COMPARISON OF FIBRE-MATRIX ADHESION ON REINFORCED GEOPOLYMER COMPOSITE WITH DIFFERENT TYPES OF FIBERS

L.A. Alves, M.D. Banea1, E.G. Vazquez , S. de Barros

Federal Center of Technological Education in Rio de Janeiro - CEFET/RJ, Federal University of Rio de Janeiro - UFRJ

Abstract: The most promising ecological alternative for common Portland cement and cementitious materials are geopolymers, thanks to its proven durability, mechanical and thermal properties. However, geopolymers can present poor tensile and bending strengths, due to their brittle and ceramic-like nature. Fiber reinforced geopolymer composites may be considered a solution to improve flexural strength and fracture toughness. This work aims to evaluate the fibre-matrix adhesion characterized by the interfacial bond strength on reinforced composite structures based on geopolymer matrix. Different fibers were used for comparison of results, such as glass-fiber, carbon fiber and natural fiber. The adhesion is assessed using a technique based on the fibre pull-out test. To minimize specimen failure by fiber fracture, a series of random embedded lengths are tested, to find the critical length. Microscopic analyses of the test specimens were also carried out after the pull-out tests. For each specimen, the test results include the bond failure mode, the average bond strength and the bond–slip curves. With the test results, the effect of the embedment length on bond strength is analysed and the bond performance of the grass-fiber on the geopolymer matrix can be evaluated by the average bond strength.

Keywords: Geopolymer, concrete, pull-out