Print Quality Assurance: A Holistic Approach (Part 1)

Quality at the Source

by: Larry Sison

Printing is a complex process that launching quality improvement programs would require a holistic approach to make it work.

Wholesale changes don't necessarily mean that all quality initiatives be deployed at the same time. This is like a fool trying to boil the ocean. Rather, the pilot project should always begin with problem areas that affect the company most.

Only after a successful deployment and implementation of the initial project and positive results have been achieved can the program be extended to the rest of the key functional areas in the printing facility.

This is a three-part series on print quality assurance. The first article focuses on the basic tenets of digital file preparation, PDF conversion and preflight verification in Prepress.

The second part discusses the different process control activities in the plate room to ensure dot integrity on the plates.

Finally, the last part concentrates on the different input parameters that need to be controlled in the press department to ensure product conformance to the established quality standards of ISO 12647.

Quality at the Source

"The organization shall plan and control the design and development of product." (ISO 9001: section 7.3.1)

A printing organization can incur unnecessary costs if defects due to a bad file were left undetected. Rectifying these problems at the end of the value stream can be so costly since it would normally require a rework. Moreover, the size and magnitude of the problem can be greater still once the defective product reaches its intended customer.

A good quality management system should always channel its efforts by starting upstream where the designs are being created.

File Assembly and Preparation

"The organization shall determine requirements specified by the customer" (ISO 9001: section 7.2.1)

Costly errors can be avoided by developing a process control plan that focuses specifically on the critical inputs of the design process. The first improvement project can be started here by making sure all essential parameters of the file assembly and preparation process conform as closely as possible to the requirements of the next customer of the process -- the print provider. Some of the requirements that help control quality are as follows:

- Page dimension
- Page numbering sequence
- Page boxes (Media, Bleed, Trim)
- Image Links
- Image resolution
- Color space of the elements in the job
- Output Intent
- Font information
- Font size
- Hairline thickness
- Spot colors
- Overprinting / Knockout
- Transparencies & Layers

Figure 1: Checking the font condition in InDesign. Some fonts have restrictions.

PDF Conversion

"The organization shall determine and implement effective arrangements for communicating with customers in relation to product information" (ISO 9001: section 7.2.3.a)

Choosing the right PDF Preset for the job can be a real nightmare for the uninitiated. It's always best to ask the print provider the specific PDF Preset they would rather work on. A design unit that embraces this approach will always save itself from major surprises.

Among the plethora of file formats commonly used nowadays are the PDF/X family of standards (ISO 15930). Selecting the right conformance level for the job is crucial since there are several parts of the PDF/X standards to choose from. These variants are:

PDF/X-1a:2001 (ISO 15930-1)

PDF/X-3:2002 (ISO 15930-3)

PDF/X-4:2008 (ISO 15930-7)

Graphic designers may want to choose the PDF/X-1a conformance level when they already know where the job is going to be printed. This is preferred if the digital file does not require further color transformations at the print site since the elements are already separated to a specific device-dependent color space (see Figure 2). It is also ideal to send this specification to print providers who are not capable of handling transparencies due to an old RIP. The PDF/X-1a variant allows CMYK, Spot and Grayscale elements and prohibits the use of RGB, Lab and other device-independent color spaces. A conforming PDF/X-1a file is based on PDF version 1.3 therefore the use of transparencies is not permitted.

PDF/X-3 allows the use of CMYK, RGB, Spot and ICC-based data making it the preferred format for jobs that require further color transformations at the print site. This is ideal for advertising materials that need to be printed on different paper stock (i.e. coated, matt, LWC, newsprint, uncoated, etc.). A conforming PDF/X-3 file is based on PDF version 1.3 therefore the use of transparencies is not permitted.

One of the newest members of the family of standard is PDF/X-4. This is the preferred choice if the printer has a RIP that is based on the Adobe PDF Print Engine architecture. If the designers want to keep the transparencies and layers live until print time, this variant will serve them well. The PDF/X-4 is an enhanced version of the PDF/X-3 except for the live transparencies and layers. This is ideal for publishing and packaging firms with a rather complex design and with a higher degree of quality.

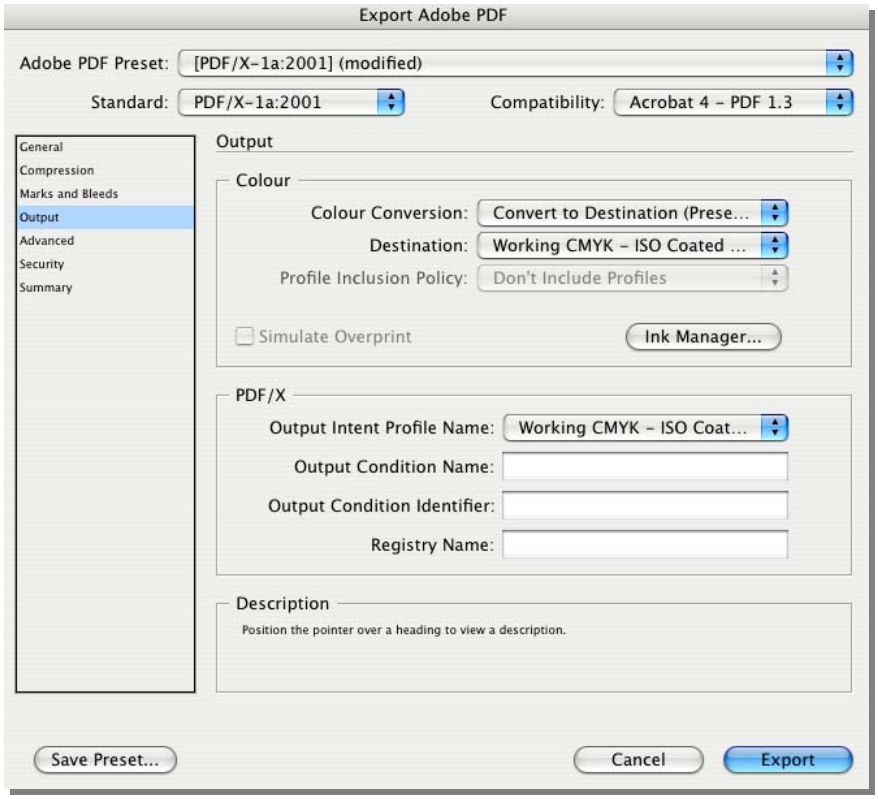

Figure 2: PDF presets can be modified to your preferred target printing condition.

Preflight Verification

"The organization shall ensure that product which does not conform to product requirements is identified and controlled to prevent its unintended use or delivery. When planned results are not achieved, correction and corrective action shall be taken, as appropriate, to ensure conformity of the product" (ISO 9001: section 8.3)

Once PDF files are created by using the suggested PDF/X Preset it is time to move on to the last leg of the process – PDF/X Verification.

The primary intent of this activity is to flag all non-conforming elements within the files to prevent these from being delivered to the customer.

The verification stage would require the PDF files to undergo a preflight checking process wherein the files are cross-checked with the normative requirements of the International Standard.

In most cases this is carried out by Adobe Acrobat Professional's built-in Preflight function. However, there are many third-party solutions available in the market (e.g. Enfocus PitStop Professional, Callas pdfToolbox4, etc.) that can do similar automated inspection with an added benefit of auto-correcting a wide-variety of errors. (see Figure 3)

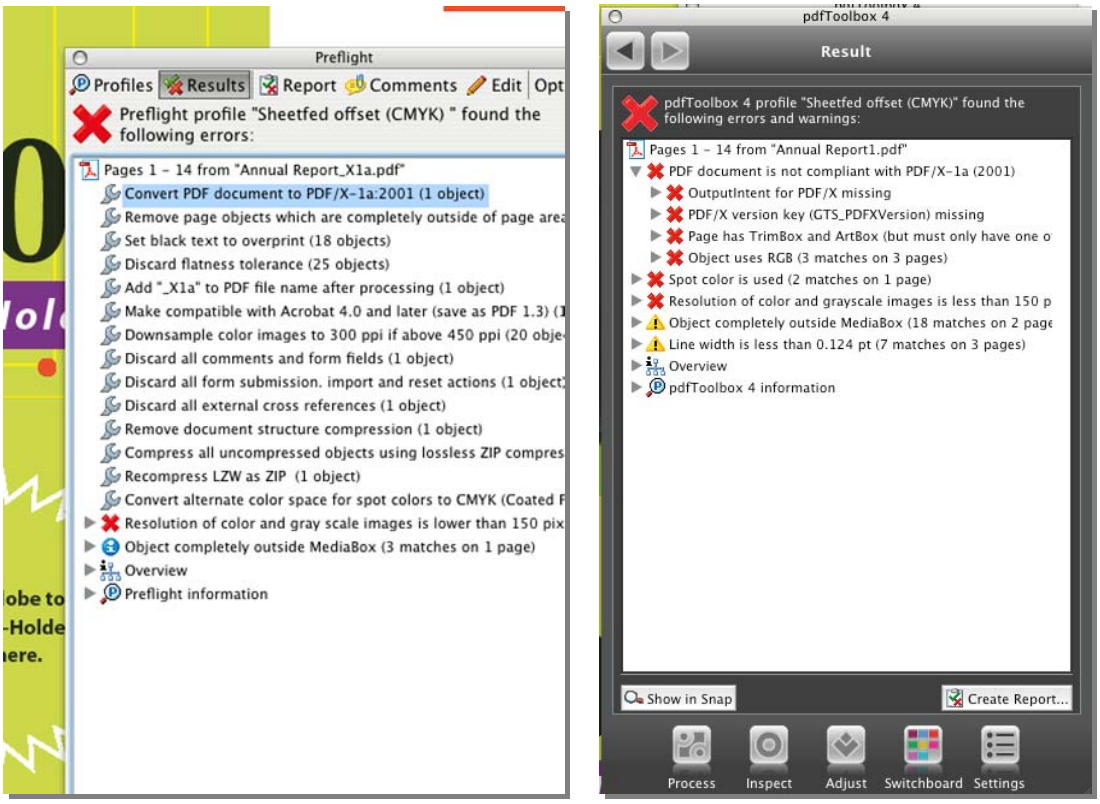

Figure 3: A sample preflight report in Acrobat Professional and pdfToolbox4. Both systems can auto-correct non-conforming items.

There are some errors that the preflight system cannot automatically correct. In such cases the process owner shall carry out corrective measures to make the products conform to the requirements. If no errors are detected the jobs can now be confidently delivered to either the immediate internal or the ultimate external customer since the products are already considered valid PDF/X files.

The author works as a Quality Engineer for Alyaum Printing Complex, a subsidiary of Alyaum Media House: ISO 9001-Certified (2007-), ISO 12647-3 Certified (2006-2007), Asia Media Awards recipient (Best in Print: 2006). For inquiries you can e-mail him at ask4press@gmail.com