Feldbinder

Digitalisation of silo trucks

Silo 4.0: unload more efficiently

Feldbinder brings bulk transportation into the digital age

The shortage of skilled workers continues to impact the transportation industry. Employers wanting to win over the much-in-demand truck drivers can definitely benefit from offering a comfortable workplace. This includes a well-equipped tractor unit but also extends to easy handling of the transported goods. This approach to innovations was also adopted by the German company Feldbinder, headquartered in Winsen an der Luhe. Feldbinder has been manufacturing silo and tank trailers since 1975 and in 2018 they launched the Silo 4.0 project, which aims to systematically take them into the digital age.

Facilitate the daily life of companies and drivers

"At that point in time, also after receiving corresponding feedback from the market, we concentrated on asking ourselves how we, with our vehicles, would be able to provide the transport companies with more comfort and support during the unloading process," remembers **Michel Jörn**, who, as a designer of new vehicles, is responsible for the silo semi-trailers and the Silo 4.0 project at Feldbinder. *"Of course, this was also about supporting the drivers as best as possible in their everyday work and make things a little easier for them."*

The idea to digitalise the silo trucks and silo trailers was born – and it was implemented with the support of the automation expert ifm. *"As we had already been in close contact with ifm due to other projects, we have made sure to also benefit from their expertise when implementing Silo 4.0,"* says **Michel Jörn**. *"In addition to the hardware itself, we were convinced in particular by the extensive testing procedure applied by ifm to its components in order to ensure suitability for mobility applications and to obtain the required certifications."*

Central control of the unloading process

So what exactly is the advantage that Silo 4.0 has over conventional semi-trailers and silo trailers? *"Until now, the driver had to walk up and down along the vehicle during the unloading process, to open or close each shut-off device of the material conveyance or the air distribution system,"* says **Michel Jörn**. *"Our digitalised vehicles can be centrally controlled from a single location. To do so, the driver can either use the touch display or the additional control panel mounted below it."*

Digitalised silo trucks provide drivers and companies with more comfort, safety and efficiency during unloading.

Very comprehensible display and robust input device: the ecomatmobile hardware is designed for demanding outdoor conditions during daily use.

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The ecomatDisplay with a capacitive 12 inch touch screen and freely configurable keys is designed for mobile use both in the cab as well as in the outdoor environment. It integrates a powerful controller, which can be individually programmed through CODESYS. To the display, Feldbinder added the ecomatPanel.

"By using the control knob, fine adjustments can be made quickly, for example when valves only need to be opened to a certain degree for mixed unloading operations," explains **Michel Jörn**. *"In addition, all the other operating actions that can be performed using the touch display can also be carried out by using the panel. This is advantageous especially when the user wears working gloves."*

The future: transparent and efficient

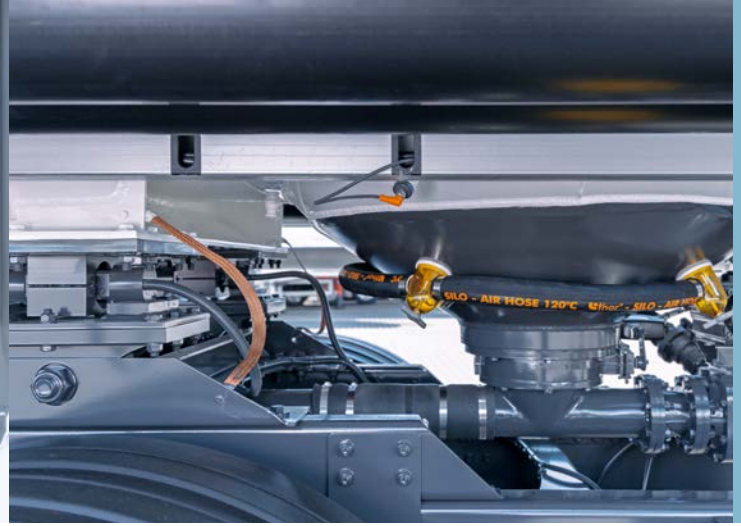
Whether opening and closing the valves, starting or shutting off the main engine and the secondary drive, speed control – with a silo trailer 4.0, the driver can do all of this in a digital manner. And thus, in an extremely comfortable and efficient way.

The same holds true for the integration of the hardware and software into the silo trailer. *"We can connect up to four CAN circuits to the controller integrated into the display, which enables us to select each individual element of the silo trailer 4.0 in a structured way,"* says **Michel Jörn**. One CAN circuit is used for the linear drives and the remote control, the second circuit is the one for the type CR2042 ioControl modules. The ioControl modules decentrally collect data from the sensors – for monitoring the pressure and fill level, for example, and forward this data to the controller via a pre-fabricated CAN Bus cable. In the same way, the modules can forward commands of the controller to the connected actuators; with Feldbinder's solution, the valves are controlled via the ioControl modules. In smaller applications, the modules can even be used as small controllers thanks to their programmability.

M12 connector reduces effort and sources of error

Depending on the type and design in question, Feldbinder equips its trailers with up to five ioControls, which are available as versions with either DEUTSCH or M12 connector.

"Currently, we are using modules with DEUTSCH connector, but we will switch over to the version with M12 connector in future," says **Michel Jörn**. *"This makes cabling significantly easier as wiring errors are eliminated right from the start thanks to the standardised design. Thus, even employees without the relevant electrotechnical knowledge are able to wire the sensors, which allows our specialists to invest their time and expertise into more demanding tasks."*



> *When implementing the project, we also used the software libraries that ifm offers for its controllers.*

ioControl modules, here in the Deutsch design:
They provide the controller with information and forward commands to the actuators but can also be used as small controllers if needed.

Integrator knows and values ifm's range of software

Regarding the development of the software, Feldbinder relied on the external expertise of system integrator Reinholz Software and Technology.

"We have been working closely with ifm for many years and know the hardware very well," says Pascal Kaufmann, head of Mobile Automation at Reinholz.

His colleague, software developer Thorben Oltmann, adds: *"The special requirement in the context of Feldbinder's Silo 4.0 project was to develop a modular software that would enable Feldbinder to define the specific equipment and configuration of each silo trailer by themselves by means of a CSV import. When implementing the project, we also used the software libraries that ifm offers for its controllers. The software blocks help accelerate the overall programming of the software considerably. First, the need to invest resources into the programming of sometimes complex functionalities is eliminated, second, there is a certainty that these software elements have been tested comprehensively and that the communication between the hardware components works seamlessly."*

The first step towards the future has been taken

Hassle-free comfort, efficient processes – has digitalisation arrived in the transportation industry? *"The customers that use our modern vehicles will never want to do without the new options again. Drivers and companies equally value the easy handling and quicker unloading times."*

So, the first step towards the future has been taken. But **Michel Jörn** does not yet want to leave it at that. *"Feldbinder has recognised the potential of the new possibilities; we want to make things for our customers even easier and offer them support regarding qualitative optimisation."*

For example, already today the CR3158 GPS module can be integrated, which helps determine the exact position of the vehicle. *"This is useful to avoid costly and time-consuming faulty loading and unloading operations when customers have multiple unloading points, for example."* In future, the process data from the silo trailer is intended to be used for the further support of quality assurance procedures. *"Recording the unloading pressure, centrally defining unloading quantities, the electronic closure of manlids and valves, all of which assigned with positional data and time stamp."*

Conclusion

A suitable combination of hardware and software enables unambiguous data recording – and via the cloud, the records can even be shared with all parties involved. All in all, this leads to transparent and more efficient transportation and unloading processes. And from this, all sides benefit in the end: transport companies, drivers and customers.

Last set-up test before delivery: In future, the information from digitalised silo trailers could contribute to quality assurance in the goods transport industry.