Review paper on wind turbine aerodynamics

The paper describes the development and description of the aerodynamic models used to estimate the aerodynamic loads on wind turbine constructions. This includes a status of the capabilities of computation fluid dynamics and the need for reliable airfoil data for the simpler engineering models. Also a discussion of the use of passive and active aerodynamic devices is included such as, e.g., Vortex Generators and distributed active flaps. Finally the problem of wakes in wind farms is addressed and a section of the likely future development of aerodynamic models for wind turbines is included. © 2011 American Society of Mechanical Engineers.