

The rise of robotics in the automotive industry

When it comes to industrial robotics, there's no doubt that its' greatest impact is in the automotive industry. The technology has given manufacturers a competitive advantage - improving the quality of production, increasing output capacity and protecting workers from potential hazards. However, it took decades of refinement for us to reach the point where we are at now.



Riccardo Ferrari, system solutions engineer at Yaskawa Southern Africa

After World War II, the industrial boom required manufacturers to meet increasing demands. The only way to do this was to create and implement technology that could assist in the delivery of higher and more consistent outputs. Factories experimented with new methods and approaches, but it was the arrival of the first integrated circuit in 1970 that signalled the real possibilities of automation.

“Nowadays, it’s common to find single-arm robots used for repetitive work in automotive factories,” says Riccardo Ferrari, system solutions engineer at Yaskawa Southern Africa. “They’re generally used for spot welding, glue application, milling and the handling of larger parts such as bonnets, windshields, and bumpers. And you’ll also find them being utilised in the painting of cars, which has been a robotic process for a long time now.”

Yet, the rise of robots in the industry created a myth that machines could do everything in the manufacturing process, eradicating the need for human workers. Ferrari dispels this notion, insisting there’s a strong symbiotic relationship between the machines and humans.

The manufacturing process still requires humans

“One of the common misconceptions that everyone has about robots is that they handle the entire manufacturing process – from start to finish – without intervention,” he says. “That’s an inaccurate belief because most industrial robots are fixed to a station. They still require a human to present the parts, via a tub or tray, for the robots to do the work. More importantly, they still require a human to program them and tell them what to do. Simply put: Without each other, the process just wouldn’t work.”

Due to its high levels of precision and reliability, a robot is a tool capable of performing certain functions that might be deemed extremely dangerous or next to impossible for a human to execute. From handling heavy spot welding equipment to lugging around hefty and sharp materials, these aren’t exactly tasks that you’d want to give a human worker in the first place. That being said, humans still hold the advantage over robots in several regards.

“Robots lack many cognitive functions, such as the ability to recognise shapes and figures so quickly,” Ferrari explains. “The human eye, as an example, is able to identify an object’s location far quicker than a robot’s 3D vision ever will. It’s about recognising the strengths and weaknesses of both humans and machines, so that we’re able to divide tasks more adequately to achieve better results.”

An area where human insight is still paramount is in the design thinking phase of automation. If the proper consideration and planning aren’t put in place, the whole process could fail.

Human and machine collaboration

Ferrari explains how this approach is about more than just identifying the correct robot for the required application. “When you put a robot into a factory, everyone looks at the robot and the task, but very little attention is paid to everything that’s peripheral – and often that’s what makes or breaks a system. You need to consider everything surrounding the robot and application, paying attention to what’s upstream and downstream of it. And more importantly, how it all needs to move together.”

Ferrari uses an example of a welding application in an automotive factory. Not only is the robot vital to the process here, but so is the consistency of the welding wire, the quality of the gas supply, and the position of the parts. Then, there are other peripheral factors such as where the cell is stationed – because a poorly positioned cell could hinder the workflow of the entire factory.

It’s critical thinking that will help move the field of robotics forward, according to Ferrari, and this requires factories to analyse their current processes and applications to see how they can evolve to become smarter and more efficient.

Looking towards the automotive industry’s future with production leaning towards electric cars, robots will still have their place, except instead of handling engine blocks, they’ll be handling battery packs. It’ll be through this type of innovative thinking and a hybrid form of human and machine collaboration that’ll lead the industry into a brighter and productive future.