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STRENGTHENING OF AUTOMOTIVE PARTS TAKING INTO ACCOUNT STRUCTURAL TRANSFORMATIONS IN SURFACE LAYERS

In world practice, the latest technologies are used to strengthen the surface layer of automotive parts. Criteria for choosing technological methods of strengthening are high wear-resistant, physico-mechanical, performance characteristics of coatings, as well as the economic factor associated with the total cost of the process, equipment, consumables, environmental friendliness and safety. namely laser treatment, allowed to significantly expand the range of modification of surface layers and significantly increase the performance of wear-resistant characteristics of car parts.

The purpose of this work is to investigate the mechanisms of formation of wear-resistant structures on medium carbon steels and their influence on the physical and mechanical characteristics of the surface of automotive parts. In addition to heat treatment in world practice are widely used numerous hardening treatments. A separate area in the technology of strengthening the surface layer of the part is laser treatment. A significant advantage of laser processing is the formation of specific structures that are formed as a result of instantaneous rates of heating and cooling with a pulse duration. $1 \cdot 10^{-3}$ - $2 \cdot 10^{-3}$c . At above fast modes of heating and cooling in local zones reorganization of microstructure and phase transformations in steels 40, 45, 50, 50ХФА carried out by a special mechanism with the formation of many types of martensite (finely dispersed, unstructured martensite).

In the combined method in the drilling furnace is the saturation of the surface layer with boron. The next stage of surface modification is laser treatment. This technology leads to partial recrystallization of the microstructures of the boron layer. Superhard needle-shaped boron layer after laser treatment is transformed into crushed clusters of borides FeB, Fe_2B and carboborides type Fe(CB), Fe_2(CB).

The main advantage of this technology is to increase the ductility of the material, which has a positive effect on the overall characteristics of strength and durability. For comparison, the following technological processes of hardening: nitriding, heat treatment, laser treatment and options for combined technologies. The analysis of mechanisms of formation of wear-resistant structures at various ways of processing is carried out. The maximum effect in the formation of wear-resistant coatings with a given set of durable and performance characteristics was found when using a combined method of processing - drilling followed by laser treatment.

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