



*TDMshopcontrol - An Integral Part of Production at Tornos*

## Optimized Production at Specialized Swiss Turning Machine Company

**Tornos was a pilot customer for „TDMshopcontrol“, the software module from TDM Systems. This Swiss machine-maker has been using TDM’s shop floor software solution since 2006 in its production area to automate the preparation and processing of production-relevant plant data.**

„We worked closely with Tornos to perfect this software program and adapt it to actual practice conditions,“ says Dr. Heinz Fink, Director of International Sales at TDM’s software-making headquarters in Tübingen. With such care, it’s no wonder that nearly a year passed before the program’s full implementation there. But now, „When everything goes right, our shop floor software solution fully implemented in only 2 to 4 weeks,“ assures Dr. Fink.

Tornos’ experience with TDM products goes back to 1996, when the first generation of TDM’s tool management software was introduced. The results were so good that the company purchased the MPO software to help organize its management of measuring and testing systems and now has implemented TDMshopcontrol as well.

The company’s plant in Moutier, Switzerland, primarily turns out complex machine parts. „That is where our know-how lies, and we can make these parts best ourselves,“ says Pierre-Yves Gurtner, the Logistics Director and TDM Applications Expert who is also

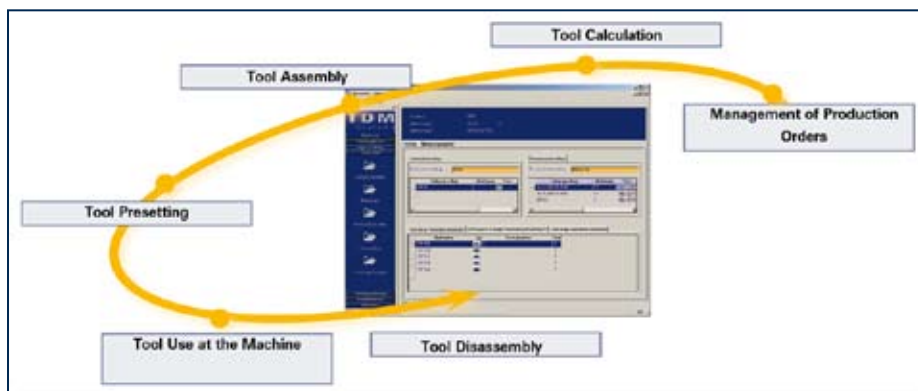
responsible at Tornos for tool logistics. Tornos-made turning machines work with high precision. Tolerances of +/- 1 micrometer are the rule more than the exception. The workpieces are for the most part extremely complex. „Our machines are designed for the manufacture of complicated and small components with micrometer-precision; that is our specialty,“ adds Pierre-Yves Kohler, who is responsible for Marketing and Communication at Tornos. Just as one example: Tornos multispindle turning machines are used primarily by automotive suppliers.

Manufacturing penetration at Tornos is very deep. With the exception of smaller supply parts, the company makes everything itself, including spindles, machine beds, and large cubical components. Nevertheless, production processes must be cost-effective. „We also request outside quotes for every order. If a more attractive price is offered, we send the production order out,“ says Pierre-Yves Gurtner. That is an incentive for Tornos’ own production team to be just a little bit faster and better so as not to lose any orders. And most of the time: it works!



*Installation of a turning center at Tornos (Photo: Tornos)*

In 2000 a new management team took over the rudder and made some changes in Tornos' product strategy: today, the company sells not merely turning machines to its customers but in most cases all-round solutions. „Our customers usually approach us with a specific assignment, and expect us to find the solution to it,“ says Pierre-Yves Gurtner. „What that means is that the machine has to be ready inside and out and from top to bottom at the time of delivery, so that the customer can begin using it immediately for his own production.“ Tornos thus provides advisory services for solutions ranging from tool selection, types of lubricant, the interconnection of peripheral devices, and much more. To that end the company maintains a technical center of its own where the machines are specially readied and tested before going out to the individual customer. At the moment, a new production building for the technical center is going up in Moutier. A good deal of the company's sales revenues goes back into R & D: 50 engineers work in the Design area alone to develop innovative



All tool circulation at a glance: beginning from the production order to the dismantling of no longer required tools. The bottom line is: tools are invariably prepared just in time and correctly, and tool-related machine downtimes are reduced to a minimum.

centralize the company's tool data. There was a time when workers at the company had to get their data from all sorts of sources. Now, in contrast, the data are centrally stored in the TDM Database, available to all users in real time - from crib numbers at the tool carousel all the way to NC programming. TDM Systems gives its customers a complete system of organization for production resources, including a multitude of interfaces with other equipment and systems, like its Zoller presetting devices or its Fastems production planning system.

From 900 to 1200 tool assemblies are permanently located at any time in the three production line magazines at Tornos. The number may change depending on incoming orders, but the magazines are always fully loaded. Depending on the individual production order, some tools

remain at machine. In addition, another 400 frequently used tools stand at the ready, fully assembled and measured, in the tool crib. That is another way of saving valuable time, a precious commodity at Tornos due to the company's bulging order books. On any given day, a total of 3,500 tools are rolling along between the tool crib and the production lines. This is supplemented by tools which are also monitored at a central location for smaller processing stations and turning machines. A good example of the way TDM Software optimizes automation processes at Tornos is its TDMshopcontrol module. As a pilot user, Tornos had a good deal to say about this software module's development. „Many of the suggestions made to us by Tornos became a standard part of the final product,“ says TDM-expert Dr. Heinz Fink.



Tornos' Pierre-Yves Gurtner at a presetting device: "Thanks to TDM we have achieved here an automated process, with flexibility, accuracy, and a high level of tool availability."

and customer-oriented solutions. In addition, Tornos itself develops the software used in the machines.

#### Smooth-running tool circulation

Pierre-Yves Gurtner sees Tornos' strength in its nimbleness and flexibility, and gives automated processes the credit for this. That is one reason he found it important to

#### 100 % automation of the entire production process

It all begins with the production order, which comes from a SAP ERP software system. A corresponding interface with TDM is now in the process of being realized. Then the tool list for the production order is brought in from TDM for reference. This is followed by coordination with the production lines by the work preparation team. The TDMshopcontrol software shows immediately which tools can be loaded into the production system's magazine for the order and which can be removed. Simultaneously, another production order is booked for dismantling. According to Pierre-Yves Gurtner, the man responsible for planning ahead, all this would be impossible without TDMshopcontrol.

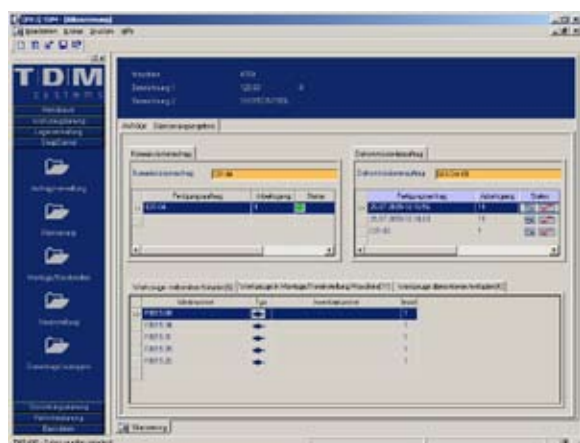


The new technology center of Tornos in Moutier, Switzerland (Photo: Tornos)

The three production lines are in operation for three shifts and 24 hours a day, every day. Nevertheless, production is carried out with maximum flexibility, making it possible to produce up to 80 different components every day. Only through this flexible production style and the high degree of automation is it possible at all to produce such a high number of components in a cost-effective manner. Every day, another brand-new turning machine goes out to the customer from the Tornos production area. And the key to this is: FMS, meaning a flexible management system of production support, together with TDMshopcontrol. „The crucially important keystone of our FMS is TDMshopcontrol,” says Yves-Pierre Gurtner. „Only TDM gives us full control over our production systems. TDMshopcontrol provides all the information we require in order to keep

reset times and tool presetting work to a minimum.“

After the production order has been assigned to one of the lines, a tool order goes automatically to the assembly and presetting teams. „There was a time when we had to report this by email or telephone. That was a complicated process and prone to errors.“ Now, the respective number tells the presetting team which orders are immediately upcoming, so that these can receive priority.



Shown here is a balance sheet for two production orders. Pierre-Yves Gurtner and his team use the TDMshopcontrol software module to organize all tool movements within the plant.

Just a mouse click is needed for the team to see what tool items and assemblies are available and which are not. In the past, this often involved much searching. But since the introduction of the TDM Software, Tornos has been able to work with minimum stock levels, thus reducing the number of tools and, of course, costs as well. „Precisely when a very expensive tool is being used, it is important for us to know at which machine it will be used and for which production order; that lets us mold our order processing to fit our resources,” says Gurtner.

If some of the tools needed for a new production order at one of the lines are already in that line’s magazine, the operator sees this right away in the TDM work preparation sheet on his screen. Then he assigns the production order precisely to that machine. The tooling data are

then sent to Fastems, thus eliminating the need to preset that machine for these tools. Not only does this save time in preparing for production, but better use is also made of machines and tools, and procurement of many related tools is also eliminated.

#### Key data

##### TDM users:

ca. 50 (6 in tool presetting, 6 CAM programmers, and ca. 35 users in the production area)

##### TDM manages:

- ca. 8,200 tool items
- ca. 5,800 tool assemblies
- ca. 6,200 tool lists

##### TDM software modules:

- TDM Base Module
- TDM Crib Module
- Gauge and Calibration Control Module (MPO)
- TDMshopcontrol
- TDM Data and Graphic Generator

##### TDM interfaces:

- TDM TDM-Library & Graphical User Interface for AutoCAD
- Zoller presetting system
- OneSpaceModeling (CAD system)
- Federer (DNC system)

### All tools in a transparent system

With TDMshopcontrol, the entire circulation of tools throughout the plant becomes transparent. „We know at every moment where every tool is located, whether it is in use at one of the production lines or is in presetting, in dismantling, already removed, or in the tool carousel.“ For example, the team member preparing the work process sees right away when preparing to assign a production order whether and where the required tools are located. If, for example, some tools for the production order are being used for presetting at the moment, he knows how long it will take for them to be delivered, and he can, if necessary, give priority to another production order for which all tools are already on hand. In other words, he starts setting up only when he knows that all tools are truly available. This permits a much more flexible management of the production process.

All related processes are made visible in TDM - from crib storage through work preparation and tool presetting to the machine, throughout the following dismantling process and ending with renewed storage in the tool carousel. The circle was recently closed with Tornos' addition of Hänel tool carousels. And the TDM crib module lets the work teams organize the



*The Tornos Sigma 32: an automatic, single-spindle turning machine with an adjustable spindle head for rods up to 32 mm in diameter and with more than 22 tool item positions at the main and counter spindles. (Photo: Tornos)*

process of removal from the crib and booking all processes to the proper cost centers. Still, a few wishes remain open: „What we still need is a connection with the aftergrinding process, meaning automatic booking of aftergrinding orders and re-booking back into our own stocks.“ Tornos is already at work with TDM Systems experts to find a solution for this.

### Company Close-up



The roots of the Swiss machine maker Tornos go back to the year 1880. In that year the first automatic turning machine left the shop in Moutier, where this turning machine specialist still has its headquarters. Interestingly, two other machine builders, Bechler and Petermann, also dedicated themselves in this small Swiss township to the art of precision turning. In view of their cheek-by-jowl proximity as competitors, Petermann and

Tornos decided in 1971 to merge, and Bechler followed ten years later, in 1981. Tornos operated Bechler under its original name for 20 years, but since 2001 the company has done business only under the name of Tornos Holding S.A.

The special expertise of Tornos lies in small turned items up to 32 mm in diameter. Customers for Tornos solutions are to be found in the automobile industry (30 %), the fields of precision metal parts and medical technology, the watch and clock industry, and in air and space travel. Tornos has three main business operation areas: single and multiple spindle machines, replacement parts, and other machines.

Tornos today employs about 600 persons in Switzerland and another 150 worldwide, tendency: growing. Sales revenue is around 250 million Swiss Franks (ca. 155 million Euros) per year.

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Pierre-Yves Gurtner is satisfied with his TDM project. He has kept careful track of all work times and has succeeded in reducing processing costs by 75%. Tornos saves nearly 50 hours a month thanks to its use of TDMshopcontrol in production. For example, the automatic booking features of TDMshopcontrol have led to enormous savings in time and costs in putting tools and tool items into storage after dismantling them. This was always done manually in the past, with frequent errors and a great outlay of time. But the greatest savings have resulted from the ability to locate tools and data quickly: the time savings here are around 95%. „With a total of some 3,500 tools to prepare every day, we were often forced to search for as long as 80 minutes a day. Now it takes us 210 seconds, that is, not even 4 minutes - and we can prove it!“ says Pierre-Yves Gurtner enthusiastically.