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Sewage flow control using an inflow controller with an electrical conductivity sensor in the outfall

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ABSTRACT

The aim of this study was to investigate the effect of an inflow controller equipped with an electrical conductivity (EC) sensor on sewage flow during rainfall events. To investigate the relationship between the water quality characteristics and EC of sewage in the field, the EC sensor was used for real-time monitoring. The correlation coefficient (R^2) of COD_{mn} vs. EC was more than 0.97. A reliable hourly maximum flow was calculated using the real-time monitoring data and a water level sensor. The capacity of regulating devices was evaluated during rainfall events by comparing the predicted flow with flow measured by field survey. When the gate was closed at an EC of less than 300 μs/cm, the flow control rate of overflow for the total discharge was about 44% and 75% during the short-term rainfall (once a day) and long-term rainfall events (over 3 d), respectively, and the COD load control rate was about 16% and 61%, respectively. The flow control rate changed according to the EC control setting: the higher the EC control setting, the more the flow control rate increased. The flow control rate was about 40% an EC of 250 μs/cm. However, it showed that there was some difference below the EC. The results indicated that controlling sewage inflow based on EC increased the removal efficiency of sewage treatment plants during rainfall events by reducing hydraulic load.

Keywords: COD load control rate; Electrical conductivity; Flow control rates; Inflow controller; Regulating devices

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