

Quantifying the Effect of Joint Type on Masonry Fire Resistance

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Abstract:

Raked joints are commonly used for aesthetic purposes; however, they have been thought to greatly reduce the fire resistance of masonry. The reason for this is that part of the mortar is removed from the joint, which could cause points of failure and allow for thermal bridging. To determine the effect that raked joints have on the fire resistance, a full-scale concrete masonry wall with raked joints was tested as per the CAN/ULC S101 standard. A wall with standard concave mortar joints was also tested as a control. The walls had supplemental monitoring from thermal imaging and thermocouples throughout the walls in order to record a complete thermal profile. Results showed that the raked joints had a limited impact on the fire resistance of the wall, as the thermocouples and thermal camera showed that the mortar joints were not the most critical parts of the masonry wall. In order to determine the applicability of these findings to other joint types, another test was done with struck joints. The results confirmed that mortar was not the most critical part in terms of the insulation failure, however its effects on integrity were not conclusively determined.

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