

# Certificate of Crash Test according to

## **ISO 10542-1:2012 Wheelchair tiedown and occupant-restraint systems - SWM & ISO 7176-19 – 2008 Wheeled mobility devices for use as seats in motor vehicles**

This report serves solely as documentation for the test results. The tested objects have been selected by the client without the assistance of Dahl Engineering.

**Assignment:** Crash testing of wheelchair and WTORS according to ISO 7176-19 sections 5.2, 5.2.1 and 5.2.2. as well as ISO 10542 sections 5.2.4 and 5.2.5

**Date of testing:** 7 November 2019

**Test object/  
Wheelchair:** Meyra Orbit 1.618 with adaptation for Dahl docking system

**Mass of wheelchair:** 119,5 kg.

**Serial no:** Not informed

**WTORS:** Dahl WTORS that meet requirements set out in ISO 10542  
Wheelchair restraint system – Dahl Docking Station  
Occupant restraint – Dahl 3p. shoulder and lap belt #500984

**Test dummy/ATD:** The test was carried out using a Hybrid II 50% male dummy with a mass of 77 Kg.

**Measuring:** The deceleration was measured by accelerometers mounted on the crash test sled.

**Photography:** The test was filmed with a high speed camera at 500 fps. Still pictures, pre and post test, was also taken.

**Test results:** See page 2

**Sled deceleration**

**and speed:** See page with plotted graph and speed

| Section      | Details                                                                                                                                                       | X if correct |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>5.2.1</b> | <b>During the test</b>                                                                                                                                        |              |
|              | <b>Horizontal excursion limits</b>                                                                                                                            |              |
|              | Wheelchair point P $\leq$ 200 mm [Xwc]                                                                                                                        | 48mm         |
|              | ATD knee $\leq$ 375 mm[Xknee]                                                                                                                                 | 174mm        |
|              | ATD front of head $\leq$ 650 mm [XheadF]                                                                                                                      | 394mm        |
|              | ATD rear of head $\leq$ 450 [XheadR]                                                                                                                          | -341         |
|              | The knee excursion exceeded the wheelchair P point excursion                                                                                                  | X            |
|              | (Batteries on powered wheelchairs) did not move completely outside the wheelchair footprint or move into the wheelchair user's space or contact with ADT legs | X            |
| <b>5.2.2</b> | <b>After the test</b>                                                                                                                                         |              |
|              | The wheelchair remained in an upright position on the platform                                                                                                | X            |
|              | The ADT remained in the wheelchair with its torso at an angle of not more than 45° to the vertical, when viewed from any direction                            | X            |
|              | There were no visible signs of material failure on the wheelchair securing points                                                                             | X            |
|              | There were no components, fragments or accessories of the wheelchair with a mass of more than 100g that completely separated from the wheelchair              | X            |
|              | There were no fragmented or separated component, that may contact the occupant, produced with sharp edges less than radius 2 mm                               | X            |
|              | There were no visible signs of failure on the wheelchairs primary load carrying components                                                                    | X            |
|              | There were no visible signs of failure on the wheelchairs seat adjusters                                                                                      | X            |
|              | The ADT was removed from the wheelchair without the use of tools                                                                                              | X            |
|              | The wheelchair was released from the tie-down system without the use of tools                                                                                 | X            |
|              | The post test decrease of the mean H-point height is not more than 20%                                                                                        | X            |

The presented samples meet the requirements set out in the above mentioned standard.

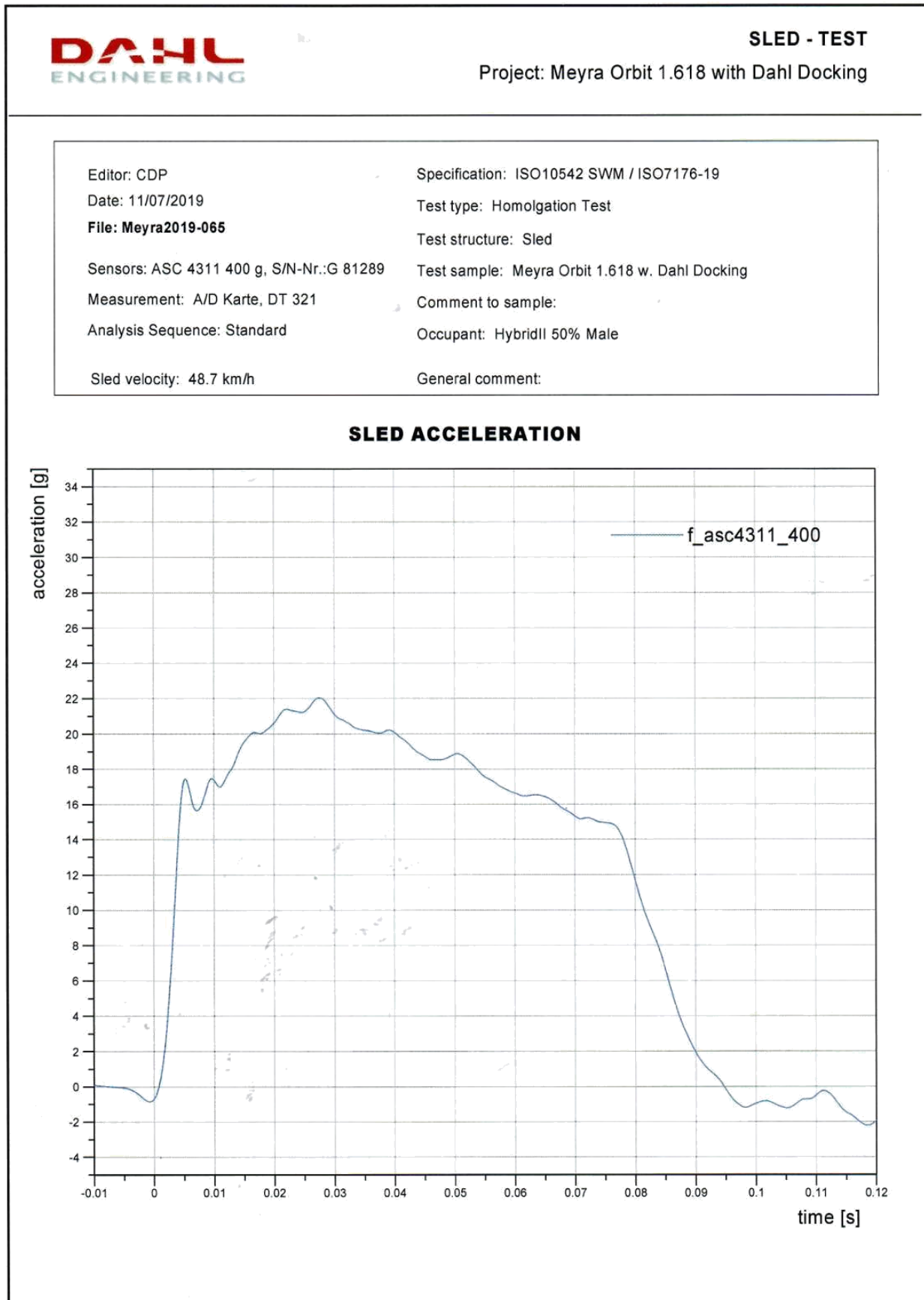
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Thisted 21 January 2020

Claus Dahl Pedersen  
 Head of test laboratory

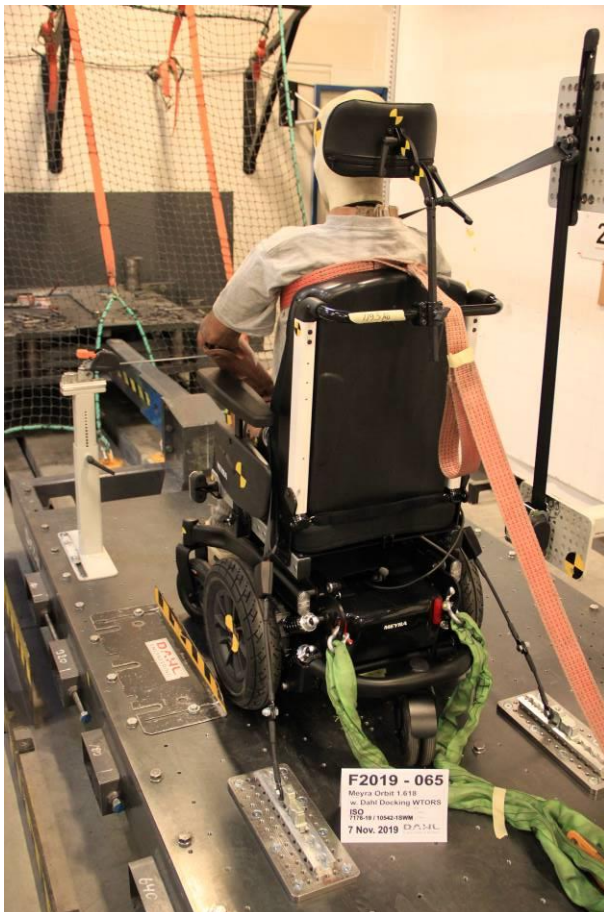
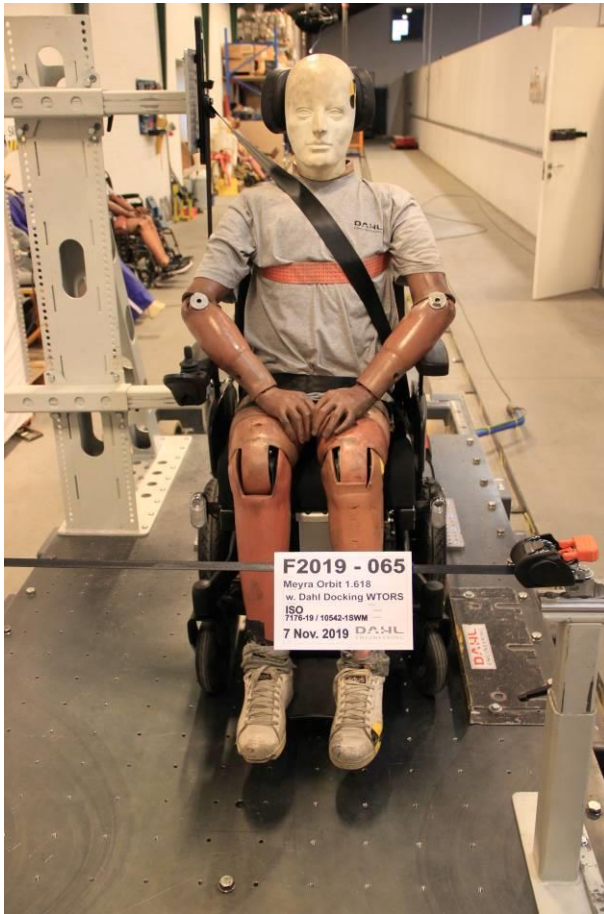


Plotted graph and speed



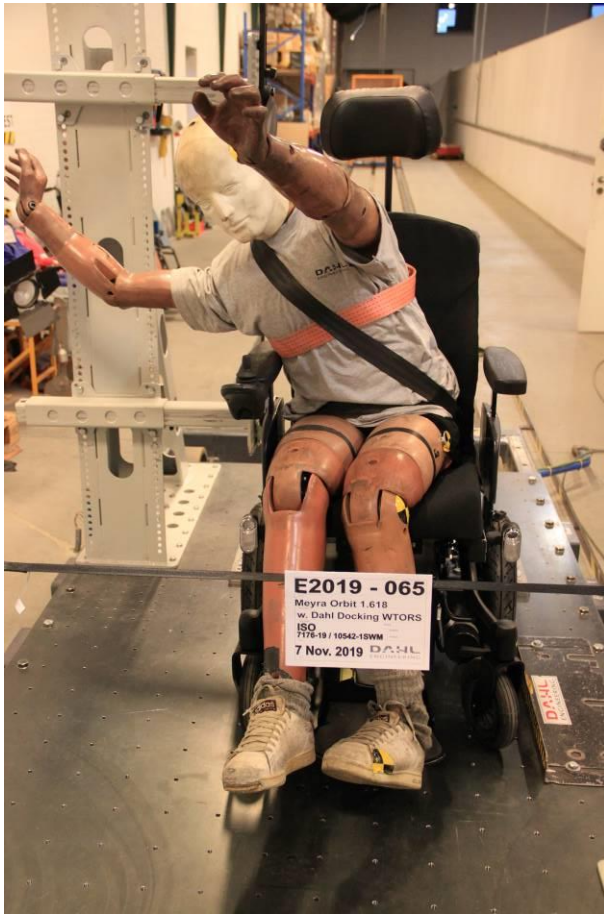


Pre- test photos





Post test photos



Post test photos

