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Research area: Product aims

Paper, paperboard and board // Graphic papers

Key words:

Paper evaluation, measuring techniques, measuring methods, sheet-fed offset paper, web offset paper, print result

TITLE:

State-of-the-art dimensional stability in sheet-fed **offset** printing; influence of printing parameters on elongation behaviour

Background/Problem area

The quality requirements to sheet-fed offset prints have risen dramatically in recent years: customers expect high colour fidelity and the correct reproduction of highly complex motifs or technical elements. However, printers must also reduce their costs in order to remain competitive. For this purpose, they are pursuing various paths: apart from using higher printing speeds, reducing the set-up times of presses and avoiding misprints, they are trying to print larger sheet sizes at moderate cost. Machine manufacturers have developed larger presses in recent decades which can print sheet sizes of up to 1,5 m x 2,0 m. This lowers the printing costs, but aggravates elongation problems (register deviations) during printing.

Yet another challenge is the increasingly shorter use cycles of consumables like paper, ink, additives etc. They are replaced by new or modified materials much faster today, and press operators must frequently cope with new conditions to achieve the desired quality because the latter depends greatly on the combination of materials used. Register variations can have various causes, but paper is one of the main influences. The moisture introduced by the ink-fountain solution emulsion causes paper fibres to swell, which leads to changes in the dimensions of print substrates.

Objectives/ Research results

The project therefore aims to:

- Comprehensively characterise printing papers especially in terms of coat thickness variations and elongation behaviour
- Improve the measuring technology for coat layer characterisations
- Improve the modelling of penetration and elongation properties of papers during printing
- Identify paper properties leading to smaller register deviations in printing, and classifying the papers accordingly
- Conducting suitable printing tests to derive recommendations for compensating measures during printing to reduce register deviations

22 industrial illustration printing papers were procured, covering a broad range of different parameters, and three of them were used in a first printing trial (by project partner SID), varying all print process parameters. The dimensional changes were measured and evaluated by means of a Luchs register measuring system. Printing parameters relevant to dimensional stability were identified, and the results were used to print the other papers whose print quality is currently being analysed.

Moreover, sample papers were produced on the VESTRA pilot coater, using two base papers, coating colour formulations, applicators and technological conditions that are known in detail.

At the same time, work was started to model the penetration behaviour of liquids into coated paper. Two different approaches are being used: FEM modelling and calculations by means of the Bosanquet equation.

Application/Economic benefits

Economic benefits will mainly be derived from the project results by printers (many of them being SME): they get recommendations how to select suitable papers and optimal printing parameters for difficult print jobs. This is expected to improve the runnability of papers especially in high-quality offset jobs (illustration printing, leaflets, posters), and to enable the printing of highly demanding originals on large formats. This will help reduce set-up times and printing costs.

Project period: 01.10.2015 – 30.09.2017

Remarks

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