

The effect of machine parameters on the surface quality in planing of rubberwood.

ABSTRACT

Some machining defects such as fuzzy grain, torn grain and chip marks often occur in Rubberwood lumbers in the planing process, and it decreases the machining yield. To understand and optimize machine-planing characteristics of this wood species, a series of experiments were carried out using a Weinig Unimate 23E moulder (cutter-head rpm of 6000, cutter Ø 120 mm) to produce machined Rubberwood surface with differing depth of cut ranging from 0.8 mm to 2.4 mm, by altering the feed rate from 8 m/min to 16 m/min according to ASTM D 1666-87. The rake angle was constant at 20°. Test specimens prepared from the lumber cut tangentially from logs, were machined at 10% moisture content using HSS tools, and surface quality obtained is visually graded on a scale of 1-5 (defect free or excellent to very poor). Best surfaces resulted in the lowest machining factors among the samples, i.e with 0.8 mm depth of cut and 8 m/min feed rate. Fuzzy grain was the most frequent occurred defects, and torn grain was the deepest occurred defect. The surface quality was found not to be affected very much by the feed rate, while depth of cut significantly affected on machining defects. This research also revealed that the combination of feed rate and depth of cut on Rubberwood had no significant effect on the machined surface quality of samples.

Keyword: Rubberwood; Wood machining; Planing; Depth of cut; Feed rate; Surface defects.