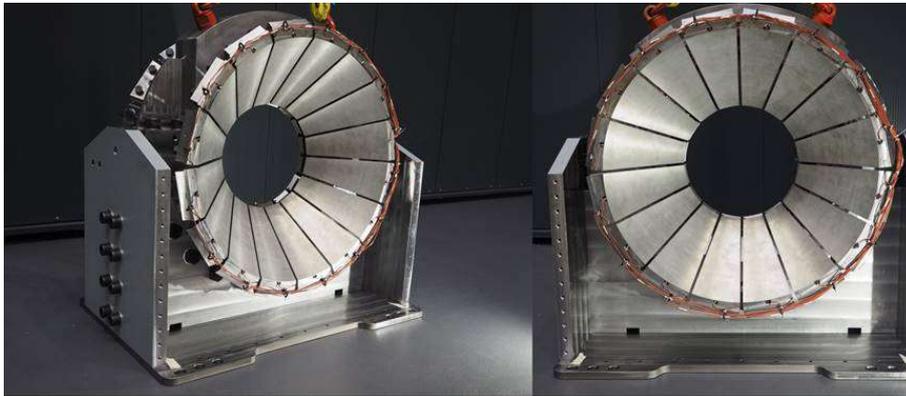


RWTH Technology

FlexPad: Conical (v-shaped) sliding bearing for the Wind Turbine main bearing



Challenge

Wind turbines count as one of the most important techniques of renewable energy production and have a constantly increasing market share within the electric power sector. Besides the continuously increasing size and performance of wind turbines, the improvement of reliability and reduction of costs are the biggest current technical challenges. Especially roller bearings often face their technical limits in the drivetrain of wind turbines (high failure rate) and reliable, cost efficient and easy to maintain alternatives are needed. For the main shaft bearing this can be reached by a sliding bearing which is, due to a conical shape of the sliding surface, capable to handle axial and radial loads in a very compact structure.

A RWTH research project with leading partners from sliding bearing industry has proved that conical (v-shaped) sliding bearings tend to high edge wear and early malfunction without specific measures. Due to the lubrication gap of the sliding bearing the shaft is able to tilt slightly. This tilting is, in particular, relevant for big bearing diameters such in Wind Turbine Main bearings -and leads to the fact that the bearing pads are not parallel orientated to the shaft anymore.

Solution

A flexible designed support structure of the bearing pads allows the pads to follow the movement of the shaft. By a slight deformation of the support, a smooth pressure distribution without edge wear and a long durability is ensured for all load cases.

By means of a special tool, RWTH Aachen was first able to perform elasto-hydrodynamic simulations of this conical sliding bearing and thus was able to detect and eliminate the edge wear problems of this new bearing type.

Advantages

- Innovation to make conical (v-shaped) sliding bearings viable and durable
- Compact design, easy maintenance by exchangeable bearing Pads (no crane needed compared to roller main bearings)

Status

- Patent application filed
- Full Scale tests completed by the end of 2018

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Fields of application

Renewable energy
(onshore and offshore
wind turbines)

Keywords

#Vibration control,
#wind; #wave; #earthquake;
#tower vibrations;
#platform vibrations

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