

Influence of Oil Palm Biomass Waste on Compressive Strength and Chloride Penetration of Mortar

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Abstract. The utilization of waste materials which are abundant and cheap, especially from clean resources, has become more pressing than ever. This study investigates the influence of Oil Palm Biomass waste including the Palm Oil Fuel Ash (POFA), Oil Palm Kernel Shell (OPKS) and Oil Palm Fibre (OPF) on the compressive strength and chloride penetration of mortar. The POFA was used as cement replacement up to 80% in nano size. The mass ratio of fine aggregates to binder was 3:1. Test specimens 70×70×70 mm cube were prepared and cured in water for 28 days. Ordinary Portland cement (OPC) mortar was also prepared as control specimen. The specimens were immersed in Sodium Chloride solution up to 18 months. The evaluation was done by visual observation, ultrasonic pulse velocity and mass change before and after exposure. The mortar was then split into two and sprayed with 0.1N Silver Nitrate solution to see the depth of penetration. The test results revealed that biomass mortar showed high resistance to chloride penetration as compared to OPC mortar due to the reduction of cement content in the mixture. Besides, the reactive silica from nano POFA produced more crystalline formation thus, reduced the porosity and crack within the biomass mortar.