

Investigation of the Interface Between Brick and Mortar

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Abstract:

Although mortar has been performing its role of holding masonry structures together for hundreds of years, masonry does fail, and the majority of cases of failure occur at the interface between the mortar and the masonry unit. The purpose of this investigation was to examine that interface in more detail, using a combination of the scanning electron microscope and x-ray diffraction. Previous investigations of tensile bond strength have shown that bond strength is affected by brick suction, brick surface texture, mortar flow and composition, and other factors. But they did not examine the fundamental mechanism of bonding, nor the chemistry at the interface.

Scanning electron microscope (SEM) photographs of the interface region show that the preponderant materials present for untreated brick are calcium-silicate-hydrate (C-S-H) and calcium hydroxide. Energy dispersive x-ray analysis (EDXA) performed on the SEM samples provides clues as to the possible composition of interfacial compounds, but additional means are needed for positive identification.

Additional investigations are recommended to determine the identity of the reaction products mentioned above, to test the durability and water resistance of chemically treated brick assemblages, and to perform more extensive testing using mortars of different composition and flow.

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