



Figure 1: common line printing problems

WHAT IS INTELLIGENT INTERWEAVING?

Bryan Collings discovers how a wave process can be used to put ink on the substrate

I AM SURE THAT, LIKE ME, YOU HAVE HEARD OF TALK OF IMPROVED DIGITAL PRINTERS THAT USE A WAVE OR WEAVE PROCESS TO PUT THE INK ON THE SUBSTRATE. UPON SEARCHING THE INTERNET I DISCOVERED AN ARTICLE BY THE WELL-RESPECTED INDEPENDENT RESEARCHER, NICHOLAS HELMUTH, AT FLAAR IN THE USA. THE VALUE OF FLAAR BEING AT A UNIVERSITY IS THAT THE STUDENTS AND FACULTY ARE DOING THE REVIEWS, AND EVALUATIONS ARE INDEPENDENT AND NEUTRAL. THEY HAD BEEN RESEARCHING THE WEAVE TECHNOLOGY DEVELOPED BY MUTOH AND WERE IMPRESSED, SO I CONTACTED MUTOH AND ASKED TO LEARN MORE.

I was invited by Nick Decock to visit the company's European manufacturing and marketing centre in Ostend (Belgium) to meet with Stephan Heintjens, the Product Marketing Manager, where I got an insight into the wave process of digital printing and the 'Intelligent Interweave' i² developed by Mutoh.

PROBLEMS OF STRAIGHT LINE PRINTING

Interweave printing, as with most good ideas, was developed to solve specific problems. With straight line printing there are certain common problems:

- Banding which tends to be caused by

inaccurate feed adjust of the substrate, causing either an over or under deposition of ink at the boundary between where each pass of ink is laid down (see figure 1). This is often cured by printers slowing their machines down, which tends to hide the mismatch effect.

- Bleeding: as the dot size increases, with solvent-based inks there tends to be more bleed, which degrades the sharpness of edges where sharp colour changes occur. This is also curable by printers switching to higher quality coated substrates.
- Banding which tends to be caused by error margins that have been multiplied when printing in a mode where the printer is jetting ink while the head carriage is moving from left to right, and vice versa. The ink jetting order, slight misalignment, drying effect etc. then cause connecting bands that reveal a slight colour difference.

The solution to these common problems is available at a cost, so the printer's profit margins are eroded.

THE WAVE PROCESS

The interweave or wave process eliminates a hard edge between each pass of the print head, making the process more tolerant of inaccurate substrate feed i.e. a slight mis-

registration between passes of the print head is compensated for. When it comes to bleed problems, the intelligent interweave firmware feature detects hard boundaries between colour blocks and compensates with a more intelligent dot placement and ink flow to eliminate bleed, even on uncoated substrates. By doing this automatically rather than by operator trial and error, the level of reject prints drops dramatically. The wave pattern can be seen in figure 2.

The weaving also pays off during bi-directional printing as its dot order selection vastly reduces or even eliminates the band to band tone difference.

Almost all current model printers, when set up correctly by a highly skilled operator situated in a controlled environment and fed with good quality substrates and inks, will produce very similar high quality results. However most digital printer operators do not have the top level technical skills of the manufacturers' technicians seen at trade shows. This skill shortfall causes printers to run their machines at less than optimum settings for each job, which in turn lowers efficiency and reduces profit margins.

In many print shops the norm is to have three or possibly four sets of print settings which are used to cover 99% of jobs usually undertaken. For a modern digital printer this is close to criminal negligence. A highly sophisticated piece of equipment is being used in a basic, simple way to the detriment of profits.

A LEVEL OF AUTOMATION

Research undertaken by Mutoh showed that most users of digital printers would be very open to a level of automation to help overcome operator skill shortfalls. As an analogy one can consider modern SLR digital cameras, which are still fully adjustable if the operators have the skill to determine their own settings. However for those less able people, they have a number of pre-set options: portraits, scenic views, night shots, action shots etc.

Based on the research, Mutoh decided to develop a semi-automatic option for the

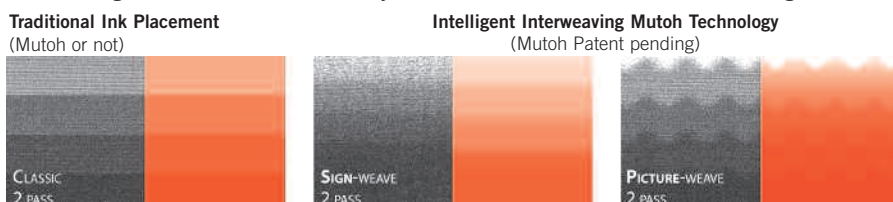


Figure 2: non-wave and wave comparison




The Mutoh headquarters

interweave technology which is called Intelligent Interweave i². To use it effectively, a printer must eliminate as many variables as possible. For example, Mutoh inks must be used, workshop relative humidity must be between 40% and 65%, and the temperature should be between 20° and 30°C. However having eliminated a lot of the variables, it becomes a simple matter of choosing between alternatives:

- What is the viewing distance? <3m, >3m, >5m.
- What is the image type? Sign / quality or picture / speed.
- What is the image content? A lot of small detail or less detail (not relevant for viewing distances greater than 5m)?

Having chosen these variables, the machine firmware then determines the optimum settings and speed to maximise the efficiency of printing, thereby maximising profits for the printer. Of course this does not cover all cases and the manual explains certain alternatives for slow drying media and media which is difficult to print on. In essence the range of alternatives would give a speed range on the new Blizzard, which has been designed around this technology, of between 3.5 m²/h and 36 m²/h.

Intelligent interweave is new technology; however printers are encouraged to review all manufacturers' offerings before making a decision.

Information on FLAAR can be found at www.wide-format-printers.org/BowlingGreenStateUniversityOhio/BGSUdigitalimaging.htm 

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DO YOU HAVE A SOLUTION?

If your company has an innovative solution to a printing problem which you would like us to write about, please contact Bryan Collings: bryancollings@specialistprinting.com