Modern mills are high-tech precision products

At velocities of up to 132 m/s, the rotating hammers in Tietjen mills crush raw materials for animal feed, plastic, organic waste, wood and many more products. Controlling the forces involved takes many years of mill expertise and precisely dimensioned components.

The company‘s site at Hemdingen in Schleswig-Holstein close to Hamburg looks more like an agricultural enterprise than the head office of a manufacturer of industrial mills known throughout the world. And the original idea for the first mill patent really did come from the agricultural history of the Tietjen family. „The founder realized that when it comes to animal feed, the grain size is also important for how well animals absorb the nutrients, in addition to the recipe and ingredients. This led to the founding of the Tietjen machinery construction company back in 1959. Today, we are process engineers who operate within the scope of project business to supply industrial mills with feeders, control systems and explosion protection for a vast range of applications around the globe“, explained Thomas Runde, one of the three CEOs in the family-run business which has a total of 60 employees.

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Material-dependent design

Tietjen mills are impact crushers. Each mill is adapted precisely to the material to be crushed or milled: capacity, humidity, intended granularity, starting sizes, material hardness, surface attributes – and the list goes on.

This is why seven employees work on 3D design. All variants share a similar fundamental design: Arranged in segments, many hammers are attached to a rotor, which rotates in the chamber at over 3 000 rpm. The material, introduced from the top into the mill chamber, hits the hammers, which crush it as a result of the force of the high-speed impact. The company‘s core know-how focuses on the arrangement of the hammers, and in particular the rotor design.

The rotors of hammer mills spin at speeds exceeding 3 000 rpm – and the components must be manufactured with the appropriate dimensional precision.

„We use different steel grades for the hammers. Stainless steel is frequently used, as the materials are acidic or else relatively hard. It‘s crucial that the rotor is manufactured with great precision due to its rotational speed“, stated Peter Wagner, Tietjen‘s General Manager and Head of Production.

The components were produced semi-automatically for many years. The continuous growth and the restricted space on the factory site made us think about purchasing a CNC machining center, which would allow us to produce more flexibly, faster and with a higher degree of precision.

Another argument was the spare parts business. Tietjen is still producing replacement parts for mills that customers have had in operation since the beginning of the 1960s. These individual parts can be more efficiently produced with a higher repeat accuracy when using a CNC machine.

Sometimes fate plays a role

Fate not only plays a role in crime thrillers, but also when it comes to making investment decisions. The Tietjen team quickly reached agreement with machine supplier Knuth about the selection of a 3-axis machining center with a tool changer.

„One of the last demonstrations involved a tool change and how it is mapped in the control system. As the whole thing appeared to be complicated and was taking somewhat longer, some of us wandered around the Knuth demonstration center. And as luck would have it, we bumped into Mr. Bartsch from Siemens, who was setting

SinuTrain: Thanks to offline programming, the machine remains in productive operation for longer.

»Right from the outset, it was clear that Sinumerik operation was smoother, more user-friendly and simpler.«

Peter Wagner, Tietjen

up a Sinumerik control system with ShopMill at another machine. Right from the outset, it was clear that the Sinumerik operations were smoother, more user-friendly and simpler. This aroused our interest. We asked if we could see more, and then made a quick decision: We would be equipping our new machining center with a Sinumerik control system“, recalled Peter Wagner, Head of Production.

However, this turned out to be easier said than done. Michael Schaaf, Technical Manager of the STAHLWERK KNUTH brand: „The 3-axis machining center was not supplied with Sinumerik. However, we made it possible for the customer, and thanks to the support from Siemens, the machining center was installed with a Sinumerik 828D with ShopMill. For batch sizes of between 3 and 5 up to maximum of 50 parts, Tietjen really does benefit from the flexible programming options and the significantly simpler operation of Sinumerik.“

Installing the machining center in the narrow factory hall presented a challenge. With the plant still operational, machines had to be moved around, the floor of the hall opened up and a solid foundation poured. The machining center went into operation early 2018.

Offline programming with SinuTrain

This bold investment decision met with much praise internally. With the new machining center, key workflow steps which had previously been outsourced were re-integrated into the company, increasing our level of vertical integration. „This further improved our flexibility and supply capabilities. This gives us an important competitive edge in the project business, where milestones and completion dates are crucial,“ explained CEO Thomas Runde.

The Sinumerik control system also played a part in this: Using SinuTrain, CNC programs are generated offline so that the machine can remain in productive operation for longer. „An extremely helpful option, which would not have been available with the original machine configuration. The Knuth machining center equipped with Sinumerik and SinuTrain, as well as the excellent collaboration between Knuth and Siemens, provide us with the best possible solution – packed with features and offering a high degree of flexibility.“

Quelle: Siemens AG

With the milling center, outsourced workflow steps were reintroduced into the company.

Left to right: Michael Schaaf (Knuth), Ingo Bartsch (Siemens), Peter Wagner (Tietjen) und Christian Nickelsen (Tietjen)

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STAHLWERK Lupus 650

Premium 3-axis machining center

with high-performance Siemens CNC

- Traversing distance, X axis 1280 mm
- Spindle speed 10,000 rpm
- Rapid traverse, X / Y axis 36,000 mm/min.

The STAHLWERK Lupus 650 in Action at Tietjen