LORC Nacelle testing

The worlds most realistic indoor nacelle test setup

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Offshore renewables activities on the Lindoe site today
LORC nacelle testing on the Lindoe site

- Nacelle testing facility located under the 1000T gantry crane
LORC nacelle testing on the Lindoe site

- New 2-section hall (3500m²) with removable rooftops (17mx42m)
Using the crane inside hall

- Nacelle installation
Two dock test bench design

- Efficient test bench design consisting of:
  - North: Function Test
    - Turbine hub included in the test
  - South: HALT
    - Excessive wind loads applied to the main shaft
Using the crane inside hall

- 80 tn stator for PM-direct drive motor installation
LORC function tester

- Test of the complete nacelle including hub
- Special adaptor allows the pitch system to remain active during testing
- Full SW and HW tested under extreme events (wind / grid)
Mode 3: Torque ctrl. mode

Customer Switch Gear
XX-0x
+HX21A202
MM
- Q1
630 A
- Q8
M - Q0
630 A

Model Selection
\omega_{ref},
T_{ref}

Wind sensor connection

Tower cable
Single line diagram

• Option 1:
  **Standard grid**

  33 kV; 50 Hz
  – Direct 33kV supply
  – Fixed frequency (50Hz)
  – OLTC to control voltage level
  – 14 steps of 2% (Max 36kV)
  – Low Harmonics (PQ measurements)

• Option 2:
  **Grid simulation**

  0 – 40 kV; 45 – 65 Hz
  – Grid simulation
  – Variable frequency (45-65Hz)
  – SW controlled voltage regulation
  – Low Voltage Ride Through (LVRT)
  – High Voltage Ride Through (40kV)
Test capabilities (function tester)

• Full functionality testing of nacelles from 3 – 10MW
  - With complete mechanical and electrical system operational
    – P-Q chart verification
    – Power quality verification
    – Low Voltage Ride Through
    – High Voltage Ride Through
    – Frequency Response
    – Thermal performance testing
    – Extreme wind gust events
    – Safety system (n-1)
    – SW verification
Pictures from the project
Pictures from the project