

AN OBSERVATIONAL STUDY OF CRACKS OCCURRENCE IN GRANITE STONES APPLIED IN MODERN BUILDING WORKS

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Stone is subjected to several decay processes after its emplacement on the built environment. Among the decay features that have been observed on stones are cracks, which can be related to the structural settings (stress distribution) of the built element or to stone characteristics inherited from the quarry. While erosive features such as granular disintegration and detachments have been extensively studied on granites, the presence and distribution of cracks has been less considered.

Here is presented a strictly non-destructive and non-invasive study by visual field inspection of modern works where it has been observed the presence of cracks in granite stones applied on elements such as pavements and small free-standing walls.

In some stones have been observed small-spaced parallel cracks with different stones showing different preferred orientations for the cracks (indicating the presence of preferential orientations that influence the development of the cracks). Other stones have cracks with a more irregular distribution. In the case of the small free-standing walls, several cracks were observed on blocks at the top of the wall (including the horizontal top surface). The limited penetrability of the cracks suggests that the problem is not related to the structure but to the specific stone where they occur.

While longitudinal studies have not been performed, one can consider that there is a potential erosion hazard related to the evolution of the cracks leading to loss of portions of the elements. Even as these cracks do not have a penetrativity that threatens the separation of important volumes of the stones its extension can achieve a metric dimension and its frequency can affect noticeable portions of the stones.

Based on the patterns the cracks and in the position and macroscopic characteristics of stones and built elements, it is proposed that the observed cracking is influenced by characteristics that the stones presented at the quarry, namely preferred orientations (promoting preferentially directional cracking), weathering degree (that can affect stone strength) or a combination of both.

The proposed hypothesis will indicate a problem that could be related to specific regions of granitic masses highlighting, therefore, the need for a detailed geological study at the quarry level as well as the need for discussing the procedures for quality control of stones.

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