Hierarchical Decision Process combined with Multi-criteria Analysis to Support Conceptual Design of Activated Sludge Plants

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Abstract
The increasing need for higher efficiencies, lower costs and more effective activated sludge plants has led to the introduction of new and varied configurations. In a field where heuristic knowledge and old correlations are combined at the early stage of the design with different simulation models and software packages, only a systematic conceptual design methodology that combines the hierarchical decision process with multi-criteria analysis can give support to the designer. The aim of this paper is to show the benefits of applying this methodology, recording the whole decision process, combining different criteria, and using different sources of information to take any decision. The methodology has been tested using a case study for reactor selection for organic matter and nitrogen removal.

Keywords: Activated sludge, wastewater, conceptual design, hierarchical decision process, multi-criteria analysis