

The CNC miller's Christmas tree



Milled Christmas tree

An alternative Christmas tree to put on your table, give as a present or present as a CNC miller's statement piece.

The workpiece is milled from an aluminum plate. The outer contour is created in the contour editor and machined using the contour milling cycles with residual material detection. The engraving cycle allows you to turn your Christmas tree into a special gift by adding your best wishes or a funny saying.

All of the information required for production, drawings, tool data and workplans are compiled in the following.

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1. Safety Note

Working with machines is always associated with numerous hazards. It is therefore imperative that the legal and company safety regulations are also observed during the production of the Christmas tree.

2. Preliminary remark

The following description is intended for persons acquainted with CNC machines and who have experience with or knowledge of SINUMERIK CNCs. All the technical data listed here corresponds to the machines, tools, materials, machining plans and drawings used to produce the prototype. Because of the widely varying conditions in other workshops, this data is only of exemplary character for a reproduction. Nevertheless, a problem-free reproduction should be possible in most cases.

The programs were created and tested using a CNC milling machine equipped with SINUMERIK Operate V4.5 SP2. It should be possible to easily adapt the program to other SINUMERIK versions (e.g. different SINUMERIK Operate SW versions). Usually these programs are not downward compatible as new cycles often require additional parameters not yet available in older versions. These must then be added manually. A simulation and necessary changes (e.g. zero points) should always be carried out.

You can download all the CAD drawings, programs and machining descriptions for the workpieces free of charge at **www.siemens.com/cnc4you**.

The following files and formats are available there:

NC programs ShopMill, drawings PDF

Christmas tree, milled

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3. Workpiece blank

- AlCu4PbMg, plate ca. 105x100x35

4. Milling machine and machining plan

- CNC milling machine DMG MORI HSC 30 linear, Siemens 840D sl - SINUMERIK Operate V4.5 SP2
 - ShopMill machining plans
 - TB_2_MILL_TLv1_S1.MPF
 - TB_2_MILL_TLv1_S2.MPF
 - tool list TB_2_MILL_TLv1_S2_TMZ.INI
- The machining plans are available as download for the software version V4.5 SINUMERIK Operate SP2.

5. Tools used

Drilling and milling tools for machining both sides of the parts.

Tools for milling machine

Tool name in the machining plan	Designation
SCHAFT_D10	End mill Ø10 mm, three-side trimmer
SCHAFT_D4	End mill Ø4 mm, two-side trimmer
FASER_D12_4SN	Chamfer cutter Ø12mm, 90°
SF12_VHM_4SN	Solid carbide end mill Ø 12 mm, four-side trimmer
VHM_D4	Solid carbide twist drill Ø 4 mm

6. Milling the Christmas Tree

The Christmas tree is made from one piece. Both, the front and the back are machined.

The blank is clamped. Start by face milling the workpiece. Then, create the rough contour of the Christmas tree using the contour milling cycles and the Ø10 mm cutter, and rework the contour with the residual material cycle and the Ø4 mm cutter. Use the same tool to finish the bottom and the edge of the contour.

The contour is chamfered using the path milling cycle and the chamfer option. Now is the time to add an individual engraving. Afterwards the workpiece is milled over once again.

Christmas tree, milled

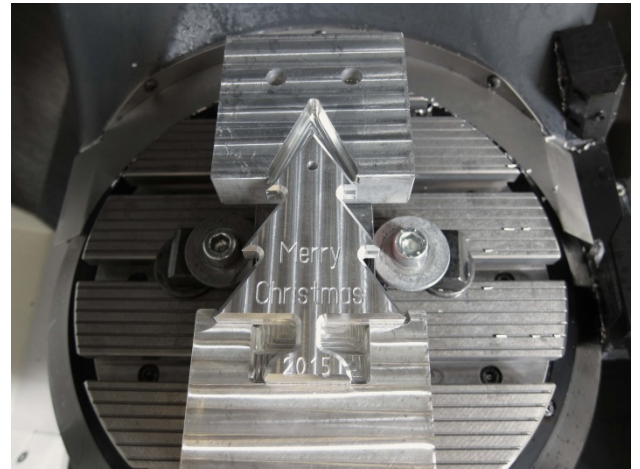
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As a next step the workpiece is reclamped, so that the back can be machined. This requires a clamping device. One option is to machine the contour of the Christmas tree in soft collet chucks, or the Christmas tree can be fixed to the table using two screws. Any holes have to be added before the workpiece is turned over. The example uses soft collet chucks.

When machining the back, the contour can be remilled again to half the thickness of the workpiece or face milling is used until the contour is visible. Depending on the thickness of the Christmas tree, this has to be taken into consideration when machining the front. The contour is chamfered and the engraving is added.

And now you can do it all over again.



Work steps at the milling machine (front page)

1. Approach the reference point of the machine
2. Read-in the workplan: TB_2_MILL_TLv1_S1.MPF
3. Read-in the tool list or zero offsets TB_2_MILL_TLv1_S2_TMZ.INI
4. Measure tools and enter them in the tool list
5. Insert tools in magazine
6. Clamp the workpiece
7. Set tool zero point, by scraping
8. Program of zero offsets
9. Perform simulation
10. Start production, process workplan

Christmas tree, milled

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Work steps at the milling machine (back)

1. Approach the reference point of the machine
2. Read-in the workplan: TB_2_MILL_TLv1_S2.MPF
3. Read-in the tool list or zero offsets TB_2_MILL_TLv1_S2_TMZ.INI
4. Measure tools and enter them in the tool list
5. Insert tools in magazine
6. Clamp the workpiece (Chuck or screws)
7. Set tool zero point, by scraping
8. Program of zero offsets
9. Perform simulation
10. Start production, process workplan

7. Information on the Internet

Design of the parts, creation of the drawings, development of the machining plans for machining

MOSER CNC-Training

www.moser-cnc-training.de/

and

TAC Technology and Application Center

Frauenauracher Str. 80

91056 Erlangen

Details of the tool machine and tools to be used

DMG MORI High Speed Cutting precision center

Internet: www.dmgmori.com

Manuals and information from the Siemens AG

Manuals and detailed information about our products, please visit the following websites:

- DOConWEB (www.automation.siemens.com/doconweb)
- Service&Support Portal (www.support.automation.siemens.com)
- SINUMERIK website (www.siemens.com/sinumerik)

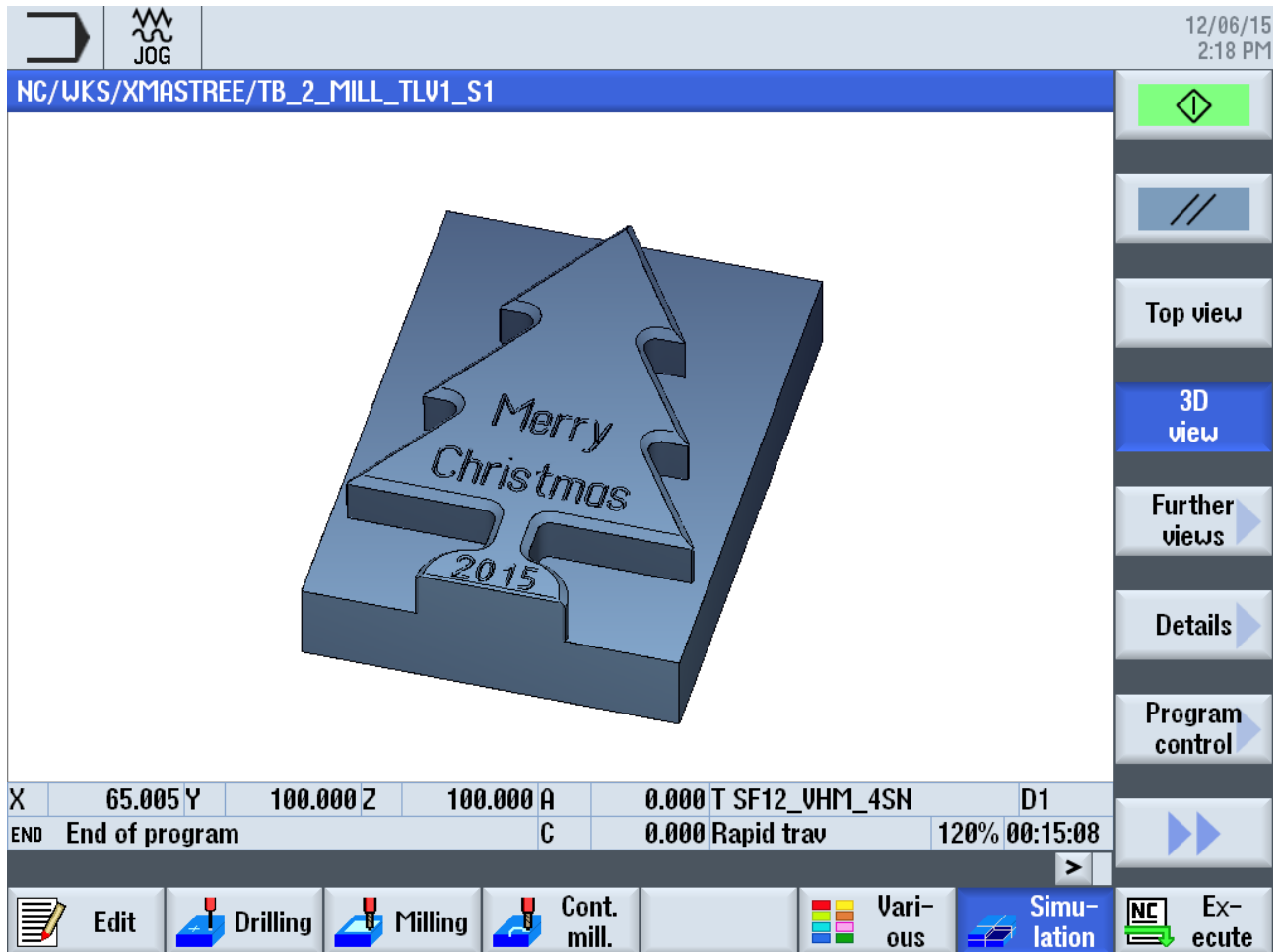
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8. Pictures

Simulation side 1

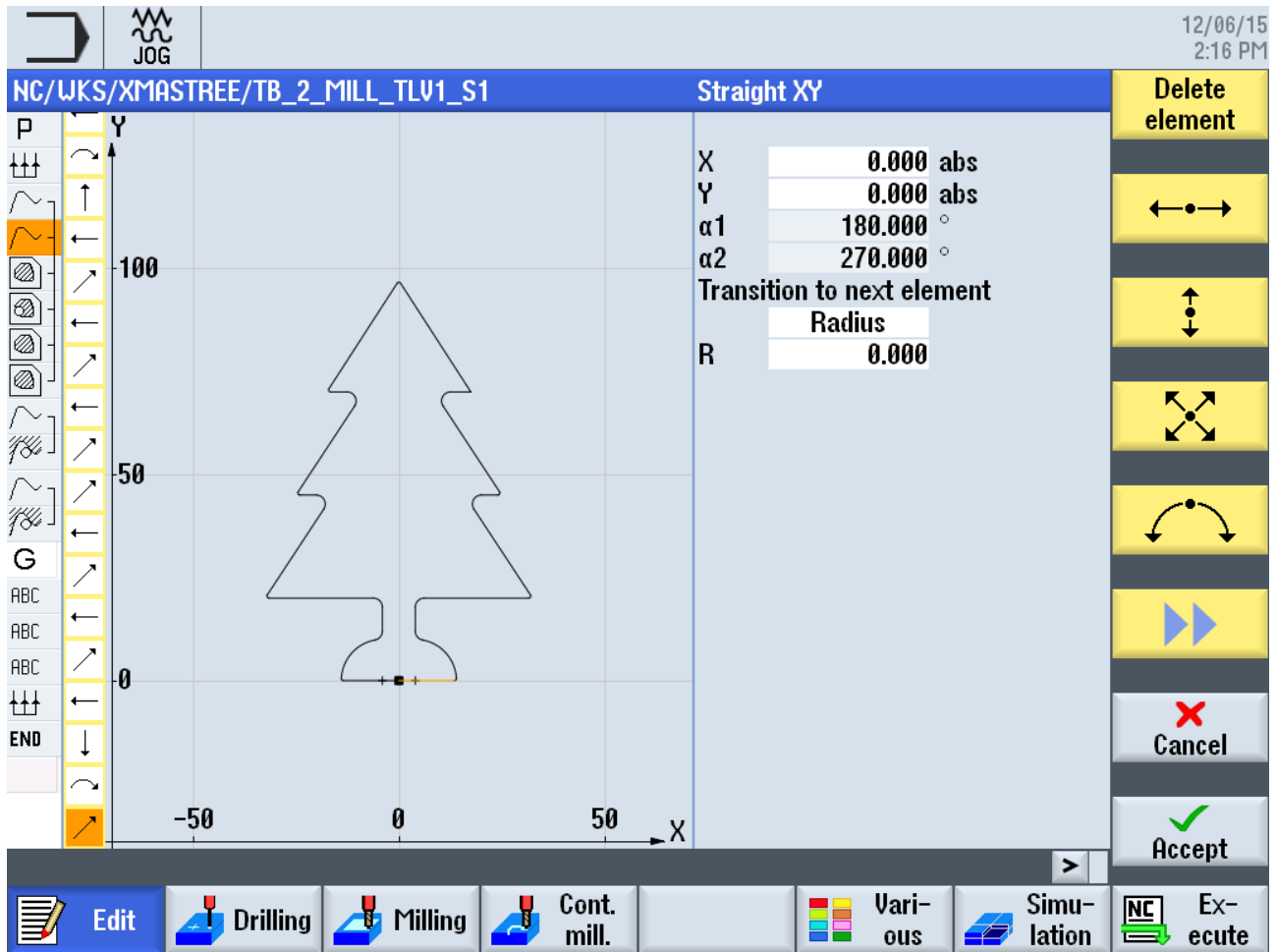


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Contour










ShopMill program










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NC/WKS/XMASTREE/TB_2_MILL_TLV1_S1 1

P	Program header	Block G513
↑↑↑	Face milling	T=SF12_VHM_4SN F0.1/t V=450m X0=-35 Y0=0 Z0=10
~	Contour	ROHZAPFEN
~	Contour	BAUM
⊗	Mill spigot	T=SCHAFT_D10 F0.1/t V=450m Z0=0 Z1=10inc
⊗	Spigot resid.mat.	T=SCHAFT_D4 F0.015/t V=400m Z0=0 Z1=10inc
⊗	Mill spigot	▽▽▽U T=SCHAFT_D4 F0.015/t V=400m Z0=0 Z1=10inc
⊗	Mill spigot	▽▽▽B T=SCHAFT_D4 F0.015/t V=400m Z0=0 Z1=10inc
~	Contour	BASIS
⌘	Path milling	Cham. T=FASER_D12_4SN F2000/min S=20000rev FS0.5 ZFS2inc
~	Contour	BAUM_FASEN
⌘	Path milling	Cham. T=FASER_D12_4SN F2000/min S=20000rev FS1.5 ZFS2inc
G	; GRAVUR	
ABC	Engraving	"Merry"
ABC	Engraving	"Christmas"
ABC	Engraving	"2015"
↑↑↑	Face milling	T=SF12_VHM_4SN F0.075/t V=500m X0=-35 Y0=0
END	End of program	
Total time: 15:46.7		

 Edit
  Drilling
  Milling
  Cont. mill.
  Vari-ous
  Simu-lation
  Ex-ecute

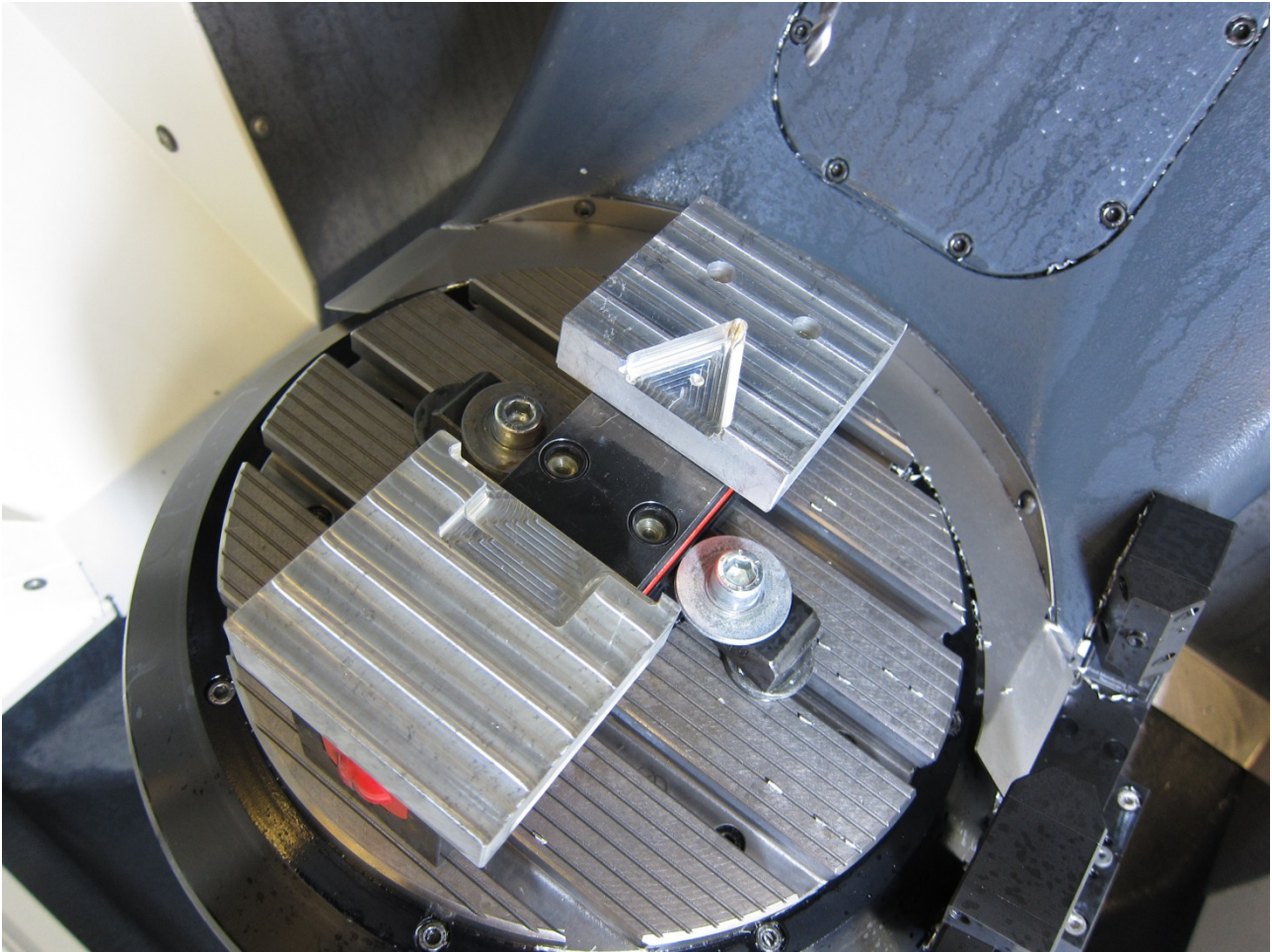
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Clamping



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