Evaluation of kenaf yarn properties as affected by different linear densities for woven fabric laminated composite production

ABSTRACT

Currently, there is a growing interest of using woven material in composite production for many applications such as structural applications, non-structural applications, household utilities, parts for automobile, aerospace components, flooring and ballistic laminate composites. The structure and properties of the woven fabric is very important as it dictate the woven composite properties. The properties of yarn like linear density, twist factor and strength can influence most of the woven fabric properties. Strength of woven fabric is one of the most important properties which make it superior in final composite applications. In this study, the effects of linear density i.e. 500, 1000, 1500 and 2000 tex on physical and mechanical properties of kenaf yarn were evaluated. The assessment on twist type, twist angle, yarn diameter, yarn structure, fibre density, moisture content, water absorption and mechanical properties were carried out on kenaf yarns. The yarn mechanical properties were tested on the tensile strength, Young's Modulus and elongation. It was found that, different linear density of yarn exhibited different behavior of yarn properties. Higher linear density yarn produced wider yarn diameter compared to lower linear density yarn, resulting to higher fibre and moisture content yarn. Yarn tensile strength has increased by 46% when linear density was changed from 500 to 2000 tex due to higher amount of individual fibres. However, for Young's Modulus, the values reduced as the yarn linear density increased due to several factors including number of fibres and moisture content of yarn.

Keyword: Linear density; Moisture content; Twist angle; Yarn