

CONTRACTOR REPORT

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**FATIGUE OF FIBERGLASS WIND TURBINE
BLADE MATERIALS**

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ABSTRACT

Fatigue behavior for a variety of generic materials used in wind turbine blades has been explored. Coupon testing was carried out under constant amplitude tensile fatigue loading to beyond 10^7 cycles for most materials. Unidirectional materials performed close to expectations despite fiber misalignment. Materials with triaxial (0/+45) reinforcement showed greater fatigue sensitivity than expected, but lifetime trends flattened at high cycles. The uniaxial and triaxial materials could be normalized to a single S-N lifetime trend for each case. Results include the effects of differing matrix materials, manufacturing methods, reinforcement structure, and ply terminations. Materials were supplied by Phoenix Industries and US WindPower.

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