In the realm of flexographic printing, there are numerous variables that contribute to the many headaches of today’s press operator. In a typical day, a press operator may consider various methods to achieve the print quality the customer desires. Ink manipulation, anilox changes, mounting tape or plate type changes are just a few tricks of the trade. Unfortunately, we all know that compromised quality is always the result. In order to make some areas of the print look better, other areas must suffer from the changes made.

Ultimately, an operator should not have needed to do any of the voodoo flexography techniques listed. Why? Because there is a more scientific approach that can be taken to achieve printing success. Despite the difficulties and compromised results of on-press manipulation, these techniques are still favored among operators that ask, “Why should we change what we believe has worked in the past?”

The response to that question is that customer expectations have changed and they no longer tolerate loose interpretations of their print requirements. Lucky for all of us, there is a better way. Standardization is a method to permanently retire the “chemistry set” approach to printing. In the following pages we are going to explore a few steps to help you minimize variables and predict success before ever going to press. These include team creation, goal selection, testing criteria, documentation and preparation protocols which will set you on the path to standardization.

**DEFINE TRIAL OBJECTIVES**

Can you recall ever discussing downtime reduction? Perhaps you’ve thought of getting your suppliers involved. You should, since both are effective parts of your drive to standardization. Remember, representatives from ink, anilox, plate, mounting tape, blade, graphics house or department look forward to participating in any way to help you become a better printer.

I would also suggest putting together a team consisting of production personnel, since employee buy-in is the most difficult to obtain. These are the people working with your components on a daily basis and can offer insightful suggestions and ideas when given the chance. Begin by determining

- Define trial objectives.
- Run banded roll test.
- Document everything!
- Communicate results.
the team’s goals, concerns, and possibly current problem areas. Never assume you don’t currently have problem areas! Combine your team of suppliers and production personnel to hammer out goals and concerns like the following:

- **Possible Goals**:
  - Color consistency
  - Better ink mileage
  - Predictability and repeatability
  - Less plate separations, combo printing, screens and solids on same plate
  - Reduction in set up times; less overall downtime
  - Reduced number of anilox rolls in inventory

- **Possible Concerns**:
  - You may currently have multiple ink systems
  - Possible difficulty running combination solid/screen
    - Screens, vignettes, or fine type printing dirty
    - Over impression of screens to get good solids
    - Not enough stations to separate

**BANDED ROLL TRIAL**

Instead of dealing in generalities that often describe a top-view of standardization, I have chosen to shed light directly on the critical mechanics of the methods your team can use and should document to achieve your goals and address your printing concerns. We will start with the banded anilox. A banded anilox roll is like any other anilox with the exception it has the added test features of varied engravings across the face length. The main purpose of running a banded roll trial is to assist the printer when it comes to selecting the engraving type, cpi (cells per inch), and ink volume requirements for their specific process. How does our team design a banded anilox?

Start by determining the roll layout. Roll layouts may vary due to the differences in ink systems and types as well as the substrates you are running. Examples of common layouts requested for water-based ink systems: 900cpi/3.0bcm, 600cpi/4.5bcm, 700cpi/4.0bcm, 800cpi/3.5bcm, 900cpi/3.0bcm. For solvent based ink systems: 800cpi/3.5bcm, 700cpi/4.0bcm, 600cpi/4.5bcm, 500cpi/5.0bcm, 400cpi/5.5bcm, 800cpi/3.5bcm. See Figure 1 and 2.

Printers sometimes question the need for the outside bands having similar specs. They are referred to as control bands. The control bands are used to confirm that you have even impression across the web.

**ADDITIONAL COMPONENTS**

We certainly cannot stop at the anilox for standardization. What other considerations should we make for testing?

- **Printing Plates**. Plate types may vary in their ability to transfer ink or hold targeted dot gain. You may have reasons to trial multiple line screens. For example, you might currently run 133lpi but have a customer requesting 150 to 175lpi. Determine the print targets or test elements. For example: tonal scale, positive and reverse type, fonts, etc.

- **Mounting tapes**. Different durometer tapes can affect both dot gain as well as solid ink density.

- **Ink supplier/system**. Know if there are options to increase strength if needed. Remember: more pigment means fewer characteristics (rub, scuff, water resistance). Ink suppliers who designed a system, have an idea of volume requirements and starting point.

- **Ink choice**. Color, pigment, strength, chromo shift with strength (over tone/under tone), overprints/ability to trap. The ink’s ability to trap may affect print order.

- **Running base colors**. I am personally a big fan of this. Reflex and green are typically the hardest colors to hit. If you are able to achieve desired color strength with base colors, your formulas can be adjusted accordingly. Formulation adjustments can be time consuming, but can add up to huge savings when done prior to the inks being sent out to press.

- **Substrates**. Start by testing the substrates that make up the majority of your product mix. Are you mostly using

**FIGURE 3.** A test sheet.

**FIGURE 4.** Good dot structure (left) versus poor dot structure.
coated or uncoated, paper or film? You shouldn’t have to test every substrate. You may run a variety of substrates that have similar color, absorption, etc.

**TRIAL AND RESULTS**

Now that our components are selected, you need to conduct the following during the run trial:

- Visually check color and dot structure.
- Measure solid ink density and color along with dot area side to side (control bands) to verify even impression.
- Collect samples and document, document, document.

Once trial is completed, have a group review data and make recommendations. If you were targeting one specific cpi/bcm combination, this would be set by your weakest link. For example, if all colors except reflex hit the desired strength at 3.5bcm, but reflex needed 4.5bcm you have a couple of options.

- Option 1: Go with 4.5 bcm as your workhorse for spot / combo.
- Option 2: See what can be done from an ink standpoint to increase strength of reflex.
- Option 3: When formulating or running colors containing reflex use 4.5bcm and run 3.5bcm for everything else.

Even when ink systems are not calibrated for a single volume, you can benefit from the exercise of testing your base inks to understand their required volumes and make for much shorter matching times. In most cases getting a calibrated set of base inks is not difficult and allows your inventory to be as standardized as possible.

**COMMUNICATION AND DOCUMENTATION**

Documentation is key throughout the entire trial process. Be sure to document not only the components used, but also the measurable aspects of each as well. This will ensure they have met the recommended or predetermined targets. This includes plate relief (possibly screen value of running targets), ink viscosity, pH of water-based inks, etc.

If results show that, with the cpi/bcm combo chosen, the min dot achievable is 4 percent at 150lpi, then graphics should not come to press set up to run a vignette from 100 percent to a min of 1 percent. Simple, right? If you measure and document it, then you can repeat it. So, develop an SOP (standard operating procedure) for plate generation, ink preparation and anilox selection.

**CORRELATION INK ROOM TO PRESS**

Unlike plate generation and anilox selection, which should be truly defined by this point in the process, ink preparation still allows for variability if left unchecked/unmeasured. These following suggestions deal with this particular issue.

For starters, now that you have determined the specs for your workhorse anilox roll, it’s time to choose a method of proofing inks prior to them going to press. Multiple methods are available. The two methods I am a big fan of are hand provers and table provers, as long as the units use a ceramic anilox, doctor blade and rubber metering roll. The main advantage of these proofing devices is they eliminate pressure as a variable. By doing so, it makes it easier to repeat color matching shift to shift/operator to operator.
Take the samples collected during verification run to match. Use the same job-specific substrate, removing a variable. Why would you match color on a coated substrate if a job was to run on uncoated? Different substrates may have different absorption, gloss, etc. that can affect the appearance of color.

Perform drawdowns using a variety of proofer rolls until you find a volume that delivers desired color strength. Document steps taken to achieve set goals and create an SOP. Communicate the process, results, and documented SOP with parties affected to ensure everyone has a clear understanding of what is expected.

We know that, traditionally, a press operator was heavily relied upon to not only do basic functions like installing tooling or maintaining and running the press, but also to become the de-facto magician for ink, plate and print woes. Giving operators a hodge-podge approach to job construction dictates the need for creative compromises. These compromises make it difficult to achieve repeatable success with so many variables.

Your customer’s expectations have elevated, so your methods must be modified to meet the challenge. Remove those troublesome, nagging variables by following the team concept, testing and procedure development to help replace the guess work of old methods. The ultimate goal is to predict results so we can meet customer expectations and repeat them with optimized effort in the future.

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