IEEE Access, vol.7, pp.73469-73479, December, 2019.

A metrological characterization approximation for the new torque measurement system in wind turbines test benches

R.M. Lorente Pedreille; M.A. Sebastián Pérez; M.A. Sáenz Nuño; M. N. Medina Martín

Abstract-

This paper presents the new transfer standard for torque measurements in the MN $\cdot \text{m}$ range and its metrological characterization through FEM analyses. Current methods used for torque measurements in such measuring range are not traceable to international standards; this situation has a deep impact in several industries, being especially important in wind energy generation. In order to improve the quality of torque measurements during wind turbine tests, the "EMPIR 14IND14-torque measurements in the MN -m range," a new European funded project has been launched. This project aims to develop new transfer standards for obtaining accurate, reliable, and traceable torque measurements in the facilities used for testing wind turbine’s performance. Within this project, CEM (Spanish Center of Metrology) has designed a new transfer standard for torque measurements named "force lever system." Modeling and simulation technologies have been used not only for designing and testing the proposed system but also for enabling the estimation of its future associated uncertainty even before it is being manufactured. The results have proven that the expected metrological behavior of the designed system will ameliorate the accuracy of current measuring methods while ensuring torque measurements’ traceability. The improvement of the torque measurements’ reliability will make it possible to better diagnose its behavior and to improve wind energy generation efficiency.

Index Terms- Metrology, nacelle, test bench, torque measurement, uncertainty, wind turbine

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:
Request full paper to the authors

If you institution has a electronic subscription to IEEE Access, you can download the paper from the journal website:
Access to the Journal website

Citation:
Lorente-Pedreille, R.M.; Sebastián, M.A.; Sáenz-Nuño, M.A.; Medina, M. N. "A metrological characterization approximation for the new torque measurement system in wind turbines test benches", IEEE Access, vol.7, pp.73469-73479, December, 2019.