

Smart Tension

Tensile force plays an important role in the winding and unwinding of cables. For this reason, HELUKABEL subsidiary Kabelmat Wickeltechnik GmbH launched a cable accumulator that intelligently regulates this force. It was used for the first time on a line of winders at Dätwyler Cables GmbH.

Through the ever growing and ever finer network of cables and wires in the modern information era, a ceaseless current of data, sensor signals, and control commands flows between computers, sensors, servers, dashboards, displays, devices, and automation components of smart cities, smart homes, and smart factories. The average single-family home used to be fitted with just a couple hundred yards of cable for lights and sockets; these days, there might be several miles of different sized conductor types. The situation in a smart factory is even more extreme. If a fault develops in any of these cables, it's no longer just a matter of a lamp not turning on. Rather, it may cause half the production to come to a standstill or someone to be locked out of their home.

Winding and cutting cables and wires prior to installation poses a significant risk, as there is no way of detecting whether an excessive load is applied to the cable for a short period of time during the process. This is particularly problematic for cables with complex internal structures. Dätwyler Cables GmbH started looking for ways to minimize this risk and turned to Kabelmat Wickeltechnik. Bernhard Hug, head of European logistics at Dätwyler, explains, "We already had winders but we needed

a line that would make things easier and more flexible for us. Not every machine can handle all cable thicknesses, but for us it was important to be able to cut flat cables as well. An important criterion during cutting is gentle tension control." Manfred Wössner, Kabelmat sales manager, knows this challenge well: "During winding, precise control of the bending radii,

tensile force, and processing speed is paramount." In order to keep the force on a cable constant, winders have long had a cable accumulator between the drums; a finely balanced system of reels that guides the cable. As the cable collects in the accumulator, a signal is sent to the unwinder to turn more slowly. As it empties, the speed is increased again.

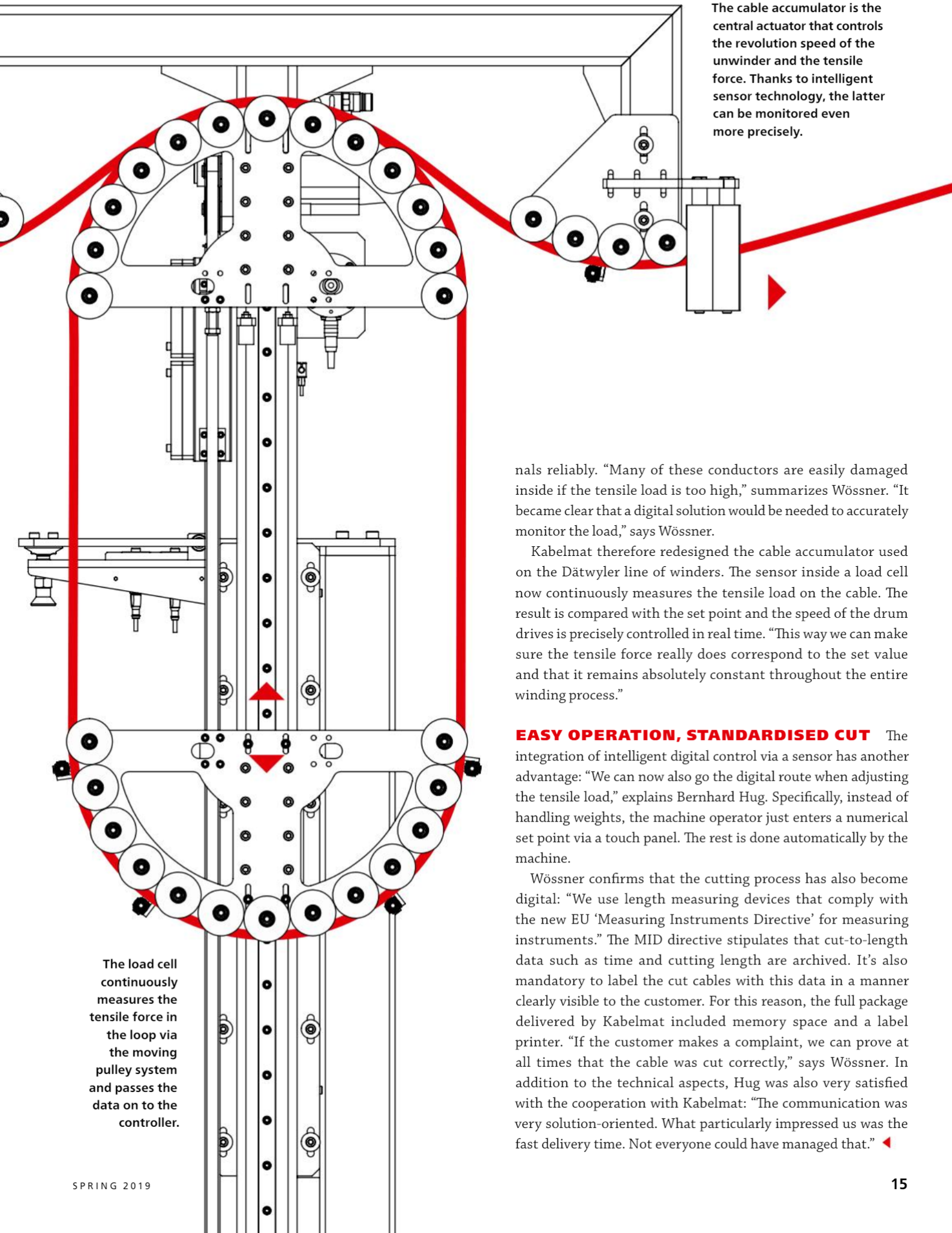
This proven solution has its weak point though, as Wössner explains, "The system is 100% mechanical which means the operator uses weights to set up the tensile force. The system doesn't measure the absolute force; it only reacts to changes in the load." In other words, the cable accumulator minimizes load variations but the system cannot determine whether the actual force at any one time corresponds to the required value.

This was an acceptable solution for many years, but with digitalization, more and more purpose-built and increasingly sensitive conductors are required to transmit electronic and optical sig-



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The cable accumulator is the central actuator that controls the revolution speed of the unwinder and the tensile force. Thanks to intelligent sensor technology, the latter can be monitored even more precisely.

nals reliably. “Many of these conductors are easily damaged inside if the tensile load is too high,” summarizes Wössner. “It became clear that a digital solution would be needed to accurately monitor the load,” says Wössner.

Kabelmat therefore redesigned the cable accumulator used on the Dätwyler line of winders. The sensor inside a load cell now continuously measures the tensile load on the cable. The result is compared with the set point and the speed of the drum drives is precisely controlled in real time. “This way we can make sure the tensile force really does correspond to the set value and that it remains absolutely constant throughout the entire winding process.”

EASY OPERATION, STANDARDISED CUT The integration of intelligent digital control via a sensor has another advantage: “We can now also go the digital route when adjusting the tensile load,” explains Bernhard Hug. Specifically, instead of handling weights, the machine operator just enters a numerical set point via a touch panel. The rest is done automatically by the machine.

Wössner confirms that the cutting process has also become digital: “We use length measuring devices that comply with the new EU ‘Measuring Instruments Directive’ for measuring instruments.” The MID directive stipulates that cut-to-length data such as time and cutting length are archived. It’s also mandatory to label the cut cables with this data in a manner clearly visible to the customer. For this reason, the full package delivered by Kabelmat included memory space and a label printer. “If the customer makes a complaint, we can prove at all times that the cable was cut correctly,” says Wössner. In addition to the technical aspects, Hug was also very satisfied with the cooperation with Kabelmat: “The communication was very solution-oriented. What particularly impressed us was the fast delivery time. Not everyone could have managed that.” ◀

The load cell continuously measures the tensile force in the loop via the moving pulley system and passes the data on to the controller.