

CFD based investigation on the influence of multi-recess shape for the design of hydrostatic thrust bearings

Minghui Guo¹, Zhuxin Tian¹, Yu Huang¹, Guojun Zhang¹, and Youmin Rong¹

¹Huazhong University of Science and Technology

February 16, 2023

Abstract

Influences of six oil recesses shapes on the performance characteristics of hydrostatic thrust bearings is discussed by using CFD methods. The performance in terms of oil film pressure, temperature and load carrying capacity is calculated. The recess pressure increases with its circumference, the variation of maximum and the minimum recess pressure in six recess shapes is 9%. The load carrying capacity (LCC) increases with the recess circumference, and the maximum on equilateral triangle recess while minimum pressure on circular. The LCC decreased 16.46% when the rotation speed from 0 to 5000rpm. The recess shape have no significant influence on the temperature distribution of oil film, but the average temperature is inversely proportional to the width of middle circle. Finally, the experiments were carried out to validating the CFD methods.

Hosted file

manuscript.docx available at <https://authorea.com/users/586724/articles/624744-cfd-based-investigation-on-the-influence-of-multi-recess-shape-for-the-design-of-hydrostatic-thrust-bearings>

Hosted file

Figure.docx available at <https://authorea.com/users/586724/articles/624744-cfd-based-investigation-on-the-influence-of-multi-recess-shape-for-the-design-of-hydrostatic-thrust-bearings>