IMPACT OF FEED RATE ON ROUGHNESS OF THE CUT SURFACE DURING CUTTING DRY BEECH AND SPRUCE WOOD WITH A CIRCULAR SAW

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ABSTRACT

The precision of wood processing and the quality of the machined surface are critical factors in achieving the desired processing outcomes. These factors are influenced by a variety of parameters, among which the feed rate during mechanical processing plays a significant role in determining the surface roughness of the cut. Surface roughness, often caused by tool marks, affects subsequent hydrothermal treatments and other mechanical processes, ultimately reducing the efficiency of wood usage when it is too high.

For this purpose, in this paper, the dependence of the feed rate on the roughness of beech and spruce wood during the cutting of dry wood with a circular saw is investigated, with the intention of determining the optimal cutting conditions for obtaining lower values of the roughness.

In this research, three different feed rates were applied (U_1 = 12 m·min^{-1}, U_2 = 16 m·min^{-1} and U_3 = 20 m·min^{-1}) for a constant cutting height of 15 mm in dry beech and spruce wood with moisture content W = 10 ± 1%. The measurements were made with a circular saw with a diameter of cutting tool D = 250 mm, a number of teeth Z = 40 and a width of the cut b = 3.2 mm. The number of rounds was n = 5500 min^{-1}.

Roughness measurements were taken with a digital comparator, according to the R_{max} criterion. The obtained results showed a pronounced significance and a directly proportional dependence of the roughness of the cut surface on the feed rate.

Keywords: beech wood, spruce wood, circular saw, roughness, feed rate.