

A Study on Artificial Intelligence-Based Sand Filtration Backwash Cycle Determination Method for Improving Sand Filtration Process Maintenance Performance

Seungjae Yeon¹, Jusuk An¹, Changseog Oh^{1,2}, Hyun je Oh^{1,2}

¹Korea Institute of Civil Engineering and Building Technology
(Daehwa-Dong) 283, Goyangde-a-Ro, Ilsanseo-Gu, Goyang-Si, Gyeonggi-Do, Korea
Yeon@kict.re.kr; jusuk@kict.re.kr

²University of Science & Technology
217 Gajeong-ro Yuseong-gu, Daejeon, 34113, Republic of Korea
csoh@kict.re.kr; hjoh@kict.re.kr

Extended Abstract

Increased workload and aging of water treatment maintenance personnel can hinder the supply of quality drinking water and threaten national water security. At the present time, in the age of low birth rate and aging population, and the era of the 4th industrial revolution, the artificial intelligence-based water treatment facility operation system is evaluated as a future technology that can continuously produce water necessary for people's lives. The artificial intelligence-based water treatment facility operation system is expected to increase the economic feasibility and production efficiency of water treatment facility operations by applying it to ICT/IOT/CPS-based smart water treatment facilities. The sand filtration process constituting the water treatment facility can remove aggregated suspended matter through the gaps between filter media, and periodic backwashing must be performed to maintain performance. The water treatment facility operates backwashing based on the water level according to the rise in the water level due to clogging of the filter media. However, since the increase in the water level is measured after the filter media has already been clogged, it is difficult to assert that the performance of the sand filter facility is restored to close to 100% as a result of backwashing. This can increase the workload of facility maintenance personnel by advancing filter media replacement cycles. Therefore, in this study, a method for determining the backwash cycle of the sand filtration process by comprehensively analyzing information such as inflow water quality, treated water quality, and treated flow rate through artificial intelligence-based learning is studied, and through this, the maintenance performance of the sand filtration process is improved. We would like to suggest ways we can improve.