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## **ANALIZA WPŁYWU POWŁOKI A-C:H:W ORAZ OLEJÓW SMAROWYCH NA PROCESY TRIBOLOGICZNE W SMAROWANYCH WĘZŁACH TARCIA**

### **ABSTRACT**

This paper presents the current research problem including the influence of the a-C:H:W coating formed on the elements of friction pairs with conformal and non-conformal contact and the lubricant (synthetic engine oils) on the tribological properties of friction pairs under conditions of limited lubrication.

The analysis of the status of the issue includes information on the processes of friction and wear of the friction pairs, classification and characteristics of engine oils, methods of producing surface layers and tribological properties of diamond-like carbon coatings, including the a-C:H:W coating type.

The research conducted on the friction pairs under conditions of limited lubrication allowed to assess the impact of the application of the a-C:H:W coating formed on the elements of the friction pairs and the synthetic lubricating oils on the tribological processes occurring in friction pairs in the conformal and linear contact. This paper shows that the use of ring samples with a-C:H:W coating in conformal contact with counter-samples made of the CuPb30 bearing alloy generates frictional conditions that hinder the creation of stable cooperation conditions. The friction pairs lubricated with the tested oils show higher values of friction parameters and increased wear of counter-samples made of the CuPb30 bearing alloy, as compared to the friction pairs with the heat-treated surface layer. The tests of friction pairs in linear contact with valve shims with the a-C:H:W coating under conditions of lubrication with the tested oils indicate the formation of cooperation conditions that reduce the resistance to motion, temperature in the friction area and the wear rate, as compared to the pairs in which commercial valve shims with hardened surface were used. Additionally, the anti-seizing properties as scuffing load and the limit seizing pressure of the lubricants used were assessed, both before and after operation in friction pairs in a linear contact. An evaluation was also made of the impact of using the 5W40 engine oil in an internal combustion engine of a passenger car.

Based on the obtained results, cognitive and utilitarian conclusions were formulated, as well as suggested directions for further research were indicated.