

Reinforcement and consolidation of masonry structures. Success cases implemented: from the study to the execution phase.

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ABSTRACT

In the meantime, reinforcement and consolidation of masonry structures has been done according to one of the following approaches, or a combination of them: By using materials with a very different nature and behaviour from the original ones in the reinforced structure or by increasing the section of those structures, increasing, therefore, their rigidity. The first approach could unleash serious setbacks in the original structure. Using materials with high elastic modulus on more flexible elements might generate new tensions in the system, which previously did not exist, compromising the reinforcement intervention. The second approach implies increasing significantly the structural geometry and, therefore, its own global rigidity.

The modern approach, which is being pursued in reinforcement and consolidation of masonry structures, is solving both issues. It is done by using compatible materials with the original structure, combining the elastic behaviour of them and assuring the original breathability, and implementing low thickness interventions in order to do not modify the original rigidity.

The proposal of a reinforcement system compatible with the historic and architectonic nature of the structure, is based on a mineral matrix of hydraulic natural lime, GeoCalce F Antisismico, combined with basalt fibre fabrics (GeoSteel Grid) or galvanized steel unidirectional bands (GeoSteel Hardwire™). With this typology of system, it is ensured an improvement in the mechanical resistances of the structure, based on a simple and low thickness application.

The objective of the exposure is introducing the reinforcement and consolidation system for masonry structures developed by Kerakoll and showing several success cases, in Spain and Italy, reinforced with this innovative system. Each case will be explained from the initial study phase to the execution of the proposed intervention, including the required calculations to determine the procedure to be done.