

Tribological Behavior of PTFE Composites Used for Guide Rings of Hydraulic Actuating Cylinders under Oil-Lubricated Condition

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Abstract : Guide rings play an important role in the performance and durability of hydraulic actuating cylinders. In service, guide rings surfaces are subjected to friction and wear against steel counterface. A good mastery of these phenomena is required for the improvement of the energy safeguard and the durability of the actuating cylinder. Polytetrafluoroethylene (PTFE) polymer is extensively used in guide rings thanks to its low coefficient of friction, its good resistance to solvents as well as its high temperature stability. In this study, friction and wear behavior of two PTFE composites filled with bronze and bronze plus MoS₂ were evaluated under oil-lubricated condition, aiming as guide rings for hydraulic actuating cylinder. Wear tests of the PTFE composite specimen sliding against steel ball were conducted using reciprocating linear tribometer. The wear mechanisms of the composites under the same sliding condition were discussed, based on Scanning Electron Microscopy examination of the worn composite surface and the optical micrographs of the steel counter surface. As for the results, comparative friction behaviors of the PTFE composites and lower friction coefficients were recorded under oil lubricated condition. The wear behavior was considerably improved to compare with this in dry sliding, while the oil adsorbed layer limited the transfer of the PTFE to the steel counter face during the sliding test.

Keywords : PTFE, composite, bronze, MoS₂, friction, wear, oil-lubrication

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