

Generator blade deformation

Does a deforming blade turbine over-predict the turbine performance?

For the deforming blade turbine, CP was predicted to be 1.9% lower at the design TSR. Therefore, a computation without considering the deformation may over-predict the turbine performance. The de-twisted blade by torsion reduced the power.

Can a deformation computation over-predict turbine performance?

Therefore, a computation without considering the deformation may over-predict the turbine performance. The de-twisted blade by torsion reduced the power. As the blade was de-twisted, the local angle of attack of the corresponding blade section was decreased to minimize the drag force of the blade.

Why do wind turbine blades rotate at a certain angular speed?

When wind turbine blades rotate at a certain angular speed in practical work, the coupling of the deformation and motion of slender flexible elastomer structures leads to dynamic stiffening and spin softening effects, which further affect the dynamic characteristics of the blades.

Why do wind turbine blades have a stiffening effect?

With the large-scale development of wind turbines, large flexible blades bear heavier loads. In the actual rotating work of blades, the coupling of structural deformation and motion produces a dynamic stiffening effect and spin softening effect, which affects the dynamic characteristics of blades.

How rotor blades affect the cost of wind turbines?

Economist recommendation is focusing on optimization of wind turbines design aspects including size, blade material, control devices, forecasting techniques, and financial funds. Besides, the contribution of the rotor blade cost to overall cost is 22% as estimated in .

Why is it important to calculate the blade vibration mode?

It is of great significance to calculate the blade vibration mode and analyze the coupling effect between the rotation of the blade and its elastic deformation for improving the performance of the wind turbine and the safe operation of the wind turbine.

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