An Experimental Investigation on the Torsion-Shear Behaviour of interlocking interfaces

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ABSTRACT

This paper presents an experimental investigation on the torsion-shear behaviour at the interface of an interlocking masonry block. An interlocking block is a rigid unit with locks avoiding the blocks to slide. This improves the seismic response of the dry jointed assemblages including the in-plane and out-of-plane behaviour of walls as shown in [1-3].

The experimental investigation is designed and carried out for the corrugated interface having one lock with rectangular cross section, i.e. the sample is an interlocking unit composed of a main body and a lock located on the upper face of the main body. It is made of two types of cement-based mortars, casted using a mold provided by 3D printer. This work demonstrates the torsion-shear capacity of the lock at the surface where it is attached to the main body of the block, when it is subjected to lateral forces.

In the designed setup, the horizontal force is applied to the lock until it is disjointed from the main body of the block, while the effect of rocking during the shear test, is avoided. The force and the displacements are measured using a load cell and Linear Variable Displacement Transducers (LVDTs), respectively. The experimental programme includes four different sets with different load application points and different load directions, each set repeated on several similar specimens.

Finally, the obtained results are compared to those obtained for dry joints by an existing numerical method using convex and corrected concave contact model within the limit state analysis framework [4]. The objective is to verify if the analytical torsion-shear yield domain already experimentally validated for dry joints can also be validated for cohesive joints, like interlocking interfaces.

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