Huber Technology (Pty) Ltd, South Africa

Energy-Efficient Controls

The operating conditions of plants frequently change significantly in the course of time without being noticed. The analysis of operating hours, cycle times, consumption of energy and consumables, degree of wear, etc., often leads to the result that a significantly improved plant efficiency can be achieved through equipment optimisation (See also HUBER Product Optimisation Service and HUBER Operation Control).

Choosing the right control and check instruments offers approaches to raise energy efficency in wastewater treatment:

Data Collection and Recording

- Precondition for any optimization of a plant's energy efficiency is knowledge of power and heat consumptions of all units, particularly the following:
  - Raw sewage lifting
  - Screening + screenings treatment
  - Grit removal and treatment
  - Biological Treatment
  - Filtration
  - Sludge Treatment

- Sludge Drying and Incineration
- Exhaust deodorization

- Power or heat consumption of all major energy consuming components should be measured and recorded.
- Process parameters, e.g. flows, concentrations and freights, need to be measured, calculated and recorded for process control and supervision as well as for energy efficiency calculations.
- Statistical correlations between certain parameters and energy consumptions, e.g. power consumption of aeration blowers versus of BOD or TOC and N freights, should be compared with historical and benchmark data.

Data Analysis

Data analysis has the following benefits:

- Supervision of process performance,
- Improved reliability, e.g. rising specific energy consumption indicates need for preventive maintenance,
- Control system evaluation and improvement,
- Energy efficiency optimization.

Operation

- Operators must be well instructed.
- Operators must periodically maintain and calibrate sensors and analyzers.
- Operators must be able to select and adjust control parameters. Self-optimizing controllers may be useful.

Examples

- Activated sludge system operation control depending on ammonium and nitrate concentrations and/or redox-potential.
- Return sludge pumps and internal recirculation pumps control proportionally to wastewater flow.
- Screenings removal control depending on flow and head loss and controlled operation of conveyors and wash-presses.
- Frequency or intensity of sand filter backwashing control depending on flow and head loss.
- Controlled operation of parallel units depending on flow or load, e.g. of screens, grit chambers, clarifiers, filters, thickening and dewatering machines.
- Controlled selection of operating units depending on flow or load, e.g. use of one bigger pump instead of two smaller pumps.
- Automated intermittent operation of components, e.g. of tank mixers.
- Controlled withdrawal of sludge from primary clarifiers depending on its solids concentration.
- Controlled withdrawal of surplus sludge from secondary clarifiers depending on sludge level and/or mixed-liquor concentration.
- Automated operation of units during low-tariff times, e.g. grit removal or filter backwashing.
- Automated shut-off, e.g. of ventilators at night or unused power transformers.
- Load management for peak power demand reduction.
- Small motors should be provided with simple ampere-meters and large ones, consuming over 10,000 kWh/a, with real-power-meters.

Huber Technology (Pty) Ltd

Company Reg. No.: 1992/006606/07

PO Box 9813
George, 6530
South Africa

Phone +27 44 874 4242
Fax +27 44 874 3658
huber@lantic.net
http://www.hubersa.com

A member of the HUBER Group