

Droplet erosion test facility.

Innovation description

Repeated impact of raindrops on wind turbine blades, with high rotational velocity, can lead to severe erosion of the blade surface coating. This reduces the aerodynamic efficiency and expose the composite structure, making it more vulnerable. Understanding of the erosion mechanisms and development and qualification of coatings rely on lab scale testing. Testing according to the standard helicopter test (ASTM G73-10) requires large test equipment making each test very expensive. For research and development there is a need for less costly test equipment to enable screening of development materials. SINTEF Materials and Chemistry has developed a downscaled version of the helicopter test which has been used to test coatings in NOWITECH. The equipment enables varying droplet sizes and impact angles.

Impact

- Reduced cost of screening test of coating materials
- Possibility to test development materials accessible only in small amounts
- Faster development of coating materials

Further development

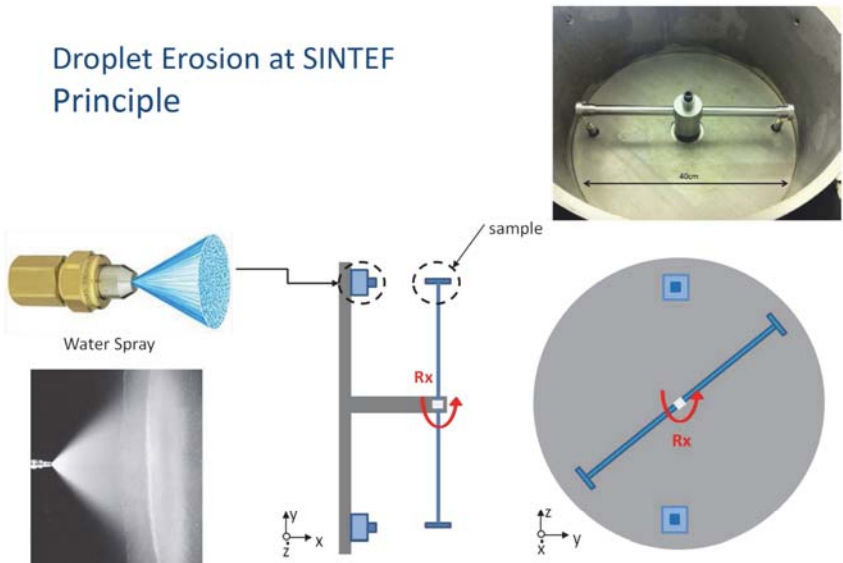
- The standard helicopter test is a downscaling from the size of a wind turbine blade (ASTM G73-10). The SINTEF droplet erosion test equipment is a further downscale. There is a need to understand how results from the SINTEF test correlates with the standard test
- Plan to develop further in IPN project (Statkraft, Siemens, Carboline)

References

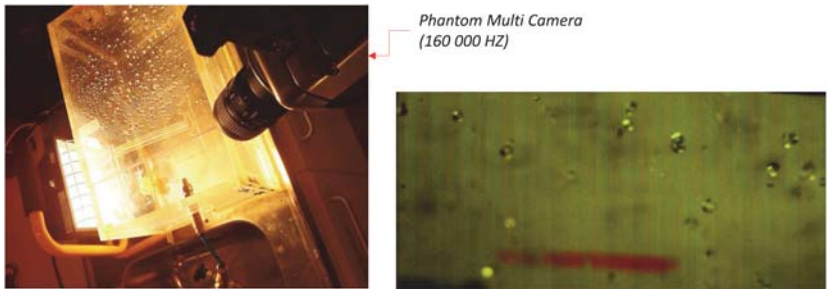
- Emil André Valaker, Droplet Erosion Protection Coatings for Offshore Wind Turbine Blades, Master Thesis NTNU 2015, Department Of Engineering Design and Materials.



Droplet Erosion at SINTEF Principle



Droplet characterization



Before test

After test

