Optimization in the pipeline

ShawCor increases efficiency via RFID

As a global coater of steel pipes for the oil- and gas sector ShawCor, operates within a highly traditional sector. Nevertheless, it is high time for optimization in the supply chain within this segment as well. That is why the company, together with systems integrator Mieloo & Alexander, examined the possibilities in the field of traceability. In the meantime, and with the help of, among others, RFID, the first steps have been taken within the Pipe Performance Products division. An enlightening conversation about this special optimization route with Brent Fisher, manager Global IT Projects & Solutions at ShawCor.

As a Global Energy Services Company, Canadian ShawCor delivers a wide range of products and services. The organization realizes a turnover of about two billion dollars and has some hundred sites in twenty different countries. More than 6,000 people work for the company. Because of that global positioning, ShawCor is able to globally provide products and services to all major oil and gas companies.

The Pipe Performance Products division is one of the most important pillars of growth within the organization. The division is specialized in coating steel pipes used for oil and gas pipelines. Some of the possibilities are anti-corrosion coatings, thermal coatings or concrete coatings. These activities take place on various ShawCor-sites worldwide. It is important to know that the pipes are at no time property of ShawCor itself.

Brent Fisher: "Often they belong to an operator. When he wants to have pipelines made various tenders are sent out. To begin with, he will appoint a steel producer to make the pipes. Subsequently he can send the pipes to us for application of the appropriate coating(s). We therefore work closely together with other parties to deliver perfect pipelines to the client. Seeing that ShawCor clients not always have the storage space, we store the pipes on our sites until the moment of installation. On the one hand we work for clients on a project-basis, on the other hand we work for distributors that deliver coated pipelines to their clients."

Brent Fisher, Global IT Projects & Solutions manager at ShawCor: "A tight partnership between your je IT-people and your operational employees is necessary for such projects to be successful..Often there is still a gap between the two when they should be working together continuously in view of the perfect total solution."

Better traceability within partnerships

Together with the other links in the chain, ShawCor has to be able to provide a full record of all logistic movements/steps within the production process and quality inspections that are carried out on each pipe segment. In the old days all registrations were done manually on the sites of ShawCor – but that has some major disadvantages.

B. Fisher: "Considering the size and weight of these types of pipes it is first of all a d a n g e r o u s j o b . One pipe can easily carry the weight of an off-road vehicle. Seeing that we place a high value on safety, we encourage operators to stop the movement of the pipeline as soon as the slightest risk occurs. During their stay on our sites we move the pipes approximately 8 to 10 times which means that we have to make sure these movements are carried out as safely as possible. Even though it is sometimes unavoidable, we prefer not to have employees too close to the pipes."

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In addition, many manual processes are inefficient and error-prone. "The pipes sometimes arrive with old or damaged barcodes or with production numbers written in chalk on the inside of the pipe. It is then up to our employees to identify it on the spot. It goes without saying that this is a laborious task. Once in a while something is wrongly interpreted. It also happens that matters can be written over incorrectly", says Brent Fisher.

At the same time, clients increasingly ask ShawCor to help them improve traceability. This enables locating the source in case of wear and tear – or worse – in pipelines. "Many coaters still work in a traditional way. To be able to offer an apt answer to such questions gives us a certain competitive advantage. In addition, our partners in the chain experience the same pressure which means that an improved traceability benefits them as well. By taking the step to digitalization we treat ourselves, as well as our partners and clients, to a more reliable and safer chain. Furthermore, centralization of all the data we collect can help us to make better decisions in the future."

Support via RFID

To be able to make the right decisions right away, ShawCor looked for a partner that could offer the necessary ideas and support in the field of traceability.

B. Fisher: "We ended up with systems integrator Mieloo & Alexander. That party had already cooperated with Dhatec, a company we took over some three years ago which is specialized in products that prevent pipes from being damaged in the logistics process. A good example are the so-called **'end caps'** which we apply to the end of the pipes to keep moist and dirt out of the pipe."

"More and more clients ask ShawCor to help increase traceability."

"We were not only looking for a hardware and software provider but most of all for a party with a lot of experience with implementation of sophisticated identification systems", he adds. "We considered the fact that Mieloo & Alexander has an excellent feel for the varying sectors as a great advantage. In the end the basic principles stay the same – what changes is the environment. For example, we need industrialized, robust solutions. Mieloo & Alexander was very well capable to look over the walls of the various sectors."

The unique ID of each pipeline, the length and the heat number that refers to the origin of the metal are the starting points for each project at ShawCor. Extra characteristics can be added, depending on further processing. Even though the pipes are made from metal, UHF RFID turned out to be an appropriate tool to support the traceability within this environment after all.

Subsequently, ShawCor and Mieloo & Alexander looked how, and where, to bring out the best in RFID. The fact that a way had to be found to apply the tags in such a way that they survive the rough environment and treatment of the pipes was a specific challenge for ShawCor. Next to the automatic identification of the pipes, ShawCor also wanted to automatically record the locations and movements.

ShawCor has fitted the 'spreader bar' of heavy lift machines with an all-in-one box with RFID-reader, DGPS-modem (Differential Global Positioning System) and 4G/WIFI modem - which enables the machine to read and trace the tags every time a pipe is included.

First optimization steps

ShawCor took its first steps in the world of RFID during a new project in Northern Europe.

B. Fisher: "The client concerned had asked us to coat concrete pipes. Since he had also informed if we could apply RFID-tags to the end caps within that project, this seemed an excellent opportunity to proceed with the technology."

The industrial proof of concept followed after the technological validation. "We then applied RFID-tags on the inside of the end caps. Next to that, we fitted the 'spreader bar' of our heavy lift machines with an all-in-one box – with RFID-reader, DGPS-modem (Differential Global Positioning System) and 4G/WIFI, modem – which enables the machine to read and trace the tags every time a pipe is included. We have thus made the machine into a tool that closely follows all movements of the pipes. An important advantage during this project was that we did not need any operators to be close to the pipes to read data anymore."

Due to positive results during that test, ShawCor started exploring other possibilities right away. The company now also has fitted pipes and transport equipment with the necessary means to trace the movements in its distributor business.

B. Fisher: "Together with Mieloo & Alexander we now walk through all operational scenarios to continuously design the right solution. It is very well possible that for certain applications handheld readers are the most suitable tools – for scanning stock for instance. RFID-portals may also offer perspectives. These come in handy when, for example, you need to serially count which pipes are leaving on a truck for certain clients. This guarantees that only the correct pipelines leave. In that context it can be interesting to make automatic 'snapshot images' of the shipments in order to, next to the RFID-data, have 'visual proof of shipment' as evidence to show the client. In fact, those are all applications that Mieloo & Alexander have already applied elsewhere. Now it comes down to picking out the bits that are the most interesting within our context while keeping in mind our industrial environment."

Right now ShawCor's intention is to set up more 'continuous flow transactions'. "Since we are a highly project-based company we want to weave in technology in more and more projects. Each project can also teach us new things", says Brent Fisher. "We have already learnt, for example, that we should not trust in one single RFID-tag on a pipe. Within this environment you can never guarantee that a tag is not damaged or lost. Luckily our pipes have two end tags. This means that we can fit tags to both sides. As a back-up we also still have the unique identification of the pipe itself. Creating redundancy is extremely crucial in our environment."

RFID within the partner network

An important project that runs at ShawCor right now concerns an enormous Mexican offshore pipeline consisting of no less than 50,000 different pipes. The pipeline in question is being made for TransCanada, a company specialized in energy-infrastructure.

B. Fisher: "Based on our findings during the first phase, we have had an RFID-tag designed with a barcode on top – in view of optimum redundancy. The idea was that those tags would be attached to the end caps. The key question within this project was when we would attach those tags. If we had to attach the tags the moment the pipe comes to our site it will be done in an environment where dust and dirt influence the quality of tagging. In addition, it takes up a lot of our employees' time to apply the tags. That is when we spoke with Dhatec – the firm that supplies our end caps. Together with the producer of the tags they have made sure that these are already attached to the end cap before they go to the coating sites. This way a protection product for our pipes becomes a 'traceability tool' as well."

Half of the pipes that have to be delivered for TransCanada in this project come from Sumitomo, a steel producer in Japan. The other half comes from Tubacero – a Mexican steel producer. Sumito subsequently sends the pipes to two ShawCor coating factories – one in Malaysia and one in Indonesia – where an anti-corrosion layer is applied. Tubacero takes care of the coating of the pipes manufactured in Mexico.

B. Fisher: "In a next phase we talked to both our own factories in Malaysia and Indonesia as well as with Tubacero. We proposed to install the end caps right after the anti-corrosion coating so that all those sites – even though Tubacero is not part of our company – have their own efficient tracking system which enables them to improve the service for the client. We were pleasantly surprised that Tubacero immediately saw the advantages of this and that they were prepared to come on board. After coating at Tubacero, the pipes now go to our two mobile sites in Mexico where we receive the pipes and store them until they are ready to be installed.

The reception of the pipes there now takes place by reading the barcode on the pipe. Because those barcodes are extremely large the operators do not have to come very close to read them which ensures a better safety. That way of working also turns out to be highly efficient and ensures an error-free readout."

Centralization via loT-platform

The final goal consists of bringing all collected data together on a loT-platform, mainly ViZix by Mojix, which is being realized by Mieloo & Alexander.

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B. Fisher: "That platform allows for collecting information from various data points – irrespective of our ERP-system. Our ERP is also not concerned with GPS-information or 'time-stamps'. For instance, the loT-platform allows us to see

which movements exactly a pipe has undergone on a certain day, on which yard location a certain pipe is, etc. That platform will also provide our analysts with the necessary data for a more efficient execution of certain movements in the future. Vizix also offers the necessary reports and makes it possible to easily visualize certain matters. This allows you to download a Google map from your site to map certain matters. Right now we are busy integrating the project for TransCanada. As soon as that is realized it will certainly be a bonus in the field of efficiency."

Brent Fisher states that the most important challenge during the past projects is finding the correct identification solution for each specific scenario. "That will always be a challenge. That is why thorough prior investigation for each project is a must. As mentioned, we keep emphasizing the importance of redundancy in each project – where identification possibilities have to be interchangeable."

"Furthermore, you also have to create a tight partnership between your IT-people and your operational employees for such projects to be successful. Often there is still a gap between the two when they should be working together continuously in view of the perfect total solution", he adds. "Last but not least, we have experienced that it is better for a company like ours to involve an external party for such matters. It is absolutely not our ambition to re-invent the wheel while the systems integrators only have to pick the right solutions from their shelves. The challenge is to then combine these in a targeted way. In that respect it is a great reassurance for us that in Mieloo & Alexander we have found a partner that can offer us the necessary support during our projects."

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