



Does the microfractography of the intact rock influence the sawability of granitic building stones?

A. Rodríguez-Rey, L.M. Suárez del Río. N. Sánchez-Delgado, V.G. Ruiz de Argandoña, L. Calleja.

Dpt. of Geology. University of Oviedo. Spain

(arrey@geol.uniovi.es / Phone: +34-985-103159)

Although the petrophysical characteristics of the rock influence the sawability of building stones with diamond tools, a lot of work remains to be done to establish the precise role of each characteristic. In principle, the microfissuration of the intact rock should have certain influence in its sawability, since the cut process takes place at grain scale. To estimate its role, cylindrical specimens of two dimension stones from the NW of Spain, the Pink Porrino and the Grey Gondomar granites, have been cut with a laboratory saw keeping constant the cutting conditions, and the sawing rate of each section has been measured. Of each cut surface, a polished thin section has been prepared. The microcrack density (number of microcracks traces per length unit) has been quantified by stereological procedures under two different microscopy techniques: reflected-light fluorescence microscopy and scanning electron microscopy (SEM). Taking into account the resolution of the fluorescence microscopy and the used magnification, only the microcracks with apertures wider than $1.5 \mu\text{m}$ have been quantified in two groups of microcracks, the aperture threshold value being $11.5 \mu\text{m}$. The results hardly show relationship between the microcrack density and the rock sawability; in the case of the Pink Porrino granite, determination coefficients (R^2) as low as 0.08 have been obtained between the sawing rate and the total microcrack density in images under fluorescence microscopy. It should be noted that the microcrack densities are small and their influence can be not very important if compared to other rock characteristics or cutting conditions. This result does not imply that the microfissuration has not influence at all in the sawing rate, since other microcrack characteristics such as their type (intragranular intergranular, etc) or the orientation of the crack surfaces with respect to the cutting plane have not been studied.