Manhole covers on roads and plazas are often sophisticated products, and a German company has found the perfect combination of machine tool, CNC software and controller to produce them for the international market.

The complete machining solution favoured by ACO Passavant Guss GmbH comprises a matec Maschinenbau machining centre equipped with a Heidenhain TNC 640 control and programmed with Edgecam, from Vero Software.

Located in Aarbergen in the Hessian region of Germany and part of the ACO Group that manufactures drainage systems for the global market, it took the company less than a year to establish complete production for positive cast aluminium models.

Along with Edgecam, the TNC 640 contour control system took on a key role with its optimal integration into the machining process.

Today’s custom designs are characterised by special features that have to be rapidly implemented because the manhole covers must meet ever higher specifications in terms of performance, including savings on materials, taking high loads, low noise and resistance to vandalism.

To manufacture the sophisticated models, ACO places its trust in a strategy of designing NC programs directly on the machine. The Edgecam programs are optimised with high simplicity using Heidenhain structured conversational programs.

"We actually began with a greenfield project," says ACO Head of Production Angelika Stein. During the intensive search for solutions, ACO realised that the combination of Edgecam and Heidenhain controls fulfilled the requirements best. The intention was to reduce the complexity of combined milling and turning processes with a control that could easily handle program creation and machine operation.

A new employee with TNC experience was taken on for those tasks. Benjamin Hejda used his sound knowledge of the control functions and cycles to recommend solutions to exploit the control’s full potential. Although he did not have experience of turning functions, the TNC 640’s ease of use made it simple for him to gain the required knowledge. And, as a result, the first models were produced on the matec 30 HV within a week.

Optimally designed for milling aluminium models and reworking castings, the matec type 30 HV 5-axis machining centre with rotary table and swivel head, was chosen at the beginning of the project. To overcome potential barriers in the process sequences and to avoid delays with machine acceptance, ACO carried out a preliminary simulation for the machine and process.

About The Company:
Name: ACO Passavant Guss GmbH
Business: World leader in drainage technology
Web: www.aco.com

Benefits Achieved:
• Virtual simulation of the complete manufacturing process prior to implementation.
• CXpert integration into Edgecam simplifies the input process as all milling and drilling cycles correspond to those of the TNC 640.
• The first models were produced on the matec 30 HV within a week due to the TNC 640’s ease of use.

Comments:
"It’s good to know that traditional companies such as ACO Passavant GmbH can improve their international competitiveness through innovation."

Manfred Kukla
CIPRO Managing Director
“We validated everything digitally,” explains Markus Wagner, CAD/CAM consultant at Edgecam reseller CIPRO GmbH, who managed installation and consultancy work in providing the combined machining solution. A post processor was written and matched to the TNC 640, while tools and machining technology for the intended component spectrum were put together. “As a result of this, preliminary machine acceptance at matec became the first successful milestone. Due to this initial work, final acceptance at ACO was achieved in good time following installation of the Edgecam software package.”

**Seamless integration with Edgecam**

The machining time for a single model can take up to 20 hours, and optimising the machining programs avoids interruptions. For example, Benjamin Hejda adds subprograms at suitable locations that retract components and remove chips. “That’s really convenient with the Heidenhain control because I write subprograms as labels and add them very simply into the program via jump labels.” The situation is similar if manual work needs to be carried out on the machine – ACO find the functions for retracting in the tilted plane and simple re-entry into the machining program to be particularly valuable.

The CXpert software module from CIPRO is matched to the Heidenhain input dialogs and optimally links the CAM programming to the control. Integration into Edgecam simplifies the input process, and all milling and drilling cycles correspond to those of the TNC 640, including support graphics, parameters and support texts. The same is true for the CNC programs, featuring easily understandable, plain-language display. This simplifies workshop CAM programming and achieves a decisive advantage for ACO.

The requirements made on model production are geared to the high demands of new products. These are designed to achieve maximum load capacity with as low a weight as possible, including moulding specific features such as draft angles for walls and fillet radii for any sharp edges.

A precision accuracy of 0.01mm is not a problem, it is more a matter of achieving smooth and grooveless surfaces so that the sand does not break away during moulding. The machining program is optimised directly in Heidenhain plain language by modifying infeeds and oversizes. Smaller corrections such as adding transition radii and logos are also performed frequently.

Another important factor is mastering full-surface machining. Despite increased functionality, the TNC 640 remains true to its concept of comprehensible dialogs and consistent operation for milling and turning functions. This saves time and makes it easy for operators to concentrate on specific production tasks.

A number of new product launches by ACO prove the new level of performance and critical requirements in terms of weight and costs could be fulfilled. The machine is used to almost full capacity, and includes an unmanned third shift. The Heidenhain maintenance functions provide a good level of safety, and an SMS message is sent when the machine is inactive.

CIPRO Managing Director Manfred Kukla says: “Looking down at a manhole, it’s easy to see that complex, efficient processes are needed to produce the cover. In addition to customised designs it’s also good to know that traditional companies such as ACO Passavant GmbH can improve their international competitiveness through innovation. It’s the expertise of partners such as CIPRO, Heidenhain and Edgecam, that made this possible in such an unusually short period of time.”

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**Edgecam**

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