

**DEVELOPMENT OF A LIGHTWEIGHT  
COMPOSITE BOARD BY USING COIR FIBER  
AND CALCIUM CARBONATE**

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## ABSTRACT

Composite boards like ceiling sheets, partition boards are vital raw materials in the construction industry. These are commonly made up using asbestos fibers and cement which lead to a high cost of production and health hazards. But, there is a possibility of using coir fiber to make the composite boards as value added products in the coir industry. Therefore, this research was conducted to develop a lightweight composite board. Calcium carbonate was used as a filler to utilize the waste of acetylene plant, to reduce the cement usage further. There are nine treatment levels (C10B, C10M.....C25Y) with three different coir fiber types (Bristle fiber, Mattress fiber and Baby fiber) and three different calcium carbonate weight ratios (10%, 20% and 25%). The experimental design was two-factor factorial with three replicates. Mechanical properties such as dry weight, thickness, density, water absorption and flexural strength were tested according to the SLS 9: Part 1: 2001. Properties of the developed boards were compared with the accepted properties of asbestos cement ceiling sheets to select the best composite board. Results revealed that, there is a significant influence from fiber type on thickness, density, water absorption and bending strength of the boards. Calcium carbonate weight ratios significantly influence on dry weight, thickness, and density and bending strength of the boards. Interaction of fiber type and calcium carbonate significantly influence only on bending strength of the boards. Except the bending strength, all tested properties of the board having C10B treatment have achieved the standard values of currently using composite boards made with asbestos fibers and cement. Therefore, the C10B (board with bristle fiber and 10% of the calcium carbonate weight ratio) can be used to produce suspended ceiling boards or interior partition boards.

**Key words:** Composite board, Cement, Coir fiber, Calcium carbonate, Mechanical properties