Hiwi gesucht

Development of a Tool for Parametric Generation of Finite Element Models for Offshore Wind Turbine Rotor Blades

Description

Currently, premature fatigue damage in bonded joints, sandwich panels and laminates of rotor blade structures is a common phenomenon, and this damage can manifest itself within 10% of the total blade life. In recent years, some progress has been made in ISD in understanding, modeling and predicting the fatigue of polymers in adhesives and fiber-reinforced composites. For large structures such as rotor blades and real load conditions and in terms of knowledge transfer to industrial practice, there is still a need for action, which is the focus of this project. To perform numerical fatigue analysis on rotor blades, the first crucial step is developing a generic finite element (FE) model of the blade. Rotor blades are complex components, featuring a tapering airfoil geometry that progressively narrows from the root to the tip. This variation has a significant impact on the aerodynamic loads acting on the blade. Furthermore, rotor blades are constructed using a diverse combination of materials, such as glass fiber composites, sandwich materials, and adhesives. These adhesives are critical for bonding key structural elements, including the spar caps to the shear web beams and the shells at the leading and trailing edges. Your role in the project will involve developing a parameterized tool to automate the creation of a generic FE model for rotor blades, collaborating closely with a team of doctoral and student researchers to achieve this goal.

Task/Work Programme
- Literature research on existing generic models of rotor blade
- Work with necessary tools: FE software Abaqus, Python API of Abaqus
- Persuasive presentations and documentation

Your Profile
- Engineering student with knowledge of Abaqus and strong programming skills in Python
- Organised and ability to develop solutions independently
- Team player
- Working language: English or German

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