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Comment on wes-2021-74

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Community comment on "Land-based wind turbines with flexible rail transportable blades – Part II: 3D FEM design optimization of the rotor blades" by Ernesto Camarena et al., Wind Energ. Sci. Discuss., https://doi.org/10.5194/wes-2021-74-CC1, 2021

This paper presents well one of the few optimization studies which constrains the blade's buckling resistance. A linear buckling analysis was conducted in ANSYS using SHELL181 type elements. The element size is unknown.

This comment should be considered as a suggestion for a realistic exploitation of the buckling reserves of a wind turbine blade design:
Fig. 10 shows a critical buckling mode on the suction side in the leading edge panel. This mode shape seems to have a very short wave length and a narrow width. Therefore this mode might be related to a local buckling failure mode like core shear crimping, cf. Fig. 4a and Fig. 6c in Rosemeier et al., 2018. Core shear crimping can become critical when the through-the-thickness shear stiffness is low compared to the bending stiffness of the face sheets. Sometimes this failure mode can be easily circumvent by a more realistic modeling, i.e., by taking the resin uptake of the core in the material parametrization into account. The resin uptake is a function of the core thickness, the slit width, the slitting pattern, and the microstructure of the core material.

Reference:
Rosemeier, Malo, P. Buriticá, and Alexandros Antoniou. "Impact of resin uptake of core materials on buckling of wind turbine blades." In Journal of Physics: Conference Series, vol. 1037, no. 4, p. 042001. IOP Publishing, 2018.
https://doi.org/10.1088/1742-6596/1037/4/042001