Assessment of the discharge in sewer pipes using two water level measurements and the relationship of gradually varying flow

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ABSTRACT

This article deals with the assessment of the discharge in sewer pipes using two measurements of the water depth. The first aim of this proposed methodology is to take into account the hydraulic complexity of the measurement site, which is the result of a transient flow and complex boundary conditions. This hydraulic behaviour leads to a non-bijective relationship between the discharge and the water level. The second aim of this method consists in operationalizing this measurement technique. Therefore, a neural network based methodology has been developed in order to assess the discharge using water level measurements and no powerful computational tool. Moreover, this approach enables a qualification of the hydraulic behaviour considering the available water depth measurements. The application of this method on a real-life pipe located in the sewer network of Strasbourg (France) makes it possible to check its operational nature.

KEYWORDS

Discharge measurement technique, free-surface channel, height-discharge relationship, instrumentation, self-monitoring.