OPTIMUM OPERATION OF AN EVAPORATOR NETWORK IN VISCOSE FIBER PRODUCTION

Optimization of energy efficiency in the spin bath recovery
LENZING AG operates the world largest fully-integrated viscose fiber production plant with a production capacity of about 284,000 t/year in Lenzing (Austria). LENZING’s viscose fibers are made from wood with environmentally friendly and innovative technology. The Lenzing viscose fibers are made from wood with environmentally friendly and innovative technology. The Lenzing viscose fibers are made from wood with environmentally friendly and innovative technology. The Lenzing viscose fibers are made from wood with environmentally friendly and innovative technology. The Lenzing viscose fibers are made from wood with environmentally friendly and innovative technology. The Lenzing viscose fibers are made from wood with environmentally friendly and innovative technology. The Lenzing viscose fibers are made from wood with environmentally friendly and innovative technology.

The evaporation of water in the spin bath recovery cycle is the process with the highest energy demand within the viscose production. Therefore it is a logical target for an improvement of energy efficiency to gain significant reduction of CO₂-emissions. For the evaporation of water different types of evaporators are arranged in a large network. Furthermore, some evaporators can be connected to different spin bath cycles. This leads to different possible combinations with different energy demand to evaporate a certain amount of water.

### Challenges

- **Load allocation**

### Developed Solution

- **Interactive tool for load allocation of the evaporators:**
  - The operators set the required evaporation capacity for each spin bath cycle
  - The optimization algorithm calculates the load for each evaporator to reach the highest energy efficiency and thus the lowest steam demand
  - The operator has the possibility for a final check of the proposed load allocation

- **System integration:**
  - Different software systems (DCS, PI System, Matlab) are connected
  - Data from a large number of different sensors and actuators is read and processed
  - Different departments (production, automation, maintenance) had to be aligned

### Benefits

- Decision support system developed and implemented
- Simplification of daily tasks
- Summary of all relevant information
- Potential increase of energy efficiency up to 2%
- Steam demand reduction of about 1.9 t/h
- Reduction of CO₂-Emissions by 3000 t/year
- Modeling tool for parameter identification of evaporator models tested and evaluated
- Mathematical model of the evaporator network developed and implemented
- Mixed integer optimization algorithm successfully tested in industrial environment

### Use Case


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