

Master Thesis

Topic:

Simulative Investigation on Sub-surface Crack Propagation in Railway Wheels

Introduction:

Railway wheels experience Rolling Contact Fatigue (RCF) due to high cyclic contact stresses. RCF causes surface and sub-surface cracking of the wheel material. The depth at which cracks occur depends on several loading and material parameters. Several models have been devised to predict the condition for propagation of these cracks. FEM/ Extended FEM (XFEM) simulations can be performed to determine the sub-surface crack parameters and subsequently its propagation direction based on available LEFM (Linear Elastic Fracture Mechanics) models.

Tasks:

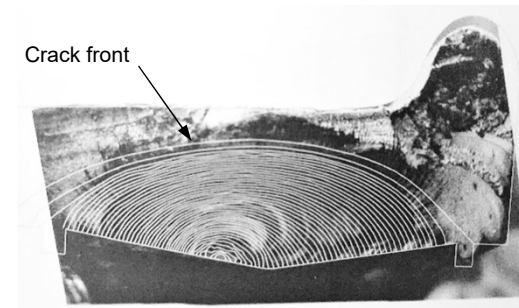
- Literature study on cracks propagation in railway wheels, available LEFM models, 3D XFEM modelling etc.
- XFEM modelling and simulation of propagation of a sub-surface crack in a railway wheel under different input conditions (load, crack geometry, depth etc)
- Evaluation of simulation results and Documentation

Requirements

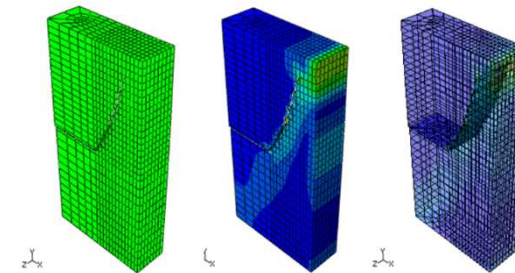
- Independent working
- Basic experience in performing FEM simulations (Preferably with ABAQUS)
- FORTRAN/Python programming skills (not obligatory)

Depending on the interest, the content and scope can be adjusted accordingly

If interested, please apply with your CV and Transcript



Source: Finite Elements in Fracture Mechanics –Kuna, M



Source: <https://abaqus-docs.mit.edu>

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