Study about the masonries realised with low-strength mortars

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Summary

Masonry is one of the oldest construction elements. In present day, the utilisation area was restrained, but taking into account the diversification of the constructions systems and materials, the masonry remain the main associated building material for the walls and civil buildings. Also, for the no-industrialised countries, all over the world, the masonry remain the most used material.

The consolidations of a damaged building impose knowledge involving building materials properties, about the constructions techniques, about elaboration and realisation of the consolidation project and, also, important knowledge in order to realise a strength calculus of the consolidated building. Re-evaluation and damaged building consolidation represent an engineering complex problem and, in the same time, a problem different from to build a new one.

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It is necessary to understand and to realise the difference between **mascrete** (mass – masonry & crete – concrete / masonry based by the cement mortars) and **masonry** (classical masonry made from the aerial binder mortars – clay, lime, gypsum). The thesis is concentrated to the **classical masonries**. Because of the differences between the physico-mechanics properties of the stone/bricks and of the low-strength mortars is it quit necessary to know what are most important: the adherence between the mortars and bricks or the mechanical strengths?

Taking into account the lack of the information looking to deformability and strength characteristics of the "old – masonries", made from bricks and bounded with the low-strength mortars, in the case of the existent building and heritages, the thesis could contribute by an elaborate analyse regarding the characteristics of the compounded elements and the its time – history evolution. The Ph. D. thesis has some important contributions to the improvement of the testing methods of the masonry structures and its components.

The Ph. D. thesis is structured by 8 chapters, as follows:

➲ Chapter I – General Notions, present a masonry definition, a short time-history of the masonry evolution, discus the advantages and the disadvantages of the masonry-based structures using and review the actual knowledge in this domain (national and world levels).

➲ Chapter II – Masonries Classification, presents multi-criteria classification of the masonry's elements (bricks and mortars), used binders.

➲ Chapter III – Masonries Structural Mechanics present the computation methods of the masonries elements subjected to the axial compression, local compression (crushing), bending, shearing and elasticity modulus determination

➲ Chapter IV – Masonry Structures Rehabilitation – describes the main steps in order to restoring and rehabilitate a masonry structure, insisting to the expert's report stage.

➲ Chapter V – Masonry Testing Methods – present the testing methods of the old masonries (realised with low-strength mortars) emphasizing the testing methodology *in situ* and in laboratory, destroying and non-

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destroying the proves, and a extended description of the devices and apparatus needed.

➲ Chapter VI – Laboratory Tests. Experimental Program**.** Are presented the personal testing program realised in The Civil Engineering Faculty of Jassy Laboratories, obtained results, and conclusions.

➲ Chapter VII – Computational Models Based On Finite Element Method, present simulation program realized with F.E.M. of the damage which could appear and a comparative study between results from numerical simulation and experimental test.

➲ Chapter VIII – Final Conclusions – contain the main conclusion from each chapter, enhance the author personal contributions and propose the future direction in order to continue the research.

Keywords: Masonry, Mortars, Masonry Testing Methods, Computational Model.