

STEADY AND DYNAMIC CHARACTERISTICS OF WIDE SLIDER BEARINGS:OPTIMAL-LOAD CONSIDERATION

Jaw-Ren Lin*, Ming-Hsiung Ho, Chi-Yi Chang, Chi-Ren Hung

Department of Mechanical Engineering
Nanya Institute of Technology
Jhongli, Taiwan

Abstract

Finding the optimal load-carrying capacity and understanding the resulting dynamic behavior play important roles in slider-bearing designing. Considering the film-gap height varying slowly with the sliding direction, the optimal-load designing together with the corresponding dynamic characteristics of wide slider bearings is theoretically analyzed in the present study. By applying the technique of calculus of variation, the optimization is performed over a class of stepped bearings with certain shoulder height parameter and riser location parameter. Comparing with the three cases of the plane bearing, the parabolic bearing and the composite bearing, the stepped-profile bearing designed at the optimal shoulder height parameter and riser location parameter provides an enhancement in the load-carrying capacity, a reduction in the friction parameter as well as an improvement in the stiffness characteristics. This optimal-load condition and the corresponding dynamics provide useful information for engineers in bearing selection and reducing power loss.

Key Words: optimal-load designing, calculus of variation, dynamic characteristics, slider bearing, stepped bearing

*E-mail: jrlin@nanya.edu.tw Fax: 03-4384670 Tel: 03-4361070 ext. 6302