

State control of combined roller and plain bearings SFB 805 | transfer project T6

Within the transfer project, a combined roller and plain bearing is equipped with sensors for online monitoring. With that, its functionalities are deeply investigated in order to quantify the industrial applicability of the bearings. The project aims for the utilization of the bearings as sensor elements in the drive trains of presses to monitor the actual bearing as well as machine conditions. Equipping the bearing with active components should furthermore enable the possibility to influence its functional properties.

Project Description

The combination of roller and plain bearings offers the potential for application in modern servo presses. When correctly designed, the roller bearings bear the main load at low circumferential speeds and operating forces, while the load ratio of the plain bearing increases with increasing speeds and loads. This load transition has been demonstrated experimentally. The resulting reduction in roller bearing load compared with pure roller bearings significantly increases the basic service life despite a reduction in the required inside diameter.

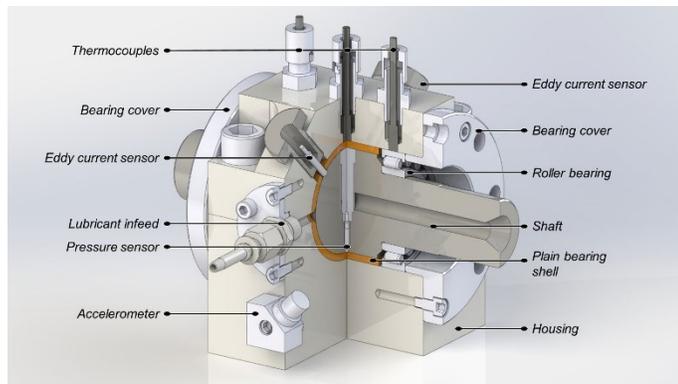


Figure 1: Sensor equipped roller and plain bearing

In addition, the required installation space is reduced and the average rotational energy of the shaft is lowered. Combined roller and plain bearings thus not only offer the possibility of extended use in press construction, but also

a possible economic alternative to conventional bearing arrangements.

Results

The use of combined roller and plain bearings is currently limited to prototypes, as they are not yet ready for large-scale industrial application. However, the potentials resulting from the combination have already been demonstrated. The possibilities shown for monitoring and influencing the operating behavior offer new potential for use in modern production machines. On the basis of the simulation program developed, investigations were carried out into the scaling of the bearings to the operating conditions of industrial press systems. From these investigations, initial design recommendations were derived for the selection of roller bearings and geometric dimensions for different operating conditions.

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Project Information

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Funding Agencies



Project partners

