CESARE'17
International Conference Coordinating Engineering for Sustainability and Resilience
Dead Sea, 3-8 May 2017

WIND TURBINE LOAD SIMULATIONS USING TWO DIFFERENT SERVO-HYDRO-AEROELASTIC SOFTWARE CODES

Mohammad Reza Shah Mohammadi[1], Paul Thomassen[2] and Carlos Rebelo[3]

[1] ISISE, Department of Civil Engineering, University of Coimbra, P-3004 516, Coimbra, Portugal, mrsm@uc.pt
[2] Simis AS, Leonardvegen 3, 7790 Malm, Norway, paul.thomassen@simis.io
[3] ISISE, Department of Civil Engineering, University of Coimbra, P-3004 516, Coimbra, Portugal, crebelo@dec.uc.pt

Keywords: Wind Turbine, Aeroelastic Simulation, Code Assessment

ABSTRACT

In this paper, the exemplary results of the comparison between FAST [1] and ASHES [2] software used to perform servo-hydro-aeroelastic simulations are presented. The focus of this paper has been the assessment of wind turbine modeling codes through code-to-code comparisons. The lack of similarities between the results will be shown and the sources of the differences will be discussed. The aerodynamic load calculation in the form of internal cross-section forces along the blades and the tower will be investigated. Moreover, the dynamic response of the structure is obtained in the simulation results and the tower-blade tip clearance will be certified. Furthermore, attention is given to the generator model, outputs and the pitch control system. The comparison will be done based on IEC 61400-1 [3] design load cases for operation and idling conditions. Finally, recommendations concerning the modeling of the wind turbine with the servo-hydro-aeroelastic simulation tools will be given.

REFERENCES

[1] J. M. Jonkman and M. L. J. Buhl, Eds., "FAST User's Guide - Updated August 2005." 2005.
[2] P. E. Thomassen, P. I. Bruheim, L. Suja, and L. Frøyd, "A Novel Tool for FEM Analysis of Offshore Wind Turbines With Innovative Visualization Techniques," in *Proceedings of the Twenty-second (2012) International Offshore and Polar Engineering Conference*, 2012, vol. 4, pp. 374–379.
[3] International Electrotechnical Committee, "International Electrotechnical Committee (IEC) 61400-1," 2006.