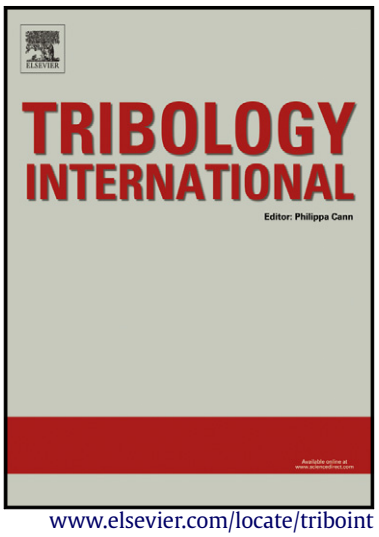

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Efficiency of a Planetary Multiplier Gearbox: Influence of Operating Conditions and Gear Oil Formulation

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Abstract

In this study a single stage planetary multiplying gearbox with helical gears was tested, on a back-to-back gearbox test rig with recirculating power under the operating conditions that matched the tangential velocities and operating contact pressures found in a planetary stage of a 2.5MW wind turbine. The study was done with four different wind turbine gear oils. The gearbox oil sump temperature was set free.

The load and no-load losses were measured and compared with the results yielded by an existing numerical model which takes into account the influence of the lubricant formulation in the load losses.

The results have indicated that each gear oil formulation promoted different power loss results resulting in distinct stabilized operating temperatures.

Keywords: Wind turbine gear oils; Coefficient of friction; Power loss; Planetary Gearbox;

1. Introduction

In the past few years, sustainability issues have acquired major importance, as the environmental toxicity and the ozone layer destruction indicators reach worrying levels. Worldwide efforts have been made aiming to increase renewable energy production and to diminish the usage of energy produced with fossil fuels.

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