

Bond Between Concrete and Building Stones in Stone Masonry Structures

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Abstract:

Stone masonry structures are widespread in many countries. The “wall tiling” and the “concrete backing” of building stones are two major methods of constructing such structures. Neither method utilizes the considerable strength that the building stones have. This is attributed to the weak bond between the concrete and the building stones, in addition to the low bond strength normal to the bed joints that affects the composite action of such types of constructions. In this research, an experimental study was conducted to investigate and improve the bond between building stones and concrete in the structures erected by the “concrete backing” approach. To address this problem, ninety-six concrete backed stone specimens were prepared and tested by applying shear stresses on the stone-concrete interface. The investigated parameters in this study are the compressive strengths of concrete and stones in addition to the roughness of the stone concrete interface. Results of this study showed that bond failure occurred in the specimens of the saw-cut stones and in most of the small roughness specimens, while the deep groove ones failed by rupturing the concrete core. Also, the bond strength increased as the area of the stone concrete interface increased up to 1.6 times the area of the no- groove specimens). A formula that estimates the bond in concrete backed stones members in terms of the concrete compressive strength and the stone concrete interface area is presented.

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