



Small scale infiltration in Portuguese cobblestone paving: field measurements with a double ring infiltrometer.

Vera Rocheta (1), Jorge Isidoro (1,3), João de Lima (2,3)

(1) University of Algarve, Civil Engineering Department, Faro, Portugal, (2) University of Coimbra, Civil Engineering Department, Coimbra, Portugal, (3) IMAR – Marine and Environmental Research Centre – IMAR-CMA, Portugal

Rapid urban growth, the subsequent construction of buildings, roads and other infrastructure and the compaction of soils during construction all help to increase the imperviousness of small scale basins, which contributes to the occurrence of urban flooding. The use of permeable paving in urban areas helps to reduce the surface runoff and increases the groundwater recharge.

The main objective of this study is to evaluate the small-scale infiltration losses through Portuguese cobblestone paving (the Portuguese term is “calçada à portuguesa”). This pavement usually consists of small rectangular hand-cut natural stones, mainly limestone, which are laid on the ground and arranged and compacted more or less homogeneously, sometimes creating motifs. It emerged in the nineteenth century and its use is widespread in Portuguese towns.

The infiltration capacity of existing cobblestone pavements and the temporal distribution of the infiltration rate have been evaluated by using double ring infiltrometers for field measurements. The equipment consists of two metal cylinders which are driven into the pavement's surface and filled with water. In this study, cobblestone pavements with different characteristics (e.g. sizes of joints and stones) were analysed and their influence on the infiltration curves of the pavement evaluated. The saturated hydraulic conductivity before and after the cobblestone placement was also assessed.

The influence of this type of paving on the urban hydrologic cycle and the advantages of using it (e.g. the reduction of urban stormwater runoff and the increase of groundwater recharge) are discussed.