Referee 2

I am pleased to see that the authors have taken most of the reviewers' comments constructively onboard. As a result of that, the manuscript has considerably improved. Before I can recommend the paper for acceptance though, I would encourage the authors to take another look at Kollár's work. Specifically, table 6.10 of chapter 6. The model therein is able to produce fully populated stiffness matrices, so I believe the authors are factually wrong stating "the approach does not consider the coupling terms, e. g., for extension-twist or bend-twist coupling."

I fully appreciate that implementing another model from scratch would be a lot of work and I am not demanding that that's done to recommend the paper is accepted, but I would like the authors to have another opportunity to consider Kollár's work. Including that model in the paper (or discarding it with the right justification) would greatly benefit the community.

Dear Reviewer,

we thank you for your comment and we have to apologize for the misinterpretation of Kollár's work. After a careful review of the approach we totally agree that the approach fulfills the requirements for an analytical cross-sectional calculation module (stated in section 1.2) in the same way as the approach of Jung et al. We justify the implementation of Jung's approach with the later possibility of extending it to pre-twisted and pre-bent beams, as given in https://doi.org/10.1163/156855109X428736. This is a necessary step for a later application of the cross-sectional approach in beam models representing a whole wind turbine blade. In section 2.5, we integrated Kollár's work in the decision process where it best fulfills the requirements as that of Jung et al. does. We added the following sentences to section 2.5:

Six analytical approaches fulfilling the multi-cell criterion are available (see table 1)….

Two approaches remain: the mixed formulation (displacement- and force-based) of Jung and Nagaraj (2002) and the force-based formulation of Kollár and Springer (2003). Both approaches are expected to lead to better shear stress distributions in comparison to Song's model (1990). However, Jung's approach was already extended to cover pre-twisted beams (Jung2009), such as wind turbine blades. Since a respective reference for the application of Kollár's model to pre-twisted beams could not be found, Jung's approach was chosen.

We corrected table 1, which now shows that Kollár's work fulfills the same requirements as that of Jung et al.

Editor

Dear Julie Teuwen,

Beside the changes we did according to the review of referee 2, we updated the paper for some minor aspects to further improve the quality and the comprehensibility:

- We changed the order of the approaches given in table 1 according to the year of publications for the analytical- and for the FE approaches
- We added explanations for the order of the stiffness matrix entries given in equation 18 (section 2.6.4) to make this point clearer
- In section 3.1 Test cases, we changed the reference for the explanation of CUS (Circumferentially Uniform Stiffness) composites to improve the comprehensibility
- In Table 6, the stiffness values for K77 were missing in the previous version

If any responses are unclear, or if you would like to have additional changes implemented, please let us know.

Sincerely,
Edgar Werthen

- On behalf of all authors –