



Investigation of the treatability of stormwater runoff with special regard to the fine solid fraction (AFS63)

In recent years, there have been several studies on the amount of the fine solids (AFS63) in stormwater runoff and on the effectiveness of both centralised and decentralised rainwater treatment plants in regards to this fine solid fraction. The results of the investigations show large deviations. Fuchs et al (2013) from the Karlsruhe Institute of Technology (KIT) find a heterogeneous solid volume with a constantly high fine fraction of 70 - 90 % of the total mass in 10 rainwater basins in NRW. For the retention of the fine fraction, efficiencies of about 30 % were determined for the investigated tanks in the load-weighted mean. In investigations for the Stadtentwässerung Freiburg, our institute determined a fine fraction of approx. 40 % of the total amount of solids for the industrial area of Freiburg Haid. The retention efficiency of the central rainwater treatment plant there for AFS63 was on average 34 % during the investigation period. In Dutch studies by Boogaard et al (2014) on particle size distribution in rainwater runoff from a total of 25 catchment areas, particles with a diameter < 90 µm accounted for approx. 50 % of the total mass of solids.

It can be seen that the results show a large deviation. On the one hand, this can be attributed to the differences and special conditions of the respective catchment areas, on the other hand, different sampling techniques were applied in the investigations. In the investigations of the KIT as well as the University of Stuttgart, large-volume sampling tanks were used. In the Dutch investigations, both manual scoop samples and automatic samplers were used as far as documented in the literature. An influence of the sampling on the measurement results cannot be excluded.

The aim of the proposed research project is to clarify the open questions with regard to the treatability of fine solids in stormwater runoff. At the same time specific studies on the treatability are also carried out.

The following fundamental questions are of particular scientific interest:

- How strongly does sample ageing and the type of sample preservation influence the analysis of AFS63 as well as the determination of settling velocities?
- What influence does the sampling technique have?
- Open questions on treatability:
- After what sedimentation time can the clear water zone be discharged into the environment with as little pollution as possible?

The clarification of these questions is particularly important in order to be able to estimate or completely rule out possible influences on the results of studies already carried out on the treatability of AFS63. The investigation of the formation of a clear water zone enables a better understanding

of the processes and a more economical and sustainable operation of rainwater treatment tanks in practice.

Financing Institution:
Ministry of the Environment, Climate Protection and the Energy Sector Baden-Württemberg (UM)
Contact:
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Duration:
05/2019 - 07/2020