C/L =	<u>148.3</u>	; Left =	<u>148.8</u>
Crush	Right =	<u>10.0</u>	; C/L =	<u>11.5</u>	; Left =	<u>8.6</u>
AVERAGE	=	<u>10.0</u>	inches			

Section 3

COMPLIANCE TEST DATA

Figure 1

PART 572 DUMMY IN-VEHICLE POSITION
(FOR REAR IMPACTS ONLY)

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS

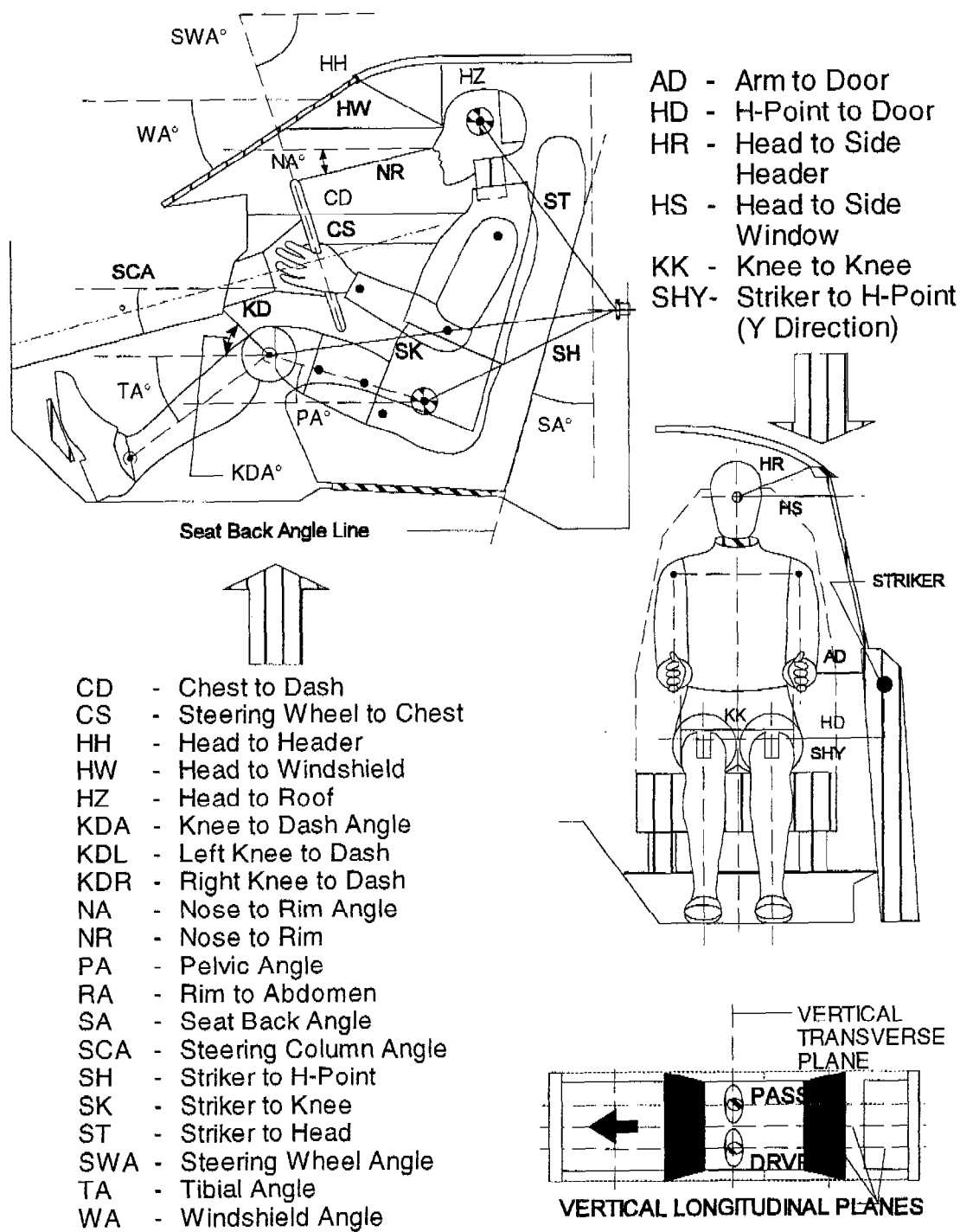


Table 5

FRONT SEAT OCCUPANT MEASUREMENTS
(FOR REAR IMPACT ONLY)

	DRIVER (Serial #152)		
WA°	37 deg.		
SWA°	26 deg.		
SCA°	64 deg.		
SA°	22 deg.		
HZ	9.4		
HH	17.4		
HW	23.5		
HR	8.9		
NR	16.7	Angle	15 deg.
CD	22.8		
CS	13.6		
RA	7.8		
KDL	4.9	Angle (KDA)	28 deg.
KDR	4.5		
PA°	21 deg.		
TA°	47 deg.		
KK	10.8		
ST	22.4	Angle	18 deg.
SK	22.7	Angle	90 deg.
SH	7.1	Angle	124 deg.
SHY	8.2		
HS	11.7		
HD	14.1		
AD	3.0		

Table 6
FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: CX0111 TEST DATE: June 15, 1999

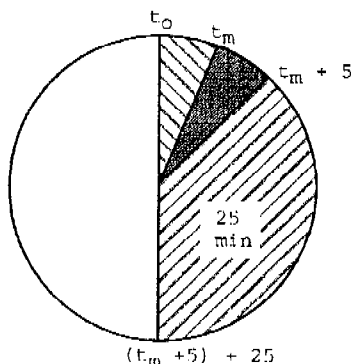
Vehicle Mfgr./Make/Model: 1999 Chevrolet Tracker 4-door MPV

Test vehicle fuel tank filled to 91 % to 94% of manufacturer's "usable" capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

TEST VEHICLE IMPACT TYPE:

- Frontal (30 mph)
- Oblique (30 mph) with - ° barrier face first
 contacting -
 (driver/passenger) side
- X Rear Moving Barrier (30 mph)
- Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT:



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

ACTUAL	MAX ALLOWED
0	1 oz.
0	5 oz.
0	1 oz./1 min.

SOLVENT SPILLAGE DETAILS:

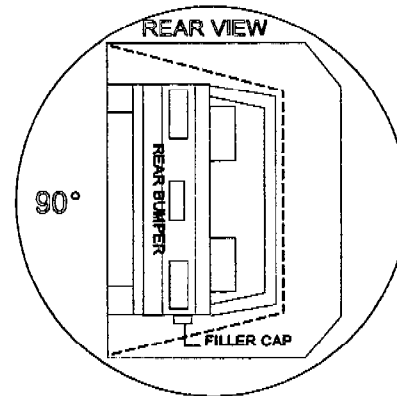
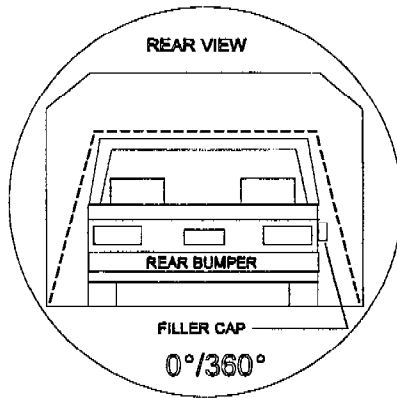
None

Table 7

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE :
0-90 Deg.

Vehicle NHTSA ID No. :
CX0111

I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 1 minutes 10 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 00 seconds
TOTAL 6 minutes 10 seconds

Next whole minute interval 7 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	n/a
---	---	---	-----

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

IV. SOLVENT SPILLAGE LOCATION(S):

None

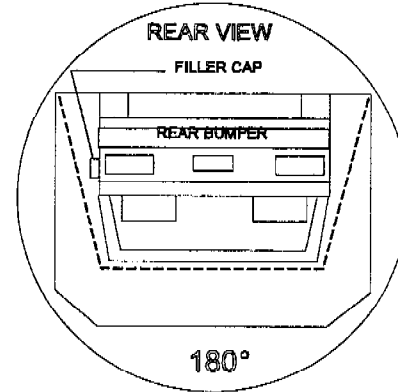
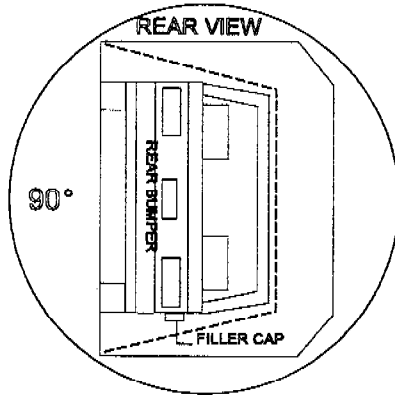
Table 7

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

90-180 Deg.

Vehicle NHTSA ID No.:

CX0111

I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

1 minutes 03 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

TOTAL

6 minutes 3 seconds

Next whole minute interval

7 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	n/a
---	---	---	-----

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

IV. SOLVENT SPILLAGE LOCATION(S):

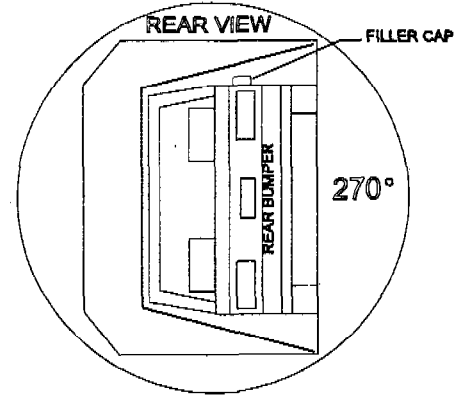
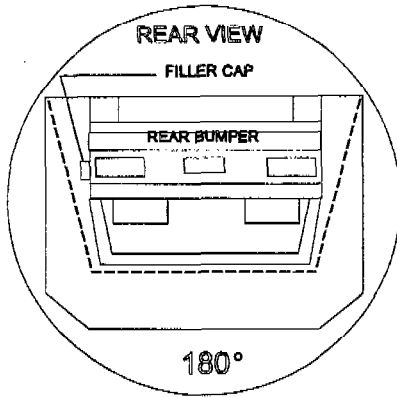
None

Table 7

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

TEST PHASE :
180-270 Deg.

Vehicle NHTSA ID No. :
CX0111

I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 1 minutes 05 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 00 seconds

TOTAL 6 minutes 5 seconds

Next whole minute interval 7 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	n/a
---	---	---	-----

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

IV. SOLVENT SPILLAGE LOCATION(S):

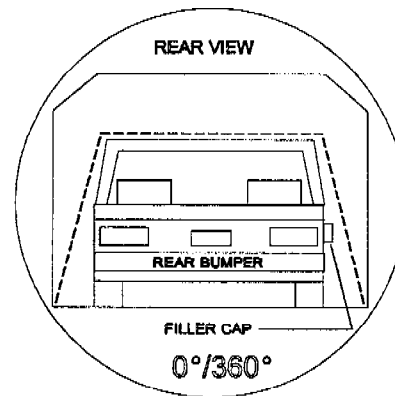
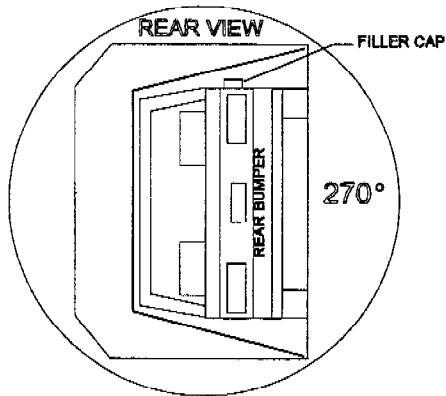
None

Table 7

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

TEST PHASE :
270-360 Deg.

Vehicle NHTSA ID No. :
CX0111



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

1 minutes 06 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

TOTAL

6 minutes 6 seconds

Next whole minute interval

7 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	n/a
---	---	---	-----

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

IV. SOLVENT SPILLAGE LOCATION(S):

None

Figure 2

CAMERA POSITIONS FOR REAR IMPACTS

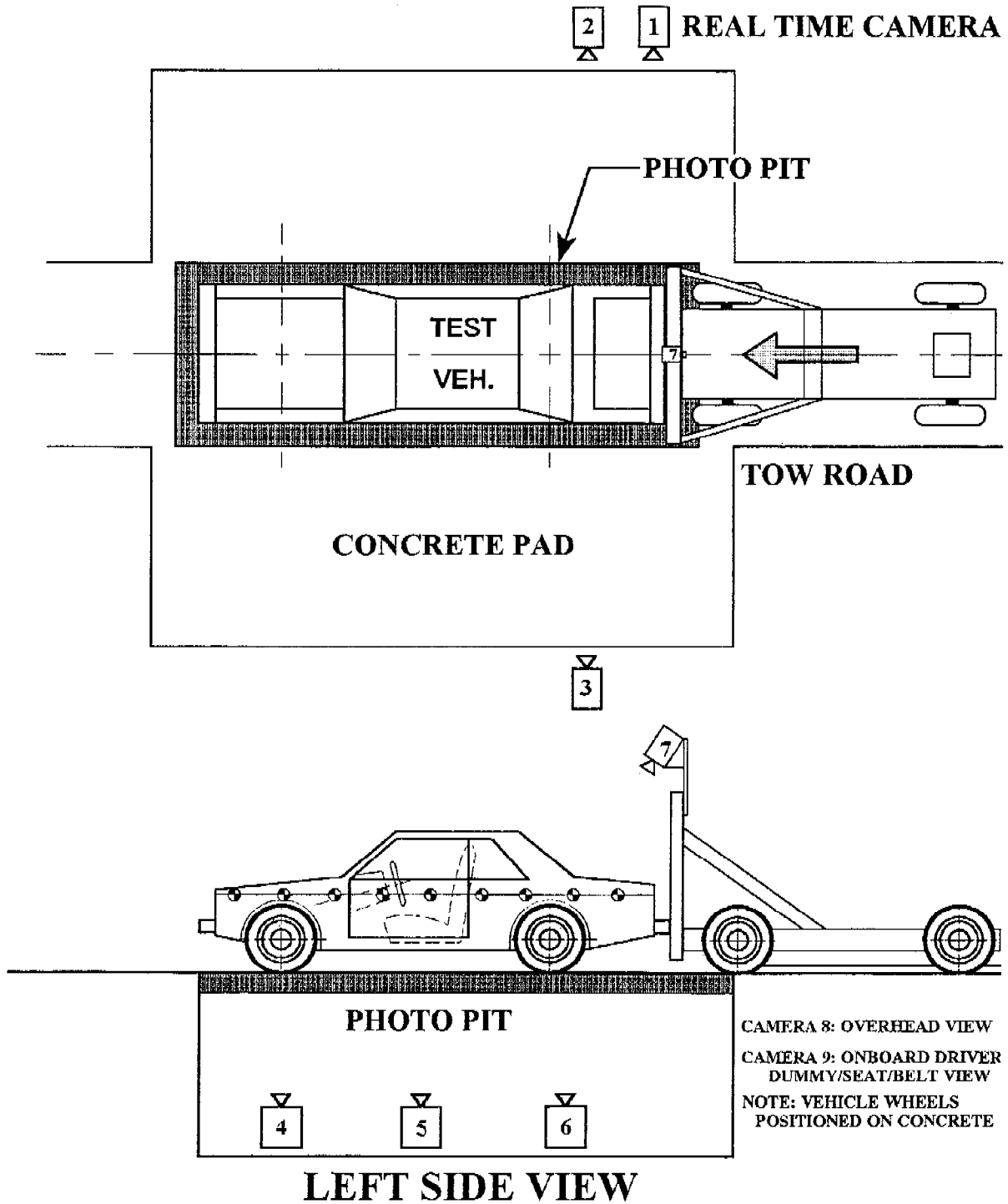


Table 8

HIGH-SPEED CAMERA LOCATIONSNHTSA No. : CX0111 Vehicle : 1999 Chevrolet Tracker 4-door MPV

CAMERA NO.	VIEW	CAMERA POSITIONS (inches)*			ANGLE** (degrees)	LENS (mm)	SPEED (fps)
		X	Y	Z			
1	Real-Time Camera	-	-	-	-	-	24
2	Right Side View	-488	55	43	0	25	810
3	Left Side View	491	78	47	-1	25	760
4	Vehicle Front Underbody View	0	128	-77	90	13	610
5	Vehicle Mid-Section Underbody View	0	79	-77	90	13	610
6	Vehicle Rear Underbody View	0	31	-77	90	13	610
7	Moving Barrier View	0	0	99	-105	13	750
8	Overhead Overall View	-20	0	386	-90	13	755
9	Onboard Driver Dummy/Seat/Belt View	-	-	-	-	13	440

* X = film plane to monorail centerline (+ to left of rail)

Y = film plane to impact location (+ ahead of impact location)

Z = film plane to ground (+ above ground)

** = referenced to horizontal plane

Section 4

NONCOMPLIANCE DATA

Table 9

TEST VEHICLE NONCOMPLIANCE NOTICE

NHTSA Contract Lab: Veridian Engineering

Lab Project Manager & Telephone No.: David J. Travale (716) 632 - 7500

Date of Test: June 15, 1999 Vehicle NHTSA No.: CX0111

Vehicle Manufacturer: CAMI Automotive Inc.

Model Year: 1999 VIN: 2CNBE13C8X6903631

Model: Tracker Body Style: 4-door MPV Build Date: 11/98

Dummy Stabilized Temperature at Time of Test: 70 °F (Spec. = 69 - 72 °F)

Impact Velocity: 29.8 mph; Time of Test: 12:30

Type of Automatic Restraint System:

Driver: Air Bag with 3 point belt system

Passenger: Air Bag with 3 point belt system

Failure Details:NoneRequirements:

Approximate date that final test report will be made available to CTM:

Date Mfg. Rep. Notified: _____ Rep. Name: _____

Remarks: _____

Date of Proposed Joint Inspection of Test Vehicle: _____

NHTSA CMT: _____ CIR No.: _____ Date: _____

Table 10

LABORATORY NOTICE OF TEST FAILURE TO OVSC

FMVSS NO.: 301; Test Date: June 15, 1999

Laboratory: Veridian Engineering

Contract No.: DTNH22-95-D-11000; Delv. Order No.: _____

Laboratory Project Engineer's Name: _____

Test Vehicle Year/Make/Model/Body Style:

1999 Chevrolet Tracker 4-door MPV

Vehicle NHTSA No.: CX0111; VIN: 2CNBE13C8X6903631

Manufacturer: CAMI Automotive Inc.

Test Failure Description: None

FMVSS Requirement, Paragraph(s) _____:

Notification to NHTSA (COTR): _____

Date: _____; By: _____

Remarks:

Table 11

ANTI-SIPHONING DEVICE FOR ALCOHOL FUEL VEHICLES

Vehicle Model Year/Make/Model/Body: 1999 Chevrolet Tracker 4-door MPV

Vehicle NHTSA No.: CX0111 VIN: 2CNBE13C8X6903631

Vehicle Build Date: 11/98 Test Date: June 15, 1999

Test Laboratory: Veridian Engineering

Observers: _____

1. Provide a description of the anti-siphoning device if possible.

Not Applicable

2. Did the test hose pass through the anti-siphoning device opening?

Yes - _____ No - _____

3. The test hose length outside of the fuel filler neck at maximum insertion:

Length = _____ cm

4. The maximum inserted test hose length is (120.00 cm - measurement from item 3):

Length = _____ cm

5. Was there evidence that the test hose contacted the surface of the Stoddard fluid in the fuel tank of the test vehicle?

Yes - _____ (Fail) No - _____ (Pass)

6. Measure the length of the portion of the hose that was submerged in the Stoddard solvent:

Length = _____ cm

Appendix A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

<u>Figure</u>	<u>Photograph Title</u>	<u>Page No.</u>
A-1	PRE-TEST FRONT VIEW	A-3
A-2	POST-TEST FRONT VIEW	A-4
A-3	PRE-TEST LEFT SIDE VIEW	A-5
A-4	POST-TEST LEFT SIDE VIEW	A-6
A-5	PRE-TEST RIGHT SIDE VIEW	A-7
A-6	POST-TEST RIGHT SIDE VIEW	A-8
A-7	PRE-TEST REAR VIEW	A-9
A-8	POST-TEST REAR VIEW	A-10
A-9	PRE-TEST LEFT FRONT THREE-QUARTER VIEW	A-11
A-10	POST-TEST LEFT FRONT THREE-QUARTER VIEW	A-12
A-11	PRE-TEST RIGHT REAR THREE-QUARTER VIEW	A-13
A-12	POST-TEST RIGHT REAR THREE-QUARTER VIEW	A-14
A-13	PRE-TEST FRONT UNDERBODY VIEW	A-15
A-14	POST-TEST FRONT UNDERBODY VIEW	A-16
A-15	PRE-TEST REAR UNDERBODY VIEW	A-17
A-16	POST-TEST REAR UNDERBODY VIEW	A-18
A-17	CERTIFICATION PLACARD	A-19
A-18	TIRE PLACARD	A-20
A-19	ROLLOVER 90°	A-21
A-20	ROLLOVER 180°	A-22
A-21	ROLLOVER 270°	A-23
A-22	ROLLOVER 360°	A-24



Figure A-1 PRE-TEST FRONT VIEW



Figure A-2 POST-TEST FRONT VIEW

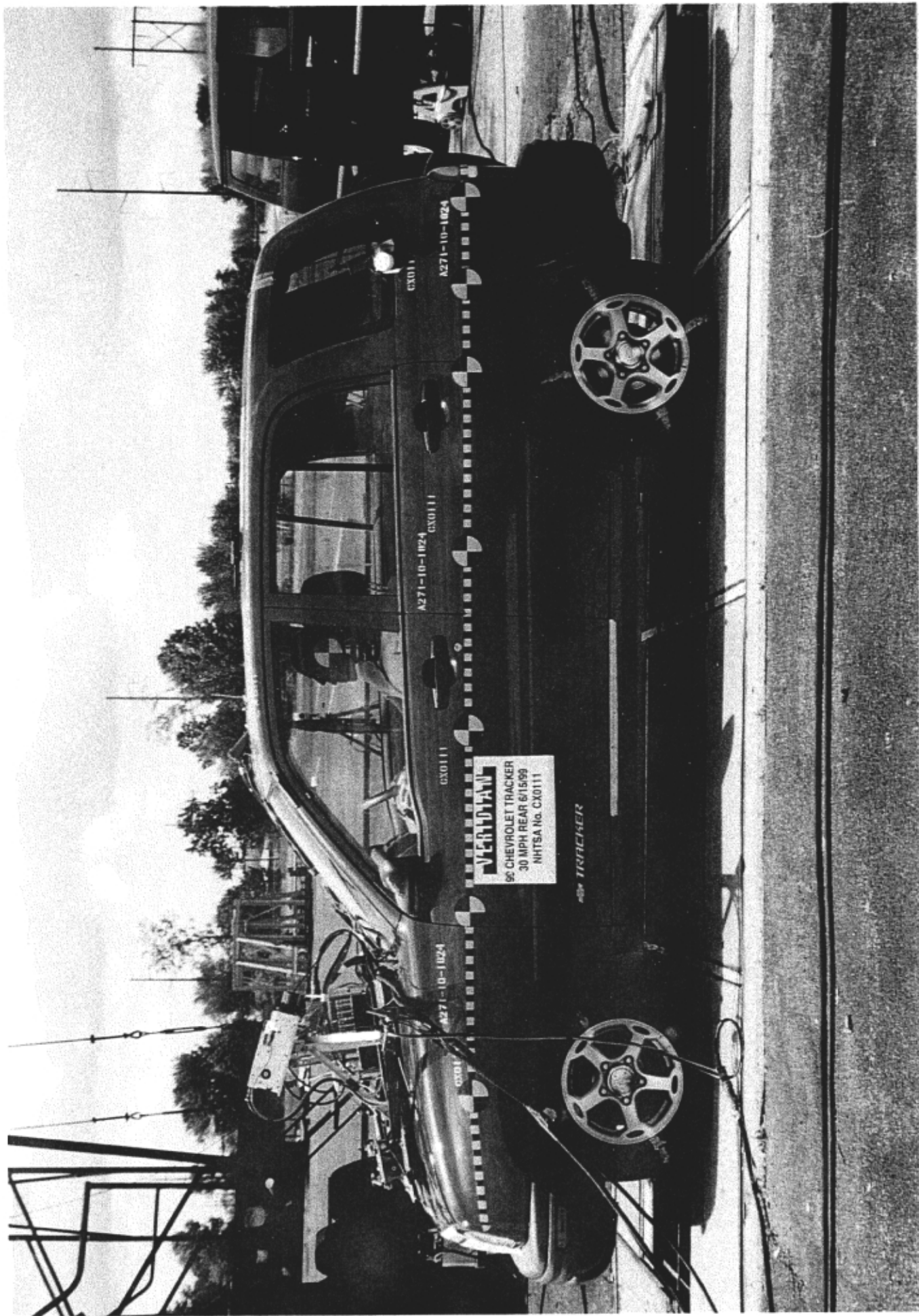


Figure A-3 PRE-TEST LEFT SIDE VIEW



Figure A-4 POST-TEST LEFT SIDE VIEW

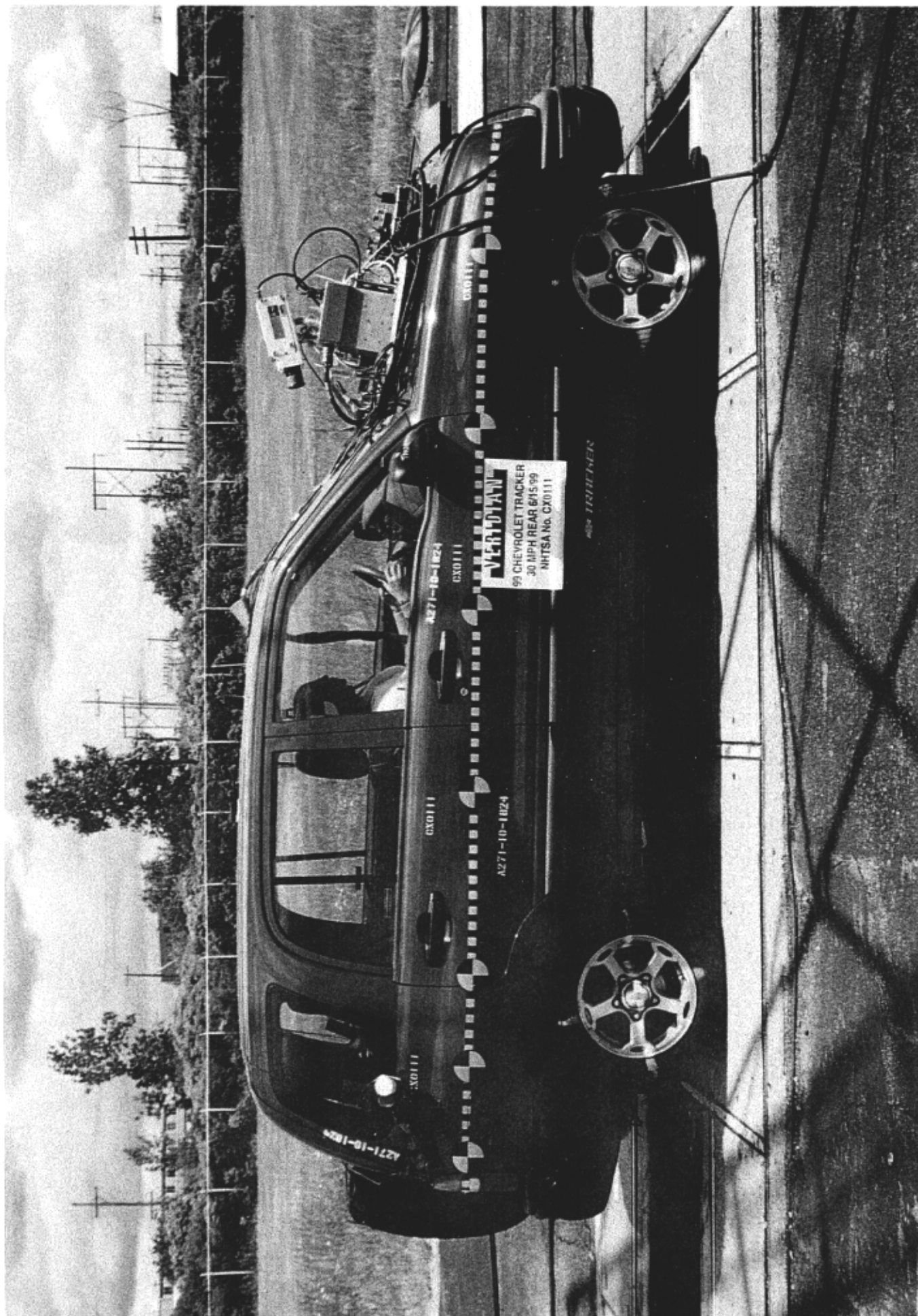


Figure A-5 PRE-TEST RIGHT SIDE VIEW

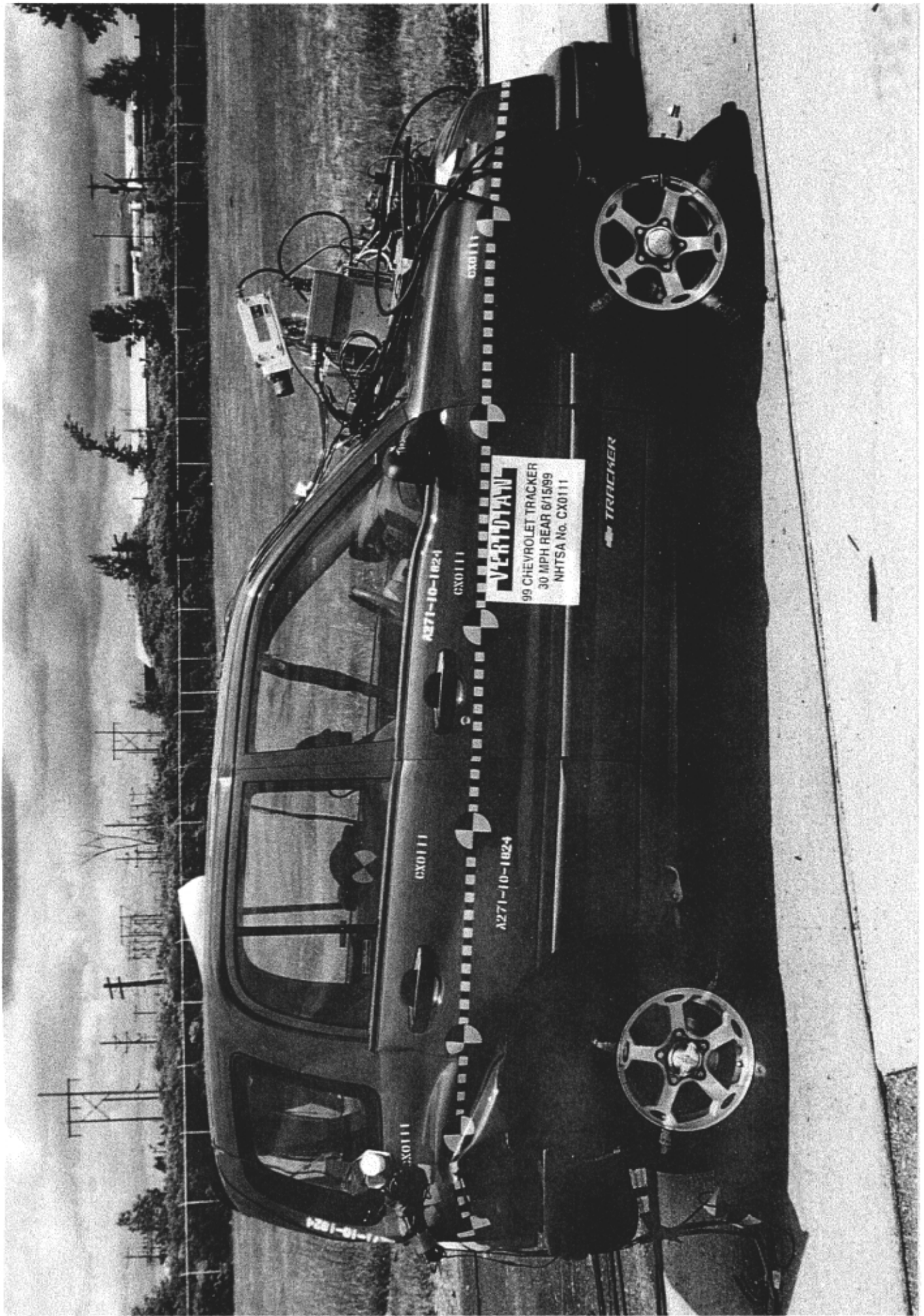


Figure A-6 POST-TEST RIGHT SIDE VIEW



Figure A-7 PRE-TEST REAR VIEW

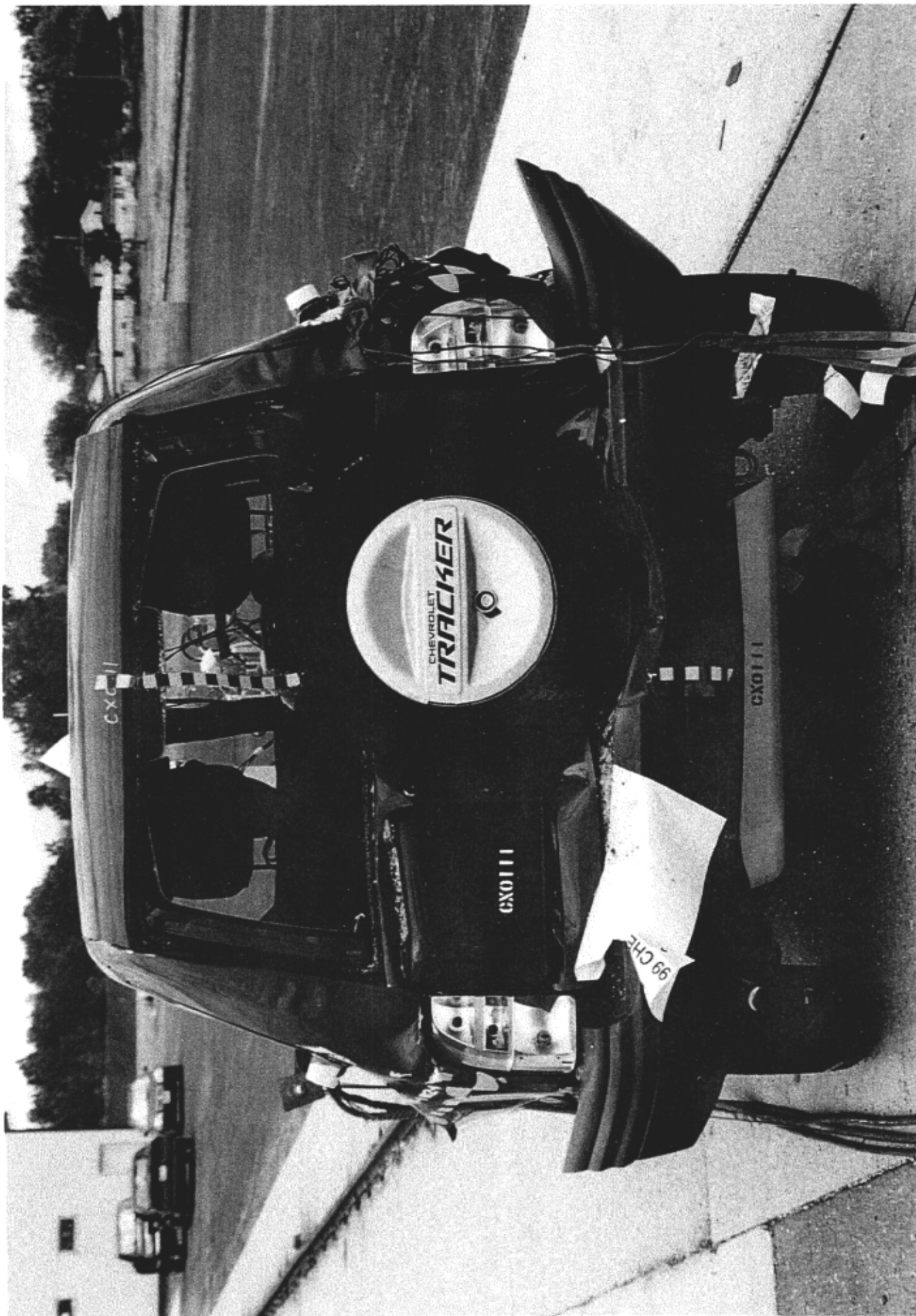


Figure A-8 POST-TEST REAR VIEW

PHOTOGRAPH NOT AVAILABLE

PHOTOGRAPH NOT AVAILABLE

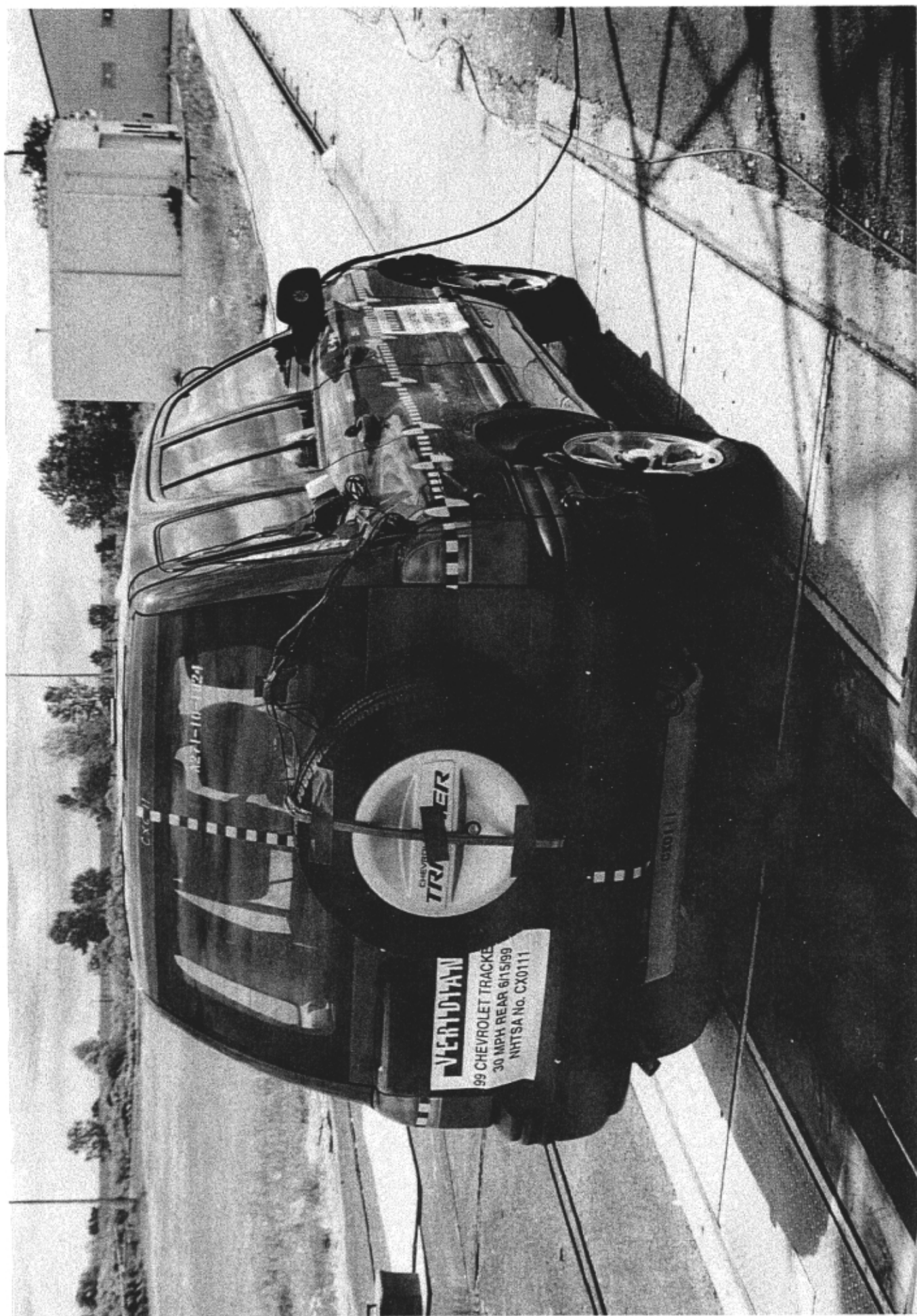


Figure A-11 PRE-TEST RIGHT REAR THREE-QUARTER VIEW



Figure A-12 POST-TEST RIGHT REAR THREE-QUARTER VIEW

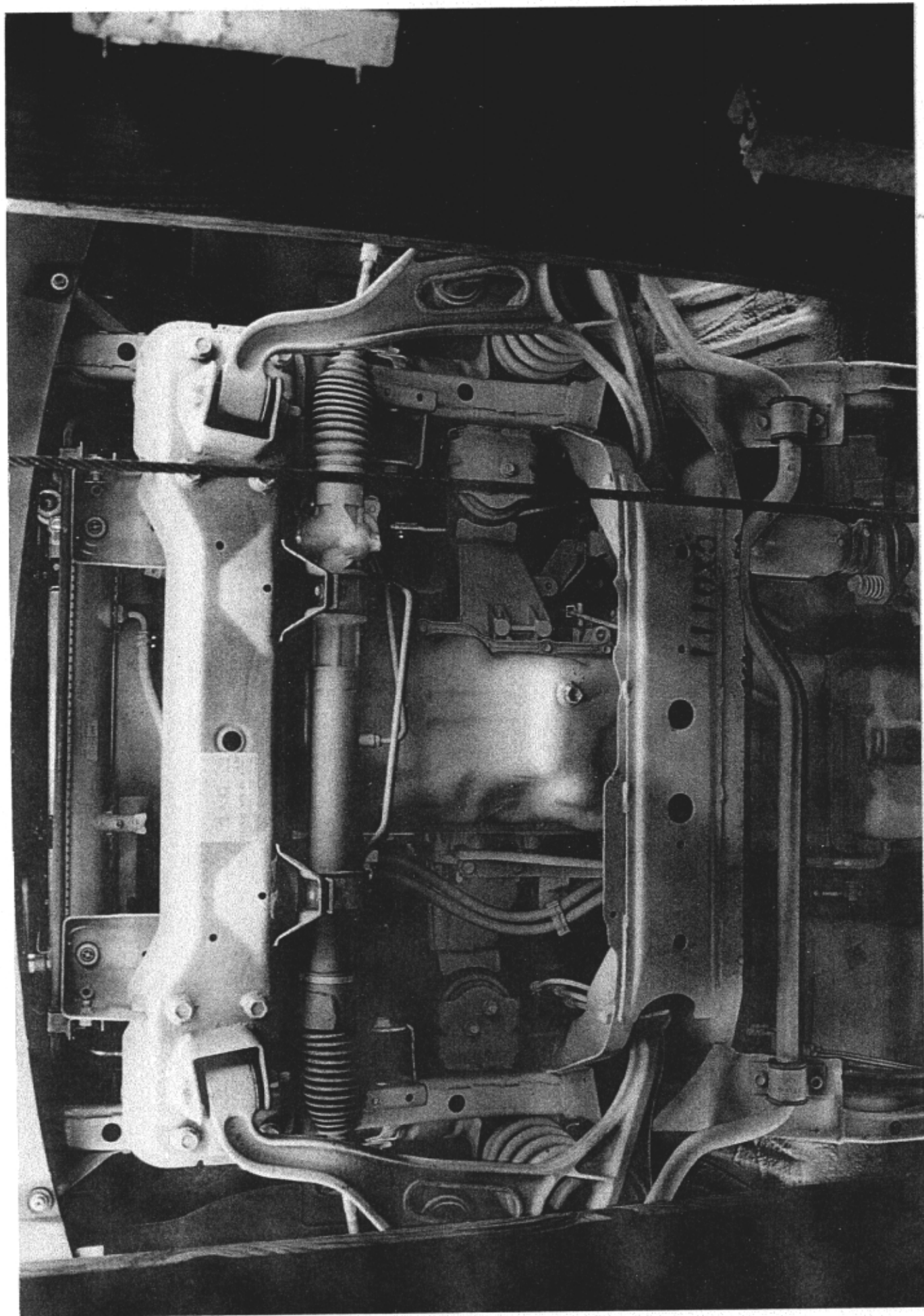


Figure A-13 PRE-TEST FRONT UNDERBODY VIEW

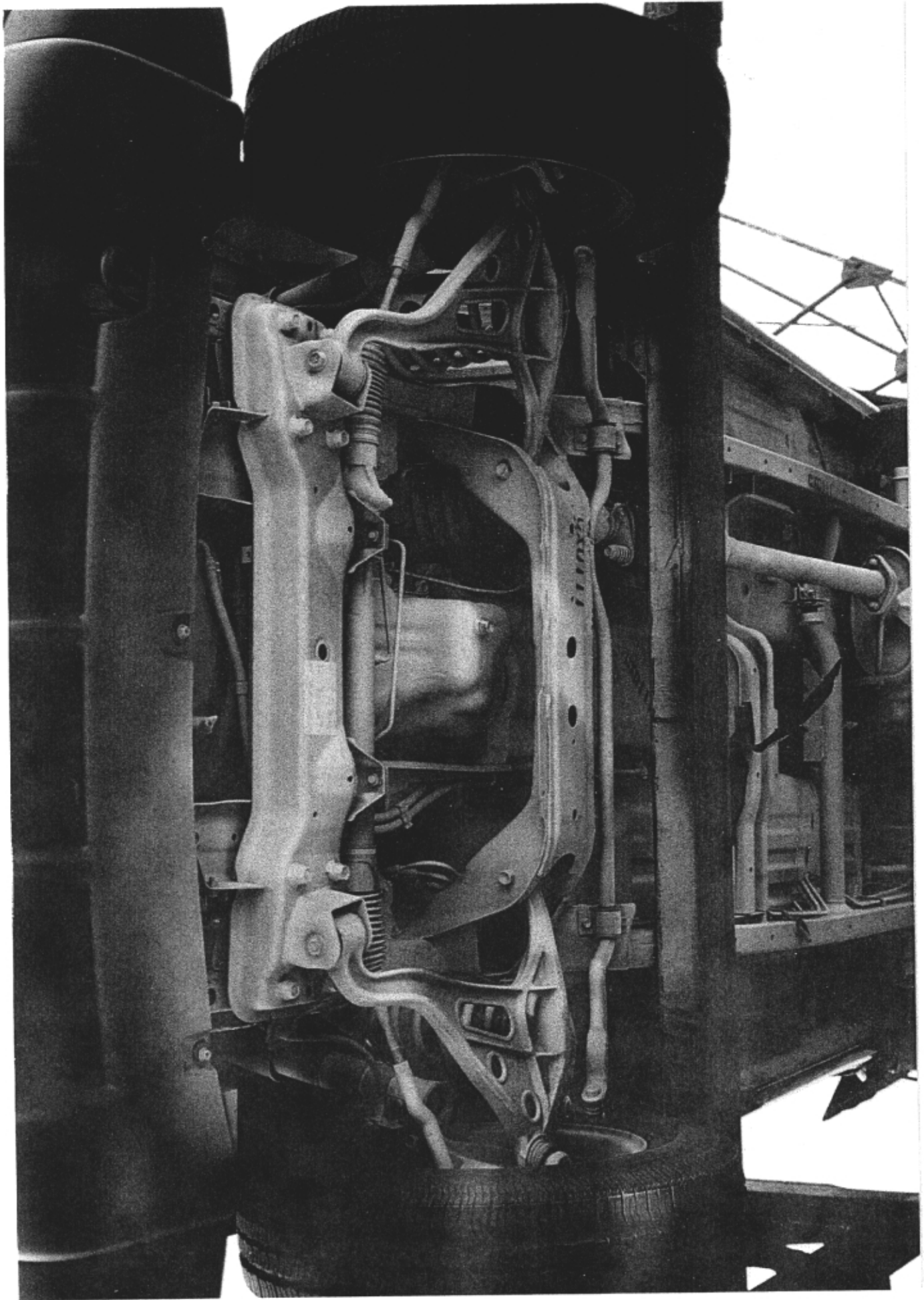


Figure A-14 POST-TEST FRONT UNDERBODY VIEW

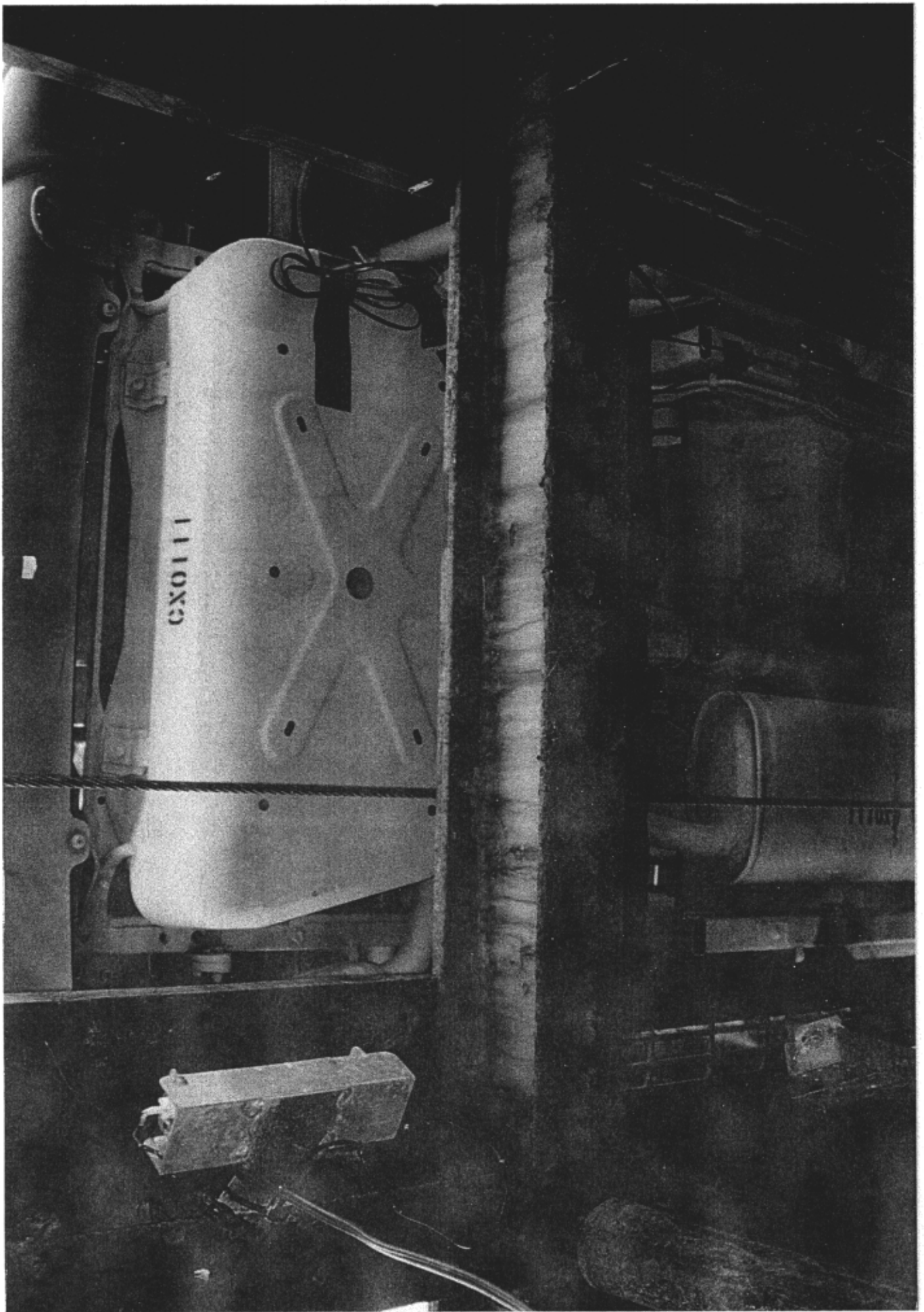


Figure A-15 PRE-TEST REAR UNDERBODY VIEW

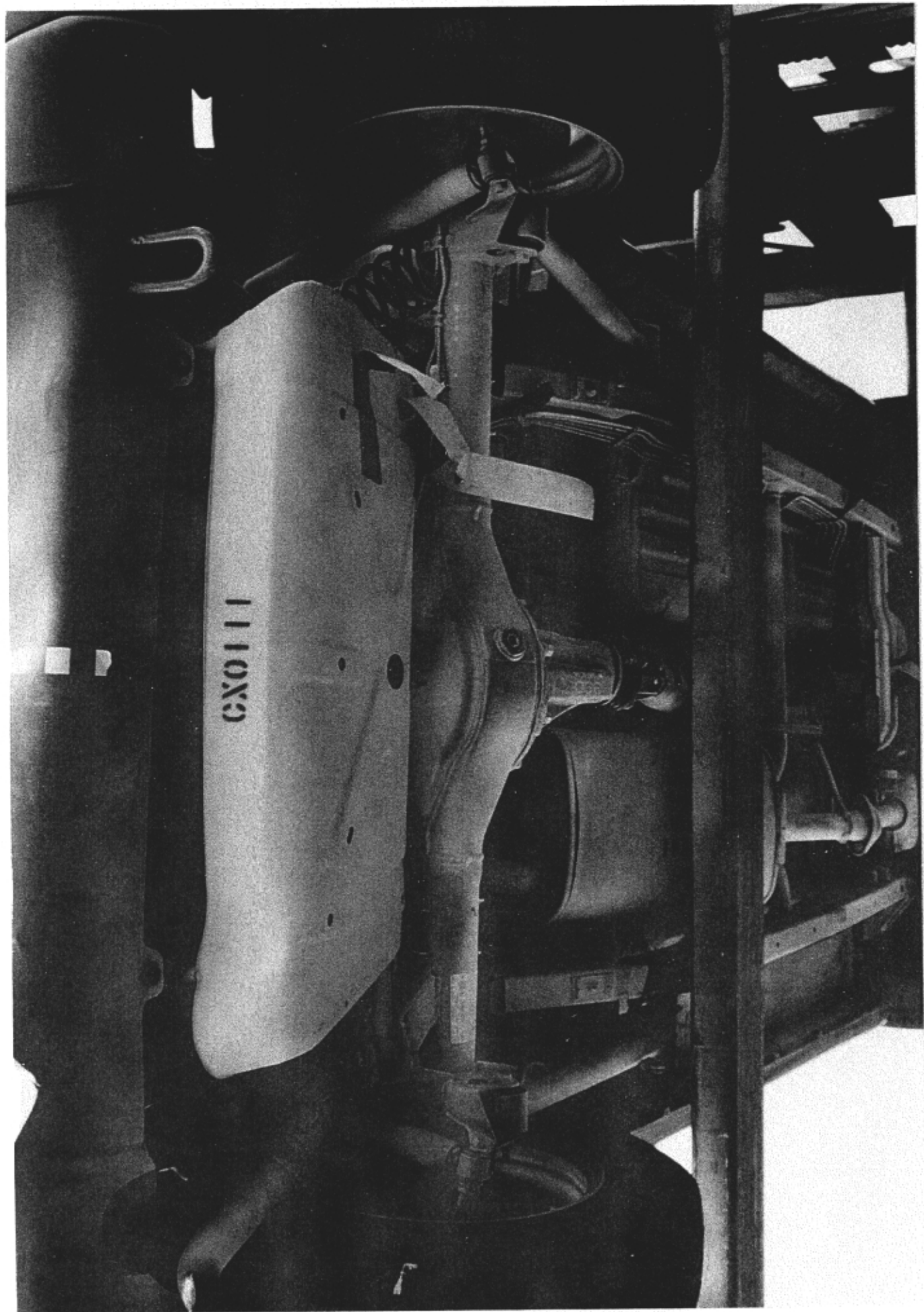


Figure A-16 POST-TEST REAR UNDERBODY VIEW

MFD. BY CAMI AUTOMOTIVE INC. CANADA

DATE	GWWR	GAWR FRT	GAWR RR
11/98	3814LB	1764LB	2205LB
	1730KG	800KG	1000KG

TIRES: P195/75R15 (FRT&RR) RIMS: 15X5 1/2JJ (FRT&RR)
MAX COLD TIRE PRESS: 26 PSI (180KPA) FRT & RR

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

2CNBE13C8X6903631

MULTIPURPOSE PASSENGER VEHICLE

THIS VEHICLE EQUIPPED FOR 915LB/415KG PAYLOAD.
SEE OWNER MANUAL FOR ADDITIONAL INFORMATION.

Y1L USA

CXOI

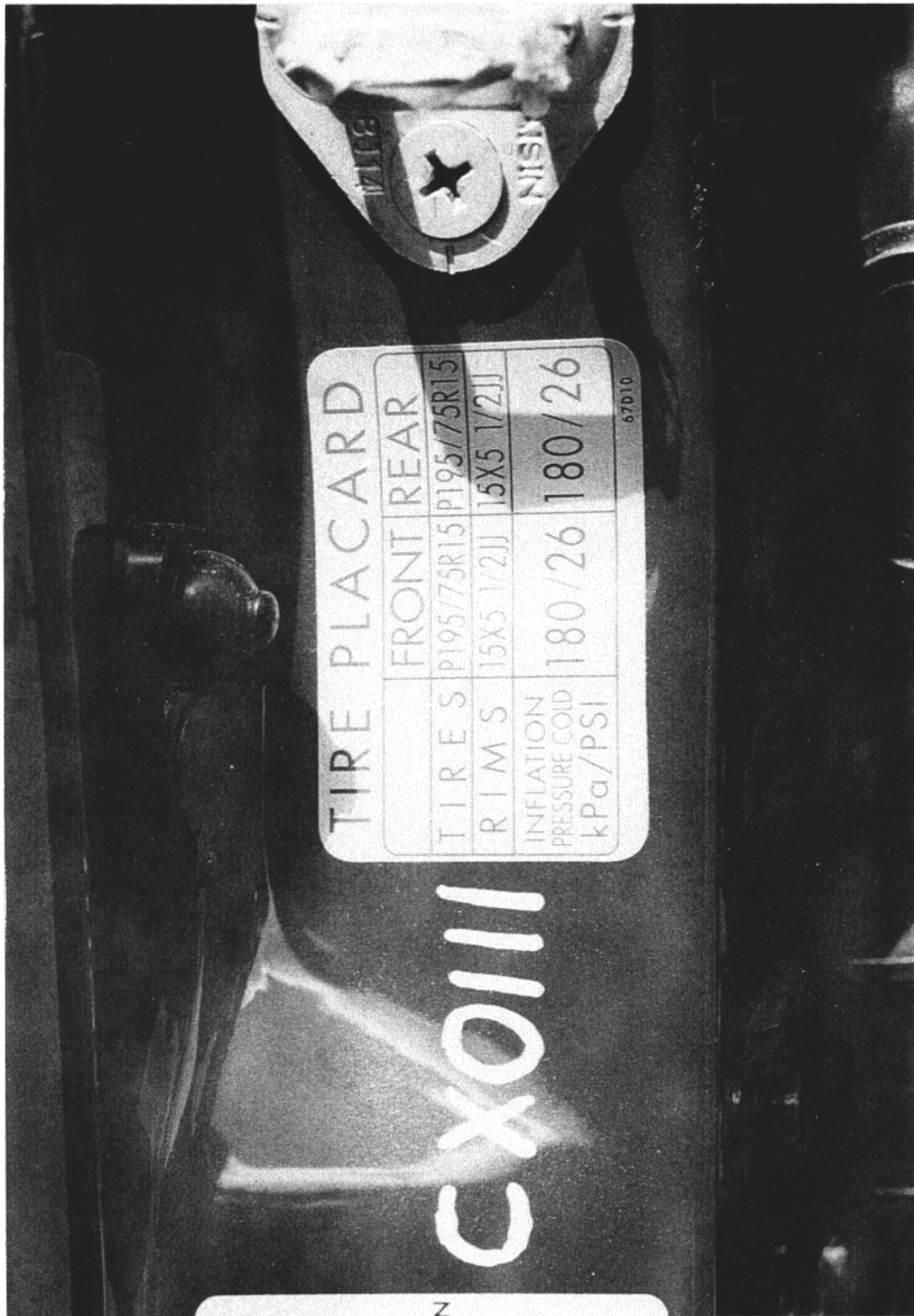


Figure A-18 TIRE PLACARD

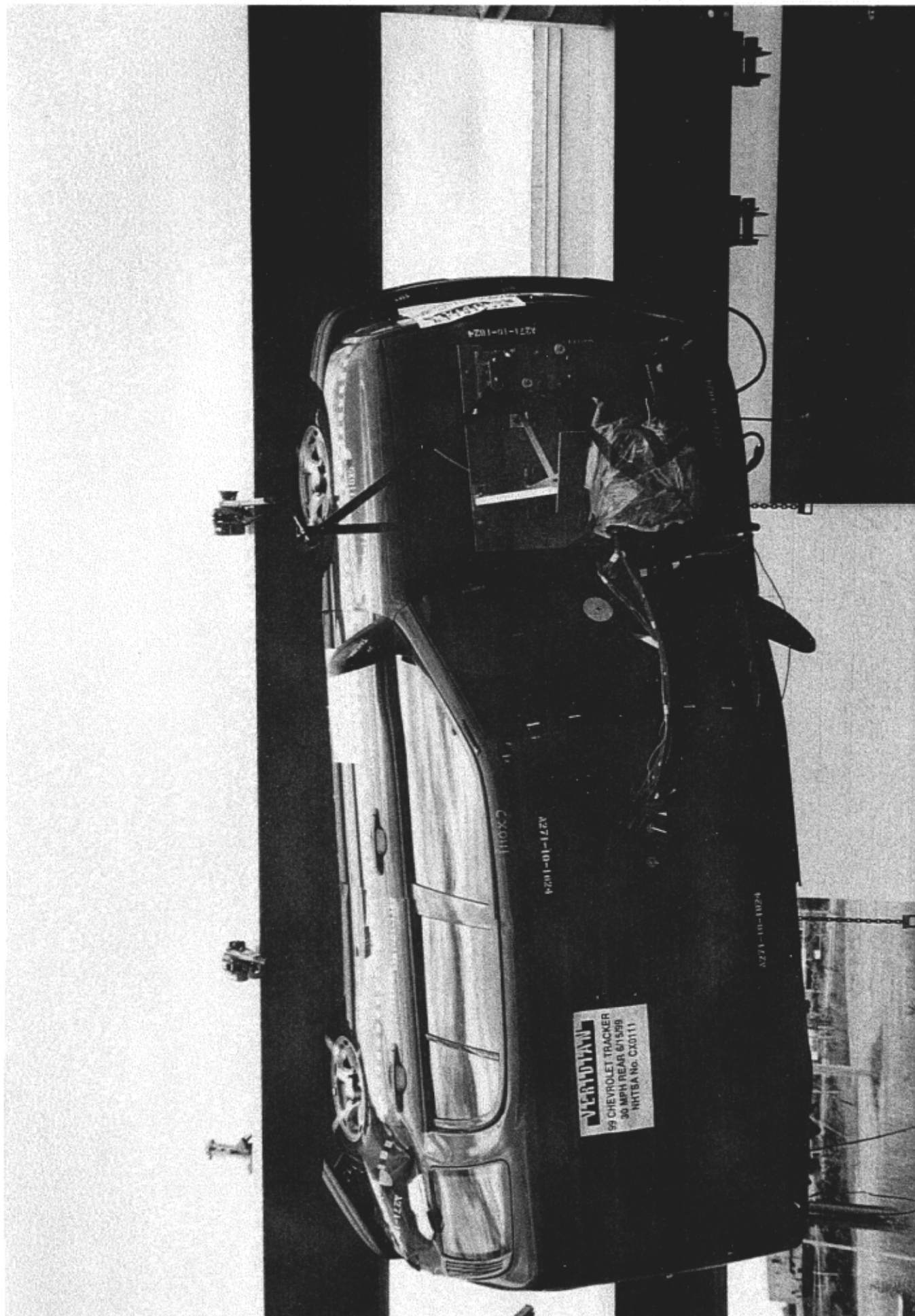


Figure A-19 ROLLOVER 90°

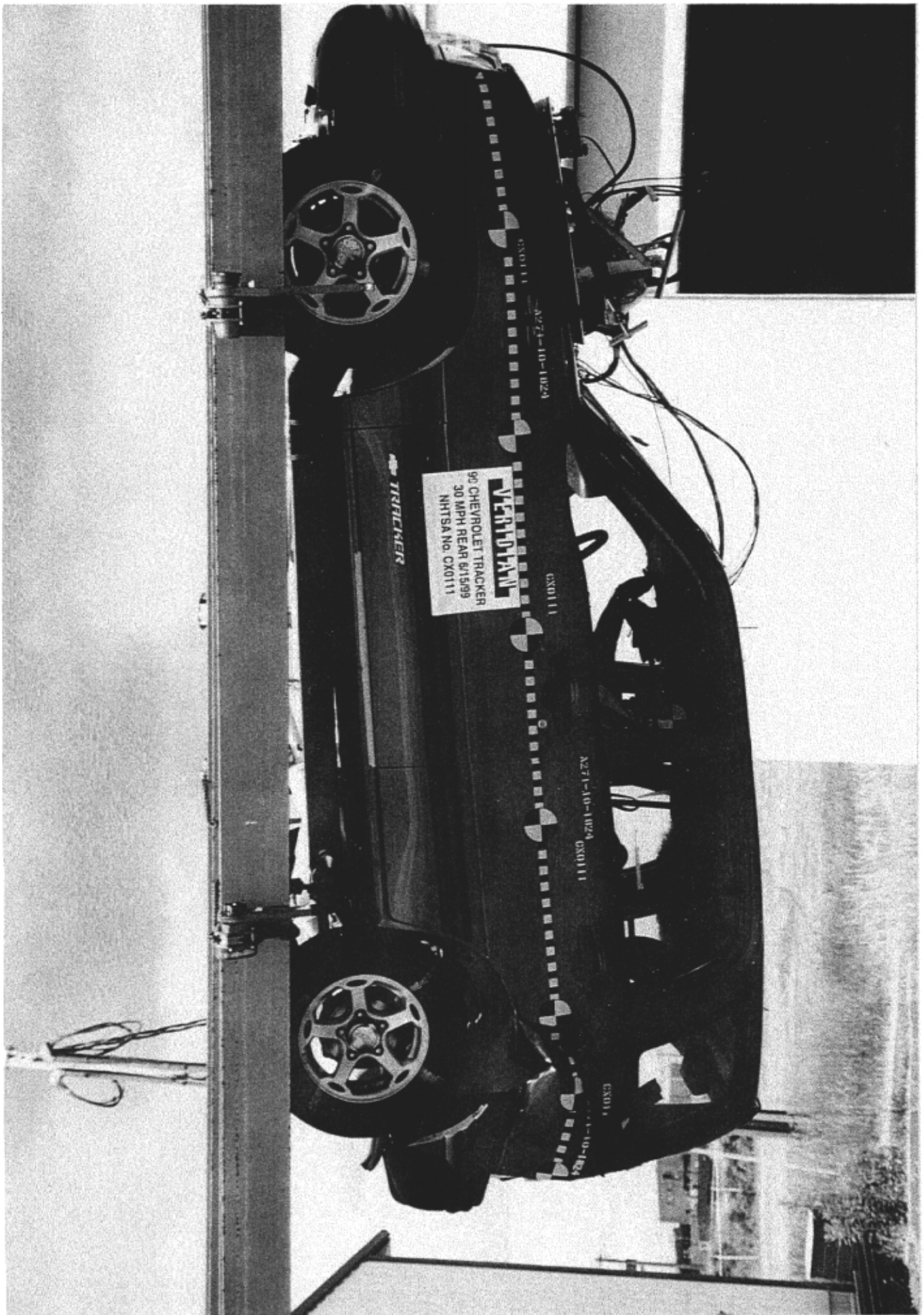


Figure A-20 ROLLOVER 180°

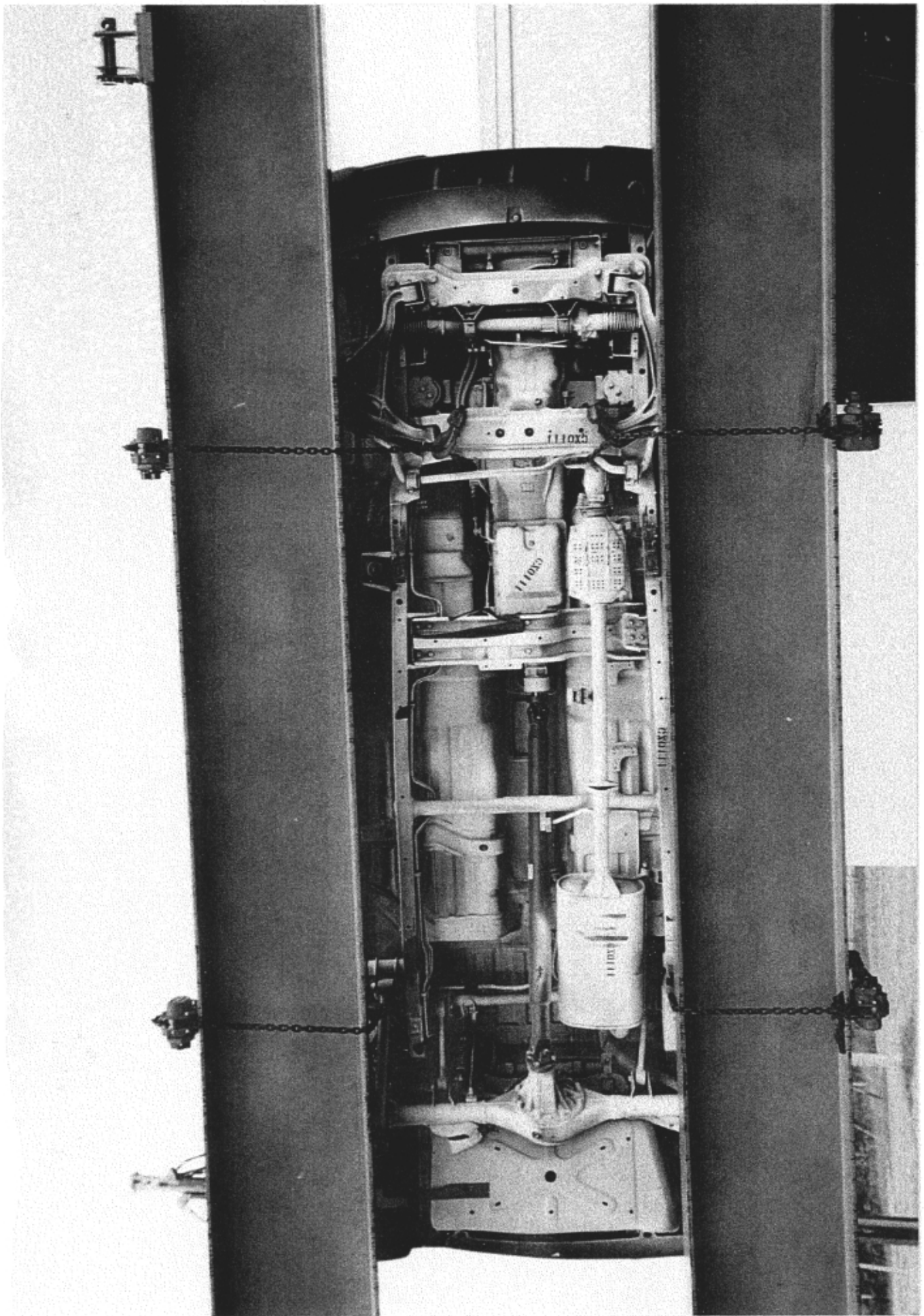


Figure A-21 ROLLOVER 270°



Figure A-22 ROLLOVER 360°

Appendix B

VEHICLE AND DUMMY RESPONSE DATA

(REAR IMPACT ONLY)

FACILITY: VERF

DATE: June 15, 1999

TEST#: A271-0100-1824

TITLE: 301 Test #10 1999 Chevrolet Tracker CX0111

CHN	NAME	Unit	Max	msec	Min	msec	Filt
24	Acc #3(X) Upper Seat Back X	g	43.2	26.9	-25.5	48.2	60
25	Acc #4(X) Lower Seat Back X	g	32.8	89.3	-17.3	47.3	60
29	Acc #1(X) Left Rear Xmember	g	27.8	20.8	-2.3	127.3	60
32	Acc #2(X) Right Rear Xmember	g	23.7	21.6	-2.7	131.6	60
35	Driver Head X	g	18.7	119.3	-2.6	467.0	1000
36	Driver Head Y	g	2.2	105.2	-1.9	167.1	1000
37	Driver Head Z	g	13.3	110.3	-0.6	44.2	1000
38	Driver Head Resultant	g	22.6	110.9	0.0	-31.1	1000
39	Driver Upper Neck Fx	lbf	34.8	116.9	-26.1	443.0	1000
40	Driver Upper Neck Fy	lbf	13.6	129.1	-6.8	234.5	1000
41	Driver Upper Neck Fz	lbf	166.5	111.8	-26.5	167.5	1000
42	Driver Upper Neck F Resultant	lbf	168.0	111.8	0.0	-79.1	1000
43	Driver Upper Neck Mx	in-lb	38.2	148.8	-14.4	46.2	600
44	Driver Upper Neck My	in-lb	87.8	85.3	-83.6	108.2	600
45	Driver Upper Neck Mz	in-lb	25.8	258.4	-54.9	174.3	600
46	Driver Upper Neck M Resultant	in-lb	89.4	85.2	0.0	-44.2	600
47	Driver Chest X	g	16.8	83.8	-1.7	385.5	180
48	Driver Chest Y	g	2.7	73.0	-1.1	133.6	180
49	Driver Chest Z	g	9.5	62.3	-1.2	170.7	180
50	Driver Chest Resultant	g	17.1	83.7	0.0	-1.4	180
51	Driver Chest Displacement	in	0.0	67.3	0.0	149.9	600
52	Driver Pelvic X	g	20.5	59.8	-4.3	153.3	1000
53	Driver Pelvic Y	g	4.7	49.8	-3.5	92.5	1000
54	Driver Pelvic Z	g	16.1	62.2	-1.3	390.8	1000
55	Driver Pelvic Resultant	g	24.6	62.2	0.0	-66.5	1000
56	Driver Lap Belt	lbf	86.6	46.0	-14.7	61.1	60
57	Driver Belt Spoolout	in	0.0	8.4	-0.8	314.6	180

P1 HIC(36ms): 49.4

t1: 102.2 msec

t2: 138.2 msec

Duration: 36.0 msec

Average Acceleration: 18.0 g

Input channels: Driver Head X (2) CFC_1000

Driver Head Y (3) CFC_1000

Driver Head Z (4) CFC_1000

P1 CLIP(3ms): 16.7 g

t1: 82.3 msec

t2: 85.3 msec

Duration: 3.0 msec

P1 CSI: 42.1

Input channels: Driver Chest X (5) CFC_180

Driver Chest Y (6) CFC_180

Driver Chest Z (7) CFC_180

TEST NO. CX0111

VEHICLE

SAE FILTER CHANNEL CLASS

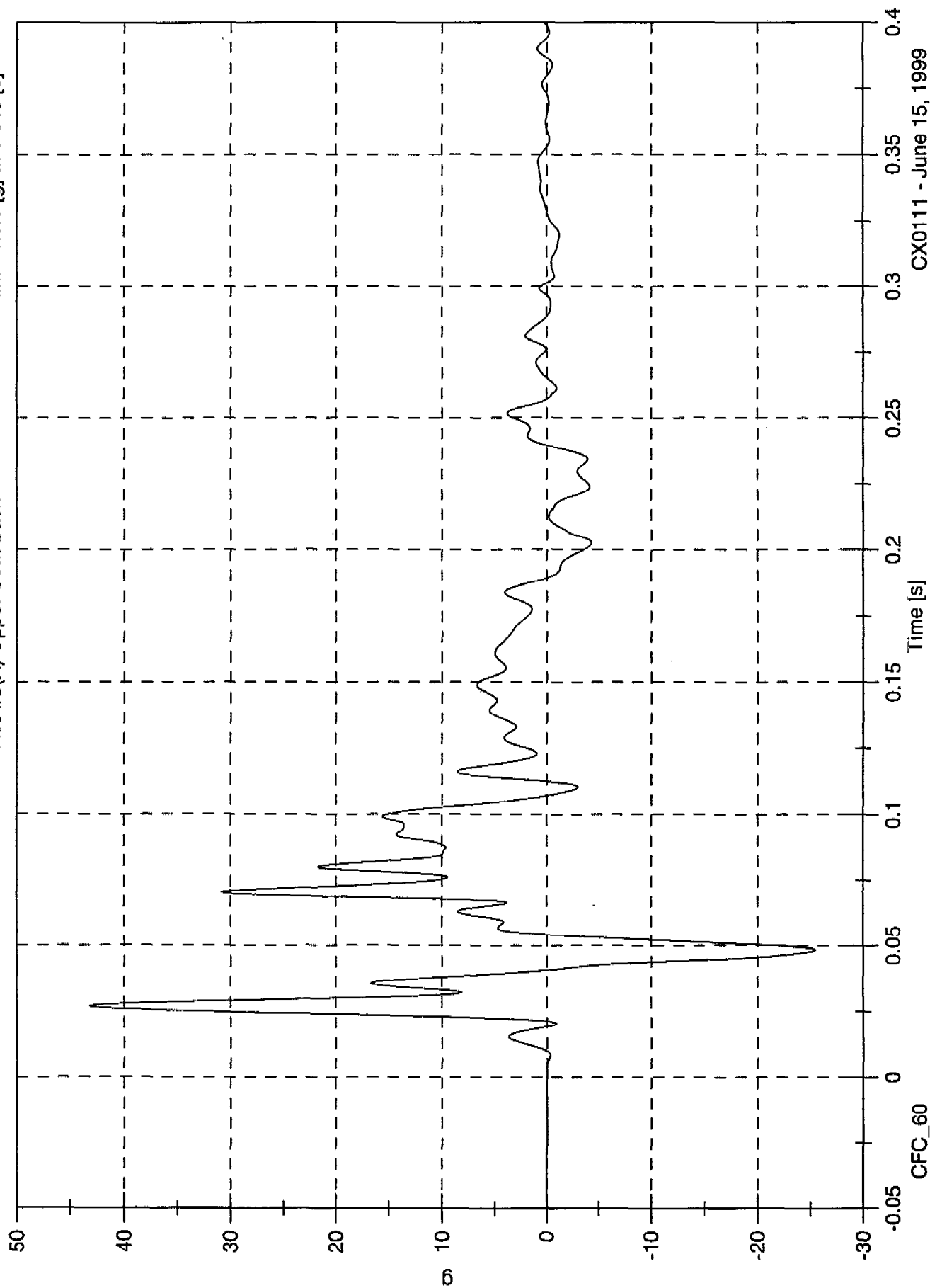
60

Note: Angular seatback position is measured in degrees of rotation from the initial (design) position.

301 Test #10 1999 Chevrolet Tracker

Acc #3(X) Upper Seat Back X

Max: 43.2 [g] at 0.027 [s]
Min: -25.5 [g] at 0.048 [s]



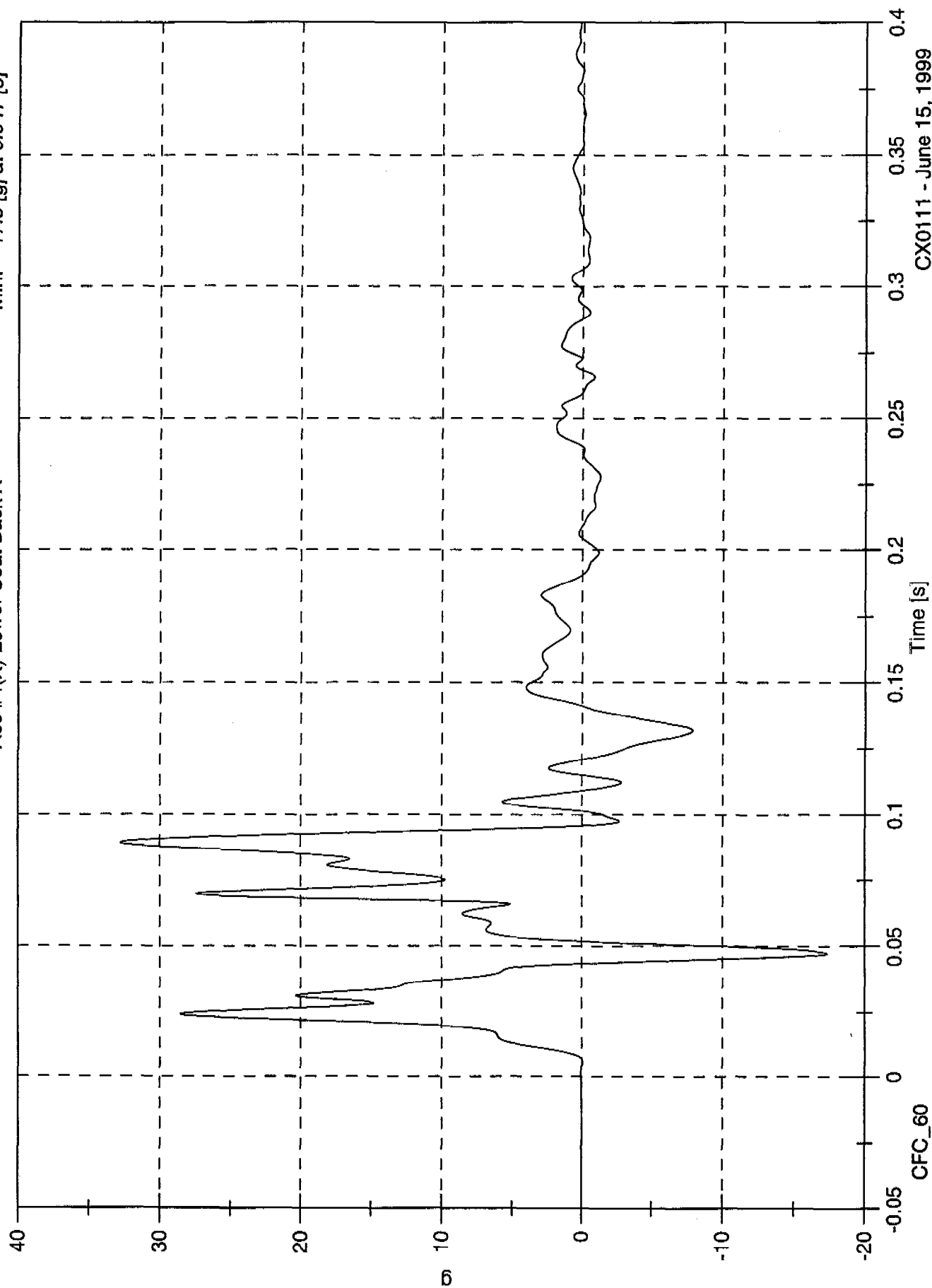
CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 32.8 [g] at 0.089 [s]

Min: -17.3 [g] at 0.047 [s]

Acc #4(X) Lower Seat Back X

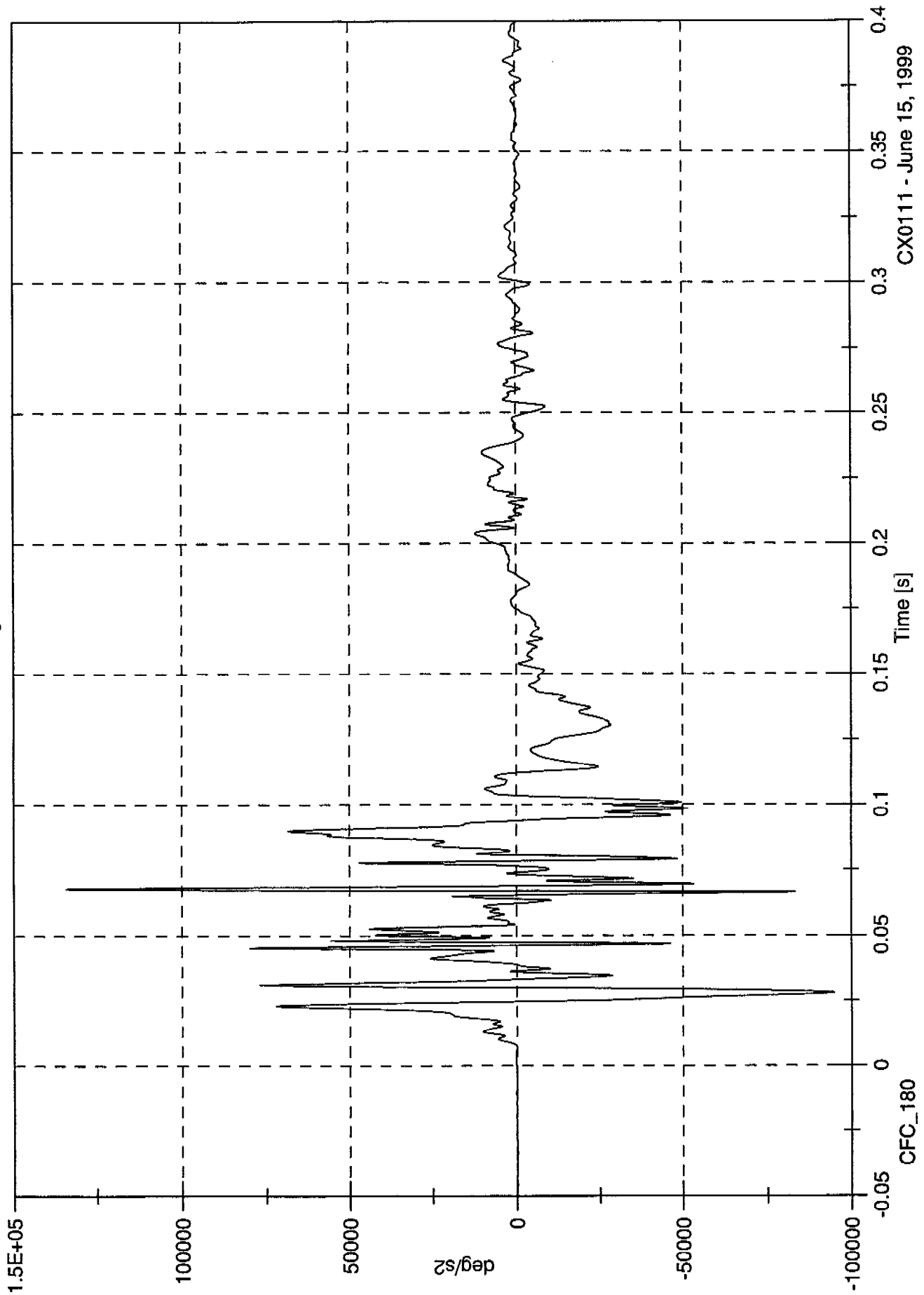


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 134220.0 [deg/s²] at 0.068 [s]
Min: -94844.0 [deg/s²] at 0.028 [s]

Seatback Angular Acceleration

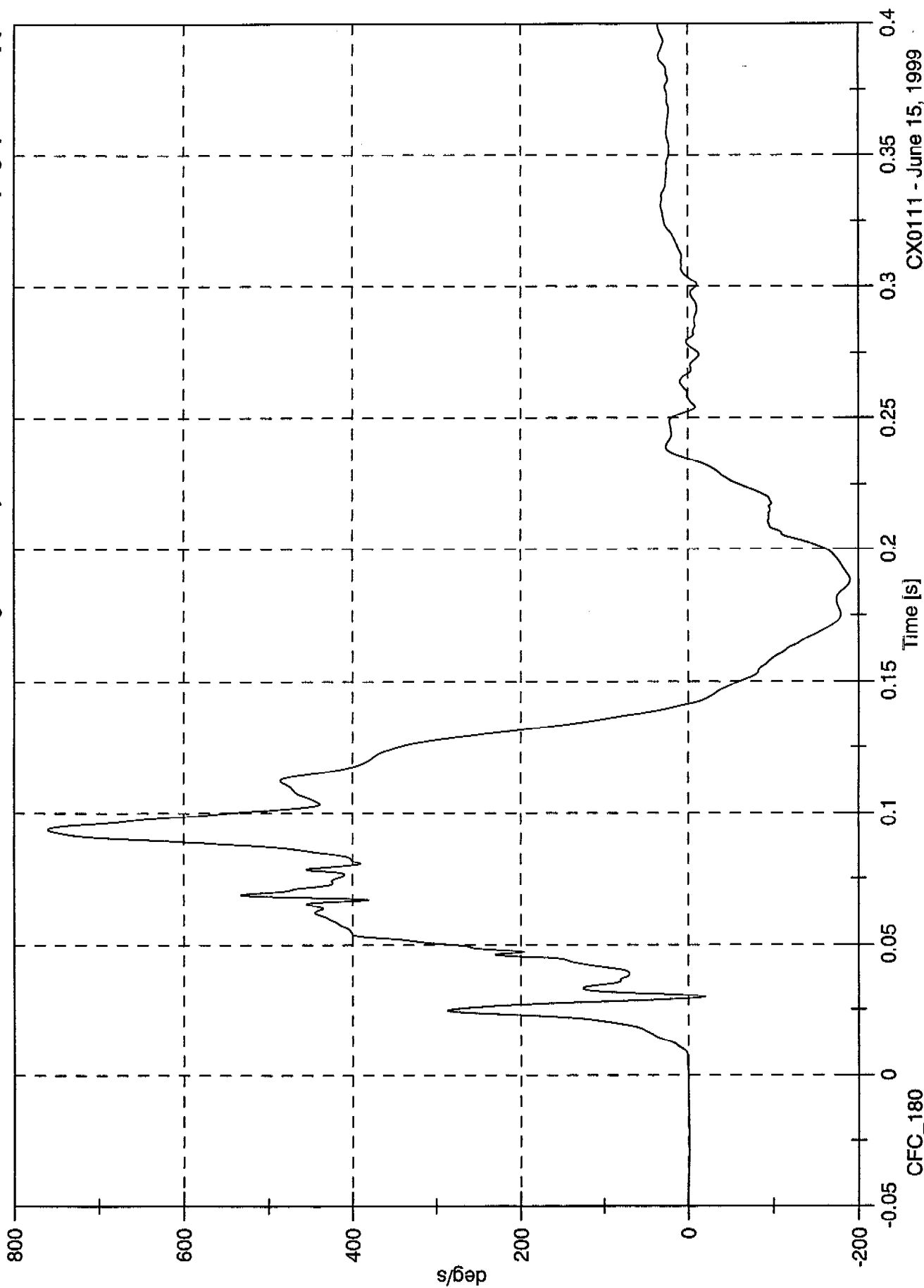


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 760.1 [deg/s] at 0.094 [s]
 Min: -189.8 [deg/s] at 0.188 [s]

Seatab Angular Velocity

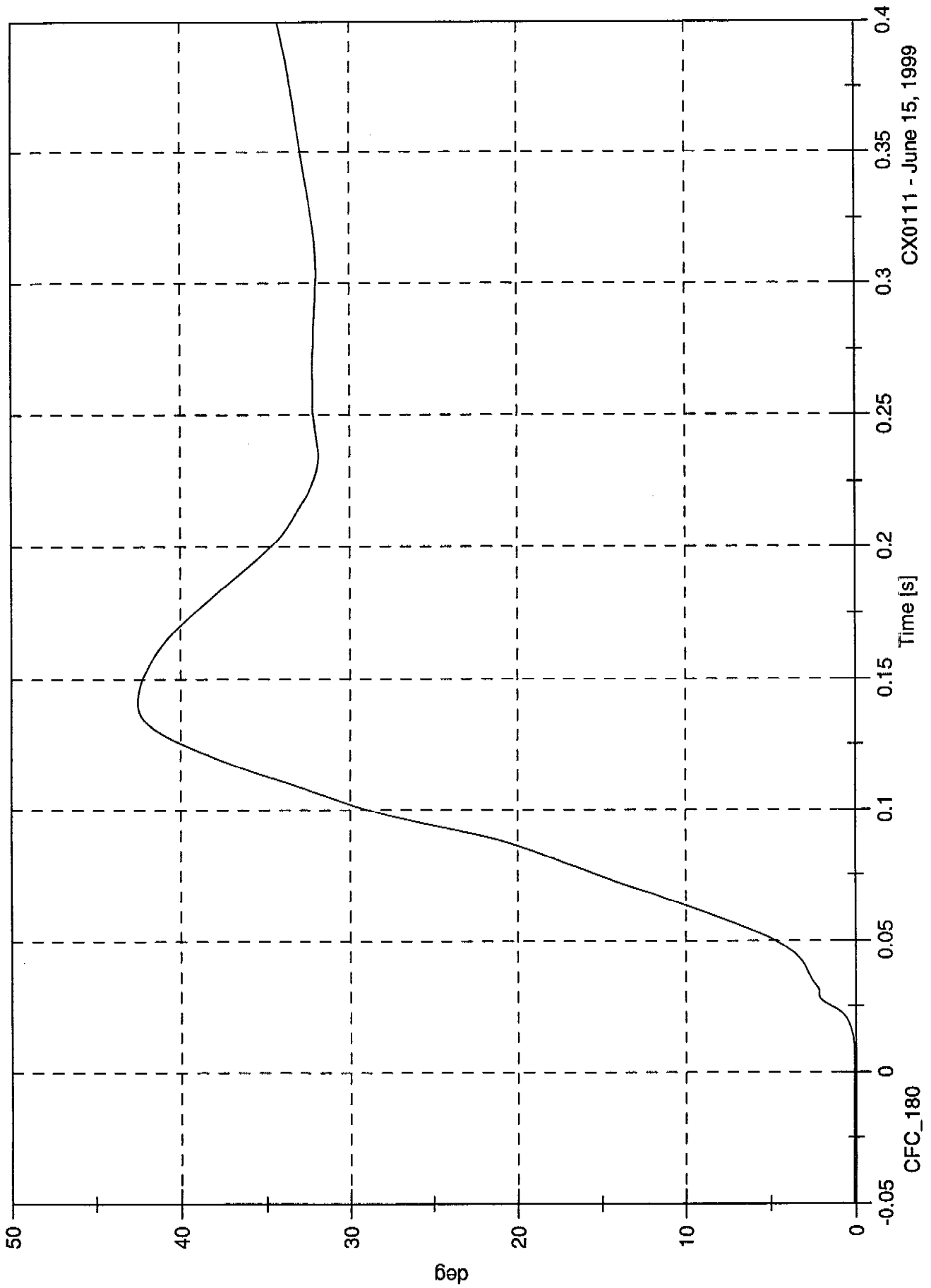


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 42.5 [deg] at 0.141 [s]
Min: 0.0 [deg] at -0.100 [s]

Seatback Angular Position



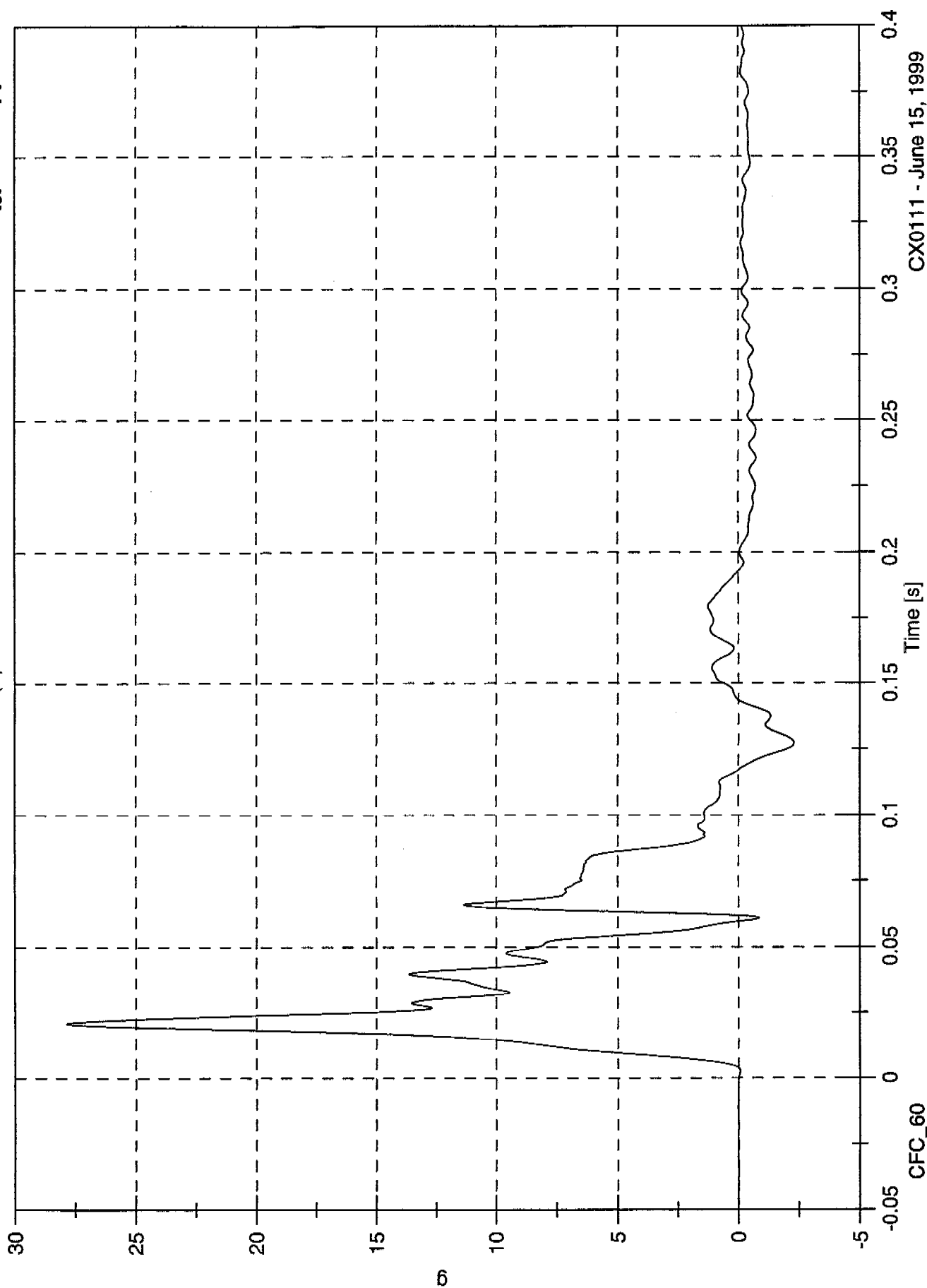
CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 27.8 [g] at 0.021 [s]

Min: -2.3 [g] at 0.127 [s]

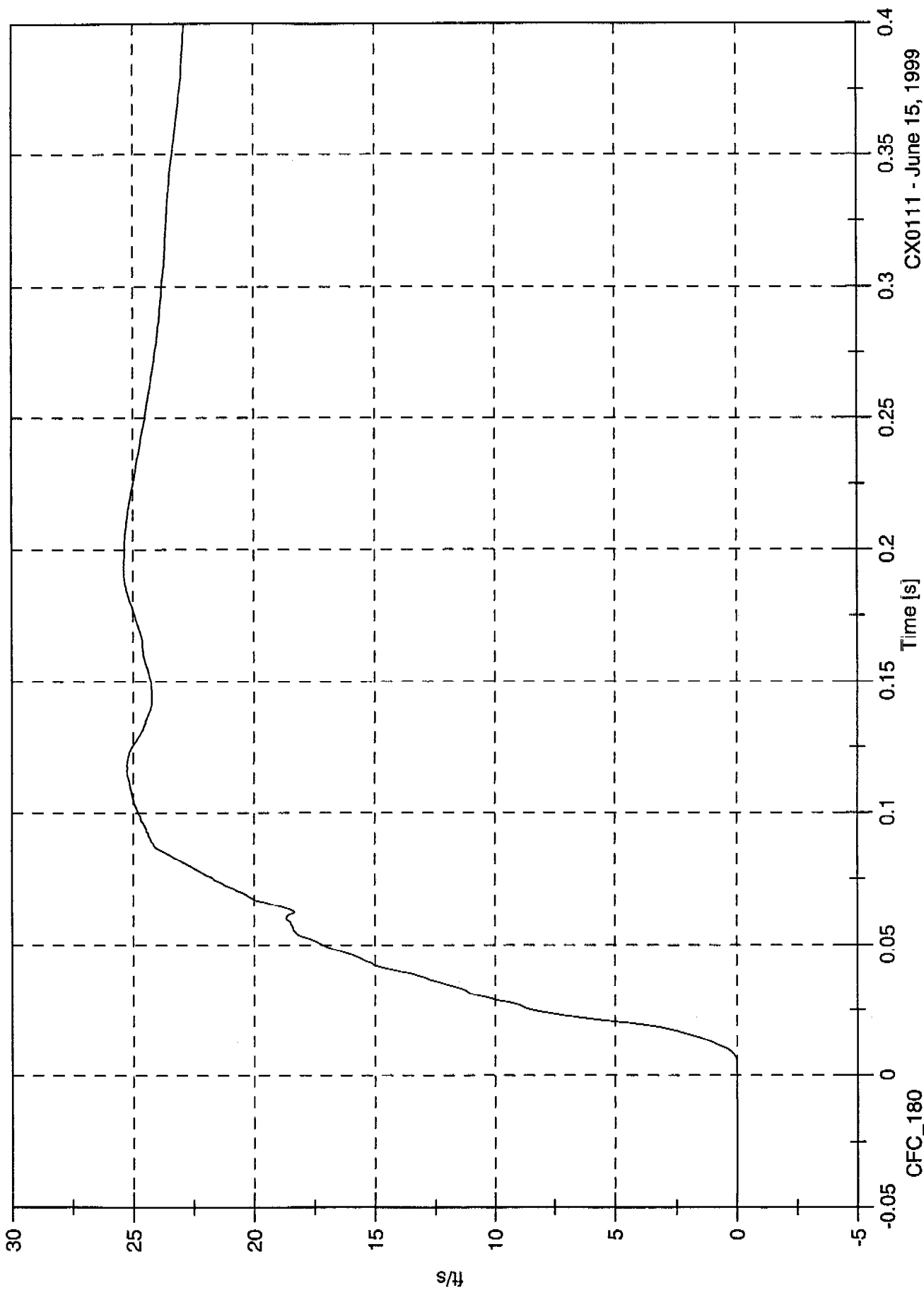
Acc #1(X) Left Rear Xmember



301 Test #10 1999 Chevrolet Tracker

Max: 25.4 [ft/s] at 0.193 [s]
Min: -0.0 [ft/s] at -0.049 [s]

Acc #1(X) Left Rear Xmember Velocity

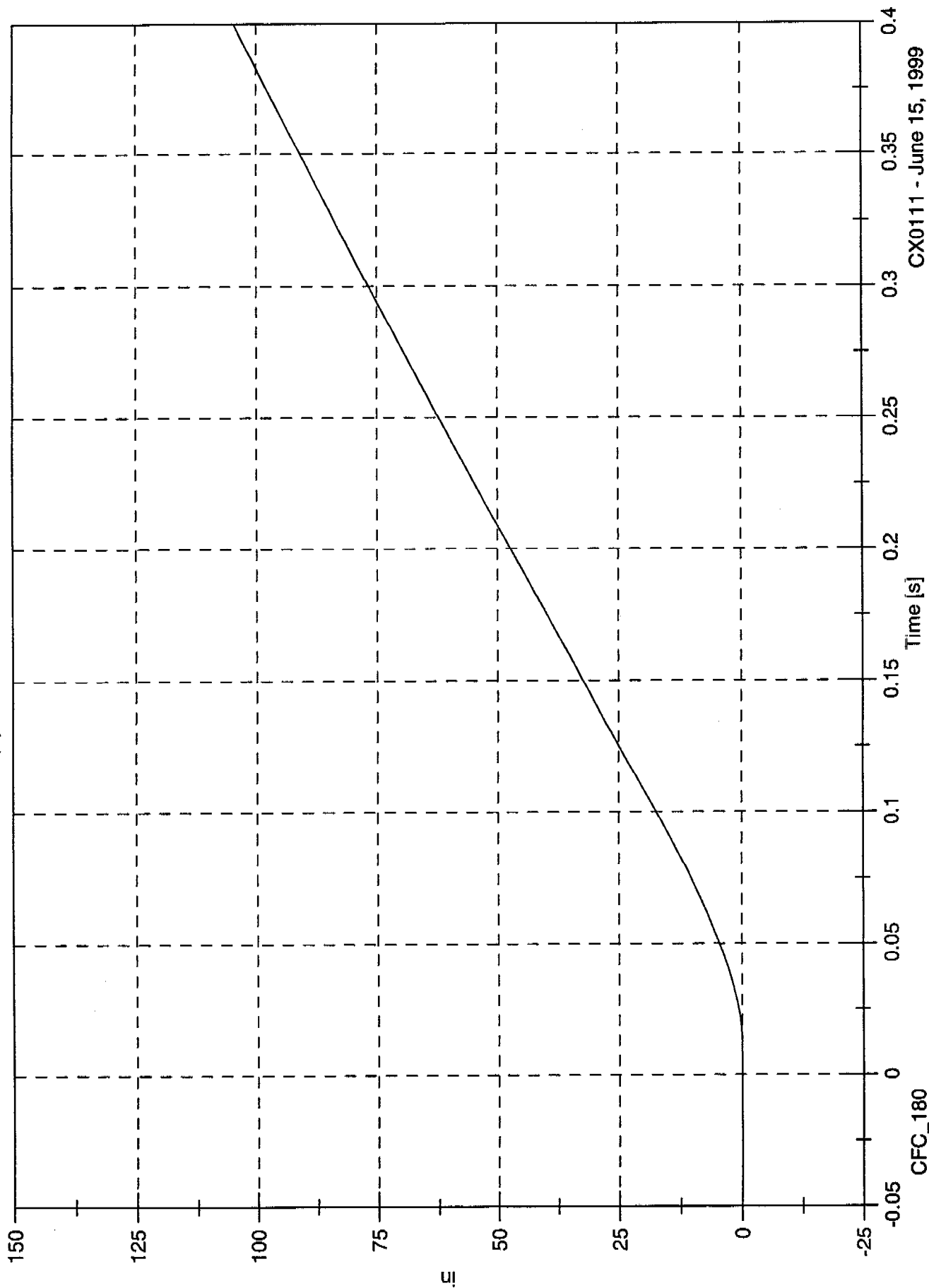


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 131.8 [in] at 0.500 [s]
 Min: -0.0 [in] at -0.010 [s]

Acc #1(X) Left Rear Xmember Displacement



CFC_180

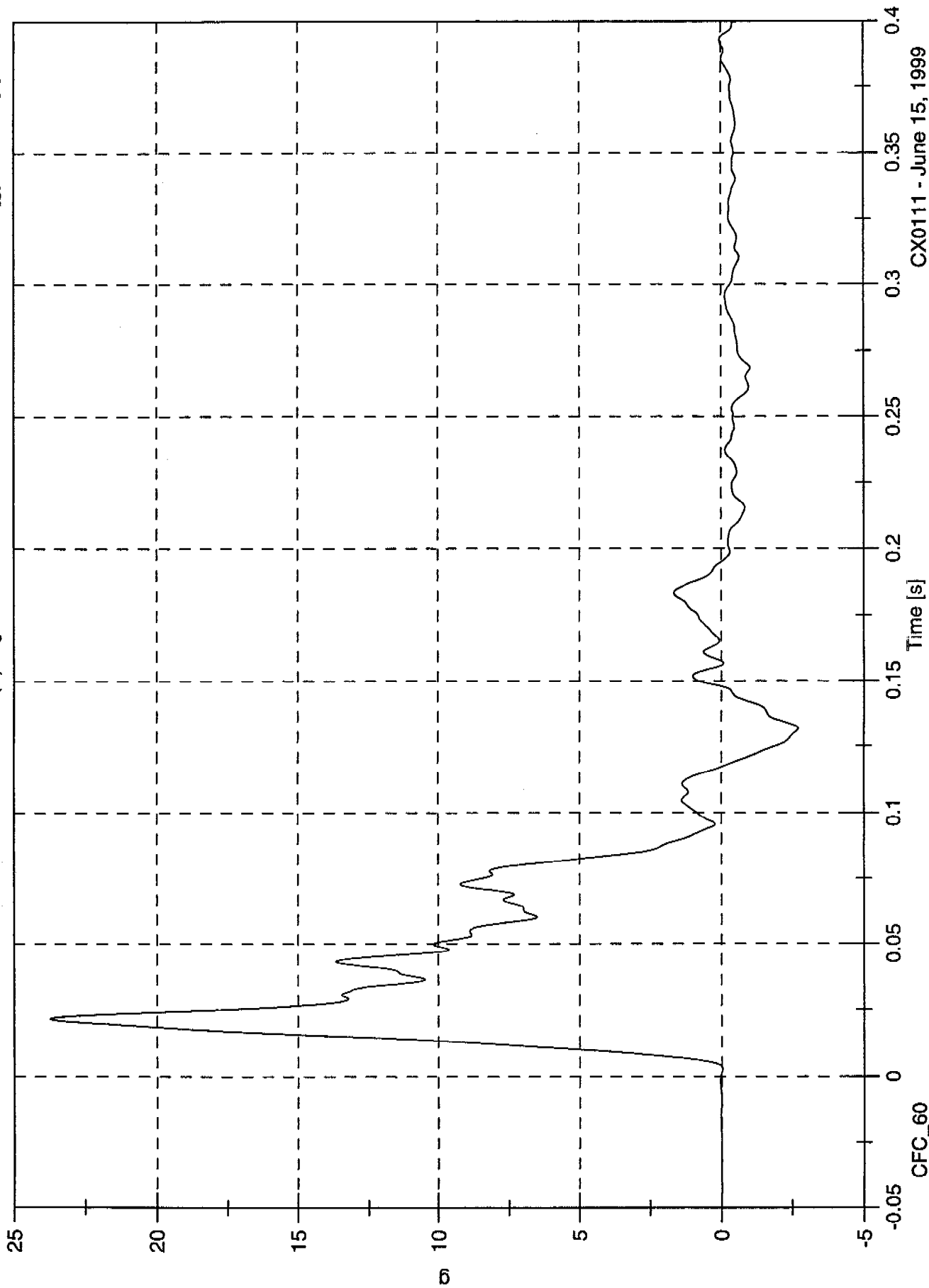
CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 23.7 [g] at 0.022 [s]

Min: -2.7 [g] at 0.132 [s]

Acc #2(X) Right Rear Xmember

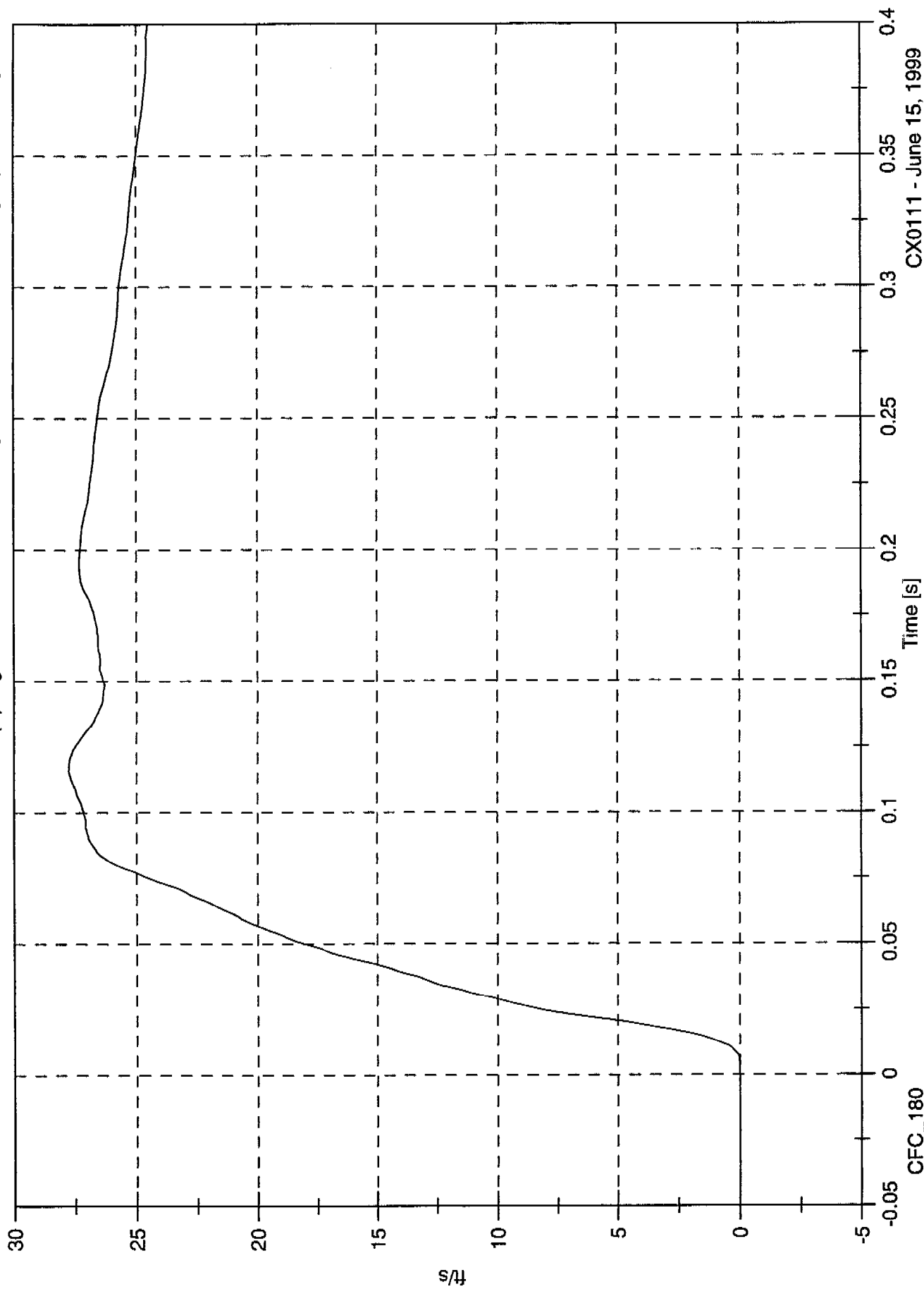


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 27.7 [ft/s] at 0.116 [s]
 Min: -0.0 [ft/s] at -0.036 [s]

Acc #2(X) Right Rear Xmember Velocity



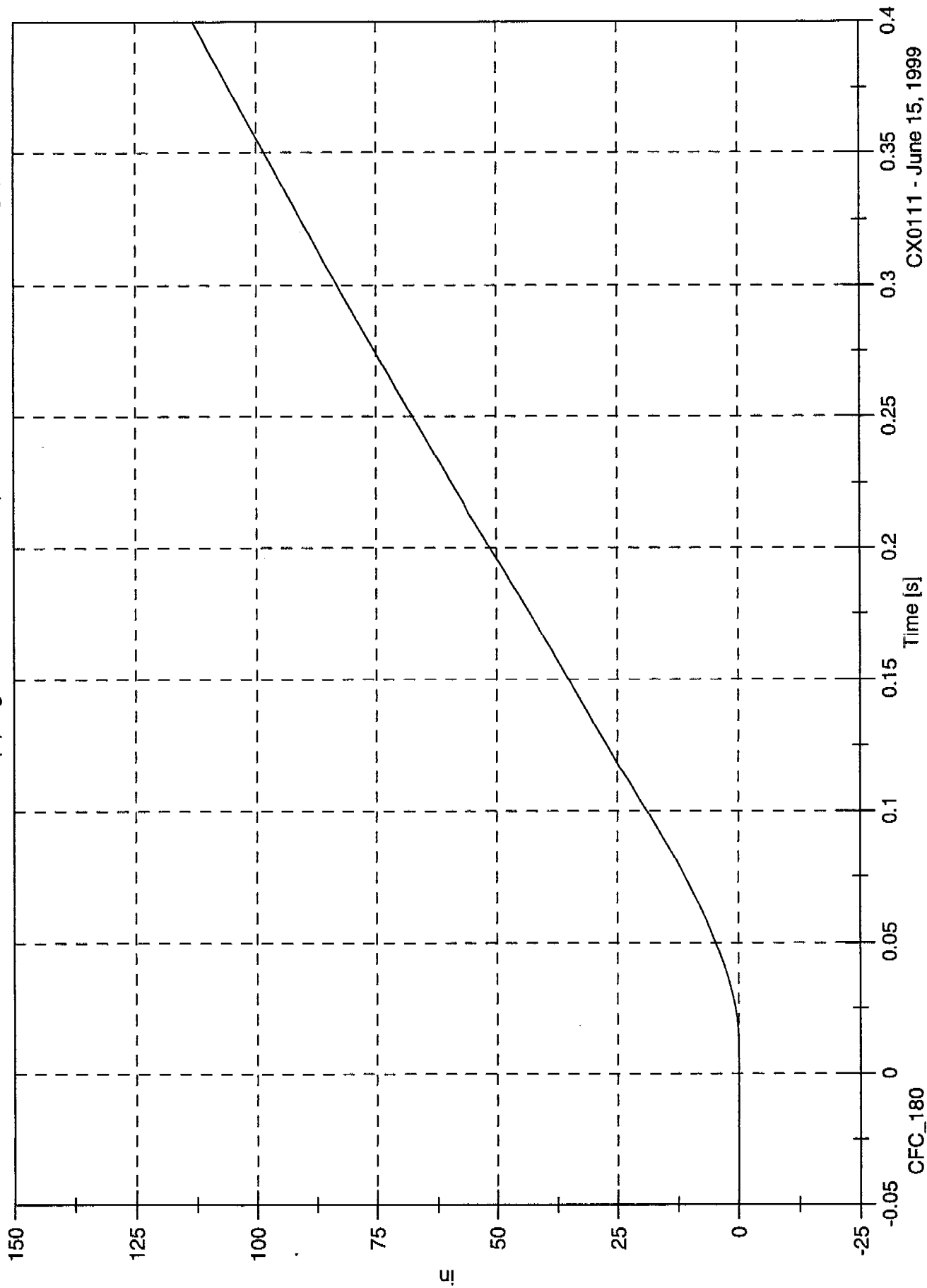
CFC_180

CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 142.1 [in] at 0.500 [s]
Min: -0.0 [in] at -0.011 [s]

Acc #2(X) Right Rear Xmember Displacement



CX0111 - June 15, 1999

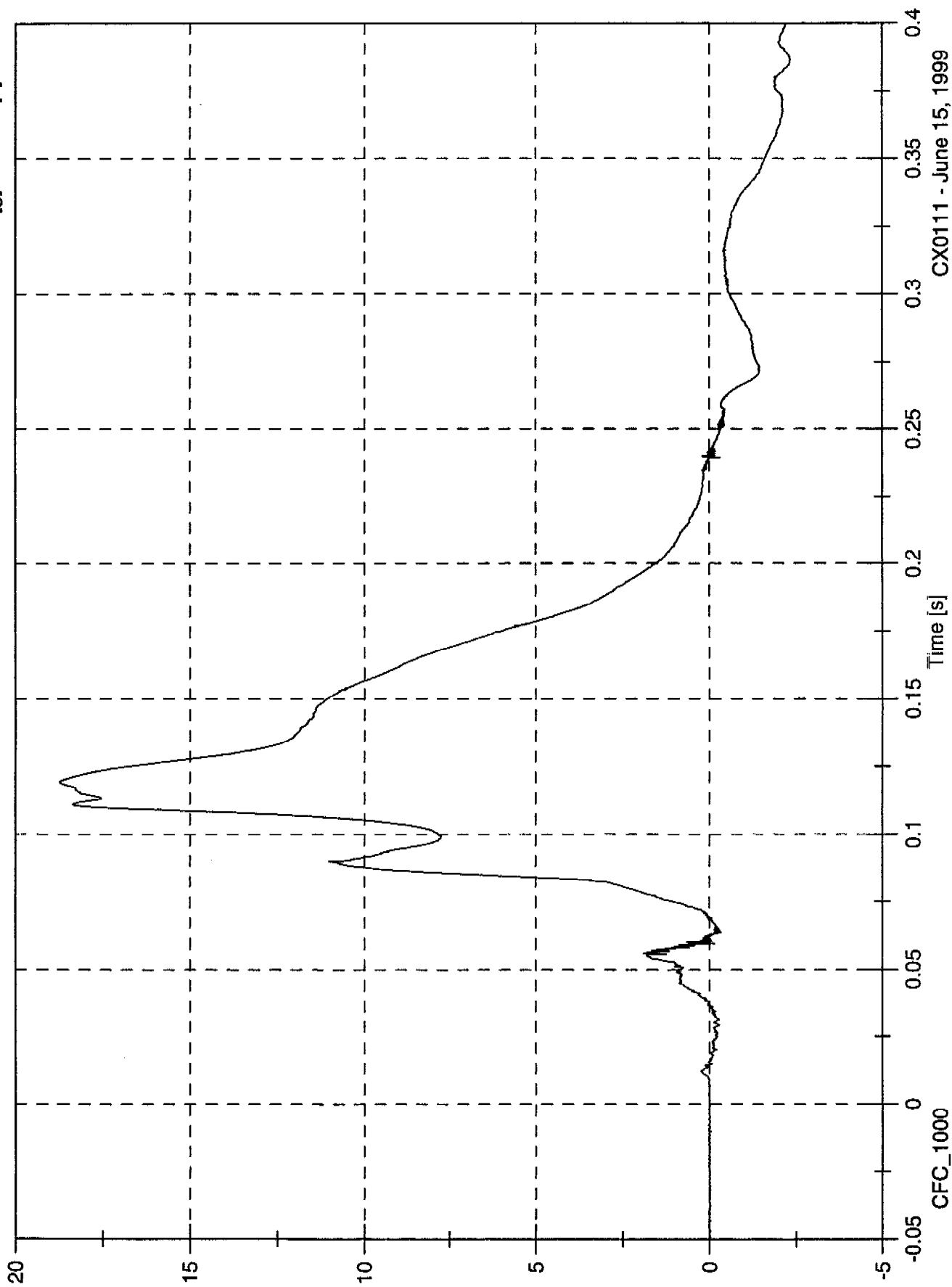
TEST NO. CX0111

DRIVER DUMMY (Pos. 1)	SAE FILTER CHANNEL CLASS
Head Accelerations	1000
Chest Accelerations	180
Pelvic Accelerations	1000
Upper Neck Forces	1000
Upper Neck Moments	600
Belt Forces	60
Belt Spoolout	60

301 Test #10 1999 Chevrolet Tracker

Max: 18.7 [g] at 0.119 [s]
Min: -2.6 [g] at 0.467 [s]

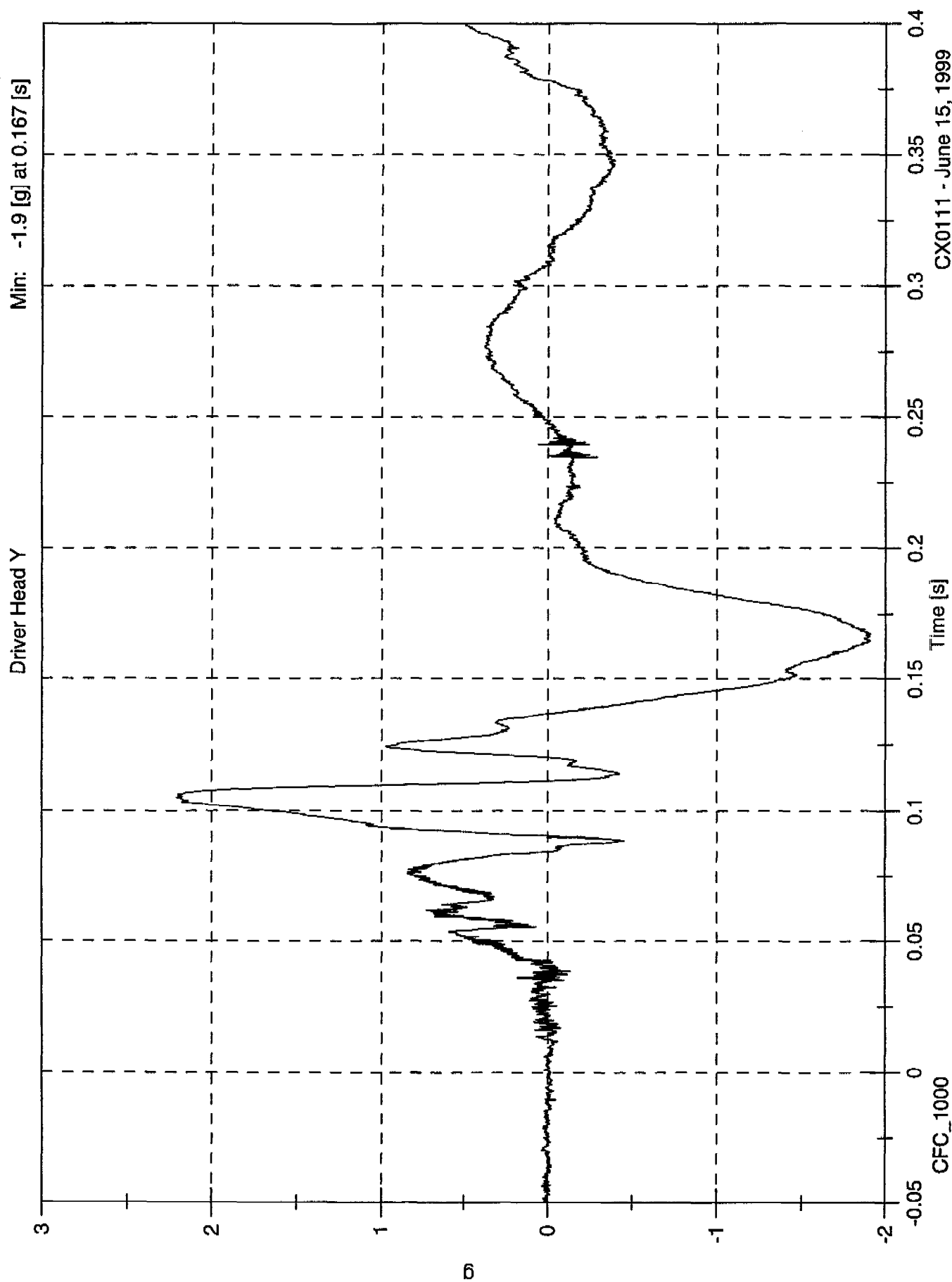
Driver Head X



CX0111 - June 15, 1999

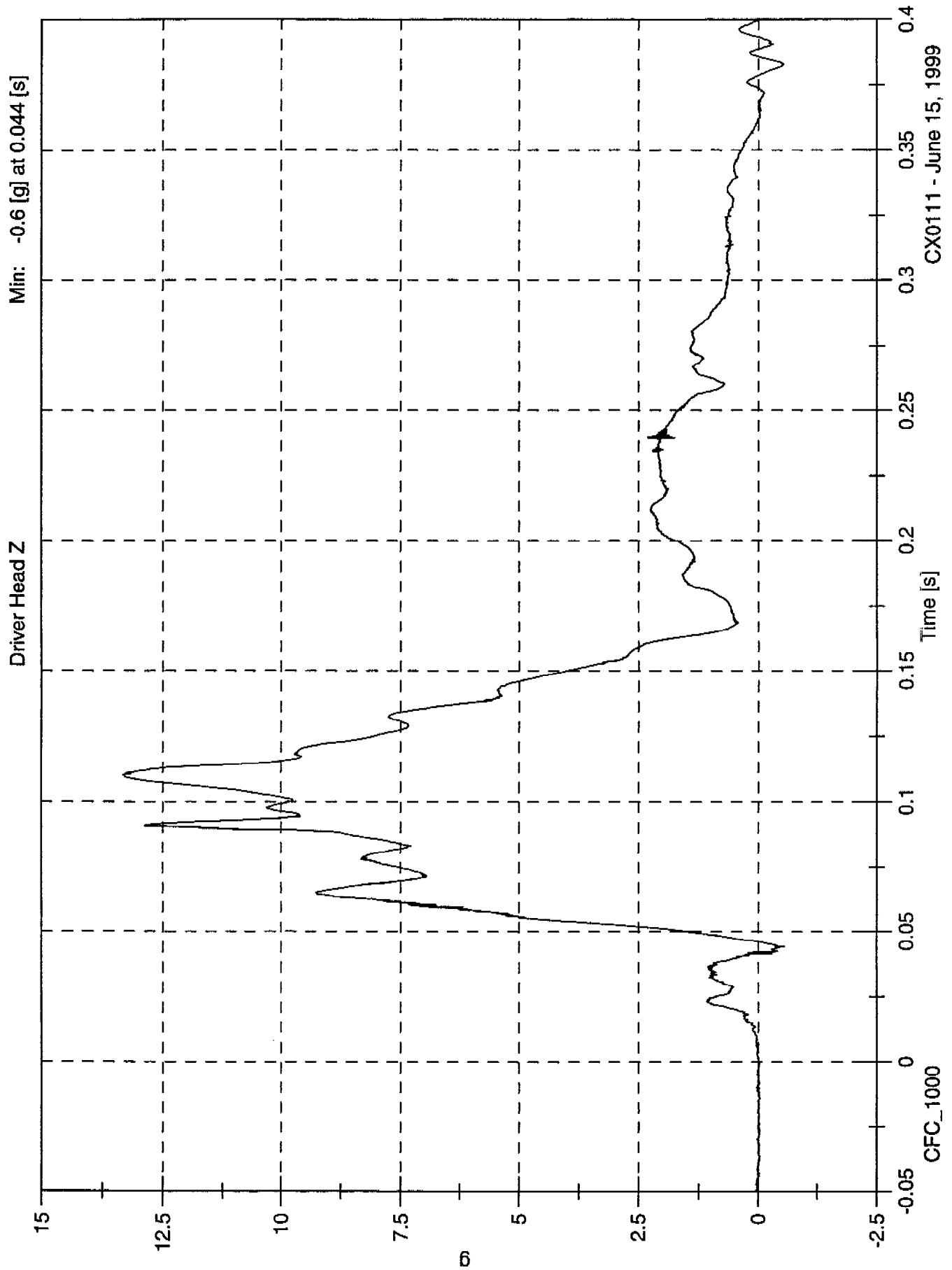
301 Test #10 1999 Chevrolet Tracker

Max: 2.2 [g] at 0.105 [s]
Min: -1.9 [g] at 0.167 [s]



301 Test #10 1999 Chevrolet Tracker

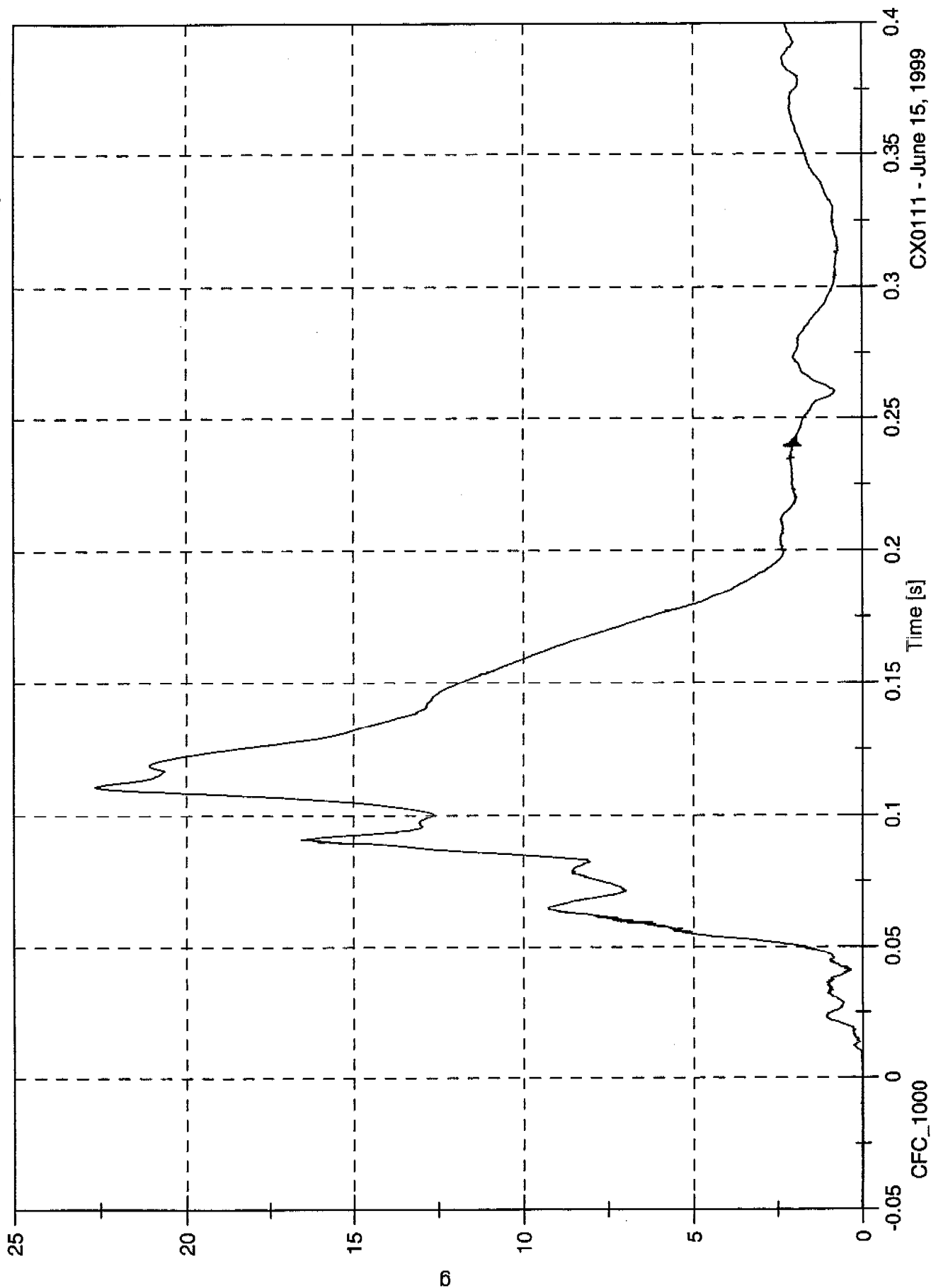
Max: 13.3 [g] at 0.110 [s]
Min: -0.6 [g] at 0.044 [s]



301 Test #10 1999 Chevrolet Tracker

Max: 22.6 [g] at 0.111 [s]
Min: 0.0 [g] at -0.031 [s]

Driver Head Resultant

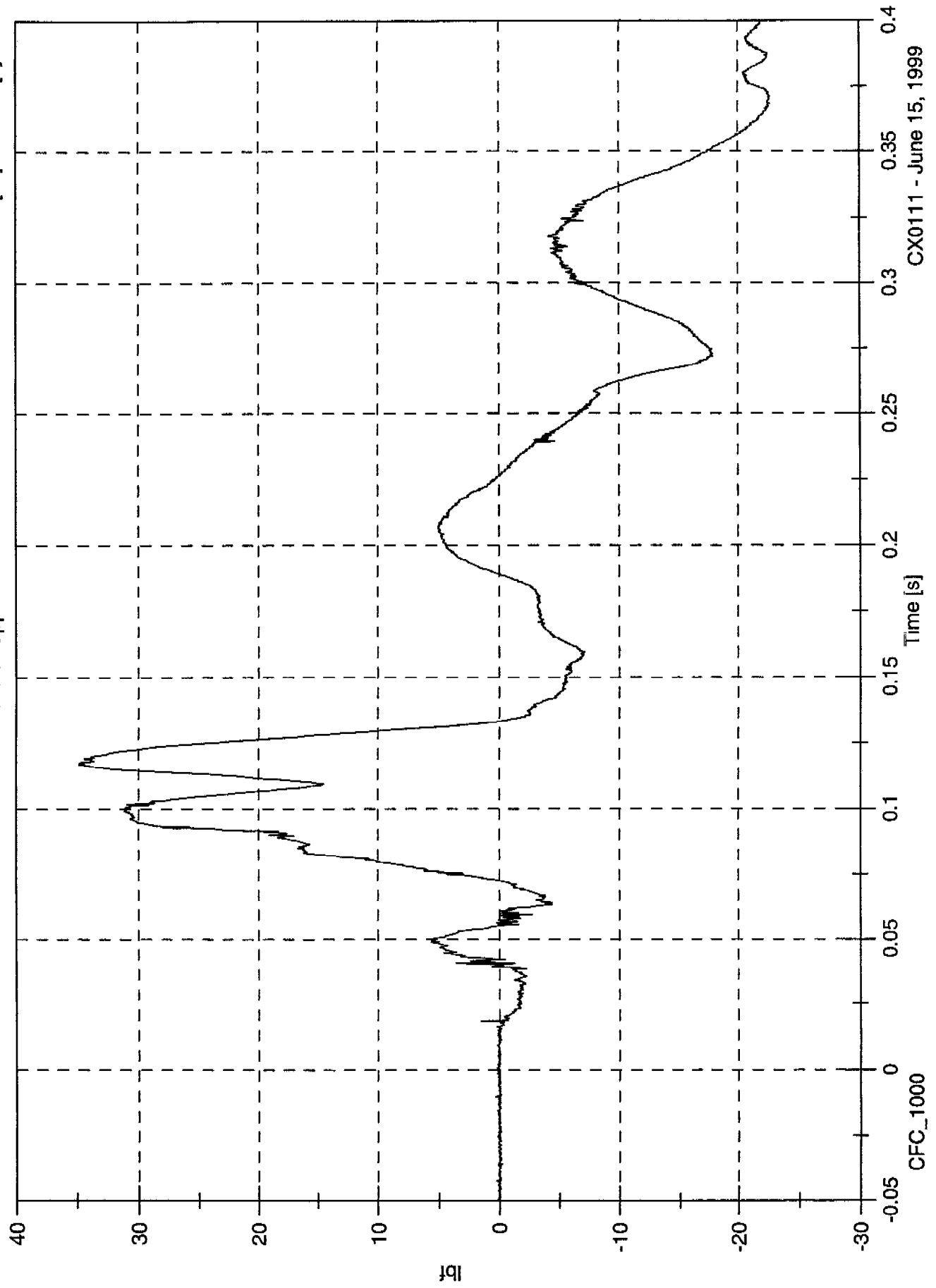


301 Test #10 1999 Chevrolet Tracker

Max: 34.8 [lbf] at 0.117 [s]

Min: -26.1 [lbf] at 0.443 [s]

Driver Upper Neck Fx

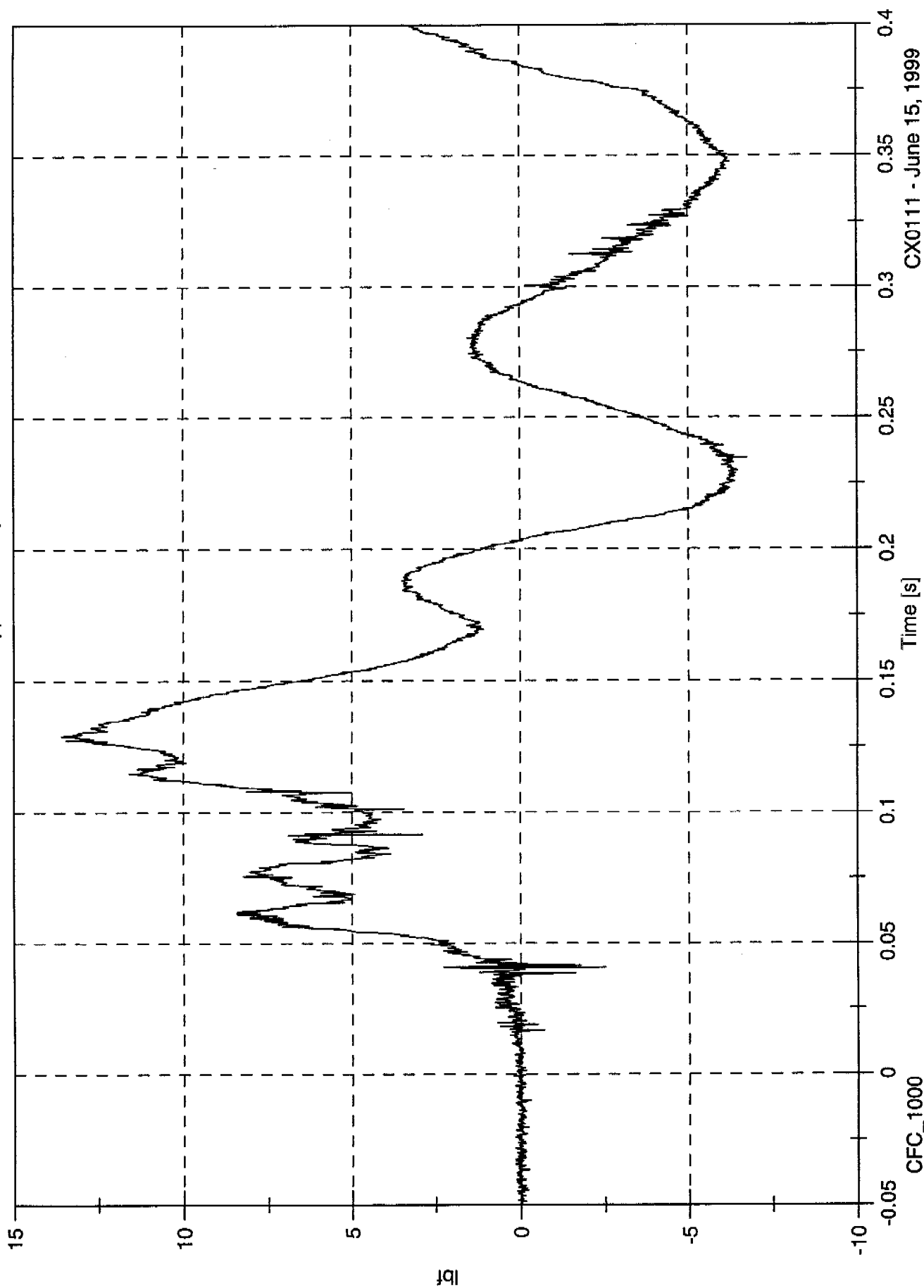


CX0111 - June 15, 1999

301 Test #10 1999 Cherolet Tracker

Max: 13.6 [lbf] at 0.129 [s]
Min: -6.8 [lbf] at 0.235 [s]

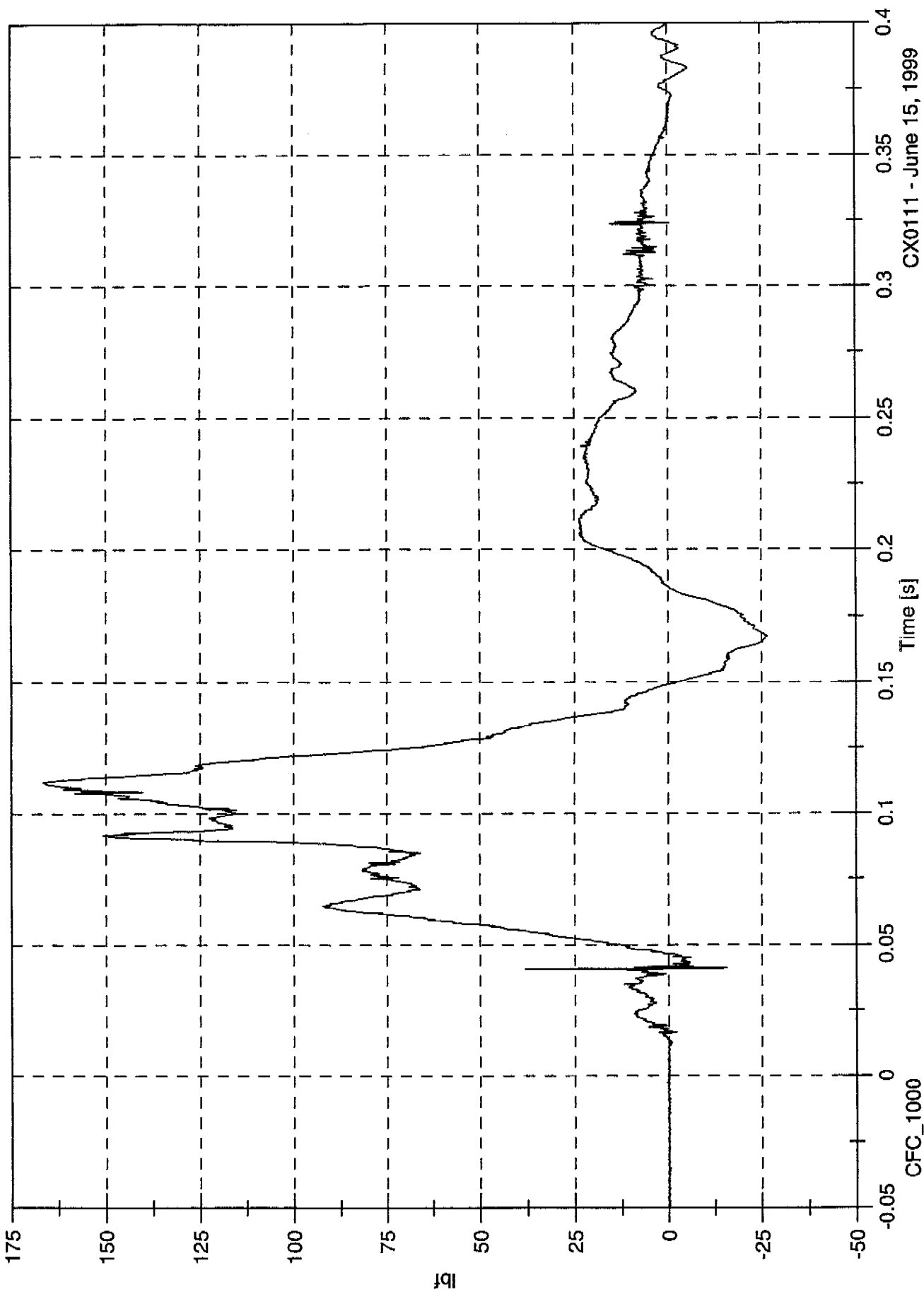
Driver Upper Neck Fy



301 Test #10 1999 Chevrolet Tracker

Max: 166.5 [lbf] at 0.112 [s]
Min: -26.5 [lbf] at 0.168 [s]

Driver Upper Neck Fz

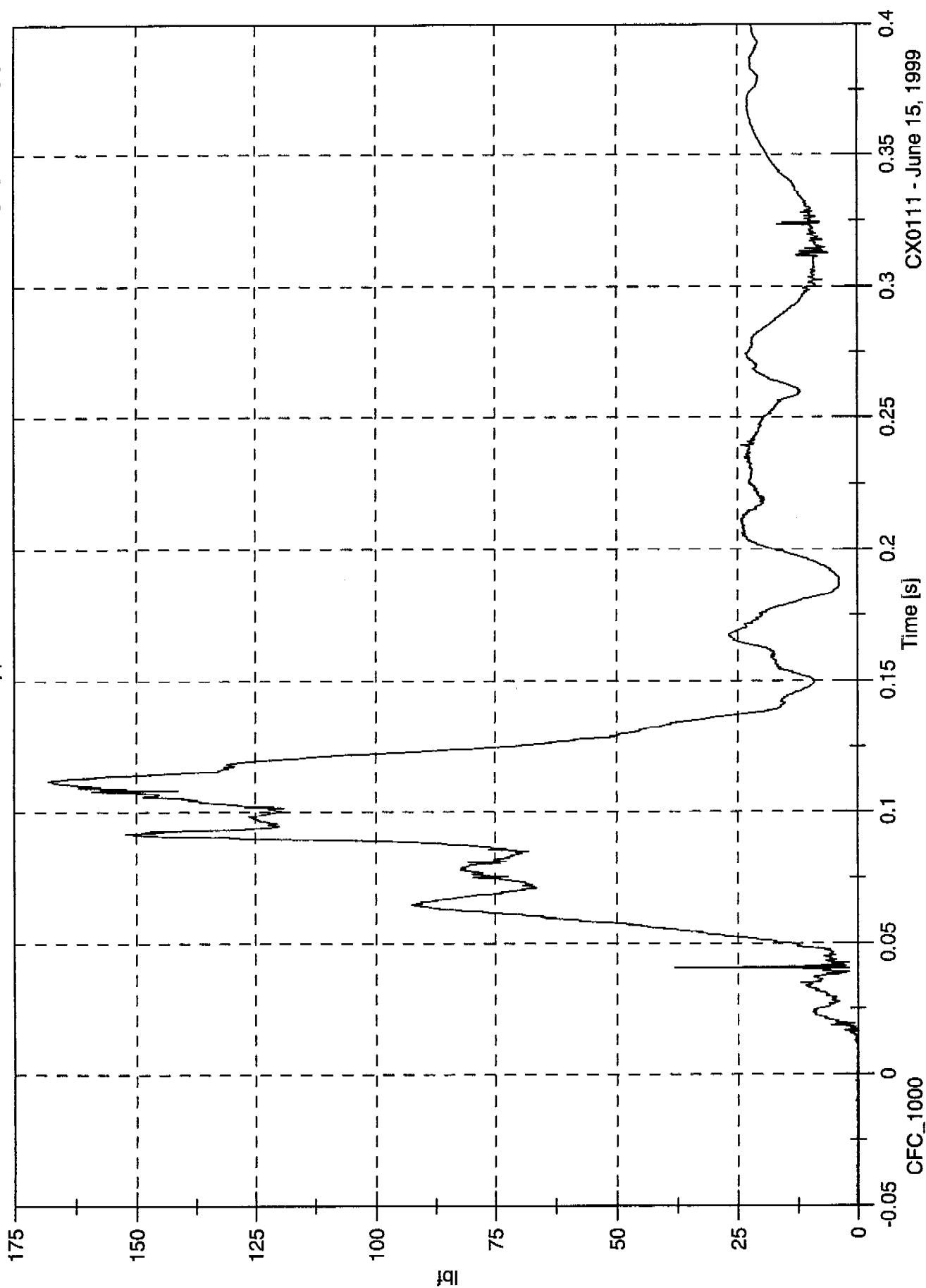


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Driver Upper Neck F Resultant

Max: 168.0 [lbf] at 0.112 [s]
Min: 0.0 [lbf] at -0.079 [s]



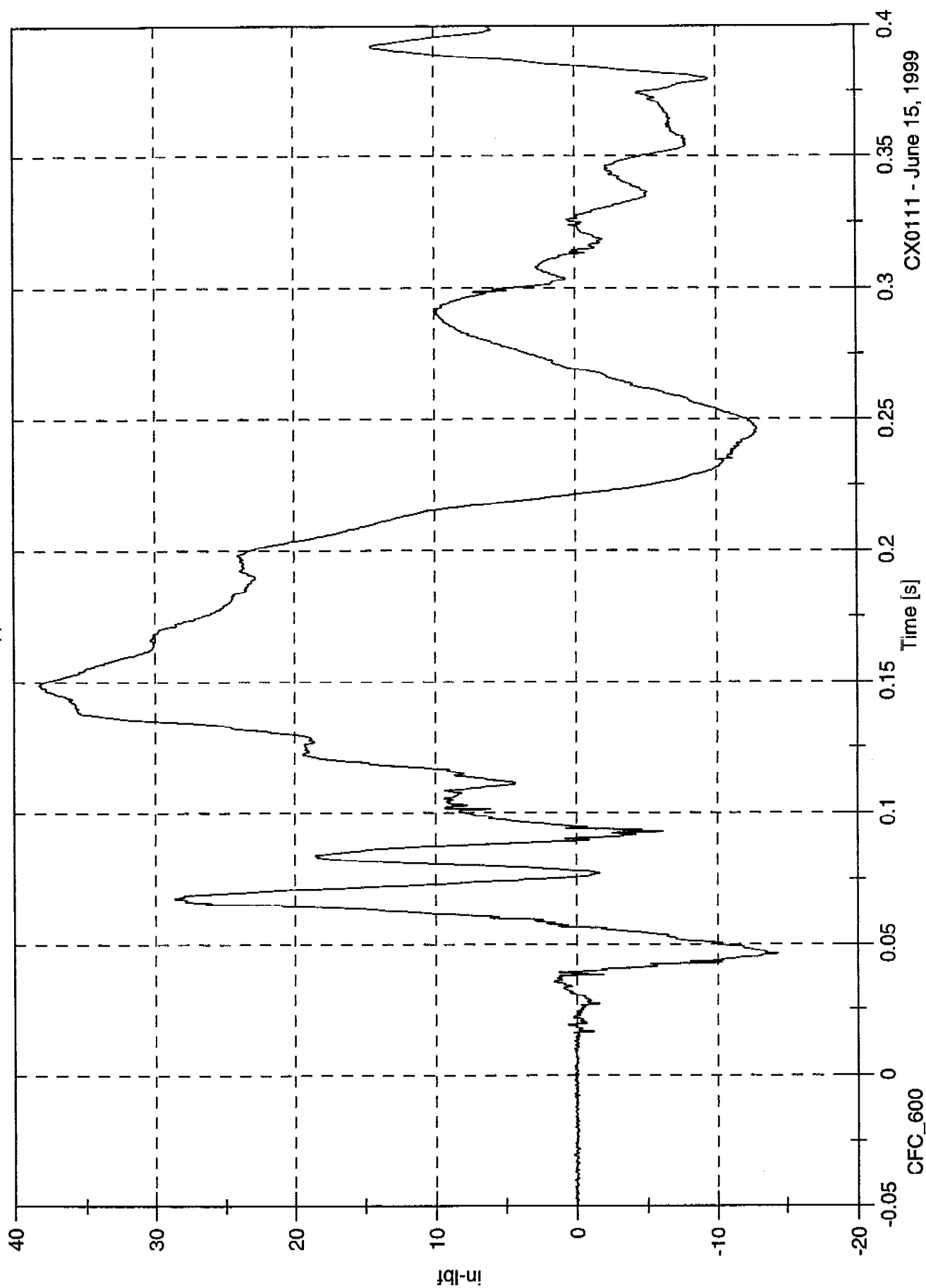
CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 38.2 [in-lbf] at 0.149 [s]

Min: -14.4 [in-lbf] at 0.046 [s]

Driver Upper Neck Mx

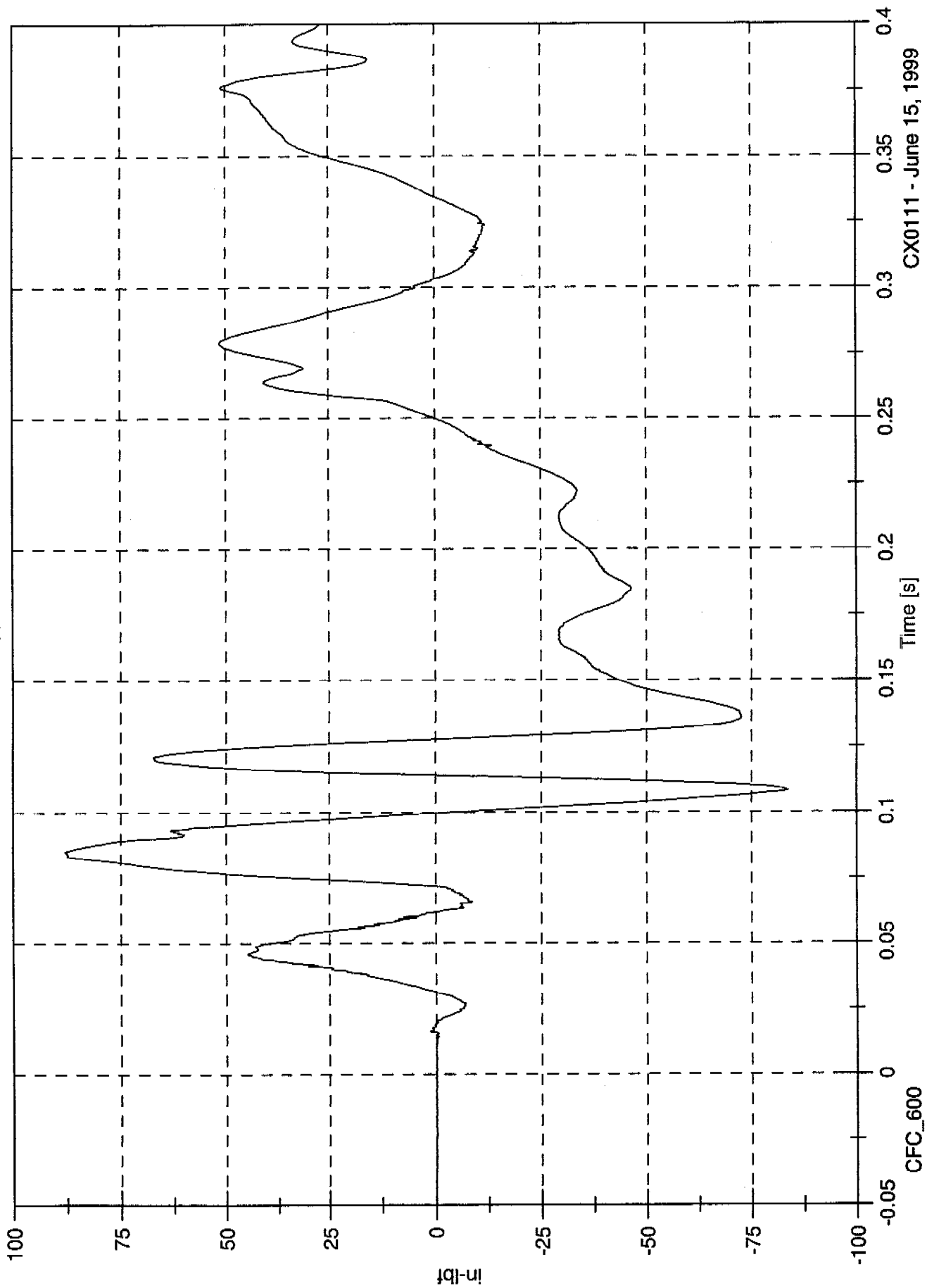


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Driver Upper Neck My

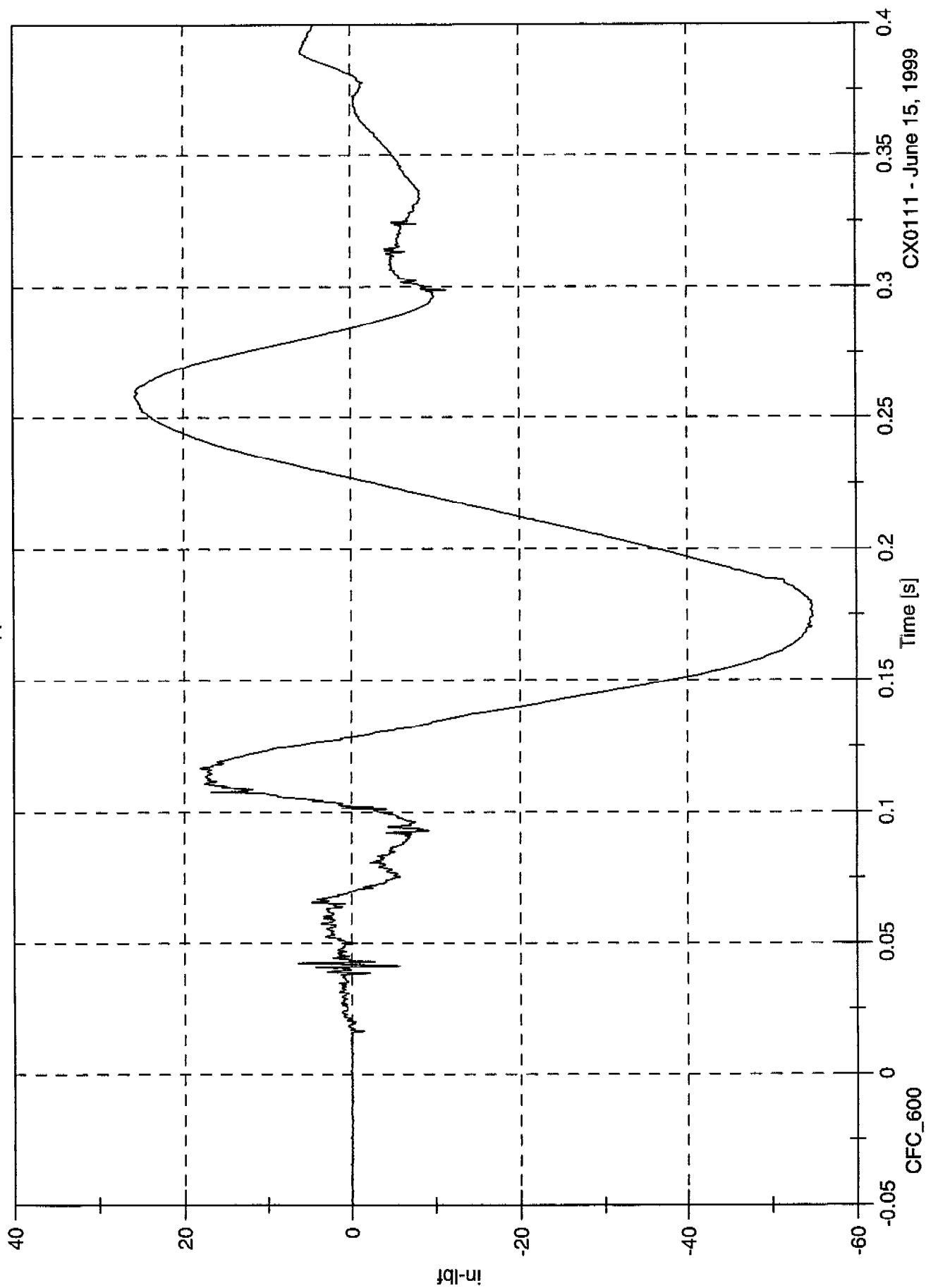
Max: 87.8 [in-lbf] at 0.085 [s]
Min: -83.6 [in-lbf] at 0.108 [s]



301 Test #10 1999 Chevrolet Tracker

Driver Upper Neck Mz

Max: 25.8 [in-lbf] at 0.258 [s]
Min: -54.9 [in-lbf] at 0.174 [s]



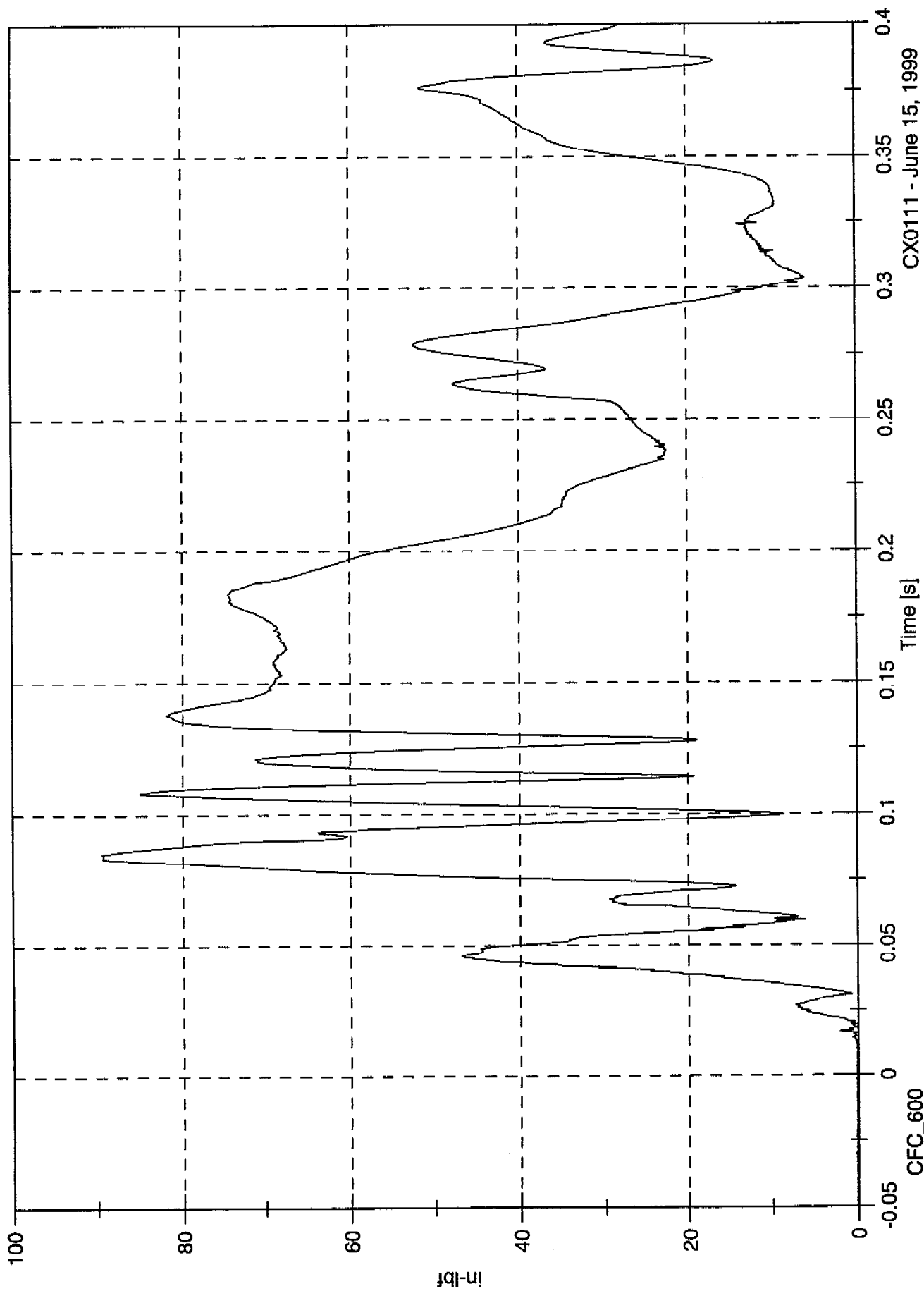
CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 89.4 [in-lbf] at 0.085 [s]

Min: 0.0 [in-lbf] at -0.044 [s]

Driver Upper Neck M Resultant

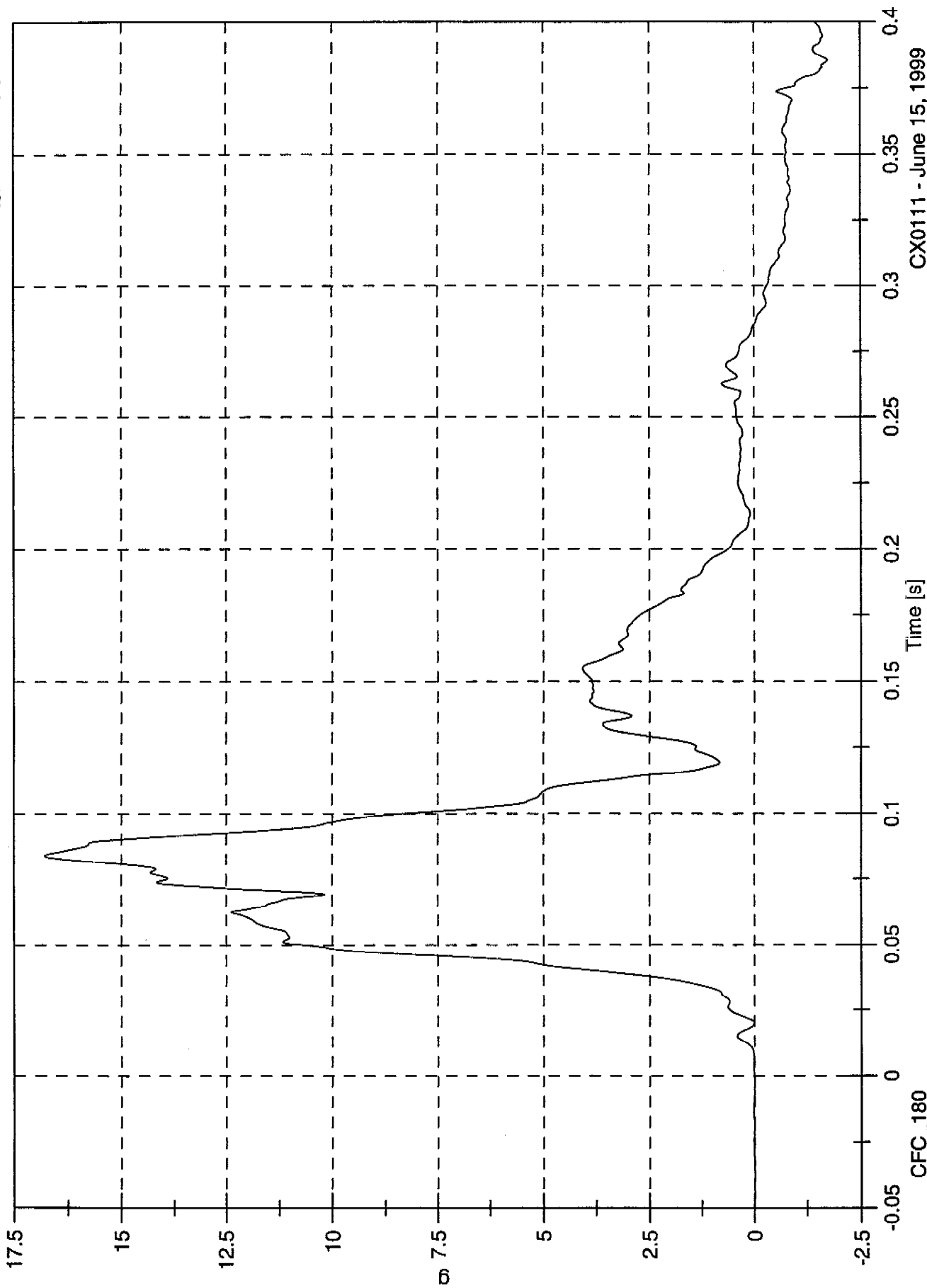


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 16.8 [g] at 0.084 [s]
Min: -1.7 [g] at 0.385 [s]

Driver Chest X



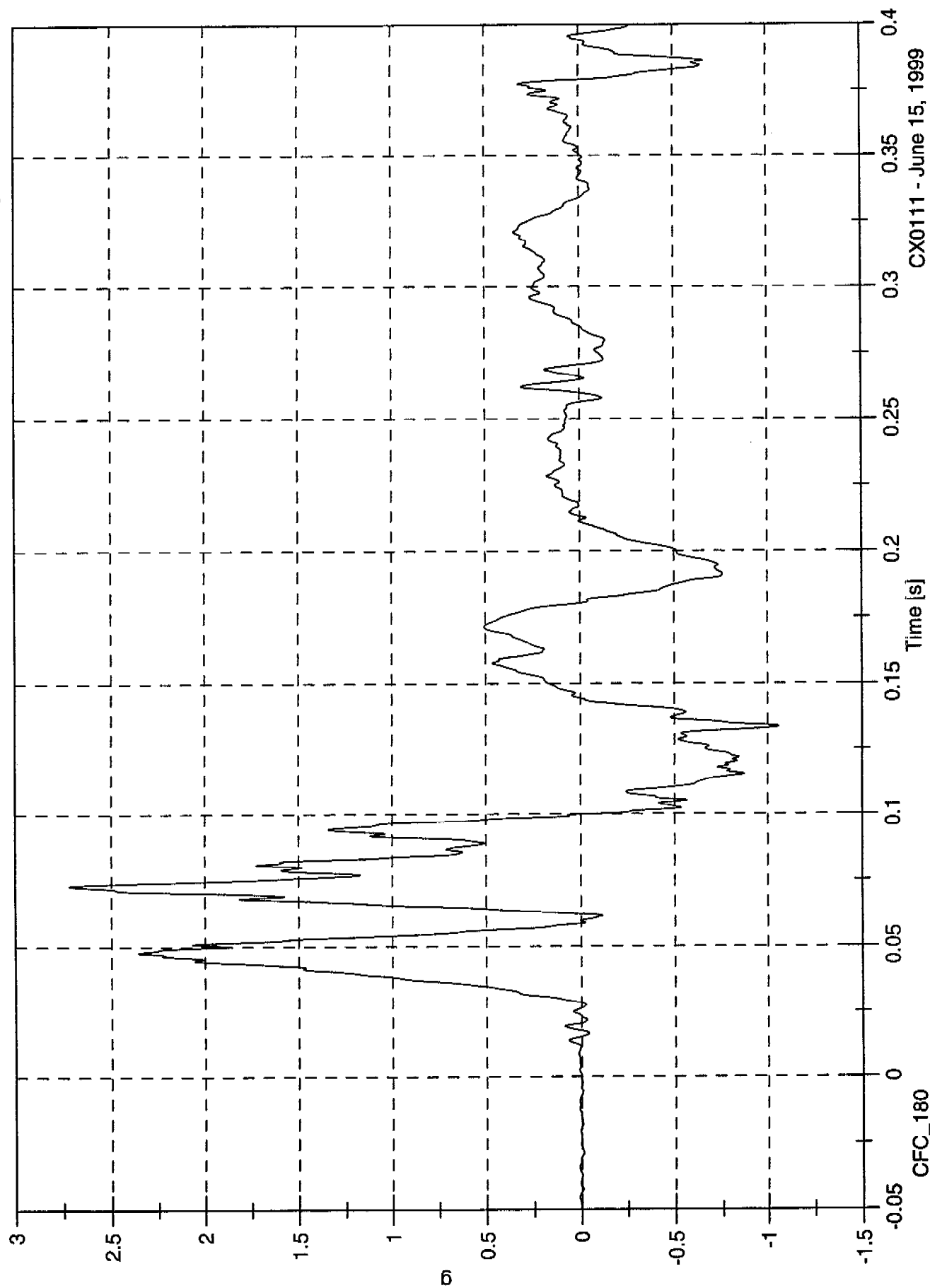
CFC_180

CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 2.7 [g] at 0.073 [s]
Min: -1.1 [g] at 0.134 [s]

Driver Chest Y

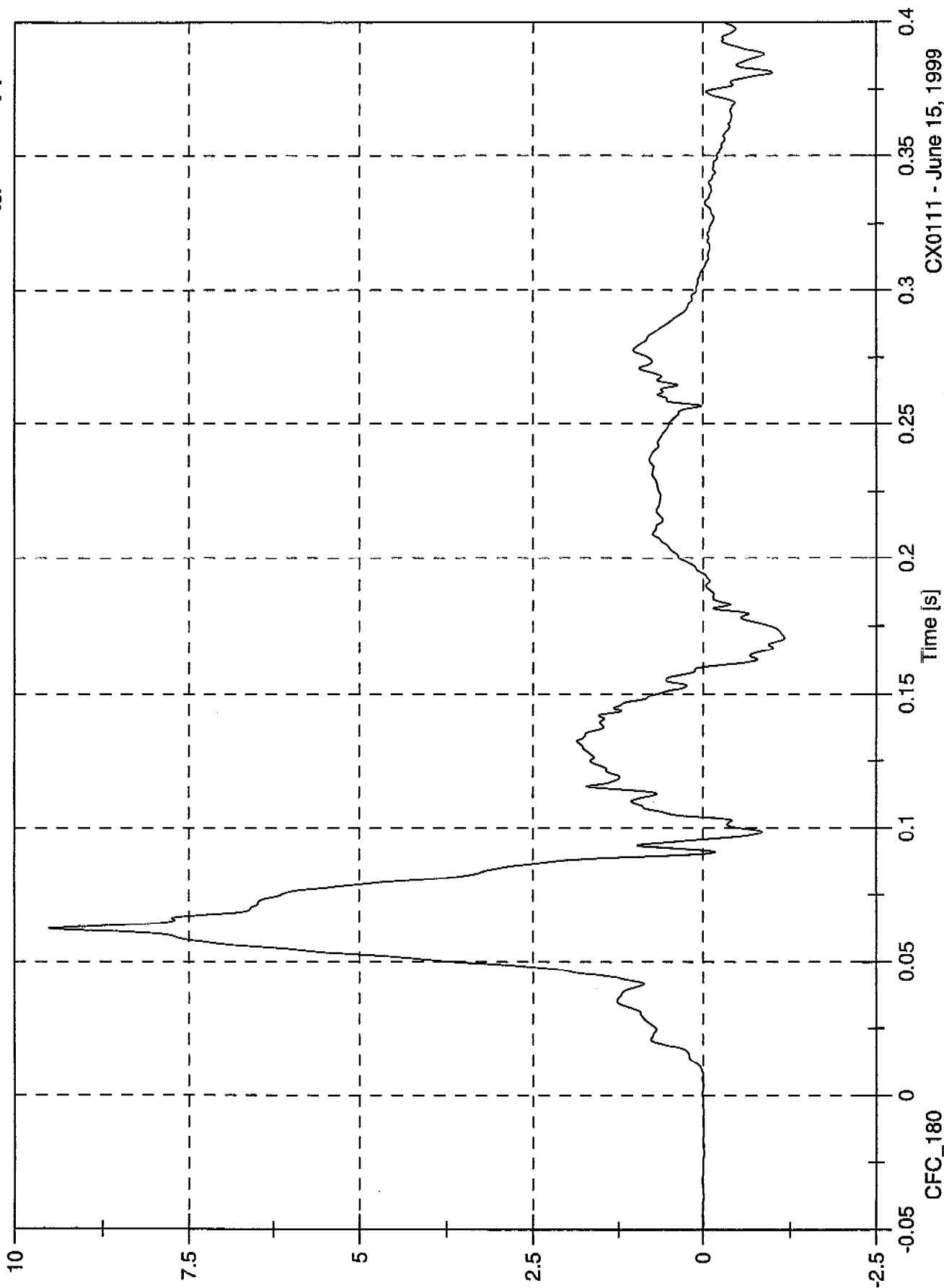


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 9.5 [g] at 0.062 [s]
Min: -1.2 [g] at 0.171 [s]

Driver Chest Z



CFC_180

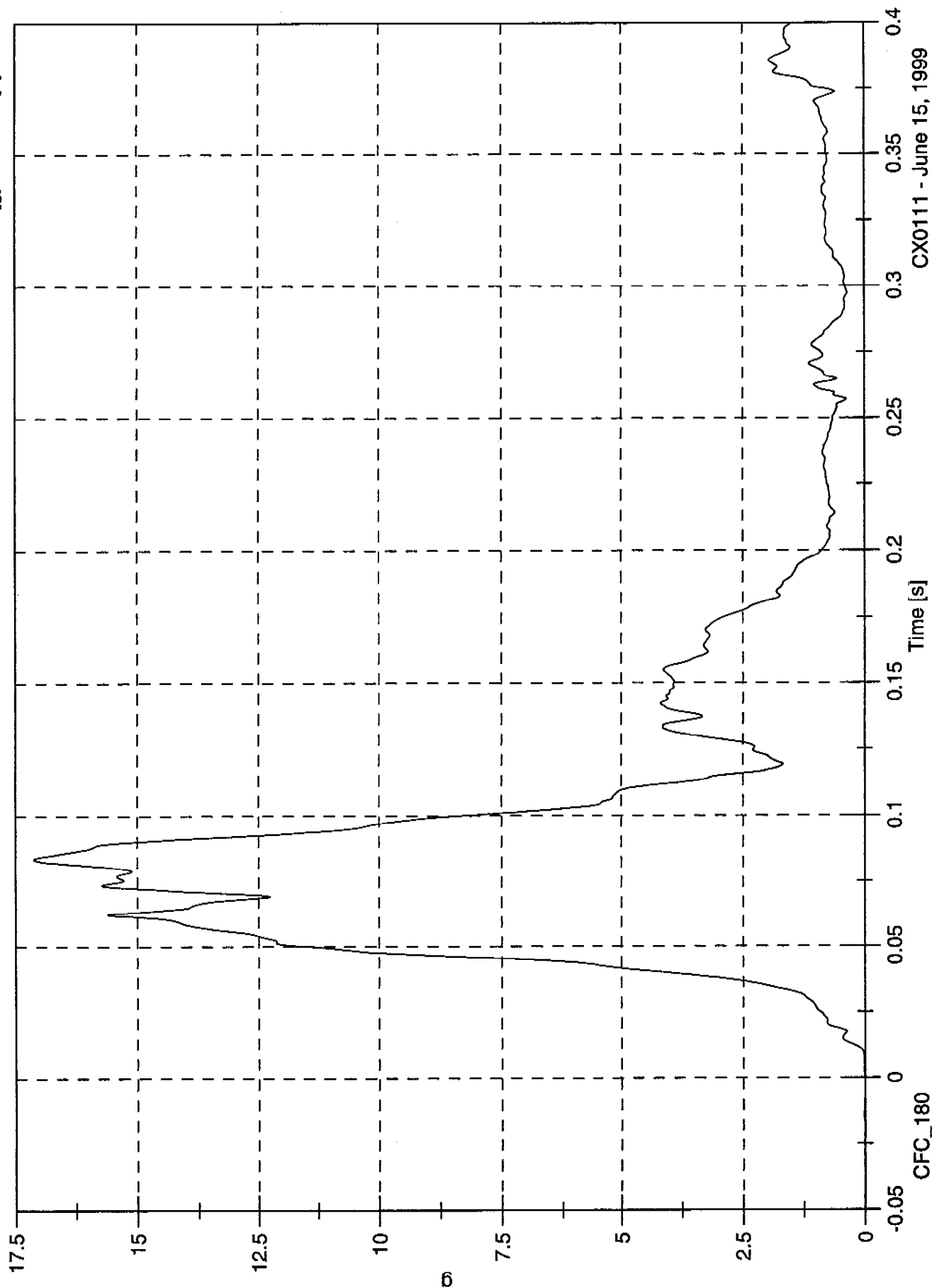
Time [s]

CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 17.1 [g] at 0.084 [s]
Min: 0.0 [g] at -0.001 [s]

Driver Chest Resultant

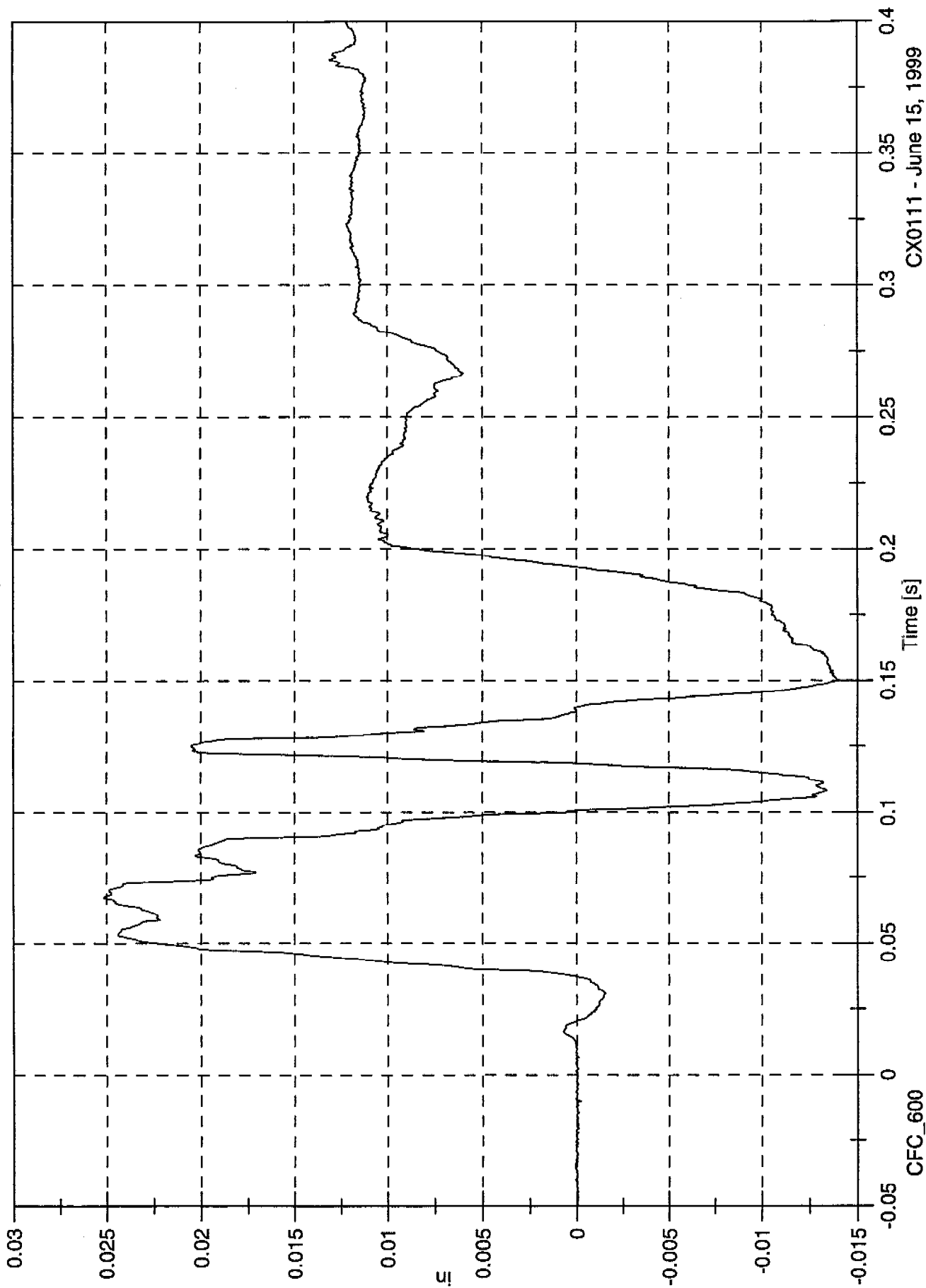


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 0.0 [in] at 0.067 [s]
Min: -0.0 [in] at 0.150 [s]

Driver Chest Displacement

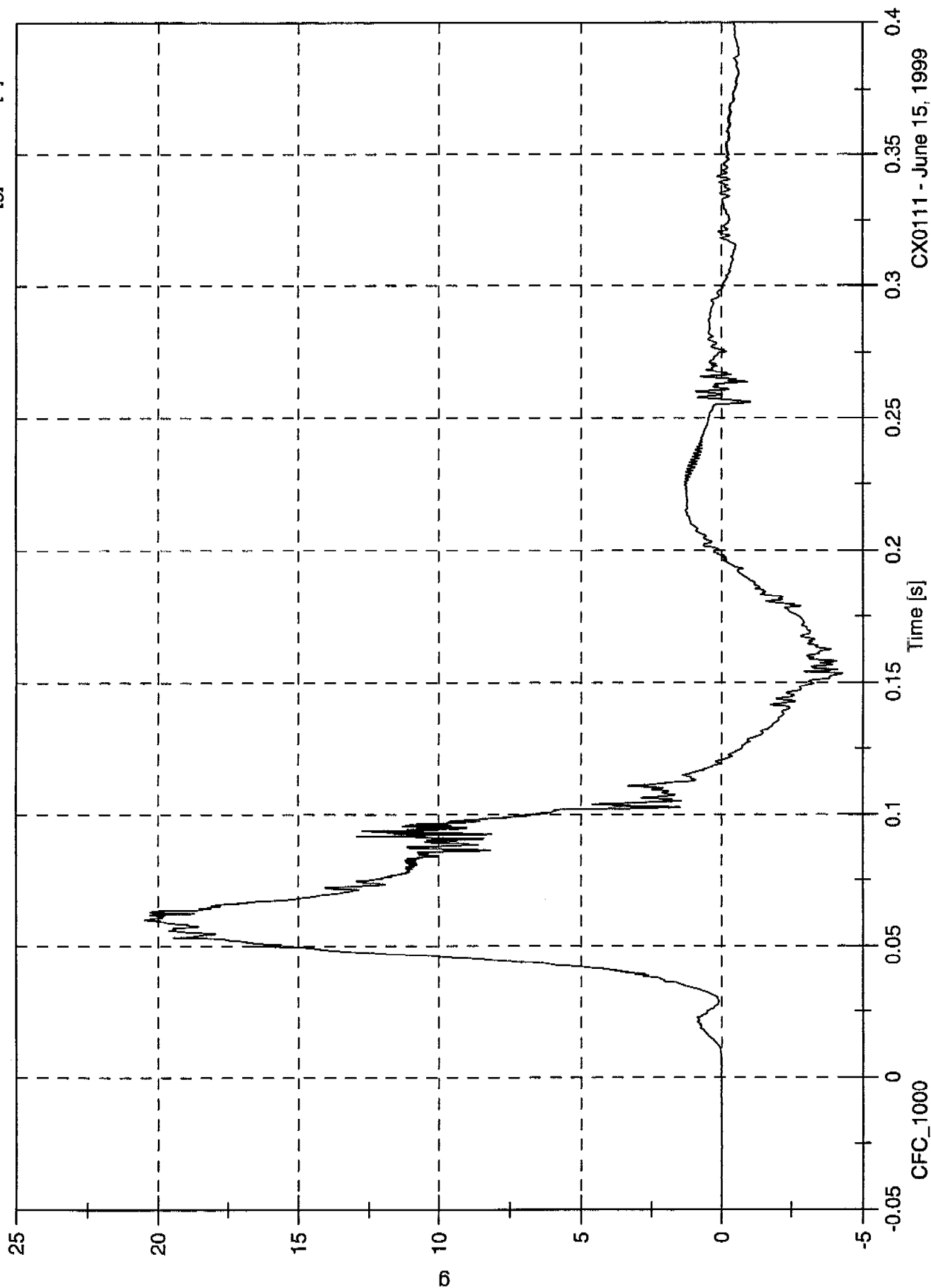


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 20.5 [g] at 0.060 [s]
Min: -4.3 [g] at 0.153 [s]

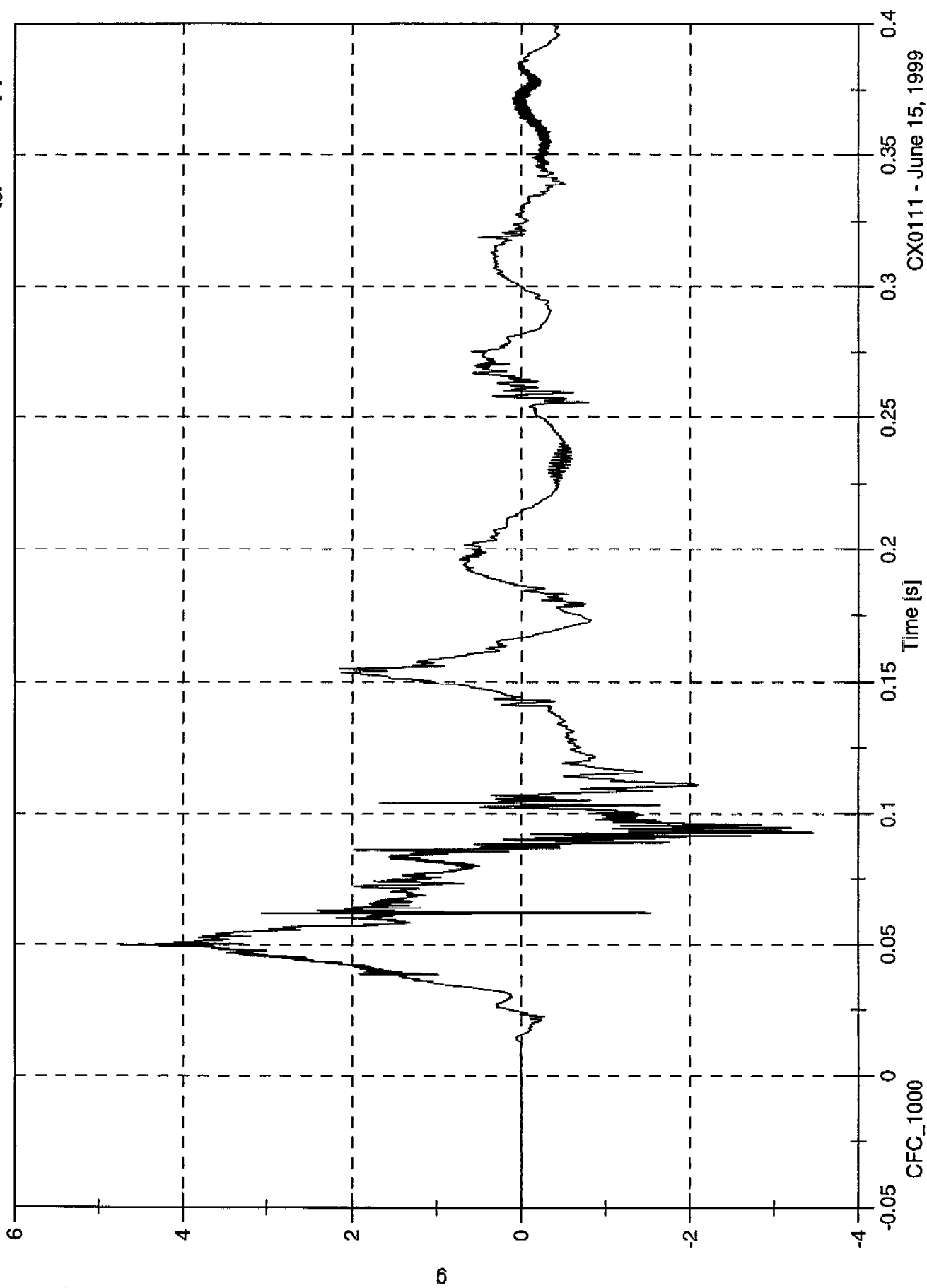
Driver Pelvic X



301 Test #10 1999 Chevrolet Tracker

Max: 4.7 [g] at 0.050 [s]
Min: -3.5 [g] at 0.093 [s]

Driver Pelvic Y



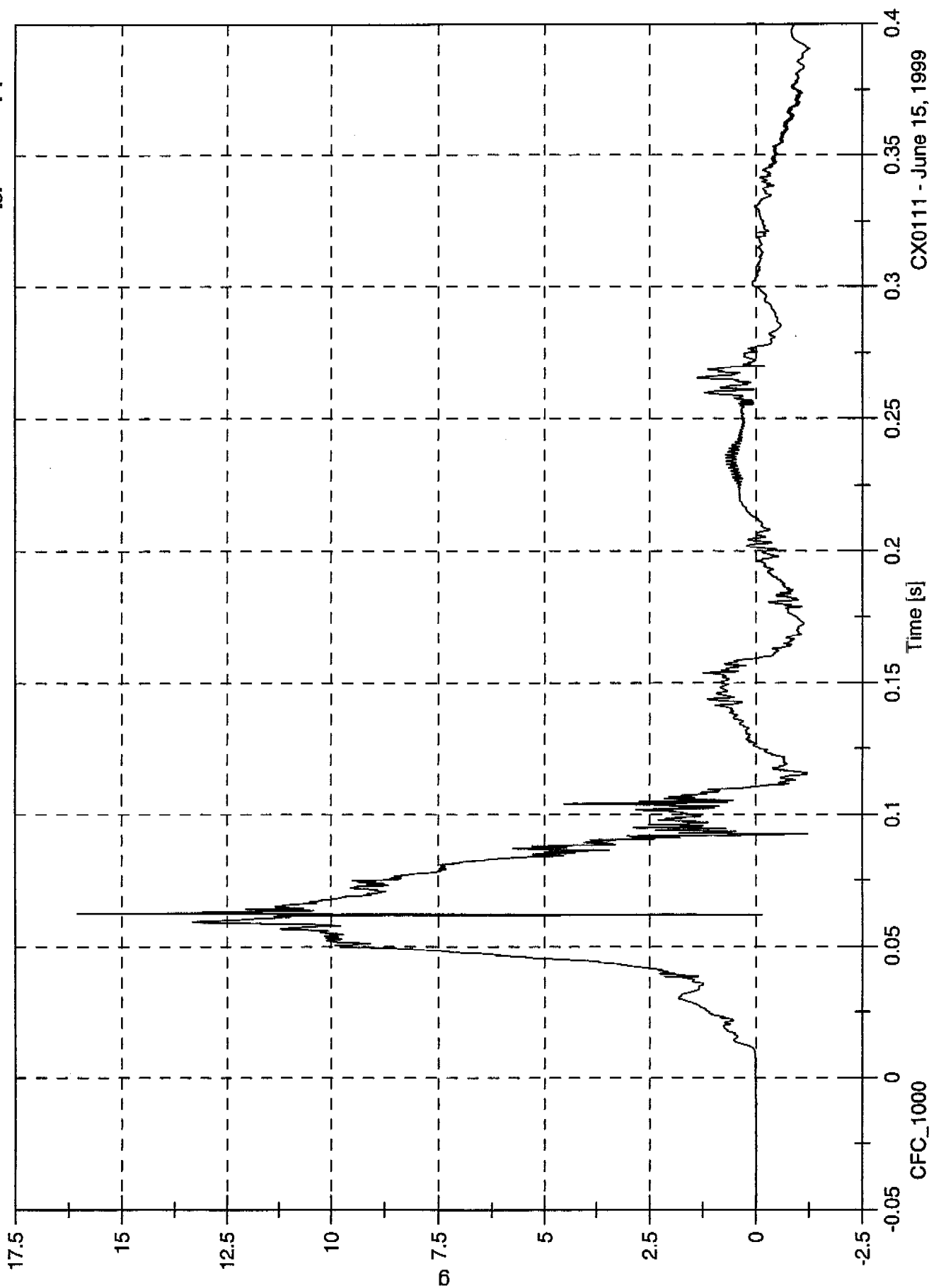
CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 16.1 [g] at 0.062 [s]

Min: -1.3 [g] at 0.391 [s]

Driver Pelvic Z

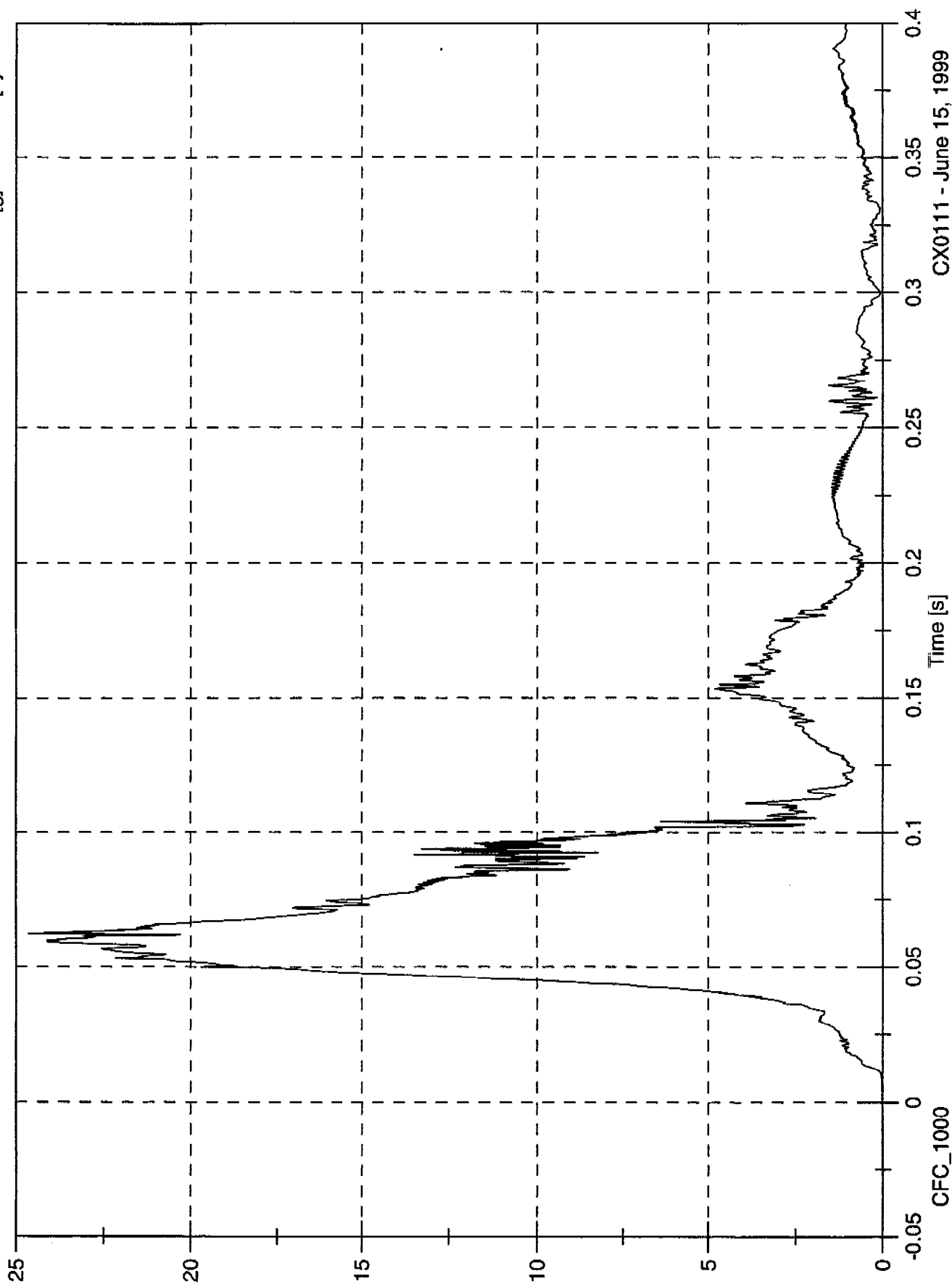


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 24.6 [g] at 0.062 [s]
Min: 0.0 [g] at -0.066 [s]

Driver Pelvic Resultant

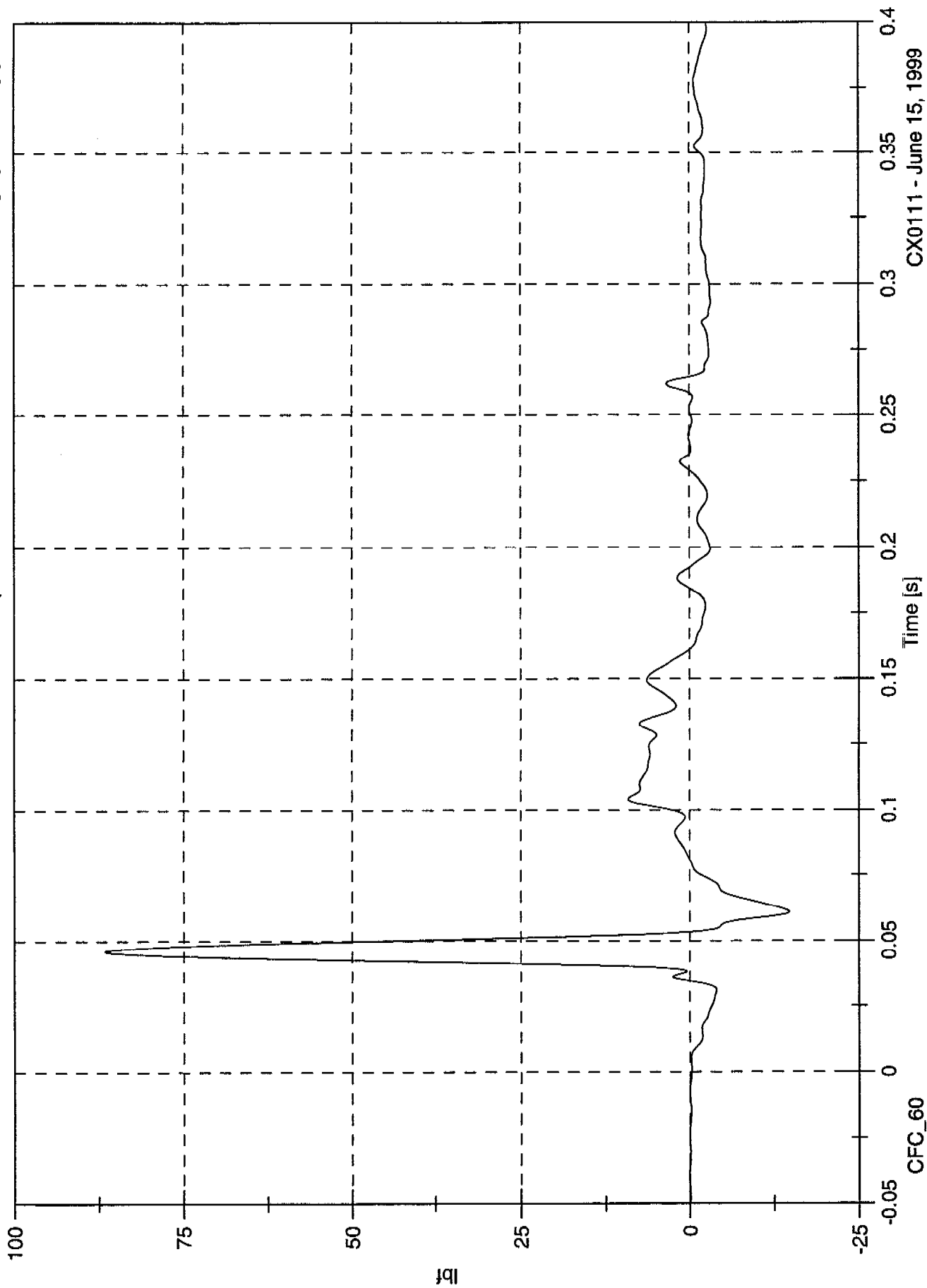


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 86.6 [lbf] at 0.046 [s]
Min: -14.7 [lbf] at 0.061 [s]

Driver Lap Belt

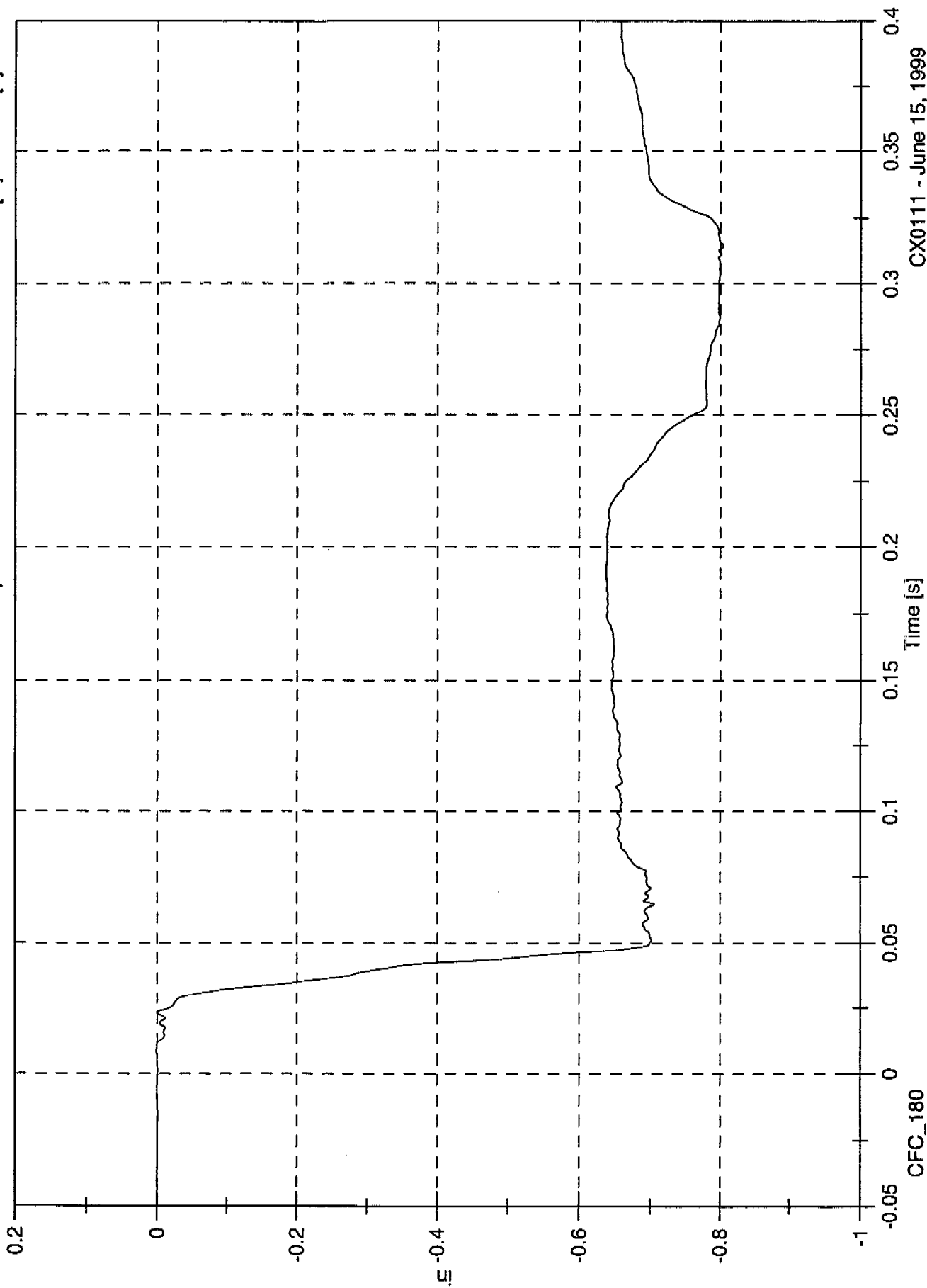


CX0111 - June 15, 1999

301 Test #10 1999 Chevrolet Tracker

Max: 0.0 [in] at 0.008 [s]
Min: -0.8 [in] at 0.315 [s]

Driver Belt Spoolout



CFC_180

CX0111 - June 15, 1999