



Influences of petrographic parameters on technological properties of greywackes used for crushed stone production

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This study focuses on the influence of petrographic parameters on technological properties of greywackes. These sedimentary rocks make about 27 % of crushed stone market in the Czech Republic. Mainly in Moravia (eastern part of the Czech Republic), greywackes represent almost exclusive high quality aggregate. The behaviour of greywackes varies, however, from quarry to quarry. In this study, we have selected the most important deposits that cover major lithological variation of local greywackes.

Studied greywackes were analysed for their petrographic parameters quantitatively (using image analysis of thin sections). The pore space characteristics were determined by using fluorescent dye – epoxy resin impregnated specimens. The studied rocks are composed of subangular and angular quartz grains, lithoclasts (stable rocks: quartzites, and unstable rocks: phylites, metaphylites, siltstones, slates, greywackes, and less frequently acid eruptive rocks), feldspars (orthoclase, microcline, plagioclase), and detrital micas. Detrital and authigenic chlorite has been found as well. The matrix which represents the largest volume of rock-forming components contains a mixture of sericite, chlorite, clay minerals, cements, and clasts in aleuropelitic size. Based on the microscopic examination, all studied rock types were classified as greywacke with fine- to medium-grained massive rock fabric. Only specimen from Bělkovice has shown partly layered structure. Alteration of feldspars and unstable rock fragments represents common feature. Diagenetic features included pressure dissolution of quartz clasts and formation of siliceous and/or calcite cements.

Based on the experimental study of technological performance of studied greywackes and its correlation to petrographic features, the average size of clasts and volume of matrix make the driving factors affecting the LA values. The LA values decrease with the increasing of volume of matrix ($R = 0.61$) and with decreasing average grain size ($R = 0.44$). The degree of sorting influences LA values as well; more graded greywackes tend to show higher LA values. Regarding PSV, its values increase with increasing volume of quartz clasts.