# Technologically innovative flexogravure printing

by Eleonora Bentivoglio

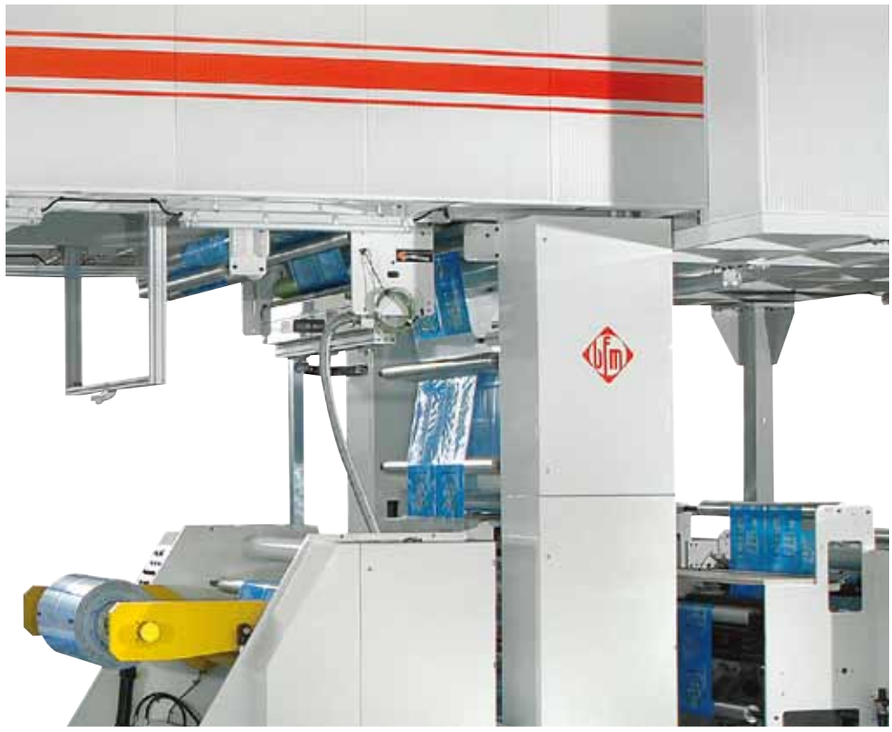
Drawing on the extensive experience of Bosch Rexroth, a leader in machine automation in the printing and converting industry, BFM has developed the "Gearless 8-colour Marte", a central drum flexogravure printing machine which, in the transition from mechanical to fully electronic transmission, meets the highest demands for precision and flexibility in format changes

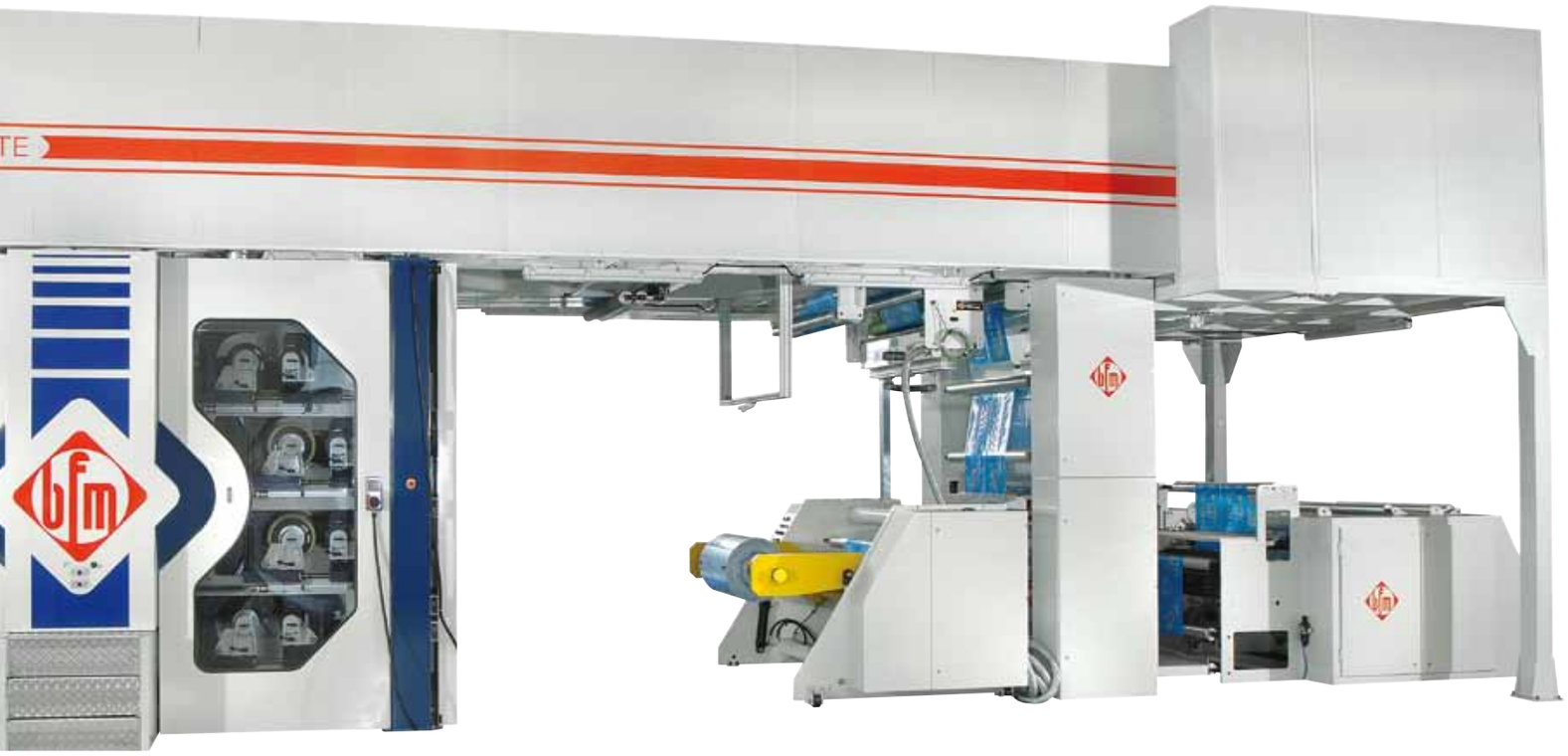
BFM is a leading Italian company in the field of manufacturing bag makers and stack configuration flexographic printing presses with 2/4/6 colour models, standalone reel-to-reel systems or systems that operate in line with extrusion plants and/or bag makers as well as CI central drum type flexographic printing presses with 4/6/8/10 colour models. Through the experience it has acquired in over 35 years in the business, the company from Solbiate Olona, near Varese, has achieved excellent results and acquired customers worldwide as well as a significant number on the Italian market.

"Since it was founded in 1975, cooperation and partnership with Luigi Bandera Spa, a world leader in the field of blow-film extrusion, has been of fundamental importance", Romano Colombo, CEO at BFM, explained.

"By working in close collaboration with Bandera, we continue to be a valued partner in the manufacturing of oscillating take-offs and automatic winders used on their extrusion plants. This has enabled us to follow changes in extrusion with great satisfaction and focus on the technological innovation that has marked developments in the industry over the last three decades. We have succeeded in applying the same design philosophy to the other two sectors, bag makers and flexo printing, with positive results that we are very proud of".

With such a flexible range of products together with constant research and technological innovation and close collaboration with the end customer, BFM is able to offer products that are becoming increasingly attractive to the market and competi-

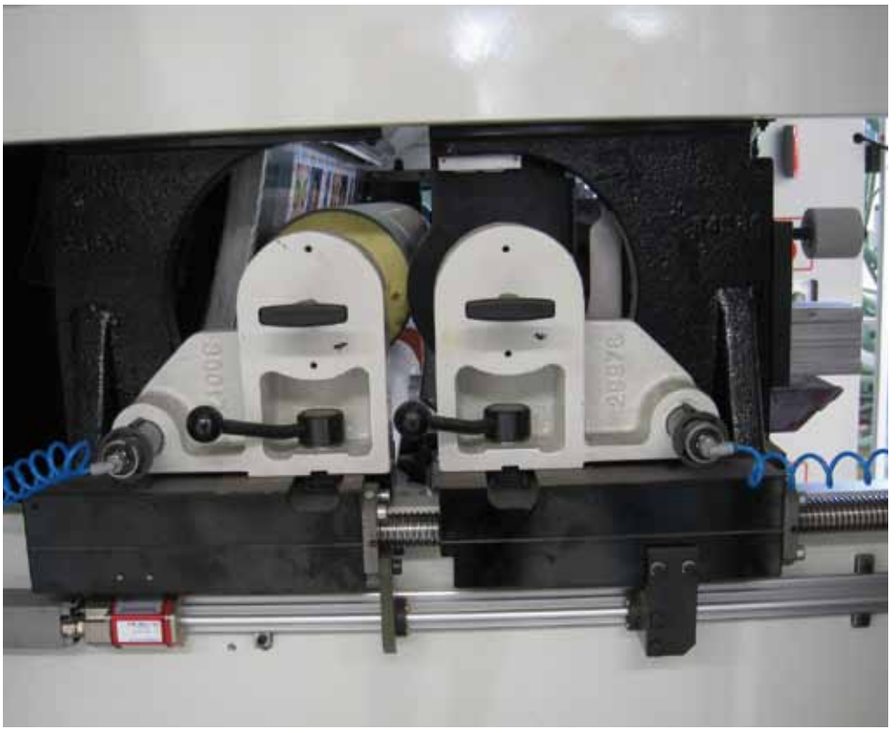




tive solutions even in difficult economic times.

At present, the company is concentrating more and more on the design and manufacture of flexo printing machines as confirmed by Colombo: "Printing machines are the cornerstones of our production: this product uses extremely advanced technological solutions in which we are investing a great deal of resources to foster continual improvements in quality".

The *"Gearless 8-colour Marte"*, BFM's first electronic machine, has been designed with this philosophy in mind: it is a central drum flexogravure printing machine designed to print on various plastic packaging materials but also sized to print on paper materials. The horizontal printing units with closed chamber doctor blades are driven by recirculating ball screws and brushless motors with high precision absolute encoders.
The print repeat length goes from a minimum of 300 mm to a maximum of 800/1200 mm and production speed reaches 350 metres per minute.



"The decision to design a gearless machine was dictated by a specific market request" Colombo continued. "Several factors guarantee the final result of the printing process: the mechanical repeatability of the machine, the quality of the print materials and choosing a suitable printing plate, but using an electronically controlled platform is vital to cutting down on format change times as well as reducing the amount of waste that is normally created during this phases."

*"The Gearless 8-colour Marte* machine has a central drum supported by specially sized shoulders that guarantee maximum stability during the printing process" Colombo said.
"The fact that the plate cylinder and anilox sleeves can be changed directly on the machine has led to a significant reduction in format change times as well as offering maximum flexibility in the use of plate cylinders and anilox for specific production requirements".

To develop a full gearless machine, BFM turned to Bosch Rexroth with whom it had shared design ideas for the automation platform from the very beginning.

"Using the Synax control platform together with digital IndraDrive drives", Luigi Franchini, Printing&Converting Busi-

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ness Development Manager at Bosch Rexroth, commented, "is the most suitable choice for electrically controlled print synchronisation management".
"The decision to use drives with advanced control functions for the position and velocity loops, which are electrically controlled with a master reference generated by the motion controller and transmitted via the deterministic Sercos bus, is the ideal solution for control architectures that require phase and speed synchronisation to be maintained between several axes" Franchini continued.

The IndraDrive drives used on the Marte are modular, i.e. they are based on the use of a power supply unit that distributes electrical power to the various modules via a shared DC bus. "Using modular drives connected to one power supply unit", Franchini continued, "means that there is maximum simplification of the power cables in the switchboard since the power supply unit requires a single connection to the mains supply and includes a built-in mains contactor and braking resistor". "Sharing the electric energy absorbed and regenerated by the various axes on the shared DC bus is also the best design solution for reducing energy consumption", Franchini concluded. Using 2-axis modules with 36 A per channel significantly reduces the amount of space occupied in the switchboard: a 2 metre wide module can hold drives for 26 axes as well as the power supply unit.

In addition to modularity and energy efficiency, IndraDrive drives also offer maximum flexibility in configuration.
"Additional options are available on the drive control boards", Franchini explained, "which can be configured according to application requirements: the Marte has an encoder emulation option that allows the encoder signal of a print element to be exported to an external CCTV-based printing synchronisation monitoring system".

"The decision to equip the central drum with an IndraDyn A asynchronous motor with high torque performance permitted to achieve maximum performance in terms of dynamics and control precision", Franchini went on, "along with IndraDyn S brushless motors, coupled with planetary reduction gear with reduced backlash which guarantee optimum performance as far as control precision and reliability are concerned".

IndraDyn S motors that drive the colour units complete the application. "The precision of the absolute encoders built into these motors and full torque control even at zero speed" Franchini said, "together with the ease with which the axes can be integrated into the automation platform have provided the most adequate solution for completing the machine axis package".

Bosch Rexroth's leadership in providing solutions for the printing industry is confirmed by the number of motors certified for use in potentially explosive areas: the MKE series, which is part of the IndraDyn S brushless motor range, is the version that can be mechanically interchanged with the standard MSK range. "If manufacturers need to certify a machine for solvent-based paint applications", Franchini explained, "they can replace the standard servo motors in the MSK series with certified equivalents in the MKE series".

"The Bosch Rexroth control platform has helped us reach a very high level of quality and precision in a very short space of time" Colombo said. "The real innovation has been to combine the high level of precision achieved in printing, extreme flexibility and speed in format changes with an automation system that enables applications to be set up extremely quickly: the ideal solution for dealing with the current market requirements for flexible packaging materials".