Initiation mechanism of transverse cracks in wind turbine blade trailing edge

Jinghua Wang¹, Leian Zhang¹, Xuemei Huang², Jinfeng Zhang³, and Chengwei Yuan¹

¹Shandong University of Technology

²Affiliation not available

³China General Certification Center

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Abstract

Transverse crack often occurs in the trailing edge region of the blade when it is subjected to excessive fatigue load in edgewise. In this paper a refined model was established through local mesh refinement methods in order to investigate the initiation mechanism of crack and its extension in blade trailing edge. The material stress around the crack in trailing edge region under different thicknesses is calculated based on the fracture mechanics theory. Then the coupons test is conducted to verify the simulation results. The factors affecting the fatigue robustness of blade trailing edge are concluded by investigating the results of finite element analysis and coupons test. In final, a practical design scheme to prevent crack initiation is given for the manufacture of wind turbine blade.

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