

# MECHANICAL PROPERTY CHANGES OF ROCKS DUE TO IMPREGNATION WITH POTASSIUM-BASED WATER-GLASS

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The aim of the study was to investigate differences in mechanical properties between fresh and impregnated rocks. Four igneous, two sedimentary and two metamorphic rocks were selected. A patent has been obtained on a new method, which makes it possible to produce natural stone tiles only 4 mm thick. The impregnated tiles are treated with potassium-based water-glass diluted with water, colloidal silica and Berol 048 (non-ionic surfactant), using vacuum technique. The test methods used were three point load bending strength and uniaxial compressive strength. The fresh and the impregnated samples used for the bending strength test were rectangular prisms 4, 7 and 10 mm thick and for the compressive strength test 27 mm cubes. The 4 mm thick samples of the fine-grained granite, anorthosite, dolerite, limestone, and the marble obtain improved bending strength when impregnated. The 4 mm coarse-grained granite and the sandstone show reduced bending strength when impregnated. The 4 mm gneiss did not show any differences between the fresh and the impregnated samples. The 7 and 10 mm samples of all rocks show either no differences at all or a slightly improved bending strength when impregnated. Independent on rock type the 27 mm cubes did not show any differences in compressive strength between the fresh and the impregnated samples. It can be concluded that the fine-grained granite, anorthosite, dolerite, limestone, and the marble are suitable for production of 4 mm thick and impregnated natural stone tiles where bending strength is the most crucial.