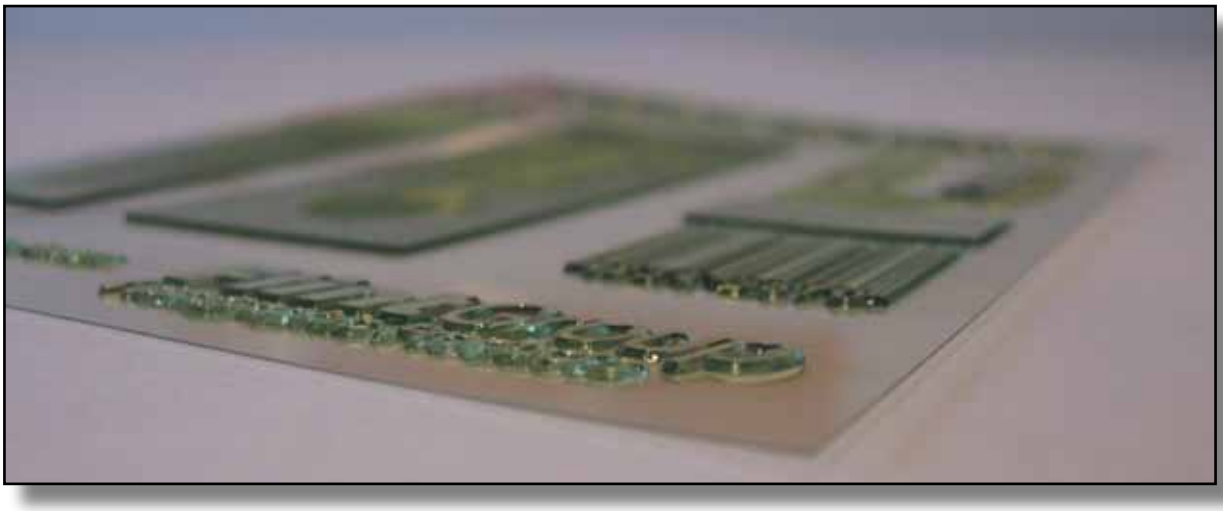


FIGURE 1. Studies have shown that thinner plates result in better print results. All photos courtesy Flint Group Flexographic Products.

Thin is In

.03in. Plates for All the Right Reasons

By Dan Rosen

Occasionally, new technologies are ahead of their time. For example, take into account electric vehicles. They've actually been around since the 1800's, albeit with limitations. But until recently, the relative price and availability of gasoline just made the concept of electric cars impractical due to limitations and costs. In other words, the economics just weren't there. Today, several leading auto makers have all-electric vehicles planned for commercial introduction within the next 24 months. And, they will probably sell well, because consumer priorities and costs have changed.

For flexography, a technical advancement that was first studied as a sanctioned project of the FTA in 1994 was eventually validated by the Association's FQC (Flexo Quality Consortium) program in 1999. The plate construction project, titled, "Taming the Flexo Process Volume IV," concluded, "Plate thickness had the largest main effect on highlights and midtones, with thinner plates significantly reducing dot gain."

- While .030in. plates print well, their quality is not so drastically different as to require new separations.
- Complete solvent processing of thin plates from exposure through detack takes a little less than an hour.
- When switching from .067in. to .030in. plates, one eliminates about half of the finished plate weight.
- Less polymer material results in less absorption of solvents in the wash, a shorter drying cycle, less packaging, and of course, less waste disposal at the end of the product lifecycle.

For the study, .027in. plates were tested alongside .047in. and .067in. plates. Along with the proven print benefits, there are many workflow benefits; however, 15 years ago the benefits were not of significant interest to the prepress market. Also, there were production challenges due to technology limitations of the day. As we approach 2010, a lot has changed. Plates are now digital with improved image quality. Processing equipment is better, and faster plate production with higher eco-efficiency is desired.

But what are the benefits of switching to ultra-thin plates, i.e., plates of gauges less than .045in.? In short, using .030in. plates, as opposed to the most prevalent .067in. or even .045in. gauge has a compelling number of benefits. Along with lower dot gain, the processing of such plates is faster (only about an hour), the weight is significantly lower, there are lower shipping costs, and the energy consumption and waste produced with .030in. plates are better for the environment. In addition, thinner plates exhibit excellent relief control and less cupping. There are just so many compelling reasons to go thin; we owe it to the industry to take another look.

PRINT QUALITY

As concluded by the FQC in the 1990s, dot gain is equal, or usually better with .030in. plates as opposed to .067in. plates. The same rule holds true in most flexo plate comparisons—thin plates print higher quality. As far as cushion tapes are concerned, recent print studies continue to show the best combination of dot gain and solid ink density are displayed when using firm or medium-firm cushion tapes. The good news is that, while .030in. plates print well, their quality is not so drastically different as to require new separations. In most cases, print jobs can be transitioned from

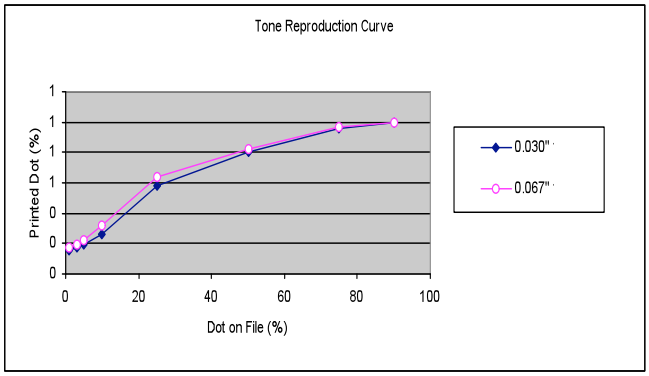


FIGURE 2: A comparison of dot gain using a medium density cushion tape.

.067in. plates to .030in. without the need to re-fingerprint and produce new separations.

PLATEMAKING SPEED & CONSISTENCY

Today's digital .030in. plates are extremely easy to process. Handling ultra-thin plates is easier on the operators, as there is less weight. This helps reduce damage and makes the ergonomics of loading large plates into the equipment easier. Complete solvent processing of thin plates from exposure through detack takes a little less than an hour (depending on the equipment). One of the most frustrating aspects of traditional platemaking has been setting the back exposure and maintaining consistent relief depth. Many plates each year are rejected due to variation in the plate relief as a result of the variability of the back exposure or washout. With .030in. photopolymer plates, you wash the plate completely down to the PET backing. This means the usual floor variations seen with .067in. plates of +/- several thousandths of an inch are now just a few microns. This is good news for platemakers! For all intents and purposes, the relief is perfectly consistent at .023in. on every .030in. plate.

REDUCED SHIPPING AND PACKAGING

When switching from .067in. to .030in. plates, one eliminates about half of the finished plate weight. This is of tremendous benefit to companies that ship their plates. For example, using the online quotation* of UPS Co.'s next-day air service, a cost was calculated for shipping a box with seven plates 42in. by 60 in. in size from Chicago to Dallas. By simply reducing the weight in changing from .067in. to .030in. plates, the quoted cost went from $191.85 to $138.70, a savings of $53.15 per shipment. In a year one would save $13,288 in shipping cost, based on just one shipment per business day, 50 weeks per year. Of course many companies ship much more than one job per day, so the savings would be even higher. (*Source: UPS.com June 1, 2009, Des Plaines IL to Irving TX, UPS Next Day Service, weight reduced from 54.2lbs to 30lbs in same-size box.)

LESS DISTORTION AND CUPPING

Due to less physical thickness of .030in. plates, they require about half the image elongation compensation of .067in. plates. Some types of work may not require any distortion at all. Another age-old problem is that of cupping. As thicker processed plates are mounted around cylinders, the solid images tend to distort, as the surface of the image stretches and pulls against the polymer beneath it. This happens more at the centers of solid images than at the edges. The result is that the plate edges poke outward, and the centers of images depress down, forming the cup-like distortion. This is the reason why when operators set impression, the edges of the solids tend to print before the centers. More impression is needed to fully print solids and the long-term result can be shortened plate life, density variation, and over impression of fine details. Once again, thin is better. The .030in. plate in theory will always have less cupping distortion than the same material in .067in., resulting in more even and faster impression setting with less long-term plate wear.

BETTER FOR ECO-EFFICIENCY

Another convincing benefit of thin plates is quite pertinent in today's market: sustainability. Thanks to the fact that thinner plates are made from less material and require less material and energy for processing, the calculated eco-efficiency benefits of .030in. plates as compared to .067in. are substantial. Based on data from the BASF Eco-Efficiency Analysis (EEA) published in the Nov. 2008 issue of **FLEXO** Magazine,

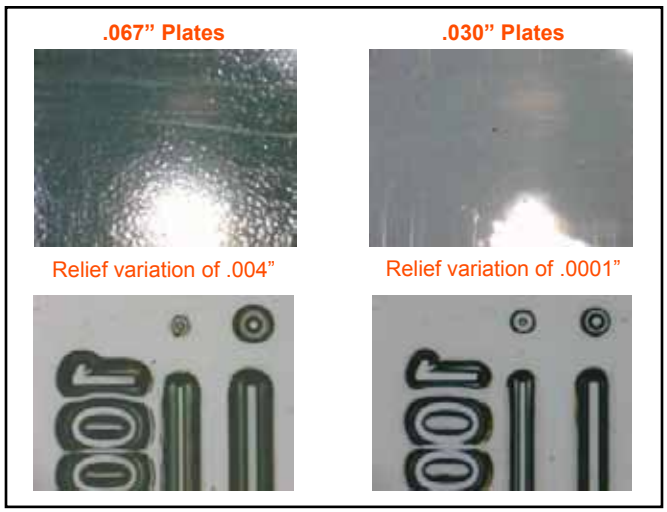


FIGURE 3: Thinner plates result in more consistent washout and relief on, as compared to .067in. plates.

we further calculate that using .030in. solvent processed plates would reduce global warming potential by an estimated 32 percent along with an estimated 40 percent reduction in energy consumption. This benefit would hold true, according to the study, regardless if comparing to .067in. solvent or thermally processed plates. The reasons behind the figures are rather straight forward. Less polymer material results in less absorption of solvents in the wash, a shorter drying cycle, less packaging, and of course, less waste disposal at the end of the product life cycle.

MAKING THE CONVERSION

The leading concern with the use of .030in. plates is how to make the transition from thicker plates. If one owns presses, cylinders, and sleeves with an undercut for thicker plates, there may be tooling costs involved. The practicality of converting to .030in. plates really depends on the individual printer, so only general statements can be provided in this article. Printers are advised to meet with their plate, sleeve, tape, and press suppliers to discuss specific possibilities and the costs for implementation. In general, one must change to a larger diameter sleeve or cylinder to compensate for the thinner plate. To make up the difference, options include:

FIGURE 4. The weight reduction results is major postage savings for those that ship plates or have them shipped to their facilities.

- Change to sleeves / cylinders with new OD
- Grind larger diameter sleeves / cylinders down to target OD
- Re-cover current sleeves to new target OD
- Change tape thickness (not always a recommended option)

For 10 pitch and Stork metric repeat sizes, the same options as above apply. One must get new sleeves / cylinders or recover or grind down as necessary to reach the target OD. While the conversion of presses to .030in. plates would require capital investment in many cases, such transitions can be managed in partnership with suppliers to minimize cost. And when considering the benefits of faster, consistent, reliable platemaking, high-quality print, reduced costs, and better eco-efficiency, it may finally be time for flexography to "go thin."

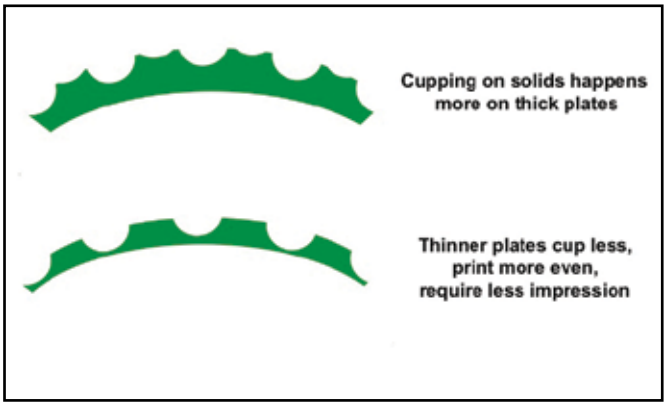
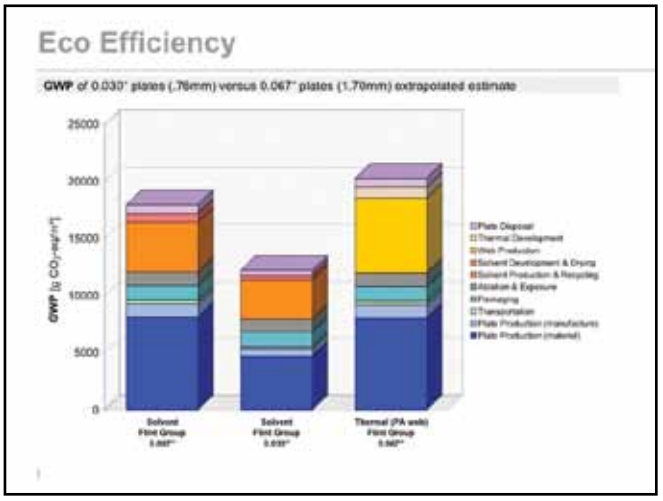


FIGURE 5. Thinner plates result in less distortion and cupping.



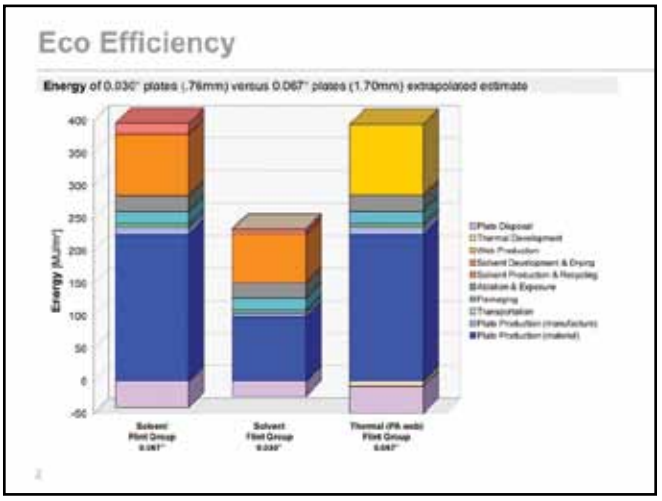


FIGURE 6. Energy and carbon footprint charts based on an Eco-Efficiency Analysis.

ABOUT THE AUTHOR:
Joining the flexographic industry 21 years ago, Dan Rosen has worked as a supplier in the field of photopolymer plate technology and is now with Flint Group Flexographic Products. With experience in manufacturing, technical service, sales and marketing, he has participated in the development and implementation of new technologies for flexo printing, including next generation photopolymers, processing systems, and computer-to-plate technology. His current position, based out of Northern Illinois, is plates sales director for North America at Flint Group.

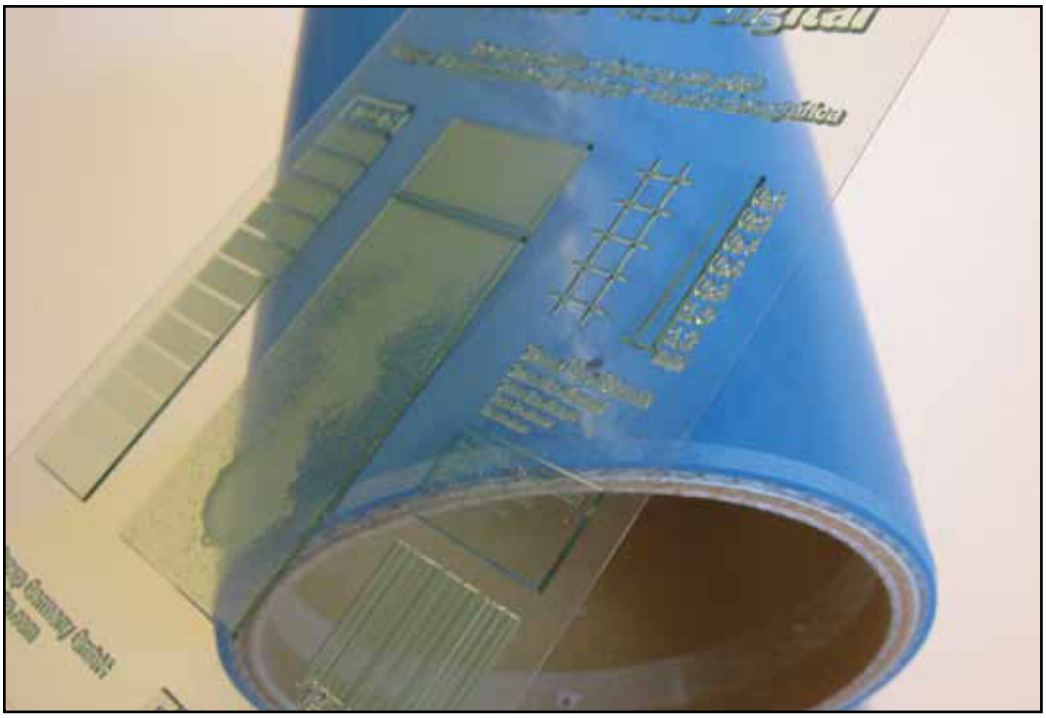


FIGURE 7. A thin plate conversion by change in sleeve OD.