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TECHNOLOGIES OF RESTORATION AND STRENGTHENING OF CAMS OF THE CRANKSHAFT OF THE AUTOMOBILE ENGINE

The main factor in the restoration of the surface is the strength of the welded layer with the base material. The surfacing material must ensure reliable adhesion of the base material to the substrate, reduce the risk of chipping and concentrations of thermal stresses in the transition zones, have high physical and mechanical characteristics, the ability to strengthen treatments. OZSh-3 electrodes were used to restore the working surface of the steel 45 cams. In terms of carbon, manganese and silicon, the steel surfacing electrodes are close to the components of steel 45 and this guarantees a reliable adhesion of the surfacing layer to the base material. After application to the prepared surface of the surfacing layer, blade treatment was performed, followed by grinding to obtain the appropriate geometry and roughness. The removed layer of metal allows to remove welding defects (pores, micro cracks and other defects).

The aim of the work is to conduct microstructural, X-ray phase studies of the restored surfaces of the cams of the camshaft of the car, to determine the wear resistance and microhardness of the working surfaces. With the help of the proposed technologies of restoration and strengthening, the optimal modes of applying the recovery layer and the optimal modes of laser treatment (pumping energy 20 kJ without surface melting) with boron-containing coatings (thickness 2 mm) were selected. In the transition zone, residual austenite is transformed into ferrite with the formation of two phases: ferrite particles (dark cascades), and the phase "boron + carbon" - boron carbide (white spots).

The main transformation of the structure occurs in the surface and under the surface zones. The main lines observed on the X-ray diffraction pattern of the sample are α -Fe, which is more than 90% in intensity. Boride lines Fe_2B , FeB less intense (up to 4%) and also present in small quantities (up to 3%) iron carbide lines Fe_3C and compounds are observed $FeCr$. Researches of the restored and strengthened surfaces of cams by means of laser drilling are carried out. Reinforced surface layer has a complex structure and generally contains a martensitic base with thin layers of borides, carbides. The microhardness of the treatment zone increases by 3-4 times (H_{μ} 6500-7000 MPa).

References

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EVALUATION OF THE LIQUID STEEL DESULFURIZATION PROCESS IN A FURNACE

As part of modeling the process of deoxygenation of metal and powder during out-of-furnace treatment, an attempt was made to estimate the distribution coefficient of sulfur and its concentration in the alloy.