



## **Increase vs. decrease in the strength of granitic rocks subjected to heat**

Anita Török and Ákos Török

Budapest University of Technology and Economics, Engineering Geology and Geotechnics, Budapest, Hungary  
(torokakos@mail.bme.hu)

Accidental fire generally causes catastrophic loss in granitic structures or tunnels excavated in granitic rocks. It is necessary to measure strength of materials at various degrees to understand the mechanical behaviour of such stone structures or tunnels. Our laboratory experiments were aimed to detect indirect tensile strength and uniaxial compressive strength of granitic rocks that were subjected to temperatures of up to 600°C. For control measurements ultrasonic pulse velocity was also recorded. The studied rocks included three granites: a Hungarian dark pink granite (Mórággy), an Austrian greyish granite (Mauthausen) and a common pinkish Spanish granite (Rosa Beta). Cylindrical tests specimens of the three granites were subjected to 300°C and 600°C, respectively. Compressive strength test and tensile strength test results were compared to strength values obtained at room temperature. Our test results show that two of the studied granites (Hungarian and the Spanish one) have higher strength at 300°C than at room temperature. To the contrary ultrasonic pulse velocity decreased for all the three granites from room temperature to 300°C. The tensile strength of the granites did not show such a clear trend, however Hungarian granite has a slightly increased tensile strength at 300°C than at room temperature. At 600°C the compressive strength, tensile strength and ultrasonic pulse velocity dropped but not at the same rate. Our experiments showed that a given and limited temperature increase can have a positive effect on strength of granites rather than an adverse effect on a short-term.