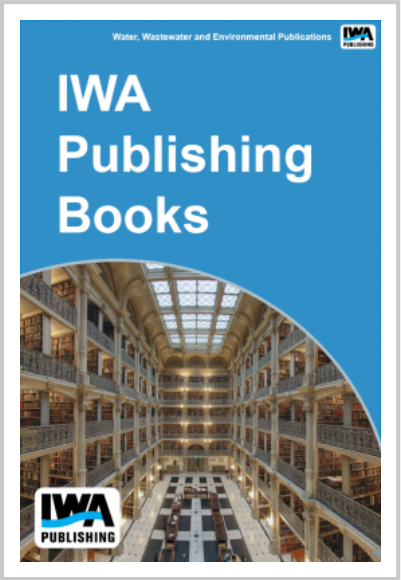
Collection System Ventilation



This report presents the methodology and findings of the Collection System Ventilation Research project completed in Phase II of the WERF initiative Minimizations of Odors and Corrosion in Collection Systems. The purpose of the study was to measure air ventilation within full-scale gravity collection system components; simultaneously measure parameters related to ventilation; use the field experimental results to evaluate current ventilation models; and develop a concept for an improved ventilation model. Experiments were completed at four different locations within the Los Angeles and King County wastewater collection systems. Subject components were concrete gravity pipes ranging in diameter from 33 to 96 inches. Air velocity was measured within each pipe using a carbon monoxide pulse tracer method. Air velocity was measured entering or exiting the components at vents using a stand pipe and hotwire anemometer arrangement. Ambient wind speed, temperature, and relative humidity; headspace temperature and relative humidity; and wastewater flow and temperature were measured. All parameters were logged continuously using data loggers. The field experiments resulted in a large database of measured ventilation and related parameters characterizing ventilation in full-scale gravity sewers. The field data were used as input to three current ventilation models (each using a different technology) to evaluate the models' accuracy compared to the measured field data. Strengths and weaknesses of each model were assessed. Finally, observations from the study were used to develop a concept for an improved ventilation model based on conservation of momentum equations in connected collection system components.

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Publication Date: 31/07/2009
ISBN13: 9781843392880
eISBN: 9781843392880
Pages: 100

Print:
Standard price: £0 / €0 / $0
Member price: £0 / €0 / $0

eBook:
Standard price: £34 / €38 / $50
Member price: £26 / €29 / $38