Solar Energy South Africa

Quality of wind power tower

Overview

The work involved in this thesis has been carried out at the Department of Electric Power Engineering of Chalmers University of Technology. The research has been funded through the EU-Joule II program and by Elforsk AB. The.

Electrical systems in wind turbine generator systems can be divided into two main groups, i.e., fixed speed and variable speed. Fixed-speed wind turbines, equipped with a generator connected directly to the grid, are the.

Do wind turbines affect power quality?

Moreover, when wind turbines are part of the grid thepower, quality seems to be a complex issue which highly depends on the interaction betweenthe grid and the wind turbines. The main impact on the grid by the wind turbines, concerningpower quality, is related to voltage changes and fluctuations, harmonic content, power peaksand flicker.

How reliable is a wind turbine?

The reliability of a wind turbine needs to be maximized, as it also determines the other challenges such as maintenance. Referring to statistics on malfunctioning of the turbine, more than 20% of failures in large wind turbines occur due to malfunctioning of the gearbox .

What is the optimum design of the onshore wind turbine tower?

An optimum design of the onshore wind turbine (WT) tower structure is crucial for achieving an economic, efficient and safe design of the entire onshore WT system.

Why should a wind turbine be higher than 10 m?

Furthermore, increasing the height of the tower will enable the turbine to receive high wind speed. Moreover, wind speed and power can increase by 20% and 30%, respectively, with increasing the tower height of 10 m. Under extreme wind conditions, the wind turbine rotates extremely fast, which can damage the turbine [76, 77].

Which structural design is used for wind turbine towers?

The soft–stiff structural design is normally used for wind turbine towers. In this design, the first natural frequency of the wind turbine tower sits between the f 1 P and f 3 P frequencies. In this study, f 1 s t is designed to avoid both f 1 P and f 3 P frequencies with a tolerance of ± 5 % (Lloyd and Hamburg, 2010).

How are wind turbine towers designed?

The methods used in the design of wind turbine towers can be roughly categorised into two types, i.e. (1) partial safety factor (PSF) design, where uncertainties in the uncertain variables are considered by PSFs; and (2) reliability based design, where the uncertainties are accounted for through stochastic modelling.

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Dynamic Analysis of a Reinforced-Concrete Post Tensioned Wind Turbine Tower

Today governments put a special importance on wind energy turbines because wind energy has great potential of all renewable energies. By 2030 most of the developed countries are ...

Investigation of power quality and structural loads for ...

In the present study, power quality issues such as power fluctuations, voltage fluctuations, and flicker emission are investigated and compared in two-bladed WTs with rigid and teetered rotors in different ...

An introduction to wind turbine towers

For instance, an 80-m tower can let 2 to 3-MW wind turbines produce more power, and enough to justify the additional cost of 20-m more, than if installed at 60 m. Taller towers will also let larger turbines enter the market. ...

Power Quality Considerations of Wind Power Plants

It then discusses the relevant power quality issues of the wind turbine types and collector systems. A case study is used to illustrate the

issue of harmonics and compliance with the IEEE-519 recommended limits for ...

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