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CRACK-WIDTH CONTROL WITH BED-JOINT REINFORCEMENT IN MASONRY STRUCTURES

The report presents the results of investigations on crack width control in reinforced masonry. The aim of the research programme was the determination of suitable minimum areas of reinforcement for crack width control with respect to aspects of durability and aesthetics. The minimum areas of reinforcement actually given in national and international masonry standards are designed to prevent yielding of the reinforcement and do not necessarily limit crack widths sufficiently. The mechanism of cracking in reinforced masonry structures due to imposed deformation parallel to the bed-joints is described. The material properties influencing the crack widths are the tensile strength of masonry parallel to the bed-joints and the mean steel stress along the bond transfer length. Based on pull-out tests with epoxy-coated reinforcement theoretical crack widths were calculated applying the bond theory given by Rehm et al. The results of these calculations were verified in full-scale tensile tests on reinforced walls. A comparison of calculated and measured crack widths demonstrates the suitability of the proposed calculation method. Minimum areas of reinforcement for crack width control are proposed for different tensile strengths of masonry and compressive strengths of mortar in the joint.

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Keywords: Reinforced Masonry, Crack-Width Control, Imposed Deformations,
Minimum Area of Reinforcement