

REPORT NUMBER: CAL-98-15

V2746

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

**TOYOTA MOTOR CORPORATION  
1998 TOYOTA 4-RUNNER  
4-DOOR SR5**

NHTSA NUMBER: MW5107

CALSPAN TEST NUMBER: 8413-14

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



December 15, 1997

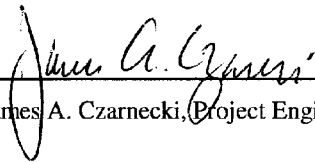
FINAL REPORT

PREPARED FOR:

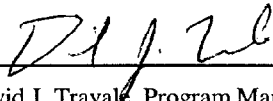
U. S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Safety Performance Standards  
Office of Crashworthiness Standards  
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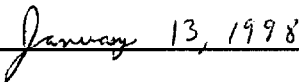
Prepared by:

  
James A. Czarnecki, Project Engineer

Approved by:

  
David J. Travala, Program Manager  
Transportation Research/  
Physical Sciences Department

Approval Date:

  
January 13, 1998

FINAL REPORT ACCEPTANCE BY OCS:

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

\_\_\_\_\_  
Date of Report Acceptance

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

\_\_\_\_\_  
Date of Report Acceptance

# **TECHNICAL REPORT STANDARD TITLE PAGE**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                                             |  |                                                                                                                                                                                                                                 |  |
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| 1. <i>Report No.</i><br>CAL-98-15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  | 2. <i>Government Accession No.</i>                          |  | 3. <i>Recipient's Catalog No.</i>                                                                                                                                                                                               |  |
| 4. <i>Title and Subtitle</i><br>Final Report of NEW CAR ASSESSMENT PROGRAM (NCAP)<br>Testing of a 1998 Toyota 4-Runner 4-Door SR5<br>NHTSA No. MW5107                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                                                             |  | 5. <i>Report Date</i><br>December 15, 1997                                                                                                                                                                                      |  |
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| 9. <i>Performing Organization Name and Address</i><br>Calspan SRL Corporation<br>4455 Genesee Street<br>Buffalo, New York 14225                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                                             |  | 10. <i>Work Unit No.</i>                                                                                                                                                                                                        |  |
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| 15. <i>Supplementary Notes</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                                                             |  |                                                                                                                                                                                                                                 |  |
| 16. <i>Abstract</i><br><br>A frontal barrier test of a 1998 Toyota 4-Runner 4-Door SR5 was performed at Calspan SRL Corporation crash test facility in Buffalo, New York, on December 15, 1997.<br><br>The impact velocity was 56.6 kph and the temperature at the barrier face was 20.5°C. The maximum post-test vehicle crush was 545 mm. The test vehicle was equipped with a 3-point belt system and supplemental second generation airbags at both front outboard seating positions.<br><br>With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appear to comply with the head, chest and femur requirements. |  |                                                             |  |                                                                                                                                                                                                                                 |  |
| 17. <i>Key Words</i><br>56 kph Frontal Barrier Impact test<br>New Car Assessment Program (NCAP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                                             |  | 18. <i>Distribution Statement</i><br><u>Copies of this report are available from:</u><br>NHTSA Technical Reference Division<br>National Highway Traffic Safety Admin.<br>400 Seventh St., SW, Room 5108<br>Washington, DC 20590 |  |
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## Section 1

### PURPOSE AND SUMMARY OF TEST MW5107

#### PURPOSE

This 56.6 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 56.6 kph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test procedure.

#### SUMMARY

A barrier was impacted by a 1998 Toyota 4-Runner 4-Door SR5 at a velocity of 56.6 kph. The test was performed at the Calspan SRL Corporation on December 15, 1997. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

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

Both ATDs were fully instrumented with head, chest, and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 064) was calibrated previous to this test and the right-front passenger (position 2) ATD (Serial No. 245) was used in one previous test in which the FMVSS 208 requirements were not exceeded. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 97 channels of data were recorded on a P.C. based data acquisition system. Appendix B contains the vehicle,

and dummy response data traces. The load cell barrier and data was not requested for this test. Position No. 1 Belt Elongation data channel did not record accurately and was saturated. Accelerometer No. 2 was damaged early in the event. This data is not accurate after 5 ms. Position No.2 Belt Elongation data channel did not record and was left out of the report. Accelerometer No. 6 data channel did not record properly and is also being omitted from the report.

The driver's HIC was 759.5. The maximum chest deceleration over 3 milliseconds was 56.8 g's and maximum chest deflection was -51.6 mm. Femur loads were -7201.5 Newtons on the left and -4427.8 Newtons on the right.

The right front passenger's HIC was 743.2. Maximum chest deceleration over 3 milliseconds was 58.8 g's and maximum chest deflection was -50.7 mm. Femur loads were 4477.4 Newtons on the left and -5295.0 Newtons on the right.

## SECTION 2

### GENERAL TEST AND VEHICLE PARAMETER DATA

#### DATA SHEET NO. 1 CRASH TEST SUMMARY

Vehicle NHTSA No. :         MW5107         Test Mode :         56 kph Frontal Barrier        

Test Date :         December 15, 1997         Time:         14:30         Temperature :         20.5         °C

Vehicle Make/Model/Body Style :         1998 Toyota 4-Runner 4-Door SR5        

Vehicle Test Weight :         2107         kg

Vehicle/Barrier Impact Angle :         0         °

Impact Velocity :         56.6         kph

Maximum Static Crush :         545         mm

Vehicle Rebound :         748.3         mm

#### DUMMIES:

#### DRIVER

#### PASSENGER

Type :         572E                 572E        

Restraint System :         Airbag with 3 point belt system                 Airbag with 3 point belt system        

Number of Data Channels :         97        

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 airbag; Top of Head to sunvisor; Side and top of head to B-pillar trim                 Face to airbag; Top of Head to Ceiling; Side and top of head to B-Pillar trim and sunvisor        

Abdomen :         -                 -        

Chest         Airbag                 Airbag        

Knees         Knee Bolster                 Knee Bolster

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION :

Year/Make/Model/Body Style : 1998 Toyota 4-Runner 4-Door SR5

NHTSA No. : MW5107 ; VIN: JT3HN86R8W0134275 ; Color : White

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

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

Transmission Data : 4 speeds; - Manual; x 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 : 12/1/97 ; Odometer Reading 89 km

Selling Dealer : Downing and Hall

& Address: 6179 Transit Rd Lockport, N.Y. 14094

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by : Toyota Motor Corporation

Date of Manufacture 8/97

GVWR : 2381 kg; GAWR: 1202 kg FRONT; 1361 kg REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load : 200 kpa FRONT

200 kpa REAR

Recommended Tire Size : P225/75R15

\* Recommended Cold Tire Pressure : 200 kpa FRONT; 200 kpa REAR

Size of Tires on Test Vehicle: P225/75R15 ; 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) = 553.5 kg

No. of Occupants x 68 kg = 340 kg

Rated Cargo/Luggage Weight (RCLW) = 214\*\* kg

\*Tire pressure used for test

\*\*136 kg maximum was used for test.

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

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

|                                      |   |                |    |                          |   |              |    |
|--------------------------------------|---|----------------|----|--------------------------|---|--------------|----|
| Right Front                          | = | <u>480</u>     | kg | Right Rear               | = | <u>416</u>   | kg |
| Left Front                           | = | <u>509.5</u>   | kg | Left Rear                | = | <u>422</u>   | kg |
| TOTAL FRONT                          | = | <u>989.5</u>   | kg | TOTAL REAR               | = | <u>838.0</u> | kg |
| TOTAL DELIVERED WEIGHT =             |   | <u>1,827.5</u> | kg |                          |   |              |    |
| % of Total Front of Vehicle Weight = |   | <u>54.1</u>    | %  | % of Total Rear Weight = |   | <u>45.9</u>  | %  |

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT :

|                                     |   |                |    |
|-------------------------------------|---|----------------|----|
| Total Delivered Weight (UDW)        | = | <u>1,827.5</u> | kg |
| Rated Cargo/Luggage Weight (RCLW)   | = | <u>136.0</u>   | kg |
| Weight of 2 p.572 Dummies @ 76 each | = | <u>152</u>     | kg |
| TARGET TEST WEIGHT                  | = | <u>2,115.5</u> | kg |

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

|                                                   |   |                |    |                          |   |                |    |
|---------------------------------------------------|---|----------------|----|--------------------------|---|----------------|----|
| Right Front                                       | = | <u>504</u>     | kg | Right Rear               | = | <u>544</u>     | kg |
| Left Front                                        | = | <u>522</u>     | kg | Left Rear                | = | <u>537</u>     | kg |
| TOTAL FRONT                                       | = | <u>1,026.0</u> | kg | TOTAL REAR               | = | <u>1,081.0</u> | kg |
| TOTAL TEST WEIGHT =                               |   | <u>2,107.0</u> | kg |                          |   |                |    |
| % of Total Front Weight =                         |   | <u>48.7</u>    | %  | % of Total Rear Weight = |   | <u>51.3</u>    | %  |
| Weight of Ballast Secured in Vehicle Trunk Area = |   | <u>135</u>     | kg |                          |   |                |    |
| Vehicle Components Removed for Weight Reduction:  |   | <u>none</u>    |    |                          |   |                |    |

VEHICLE ATTITUDE (all dimension in millimeters):

|                              |    |                                                   |    |            |    |            |    |            |
|------------------------------|----|---------------------------------------------------|----|------------|----|------------|----|------------|
| AS DELIVERED :               | RF | <u>900</u>                                        | LF | <u>895</u> | RR | <u>912</u> | LR | <u>910</u> |
| FULLY LOADED :               | RF | <u>900</u>                                        | LF | <u>895</u> | RR | <u>863</u> | LR | <u>854</u> |
| AS TESTED :                  | RF | <u>900</u>                                        | LF | <u>895</u> | RR | <u>872</u> | LR | <u>861</u> |
| Vehicle's Wheel Base :       |    | <u>2670</u> mm                                    |    |            |    |            |    |            |
| Location of Vehicle's C.G. : |    | <u>1,369.8</u> mm rearward of front wheel center. |    |            |    |            |    |            |

FUEL SYSTEM DATA :

|                                                                                                                                                             |                          |                      |                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------|----------------------------------|
| Fuel System Capacity From Owner's Manual                                                                                                                    | =                        | <u>70</u>            | liters                           |
| Usable Capacity Figure Furnished by COTR                                                                                                                    | =                        | <u>70</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>64.5</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 side, fuel tank fore of rear axle on left side and 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 : December 15, 1997 Time: 14:30 Temperature: 20.5 °C  
Vehicle NHTSA No. : MW5107  
Required Impact Velocity Range : 55.7 to 57.1 kph

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

Trap No. 1 = 56.6 kph; Trap No. 2 = 56.6 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 = 4480 ; C/L = 4505 ; Left = 4485  
Post-Test Right = 3940 ; C/L = 3960 ; Left = 3955  
Crush Right = 540.0 ; C/L = 545.0 ; Left = 530.0  
AVERAGE = 538.3 mm

VEHICLE REBOUND: (From rigid barrier only.)

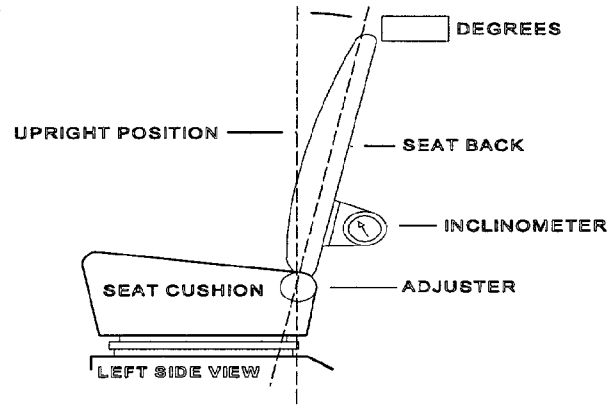
Distance from front of test vehicle to impact point :  
Right = 761 ; C/L = 735 ; Left = 749  
AVERAGE = 748.3 mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 1998 Vehicle Model: Toyota 4-Runner Body Style : 4-Door SR5

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.



Seat back angle for driver's seat : 12

Measurement instructions : Recline to 7<sup>th</sup> notch rearward from most upright position

Seat back angle for passenger's seat : 12

Measurement instructions : Recline to 7<sup>th</sup> notch rearward from most upright position

2. Seat Fore and Aft Positioning

Positioning of the driver's seat : Move to the 8th notch rearward from most forward position

Positioning of the passenger's seat (if applicable) : Move to the 8th notch rearward from most forward position

3. Fuel Tank Capacity Data

3.1

A. "Usable Capacity" of the standard equipment fuel tank is 70 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 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 64.5 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.

With ignition 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.

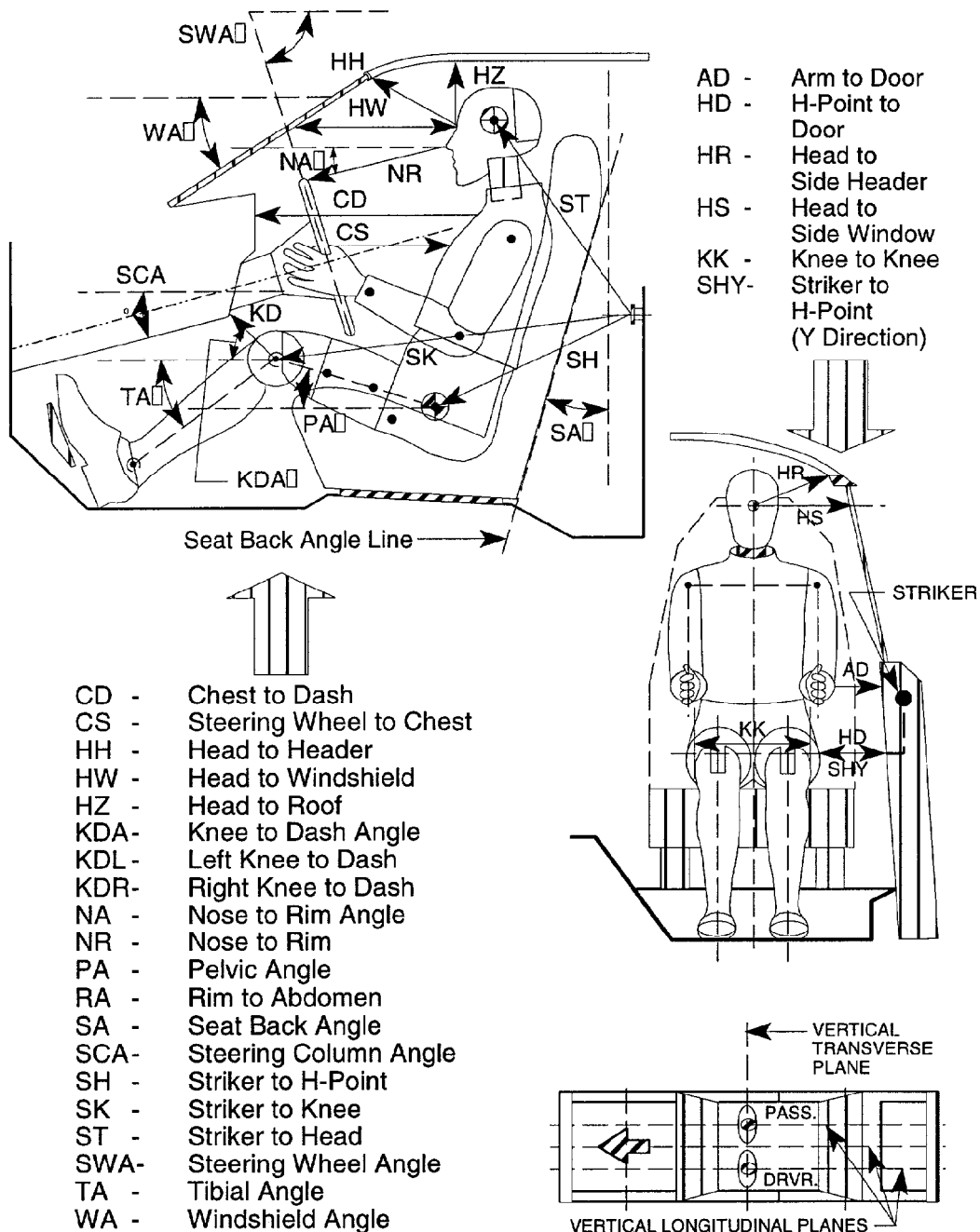
Operational Instructions: \_\_\_\_\_ Tilt 4<sup>th</sup> notch downward from the most upright position

\_\_\_\_\_ 25 degree angle to rocker panel

5. SEAT BELT UPPER ANCHORAGE

Nominal design riding position: \_\_\_\_\_ Placed in midposition.

## DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS

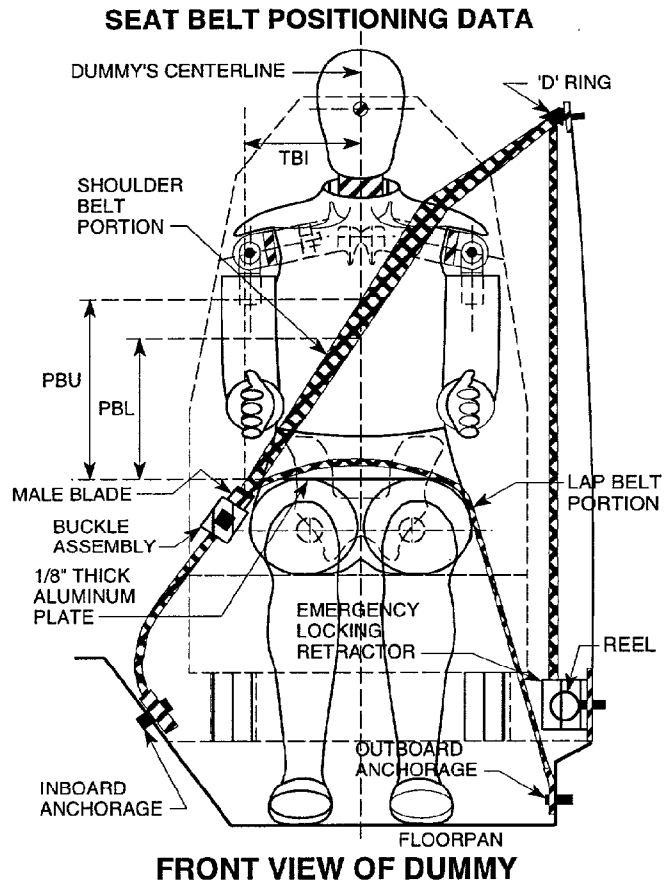


DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE

|      | DRIVER (Serial #064) |             |          | PASS. (Serial # 245) |             |          |
|------|----------------------|-------------|----------|----------------------|-------------|----------|
| WA°  | 38 deg.              |             |          | N/A                  |             |          |
| SWA° | 70 deg.              |             |          | N/A                  |             |          |
| SCA° | 20 deg.              |             |          | N/A                  |             |          |
| SA°  | 12 deg.              |             |          | 12 deg.              |             |          |
| HZ   | 167                  |             |          | 169                  |             |          |
| HH   | 404                  |             |          | 398                  |             |          |
| HW   | 569                  |             |          | 566                  |             |          |
| HR   | 251                  |             |          | 243                  |             |          |
| NR   | 420                  | Angle       | 11 deg.  | N/A                  |             |          |
| CD   | 574                  |             |          | 559                  |             |          |
| CS   | 355                  |             |          | N/A                  |             |          |
| RA   | 209                  |             |          | N/A                  |             |          |
| KDL  | 211                  | Angle (KDA) | 26 deg.  | 191                  |             |          |
| KDR  | 207                  |             |          | 187                  | Angle (KDA) | 34 deg.  |
| PA°  | 22 deg.              |             |          | 22 deg.              |             |          |
| TA°  | 45 deg.              |             |          | 41 deg.              |             |          |
| KK   | 308                  |             |          | 280                  |             |          |
| ST   | 558                  | Angle       | 11 deg.  | 552                  | Angle       | 10 deg.  |
| SK   | 616                  | Angle       | 89 deg.  | 611                  | Angle       | 90 deg.  |
| SH   | 261                  | Angle       | 105 deg. | 247                  | Angle       | 111 deg. |
| SHY  | 240                  |             |          | 232                  |             |          |
| HS   | 284                  |             |          | 287                  |             |          |
| HD   | 166                  |             |          | 135                  |             |          |
| AD   | 86                   |             |          | 91                   |             |          |

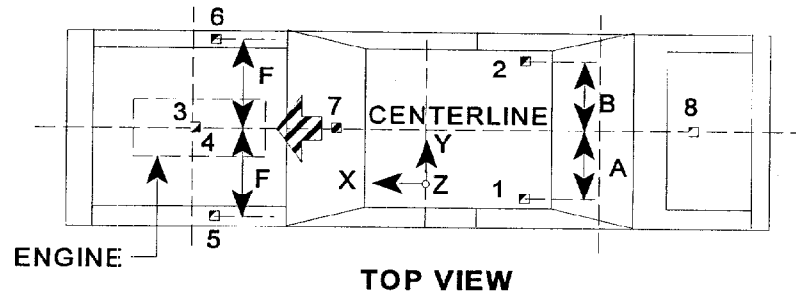
Dimensions in millimeters

**DATA SHEET NO. 6 SEAT BELT POSITIONING DATA**

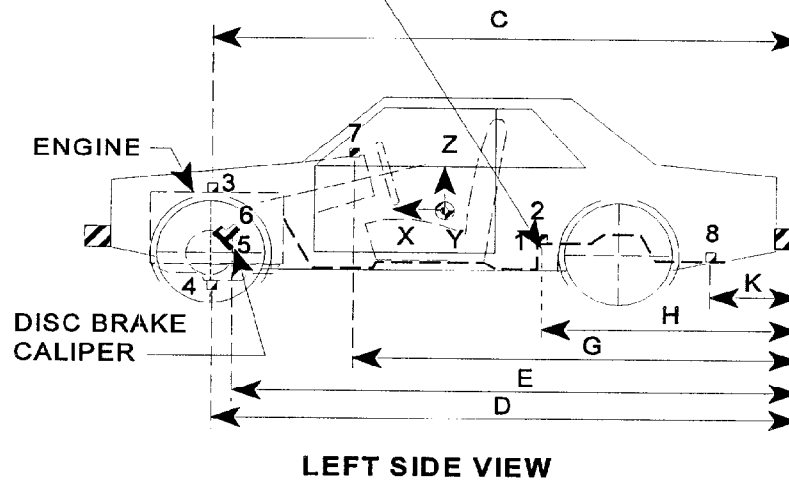


|                                                     | DRIVER DUMMY<br>(mm) | PASSENGER DUMMY<br>(mm) |
|-----------------------------------------------------|----------------------|-------------------------|
| PBU -- Top surface of alum. plate to upper edge     | 318                  | 374                     |
| PBL-- Top surface of alum. plate to belt lower edge | 236                  | 281                     |
| <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  | 580             | 604 redundant |
| B Right Rear Seat Crossmember Y | 585             | 613 redundant |
| C Top of Engine X               | 3676            |               |
| D Bottom of Engine X            | 3490            |               |
| E Disc Brake Calipers X         | 3821            |               |
| F Disc Brake Calipers Y         | 490             |               |
| G Instrument Panel X            | 2982            |               |
| H Rear Seat Crossmembers X      | 1786            |               |
|                                 |                 |               |

| LOCATION<br>NUMBER | DESCRIPTION                          | MAXIMUM VALUE (g's) |       |        |       |
|--------------------|--------------------------------------|---------------------|-------|--------|-------|
|                    |                                      | Pos.                | msec. | Neg.   | msec. |
| 1                  | Rear Seat X-Member @ Left Side       | 3.3                 | 143.8 | -38.9  | 51.3  |
| 2                  | Rear Seat X-Member @ Right Side      | *                   | *     | *      | *     |
| 3                  | Top of Engine Block                  | 43.1                | 46.3  | -104.4 | 27.9  |
| 4                  | Bottom of Engine                     | 32.9                | 45.0  | -95.4  | 32.7  |
| 5                  | Disc Brake Caliper @ Left Side       | 37.9                | 55.6  | -88.4  | 37.5  |
| 6                  | Disc Brake Caliper @ Right Side      | **                  | **    | **     | **    |
| 7                  | Instrument Panel                     | 13.1                | 85.5  | -68.1  | 35.7  |
| 8                  | Rear Seat X-Member @ Left-Redundant  | 3.6                 | 143.7 | -38.7  | 51.3  |
| 9                  | Rear Seat X-Member @ Right-Redundant | 3.5                 | 143.0 | -37.6  | 53.5  |

\* Data Cable damaged after 5 ms.

\*\*Channel did not record

**DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES**

NHTSA Test No.: MW5107 Vehicle: 1998 Toyota 4-Runner 4-Door SR5

| DESCRIPTION               | UNIT | MAXIMUM VALUE |       |         |       |
|---------------------------|------|---------------|-------|---------|-------|
|                           |      | Pos.          | msec. | Neg.    | msec. |
| Pos. 1 Head X             | g's  | 82.3          | 184.7 | -58.7   | 73.5  |
| Pos. 1 Head Y             | g's  | 23.1          | 179.7 | -9.5    | 80.6  |
| Pos. 1 Head Z             | g's  | 43.7          | 69.4  | -5.3    | 116.9 |
| Pos. 1 Head Resultant     | g's  | 89.7          | 184.7 | 0.0     | -22.8 |
| Pos. 2 Head X             | g's  | 20.4          | 204.7 | -52.4   | 76.5  |
| Pos. 2 Head Y             | g's  | 8.7           | 200.8 | -16.9   | 77.1  |
| Pos. 2 Head Z             | g's  | 58.5          | 67.2  | -6.5    | 112.6 |
| Pos. 2 Head Resultant     | g's  | 74.4          | 67.2  | 0.0     | -26.4 |
| Pos. 1 Chest X            | g's  | 10.0          | 195.5 | -56.6   | 67.9  |
| Pos. 1 Chest Y            | g's  | 2.9           | 188.2 | -5.2    | 56.3  |
| Pos. 1 Chest Z            | g's  | 15.6          | 41.9  | -13.1   | 96.1  |
| Pos. 1 Chest Resultant    | g's  | 57.3          | 67.9  | 0.0     | -33.1 |
| Pos. 1 Chest Displacement | mm   | 0.0           | 19.2  | -51.6   | 72.5  |
| Pos. 2 Chest X            | g's  | 5.0           | 153.0 | -58.8   | 63.0  |
| Pos. 2 Chest Y            | g's  | 6.5           | 70.9  | -4.7    | 103.2 |
| Pos. 2 Chest Z            | g's  | 14.9          | 69.5  | -13.0   | 115.8 |
| Pos. 2 Chest Resultant    | g's  | 59.3          | 60.6  | 0.0     | -31.7 |
| Pos. 2 Chest Displacement | mm   | 0.0           | 22.5  | -50.7   | 72.8  |
| Pos. 1 Left Femur         | N    | 457.0         | 41.6  | -7201.5 | 61.5  |
| Pos. 1 Right Femur        | N    | 1877.3        | 38.2  | -4427.8 | 54.2  |
| Pos. 2 Left Femur         | N    | 1006.9        | 39.8  | -4477.4 | 69.0  |
| Pos. 2 Right Femur        | N    | 470.6         | 40.8  | -5295.0 | 57.0  |
| Pos. 1 Left Belt Load     | N    | 3924.9        | 53.5  | -8.6    | 1.2   |
| Pos. 1 Torso Belt Load    | N    | 9470.4        | 68.9  | -27.0   | 209.1 |
| Pos. 2 Right Belt Load    | N    | 5917.2        | 59.2  | -15.3   | 3.2   |
| Pos. 2 Torso Belt Load    | N    | 9321.9        | 61.8  | -111.0  | 172.2 |

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

NHTSA Test No.:     MW5107     Vehicle:     1998 Toyota 4-Runner 4-Door SR5    

| HEAD INJURY CRITERIA (HIC) |       |                       |                       |                                                          |
|----------------------------|-------|-----------------------|-----------------------|----------------------------------------------------------|
|                            | HIC** | t <sub>1</sub> (msec) | t <sub>2</sub> (msec) | Average Acceleration<br>t <sub>1</sub> to t <sub>2</sub> |
| Position #1 - Driver       | 759.5 | 55.2                  | 91.2                  | 53.67                                                    |
| Position #2 - Passenger    | 743.2 | 55.0                  | 88.9                  | 54.5                                                     |

\*\* HIC is as defined in FMVSS 208. The maximum time interval from t<sub>1</sub> to t<sub>2</sub> is 36 milliseconds.

| CLIP SUMMARY*           |            |                       |                       |       |
|-------------------------|------------|-----------------------|-----------------------|-------|
|                         | CLIP (g's) | t <sub>1</sub> (msec) | t <sub>2</sub> (msec) | CSI   |
| Position #1 - Driver    | 56.8       | 67.1                  | 70.1                  | 598.2 |
| Position #2 - Passenger | 58.8       | 60.0                  | 63.7                  | 650.3 |

\* 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: 1998 Toyota 4-Runner 4-Door SR5

NHTSA Test No.: MW5107 Test Date: December 15, 1997

| DESCRIPTION               | UNIT | MAXIMUM VALUE |       |         |       |
|---------------------------|------|---------------|-------|---------|-------|
|                           |      | Pos.          | msec  | Neg.    | msec  |
| Pos. 1 Upper Neck Fx      | N    | 158.2         | 31.6  | -751.4  | 62.0  |
| Pos. 1 Upper Neck Fy      | N    | 135.5         | 62.0  | -343.8  | 93.2  |
| Pos. 1 Upper Neck Fz      | N    | 3749.5        | 69.6  | -3156.2 | 189.3 |
| Pos. 1 Neck Force Result  | N    | 3772.2        | 69.2  | 3.6     | -12.9 |
| Pos. 1 Upper Neck Mx      | N-m  | 40.8          | 190.4 | -9.1    | 162.6 |
| Pos. 1 Upper Neck My      | N-m  | 61.6          | 210.5 | -47.4   | 192.3 |
| Pos. 1 Upper Neck Mz      | N-m  | 19.8          | 96.1  | -13.4   | 150.6 |
| Pos. 1 Neck Moment Result | N-m  | 62.2          | 210.5 | 0.0     | -36.0 |
| Pos. 2 Upper Neck Fx      | N    | 324.1         | 30.0  | -543.6  | 126.7 |
| Pos. 2 Upper Neck Fy      | N    | 328.3         | 65.6  | -382.0  | 30.0  |
| Pos. 2 Upper Neck Fz      | N    | 2797.9        | 67.4  | -407.8  | 344.2 |
| Pos. 2 Neck Force Result  | N    | 2830.6        | 67.4  | 6.1     | 287.4 |
| Pos. 2 Upper Neck Mx      | N-m  | 7.4           | 89.0  | -17.7   | 62.8  |
| Pos. 2 Upper Neck My      | N-m  | 39.8          | 74.5  | -20.8   | 50.3  |
| Pos. 2 Upper Neck Mz      | N-m  | 29.3          | 91.2  | -11.9   | 141.3 |
| Pos. 2 Neck Moment Result | N-m  | 42.3          | 74.5  | 0.0     | -32.6 |
| Pos. 1 Pelvic (X)         | g's  | 7.8           | 105.4 | -67.2   | 54.7  |
| Pos. 1 Pelvic (Y)         | g's  | 17.9          | 56.6  | -12.2   | 41.1  |
| Pos. 1 Pelvic (Z)         | g's  | 7.6           | 38.7  | -19.2   | 73.0  |
| Pos. 1 Pelvic (R)         | g's  | 68.0          | 54.7  | 0.0     | -29.4 |
| Pos. 2 Pelvic (X)         | g's  | 7.9           | 136.0 | -64.7   | 44.6  |
| Pos. 2 Pelvic (Y)         | g's  | 6.4           | 37.3  | -13.9   | 63.9  |
| Pos. 2 Pelvic (Z)         | g's  | 10.6          | 37.0  | -14.4   | 74.6  |
| Pos. 2 Pelvic (R)         | g's  | 64.9          | 44.6  | 0.1     | -26.4 |

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

Vehicle Year/Make/Model/Body Style: 1998 Toyota 4-Runner 4-Door SR5  
NHTSA Test No.: MW5107      Test Date: December 15, 1997

| DESCRIPTION              | UNIT | MAXIMUM VALUE |       |         |       |
|--------------------------|------|---------------|-------|---------|-------|
|                          |      | Pos.          | msec  | Neg.    | msec  |
| P1 Lt Upper Tibia Mx     | N-m  | 22.4          | 40.8  | -42.6   | 51.4  |
| P1 Lt Upper Tibia My     | N-m  | 30.6          | 86.3  | -129.4  | 40.4  |
| P1 Lt Lower Tibia Fx     | N    | 62.6          | 157.0 | -1427.1 | 63.7  |
| P1 Lt Lower Tibia Fz     | N    | 110.3         | 182.4 | -3494.2 | 37.8  |
| P1 Lt Lower Tibia My     | N-m  | 226.0         | 65.4  | -56.7   | 50.0  |
| P1 Rt Upper Tibia Mx     | N-m  | 42.3          | 42.7  | -24.3   | 51.3  |
| P1 Rt Upper Tibia My     | N-m  | 245.7         | 37.7  | -82.7   | 49.9  |
| P1 Rt Lower Tibia Fx     | N    | 110.7         | 115.0 | -2201.0 | 37.7  |
| P1 Rt Lower Tibia Fz     | N    | 93.9          | 121.5 | -1570.1 | 42.3  |
| P1 Rt Lower Tibia My     | N-m  | 538.9         | 56.4  | -250.6  | 37.6  |
| Pos. 2 Lt Upper Tibia Mx | N-m  | 31.6          | 75.8  | -39.7   | 57.9  |
| Pos. 2 Lt Upper Tibia My | N-m  | 71.4          | 78.1  | -242.2  | 36.3  |
| Pos. 2 Lt Lower Tibia Fx | N    | 176.2         | 79.0  | -2009.3 | 36.4  |
| Pos. 2 Lt Lower Tibia Fz | N    | 234.9         | 67.9  | -4577.3 | 37.0  |
| Pos. 2 Lt Lower Tibia My | N-m  | 45.6          | 77.4  | -123.0  | 36.3  |
| Pos. 2 Rt Upper Tibia Mx | N-m  | 89.9          | 64.6  | -23.1   | 269.9 |
| Pos. 2 Rt Upper Tibia My | N-m  | 134.9         | 65.0  | -62.9   | 40.3  |
| Pos. 2 Rt Lower Tibia Fx | N    | 323.5         | 60.1  | -1749.3 | 89.8  |
| Pos. 2 Rt Lower Tibia Fz | N    | 197.0         | 124.2 | -1565.5 | 92.3  |
| Pos. 2 Rt Lower Tibia My | N-m  | 137.2         | 68.9  | -43.5   | 31.1  |

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

Vehicle Year/Make/Model/Body Style: 1998 Toyota 4-Runner 4-Door SR5  
 NHTSA Test No.: MW5107      Test Date: December 15, 1997

| DESCRIPTION          | UNIT | MAXIMUM VALUE |      |        |      |
|----------------------|------|---------------|------|--------|------|
|                      |      | Pos.          | msec | Neg.   | msec |
| Pos. 1 Left Ankle X  | g's  | 32.5          | 11.9 | -128.0 | 37.8 |
| Pos. 1 Left Ankle Z  | g's  | 40.6          | 53.1 | -128.0 | 48.4 |
| Pos. 1 Left Toe Z    | g's  | 74.9          | 55.0 | -150.5 | 48.4 |
| Pos. 1 Right Ankle X | g's  | 60.8          | 49.8 | -271.7 | 37.4 |
| Pos. 1 Right Ankle Z | g's  | 14.8          | 48.7 | -231.5 | 36.9 |
| Pos. 1 Right Toe Z   | g's  | 136.7         | 43.2 | -476.7 | 36.1 |
| Pos. 2 Left Ankle X  | g's  | 32.5          | 68.0 | -296.5 | 36.9 |
| Pos. 2 Left Ankle Z  | g's  | 56.3          | 36.4 | -114.0 | 34.5 |
| Pos. 2 Left Toe Z    | g's  | 89.2          | 36.4 | -340.4 | 34.6 |
| Pos. 2 Right Ankle X | g's  | 25.2          | 70.0 | -92.6  | 43.2 |
| Pos. 2 Right Ankle Z | g's  | 18.9          | 27.9 | -72.4  | 46.4 |
| Pos. 2 Right Toe Z   | g's  | 33.1          | 54.9 | -89.1  | 46.8 |

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

NHTSA Test No.: MW5107 Vehicle: 1998 Toyota 4-Runner 4-Door SR5

| DESCRIPTION                | UNIT | MAXIMUM VALUE |       |       |       |
|----------------------------|------|---------------|-------|-------|-------|
|                            |      | Pos.          | msec  | Neg.  | msec  |
| Pos. 1 Head X(R)           | g's  | 85.5          | 184.7 | -64.6 | 73.0  |
| Pos. 1 Head Y(R)           | g's  | 19.4          | 184.0 | -11.6 | 78.1  |
| Pos. 1 Head Z(R)           | g's  | 48.7          | 184.7 | -10.4 | 211.1 |
| Pos. 1 Head Resultant(RR)  | g's  | 100.2         | 184.7 | 0.0   | -13.0 |
| Pos. 2 Head X(R)           | g's  | 20.3          | 210.8 | -62.4 | 71.2  |
| Pos. 2 Head Y(R)           | g's  | 8.9           | 202.3 | -20.0 | 77.0  |
| Pos. 2 Head Z(R)           | g's  | 62.2          | 67.5  | -7.5  | 127.6 |
| Pos. 2 Head Resultant(RR)  | g's  | 84.1          | 67.5  | 0.0   | -25.9 |
| Pos. 1 Chest X(R)          | g's  | 9.9           | 195.5 | -56.1 | 70.0  |
| Pos. 1 Chest Y(R)          | g's  | 2.3           | 191.2 | -5.4  | 54.9  |
| Pos. 1 Chest Z(R)          | g's  | 15.2          | 42.0  | -12.4 | 99.5  |
| Pos. 1 Chest Resultant(RR) | g's  | 56.7          | 69.9  | 0.0   | -37.8 |
| Pos. 2 Chest X(R)          | g's  | 5.3           | 158.4 | -59.3 | 62.8  |
| Pos. 2 Chest Y(R)          | g's  | 6.1           | 71.0  | -5.6  | 103.4 |
| Pos. 2 Chest Z(R)          | g's  | 15.9          | 69.7  | -12.2 | 117.0 |
| Pos. 2 Chest Resultant(RR) | g's  | 59.7          | 62.8  | 0.0   | -29.9 |

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

NHTSA Test No.: MW5107 Vehicle: 1998 Toyota 4-Runner 4-Door SR5

| HEAD INJURY CRITERIA (HIC) REDUNDANT |       |                       |                       |                                                          |
|--------------------------------------|-------|-----------------------|-----------------------|----------------------------------------------------------|
|                                      | HIC** | t <sub>1</sub> (msec) | t <sub>2</sub> (msec) | Average Acceleration<br>t <sub>1</sub> to t <sub>2</sub> |
| Position #1 - Driver                 | 899.2 | 54.3                  | 90.3                  | 57.4                                                     |
| Position #2 - Passenger              | 999.6 | 54.3                  | 88.5                  | 61.1                                                     |

\*\* HIC is as defined in FMVSS 208. The maximum time interval from t<sub>1</sub> to t<sub>2</sub> is 36 milliseconds.

| CLIP SUMMARY* REDUNDANT |            |                       |                       |       |
|-------------------------|------------|-----------------------|-----------------------|-------|
|                         | CLIP (g's) | t <sub>1</sub> (msec) | t <sub>2</sub> (msec) | CSI   |
| Position #1 - Driver    | 56.6       | 67.3                  | 70.3                  | 588.3 |
| Position #2 - Passenger | 57.9       | 60.9                  | 63.9                  | 646.3 |

\* 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:

|                                                                                            | <u>Driver</u> | <u>Passenger</u> |
|--------------------------------------------------------------------------------------------|---------------|------------------|
| Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems. | <u>1710</u>   | <u>1700</u>      |
| Shoulder belt length as measured on Part 572 Dummy.                                        | <u>850</u>    | <u>833</u>       |
| Lap belt length as measured on Part 572 Dummy.                                             | <u>640</u>    | <u>647</u>       |

SHOULDER BELT SPOOL-OFF DATA:

|                                 |             |             |
|---------------------------------|-------------|-------------|
| As determined by film analysis. | <u>65</u>   | <u>62</u>   |
| As determined mechanically.     | <u>60</u>   | <u>64</u>   |
| As determined electronically.   | <u>71.3</u> | <u>62.4</u> |

BELT STRETCH DATA:

|                                                                           |          |          |
|---------------------------------------------------------------------------|----------|----------|
| Measured electronically between shoulder belt load cell and the "D" ring. | <u>*</u> | <u>*</u> |
| Measured mechanically.                                                    | <u>2</u> | <u>1</u> |

Dimensions in millimeters

\*Channel did not record

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 15 mm molding.

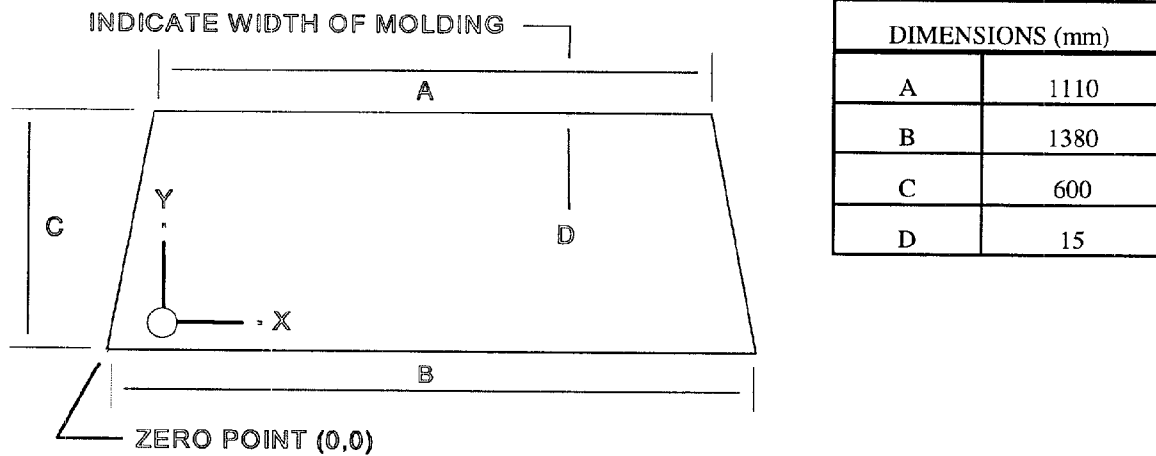
FMVSS 212 REQUIREMENTS:

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 | 1845                 | 1845          | 100            |
| LEFT SIDE  | 1845                 | 1845          | 100            |
| TOTAL      | 3,690                | 3,690         | 100            |

AREA OF RETENTION FAILURE:



FAILURE DETAILS: None

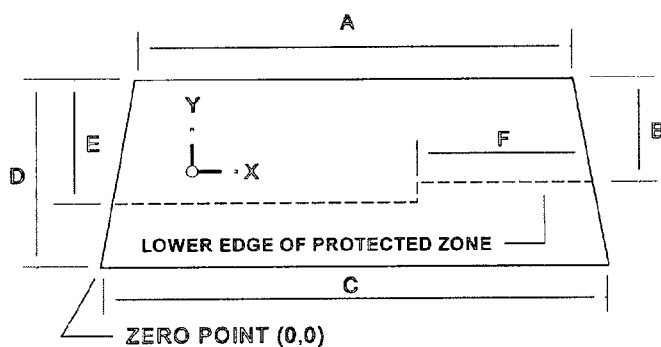
DATA SHEET NO. 11 FMVSS NO. 219 (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA

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)



| DIMENSIONS |      |
|------------|------|
| A          | 1110 |
| B          | 314  |
| C          | 1380 |
| D          | 600  |
| E          | 350  |
| F          | 670  |

FRONT VIEW OF WINDSHIELD

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

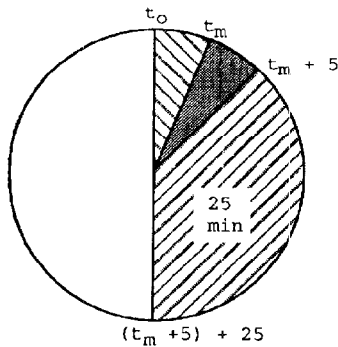
NHTSA TEST No.: MW5107 TEST DATE: December 15, 1997  
VEHICLE MAKE/MODEL: 1998 Toyota 4-Runner

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

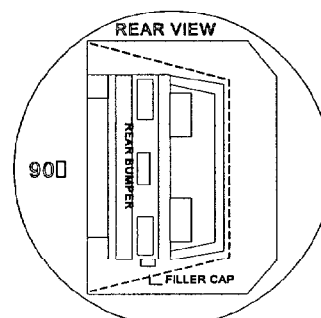
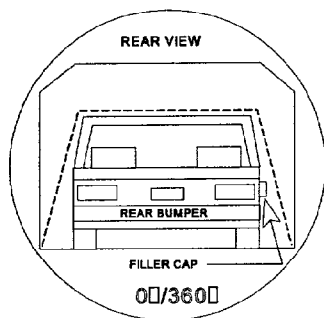
| ACTUAL | MAX ALLOWED |
|--------|-------------|
| 0      | 28 g        |
| 0      | 141 g       |
| 0      | 28 g/min.   |

SOLVENT SPILLAGE DETAILS: None

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

TEST PHASE:  
0-90 deg.

NHTSA Test No.:  
MW5107



INDETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

1 minutes 6 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

**TOTAL**

6 minutes 6 seconds

Next whole minute interval

7 minutes 00 seconds

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATION(S): None

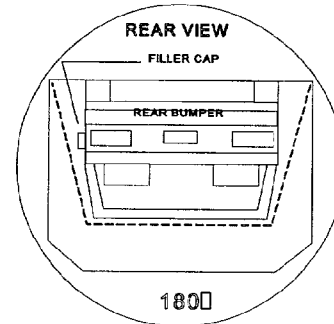
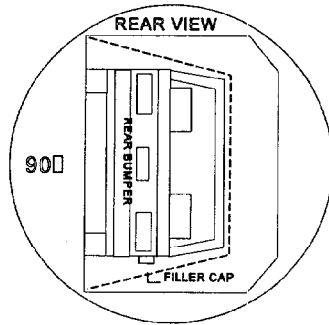
TEST SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:

90-180 deg.

NHTSA Test No.:

MW5107



**I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:**

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

1 minutes 9 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

**TOTAL**

6 minutes 9 seconds

Next whole minute interval

7 minutes 00 seconds

**II. FMVSS 301 REQUIREMENTS:**

**(1) Time Period**

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

**(2) Maximum Allowable Solvent Spillage**

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

**III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:**

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

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

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

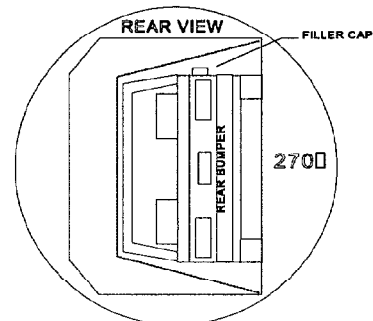
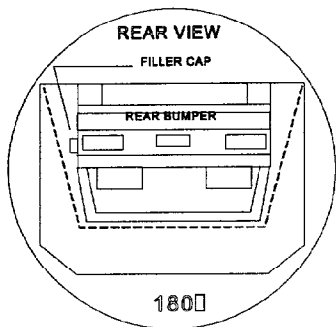
**TEST SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)**

**TEST PHASE:**

180-270 deg.

**NHTSA Test No.:**

MW5107



**I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:**

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

1 minutes

2 seconds

FMVSS 301 Position Hold Time +

5 minutes

00 seconds

**TOTAL**

6 minutes

2 seconds

Next whole minute interval

7 minutes

00 seconds

**II. FMVSS 301 REQUIREMENTS:**

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

**III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:**

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

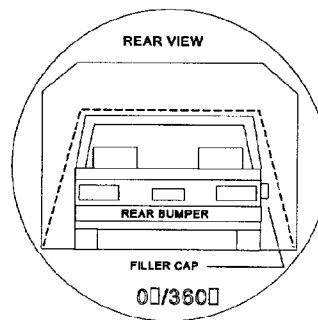
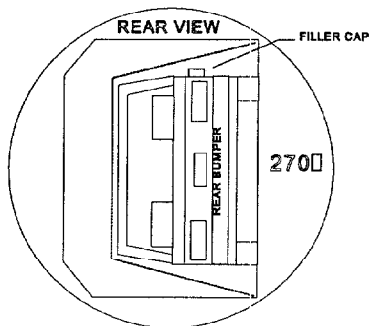
Note: Record spillage for whole minute intervals only as determined above.

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

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

TEST PHASE:  
270-360 deg.

NHTSA Test No.:  
MW5107



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

1 minutes 11 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

**TOTAL**

6 minutes 11 seconds

Next whole minute interval

7 minutes 00 seconds

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

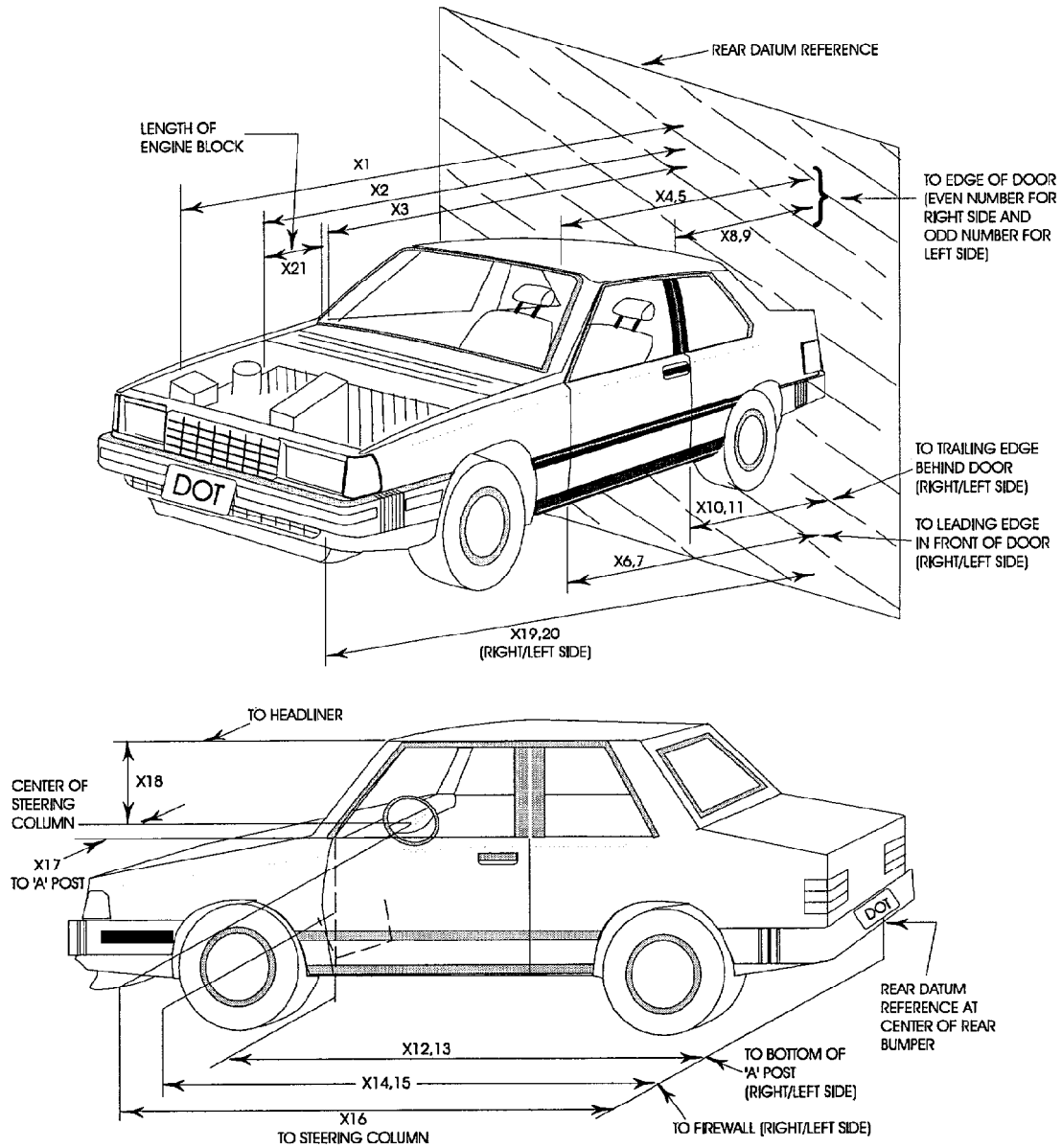
III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATION(S): None

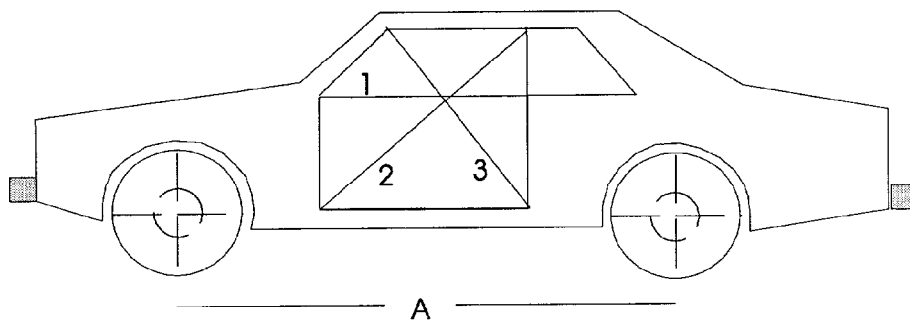
## TEST VEHICLE MEASUREMENTS



DATA SHEET NO.14 VEHICLE MEASUREMENTS

| No. |                                                              | All Dimensions in mm |           |             |
|-----|--------------------------------------------------------------|----------------------|-----------|-------------|
|     |                                                              | Pre-Test             | Post-Test | Differences |
| X1  | Total Length of Vehicle at Centerline                        | 4505                 | 3960      | 545         |
| X2  | Rear Surface of Vehicle to Front of Engine                   | 3855                 | 3635      | 220         |
| X3  | Rear Surface of Vehicle to Firewall                          | 3435                 | 3325      | 110         |
| X4  | Rear Surface of Vehicle to Upper Leading Edge of Right Door  | 3193                 | 3192      | 1           |
| X5  | Rear Surface of Vehicle to Upper Leading Edge of Left Door   | 3180                 | 3176      | 4           |
| X6  | Rear Surface of Vehicle to Lower Leading Edge of Right Door  | 3156                 | 3131      | 25          |
| X7  | Rear Surface of Vehicle to Lower Leading Edge of Left Door   | 3140                 | 3120      | 20          |
| X8  | Rear Surface of Vehicle to Upper Trailing Edge of Right Door | 2147                 | 2145      | 2           |
| X9  | Rear Surface of Vehicle to Upper Trailing Edge of Left Door  | 2136                 | 2143      | -7          |
| X10 | Rear Surface of Vehicle to Lower Trailing Edge of Right Door | 2117                 | 2067      | 50          |
| X11 | Rear Surface of Vehicle to Lower Trailing Edge of Left Door  | 2119                 | 2077      | 42          |
| X12 | Rear Surface of Vehicle to Bottom of "A" Post of Right Side  | 3062                 | 3015      | 47          |
| X13 | Rear Surface of Vehicle to Bottom of "A" Post of Left Side   | 3055                 | 3039      | 16          |
| X14 | Rear Surface of Vehicle to Firewall, Right Side              | 3435                 | 3325      | 110         |
| X15 | Rear Surface of Vehicle to Firewall, Left Side               | 3435                 | 3325      | 110         |
| X16 | Rear Surface of Vehicle to Steering Column                   | 2765                 | 2785      | -20         |
| X17 | Center of Steering Column to "A" Post                        | 385                  | 360       | 25          |
| X18 | Center of Steering Column to Headliner                       | 410                  | 340       | 70          |
| X19 | Rear Surface of Vehicle to Right Side of Front Bumper        | 4480                 | 3940      | 540         |
| X20 | Rear Surface of Vehicle to Left Side of Front Bumper         | 4485                 | 3955      | 530         |
| X21 | Length of Engine Block                                       | 470                  | 470       | 0           |
| RD  | Rear Surface of Vehicle to Right Side of Dash Panel          | 2965                 | 2935      | 30          |
| CD  | Rear Surface of Vehicle to Center of Dash Panel              | 2975                 | 2945      | 30          |
| LD  | Rear Surface of Vehicle to Left Side of Dash Panel           | 2980                 | 2960      | 20          |

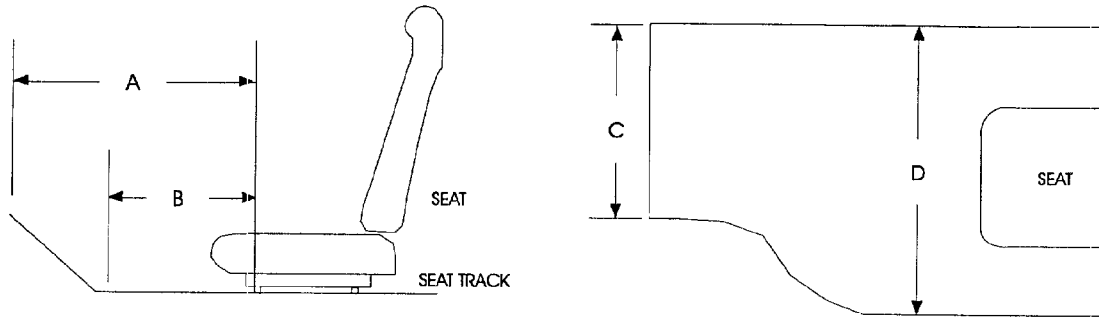
**DATA SHEET NO.14    VEHICLE MEASUREMENTS (cont.)**  
**VEHICLE INTRUSION MEASUREMENTS**  
**DOOR OPENING WIDTH**



| UNITS (mm)  | LEFT |      |      | RIGHT |      |      |
|-------------|------|------|------|-------|------|------|
| MEASUREMENT | 1    | 2    | 3    | 1     | 2    | 3    |
| BEFORE TEST | 995  | 1520 | 1120 | 990   | 1515 | 1125 |
| AFTER TEST  | 980  | 1505 | 1170 | 980   | 1510 | 1165 |
| DIFFERENCE  | 15   | 15   | -50  | 10    | 5    | -40  |

| UNITS (mm)  | A = WHEELBASE LEFT | A = WHEELBASE RIGHT |
|-------------|--------------------|---------------------|
| BEFORE TEST | 2670               | 2670                |
| AFTER TEST  | 2610               | 2610                |
| DIFFERENCE  | 60                 | 60                  |

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



DRIVER

| Measurement | Pre-Test | Post-Test | Difference |
|-------------|----------|-----------|------------|
| A           | 630      | 570       | 60         |
| B           | 570      | 555       | 15         |
| C           | 405      | 305       | 100        |
| D           | 430      | 415       | 15         |

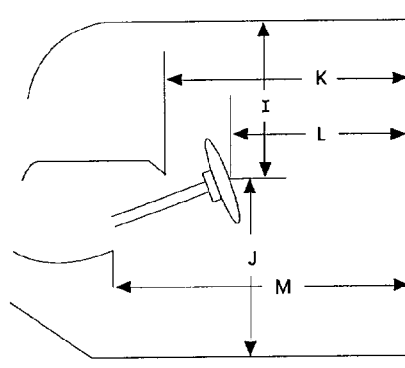
PASSENGER

| Measurement | Pre-Test | Post-Test | Difference |
|-------------|----------|-----------|------------|
| A           | 640      | 590       | 50         |
| B           | 565      | 540       | 25         |
| C           | 395      | 370       | 25         |
| D           | 415      | 410       | 5          |

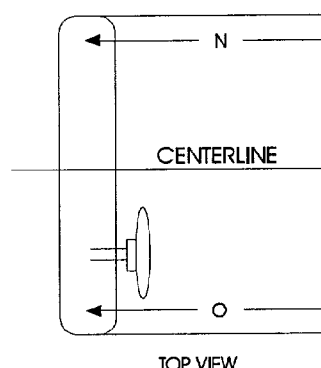
Units = mm

**DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)**

**VEHICLE INTRUSION MEASUREMENTS  
STATIC PASSENGER COMPARTMENT INTRUSION**

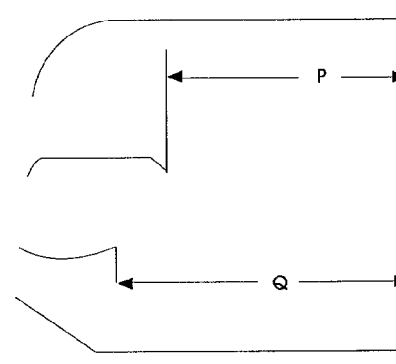


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS  
FROM C-PILLAR  
BELT ANCHORAGE

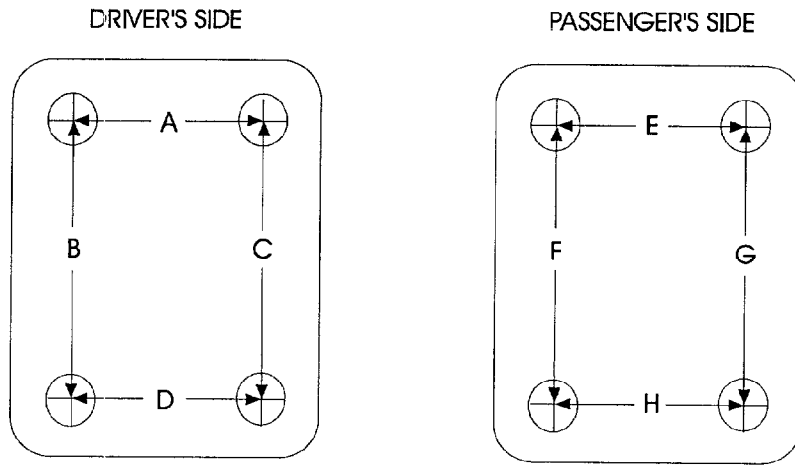


PASSENGER'S SIDE

| Measurement   | Pre-Test | Post-Test | Difference |
|---------------|----------|-----------|------------|
| I             | 400      | 345       | 55         |
| J             | 655      | 710       | -55        |
| K             | 790      | 775       | 15         |
| L             | 560      | 580       | -20        |
| M             | 820      | 835       | -15        |
| N             | 760      | 730       | 30         |
| O             | 775      | 755       | 20         |
| P = K (PASS.) | 735      | 700       | 35         |
| Q = M (PASS.) | 745      | 705       | 40         |

Units = mm

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



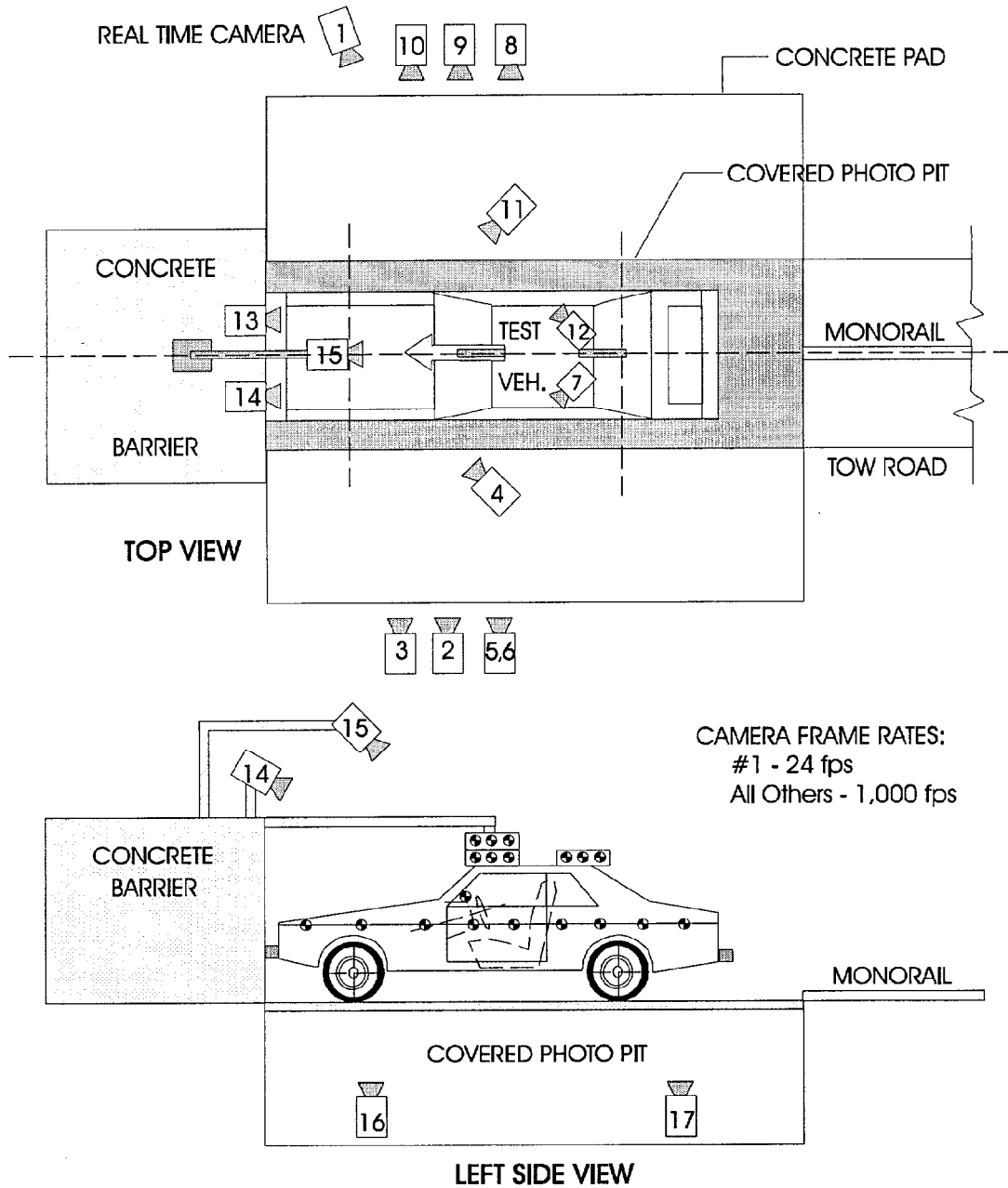
TOP VIEW THROUGH FLOOR PAN

| Measurement | Pre-Test | Post-Test | Difference |
|-------------|----------|-----------|------------|
| A           | 305      | 310       | -5         |
| B           | 325      | NA        | 325        |
| C           | 270      | 270       | 0          |
| D           | 300      | NA        | 300        |
| E           | 225      | 220       | 5          |
| F           | 245      | 250       | -5         |
| G           | 335      | 330       | 5          |
| H           | 225      | 220       | 5          |

Units = 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.: MW5107 Vehicle: 1998 Toyota 4-Runner 4-Door SR5

| 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           | 6590                   | 1502 | 1106  | -3            | 6311                      | 13        | 1000        |
| 3          | Left Side View              | 8004                   | 783  | 1226  | -3.5          | 7725                      | 25        | 1000        |
| 4          | Driver and Interior View    | 5011                   | 2889 | 2002  | -11           | -                         | 25        | 1000        |
| 5          | Steering Column (Bottom)    | 7153                   | 1078 | 1175  | -3            | 6874                      | 25        | 1010        |
| 6          | Steering Column (Top)       | 7153                   | 1078 | 1784  | -5            | 6874                      | 25        | 1000        |
| 7          | Left Belt                   | -                      | -    | -     | -             | -                         | 8         | 720         |
| 8          | Overall Right Side          | 6479                   | 2106 | 1293  | -2.5          | 6200                      | 13        | 1000        |
| 9          | Right Side View             | 7887                   | 1469 | 1320  | -3.5          | 7608                      | 25        | 1000        |
| 10         | Right Passenger View        | 7484                   | 2108 | 1547  | -4            | 7205                      | 35        | 990         |
| 11         | Passenger and Interior View | 4944                   | 3073 | 2014  | -12           | -                         | 25        | 1000        |
| 12         | Right Belt                  | -                      | -    | -     | -             | -                         | 8         | 760         |
| 13         | Passenger Front View        | 580                    | 0    | 2000  | -50           | -                         | 8         | 1000        |
| 14         | Driver Front View           | 580                    | 0    | 2000  | -50           | -                         | 8         | 1000        |
| 15         | Windshield View             | 0                      | 530  | 3048  | -58           | -                         | 8         | 1010        |
| 16         | Pit View of Engine          | 0                      | 970  | -3048 | 90            | -                         | 13        | 1010        |
| 17         | Pit View of Fuel Tank       | 0                      | 2920 | -3048 | 90            | -                         | 13        | 1000        |

\*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

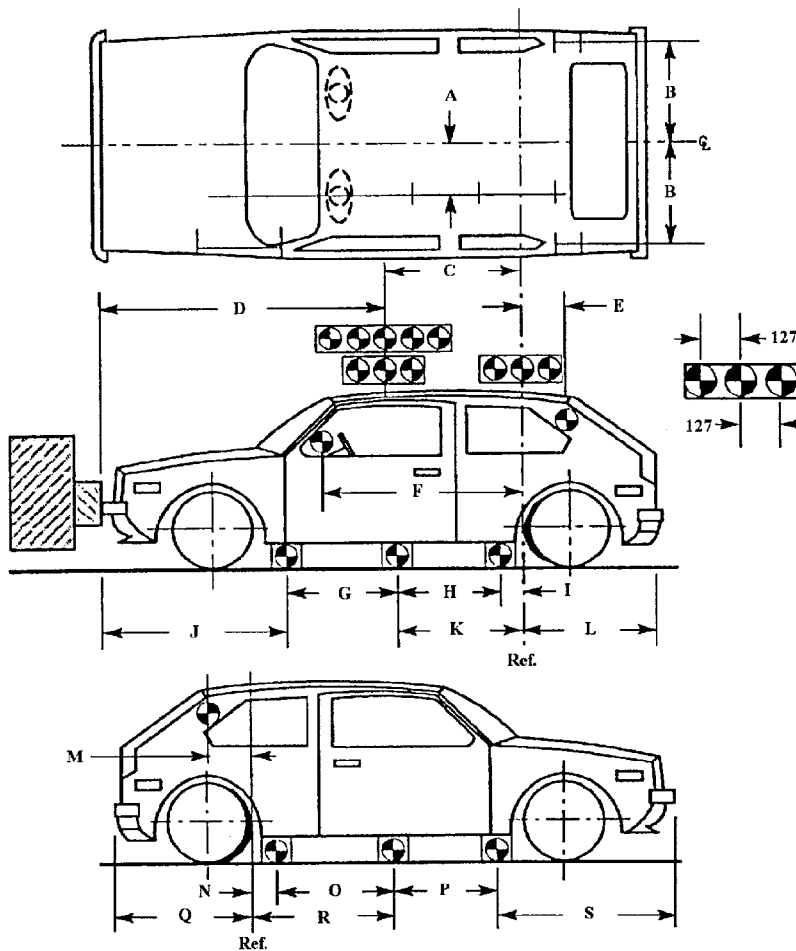
\*\* = referenced to horizontal plane

N.T. indicates No Timing

DATA SHEET NO. 16      VEHICLE REFERENCE PHOTO TARGET LOCATIONS

(Dimensions in millimeters)

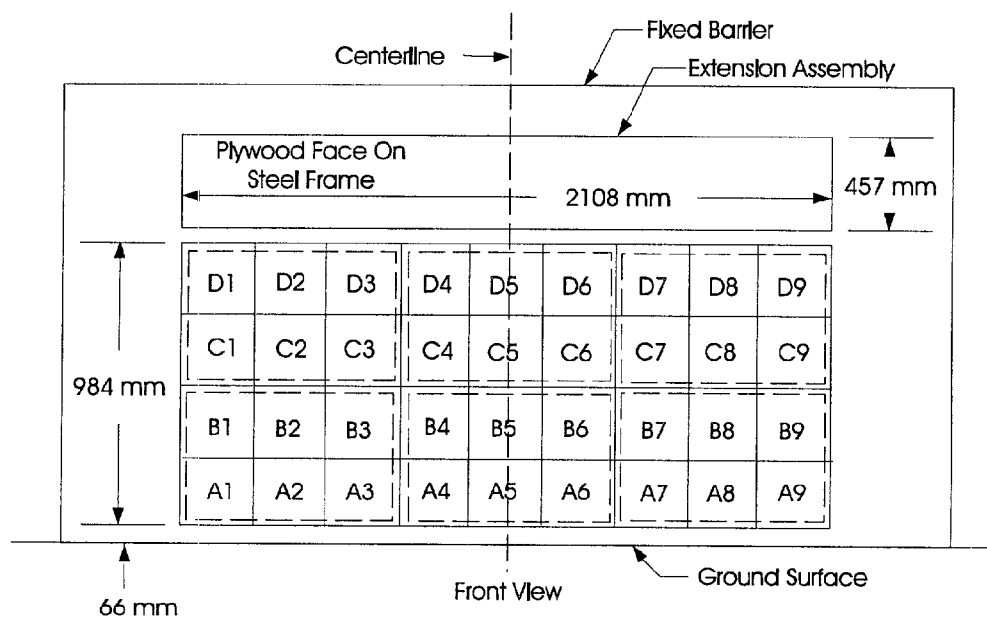
|   |      |
|---|------|
| A | 355  |
| B | 1230 |
| C | 1216 |
| D | 1968 |
| E | 380  |
| F | 1501 |
| G | 780  |
| H | 790  |
| I | 161  |
| J | 1354 |
| K | 951  |
| L | 1589 |
| M | 380  |
| N | 161  |
| O | 780  |
| P | 790  |
| Q | 1589 |
| R | 951  |
| S | 1354 |



DATA SHEET NO. 17      LOAD CELL LOCATIONS ON FIXED BARRIER

LOAD CELL BARRIER NOT REQUESTED FOR THIS TEST

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



6 GROUPS OF 6 LOAD CELLS EACH

|                       |                       |                       |
|-----------------------|-----------------------|-----------------------|
| Group 4<br>C1 thru D3 | Group 5<br>C4 thru D6 | Group 6<br>C7 thru D9 |
| Group 1<br>A1 thru B3 | Group 2<br>A4 thru B6 | Group 3<br>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. : MW5107; Test Date: December 15, 1997; Technician: J. Cz.

Vehicle Model Year/Make/Model: 1998 Toyota 4-Runner

- A. No. of vent holes: 2 -Driver 2 -Passenger
- B. Size of vent holes: (mm<sup>2</sup>) 20 -Driver 35 -Passenger
- C. Total vent area: (mm<sup>2</sup>) 40 -Driver 70 -Passenger
- D. Deflated air bag length and width dimensions or, if round, diameter. (mm)
- Driver: - -Length; - -Width; 62 -Diameter
- Passenger: 600 -Height; 480 -Width; 750 -Depth

- E. Is the air bag tethered?

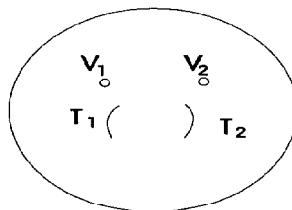
Driver: x -Yes; - -No; If yes, record length of tether- 160

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

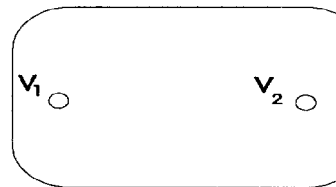
Sketch the air bag showing the location of the vent holes, how the bag is tethered, and where the bag is tethered. Also describe how the tethers are attached to the bag and the steering wheel.

(Note: Not to scale; V<sub>n</sub> = Vent hole<sub>n</sub>, T<sub>n</sub> = Tether<sub>n</sub>).

**DRIVER**  
vents underneath bag



**PASSENGER**  
vents underneath bag



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

Driver: Air bag: 45165-35030

Generator: TDSH7A1BEY0

Passenger: Air bag: P117080-02D

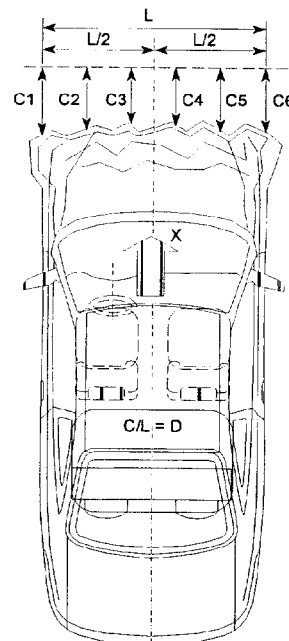
Generator: TBNH6T4JBUZ

DATA SHEET NO.19      ACCIDENT INVESTIGATION DIVISION DATA  
FOR 56.3 KPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Toyota 4-Runner 4-Door SR5  
 NHTSA Test No.: MW5107      VIN: JT3HN86R8W0134275  
 Model Year: 1998      Build Date: 8/97      Test Date: December 15, 1997  
 Vehicle Size Category: SUV      Test Weight: 2107 kg  
 Vehicle Wheelbase: 2670 mm; Front Overhang: 1354 mm; Overall Width: 1690 mm  
 Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions:

|      | PRE  | POST | DIFF |    |
|------|------|------|------|----|
| C1 = | 4340 | 3880 | -460 | mm |
| C2 = | 4485 | 3960 | -525 | mm |
| C3 = | 4515 | 3965 | -550 | mm |
| C4 = | 4515 | 3960 | -555 | mm |
| C5 = | 4480 | 3945 | -535 | mm |
| C6 = | 4335 | 3865 | -470 | mm |



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

Length of Damaged Region:

L1 = 1660 mm  
 L2 = 830 mm  
 L3 = 332 mm

Appendix A  
PHOTOGRAPHS

## PHOTOGRAPHS

| <u>Figure</u> | <u>Title</u>                                   | <u>Page</u> |
|---------------|------------------------------------------------|-------------|
| A-1           | LOAD CELL LOCATIONS. A-4                       |             |
| A-2           | PRE-TEST FRONT VIEW .....                      | A-5         |
| A-3           | POST-TEST FRONT VIEW. ....                     | A-6         |
| A-4           | PRE-TEST LEFT SIDE VIEW .....                  | A-7         |
| A-5           | POST-TEST LEFT SIDE VIEW .....                 | A-8         |
| A-6           | PRE-TEST RIGHT SIDE VIEW .....                 | A-9         |
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| A-8           | PRE-TEST RIGHT FRONT THREE-QUARTER VIEW .....  | A-11        |
| A-9           | POST-TEST RIGHT FRONT THREE-QUARTER VIEW ..... | A-12        |
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| A-11          | POST-TEST LEFT REAR THREE-QUARTER VIEW .....   | A-14        |
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| A-21          | POST-TEST REAR UNDERBODY VIEW .....            | A-24        |
| A-22          | PRE-TEST DRIVER POSITION VIEW .....            | A-25        |
| A-23          | POST-TEST DRIVER POSITION VIEW .....           | A-26        |
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| A-25          | POST-TEST PASSENGER POSITION VIEW. ....        | A-28        |
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| A-27          | POST-TEST DRIVER AND INTERIOR VIEW .....       | A-30        |
| A-28          | PRE-TEST PASSENGER AND INTERIOR VIEW .....     | A-31        |
| A-29          | POST-TEST PASSENGER AND INTERIOR VIEW .....    | A-32        |
| A-30          | PRE-TEST DRIVER HEAD LOCATION .....            | A-33        |
| A-31          | POST-TEST DRIVER HEAD LOCATION .....           | A-34        |

# PHOTOGRAPHS (continued)

| <u>Figure</u> | <u>Title</u>                             | <u>Page</u> |
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| A-33          | POST-TEST PASSENGER HEAD LOCATION .....  | A-36        |
| A-34          | PRE-TEST DRIVER FLOOR PAN VIEW .....     | A-37        |
| A-35          | POST-TEST DRIVER FLOOR PAN VIEW .....    | A-38        |
| A-36          | PRE-TEST PASSENGER FLOOR PAN VIEW .....  | A-39        |
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| A-38          | ROLLOVER VIEW .....                      | A-41        |
| A-39          | IMPACT VIEW .....                        | A-42        |

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

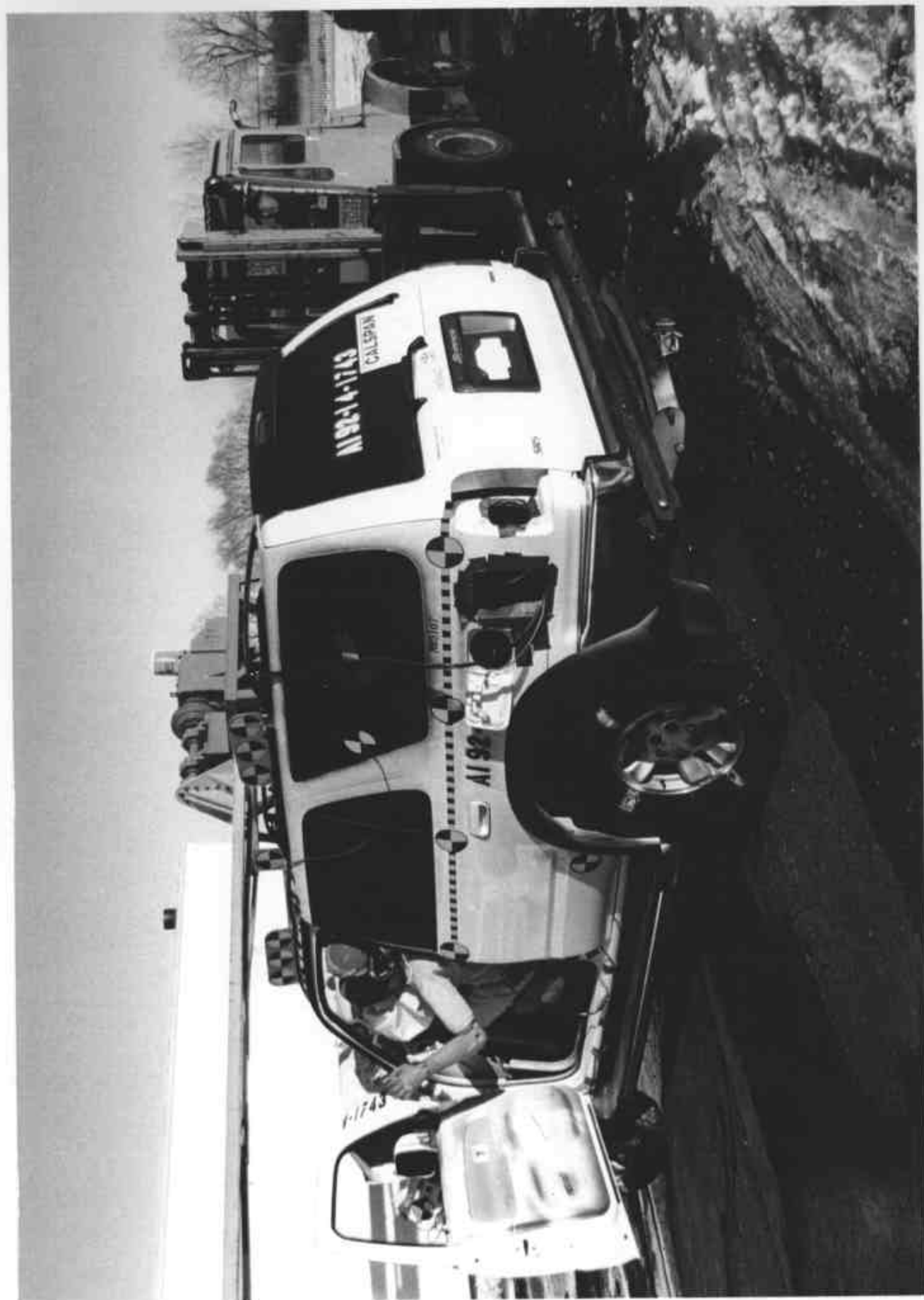


Figure A-11 POST-TEST LEFT REAR THREE-QUARTER VIEW

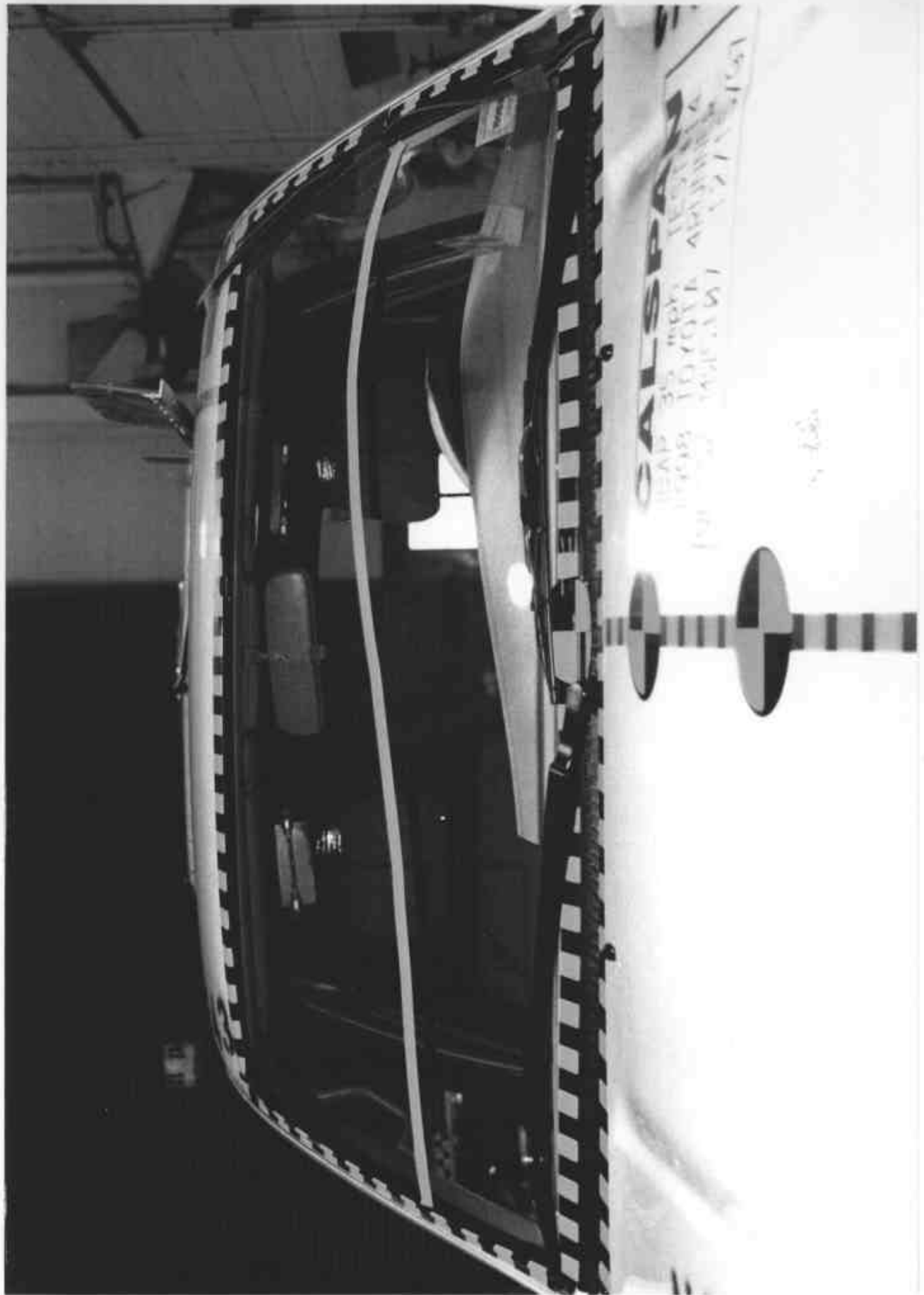


Figure A-12 PRE-TEST WINDSHIELD VIEW

PHOTOGRAPH NOT AVAILABLE

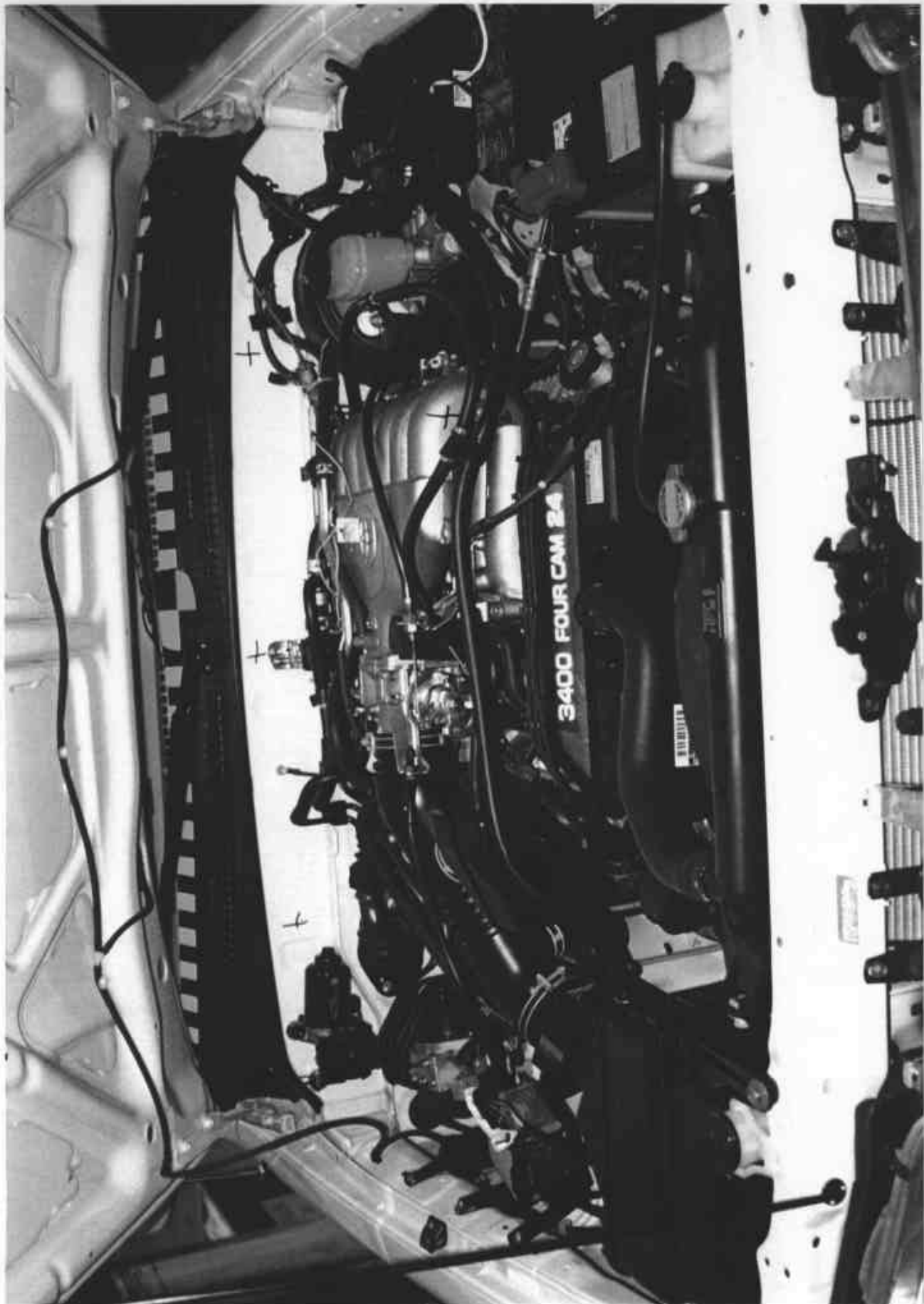


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

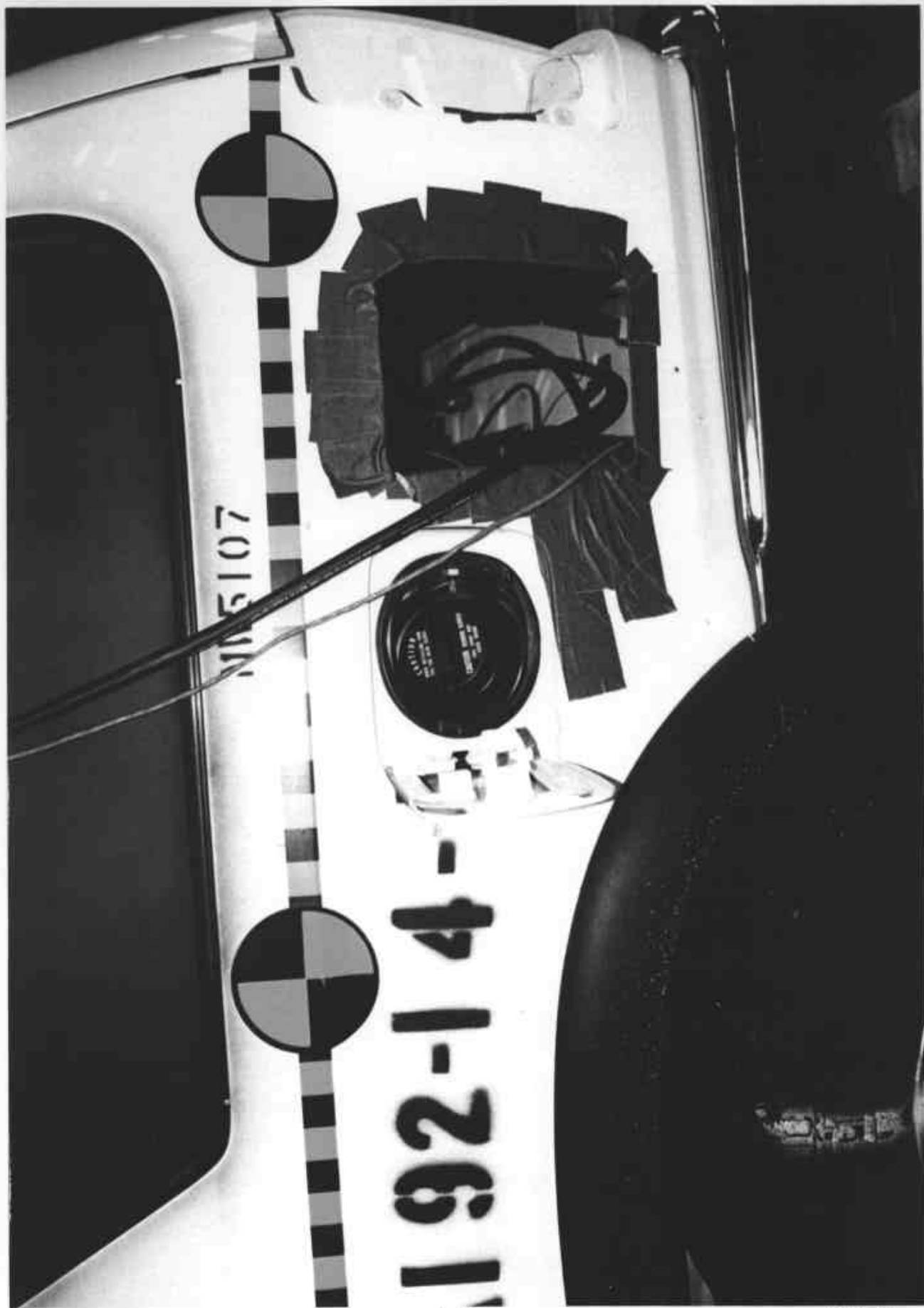


Figure A-15 FUEL CAP VIEW



Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

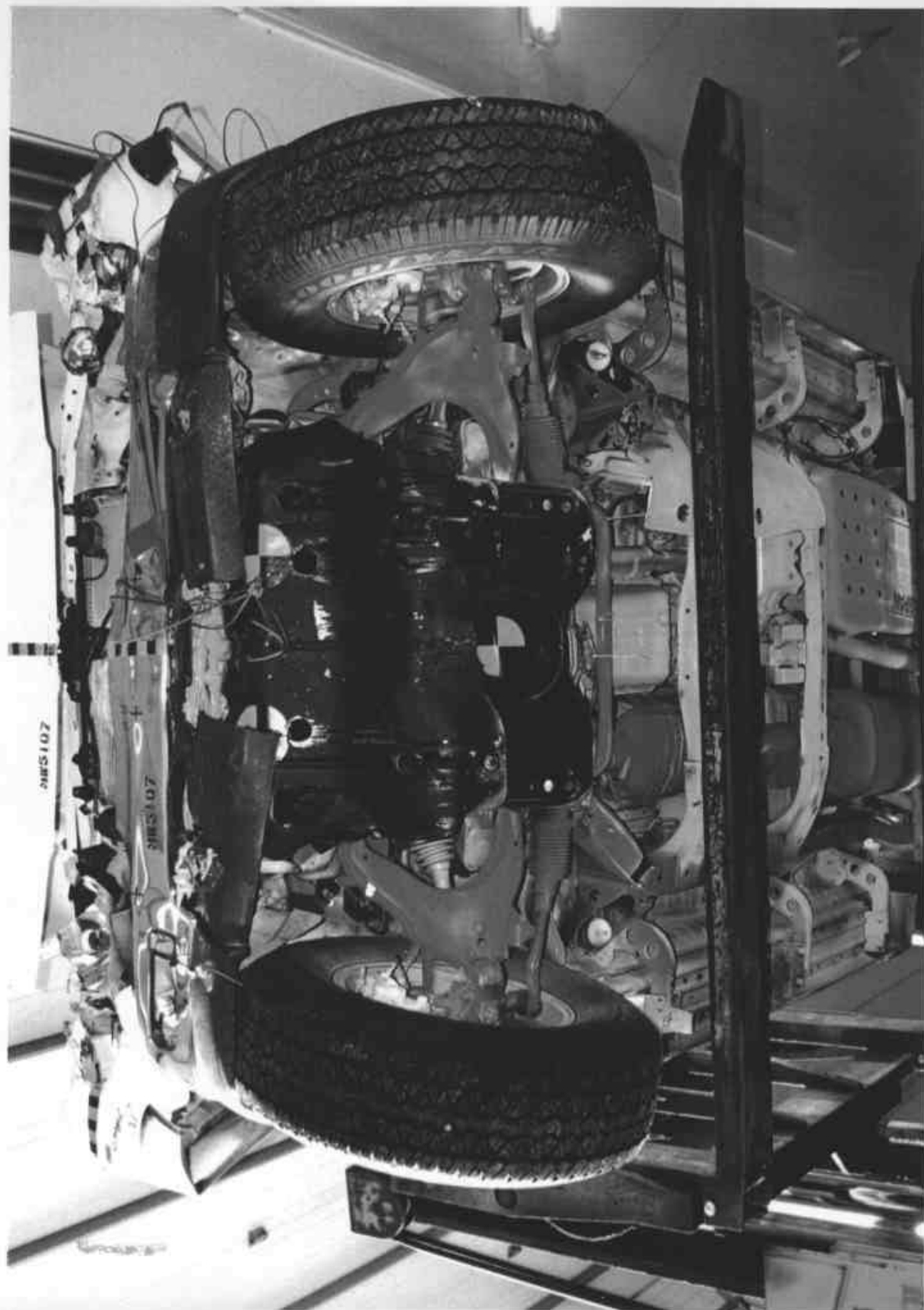


Figure A-17 POST-TEST FRONT UNDERBODY VIEW

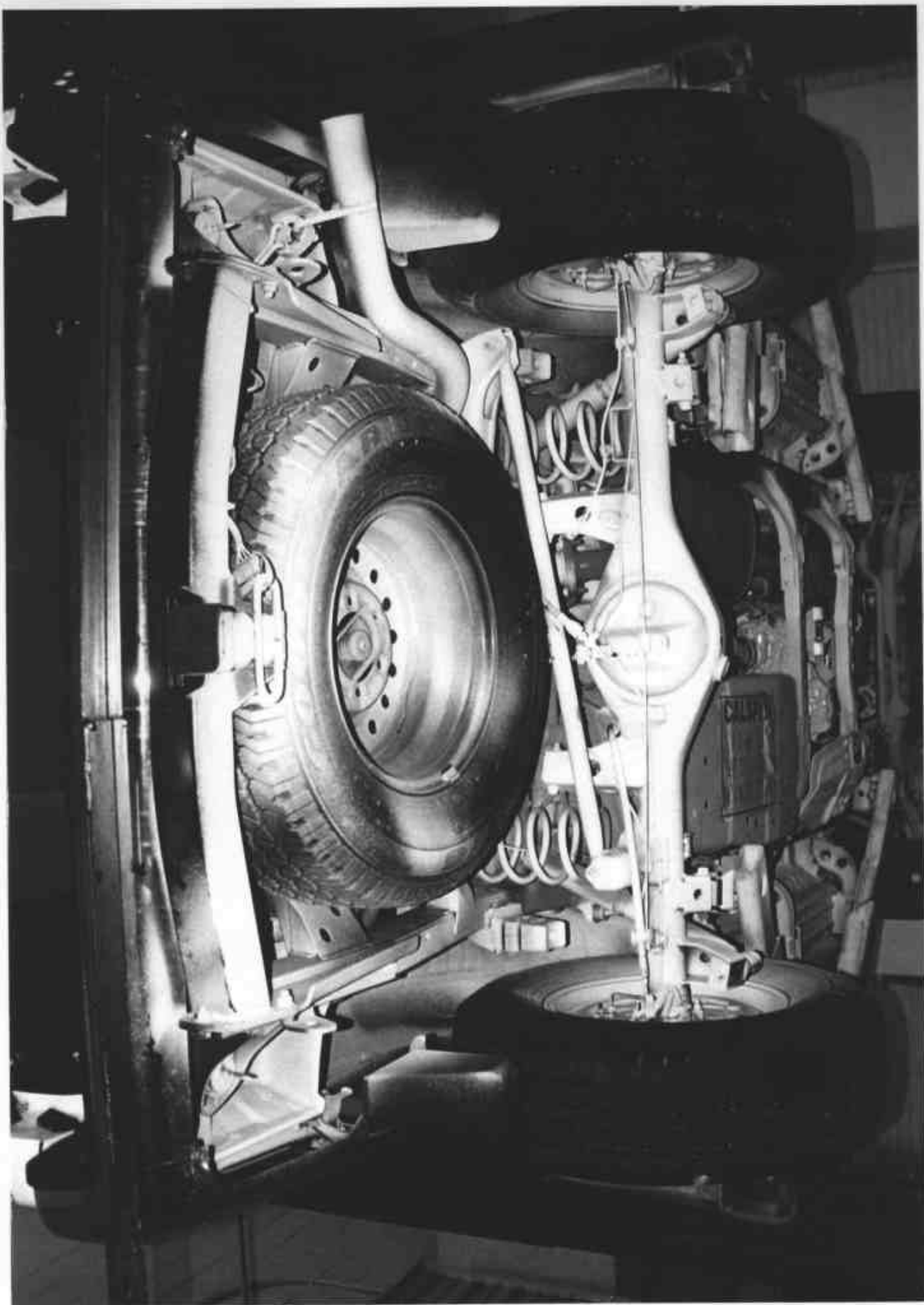


Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW



Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW

Figure A-20 PRE-TEST REAR UNDERBODY VIEW



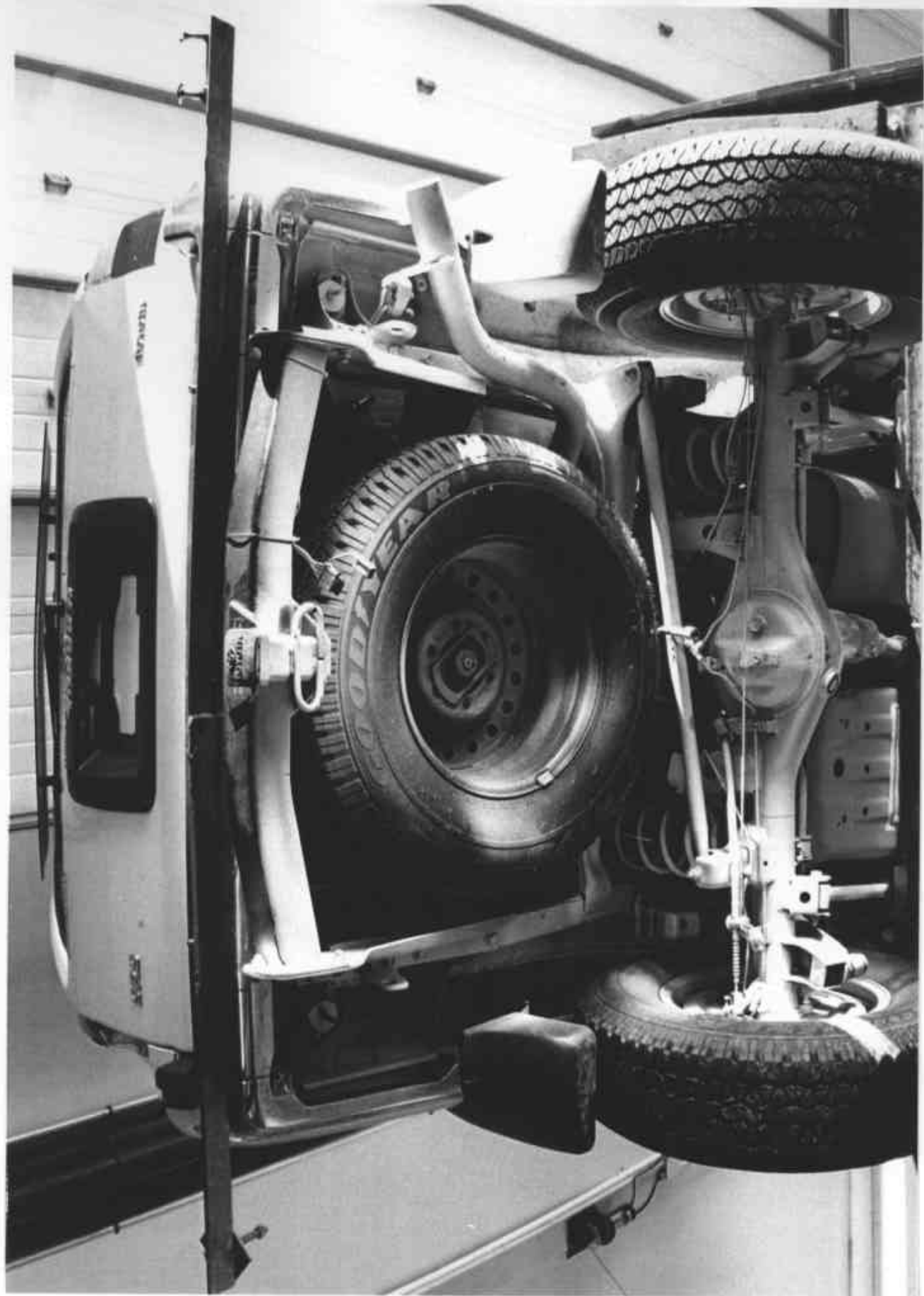


Figure A-21 POST-TEST REAR UNDERBODY VIEW

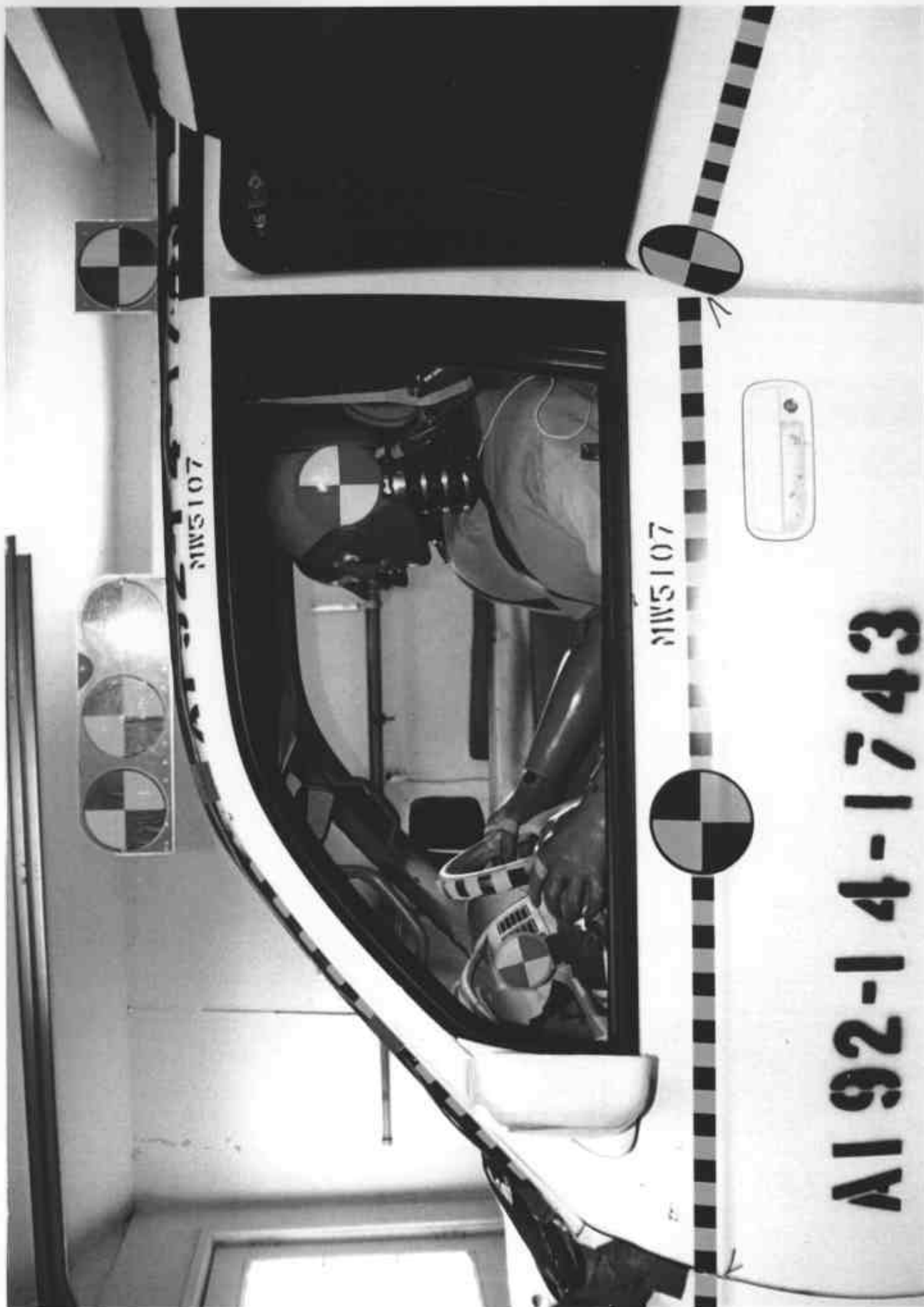


Figure A-22 PRE-TEST DRIVER POSITION VIEW



Figure A-23 POST-TEST DRIVER POSITION VIEW



Figure A-24 PRE-TEST PASSENGER POSITION VIEW



Figure A-25 POST-TEST PASSENGER POSITION VIEW

Figure A-26 PRE-TEST DRIVER AND INTERIOR VIEW





Figure A-27 POST-TEST DRIVER AND INTERIOR VIEW



Figure A-28 PRE-TEST PASSENGER AND INTERIOR VIEW



Figure A-29 POST-TEST PASSENGER AND INTERIOR VIEW

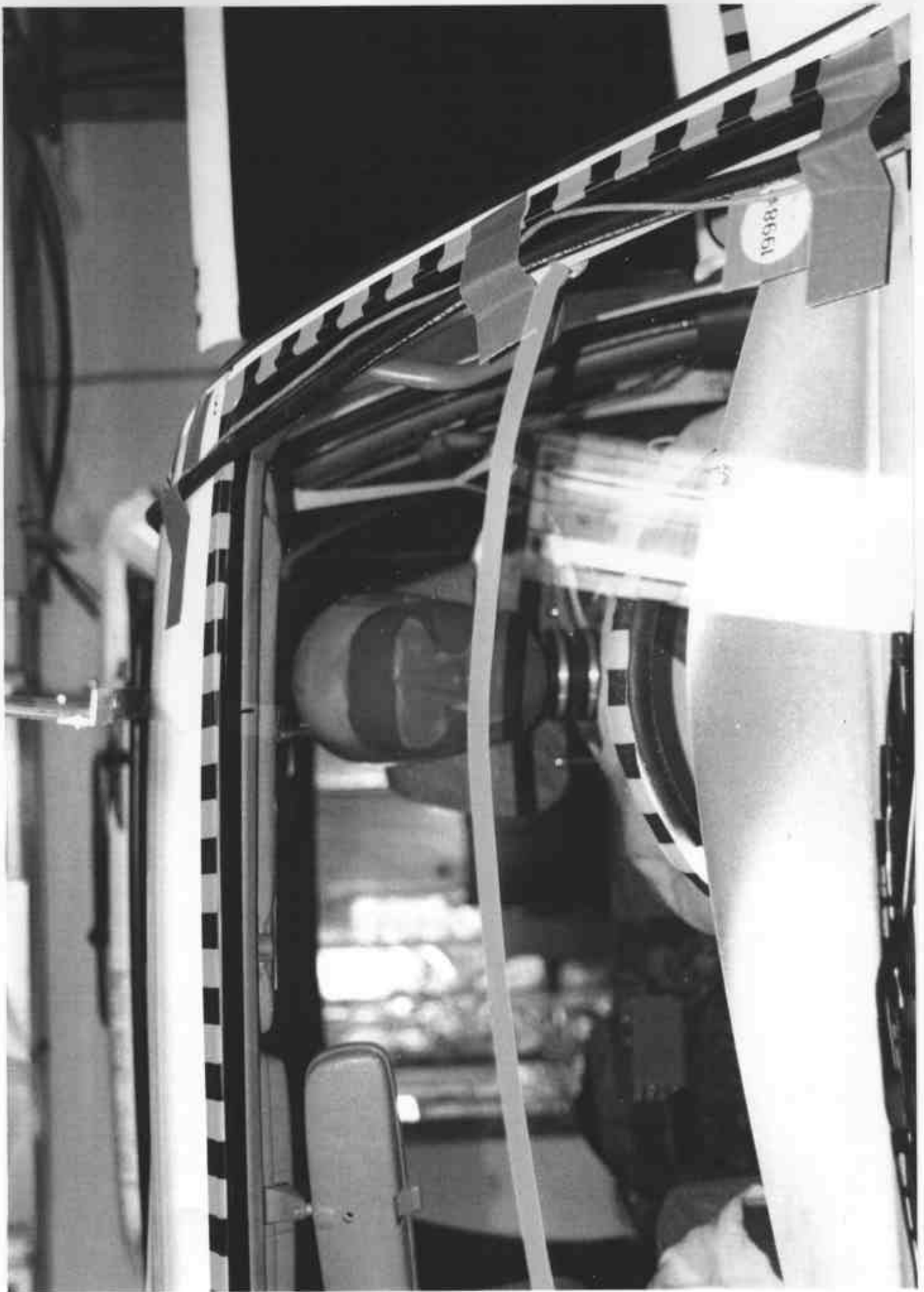


Figure A-30 PRE-TEST DRIVER HEAD LOCATION

Figure A-31 POST-TEST DRIVER HEAD LOCATION

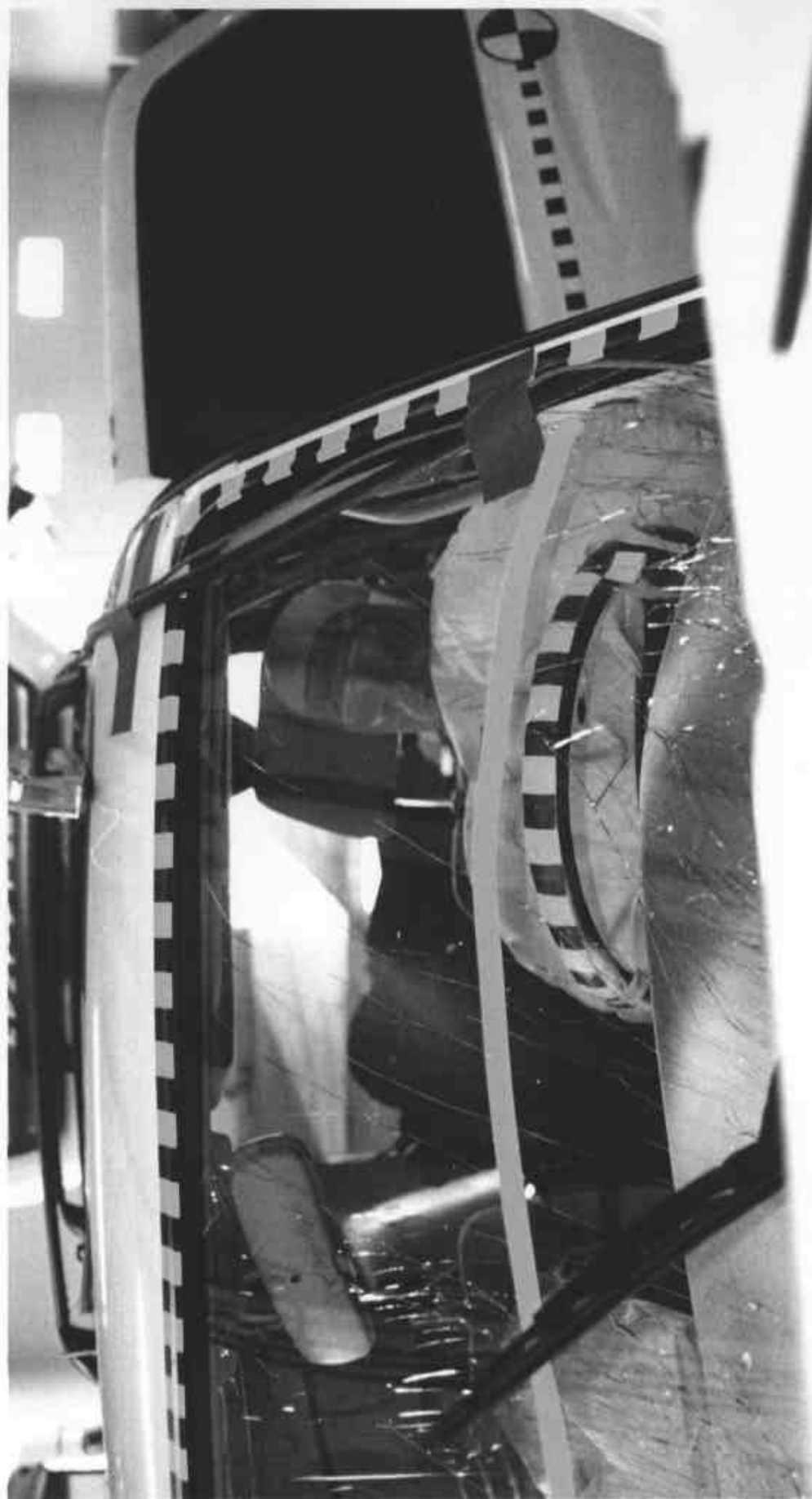




Figure A-32 PRE-TEST PASSENGER HEAD LOCATION

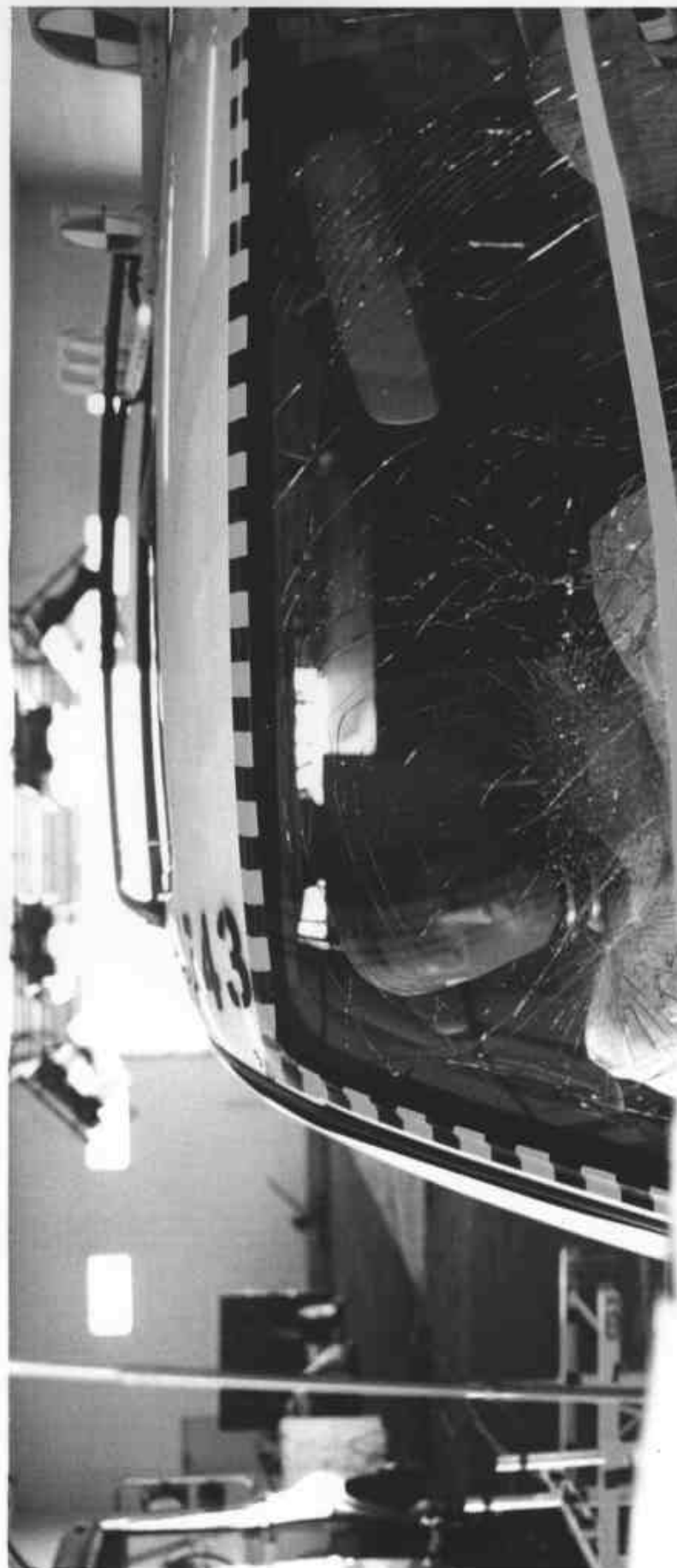


Figure A-33 POST-TEST PASSENGER HEAD LOCATION



Figure A-34 PRE-TEST DRIVER FLOOR PAN VIEW



Figure A-35 POST-TEST DRIVER FLOOR PAN VIEW



Figure A-36 PRE-TEST PASSENGER FLOOR PAN VIEW

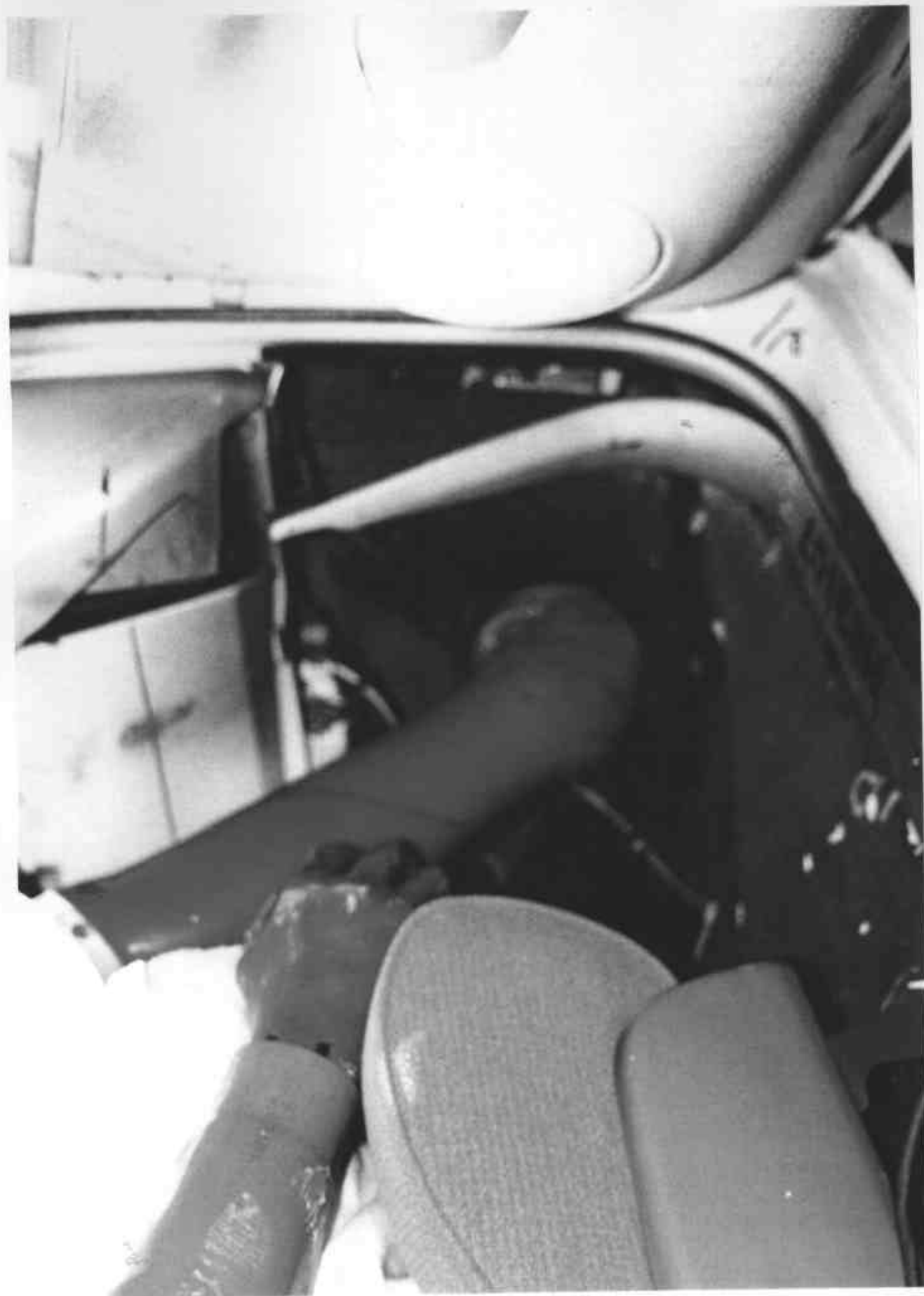


Figure A-37 POST-TEST PASSENGER FLOOR PAN VIEW



Figure A-38 ROLLOVER VIEW



Figure A-39 IMPACT VIEW

## Appendix B

### DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

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

| <b>Transducer</b>                             | <b>DOT/NHTSA Sign Convention<br/>(positive unless noted)</b>                                                                                                  |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Upper Neck Load Cell                          | Fx Head forward<br>Fy Head left<br>Fz Neck in tension<br>Mx Right ear to right shoulder<br>My Chin to chest (flexion)<br>Mz Chin to left shoulder (look left) |
| Chest Displacement Potentiometer              | Compression is negative                                                                                                                                       |
| Pelvic Load Cell (Lower Lumbar)               | Fx Chest forward<br>Fy Chest left<br>Fz Spine in tension                                                                                                      |
| Femur Load Cell                               | Compression is negative                                                                                                                                       |
| Upper Tibia Load Cell<br>(right and left leg) | Mx Support tibia, load right side center<br>My Support tibia, load front (shin) center                                                                        |
| Lower Tibia Load Cell<br>(right and left leg) | Fy Foot right w/r to left<br>Fz Tibia in tension<br>Mx Support tibia, press right side center                                                                 |

NHTSA TEST NO. MW5107

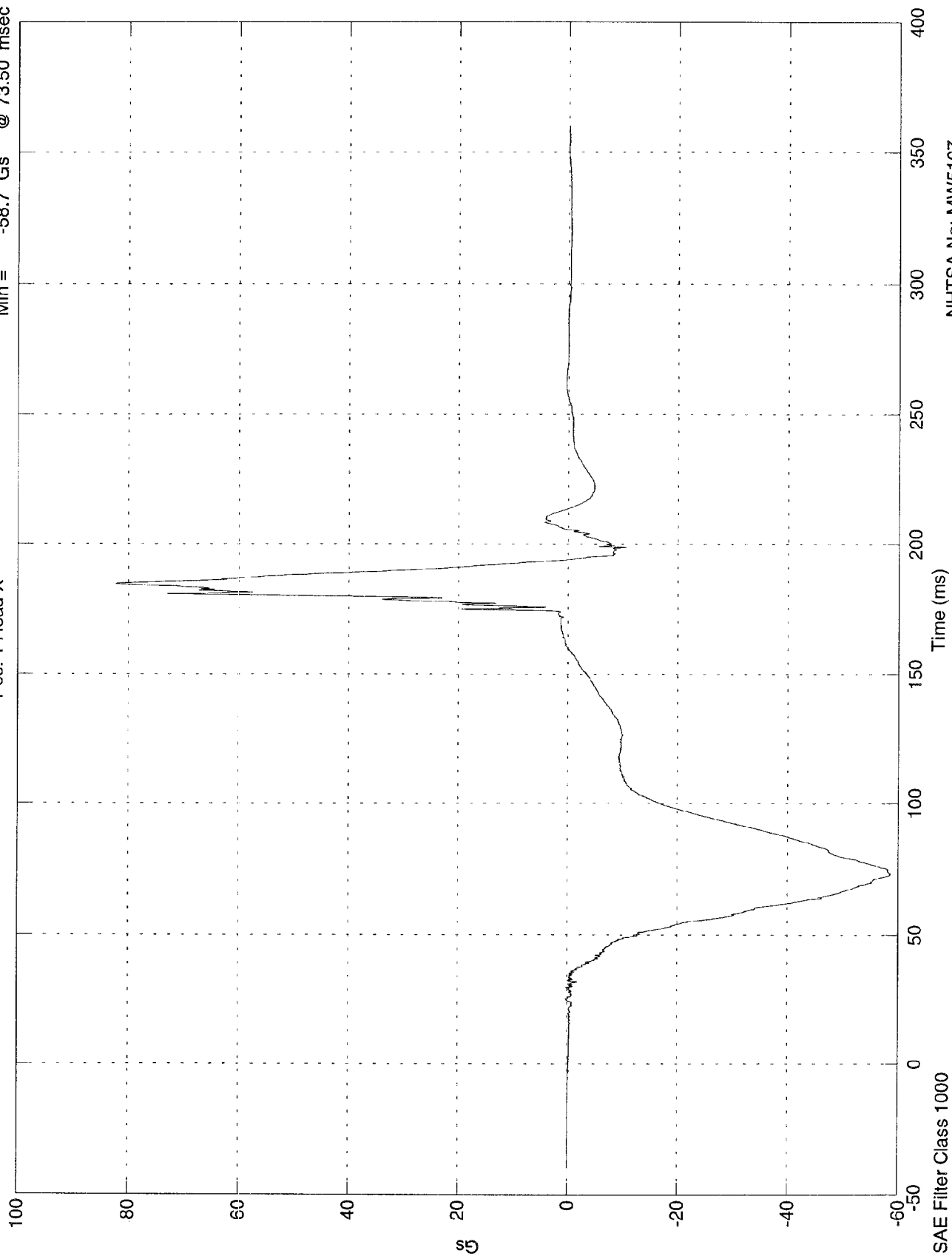
DUMMY DATA

| 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 #14 - 1998 TOYOTA 4-RUNNER

Max = 82.3 Gs @ 184.70 msec  
Min = -58.7 Gs @ 73.50 msec

Pos. 1 Head X

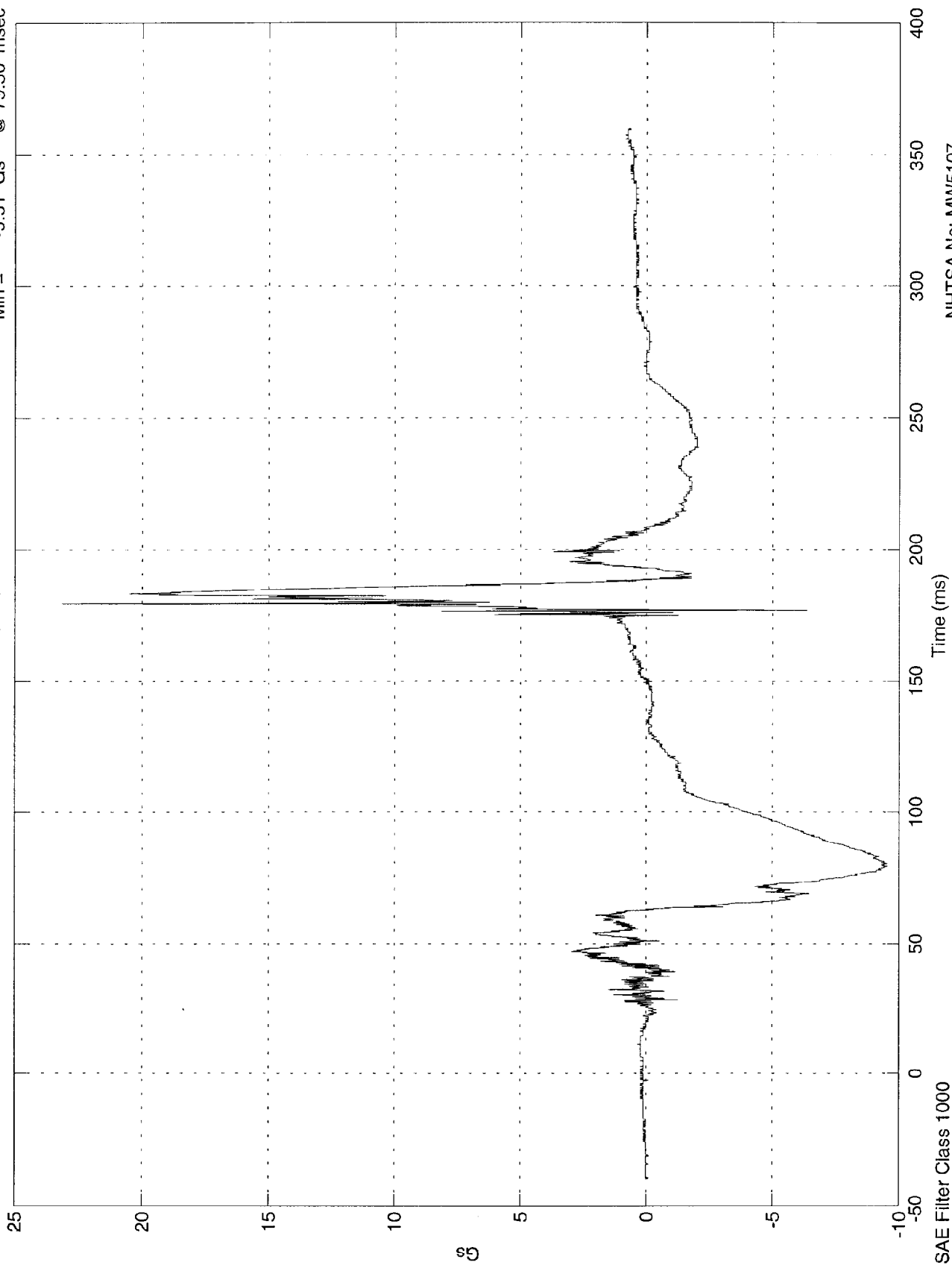


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 23.1 Gs @ 179.80 msec  
Min = -9.51 Gs @ 79.50 msec

Pos. 1 Head Y

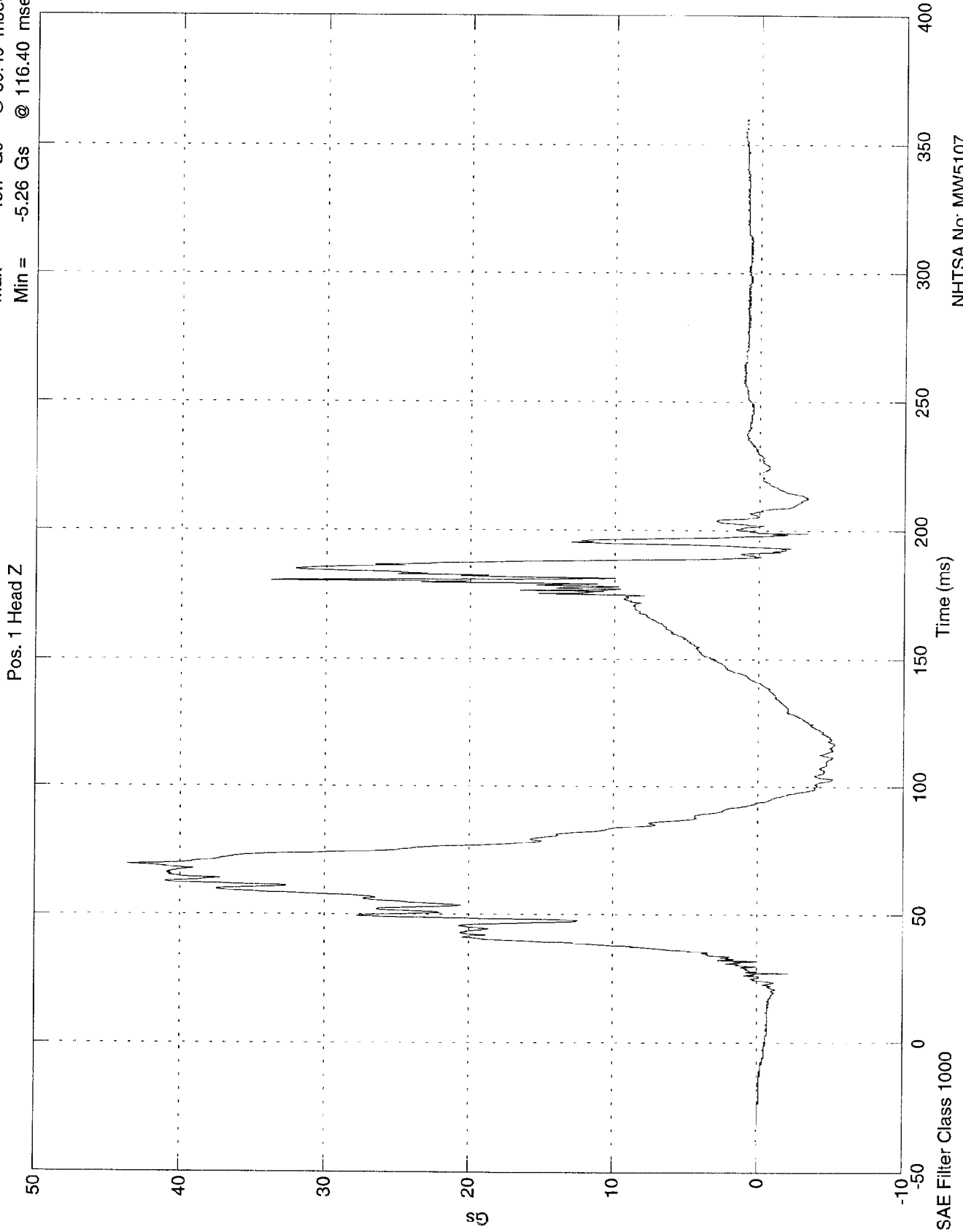


SAE Filter Class 1000

NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 43.7 Gs @ 69.40 msec  
Min = -5.26 Gs @ 116.40 msec

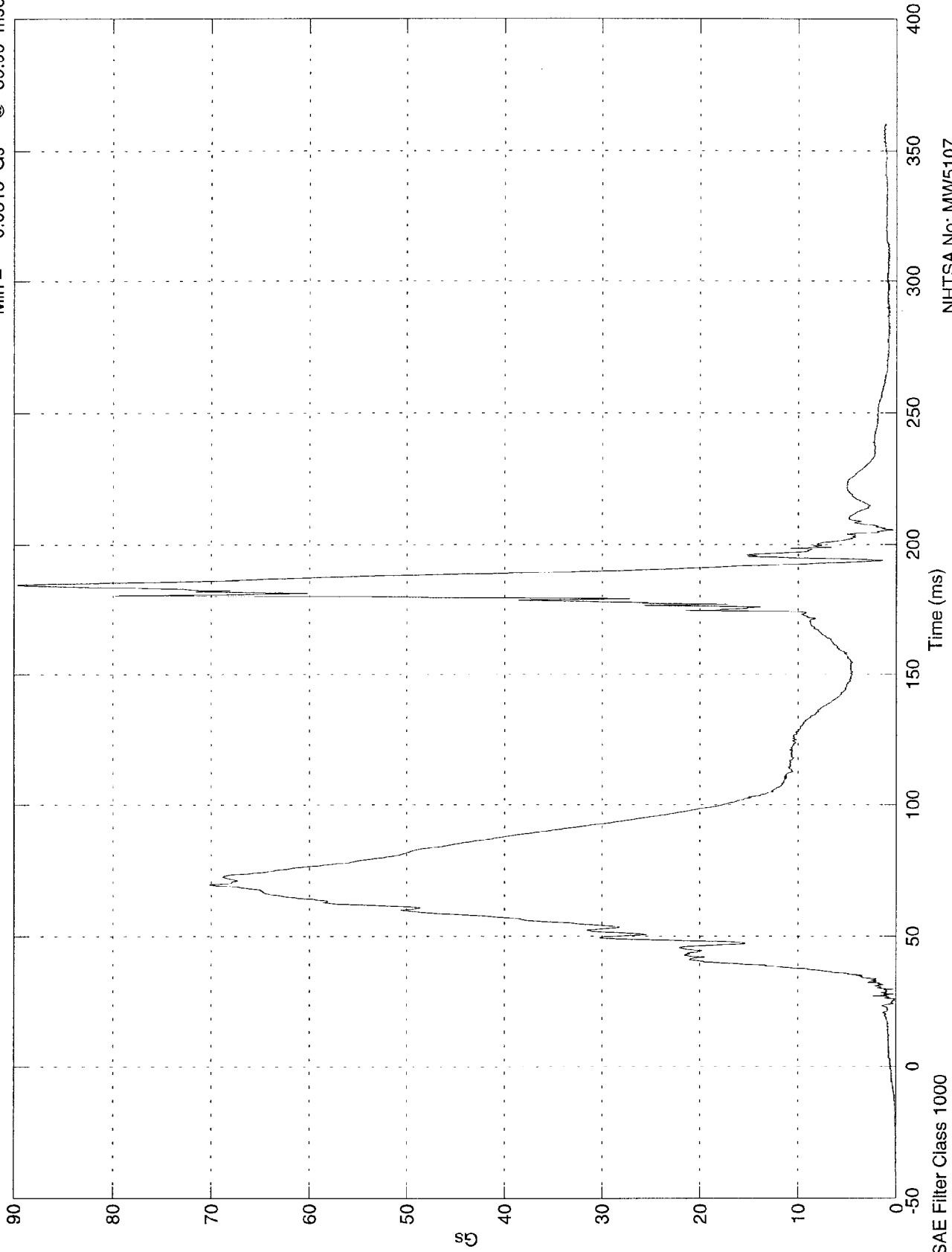


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 89.7 Gs @ 184.80 msec  
Min = 0.0315 Gs @ -39.90 msec

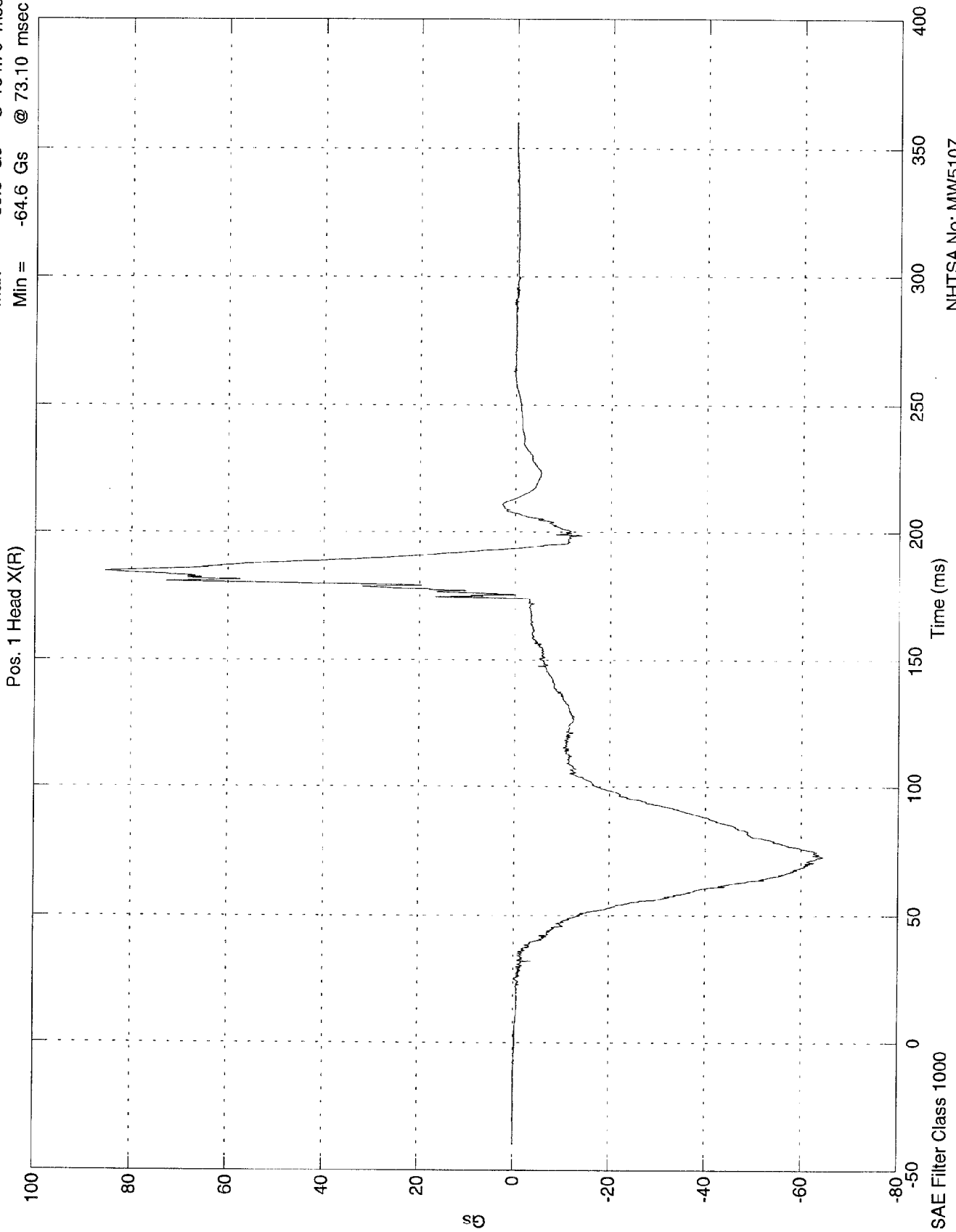
Pos. 1 Head Resultant



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

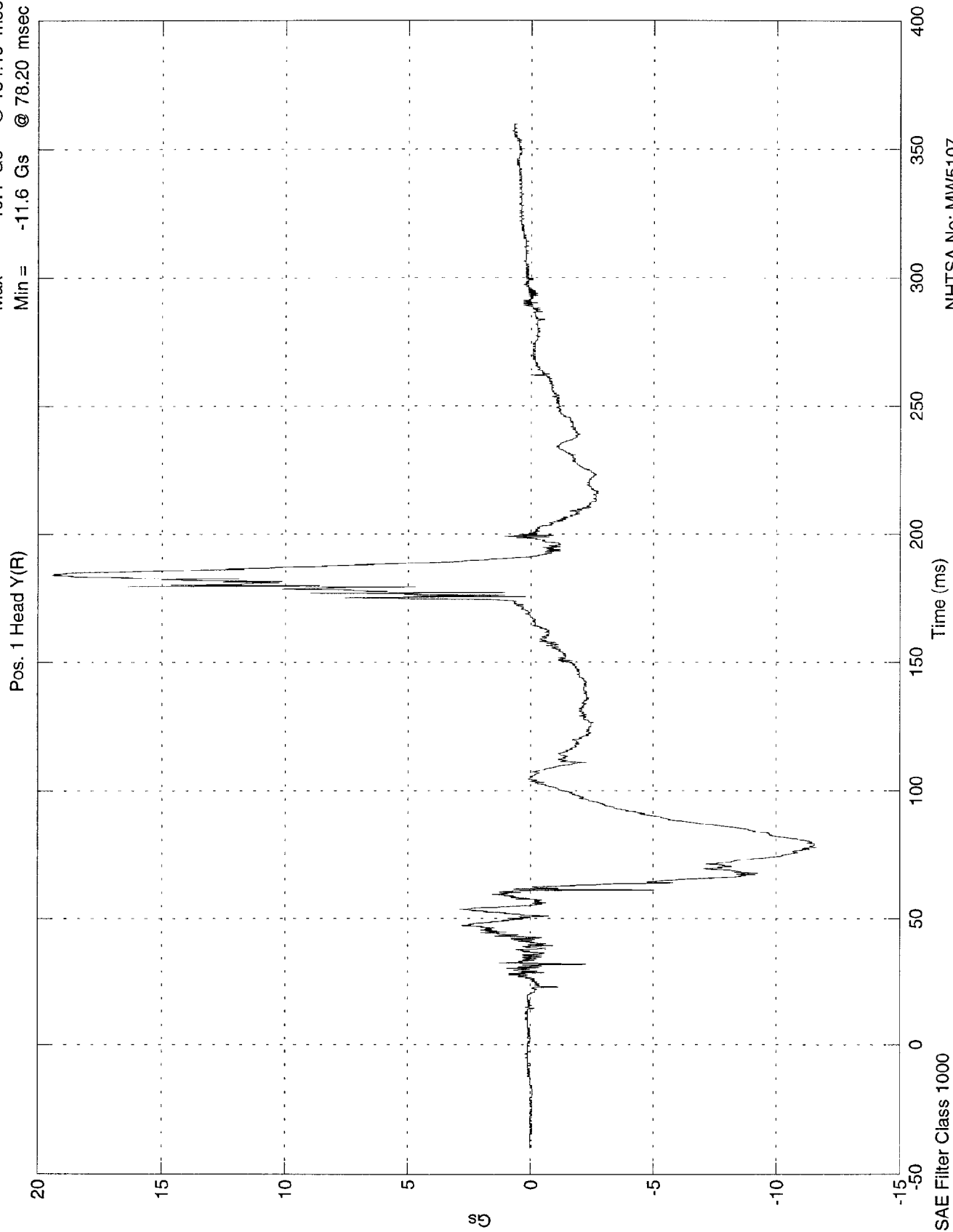
Max = 85.5 Gs @ 184.70 msec  
Min = -64.6 Gs @ 73.10 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

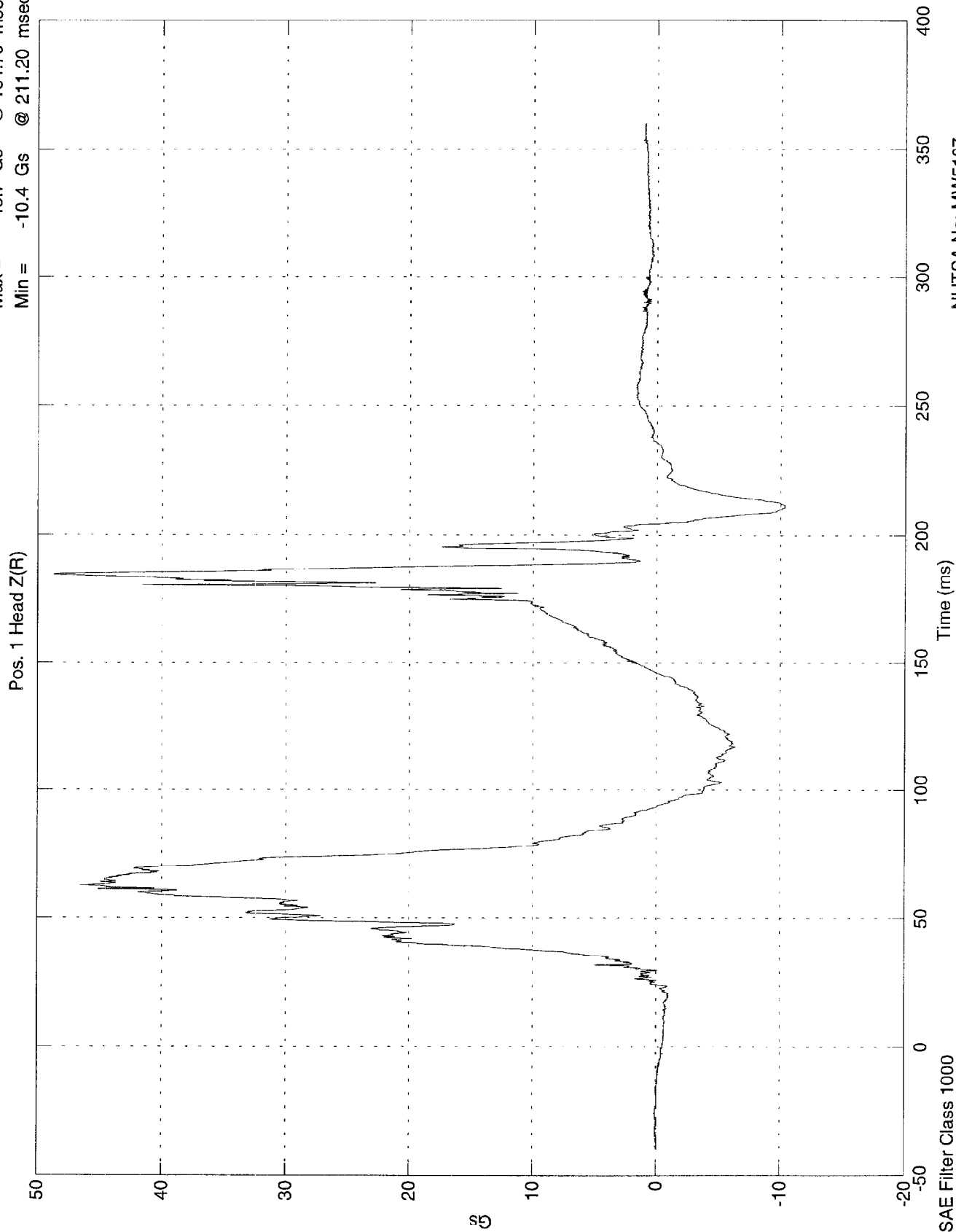
Max = 19.4 Gs @ 184.10 msec  
Min = -11.6 Gs @ 78.20 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 48.7 Gs @ 184.70 msec  
 Min = -10.4 Gs @ 211.20 msec

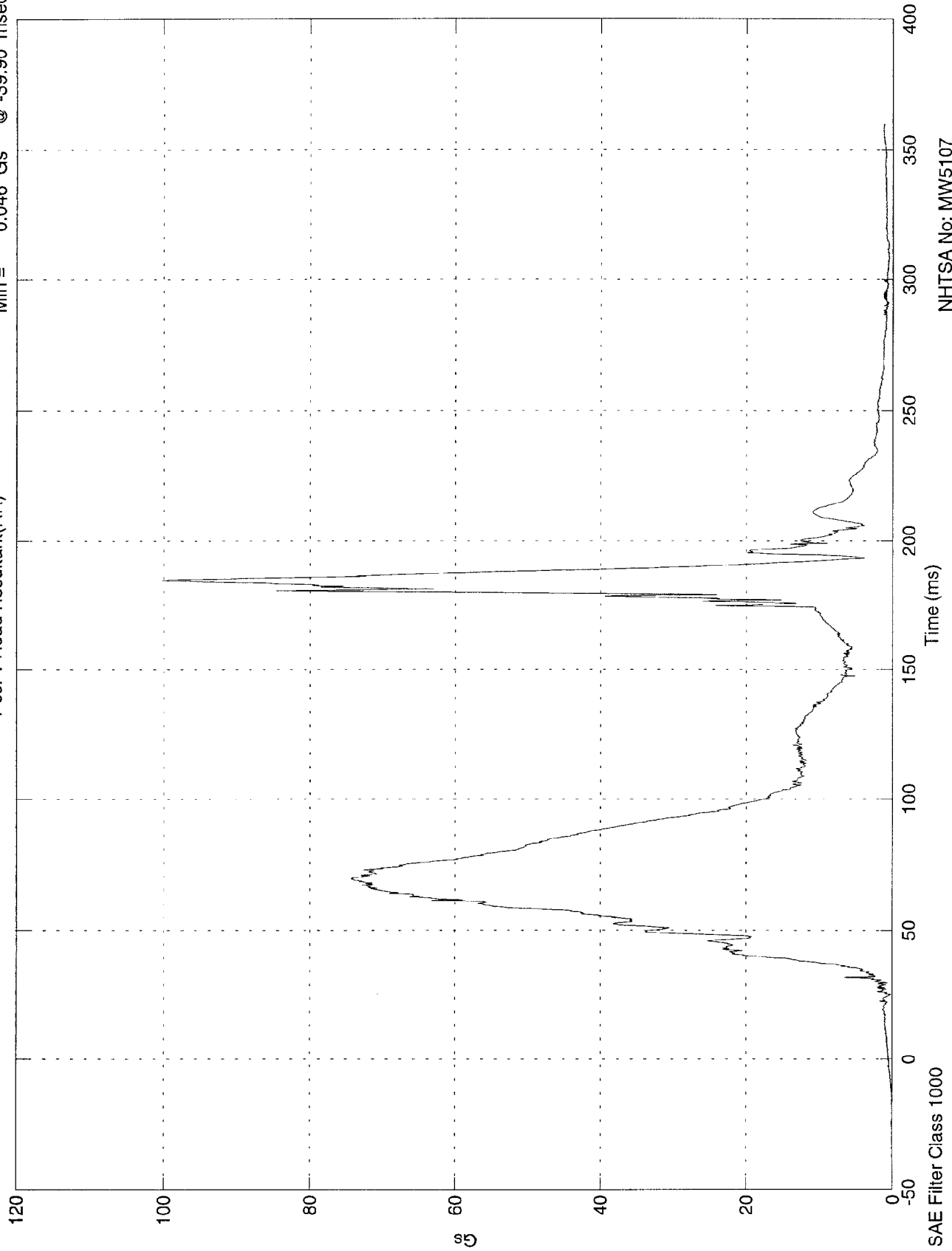


NHTSA No: MW5107  
 Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 100 Gs @ 184.80 msec  
Min = 0.046 Gs @ -39.90 msec

Pos. 1 Head Resultant(RR)

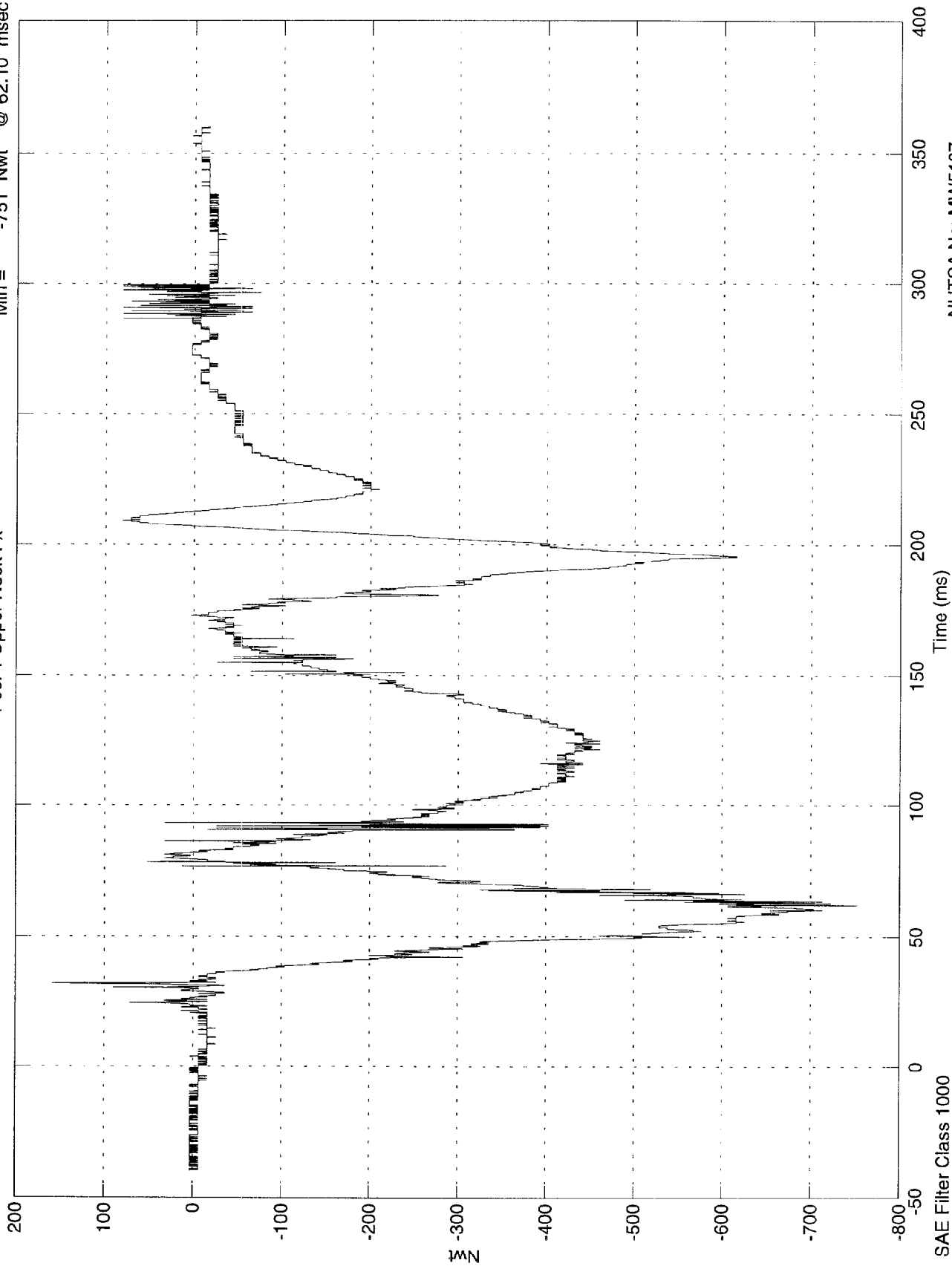


NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 158 Nwt @ 31.70 msec  
Min = -751 Nwt @ 62.10 msec

Pos. 1 Upper Neck Fx

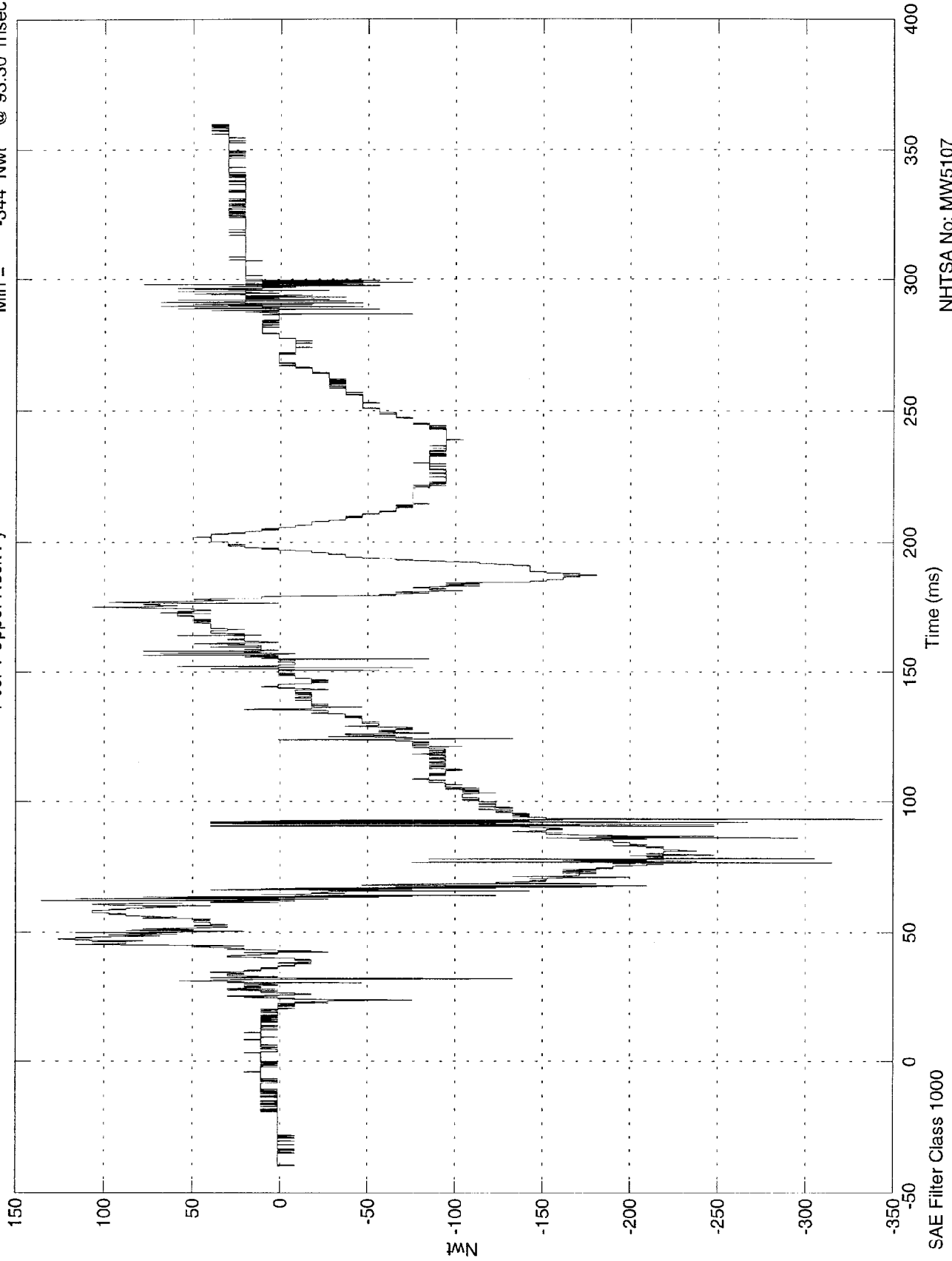


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 135 Nwt @ 62.10 msec  
Min = -344 Nwt @ 93.30 msec

Pos. 1 Upper Neck Fy

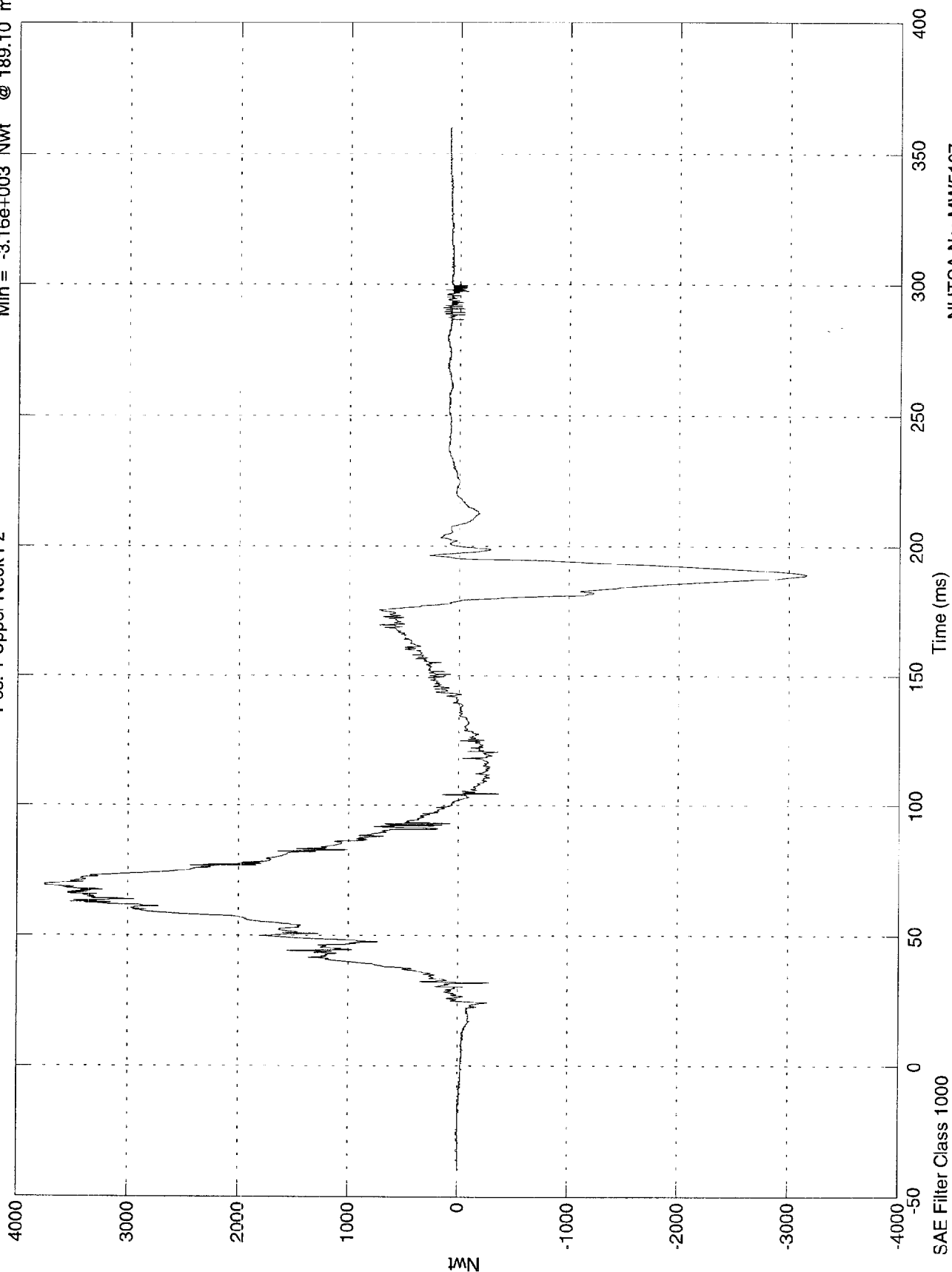


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 3.75e+003 Nwt @ 69.30 msec  
Min = -3.16e+003 Nwt @ 189.10 msec

Pos. 1 Upper Neck Fz

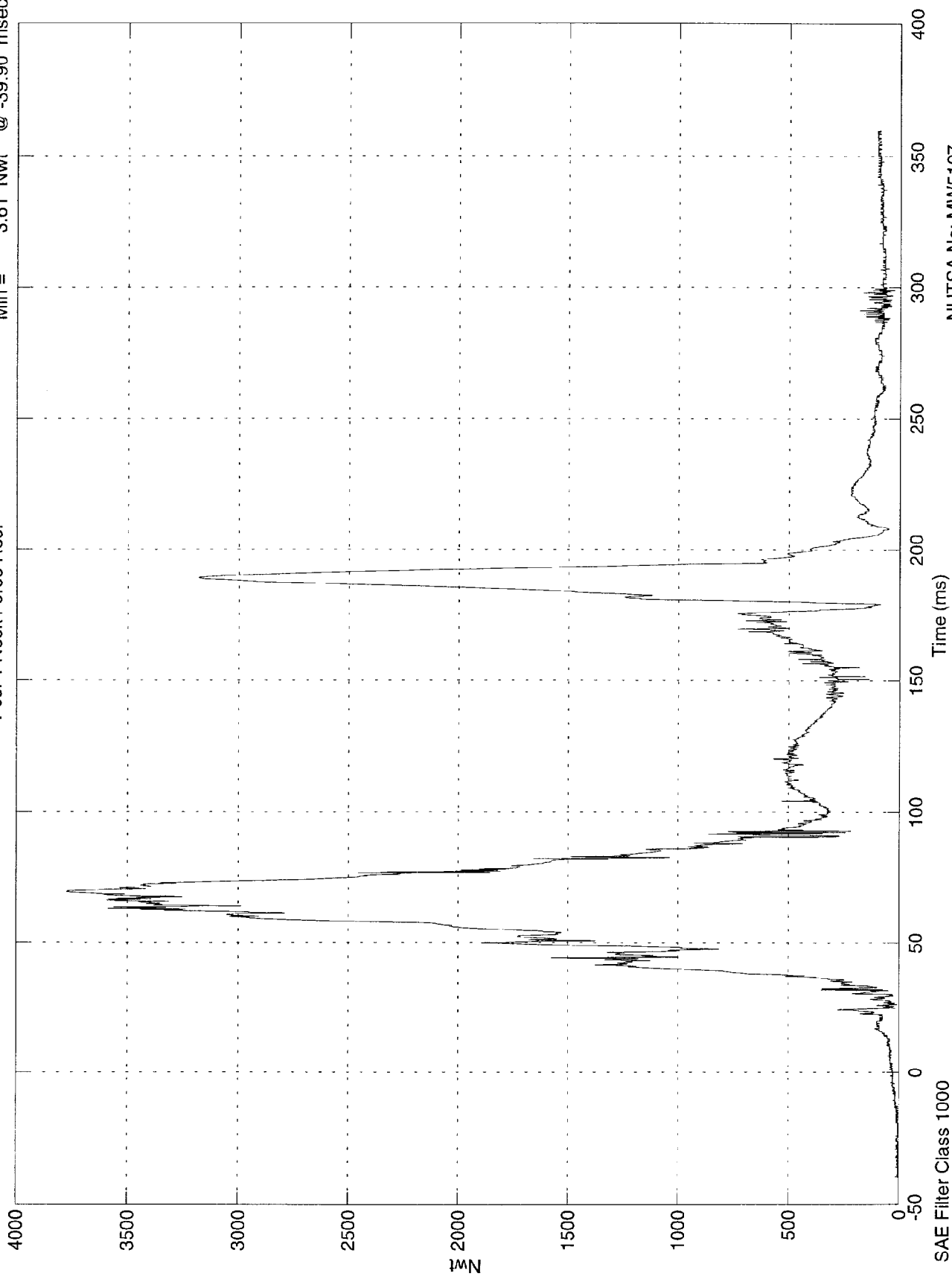


NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 3.77e+003 Nwt @ 69.30 msec  
 Min = 3.61 Nwt @ -39.90 msec

Pos. 1 Neck Force Res.

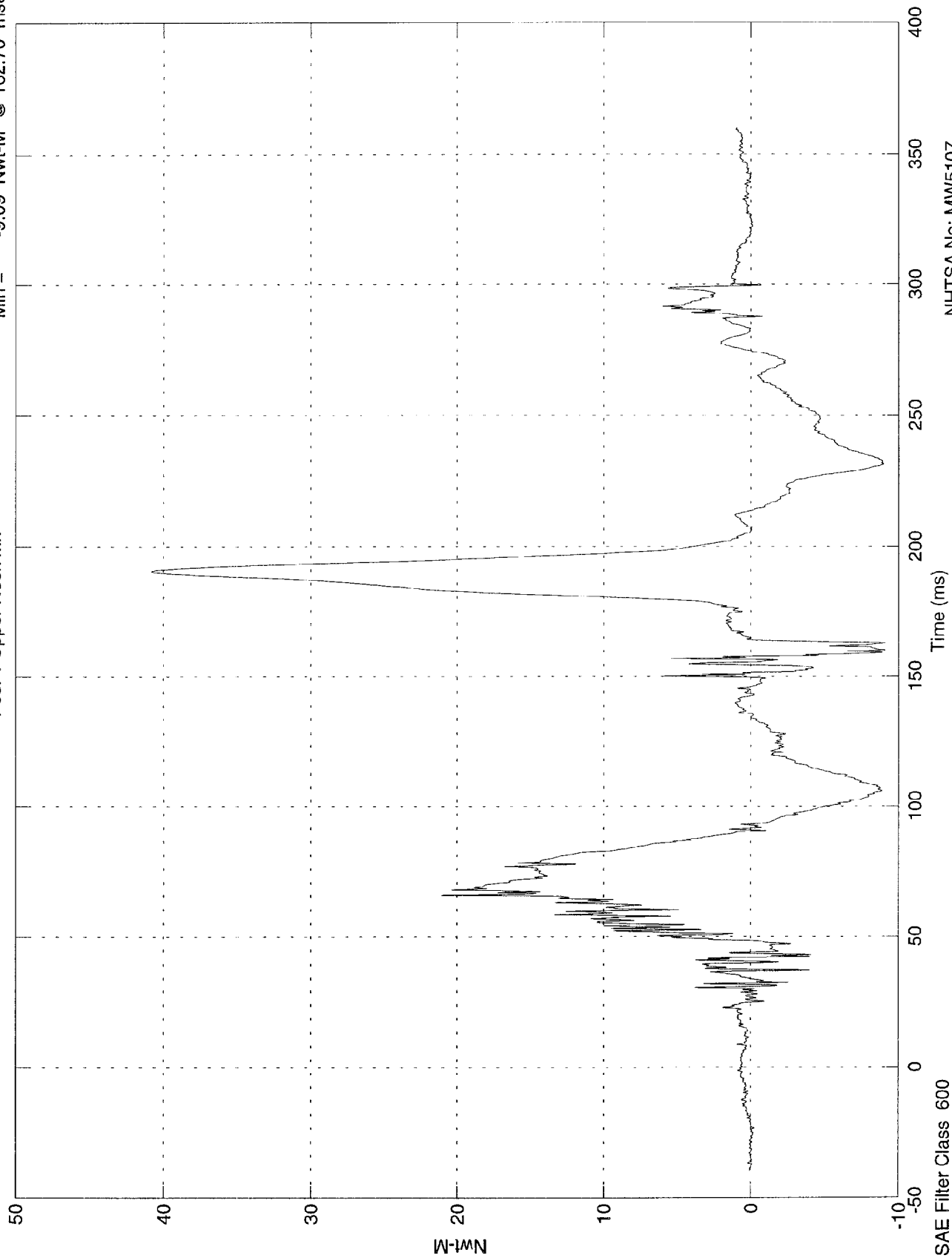


NHTSA No: MW5107  
 Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 40.8 Nwt-M @ 190.50 msec  
 Min = -9.09 Nwt-M @ 162.70 msec

Pos. 1 Upper Neck Mx

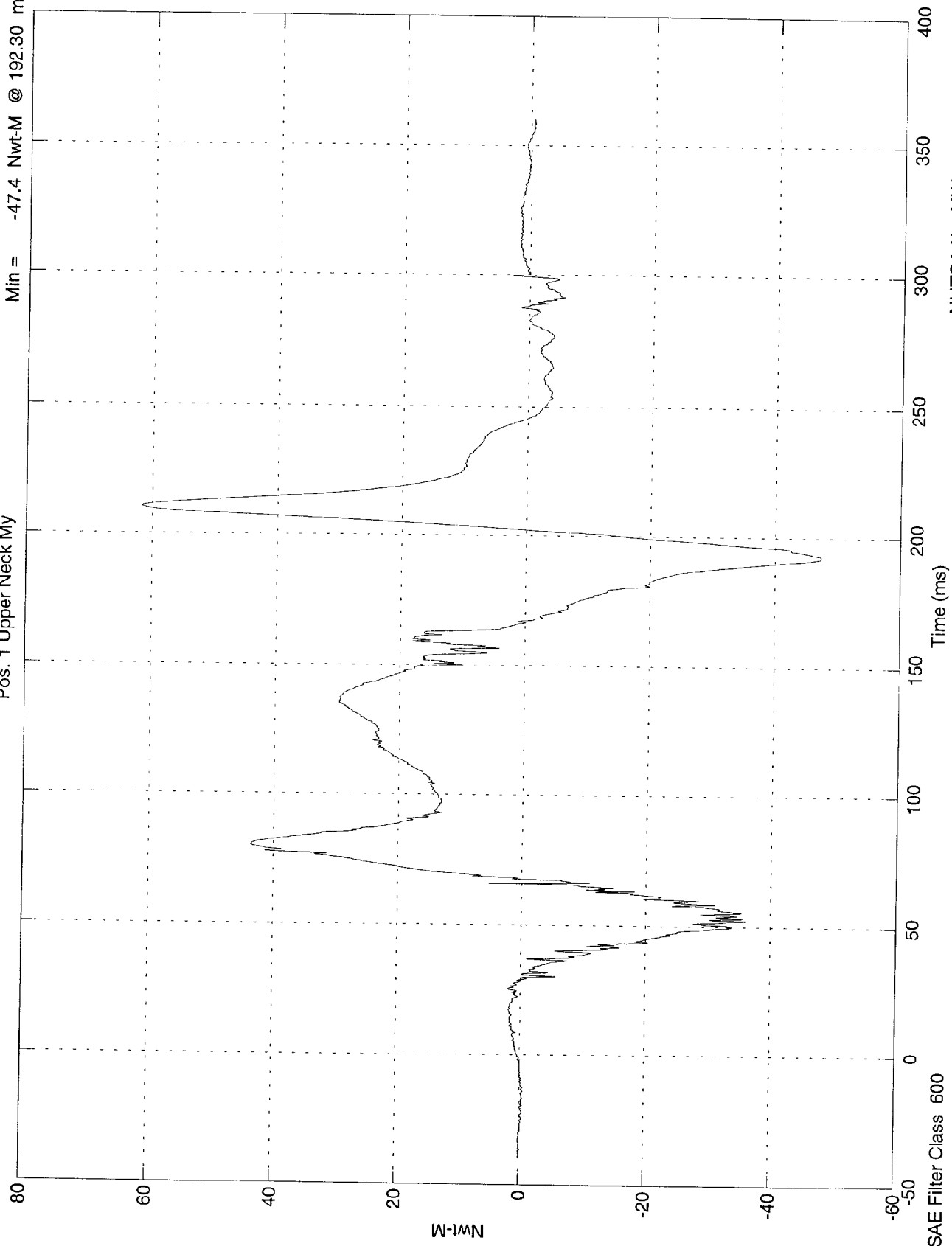


NHTSA No: MW5107  
 Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 61.6 Nwt-M @ 210.60 msec  
 Min = -47.4 Nwt-M @ 192.30 msec

Pos. 1 Upper Neck My

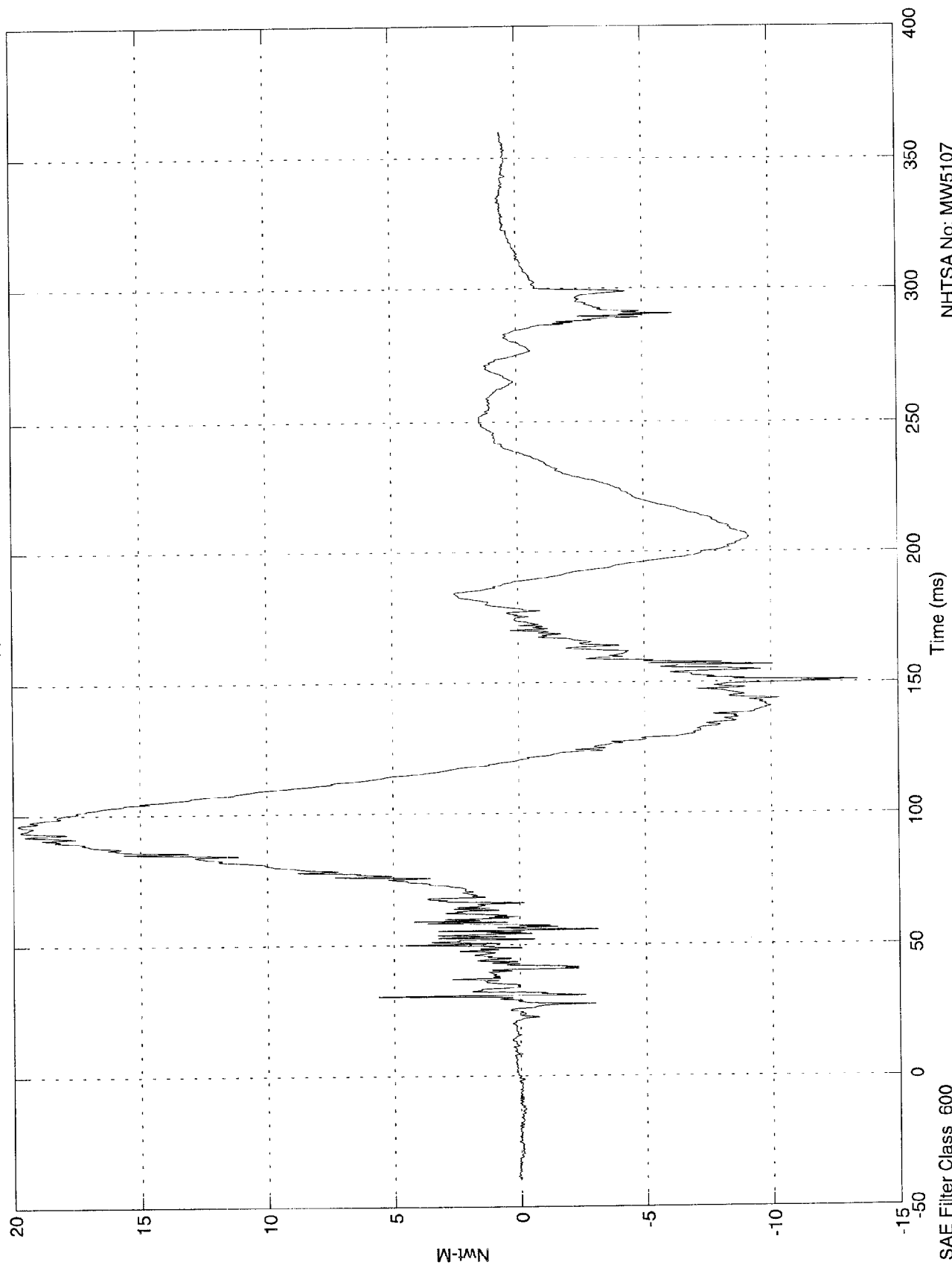


NHTSA No: MW5107  
 Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 19.8 Nwt-M @ 96.20 msec  
 Min = -13.4 Nwt-M @ 150.70 msec

Pos. 1 Upper Neck Mz



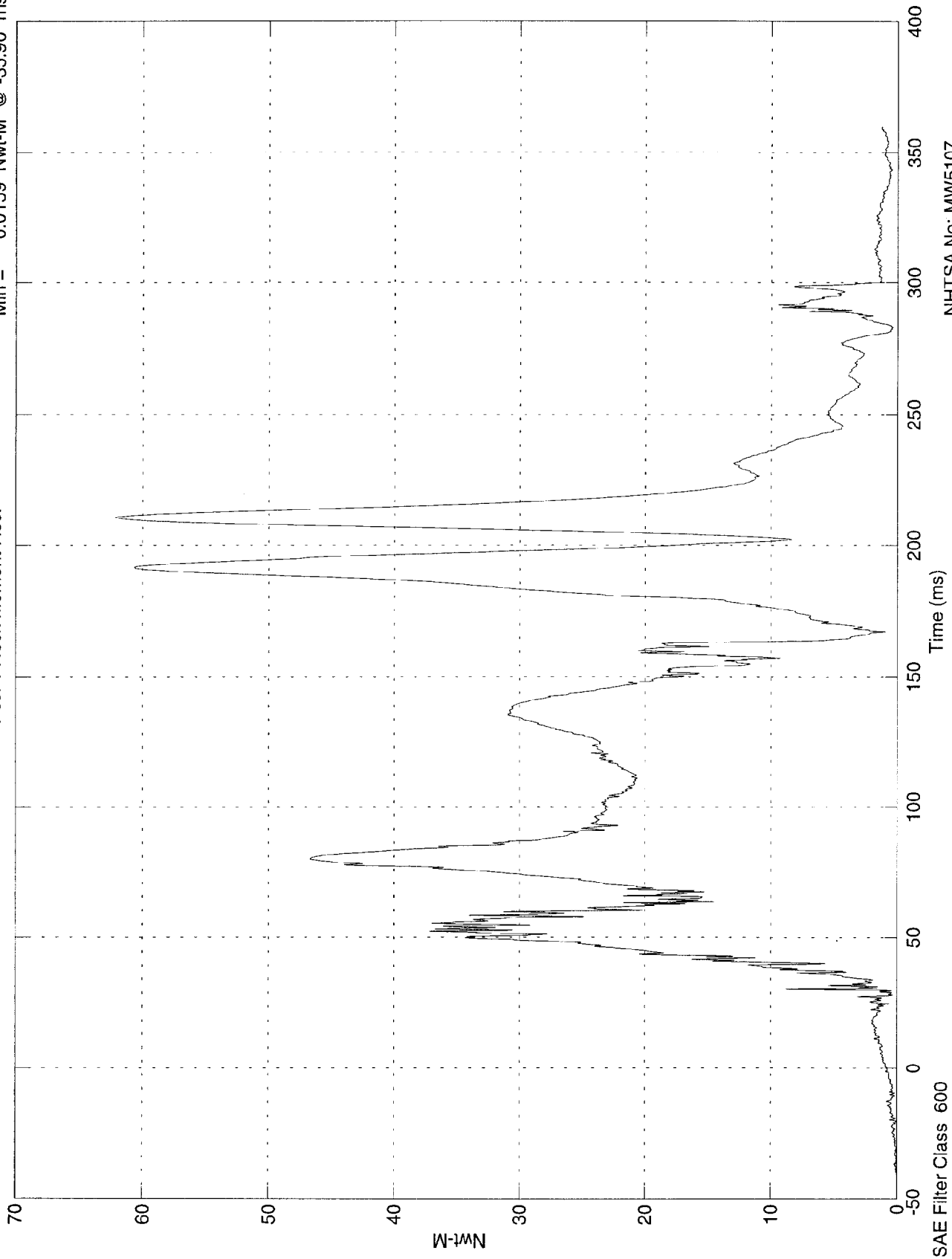
NHTSA No: MW5107  
 Date: 15 Dec 1997

SAE Filter Class 600

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 62.2 Nwt-M @ 210.60 msec  
 Min = 0.0159 Nwt-M @ -35.90 msec

Pos. 1 Neck Moment Res.



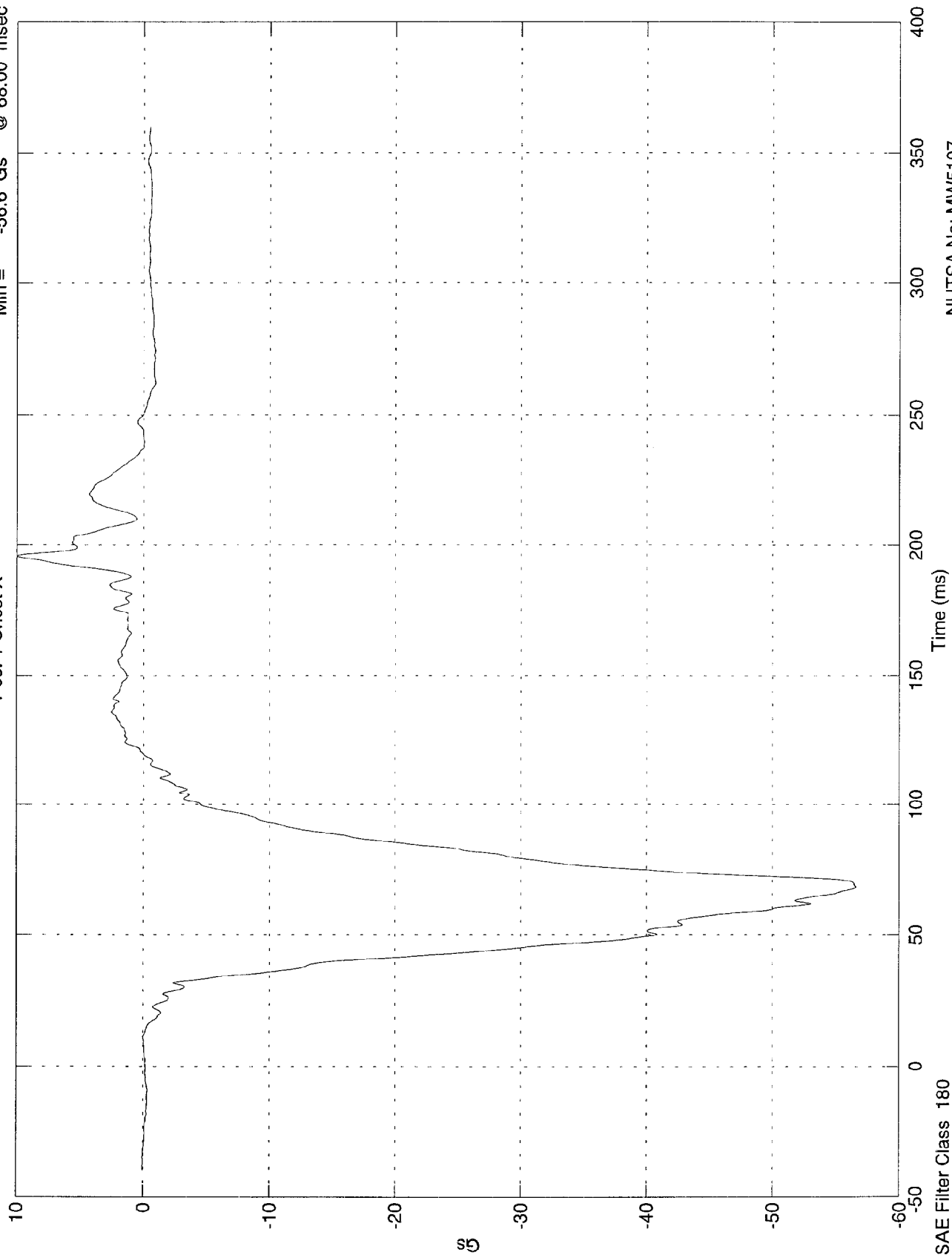
SAE Filter Class 600

NHTSA No: MW5107  
 Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 9.99 Gs @ 195.60 msec  
Min = -56.6 Gs @ 68.00 msec

Pos. 1 Chest X

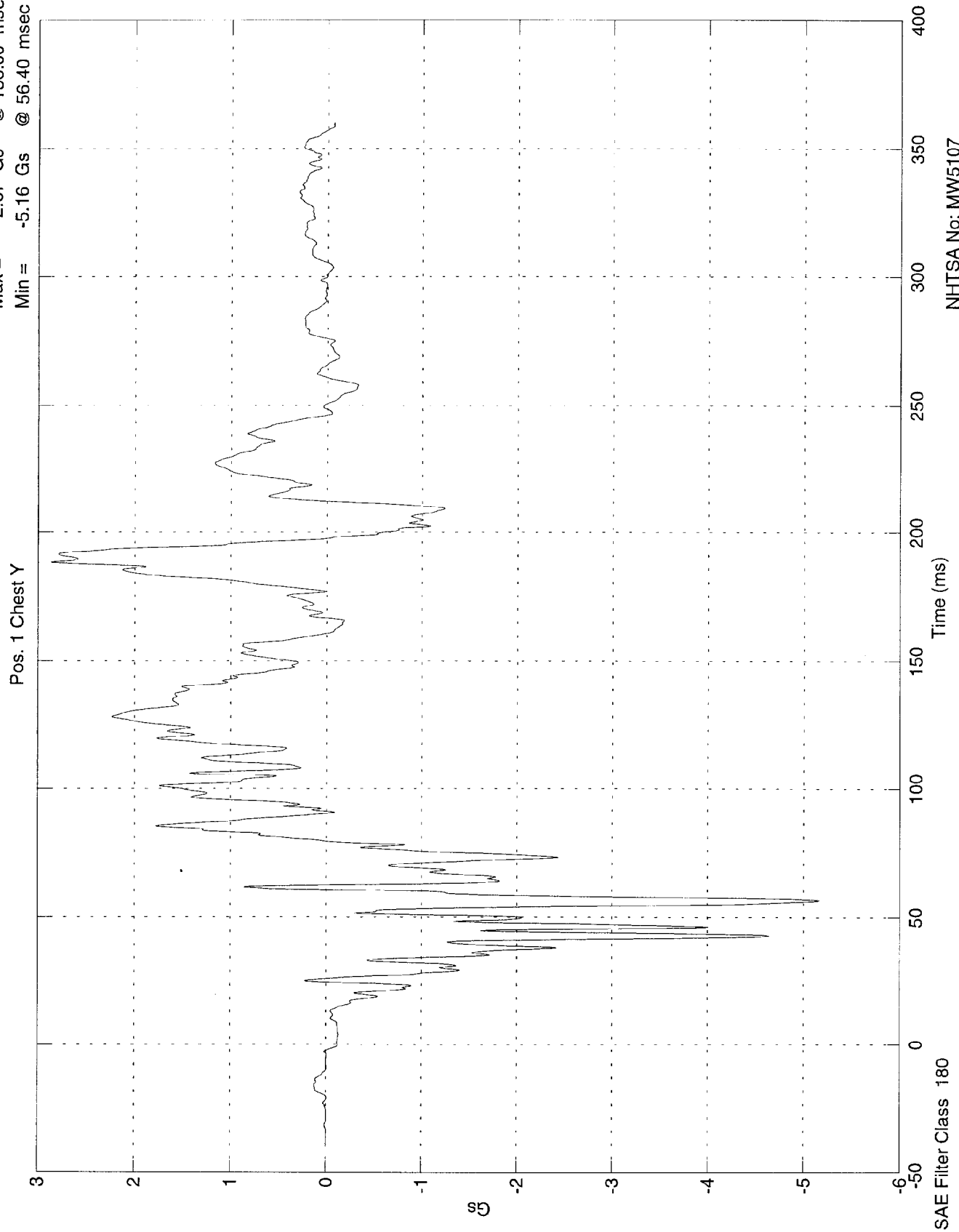


SAE Filter Class 180

NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 2.87 Gs @ 188.30 msec  
Min = -5.16 Gs @ 56.40 msec

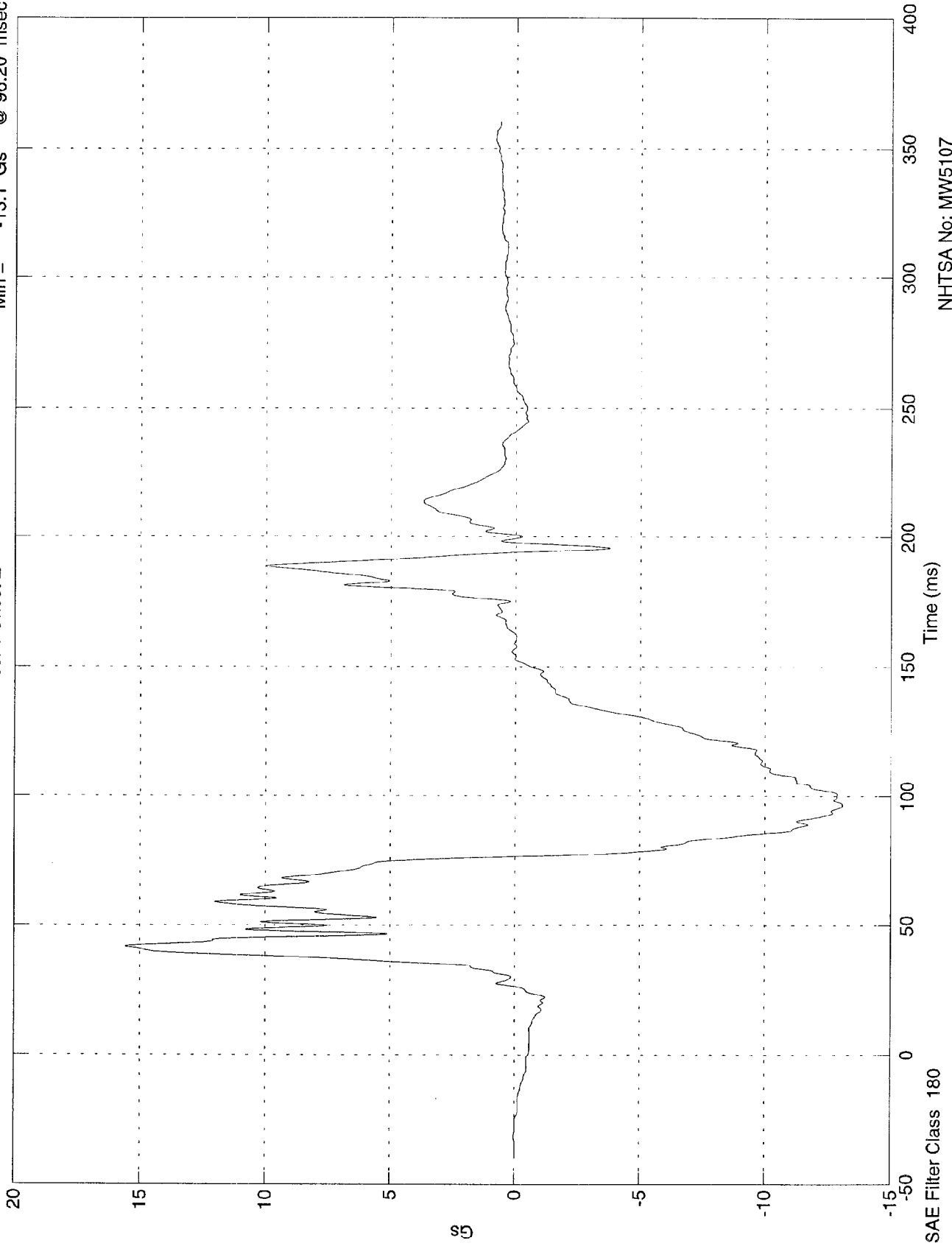


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

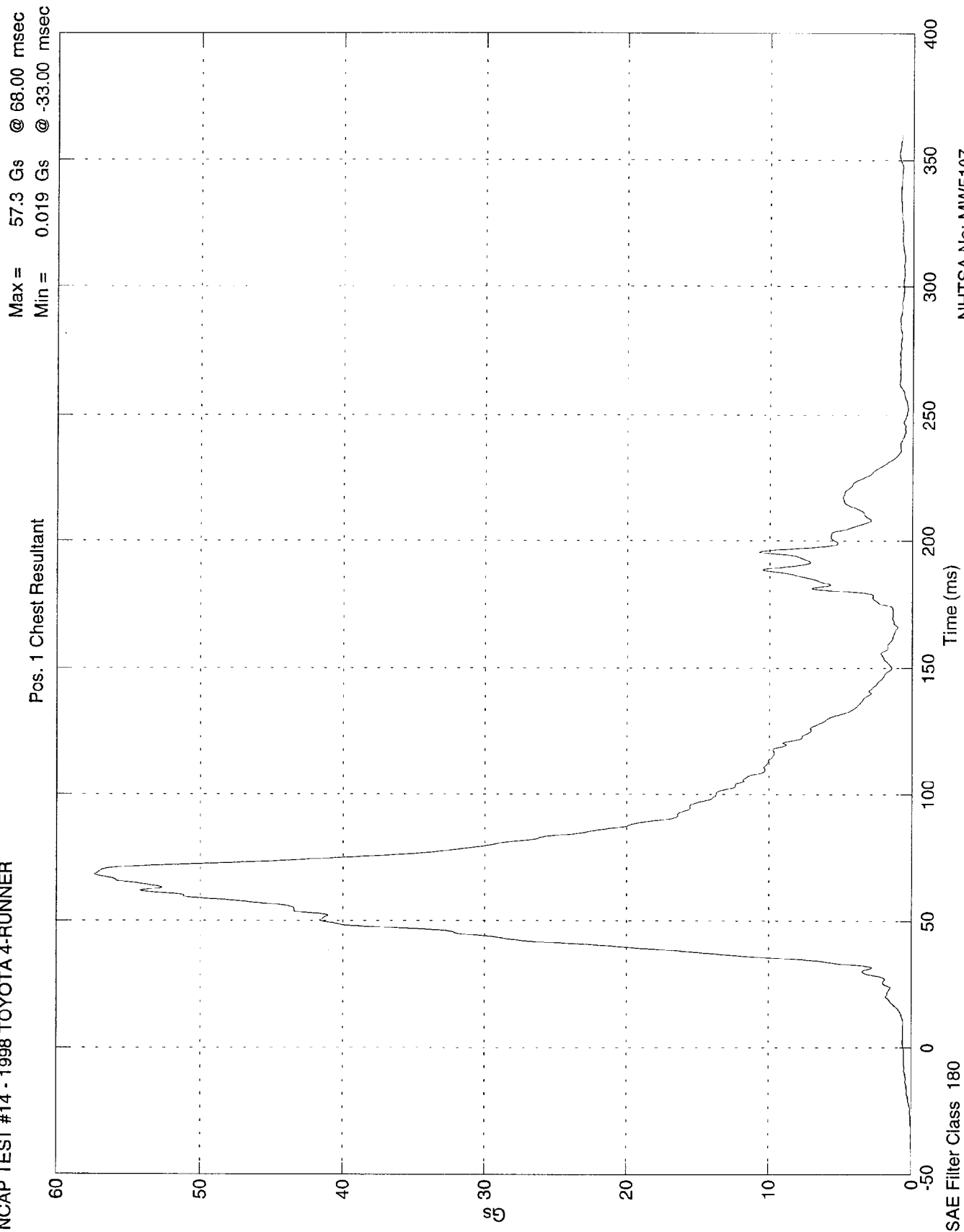
Max = 15.6 Gs @ 42.00 msec  
Min = -13.1 Gs @ 96.20 msec

Pos. 1 Chest Z



NHTSA No: MW5107  
Date: 15 Dec 1997

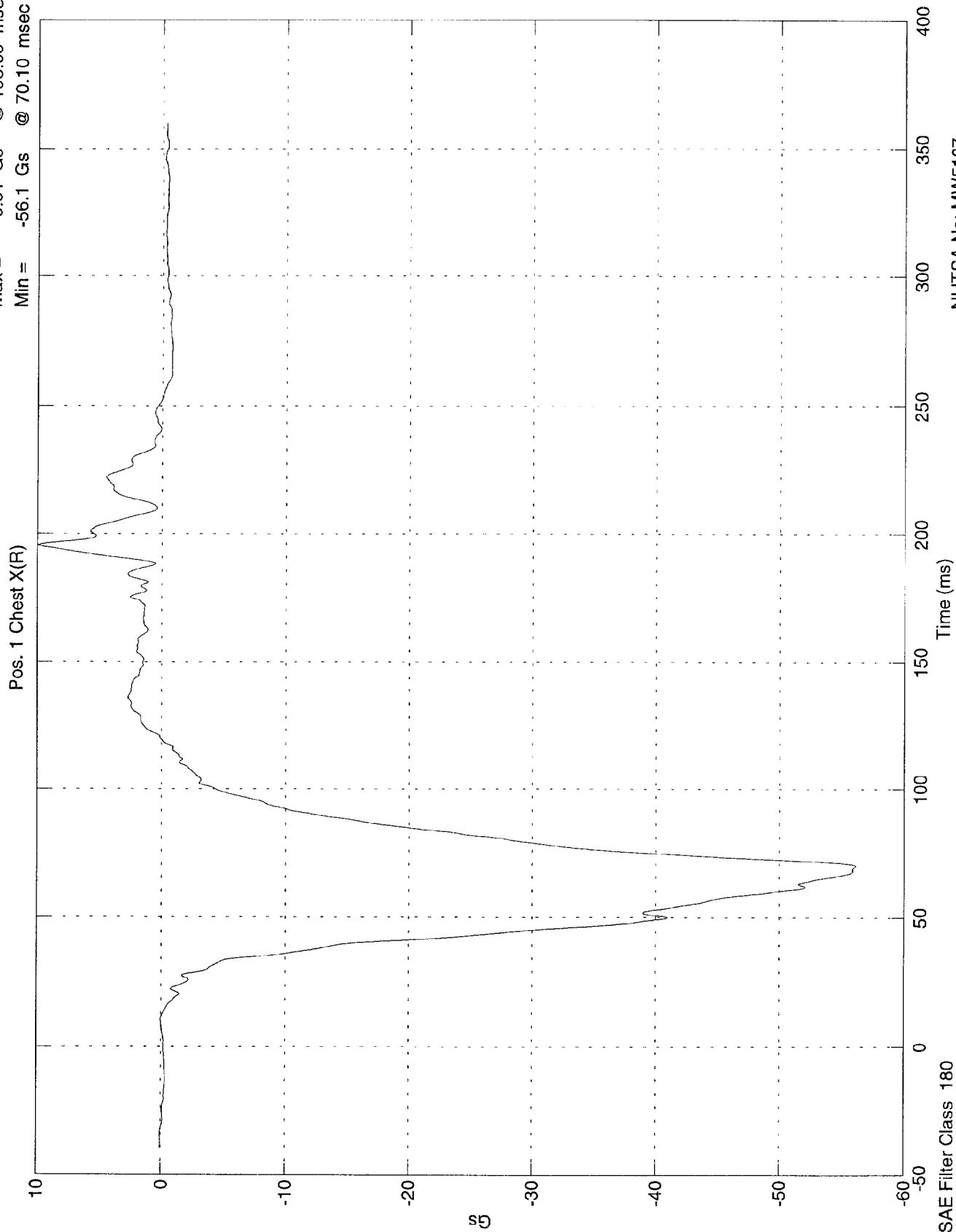
NCAP TEST #14 - 1998 TOYOTA 4-RUNNER



NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

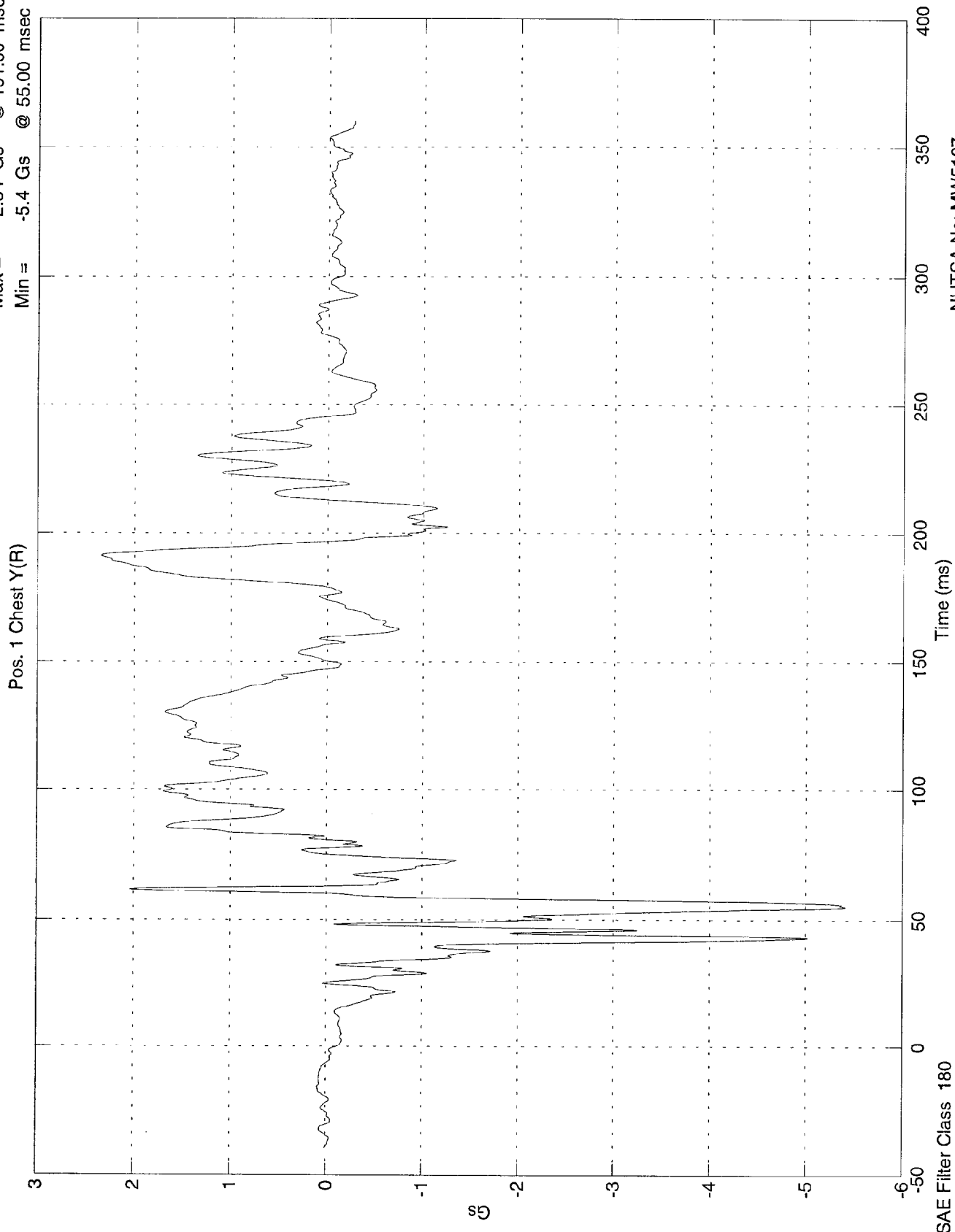
Max = 9.91 Gs @ 195.60 msec  
 Min = -56.1 Gs @ 70.10 msec



NHTSA No: MW5107  
 Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 2.34 Gs @ 191.30 msec  
 Min = -5.4 Gs @ 55.00 msec

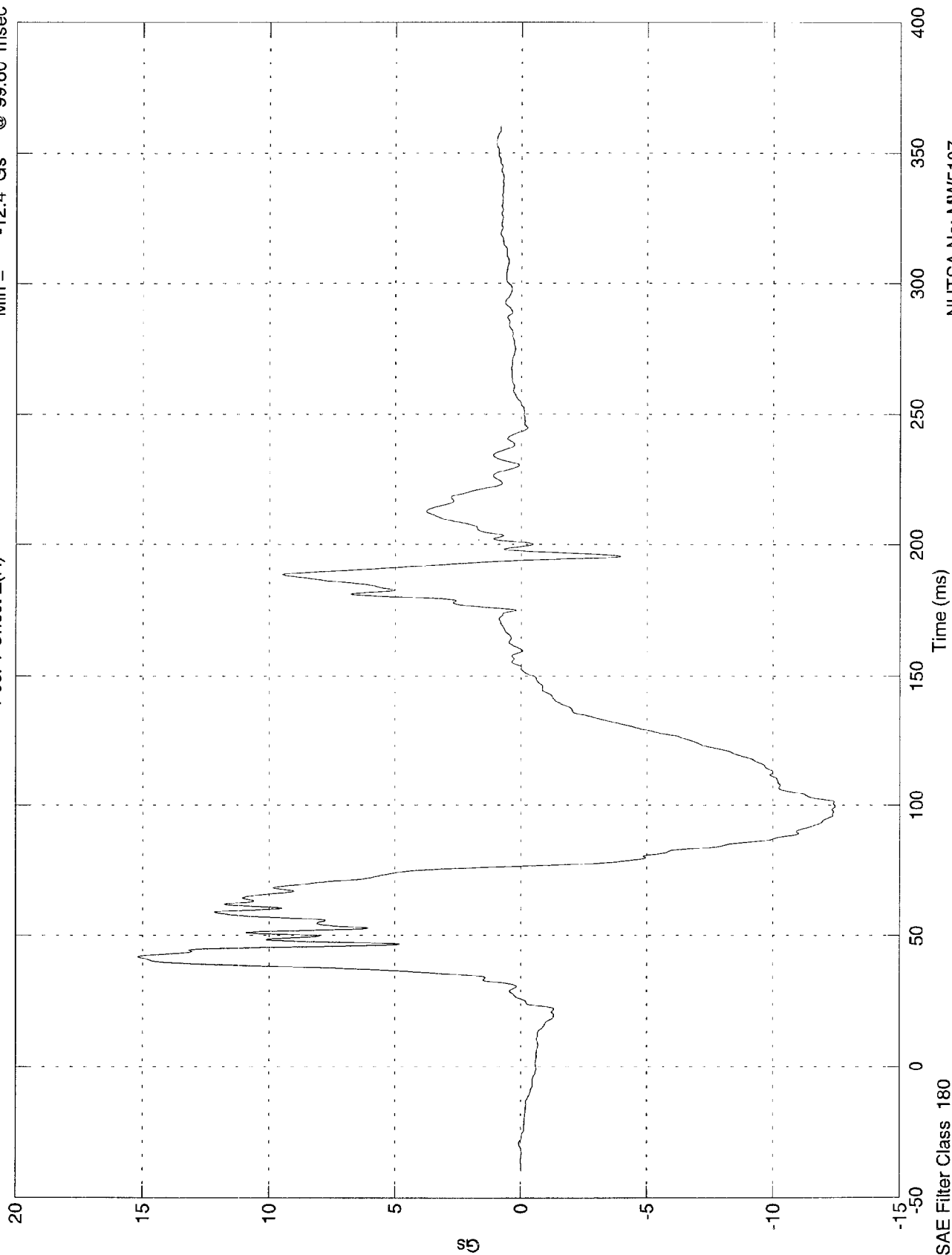


NHTSA No: MW5107  
 Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

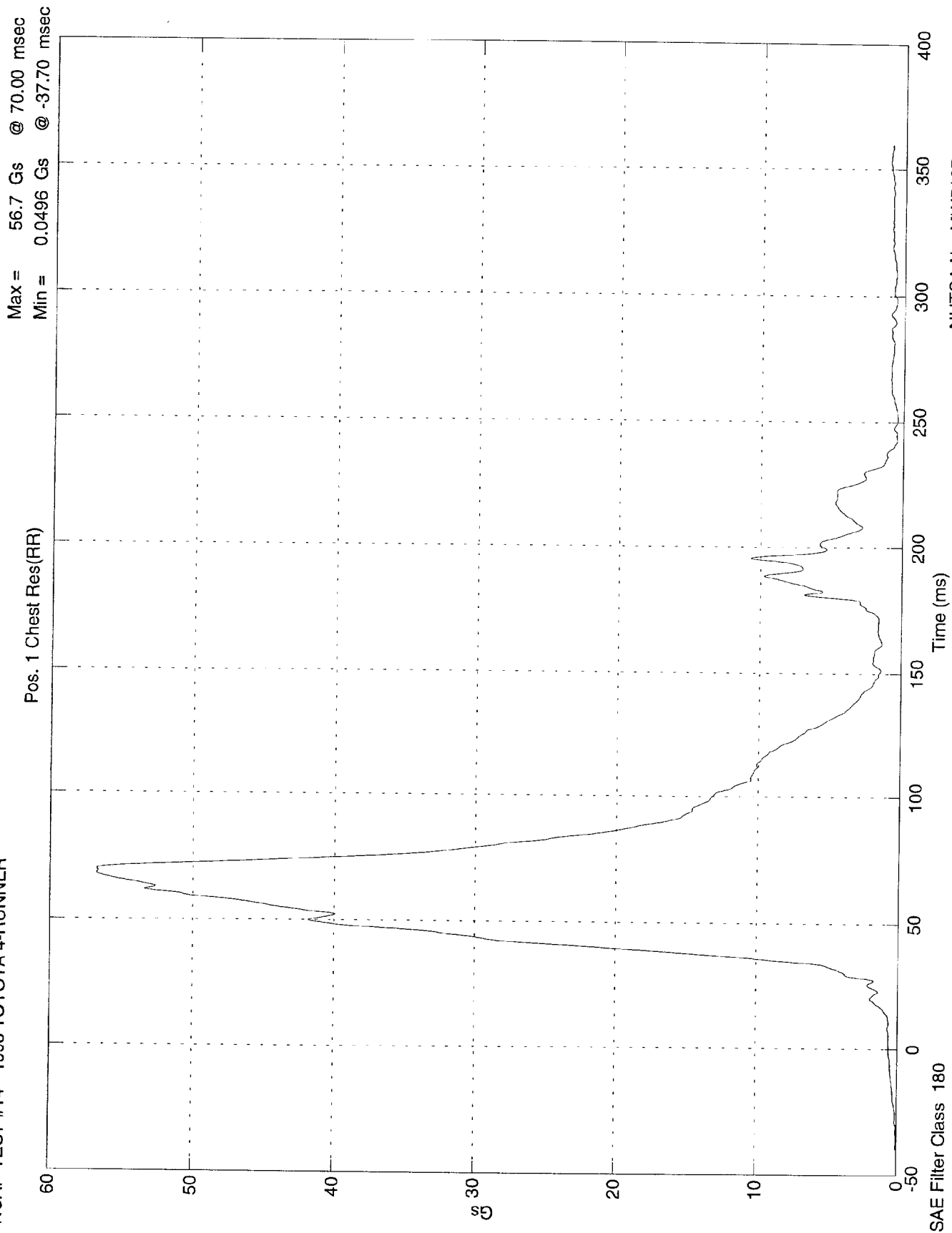
Max = 15.2 Gs @ 42.10 msec  
Min = -12.4 Gs @ 99.60 msec

Pos. 1 Chest Z(R)



NHTSA No: MW5107  
Date: 15 Dec 1997

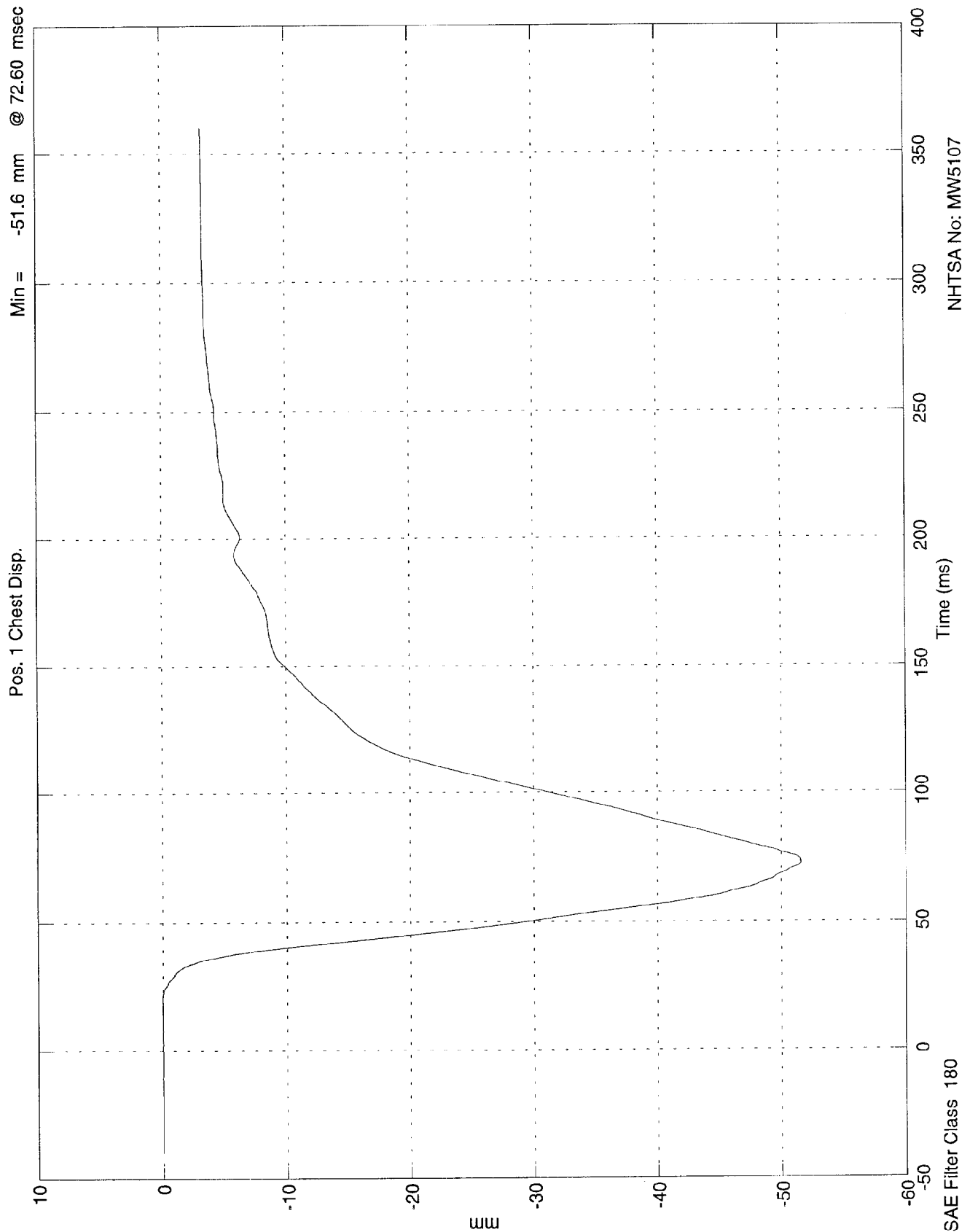
NCAP TEST #14 - 1998 TOYOTA 4-RUNNER



NHTSA No: MW5107  
Date: 15 Dec 1997

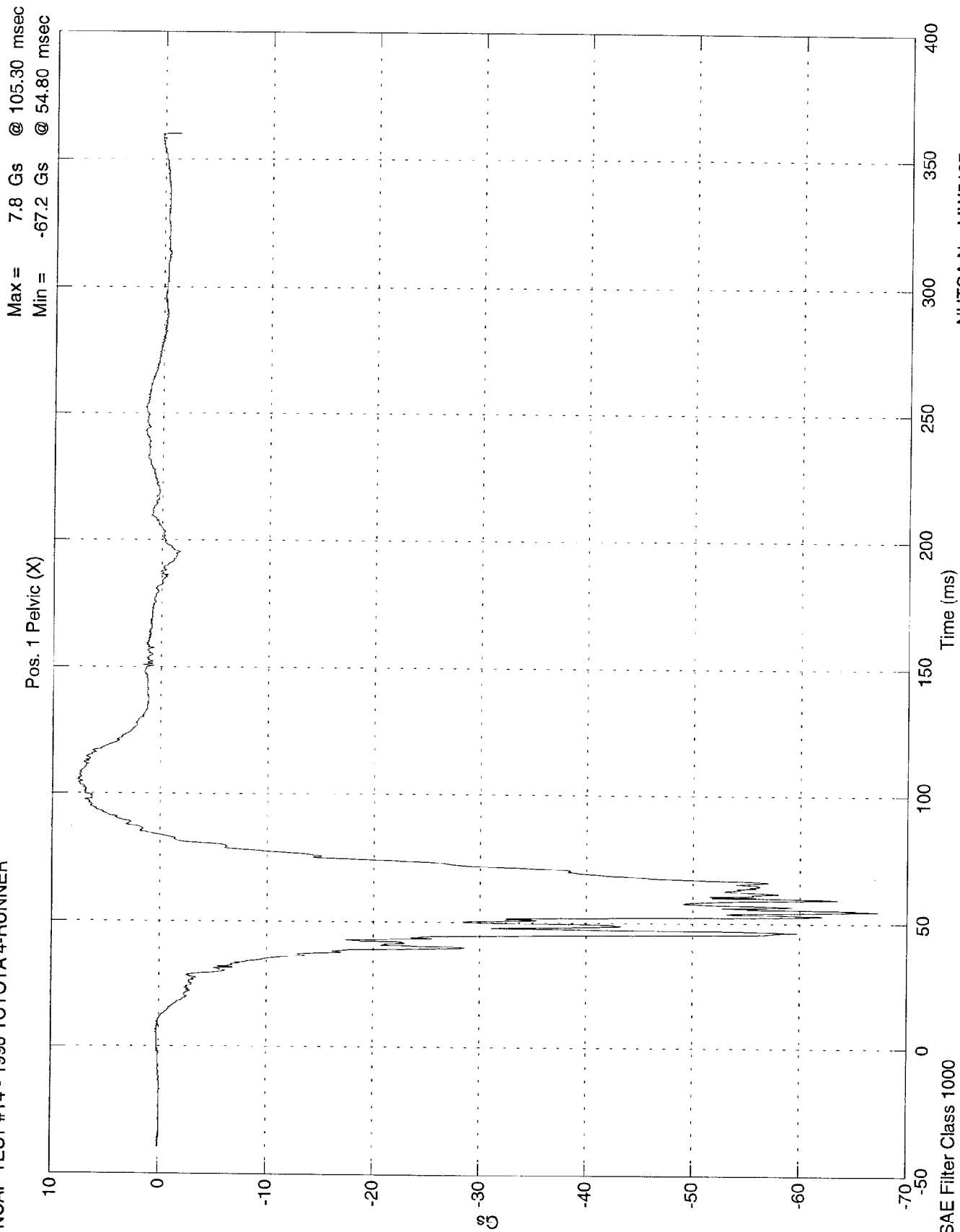
NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 0.0287 mm @ 19.30 msec  
Min = -51.6 mm @ 72.60 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

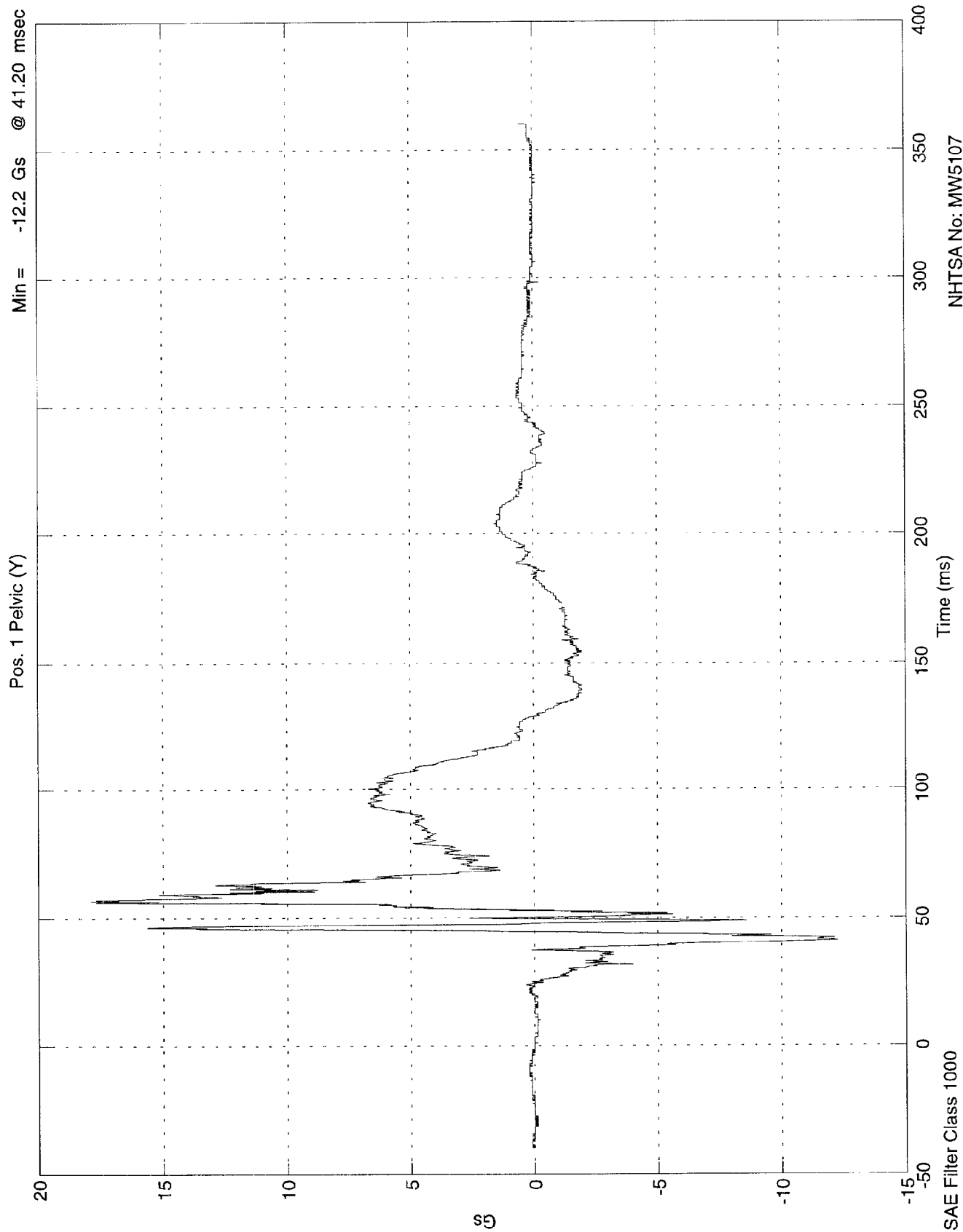
NCAP TEST #14 - 1998 TOYOTA 4-RUNNER



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

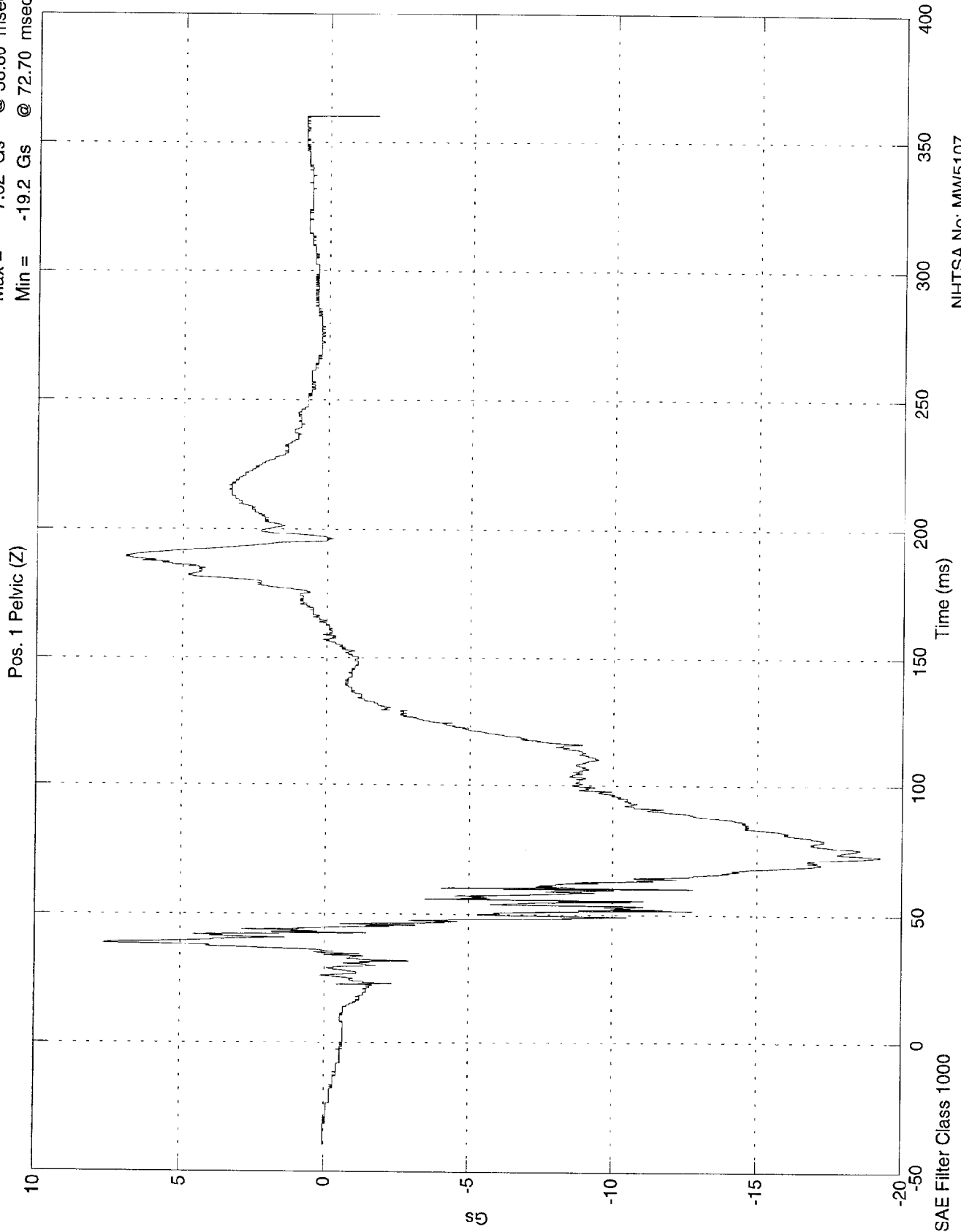
Max = 17.9 Gs @ 56.70 msec  
Min = -12.2 Gs @ 41.20 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 7.62 Gs @ 38.80 msec  
Min = -19.2 Gs @ 72.70 msec

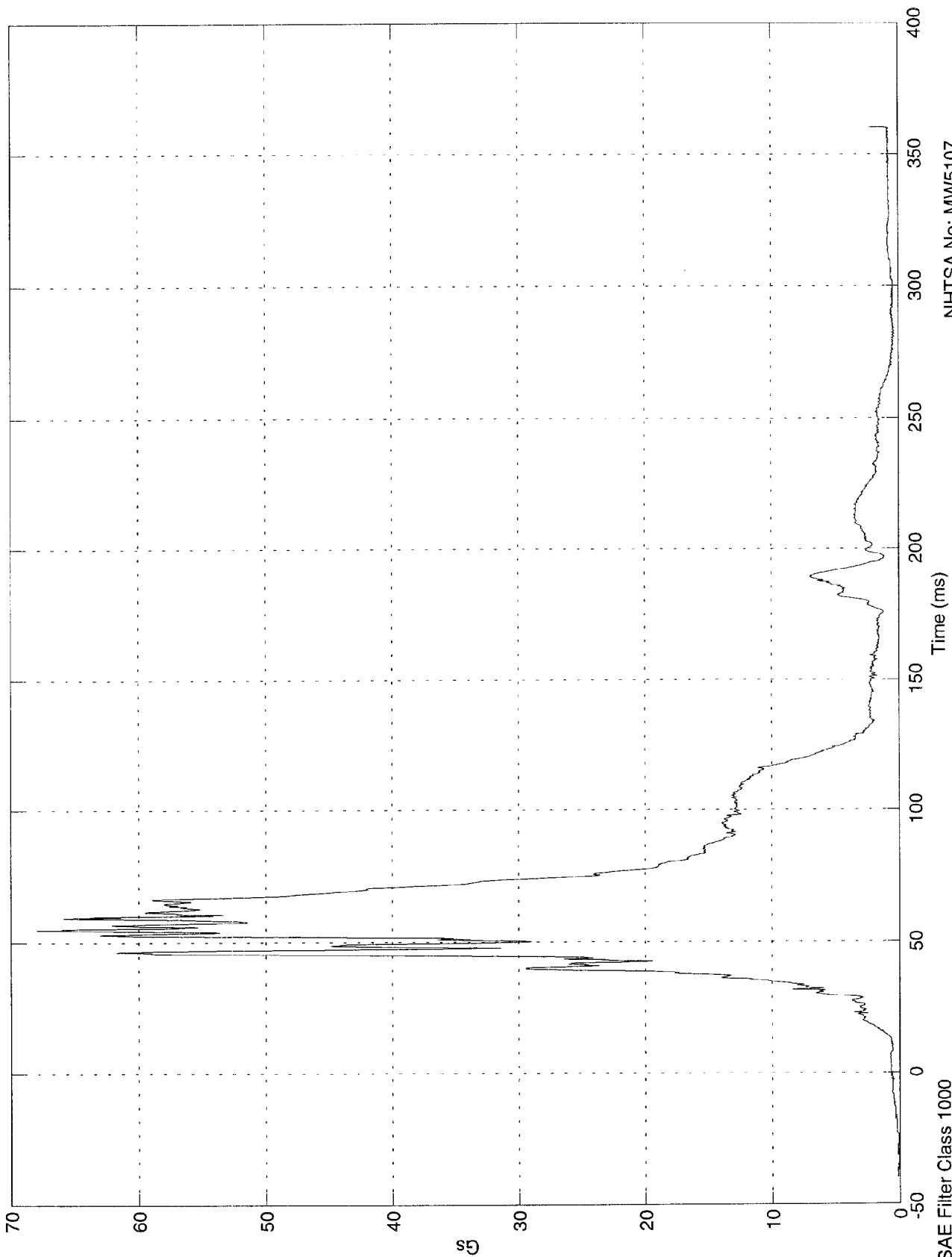


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 68 Gs @ 54.80 msec  
Min = 0.0478 Gs @ -37.30 msec

Pos. 1 Pelvic (R)



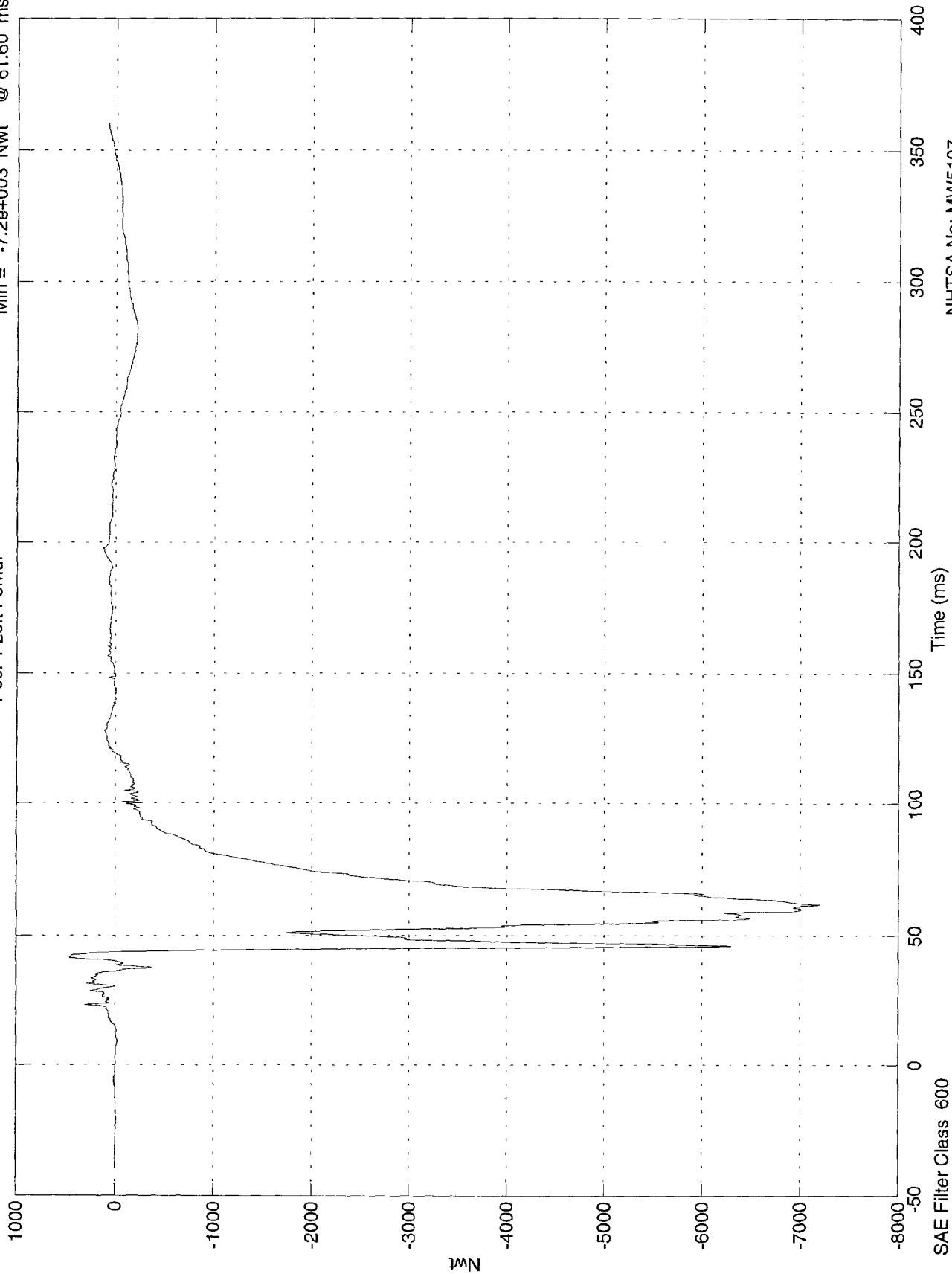
SAE Filter Class 1000

NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 457 Nwt @ 41.70 msec  
Min = -7.2e+003 Nwt @ 61.60 msec

Pos. 1 Left Femur

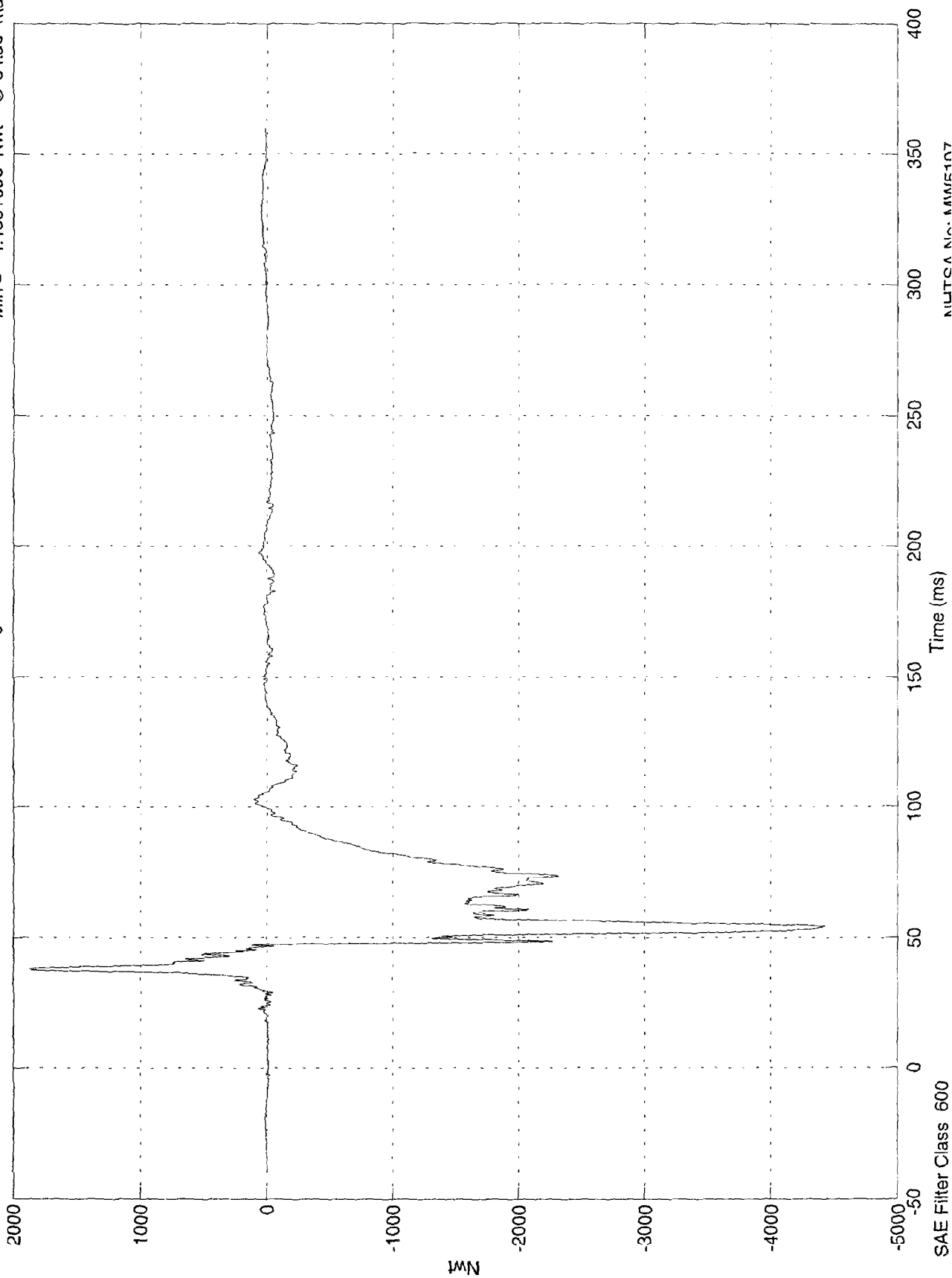


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 1.88e+003 Nwt @ 38.30 msec  
 Min = -4.43e+003 Nwt @ 54.30 msec

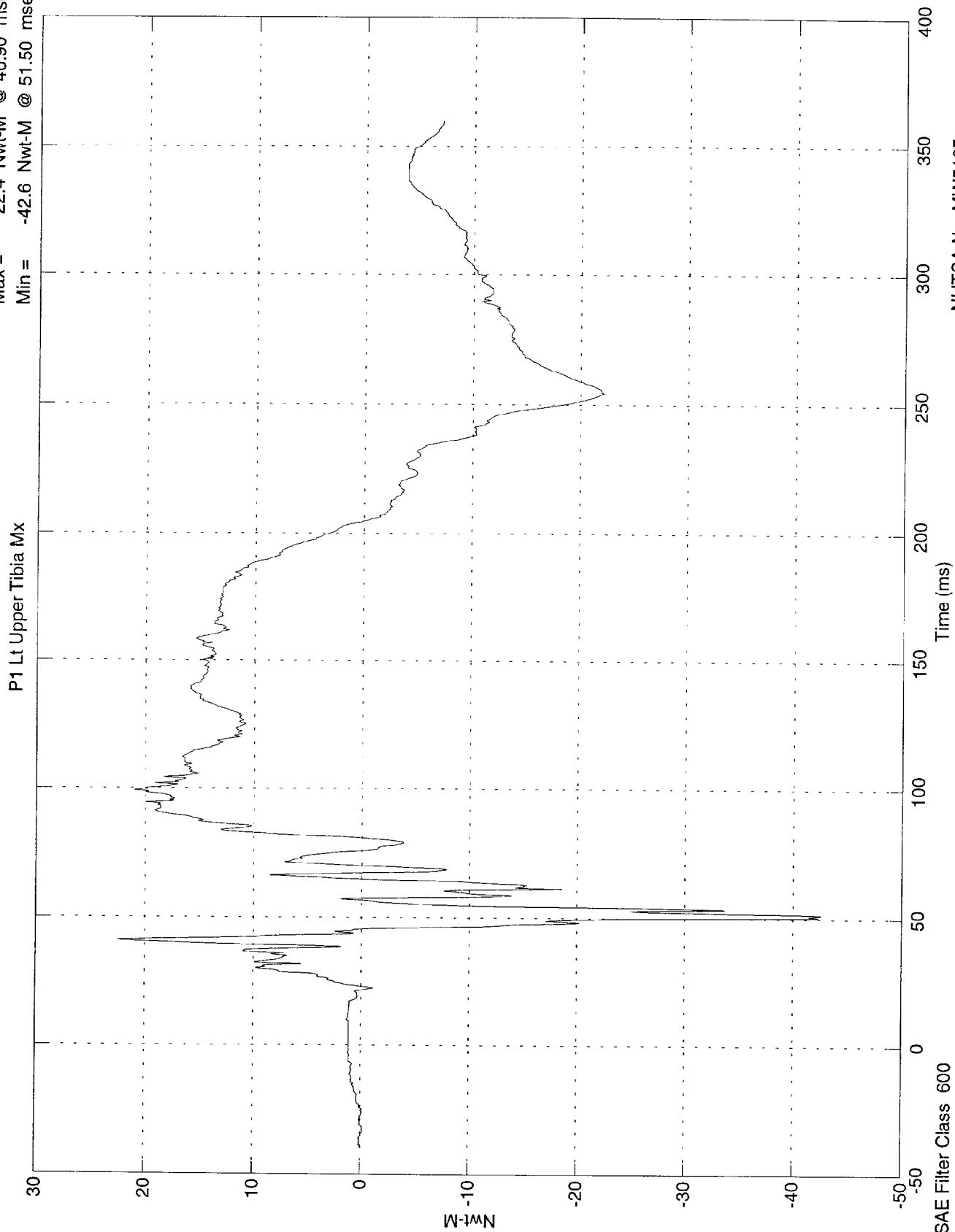
Pos. 1 Right Femur



SAE Filter Class 600

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 22.4 Nwt-M @ 40.90 msec  
Min = -42.6 Nwt-M @ 51.50 msec

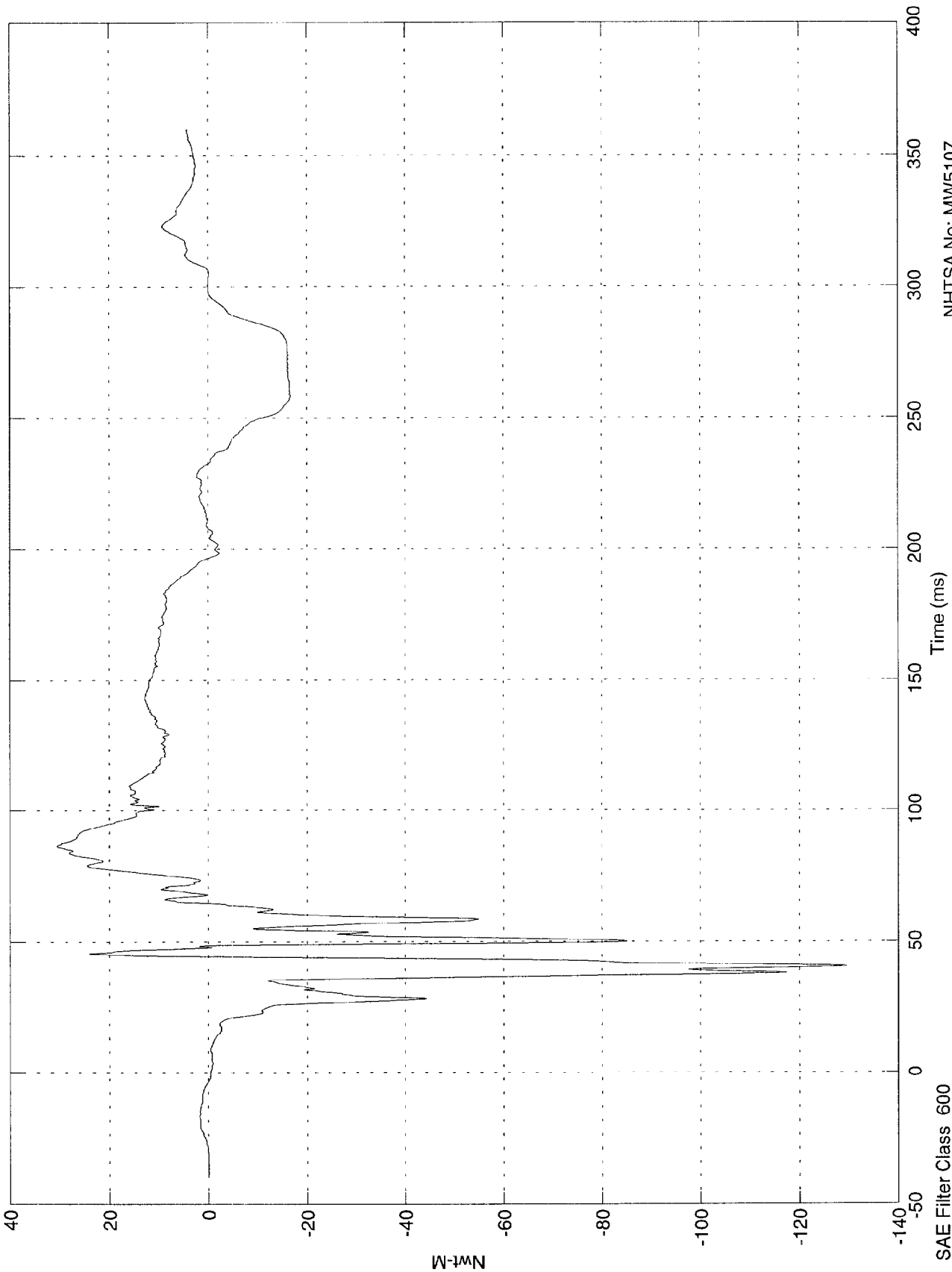


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 30.6 Nwt-M @ 86.40 msec  
 Min = -129 Nwt-M @ 40.50 msec

P1 Lt Upper Tibia My

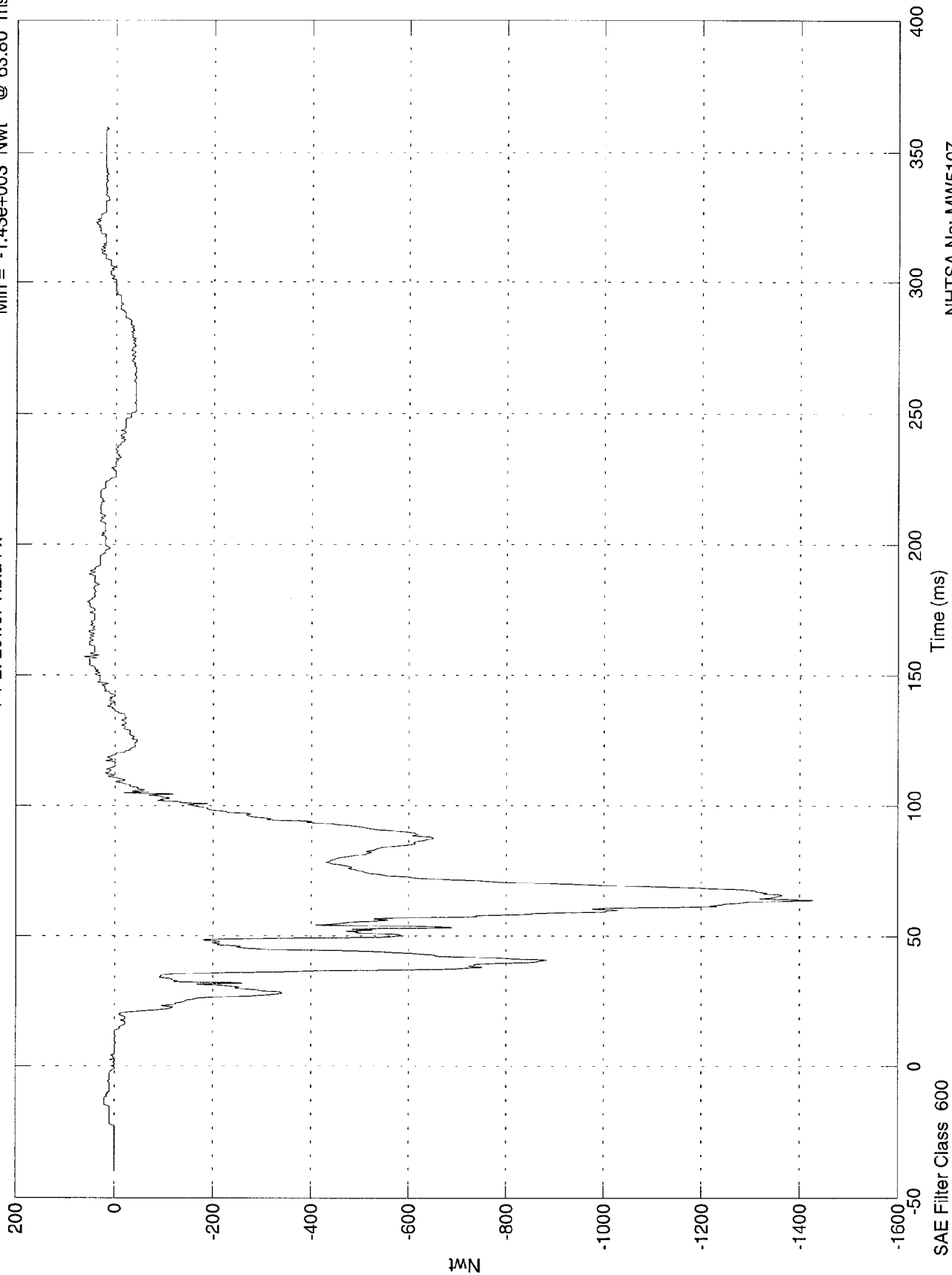


NHTSA No: MW5107  
 Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 62.6 Nwt @ 157.10 msec  
Min = -1.43e+003 Nwt @ 63.80 msec

P1 Lt Lower Tibia Fx

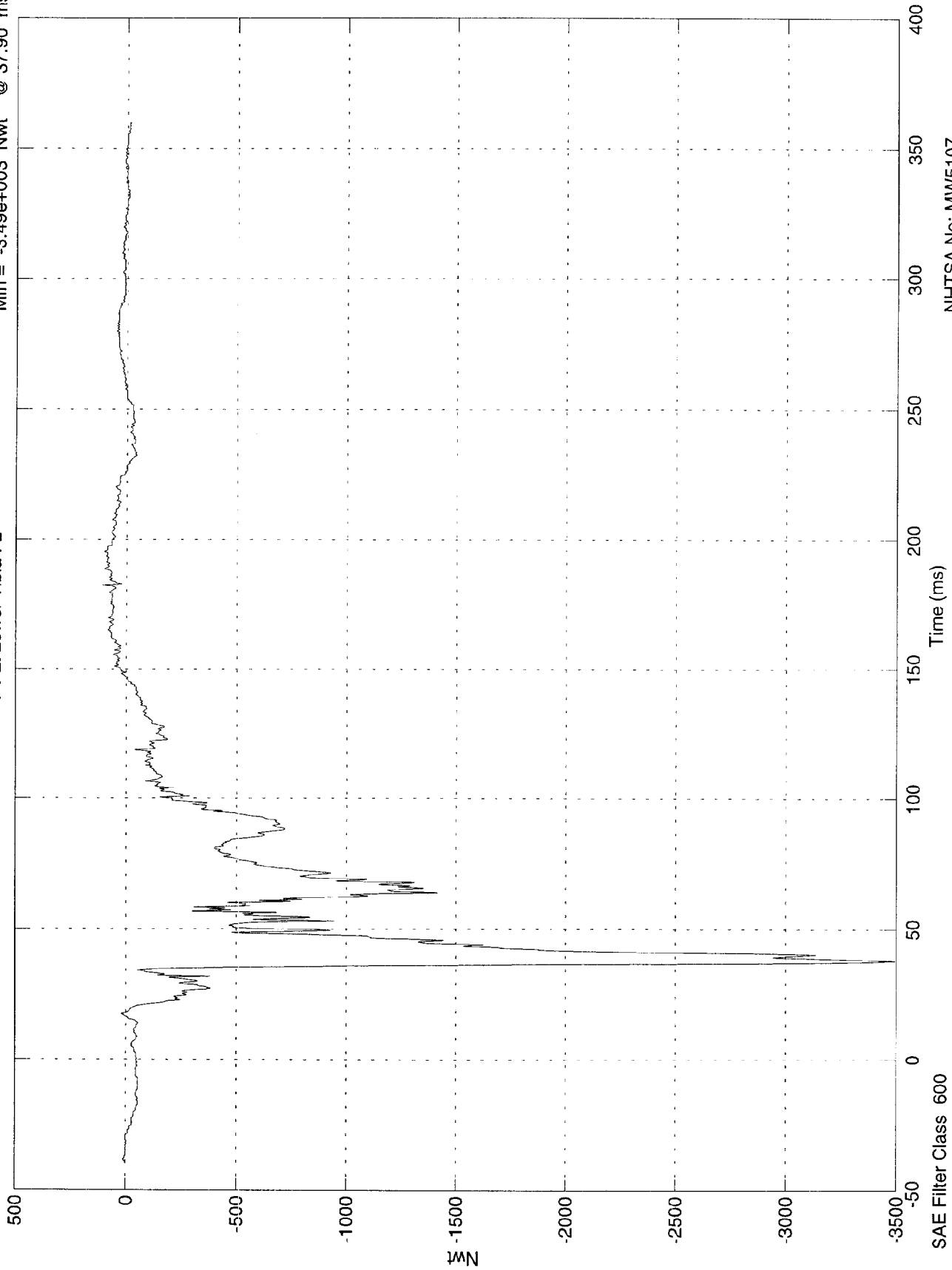


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 110 Nwt @ 182.50 msec  
Min = -3.49e+003 Nwt @ 37.90 msec

P1 Lt Lower Tibia Fz

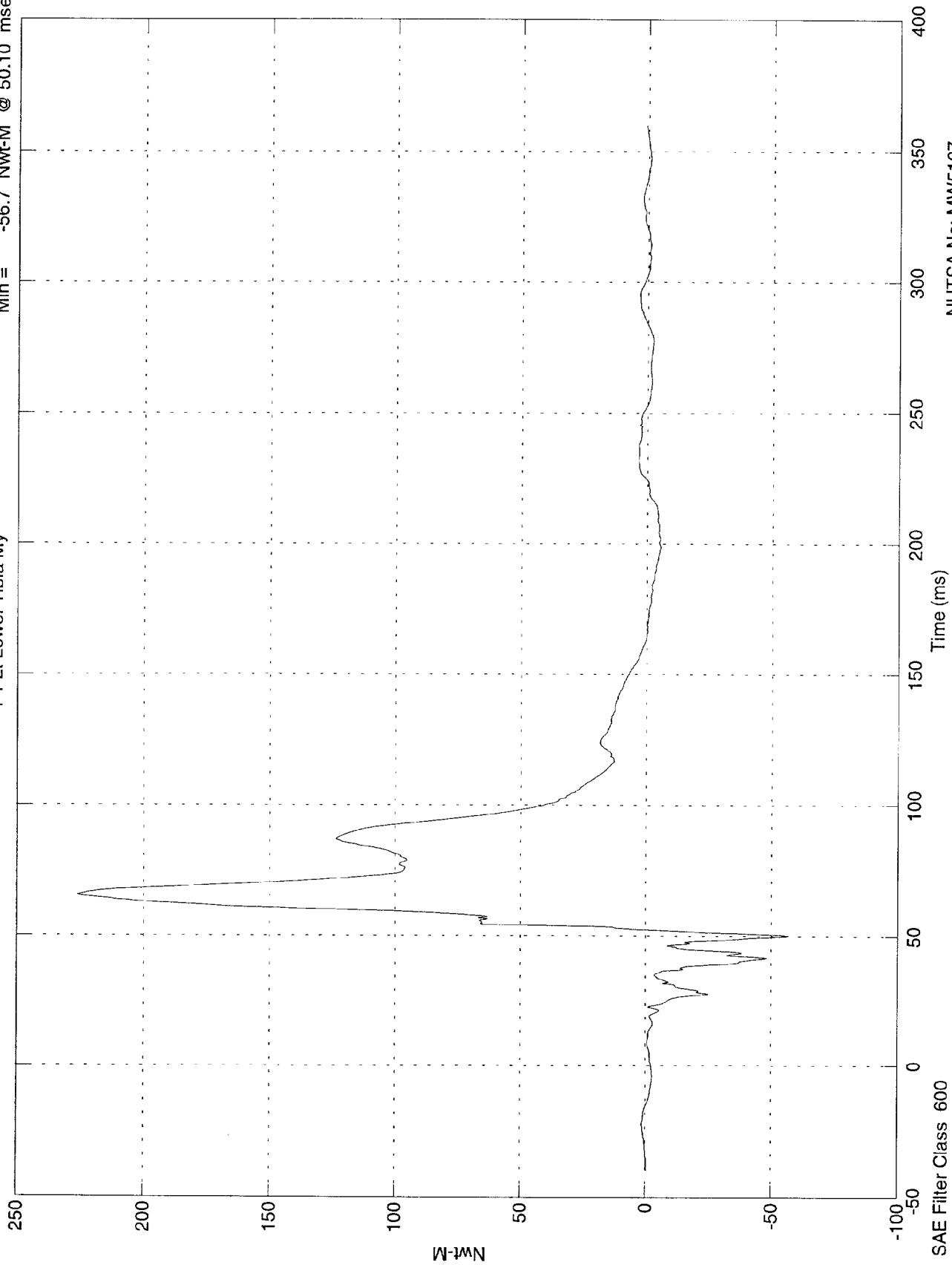


NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 226 Nwt-M @ 65.50 msec  
Min = -56.7 Nwt-M @ 50.10 msec

P1 Lt Lower Tibia My



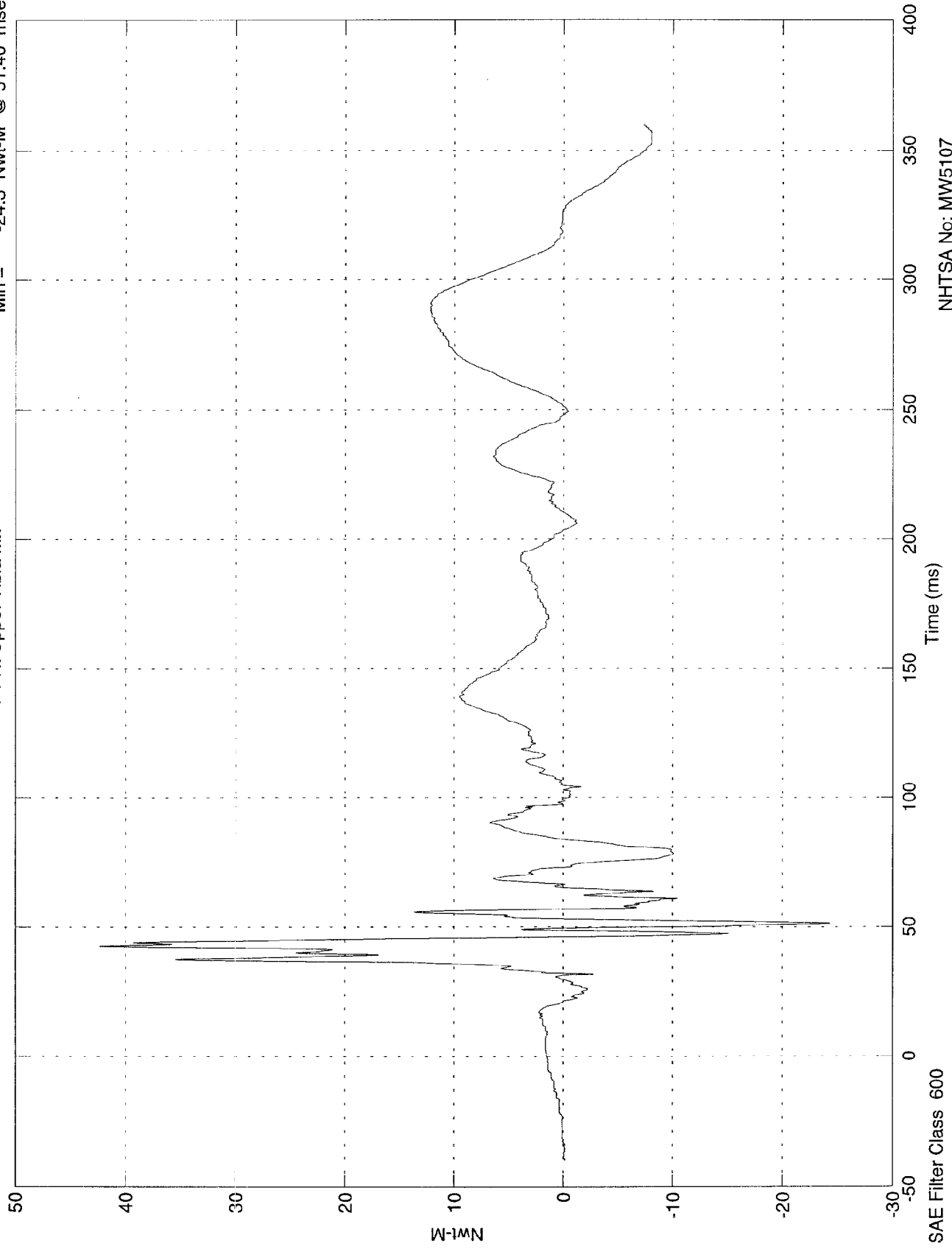
NHTSA No: MW5107  
Date: 15 Dec 1997

SAE Filter Class 600

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 42.3 Nwt-M @ 42.80 msec  
Min = -24.3 Nwt-M @ 51.40 msec

P1 Rt Upper Tibia Mx

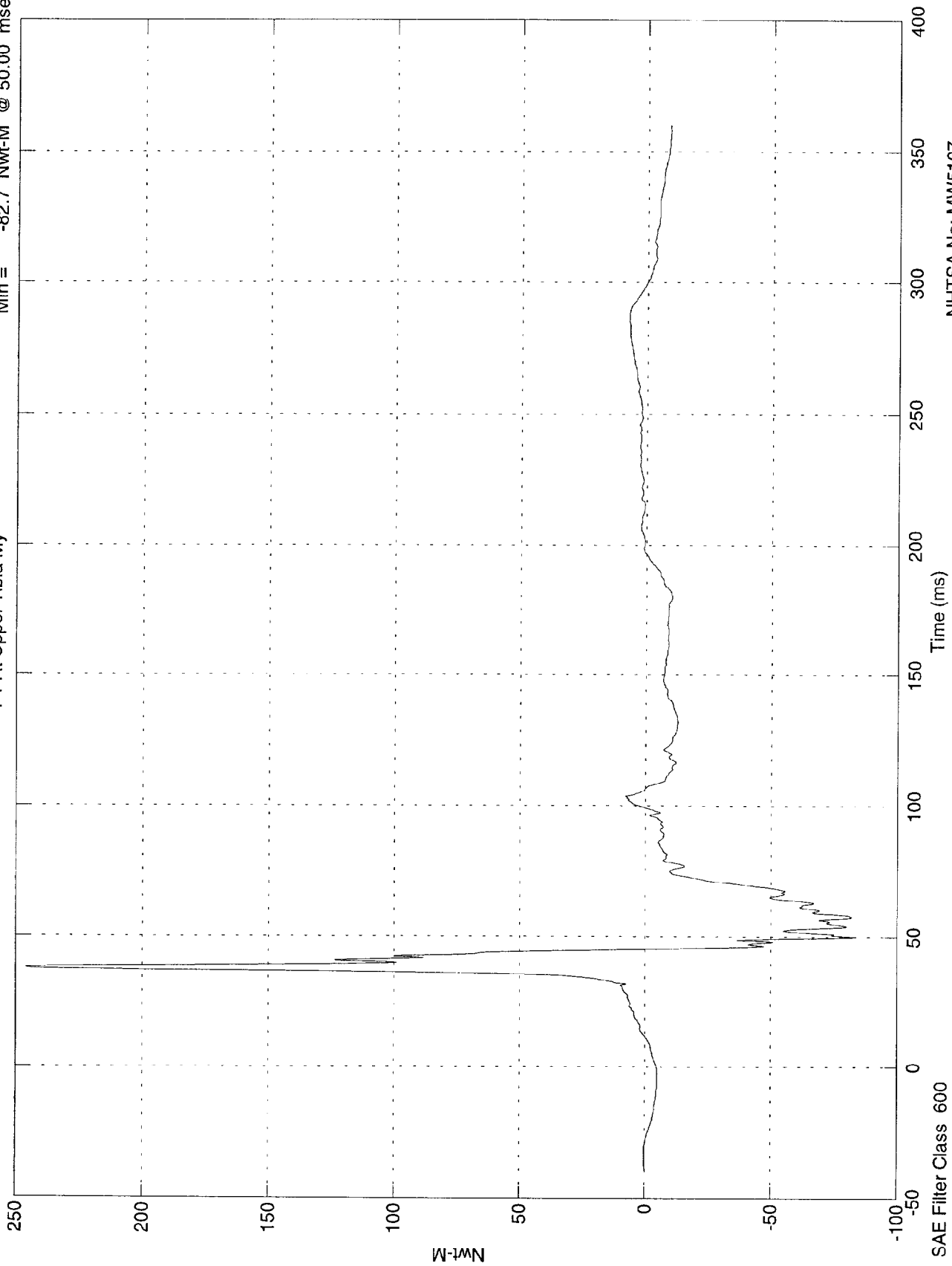


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 246 Nwt-M @ 37.80 msec  
Min = -82.7 Nwt-M @ 50.00 msec

P1 Rt Upper Tibia My



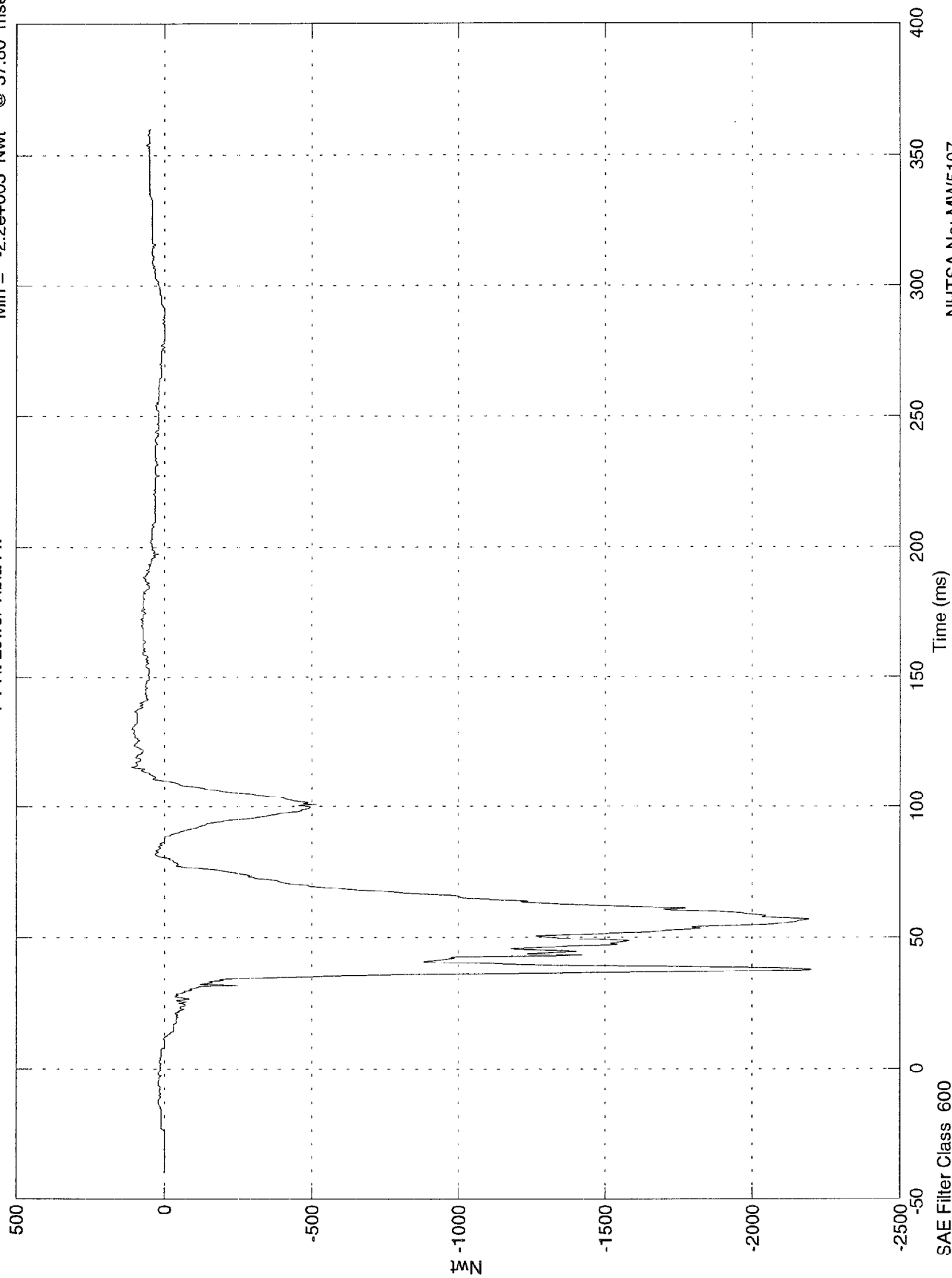
SAE Filter Class 600

NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 111 Nwt @ 115.10 msec  
Min = -2.2e+003 Nwt @ 37.80 msec

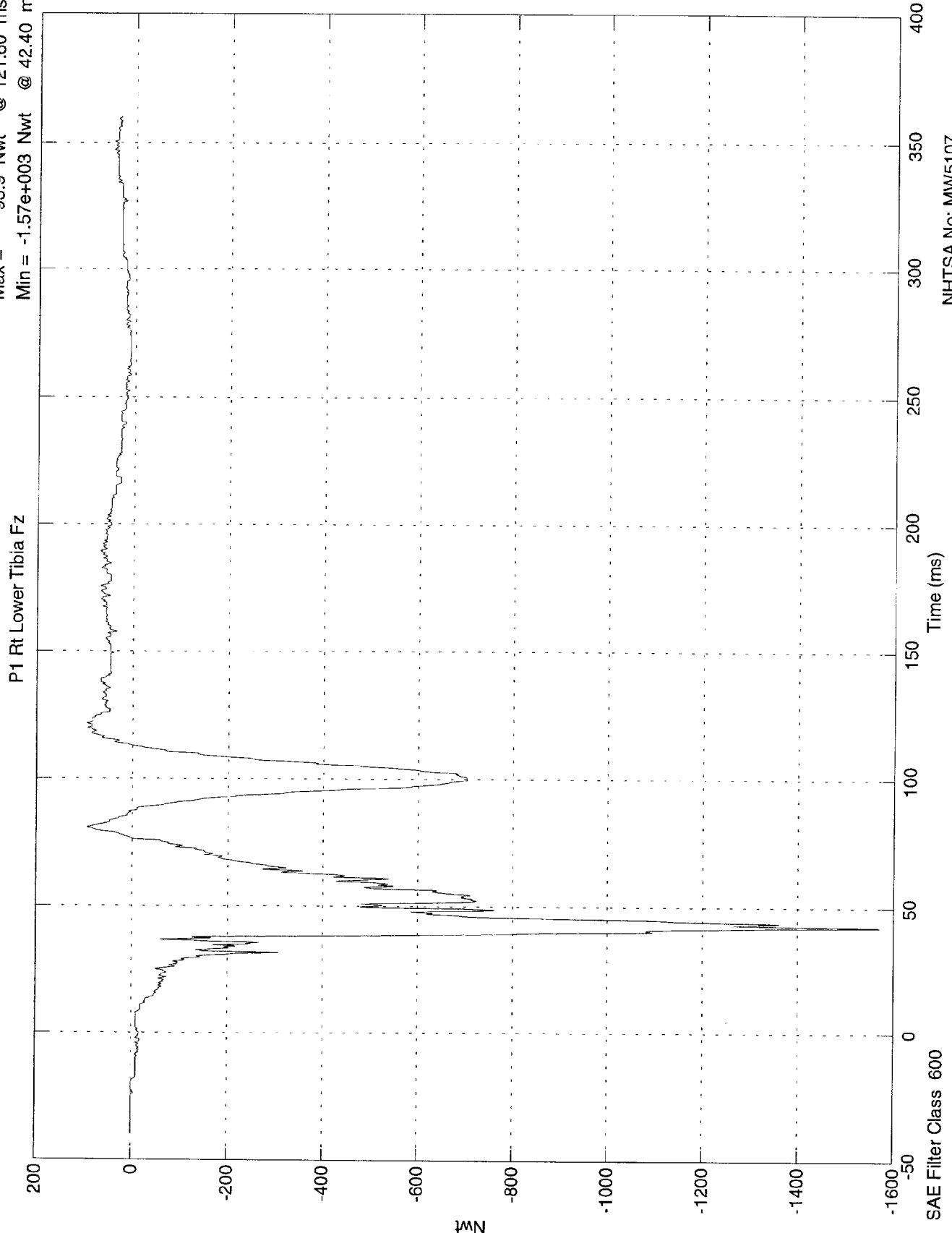
P1 Rt Lower Tibia Fx



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 93.9 Nwt @ 121.60 msec  
Min = -1.57e+003 Nwt @ 42.40 msec

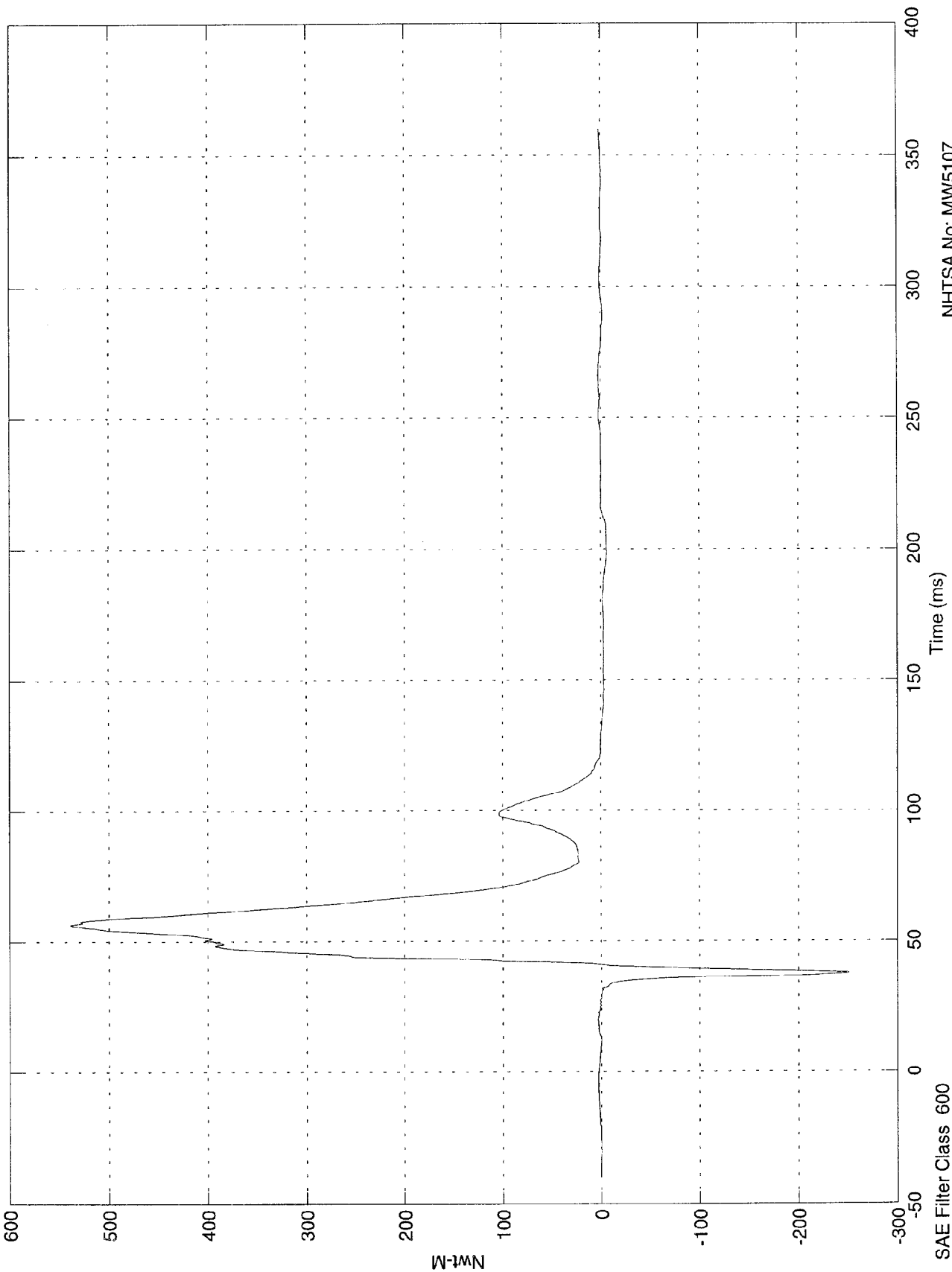


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 539 Nwt-M @ 56.50 msec  
Min = -251 Nwt-M @ 37.70 msec

P1 Rt Lower Tibia My

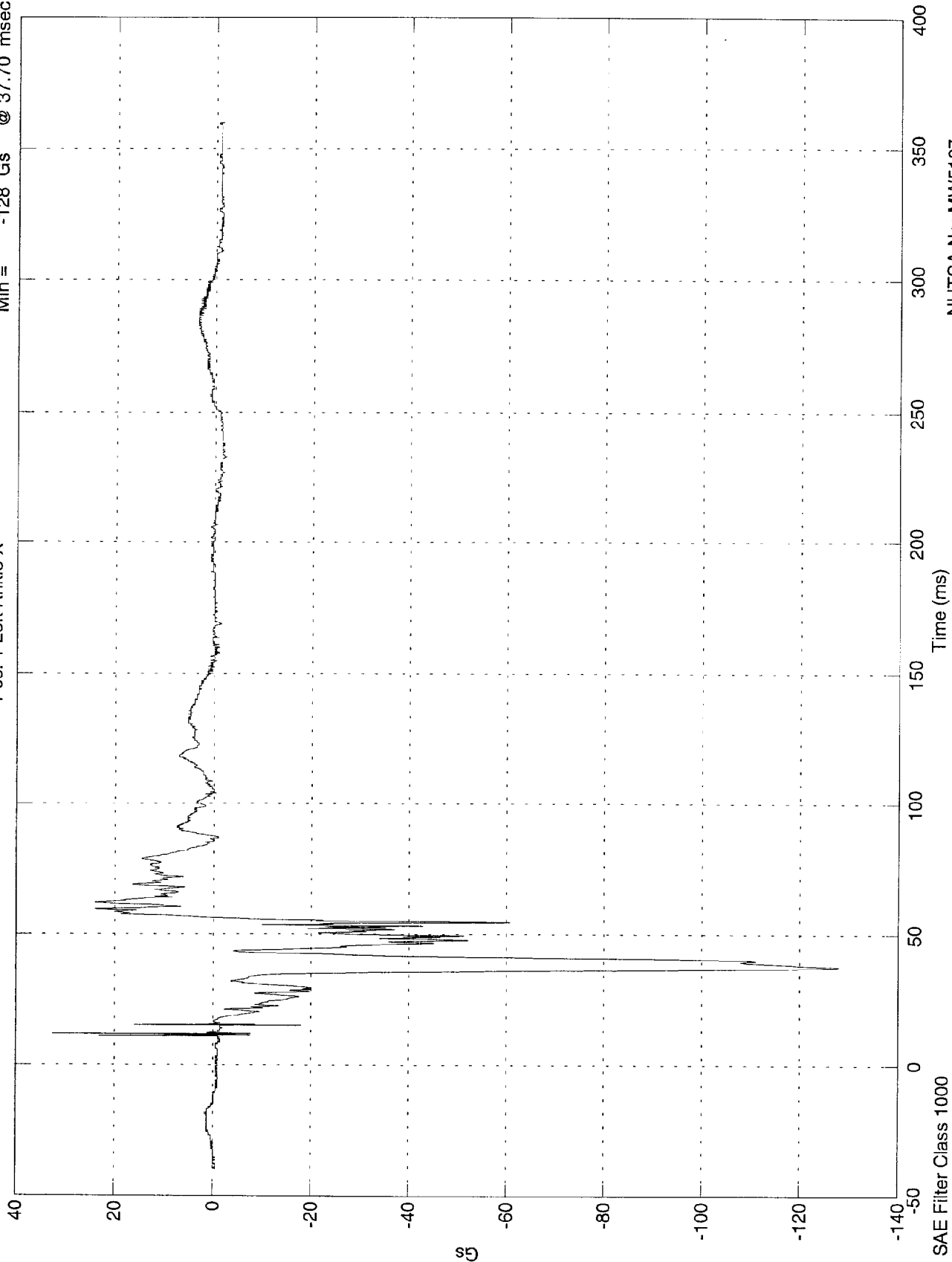


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 32.5 Gs @ 12.00 msec  
Min = -128 Gs @ 37.70 msec

Pos. 1 Left Ankle X

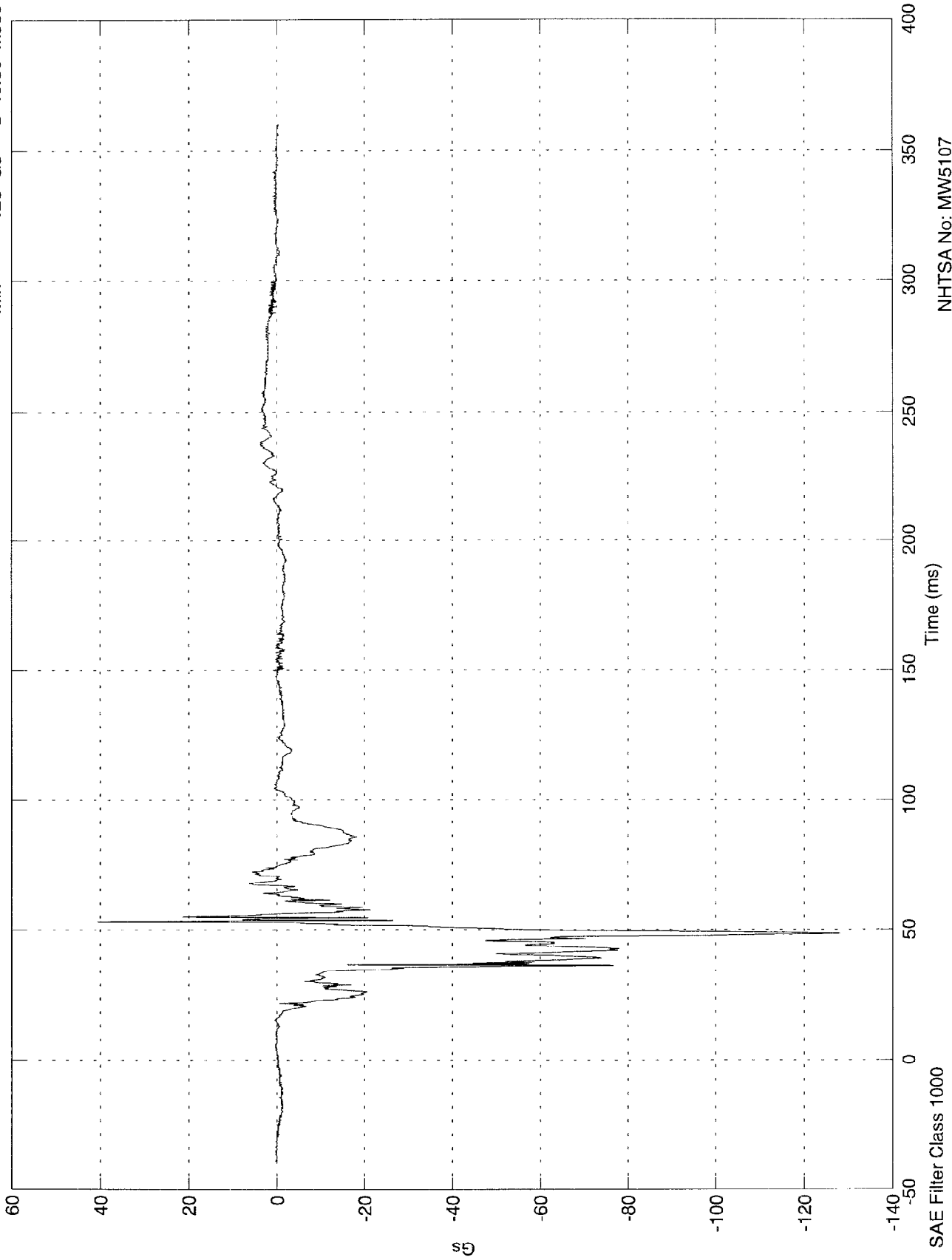


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 40.6 Gs @ 53.20 msec  
Min = -128 Gs @ 48.50 msec

Pos. 1 Left Ankle Z

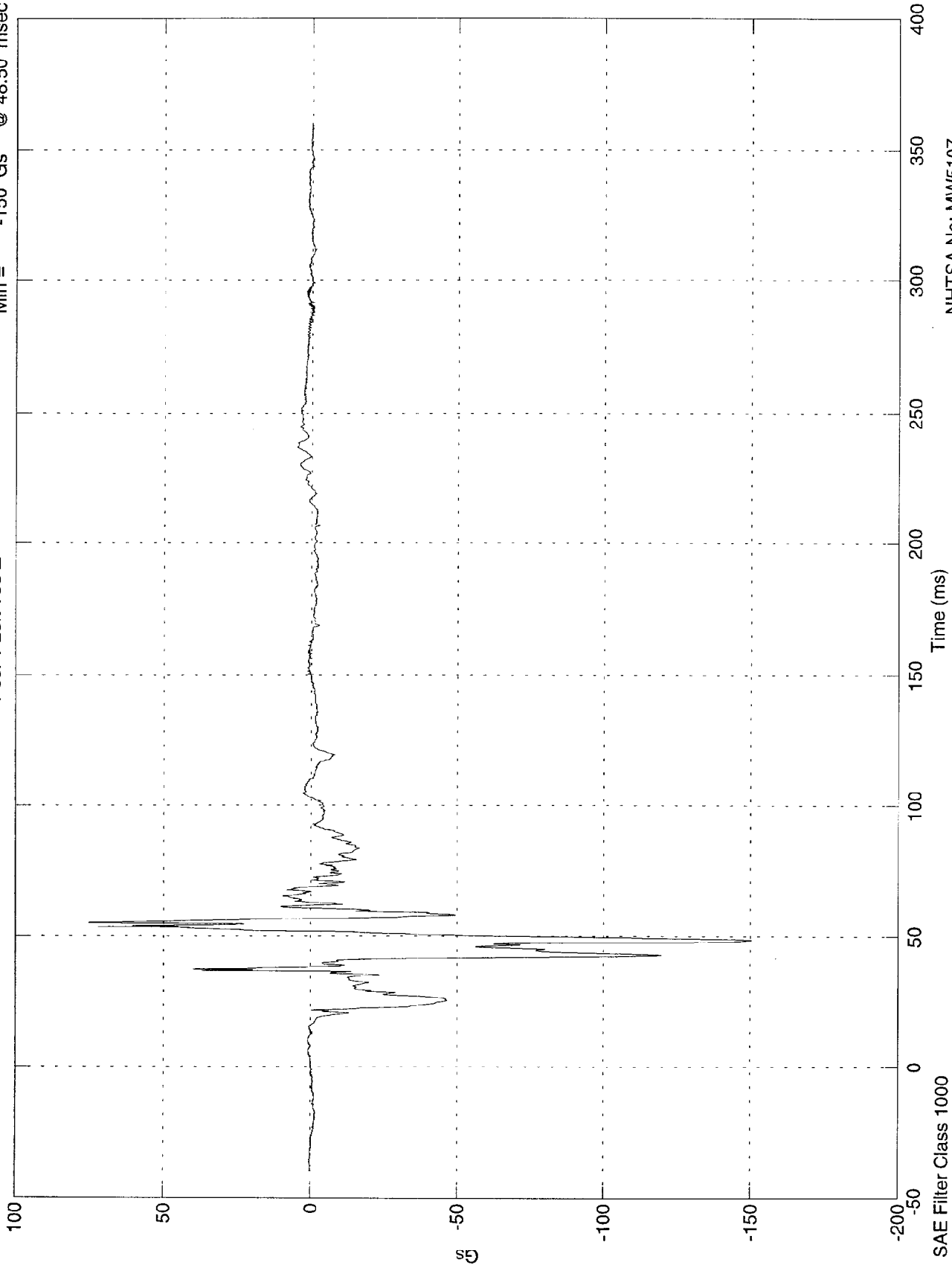


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 74.9 Gs @ 55.00 msec  
Min = -150 Gs @ 48.50 msec

Pos. 1 Left Toe Z

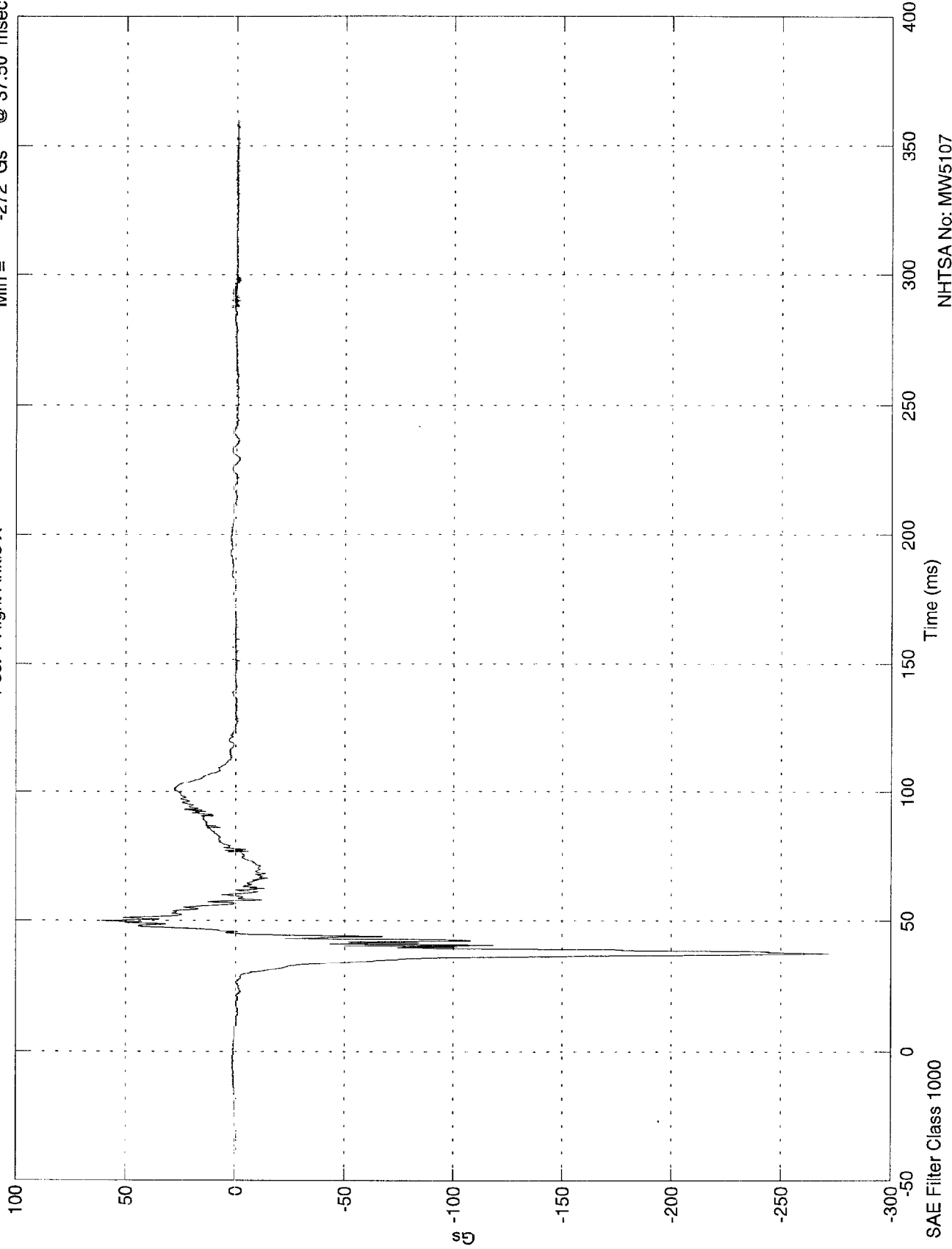


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 60.8 Gs @ 49.90 msec  
Min = -272 Gs @ 37.50 msec

Pos. 1 Right Ankle X

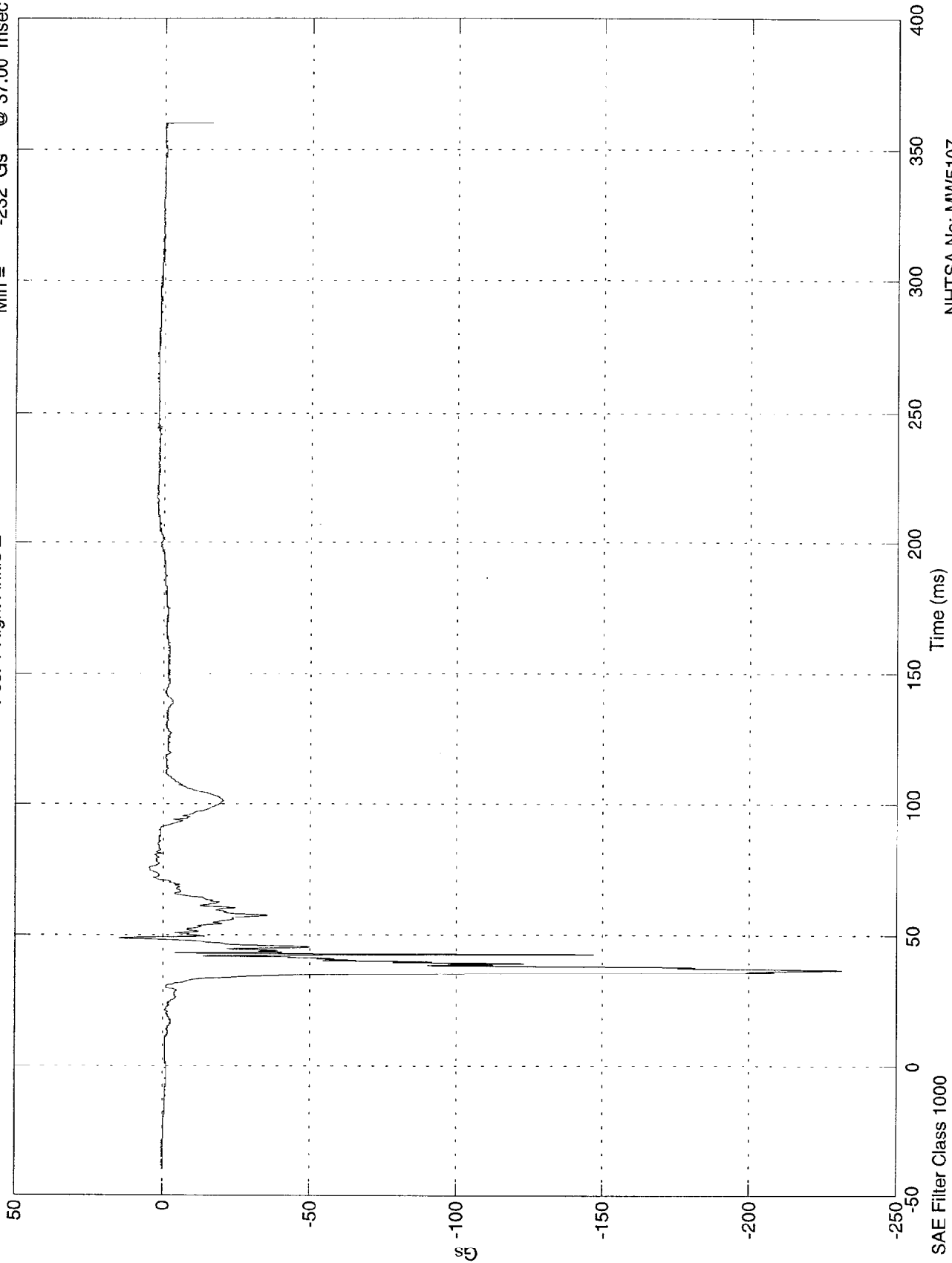


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 14.8 Gs @ 48.80 msec  
Min = -232 Gs @ 37.00 msec

Pos. 1 Right Ankle Z

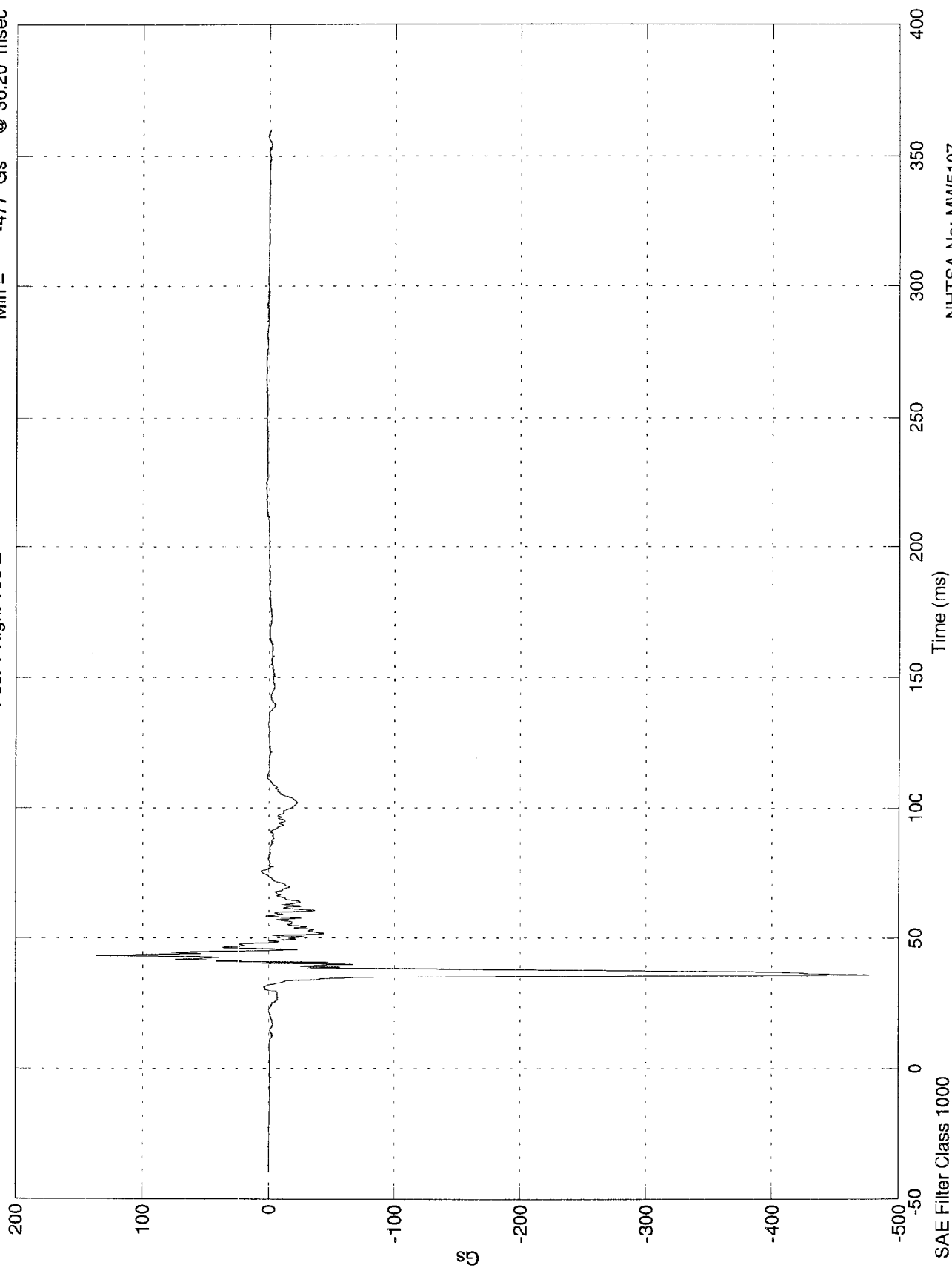


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 137 Gs @ 43.30 msec  
Min = -477 Gs @ 36.20 msec

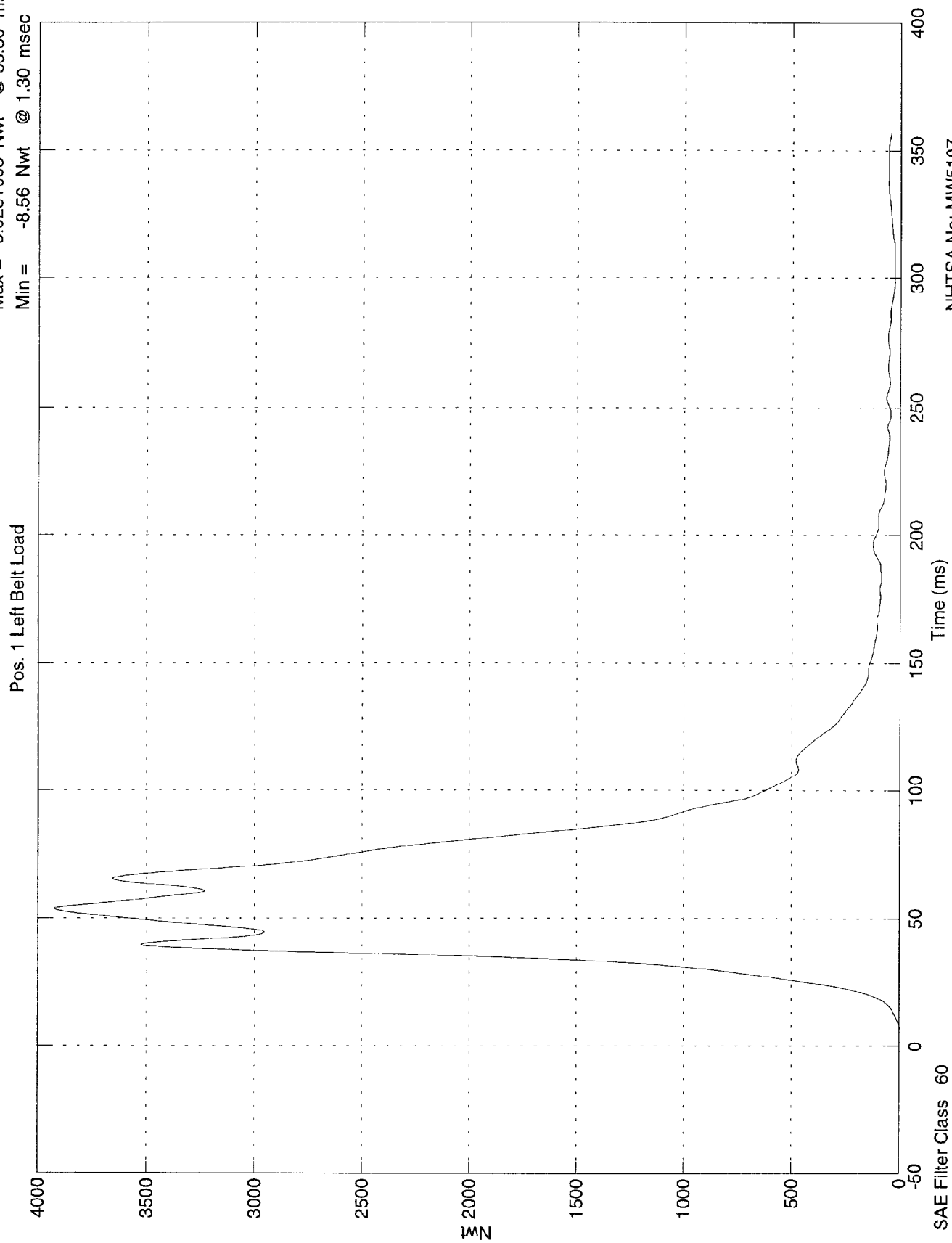
Pos. 1 Right Toe Z



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 3.92e+003 Nwt @ 53.60 msec  
Min = -8.56 Nwt @ 1.30 msec

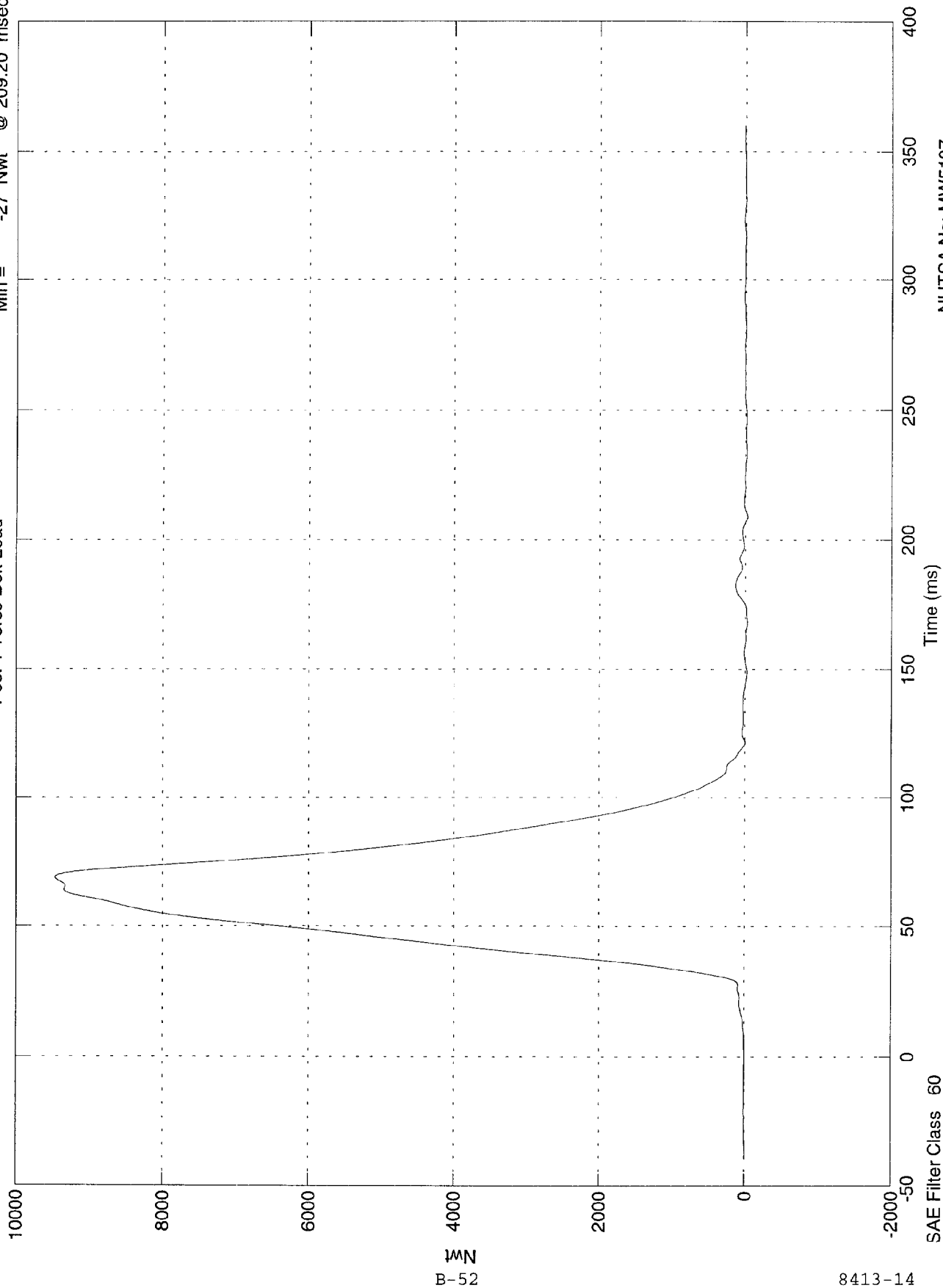


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 9.47e+003 Nwt @ 69.00 msec  
Min = -27 Nwt @ 209.20 msec

Pos. 1 Torso Belt Load

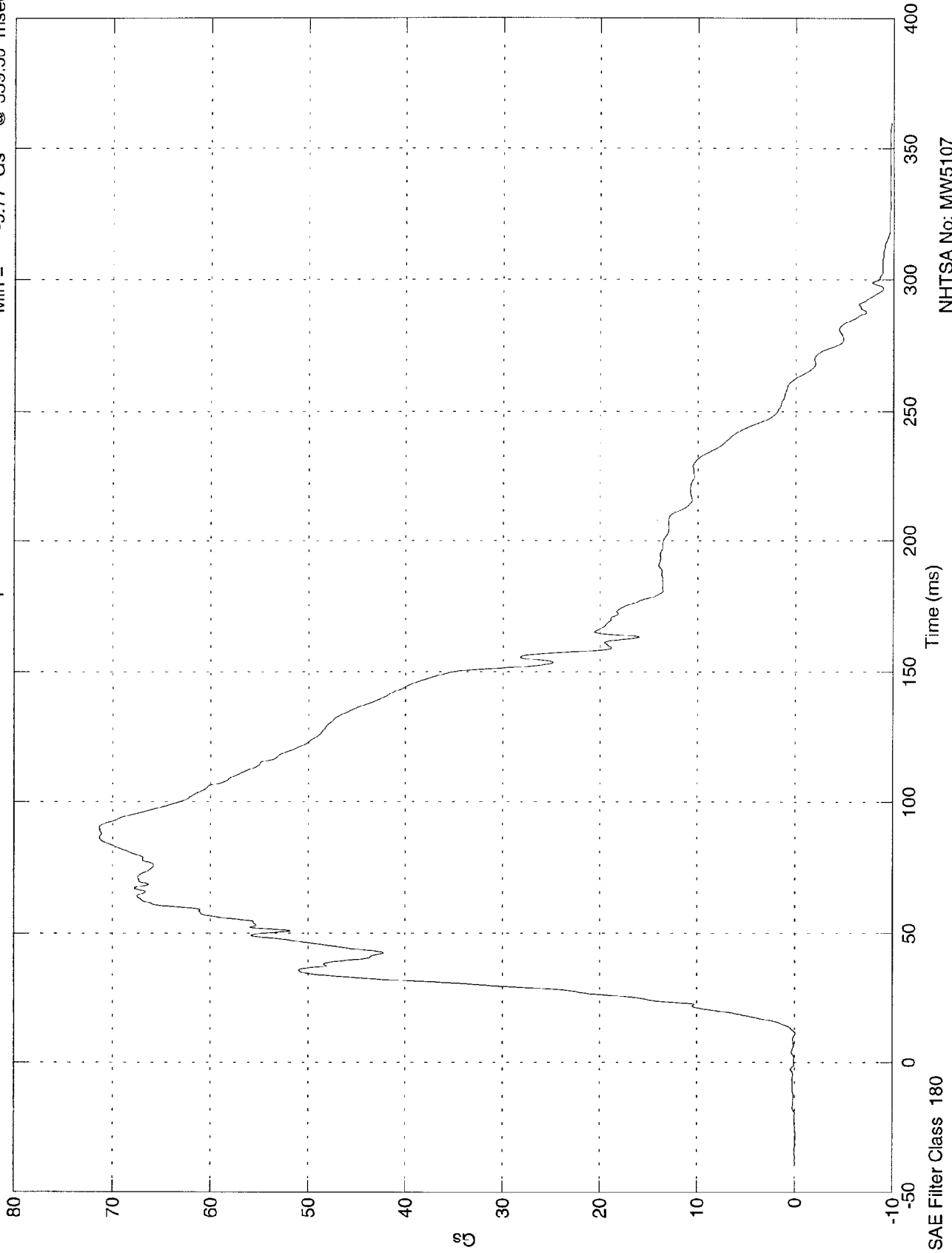


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 71.3 Gs @ 90.50 msec  
Min = -9.77 Gs @ 359.50 msec

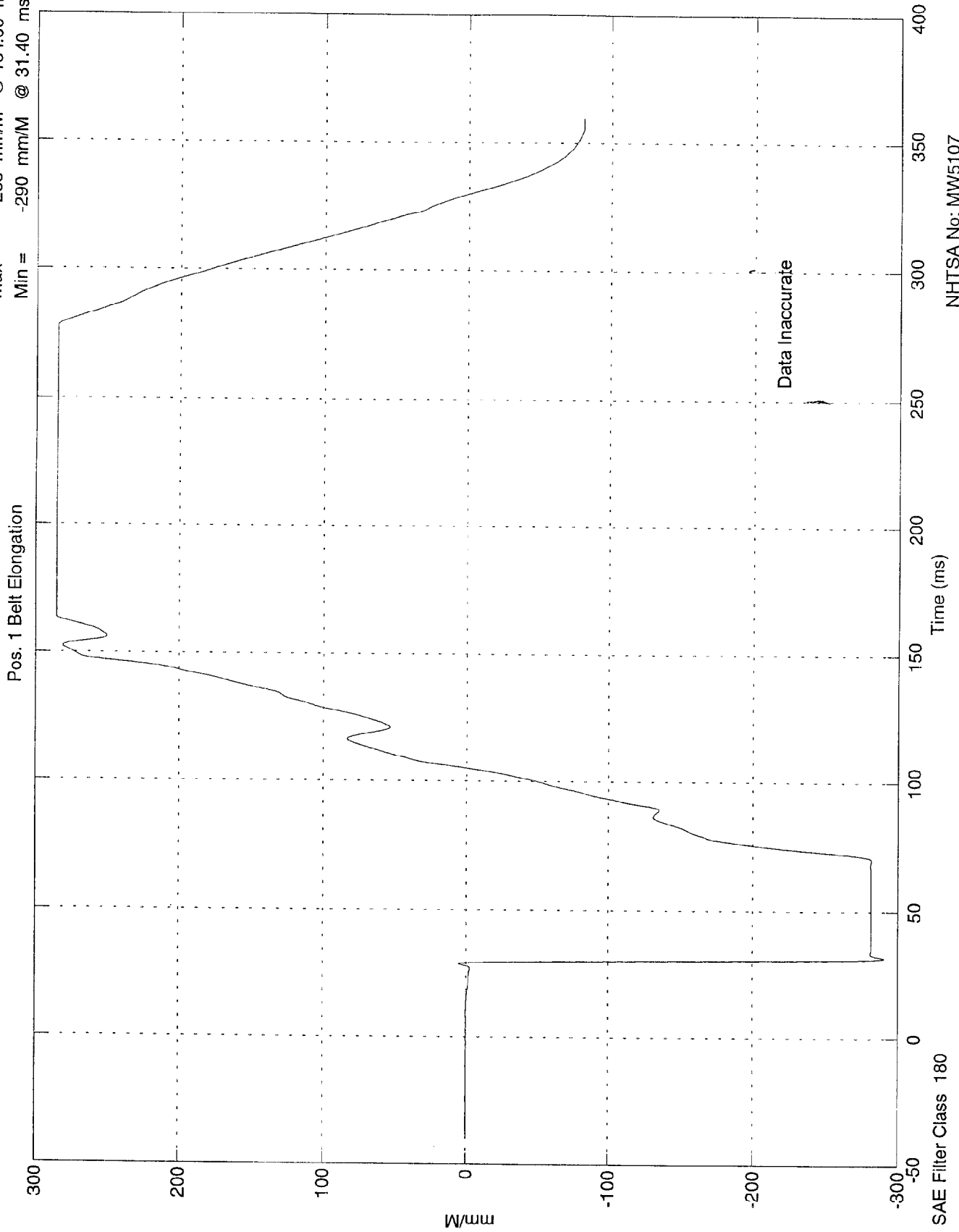
Pos. 1 Belt Spoolout



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 285 mm/M @ 164.00 msec  
Min = -290 mm/M @ 31.40 msec

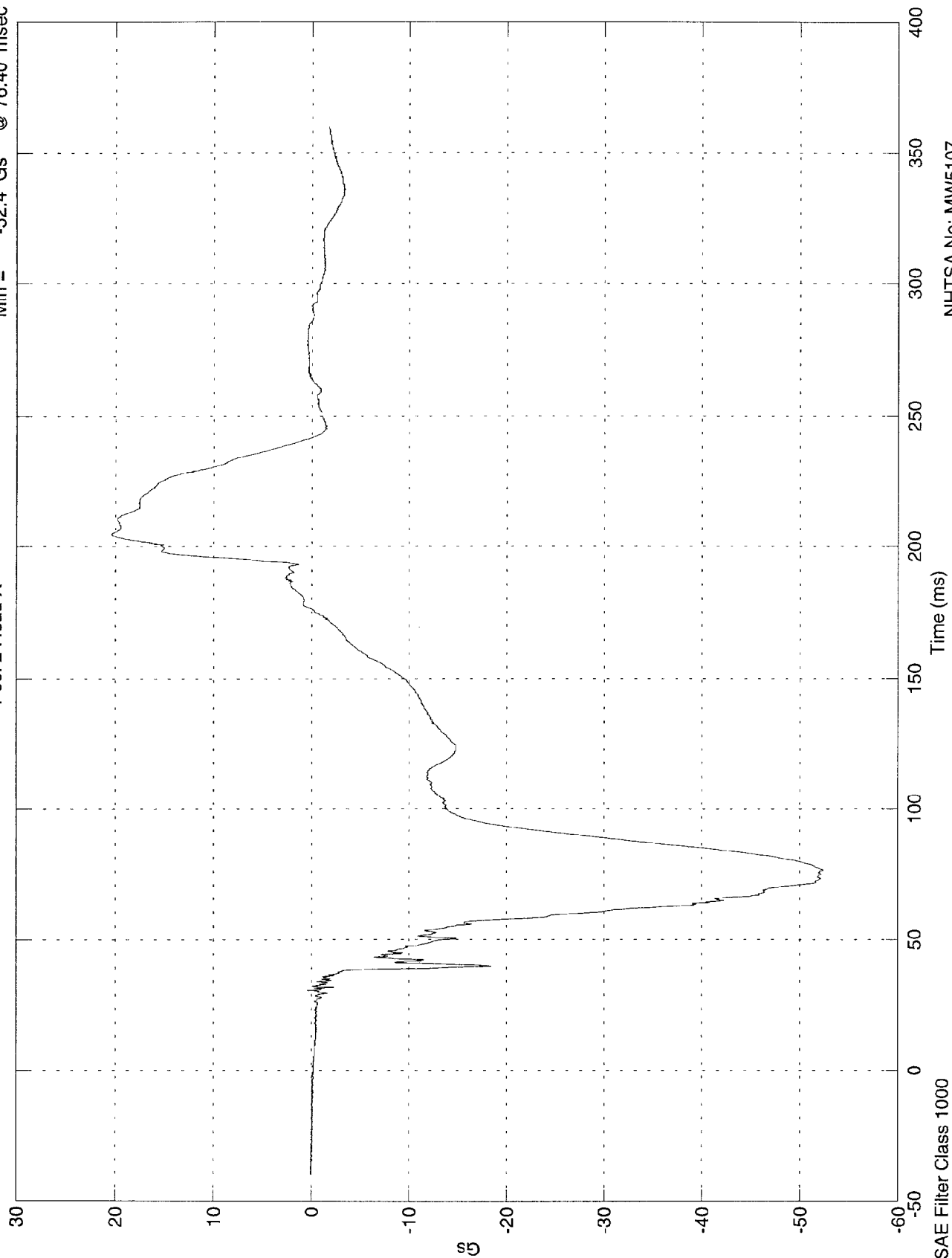


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 20.4 Gs @ 204.20 msec  
Min = -52.4 Gs @ 76.40 msec

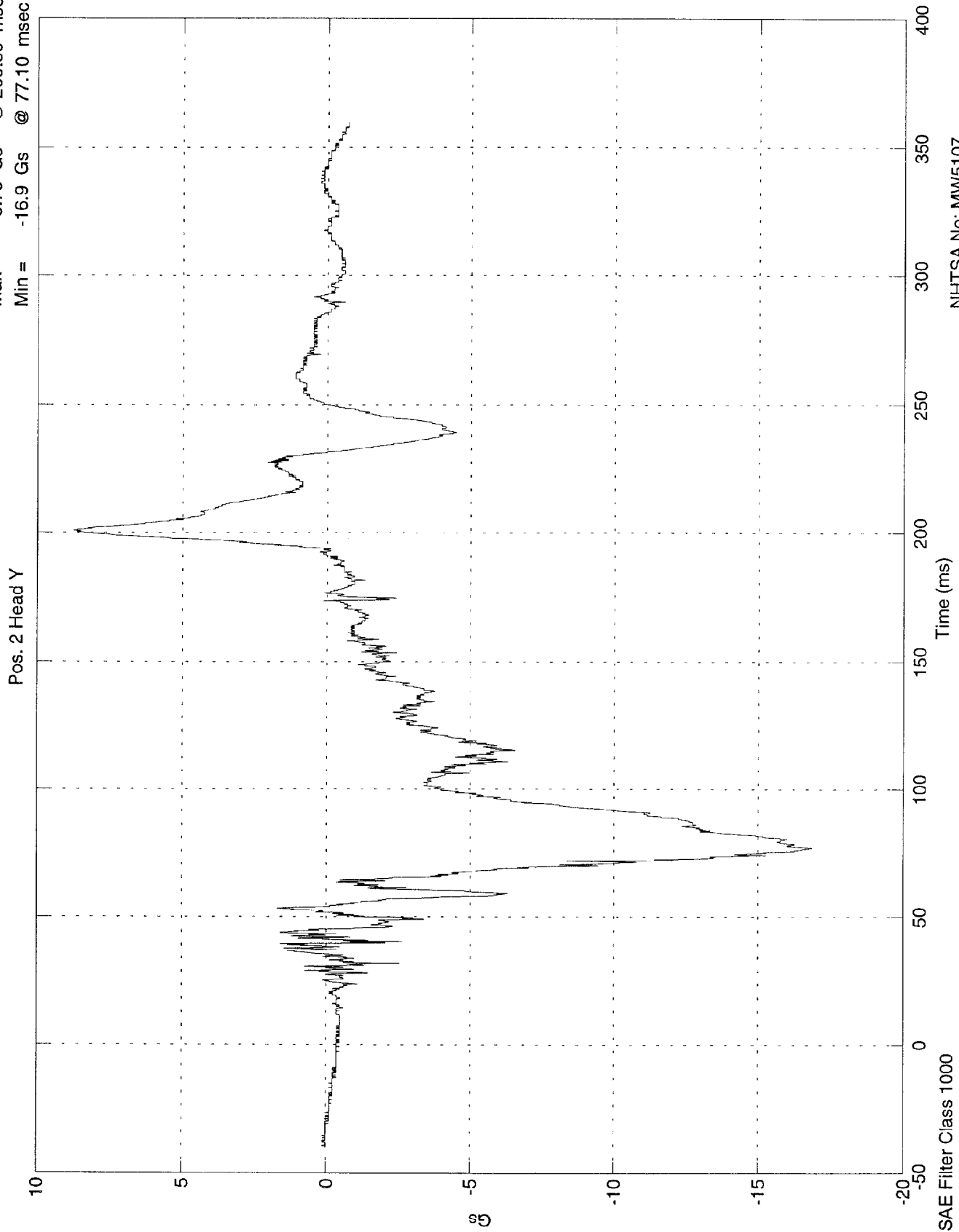
Pos. 2 Head X



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 8.75 Gs @ 200.80 msec  
Min = -16.9 Gs @ 77.10 msec

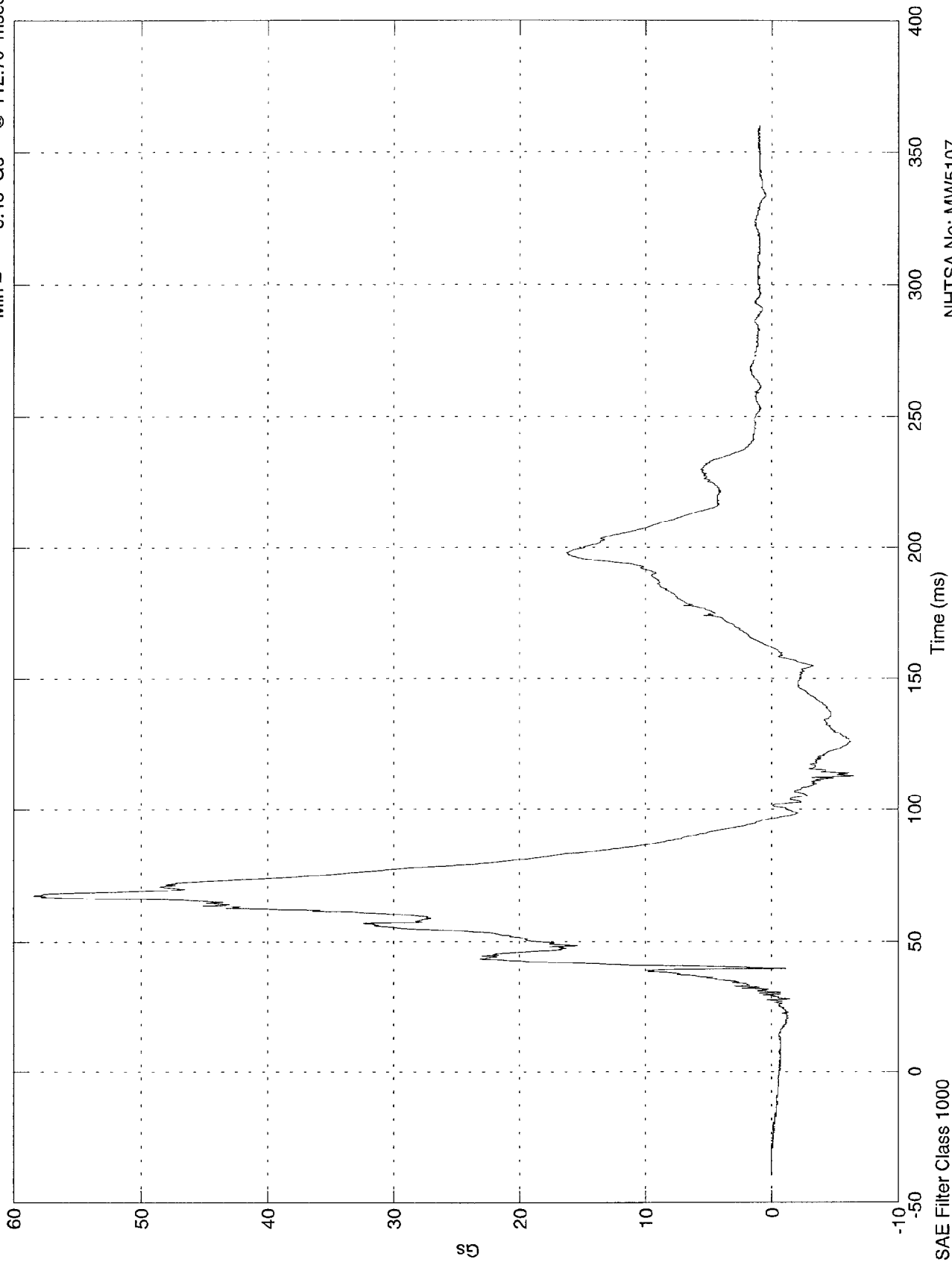


NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 58.5 Gs @ 67.30 msec  
 Min = -6.46 Gs @ 112.70 msec

Pos. 2 Head Z

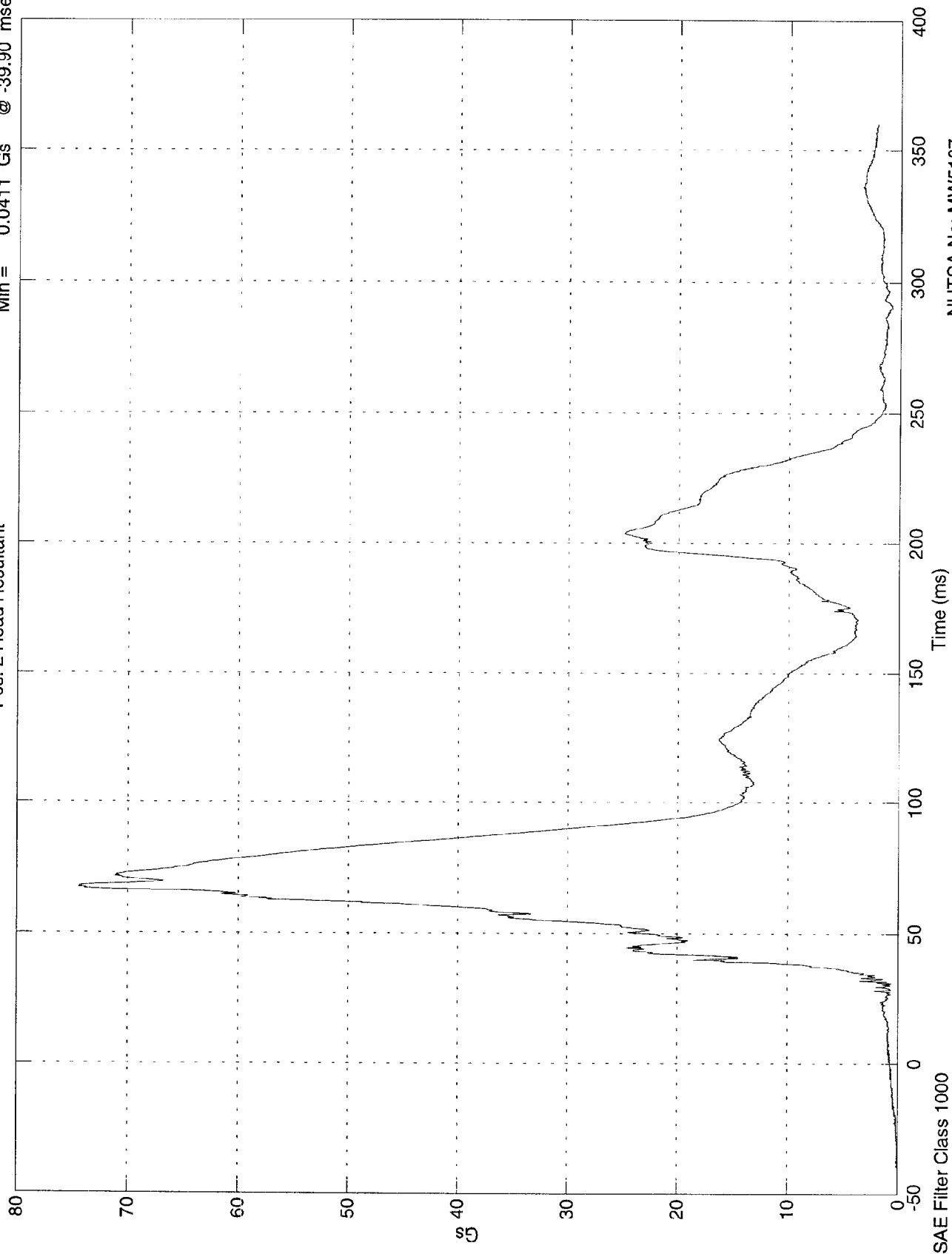


NHTSA No: MW5107  
 Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 74.4 Gs @ 67.30 msec  
 Min = 0.0411 Gs @ -39.90 msec

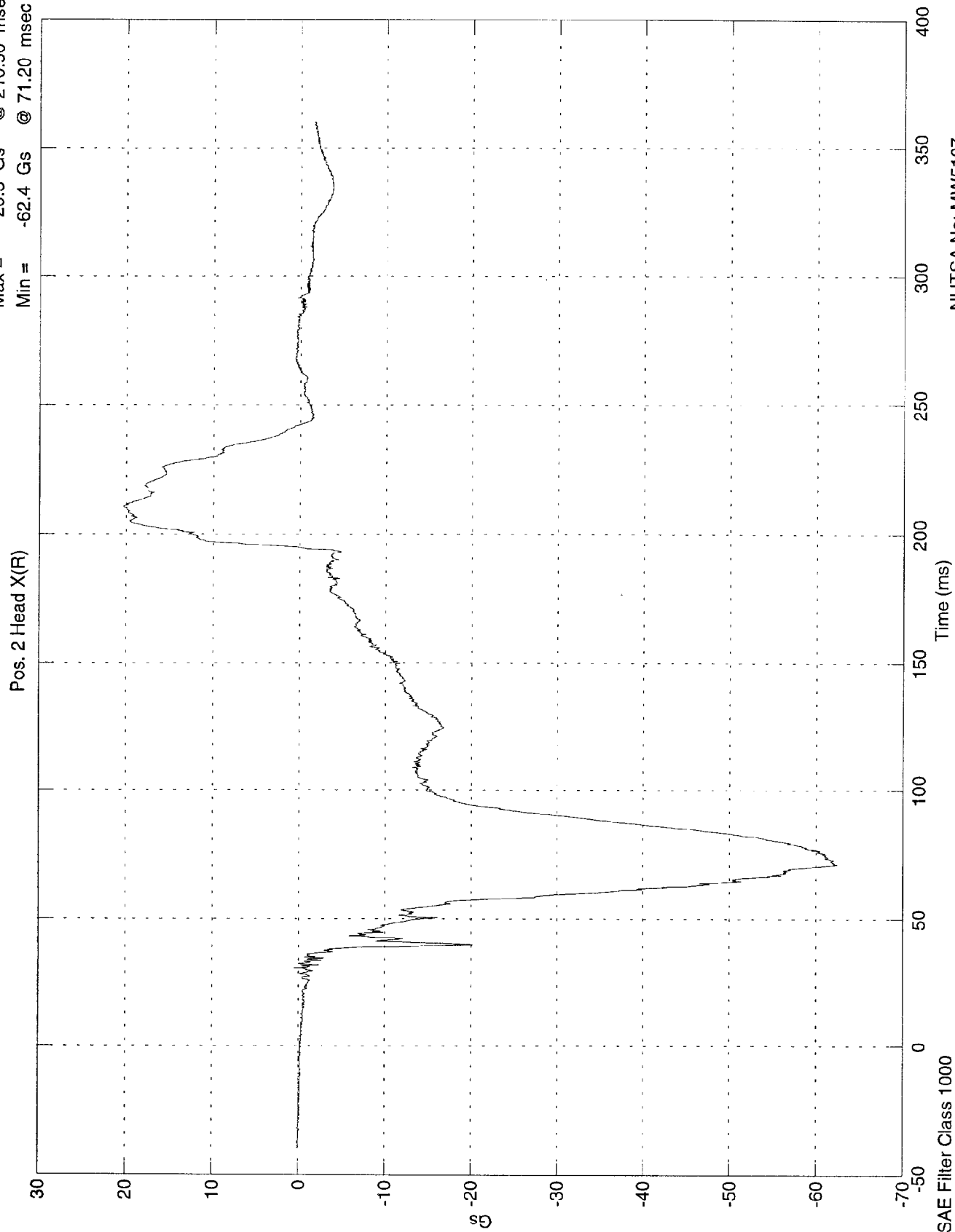
Pos. 2 Head Resultant



NHTSA No: MW5107  
 Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

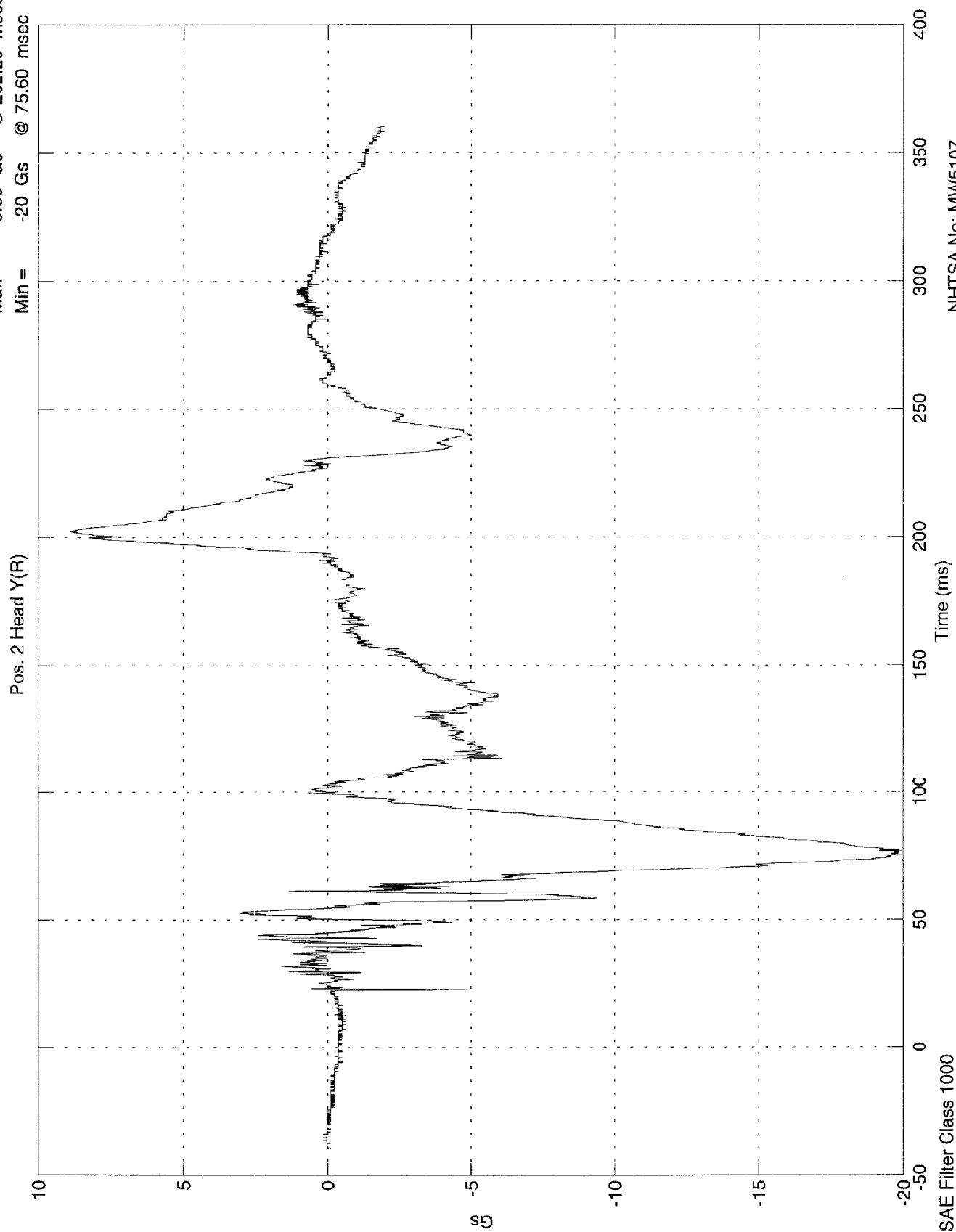
Max = 20.3 Gs @ 210.50 msec  
 Min = -62.4 Gs @ 71.20 msec



NHTSA No: MW5107  
 Date: 15 Dec 1997

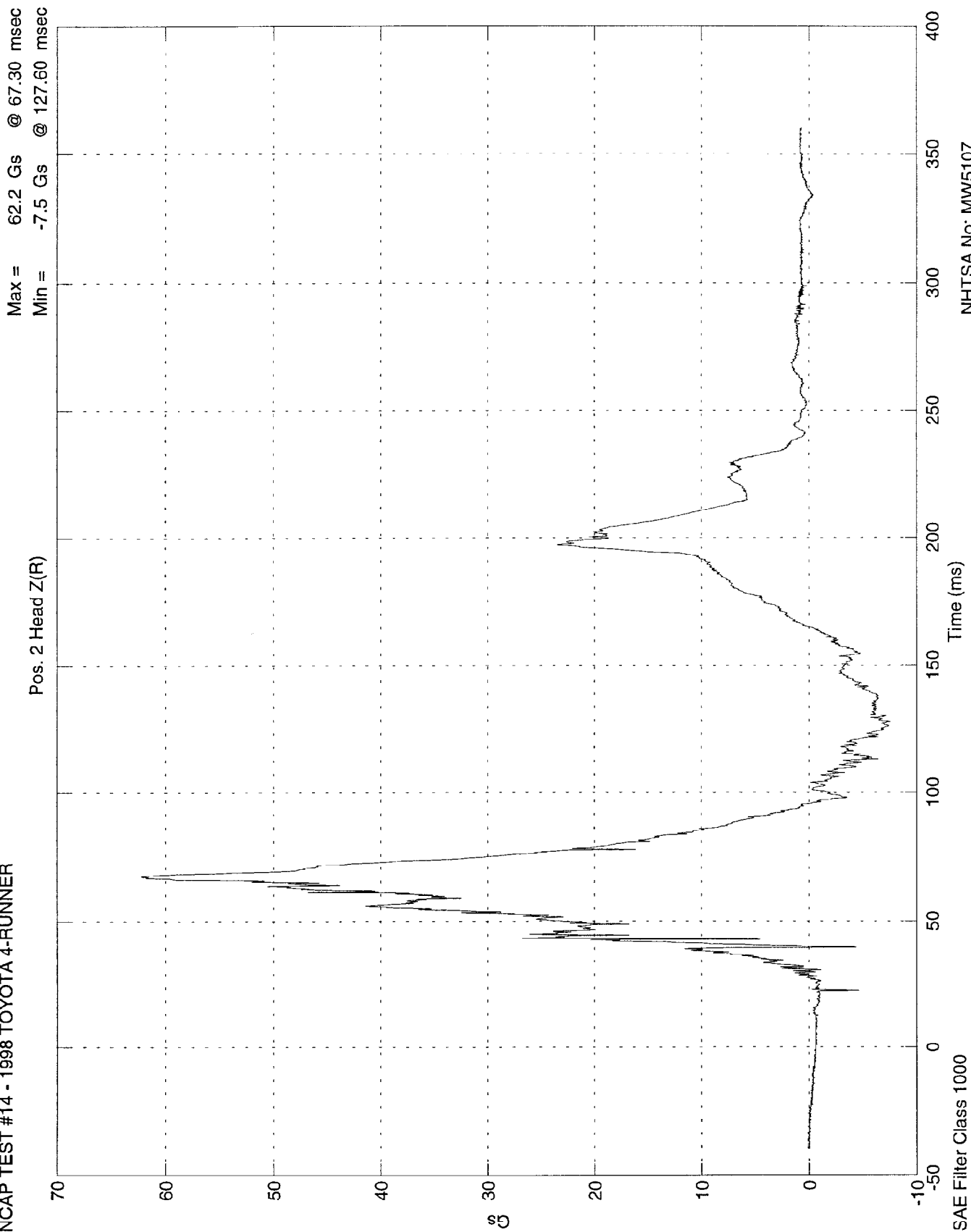
NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 8.89 Gs @ 202.20 msec  
 Min = -20 Gs @ 75.60 msec



NHTSA No: MW5107  
 Date: 15 Dec 1997

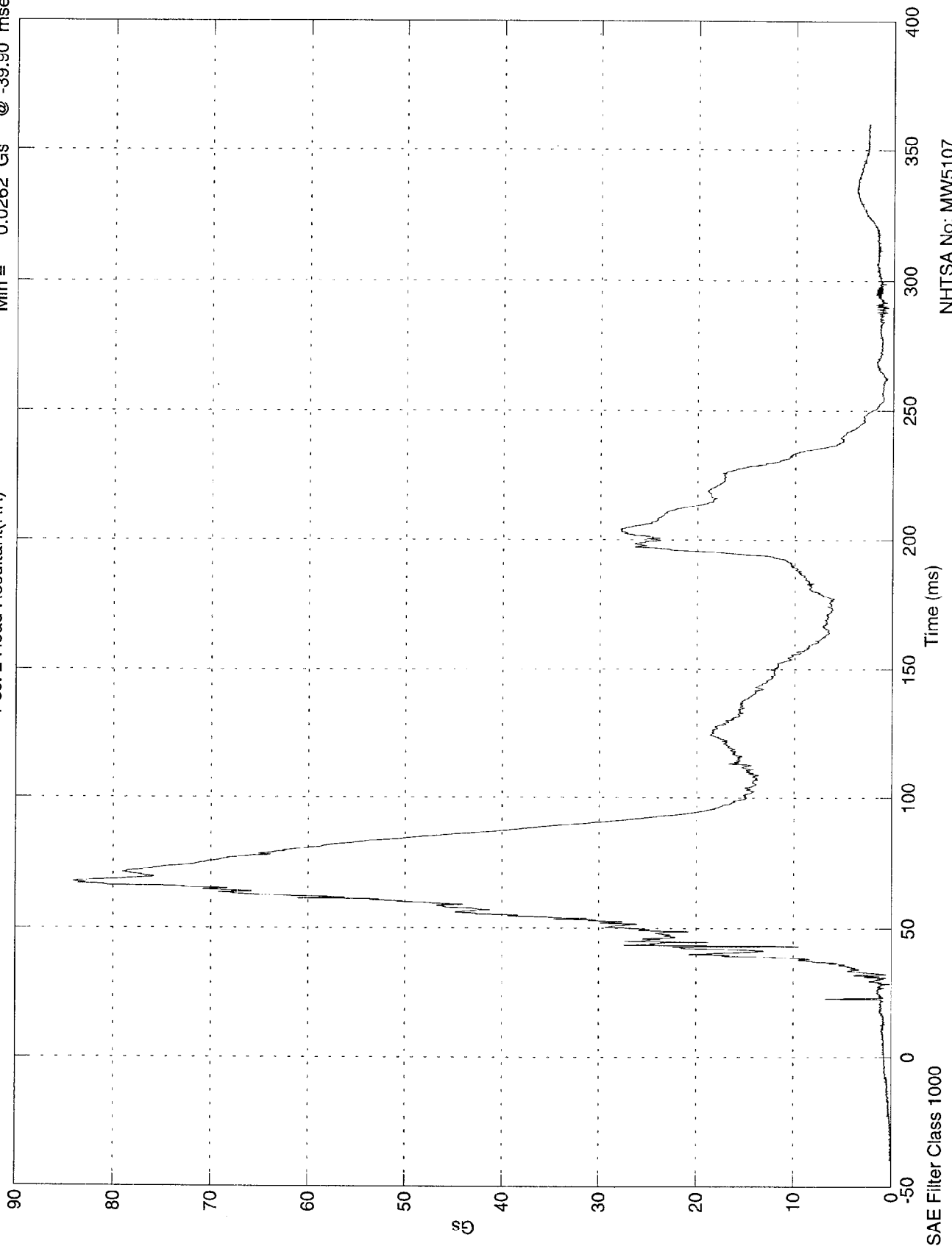
NCAP TEST #14 - 1998 TOYOTA 4-RUNNER



NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 84.1 Gs @ 67.60 msec  
Min = 0.0262 Gs @ -39.90 msec

Pos. 2 Head Resultant(RR)

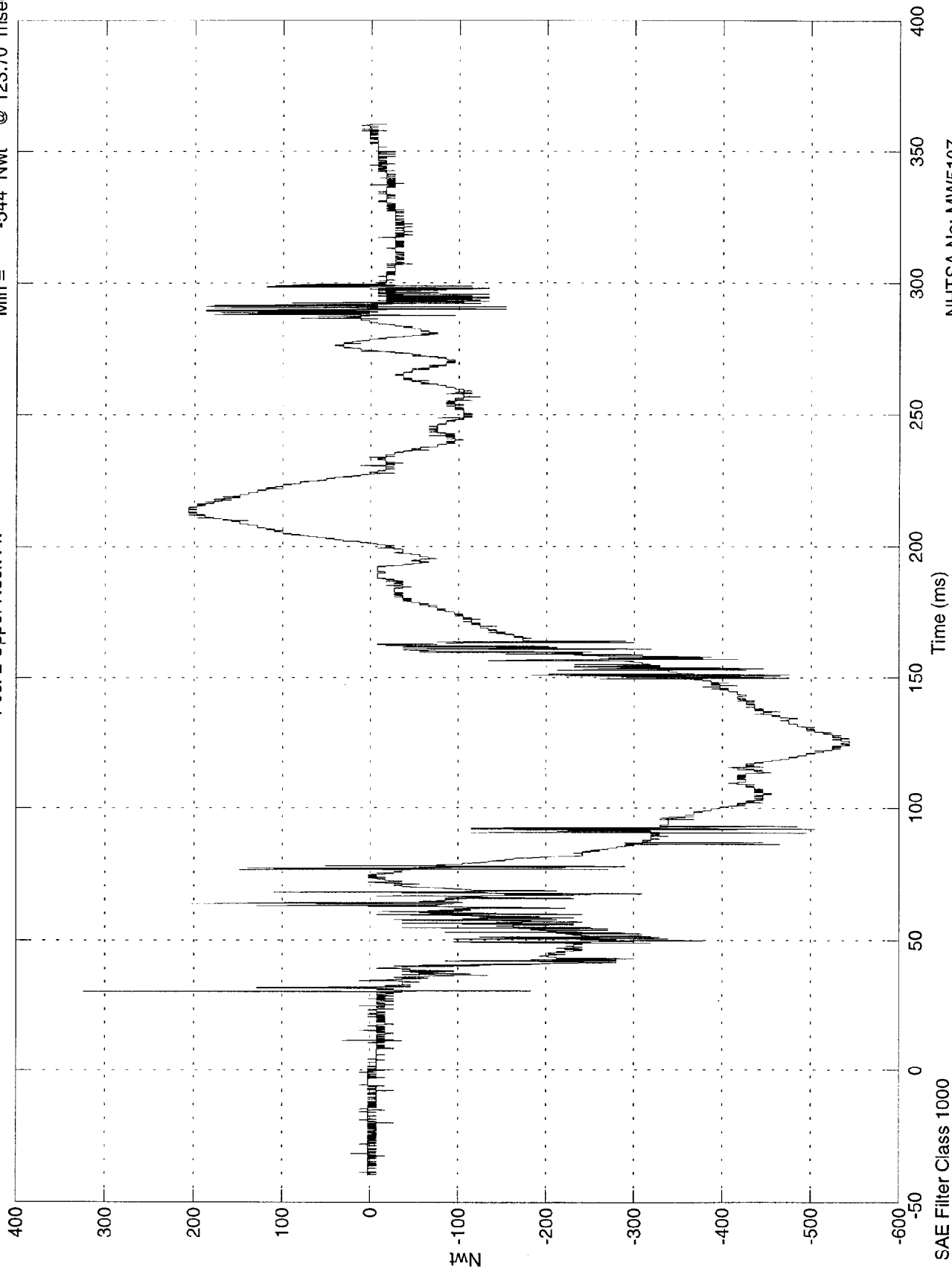


NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 324 Nwt @ 30.10 msec  
Min = -544 Nwt @ 123.70 msec

Pos. 2 Upper Neck Fx



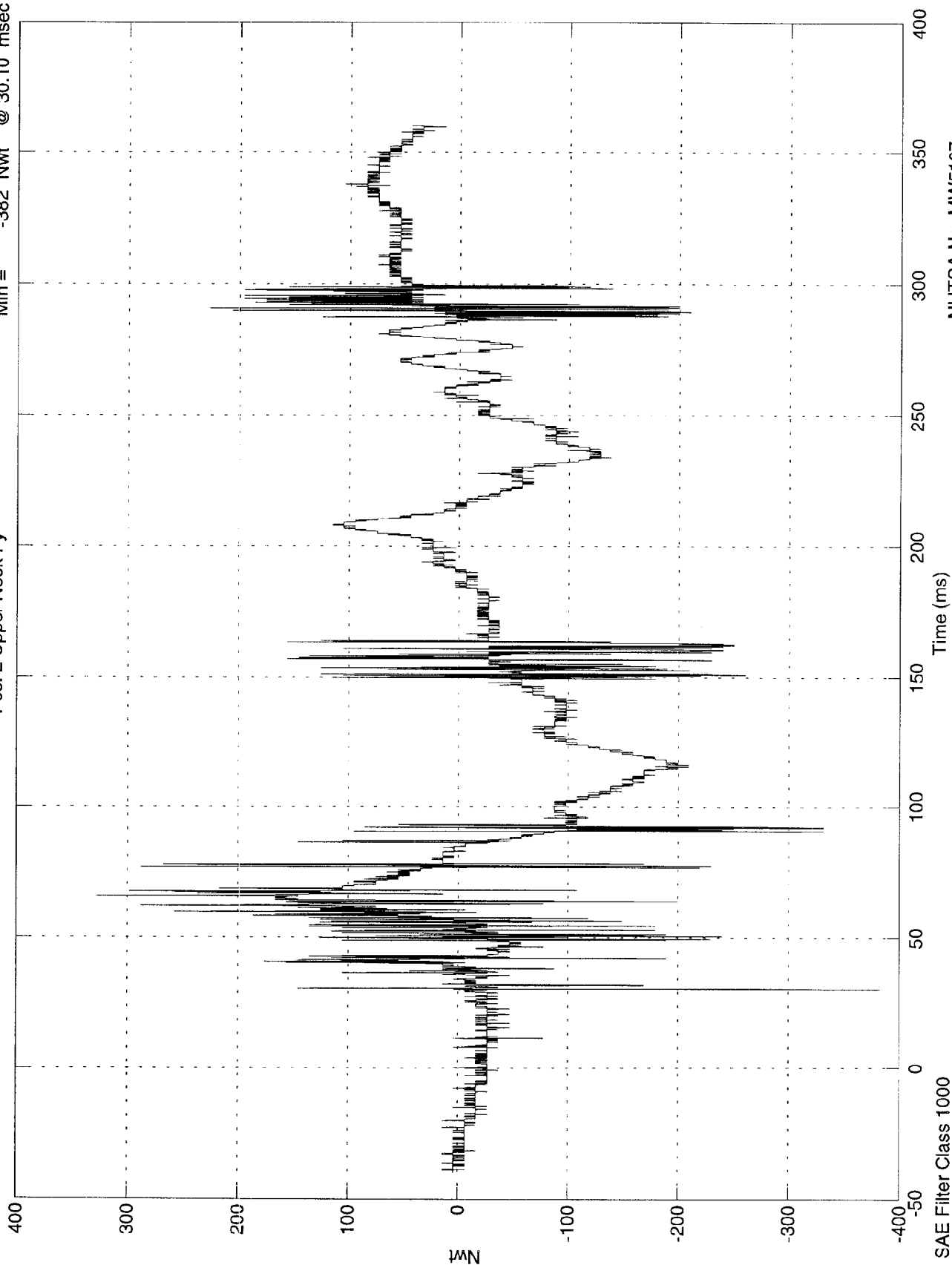
NHTSA No: MW5107  
Date: 15 Dec 1997

SAE Filter Class 1000

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 328 Nwt @ 65.70 msec  
Min = -382 Nwt @ 30.10 msec

Pos. 2 Upper Neck Fy

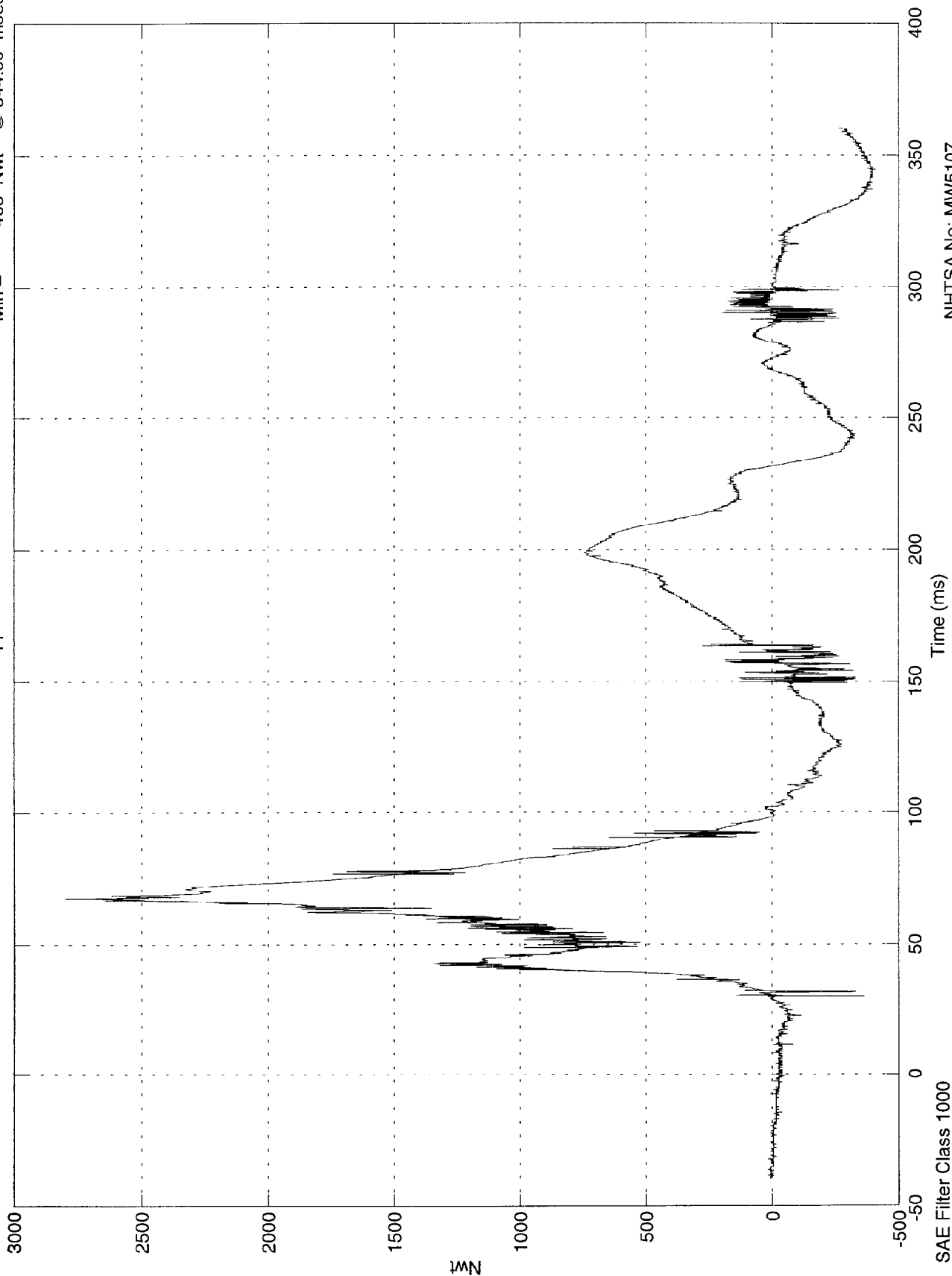


NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 2.8e+003 Nwt @ 67.50 msec  
 Min = -408 Nwt @ 344.30 msec

Pos. 2 Upper Neck Fz

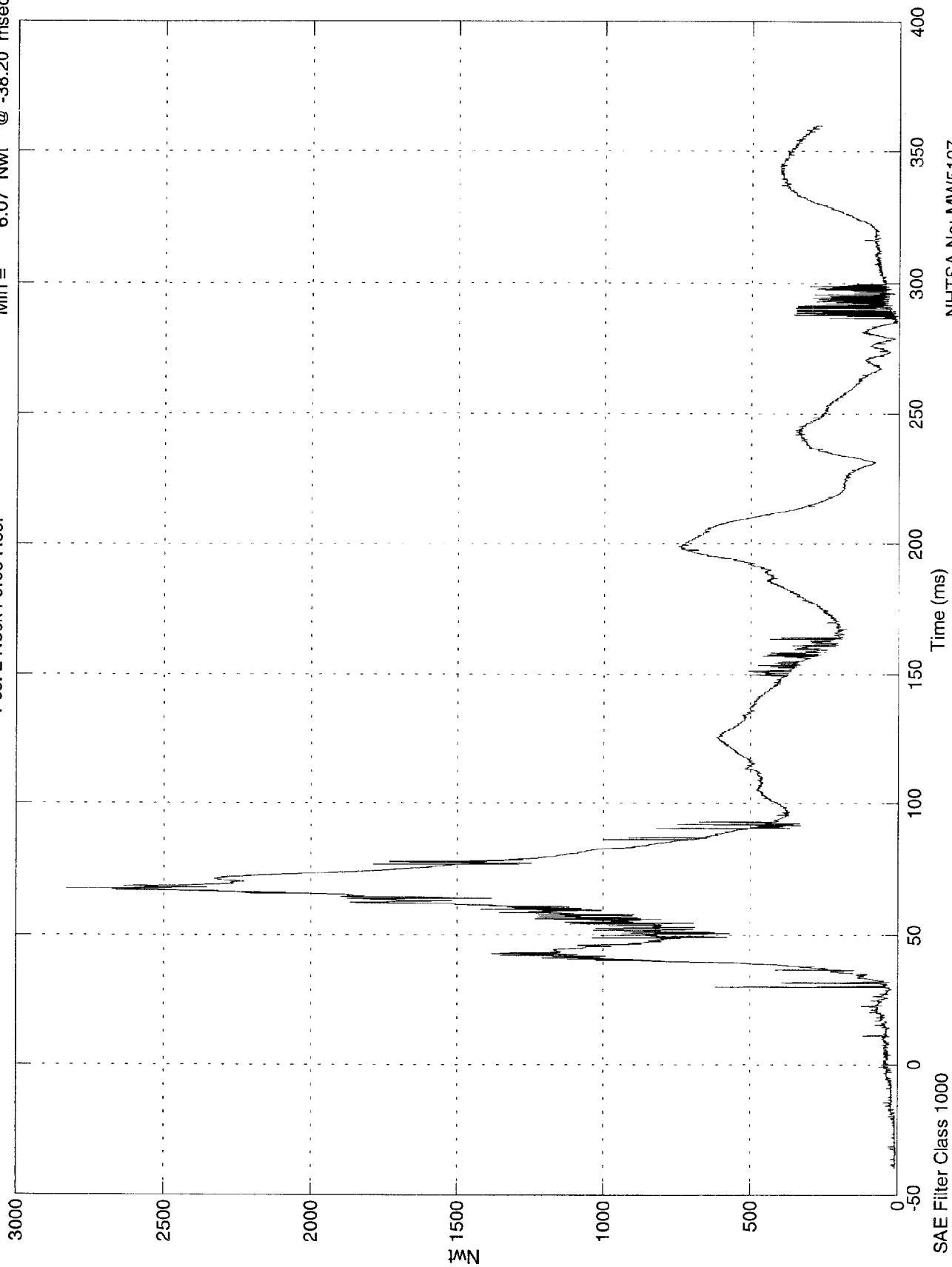


NHTSA No: MW5107  
 Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 2.83e+003 Nwt @ 67.50 msec  
Min = 6.07 Nwt @ -38.20 msec

Pos. 2 Neck Force Res.

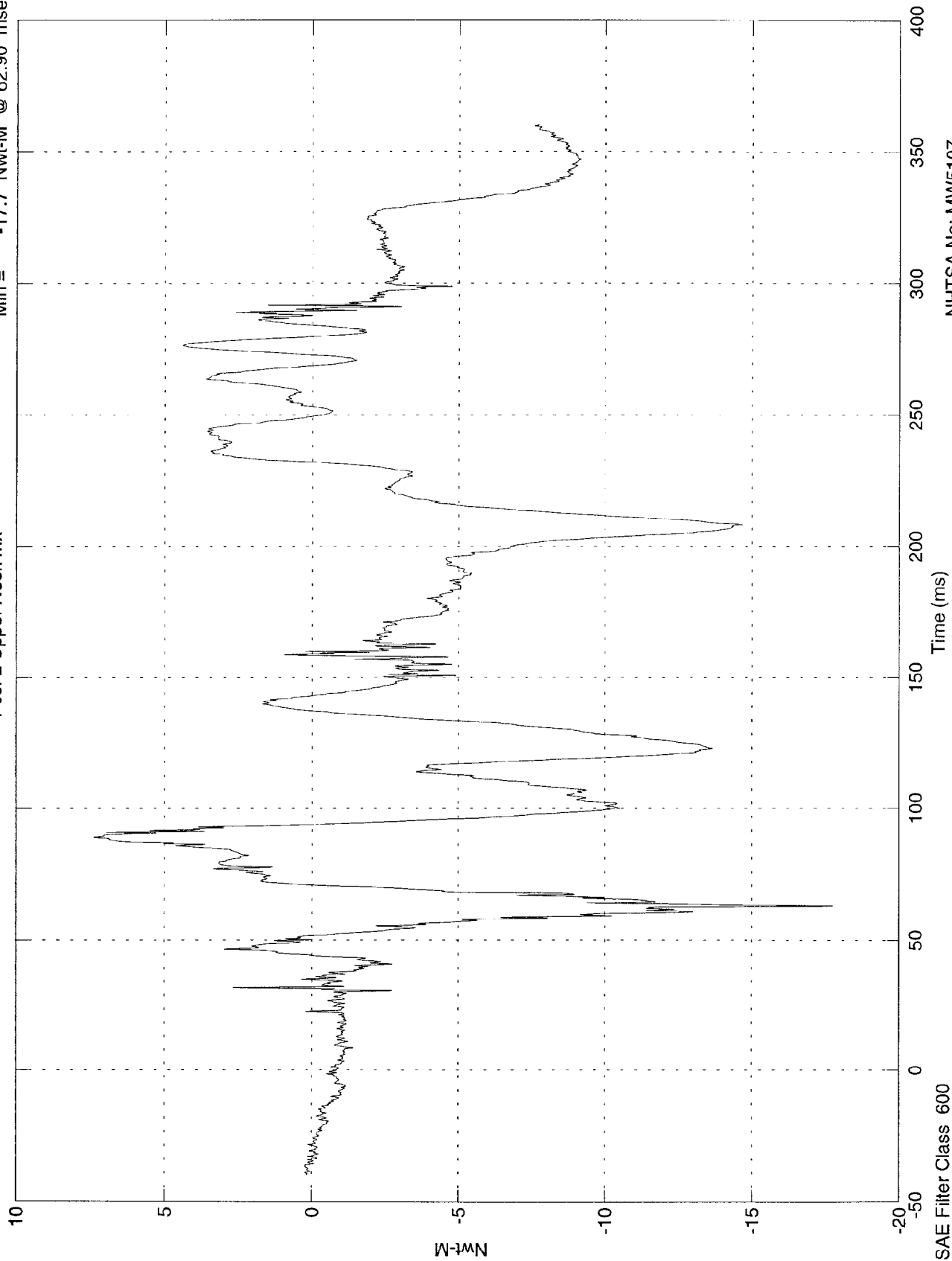


NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 7.37 Nwt-M @ 89.10 msec  
 Min = -17.7 Nwt-M @ 62.90 msec

Pos. 2 Upper Neck Mx



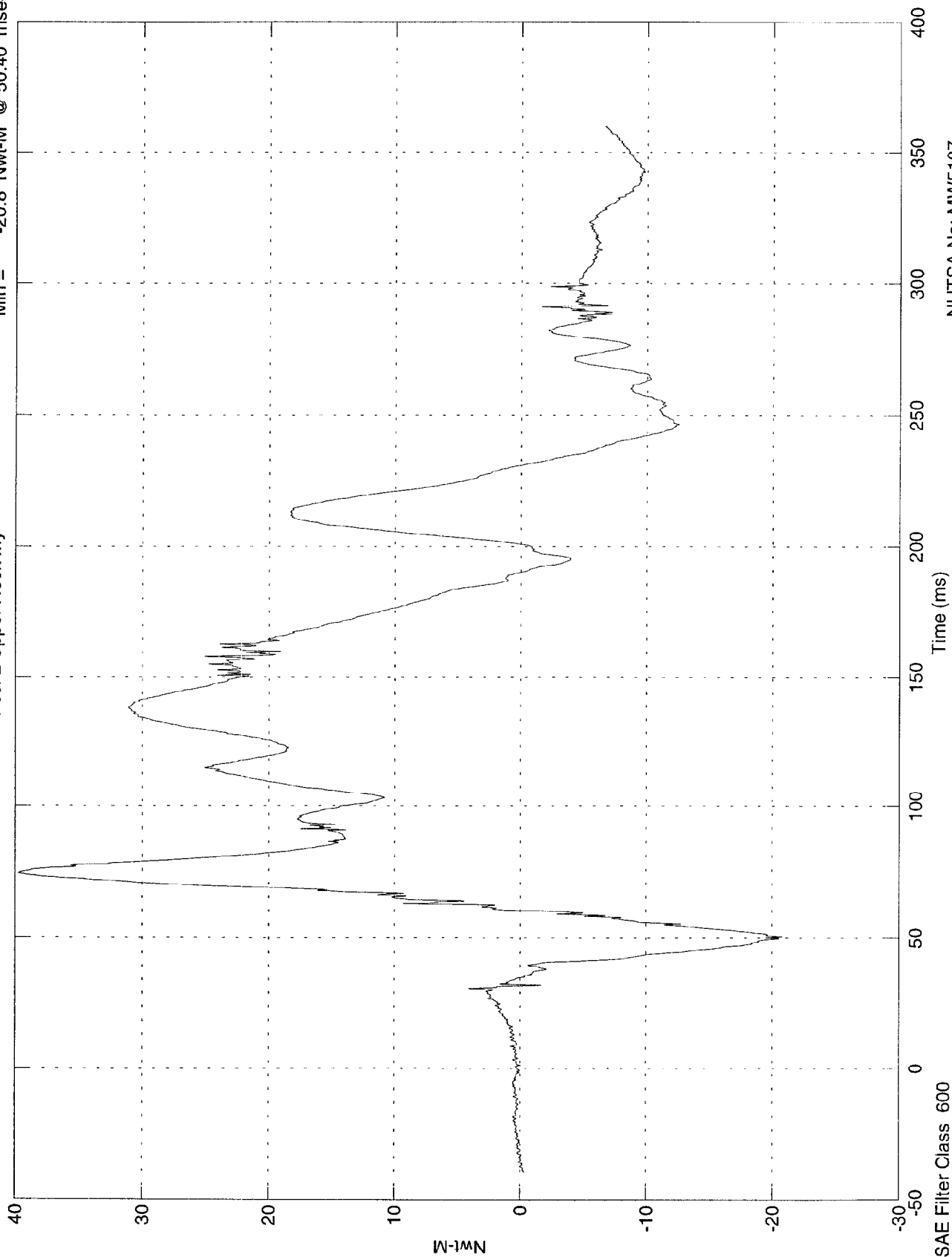
SAE Filter Class 600

NHTSA No: MW5107  
 Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 39.8 Nwt-M @ 74.60 msec  
 Min = -20.8 Nwt-M @ 50.40 msec

Pos. 2 Upper Neck My

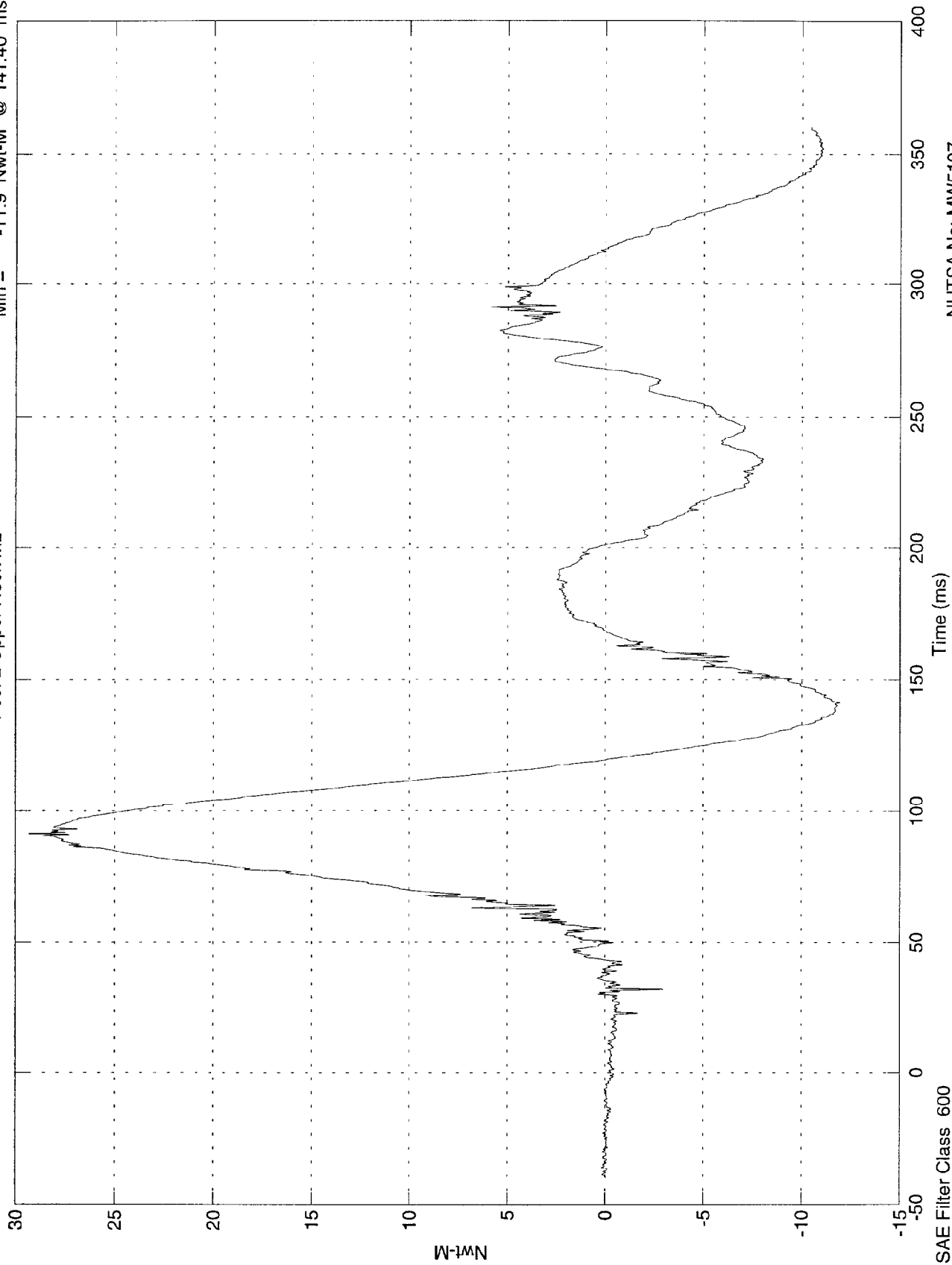


NHTSA No: MW5107  
 Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 29.3 Nwt-M @ 91.30 msec  
Min = -11.9 Nwt-M @ 141.40 msec

Pos. 2 Upper Neck Mz



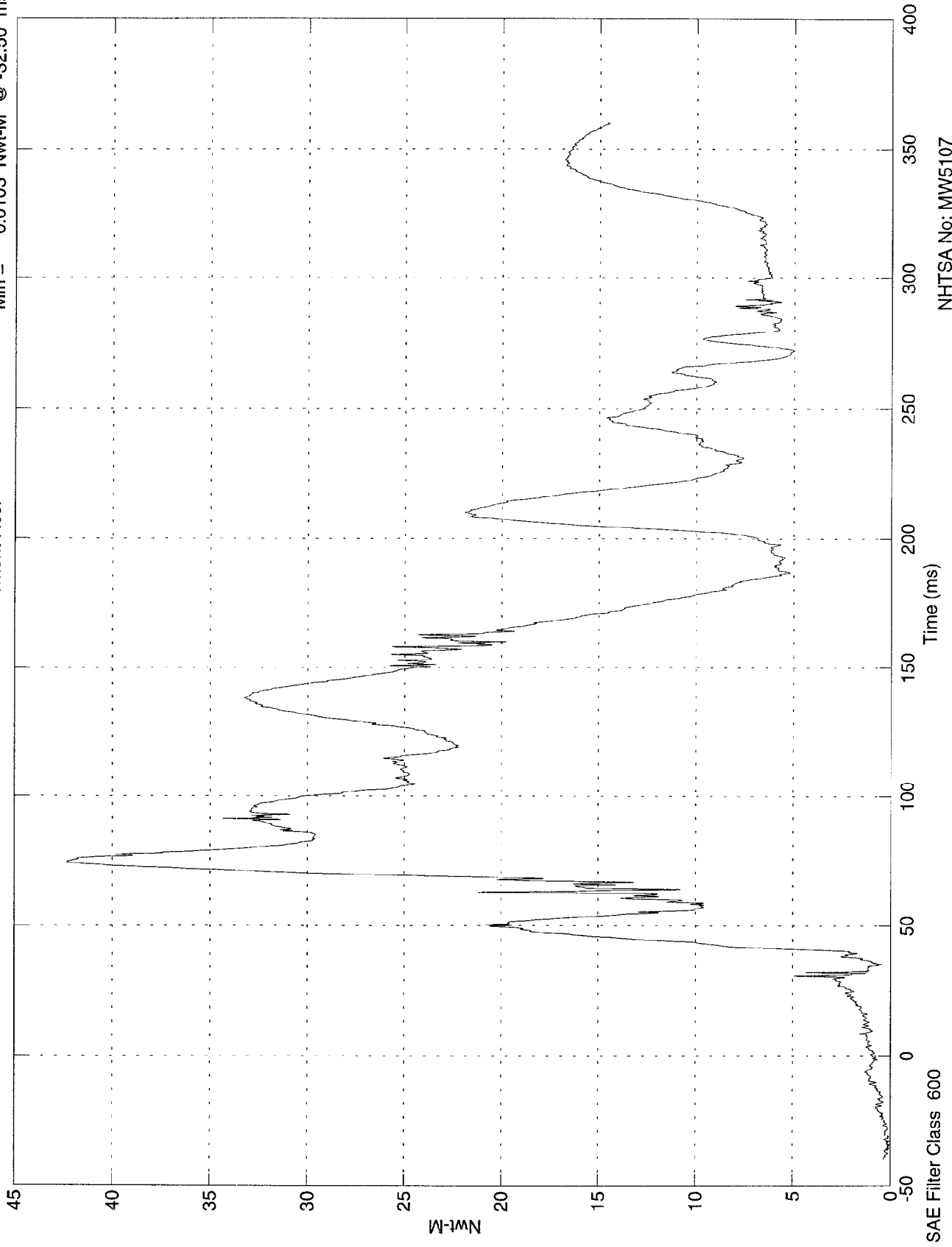
NHTSA No: MW5107  
Date: 15 Dec 1997

SAE Filter Class 600

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 42.3 Nwt-M @ 74.60 msec  
Min = 0.0103 Nwt-M @ -32.50 msec

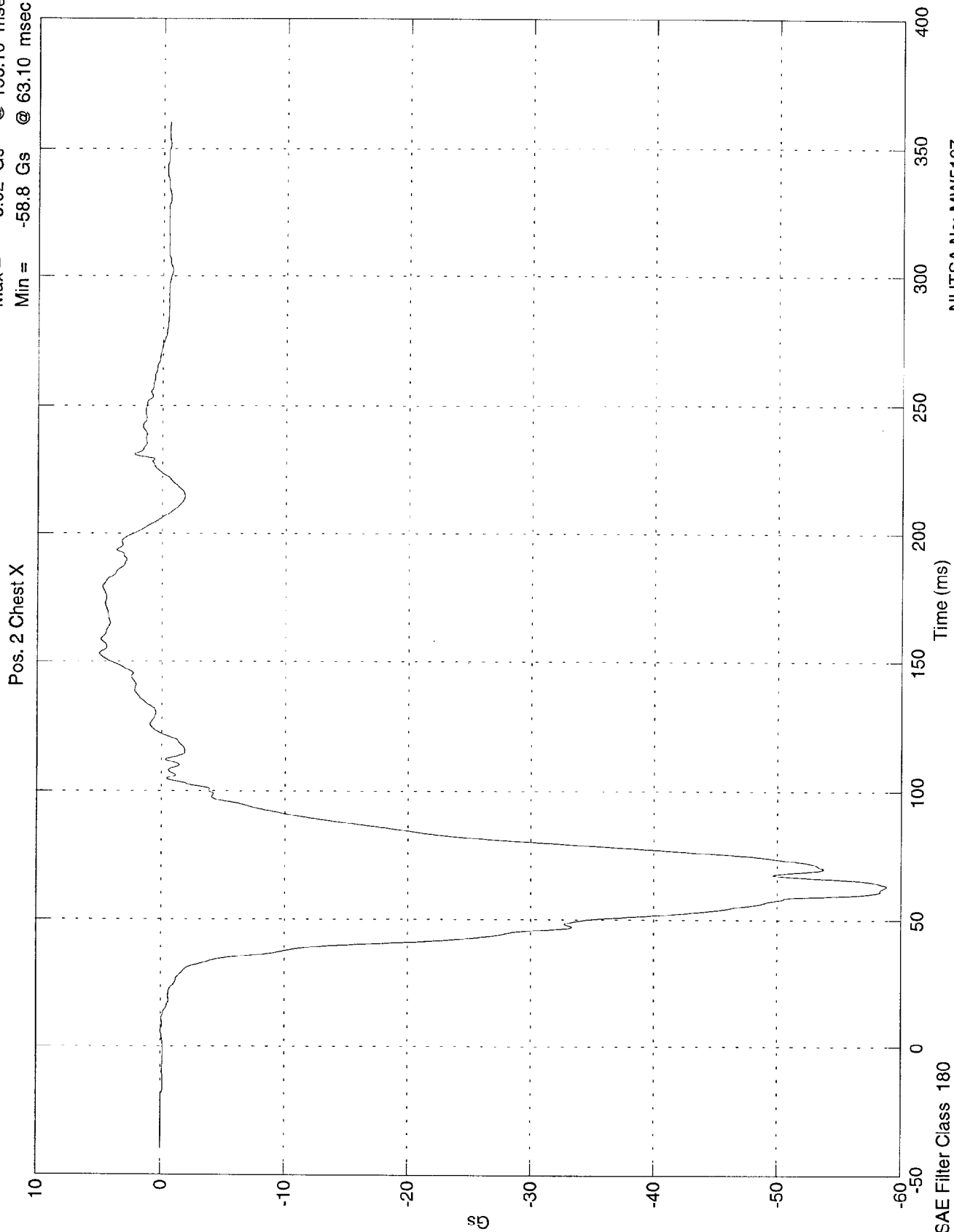
Pos. 2 Neck Moment Res.



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 5.02 Gs @ 153.10 msec  
Min = -58.8 Gs @ 63.10 msec

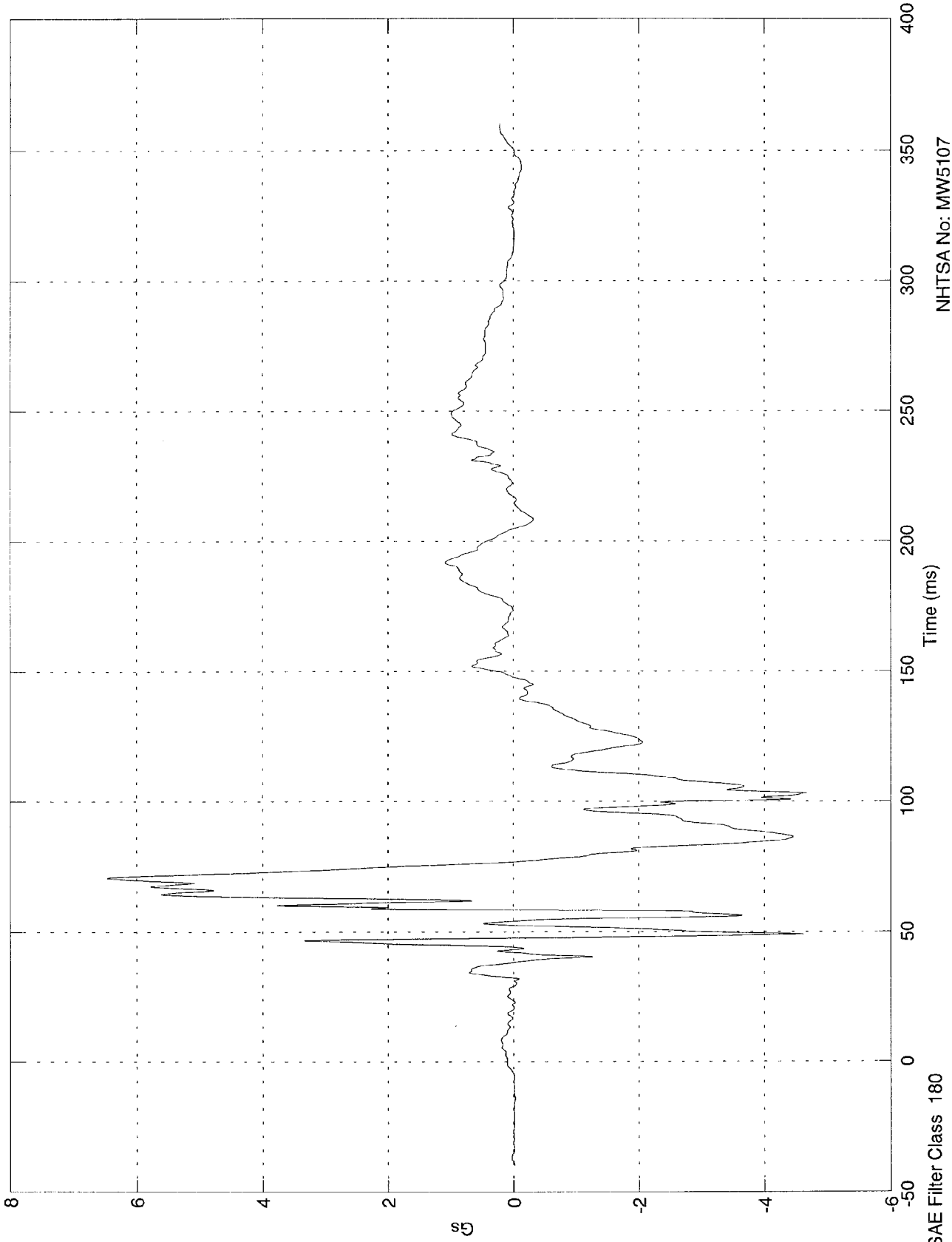


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

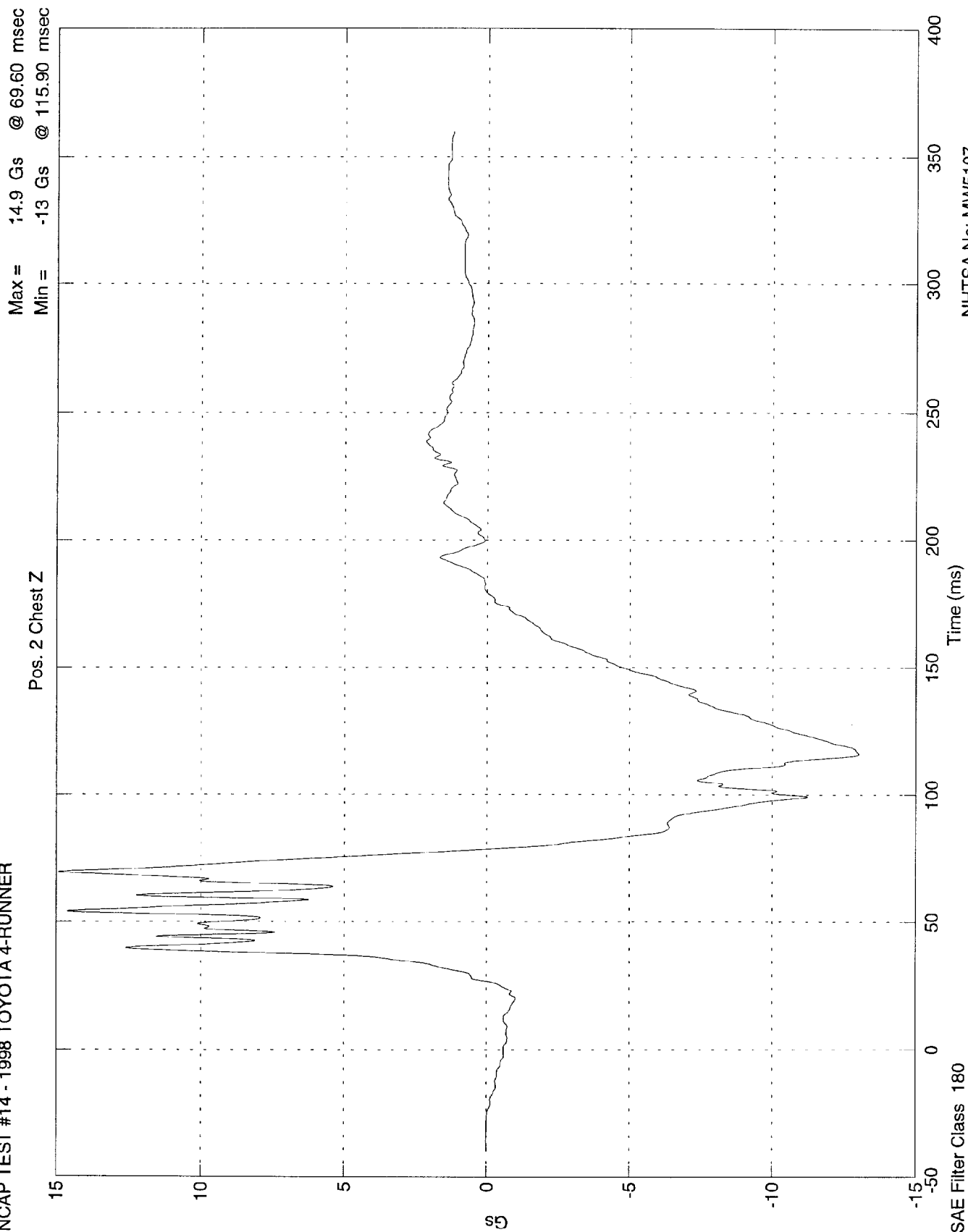
Max = 6.47 Gs @ 71.00 msec  
Min = -4.69 Gs @ 103.30 msec

Pos. 2 Chest Y



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

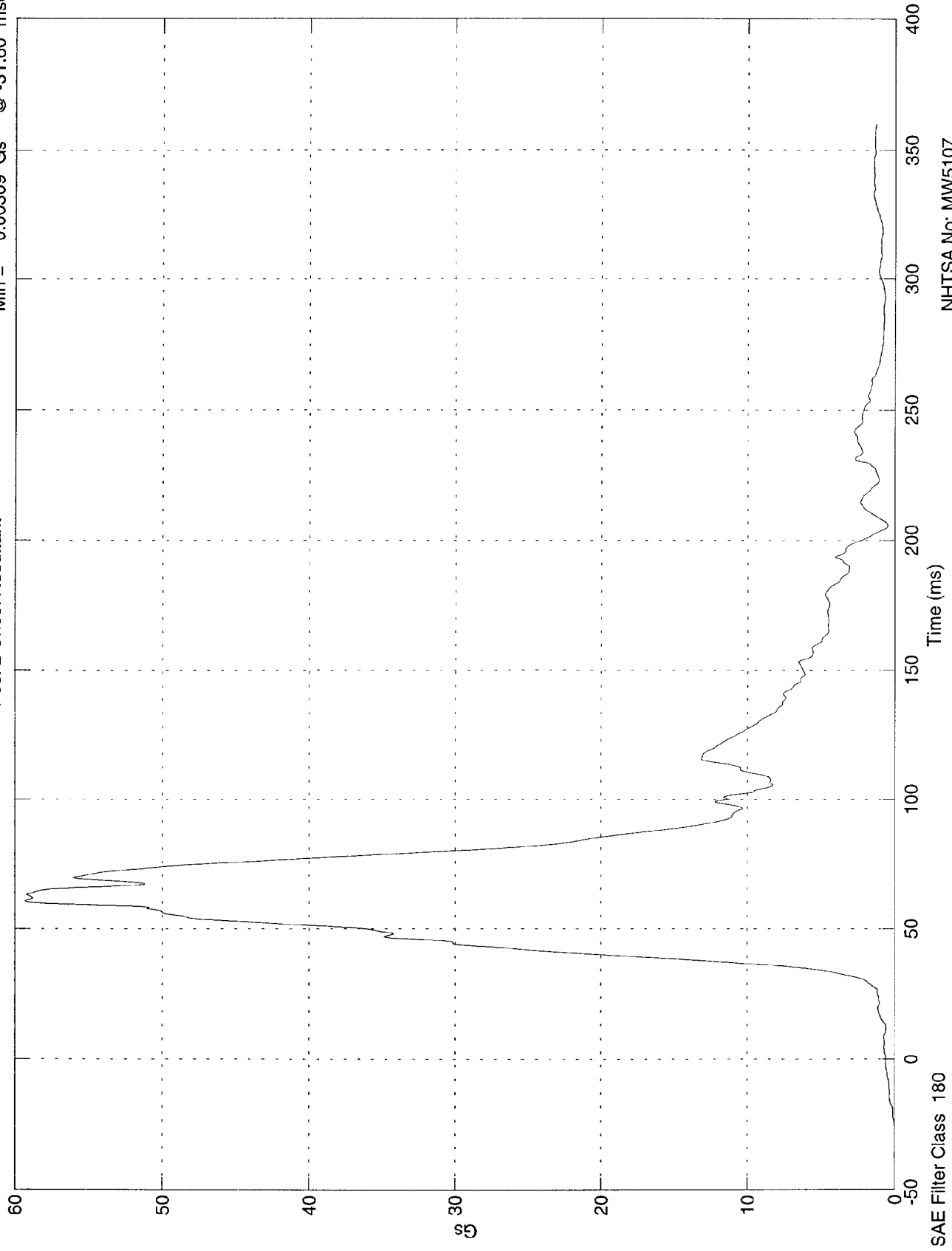


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 59.3 Gs @ 60.70 msec  
Min = 0.00309 Gs @ -31.60 msec

Pos. 2 Chest Resultant

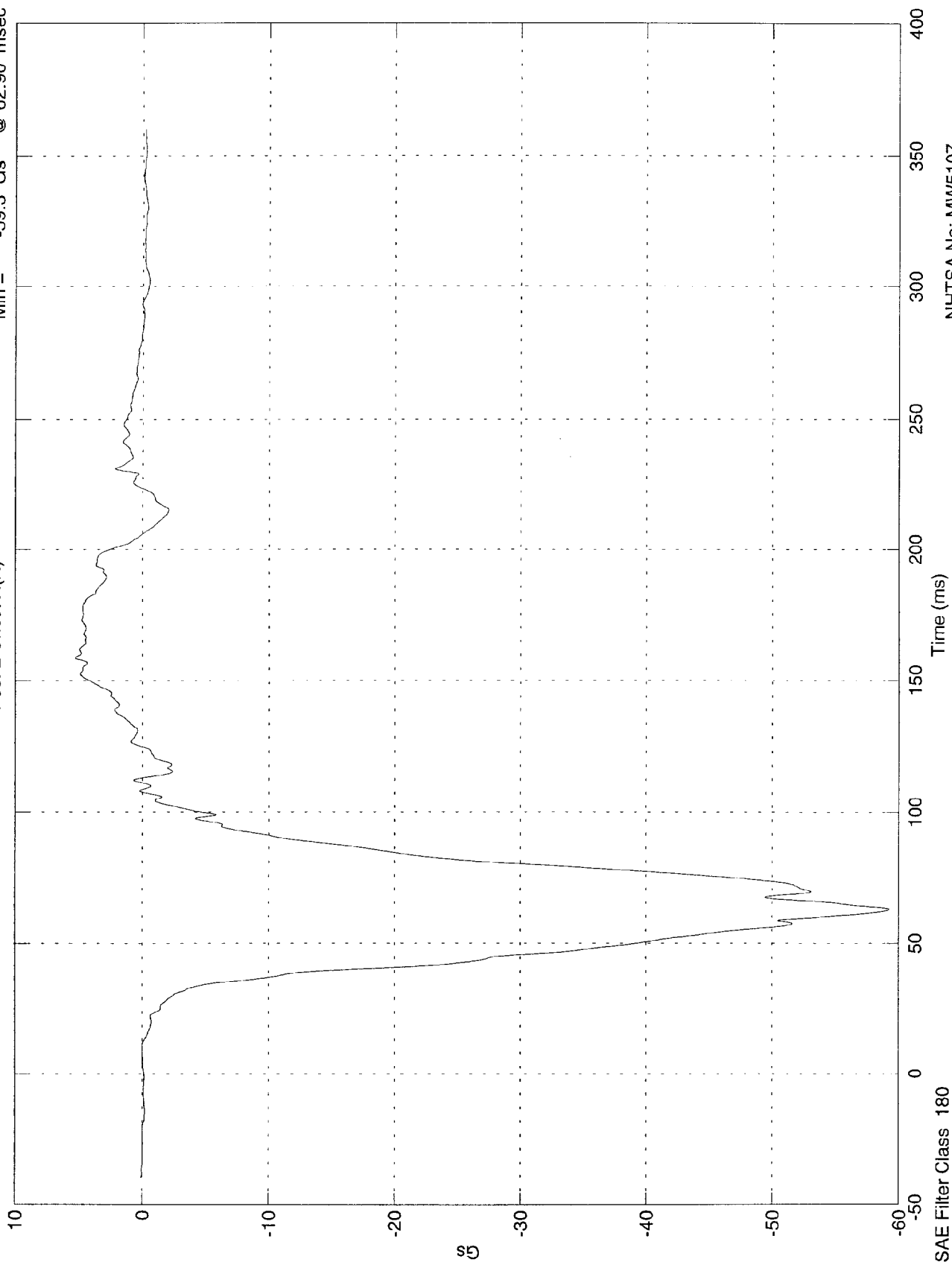


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 5.28 Gs @ 158.50 msec  
Min = -59.3 Gs @ 62.90 msec

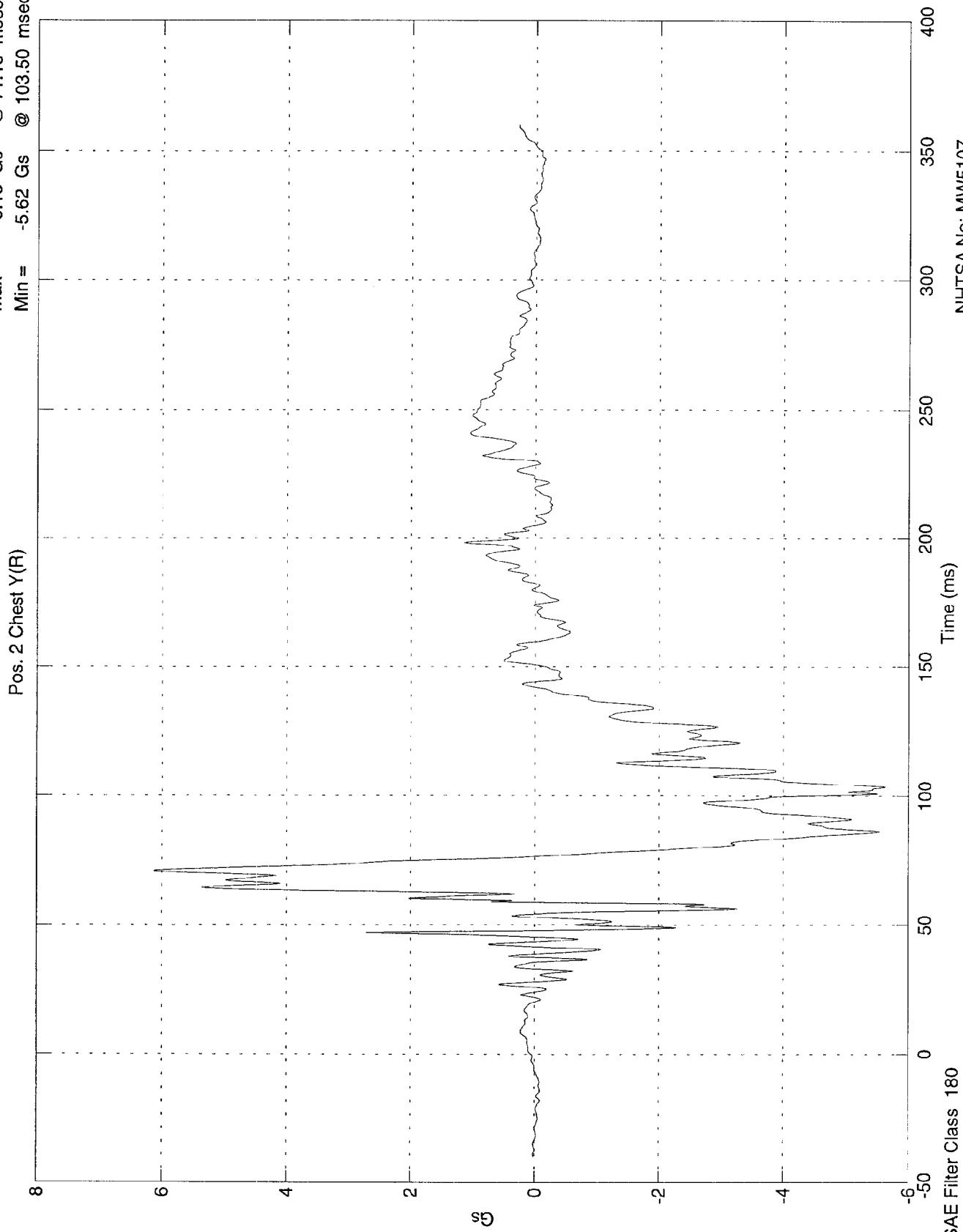
Pos. 2 Chest X(R)



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

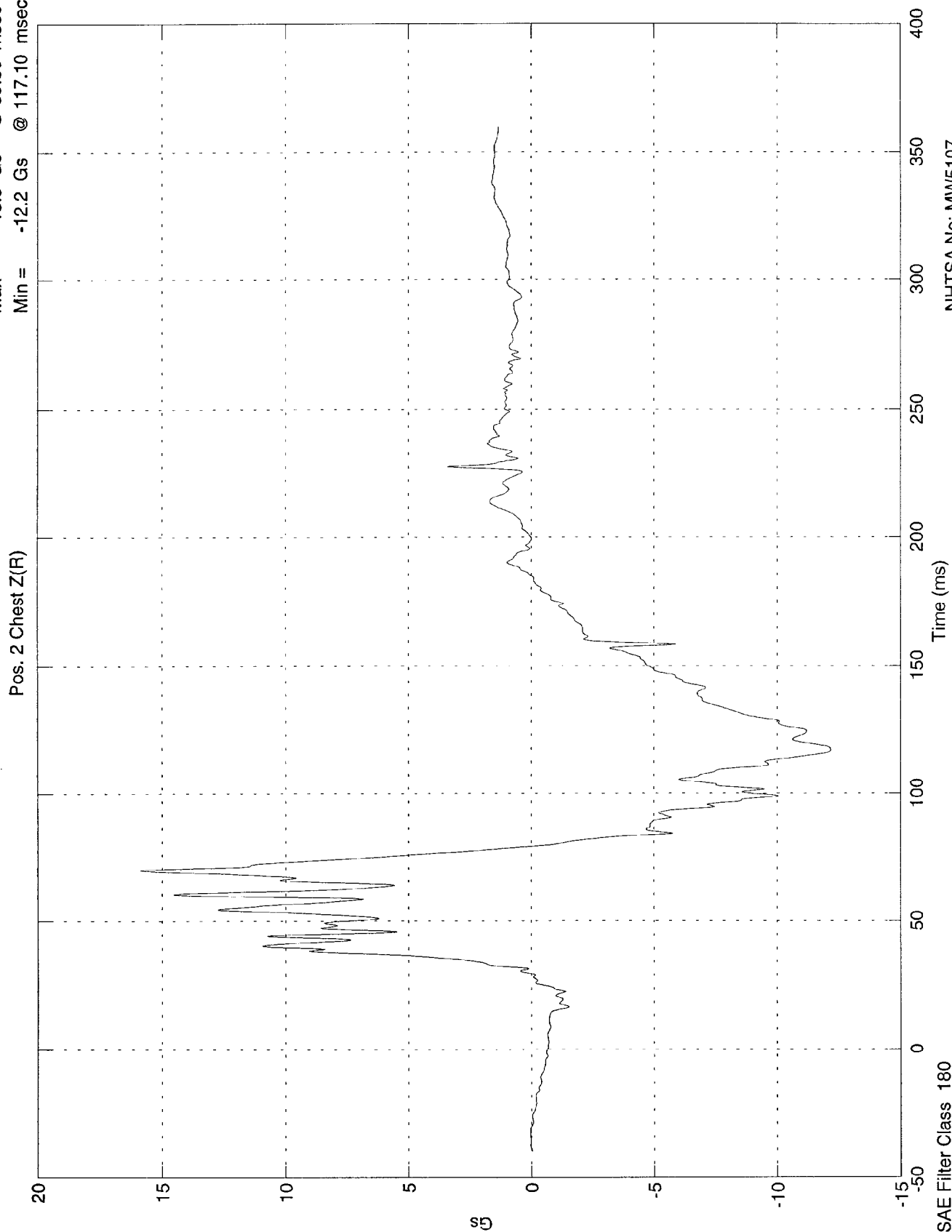
Max = 6.13 Gs @ 71.10 msec  
Min = -5.62 Gs @ 103.50 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 15.9 Gs @ 69.80 msec  
Min = -12.2 Gs @ 117.10 msec

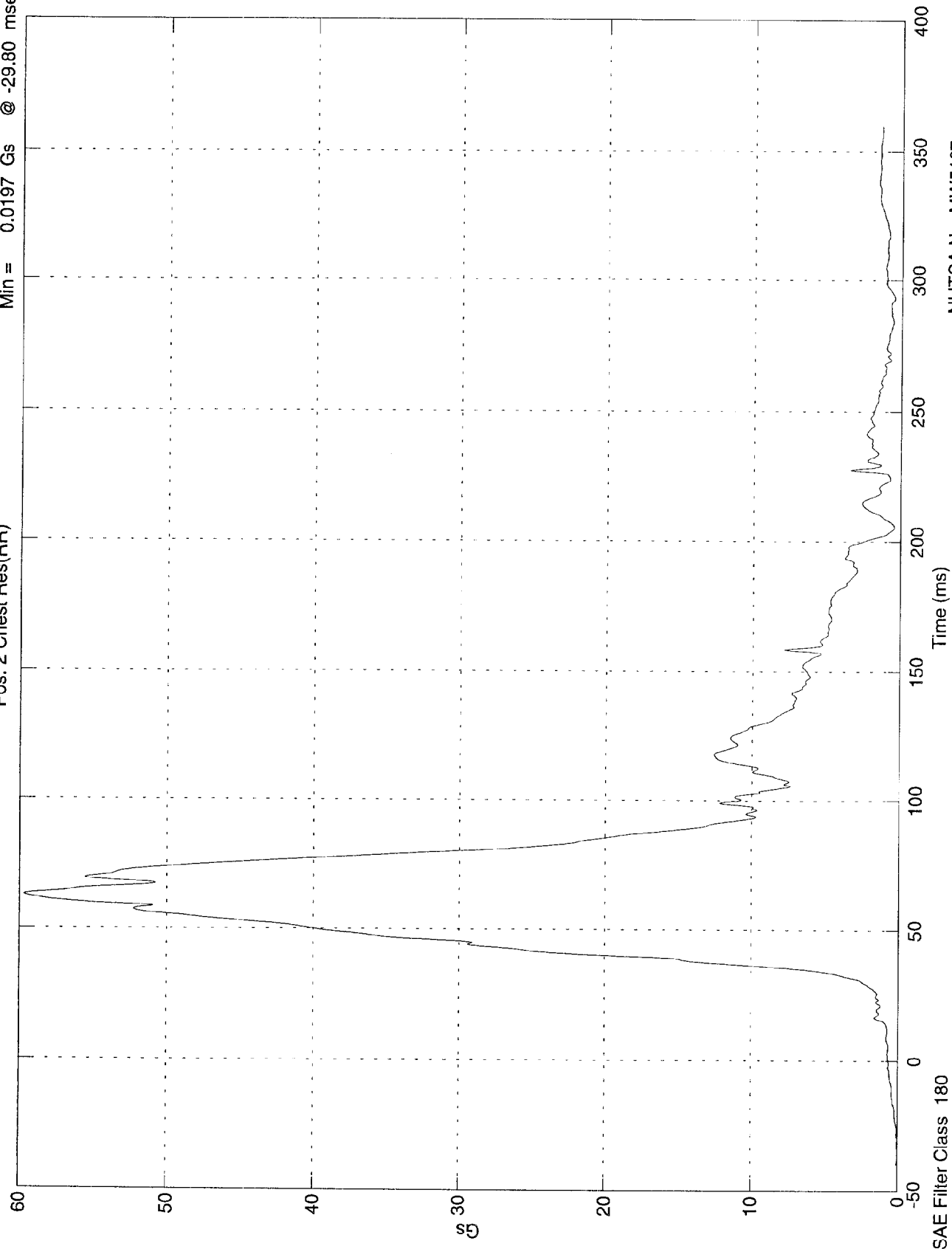


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 59.7 Gs @ 62.90 msec  
Min = 0.0197 Gs @ -29.80 msec

Pos. 2 Chest Res(RR)

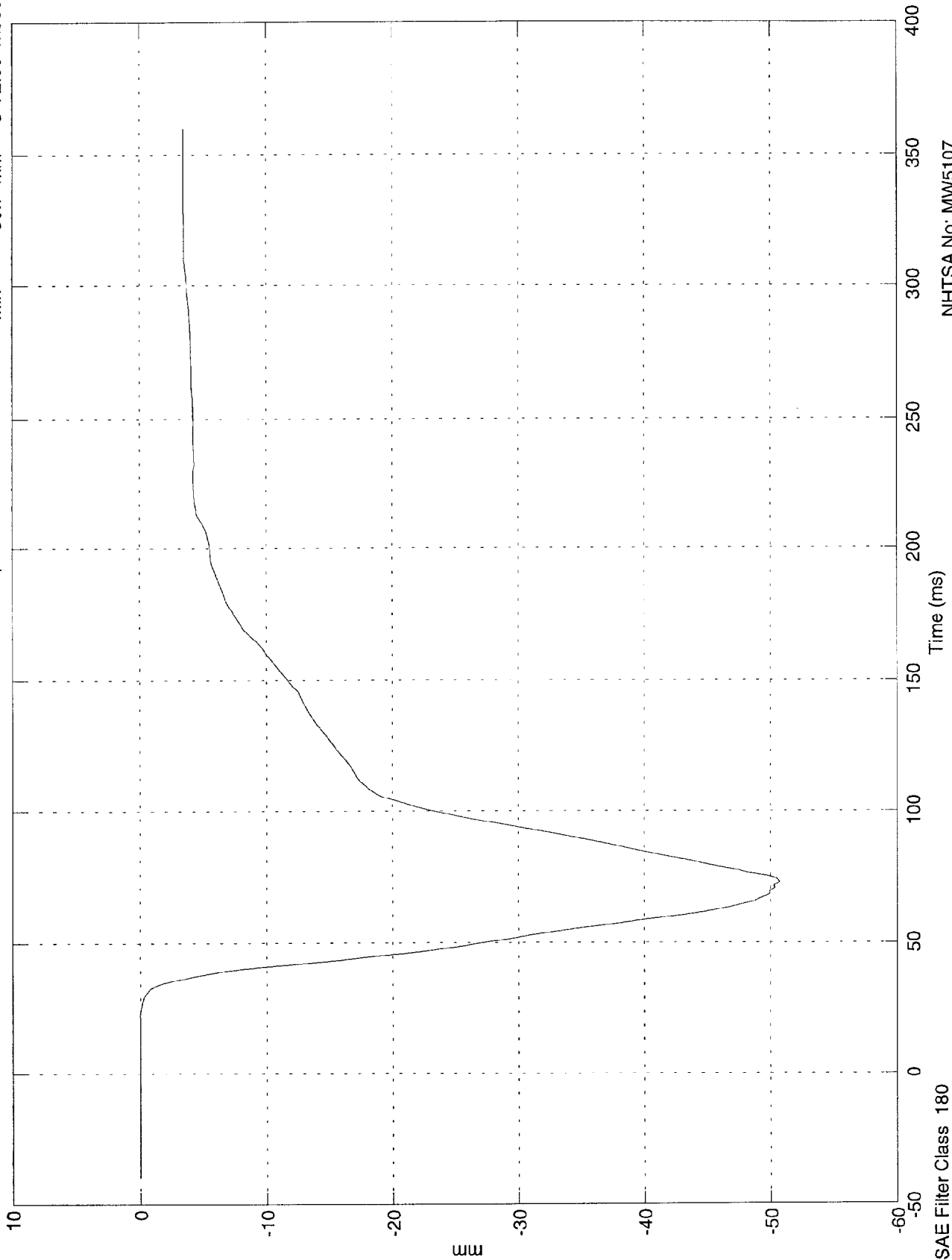


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 0.0178 mm @ 22.60 msec  
Min = -50.7 mm @ 72.90 msec

Pos. 2 Chest Disp.

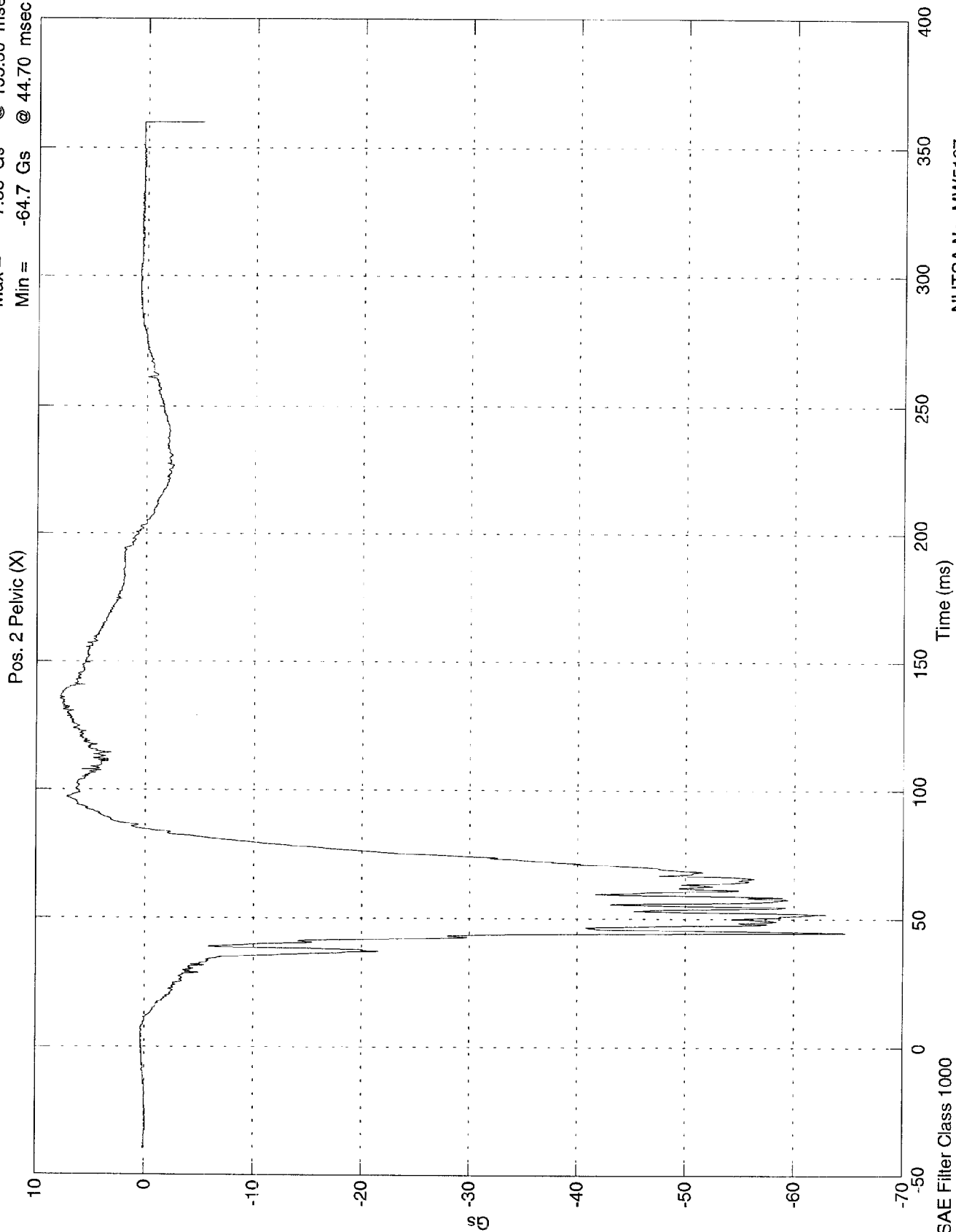


NHTSA No: MW5107  
Date: 15 Dec 1997

SAE Filter Class 180

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

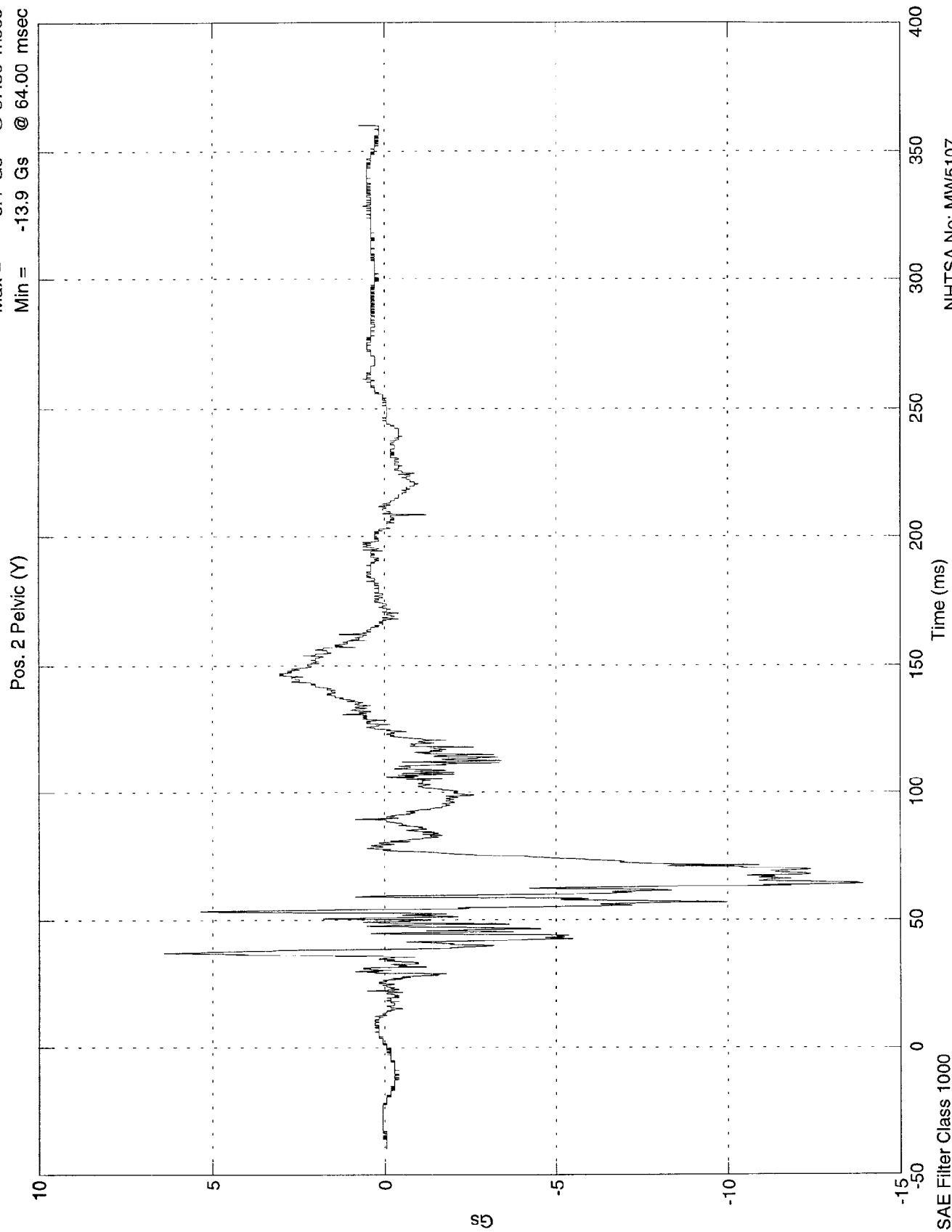
Max = 7.86 Gs @ 135.30 msec  
Min = -64.7 Gs @ 44.70 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

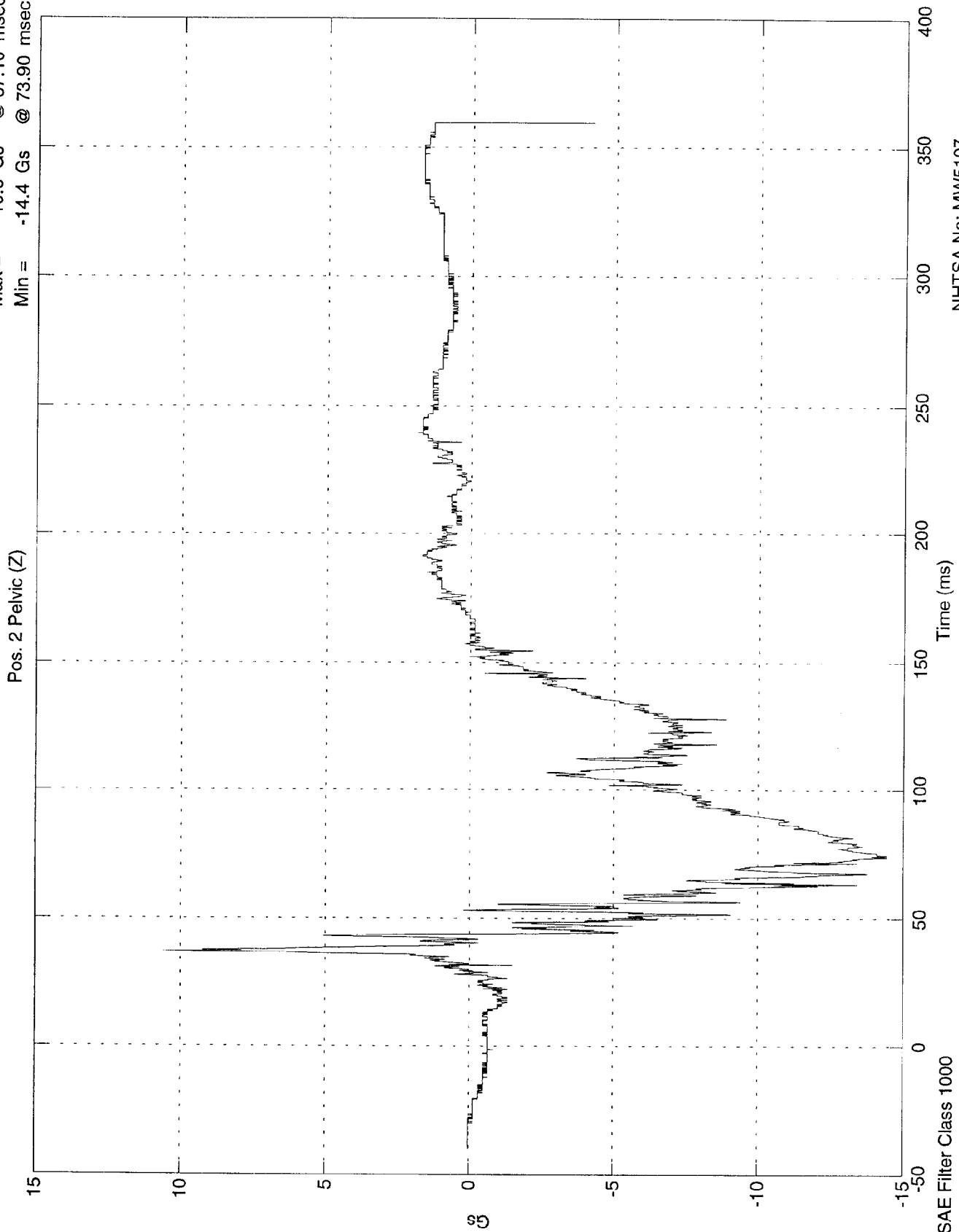
Max = 6.4 Gs @ 37.30 msec  
Min = -13.9 Gs @ 64.00 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 10.6 Gs @ 37.10 msec  
 Min = -14.4 Gs @ 73.90 msec

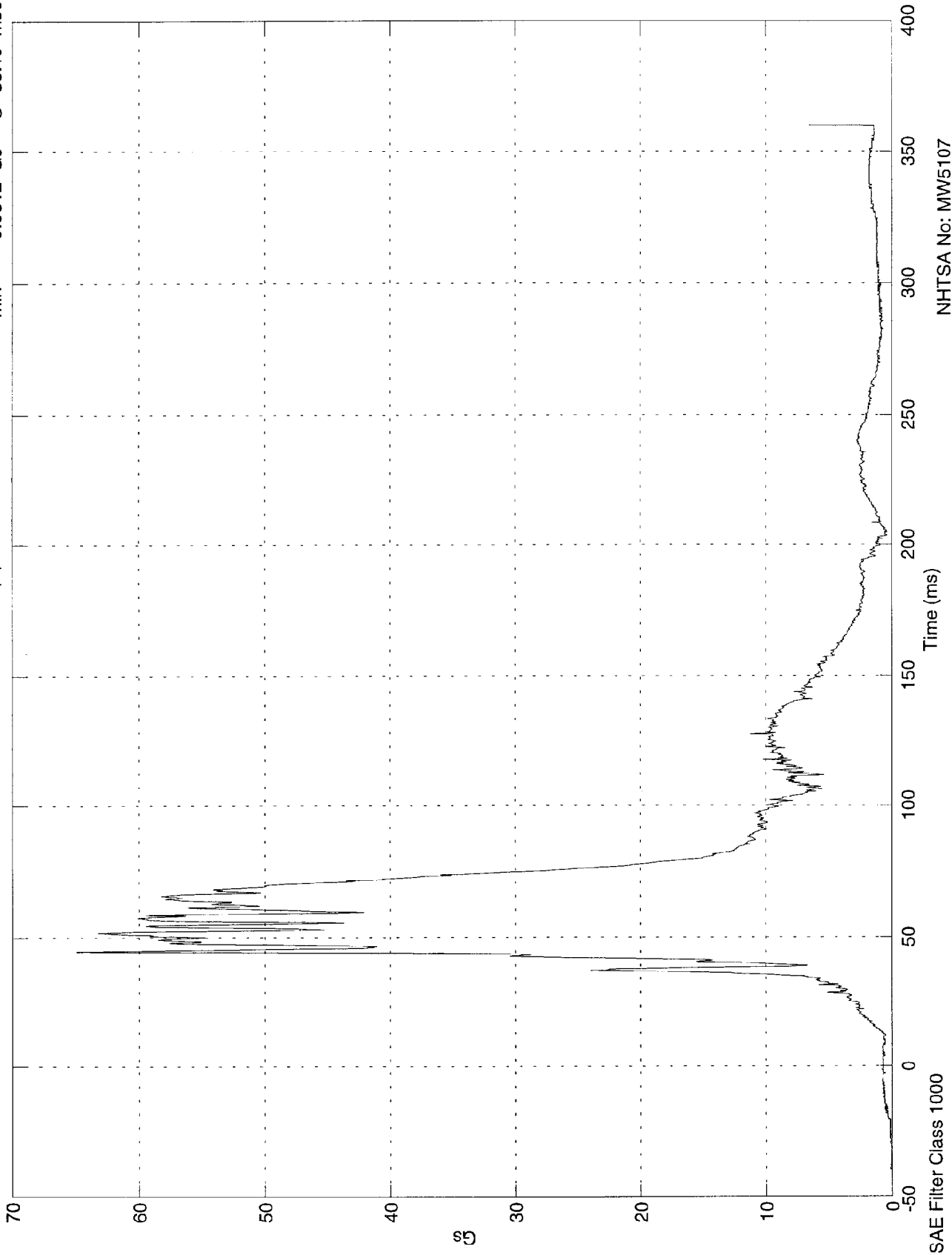


NHTSA No: MW5107  
 Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 64.9 Gs @ 44.70 msec  
 Min = 0.0612 Gs @ -36.10 msec

Pos. 2 Pelvic (R)

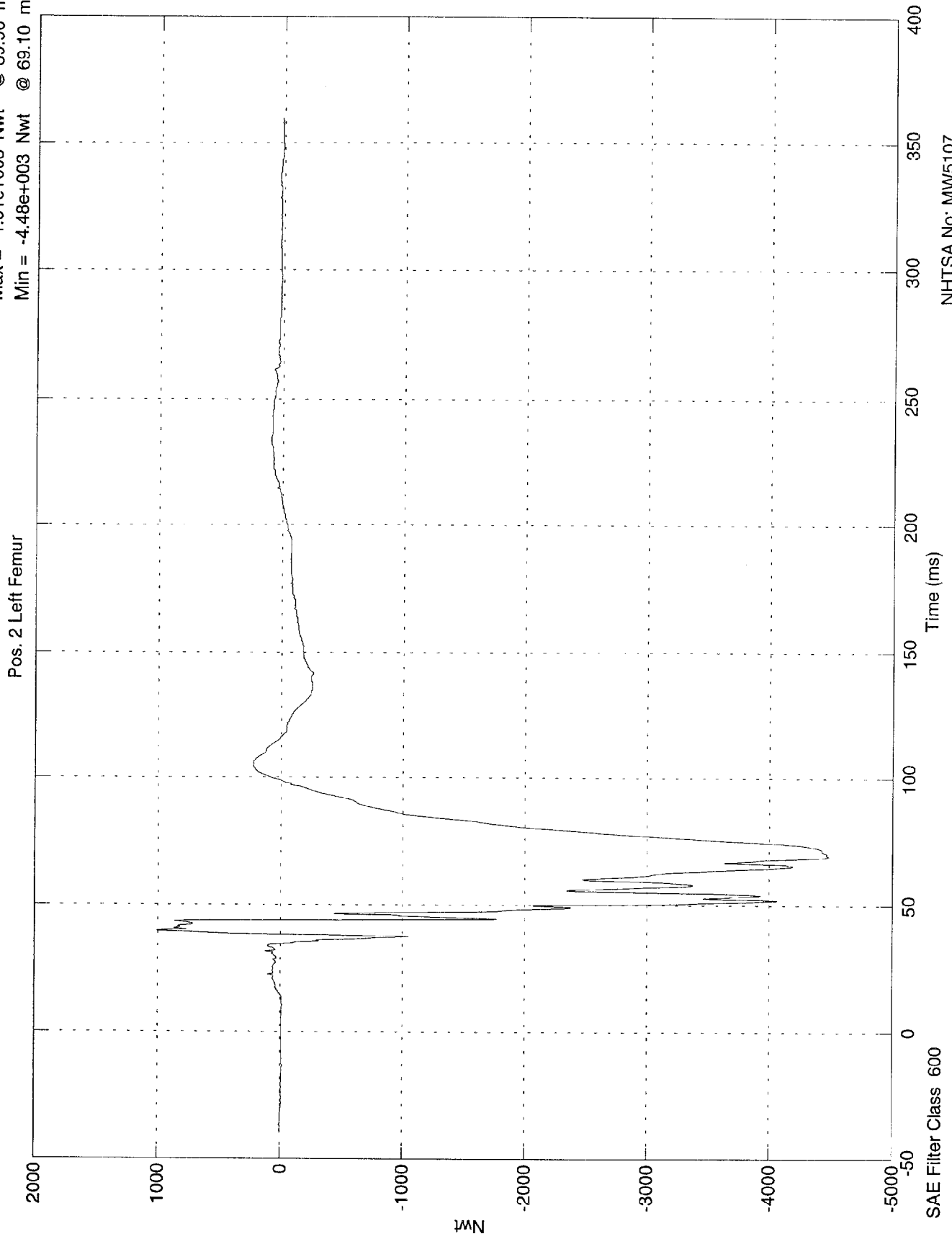


NHTSA No: MW5107  
 Date: 15 Dec 1997

SAE Filter Class 1000

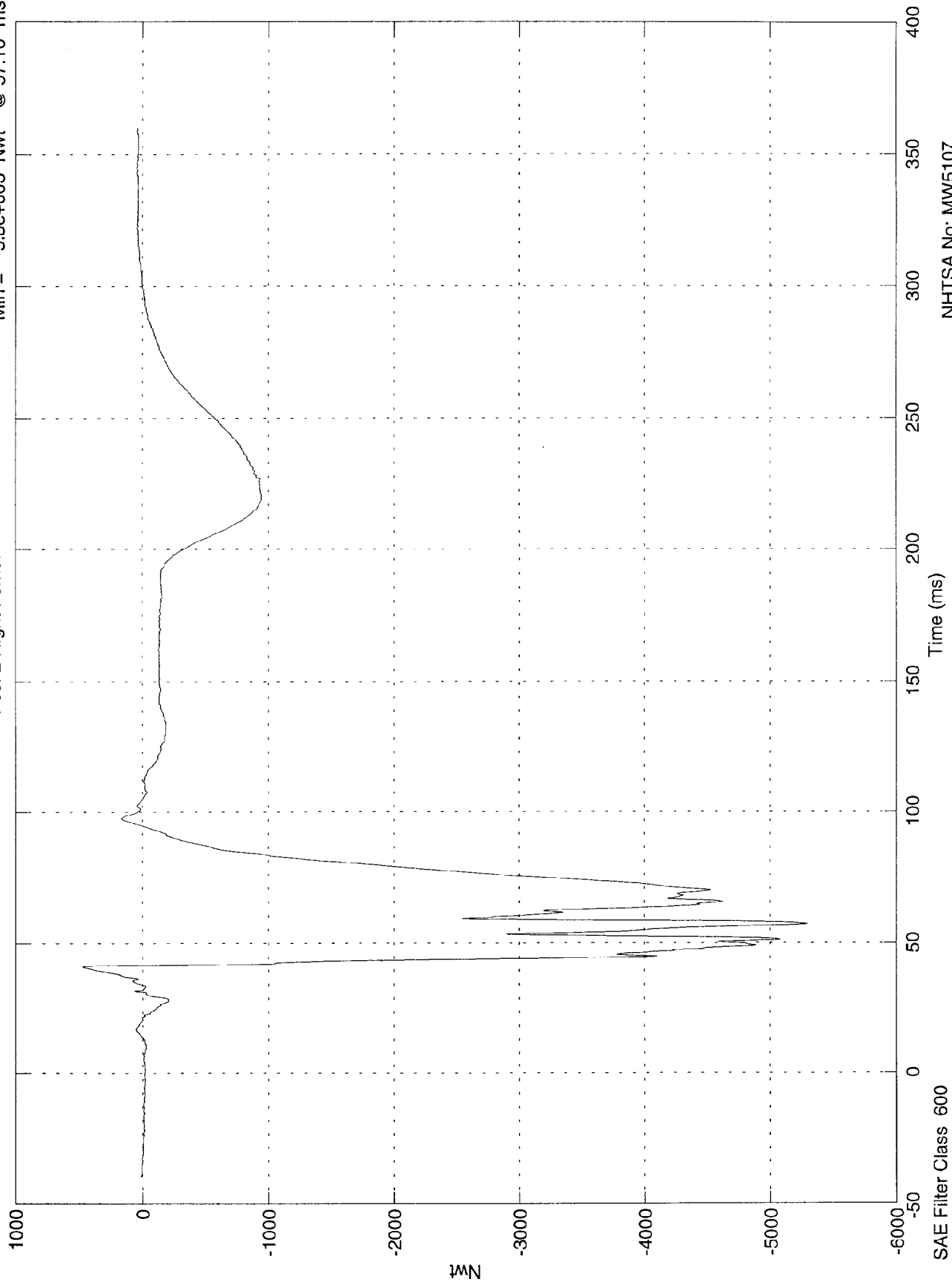
NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 1.01e+003 Nwt @ 39.90 msec  
Min = -4.48e+003 Nwt @ 69.10 msec



Pos. 2 Right Femur

Max = 471 Nwt @ 40.90 msec  
Min = -5.3e+003 Nwt @ 57.10 msec

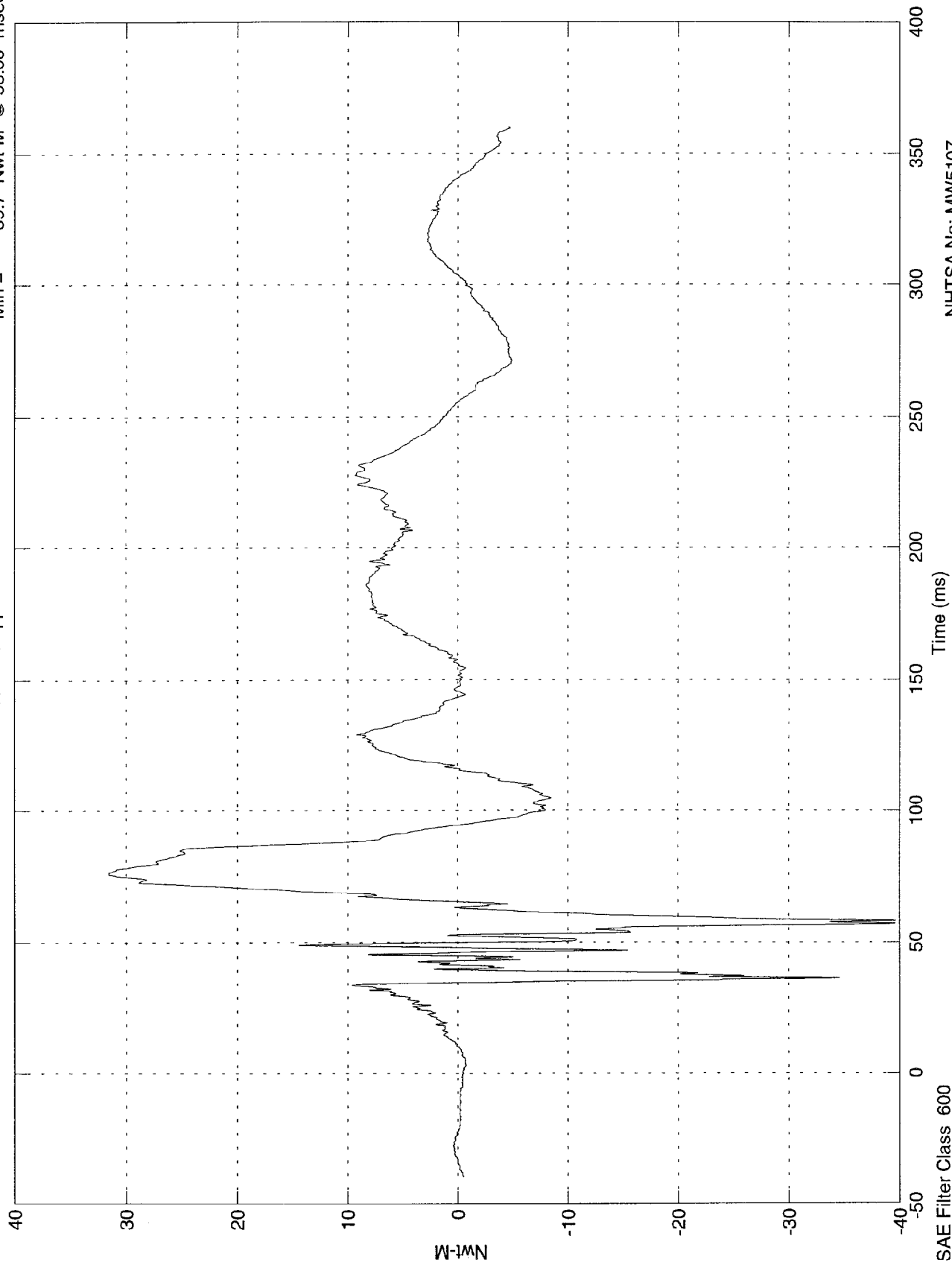


NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 31.6 Nwt-M @ 75.90 msec  
 Min = -39.7 Nwt-M @ 58.00 msec

Pos. 2 Lt Upper Tibia Mx



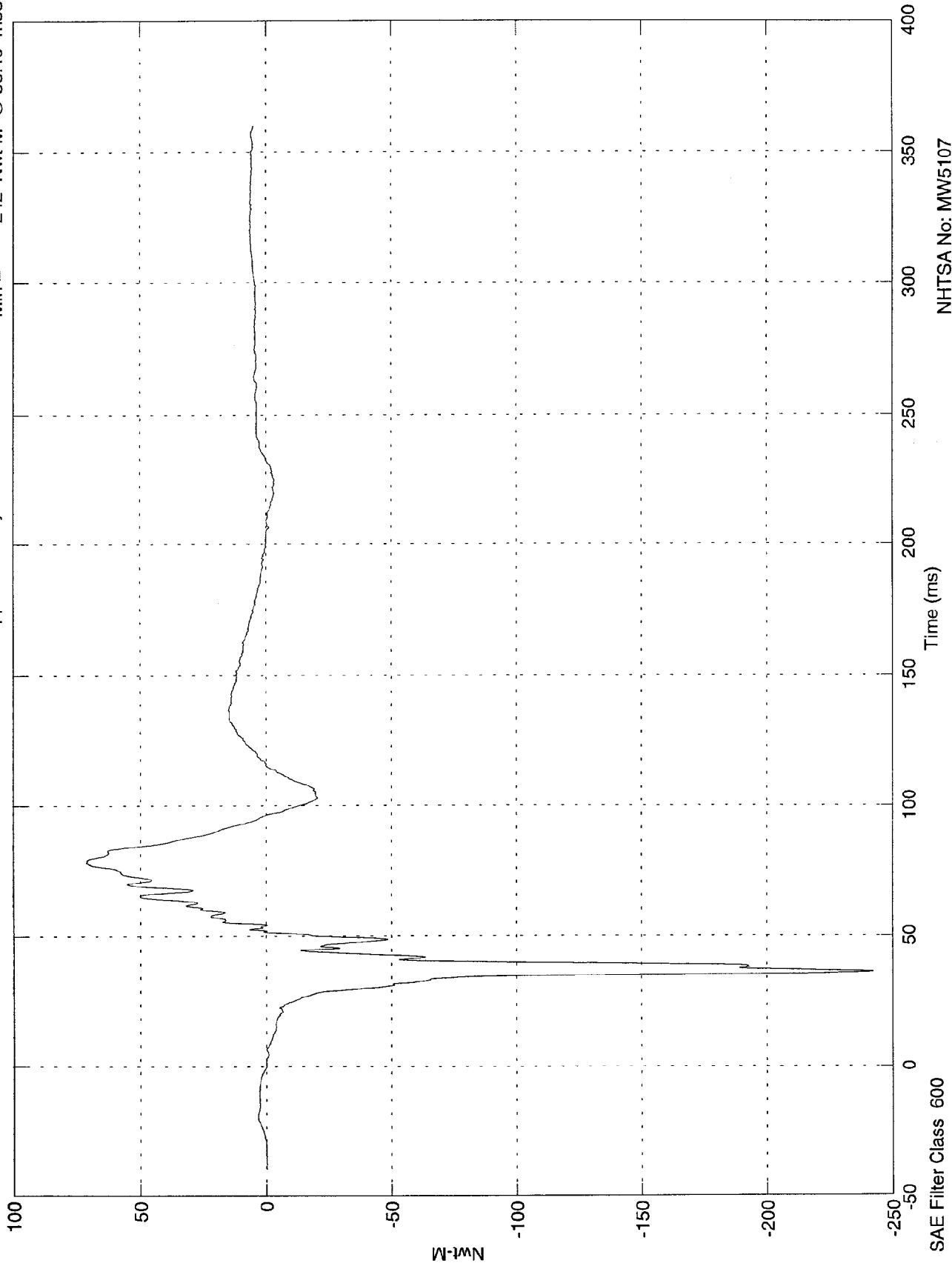
NHTSA No: MW5107  
 Date: 15 Dec 1997

SAE Filter Class 600

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Pos. 2 Lt Upper Tibia My

Max = 71.4 Nwt-M @ 78.20 msec  
Min = -242 Nwt-M @ 36.40 msec

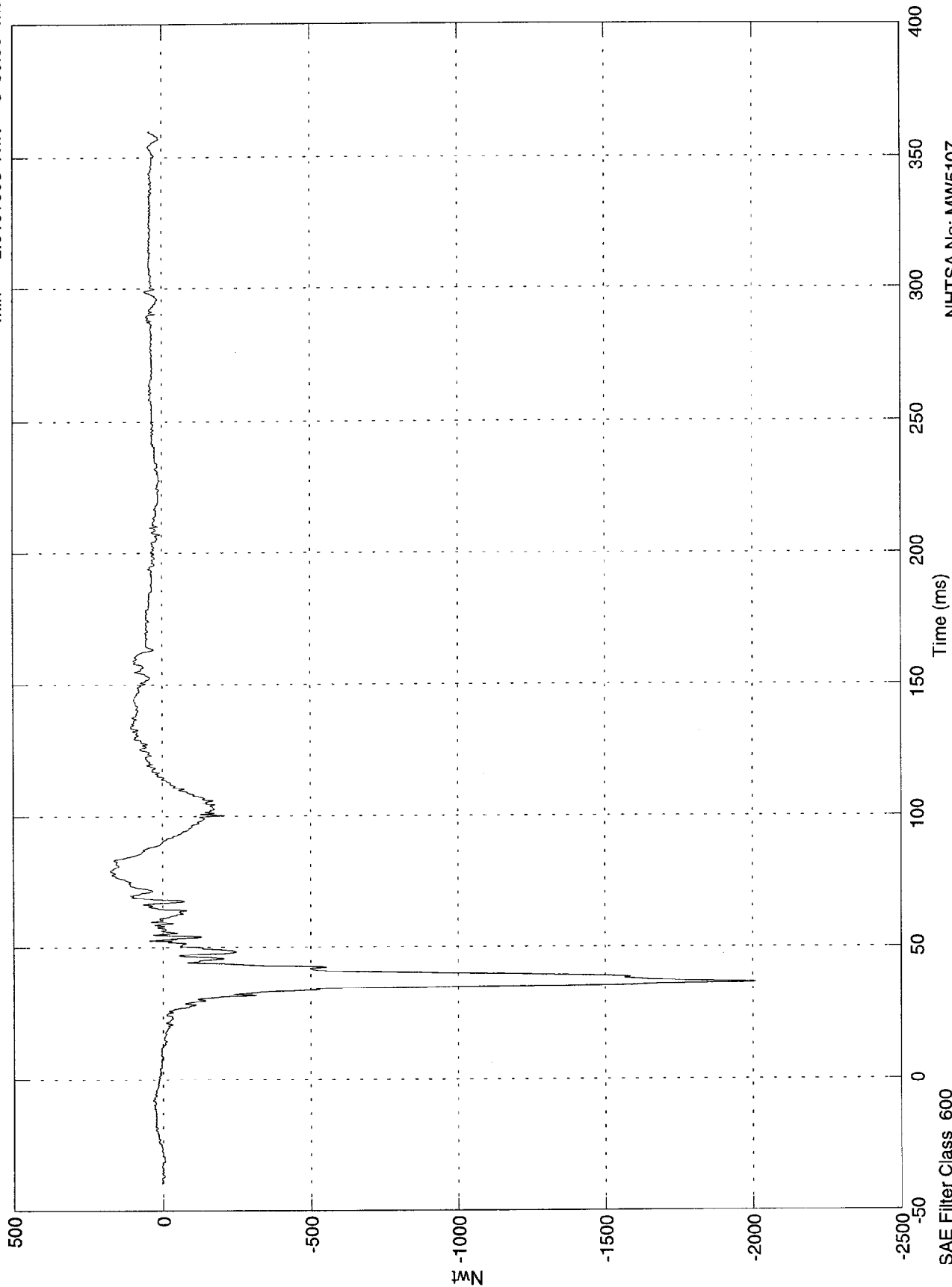


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 176 Nwt @ 79.10 msec  
Min = -2.01e+003 Nwt @ 36.50 msec

Pos. 2 Lt Lower Tibia Fx

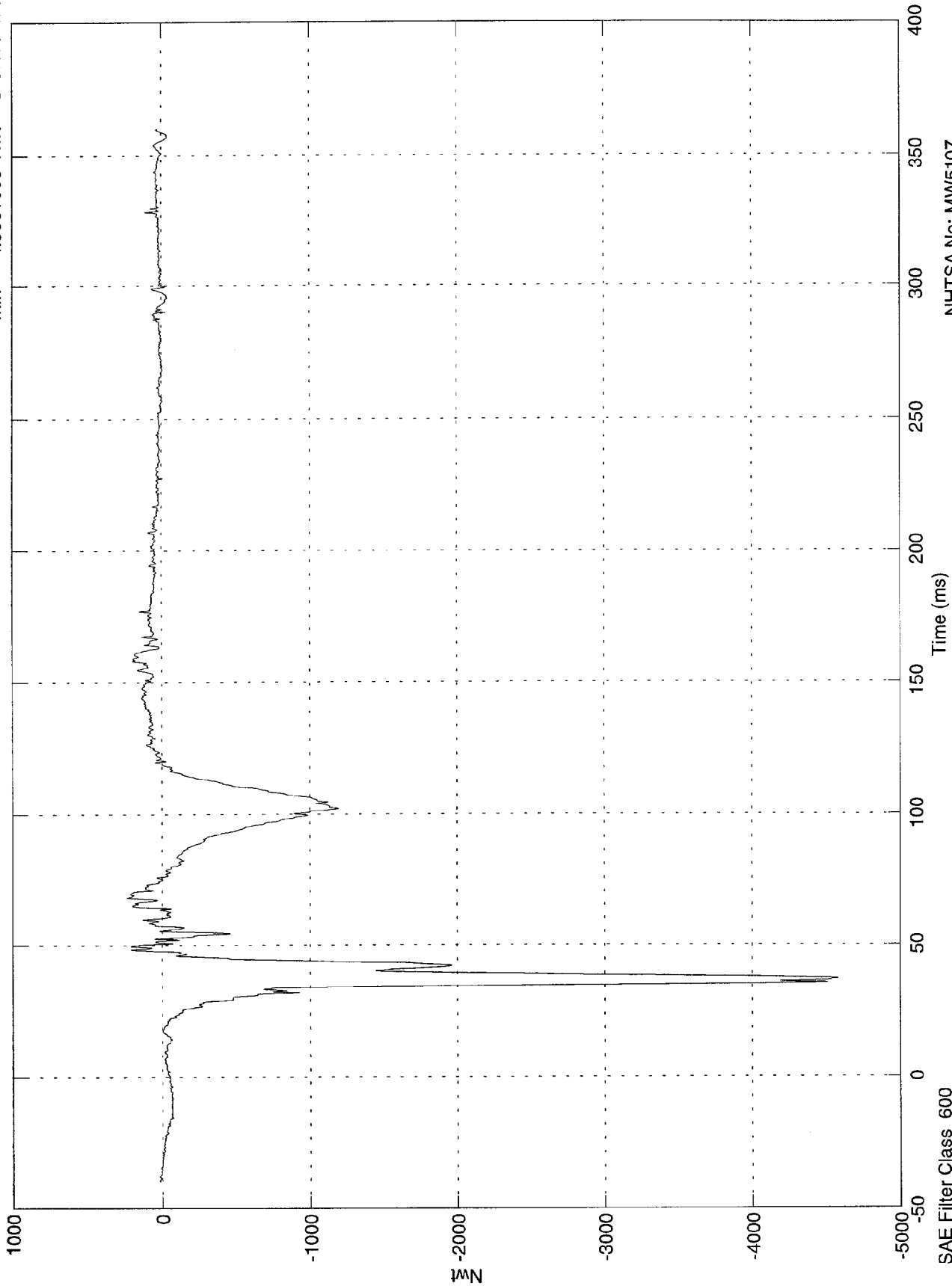


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 235 Nwt @ 68.00 msec  
Min = -4.58e+003 Nwt @ 37.10 msec

Pos. 2 Lt Lower Tibia Fz



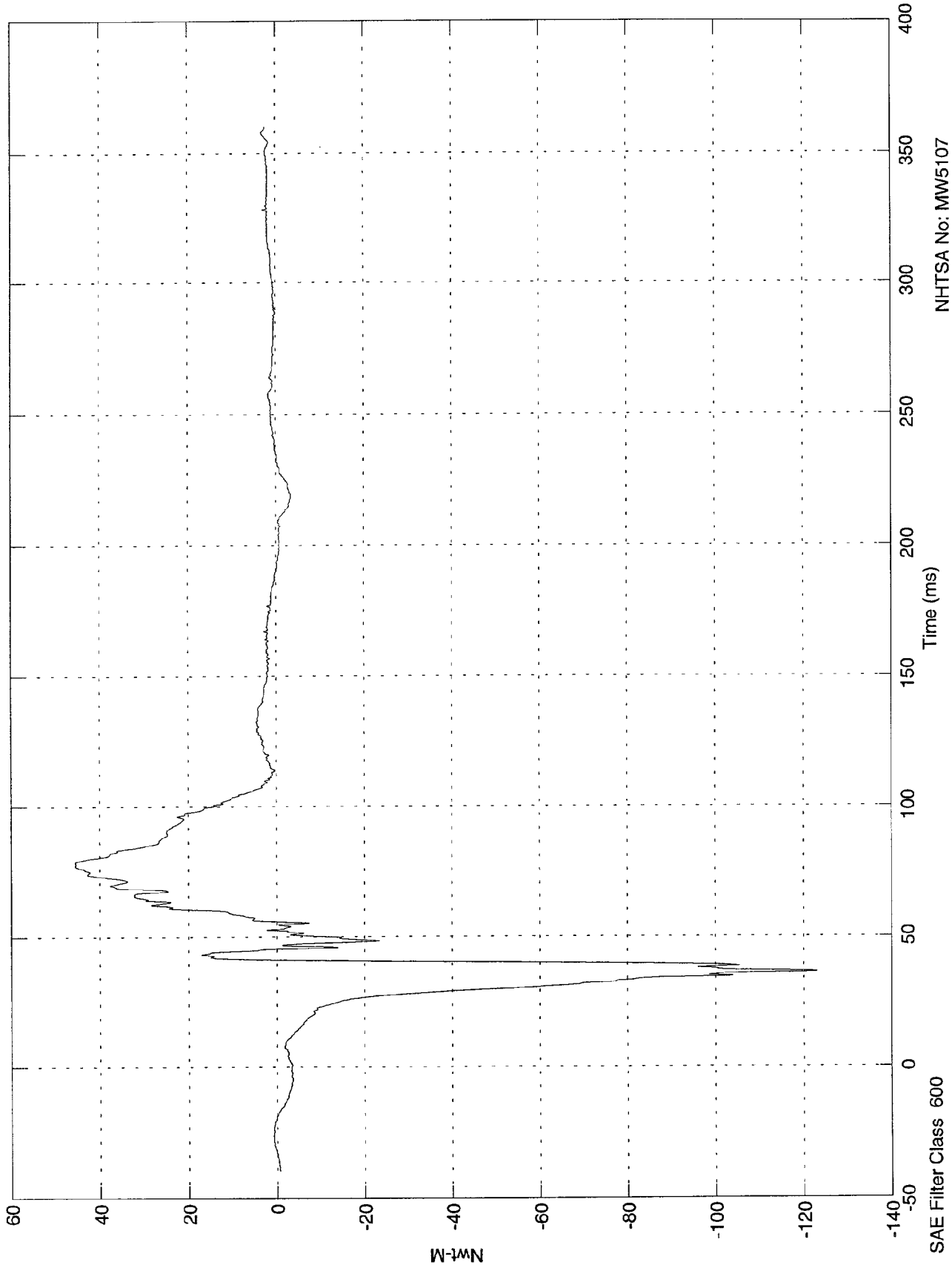
NHTSA No: MW5107  
Date: 15 Dec 1997

SAE Filter Class 600

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Pos. 2 Lt Lower Tibia My

Max = 45.6 Nwt-M @ 77.50 msec  
Min = -123 Nwt-M @ 36.40 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

SAE Filter Class 600

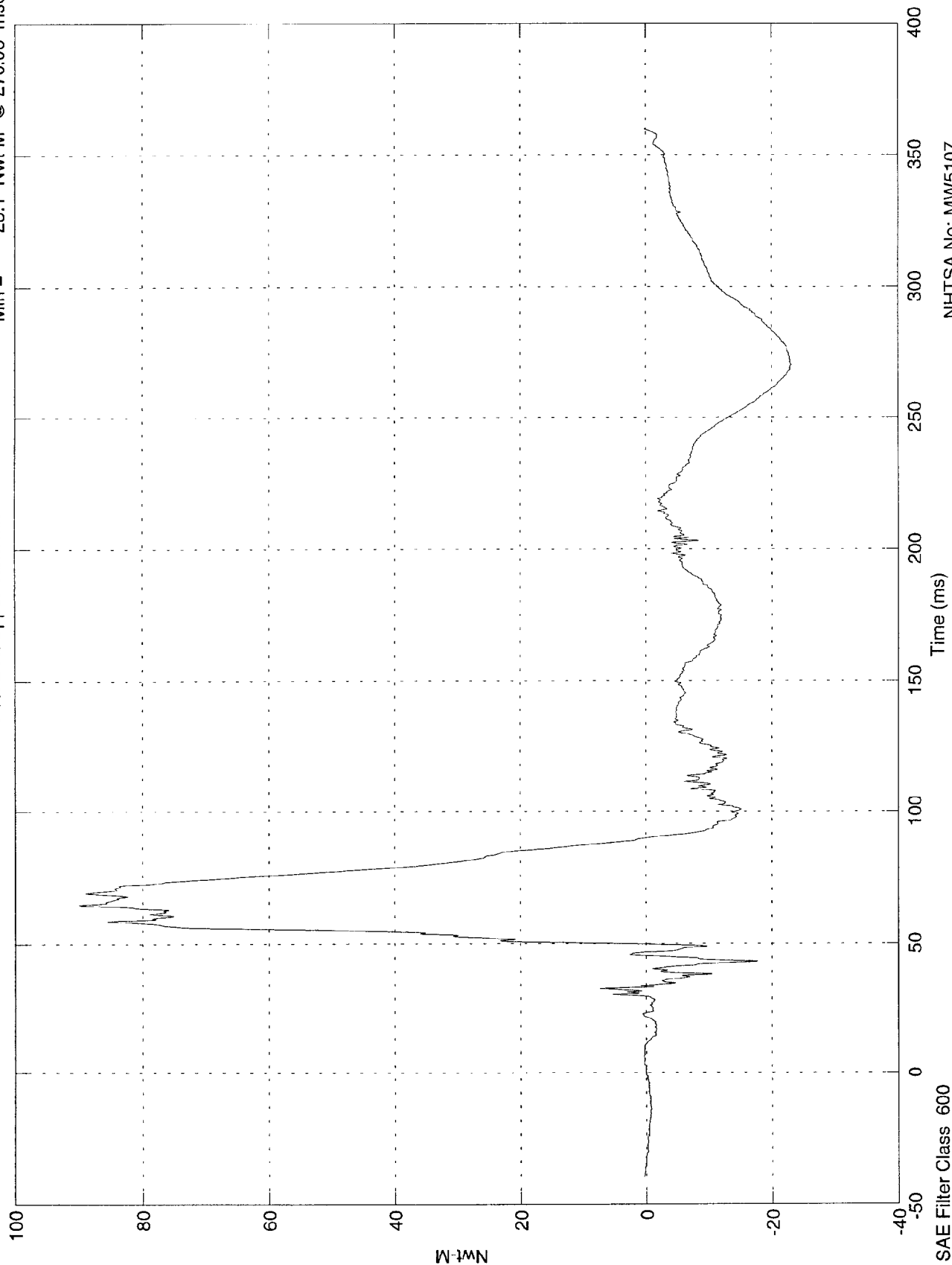
Nwt-M

Time (ms)

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 89.9 Nwt-M @ 64.70 msec  
 Min = -23.1 Nwt-M @ 270.00 msec

Pos. 2 Rt Upper Tibia Mx



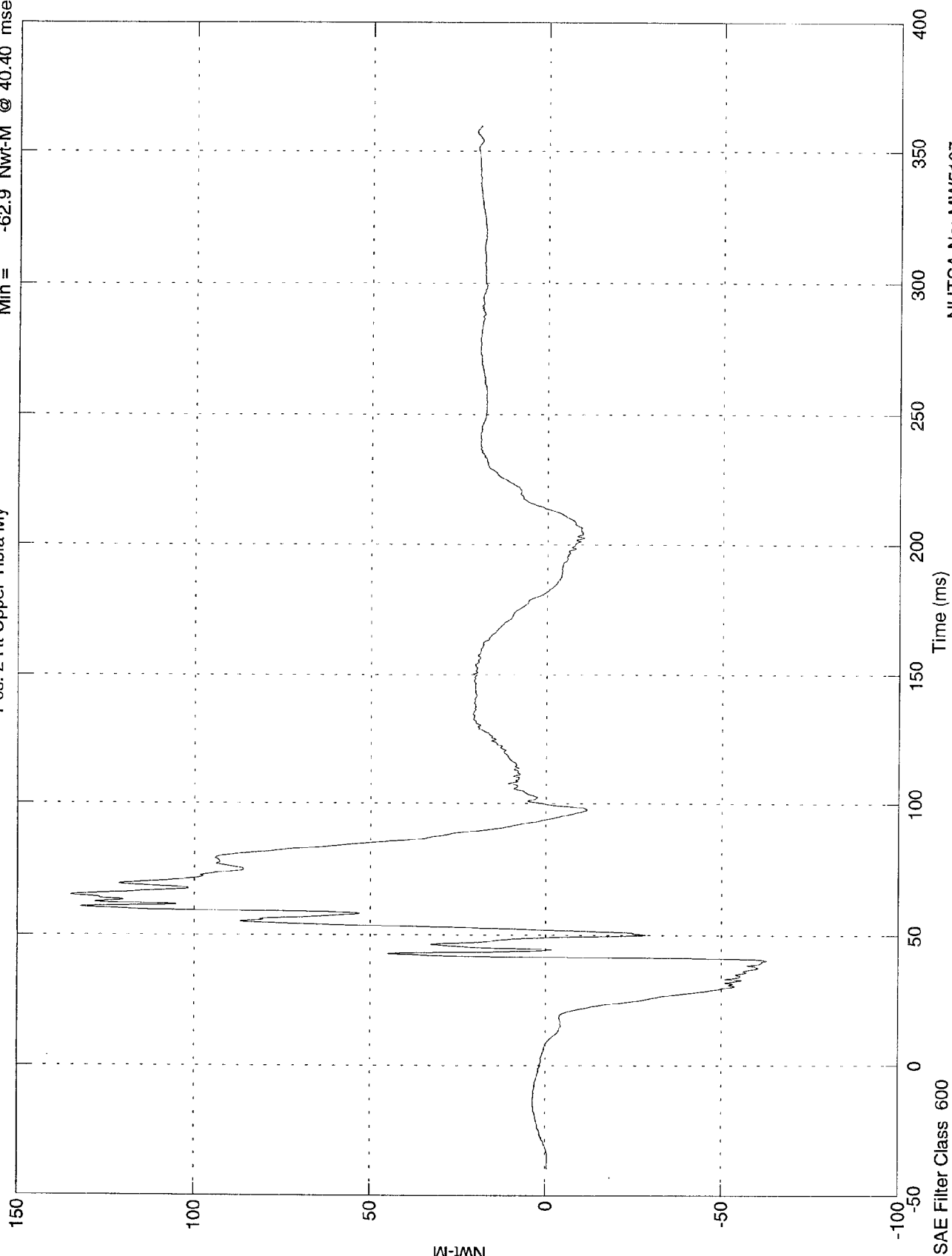
NHTSA No: MW5107  
 Date: 15 Dec 1997

SAE Filter Class 600

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 135 Nwt-M @ 65.10 msec  
 Min = -62.9 Nwt-M @ 40.40 msec

Pos. 2 Rt Upper Tibia My

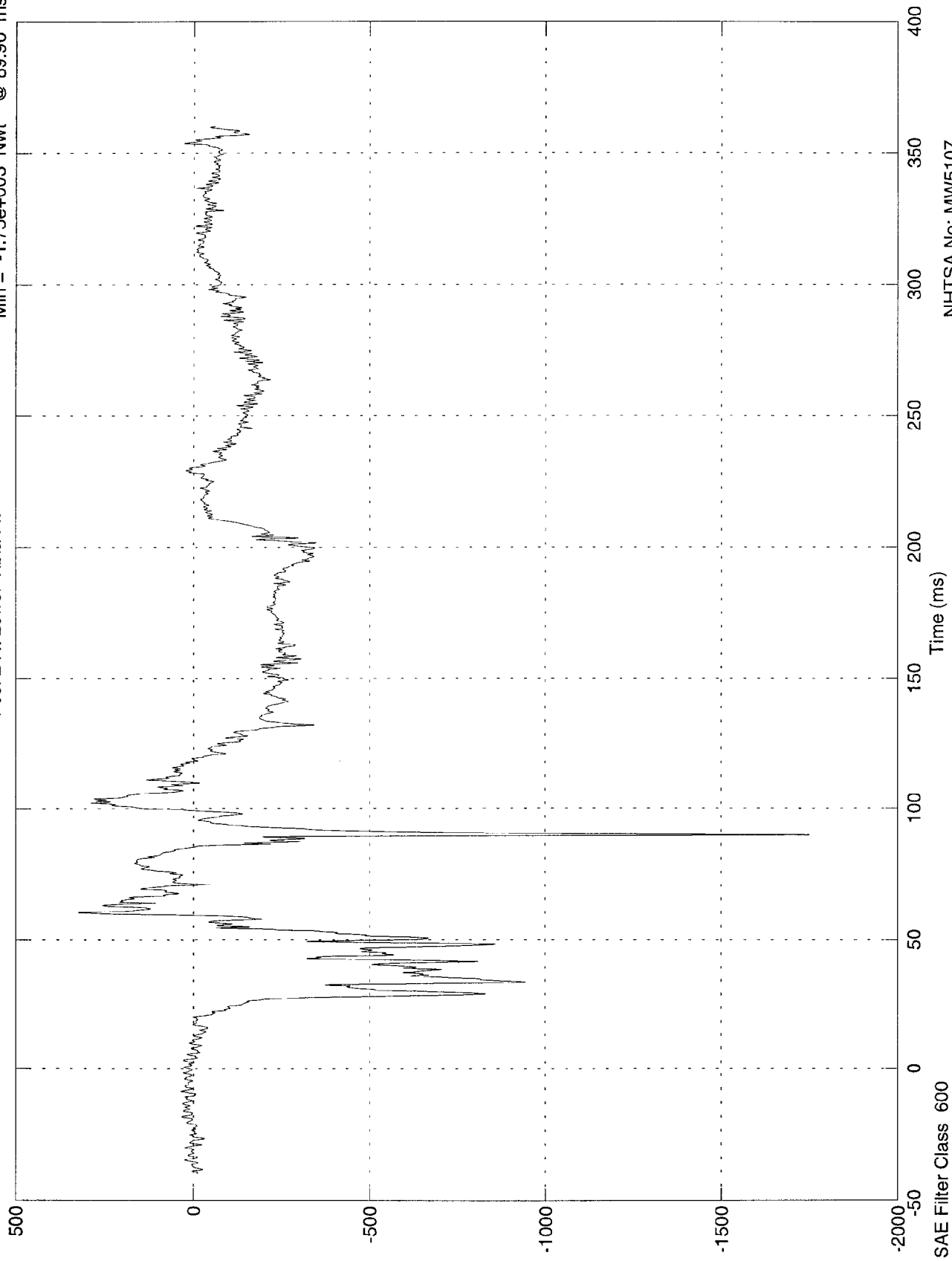


NHTSA No: MW5107  
 Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 323 Nwt @ 60.20 msec  
Min = -1.75e+003 Nwt @ 89.90 msec

Pos. 2 Rt Lower Tibia Fx

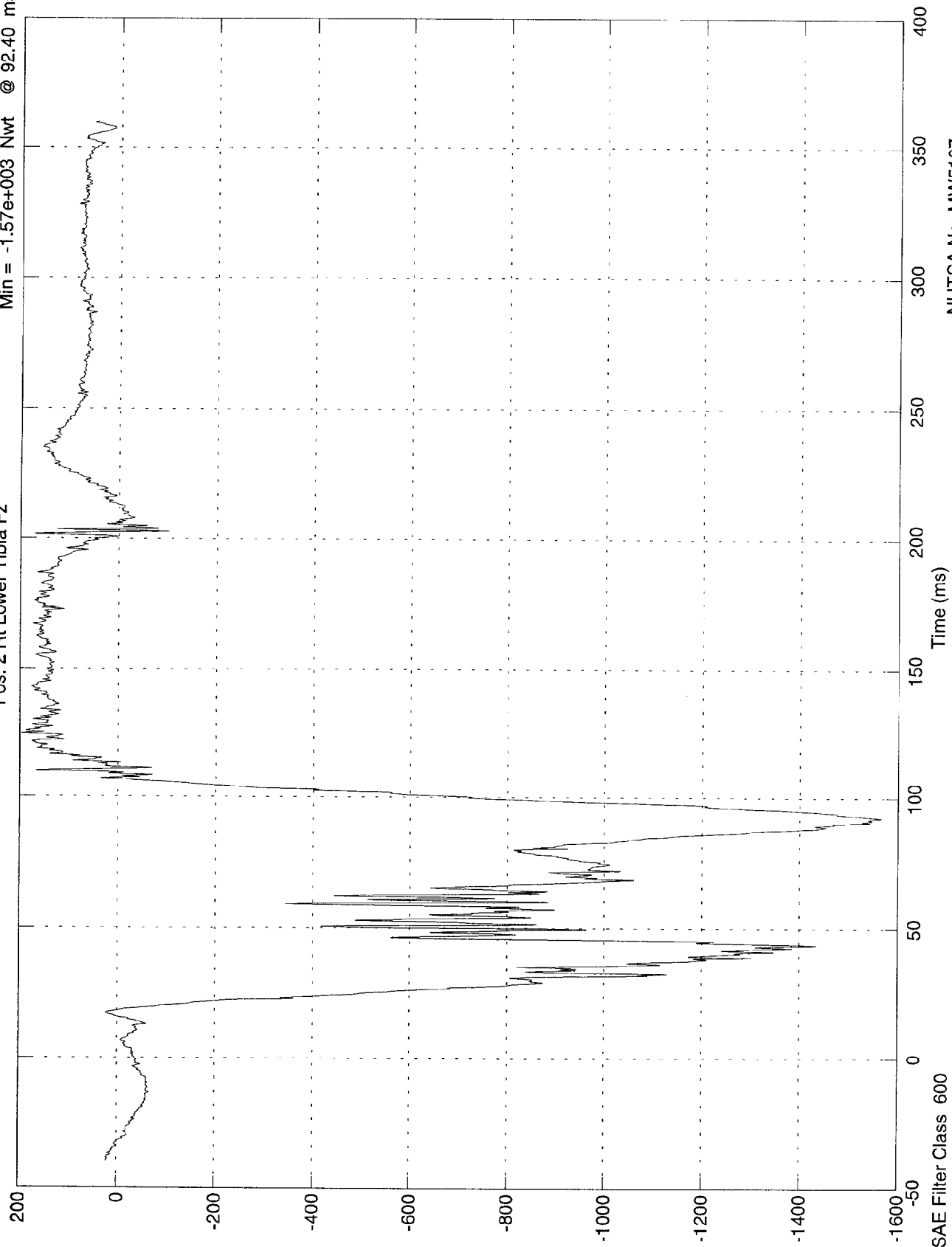


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 197 Nwt @ 124.30 msec  
Min = -1.57e+003 Nwt @ 92.40 msec

Pos. 2 Rt Lower Tibia Fz

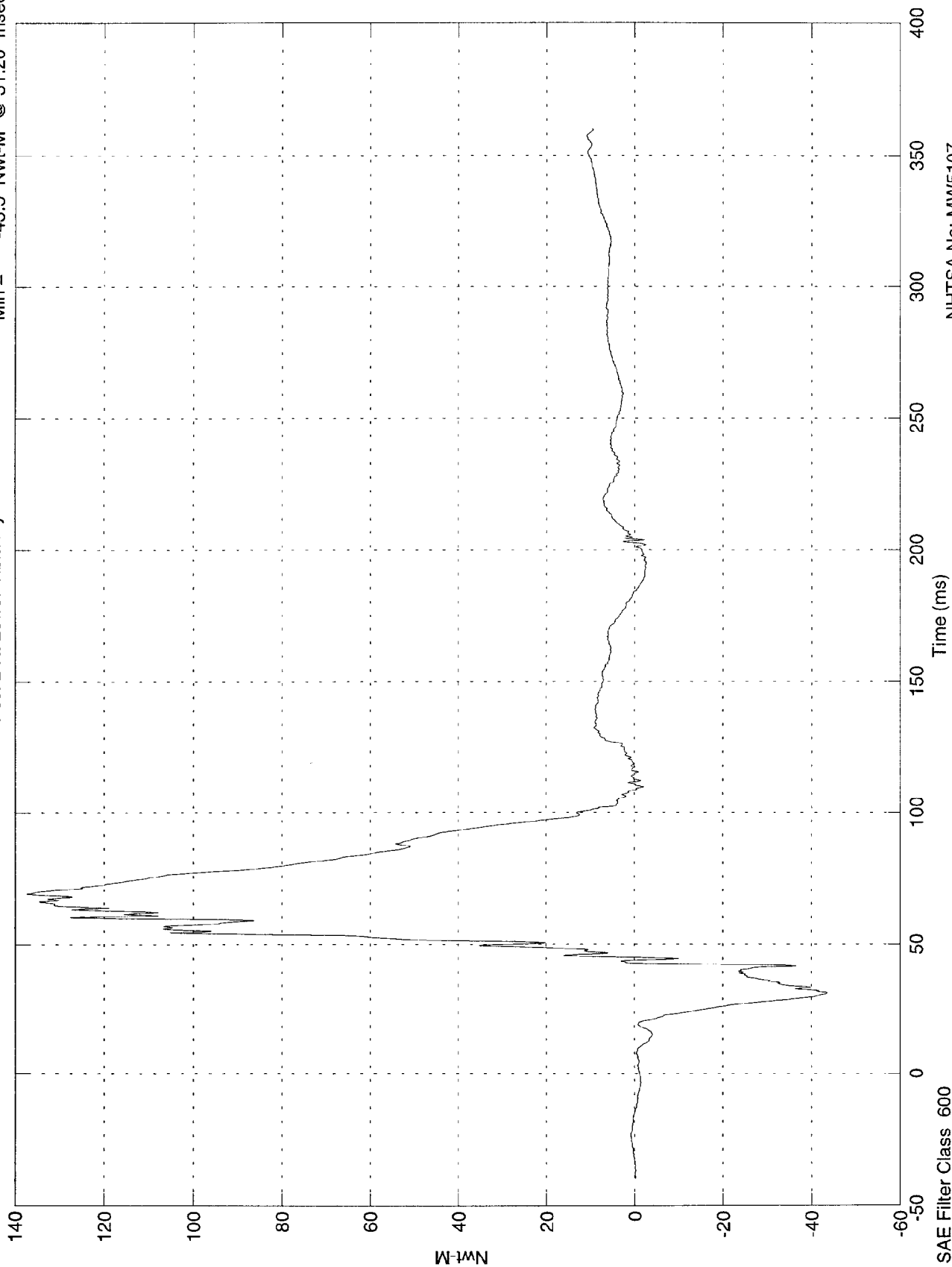


NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 137 Nwt-M @ 69.00 msec  
 Min = -43.5 Nwt-M @ 31.20 msec

Pos. 2 Rt Lower Tibia My



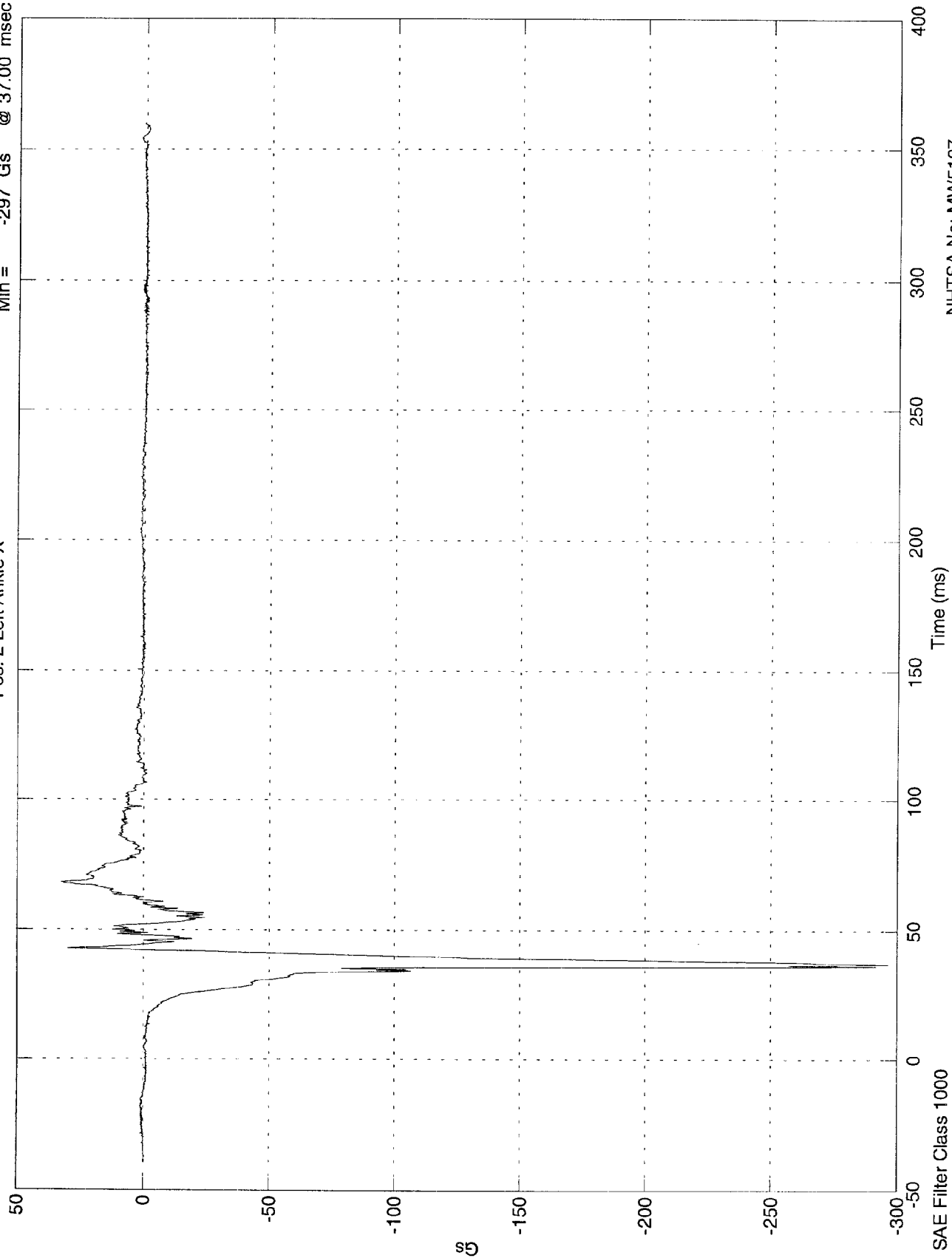
NHTSA No: MW5107  
 Date: 15 Dec 1997

SAE Filter Class 600

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 32.5 Gs @ 68.10 msec  
Min = -297 Gs @ 37.00 msec

Pos. 2 Left Ankle X

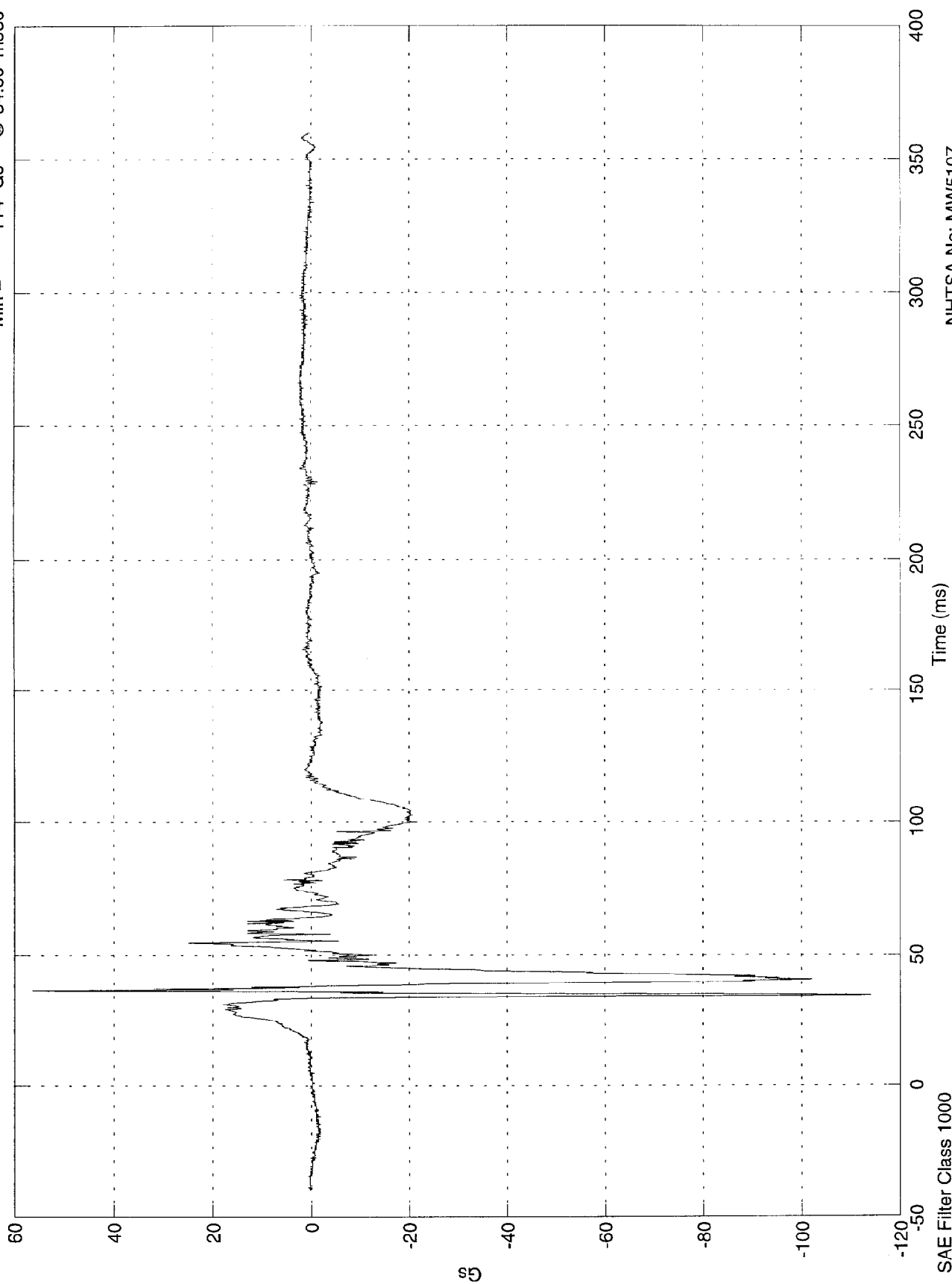


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 56.3 Gs @ 36.50 msec  
Min = -114 Gs @ 34.60 msec

Pos. 2 Left Ankle Z



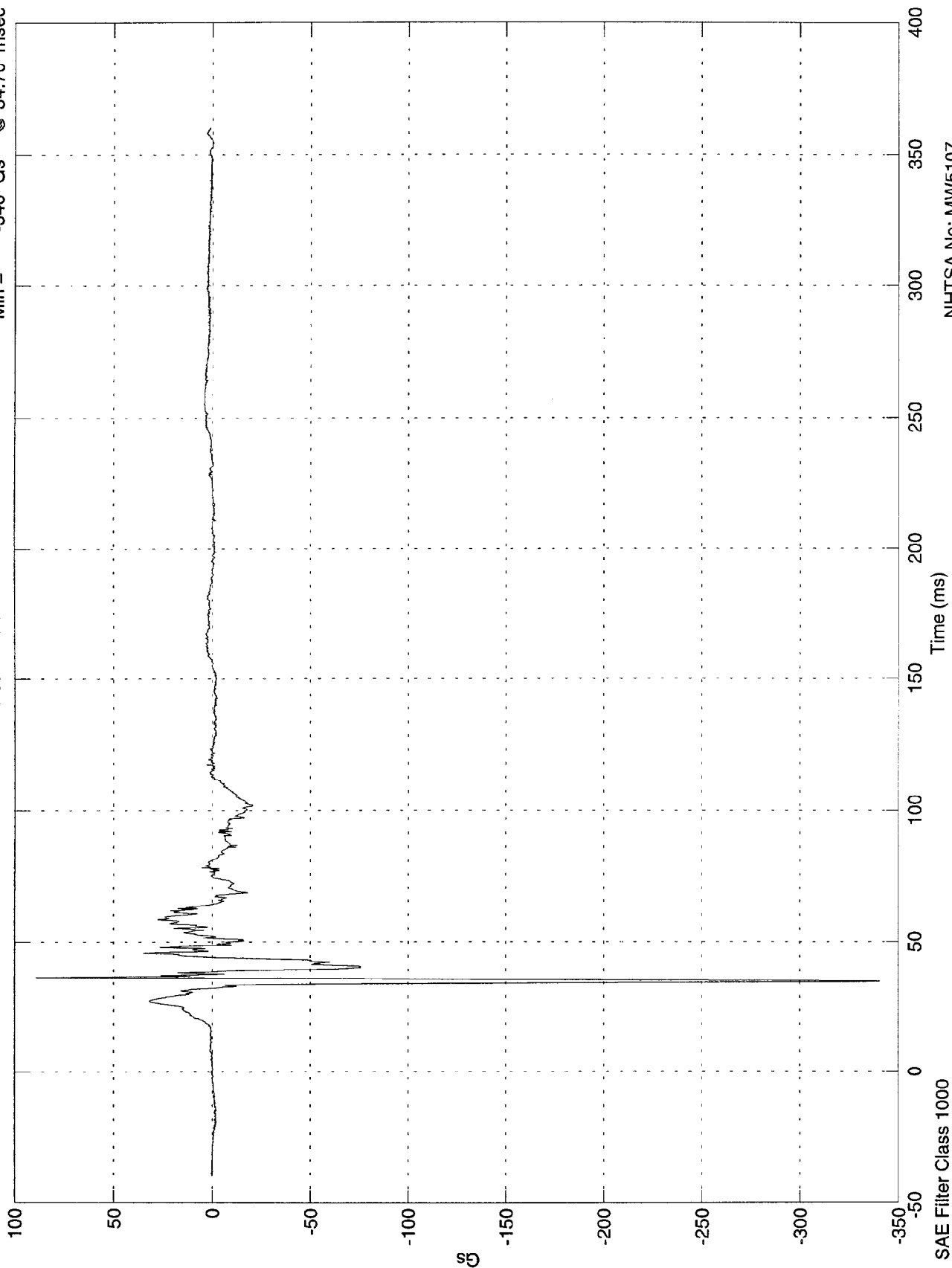
SAE Filter Class 1000

NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 89.2 Gs @ 36.50 msec  
Min = -340 Gs @ 34.70 msec

Pos. 2 Left Toe Z

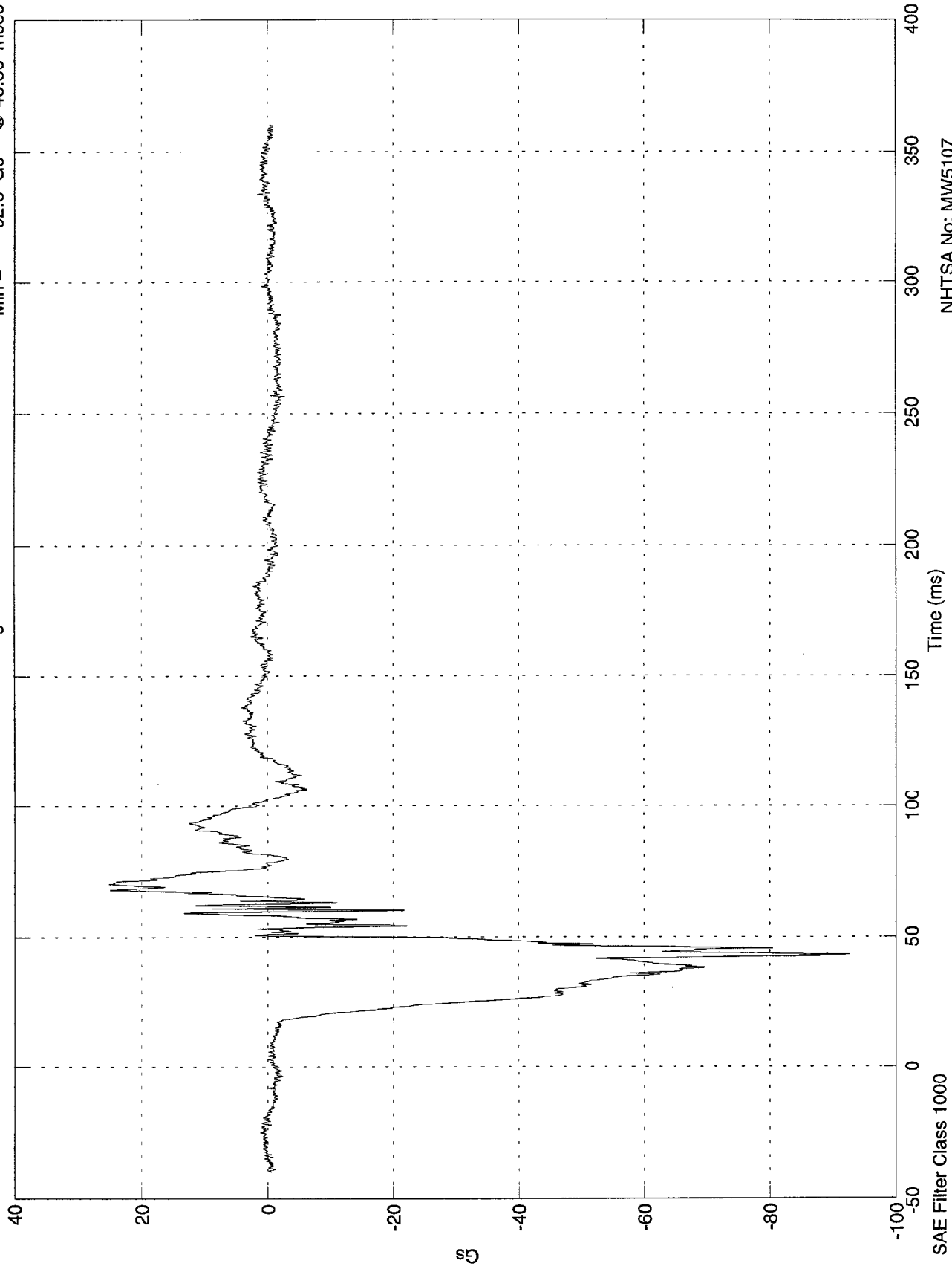


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 25.2 Gs @ 70.10 msec  
Min = -92.6 Gs @ 43.30 msec

Pos. 2 Right Ankle X

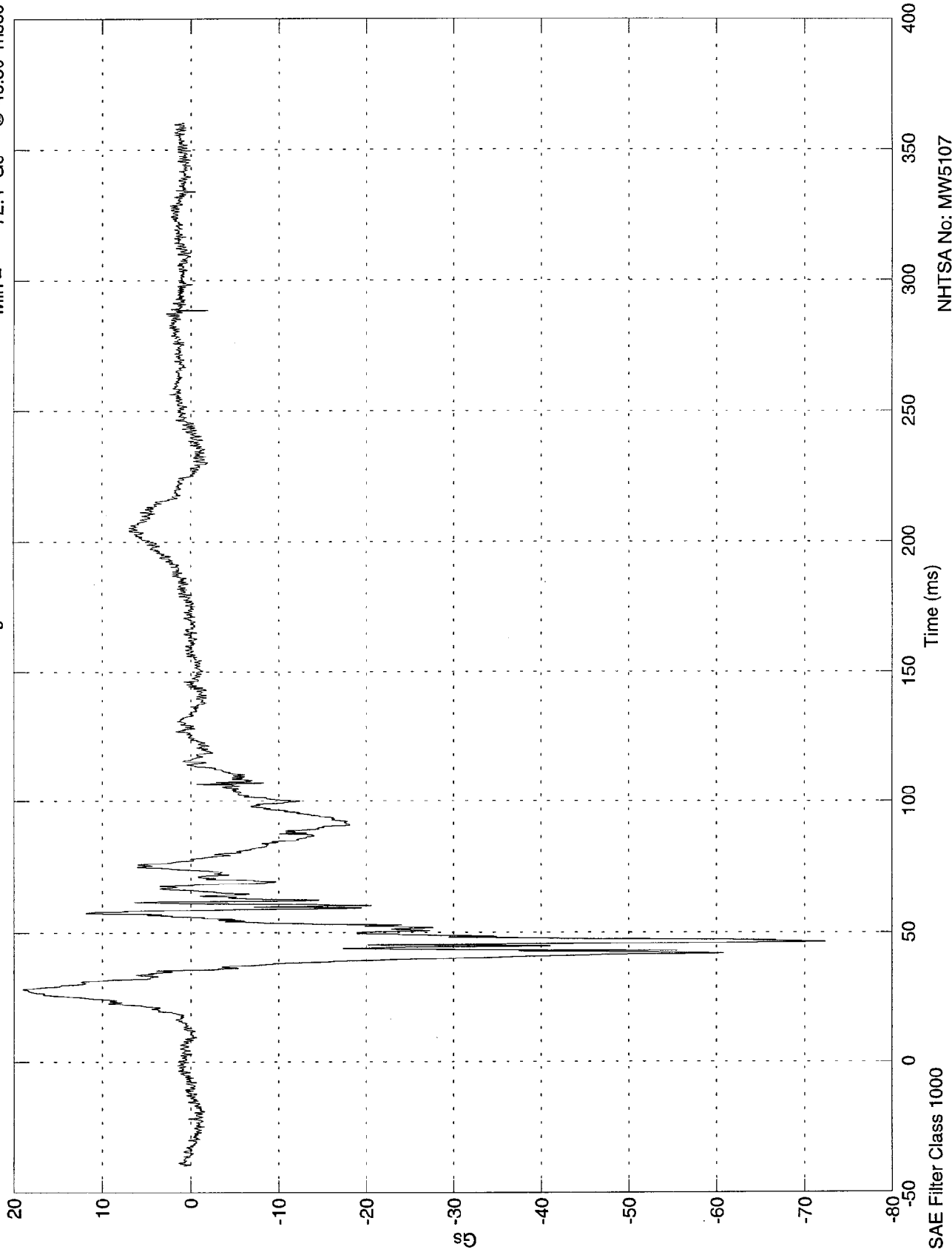


NHTSA No: MW5107  
Date: 17 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 18.9 Gs @ 27.90 msec  
Min = -72.4 Gs @ 46.50 msec

Pos. 2 Right Ankle Z

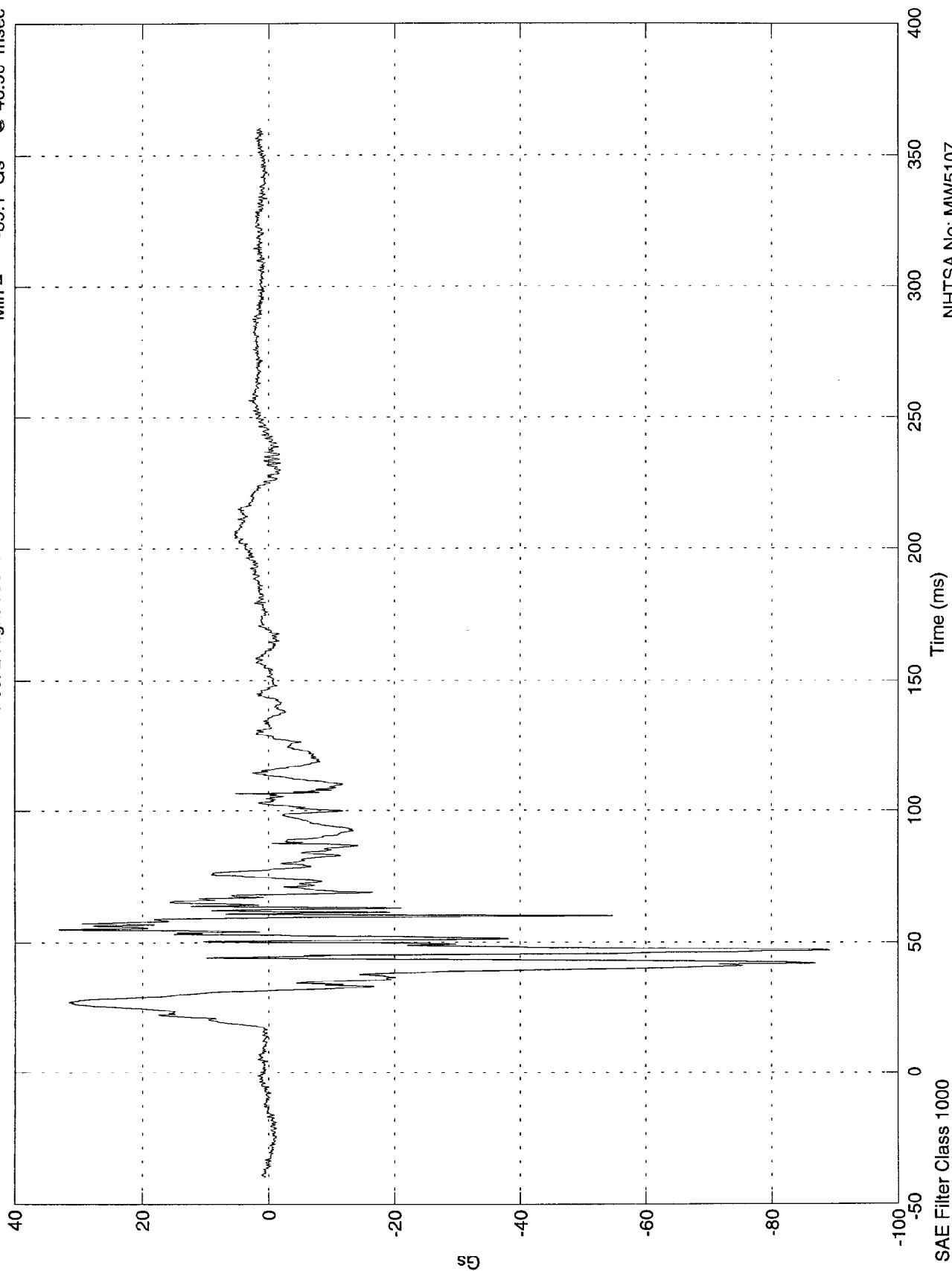


NHTSA No: MW5107  
Date: 17 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 33.1 Gs @ 55.00 msec  
 Min = -89.1 Gs @ 46.90 msec

Pos. 2 Right Toe Z

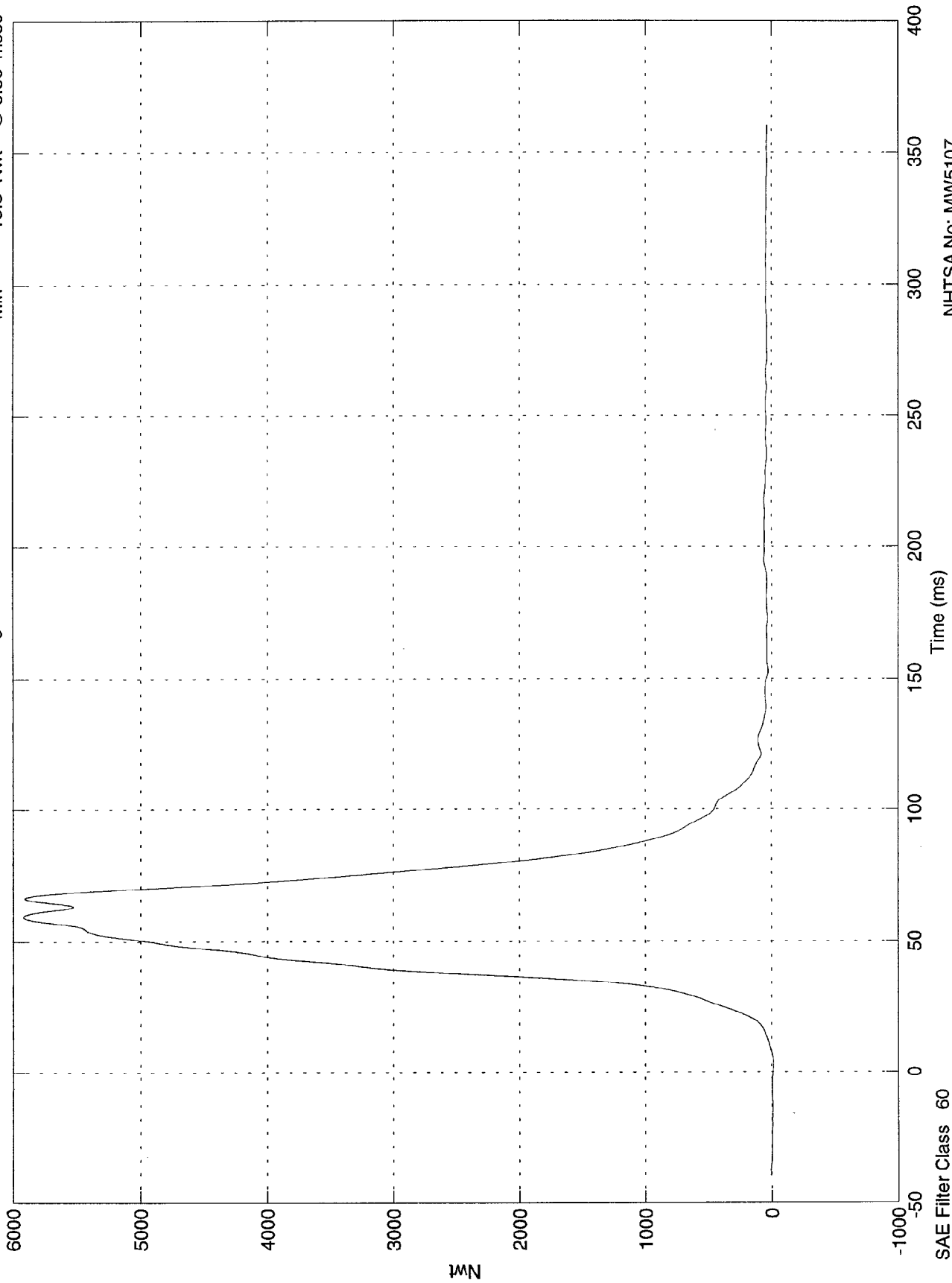


NHTSA No: MW5107  
 Date: 17 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Pos. 2 Right Belt Load

Max = 5.92e+003 Nwt @ 59.30 msec  
Min = -15.3 Nwt @ 3.30 msec

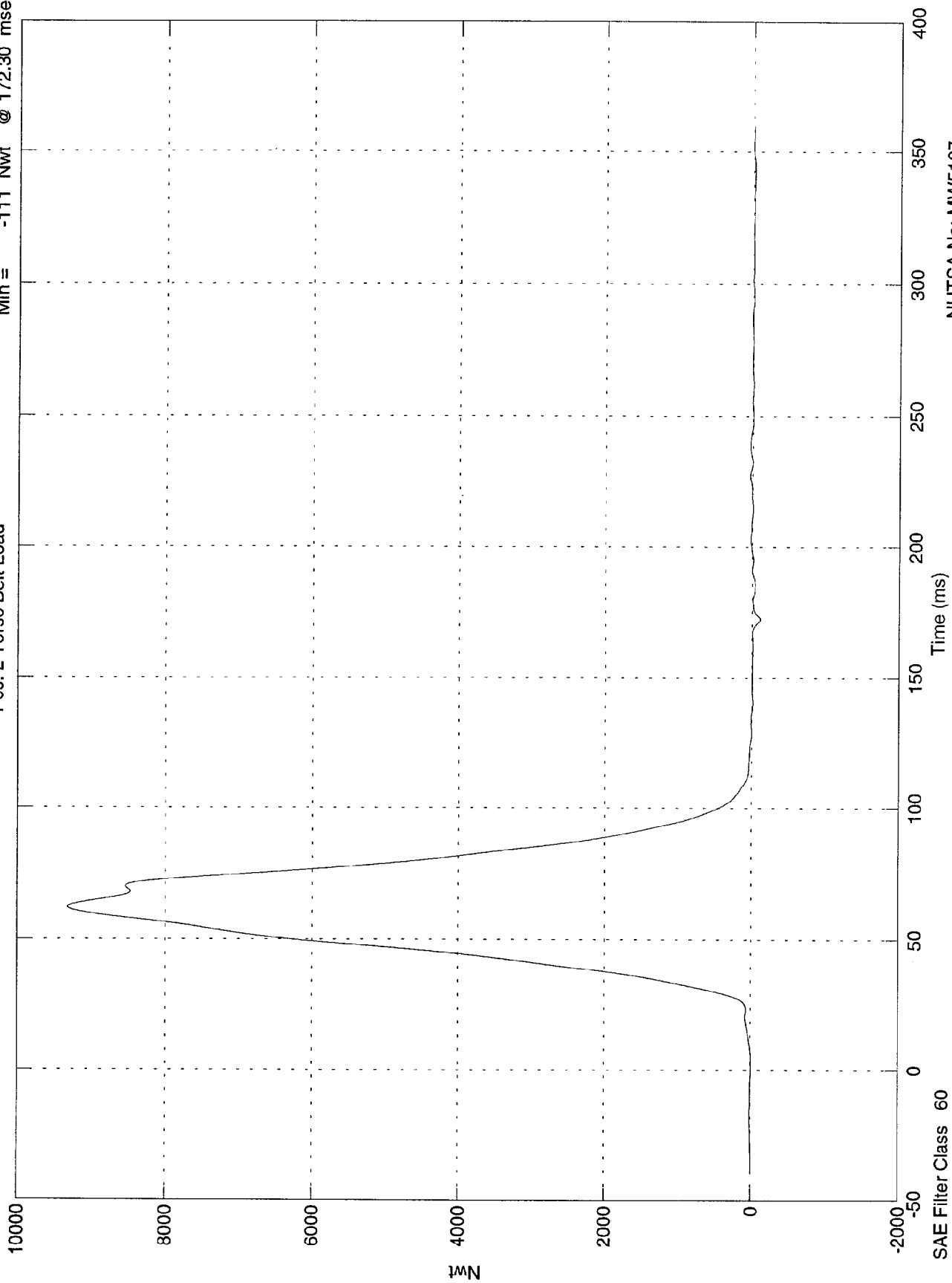


NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 9.32e+003 Nwt @ 61.90 msec  
 Min = -111 Nwt @ 172.30 msec

Pos. 2 Torso Belt Load

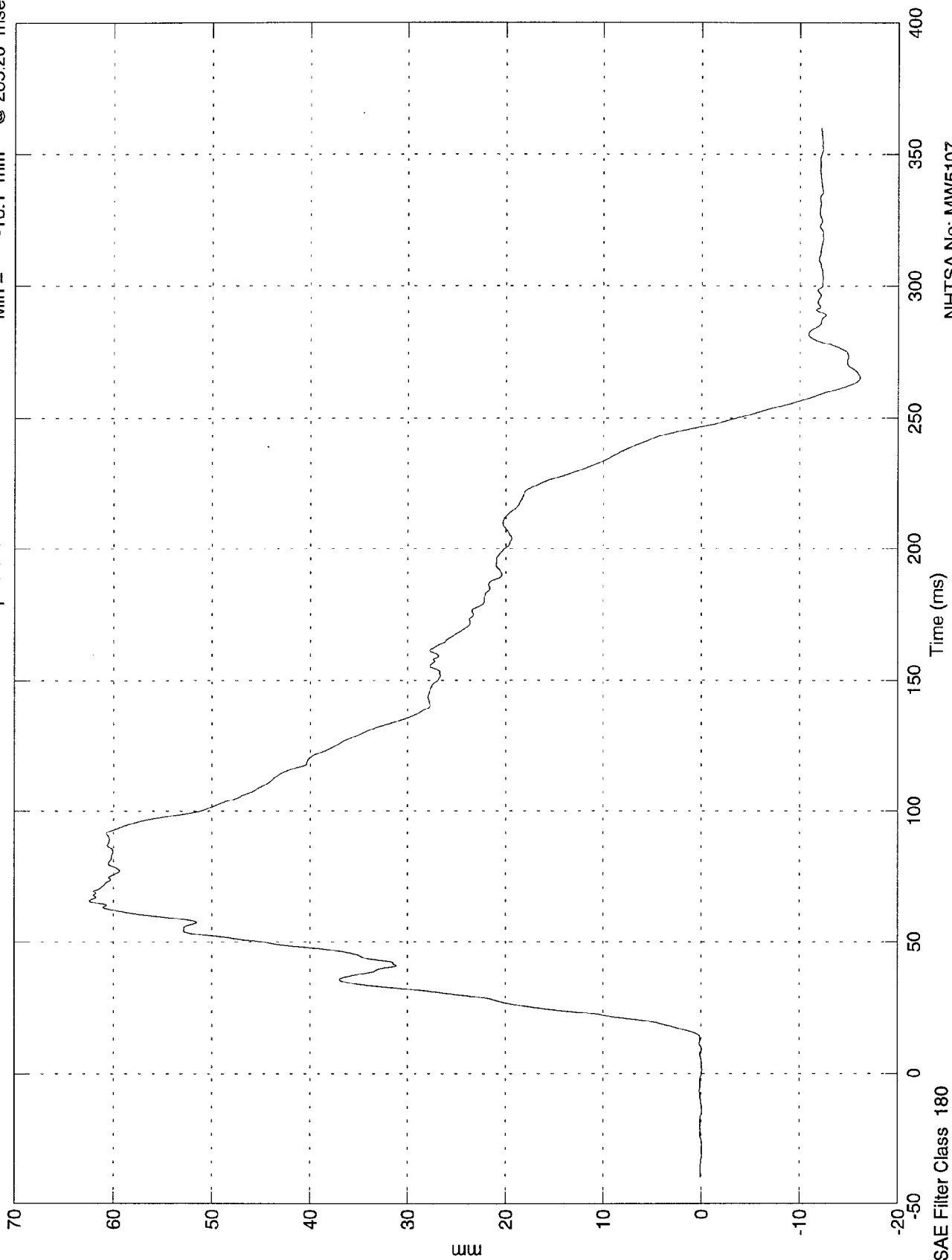


NHTSA No: MW5107  
 Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 62.4 mm @ 65.50 msec  
Min = -16.1 mm @ 265.20 msec

Pos. 2 Belt Spoolout



NHTSA No: MW5107  
Date: 15 Dec 1997

SAE Filter Class 180

NHTSA TEST NO. MW5107

VEHICLE DATA

FILTER CHANNEL CLASS

Acceleration

60

Velocity

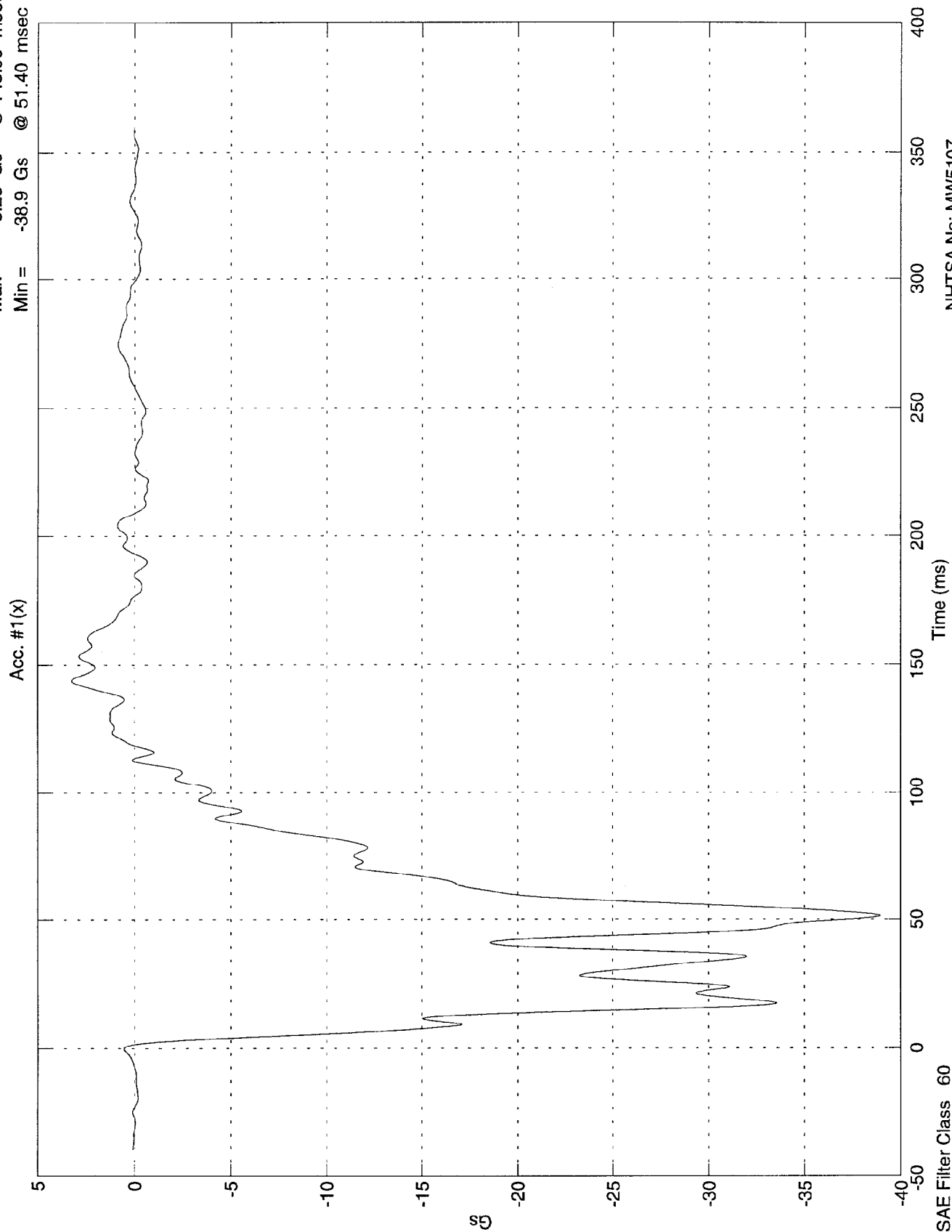
180

Displacement

180

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 3.25 Gs @ 143.90 msec  
 Min = -38.9 Gs @ 51.40 msec



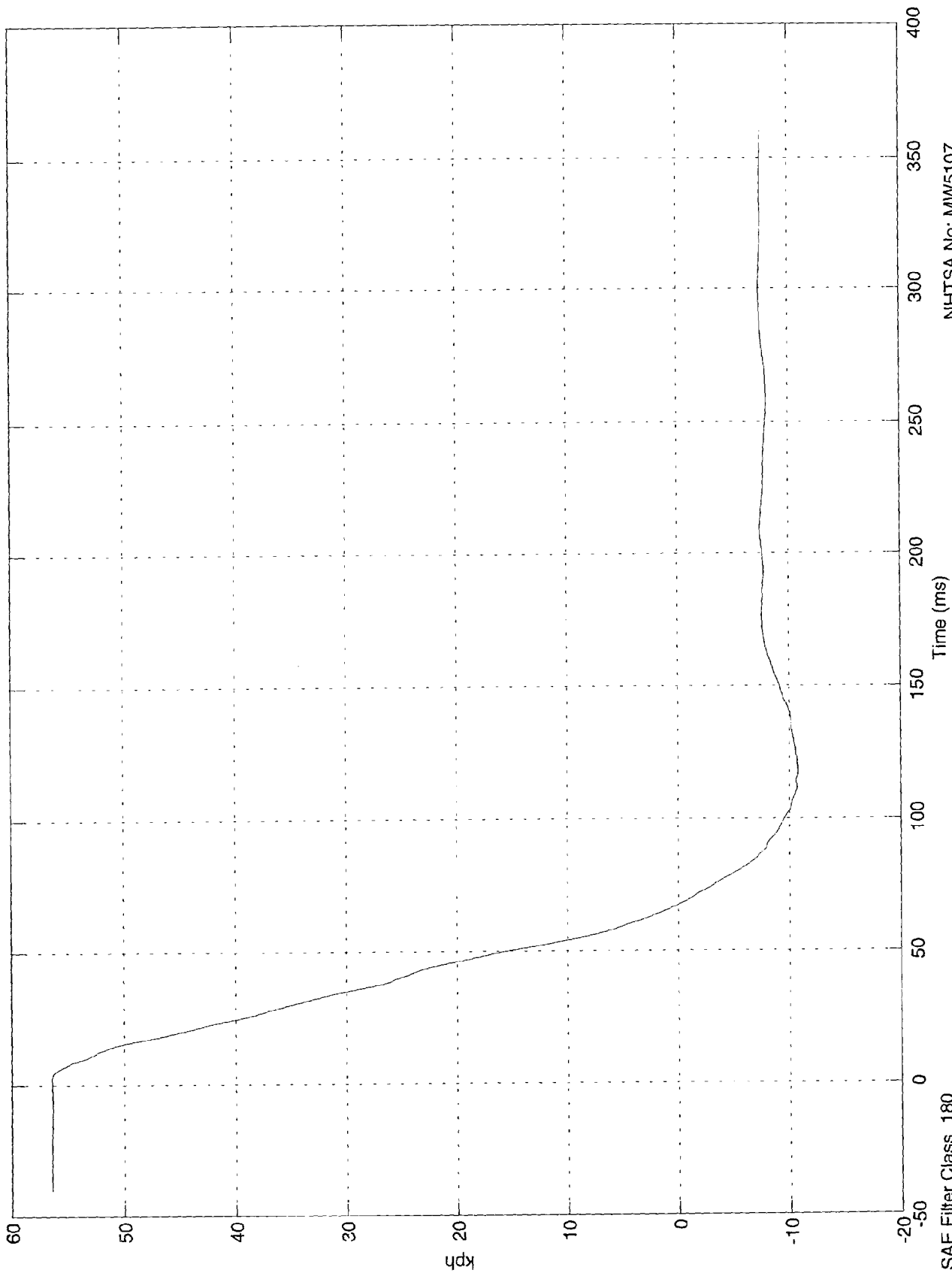
NHTSA No: MW5107  
 Date: 15 Dec 1997

SAE Filter Class 60

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 56.4 kph @ -23.50 msec  
Min = -10.8 kph @ 117.60 msec

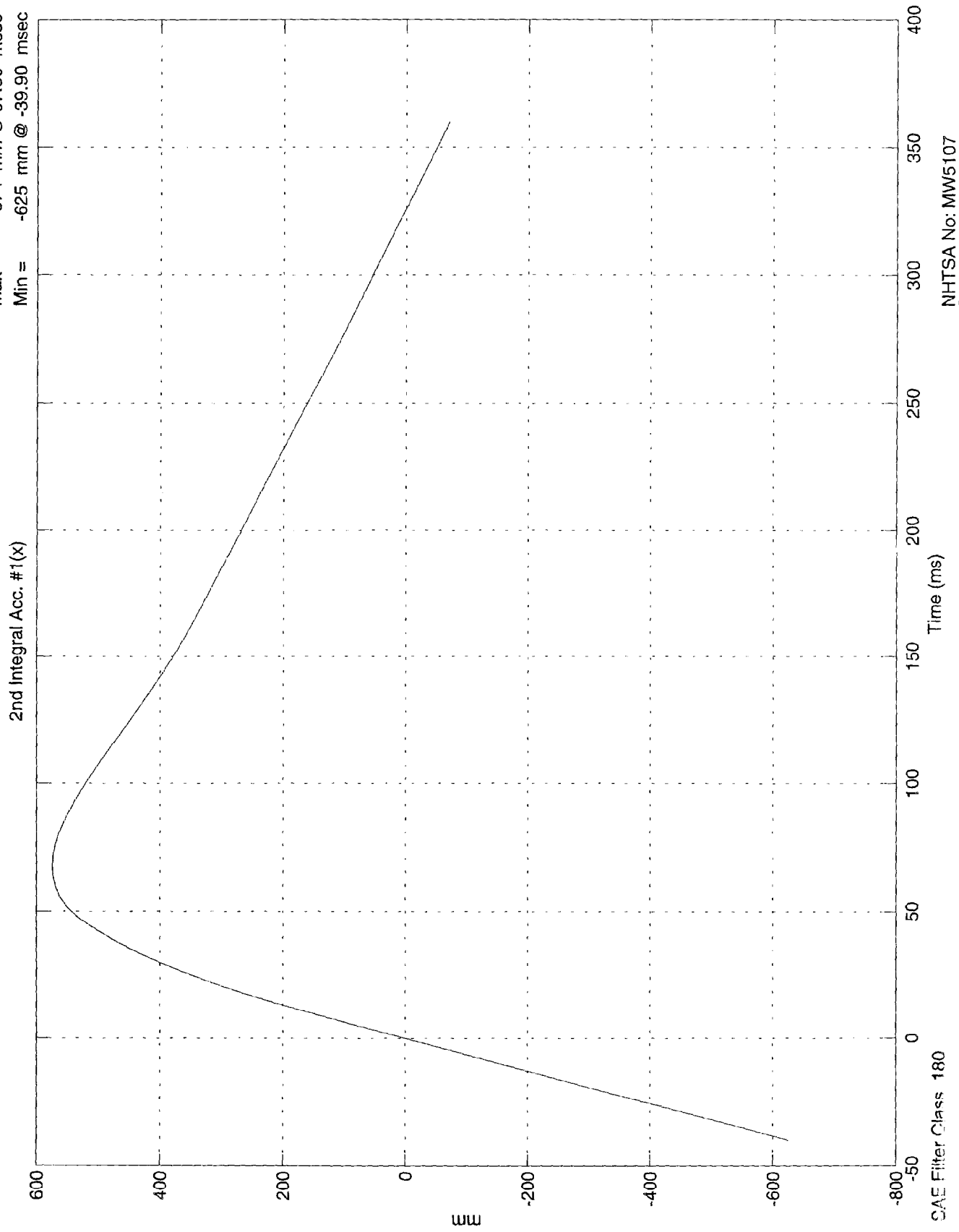
1st Integral Acc. #1(x)



NHTSA No: MWS107  
Date: 15 Dec 1997

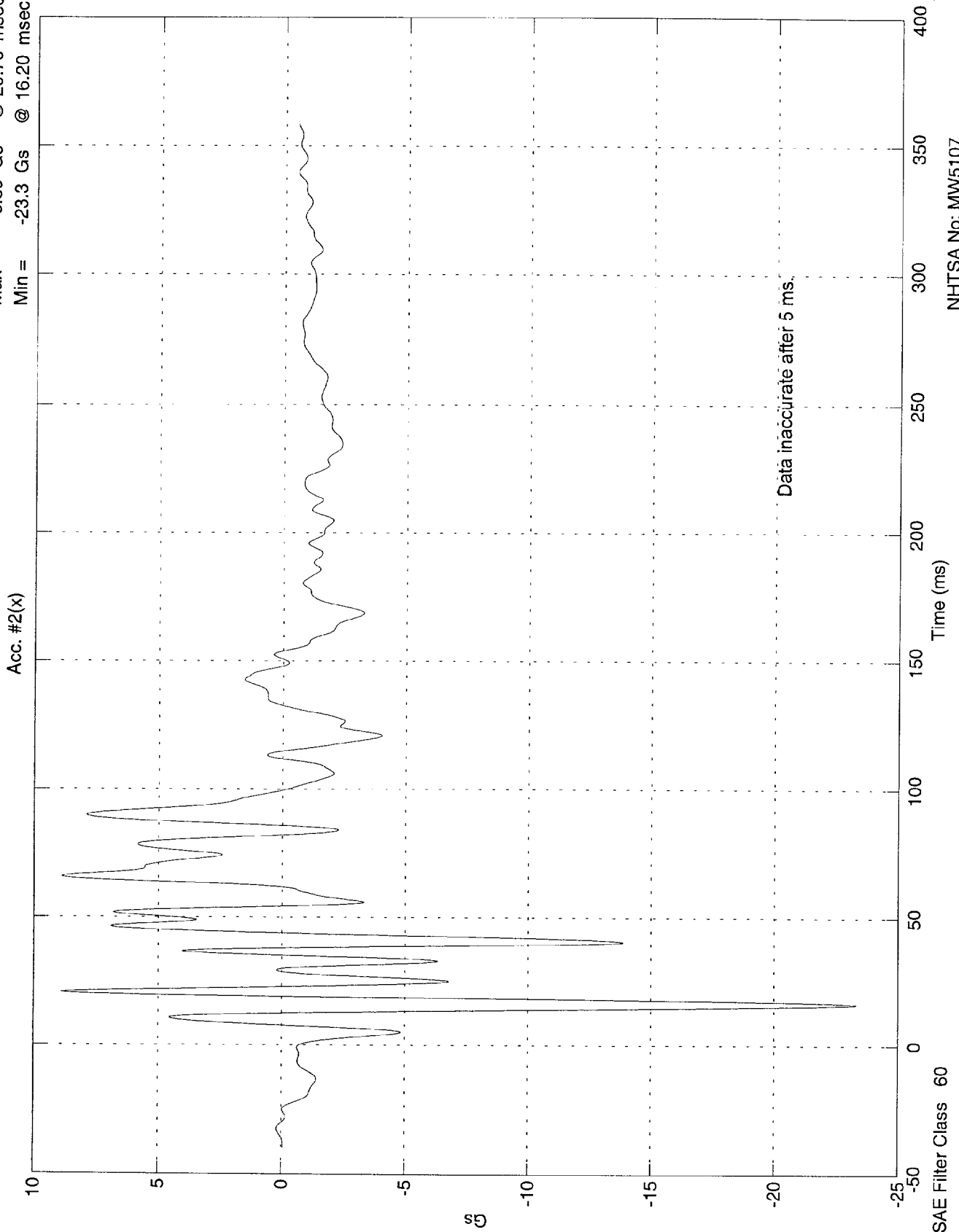
NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 574 mm @ 67.50 msec  
Min = -625 mm @ -39.90 msec



NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

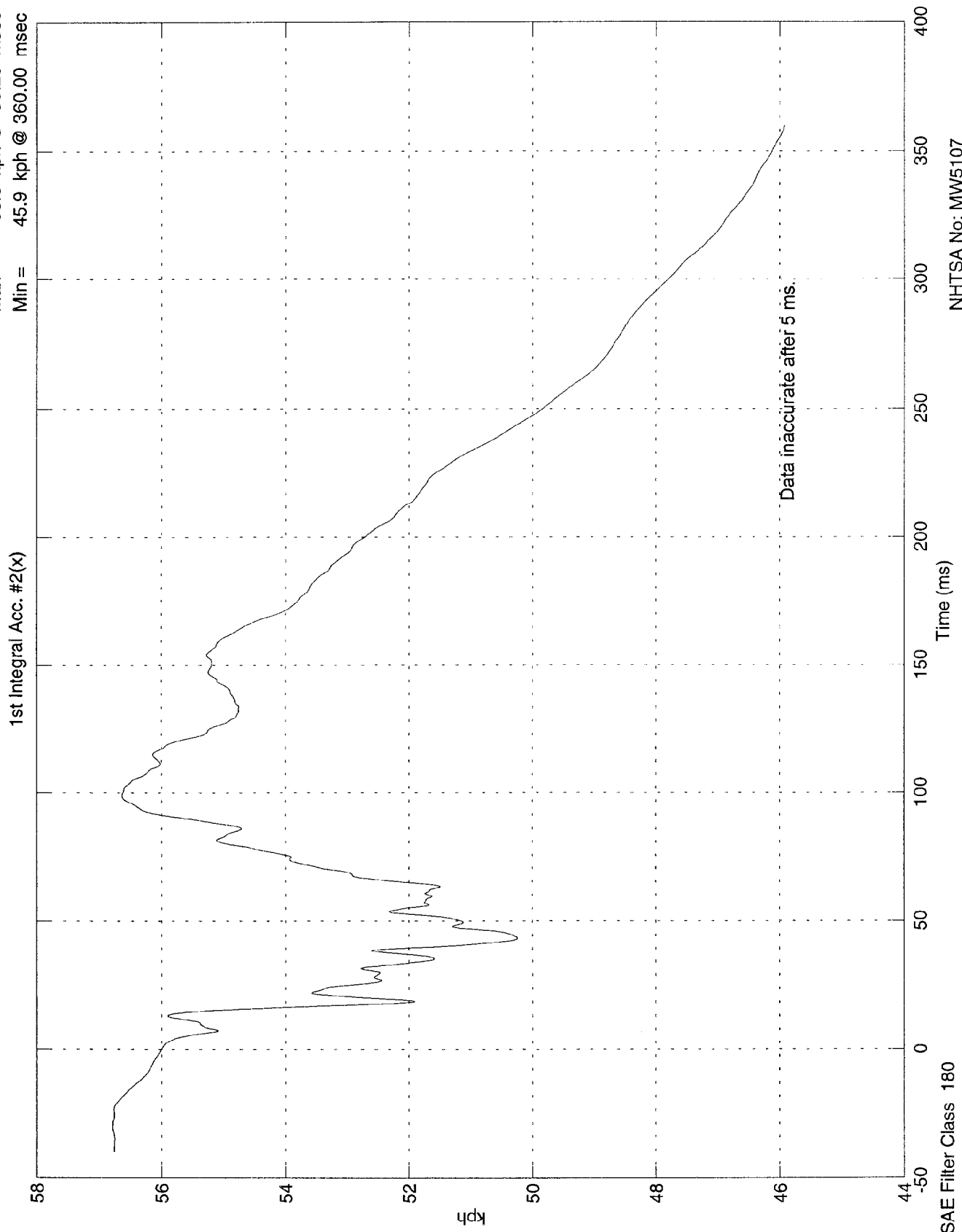
Max = 8.89 Gs @ 20.70 msec  
Min = -23.3 Gs @ 16.20 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

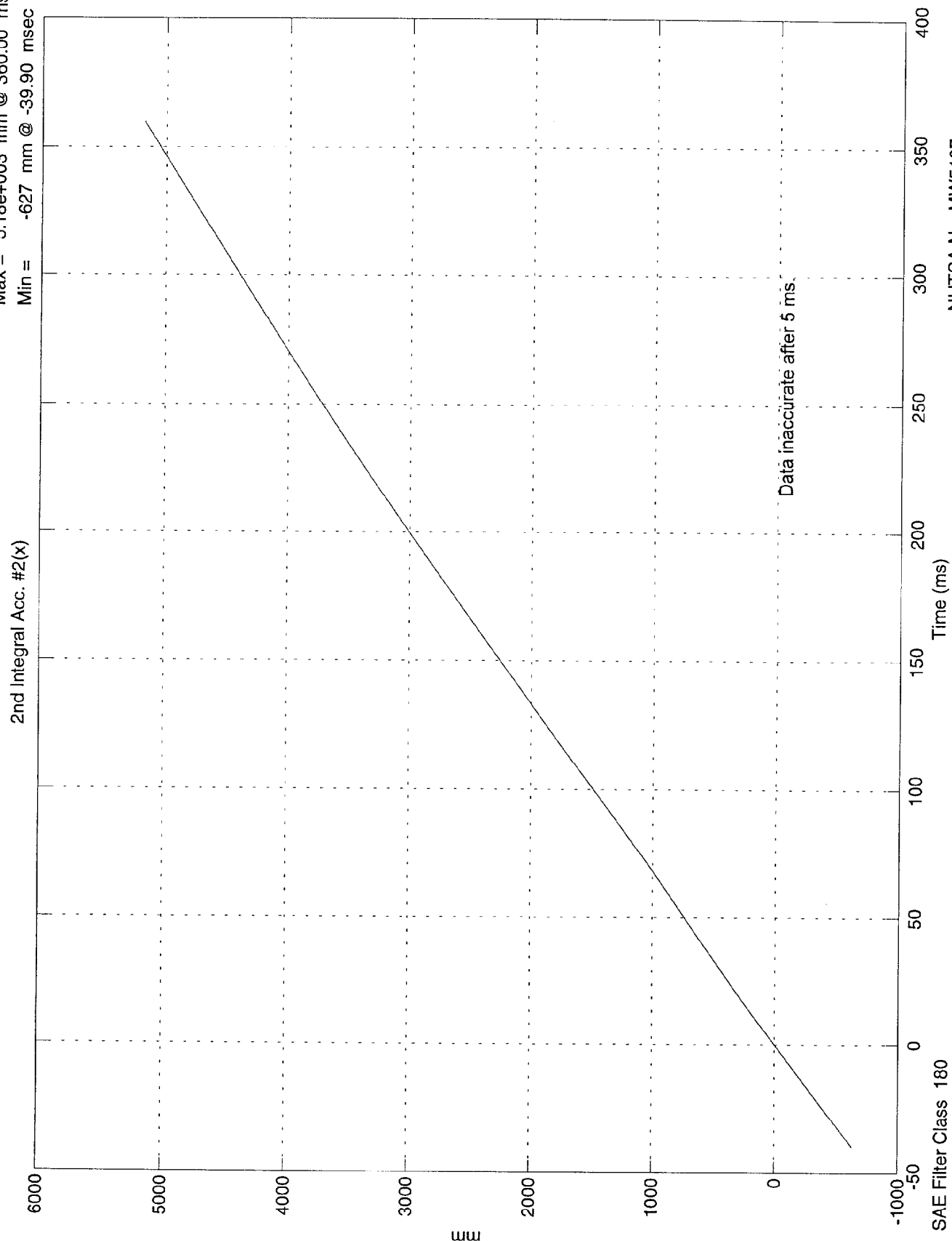
Max = 56.8 kph @ -30.20 msec  
Min = 45.9 kph @ 360.00 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

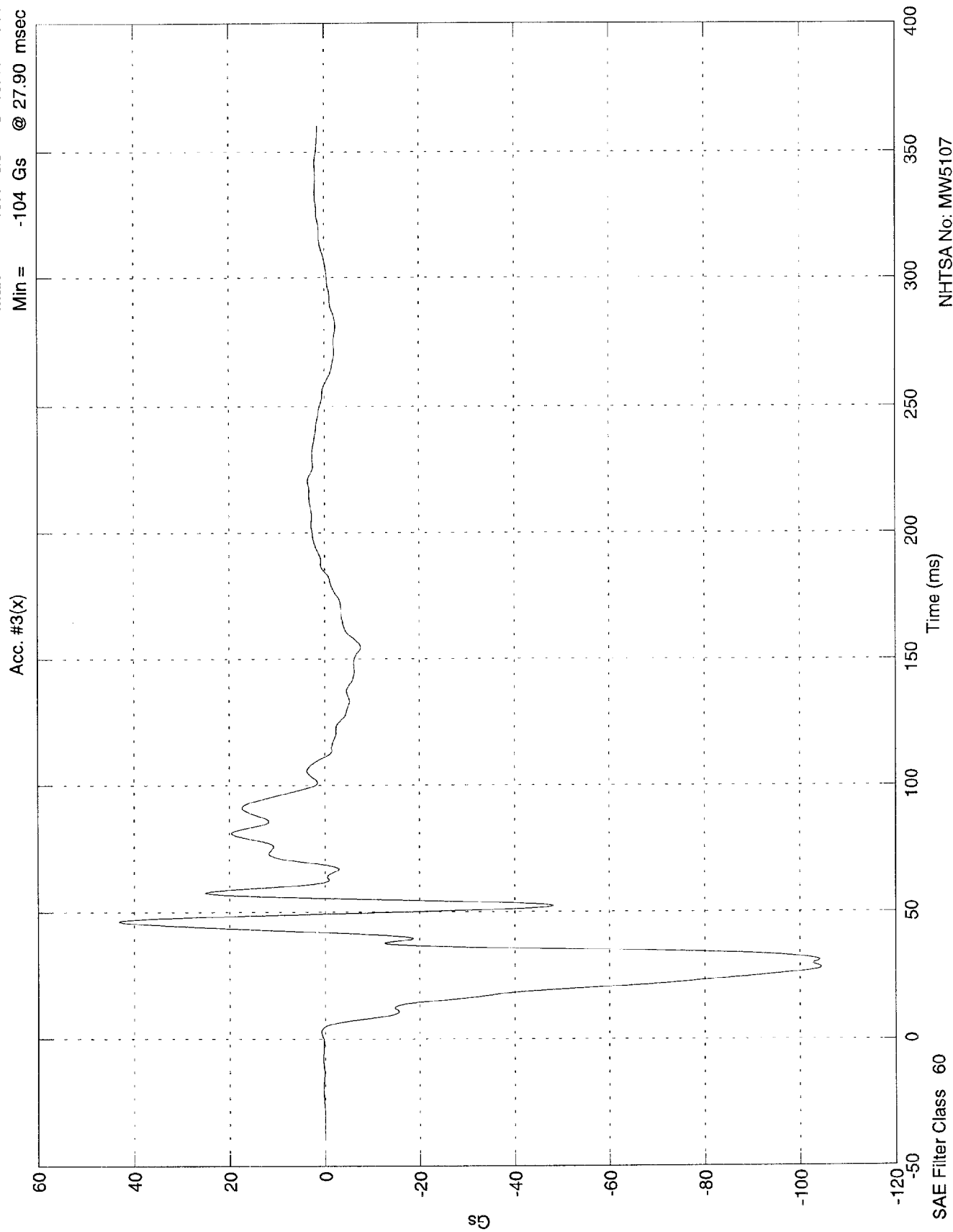
Max = 5.18e+003 mm @ 360.00 msec  
Min = -627 mm @ -39.90 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

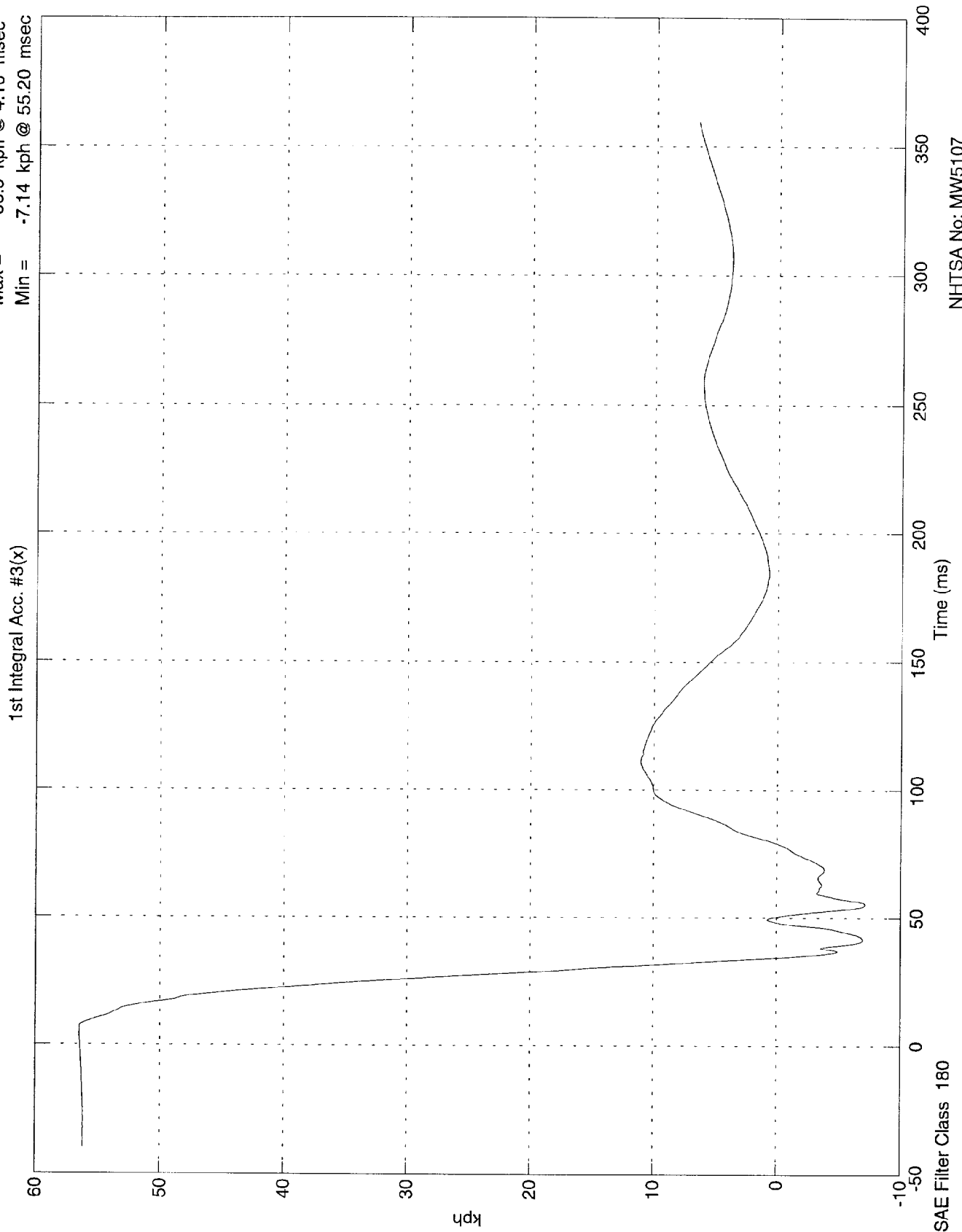
Max = 43.1 Gs @ 46.40 msec  
 Min = -104 Gs @ 27.90 msec



NHTSA No: MW5107  
 Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 56.5 kph @ 4.10 msec  
Min = -7.14 kph @ 55.20 msec

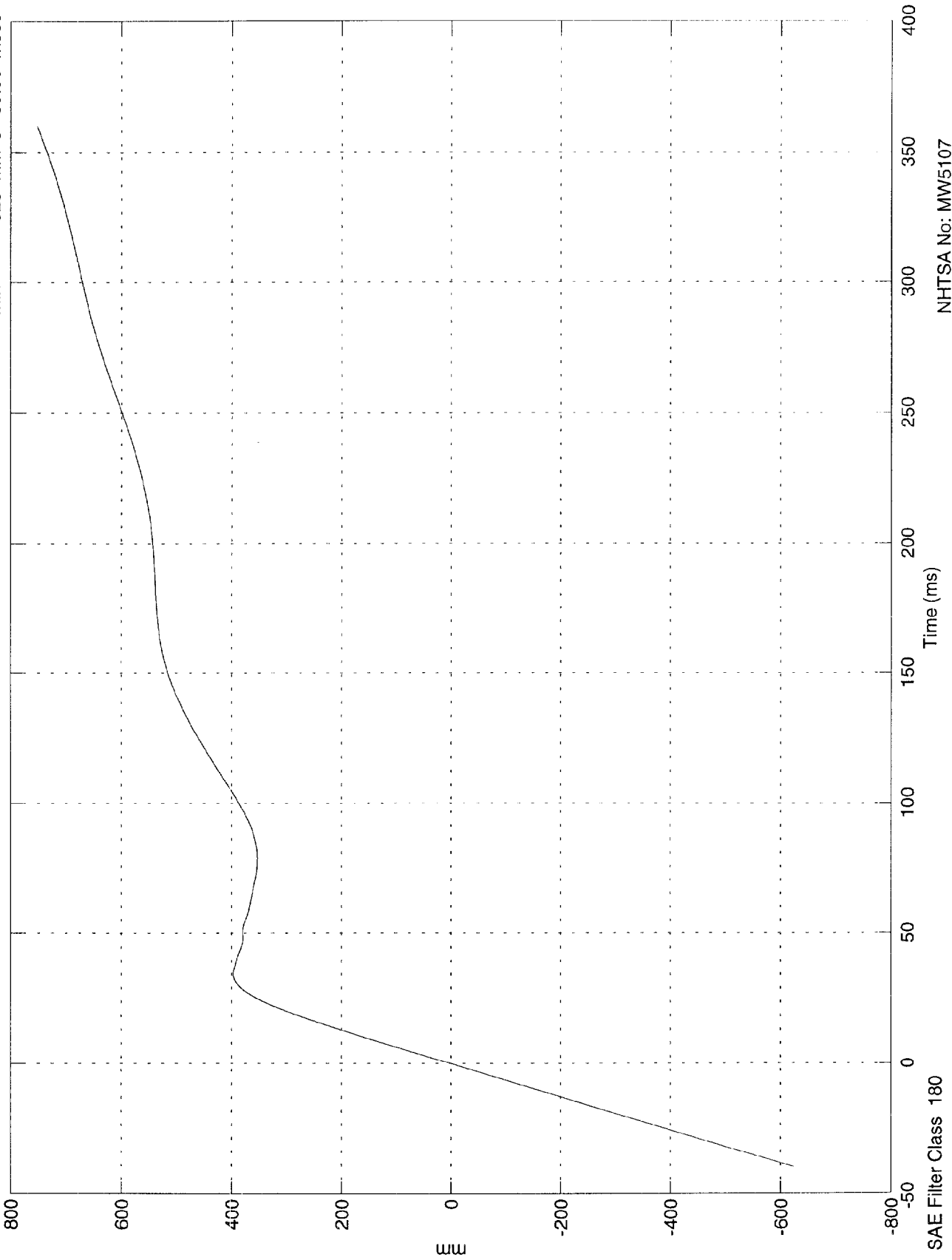


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 752 mm @ 360.00 msec  
Min = -623 mm @ -39.90 msec

2nd Integral Acc. #3(x)

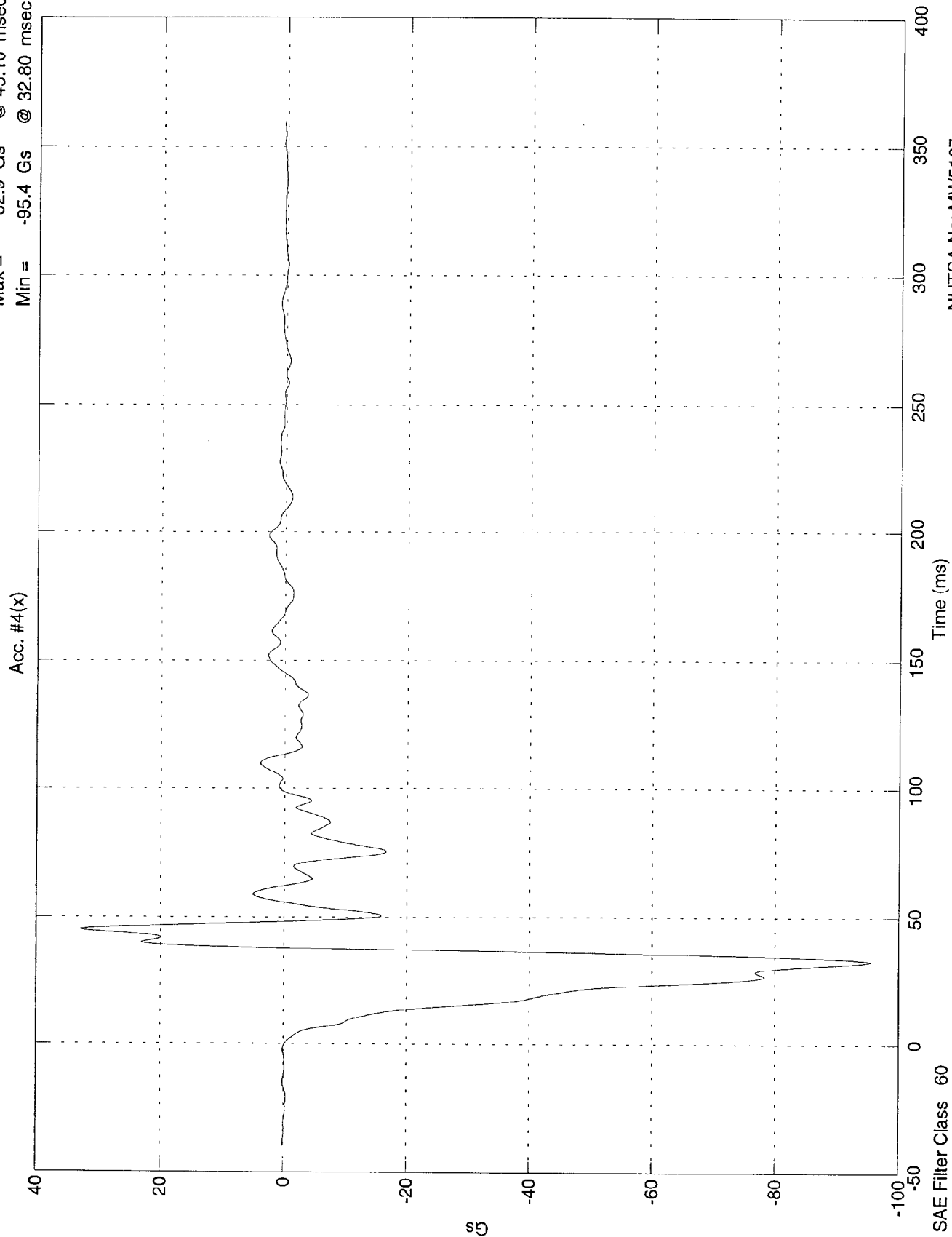


NHTSA No: MW5107  
Date: 15 Dec 1997

SAE Filter Class 180

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 32.9 Gs @ 45.10 msec  
 Min = -95.4 Gs @ 32.80 msec

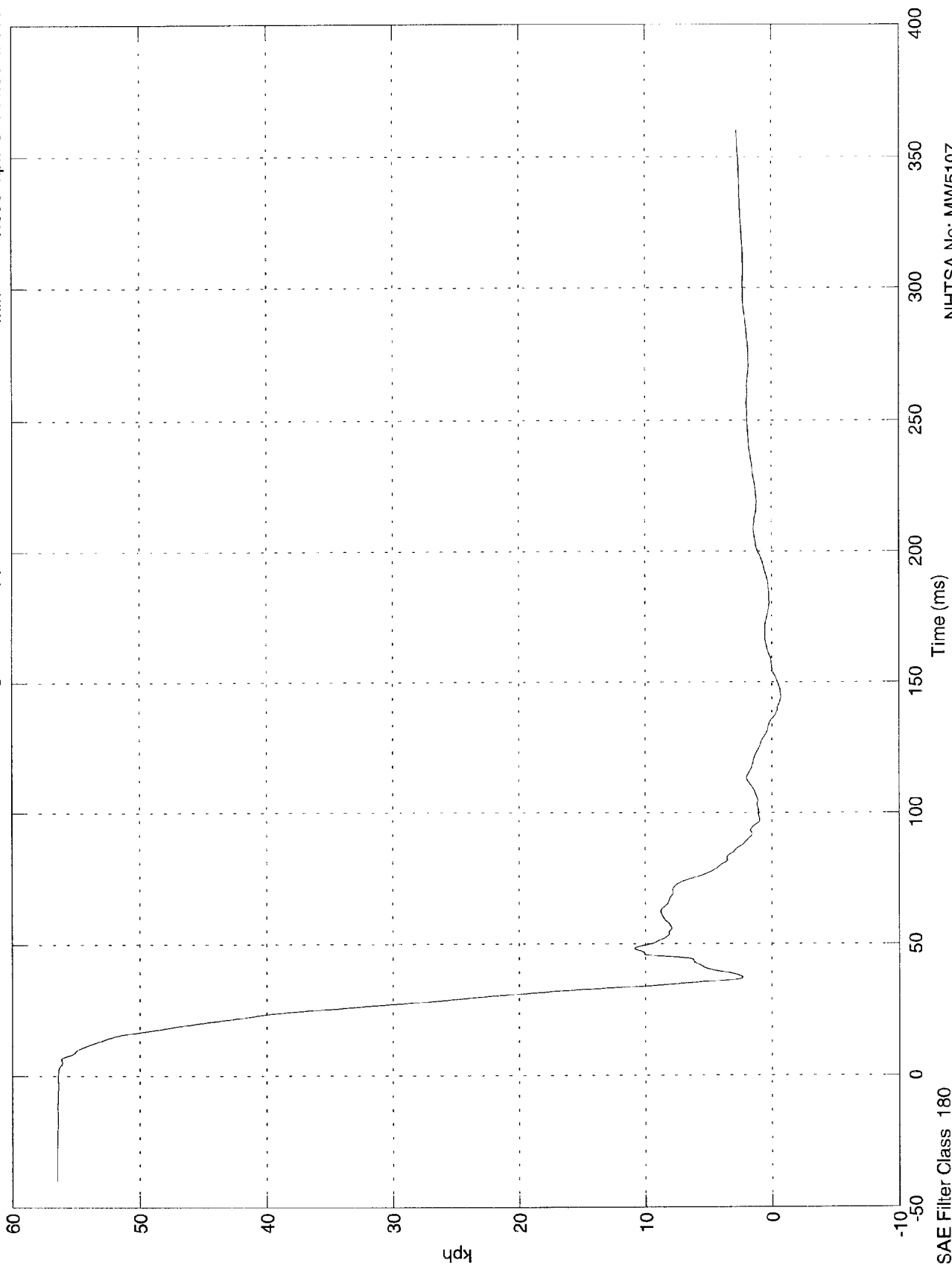


NHTSA No: MW5107  
 Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 56.5 kph @ -36.90 msec  
Min = -0.696 kph @ 144.60 msec

1st Integral Acc. #4(x)



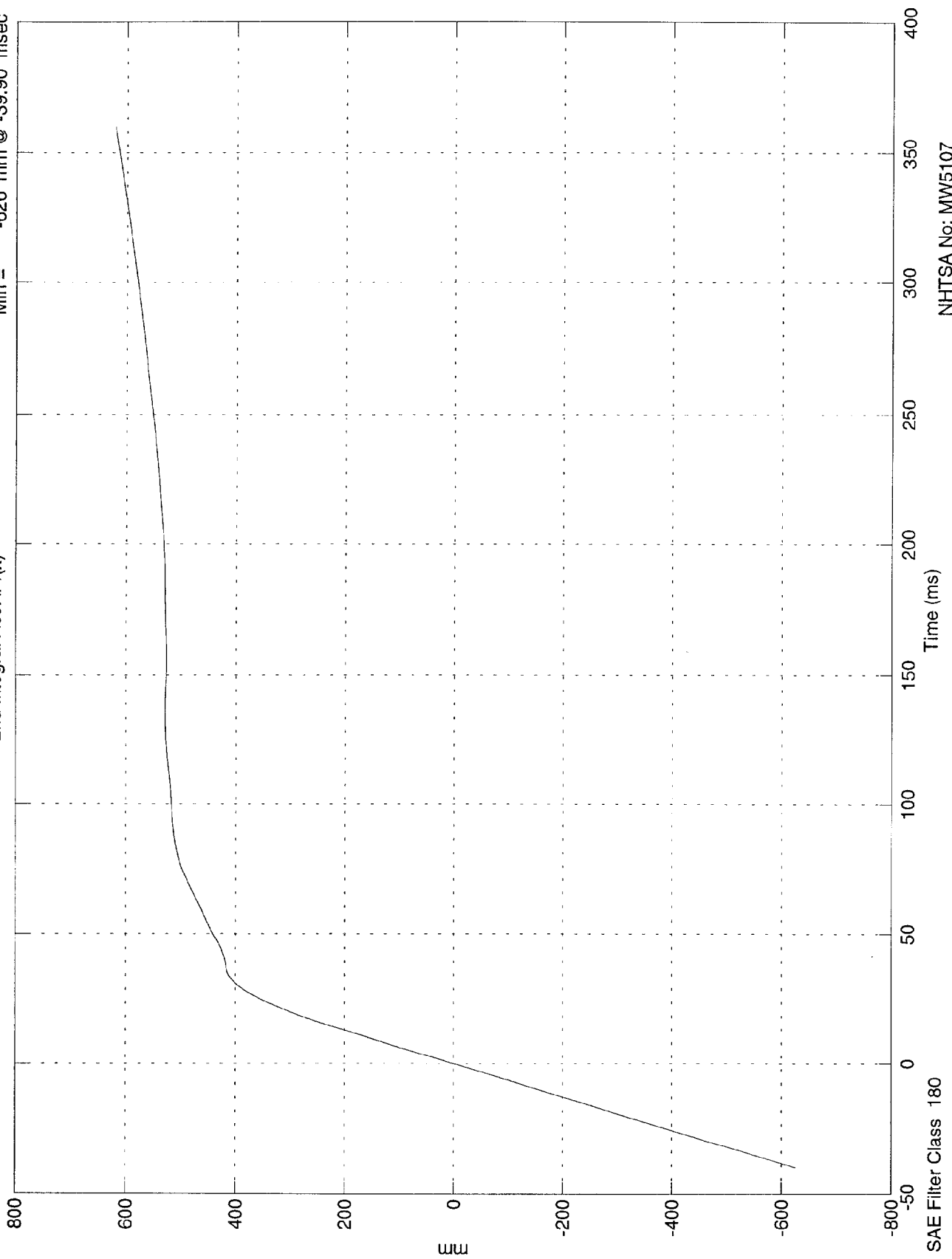
SAE Filter Class 180

NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 621 mm @ 360.00 msec  
Min = -626 mm @ -39.90 msec

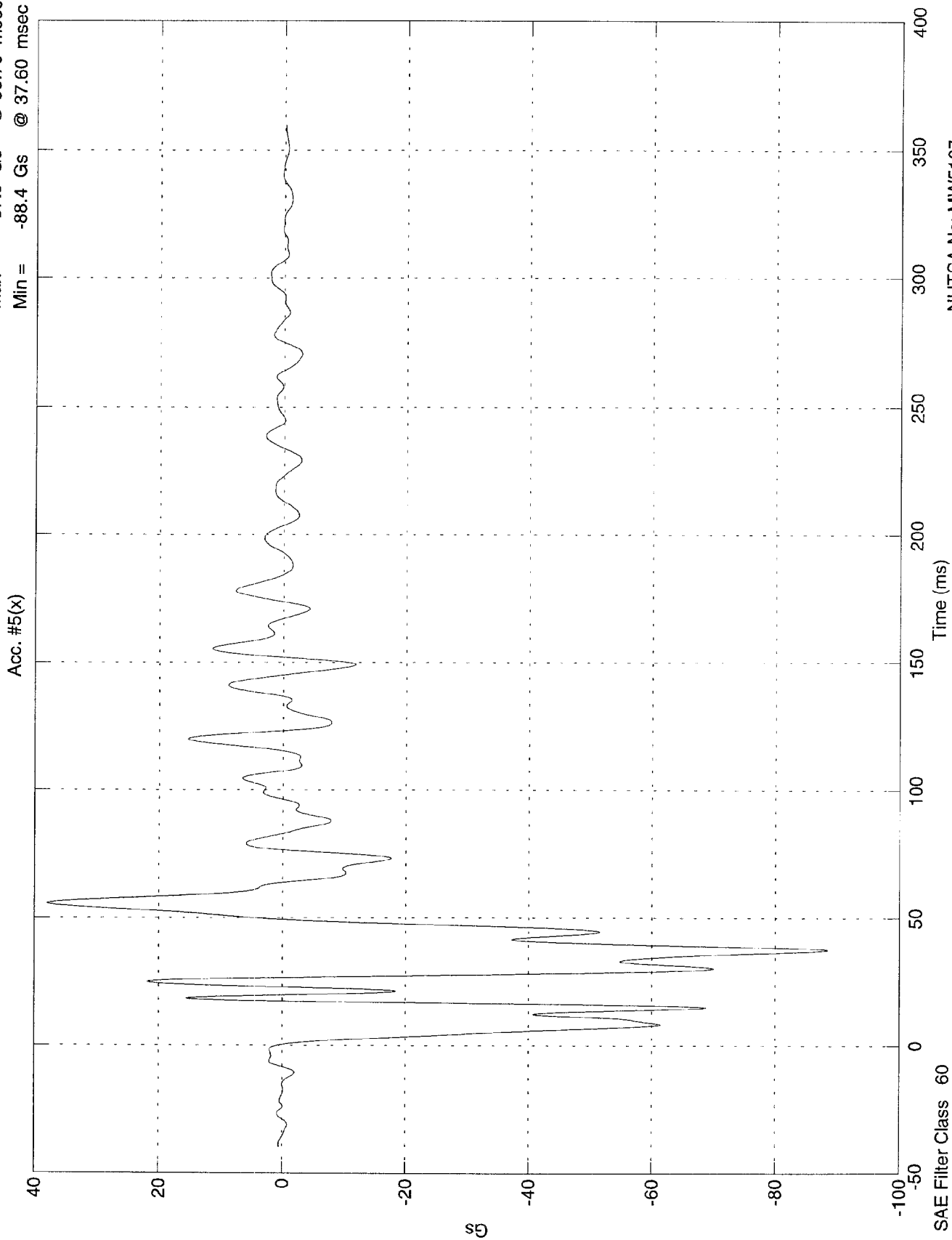
2nd Integral Acc. #4(x)



NHTSA No: MW5107  
Date: 15 Dec 1997

# NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

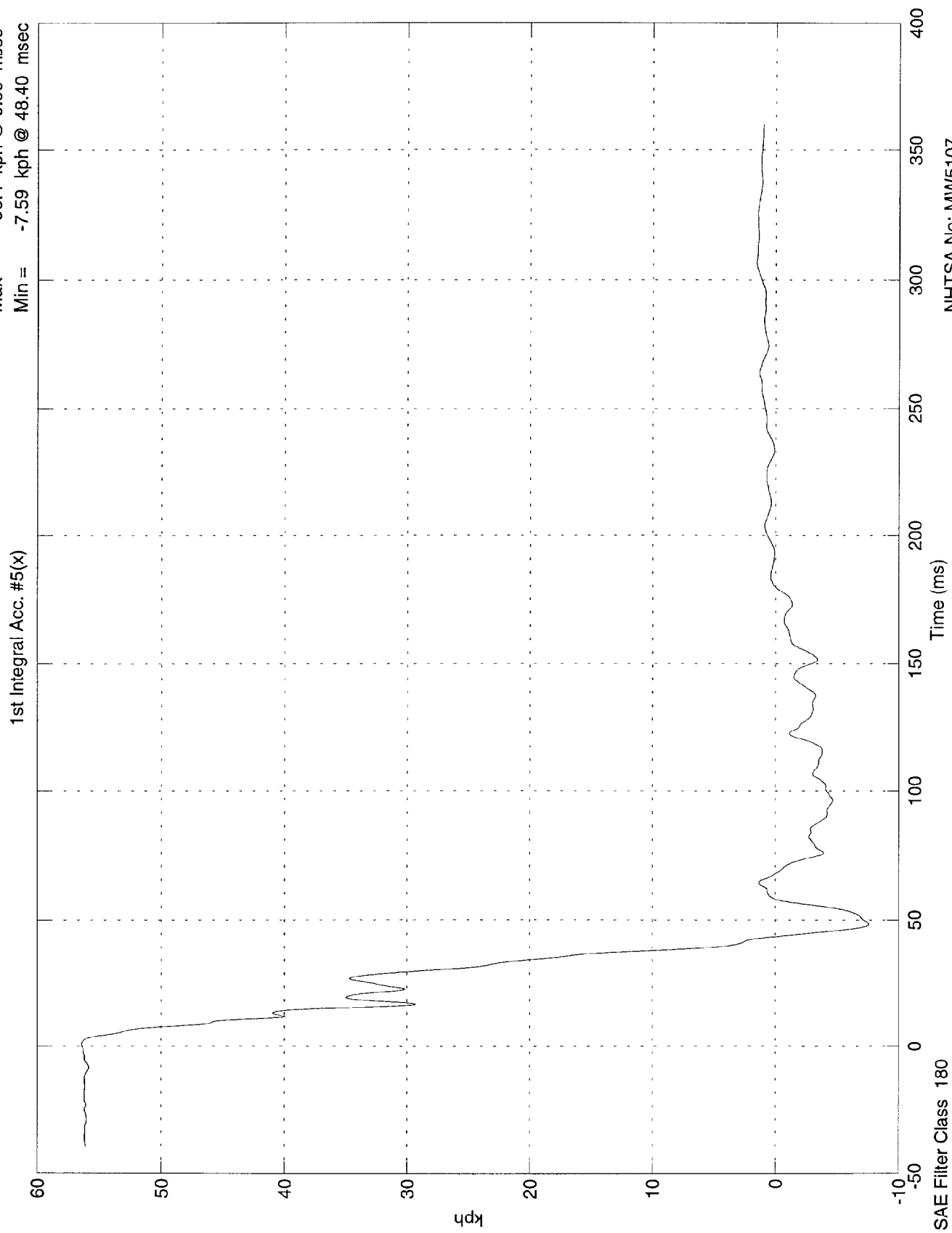
Max = 37.9 Gs @ 55.70 msec  
 Min = -88.4 Gs @ 37.60 msec



NHTSA No: MW5107  
 Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 56.4 kph @ 0.90 msec  
Min = -7.59 kph @ 48.40 msec

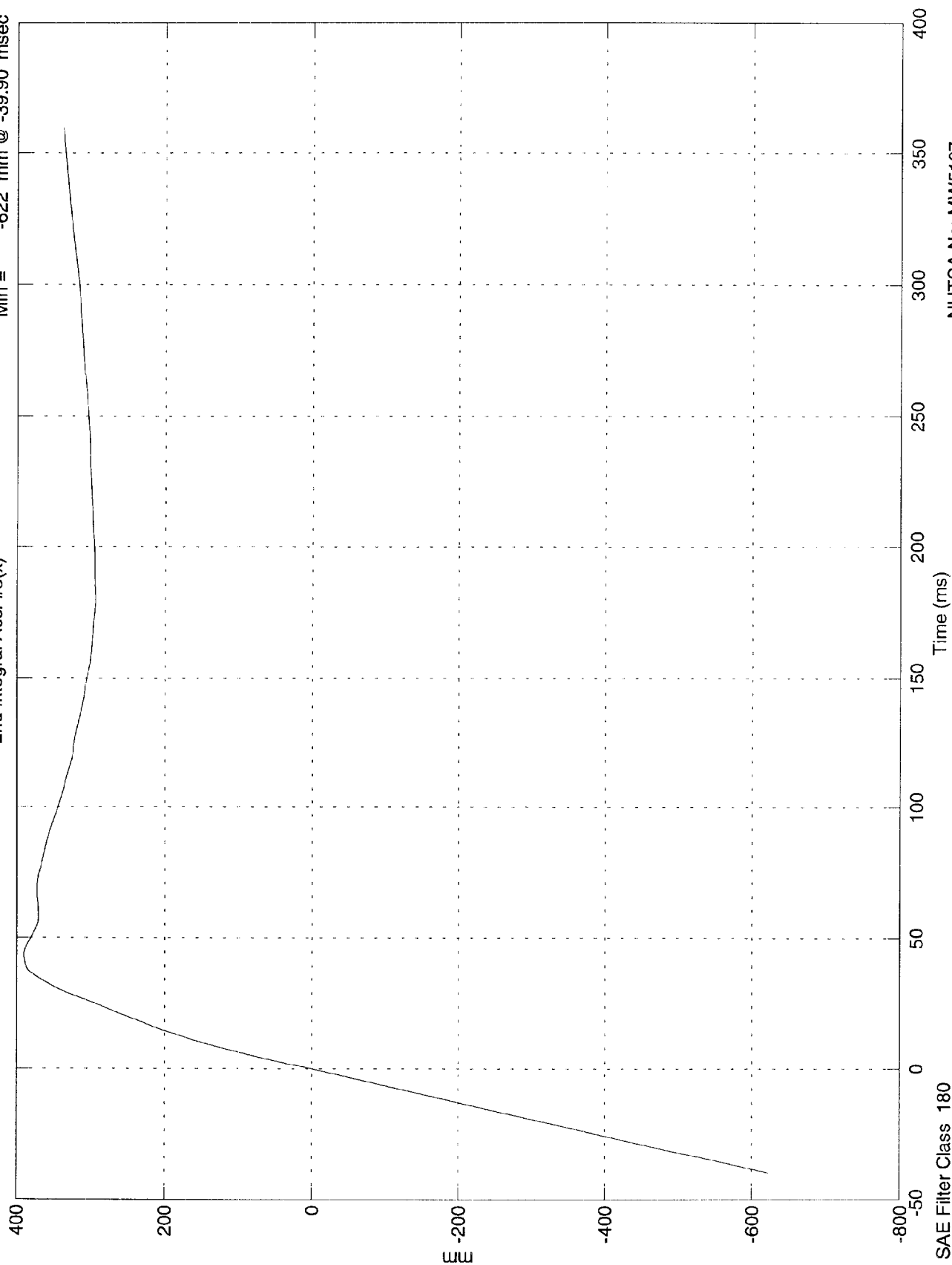


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 390 mm @ 43.50 msec  
Min = -622 mm @ -39.90 msec

2nd Integral Acc. #5(x)

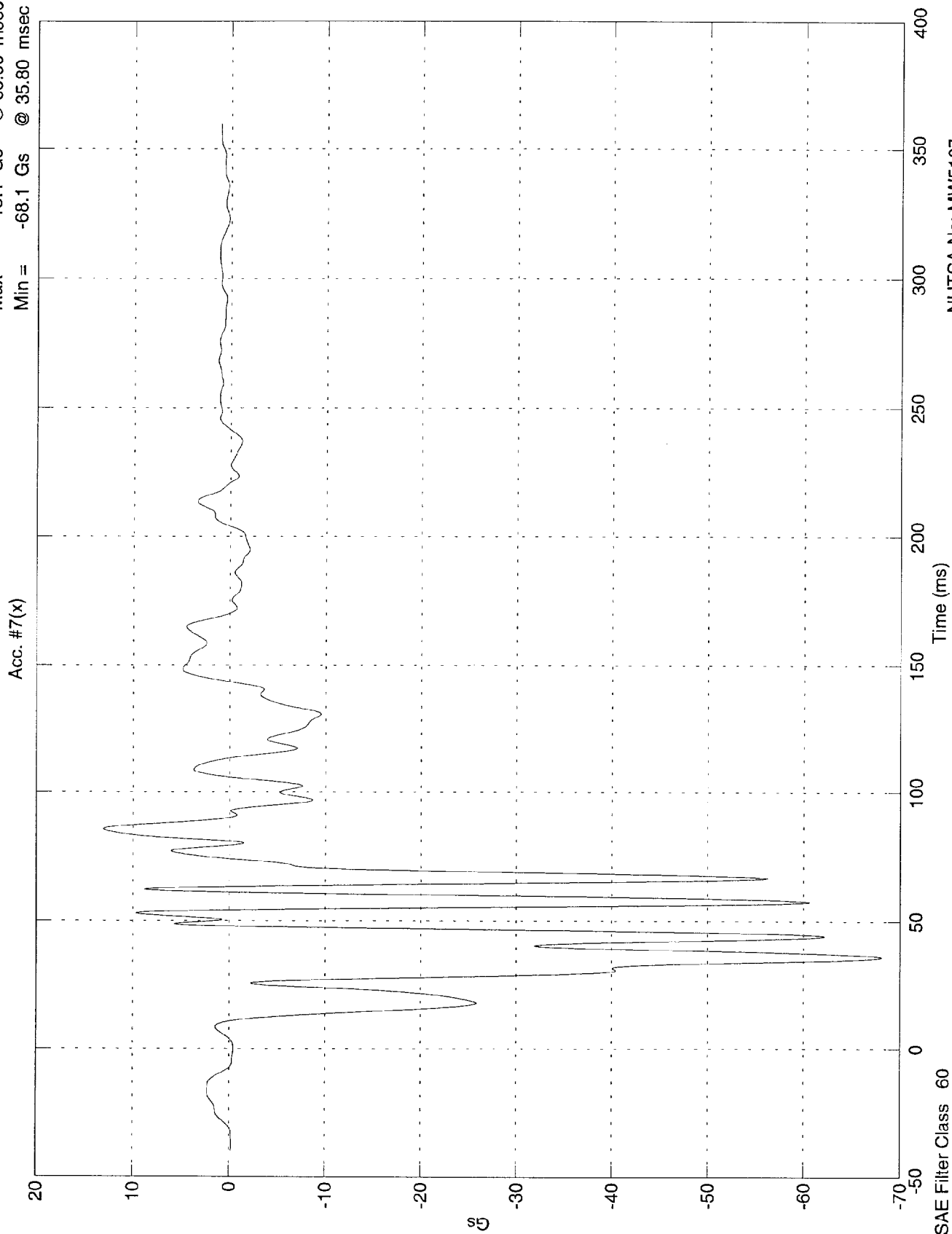


SAE Filter Class 180

NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

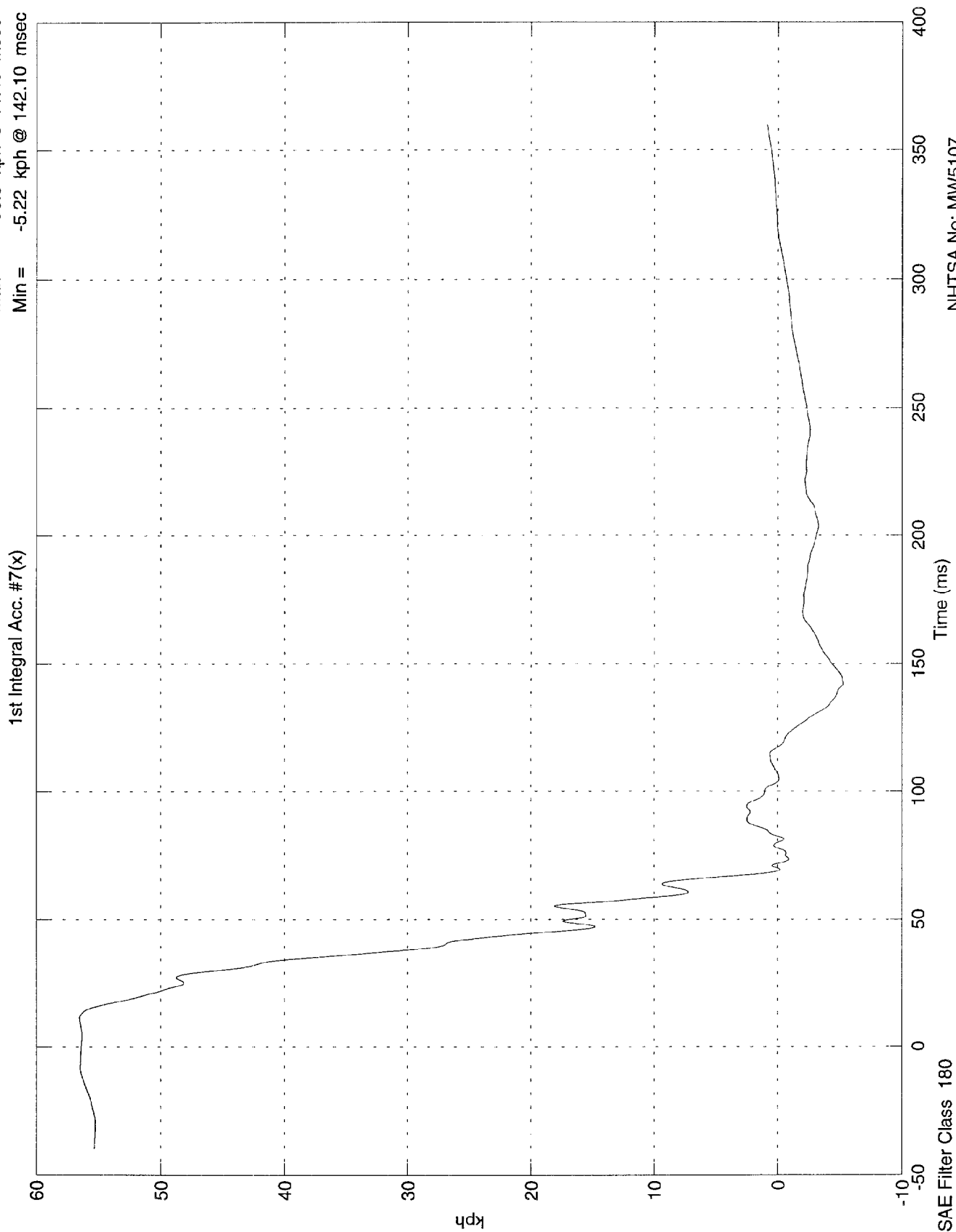
Max = 13.1 Gs @ 85.60 msec  
Min = -68.1 Gs @ 35.80 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

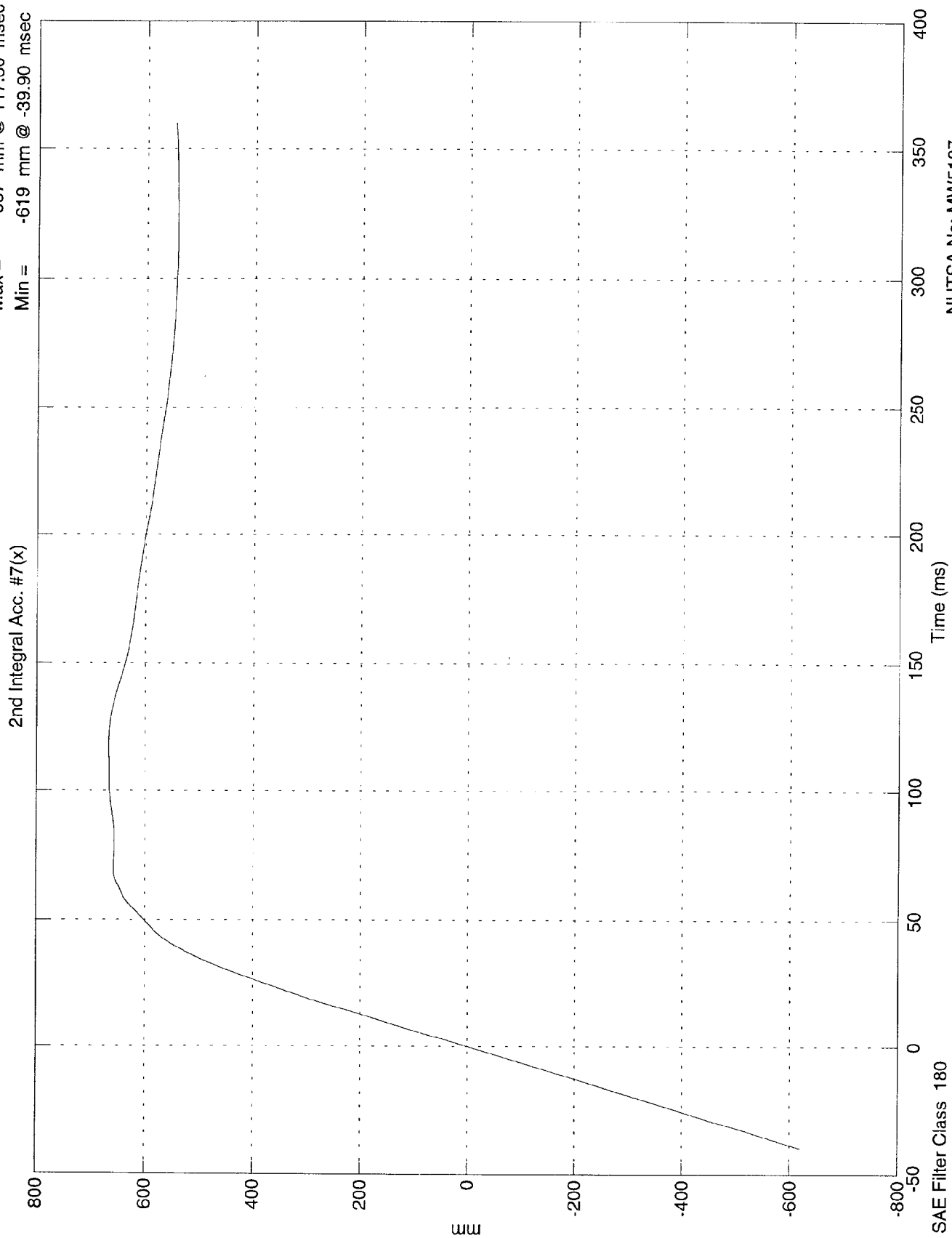
Max = 56.5 kph @ 11.40 msec  
Min = -5.22 kph @ 142.10 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

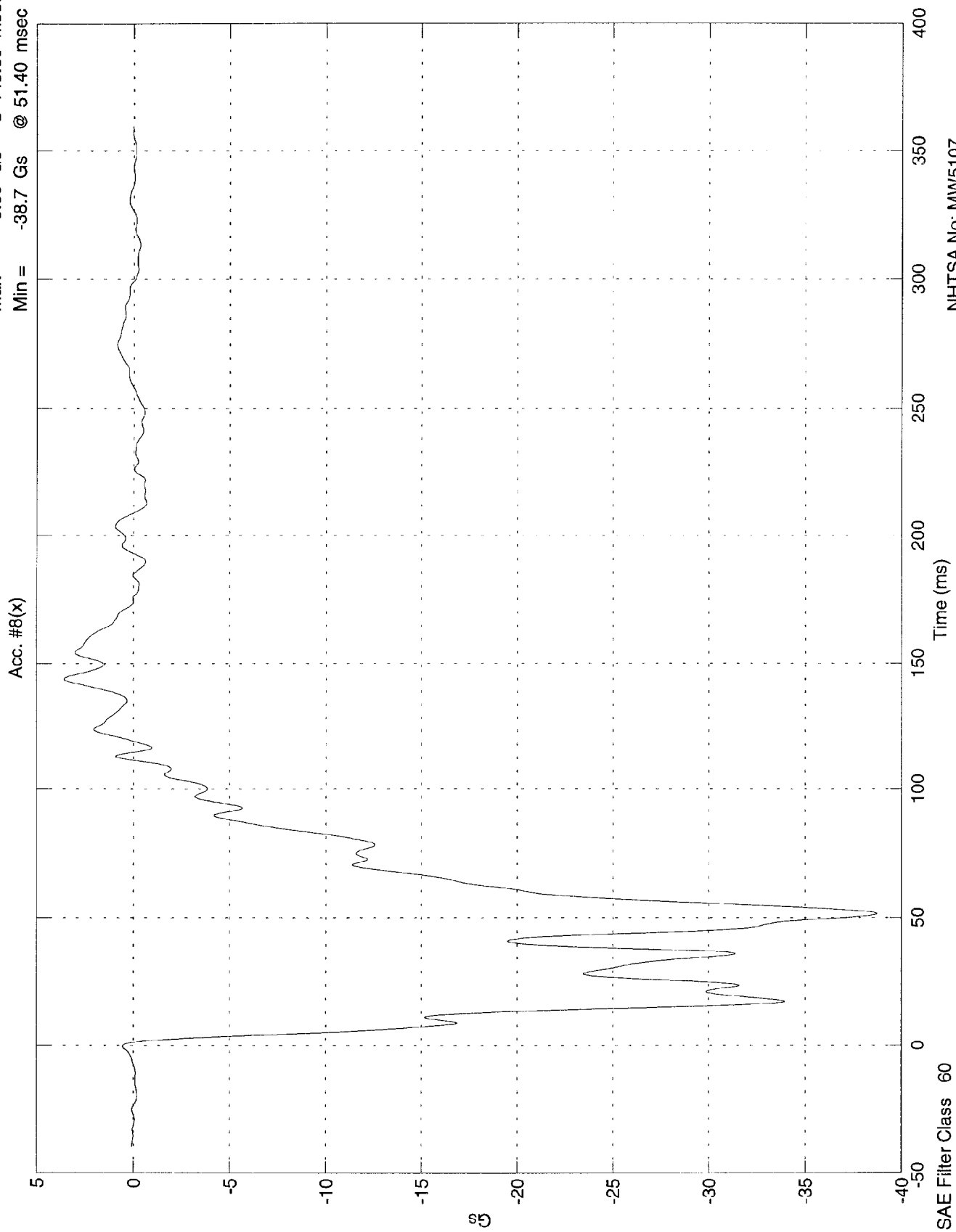
Max = 667 mm @ 117.30 msec  
Min = -619 mm @ -39.90 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

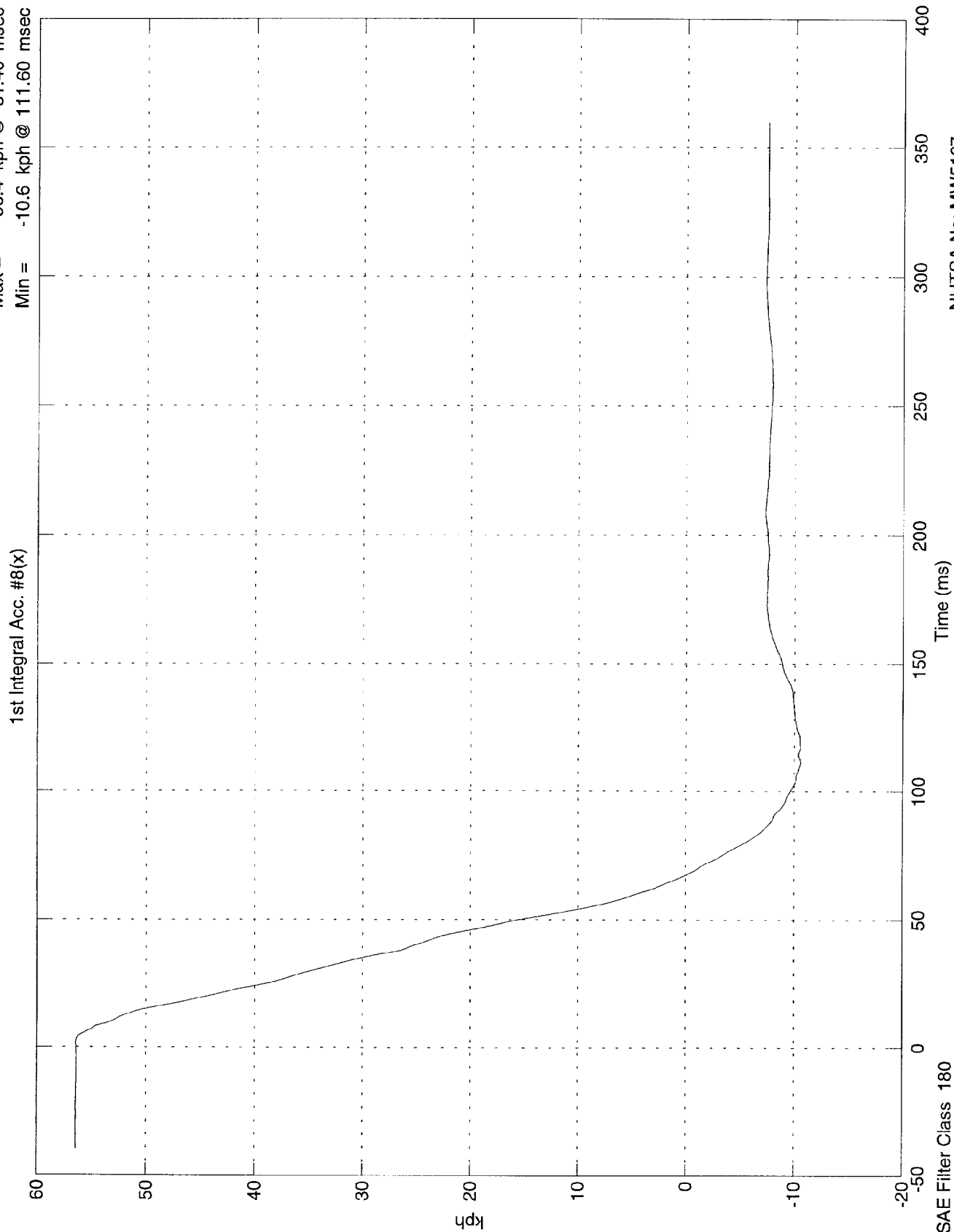
Max = 3.59 Gs @ 143.80 msec  
Min = -38.7 Gs @ 51.40 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 56.4 kph @ -31.40 msec  
Min = -10.6 kph @ 111.60 msec

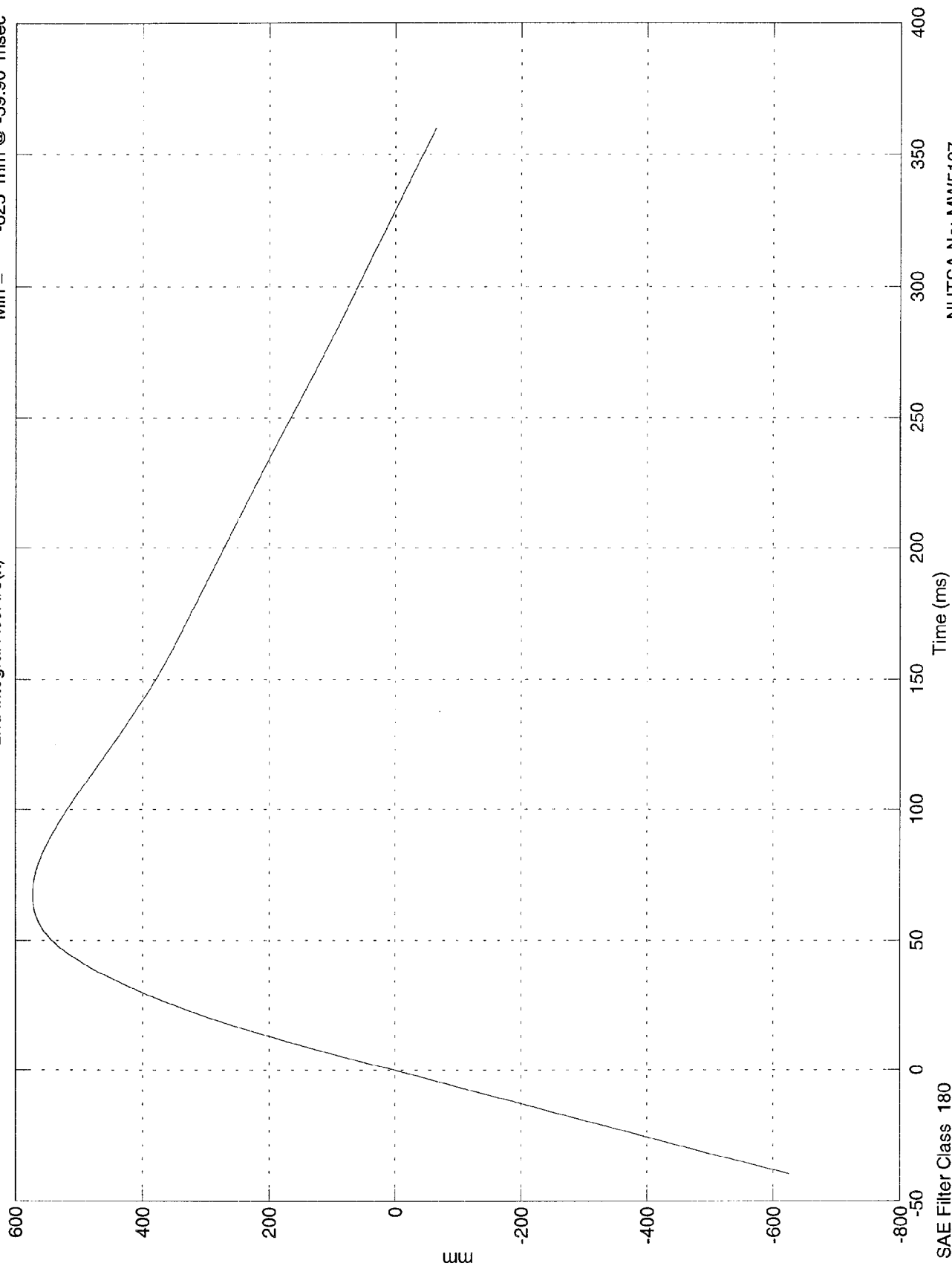


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 573 mm @ 67.20 msec  
Min = -625 mm @ -39.90 msec

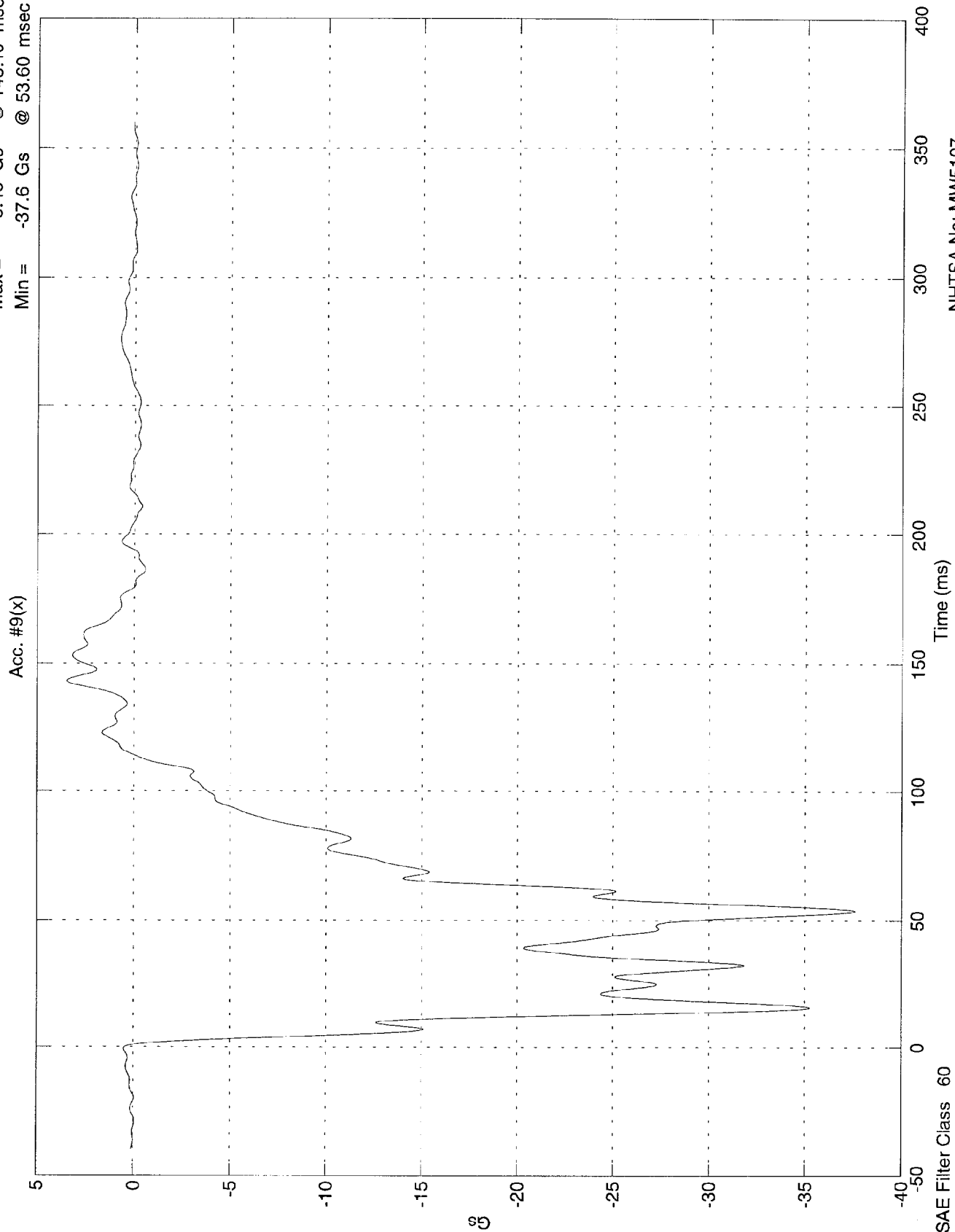
2nd Integral Acc. #8(x)



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 3.48 Gs @ 143.10 msec  
Min = -37.6 Gs @ 53.60 msec

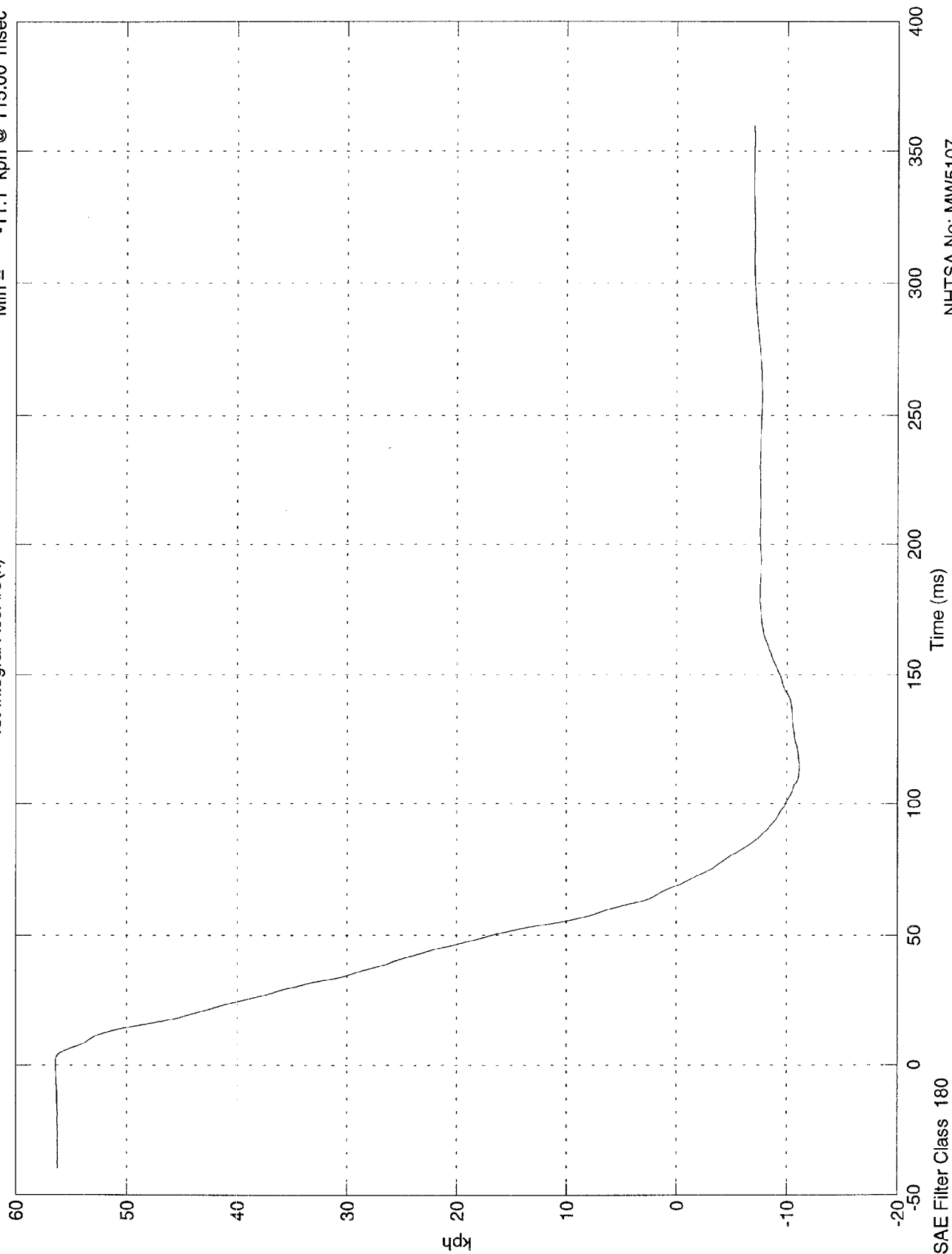


NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 56.4 kph @ 1.60 msec  
Min = -11.1 kph @ 115.00 msec

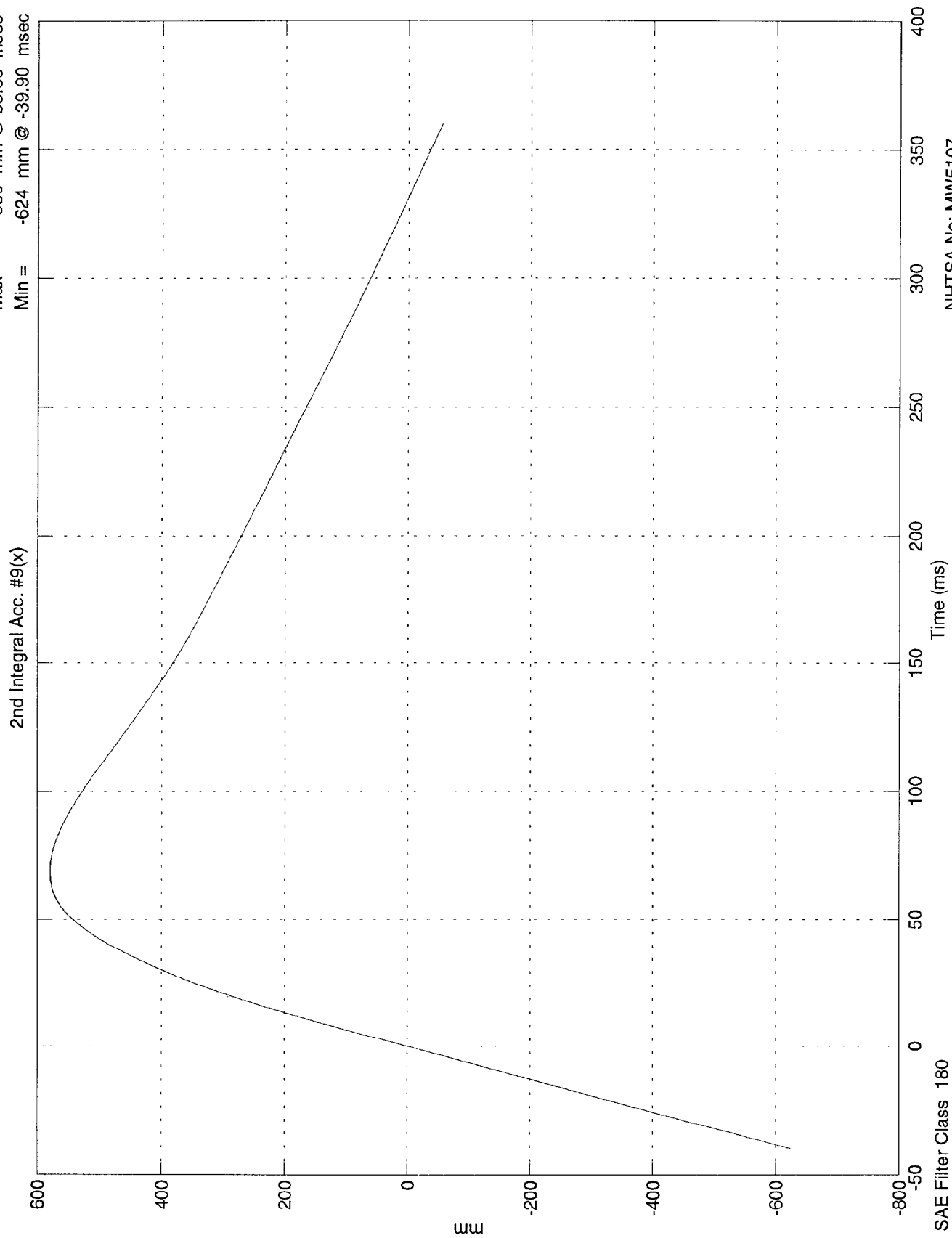
1st Integral Acc. #9(x)



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

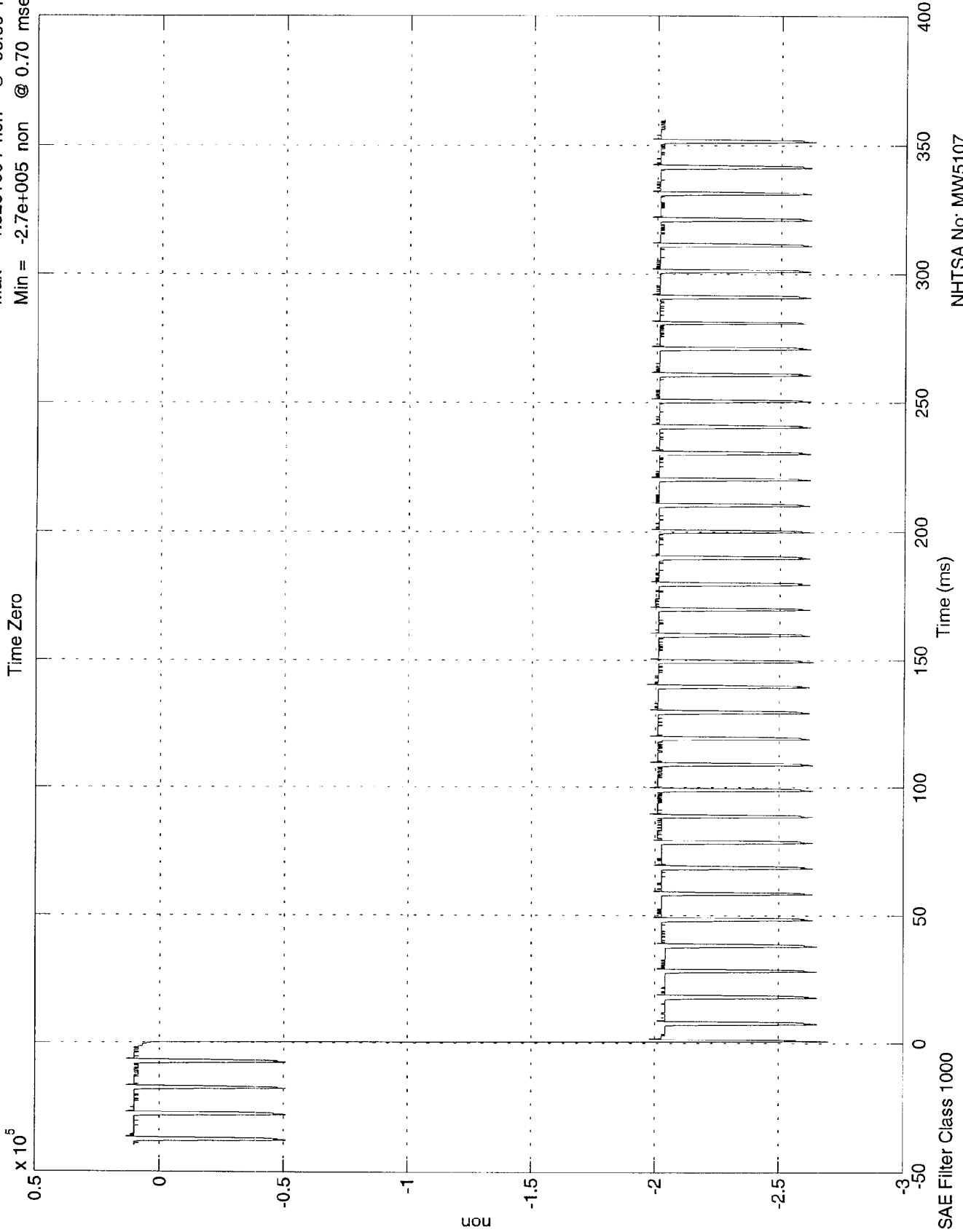
Max = 580 mm @ 68.60 msec  
Min = -624 mm @ -39.90 msec



NHTSA No: MW5107  
Date: 15 Dec 1997

NCAP TEST #14 - 1998 TOYOTA 4-RUNNER

Max = 1.32e+004 non @ -36.60 msec  
Min = -2.7e+005 non @ 0.70 msec



NHTSA No: MW5107  
Date: 17 Dec 1997

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 SRL Corporation. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

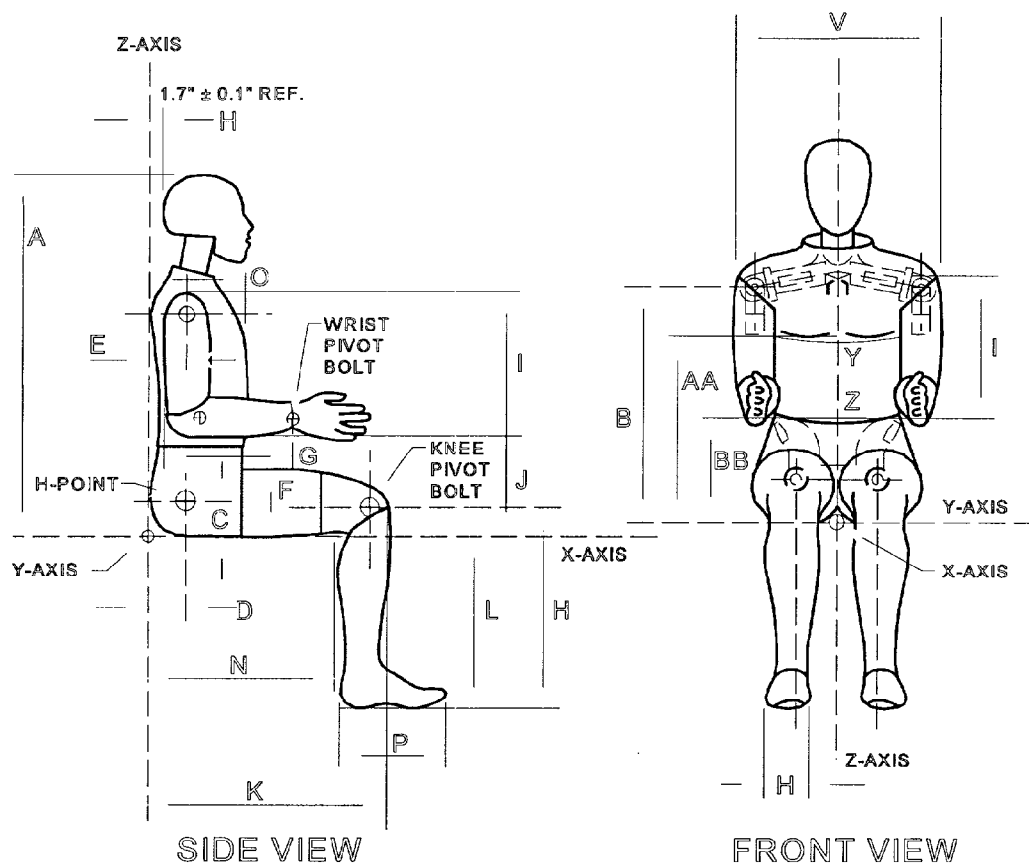
| <u>Position No./Location</u> | <u>Serial No.</u> | <u>Completion Date</u> |
|------------------------------|-------------------|------------------------|
| #1/Driver                    | 064               | 12/08/97               |
| #2/Right Front Passenger     | 245               | 12/08/97               |

#### Electronic Test Equipment

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

## DUMMY CONFIGURATION DIMENSIONS

### EXTERNAL DIMENSIONS SPECIFICATIONS



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

PART 572E  
HEAD DROP TEST

Dummy Serial Number 064  
Calspan Sequential Test Number 5  
Date 12/4/97  
Workfile 064597.hdp

| TEST PARAMETER                  | SPECIFICATION | TEST RESULTS |
|---------------------------------|---------------|--------------|
| Temperature                     | 66-78 Deg F   | 70           |
| Relative Humidity               | 10% - 70%     | 32           |
| Peak Resultant Acceleration     | 225-275 G's   | 244.1        |
| Peak Lateral Acceleration       | 15 G's Max    | 10.8         |
| Is Acceleration Curve Unimodal? | YES           | Yes          |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E  
NECK FLEXION TEST

Dummy Serial Number 064  
Calspan Sequential Test Number 5  
Date 12/4/97  
Workfile 064597.nfl

6 Axis Neck Transducer

| TEST PARAMETER                                     |       | SPECIFICATION      | TEST RESULTS |
|----------------------------------------------------|-------|--------------------|--------------|
| Temperature                                        |       | 69-72 Deg F        | 70           |
| Relative Humidity                                  |       | 10% - 70%          | 32           |
| Impact Velocity                                    |       | 22.60 - 23.40 Ft/s | 23.12        |
| Pendulum Deceleration                              | 10 ms | 22.50 - 27.50 G's  | 22.78        |
|                                                    | 20 ms | 17.60 - 22.60 G's  | 20.20        |
|                                                    | 30 ms | 12.50 - 18.50 G's  | 16.67        |
| Max Pendulum G's Above 30 ms                       |       | 29 G's Max         | 16.67        |
| Deceleration - Time Curve Decay<br>Time to 5 G's   |       | 34 - 42 ms         | 40.13        |
| D Plane Rotation                                   | Max   | 64 - 78 Deg        | 66.68        |
|                                                    | Time  | 57 - 64 ms         | 56.38        |
| Moment About Occipital<br>Condyle                  | Max   | 65 - 80 Ft-Lbs     | 79.00        |
|                                                    | Time  | 47 - 58 ms         | 52.50        |
| Rotation Angle - Time Curve Decay<br>Time to Zero  |       | 113 - 128 ms       | 115.63       |
| Positive Moment - Time Curve<br>Decay Time to Zero |       | 97 - 107 ms        | 97.00        |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E  
NECK EXTENSION TEST

Dummy Serial Number 064  
 Calspan Sequential Test Number 5  
 Date 12/4/97  
 Workfile 064597.nex

6 Axis Neck Transducer

| TEST PARAMETER                                  |       | SPECIFICATION        | TEST RESULTS |
|-------------------------------------------------|-------|----------------------|--------------|
| Temperature                                     |       | 69-72 Deg F          | 70           |
| Relative Humidity                               |       | 10% - 70%            | 32           |
| Impact Velocity                                 |       | 19.50 - 20.30 Ft/s   | 19.71        |
| Pendulum Deceleration                           | 10 ms | 17.20 - 21.20 G's    | 17.60        |
|                                                 | 20 ms | 14.00 - 19.00 G's    | 16.66        |
|                                                 | 30 ms | 11.00 - 16.00 G's    | 14.45        |
| Max Pendulum G's Above 30 ms                    |       | 22 G's Max           | 14.45        |
| Deceleration - Time Curve Decay Time to 5 G's   |       | 38 - 46 ms           | 43.38        |
| D Plane Rotation                                | Max   | 81 - 106 Deg         | 86.29        |
|                                                 | Time  | 72 - 82 ms           | 75.25        |
| Moment About Occipital Condyle                  | Max   | -59.0 - -39.0 Ft-Lbs | -47.91       |
|                                                 | Time  | 65 - 79 ms           | 70.50        |
| Rotation Angle - Time Curve Decay Time to Zero  |       | 147 - 174 ms         | 149.88       |
| Positive Moment - Time Curve Decay Time to Zero |       | 120 - 148 ms         | 133.75       |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E  
THORAX IMPACT TEST

Dummy Serial Number      064  
Calspan Sequential Test Number      5  
Date      12/5/97  
Workfile      064597.th3

| TEST PARAMETER          | SPECIFICATION    | TEST RESULTS |
|-------------------------|------------------|--------------|
| Temperature             | 69-72 Deg F      | 70           |
| Relative Humidity       | 10% - 70%        | 30           |
| Pendulum Velocity       | 21.6 - 22.4 Ft/s | 21.77        |
| Maximum Deflection      | 2.50 - 2.86 in   | 2.61         |
| Maximum Resistive Force | 1160 - 1325 Lbs  | 1294.03      |
| Internal Hysteresis     | 69 - 85 %        | 72.4         |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E  
KNEE IMPACT TEST

Dummy Serial Number           064  
Calspan Sequential Test Number   5  
Date                               12/8/97  
Workfile                         064597.

| TEST PARAMETER         | SPECIFICATION   | TEST RESULTS |
|------------------------|-----------------|--------------|
| <b>LEFT KNEE</b>       |                 |              |
| Temperature            | 66 - 78 Deg F   | 70           |
| Relative Humidity      | 10% - 70%       | 50           |
| Probe Velocity         | 6.8 - 7.0 Ft/s  | 7.00         |
| Peak Knee Impact Force | 1060 - 1300 Lbs | 1142.0       |
| <b>RIGHT KNEE</b>      |                 |              |
| Temperature            | 66 - 78 Deg F   | 70           |
| Relative Humidity      | 10% - 70%       | 50           |
| Probe Velocity         | 6.8 - 7.0 Ft/s  | 6.95         |
| Peak Knee Impact Force | 1060 - 1300 Lbs | 1238.0       |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E  
EXTERNAL DIMENSIONS

Dummy Serial Number      064  
Calspan Sequential Test Number      5  
Date      12/5/97

| TEST PARAMETER                    |    | SPECIFICATION  | TEST RESULTS |
|-----------------------------------|----|----------------|--------------|
| Temperature                       |    |                | 70           |
| Relative Humidity                 |    |                | 30           |
| Location for Chest Circumference  | AA | 16.9 - 17.1 in | 17.0         |
| Location for Waist Circumference  | BB | 8.9 - 9.1 in   | 9.0          |
| Chest Circumference (With Jacket) | Y  | 38.2 - 39.4 in | 38.8         |
| Waist Circumference               | Z  | 32.9 - 34.1 in | 33.0         |
| 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   | 6.0          |
| Buttock Knee Length               | K  | 22.8 - 23.8 in | 23.4         |
| Buttock Popliteal Length          | N  | 17.8 - 18.8 in | 18.4         |
| Popliteal Height                  | L  | 16.9 - 17.9 in | 17.3         |
| Knee Pivot Height                 | M  | 19.1 - 19.7 in | 19.4         |
| Foot Length                       | P  | 9.9 - 10.5 in  | 10.1         |
| Foot Breadth                      | W  | 3.6 - 4.2 in   | 3.8          |
| Shoulder Pivot from Backline      | E  | 3.3 - 3.7 in   | 3.6          |
| Shoulder Breadth                  | V  | 16.6 - 17.2 in | 16.9         |
| Shoulder Pivot Height             | B  | 19.9 - 20.5 in | 20.4         |
| Elbow Rest Height                 | J  | 7.5 - 8.3 in   | 8.0          |
| Shoulder - Elbow Length           | I  | 13.0 - 13.6 in | 13.2         |
| 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 245  
Calspan Sequential Test Number 6  
Date 12/4/97  
Workfile 245697.hdp

| TEST PARAMETER                  | SPECIFICATION | TEST RESULTS |
|---------------------------------|---------------|--------------|
| Temperature                     | 66-78 Deg F   | 70           |
| Relative Humidity               | 10% - 70%     | 32           |
| Peak Resultant Acceleration     | 225-275 G's   | 240.8        |
| Peak Lateral Acceleration       | 15 G's Max    | 13.2         |
| Is Acceleration Curve Unimodal? | YES           | Yes          |

Remarks:

Laboratory Technician: B. Swiccicki

PART 572E  
NECK FLEXION TEST

Dummy Serial Number 245  
 Calspan Sequential Test Number 6  
 Date 12/6/97  
 Workfile 245697.nfl

6 Axis Neck Transducer

| TEST PARAMETER                                     |       | SPECIFICATION      | TEST RESULTS |
|----------------------------------------------------|-------|--------------------|--------------|
| Temperature                                        |       | 69-72 Deg F        | 70           |
| Relative Humidity                                  |       | 10% - 70%          | 30           |
| Impact Velocity                                    |       | 22.60 - 23.40 Ft/s | 23.18        |
| Pendulum Deceleration                              | 10 ms | 22.50 - 27.50 G's  | 24.17        |
|                                                    | 20 ms | 17.60 - 22.60 G's  | 20.50        |
|                                                    | 30 ms | 12.50 - 18.50 G's  | 14.08        |
| Max Pendulum G's Above 30 ms                       |       | 29 G's Max         | 14.08        |
| Deceleration - Time Curve Decay<br>Time to 5 G's   |       | 34 - 42 ms         | 41.88        |
| D Plane Rotation                                   | Max   | 64 - 78 Deg        | 73.14        |
|                                                    | Time  | 57 - 64 ms         | 60.13        |
| Moment About Occipital<br>Condyle                  | Max   | 65 - 80 Ft-Lbs     | 68.43        |
|                                                    | Time  | 47 - 58 ms         | 55.75        |
| Rotation Angle - Time Curve Decay<br>Time to Zero  |       | 113 - 128 ms       | 120.00       |
| Positive Moment - Time Curve<br>Decay Time to Zero |       | 97 - 107 ms        | 98.63        |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E  
NECK EXTENSION TEST

Dummy Serial Number 245  
 Calspan Sequential Test Number 6  
 Date 12/5/97  
 Workfile 245697.nex

6 Axis Neck Transducer

| TEST PARAMETER                                  |       | SPECIFICATION        | TEST RESULTS |
|-------------------------------------------------|-------|----------------------|--------------|
| Temperature                                     |       | 69-72 Deg F          | 70           |
| Relative Humidity                               |       | 10% - 70%            | 50           |
| Impact Velocity                                 |       | 19.50 - 20.30 Ft/s   | 19.76        |
| Pendulum Deceleration                           | 10 ms | 17.20 - 21.20 G's    | 18.25        |
|                                                 | 20 ms | 14.00 - 19.00 G's    | 16.94        |
|                                                 | 30 ms | 11.00 - 16.00 G's    | 14.89        |
| Max Pendulum G's Above 30 ms                    |       | 22 G's Max           | 14.89        |
| Deceleration - Time Curve Decay Time to 5 G's   |       | 38 - 46 ms           | 41.75        |
| D Plane Rotation                                | Max   | 81 - 106 Deg         | 90.70        |
|                                                 | Time  | 72 - 82 ms           | 74.13        |
| Moment About Occipital Condyle                  | Max   | -59.0 - -39.0 Ft-Lbs | -51.90       |
|                                                 | Time  | 65 - 79 ms           | 70.13        |
| Rotation Angle - Time Curve Decay Time to Zero  |       | 147 - 174 ms         | 148.38       |
| Positive Moment - Time Curve Decay Time to Zero |       | 120 - 148 ms         | 134.00       |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E  
THORAX IMPACT TEST

Dummy Serial Number 245  
Calspan Sequential Test Number 6  
Date 12/5/97  
Workfile 245697.th3

| TEST PARAMETER          | SPECIFICATION    | TEST RESULTS |
|-------------------------|------------------|--------------|
| Temperature             | 69-72 Deg F      | 70           |
| Relative Humidity       | 10% - 70%        | 30           |
| Pendulum Velocity       | 21.6 - 22.4 Ft/s | 21.73        |
| Maximum Deflection      | 2.50 - 2.86 in   | 2.66         |
| Maximum Resistive Force | 1160 - 1325 Lbs  | 1244.68      |
| Internal Hysteresis     | 69 - 85 %        | 74.4         |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E  
KNEE IMPACT TEST

Dummy Serial Number        245  
Calspan Sequential Test Number    6  
Date                                12/8/97  
Workfile                          245697.

| TEST PARAMETER         | SPECIFICATION   | TEST RESULTS |
|------------------------|-----------------|--------------|
| <b>LEFT KNEE</b>       |                 |              |
| Temperature            | 66 - 78 Deg F   | 70           |
| Relative Humidity      | 10% - 70%       | 50           |
| Probe Velocity         | 6.8 - 7.0 Ft/s  | 7.00         |
| Peak Knee Impact Force | 1060 - 1300 Lbs | 1190.0       |
| <b>RIGHT KNEE</b>      |                 |              |
| Temperature            | 66 - 78 Deg F   | 70           |
| Relative Humidity      | 10% - 70%       | 50           |
| Probe Velocity         | 6.8 - 7.0 Ft/s  | 6.90         |
| Peak Knee Impact Force | 1060 - 1300 Lbs | 1252.0       |

Remarks:

Laboratory Technician:     B. Swiecicki

PART 572E  
EXTERNAL DIMENSIONS

Dummy Serial Number      245  
Calspan Sequential Test Number      6  
Date      12/5/97

| TEST PARAMETER                    |    | SPECIFICATION  | TEST RESULTS |
|-----------------------------------|----|----------------|--------------|
| Temperature                       |    |                | 70           |
| Relative Humidity                 |    |                | 30           |
| Location for Chest Circumference  | AA | 16.9 - 17.1 in | 17.0         |
| Location for Waist Circumference  | BB | 8.9 - 9.1 in   | 9.0          |
| Chest Circumference (With Jacket) | Y  | 38.2 - 39.4 in | 39.2         |
| Waist Circumference               | Z  | 32.9 - 34.1 in | 33.7         |
| 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 | 34.8         |
| 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 | 18.4         |
| 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

## Appendix D

### DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

# INSTRUMENT CALIBRATION FOR DRIVER DUMMY

( 6 Month Calibration Minimum )

| DRIVER DUMMY (S/N 064)   | Serial # | Manufacturer | Calibration |       |
|--------------------------|----------|--------------|-------------|-------|
|                          |          |              | Last        | Next  |
| Head X                   | AF5B3    | ENDEVCO      | 8/97        | 2/98  |
| Y                        | AF5F7    | ENDEVCO      | 8/97        | 2/98  |
| Z                        | AF5E1    | ENDEVCO      | 8/97        | 2/98  |
| Chest X                  | A08A     | ENDEVCO      | 8/97        | 2/98  |
| Y                        | ADL42    | ENDEVCO      | 8/97        | 2/98  |
| Z                        | A28F     | ENDEVCO      | 8/97        | 2/98  |
| Right Femur Load Cell    | 952      | GSE          | 9/97        | 3/98  |
| Left Femur Load Cell     | 951      | GSE          | 9/97        | 3/98  |
| Neck Load Cell X         | 076      | DENTON       | 10/97       | 4/98  |
| Y                        | 076      | DENTON       | 10/97       | 4/98  |
| Z                        | 076      | DENTON       | 10/97       | 4/98  |
| Neck Moment X            | 076      | DENTON       | 10/97       | 4/98  |
| Y                        | 076      | DENTON       | 10/97       | 4/98  |
| Z                        | 076      | DENTON       | 10/97       | 4/98  |
| Chest Deflection Gauge   | 064      | HUMANOID     | 10/97       | 4/98  |
| Hybrid III Use Only      |          |              |             |       |
| Lap Belt Load Cells      | 706      | LEBOW        | 6/97        | 12/97 |
| Shoulder Belt Load Cells | 707      | LEBOW        | 6/97        | 12/97 |
| Spool-Out Potentiometer  | M7       | MAGNETEK     | 9/97        | 3/98  |
| Belt Stretch Transducer  | E1       | CALSPAN      | 9/97        | 3/98  |

# INSTRUMENT CALIBRATION FOR DRIVER DUMMY

( 6 Month Calibration Minimum )

| DRIVER DUMMY      | Serial # | Manufacturer | Calibration |       |
|-------------------|----------|--------------|-------------|-------|
|                   |          |              | Last        | Next  |
| Head              |          |              |             |       |
| X (R)             | A13942   | ENDEVCO      | 8/97        | 2/98  |
| Y (R)             | J18649   | ENDEVCO      | 8/97        | 2/98  |
| Z (R)             | J18400   | ENDEVCO      | 8/97        | 2/98  |
| Chest             |          |              |             |       |
| X (R)             | B11407   | ENDEVCO      | 6/97        | 12/97 |
| Y (R)             | B11073   | ENDEVCO      | 6/97        | 12/97 |
| Z (R)             | B11408   | ENDEVCO      | 6/97        | 12/97 |
| Pelvic            |          |              |             |       |
| X                 | C14953   | ENDEVCO      | 8/97        | 2/98  |
| Y                 | C14966   | ENDEVCO      | 8/97        | 2/98  |
| Z                 | C14968   | ENDEVCO      | 8/97        | 2/98  |
| Left Upper Tibia  |          |              |             |       |
| Mx                | 038      | DENTON       | 10/97       | 4/98  |
| Left Upper Tibia  |          |              |             |       |
| My                | 038      | DENTON       | 10/97       | 4/98  |
| Left Lower Tibia  |          |              |             |       |
| Fy                | 032      | DENTON       | 10/97       | 4/98  |
| Left Lower Tibia  |          |              |             |       |
| Fz                | 032      | DENTON       | 10/97       | 4/98  |
| Left Lower Tibia  |          |              |             |       |
| Mx                | 032      | DENTON       | 10/97       | 4/98  |
| Right Upper Tibia |          |              |             |       |
| Mx                | 045      | DENTON       | 10/97       | 4/98  |
| Right Upper Tibia |          |              |             |       |
| My                | 045      | DENTON       | 10/97       | 4/98  |
| Right Lower Tibia |          |              |             |       |
| Fy                | 041      | DENTON       | 10/97       | 4/98  |
| Right Lower Tibia |          |              |             |       |
| Fz                | 041      | DENTON       | 10/97       | 4/98  |
| Right Lower Tibia |          |              |             |       |
| Mx                | 041      | DENTON       | 10/97       | 4/98  |

# INSTRUMENT CALIBRATION FOR DRIVER DUMMY

( 6 Month Calibration Minimum )

| DRIVER DUMMY       | Serial # | Manufacture | Calibration |      |
|--------------------|----------|-------------|-------------|------|
|                    |          |             | Last        | Next |
| Left Foot Front Z  | A14058   | ENDEVCO     | 9/97        | 3/98 |
| Left Foot Rear X   | A13929   | ENDEVCO     | 9/97        | 3/98 |
| Left Foot Rear Z   | A14150   | ENDEVCO     | 9/97        | 3/98 |
| Right Foot Front Z | A14124   | ENDEVCO     | 9/97        | 3/98 |
| Right Foot Rear X  | A14181   | ENDEVCO     | 9/97        | 3/98 |
| Right Foot Rear Z  | A14126   | ENDEVCO     | 9/97        | 3/98 |

# INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

( 6 Month Calibration Minimum )

| PASSENGER DUMMY (S/N 245) | Serial # | Manufacturer | Calibration |       |
|---------------------------|----------|--------------|-------------|-------|
|                           |          |              | Last        | Next  |
| Head                      |          |              |             |       |
| X                         | ADL98    | ENDEVCO      | 8/97        | 2/98  |
| Y                         | AE8K0    | ENDEVCO      | 8/97        | 2/98  |
| Z                         | ADMB6    | ENDEVCO      | 8/97        | 2/98  |
| Chest                     |          |              |             |       |
| X                         | A26A     | ENDEVCO      | 8/97        | 2/98  |
| Y                         | A27A     | ENDEVCO      | 8/97        | 2/98  |
| Z                         | A51A     | ENDEVCO      | 8/97        | 2/98  |
| Right Femur Load Cell     | 232      | GSE          | 9/97        | 3/98  |
| Left Femur Load Cell      | 231      | GSE          | 9/97        | 3/98  |
| Neck Load Cell            | 440      | DENTON       | 8/97        | 2/98  |
| X                         | 440      | DENTON       | 8/97        | 2/98  |
| Y                         | 440      | DENTON       | 8/97        | 2/98  |
| Z                         | 440      | DENTON       | 8/97        | 2/98  |
| Neck Moment               | 440      | DENTON       | 8/97        | 2/98  |
| X                         | 440      | DENTON       | 8/97        | 2/98  |
| Y                         | 440      | DENTON       | 8/97        | 2/98  |
| Z                         | 440      | DENTON       | 8/97        | 2/98  |
| Chest Deflection Gauge    | 245      | HUMANOID     | 10/97       | 4/98  |
| Hybrid III Use Only       |          |              |             |       |
| Lap Belt Load Cells       | 635      | LEBOW        | 6/97        | 12/97 |
| Shoulder Belt Load Cells  | 711      | LEBOW        | 6/97        | 12/97 |
| Spool-Out Potentiometer   | M11      | MAGNETEK     | 9/97        | 3/98  |
| Belt Stretch Transducer   | E4       | CALSPAN      | 9/97        | 3/98  |

# INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

( 6 Month Calibration Minimum )

| PASSENGER DUMMY   | Serial # | Manufacturer | Calibration |      |
|-------------------|----------|--------------|-------------|------|
|                   |          |              | Last        | Next |
| Head              |          |              |             |      |
| X (R)             | A13829   | ENDEVCO      | 11/97       | 5/98 |
| Y (R)             | AC8F6    | ENDEVCO      | 8/97        | 2/98 |
| Z (R)             | ACCW0    | ENDEVCO      | 8/97        | 2/98 |
| Chest             |          |              |             |      |
| X (R)             | AHRC9    | ENDEVCO      | 8/97        | 2/98 |
| Y (R)             | AC7W8    | ENDEVCO      | 8/97        | 2/98 |
| Z (R)             | ACC06    | ENDEVCO      | 8/97        | 2/98 |
| Pelvic            |          |              |             |      |
| X                 | AL6N5    | ENDEVCO      | 8/97        | 2/98 |
| Y                 | AL6R7    | ENDEVCO      | 8/97        | 2/98 |
| Z                 | A12C     | ENDEVCO      | 8/97        | 2/98 |
| Left Upper Tibia  | Mx       | DENTON       | 10/97       | 4/98 |
| Left Upper Tibia  | My       | DENTON       | 10/97       | 4/98 |
| Left Lower Tibia  | Fy       | DENTON       | 10/97       | 4/98 |
| Left Lower Tibia  | Fz       | DENTON       | 10/97       | 4/98 |
| Left Lower Tibia  | Mx       | DENTON       | 10/97       | 4/98 |
| Right Upper Tibia | Mx       | DENTON       | 10/97       | 4/98 |
| Right Upper Tibia | My       | DENTON       | 10/97       | 4/98 |
| Right Lower Tibia | Fy       | DENTON       | 10/97       | 4/98 |
| Right Lower Tibia | Fz       | DENTON       | 10/97       | 4/98 |
| Right Lower Tibia | Mx       | DENTON       | 10/97       | 4/98 |

# INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

( 6 Month Calibration Minimum )

| PASSENGER DUMMY    | Serial # | Manufacture | Calibration |      |
|--------------------|----------|-------------|-------------|------|
|                    |          |             | Last        | Next |
| Left Foot Front Z  | A13011   | ENDEVCO     | 9/97        | 3/98 |
| Left Foot Rear X   | A13506   | ENDEVCO     | 9/97        | 3/98 |
| Left Foot Rear Z   | A12268   | ENDEVCO     | 9/97        | 3/98 |
| Right Foot Front Z | J18418   | ENDEVCO     | 8/97        | 2/98 |
| Right Foot Rear X  | AEWK1    | ENDEVCO     | 8/97        | 2/98 |
| Right Foot Rear Z  | AKD92    | ENDEVCO     | 8/97        | 2/98 |

# INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS

( 6 Month Calibration Minimum )

|                                 | Serial # | Manufacturer | Calibration |      |
|---------------------------------|----------|--------------|-------------|------|
|                                 |          |              | Last        | Next |
| Left Seat Rear Crossmember      | Y93      | ICS          | 8/97        | 2/98 |
| Right Rear Seat Crossmember     | Y18      | ICS          | 10/97       | 4/98 |
| Top of Engine                   | Y13      | ICS          | 10/97       | 4/98 |
| Bottom of Engine                | Y171     | ICS          | 9/97        | 3/98 |
| Left Disc Brake Caliper         | A44      | CEC          | 10/97       | 4/98 |
| Right Disc Brake Caliper        | A56      | CEC          | 10/97       | 4/98 |
| Instrument Panel                | A86      | CEC          | 10/97       | 4/98 |
| Left Seat Rear Crossmember (R)  | D75      | ICS          | 10/97       | 4/98 |
| Right Seat Rear Crossmember (R) | D79      | ICS          | 9/97        | 3/98 |