

Morphological and bending properties of cross-laminated timber prototype manufactured with densified *Paraserianthes falcataria*

ABSTRACT

Densification is a modification process commonly used to modify the density and hence, properties improvement of low-density wood. Cross-laminated timber (CLT) manufactured from plantation tree has gained more interest recently but the potentiality of using densified fast-grown plantation wood, Batai (*Paraserianthes falcataria*) in the layering of CLT has yet to be discovered. This study aims to investigate the relationship between morphology of densified wood and bending performance of lab-scale prototype CLT manufactured from it. Laminas after conditioned were hot-pressed (105 °C, 6 MPa for 10 minutes) for two stages with venting (press released for 1 minute 40 seconds) in between before cooling to below 100°C to reduce immediate springback. Densified laminas with three different targeted thicknesses (8, 10, and 15) mm were produced before further manufactured into three-layer CLT (24, 30, and 45) mm thick panels. CLT 60 mm thick panels from three pieces of undensified (20 mm) laminas acts as control. Results show that area of pores morphologically had reduced significantly (average 6.59 μm^2) for laminas densified to 8 mm. CLT 24 show significant improvement up to 696% (Modulus of Elasticity) and 48.8% (Modulus of Rupture) when the area of pores had reduced. Morphological of densified laminas correlates negatively with bending properties of CLT.