

Trade Press Article

What Flexography still needs on its way to a fully industrialised process

Flexography has developed tremendously and has deserved to be the worldwide dominating packaging printing process that it is today. Despite of that it has to take a number of steps still in order to develop a fully industrialised production process. This appears to be necessary in light of the author's vision of the future of packaging printing.

Packaging printing by the year 2050

My roadmap for packaging printing, which must be outlined here for a better understanding of the "todos" for Flexography, is based on a couple of assumptions on the impacts that may affect the development of the printing processes in the packaging arena during the coming years. One of the most important factors will of course be so-called digital printing, which currently is much overhyped. Further significant factors may be online sales, i.e. the ordering of goods over the Internet, thus circumventing the usual shops, the integration of printing into the packaging lines, the use of data goggles and so-called 3-D printing.

While the aforementioned aspects may be looked at as potential threats, there are still substantial positive factors ahead. For instance there will perhaps always be a need for a physical packaging at the very place, where a product is being produced. Substitution by digital media does not work with physical packages. Only so-called 3-D printing, which potentially lets every home user produce the product by himself, could be seen as a threat. However, in that I cannot imagine this to be used with all the mass products we currently sell or buy, I find this to be a minor threat for packaging.

Where today the conventional printing methods dominate the markets we will, however, see a noticeable shift towards digital printing within the next five years. Still it is the conventional printing methods, Flexography well included, that set the standards for print quality and, most of all, for the fulfilling of the many complex physical, chemical and technical requirements. Nonetheless, it is the relatively high minimum order quantities and delivery times of the conventional printing methods (mostly Rotogravure) on one hand, and the ever-shrinking lot sizes on the other hand, that have put a lot of „pressure to the vessel“. This is what currently discharges through the aforementioned overhyping of digital printing.



Pic 1: Online Sales



Pic 2: Data goggles make surface decorations redundant

Plausible in my eyes, yet speculative, is the assumption that the growing online sales market will lead to a **simplification of the graphics** of many packages particularly affected of that. We may see a shrinking number of printing inks being used and the utilisation of fixed colour palettes with more than four process inks (see also later). There are, however, opposite assumptions in the market, too. The general trend to answer this question will have developed by the year 2022.

Until about the end of the third decade I expect that packages will typically be produced in very small quantities to start with and to evaluate them in the market. Printing decoration will then be done using a digital method. Once such a product/packaging has proven to be successful and survive the market's selection process, the focus will be on the cost of mass production for the bigger quantities needed by then, perhaps even more so than is the case today. And it will be the conventional printing methods with Flexography at the very forefront that will be unbeatable in this respect. A few preconditions must, however, be fulfilled by then.

Integrating packaging printing into the packaging lines is a factor of uncertainty in my considerations. The more this actually happens, the more digital printing will be used. In any case, Flexography will have to be in a position to utilise existing graphic data from other printing methods, digital printing in particular, seamlessly by then. I will get back to this point again.

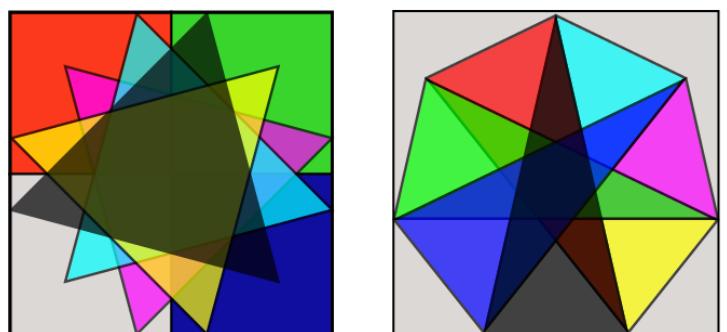
In the course of the fourth decade I expect that many digital printing applications have been realised in the aforementioned packaging lines, yet there still will be conventional off-line packaging printing using conventional methods in the markets. It is the sheer amount of packaging material needed that justifies this assumption alone. By then we will see the printing methods fully complementing one another.

Although they are present today I do expect a substantial impact of data goggles onto our lives only in the fifth decade. The scenario that has been advertised by The Matrix movies makes it redundant to physically decorate any surface as long as it is only its visual appearance that is of interest. Packaging decoration is one of the processes thus made redundant, like wallpapers or painting of vehicles. But even in this horror scenario there will still be physical packages to protect the contained goods and I do assume that many of them will still carry a decoration applied by printing technologies. Packaging printing may not be the big thing by then, but we may enjoy a whole number of very successful years until then.

What will (have to) change?

Flexography has developed very well over a whole number of years. Particularly its latest innovations in the realm of printing plates (so-called **flattop printing plates**, especially those of the „automatic“ version) yield a high potential for simplification and cost savings, aside from better stability and reproducibility, one of the basics for industrialised production. Cooperative interactions between prepress and printing may still have room for improvement, but will be industrialised, too, by the proposal for an industry standard to be outlined further down.

If my assumptions over the evolution packaging printing hold true, Flexography will experience ever more print design files that have been used in a digital printing method before. Typically - as this is one of the limitations of digital printing - such design files will be generated using a **fixed colour palette** of six or seven primaries and special inks are an extreme exception. This is when we must be able to cope with such files in Flexography, too! And for cost reasons there



Pic 3: 4C+++ versus 7C+

must not be any rework of the files required!

In the course of the aforementioned multicolour separations with fixed colour palettes of more than four process inks one must consider the colour separation method of so-called **grey component replacement (GCR)**. As soon as there are more than the usual four CMYK inks being used in a photographic image the question for the available halftone screen angles arises. Their limited availabilities make it necessary to render all tertiary colours through black instead of using the opposite colour in the colour circle, as would be the case in chromatic colour separations. Printing a GCR colour separation well does, however, require a highly saturated black that nonetheless does not allow for increased dot gain. This is something where a whole generation of Flexo printers has to develop towards to.

It is, on the other hand, a potentially advantageous undertaking to strive for such capabilities, because there is substantially reduced **consumption of chromatic inks** and, most of all, vastly **reduced press setup times** caused by (the absence of) ink setup to be gained.

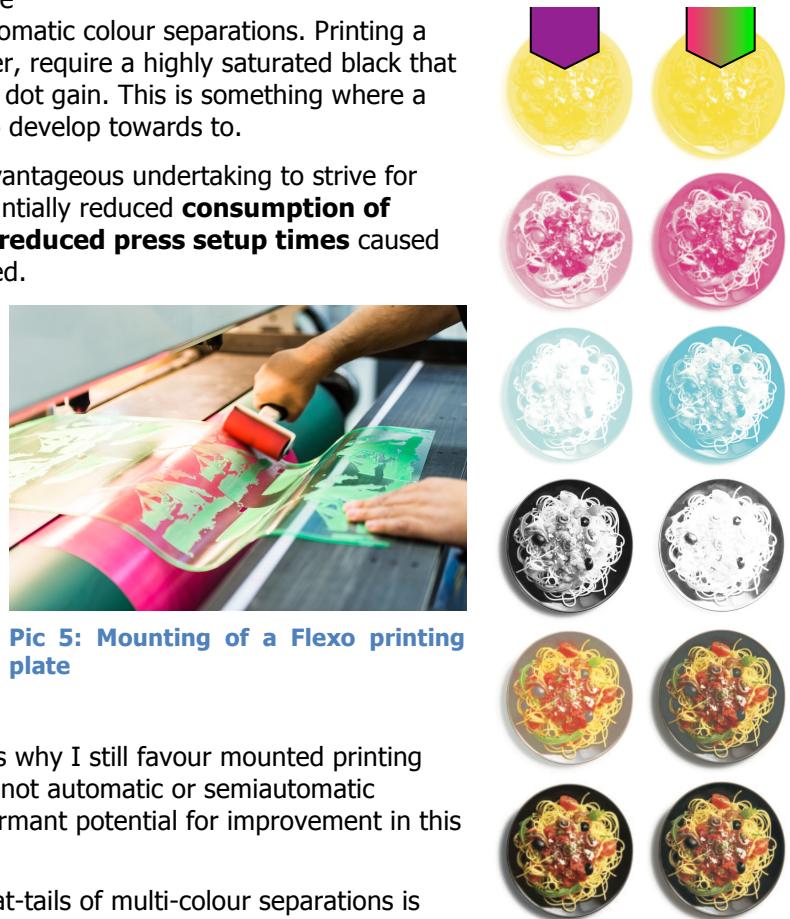
In order for the aforementioned multicolour separations to work correctly a good **registration** between the printing inks is imperative. This is a difficult task to achieve, particularly with large formats and jobs with manifold design copies on the sheet. The respective plate makers typically respond to this discussion by

highlighting their seamless print forms. These do have the potential to solve the registration problem, however, I tend to think that they will introduce other limitations at the same time. This is why I still favour mounted printing plates. It remains to be seen whether or not automatic or semiautomatic mounting machines will harvest some dormant potential for improvement in this arena. It would be needed quite badly.

An other necessity that comes on the coat-tails of multi-colour separations is the efficient **colour management** of the extra colour channels. The prevailing strategy to inflate the respective test target sizes must be criticised vividly, although this practice has proven technical feasibility. The test targets have partly become that large, they cannot be printed in one sheet any more. This is where clever simplifications are required, but I can see them in the market already and have made good experiences



Pic 4: Cover of Flexo- und Tiefdruck magazine with 4C vs. 7C



Pic 5: Mounting of a Flexo printing plate



Pic 6: Mini Colour Management Test Target by ColorLogic

with them. Intelligently designed **mini test targets** seem to be the plausible solution.

In-line colour measurement inside the printing presses is another aspect I would like to see improved and spread further in order to promote a seamless connection between pre-press, printshop and print buyer. This does not only allow for a plausible check of the achieved colours during production, this will also allow for continuous improvement of the quality of the utilised colour profiles for prepress. Through the close connection with in-line inspection systems one can also prove the gained reliability to the customer.

There must also be further **automation** in prepress and on press. Flexo is well on the way in that many make ready and set up processes have been automated by now. Generating plausible and reliable **colour recipes for special inks** outside of the printing press, however, appears to be work in progress still, even if the aforementioned usage of multi-colour separations may render this less important over time.

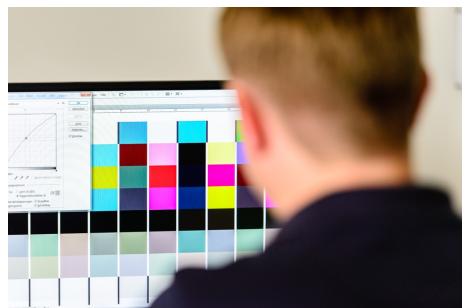
In times of the aforementioned overhyping of digital printing we, of course, must explicitly work on **prepress cost**. This does include the reworking of digital files in repro, but also making the required print forms. The availability of the so-called flattop printing plates, particularly those that provide this feature intrinsically, has made things a lot easier. The DFTA technology Centre has contributed here as well with its technology studies and proposals. But the search for cost savings in prepress does depend much on the following aspect:

The biggest and most important key to industrialisation is hidden in print quality or a particular portion of it respectively. The highlight end of the tonal range in halftone printing is key in this case. In this particular respect Flexography must necessarily rise to the level of offset lithography and be able to print a **true 1% tint** any time and long-term consistent. This is the single most important precondition for being able to use print files from other printing methods seamlessly.

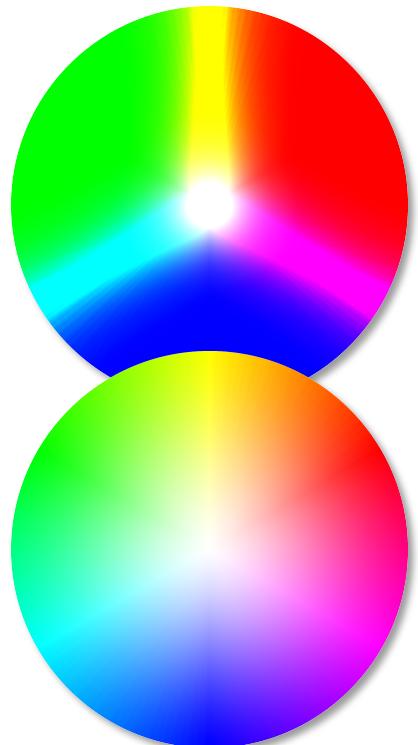
As soon as one thinks about this question all the way through, the achievement of a perfect linear print gradation particularly in the highlight end of the tonal range is not only a question of quality per se, for example with respect to smooth vignettes, but is also a basic precondition for colour management with a reliable preview of the end result and thus being able to **link up with other printing processes** perfectly. This appears to be mandatory in light of my scenario of the future of package printing.

The adjacent graphics try to illustrate this fact. While Flexography, as is being illustrated in the upper graphic in a much exaggerated way, still operates with a relatively high first printing tone it does render some important parts of the colour gamut inaccessible. Contemporary halftone printing rather needs harmonic transitions as have been demonstrated in the bottom graphic. There is quite a number of Flexo printers mastering this field already, but this capability must spread much further down to the average printers.

Having said all this, in the meantime it is, however, the lack of an **industry wide colour communication standard** that has perhaps



Pic 7: Image retouching



Pic 8: top: printing with drop-offs; bottom: harmonic transitions

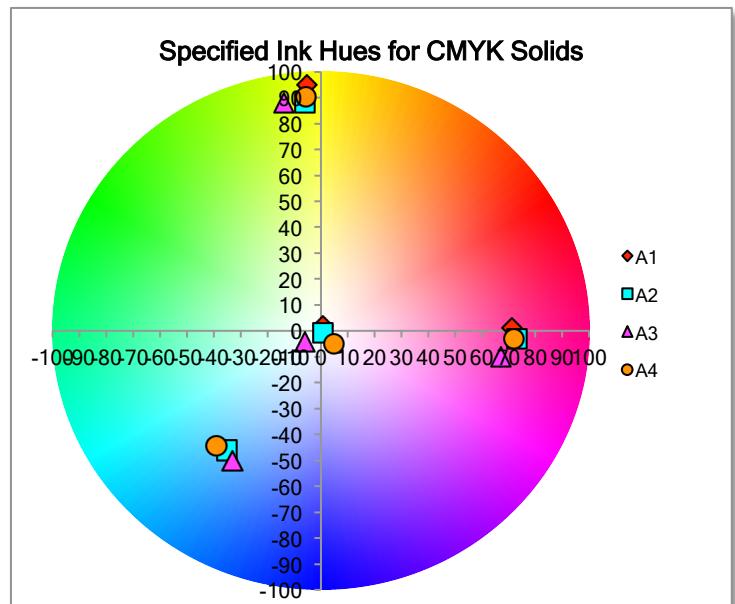
become the biggest and most important obstacle for Flexo printers at current. Although the DFTA workgroup for technology has published an official guideline for colour communication, the respective colour profiles are still missing. They would be required to „translate“ the verbal instructions into colour appearances useful for prepress and print shops.

Unfortunately, this has led to some sort of “anarchy” in prepress. In that by now many print buyers work together with a so-called central repro agency it is them who have issued directives for the print shops about how to establish their primary colours and dot gain in halftone printing. On one hand they have misused the power they represent with the large print buyers in their back, on the other hand they need such assumptions about how printing will perform colour wise. Issuing such directives is therefore not a bad thing per se, but the various directives have turned out to be substantially different from one another. Please see the adjacent graphics for a better overview. Mind that all these adjustments must be carried out on the most costly instrument in the process, namely the printing press, if a print shop works for various customers being represented by different central repro agencies!

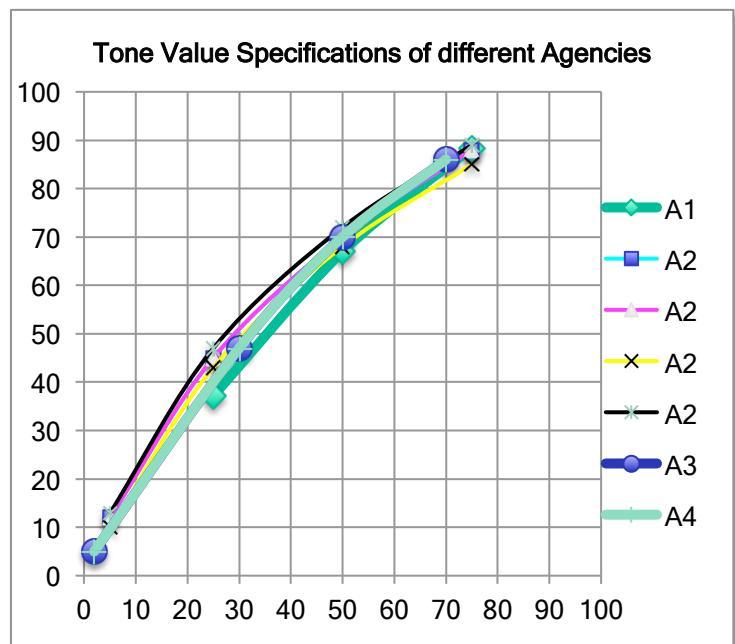
Standard colour profiles may solve this dilemma, but do include high risks in technical and commercial respect if they are made and published according to the wrong concept. Offset lithography gives us a bad example we do not want to copy. However, Flexography did have some alternative concepts for quite a while that would avoid the mistakes made in offset, and now there is also the technology available to carry out these ideas plausibly. A DFTA workgroup will probably start working on this within a few weeks. Flexography and the print shops in particular may gain substantial value of this.

Conclusion

Flexography has come a long way, but still needs to finalise a couple of roadworks on its way to a fully industrialised process. A good part of this has to do with the assumed requirement for a seamless link with other printing processes, namely digital printing mostly. The current overhyping of digital printing will, once the euphoria has settled



Pic 9: Directives for Colour Hue by various central repro agencies for Flexo printers (anonymised)



Pic 10: Directives for TVI by various central repro agencies (anonymised)

through reality, add to improved reputation and leveraged business for Flexography, if we can do the outlined home works successfully.

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