Experimental Investigation of Long-Term Behavior of Dry-Stacked Masonry

Gero Marzahn[1] and Gert König[2]

Abstract:

Dry-stacked masonry differs from traditional masonry in that no mortar is used to erect brickwork. Apart from the load failure mechanism, the study anticipated that the long-term behavior of mortarless masonry would alter due to the absence of mortar. Hence, the study sought to reveal the behavioral differences of individual masonry units (calcium silicate blocks and autoclaved aerated concrete blocks) and dry-stacked masonry walls using the same units under compression in the long run. Based on the knowledge of masonry with mortar joints, specimens of small wall patterns and individual units were subjected to different sustained compression loads to study the creep deformation over time. Whereas the creep behavior of individual units was found to be consistent with accepted creep theories for solid materials, the behavior of dry-stacked masonry walls differed because of the significant impact of unfilled joints. For practical issues of creep prediction, therefore, the stress level must be always taken into account for such masonry. Aside from creep investigation, additional compression tests were conducted on single units and dry-stacked masonry specimens to observe whether the dry joints also affect the sustained compressive strength. However, it was found that the dry joints only insignificantly influenced the long-term compressive strength.

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[1] Dr.-Ing., Visiting Researcher at the Civil, Environ., and Arch. Eng. Department at the University of Colorado at Boulder, Boulder, CO; former member of the University of Leipzig, Leipzig, Germany.
[2] Prof. Dr.-Ing. Dr.-Ing. e.h., Institute for Concrete Structures and Building Materials, University of Leipzig.