

3121  
V3121

**1999 Dodge Intrepid  
into a 40% Left Offset Deformable Barrier  
TRC Test Number: 990625-1**

**Prepared by:  
Transportation Research Center Inc.  
10820 State Route 347  
East Liberty, OH 43319**

**Final Report  
June - July 1999**

**Prepared For:  
Vehicle Research and Test Center  
P. O. Box 37  
East Liberty, OH 43319**

### Notice

Transportation Research Center Inc. does not endorse or certify products of manufacturers. The manufacturer's name appears solely to identify the test article. Transportation Research Center Inc. assumes no liability for the report or use thereof. It is responsible for the facts and the accuracy of the data presented herein. This report does not constitute a standard, specification, or regulation.

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

## Table of Contents

| <u>Section</u> | <u>Description</u>                                             | <u>Page</u> |
|----------------|----------------------------------------------------------------|-------------|
| 1.0            | Purpose and Test Procedure                                     | 1-1         |
| 2.0            | 35 mph 40% Left ODB Impact Test Summary                        | 2-1         |
| 3.0            | FMVSS 208 Data                                                 | 3-1         |
| 4.0            | Vehicle, Occupant, Camera, and Deformable Barrier Measurements | 4-1         |
| Appendix A     | Photographs                                                    | A-1         |
| Appendix B     | Data Plots                                                     | B-1         |
| Appendix C     | Miscellaneous Test Information                                 | C-1         |

## List of Tables

| <u>Number</u> | <u>Description</u>                               | <u>Page</u> |
|---------------|--------------------------------------------------|-------------|
| 1             | Crash Test Summary                               | 2-5         |
| 2             | Test Vehicle Information                         | 2-7         |
| 3             | Post-Impact Data                                 | 2-10        |
| 4             | Vehicle Accelerometer Locations and Data Summary | 2-14        |
| 5             | Dummy Injury Criteria                            | 3-2         |
| 6             | Impacted Vehicle Measurements                    | 4-3         |
| 7             | Dummy Measurement Data for Front Seat Occupants  | 4-6         |
| 8             | Motion Picture Camera Locations                  | 4-8         |
| 9             | Deformable Barrier Face Profile                  | 4-15        |

## List of Figures

| <u>Number</u> | <u>Description</u>                                                  | <u>Page</u> |
|---------------|---------------------------------------------------------------------|-------------|
| 1             | Impact Velocity Measurement System                                  | 2-11        |
| 2             | Accident Investigation Division Data for 35 mph 40% Left ODB Impact | 2-12        |
| 3             | Vehicle Accelerometer Placement                                     | 2-13        |
| 4             | Pre-test and Post-test Measurement Points                           | 4-2         |
| 5             | Vehicle Target Locations                                            | 4-4         |
| 6             | Dummy Measurement Locations for Front Seat Occupants                | 4-5         |
| 7             | Camera Positions                                                    | 4-7         |
| 8             | Deformable Barrier Face Profile                                     | 4-9         |

## List of Photographs

| <u>Description</u>                       | <u>Figure</u> |
|------------------------------------------|---------------|
| Pre-Test Front View                      | A-1           |
| Post-Test Front View                     | A-2           |
| Pre-Test Left Side View                  | A-3           |
| Post-Test Left Side View                 | A-4           |
| Pre-Test Left Rear Three-Quarter View    | A-5           |
| Post-Test Left Rear Three-Quarter View   | A-6           |
| Pre-Test Rear View                       | A-7           |
| Post-Test Rear View                      | A-8           |
| Pre-Test Right Side View                 | A-9           |
| Post-Test Right Side View                | A-10          |
| Pre-Test Right Front Three-Quarter View  | A-11          |
| Post-Test Right Front Three-Quarter View | A-12          |
| Pre-Test Overhead View                   | A-13          |
| Post-Test Overhead View                  | A-14          |
| Pre-Test Overhead Close –Up View         | A-15          |
| Post-Test Overhead Close –Up View        | A-16          |
| Pre-Test Underbody - View 1              | A-17          |
| Post-Test Underbody - View 1             | A-18          |
| Pre-Test Underbody - View 2              | A-19          |
| Post-Test Underbody - View 2             | A-20          |
| Pre-Test Underbody - View 3              | A-21          |
| Post-Test Underbody - View 3             | A-22          |
| Pre-Test Underbody - View 4              | A-23          |
| Post-Test Underbody - View 4             | A-24          |
| Pre-Test Underbody - View 5              | A-25          |
| Post-Test Underbody - View 5             | A-26          |
| Pre-Test Engine Compartment View         | A-27          |
| Post-Test Engine Compartment View        | A-28          |
| Pre-Test Windshield - View 1             | A-29          |

List of Photographs, Cont'd.

| <u>Description</u>                              | <u>Figure</u> |
|-------------------------------------------------|---------------|
| Post-Test Windshield - View 1                   | A-30          |
| Pre-Test Windshield - View 2                    | A-31          |
| Post-Test Windshield - View 2                   | A-32          |
| Pre-Test Driver Dummy Windshield View           | A-33          |
| Post-Test Driver Dummy Windshield View          | A-34          |
| Pre-Test Passenger Dummy Windshield View        | A-35          |
| Post-Test Passenger Dummy Windshield View       | A-36          |
| Pre-Test Driver Dummy Position - View 1         | A-37          |
| Post-Test Driver Dummy Position - View 1        | A-38          |
| Pre-Test Driver Dummy Position -View 2          | A-39          |
| Post-Test Driver Dummy Position - View 2        | A-40          |
| Pre-Test Driver Dummy Position -View 3          | A-41          |
| Post-Test Driver Dummy Position - View 3        | A-42          |
| Pre-Test Passenger Dummy Position - View 1      | A-43          |
| Post-Test Passenger Dummy Position - View 1     | A-44          |
| Pre-Test Passenger Dummy Position - View 2      | A-45          |
| Post-Test Passenger Dummy Position - View 2     | A-46          |
| Pre-Test Passenger Dummy Position - View 3      | A-47          |
| Post-Test Passenger Dummy Position - View 3     | A-48          |
| Post-Test Driver Dummy View                     | A-49          |
| Post-Test Driver Dummy Head Contact - View 1    | A-50          |
| Post-Test Driver Dummy Head Contact - View 2    | A-51          |
| Post-Test Driver Dummy Head Contact - View 3    | A-52          |
| Post-Test Driver Dummy Knee Contact View        | A-53          |
| Post-Test Passenger Dummy View                  | A-54          |
| Post-Test Passenger Dummy Head Contact - View 1 | A-55          |
| Post-Test Passenger Dummy Head Contact - View 2 | A-56          |
| Post-Test Passenger Dummy Knee Contact View     | A-57          |
| Post-Test Barrier Front View                    | A-58          |

List of Photographs, Cont'd.

| <u>Description</u>                        | <u>Figure</u> |
|-------------------------------------------|---------------|
| Post-Test Barrier Left Side View          | A-59          |
| Post-Test Barrier Right Side View         | A-60          |
| Pre-Test Vehicle Certification Label View | A-61          |
| Impact Event                              | A-62          |



## Section 1.0

### Purpose and Test Procedure

### Purpose and Test Summary

This 35 mph 40% left offset deformable barrier impact test has as the main objective to investigate both vehicle and occupant dynamics during a 40% left offset deformable barrier test. A secondary objective is to gather information on depowered airbags.

This test was conducted with a 1999 Dodge Intrepid that impacted a 40% left offset deformable barrier. The test vehicle contained two instrumented Hybrid III 5th percentile adult female dummies.

## Section 2.0

### 40% Left Offset Deformable Barrier Impact Test Summary

## Test Procedure

This test was conducted per VRTC personnel's instructions. Data was obtained relative to FMVSS 208, "Occupant Crash Protection," performance.

The test vehicle was instrumented with eight (8) accelerometers to measure longitudinal, lateral, and vertical axis accelerations and two (2) inductive pickup switches to measure the driver and passenger airbag fire times. The vehicle's specified impact velocity range was 55.5 to 57.1 kph. The vehicle impacted a 40% left offset deformable barrier.

The test vehicle contained two (2) Hybrid III 5th percentile adult female anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the FMVSS 208 laboratory seating procedure.

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations; chest deflection potentiometers; left and right femur load cells to measure axial forces; and upper neck load cells to measure forces and moments.

The forty (40) data channels were digitally sampled at 12,500 samples per second and processed per Sections 11.13 through 11.15 of the Laboratory Test Procedure.

One (1) real-time panning motion picture camera and thirteen (13) high-speed motion picture cameras recorded the crash event. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle and occupant data are summarized in Section 2.0. The FMVSS 208 data are presented in Section 3.0. The vehicle, occupant, and camera measurements are presented in Section 4.0. Appendix A contains the still photographic prints. Appendix B contains the dummy and vehicle data plots. Appendix C contains the miscellaneous test information.

### Test Results Summary

This 40% left offset deformable barrier test was conducted at TRC on June 25, 1999.

The test vehicle, a 1999 Dodge Intrepid, was equipped with airbags at the driver's and right front passenger's seating positions. The vehicle's test weight was 1688.3 kilograms. The vehicle's impact speed was 56.6 kph. The vehicle's maximum static crush was 647 millimeters.

The driver's 15-millisecond HIC was 472 and its 36-millisecond HIC was 709. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 51.5 g. The driver's chest deflection was 40.9 millimeters. The driver's left and right femur maximum compressive forces were 2914 N and 2928 N, respectively.

The right front passenger's 15-millisecond HIC was 368 and its 36-millisecond HIC was 634. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 77.8 g. The passenger's chest deflection was 12.3 millimeters. The right front passenger's left and right femur maximum compressive forces were 4450 N and 3032 N, respectively.

### Data Acquisition Explanations

The right rear seat x-axis accelerometer, channel TRRXG1, exceeded its full scale value at approximately 102 milliseconds and recorded no data after that time.

Table 1 Crash Test Summary

|                                         |                                           |
|-----------------------------------------|-------------------------------------------|
| Test type:                              | 40% left offset deformable barrier impact |
| Test date:                              | June 25, 1999                             |
| Test time:                              | 0924                                      |
| Ambient temperature<br>at impact area:  | 21° C                                     |
| Vehicle year/make/<br>model/body style: | 1999/Dodge/Intrepid/Sedan                 |
| Vehicle test weight:                    | 1688.3 kg                                 |
| Impact angle <sup>1</sup> :             | 0°                                        |
| Impact velocity <sup>2</sup> :          |                                           |
| Primary:                                | 56.6 kph                                  |
| Secondary:                              | 56.5 kph                                  |
| Maximum static crush:                   | 647 mm                                    |
| Average rebound:                        | N/A                                       |
| Number of cameras:                      |                                           |
| Real-time:                              | 1                                         |
| High-speed:                             | 13                                        |
| Door opening data:                      |                                           |
| Left-front:                             | Easy                                      |
| Right-front:                            | Easy                                      |

<sup>1</sup> With respect to tow track centerline.

<sup>2</sup> Speed trap measurement ( $\pm .08$  km/h accuracy)

Table 1 Crash Test Summary, Cont'd.

|                               |                                                       |                                                       |
|-------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| Dummies:                      | <u>Driver #369</u>                                    | <u>Passenger #289</u>                                 |
| Type:                         | Hybrid III 5 <sup>th</sup> percentile<br>adult female | Hybrid III 5 <sup>th</sup> percentile<br>adult female |
| Location:                     | Left front                                            | Right front                                           |
| Restraint:                    | Airbag                                                | Airbag                                                |
| Number of data channels:      | 15                                                    | 15                                                    |
| Front seat data:              |                                                       |                                                       |
| Seat track failure:           | None                                                  | None                                                  |
| Seat back failure:            | None                                                  | None                                                  |
| Visible dummy contact points: |                                                       |                                                       |
| Head:                         | Steering wheel, Airbag                                | Airbag, Instrument panel                              |
| Chest:                        | Airbag, Steering wheel                                | Airbag                                                |
| Abdomen:                      | None                                                  | None                                                  |
| Left knee:                    | Instrument panel                                      | Instrument panel                                      |
| Right knee:                   | Instrument panel                                      | Instrument panel                                      |



Table 2 Test Vehicle Information

Vehicle year/make/  
model/body style: 1999/Dodge/Intrepid/Sedan

Color: Deep cranberry

VIN: 2B3HD46R4XH657282

Engine data:

Placement: Transverse

Cylinders: 6

Displacement: 2.7 liters

Transmission data: 4 speed,      manual,   X   automatic,      overdrive

Final drive:   X   fwd,      rwd,      4wd

Date vehicle received: N/A

Odometer reading: N/A

Dealer's name and address: Taylor Motors Inc.  
11339 State Route 13 North  
Athens, OH 45701

Accessories:

|                  |     |                            |      |
|------------------|-----|----------------------------|------|
| Power steering   | Yes | Automatic transmission     | Yes  |
| Power brakes     | Yes | Automatic speed control    | Yes  |
| Power seats      | No  | Tilting steering wheel     | Yes  |
| Power windows    | Yes | Telescoping steering wheel | No   |
| Tinted glass     | Yes | Air conditioning           | No   |
| Radio            | Yes | Anti-skid brake            | Yes  |
| Clock            | Yes | Rear window defroster      | Yes  |
| Power door locks | Yes | Other:                     | None |

Certification data from vehicle's label:

Vehicle manufactured by: Daimler Chrysler Corp.

Date of manufacture: 12/98

VIN: 2B3HD46R4XH657282

GVWR: 4551lb.

GAWR: Front: 2595lb.

Rear: 2031lb.

Table 2 Test Vehicle Information, Cont'd.

|                           |             |
|---------------------------|-------------|
| Size of tires on vehicle: | P225/60R16  |
| Spare tire:               | Space saver |
| Type of front seats:      | Bucket      |

Tire & capacity data from vehicle's label:

|                        |            |
|------------------------|------------|
| Recommended tire size: | P225/60R16 |
|------------------------|------------|

Recommended cold tire pressure:

|        |        |
|--------|--------|
| Front: | 32 psi |
|--------|--------|

|       |        |
|-------|--------|
| Rear: | 32 psi |
|-------|--------|

Designated Seating Capacity:

|       |   |
|-------|---|
| Front | 2 |
|-------|---|

|      |   |
|------|---|
| Rear | 3 |
|------|---|

|       |   |
|-------|---|
| Total | 5 |
|-------|---|

|                       |         |
|-----------------------|---------|
| Vehicle Cargo Weight: | 865 lb. |
|-----------------------|---------|

Test vehicle attitudes:

|                     |            |            |            |            |
|---------------------|------------|------------|------------|------------|
| Delivered attitude: | LF: 740 mm | RF: 735 mm | LR: 759 mm | RR: 755 mm |
|---------------------|------------|------------|------------|------------|

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Fully loaded attitude: | LF: 731 mm | RF: 724 mm | LR: 730 mm | RR: 730 mm |
|------------------------|------------|------------|------------|------------|

|                    |            |            |            |            |
|--------------------|------------|------------|------------|------------|
| Pre-test attitude: | LF: 732 mm | RF: 724 mm | LR: 713 mm | RR: 715 mm |
|--------------------|------------|------------|------------|------------|

|                     |            |            |            |            |
|---------------------|------------|------------|------------|------------|
| Post-test attitude: | LF: 978 mm | RF: 704 mm | LR: 749 mm | RR: 696 mm |
|---------------------|------------|------------|------------|------------|

Table 2 Test Vehicle Information, Cont'd.

Weight of test vehicle as received (with maximum fluids):

|                        |           |                                 |          |
|------------------------|-----------|---------------------------------|----------|
| Right front            | 491.7 kg  | Right rear                      | 274.0 kg |
| Left front             | 496.7 kg  | Left rear                       | 287.1 kg |
| Total front weight     | 988.4 kg  | (63.8% of total vehicle weight) |          |
| Total rear weight      | 561.1 kg  | (36.2% of total vehicle weight) |          |
| Total delivered weight | 1549.5 kg |                                 |          |

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1549.5 kg)

DSC<sup>1</sup> = Designated Seating Capacity (5)

RCLW<sup>2</sup> = 52.2 kg

Target test weight = UDW + RCLW + (number of Hybrid III Dummies x 47.6 kg per dummy)

Target test weight = 1549.5 + 52.2 + 95.2 = 1696.9 kg

Weight of test vehicle with required dummies:

|                    |           |                                  |          |
|--------------------|-----------|----------------------------------|----------|
| Right front        | 503.1 kg  | Right rear                       | 336.6 kg |
| Left front         | 514.8 kg  | Left rear                        | 333.8 kg |
| Total front weight | 1017.9 kg | (60.3% of total vehicle weight)  |          |
| Total rear weight  | 670.4 kg  | (39.7% of total vehicle weight)  |          |
| Total test weight  | 1688.3 kg | (0.51% under target test weight) |          |

Weight of ballast secured in vehicle: N/A

Components removed to meet target test weight: Rear seat

CG rearward of front wheel centerline: 1142 mm

Vehicle Wheelbase: 2875 mm

<sup>1</sup> The designated seating capacity is determined by counting the number of seat belts installed in the vehicle.

<sup>2</sup> From vehicle's tire label.

Table 3 Post-Impact Data

Test number: 990625-1  
Test date: June 25, 1999  
Test time: 0924  
Test type: 40% left offset deformable barrier impact  
Impact angle: 0°  
Ambient temperature  
at impact area: 22° C  
Temperature in  
occupant compartment: 21° C  
Impact velocity:  
Primary: 56.6 kph  
Secondary: 56.5 kph  
Specified range: 55.5 to 57.1 kph

Distance from vehicle to barrier:

Entering velocity trap: 661 mm  
Exiting velocity trap: 51 mm

Test vehicle static crush:

Overall length of test vehicle:

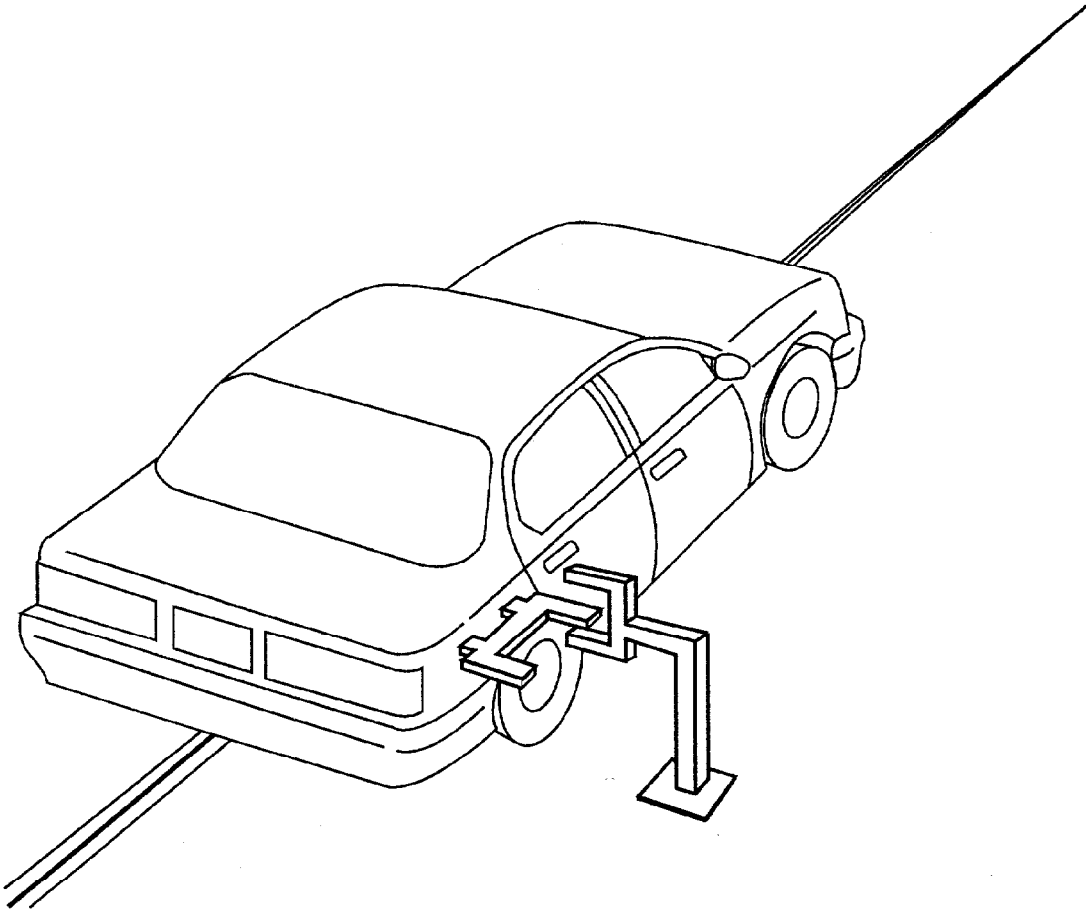
|                |            |            |            |
|----------------|------------|------------|------------|
| Pre-test:      | L: 5009 mm | C: 5237 mm | R: 5009 mm |
| Post-test:     | L: 4530 mm | C: 4982 mm | R: 5120 mm |
| Total crush:   | L: 479 mm  | C: 255 mm  | R: -111 mm |
| Average crush: | 208 mm     |            |            |

Test vehicle rebound from 40% left offset deformable barrier:

Distance from test vehicle to barrier:

|                  |        |        |        |
|------------------|--------|--------|--------|
| Post-test:       | L: N/A | C: N/A | R: N/A |
| Average rebound: | N/A    |        |        |

Figure 1 Impact Velocity Measurement System



The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 610-millimeter spacing.

Figure 2 Accident Investigation Division Data for 35 mph 40% Left ODB Impact

Test date: June 25, 1999  
 Vehicle year/make/model/body style: 1999/Dodge/Intrepid/Sedan  
 VIN: 2B3HD46R4XH657282  
 Build date: 12/98  
 Test weight: 1688.3 kg  
 Vehicle wheelbase: 2875 mm  
 Maximum width: 1890 mm  
 Front overhang: 1097 mm

Collision Deformation  
 Classification (CDC) Code: 12FDEW4

Crush depth measurements:

|     |         |
|-----|---------|
| C1: | 479 mm  |
| C2: | 647 mm  |
| C3: | 539 mm  |
| C4: | 137 mm  |
| C5: | 6 mm    |
| C6: | -111 mm |

Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged region: L: 1525 mm

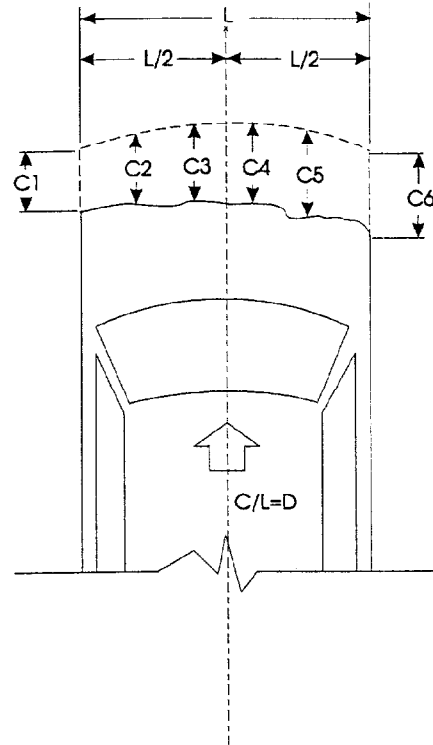
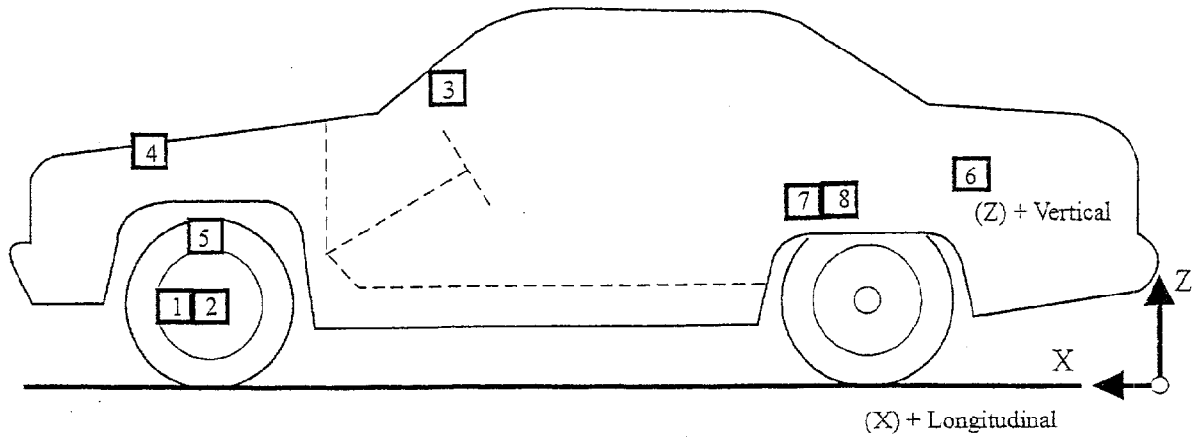
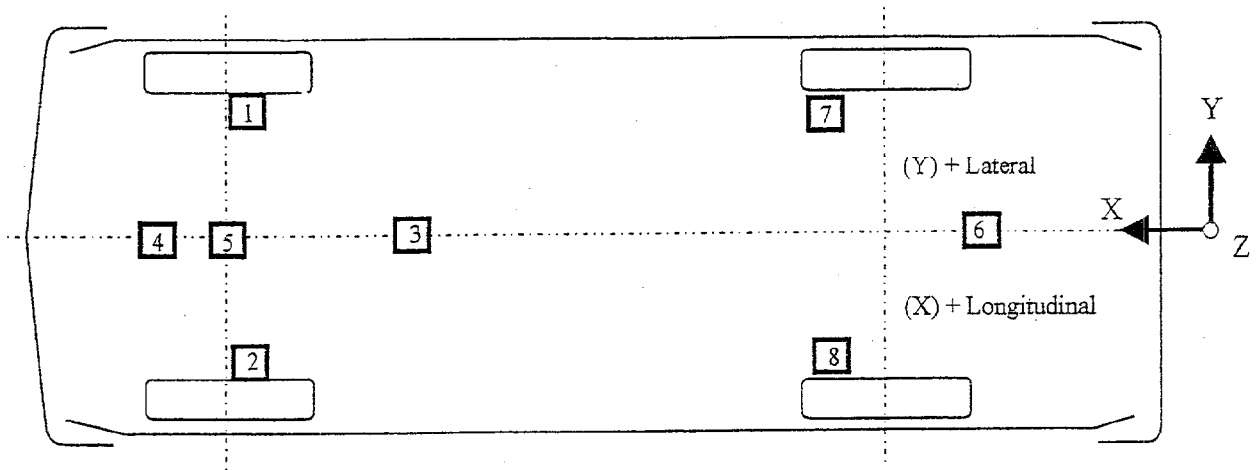


Figure 3 Vehicle Accelerometer Placement



Side View



Bottom View

Table 4 Vehicle Accelerometer Locations and Data Summary

| TEST NUMBER: 990625-1<br>No. LOCATION | X       |          | Y       |         | Z      |            | POSITIVE<br>DIRECTION |            | NEGATIVE<br>DIRECTION |  |
|---------------------------------------|---------|----------|---------|---------|--------|------------|-----------------------|------------|-----------------------|--|
|                                       | PRE     | POST     | PRE     | POST    | PRE    | POST       |                       |            |                       |  |
| 1 LEFT BRAKE CALIPER                  | 4205 mm | 4140 mm  | 690 mm  | 630 mm  | 317 mm | 245 mm     |                       |            |                       |  |
| LONGITUDINAL                          |         |          |         |         | 72.2 g | @ 93.7 ms  | 53.7 g                | @ 101.2 ms |                       |  |
| 2 RIGHT BRAKE CALIPER                 | 4205 mm | 4320 mm  | -690 mm | -690 mm | 315 mm | 314 mm     |                       |            |                       |  |
| LONGITUDINAL                          |         |          |         |         | 5.4 g  | @ 152.9 ms | 53.5 g                | @ 83.8 ms  |                       |  |
| 3 INSTRUMENT PANEL<br>CENTER          | 3477 mm | 3440 mm  | -45 mm  | -45 mm  | 890 mm | 897 mm     |                       |            |                       |  |
| LONGITUDINAL                          |         |          |         |         | 31.4 g | @ 158.2 ms | 60.2 g                | @ 89.1 ms  |                       |  |
| 4 ENGINE TOP                          | 4664 mm | 4540 mm  | -131 mm | -189 mm | 785 mm | 748 mm     |                       |            |                       |  |
| LONGITUDINAL                          |         |          |         |         | 12.5 g | @ 90.9 ms  | 58.2 g                | @ 64.7 ms  |                       |  |
| 5 ENGINE BOTTOM                       | 4555 mm | 44431 mm | 0 mm    | -58 mm  | 178 mm | 160 mm     |                       |            |                       |  |
| LONGITUDINAL                          |         |          |         |         | 51.7 g | @ 69.5 ms  | 47.9 g                | @ 63.8 ms  |                       |  |



Table 4 Vehicle Accelerometer Locations and Data Summary, Cont'd.

| TEST NUMBER: 990625-1 |                           |              |         |        |                    |            |                    |           |  |
|-----------------------|---------------------------|--------------|---------|--------|--------------------|------------|--------------------|-----------|--|
| No. LOCATION          |                           | X            | Y       | Z      | POSITIVE DIRECTION |            | NEGATIVE DIRECTION |           |  |
| 6                     | REAR VEHICLE              | PRE 269 mm   | 0 mm    | 500 mm | 5.5 g              | @ 124.3 ms | 9.4 g              | @ 99.8 ms |  |
|                       | CENTERLINE VERTICAL       | POST 260 mm  | 0 mm    | 511 mm |                    |            |                    |           |  |
| 7                     | LEFT REAR SEAT            | PRE 2141 mm  | 645 mm  | 379 mm | 2.3 g              | @ 201.4 ms | 31.9 g             | @ 91.8 ms |  |
|                       | LONGITUDINAL              | POST 2142 mm | 645 mm  | 348 mm |                    |            |                    |           |  |
| 8                     | RIGHT REAR SEAT           | PRE 2141 mm  | -645 mm | 375 mm | 36.6 g             | @ 99.8 ms  | 0.0 g              | @ 0.0 ms  |  |
|                       | LONGITUDINAL <sup>1</sup> | POST 2142 mm | -645 mm | 348 mm |                    |            |                    |           |  |

REFERENCE: X: + FORWARD FROM REAR BUMPER  
Y: + LEFTWARD FROM VEHICLE CENTERLINE  
Z: + UPWARD FROM GROUND LEVEL

<sup>1</sup>See DATA ACQUISITION EXPLANATIONS

## Section 3.0

### FMVSS 208 Data

Table 5 Dummy Injury Criteria

|           | <u>Maximum Acceleration</u> |        |        |        |         |        |        |
|-----------|-----------------------------|--------|--------|--------|---------|--------|--------|
|           | Head                        |        |        |        | Chest   |        |        |
|           | X                           | Y      | Z      | R      | X       | Y      | Z      |
| Driver    | -82.3 g                     | 14.5 g | 62.3 g | 86.8 g | -83.6 g | 14.0 g | 16.0 g |
| Passenger | -45.0 g                     | 40.0 g | 53.5 g | 65.7 g | -70.8 g | 32.6 g | 28.1 g |

Maximum Femur Compressive Force

|           | Left Femur | Right Femur |
|-----------|------------|-------------|
| Driver    | 2914 N     | 2928 N      |
| Passenger | 4450 N     | 3032 N      |

15-millisecond Head Injury Criteria<sup>1</sup>

|           | HIC | Time t <sub>1</sub> | Time t <sub>2</sub> |
|-----------|-----|---------------------|---------------------|
| Driver    | 472 | 85.2 ms             | 100.2 ms            |
| Passenger | 368 | 124.2 ms            | 139.3 ms            |

36-millisecond Head Injury Criteria<sup>1</sup>

|           | HIC | Time t <sub>1</sub> | Time t <sub>2</sub> |
|-----------|-----|---------------------|---------------------|
| Driver    | 709 | 79.6 ms             | 113.4 ms            |
| Passenger | 634 | 109.2 ms            | 145.2 ms            |

Chest Maximum Resultant Acceleration<sup>2</sup>

|           | Acceleration | Time t <sub>1</sub> | Time t <sub>2</sub> |
|-----------|--------------|---------------------|---------------------|
| Driver    | 51.5 g       | 101.4 ms            | 104.5 ms            |
| Passenger | 77.8 g       | 116.2 ms            | 119.3 ms            |

Maximum Chest Deflection

|           |         |
|-----------|---------|
| Driver    | 40.9 mm |
| Passenger | 12.3 mm |

<sup>1</sup> As defined in FMVSS No. 208

<sup>2</sup> Defined as equal to or exceeding 0.003 sec. duration

## Dummy Kinematic Summary

### Driver Dummy

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The front of the dummy's head then hit the steering wheel. The dummy's chest impacted the airbag and soon after the dummy's head impacted the airbag. As the dummy translated forward, the dummy's chest impacted the steering wheel. The dummy rebounded rearward into the seat. The dummy then came to rest seated upright in the driver's seat, leaning slightly forward and to the left.

### Right Front Passenger Dummy

Upon impact, the passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy impacted its head and chest into the airbag. The dummy's head continued to translate forward into the airbag until the top of the dummy's head reached the instrument panel. The top of the dummy's head rebounded off of the instrument panel. The dummy rebounded rearward into the seat. The dummy came to rest seated upright in the passenger's seat, leaning slightly forward and to the left.

## Section 4.0

### Vehicle, Occupant, and Camera Measurements

Figure 4 Pre-test and Post-test Measurement Points

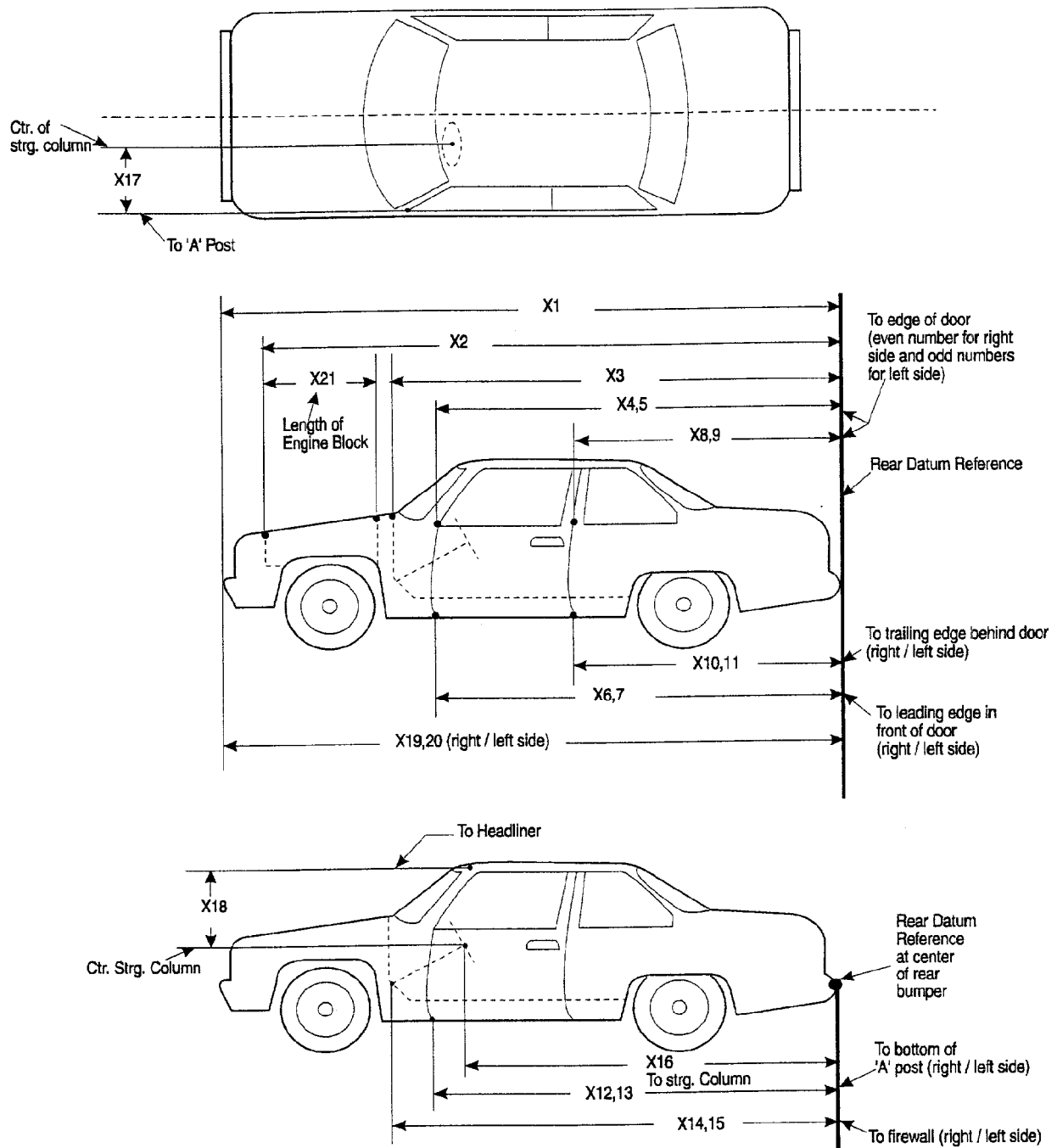


Table 6 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1999/Dodge/Intrepid/Sedan

Test Number: 990625-1

| No. | Type of measurement                                        | Pre-Test | Post-Test | Difference |
|-----|------------------------------------------------------------|----------|-----------|------------|
| X1  | Total Length of Veh. at Centerline                         | 5237     | 4982      | 255        |
| X2  | Rear Surface of Veh. to Front of Engine Block              | 4707     | 4532      | 175        |
| X3  | Rear Surface of Veh. to Firewall                           | 4273     | 4200      | 73         |
| X4  | Rear Surface of Veh. to Upper Leading Edge of Right Door   | 3687     | 3694      | -7         |
| X5  | Rear Surface of Veh. to Upper Leading Edge of Left Door    | 3687     | 3688      | -1         |
| X6  | Rear Surface of Veh. to Lower Leading Edge of Right Door   | 3632     | 3634      | -2         |
| X7  | Rear Surface of Veh. to Lower Leading Edge of Left Door    | 3636     | 3641      | -5         |
| X8  | Rear Surface of Veh. to Upper Trailing Edge of Right Door  | 2595     | 2599      | -4         |
| X9  | Rear Surface of Veh. to Upper Trailing Edge of Left Door   | 2592     | 2595      | -3         |
| X10 | Rear Surface of Veh. to Lower Trailing Edge of Right Door  | 2592     | 2594      | -2         |
| X11 | Rear Surface of Veh. to Lower Trailing Edge of Left Door   | 2600     | 2599      | 1          |
| X12 | Rear Surface of Veh. to Bottom of " A " Post on Right Side | 3606     | 3590      | 16         |
| X13 | Rear Surface of Veh. to Bottom of " A " Post on Left Side  | 3595     | 3586      | 9          |
| X14 | Rear Surface of Veh. to Firewall--Right Side               | 4266     | 4262      | 4          |
| X15 | Rear Surface of Vehicle to Firewall --Left Side            | 4517     | 4175      | 342        |
| X16 | Rear Surface of Veh. to Steering Wheel Center              | 3131     | 3240      | -109       |
| X17 | Center of Steering Column to " A " Post                    | 296      | 287       | 9          |
| X18 | Center of Steering Column to Headliner                     | 400      | 450       | -50        |
| X19 | Rear Surface of Veh. to Right Side of Front Bumper         | 5009     | 5120      | -111       |
| X20 | Rear Surface of Veh. to Left Side of Front Bumper          | 5009     | 4530      | 479        |
| X21 | Length of Engine Block                                     | 500      | 500       | 0          |

Figure 5 Vehicle Target Locations

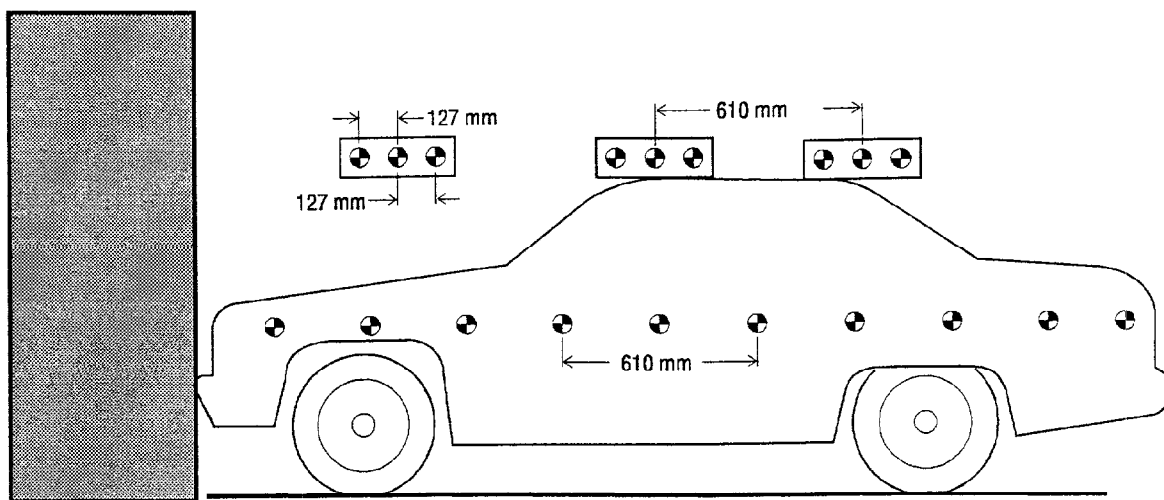




Figure 6 Dummy Measurement Locations for Front Seat Occupants

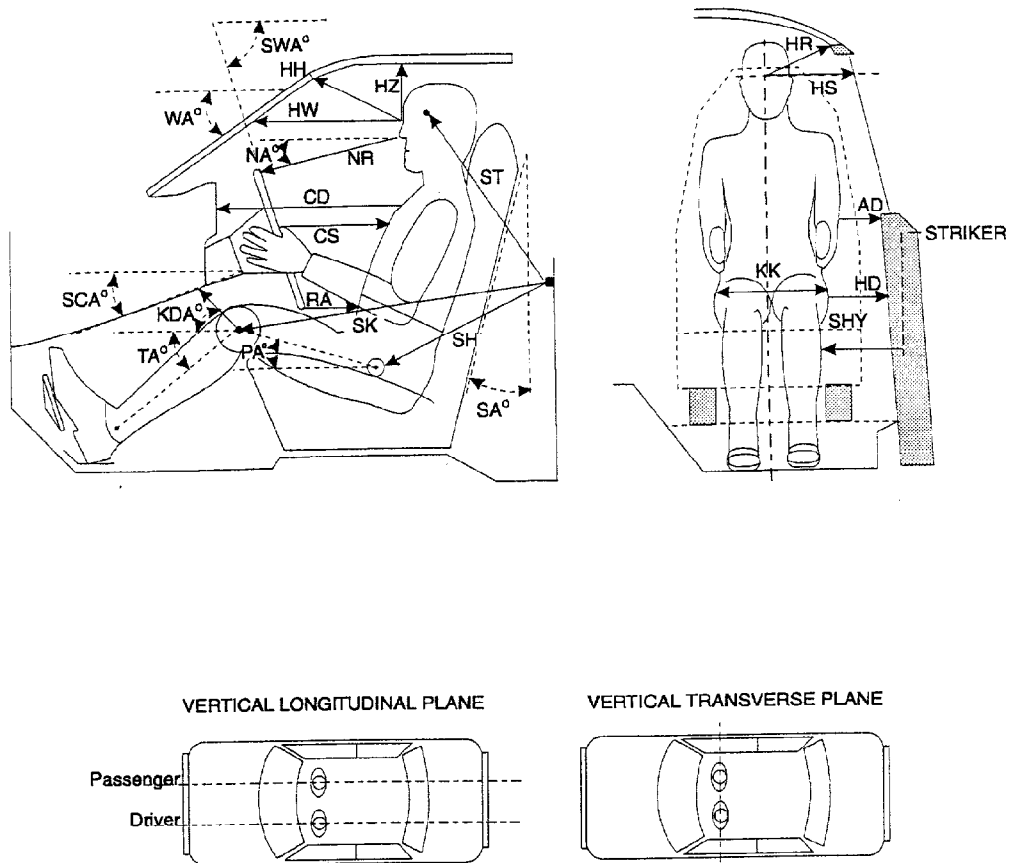


Table 7 Dummy Measurement Data For Front Seat Occupants

| Designation     | Type of Measurement         | Driver<br>(Serial #369) | Passenger<br>(Serial #289) |
|-----------------|-----------------------------|-------------------------|----------------------------|
| WA              | Windshield angle            | 22.5°                   | 22.5°                      |
| SWA             | Steering wheel angle        | 70°                     | N/A                        |
| SCA             | Steering column angle       | 20°                     | N/A                        |
| SA              | Seat back angle             | 18.0°                   | 22.4°                      |
| HZ              | Head to roof                | 214 mm                  | 190 mm                     |
| HH              | Head to header              | 285 mm                  | 277 mm                     |
| HW              | Head to windshield          | 651 mm                  | 609 mm                     |
| HR              | Head to side header         | 253 mm                  | 220 mm                     |
| NR              | Nose to rim                 | 251 mm                  | N/A                        |
| NA              | Nose to rim angle           | 1.5°                    | N/A                        |
| CD              | Chest to dash               | 438 mm                  | 424 mm                     |
| CS              | Steering wheel to chest     | 179 mm                  | N/A                        |
| RA              | Rim to abdomen              | 103 mm                  | N/A                        |
| KDL             | Left knee to dash           | 109 mm                  | 138 mm                     |
| KDR             | Right knee to dash          | 126 mm                  | 125 mm                     |
| KDA             | Outboard knee to dash angle | 27.9°                   | 54.2°                      |
| PA              | Pelvic angle                | 21.2°                   | 18.9°                      |
| TA              | Tibial angle                | 52.2°                   | 46.2°                      |
| KK              | Knee to knee                | 230 mm                  | 235 mm                     |
| ST <sup>1</sup> | Striker to head             | 438 mm                  | 498 mm                     |
|                 | Striker to head angle       | -66.4°                  | -69.5°                     |
| SK <sup>1</sup> | Striker to knee             | 626 mm                  | 620 mm                     |
|                 | Striker to knee angle       | 1.8°                    | 0.9°                       |
| SH <sup>1</sup> | Striker to H-point          | 329 mm                  | 332 mm                     |
|                 | Striker to H-point angle    | 22.6°                   | 21.3°                      |
| SHY             | Striker to H-point (Y dir.) | 316 mm                  | 322 mm                     |
| HS              | Head to side window         | 399 mm                  | 342 mm                     |
| HD              | H-point to door             | 228 mm                  | 258 mm                     |
| AD              | Arm to door                 | 179 mm                  | 177 mm                     |

The seat back angle (SA°) is measured relative to vertical, all other angles are measured relative to horizontal.

<sup>1</sup> A negative angle indicates the measurement point was above the striker.

Figure 7 Camera Positions

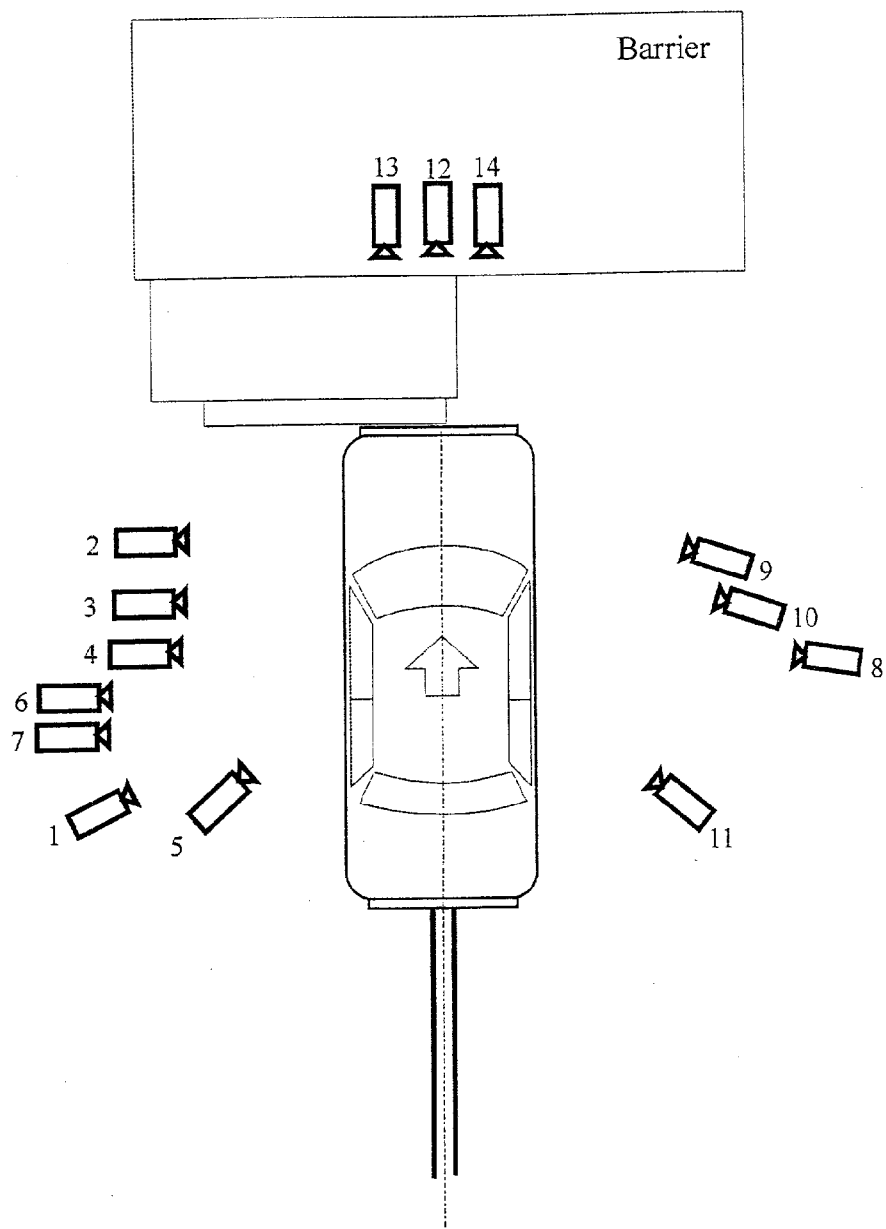


Table 8 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1999/Dodge/Intrepid/Sedan

Test number: 990625-1

| Camera Number | View                       | Camera Positions <sup>1</sup> |          |         | Camera Angle <sup>2</sup> | Film Plane to Head Target | Camera Lens | Film Speed       |
|---------------|----------------------------|-------------------------------|----------|---------|---------------------------|---------------------------|-------------|------------------|
|               |                            | X                             | Y        | Z       |                           |                           |             |                  |
| 1             | Real-time panning/doc      | NA                            | NA       | NA      | NA                        | NA                        | 16 mm       | 24 frames/s      |
| 2             | Left vehicle crush         | 305 mm                        | 5486 mm  | 470 mm  | NA                        | NA                        | 25 mm       | 997 frames/s     |
| 3             | Left windshield intrusion  | 914 mm                        | 7391 mm  | 1143 mm | NA                        | NA                        | 50 mm       | 1010 frames/s    |
| 4             | Left windshield intrusion  | 1041 mm                       | 8077 mm  | 1321 mm | NA                        | 7620 mm                   | 25 mm       | 1012 frames/s    |
| 5             | Driver kinematics          | 2743 mm                       | 3048 mm  | 2007 mm | NA                        | 2743 mm                   | 25 mm       | 989 frames/s     |
| 6             | Steering column motion     | 2134 mm                       | 9042 mm  | 1930 mm | NA                        | 8534 mm                   | 25 mm       | 997 frames/s     |
| 7             | Steering column motion     | 2134 mm                       | 9042 mm  | 3023 mm | NA                        | 8687 mm                   | 25 mm       | 1007 frames/s    |
| 8             | Right overall              | 2642 mm                       | -7925 mm | 762 mm  | NA                        | 7620 mm                   | 13 mm       | 1007 frames/s    |
| 9             | Right windshield intrusion | 914 mm                        | -7442 mm | 1130 mm | NA                        | NA                        | 50 mm       | 1005 frames/s    |
| 10            | Passenger kinematics       | 1524 mm                       | -7620 mm | 1346 mm | NA                        | 7315 mm                   | 25 mm       | 997 frames/s     |
| 11            | Passenger kinematics       | 2743 mm                       | -3048 mm | 2032 mm | NA                        | 2438 mm                   | 25 mm       | 1012 frames/s    |
| 12            | Windshield front view      | NA                            | NA       | 2388 mm | NA                        | NA                        | 13 mm       | N/A <sup>3</sup> |
| 13            | Driver - front view        | NA                            | NA       | 2362 mm | NA                        | NA                        | 17 mm       | 992 frames/s     |
| 14            | Passenger - front view     | NA                            | NA       | 2388 mm | NA                        | NA                        | 17 mm       | 1007 frames/s    |

<sup>1</sup> +X: Film plane forward of barrier face

+Y: Film plane to left of monorail centerline

+Z: Film plane above ground level

<sup>2</sup> Camera angle measurements were not recorded for this test.<sup>3</sup> The camera did not run during the impact event.

Figure 8 Deformable Barrier Face Profile 1-11

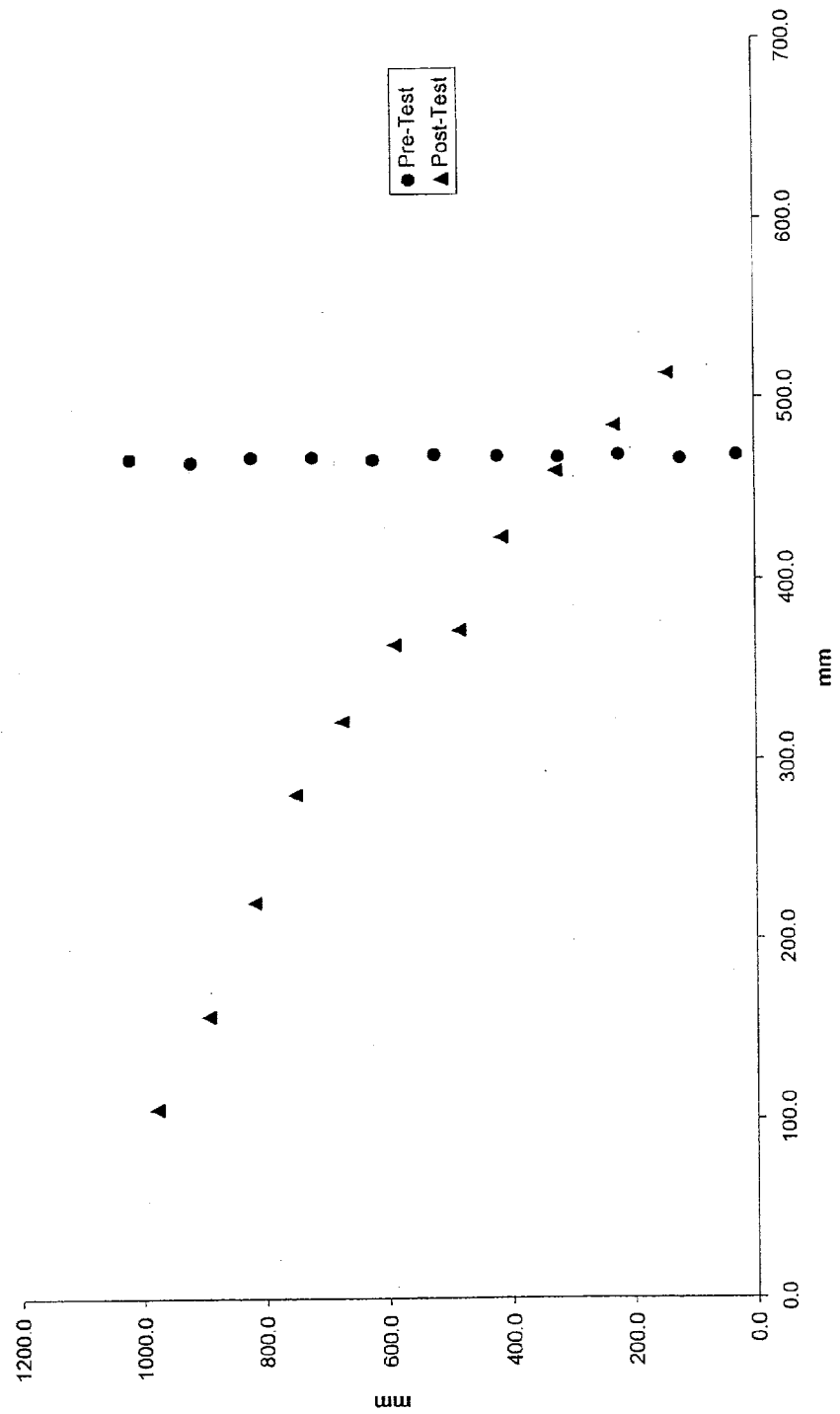


Figure 8 Deformable Barrier Face Profile 12-22

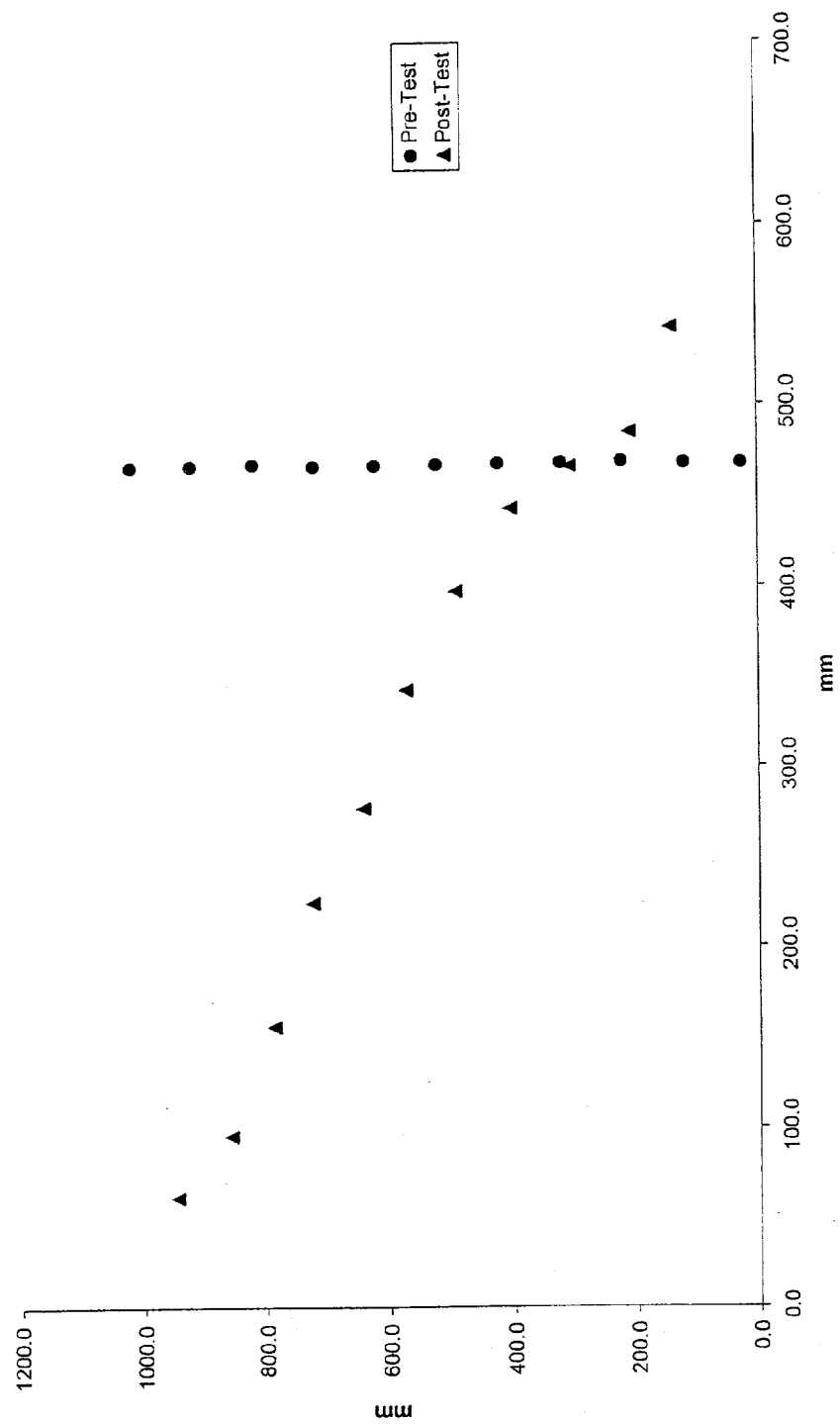


Figure 8 Deformable Barrier Face Profile 23-33

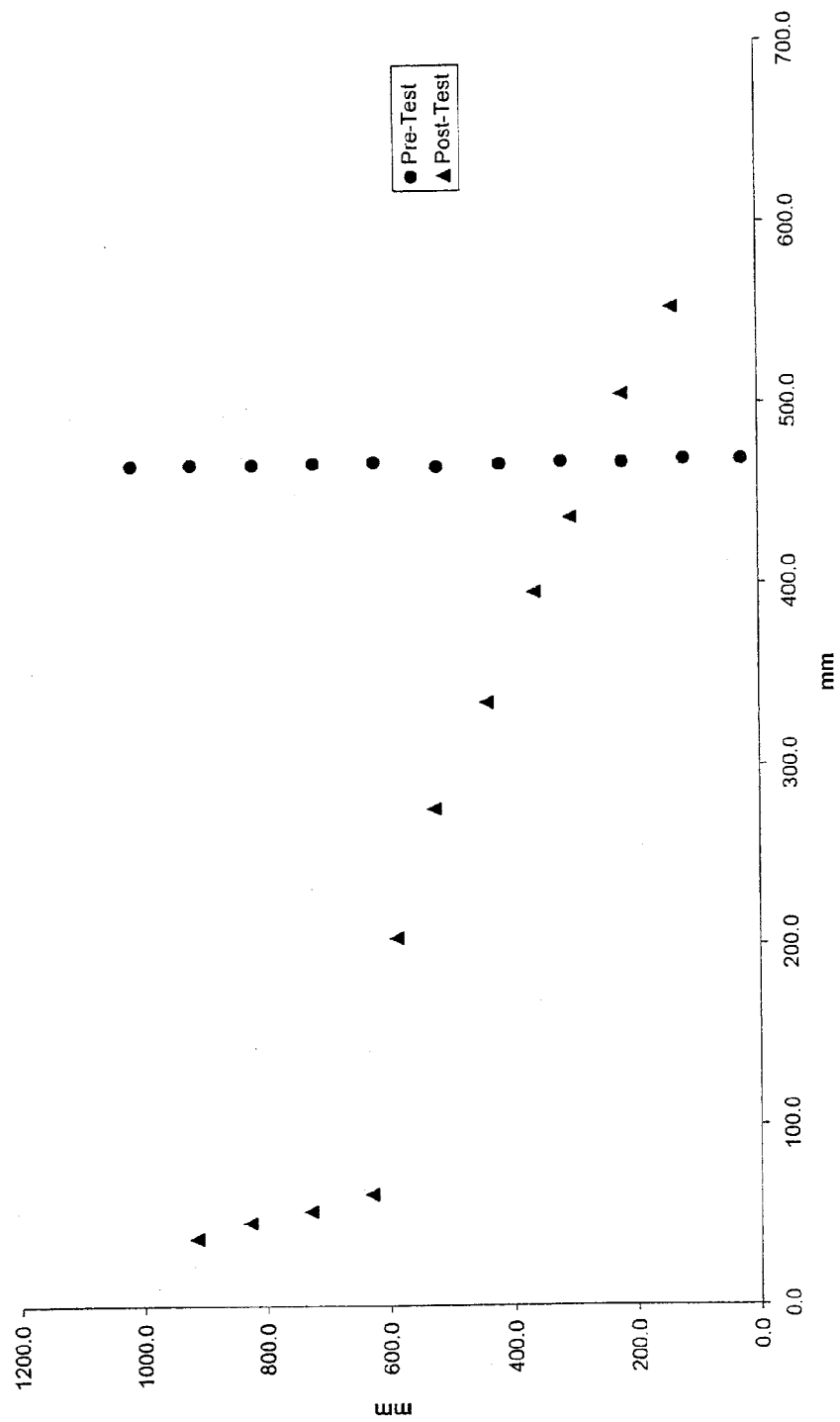


Figure 8 Deformable Barrier Face Profile 34-44

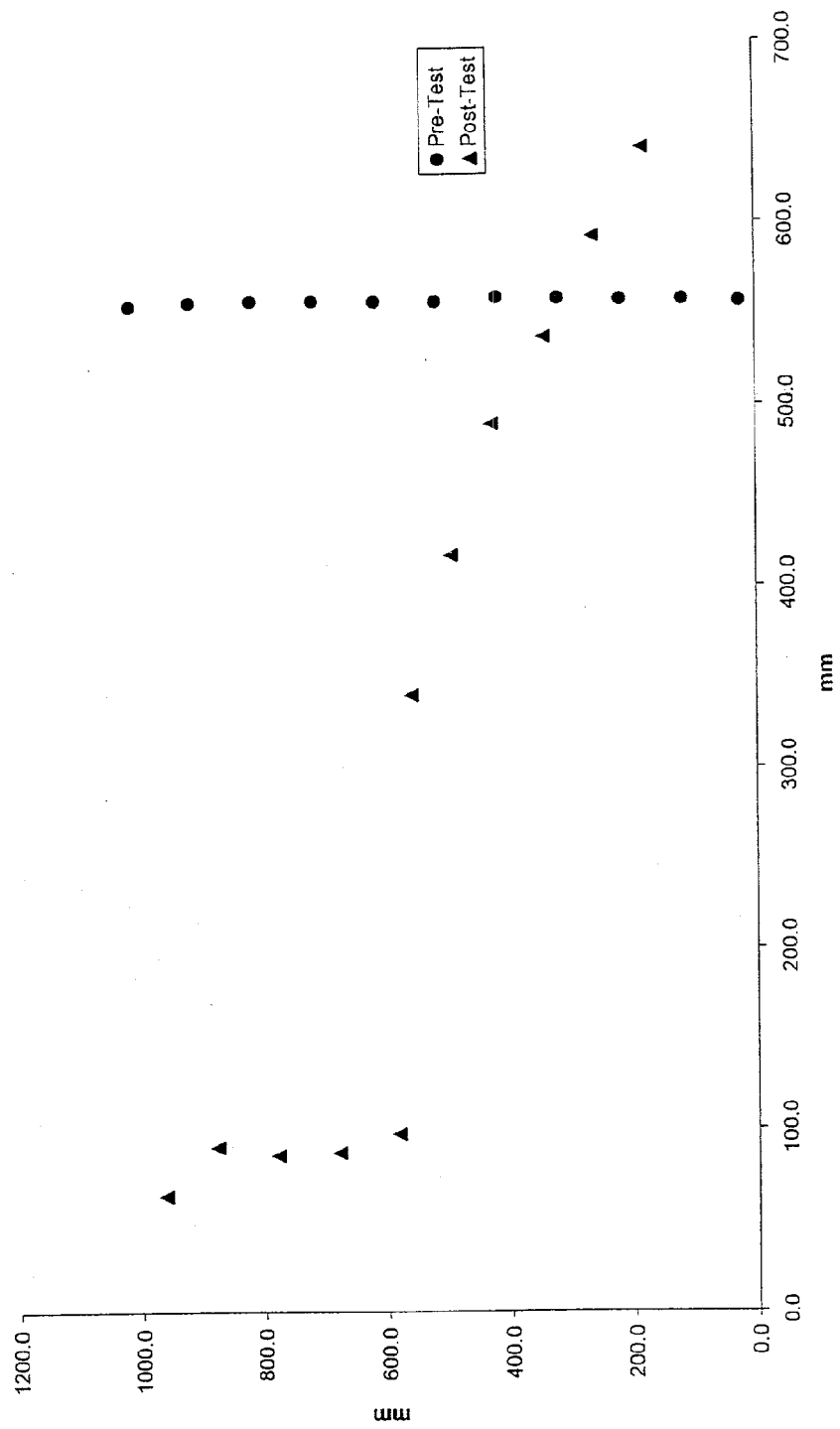




Figure 8 Deformable Barrier Face Profile 45-55

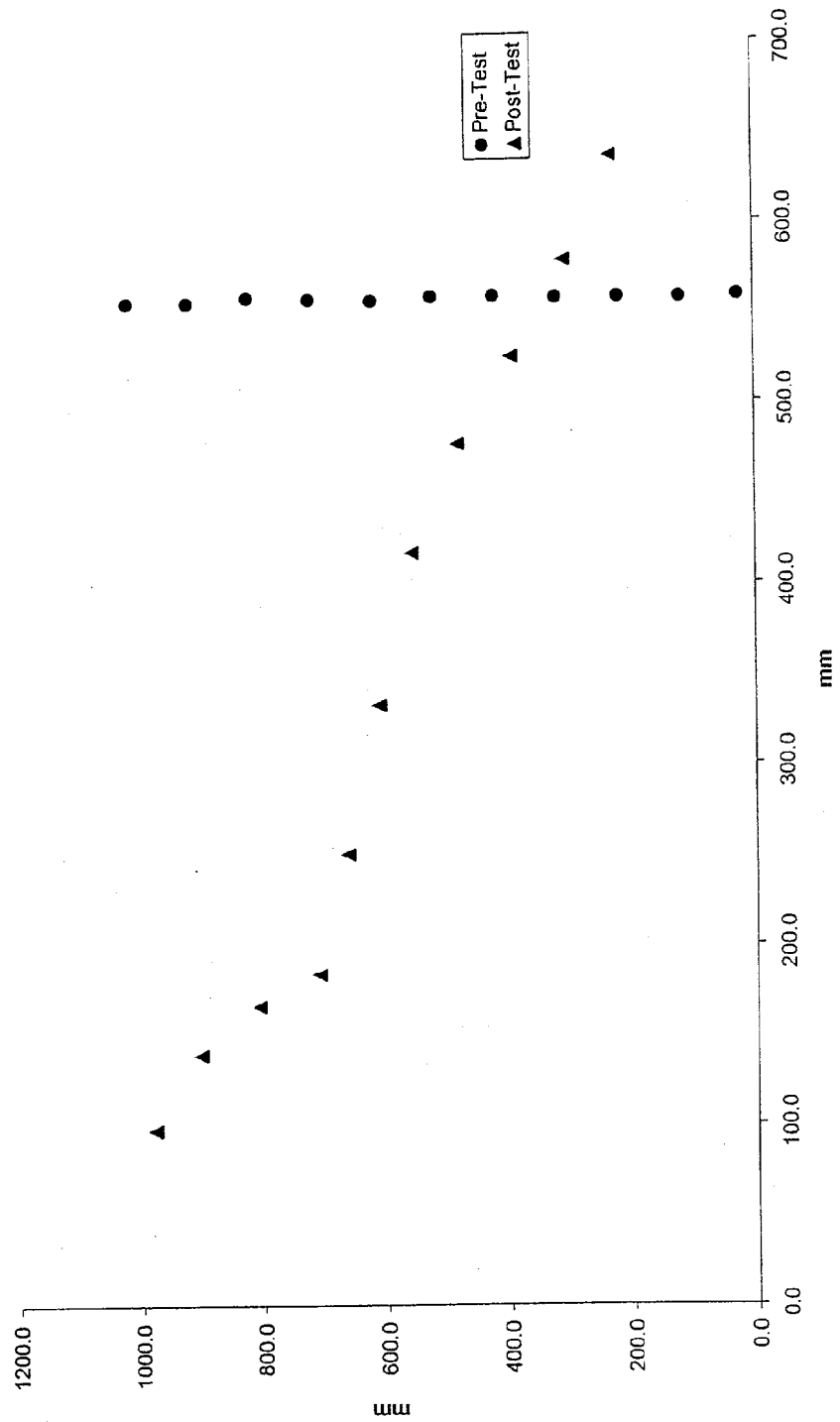


Figure 8 Deformable Barrier Face Profile 56-66

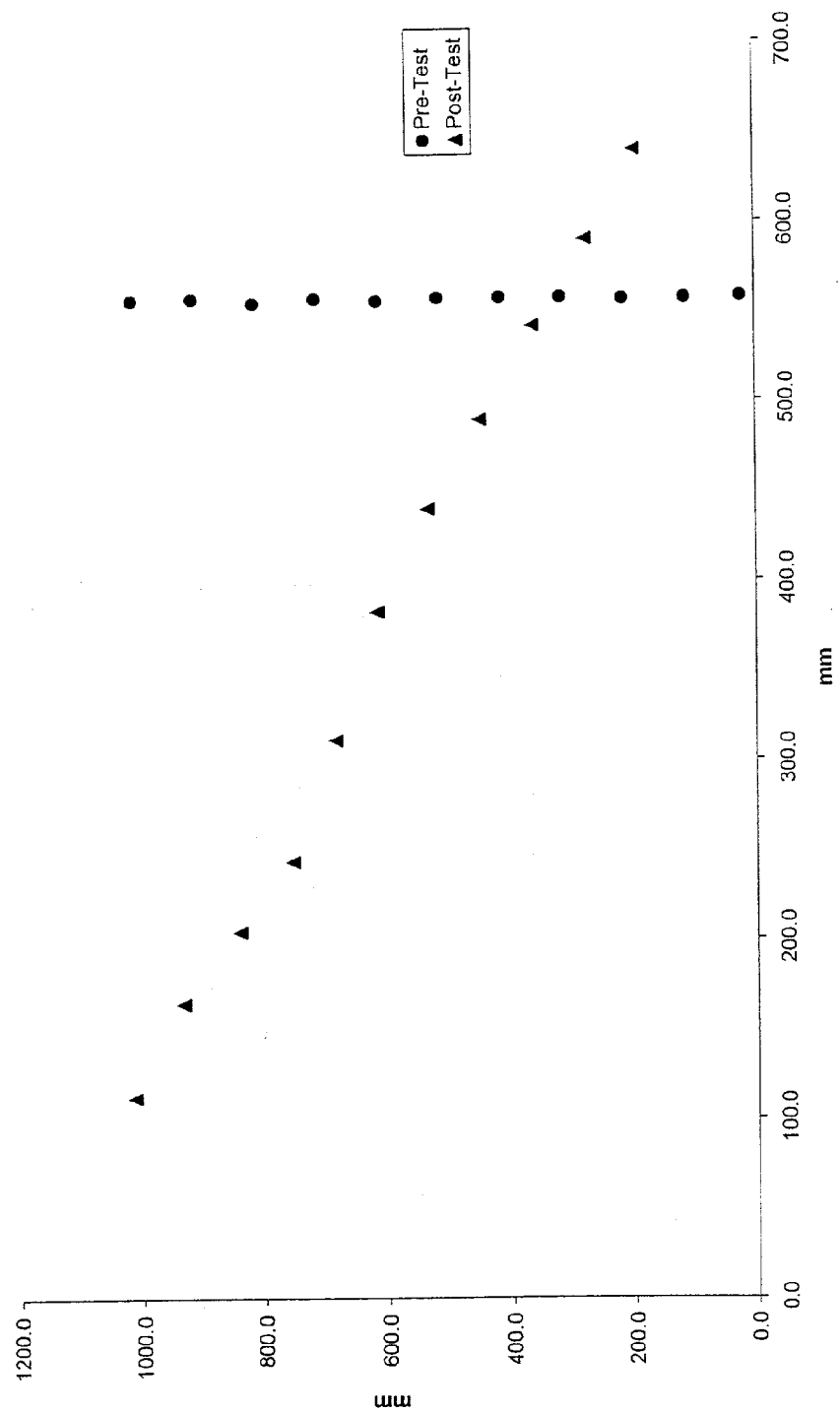


Table 9 Deformable Barrier Face Profile

| Pre-Test |       |        |       | Post-Test |       |       |       | Difference |       |        |       |
|----------|-------|--------|-------|-----------|-------|-------|-------|------------|-------|--------|-------|
| Index    | Xmm   | Ymm    | Zmm   | Index     | Xmm   | Ymm   | Zmm   | Index      | Xmm   | Ymm    | Zmm   |
| 1        | 468.5 | 29.8   | 657.3 | 1         | 513.0 | 144.3 | 571.6 | 1          | -44.5 | -114.5 | 85.7  |
| 2        | 466.5 | 123.5  | 658.8 | 2         | 484.6 | 231.8 | 555.5 | 2          | -18.1 | -108.3 | 103.3 |
| 3        | 468.5 | 224.2  | 656.9 | 3         | 459.5 | 326.9 | 535.2 | 3          | 9.0   | -102.7 | 121.7 |
| 4        | 467.5 | 322.9  | 657.7 | 4         | 422.8 | 415.8 | 510.0 | 4          | 44.7  | -92.9  | 147.7 |
| 5        | 468.3 | 422.1  | 656.8 | 5         | 371.8 | 485.7 | 489.5 | 5          | 96.5  | -63.6  | 167.3 |
| 6        | 469.4 | 523.6  | 654.5 | 6         | 364.0 | 590.0 | 498.8 | 6          | 105.4 | -66.4  | 155.7 |
| 7        | 466.6 | 622.7  | 654.4 | 7         | 321.7 | 675.2 | 496.6 | 7          | 144.9 | -52.5  | 157.8 |
| 8        | 468.2 | 722.1  | 652.6 | 8         | 280.4 | 751.6 | 510.0 | 8          | 187.8 | -29.5  | 142.6 |
| 9        | 468.0 | 821.9  | 652.2 | 9         | 219.8 | 819.2 | 530.5 | 9          | 248.2 | 2.7    | 121.7 |
| 10       | 465.3 | 920.9  | 651.0 | 10        | 157.3 | 895.0 | 548.5 | 10         | 308.0 | 25.9   | 102.5 |
| 11       | 467.4 | 1020.0 | 650.4 | 11        | 105.9 | 979.1 | 548.3 | 11         | 361.5 | 40.9   | 102.1 |
| 12       | 468.0 | 27.5   | 549.6 | 12        | 541.8 | 142.9 | 465.5 | 12         | -73.8 | -115.4 | 84.1  |
| 13       | 468.0 | 122.3  | 549.8 | 13        | 484.3 | 210.2 | 447.9 | 13         | -16.3 | -87.9  | 101.9 |
| 14       | 468.8 | 223.4  | 546.0 | 14        | 465.7 | 307.8 | 428.8 | 14         | 3.1   | -84.4  | 117.2 |
| 15       | 468.1 | 322.1  | 547.8 | 15        | 442.3 | 403.3 | 411.2 | 15         | 25.8  | -81.2  | 136.6 |
| 16       | 467.9 | 423.5  | 546.8 | 16        | 397.2 | 491.9 | 400.8 | 16         | 70.7  | -68.4  | 146.0 |
| 17       | 467.6 | 522.4  | 546.0 | 17        | 342.8 | 572.0 | 396.3 | 17         | 124.8 | -49.6  | 149.7 |
| 18       | 467.1 | 621.9  | 545.0 | 18        | 276.7 | 642.0 | 417.0 | 18         | 190.4 | -20.1  | 128.0 |
| 19       | 466.5 | 721.2  | 544.4 | 19        | 224.0 | 724.7 | 423.5 | 19         | 242.5 | -3.5   | 120.9 |
| 20       | 467.5 | 821.1  | 544.1 | 20        | 156.0 | 787.7 | 449.1 | 20         | 311.5 | 33.4   | 95.0  |
| 21       | 466.9 | 922.4  | 542.7 | 21        | 95.7  | 859.2 | 468.7 | 21         | 371.2 | 63.2   | 74.0  |
| 22       | 466.7 | 1020.1 | 542.6 | 22        | 61.7  | 948.0 | 454.0 | 22         | 405.0 | 72.1   | 88.6  |

Table 9 Deformable Barrier Face Profile Cont'd.

| Pre-Test |       |        |       | Post-Test |       |       |       | Difference |       |        |       |
|----------|-------|--------|-------|-----------|-------|-------|-------|------------|-------|--------|-------|
| Index    | Xmm   | Ymm    | Zmm   | Index     | Xmm   | Ymm   | Zmm   | Index      | Xmm   | Ymm    | Zmm   |
| 23       | 469.2 | 27.1   | 436.4 | 23        | 552.2 | 140.3 | 355.3 | 23         | -83.0 | -113.2 | 81.1  |
| 24       | 469.1 | 122.0  | 436.1 | 24        | 504.2 | 222.5 | 352.8 | 24         | -35.1 | -100.5 | 83.3  |
| 25       | 467.3 | 221.2  | 436.7 | 25        | 436.2 | 306.3 | 328.7 | 25         | 31.1  | -85.1  | 108.0 |
| 26       | 467.8 | 320.9  | 436.1 | 26        | 395.1 | 365.7 | 321.2 | 26         | 72.7  | -44.8  | 114.9 |
| 27       | 466.9 | 419.7  | 433.9 | 27        | 334.9 | 442.4 | 326.2 | 27         | 132.0 | -22.7  | 107.7 |
| 28       | 465.5 | 520.9  | 435.1 | 28        | 275.6 | 527.4 | 327.6 | 28         | 189.9 | -6.5   | 107.5 |
| 29       | 468.4 | 621.8  | 431.6 | 29        | 203.8 | 589.8 | 349.5 | 29         | 264.6 | 32.0   | 82.1  |
| 30       | 467.6 | 721.1  | 430.7 | 30        | 62.8  | 630.9 | 335.1 | 30         | 404.8 | 90.2   | 95.6  |
| 31       | 466.8 | 821.0  | 429.9 | 31        | 53.4  | 730.8 | 345.4 | 31         | 413.4 | 90.2   | 84.5  |
| 32       | 467.0 | 921.5  | 431.1 | 32        | 47.1  | 829.5 | 362.1 | 32         | 419.9 | 92.0   | 69.0  |
| 33       | 466.9 | 1018.3 | 429.4 | 33        | 38.0  | 916.4 | 368.1 | 33         | 428.9 | 101.9  | 61.3  |
| 34       | 556.5 | 26.0   | 333.1 | 34        | 639.9 | 183.0 | 266.7 | 34         | -83.4 | -157.0 | 66.4  |
| 35       | 557.5 | 118.9  | 331.5 | 35        | 591.5 | 263.2 | 277.8 | 35         | -34.0 | -144.3 | 53.7  |
| 36       | 557.2 | 220.4  | 329.7 | 36        | 536.5 | 343.2 | 290.8 | 36         | 20.7  | -122.8 | 38.9  |
| 37       | 558.0 | 320.2  | 328.8 | 37        | 489.3 | 429.1 | 302.3 | 37         | 68.7  | -108.9 | 26.5  |
| 38       | 558.8 | 420.1  | 326.9 | 38        | 416.3 | 496.6 | 301.3 | 38         | 142.5 | -76.5  | 25.6  |
| 39       | 556.8 | 519.0  | 327.5 | 39        | 339.9 | 560.2 | 301.5 | 39         | 216.9 | -41.2  | 26.0  |
| 40       | 557.0 | 617.9  | 326.7 | 40        | 97.5  | 583.3 | 256.5 | 40         | 459.5 | 34.6   | 70.2  |
| 41       | 557.2 | 719.0  | 325.8 | 41        | 87.5  | 681.0 | 273.3 | 41         | 469.7 | 38.0   | 52.5  |
| 42       | 557.2 | 819.6  | 325.3 | 42        | 86.2  | 779.6 | 291.2 | 42         | 471.0 | 40.0   | 34.1  |
| 43       | 556.7 | 919.9  | 324.4 | 43        | 90.6  | 878.5 | 312.3 | 43         | 466.1 | 41.4   | 12.1  |
| 44       | 555.0 | 1017.4 | 324.5 | 44        | 64.5  | 963.4 | 317.7 | 44         | 490.5 | 54.0   | 6.8   |

Table 9 Deformable Barrier Face Profile Cont'd.

| Pre-Test |       |        |       | Post-Test |       |        |       | Difference |       |        |      |
|----------|-------|--------|-------|-----------|-------|--------|-------|------------|-------|--------|------|
| Index    | Xmm   | Ymm    | Zmm   | Index     | Xmm   | Ymm    | Zmm   | Index      | Xmm   | Ymm    | Zmm  |
| 45       | 558.2 | 25.5   | 221.7 | 45        | 634.7 | 231.6  | 160.5 | 45         | -76.5 | -206.1 | 61.2 |
| 46       | 557.0 | 121.3  | 223.6 | 46        | 577.0 | 308.5  | 171.2 | 46         | -20.0 | -187.2 | 52.4 |
| 47       | 557.1 | 220.5  | 221.5 | 47        | 524.2 | 394.1  | 181.3 | 47         | 32.9  | -173.6 | 40.2 |
| 48       | 556.7 | 322.1  | 220.1 | 48        | 476.5 | 481.4  | 192.2 | 48         | 80.2  | -159.3 | 27.9 |
| 49       | 557.8 | 421.7  | 217.4 | 49        | 416.3 | 556.9  | 194.9 | 49         | 141.5 | -135.2 | 22.5 |
| 50       | 557.7 | 522.6  | 218.2 | 50        | 332.3 | 610.6  | 188.7 | 50         | 225.4 | -88.0  | 29.5 |
| 51       | 555.9 | 619.9  | 217.3 | 51        | 249.2 | 662.4  | 182.0 | 51         | 306.7 | -42.5  | 35.3 |
| 52       | 556.5 | 721.2  | 217.0 | 52        | 183.5 | 709.6  | 175.4 | 52         | 373.0 | 11.6   | 41.6 |
| 53       | 557.5 | 823.0  | 215.7 | 53        | 165.7 | 808.3  | 189.8 | 53         | 391.8 | 14.7   | 25.9 |
| 54       | 554.8 | 922.0  | 214.0 | 54        | 138.9 | 905.5  | 198.0 | 54         | 415.9 | 16.5   | 16.0 |
| 55       | 555.1 | 1019.4 | 215.5 | 55        | 96.9  | 980.2  | 198.6 | 55         | 458.2 | 39.2   | 16.9 |
| 56       | 557.7 | 23.3   | 110.2 | 56        | 639.1 | 197.2  | 16.6  | 56         | -81.4 | -173.9 | 93.6 |
| 57       | 556.7 | 115.9  | 112.7 | 57        | 589.4 | 277.2  | 24.5  | 57         | -32.7 | -161.3 | 88.2 |
| 58       | 556.0 | 217.7  | 110.9 | 58        | 540.9 | 364.9  | 34.6  | 58         | 15.1  | -147.2 | 76.3 |
| 59       | 557.0 | 318.7  | 109.0 | 59        | 488.8 | 451.1  | 42.2  | 59         | 68.2  | -132.4 | 66.8 |
| 60       | 557.4 | 417.5  | 109.0 | 60        | 439.2 | 535.6  | 51.3  | 60         | 118.2 | -118.1 | 57.7 |
| 61       | 557.4 | 518.2  | 107.1 | 61        | 382.5 | 617.1  | 55.4  | 61         | 174.9 | -98.9  | 51.7 |
| 62       | 555.5 | 616.4  | 106.2 | 62        | 310.9 | 686.0  | 46.9  | 62         | 244.6 | -69.6  | 59.3 |
| 63       | 556.8 | 715.9  | 105.4 | 63        | 242.7 | 755.5  | 39.6  | 63         | 314.1 | -39.6  | 65.8 |
| 64       | 554.3 | 816.1  | 105.8 | 64        | 203.6 | 841.5  | 47.9  | 64         | 350.7 | -25.4  | 57.9 |
| 65       | 556.7 | 917.2  | 103.6 | 65        | 164   | 934.6  | 51    | 65         | 392.7 | -17.4  | 52.6 |
| 66       | 556.4 | 1014.9 | 103.8 | 66        | 112.3 | 1015.4 | 43.9  | 66         | 444.1 | -0.5   | 59.9 |

## Appendix A

### Photographs



Figure A-1 Pre-Test Front View

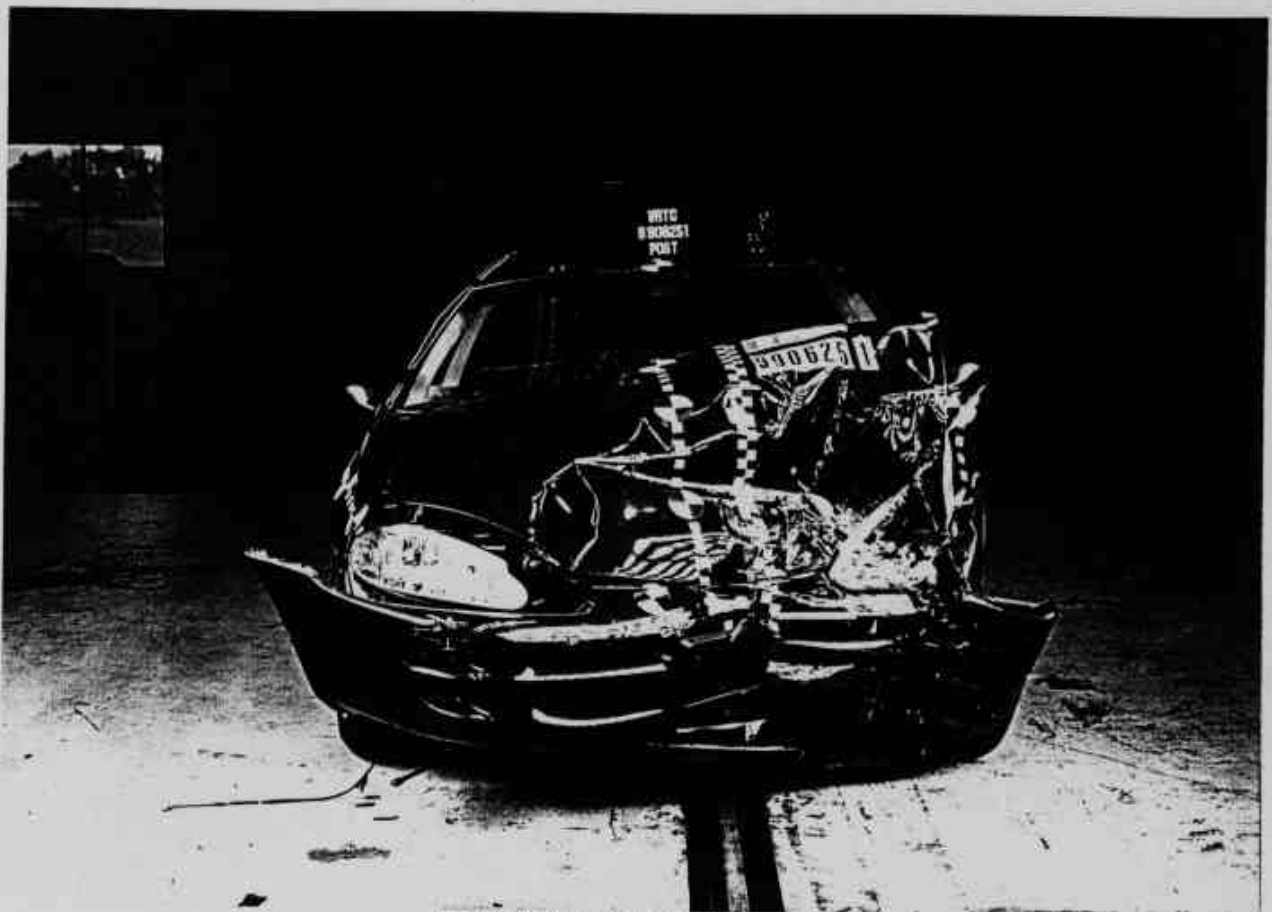


Figure A-2 Post-Test Front View



Figure A-3 Pre-Test Left Side View

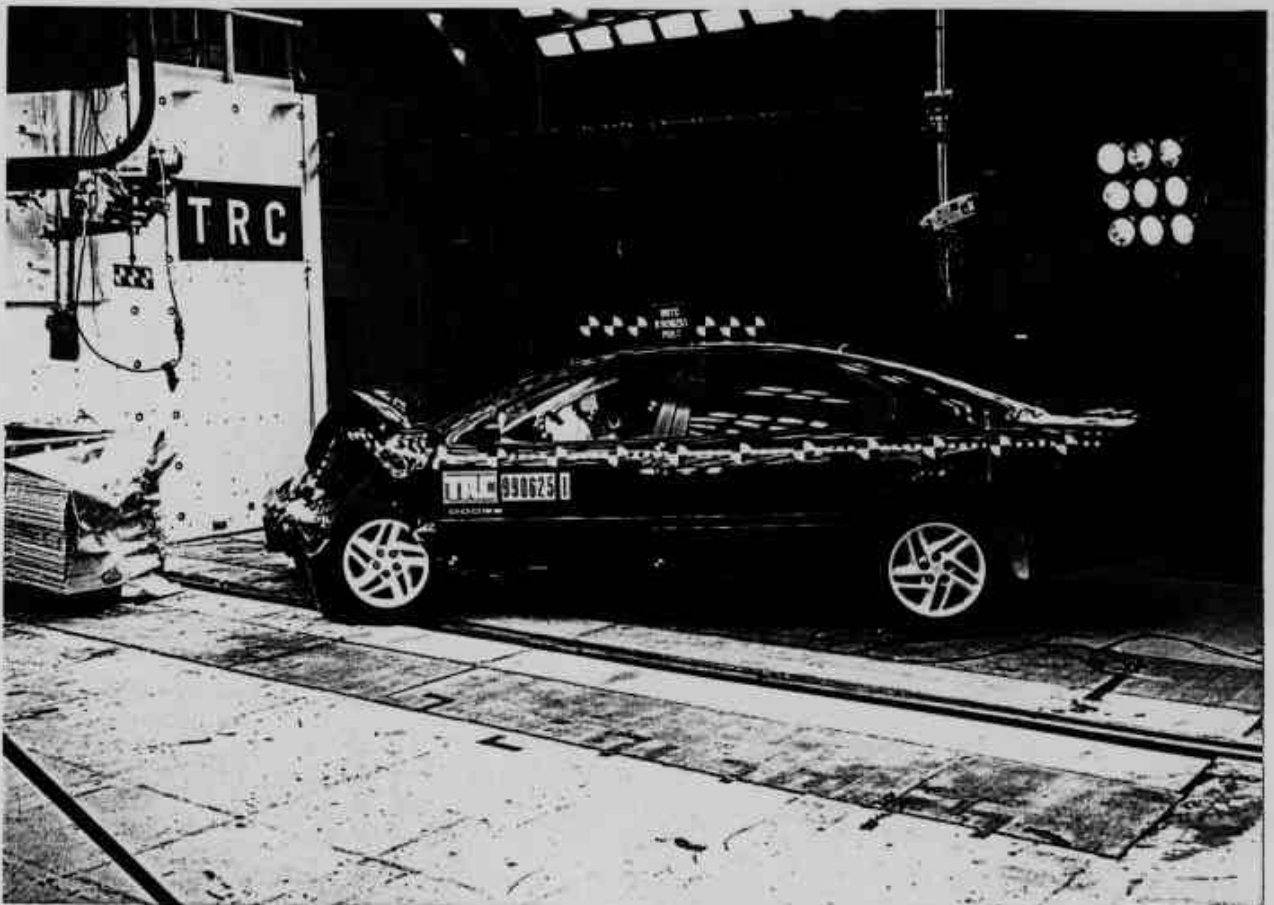


Figure A-4 Post-Test Left Side View





Figure A-5 Pre-Test Left Rear Three-Quarter View



Figure A-6 Post-Test Left Rear Three-Quarter View



Figure A-7 Pre-Test Rear View



Figure A-8 Post-Test Rear View

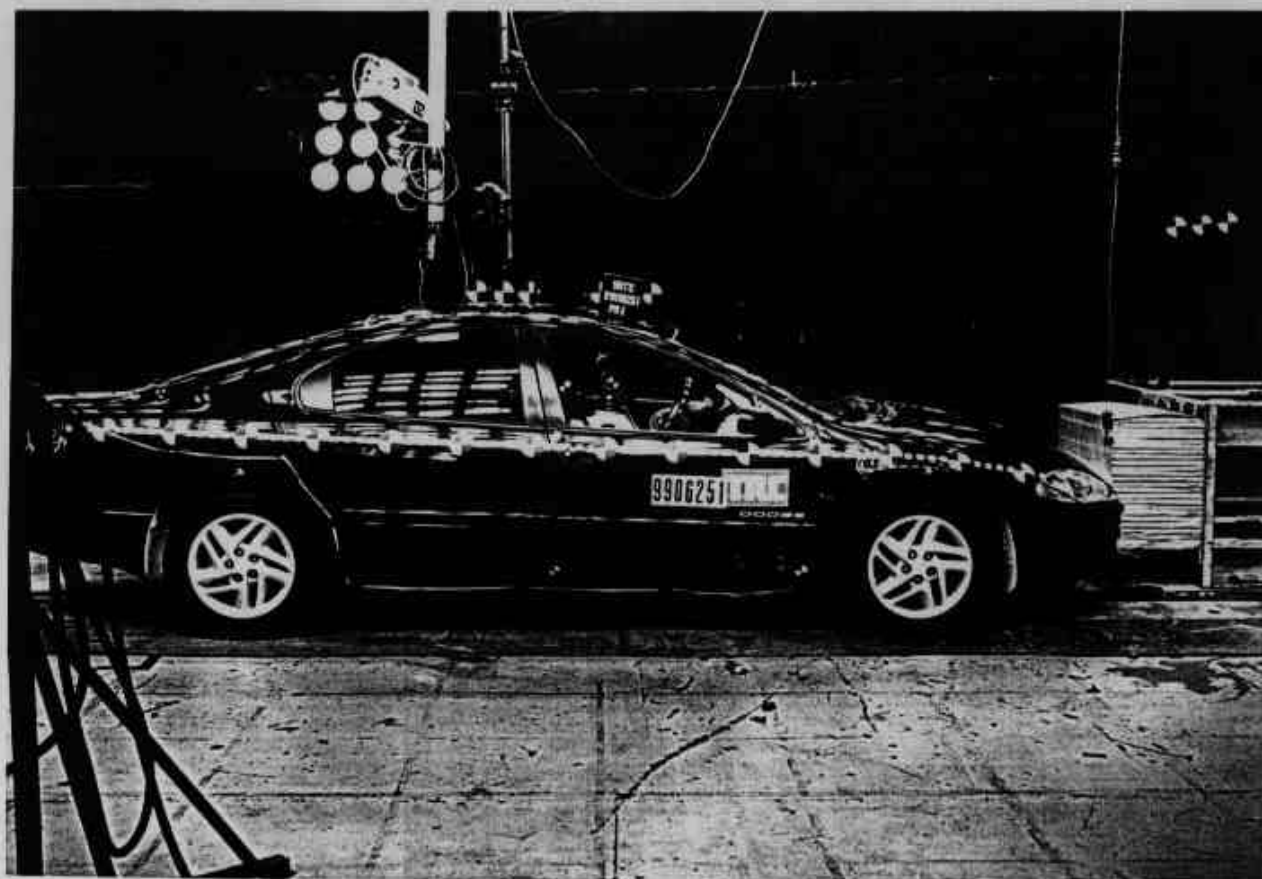


Figure A-9 Pre-Test Right Side View



Figure A-10 Post-Test Right Side View



Figure A-11 Pre-Test Right Front Three-Quarter View



Figure A-12 Post-Test Right Front Three-Quarter View

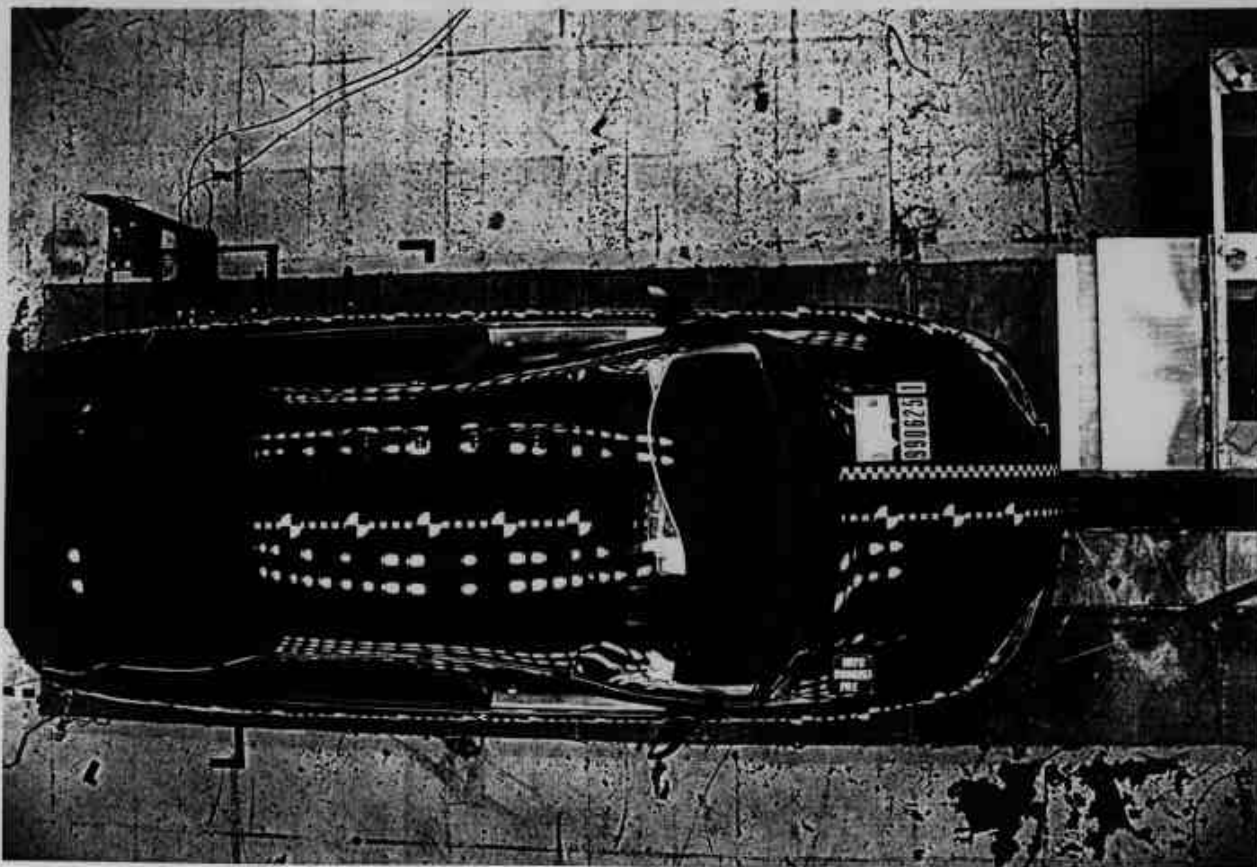


Figure A-13 Pre-Test Overhead View

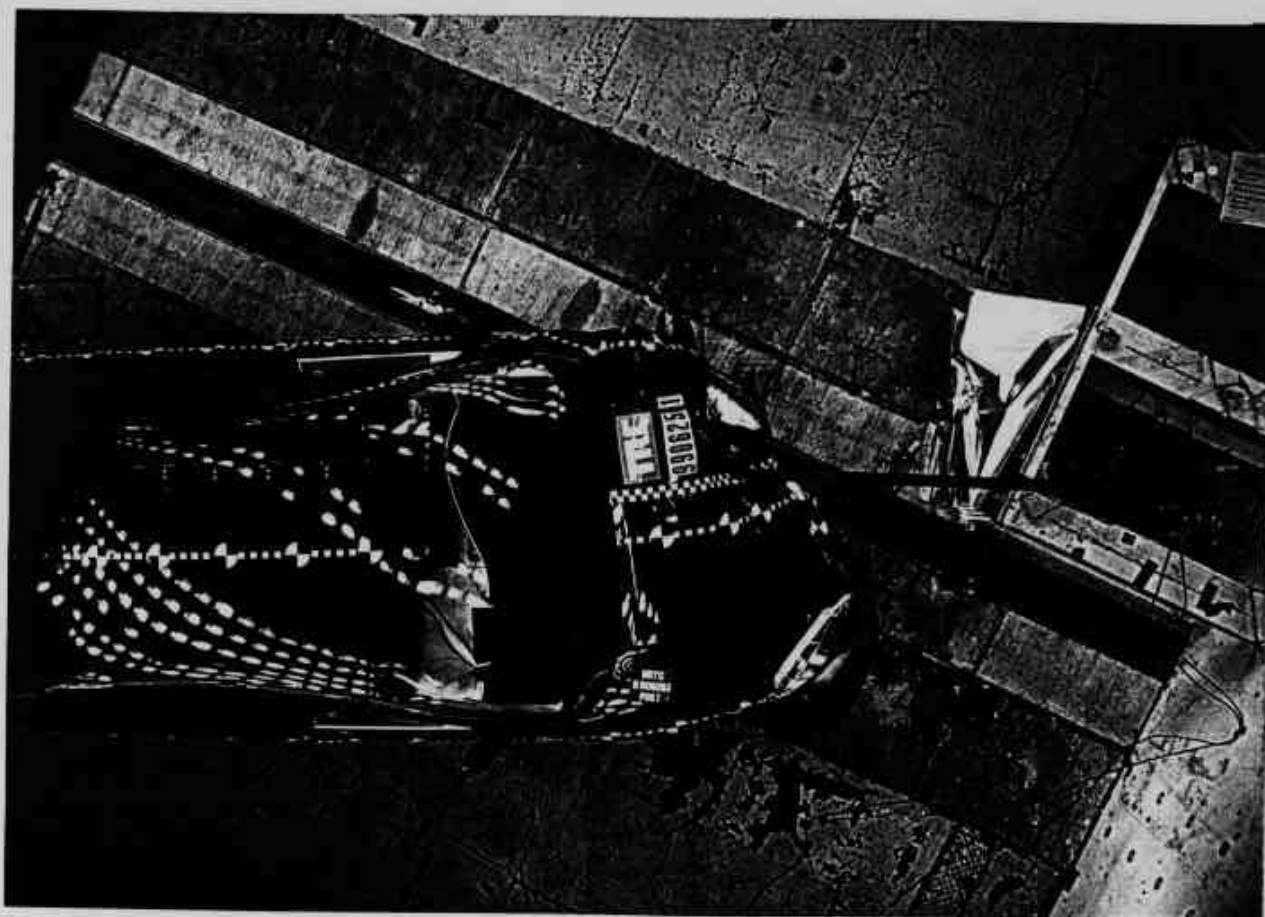


Figure A-14 Post-Test Overhead View



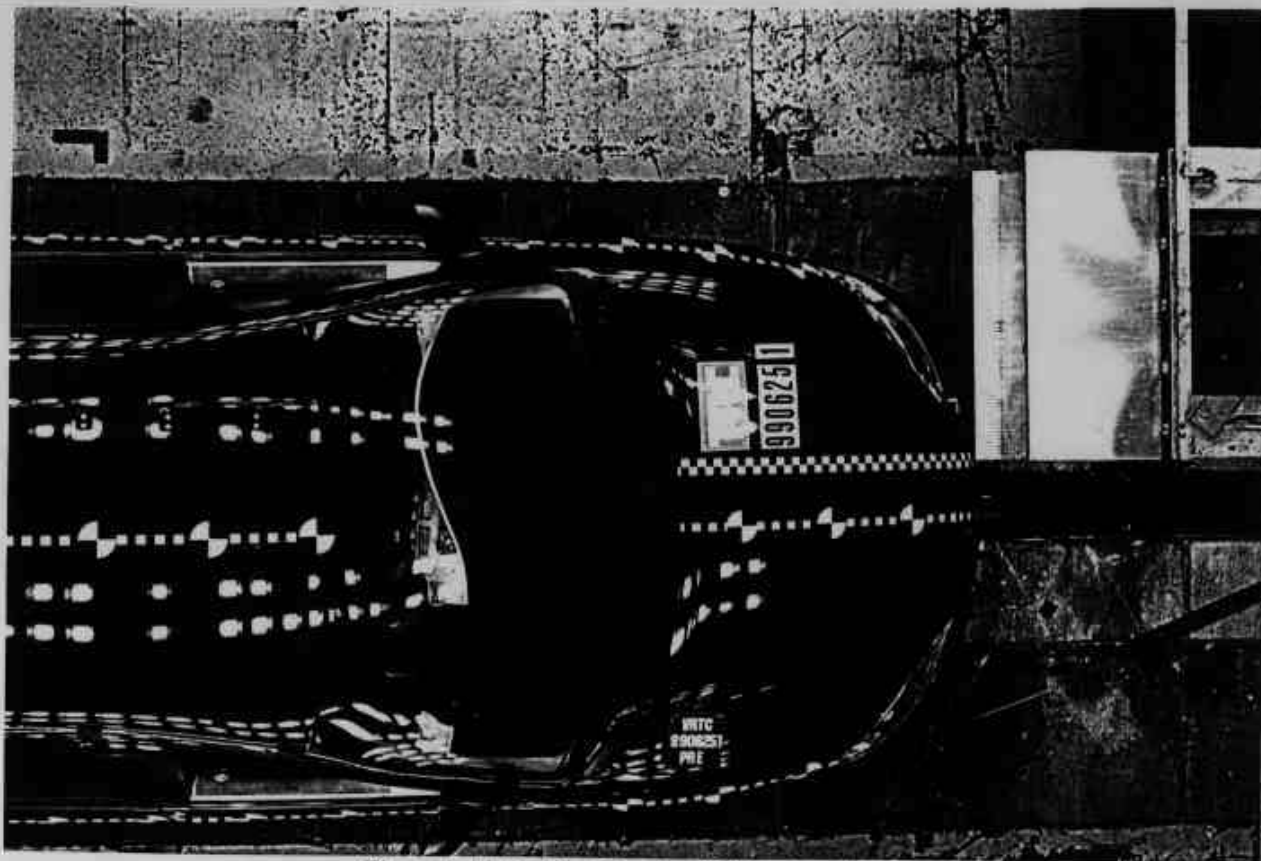


Figure A-15 Pre-Test Overhead Close - Up View

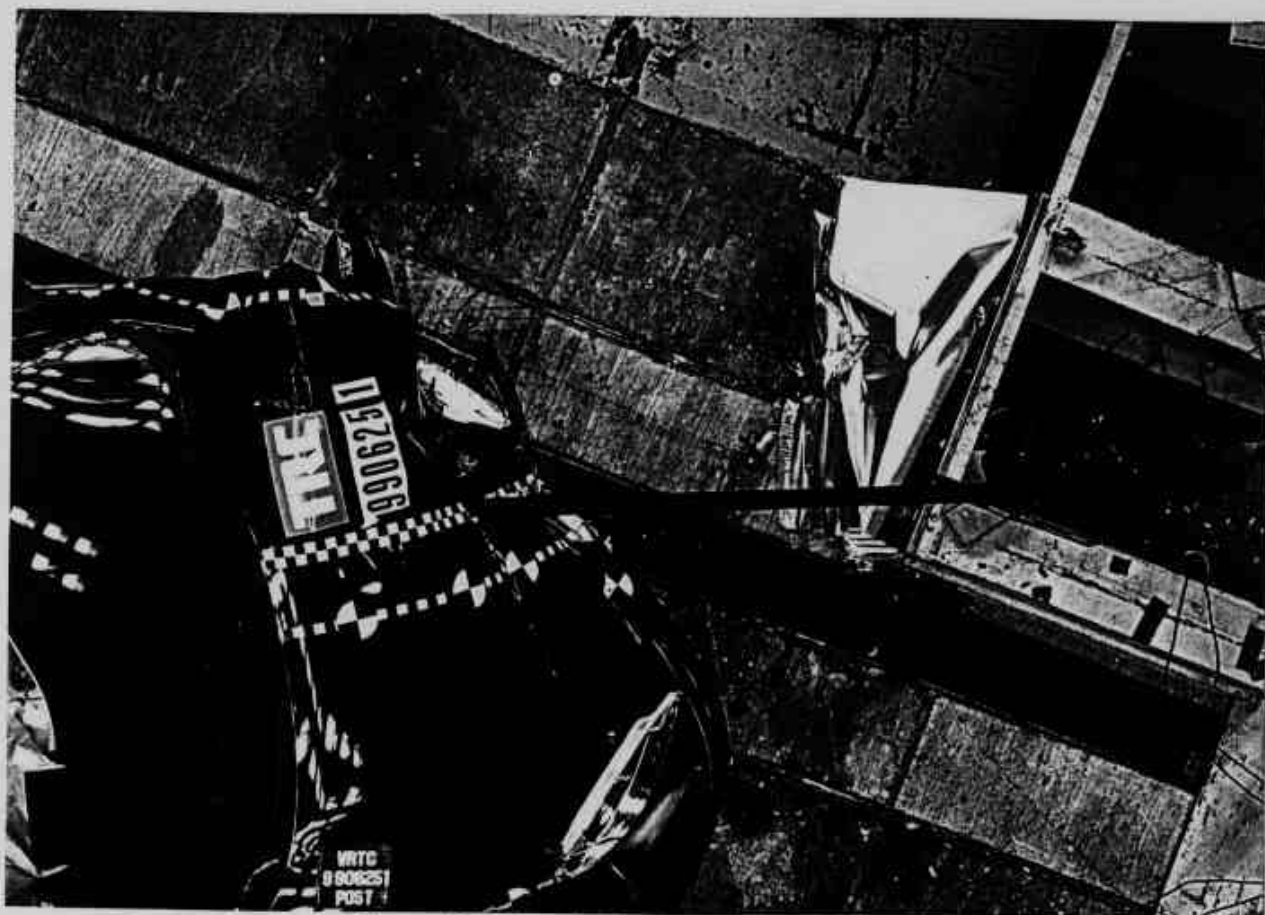


Figure A-16 Post-Test Overhead Close - Up View

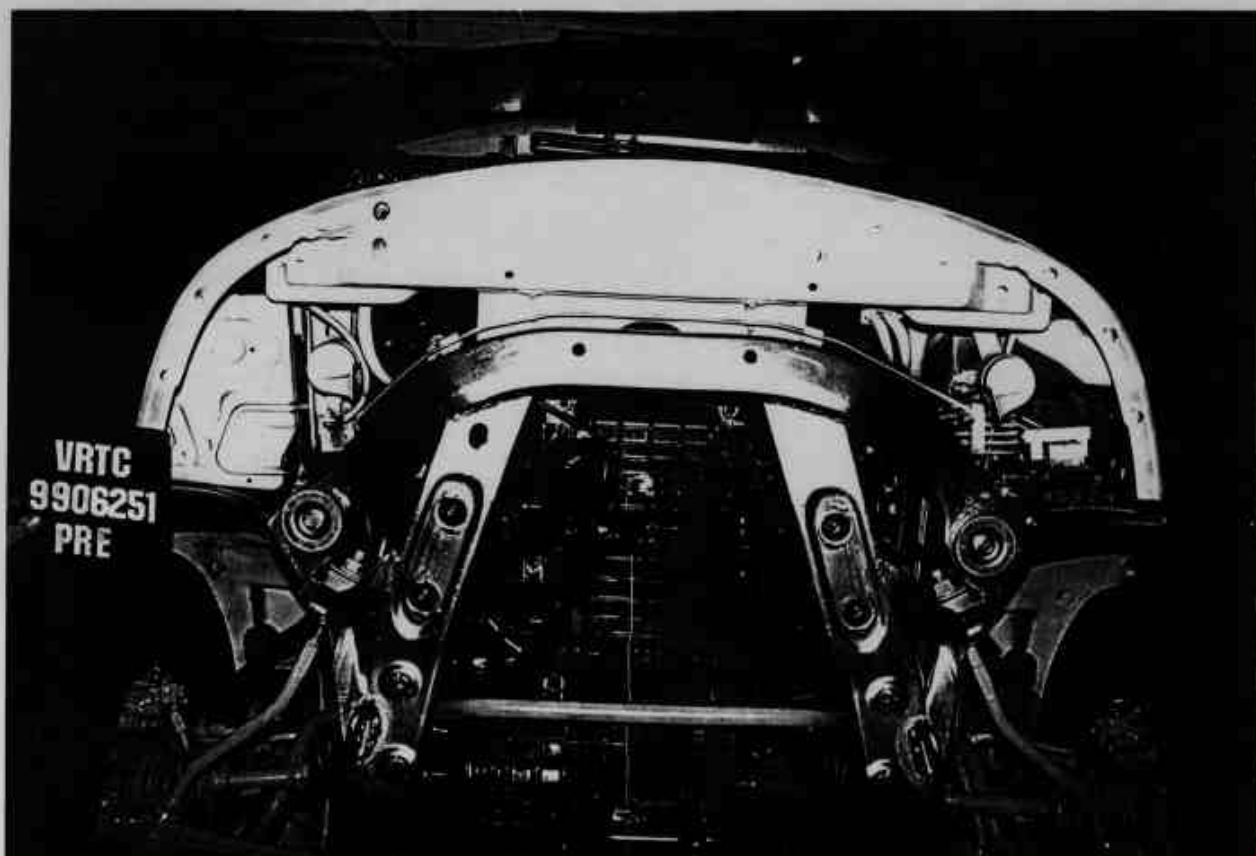


Figure A-17 Pre-Test Underbody - View 1

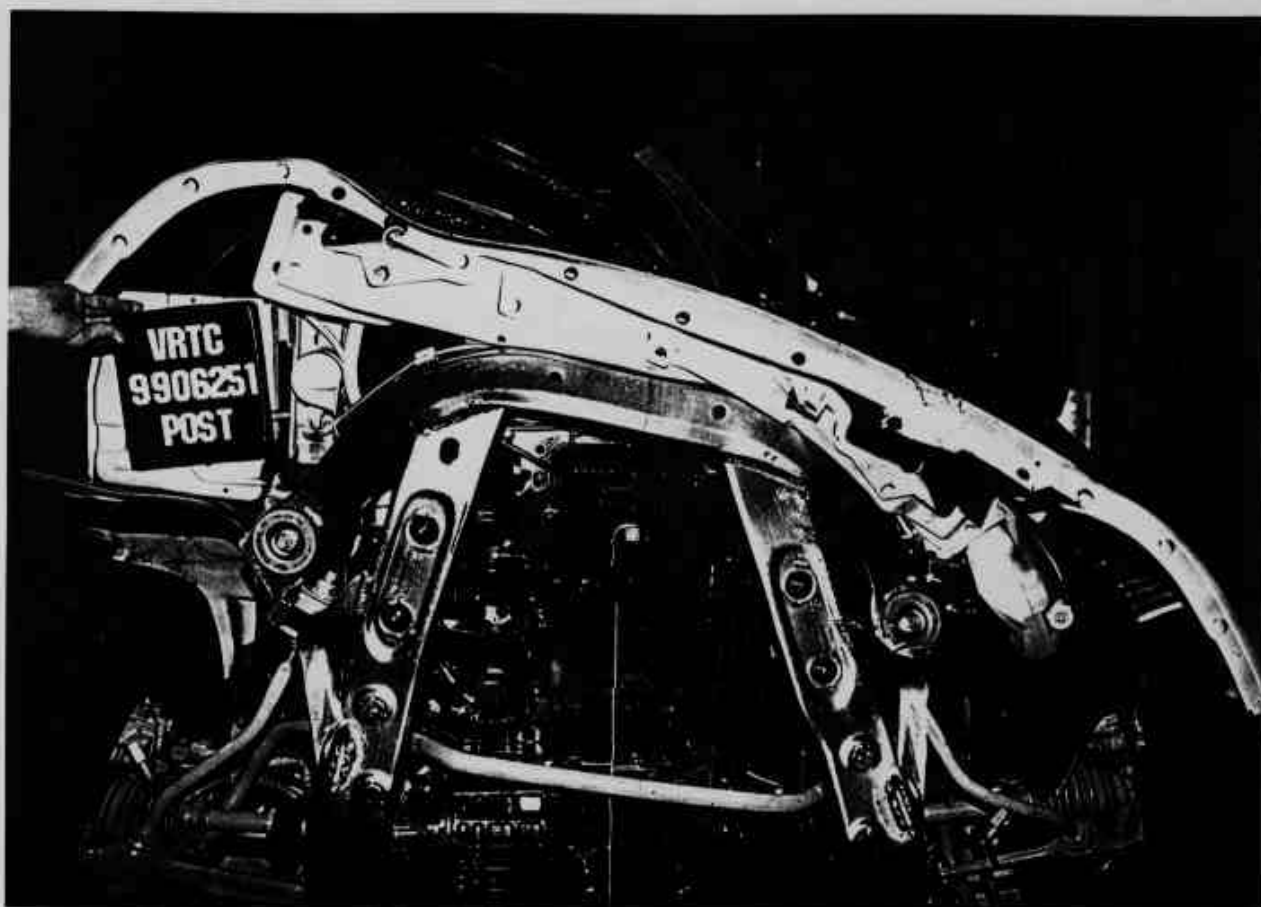


Figure A-18 Post-Test Underbody - View 1

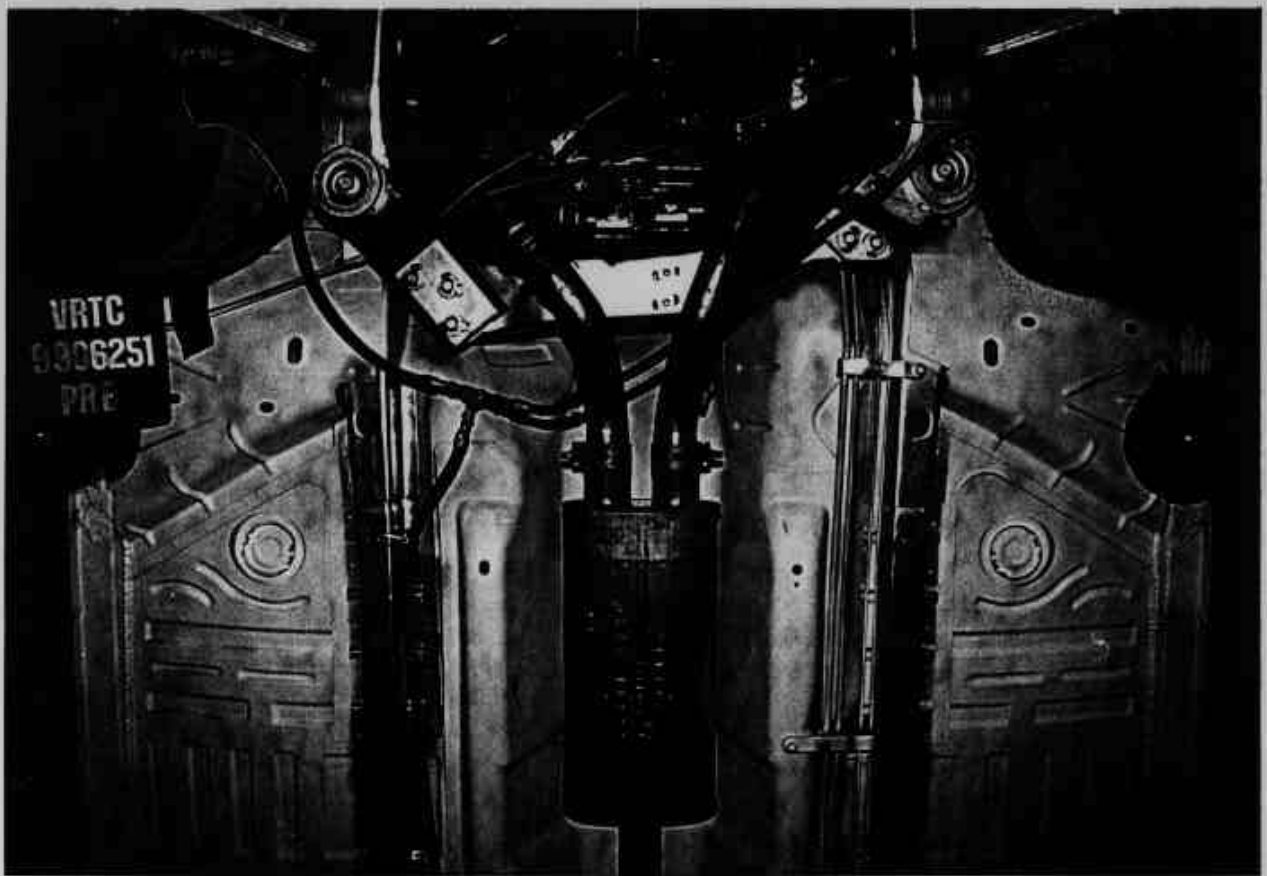


Figure A-19 Pre-Test Underbody - View 2



Figure A-20 Post-Test Underbody - View 2



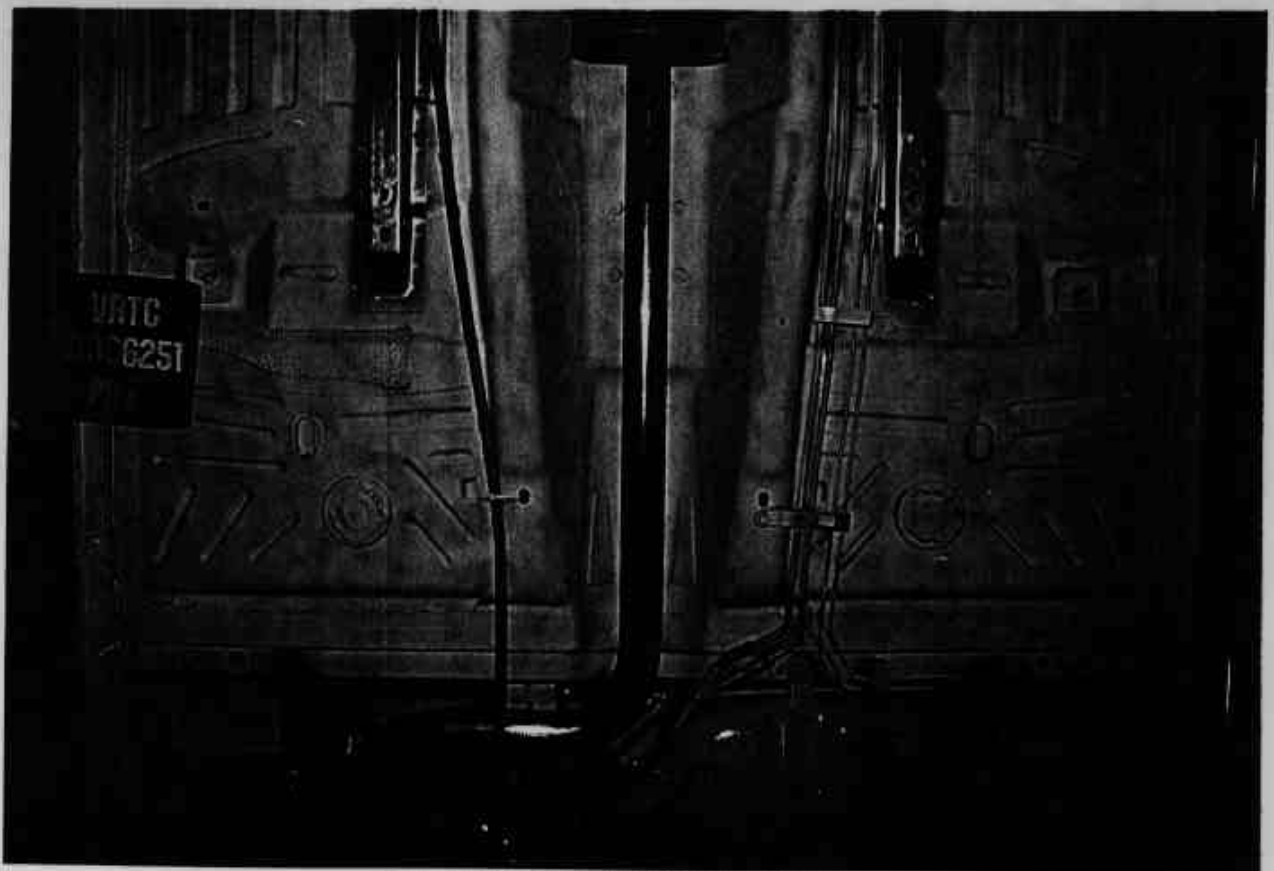


Figure A-21 Pre-Test Underbody - View 3

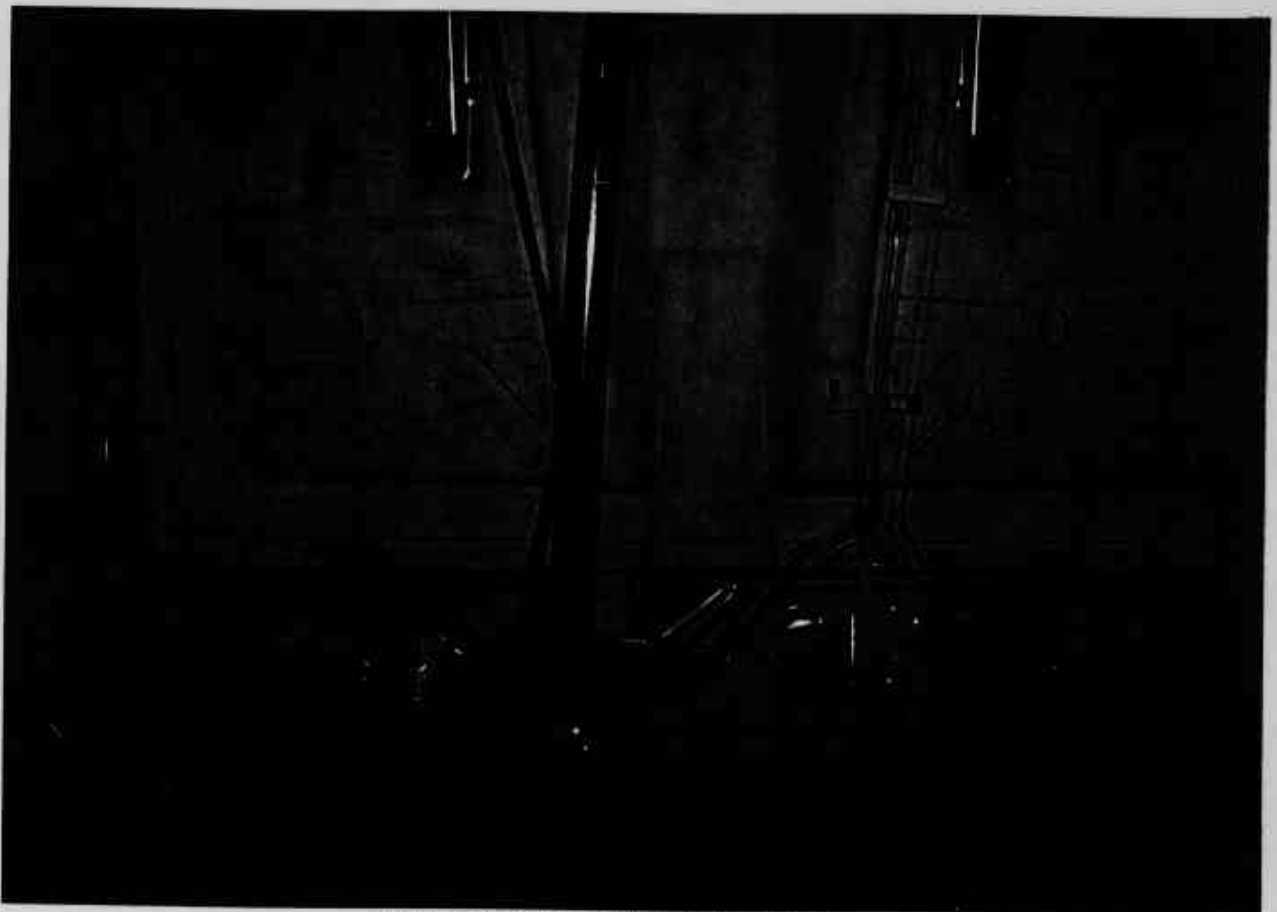


Figure A-22 Post-Test Underbody - View 3

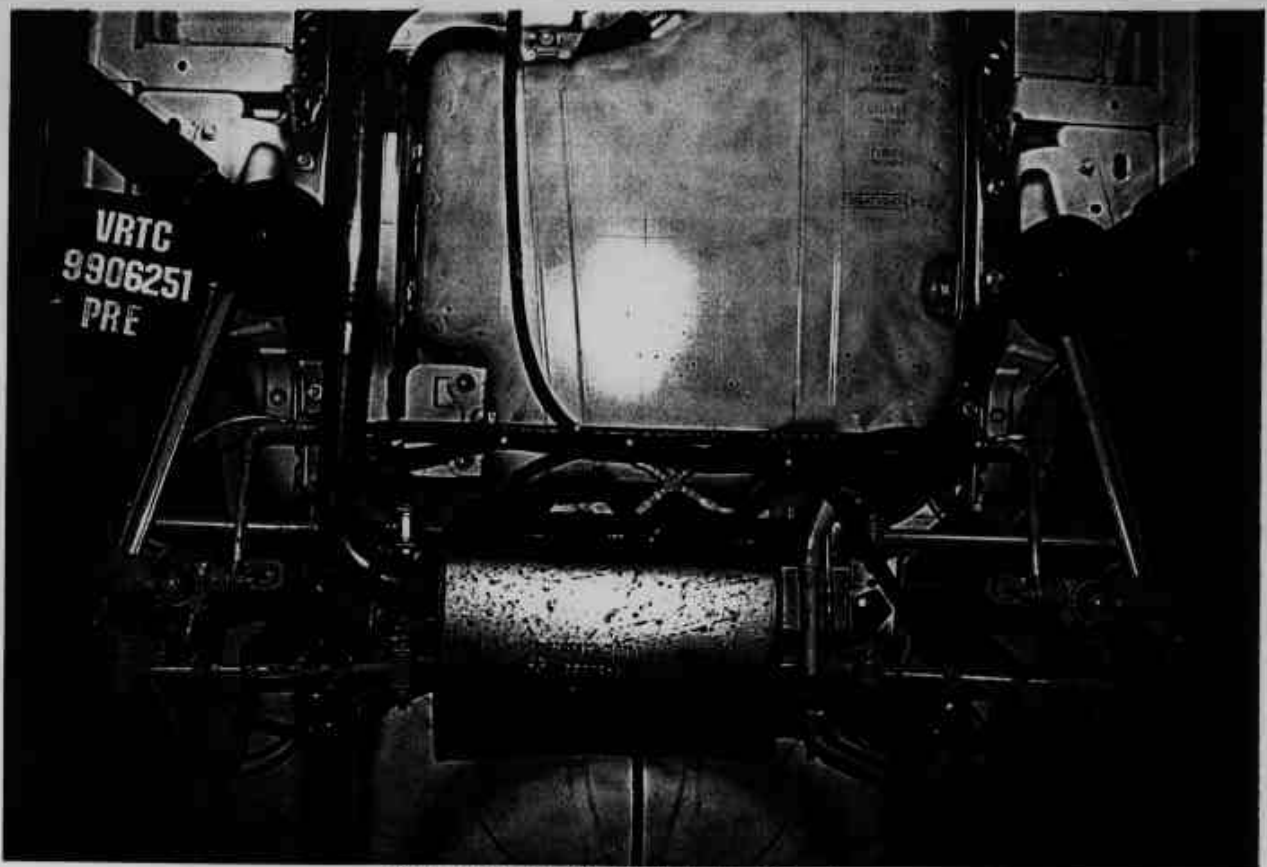


Figure A-23 Pre-Test Underbody - View 4

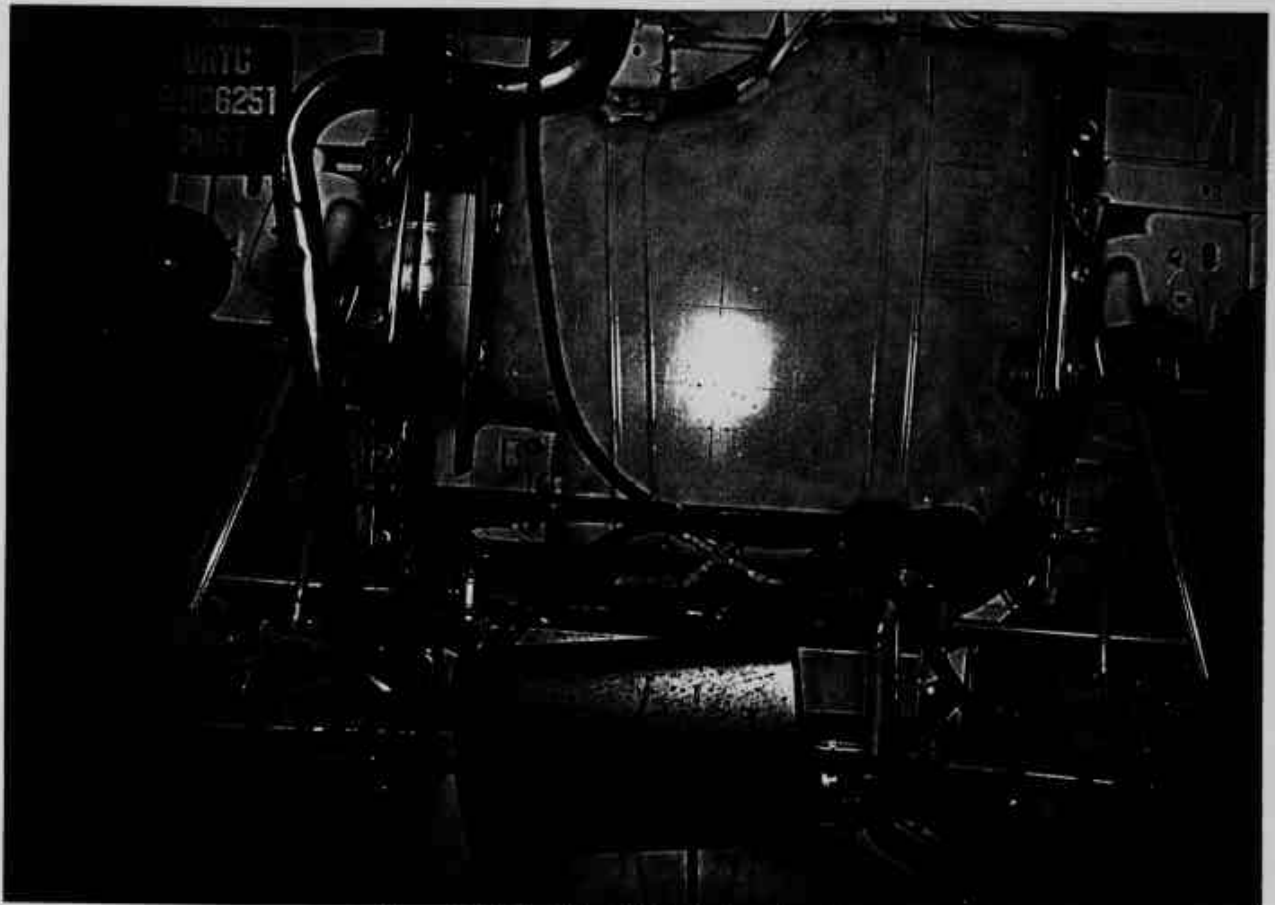


Figure A-24 Post-Test Underbody - View 4

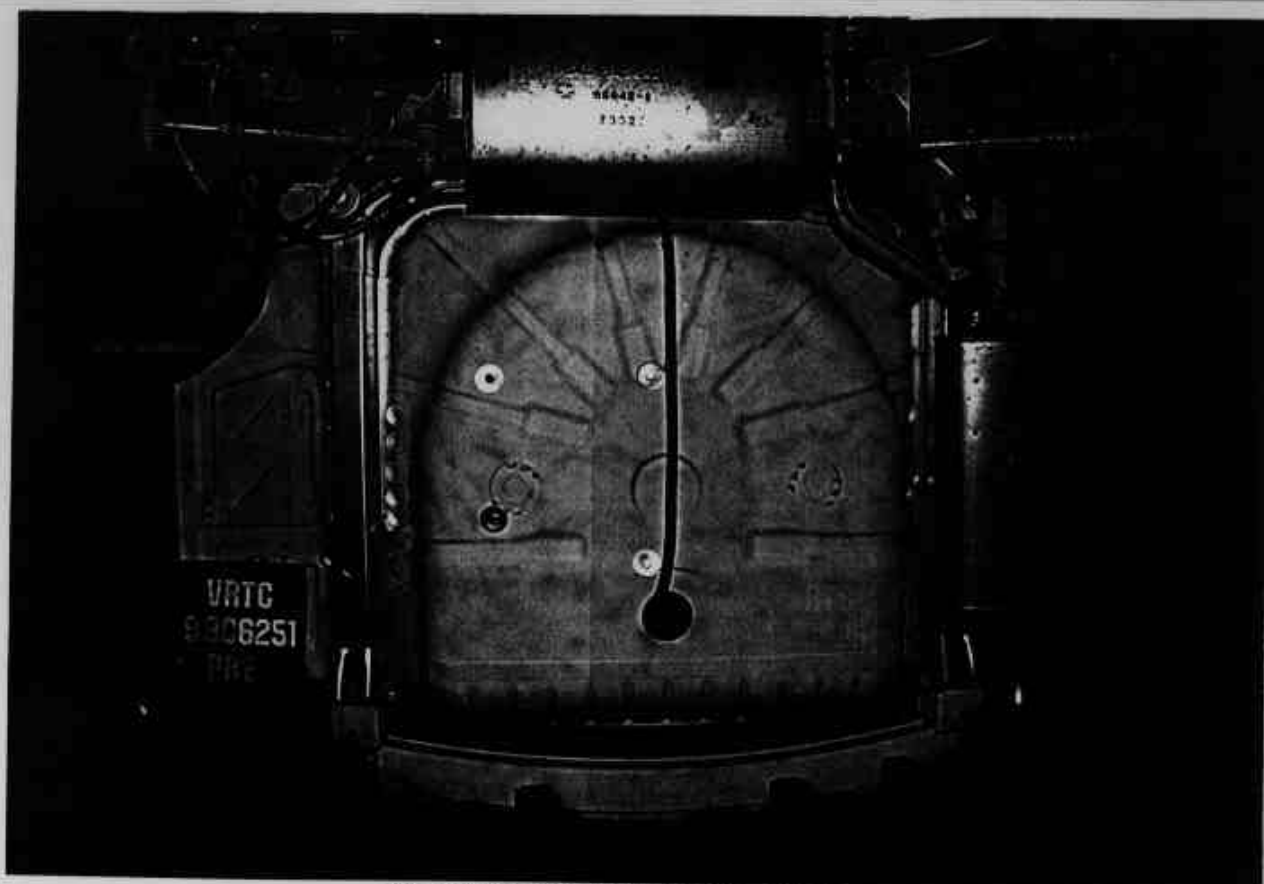


Figure A-25 Pre-Test Underbody - View 5

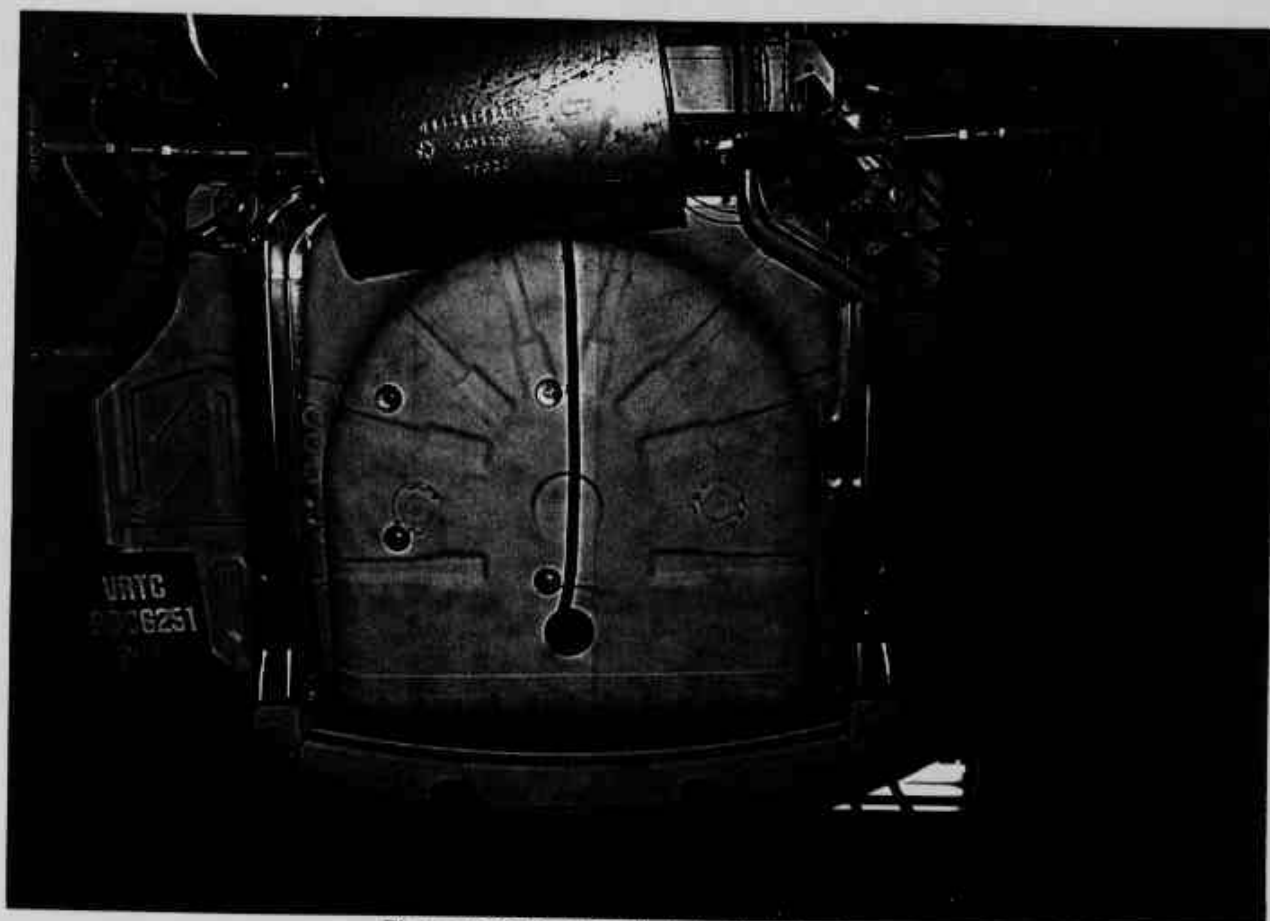


Figure A-26 Post-Test Underbody - View 5

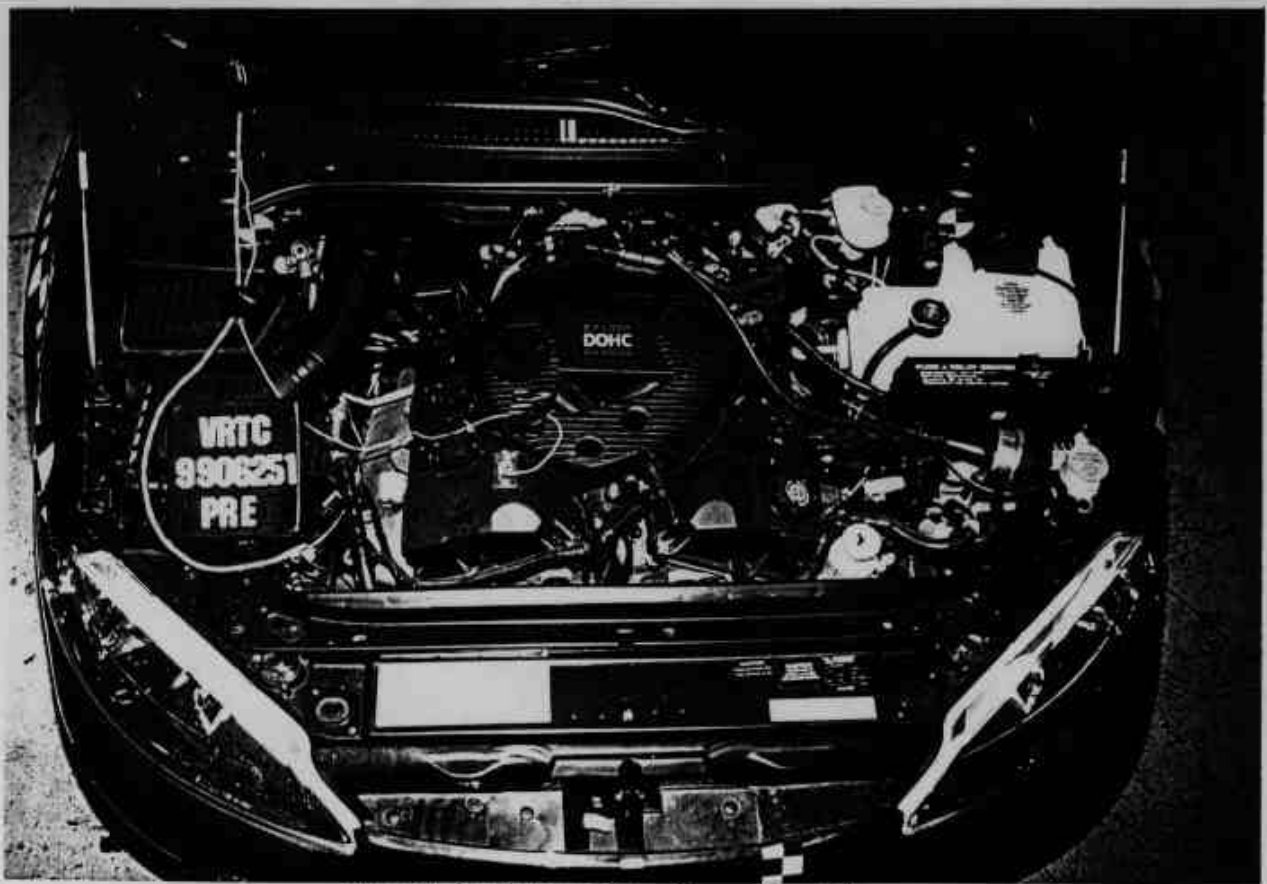


Figure A-27 Pre-Test Engine Compartment View

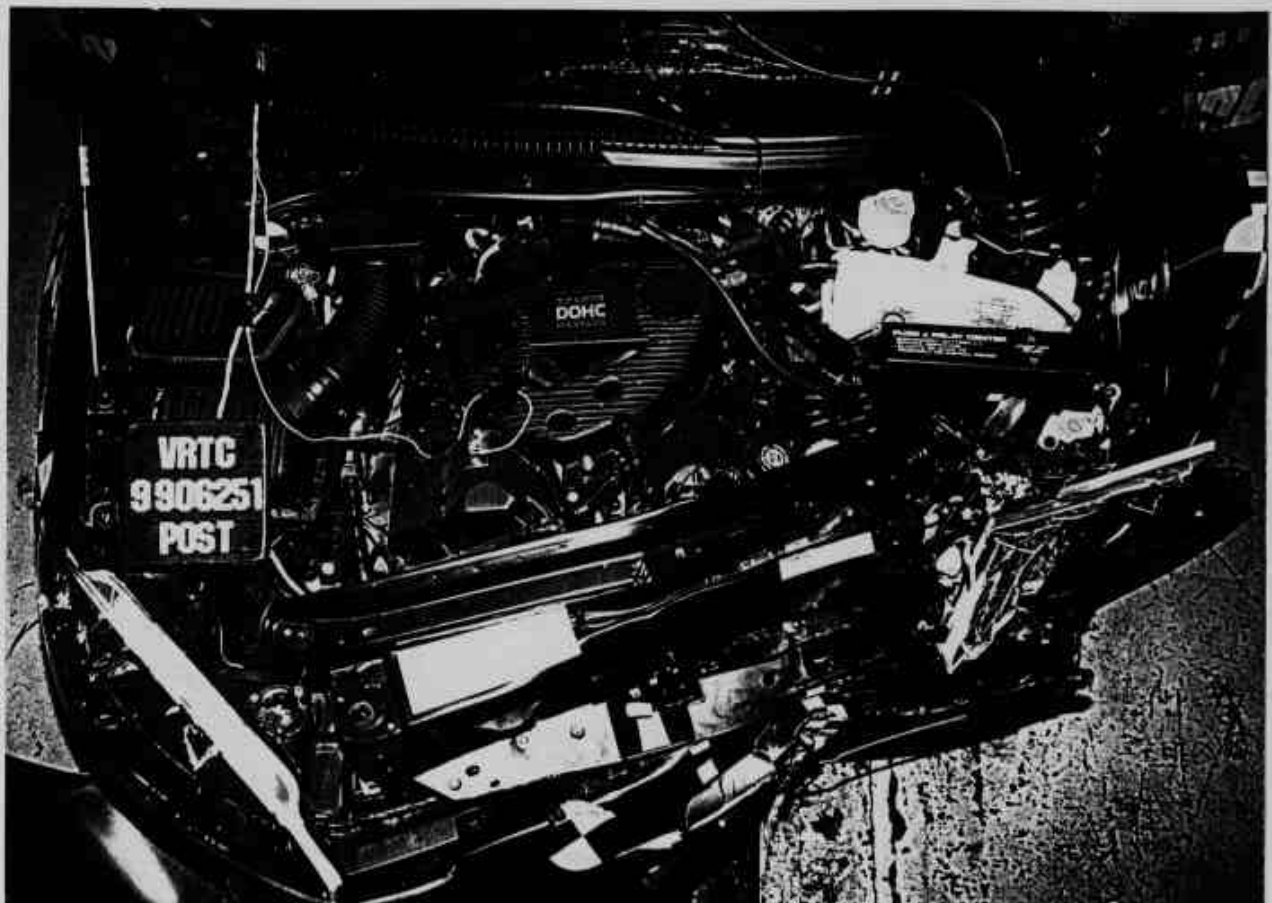


Figure A-28 Post-Test Engine Compartment View

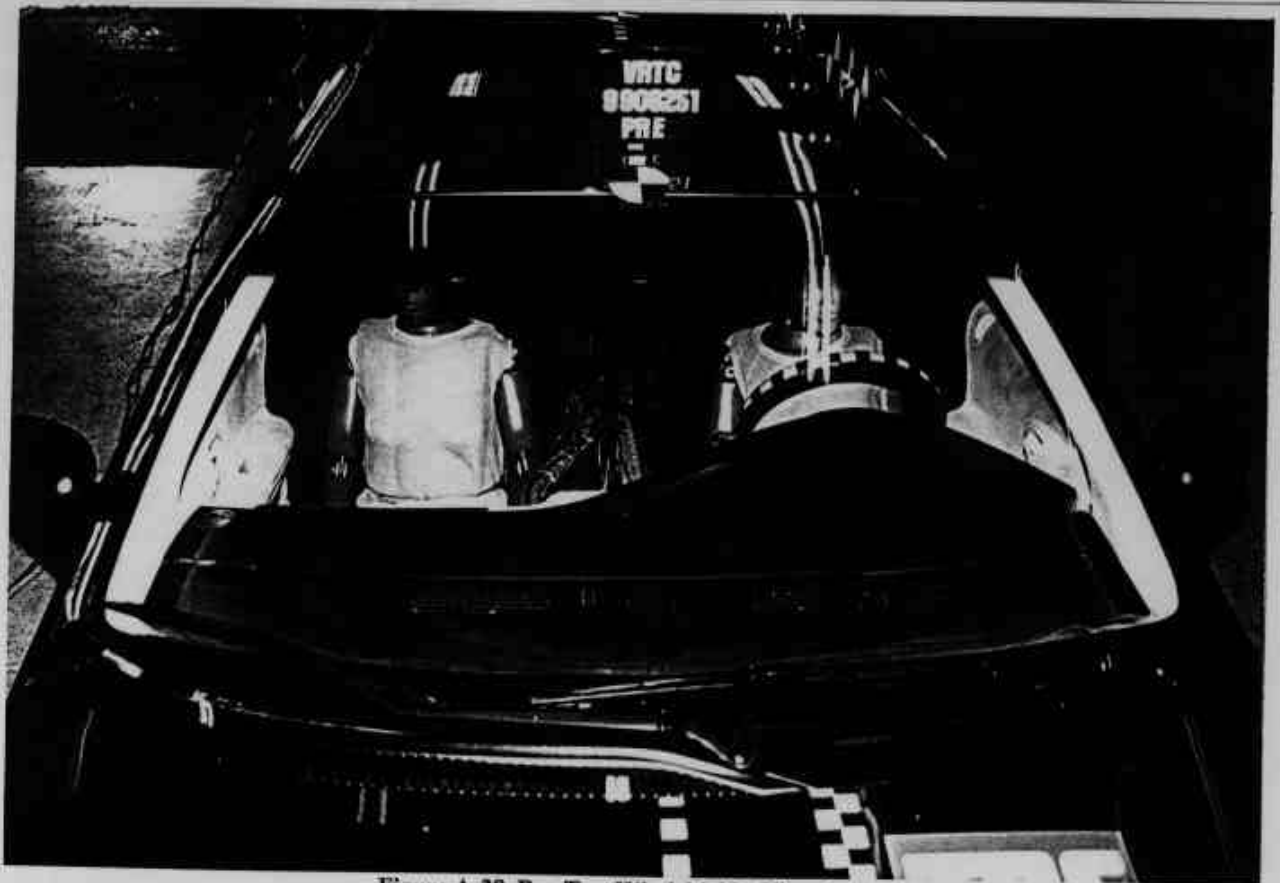


Figure A-29 Pre-Test Windshield - View 1

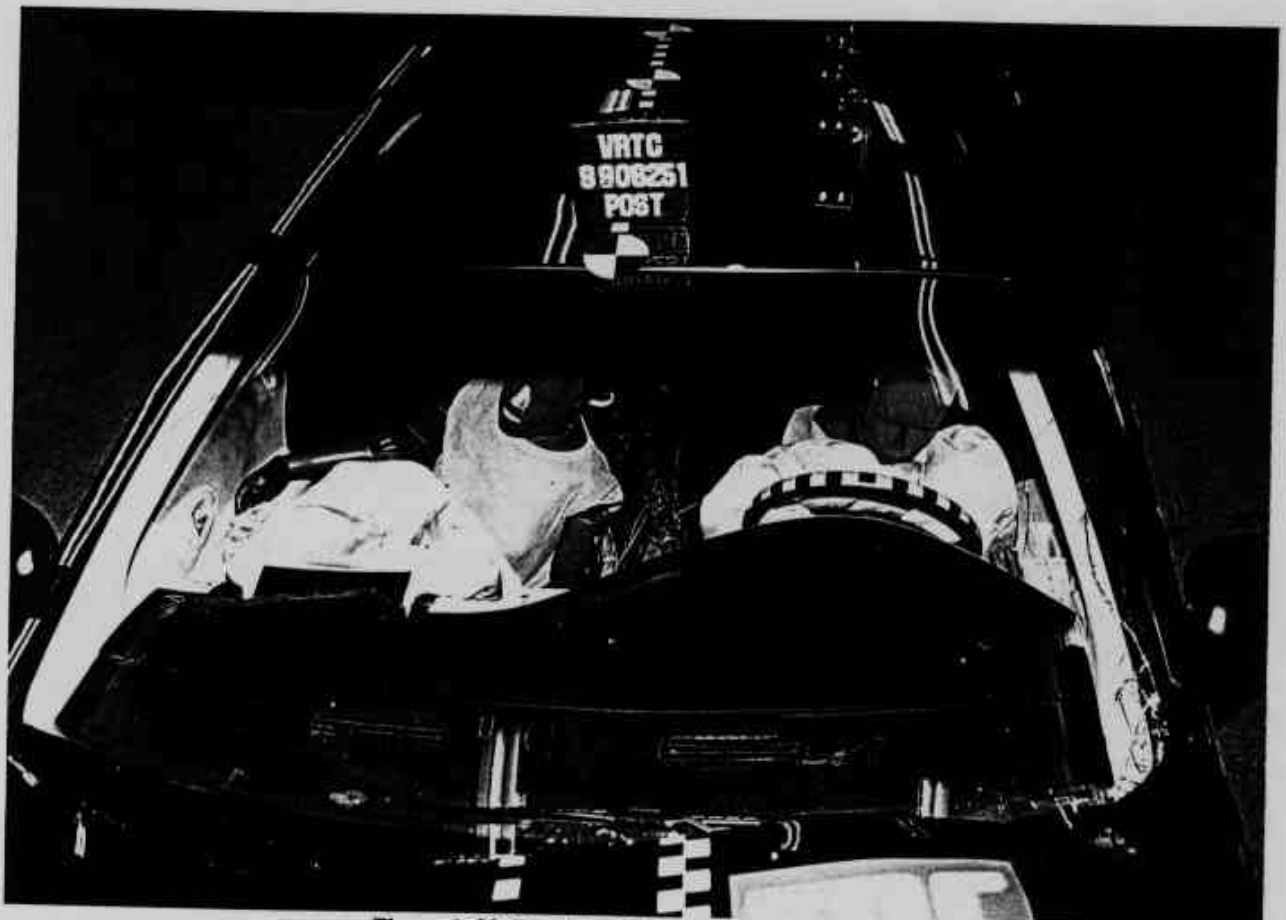


Figure A-30 Post-Test Windshield - View 1



Figure A-31 Pre-Test Windshield - View 2



Figure A-32 Post-Test Windshield - View 2

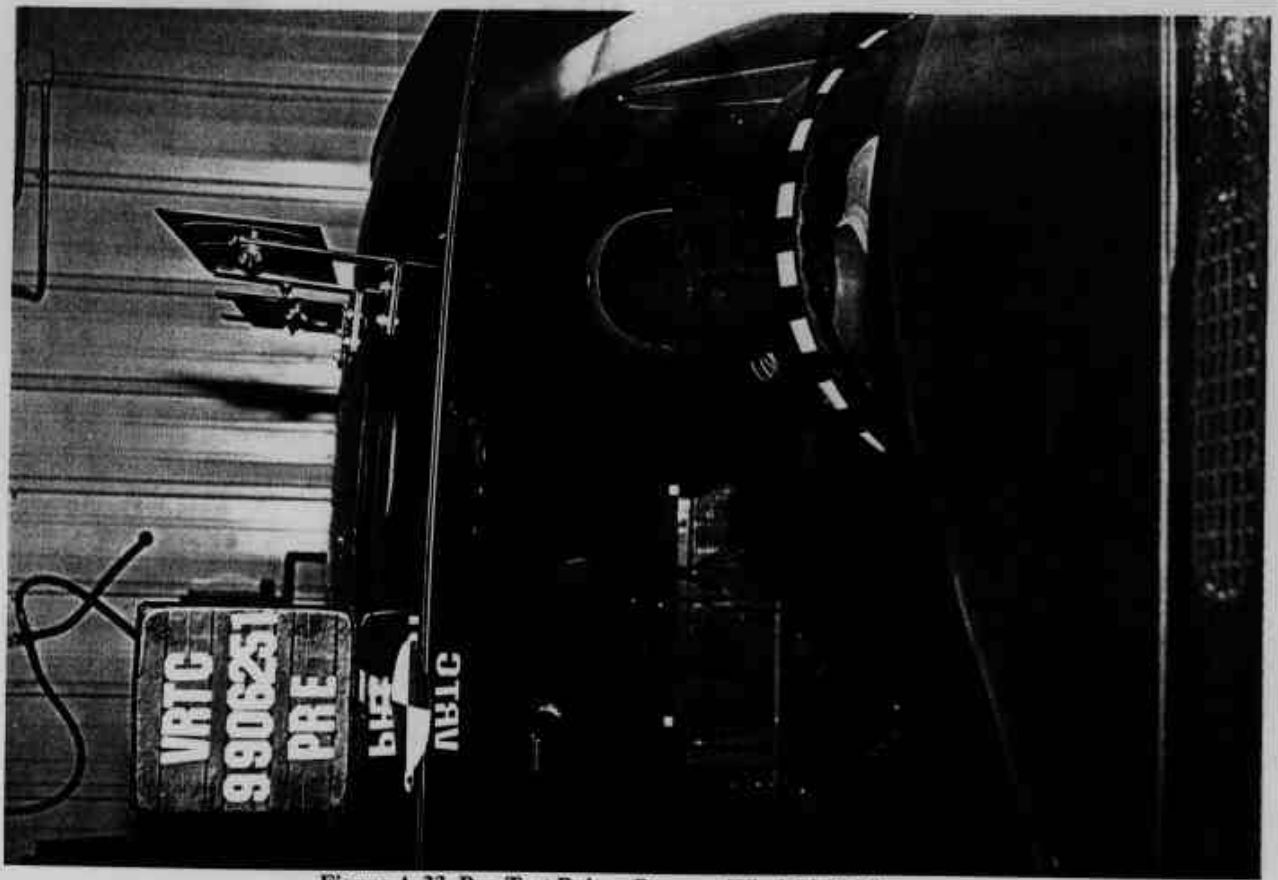


Figure A-33 Pre-Test Driver Dummy Windshield View

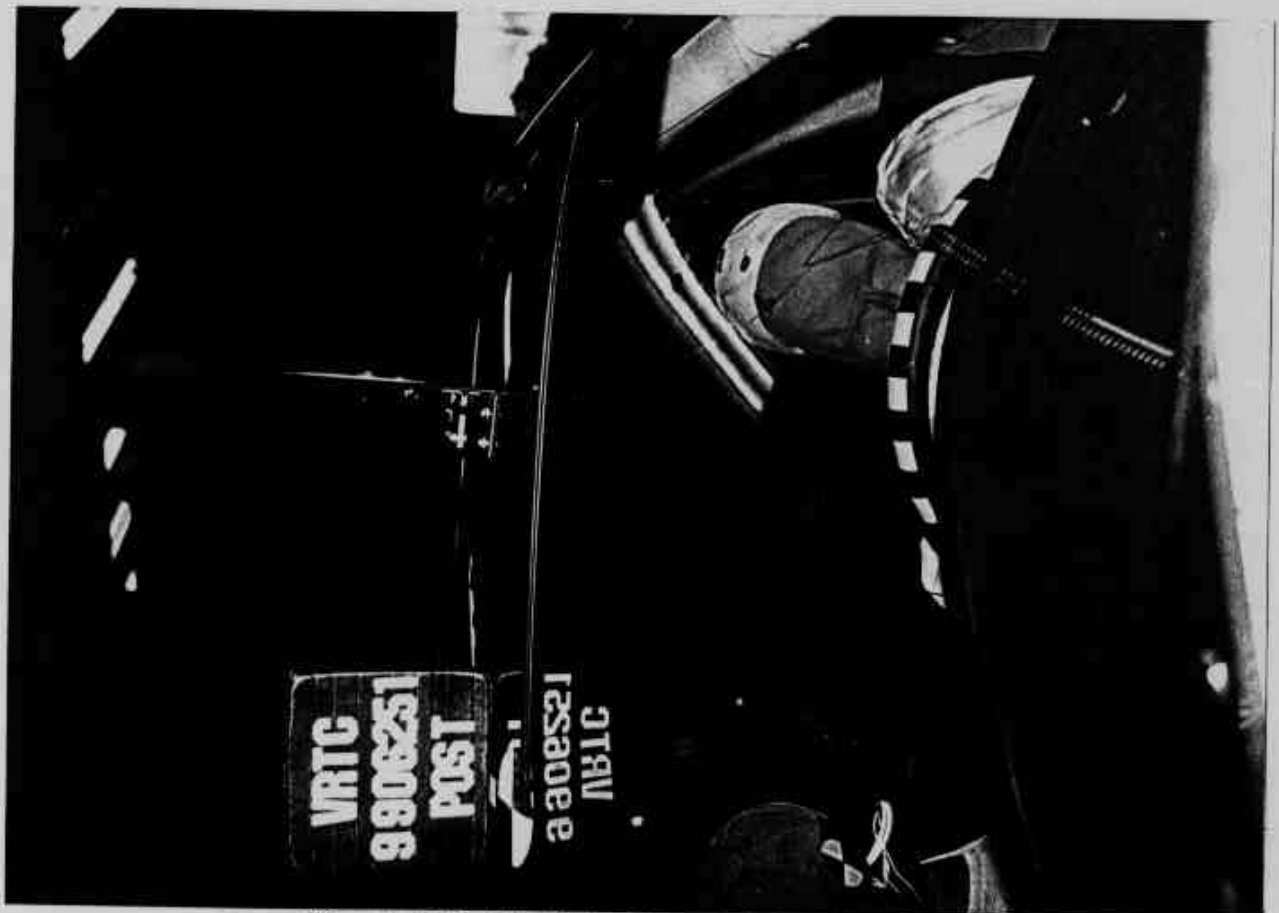


Figure A-34 Post-Test Driver Dummy Windshield View

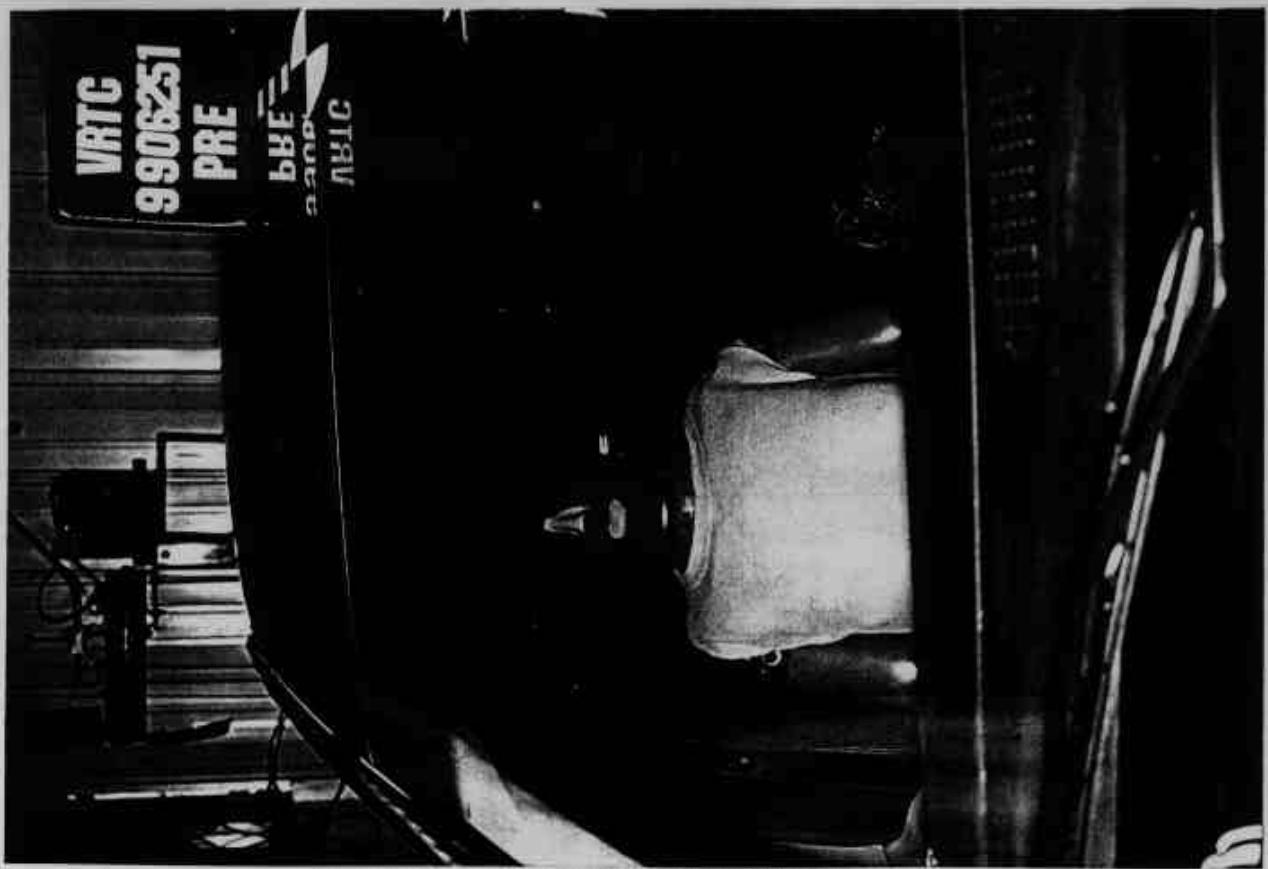


Figure A-35 Pre-Test Passenger Dummy Windshield View



Figure A-36 Post-Test Passenger Dummy Windshield View





Figure A-37 Pre-Test Driver Dummy Position - View 1



Figure A-38 Post-Test Driver Dummy Position - View 1



Figure A-39 Pre-Test Driver Dummy Position -View 2

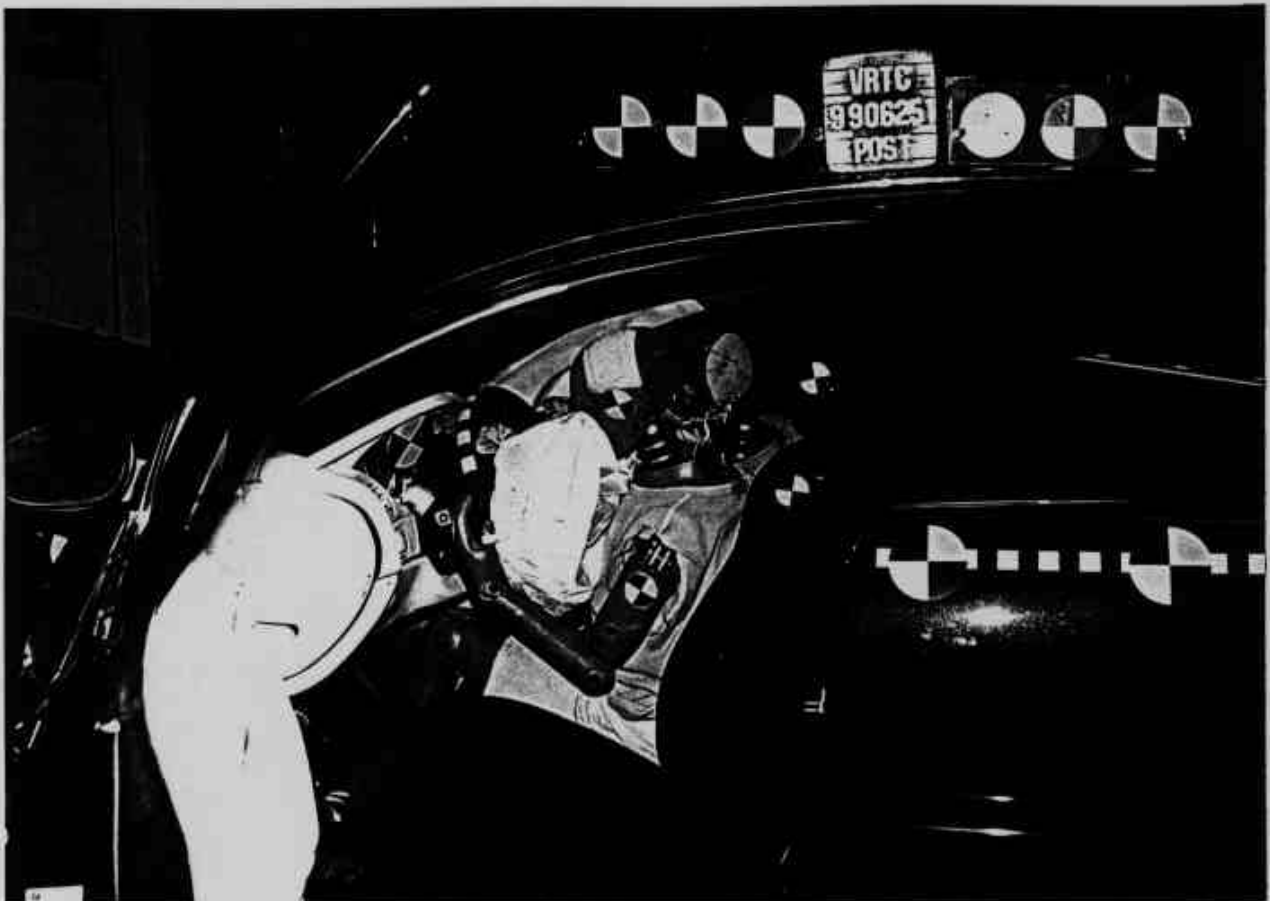


Figure A-40 Post-Test Driver Dummy Position - View 2



Figure A-41 Pre-Test Driver Dummy Position -View 3

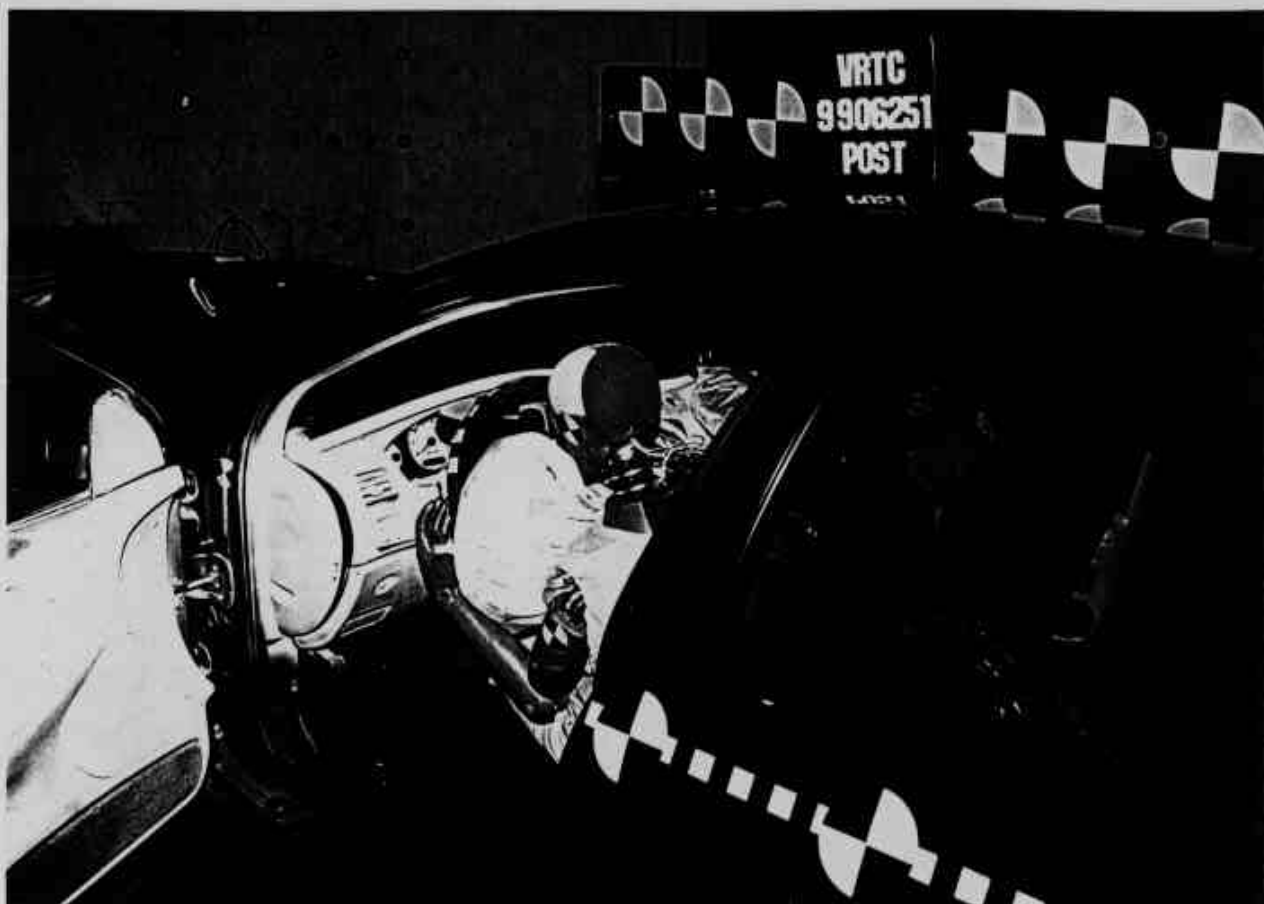


Figure A-42 Post-Test Driver Dummy Position - View 3



Figure A-43 Pre-Test Passenger Dummy Position - View 1



Figure A-44 Post-Test Passenger Dummy Position - View 1



Figure A-45 Pre-Test Passenger Dummy Position - View 2



Figure A-46 Post-Test Passenger Dummy Position - View 2

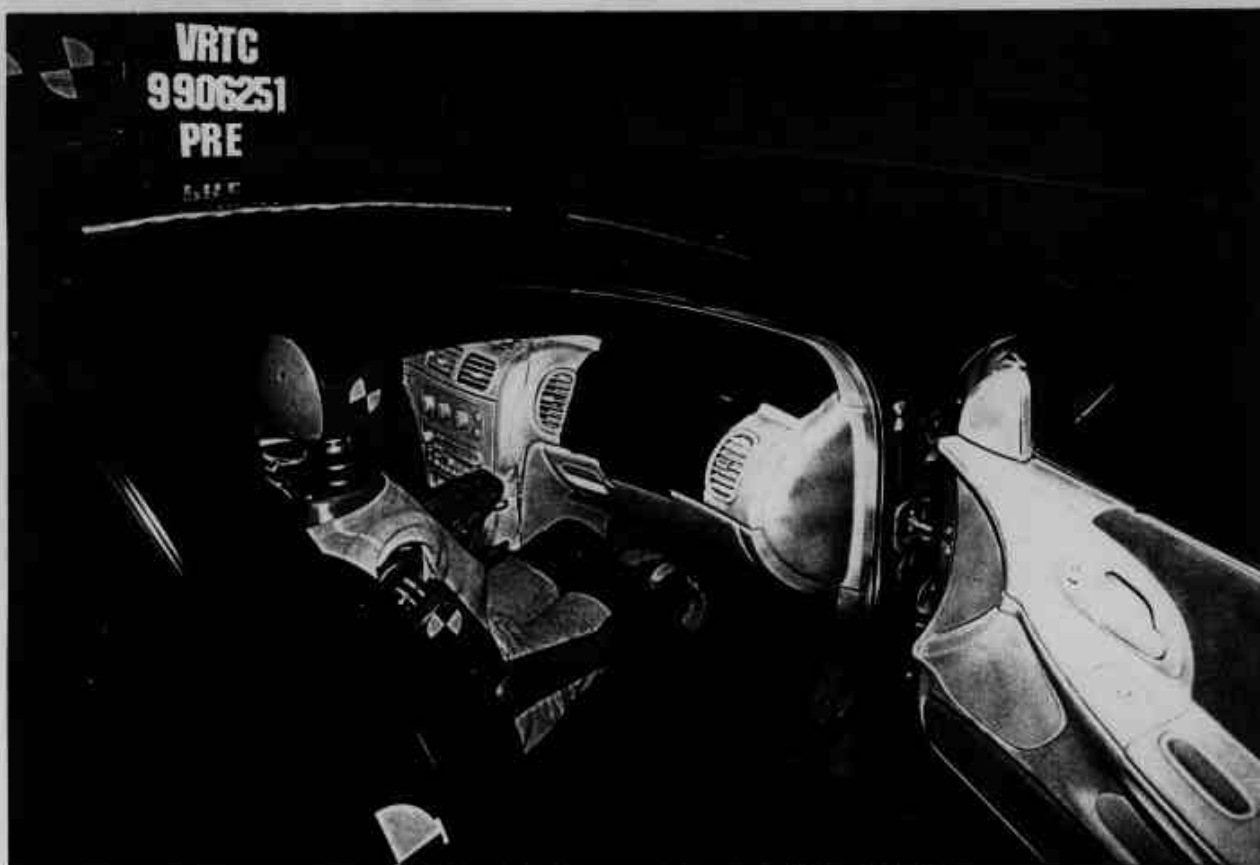


Figure A-47 Pre-Test Passenger Dummy Position - View 3



Figure A-48 Post-Test Passenger Dummy Position - View 3

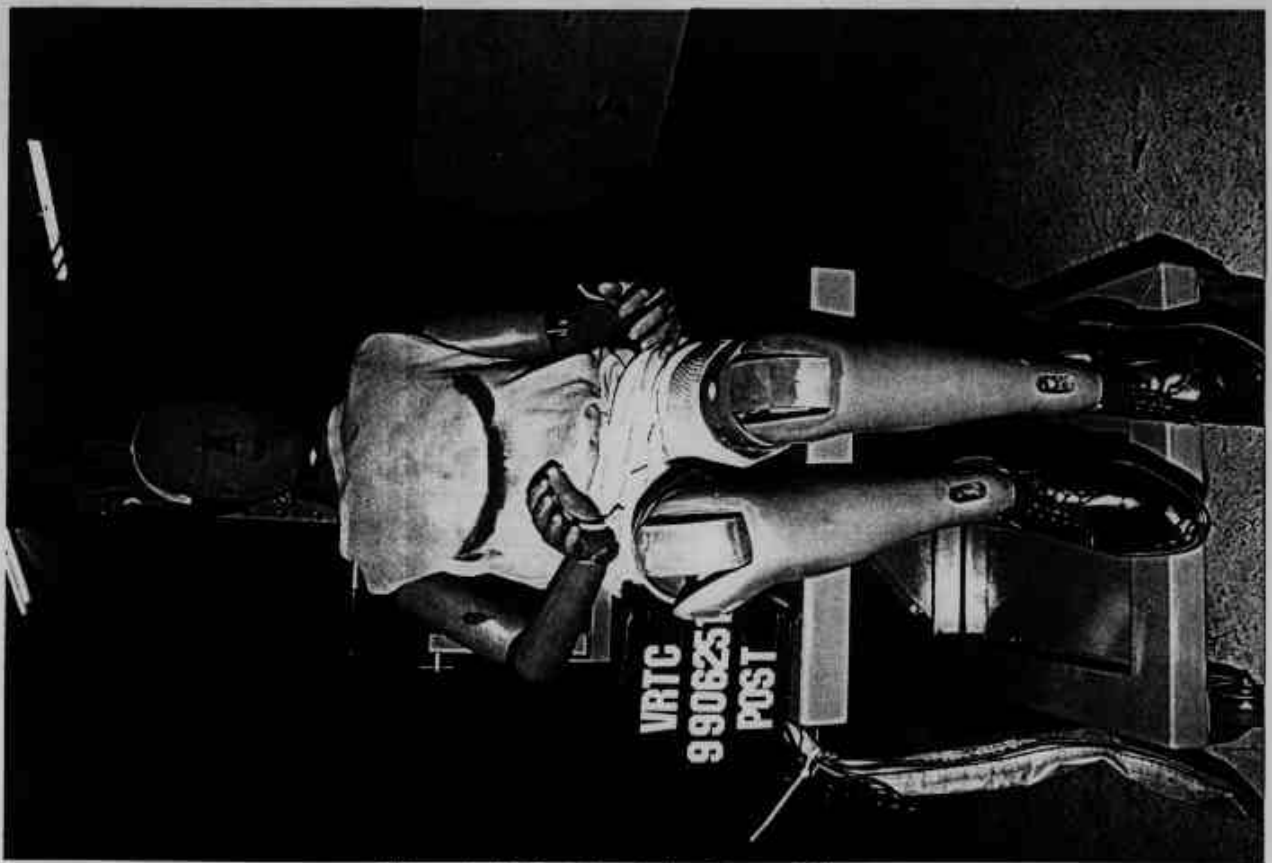


Figure A-49 Post-Test Driver Dummy View



Figure A-50 Post-Test Driver Dummy Head Contact - View 1



Figure A-51 Post-Test Driver Dummy Head Contact - View 2



Figure A-52 Post-Test Driver Dummy Head Contact - View 3





Figure A-53 Post-Test Driver Dummy Knee Contact View

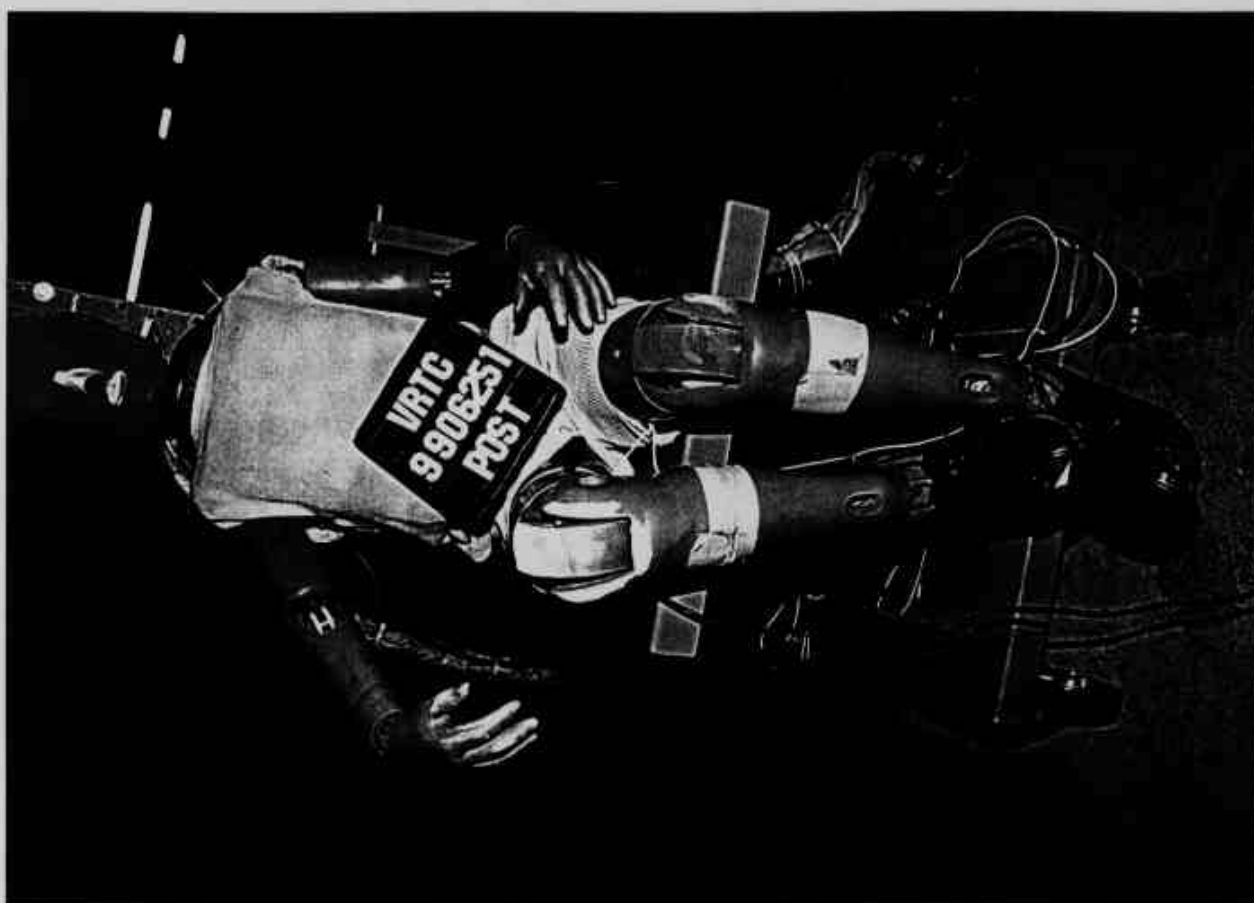


Figure A-54 Post-Test Passenger Dummy View



Figure A-55 Post-Test Passenger Dummy Head Contact - View 1



Figure A-56 Post-Test Passenger Dummy Head Contact - View 2



Figure A-57 Post-Test Passenger Dummy Knee Contact View

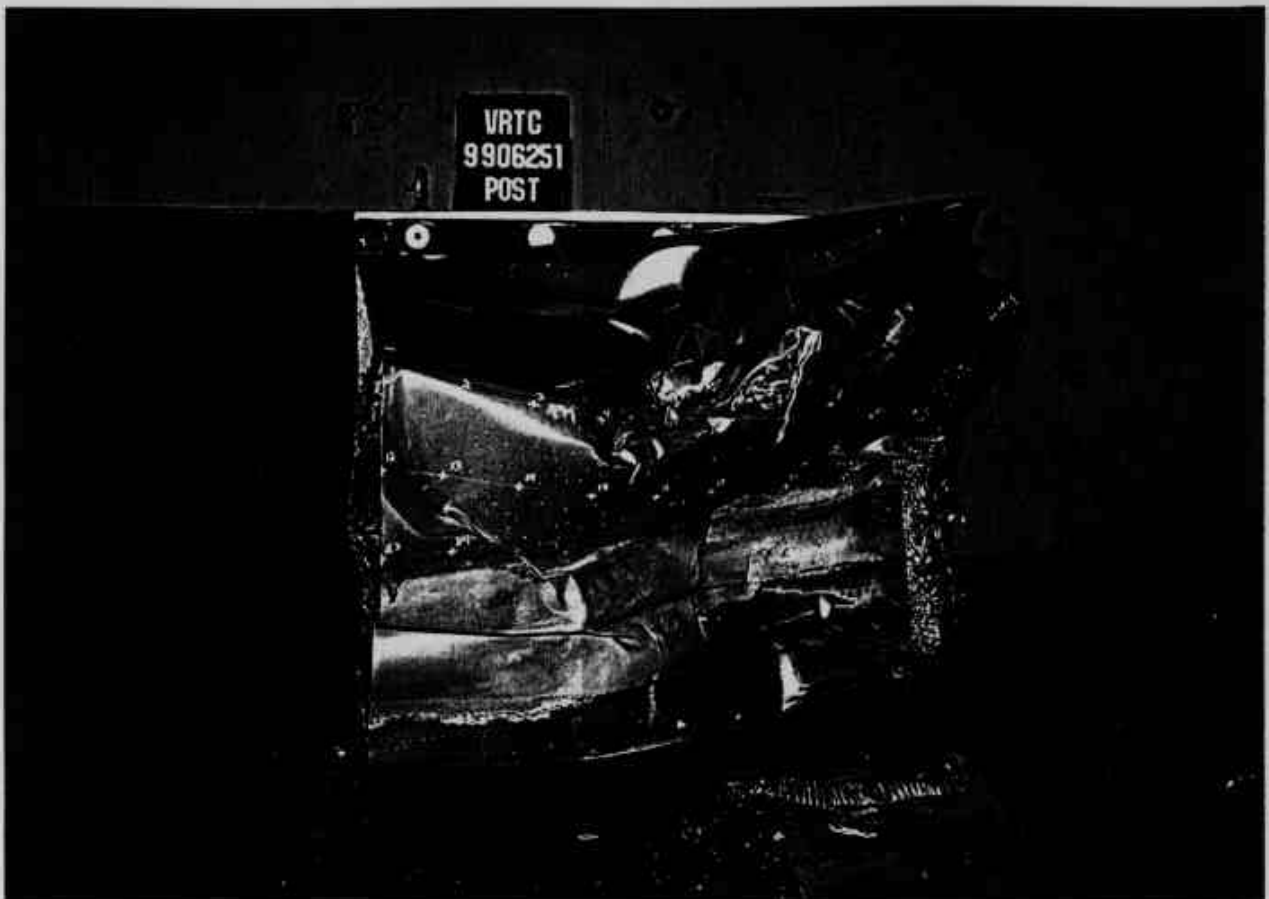


Figure A-58 Post-Test Barrier Front View

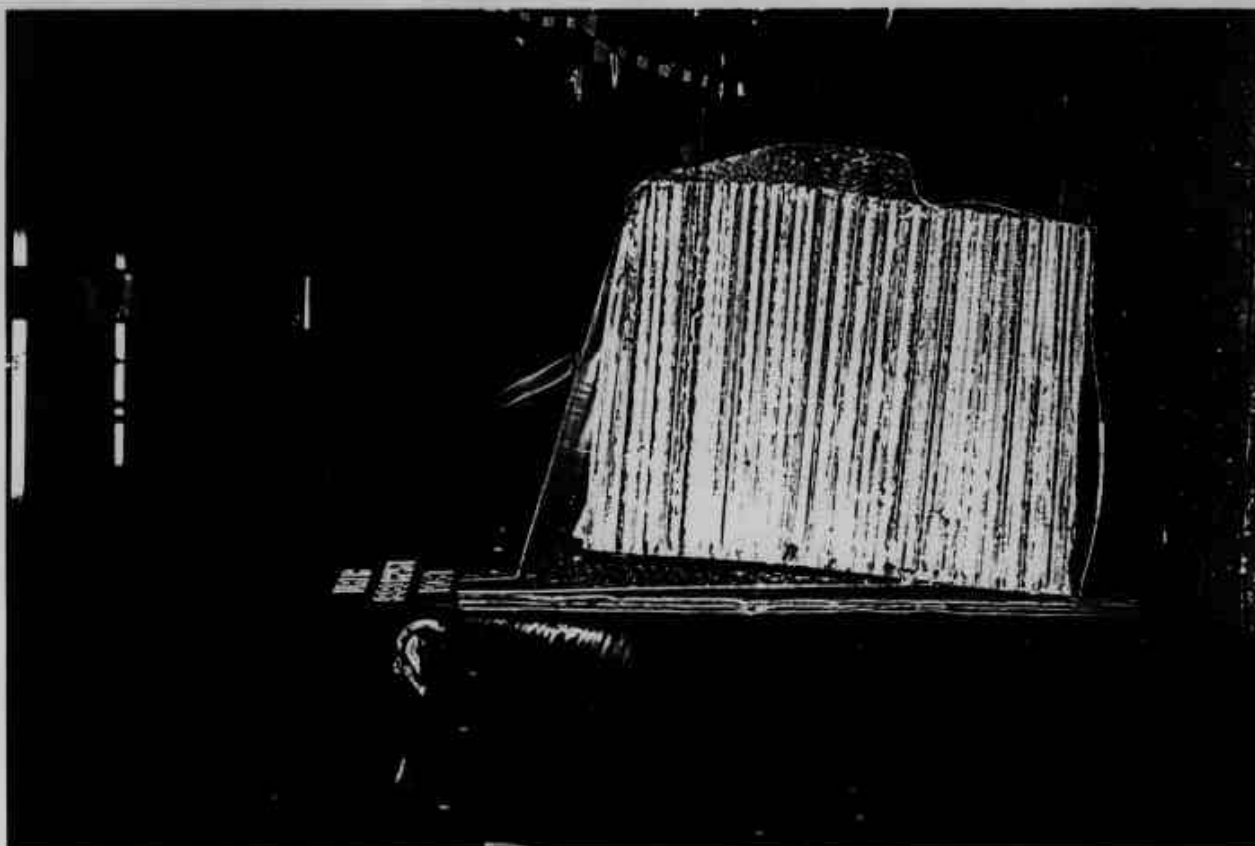


Figure A-59 Post-Test Barrier Left Side View



Figure A-60 Post-Test Barrier Right Side View



Figure A-61 Pre-Test Vehicle Certification Label View



Figure A-62 Impact Event

## Appendix B

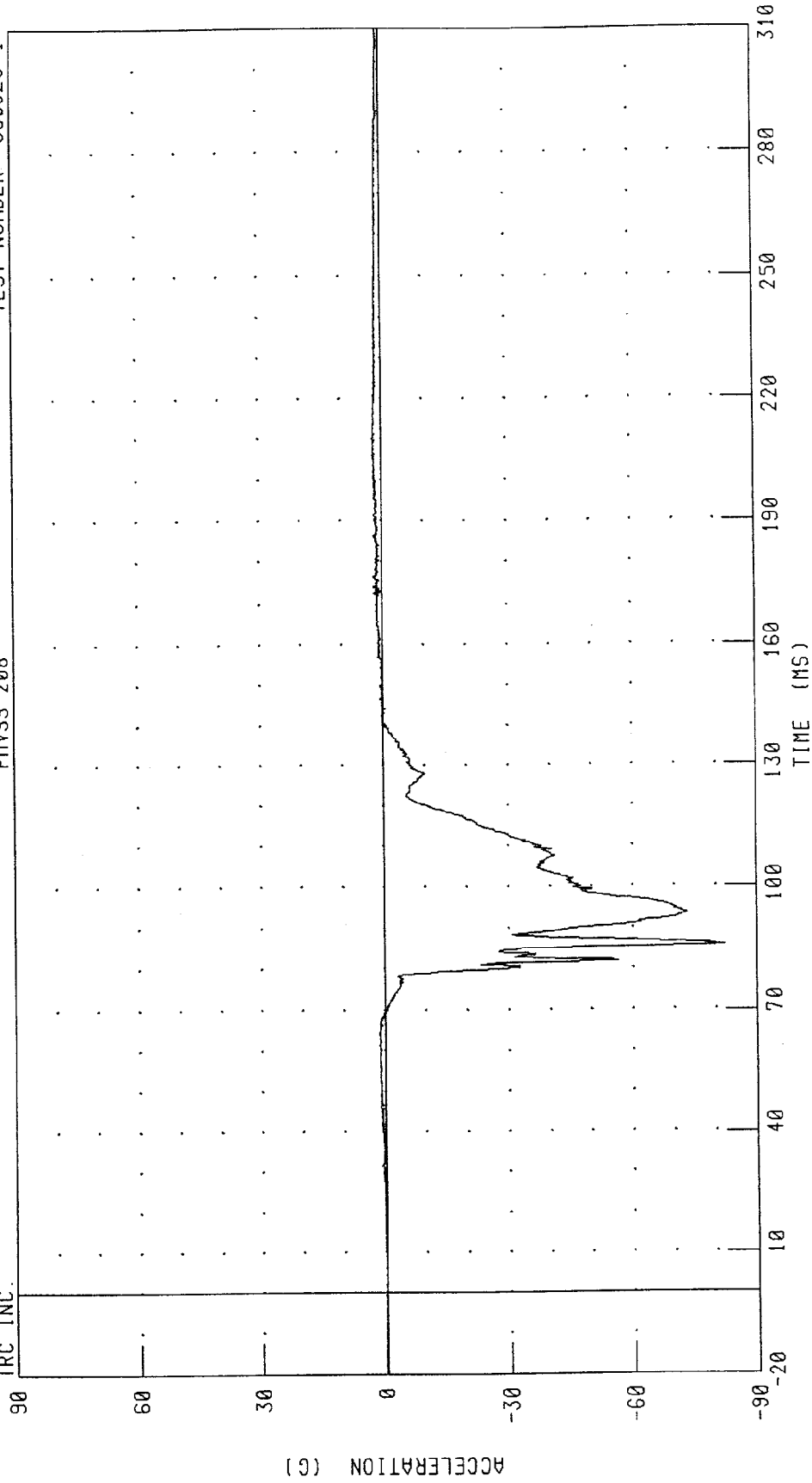
### Data Plots

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER HEAD X-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 2.21 G @ 205.92 MS; -82.26 G @ 85.92 MS

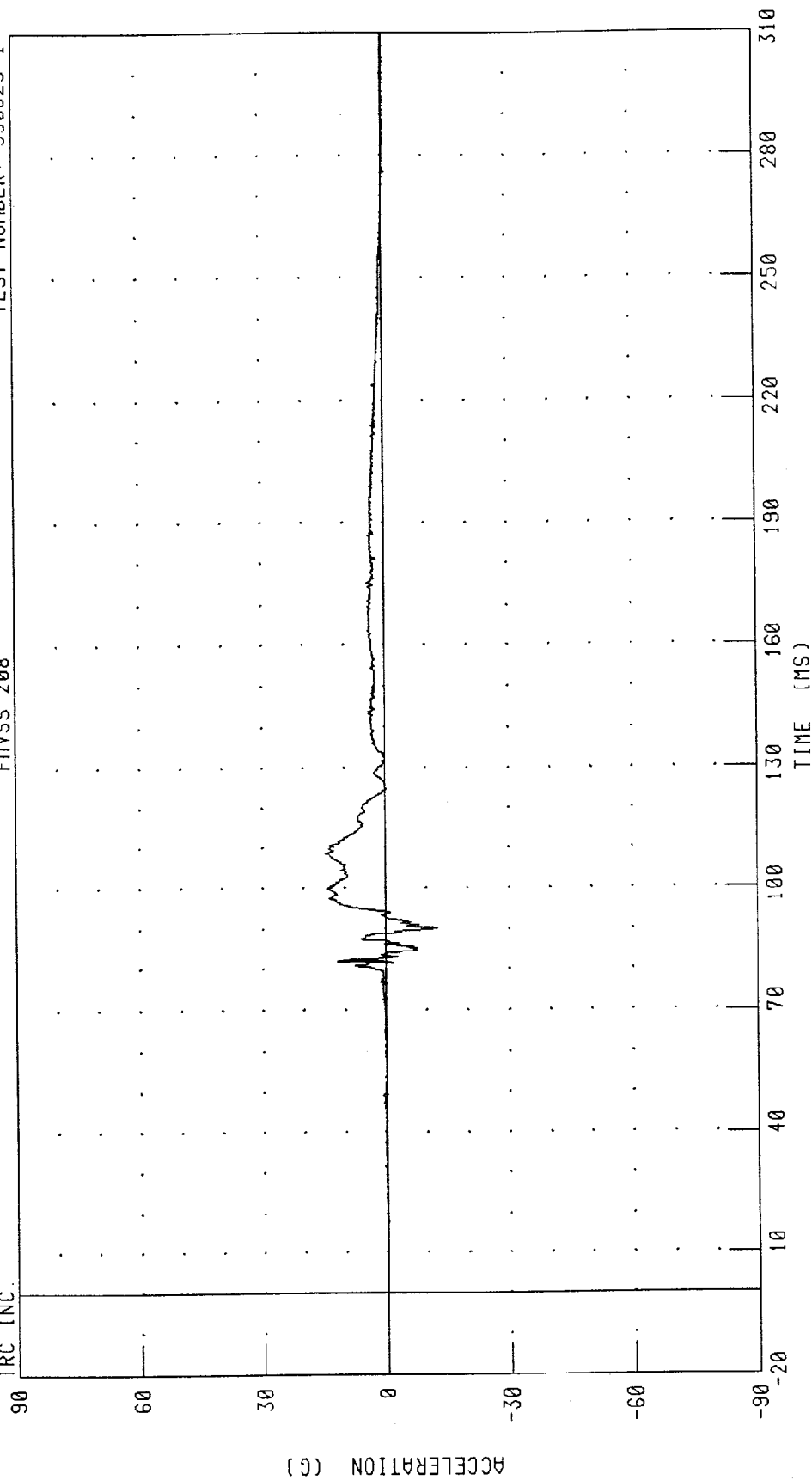
CHANNEL: HEDXC1 FILTER: CH. CLASS 1000

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: HEDYC1 FILTER: CH. CLASS 1000

PEAK DATA: 14.49 G @ 108.56 MS; -12.58 G @ 90.16 MS

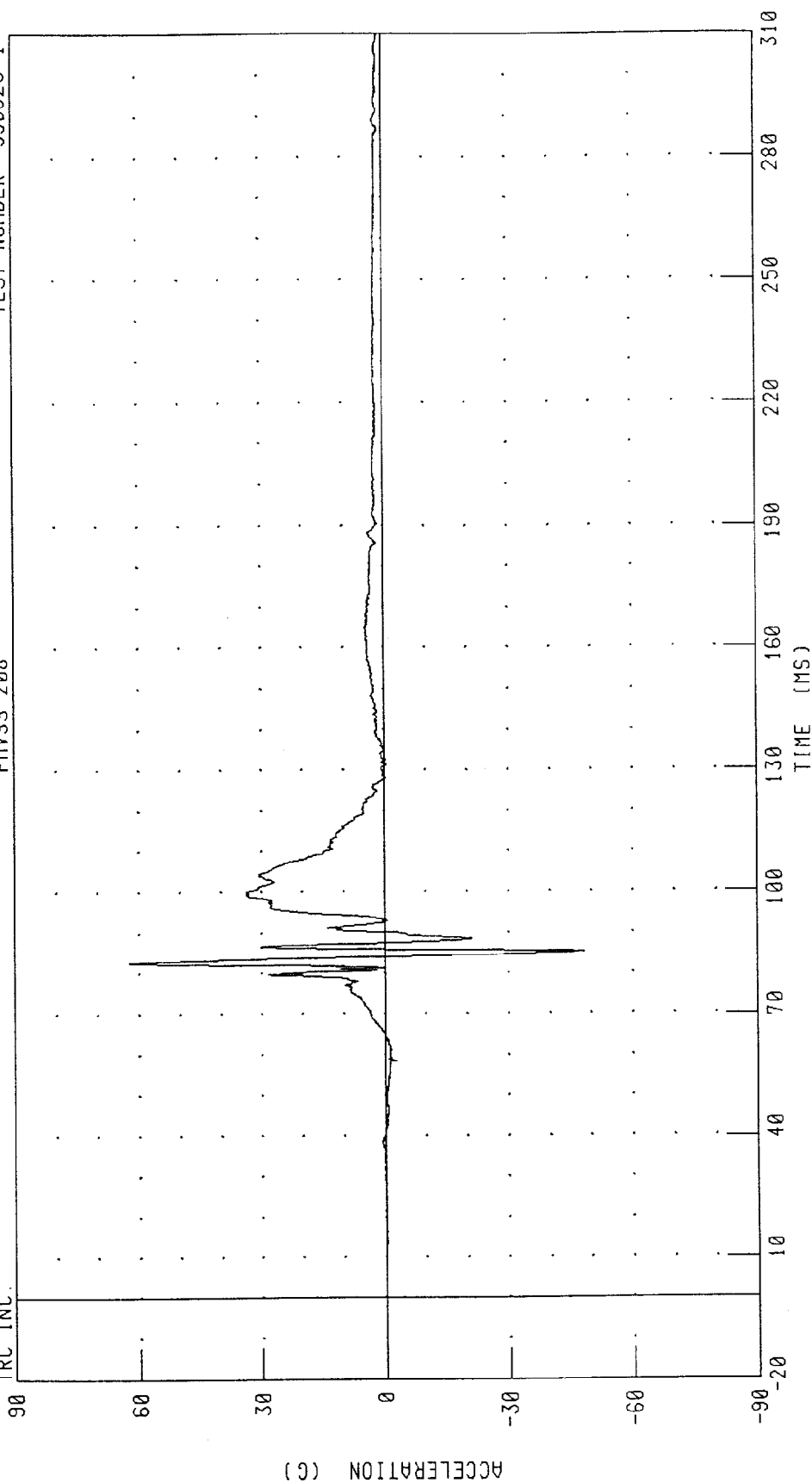


1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 62.29 G @ 82.72 MS, -48.30 G @ 85.36 MS

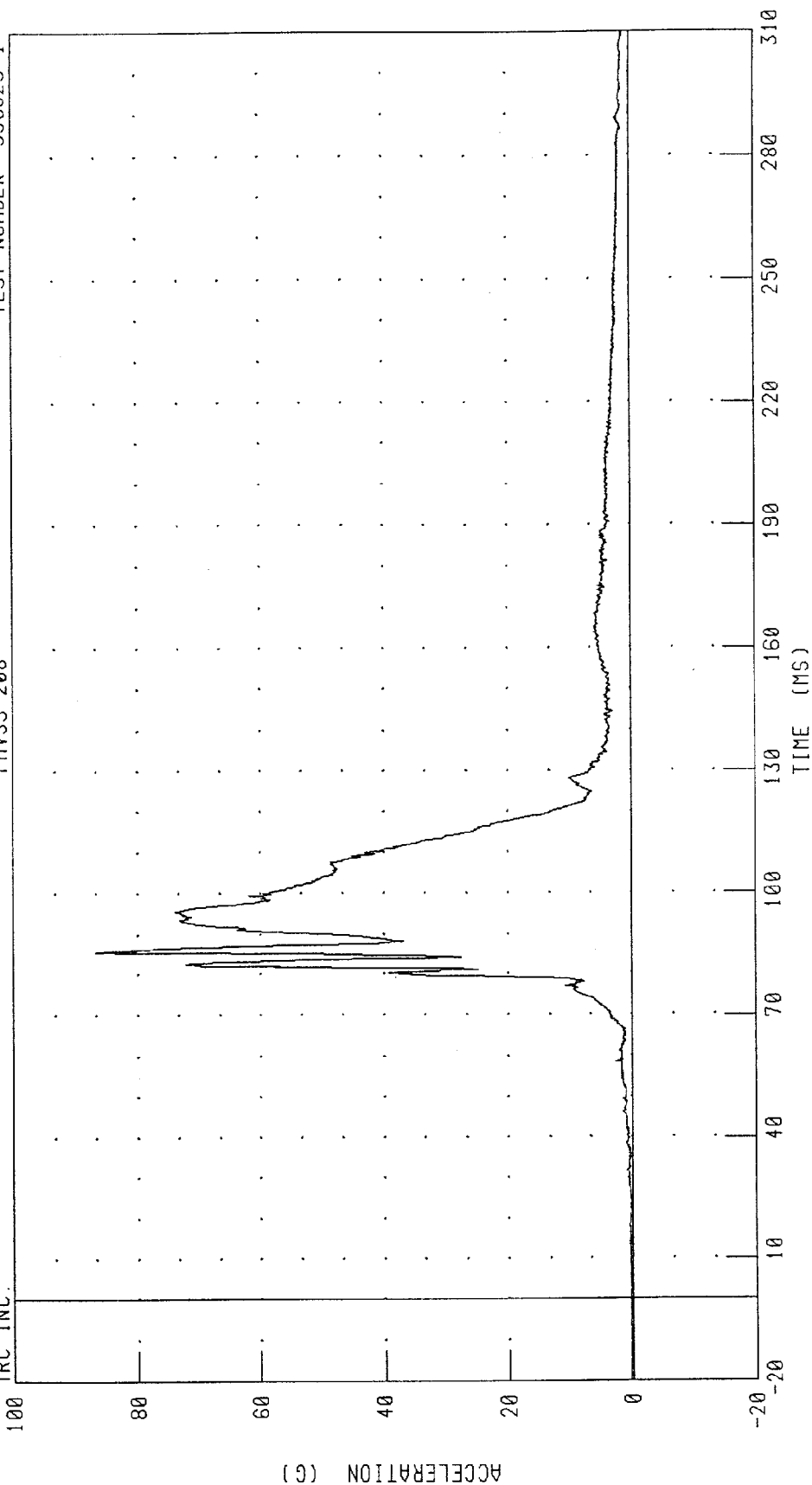
CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



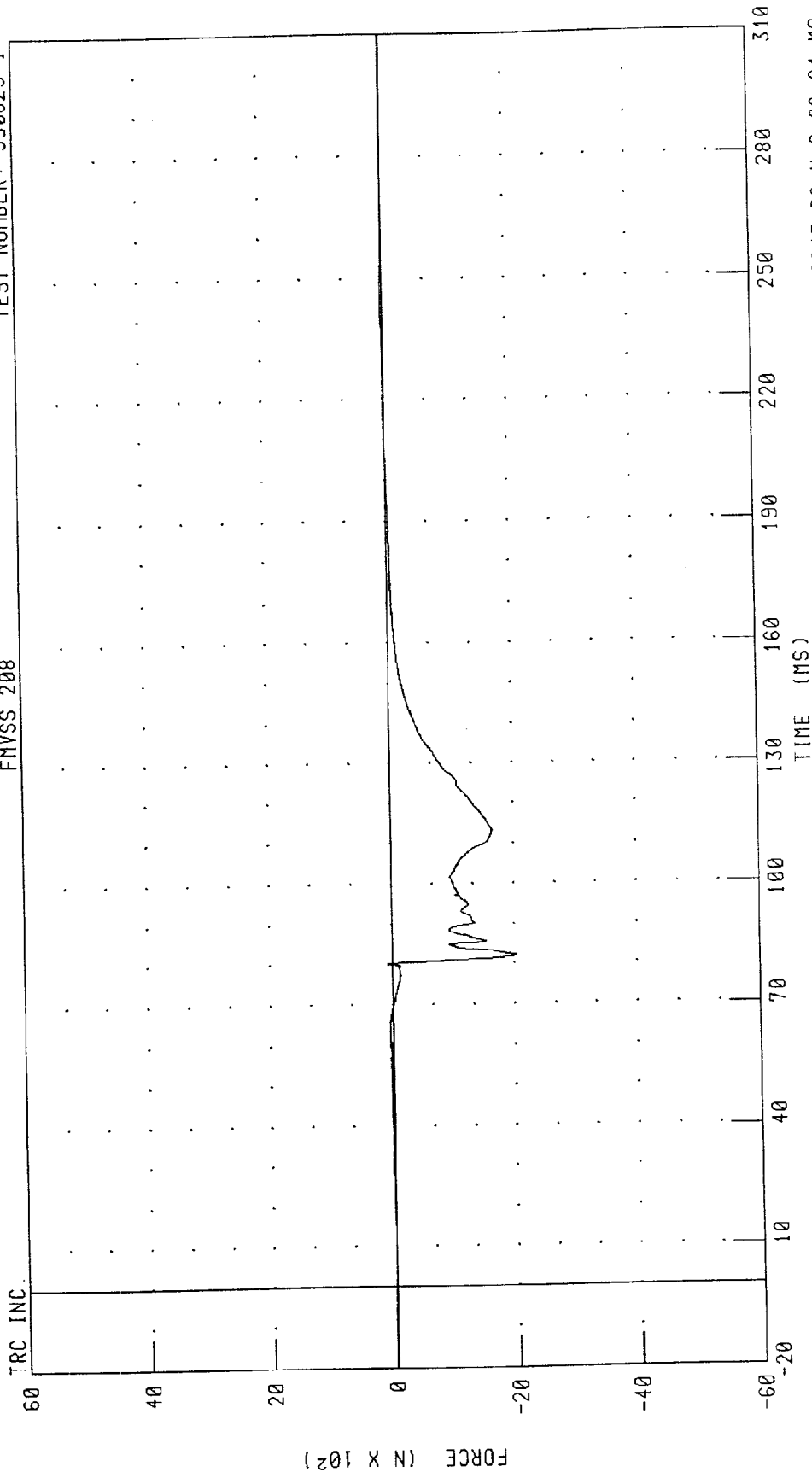
CHANNEL: HEDRG1 FILTER: CH CLASS 1000

PEAK DATA: 86.84 G @ 85.60 MS; 0.07 G @ -19.92 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 990625-1

FMVSS 208



PEAK DATA: 83.66 N @ 80.16 MS, -2043 90 N @ 82.24 MS

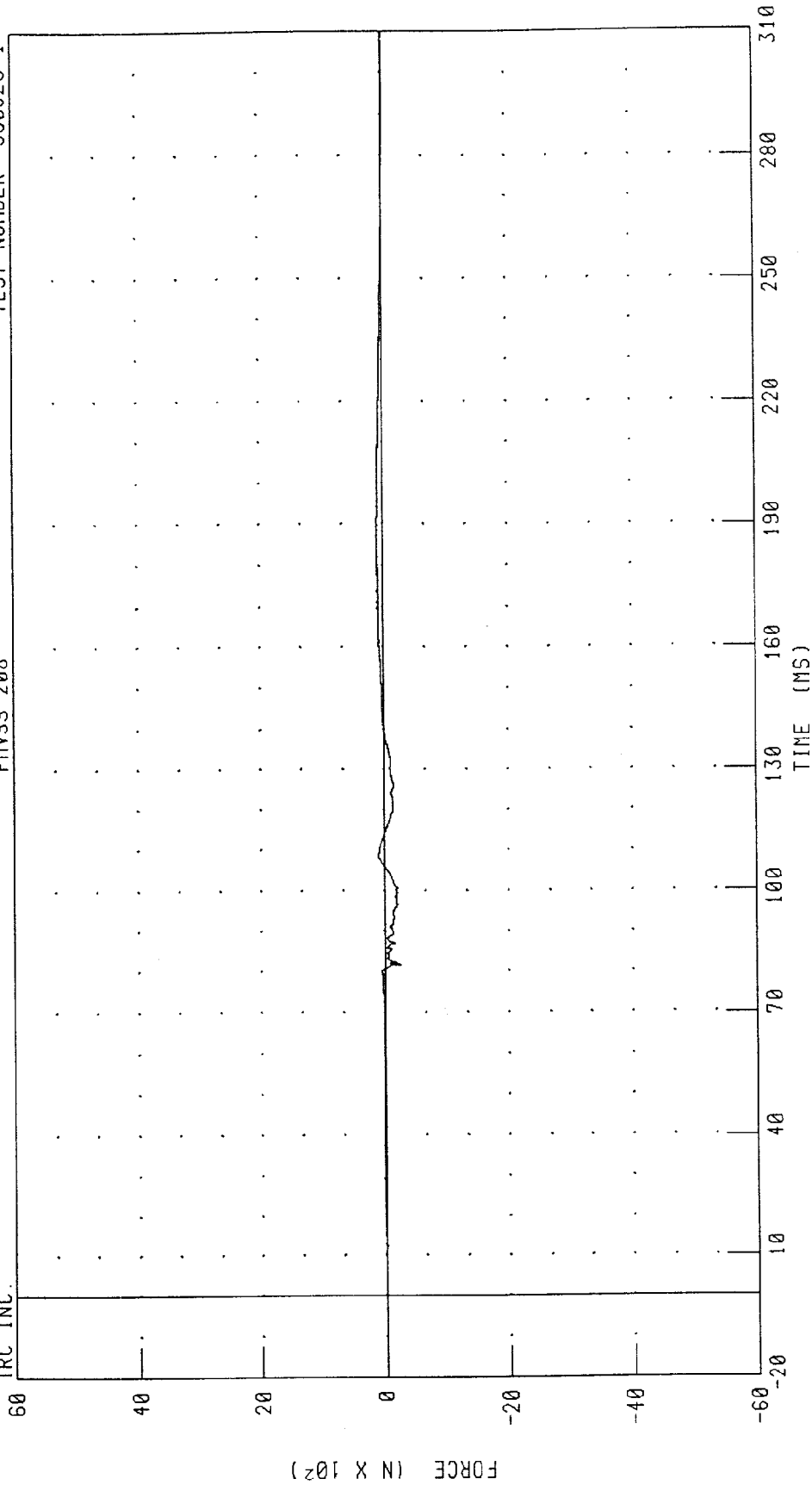
CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

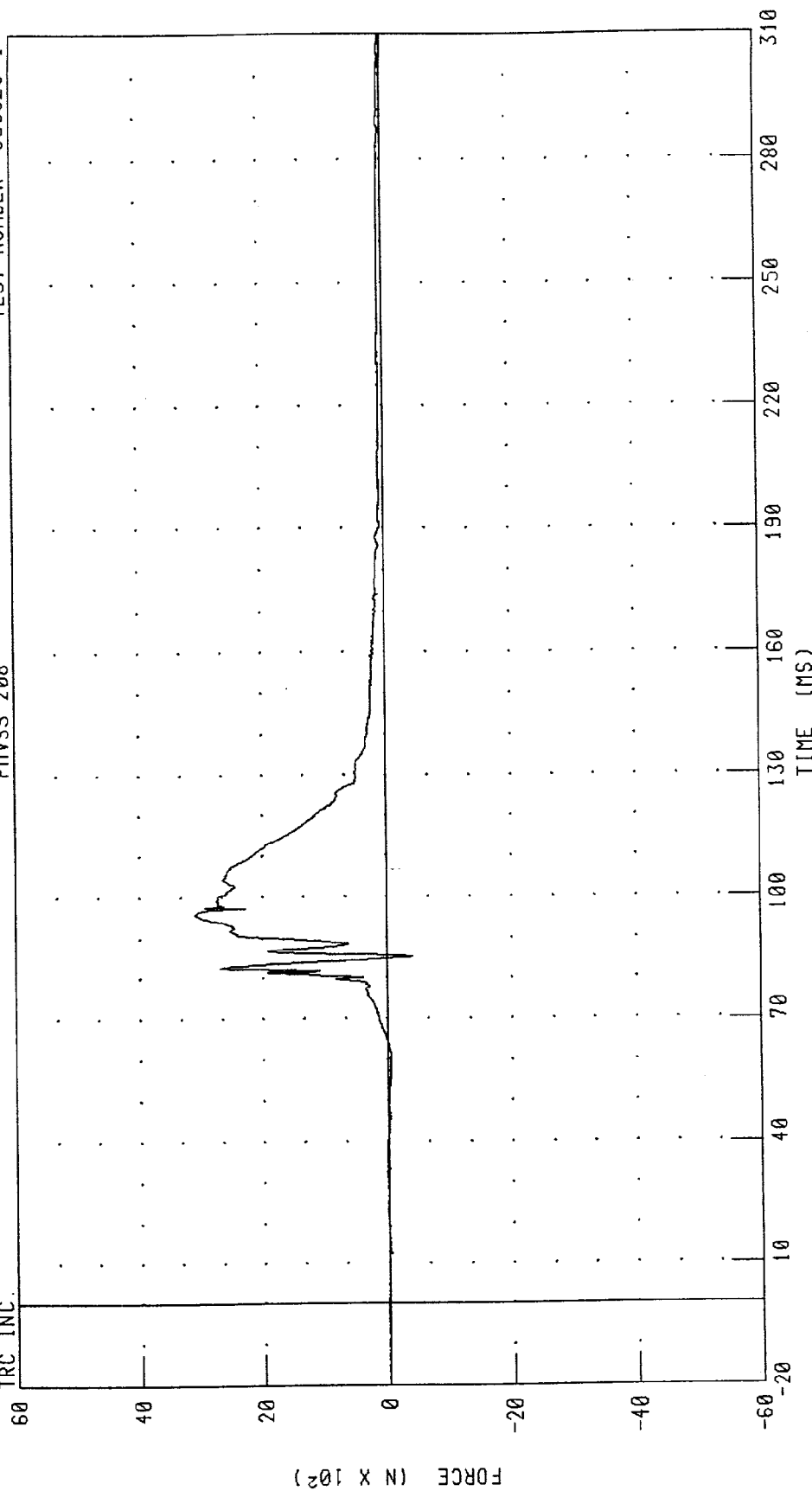
PEAK DATA: 102.03 N @ 108.56 MS; -263.03 N @ 81.68 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 3115.77 N @ 95.68 MS; -421.35 N @ 85.28 MS

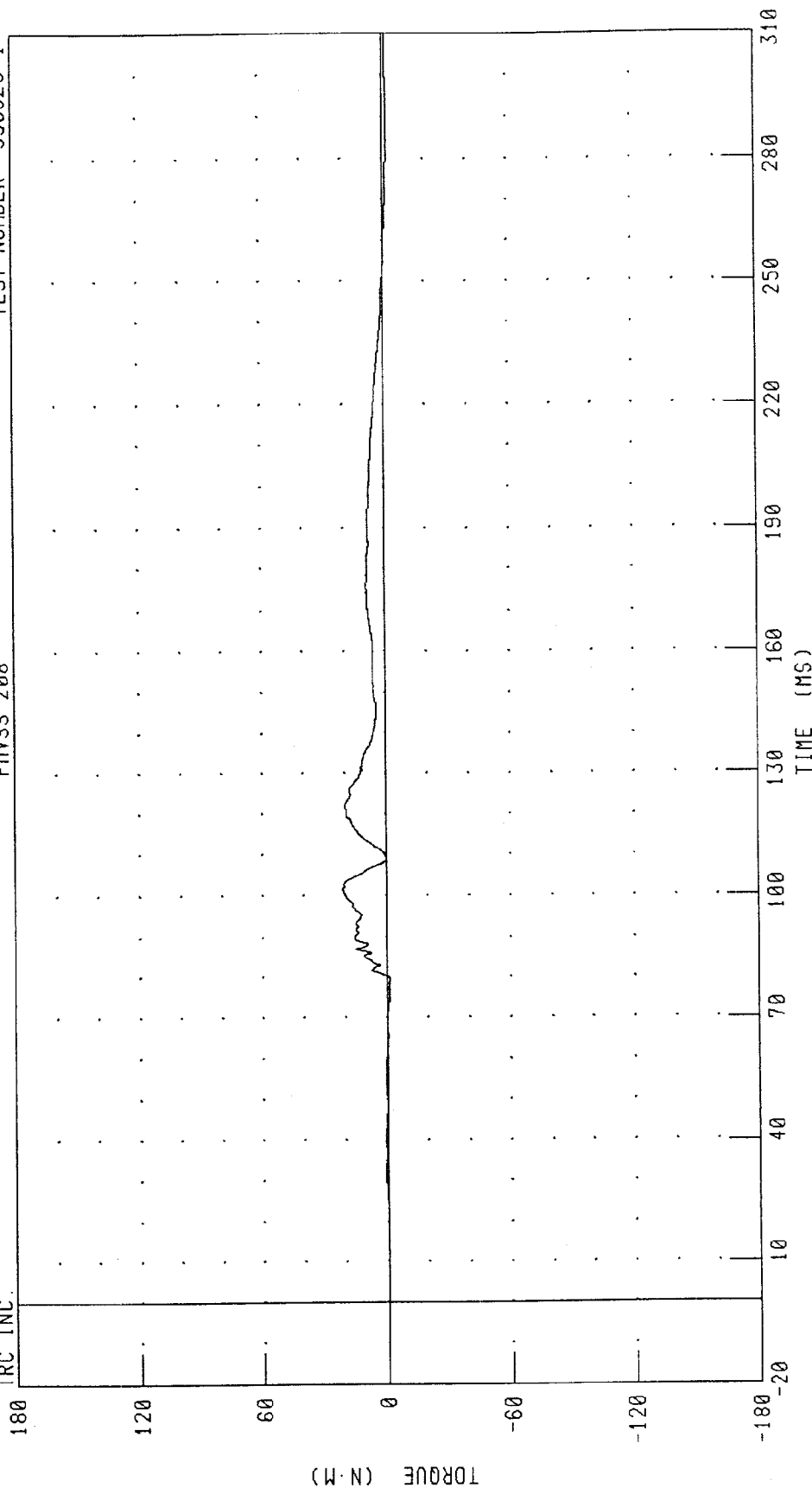
CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



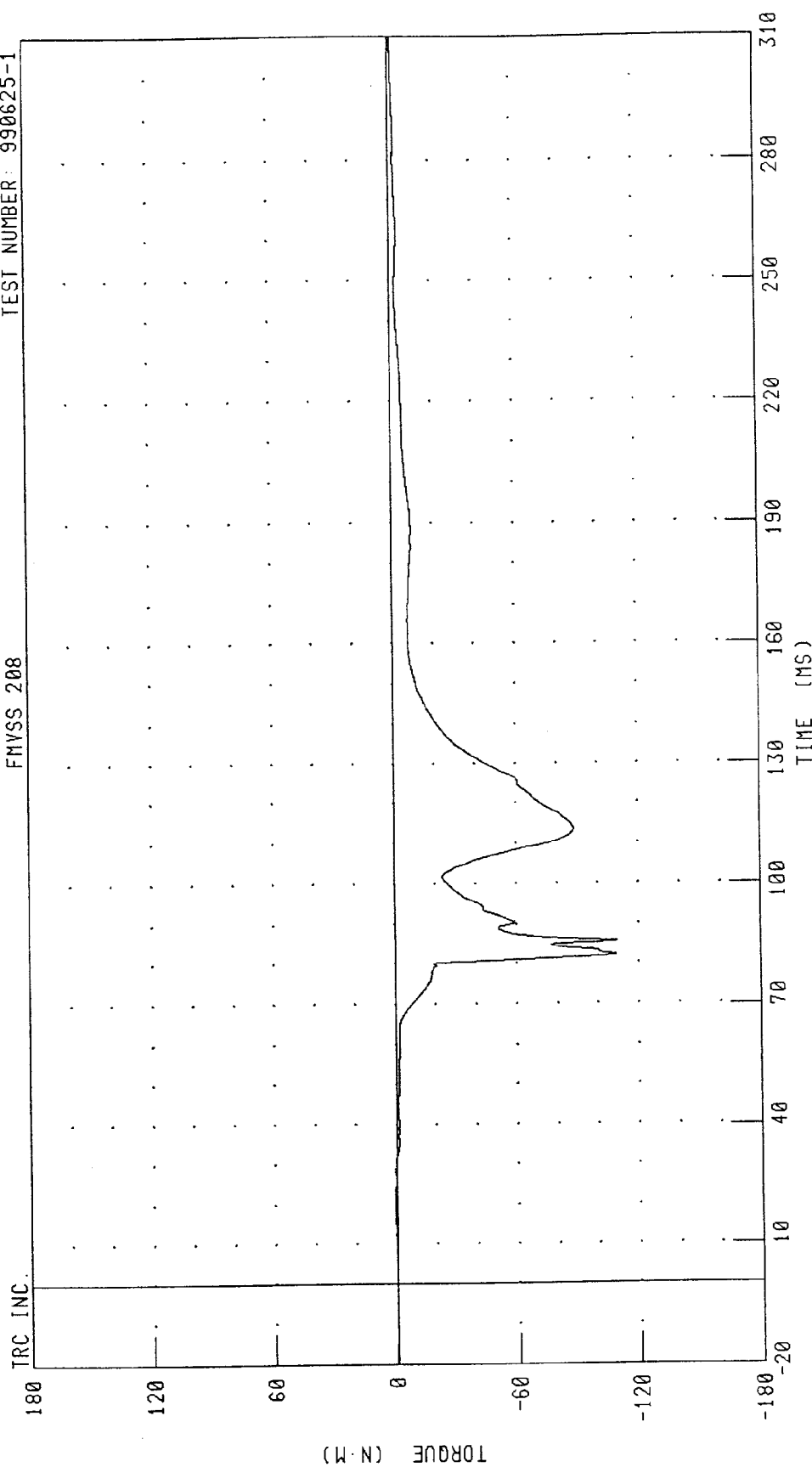
PEAK DATA: 21.09 N·M @ 101.60 MS; -2.27 N·M @ 285.76 MS

CHANNEL: NEKXM1 FILTER: CH. CLASS 600

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 990625-1

FMYSS 208



PEAK DATA: 0.78 N·M @ 20.00 MS; -109.26 N·M @ 85.76 MS

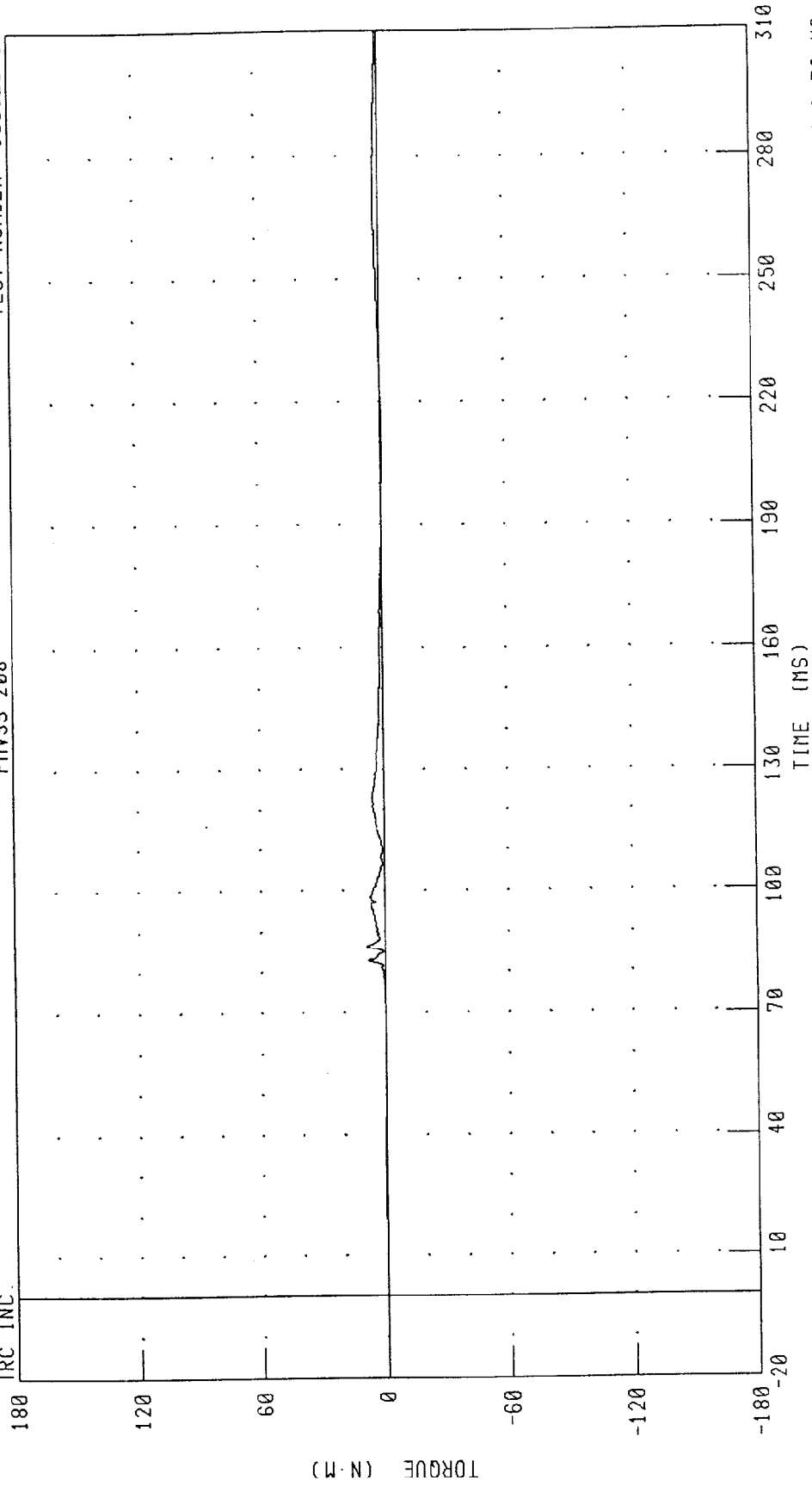
CHANNEL: NEKYM1 FILTER: CH. CLASS 600

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 9.16 N·M @ 86.40 MS, -0.77 N·M @ 212.32 MS

FILTER: CH. CLASS 600

CHANNEL: NEKZM1

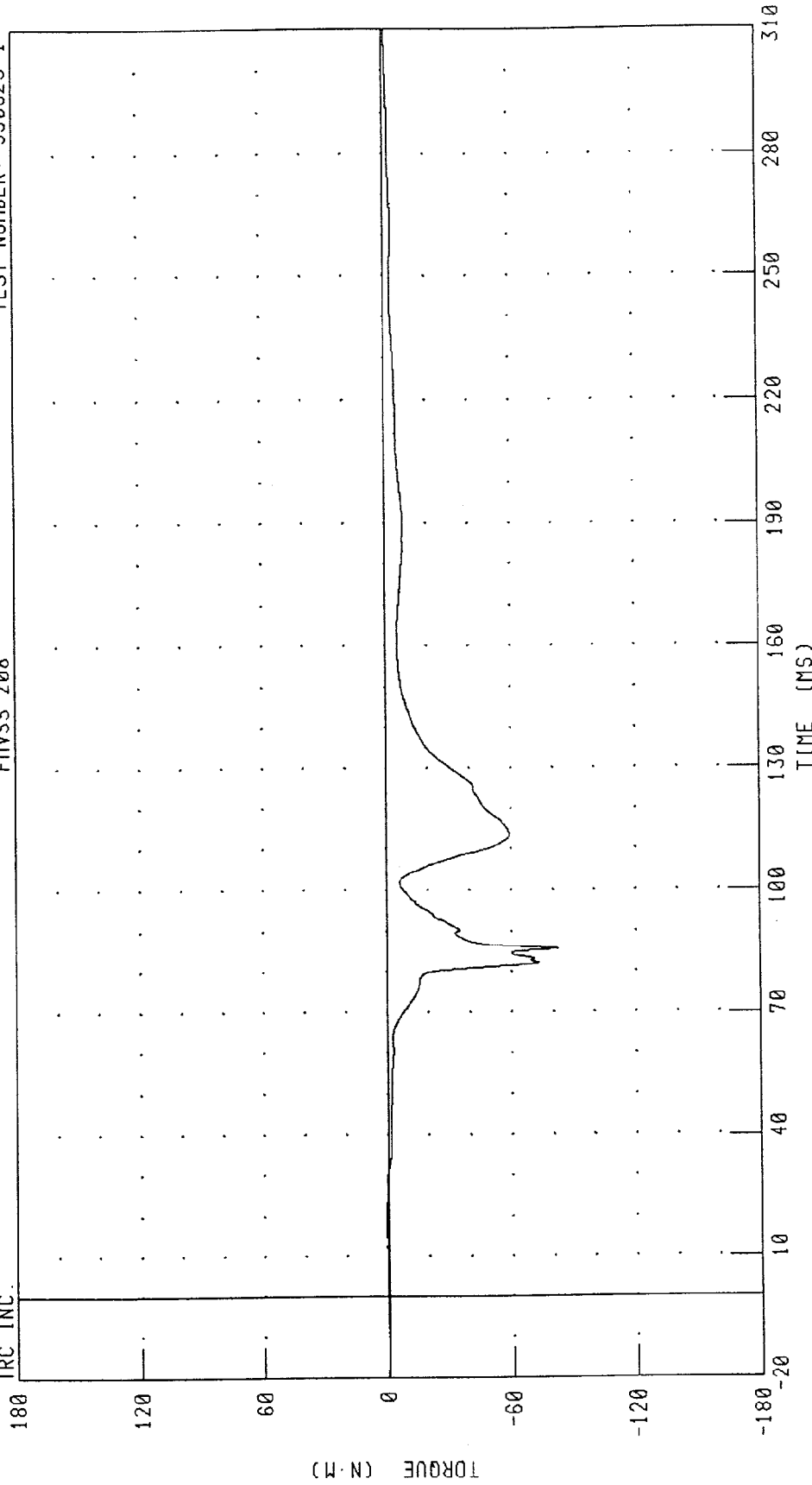


1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER NECK OCCIPITAL CONDYLE

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 0.76 N·M @ 20.00 MS; -82.48 N·M @ 85.68 MS

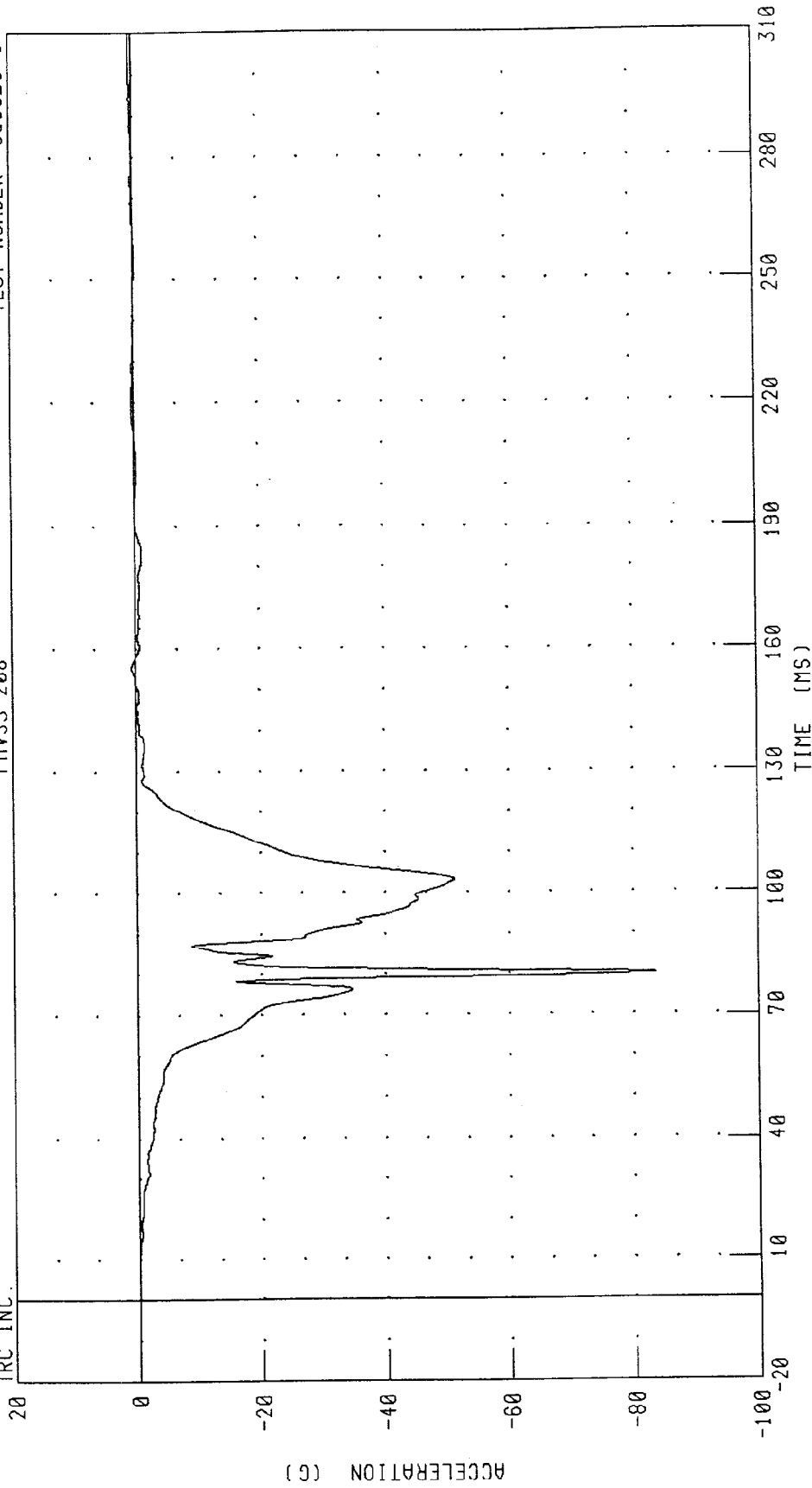
CHANNEL: NEKOM1 FILTER: CH. CLASS 600

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER CHEST X-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: CSTXC1 FILTER: CH. CLASS 180

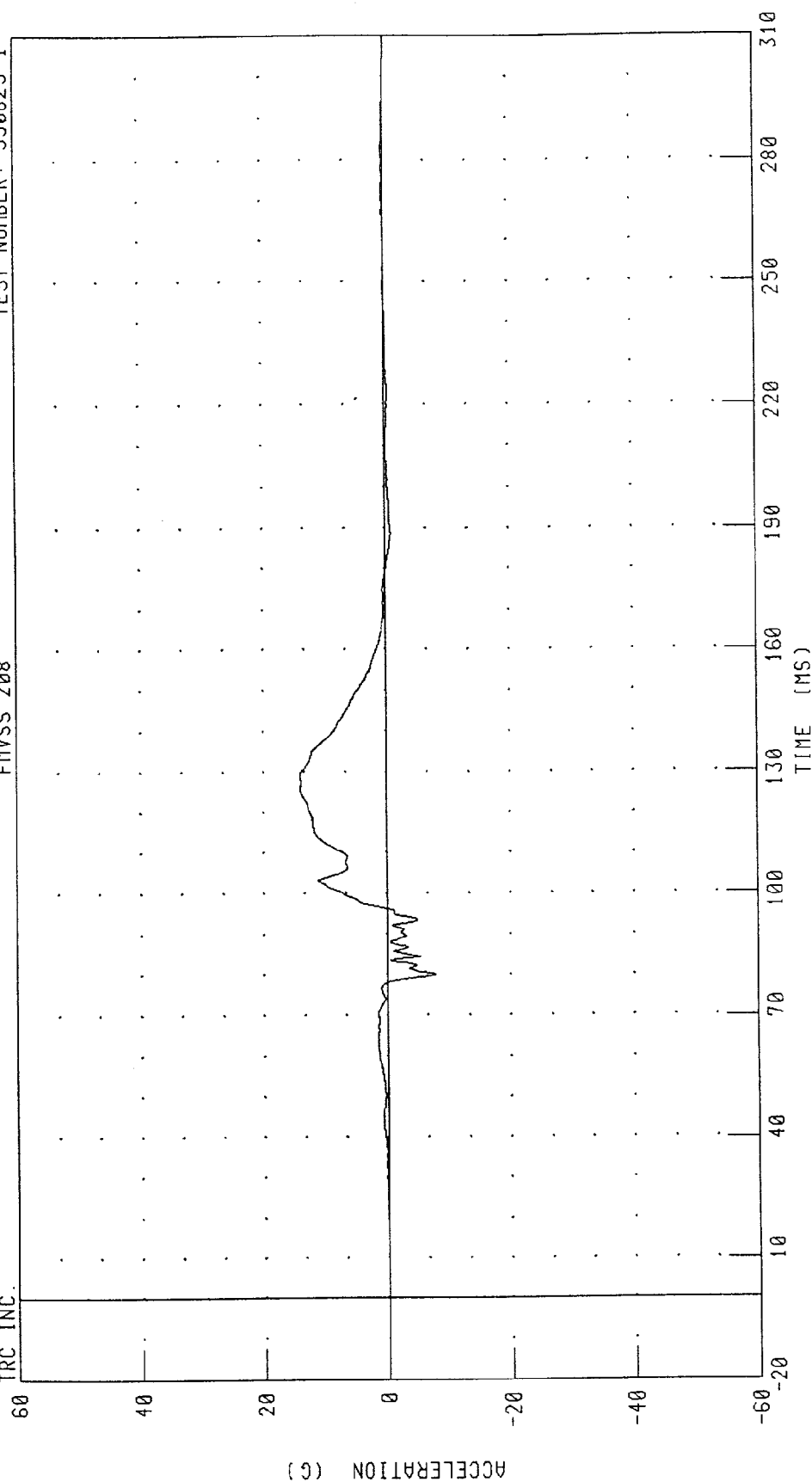
PEAK DATA: 0.74 G @ 155.44 MS; -83.56 G @ 80.16 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 13.96 G @ 128.96 MS, -7.94 G @ 80.32 MS

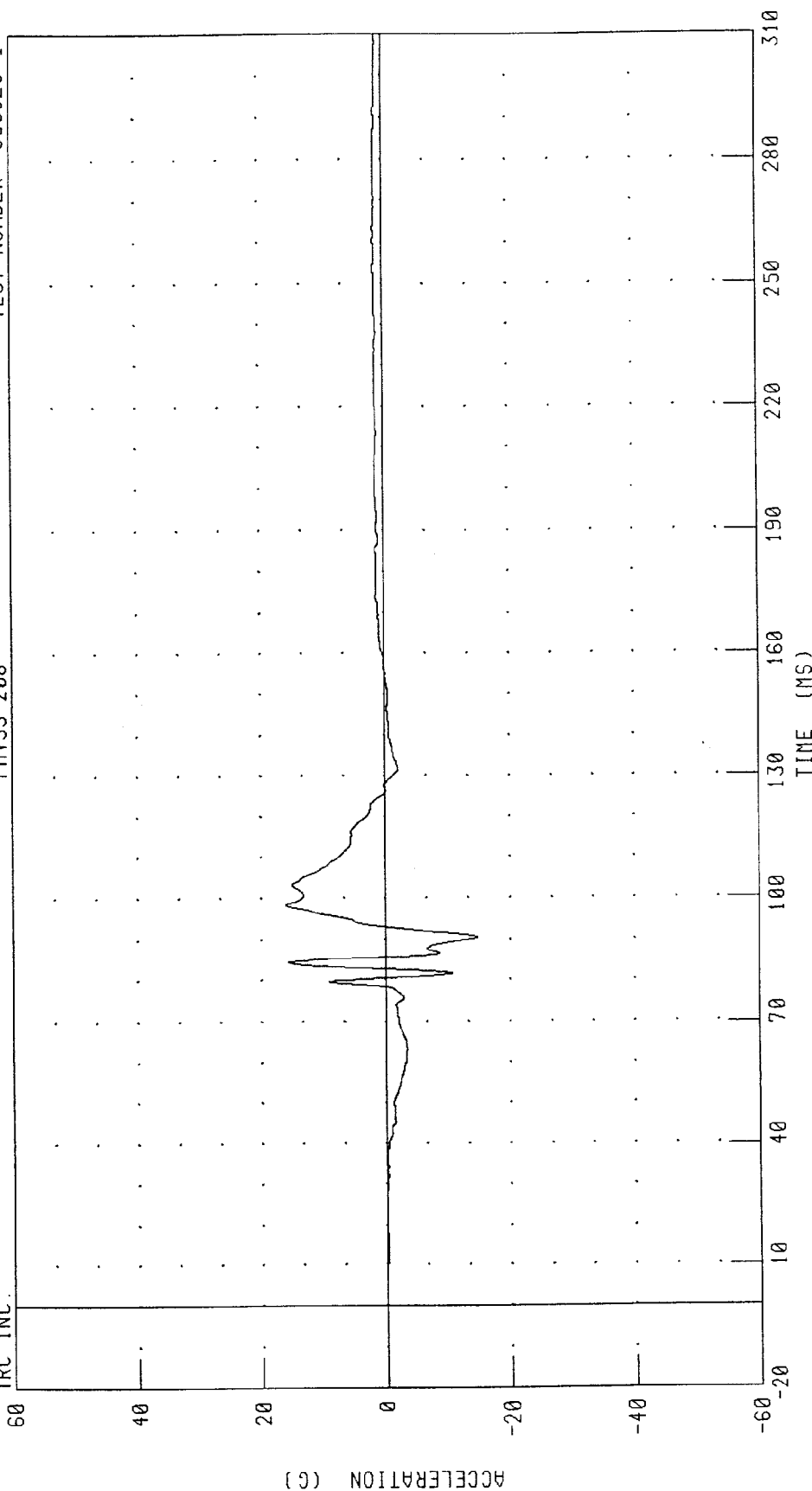
CHANNEL: CSTYG1 FILTER: CH. CLASS 180

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: CSTZG1 FILTER: CH. CLASS 180

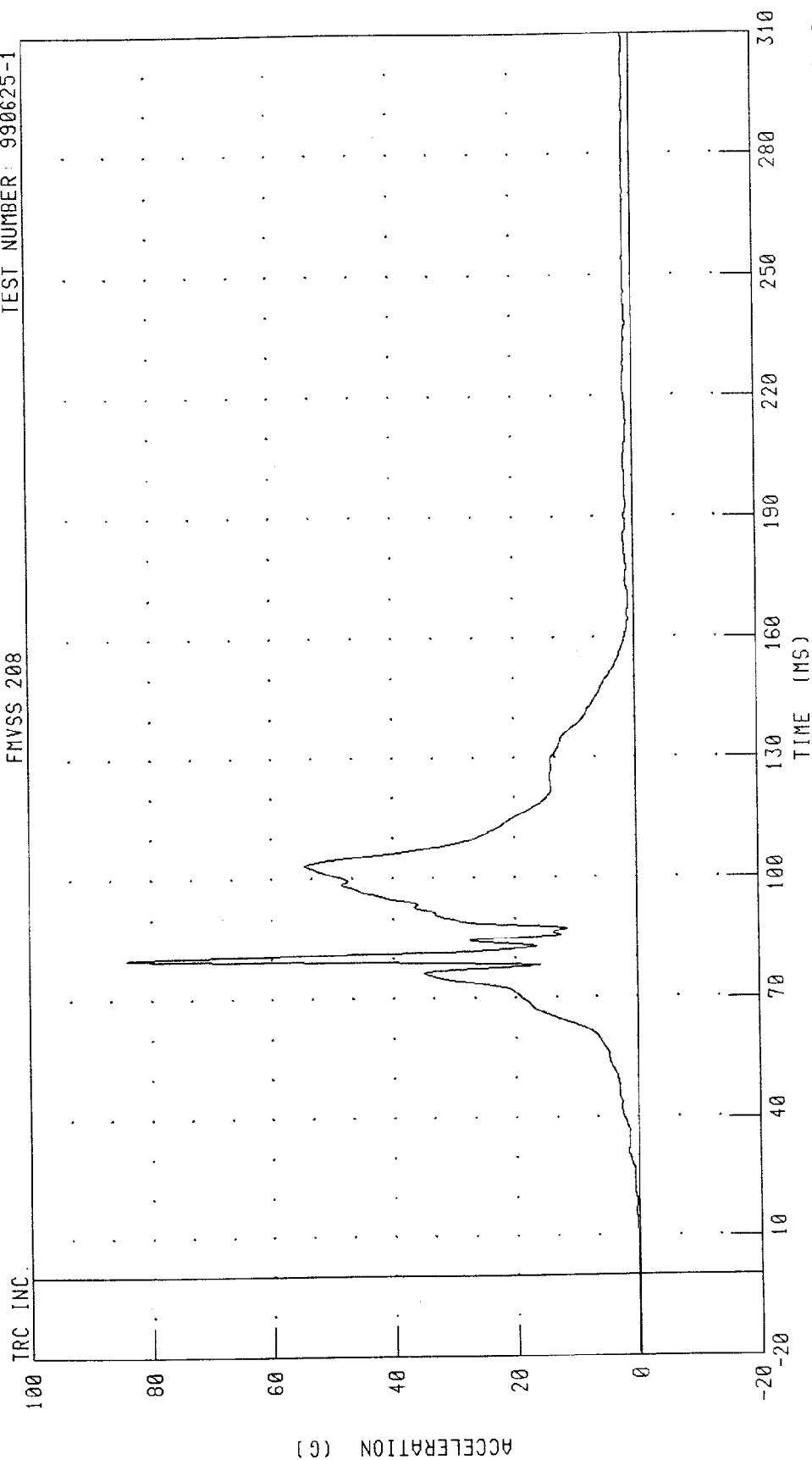
PEAK DATA: 16.04 G @ 98.48 MS; -14.75 G @ 90.64 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER CHEST RESULTANT ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 84.11 G @ 80.16 MS; 0.00 C @ -20.00 MS

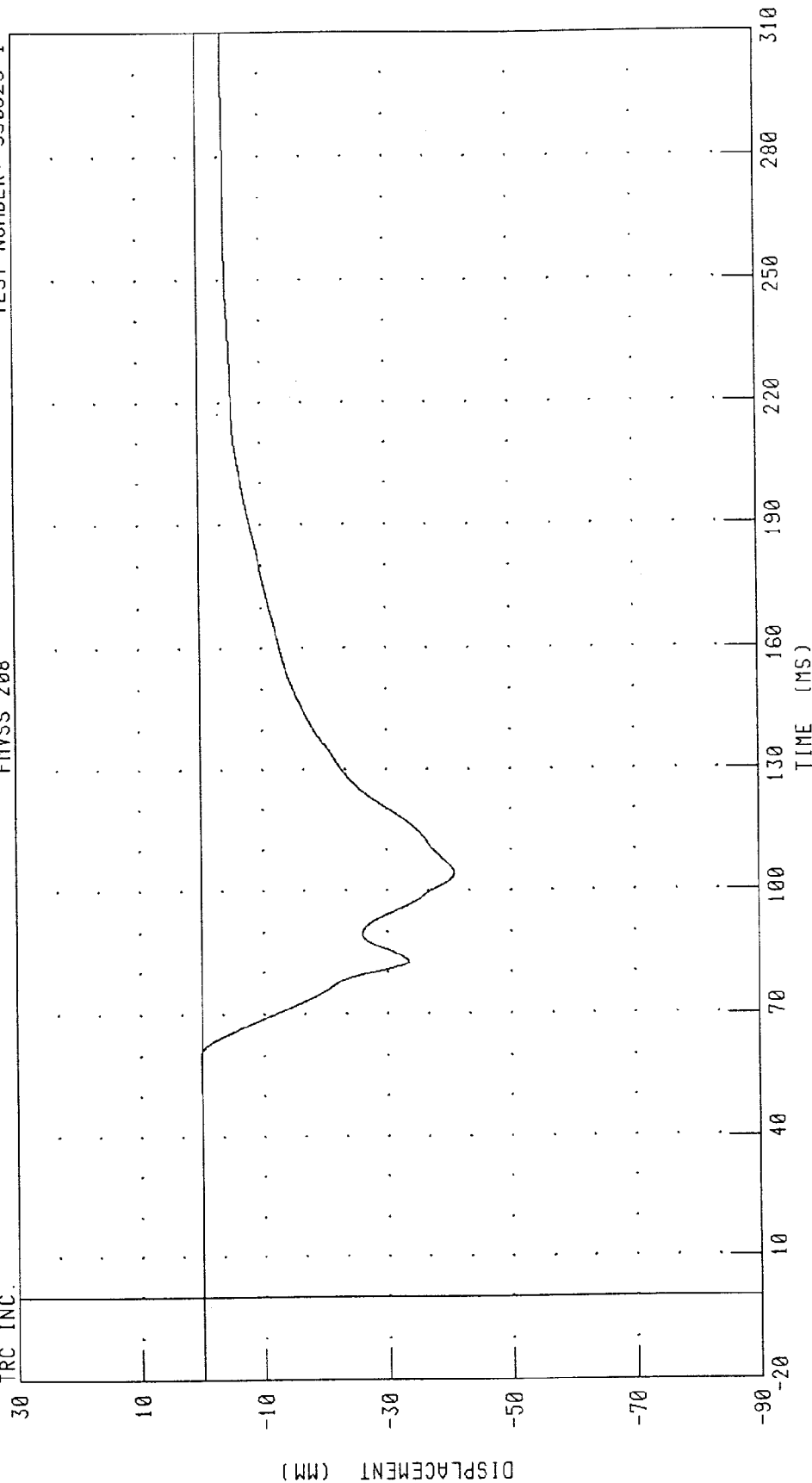
CHANNEL: CSTRG1 FILTER: CH. CLASS 180

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER CHEST DEFLECTION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: CSTXD1 FILTER: CH. CLASS 180

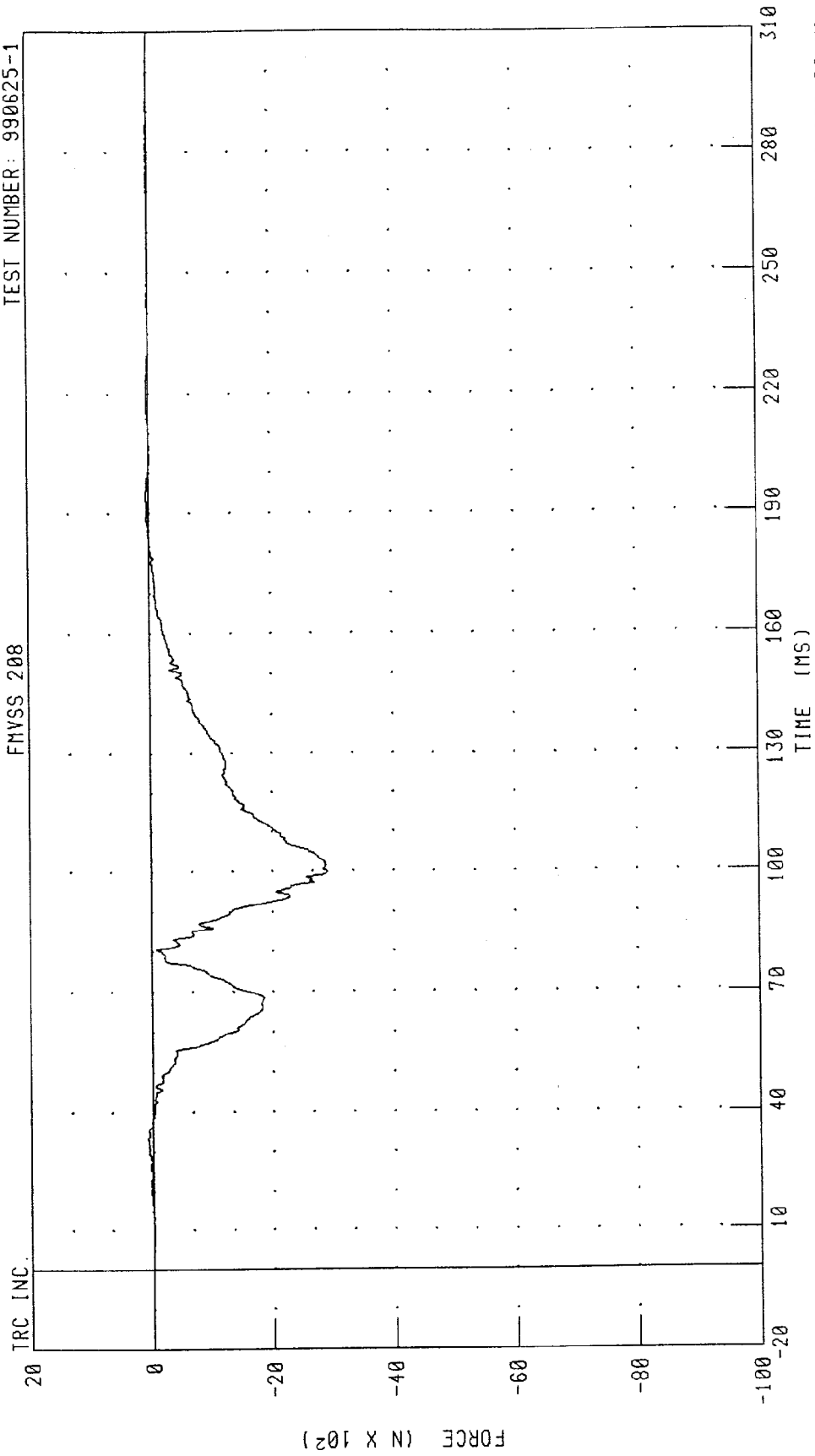
PEAK DATA: 0.32 MM @ 59.76 MS; -40.94 MM @ 104.48 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH

DRIVER LEFT FEMUR FORCE

FMVSS 208

TEST NUMBER: 990625--1



CHANNEL: LFMF1 FILTER: CH. CLASS 600

PEAK DATA: 90 78 N @ 33.44 MS, -2913.75 N @ 100.00 MS

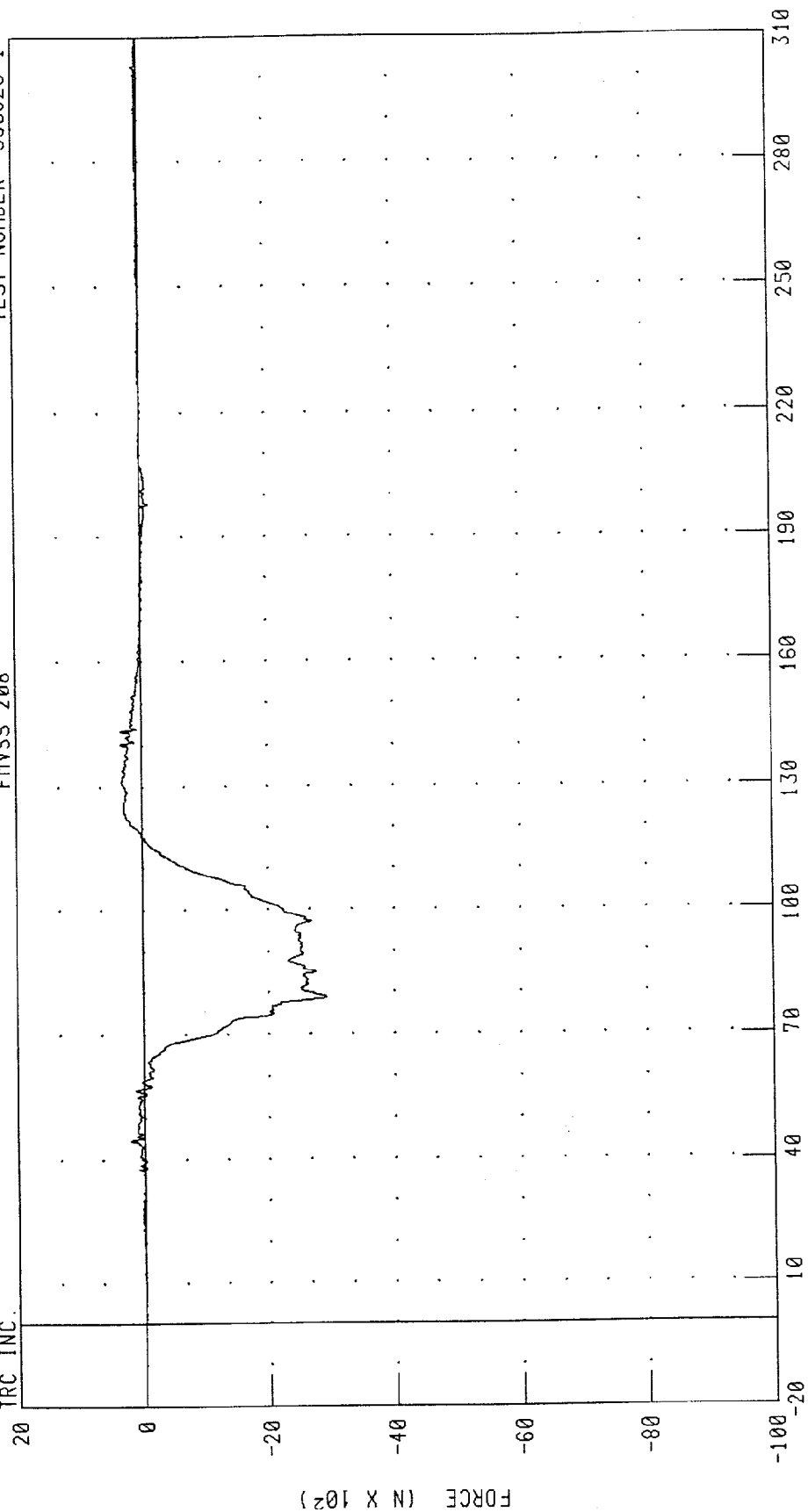
1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH

DRIVER RIGHT FEMUR FORCE

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 349.57 N @ 140.56 MS; -2927.58 N @ 79.04 MS

CHANNEL: RFMF1 FILTER: CH. CLASS 600

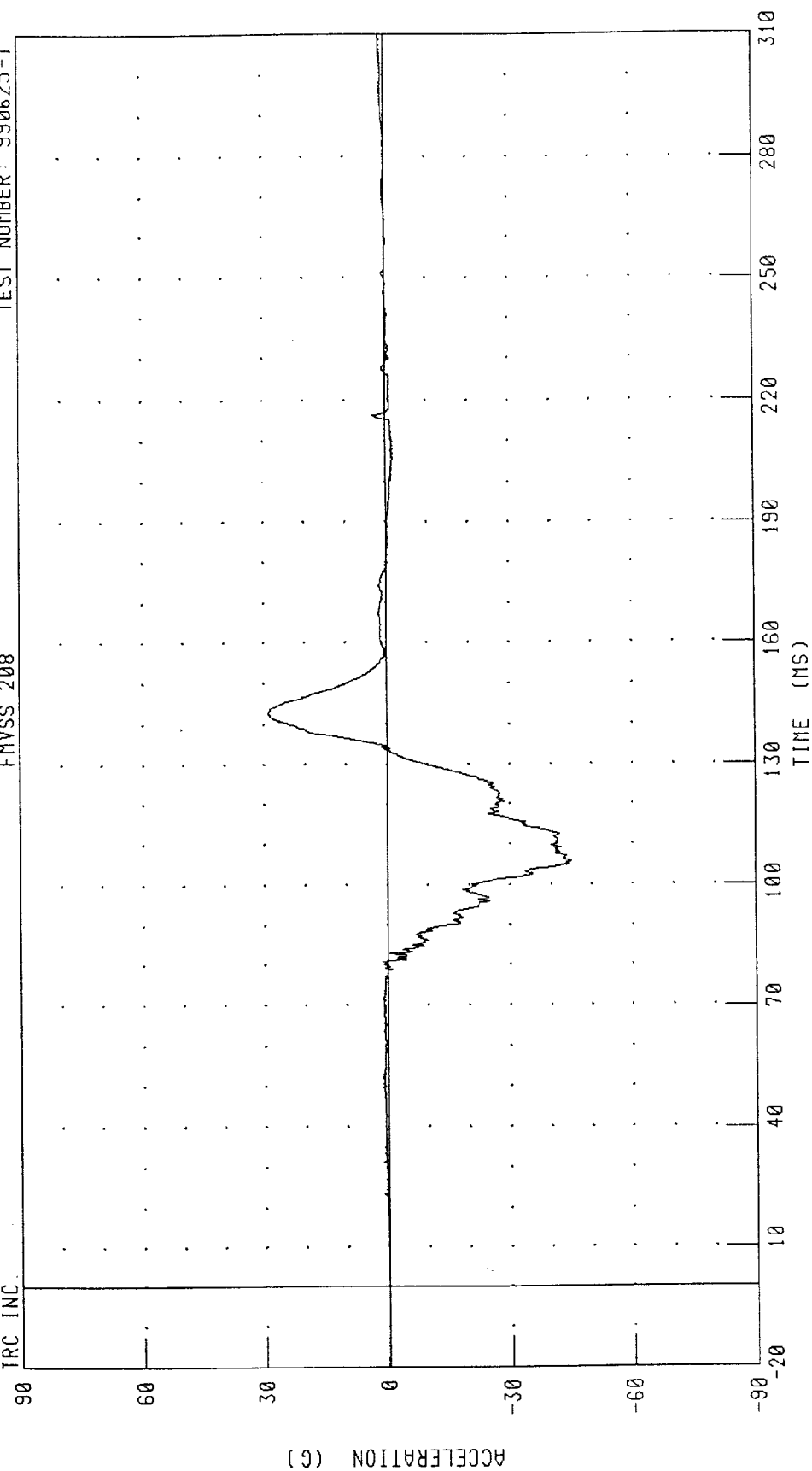


1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 29.08 G @ 142.80 MS; -44.98 G @ 105.84 MS

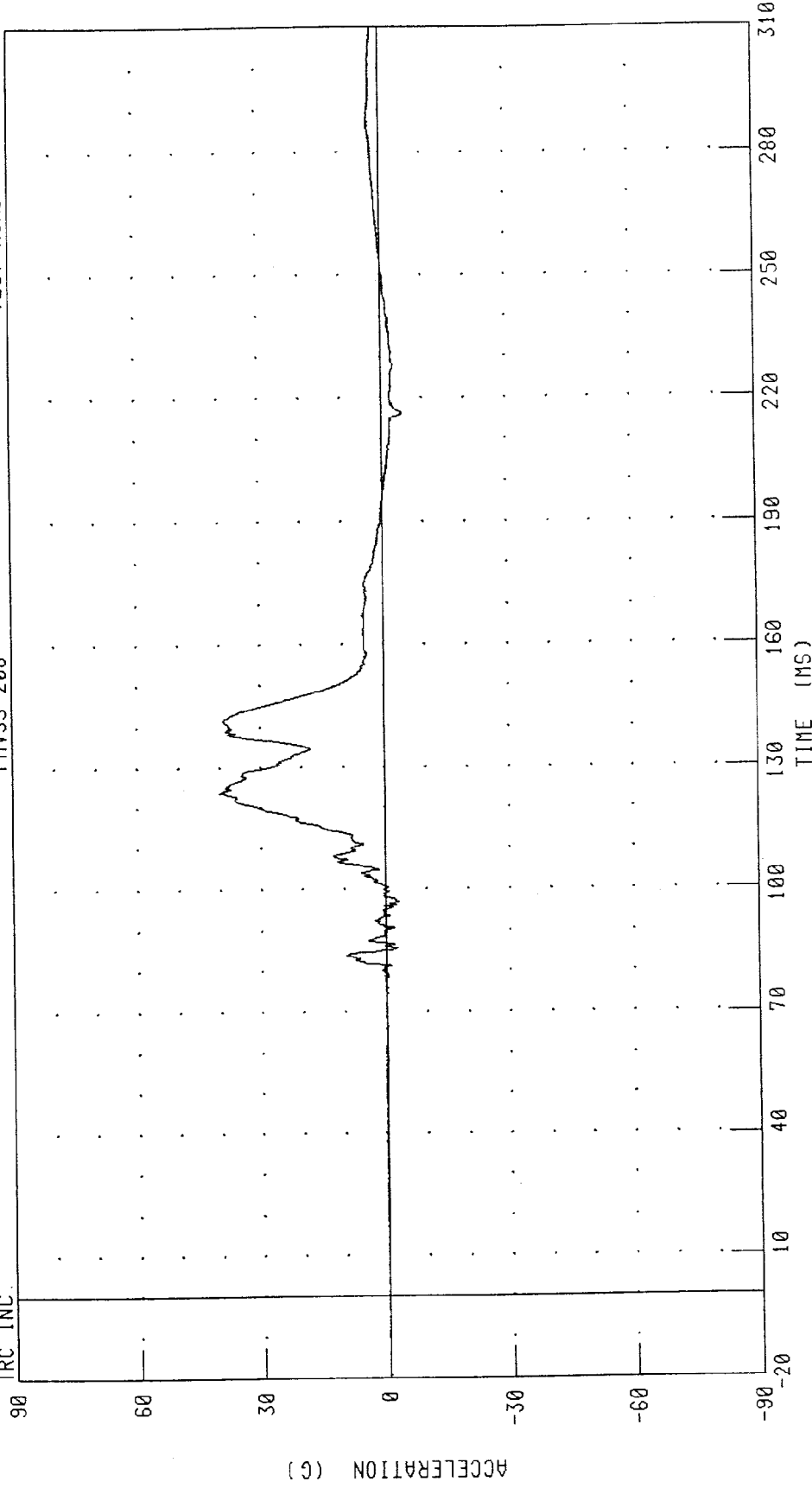
CHANNEL: HEDXC2 FILTER: CH. CLASS 1000

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 40.01 G @ 123.84 MS; -5.20 G @ 216.24 MS

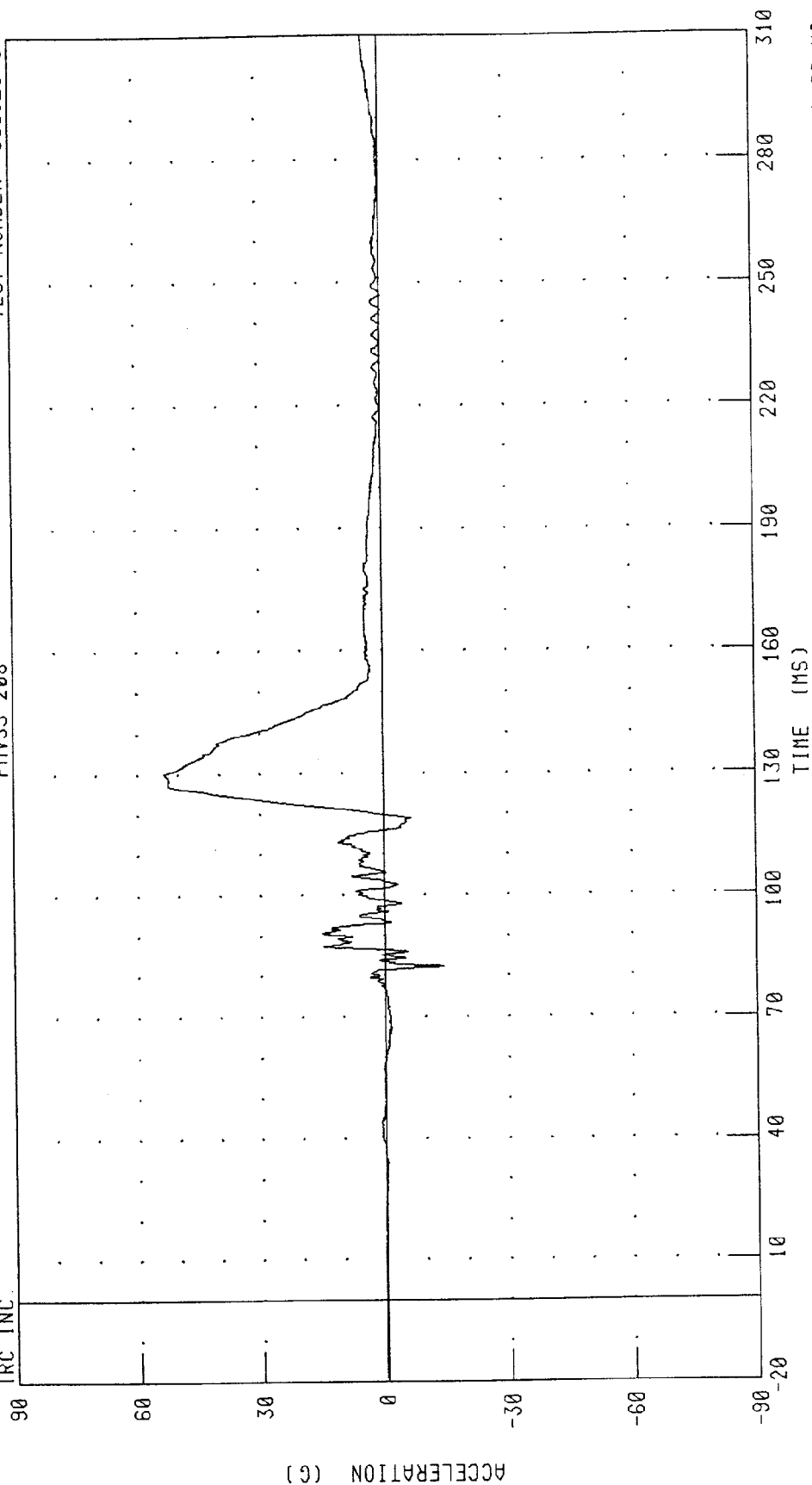
CHANNEL: HEDYC2 FILTER: CH. CLASS 1000

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 53.55 G @ 130.24 MS; -14.29 G @ 82.32 MS

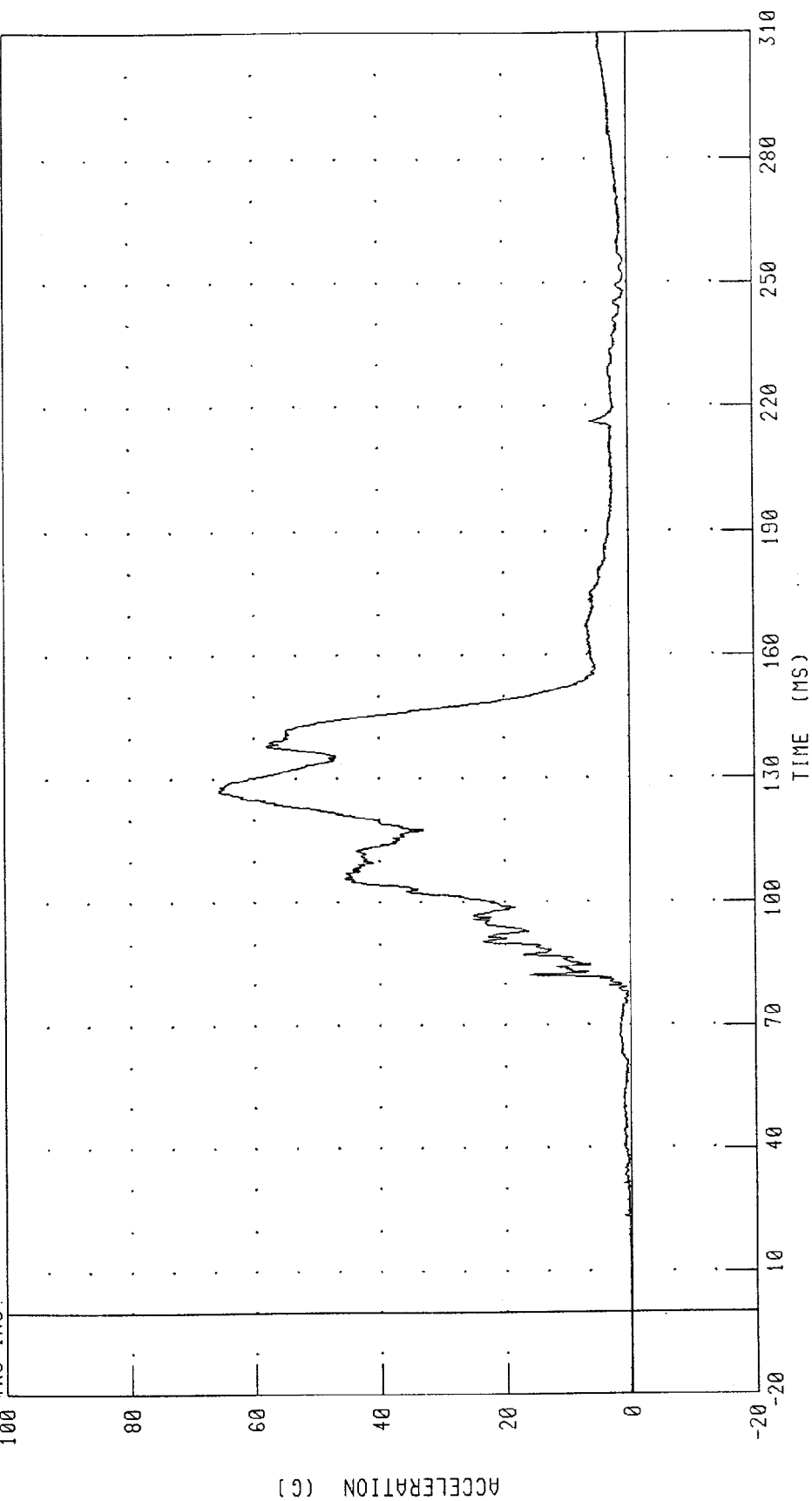
CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 65.71 G @ 127.04 MS; 0.10 G @ -17.12 MS

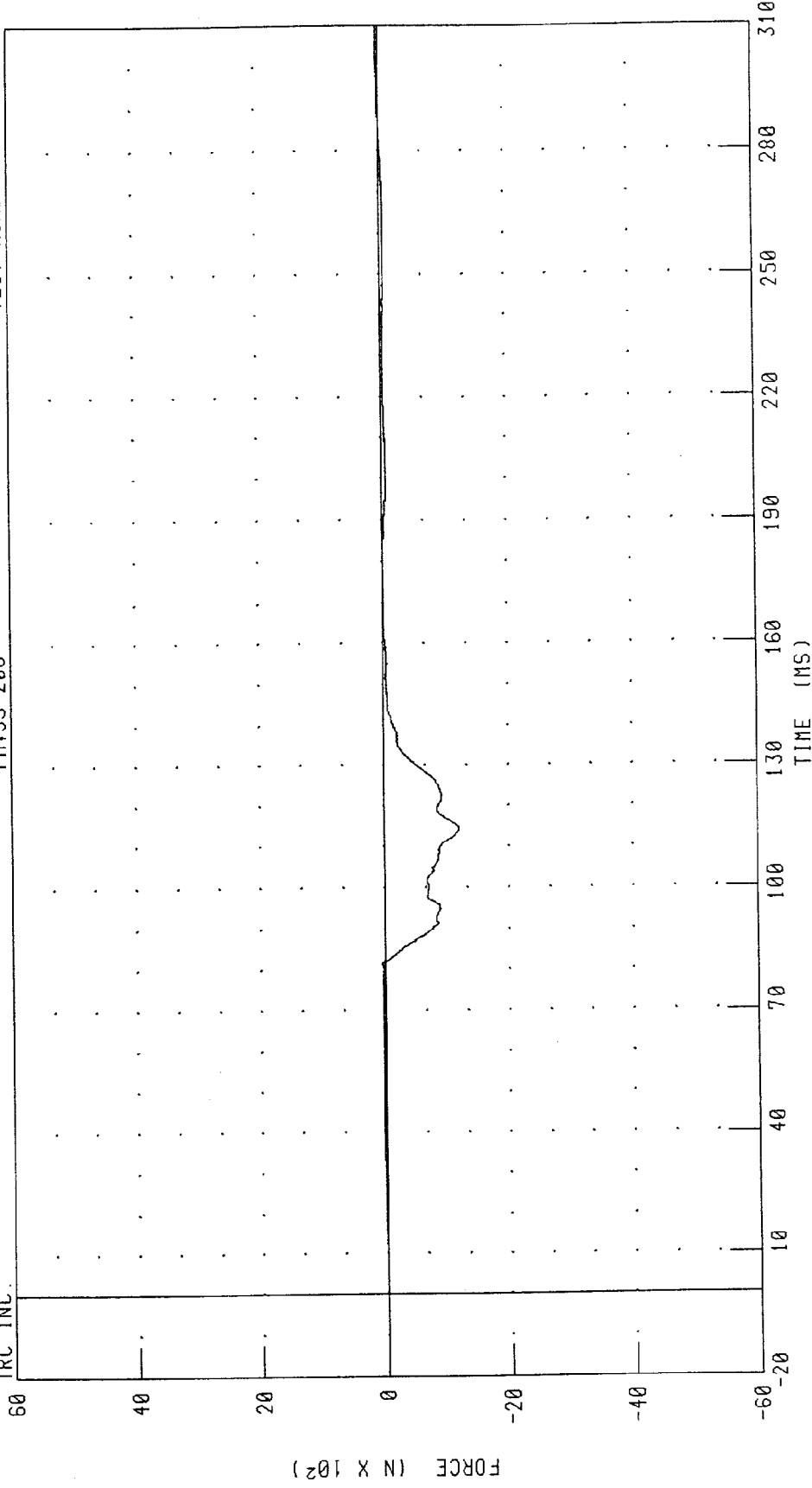
CHANNEL: HEDRC2 FILTER: CH. CLASS 1000

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 65.06 N @ 81.60 MS; -1217.14 N @ 114.40 MS

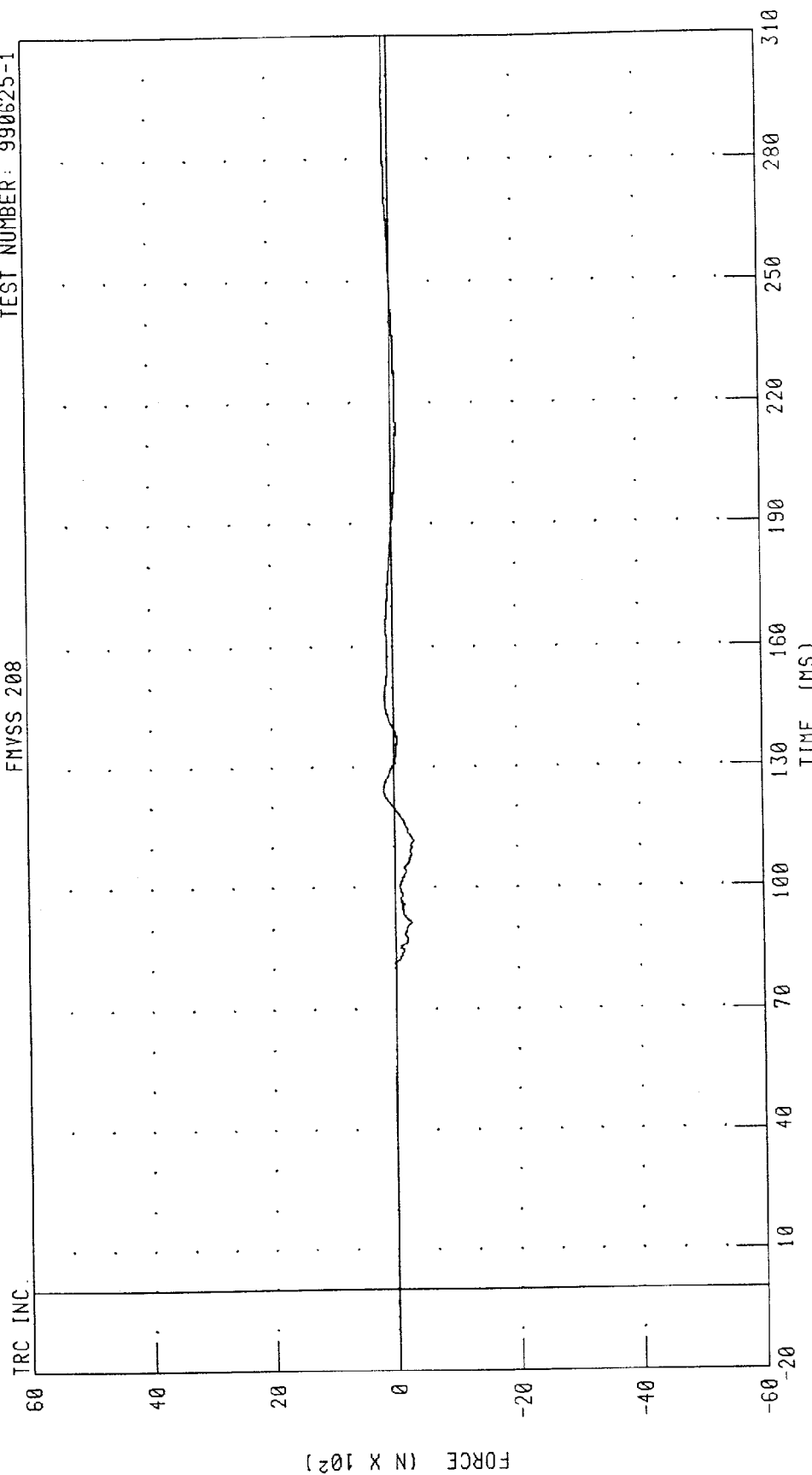
FILTER: CH. CLASS 1000

CHANNEL: NEKXF2

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 990625-1

FMVSS 208



PEAK DATA: 162.11 N @ 123.84 MS, -315.41 N @ 111.84 MS

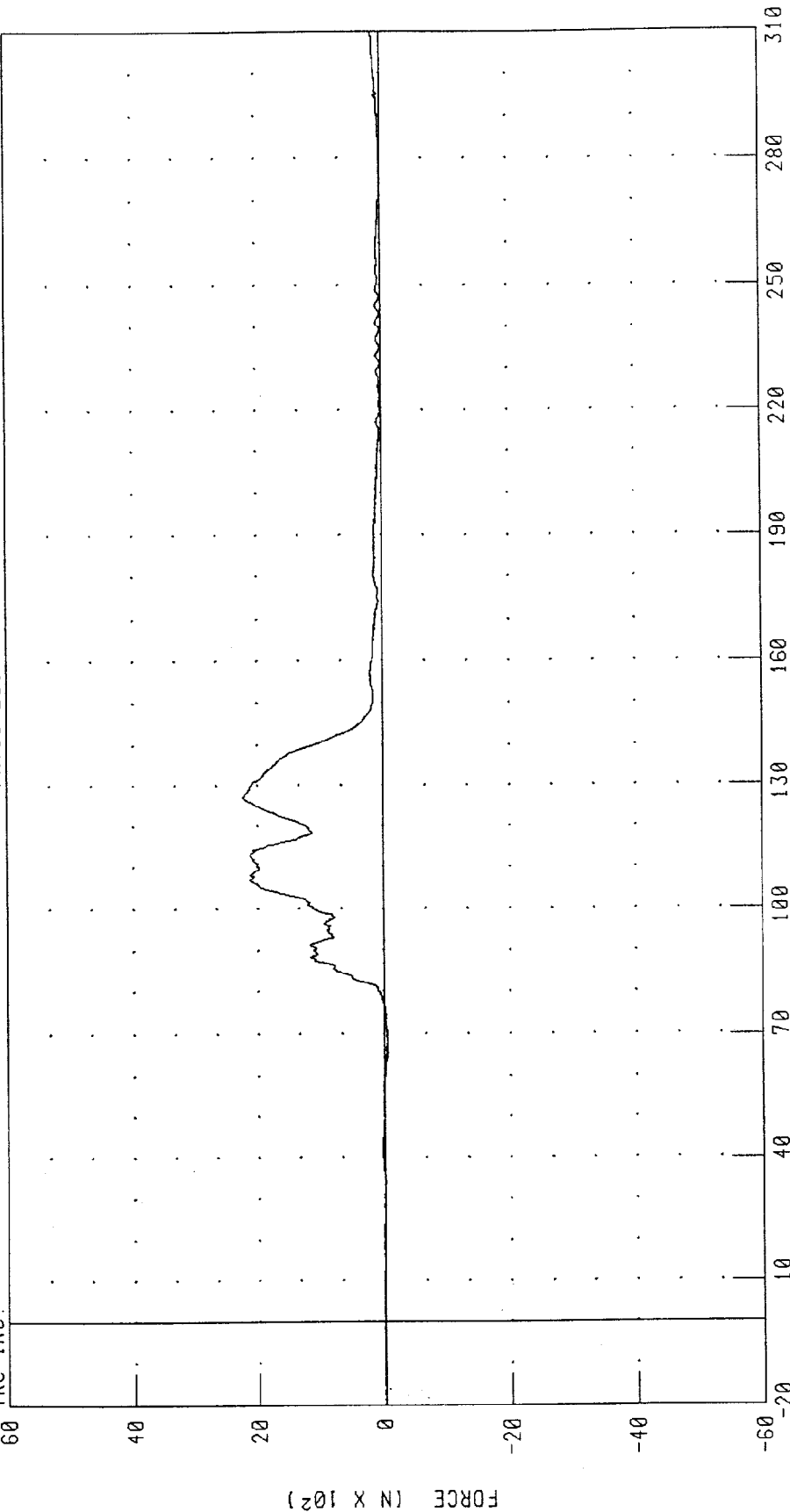
CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



TIME (MS)

PEAK DATA: 2224.37 N @ 126.96 MS; -56.92 N @ 65.68 MS

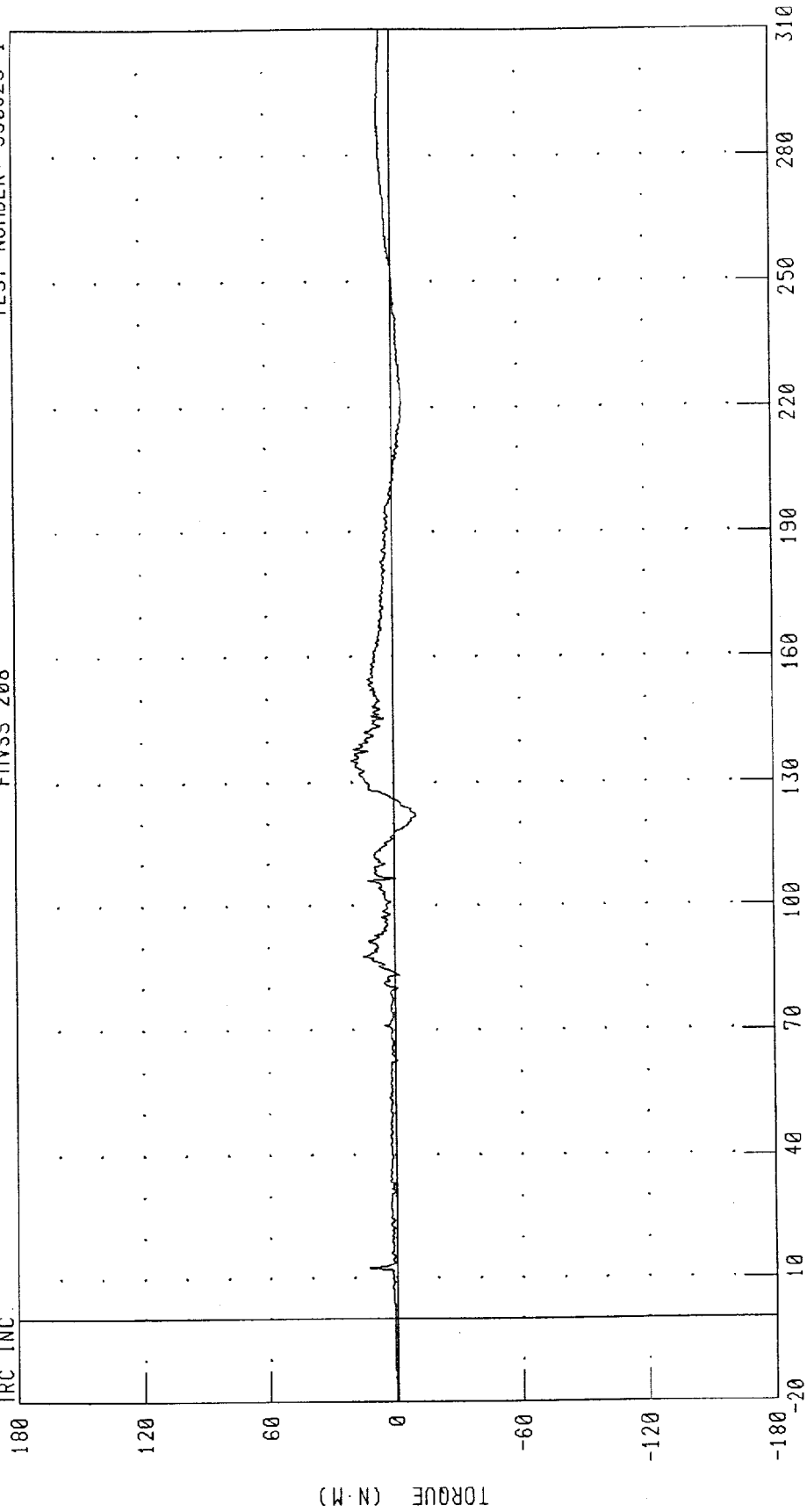
CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



TIME (MS)

PEAK DATA: 20.17 N-M @ 135.28 MS; -10.47 N-M @ 122.32 MS

CHANNEL: NEKXM2 FILTER: CH. CLASS 600

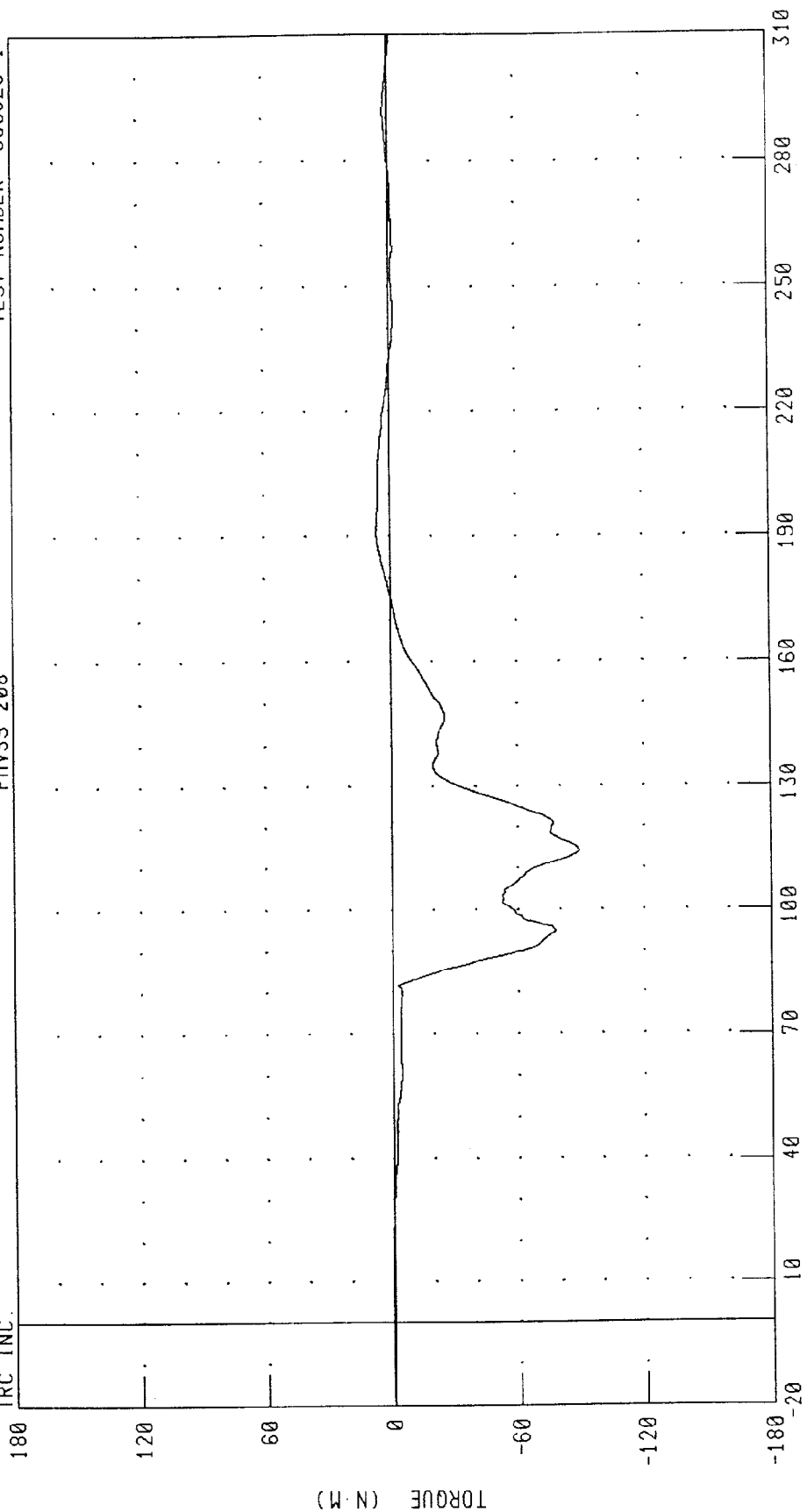


1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



TIME (MS)

PEAK DATA: 6.20 N·M @ 190.80 MS; -89.09 N·M @ 114.40 MS

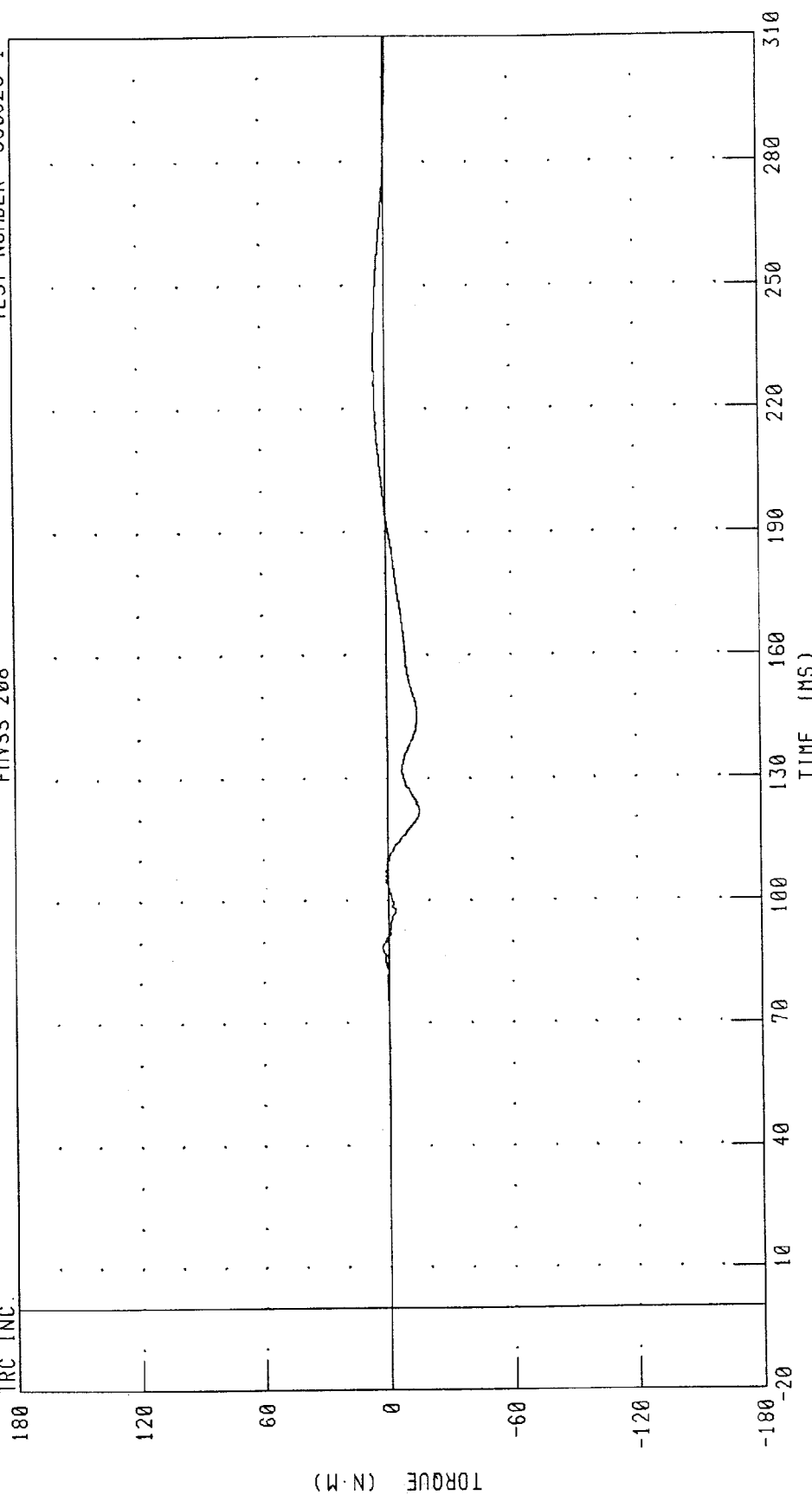
CHANNEL: NEKYM2 FILTER: CH. CLASS 600

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: NEKZM2 FILTER: CH. CLASS 600

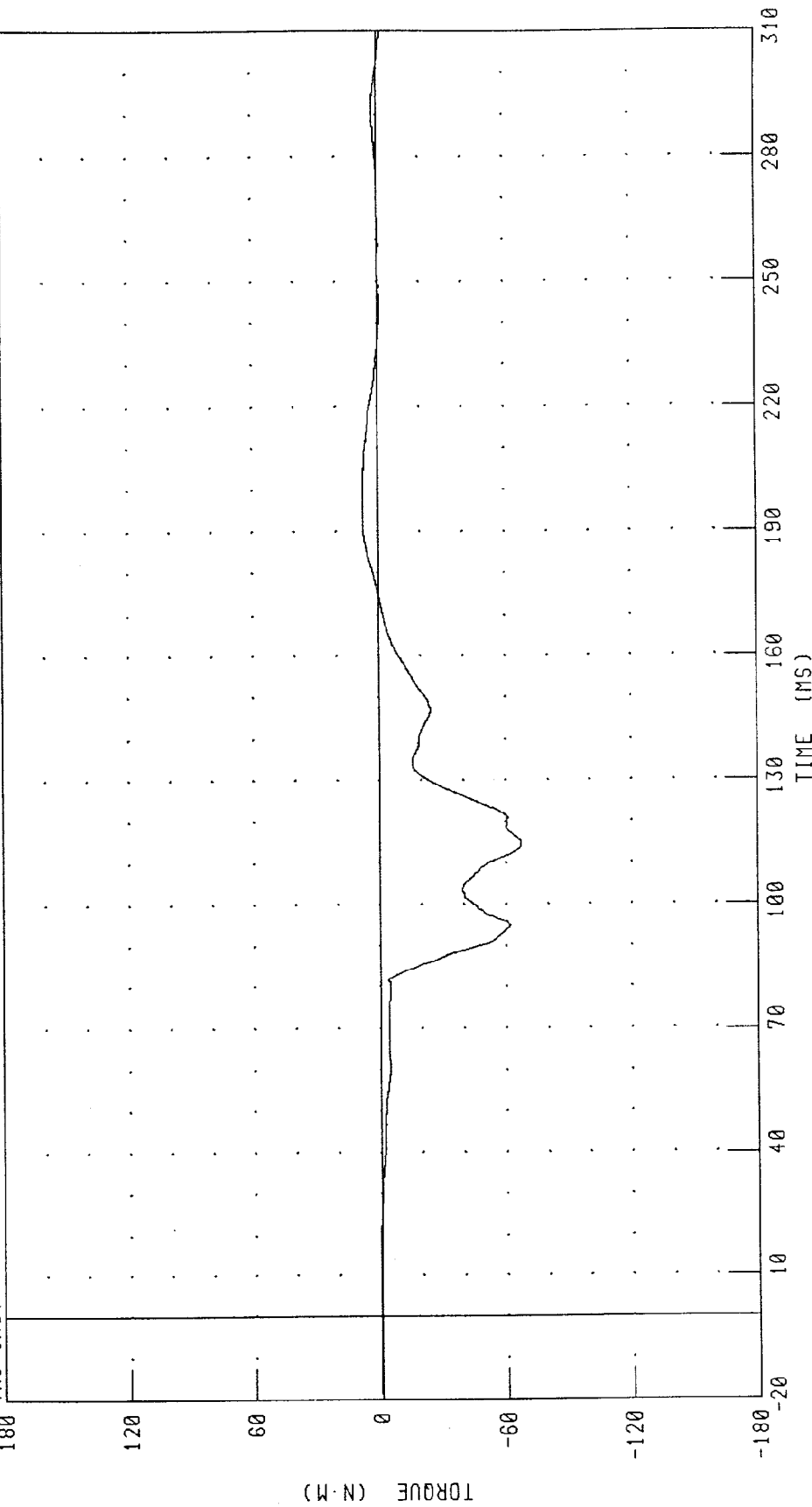
PEAK DATA: 5.24 N·M @ 232.16 MS, -15.44 N·M @ 122.48 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 7.12 N-M @ 192.64 MS; -67.50 N-M @ 114.40 MS

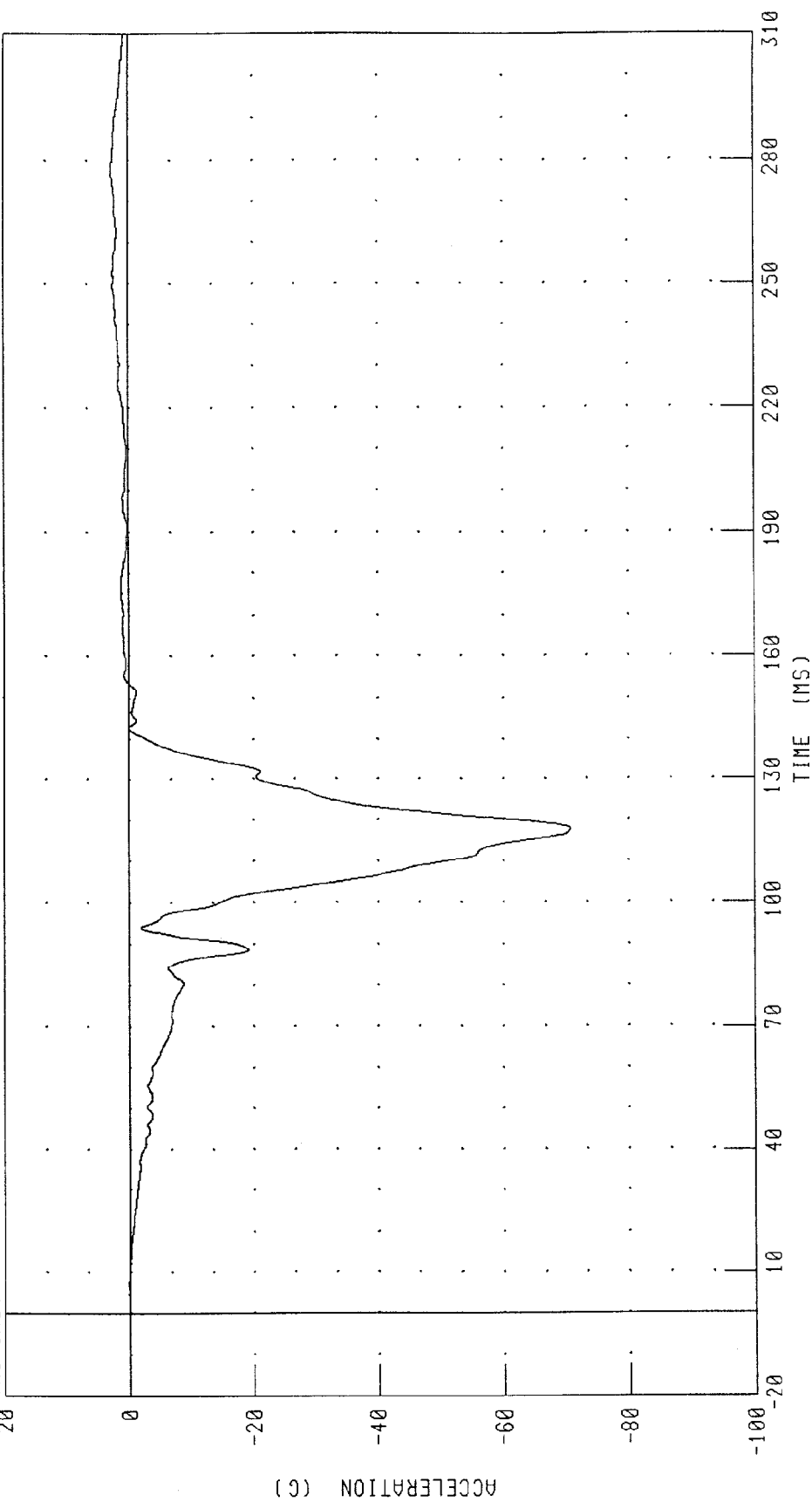
CHANNEL: NEKOM2 FILTER: CH. CLASS 600

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: CSTXG2 FILTER: CH. CLASS 180

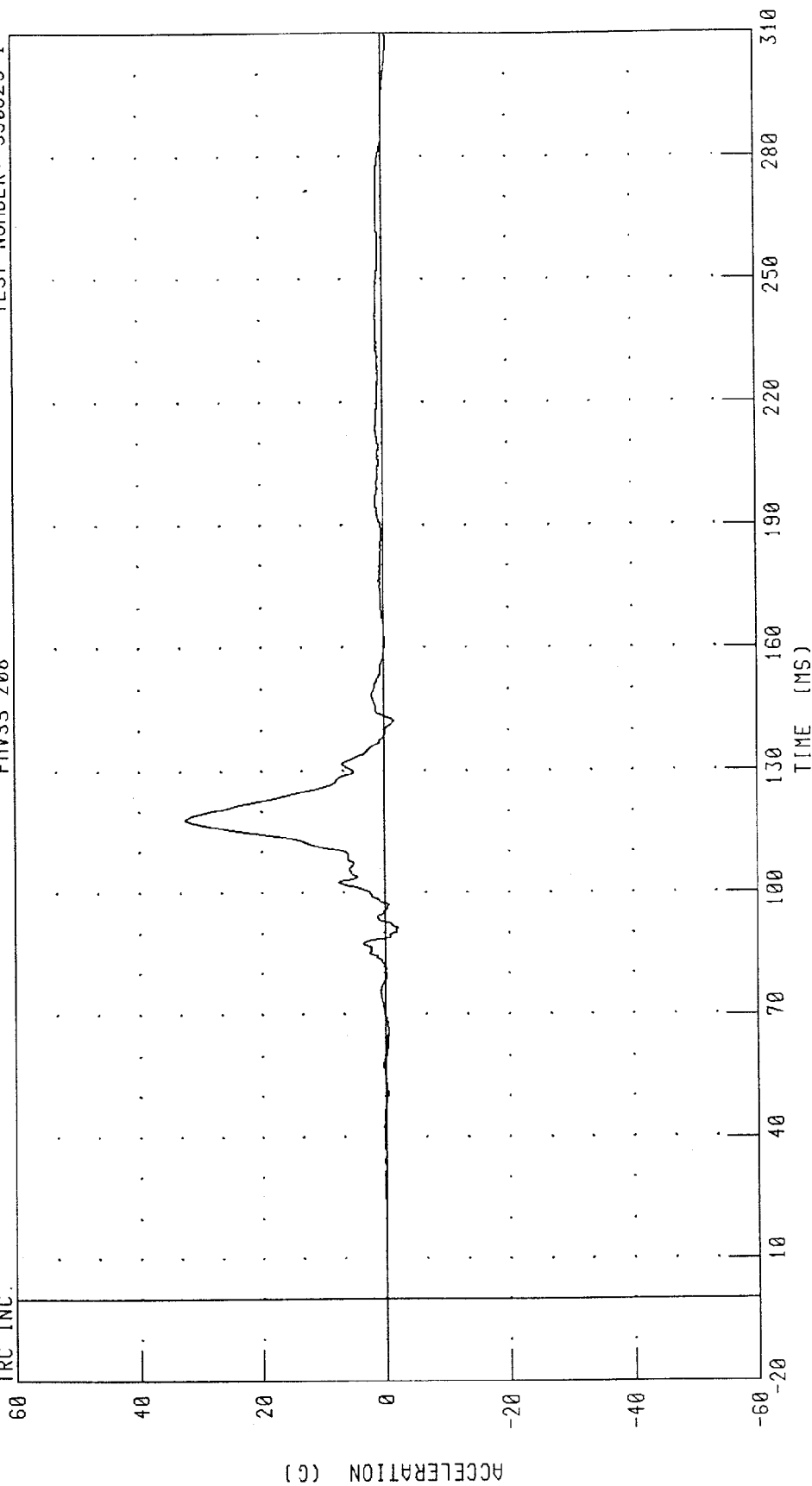
PEAK DATA: 2.74 G @ 277.68 MS, -70.80 G @ 118.00 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 32.58 G @ 118.16 MS, -2.02 G @ 91.36 MS

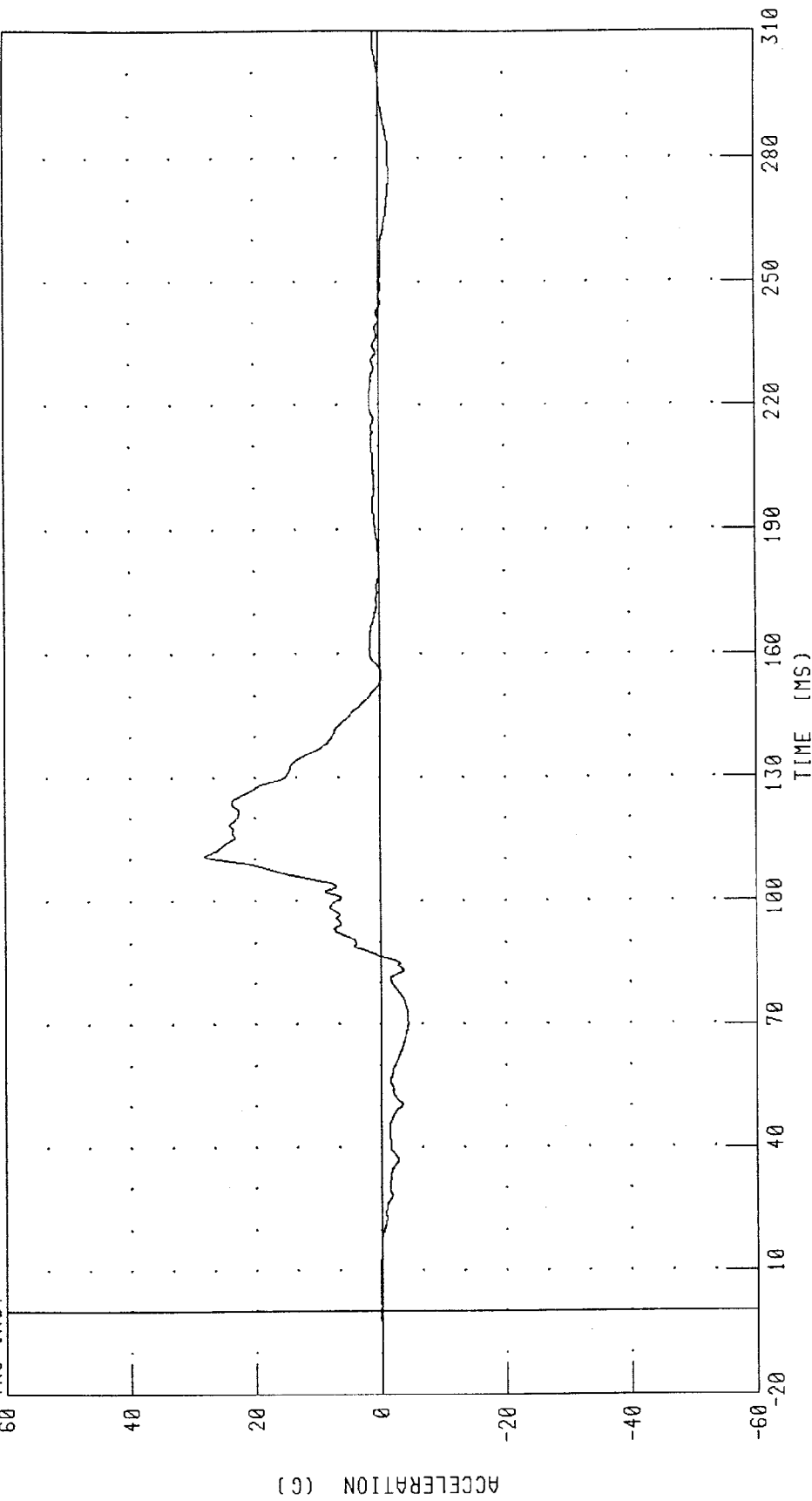
CHANNEL: CSTYG2 FILTER: CH. CLASS 180

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: CSTZG2 FILTER: CH. CLASS 180

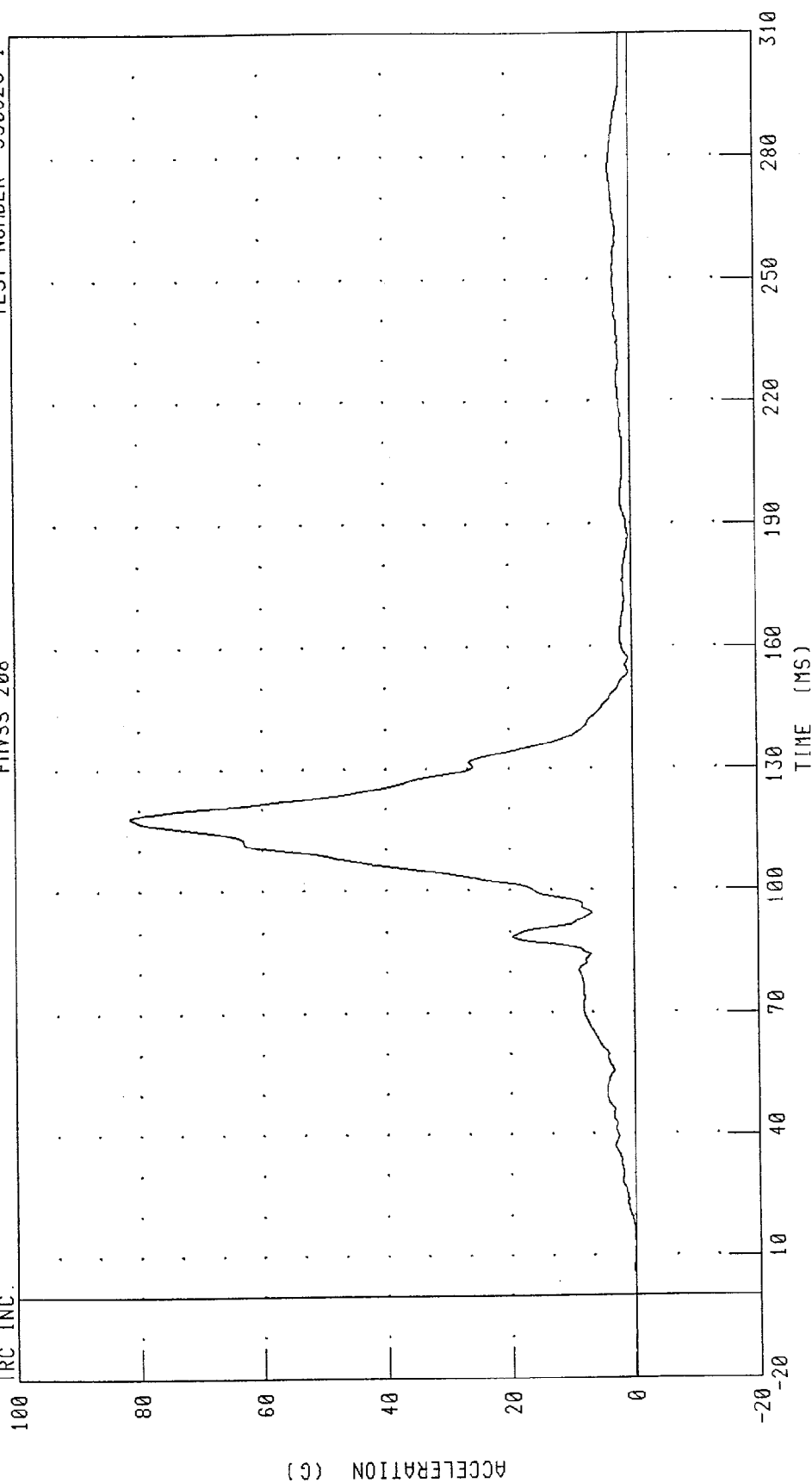
PEAK DATA: 28.07 G @ 110.88 MS, -4.40 G @ 70.32 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: CSTRG2 FILTER: CH. CLASS 180

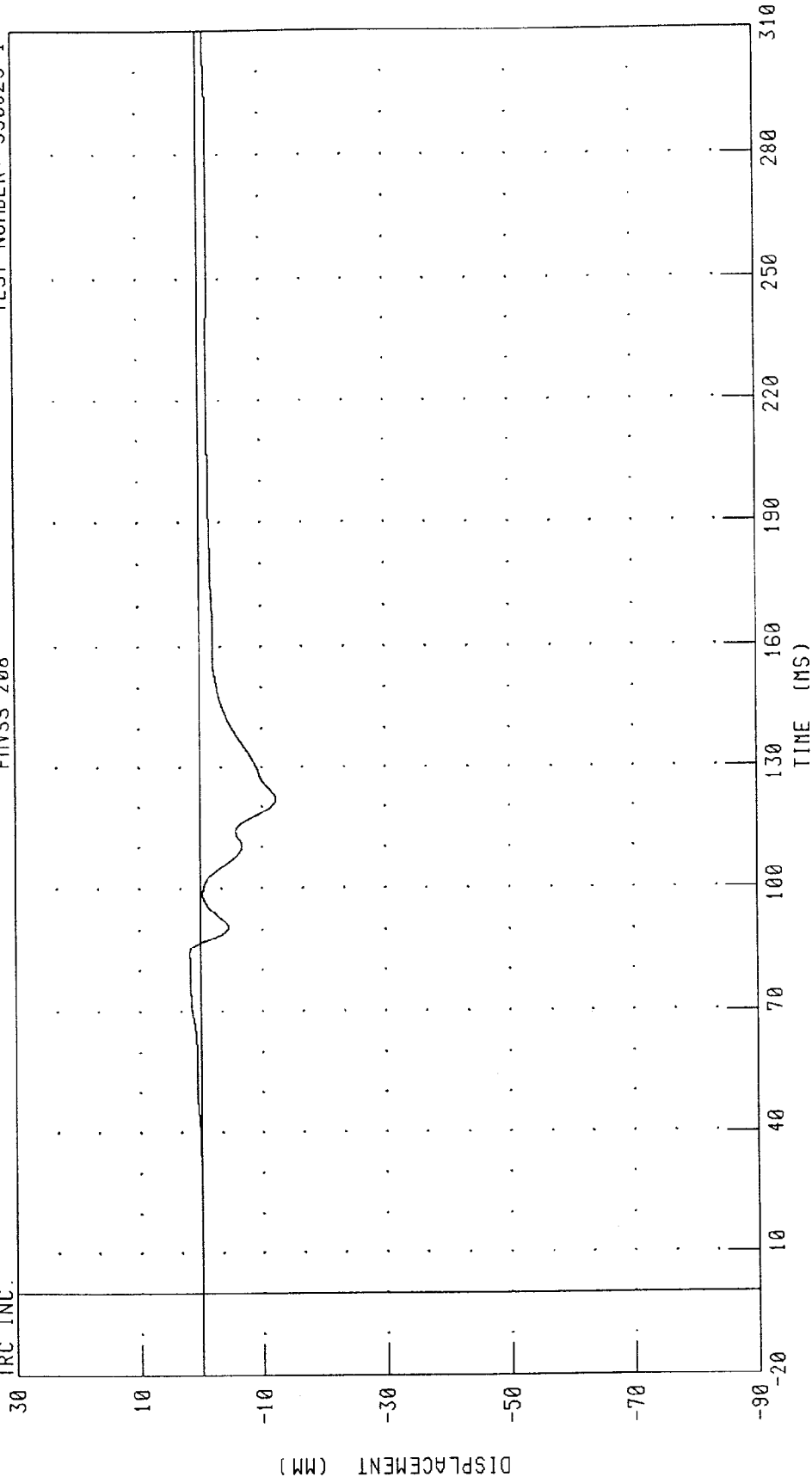
PEAK DATA: 81.48 G @ 118.08 MS; 0.01 G @ -20.00 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER CHEST DEFLECTION

TEST NUMBER: 990625-1

FMVSS 208

IRC INC.



CHANNEL: CSTXD2 FILTER: CH. CLASS 180

PEAK DATA: 1.88 MM @ 84.08 MS, -12.31 MM @ 121.92 MS

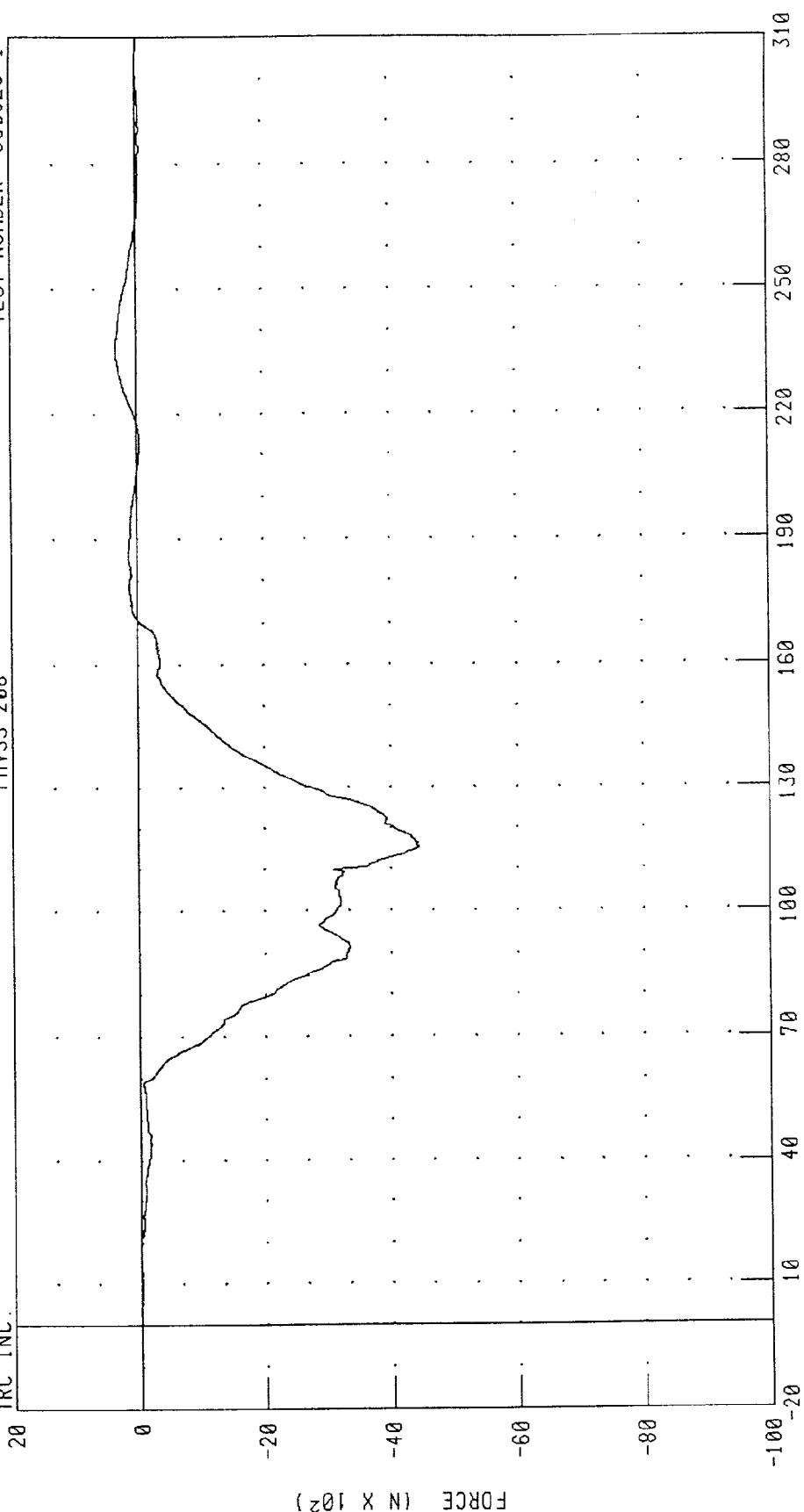


1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



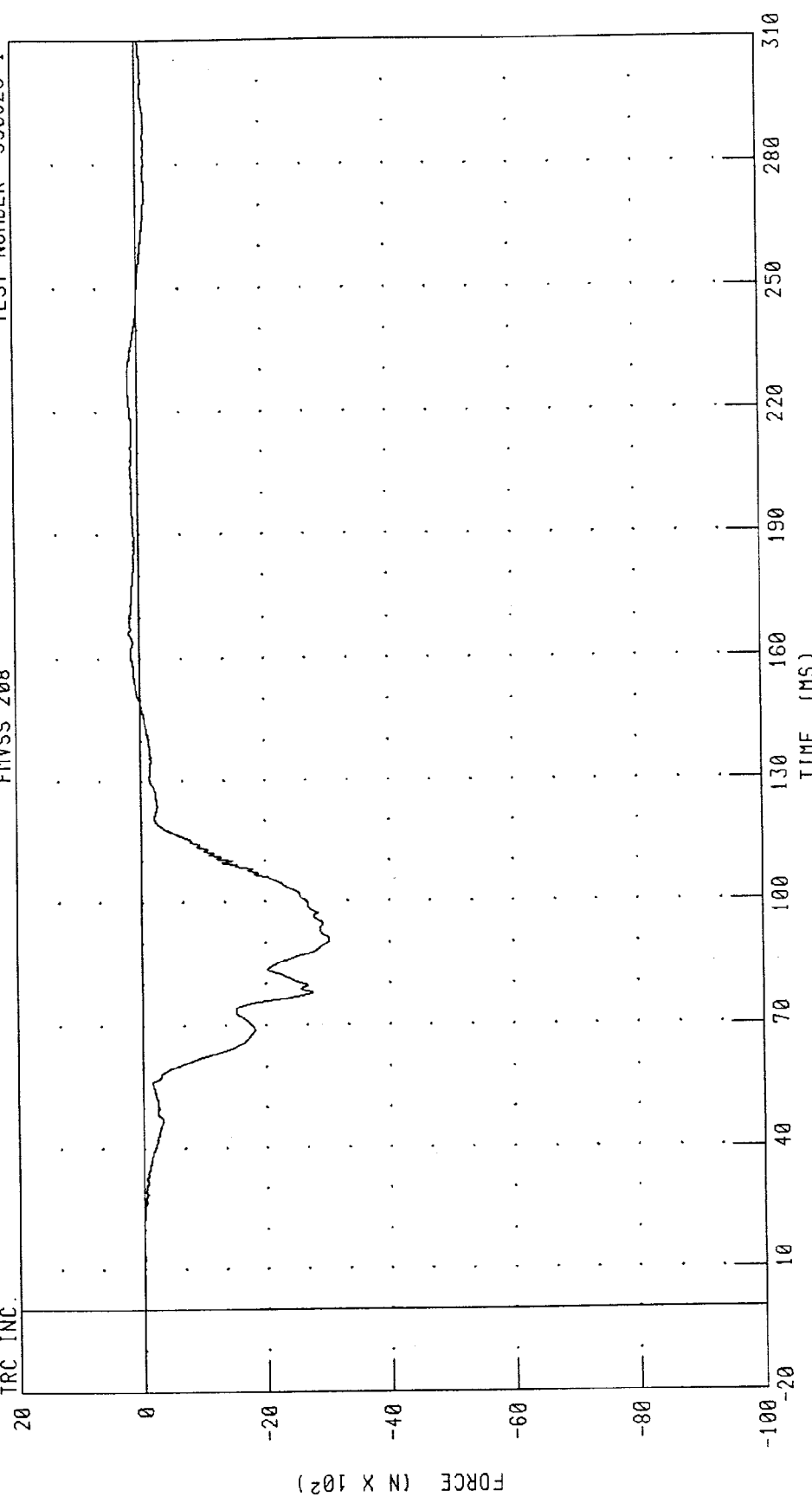
CHANNEL: LFMF2 FILTER: CH. CLASS 600  
PEAK DATA: 335.06 N @ 233.92 MS; -4449.63 N @ 115.44 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 176.45 N @ 166.56 MS; -3032.03 N @ 90.64 MS

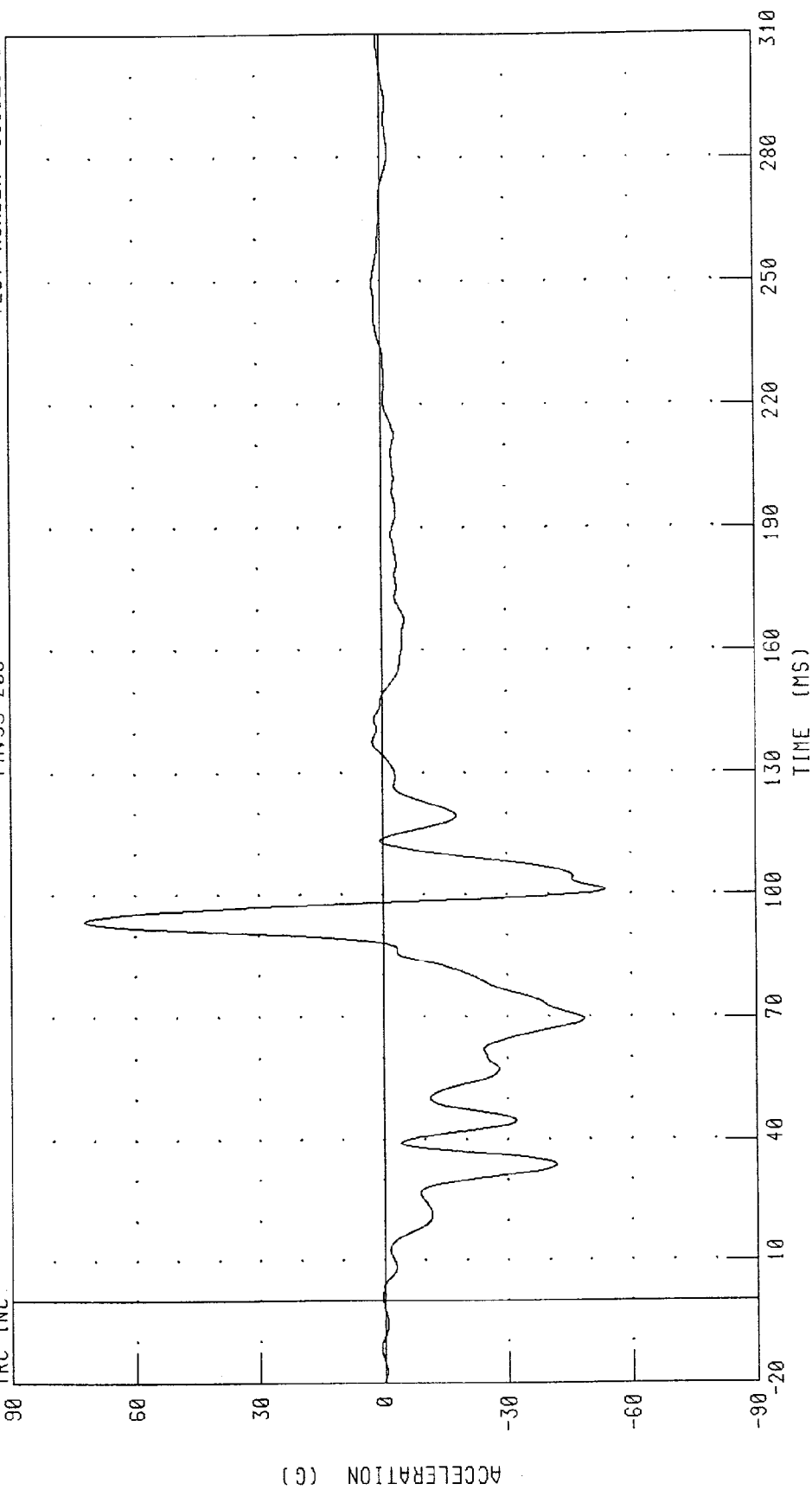
CHANNEL: RFMF2 FILTER: CH. CLASS 600

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TRC INC

FMVSS 208

TEST NUMBER: 990625-1



CHANNEL: BCLXC1 FILTER: CH. CLASS 60

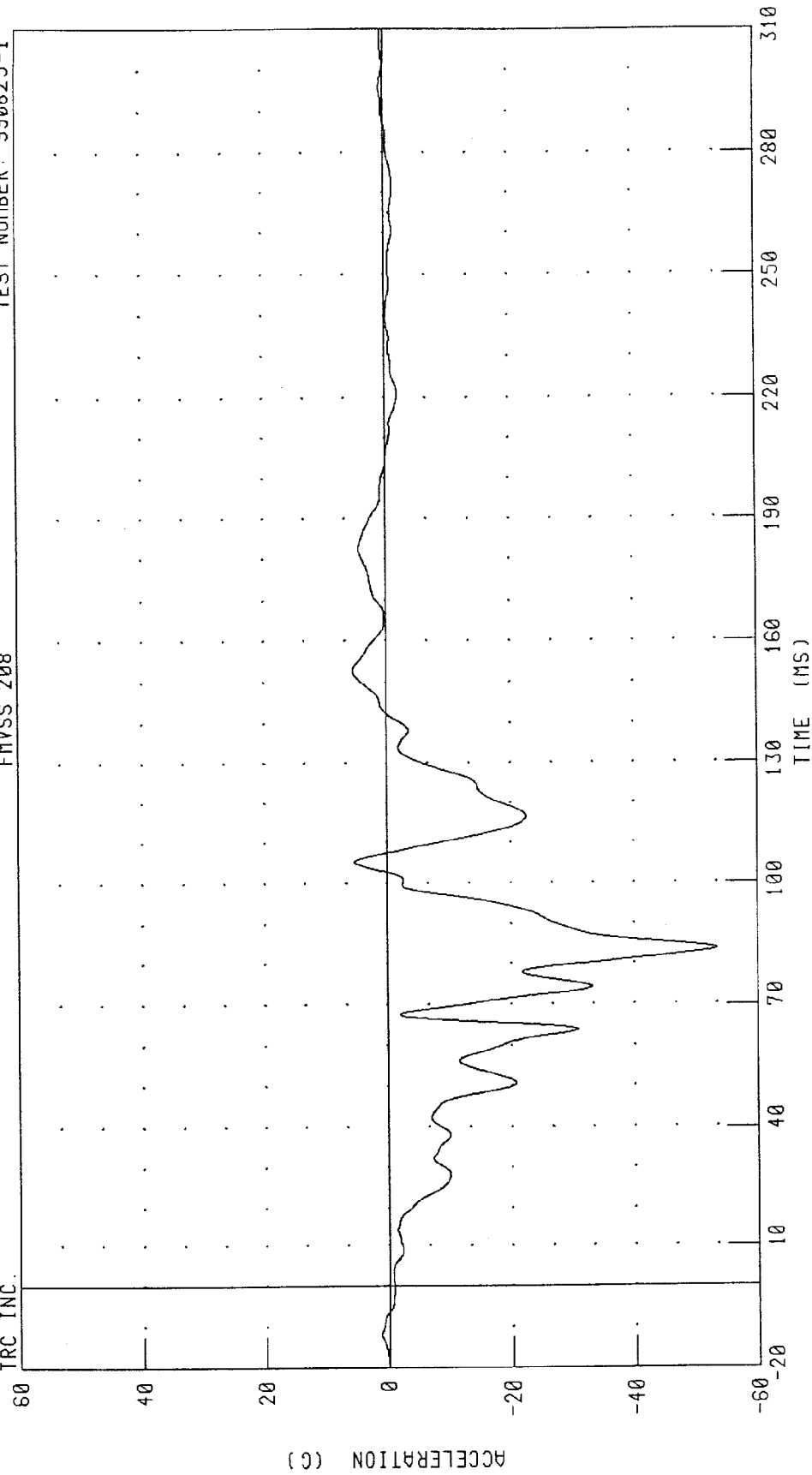
PEAK DATA: 72.18 G @ 93.68 MS, -53.74 G @ 101.20 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: BCRXG1 FILTER: CH. CLASS 60

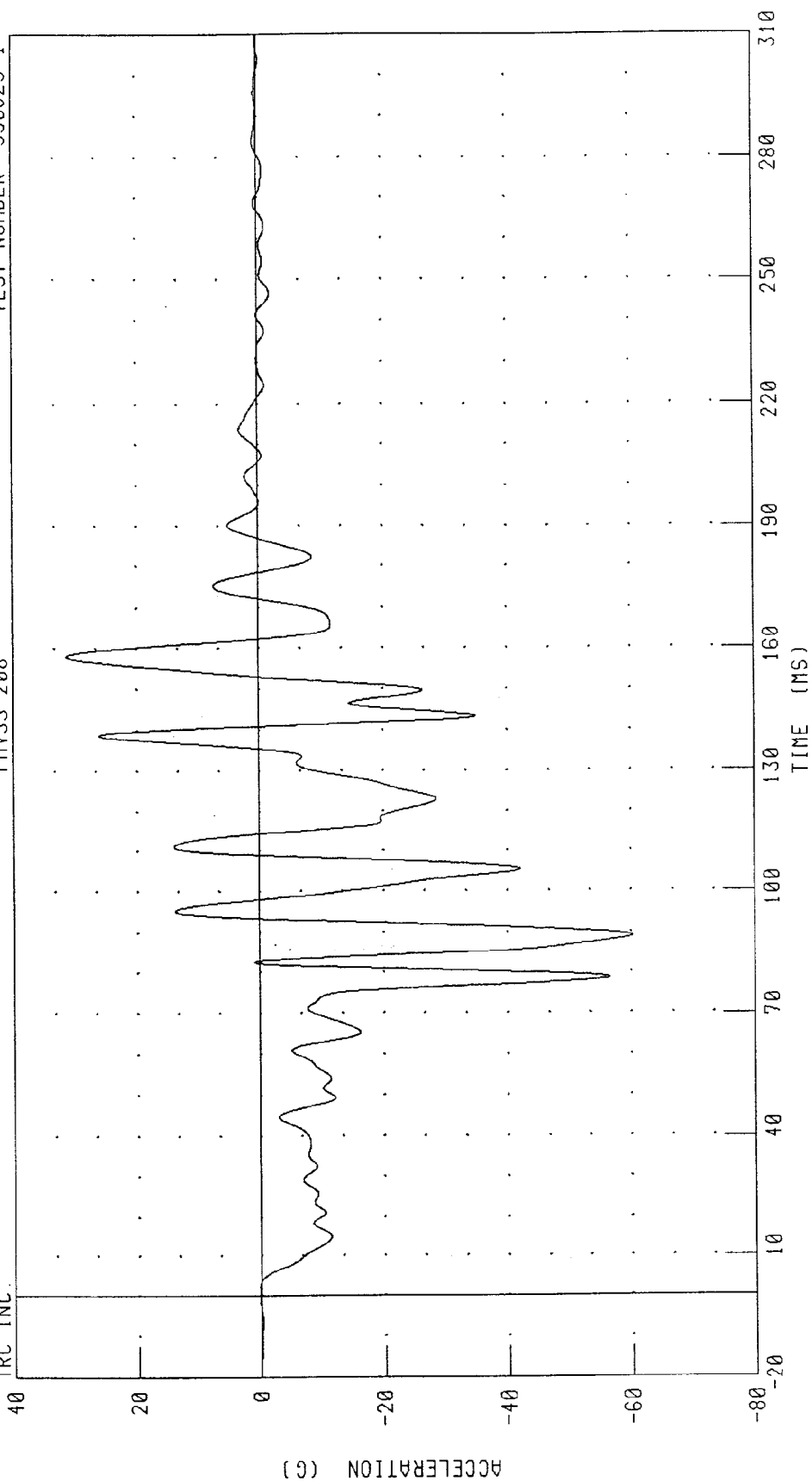
PEAK DATA: 5.40 G @ 152.88 MS, -53.48 G @ 83.76 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DASH PANEL CENTER X-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: DPCXG1 FILTER: CH. CLASS 60

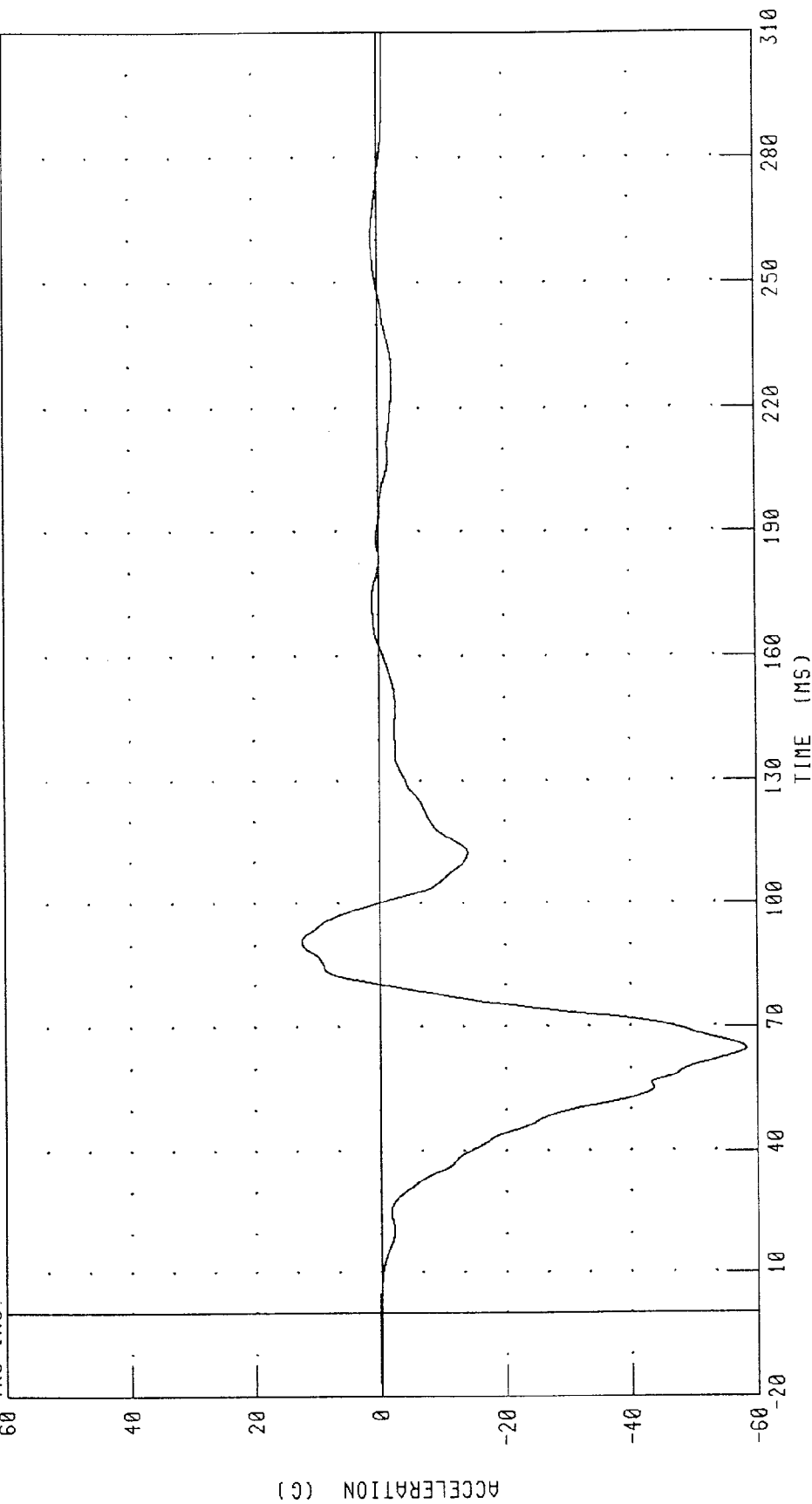
PEAK DATA: 31.39 G @ 158.24 MS; -60.21 G @ 89.12 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
ENGINE TOP X-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



CHANNEL: ENCXG1 FILTER: CH. CLASS 60

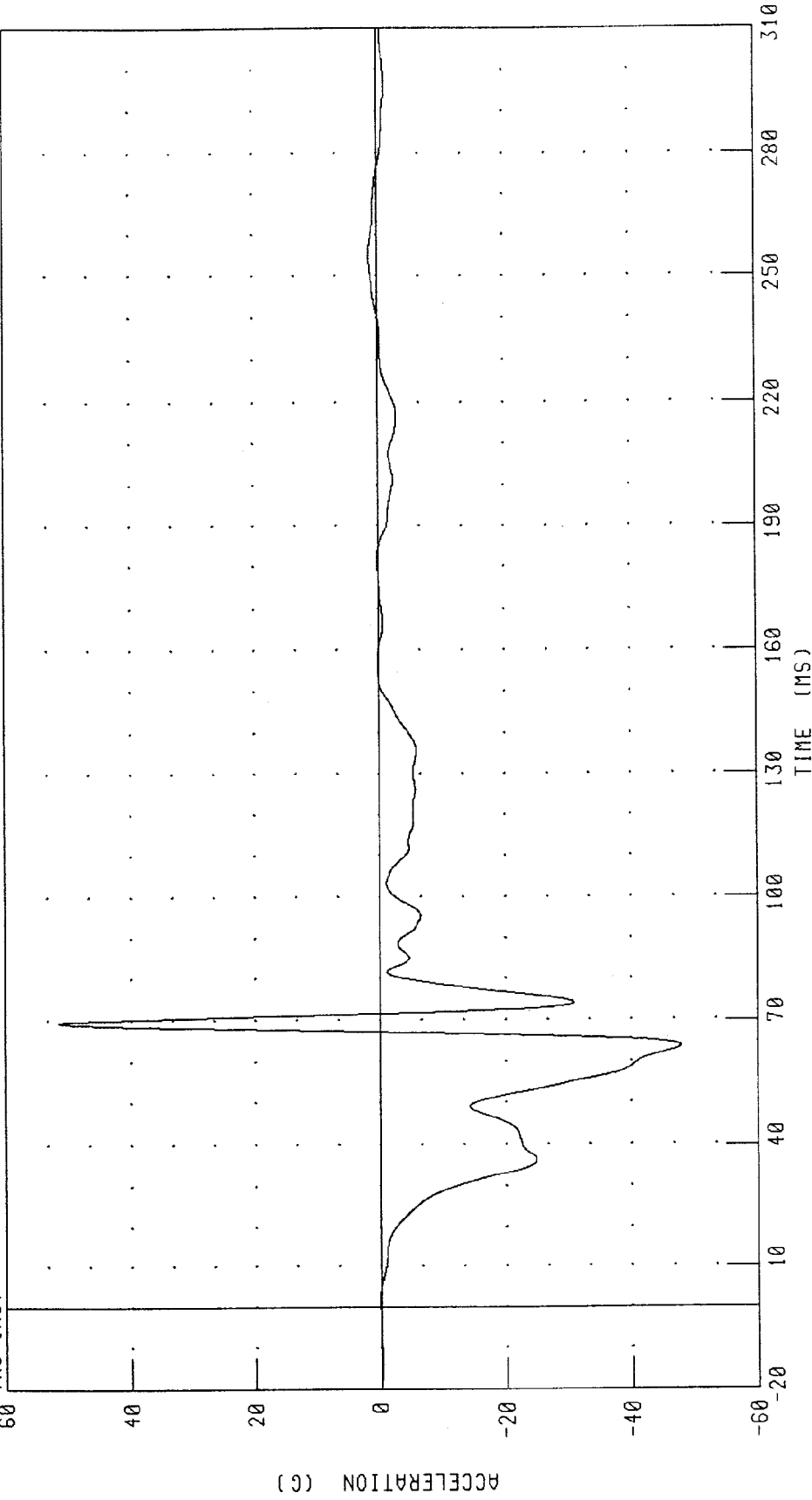
PEAK DATA: 12.47 G @ 90.88 MS, -58.25 G @ 64.72 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
ENGINE BOTTOM X-AXIS ACCELERATION

TEST NUMBER: 990625-1

FNVS 208

TRC INC.



CHANNEL: ENGXC2 FILTER: CH. CLASS 60

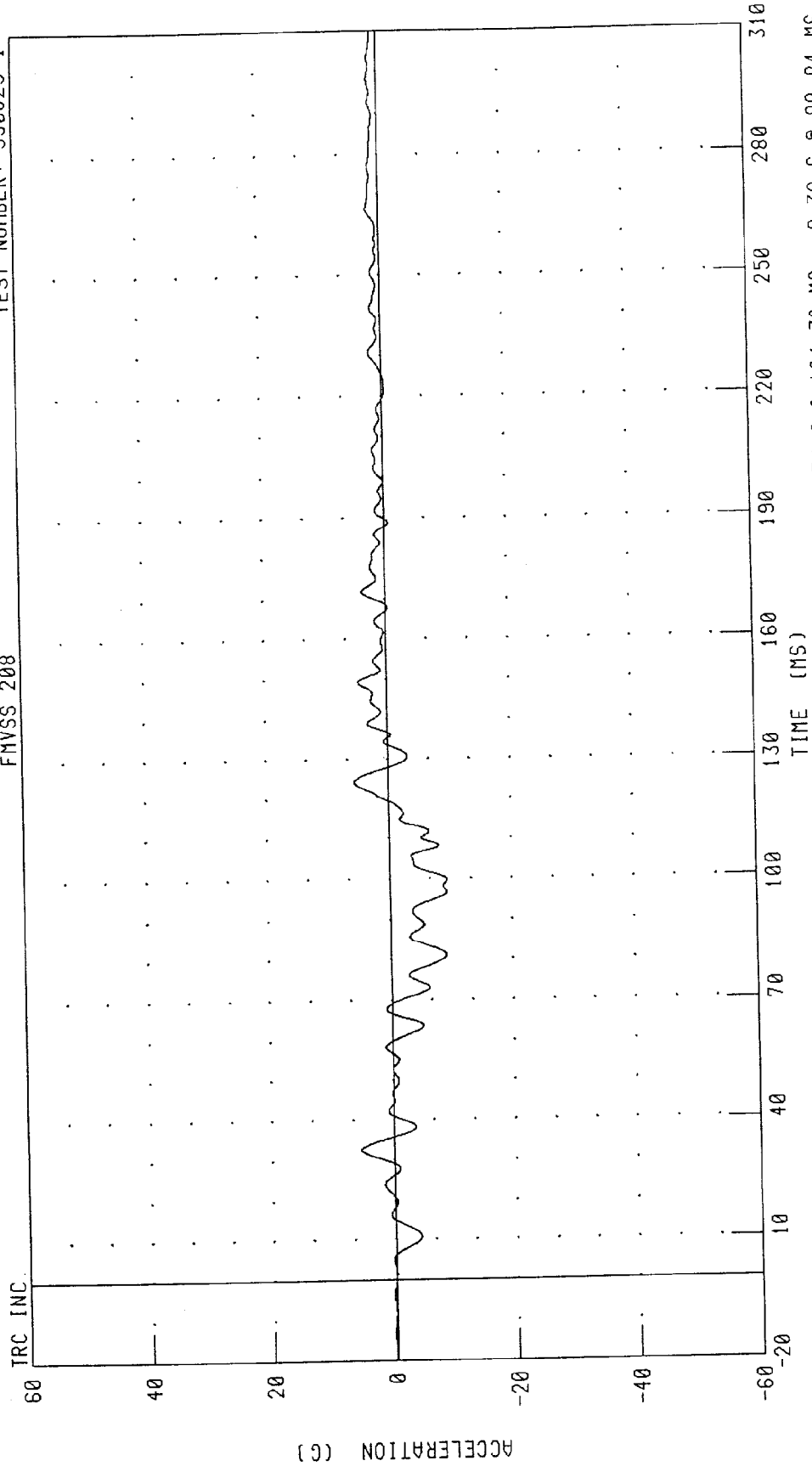
PEAK DATA: 51.66 G @ 69.52 MS; -47.85 G @ 63.76 MS

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
VEHICLE REAR CENTER Z-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 5.54 G @ 124.32 MS; -9.39 G @ 99.84 MS

CHANNEL: RDKZC1 FILTER: CH. CLASS 60

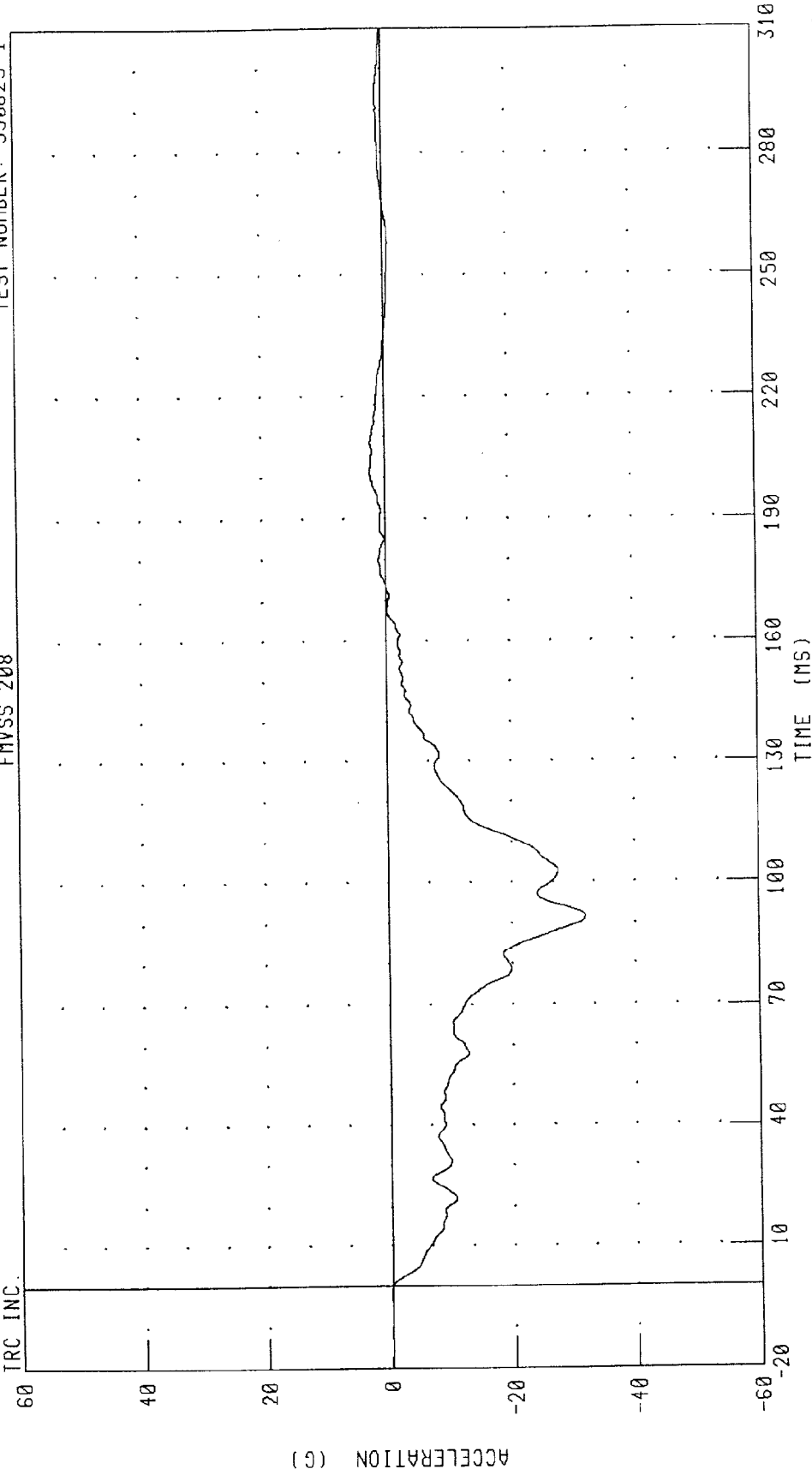


1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
LEFT REAR SEAT X-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 2.34 G @ 201.36 MS; -31.88 G @ 91.76 MS

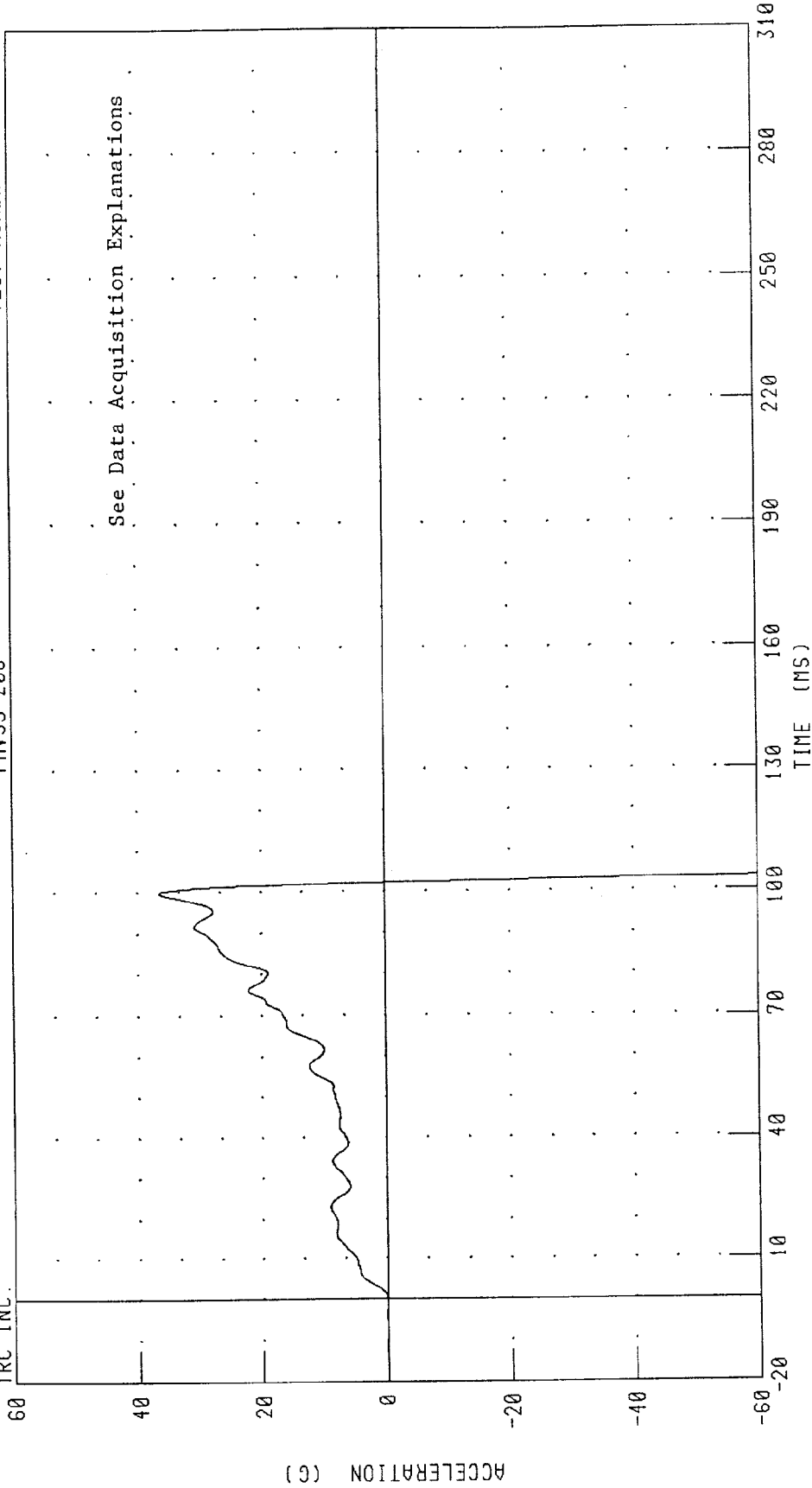
CHANNEL: TLRX01 FILTER: CH. CLASS 60

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
RIGHT REAR SEAT X-AXIS ACCELERATION

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



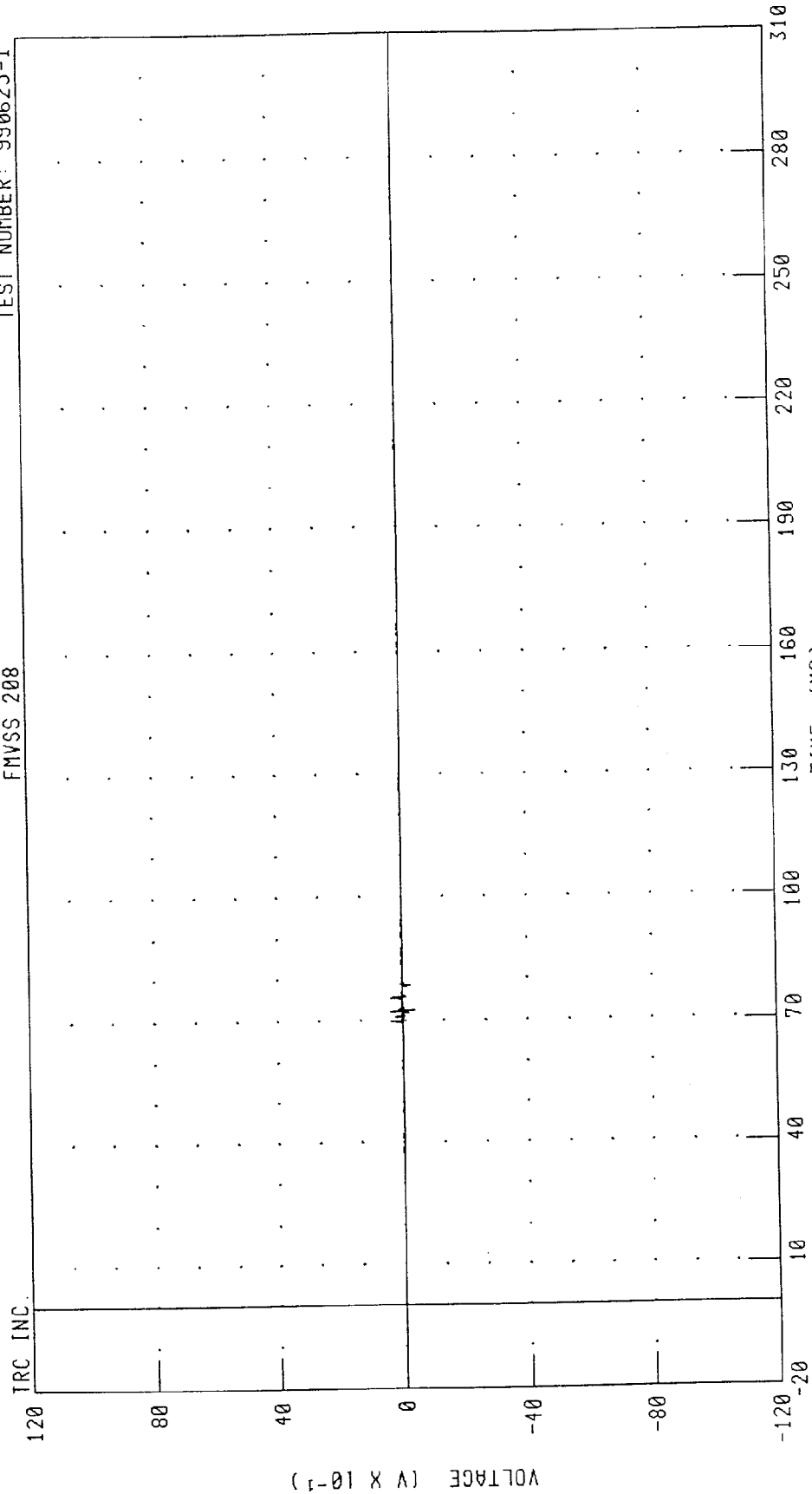
PEAK DATA: 36.57 G @ 99.84 MS; -402.90 G @ 122.00 MS

CHANNEL: TRRX01 FILTER: CH. CLASS 60

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
DRIVER SIDE INDUCTIVE AIRBAG FIRE PICKUP

TEST NUMBER: 990625-1

FMVSS 208



PEAK DATA: 0.37 V @ 72.24 MS, -0.38 V @ 72.56 MS

FILTER: CH. CLASS 1000

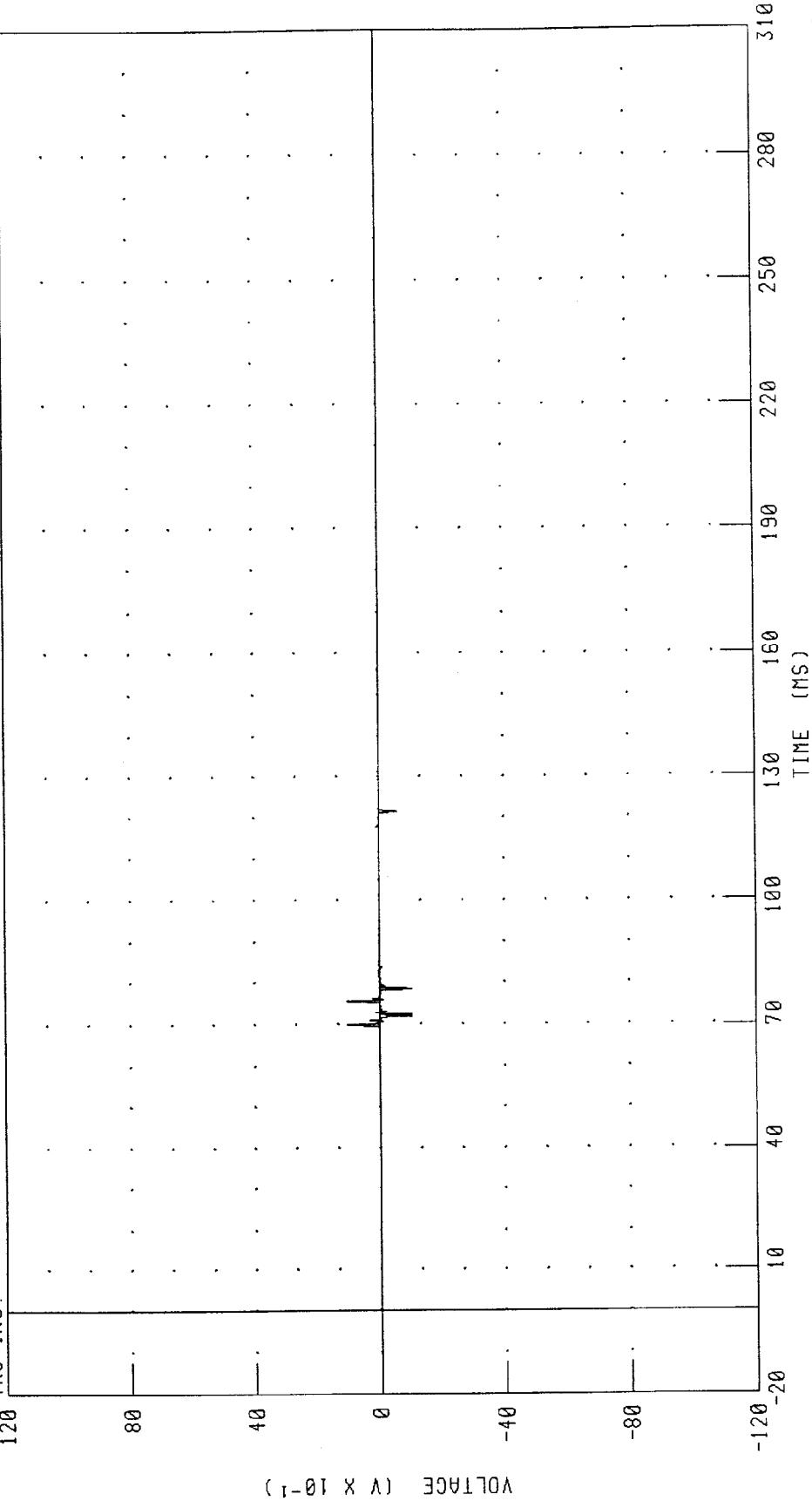
CHANNEL: ABS01

1999 DODGE INTREPID INTO A 40% LEFT OFFSET BARRIER AT 35 MPH  
PASSENGER SIDE INDUCTIVE AIRBAG FIRE PICKUP

TEST NUMBER: 990625-1

FMVSS 208

TRC INC.



PEAK DATA: 1.02 V @ 69.84 MS; -1.02 V @ 71.92 MS

CHANNEL: ABS02 FILTER: CH. CLASS 1000

## Appendix C

### Miscellaneous Test Information

## Dummy Sign Convention

Accelerometers:    +X: Forward  
                             +Y: Rightward  
                             +Z: Downward

Potentiometers:    +Chest longitudinal deflection: Outward

Load cells:            +Femur force: Tension

Neck load cells:    +X force: Head rearward  
                             +Y force: Head leftward  
                             +Z force: Head upward (tension on neck)  
                             +X moment: Left ear rotating toward left shoulder  
                             +Y moment: Chin rotating toward chest  
                             +Z moment: Chin rotating toward left shoulder

Filtering Data

J211 MAR95

Load Cell Barrier Forces Class 60

Vehicle Structural Accelerations Class 60

Occupant

Head Accelerometer Class 1000

Neck Class 60

Chest Accelerometer Class 180

Chest Deflection Class 180

Femur Force Class 600

Sternum Accelerometer Class 180

Lower Leg Class 600

### Vehicle Instrumentation Placement

Vehicle year/make/model/body style: 1999/Dodge/Intrepid/Sedan

Test number: 990625-1

| Number | Location                       | Axis | Manufacturer | Model      | S/N    | Orientation<br>(+ Sensing) |
|--------|--------------------------------|------|--------------|------------|--------|----------------------------|
| 1      | Left Brake Caliper             | X    | Endevco      | 7264-2000T | J21623 | Forward                    |
| 2      | Right Brake Caliper            | X    | Endevco      | 7264-2000T | J27868 | Forward                    |
| 3      | Instrument Panel<br>Center     | X    | Endevco      | 7264-2000T | J22653 | Forward                    |
| 4      | Engine Top                     | X    | Endevco      | 7264-2000T | J21803 | Forward                    |
| 5      | Engine Bottom                  | X    | Endevco      | 7264-2000T | AJ9T0  | Forward                    |
| 6      | Vehicle Rear Center            | Z    | Endevco      | 7264-2000T | J26523 | Up                         |
| 7      | Left Rear Seat<br>Crossmember  | X    | Endevco      | 7264-2000T | J27413 | Forward                    |
| 8      | Right Rear Seat<br>Crossmember | X    | Endevco      | 7264-2000T | J26954 | Forward                    |
| 9      | Driver Airbag                  | N/A  | Fluke        | Y8101A     | IP1    | N/A                        |
| 10     | Passenger Airbag               | N/A  | Fluke        | Y8101A     | IP2    | N/A                        |



### Description Of Timing Marks On TRC High-Speed Film

All TRC high-speed cameras are equipped with red leds which put timing marks on the right edge of the film. TRC uses a single timing generator to generate the timing for all cameras. This allows the timing marks to be common to all cameras. The timing marks can be used to measure camera speed (frames per second) or to locate a point in time before or after the time-zero event.

The timing marks appear on the film as small red marks on the right edge of the film. Round marks are left by the Photo-Sonics and Stalex cameras while horizontal bars are left by the Hycam, Locam, and Fastax II cameras.

The timing generator puts out a pulse for every millisecond plus it generates additional pulses for hundredths and tenths of seconds. To explain this further, we can use an example of a camera running at 1000 frames per second.

1. Every frame will have **one** led appear in it. This indicates a *millisecond* pulse.
2. Every ten frames will have **two** leds appear in it. These indicate a *millisecond* pulse plus a *hundredth of a second* pulse.
3. Every one hundred frames will have **three** leds appear in it. These indicate a *millisecond* pulse, a *hundredth of a second* pulse, and a *tenth of a second* pulse.

# TRANSDUCER INFORMATION

5th Female HYBRID III DUMMY SERIAL NO.: 3691; MFR.: \_\_\_\_\_; SEATING POSITION: DR \_\_\_\_\_  
 PROJECT-SEGMENT NO.: 096017 1316; ENGINEER: PG \_\_\_\_\_; TEST DATE: 6-24-99

| MNEMONIC<br>PARAMETER<br>BEING<br>MEASURED | TYPE<br>OF<br>TRANSDUCER       | MODEL<br>NO. | SERIAL<br>NO. | MFR. | SENSITIVITY                     | CAL<br>DUE<br>DATE | FULL SCALE<br>(ENGR. UNITS)<br>DESIRED      ACTUAL | DIRECTION<br>OF<br>POSITIVE<br>POLARITY | CABLE<br>NO. |
|--------------------------------------------|--------------------------------|--------------|---------------|------|---------------------------------|--------------------|----------------------------------------------------|-----------------------------------------|--------------|
| HEDXG<br>HAP                               | HEAD<br>X-AXIS<br>ACCEL.       | 7264         | A20FJ         | End. | 2563 mv/g at 10 volts           | 12-2-<br>1999      | 400 g                                              | Rear                                    | A20FJ        |
| HEDYG<br>HLR                               | HEAD<br>Y-AXIS<br>ACCEL.       | "            | A31FJ         | "    | 2683 mv/g at 10 volts           | "                  | 400 g                                              | Left                                    | A31FJ        |
| HEDZG<br>HIS                               | HEAD<br>Z-AXIS<br>ACCEL.       | "            | CL95H         | "    | 2822 mv/g at 10 volts           | "                  | 400 g                                              | Up                                      | CL95H        |
| NEKXF<br>NFX                               | NECK X-AXIS<br>SHEAR<br>FORCE  | 1716A        | 0534          | DEN  | 1.7247 mv/v at 2000 lbs.        | 12-2-<br>1999      | 2,000 lbs.<br>9,000 N                              |                                         | FX           |
| NEKYF<br>NFY                               | NECK Y-AXIS<br>SHEAR<br>FORCE  | "            | "             | "    | 1.6643 mv/v at 2000 lbs.        | "                  | 2,000 lbs.<br>9,000 N                              |                                         | FY           |
| NEKZF<br>NFZ                               | NECK Z-AXIS<br>AXIAL<br>FORCE  | "            | "             | "    | 1.1561 mv/v at 3000 lbs.        | "                  | 3,000 lbs.<br>13,500 N                             |                                         | FZ           |
| NEKXM<br>NMX                               | NECK<br>MOMENT<br>ABOUT X AXIS | "            | "             | "    | 1.6355 mv/v at 2500 in.<br>lbs. | "                  | 200 ft-lbs<br>275 N-m                              |                                         | MX           |
| NEKYM<br>NMY                               | NECK<br>MOMENT<br>ABOUT Y AXIS | "            | "             | "    | 1.6430 mv/v at 2500 in.<br>lbs. | "                  | 200 ft-lbs<br>275 N-m                              |                                         | MY           |
| NEKZM<br>NMZ                               | NECK<br>MOMENT<br>ABOUT Z AXIS | "            | "             | "    | 2.3186 mv/v at 2500 in.<br>lbs. | "                  | 200 ft-lbs<br>275 N-m                              |                                         | MZ           |

# TRANSDUCER INFORMATION

5th Female HYBRID III DUMMY SERIAL NO.: 3691; MFR.: \_\_\_\_\_; SEATING POSITION: \_\_\_\_\_ DR \_\_\_\_\_  
 PROJECT-SEGMENT NO.: 096017 1316; ENGINEER: \_\_\_\_\_ PG \_\_\_\_\_; TEST DATE: 6-24-99

| MNEMONIC<br>PARAMETER<br>BEING<br>MEASURED | TYPE<br>OF<br>TRANSDUCER   | MODEL<br>NO.   | SERIAL<br>NO. | MFR.  | SENSITIVITY              | CAL<br>DUE<br>DATE | FULL SCALE<br>(ENGR. UNITS)       |        | DIRECTION<br>OF<br>POSITIVE<br>POLARITY | CABLE<br>NO. |
|--------------------------------------------|----------------------------|----------------|---------------|-------|--------------------------|--------------------|-----------------------------------|--------|-----------------------------------------|--------------|
|                                            |                            |                |               |       |                          |                    | DESIRED                           | ACTUAL |                                         |              |
| CSTXG<br>CAP                               | CHEST<br>X-AXIS<br>ACCEL.  | 7264           | A72JJ         | End.  | .2773 mv/g at 10 volts   | 12-2-<br>1999      | 400 g                             |        | Forward                                 | A72JJ        |
| CSTYG<br>CLR                               | CHEST<br>Y-AXIS<br>ACCEL.  | "              | A69JJ         | "     | .2702 mv/g at 10 volts   | "                  | 400 g                             |        | Left                                    | A69JJ        |
| CSTZG<br>CIS                               | CHEST<br>Z-AXIS<br>ACCEL.  | "              | A34FJ         | "     | .2565 mv/g at 10 volts   | "                  | 400 g                             |        | Up                                      | A34FJ        |
| CSTXD<br>CAPD                              | CHEST<br>DEFLECTION        | 14CB1-<br>2897 | 1188          | Bourn | 43.6 mv/v/in             | "                  | 6 inch<br>150 mm                  |        | Extension                               | 1188         |
| PEVXG<br>PAP                               | PELVIS<br>X-AXIS<br>ACCEL. | 7264           | CY3IH         | End.  | .2031 mv/g at 10 volts   | "                  | 400 g                             |        | Rear                                    | C14981       |
| PEVYG<br>PLR                               | PELVIS<br>Y-AXIS<br>ACCEL. | "              | A51JJ         | "     | .2917 mv/g at 10 volts   | "                  | 400 g                             |        | Left                                    | C15183       |
| PEVZG<br>PIS                               | PELVIS<br>Z-AXIS<br>ACCEL. | "              | A75JJ         | "     | .2695 mv/g at 10 volts   | "                  | 400 g                             |        | Up                                      | C15184       |
| LFMF<br>LF                                 | LEFT<br>FEMUR<br>FORCE     | 2430           | 1006          | DEN   | 0.9459 mv/v at 3000 lbs. | 12-2-<br>1999      | 1300 Kg<br>3,000 lbs.<br>13,500 N |        | Extension                               | 1518         |
| RFMF<br>RF                                 | RIGHT<br>FEMUR<br>FORCE    | "              | 1007          | "     | 0.9114 mv/v at 3000 lbs. | "                  | 1300 Kg<br>3,000 lbs.<br>13,500 N |        | Extension                               | 71           |

5th Female HYBRID III DUMMY SERIAL NO.: 369t; MFR.: ; SEATING POSITION: DR  
PROJECT-SEGMENT NO.: 096017 1316; ENGINEER: PG; TEST DATE: 6-24-99

[illegible]

# Accelerometer Information

Engineer: Rhule  
 Test Date: Feb-98  
 Dummy S/N: 289  
 Type: Hybrid III 5<sup>th</sup> percentile

| Mnemonic Parameter Being Measured | Description          | Model Number | Serial Number | Sensitivity (mV/V)   | Cal Due Date | Full-Scale Desired G | Direction Of Positive Polarity       |
|-----------------------------------|----------------------|--------------|---------------|----------------------|--------------|----------------------|--------------------------------------|
| <b>Neck Load Cell</b>             |                      |              |               |                      |              |                      |                                      |
| NEKXF                             | Neck X-force         | 1716         | 425           | 1.6944 @ 2,000 lbs   | 10/07/99     | 2000                 | Head forward/chest rearward          |
| NEKYF                             | Neck Y-force         | 1716         | 425           | 1.6421 @ 2,000 lbs   | 10/07/99     | 2000                 | Head left/chest right                |
| NEKZF                             | Neck Z-force         | 1716         | 425           | 1.1515 @ 3,000 lbs   | 10/07/99     | 3000                 | Head up/chest down                   |
| NEKXM                             | Neck X-moment        | 1716         | 425           | 1.5817 @ 2500 in-lbs | 10/07/99     | 2500                 | Right ear to right shoulder          |
| NEKYM                             | Neck Y-moment        | 1716         | 425           | 1.6308 @ 2500 in-lbs | 10/07/99     | 2500                 | Chin forward to sternum              |
| NEKZM                             | Neck Z-moment        | 1716         | 425           | 2.2688 @ 2500 in-lbs | 10/07/99     | 2500                 | Chin to left shoulder                |
| <b>Femur Load Cells</b>           |                      |              |               |                      |              |                      |                                      |
| <b>Left femur</b>                 |                      |              |               |                      |              |                      |                                      |
| LFMXF                             | Left femur X-force   | 1914         | 0259          | 1.9091 @ 3000 lbs    | 10/07/99     | 3000                 | Knee upward/upper femur down         |
| LFMYF                             | Left femur Y-force   | 1914         | 0259          | 1.9105 @ 3000 lbs    | 10/07/99     | 3000                 | Knee left/upper femur right          |
| LFMZf                             | Left femur Z-force   | 1914         | 0259          | 1.1840 @ 5000 lbs    | 10/07/99     | 5000                 | Knee forward/pelvis rearward         |
| LFMXM                             | Left femur X-moment  | 1914         | 0259          | 1.4989 @ 3000 in-lbs | 10/07/99     | 3000                 | Knee left, hold upper femur in place |
| LFMYM                             | Left femur Y-moment  | 1914         | 0259          | 1.5040 @ 3000 in-lbs | 10/07/99     | 3000                 | Knee up, hold upper femur in place   |
| LFMZM                             | Left femur Z-moment  | 1914         | 0259          | 2.6742 @ 3000 in-lbs | 10/07/99     | 3000                 | Twist knee to right, hold up femur   |
| <b>Right femur</b>                |                      |              |               |                      |              |                      |                                      |
| RFMXF                             | Right femur X-force  | 1914         | 0257          | 1.9130 @ 3000 lbs    | 10/07/99     | 3000                 | Knee upward/upper femur down         |
| RFMYF                             | Right femur Y-force  | 1914         | 0257          | 1.9299 @ 3000 lbs    | 10/07/99     | 3000                 | Knee left/upper femur right          |
| RFMZf                             | Right femur Z-force  | 1914         | 0257          | 1.1926 @ 5000 lbs    | 10/07/99     | 5000                 | Knee forward/pelvis rearward         |
| RFMXM                             | Right femur X-moment | 1914         | 0257          | 1.4705 @ 3000 in-lbs | 10/07/99     | 3000                 | Knee left, hold upper femur in place |
| RFMYM                             | Right femur Y-moment | 1914         | 0257          | 1.5124 @ 3000 in-lbs | 10/07/99     | 3000                 | Knee up, hold upper femur in place   |
| RFMZM                             | Right femur Z-moment | 1914         | 0257          | 2.5006 @ 3000 in-lbs | 10/07/99     | 3000                 | Twist knee to right, hold up femur   |
|                                   |                      |              |               |                      |              |                      |                                      |
|                                   |                      |              |               |                      |              |                      |                                      |
|                                   |                      |              |               |                      |              |                      |                                      |

# Accelerometer Information

Engineer: Rhule  
 Test Date: Feb-98  
 Dummy S/N: 289  
 Type: 5<sup>th</sup> female

| Mnemonic Parameter Being Measured | Description      | Model Number | Serial Number | Mfr.    | Sensitivity Mv/g @100 Hz | Cal Due Date | Full-Scale Desired G | Direction Of Positive Polarity |
|-----------------------------------|------------------|--------------|---------------|---------|--------------------------|--------------|----------------------|--------------------------------|
| CSTXG                             | Chest X          | 7264         | J20599        | Endevco | 0.2054                   | 10/07/99     | 200                  | FWD                            |
| CSTYG                             | Chest Y          | 7264         | J20580        | Endevco | 0.2237                   | 10/07/99     | 200                  | LEFT                           |
| CSTZG                             | Chest Z          | 7264         | EH88J         | Endevco | 0.2833                   | 10/07/99     | 200                  | UP                             |
| STTXG                             | Sternum top X    | 7264         | J20569        | Endevco | 0.2179                   | 10/07/99     | 2000                 | FWD                            |
| STMXG                             | Sternum middle X | 7264         | J20064        | Endevco | 0.2279                   | 10/07/99     | 2000                 | FWD                            |
| STBXG                             | Sternum bottom X | 7264         | J20570        | Endevco | 0.2230                   | 10/07/99     | 2000                 | FWD                            |
| SPTXG                             | Spine top X      | 7264         | J19872        | Endevco | 0.2406                   | 10/07/99     | 200                  | REAR                           |
| SPMXG                             | Spine middle X   | 7264         | J19877        | Endevco | 0.2472                   | 10/07/99     | 200                  | REAR                           |
| SPBXG                             | Spine bottom X   | 7264         | J19890        | Endevco | 0.2267                   | 10/07/99     | 200                  | REAR                           |
| HEDXG                             | Head X           | 7264         | J20165        | Endevco | 0.2225                   | 10/07/99     | 200                  | REAR                           |
| HEDYG                             | Head Y           | 7264         | J19865        | Endevco | 0.2129                   | 10/07/99     | 200                  | LEFT                           |
| HEDZG                             | Head Z           | 7264         | J19934        | Endevco | 0.2452                   | 10/07/99     | 200                  | UP                             |
| PEVXG                             | Pelvis X         | 7264         | CY06H         | Endevco | 0.3020                   | 10/07/99     | 200                  | REAR                           |
| PEVYG                             | Pelvis Y         | 7264         | AGAC4         | Endevco | 0.2385                   | 10/07/99     | 200                  | LEFT                           |
| PEVZG                             | Pelvis Z         | 7264         | BF65J         | Endevco | 0.3357                   | 10/07/99     | 200                  | UP                             |
| PEVYGA                            | Pelvis Y         | 7264         | J20218        | Endevco | 0.2473                   | 10/27/99     | 200                  | RIGHT                          |

Engineer: Rhule  
Test Date: Feb-98  
Dummy S/N: 289  
Type: Hybrid III 5<sup>th</sup> percentile

[illegible]