



Failure of weak to strong sandstones: monitoring and observation of fracture phenomena

R. Přikryl (1), T. Lokajicek (2), J. Lesner (1)

1. Institute of Geochemistry, Mineralogy and Mineral Resources, Faculty of Science, Charles University in Prague, Albertov 6, 128 43 Prague, Czech Republic; e-mail prikryl@natur.cuni.cz
2. Institute of Rock Structure and Mechanics, Academy of Sciences of the Czech Republic, V Holešovičkách 41, 180 00 Prague, Czech Republic

Compression tests (uniaxial, tensile) were carried out on series of clastic sedimentary rocks (sandstones). Cylindrical test specimens were stressed to the macroscopic failure. Acoustic emission (AE) activity was monitored using a multichannel system. Broad-band recording system with high dynamic recording range enables to analyse individual acoustic emission events in a wide frequency and energy range. Each event was analysed regarding its time of occurrence, energy and polarity of the first onset. Direct observation of fracture phenomena consists of the penetration by epoxy resin – fluorescent dye mixture that facilitates visualisation of fractures. Thin sections, prepared from these samples in the axis parallel to the loading direction, were studied in conventional optical microscope equipped with UV light.

Set of experimental rocks was selected in order to clarify influence of rock fabric (mainly variable grain size and presence of matrix) and petrophysical properties (porosity) of sedimentary rocks on their failure in axially oriented stress conditions. The results of this study will be further applied on the stability of underground excavations in weak sandstones located in Prague urban area.