Solar Energy South Africa

De-icing of wind turbine blades

Overview

Is there an effective anti-icing strategy for wind turbine blades?

The review discusses an effective anti-icing strategy for wind turbine blades, including various passive and active physical de-icing techniques using superhydrophobic coatings, thermal heaters, ultrasonic and vibration devices, operating control to determine the optimal methods and their combinations.

Does cold weather affect wind turbine blade icing?

De-Icing Techniques for Wind Turbine Blades The cold weather in the Arctic countries determines the relevance of the icing problem in which de-icing is significant (see Figure 1). The ice accumulation on wind turbine blades creates potential risks for operation, safety, and erosion.

Do wind turbine blades use chemical ice removal?

Indeed, almost every de-icing device uses either physical or chemical elimination of ice, which is energy- and resource-intensive as well as environmentally polluting. The chemical method is not currently used for wind turbine blades.

Are wind turbine blades transparent icing?

Field tests were carried out on 1.5 MW and 2.0 MW wind turbines in freezing weather, and the error between the detected icing thickness and the actual was about 20%. Based on the total internal reflection effect of light, an optical remote monitoring method for the transparent icing of wind turbine blades was proposed by Kabardin et al.

How does icing affect a 5 MW wind turbine blade?

For 5 MW wind turbine blades, Johnson et al. superimposed the icing configuration onto the base structure, taking into account the geometric analysis of the blade configuration after icing, and optimized the blade geometry based on different wind speeds, as shown in Figure 7 .

What are examples of wind turbine icing?

Examples of wind turbine icing. The icing effect on the blades may change the load distributions and dynamic behavior of the rotor system. Inhomogeneity caused by ice accretion can also be a source of blade instability and excessive vibration. For blade-regulated wind turbines, icing can impact the rotor control earlier than intended.

De-icing of wind turbine blades

Review on Anti-icing and De-icing Techniques of Wind Turbine ...

Antifreeze solutions such as ethanol, ethylene glycol, and propylene glycol applied to the wind turbine blades will mix with the supercooled water droplets captured by the blades to reduce ...

Review on Anti-icing and De-icing Techniques of Wind Turbine Blades

--In recent years, the installed capacity of wind turbines has been growing rapidly worldwide. However, wind turbines in high-altitude or high-latitude regions suffer from icing disasters, ...

An effect assessment and prediction method of ultrasonic de-icing ...

The review discusses an effective anti-icing strategy for wind turbine blades, including various passive and active physical de-icing techniques using superhydrophobic coatings, thermal ...

A Review of Wind Turbine Icing and Anti/De-Icing ...

Chen et al. studied the numerical simulation optimization design of anti/de-icing components of wind turbine blades, and adopted an orthogonal optimization method to optimize blade parameters to prevent icing.

Wind Turbine Blade Icing Monitoring, De-Icing and Wear ...

Icing of wind turbine blades will lead to blade wear, load increase and affect power generation. In this paper, machine vision monitoring is the main focus, and laser displacement sensor is used ...

Wind Tunnel Study of the Electro-Thermal De-Icing of Wind Turbine Blades

of an electro-thermal de-icing system for wind turbine blades, an experimental set-up was built and used to test the system under icing conditions in a refrigerated wind tunnel. The ...

Contact Us

For catalog requests, pricing, or partnerships, please visit: https://ian-solar.co.za