



Alkali-silica reactivity of volcanic rocks as documented by combination of mortar-bar and gel-pat tests

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Volcanic rocks are considered to be of moderate susceptibility to alkali-silica reaction which makes one of the most serious problems of the concrete stability. Due to the fact that volcanic rocks are widely used material for crushed stone production in the Czech Republic (34 % of total crushed stone production), the current study focused on the selection of the non-reactive and reactive types of volcanic rocks. The experiments – accelerated mortar-bar test (ASTM method) and gel-pat test (BS 7943 method) have been employed. The design of the gel-pat test (originally used for the assessment of cherts) has been modified by using higher concentration of alkaline solution (1M NaOH and 1M NaOH + KOH). Form the wide range of the studied volcanic rocks (basalts, phonolites, melaphyres, diabases, porphyries) only minority showed increased susceptibility to be attacked by alkaline solutions. The presence of newly formed alkali-silica gels was verified by using microscopic techniques optical microscopy of thin sections prepared from the specimens after the termination of the tests. The amount of gels and presence of phenomena linked to their action (e.g. formation of microcracks due to hydration of gels) was quantified by using image analysis. The composition of the gels was checked by using SEM/EDS analysis.