

SAND2008-4809
Unlimited Release
Printed August 2008

Active Load Control Techniques for Wind Turbines

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Sandia Contract No. 360473

ABSTRACT

This report provides an overview on the current state of wind turbine control and introduces a number of active techniques that could be potentially used for control of wind turbine blades. The focus is on research regarding active flow control (AFC) as it applies to wind turbine performance and loads. The techniques and concepts described here are often described as "smart structures" or "smart rotor control". This field is rapidly growing and there are numerous concepts currently being investigated around the world; some concepts already are focused on the wind energy industry and others are intended for use in other fields, but have the potential for wind turbine control. An AFC system can be broken into three categories: controls and sensors, actuators and devices, and the flow phenomena. This report focuses on the research involved with the actuators and devices and the generated flow phenomena caused by each device.