

ABSTRACT

Bio-Inspired has been a concern in recent years because it has a good structure and has unique mechanical features. Thin-walled tube design that applies the Bio-Inspired Rib structure to bamboo in a multi-cell configuration, with the aim of increasing specific energy absorption (SEA). Rib on Bamboo has good strength because it is able to withstand environmental loads such as wind and rain. Inspiration on bamboo rib design will be optimization in Thin-Walled structures with 4 cross-sectional rib configurations with designs (I-Shape), (V-Shape), (O-Shape) and (X-Shape). The effects of cross-sectional rib will be evaluated using the finite element method. To produce the optimal specific energy absorption (SEA) value, an appropriate input factor design is needed. The Taguchi method will be used to determine the design factors that are suitable for this test, there are 2 design factors, namely the rib design and thickness with each factor having 4 number of levels, then with this experiment carried out 16 times, this is based on $L_{16}(4^2)$ full factorial on orthogonal arrays. For the results of data processing that has been done the optimal factor design on the design factor is at Level 4 with the rib X-Shape shape and at a thickness factor of 1.8mm which results in a specific energy absorption (SEA) value of 67,022 J / g

Keywords: Thin-Walled, Taguchi Method, finite element, Bionic-Bamboo, Bio-Inspired

