

Hollow shaft of wind turbine generator

Can lightweight rotor shaft design be used in a wind turbine?

Through the application of the lightweight design methodology to the rotor shaft for a wind turbine, 20% material could be saved in the trumpet section of the optimized hollow rotor shaft in comparison to the raw design, but with fulfilment of the failure criterion.

What is a wind turbine rotor shaft made of?

The stated potential of GJS manufactured in permanent metal moulds and its unknown specific material properties led to the research project "Gusswelle". The main objective is the optimization of design possibilities for wind turbine rotor shafts. Therefore, a raw hollow rotor design shaft made of EN-GJS-400-18-LT chill cast is developed.

What is the hollow rotor shaft design methodology?

The hollow rotor shaft design methodology is divided into different interdependent steps (Fig. 1). Involved in the design process are Fraunhofer LBF, Fraunhofer IWES and a participating foundry. Fraunhofer LBF determines the cyclic material behavior of EN-GJS-400-18-LT chill cast.

Can chill cast be used for wind turbine rotor shaft design?

The main objective is the optimization of design possibilities for wind turbine rotor shafts. Therefore, a raw hollow rotor design shaft made of EN-GJS-400-18-LT chill cast is developed. The project partner Fraunhofer LBF investigates the cyclic material behaviour of chill cast nodular cast iron.

What is optimized hollow rotor shaft?

Based on material investigations of EN-GJS-400-18-LT chill cast, an optimized hollow rotor shaft is developed. The design process and the resulting shaft design are presented. The optimized hollow rotor shaft prototype will be tested on a full-scale test bench to validate the design methodology.

Is inner ring creep relevant for hollow rotor shafts of wind turbines?

Therefore, inner ring creep is highly relevant for hollow rotor shafts of wind turbines with thin walls and low contact pressure. The prediction methodology for inner ring creep used in this case is based on the finite element simulation of the main shaft fatigue test bench.

The component at the heart of this project is a cast-iron hollow rotor shaft for wind turbines. Earlier project results on an optimized hollow rotor shaft design and the underlying design process ...

Synchronous Generator Synchronous Generator as a Wind Power Generator. Like the DC generator in the previous tutorial, the operation of a Synchronous Generator is also based on Faraday's law of electromagnetic induction, ...

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To realize large wind power plants in an economically feasible way, it is necessary to identify potential for lightweight design of the generator hollow-shafts, which are commonly produced ...

The generator is driven by a split-shaft drivetrain that decouples the turbine's shaft from the shaft of the generator to provide independent control of their angular velocities.

An innovatory concept of open-die forging of windmill main shaft is described. Comparative study of the new technology based on the concept of cogging hollow shaft on mandrel featuring ...

shaft is given in Fig 3. Due to the tangential force of the wind, the power is delivered to the shaft and transmitted to the various members that are linked to the shaft. To transfer the power from ...

This chapter reviews the aerodynamic characteristics of horizontal axis wind turbines (HAWTs). While the aerodynamics of wind turbine are relatively complicated in detail, the fundamental operational principle of a ...

In the traditional design and previous studies of wind turbine drivetrains, Qin et al. [1], [2], [3] studied the internal excitation of the gear system (such as bearing support ...

A wind turbine is a mechanical machine that converts the kinetic energy of fast-moving winds into electrical energy. The energy converted is based on the axis of rotation of the blades. The small turbines are used for ...

Download scientific diagram | Hollow rotor shaft design process from publication: Optimized cast components in the drive train of wind turbines and inner ring creep in the main bearing ...

The paper describes a rolling process for a hollow Ti6Al4V alloy shaft used in driving systems of light trucks. The shaft is formed by skew rolling using three tapered rolls.

The main shaft (low speed shaft), is a basic element of a wind turbine. As it connects the generator and the rotor hub (Figure 1), severe service conditions of cyclic loading impose high ...

