

Research Institute:

PTS Heidenau
Pirnaer Straße 37
01809 Heidenau

Head of the research institute:

Dr. F. Miletzky

Project leader:

Dipl.-Ing. S. Altmann
Tel: 03529 / 551-634
Fax: 03529 / 551-899
E-Mail: Sven.Altmann@ptspaper.de

Internet: www.ptspaper.de

Research area: Product aims

Paper and board production // Stock preparation

Key words:

Key words: Recovered paper, strength values, board, linerboard, modelling, prediction, optimisation, costs

Title: Guaranteeing the product properties of packaging paper and board in a changing global context**Background/Problem area**

The production of packaging paper and board is being governed by the growing pressure of rising costs as a result of the increase in energy costs, the upsurge in competition from Asian markets and the creation of overcapacity. The sector has been recording falling profit margins and even an ever greater number of plant closures. The situation is being aggravated by the cost- and market-induced use of often low-grade or substandard recovered paper which has been recycled several times and contains an ever growing percentage of fillers and ash. It is reasonable to assume that the strength potential of these raw materials will continue to decline in future. For reason of material and ecological efficiency, on the other hand, the market is making ever greater demands for lighter packaging materials made from paper and board whilst at the same time demanding the same strength requirements.

With this interplay of different factors, the question arises as to how production can be realised under the given framework conditions so that it is as cost-effective as possible whilst at the same time maintaining the same product properties.

Today, most producers of linerboard and other board products must be capable of manufacturing saleable products with specified characteristic values under fluctuating framework conditions without the help of computer-assisted optimisation methods. Some mills are employing in-mill tools which are usually based on classical cost calculations and make short-term options possible based on current day rates.

PTS has developed methods and algorithms aimed at comprehensive cost, product and process optimisation which until now have been used for the simulation-assisted prediction of strength properties and cost optimisation in linerboard production. These tools can be used to meet business management demands of taking additional strategy-oriented cost calculations into account in view of changing production conditions.

The prediction and optimisation tools have been expanded in scope to take into account additional product grades, properties of products and raw materials as well as cost factors (such as emissions trading and changes in the recovered paper market, among other things).

Objectives/Research results

The aim of this research project was to make a contribution to guaranteeing the requisite product properties of packaging paper and board based on the lowest possible production costs in the awareness of the changing quality of the raw materials.

A method was further developed for the simultaneous optimisation of product properties, use of resources, process engineering and production costs in the manufacturing process.

General strength parameters such as tensile strength and ply bond strength are predicted. If linerboard in particular is the object of study, additional characteristic values such as SCT, CMT, bursting strength and the bending stiffness of board can also be forecast.

Making a prediction involves quantifying the effects qualitative changes in the recovered paper grades will have on the product properties. The resources that were taken into account included several grades of recovered paper with varying degrees of recycling and blending based on the global recovered paper flows and important process chemicals (e.g. starch).

The process configuration, process control, specific energy consumption and separation efficiency values are important aspects in process engineering. When studying the production costs for different process alternatives, all variable costs and the important fixed costs (e.g. investment costs and costs for emissions trading) were taken into account.

Application/Economic benefits

The economic benefits will accrue when the method to minimise production costs is actually put into practice. The prerequisite is that the effects of the changed framework conditions on certain product properties be quantified and viewed in an overall context with all cost factors.

Paper mills that implement concept developments using their own technology staffs are thus given a tool with which they can back up their strategic decision-taking. Using the optimisation method within the framework of process optimisation can help paper mills reduce their costs of raw materials and chemicals, energy costs, disposal costs and the costs of rebuilds or of constructing new facilities. Additional users are planners, engineering offices and plant manufacturers.

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Remarks

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