

# **Extreme Load Estimation for Wind Turbines: Issues and Opportunities for Improved Practice**

Paul S Veers  
Wind Energy Technology Department  
Sandia National Laboratories

Sandy Butterfield  
National Wind Technology Center  
National Renewable Energy Laboratory  
Golden, CO 80401-3393

## **ABSTRACT**

Current design load estimation procedures for wind turbines often do not accurately treat the statistical nature of loads. Current practice for wind turbine load analysis is reviewed. The authors' opinions on the shortcomings of these practices are discussed. Experience gained from current research on statistical load extrapolation methods is reviewed. Statistical modeling techniques are presented. Open questions on current techniques are summarized and critical issues that need to be resolved for an accurate statistical load extrapolation method are discussed.