THE INFLUENCE OF THE ARCHITECTURE OF COATING ON THE WORKING EFFICIENCY OF MILLINGS WHILE PROCESSING THE TITANIUM ALLOY

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The article discusses the technological principles of improving performance end mills made from high speed steel R6M5K5 by hardening the cutting end mills ion nitriding and complex hardening ion nitriding plus composite wear-resistant coating based on nitrides. For optimization of the nitriding process produced the test for resistance of the party of cutters. The selected optimal mode of hardening, providing the greatest vitality end mills for machining titanium alloy VT20. The proposed compositions of wear-resistant coatings and experimental data on the influence of coating composition on the durability of end mills. The effect of cutting parameters on the durability of the hardened tool. Set out a theoretical analysis of test results health a hardened cutting tool.

The purpose of this work is to investigate the influence of the architecture of a multi-layer wear-resistant coating applied to end mills from high-speed steel on their performance when processing a titanium alloy VT20.

To determine the optimal form of hardening, the composition of the wear-resistant coating during the processing of the titanium alloy VT20, the tool was tested for the resistance of a tool subjected to various types of hardening to compare its performance.

Taking into account the previously obtained results, the pre-hardened tool was subjected to the investigation by ion nitriding and complex hardening of the end mills was performed:

a - ion nitriding + single-layer wear-resistant coating;

b - ion nitriding + two-layer wear-resistant coating;

c - ion nitriding + four-layer wear-resistant coating.

Tests have shown that the application of a single-layer wear-resistant coating to a pre-hardened tool by ion nitriding does not result in a significant increase in strength, with respect to the optimum mode of tool hardening by ion nitriding. The maximum resistance is achieved when coatings are based on zirconium nitrides (76 min.) And zirconium-hafnium (81 min.). The coefficient of increase in durability increases from 1.86 to 2.1 and 2.25, respectively.

The most optimal of two-layer and four-layer combination of wear-resistant coating is a combined hardening with soft layers of molybdenum. Tool durability is increased up to 3.5 times with two-layer (125 min.) And up to 5.5 times with four-layer combined hardening (199 min.).

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