



Physical changes of porous Hungarian limestones related to silica-acid-ester consolidant treatments, the key properties of monumental stones in assessing the performance of consolidants

Z. Pápay, Á. Török

Budapest University of Technology and Economics, Department of Construction Materials and Engineering Geology, H-1111 Budapest, Stoczek u. 2, Hungary, phone: +36-14632414, fax: +36-14632017, e-mail: zita.papay@googlemail.com, torokakos@mail.bme.hu

Even the highest quality stones show decay in monuments. The porous limestones, that are common in the monuments of Hungary, now show severe signs of deterioration. The damaged stones are often treated by stone consolidants on site during restoration works. Thus not only the selection of proper stone but also the treatments of ashlar of monuments are important issues of monumental stone research. To understand the behaviour of consolidated monumental stones laboratory test were performed.

Two types of porous Miocene limestones from Sós-kút were treated with silica acid ester under laboratory conditions to assess the performance of silica-acid-ester. Cylindrical specimens were tested under laboratory conditions by using vacuum impregnation of 100m% and 20m% silica-acid-ester. Physical properties such as density, ultrasonic sound velocity, and tensile strength were recorded before and after the treatment. Although both consolidants increase the strength of the limestones significant variations in rock mechanical parameters were recorded.

The experiments have shown that both medium grained and fine grained limestones absorbed less silica acid ester of 20m%-type, meanwhile this consolidant caused an increased tensile strength compared to the concentrated one. These experiments have also shown that the increase of densities and tensile strength are closely related to

pore-size distribution and pre-treatment properties of limestones.