



Diploma thesis: Modeling of Water Flow and Nutrient Transport in Green Roofs
Student: Bc. Razbar Wahab
Supervisor: doc. Ing. Michal Sněhota, Ph.D.
Department/Head of Department: K143 / prof. Dr. Ing. Tomáš Dostál

Student Razbar Wahab selected the topic of modeling a green roof system irrigated by recycled wastewater, addressing contemporary issues such as the urban heat island effect, building cooling, and global change. Over the past two semesters, Razbar has diligently worked on her diploma thesis within the Water and Environmental Engineering program.

The literature review was conducted comprehensively, primarily utilizing articles from reputable international journals, which the student independently sourced from citation databases.

In the practical section of the thesis, Razbar initially reviewed the outcomes of a hybrid green roof model experiment previously conducted by our team. Subsequently, she developed a conceptual model to describe the interaction between the two components of the hybrid green roof system: the constructed wetland and the layered semi-intensive green roof. Following consultations with her supervisor, the constructed wetland was modeled as a simple reservoir, while the HYDRUS 2D model was employed to simulate the semi-extensive green roof component.

Throughout her master's thesis work, Razbar Wahab maintained regular consultations and consistently met her assigned tasks. The development process of the diploma thesis was efficient; however, challenges with model numerical iterations consumed additional time, resulting in the completion of the work under some time pressure. Nevertheless, due to the student's exceptional dedication in the final phase, the overall quality of the work was not significantly impacted, and the thesis was submitted within the assigned deadline.

Razbar effectively utilized knowledge from multiple subjects within the program, including hydrology, subsurface hydrology, and others, to inform her research and modeling efforts.

The diploma thesis presents specific findings, notably confirming the hypothesis that water predominantly flows through the drainage layer of the semi-intensive green roof. This thesis represents a significant step towards developing a digital twin of the hybrid green roof system. The objectives outlined in the assignment have been fully achieved. I am confident that the results are of interest to both the scientific community and practical applications and are publishable with further development.

Grade: A – Excellent

Prague, 22.6.2024

doc. Ing. Michal Sněhota, Ph.D.