Velco uses its own design of the Turck Cloud dashboard. Thanks to the responsive design functionality it can also be used optimally on tablets and smartphones

QUICK READ

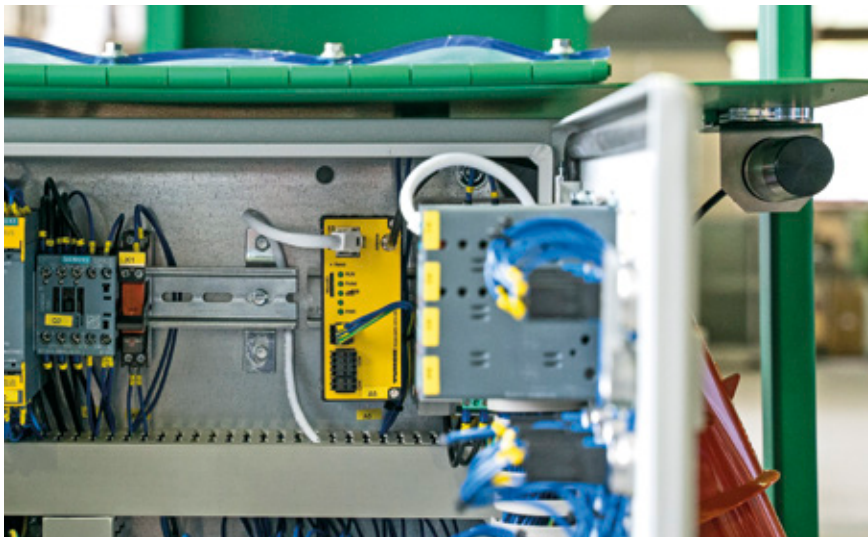
The pressurized vessel, rotor gunning machines and injection plants from Velco are used in blast furnaces, steelworks, foundries and in the refractory industry. In order to provide rapid support for customers in the event of malfunctions, the special machines are provided with a remote monitoring function. As the previous solution could no longer meet the latest requirements, Velco searched for a cloud based solution that would allow worldwide remote access via PC or smartphone. After a selection process, it was Turck's cloud solution that was chosen, as it was the only one that could meet all requirements.

Taskforce for Rapid Intervention

Special machine manufacturer Velco uses a remote monitoring solution based on Turck Cloud Solutions for locating error sources and monitoring production parameters

The development of Industry 4.0 has some similarity to the downfall of the Roman empire: Nobody knows exactly when it all started. While it is possible to say when the term gained popularity, any notable milestones can only be identified in retrospect. The Velbert-based company Velco Gesellschaft für Förder-, Spritz- u. Silo-Anlagen mbH could thus also look back on the development of its machines and claim that it already started out with Industry 4.0 in the nineties, when it fitted its products with remote monitoring modules. Velco nevertheless claims to be a traditional down-to-earth company that prefers to make a good impression by offering benefits to the customer.

"Even as a traditional company with a fully developed technology, we also have to deal with the innovation trends in the world market, particularly with regard to machine communication, and generate customer satisfaction with our service," states Velco CEO Christian Wolf. He thus emphasizes here the fact that a down-to-earth attitude and digitalization combine very well as long as there is a focus on real customer benefits.



Thanks to the mobile internet connection, authorization for the customer's corporate network is unnecessary, the heavy duty antenna on the right of the control cabinet provides worldwide access to Velco machines – even in the steelworks

Velco special machines renew refractory concrete layers in steel and blast furnaces

This was also the company's aim when it integrated cloud-based machine monitoring. Steelworks operators worldwide use Velco machines to spray their blast furnaces, ladles or channels with refractory concrete. The layer of special concrete is attacked by the slag and heat and has to be renewed regularly. Steelworks and blast furnace operators use a refractory concrete gunning machine for this or outsource the refractory repairs to refractory material manufacturers and processors.

Flying to Abu-Dhabi to turn on the supply line

The machines of the refractory concrete service providers can not only be found in Duisburg or Salzgitter, but also in Abu Dhabi, for example, or India. "The customer wants to know: whether the machine is working or not and whether or not it is operating correctly? Customers want support with remote maintenance," explains Klaus Küster, head of electrical engineering at Velco. This was our original objective. Companies invest a lot of working hours and travel costs in order to fly service technicians half way round the world, sometimes only to discover that the operator cannot detect minor faults and rectify them. The remote monitoring module was designed to eliminate these kinds of excessive service callouts for accidently closed supply lines or the pressing of emergency pushbuttons and at the same time help with the troubleshooting of real malfunctions. The first remote monitoring modules built in the nineties had a limited range of functions and in some places the costs went out of control because the GSM based solution continuously sent SMS messages – with every individual message costing something even when there was no network available. The connection quality was also often unsatisfactory.

Turck Cloud offers outstanding user friendliness

In 2018 Velco therefore looked for an up-to-date remote maintenance solution, by which it could not only view machine data but also allow access to the machines. "We excluded the major cloud vendors because they did not offer any industry-specific solutions. Ultimately we needed a solution that could also operate in extreme environments like steelworks", Velco electrical engineer Michael Sundmacher explains the basic requirements. After a selection process Turck Cloud Solutions stood out on account of its user-friendliness: "The Turck Cloud impressed us with the fact that a browser allowed with a single click an overview of all machines or the moving between the individual machines. Any noting of addresses is unnecessary and operation is also possible from a smartphone, thus providing direct access to all data for any machine. This

When Velco customers want to diagnose machine states worldwide via their smartphone, heavy metal meets Industry 4.0 – with Turck Cloud Solutions Velco can now help its customer quickly and efficiently with troubleshooting and save costs for onsite service callouts

is also confirmed by our customers and so we chose the Turck solution," Sundmacher explains Velco's decision. Klaus Küster adds: "The key benefit is the fact that we could access the controller of the machine directly via a PC or a smartphone and even control this via Modbus. Other solutions can't offer this."

"Click and happy" dashboard

The customer's employees call up the dashboard of the Velco cloud and see their machines listed in the navigation window. A map in a Google Maps view indicates the location of the individual machines. If an employee clicks on one of the entries in the list, the dashboard provides a clear overview of all the relevant data. Besides some analog values such as water pressure or material level, there are also digital indicators such as for operating state or the status of the emergency stop button. The user can also see an operating hours counter and other numerical displays. The dashboard can be made up very easily by the users themselves – with just a few clicks and without any programming knowledge. "This is really a case of click and happy operation," Michael Sundmacher sums up. Users can also create their own alarm messages via SMS or email for different users.

Customers can also remotely control the Velco machines via the dashboard, if this is required for troubleshooting. The support technicians see from their desk whether the most minor faults such as "missing water supply" or "Emergency stop button pressed" can be excluded. Thanks to the additional data, they are able to effectively support any further troubleshooting.

Automatic material ordering possible

Many innovations appear like icebergs. The expected effect and benefits only constitute the tip of the iceberg. The majority of operating scenarios and side benefits only become evident during daily use. A welcome side effect the cloud: It provides transparency. Refractory concrete users in particular want to see how long a machine is in operation. Depending on

Michael Sundmacher (left) and Klaus Küster have tested many cloud solutions before they chose Turck's solution because "the key benefit was the fact that we could access the machine controller directly with a PC or smartphone and could even control this via Modbus. No other vendor can offer this."

the contract, customers are required to purchase the special concrete of a particular manufacturer. If the consumption values for the concrete do not match the operating hours of the machine, the end customer can assume that other material was used. These kinds of cases enable the rental services to respond in future.

The cloud solution also opens up new sales models for refractory concrete manufacturers. Today they are able to offer and invoice the service according to actual use. This is similar to the use of printers today, which are rarely purchased for work tasks but are hired as a complete service package – including consumable material and maintenance.

Measured value recording simplifies troubleshooting

Support employees often face the problem that many errors only occur infrequently and randomly. Troubleshooting can then take up a lot of time and is sometimes also nerve wracking. In these cases, the support will record relevant measured values over a defined

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Michael Sundmacher | Velco

period. The system outputs the values in a CSV file. In this way, Velco support can identify in future the location of faults more easily. Even algorithms for predictive maintenance could later be used via this interface. This shows how closely the latest automation trends are linked. Cloud solutions simplify condition monitoring and predictive maintenance but are not necessary requirements for it.

Cloud connection even of third party machines

Back to the day-to-day challenges: Some customers also want a Velco cloud for integrating the machines of other manufacturers in the remote maintenance. For this Turck uses a web programmable EDGE gateway which, thanks to the large number of interfaces and supported protocols, can be integrated easily in existing systems with the controllers of other manufacturers and which transfers the machine data to the cloud. This even operates in both directions. Users and customers can thus view, monitor and remotely control all the machines in the cloud dashboard.

Assigning individual user roles and rights

Some users consider the risks involved with remote control as well as its benefits. From the very beginning, Turck has therefore placed prime importance on data and communication security. The management of roles and rights enables the owner of the machine to determine which users can navigate in the cloud and with what authorizations. Different authorization levels can be defined individually for each machine and user, from elementary read rights to write authorization, right through to administrator rights. The communication between Turck's TCG20 cloud gateway and the cloud server is also encrypted via the Kolibri proprietary cloud protocol, which meets the latest standard for data transport in the web (TLS 1.3, AES256).

Mobile communication makes corporate network access unnecessary

Responsible IT managers seldom allow access to the corporate network even when it uses encryption. With the Turck solution this is not a problem since the TCG20 can also establish the connection to the cloud via the mobile network. This therefore always ensures mobile access to the machines – regardless of where they will be used in the world in the future. The financial investment for data communication via mobile networks is manageable. "Today we use quite normal country-specific SIM cards and everything works. The financial risk is negligible," Sundmacher explains. The TCG20 is nevertheless also available with a Wifi interface as well as a flexible combination device with Wifi and mobile communication. Particularly customers who wish to host their cloud "on-premises", i.e. on in-house servers, will often use the Wifi version.

Conclusion

The overview of the state of all machines is a real benefit for Velco and a strong sales argument compared to the competition. This is how it works with mega trends. All players would like to offer their customers a better product. With Velco, this was the optimum remote access to the machines. Each player advances the mega trend over time and with the increasing number of these kinds of innovations. Even if no-one can say exactly when the whole thing started – for Velco the launch of its cloud was a milestone on the journey towards Industry 4.0.

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Further information: www.turck.com/cloud

»Industrial Clouds«