The "Balemaster" at the Erlensee plant of DS Smith shreds paper and compresses it into two meter cubes

QUICK READ

DS Smith is one of the leading manufacturers of customized packaging and displays using corrugated board as a base material. The company has up to now been monitoring manually the output of its paper presses in the Erlensee plant near Hanau. A complete solution now automatically provides employees with information from laser sensors and an intelligent I/O module about when the bales from the two paper presses have reached the maximum limit and have to be moved away. This saves a lot of time since employees no longer have to continually check progress in the neighboring hall. Turck's TBEN-S compact I/O module with the ARGEE integrated field logic controller operates here as a stand-alone controller – directly in the field, without the need for a control cabinet.

»A control cabinet or housing are not required for the TBEN-S module – for me a major benefit.«
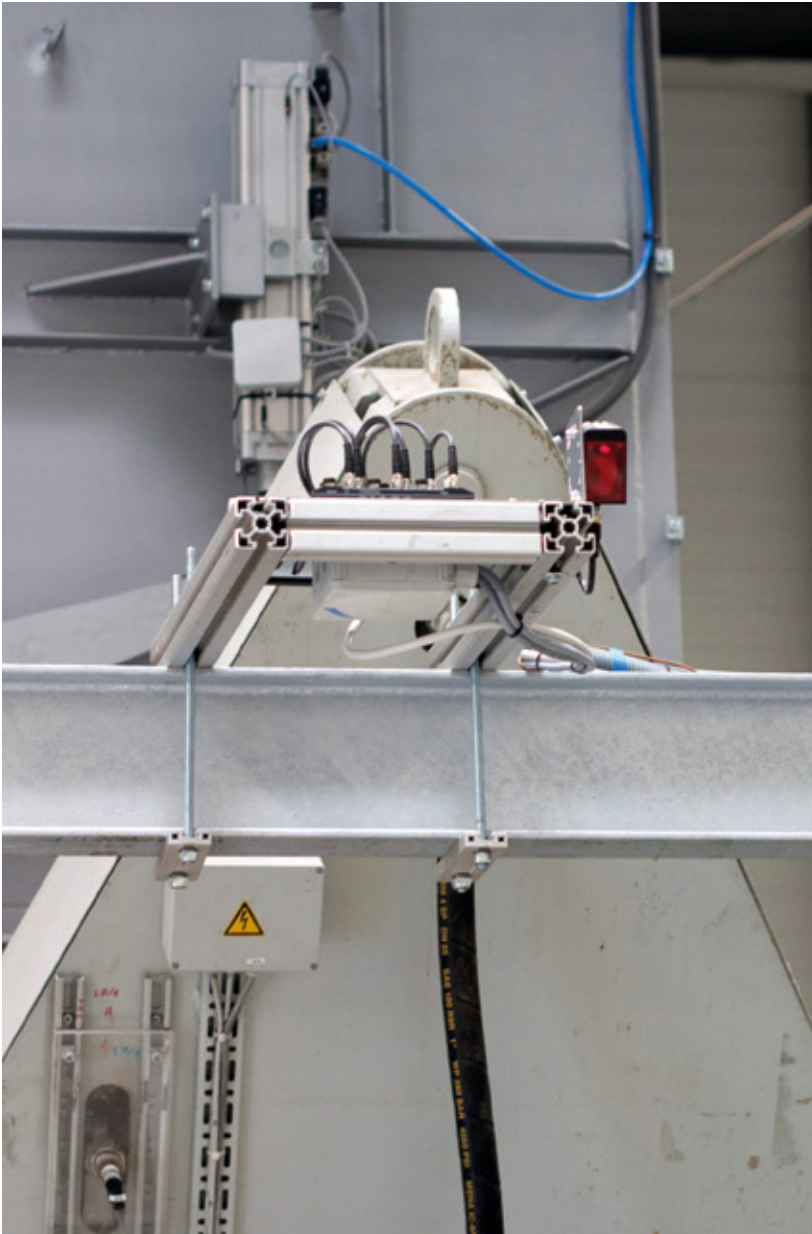
Manfred Ernst | Sonepar

Compact Protection

Packaging manufacturer DS Smith monitors its paper presses at its Erlensee plant with an intelligent I/O solution from Turck

DS Smith moved from its Hanau site to Erlensee in November, 2016, and the machines have been running here since then. The company is one of the leading manufacturers of customized packaging and displays in Europe. DS Smith always takes the complete supply cycle of its customers into consideration, so that its processes can be optimized. The creative displays and the innovative packaging concepts help the customer to reduce corporate costs and to increase sales. The product portfolio includes shelf ready packaging suitable for commercial use, striking point of sale displays, consumer products – as well as transport packaging and packaging concepts for industry.

Sustainability is a very important issue for DS Smith. The company has its own recycling area. Reject material accumulated during production is further processed here for recycling. This is prepared for shipment and further processing directly in the factory. Offcuts and faulty packaging are shredded in a waste press, compressed into cubes and transferred into the storage room.

Decentralized intelligence: Turck's compact TBEN-S block I/O module with ARGEE controls the application directly in the field without the need for a control cabinet
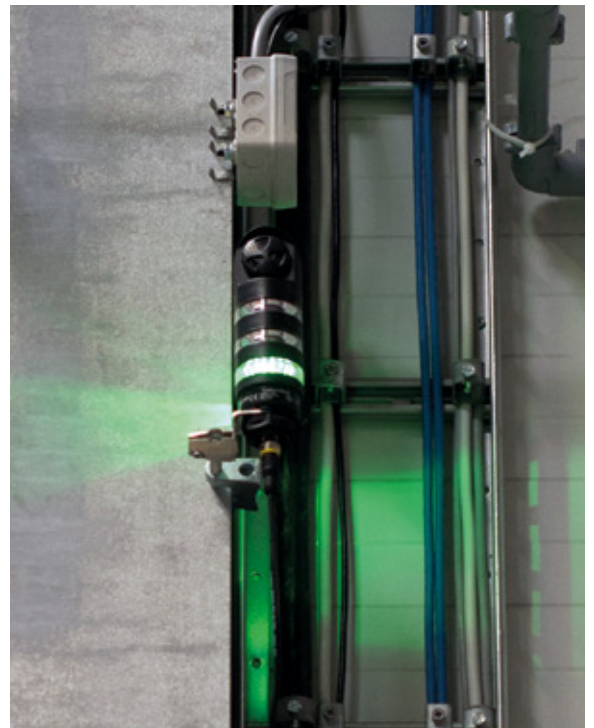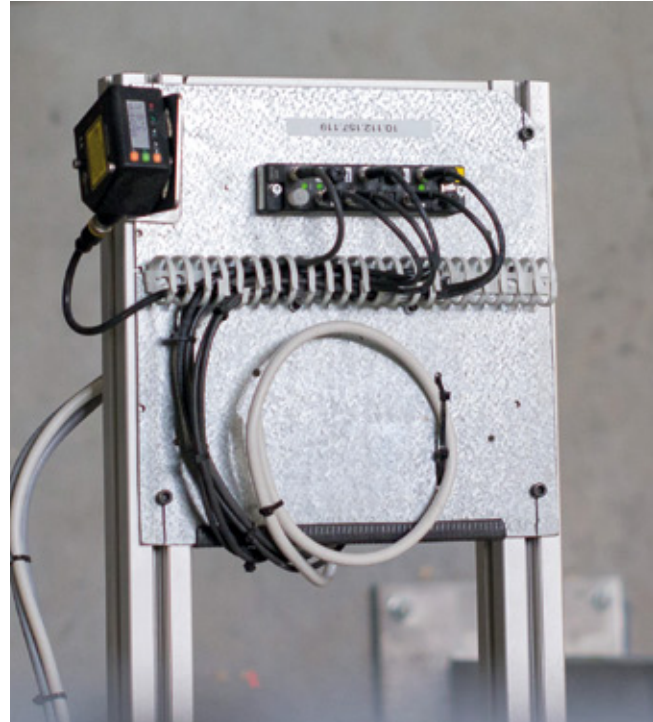

Banner's LTF12 laser sensor monitors the output of the paper bales and triggers a signal to the TBEN-S when the limit value is exceeded

At the Erlensee plant, this process functioned perfectly. The only thing missing was a feedback signal from the press. As this is located in a room where nobody is permanently at work, it was always necessary for an employee to stop working and check the progress of the machine. The colleague responsible could only estimate how many bales the machine produced in an hour on the basis of the material supplied. Coming too early meant a loss in working time. Coming too late meant that the clearing up with a fork lift was always more difficult. In the worst case, the bales could have pushed in on the thin wall to the adjoining hall and pushed through it.

Basic light sensor not enough
To prevent this, a system had to be used that would provide information on the progress of the bales. Philipp Freppon, employee responsible for maintenance at DS Smith, found that a standard light sensor was not enough for this task. In order to ensure a correct switchoff, a sensor was needed that not only

The TL50C signal light indicates the status of the "Balemaster" to the employees in the adjoining hall – visually and acoustically

supplied switching information but also measured the distance, so that it would only switch within a specified switching distance window. However, passing colleagues and employees who are removing bales with a fork lift truck would also be detected by the sensor. Added to this is the fact that structural factors prevented the sensor from being mounted at the side since the wall required for this had a rolling door. Simple

light sensors, light switches or a photoelectric sensor were therefore unsuitable for the requirements at DS Smith.

Decentralized intelligence without a control cabinet

Freppon presented this problem to Manfred Ernst, specialist automation consultant at Sonepar, an electrical wholesaler. He recommended a measuring laser sensor, which, in combination with a compact controller, could evaluate the data and trigger an appropriate signal. Ernst had already got to know Turck's I/O modules with the ARGEE integrated programming environment and tested it at the customer's site.

In addition to eight universally configurable inputs and outputs, the TBEN-S module also makes it possible to link inputs and outputs with actions and conditions in order to run small applications autonomously. The ARGEE programming environment required comes already pre-installed as standard on every module, thus turning the I/O modules into intelligent field logic controllers (FLCs). The software is based on HTML5 and JavaScript, and enables the user to configure the module without any previous knowledge of a programming language. Programming is carried out easily via a standard web browser.

When the LTF12 laser sensor with the connected TBEN-S was tested in the Erlensee plant, Freppon was greatly impressed: "At first I thought I needed a control cabinet as well as the sensor. However, we then came upon the TBEN-S module with ARGEE. This fitted perfectly straightaway. It is compact, fits everywhere and offers very good protection to IP67, thus eliminating the need for a control cabinet." Manfred Ernst also appreciates the high degree of protection of the I/O module: "A control cabinet or housing are not required for the TBEN-S module – for me a major benefit."

Intuitive programming in an instant

Besides the ability to program links with Boolean operators, the modules can perform calculations, timer, counter and binary switch functions, as well as exchange data with higher-level controllers. The module itself is connected to a network via an Ethernet male connector, which in turn is connected to a desktop computer, from where programming can be carried out with a browser. All the required data is provided clearly on one page. "This has worked brilliantly. The programming is intuitive, and almost self-explanatory," Freppon describes his experience. "In order to program the system, an input and output are always used to implement these connections as well as to carry out the required action. Although all this is programmed with a browser, no permanent internet connection is needed." "Once stored, the program can be used at any time," says Freppon. The fact that no additional software has to be installed on the customer's computer is a particular benefit. ARGEE is a server-free web application that runs in the web browser.

The timer was programmed via ARGEE likewise as a condition. Freppon selected a factor here of 45 seconds. This time factor prevents error messages caused

by people in the light beam or passing fork lift trucks. TL50 LED traffic light outside of the hall indicates the status of the machine at any time. If the signal is triggered for 45 seconds, the green light switches to yellow and the siren is switched on. The red light, which is triggered by the controller of the "Balemaster", only lights up when there is a fault at the machine. This enables employees to carry out their work and only requires them to intervene when the signal is activated. These settings also offer additional safety.

The TL50-LED traffic light indicator with its integrated siren from Banner Engineering, Turck' optical sensor partners, enables the signal to be noticed in the adjoining hall. The integrated siren notifies employees when the maximum bale output has been reached, even if the light is not in view. "We liked this feature very much, as we really have everything rolled into one; a genuine all-round complete solution. Even the cables are from Turck." Freppon was able to combine the number and colors of the stack light elements at DS Smith as required. In this case, a conventional traffic light indicator with three light units for red, yellow, green and the siren element was chosen.

Reliable object detection

A key benefit of the LTF12 sensor is its ability to detect objects reliably. From a height of 0.5 to 12 meters, it can detect objects, regardless of material composition and color, even from narrow viewing angles or in bright ambient light of up to 40 000 lux. Users can thus install the sensor very flexibly. The LTF12 sensor used at DS Smith is located on the paper press and looks down from above onto a point five meters in front of the machine output.

Both Philipp Freppon (left) from DS Smith, and Manfred Ernst from Sonepar, are impressed by Turck's cabinet-free complete solution