

## SUMMARY

The doctoral dissertation entitled "Load capacity of slewing ring bearings taking into account the susceptibility of bolted connections" presents the analysis of bolted joints fixing slewing bearings by numerical modeling using the finite element method. The following numerical models of screws were used for this purpose: two rigid *spider* linear models with beam elements modeling the bolt stem and a solid model built of rectangular elements. These models allow you to enter the preload of screws in the connections to the preclamp. The issue of bearing mounting was carried out on the example of a three-row slewing ring bearing with internal gear, in which the outer ring of the bearing is divided.

In addition to the ultimate limit criterion of the *rolling parts – bearing raceway* assembly and the criterion of the ultimate limit of the mounting bolt assembly, a new additional criterion for the continuity of contact between the contacting surfaces of the split ring and between the surfaces of the bearing rings and the body is proposed. Split rings are used in three-row roller bearings and double row ball bearings.

Test numerical tests were performed on bearing ring fragments and calculations of the static load carrying capacity of the slewing bearing were performed on the example of a single-vessel excavator crawler bearing and the limit load on the bolted connection of this bearing with the excavator chassis frame.

The obtained results confirmed the mutual influence between the load carrying capacity of the bearing and the load capacity of the bolt connection fixing the bearings along the entire length of the boundary line of the field of permissible external loads of the bearing. Such changes in load capacity have not been sufficiently signaled in the literature so far.

Both partial loss of contact between the analyzed surfaces of the split bearing rings as well as both the bearing and housing surfaces and the complete loss of contact between the numerous analyzed cases of the design solution of the mounting bolt assembly were found.

The need for a contact criterion was suggested when designing slewing bearings with unusual design solutions for embedding the bearing in the work machine, as well as in bearings with a split outer ring.