UNIVERSITI TEKNOLOGI MARA

DURABILITY OF TREATED GLUED LAMINATED (GLULAM) TIMBER MANUFACTURED FROM LOWER GRADE TIMBER SPECIES

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Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science in Civil Engineering

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Lower density timber, theoretically will be good for glued laminated timber (glulam) manufacturing since the idea of glulam is to increase the strength properties of the timber for structural application. However, lower density timber for outdoor applications imposes durability problems. Therefore, these timbers need to be treated before used for glulam structures. Treated lower density timber into glulam could offer a competitive structural material in timber construction. However, the treatment may interfere with the strength properties, durability and bonding performance of glulam timber. Therefore, this research was conducted to quantify the bending strength and bonding properties of glulam made from low density timbers treated with chromated copper arsenate (CCA) preservative. Bintangor (*Calophyllum sp*) and Sesenduk (*Endospermum sp*) timber species were selected for this sudy. 5-ply glulam beams with 100mm(W) x 150mm(T) x 3000mm (L) were fabricated and bonded with PRF adhesive in accordance with MS 758. The glulam beams were exposed to three different environment conditions namely room, covered and uncovered conditions for six months. Results showed that Bintangor has higher bending strength than Sesenduk for untreated and treated glulam. The percentage difference in MOR for untreated and treated Sesenduk were lower than untreated and treated Bintangor as the environment become severe. Treated glulam has better wetting properties based on the lower contact angle value compared to untreated glulam. The delamination, shear bond strength and wood failure percentage were met the requirement as stated in MS758, which indicates that the bonding properties of glulam produced in the study are satisfied.

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TABLE OF CONTENTS