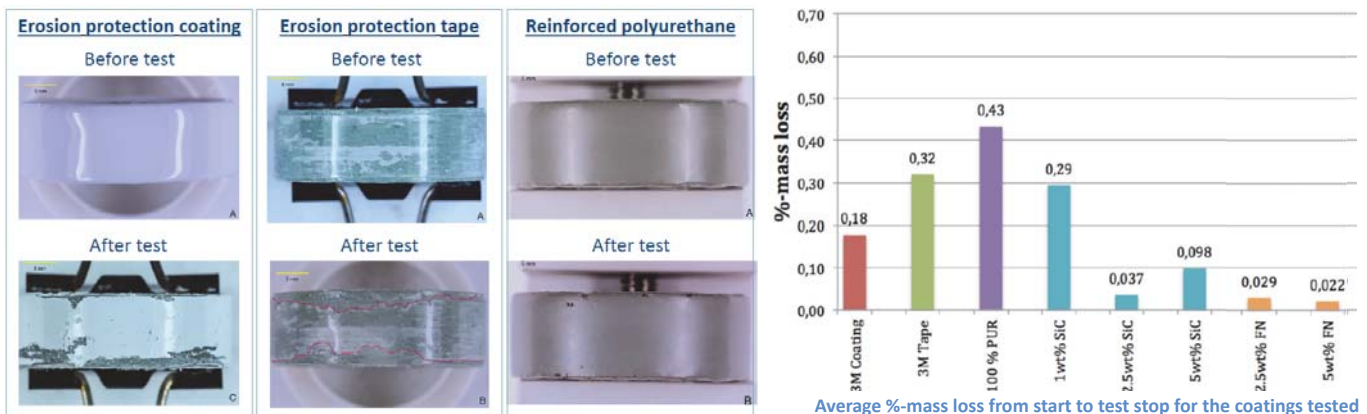


Droplet erosion resistant blade coatings.

Innovation description

Rainfall combined with high rotational speed of wind turbine blades leads to high energy impact of droplet on the blade leading edge. Unless proper erosion resistant coating is utilized this can lead to severe erosion of the leading edge which reduces the aerodynamic efficiency and makes the composite structure more vulnerable.

SINTEF has improved the erosion resistance of a commercial polyurethane coating dramatically by reinforcing it with specialized nano-particles with molecular branches providing good compatibility with the polyurethane.



Impact

- Leading edge erosion is a severe problem for off-shore wind leading to high maintenance cost and production losses. To reduce costs it's critical to develop more erosion resistant coating. If this is not accomplished erosion can become a showstopper with regards to development of larger turbines with even higher rotational velocities

Further development

- The reinforced coatings has so far only been tested with our in-house small scale equipment for erosion testing. This has so far provided promising results. Next step is to test the coatings due to ASTM G73-10. ASTM G73-10 requires large sample. More nano – particles and reinforced coating is under preparation to accommodate testing according to ASTM G73-10.

References

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