CONSIDERATIONS REGARDING THE ANALYTICAL SOLUTION OF SLIDER BEARING LUBRICATION

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The solution of the differential equation for pressures proposed by Reynolds has preoccupied researchers along the years. The first attempts were analytical [5, 7]. After 1956, the utilization of numerical methods for the solution of the Reynolds equation, Pinkus [6], led to the elimination of analytical approaches. The international literature of the last years contains scientific papers [1-3] which bring again to the fore the analytical solution of the lubrication.

The present paper proposes a quantitative calculation of slider bearings, focusing on the numerical solution of equation energy in the thermal field and on the analytic solution [2], in hydrodynamic one. For beginning the slider bearing pad has been replaced with the partial bush of a journal bearing. Concretely, the transformation of the slider bearing pad into a journal bearing lobe was effected in the following manner: a journal bearing with an indifferent L/D ratio was considered, whose length L was precisely the height of the equivalent trapezoid, and the thicknesses of the lubricant film observed the thicknesses of the pad's film and the ratio among them.

The calculation steps in finding the pressure variation law are presented, with an emphasis on the boundary 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 [4].

CONCLUSIONS

The calculation of hydrodynamic parameters is made analytically, and ensures a good theory-experiment agreement

The calculation times are very small compared to those required by the numerical methods for the solution of the Reynolds equation.

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