

Wafangdian Bearing Group Corporation (ZWZ)

Digital pitch bearing verification for the wind industry: a unique solution for large bearing analysis and verification in the wind industry



“We are delighted to have a new consultancy collaboration with ZWZ after working with them over the last few years. With much experience on pitch bearings and wind turbines, as well as verified and continuously developing software, Romax would like to deliver new values to Chinese bearing customers, especially ZWZ.”

Bingbing Zhang,

Deputy General Manager, Romax China

Before the collaboration with Romax, ZWZ were struggling to develop simulation methodology for large bearings to verify their performance under sophisticated load cycles featured in the wind industry. ZWZ strived to supply bearings to a major global OEM who require strict virtual simulation and digital verification of a product before any testing work.

Romax provide unique solutions for large bearing analysis and verification through a combination of CAE methods and simulation with Romax Wind. The OEM was glad to work with Romax as an independent bearing expert to review the pitch bearing design.

Client

Wafangdian Bearing Group Corporation (ZWZ) is one of the largest bearing companies in China. Romax's client is the wind turbine department of ZWZ National Large Bearing Engineering Research Center, focusing on pitch and yaw bearings and main bearing development.

Challenge

ZWZ was dedicated to developing high-end products and has a strong demand to supply pitch bearings to one of the world's leading wind turbine OEMs. The OEM's strict requirement was that the challenge of digital design verification be solved, as currently the testing is limited for this kind of large bearing.

Solution

As the world's number one independent bearing expert, Romax has reviewed the pitch bearing design using advanced CAE methods and used its unique experience to make key performance improvement recommendations in less than 2 months.

Benefits

ZWZ has been able to successfully verify the pitch bearing product with many of digital calculations to ensure it fully meets the OEM's requirements.

Combined simulation process by Romax Wind and CAE tool chain in China

The modelling of pitch bearings in general FE software is complex, time-consuming, and therefore very likely to introduce possible human errors that can't be easily identified during the modelling process. Romax Wind uses parametric modelling, which can significantly reduce human errors without compromising calculation accuracy.

Romax Technology have developed a combined simulation process by integrating Romax Wind within a CAE tool chain. Using this methodology, the pitch bearing was modelled quickly and without errors. The modelling time consumption is 5 times less than modelling using general FE software. The time saved can be used for solving the load cases and optimising the product. Romax delivered the results and suggestions on time to support ZWZ to verify the pitch bearing's performance to the OEM. ZWZ both saved time and won the deal.

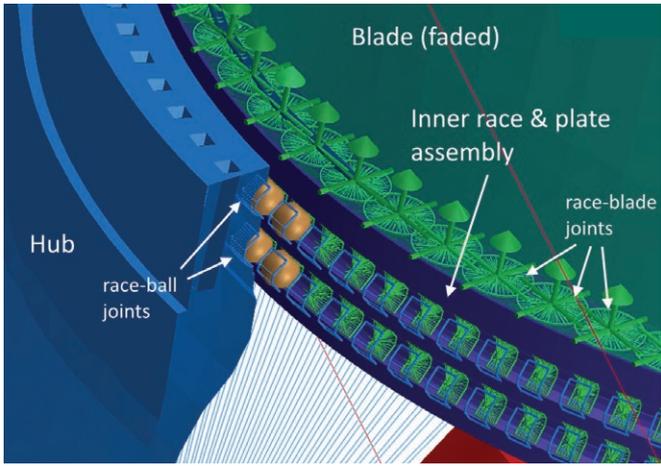
The operating condition of a pitch bearing is quite different from normal roller or ball bearings. Pitch bearings don't rotate in full circles, so don't accumulate raceway damage in the same way as rotating bearings. There is no international standard for the calculation of pitch bearings. Therefore, Romax have developed analysis and assessment methods based on calculations and previous experience for such kind of bearings.

The project team from Romax and ZWZ managed to complete all digital simulation and verification within two months, with the result that the OEM accepted the methodology and the product. Romax also provided technological transfer to ZWZ so that they successfully developed their simulation platform and evaluation criteria for the products, which yields benefits for their team capability, construction and development.

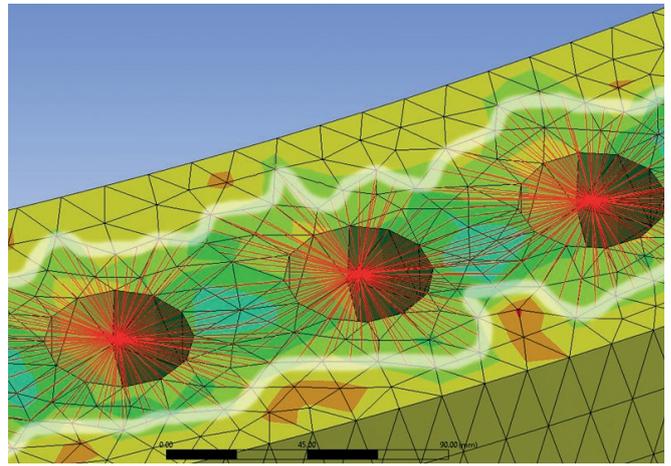


Romax has a strong bearing simulation capacity. We have developed a long-term collaboration with Romax and have significantly benefited from our communication with them, especially in some special fields with special development requirements, such as large bearings, high speed bearings and journal bearings. As a very professional bearing development software, Romax Wind is an important tool in our design and development process."

Yufei Guo,
Director of Development, ZWZ



Wind pitch bearing modelling details with flexible inner and outer races in Romax Wind



FE meshing details of bolt holes





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Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Romax, part of Hexagon's Manufacturing Intelligence division, provides world-leading solutions for the design, analysis, testing and manufacture of gearboxes, drivetrains and bearings. Learn more at romaxtech.com. Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter.

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