



## Successful TDM-User

### TDM's Data and Graphic Generator brings digital tool management to Liebherr

**In the quiet town of Biberach, Germany, the TDM software has been revolutionizing the Liebherr Company's world since January 2005. What began simply as a pilot project for drive train production is now earmarked for expansion to other areas of Liebherr in Biberach.**



Liebherr needs many tools to produce its drive mechanisms for construction cranes, industrial cranes, dump trucks, and other products. The Liebherr plant in Biberach currently uses up to 5000 tools. Liebherr's tool logistics are controlled by software from TDM Systems

The digitally organized production is the in-house prestige project at Liebherr's Drive Train Area in Biberach. „What we're aiming at", says Project Manager Robert Piesche, „is to set in motion a system of central tool data management with automated tool dispensers and cross-departmental availability of 2D & 3D tool data." TDM's Tool Management System has already brought the whole process of tool procurement and tool preparation under one roof. Today, stocks in the tool crib and in the Production and Repair Areas can be called up at any time, so that it is almost impossible for any tool to be ordered too often. Tool dispensation has been centralized and automated: TDMstoreasy from TDM Systems controls the vending machines, paternoster and lift systems and ensures that they always have the needed tools and items ready at every moment. The soon-to-be implemented interface between Top-Solid (CAM) and TDM will also improve NC programming by providing uniform tool data. In order to keep manual, time-consuming entry of data to a minimum, Liebherr makes use of the TDM Data and Graphic Generator.

At the production plant in Biberach, around 1750 Liebherr employees produce vehicular cranes and turret cranes, along with drive mechanism components and high-technology control systems. About 100 CNC machines are available for the production of drive mechanisms, large roller bearings, and cranes, 60 of them alone in the

drive mechanism area. This plant supplies other plants of Liebherr. All kinds of casting materials and steel are processed for the drive mechanisms and control systems of cranes and construction machinery. Up to 5000 tool assemblies are used to drill, mill and turn the components. This involves around 20,000 tool items.

#### Shorter search times, greater transparency, less redundancy of orders

Given this diversity of tools, it is not always easy to maintain an overview. One difficulty, for example, was caused by the time required to search for tools. It was often the case that a tool was not found at all because it had disappeared into a drawer somewhere in the plant. Unnecessary duplication of tool orders was the result. Another disadvantage: there was only one main crib for tools, and each tool in it was marked with an ID-number specified by Liebherr itself. If for example a milling cutter went out of the main crib in the direction of the tool dispenser, it became „black market" stock, since the idnumber could no longer be tracked. Transparency was also lacking among the components, which were not procured via Central Materials Management and Control. „Every tool holder and every tool mount in the tool dispenser was unregistered," says job

preparation expert Piesche, „we didn't even know in detail which tools were being used with which machines. That was one of our suggestions for improvement to Management."

#### Clear-Cut Classification

Robert Piesche and his team of CNC programmers and process planning engineers began introducing TDM Systems software in January 2005. In addition to the TDM Base Module, the Drive Mechanism Area now uses the TDM Tool Crib Module for tool dispensing and plans to implement the TDM Ordering Module as well. To ensure that top-quality tool data are available, Liebherr enters the data of turning and milling tools into the database with the TDM Data and Graphic Generator (TDM 3D). When entering tool data, Liebherr's TDM project team classifies tools according to TDM's user-oriented Class and Group Structure. „When creating a new tool entry, for example for a tool from Coromant, we simultaneously include the idnumber," says Piesche. It's important for each tool to have its own identification number so that the TDM software can later be expanded to include other plant areas as well. Every drill bit or milling cutter will be listed with the same number in all plants. A tool sheet is automatically issued containing all important information: all compo-



Planning digital production and the Factory of the Future at Liebherr in Biberach (left to right): Process Planning Engineer Bernhard Stuchlik, CNC Programmer Gerhard Hagel and Robert Piesche, Director of Production Scheduling flank TDM's Marketing Director Daniela Rudolf. Currently, all eyes are on the optimization of tool organization. TDM's Tool Management System, its new Data and Graphic Generator, and TDMstoreasy for automatic ejection of indexable inserts are in the center of attention



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**Indexable insert ejection via touchscreen:**  
TDM's new TDMstoreasy software at Liebherr controls loading and dispensing at a vending machine from Sandvik. The team member in the production facilities inserts his plant data acquisition card in the slot at the right, uses the touchscreen to select the required indexable inserts, and these are then dispensed automatically

nents are listed in easy-to-understand fashion, along with master data, geometric parameters, and 2D-DXF graphics.

### No Remeasurement Necessary

Liebherr's NC programmers need to know each tool's exact dimensions in order to work with accurate tool data. However, few manufacturers deliver usable data. Even when technical drawings are supplied, if available at all, they are by no means always accurate. In the past, Liebherr in Biberach used a CAD/CAM program which was only capable of creating 2D graphics. „We always made it a practice to show the complete tool and not the components," says the programmer Gerhard Hagel. „Things got a bit complicated whenever we had to construct a new tool." No one kept track of the exact time required, but it took about 20 minutes. from start to finish to enter a tool into a data base. If no technical drawings were avail-

able, the NC programmers had no choice but to measure the tool from scratch, which took a good deal of time. All that will soon change: TDM's Data and Graphic Generator has now been installed at Liebherr in Biberach and has passed the first tests. In future it will facilitate data acquisition, since its database already contains the data of turning and milling tools from manufacturers like WALTER and Coromant. In order to show a complex milling tool in 3D, the user need only select it via TDM's graphic search function. Within seconds, a 2D or 3D tool model based on 25 parameters appears, together with the tool master data. All images are true-to-scale, accurately simulated, and true-to-life. „We took a look at TDM's software and decided to implement it intensively in generating our data," says Gerhard Hagel. „Time-consuming topographic measurement of tools will be soon be superfluous in our plant." Liebherr plans to use the tool for collision analysis as well. "The data made put at our disposal by the tool are very useful," says Robert Piesche. „Our target now is to store all components digitally with TDM 3D so that every programmer will be able to construct his own tools in TDM."

Data exchange will be even more frequent and intensive in future between the NC programming system (TopSolid) and TDM. As CNC-programming expert Gerhard Hagel says, „TDM gives TopSolid the geometric and technological data it requires. As a result, we are always working with correct

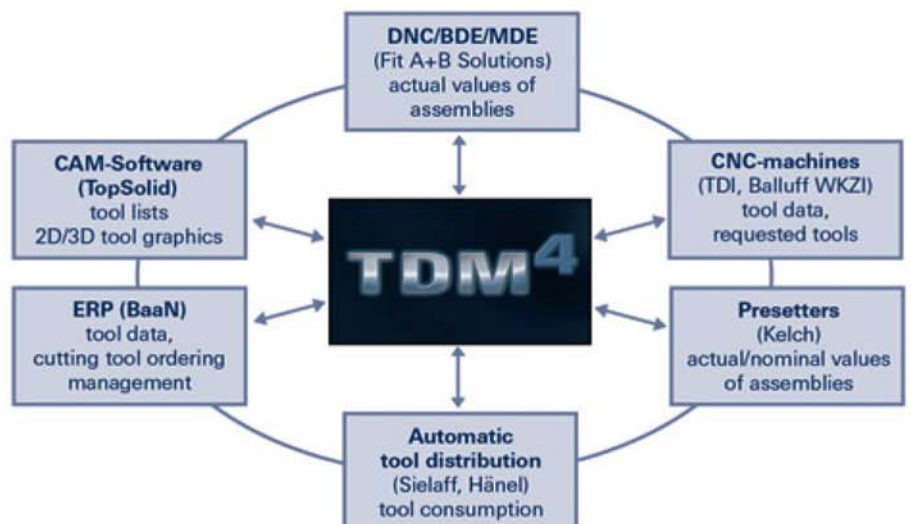
tool data and graphics. Our tool lists go directly from TopSolid back into TDM."

### On the Trail of the Digital Factory

TDM's software is an important part of Liebherr's progress in Biberach towards digital production in the „Digital Factory". Liebherr has major plans for TDM and its interlinked software modules: Liebherr will set up an interface between TDM and the ERP system „Infor". „For us, ERP has a crucial function. We need this kind of interface in order to keep our Purchasing Department constantly informed about tools," says Piesche.

Robert Piesche and his team are now concentrating on further optimization and consolidation of tool dispensation processes and on new crib systems from Hanel for automatic distribution of tools. A Sandvik Coromant spiral-type vending machine has already been in operation at Liebherr for some time and is now controlled by the TDMstoreasy software, which monitors its operation while registering all indexable insert removals and allocating this information to the proper cost centers. Two Hanel paternoster lifts have already been integrated into the system and get their assignments from TDMstoreasy.

Once the systems are up and running smoothly, the TDM System will be introduced in Liebherr's other divisions in Biberach." says Robert Piesche.



TDM software plays a central role in shaping digitalized production at the Factory of the future. Interfaces are available for all major systems such as ERP, CAD/CAM, NC programs, calibration devices, etc.