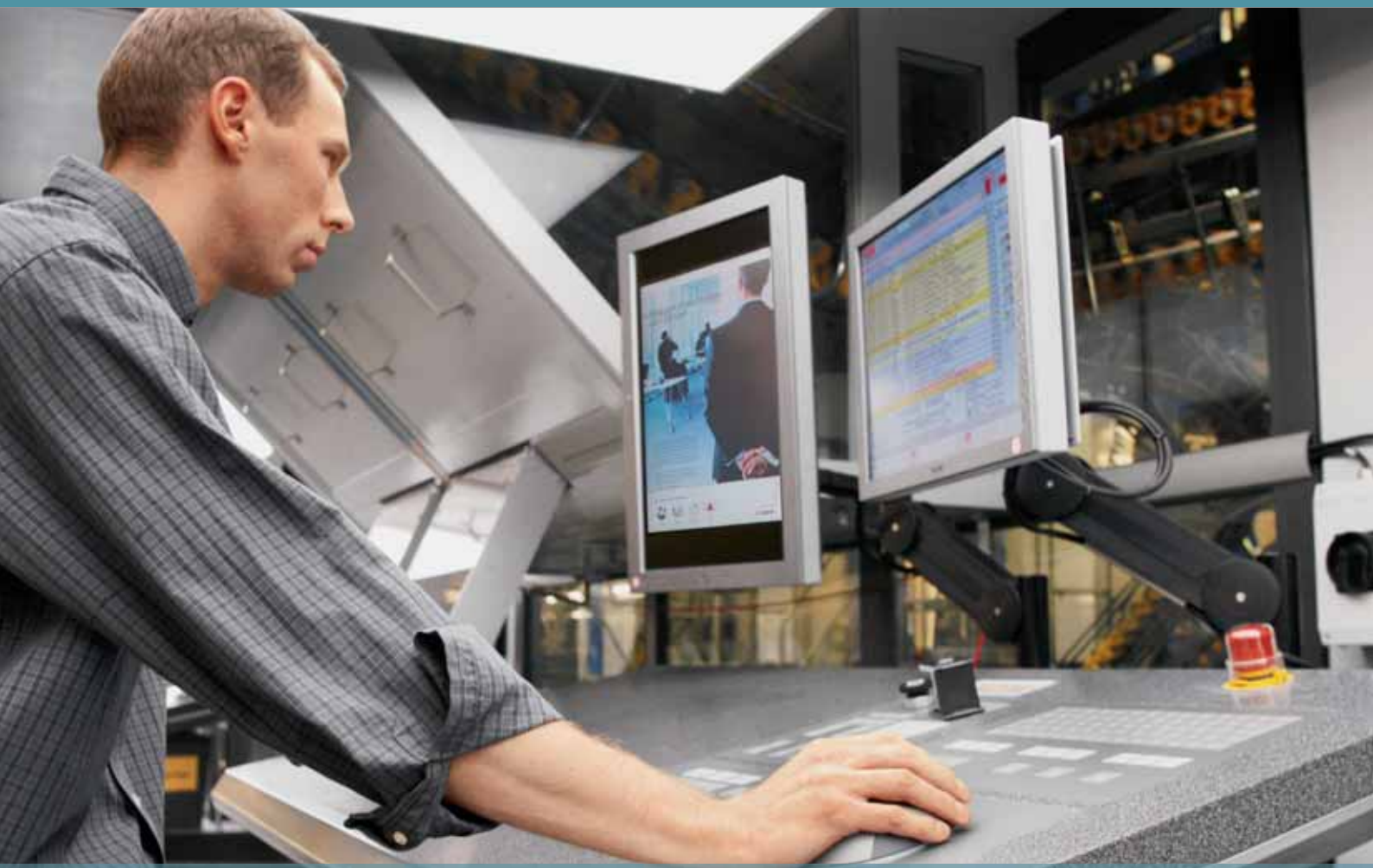
Making news

From automation supplier to system integrator

Steve Kirk

Reading the newspaper at the breakfast table is a long-held tradition, but rumor has it that the printed page is in decline. Happily, that rumor does not stand up to scrutiny. Although growth is indeed stagnant in some markets of the world, in others, it is growing in leaps and bounds. Automation is playing an ever-greater role in the high-tech printing process and ABB is leading the way. Developments in automation and systems integration will ensure the presence of newspapers at the breakfast table for a long time to come.



Commercial newspapers have been around since the early 17th Century, but some now believe that printed news has had its day. Others say that the future of newspapers is assured until we can swat a fly with a PC! However, the fact remains that newspaper publishing is a high-tech industry with an annual turn over of billions of dollars, and while circulations are rather flat in some countries, in others they are booming. Even in countries with stagnating circulations, the trend towards increased color advertising is driving major investment in printing technology. At the forefront of innovation in this technology is ABB's Center of Excellence for Printing, in Baden, Switzerland.

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Newspaper printing process

The process of newspaper production runs under intense time pressure. Production has to start as late as possible (maybe at 11 pm) so that the latest news and sports results can be included. But the newspapers still have to be delivered on time early the next morning. A steel works or a shoe factory can always sell yesterday's production, but yesterday's newspapers are worthless.

1 shows an overview of the newspaper production process. The first step is to define the structure of the newspaper according to the needs of the editorial and advertising departments.

Editorial offices are often located in city centers, while production facilities are generally situated on the outskirts. Despite this separation, the two entities must work together to combine the editorial contributions with advertising material to assemble complete page layouts and, ultimately, the finished newspaper. The page layouts, usually in the form of one PDF file per page, are transmitted to the production facility, where they pass through a RIP (raster image processor) device. This generates TIFF files (ie, bitmaps) for the different color separations. Color printing is normally achieved by combining the four process colors Factbox 1. Because each color is printed separately, four separations are needed, with one printing plate for each color. These plates are produced in a device known as a plate-setter.

Ink supply

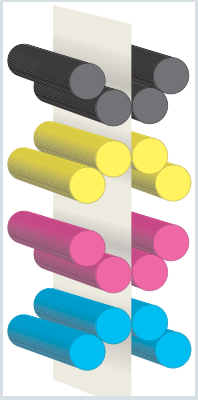
The TIFF data are analyzed to calculate the optimal amount of ink coverage for the various zones across each page. The press management system uses these data to compute the correct ink supply settings on the press. The press management system also knows which impositions[1)] are required. The user selects the preferred variant and the press management system obtains the optimum settings for the adjustable elements on

Newspaper printing press with ABB controls at Singapore Press Holdings

Factbox 1 Offset printing

Almost all newspapers are printed using the offset process. To produce full color images it is necessary to print four different process colors: cyan, magenta, yellow and black. In a typical newspaper press, the web of paper, which can be up to 6 pages wide, passes through four pairs of printing couples, one pair for each process color./box The outermost cylinders in the diagram are the plate cylinders on which the printing plates are mounted. The image to be printed lies on the plate in the form of a water-repellant material. As the plate cylinder rotates, it is first dampened with water, which adheres only to the non-image areas, and then ink is applied. The ink adheres only to the dry areas and therefore corresponds to the image. As the plate cylinder rotates further, the ink is transferred to the blanket cylinder, producing a reversed image. The blanket cylinder then rotates further and transfers the ink to the paper.

To produce a sharp image, the different colors must be aligned very precisely with each other. In the past, this was done using gearwheels and shafts, but almost all modern presses now achieve this by providing each printing couple with its own motor. All of the motors are then synchronized electronically – another technique pioneered by ABB.



the press (eg registers or compensators, web tension control elements) from its database of previously used values. The press management system also stores the curves for adjusting the ink and water supply based on the press speed. As soon as the operator at the press control console is ready to prepare the production, the values are sent to the press controls and set on the press.

ABB Printing diversified and evolved into a true IT supplier, providing software solutions for managing the entire newspaper production process.

Paper feed

The press also needs paper, of course. This is handled in a separate process. The goods-in department registers the reels of paper as they are delivered and transfers them to the main storage area. Reels are then unpacked and prepared for use according to the production plans for the coming 24 hours. They are transferred as required to the reelstands – the part of the press that runs the paper into the printing units and changes reels at full production speed (typically about 12 m/s) by gluing the new web of paper onto the old one and cutting through the remainder of the old web. In larger print works, the movement of paper reels is fully automated using automatic guided vehicles (AGVs).

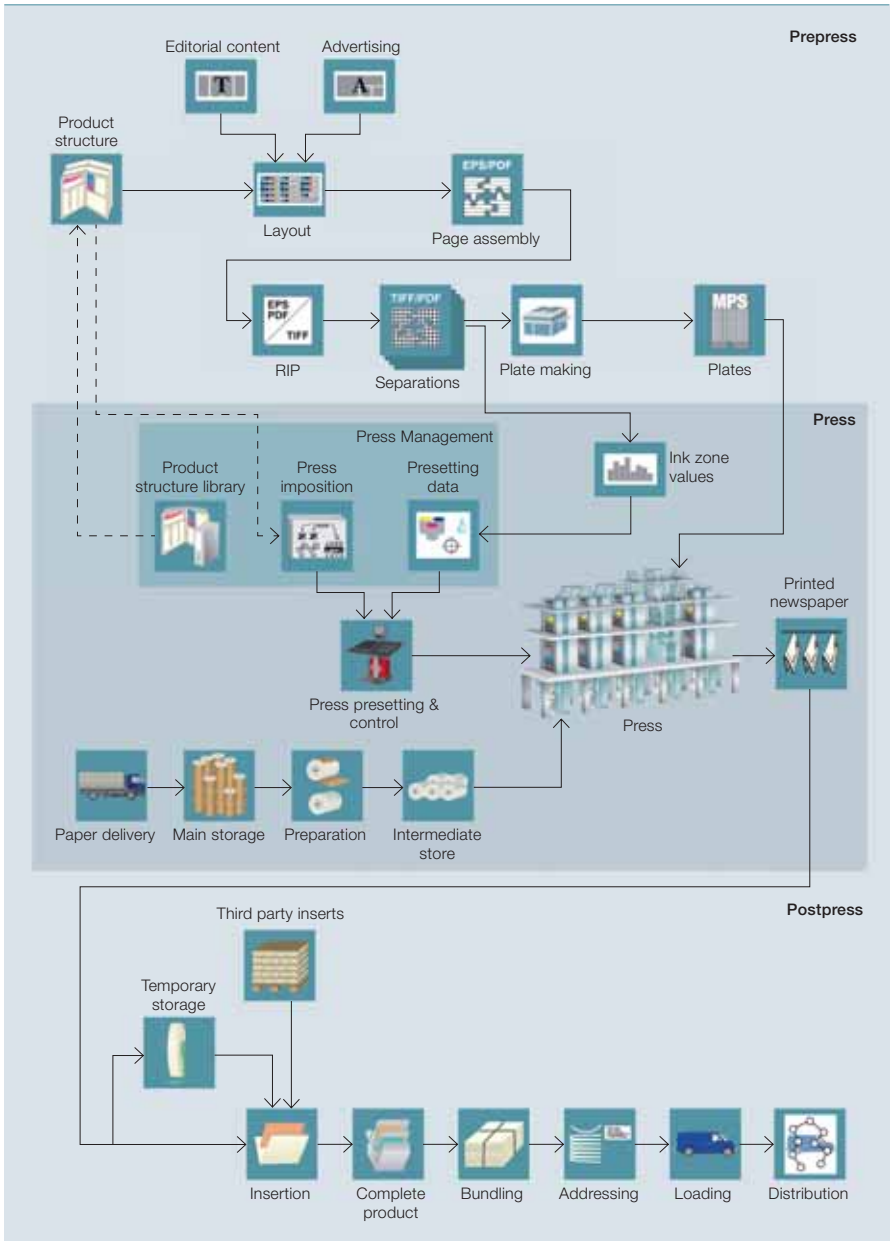
Post-press

After printing, the printed papers are transported from the press into the post-press area, also known as the mailroom. If the product is a preprint that belongs to a later newspaper, it is wound onto disks for storage 2. Otherwise, the newspaper goes on to the inserting drums. These machines are used to insert additional print products into newspapers. These can be either preprints, as mentioned above, or third-party inserts, such as brochures and other advertising material. This completes the newspapers, which are then bundled together, addressed and loaded onto trucks for distribution.

ABB as integrator

Where does ABB come into all this? The answer these days is – just about everywhere. ABB's Center of Excellence for Printing was originally a standard automation supplier providing drives and control systems for the printing press and the press management system, MPS (Master Printing System) Production. See also Factbox 2. However, as the press manufacturers began to deliver the drives, and later the low-level controls themselves,

1 Overview of the newspaper production process.



Factbox 2 Pioneering history

ABB has a long history as a pioneer in the newspaper printing industry. Some of the past highlights are:

1973: first programmable controllers on newspaper printing presses
1977: first computer-assisted production planning and press presetting in the world
1985: first screen-based control consoles for a newspaper press
1994: first shaftless printing press with individually driven printing couples

ABB Printing diversified and evolved into a true IT supplier, providing software solutions for managing the entire newspaper production process. It extended the MPS family step by step, with many new applications. Factbox 3.

Integration is the keyword here. While other suppliers can provide systems to support one or other of these sub-processes, ABB can provide its customers with tightly integrated system modules for the entire process. An example makes the benefits clear. Consider the integration of the three system applications MPS Production, MPS PageManager and MPS PlateWorkflow. MPS Production knows what the press can produce. It passes this information to MPS PageManager so that this system can ensure that only products that can be printed are defined by the users. The integration between MPS Production and MPS PlateWorkflow means that MPS PlateWorkflow automatically knows, what imposition is to be used and can mark the plates with the location on the press at which they should be mounted. MPS PlateWorkflow also receives the production planning data, and can therefore optimize the plate production based on the priority of the different print jobs.

Similarly, the integration of MPS Production with MPS Roll Handling makes the production planning available here too. MPS Roll Handling knows in advance which reels are required for which production, and can ensure that the correct reels are prepared and made available without manual intervention. The reel stock levels in the main storage can also be managed according to long term production plans. When the print runs have been completed, information from MPS Production is transferred to MPS Roll Handling. MPS Roll Handling then generates statistics related to which reels were used for which products and produces quality-assessment data such as number of web breaks per 1000 km of paper for each manufacturer.

MPS Cockpit 3 makes it possible to optimize the overall management and planning of the entire production process rather than just the individual sub-processes. Bottlenecks between sub-processes can be identified and eliminated. The printing process can be driven from one system with all key data being entered once, and once only, across the entire production chain and across multiple sites.

Factbox 3 Application modules for the printing process

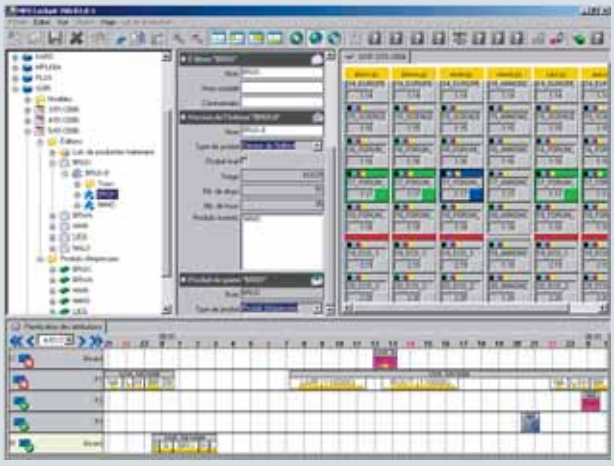
- MPS PageManager – for product structure definition and page assembly.
- MPS PlateWorkflow – for the generation of the RIP-data for the pages, and the control of the full integration of the plate setters with the page planning and the press production management system.
- MPS Roll Handling – for complete automation of the newsprint reel supply from delivery to the press.
- MPS InsertManager – for supporting the sale, planning, production, storage and the fine distribution of newspaper inserts, ie, ensuring that relevant inserts are delivered to selected areas only.
- MPS Cockpit – for managing the entire production process including all sub-processes.
- MPS Insight – a browser-based tracking tool that makes an overview of the current plant-wide production status, available on the Intranet or Internet.

Pragmatism prevails

Although a complete set of tightly integrated modules will generate the best results, pragmatism must prevail. Few customers are going to want to replace all existing system applications in one go, not least for financial reasons. Existing modules need to be accommodated in the integration concept. ABB's printing team recognized this at an early stage and the ability to integrate third party systems into the ABB product landscape was

2 Preprints stored on a rotary disk

3 MPS Cockpit screenshot showing different editions of a newspaper (left), page and color content (right), and production scheduling (below)



incorporated into the original design. This made total system integration affordable for a much larger number of customers.

An example of ABB's integrated workflow can be found at the Rossel Printing Company in Belgium, which has recently opened a brand-new print center at Nivelles, near Brussels. Rossel's aim was to achieve the highest possible level of integration and thereby maximize efficiency. ABB helped to turn this vision into reality. The workflow is illustrated in 4.

Total integration at Rossel Printing of Belgium

Rossel prints a range of newspapers that includes "Le Soir", from Rossel's own editorial department, "Vlan", a free newspaper from a separate office and "La Capitale", which comes from the offices of Sud Presse. Rossel also handles other customers with a further range of products. As a result, their software systems must cope with inputs from more than four different editorial sites.

The initial long-term plan is laid out using MPS Cockpit, for both the printing and the mailroom areas. The size of the newspaper is typically supplied by the editorial systems on the day the product is to be printed. The Hermes editorial system, used for Le Soir, is fully integrated with MPS Cockpit and MPS PageManager, which itself is also fully integrated with MPS Cockpit. To ensure that users of the Hermes system can define products that can be printed on the new presses, the Hermes system is supplied with ABB's Product Structure Library, in which all permissible structures are specified. Products from other editorial offices are defined directly in the MPS PageManager.

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The size of the print run is defined by a completely different system: Rossel's circulation management system, which automatically transfers the print-run data to MPS Cockpit. This system contains all the production planning data required by the sub-systems that handle the different aspects of production.

The newsprint requirements for upcoming productions are passed to MPS Roll Handling, which controls the movements of the AGVs and the reels from goods-in to disposal.

The production planning data are passed automatically to MPS Production, which then calculates the plate imposition and passes the data to ABB's MPS PlateWorkflow. The data are used to control and optimize the entire plate production process, including the four plate-setters. The page content is imported directly from the various editorial offices, and MPS PlateWorkflow calculates the required ink zone values and supplies them to MPS Production so that the presses can be preset.

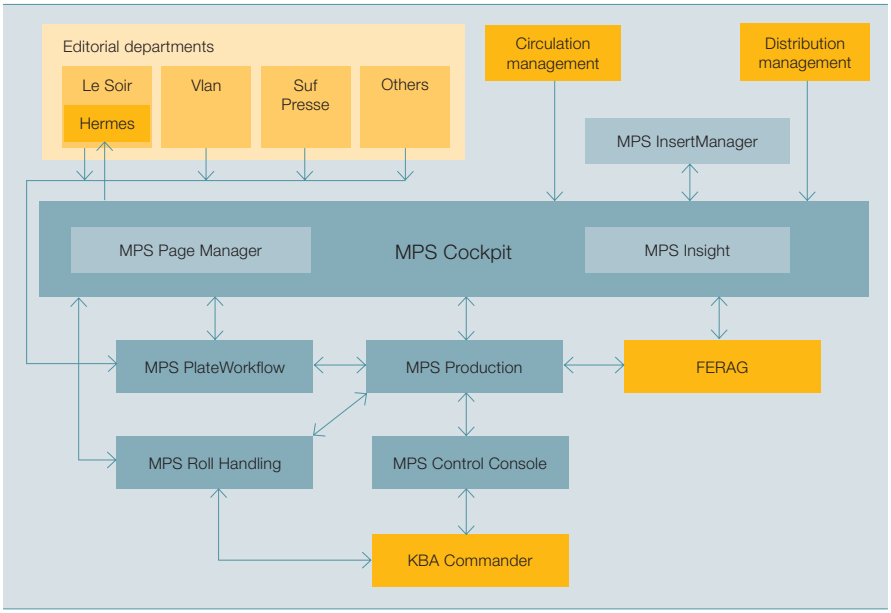
MPS Production also passes the production plan data, complete with preset values, ink and water curves, to the MPS Control Console, where it is made available to the printers for their preparation of the presses for production.

The FERAG mailroom management system receives all the required production planning data from MPS Cockpit. The sale of insertion capacity and the storage of inserts are supported by MPS InsertManager, which also works with MPS Cockpit.

When production is running, data flows upwards through the system to keep MPS Cockpit, and MPS Insight, supplied with tracking data. MPS Insight displays the plant overview with copy counters situated at various locations on the presses and in the mailroom.

Rossel is just one of many companies profiting from ABB's integrated workflow system. Integration has become a recipe for success, not just for ABB's customers but also for ABB itself.

4 Workflow overview at the Rossel Printing Company, Belgium



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Footnote

[1] Impositions are the configurations of paper and plates required to produce the correct sequence of pages.