

SANDIA REPORT

SAND82-0345 UC-261

Unlimited Release

Printed October 1982

**FINITE ELEMENT ANALYSIS AND MODAL
TESTING OF A ROTATING WIND TURBINE**

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ABSTRACT

A finite element procedure, which includes geometric stiffening, and centrifugal and Coriolis terms resulting from the use of a rotating coordinate system, has been developed to compute the mode shapes and frequencies of rotating structures. Special application of this capability has been made to Darrieus vertical axis wind turbines. In a parallel development effort, a technique for the modal testing of a rotating vertical axis wind turbine has been established to measure modal parameters directly. Results from the predictive and experimental techniques for the modal frequencies and mode shapes are compared over a wide range of rotational speeds.

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550
for the United States Department of Energy
Under Contract DE-AC04-94AL85000