

Effect of Surface Preparation of Concrete Substrate on Bond Tensile Strength of Thin Bonded Cement Based Overlays

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Abstract : After a certain period of time, the degradation of concrete structures is unavoidable. For large concrete areas, thin bonded cement-based overlay is a suitable rehabilitation technique. Previous research demonstrated that durability of bonded cement-based repairs is always a problem and one of its main reasons is debonding at interface. Since durability and efficiency of any repair system mainly depend upon the bond between concrete substrate and repair material, the bond between concrete substrate and repair material can be improved by increasing the surface roughness. The surface roughness can be improved by performing surface treatment of the concrete substrate to enhance mechanical interlocking which is one of the basic mechanisms of adhesion between two surfaces. In this research, bond tensile strength of cement-based overlays having substrate surface prepared using different techniques has been characterized. In first step cement based substrate was prepared and then cured for three months. After curing two different types of the surface treatments were performed on this substrate; cutting and sandblasting. In second step overlay was cast on these prepared surfaces, which were cut and sandblasted surfaces. The overlay was also cast on the surface without any treatment. Finally, bond tensile strength of cement-based overlays was evaluated in direct tension test and the results are discussed in this paper.

Keywords : concrete substrate, surface preparation, overlays, bond tensile strength

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