

LINGJACK ENGINEERING WORKS

Extinguishing scepticism about change

Labour shortages in the fire safety industry pushed Lingjack's Kenneth Lim to automate its work processes, but the change did not happen overnight.

IN AN industrial building in Woodlands, powerful arms work tirelessly: feeding sheet metal into machines, lifting heavy cylinders, welding and spray-painting.

Robotic arms, that is. In 2016, with the help of a grant from Spring Singapore, 14 robotic arms were incorporated into the production line of firefighting equipment maker Lingjack Engineering Works.

Managing director Kenneth Lim quips: "If I get more orders, I can always get the machines to work longer. I don't need to have a headache if tomorrow is a holiday and nobody wants to work for me."

Yet his light-hearted tone belies the manpower challenges that prompted the small firm to embark upon automation.

EARLY EVOLUTION

Mr Lim is the second generation to head the firm, which his father founded in 1971 as a sole proprietorship. Originally a general engineering firm, Lingjack began making fire extinguishers in the 1980s, establishing the Combat brand which endures today.

After becoming a private limited company in 1991, Lingjack started to expand its product range to other fire safety products.

In 1997, it moved from a flatted factory to its current premises, adding more production lines now that it had its own building.

Further transformation and expansion were to come after Mr Lim took on a management role in the 1990s.

Previously, Lingjack had focused on the Singapore market, making only occasional overseas sales when it received enquiries. But Mr Lim saw a need to go further.

"The simple fact is that the Singapore market is very small," he says.

In 2000, Lingjack achieved United Kingdom certification, opening the door to markets in Europe and the Middle East. The firm began going for international exhibitions, picking up distributors in various countries.

Since around 2008 or so, it started looking closer to home. Says Mr Lim: "For us now, our focus is back to Asia and the Middle East, where we see growth, rather than the Europe side."

The firm has offices in Vietnam, Myanmar and Indonesia, as well as one in Shanghai that focuses on the marine offshore industry, and a factory in Johor Baru.

Lingjack's expansion has not just been geographical. Over the last 10 years, it has moved into equipment trading, representing manufacturers from the United States and Europe and bringing their products to Asia.

Retaining its focus on the fire industry, the firm also works on fire protection systems, seeing projects through from concept and design to fabrication and commissioning. Yet throughout these changes, its manufacturing operations in Woodlands remained labour-intensive – until 2016.

FIGHTING THE LABOUR CRUNCH

Lingjack faces the same key challenge as many other small manufacturers, says Mr Lim: "You cannot find Singaporeans anymore."

Before automation, Lingjack had some 45 production workers, accounting for about half its headcount. Because many of them were foreign workers, quotas and levies were a constant source of pressure.

It became clear that the firm could not carry on with its reliance on labour-intensive manual work.

Mr Lim admits that the transformation plan did face some resistance from some of the older management.

But the undeniable fact of the industry's labour shortage helped him push for change.

Financial support from the government also helped to soften the blow of the heavy investment required: "If we had done it ourselves, it would definitely have been a slower process."

As it was, the process was hardly speedy. The firm took its time to understand what automation should entail, and to get management buy-in and workers' support.

Says Mr Lim: "What we do is to go slowly, step by step, to get things changed."

In 2013, before approaching Spring Singapore, Lingjack bought a single small robotic arm. "We thought we should buy one and try. The key thing is to let everybody have a feel: what is a robot, how does it help you."

After all, he adds, the biggest challenge in transforming is not about getting the hardware: "From top



"Robots, to us, are a long-term investment. The benefits we get are more intangible," says Mr Lim.

BT PHOTO: YEN MENG JIIN

to bottom, it is all about the mentality."

"To really get your existing staff, especially older workers, to accept the fact that we can do things in a better way ... that is where we really spend a lot of time guiding them.

"And the process is not easy, you know – they always tend to swing back to what they are used to."

Lingjack has many workers who have been with the

firm for 20 or 30 years. Says Mr Lim: "When you put in something new, they will say, 'Eh, this one cannot work.' They give you all sorts of reasons.

"It's not that they don't believe (in change), but they feel that automation has a lot of problems. So we have to prove to them that this thing can work. It takes a while."

Happily, once staff saw the effectiveness of their

mechanical “co-workers”, they were convinced of the need to move forward with automation.

“After that, you will start to see that they are the ones pushing you more now,” Mr Lim says with a laugh.

“They will say, ‘Why don’t you automate this, why don’t you automate that,’ because they realise that actually, there are a lot of things they don’t need to do.”

Alongside trialling the first robotic arm, the firm spent more than a year researching automation.

“After that, we decided that, okay, we have acquired enough knowledge to move on. That was when we decided to invest heavily with the help of Spring Singapore.”

The caution was partly because they had heard “a lot of negative stories” from elsewhere in the industry, adds Mr Lim: “You buy automation (equipment) and after that it becomes a white elephant.”

Lingjack wanted to be practical in its investment. Instead of replacing its entire production line, it made changes only where necessary.

For greater efficiency, two manual processes – cutting and bending sheet metal – were automated, with new laser-cutting and automated bending machines. The robotic arms were simply integrated into the workflow, working in tandem with existing machines.

FIRED UP FOR THE FUTURE

The journey from sheet metal to finished product does not take place along one continuous production line. Each process requires a different machine, with the half-formed fire extinguishers having to be loaded and unloaded at each point.

Previously, one particular seven-step stretch – shaping cut metal sheets into the fire extinguisher bodies – required seven workers, just to load and unload the machines.

With robotic arms bridging the gaps between each machine, human workers need only load the cut metal into the first machine, and finally unload the shaped cylinders at the other end of the whole chain.

“Now it’s just one process,” Mr Lim sums up. “We streamline the whole process and operation and make it so easy that you technically need maybe 1.5 people there.”

Lingjack’s production team has thus been trimmed

to 25 workers. With about 60 people in total in its Singapore office, the firm is comfortably below the manufacturing sector’s foreign labour cap of 60 per cent.

Output has increased, and Lingjack estimates a total efficiency gain of about 40 per cent from this move.

But the pure return-on-investment figures are not the point, says Mr Lim.

“Robots, to us, are a long-term investment. The benefits we get are more intangible.”

The automated laser-cutting machine allows for greater product consistency and quality, resulting in fewer rejects and less wastage.

With about 90 per cent of work processes automated, the business is much more “scalable”, with the capacity to take on more orders. “Even the workers themselves are happier,” says Mr Lim.

And while automation was seen as a direct way to cope with the labour shortage, it has ameliorated the issue in another way as well, he adds.

“That is also how we attract the young engineers to come. You know young engineers – they come, they see all the robots, they’re happy,” he says with a smile.

ROBOTIC ATTRACTION

Of the six people in Lingjack’s engineering team, three were hired as fresh graduates after the company embarked on automation. Lingjack’s continuing transformation will create more jobs that appeal to younger workers, with software engineers required for its next phase: digitalisation.

As before, this will not involve a full overhaul of the production line, but judicious additions and tweaks. Data will be collected from existing machines and uploaded to an online network.

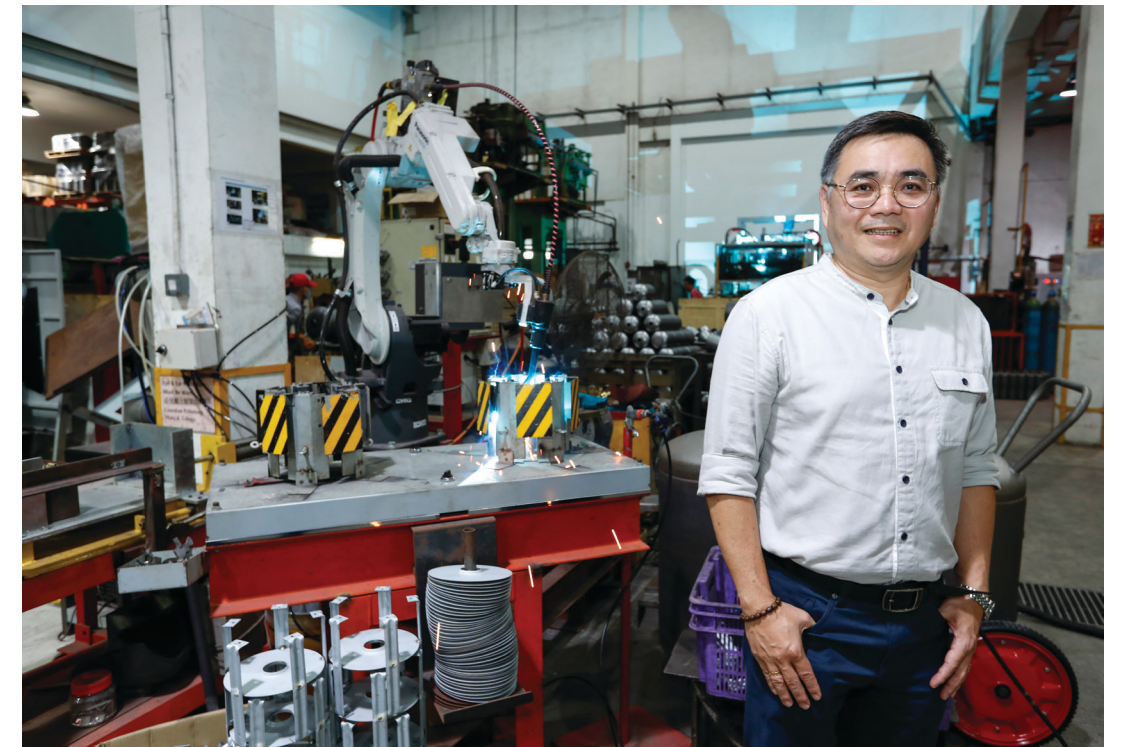
“Eventually we will be able to view our operations from our handphones offsite,” says Mr Lim. He expects this phase to be complete by next year.

By committing to internal transformation, Lingjack has also improved its external image. The updated factory floor is now a point of pride that can be shown to visiting customers.

On a less tangible yet no less important level, the company’s future-oriented stance burnishes its brand and reputation.

After all, the fire safety industry is unique, says Mr Lim: “It is an industry where I sell you products, (but) I don’t want you to use them. I want to sell you a good extinguisher, but I hope that you don’t have to use it.”

It is thus crucial to build customer confidence in Lingjack’s products and the company as a whole: “You can be confident that if you buy my extinguisher and put it in your home or office, when something goes wrong, you know that it will work.”



Engineering greater efficiency

WHEN Lucas Fong joined Lingjack Engineering Works in 2010, the firm’s engineering department was undergoing a modest change: switching from 2D drawing software for product designs to digital 3D modelling.

Mr Fong has since risen from being an engineer to becoming Lingjack’s senior engineering manager – and has overseen a much more dramatic transformation.

In 2016, Lingjack moved towards automation. The idea was not to overhaul the entire approach, but to replace specific manual processes.

These included simple, repetitive tasks such as transferring materials from one machine to another; spray-painting the fully-formed cylinders; or lifting empty extinguishers into place to be filled.

“All these repetitive jobs can be done by robots,” says Mr Fong. Fourteen robotic arms were thus added at various points in the production line.

Other tasks that were particularly suited for automation included those that required precision. Lingjack therefore invested in automated machines for laser-cutting and bending metal sheets.

The firm has benefited from the resulting rise in accuracy and quality, and is better able to tackle ad hoc specifications or new orders.

Lingjack’s workers, too, have gained. Previously, they had to manually cut and bend metal to meet

various product specifications, and move stacks of material or half-formed products.

Now, with the laser-cutting and auto-bending machines programmed accordingly, they can stand back as robots do the heavy lifting. The robotic arms have also taken on dangerous tasks such as welding.

Not only has this made workers’ jobs safer and less tedious, it has also increased their skills and hence their value, says Mr Fong: “The workers can concentrate on doing more important work.”

Lingjack’s production workers went for training to learn how to program the robotic arms – a big step up from their previous manual jobs.

The change was not necessarily easy. Many workers are old hands at the job, averaging more than 10 years with the company, says Mr Fong: “They know the process well.”

But that is precisely why it was time to go one step further, he adds.

For their part, Lingjack’s engineers learnt how to configure the automated machines and troubleshoot.

Speaking for both himself and the engineers in his team, he says: “It feels great to do more challenging work.”

But just as satisfying for him was Lingjack’s brave choice to transform: “Of course it felt great. It is the correct vision for us to go forward.”

Lingjack’s engineers had to learn how to configure the automated machines and troubleshoot. Speaking for both himself and the engineers in his team, Mr Fong says: “It feels great to do more challenging work.”

BT PHOTO: YEN MENG JIIN

Once staff saw the effectiveness of their mechanical “co-workers”, they were convinced of the need to move forward with automation.