

Masonry Lintels – Shear Failure Analysis

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Abstract:

This paper presents the analytical model of shear stress distribution and prediction of load at failure on masonry lintels where the failure mode was shear. Experimental testing of masonry lintels resolve that failure mechanism initiates in the first bottom mortar bed joint of such lintel. This type of failure is always sudden, brittle, nonductile and different from the flexural failure, that means not announced by progressive cracking. Procedure used to create analytical model of shear failure is presented. The paper elaborates several possible compression stress trajectories and as a most probable, the one in the shape of ellipse is accepted. Analytical function of shear stress distribution along the mortar bed joint, as well as the load at failure and the place where failure initiates are established too. This is one contribution to the analysis of nonductile behavior of masonry lintels due to brittle shear failure. To test the validity of the analytical model, comparison with experimental results has been presented.

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