World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:17, No:11, 2023

Effect of Concrete Strength on the Bond Between Carbon Fiber Reinforced Polymer and Concrete in Hot Weather

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Abstract : This research deals with the bond behavior of carbon FRP composite wraps adhered/bonded to the surface of the concrete. Four concrete mixes were designed to achieve a concrete compressive strength of 18, 22.5,25 and 30 MP after 28 days of curing. The focus of the study is on bond degradation when the hybrid structure is exposed to hot weather conditions. Specimens were exposed to 50 0C temperature duration 6 months and other specimens were sustained in laboratory temperature (20-24) 0C. Upon removing the specimens from their conditioning environment, tension tests were performed in the machine using a specially manufactured concrete cube holder. A lightweight mortar layer is used to protect the bonded carbon FRP layer on the concrete surface. The results show that the higher the concrete's compressive, the higher the bond strength. The high temperature decreases the bond strength between concrete and carbon fiber-reinforced polymer. The use of a protection layer is essential for concrete exposed to hot weather.

Keywords : concrete, bond, hot weather and carbon fiber, carbon fiber reinforced polymers
Conference Title : ICCEE 2023 : International Conference on Civil and Ecological Engineering
Conference Location : Cape Town, South Africa
Conference Dates : November 06-07, 2023