

## **DYNAMIC CHARACTERISTICS OF THE CYLINDRICAL JOURNAL BEARINGS OF VARIABLE AXIAL PROFILE**

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### **ABSTRACT**

During the operation of turbo unit its bearings displace as result of heat elongation of bearings supports. It changes the static deflection line of rotor determined during assembly of the turbo unit causing an increase in the stresses on the bearing edges and the decrease in the dynamic state of the machine. One of possibilities to avoid the edge stresses is to apply the bearings with variable axial profile, e.g. convex (hyperboloid) profile in the axial cross-section of bearing.

Application of journal bearings with hyperboloid profile allows extending the bearing operation range without the stress concentration on the edges of bush. These bearings successfully carry the extreme load in conditions of misaligned axis of journal and the bush eliminating the necessity of using self-aligning bearings.

Static and dynamic characteristics of journal bearing include the resulting force, attitude angle, oil film pressure and temperature distributions, minimum oil film thickness, maximum oil film temperature as well as the stiffness and damping coefficients of oil film. In the literature there is a lack of data on the dynamic characteristics of hyperboloid journal bearings operating at the conditions of adiabatic oil film and static equilibrium position of the journal.

For the hyperboloid bearing the dynamic characteristics have been obtained. Different values of length to diameter ratio, assumed shape and inclination ratio coefficients have been assumed. Iterative solution of the Reynolds', energy and viscosity equations was applied. Adiabatic oil film, laminar flow in the bearing gap, as well as aligned and misaligned orientation of journal in the bush, were considered.