



## **COMPATIBILITY AND ADHESION OF MK/BFS ALKALI-ACTIVATED REPAIR MORTARS TO PORTLAND CEMENT CONCRETE SUBSTRATES**

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**Abstract:** Infrastructure rehabilitation represents a huge opportunity of market for the construction industry in terms of development of new materials for the repair of concrete structures. Alkali-activated materials (AAM) have been widely promoted as greener binders for sustainable constructions and, more recently, as a potential repair material for rehabilitation of concrete structures. However, the feasibility of a material for concrete repair depends on its compatibility and adhesion to the concrete substrate. This paper studied AAM as repair mortars obtained from the alkaline activation of metakaolin (MK) partially substituted (0, 20, 40, 60 and 80 wt. %) with blast furnace slag (BFS). Mechanical compatibility with a representative PC concrete substrate was firstly investigated through compressive strength and modulus of elasticity (E) tests. Mortars with equivalent strength and E were applied onto the PC substrate and their adhesion and delamination assessment were evaluated, respectively, via pull-off and four-point bending tests. Results indicate that neat MK-based mortars present excellent adhesion to PC concrete substrates via pull-off testing, but severe delamination was observed in bending tests. An option amount of BFS (20%) mitigates this issue, by reducing the solution demand and drying shrinkage. Higher contents of BFS (> 60%) may be detrimental to bond strength, which is probably associated to high alkalinity conditions.

**Keywords:** alkali-activated materials, repair, bond strength, compatibility