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Interactive comment on "Comparison of Planetary Bearing Load-Sharing Characteristics in Wind Turbine Gearboxes" *by* Jonathan Keller et al.

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Comment #1: "The gearbox used in this paper was originally designed for a 750 kW wind turbine that was probably introduced about 20 years ago. Current wind turbines have torques that are more than an order of magnitude larger. What does this mean for the relevance of the paper? How do these effects scale? How has gearbox technology (gears and bearings) developed since then?"

Authors' response to comment #1: This historical perspective and future outlook is certainly true. However, for many modern turbines the drivetrain architecture (3-point) and gearbox planetary design (3-planets supported by CRBs and a floating sun) have not changed and are still commonly used. For larger turbines, the torque has increased

but so has the rotor moments and size (mass) of the gearbox. It is anticipated that the planetary load sharing problem persists for modern, large wind turbine gearboxes. The authors are actually developing a separate journal manuscript which examines this behavior analytically – the formulation itself being worthy of a journal manuscript in our estimation. For a given torque, rotor moment and mass for a larger drivetrain this question could be examined in more detail. But, we felt that it was beyond the scope of the present paper.

No changes were made to the manuscript.

Comment #2: "To me, it looks like the correlation between measurements and models is reasonable, but not excellent, while the authors characterize the correlation as good. Does it make sense to comment on the reasons for these differences? Does this mean that models should be further improved? Or does this mainly caused by manufacturing inaccuracies so that it does not make sense to try to improve models?"

Authors' response to comment #2: This is a valid point and question, and was part of the reason the authors undertook the parametric studies – especially for pin position error. In retrospect, for the gearbox with CRBs we wish we had acquired more data points (instead of just 1) for the pitch and yaw moment cases like we did for pure torque conditions (this can be seen, for example, in Fig. 10). This would allow a better assessment of how well the models and experiments match. We did acquire more of these points for the gearbox with TRBs and we think it improves the quality of the work. The Transmission3D software is the highest-fidelity software that the authors are aware of for this type of gearbox modeling.

No changes were made to the manuscript.

Comment #3: "Cylindrical Roller Bearings with clearance and Tapered Roller Bearings with preload are compared, and it is concluded that TRB with preload result in a significantly longer lifetime. Does preload lead to a reduction in efficiency? Can I conclude from the temperature measurements that there is no increase in losses?"

Authors' response to comment #3: Also a valid concern, and it was the motivation for examining the temperature measurements as you have surmised. To better address this fact, the authors have added a phrase stating:

There is little to no difference in the temperature of the planet bearing inner races between the two gearboxes and thus most likely little to no impact on the gearbox efficiency.

Please also note the supplement to this comment:
https://www.wind-energ-sci-discuss.net/wes-2018-36/wes-2018-36-AC3-supplement.pdf

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