REPORT DOT-HS-4-00865

BELT RETRACTOR TESTING WITH
STANDARD VEHICLE SEAT
(APPENDIX D)

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This report discusses a series of tests conducted on the DOT Standard Seat. These tests were conducted using several child restraint systems restrained to the bench seat by various 3-point automobile harness systems. Two different acceleration sled pulses were used in this study. The performance of the restraint systems under the different test conditions is given in tabular form as well as all of the test data.
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Test data appear in ascending order of Test Nos. Within each test, the data is presented in the following order.

Test data summary
Test Setup photograph
Graph-check camera sequence photograph
Summary Data  Head accelerations
Summary Data  Chest accelerations
Resultant acceleration/Severity Index - Time Curves

<table>
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<tr>
<th>TEST NO.</th>
<th>RESTRAINT DESCRIPTION</th>
<th>RETRACTOR</th>
<th>SLED ACCEL. ANGLE G's</th>
<th>IMPACT DIRECTION</th>
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QT = Qualifying Trapezoidal, QHS = Qualifying Half Sine, CT = Compliance Trapezoidal
F = Front, S = Side, R = Rear, St = Standard, PS = Passenger Side,
DS = Driver Side, Pr = Production
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<th>SLED ACCEL. ANGLE G's</th>
<th>IMPACT DIRECTION</th>
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<td>Table D-1B</td>
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<td>Child Restraint Test Summaries</td>
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APPENDIX D  TEST PROGRAM SUMMARY

The accompanying test data met the test objectives as follows:

1) safety problems with various 1974 belt systems and child restraints during crash conditions were investigated;

2) acceptability of use of such systems with the DOT Standard Vehicle Seat versus the GM Production seats was verified;

3) data were collected on differences between using non-retractor belts per Federal Standard No. 213 and retractor belt systems now used in current production automobiles;

4) effects of various sled pulses as shown in Figure D-1 and D-2, on retractor, vehicle seat, and child restraint performance was investigated;

5) quick-look test data on performance and repeatability on the new infant dummy were obtained.

The various belt systems were mounted in locations similar to actual vehicle positions. A new vehicle belt system, child restraint system, and vehicle seat (where used) was used for each test. Replaceable cushions on the standard seat were replaced after each test, so that a new cushion area was available for each test. Unused 1974 Chevrolet Impala Vehicle seats were used both braced and unbraced. The reinforced seats were braced at end mounts and behind the seat back to limit seat back deflections, lateral and rear, to 1 inch at the top of the seat back.

Test data is presented in columnar form in Tables D-1 and D-2, and include child seat manufacturer and model, impact direction, retractor type, dummy age and seating position, sled parameters, head and chest accelerations, belt loads, and head excursion data.

Dynamic restraint characteristics of the various belt systems are discussed below.

D-2
All belt systems tested functioned properly. The VW belt loosened on rebound, but provided dynamic restraint on impact. The Toyota belt acted in the same way as the VW belt, but with generally smaller excursions.

It was found that with any shielded device such as the Tot Guard, placement of the shoulder belt under the shield prevented rotation of the system on impact. It was also found that on side impact, the shoulder belt aided in preventing rotation of the child seat when impact occurred on the same side that the shoulder belt goes around the seat.

Head excursion values appeared to be independent of the type of sled pulse for both standard and production seats.

Head excursion values obtained in the Tot Guard Child Seating System were an average of 3.5 inches higher for the standard seat compared to the production seat. This additional head travel was probably due to child restraint interaction with the leading edge of the seat cushion frame during foam bottoming, indicating that the standard seat was more compliant in this region.

The Qualifying Trapezoidal sled pulse generally resulted in higher HIC and Severity Index values than the Compliance Trapezoidal or the Qualifying Half-sine sled pulses for both the standard and production seats.

The standard seat tended to produce somewhat lower peak resultant, acceleration, HIC, and Severity Index values in both frontal and rear impacts than the production seat, as a result of its greater head excursion values.

It should be noted that the belts tested which were not GM belts did not strictly meet their design use configurations. Consequently, head excursions obtained with a VW belt system on a GM test buck, for example, would not be representative of a head excursion obtained with a VW belt on a VW test buck; hence, detailed specific comparisons are not valid; however, gross relative comparisons can be made.
FIGURE NO. D-1 : COMPLIANCE ACCELERATION ENVELOPES
FIGURE NO. D-2: QUALIFYING ACCELERATION ENVELOPES

D-2 A: 30 MPH QUALIFYING TRAPEZOIDAL SLED PULSE

D-2 B: 20 MPH QUALIFYING TRAPEZOIDAL SLED PULSE

D-2 C: 30 MPH QUALIFYING HALF-SINE SLED PULSE

D-2 D: 20 MPH QUALIFYING TRAPEZOIDAL SLED PULSE
| MANUFACTURER AND MODEL | TEST NO. | DIRECTION | TYPE RETRACTOR | SEAT TYPE | SEATING POSITION | DUMMY | SLED | HEAD ACCELERATION | EXCURSION |
|------------------------|----------|-----------|----------------|-----------|-----------------|-------|------|-------------------|-----------|------------------|-------|
| Ford TROT Guard       | 795      | Rear      | CM             | Standard  | D 3 yr.         | 3 yr. | 0.3 Trap | 29.3 | 16.6 | 19               | 34    | 19               | 37    | 94               | 76    | NA               | -     |
| Ford TROT Guard       | 804      | Rear      | W1             | Production | D 3 yr.         | 3 yr. | 0.3 Trap | 29.8 | 17.0 | 28               | 14    | 15               | 32    | 121              | 95    | NA               | -     |
| Ford TROT Guard       | 775      | Front     | CM             | Standard  | P 3 yr.         | 3 yr. | 0.3 Trap | 45.0 | 22.3 | 72               | 28    | 50               | 79    | 925              | 795   | -                | 20.1  |
| Ford TROT Guard       | 505      | Front     | CM             | Production | P 3 yr.         | 3 yr. | 0.3 Trap | 43.7 | 23.2 | 66               | 19    | 49               | 73    | 773              | 657   | -                | 25.0  |
| Ford TROT Guard       | 805      | Front     | CM             | Production | P 3 yr.         | 3 yr. | 0.3 Trap | 45.9 | 22.4 | 72               | 35    | 40               | 75    | 1055             | 755   | -                | 15.0  |
| Ford TROT Guard       | 776      | Front     | CM             | Standard  | P 3 yr.         | 3 yr. | 0.3 Trap | 43.2 | 16.7 | 60               | 23    | 10               | 14    | 548              | 424   | -                | 16.9  |
| Ford TROT Guard       | 777      | Front     | CM             | Standard  | P 3 yr.         | 3 yr. | 0.3 Trap | 43.2 | 16.7 | 60               | 23    | 10               | 14    | 548              | 424   | -                | 15.0  |
| Ford TROT Guard       | 778      | Front     | CM             | Standard  | P 3 yr.         | 3 yr. | 0.3 Trap | 43.4 | 15.2 | 72               | 20    | 46               | 70    | 845              | 696   | -                | 16.1  |
| Ford TROT Guard       | 807      | Front     | CM             | Production | P 3 yr.         | 3 yr. | 0.3 Trap | 44.9 | 20.4 | 70               | 25    | 45               | 83    | 596              | 731   | -                | 15.2  |
| Ford TROT Guard       | 808      | Front     | CM             | Production | P 3 yr.         | 3 yr. | 0.3 Trap | 44.2 | 19.2 | 63               | 24    | 35               | 72    | 765              | 603   | -                | 15.9  |
| Ford TROT Guard       | 812      | Front     | CM             | Standard  | P 3 yr.         | 3 yr. | Q-Half-sine | 44.8 | 28.8 | 57               | 15    | 40               | 59    | 552              | 484   | -                | 20.5  |
| Ford TROT Guard       | 811      | Front     | CM             | Production | P 3 yr.         | 3 yr. | Q-Half-sine | 45.5 | 26.0 | 73               | 37    | 20               | 76    | 859              | 644   | -                | 16.3  |
| GM Infant Carrier     | 801      | Front     | CM-1           | Production Back-Restrained | P 6 mo. | 6 mo. | Trap | 44.9 | 21.0 | NI               | NI    | NI               | NA    | NA               | NA    | 30.6             | -     |
| GM Infant Carrier     | 802      | Side      | CM-1           | Production Back-Restrained | P 6 mo. | 6 mo. | Trap | 30.1 | 17.8 | NI               | NI    | NI               | NA    | NA               | NA    | 32.4             | -     |
| GM Infant Carrier     | 803      | Rear      | CM-1           | Production Back-Restrained | D 6 mo. | 6 mo. | Trap | 29.9 | 17.6 | NI               | NI    | NI               | NA    | NA               | NA    | NA               | -     |

* Dummy Contacted Shield Low on Chest Resulting in High Head Excursion*
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<td>D</td>
<td>3 yr.</td>
<td>Q Trac.</td>
<td>30.2 ft/sec</td>
<td>10.0</td>
<td>NA</td>
<td>13.8 G's</td>
<td>6</td>
<td>210 lbs</td>
<td>0</td>
<td>0</td>
<td>75 lbs</td>
<td>0</td>
<td>100 lbs</td>
</tr>
<tr>
<td>295</td>
<td>Rear</td>
<td>AN Standard</td>
<td>D</td>
<td>3 yr.</td>
<td>Q Trac.</td>
<td>29.8 ft/sec</td>
<td>10.0</td>
<td>NA</td>
<td>16.2 G's</td>
<td>6</td>
<td>210 lbs</td>
<td>0</td>
<td>0</td>
<td>75 lbs</td>
<td>0</td>
<td>100 lbs</td>
</tr>
<tr>
<td>296</td>
<td>Rear</td>
<td>GM Standard</td>
<td>D</td>
<td>3 yr.</td>
<td>Q Trac.</td>
<td>25.6 ft/sec</td>
<td>10.0</td>
<td>NA</td>
<td>16.1 G's</td>
<td>6</td>
<td>210 lbs</td>
<td>0</td>
<td>0</td>
<td>75 lbs</td>
<td>0</td>
<td>220 lbs</td>
</tr>
<tr>
<td>297</td>
<td>Rear</td>
<td>GM Standard</td>
<td>D</td>
<td>3 yr.</td>
<td>Q Trac.</td>
<td>23.9 ft/sec</td>
<td>10.0</td>
<td>NA</td>
<td>16.2 G's</td>
<td>10</td>
<td>210 lbs</td>
<td>0</td>
<td>0</td>
<td>75 lbs</td>
<td>0</td>
<td>220 lbs</td>
</tr>
<tr>
<td>298</td>
<td>Rear</td>
<td>GM Standard</td>
<td>P</td>
<td>3 yr.</td>
<td>Q Trac.</td>
<td>29.8 ft/sec</td>
<td>10.0</td>
<td>NA</td>
<td>16.2 G's</td>
<td>10</td>
<td>210 lbs</td>
<td>0</td>
<td>0</td>
<td>75 lbs</td>
<td>0</td>
<td>220 lbs</td>
</tr>
<tr>
<td>299</td>
<td>Rear</td>
<td>GM Standard</td>
<td>P</td>
<td>3 yr.</td>
<td>Q Trac.</td>
<td>29.8 ft/sec</td>
<td>10.0</td>
<td>NA</td>
<td>16.2 G's</td>
<td>10</td>
<td>210 lbs</td>
<td>0</td>
<td>0</td>
<td>75 lbs</td>
<td>0</td>
<td>220 lbs</td>
</tr>
<tr>
<td>300</td>
<td>Rear</td>
<td>GM Standard</td>
<td>P</td>
<td>3 yr.</td>
<td>Q Trac.</td>
<td>29.8 ft/sec</td>
<td>10.0</td>
<td>NA</td>
<td>16.2 G's</td>
<td>10</td>
<td>210 lbs</td>
<td>0</td>
<td>0</td>
<td>75 lbs</td>
<td>0</td>
<td>220 lbs</td>
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<td>Symbols</td>
<td>Sled Pulse Descriptions</td>
<td>Head Excursion Terms</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>P</td>
<td>Passenger seat</td>
<td>Q Trap - qualifying trapezoidal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Driver seat</td>
<td>C Trap - compliance trapezoidal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NI</td>
<td>Not instrumented</td>
<td>Q Half - qualifying halfsine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>Not available</td>
<td>sine</td>
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<td></td>
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<td></td>
<td></td>
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<td>NP</td>
<td>No Belt Preload used</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

SLEED VELOCITY AND ACCELERATION ARE AVERAGE VALUES; ALL OTHER READINGS ARE PEAK VALUES

The Maximum Absolute Head Excursion (MAHE) is the total head excursion measured at the leading edge of the dummy's head. The Maximum Relative Head Excursion (MRHE) is the forwardmost excursion of the head relative to the vehicle seat. The NHTSA proposed revised performance requirements to MVSS 213 limits the forward MRHE to 18 inches (45.7 cm) relative to the vehicle seat back. The vertical MRHE is limited to 27 inches (68.6 cm) relative to the vehicle seat bottom. Side excursion is limited to a MAHE of 19 inches (48.3 cm). The initial and maximum back angle of the infant system as measured with respect to the vertical are also given below.
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-775
Test Date: 9-6-74
Restraint Description: Ford Tot Guard (passenger side)
Harness Configurations: GM retractor

Dummy 3 year

Sled Velocity (avg., ft/sec) 45.04
Sled Acceleration (avg. g's) 22.3 Qualifying trapezoidal

Belt Loads (peak pounds):
Right Lap 600
Left Lap 1000
Shoulder* 800

Impact Direction: Front
Seat Standard

Test Observations: The GM belt restraint system worked well.

* asterisk on belt load value indicates load was on over back strap
Figure D-1  Test Setup for A-775
Test No. A-775

Figure D-2  Graph-Check Camera Sequence
Test Number: A725
Dummy: Sierra 3yr
Sled Velocity: 45.0 ft/sec

SUMMARY DATA HEAD ACCELERATIONS

Test Type: Front
Hat Guard: Standard

Sled Pulse
5 g's/Division
Filtered
Class: 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class: 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class: 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class: 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class: 1000

1-12.5 MSEC
Test Number: A775
Dummy: Sierra 3yr
Sled Velocity: 504 ft/sec

SUMMARY DATA CHEST ACCELERATIONS

Test Type: Front
Tjet Guard: Standard

Sled Pulse: 5 g's/Division
Filtered: Class 60

Anterior-Posterior Chest Accelerations: 12.5 g's/Division
Filtered: Class 180

Superior-Inferior Chest Accelerations: 12.5 g's/Division
Filtered: Class 180

Left-Right Chest Accelerations: 12.5 g's/Division
Filtered: Class 180

Resultant Chest Accelerations: 10 g's/Division
Filtered: Class 180

1-12.5 msec
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-776
Test Date: 9-6-74
Restraint Description: Ford Tot Guard (passenger side)
Harness Configurations: GM retractor

Dummy 3 year
Sled Velocity (avg., ft/sec) 43.15
Sled Acceleration (avg. g's) 18.68 (compliance trapezoidal)
Belt Loads (peak pounds):
  Right Lap 340
  Left Lap ~ 650
  Shoulder 500
Impact Direction: Front
Seat Standard

Test Observations: The GM belt restraint system worked well.
Loss of tape and thus no HIC, Resultant, or SI.
Test No. A-776

Figure D-4  Graph-Check Camera Sequence
HSRI CHILD SEAT DATA SUMMARY

Test Number:      A-777
Test Date:        9-6-74
Restraint Description:  Ford Tot Guard (passenger side)
Harness Configurations:  GM retractor

Dummy:  3 year

Sled Velocity (avg., ft/sec):  43.22
Sled Acceleration (avg. g's):  19 (compliance trapezoidal)
Belt Loads (peak pounds):
  | Right Lap | 430 |
  | Left Lap  | 900 |
  | Shoulder  | 680 |
Impact Direction:  Front
Seat:  Standard

Test Observations:  The GM belt restraint system worked well.
Test No. A-777

Figure D-6  Graph-Check Camera Sequence
SUMMARY DATA HEAD ACCELERATIONS

Test Number: A-777
Dummy: Sierra 3 yr
Sled Velocity: 53.2 ft/sec

Test Type: Front
Standard

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head Accelerations
10 g's/Division
Filtered
Class 1000

1 T-12.5 msec
**SUMMARY DATA CHEST ACCELERATIONS**

<table>
<thead>
<tr>
<th>Test Number</th>
<th>A 722</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dummy</td>
<td>Sierra 3 yr</td>
</tr>
<tr>
<td>Sled Velocity</td>
<td>43.22 ft/sec</td>
</tr>
</tbody>
</table>

**Test Type**

<table>
<thead>
<tr>
<th>Sled Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 g's/Division</td>
</tr>
<tr>
<td>Filtered</td>
</tr>
<tr>
<td>Class 60</td>
</tr>
</tbody>
</table>

**Anterior-Posterior Chest Accelerations**

<table>
<thead>
<tr>
<th>Anterior-Posterior Chest Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 g's/Division</td>
</tr>
<tr>
<td>Filtered</td>
</tr>
<tr>
<td>Class 180</td>
</tr>
</tbody>
</table>

**Superior-Inferior Chest Accelerations**

<table>
<thead>
<tr>
<th>Superior-Inferior Chest Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 g's/Division</td>
</tr>
<tr>
<td>Filtered</td>
</tr>
<tr>
<td>Class 180</td>
</tr>
</tbody>
</table>

**Left-Right Chest Accelerations**

<table>
<thead>
<tr>
<th>Left-Right Chest Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 g's/Division</td>
</tr>
<tr>
<td>Filtered</td>
</tr>
<tr>
<td>Class 180</td>
</tr>
</tbody>
</table>

**Resultant Chest Accelerations**

<table>
<thead>
<tr>
<th>Resultant Chest Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 g's/Division</td>
</tr>
<tr>
<td>Filtered</td>
</tr>
<tr>
<td>Class 180</td>
</tr>
</tbody>
</table>

**Test Result**

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Front</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td></td>
</tr>
</tbody>
</table>
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-778

Test Date: 9-6-74

Restraint Description: Ford Tot Guard (passenger side)

Harness Configurations: GM retractor

Dummy: 3 year

Sled Velocity (avg., ft/sec): 43.38

Sled Acceleration (avg. g's): 19.2 (compliance trapezoidal)

Belt Loads (peak pounds):

<table>
<thead>
<tr>
<th>Type</th>
<th>Right Lap</th>
<th>Left Lap</th>
<th>Shoulder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500</td>
<td>900</td>
<td>750</td>
</tr>
</tbody>
</table>

Impact Direction: Front

Seat: Standard

Test Observations: The GM belt restraint system worked well.
Test No. A-778

Figure D-8  Graph-Check Camera Sequence
Test Number: A-078
Test Type: Front
Dummy: Sierra
Sled Velocity: 33.3 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class: 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class: 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class: 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class: 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class: 1000
| Test Number | A 728 |
| Dummy       | Sierra 3yr |
| Sled Velocity | 73.3 ft/sec |

**Summary Data Chest Accelerations**

<table>
<thead>
<tr>
<th>Test Type</th>
<th>FRONT</th>
</tr>
</thead>
</table>

**Standards**

| Sled Pulse | 5 g's/Division |
| Filtered   |                |
| Class 60   |                |

<table>
<thead>
<tr>
<th>Anterior-Posterior Chest Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5 g's/Division</td>
</tr>
<tr>
<td>Filtered</td>
</tr>
<tr>
<td>Class 180</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Superior-Inferior Chest Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5 g's/Division</td>
</tr>
<tr>
<td>Filtered</td>
</tr>
<tr>
<td>Class 180</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Left-Right Chest Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5 g's/Division</td>
</tr>
<tr>
<td>Filtered</td>
</tr>
<tr>
<td>Class 180</td>
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<table>
<thead>
<tr>
<th>Resultant Chest Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5 g's/Division</td>
</tr>
<tr>
<td>Filtered</td>
</tr>
<tr>
<td>Class 180</td>
</tr>
</tbody>
</table>

12.5 msec
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-779
Test Date: 9-7-74
Restraint Description: Peterson 75, infant seat (passenger side)
Harness Configurations: GM retractor

Dummy 6 month

Sled Velocity (avg., ft/sec) 44.01
Sled Acceleration (avg. g's) 19.1 (compliance trapezoidal)

Belt Loads (peak pounds):

<table>
<thead>
<tr>
<th></th>
<th>Right Lap</th>
<th>Left Lap</th>
<th>Shoulder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>300</td>
<td>400</td>
<td>75</td>
</tr>
</tbody>
</table>

Impact Direction: Front
Seat Standard

Test Observations: The GM belt restraint system worked well. Insert for infant adapter pulled out.
Test No. A-779

Figure D-10  Graph-Check Camera Sequence
Test Number 779
Dummy G
Sled Velocity 4/5 ft/sec

SUMMARY DATA HEAD ACCELERATIONS

Test Type Front
Peterson Standard

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000

1-12.5 MSE
HSRI CHILD SEAT DATA SUMMARY

**Test Number:** A-780

**Test Date:** 9-7-74

**Restraint Description:** Peterson 75 infant seat (Passenger side)

**Harness Configurations:** GM retractor

<table>
<thead>
<tr>
<th>Dummy</th>
<th>6 month</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Sled Velocity (avg., ft/sec)</th>
<th>42.34</th>
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</thead>
<tbody>
<tr>
<td>Sled Acceleration (avg. g's)</td>
<td>18.8 (compliance trapezoidal)</td>
</tr>
</tbody>
</table>

**Belt Loads (peak pounds):**

- Right Lap: 300
- Left Lap: 400
- Shoulder: 100

**Impact Direction:** Front

**Seat:** Standard

**Test Observations:** The GM belt restraint system worked well. Insert for infant adapter pulled out.
Test No. A-780

Figure D-12 Graph-Check Camera Sequence
Test Number: A 780
Dummy: 6 month
Sled Velocity: 42.34 ft/sec

SUMMARY DATA HEAD ACCELERATIONS
Test Type: Front

- **Sled Pulse**
  - 5 g's/Division
  - Filtered
  - Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inf erior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-781
Test Date: 9-7-74
Restraint Description: Peterson 75 infant seat (passenger side)
Harness Configurations: GM retractor

Dummy: 6 month
Sled Velocity (avg., ft/sec): 43.08
Sled Acceleration (avg. g's): 19 (compliance trapezoidal)
Belt Loads (peak pounds):
- Right Lap: 350
- Left Lap: 350
- Shoulder: 75

Impact Direction: Front
Seat: Standard

Test Observations: The GM belt restraint system worked well.
Figure D-13  Test Setup for A-781
Test No. A-781

Figure D-14  Graph-Check Camera Sequence
<table>
<thead>
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<th>Test Number</th>
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<tbody>
<tr>
<td>Dummy</td>
<td>0 MONTH</td>
</tr>
<tr>
<td>Sled Velocity</td>
<td>43.08 ft/sec</td>
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</tbody>
</table>

**Summary Data Head Accelerations**

- **Test Type**: Front
- **Standard**

**Sled Pulse**
- 5 g's/Division
- Filtered
- Class 60

**Anterior-Posterior Head Accelerations**
- 25 g's/Division
- Filtered
- Class 1000

**Superior-Inferior Head Accelerations**
- 25 g's/Division
- Filtered
- Class 1000

**Left-Right Head Accelerations**
- 25 g's/Division
- Filtered
- Class 1000

**Resultant Head Accelerations**
- 10 g's/Division
- Filtered
- Class 1000
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-782

Test Date: 9-7-74

Restraint Description: Peterson 75 infant seat (passenger side)

Harness Configurations: GM retractor

<table>
<thead>
<tr>
<th>Dummy</th>
<th>6 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sled Velocity (avg., ft/sec)</td>
<td>45.76</td>
</tr>
<tr>
<td>Sled Acceleration (avg. g's)</td>
<td>22.7 Qualifying Trapezoidal</td>
</tr>
</tbody>
</table>

Belt Loads (peak pounds):

| Right Lap | 375 |
| Left Lap | 525 |
| Shoulder | 175 |

Impact Direction: Front

Seat Standard

Test Observations: The GM belt restraint system worked well. Insert for infant adapter pulled out, and back of infant seat split.
Test No. A-782

Figure D-16  Graph-Check Camera Sequence
**SUMMARY DATA HEAD ACCELERATIONS**

**Test Number** 782  
**Dummy** 6 month  
**Sled Velocity** 45.76 ft/sec

**Test Type**  
**Peterson**  
**Standard**

**Sled Pulse**  
5 g's/Division  
Filtered  
Class 60

**Anterior-Posterior**  
Head Accelerations  
25 g's/Division  
Filtered  
Class 1000

**Superior-Inferior**  
Head Accelerations  
25 g's/Division  
Filtered  
Class 1000

**Left-Right**  
Head Accelerations  
25 g's/Division  
Filtered  
Class 1000

**Resultant Head**  
Accelerations  
10 g's/Division  
Filtered  
Class 1000
**HSRI CHILD SEAT DATA SUMMARY**

**Test Number:** A-783  
**Test Date:** 9-7-74  
**Restraint Description:** Bobby-Mac infant seat (passenger side)  
**Harness Configurations:** GM retractor

<table>
<thead>
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<th>Dummy</th>
<th>6 month</th>
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</thead>
<tbody>
<tr>
<td>Sled Velocity (avg., ft/sec)</td>
<td>44.34</td>
</tr>
<tr>
<td>Sled Acceleration (avg. g's)</td>
<td>22.4 (Qualifying Trapezoidal)</td>
</tr>
<tr>
<td>Belt Loads (peak pounds):</td>
<td></td>
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<tr>
<td>Right Lap</td>
<td>400</td>
</tr>
<tr>
<td>Left Lap</td>
<td>575</td>
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<tr>
<td>Shoulder</td>
<td>100</td>
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<td>Impact Direction:</td>
<td>Front</td>
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<tr>
<td>Seat</td>
<td>Standard</td>
</tr>
</tbody>
</table>

**Test Observations:** The GM belt restraint system worked well
Figure D-19  Graph-Check Camera Sequence

Test No. A-783
Test Number: 783
Dummy: 6 month
Sled Velocity: 44.34 ft/sec

SUMMARY DATA: HEAD ACCELERATIONS

Test Type: Front

Bobby Mac

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000

1-12.5 msec
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-784

Test Date: 9-7-74

Restraint Description: Kantwet Harness (passenger side)

Harness Configurations: GM retractor

Dummy 6 year

Sled Velocity (avg., ft/sec) 44.07

Sled Acceleration (avg. g's) 22.4 Qualifying trapezoidal

Belt Loads (peak pounds):

<table>
<thead>
<tr>
<th></th>
<th>Right Lap</th>
<th>Left Lap</th>
<th>Shoulder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>350</td>
<td>570</td>
<td>900</td>
</tr>
</tbody>
</table>

Impact Direction: Front

Seat Standard

Test Observations: The GM belt restraint system worked well. Back connection on harness belt loads pulled apart.
Figure D-20  Test Setup for A-784
Test No. A-784

Figure D-21 Graph-Check Camera Sequence
Test Number: A-084
Dummy: SIERRA 6 YEAR
Sled Velocity: 44.07 ft/sec

SUMMARY DATA HEAD ACCELERATIONS
Test Type: FRONT
Harness: Standard

Sled Pulse
5 g/s/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g/s/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g/s/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g/s/Division
Filtered
Class 1000

Resultant Head Accelerations
10 g/s/Division
Filtered
Class 1000
SUMMARY DATA CHEST ACCELERATIONS

Test Number A 784
Dummy SIERRA 6 YEAR
Sled Velocity 44.07 ft/sec

Test Type FRONT
Harness KANTEK STANDARD

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Chest Accelerations
1.5 g's/Division
Filtered
Class 180

Superior-Inferior
Chest Accelerations
1.5 g's/Division
Filtered
Class 180

Left-Right
Chest Accelerations
1.5 g's/Division
Filtered
Class 180

Resultant Chest
Accelerations
0 g's/Division
Filtered
Class 180

| 1-12.5 MSEC |
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-785

Test Date: 9-7-74

Restraint Description: Kantwet Model 884 (Passenger side)

Harness Configurations: Volkswagen retractor, left end of lap belt made of cable which prevented load cell mounting. Rear strap used on child seat.

Dummy: 3 year

Sled Velocity (avg., ft/sec): 43.33

Sled Acceleration (avg. g's): 18.6 compliance trapezoidal

Belt Loads (peak pounds):

<table>
<thead>
<tr>
<th></th>
<th>Right Lap</th>
<th>Left Lap</th>
<th>Shoulder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>320</td>
<td>NI</td>
<td>200, 840*</td>
</tr>
</tbody>
</table>

Impact Direction: Front

Seat: Standard

Test Observations: The Volkswagen belt restraint system worked well. The belts cannot be preloaded.

*asterisk on belt load value indicates load was on over back strap.
Test No. A-785

Figure D-23  Graph-Check Camera Sequence
Test Number: A-785
Dummy: Sierra 3yr
Sled Velocity: 43.33 ft/sec

Summary Data: Head Accelerations

Test Type: Front
Kantweft: Standard

Sled Pulse:
5 g's/Division
Filtered
Class 60

Anterior-Posterior:
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior:
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right:
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head:
Accelerations
10 g's/Division
Filtered
Class 1000

1-12.5 msec
Summary Data Chest Accelerations

Test Number: 9785
Dummy: Sierra 3yr
Sled Velocity: 93.33 ft/sec

Test Type: Kantwe
Standard

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Superior-Inferior
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Left-Right
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Resultant Chest
Accelerations
10 g's/Division
Filtered
Class 180

12.5 msec
Test Number: A-786
Test Date: 9-7-74
Restraint Description: Peterson 75 child seat (passenger side)
Harness Configurations: Volkswagen retractor, left lap belt made of cable

Which prevented load measurement.

Dummy 3 year

Sled Velocity (avg., ft/sec)  45.71

Sled Acceleration (avg. g's) 21.8 Qualifying Trapezoidal

Belt Loads (peak pounds):

<table>
<thead>
<tr>
<th></th>
<th>Right Lap</th>
<th>Left Lap</th>
<th>Shoulder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>700</td>
<td></td>
<td>460</td>
</tr>
</tbody>
</table>

Impact Direction: Front

Seat Standard

Test Observations: The Volkswagen belt restraint system worked well.
The belts cannot be preloaded.
Figure D-24  Test Setup for A-786
Test No. A-786

Figure D-25  Graph-Check Camera Sequence
Test Number: A-786
Dummy: Sierra
Sled Velocity: 45.7 ft/sec

Summary Data Head Accelerations

Test Type: Front

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head Accelerations
10 g's/Division
Filtered
Class 1000

1-12.5 kHz
**Summary Data Chest Accelerations**

**Test Number**: A 286  
**Dummy**: Sierra 3yr  
**Sled Velocity**: 15.7 ft/sec

**Sled Pulse**  
5 g's/Division  
Filtered  
Class 60

**Anterior-Posterior Chest Accelerations**  
/2.5 g's/Division  
Filtered  
Class 180

**Superior-Inferior Chest Accelerations**  
/2.5 g's/Division  
Filtered  
Class 180

**Left-Right Chest Accelerations**  
/2.5 g's/Division  
Filtered  
Class 180

**Resultant Chest Accelerations**  
/10 g's/Division  
Filtered  
Class 180

**Test Type**: Front  
**Peterson**: Standard

---

**Graphs**

- **Sled Pulse**
- **Anterior-Posterior Chest Accelerations**
- **Superior-Inferior Chest Accelerations**
- **Left-Right Chest Accelerations**
- **Resultant Chest Accelerations**

---

** временi**: 1-12.5 MSEC
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-787
Test Date: 9-7-74
Restraint Description: Peterson 75 (child seat) (passenger side)
Harness Configurations: Toyota retractor, lap belt only

Dummy 3 year
Sled Velocity (avg., ft/sec) 45.15
Sled Acceleration (avg. g's) 21.8 Qualifying Trapezoidal

Belt Loads (peak pounds):
  Right Lap 700
  Left Lap 850
  Shoulder Not used

Impact Direction: Front
Seat Standard

Test Observations: The Toyota belt restraint system, lap belt only worked well. The shoulder belt is not needed when a Peterson child seat is used in a front impact test. The belts cannot be preloaded.
Test No. A-787

Figure D-27 Graph-Check Camera Sequence
Test Number A-787
Dummy Sierra 3yr
Sled Velocity 45.15 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head Accelerations
10 g's/Division
Filtered
Class 1000
SUMMARY DATA CHEST ACCELERATIONS

Test Number A797
Dummy Sierra 3yr
Sled Velocity 45.15 ft/sec

Test Type Front

PETerson

STANDARD

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Chest Accelerations
1/2 g's/Division
Filtered
Class 180

Superior-Inferior
Chest Accelerations
1/2 g's/Division
Filtered
Class 180

Left-Right
Chest Accelerations
1/2 g's/Division
Filtered
Class 180

Resultant Chest
Accelerations
0 g's/Division
Filtered
Class 180

1-12.5 MSEC
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-788
Test Date: 9-8-74
Restraint Description: Peterson 75 child seat (passenger side)
Harness Configurations: Toyota retractor, lap belt only

<table>
<thead>
<tr>
<th>Dummy</th>
<th>3 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sled Velocity (avg., ft/sec)</td>
<td>29.54</td>
</tr>
<tr>
<td>Sled Acceleration (avg. g's)</td>
<td>16.6   Qualifying Trapezoidal</td>
</tr>
<tr>
<td>Belt Loads (peak pounds):</td>
<td></td>
</tr>
<tr>
<td>Right Lap</td>
<td>0, Rebound 50</td>
</tr>
<tr>
<td>Left Lap</td>
<td>0, Rebound 50</td>
</tr>
<tr>
<td>Shoulder</td>
<td>Not used</td>
</tr>
</tbody>
</table>

Impact Direction: Rear
Seat Standard

Test Observations: The Toyota belt restraint system worked well. The belts cannot be preloaded.
Test No. A-788

Figure D-29  Graph-Check Camera Sequence
Test Number A-788
Dummy Sierra 3yr
Sled Velocity 29.5 ft/sec

SUMMARY DATA HEAD ACCELERATIONS

Test Type NEAR
Peterson
Standard

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000

1-12.5 MSEC
SUMMARY DATA CHEST ACCELERATIONS

Test Number: A788
Test Type: REAR

Dummy: Sierra 3yr
Sled Velocity: 29.54 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Superior-Inferior Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Left-Right Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Resultant Chest Accelerations
12.5 g's/Division
Filtered
Class 180

1-12.5 MSEC
S.I. = 67

H.I.C. = 55

SEP 27, 1974

27 = PERK

7 = AVE

RESULTANT ACCELERATION, G'S

TIME, MILLISECONDS

A-788

SEVERITY INDEX

100.  80.  60.  40.  20.  0.

120.  160.  200.  240.  280.  320.
### HSRI CHILD SEAT DATA SUMMARY

<table>
<thead>
<tr>
<th>Test Number:</th>
<th>A-789</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Date:</td>
<td>9-8-74</td>
</tr>
<tr>
<td>Restraint Description:</td>
<td>Peterson 75 Child seat (driver side)</td>
</tr>
<tr>
<td>Harness Configurations:</td>
<td>Datsun retractor, lap belt only, right lap belt made of cable prevented right lap belt load measurement.</td>
</tr>
<tr>
<td>Dummy:</td>
<td>3 year</td>
</tr>
<tr>
<td>Sled Velocity (avg., ft/sec)</td>
<td>29.06</td>
</tr>
<tr>
<td>Sled Acceleration (avg. g's)</td>
<td>16.8 Qualifying trapezoidal</td>
</tr>
<tr>
<td>Belt Loads (peak pounds):</td>
<td>Right Lap</td>
</tr>
<tr>
<td></td>
<td>Left Lap</td>
</tr>
<tr>
<td></td>
<td>Shoulder</td>
</tr>
<tr>
<td>Impact Direction:</td>
<td>Rear</td>
</tr>
<tr>
<td>Seat:</td>
<td>Standard</td>
</tr>
</tbody>
</table>

**Test Observations:**
The Datsun belt restraint system, lap only, worked well. The shoulder belt is not needed when a Peterson Child seat is used in a front impact test.
Test No. A-789

Figure D-31  Graph-Check Camera Sequence
Test Number A-089
Dummy Sierra 3 yr
Sled Velocity 29.0 ft/sec

SUMMARY DATA HEAD ACCELERATIONS

Test Type Rear
Peterson Standard

Sled Pulse
5 g/s/Division
Filtered
Class 60

Anterior-Posterior Head Accelerations
25 g/s/Division
Filtered
Class 1000

Superior-Inferior Head Accelerations
25 g/s/Division
Filtered
Class 1000

Left-Right Head Accelerations
25 g/s/Division
Filtered
Class 1000

Resultant Head Accelerations
10 g/s/Division
Filtered
Class 1000

1-12.5 msec
SUMMARY DATA CHEST ACCELERATIONS

Test Number A 789
Dummy Sierra 3yr
Sled Velocity 290.6 ft/sec

Test Type REAR

PETTSON

STANDARD

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior Chest Accelerations
1/2 g's/Division
Filtered
Class 180

Superior-Inferior Chest Accelerations
1/2 g's/Division
Filtered
Class 180

Left-Right Chest Accelerations
1/2 g's/Division
Filtered
Class 180

Resultant Chest Accelerations
1 g's/Division
Filtered
Class 180

1-12.5 MSEC
SEP 27, 1974

H.I.C. = 41

S.I. = 47

RESULTANT ACCELERATION, G'S

TIME, MILLISECONDS

A-789
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-790

Test Date: 9-8-74

Restraint Description: GM Child Love Seat (driver side)

Harness Configurations: Chrysler retractor, double belt prevented right lap belt load measurement.

Dummy 3 year

Sled Velocity (avg., ft/sec) 29.9

Sled Acceleration (avg. g's) 16.8 Qualifying trapezoidal

Belt Loads (peak pounds):

<table>
<thead>
<tr>
<th>Belt</th>
<th>Right Lap</th>
<th>Left Lap</th>
<th>Shoulder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>200</td>
<td>0</td>
</tr>
</tbody>
</table>

Impact Direction: Rear

Seat Standard

Test Observations: The Chrysler belt restraint system worked well. The shoulder belt is not needed when a GM child love seat is used in a front impact test.
Test No. A-790

Figure D-33  Graph-Check Camera Sequence
Test Number: A-790
Dummy: Sierra 3 yr
Sled Velocity: 29.90 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000

SUMMARY DATA HEAD ACCELERATIONS
Test Type: REAR
Love SEAP
Standard

1-12.5 MSE
Test Number: A 790
Dummy: Sierra 3yr
Sled Velocity: 29.9 ft/sec

Summary Data Chest Accelerations
Test Type: Rear

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Superior-Inferior Chest Accelerations
2.5 g's/Division
Filtered
Class 180

Left-Right Chest Accelerations
2.5 g's/Division
Filtered
Class 180

Resultant Chest Accelerations
10 g's/Division
Filtered
Class 180

1-12.5 msec
**HSRI CHILD SEAT DATA SUMMARY**

**Test Number:** A-791  
**Test Date:** 9-8-74  
**Restraint Description:** Peterson 75 infant seat (driver side)  
**Harness Configurations:** GM retractor, lap belt only  

<table>
<thead>
<tr>
<th>Dummy</th>
<th>6 month</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sled Velocity (avg., ft/sec)</strong></td>
<td>32.00</td>
</tr>
<tr>
<td><strong>Sled Acceleration (avg. g's)</strong></td>
<td>16.8 Qualifying trapezoidal</td>
</tr>
<tr>
<td><strong>Belt Loads (peak pounds):</strong></td>
<td></td>
</tr>
<tr>
<td>Right Lap</td>
<td>100</td>
</tr>
<tr>
<td>Left Lap</td>
<td>150</td>
</tr>
<tr>
<td>Shoulder</td>
<td>0</td>
</tr>
</tbody>
</table>

**Impact Direction:** Rear  
**Seat:** Standard  

**Test Observations:** The GM belt restraint system worked well.
Test No. A-791

Figure D-35  Graph-Check Camera Sequence
<table>
<thead>
<tr>
<th>Test Number</th>
<th>791</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dummy</td>
<td>6 month</td>
</tr>
<tr>
<td>Sled Velocity</td>
<td>32.00 ft/sec</td>
</tr>
</tbody>
</table>

**Summary Data Head Accelerations**

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Standard</th>
</tr>
</thead>
</table>

**Sled Pulse**
5 g/s/Division
Filtered
Class 60

**Anterior-Posterior**
Head Accelerations
25 g/s/Division
Filtered
Class 1000

**Superior-Inferior**
Head Accelerations
25 g/s/Division
Filtered
Class 1000

**Left-Right**
Head Accelerations
25 g/s/Division
Filtered
Class 1000

**Resultant Head**
Accelerations
10 g/s/Division
Filtered
Class 1000
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-792
Test Date: 9-8-74
Restraint Description: Peterson 75 (child) (driver side)
Harness Configurations: Ford retractor, lap belt only

<table>
<thead>
<tr>
<th>Dummy</th>
<th>3 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sled Velocity (avg., ft/sec)</td>
<td>Loss of data</td>
</tr>
<tr>
<td>Sled Acceleration (avg. g's)</td>
<td>16.8 Qualifying Trapezoidal</td>
</tr>
<tr>
<td>Belt Loads (peak pounds):</td>
<td></td>
</tr>
<tr>
<td>Right Lap</td>
<td>50</td>
</tr>
<tr>
<td>Left Lap</td>
<td>100</td>
</tr>
<tr>
<td>Shoulder</td>
<td>0</td>
</tr>
</tbody>
</table>

Impact Direction: Rear
Seat Standard

Test Observations: The Ford belt restraint system worked well.
Test No. A-792

Figure D-37  Graph-Check Camera Sequence
Test Number A-792
Dummy Sierra 3yr
Sled Velocity ft/sec

SUMMARY DATA HEAD ACCELERATIONS

Test Type HEAR
PETERSON
STANDARD

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000

1-12.5 MSE
Test Number: A-292
Dummy: Sierra 3yr
Test Type: REAR
Peterson
STANDARD

Sled Velocity: ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Chest Accelerations
1/2.5 g's/Division
Filtered
Class 180

Superior-Inferior
Chest Accelerations
1/2.5 g's/Division
Filtered
Class 180

Left-Right
Chest Accelerations
1/2.5 g's/Division
Filtered
Class 180

Resultant Chest
Accelerations
1/2.5 g's/Division
Filtered
Class 180

Instrument Systems Division

1-12.5 MSEC
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-793
Test Date: 9-8-74
Restraint Description: Kantwet Model 884 (driver side)
Harness Configurations: GM retractor

Dummy: 3 year
Sled Velocity (avg., ft/sec) 28.49
Sled Acceleration (avg. g's) 16.8 Qualifying Trapezoidal
Belt Loads (peak pounds):
  Right Lap 100
  Left Lap 170
  Shoulder 25
Impact Direction: Rear
Seat: Standard

Test Observations: The GM belt restraint system worked well.
Test No. A-793

Figure D-39  Graph-Check Camera Sequence
Test Number A-993
Dummy Sierra 3 yr
Sled Velocity 28.4 ft/sec

SUMMARY DATA HEAD ACCELERATIONS
Test Type REAR
KANTWET STANDARD

Sled Pulse
5 g/s/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g/s/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g/s/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g/s/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g/s/Division
Filtered
Class 1000
SUMMARY

DATA

CXEST

ACC, ELERATIONS

Test Number: 793
Dummy: Sierra 3yr
Sled Velocity: 28.4 ft/sec

Test Type: REAR

Kantwek

Standard

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Superior-Inferior
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Left-Right
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Resultant Chest
Accelerations
10 g's/Division
Filtered
Class 180

1-12.5 msec
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-794
Test Date: 9-8-74
Restraint Description: Ford Tot Guard (Driver Side)
Harness Configurations: American Motors retractor

Dummy 3 year
Sled Velocity (avg., ft/sec) 29.14
Sled Acceleration (avg. g's) 16.7 (Qualifying Trapezoidal)
Belt Loads (peak pounds):
  Right Lap 100
  Left Lap 100
  Shoulder 0

Impact Direction: Rear
Seat Standard

Test Observations: Upon impact, the face-shield usually rotates upward (aided by the shoulder belt) and the seat tends to slide underneath the belt in this rearward configuration. Use of the American Motors belt system, which is capable of holding a preload, prevented this occurrence. The American Motors restraint system worked well.
Figure D-41  Graph-Check Camera Sequence
Test Number **A-794**  
Dummy **Sierra 3yr**  
Sled Velocity **29.14 ft/sec**

**SUMMARY DATA HEAD ACCELERATIONS**

**Test Type**: REAR  
**Tot Guard**: STANDARD

**Sled Pulse**:  
5 g's/Division  
Filtered  
Class 60

**Anterior-Posterior**  
Head Accelerations  
25 g's/Division  
Filtered  
Class 1000

**Superior-Inferior**  
Head Accelerations  
25 g's/Division  
Filtered  
Class 1000

**Left-Right**  
Head Accelerations  
25 g's/Division  
Filtered  
Class 1000

**Resultant Head**  
Accelerations  
10 g's/Division  
Filtered  
Class 1000

Time: 1-12.5 MSEC
Test Number A794
Dummy Sierra 3yr
Sled Velocity 29.14 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Superior-Inferior Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Left-Right Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Resultant Chest Accelerations
12.5 g's/Division
Filtered
Class 180

SUMMARY DATA CHEST ACCELERATIONS
Test Type REAR
Top Guard STANDARD

1-12.5 MSEC
**HSRI CHILD SEAT DATA SUMMARY**

**Test Number:** A-795  
**Test Date:** 9-8-74

**Restraint Description:** Ford Tot Guard (driver side)  
**Harness Configurations:** Volkswagen retractor, cable prevented right lap belt load adjustment.

<table>
<thead>
<tr>
<th>Dummy</th>
<th>3 year</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sled Velocity (avg., ft/sec)</th>
<th>29.31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sled Acceleration (avg. g's)</td>
<td>16.6</td>
</tr>
</tbody>
</table>

| Belt Loads (peak pounds): | Right Lap | | Left Lap | 80 | Shoulder | 0 |
|----------------------------|--|---|---|---|---|

**Impact Direction:** Rear  
**Seat:** Standard

**Test Observations:** The Volkswagen belt system does not allow a pre-load. Consequently, in contrast to the preceding test, the Tot Guard rotated underneath the belt (aided by the shoulder belt) and allowed the dummy and Tot Guard to fall to the floor upon rebound.
Test No. A-795

Figure D-43  Graph-Check Camera Sequence
Test Number: A-095
Dummy: Sierra 3yr
Sled Velocity: 29.3 ft/sec

SUMMARY DATA HEAD ACCELERATIONS

Test Type: REAR
Test Guard: STANDARD

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000

1-12.5 ms
Test Number A 795
Dummy Sierra 3yr
Sled Velocity 29.31 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Superior-Inferior Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Left-Right Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Resultant Chest Accelerations
12.5 g's/Division
Filtered
Class 180

SUMMARY DATA CHEST ACCELERATIONS
Test Type Rear
Felt Guard
Standard

BRUSH ACCUCHART

1-12.5 MSEC
**Test Number:** A-796  
**Test Date:** 9-8-74  
**Restraint Description:** Bobby Mac (infant) (passenger side)  
**Harness Configurations:** GM retractor

<table>
<thead>
<tr>
<th>Dummy</th>
<th>6 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sled Velocity (avg., ft/sec)</td>
<td>30.18</td>
</tr>
<tr>
<td>Sled Acceleration (avg. g's)</td>
<td>13.8 Compliance Trapezoidal</td>
</tr>
</tbody>
</table>
| Belt Loads (peak pounds):      | Right Lap 225  
|                                  | Left Lap 150  
|                                  | Shoulder 0    |
| Impact Direction:              | Side |
| Seat                        | Standard |

**Test Observations:** The GM belt restraint system worked well. No Graph-check photo.
Figure D-44  Test Setup for A-796
<table>
<thead>
<tr>
<th>Test Number</th>
<th>Dummy</th>
<th>Sled Velocity</th>
<th>Filtered</th>
</tr>
</thead>
<tbody>
<tr>
<td>A796</td>
<td>6 MONTH</td>
<td>30.1 ft/sec</td>
<td>Class 60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Sled Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side</td>
<td>5 g's/Division</td>
</tr>
<tr>
<td>Bobby Mac</td>
<td>Standard</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anterior-Posterior Head Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 g's/Division Filtered Class 1000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Superior-Inferior Head Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 g's/Division Filtered Class 1000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Left-Right Head Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 g's/Division Filtered Class 1000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resultant Head Accelerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 g's/Division Filtered Class 1000</td>
</tr>
</tbody>
</table>
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-797
Test Date: 9-8-74
Restraint Description: Bobby Mac infant (passenger side)
Harness Configurations: GM retractor, lap belt only

Dummy 6 month

Sled Velocity (avg., ft/sec) 29.83
Sled Acceleration (avg. g's) 16.2 Qualifying Trapezoidal

Belt Loads (peak pounds):

<table>
<thead>
<tr>
<th>Belt Type</th>
<th>Load (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Lap</td>
<td>250</td>
</tr>
<tr>
<td>Left Lap</td>
<td>150</td>
</tr>
<tr>
<td>Shoulder</td>
<td>0</td>
</tr>
</tbody>
</table>

Impact Direction: Side
Seat Standard

Test Observations: The GM belt restraint system worked well.
Test No. A-797

Figure D-46  Graph-Check Camera Sequence
### SUMMARY DATA HEAD ACCELERATIONS

<table>
<thead>
<tr>
<th>Test Number</th>
<th>Dummy</th>
<th>Sled Velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 797</td>
<td>6 month</td>
<td>29.83 ft/sec</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Side</th>
<th>Sled Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>Bobby</td>
<td>5 g's/Division</td>
</tr>
</tbody>
</table>

- **Anterior-Posterior**
  - Head Accelerations
  - 25 g's/Division
  - Filtered
  - Class 1000

- **Superior-Inferior**
  - Head Accelerations
  - 25 g's/Division
  - Filtered
  - Class 1000

- **Left-Right**
  - Head Accelerations
  - 25 g's/Division
  - Filtered
  - Class 1000

- **Resultant Head**
  - Accelerations
  - 10 g's/Division
  - Filtered
  - Class 1000
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-798
Test Date: 9-8-74
Restraint Description: Peterson 75 Child seat (passenger side)
Harness Configurations: GM retractor, lap belt only

Dummy 3 year
Sled Velocity (avg., ft/sec) 25.59
Sled Acceleration (avg. g's) 16.1 Qualifying Trapezoidal

Belt Loads (peak pounds):
- Right Lap 450
- Left Lap 150
- Shoulder 220

Impact Direction: Side
Seat Standard

Test Observations: In side impacts, the presence of the integral GM shoulder belt beside the Peterson seat tends to lower resultant head and child seat excursion in the direction of the impact. The GM belt restraint system worked well.
Test No. A-798

Figure D-48  Graph-Check Camera Sequence
<table>
<thead>
<tr>
<th>Test Number</th>
<th>A-798</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dummy</td>
<td>Sierra 3yr</td>
</tr>
<tr>
<td>Sled Velocity</td>
<td>25.59 ft/sec</td>
</tr>
</tbody>
</table>

**SUMMARY DATA HEAD ACCELERATIONS**

- **Test Type**: Peterson
- **Side**: Standard

### Sled Pulse
- 5 g's/Division
- Filtered
- Class 60

### Anterior-Posterior Head Accelerations
- 25 g's/Division
- Filtered
- Class 1000

### Superior-Inferior Head Accelerations
- 25 g's/Division
- Filtered
- Class 1000

### Left-Right Head Accelerations
- 25 g's/Division
- Filtered
- Class 1000

### Resultant Head Accelerations
- 10 g's/Division
- Filtered
- Class 1000

1-12.5 ms
SUMMARY DATA CHEST ACCELERATIONS

Test Number A798
Dummy Sierra 3yr
Sled Velocity 25.59 ft/sec

Test Type Cide
Peterson
Standard

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Superior-Inferior
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Left-Right
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Resultant Chest Accelerations
10 g's/Division
Filtered
Class 180

1-12.5 msec
**HSRI CHILD SEAT DATA SUMMARY**

**Test Number:** A-799

**Test Date:** 9-9-74

**Restraint Description:** GM Child Love Seat (passenger side)

**Harness Configurations:** Chrysler Retractor, Double belt prevented left lap belt load measurement

**Dummy:** 3 year

**Sled Velocity (avg., ft/sec):** 29.89

**Sled Acceleration (avg. g's):** 16.2 Qualifying trapezoidal

**Belt Loads (peak pounds):**
- Right Lap: 560
- Left Lap: 0
- Shoulder: 200

**Impact Direction:** Side

**Seat:** Standard

**Test Observations:** In this side impact, the presence of the integral Chrysler shoulder belt beside the Love Seat reduced head and seat excursions. The Chrysler belt restraint system worked well.
Figure D-49   Test Setup for A-799
Test No. A-799

Figure D-50
Graph-Check Camera Sequence
Test Number A-099
Dummy Sierra 3yr
Sled Velocity 29.8 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000

SUMMARY DATA HEAD ACCELERATIONS
Test Type Side
LOVE SEAT
STANDARD
Test Number: A-799
Dummy: Sierra 3 yr
Sled Velocity: 29.89 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Chest Accelerations
1/2 g's/Division
Filtered
Class 180

Superior-Inferior
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Left-Right
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Resultant Chest
Accelerations
12.5 g's/Division
Filtered
Class 180

12.5 MSEC
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-800
Test Date: 9-9-74
Restraint Description: Ford Tot Guard (passenger side)
Harness Configurations: Volkswagen retractor, cable prevented inboard lap belt load measurement

Dummy 3 year

Sled Velocity (avg., ft/sec) 29.78
Sled Acceleration (avg. g's) 16.2 Qualifying Trapezoidal

Belt Loads (peak pounds):

<table>
<thead>
<tr>
<th>Type</th>
<th>Right Lap</th>
<th>Left Lap</th>
<th>Shoulder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>450</td>
<td>-</td>
<td>150</td>
</tr>
</tbody>
</table>

Impact Direction: Side

Seat Standard

Test Observations: The Volkswagen belt restraint system worked well. The belts cannot be preloaded.
Test No. A-800

Figure D-52  Graph-Check Camera Sequence
Test Number A-800

Dummy Sierra 3 yr
Sled Velocity 27.98 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000
Test Number: 800
Dummy: Sierra 3 yr
Sled Velocity: 29.78 ft/sec

Sled Pulse
$\Delta g's$ / Division
Filtered
Class: 60

Anterior-Posterior Chest Accelerations
$12.5 g's$ / Division
Filtered
Class: 180

Superior-Inferior Chest Accelerations
$12.5 g's$ / Division
Filtered
Class: 180

Left-Right Chest Accelerations
$10 g's$ / Division
Filtered
Class: 180

Resultant Chest Accelerations
$10 g's$ / Division
Filtered
Class: 180

-12.5 MSEC
Test Number: A-801
Test Date: 9-9-74
Restraint Description: GM Infant Carrier (passenger side)
Harness Configurations: GM lap belt only

Dummy 6 month
Sled Velocity (avg., ft/sec) 44.94
Sled Acceleration (avg. g's) 21 (HSRI standard)
Belt Loads (peak pounds):
   Right Lap 600
   Left Lap 600
   Shoulder NI
Impact Direction: Front
Seat Production - restrained

Test Observations: The GM belt restraint system worked well.
Test No. A-801

Figure D-54  Graph-Check Camera Sequence
Test Number A 801
Dummy 6 MONTH
Sled Velocity 44.74 ft/sec

Sled Pulse
5 g/s/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-802

Test Date: 9-9-74

Restraint Description: GM Infant Carrier (passenger side)

Harness Configurations: GM lap belt, no retractor

Dummy 6 month

Sled Velocity (avg., ft/sec) 30.10

Sled Acceleration (avg. g's) 17.8 HSRI (Standard)

Belt Loads (peak pounds):

<table>
<thead>
<tr>
<th>Belt</th>
<th>Right Lap</th>
<th>Left Lap</th>
<th>Shoulder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30.0</td>
<td>125</td>
<td>NI</td>
</tr>
</tbody>
</table>

Impact Direction: Side

Seat Production - restrained

Test Observations: The left harness slipped off dummy. The GM belt restraint system worked well.
Test No. A-802

Figure D-56  Graph-Check Camera Sequence
<table>
<thead>
<tr>
<th>Test Number</th>
<th>A-9C2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dummy</td>
<td>6 MTH</td>
</tr>
<tr>
<td>Sled Velocity</td>
<td>30.10 ft/sec</td>
</tr>
</tbody>
</table>

**SUMMARY DATA HEAD ACCELERATIONS**

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM 11F11FC</td>
<td>IMPALA</td>
</tr>
</tbody>
</table>

**Sled Pulse**
- 5 g's/Division
- Filtered
- Class 60

**Anterior-Posterior**
- Head Accelerations
- 25 g's/Division
- Filtered
- Class 1000

**Superior-Inferior**
- Head Accelerations
- 25 g's/Division
- Filtered
- Class 1000

**Left-Right**
- Head Accelerations
- 25 g's/Division
- Filtered
- Class 1000

**Resultant Head**
- Accelerations
- 10 g's/Division
- Filtered
- Class 1000
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-803
Test Date: 9-9-74
Restraint Description: GM Infant Carrier (driver side)
Harness Configurations: GM lap belt, no retractor

Dummy: 6 month

Sled Velocity (avg., ft/sec): 29.92
Sled Acceleration (avg. g's): 17.6 (HSRI standard)
Belt Loads (peak pounds):
- Right Lap: 150
- Left Lap: 150
- Shoulder: NI

Impact Direction: Rear
Seat: Production - restrained

Test Observations: Child system worked well.
Test No. A-803

Figure D-58  Graph-Check Camera Sequence
Test Number: 403
Dummy: 6 MONTH
Sled Velocity: 29.92 ft/sec

SUMMARY DATA HEAD ACCELERATIONS

Test Type: HEAR
G.M. INFANT CARRIER
IMORA

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-804
Test Date: 9-10-74
Restraint Description: Ford Tot Guard (driver side)
Harness Configurations: Volkswagen retractor, cable prevented right belt load measurement.

Dummy: 3 year
Sled Velocity (avg., ft/sec) 29.80
Sled Acceleration (avg. g's) 17.0 Qualifying trapezoidal
Belt Loads (peak pounds):
   Right Lap  NI
   Left Lap  90
   Shoulder  80
Impact Direction: Rear
Seat: Production - unrestrained

Test Observations: Same configuration as test A-794.
Figure D-59  Test Setup of A-804
Test Number A-804
Dummy Sierra S-Yr
Sled Velocity 29.80 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000

SUMMARY DATA HEAD ACCELERATIONS

Test Type REAR
Tot Guard Impala
SUMMARY DATA CHEST ACCELERATIONS

Test Number A 804  
Dummy Sierra 3 yr  
Sled Velocity 29.80 ft/sec

Test Type REAC  
Tot Guard Impala

Sled Pulse  
5 g's/Division  
Filtered  
Class 60

Anterior-Posterior Chest Accelerations  
1.5 g's/Division  
Filtered  
Class 180

Superior-Inferior Chest Accelerations  
1.5 g's/Division  
Filtered  
Class 180

Left-Right Chest Accelerations  
1.5 g's/Division  
Filtered  
Class 180

Resultant Chest Accelerations  
1.5 g's/Division  
Filtered  
Class 180

1-12.5 MSEC
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-805
Test Date: 9-10-74
Restraint Description: Ford Tot Guard (passenger side)
Harness Configurations: GM retractor

Dummy: 3 year

Sled Velocity (avg., ft/sec) 43.71
Sled Acceleration (avg. g's) 23.2 (Qualifying trapezoidal)

Belt Loads (peak pounds):
- Right Lap 870
- Left Lap 1050
- Shoulder 500

Impact Direction: Front
Seat: Production - unrestrained

Test Observations: The GM belt restraint system worked well.
Test No. A-805

Figure D-63  Graph-Check Camera Sequence
Test Number: A-805
Dummy: Sierra 3yr
Sled Velocity: 43.7 ft/sec

SUMMARY DATA HEAD ACCELERATIONS

Test Type: Front
Tot Guard: Impala

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000

1-12.5 MSEC
HSRI CHILD SEAT DATA SUMMARY

Test Number: A-806
Test Date: 9-10-74
Restraint Description: Ford Tot Guard (passenger side)
Harness Configurations: GM retractor

Dummy: 3 year
Sled Velocity (avg., ft/sec): 45.85
Sled Acceleration (avg. g's): 22.4 (qualifying trapezoidal)
Belt Loads (peak pounds):
- Right Lap: 570
- Left Lap: 1060
- Shoulder: 800
Impact Direction: Front
Seat: Production unrestrained

Test Observations: The GM belt restraint system worked well. Forward, on rebound, the tot-guard came out from under the belt system (See Post impact photo.)
Test No. A-806

Figure D-65  Graph-Check Camera Sequence
Test Number: A-806
Dummy: Sierra 3 yr.
Sled Velocity: 45.85 ft/sec

SUMMARY DATA HEAD ACCELERATIONS

Test Type: Front
Tol Gaurd

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head Accelerations
10 g's/Division
Filtered
Class 1000

1-12.5 MSE
SUMMARY DATA CHEST ACCELERATIONS

Test Number A 806
Dummy Sierra 3yr
Sled Velocity 45.85 ft/sec

Test Type Front
Tot Guard

Sled Pulse
5 g's/Division
Filtered
Class 50

Anterior-Posterior
Chest Accelerations
1.0 g's/Division
Filtered
Class 180

Superior-Inferior
Chest Accelerations
1.0 g's/Division
Filtered
Class 180

Left-Right
Chest Accelerations
1.0 g's/Division
Filtered
Class 180

Resultant Chest Accelerations
10 g's/Division
Filtered
Class 180

-12.5 MSEC
**HSRI CHILD SEAT DATA SUMMARY**

**Test Number:** A-807  
**Test Date:** 9-10-74  
**Restraint Description:** Tot Guard (passenger side)  
**Harness Configurations:** GM retractor  

<table>
<thead>
<tr>
<th>Dummy</th>
<th>3 year</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sled Velocity (avg., ft/sec)</th>
<th>44.85</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sled Acceleration (avg. g's)</th>
<th>20.4 Compliance Trapezoidal</th>
</tr>
</thead>
</table>

| Belt Loads (peak pounds): | Right Lap | 650  
|---------------------------|-----------|
|                            | Left Lap  | 960  
|                            | Shoulder  | 800  |

<table>
<thead>
<tr>
<th>Impact Direction:</th>
<th>Front</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Seat</th>
<th>Production-unrestrained</th>
</tr>
</thead>
</table>

**Test Observations:** The GM belt restraint system worked well. No graph-check photo.
Test Number: A-809
Dummy: Sierra 3yr
Sled Velocity: 44.85 ft/sec

**SUMMARY DATA HEAD ACCELERATIONS**

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Front</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Guard</td>
<td>Impala</td>
</tr>
</tbody>
</table>

**Sled Pulse**
- 5 g's/Division
- Filtered
- Class 60

**Anterior-Posterior**
- Head Accelerations
- 25 g's/Division
- Filtered
- Class 1000

**Superior-Inferior**
- Head Accelerations
- 25 g's/Division
- Filtered
- Class 1000

**Left-Right**
- Head Accelerations
- 25 g's/Division
- Filtered
- Class 1000

**Resultant Head**
- Accelerations
- 10 g's/Division
- Filtered
- Class 1000

**Graphs**

1-12.5 msec
SUMMARY DATA CHEST ACCELERATIONS

Test Number: A07
Dummy: Sierra 3yr
Sled Velocity: 44.85 ft/sec

Test Type:
- Tot Guard
- Impala

Sled Pulse
5 g's/Division
Filtered
Class: 60

Anterior-Posterior
Chest Accelerations
1.25 g's/Division
Filtered
Class: 180

Superior-Inferior
Chest Accelerations
1.25 g's/Division
Filtered
Class: 180

Left-Right
Chest Accelerations
1.25 g's/Division
Filtered
Class: 180

Resultant Chest
Accelerations
1/3 g's/Division
Filtered
Class: 180

- 12.5 msec
Test Number: A-808
Test Date: 9-10-74
Restraint Description: Ford Tot Guard (passenger side)
Harness Configurations: GM retractor

Dummy 3 year
Sled Velocity (avg., ft/sec) 44.15
Sled Acceleration (avg. g's) 19.2 compliance trapezoidal
Belt Loads (peak pounds):
- Right Lap 650
- Left Lap 950
- Shoulder 700
Impact Direction: Front
Seat Production - unrestrained

Test Observations: The GM belt restraint system worked well.
Figure D-69  Test Setup of A-808
Test No. A-808

Figure D-70  Graph-Check Camera Sequence
Test Number: A-809

Dummy: Sierra 3 yr

Sled Velocity: 44.15 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000
<table>
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<th>Test Number</th>
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<tbody>
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<td>Sled Velocity</td>
<td>44.15 ft/sec</td>
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<tr>
<td><strong>Test Type</strong></td>
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<tr>
<td><strong>Ford Jet Guard</strong></td>
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<td><strong>Production</strong></td>
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<td><strong>Sled Pulse</strong></td>
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<td><strong>5g's/Division</strong></td>
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<tr>
<td><strong>Filtered</strong></td>
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</tr>
<tr>
<td><strong>Class 60</strong></td>
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<td><strong>Anterior-Posterior Chest Accelerations</strong></td>
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<td><strong>25g's/Division</strong></td>
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<tr>
<td><strong>Filtered</strong></td>
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<tr>
<td><strong>Class 180</strong></td>
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<td><strong>Superior-Inferior Chest Accelerations</strong></td>
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<tr>
<td><strong>25g's/Division</strong></td>
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<tr>
<td><strong>Filtered</strong></td>
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<tr>
<td><strong>Class 180</strong></td>
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</thead>
<tbody>
<tr>
<td><strong>Left-Right Chest Accelerations</strong></td>
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<td><strong>25g's/Division</strong></td>
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<tr>
<td><strong>Filtered</strong></td>
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<td><strong>Class 180</strong></td>
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<tr>
<td><strong>Resultant Chest Accelerations</strong></td>
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<tr>
<td><strong>10g's/Division</strong></td>
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<tr>
<td><strong>Class 180</strong></td>
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</table>

- 1-12.5 MSEC
### HSRI CHILD SEAT DATA SUMMARY

**Test Number:** A-81

**Test Date:** 

**Restraint Description:** Ford Tot Guard (passenger side)

**Harness Configurations:** GM retractor

---

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<tr>
<th>Dummy</th>
<th>3 year</th>
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<td>Sled Velocity (avg., ft/sec)</td>
<td>45.52</td>
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<tr>
<td>Sled Acceleration (peak g's)</td>
<td>26 Qualifying half sine</td>
</tr>
</tbody>
</table>

**Belt Loads (peak pounds):**
- Right Lap: 650
- Left Lap: 900
- Shoulder: 700

**Impact Direction:** Front

**Seat:** Production, unrestrained

**Test Observations:** The GM belt restraint system worked well.
TEST NO. A-811

Figure D-72 Graph-Check Camera Sequence
Test Number: A-811
Dummy: Sierra 3 Year
Sled Velocity: 55.52 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000

IMPALA SEAT
FORD SLED GUARD
FRONT
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<td>Dummy</td>
<td>Sierra 3yr</td>
</tr>
<tr>
<td>Sled Velocity</td>
<td>ft/sec</td>
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</table>

<table>
<thead>
<tr>
<th>Sled Pulse</th>
<th>5 g's/Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtered</td>
<td>Class 60</td>
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### Summary Data Chest Accelerations

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<thead>
<tr>
<th>Test Type</th>
<th>Front</th>
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<tbody>
<tr>
<td>Ford Tot</td>
<td>Guard</td>
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<tr>
<td>Impala</td>
<td></td>
</tr>
</tbody>
</table>

**Anterior-Posterior Chest Accelerations**

- 25 g's/Division
- Filtered
- Class 180

**Superior-Inferior Chest Accelerations**

- 25 g's/Division
- Filtered
- Class 180

**Left-Right Chest Accelerations**

- 25 g's/Division
- Filtered
- Class 180

**Resultant Chest Accelerations**

- 10 g's/Division
- Filtered
- Class 180

Gould Inc., Instrument Systems Division

- 12.5 MSEC
Test Number: A-812

Test Date: 

Restraint Description: Ford Tot Guard (passenger side)

Harness Configurations: GM retractor

Dummy: 3 year

Sled Velocity (peak ft/sec): 44.85

Sled Acceleration (avg. g's): 28.8 Qualifying half sine

Belt Loads (peak pounds):
- Right Lap: 625
- Left Lap: 950
- Shoulder: 750

Impact Direction: Front

Seat: Standard

Test Observations: The GM belt restraint system worked well.
TEST NO. A-812

Figure D-74  Graph-Check Camera Sequence
SUMMARY DATA HEAD ACCELERATIONS

Test Number: A-912
Test Type: FRONT

Dummy: SIERRA 3 YEAR
Ford: TOT GUARD
Standard Seat

Sled Velocity: 44.85 ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Superior-Inferior
Head Accelerations
25 g's/Division
Filtered
Class 1000

Left-Right
Head Accelerations
25 g's/Division
Filtered
Class 1000

Resultant Head
Accelerations
10 g's/Division
Filtered
Class 1000
Test Number: A812
Dummy: Sierra 3yr
Sled Velocity: ft/sec

Sled Pulse
5 g's/Division
Filtered
Class 60

Anterior-Posterior
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Superior-Inferior
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Left-Right
Chest Accelerations
12.5 g's/Division
Filtered
Class 180

Resultant Chest Accelerations
10 g's/Division
Filtered
Class 180

SUMMARY DATA CHEST ACCELERATIONS
Test Type: Ford Top Guard
Standard

1-12.5 msec