

"SKU PROLIFERATION SOLUTIONS"



The turret unwind/rewind are located back to back in the center of the press.

An approach like that of KYMC's mid web equals reduced capital equipment costs for a greater ROI.

A SOLUTION FOR SHORT RUN FLEXIBLE PACKAGING

Meeting the Challenge of Changes in Supply Chain, Manufacturing Environment

by Wallace Nard

In North America, changing demographics are causing massive shifts in how packaging is developed, marketed and distributed. The baby boomer generation will be 76 million members strong by 2015 and is projected to control 53 percent of the \$706 billion spent on groceries. Male boomers are now living to almost 75 years of age and female boomers are living to nearly 80. The growing aging population is an increasingly important consumer segment and is creating a demand for healthier foods and convenience packaging.

This, combined with an "on the go" younger generation and a rise in the number of single person households, has created a demand for smaller portions and "ready to eat" foods. Taken together, this has all led to a change in consumer purchasing habits.

PATTERN CHANGES

Changes in consumer purchasing have caused a shift in how and even where brand owners produce their product. Historically, long run orders have driven programs designed at making this volume work as efficiently and profitably as possible. Flexo presses that can run at faster than 2,000 fpm have entered the market in recent years, but the real question is: How does this fact line up with the change in order patterns? This question can best be answered depending on the type of flexible packing converter.

The total output of packaging produced has increased; however, the total number of orders, as well as the distribution of those orders, has changed significantly. The number and

WHY MID WEB?

- Closer Tolerances
- Faster Job Changes
- Reduced Material Waste
- Lower Production Costs
- Faster Ink Changes

frequency of long run orders has decreased dramatically, while the number and frequency of many other types of orders have increased:

- Private label
- Innovation
- Special event marketing
- Low volume SKUs
- End of life products

The traditional packaging supply chain challenge has been to manage volume. The new challenge is to continue to manage volume, while at the same time managing shorter runs. Companies with an infrastructure tailored for volume typically have a difficult time handling shorter runs with flexibility and lower costs. This problem creates opportunities for companies that can more effectively manage the shorter runs, as well as produce the high volume orders profitably. Some companies are working to reengineer their businesses to better manage these shifts in order volume and frequency.

MANUFACTURING ENVIRONMENT

There appears to also be a shift, for many companies that went offshore several years ago, toward moving manufacturing supplies closer to demand locations. The ability to meet their customers' demands for unique packages, rapid delivery and response times, as well as maintaining low inventories, has caused this return of manufacturing to the U.S. In an Accenture study, 61 percent of respondents said they were considering more closely matching supply location with demand location by on or near shoring manufacturing and supply.

As offshoring of manufacturing and packaging shifts back to local supply chains, the cost for retooling locally and ROI becomes a major challenge in today's environment. Continuing structural changes in the packaging industry with consolidation among converters and increased material costs has significantly added pressure on prices and margins. The cost of capital equipment and financing is an important consideration, coupled with shorter runs in today's environment.

SHORT RUN & MID WEB

Over the years, a number of flexo press manufacturers have entered the market with a mid web central impression (CI) press, but these attempts failed to penetrate the market. Their approach was a low cost, lower speed press, based on the theory speed should not be an issue for short runs.

This concept did not remain viable for the constantly changing market.

High speed flexo has become a trend but has had its challenges. Ink containment, slinging and ink misting together with proper ink release from anilox cells at higher speeds require special converter expertise. The wider and faster you go, the more plate and anilox sleeve accuracy becomes a problem, leading to critical print pressures and even bounce problems.

Then there is the approach of a robotic press change that can pre store multiple jobs in a holding rack, ready for the next job change. This high speed press concept has met limited market acceptance, mainly with larger converters for

longer runs which, as we have said, are decreasing each year. The high cost of this approach has also been a drawback for most converters. Then came the approach of going wider with a combination of SKUs across a web, but this was never met with widespread acceptance from a practical point of view, due to the scheduling situation it can pose.

GAME CHANGING ADVANCES

It has been a well known fact that flexo printing requires a light impression setting for highlights and vignettes, whereas solid areas need pressure to transfer the ink and achieve proper ink densities. Conversely, gravure and offset printing requires more impression to transfer the ink properly. Pressure affects ink transfer differently with each print process. On a flexo press, too much pressure increases the possibility of bounce with certain images or printed bars across the web.

Researchers at the DFTA-TZ (Technology Center of German FTA) at the Hochschule der Medien (Media University) in Stuttgart have done a lot of work on what they call "Planoflex" shallow relief plates of 100 μm . depth and how they relate to printing pressures of the anilox to plate versus plate to substrate. They found that increasing pressure between the anilox and plate had the most negative effect on print quality. They proved that a defined lower impression between the anilox and plate contributes more to sharp print than pressure between the plate and impression roller with substrate.

Anilox to plate impressions need only to transfer the ink to the entire surface of the print area evenly and then the plate to impression roll is not as critical. DFTA-TZ found that with 100 μm . relief plates and a pressure between anilox and plate of only 60 μm ., the plate impression to substrate could be up to 140 μm . with no detrimental effect on print quality. DFTA-TZ has applied for a patent based on this concept.

The basis of this approach is: You cannot print what you do not ink. In addition, thinner relief plates can also reduce the likelihood of bounce caused by the plate images. Taking this approach that a deep relief plate is not needed, plate thickness can also be reduced. By combining:

- Plate relief
- Advances in plate surface structuring to improve ink transfer of solids to gain higher density ranges together
- Lowering the highlight dot structure

The resulting combination is a game changer. By altering the surface tension of the plate, more ink can be transferred with less pressure, yet still hold the highlights dots.

A NEW CASE

Mid web flexo can be defined several ways, but for this article we define it as 27 in. (670 mm.), 34 in. (870 mm.) or 42 in. (1,070 mm.) web widths. A mid web press can contribute greatly to reduced print pressures. How does the TIR (total indicated run out) and printing pressure relate to a mid web press? If you have a printed area that is 42 in. wide and a print repeat of 28 in., this equals 1,176 sq. in. of printed area. A 62 in. wide press with the same 28 in. repeat equals 1,736 sq. in.

It is logical that with a print area 32 percent larger there will be a greater TIR of the mounted plate on the sleeve to deal with and greater anilox TIR as well. Taking into consid-

eration the DFTA-TZ research that lower impression between the anilox and plate contributes to sharper print, there exists a better opportunity to control the defined lower impression between the anilox and plate to transfer the ink only to the surface of the plate and not into the sides and relief areas of the plate.

Currently KYMC has a 34 in. (860 mm.) mid web press at their factory and after conducting extensive engineering and print trials the press is ready to be viewed in operation. This new mid web 8- and 10-color all servo CI press has been engineered to meet the challenges of shorter runs and at the same time be able to run at high speeds to handle longer runs profitably. We have not sacrificed the latest advances in modern flexo technology, only applied this to the mid web approach to meet today's markets.

We have been able to achieve gravure print quality with higher screens—175 lpm—that can be achieved easily with the flexo process, while running multiple SKUs using extended gamut and HD flexo, at a lower cost. How is this possible?

- Closer Tolerances
 - ♦ Larger diameter plate and anilox sleeve mandrels for greater stability and accuracy
 - ♦ Mechanical locking of the plate and anilox sleeve mandrels for quick changes
 - ♦ Anilox sleeves hold closer tolerances even though they are larger in diameter
 - ♦ Overall press and bearing tolerances are tighter
 - ♦ Closer tolerances of the plate and bridge sleeves because of width
- Lower Production Costs
 - ♦ Less ink waste from run to run through better ink management
 - ♦ Flexo plate costs are less because of overall smaller plate areas
 - ♦ Plate mounting time and materials are reduced with better register accuracy; in the round seamless plate sleeves are cheaper
 - ♦ Lower energy consumption
- Faster Job Changes
 - ♦ Changing plate and anilox sleeves is easier because of weight and size—easy anilox sleeve change by means of push out assistance
 - ♦ Setup times for printing pressure adjustment and register accuracy is achieved faster because the mid web is more operation friendly
- Faster Ink Changes
 - ♦ Sincroclean Constant Ink Flow Technology (CIFT) with individual ink flow control at each color station with a new ink pump (see photo at right)
 - ♦ Ink flow settings can be stored for repeat runs



- ♦ Sincroclean (dual pump), constant flow in and out to control cleaning of each deck independently
- ♦ Three settings for light, medium and heavy cleaning
- ♦ Enclosed chamber doctor blade leakage is reduced through controlled chamber ink and cleaning pressure
- ♦ Spare enclosed chamber doctor blades are lighter and easier to handle for off line changing of blades and end seals
- Reduce Material Waste
 - ♦ With micro dot auto register there is less material waste without marks. Register setting while the press is not running also reduces material waste
 - ♦ Auto impression setting without using marks, instead by using torque pressure setting
 - ♦ Downgauging to thinner materials is easier handled and overall material waste during set up is lower all due to the width

Additionally, a defect detection unit is used. If run at more than 2,000 fpm, it requires shorter measuring times. The mid web press, running at reasonable speeds in the 1,200 to 1,400 fpm range, can handle 100 percent defect inspection easier.

With the advent of HD flexo, expanding use of extended gamut or G7 implementation in combination with Gray Component Replacement (GCR); the mid web concept takes on an entirely new appeal for shorter runs.

It is a known fact that a mid web press makes it easier to set and control the impression, making it easier to consistently hit set target points on press. By combining higher printing speeds with the ability to better maintain control of the print process, it is possible to meet the demands of the changing needs of the packaging supply chain. ■

About the Author: Wallace Nard's career in the printing and converting industry spans more than 55 years. He started his career in flexo in 1957 working for Porter and Dugas in Chicago. He became general manager of that company in 1964. He then became vice president of Reilly Lake Shore Graphics in Chicago in the 1970s. He then joined Anderson & Vreeland in 1973, working his way up to marketing manager. In 1989, Nard formed Novaflex, based in suburban Chicago, a printing and laminating sales/service group.

He has served as the FTA national workshop chairman in 1978 and 1979. He was elected to the FTA Board of Directors in 1979 and again in 1982; he also served as chairman of the board. He served as secretary, treasurer and chairman of the planning committee and as a member of the compensation committee. He was chairman of the FTA Annual Forum in 1983 and has spoken at numerous gravure and flexo association meetings. He was an editor for Flexography: Principles & Practices and the holder of several patents related to the graphics industry. Nard was inducted into the FTA Hall of Fame in 1988 for his lifetime contribution to the industry.