Properties of composite panels from modified rice hulls

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Abstract

In this paper, the internal bond (LB.) strength, flexural properties, and thickness swelling (TS) of composite panels produced from hammer-milled and steam pre-treated rice hulls bonded with phenol formaldehyde (PF) resin are presented. Steam pre-treatment of the rice hull was carried out between 110 and 140°C. The LB. strength, flexural properties and TS of the resulting composite panels improved with steam pre-treatment of rice hulls. The highest mechanical properties and the lowest TS of the composite panels were obtained from steam pre-treated rice hulls. Partial removal of surface impurities of the steam pre-treated rice hulls was partly responsible for the improved properties. Further improvement observed after raising the density from 1000 to 1400 kgm-3 was associated with enhanced interfacial binding stresses between the rice hull particles and the PF resin. The LB. strength, flexural properties, and TS of the densified panels passed the requirements of EN 312-2 by 53%.

Keywords: Composite panels, interface, mechanical testing, thickness swelling testing, steam pre-treatment.