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模態振頻於風機葉片壽命評估之應用

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摘要

本研究目的以風機葉片模態振頻之變化，藉以評估風機葉片壽命之狀況。並以核研所自製 25kW 風機經過實際運轉 7 年之葉片進行模態測試，測試結果顯示其目前模態振頻與出廠值相比下降達 33%。此外葉片亦經過紅外線熱像非破壞性檢測，結果顯示葉片確有多處受損，因而驗證以模態振頻變化評估葉片壽命之可能性。

關鍵詞：風機葉片 、模態振頻、非破壞性檢測。

Abstract

This study is to evaluate the life of the blade of wind turbine via the difference of modal frequency. In the paper, the blade of the 25kW wind turbine (INER-C25A) which has been operated for 7 years was examined by modal tests. The modal test result shows that currently the modal frequency of blade is 33% lower than that of the factory one. Moreover, the infrared thermography, a non-destructive test, was also performed to examine the blade. The result shows there are indeed several defects within the blade. Therefore, the possibility of evaluating the life of the blade of wind turbine via the difference of their modal frequency was verified.

Keywords: blade of wind turbine, modal frequency, non-destructive test.