Analysis of the retention capacity of green roofs

Ewa BURSZTA-ADAMIAK

Wrocław University of Environmental and Life Sciences, Institute of Environmental Engineering, pl. Grunwaldzki 24, 50-363 Wrocław, Poland, e-mail: ewa.burszta-adamiak@up.wroc.pl

Abstract

Green roofs are one of the modern solutions used to achieve sustainable stormwater management in urban areas. These structures are still more often designed for newly constructed buildings in Poland, based on the observations of changes in urban areas that result in the increased sealing of soil surface and thus in the limitation of natural stormwater infiltration and retention sites. In spite of a growing interest in green roofs, the data related to their retention capacity in Polish conditions is still insufficient.

This study presents the results of the author’s tests, conducted in the years 2009–2010 on experimental sites located on the roof of the Science and Education Centre building of the University of Environmental and Life Sciences in Wrocław. The aim of these tests was to determine the retention capabilities of green roofs and the runoff delay and peak runoff reduction during rainfall events recorded in local conditions.

The results show that green roofs can play a significant role in the reduction of total outflow volume of stormwater falling on their surface. Multi-layered structure of green roofs contribute also to a slowdown in the outflow of stormwater and to reduction in the peak runoff volume in comparison to the maximum recorded intensity of rainfall. Mean retention for 153 analysed rainfall events amounted from 82.5% to 85.7% for green roofs. In the case of rain events up to 1 mm a day, the retention for green roofs reached nearly 100%.

Key words: green roofs, peak runoff reduction, retention, stormwater, urban area