hyperMILL®

2016.1

What's new?

OPEN MIND
THE CAM FORCE

What's new in 2016.1?

*hyper*MILL® 2016.1 features greater performance and many highlights, from the *hyper*MILL® MAXX Machining performance package for roughing, finishing and drilling – with its 'tangent plane machining' strategy – right through to the new 3D rest material roughing and new Mesh functions in *hyper*CAD®-S.

Contents

System requirements: Windows® 7 (64-bit), Windows® 8.1 Pro and Windows® 10, DVD-capable drive
CAD integrations: *hyper*CAD®, *hyper*CAD®-S, Autodesk® Inventor®, SOLIDWORKS, ThinkDesign
Software languages: de, en, es, fr, it, nl, cs, pl, ru, sl, pt-br, ja, ko, zh-cn, zh-tw
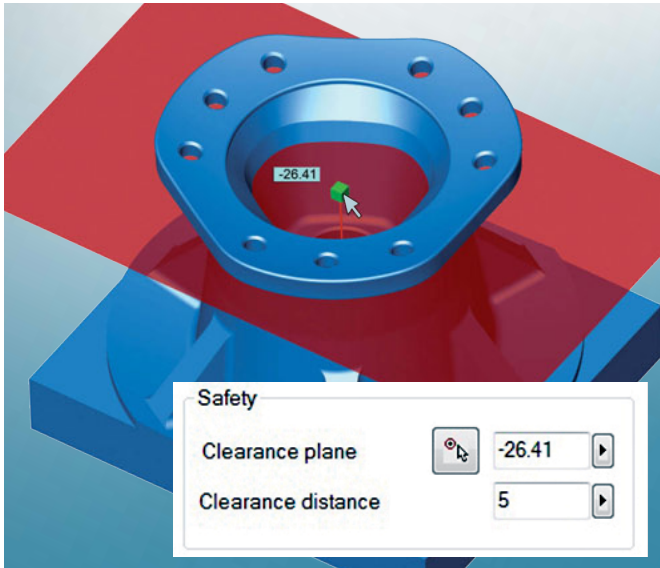
Interactive selection

A new CAD for CAM function makes it possible to interactively position the Z coordinates for top, bottom and clearance plane in the CAD*. These planes can also be resized to allow a better visualisation.
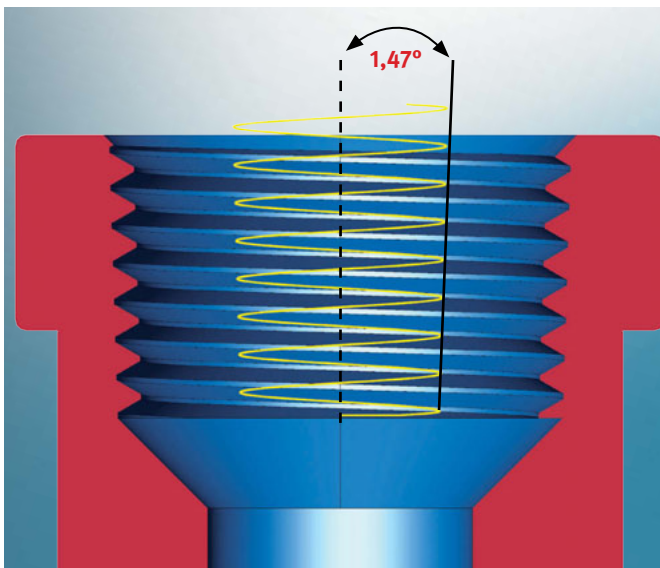
Benefit: User-friendly, greater safety.

Set workplane to frame

Workplanes can now be transferred directly as frames.

Benefit: User-friendly, saves time.

CAM – 2D strategies

Thread milling

It is now possible to produce tapered threads by defining the cone angle.

Benefit: Simple and flexible programming.
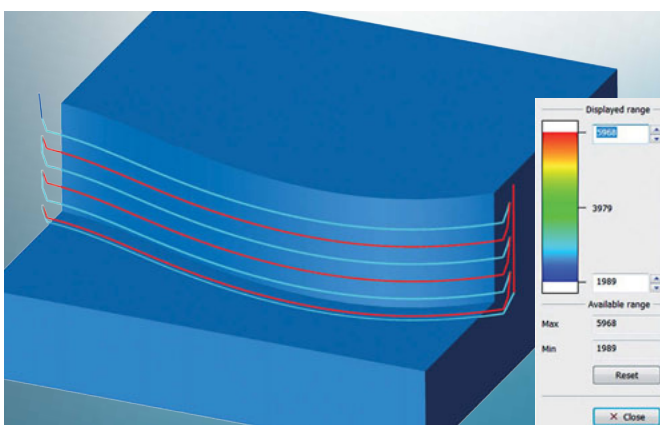
Contour milling on 3D models

The new 'Zag feedrate' option adapts the feedrate for zigzag infeeds. This makes it possible to specify a reduced feedrate value for conventional machining.

Benefit: Faster and more tool-friendly machining.

*only for *hyper*CAD®-S

3D-optimised rest material roughing

This new cycle generates HSC-optimised toolpaths for rest material machining, based on a preceding roughing operation. The stock and user-defined values for minimum stock removal are used to calculate the rest material areas extremely quickly. Rest material boundaries that have been generated can be reused for later machining.
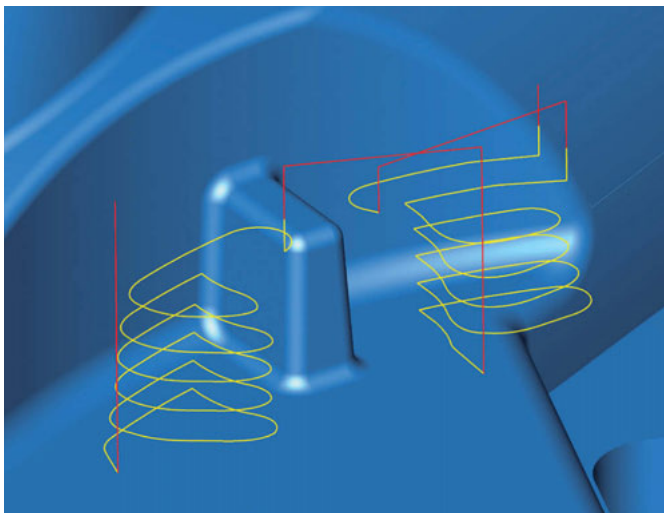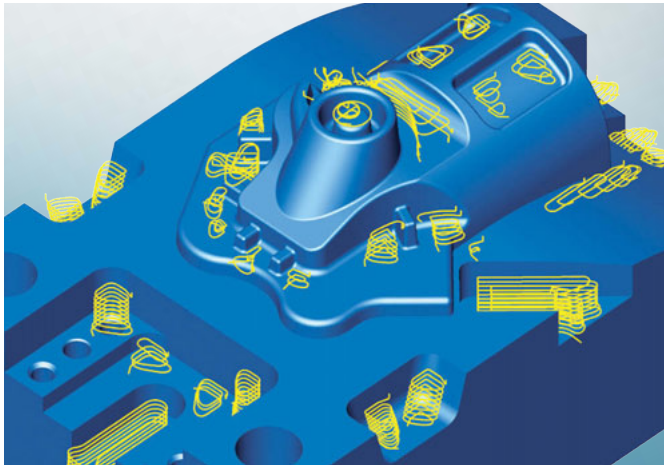
- New technology allows for extremely fast calculation times
- Smooth toolpath connection paths ensure the best possible surface quality
- Increased feedrates when leaving the stock guarantee efficient machining
- All toolpaths are generated collision-free completely against the component and all rapid link movements are generated collision-free against the conveyed stock

Benefit: Machine-friendly, tool-friendly, extremely short machining and calculation times.
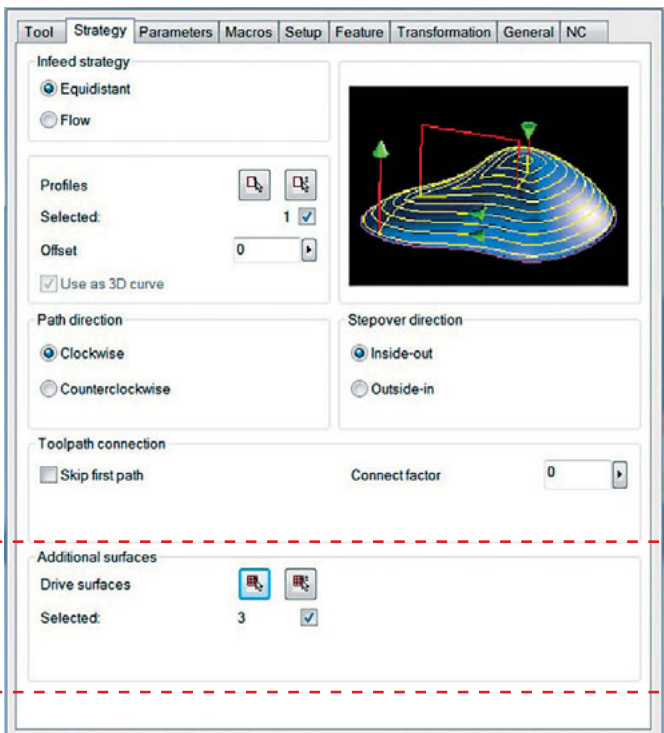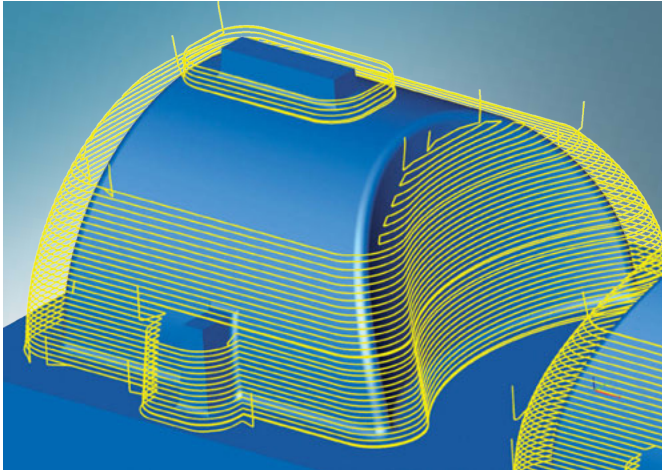

3D equidistant finishing

Simple face selection allows a machining operation with a constant infeed to be programmed quickly and efficiently.
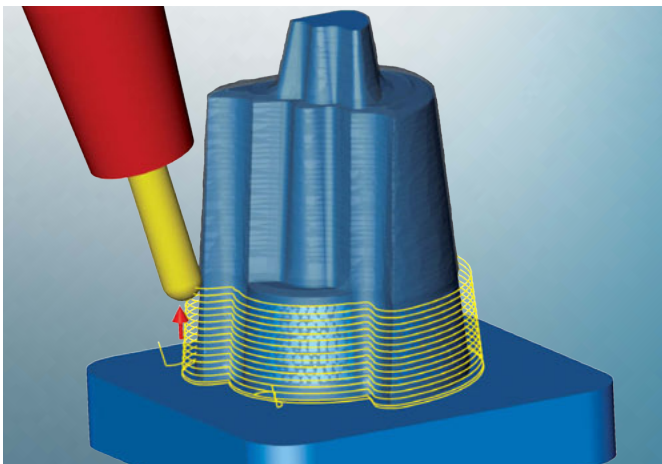
Benefit: Faster programming.

3D shape Z-level finishing

Slope-dependent machining has been added to this strategy. Flat areas can be excluded by defining an angle. This guarantees efficient machining.

Benefit: Simple programming, efficient machining.

Highlight
3D/5axis Z-level finishing

A new option allows the machining direction to be started from the bottom. This toolpath strategy can be optimally utilised, particularly in 5axis machining. All toolpaths are checked for collisions. This offers great advantages to tool and mould making.

The function is also available for 3D Z-level finishing.

Benefit: Improved surface quality, tool-friendly.
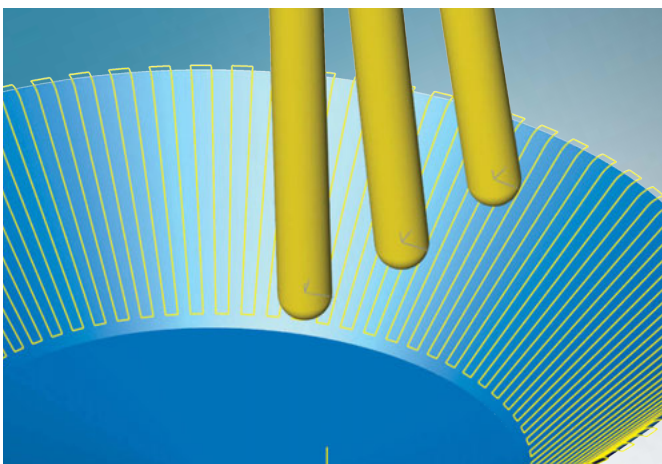
5axis profile finishing

New function for automatic indexing: With the 'Single path index' option, the check for a collision-free tool angle is performed for each path segment. Individual path segments are also recognised when they are directly connected. This means that only small angle changes occur between the segments.

Benefit: More programming flexibility, tool-friendly machining.

Tool shank   Tool tip
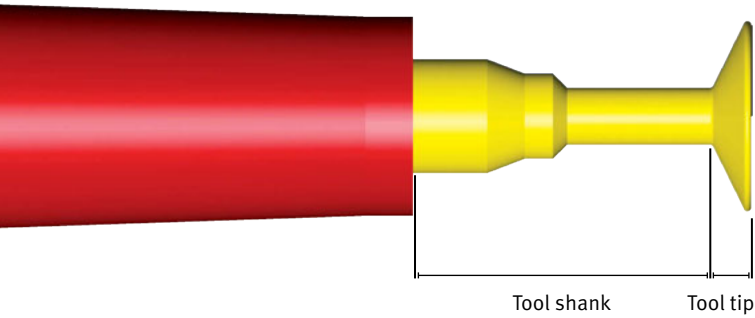
Highlight
Freely definable tool geometry

*hyper*MILL® 2016.1 offers a unique and flexible type of free tool definition. This innovation allows the user to easily define special tools and complex shank geometries. *hyper*MILL® 2016.1 uses this free tool geometry for calculation and simulation purposes.

- The shape of the shaft can be defined freely or as parameters. Special shaft shapes or tool holders can be completely mapped and are available for collision checking.
- The shape of the tool cutting edge can be freely defined. Exact position identification allows for optimal inclination to the area to be machined. This new function is supported in the 5axis rework machining strategy, where it can be used extremely flexibly.

Benefit: Flexible tool definition, use of special tools.
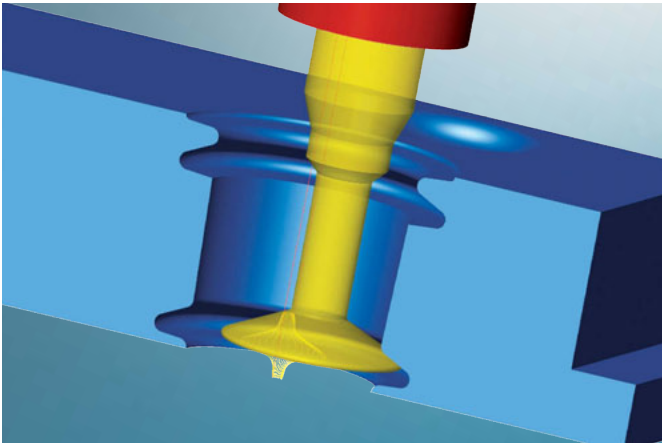
Highlight
Tool database
## Cutting point management

Defining and managing mill turning cutting points using the tool database is more convenient. The user can choose between a free definition or the orthogonal or computational middle point of the tool cutting edge. The user can define different cutting points for a tool in the *hyper*MILL® tool database. This allows the tool to be used with different orientations. The cutting edge and reference point are transferred automatically from the tool database.
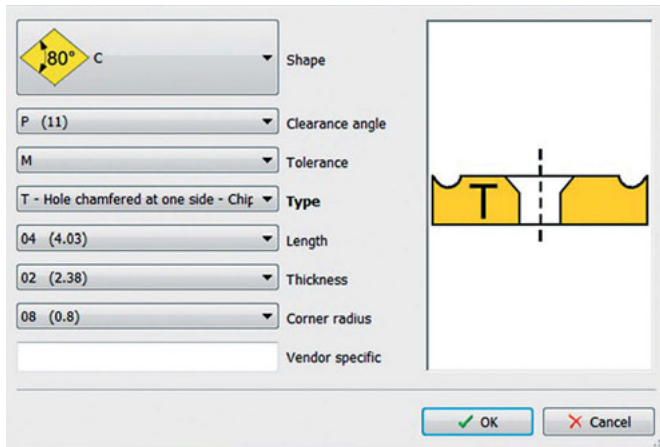
Benefit: Visualisation of the cutting position, easier definition.

Optimised user interface

To improve user friendliness, separate cycles for finishing, roughing, grooving and parting are now arranged in a menu window.

Benefit: User-friendly, clearer and simple programming.
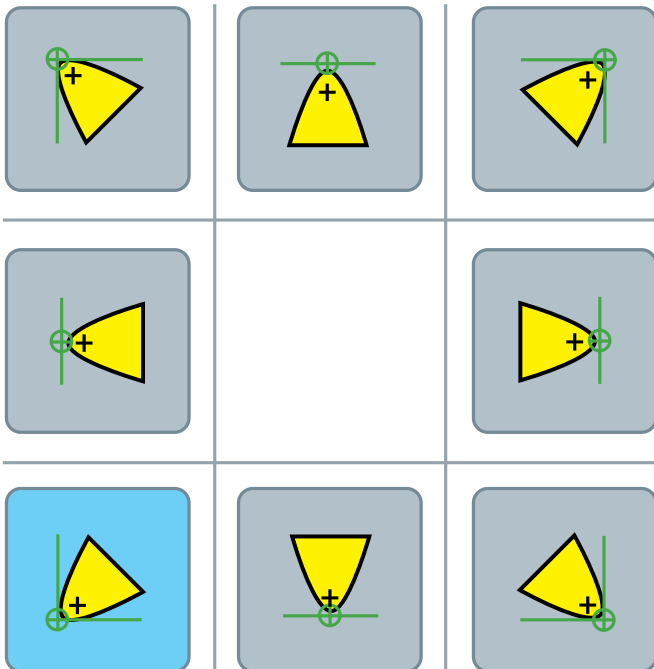
ANSI/ISO code tool description

Cutting inserts can be easily defined in the tool database using ANSI/ISO code. This makes it easier to create standardised tools according to standard specifications.

Benefit: Easier tool definition.

Advanced functions in the macro database

User-defined parameter enabling makes it possible to access specific macros immediately and use them for machining. This way, it is possible to assign certain strategies directly for a machining operation.
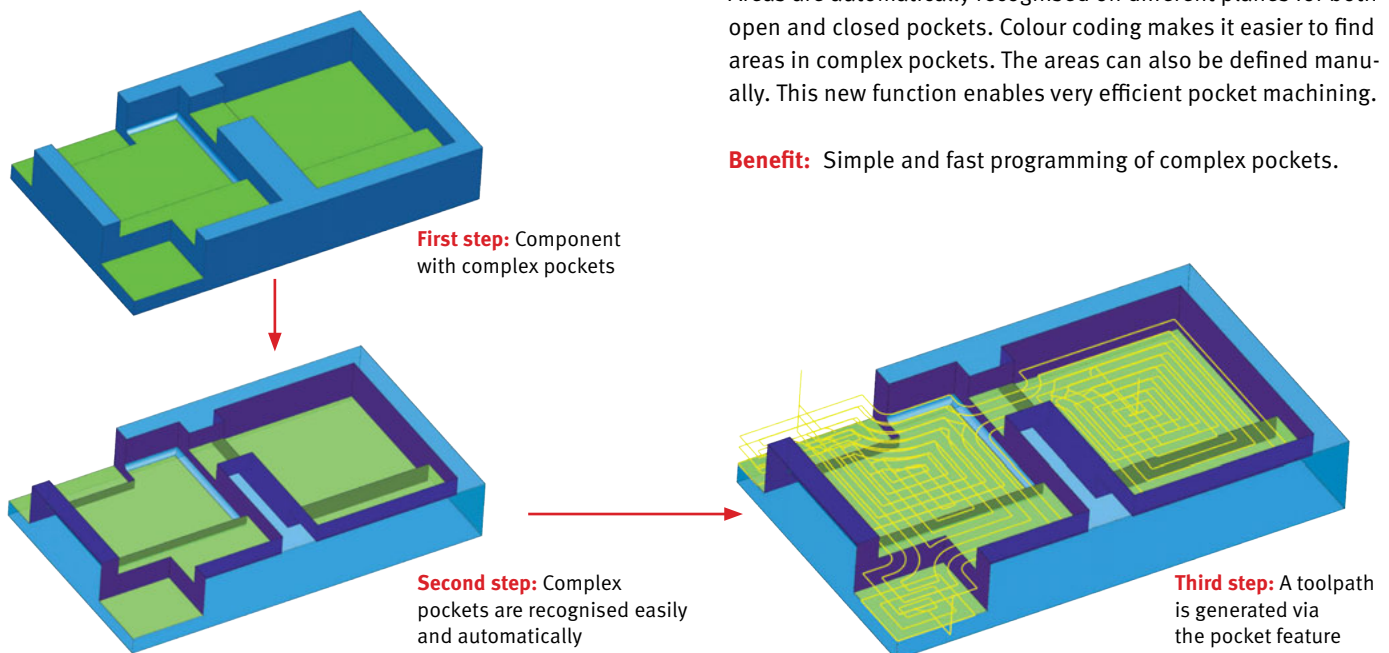
Benefit: Faster macro assignment.

Highlight
Pocket recognition

Areas are automatically recognised on different planes for both open and closed pockets. Colour coding makes it easier to find areas in complex pockets. The areas can also be defined manually. This new function enables very efficient pocket machining.

**Benefit:** Simple and fast programming of complex pockets.

First step: Component with complex pockets

Second step: Complex pockets are recognised easily and automatically

Third step: A toolpath is generated via the pocket feature

Performance, Performance, Performance

Speed is more crucial than ever these days. This is why OPEN MIND developed *hyper*MILL®
MAXX Machining, the comprehensive high-performance solution for roughing, finishing and
drilling. Trochoidal tool paths ensure extremely fast material removal. Innovative strategies
for barrel cutters allow for finishing in record time. Milling tools tilted in the cutting direction
can quickly and easily drill holes and open pockets in hard material without the need for a
predrilled hole.

These unique solutions from OPEN MIND save enormous amounts of time while ensuring
the same high quality. This allows CAM programmers to maximise machine performance
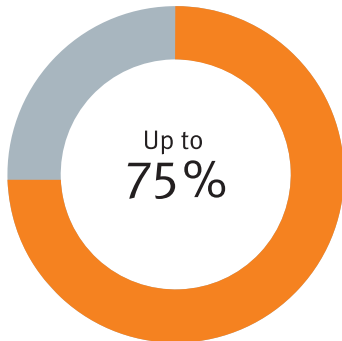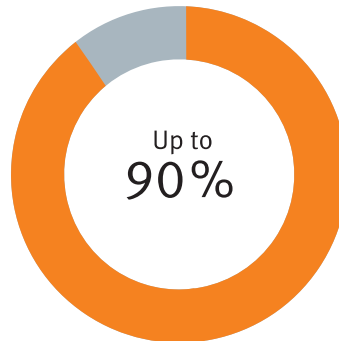for any application.
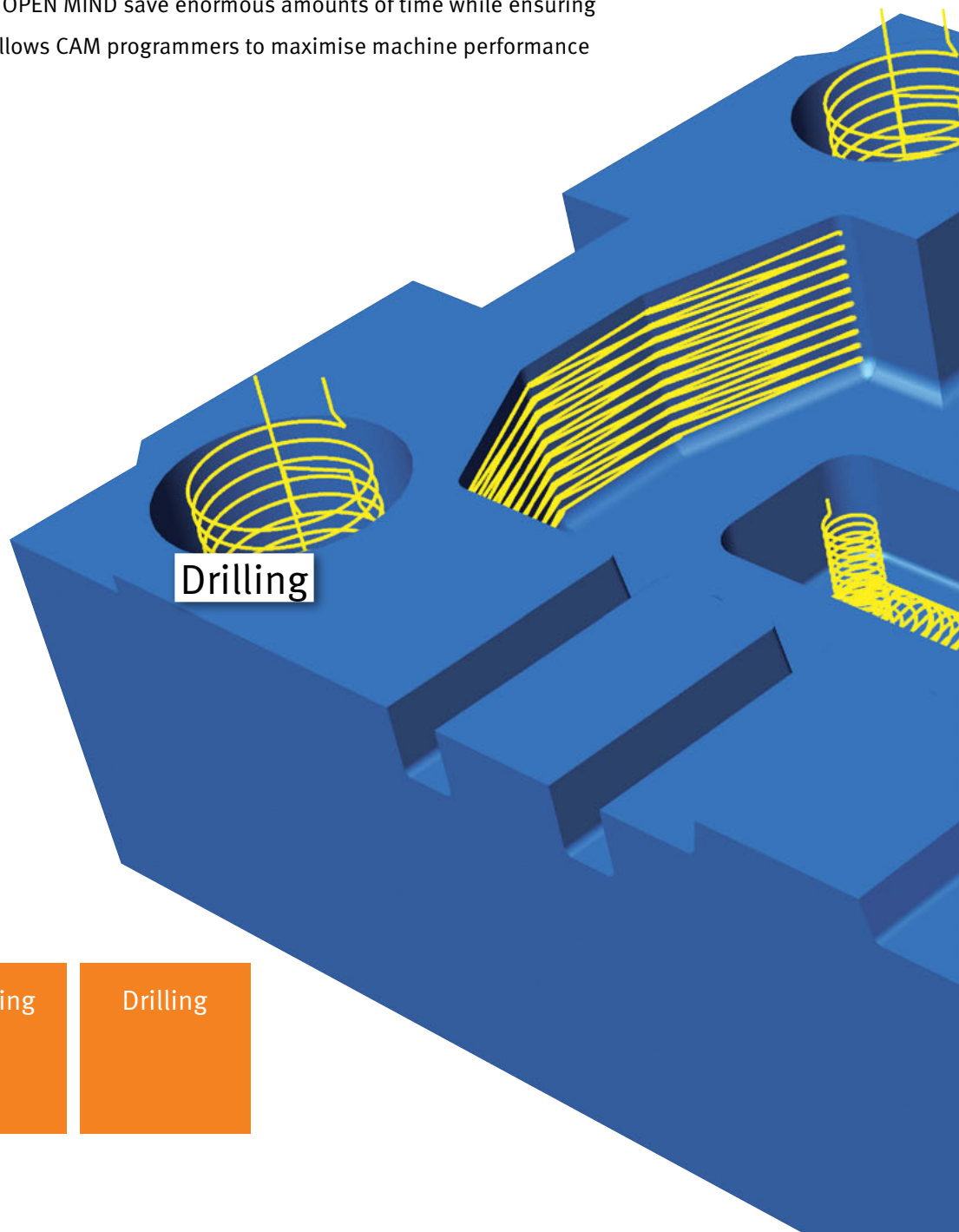
Drilling

*hyper*MILL®
MAXX Machining

Roughing   Finishing   Drilling

hyperMILL ®

MAXX Machining

Up to
75 %

Time savings
for roughing

Up to
90 %

Time savings
for finishing

100 %
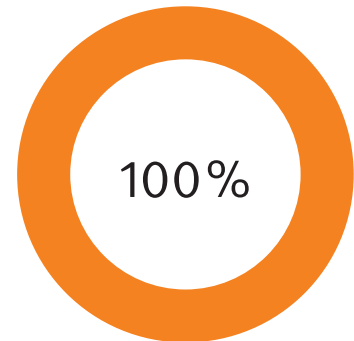
Process safety

POSSIBLE APPLICATIONS:
- Tool and mould manufacturing
- Production Machining
- Aerospace
- Automotive
- Motor sports
- Energy industries

Finishing

Roughing

Performance boost for Z-level finishing

OPEN MIND developed the innovative tangent plane machining strategy especially for plane machining applications. Compared to conventional methods, time savings of up to 90 per cent can be achieved when a conical barrel cutter is used. Tangent plane machining takes advantage of the tool shape in order to achieve perfect surfaces for plane machining. Intelligent automated functions ensure optimum tool orientation and fit. In this way, even hard-to-reach areas can be efficiently machined.

Easy selection of planes makes for a user-friendly experience. 5axis tool paths are automatically generated and checked for collisions when the user clicks on the faces to be machined.

Time saved during finishing: up to 90%
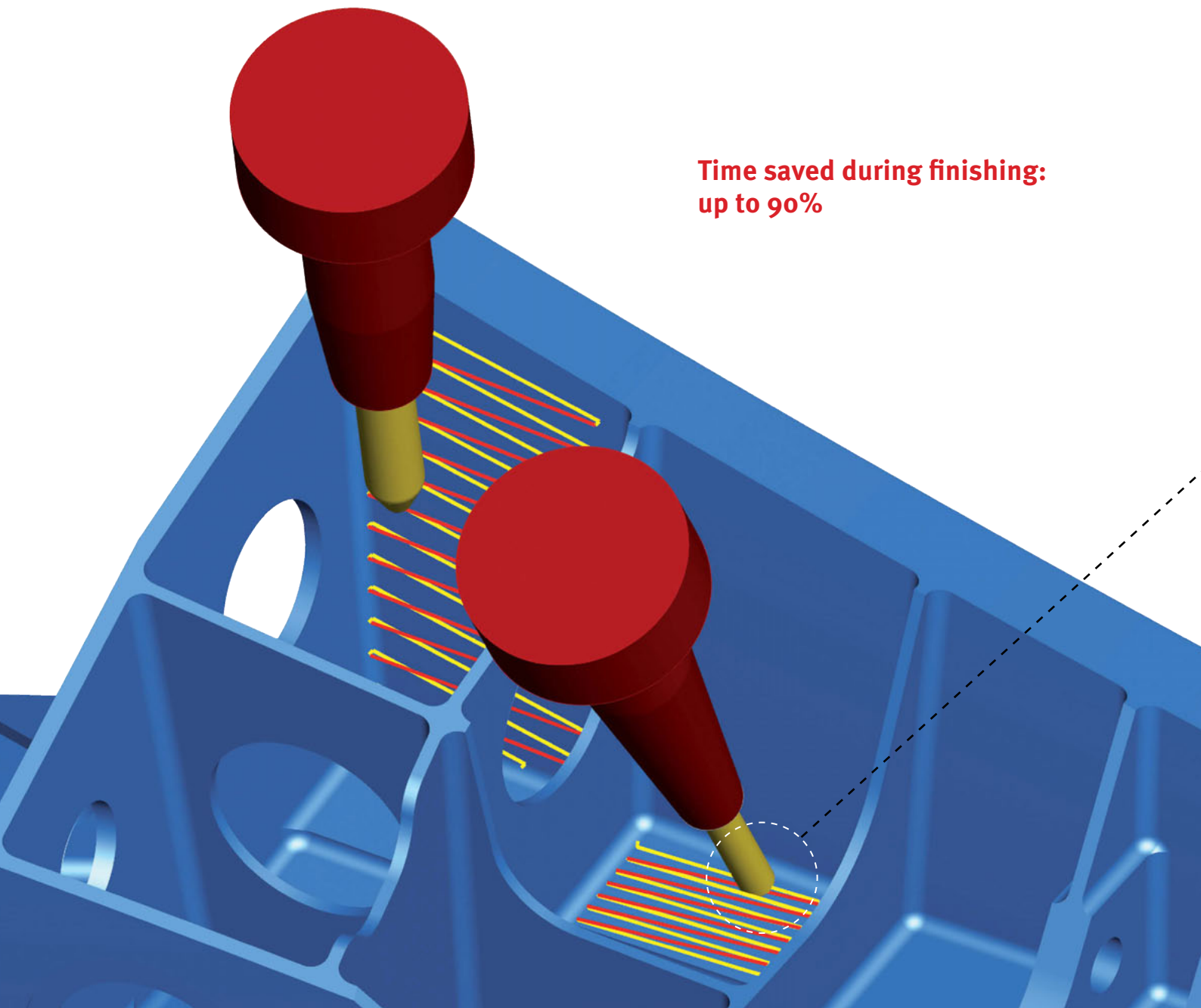
Features

- Especially for machining steep or flat planes: Strategy for tangent plane machining with conical barrel cutters
- Efficient and reliable finishing strategies
- Hard-to-reach areas can be optimally machined. For example, bottoms of pockets and levels with fillets can be milled.
- Much greater step-over distances with the same theoretical scallop height
- Reduced number of tools
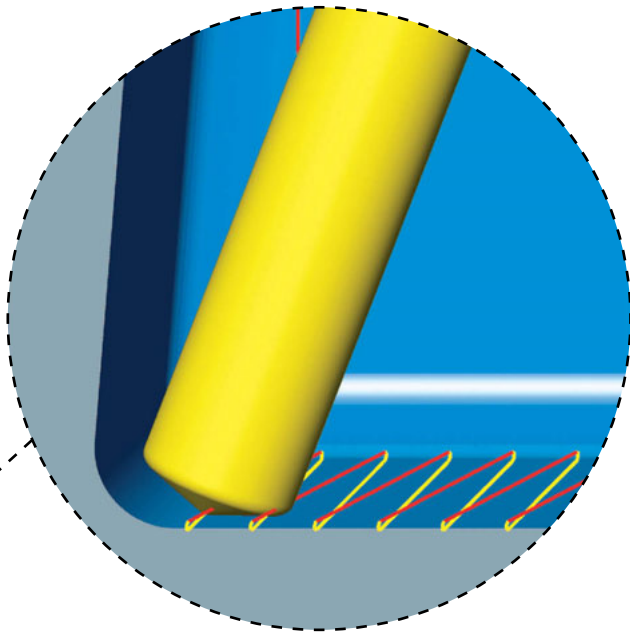
Bottom machining
Bottom surfaces with undercut situations and edge areas of high walls or pocket bottoms can be optimally machined using the strategy for conical barrel cutters

Tangent plane machining

- **Strategies**
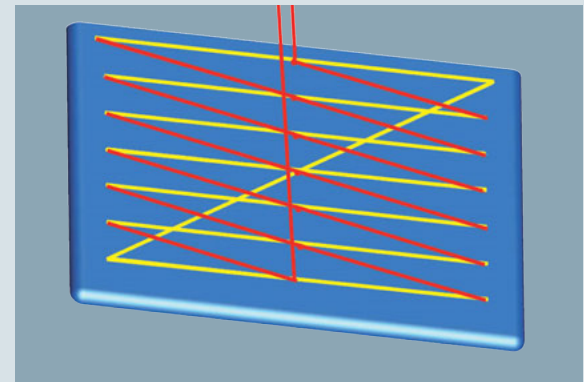 The following machining strategies are available for tangent plane machining:
  (1) Machining the face
 (2) Machining the face with limit
  (3) Machining the limit
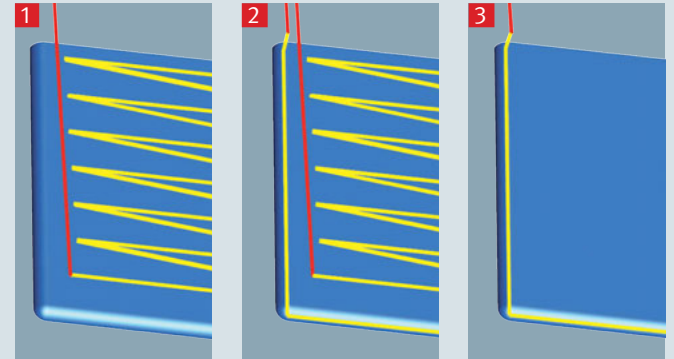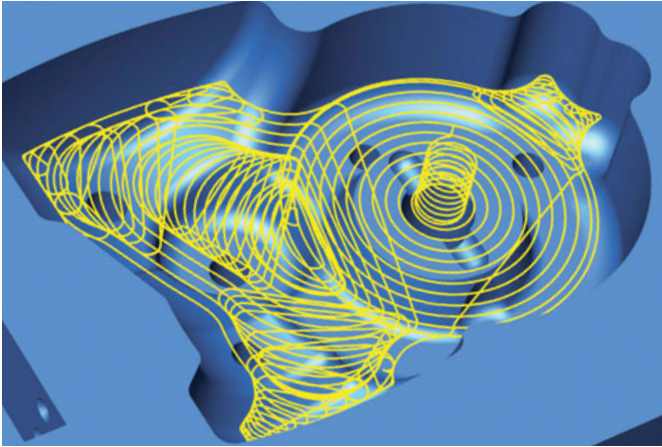
- **Indexed machining**
  The face is machined with different orientations in specific areas. A high level of surface quality between the orientations is achieved thanks to a defined overlap.

- **Simultaneous machining**
  The entire face undergoes 5axis simultaneous machining. 5axis simultaneous machining is especially effective with dynamic machines.
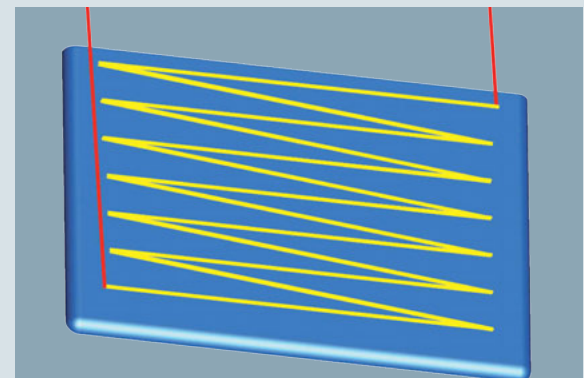
High-performance-cutting (HPC)

The roughing module in *hyper*MILL® MAXX Machining offers solutions for high-performance cutting (HPC) with spiral and trochoidal tool movements. The package combines optimal milling paths, maximum material removal and the shortest possible machining times.

New features
There are two enhancements for roughing: Improved curve cutting conditions thanks to automatic feedrate adjustment. A more even material removal rate allows the feedrates to be further optimised for the entire machining process.

The second enhancement ensures that the largest possible area is machined in spiral toolpaths. All the remaining areas are machined in trochoidal paths.

Benefit: Tool-friendly, shorter machining time.
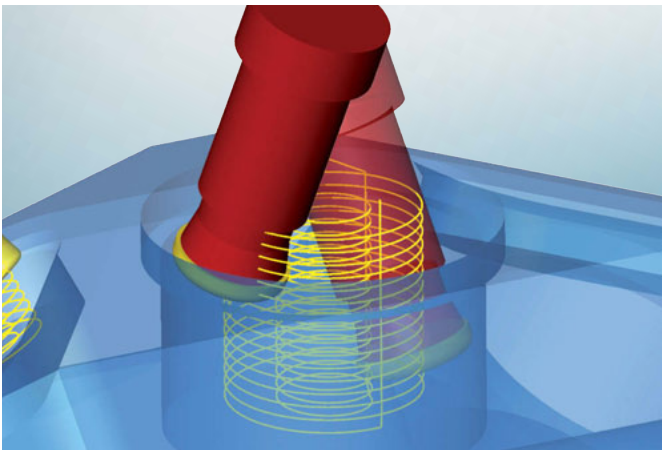

5axis helical drilling

The 5axis helical drilling strategy in *hyper*MILL® MAXX Machining involves helical tilt milling. The milling tool is tilted in the cutting direction. Collision with the hole wall is avoided with a second tilt. This strategy is excellent for making an opening cut when roughing deep cavities. The material is removed from a circular pocket in a highly efficient and tool-friendly fashion.

New features
An overall improvement has been made to the cycle by significantly reducing the calculation time. Two new functions are also available: In the new 5axis drilling mode, a very high positioning speed can be achieved between the individual holes for the entire component and the planes.

The pitch height can be automatically adjusted during the calculation by defining a minimal pitch angle. If the tool is at risk of collision during machining, the pitch value is changed automatically to ensure collision-free machining.

Benefit: Shorter calculation time, softer machine movements, more user-friendly.
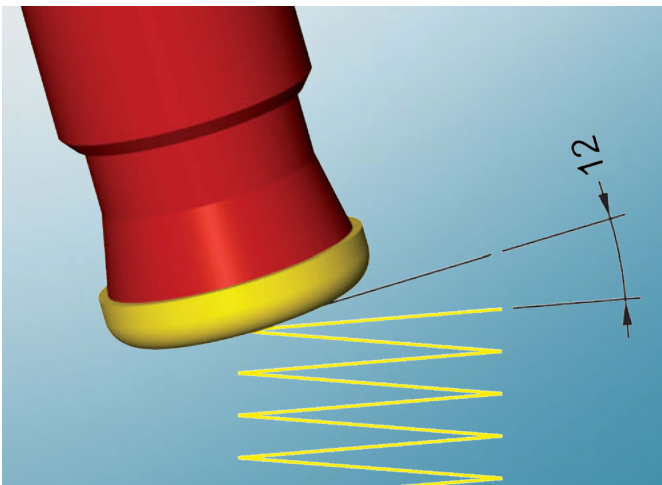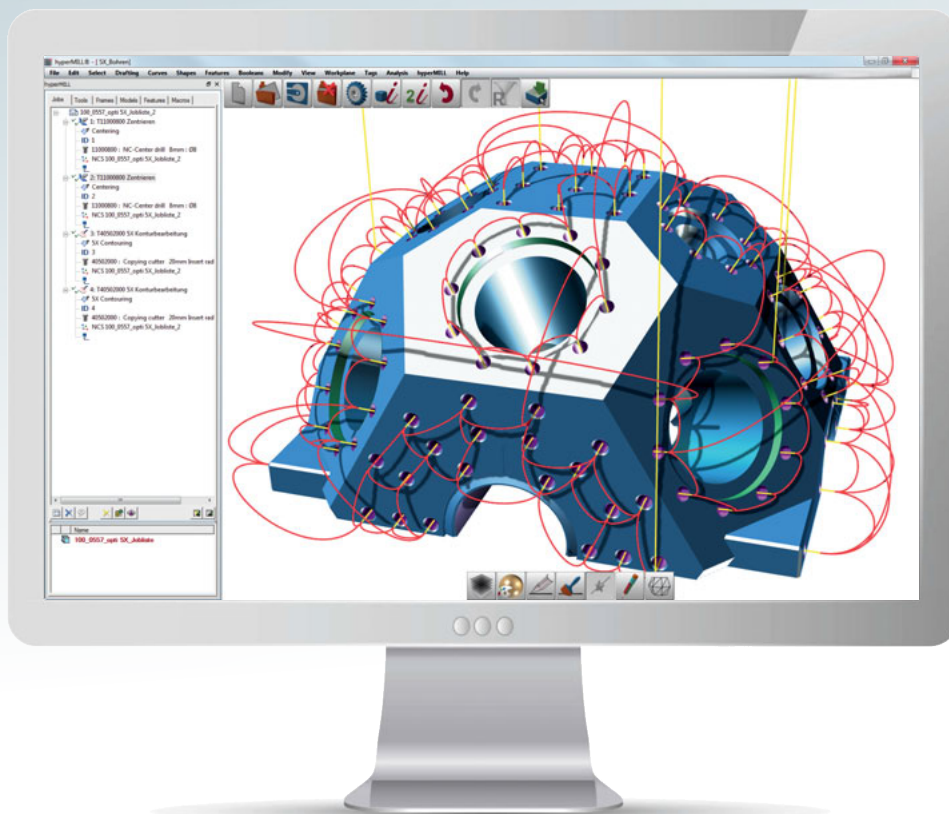
CAD for CAM

In a class of its own among CAD systems

Only a high-end CAM developer can do CAD for CAM. With this in mind, Open Mind Technologies AG – known as an innovative pioneer – developed a new CAD system from scratch that is perfectly matched to *hyper*MILL®. The system has its own 3D CAD kernel made by OPEN MIND. The result is a unique CAD system for CAM programmers that is very easy to learn and that vastly accelerates NC programming processes.

*hyper*CAD®-S fully exploits the performance offered by contemporary hardware systems to create digital manufacturing data. The advanced and extremely powerful 64-bit system is the perfect solution for mastering many of the daily challenges that arise when working with meshes, faces and solids to create precise components and tools. Large volumes of imported data can be prepared for subsequent NC programming easily, quickly, reliably and completely independently from the original CAD system. *hyper*CAD®-S is 'CAD for CAM' at its purest.

- **CAD for CAM**
- **64-bit multi-application**
- **Top performance**
- **Optimal ergonomics**
- **Highly intuitive**
- **Optimal hardware utilisation**

Highlight

Mesh – Preparing meshes quickly for milling

Scanned, forged and cast parts, clay models and moulds: 3D surface scanners have a wide range of uses. 3D scanners offer precise, high-resolution, full views of 3D objects, mostly combined with a large quantity of data.

The main task of the CAM programmer is to generate a perfect basis for milling a mesh very quickly from a set of scanned data. In order to achieve the best possible milling results, the CAM programmer can use *hyper*CAD®-S Mesh to repair any possible mesh deviations very quickly, perform metrological analyses and checks and prepare meshes conveniently for milling. Six new functions are available for machining meshes.
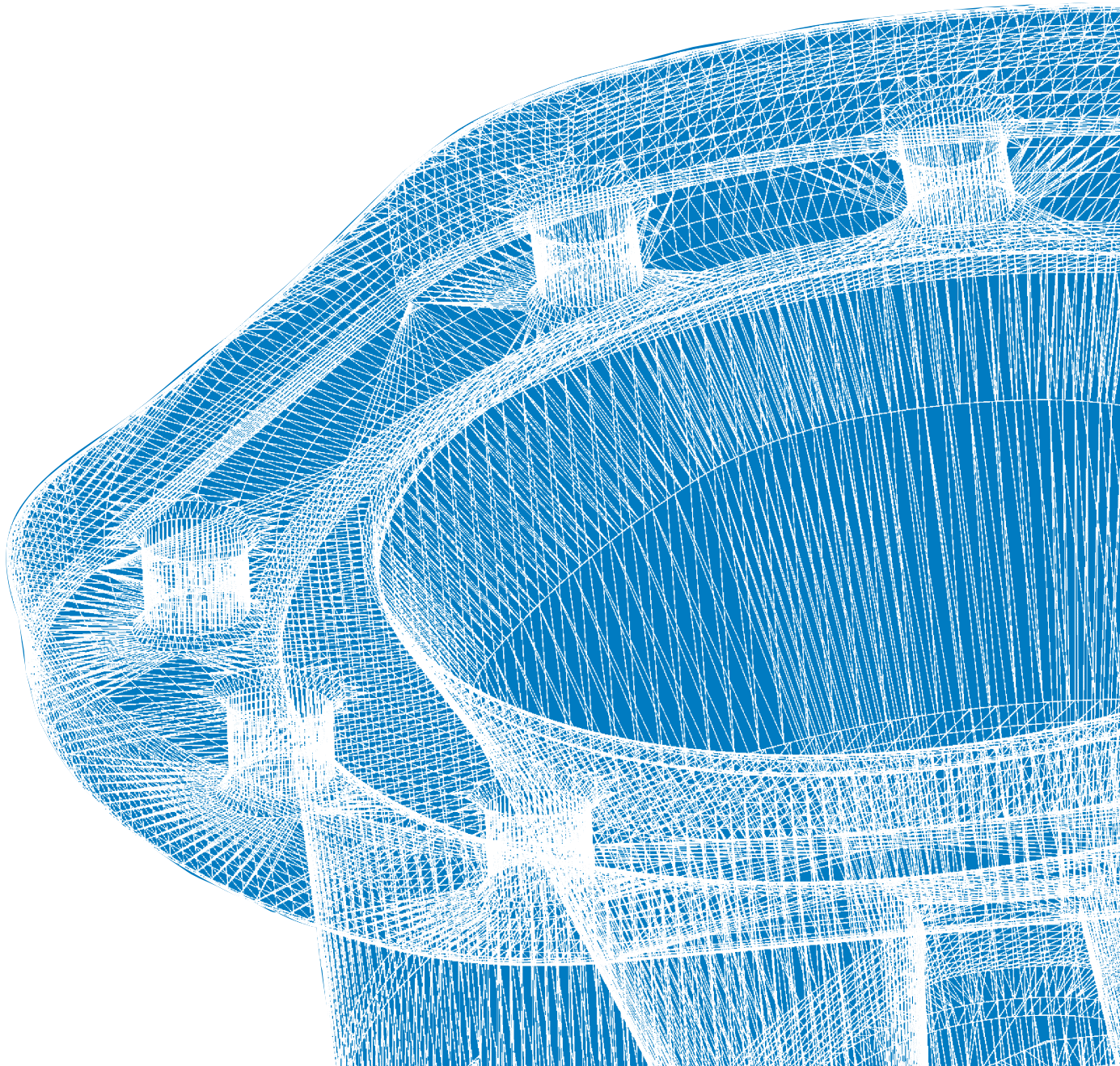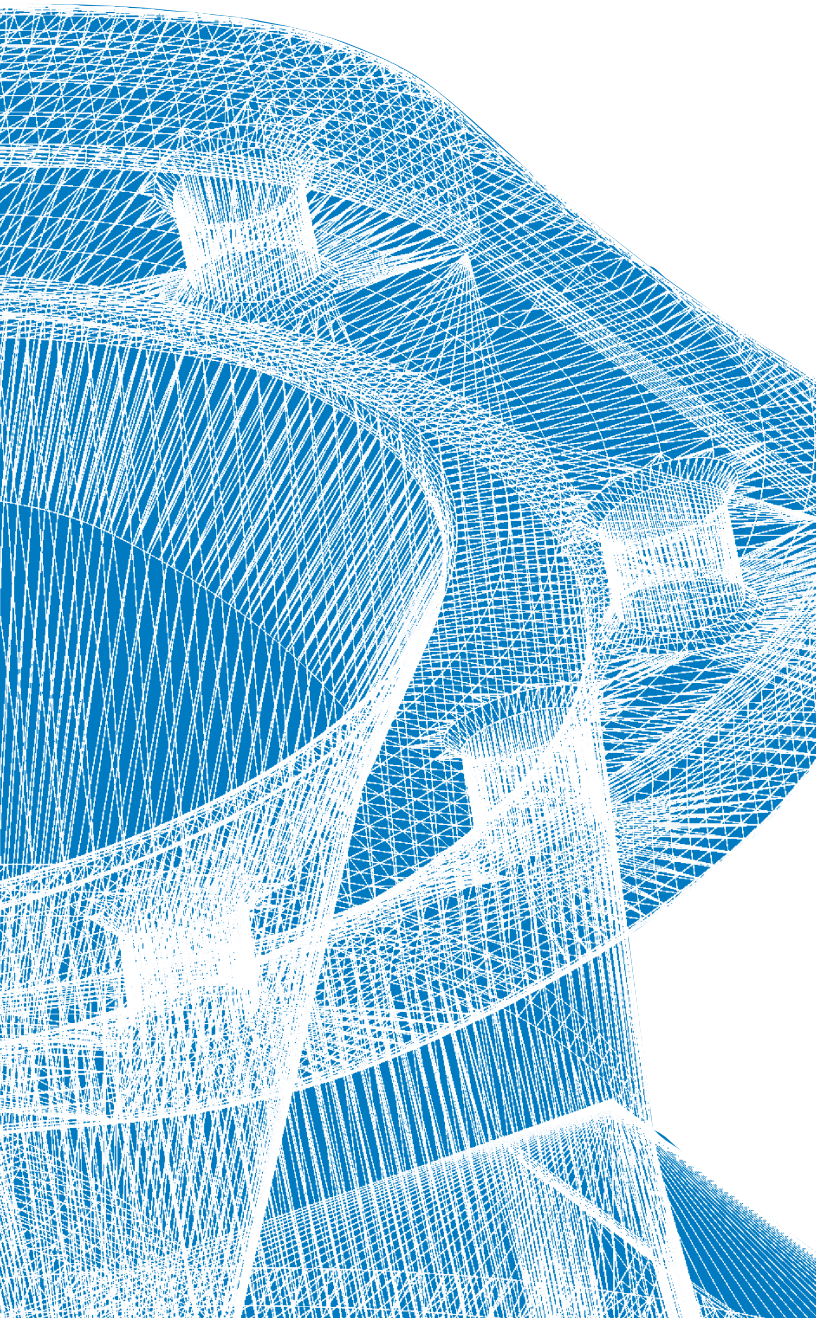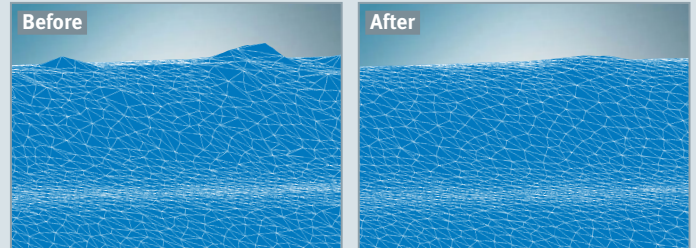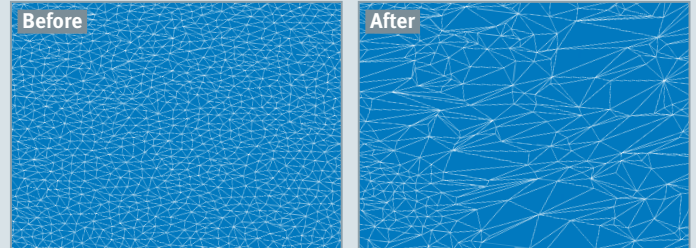
Mesh functionalities

■ **Smooth meshes**
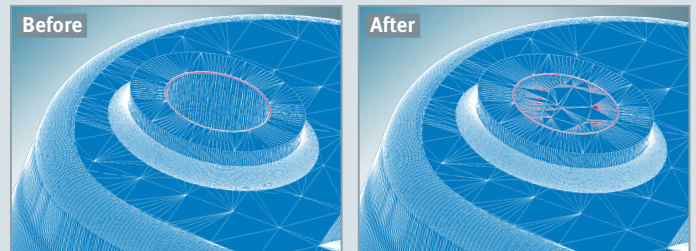This function allows the user to smooth meshes in order to repair deviations.

Before / After

■ **Decimate meshes**
This function allows the user to reduce the mesh density while retaining the geometry properties. The reduced data volume helps to accelerate the model calculation.

Before / After

■ **Fill mesh areas**
This provides a simple and convenient way to close holes in meshes.

Before / After

■ **Separate mesh clusters**
This function allows the user to delete meshes that are not connected.

■ **Mesh from faces**
A mesh can be generated from faces, open and closed solids.

■ **Split meshes**
Mesh elements can be split using a planar entity. All the cut triangles are regenerated to ensure that a smooth cut is achieved.
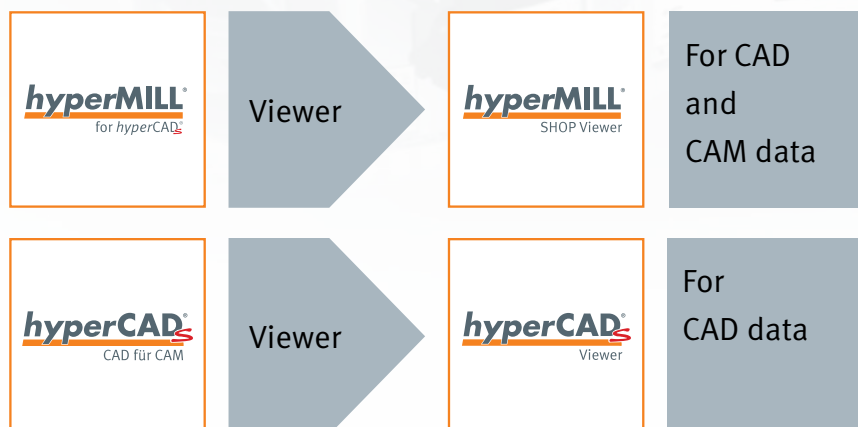
Viewer for CAD and CAM files:
more transparency, fewer errors.

*hyper*CAD®-S Viewer is available for *hyper*CAD®-S. This makes it possible to view CAD files. *hyper*MILL®
SHOP Viewer is also available for *hyper*CAD®-S. This makes it possible to view CAM data from *hyper*MILL®.
*hyper*CAD®-S Viewer is ideal for departments that simply want to take a brief look at their CAD data, for
example, in job planning or quote calculation. *hyper*CAD®-S Viewer optionally offers all current direct inter-
faces and tried-and-tested neutral data formats.

*hyper*MILL® SHOP Viewer not only allows the user to view CAD data; they can also view CAM data from
*hyper*MILL®. This extends the options that are available to machine operators as, until now, only the NC
programs were available to them for set-ups. With *hyper*MILL® SHOP Viewer – the visualisation solution
for the workshop – data that is relevant to production can be visualised and simulated directly next to the
machine. Every manufacturing operation can be checked in detail on the monitor before the set-up. This
results in a far better understanding of the actual manufacturing process than before and the machine
operator can apply their manufacturing expertise more effectively.

**Simple and fast display,
analysis and documentation of CAM/CAD data.**

| **hyperMILL®** for *hyper*CAD® | Viewer | **hyperMILL®** SHOP Viewer | For CAD and CAM data |
| **hyperCAD®s** CAD für CAM | Viewer | **hyperCAD®s** Viewer | For CAD data |

Fast access: *hyper*CAD®-S Viewer allows quick access to the geometry and component structure.

Increased process reliability: *hyper*MILL® SHOP Viewer allows experienced machine operators to recognise possible errors early on before the start of manufacturing using virtual process analyses.

Features: *hyper*CAD®-S Viewer

- **Target groups:** The Viewer is particularly used in departments that simply want to take a brief look at their CAD data, for example, in job planning or quote calculation.

- **CAD interfaces:** The Viewer supports an extensive package of interfaces: *hyper*CAD® files, IGES, STEP, DXF/DWG, point cloud, Parasolid® and optional Catia V4® and V5®, Autodesk® Inventor®, Siemens NX®, SOLIDWORKS, PTC® Creo.

Features: *hyper*MILL® SHOP Viewer

- **Target group:** Machine operators can better leverage their in-depth manufacturing knowledge with *hyper*MILL® SHOP Viewer. Serious mistakes, such as the choice of a wrong tool or unproductive processes, can thus be avoided.

- **Application area:** *hyper*MILL® SHOP Viewer is designed for quick access in the manufacturing environment during the post-CAM programming phase.

- **Simulating manufacturing processes:** The traceability of NC programs is noticeably improved through the toolpath simulation, the material removal simulation and the internal machine simulation. The manufacturing processes with the corresponding clamping status can be safely simulated starting with the stockmodel.

- **Verifying details:** Display of all elements and parameters (geometry, features and toolpaths) as in *hyper*MILL®. With a few clicks, the operator can measure and check the toolpaths on the machine, for example.

- **Improved communication:** Detailed information about *hyper*MILL® jobs are immediately and consistently available for all parties involved in the manufacturing process.

- **Fast access:** *hyper*MILL® SHOP Viewer allows quick access to all manufacturing data, as well as to the geometry and component structure.

- **Practical:** The 'Pack&Go' function allows configuration files such as the machine model, postprocessor and POF files to be integrated into the project file. This ensures that the project data is easily opened on all *hyper*MILL® workstations, without the need for any special setup.
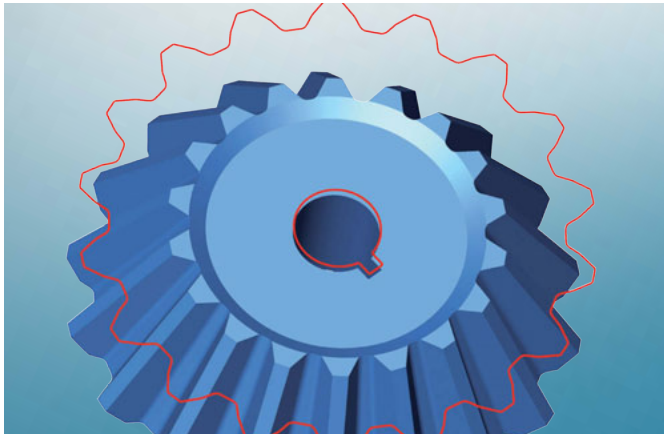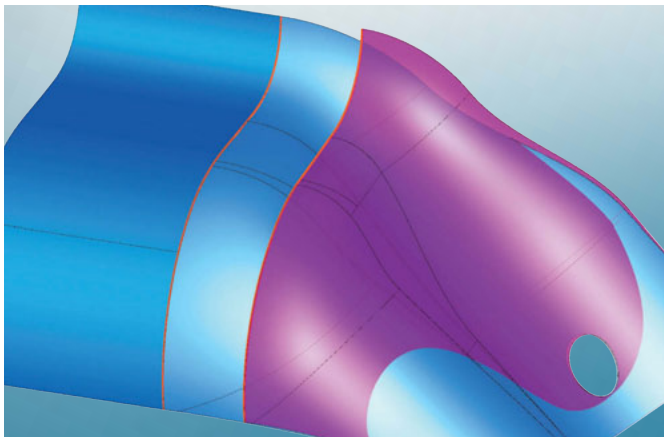
Shape contours

The shape contours of a face or component can be created quickly and easily with this new function. The function can be applied to face, solid and mesh models. Contours for CAM machining can be created more quickly.

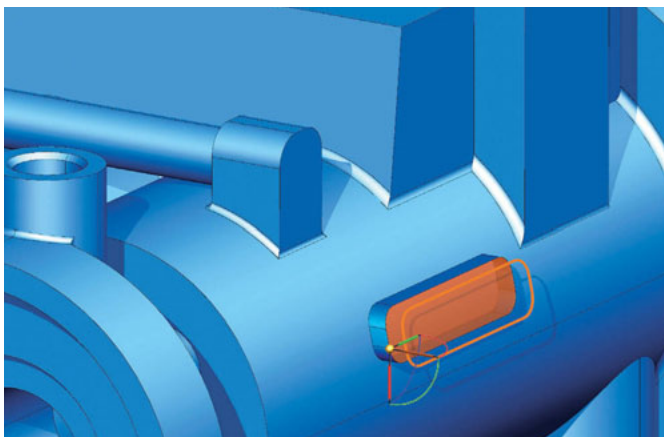**Benefit:** More user-friendly, fast preparation of contours.

Deformation

In addition to positional deformation, it is also possible to select a tangential dependency. This makes it possible to construct perfect transitions for later milling.

It also means that the start and target conditions can now have a different number of curves.

Benefit: More user-friendly.

Trimming solid faces

The 'Trimming' function can now also be applied to solid faces. The shape of the trimmed areas can be modified afterwards using direct modelling.

Benefit: Fast machining of solid models.

New sketcher

The new sketcher offers functionality for conveniently drawing design sketches. The user can enter design values easily in mini dialog boxes and specify the lengths and positions of lines precisely by value, for example. Common dependencies such as vertical, horizontal and tangential are displayed interactively during construction. These functions can also be applied to existing curves, faces and boundaries.

Benefit: User-friendly, fast design.
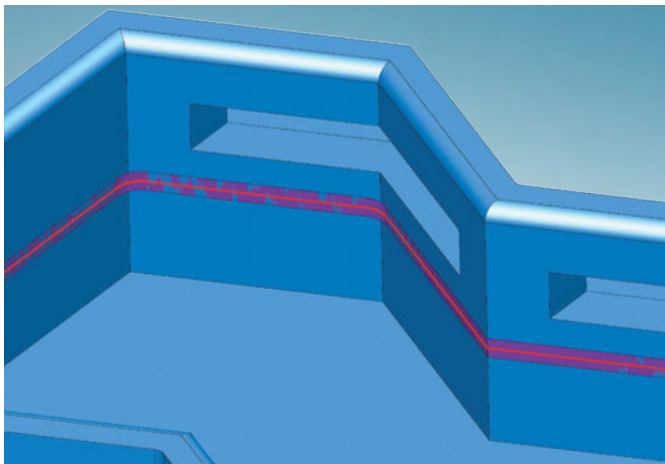
Highlight
Swarf cutting faces

Perfect faces can be created easily and quickly for swarf cutting, based on existing geometries. 'Interior corners' are filleted automatically. This ensures optimal milling.

Benefit: More user-friendly.

Search functions for workplanes

A new function makes it easier to find and sort names/descriptions in extensive structures.

Benefit: Fast searching in extensive structures.
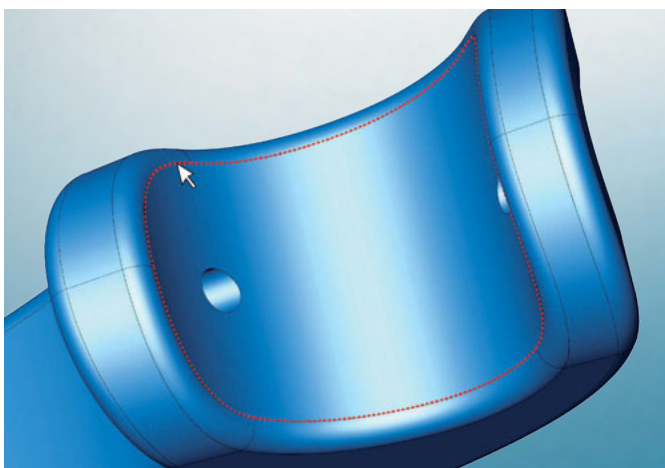
Chain selection

Chain selection can now also be applied to faces. This makes it quick and easy to select chains on face models.

Benefit: More user-friendly.

Moving/copying

A reference point option has been added to this command. A linear shift on the X, Y and Z axis can now be related to a reference point. The reference point may also be set to the current workplane.

Benefit: Measuring and moving in one command.

Print box

A configurable title block and frame can now be added to workplanes. Views can be saved and loaded.

Benefit: Detailed information in the manufacturing plan.

OPEN MIND
THE CAM FORCE

We push machining to the limit