СЕКЦІЯ 3
НОВІ ТЕХНОЛОГІЇ ОБЛАДНАННЯ ТА МАТЕРІАЛИ В МАШИНОБУДУВАННІ

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INCREASE IN WEAR RESISTANCE IN BEARINGS OF SLIDING

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.

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.

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. 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 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 (175 min and 70 min 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.

List of references

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THE MANAGEMENT OF DATA FLOW MANUFACTURING OBJECT FOR INFORMATION SYSTEM OF INDUSTRY 4.0

One of the most closely watched indicators of long-term economic prospects is productivity. Rising productivity is the key making possible permanent increases in the standard of living. Changes in a technology are the only source of permanent increases in productivity, but a number of transient factors can affect both true and "measured" productivity. [1] The present situation in the industry is characterized as a period of intense progress of technologies at the significant computer aid in all branches of industry. In connection with the technical progress it is increasing the pressure on the manufacturers to develop and make the products as soon as possible at the minimal cost in required quality. The product has to be competitive, it has to be up to qualitative and functional standard, it has to have reasonable price, efficacious design, and it has to consider safety, ergonomic and other aspects, which decided about its marketability. That is why the system has to ensure production effectivity and quality increasing, To be its structure dynamically adaptable for actual situation and for user specific conditions with minimum negative effects. Selection in which way will be a process plan created, whether approach of group technology will be used or whether it will be done for every part separately. If the part will be manufactured using of NC (Numerical Control) machine, the producer will be able to decide how the NC program originate, whether it will be written manually or whether it will be created by means of CAM (Computer Aided Manufacturing) system; Selection of parts with the similar material and dimensional characteristics, with similar process plans; therefore, it will be considerably able to save the batch time; To be parameters processed easier and faster. To be preparatory time for a technological documentation reduced; To be information used not only for technological documentation generation, but also for details processing due to data storage, for economical needs and for wage records [2,3].

Data flow in the future, that is also considered in the newly designed information system, is based on the concept using STEP NC. It enables a product model database to serve as direct input to a CNC machine tool. No separate files of tool paths. No G or M codes. No post processors. This is a radically different approach to CNC programming. STEP NC is an extension to STEP, the STandard for the Exchange of Product model data [4]. STEP is the international standard that specifies a neutral data format for digital information about a product. STEP allows this data to be shared and exchanged among different and otherwise incompatible computer platforms. STEP NC standardizes how information about CNC machining can be added to parts represented in the STEP product model [5].