

HI-ALLOY CASTINGS

Foundries are traditionally depicted as being dirty, dark and dangerous but the current General Manager of Hi-Alloy Castings, Dalmari Mc Queen, is focused on transforming the company into a “foundry of the future” which is digital, intelligent, clean and green. Mc Queen is an industrial engineer who has a long history of working and consulting in the foundry sector. For many years she has been focused on refining her ideas around digitalising a foundry and Hi Alloys provided a perfect opportunity to implement some of these ideas. She took over at a rather low point in the company’s 40-year history. Within months of joining the company she found herself at its helm trying to navigate it through business rescue and the COVID-19 pandemic. Despite these developments, the team in conjunction with the majority shareholder stabilised the company, brought it out of business rescue, and in the process has begun to turn Hi-Alloy Castings into a “learning factory”.

This revival is mainly due to a commitment to introduce lean manufacturing principles as well as some of Mc Queen’s ideas around digitalising the factory. She was inspired by the potential of digitisation that was made popular by all the talk about a Fourth Industrial Revolution. As such, she looked at the business, its operations, and its customer relations from a digital perspective. Whereas many foundries use information and communication technology (ICT) in design and accounting, she wanted to see the design of the casting and its production process – not only for management to see how everything comes together, but for all the staff to see as well. During a walk around the foundry, you invariably see designs taped to the walls. She did this as part of an attempt to involve the staff to imagine how the casting could be made.

TECHNOLOGICAL CHANGE AND INNOVATION SYSTEM OBSERVATORY

The aim of the Technological Change and Innovation System Observatory project is to support the Department of Trade, Industry and Competition (the dtic) and industry sectors to develop an integrated, strategic response to discontinuous technological change and disruptive innovation. It aims to equip public and private organisations to become more sensitive to global technological shifts, and the changing demands placed on the innovation system, the manufacturing sector and its stakeholders.

TRADE & INDUSTRIAL POLICY STRATEGIES

TIPS supports policy development through research and dialogue. Its areas of focus are trade and inclusive industrial policy, and sustainable development.

Author:
Renee Grawitzky

info@tips.org.za
www.tips.org.za

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SHOWCASING TECHNOLOGICAL CHANGE

Companies adopt new technologies and digitise for different reasons. These may be innovation and staying ahead of competitors, cost reductions, reducing production times, enhancing customer support, or even a means to resuscitate a company at risk. This series of case studies explores the success companies have experienced in adopting new technologies and digitising their operations. Companies have made these changes over time and in all the case studies have had positive outcomes. They have grown, improved employment, and increased skills levels.

The case studies form part of work TIPS has undertaken with the Department of Trade, Industry and Competition (the dtic) and in partnership with the World Economic Forum to showcase the benefits and importance of technological change by South African companies. This case study profiles Hi-Alloy Castings, a foundry that is digitising and involving its workers in the process. Other case studies are: Prestige Clothing TFG, Imraan Textile Mills; Jendamark Automation; and ModeTech Services. Copies of the case studies are available at Technological Change and Innovation System Observatory.

Concurrent engineering, defined as a collaborative, team-based approach for designing products that combine multiple departments and disciplines into a project team, is one of the changes introduced at Hi-Alloy Castings.

As a result of her focus to turn the business around, she has introduced various initiatives to reduce costs and improve efficiency and competitiveness. Such measures have included digitalising various functions with plans to look at some automation in the future as well as streamlining, improving and enhancing the pattern-making process. This aimed to entrench the company's niche in making a range of quality products with agility along with the ability to react quickly to opportunities.

Hi-Alloy Casings is based on the East Rand and was founded as a small operation in 1981. Originally the company manufactured components for the Shot Blasting Industry with a 185kg Pillar Induction Furnace. Over the years, the company grew and experienced a number of ownership changes. Today it designs and produces metal shape solutions for the crushing, mineral processing, pump and valve and general engineering industries. And while it is a relatively small foundry, it has a significant global presence as its products are exported worldwide through its customers.

Before going into business rescue the company had a staff complement of 115 and an annual turnover of around R75 million but had not been breaking even for a number of years. Today, its staff complement is 71, its annual turnover is in the region of R50 million a year, and the company has a positive cashflow and has repaid its business rescue debt. Hi-Alloy Castings has survived when many of its competitors and other foundries have been forced to close their doors. This is mainly as a result of implementing an open dialogue between staff and management, using technology to link everyone in on the information flow, and by giving ownership of key functions to all levels of staff.

TECHNOLOGICAL ADVANCES

The crisis – brought about by the company going into business rescue and the start of the COVID-19 pandemic – provided the impetus for change. This change was about innovation. It was about improving processes, products and business models with the aim of laying the foundation for a foundry of the future. The key interventions have focused on the following areas:

- Digitisation and integration of vertical and horizontal value chains.
- Digital business models and customer access.
- Creating or augmenting smart products and services (digitisation of product and service offerings) which are in a development phase.

Some technological changes that took place first included digital connectivity and shifting from paper and forms to digital solutions. This process saw computerised systems from requisitions to the payment of invoices, resulting in the streamlining of systems. The financial and production systems are now all synchronised and accessible. This has led to improving resilience of supply chains and logistics as well as improving inventory and job tracking.

The second change was around improving the technologies and methods for the pattern-making process, so as to improve overall quality and ensure greater stability and consistency. In addition, initiatives are underway to explore new raw material inputs, for example advance and smart materials. As part of this change, concurrent engineering has been introduced in which design and engineering work together to ensure the customer knows that the producing process, pattern and final casting meets the specifications. Concurrently the company implemented a Customer Relationship Management system. This was to build stronger relationships with customers and moved into co-creating with some customers.



The third area of change was organisation-wide communications and collaboration tools to improve communication within the company. An example of this is making the operations, volumes, specifications and even key financial data visible and available to staff. The next area of change was greening the production process by exploring new methods around the moulding process. Last, the company focused on improving employee safety, well-being, and health. There is an increased focus on employee wellness, using digital platforms to do inspections and ensure a quicker turnaround time for problem solving.

IMPACT ON JOBS, SKILLS AND WORK ORGANISATION

As a result of the restructuring and the move towards digitisation, the company needed employees with more IT skills, while those employees who were promoted into other positions (as a result of the restructuring) were upskilled in a range of areas. In response to the changing needs, the company has been focused on providing all employees with training in different areas to the point that most employees have been upskilled in the past two to three years. This upskilling has applied across the board from shopfloor workers to supervisors and to managers. For example, the emphasis on digital training means that more than 60% of shopfloor workers are now able to either use a tablet or computer, while the same applies to managers across the board. There has also been an increased focus on technical skills training around the pattern and moulding-making process. This has focused on attention to detail and improving precision to ensure consistency around the mould-making process. As Mc Queen points out, one of the key weaknesses they needed to address was attention to detail. The aim of upskilling in this area, which has taken the form of continuous on-the-job training, has been to ensure that the moulding process is more precise and stable.

Aside from digital and technical training, the company is focused on continuous on-the-job training to ensure that employees maximise their potential, as well as customer relations training. All employees have received training on the importance of the customer and ensuring good customer relationships. This has even extended to the drivers who deliver the finished products to customers. They not only check that products are up to standard and of the right quality but are aware of their roles and responsibilities on delivery.

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When the company went into business rescue a number of managers resigned, resulting in a whole layer of management almost disappearing. A number of these positions fell away (as the company had been top heavy) and a number of these positions have been filled by workers from the shopfloor.

Technological change has not in of itself led to a significant change in the nature of jobs. This is partly linked to the fact that the production process has not changed significantly. With an increased focus on digitalising operations and processes, jobs have been enhanced and expanded. This has been especially so from supervisory level upwards. When the company went into business rescue a number of managers resigned, resulting in a whole layer of management almost disappearing. A number of these positions fell away (as the company had been top heavy) and a number of these positions have been filled by workers from the shopfloor. This took place alongside implementing technology to take over the management function in certain areas. Mc Queen explains that these workers have been upskilled, but the reality is that “some of them knew these jobs but no-one had given them a chance before”.

While digitisation has raised the need for more IT skills, what has also emerged in the company is a commitment to ongoing upskilling leading to more multi-skilling. So, for example, a security guard who showed potential beyond checking in people and checking out shipments was given more responsibilities. The security guards have received digital training, with the result that the security guard on day duty tracks and monitors the outflow of finished products online, and this is the same for raw materials delivered. The security guard on night duty also performs the function of the night shift supervisor and monitors what happens during the night shift as the foundry is a 24-hour operation. The technical manager (who used to be a supervisor) says, “everyone has more of a culture of I am not doing one job but doing different things”. The shop stewards, who are very much part of the decision-making processes in the company, are on board with this and understand the need for everyone to pull together to ensure the survival of the company.

The shop stewards pointed out that there is greater teamwork and workers are given more opportunities for promotion and to grow. They not only feel more empowered with increased knowledge such as digital skills but, if they show ability, they can move to other divisions. In effect, most jobs have been enhanced and workers have more scope to expand their jobs or perform less standardised tasks, and have more opportunities of taking up leadership roles. Mc Queen pointed out that, depending on projects, different people are identified to lead projects, providing them with opportunities to take responsibility and lead.





IMPACT OF NEW TECHNOLOGIES ON THE BUSINESS

The impact of introducing new systems and processes, and a commitment to digitalising, has contributed to the growth and success of the business:

- The company has been able to move out of business rescue and is now stable. The company is one of the 6%-7% of South African companies that went into business rescue ahead of the pandemic that has survived. Mc Queen points out that the company is not out of the woods, but the situation has stabilised to the point that it is now able to pay back its business rescue debt.
- Digitising the various business functions has ensured there are more checks and balances in place and all processes are being monitored online. This has led to more sharing of information and higher levels of transparency. As one manager pointed out, “people now share information and there are more open relationships, and we discuss things to find solutions”.
- While production processes have not changed, what has changed is the way patterns are made as they control the end product. As a result, a lot more effort and intelligence is going into this process to ensure more precision and consistency. The ultimate aim is entrenching the company as a niche small-scale series production and personalised customs once-offs.
- As a result of changes in the way that product and process inspections happen, quality has improved, and waste has been reduced.
- While the company has always been focused on building customer relations, this has been taken to a new level. Not only do all workers understand the importance of “the customer” but the company has forged closer relationships with its key customers and moved into a space of “co-creating” to ensure the final product exactly meets the customer’s specifications.
- Lead times from pattern-making to production of the final product has been reduced substantially. For example, previously the pattern-making process used to take four to six weeks but now it is taking between one to two weeks. From casting to delivery used to take up to a month and now it takes between five to seven days. This is a result of improved systems and an awareness of what the customer wants.
- Overall competitiveness has increased as a result of bigger throughput in the factory, reduced fixed costs and more strategic purchasing of raw materials, including promoting the circular economy by recycling scrap metal from customers as well as reduced wastage.
- As a result of employees understanding the connections between waste and energy consumption, or between one area in the business and another, they started to make small improvements by themselves. This in effect translates into employees taking ownership of tools, materials and areas.

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And what has been the impact on workers?

More than 60% of shopfloor workers have to date received computer training. This has provided some with the opportunity to move into other positions and has empowered many. For example, one worker who is now the health and safety representative and uses a tablet constantly to monitor safety and to order safety equipment said: “we want to learn, and we are no longer scared about technology anymore”. A supervisor who was promoted to become the technical manager states: “I have worked on the shopfloor for most of my life and I am a hands-on guy and now my job has changed. I have learnt digital skills and I am learning a lot.” In a similar vein, one security guard received computer training and, as a result, part of his function is to monitor and track goods coming into the factory and those leaving. He is so proud that he is now computer literate and has upskilled himself.

The company’s commitment to on-going learning and on-the-job training has meant that “people are upgrading their skills daily”. One of the drivers stated that “things are more organised – she (Mc Queen) is pushing for new things every day and we learn every day!” One shop steward stated, “people feel more valued, and people have more freedom and autonomy”. The shop steward added that people do now not have to wait for management, “people are building their confidence”. With the shift in culture away from the “blaming game, people are supporting each other more and helping each other ... We are sharing our experiences with the person next to us. It is now a more open factory with more of a sharing of skills and knowledge. Workers feel more valued and more empowered.” Finally, a metallurgist responsible for the moulding department spoke about her growth and her growing ability to communicate with and manage people. As a woman it was initially a challenge as the company has “always been run by men but now that Dalmari (Mc Queen) came along, they are now more open to accepting me”.

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FACTORS WHICH ENABLED OR HINDERED CHANGE

Introducing different ways of working was driven by the need to save the company and ensure its ongoing sustainability. The company went into business rescue in September 2019 just months before the pandemic. While the company was in a niche market and had been in existence for a long time and had a stable customer base, it had been experiencing losses for a significant number of years as its overheads continued to rise. When the company went into business rescue the existing CEO stepped down and Mc Queen, who had just joined the company in another capacity, agreed to step in and try and save the company together with the main shareholder. “It was the crisis which made us look at what could be done, and it forced us to take action,” she recalls. The action taken included streamlining the management structure, which was top-heavy and bloated, reducing costs, improving competitiveness and sustainability. In view of her passion for systems and her desire to transform H-Alloy into a “foundry of the future”, she drove the introduction of her ideas around digitalising.

While it has not been an easy road, what made the process easier was that the restructuring did not lead to any forced retrenchments as a significant number of management and staff left when the company went into business rescue. The departure of older managers paved the way for Mc Queen and her team to begin to drive a new agenda, culture and begin to change attitudes. Mc Queen explains that one of the key problems in the foundry sector has been the management culture and management mindset which she has begun to address. The second key challenge has been cashflow which was compounded by the start of the hard lockdown during the pandemic.

Having sorted out initial cashflow problems, Mc Queen and a small team began the next big challenge of addressing the culture in the company. “Everyone jumps to the conclusion that skills are the issue, but the biggest battle is around culture and how do you redefine a company culture.” The existing culture, she explains, was characterised by what she calls the “blame game”. Today, she says, there is a greater focus on continuous on-the-job training, which is leading to greater efficiencies and improved productivity and reduced waste as quality assurance processes have changed with a shift away from the “blame game” towards joint problem solving. She explains [that if there is a problem, for example with a casting and it is rejected, “we come together to find a solution instead of looking to who we can blame. During such a process we use the opportunity to turn the problem-solving process into a training process as part of our commitment to continuous improvement and learning. I do not want to hear blame rather let’s see why this is happening and I am trying to teach the managers and supervisors to take responsibility.”

In addition, management historically in South Africa has underestimated the knowledge of workers on the shopfloor. The new focus of the company is not only to drive out the culture of blaming but to empower workers (who have the knowledge) and allow them to take ownership of their work. Other interventions introduced to pave the way for change have included the following:

- The General Manager believes strong in leading by example. As a result, the management team are visible on the shopfloor and, when necessary, will perform tasks required on the shopfloor where there are gaps. Mc Queen walks on average 10 to 20 kilometres day on the shopfloor so as to monitor what is going on and to ensure that “we are managing on the shopfloor and not just sitting in our offices”.
- The management team works closely with the shop stewards and built up a strong relationship during the restructuring process. Through this process workers have begun to understand the business better.
- There are higher levels of transparency around the state of the business and there is more sharing of information and experiences.

VISION FOR THE FUTURE

The basis has been laid for Mc Queen to turn Hi-Alloy Casings into a foundry of the future. She and her team are slowly building trust among the employees and plans are underway to continue implementing lean manufacturing principles. During business rescue, the foundry did not have any capacity to really expand or make investments. All the changes that have been introduced have been done on a shoestring. Now that the foundry is sitting with a positive cashflow, it can now invest and expand the design capacity, and make further improvements in the manufacturing side.

As part of her vision, Mc Queen is intent on entrenching Hi-Alloy Casings as a niche foundry. Mc Queen explains that small foundries like Hi-Alloy are classified as jobbing foundries, namely, foundries that do a range of small jobs rather than mass production. While the company has already begun to distinguish itself from jobbing foundries, the plan is to further entrench itself as a niche foundry doing small-scale series production with customised once-offs. This will be achieved by continuing to build the companies pattern-making capacity to produce customised products. The focus is now on upskilling the pattern makers and continuing to introduce more process controls into the pattern-making process and manufacturing process.

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