ANALYTICAL MODEL OF QUANTITATIVE ESTIMATION OF SLIDER BEARINGS

IONESCU Mihail
"Stefan cel Mare" University Suceava
ionescu@fim.usv.ro

This paper proposes the extension of the analytic model for calculation of the hydrodynamic parameters of journal bearings, presented in papers (1, 2), to slider bearings.

The calculation of the functional parameters of hydrodynamic slider bearings involves the solution of the system consisting of the differential equations of pressure and of the thermal balance equation, to which other equations are added, depending on the desired degree of precision. The estimation of an axial bearing's parameters regardless of the number of pads consists in the estimation of one pad's parameters and their multiplication by the number of pads. For the simplification of the calculations, the literature in the field proposes the replacement of the axial bearing pad with a rectangular pad of equal surface.

In the present paper the slider bearing pad has been replaced with an isosceles trapezoid of equal surface. The considered trapezoid observes closely the behaviour of the slider bearing pad.

Then, the equivalent trapezoidal pad is assimilated to the partial bush of a journal bearing. From now on, the calculation of parameters will be done according to the methodology specific to journal bearings.

The calculation steps in finding the pressure and temperature variation laws are presented, with an emphasis on the limit conditions of differential equation integration and on their influence on the calculation accuracy.

In this respect, the paper points out the accuracy and the applicability range of the proposed equation with reference to a number of concrete cases offered by the literature in the field (3, 4, 5).

CONCLUSIONS

- there is good agreement between theory and experiment;
- the working times are inconsiderably small by comparison with those required by the numerical methods.

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