Use of natural fibrous lime mortar for improving the out of plane lateral resistance of masonry

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Abstract

The Italian Historical Heritage consists of masonry buildings. They have always coexisted with seismic events or natural degradation phenomena.
Previous studies have shown that the addition of fibers to masonry elements, (i.e. blocks, mortar and plaster), improves their mechanical properties compressive, shear and tensile strength.
The use of natural fibres within lime mortar did more to enhance the wall strength than fibres within blocks.
In this study, the effectiveness of natural fibrous lime mortar for improving the out of plane lateral resistance of masonry walling was evaluated.
Experimental shear tests were carried out on triplet samples made of tuff masonry blocks joined by lime mortars without and with hemp fibers.
Five samples manufactured with hemp fibres, having a percentage of 1% and 2% with respect to the mortar weight, have been tested and their behaviour has been compared to that of the triplet made of the simple lime mortars linking tuff blocks.
The comparison has been done in terms of both force-displacement and shear stress-deformation angle curves.
The achieved results have proved the effectiveness of hemp fibres in manufacturing reinforced lime mortars able to join together top sustainable features with high mechanical characteristics.

Keywords: **Experimental shear tests, tuff block triplets, hemp fibers**

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