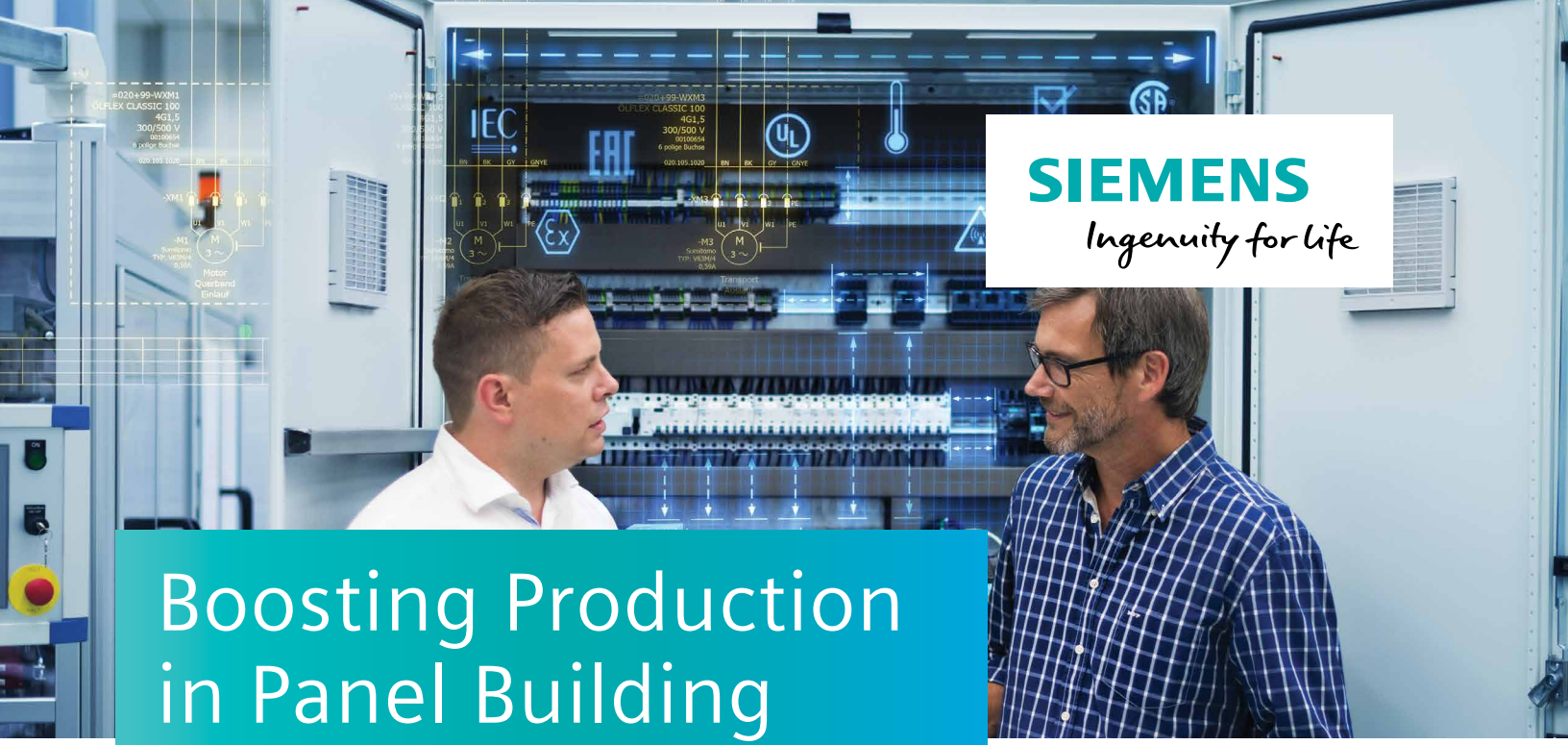

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Boosting Production in Panel Building

When the 3D planning data flows directly into production machines.

Introduction

Manufacturing automation is by no means standard in panel building: The percentage of panel builders and mechanical engineers having automation in production is currently 5-10% at the most. Yet with increasing digitalization and integrated data flow above and beyond processes and systems, this will change. For example, within ten years, according to experts, 80% of Germany's panel builders and mechanical engineers will be producing control panels using full or partial automation.

The transformation begins – for example in Computer Aided Engineering (CAE) – with planning in a 3D format. And it leads to machine-controlled production and automation processes, which are running more quickly, more resource-efficient and more precisely than ever before.

In 2010, CAE was still rendering two-dimensional construction diagrams

It wasn't even ten years ago when e-designers were already designing their control cabinets on the computer. The calculation of parts lists per component was already being performed in a CAE system. Three dimensionality, however, was as much a pipe dream as direct data flow from design into production. Instead, software-based creation of a panel building diagram more or less meant generating a two-dimensional drawing. In the end, the plan was printed out and forwarded to the production floor. On the basis of the CAE drawing, a separate terminal and wiring diagram was created, indicating how the devices were to be connected to one another in the cabinet.

Today, the 3D data flows from the CAE directly into production

In the meantime, modern, high-performance CAD/CAE software allows realistic plans to be generated in a 3D format. The planning data can also be applied to downstream manufacturing and mounting steps with a mouse click. Because of this, three-dimensional CAE information is able to provide complete parts lists and quantities for the required components. The CAE data also flows into the various production machines, because the days when industrial workers had to cut cables, drill mounting plates or attach end sleeves are increasingly over. Instead, there are machines to perform those tasks. Fed with data from the planning department, they handle the various routine jobs with a whole new level of precision and speed.

In other words: *Advancing digitalization and data preparation enables engineering and production processes to seamlessly converge. Using machines that work with CAE data also offers panel building and mechanical engineering streamlined throughput times – in a quality that would never be possible manually.*

Very high degree of individual automation possible

As a general rule, virtually any mounting step can be automated. It is the panel builder who decides which tasks he would like to perform using a machine – or where he wants to invest in complete automation and where he relies on more economical semi-automation. Let us take the cable harness function, for example: The spectrum ranges from the basic $10,000 machine, which only cuts to size one cable type, right down to the approx. $350,000 high-end automated machine, which cuts to size all cables for control cabinets of any size – including marking, attachment of end sleeves, bundling, etc.

Machine production is interesting even for smaller panel builders

Especially because the level of automation and the amount of the investment can be decided so individually, production automation is as interesting for large series producers as it is for small panel builders. Add to this the fact that the machine works highly efficiently even starting with single item batches, whereby manufacturers of individual panels and custom machinery can benefit in particular.

Changeover in the preliminary run

Ideally, panel builders and mechanical engineers examine all the opportunities and risks of automated production at an early stage. Important considerations, for example, include a precise analysis of the current engineering and production processes, a comparison of the actual condition with 3D CAE options and a neutral cost-benefit analysis. Whereby the entire changeover time and effort must always be taken into account: from reorganization of the production processes, through the design of an appropriate IT landscape, right down to the qualification of the employees.

Higher productivity, higher quality, greater competitiveness

Independent of how the individual path to automation turns out to be in the end: A machine always works much faster and more precisely than human beings. That is why the use of automated production machines definitely guarantees an edge in productivity, quality and competitiveness. The data-controlled precision of machine production reduces waste and material losses to a minimum. And last but not least, employers can deploy the manufacturing personnel freed up from routine tasks to perform other, more meaningful tasks – an advantage that is extremely important in times of when there is a chronic shortage of skilled labor. Finally, panel builders and mechanical engineers more and more lament the fact that they can hardly meet the demand with existing personnel. By means of targeted manufacturing automation, production can be significantly increased – with the same workforce.

Skilled workers are assigned new and meaningful tasks

Conversely, however, this also means that the use of highly-efficient machinery does not have to lead to a reduction in personnel. An automatic operation, which can suddenly produce 20, instead of five, panels per week, does in fact need each woman and each man – not for cutting cable or drilling mounting plates, however, but for running the machines or maintaining the IT infrastructure. After all, in the scope of automation, a completely new digitalized engineering and manufacturing process is set up.

Component suppliers need to deliver the required product data

And this routine – like every other digital process – is based on large volumes of data. Whereas a two-dimensional CAE system did not need much more than specifications such as height and width per component, with more high-performance CAE tools, it is a whole different story. A modern CAE system, which not only supports three-dimensional planning but also controls the production machines, requires much more comprehensive component data, including the electrotechnical information. That is why when choosing products, it is always important to ensure that the manufacturer has equipped its products with all the master data that the CAE system requires. For fully streamlined engineering and production processes, it is also ideal if device and planning tool suppliers work closely together and guarantee fully automated import of product master data by the manufacturer into the CAE.

The following applies in any case: The better the available product master data, the more intelligent the CAE. And the more intelligent the CAE, the more efficiently the gap can be bridged between design and automated manufacturing.

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Whether it be reference guides, web-based training courses, helpful engineering tools or useful information on all aspects of "panel building". On our website ***usa.siemens.com/controlpanels***, you'll find comprehensive information on "Standards know-how, tools and data for digitalization in engineering and a matching product and system portfolio."

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