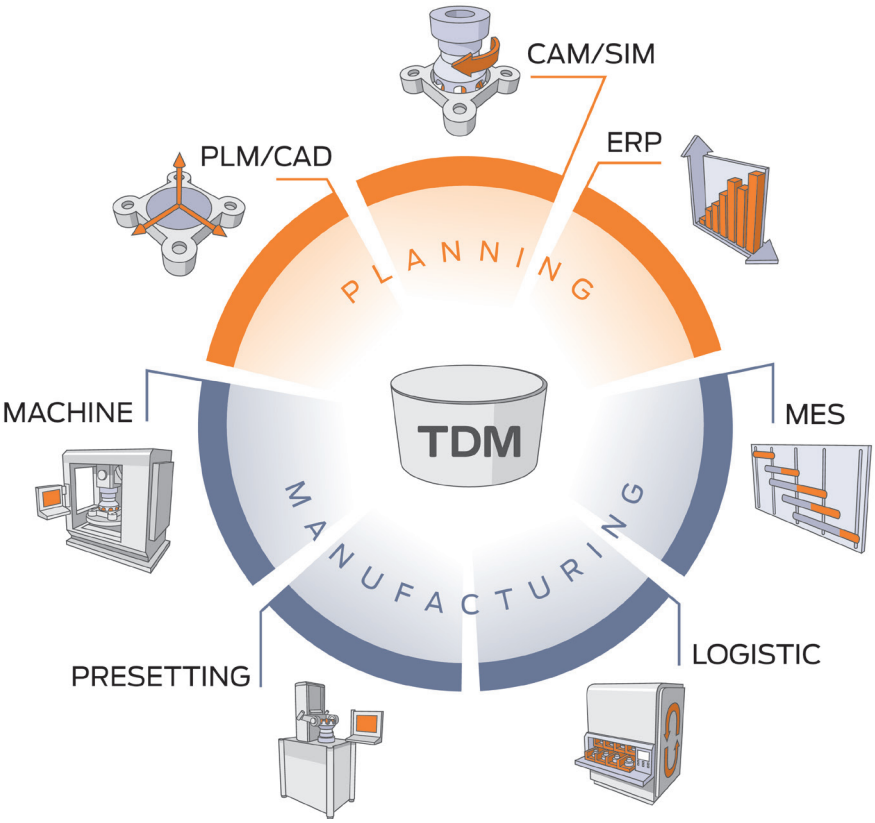
tdmsystems

TDM Base Module –
Professional Management of your Tool Data

I. Fields of Application

The TDM Base Module lays the groundwork for the many helpful functions of the TDM tool data management system. Its many features and user friendly design make cost-conscious and transparent data organization possible in all areas of your company. The TDM software interfaces allow it to exchange data not only with ERP, CAD/CAM and simulation systems but also with storage systems, presetting devices and machines in the production area. Among the TDM highlights are its efficient features for data input and straightforward operation, along with practice-oriented functions like automatic assembly of tools and easy tool selection.



This module description gives you information about:

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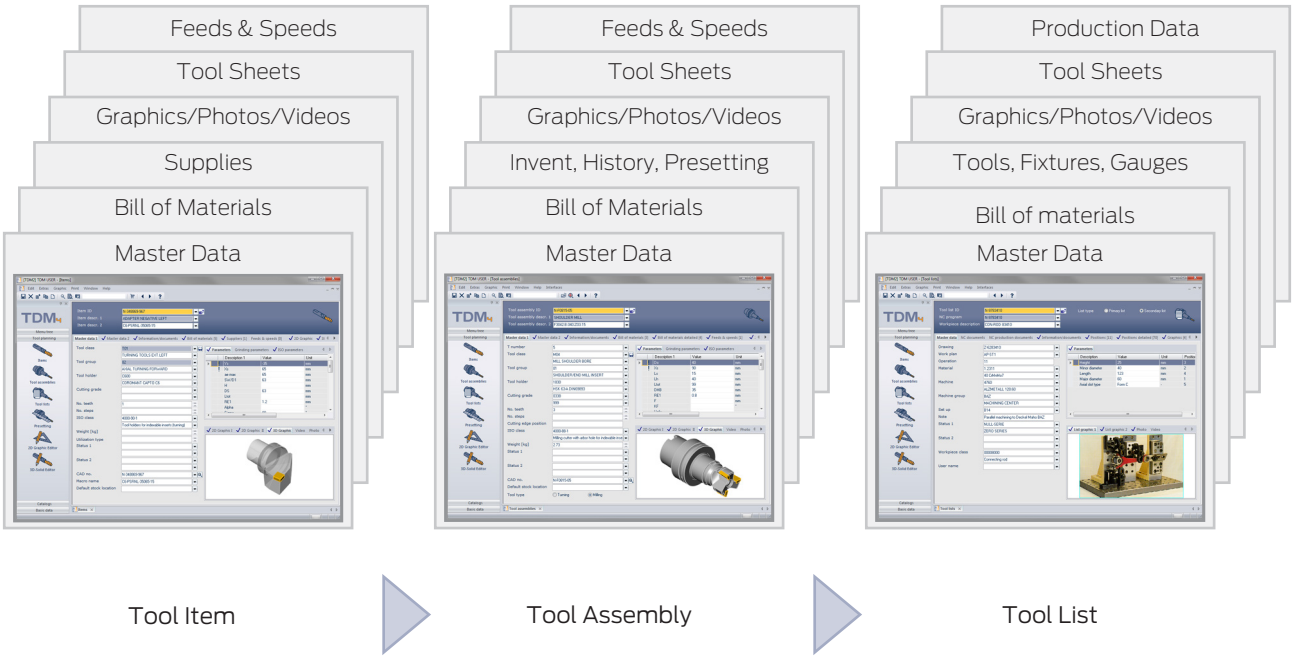
II. Working areas of the TDM

Working with the TDM Base Module

Your planning and production processes require tool information. Every working area or department has different demands to the tool data: the CAM system needs with tool assembly data, the tool crib orders tool items which requires order numbers and supplier information, the production area works with tool lists and setup sheets of individual tool assemblies, etc. The tool planning of TDM Base Module maps these requirements in its data strucutre and manages tool items, tool assemblies and tool lists on different levels. Every data level offers a variety of possibilities to define and store information, data, photos, etc. thus allowing the user to efficiently and logically use the software and data.

Working- and datastructure of TDM Base Module



Please find on the following pages detailed information about data and working areas of the TDM Base Module. It is structured in „tool items“, „assemblies“ and „tool lists“.

3 clicks and the tool will be ready!

The TDM Software has been permanently developed in coordination with our customers. Our main emphasis is placed on: logical funcions, simply realized. Our highest priority: 3 clicks to hit the target or 3 clicks to get the tool!

3Clicks

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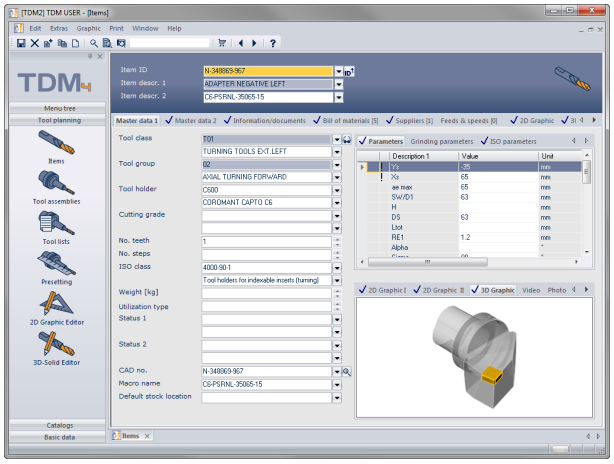
III.a Tool Items

Descriptions of tool items in TDM are very detailed. Numerous tabs are presented in the screen display to ensure structured information for the user.



Master data management of tool items

Tool master data - that‘s behind

The master data of tools is defined in the tabs „Master data 1“ and „Master data 2“ including the following information:

- Tool class
- Tool group
- Tool holder
- Cutting grade
- No. teeth
- No. steps
- ISO class
- Weight
- Utilization type
- Status I and II
- CAD number
- Macro name
- Default stock location
- 2D Graphic, 3D Graphic, photo, video
- Paramter graphic and envelope outline
- Parameters
- Grinding parameters
- Referenceparameters
- Interface to component and machine
- Insert geometry/number
- Cartridge seat
- Presetting parameters and collision data

Information/documents

For each item multiple information and documents can be stored. (see Document Management page 10)

Bill of materials

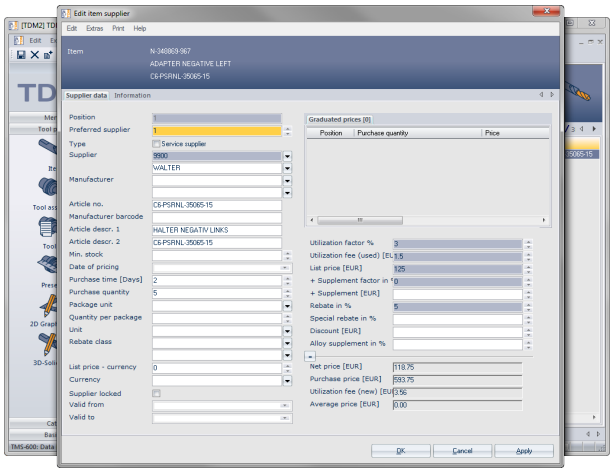
All parts (like screws, pilots etc.) required for the items are defined in the bill of materials.

TDM Supplier Management

Data for one or more suppliers can be allocated and managed for every tool in TDM. When doing so, TDM stores not only the data of each individual supplier but also the maximum stock level, the order quantity, the time required for procurement and the conditions for both pricing and payment. This is the basis for ordering with the TDM Tool Crib Module and TDM Ordering Module.

Physical tools - individual tool description

First of all, TDM V4 manages the master data of your tools which is available for every tool in the same structure. But you can also define tool characteristics that are important for the distinction of tools in your company. These characteristics are defined in the tab „Physical tools“.



Editing of supplier Information in TDM V4

Feeds and Speeds

To every item you can assign feeds and speeds data. Based on material and cutting grades this data defines the cutting conditions for the tools including the following information and parameters:

- Technology index
- Technology class and group
- Material and material group
- Cutting grade and cutting grade group
- Technology parameters like e.g.:
- Operation
- Number of revolutions n
- Cutting speed vc
- Feed rate vf
- Feed per tooth fz
- Reed per revolution fn
- Cutting depth ap
- Cutting width ae
- Tool life t
- Tool life quantity x
- Tool life distance l

Tool crib/order information

This tab provides information about the current position of the tool: at cost center/workplace or stock location. This report includes also information on the number of new and used items or items that must be repaired. Additionally, the defined minimum stock, the number of the corresponding physical tools (if defined) and stock type is displayed. The report lists only „free“ items that are not build in a tool assembly. The field „Order information“ shows the number of current orders and orders made in the past.

Allocation

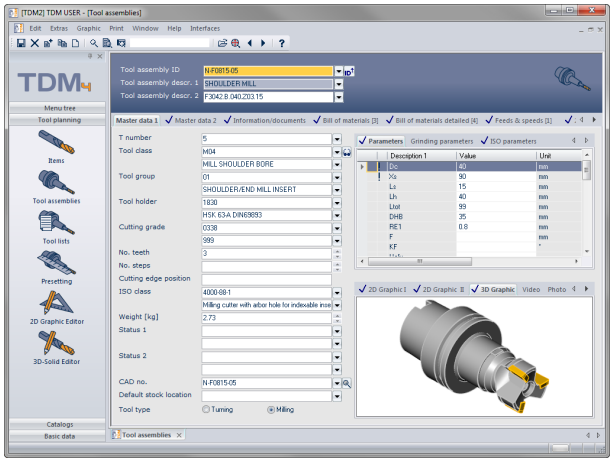
The tab „Allocation“ defines alternative items of the corresponding article and the container where you can store the article if you are working with the TDM Tool Crib Module.

Tool sheet for Items

This tab stores the setup sheet including the CAD drawing of the tool.

III.b Tool assemblies

TDM describes tool assemblies and keeps the information available for future use. This includes not only tool assembly master data, tool classes and groups, but also cutting grades, the ISO class, collision parameters and presetting data. And the TDM software can also store 2D and 3D praphics, images, photographs and videos. As on item level, TDM makes it possible to find tool assemblies by searching for graphic images, technical aspects or simply machine by machine.



Master data - tool assembly in TDM

Master data of tool assemblies

The master data of tools is defined in the tabs „Master data 1“ and „Master data 2“ including the following information:

- Cutting grade
- Tool class and tool group
- Tool holder
- No. teeth and no. steps
- Referenceclass
- Weight
- Utilization type
- Status I and II
- CAD-number
- Macro name
- Default stock location
- 2D Graphic, 3D Graphic, photo, video
- Paramter graphic and envelope outline
- Parameters
- Grinding- and ISO parameters
- Interface to component and machine
- Insert geometry/number
- Cartridge seat
- Presetting parameters and collision data

Information/documents

For each item multiple information and documents can be stored. (see Document Management page 10)

Physical tools - individual tool description

First of all, TDM V4 manages the master data of your tools which is available for every tool in the same structure. But you can also define tool characteristics that are important for the differentation of tools in your company. The characteristics are defined in the tab „Physical tools“. For tool assemblies a variety of physical tool parameters are pre-defined:

- Assembly date
- Current location
- Current tool life
- Different actual values
- etc.

TDM provides also a history of physical tools containing the maintenance data of the tool.

Feeds and speeds

To every tool assembly you can assign feeds and speeds data. Based on material and cutting grades this data defines the cutting conditions for the tool including the following information and parameters:

- Technology index
- Technology class and group
- Material and material group
- Cutting grade and cutting grade group
- Technology parameters like e.g.:
- Operation
- Number of revolutions n
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- Feed per tooth fz
- Feed per revolution fn
- Cutting depth ap
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- Tool life t
- Tool life quantity x
- Tool life distance l

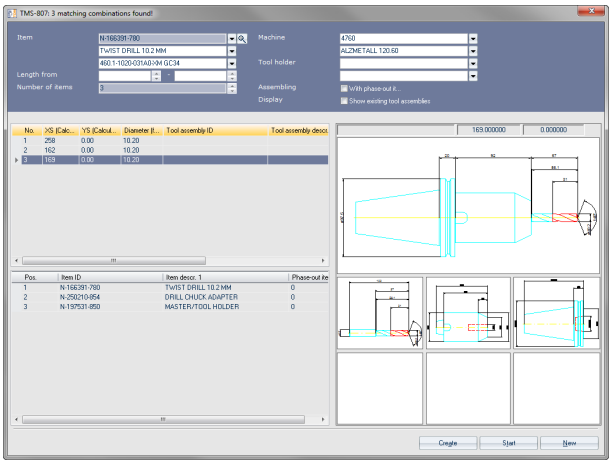
Tool crib/order information

This tab provides information of the current location of the tool assembly: at cost conter/workplace or stock location. This report includes also information on the number of new and used items or items that must be repaired. Additionally, the defined minimum stock, the number of the corresponding tool (if defined) and stock type is displayed. The report lists only „free“ items that are not build in a tool assembly. The field „Order information“ shows the number of current orders and orders made in the past.

Tool assemblies fitting perfectly

TDM supports your tool assembling. Using different criteria like length, machine or the definition of the cutting items TDM uses interfaces (defined in the master data of items) to search for matching items. With 3 clicks TDM puts the tool together and makes a plausibility check. You simply have to select the cutting item!

- TDM not only searches for items with the best interfaces for your specifications but also presents options and/or alternatives!
- TDM carries out a plausibility check: do the items match?
- TDM generates a true-to-scale 2D drawing, including a tool data sheet
- TDM creates tool assemblies in 3D

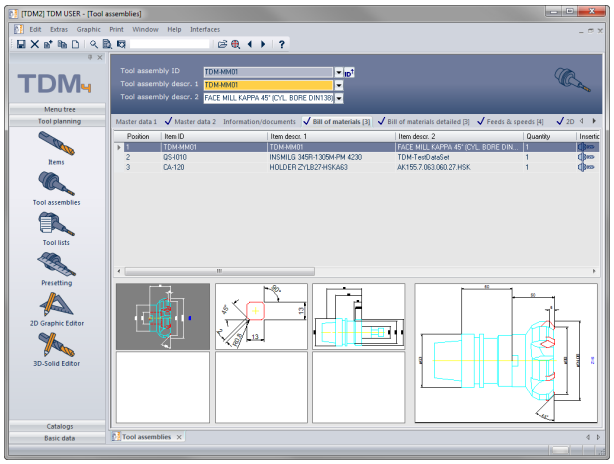


TDM suggests appropriate alternatives for tool assembling

III.c Tool lists

Bill of materials of tool assemblies

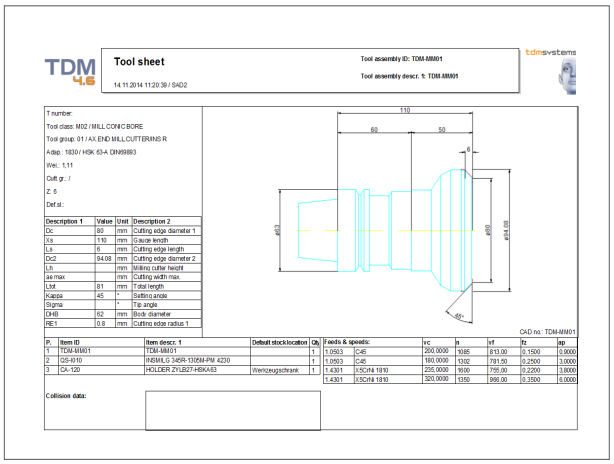
TDM contains detailed information for every tool assembly. And when assembling tools TDM automatically generates a bill of materials showing the individual items with a 2D graphic image, along with the related parameters. Whenever feeds and speeds exist for these items they are of course also shown in the bill of materials.



Display of individual items in the bill of materials

Tool data sheets — automatically!

The TDM Base Module automatically creates a tool data sheet for every tool assembly, including all the relevant data and graphic images for assembly, measurement and use.



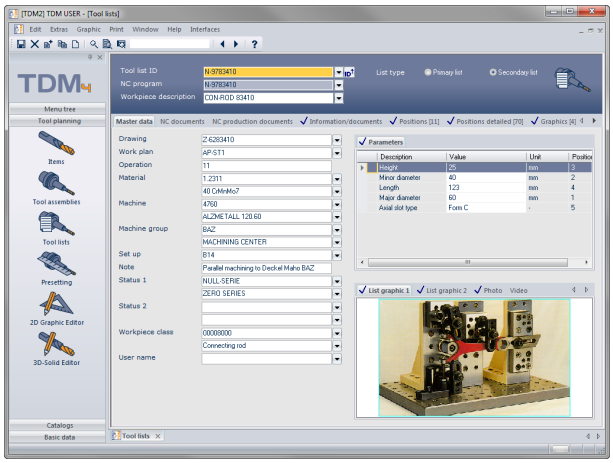
TDM-generated setup-sheets of tool assemblies are the optimal basis for correct tool assembling

Tool lists in TDM contain tools, production resources, gauges and fixtures which are required for a production order. Tool lists are the base for setup sheets. Each tool list is described with a variety of data and information e. g. graphics and documents.

Master data of tool lists

Tool lists like items and assemblies can be described with a variety of information:

- Drawing number
- Work plan number
- NC program number
- Operation
- Material
- Machine and machine group
- Setup
- Status I and II
- Component



Master data of tool lists in TDM

NC-Documents

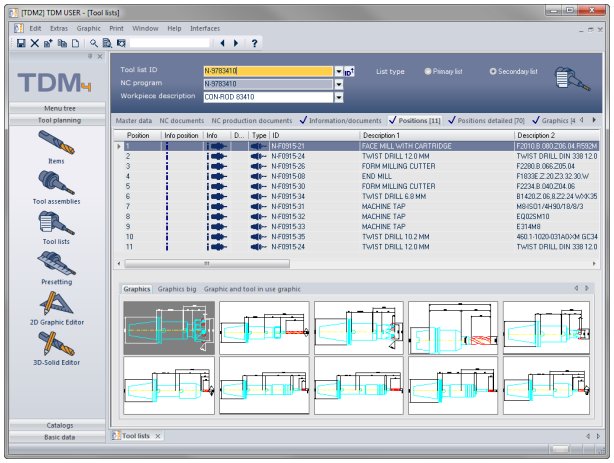
The software module „TDM NC-Management“ is available on tool list level and allows a management of NC programs for the corresponding order/tool list. You can load a specific tool list and edit or view the files in the tab „NC documents“. Files can be for instance the assigned NC program or text files with order information. The NC program management can be purchased as additional module and is not included into the delivery of TDM Base Module.

Information/documents

For each item multiple information and documents can be stored. (see Document Management page 10)

Tool lists positions

A tool list contains all items, tool assemblies, inspection equipment and fixtures required for the component defined in the master data or the NC program. The tool list positions are captured with the ident number and description. Additionally, you can define for every tool assembly the valid data record from the spectrum of possible feeds and speeds data. The system stores also parameter graphics to every position.



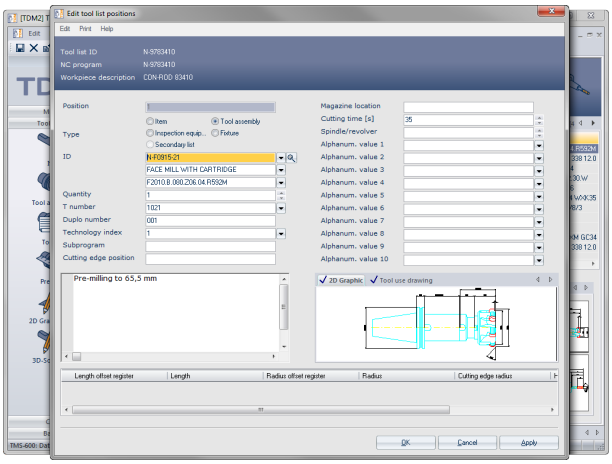
Tool list positions in the TDM Base Module

Creation of tool lists

TDM offers various options for creating and processing tool lists:

- Creation of tool lists with the TDM Tool List Assistant
- Creation of tool lists in a CAM system (e.g. NX, CATIA V5, TopSolid, etc.) with tool assembly data from TDM and subsequent forwarding of the tool list to TDM

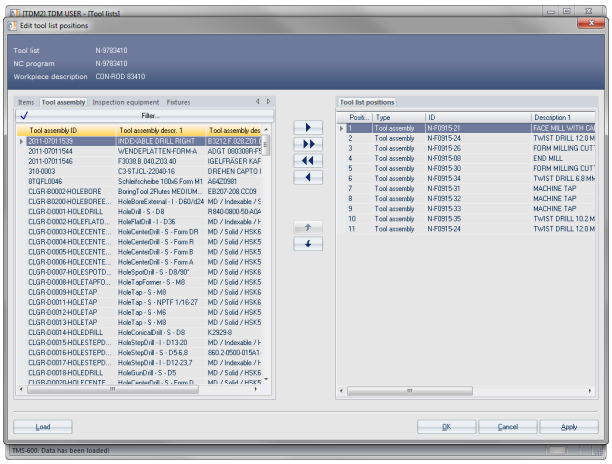
Further information on the creation of tool lists via CAM system can be found in the respective interface description.



Edition of tool list positions in TDM

Assistant for creating tool lists

Creating tool lists is easy and quick with TDM. Just drag & drop the tool assemblies into a new list and your're done! TDM automatically uses the spindle adapter of the respective machine as a filter.



Creation of a tool list with the TDM Tool List Assistant

IV. Specific functions and highlights

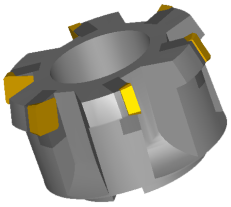
TDM Base Module offers efficient functions and features that make TDM not only easy but also straightforward in use. This includes user friendly functions which ensure simple and transparent processes (e.g. Document Management, Form Generator or the data export to Excel). TDM provides also a number of reports giving information about use of tools.

The Features in TDM - so does the work with the software fun!

Integrated 3D graphic kernel

A CAD kernel for displaying and processing 3D tool graphics is a standard part of TDM V4. The following formats are supported:

- Step AP 203
- SAT
- STL
- TLS
- VRML
- OF1



Fast data input

TDM Base Module offers various possibilities for your data input. On oneside the internal manufacturer catalogues can be used on the other side the TDM Data and Graphic Generator. It creates the master data along with a true-to-scale. Both can be used in conjunctio- with the TDM Import Assistant. Let's have a closer look:

a. Tool manufacturer catalogs in TDM

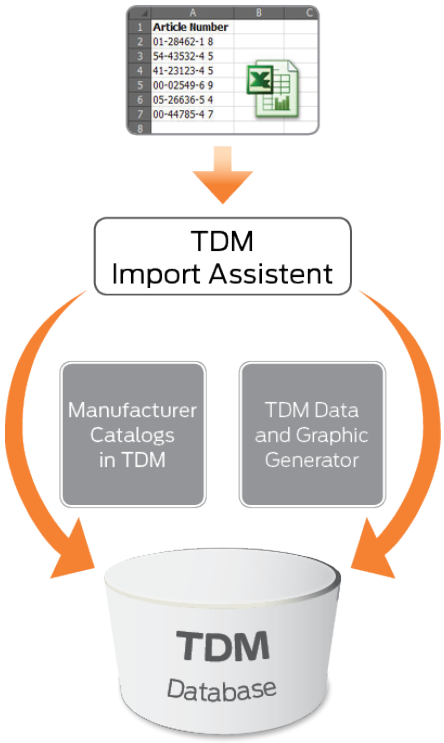
As a standard feature, TDM has interfaces with more than 50 tool data catalogs from tool manufacturers such as Almü, Arno, Bahmüller, Depo, Fraisa, GEWEFA, Gühring, Haimer, Hoffmann, Horn, ISCAR, Kaiser, Kennametal Hertel, Klenk, Komet, SANDVIK Coromant, Walter, Walter Prototyp, Walter Titex, Wohlhaupter and more.

b. TDM Import Assistant

A further standard feature of the TDM Base Module is the Import Assistant, which manages the generation of tool data and graphics based on tool manufacturer catalogs of the TDM Data and Graphic Generator. The data is automatically drawn from the pool of installed tool manufacturer catalogs and stored in the database. This works as described below:

- Generation of tool data and graphic images based on each manufacturer's Excel sheet, including article numbers for each tool
- The Import Assistant searches by article numbers for the tools of the required manufacturer in the respective catalog and stores the data records in the database.

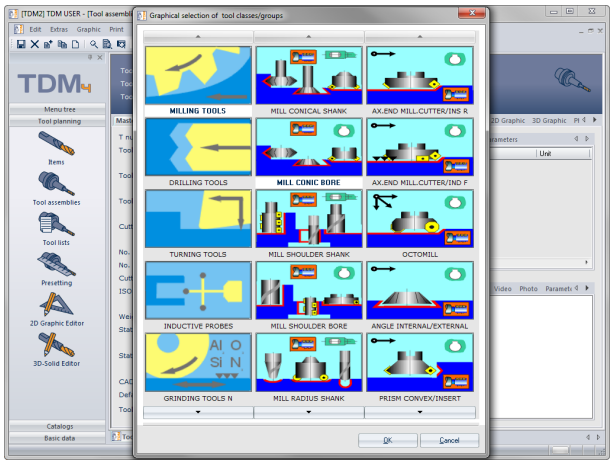
For more information see module description „TDM Data- and Graphic Generator"



Definition of order number and automatic input by using the catalogs or the TDM Data and Graphic Generator into TDM's database

Intuitive handling - 3 clicks to get the tool!

Straightforward structure and a intuitive graphical user interface underpin TDM's leading market position and acceptance. TDM standardizes logical functions and simple user guidance, our top priority: 3 clicks to the tool.



Intuitive handling, like graphical tool selection

3 clicks to the item

The TDM Data and Graphic Generator (see module description „TDM Data- and Graphic Generator") offers over 40.000 digitally formatted tools. Generate your tool with 3 clicks:

1. Click: Tool selection
2. Click: Generation of data and graphics
3. Click: Generation of data and of 2D and 3D graphic.

3 clicks to get the tool assembly

1. Click: Selection of cutting item
2. Click: Selection of matching combination (TDM suggests matching combinations)
3. Click: TDM assemble the tool and save it in the database

There are uncountable examples showing how to hit your target in TDM with 3 clicks!

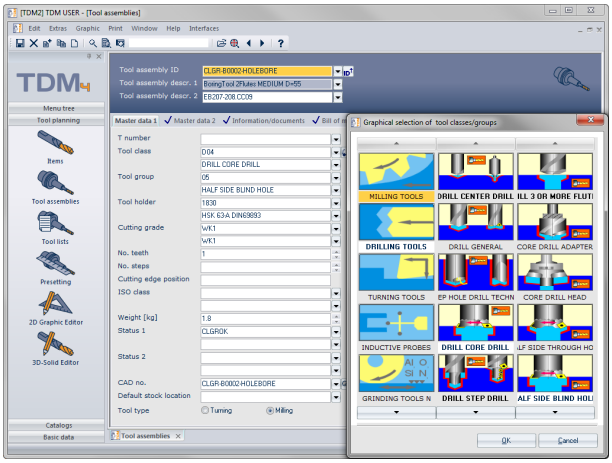
TDM offers also:

- Drag & Drop function for fast allocation of data and documents
- Intuitive graphical user interface for fast orientation and handling

Tool search function: Frustrating searches? That was yesterday!

TDM ensures correct selection of the right tools. That's very important for productivity. The TDM Base Module offers a variety of selection criteria to find the correct tool in an easy way, with:

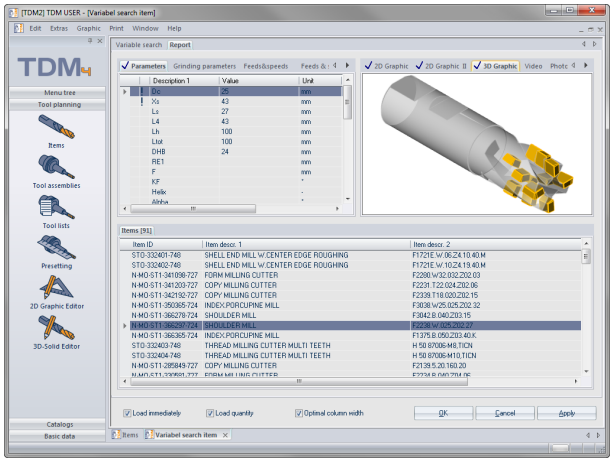
- Graphic tool selection according to machining type (e. g. slebmilling, axial turning, etc.)
- Tool selection via technical criteria, geometry and machine
- Easy, intuitive tool search



It allows the set-up of a customized search panel

Additional search functions: Variable searching

The advantage: an ideal way of narrowing down the search in advance with the possibility to store the algorithms for a re-use at any time.



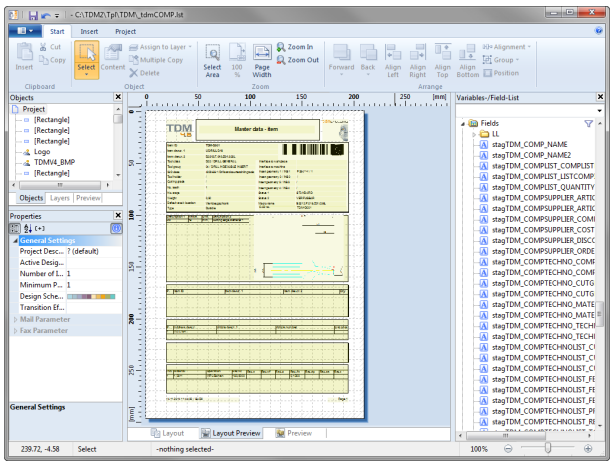
Result of a variable search report in TDM V4

Efficient software handling with TDM functions!

TDM Form Sheet Generator

This module makes it possible to create printouts according to individual requirements, including:

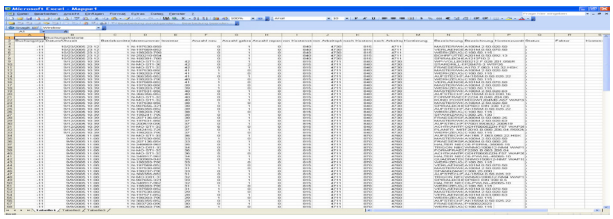
- Setup sheets for items
- Tool assembly graphics
- Tool lists and barcode sheets



Form set-up with the form generator

Data export from TDM to Excel

TDM can export the results of its evaluations directly to MS-Excel, where the data can be processed.

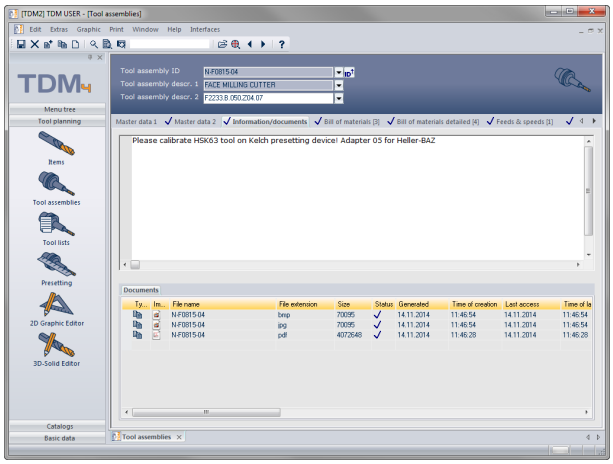


Export from TDM to Excel

TDM Document Management

TDM offers two standard options for precise management of documents. Both are contained in the TDM Base Module in order to ensure centralized storage of information and access ability:

- TDM makes it possible to file documents and graphic images for every identified production resource and
- TDM is capable of integrating MS Office files, PDF files, graphic formats like jpg, bmp, tif, video formats like avi, wmv, and mpeg.



Assignment of information with the integrated Document Management

Integrated multiple plant capability

Companies with various business locations can use the TDM Base Module and its database as a central data server. Data access is individually defined for each different company location, so that users at those locations have access only to the tools from their own company area. All tool data is managed at a single, centralized company location. The TDM Base module's system configuration settings also allow user groups to be defined according to a variety of criteria.

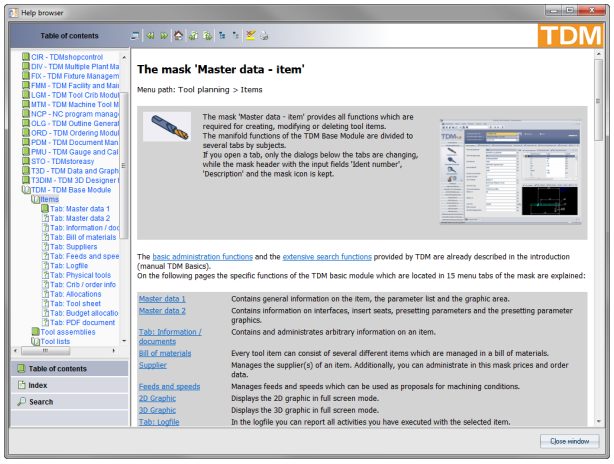
Create acceptance through intutive handling

We wanted to make TDM as easy as possible in handling, therefore we have done our best to incorporate all our knowledge, gained through our experience as market leader:

- Standard Excel export
- Transparent queries and evaluations

Always there to answer questions: the TDM Help

A standard part of the TDM Base Module is its integrated Online Help function with context-sensitive answers and a storehouse of suggestions for almost every instance.



Online help in TDM

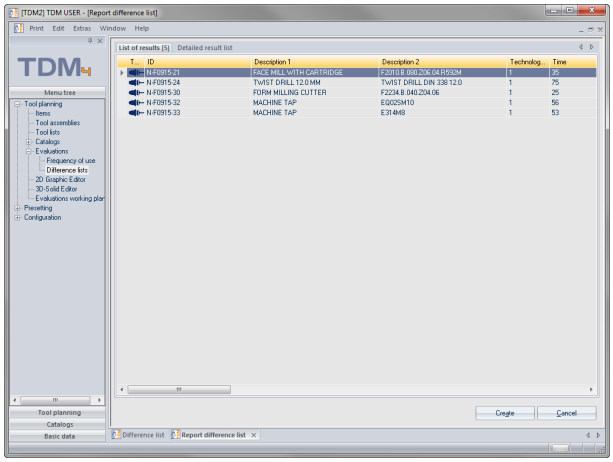
Reports in TDM

The TDM Base Module comes with practical evaluation options for more transparency in tool planning.

Difference lists

The „Difference lists" compare tool lists of an production order in progress and a new order to determine, for example, which tools need to be replaced at a specific machine and which can remain. The following types of evaluation are available:

- Lists of tools to be prepared
- Lists of tools which remain at the machine
- Lists of tools from both production orders
- Lists of overlapping tools from both tool lists

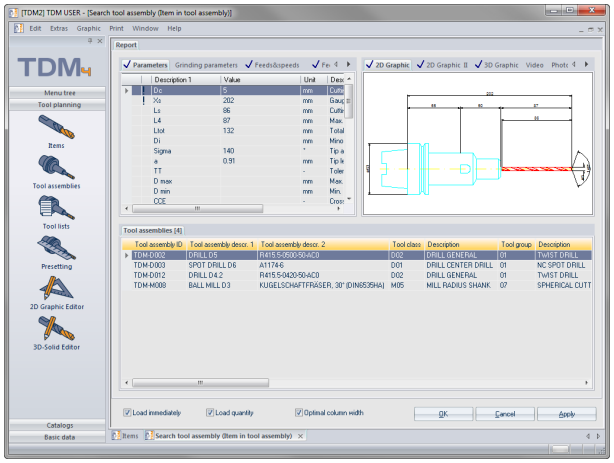


Report on comparison of tool lists in TDM

Multi-stage use information

TDM uses this function to analyze how often, for example, specific tool items have been used in tool assemblies or tool lists. The following types of usage information are available:

- Alternat
- ive item in item
- Item in item
- Item in tool assemblies
- Free items in tool lists
- Build-in items in tool lists
- All phase out items
- Tool assemblies in tool lists
- Tool assemblies in default tool kit
- All phase out tool assemblies
- All tool assemblies with phase out items



Tool use „Item in tool assembly“

Useful function: Modification remarks

TDM Base Module keeps track of all modifications of items, tool assemblies or tool lists along with user data, date and additional information. This supports a throughout and sustainable documentation.

V. Structural and Basic Data

Basic Data

TDM Base Module comes with pre-defined basic data. This enables our user to describe their tooling in more depth. A classification into classes and groups support a higher tool and data usage. Default basic data of TDM is:

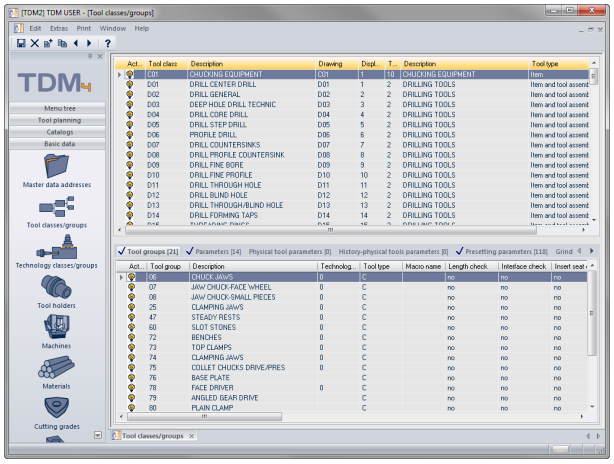
- Tool classes/groups
- Technology classes/groups
- Cutting grades
- Materials
- Reference classes
- Component classes
- Interfaces/insert seats

The basic data offers the user the possibility to efficiently and professionally use the software right after introduction. In the following the basic data is explained in more detail:

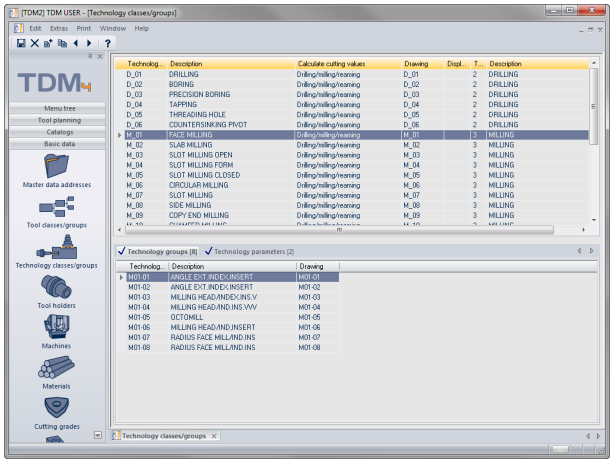
Customized TDM class/group structure (optional)

The TDM class/group structure represents a comprehensive classification of tools by standardized parameter lists and pictograms in 3 steps:

- Tool class types: milling, drilling and turning
  Indexable inserts, tool holders and tunrning adapters, aggregates, accessories and measuring probes
- Tool classes: divides the above mentioned tool class types once more. All in all TDM hast 127 tool classes; examples for drilling: center drill, deep hole drill technics, core drill, step drill, profile drill, countersink drill, profile countersink drill etc.
- Tool groups: subdivide the tool classes more detailed. TDM has 1114 tool groups; example for toll class „Core drill“: core drill three flutes, core drill adapter, core drill head countersinks crank, etc.



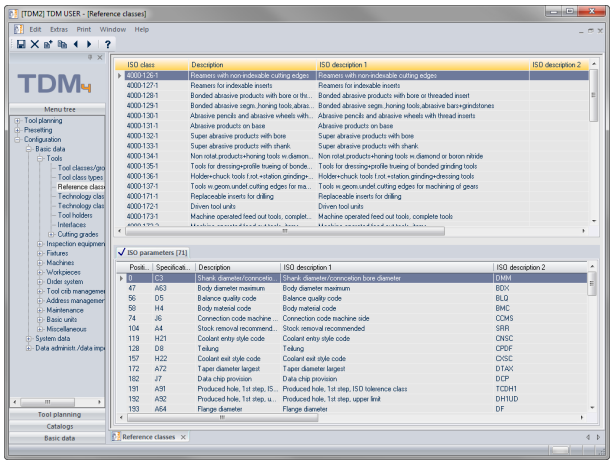
Every tool class is sub-divided into tool groups



TDM contains 28 technology classes described in more detail by a variety of technology groups

Reference classes

Reference classes (ISO classes) support the geometrical classification of the tools into groups with defined parameters as described by DIN 4000.



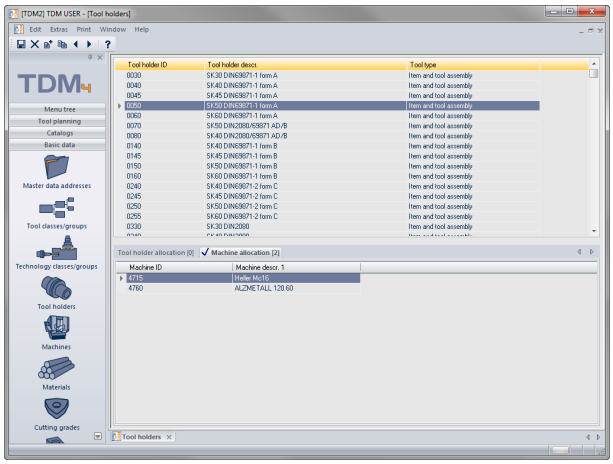
All in all TDM contains 24 reference classes with a multiplicity of parameters

Technology classes/groups

A technology class describes tools of different machining processes but with identic parameters. There are three different technology class types: milling, drilling and turning. Technology groups subdivide the technology classes and specify the machining types more detailed.

Tool holders

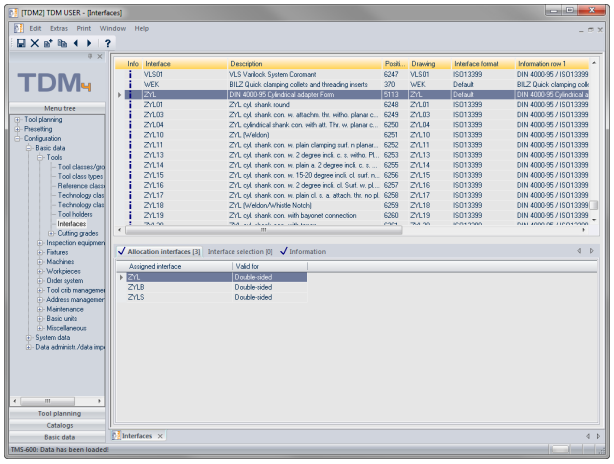
Here you can find all tool holders required for tool assembling. All tool holders are considered in direction to machine; at tool assembly level they are used for the definition of the machine, at item level as additional search criteria. Tool holders can be assigned either to items or tool assemblies or to both of them.



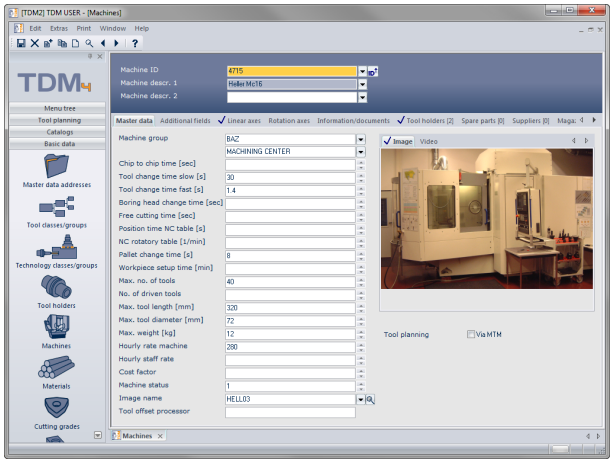
The Base Module provides 243 different tool holders

Interfaces

TDM comes with pre-defined number of interfaces to describe items in an optimal way. The interfaces are divided into „Interface to machine“ and „Interface to component“. The definition of interfaces is very important for the plausibility check at tool assembling.



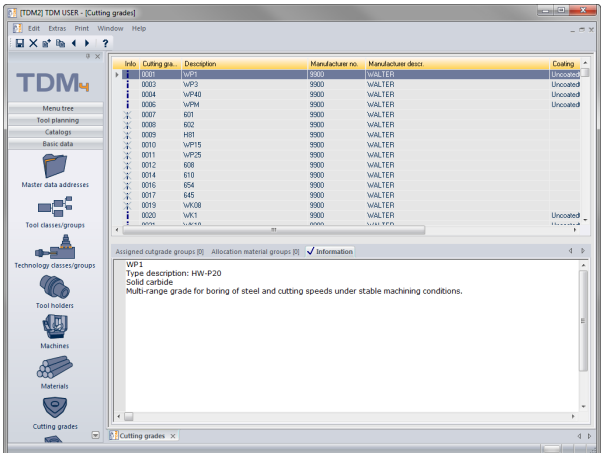
TDM provides the common different interface definitions



Master data of machine in TDM

Cutting grades

The description of cutting grades of a tool is essential for an optimal tool use. Finally, it determines how efficient a tool can be used for machining. TDM contains in total 81 different cutting grades, described by cutting grade type, coating and manufacturer. The cutting grade group provides more detailed information on the corresponding cutting grades.



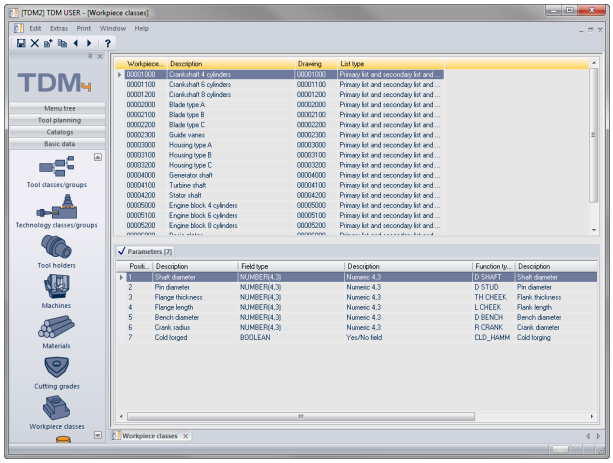
Pre-defined cutting grades for optimal tool use

Machines

TDM describes machines of the production area in consideration of their technical performance. The machine table is the base for interfaces to external software systems, but also for internal checks e.g. the compatibility of tool/machine holders.

Components

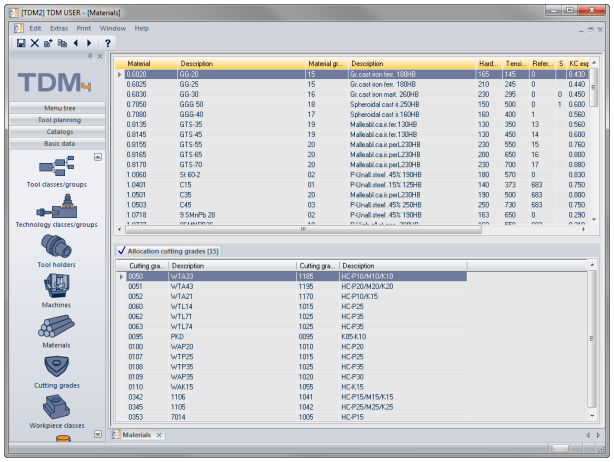
In the production you have the possibility to access to existing tool data records when you generate a new NC component program. Search spectrum for components can be restricted by the classification of components into classes with similar or identic machining processes. Furthermore, you can assign class specific parameters. Examples for component classes are crankshafts, housings and engine blocks. The component classes are described by different parameters.



Extract of component classes and describing parameters

Materials

Materials describe the materials of components that should be machined. In TDM the matching cutting grades of the tools are already assigned to each material. This is the basis for every user to build up knowhow. At the end this allocation is very important to get optimal machining results with regard to feeds and speeds. Given the ideal case, one or several cutting grades, technologies and possible materials have been assigned to each tool.



TDM cutting grades are already assigned to pre-defined materials

Adress management

The basic data of the TDM Base Module comprises also an adress management, providing professional administration of supplier addresses and other addresses. The following information can be managed:

- Master data of addresses
- Industries
- Countries
- Languages
- Position employees
- Salutations
- Titles

VI. System Configuration and User Management

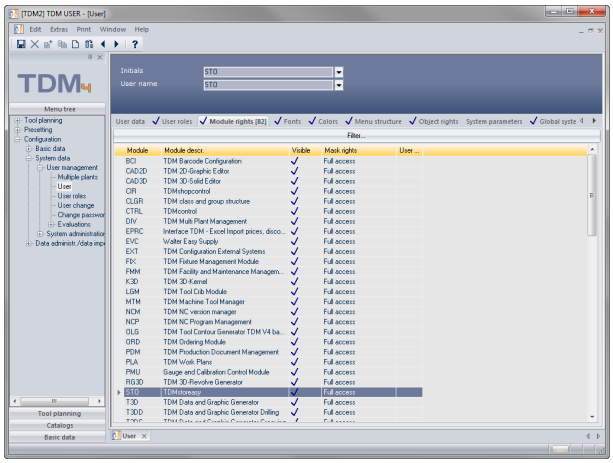
The system administration of the TDM Base Module offers all possibilities to equip all users with individual TDM functions and to manage them well-arranged within the system. The system administration consists of the user management and
administration and is subdivided as follows:

- User management: User management, multi plant management (optional), user roles
- Administration: Database commands, device management, external systems, catalog configuration, interface configuration

User management

The user management offers the possibility to define detailed access rights, individual setting like colors, fonts, etc. overview about the features of the user management:

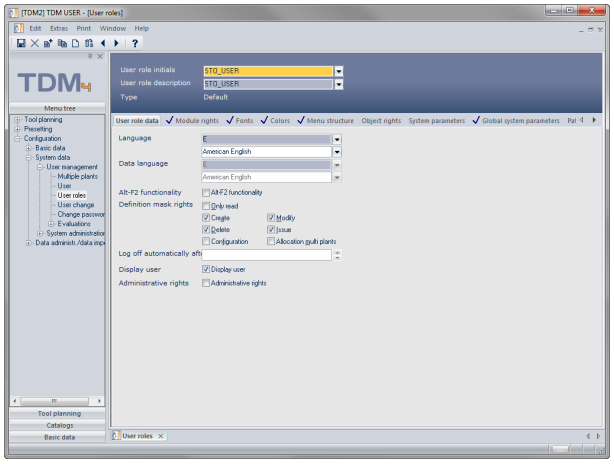
- User: name, department, language, definition of mask rights like reading, writing, deleting etc.
- Module rights: all modules accessible by the user are indicated in this list
- Fonts: definition of fonts, font size or font properties for different fields
- Colors: TDM provides the individual definition of colors for different text and menu fields
- Menu structure: individual definition of the menu structure for every user.
- etc.



Assignment of module rights to a specific user role

User roles

The concept „User role“ of TDM reduces considerably your administrative expenses. A role is defined by different criteria like writing rights, data access, software module and menus. The criteria depends on the tasks of employees. Therefore a role describes also the application scope of specific working areas, e. g. crib management, tool assembling or NC programming. It is possible that a user has different roles. If the characteristics of a role are modify, they will be updated for the corresponding user.



The definition of user roles simplifies the administration of different users

VII. System requirements

Technical requirements:

- Oracle database Version 10, 11 or SQL Server 2008, 2012, 2014
- Windows 7 starting with Professional, Windows 8, 10

Other TDM modules are also available to enhance the TDM Base Module:

- TDM Data and Graphic Generator: software for generating tools (data, 2D and 3D graphics) of over 40.000 manufacturers
- TDM Tool Crib Module: organization of items, tool assemblies and tool lists in tool crib, at machines and maintenance
- TDM Ordering Module: looks after optimal crib stocks and real-time order management of tool and production equipment
- TDM Fixture Management Module: manages independently fixtures including master data and bill of materials
- TDMshopcontrol: management of the complete tool circulation from tool calculation, tool assembling, work order, tool use up to disassembling
- Interfaces with CAD-/CAM-ERP, simulation systems and the TDM Data and Graphics Generator

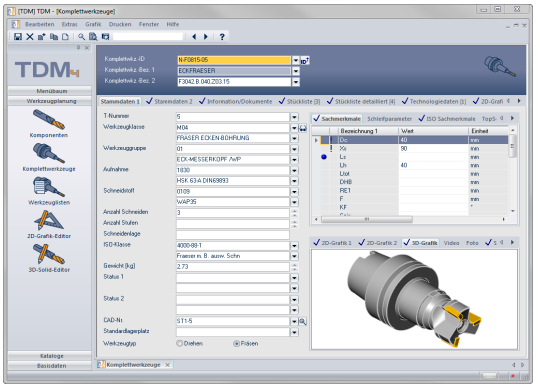
Interfaces (optional):

We recommend that you make the TDM tool data available throughout your compmany. To ensure this, TDM Systems offers interfaces between TDM and the following systems:

- CAD-/CAM systems
- Simulation systems
- ERP systems
- Presetting devices
- Automatic storage systems
- Individual machines

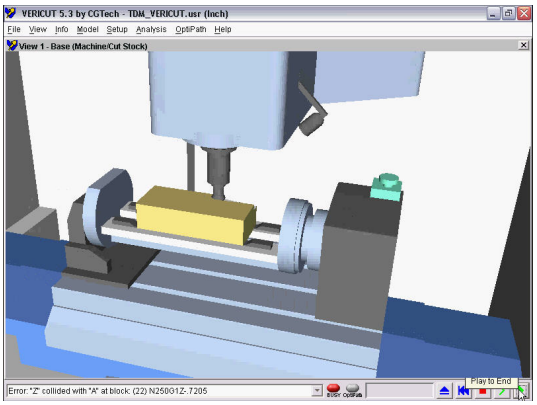
VIII. Advantages

TDM V4 is the software you want for comprehensive, costconscious tool data management. TDM V4 helps you to build up a central database of know-how and information. Planning and production is working with real tool data. That optimizes process and contributes essentially to an improvement of product quality.



Time savings through:

- Fast tool selection
- Data updates in a centralized database
- Efficient data input and processing
- Fast access to the production area's experience and knowhow
- Straightforward evaluations



Cost reduction through:

- Reduction and standardization of tool diversity
- Up to 15 % lower tooling costs
- Increased frequency of tool use
- Up to 90 % less machine downtimes caused by missing tools or delayed preparation of tools
- Less setup time and work

Qualitative advantages:

- Reliability of NC programs due to reliable tool data
- Reproducible cutting values
- Accurate, reliable processing due to reproducible cutting values and conditions of use
- Availability of 3D graphic images from NC simulation
- Interfaces with NC programming and simulations systems with direct data access from the NC environment
- Data security and easy data maintenance thanks standard interfaces to common ERP systems, NC programming and simulation systems

Digital tool data management for more efficiency, productivity and quality!

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