INLINE COLOUR MEASUREMENT

With many flexographic converters continuing to rely on the visual judgement of operators to manage colour, inline colour measurement offers an effective and efficient means of monitoring and maintaining consistent print quality, writes Brian Gamm

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Esko AVT SpectraLab in action

Across the flexographic printing industry, demand for colour measurement, and the improved information about colour quality such measurement provides, is growing rapidly. Consumer product companies (CPCs) in particular want ever more detailed reporting about quality, while printers want better process control. Yet, many flexographic converters continue to rely on the visual judgement of operators to manage colour.

While there is no denying that visual judgement is vital to assessing print quality, there can be major differences in the conclusions due to variations in viewing environments and differences in colour vision amongst operators. As a result, visual judgement alone cannot provide the measurable precision needed for process monitoring. That is why converters typically take a hybrid approach, using spectrophotometers to measure target colours reliably and repeatedly, in combination with visual judgement by operators to evaluate general image quality.

Who's being empowered to make the judgement call is also important. While operators are responsible for the actual printing, the management of colour is often delegated to in-plant ink vendors or quality control staff. Essentially these 'colour specialists' are trained in the use of both spectrophotometers and colour management applications, much like the operators themselves.

However, while operators and colour specialists may handle the same colour measurement equipment and work with the same colour quality applications, the specific corrective action taken by operators and colour specialists may differ. A better colour measurement process can help operators quickly identify when problems occur and then help them co-ordinate the appropriate actions, such as checking ink viscosity, or asking the colour specialist to help correct an ink formulation.

INLINE VS. OFFLINE COLOUR MEASUREMENT

Spectrophotometers can be part of both offline and inline colour measurement systems. But how they work differs quite dramatically. With an offline colour measurement system, you need to remove the samples when the press is stopped, and then measure them using a handheld spectrophotometer, such as the X-Rite eXact. Inline colour measurement systems, such as the AVT SpectraLab inline colour measurement system from Esko, use a spectrophotometer installed on the printing press to measure colour on the moving web.

The key problem with measuring offline is that it significantly restricts the colour information that is provided. With thousands of metres of material moving between each recorded offline colour measurement, a lot of production material is missed. Although more samples may be pulled and measured during the make ready process – whether it's from short rolls or cut direct from the web itself – the pulling of multiple mid-roll samples is impractical once production begins, and thus is almost never done.

As a result, the few measurements collected during production are predominantly from the end of each roll, and the reality is that in this situation, printers cannot adequately standardise their processes or make accurate colour adjustments.

Only inline colour measurement systems can easily and consistently provide measurements mid-roll, allowing the operator or colour specialist to respond to changes in colour quickly and gain a more detailed picture of colour behaviour. This has tremendous benefits, particularly in time and cost savings.

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TAKE ACTION EARLY

Inline colour measurement with AVT SpectraLab significantly increases colour measurement efficiency and reduces waste as it enables early detection of colour drift and reduces customer rejections due to colour quality issues. Indeed, many professionals consider the ability it gives a converter to detect and correct colour changes before the end of a roll to be the most direct benefit of inline colour measurement.

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As an example, using SpectraLab, operators and colour specialists can automatically monitor colour consistency within a roll and view colour measurement data press-side. If printed colour drifts beyond an acceptable tolerance, SpectraLab sounds an alert, notifying the operator of the need to take corrective action.

Furthermore, SpectraLab BestMatch suggests how the operator can correct colour. Using inline colour measurement during makeready can also help operators reduce the number of pulls by identifying how to correct ink colour without reformulation. Then, during the first production roll, the operator can monitor and correct for the colour changes that commonly occur as ink rheology stabilises and plates potentially swell.

Images showing inline colour measurement data

The SpectraLab inspection user interface helps operators diagnose the nature of a problem mid-roll and, along with SpectraLab BestMatch, helps operators quickly choose the right corrective action, further reducing waste and the possibility of a rejected roll.

By positioning a measurement point within the designated space, it becomes clear whether the issue is with the ink's viscosity or with the ink itself (such as a blue that's too red). Understanding the source of the problem, of course, is crucial to optimising efficiency and ultimately, fixing the problem. For example, if it's a matter of ink viscosity, adjusting pressure or switching to a different anilox is unlikely to improve the situation. Instead, examining the ink's formulation would be the right first step.

ADDITIONAL ADVANTAGES

The main benefit of an inline colour measurement system is undoubtedly its ability to capture far more measurements. And that's mostly about logistics. As mentioned above, with an offline colour measurement system, you would need to stop the press in order to manually measure printed samples. But, with an inline measurement system, it's done automatically, at any point in the printing process, without the need to stop.

With that, there are several other advantages of inline colour measurement that are also worth considering.

For example, one converter we work with reported that prior to inline colour measurement, three employees worked full time collecting colour measurements, a highly laborious process. They collected samples from each and every roll of every single job, then used an offline spectrophotometer to measure the colour bars, manually entered all of the data into a colour management application, and finally generated reports summarising their findings for both internal quality control and customers. With inline colour measurement, labour demands were drastically decreased. Only one employee is now needed for colour assessment. Moreover, the system now automatically collects all of the colour measurements inline and exports them to a central location. There, a single specialist can load the measurements into the colour management application and create the reports, further saving on labour.

Another impressive gain has been in dispute resolution. Several converters have reported that by collecting colour measurements throughout each printed roll, they have found it easier to resolve colour-related disputes with customers. With an inline system and the colour logs it generates, they are now able to more effectively investigate customer complaints of inaccurate colour. Backed by these logs, they can clearly demonstrate, with tangible proof, that the printed colour in question was within the specified tolerance throughout most (if not all) of the supplied rolls – something they had not been able to do in the past with an offline system. These tell us that this is a very strong advantage.

Finally, while an inline colour measurement system has incredible advantages on its own, it is even more powerful when coupled with an inline defect inspection system, such as the AVT Argus or Helios system. Combining these systems enables you to automate the collection of colour measurement data, and simultaneously export various types of data related to print quality within the same data stream. This holistic process minimises handling of printed samples, reduces operator error around colour measurement, ensures data integrity, and enables accurate and insightful analysis across the print process.

BETTER DATA; MORE EFFICIENT

There is no denying that colour measurement in flexographic print production is essential for monitoring and maintaining consistent colour. Although it can be done offline, inline colour measurement is superior in many ways. Not only can converters collect far better colour data with an inline system, but they can also do so more quickly and efficiently. With no need to stop the press to pull samples, the press can continue running throughout production, which again results in significant time and cost savings. Additionally, converters can make better use of employees' time and skills by minimising the number of people required for data collection tasks.

"Using SpectraLab, operators and colour specialists can automatically monitor colour consistency within a roll"

Another benefit is that both the converter and end-customers alike can automatically receive data that accurately reflects the exact colour of a job throughout each roll. This has proved essential in enhancing conflict resolution and improving customer satisfaction.

Overall, inline colour measurement systems are a valuable innovation, one that helps streamline the colour measurement process and vastly improve print quality monitoring – driving optimal efficiency and results. ■

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