Optimizing the Granite Cutting Process Using Machine Learning Techniques

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ABSTRACT

The adjustment of parameters for the diamond-disk cutting process for the different varieties of granite marketed in Galicia has traditionally been done by operators. It is therefore of interest to determine and optimize cutting parameters on the basis of the petrographic and physical characteristics of each kind of rock.

To perform the analysis, a system for capturing data was installed in an industrial diamond-disk saw that automatically recorded its functioning in real time, indicating the evolution of significant machine parameters. In addition, a network analyser was connected to the saw's three-phase motor to make readings of energy consumption.

Variations in the most important cutting parameters and the properties of the rock derived from several characterization tests resulted in a set of measurements that yielded a sample representative of the problem.

The optimization problem, subject to certain restrictions, was evaluated using machine learning techniques that reduced computation time. The machine learning techniques were implemented using the real measurements obtained experimentally.