

# “Mechanical characterization of traditional masonry in an homogeneous territory: Valtellina”

Mattia Sala\*, Dario Foppoli†, Stefano Della Torre‡

\* Graduated in Building Engineering at Politecnico di Milano  
e-mail:mattia5.sala@mail.polimi.it - Web page: <http://www.polimi.it>

† Technical director of *Foppoli Moretta e Associati s.r.l.*  
Via G.F. Damiani 2, 23037 Tirano (SO)  
Email: [posta@foppolimoretta.it](mailto:posta@foppolimoretta.it) - Web page: <http://www.foppolimoretta.it>

‡ Director of dABC (Department of Architecture, Built environment and Construction engineering)  
Edificio 5, Politecnico di Milano, Piazza Leonardo da Vinci, 32, 20133 Milano (MI)  
Email: [stefano.dellatorre@polimi.it](mailto:stefano.dellatorre@polimi.it) - Web page: <http://www.abc.polimi.it>

## ABSTRACT

In the frame of the Italian structural code, the Circ. 21/01/2019 cap. C8.5.3.1, provides tables with standard values of the mechanical characteristics of the existing masonry that have to be managed, taking into account the confidence factor and the degree of knowledge of the masonry itself. These tables are referred to specific masonries typologies, as described and identified, on the basis of the masonry texture.

Indeed, as the bibliography suggests, the way in which the masonry is built up really affects the structural behaviour, both in terms of mechanical properties and failure mechanisms. For this reason the code entrusts to each Region to improve and better define the mechanical characteristics of the masonries, specifically in areas where they could be regarded as homogeneous. Valtellina, located in the middle of the Alps and in the north of the Lombardy Region, could be regarded as a homogeneous area because of its specific and particular masonry typology, built up with hard stones pieces and weak lime mortar: similar characteristics are found also in the nearby Swiss area of *Val Poschiavo*.

The aim of this paper will be the collection, implementation and improvement of in-situ experimental data, achieved through NDTs (non-destructive tests) and MDTs (minor destructive tests). The available data come mainly from single and double flat-jack analyses, performed in order to define and characterize the stress state of the masonries and their mechanical properties (E, G,  $\nu$ ). Moreover the available analyses are implemented with other tests: sonic tests to define the masonry quality, chemical analyses and rebound tests to define the mortar's properties.

The data will be elaborated in order to classify the masonries through the following criteria:

- › Age of construction;
- › Construction typology;
- › Mortar typology;
- › Mechanical resistance and properties

The research and the works carried out proved to be valid and effective, as they allow to classify and mechanically identify a masonry type, which had never been catalogued before. It is furthermore useful as a substantial example of the procedure required by the Italian code in order to define the quality, the behaviour and the mechanical properties of homogeneous masonry types with a higher degree of knowledge.

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