

UDK 677.611.004.6

## **INCREASING THE WEARPROOFNESS OF MACHINE DETAILS OF LIGHT INDUSTRY BY TECHNOLOGICAL METHODS**

Al Kloub Naser Yousef Abdalla, Ph.D., Associate Professor  
*Aquaba University of Technology, Aquaba, The Hashemite Kingdom of Jordan*

Keywords: durability, wearability, reliability, coverings, melting coverings, worn-out parts.

A knitting production is one of the leading industries in Jordan. 13 industrial areas were created through this country as a result of agreement about free trade between the USA and Jordan (2001). In industrial areas, which provide duty-free access to the USA market, produce mostly light industry products.

Improvement of engineering products is complicated without application of new progressive technological processes, which allow the promotion of the resource and reliability, provide the capability of details and knots in the hard-external environmental conditions, at high temperatures and in aggressive environments, under the action of dynamic and contact loads. This approach is fully applicable to modern equipment for the textile industry.

The analysis of work of circle knitting machines testifies that their efficiency is determined by reliability and durability of the wedges of the needle and platinum locks of the weaving mechanism.

These responsible details unfortunately have subzero wearproofness, that is why require permanent replacement to new but they cost too much. The replacement of threadbare wedges of circle knitting machines - consuming process which decline the return of these high-performance machines in the total result.

The question about increasing of wedges wearproofness mostly poetry by the choice of new constructions. In the same time the realization of such decisions requires considerable material charges, related to development and making of new types of needle wares, wedges etc. Thus the best way for solving these problems is usage of technological methods, which should significantly reduce the probability of its local destruction, and, consequently, the denial of the work of the knitting system.

The application of technology strengthening processes in machine building and extensive research, conducted in this area in the world, can solve this problem. However, today practically there are no theoretical and experimental data that would allow us to assess the wear resistance of the surface working layer of the wedges, strengthened by various methods, which prevents the efficient use of these methods, both in the manufacture and repair of wedges. Therefore, the choice of optimal reinforcing technologies, as well as the assessment of wear resistance of the surface layer of parts in real operating

conditions, is an urgent task and is of unquestionable scientific and practical interest.

The studies initiated in the Kiev National University of Technologies and Design (Ukraine) and conducted at the Aquabe University of Technology (Jordan) have allowed us to formulate the principles of choosing the method of surface strengthening of the responsible parts of light industry machines, which allows them to increase their durability. The possibility of replacing high-alloy steels, which are used in the manufacture of wedges, is established on the usual structural ones, in conjunction with the subsequent strengthening of the surface layer. Dependencies are also offered for the calculation of competitive coating technology, including performance characteristics of coatings, characteristics of technology and equipment.

It is proved that on the basis of comparison of the quantitative significance of the complex index of competitiveness of coating technology with advanced basic analogues it is possible to determine the economically grounded price of the implementation of the coating technology and to conclude that it is expedient to leave this type of technology on the external or internal market.

Experimental studies of physico-mechanical and tribological properties of reinforcing coatings and surfacing, as well as production tests, were aimed at making the assumptions made about the possibility of efficient use of technological methods to increase wear-resistance of wear parts and, in particular, the durability of wedges, to strengthen the working surface of which wear-resistant surface layers were used, deposited by boring, ion nitriding, electrosurgical doping, and also by surfacing alloys.

It has been proved that the greatest savings in the alternative, the choice of technologies of surface hardening provides a transition from traditional methods of chemical-thermal treatment to perspective, based on the use of highly concentrated superficial energy sources. The proposed methodology provides for the calculation and obtaining of comparative technical and economic data characterizing the methods of change, taking into account technological costs, resource costs, and also the science of technology.

On the basis of theoretical and experimental researches, the problem of the choice, designation and technological support of optimum parameters of hardening surface treatment of wedges of circular knitting machines has been solved, which allows to ensure their increased durability. It is also possible to replace the high-alloy steels used in the manufacture of wedges, on the usual structural, in conjunction with the strengthening of the surface layer.

The basic principles of automated design of technological processes of application of coatings are formulated, the proposed algorithm for calculation of covered areas is strengthened based on the algebraic composition of a set of values of elements of parts and products.