Performance evaluation of sustainable lubricating greases for rolling bearings

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The development of novel technologies generates new challenges in the lubrication of novel equipment, usually containing grease-lubricated bearings. Therefore, grease formulations must be adapted for the novel operating conditions of such equipment. Most of these conditions demand high and fluctuating bearing rotational speeds, which could cause detrimental effects on the bearing life. Additionally, novel testing methodologies have been created to evaluate the tribological response of different grease formulations. This work presents a tribological evaluation of several greases thickened with different thickener systems. The lubricants are based on the same oil, have the same NLGI grade but contain no additives. The experimental plan is performed in a novel machine capable of measuring the friction and self-induced temperature in 6208 deep groove ball bearings. Experiments of approximately 16 days were performed in the evaluation that consisted of low, medium, and high fluctuating speeds. Speeds up to 600,000 nDm were reached. The complex response to changes in the operating condition of the evaluated greases is evaluated in the transient and steady-state data. Finally, the impact on sustainability is quantified by measuring the energy consumption at each of the test speeds, validating the use of novel greases.

Keywords: Rolling bearing, Grease, Polypropylene, Lithium-complex, Sustainability, high-speed bearing test rig

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