

(79)

Investigating Hygroscopic Property of Historical Timber against Load Bearing: A Case Study on Ambalam(s) Sri Lanka

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Abstract

Building material with a thousand-year history which is only being second for stone can be introduced as wood. Complexity of wood is found in the interrelationship between several cells at a much larger scale. Wood cell wall is made up of cellulose, hemicellulose and the hydroxyl groups on these chemicals make the cell wall hygroscopic. Lignin is the agent cementing cells together while rigidifying the cell wall. It creates a comparatively hydrophobic molecule. Moisture in wood has a resilient effect towards its properties, and wood-water relations greatly affects on the wood in application. The aim of the study is to investigate the impact of hygroscopic property of historical timber against load bearing in heritage structures in Sri Lanka. Ambalam(s); heritage structure, a way side resting place built under vernacular architecture was selected as the case study. Padivitiya Ambalama, Panavitiya Ambalama, Karagahagedra Ambalama, Giruwa Ambalama and Rukula Ambalama were selected as in prior to timber as the main constructive material. This paper reviews on wood-water interaction through mapping the grain orientation of exposed cross sections of the structural components. The capability of water to alter physical properties of wood are only deliberated in cases wherever there is an influence on state and in transition. Results depicted the historical structural components have overcome the impacts caused due to the hygroscopic property through proper grain oriented sectional applications. This had influenced the structure to rest stable against load bearing for years.

Keywords: Timber; Grain distribution; Hygroscopic property, Fibre saturation point