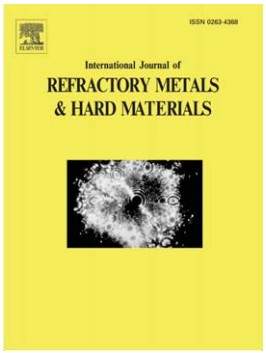

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Long term performance of stone-cutting tools

L. G. Rosa [a] *, J. C. Fernandes [a], C. A. Anjinho [b], A. Coelho [b] and P. M. Amaral [a]

[a] Universidade de Lisboa, Instituto Superior Tecnico, Dept. of Mech. Engineering, Av. Rovisco Pais, 1049-001 Lisboa, Portugal

[b] FrontWave, Rua do Comércio nº15, 7150-321 Borba, Portugal

* Corresponding author: **luisguerra@tecnico.ulisboa.pt**

ABSTRACT

This research work addresses the long-term performance – up to 5 square meters of area of cut – of diamond-impregnated segmented discs used for hard stone cutting. Comparative studies among "geometrically equal" tools were carried out through the assessment of their cutting behaviour, under real conditions, using the same type of stone (Porriño granite). Several types of plots are used to monitor the performance of the tool, e.g. graphs of resultant force (generated by the contact between the tool and the stone slab) versus area of cut; and graphs of tool wear (weight loss) versus area of cut. Six discs were studied. The performance of each disc was observed along the cutting operation involving a considerably high area of cut, e.g. 625 linear meters of cut using an average cutting depth of 8 mm (equivalent to 5 square meters of area of cut). Different types of matrices were used for manufacturing new segments for the cutting discs (the diamond content in the segments was kept constant). Matrices containing: Co+bronze (50wt%Co + 50wt% of a 90Cu-10Sn bronze); Co+bronze + 2.5wt% graphite; Co+bronze + 5.0wt% graphite; Co+bronze + 10wt% WC; and Co+bronze + 20wt% WC, were produced and their behaviour was compared to that of a standard disc available in the market and commonly used by the stone industry for cutting granite. Interesting alterations in cutting regimes were observed during the long-term tests.