



## **Damage of natural stone tablets exposed to exhaust gas under laboratory conditions**

Orsolya Farkas (1), György Szabados (2), and Ákos Török (1)

(1) Budapest University of Technology and Economics, Dept. of Engineering Geology and Geotechnics, Budapest, Hungary (torokakos@mail.bme.hu), (2) Institute for Transport Sciences, Non-Profit Ltd., Budapest, Hungary

Natural stone tablets were exposed to exhaust gas under laboratory conditions to assess urban stone damage. Cylindrical test specimens (3 cm in diameter) were made from travertine, non-porous limestone, porous limestone, rhyolite tuff, sandstone, andesite, granite and marble. The samples were exposed to exhaust gas that was generated from diesel engine combustion (engine type: RÁBA D10 UTSSL 160, EURO II). The operating condition of the internal combustion engine was: 1300 r/m (app 50%). The exhaust gas was diverted into a pipe system where the samples were placed perpendicular to main flow for 1, 2, 4, 8 and 10 hours, respectively. The exhaust emission was measured by using AVL particulate measurement technology; filter paper method (AVL 415). The stone samples were documented and selective parameters were measured prior to and after exhaust gas exposure. Density, volume, ultrasonic pulse velocity, mineral composition and penetration depth of emission related particulate matter were recorded. The first results indicate that after 10 hours of exposure significant amount of particulate matter deposited on the stone surface independently from the surface properties and porosity. The black soot particles uniformly covered all types of stones, making hard to differentiate the specimens.