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Impact of the wear of the cutting edge on selected parameters of the surface geometric structure after wood milling

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Abstract: *Impact of the wear of the cutting edge on selected parameters of the surface geometric structure after wood milling.* The paper presents measurement results of selected parameters of pine (*Pinus sylvestris* L.) wood surface roughness. Surfaces obtained after a milling process on a bottom spindle milling machine were investigated. The tool was a milling head with cutters covered with antiwear coatings. Significant differences were found between the selected roughness parameters obtained for surfaces processed with cutting edges with multilayer coatings and parameters determined on the surface milled using the cutter without multilayers. The best effects observed in the case of the cutter with the applied CrCN/CrN type multilayer coating, Λ ~400 nm modulation and 1:5 thickness ratio of individual layers.

Key words: cutting edge wear, surface geometric structure, wood milling, PVD

INTRODUCTION

Surface roughness is one of primary parameters influencing the quality of finished surfaces. Small roughness improves hygienic parameters, facilities removal of dirt from surfaces, increases the resistance of wood to the effect of pests and also affects the value of the friction coefficient. The concept of roughness is a very important problem in each wood finishing process and has been investigated by many researchers both with regard to wood as well as wood-derived articles [2, 3, 8].

Processes affecting surface roughness depend, to a large extent, on the condition of the cutter of the machining tool. That is why investigations have been carried out in recent years whose aim was to increase the life of cutting edges [1, 4]. One of the methods increasing life of blades is spreading them with thin layers of different compounds which form protective coating employing for this purpose a number of various techniques, e.g. physical vapour deposition (PVD). The above-mentioned coatings are characterised, among others, by very good hardness, resistance to abrasive wear as well as high-temperature oxidation. Thanks to the application of protective coatings on machining blades it is possible to achieve, among others, improvement of the processing accuracy to such extent that, sometimes, finishing processings may be eliminated leading to simplification of technological processes.