

# CMS – from press run analysis to a color-managed workflow

By Robert Chung

## Introduction

A single press run is required to produce a publication. But knowledge about the press is necessary to produce a color-managed publication. This article explains the approaches we took to produce *Test Targets 3.0*.

## Calibrating the web offset press

A color-managed print production works if the press condition is repeatable. We identified the prepress, ink, paper, and press conditions and chose SWOP as the printing specification (Table 1).

PREPRESS	Digital test forms: 1-12
Signature contents:	See the attached layout
PROOF	Digital
Manufacturer:	Agfa Sherpa
PLATE	Creo CTP 2400 spi
Manufacturer:	KPG (12mil): thermal
PRESS	Heidelberg M-1000B
Manufacturer:	38" web offset press
FOUNTAIN SOL'N	Anchor
Manufacturer:	MXEH IIS Emerald Premium
BLANKET	Day International 9500
Manufacturer:	Compressible
INK	Process
Manufacturer:	SUN CHEMICAL
PAPER	IP Velocity #3 coated
Brand:	80 lb. Text, 35" wide
PRINTING	Reference: <b>SWOP</b>
Ink-down sequence:	KCMY
Solid ink density:	K: 1.60 M: 1.40
(±0.10)	C: 1.30 Y: 1.00
Dot gain:	K: 22% M: 20%
(±3%)	C: 20% Y: 18%
Color control bar:	RIT Color Control Bar

Table 1. Press run organizer

The first press run took place on Oct. 14, 2002. We asked the press crew to print solid ink patches to SWOP densities. We then measured the dot gain of 50% tint patches and adjusted the dot gain to SWOP aim points with the use of transfer curves in the CTP operation. Here, we added 1% dot gain to the cyan printer, 3% dot gain to the yellow printer, and 4% dot gain to the black printer while the magenta printer needed no adjustment.

With the help of dot gain adjustments in the CTP operation, the second (Oct. 18, 2002) press run conformed to SWOP density and dot gain specifications. The second press run lasted about 25 minutes. Press sheets samples were collected at 30 seconds interval.

## Process variation and deviation

Process variation refers to how close the measurements compare to one another. Process deviation is a measure of the difference between the average of measurements and the aim or center points. A precise process exhibits small variation. An accurate process exhibits small deviation. While we strive for a precise and accurate process, we don't always achieve it. Upon density measurement and analysis, Figure 1 shows solid ink density (SID) variation and deviation of process inks from their respective aim points over time for the Oct. 18, 2002 press run.

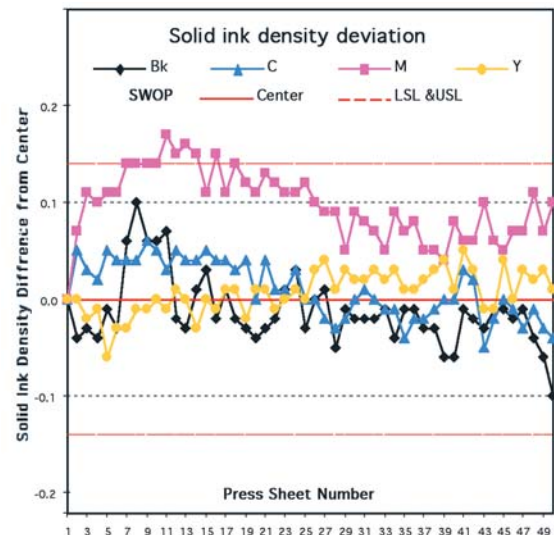


Figure 1. SID variation and deviation

While cyan, yellow and black printers showed solid ink density variations, their averages were close to the center point of SWOP aims. Only the magenta printer exhibits high SID deviation throughout the press run.

Figure 2 shows dot gain variation and deviation of CMYK printing units. We can see that the black printer exhibits a large dot gain deviation by consistently printing too sharp. More dot gain compensation would have been necessary for dot gain conformance of black printer.

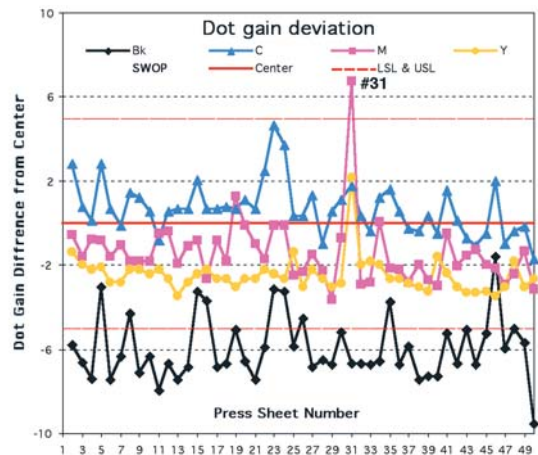


Figure 2. Dot gain variation and deviation

Another interesting observation was the unusual high dot gain of the magenta printer found in press sheet #31. Upon close examination of the press sheet with a magnifier, the cause of the large dot gain was due to dot doubling. The doubling effect was also seen vividly from the concentric circles patch and the RIT doubling grid target.

### Profiling from the best sheet

At 1200 ft/min press speed, a web offset press can print 20,000 impressions from a roll of paper in 30 minutes. But we need only one or no more than three press sheets to build a press profile. Thus, it is important that we pick the press sheet with no visual flaws while conforming to specifications the closest among all measured samples. From the second (Oct. 18, 2002) press run, press sheet #37 was the choice and we called this sample the best sheet. Plate/press curves of the best sheet (Figure 3) were measured from the TF\_01 Device Characterization Target along with an Excel template. Profiling targets, e.g., TF\_05 GretagMacbeth Profiling Target, from the best sheet were then used for press profiling.

### Color-managed workflow

Variability exists everywhere. While no two snow flakes are identical, no two press runs are the same. We've developed a methodology in assessing process capability of a press run (GATF, 2001). Ultimately, it's the temporal consistency within a press run and the run-to-run

consistency that determines the color rendering performance of a color-managed imaging workflow.

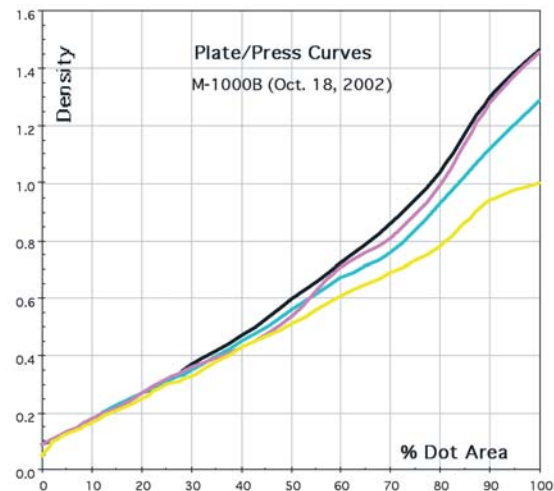


Figure 3. Plate/Press curves of the best sheet

You will see the effect of generic and custom press profiles when converting pictorial color images from source RGB profiles to the press CMYK profile. You will also find color matching comparison between generic and custom press profiles in *Test Targets 3.0*. Whatever the results which might be concluded, a color-managed imaging workflow will only excel in producing and matching color when profiled devices stay calibrated and are consistent.

### Reference

"Conducting a Press Run Analysis," co-authored with Yoshikazu Shimamura, *Proceedings of the 28th IARIGAI Research Conference, Advances in Color Reproduction*, GATF, 2001.

"A color-managed imaging workflow will only excel in producing and matching color when profiled devices stay calibrated and are consistent."