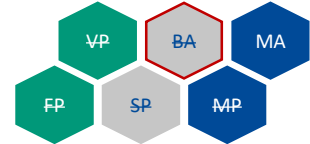


Design and optimization of GFRP specimen geometry using Ansys for ultrasonic fatigue testing ($f = 20 \text{ kHz}$)



Master thesis (MA)*

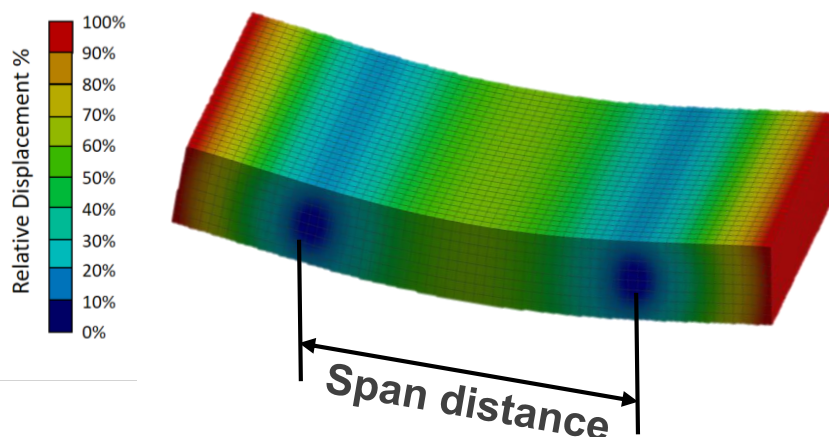
Recommend for: M.Sc. SSE,



Background

To study the fatigue behavior of fiber-reinforced polymers (FRP) in the Very High Cycle Fatigue (VHCF) regime, axial and three-point bending setups have been developed at INATECH. These test systems apply cyclic oscillations at a frequency of 20 kHz.

For a test specimen to undergo oscillations at 20 kHz with an axial or a three-point bending load, its eigen frequency under the desired oscillation mode needs to be equal to 20 kHz such that the condition of resonance is satisfied. This frequency is related to the stiffness and density of the material.



Objectives

The goals of the thesis would be to

- ❖ Perform a literature study to determine the elastic properties of different glass-fiber reinforced polymers (GFRPs).
- ❖ Choose an appropriate GFRP material system for the fatigue specimens.
- ❖ Carry out modal analysis in ANSYS to determine and optimize for suitable specimen geometry to achieve the resonance frequency condition.
- ❖ Validate the model by comparing the results with the existing models.

Starts: As soon as possible

Timeframe: According to examination regulations

More topics on request!

* Forschungspraktikum = FP, Vertiefungspraktikum = VP, Study Project = SP, Bachelor Project = BA, Master Project = MP, Master Thesis = MA

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