

**Bachelor Lab Project II: “Roving Hammer Experiments on Model Wind Turbine MoWiTO1.8”**



*Fig 1. Modal parameter extraction via Roving Hammer test*

**Background**

MoWiTO1.8 is the experimental model wind turbine in the ForWind WindLab. The aeroelastic behaviour can be tested in the 3x3m wind tunnel of University Oldenburg, but as well simulated with aeroelastic simulation code FAST. The quality for the simulation depends on exact aerodynamic parameters but as well on correct structural values of the model. In the Lab Project II the modal parameters of the real structure shall be measured via impact test. A Roving Hammer, three-axial accelerometers and the installed sensors on the turbine will be used. Similar experiments are state of the art in the verification of physical parameters in prototype design in any kind of industrial structure from aerospace to automotive and as well small structures like CD-drives.

**Task**

The relevant parameters of the FAST model shall be analysed together with the actual users of the system. The Roving Hammer experiment must be designed. The actual situation regarding standard sensors in the system, extra available measuring equipment like accelerometers must be identified. Possible points for applying the force must be found. After this the experimental equipment must be set up including sensors, digital analogue converters and logging devices. After the experiment suitable methods to extract the relevant parameters must be used.

**Work steps**

- Literature of existing methods
- Survey of user expectations
- Design of experiment
- Start-up of measuring equipment
- Experiment
- Result evaluation
- Documentation

**Requirements**

- Keen to experimental work in the lab
- Interested in vibration questions
- Interest in LabVIEW and MATLAB

Place	University of Oldenburg
Begin	March 2018
Duration	6 ECTS ca. 180 Hours
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2 <sup>nd</sup> Supervisor	Frederik Berger

**Literature**

1. F. Berger and M. Kühn, "Scaled Wind Turbine Setup in Turbulent Wind Tunnel," presented at the DeepWind2018, Trondheim, Norway, 2018.
2. NWTC Information Portal (OpenFAST). <https://nwtc.nrel.gov/OpenFAST>. Last modified 05-January-2018 ; Accessed 06-February-2018
3. J. White, D. Adams, and M. Rumsey, "Modal Analysis of CX-100 Rotor Blade and Micon 65/13 Wind Turbine," 2009, Available: <https://www.osti.gov/scitech/servlets/purl/1141928>.