DTU

Erosion-safe turbine operation

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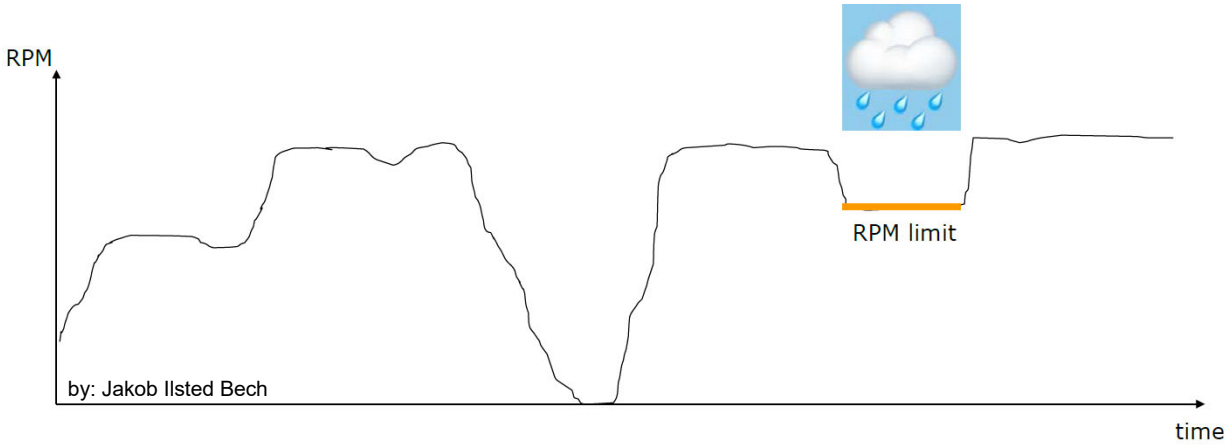
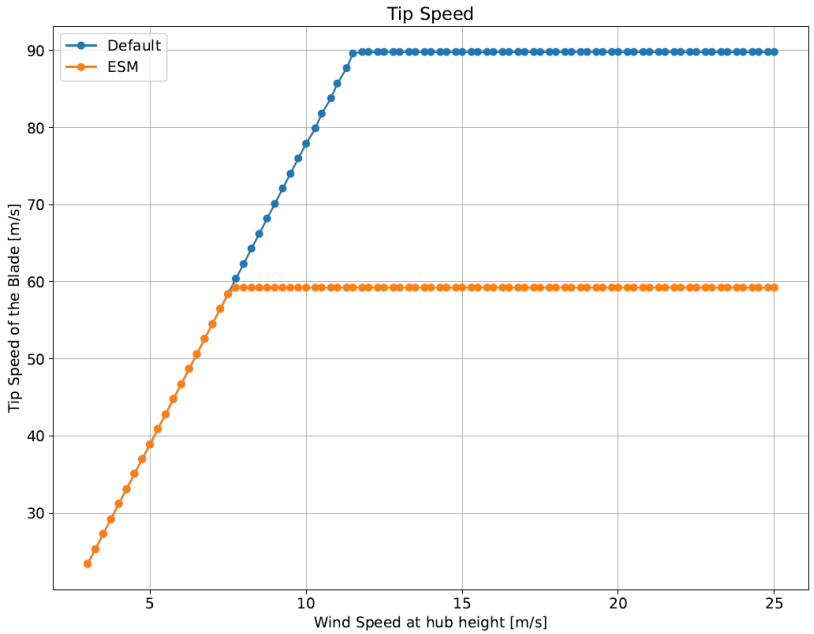
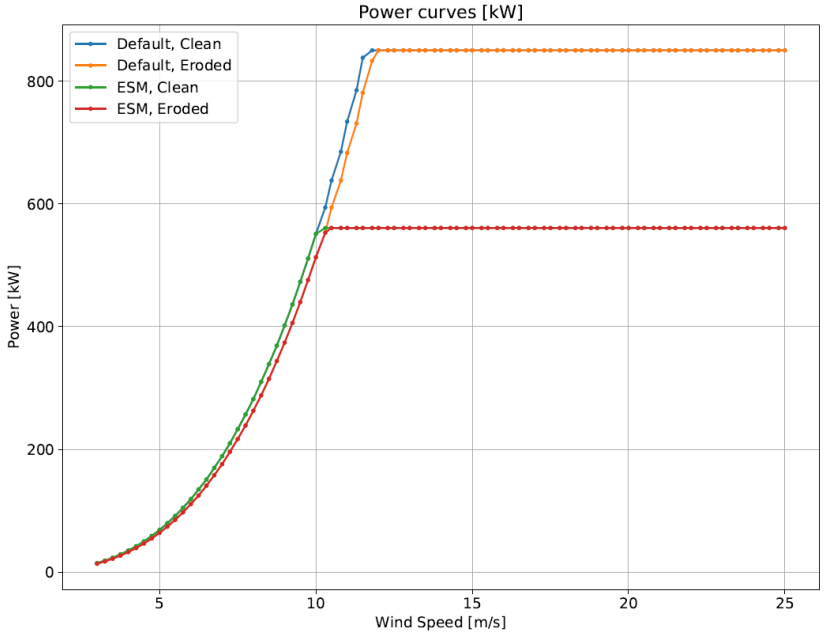
As we know, erosion is a thing.

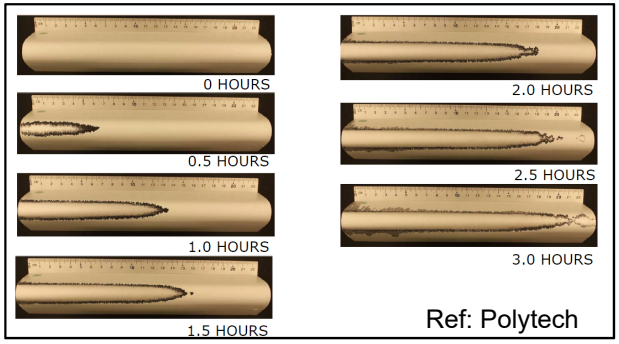
Erosion-Safe Operation

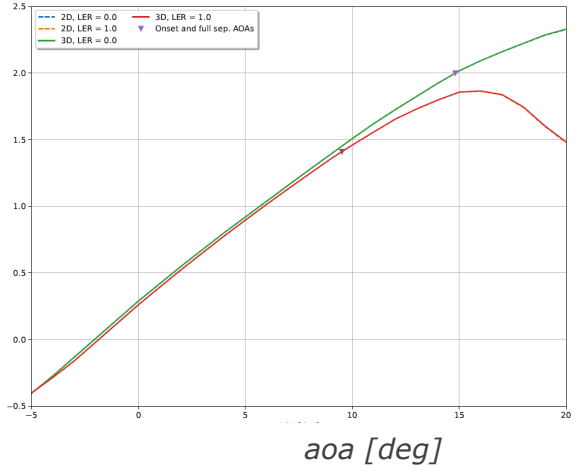




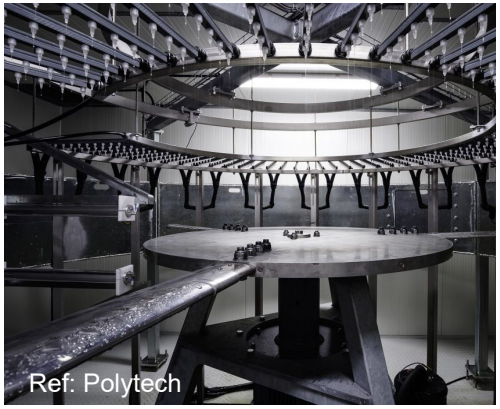


Modelling of erosion-safe operation: Why and how?





(*) Modelling of erosion



Kinetic Energy Model

$$N_{fail} = 18 \left(\frac{E}{E_0}\right)^{-4.7} \qquad E \sim d^3$$

Accumulated Water Model

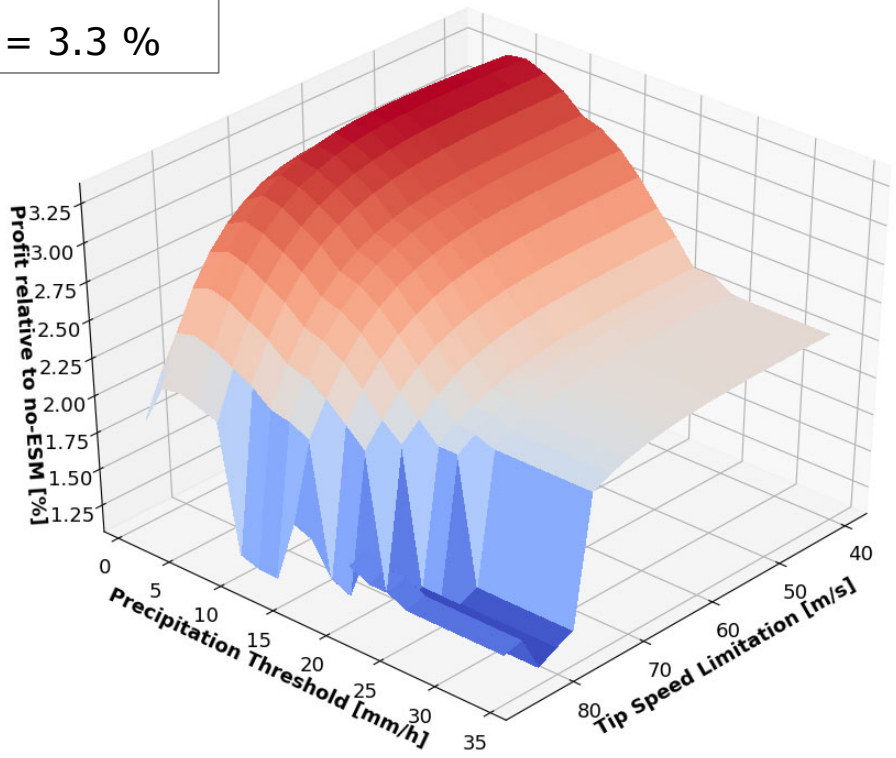
$$h_{fail} = 1.5\ 10^{19} \left(\frac{v}{v_0}\right)^{-9.3}$$

Optimization of Erosion-Safe Operation

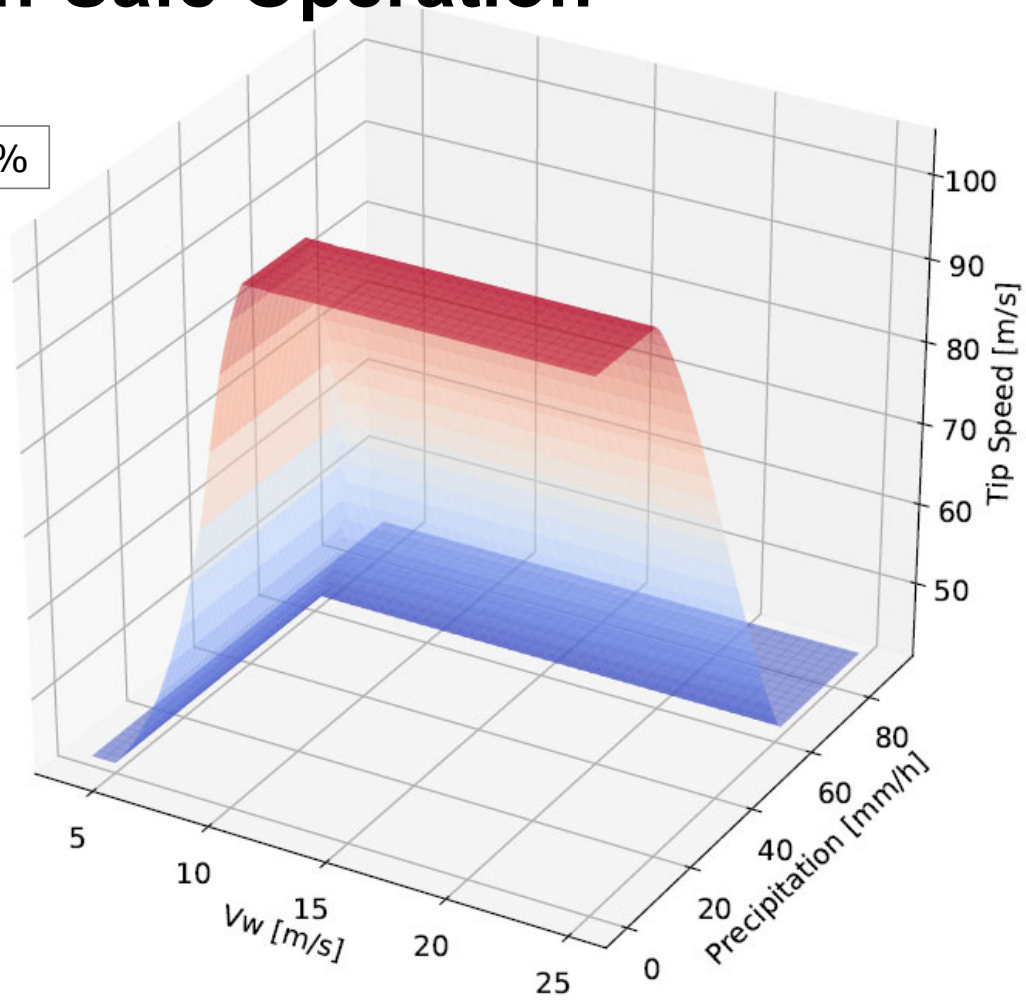
4.8 mm/h

56 m/s

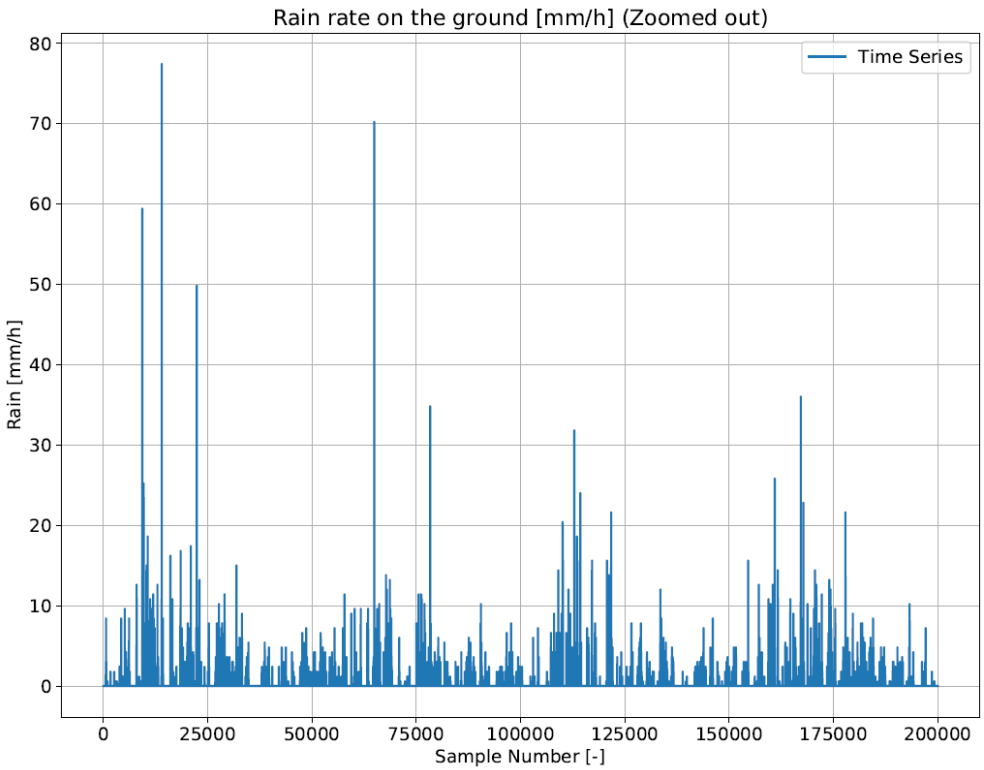
Profit = 3.3 %

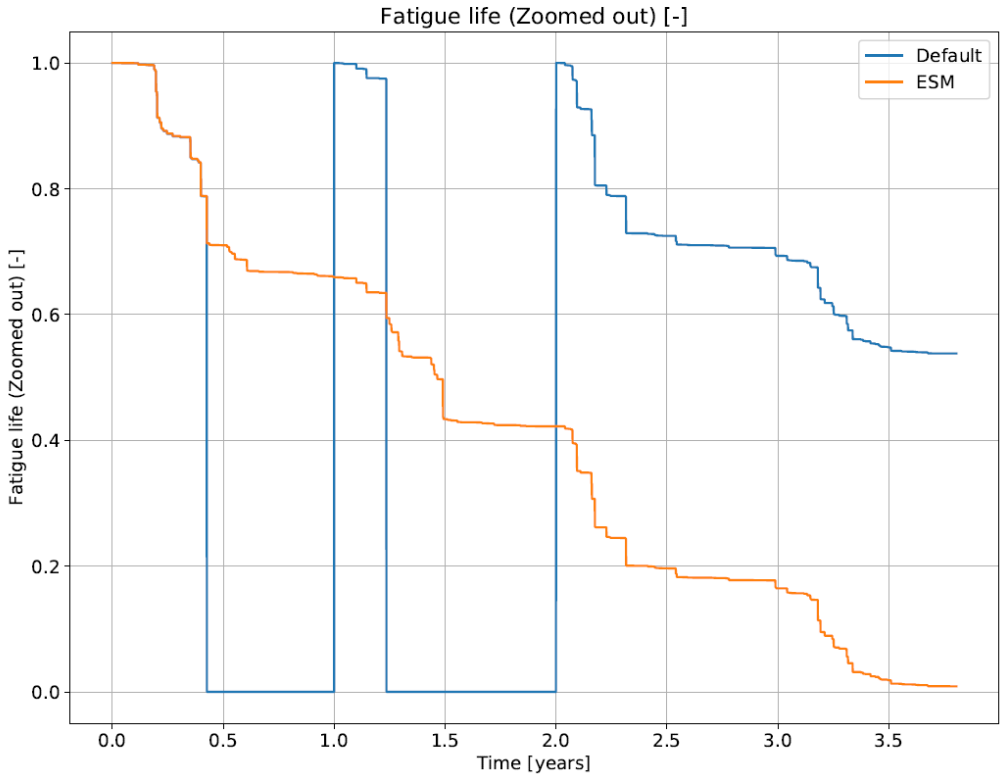


Profit = 3.5 %



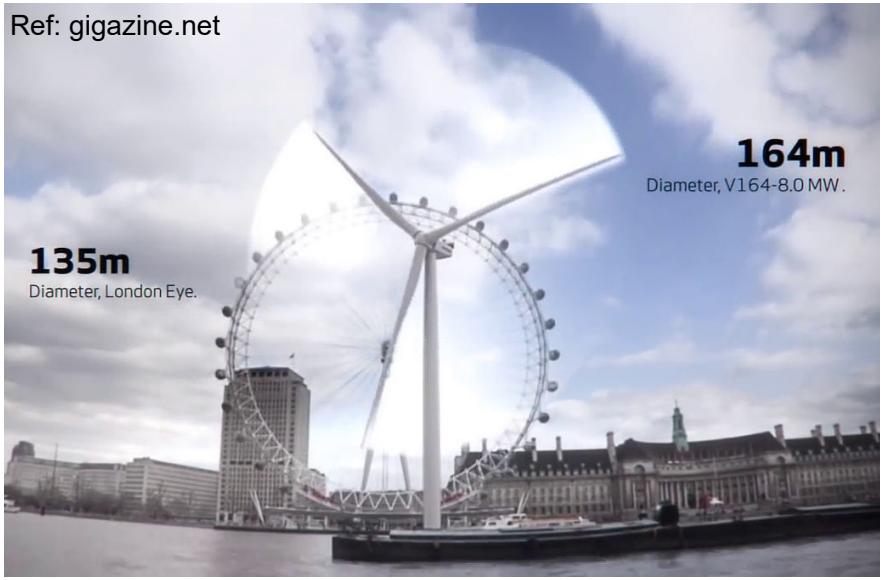
Optimization of Erosion-Safe Operation

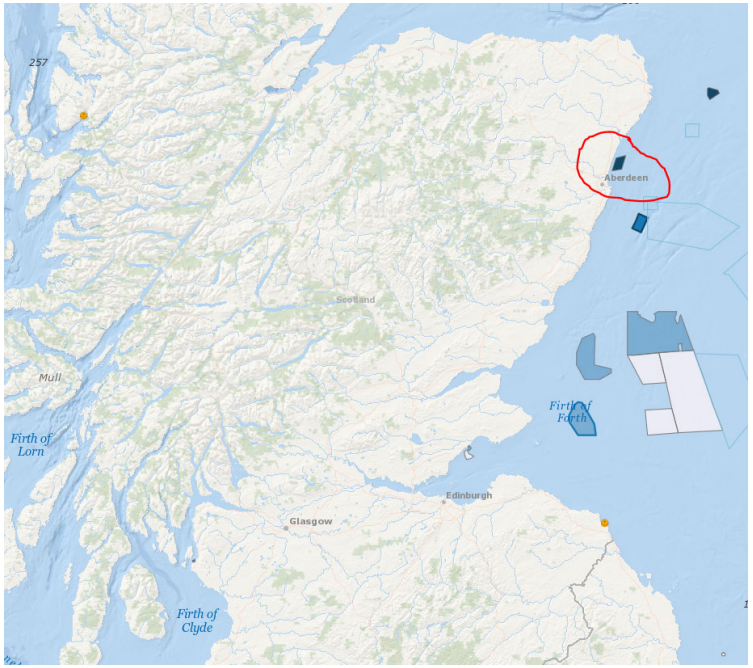




We are preparing for a full-scale validation

- *Vattenfall's offshore MHI Vestas V164, Aberdeen Offshore Wind Farm, UK*





Metek MRR-PRO

References:

Bech et al. 10.5194/wes-3-729-2018

Hasager et al. 10.1016/j.renene.2019.12.043

Thank you.