

3D reconstruction of surface roughness of eroding leading edge of wind turbine blades

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March 6, 2023

Abstract

In this paper, 3D reconstruction of the leading edge of wind turbine blades from images, also known as photogrammetry, is investigated. The technique was applied to a decommissioned blade with an eroded leading edge, with images captured by a smartphone. The reconstructed 3D surface was accurate, when compared to the captured images, despite the small number of images used. A solid model was then created and imported into a finite element modelling software for rain-droplet impact simulations. Photogrammetry is relatively cheap, when compared to other surface scanning techniques, and provides means of monitoring erosion damage when combined with drone imaging. Further investigations of the parameters which control the accuracy of the reconstructed surface must be performed, to fully explore the potential of photogrammetry for 3D reconstruction of leading edge erosion damage.

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