عنوان مقاله:

Strength Analysis of Low-speed Shaft under Rotor-lock Status in a ۲.۵ MW Wind Turbine

محل انتشار:

سی و یکمین همایش سالانه بین المللی مهندسی مکانیک ایران و نهمین همایش صنعت نیروگاهی ایران (سال: 1402)

تعداد صفحات اصل مقاله: 6

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خلاصه مقاله:

This study presents strength analysis of rotor lock (lockbolt) and low-speed shaft (or main shaft) in a ۲.۵ MWwind turbine under load cases of transport, erection,maintenance and repair. The rotor lock prevents themotion of the main shaft in these situations. Since therotor lock is a safety-related component, its structuralstability and strength is an important issue. Finiteelement analysis was conducted to evaluate the safecondition of the assembly when design torques due toextreme loads of rotor locking were applied. The vonMises stresses and corresponding safety factors werecalculated. It was observed that for three calculatedtorques of holding rotor in different load cases, the mainshaft design was safe and could withstand all torqueswithout failure (with some plasticity in lock region).Regarding the rotor lock bolt, the plastification of itshould be avoided to prevent the failing of itsfunctionality. However, the FE results showed that onlyT۱ in DLC ۸.۱ could be withstood by rotor lock withoutcausing plasticity in it and for other load cases,plasticity occurred in rotor lock. As mentioned in GLguideline, by ensuring that only applying the rotor lockwhen qualified personnel with technical training ispresent at the wind turbine, it is possible to design therotor lock for DLC ۸.۱ .only

کلمات کلیدی:

wind turbine, rotor lock, main shaft

لینک ثابت مقاله در پایگاه سیویلیکا: