

Parking Assistance

A sensor supported parking system offers protection from parking damage for bulk liquid distributor ADPO in the port of Antwerp – autonomously controlled in the field by Turck's ARGEE logic in the I/O module

If you look at the figures for the port of Antwerp, the problem quickly becomes clear. The second largest harbor in Europe (by handling in tons) covers an area of 153 square kilometers, an area 44 times bigger than Central Park in New York. As the transshipment volume is constantly increasing – from 158 million tons (2009) to 238 million (2019) – and the potential space for expansions and adjoining logistics is limited, the handling of goods must be maximized in the existing area. One route towards this is the shortening of the handling times from the ships in dock to the transportation of the goods by rail or road.

After conventional containers, liquid bulk is the second largest type of cargo that is handled in Antwerp. Logistics companies like ADPO ensure the smooth unloading of tank and liquid container ships. The company operates a 35 hectare terminal on the left bank of the Scheldt for the loading and storage of liquid chemicals. ADPO customers have their goods warehoused, filled in containers and forwarded. The logistics company also offers a complete all-round carefree package for liquid chemical logistics – together with tank cleaning, loading and customs clearance. As the harbor space is in short supply, ADPO also has to increase its efficiency in goods handling.

Manual filling not efficient

Part of the plant on the Scheldt is a cargo terminal for liquid chemicals, which firstly have to be filled in drums before they can be transported further. Up to the middle of 2019, the filling process was still carried out manually. This required a truck with empty drums to be parked at a loading ramp. The filling was carried out manually with a hose. "Competition, however, is strong and that is also why we had to automate here in order to increase our efficiency," says Jan van Mechelen, project engineer at ADPO.

Parking maneuver damages loading ramps

Besides the slow filling speed, another drawback of this solution was the fact that the trucks had to be driven very close to the loading ramp. The flap on the truck trailer was only 40 centimeters deep. Reversing



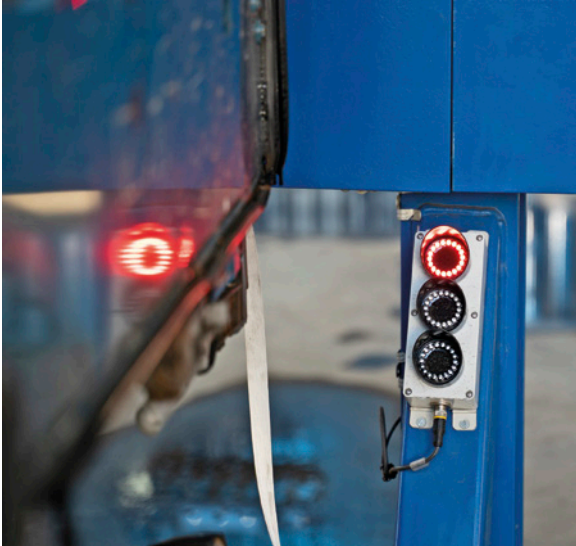
A tight spot: Without a parking assistant it is almost impossible to bring the trailer precisely to a 40 centimeter distance to the ramp



QUICK READ

Logistics services company ADPO fills liquid chemicals from ships into drums. As part of its automation of the drum filling and loading system, Turck installed a parking assistant for trucks at ADPO. The compact ARGEE logic controller in the FEN20 I/O module converts in the field the signals of a laser scanner for controlling a traffic light signal system. This enables drivers to see when they have to stop – and also if people are present within the protected area. This reliably prevents work accidents at ADPO as well as damage to the loading ramp and thus increases the availability of the automated drum filling system.

The truck must be close enough to the ramp for the flap to rest on it securely



The driver stops reversing when the red LED ring is lit



an 18 meter long articulated truck exactly to a distance of 40 centimeters is difficult. Till recently, drivers therefore reversed until the trailer hit the loading ramp. The ramp frequently had to be repaired as a result because the constant knocks from the truck tore the impact barrier out of its anchors.

ADPO in Aalst looked for an optimized solution for this primitive parking system to be included in the development of an automated drum filling system. The order was awarded to Turck's Belgian subsidiary Multiprox, which had already demonstrated its solution expertise in several projects with ADPO, such as an automated entrance opening for goods trains to the terminal site. In consultation with the responsible project engineer Jan van Mechelen, Turck Multiprox developed an automatic parking assistant: "We didn't want to regularly renew the loading supports in the optimized plant. The solution for the automatic filling system also had to detect the exact position of the truck," van Mechelen describes his requirement.

LED traffic light system indicates the distance to the ramp

Turck Multiprox had already developed a suitable solution for similar applications for major logistics companies. Each laser scanner monitors here one of the six parking bays. An LED traffic light indicator signals to the driver the actual distance to the ramp. If the truck is still too far away and the scanner does not detect an object, the traffic light remains unlit. As soon as the truck is within range of the scanner, the green LED ring lights up. The yellow ring lights up once the trailer is 120 centimeters away from the ramp, and the red ring lights up when the trailer is within 40 centimeters from the ramp so that the driver can stop the truck.



ADPO project engineer Jan van Mechelen could "considerably increase the efficiency of the drum filling system" with the Turck solution

When the filling was carried out manually, the precise docking location of the truck was not important since the drums were loaded by hand anyway. With the automated drum filling system, however, a conveyor belt is moved into the opened trailer. A worker standing there lifts the empty drums onto the convey-



Each scanner monitors a parking bay and thus ensures faster loading and additional safety



Mini controller in the field: The compact FEN20 I/O module (right) uses its integrated ARGEE logic to convert the switching signals of the laser scanner to the four states of the signal indicator

or belt. The rest of the filling process is carried out automatically. The precise parking of the trucks in their bays is therefore important.

Decentralized solution saves wiring and costs

The traffic light indicator is connected to a small decentralized controller unit which in turn processes the signals of a laser scanner. It detects here the trucks and outputs their distance to the position of the scanner. As this was actually developed for opening gates, its three digital output signals had to be converted for the signal lights of the LED traffic light indicator. This is implemented with Turck's ARGEE logic controller, which runs remotely on the FEN20 IP20 I/O module in the control cabinet. Simple if-then logic operations are used by ARGEE to convert the digital switching outputs to the appropriate output signals for the traffic light signals. Even using a compact controller for this task would have been an excessive solution.

Then FEN20 makes it possible to program simple logic commands using the browser-based ARGEE

programming environment. Programming here does not mean writing code. The "Flow Editor" makes it possible to use any web browser to create logic control plans via drop-down fields and buttons. The system specialists from Turck Multiprox took this on for ADPO. "For us it was important to have a turnkey solution that we can run straightaway. We did not want to engage our own programmer with it", says van Mechelen.

Safety and efficiency of drum filling increased

"The Turck Multiprox solution for automating the process considerably increased the efficiency of the drum filling. The loading time was previously much long longer. We were also able to increase safety since the scanner also detects the presence of people in the parking area," van Mechelen sums up.

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