

Wind turbine main-bearing lubrication - Part 2: Simulation based results for a double-row spherical roller main-bearing in a 1.5 MW wind turbine

Response to Editor

Dear Amir,

Thank you for handling the review process for this paper.

We are grateful to the reviewers for providing excellent suggestions and feedback which will help improve this manuscript.

Reviewer 2 asked some legitimate questions concerning research novelty for Part 2 of this overall paper. We have provided a detailed discussion on this within our response to Reviewer 2, but felt it was helpful to include some of this here as well. The following is an excerpt from that response which reiterates the aims, context and novelty of this manuscript:

“The main-bearing is a component which has been identified as a problem for the wind industry, but one for which the literature has been relatively sparse until recently. A growing number of studies have now considered various aspects of the operation and reliability of this components, but, before now there have been no papers whatsoever which consider lubrication and EHL conditions for this component. Since the main-bearing is a tribological and lubricated component this aspect of its operation must be included if the premature failures seen in the field are to be properly understood and ultimately prevented. The difficulty when it comes to understanding this component is the fundamentally multi-disciplinary nature of the problem, since it is a bearing affixed to a flexible structure whose input loads are complex and determined by interactions between the wind turbine rotor and turbulent wind fields. Bringing these various aspects of the problem together necessitates simpler analyses to begin with, in order for important aspects and interactions to be identified – allowing areas for further analysis (using more sophisticated models) to be identified and prioritised. This paper represents that first effort for main-bearings in wind turbines. As such, we don’t necessarily claim that we are doing things very much differently from the current industrial approach, but, the methods we use are applied transparently and with careful consideration of their validity and limitations etc. Furthermore, the industrial work on main-bearings you refer to isn’t available in the public domain and so can’t be built on as ours can. Finally, as with the review portion of the paper, a principal aim here is also the promotion of interdisciplinary understanding for engineers in related disciplines to be able to perform similar analyses and understand how our results impacts them. The current paper also achieves this goal and is the first to do this (for the main-bearing), this is another aspect of the paper’s novelty, in addition to the new knowledge being presented here for this component. Overall we believe that this paper presents a solid foundational set of results, using existing methods applied with careful consideration, which lays the groundwork for further work and more sophisticated analyses.”

The above outlines the important novelty of this manuscript for main-bearings in wind turbines and why we believe it is a valuable article for WES readers.

We look forward to submitting a revised version of the manuscript.

If anything in our responses requires further clarification, we’ll be happy to provide it.

Edward Hart
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