A case study on gravel-contact-aeration-oxidation system to treat the combined sewage and rainwater flowing into Keelung River, Taiwan

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ABSTRACT

The combined sewage overflow (CSO) flowing into in Keelung River, Taipei impairs its water quality. Contact oxidation treatment system is an optimal choice available to reduce pollutants from the CSO. The pollutant removal efficiencies of CSO were assessed using contact oxidation treatment system. The system consisted of three treatment units, grit chamber, aeration zone and non-aeration zone. There was an average daily treatment capacity of 5,500 $m^3 d^{-1}$ with a total hydraulic retention time of 6 h and an average water depth of 3.5 m. The water samples were taken monthly from January 2011 to December 2013, for the analyses of total suspended solids, biochemical oxygen demand, chemical oxygen demand, ammonia and nitrate. The overall removal efficiencies were 70% for total suspended solids, 75% for biochemical oxygen demand, 99% for ammonia and 96% for organic N. This indicates that the contact oxidation treatment system is able to remove organic nitrogen, ammonia effectively. However, the outflow concentrations of nitrate were much higher than those of the inflow. The high ammonia and low nitrate removal efficiencies demonstrated that denitrification processes did not occur in the wetland system due to high concentrations of dissolved oxygen in non-aeration zone of the treatment system.

Keywords: Ammonia nitrogen; Gravel contact oxidation; Nitrate; Removal efficiency

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