**Chip Flow and Shape Generated in Milling of Wood-Based Materials by Helical Cutting Tools**

**Kidung Tirtayasa Putra Pangestu1), Dodi Nandika1), Imam Wahyudi1), Hiroshi Usuki2) and Wayan Darmawan1\*)**

1Department of Forest Product, IPB University, Bogor, Indonesia;

2Department of Mechanical and Biofunctional System, The University of Tokyo, Tokyo, Japan

\*Corresponding Author E-mail: wayandar@indo.net.id

*Abstract:* An extreme helix angle of cutting tool edge has been developed in milling of new commercially wood-based materials. The purpose of this research was to investigate chip flow and shape of helical edge cutting tools in milling wood-based materials. The wood-based materials of wood plastic composite, laminated veneer lumber, and oriented strand board were cut by the helical edge cutting tools (helix angle of 15o, 30o, 45o, 60o, and 75o) in up-milling and down-milling process on a computer numerical control router. Feed speed was set up in 2, 3, and 4 m/min. The results show that the helical edges provide better chip flow with nearly axial direction and lower flight velocity compared to the conventional edge (straight edge/helix angle of 0o). The milling condition and the structure of the wood-based materials could take an important role in determining the chip flow and shape. The cutting tool edge of 75o helix angle due to its low in dust emission should be proposed for milling of the wood-based materials.

*Keywords: chip flow and shape; feed speed; helical cutting tool; up and down milling; wood-based material*