

## **When perfection meets passion**

### **HOMAG Group supplies complete door leaf production plant for RIWAG**

**A glance at the plant layout brings to mind a Swiss clock movement: All the intermeshing components are tucked close in together and everything ticks over nicely - producing absolute precision. The reality on the factory floor confirms the impression: not a single metre of space is unused. The exemplary door leaf blank manufacturing facility operated by the Swiss manufacturer RIWAG Türen AG is everything a high-tech production plant should be, and sets some impressive milestones along the way.**

The new production plant in Arth in central Switzerland has been operational now for around two years. It enables RIWAG to produce internal, external, apartment and functional doors in any optional and changing dimensions from as little as batch size 1, with what is a previously unattainable degree of production flexibility. The company's owner, Aldo Rickenbach: "Achieving enormous flexibility is only one side of the coin. Doing it economically and to a high standard of quality is the other." The real challenge of this project was in reconciling these two apparently contradictory requirements.

#### **Investing in the future**

A case for HOMAG Group Engineering, the plant specialist within the HOMAG Group. "We quickly realized that, because of its proximity to the various producing companies of the HOMAG Group, this system supplier was able to provide precisely the technological competence we needed to realize our project", recalls Aldo Rickenbach. Working with his son Remo Rickenbach, responsible for production, RIWAG Project Manager Remo

Albisser, and Head of IT Marco Contratto, he set a bold course aimed at providing a new future-proof market position for the family firm, which was founded back in 1943 as a small joinery. But for over 25 years now, doors have been the Swiss company's sole mainstay. What was once a humble woodworking shop has been transformed into an exemplary medium-sized company employing a workforce of 45 and with capacity for more than 1200 doors and 250 frames per working week. This achievement is due in some part to its investment in the new HOMAG plant.

In for a penny, in for a pound – this was the attitude adopted by the visionary company owner. “Once RIWAG had decided to go ahead and build a new hall in compliance with Minergie requirements, installing state-of-the-art production facilities made perfect sense”, explains Klaus Zahn. The HOMAG Engineering Project Manager was closely involved in the ambitious project from the very first customer contact right through to commissioning. “The outcome: A plant whose specifications and complexity are precisely tailored to the present and future requirements of Riwig.” Tailored not only in the technical sense, but also in terms of the layout. Over an area of around 70 x 30 metres, there is scarcely a single square metre of space in the self-supporting hall building which has not been utilized.

### **Unusually high degree of automation**

This claim applies in particular to the company's highly advanced IT capability. RIWAG has made use of electronic data processing since 1983. Its production engineering department has worked electronically for over 20 years, and the company has been using computer-integrated manufacturing for the same period of time. RIWAG is passionate about keeping pace with the ever growing challenges of computer-aided production. “Based on RIWAG's experience and receptiveness in the field of IT and using the expertise of HOMAG Group member SCHULER Business Solutions, we were able to achieve an unusually high degree of

automation”, says Klaus Zahn.

The basis for the complex IT solution was the customer’s existing ERP system AVOR. The MOS control level processes all the necessary data and passes it on to the second IT level. This level is split into two cells, door leaf blank production and calibration/buffering. The production cell finally transfers the production data to the machines and the various sections. The entire plant can be run by just 1.25 operators. The 0.25 is provided by one employee for loading, who fills the storage locations at the start of the shift. During running operations, he is informed by a SMS text message when a storage location needs restocking. The operator deployed at the control centre is responsible for starting the plant, and for monitoring and control. Nine remote-controlled cameras supply images to the monitors in the production control centre. Their position raised four metres above the hall floor affords a direct overview of the whole situation.

Blank production draws on two BARGSTEDT storage units for the cores and barrier layers, and another for the rails. Three to five-ply doors are produced using these three basic components. The materials are transported by industrial trucks to their processing lines. There are 22 storage locations available for the cores alone, and 32 for the decks. The pre-produced rails can be used to produce 54 different frames – fully automatically, needless to say. The figures clearly illustrate the enormous variety of possible doors.

### **Minimal cutting waste despite variable door leaf dimensions**

To manufacture door leaf blanks, the production process is divided into three lines which prepare the cores, the barrier layers and the frames. Like the barrier layers, the cores are also transported in stacks from the warehouse in the basement directly underneath the hall. Door production orders are collated into so-called production packages with cores of the same specification. They are automatically removed from the stack

storage system, separated and fed individually to the plant components. A HOMAG double-end tenoner then cuts them to a fixed length dimension before they are glued in a longitudinal press to form a continuous carpet. They are then provisionally cut to size by a TORWEGGE pressure beam saw and cut parallel in another double-end tenoner.

The cores are then joined transversely again to form a continuous carpet and glued in a transverse press. This process is followed by cutting to the required width and final length dimension, in each case using a pressure beam saw, whereby a different dimension is possible for every individual door if required. “The real bonus of this plant”, explains Klaus Zahn, “is that the lengths can vary between 700 and 3,000 mm. At the same time, widths of between 280 and 1400 mm and thicknesses of between 30 and 80 mm are possible. The formation of the continuous core carpet is decisive to ensure minimized cutting waste. This is particularly important at RIWAG as here only top quality materials are used. This is the only way that the company is able to guarantee the outstanding quality of its doors”. The tiny residue left over as cutting waste is sent to the in-house incinerator to produce energy.

The rail frames are prepared in the second production line. The separately pre-produced rails are also automatically fed into the system. A robot picks the individual rails from the rail store and positions them around the arriving cores. The correctly positioned components are then transported into the frame press for further processing.

On the third line, while the parallel processes are running on the other two lines, the barrier layers are cut to size and glued. Depending on the door specification (3 or 5-ply) the plant calls forward two or four barrier layers from the store. This is performed individually for each door and can consequently vary from one door to the next. Shortening the width is performed by a throughfeed saw, while a pressure beam cross-cutting saw

cuts the layers to a fixed raw length. Any adhering sawdust is removed in a brushing machine, and the elements are then coated over their surface with glue and are ready to meet up with the core.

### **Time for marriage of the parts**

The two “main lines” converge at the “altar”. At the first laying station, the cores, now pressed together with the frames, are placed on the lower deck before the second barrier layer is fed in to rest on the top. Further downstream, five Sergiani presses are waiting to receive the assembled components. Four of these are configured as two-daylight presses to receive the sandwich constructions for pressing. Here too, indeed is automatic, this time using a loading carriage. Before being fed into the press, the formats are scanned in and the data used to compute the optimum press parameters. Because of the wide variety of different door formats, this step is vital in order to achieve a perfect pressing result.

After the pressing process, the door leaf blanks have to cool. They are distributed by an unloading carriage over 30 slots in a cooling station, where they are cooled down to a temperature of around 20° Celsius. The air conditioning system of the Minergie hall ensures that this temperature is maintained at a constant level throughout the year.

The door blanks have now almost completed their production process. After a pass through a calibrating sander, the stacking station awaits with nine stacking locations. The door leaves are sorted and stacked taking into account the different further processing steps they are due to undergo – delivery, rebating, hardware mounting, colour treatment.

### **A joint HOMAG partner project**

“I am tempted to describe the RIWAG door production plant from HOMAG Engineering as an integral work of art” eulogises Project Manager Klaus Zahn. He was in charge of coordinating the construction of the entire plant.

Playing a vital role alongside HOMAG, whose machines were used for the sizing operations were the company BARGSTEDT, which supplied the storage and stacking technology as well as the transport solutions, TORWEGGE for the entire core production, Heesemann for calibration and sanding and last but not least SCHULER Business Solutions, which was in charge of control engineering. “Working in close cooperation with the customer, we succeeded in fully complying with the complex brief, providing extreme economy coupled with maximum flexibility and optimum production quality”, sums up Klaus Zahn. RIWAG boss Aldo Rickenbach adds: “We were very impressed by the expertise and seamless cooperation of all the HOMAG partners. The love of perfection and passion for finding technical solutions on both sides were key to our success.”

All pictures: HOMAG AG



**Fig. 1:**

Swiss company RIWAG AG invested heavily in the new Minergie hall and modernization of its production facilities.



**Fig. 2:**

The HOMAG plant layout in the 100 x 50 m hall left practically no space unused.



**Fig. 3:**  
The BARGSTEDT store housing the barrier layers.



**Fig. 4:**  
The robot positions the different rails to create a frame around the core.



**Fig. 5:**

In the TORWEGGE frame press, the frames and cores are joined.



**Fig. 6:**

After the “marriage” of the rails, cores and barrier layers, five presses wait to receive the assembled components.



**Fig. 7:**

The cooling porcupine houses the pressed door blanks as they cool down to the hall temperature of around 20° Celsius.



**Fig. 8:**

One operator is sufficient to control and monitor all the plant functions from the HOMAG Group control centre.



**Fig. 9:**

Different labels stand for different doors. The great bonus of the HOMAG plant is its enormous flexibility.



**Fig. 10:**

View of the storage systems and the control centre in the background



**Fig. 11:**

On this plant line, the barrier layers are cut to size and glued.

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