

Potential External Strengthening of Reinforced Concrete Beam Using Natural Fiber Composite Plate

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Abstract. Natural fiber composites have been extensively studied due to its low environmental impact, low cost and available under a wide range of applications. A study has been conducted to investigate the potential use of mengkuang leaves or *Pandanus atrocarpus* bonded with epoxy resin as external strengthening material for the strengthening of reinforced concrete (RC) beams. Physical and mechanical properties as well as structural properties of the mengkuang leaves-epoxy composite plate (MLECP) was evaluated in this study. Chemical treatment was performed on the dried mengkuang leaves using sodium hydroxide (NaOH) with concentration of 2%, 5% and 8%. Scanning electron microscope (SEM) and flexural strength tests were conducted on the treated and untreated mengkuang leaves and flexural specimens, respectively. Strengthening of RC beams using MLECP were conducted and tested to failure under four-point loading. Results showed that the flexural strength of the composites with 0.3 fiber volume ratio exhibited the highest flexural strength, about 96% higher than the unreinforced-epoxy plate. In terms of structural properties, it was found that the strengthened beam using MLECP managed to increase the beam capacity to about 10% higher than the control beam.