

# Application of Flexural Timber Reinforcement in Light Concrete Beam Structure

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**Abstract.** Timber is a capable alternative for reinforcement in concrete beam because it possesses high strength ratio compare to its weight although its strength is incompatible to steel. This study was conducted to highlight the flexural behaviour of beam reinforced with two types of timber; *Balau* and *Meranti*. Comparisons of behaviour have been made between samples applying the Reinforced Concrete Design to EC2. The result of flexural test shows that steel reinforcement beam (SRB) carried the utmost loads compared to timber sample beam which reinforced with *Balau* (BRB) and *Meranti* (MRB). Compared to the flexural strength of SRB, BRB reached about 69 % of the value while MRB reached to 66 % respectively. It was found that the failure mode of the timber beam was closely related to the load-deflection behaviour same as conventional steel beam. The larger the load-deflection value, the wider the range of cracking occurred.

## Introduction

Structure assembly that constructed from timber have played an important role in construction industry for centuries especially in countries which have good resource of timber. Basically, timber is tough, strong and long lasting element. Timber has been used as a construction material in many ways. Usages for the entire structure are well known for houses and bridges. The usage of timber as a reinforcement material in concrete is rarely known. Its application as a reinforcement material in concrete structure had received very little attention.

Timber and concrete are inexpensive building material. Both are relatively easy to work on. As composite elements, timber can provides tensile strength for the concrete in a same way of steel reinforcement. Several researchers had conducted full scale testing of different means of achieving composite action between timber and concrete. Most studies dedicated on timber–concrete composite floors which focused on load-deflection capacity, mechanical properties, short term behaviour and also connections [1–4].

Near to this study, bamboo was one of the most commonly used study materials to substitute reinforcing steel bar in concrete [5,6]. Prior to the durability of organic materials, treatment and curing are essential consideration before application [6]. A comparison between steel and bamboo shows that there are benefits and ill effects for both materials [6,7] Even though composite mineral materials based on fibre reinforced polymer (FRP) has become outstanding replacement for conventional steel reinforcement [8], this study has the intention to add to the knowledge base of timber reinforced concrete with locally obtainable timber to produce concrete structural elements.

