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**STRUCTURAL DESIGN OF THE SANDIA 34-METER
VERTICAL-AXIS WIND TURBINE**

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ABSTRACT

Sandia National Laboratories, as the lead Department of Energy laboratory for Vertical-Axis Wind Turbine development, is currently designing a 34-m diameter Darrieus-type vertical-axis wind turbine. This turbine will be a research test bed that provides a focus for advancing technology and validating design and fabrication techniques in a size range suitable for utility use. Structural data from this machine will allow structural modeling to be refined and verified for a turbine on which the gravity effects and stochastic wind loading are significant. Performance data from it will allow aerodynamic modeling to be refined and verified. This design effort incorporates Sandia's state-of-the-art analysis tools in the design of a complete machine. In this report I describe the analytic tools we are using, summarize the conceptual design procedure, and present portions of our detailed design as it existed in September 1984.

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