

WHEN COBOTS DON'T WORK FOR YOU

THE EFFICIENCY EDGE

Cobots, or collaborative robots, are a type of industrial robot designed to work in close proximity to humans in a shared workspace. But while cobots are designed to work with you, they don't always work for you - and their effective use will depend entirely on the production environment concerned. In this article, we'll first unpack their history and purpose, consider the pros and then dive into the cons for various use cases.

Invented in 1996 by professors J. Edward Colgate and Michael Peshkin of Northwestern University, the cobot was the product of a research grant from the General Motors Foundation aimed at developing robot-like equipment safe enough to team up with workers in an automotive factory.

Unlike traditional industrial robots, which usually operate in separate, fenced-off areas for safety, cobots are equipped with sensors and safety mechanisms that allow them to operate safely alongside human workers.





They are designed to assist human workers by taking over repetitive, strenuous or dangerous tasks, enabling workers to focus on activities that require more complex decision-making or craftsmanship.

In essence, cobots represent a significant shift in the world of robotics and manufacturing. They embody a move away from a model where robots replace human workers, towards one where they work alongside and augment the capabilities of human workers. This synergy of human and machine collaboration can result in a more efficient and safer manufacturing environment.

Human-cobot collaboration

According to the International Federation of Robotics, there are four levels of collaboration between industrial robots and humans:

1. **Coexistence:** Where humans and robots work alongside each other without a fence but no shared workspace.
2. **Sequential Collaboration:** Where the human and robot share a workspace but do not work on a part at the same time.
3. **Cooperation:** Where the human and robot work on the same part at the same time, with both in motion.
4. **Responsive Collaboration:** Where the robot responds in real-time to the human's movements.

In reality, most industrial use cases involve Level 1 or 2, with the humans and cobots completing tasks independently or sequentially. Rarely is there 'true collaboration', or direct and dynamic interaction, which would also raise the safety risk factor.

The on-the-ground reality

While the initial vision for cobots was to create a harmonious workspace where robots and humans could labour side by side, the reality has often played out differently. In most successful implementations, cobots have been deployed primarily to fully automate tasks with minimal human-robot interaction.

This unanticipated outcome does not diminish the value of cobots. On the contrary, it showcases their versatility and adaptability, surpassing their initial design intent. However, it underscores the need for pragmatic expectations when integrating cobots into a manufacturing environment.

The true power of cobots may not lie in human-robot collaboration, after all, but rather in their ability to efficiently and quickly tackle tasks, delivering significant productivity gains.

A new take on cobots

Generally smaller, more flexible, and easier to program and reprogram than traditional industrial robots, cobots are a good fit for smaller operations or tasks that change frequently. Their small size makes them useful for integrating some level of automation into existing, mainly manual lines where space is limited.

Cobots bring other advantages that cater to the evolving needs of modern factories. These advantages illustrate why many manufacturers are choosing cobots over traditional industrial robots for smaller automation tasks:

1. **Speedy deployment:** Cobots are designed for quick installation and setup, providing a faster “go-live” timeline, compared to conventional industrial robots. This benefit becomes particularly significant in industries where time-to-market is critical.
2. **User-friendly interface:** The programming interface of cobots is intuitive and simple, reducing the

barriers to entry. This enables a broader range of employees, not just robotic specialists – to understand, deploy, and operate these robots, promoting wider adoption and usability.

3. **Built-in safety features:** Cobots come equipped with bump detection capabilities, making them safer to use in close proximity to human workers. This feature can eliminate the need for additional safety fences or detection devices, leading to cost savings and a reduced workspace footprint.
4. **Standardisation of accessories:** There is a growing trend toward standardisation within the cobot accessories market. From grippers and end effectors to vision systems like cameras – increased standardisation reduces design and implementation time, simplifying the process of integrating cobots into existing workflows.

Collectively, these advantages make cobots an increasingly attractive option for manufacturers seeking to leverage the benefits of automation while maintaining a human-centric workspace.



So what's the problem?

Despite their numerous benefits, cobots are not the perfect solution for every manufacturing scenario. It is important to consider their limitations when deciding whether they are the right fit for your factory:

1. **Speed and safety:** Cobots are typically slower than both humans and traditional industrial robots. To meet safety standards, they must maintain a pace that allows for an immediate stop, if a bump or unexpected contact is detected, which also slows the human down. Further, while cobots are generally safer, the tools they use (such as pneumatic grippers or devices with sharp edges) can still pose a risk to humans, such as an accidental facial or eye injury.
2. **Repeatability:** While cobots are designed to perform a variety of tasks, they may not offer the high precision and repeatability that conventional robots provide. If a process requires highly accurate, repeatable actions, cobots might not be the best choice.
3. **Reliability and duty cycles:** Cobots are not typically designed for extremely high-duty cycles, unlike traditional industrial robots. In scenarios where they are used intensively, such as tightening applications, reliability issues may arise. Over time, this could result in more maintenance and potential downtime, offsetting the benefits of their initial easy deployment and operational cost savings.

It is essential to weigh these disadvantages against the potential benefits of cobots to make an informed decision on their suitability for your specific manufacturing environment

Cobot safety above all

Now that cobots have been around for a while, we have learned a lot - what they are good at and where they really don't work.

Because they are designed to collaborate with humans, worker safety should always remain top of mind. It is the system integrator, not the manufacturer, who is ultimately responsible for the safety certification.

(ISO 15066:2016 specifies safety requirements for collaborative industrial robot systems and the work environment, and supplements the requirements and guidance on collaborative industrial robot operation given in ISO 10218-1 and ISO 10218-2. This comprehensive guideline also sets out how to properly assess risk. When the new ISO 10218 editions are published, the safety requirements for industrial robots intended for use in collaborative applications with humans will be incorporated and ISO 15066 will be withdrawn.)

Collaboration beyond cobots

As we move into an increasingly digitalised and automated future, human-machine interaction is a key consideration in developing assembly systems. Collaboration extends beyond cobots and is increasingly crucial on the shop floor, particularly in semi-automated stations where operators work alongside machines. Coordinating tasks in parallel to optimise cycle time is vital for production line control systems, with a steadfast commitment to prioritising operator safety.

A master orchestrator plays a pivotal role in planning and executing tasks for both machines and operators to achieve efficiency without compromising safety.

Watch the videos below to:

Learn more about human-machine orchestration



See cobot safety technologies in action



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