

AUTOMATED WALL PRODUCTION FOR PREFABRICATED HOUSES

ERGONOMICS, PROCESS RELIABILITY

AND FLEXIBILITY IN ONE SYSTEM



The future is made of wood – sustainable and energy-efficient. Ultra-modern prefabricated houses, like those made by our customer FingerHaus from Frankenberg (Eder), are on the rise. The demand is large in an industry that is booming but simultaneously being hit by a shortage of skilled employees. The burden on existing staff has to be eased as much as possible so that they can be used exclusively for complex tasks, while the focus remains on maximum quality through high process reliability. This is where we come into play as a special mechanical engineering company.

In close consultation with the employees on site, we have developed a system which covers two important areas as a central processing machine in production: first, wall timbers are supplied to a frame station with semi-automated production of the wooden frameworks; there then follow two cells for automatic paneling of the wall elements by a robot. The challenge: every FingerHaus is unique, tailored to the preferences and requirements of the customer. In addition to the standard wall elements, there are always special cases with unusual geometries – a clear advantage for the customers of FingerHaus and at the same time an exciting challenge for our engineers and technicians.

The core element of the solution is a state-of-the-art camera system that detects the position of the timber and plasterboard sheets and is in constant communication with the robot via a specially designed software package. The result is a precise paneling machine that allows efficient collaboration between employees and robots thanks to the intelligent design of its safety zones.

OVERVIEW OF INDIVIDUAL OPERATIONS



maximum flexibility of paneling, both for standard sizes and custom dimensions



central cell control for maximum user-friendliness



fast, straightforward feed of materials



positioning of the cut sections for the wooden frame by semi-automatic feed conveyor



provision of the standard lengths of timber by robot from magazines



assembly of the wooden framework by workers



reliable fixing of critical connection points on the wooden frame



transport of the wooden frames between cells by roller conveyors



fast cell change of the robot to cell 1



state-of-the-art camera system for detection of the sheet position



intelligent light system to support position detection



fast transfer of data to robot with vacuum gripper for precise paneling with timber sheets



detection and removal of filler pieces required for processing



visual inspection and approval by employees



automatic robot gripper change from vacuum gripper to stapler



staples on the sheets with defined staple tracks and corners



gripper changeover from stapler to vacuum gripper



change of cell to plasterboard sheet cell



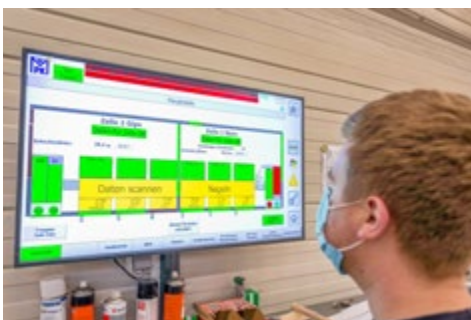
identical process for lining with plasterboard sheets



safe cooperation between workers and robots with division of cells

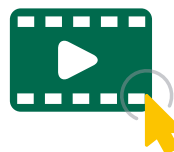


fast handover of the paneled house walls for the next production stage



control of individual processes for maximum flexibility with the option for intermediate work steps

Take a look at the machine video for this project at www.beth-germany.com:



THE PROJECT IN FIGURES

With prefabricated house walls as the focus of the production process, factors such as weight, size and available area play an important part: the result in this project is a system 50 meters in length and approx. 10 meters wide. At first sight, the machine might seem large, but if you consider the average dimensions of the walls, the concept ultimately impresses with its efficient and clever use of the available area. Tailored entirely to the requirements of FingerHaus GmbH.

Facts

- sheet sizes 80 x 250 mm to 1250 x 3000 mm possible
- complex “PK Construct” software solution for constant, fast communication between camera system and robot
- use of high-quality components from manufacturers such as ABB, Siemens and Rittal
- seamless integration into the production process with data transfer from CAD system



DISTINCTIVE FEATURES OF THE PROJECT

It is worth highlighting the small but fine details of this system, which it has only been possible to deliver through close collaboration with the FingerHaus staff on site: existing work processes were analyzed, improvements identified and a customized automation solution developed. Whether it's efficient use of the existing production space, operability of the robot in individual processes for more flexible cooperation with the workers on the machine, or simply the fact that process reliability can be improved through simple aids such as automatic positioning stop points on the frame station or the redundant design of the stapling system – the technology is working in the service of people here, which means it is possible not only to increase productivity but also to relieve the burden on staff permanently and, as a result, allow them to take on other, more important work. With this machine, our customer FingerHaus has state-of-the-art production technology at its disposal and is ideally equipped for the future.



CONTACT

ARE YOU FACING SIMILAR CHALLENGES?

We will be happy to advise you on projects of this sort and answer any questions you may have about our references.

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