How to turn a pipe shop into a 'smart shop'

What are the biggest challenges pipe-shop managers currently face? The most common answers are likely to include at least one of the following: a shortage of skilled labour; high per-unit fabrication costs; out-dated or obsolete equipment (in some cases barely functional, because the OEM can no longer provide spare parts or there is nobody in the company who is able to operate/maintain it); and increasingly strict quality control and environmental regulations.

Similarly, if you asked what the biggest time loss and cost factors are inside a shop, it is likely one of the following would be mentioned: waiting/idle times at machines and work places; planning time, including turning spool drawings into actual work packages, as well as allocating work orders; and time spent on documentation and reports.

So how can these challenges be faced, and the loss and cost factors be alleviated? How can a spool shop be turned into a 'smart shop', that allows the manager to run it efficiently, with a minimum of idle times, and a maximum of productivity?

The obvious answer is automation, but unfortunately the answer comes with a string of new questions:

- Is automation even possible for a job shop, which does not focus on mass producing the same type of spools in large quantities, but instead has a large number of small batches of different spool types?
- Should the shop be automated all at once, or piece by piece?
- How much money should be invested, and in what machines, in order to be economically viable?
- How can automation of fabrication processes help resolve problems such as idle times, or time spent on administrative tasks?

3R solutions has been a specialist in pipe-shop automation for more than 40 years, and has set up pipe-shops all over the world. Its concepts combine sophisticated software with powerful processing machines and customised logistics systems.

"Our goal is to offer the customer a pipe-shop concept that is optimised for his individual requirements," said CEO Georg Schulze-Duerr. "Every customer and project is somehow different, with different expectations, requirements and needs and it is very important to find a tailor-made solution that works perfectly for this customer within his budget. You cannot just offer a one-size-fits-all product."

As a first step 3R performs an in-depth consultation, where it talks to all involved parties and suggest potential machines and methods.

"It is common for a customer to have certain expectations of how things should be done, but once the discussion starts, and new ideas are kicked around, the end result is often somewhat different from their initial ideas and ours," Mr Schulze-Duerr explains.

"The worst entality for any innovation is usually 'we have always done it this way', closely followed by 'everybody does it like that.' The idea is to improve and to find a way to do things better."

"Our company founder Mr GA Nieweg was one of the first people to offer software that turned engineering data into fabrication data and to control the workflow of a pipe-shop. This was in the early 1980s on Hewlett Packard workstations, long before Microsoft Windows or Apple became the household names they are today."

It is this software that sets 3R solutions apart from our competitors, as is the level of integration of software, logistics and machines. "It is tempting to think that you can improve your fabrication by buying some machines and some conveyors," said Mr Schulze-Duerr. "But all processes inside a pipe-shop are connected and interdependent. If you change one component, you can expect problems to show up somewhere else. If done correctly, you can achieve a massive gain in productivity, saving a lot of money. If done incorrectly, however, you spend a lot of money for little gain."

"It does not help me if I can weld a pipe three minutes faster than I could before, if it still takes me the same time to bring the pipe from the beveling station to the welding machine. And how automated is my transport, if my conveyors only moves while I hold down a button? Especially if my conveyor is thirty meters long, and I need a spotter to let me know when to let go of the button? Once I am done at my station, one single push of a button should send the pipe on its way to the next station, let the control system know that I am ready for the next one, and update the database with the current status of my machine, the pipe I just processed, and the pipe I am processing next."

This central control system and database are the key to efficient workshop processes. "You need to track the Five Ws of Fabrication," Mr Schulze-Duerr says: "Which pipe? Which machine? What work order? Which operator? What time?"

"With modern machines we can also track a lot of machine information, getting the shop ready for Industry 4.0."

Adjusting machines for integration into an automated flow is another advantage 3R offers the customer. "A lot of customers are looking at machines as autonomous units. They buy each machine individually, usually going through a standard bidding process and award the contract to the cheapest bidder.

"In the end you have what we call a 'patchwork shop' and they are a challenge to integrate, because nothing is designed to work together.

"A pipe-shop is like a jigsaw puzzle. You cannot take pieces from three different puzzles and mash them together," Mr Schulze-Duerr explains. "We have worked closely together with a number of leading machine manufacturers. They know our requirements for integration. Quite often the required modifications are not complicated, but they can make or break a pipe-shop."

3R solutions
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