EXPERIMENTAL DATA FOR THE CALIBRATION OF A NON-LINEAR NUMERICAL MODEL FOR DESCRIBING THE RESPONSE OF MASONRY CONSTRUCTIONS UNDER CYCLIC LOADING

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ABSTRACT

One of the crucial issues in the still open problem of seismic analyses of masonry constructions is the study of the structural capacity for cyclic loadings [1]. Indeed, because of the very low tensile strength of mortar joints, the mechanical response under dynamic alternate loads of masonry constructions is strongly influenced by the activation of rocking mechanisms between ashlars and this behavior is very difficult to predict by using numerical models. On the other hand, these mechanisms allow for avoiding the collapse of the structure and make overall the structure capable of withstanding horizontal accelerations considerably higher than those predictable by static non-linear analyses [2].
The above difficulties are even more pronounced when constructions embedding curved elements like arches, vaults and domes have to be studied. In order to develop effective nonlinear numerical models like, e.g., [3], the latter have to be capable of representing the relevant aspects of the experimental behavior and the mechanical parameters of the model have to be carefully calibrated with reference to suitable experimental test results. In this paper the outcomes of experimental tests on a tuff masonry arch under cyclic loading are proposed and discussed, along with the results of experimental tests on the masonry materials (blocks and mortar) aimed at determining the compressive, flexural and shear behavior.

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