

FACTORY OPTIMISATION & VISUALISATION DEMONSTRATOR FOR AN ELECTRIC MACHINE PRODUCTION LINE



Developing a digital dashboard for factory and production optimisation of flexible manufacturing cells for electric motors

“What we’ve created here demonstrates the value that can be achieved through simulation technology, and there is scope to progress this even further by applying algorithms to explore specific parts of the manufacturing process. How the data is displayed via the dashboard is a critical element to this project, and we’ve been really pleased with the results.”

Elliott Chacksfield, Senior Research Engineer – MTC

THE CHALLENGE

Factory and production optimisation can lead to significant improvements in manufacturing processes. But for many businesses, the challenge is in accessing key data and analysing it to support the decision making needed to realise these benefits.

As part of the organisation’s expanding capabilities in electrification, the MTC identified the manufacture of a lightweight electric motor as a case study to apply factory layout optimisation techniques to upgrade manufacturing systems, and in turn, use these findings for broader sector application.

Areas that were identified for optimising the manufacture of electric motors included: the required number of workstations with a view to preventing supply bottlenecks, workstation placement to minimise footprint and time spent moving parts between workstations, and the number of operators necessary to run a production system to utilise its full capacity.

These factors are interdependent and multifaceted; consequently, a solution was required to address these complex challenges, and support engineers in making well informed decisions to improve manufacturing efficiency.

MTC'S SOLUTION

The MTC applied simulation technology and advanced data analysis methodologies to generate scenarios at different stages and levels of production of the example electric motor, in order to identify areas for optimisation.

Simulation techniques allowed analysis to be performed across multiple production factors (e.g. processes, material handling, storage and manual operations) at any one time. Solutions can then be tested for different scenarios (e.g. machinery, system reconfigurations, shift patterns and maintenance tasks) to help identify likely outcomes.

The data extracted from the simulation was analysed and configured into a dashboard to support users with better understanding the information. These interactive visualisations can display comparative solutions and help individuals from across the business to investigate and understand the data in a more accessible way.

THE OUTCOME

The factory and production optimisation demonstration ultimately seeks to identify challenges throughout the production process, and provide data and analysis to inform decision making based on simulating different scenarios.

For example, the demonstration illustrated how a tenfold throughput increase (from 15 to 213 products per day) could be realised, whilst only requiring double the floor space (from 406 m² to 884 m²).

The advanced visualisation solution presented these results, as well as the optimisation decisions, in an interactive and accessible format.

Simulation technology can provide significant benefits when optimising production processes, particularly when applied to emerging themes such as electrification. Its application spans across multiple sectors, and through the use of visualisation demonstrators and digital dashboards, raw data is transformed into a toolset that can inform key decision making whilst minimising risk.

Danny McGee, Associate Director - MTC

BENEFITS TO THE CLIENT

- ▶ Well informed decision making for factory and production optimisation to help minimise risk
- ▶ Intuitive interaction with simulation findings helps non-technical users to understand the analysis and gain insights into the behaviour of the production system
- ▶ Visualisation of factory layout with accurate animations displays worker movements to support further analysis into machinery and worker positioning
- ▶ Virtual representation permits users to run different scenarios without impacting manufacturing output or costly prototyping