

# **A NEW TECHNIQUE FOR DETERMINING THE DURABILITY OF VEGETABLE FIBER REINFORCED CEMENT BASED COMPOSITES**

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For many years the durability of cement based materials reinforced with vegetable fibers have been determined using wetting and drying cycles. To completely saturate the specimens they are usually immersed in a water tank whereas the drying process is made in an oven under temperatures ranging from 60-80°C. This procedure may cause damage to the composites once they are subjected to thermal shocks misleading to an inadequate interpretation of the obtained results. In this work it was developed a forced air flow chamber that allows the control of the wind velocity and air temperature making possible to simulate the environmental conditions, which the material would be subjected in real life application. In this study, the air chamber was set to wind speed and temperature of 0.5m/s and 40°C, respectively. Two types of matrices were used: (i) an OPC reference matrix and (ii) a matrix with 50% of cement replacement (in mass) by metakaolin and calcined clay brick. The sisal fiber mortar laminates were compression molded with 5 layers and 6% of fiber volume fraction. The composites were subjected to 25, 50, 75 and 100 cycles of wetting and drying after 180 days of fog cure. Some specimens were also subjected to wetting and drying cycles using conventional oven to dry the samples in order to provide results for comparison with the newly proposed technique. The durability was evaluated from the results of four point bending tests and Scanning Electron Microscopy (SEM) observations. The newly developed equipment proved to be adequate for accelerating the aging process of the laminates conducting to consistent results. Results of the bending tests and SEM observation indicated that the composite containing calcined clay presented improved durability with aging.

Keywords: durability, sisal, vegetable fibers.