

# On the Fatigue Analysis of Wind Turbines

by

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## Abstract

Modern wind turbines are fatigue critical machines that are typically used to produce electrical power from the wind. Operational experiences with these large rotating machines indicated that their components (primarily blades and blade joints) were failing at unexpectedly high rates, which led the wind turbine community to develop fatigue analysis capabilities for wind turbines. Our ability to analyze the fatigue behavior of wind turbine components has matured to the point that the prediction of service lifetime is becoming an essential part of the design process. In this review paper, I size the technology and describe the "best practices" for the fatigue analysis of a wind turbine component. The paper focuses on U. S. technology, but cites European references that provide important insights into the fatigue analysis of wind turbines.