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Application of Digital Image Correlation for strain measurements of large masonry walls

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A full-scale testing of large unreinforced masonry walls subjected to the in-plane static-cyclic loading is underway at ETH Zurich. During the testing measurements included all applied forces together with an overall and a local picture of the deformation state of the specimens. In order to achieve this, in addition to the traditional hard-wired instruments, i.e. LVDTs, a 2D Digital Image Correlation (DIC) measurement system has been used. DIC is a cutting-edge, non-contact, optical measurement technique that provides full-field displacements and strains by comparing the digital images of the test object's surface obtained before and after deformation. The present paper reports on the measurement procedure and discusses obtained results and the applicability of DIC for strain measurements when testing large masonry walls at full-scale. A set of conclusions and recommendations for the practical application and future research are also given.

Keywords: Full-scale testing, Unreinforced masonry, Digital Image Correlation, Static-cyclic loading, Strain measurement