

GIS integration of a quality control management system applied in water distribution

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ABSTRACT

Introduction

The SIGE is an association of municipalities. The main works this service is distribute the drinking water and manage the waste. Meat industry joined the former "regional public utility of **water** management" considering that meat is a foodstuff like drinkable water.

The Swiss law concerning the foodstuff was approved in 1995 with a main change due to the interpretation of responsibility in quality control matter. The essential difference is that the water distributor has to prove that its job is done following the right rules. During the past, the customer have to show that water was contaminated.

Starting from the graphic data available on AutoCAD and different sources of thematic data stored in several database, all has been linked together in one geographic database. Two systems are now working: a schematic one with the whole network on which we can do management, and a more precise and detailed one, still being completed.

To insure the transmission of information, meaning a traceability of all interventions, a couple of forms have been introduced. The informations of these forms are then recorded in the Geographic Database and can be consulted at all time.

Applications

Actually, the applications of this GIS for the quality control of the networks are:

Maintenance of the network

When manipulating valves or cleaning reservoirs, the operations are consigned in the database through forms coming from the site.

Works' improvement

After the inventory of all non-conform points seen in the water works, they are sorted by set of priorities. Using different queries, GIS becomes a good tool for decision making and makes easier the planning of interventions needed.

Pipes renewal

After replacing an old pipe, a washing or disinfecting procedure is led in order to insure the quality of the distributed water. The quality is confirmed by bacteriological analysis. The flow, time of washing, concentration of chlorine and contact time are indicated on the corresponding form. As described below, the bacteriological control is performed as well.

Laboratory results interpretation

All results coming from water analysis are collected in the geographic information system, which allows to consult the evolution of each parameters and to answer customers' questions quicker and with more efficiency.

Leakages management

Each leakage detected is described and localised on the system. We assume that after about ten years of collected data, it would be possible to do a statistical study and find a prediction model for the probability of leakage appearance on the pipes. This model would then be validated by fitting the predictions on the observations.

Perspectives

Integrated hydraulic simulation model

To avoid the redrawing of network's parts in the model, we are testing now the possibility of calculating the hydraulic behaviour extracting the pipes' data directly from the GIS software.

Data recording through pocket computer

In the next future, the collect of informations like work's defects or leakage position will be done with a laptop connected with a GPS.

Risk assessment on resource's watersheds

Compiling several representative parameters a risk assessment of the vulnerability of the water resource will be done.