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UNCERTAINTY EVALUATION OF MULTI-SENSOR FLOW MEASUREMENT IN A SEWER SYSTEM USING MONTE CARLO METHOD

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Abstract – Technical requirements and economical impacts of flow measurements in sewer systems are a issue concern in today's system's management. Thus, the quality of the measurements is considered to be a critical issue. Considering the complex nature of the measurand and the metrological requirements of local installations, the best available level of accuracy in measurement results should be sought. Therefore, both the knowledge of the measurand estimates and measurement of uncertainties are required for achieving robust results.

Within this context, the quality of measurement results depends on the knowledge of the uncertainty contributions and on the selection of an appropriate method to evaluate the measurement uncertainty. The study of these aspects can be of major importance in providing information to management of the system, namely in the selection of appropriate technology, upgrading and maintenance activities.

The Monte Carlo method is used in this paper to carry out the evaluation of the measurement uncertainty, considering its inherent capacity to deal with non-linear and multi-stage mathematical models. Influence of geometric conditions and other relevant parameters in the quality of measurements is discussed. The study was developed within the context of a specific sewer system, using a particular measurement system, from which measurement data was gathered.

Keywords: sewer systems, flow measurement, measurement uncertainty, Monte Carlo Method.