



Research on the efficiency of innovative Stormwater Treatment Facilities

Stormwater sedimentation tanks are currently the most common methods when it comes to the treatment of surface runoffs. Latest researches on their effectiveness lead to the conclusion though, that they are less effective than assumed. In view of the efforts in construction, as well as, the land consumption, the cost-value ratio of stormwater sedimentation tanks is rather unfavourable. In behalf of the Eigenbetrieb Stadtentwässerung (ESE), badenova AG & Co. KG designed a new, inexpensive and space-saving type of construction. Operating with a separate sewer system, the surface runoff from the industrial park Freiburg Haid is treated with a stormwater treatment facility following the „Freiburger Modell“(RFM). It is the first industrially implemented structure of its type. In consequence, neither dimensioning standards nor configuration parameters were available for the planning.

The goal of the rainwater treatment is – due to the requirements of the Land Baden-Württemberg (LfU, 2005) – the retention of 50% of the solids in the annual rainfall. This aim was verified by CFD-Simulations during the planning process. The Database, including the appearance and properties of those suspended solids, was supplied by the Institute for Sanitary Engineering, Water Quality and Solid Waste Management (ISWA) from the University of Stuttgart (ISWA, 2009).

The target of the current investigation is to monitor the facility’s efficiency metrologically. Exceeding the evaluation of one facility, the results serve the purpose to gain universal knowledge about the effectiveness of other RFM type facilities. If the positive results of the numeric simulation will be proven by a pilot plant, a possibility for wider implementations would be attainable.

According to the current valid guidelines of the Land Baden-Württemberg, the objective of the estimation is the long-term average of solid retention. At the federal level, the technical associations DWA and BWK are currently developing a uniform technical guideline for the treatment of stormwater and combined wastewater. Whereby, the Parameter AFSFein is being introduced as an evaluation criterion for emissions due to precipitation. It defines the solid fraction with a particle diameter < 63 µm. The limitation to the fine fraction is due to the fact that the finer particles are disproportionately loaded with pollutants such as heavy metals and polycyclic aromatic hydrocarbons (PAH). The Ministry of the Environment, Climate Protection and the Energy Sector Baden-Württemberg is considering the implementation of the parameter AFSFein as a criterion for Baden-Württemberg as well.

In addition to the overall efficiency of solid retention, the effectiveness of the system for retaining AFSFein will also be determined; thus creating a database for the planning and approval of future facilities. As of now, there is only limited data available for the appearance of AFSFein in surface runoffs. The same applies to their behaviour in treatment facilities. Hence, the research provides important knowledge in understanding the transport processes in stormwater runoff. Beyond the evaluation of RFM, these findings are of general interest for the development of strategies on dealing with surface runoff from industrial parks and planning of the appropriate treatment facilities.



Figure 1: Clear water discharge after sedimentation process

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