Improving Performance and Parametric Analysis of Helix on Rubber Rotary Lip Seal

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ABSTRACT

In this thesis, a direct numerical simulation model has been adopted to develop a new double-helix design and improve the performance of a rubber rotary lip seal. A commercial computational fluid dynamics software, CFD-RCR, with a SIMPLEC algorithm and staggered-grid arrangement is employed to simulate the flow field around the contact region between the lip and the shaft in the environment of a pumping-rate test rig, where both side of the rubber rotary lip seal are filled with the lubricating fluid initially. The pumping rates are calculated at shaft speed, ranging from 1000 to 6000 rpm, and compared to the measured values from the test rig. Good agreement is observed. Both calculated and measured pumping rates increase as shaft speed increase. The results demonstrate that the rotary lip seal with double-helix design has better performance than traditional one with single oblique helix design.

Keywords : Rubber Rotary Lip Seal, Helix, Computational Fluid Dynamics, Pumping Rate

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