Achieving the Newest Generation of Flexo Plate Capabilities and Its Implementation

Dr. John Anderson

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Abstract

Flexographic printing is a crucial component of sales and marketing for some of the world's most recognizable brands and popular products. In 2008, Kodak entered the digital flexographic plate market, bringing dramatic improvements through the introduction of advanced technologies that quickly closed the gap between flexography and rotogravure. This paper details how Kodak's core technologies have helped to transform flexographic printing from its position as a 'lower-quality' print process to being one of the most sought-after solutions for brands that demand the highest quality and consistency. Packaging print service providers have also benefited from a plate technology that drives print production cost saving and press room efficiencies. In addition, this paper highlights Kodak's most current technological features, presented originally in 2015 at the TAGA conference, which have been demonstrated to offer printers additional opportunities for cost saving and quality improvements, and shed light on the need for comprehensive solution implementation and press optimization to take full advantage of the advanced technology.

The Impact of Flexographic Printing

From the world's most established brands to those just entering the marketing and competing for shelf space, flexography is the most common print process used in packaging and impactful print quality is essential to producing the shelf-impact necessary to grab the attention of busy shoppers. Flexography extends into a variety of packaging formats including:

- Corrugated Boxes
- Flexible packaging
- Stand-up pouches
- Shrink sleeve

Kodak

- Labels
- Paperboard products

A Market Shift: Kodak Technology Addresses Flexography Challenges

Seven years ago, the flexographic market was faced with a variety of significant challenges including, but not limited to: inconsistent print results, heavy ink usage and poor solid ink densities, all of which prevented flexography from achieving the highest levels of quality and often drove increased costs. These challenges led many brands to favor offset and rotogravure printing processes in order to obtain the consistency and shelf-impact they required.

In 2008, Kodak entered the digital flexographic plate market, introducing a differentiated plate imaging technology and pioneering the use of a digital flat top dot structure to squarely address the major print challenges. The revolutionary plate system technology hinged on four fundamental core technology components:

- KODAK SQUAREspot Imaging Technology, developed originally for the offset plate industry and in use in over 16,000 devices worldwide, that is capable of imaging square pixels up to 450 LPI using AM and FM dot structures
- KODAK FLEXCEL NX Thermal Imaging Layer (TIL) - the highest resolution digital imaged film in the graphic industry, with a thermal dye based multi-layer ablative film, capable of up to 800 LPI
- KODAK FLEXCEL NXH Plate – a single plate type that is appropriate for all applications (with the exception of corrugated post-print), specified at 300 LPI, 0.4-99.6%
- Advanced lamination – a patented process in which the imaged TIL is brought into intimate contact with the NXH plate in order to facilitate pixel for pixel reproduction on the plate

The combination of the core technologies resulted in advanced digital flexo plate that addressed the aforementioned flexography issues and provided exceptional print quality, greater press stability and operator latitude while improving plate life and on-press performance. Figure 1a. is a 250% magnification of Kodak's flat top dots. As outlined in Figure 1b. Kodak's flat top dots have 1:1:1 reproduction from the native file, to the TIL and finally, the FLEXCEL NXH plate. This level of specificity ensures consistent dot structure and on-press repeatability.

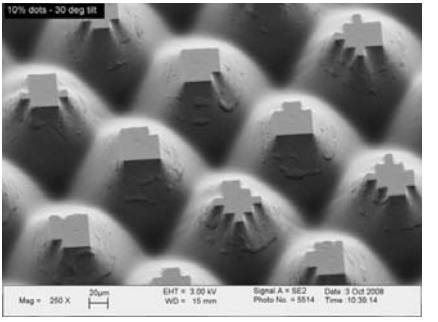

Figure 1a

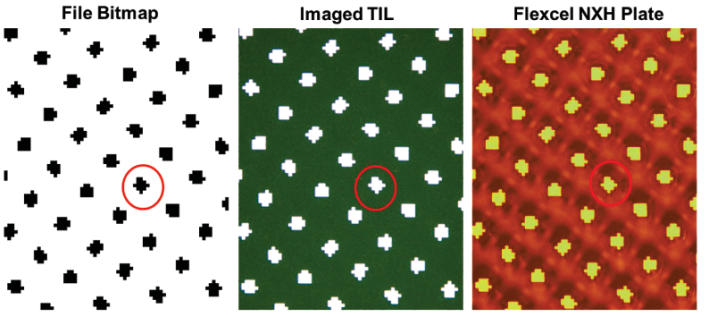

Figure 1b

To further close the gap between flexography and gravure, Kodak worked to address remaining issues with ink transfer that resulted in the 'muddy colors' traditionally associated with flexographic printing. In 2010, Kodak launched DIGICAP NX Patterning to specifically address significant levels of pin holes in solids which negatively affect solid ink density, overprint color gamut and overprint color cleanliness.

As shown in Figure 2a. DIGICAP NX applies a unique surface pattern to the FLEXCEL NXH Plate, effectively breaking up the pattern from the anilox roll, eliminating its transference to the substrate and allowing ink to be laid down more evenly without pinholes.

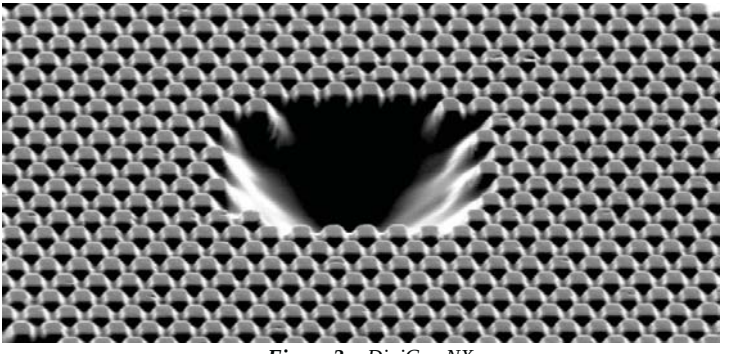

Figure 2a: *DigiCap NX*

At the time of the presentation for this paper, spring 2015, Kodak identified the following as further opportunities for flexographic gains both on-press and in general:

1. Color and color fidelity
   - Address pin-holing with heavy anilox volumes – whites, coatings, spot colors, metallics
   - Color tonal range – the use of four color / spot colors vs. expanded color gamut
   - Cleanliness of colors – as it relates to process builds over a white base

2. Print details
   - Fades to zero without grainy hybrid screens
   - Keeping reverses open and clean with heavy anilox volumes
   - Dirty print and its effect on process productivity
3. Economics and competition
   - Relatively heavy ink deposits and its effect on costs or productivity
   - Cost control for brands
   - Competitive demands to increase resolution to specifically match the 175 LPI used in rotogravure to enable greater conversion

Since the presentation of this paper, Kodak has released new features to specifically address the above challenges:

1. Advanced ink transfer capabilities improve color fidelity – the launch of the NX Advantage for the KODAK FLEXCEL NX System, recipient of a 2015 PIA / GATF InterTech Award, adds an advanced range of plate surface patterns, Figure 2b. that are applicable to all flexographic applications and expand upon the strength of DIGICAP NX Patterning to improve ink transfer in a wider range of situations and for a broad range of anilox volumes. The result for higher volume anilox applications is more efficient ink transfer, smoother ink laydown and a vast reduction in pinholes. The application of this technology to white ink produces a smooth pinhole free white allowing flexo printers to achieve stronger and cleaner colors, avoiding the traditional "muddy" colors associated with flexo.

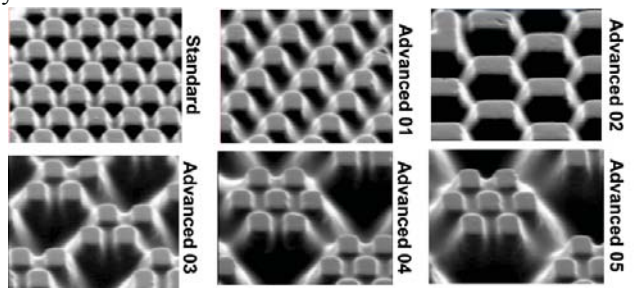

Figure 2b: *NX Advantage Advanced Patterning*

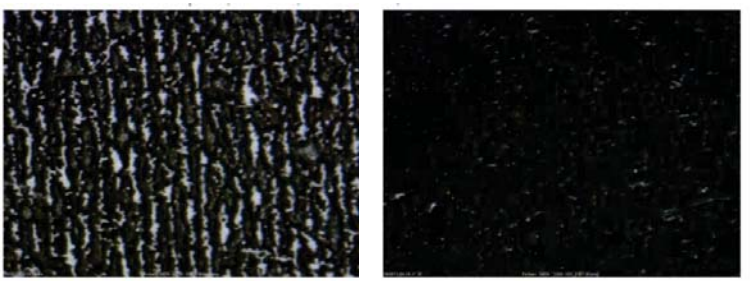

Figure 2c

Traditional Digital Flexo *DigiCap NX Advantage Advanced Patterning*

2. Print details – Kodak's newly introduced MAXTONE SX Screening enables transitions from an FM screen in the highlights and shadows to a slightly dithered AM screen in the midtones resulting in the ability to blend fades and other features to zero. KODAK HYPERFLEX NX Imaging enables smaller dots to form and hold, effectively reducing the smallest printable dot size. The combination of these solutions extend the tonal range in shadows and expand the color gamut, allowing for a more comprehensive visual range of options.

3. Economics and competition – integral to the development of flexographic technologies is a need for a razor sharp focus on the true impact of the flexographic plate on the overall print production process and the role that it can play in driving cost savings and a more streamlined manufacturing process. It's tempting to solve print quality problems by adding complex steps in prepress or by increasing the number of plate choices to provide a solution for specific scenarios but to do so would add complexity, introduce opportunity for error and, as a result, drive increased cost. Kodak chooses and advocates an approach that centers on simplicity and leverages unique technology to deliver quality and efficiency benefits with the simplest plate portfolio in the industry.

These unique technology advances have had an unparalleled impact on the quality of the final printed packaging and the efficiencies seen on-press are also substantial. Users of the KODAK FLEXCEL NXH Plates consistently report:

- A reduction in the number of plates necessary
- Reduced ink use
- Reduced cost per job
- Increased productive press time
- Increased sustainability

Key to success with these advanced technologies, both on-press and throughout the production process, is a comprehensive implementation process. The flexo printing process is a complete system with many key components that need to be fine-tuned for optimum interaction. Leveraging the maximum benefits of advanced plate technologies requires careful optimization of the total print condition. Fortunately, significant advances in press, ink and anilox technology are available to enable printers to take full advantage of the latest plate technology and collectively suppliers are learning how to push the flexographic process even further forward

Conclusion

The flexographic market has made tremendous strides within the last seven years driven in part by technological advances in flexo plate technology from Kodak that have essentially enabled printers to close the gap between flexography and rotogravure printing. As the industry continues to grow and evolve, the need for technology that is aligned with the demands of the brands, and its customers, will continue to drive the success of flexography. Having access to the most advanced plate technology does not drive a superior final product alone – those that combine advanced plate technology with proper implementation, application and thorough industry knowledge will deliver the products that brands desire and remain profitable in the process.