Wind Energ. Sci. Discuss.,
https://doi.org/10.5194/wes-2020-6-RC1, 2020

eawe european academy of wind energy
Open Access WIND ENERGY SCIENCE DISCUSSIONS

Interactive comment on "Validation and accommodation of vortex wake codes for wind turbine design load calculations" *by* Koen Boorsma et al.

Anonymous Referee #1

Received and published: 28 January 2020

This paper presents: *A comparison between CFD, vortex-wake methods, and BEM results, including the influence of shear and turbulence, with suggestions for how to improve lower-fidelity solutions based on the insights gleaned from higher-fidelity solutions *A validation of the BEM and vortex-wake methods against measured field data from a full-scale wind turbine. *Recommendations on when to apply vortex-wake methods based on operational condition and IEC design load case.

Overall, the paper is well written, the results appear to be scientifically sound, and the results are informative. A few corrections and clarifications are warranted to approve the final publication. Please find specific comments and technical corrections below:

Printer-friendly version

Discussion paper

Specific Comments (Section/ Line / Comment): - / - / The code-to-code results of section 2 seem very valuable for other BEM and vortex methods to compare to. Can these results be shared publicly, e.g., through a website? 2.1 / - / A couple comments. The general capability of each model is less important than the specific models employed in the study; suggest focusing only on the specific models employed. Also, for the BEM and vortex methods, it would be useful to add a table comparing/contrasting which models are employed, as well as the time/space discretizations used. The various subsections are a bit mixed now. 2.3 / 209 / The text says shear is neglected from case Nr 1. Is that the same for all cases? 2.3 / - / It would be useful to add a table comparing the computational expense, including real time and number of cores. 2.3 / 216 / Were the rotor speed and pitch derived from one simulation and applied to all simulation model, or just applied to the CFD? It would be preferred if they were applied to all simulations. 2.4 / 368 / It would be useful to add a figure to clarify this approach of sector averaging. 3.2 / 413 / What is meant by "standard error the mean" when sigma contains the standard deviation? 3.2 / 422 / Where the data provided by the manufacturer (especially aero) calibrated based on the field measurements? 3.2 / 425 / Was just the TI matched, or also the mean profile (shear), turbulence spectra, spatial coherence, Reynolds stresses? 4.1 / - / It would be also useful to mention that geometric details such as curvature, sweep, and/or deflection are also better captured by vortex methods over BEM. 4.1 / - / This discussion is useful, but perhaps a bit out of place considering that no results are presented showing the differences between BEM and vortex methods for these load cases. Perhaps save this for a future publication where results will be presented? 4.1 / 528 / DLC 6.X consider the turbine parked or idling, where the wake is expected to be minimal. Wouldn't a geometric AoA (without induction) suffice? 4.2 / 560 / The reviewer is unclear what is presented here. What is meant by "relative to the average..."?

Technical Corrections (Section / Line / Comment): 1/ 17 / The first two sentences are a bit odd for an international journal. Suggest making more generic or discussing international growth. 2.1.4 / 153 / Add a space between "model" and "Snel". 2.3.2 /

249 / Change "serie" to "series". 2.3.3/ - / The data of Table 3 would be interpreted better as a bar chart. 2.4 / 349 / The "W" in atan2 should be changed to "U". 2.4 / 353 / The reviewer's understanding is that these simulations considered a rigid structure, so, there is no torsion deformation. 3.2 / 409 / Clarify that "m=10". 3.2 / 424 / Change "Turbsim" to "TurbSim". 3.2 / - / Are the units on the legend purposely missing, e.g., to normalize the data?

Interactive comment on Wind Energ. Sci. Discuss., https://doi.org/10.5194/wes-2020-6, 2020.

Printer-friendly version

Discussion paper