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文章名称: 34m复合材料风力发电机组叶片屈曲有限元分析*-----李成友 等

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:: 文章简介 ::

摘要: 采用有限元分析的方法解决了叶片的静强度和屈曲稳定性问题。首先, 阐述了利用MSC .Patran建立复合材料叶片的有限元模型的步骤和方法; 其次, 利用蔡-吴(E.M.Wu) 失效准则和Hill-蔡 (S.W.Tsai) 强度理论校核了几种主要承力材料的强度; 最后, 结合有限元二阶屈曲模态计算结果, 讨论了风机叶片结构的屈曲稳定性。

关键词: 风力发电机; 叶片; 复合材料; 有限元分析

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Finite Element Analysis of Buckling in the 34m Composite Material Wind Turbine Blades

Abstract: The aim of this paper is to investigate the static strength and buckling stability of the 34m composite wind turbine blades (CWTBs). Because the geometric shape and boundary of the wind turbine blades are complicated, the finite element method is used to analyze this problem. First, based on the MSC.Patran, the procedures of the finite element modeling for the CWTBs are discussed. Next, the strength of main materials in CWTB is checked with the E.M.Wu failure criterion and S.W. Tsai strength theory. Finally, the buckling stability of the CWTBs is discussed on the basis of calculation for two-order buckling mode of CWTBs.

Key words: wind turbine; blade; composite material; finite element analysis

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