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Interactive comment on "Methodology for the engineering calculation of flaps on Wind Turbines using BEM codes" *by* Maria Aparicio-Sanchez et al.

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The paper outlines a modeling approach for including the aerodynamic effects of moving flaps in BEM based rotor models for horizontal axis wind turbines and provides a number of validations against measured data. The results are encouraging but as explained in the comments below, there are points that need clarification especially regarding the implementation details of the modeling approach. In the description of the modeling approach several points are unclear. 1. Eq (1) contains the X and Y functions that are not specified. In eq (2) "alpha" is used as angle of attack while in Eq(3) the angle of attack changes into an effective angle of attack. Also in Eq (3) the fraction appearing in the 2nd term is not specified. Finally why should C_T be proportional to

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C_N? 2. The semi-empirical delay mentioned in connection to C_M is also not specified. 3. A core radius is mentioned in connection to Eq (7) but again not specified. 4. The passage from Eq(9) to Eq(10) seems to assume that V is approximately equal to the local rotational speed With respect to the validation tests presented in Section 3, 1. There is no reference to the numerical parameters and input that were used nor any discussion on eventual calibrations that were applied. Besides the time step, discussion is needed on how X and Y were defined and how the core size affects the predictions in the rotating cases. Also of significance is to know how many polars were used and how they were obtained. 2. The agreement shown in Figs 4 & 5 is good while that obtained in Figs 6 & 7 is less good. One clear difference between the two cases concerns the Re number. The other concerns the airfoil shape. Could any of the two explain the difference in the quality of the predictions? 3. It would be useful to add comparisons for the drag coefficient if measured data are available. Such a comparison would eventually explain the differences obtained in the C_T predictions shown at the end of the section. 4. Concerning Figs 8 & 9, a) How was the angle of attack measured? b) The predicted angle of attack does not show any hysteresis. Is there an explanation for this? c) the captions of the figures do not agree with their content. 5. In Figs 10-13, the predictions do not show clear convergence to a periodic solution. Is there an explanation to that? 6. In the rotating cases, in addition to the effect of the core size, it would be useful to know the density of the elements that were used and how the transition zone was treated. In the model as presented, the flap corresponds to a discontinuity in its geometry while in the CFD simulations there is a smooth transition. It seems that the core radius introduces some smoothening. However, a similar effect may have been obtained when interpolating the polars along the span direction. 7. The changes in C_N and C_T are presented. I assume that they all refer to the difference with respect to the case without flap deflection. Do the absolute values compare similarly? This is important in view of applying the particular modeling in aeroelastic simulations. Other comments: 1. Is there a reference to the measurements used in the second experiment? 2. In the rotating cases, results from two CFD

codes and one Vortex are used. Please add the relevant references. Also, specify the wind speed in both cases. 3. The use of language in the text may be improved.

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