1 Telemetering and remote control for water quality monitoring in urban drainage network

C. Berretta, I. Gnecco, D. Dicerto and L.G. Lanza

Dept. of Environmental Engineering, University of Genoa, Italy

berretta@diam.unige.it / Fax: +39-010-3532481

In the framework of the management and treatment of storm water runoff from urban and production sites, the role of monitoring is assuming increasing importance. Indeed, several experimental studies demonstrated the strong influence of the specific site of concern on pollutants build-up and wash-off processes.

In a monitoring campaign the number of data required to provide suitable information about the wash-off process often poses some short difficulties, mainly due to the high cost of instruments and chemical analysis, the duration of the measurement campaign and the limited available human resources. To compensate for these difficulties optimisation of the monitoring network is often decisive. A telemetering and remote control system for the real time management of a monitoring network has been developed to this aim, fully automated through the connection of sensors and samplers to an external controller connected to a wireless network. The main objective is to overcome the limited programming capacity of the specific sensor or automatic sampler in order to allow the monitoring system to adapt to the evolution of the rainfall event in progress. Sampling conditions and the sampling frequency can be adjusted to meet the specific target of the monitoring effort. Also, by processing rainfall data the sampling frequency can be adjusted in real time as a function of the rainfall intensity.

The information deriving from one sensor can be shared among different monitoring stations, even if a specific sensor is far away or not directly wired.

The architecture of the system includes an external controller linked to a rain gauge and to an automatic sampler, which is in turn connected to a multi parameter sensor and a flow meter. The system is powered by a photovoltaic panel and a battery. The external controller has the function of controlling and activating the sampling phase based on rainfall/flow rate/quality information. The controller is linked to a server through an internet connection, thus transmitting all data in real time. The server incorporates multiple functionalities, including data collection/validation/elaboration and real time data publication to a web portal.

The monitoring system is presently under test in the framework of an experimental study for first flush flow characterization in an urban residential area of the town of Genoa called "Colle degli Ometti", with a surface area of about 4.5 ha.