



In view of the success of our new film manufacturing machine and the very high level of customer satisfaction it has generated, we expect to be using SmartWire-DT also on other machines.

Mauro Andreoli, Sales Manager at Macchi

Perfectly Packed

Location:

Varese, Italy

Segment:

Machinery

Problem:

Development of an energy-saving film manufacturing machine with a five extruder system

Solution:

SmartWire-DT, NZM circuit-breakers, DILM contactors, RMQ pushbutton actuators, PKZ motor-protective circuit-breakers, XV series touch screen HMI, XI/ON remote I/O modules, XC200 PLC

Results:

Improved performance and efficiency at every stage of the plastic film production process thanks to SmartWire-DT technology on the new film manufacturing machine

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Background

For its novel CAST film 2000-5 machine that produces plastic film for packaging applications, Macchi SpA, a leading Italian manufacturer of plastics processing equipment, has found that using Eaton's innovative SmartWire-DT technology for control system wiring brings important benefits, including a smaller control cabinet, reduced wiring complexity, easier testing and faster commissioning.

Plastic stretch-wrap film is widely used for packaging in almost every industry, typically for wrapping pallets loaded with products. Conventionally, this film is supplied on large reels with cardboard cores but recently Macchi has been encouraging film manufacturers and end users to switch to coreless pre-stretched film.

This makes big savings possible. A company that wraps 100,000 pallets a year with conventional 20-micron film would use around 50 tonnes of film a year, but with

pre-stretched film, it would use only 13.5 tonnes, a reduction of around 73%. This significantly cuts costs, and it also helps to protect the environment not only because less film is needed, but also because fewer vehicle journeys are needed to deliver the film.

Eliminating the cardboard cores delivers further savings, as the cores account for up to 5% of the cost of each film reel. In addition, a business using one pallet per week of film can, by switching to coreless film, expect to remove up to four tonnes of cardboard per year from its waste stream.

Macchi is an advocate of cast pre-stretch film rather than the blown film that is currently more common. This is because, for film manufacturers, cast film offers further benefits, including enhanced line productivity, a wider choice of polymers, closer dimensional tolerances, and the possibility of producing film with outstanding optical properties.

Challenges

To allow film manufacturers and their customers to enjoy the full benefits of cast pre-stretch film, Macchi has recently developed its new CAST film 5000 film-manufacturing machine. This incorporates a five extruder system that produces a co-extruded five-layer web with thin skin technology. A 1,350 mm diameter chill roller rapidly cools the film after extrusion, and has been specially engineered to handle the machine's exceptionally high throughput.

Energy efficiency was one of the key considerations during the design of the machine, which uses energy-saving water-cooled motors in the co-extrusion section, complemented by gearless torque drives for managing the downstream web path.

To control the extruders, coil winders, cutters and other elements that make up this sophisticated machine, an equally sophisticated control



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system is needed. While many options were available, the engineers at Macchi decided after careful evaluation that the best solution would be to base their design for the control system on Eaton components. One of the key factors that influenced the engineers in making this decision was Eaton's unique SmartWire-DT control wiring system.

Solution

With SmartWire-DT, the components making up the control system are no longer connected by conventional wiring, but are instead linked with plug-in cables that are supplied complete with the plugs already fitted, so that they are ready for immediate use. The cables carry status and data signals between the control devices and, where appropriate, they also supply the devices with power.

SmartWire-DT can be used with almost all types of control and automation component in the extensive Eaton range and can now be used not only for connections within the control cabinet, but also for connections to field-mounted devices. This is particularly important in machine control applications, as the resulting simplification of field wiring significantly reduces costs as well as making it easier to carry out fault finding and maintenance on the machine.

For the Macchi CAST film 5000 machine, Eaton components used included NZM circuit breakers, DILM contactors, RMQ Titan pushbuttons, PKZ motor-protective circuit breakers, XV series touch-screen operator interface panels, XION remote input/output units and XIOC programmable controllers.

Eaton technology helps save time, money and space

A major benefit of the SmartWire-DT system is that it is compatible with standard electromechanical devices from the Eaton range, such as contactors and circuit breakers, which only require the addition

of a simple interface block to connect to the system. This avoids the need for costly special versions of components for use in SmartWire-DT applications.

SmartWire-DT greatly reduces the amount of wiring needed in the control cabinet, which gives big savings in the time needed for wiring and also means that, in many instances, a smaller control enclosure can be used. This is a particular benefit in machine control applications like the CAST film 5000, as there is typically very little space available to accommodate the control system.

A further benefit of the SmartWire-DT system is that it virtually eliminates the risk of wiring errors, which made the testing and commissioning of the CAST film 5000 machine's control system much faster and easier than it would have been if conventional control wiring had been used.

Results

Macchi found that the Eaton control components and the SmartWire-DT wiring system fully lived up to expectations at every stage of this complex project, delivering, as expected, big cost savings and reducing the complexity of both panel and field wiring. Significant time savings in the manufacture, testing and commissioning of the machine were also achieved, and the flexibility of the SmartWire-DT system will make it easy to incorporate future upgrades and modifications.

In use, the new CAST film 5000 machine has revealed an additional bonus to which the use of Eaton automation and control components has made a major contribution – improved performance and efficiency in every stage of the plastic film production process, together with a notable reduction in operating costs.

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MACCHI S.P.A. has two main locations, the headquarter for the manufacturing of blown film lines and a detached site specifically dedicated to cast lines. In both sites the working philosophy is based on the same principles: reliability, efficiency and flexibility.



Lean Connectivity: XV400 touch displays with RMQ control circuit devices. The wiring effort can be reduced by up to 85%.

generated," said Mauro Andreoli, Sales Manager at Macchi, "we expect to be using SmartWire-DT technology again in the very near future, not only on CAST machines, but also on other Macchi machines such as blown co-extrusion machines for shopping bag production and calendaring lines. Overall, we consider SmartWire-DT to be a big and very important step forward in control system technology."

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