# CONFIDENTIAL

INVACARE REA AB

ISO 7176/19
WHEELCHAIR DYNAMIC CRASH
HYGE SLED TEST

WHEELER – TRANSPORT COMFORT

TEST DATE: 18TH JUNE 2001
MILLBROOK TEST No.: S7461
MILLBROOK REPORT No.: MBK 01/0408

## DISTRIBUTION

| | | |
|---|---|---|
| Invacare REA AB.: | Goran Nillson | (1 Copy) |
| Millbrook P.G.: | Safety Test Laboratory | (Originals) |
| | Contract File | (B/W Photocopies) |

## TEST DESCRIPTION

| | |
|---|---|
| Test No.: | S7461 |
| Test Date: | 18th June 2001 |
| Test Type: | ISO 7176/19 Wheelchair Dynamic Crash Test |
| Occupant: | HIII 5th Percentile (53 kg). |
| Wheelchair Type: | Wheeler – Transport Comfort (Less Foot Straps) |
| Restraint System: | Unwin<br>Occupant: WWR/SW/ATS/R<br>Wheelchair: WWR/3H/ATF/FA/WH |

## CONTENTS



Prepared by: _____ Date : 16 July 2001
B. Appleyard – Senior Engineer

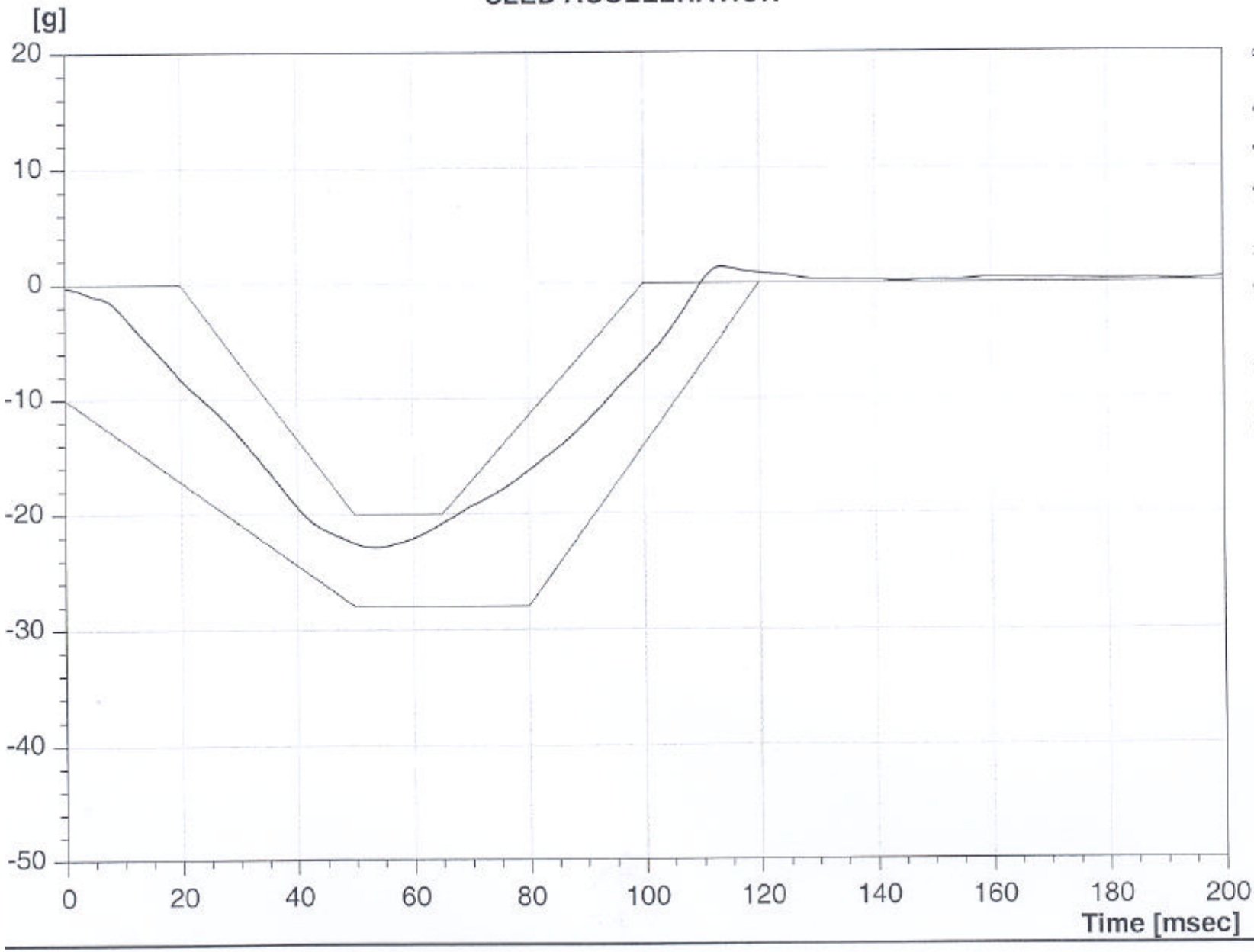
Approved by: _____ Date : 16 JULY '01
P. Glyn-Davies - Manager

PRELIMINARY DATA

MILLBROOK

CRASH TEST LABORATORIES

## SLED ACCELERATION




Customer : Invacare
: (Sweden)

Test Number: S7461

Test Date : 18 June 2001

Test Type : ISO/FDIS 7176/19
: Dynamic Test

Dummy Type : Hybrid III 5%ile

Wheelchair : Wheeler
: Transport Comfort
: No Shoe Straps

Restraints : Unwin

Test Eng. : G. Nilsson
Millbrook : B. Appleyard

**Sled Pulse Criteria - Acceptable**

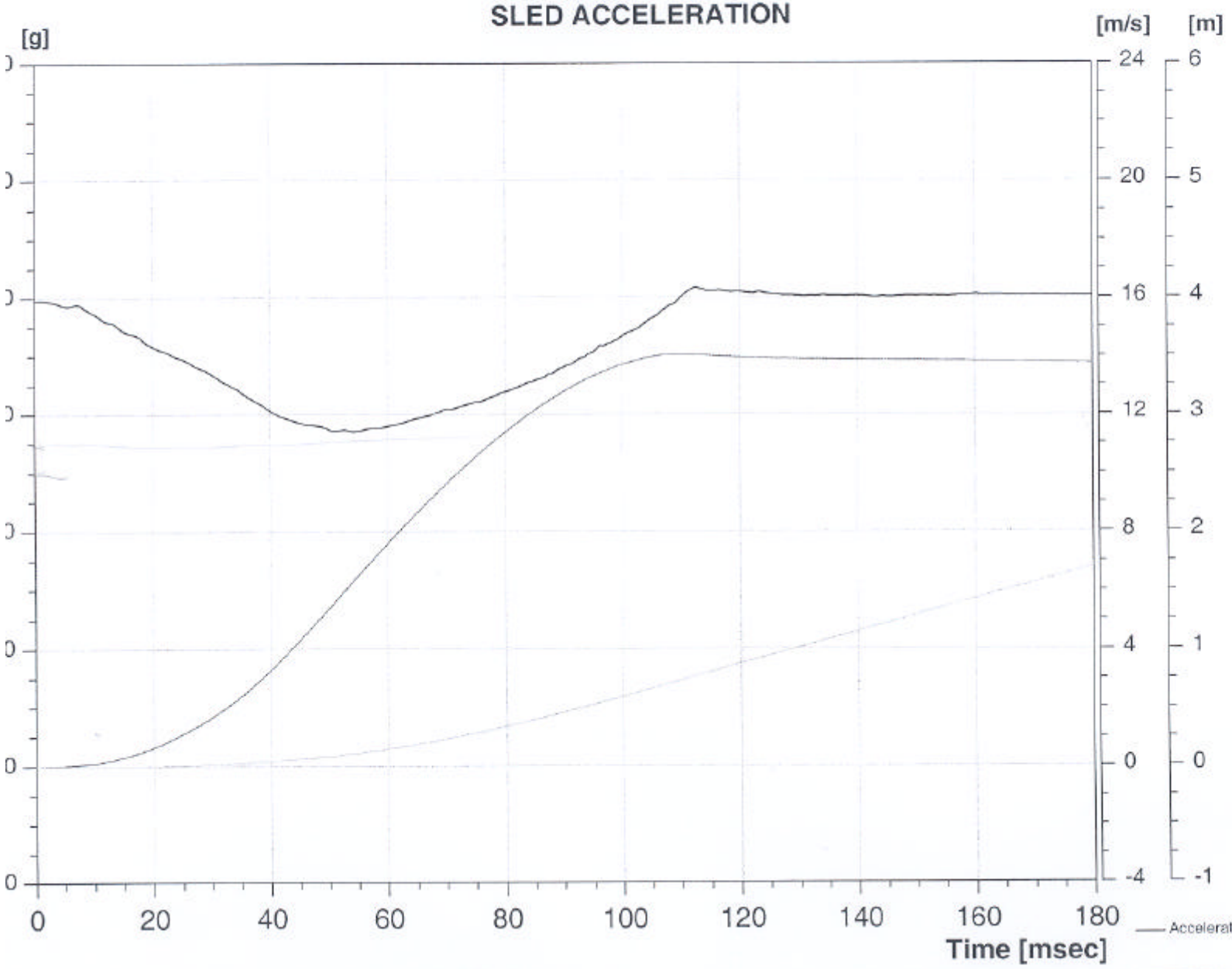
Filter : CFC 60 (SAE J211)
CAC : 200.67 [g]
Sensor ID : ZU41
Max Value : 1.39 g [113.5 msec]
Min Value : -22.89 g [ 53.7 msec]
Plot Date : 18.06.2001 at 15:51:12

PRELIMINARY DATA

MILLBROOK

CRASH TEST LABORATORIES

## SLED ACCELERATION




Customer : Invacare
: (Sweden)

Test Number: S7461

Test Date : 18 June 2001

Test Type : ISO/FDIS 7176/19
: Dynamic Test

Dummy Type : Hybrid III 5%ile

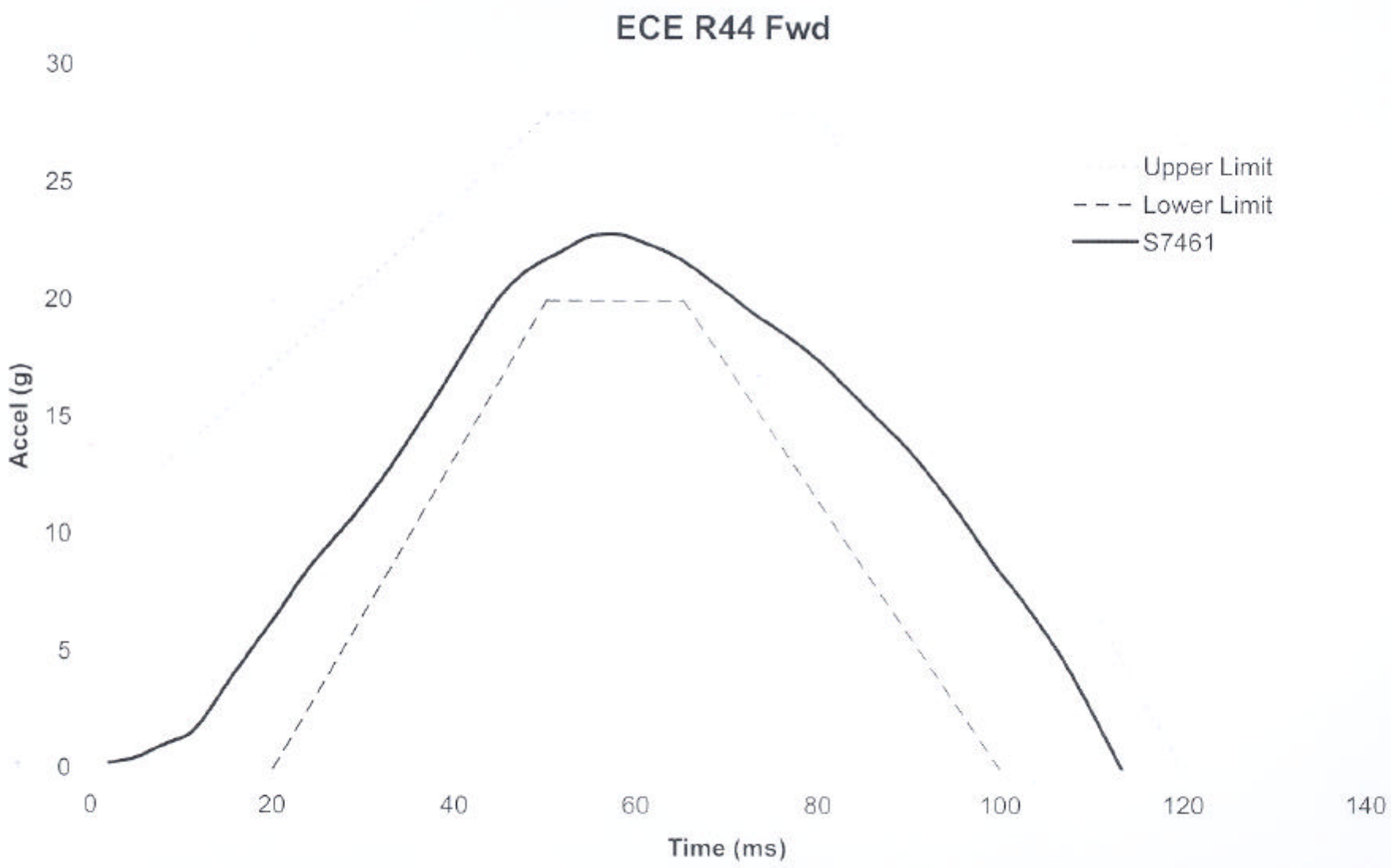
Wheelchair : Wheeler
: Transport Comfort
: No Shoe Straps

Restraints : Unwin

Test Eng. : G. Nilsson
Millbrook : B. Appleyard

Filter : CFC 180 (SAE J211)
CAC : 200.67 [g]
Sensor ID : ZU41

**Acceleration**
Max Value : 1.66 g [112.5 msec]
Min Value : -22.99 g [ 54.4 msec]
**Velocity**
Max Value : 14.04 m/s [110.0 msec]
Min Value : 0.00 m/s [ 0.1 msec]
**Displacement**
Max Value : 12.03 m [1016.9 msec]
Min Value : 0.00 m [ 0.1 msec]
Plot Date : 18.06.2001 at 15:51:19


ECE R44 Fwd
Upper Limit
Lower Limit
S7461
Accel (g)
30
25
20
15
10
5
0
0
20
40
60
80
100
120
140
Time (ms)

# Test Results

## ISO/FDIS 7176/19
## (07/NOV/2000)

## Section 5 - Dynamic Performance Requirements

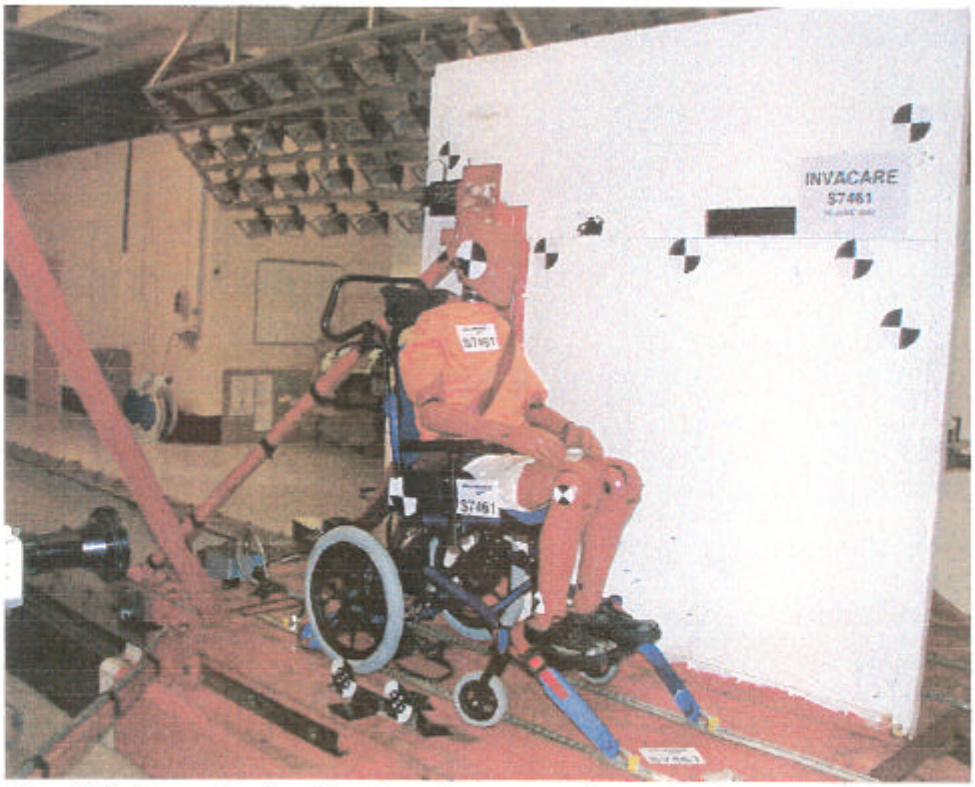
| WHEELCHAIR | Wheeler – Transport Comfort (Less Foot Straps) | RESULTS |
|---|---|---|
| 5.2.1 | **During the Test** | |
| 5.3.1 | a). Horizontal ATD and wheelchair excursion limits as per limits shown in Table 3:- | |
| | Was the horizontal movement of the test wheelchair P- Point (X wc) less than 200 mm. (±5mm) | PASS 81mm |
| | Was the horizontal movement of the dummy knee (X knee) less than 375 mm. (±5mm) | PASS 168mm |
| | Was the horizontal movement of the dummy head (X head) less than 650 mm. (±5mm) | PASS 290mm |
| | b). Was the ratio X knee/X wc >1.1 | PASS 2.1:1 |
| | c). Not Measured | |
| | d). Did the batteries of powered wheelchairs, or their surrogate parts:- | N/A |
| | i). move outside of the wheelchair footprint | N/A |
| | ii). move into the wheelchair user's space | N/A |
| 5.2.2 | **Post Test** | |
| 5.3.2 | a). Did the wheelchair remain upright on the test platform<br>Did the ATD remain in a seated posture in the test wheelchair with a torso angle less that 45° | PASS<br>PASS |
| | b). Did the wheelchair securement points show visible signs of material failure | PASS |
| | c). Did any components of a mass greater that 100g become detached from the wheelchair | PASS |
| | d). Did any occupant contactable components fragment or separate with an edge of less than 2mm | PASS |
| | e). Did any primary load carrying components of the wheelchair show any visible signs of failure | PASS |
| | f). Did any 'tilt in space' locking mechanisms show signs of failure | PASS |
| | g). Was the ATD released without the use of tools | PASS |
| | f). Was the wheelchair released from the restraint system without the use of tools | PASS |
| | h). Was the average decrease of H-Point height relative to the wheelchair platform less than 20% of the pre-test height. | PASS 5% |
| Has the wheelchair satisfied the Dynamic Test requirements of ISO/FDIS 7176/19 of 07/November/2000 | | PASS |

Invacare REA AB S7461

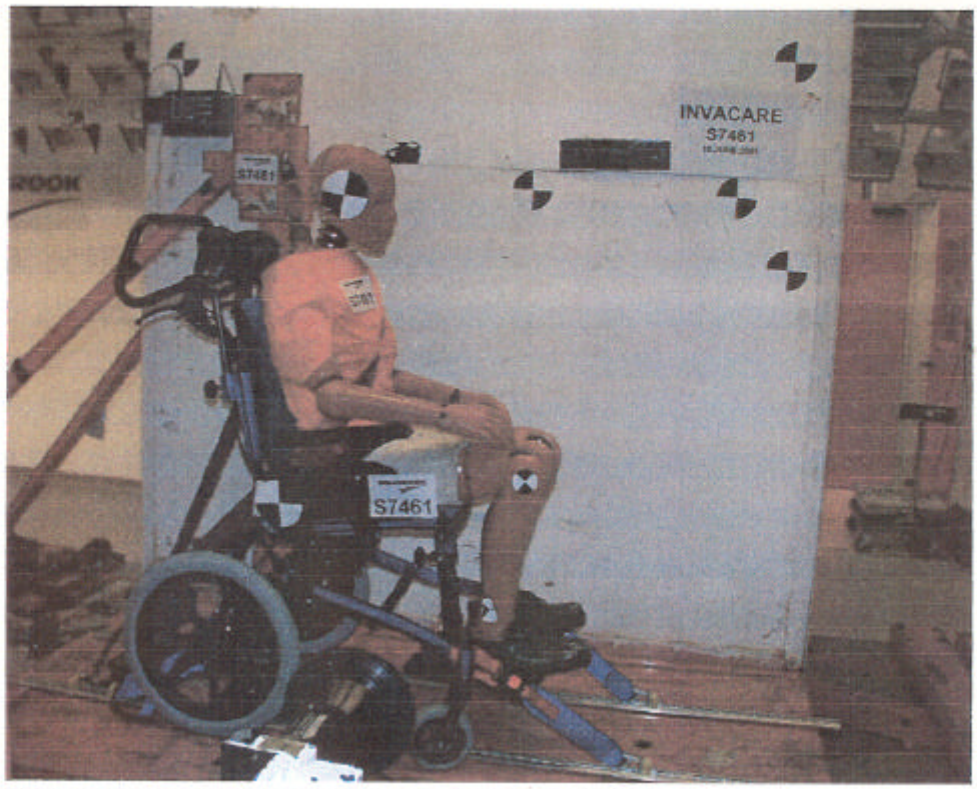
# TRANSDUCER CALIBRATION REPORT

| Chan No. | Channel Description | Transducer Make | Transducer Model | Trans No. | CFC | CAC | Calibration Date | In Cal |
|---|---|---|---|---|---|---|---|---|
| 3 | SLED ACCELERATION | ENDEVCO | 2262C-200 | ZU41 | 1000 | 201 | 13-Jul-2000 | Yes |


Front view of wheelchair and occupant, pre-test




Front ¾ view of wheelchair and occupant, pre-test

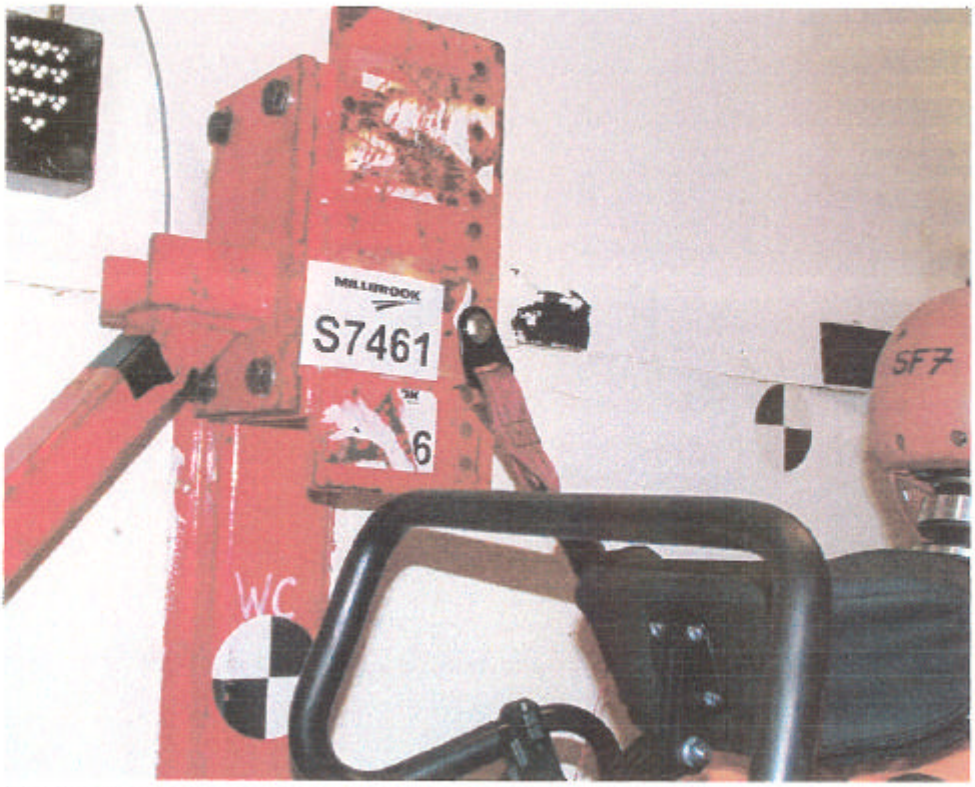



RH view of wheelchair and occupant, pre-test


Rear view of wheelchair and occupant, pre-test

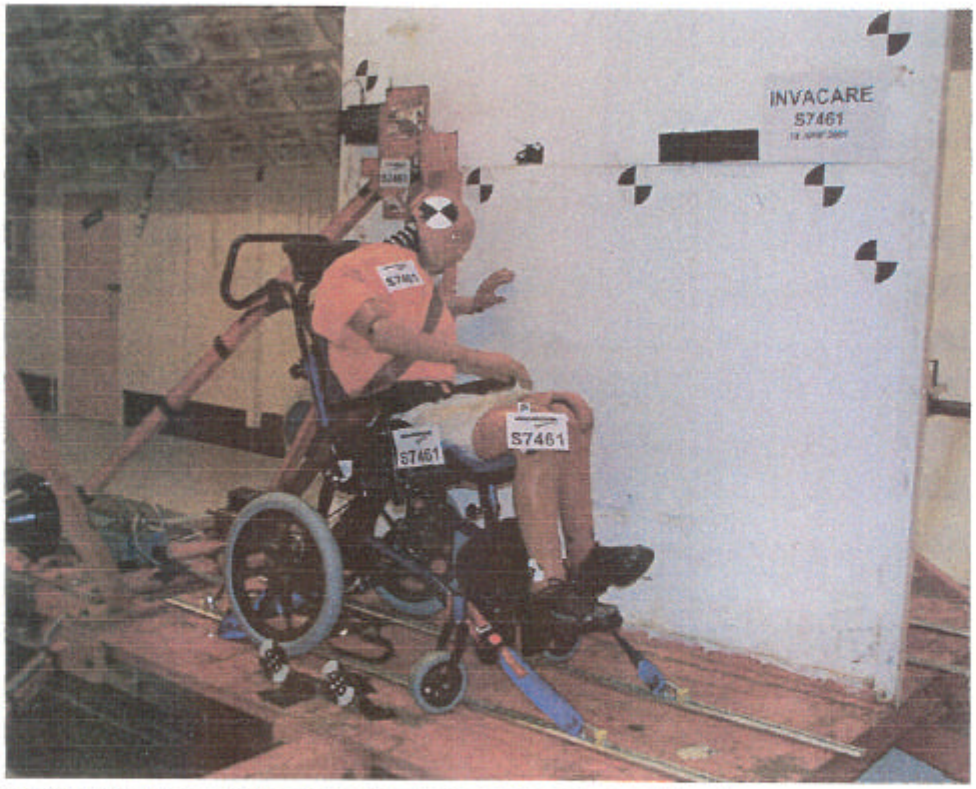

View of wheelchair front tie-downs, pre-test


View of wheelchair rear tie-downs, pre-test



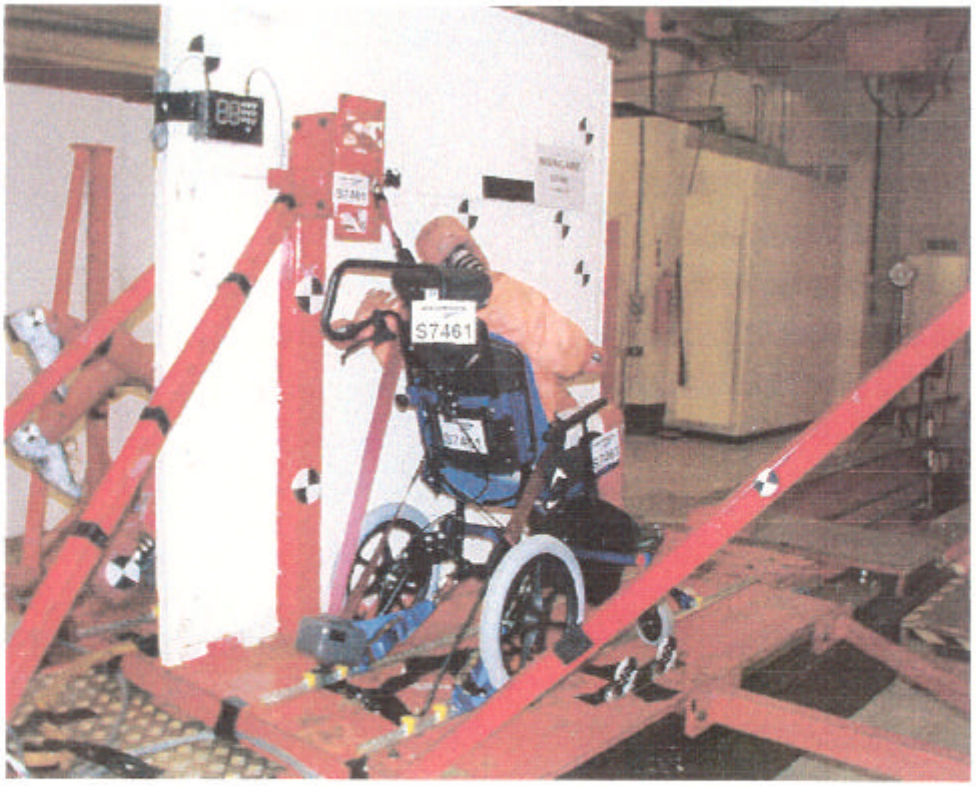

View of occupant upper torso anchorage, pre-test


Front view of wheelchair and occupant, post-test




Front ¾ view of wheelchair and occupant, post-test

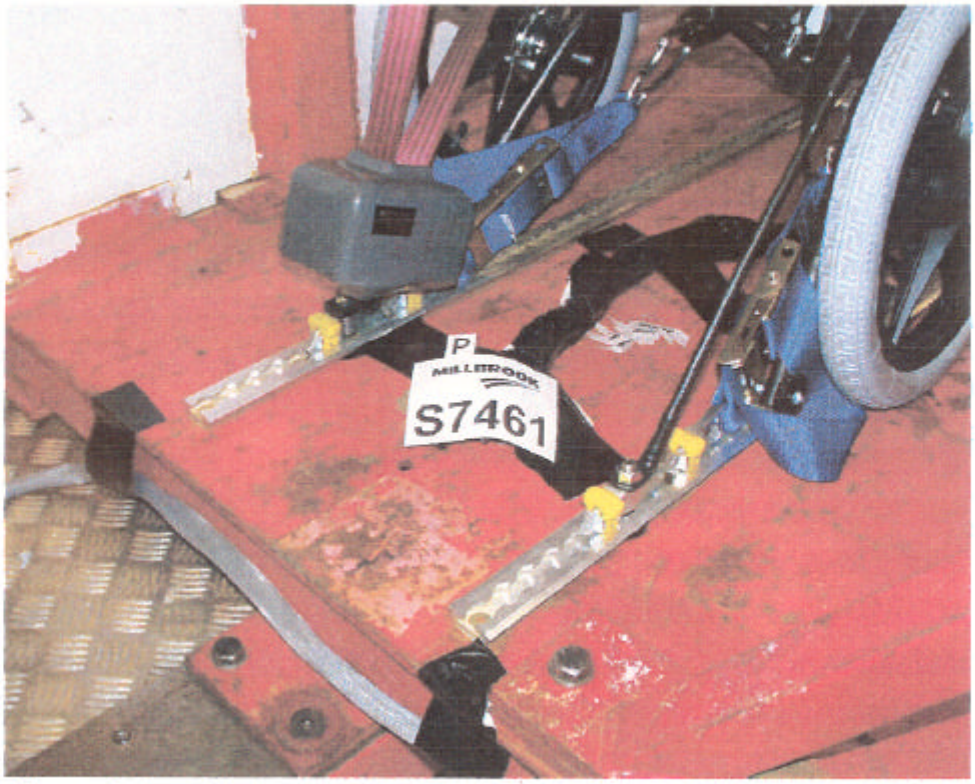

RH view of wheelchair and occupant, post-test




Rear ¾ view of wheelchair and occupant, post-test


Rear view of wheelchair and occupant, post-test


View of wheelchair front tie-downs, post-test




View of wheelchair rear tie-downs, post-test


View of occupant upper torso anchorage, post-test