УДК 621.785.5: 621.9.048.7

Idan Alaa Fadhil Idan[1], O. V. Akimov[2], K. O. Kostyk[2]

[1]The University of Technology, Iraq

[2]National Technical University

«Kharkiv Polytechnic Institute»

SURFACE HARDENING OF STEEL PARTS

Surface destruction of machine parts leads to failure of machine mechanisms. The reasons for this are wear parts during operation. Particularly negative impact on the surface of the product has abrasive wear. The reasons for this are the friction processes of a harder material or its individual particles on the surface of the parts. The material of the majority of machine parts used on real objects are ferrous metals, namely steel.

The purpose of this work is the study of process of obtaining a hard coating on the surface of steel products.

Experimental investigations were carried out on samples of steel 38Cr2MoAl. Laser treatment of steel was carried out at the installation "Latus-31". Boriding was carried out in a powder medium with microfine boron-containing substance and activators.

It was established that after laser treatment the grinding of the grain structure of the surface layers of steel 38Cr2MoAl. At the same time, the thickness of the hardened layer by the laser varies in the range from 0.2 to 0.41 mm, depending on the change in the speed of movement of the laser beam (from 1.5 to 0.5 m/min, respectively).

Subsequent boriding gave the opportunity to obtain a greater layer of borides with a thickness up to 0,140 mm and a microhardness of up to 22.5 GPa, in comparison with boriding without prior laser treatment that provides hardness up to 20 GPa with a depth of layer up to 0,073.

Similar results were obtained for other carbon and alloy steels. Proposed surface hardening enhances the durability of the parts to the abrasive wear by getting the very hard surface layer.