



NEWSLETTER NO. 1 – JANUARY 2016

WELCOME

Welcome to the first edition of the newsletter for the EMPIR MN·m Torque project. Over the next three years the newsletter will provide you with everything you need to know about the latest project developments.

The project *Torque measurement in the MN·m range* has the ambitious vision to show a road map to traceability of torque loads in the MN·m range with a focus on wind turbine nacelle test benches. This traceability is important to determine a correct precision of the measurements which is needed to ensure the high quality of the tests. This goal is pursued on the one hand by considering the extrapolation of a calibration from a smaller range because up to now the maximum traceable torque is only 1.1 MN·m. On the other hand, a calibration technique for torque measurements with a force lever system will be designed and studied. Effects from additional loads as they occur in wind turbine nacelle test benches on the torque transducer will also be investigated.

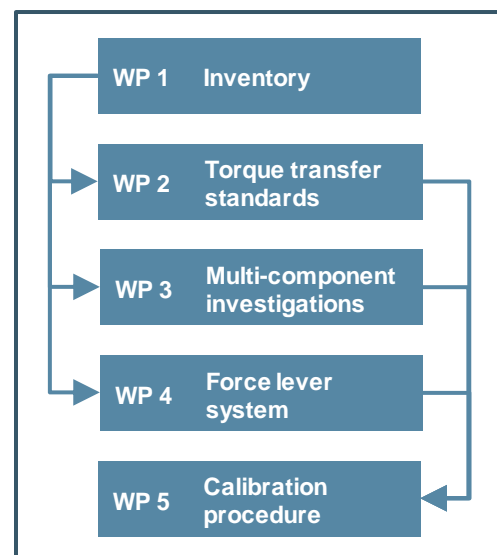
Finally, a calibration procedure for torque loads in wind turbine test benches will be developed and approved at the Center for Wind Power Drives in Aachen, Germany. Based on the results, the final outcome of the project is a good practice guide on the investigation and torque calibration of nacelle test benches.

PROJECT NEWS

The project started in September 2015 and runs for a period of three years. For a better focus on specific issues and to separate

several work steps, the project is divided into five main areas called work packages (WP). Each work package focuses on a certain issue in the measurement and traceability of large torque loads in nacelle test benches.

Work package 1 (*Inventory*) will review the setup and installation of existing nacelle test benches to assess current torque measuring methods and their uncertainties and to gather information for work packages 2, 3 and 4.



Work package 2 (*Torque transfer standards*) will investigate potential torque transducers that can be used as transfer standards between torque standard machines and wind turbine nacelle test bench. WP2 will also develop an extrapolation method for torque loads up to 5 MN·m using FEM simulations.

Work package 3 (*Multi-component investigations*) will focus on the effect of additional mechanical loads on torque transducers. Design principles for a 5 MN·m torque transducer with improved multi-component measurement capability will be developed



within this work package using small scale research (in the kN·m range) and FEM simulations.

Work package 4 (*Force lever system*) will design a torque transfer standard for torque loads up to 20 MN·m based on a force lever system. This system will be based on commercially available force transducers which are coupled to a specifically designed lever.

Work package 5 (*Calibration procedure*) will focus on developing a procedure for the calibration of torque measurements in wind turbine nacelle test benches including a consideration of cross-talk effects from additional loads as well as an uncertainty model. A tentative calibration procedure will be tested in the nacelle test bench at the Center for Wind Power Drives in Aachen, Germany.

INVOLVEMENT IN THE PROJECT

We are always looking for further input to our project to complete our overview of the needs and capabilities of the industry. If you are interested in working with us, please contact us via email or use the short questionnaire on our website to give us a first idea of your capabilities in the field of torque measurement.

HOW TO CONTACT US

Project coordination:

Dr. Rolf Kumme

Physikalisch-Technische Bundesanstalt

Bundesallee 100

38116 Braunschweig, Germany

rolf.kumme@ptb.de

Project website:

www.ptb.de/empir/torquemetrology.html

THE CONSORTIUM

NATIONAL METROLOGY INSTITUTES



RESEARCH INSTITUTES



ACKNOWLEDGEMENTS



The EMPIR initiative is co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR Participating States