Automation speeds up CNC processing for woodworking shops and industry

Automating material infeed

CNC processing centers will be tomorrow's standard machines. Their ability to be embedded in existing work flows is crucial to their successful application. The watchword here is automation. Individually tailored concepts enable a tangible gain in both productivity and quality.
Eduard Schiessl, Friedhelm Rempp

Anyone who attended this year's LIGNA in Hanover had an opportunity to gain an impression of the HOMAG Group's comprehensive automation solutions. No matter what the scale of the customer operation, the HOMAG project engineering team specializing in CNC production cells works in close cooperation with its customers to devise the optimum individually tailored solution. The experts are now able to draw on an impressive fund of experience gained though countless completed plants and production cells.

Why automate?
There are a whole range of reasons for considering automation. Taking all factors into consideration, there is really no getting around it. Even for small-scale joineries, there are striking beneficial effects to be gained with only a modest, easily manageable capital outlay and a surprisingly rapid return on investment.
One factor to consider is dwindling production series sizes (watchword: batch size 1). Depending on the technology involved, companies find it increasingly difficult to respond with the flexibility, economy and in particular speed required to address this unstoppable trend. Given this scenario, CNC processing centers are increasingly becoming the vital hinge pin of every workshop. They are able

to process batch sizes of just 1 with an enormous degree of process reliability – even when working with mixed stacks.
Another factor is the increasing shortage of skilled staff: It makes little sense for the precious time of experienced employees to be wasted on the laborious feeding and stacking of parts. Their expertise is best put to use in ensuring perfect preparation and organization of the machine environment.
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Automate and reap the profits

Automation helps to extend the machine's running times – also during breaks and at the end of shifts. Eight hours of staffed operation can turn into twelve hours of machine running time, for instance by using breaks, extending running times after core working hours and so on.
It also enables parallel operation of several machines by one and the same employee, for instance while one machine is being manually fed while a second or even third machine is working automatically next to it with the aid of a feeding system. Using a feeder practically eliminates any operator-related machine standstill periods, enhancing throughput and tangibly reducing unit costs. Automated handling also helps prevent the damage which is a regular occurrence when parts are handled manually. Another positive side effect: Less physical strain on employees. Three interesting automation stages are described below in more detail.

Rapid payback in the entry level segment

The automation solution using the TBA feeder is ideally suited as entry-level option for companies running a small or medium-sized operation. The feeder can be mounted at any HOMAG or WEEKE CNC processing center of the BMG-200-600 series (gantry machine) with a minimal space requirement. While the investment outlay for a TBA feeder is relatively modest, the impact is considerable. Return on investment is often possible within just one to two years.

For companies which produce both (small) series and also batch size 1, the processing center can be used for instance during core working hours to process one-off parts with manual infeed. The CNC machine can then be used with the feeder during breaks or after the end of working hours to process mixed stacks.

Beneficial effects and gains at a glance:

- Automatic and manual operation possible
- Low-cost automation
- Rapid return on investment
- Low space requirement, simple operation
- Low-manned extension of running time

High-performance bridge gantry

Double-table bridge gantry machine (BOF/BAZ) with TBP gantry feeder:
Because of the possible length of up to 15 m, linear gantries are the ideal solution when it comes to automating large gantry processing centers. The platform can be used to mount and operate up to four spindles for simultaneous trimming or several other units.

The workpieces are individually fed and stacked again after processing by the gantry, with feed possible over the complete work area. When using double or synchronous workpiece positioning, several workpieces can be loaded, processed and stacked again in parallel. This generally enables the machine output to be doubled.

Maximum part weights of up to 150 kg, several stacking stations, different gripper systems and integrated cleaning devices turn the gantry loader into a universally applicable solution offering outstanding productivity. The lateral arrangement of the stacking stations allows the CNC processing center to remain fully manually operated. Operation is integrated into the machine‘s control system and can be programmed using wood**WOP**. The system operates completely independently. Used in combination with a five-axis machine and an

automatic positioning table, for instance, a whole range of individual steps can be simultaneously covered directly by a single machine or plant. The benefits of complete processing are clearly evident: Enhanced part quality, time savings and far less physical strain on employees.

Beneficial effects and possibilities:

- Feeder covers a wide work area
- Handling of even the heaviest components
- Parallel pick-up of several parts possible, for instance for synchronous processing
- High output, continuous operation

Robots: Highly flexible all-rounders

The use of robot solutions enables maximum plant efficiency. Robots offer outstanding flexibility in terms of the arrangement of surrounding process steps and are adaptable when it comes to changes in the work sequence or product spectrum.

Suitable measures can provide the guarantee of extremely high process reliability and enable low-manned production. When using a robot, machine operators may be released from their workstations for certain periods without problems, enhancing productivity, taking the strain from machine operators and improving the quality of workpieces.

The robot’s particular strength lies in its free six-axis movement. Its capability is brought to bear wherever additional functions are called for, such as varying layer patterns, integration of alignment and flipping stations or integral position measurement and correction. Operation is also simple and uncomplicated. Directly integrated into the plant control system, it eliminates the need for prior robot programming experience. The robot is programmed solely using the relevant workpiece parameters such as length, width, thickness and supplementary parameters such as flipping.

Customer example 1

Example from practice: Robot handling

Central part storage meets robot feed

The company Kappler GmbH & Co. KG in Pfalzgrafenweiler uses a completely automated material handling system in its part production with a central sorting station and buffer store. Linked to this by a linear traversing robot behind the machine is a BMG 512 CNC processing center.
The robot ensures seamless automated alternating processing at the CNC, making for enhanced productivity. It picks up the workpieces from the sorting storage system, feeds the machine and then deposits the parts again after processing. Working together with the automatic suction cup positioning of the BMG, this system enables unmanned operation. The robot also flips the parts before or during processing, making manual part handling a thing of the past at this production cell. Stacking operation is also easily achievable for production series. Kappler Med+Org produces sophisticated fittings for public buildings, the medical sector as well as office furniture systems. The company is active across Europe. Alongside Austria, Switzerland and Luxembourg, it is enjoying increasing popularity in the USA, Canada, Scandinavia, Ireland and France.
www.kappler.de

Picture captions:

Fig. Kappler 1:
The robot behind the processing center offers a linear traversing facility. Working together with the automatic …

Fig. Kappler 2:
… suction cup positioning system of the BMG, this permits unmanned operation with very high productivity.

Customer example 2

Example from practice: Gantry feeder

Double table arrangement ensures maximum productivity

Walter Bosch GmbH, Wilburgstetten, has been using a HOMAG-BAZ 723 for the past two years. The processing center is equipped with two independently operating tables, five-axis “Drive5+” and **laser**Tec edge processing. An automatic TBP gantry feeder takes care of feeding and destacking components up to 80 kg in weight.

Bosch is now completing a wide-range of operations on the new center which it had never originally envisaged. For example it is used to make simple grooving cuts which are otherwise performed on a throughfeed machine. The benefit: Performing these cuts on the processing center does not tie up any operators. The stack is simply placed ready and the TBP positions one workpiece at a time on the table. The double table arrangement means that the feeder is constantly in motion. The machine regularly goes on working for a few hours after the end of the working day. CEO Norbert Bosch is able to keep an eye on the lights of the processing center from his living room, and from the comfort of his sofa is able to see if the machine is still busy working.

Bosch plans and produces high-end fit-outs for offices, prestigious hotels and other public buildings.

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Picture captions:

Fig. Bosch 1:
The TBP gantry feeder permits fully automatic operation of the HOMAG-BAZ 723.

Fig. Bosch 2:
The double table arrangement allows the processing center to work through without standstill periods.

Pictures courtesy of: HOMAG Group AG

Fig. 1:
Turning, flipping, infeed, stacking: There are practically no limits when it comes to the integration of modern handling technology. Automation not only enhances productivity and quality – the ergonomic benefits for operating staff are also an important consideration.

Fig. 2:
Automation in the entry level: The TBA feeder can be mounted onto any BMG-200-600 series HOMAG or WEEKE-CNC processing center (gantry machine) with minimal space requirement.

Fig. 3:
Operation is integrated into the control system and the TBA can be simply programmed using wood**WOP**.

Fig. 4:
When using a TBA feeder, the processing center retains facility for full manual control at any time.

Fig. 5:
Because of the possible length of up to 15 m, linear gantries are the ideal solution when it comes to automating large gantry processing centers. When using double or synchronous workpiece positioning …

Fig. 6:
… several workpieces can be loaded, processed and stacked again in parallel. This generally enables the machine output to be doubled. This type of plant works fully independently.

Fig. 7:
Stationary robot next to the processing center (BMG): This solution already offers good flexibility and is a particularly interesting option for small and medium-sized enterprises.

Fig. 8:
Robot behind the machine, traversable over the linear axis: This enables alternating processing …

Fig. 9:
… making for enhanced productivity. Extended material flow options and stacking locations can be added.

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