Suparak Kaewsang 2014: Water Quality Simulation of a Water Distribution Network System by EPANET Model. Master of Engineering (Water Resources Engineering), Major Field: Water Resources Engineering, Department of Water Resources Engineering. Thesis Advisor: Assistant Professor Adichai Pornprommin, D.Eng. 90 pages.

This thesis is to simulate water quality of a water distribution network system at customer level by using a mathematical model EPANET 2.0 in order to manage water quality in a district metering area (DMA) 12-03-05 of Lad Phrao branch office. The hydraulic model calibration used the water pressure from field data to adjust the model. The water quality model calibration used free residual chlorine measurements from field data to adjust the model. When the model is calibrated, it is then applied for the management of water quality in the district metering area.

Results of simulation of the water quality of a water distribution network system in the district metering area 12-03-05 showed that the mathematical model of EPANET 2.0 can be used to simulate a water quality of the pipe network in the district metering area with satisfactory. Comparing 4 measuring points of water pressure from field data with water pressure from the model, the average of root-mean-square error (RMSE) and correlation coefficient (r) were 0.6059 m and 0.8022, respectively, and the average of pipe roughness Hazen-William coefficients (C_{HW}) was 127.43. The water quality model calibration using the bulk decay coefficient (k_b) equal to -3.384 day^{-1} from the bottle test of Metropolitan Waterworks Authority and the wall reaction coefficient (k_w) is calibrated to -0.16 m/day. Comparing 3 measuring points of free residual chlorine from field data with free residual chlorine from the model, the average of root-mean-square error (RMSE) and correlation coefficient (r) were 0.047 mg/liter and 0.907, respectively. The calibrated model was applied to a case study is which managed by adjusting the chlorine concentration and chlorine hourly pattern at the inlet of the DMA to having free residual chlorine at the furthest measurement point not less than the standard World Health Organization of 0.2 mg/liter.

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