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Properties of pultruded jute and kenaf fiber reinforced unsaturated polyester composites

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1. Introduction

Natural fiber reinforced polymer composites have a significant advantage over metallic material under corrosive environments due to their high corrosive resistance against corrosive agents such as water, hydrogen and oxygen (Gassan, 1999). However, the performance of this natural fiber reinforced composite is restricted among others by the properties of the fiber itself. Generally, natural fiber reinforced polymer composites will change dimensions with changes in moisture content which directly affect its dimensional stability and mechanical properties (Yang *et al*., 1996). The main objective of this study is to investigate the water absorption behavior of PJRC and PKRC and measure the properties of PJRC and PKRC before and after immersion in sea water (pH 8.9). The intended application of these composites is to offer an alternative material for construction applications exposed to a sea water environment.

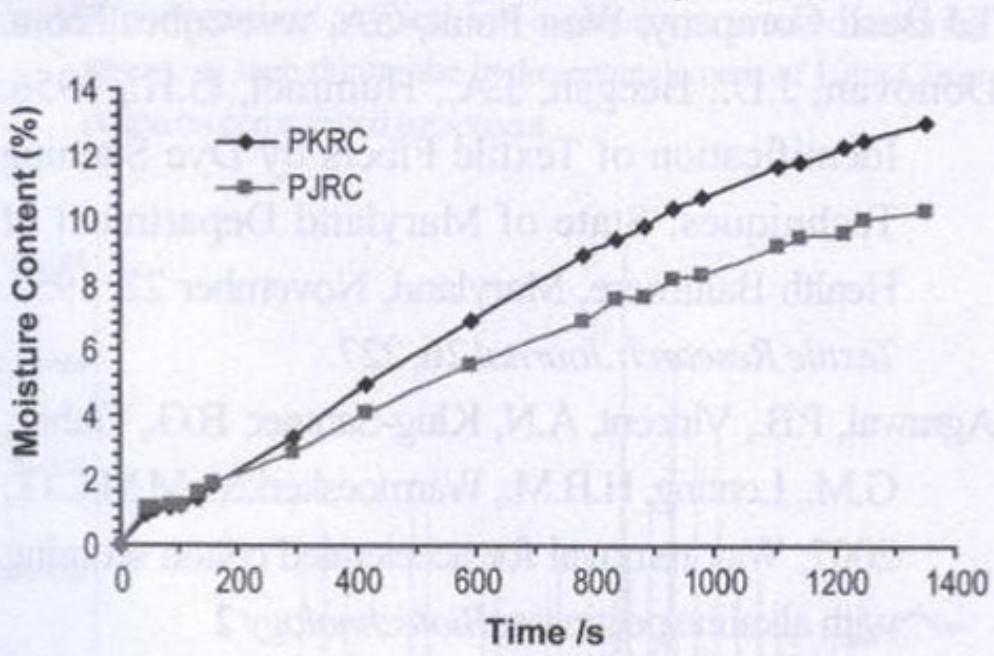

Fig. 1. Moisture absorption curves of PJRC and PKRC in sea water (pH: 8.9)

Figure 1 represents the moisture absorption curve for PJRC and PKRC immersed in sea water (pH 8.9) for the duration of three weeks. From the figure, it can be clearly seen that PKRC absorbs greater amounts of sea water over a similar period as compared to PJRC. Unlike synthetic fibers, higher moisture gain in natural fibers is attributed to the plasticization of both Unsaturated Polyester resin (USP) and the cellulosic part of kenaf and jute fibers. It is widely accepted that the percentage of moisture absorption is highly dependent on the cellulose content, fibrillar structure and microfibrillar angle of the natural fibers.

Kenaf fiber having a higher cellulose content and lower microfibrillar angle posses a greater tendency to absorb water as compared to jute fiber with a lower cellulose content and a higher microfibrillar angle. From the figure, the rate of approach to equilibrium is clearly more rapid for kenaf and jute. The water uptake process of

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