

A method for the detection of oil leakages on the pitch system

Background

The Pitch System monitors and adjusts the angle of attack of the wind turbine's rotor blades. This system plays a vital role in a wind turbine by maintaining the optimum blade angle to achieve the ideal rotor speed or power output. A Pitch system can act either as a safety mechanism by pitching the blades to a position where they act as an aerodynamic brake, avoiding rotor overspeed, or even keeping the turbine safe in extreme weather conditions. Vestas wind turbines make use of hydraulic systems to pitch the blades since these systems are very accurate and can deliver constant force regardless of the speed. Nevertheless, hydraulic systems are very sensitive to leakages, therefore a method for the early detection of oil leakages is of high value and importance.

Scope

Propose a method for the detection of oil leakages in the pitch system. Main goals:

- Study and understand the pitch system of a wind turbine – Identify the different components and variables of the system
- Propose a method for detecting oil leakages on the system based on the data or sensors available at Vestas turbines.
- Create a model for the simulation of the pitch system that validates the hydraulic oil leakage detection method – Present conclusions about the research and simulation.

Keywords

Wind turbines; Pitch System; Hydraulic systems; Matlab; Simulink

