

Thesis title:

Development of an insulation system for fiber reinforced polymer (FRP) concrete composites using cementitious material

Abstract:

A degradation of the mechanical and bond properties of CFRP composites was observed when it is subjected to high temperatures as its transient glass temperature is only 70 ° C. The epoxy resins will soften at high temperatures and eventually ignite, which will weaken the polymer matrix and thus raise a potential concern for the structural integrity of CFRP-concrete composite structures. This decreases bond resistance, tensile strength, and elastic module etc. A cement-based Insulated plaster was developed using RHA wastes as a replacement of sand. An experimental program was conducted and various trial mixes were prepared to study the mechanical and thermal behaviour. The effective use of waste materials for manmade structures is a key aspect of sustainable development. This research was focused on the innovation of an insulation mortar for plastering applications to enhance thermal comfort in buildings using Rice Husk Ash (RHA). The development phase of the product involves the material characterization, trial, and error process of combinations of constituent materials and determination of properties of the end product. The results indicated that the RHA used in this study belongs to F pozzolans. The thermal conductivity of plaster decreases drastically with the decreased dry density of the product which indicates a quadratic relationship between two variables. A feasible RHA replacement range in the mortar was identified as 30 %. The developed mortar ensures the balance between thermal and strength performance required for the applications in building. At last stage the developed plaster was applied with CFRP specimens and checked for the thermal test and bond test using single shear test.