A new gravure concept

J. Robin Rappolt

The gravure industry has had some interesting challenges in the last few years. Shorter gravure runs were being required by brand proliferation and special deals on the consumer's packages. The "Just In Time" philosophy had broken long, profitable runs into a number of separate makeready operations. Many printers found themselves in a makeready business rather than the printing business. Trial runs compounded the problem still further. As a result, a new concept in gravure printing was required to meet these challenges.

An inherent problem with gravure has always been the expense of downtime to change over to the next job: the bigger and newer the press, the higher the hourly charges. Wider and faster presses were designed to run more efficiently and save printers money. But even with the advent of removable trolleys or printing carts, the downtime was too great, and the wide, heavy carts required too many hours to prepare. Disadvantages of the wider presses included increased cylinder costs, decreased running time, longer web lengths in the press, increased startup waste, and higher hourly costs.

It was obvious that some old narrow-web presses were inherently easier to make ready due to their lighter weight and smaller size. However, these old-fashioned models had too many changeover steps to be performed both on the press and in the makeready room.

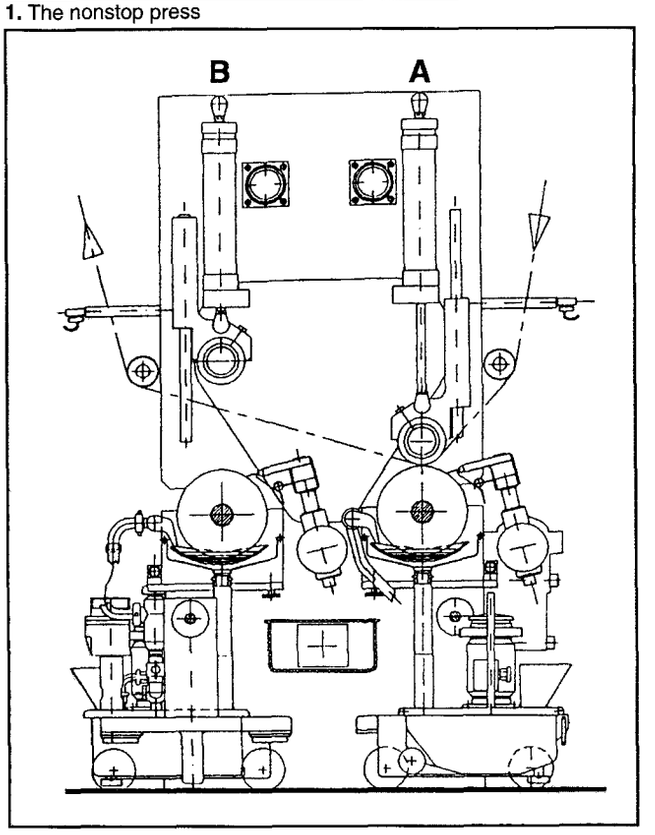
The nonstop press

What the industry needed was a press that was "nonstop." It had to be smaller and run longer. It had to have a theoretical switch that allowed it to change jobs—from "A" to "B". This meant that the printing station would be running the "A" cylinder while the "B" cylinder was being installed and broken in.

What was developed was a new concept of having two printing locations, A and B, in each gravure station. **Figure 1** illustrates the concept.

Each printing station has two main drive gear boxes. While one is engaged and printing, the other can be driven by a slave drive. This permits wash-up, inking, running in of the next job's doctor blade, and preliminary color matching. Each printing station has duplicate printing equipment such as impression rolls, pneumatically oscillating doctor blades, ink applicators, ink pans, ink tanks, ink pumps with motors, and trolleys. The frame has a wide opening on the operator's side for easy access to the sleeved impression rolls, which are easily changed with pneumatic assistance. Ink pump motors are quickly demounted from their pumps when a trolley is removed. The motors are parked in floor receptacles and do not have to be disconnected.

1. The nonstop press



When a job is changed over, the press does have to be stopped. The other location is selected via the "A" or "B" switch. An idler roller is swung into position for "B" printing or retracted for "A" printing. The appropriate gear box automatically engages, and the slave drive switch changes to the nonprinting unit. The gear box engages the print cylinder in only one position for preregister. The unit is told whether the printing is at "A" or "B" so that it will preset the compensator accordingly.

If reverse printing is used on the "B" location, the doctor blade will have been set up on the B trolley. If reverse printing

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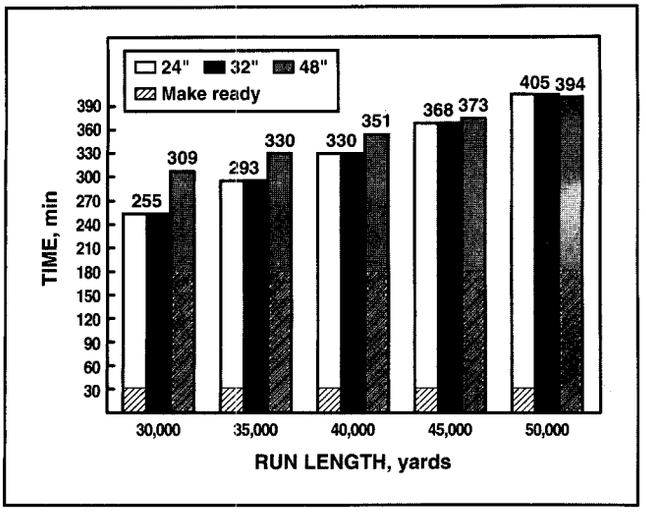
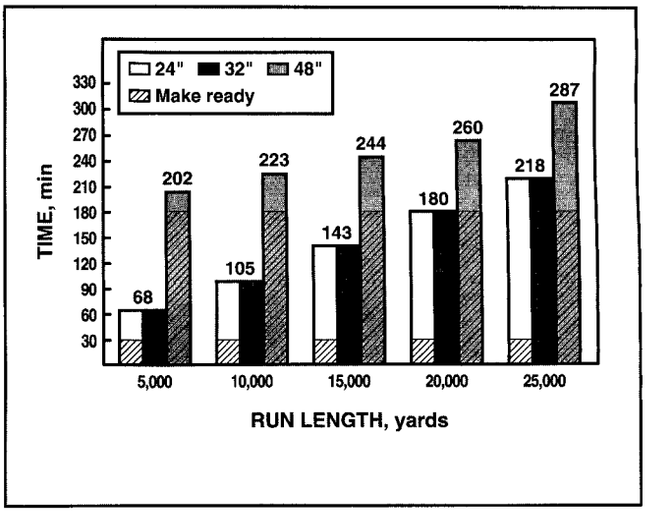
2. Runs plus changeover times for printing runs over 30,000 yards



3. Runs plus changeover times for printing runs from 5000 to 25,000 yards



is used on the "A" location, the doctor blade holder in the center of the gravure frame is easily flipped over from the "B" face position to the "A" reverse position.

If the new job has been run previously, the system remembers the repeat lengths and register marks. It sets the compensators for automatic color-to-color tolerances, dryer temperatures, and web tensions. A completely new job can also be preset by entering the repeat lengths into the computer.

Press handles many products

The press is designed for a wide variety of products, such as paper, films, foils, and laminates, at speeds up to 150 m/min. A preconditioning station is used, which is essentially a standard length dryer of 2 m. The standard dryer is for face printing. Where reverse printing can occur, a double dryer is used. If the dryer is set up as cascading air flow for the most odor-free products, the engaging of a reverse print cylinder will automatically reverse the direction of cascade, as zone I becomes zone II. A four-zone 6.3-m dryer is used for thermoset lacquers, water-based coatings, PVDC, cold seals, or adhesives for laminating in-line. All dryers are insulated and have stainless steel air nozzles and ducts. Very freely turning chill rolls are used at the web exit points, including top exits for short webbing the multizoned dryers.

The wide opening in the front frame is closed by two tempered safety glass doors. A flexible curtain across the width rides down with each impression roll mechanism. The cross member of the gravure frame is hollow with slots. It is connected to the exhaust air system. The cascade air system, employing two supply fans for even the small standard dryer, gives the cleanest possible web with a lower volume of exhaust air.

The short run utility on the press can be appreciated by the following example. A 48 in. (1219 mm) press running 700 ft/min (213 m/min) on two six-color jobs is compared to a 24 in. (610 mm) and a 32 in. (813 mm) nonstop running half the speed. Changeover for the wide press is typically 30 min per station times six stations—a total of 3 h. A conservative estimate is that the nonstop is down for 5 min per station, or 30 min in all. The hourly yield of the nonstop is considerably better than the large machine with printing run lengths under 50,000 yards (46,000 m). **Figures 2 and 3** illustrate these yields.

The downtime estimates were proven conservative, as eight-color job changes have been accomplished in 20 min on two of these eight-color presses which are now in commercial use.

If a fume incinerator is selected for the larger press, it would only perform its design function approximately half the time. A smaller incinerator could be selected for the non-stop press and it would have a 90% duty cycle. This would save capital cost as well as fuel cost.

Short run gravure has become a quantum step shorter while maintaining traditional gravure quality in a cost-effective manner. □

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