

Teaching Session and Protocol for Sustainable Building Materials

Teaching Session

This section comprises both teaching and practical works in building materials. The teaching involve the general overview of the use of natural fiber and waste polymer specifically polyethylene as reinforcement in building materials. These reinforcements are known to bridge cracks and voids in the composite and as a result increases the mechanical properties of the composite. Strength models will be used in analyzing the composite to determine the compressive and flexural strengths of the resulting composite. Crack bridging models will then be applied to observe the mechanism of crack shielding in the composite.

Protocol

Day 1:

- Pure water sachets (low density polyethylene) will be collected and washed with distilled water and air dried.
- The solvent will be heated to about 140 °C. This is then followed by dropping the sachets one after the other and continuously stirring until complete dissolution
- At the point of saturation, the slurry is cool off rapidly with ice blocks
- The resulting slurry is washed repeatedly with SDS, tween 20 or 80 and ethanol to remove the solvent
- The slurry is then air dried to obtain your powder
- Natural fibers will also be collected and processed.

Day 2:

- Different volume percentages of powdered sachets and fibers, specifically 5%, 10%, 20% and 30% are determined.
- Each of the volume percentages will be mixed with 20 vol. % cement and the appropriate matrix (by volume) to sum up 100%.

- The different volume percentages of the sachets and fibers will be separately mixed homogenously with the matrix and cement
- These homogenous mixtures will then be molded into bricks and air dried.

Day 3:

- Already dried samples are observed and if possible determine the following; water absorption capacity, impact test etc.

Tutors

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