2-D CFD Computations of the Two-Bladed Darrieus-Type Wind Turbine - DTU Orbit
(11/11/2019)

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In spite of the attractiveness of CFD methods and advanced measurement methods, there is still no full analysis of aerodynamic blade loads for vertical axis Darrieus-type wind turbines. Due to an inherently unsteady flow around the rotor blades, blade-wake-blade interaction and the occurrence of dynamic stall, the aerodynamics of this type of wind turbine is very complex. A two-bladed rotor have been investigated numerically for the tip speed ratio of 5.0. This paper compares results for aerodynamic blade loads obtained applying such turbulence models as: the standard k-epsilon; the RNG k-epsilon; the Realizable k-epsilon and the SST k-omega. As a result, quantitative instantaneous blade forces as well as instantaneous wake profiles behind the rotor have been obtained. Aerodynamic wake behind the rotor is also visualized by using streak lines. All CFD results are compared with experimental data taken from literature. Good agreement between the numerical results and the experiment is shown for the aerodynamic blade loads as well as for aerodynamic wake behind the rotor.

General information
Publication status: Published
Organisations: Fluid Mechanics, Department of Wind Energy, Warsaw University of Technology
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Pages: 835-845
Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: Journal of Applied Fluid Mechanics
Volume: 11
Issue number: 4
ISSN (Print): 1735-3572
Ratings:
Scopus rating (2018): CiteScore 1.22 SJR 0.367 SNIP 0.708
Web of Science (2018): Impact factor 0.914
Original language: English
Electronic versions:
28383_062418053946_1_.pdf
DOIs:
10.18869/acadpub.jafm.73.247.28383
Source: FindIt
Source ID: 2438987810
Research output: Contribution to journal › Journal article – Annual report year: 2018 › Research › peer-review