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TRIBOLOGICAL CHARACTERISATION OF LAMELLAR GREY CAST IRON FOR APPLICATION IN HEAVY DUTY DIESEL ENGINES CYLINDER LINERS

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Abstract

The aim of this study consists in comprehension of the influence of the material (chemical composition and microstructure) on wear of heavy duty diesel engines cylinder liners. Three kinds of lamellar grey cast iron have been studied: one grey cast iron, one grey cast iron which is heat treated and one grey cast iron micro alloyed with phosphorous and boron. Friction tests with the configuration "sphere against a piece of cylinder liner" in lubricated contact (commercial oil 5W30) have been carried out on a Cameron Plint TE77 test rig, at a temperature of 150°C. Three normal loads have been studied: 50 N, 100 N and 200 N. The friction coefficient has been measured. The wear scars on the cylinder liner and the sphere have been studied after friction and the wear volumes have been determined by profilometry. The tests have shown that the properties of the grey cast iron have influence on the friction coefficient, the wear and the formation of the tribochemical film. The friction coefficient decreases with increasing the normal load as a function of the material. The heat treated samples show the best wear resistance.