woodCAD|CAM
Software for furniture and interior design

Details
3D software for furniture and interior design

woodCAD|CAM: integrated software for 3D design and manufacturing

The market expects top quality, shorter delivery periods, and individual design. Those able to offer the greatest flexibility will stay ahead of the field. Developed solutions are required worldwide in the furniture and interior design business. Modern software solutions must provide continuous assistance from the planning, presentation, and design to the final production and supply modifications at any time.
Content

Strategy
- Industry-specific solutions .................................. 3
- 3D software for interior design ................................. 4

Planning and design
- Room planning ...................................................... 5
- Interior design and quotations .................................. 6
- Design assistants .................................................... 7
- Design modifications and drawing output ................. 8

Order management
- Project administration and part lists ...................... 9
- Design supported calculations ............................... 10

System architecture
- Parts and material structure .................................. 11
- Connection technology ........................................ 12
- Master data and catalogs ..................................... 13

Photorealism
- Photorealism ....................................................... 14

CNC production
- Link to CNC production .................................... 15
- Automated CNC programming ............................. 16

Company
- eBusiness .......................................................... 17
- Imprint ............................................................. 18
The industry uses woodCAD\textit{\textvert CAM} for the parametric design of carcass furniture. Manufacturers with a high range of variants or custom made products simplify their processes with woodCAD\textit{\textvert CAM} technology including efficient design, parametric design, and the generation of part lists of CNC programs. The system kernel is SQL data base oriented and allows an easy transfer of design data and part lists.

As a result, woodCAD\textit{\textvert CAM} becomes a data provider for ERP systems and manufacturing control. woodCAD\textit{\textvert CAM} itself has numerous functions to transfer structured geometry and manufacturing data to manufacturing plants and machinery centers.

Examples:
- The system enables the control of multiple CNC machines with different unit and tool equipment.
- Due to intelligent functions, components with all the design and manufacturing details, find the machine needed for their production path in the factory automatically.

Further functionalities are specific administrative tools which allow the generation of production batches or the real-time calculation of custom made products. HOMAG Group software modules like woodWOP, woodNest or CutRite for cut optimization are seamlessly integrated. Therefore woodCAD\textit{\textvert CAM} makes business transactions transparent and economic control comprehensive to the departments. Depending on the requirements, woodCAD\textit{\textvert CAM} is available as a "stand-alone" application as an integrated system component.

In addition, HOMAG eSOLUTION offers the industry oriented software line MCS. MCS is based on an advanced product configurator and is able to generate complete and technical verified data for the entire order and manufacturing process. Orders are not only registered, but they also can be taken over by retail or outlets automatically. Intelligent import routines transfer different trade orders of data to the HOMAG eSOLUTION eBusiness (see eBusiness, page 17) into concrete business orders. This ensures speed, safety, and flexibility in the order and manufacturing process for both standard and special.

The MCS software modules will be installed in addition to existing standard ERP and PPS systems. They help to map the sector-specific requirements in a better and faster way.

HOMAG eSOLUTION stands for state-of-the-art flexible process solutions.
woodCAD|CAM is perfectly tailored to the specific needs of the PRACTIVE customer. The software provides an integrated data flow in operation from “design to machine”. Layouts of individual furniture and complex room situations can be created within a very short time and impressively presented. Details or complete part groups can be modified according to the customer’s desires and immediately calculated and displayed. Manufacturing lists are available directly after creating the design. Design data are prepared for manufacturing automatically and transferred to the machine. All different manufacturing methods offered from the HOMAG Group are supported there.

With a complete implementation, woodCAD|CAM saves up to 70 percent towards conventional solutions. woodCAD|CAM reduces the costs and increases the process reliability.

woodCAD|CAM is based on proven CAD/CAM technology and is optimized for HOMAG Group machinery. The symbiosis of current HOMAG Group machine technology and state-of-the-art software provides the manufacturers of furniture and interior design with investment and competitive advantages.

Manufacturing data and part contours will be transferred to current machine types of e.g. HOMAG, WEEKE, HOLZMA or BRANDT and directly processed. HOMAG Group software products such as woodWOP, woodNest, or CutRite are part of the solution. woodCAD|CAM upgrades the technological know-how of the manufacturing companies and increases their profit. woodCAD|CAM is especially suitable for manufacturing kitchens, bathrooms, living-rooms, and office furniture.

The modular structure allows a step-by-step implementation in the company. For the PRACTIVE sector, HOMAG eSOLUTION offers woodCAD|CAM as a required standard solution to the machine technology. The aim is to shift the work preparation from the workshop into the office.
Room planning

Detailed planning and illustrative customer presentation

3D room planning
woodCAD|CAM provides a special architecture module for the detailed planning of complex room situations as well as an illustrative customer presentation. It enables fast and simple transfers of the planning results in the CAD system. All required technical parameters (wall length, wall thickness, ceiling height etc.) are systematically in the dialog. Openings such as windows and doors can be included where the planner conforms to the dimensions for the windows and doors. If it is necessary to adjust to a detailed dimension, there are plenty of modification functions available.

Room situation
It is also possible to create 3D walls from the 2D drawing of the architect by simply selecting the drawn elements. For completing the room situation, components such as stairs, uprights, and columns are inserted. The user has created a detailed architectural basis for the desired planning. Decoration units such as lamps, plants, sanitary objects, and devices are available for a realistic design of the customer presentation.

Individual planning grid
woodCAD|CAM has an efficient planning grid that offers a flexible and easy-to-use assistance for complex planning. The planning grid can be aligned to a wall or free contour and divided into segments. Therefore different planning levels can be defined.

The planning level plus the oriented alignment can be defined for every article. In contrast to usual design planning programs, woodCAD|CAM enables the individual specified grids for complex planning tasks such as e.g. counters and curved constructions.

Article libraries
woodCAD|CAM provides a centralized administration of all library elements such as standard or special articles, purchased objects, and variable elements. The structure of the library is freely defined; the contents are stored within explorer’s folders and are easily expandable during the planning process.
Planning and design
The visualization level of plans and designs is optionally customized. In the 2D plan only simple blocks with abbreviated designations are shown. However, the 3D block with fronts, partitions, and handles already appear in the 3D plan. In the 3D design mode the fittings then become visible. In the highest visualization level, profiles and processes can be precisely displayed.

Article selection
Individual furniture types can be composed and configured with a comfortable selection interface in a catalog as mentioned. When the article has been completely defined, it can be exactly positioned in the 3D room plan. For this purpose, there are high-performed insertion and connection functions available.

Quotation
Once the planning has been completed a quotation can be automatically created. This data is generated on the basis of a material overhead calculation and labour/production times (described more detailed in the chapter calculation). A quotation can be calculated for each sales article. The result can be saved in a shopping basket and edited afterwards. By doing this, prices can be modified, positions added and discounts can be assigned as required. Finally, the quotation is outputted in a professional style. Beforehand, position numbers can be allocated to the planning positions for structure and better readability of the offer. This procedure can be optionally carried out semi-automatically or fully automatically. This structure is shown in the manufacture bills of material.

Visualization
All visualization levels are configurable as well as alternately selectable. For example, with design modifications, the 3D design mode is selected to have access to the complete part list structure up to the smallest screw. After completing the modification, the modified article is transferred back to the planning mode and is available as a planning block. With the command "Clone", characteristics can be transferred from one planning block to another.
Design assistants

woodCAD|CAM offers different methods to ensure a fast solution for the required design tasks

**Article Designer**
The Article Designer is a perfect solution to meet the requirements for similar or dimensioned independent designs. This module meets the requirements in cabinet- and object designs if similar furniture with different dimensions or front divisions are requested. Thereby the Article Designer refers to parametric components.

**Object Designer**
The Object Designer is based on the classical 2D system of the qualified designer. The basis for generating the part is one or several vertical sections as well as the top view of the construction. The 2D geometric data can be created with simple 2D CAD functions such as e.g. polylines. Finally, woodCAD|CAM automatically generates the complete counter element with all details in 3D from the different 2D views. By modifying the 2D drawing element, the 3D model can be aligned per mouse click.

**Part Designer**
The Part Designer provides more flexibility and individuality in the 3D modeling. Individual parts are freely combined on the screen in 3D. The procedure is similar to the final assembly of a furniture element. Every element consists of snap- and identification points so that parts, edges, connectors, machining etc. can be interactively aligned on the screen. The shape must be defined first before profiles, materials, and fittings can be allocated.

**Frame elements**
Frames can be designed from cross sections. This takes place on the machining of profiles, pipe elements, connectors etc. where wood, metal- or plastic parts can be applied.

**Stripes and worktops**
Assistants for creating light valances, trims, and cornices as well as for generating worktops are not only applied in the kitchen but also in the interior design and laboratory design. Thereby the elements are automatically generated, and if necessary, connectors are set based on user-specific construction principles along the outline process of articles.
Modification functions
Frequent modifications are carried out with a customer’s order even though it is ready for production. Therefore all previously created production documents such as drawings, part list data, and CNC programs must be checked and if necessary modified in practice. **woodCAD|CAM** offers a variety of possibilities to cover requirements of the modification design. New articles can be quickly assembled from existing parts. In addition, numerous functions of alignment and modification functions are available for modifying articles and parts along with their characteristics.

The modification functions can be recorded and saved with the article. This allows modifications, which have been carried out only once and can be immediately applied on dimensional modified articles.

Automatic dimensioning of articles and parts
The system-internal dimensioning module can be parametrically controlled to meet different requirements. Furthermore, with manual dimension and labelling functions, additional details can be shown in the drawing. As an assembly aid, design documentation views can be created in every article.

**woodCAD|CAM** displays the saved article and part group structure in the database. With the part dimension complete, dimensioned production drawings can be created for all parts. The parameter enables adjustments which details should appear in the drawing.

Automatic part dimensioning

Drawing output
Sections are important for the assembly as well as for production, and are created with special commands for any cut levels. If the design is modified, the sections adjust themselves accordingly. A range of branch specific options create practical displays with material identification and cut markers.

Customers and distribution require a clear display of the planning or design. Various functions are available for creating part and connector dimensions or a 3-table-projection with downsized construction details.

section B-B
Project administration and part lists

Integrated project administration to combine individual orders or drawings to business orders

Detailed production documents can be created for orders. For this purpose woodCAD/CAM has a range of functions for administration, sorting, and printing of part lists. The part list data can be optionally transferred directly to the cut optimization or the company-specific solution.

The integrated Report Generator in the Process, enables the output of special customized part lists. Different list formats, sorting parts (material types, dimensions etc.), and part compression (same dimension, same material type, same processing) can be performed. Besides the classical part lists, the system also supports the output of a graphical part list. All articles can be outputted with explosion view, side view, isometric view, and part drawing additionally to the part list data set.

The Report-Generator offers the following options:
- Cut lists: Sorting according to the description and material, same raw dimensions, same CNC processing program etc.
- Production lists: output of materials, surfaces and edges with all dimensions, as well as the edge picture for all parts of the order
- Purchased parts: output of all purchased parts with order codes and vendor information
- Profile and edges: output of all edges and profiles with dimensions and a compendium of the same elements
- Coating and surfaces: output of all veneers and foils with dimensions and a compendium of the same elements
- Labels: output including graphics as well as partly respective CNC program numbers
- Structured part lists: assembly of a structured list with allocating individual parts to article and position groups

With the open data structure, the job data can be transferred to text, spreadsheets, and other databases.
Design supported calculation

Cost transparency at all levels

Calculation
Not only can planning or design data be used for part lists with the data structure and CNC programs, but also for conducted calculations. For this purpose different calculation methods are offered.

Material overhead
For the material overhead calculation, the exact quantity is determined and calculated with material price as well as the overhead.

Manufacturing costs
Not only is material calculated, but the production time and production cost with material is calculated as well. Operations and variable time periods can be allocated to every element in the object structure. A complete work plan is order specific and composed from operations consisting of the calculated production time. Cost centers with the cost set per time unit enables the calculation of the exact production time and cost.

Article prices
Within the articles, price calculations or variable prices are added and directly deposited in the article. These prices can be linked with the execution versions to be able to deposit complex price tables.
Parts and material structure

Parts are defined by the characteristics such as base material, coatings, veneers, edges, and profiles.

The calculation also takes into account any complex parts. They can be defined as e.g. partition designs as a sandwich structure in metal stand design, metal constructions for table frames, or shop-fitting elements. Multi-elements such as frames and filling constructions, can be defined by nesting the different parts.

The parts of the relevant required design can be dynamically aligned by means of certain rules for the part definition. While doing so, it is possible to have a permanent access to libraries for panels, edges and veneers. By selecting a material, the basic data for generating the part lists as well as calculations, photorealism and production can be defined.
Connections
A comprehensive library with intelligent and parametrical connections allows a fast and safe design. The software supports the designer with the following automatisms:
- Analysis of the connection situation
- Selection of suitable connection elements (e.g. fittings) optional with the necessary accessories
- Positioning of fittings by the means of parametrical rules
- Generating works of drillings and grooves on adjacent parts
- Drawings, part list information, CNC programs etc. are automatically updated

Fitting selection
Within the connection optimization (independent error-free search for part optimized fittings) woodCAD|CAM can automatically apply a dynamic search for the suitable fitting solution where the system recognizes recurring situations and suggests suitable fitting solutions. The following example directly shows the optimum benefit with the design modifications:

Processing transmissions
If a designer inserts a door, the fitting situations, grooves, protrusions etc. are analyzed. The suitable hinge with an assembly plate is positioned by the means of the insertion rules. Thereby woodCAD|CAM automatically identifies the dependencies between the door element and side element and generates the constructive necessary workings on the respective adjacent part so that there is a flowing continuity.
Master data and catalogs

Cooperating with the manufacturers and distributors from the furniture supplier industry provide comprehensive online product catalogs

Download catalogs
The catalogs provide panel material, fittings such as hinges, furniture connectors, drawers, articulated sliding door components, and electromagnetic opening systems. Complete assembly groups for drawer slides and drawer elements, can be parametrically aligned to an existing construction.

This data can be updated online by the Service menu of our website at any time. This saves time and makes it possible to consider the innovations and variety of products of the suppliers in the design.

Furthermore, woodCAD/CAM provides a selection of core materials, surfaces, profiles, edges, and solid wood materials. Data for complex systems such as locks, metal components for shopfittings, and worktops are also available as well.

In addition, article libraries provide displays of a complete range of cabinets and carcase furniture for different branches.

Data maintenance
A range of tools are already provided for servicing your own catalogs:
- woodCAD/CAM Process offers a clear input and maintenance of data.
- Data from the system of branches or manufacturer data can be transferred with diverse interfaces.
- Data between ERP/PPS and woodCAD/CAM can be synchronized with special replication processes so that a clear and uniform maintenance of data and the consistency of master data is guaranteed in distributed systems.
Integrated rendering

woodCAD|CAM has an integrated photographic display which automatically defines the application of materials and colours in the planning and design so the customer receives a clear picture of the design or room situation. If necessary, corrections referring to the shape and material are possible before the production starts. The special effects of the photographic display are achieved by:

- The allocation of materials for surfaces, veneers, and profiles with their reflection characteristics
- Setting light sources with different light qualities (sunlight, spotlight etc.)
- Shadow and mirror calculation
- Numerous additional special effects such as e.g. freehand lines or comic-style

Animation and Photorealism

Thereby woodCAD|CAM supports different rendering methods. The integrated functions allow a quick process in the planning without loading an external application. Alternatively the data can be transferred to current render and animation programs with a special interface that offer a wide variety on illumination options and special effects.

Photorealism

Convincing customers with photorealism
Link to the CNC production

High utility by linking CNC production plants

Detailed machining data can be already derived from the planning and design. Not only geometrically data, but technology parameters as well as the sequential control are automatically generated. woodCAD/CAM focuses on the individual machine situations, from the individual CNC machine to the workshop unit out of saw, edge and CNC, to full automatic industrial plants. A professional and economical CNC connection is possible.

CAM solutions
- Automatically generating complete CNC programs for all parts in the order are popular in the practice because a very high economic efficiency can be achieved. As a result all information can be created for the machines in the process chain.
- With panel dividing saws, the automatic generated cut list with detailed cut dimensions and barcode information is transferred to the cut optimization software.
- For throughfeed machines to process narrow surfaces, a detailed sequential control can be initiated with the barcode.
- For CNC machining centers, there is a range of optimized components available to support complex processes like e.g. edge banding aggregates, nesting or folding (besides the classical process methods), drilling, milling, and sawing.
- In addition to the classical stationary facilities, production lines and press lines can be driven.
- For 5 axis technology, a programming system with a real time simulation is available to reduce the complexity of the technology and to simplify the operation.

Barcode
The main item of the CNC manufacturing is a suitable identification for a work element or something similar with the barcode. A unique part number can be directly generated in woodCAD/CAM with freely adjustable rules to guarantee that the part is clearly allocated in the production stages.

Cut optimization
For the connection of programs to a cut optimization, a free configurable interface is set. In doing so, not only can cut dimensions and material descriptions be transferred, but part descriptions, position numbers, and part graphics can be transferred as well. On the saw the part is marked with the label with the unique number which is automatically transferred to all following CNC machines.
Automated CNC programming

All required CNC programs are directly generated from the 3D design for the complete order

The outstanding advantage of woodCAD|CAM is the automatic CNC programming for HOMAG Group machinery. In terms of saving time and avoiding mistakes, the conventional solutions cannot be fully achieved.

Generating CNC programs
The automatic inheritance of the drilling patterns provides a coherent construction of the fittings. Accordingly, all CNC data and drilling pictures are suitably coordinated. At the same time several required CNC programs for the complete parts are automatically created for the order. In addition to the evaluation of the geometric data of the parts, material characteristics, edge trims, tools, and technology data are considered. The result is a direct running CNC program consisting of all required parameters such as tool assignment, rotation speed (rpm), feed, start up strategy, first and second working etc. on the machine.

CAM functions
The technology offers different software components to cover the following reference tasks:
- The generated CNC program from woodCAD|CAM is directly transferred to the woodWOP system, which has the advantage that the machine operator can operate the CNC machine as usual.
- One or several tools can be allocated to every profile from different approaches and retract paths are generated.
- The part positioning on the machine table is also automatically defined.
- Appropriate tool movements can be created for parts with mitre joints.
- The processing of a part can be divided onto several machines.

Nesting
In the nesting method the parts are milled out of a panel. The software creates an optimized nesting plan to generate milling movements out of it. For any existing horizontal processes, CNC programs are further created for alternative machines.

The transfer to woodNest achieves an optimum utilization of material.
HOMAG eSOLUTION develops the Internet-based presentation and sales systems, woodNET, to combine internal processes of work preparation and manufacturing with sales tasks. woodNET generates an integrated eBusiness solution and provides the strategic approach from sales directly to the machine.

From sales directly to the machine
For this aim HOMAG eSOLUTION has developed a web-based platform to manage sales or B2B order processes. Examples are direct sale, retail, and manufacturing outsourcing. Functions such as furniture configuration, planning in 3D, administration of catalogs, direct calculation, and quotation costing are managed by Browser-based applications or “thin clients”.

The user guidance is intuitive, comfortable, and state-of-the-art.

The quotations and sales plannings which are generated with woodNET, can be imported directly into woodCAD|CAM for further processing. Thereby incoming orders will be transferred into manufacturing documents, part lists and CNC programs automatically. A manual order processing is no longer necessary.

woodNET makes it possible to work with the same variable dimensioned furniture libraries in the entire process which have been generated directly from woodCAD|CAM. The unique advantage is obvious; 3D Design data including all parametric methods can be applied directly for sales planning and proposal preparation without any restrictions.

Integration and consistency instead of interfaces
The result of this consistency is the accelerated and error-free order processing. With the order entry, technical production orders have already been checked. New articles and catalogs can be marketed without delay. The integrated process and data security provide considerable savings and optimal results when using woodCAD|CAM and woodNET.
HOMAG eSOLUTION

Partner for software solutions

Perfection is programmable
The software solutions of HOMAG eSOLUTION optimize company processes across the board for the PRACTIVE sector and furniture industry, which are manufacturing with HOMAG Group machinery. HOMAG eSOLUTION combines the products of the HOMAG Group with state-of-the-art software technology to organize an integrated data flow in operation from sales to manufacturing perfectly. Besides the CAD/CAM technology, the company offers sector-specific software modules for ERP systems.

HOMAG eSOLUTION was founded in 2010 in order to extend the HOMAG Group software competence for all upstream processes of the machines. The strategic mission is to provide the right technology and suitable products in order to prepare the data, which arise from the business process. With this, HOMAG eSOLUTION ensures the perfect link to HOMAG Group machinery.

The products and solutions are distributed and technically supported world-wide by the international HOMAG Group sales organizations. A key component of HOMAG eSOLUTION and the HOMAG Group companies is the common commitment to the high standard of quality “made in Germany”. Perfection is programmable.