

## **50,000 doors for Sweden**

### **Processing cell replaces majority of the machine outfit for a Swedish door manufacturer**

**A Swedish door and frame manufacturer based in Högsby specializes in doors with wide ranging different designs, for instance with glazing panels, applications and different add-on functional features. Specifically with a view to achieving improved performance and higher quality, a decision was taken in Högsby to invest in a new production plant. Just under a year ago, HOMAG in Schopfloch supplied the company with a top class production cell which more than fulfilled the user's target specifications. The term Cooperative Problem Solving has been coined by those involved to describe the procedure used to put the project in place and the amazing results of the investment.**

When Swedish door manufacture Elitdörren, now trading under the shorter name of INWIDO, put out initial feelers regarding a new production facility just under two years ago, it expected to receive a quote with a technical description of the plant and of course the relevant pricing information. What it actually received was totally unexpected. One of the bidders took the time to sit down with the Elitdörren development experts and thrash out an initial technical solution by a process of cooperative partnership, at this stage without considering the cost factor. The outcome of this brainstorming process appeared astounding at first glance, but convincing nevertheless. In a process of this kind, the importance of an investigatory visit to a reference user goes without saying. It was this visit which engendered the necessary confidence in the supplier's expertise and provided the customer with an intriguing insight into the technical possibilities opened up by modern production engineering. It was only

after clarifying all the technical possibilities that the manufacturer drew up a quotation, which served to further confirm the customer's confidence – as did the final outcome of the project described in the summary.

The heart of the production cell is a CNC processing centre – or as it is called at HOMAG a CNC router BOF 723/58/16/F/KC. This is a high-performance machine built in line with the very latest design concepts with a fixed gantry equipped on both sides with three separately operating processing units, two of them arranged on the back of the gantry. One of the units, a five-axis 14 kW spindle with a speed range of up to 24,000 rpm and an HSK F63 tool interface, operates alternately at the two workpiece tables and is primarily used for lock case processing. The other two processing units for sizing and vertical processing operations such as glazing panel cutouts and applications, are each responsible for one table only and consequently each fitted with a 28 kW HSC spindle with a speed range of up to 30,000 rpm. Both spindles are additionally fitted with a SENSOFLEX tracing system which permits them to execute engravings and special applications to a precise trimming depth independently of workpiece thickness tolerances. The traversing speeds of the machines are specified as up to 80 m/min in the X axis, up to 60 m/min in the Y axis and up to 40 m/min in the Z axis. A separate measuring sensor system is installed on the unit carriers in the processing gantry for vertical processing. This provides precise position data on the exact location of the workpiece. Three 18-slot plate tool changers make available the tools for the processing units.

The two independently operating vacuum console tables are designed for alternating processing and for workpiece sizes of up to a maximum of 2,870 mm in length, 1,825 mm in width and 200 mm in thickness – and for vertical processing with tool diameters of up to 25 mm. These tables can also be coupled to accommodate outside doors with lengths of up to 5,860 mm. The area gantry for workpiece handling upstream and downstream

from the machine is equipped with two crane beams, each with one vacuum gripper. Between the front and back processing operations, a flip station is positioned. Like the alignment roller table, this is also fed by the handling system. A pusher system integrated in the machine takes care of automatic, trouble-free chip and waste piece disposal.

For control of the production cell, a **powerControl** PC85 with PLC based on the Windows XP operating system is used. A menu-prompted operating system is just as much a matter of course as are path control on every axis and modern multiple-channel technology for parallel movement sequences. The PC software package is based on the wood**WOP** system for the graphic, dialogue-oriented generation of CNC programs.

### **Production sequence**

The overall design of the production cell was based on the necessary output and of course on the “only possible” or in other words optimum production sequence. These were the issues on which those involved in the project on both the customer and the supplier side concentrated exclusively in the early stages. It was only when the production concept was in place that the production plant itself was designed. “This”, as the HOMAG project manager Klaus Zahn explains, “is the only viable route which can achieve a successful outcome”. The unfinished door leaves are placed ready in Högsby on a roller conveyor in the form of a stack with a height of up to 1,600 mm and a stack weight of up to 3,000 kg on the production cell. Crane beam 1 engages the first door with its suction gripper and deposits it on the alignment conveyor, where the door leaf is aligned in the X and Y direction. It is then picked up again, detected by a transponder, and deposited and vacuum clamped in a defined position on the machine’s first processing table. The lock case, a possible glazing panel cutout and the surface of the door are processed from one side. If rear processing of the door is required, the relevant glazing panel cutout is then produced. Before this, crane beam 1 deposits the door leaf in a flip

station. After flipping, it returns the door to the machine table. While the first door is being processed, the second table is fed by vacuum beam 1. Only when one of the two doors has been finish processed does the second handling beam move into action, engaging the finished workpiece and depositing it on the stack of finished parts. The use of this second gripper beam alone served to increase the output of the production cell by around 30 per cent.

Incidentally: around 30 per cent of doors produced require two-sided processing and between 30 and 40 per cent are given a glazing panel cutout. The outstanding performance of the production cell is demonstrated by the output of no fewer than 18 to 20 doors per hour, depending on processing intensity. This corresponds to around 50,000 doors per year for the Swedish manufacturer.

### **Summary:**

The production cell in Högsby has been up and running for just under a year – after just a six-week start-up period until fault-free handover – with an extremely high production availability record. There has been an unmistakable rise in production, with huge savings in manpower. Other interesting benefits of the new plant are far lower space requirement, faster throughput time for small batch sizes of generally between 5 and 10 doors – right down to one-off batch size 1 production. A lower energy requirement and lower suction output are “just” secondary benefits. Despite a higher investment input than originally envisaged by Inwido, the initial outlay for the production cell looks set to be recouped within less than two years. However, the benefits accruing from the high quality of the doors, which far exceeds what would previously have been possible, are far from being quantified.



**Fig. 1:**

The CNC production cell in Högsby has an output of 20 doors per hour



**Fig. 2:**

Processing takes place using the alternating method on two tables which operate independently but can be coupled to accommodate large parts



**Fig. 3:**  
Finished door leaves on one of the processing tables



**Fig. 4:**  
One of the main processing spindles, next to it one of the two measuring sensor units



**Fig. 5:**  
Door formats in different widths on the infeed roller conveyor



**Fig. 6:**  
The alignment table arranged upstream from the machine



**Fig. 7:**

Handling beam 1 loading the first machine table (during the introductory phase in the customer's factory)

---

**For more information, contact**

**HOMAG Holzbearbeitungssysteme AG**

Homagstraße 3 – 5  
72296 SCHOPFLOCH  
GERMANY  
<http://www.homag.de>

**Gerhard Engelen**

Head of Marketing Services  
Tel. +49 7443 13-2476  
Fax +49 7443 13-8-2476  
[gerhard.engelen@homag.de](mailto:gerhard.engelen@homag.de)