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**Editorial**

**CURRENT APPROACHES IN THE RESEARCH OF DIMENSION STONES: FROM QUARRY TO HERITAGE**

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Humans use stones since ever. All the great monuments made over time are some way related with stones. The importance of stones increases every year with the creation of new materials and new applications. Stone related activities are important for some countries. In 2015 the international market of stone products generated a flux of 78 millions of tons with a value of 26 billions € [1].

Aesthetic characteristics determine the choice among the available stone varieties (Fig. 1), however others factors must be considered during the three phases of the stone processing cycle: exploitation, transformation and application [2]. These three phases are conditioned by several factors which delimit the scientific investigation in the dimension stone field. The most important factors are fracturing, physical-mechanical properties and durability.

Quarries must be able to provide blocks with the appropriate size in order to maximize the further processing (Fig. 1). Local fracturing plays a major role in the quarry assessment since small variations in the pattern and/or joint density can significantly reduce the quarry production. The choice of the best surveying method is fundamental for the assessment of the block geometry with acceptable quality [3]. Random joints, lateral and in-deep variation of the degree of jointing, and the sometimes invisible subhorizontal joints, are some sources of error when the degree of jointing is estimated based on incorrect joint surveying [2,4]. During a campaign of fracturing survey all these factors must be taken into account to get the correct deposit characterization.

Natural stones are used in different applications and under wide environmental conditions, therefore their physical-mechanical properties must be in agreement with known international standards [5]. These international standards can be different according the use of the stone and even with the country, but they usually include the assessment of the fundamental properties, such as bulk density, porosity and uniaxial compressive strength [6,7]. Some problems, as changes in color, loss gloss and bowing were referred in weathered granites [2,4] and a particular caution is required when such stones are used. Stone durability is assessed trough performing ageing tests. These tests are implement to know the stone behaviour under a specific environmental condition or even to assess the efficacy of a protective treatment. In spite of the idea of endlessness of the stones, under the wrong combination the life span can be drastically reduced [8].

Heritage issues have an increasing importance though to the pronounced degradation of some stone monuments. The assessment of the behaviour of the stone after centuries exposed to the environmental conditions and anthropic aggressions highlights the importance of the petrophysic and geomechanical researches in order to avoid or mitigate the deterioration [9-11]. There are many examples of rapid deterioration when the stone does not meet the physical-mechanical standards, the stone mineralogy was not considered, or the building process was deficient [12].

Current stone researches play an important role in the dimension stone industry. In the past the aesthetics and the block size determined the practice in dimension stone exploration (Fig. 1), but nowadays several branches are included, such as environment,

safety, machinery, geology, geomechanics, petrophysics and engineering geology [13-20]. All the players, from the extraction in quarries to the different utilizations, are now more conscious about the complexity of the processes related with the stone.

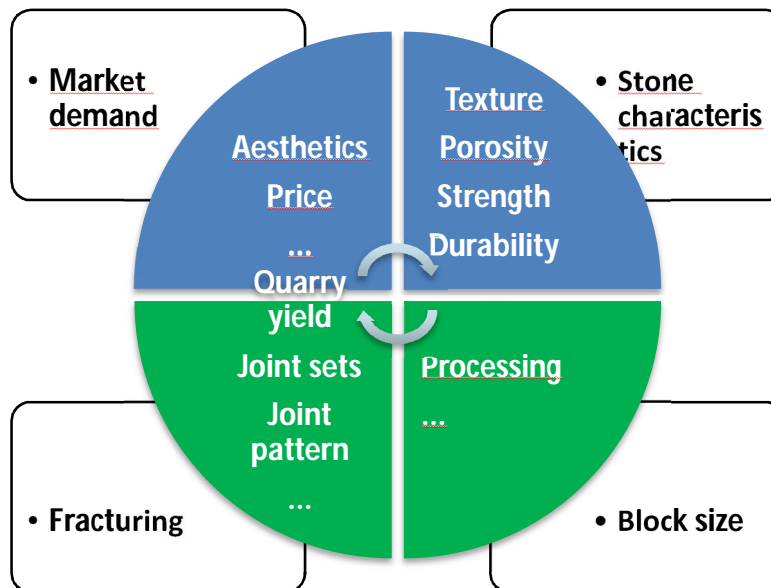


Figure 1. Some of the factors with an important role in stone dimension in the industry.

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