현장규모의 하폐수처리장의 공정 인식, 모니터링 및 관리제어

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The dissolved oxygen (DO) concentration is considered to be the most critical factor in improving the wastewater treatment efficiency and saving energy in a biological treatment plant. However, the DO level cannot be controlled satisfactorily with a simple PID controller since it depends on the time-varying influent loads, time delays, sensor noise and slow dynamics, temperature, and the activity of microorganisms. This paper presents our experience of process identification, control, and monitoring in a full-scale industrial wastewater treatment plant. The objectives of this study were (1) to compare different process identification methods of PID autotuning applied to stable DO control, (2) to implement a process monitoring method that estimates the respiration rate simultaneously during the process identification step, and (3) to propose a simple supervisory control for determining the appropriate set point of the DO controller for the optimal operation of the aeration basin. The experimental results demonstrate that the PID controller and the monitoring, autotuning, and supervisory control of the respiration rate result in improved control performance in a wastewater treatment plant.