Color proofing-

The next step in the production cycle, after scanning is proofing. There are a variety of reasons for a proof, copy editors need it for type corrections and legal restrictions. Page layout people need it for color breaks and formatting, positioning issues. Scanner operators need it for color evaluation and color correction.

I will divide proofing into these 3 categories 1-soft proofing 2-copier/laser 3-contract. Soft proofing, until most recently, was only considered as 'representative' of the final product. The copier/laser proof is hard copy but limited in color accuracy. The contract proof is designed to be as close to the final product as possible. However, things are changing! At the 2003 GATF Tech Alert Conference Feb.2-4 in Pittsburgh, two 'Contract Soft Proofing' units were demonstrated, according to surveyed viewers of these devices, nearly 1/2 said they were an acceptable match to the printed samples!

A soft, (non-contract) proof, can be made by viewing a PDF file on a color monitor. The intent is to satisfy content, positioning, layout, etc. If we need a proof to mark-up or share without contract quality then a copier/laser proof will work. Since this study contract proofing has grown by leaps and bounds. In many workflows this soft proof is considered a 'contract proof'.

The contract proof is the ultimate example of what the printed piece should look like. In the past, we used the same Y-M-C-K colors as the printing press. In the very early years we use a system of dry toners applied by hand called Cromalin. This Dupont product, could match nearly any press ink color by mixing different values of these toners. The next generation of proofing was the 3M color key material, again these pre-coated colorants attempted to match the printing ink colors. These Y-M-C-K colored materials were mounted on a paper stock by taping the material near the top of each sheet, leaving each one loose to lift up for single color viewing. The next generation of proofing allowed these colorants to be mounted on a plastic base or actual stock, Matchprint and Waterproof are examples of this technology.

For discussion, we'll limit the examples to 3M's Matchprint system. We realize that the film output imagesetters are linear in nature (i.e. a 50% file size = 50% on film). Although some shops modified these numbers for particular print conditions, the normal set up is linear. These color sheets are laminated to a base material and exposed with an ultraviolet exposure unit and developed, the unexposed material washes away. The exposed area hardens and remains on the carrier. This process is repeated for all colors. With the use of a GATF Proof Comparator, we can measure the exposure and values of the proof, including SID (solid ink density), dot gain (tone value increase), print contrast, gray balance etc. With the invention of CTP, film is no longer in the workflow. The new proofing systems are digital by design.

We need to understand how proofs work. Let's go back to scanning for a moment, we scanned for a TVI of around 20% in the midtone. This means we removed 'weight' in the image equal to 20% in the midtones, a correctly made proof will represent this 20% increase visually. Now here's the interesting part, we know that the film has a 50% screen value., The proof viewed with a magnification loupe it looks like 50%, however, if we measure it with a densitometer it will measure 70% (total dot area or a gain of 20%)! When we measure color proofs it's the TOTAL gain we're interested in, the combination of optical and mechanical gain. Color proofs are designed to have a lot of optical gain because the colorants never absorb into the paper like a press sheet's ink will. On the

printing press there's little optical gain but more physical gain, it's the TOTAL gain we are interested in for measurement.

Many people don't understand the 'optical' component to this dot gain measurement. These color proofs are designed so that the some of the light is diffused, and not reflected back to the viewer, therefore we perceive it to be 'darker'. This amount of reflection is measured by the densitometer and recognized as 'dot area' or 'dot gain'. At press there is also some optical gain, but more mechanical gain from the ink absorbing into the paper. It's the total gain we are interested in and measure on the proofing, or color bars.

This is why it's so important to place a measurement patch on the proof to determine the characteristics of the proof. If the proof measures only 15% gain and the scan represented (-20%) the proof will appear 'light', otherwise a proof with 35% gain and a scan with (-20%) will appear 'darker. These are just contrast differences. What about color differences? If the gain isn't the same for Y-M-C, then the color will be out of gray balance! Even differences as small as 2% will show a measurable difference. This is why color proofing is so critical, all the decisions about color are based on this product, scanning corrections, customer corrections and presswork.

The colorants, densities, and dot gains must match the print condition, inks and paper. This information is on film based systems, in the new digital world everything has changed,. digital color proofing systems with color management capabilities can be made to match any print condition. These digital machines must be able to use ICC profiles to make these conversion from one device to another, not all color devices have this ability. The use of ICC profiles with digital proofers, with as many as 6 colors, and a wider color gamut than the press, can be adjusted to match the press.

The viewing conditions of these off press proofs is very critical, we should view then under controlled lighting at 5,000 Kelvin. We should have designated areas for viewing color in pre-press and at press. GATF makes a neat little control strip that can be attached to the proof to determine if the color temperature, 5,000K is correct. They are available at <gain.org.> under process controls. Without the correct color viewing condition, images will be too warm (+magenta) or too blue (+cyan), showing, tungsten or fluorescent, respectively.

Monitor, soft proofing, has some limitations, but they are being overcome with auto calibration and tighter specifications. At Tech Alert in Pittsburgh, Feb 2-4, GATF did a study on 'contract soft proofing' the results were very good.

The proof values are very important as we move to platemaking and presswork. Being a negative process, dot gain is a natural phenomenon and it increases at every step.

You can visit www.swop.org for a complete list of proofing systems that are 'SWOP Certified', meaning that the digital and soft proofing systems that applied and were approved to be a visual match to a SWOP printed sheet.

Next month we'll tackle the platemaking area, conventional and digital.