Study of marking mechanisms on coated papers and boards in the cross cutter and development of prevention strategies

Background/Problem area
Coated papers and boards are gaining ever greater market shares in paper production. Due to their material advantages, matt coated papers in particular are bringing about a positive market development with significant growth rates. The matt surfaces of these papers, however, are sensitive to the mechanical forces that occur during converting or other following passes. As a result of growing cost pressures, papermakers have been increasing machine speeds, thus simultaneously increasing the mechanical loads on the paper. For instance, speeds above 350 m/min are being aimed at for cross cutters, the focus of this research project. However, more markings (local gloss changes) are occurring as a consequence of these high speeds. The mechanisms that cause the markings have not been studied as yet. It seems that local pressure-shear strains on the coat surface cause the particles to realign. But it is not yet clear under which conditions the markings form and what characteristics of the coating or base paper are responsible. Hence, here is a need for research to acquire the necessary knowledge to bring about effective optimisation of new or existing facilities for the converting operation (cross cutter) or the coating itself.

Objectives/Research results
The objective of the research project is to gather knowledge about the mechanisms responsible for the markings and the development of a prevention strategy. This will allow the production quality and the machine capacity at the finishing and converting stations for (matt and semi matt) coated papers and boards to be increased. The study will focus on cross cutters where markings occur in different machine parts.

Different coated papers and boards have been characterised regarding their surface and physical properties. These papers and boards are also being studied regarding their marking tendency using a unit built to simulate the markings. Differences in the marking tendency exist between the different papers and boards as well in different grammages of one paper quality. The belts that are used as friction partners in the simulation unit have a significant influence on the marking tendency. When paper is used as the friction partner, more pronounced marking can be observed compared to the use of belts. The surface of the marked areas of the papers and board is abraded, resulting in a partially smoother and thus glossier surface.

Application/Economic benefits
The results of the research project can be used by the producers of coated papers and boards (development of prevention strategies for coating formulations with a low marking tendency). The results can also be seen in the finishing and converting of papers and boards. The improvement in surface quality and machine capacity can reduce the costs of paper production. Furthermore, a decline in the number of complaints is also possible, thus reducing the overall costs of the products made from paper or board and improving the mill's competitive position.


Remarks
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