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INCREASE IN WEAR RESISTANCE IN BEARINGS OF SLIDING

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The purpose of the work is to increase the efficiency of the bearings of sliding.

Sliding bearings, working in the conditions of periodic lubrication with plastic lubricants, often lose their ability to work due to the occurrence of grip and damage and the destruction of contact surfaces, especially at high contact loads.

The main reason for the appearance of scoring on such surfaces is the destruction of a separate oil film due to its wear and failure of restoration conditions. In this case, there are areas of direct contact and film of secondary structures, which are created in the process of friction and protect the surface, also destroyed. In this case, contact is performed on juvenile surfaces, which, in the presence of high contact loads, leads to the emergence of separate areas of sequestering followed by the occurrence of scoring and damage to the contact surfaces [1,2].

The increase in the hardness of the bearing surfaces can significantly reduce the risk of abrasion even if the supply of the lubricant to the contact area is violated, but with the use of traditional steel-bronze combinations this possibility is limited.

In these conditions, the promising use of the combination of steel-steel with heat treatment surfaces to high hardness, but the addition of steel hardened surfaces is accompanied by great difficulty, and sometimes impossible at all.

To ensure the performance of such surfaces in conditions of high contact loads, it is necessary to solve the problem of a reliable supply of lubricant to the friction zone to ensure the restoration of a separate oil film.

One of the possible ways to improve the transportation of lubricant to the friction zone and to ensure the recovery of oil film in load bearing areas is to create an oil-tight relief that can accumulate and transport the lubricant on the surface of the contact.

We have been carried out research the possibility of increasing the hardness of the heavy loaded friction slip due to the use instead of bronze of tempered steel with the formation on the working surface of the corresponding macro relief.

Comparative tests on the wear resistance of the traditional steel-bronze pair and steel-steel pairs were performed on a lathe-screw machine 16K20.

The valves were made with a diameter of 90 mm from steel 45 with subsequent quenching to HRC_e55. Roughness of the surface after grinding Ra = 0.63 mkm (Fig.1).

The bushings were made of steel 3 and bronze BR.OF 10-1. Steel bushes were cemented to a depth of 2 mm and quenched to HRC_e 58. The roughness of the inner surface formed an oil-capacitive macro-relief. Depth of separate grooves 0,3 mm. The edges are rounded (Fig.2).

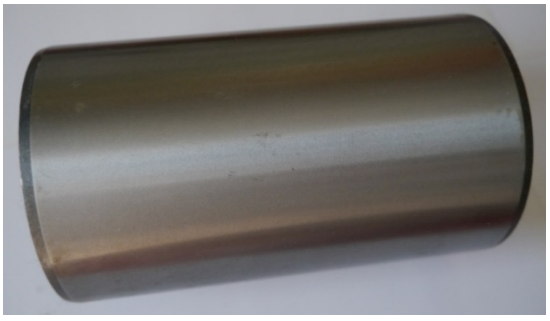

Fig.1. The quench valve

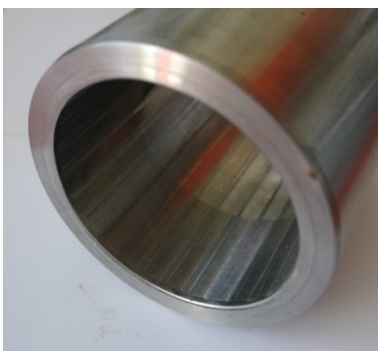

Fig.2. The steel bushing

The size of the gap in the friction pair did not exceed 50 mkm.
Before the start of the experiment, Litol-24 plastic grease material was applied to the working surfaces in the amount of 70 mg to provide conditions for limited lubrication.

The friction pair was loaded with a fixed effort of 2000 N.

The rotational speed corresponded to 1.3 s-1. In the course of the experiment, the temperature was fixed with the help of a chromole-aluminum thermocouple and the force of friction using the spring dynamometer UDM-600.

The emergence of scoring was determined by the sharp increase in temperature and friction that was accompanied by noise and vibration.

The results of the research showed the prospect of using steel with the application of low-capacity grooves perpendicular to the velocity vector on the high-solid surface, which allows to restore the oil film in the contact area and to locate the silts when they occur.

In comparison with bronze bushings, the resilience and almost three times (175min and 70min respectively).

The viability of a pair of steel sleeves during the recovery of lubrication was also several times higher due to the localization of scoring and prevention due to this catastrophic destruction of the working surface, which occurs when using bronze bushings and a continuous working surface.

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