

Wear performance of EDM-machined cermet substrates with different surface finishes

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The tribological behaviour of materials machined by electro discharge machining (EDM) is strongly influenced by microstructural changes in the surface layers. This technique is commonly used to machine cemented carbides, which are known for their high hardness and excellent wear resistance.

In this research, the impact of different surface finishes on the tribological properties of cemented carbides was examined. In order to obtain different surface finishes, samples were extracted using the EDM process and then subjected to sandblasting, grinding and lapping operations.

The microstructure of each sample was analysed using optical and scanning electron microscopy (SEM) with an EDXS probe for chemical composition analysis and GDOES for further investigation. Mechanical properties were measured through microhardness tests. For the tribological characterization, wear tests were performed under different loading conditions. The wear traces were examined with a stylus profilometer and SEM, both in top view and in cross section.

Experimental results revealed that EDM and ground specimens showed superior wear resistance. Surface treatments that generated more defects resulted in lower tribological performance. In contrast, super-finishing treatments provided slight improvements in wear resistance, but too small compared to the increase in costs.

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