The integration of models, data management, interfaces and training and decision support in a drinking water treatment plant simulator

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Water supply companies are gradually changing to centralized fully-automated operation as a consequence of which operation supervisors will lose skills and knowledge gradually. The drinking WATER Simulator for Proactive Operation and Training (WATERSPOT) provides an environment in which supervisors can train operation of the drinking water treatment plant they are responsible for. The simulator will have the same user interface and control functions as the process automation system. The simulator will be used by technologists for offline process optimization as well.

The objective of this research is the integration of models, interfaces, data management and decision and training support features in a simulator for drinking water treatment plants.

Four models have been integrated: a Stimela water quality model, an EPANET hydraulic model, a control model and a field object model. The system will be generic, so it is easily adaptable by water supply companies. This will be proven by the application of the simulator at the Wim Mensink, Scheveningen, Harderbroek and Weespekarpsel drinking water treatment plants and at one in Taiwan.

EPANET is software used worldwide to model water distribution piping systems. A library of elements has been developed to use EPANET for modeling the hydraulic behavior at drinking water treatment plants. The existing Stimela water quality models have been transferred to the next development level as defined by Argent1.

An emulator, a copy of a process automation system on a PC, will be connected to the simulator. A Stimela model for backwashing of sand filters will be developed, the most effective way of simulator training will be compared with other ways of training and the usefulness and practicality as well as the acceptance of the simulator by end-users will be researched.


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**Highlights**

As is common in other fields of science, in drinking water treatment the integration of models in training and decision support systems has started. Four models, data management, interfaces and training and decision support features have been integrated. The application is a simulator for supervisors and technologists of drinking water treatment plants.

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**Simulator**

- Models
  - Water quality
  - Hydraulic
  - Process control
  - Field objects

- Training and decision support
- Process optimization

**Graphic user interface**

- Data management
  - Process data
  - Object tags

- Training performance

Value of integrated components exceeds value of sum of individual components

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