

Characterisation

Newsletter

Number 02, August 2007

News from PFI:

New PhD student:

Sara Paunonen has been engaged as PhD student in the "Novel fibre-based water barrier packaging for transport of fresh fish and agricultural products" - project. The focus of Sara's work is on modeling of mechanical strength properties of packaging exposed to moisture.

New projects and available positions

•Fibre-based packaging materials: Development of innovative and sustainable barrier concepts".
 •"Improved brightness of wood-containing printing paper".
 •"Nanosized cellulose fibrils as stabilizers of emulsions".
 There are 1 post doc and 4 PhD positions available in the mentioned projects.

Two new PhDs:

Siv. ing. Martin Andressen will defend his thesis entitled: "*Surface modification of microfibrillated cellulose*", on August 31.
 Cand. scient. Ingvild A. Johnsen will defend her thesis entitled: "*The impact of dissolved hemicelluloses on adsorption of wood resin to TMP fines*", on October 12.

More information is available at www.pfi.no

The structure of newsprints and print-through

The paper industry is constantly facing tough conditions and hard competition. This is particular the case for newsprint products due to over-capacity and low prices. In addition, as quality demands on paper and print are rising, better knowledge and understanding of the paper structure details and their interactions with printing inks is essential. This urges the development of new and improved techniques for assessing the detailed structure of paper, thus providing necessary information to improve its mechanical, optical and print quality properties.

In this issue of the Characterisation newsletter we have focused on the quantification of newsprint structure and its relationship to print quality. The assessment of paper structure can involve several methods, including conventional and indirect laboratory methods, several microscopy techniques and more advanced 3D characterisation. In addition, scanners are becoming a valuable tool for analysis of paper and print quality. Due to their versatility, desktop scanners may be used for assessing e.g. optical formation, wiremarks, specks, mottling, picking and fibre orientation. This proposes such devices as powerful and convenient tools for quantification of some relevant paper characteristics, as exemplified here.

Upcoming events

4th Pulp and Paper Chemical Analysis Seminar
 September 10-11, Stockholm
www.sffi.se

PTS Coating Symposium:
 September 17-21, Baden-Baden
www.coating-symposium.com

COST E32 symposium: "Paper in printing processes". October 4-5, Grenoble.
www.pfi.no/gary/COSTE32.htm

Nordisk treforedlings-symposium and treforedlingsforum:
 October 9-10, Trondheim.
 November 20-21, Oslo.
www.pfi.no/konferanser.html

Recommended links

PFI services:
www.pfi.no/contract/contract.htm

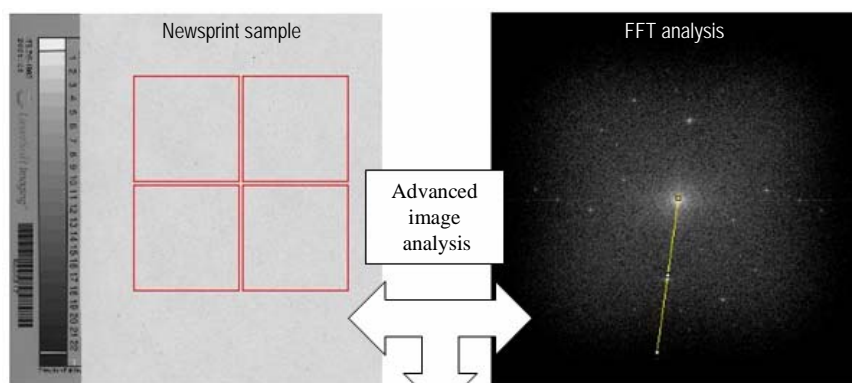
STFI-Packforsk:
www.stfi.se

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- Print quality

Selected analysis method

Assessment of newsprint quality based on desktop scanners



Assessment of newsprint quality involves:

Dirt specks, Wiremarks, Print-through, Shrinkage, Optical formation

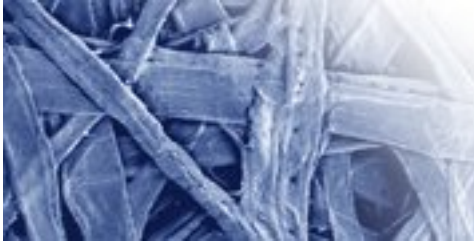
Editor

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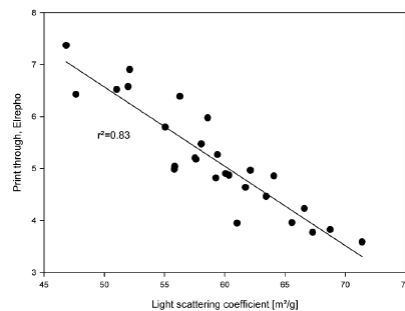
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The effect of paper structure on print-through

The influence of ink pigment penetration and paper structure on print through

Abstract

A method to quantify ink pigment penetration using scanning electron microscope (SEM) and image analysis is described. The method is based on quantification of clay particles present in yellow coldset offset ink. To test the method a 3x3 statistical experiment was designed. The amounts of fines, chemical pulp and calendering were the variables studied in the experiment. Ink pigment penetration, print-through, optical properties and structural properties of the handsheets were determined. All three variables had significant effects on the print-through measurements. Increased amount of fines in the paper reduced the print-through, while increased amounts of chemical pulp and calendering increased the print-through. All three variables had effects on the print-through partly due to the changes they caused in the light scattering coefficient of the paper. However, both calendering and increased amount of fines reduced the average depth of ink pigment penetration into the paper. A model describing the print-through as a function of light scattering and ink pigment penetration depth explained 86% of the data variation.



Print-through as a function of light scattering coefficient is shown. Increased amount of fines raise the light scattering and reduces print-through. On the other hand, increased amount of chemical pulp and increased calendering will reduce light scattering and raise print-through.

Reproduced from Eriksen and Gregersen, 2005.

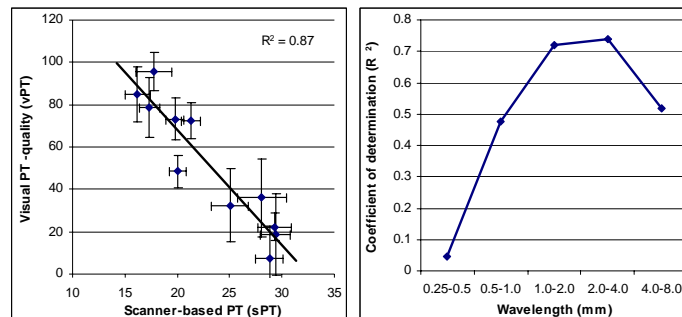
Reference: Eriksen, Ø. and Gregersen, Ø.W.: "The influence of ink pigment penetration and paper structure on print through". Nordic Pulp and Paper Research J. 20(2) : 242-246 (2005).

Desktop scanners for assessing print-through

On the suitability of desktop scanners for assessing print-through

Abstract

A new scanner-based method for assessing print-through is introduced and compared to print-through assessment methods based on reflectance values. A direct relationship between the print-through assessment methods and perceptual print-through is established. Print-through assessment based on the $L^*a^*b^*$ components has the lowest prediction power with respect to the visual perception of the samples assessed in this study. The scanner-based method seems to be the most suitable and adequate for estimating and predicting the print-through level. The quantification yields objective results differentiating well between the assessed samples.



Left) Relationship between visual perception of print-through (vPT) and scanner-based print-through assessment (sPT), for the commercial newsprints. Right) Successive correlation between the vPT and the variation of greylevels (vGL) of the backside of the printed areas.

Reproduced from Chinga et al. (2007).

Reference: Chinga, G., Eriksen, Ø. and Eilertsen, M.: "On the suitability of desktop scanners for assessing print-through". J. of Pulp and Paper Science 33(3) (2007).

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