



Relationship between mechanical and technologic properties of volcanic rocks used for aggregates

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The influence of petrographic parameters (modal composition, rock microfabric parameters like grain size and shape) on the technological properties of rocks used for the production of crushed stone makes one of the overlooked aspects in current research and practice of aggregates. In our study, we focused on the detailed examination of volcanic rocks that contribute about 34 % to the total production of crushed stone in the Czech Republic. Principal sources of mostly basaltic rocks are bound to the young volcanic areas in north-west and north Bohemia, and north Moravia; some intermediate and acid varieties are exploited as well. The older volcanic rocks (mostly of Palaeozoic age) come from west and south-west Bohemia. Samples (both crushed fractions and larger non-fractured blocks) taken from about 40 active quarries were subjected to the standard petrographic analysis, geomechanical testing, and technological evaluation. Petrographic analysis included quantitative computer-assisted image analysis of thin sections in order to obtain data on modal composition, grain size distribution etc. Standard rock mechanical tests (uniaxial compressive and tensile strength, deformability measurements) were systematically studied following ISRM methodology. From the range of technological properties, the mechanical resistance (Los Angeles test, Aggregate Impact Value) and resistance to be polished (Polished Stone Value) were determined. The technological testing also included analysis of the size and shape parameters of individual particles to express the flakiness index and elongation index of individual size fractions of the studied aggregates. The results from the above mentioned tests were mutually correlated in order to find the proper use of individual types of rock varieties.