THE IMPACT OF TOOL HEIGHT ON THE WORKPIECE IN WOOD CUTTING WITH CIRCULAR SAWS

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ABSTRACT

The tool height influences the cutting force by changing the angle at which the blade penetrates the wood. This parameter was analyzed at two different heights. In the first set of measurements, previously used to assess the bluntness of the tool, a sharp saw was positioned 3 mm above the workpiece. The second set was also carried out with a sharp saw, but the height of the tool was set to 15 mm above the workpiece. In both cases, all other parameters were kept constant, so it was not necessary to introduce the concept of specific cutting resistance. By analyzing the average cutting forces, basic data was obtained showing that changing the saw height changes the average fiber cutting angle. When the saw projected 3 mm beyond the workpiece, the average cutting angle Φm was 21.25°; with a projection of 15 mm, Φm increased to 27.87°. A significant difference is observed between these two configurations, with an average cutting angle difference of 6.62º. The rake angle of the saw used in the analysis was 20º. This change in the average fiber cutting angle explains the variation in the required cutting force under otherwise identical conditions.

Keywords: machinability, cutting regime, cutting forces.