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NUMERICAL MODELLING OF METAL CONNECTORS IN HISTORICAL DRY-STONE MASONRY STRUCTURES

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Preservation and estimation of the resistance of historical dry-stone masonry structures, especially those that are classified as world cultural heritage represent great challenge to researchers nowadays. These structures are often reinforced with different types of metal connectors, such as clamps and bolts, embedded into the holes and filled with lead. In order to investigate mechanical behaviour and carrying capacity of such structures subjected to various dynamic effects of which the dominant is earthquake, it is necessary to develop the software which, among other algorithms, include numerical modelling of clamps and bolts. In this paper, a new numerical model of clamps and bolts suitable for implementation in computer programs based on discrete or finite-discrete element method [1-2] is presented. The model is based on force-displacement curves, experimentally obtained by testing of the specimens composed of two stone blocks connected with clamp or bolt [3]. Increasing of the structural load accompanied with the tangential and shear separation of the blocks led to the reduction of the normal and shear stress in connecting elements, which were reflected in the experimentally obtained curves and implemented in material models of connectors.

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