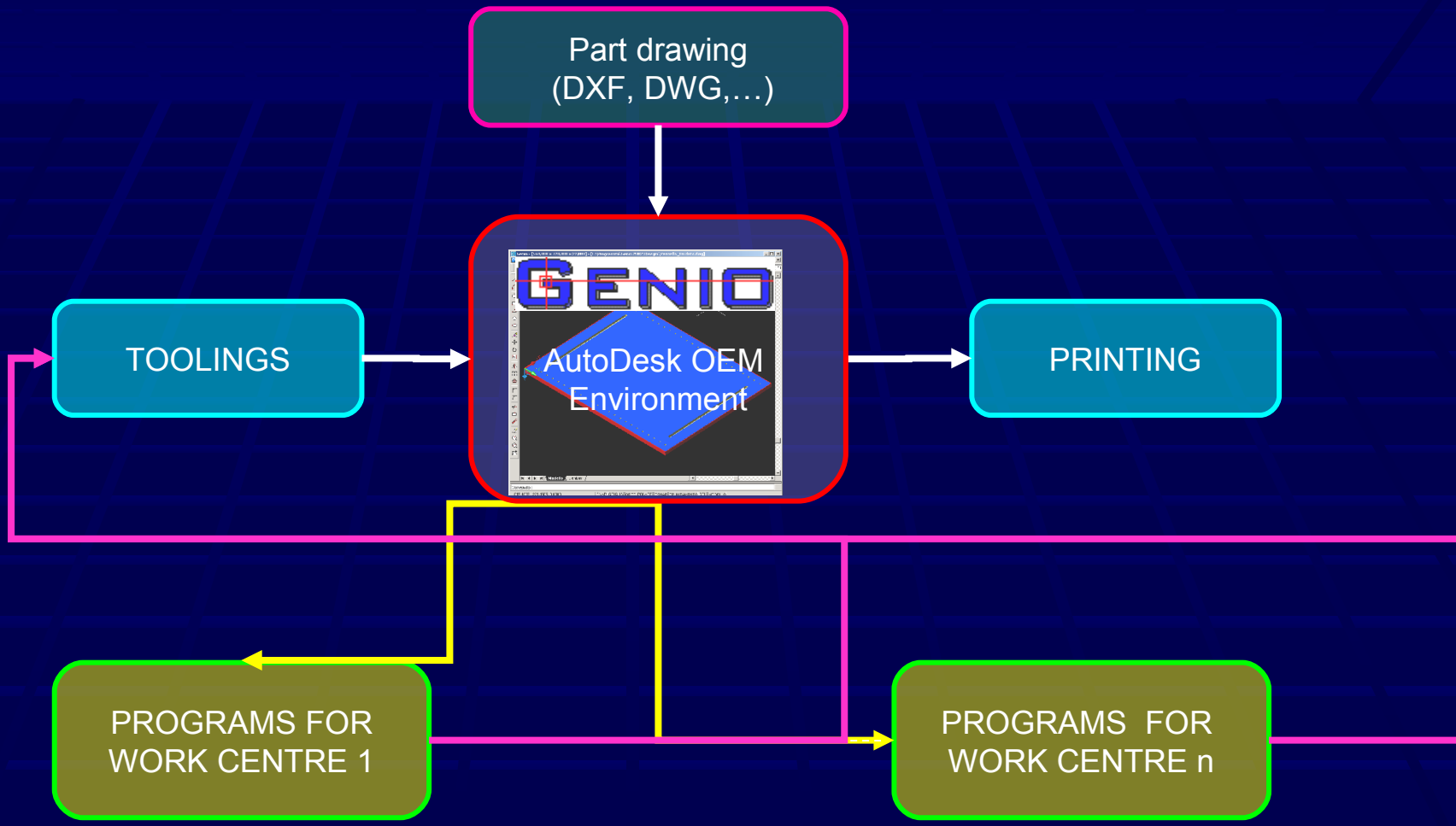
# GENIO

CAD/CAM software powered by Autodesk technology for parametric programming of boring, routing and edge-banding work centres

# Overview

- Genio is a powerful CAD/CAM system powered by Autodesk 3D environment
- The operator can draw or import geometries and then apply in a fast and easy way all machining required to reach the optimum result
- Machining can be programmed in parametric form by using the Genio Macro Programming Language, this allows users to build powerful parametric libraries personalized for their own components
- Genio allows the remote programming of several machines from a single position
- Genio is the right choice for the company that is looking at the future

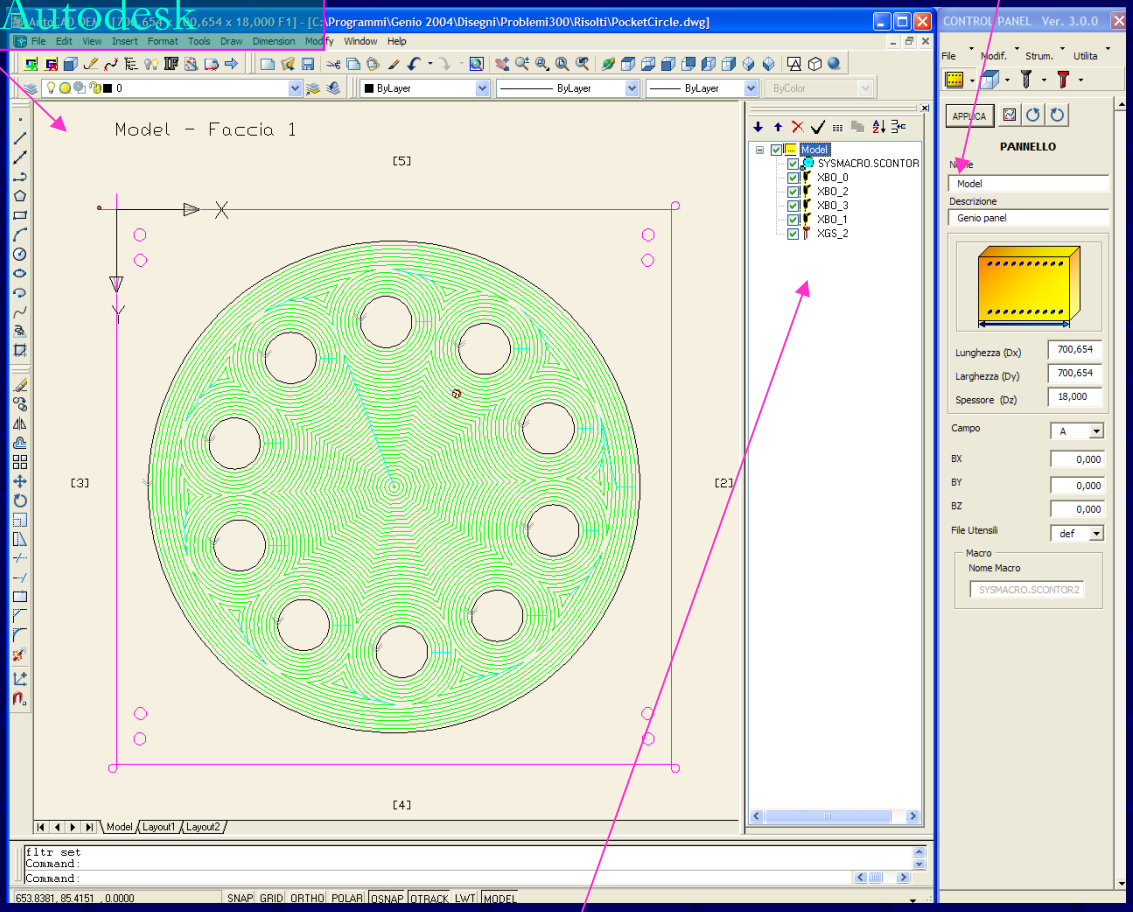
# Project architecture



# User interface structure

Integrated CAD 3D
Powered by Autodesk

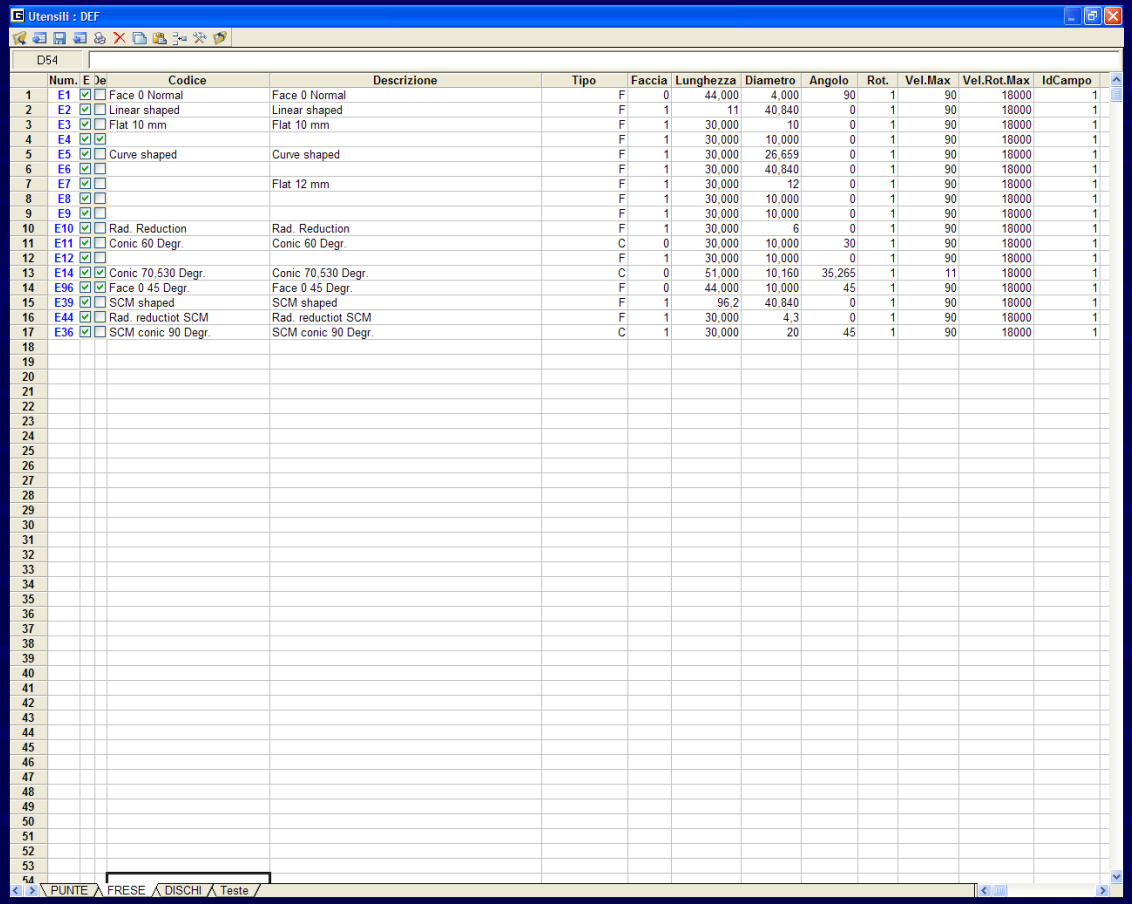
CAM interface (Control Panel)




Machining tree (can be hidden)

# Spreadsheets

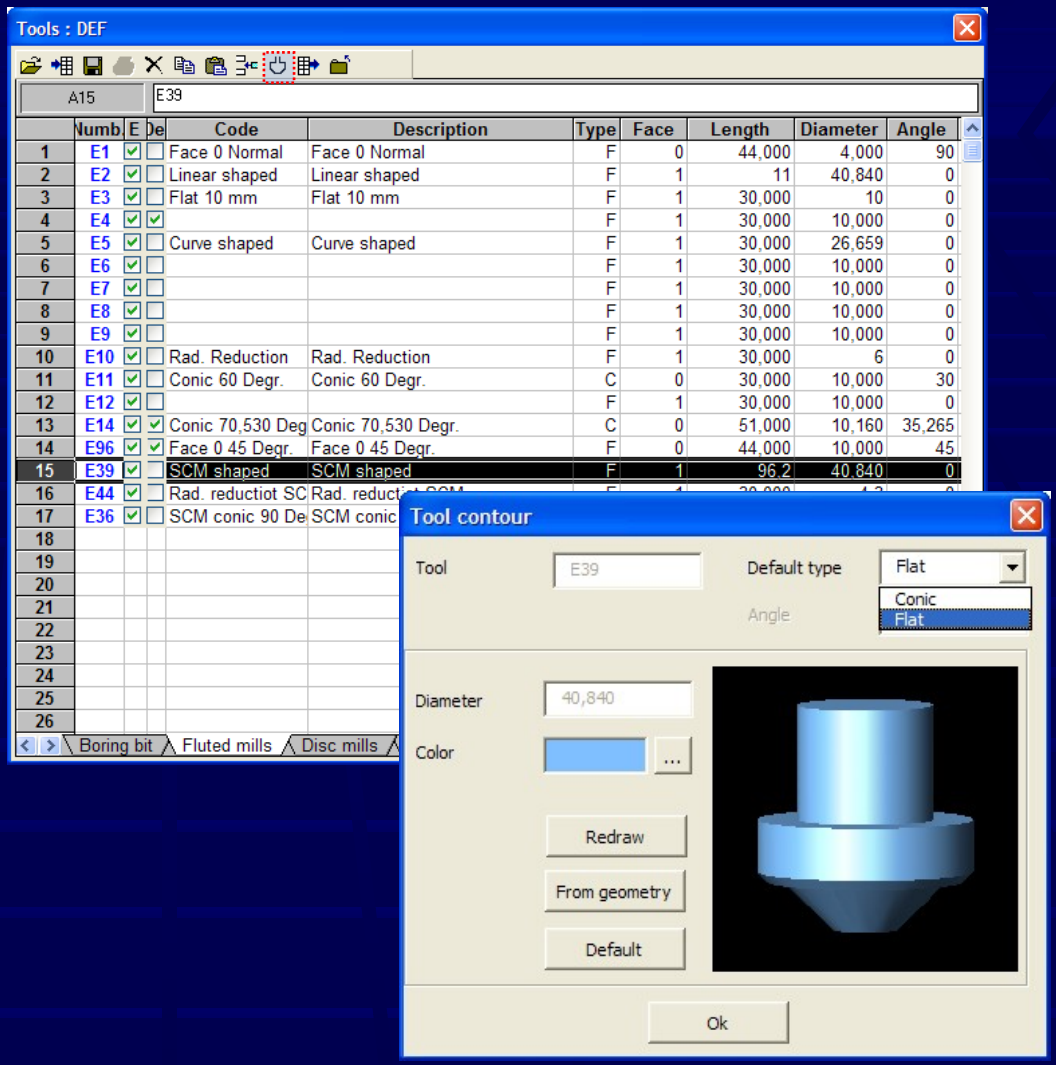
- Programming and output spreadsheets (tooling, macros etc…) are now full Excel compatible
- New style
- Window maximization button
- Automatic scroll with mouse central wheel




| | Num. | E | De | Codice | Descrizione | Tipo | Faccia | Lunghezza | Diametro | Angolo | Rot. | Vel.Max | Vel.Rot.Max | IdCampo |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | E1 | ☑ | ☐ | Face 0 Normal | Face 0 Normal | F | 0 | 44,000 | 4,000 | 90 | 1 | 90 | 18000 | 1 |
| 2 | E2 | ☑ | ☐ | Linear shaped | Linear shaped | F | 1 | 11 | 40,840 | 0 | 1 | 90 | 18000 | 1 |
| 3 | E3 | ☑ | ☐ | Flat 10 mm | Flat 10 mm | F | 1 | 30,000 | 10 | 0 | 1 | 90 | 18000 | 1 |
| 4 | E4 | ☑ | ☑ | | | F | 1 | 30,000 | 10,000 | 0 | 1 | 90 | 18000 | 1 |
| 5 | E5 | ☑ | ☐ | Curve shaped | Curve shaped | F | 1 | 30,000 | 26,659 | 0 | 1 | 90 | 18000 | 1 |
| 6 | E6 | ☑ | ☐ | | | F | 1 | 30,000 | 40,840 | 0 | 1 | 90 | 18000 | 1 |
| 7 | E7 | ☑ | ☐ | | Flat 12 mm | F | 1 | 30,000 | 12 | 0 | 1 | 90 | 18000 | 1 |
| 8 | E8 | ☑ | ☐ | | | F | 1 | 30,000 | 10,000 | 0 | 1 | 90 | 18000 | 1 |
| 9 | E9 | ☑ | ☐ | | | F | 1 | 30,000 | 10,000 | 0 | 1 | 90 | 18000 | 1 |
| 10 | E10 | ☑ | ☐ | Rad. Reduction | Rad. Reduction | F | 1 | 30,000 | 6 | 0 | 1 | 90 | 18000 | 1 |
| 11 | E11 | ☑ | ☐ | Conic 60 Degr. | Conic 60 Degr. | C | 0 | 30,000 | 10,000 | 30 | 1 | 90 | 18000 | 1 |
| 12 | E12 | ☑ | ☐ | | | F | 1 | 30,000 | 10,000 | 0 | 1 | 90 | 18000 | 1 |
| 13 | E14 | ☑ | ☑ | Conic 70,530 Degr. | Conic 70,530 Degr. | C | 0 | 51,000 | 10,160 | 35,265 | 1 | 11 | 18000 | 1 |
| 14 | E96 | ☑ | ☑ | Face 0 45 Degr. | Face 0 45 Degr. | F | 0 | 44,000 | 10,000 | 45 | 1 | 90 | 18000 | 1 |
| 15 | E39 | ☑ | ☐ | SCM shaped | SCM shaped | F | 1 | 96,2 | 40,840 | 0 | 1 | 90 | 18000 | 1 |
| 16 | E44 | ☑ | ☐ | Rad. reductiot SCM | Rad. reductiot SCM | F | 1 | 30,000 | 4,3 | 0 | 1 | 90 | 18000 | 1 |
| 17 | E36 | ☑ | ☐ | SCM conic 90 Degr. | SCM conic 90 Degr. | C | 1 | 30,000 | 20 | 45 | 1 | 90 | 18000 | 1 |

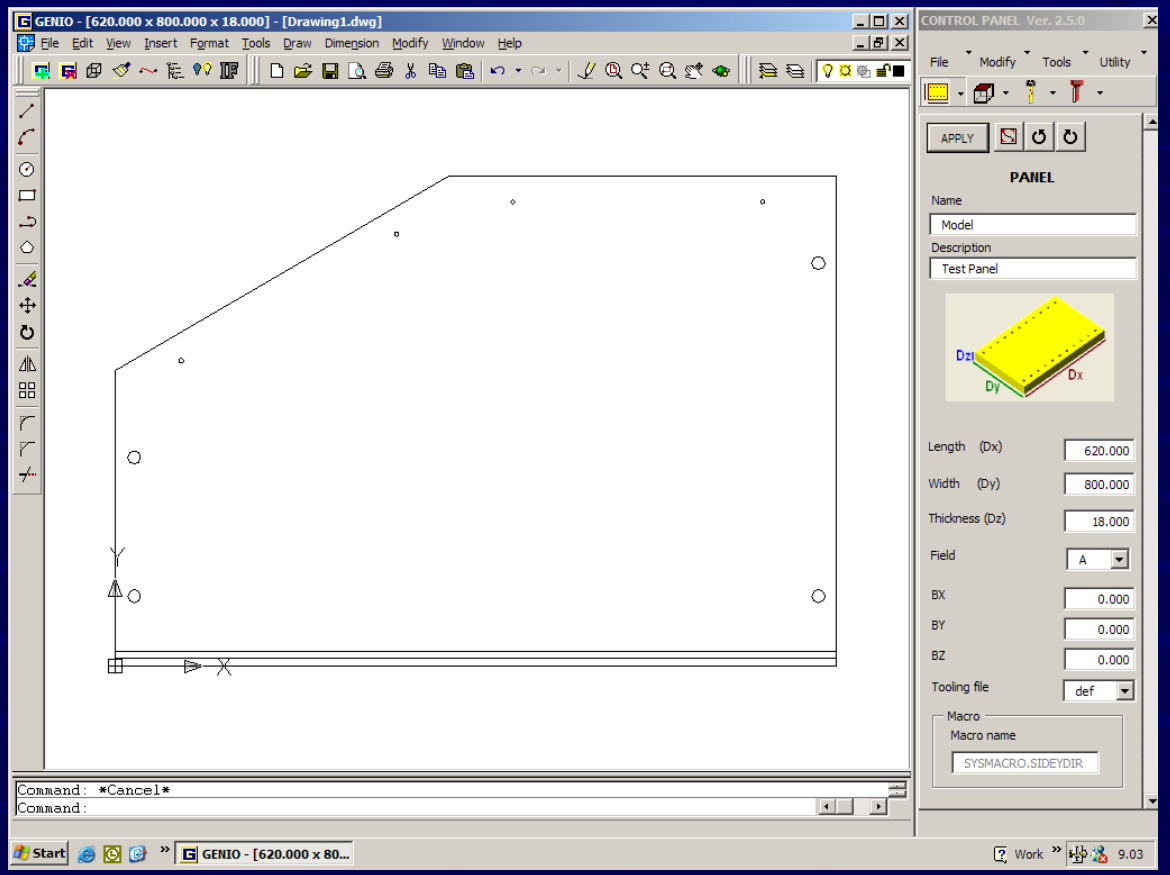
# Tooling

- Tooling data programming
- Import of tooling data from the machine
- Storage of several tooling archives
- For each tool can be stored a drawing created form the tool shape



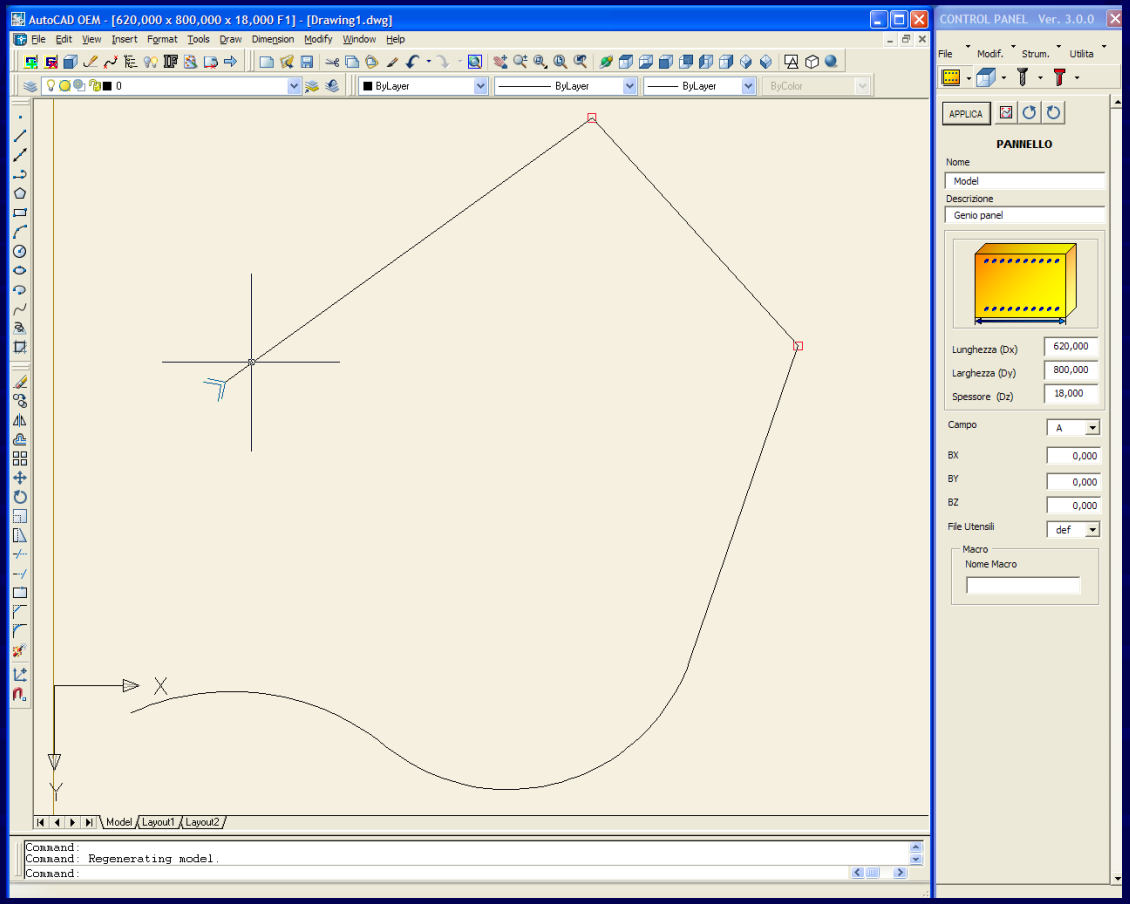
# Import of drawings

- Import of workable geometries from several standard drawing formats (DXF, DWG, etc…)
- The program automatically finds the overall dimensions and centers the drawing within the panel
- The auto-join function automatically joins contiguous entities of the drawing
- The default direction and the default starting point can be set for each geometry



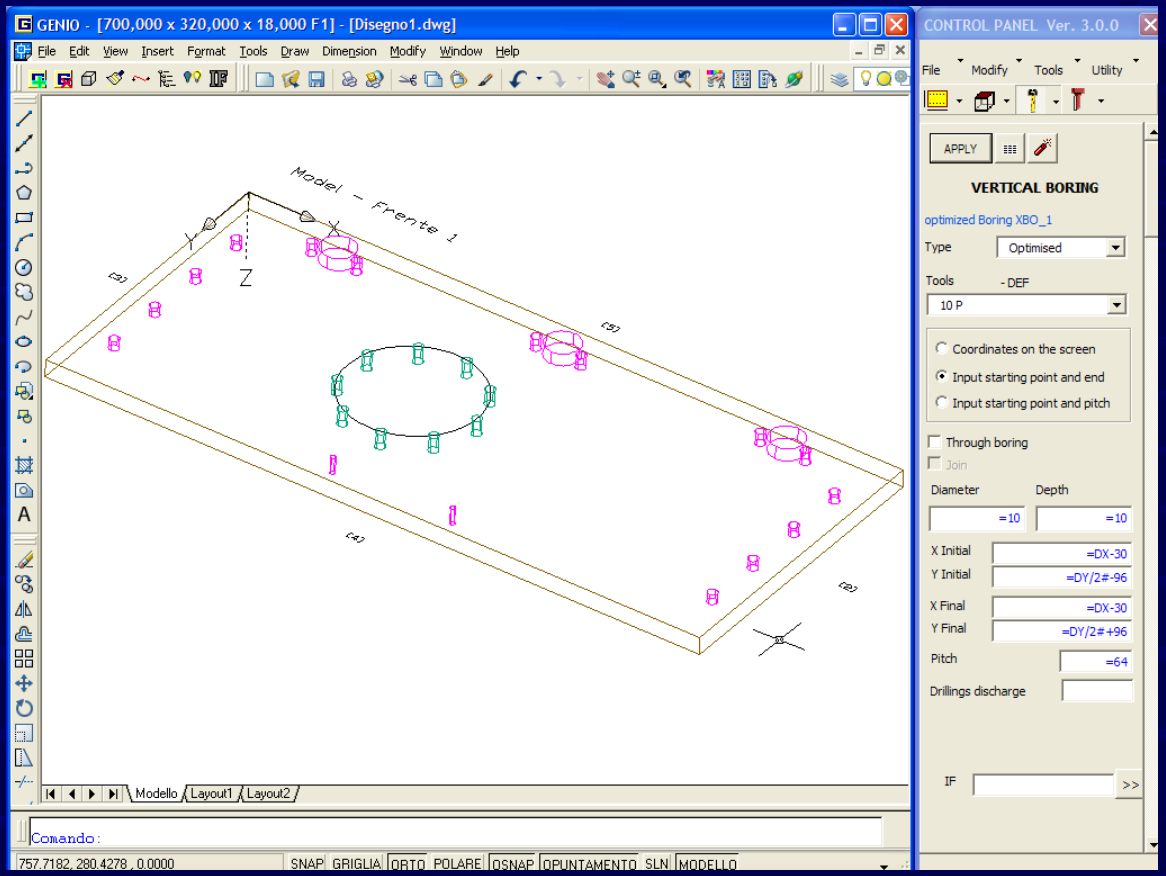
# Geometry properties

- Automatic regeneration of geometry signals
- Dynamic or static view of geometry signals
- Dynamic view (mouse over) of not-tangent entities signals



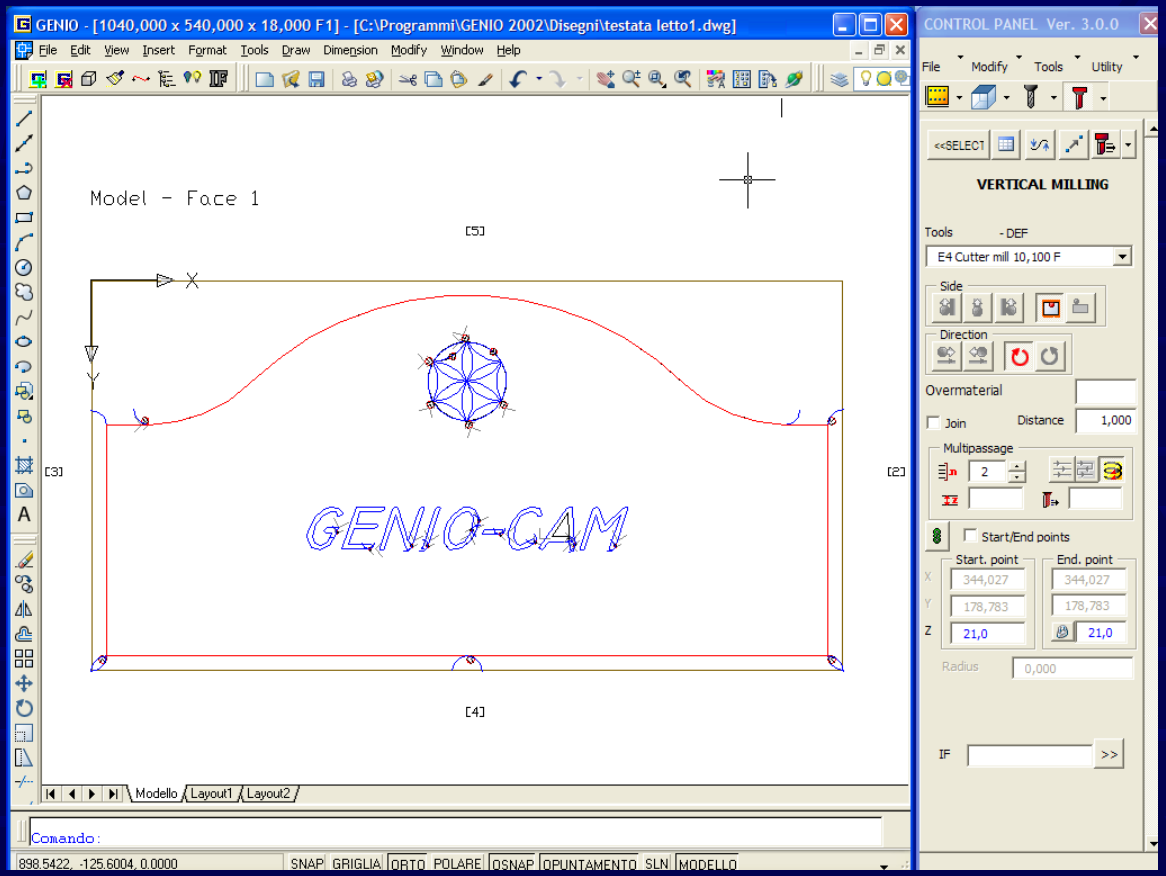
# Boring

- Normal boring
- Optimized boring
- Borings on horizontal faces
- Borings on existing paths
- Parametric borings with aid for preset constraints (centering, mirroring, etc…)
- Face 6 (bottom) borings



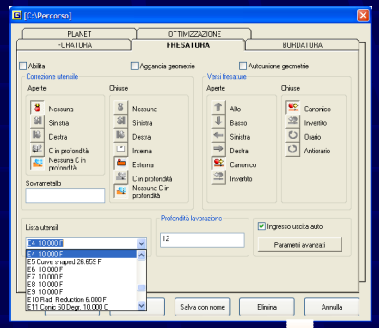
# Milling

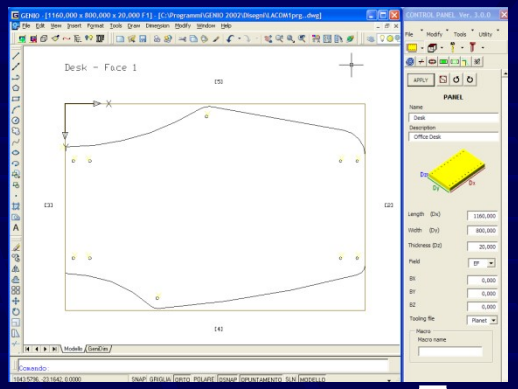
- Millings on workable geometries such as lines, arcs, circles, ellipses, 2D and 3D polylines, splines, etc..
- Millings on horizontal faces or user defined panes
- Programming of start and end points, direction, offset, lead-in/lead-out
- Face 6 (bottom) millings
- Multipassage

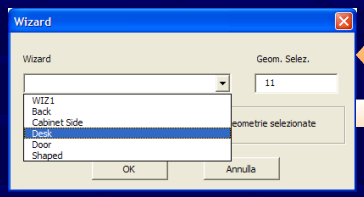


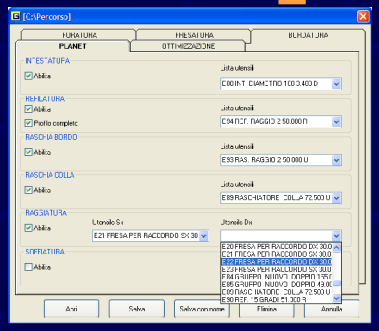
# Machining aied programming: Genio wizard

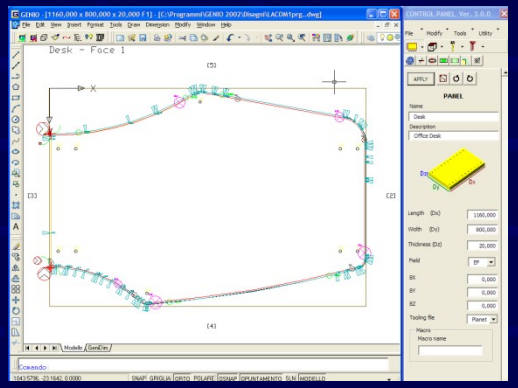
- The “Genio” Wizard allows the management of machining profiles applicable to a set of geometries.
- Programming and storing  of several machining profiles
- Geometries selection
- Profile selection
- Automatic generation of the required machining sequence according to the active profile and to the selected geometries





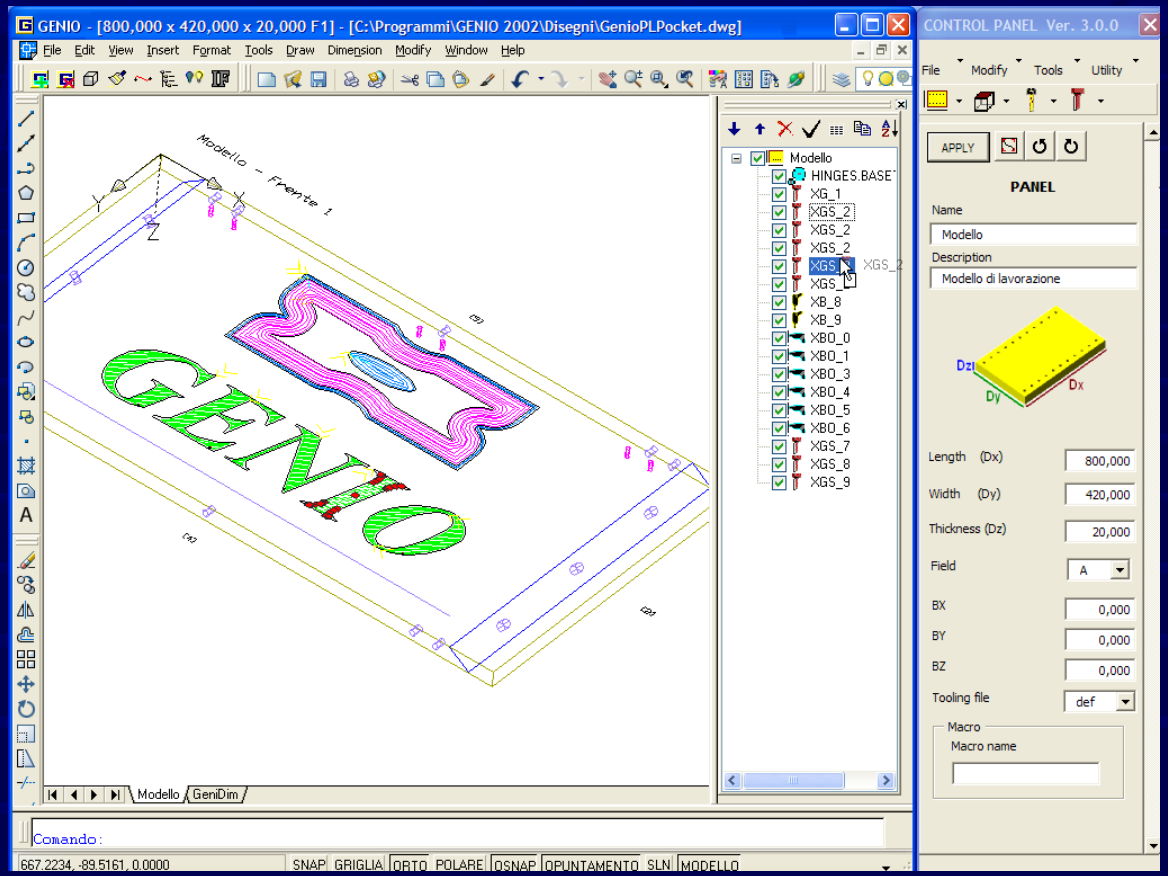





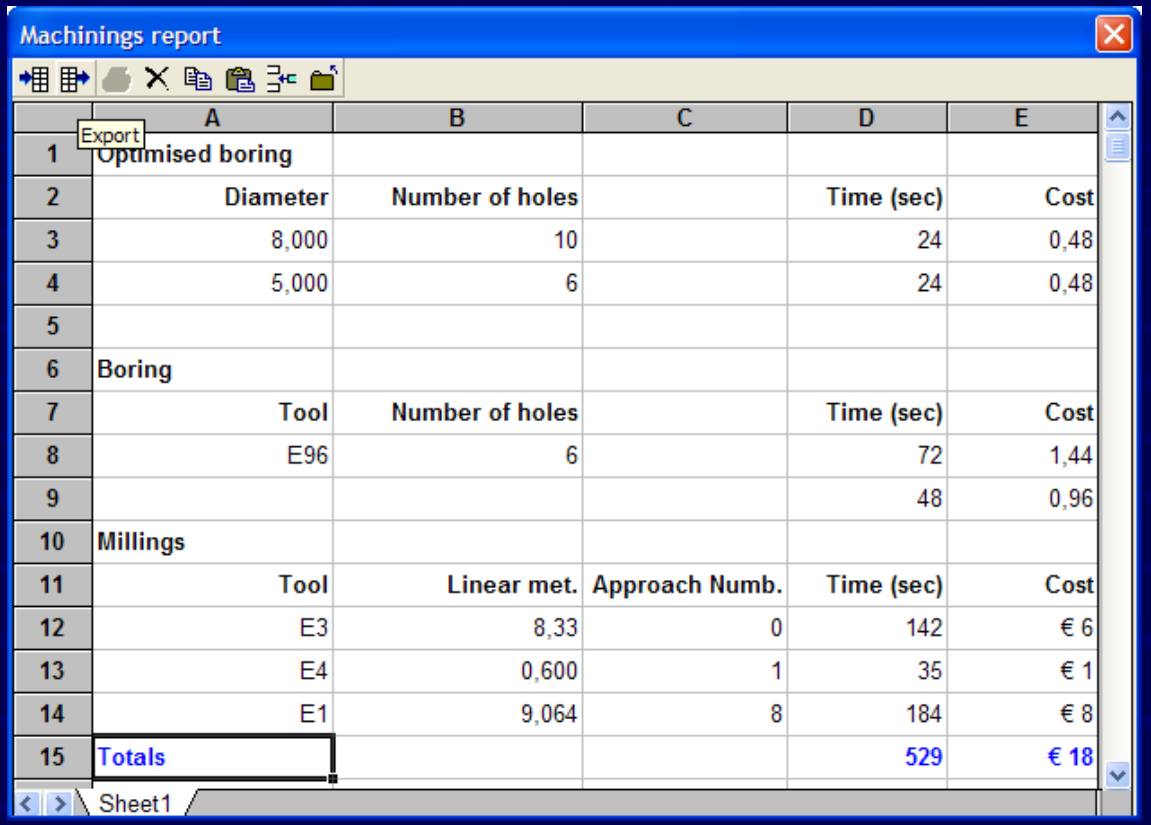
# Machining management

- The “machining tree” supports functions for manage in an easy way the programmed machining
- Automatic or manual (drag and drop) sorting of the machining sequence
- Enabling / disabling and removing of machining
- Modification of names and parameters of the programmed machining
- Automatic or manual (drag and drop) sorting of the machining sequence
- Manual sorting by clicking on machining drawings



# Machining report

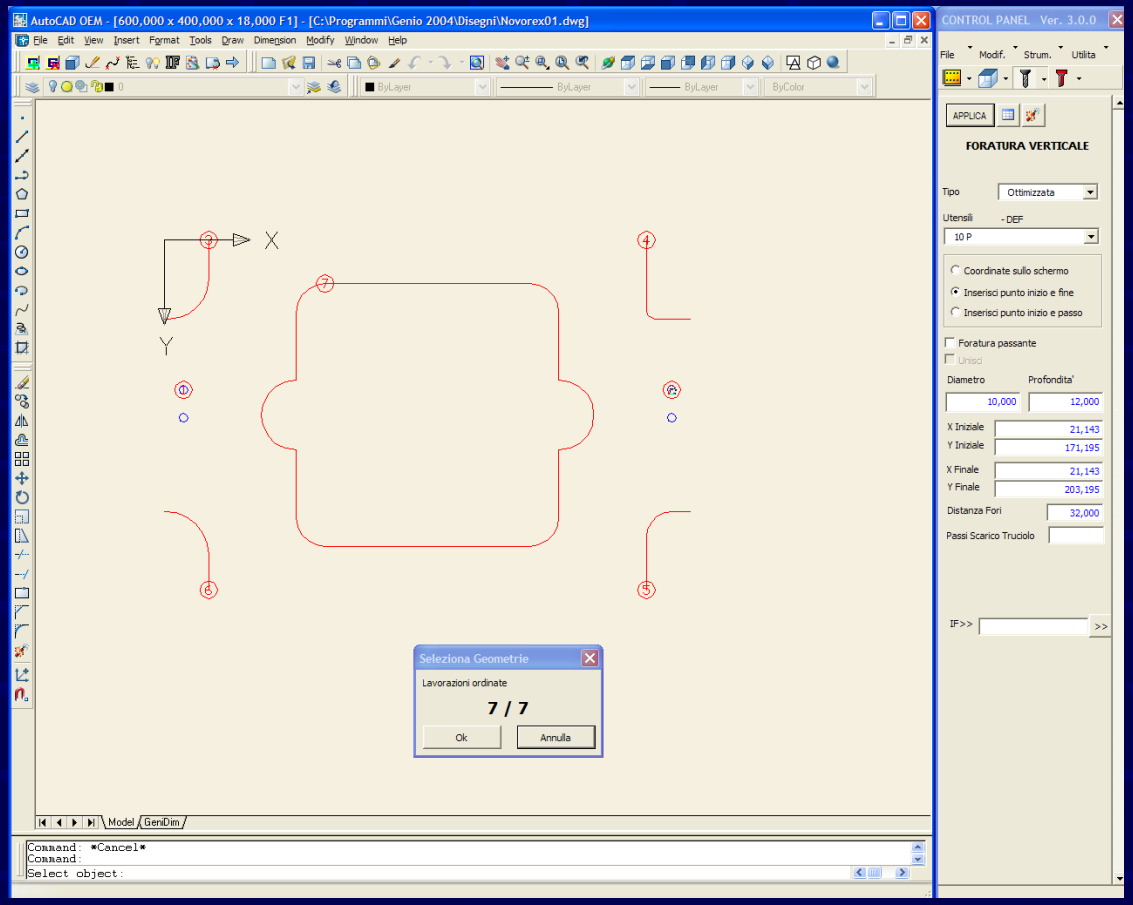
- Sport of programmed panel machining
- Holes number
- Number of approaches for millings
- Estimated machining times
- Estimated costs
- Reports can be modified and saved as Excel spreadsheets or as text files




| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | Optimised boring | | | | |
| 2 | Diameter | Number of holes | | Time (sec) | Cost |
| 3 | 8,000 | 10 | | 24 | 0,48 |
| 4 | 5,000 | 6 | | 24 | 0,48 |
| 5 | | | | | |
| 6 | Boring | | | | |
| 7 | Tool | Number of holes | | Time (sec) | Cost |
| 8 | E96 | 6 | | 72 | 1,44 |
| 9 | | | | 48 | 0,96 |
| 10 | Millings | | | | |
| 11 | Tool | Linear met. | Approach Numb. | Time (sec) | Cost |
| 12 | E3 | 8,33 | 0 | 142 | € 6 |
| 13 | E4 | 0,600 | 1 | 35 | € 1 |
| 14 | E1 | 9,064 | 8 | 184 | € 8 |
| 15 | Totals | | | 529 | € 18 |

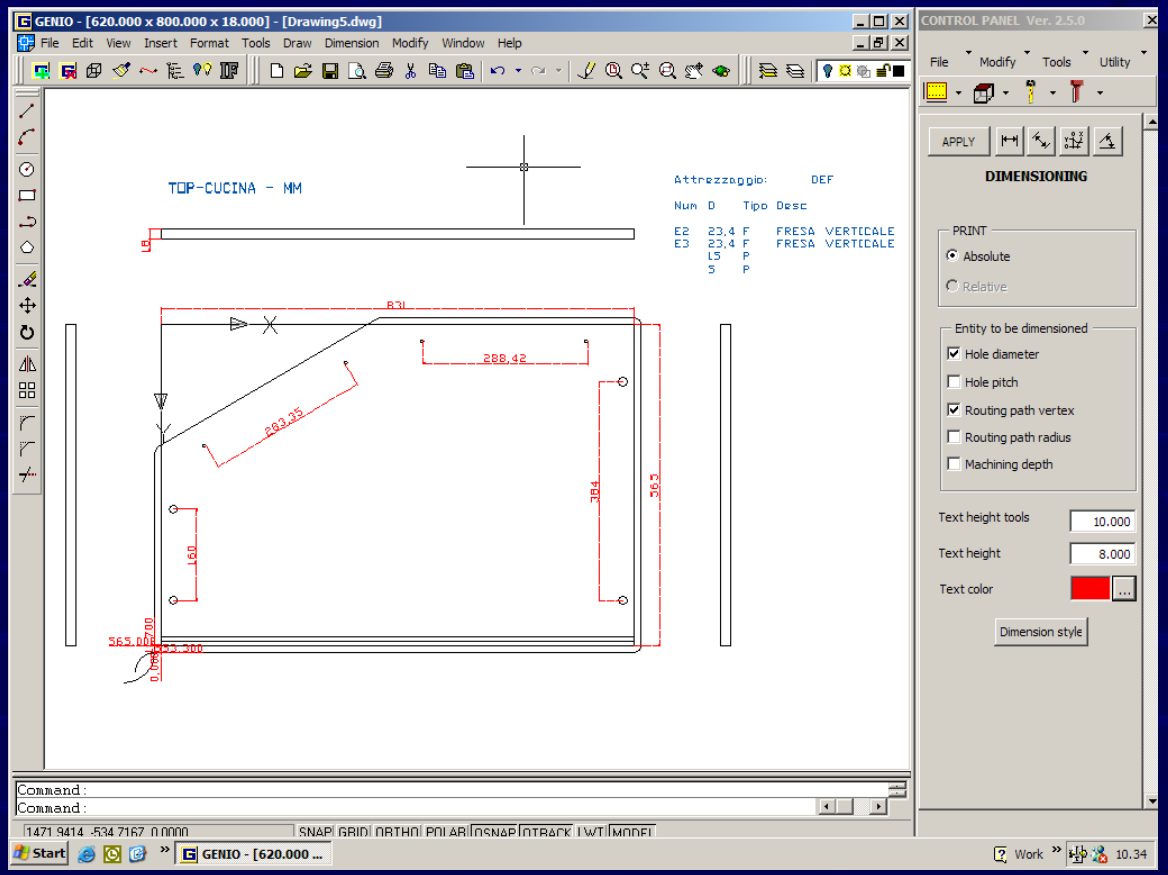
# Machining sequence

- Manual machining sequence programming by clicking on machining drawings



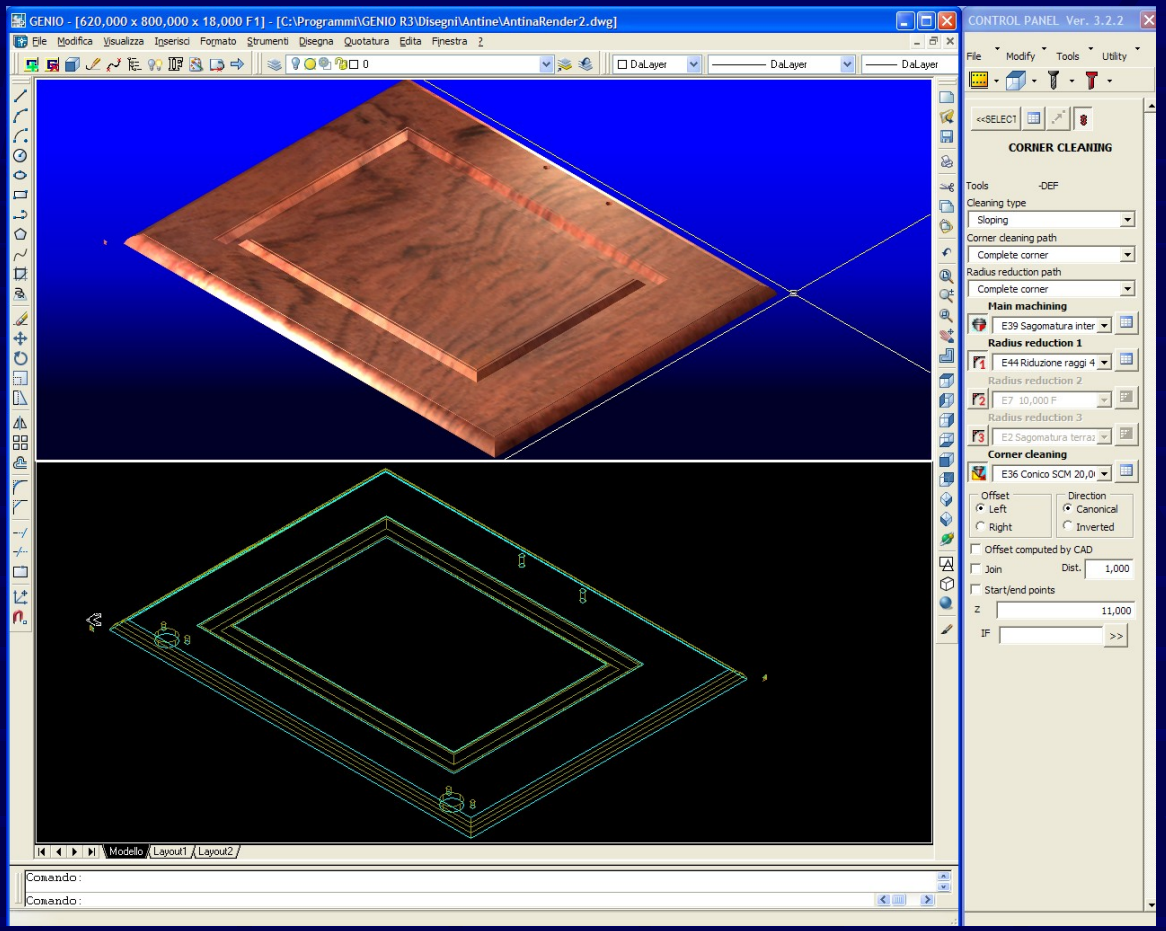
# Panel dimensioning

- Automatic dimensioning of programmed machining (diameters, depths, coordinates, etc…)
- Manual dimensioning of programmed machining (distances, coordinates, angles, etc...)
- Tooling list
- Print-out of dimensioned drawing



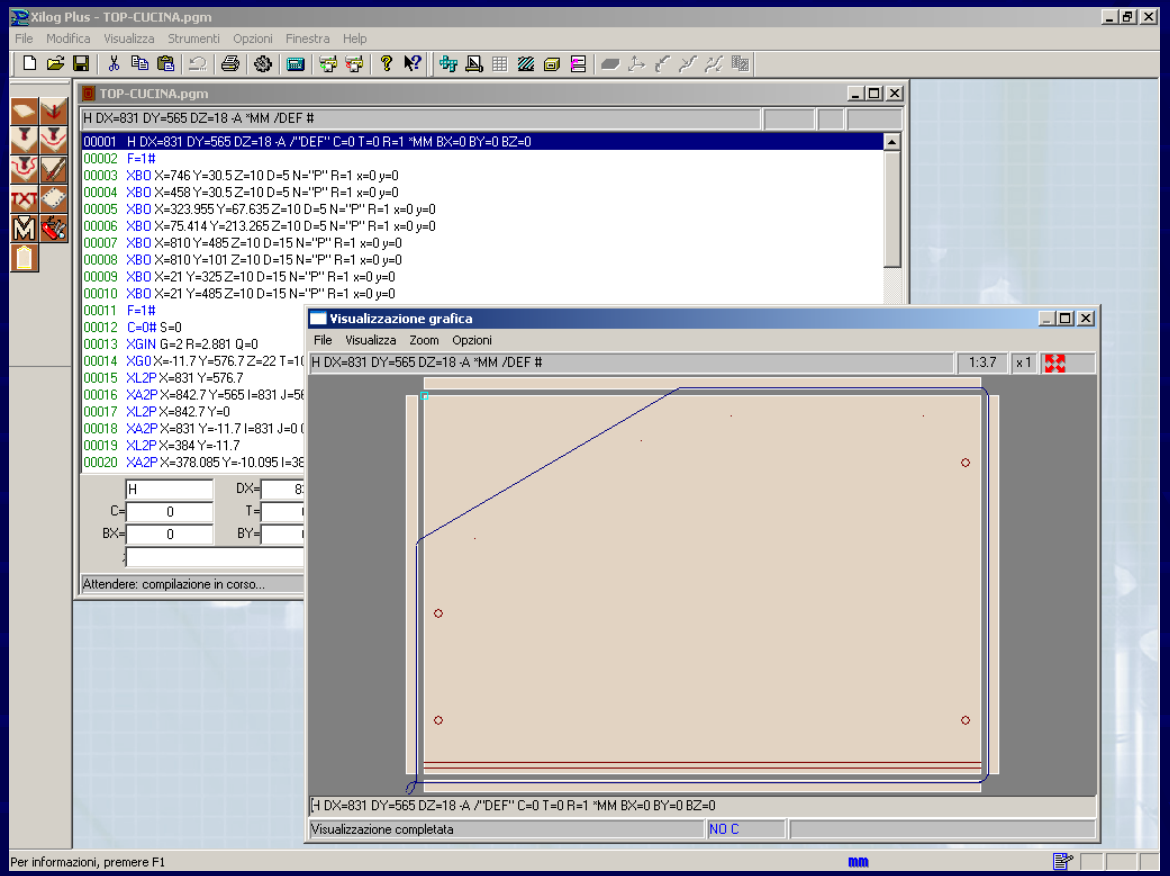
# 3D solid view

- 3D solid view of programmed panel
- Utility for 2D or 3D machining simulation of the tooling path with visualization of the head feed motion
- Rendering



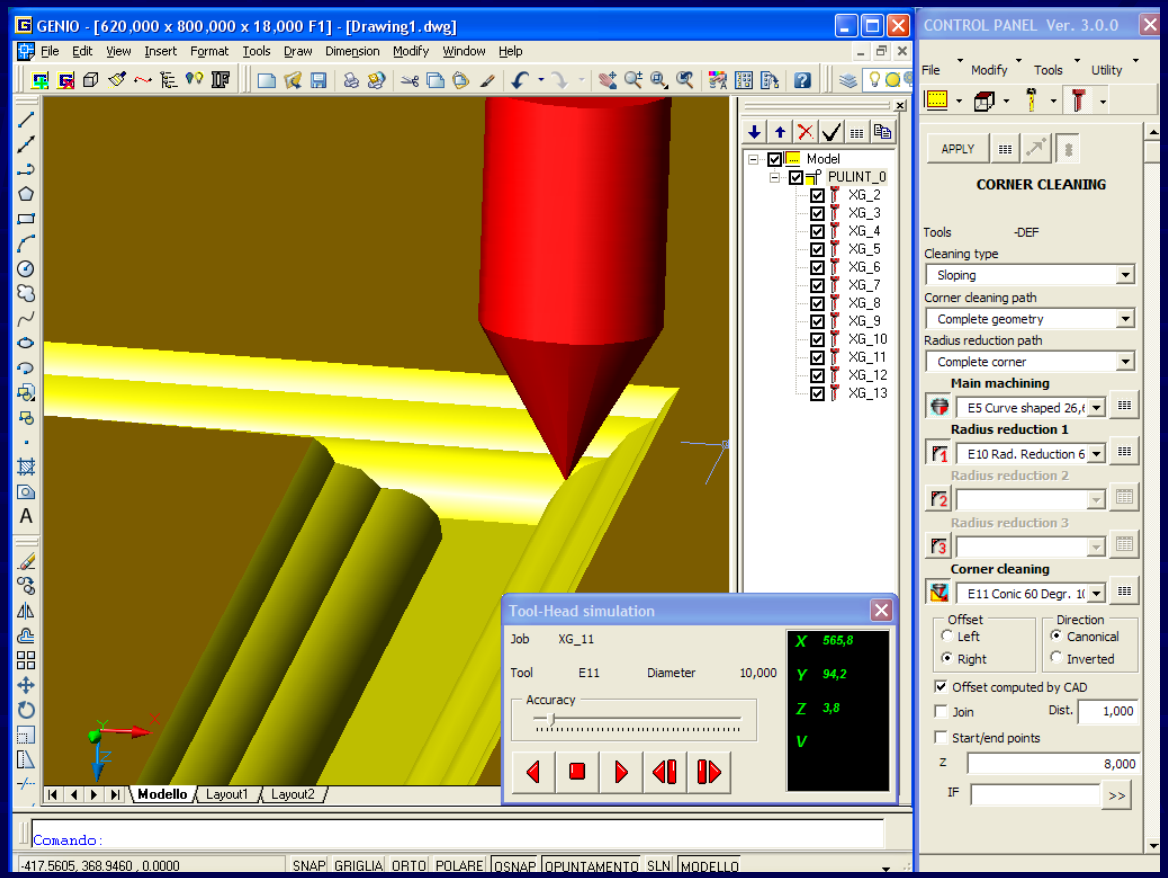
# Generation of CNC code

- Automatic generation of the CNC program code for the selected machine
- An editable preview of the CNC code is available in order to view, copy or modify manually the generated program



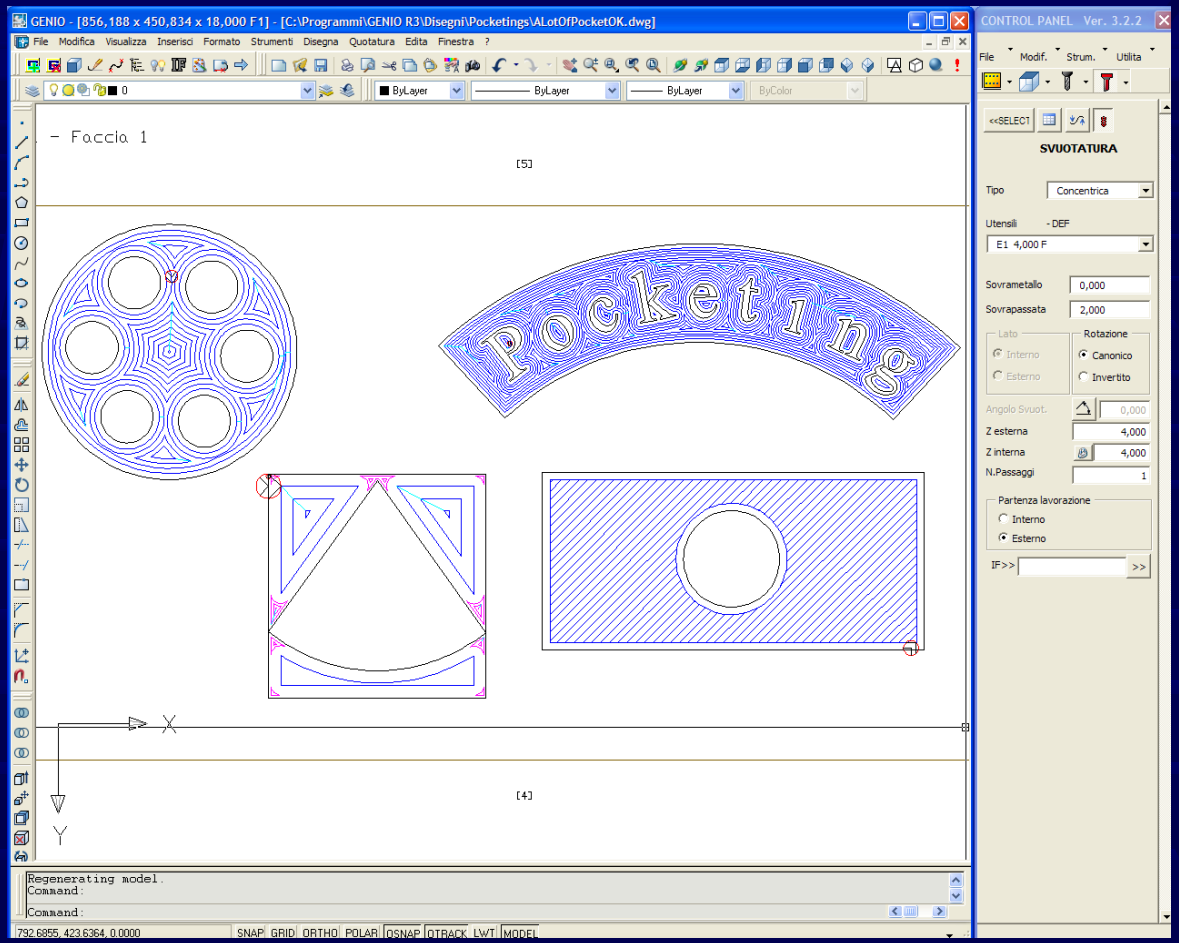
# Advanced programming: internal corner cleaning

- Useful for doors
- Programming of the tool list for the process
- Automatic computation of tooling paths based on the main tool shape and on the machining depth
- Partial or complete machining, offset on CN or automatically computed by the CAD
- The machining are automatically updated when the linked geometry is changed



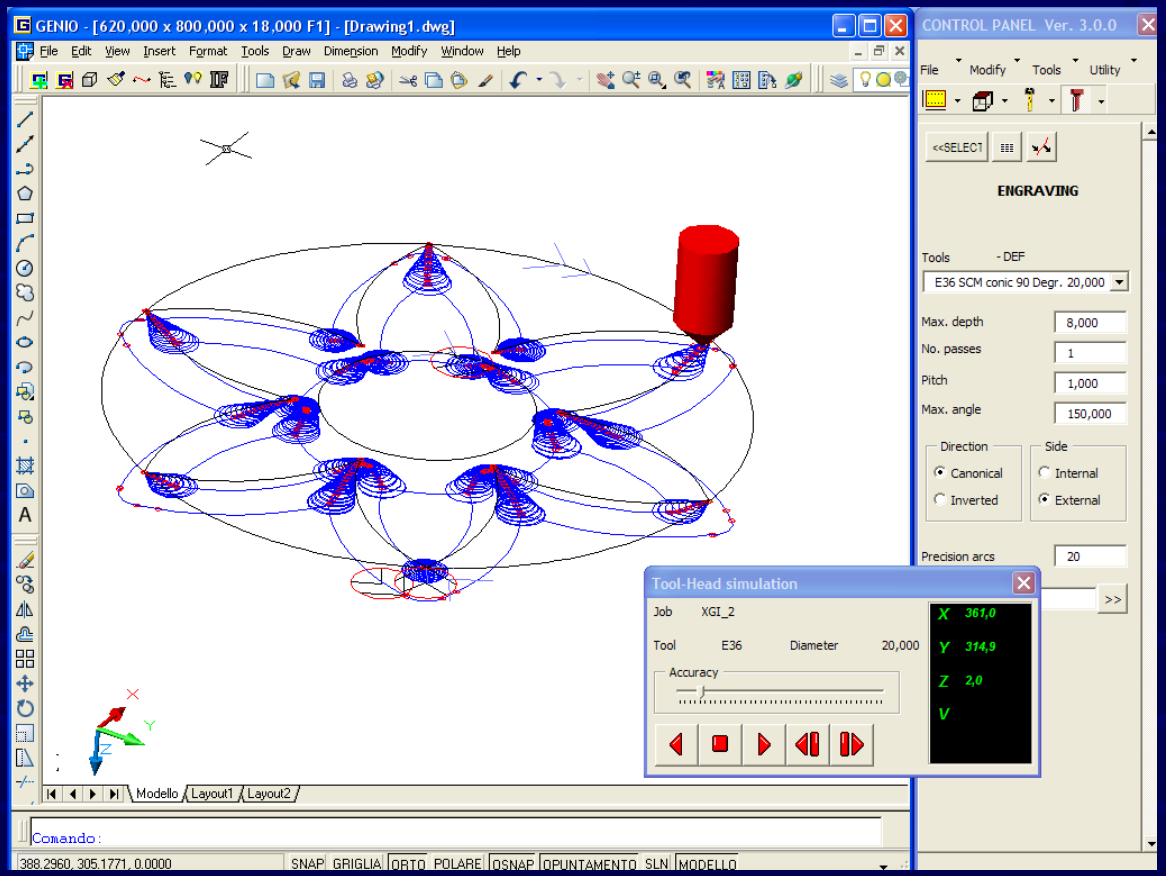
# Pocketing

- Concentric pocketing
- Linear (zig-zag) pocketing with parametric zig-zag angle
- Internal holes management
- Finish passage
- Overmaterial



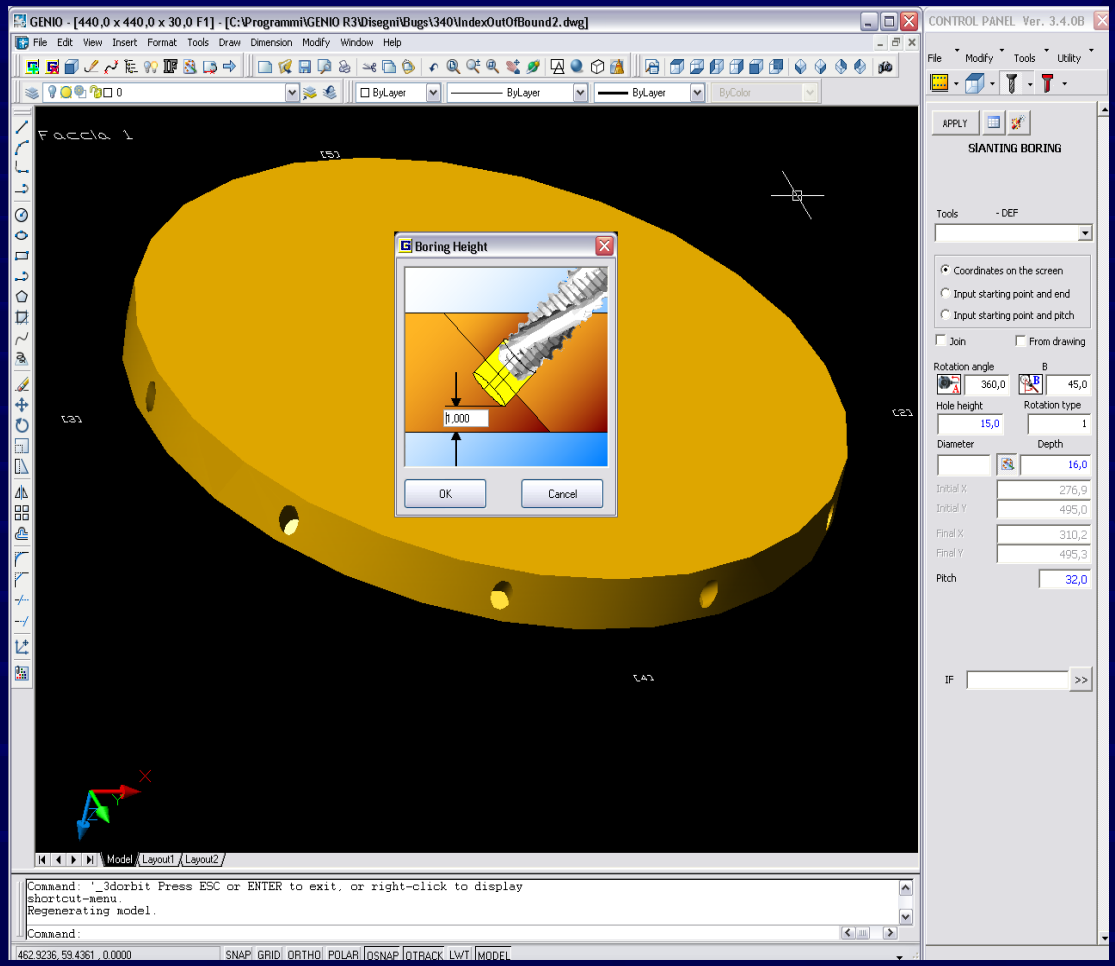
# Advanced programming: engraving

- Programming of machining using conic tools
- Interpolated machining depth (Z) are automatically computed
- The functionality automatically computes the interferences of the conic tool with the internal geometries



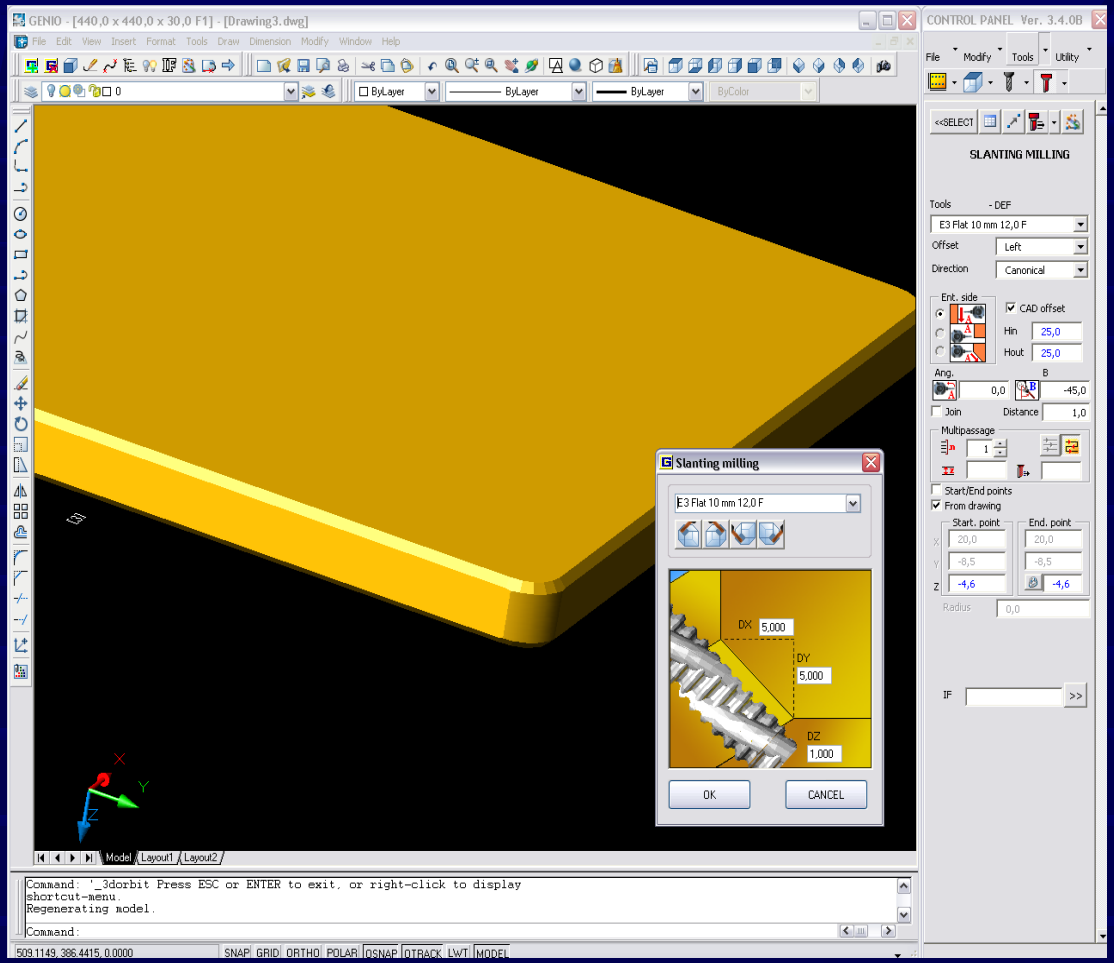
# Slanting Boring management

- Wizard for slanting boring programming
- Slanting borings on given paths
- Automatic computation of parameters for Xilog code



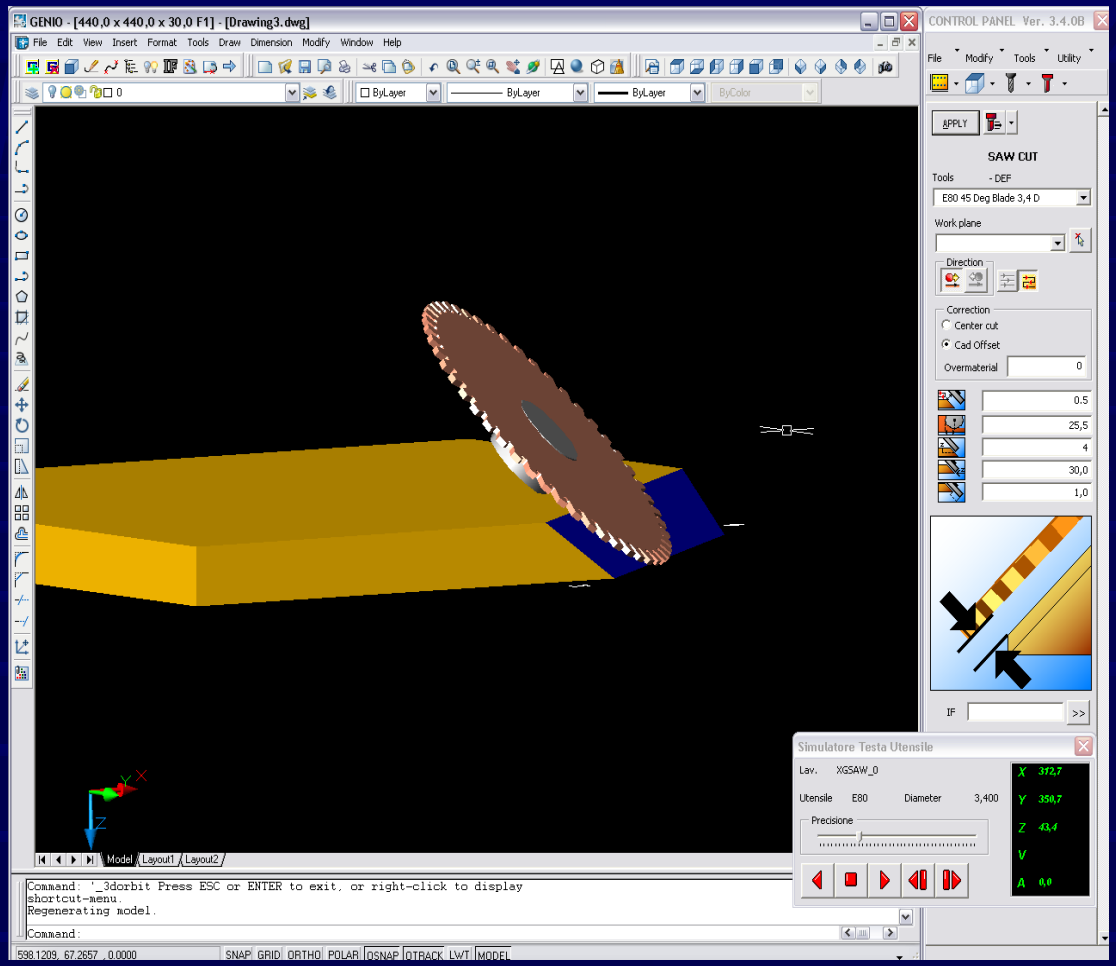
# Slanting milling management

- Wizard for slanting milling programming
- Slanting millings symmetrical in respect of panel edges
- Automatic computation of parameters for Xilog code



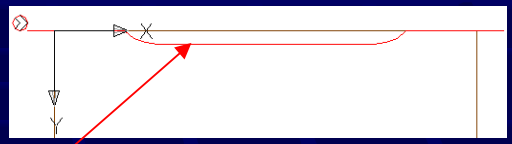
# Cut with slanting saw

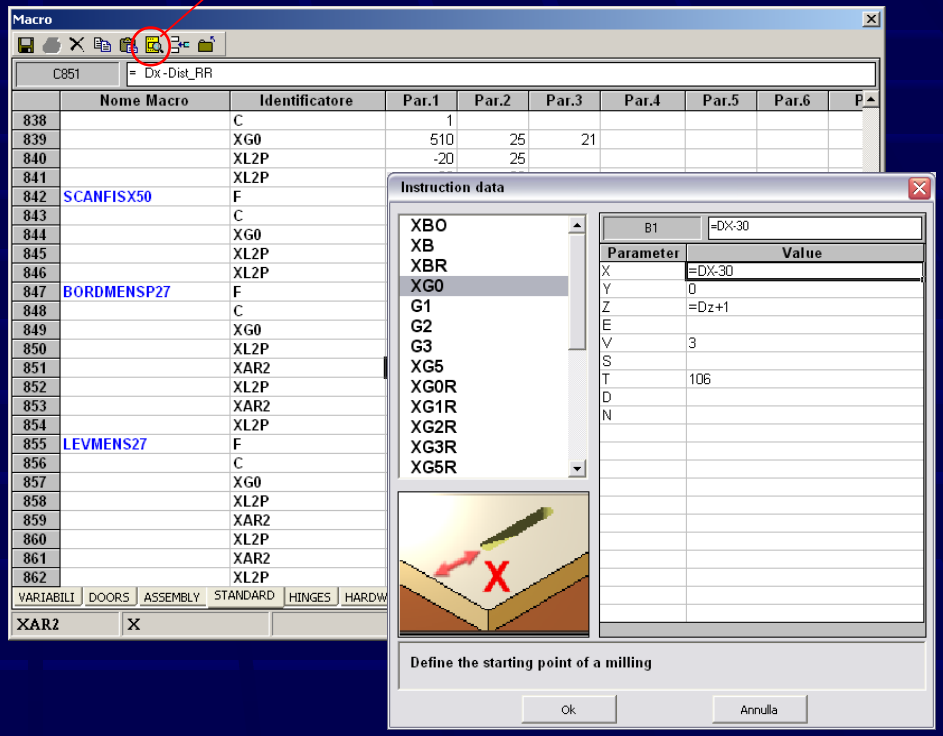
- Saw cut programming starting from a working plane
- Automatic computation of saw offset
- Multipassage with scoring pass
- Extra-depth
- Length offset for saw cut



# Parametric macro programming

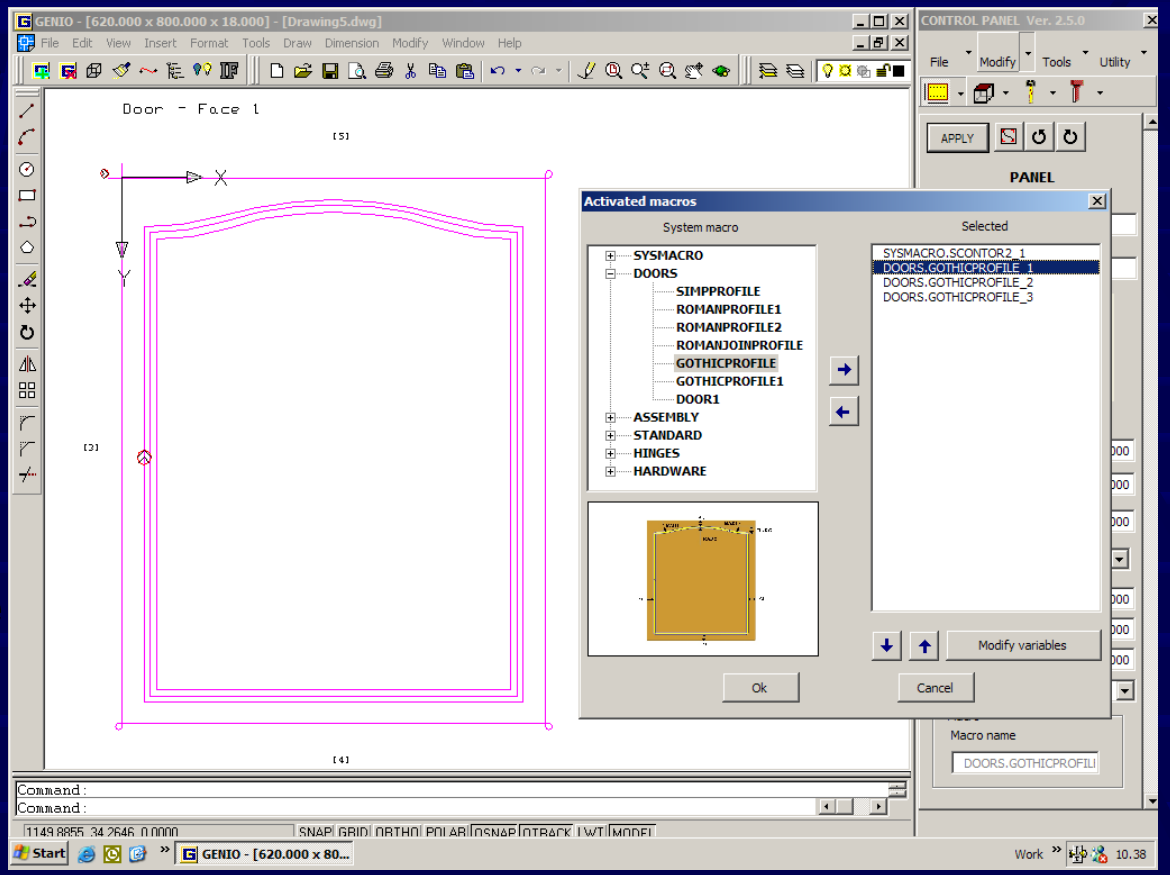
- Parametric macro programming is supported with a powerful and easy language
- Management of global variables (Dx, Dy, Dz) or defined by the user
- Formulas with spreadsheets standard syntax (Excel-like)
- Conditional statements, cycles and subroutines are supported
- A memo image can be assigned for each macro
- The macro workbook can be divided in several spreadsheets
- Preview of macros with test button
- A default library of standard macros is supplied



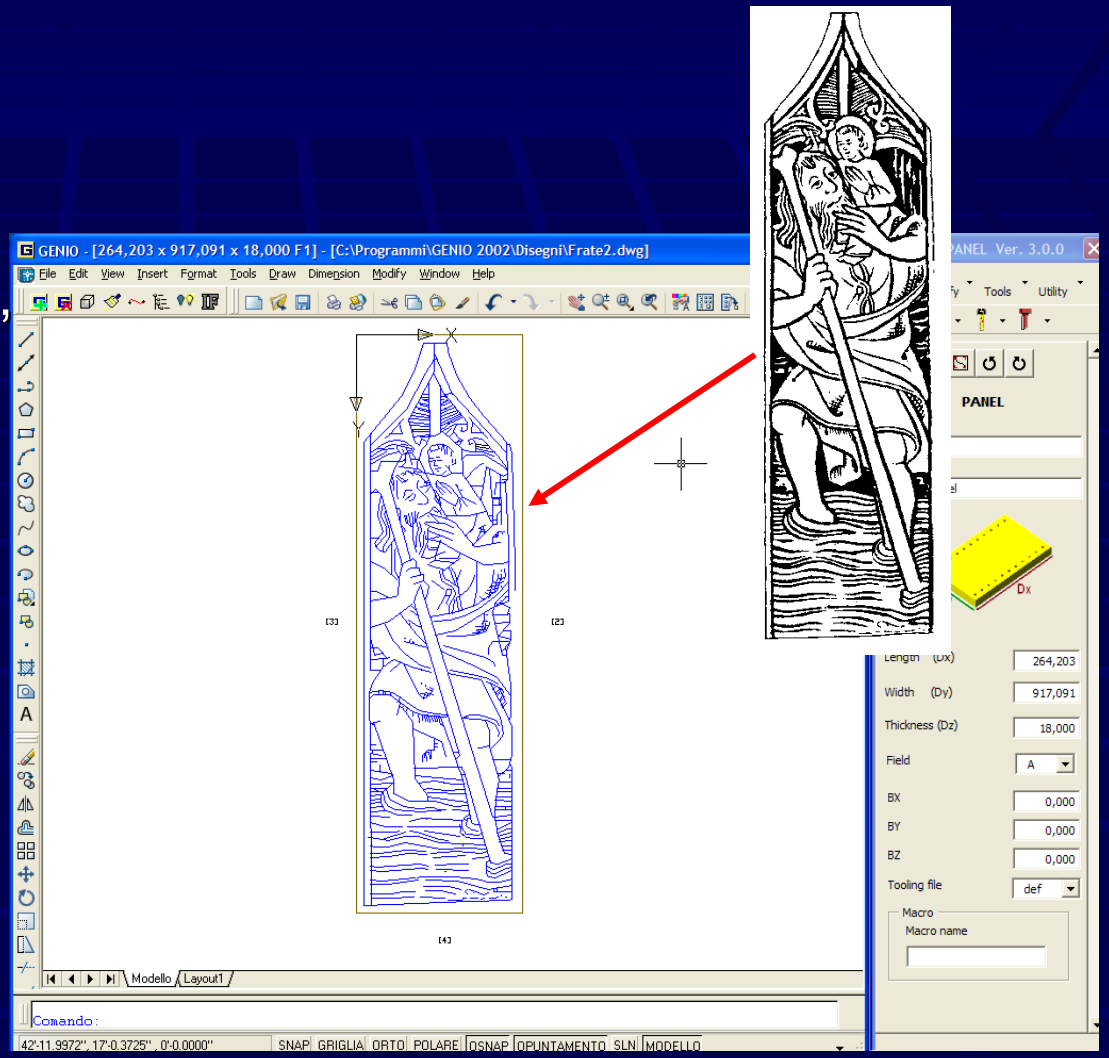
# Insertion of parametric macros

- Programmed macro can be inserted easily and quickly in the active drawing
- It's possible to insert more instances of the same macro, with its local values for the parameters
- The inserted macros are automatically updated when the panel dimensions or the value of parameters are changed.
- Import of  Xilog parametric programs as parametric macros



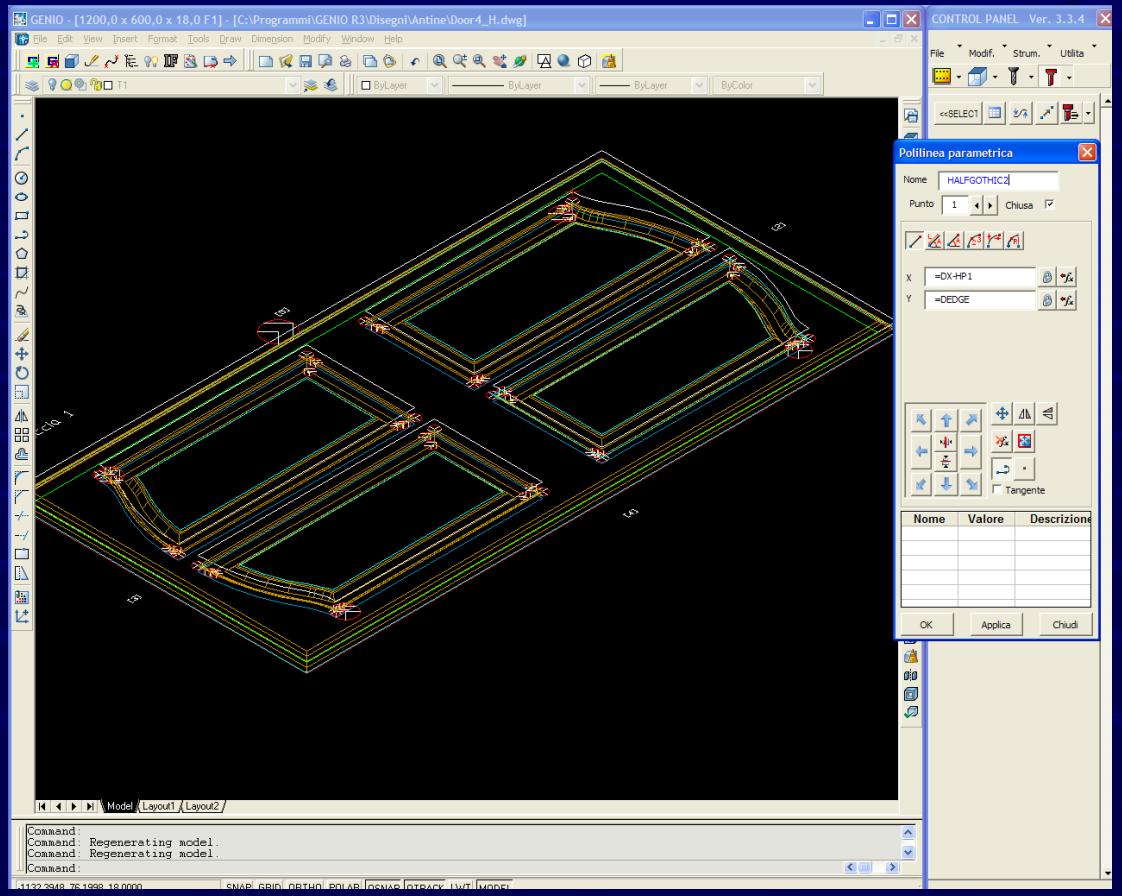
# Options: raster to vector conversion

- Import of images stored in files with several graphics formats supported (bitmap, jpeg, tif, etc..) as workable drawings.
- Selection of the insertion point of drawings onto the screen
- Vectoralization on centerlines or on outlines
- Automatic detection of entities such as arcs and lines



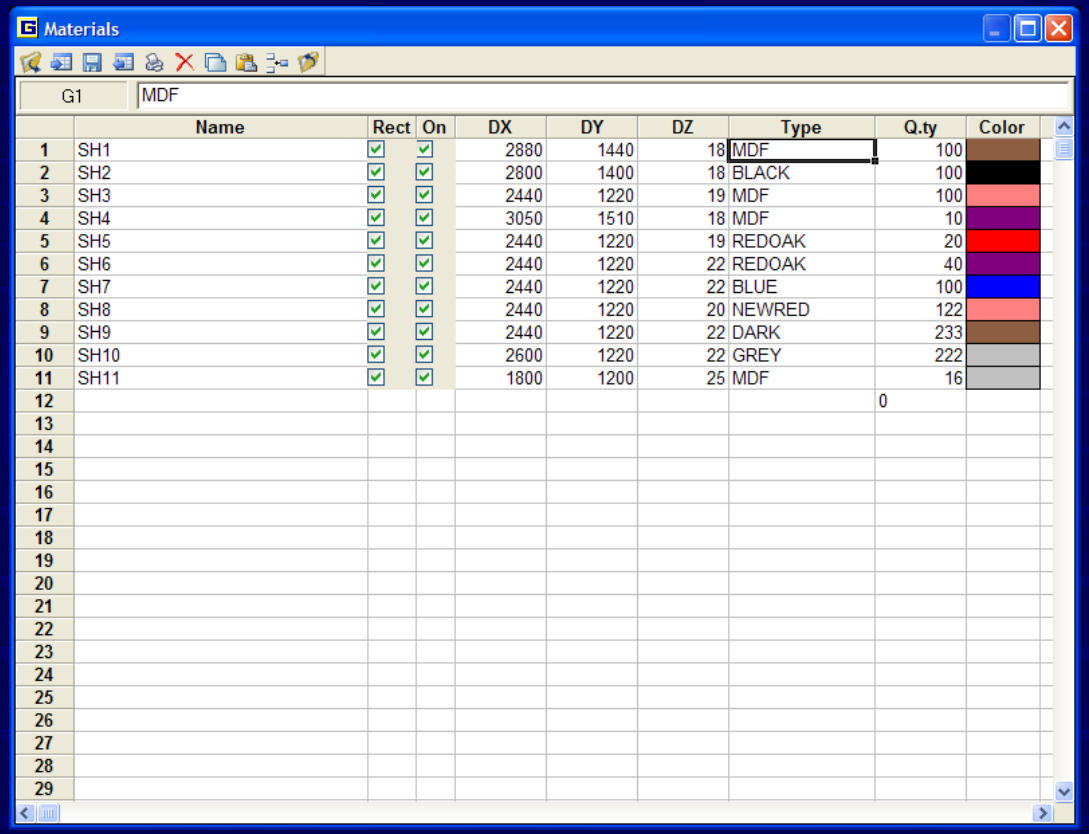
# Options: Parametric Geometries

- Parameterization of drawings with programmed constraints
- Formulas are supported
- Utilization of global or defined local variables available within formulas
- Automatic programming of preset constraints (fixed distances from edges, centering, mirroring, etc..)
- Setting of tangent constraints
- Parametric library



# Options: nesting - sheet archive

- Sheet archive stored in a spreadsheet
- Code, dimensions, type, quantity in stock, drawing color are programmed for each sheet in stock
- Used materials can be automatically downloaded from stock by clicking on a button




| | Name | Rect | On | DX | DY | DZ | Type | Q.ty | Color |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SH1 | ☑ | ☑ | 2880 | 1440 | 18 | MDF | 100 | |
| 2 | SH2 | ☑ | ☑ | 2800 | 1400 | 18 | BLACK | 100 | |
| 3 | SH3 | ☑ | ☑ | 2440 | 1220 | 19 | MDF | 100 | |
| 4 | SH4 | ☑ | ☑ | 3050 | 1510 | 18 | MDF | 10 | |
| 5 | SH5 | ☑ | ☑ | 2440 | 1220 | 19 | REDOAK | 20 | |
| 6 | SH6 | ☑ | ☑ | 2440 | 1220 | 22 | REDOAK | 40 | |
| 7 | SH7 | ☑ | ☑ | 2440 | 1220 | 22 | BLUE | 100 | |
| 8 | SH8 | ☑ | ☑ | 2440 | 1220 | 20 | NEWRED | 122 | |
| 9 | SH9 | ☑ | ☑ | 2440 | 1220 | 22 | DARK | 233 | |
| 10 | SH10 | ☑ | ☑ | 2600 | 1220 | 22 | GREY | 222 | |
| 11 | SH11 | ☑ | ☑ | 1800 | 1200 | 25 | MDF | 16 | |
| 12 | | | | | | | | 0 | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
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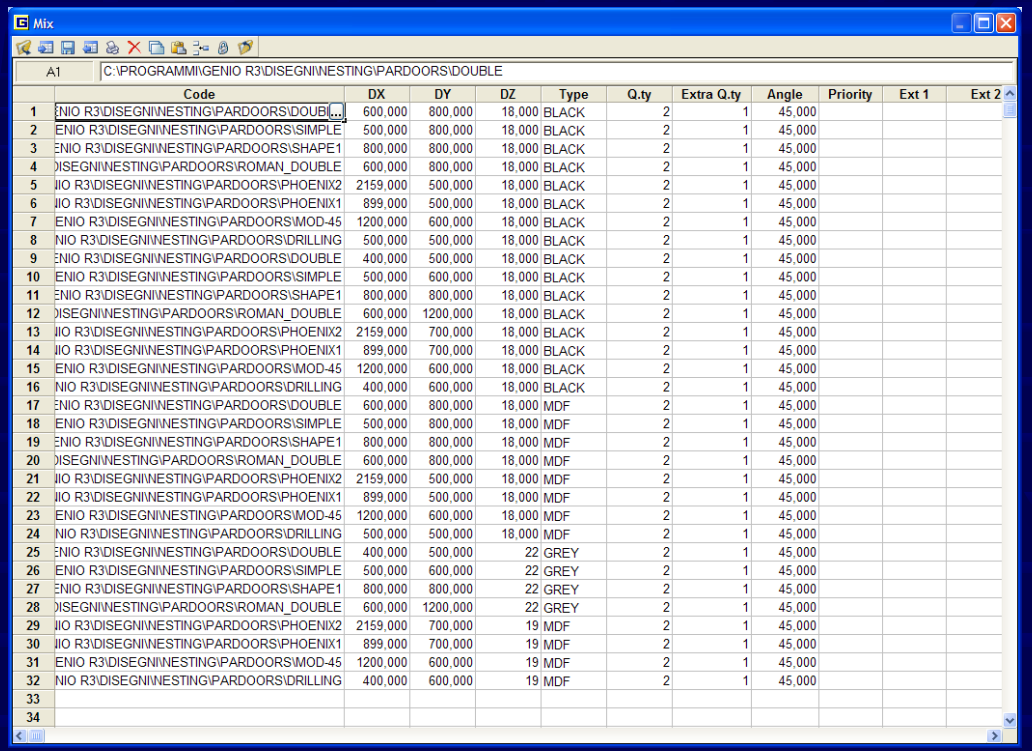
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |

# Options: nesting – panel list

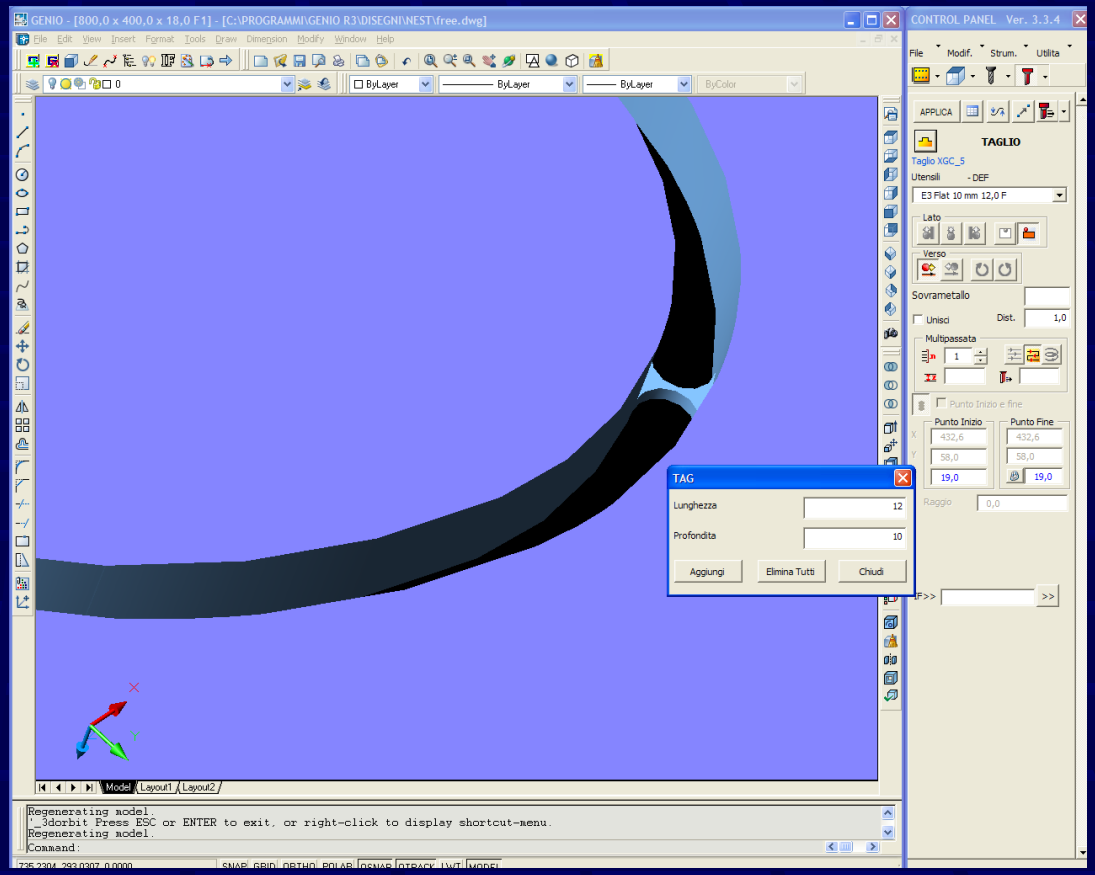
- Panel list of several materials (Multi-job programming).
- Panels of the list are automatically exploded in several homogeneous lists and then nested on boards of the same type and thickness




| | Code | DX | DY | DZ | Type | Q.ty | Extra Q.ty | Angle | Priority | Ext 1 | Ext 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ENIO R3\DISEGNI\NESTING\PARDOORS\DOUBL... | 600,000 | 800,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 2 | ENIO R3\DISEGNI\NESTING\PARDOORS\SIMPLE | 500,000 | 800,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 3 | ENIO R3\DISEGNI\NESTING\PARDOORS\SHAPE1 | 800,000 | 800,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 4 | DISEGNI\NESTING\PARDOORS\ROMAN_DOUBLE | 600,000 | 800,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 5 | IO R3\DISEGNI\NESTING\PARDOORS\PHOENIX2 | 2159,000 | 500,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 6 | IO R3\DISEGNI\NESTING\PARDOORS\PHOENIX1 | 899,000 | 500,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 7 | ENIO R3\DISEGNI\NESTING\PARDOORS\MOD-45 | 1200,000 | 600,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 8 | NIO R3\DISEGNI\NESTING\PARDOORS\DRILLING | 500,000 | 500,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 9 | ENIO R3\DISEGNI\NESTING\PARDOORS\DOUBLE | 400,000 | 500,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 10 | ENIO R3\DISEGNI\NESTING\PARDOORS\SIMPLE | 500,000 | 600,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 11 | ENIO R3\DISEGNI\NESTING\PARDOORS\SHAPE1 | 800,000 | 800,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 12 | DISEGNI\NESTING\PARDOORS\ROMAN_DOUBLE | 600,000 | 1200,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 13 | IO R3\DISEGNI\NESTING\PARDOORS\PHOENIX2 | 2159,000 | 700,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 14 | IO R3\DISEGNI\NESTING\PARDOORS\PHOENIX1 | 899,000 | 700,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 15 | ENIO R3\DISEGNI\NESTING\PARDOORS\MOD-45 | 1200,000 | 600,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 16 | NIO R3\DISEGNI\NESTING\PARDOORS\DRILLING | 400,000 | 600,000 | 18,000 | BLACK | 2 | 1 | 45,000 | | | |
| 17 | ENIO R3\DISEGNI\NESTING\PARDOORS\DOUBLE | 600,000 | 800,000 | 18,000 | MDF | 2 | 1 | 45,000 | | | |
| 18 | ENIO R3\DISEGNI\NESTING\PARDOORS\SIMPLE | 500,000 | 800,000 | 18,000 | MDF | 2 | 1 | 45,000 | | | |
| 19 | ENIO R3\DISEGNI\NESTING\PARDOORS\SHAPE1 | 800,000 | 800,000 | 18,000 | MDF | 2 | 1 | 45,000 | | | |
| 20 | DISEGNI\NESTING\PARDOORS\ROMAN_DOUBLE | 600,000 | 800,000 | 18,000 | MDF | 2 | 1 | 45,000 | | | |
| 21 | IO R3\DISEGNI\NESTING\PARDOORS\PHOENIX2 | 2159,000 | 500,000 | 18,000 | MDF | 2 | 1 | 45,000 | | | |
| 22 | IO R3\DISEGNI\NESTING\PARDOORS\PHOENIX1 | 899,000 | 500,000 | 18,000 | MDF | 2 | 1 | 45,000 | | | |
| 23 | ENIO R3\DISEGNI\NESTING\PARDOORS\MOD-45 | 1200,000 | 600,000 | 18,000 | MDF | 2 | 1 | 45,000 | | | |
| 24 | NIO R3\DISEGNI\NESTING\PARDOORS\DRILLING | 500,000 | 500,000 | 18,000 | MDF | 2 | 1 | 45,000 | | | |
| 25 | ENIO R3\DISEGNI\NESTING\PARDOORS\DOUBLE | 400,000 | 500,000 | 22 | GREY | 2 | 1 | 45,000 | | | |
| 26 | ENIO R3\DISEGNI\NESTING\PARDOORS\SIMPLE | 500,000 | 600,000 | 22 | GREY | 2 | 1 | 45,000 | | | |
| 27 | ENIO R3\DISEGNI\NESTING\PARDOORS\SHAPE1 | 800,000 | 800,000 | 22 | GREY | 2 | 1 | 45,000 | | | |
| 28 | DISEGNI\NESTING\PARDOORS\ROMAN_DOUBLE | 600,000 | 1200,000 | 22 | GREY | 2 | 1 | 45,000 | | | |
| 29 | IO R3\DISEGNI\NESTING\PARDOORS\PHOENIX2 | 2159,000 | 700,000 | 19 | MDF | 2 | 1 | 45,000 | | | |
| 30 | IO R3\DISEGNI\NESTING\PARDOORS\PHOENIX1 | 899,000 | 700,000 | 19 | MDF | 2 | 1 | 45,000 | | | |
| 31 | ENIO R3\DISEGNI\NESTING\PARDOORS\MOD-45 | 1200,000 | 600,000 | 19 | MDF | 2 | 1 | 45,000 | | | |
| 32 | NIO R3\DISEGNI\NESTING\PARDOORS\DRILLING | 400,000 | 600,000 | 19 | MDF | 2 | 1 | 45,000 | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |

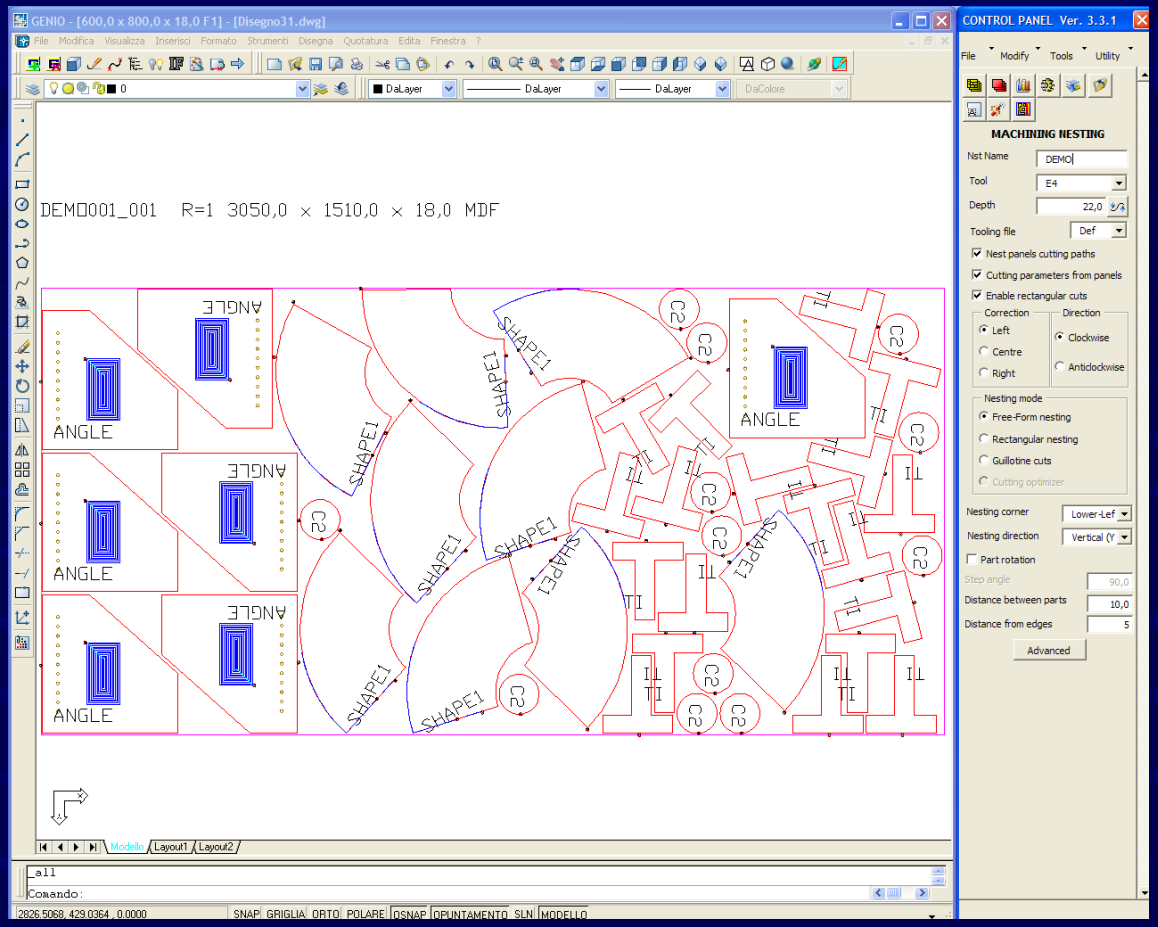
# Options: nesting – Tagging

- Tags programming to avoid movements of smaller pieces
- It's possible to program length and depth of tags



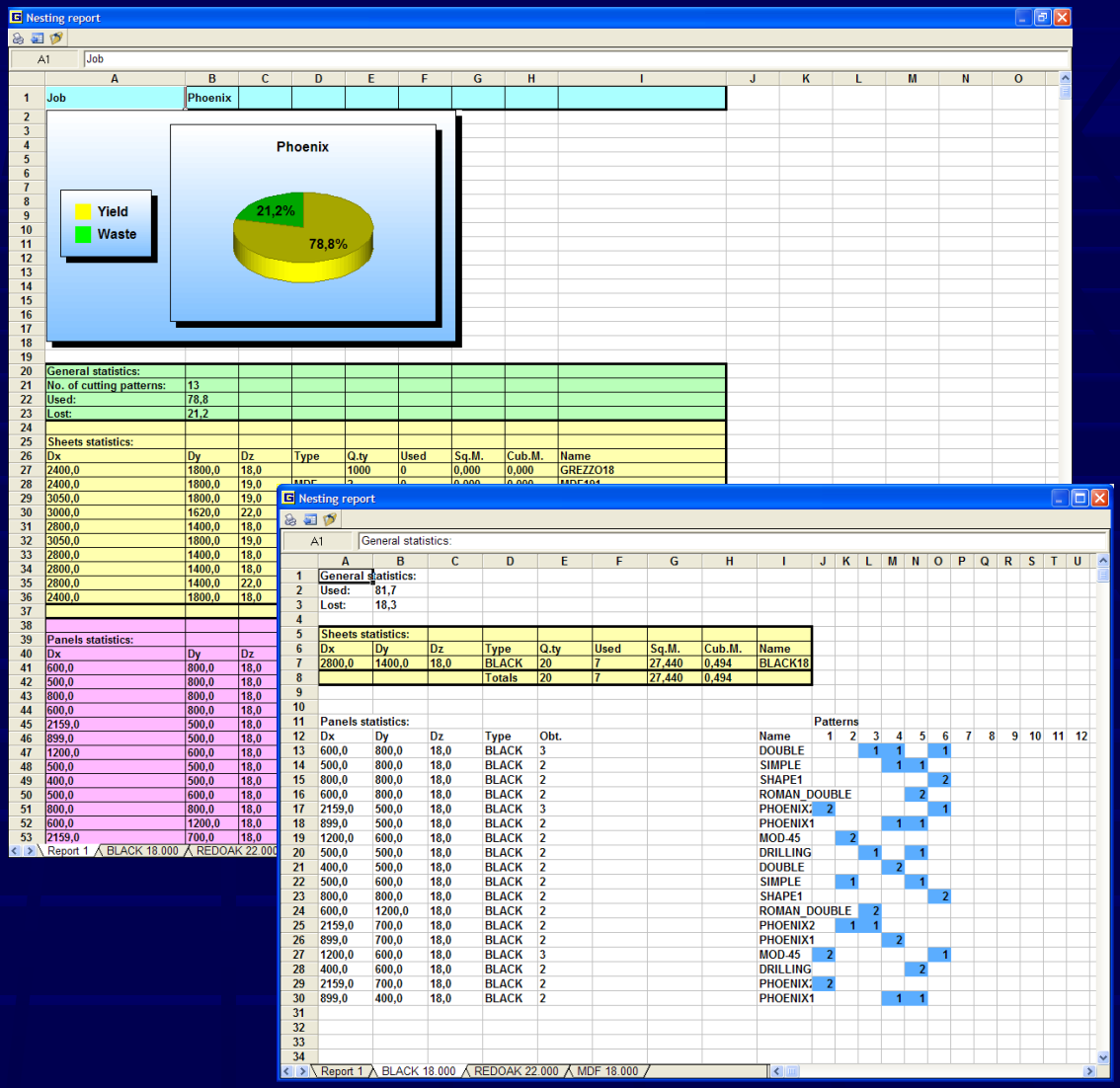
# Options: nesting – optimization

- Any Shape Nesting
- Rectangular Nesting
- Tags programming to avoid movements of smaller pieces
- Nesting of parametric panels
- Possibility of adding cuts to computed nesting patterns in order to obtain and save larger and regular off-cuts
- CNC Output with optimized code



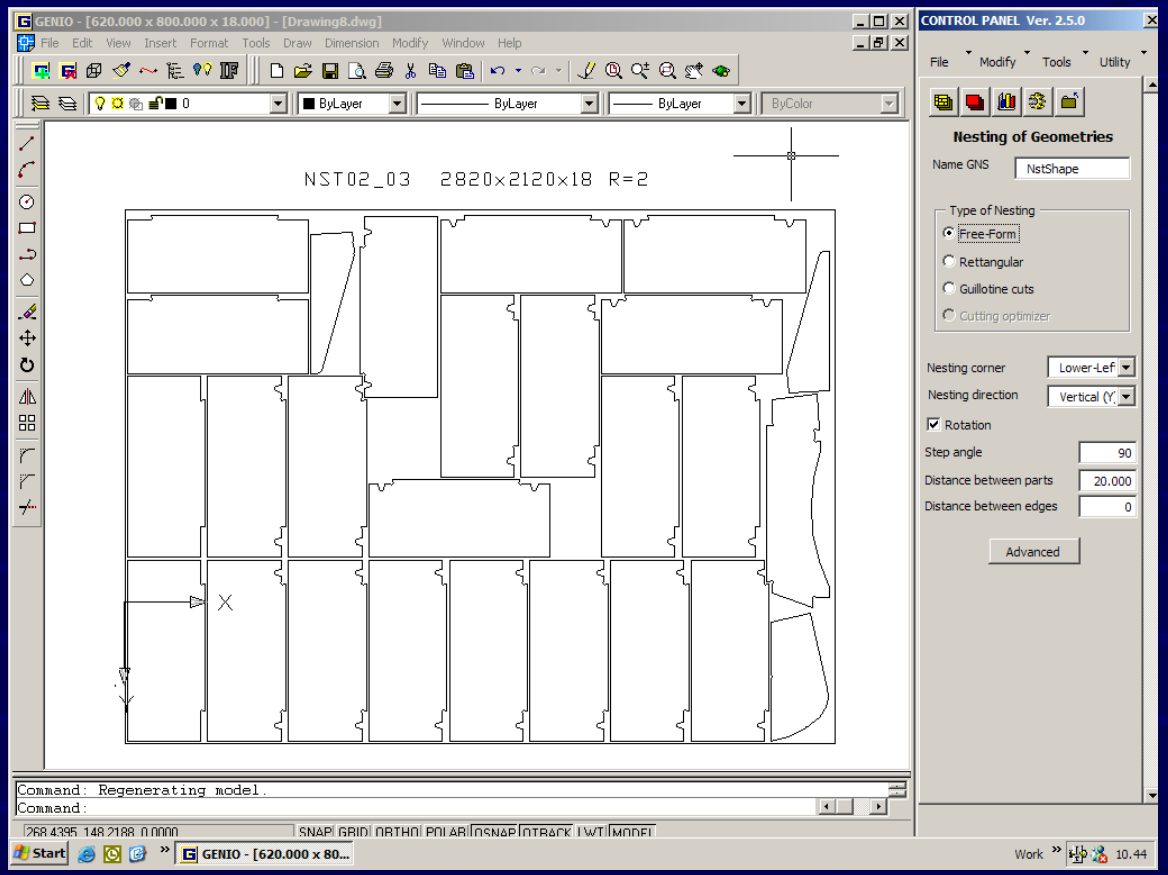
# Options: nesting – other features

- New report with Excel workbook compatibility
- General statistics spreadsheet
- Spreadsheet report for each optimized material



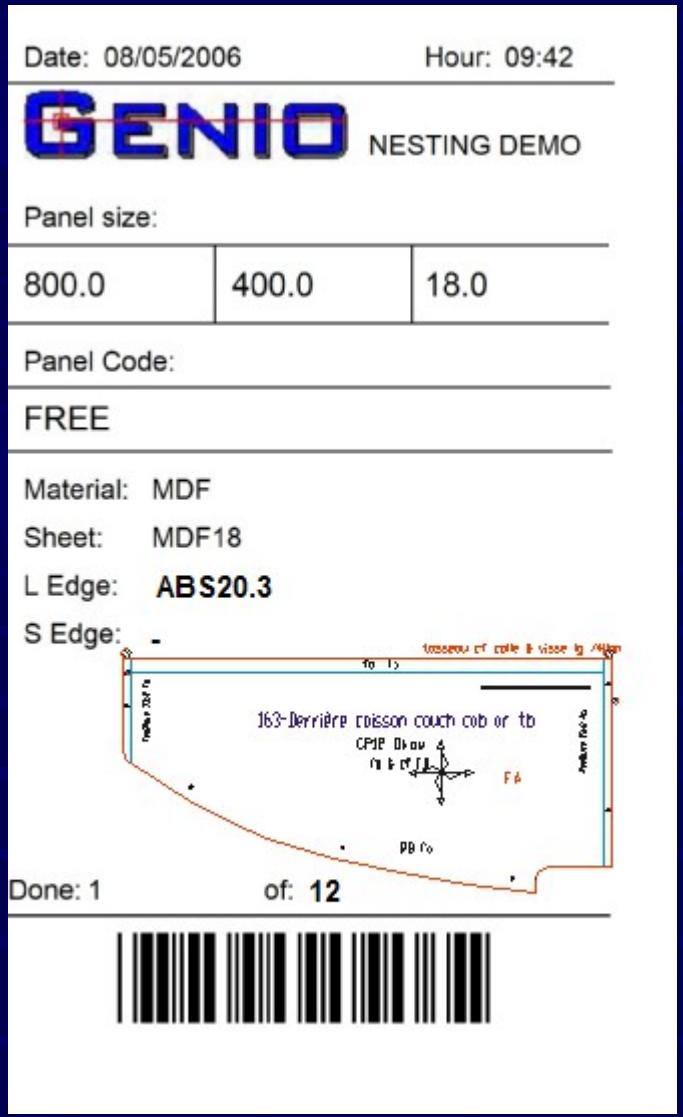
# Options: nesting - nesting geometries

- Filling of any-shape multiple sheets with any-shape geometries by optimizing the total waste.
- Part list programming
- Sheet list programming
- Programming of parameters such as distance between parts, part rotation, part priority
- Manually override the nesting patterns
- The obtained nesting drawings can be saved and then programmed as well as common panels



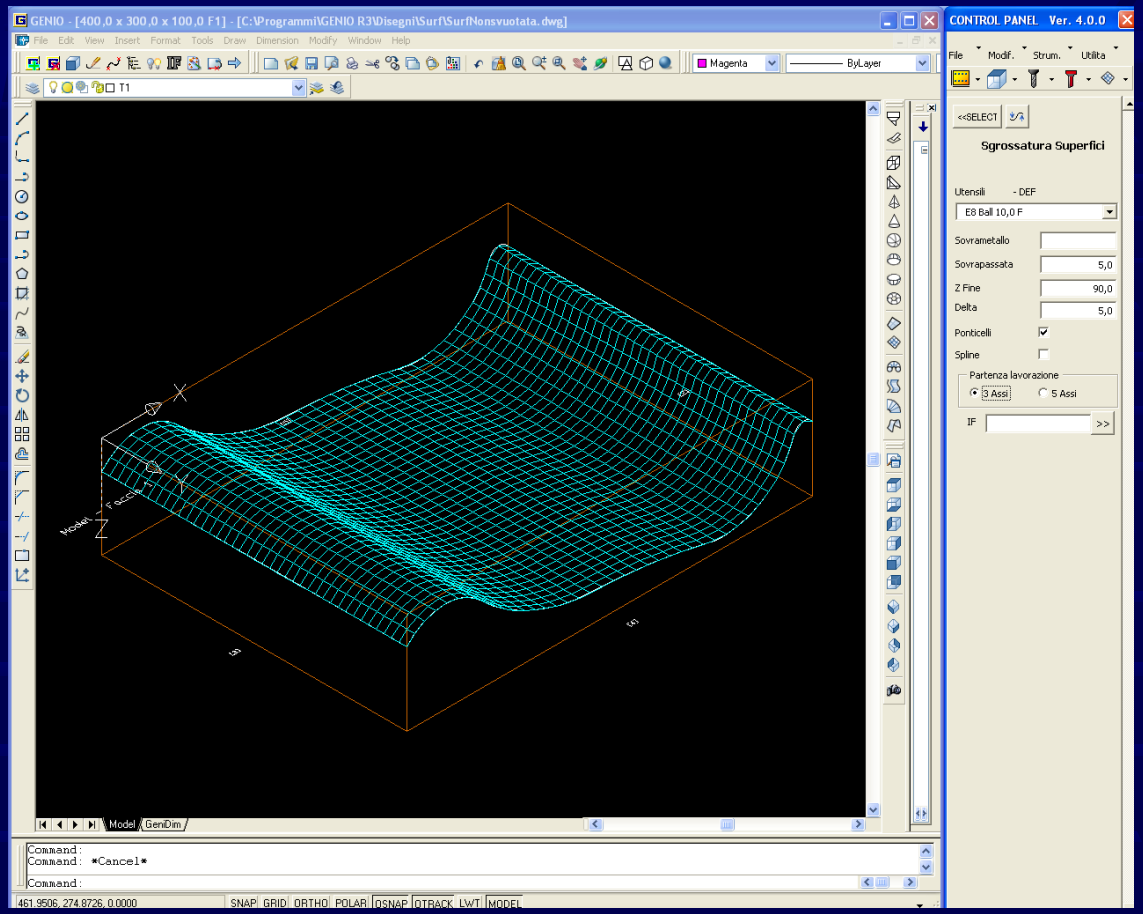
# Options: nesting – Label printing

- Printing of default data (dimensions, codes, quantity, etc…)
- Printing of extra data (it's possible to print up to 36 Extra fields for each panel)
- Printing of panel drawings



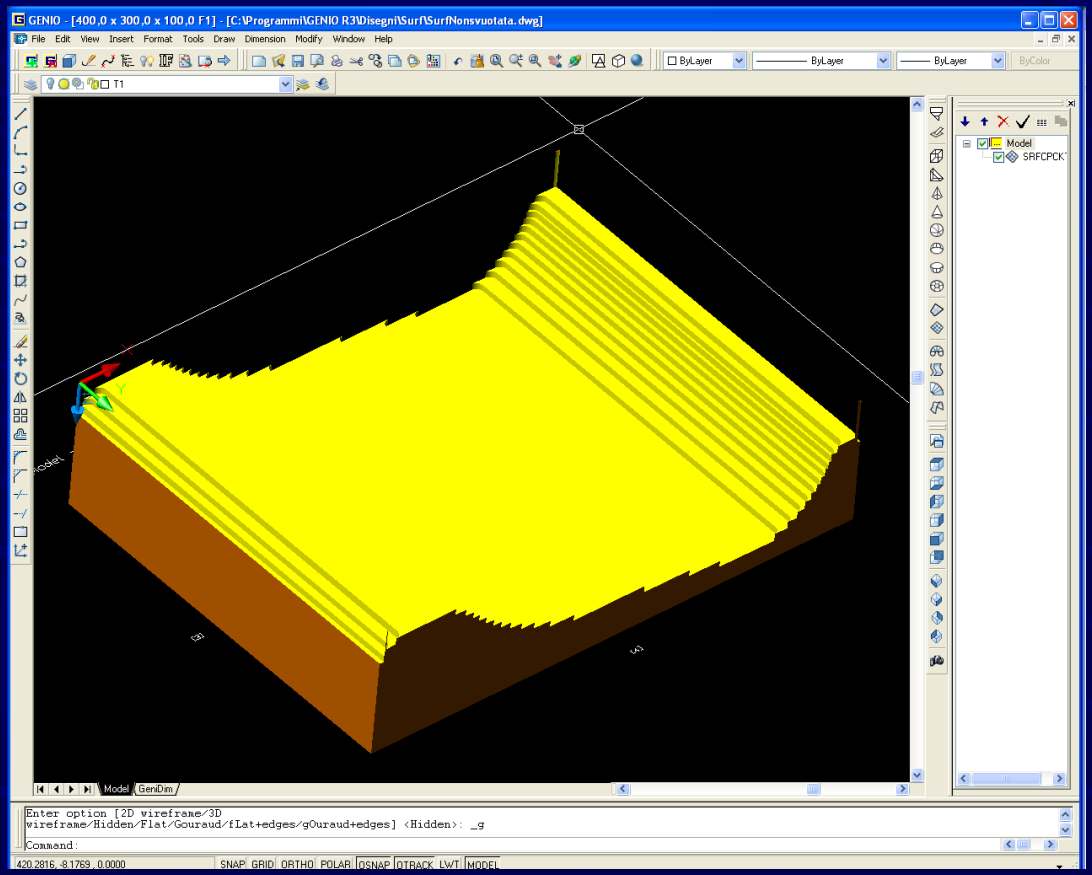
# Options: Surface machining

- Surface definition
- It's possible to import Dxf Files



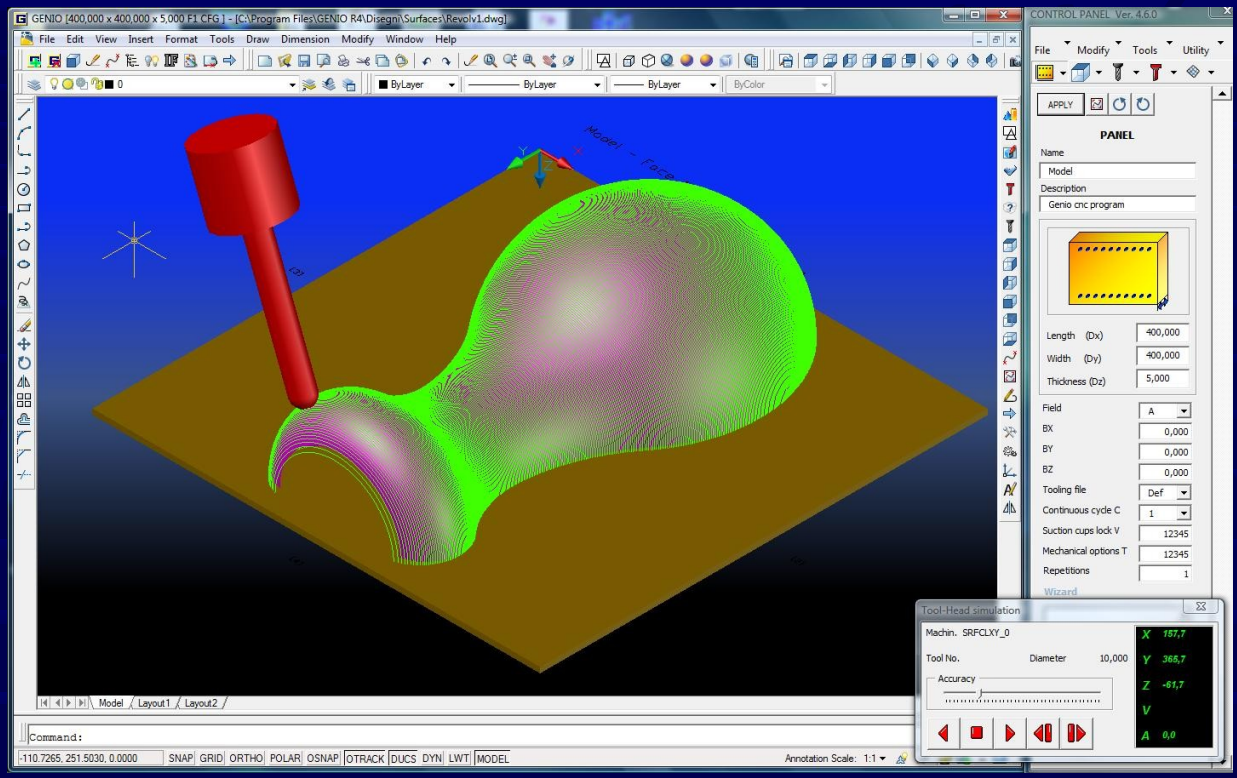
# Options: Surface roughing

- Material reduction by multi-depth concentric pocketing
- It’s possible to program the overmaterial, the Z-step between passages, etc…



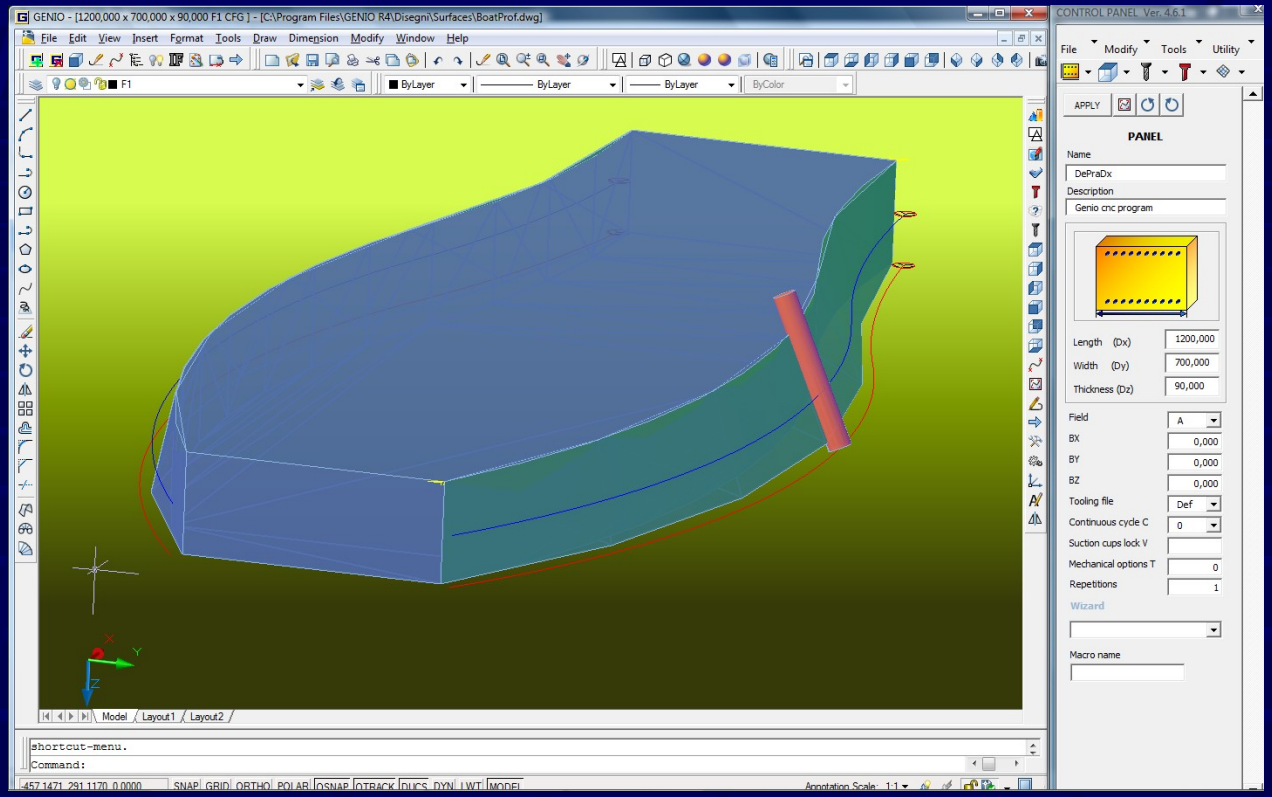
# Options: Surface finish

- Surface finish with 3 or 5 axis milling
- It's possible to program the overmaterial, the milling direction, the angle phase, etc…



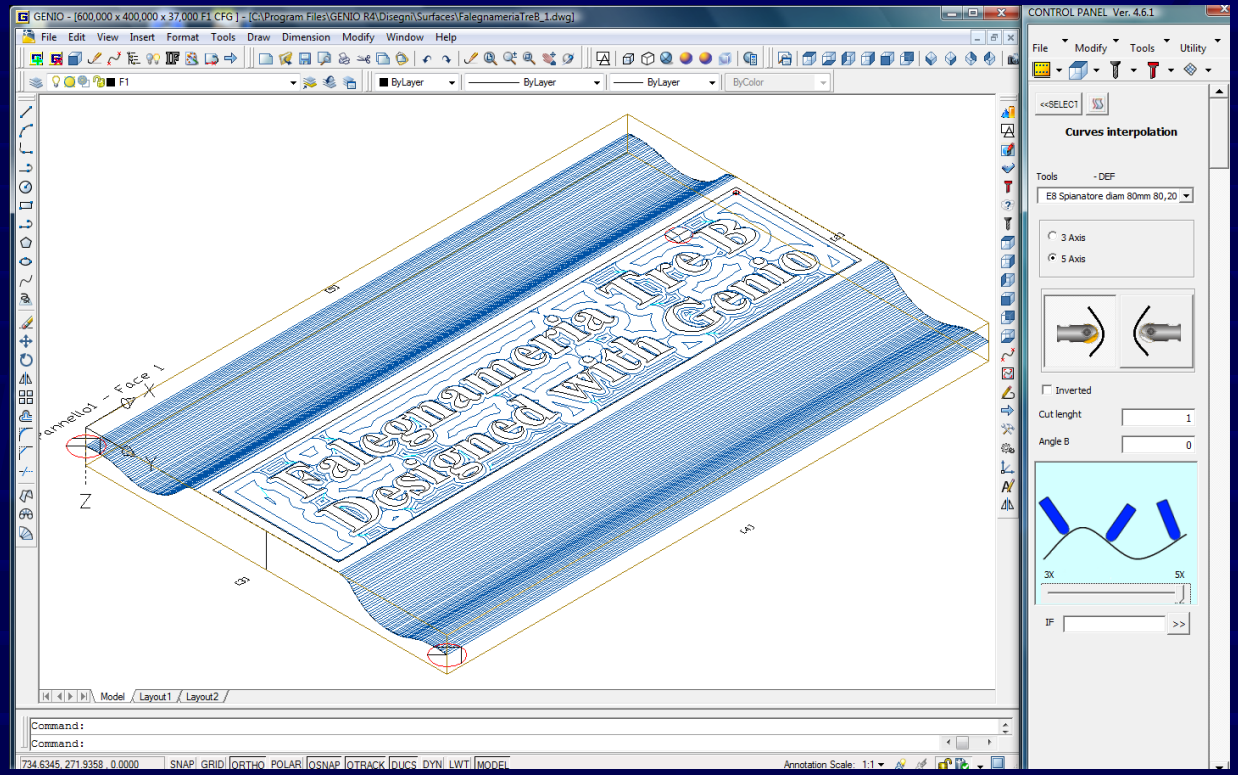
# Options: Tool-side machining 5-Axis

- Machining of surfaces with the tool side
- 5-Axis interpolation
- Multi-pass
- Choice of the side to machine



# Options: Interpolation of curves

- Machining of lines, arcs, polylines, etc…with automatic 3 or 5 Axis interpolation
- The original tool path can be aligned with AutoCad commands (Copy, Array, Rotate, etc…) or along a direction polyline.
- Text, paths and logos milling on existing surfaces



# Options: Machine simulation

- Virtual 3D machine simulation.
- Tool path visualization
- Movements of the tool head
- Suction cups positioning
- Zoom, pan, rotation, transparency.
- Machining information
- Material removing