Healthy Workplaces Good Practice Awards 2023–2025

CASE STUDY

Collaborative robots and automation to improve ergonomics in electronics solutions

COMMENDED

ORGANISATION/COMPANY	COUNTRY	SECTOR	TASKS
Dinamica Generale	Italy	Electronic solutions and sensors	Electronic solutions, cloud platforms and smart sensors for precision farming and healthcare sectors

Introduction to the case study

Faced with the challenges of manual work, Dinamica Generale transformed its processes with automation to protect workers and boost efficiency. By implementing robotic systems, the company eliminated strenuous tasks, improved ergonomics and fostered inclusivity. With a commitment to continuous innovation, Dinamica Generale proves that digital technology can drive both safety and productivity forward.

Background

Dinamica Generale is a global provider of electronic solutions and sensors for industries ranging from agriculture and food production to healthcare and industrial applications.

Spanning 19,500 m², Dinamica Generale's state-of-the-art facility includes a 7,000 m² production area. With over 30 years of steady growth, the company has established itself as a leader in its sector and has introduced advanced manufacturing technologies and automated warehouses.

However, as operations expanded, the company identified key areas where workplace safety and ergonomics could be optimised. These included manual handling of loads, ergonomic risks at workstations and physical demands of feeding components into the assembly line. Addressing these occupational safety and health (OSH) concerns became a priority to ensure a safer and more efficient working environment for its workers.

Aims

Dinamica Generale aims to boost worker wellbeing and production efficiency by implementing innovative automated solutions.

What was done and how?

The company implemented three different solutions that leverage robotics and automation:

- It integrated a collaborative robot with a 30-kilogram loading capacity to handle spindles on strain gauge bonding machines. Pins arrive on a custom-designed trolley, allowing the robotic gripper to pick them up and transport them to an available bonding station for processing. Afterwards, the robot moves the semi-finished product to a stackable rack for heat treatment. The system automatically configures work parameters by scanning barcodes, ensuring seamless and efficient processing through factory system integration.
- Dinamica Generale also installed an automated pin washing system. With an overhead conveyor that moves pin baskets through cleaning phases, the system eliminated manual handling and workers' exposure to chemicals.
- It introduced an electronically controlled industrial manipulator to handle components on the assembly line. The intelligent device removes the risk of manual load handling while

improving control and accuracy in positioning, leading to higher productivity. Its electronic control detects the operator's movements, so no manual weight adjustments or extra controls are needed.

What was achieved?

- The new robotic island for spindle management eliminated manual handling of 60,000 cells per year. Each cell weighs 5 to 30 kg each.
- The solution improved worker wellbeing, reducing risks of occupational diseases. It also increased gender inclusion by making tasks accessible to all.
- The new washing pins island removed manual chemical cleaning and improved ergonomics with better storage on trolleys. For workers, this meant the elimination of contact and inhalation of chemicals.
- The intelligent device for handling components eliminated manual handling of 60,000 cells per year, each weighing over 10 kg. This improved workplace safety, putting an end to the risk of cell falling.

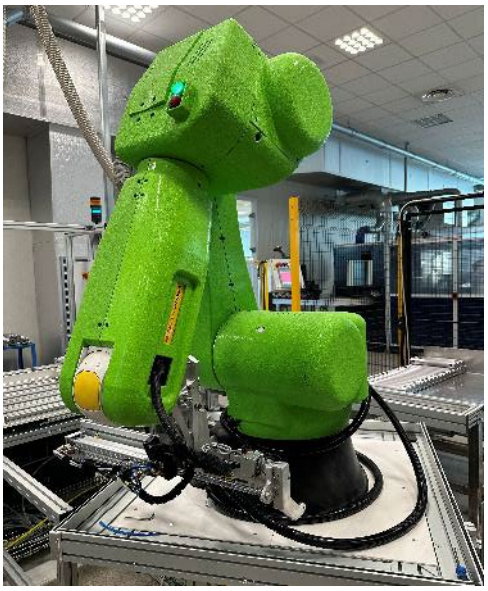
Success factors

- Implementing automated solutions that relieve the operator from handling activities significantly reduced OSH risks. Minimising manual load handling led to fewer work-related injuries and long-term health issues. It improved worker wellbeing with fewer absences due to illness or accidents.
- Automation removed physical barriers, allowing both men and women to perform all tasks. Advancing gender inclusion allowed the company to obtain a gender equality certification (UNI PdR 125/2022), promoting inclusivity and workforce diversity.
- The adoption of a collaborative robot enabled safe interaction between operators and machines in shared workspaces.
- Through seamless human-machine collaboration, process efficiency is maintained without requiring a complete overhaul of production methods.
- By integrating information and communication technologies into the production process, the company improved flexibility, efficiency and quality, optimising coordination of various workflows.
- Periodic safety inspections and direct involvement of key stakeholders ensure a proactive OSH approach and continuous improvement.

Transferability

The solutions implemented at Dinamica Generale represent technologies with broad applicability across multiple industries, from steelmaking to general manufacturing. The effectiveness of these automated solutions depends on factors such as workplace context, worker training and the specific implementation goals. Their high **design transferability** makes them a strong model for companies looking to boost both worker wellbeing and process efficiency.

Within Dinamica Generale, the success of the initial **robotic island for pin servicing** led to further investments in the **washing system and intelligent lifting device**, demonstrating that automation can be progressively integrated to improve ergonomics and productivity.



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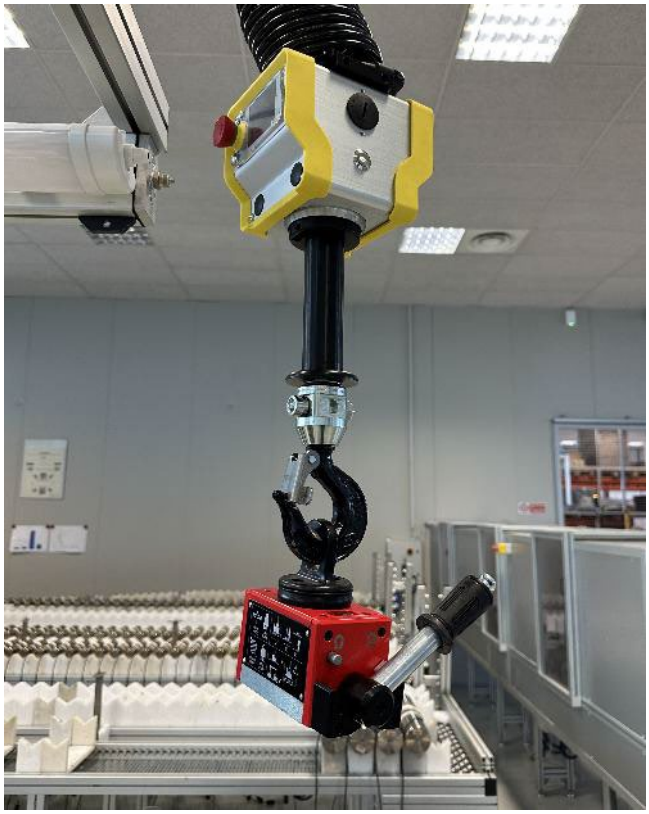
Costs and benefits

The total investment for implementing the three automated solutions amounted to €344,000. While the upfront costs were significant, the long-term benefits justify the investment.

By eliminating manual load handling, these solutions improved worker wellbeing, reducing the risk of injuries and long-term occupational diseases. Additionally, automation has increased productivity, streamlining operations. The company gained greater process efficiency through self-configuring systems and barcode-driven automation, reducing human error and optimising workflow. Beyond operational advantages, these improvements supported workforce inclusivity, allowing a broader range of workers to perform tasks previously limited by physical demands.



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Key features of good practice example

- Automated solutions reduce strain-related injuries, improve ergonomics and foster gender inclusion by removing physical barriers.
- Integrating Industry 4.0 technologies, such as barcodes, databases and interconnected systems, ensures seamless automation and process optimisation.
- Automation reduces downtime, improves precision and streamlines workflow.

Further information

Further information can be found at:

https://www.dinamicagenerale.com/

References and resources

https://www.youtube.com/watch?v=JL9WqEoCPcA

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