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OPTIMIZATION OF WASTEWATER TREATMENT PLANTS MONITORING IN FLOW VARIATION CONDITIONS DUE TO RAIN EVENTS

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Abstract

The direct measurement of the nutrients largely contributes to understand how the quality of the information, coming from the instruments, may improve the performances of the plants. The advanced knowledge acquired on the meaning of the signals gives new possibilities to control the biological processes and estimate the operational state of the plant, improving the quality of the effluent and keeping the operational costs as low as possible. Such information, furthermore, can be used to understand what sensors to install and in what position of the plant.

Starting from an accurate literature update, this paper aims to propose some parameters, control sections and analytical methods indispensable to monitoring and automatically control full-scale plants, with urban sewage coming from combined sewer systems.

In particular, a measurement campaign has been carried out in the WWTP of Bologna (Italy), a traditional continuous flow Activated Sludge treatment without denitrification, during one year. Considering the influent in dry and rain conditions, the behaviour of the plant in different sections has been studied and characterized. Comparing the acquired data appears important to monitor the BOD, COD and TSS concentrations at the primary sedimentation outlet, the input and the output sections of the plant, as well as the TSS concentration in the aeration tank, measured using continuous optical methods. Finally, the study shows the need for a monitoring system related with the sewage system dimensions and how Hydraulic Retention Time plays a key role to identify and manage the inlet variations.

Key words: dilution, mixed drainage system, monitoring, nitrification, weak sewage

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