



Doctoral Symposium on Information and Communication Technologies
- DSICT pp 33–46

Modeling of the Guangarcucho Municipal Wastewater Treatment Plant Using WEST, Cuenca-Ecuador

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Conference paper | [First Online: 31 January 2022](#)

53 Accesses

Part of the [Lecture Notes in Electrical Engineering](#) book series (LNEE, volume 846)

Abstract

The present work applied the ASM1 simulation model for the wastewater treatment system of Guangarcucho plant (G-WWTP) in the city of Cuenca. The main objective was to generate conclusions about parameters that determine the quality of the effluent, and to have a first approximation of the operating processes in the plant. In order to achieve this, a work routine was developed with the WEST software, data on pollutant concentration and flow rates from a year of daily records (year 2018–2019) was taken at the entrance of the Ucubamba current wastewater treatment plant (U-WWTP), which were provided by

ETAPA-EP, while kinetic parameters were taken from those used for designing G-WWTP plant. Steady-state simulations were performed to later analyze dynamic-state simulations. The topological configuration was structured by biological reactors, a dissolved oxygen control model, a secondary settlers model, combiners and flow dividers, among the main elements. In addition, a basic sensitivity analysis was performed on variables that can be manipulated at the macro level in the plant: dissolved oxygen concentration (DO) and internal sludge recirculation (Q_{lodos}). It was found that internal sludge recirculation influences positively on the effluent quality, causing concentration of organic matter (BOD) and decrease of the suspended solids (TSS) to decrease, while the concentration of dissolved oxygen higher or lower than 2.5 mg/L, does not have a greater influence on the quality variation of the effluent.

Keywords

Wastewater treatment plant

Simulation model WEST software

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About this paper

Cite this paper

Duque-Sarango, P., Pinos, V. (2022). Modeling of the Guangarcucho Municipal Wastewater Treatment Plant Using WEST, Cuenca-Ecuador. In: Berrezueta, S., Abad, K. (eds) Doctoral Symposium on Information and Communication Technologies - DSICT. Lecture Notes in Electrical Engineering, vol 846. Springer, Cham.
https://doi.org/10.1007/978-3-030-93718-8_4

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DOI

https://doi.org/10.1007/978-3-030-93718-8_4

Published	Publisher Name	Print ISBN
31 January 2022	Springer, Cham	978-3-030-93717-1

Online ISBN	eBook Packages
978-3-030-93718-8	Engineering Engineering_(R0)

Not logged in - 192.188.48.189

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