

Review of wes-2023-86

Title: An experimental study on the aerodynamic loads of a floating offshore wind turbine under imposed motions

By: Federico Taruffi, Felipe Novais and Axelle Viré

Short résumé

A small-scale wind turbine is used to investigate experimentally the unsteady aerodynamic response of a floating wind turbine in a setup using a six-DOF hexapod robot.

General comments:

The author's presents very interesting findings, showing increased thrust amplitude at reduced frequencies above 1.2, in the order of 50% higher. The paper is well written and to the point. The experimental setup and subsequent treatment of acquired measured signals is well explained and the setup carefully engineered, a very nice setup. The low Reynolds no. does have an impact as the SD7032 foil shows decreasing aerodynamic performance at below $Re < 60k$. The cases with wave load does show good comparison, although mainly presenting the capability of the setup, as only limited results is shown. The section could be omitted and be part of a larger investigation on FOWT, varying range of parameters and sea-states.

Specific comments:

L185: foil interpolation with Re in FAST? I think better predictions could be found if Re -interpolation is included.

L192: Fig. 6 is nice, but should be put in context of the real turbine, which would pitch out with decreasing TSR, a comment on this should be included.

L197: The uncertainty is stated, is it high or acceptable?

L213: Nice, Ref. to method? How large is the phase error not using the acc. signals?

Fig. 10 trend rather different at 2.5 vs. 4.0m/s, Low Re impact of the foil data.

L222-L226: The set of equations used here could be stated explicitly related to figure 2.

The reduced frequency k seen by 2D foil sections along the blade, as experienced by a harmonic translating 2D foil, could be estimated. The onset of the unsteady aerodynamic regime is at k -values, $k = \pi f c / U$ above 0.05. Could the inboard portion of the rotor blade be estimated that would experience the unsteady regime? 50% of the blade at 5Hz?

Concluding remarks:

The paper is highly recommended for publication.

Ref.:

Wording - figure:

L305: TripelStar - TripelSpar

Tabel A2. Pitch: $\Delta V = 1$? Should be 0.1...?