ABSTRACT

Glued laminated (glulam) timber, one of various engineered wood products (EWP), has been widely accepted as structural, as well as non-structural member of choices in civil engineering infrastructure applications. During recent years, fiber reinforced polymer (FRP) has been introduced to be applied as external reinforcement for glulam timber beams due to its many advantages over conventional engineering material reinforcement. The use of Para-rubber wood (PW) planks in glulam beams has been intensely under attention over the past decades. However, the use of FRP materials for reinforcement and PW as a raw wood material for glulam timber are still very limited; prior studies are scarcely available and/or have not yet shed sufficient light, especially on structural performances and behaviors. The main objective of this research is thus to evaluate the structural performance, strength properties (flexural and shear rigidity) and the behavior of FRP reinforced PW glulam beams under a variety of bending test conditions. In the study, analytical methodologies have been proposed to determine the maximum load (moment) capacity, reduction factor of flexural rigidity, ductility, and deformation factor. The experimental and analytical results derived have led to contribute to a further knowledge and understanding of structural performance and behavior of this promising composite material.

Key words: Fiber Reinforced Polymer (FRP), Para-rubber wood (PW), Glued Laminated (Glulam) timber, Beam, Bending, Shear