



Modelling and Optimal Control of a Sewer Network

Georges Schutz¹, David Fiorelli², Stefanie Seiffert³, Mario Regneri⁴, Kai Klepischewski⁵

¹ Public Research Center Henri Tudor, Luxembourg, georges.schutz@tudor.lu

² Public Research Center Henri Tudor, Luxembourg, david.fiorelli@tudor.lu

³ Public Research Center Henri Tudor, Luxembourg, stefanie.seiffert@tudor.lu

⁴ Public Research Center Henri Tudor, Luxembourg, mario.regneri@tudor.lu

⁵ Public Research Center Henri Tudor, Luxembourg, kai.klepischewski@tudor.lu

ABSTRACT

The study presented here focuses on the development and implementation of a real time predictive controller for regulation of flow streams in a combined sewer system currently being built in a rural catchment of Luxembourg. The main objective of the application of optimised real time control (RTC) is to minimize combined sewer overflow (CSO) emissions into natural water courses. Currently only some sections of the sewer system are in operation. Therefore standard simulation tools are used to mimic the hydraulics of the catchment and the total future sewer system. The standard programs are calibrated based on monitoring data gathered at existing structures of the network. They provided data for the development of a simplified flow model which will be used as an online model in the optimisation procedure linked to the real time predictive control system. Furthermore, the performance of the control system will be evaluated by a comparison with hydraulic modelling results. First off line tests of the simplified flow model of the sewer system prove the applicability of the model and indicate the efficiency of the real time predictive controller.

KEYWORDS

Calibration, hydraulic model, predictive control, real time control, sewer networks