ABSTRACT

The increase of expensiveness and scarcity wood as the main material of fishing boats has encouraged practitioners to examine alternative wood materials. Bamboo laminate has mechanical properties greater than teak, so it is considered capable of replacing the teak wood as the main material of fishing boat. But there are still doubts if this material is used on ships with large capacity. So the question arises as to what is the maximum size of the vessel with the main material of bamboo laminate can be built based on the strength and economical aspects. The calculation begins by determining the main dimension of boats, followed by calculating the size of the components of the boat's construction by BKI 2013 edition. Strength analysis is done by 3D vessel modeling approach using Finite Element Method (FEM). While the economic analysis conducted by comparing boats made from bamboo laminate ori and betung, with boats made from teak wood. The results of the calculation and analysis indicates that the strength of boat with a capacity of 20 to 60 GT made from bamboo laminate meets the criteria of strength, which does not exceed a permissible stress of 142 MPa for bamboo laminate ori and 120 MPa for bamboo laminate betung. The results of calculation and economic analysis indicates that the boats made from bamboo laminate has lower production costs than teak boat. The lowest difference in production cost is in 20 GT vessels IDR 178,191,571.00; and as bigger as boat capacities the production cost difference becomes larger. Boat with a capacity of 60 GT have the biggest difference, at IDR 383,428,715.00. Based on the actual conditions in which most large wooden boats that were built only up to a capacity of 60 GT, the calculation and analysis on the capacity been deferred at 60 GT.

Keyword : fishing vessel, bamboo, lamination, gross tonnage (GT), strength, construction dimension