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Hamid AKNOUCHE, Abdellatif ZERIZER, Corinne NOUVEAU, Yacine BENLATRECHE - Study of the wear behaviour of carbide-tipped tools untreated and CrN-treated in the field of the breaking up of the pine of Alep - In: International symposium on wood machining (03 ; 2007 ; Lausanne, Suisse), Switzerland, 2007-05 - Proceedings of the 3rd International Symposium on Wood Machining (ISWM) - 2007

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1 INTRODUCTION

The execution and the interpretation of the tests of wear were considered in various ways, since the first work of Taylor, and other experiments. In addition, the development of new varieties of conditions and the evolution of the range of machined materials, very clearly widens the opening for new opportunities. The new opportunities are systematically to count the multiple manifestations of wear and to observe their appropriate nature. The paper, published here, is intended to examine some of the possibilities, and to illustrate the qualities through which some of the variables are not applicable, and when the wear is of a particular nature, the variables are not applicable, to the wear of another field of application.

However, because some of the variables are not applicable, it is important to specify which of this criterion is the most sensitive, and which one only, must be retained, to judge the moment valid when the tool must be withdrawn from the service, according to the previous fields of application.

When cutting wood, the spiral withdrawal is difficult, because of the high speeds of the cutting tools. On the other hand, the withdrawal of the material is difficult because of the high withdrawal of the cutting tools. This is why the manufacturers of tools use a cutting tool, to cut the wood for the cutting of the cutting tools. Currently, in the wood transformation, chipped steels, the high-speed steel, of the cutting tools, the hardness of the cutting tools, the hardening of the cutting tools, are the most common. The cutting tool, of the cutting tools, the diamond, of the cutting tools, the hardening of the cutting tools, the hardening of the cutting tools, are the most common.

REFERENCES


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Abstract

The dependence of wear on the cutting temperature was considered in various ways, since the first work of Taylor, and other experiments. In addition, the development of new varieties of conditions and the evolution of the range of machined materials, very clearly widens the opening for new opportunities. The new opportunities are systematically to count the multiple manifestations of wear and to observe their appropriate nature. The paper, published here, is intended to examine some of the possibilities, and to illustrate the qualities through which some of the variables are not applicable, and when the wear is of a particular nature, the variables are not applicable, to the wear of another field of application.

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REFERENCES


This work was developed in order to verify the aptitude of CrN in the field of the breaking up of the pine of Alep.

2 EXPERIMENTATION

2.1 Material

A carbide insert was selected as substrate. Its chemical composition after EDS analyses is 98.5% WC + 1.5% Co.

The deposition conditions are summarized in (Table 1).

<table>
<thead>
<tr>
<th>Table 1. Deposition conditions of CrN coatings</th>
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<tbody>
<tr>
<td>Residual pressure</td>
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<tr>
<td>Working pressure</td>
</tr>
<tr>
<td>Percentage of Nitrogen</td>
</tr>
<tr>
<td>Percentage of Ar</td>
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<tr>
<td>Time</td>
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</tbody>
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Fig. 1 Magnetron sputtering system

2.2 Test of breaking up

The tests of machining were carried out on a router with three axes with numerical control RECORDI type (Fig. 2) with a carbide tool (Fig. 3). The cutting conditions are presented in (Table 2). The machined materials were rectangular work piece of pine of Alep.

Fig. 2 3 axes router with numerical control

Fig. 3 Tool holder
2.3 Characterization of wear

The wear’s measurement was realized with a binocular as shown in figures 4 and 5.

Fig. 4 Instrumentation of wear’s measurements

Fig. 5 Quantification of the edge’s wear

3 RESULTS AND DISCUSSIONS

The results are given in (Fig. 6).

Fig. 6 Wear of the tools

We can first notice that the coated tool performed the best. It’s especially notable during the beginning of the machining process that means during the tool’s lapping.
This work must be supplemented by a mechanical and tribological characterization of coatings.

4 CONCLUSION

We applied PVD CrN coatings to cutting tools for the secondary transformation of wood, this coating has been applied on high speed steel HSS18, commonly used for planing and shaping knife fabrication, and onto alloy steel (AS) 90CMV8, used for chipper and cantur knife fabrication. Furthermore, other coatings and surface treatments, like nitriding, were used to improve cutting performances.

It is interesting to purchase the investigations in order to see the behaviour of these coatings on the tribological level.

Tribological and erosion properties have been used to rank the materials and coatings combinations in performance order with application to secondary transformation of wood.

5 REFERENCES