VDB Solar Solutions

Wind turbine blade bolts

Overview

What are wind turbine blade bolts?

Wind turbine blade bolts are generally stud bolts [27]. Take the bolt of type GB899-1988 as an example, as shown in Figure 1; one end is connected to the hub, and the other end is fastened at the root of the blade by pre-embedding.

What is the load state of a wind turbine blade root bolt?

The load state of bolts is usually complex, including traction, shear and bending. Fatigue due to bending loads has been appointed as a failure cause in a megawatt-class wind turbine blade root bolt . Wang et al. suggested the importance of shear fatigue for a higher accuracy of fatigue design. .

Did wind turbine blade root bolts break?

The reported failures of the wind turbine blade root bolts in this article occurred at a wind farm of Inner Mongolia province of the People’s Republic of China. After just 3 years of performance, the root bolts of the turbine blade suddenly were broken, and the blade fell off to the ground.

What causes a fractured high strength bolt in a mw class wind turbine?

Failure analysis of a fractured high strength bolt used in a MW Class wind turbine blade connection system was conducted to clarify the failure cause and to determine the prevention method. Applying detailed mechanical characteristics and metallurgical investigations, the bolts failure cause can be attributed to bending fatigue.

Does a high-strength wind turbine blade root Bolt have a decarburization layer?

The failure analysis of a high-strength wind turbine blade root bolt was conducted in this study. It can be revealed from the hardness, chemical characterization and metallographic test that there exists a significant decarburization layer beneath the bolt threaded surface.

What are the common failures of wind turbine blade bolts?

The common failures of wind turbine blade bolts are mainly bolt loosening and bolt breakage. Figure 3 shows the state of the blades of the wind turbine in different operating states.

Wind turbine blade bolts

Reduction of Stress Concentration Factor (SCF) on the Bolted ...

The importance of a reliable blade root connection has grown due to the higher-gravity-induced edgewise loads on the blade root that resulted from the recent increased size ...

Failure Analysis of a MW-Class Wind Turbine Blade Root Bolt

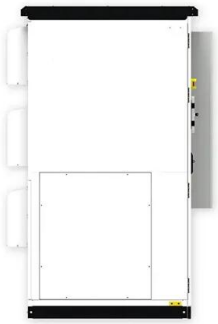
Failure analysis of a fractured high strength bolt used in a MW Class wind turbine blade connection system was conducted to clarify the failure cause and to determine the ...

The Concept of Segmented Wind Turbine Blades: A Review

There is a trend to increase the length of wind turbine blades in an effort to reduce the cost of energy (COE). This causes manufacturing and transportation issues, which have given rise to ...

Bolting applications, part 1 , Wind Systems Magazine

High-strength bolts are used on nearly all wind turbine major component assemblies including base and tower sections, blades, hubs, and main shafts. Such bolting is ...



Fault Detection for Wind Turbine Blade Bolts Based on GSG ...

wind turbine blade bolts. Wind turbine blade bolts are generally stud bolts [27]. Take the bolt of type GB899-1988 as an example, as shown in Figure1; one end is connected to the hub, and ...

Time-domain fatigue assessment for blade root bolts of floating

In the past two decades, S-N curves (or ?-N curves) and PM rule based approaches were gradually developed for fatigue assessment for the blade of an offshore wind ...

Analysis and Research on the Cause of Wind Turbine ...

In 2019, inspection personnel of a wind farm went to the tower and found that a total of 6 bolts of blades in the hub of a wind turbine had broken and failed. In order to find out the cause of

Fatigue fracture failure analysis of wind turbine blade root bolt

susceptible to fatigue and, in severe cases, fracture[4]. The M42 high-strength bolt, a vital component connecting turbine blades to the tower frame in large-scale wind turbine units, ...

Fatigue Life Prediction for Flange Connecting Bolts of Wind Turbine ...

The wind turbine tower is composed of many sections, and each adjacent section is connected by the bolts which are arranged evenly along the flange ring. The flange connection is the ...

The Parts of a Wind Turbine: Major Components Explained

These turbines have rotor blades just over 115m long. 5 When rotating at normal operational speeds, the blade tips of a 15MW wind turbine sweep through the air at ...

Time-domain fatigue assessment for blade root bolts of floating

Analysis and Research on the Cause of Wind Turbine Blade Bolt Fracture. Feng Yun J. Liu Chunyu Liu Xiaochun Zhao. Engineering, Environmental Science. Journal of ...

Failure Investigation of the Wind Turbine Blade Root Bolt

in the maintenance of the turbines and the bolts that con-nect the turbine blades with the flanges [1]. The reported failures of the wind turbine blade root bolts in this article occurred at a wind ...

Failure Analysis of a MW-Class Wind Turbine Blade Root Bolt

ducted detailed stress analysis of a fractured wind turbine blade root bolt, and the main fracture reason was con-tributed to the structure's low-temperature fracture toughness [2].

An experimental study on the identification of the root ...

Up to now, the actual wind turbine blade bolt failure is mainly found by manual regular inspection. Some of the research on wind turbine blade bolts is based on finite element software for fatigue assessment, analyzing the impact of ...

IoT platform for offshore wind turbine blade structure health ...

estimation of the deployment of wind turbines and their impact on reducing CO 2 from 2008 to 2030. It is clear that wind energy will continue to play a significant role in producing green ...

Failure Investigation of the Wind Turbine Blade Root Bolt

The failure analysis of the high-strength bolt at root position of the wind turbine blade was conducted to find the cause of fracture. Detailed investigations using several ...

Home , EchoBolt

As existing assets age and new larger wind turbines are deployed in ever harsher environments, assurance of structural integrity of wind turbines is an increasingly vital activity for the sector. ...

High Strength Anchor Bolt and Other Bolt used in ...

Bolts that connect wind turbine blades, mainly non-standard stud bolts and T-shaped round nuts for some products. Bolts and screws are 10.9, a few are 8.8; nuts are 10, 8; the hardness of the gasket is 35-45HRC, these varieties must ...

Experimental estimation of the residual fatigue life of in-service wind

Kong et al. [20] described the structural design of a composite wind turbine blade considering fatigue life. K. Ha [21] used 2D and 3D finite element models to determine ...

Wind Energy Tower Turbine Bolts and Nuts

A wind turbine's nuts might be the most important part of the machine. These bolts are used to connect the wind turbine's blades to the hub, where the shaft meets the generator. The rotor ...

Where are bolts used in a wind turbine?

Wind turbines, like helicopters, are fatigue machines--always vibrating and working to loosen their fasteners. More vibration will come as engineers develop longer blades ...

Tension and torque tools for wind turbines

Find a list of all tension and torque tool applications on wind turbines: Foundation bolts , tower segment bolts , gearbox bolts , rotor bolts , yaw bearing bolts , rotor blade bolts and ...

Failure Investigation of the Wind Turbine Blade Root Bolt

The failure analysis of the high-strength bolt at root position of the wind turbine blade was conducted to find the cause of fracture. Detailed investigations using several characterization techniques such as stress ...

Failure Investigation of the Wind Turbine Blade Root ...

The failure analysis of the high-strength bolt at root position of the wind turbine blade was conducted to find the cause of fracture. Detailed investigations using several characterization techniques such as stress ...

Fault Detection for Wind Turbine Blade Bolts Based on GSG ...

The dataset of wind turbine blade bolts in this study has a total of 48 features, and Table 1 lists the importance values of some features, where the initial letters of the feature ...

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