Initiation of trailing edge failure in full-scale wind turbine blade test

The reliability and accuracy of a numerical shell model simulation and its predictive capabilities with existing failure criteria are compared to experiments of a 34 m long blade tested to ultimate failure. Strengths and weaknesses of in-plane failure criteria are highlighted and the geometrical non-linear buckling effect of the trailing edge under combined loading, and how it affects the ultimate strength of a blade in a trailing-edge failure dominated load direction were investigated. The study details the interaction between trailing edge buckling on damage onset and sandwich panel failure. The numerically applied fracture mechanics approaches showed good agreement with the experimental results.

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