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Research area: Product aims

Paper, paperboard and board // graphic papers

Key words:

Tone value, dot gain, sheet offset paper, sheet offset printing, print results, Process Standard Offset, paper evaluation, measurement technologies, measuring procedures

TITLE:**Determination of the tone-value-relevant paper characteristics and development of methods for predicting dot gain in sheet-fed offset printing****Background/Problem area**

The paper industry makes available to the printing industry a number of fundamental paper properties such as grammage, thickness, specific volume, optical and surface properties, selected strength properties, etc. The question is how meaningful these properties are for the printing industry – pre-press, printing process control and its efficiency as well as the estimation of the results of printing.

As the work of the Paper and Print Forum has shown in recent years, these property characteristics are indeed relevant, although not yet adequate for estimating the print results prior to the printing run, which was also the reason why further intensive co-operation was agreed upon.

There is a substantial deficit in estimating the dot gain during offset printing based on fundamental paper properties, taking their mutual interaction into account. Such an estimation during pre-printing and proofing could achieve a consideration reduction in costs.

Objectives/Research results

The objective of the project is to determine the paper-relevant causes of optical and geometrical dot gain and its quantification in order to be able to estimate dot gain prior to printing. During the initial phase, test prints (print trials) were used to separate the optical and geometrical dot gain (development of methodology) and establish the factors that characterise the print image. Moreover, the dependency of the dot parameters on the printing conditions and paper properties as well as the relationship between optical dot gain and paper properties was determined. These experiment-based studies were supplemented by the simulation of image reproduction by means of linear system theory, describing the paper by the dot spread function (determined experimentally or calculated according to KUBELKA-MUNK). A software tool was developed to simulate the development of dot gain when varying the parameter settings. Extensive simulation studies are currently under way.

Results of experiments and simulation lay the foundation of modelling which serves to estimate the dot gain prior to printing. Another important step is transforming the results into the printer's world which uses for dot gain either the model according to Murray Davies (density) or the relative colourimetric colouring (L^* , a^* , b^*). The lookup tables necessary for this purpose are to be developed. A printing trial was conducted for validation; its printing technological evaluation has yet to be completed.

Application/Economic benefits

The economic effect of the anticipated research results is being awaited on a cross-sector basis by the frequently small- or medium-sized sheet-fed offset printers and manufacturers of measuring equipment as well as by the paper industry. In concrete terms, the findings are to result in an improvement of the properties of print paper that are relevant for converting. This is intended to reduce the print-related problems, thus achieving a reduction in the number of complaints or a reduction in the costs of makeready waste. In this context, the results will also lead to a better understanding of the interface between paper and print.

Project period: 01.01.2013 – 31.12.2014

Remarks

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