

Modelling of Factors Affecting Bond Strength of Fibre Reinforced Polymer Externally Bonded to Timber and Concrete

Authors : Abbas Vahedian, Rijun Shrestha, Keith Crews

Abstract : In recent years, fibre reinforced polymers as applications of strengthening materials have received significant attention by civil engineers and environmentalists because of their excellent characteristics. Currently, these composites have become a mainstream technology for strengthening of infrastructures such as steel, concrete and more recently, timber and masonry structures. However, debonding is identified as the main problem which limit the full utilisation of the FRP material. In this paper, a preliminary analysis of factors affecting bond strength of FRP-to-concrete and timber bonded interface has been conducted. A novel theoretical method through regression analysis has been established to evaluate these factors. Results of proposed model are then assessed with results of pull-out tests and satisfactory comparisons are achieved between measured failure loads ($R^2 = 0.83$, $P < 0.0001$) and the predicted loads ($R^2 = 0.78$, $P < 0.0001$).

Keywords : debonding, fibre reinforced polymers (FRP), pull-out test, stepwise regression analysis

Conference Title : ICCMSE 2017 : International Conference on Composite Materials in Structural Engineering

Conference Location : San Diego, United States

Conference Dates : December 18-19, 2017