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PHYSICAL AND MECHANICAL BEHAVIOUR OF WOOD-PLASTIC NANOCOMPOSITES BASED ON RECYCLED AND VIRGIN POLYPROPYLENE AND WASTE NEWSPAPER FIBERS

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Recently investigation of nano particles looks promising to enhance structural properties of WPCs. In this study, the effect of nano clay on physical and mechanical properties of wood plastic composites were manufactured by two types of virgin and recycled polypropylene (vPP & rPP) with waste newspaper fibers (WNF) were investigated. The blend nanocomposites were prepared by melt compounding method with various amounts of nanoclay (0, 2.5, and 5%) in Hakee internal mixer and the samples were then made by injection molding. Mechanical results of most specimens were indicated that flexural strength and modulus, tensile strength and modulus and impact strength can be improved by addition of nanoclay. On the other hand, the water absorption and thickness swelling rate of the composites were evaluated by immersing the samples in water at room temperature for 1000 hours. The results revealed that shorter equilibrium time (the time to reach the equilibrium thickness swelling) and water absorption decreased with increase of clay loading, and had a positive effect on enhancing the dimensional stability of the composites. Although, rPP/WNF nanocomposites had lower physical and mechanical properties than vPP/WNF nanocomposites, no significant differences were found between these two types of composites and it shows the potential of rPP/WNF nanocomposites to convert recycled wood fiber and plastics into durable products that are recyclable and otherwise environmentally friendly.