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SET-UP OF A NOVEL TEST PLANT FOR HIGH POWER TURBOMACHINERY TILTING PAD JOURNAL BEARINGS

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Abstract

Due to the increasing demands of efficiency, especially in the next-generation high power density turbomachinery, lubricated bearings are facing extreme operating conditions, particularly high peripheral speeds. The design effort for new bearings must be supported by experimental investigations.

In this work a novel test rig for the static and dynamic characterization of high performance tilting pad journal bearings is described (150 to 300 mm diameter, maximum peripheral speed 150 m/s and static load 270 kN). Test procedures are illustrated and commissioning results obtained with a four pad tilting pad journal bearing are presented showing the test rig potential.

Keywords:

Tilting pad journal bearings, test rig, experimental tests, bearing static and dynamic characteristics

1. Introduction

Due to the increasing demands of efficiency, especially in the next-generation compression systems supporting sustainable energy development (Carbon Capture Sequestration - CCS, Compressed Air Energy Storage - CAES, Liquefied Air Energy Storage - LAES), lubricated bearings are facing extreme operating conditions, in particular, high peripheral speeds.

The design of industrial compression systems (turbines/electric motors and compressors) has always been driven by a compromise between efficiency, reliability and cost reduction. Both the increase in efficiency

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