

Physico-Mechanical Characteristics of Limestone Blocks from the Republic of Moldova

Doina-Cezara ALBU

Gheorghe Asachi Technical University of Iasi, Faculty of Civil Engineering and Building Services,
Prof. Dimitrie Mangeron av. 1, RO-700050 Iasi, Romania. ORCID 0000-0001-8099-8584

E-mail: doina-cezara.albu@student.tuiasi.ro

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Abstract. The present experimental study aims to contribute to the knowledge of the physical-mechanical properties of limestone blocks quarried in the Republic of Moldova. Apparent density, water absorption and compressive strength are examined based on laboratory work. The masonry material - limestone blocks are characterized both in comparison with other types of masonry materials and by comparing the compressive strength with other types of limestones. The analysed limestone samples were taken from 3 limestone quarries located in different areas on the territory of the Republic of Moldova. The results showed that limestone blocks from Moldova have better properties than AAC and some bricks. The materials used in the experimental work were selected to be representative of the mechanical characteristics present in old and existing buildings in Chisinau. This research is significant for the variation of the physical-mechanical properties of Moldovan limestone blocks compared to the same properties of other types of masonry blocks.

Introduction

Limestone is a naturally occurring building material used since ancient times. It is a widespread sedimentary rock that includes calcium carbonate. The main advantages of limestone blocks used in construction are durability, wear resistance, thermal conductivity, high ecological and biological compatibility with the human body, as well as pronounced natural antiseptic and antiallergic properties.(1)

Limestone has a varied typology, for construction, it is important to classify by structure. (2) On the territory of the Republic of Moldova can be found shell rock, oolitic rock but also the most accessible limestone - rubble.

Limestone blocks in the Republic of Moldova have been widely quarried since the 50s and 60s of the 20th century, mainly being used for the construction of residential buildings, but we can also find buildings dating back to the 18th-19th century made of this material. (2)

The mechanical properties of limestone blocks change over time under the influence of natural and anthropogenic factors. Despite its internal strength, limestone belongs to the soft rocks and for this reason, one of its main disadvantages is its susceptibility to weathering. On average, limestone products begin to decay after 75 years, but 150-year-old buildings do not lose their usefulness, as the experience of historic buildings in Chisinau shows. Only if the building is not properly maintained does the degradation of the materials from which it was constructed occur. (1) The causes of damage are:

- high humidity;
- mechanical stress;
- physical weathering;
- chemical reactions of a stone with a gas-laden atmosphere and chemically active waters;
- active human actions.

The issue of the durability of building materials is being examined by various researchers. As a rule, aspects such as the safety over time of building materials, the service life of the material after