

ABSTRACT

MECHANICAL PROPERTIES OF GLUE LAMINATED BEAMS FABRICATED FROM THREE SPECIES OF INDONESIAN TROPICAL WOOD

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Hardwood are stronger and stiffer than softwood, but when it was made glulam beam, the flexural strength is not the same as the solid wood, therefore glulam is generally made from softwood. Research that has been done shows that hardwood if made glulam beam has a lower flexural strength than if it is still solid wood. The reason is that the fingerjoint connection failed first. For hardwood to be used optimally for glulam, it is necessary to examine various parameters that affect fingerjoint performance, namely the type of wood, type of adhesive, and process, so that Indonesia which is a tropical country producing good hardwood, has the prospect of developing glulam better by using hardwood. In this study, three types of Indonesian tropical hardwood were used, that is Meranti (*Shorea spp.*), Jabon (*Antocephalus cadamba miq*), and Sengon (*Paraseriantes falcataria*). Meranti is hardwood from natural forest products, and the other two types, Sengon and Jabon, are fast growing hardwood species. The three types of adhesives used are Urea Formaldehyde (UF), Polyurethane one component (PUR), and Phenol Resorcinol Formaldehyde (PRF). Referring to the European Norm (EN) or European standards an experimental test of fingerjoint and glulam beam connections was conducted to find the values of mechanical characteristics, especially the modulus of elasticity values $E_{0,g,mean}$ (MOE) and flexural strength values $f_{m,g,k}$ or modulus of rupture (MOR). From this study, it was concluded that the mechanical characteristics of Jabon and Sengon were not identified in EN 338 (2016), while Meranti is identified in class D40. The values of mechanical characteristics glulam made from Sengon and Jabon were not identified in EN 14080 (2013), while glulam made from Meranti was identified. Due to the fingerjoint connection, The MOR value of glulam made from Jabon has decreased compared to solid wood, the biggest decrease is those using PUR adhesive which was decreased 14.00%, and UF adhesive has decreased 2.00%, while PRF adhesive has increased by 0.06%. Glulam Sengon has the highest decrease in MOR value is glulam with PUR adhesive which is 8.10%, then PRF adhesive drops 1.00%, while UF adhesive rises 0.60%. Glulam Meranti has the highest decrease in MOR value is glulam with PUR adhesive which is 29.00%, PRF adhesive drops 19.1%, and the lowest glulam with UF adhesive drops 14.70%.

Keywords: Mechanical properties, glulam, hardwood, Jabon, Sengon, Meranti.