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Research area: Product aims
Simulation tool for fibre system analyses

Keywords: Recycled fibre treatment, Simulation, Fibre losses

Subject: Reducing fibre losses and saving disposal costs through the simulation-based optimisation of recovered paper treatments for graphic paper production.

Background/Problem area
Recovered papers differ greatly in their origins, compositions and contents of non-paper components. The treatment of recovered papers to obtain fibrous raw materials for fresh paper production inevitably involves considerable amounts of contaminants. The composition and amount of residues produced depend on the contaminant load of the recovered papers, type and selectivity of the treatment processes used, and on the desired cleanliness of the recycled pulp. In addition to contaminants or non-paper components such as staples, plastic films, adhesives, dirt, paper and board materials that are difficult to defibre etc., the rejects contain fibres which have already undergone several recycles and are therefore unsuitable for fresh papermaking, and fibres which could still be used for papermaking and must therefore be considered losses.

To ensure an optimum utilisation of the recovered papers, the amount of usable fibres discharged with the reject must be reduced. This will also lower the mills overall residue volumes and associated disposal costs. Key influences on the amount of screening residues produced are the treatment process employed and the initial contaminant load of the recovered papers. Significant differences and variations in the reject volumes of recycling mills treating similar grades of recovered papers for the production of comparable products indicate that there is considerable room for improvement with respect to their raw material use and production technology.

Objectives/Research results
Against the background of a gradually deteriorating quality of the recovered papers, the project aims at modifying and optimising the recycled pulp treatment of mills producing recycled-fibre based graphic papers, to maintain or increase the utilisation rates of deinked pulps in the German paper industry. An optimum utilisation of the recovered papers can be ensured by maximising the fibre share in the screening accepts whilst minimising the residues from recycled fibre treatment. In other words: Fibre losses are to be reduced whilst enhancing the quality of the finished pulp.

After selection of suitable paper mills the sampling in two different recovered paper treatments for graphic paper production were done. All relevant data of the process were determined. All data needed for the simulation models were registered and the necessary laboratory analysis were done.

On the basis of the data the simulation models were constructed. Most of the supplemention and adaption works were done. The simulation models were configurated and parameterised. For the first paper mill simulation calculations were done and steps to optimise the recovered paper treatment were developed.

During the last step further simulation calculations will be done to optimise the connection method of the process and the operation of the plants. Also comparing valuations will be done.

Application/Economic benefits
The optimisation of their treatment processes – i.e. application of improved circuit designs and optimum operating, system and process parameters – will enable paper recycling mills to reduce their residue volumes and fibre losses, and thus to save disposal costs.

The results of this research project will benefit especially SME wishing to enhance the efficiency of their production systems and quality of their products whilst saving valuable raw material and disposal costs. The project will help to ensure the economic success and competitiveness of mills producing recycled-fibre based graphic papers over paper producers using virgin fibres only.

Project period: 01.07.2002 – 30.06.2004

Remarks
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