IC Leipzig 2016 Title
Paper Strain influenced by Tack and Fountain Solution

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Keywords: Offset, Paper, Strain, Colour register

Abstract

Offset printing quality is influenced by several parameters. One of these is colour register. Whereas many sources of colour register misalignment have been heavily reduced in recent year by the use of modern technologies like digital prepress and automatic or semi-automatic plate loading systems, influences on paper due to the printing process remain. The paper strain is induced either by the humidity of the paper, the tack of the ink or rolling forces in the nip of impression and blanket cylinder. The latter one may be seen as an ingot slab mil. Once paper strain is involved an easy cure is not at hand as colour register may vary over the sheet from the beginning to the end and from the centre to the sides. Deviations of this kind can't be eliminated by shifting the register in printing or lateral direction.

This work tries to find hints in targeting down the above mentioned influences. For this purpose a series of trials was undertaken to change the humidity in the paper, by changing the fountain solution setting and changing between waterless offset and wet offset. Also the influence on solids printed in a certain colour was compared to more or less blank sheets. By the use of a colour register measuring device a 2D Map of the observed strain was accomplished. To widen the field a variety of paper types were studied.

It was found, that some of the papers showed a non-linear behaviour in such a sense, that the strain is not a linear function of the coordinates. Especially at the trailing edge some irregularities where observed. Taken this into account it is shown, that the observed data may be represented by a model describing the strain in printing and cross direction using a polynomial of third order. This seems to be of importance when compensating this type of deviations in prepress by reshaping algorithms working on the individual colour separations. Increasing formats and increasing quality requirements are asking for an even better fitting model representing the effects. Tools used in the industry todays are mostly working with a linear approach.

As for production processes not only the achievement of a certain parameter value is important, but also the ability to reproduce it within narrow limits, the trials were partially analysed in this regard, thus analysing a large row of prints. The findings show some regularities of lower magnitude and are shown in 2D-Maps trying to visualise the data. They probably show the possible limit of the quality being achieved with this material – process – machine combination. Also these presumably stochastic deviations limit corrections being done in prepress as mentioned above.

Finally the paper tries to link some findings to geometric models. Even though these are static models they give fruitful hints how to link the warp angle to strain. Thus giving hints for interpretations of the studies and for further research.

Author biography

Dilan Uzun was a student at Hochschule der Medien, Stuttgart and worked on paper strain during her Bachelor thesis work. She now works at CCL Istanbul. Chang Li worked on paper strain in offset printing while she was involved in a project. She is now at Xian University, Xian after earning her Master degree. Karl Schaschek teaches as Professor at the Hochschule der Medien, Stuttgart and is working in the field of Offset printing, 3D-printing and automated quality assurance processes. Before his engagement at HdM he work for Koenig & Bauer AG, Würzburg, being responsible for the R&D-Departement. He earned his doctoral degree at the Justus-Maximillian-Universtät, Würzburg in physical chemistry, working on Raman-Mie spectroscopy. The work resulted in an invation by Richard Chang to join a post-doctoral program at Yale University, New Haven. The program was supported in part by DFG. There he delved into the spectroscopic analysis of laser induced evaporation of droplets. After returning from this research program to Germany he joined KBA.