Urin Soteyome 2011: Canal Operation Improvement by Computer Simulation Model: Case Study of Songphinong Operation and Maintenance Project. Doctor of Engineering (Irrigation Engineering) Major Field: Irrigation Engineering, Department of Irrigation Engineering. Thesis Advisor: Associate Professor Varawoot Vudhivanich, Ph.D. 271 pages.

Canal Operation Improvement by Computer Simulation Model aims to increase canal operation management effectiveness with Computer Simulation Model, in order to serve water requirement as Service Oriented Management (SOM). The study area is at KM.0+020 – KM.26+401 in the 5L-2L irrigation canal of the Great Maeklong irrigation system. Rapid Appraisal Process (RAP) was used to access the project during 1 November 2008 – 31 October 2009. It shows that annual irrigation efficiency is 51%. The actual water delivery service is lower than the target in every canal level, due to upstream water level of canal regulators is high variation. Comparing the result of canal system control performance and output performance with Existing Operation, Canal Operation Model (COM) and Canal Automation System (CAS) shows that CAS is better than others (MAE = 0.10 m/m, IAE = 0.03 m/m, RWLC = 0.96, PA = 0.93, PE = 0.76 และ PEQ = 0.91). The canal operation with COM increases canal system control performance and output performance from Existing Operation, especially, rate of monitor water level and adjust gate of cross regulators twice a day. The Maximum Absolute Error (MAE) and The Integrated Absolute Error (IAE) are decreased 0.14 and 0.08 m. per water depth, respectively. The Water Level Control (RWLC) is increased up to 100%. The Efficiency Performance (PE) is increased from 0.38 to 0.76, The Equity Performance is increased 0.89 to 0.92 and the Adequacy Performance is good (PE = 0.92).

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