Wind Energ. Sci. Discuss.,
https://doi.org/10.5194/wes-2019-84-RC1, 2020

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Interactive comment on "A novel rotor blade fatigue test setup with elliptical biaxial resonant excitation" *by* David Melcher et al.

Peter Greaves (Referee)

peter.greaves@ore.catapult.org.uk

Received and published: 14 January 2020

I think this is a very interesting piece of work - I tried something similar to this during my PhD, but using much less robust methods. I found that the masses which were required seemed very high to me at the time, but I didn't appreciate that there are methods of applying these virtual masses which do not require them to be at the same height as the blade.

This test method has the advantage over the test optimisation method being pursued by ourselves and others (in which the frequencies do not need to coincide) that much less information sharing needs to take place between test house and customer, but perhaps at the expense of a more challenging test set-up process.

I think it is very important that you validated your results with a nonlinear time-stepping simulation as the nonlinearities could lead to significant angular changes of the push rods.

For the iteration to obtain the aerodynamic loads, I have considered a different way of doing this which may be of interest:

1 - Scale the mode shape so that the test loads match the target loads in a least squared sense 2 - Calculate energy dissipated during cycle by aerodynamic and structural damping (using a damping matrix generated by Rayleigh method) 3 - Use the actuator displacement to calculate the actuator force by equating the energy in (integral of actuator force x distance over cycle) to the energy out (air resistance and structural damping)

If it is possible, it would be very interesting to know a rough size range for the blade (I appreciate you can't share the exact length as this can identify the blade) as this would help contextualize the magnitude of the loads and masses required.

Overall, congratulations on a great piece of work!

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