Master thesis

Finite Element-Based assessment of tooth flank fracture risks for case-hardened gears

The project

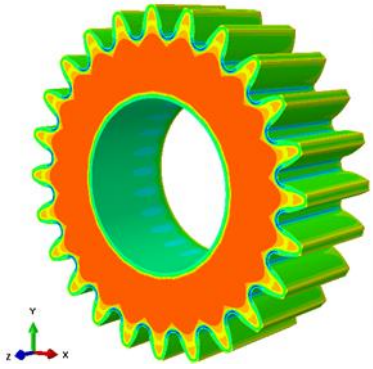
The load-carrying capacity of widely used case-hardened gears in wind turbines is limited by tooth flank fracture, which occurs as a result of cracks initiated in the component's depth due to unfavorable residual stress state induced by the heat-treatment. A reliable prediction model for tooth flank fracture relying on a good description of the residual stress state after case-hardening heat-treatments is to be developed.

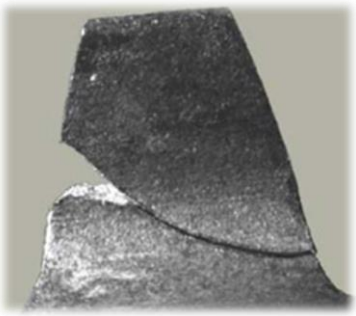
Tasks

Based on an existing Finite Element model for the heat-treatment, the candidate will identify relevant methods and boundary conditions to link the residual stress simulation results to an assessment of the tooth flank fracture risks in a FE tool. Literature survey, building up the model and applying it through parameter studies will form the thesis' core, while further developments with consideration of the effects of non-metallic inclusions are possible.

Requirements

- Knowledge in materials science or steels
- Interest in numerical simulation
- Motivation and reliability
- Ideally experience with Abaqus and Matlab or Python





We offer

A comprehensive and industry-relevant thesis in line with the latest state of this research field. The candidate will be will be part of a pleasant working environment and helpful team.

Contact

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