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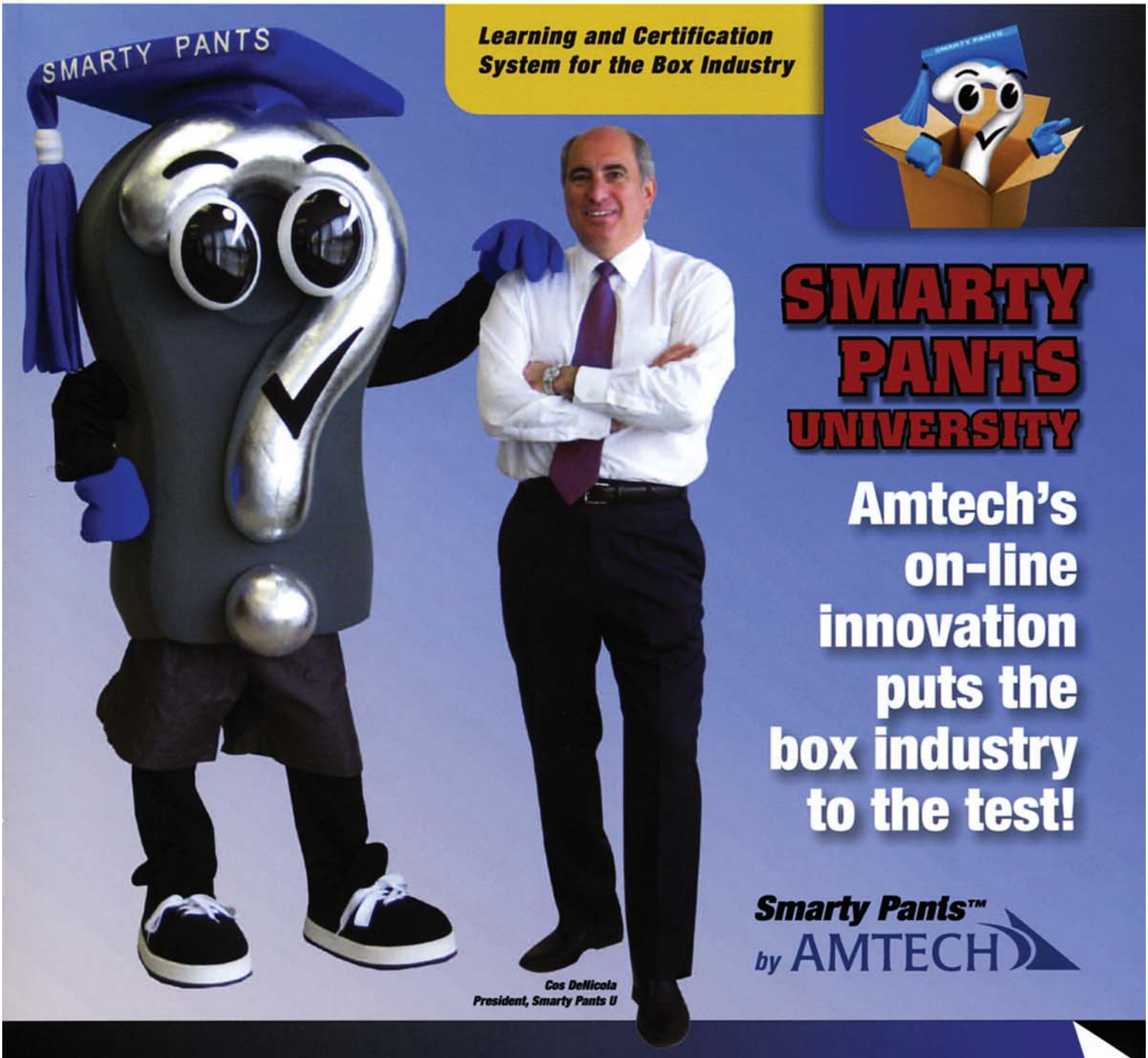
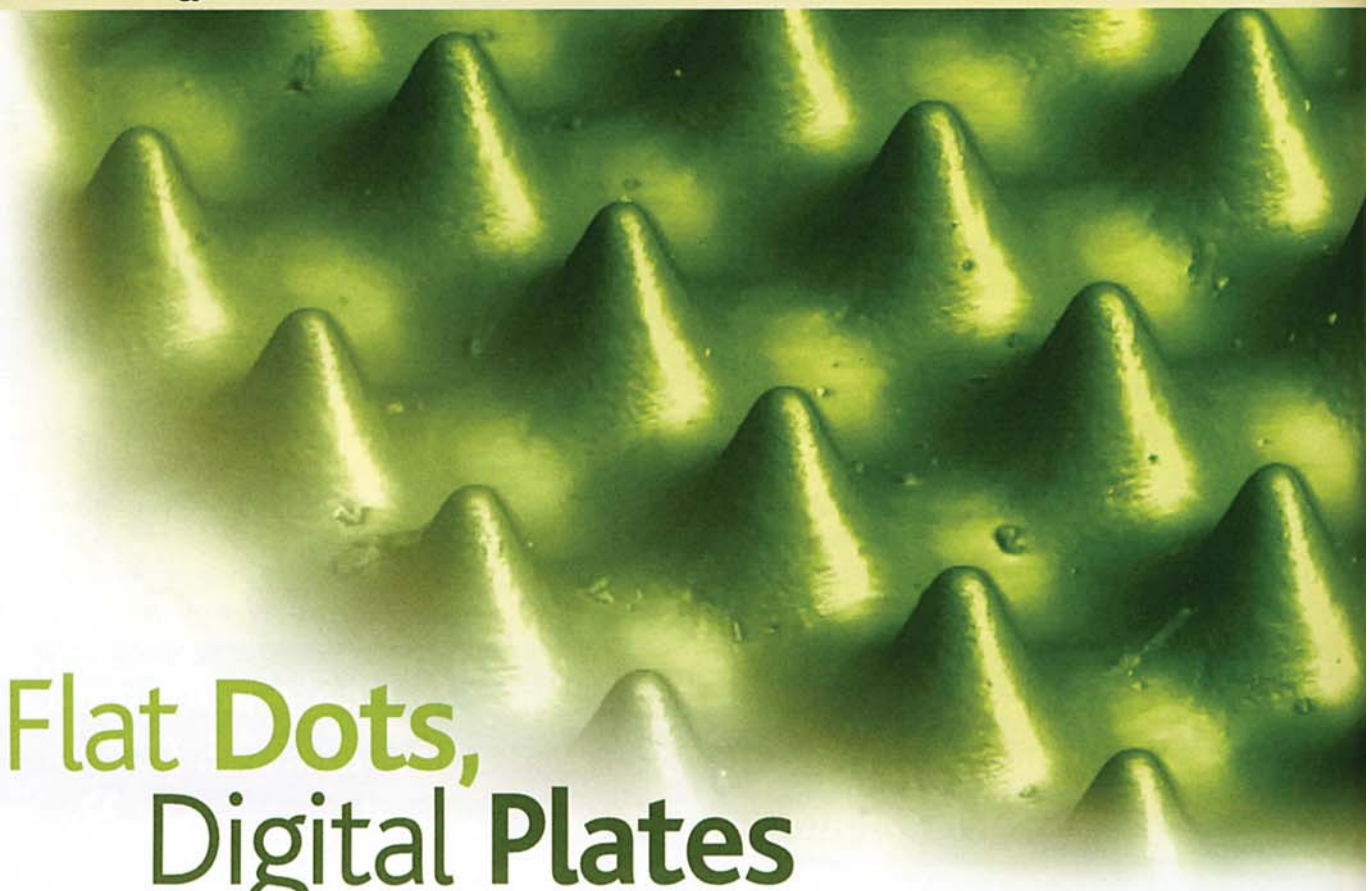




Flat Dots, Digital Plates

A new patent-pending digital plate for flexographic printers improves print quality, saves costs and speeds up setup times.

By David Price
PRPflexo

If you were asked to describe your desk to a co-worker, would you even bother to mention that the top of it is flat? Of course not. It's a fact that everyone assumes to be true. If you had to say that you have a "flat-topped desk," it would imply that there are some people out there using desks with rounded tops.

Incredibly, a discussion similar to this is currently going on in the flexo world. There has been much talk lately about "flat-topped dots" for digital plates. The mere fact that the term "flat-topped dots" even exists implies that there are digital plates out there with dots which have rounded tops.

The differences between flat-topped and rounded dots are real. And the benefits of using flat-topped dots are significant.

The Digital Debate

Let's define some of the terms commonly associated with flexographic printing plates. The "face" is the printing surface of the plate. The "bevel" is the angled side of the printing element, from the face to the "floor" or background of the dot. "Relief depth" is the distance from the face to the floor of the plate. "Dot gain" or print gain, is a comparison between the intended print targets, expressed as dot percentages, as compared to the actual print results. Dot gain can be measured either as increased density or as increased dot percentage.

Although all these terms refer directly to halftone dots of screened or process printing plates, the same factors impact detailed line work, barcodes and fine relief and reverse type.

In the past few years, the buzzword of our industry has been "DIGITAL," with a dramatic push to any digital technology perceived as leading edge technology. Digital plate making for printing, first for offset, and then for flexo plates, eliminated film negatives and the associated chemistry or separate plotting device. The workflow and control of the process were improved.

Digital plates for flexo printing are made from sheet photopolymer materials that are supplied with an ablatable carbon/wax layer on the face of the raw material. The digital imagers ablate only the carbon/wax layer in the image area, and the remaining coating serves as a mask. Exposure to UV light "polymerizes" the

image area, and the non-image area is removed with further processing.

The perception of improvement was widespread, and even "brand managers" at consumer products companies insisted that, wherever possible, their printers move to digital plates.

However, as those in the direct print corrugated market can attest, digital plates could not be used on combined corrugated board. Four years ago, certain digital plate equipment manufacturers were in development on a technology to make digital plates applicable for corrugated. They promised, for the first time, "flat-topped" dots, by adding an exposure unit directly inside the ablation device. That technology is still in development, with limited release to the market.

Nonetheless, there was widespread acknowledgement that "flat-topped" dots are indeed desirable (especially for corrugated), and that current digital technology could NOT provide them. Image 1 shows the rounded dot profile of a conventional digital dot, referred to hereafter as "nubby" dots.

Without expounding on chemical reactions, it is suffice to say that conventional digital dots do not form well at the plate surface, particularly at the edges of the mask on print elements. The plate material is insufficiently exposed, and washes away in processing. This "loss" of plate material reaching the surface requires that conventional digital plates get a "bump" to compensate, by pushing the minimum dot size up. An ablated 2% dot in the mask creates a dot that does not even reach the surface. Typically, a 7 to 10% dot ablation is required in the mask to create a dot that reaches the plate surface with an acceptable minimum dot. This "bump" creates a compression of the file, by limiting the number of gray values available. (See Image 2)

There has been widespread acknowledgement that "flat-topped" dots are desirable, especially for corrugated, and that current digital technology could not provide them.

IMAGE 1
THIS 400X SLICE OF A 25% DOT AT 200 LINE "NUBBY" DOT PROFILE RESULTING FROM CONVENTIONAL PLATEMAKING TECHNIQUES. NOTE THE BROAD SHOULDER AND SHALLOW RELIEF DEPTH.

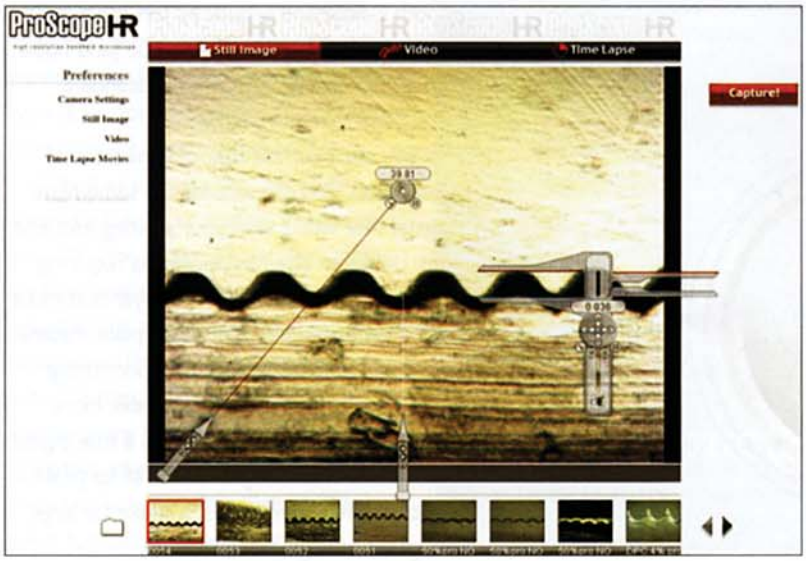
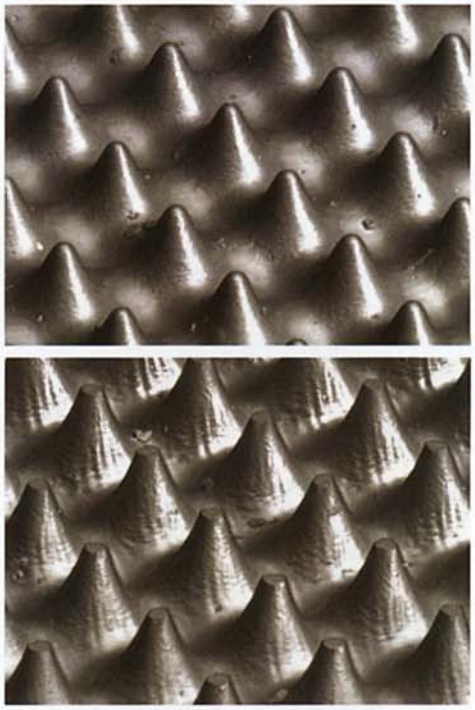


IMAGE 2
LINE SCREEN IMAGES AT 120X. THE IMAGE AT TOP SHOWS 7% NO-BUMP "NUBBY" CONVENTIONAL DIGITAL DOTS, WHILE THE BOTTOM IMAGE SHOWS "FLAT-TOPPED" PATENT-PENDING PLATE TECHNOLOGY WITH A TRUE 2% DOT.



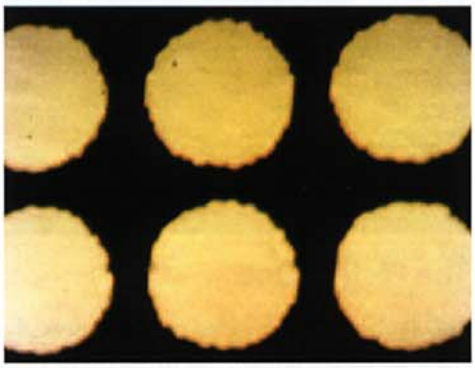
The Perfect Dot

Direct printing of corrugated presents a special challenge for dot profiles, due to the unevenness created where the flute tips of the medium are adhered to the linerboard surface. Even the slightest bit of variation in the board surface of good E-flute, and even the best quality B-flute, creates uneven impression on the plate surface, the face of the plate. With a "nubby" dot profile like that of conventional digital plates, the variation in impression on the board surface emphasizes fluting, making conventional digital plates unacceptable for direct printing of corrugated.

There is more to creating the ideal dot structure than just a "flat-topped" dot, however. The bevel angle must be optimized, for best results. Too broad of a dot bevel causes most of the compression of the dot to occur at the plate surface, permitting ink to build up on the bevel and exaggerating dot gain. Too vertical a bevel, and the dots are fragile, possibly bending over or breaking off easily. The perfect dot bevel permits each halftone dot to compress much like a tiny shock absorber, in a more vertical orientation than in a horizontal orientation. The perfect dot bevel affords added relief depth, particularly in reverse text and between the halftone dots.

Also, the transition from the "face" to the "bevel" should be optimized to be as crisp and sharp a transition as possible. It only makes sense that the intended print target, the halftone dot, be as accurate as possible. In fact, the ideal dot represents exactly what is represented in the ablated digital mask. (See Image 3.)

Conventional digital plates do not meet these optimization standards for direct printing of corrugated. However, there is one totally new, patent-pending plate processing technology that offers these optimizations. Recently released at the FTA tabletop session in November, this plate technology is now available to interested flexographic printers, for printing on any substrate. Many of the market leaders in display printing and point-of-purchase packaging are currently running preliminary trials on this technology, with outstanding results.



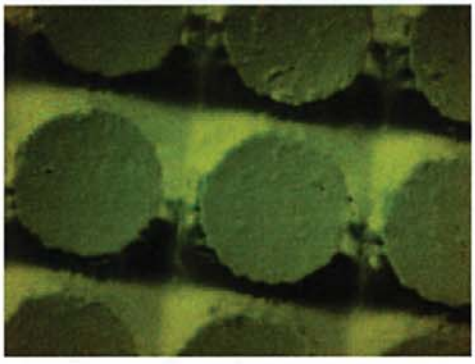
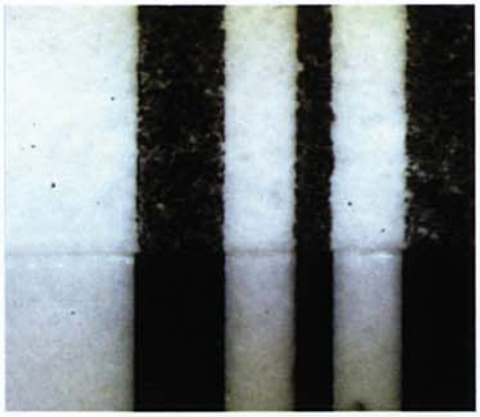


IMAGE 3
AT TOP LEFT IS THE ABLATED MASK, WITH LIGHT AREA REPRESENTING INTENDED HALFTONE DOT. AT BOTTOM LEFT IS THE RESULTING DOT USING PATENT-PENDING PLATE TECHNOLOGY, VIRTUALLY THE SAME SIZE DOT AS THE ABLATED DIGITAL MASK

Recently released at the FTA tabletop session in November, this plate technology is now available to interested flexographic printers, for printing on any substrate.

IMAGE 4
THE TOP HALF OF THIS IMAGE SHOWS THE ACTUAL PRINT OF A UPC CODE FROM PATENT-PENDING DIGITAL PLATES, COMPARED TO A FILM POSITIVE OF THE SAME IMAGE FOR COMPARISON. THE UPC WAS PRINTED WITH .155 PLATES ON .120 FOAM, WITH 280 LINE SCREEN ANILOX ROLLS AT 5.7 BCM. THE PRINT IS CRISP AND CLEAN, SHOWING ALMOST NO GAIN, YET GOOD INK DENSITY.



You don't have to print displays to take advantage of the improvement, however. Even at 45-line screen and high volume anilox rolls, these plates can be used to run combination plates of halftones and solids. Bar codes are crisp and clean (see Image 4). No more blurry type. Your capabilities are dramatically improved with no capital investment.

These plates are offered in any caliper, including: .045, .067, .090, .107, .112, .125, and even .250 plates. In a test at Clemson University on its banded anilox rolls, a halftone image was printed at 200-line screen using .125 digital plate materials, with virtually no fluting on both E-flute and B-flute. As this is a patent-pending plate-processing technique (and not a specialized material in itself), any standard digital plate material can be used.

If you are a current user of conventional digital plates, you can request the same plate material that works with your existing inks and tapes. Unlike an alternative process requiring the plotting of a separate mask layer that must then be laminated to a specialized plate material, there is no "lamination" process (permitting possible contamination, and probable extra expense). Additionally, since this is a true digital plate, sizes are currently available at up to 48 x 80 inches – full-sized plates, suitable for large corrugated or large preprint items.

IMAGE 5
A SINGLE DOT, AT 250X SHOWS THE FLAT-TOPPED DOT PROFILE, SHARP BEVEL, AND RELIEF DEPTH AVAILABLE WITH THIS PATENTPENDING DIGITAL PLATE TECHNOLOGY.

The perfect dot is not only "flat-topped," but also has an incredibly crisp transition from the face to the bevel, and that bevel angle is optimized for support and response to impression. The perfect dot can be supplied in your exact configuration, without requiring any changes to ink or anilox systems. (See Image 5.)

Added Benefits

Improved print quality is the result, but is only part of the picture. Cost savings extend beyond the elimination of the film negatives and the expense of analog proofing, to improved efficiencies on the floor. With a broader "sweet-spot" on press, jobs will set up faster with less supervision. Plates run cleaner longer, requiring fewer stops to clean the plates, especially on long running items. Reverse type stays open. Bar codes and small type print are accurate and legible.

Whether you need to run 45-line screen halftones, or process images at over 200-line screen, digital flexo plates are now available that will exceed your expectations and expand your capabilities. This technology improves even the most basic press conditions, and performs brilliantly in concert with the latest advances in ink, anilox, and press technology, in the flexographers' quest for continual improvement.

David Price is the sales manager at PRPflexo in Indianapolis, Ind. He has been involved in flexo prepress and plate making, and the corrugated industry for the past 34 years, largely at PRPflexo. Ned Wier, PRPflexo director of research, invented both patented "ExSpect" and patent-pending "Digital ExSpect" technology. Contact dprice@prpflexo.com or visit www.prpflexo.com for more information.