TopCAM3D as extension of TopCAM2D, supplements the MTS product TopMill with a 3D programming system for prismatic 2½D multi-sided and complete machining with 5-axes machining centers and with the import of 3D-step milling workpiece data.

TopCAM3D is a machining plane oriented 3D milling programming system with automatic machining feature recognition for classic, multi-sided machining of usually complex machine parts with 5-axes machining centers.

It will recognize features such as bores, rectangular, circular pockets and any other contour pockets with islands, grooves as well as any other free cutting of contour areas with islands and will automatically assign roughing, residual chip roughing as well as finishing tools with its technologies Chamfers will be recognized and may also be added (e.g. for edge breaking). The system will make suggestions in regards to tools and the machining technologies and offers additional optimization algorithms for the selection of roughing tools. A selection can be made between contour-parallel, meandering and trochodial (HSC high speed cutting) removal strategies.

The program generation is done either completely automatic based on the machining strategy, by marking the various machining planes on the workpiece, or the user may select only some features in a machining plane and determine also their machining sequence. The corresponding NC-program is written automatically by TopCAM3D and may be simulated in TopMill as virtual test machine in the NC code of the target control at any time.

MachineAssembler
New machine models can be defined with the extension module MachineAssembler.

Employable training contents

TopTrain CNC basics (general basic information and knowledge, turning basics, milling basics)
TopCAT/Fix Setup activities, tools, tool assembly, tool correction values, workpiece clamping and workpiece zero points
TopMill/StopMill Simulation of control specific programs on different virtual machines by setup the target simulation machine via a setup sheet
TopTurn ISO programming turning, e.g. PAL2009, UTC, Fanuc, Mazak, Siemens
canned cycle programming turning, workpiece transfer to opposite spindle
turnmill machining with driven tools on the front face, cylindrical surface and tendon surfaces (with Y and B axes)
TopMill ISO programming milling, e.g. PAL2009, UTC, Fanuc, Heidenhain, Siemens, canned cycle programming milling multi-sided milling machining with the programming of arbitrary machining planes
TopCAM2D Preparation: Interpretation and creation of technical drawings
CAM introduction turning rotational symmetric workpieces and driven tools,
CAM introduction machining for 2½D and milling
TopCAM3D 3D-CAM multi-sided machining with feature recognition

Reference products in Production
A.H. Schütte CNC simulation of tool grinding and multi spindle machining Siemens 823D/840D CNC control simulation and Sinutrain simulation

System requirements

The software is compatible with the operating systems WINDOWS 2000/XP/VISTA/7 and 8 as a single user license or multisuer network license version. Hardware requirements: standard PC with 3D standard graphic card

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The tested and approved Top Products of MTS, which together form the MTS CNC System, allow a comprehensive and universal CNC and CAM training that contains and combines continuously elementary CNC learning contents to most current and advanced CAM methods. The didactic concept is based on the principle of „working with the CNC simulators TopMill and TopTurn, in the same way as with real machine tools“. The MTS CNC System can be adapted to the CNC training contents for CNC machine operators, industrial mechanics, mechatronics technicians, tool mechanics, CNC production specialists and CNC machine tool programmers, e.g. according to the German PAL standards, as well as to the CNC training contents for technicians, master craftsmen and up to mechanical engineers. Learning assessments for each training level can be carried out simultaneously with NCTest (cloze text method with automatic evaluation). The use of control specific CNC command codes or the implementation of postprocessors allows a smooth and continuous transition from the virtual CNC machine tools to practical training on real CNC machines.

This software is able to cover technical qualifications in the vast CNC area, from basic to the programming of complex machining processes on 5 axes machining centers and even up to optimizing programs.

We thereby offer the perfect, efficient and cost effective, as well as easily implementable solution for initial CNC training, CNC staff qualification and continuing CNC education and training, starting from varying initial qualifications towards differing qualification levels, relevant for your production.

The present comprehensive CNC and CAM training solution is the result of thirty years of continuous advancement and adaptation of the MTS CNC training and continuing training software to the development and progress of CNC-machines and their CNC controls towards the multiple axes turn-mill or mill-turn production centers of today. The development of our high quality and sophisticated material removal and machine room simulation with collision detection for turning, milling and tool grinding has established new standards in the industrial sector as well (Leading CNC control manufacturers are using our CNC simulation and canned cycles within their CNC controls).

TopTrain
TopTrain is an e-learning module for CNC basics, CNC turning and CNC milling based on ISO standards with the inclusion of the MTS 3D machine room and machining simulation of exercises. The training contents in TopTrain include the subject matters of CNC programming in the metalworking professions, from industrial mechanics to CNC machine operators and programmers.

The training content of TopTrain is supplemented by interactive programming exercises in cloze text format, where entries may be evaluated and corrected instantly as a means of learning assessment. The TopTrain evaluation module offers a convenient means of training assessment for all covered subjects, both for the trainee as well as the trainer.

NCTest
NCTest enables you to conduct CNC examinations in cloze text format according to UTC (UTC: Fanuc compatible training control) or German PAL examination standards on PC. NCTest differentiates between an examination preparation and the actual examination mode. In examination mode, the start-time and maximal duration of the examination can be preset. Evaluation of the examination is done automatically at the end of the exam and includes the calculation of the achieved number of points.

The cloze text examination programs can be created through the PCPrint function of TopMill and TopTurn.

In principle, NCTest can not only be used for the UTC or German PAL2007/2009 examination CNC control languages, but also for any other ISO-NC programming language using letters as NC addresses.

TopFix as extension of TopMill
Aside from the standard clamping devices for setup, as jaw chucks, clamping between centers or parallel vises, the modular clamping system TopFix can be added in order to clamp a workpiece directly onto the machine table with, e.g. rests, arresters, clamps and clamping shoes, or to clamp a complex cast workpiece with clamping elements of a modular clamping system.

TopFix allows you to quickly and easily design a workpiece clamping by means of an interactive graphic process, for any given, prefabricated workpiece or free form raw piece, free of mounting errors and mounting collisions of the clamping components. Even complex clamping tasks can easily be planned and accomplished.

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TopMill and TopTurn are equipped for this purpose with an easy to handle and comfortable setup dialogue, that realistically simulates all these activities in the virtual machine tools (e.g. scratching a workpiece under manual control with a hand wheel, to set the zero point of an axis). The entire setup information is summarized in a setup sheet, located in the commentary block at the beginning of the NC program.

TopCAM 2D Turning and Milling Programming System
TopCAM2D is a programming system for turning and milling, integrated into a 2D-CAD-system for 2'-0 multi-sided milling machining and complete turn-mill machining with driven tools and an opposite spindle. The CAM-section uses the TopCAT tool management.

Generating the programs is done through a simply, interactive dialogue, during with the work plan (schedule) is written automatically. PAL command coding is used internally as a control-neutral format, which is converted by postprocessors into the target control code.

Due to the automated TopMill/TopTurn setup sheet creation and the inclusion of postprocessors, it is possible to simulate the created programs in TopMill or TopTurn in the programming code of the target control for every intermediate machining step.

The present comprehensive CNC and CAM training solution is the result of thirty years of continuous advancement and adaptation of the MTS CNC training and continuing training software to the development and progress of CNC-machines and their CNC controls towards the multiple axes turn-mill or mill-turn production centers of today. The development of our high quality and sophisticated material removal and machine room simulation with collision detection for turning, milling and tool grinding has established new standards in the industrial sector as well (Leading CNC control manufacturers are using our CNC simulation and canned cycles within their CNC controls).

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