Experimental overview of the mechanical properties of Steel Reinforced Grout for structural retrofitting.

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ABSTRACT

In the recent years, Steel Reinforced Grout (SRG) is becoming an innovative solution for retrofitting existing structures, thanks to its capability to provide a tensile strength, with limited increase in mass and in stiffness [1, 2].
Therefore, a significant number of companies started to product SRG reinforcement systems and the scientific community started experimental and numerical investigations to demonstrate its effectiveness for structural applications.
Only recently SRG systems have been included in the AC434 Acceptance Criteria [3] and in the CNR-DT215 [4] guideline for the design of structural applications with FRCM.
However, a clear view of the mechanical properties of these systems is still lacking since the behavior could strongly depend upon the architecture of the single cord, the density of the textile and the characteristics of the matrix.
The purpose of this paper is to provide an overview of the structural properties of SRG systems on the basis of the experimental tests carried out at Roma Tre University and of the other experimental evidences available in the literature.
To this end, the results of the tensile tests on bare textile, SRG coupons with different inorganic matrix, and bond tests on masonry and reinforced concrete substrate, are collected and presented, to provide a clear comparison between the performances of the different SRG systems. More precisely, the capacity of the steel cords to ensure a proper shear transfer through interlocking within the matrix, the effect of the density of the steel textile on the expected failure mechanism in the bond tests, the influence of the mortar matrix on the crack spacing, ultimate deformation and tension stiffening, will be investigated, to provide a comprehensive knowledge of SRG systems.

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