COMPARATIVE ANALYSIS OF PLANKING SYSTEM AND BAMBOO LUMBER IN BAMBOO LAMINATE SHIPBUILDING

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ABSTRACT

Past few years, availability of wood for construction has been decreased and the market price also continued to increase, while on the other hand bamboo can be grown in almost all regions of Indonesia so that its availability is abundant. Bamboo also has a rapid growth rate, has good mechanical properties, and can be harvested at the age above 3 years. One type of bamboo that is suitable for use as a wood substitute is bamboo ori (bambusa arundinacea). However, the original form of bamboo with joint and hollow circle are quite difficult to used in production process. This problem can be overcome using a gluing technique that allows to combine multiple elements with rectangular cross section into a single unit called a lamination technique. There are several kinds of method to manufacture laminates, among others are Planking System and Bamboo Lumber. The purpose of this study was to determine the technical and economic comparison of both methods of manufacture to determine the better method. Technical analysis using tensile test and flexure test following the standard test ASTM D 3500 and ASTM D 3043. The difference result between the tensile strength and flexural strength of both variations are not are not experiencing a big difference, the results of two tests showed that bamboo planking bending strength 17,23% greater than lumber while lumber tensile strength 8,58% greater than planking. Economic calculations presented that the bamboo lumber method is 22,57% more economical in the hull fabrication of fishing boat with a material cost of Rp 5.049.222 and production time is 19,77% faster with 109,07 hours per cubic meter.

Keyword: Wooden Ship, Bamboo Laminate, Manufacture Method, Planking System, Bamboo Lumber