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Hard Coatings Characterization Based on Chromium Nitrides: Applications for Wood Machining

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Abstract : The phenomena occurring during machining are related to the internal friction of the material that deforms and the friction the flake on the rake face of tool. Various researches have been conducted to improve the wear resistance of the tool by thin film deposition. This work aims to present an experimental approach related to wood machining technique to evaluate the wear for the case of ripping Aleppo pine, a species well established in the Mediterranean in general and in Algeria in particular. The study will be done on tungsten carbide cutting tools widely used in woodworking and coated with chrome nitride (CrN) and Chromium Nitride enriched Aluminium (CrAlN) with percentage different of aluminum sputtered through frame magnetron mark Nordiko 3500. The deposition conditions are already optimized by previous studies. The wear tests were performed in the laboratory of ENSAM Cluny (France) on a numerical control ripper of recordi type. This comparative study of the behavior of tools, coated and uncoated, showed that the addition of the aluminum chromium nitride films does not improve the tool ability to resist abrasive wear that is predominant when ripping the Aleppo pine. By against the aluminum addition improves the crystallization of chromium nitride films.

Keywords : Aleppo pine, PVD, coatings, CrAlN, wear
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