Dynamic stall model modifications to improve the modeling of vertical axis wind turbines -
DTU Orbit (28/10/2019)

Dynamic stall model modifications to improve the modeling of vertical axis wind turbines
The Beddoes-Leishman type dynamic stall model was originally implemented in HAWC2 with a focus on horizontal axis
wind turbines. In case of HAWTs, some terms in the unsteady airfoil lift and drag are very small and can be neglected,
which are very important for VAWTs. Furthermore, the angle of attack variations during normal operation of VAWTs are by
far larger than those occurring on HAWTs. This posed a challenge to the Beddoes-Leishman-type dynamic stall model,
which had previously been validated for small variations in angle of attack against CFD and measurements. This report
contains some necessary modifications of the Beddoes-Leishman type dynamic stall model in HAWC2 to enable unsteady
aerodynamic
computations on VAWTs. A short validation against measurements of the NREL/NASA Ames Phase VI rotor in standstill is
included. There, it is shown that the model changes have only a small, but beneficial effect at small angle of attack
variations.

General information
Publication status: Published
Organisations: Department of Wind Energy, Wind turbine loads & control, Aerodynamic design
Contributors: Pirrung, G., Gaunaa, M.
Number of pages: 16
Publication date: 2018

Publication information
Original language: English
(DTU Wind Energy E: No. 171).
Electronic versions:
report_E_0171.pdf
Source: PublicationPreSubmission
Source ID: 149926450
Research output: Book/Report › Report – Annual report year: 2018 › Research › peer-review