Taking Tinkering to Task!

FIRST: Printing’s Five S’s—Sort, Set in Order, Shine, Standardize & Sustain

By Sean Teufler and Johnny Dye

One of the most pressing problems that hinders the flexographic process is tinkering—a blend of undefined print processes and uncontrolled press inputs, held together by a print culture that sustains it. Issues that develop from this concoction often force a press operator to compensate for shortcomings in hopes of achieving an acceptable quality outcome; but alas, the fruits of this labor can be rejected product, unsatisfied customers and lost opportunities.

If tinkering is so obvious, then why does it happen? Two reasons:

1. Necessity, because the operator doesn’t have a choice but to try to make it right
2. Print culture, which develops over time

So, what can be done? First, we must get the print process under control. We must define the press inputs and decide on simple checks and balances, while understanding the limitations of the operator with each input. Lastly, we must address how to change the print culture.

In order to have a good grasp on consistency, a process must be defined and standards must be upheld. While there

FORM & FUNCTION

- Optimization, Fingerprinting and Characterization improve communication among all parties and build a foundation of understanding for further process improvement
- Get the print process under control
- Define press inputs and decide on checks and balances
- Understand limitations of the operator
- Change the print culture.

Utilize tools like pads, brushes and sponges for plate cleaning, both for the image surface to avoid print defects and the back of the plate to remove residue interfering with adhesion to the mounting tape.
are various opinions in the industry on how to achieve desired outcome, all can agree that *Flexographic Image Reproduction Specifications and Tolerances (FIRST)* guidelines provide the basic understanding for control and repeatability in the flexographic process.

Think of FIRST as the “Five S’s of Printing.” You sort, set in order, shine, standardize and sustain. This journey begins at press by doing an optimization of your press operation, thereby assuring yourself there are no mechanical issues that will hinder the print process. Gears, bearings, frame walls and drying function are some of the many sources of mechanical problems. Press cleanliness is also very important to maintain. We often find tinkering related to fatigued equipment. Equipment must work as designed, or it will cause problems for you when it counts. Smart tool selection is part of it. When we talk about the right tools, we often think of the basics. Also, consider tools for the operator that help maintain the process, like tools for measurement and inspection. Once a press can hold proper register, avoid adding to physical print changes, like bounce or chatter, and adequately dry the ink, you are well on your way to having an optimized print process.

We often find optimization steps skipped, only to rear up during the print process. Once an optimization has been completed, you define the print process and capabilities by doing a fingerprint. Fingerprinting is the step where numerical values are defined and which will allow for measurements and repeatability. All conditions need to be documented, like tension, tools used—tape, plate, ink type, anilox, etc. Many of the inputs we will discuss later on.

Once the press capability is harnessed, a characterization run will allow the prepress team and customer to realize the full potential and limitations of a particular press and the combination of variables, based off of repeatability. Lastly, and most importantly, these three steps of Optimization, Fingerprint and Characterization, will undoubtedly improve communication among all parties and build a foundation of understanding for further process improvement. Please remember, maintain the press if you expect to sustain repeatability.

Press inputs are defined as the parts that come to the press, so a print job can be assembled and printed. Again, the five inputs are prepress, ink, anilox, plate/mount and print samples. Furthering the investigation of these sources, two classifications were developed:

1. Internal—what the operator can do at press
2. External—what must be done before going press

**PREPRESS FUNCTIONS**

Let’s look at prepress from the viewpoint of the operator. What are the realities? Internally, the operator can only maintain proper press conditions. Thinking about it, any changes in printing process to satisfy one area would yield undesired consequences to other areas. A normal, repeatable setup, which the operator can supply will serve to isolate a prepress issue, but not address it. In these cases, the problem must always go back upstream.

Externally, there are a few common sources you will want to examine to see if they are addressed in the operation. Certainly, an operation would want to be based on a fingerprint/characterization where standards have been established for both press and prepress. Print efforts that avoid this basic tenet of process control and capability will be fraught with problems. To achieve consistency and avoid guesswork for the operator, targets must be in the artwork, or the operator will not be able to control the process. If an operator is asked to qualify and run a job without control targets to help them measure, then you can guarantee different results from what is desired and no consistency from run-to-run.

Control must be accounted for, or expectations will be dramatically lowered. Artwork that is inherited from the customer and processed without re-separation to your press parameters will create unpredictable outcomes, so ask your customer about doing a reseparation and including pertinent targets.
INK FUNCTIONS

Ink serves to provide three things: color, printability and adhesion to substrate. What are the expectations for an operator when it comes to ink? Internally, operators have one objective; maintain condition. When it comes to ink condition, there are four that must be met at press:

- If running water base, think of maintaining pH and viscosity
- For solvents, maintain viscosity with the proper blend
- For UV, avoid any light sources

All inks can be compromised due to temperature extremes or contamination. The external ink process must deal with three main issues; ink selection, color match and then storage.

- Ink selection should always focus on formulation, chemistry and adhesion to substrate. Specific selections should be determined in a lab through testing and should stay within the realm of ink suppliers and support staff.
- When it comes to color matching, uncontrolled batches are probably the single greatest generator of waste in time and material at press. Much can be done beforehand to prevent all the waste. Have a vetted, stable proofing method, so the results are repeatable. If you cannot proof directly before going to press with an ink, retain wet samples of the matched ink made in press for later use in proofing new batches. Document batch formulas and any adjustments and recalculate for future use. Make sure you have a way to capture data by using spectrophotometers, viscosity checks, etc.
- Ink storage may seem like a mundane exercise, but inks saved for another run play a critical role in tinkering. Inks are challenged by their environments. Controlling the elements of aging, exposure to air, light and temperature extremes are as vital to storage as they are in press.

ANILOX FUNCTIONS

Aniloxs, hand-in-hand with doctor blades, supply a measured amount of ink and support the graphic image. Aniloxs are no exception as a source of tinkering. What would be our expectations of the operator? Internally, an operator would be expected to handle the primary cleaning process, maintain the physical condition, have aniloxs that are stored at press ready to go and be expected to use a simple scope to verify that cleaning methods are effective.

The key to anilox cleaning is to maintain wet ink on the anilox. Have the operators document the ink station shutdown procedure, keep it in mind and focus first on getting the anilox clean. Aside from the documentation, make sure you use a cleaner that actually works on the ink system you are cleaning up. Make sure the cleaners are anilox safe and those using them have the proper personal protection. If you decide to change cleaners, you may need to rework the cleaning documentation to reflect the new method.

Certify the rolls and chambered doctor blades through a tagging system that makes identification simple. Also, flag potential issues associated with using an anilox with a minor flaw.
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External to the press, you would consider a secondary cleaning system like, media or soda blast, ultrasonic, soak tank, dishwasher type or laser. While there are a variety of systems to choose from, the most important point about any of them is keeping them maintained to the OEM specifications.

Equipment works best when operated under proper conditions of air pressure, exposure time, temperature, rotation and media type/specification. When the systems are not maintained, the cells won’t get cleaned and under extreme settings/conditions they can also become damaged.

Anilox maintenance has both internal and external functions. Internally, an operator would be expected to be responsible for the physical location of the anilox, including roll protection. Bearings and gears need to be maintained and checked for any signs of failure; before aniloxs suffer as a result. Externally, there are many pitfalls that must be avoided and can be addressed with a thorough inspection process. It begins by having the entire plate inspected for cracks, wrinkles, lost images or underdeveloped images. Lost images would include targets that have been removed for whatever reason. Remember that without measurable targets, the operator cannot measure and control and will be forced to make blind adjustments and tinker.

Utilize tools like pads, brushes and sponges for plate cleaning, both for the image surface to avoid print defects and the back of the plate to remove residue interfering with adhesion to the mounting tape. Tape selection should already be defined by the fingerprint. Mounting hardware should have an undamaged surface as those defects will otherwise translate to the print. Cylinder and mandrel accuracy must also be checked. Follow OEM protocols when designing best practices for these components.

Any platemounting equipment must be up to par. Components like bearings, locking head position, camera position and media type/specification must be evaluated and mechanical play must be eliminated.

PRINT SAMPLES

When an operator is provided a printed sample to match, he/she is faced with a very difficult situation. Operators can only match within the realm of specification determined by process and press capability and print samples may fall well outside those parameters.

Internally, all one can ask an operator to do is maintain the sample, look at it under the appropriate light source and measure when possible to verify a match. Often, the samples will run afoul of press capability because the sample was not originally run to some standardized format.

Externally, determining the true specification and communicating amongst all parties is essential to provide an operator with the needed target. Age of the sample and substrate condition affect the color perception and must be taken into account. Illumination is a standard that must be established between customer and printer. Illumination often reveals at press, perform a quick examination for damage and cell cleanliness. This simple step avoids lengthy delays in press. Externally, once a roll has made it out of a secondary cleaning system, more sophisticated inspection systems can be used to recertify rolls. These systems need to be calibrated to be an effective measurement of anilox condition. Alternatively, aniloxs can be audited periodically by the anilox supplier.

The benefits of an audit include a fresh set of eyes to detect problems early, which often saves the bulk of the inventory from damage by raising awareness. After the cleaning and verification, certify the rolls through a tagging system that makes identification simple. Also, flag potential issues associated with using an anilox with a minor flaw.

PLATE MOUNTING FUNCTIONS

As plates and mounting relate to the operator, there are three items he or she can attend to. He/she must be able to clean the plate properly without causing plate lift, install without damaging and maintain the physical condition.

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monitor his or her area of expertise. Create a cultural change that discourages tinkering instead of enabling.

Operators of presses must understand the limitations they face, how to recognize them and what their true roles are at press. These roles are limited to repeatable setups, following the recipe and sustaining the print capability. Anything else falls under the category of tinkering. Remove the obstacles to your printing process by getting rid of wasteful practices and become more competitive today! ■

About the Authors: Sean Teufler, technical graphics advisor, Harper GraphicSolutions, has been a part of Harper Corporation of America for more than nine years. In that time he has been “Tech of the Year” for Harper seven years in a row. Sean stays active in the industry committees, among them Flexographic Technical Association’s Supplier Leadership Council and Flexo Quality Consortium (FQC). Teufler, a familiar speaker at many FTA and other industry events, was recognized earlier this year with the 2012 FTA President’s Award for Leadership Excellence. He is a Level 3 FFTA/TEST Certified Implementation Specialist.

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He started his journey in the flexographic industry in 1991. During his 21-year career, Dye has worked for two of the largest and most respected converters in North America; serving multiple locations all over the country in the fields of press and prepress management. Johnny has been working for Accredo Packaging, Inc. for the last four years. He stays very active in the FTA, and served as a speaker at the 2012 Forum.