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ACOUSTIC EMISSION MONITORING OF A WIND TURBINE BLADE DURING A FATIGUE TEST*^Ψ

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ABSTRACT

A fatigue test of a wind turbine blade was conducted at the National Renewable Energy Laboratory. Acoustic emission monitoring of the test was performed, starting with the second loading level. The acoustic emission data showed that this load exceeded the strength of the blade. An oil can type of deformation was seen in two areas of the upper skin of the blade from the beginning of the second loading. One was near the blade root and the other was at about 35% of the span. The acoustic emission data indicated that no damage was taking place near the root, but in the deforming area at 35% span, damage occurred from the first cycles of the second load. The test was stopped after approximately one day, although no gross damage had occurred. Several weeks later the test was resumed. Gross damage occurred in approximately one half hour. The emission data showed evidence of a possible second damage site.

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