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Interactive comment on "Development of a Second Order Dynamic Stall Model" *by* Niels Adema et al.

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1.-General comments: The subject of unsteady aerodynamics, dynamic stall and the critical implications that directly has in the aero-elastic damping it is a relevant scientific question with a high technical interest thesedays. The work presented in this paper is a current concern especially as industry is leading to longer and longer blades, where fatigue is starting to provoke some changes in the design of some leading and trailing edge reinforcements and more important some extreme loads under parked conditions are getting more impact into the design. The work presented herein is an improvement of the Snel model and not a new method base of a new scientific idea or based in new insights that stem from experimental work . Although the approach within the study is very suitable, it is recommended to rewrite chaper 3 following a more clear

structure as V. A. Riziotis suggest in his review. There is enough information for others to repeat or verify the work and the results are discussed in an appropriate way, well presented and support the complete discussion. The work includes a good selection of references, but can be completed. Later on the technical corrections section a couple of contributions are suggested. The results obtained herein, the discussion and the conclusions are clear concise and well written. Therefore I recommend publication of the paper after some revision is made to the original text according to the specific comments and technical corrections below.

2.- Specific comments: When dealing with design drivers for blade design, attention should be payed to the completeness of the statements. A couple of cases where the authors may want to consider this follow in the next comments. Although It is well accepted that dynamic stall plays a critical role in fatigue it should market that also extreme loads are amplified under unsteady conditions. As the authors mention in the paper parked and idling failure can occur by fatigue, but it should be take it into account that extreme loads are very relevant especially for the mentioned cases of standstill and idling. In general the design load cases DLC 6.1 6.2 and 6.3 are for extreme loads and DLC 6.4 for fatigue.

In order to facilitate and complete the credit to related work, please included other relevant studies of unsteady aerodynamics for parked blades. The shedding vorticity does not only appear at the very high angles of attack near 90 degrees, but in experimental unsteady data for a parked blade one can see this phenomena even at angles of inflow below 30 and 20 degrees. You can see that in the "A Gonzalez, X Munduate. Unsteady modelling of the oscillating S809 aerofoil and NREL phase VI parked blade using the Beddoes-Leishman dynamic stall model., 2007, Journal of Physics: Conference Series 75 (1), 012020." It is also missing a reference to other previous work, in this case from V.K. Truong, 2016 were he already presented a model to tackle exactly the same target you are presenting here, a modification to his previous 1993 model to include vortex shedding. "V.K. Truong. Modelling Aerodynamics for Comprehensive Analysis of Helicopter Rotors. In Proceedings of the 42nd European Rotorcraft Forum, Lille, France, 5–8 September 2016".

Please, follow the specific technical corrections included in the supplement attached file.

Please also note the supplement to this comment:
https://www.wind-energ-sci-discuss.net/wes-2019-87/wes-2019-87-RC2-supplement.pdf

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