

Abstract

The objective of this research was to study the local materials, bamboo, in the form of bamboo mat typically used for a temporary purpose. The production process was developed to produce the bamboo mat to be used as wall and roofing materials with enhanced properties and suitable for construction.

For wall materials, 3-, 4- and 5-layered bamboo mats were constructed with Phenol Formaldehyde glue for comparing with the 3-layered bamboo mat plywood constructed with Urea Formaldehyde glue, generally found in the market. The results showed that 3- and 4-layered bamboo mat plywood constructed with Phenol Formaldehyde glue passed the GB 13123-91 Bamboo-Mat Plywood standard including moisture content, modulus of rupture and remaining strength for exterior wall. They were classified as Grade 3 thin bamboo mat plywood (2 - 6 mm. thickness) with medium strength. The 5-layered bamboo mat plywood did not pass the standard tests due to its thickness. This resulted in bonding strength loss due to the fact that the heat did not spread entirely over the layers of bamboo mat. Therefore, more time should be provided to press the bamboo mat with more layers. For the 3-layered bamboo mat plywood found in the market, it was not suitable for exterior use due to the lack of durability for inclement weather.

Regarding roofing materials, the results also revealed that the bamboo mat corrugated sheet was stronger than both Asbestos cement corrugated sheet and corrugated galvanized metal sheet, with the bending strength of $1,647 \text{ kg/m}^2$. Also, the bamboo mat corrugated sheet is lighter than the Asbestos cement corrugated sheet, making it more economical and easier to transport. For the leakage test, the result showed that there were very few points of leakage.

In economic perspective, when compared the layered bamboo mat plywood to teak plywood with similar thickness, it was found that bamboo mat plywood production cost was cheaper than the teak plywood. The bamboo mat plywood not only functioned as an exterior wall but also had the esthetics of wood carving design. However, the cost of bamboo mat corrugated sheet was generally high, so that, it was suitable for middle class market.