An improved algorithm for prediction of Young's Modulus of wood plastic composites

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Abstract

In this paper, a simulation model is proposed to predict Young's Modulus for wood plastic composites (WPC) based on micromechanical models. Most of the previous models developed, have assumed that wood have uniform properties similar to synthetic fibers. But in reality wood behave differently due to different natural sources. During the manufacturing process of WPC, the cell wall of the wood fibers gets damaged during extrusion and injection molding. The percentage of void volume present inside the wood fiber is reduced. The proposed model is able to predict Young's Modulus taking into account the impact of "void volume" and the moisture content of WPC. Model results were validated with experimental results and it was observed that predicted results have shown improvements in comparison to the previously reported models. The present model will be very useful for the people working in the wood composite industry and in research institutes, to increase the understanding of internal processes during manufacturing process. It will help in reducing the quality defects and improving the strength.

Keywords: Wood plastic composites, simulation model, Young's Modulus.