

## Comment on wes-2021-163

Anonymous Referee #1

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Referee comment on "How should the lift and drag forces be calculated from 2-D airfoil data for dihedral or coned wind turbine blades?" by Ang Li et al., Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2021-163-RC1>, 2022

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The authors introduced a new correction to account for dynamic effects in turbine blades with complex out-of-plane shapes (pre-coned, dihedral). The latter consists in the use of two reference points for the computation of aerodynamic forces from input 2D polar data. Quarter-chord position is used to assess the aerodynamic force direction, the three-quarter chord one for the evaluation of its magnitude. This new formulation has been implemented in different low-order models (LLT, BEM, BEVC and ALM) and validated against blade-resolved CFD simulations of a large-scale rotor, showing promising results. The reviewer believes that the topic and the activity are very interesting, innovative and worthy of investigation. The study is extensive and the investigation approach is adequate and consistent throughout the whole activity. Notwithstanding this, the paper is not very well presented and some conceptual passages are not clear. Some specific considerations:

- Abstract: it is not clear why the BEM belongs to the Lifting Line (LL) class of methods (line 3)
- Abstract: the passage at lines 5-8 is not very clear
- Section 1 (Introduction): the relationship between low-order models, dynamic stall models and the proposed correction is not very clear. The author should also discuss better what is the advantage of the proposed solution with respect to a modern dynamic stall model such as the Beddoes-Leishman one, which, according to what stated by the authors in the conclusions, is able to yield the same results
- Section 3: the demonstration of the proposed solution from the unsteady thin airfoil theory is quite hard to follow. In the Reviewer's opinion, it would be better to divide the demonstration according to the specific features of the correction, i.e., what point to use for direction and magnitude of the computed aerodynamic force
- Organization of the content in sections 3 and 4 is quite chaotic, with a lot of redundant information. The Reviewer suggests re-arranging the content in a more concise way, using a table as a support to resume all the different modelling combinations used in the investigation
- The use of the first-person plural (e.g., in line 46) is not recommended for a scientific publication and should be replaced with something more impersonal

Based on the aforementioned comments, the reviewer recommends the publication of this paper after the suggested revisions have been performed.