

Generator rotor blade pull-off force

Can a magnetic pull force model be used in generator rotors?

The article [17] developed a new magnetic pull force model and rotor model for a wide range of external forcing frequencies. The model emphasizes the importance of the tangential component of the UMP compared to the previous model. The theory can be used in the design and analysis of generator rotors.

What causes a generator rotor to degrade?

One component of the generator that is typically refurbished, upgraded or updated is the generator rotor (field). Degradation of the generator field can be caused by a number of factors, including a breakdown in insulation due to time and temperature and mechanical wear.

Does a gas generator rotor work with blade off?

The gas generator rotor, which is the core component of the aero-turboshaft engine, usually runs between the second-order critical speed and the third-order critical speed and has richer dynamic characteristics than simple rotors. At present, works on the dynamic response of the turboshaft aero-engine with blade off are not reported.

What is a rotor blade in a wind turbine?

The rotor blade is the key component of a wind turbine generator (WTG) and converts the energy of the wind into a mechanically useful form of energy. It represents a significant cost factor in the overall context of the turbine and at the same time has an enormous impact on the yield of the turbine.

Are generator rotor and turbine runner deformed?

It is assumed that the generator rotor and turbine runner are not deformed during the operation of the unit, while the effect of the torsional action of the main shaft is ignored and the influence of the mass of the rotor shaft and the thrust bearing on the vibration state of the unit system is not considered.

What happens if a generator rotor is damaged?

This degradation can lead to shorted turns, a field ground, or an in-service operational incident that can require premature maintenance work. The type of work needed to repair and upgrade depends upon the generator rotor design, length of time in service and the manner in which the rotor was operated.

The rotor eccentricity is a typical manifestation of unit vibration, and the unbalanced magnetic pull force non-linearity of the unit under different vibration conditions is the key research object of rotor system modal analysis. As the eccentricity of the generator rotor increases, the unbalanced magnetic pull shows a non-linear trend to increase.

Finite-element-method-based modeling of the electrical machine unbalanced magnetic pull and active magnetic bearing forces is carried out, and the results are used in the harmonic force analysis ...

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Therefore, it is of interest to calculate the forces that arise in a large synchronous generator with an eccentric rotor and study the influence these forces have on the stability of the generator ...

Hydraulic turbine generator sets are crucial for harnessing water energy. However, the nonlinear phenomena resulting from the combination of unbalanced magnetic pull (UMP) and oil film forces ...

In order to study the transient dynamic characteristics for complex rotors suffering from blade off, a mathematical model for solving the response of the gas generator rotor in the aero-turboshaft engine is ...

Effect of Generator Rotor Radial Deviation on the Unbalanced Magnetic Pull of 1000 MW Hydro-Generator Unit. ... magnetic pull force model and rotor model for a wide range of external forcing ...

Purpose In this paper, the combined rotor system of turbo-generator is taken as the research object, and the variation law of interface contact stress, contact stiffness and torsional natural frequency of the combined rotor system during operation is deeply analyzed. Method A three-dimensional cross-scale dynamic model of the rotor is proposed based on the ...

A detailed review of the current state-of-art for wind turbine blade design is presented, including theoretical maximum efficiency, propulsion, practical efficiency, HAWT blade design, and blade loads. The review provides a complete picture of wind turbine blade design and shows the dominance of modern turbines almost exclusive use of horizontal axis rotors. The ...

In addition, installed on the spindle without elastic conjunction, blade No.10 vibrated and inevitably. spun off due to the large centrifugal force. Therefore, blade No.10 first cracked at the ...

The UMP as a function of terminal voltage and load is investigated for a typical hydroelectric generator with an off-centered rotor. The paper will in particular treat how iron saturation affects the magnitude of the magnetic pull force. ...

The results of this study suggest that the excretion coefficient of the runner inlet, the initial position angle of the turbine blade, the up guide bearing, and the mass of the ...

occurs, the air-gap field will be distorted, and generator rotor will be affected by unbalanced magnetic pull (UMP), thus the rotor will generate a radial vibration [15]. This provides the possibility to realize ISCFW on-line monitoring by means of collecting the generator rotor vibration signal of rotor and

Therefore, various electromagnetic parameters are required to calculate the unbalanced magnetic pull force of the generator under no-load operating conditions based on the no-load characteristic curve of the generator. ... The absolute eccentricity of the rotor is preset to be $e = 4.3724$ mm, and the unbalanced magnetic pull force on the rotor ...

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The AH-1G helicopter rotor blade (Fig. 9.11) was selected for the numerical investigation of the forward flight conditions. During The Tip Aerodynamics and Acoustics Test (TAAT), performed by Cross and Watts, several arrays of absolute pressure transducers were placed on the rotor blades providing a large set of data. This flight test campaign ...

In [23], a rotor dynamic model of electromechanical coupling was obtained to describe the rotor stability of the nonlinear magnetic pull under various shapes in the rotor, and the dynamic ...

The authors used a two-dimensional (2-D) finite element (FE) calculation approach and the MST method to analyze the magnetic pull force versus load. The article developed a new magnetic ...

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