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Heat Treatment on Malaysian Hardwood Timbers: The Effect of Heat Exposure at Different Levels of Temperature on Bending Strength Properties

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Abstract : Heat treatment on timbers is a process of applying heat to modify and equip the timbers with new improvised characteristics. It is environmental friendly compared to the common practice of treating timber by chemical preservatives. Malaysian hardwood timbers; Pauh Kijang and Kapur in green condition were heat treated at 150°C, 170°C, 190°C and 210°C in a specially design electronic furnace in one hour duration. The objectives were to determine the effect of heat treatment on bending strength properties of heat treated Pauh Kijang and Kapur in term of Modulus of Elasticity (MOE) and Modulus of Rupture (MOR) and to examine the significance changes at each temperature levels applied. Untreated samples for each species were used as a control sample. The results indicated that the bending strength properties for both species of timbers were affected by the heat exposure. Both MOE and MOR values for heat treated Pauh Kijang were increased when subjected to the specified temperature levels except at 210°C. The values were dropped compared to the control sample and sample treated at 190°C. Heat treated Kapur shows the same pattern of increment on its MOE and MOR values after exposure to heat at three temperature levels used and the values dropped at 210°C. However, differ to Pauh Kijang, even though there were decrement occurred at 210°C but the value is still higher compared to the control sample. The increments of MOE and MOR values are an indicator that heat treatment had successfully improvised the bending strength properties of these two species of hardwood timber. As the good strength of Malaysian timbers used as structural material is limited in numbers and expensive, heat treating timber with low strength properties is an alternative way to overcome this issue. Heat treatment is an alternative method need to be explored and made available in Malaysia as this country is still practicing chemical preservative treatment on the timbers.

Keywords : bending strength, hardwood timber, heat treatment, modulus of elasticity (MOE), modulus of rupture (MOR)
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