

Assessment of concrete patch repair performance

Rahman M.K., Baluch M.H., Al-Ghadib A., Sharif A.

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Abstract: A complex chain of processes is triggered in a concrete patch repair system, when a cementitious repair layer is cast over a deteriorated patch of concrete. These processes have a profound influence on the deformational response in a patch repair system without any external mechanical action. Some of these processes have been identified as critical processes, based on a comprehensive experimental investigation and numerical simulation of a patch repair system. They play a vital role in stress build up, performance and long-term integrity of repair systems. For assessing the performance of a patch repair system it is imperative that evolution of key material parameters like free shrinkage strain, tensile elastic modulus, tensile creep strain, tensile strength and moisture diffusivity of the repair materials be provided. The role of these critical material parameters in patch repair performance is highlighted in this paper. Experimental investigation of field performance of four different repair materials in a Banz^çiger mould showed cracking in two repair materials, within the first few weeks of its casting. If the repaired structure were subjected to an aggressive environment, these cracks would provide free access for intrusion by chloride ions, from the aggressive ambient/ground environment that exists in the Eastern Province of Saudi Arabia. The core of the performance criterion should be a crack free repair layer for a patch repair to retain its integrity and to protect the reinforcement in the substrate.