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SINUMERIK live: DXF application

Quicker from drawing to component
Possibilities and limits

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SINUMERIK live
Application technology explained in an easily understandable way

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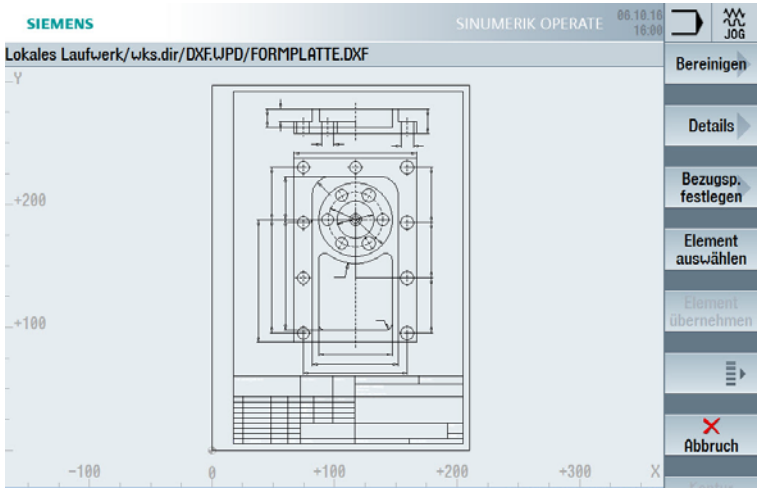
Series of videos with the aim of presenting individual topics on the practical use of SINUMERIK within a short time!

Consists of short slide presentations and **practical application**!

DXF application

Quicker from drawing to component – Possibilities and limits



DXF application
Quicker from drawing to component - Possibilities and limits

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1 What is DXF?
- 1.1 Data format
- 1.2 Create DXF data
- 1.3 Readable DXF formats in CNCs

2 Why have a DXF reader on the CNC?

3 How does the DXF reader work on SINUMERIK?
- 3.1 Practical example
- 3.2 Functions of the DXF reader on SINUMERIK
- 3.3 Application at a glance

4 Possibilities and limits of the SINUMERIK DXF reader
- 4.1 Possibilities
- 4.2 Limits

5 Summary

1 What is DXF?
Data format

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Drawing Interchange File Format **(DXF):**
DXF is a **file format** specified by Autodesk for **CAD data exchange** which has been integrated in the **CAD** program AutoCAD.

Drawing Interchange File Format **(DXF):**
The derivation of the designation **DXF** from "**D**ata e**X**change **F**ormat" is admittedly obvious and customary - but incorrect.

DXF as a standard format
This interface has established itself in the **CAD** market as a quasi data exchange standard, although it was not developed by Autodesk with that intention.

DXF as a standard format
The DXF format was described and openly documented by Autodesk. This documentation was then taken over by other **CAD/CNC/CAM** manufacturers as an interface.

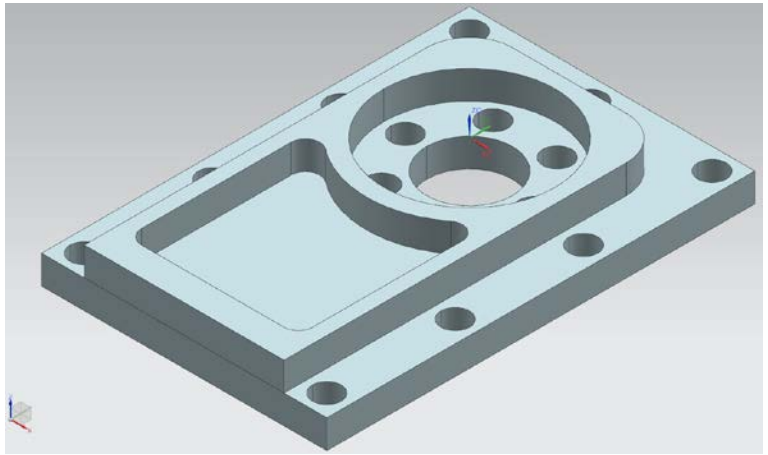
DXF as a standard format
Each **CAD** and **CAM** program manages the import and export of **DXF**, whereby **DXF** as an industry standard forms the lowest common denominator of all **CAD** systems.

DXF as a standard format
The **DXF** format is almost exclusively used for inter-program data exchange - and also between different operating systems.

DXF data:
DXF files are fundamentally dimensionless, so that the user of an external **DX** file must know the unit used in the drawing.

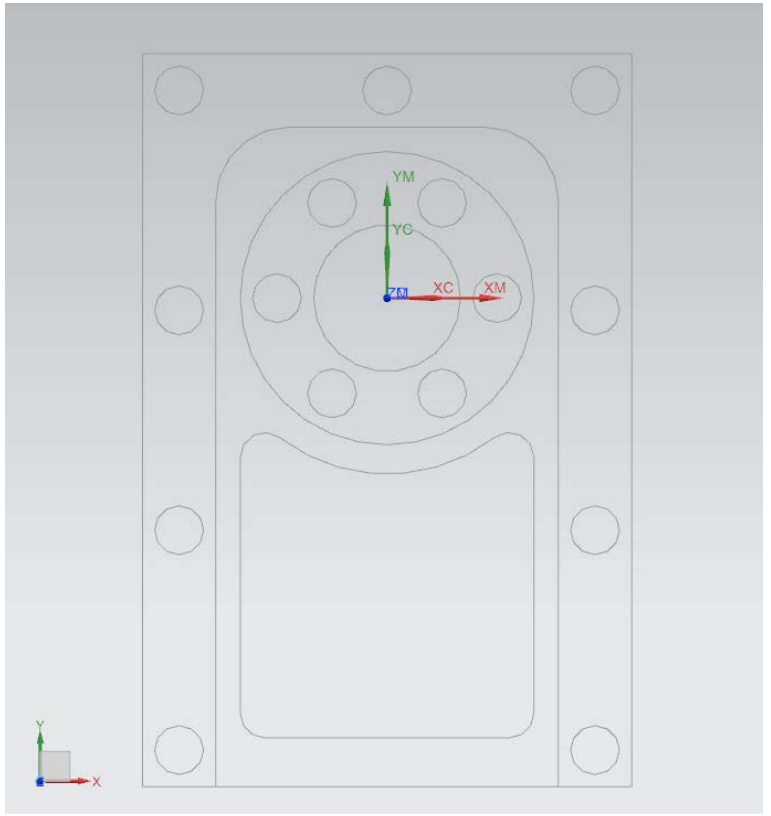
DXF data:
All elements that are useful and implementable for technical drawings are supported in **DXF**.

1 What is DXF?
Creating DXF data



Volume model

Converting in DXF



2D model
consisting of lines and curves

1 What is DXF?
Readable formats of DXF readers in CNCs

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As a rule, DXF readers can read in all 2D geometry elements (points, lines, curves).

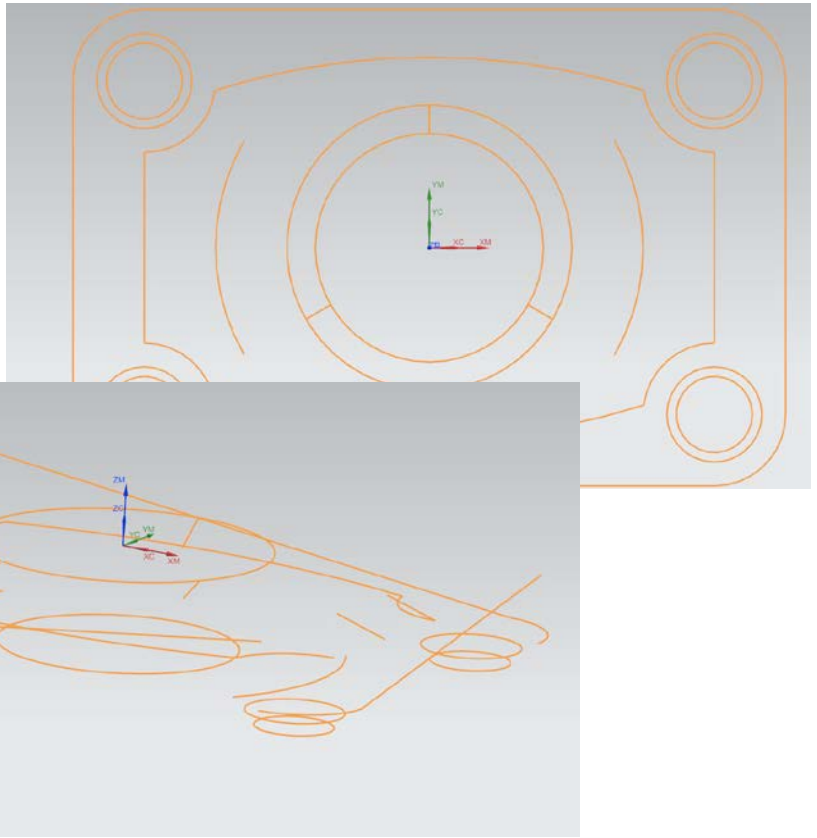
Typical limits of DXF readers:

Not all functions are fully supported by all manufacturers

→ Data loss during exchange via DXF

Examples of non-readable data

- Splines implemented in DXF
- 3D DXF
- DWG
- Diametric and isometric views of DXF

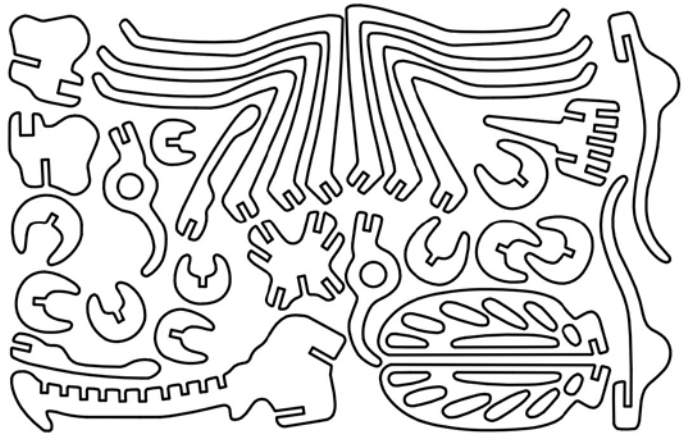


2 Why have a DXF reader on the CNC?

In SINUMERIK/SinuTrain, DXF data is loaded **directly into the control**, so that the turning and milling contours can be created **more quickly and be programmed natively.**

This new function as from software version 4.7 enables
the contour to be generated directly from the DXF data or the G code to be created.

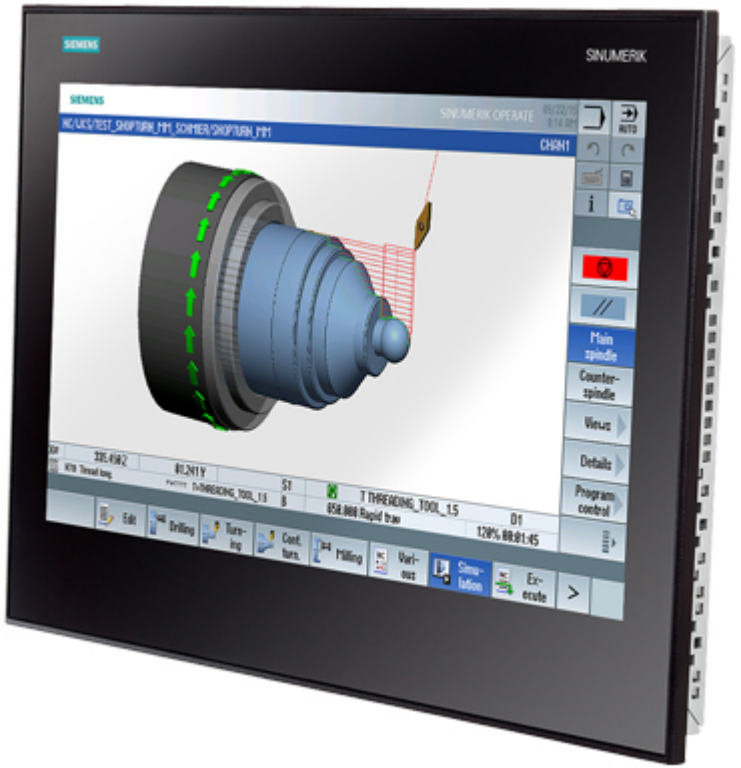
- Complicated calculations of intersections, angles, radius and circle center points are completely eliminated
- DXF data can be used both in ShopMill/ShopTurn as well as in the G code/programGuide
- The time required to read in simple and complex contours is equally short



3 How does the DXF reader work on SINUMERIK?
Practical example

DXF reader integrated as a new function as from SW 4.7 - simple (and) practical

3 How does the DXF reader work on SINUMERIK?
Functions of the DXF reader on SINUMERIK

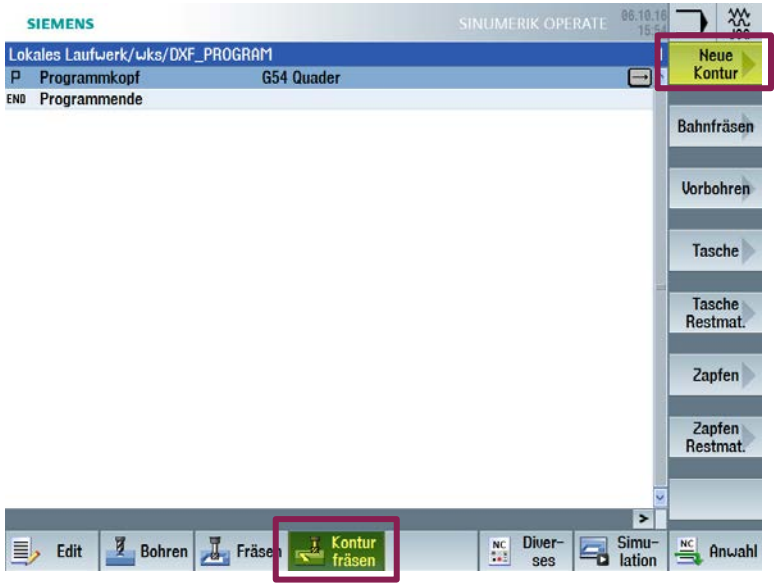


Functions:

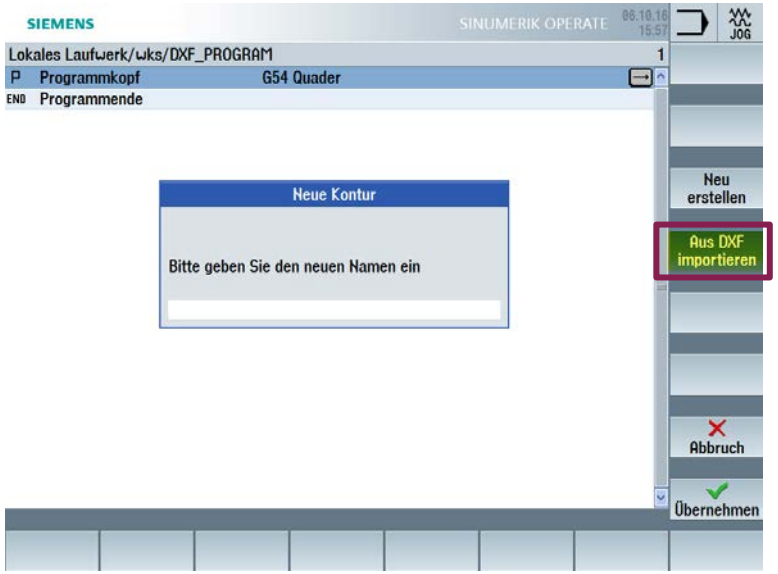
- Checking the drawing
- Checking the component
- Managing layers
- Managing geometric elements
- Reading geometric elements
- Generating a contour
- Transformation into movement commands

3 How does the DXF reader work on SINUMERIK?
Overview of application

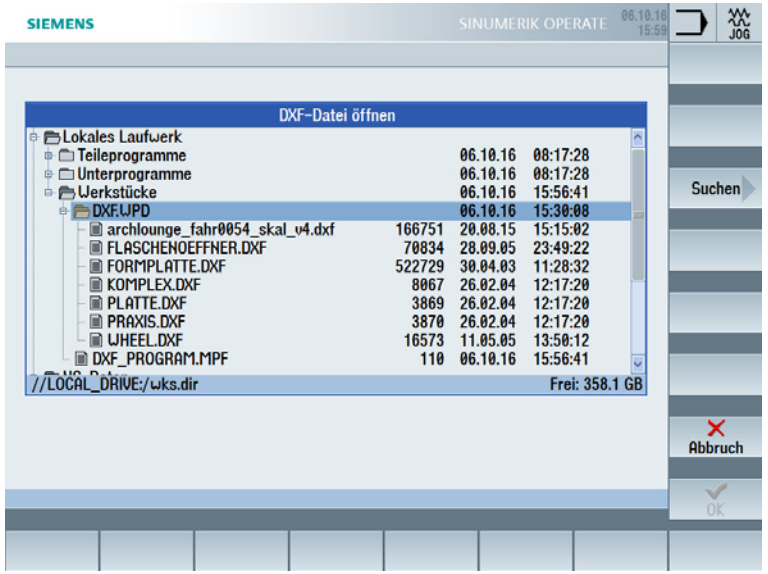
Contour milling→ New contour



Select "Import from DXF"

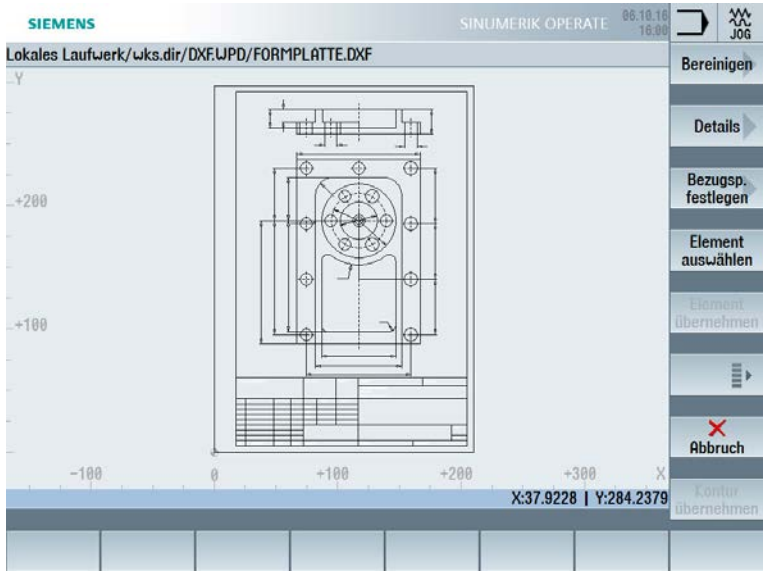


Select DXF file in the program manager

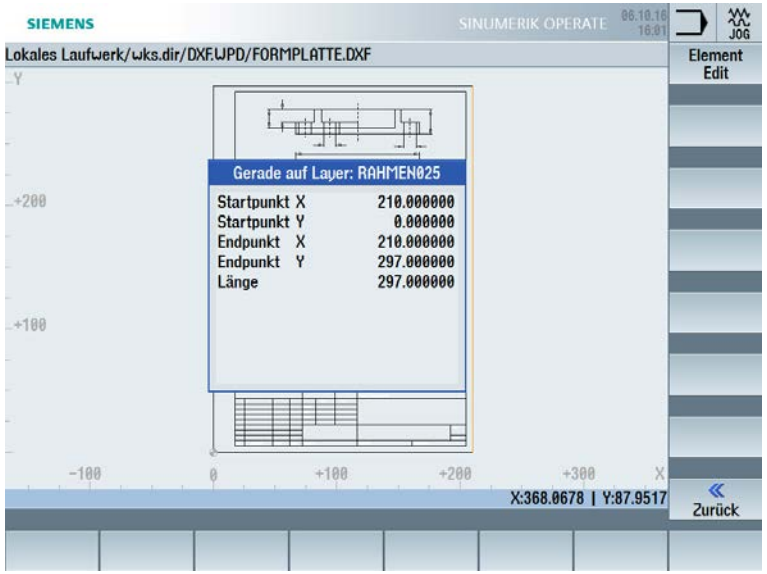


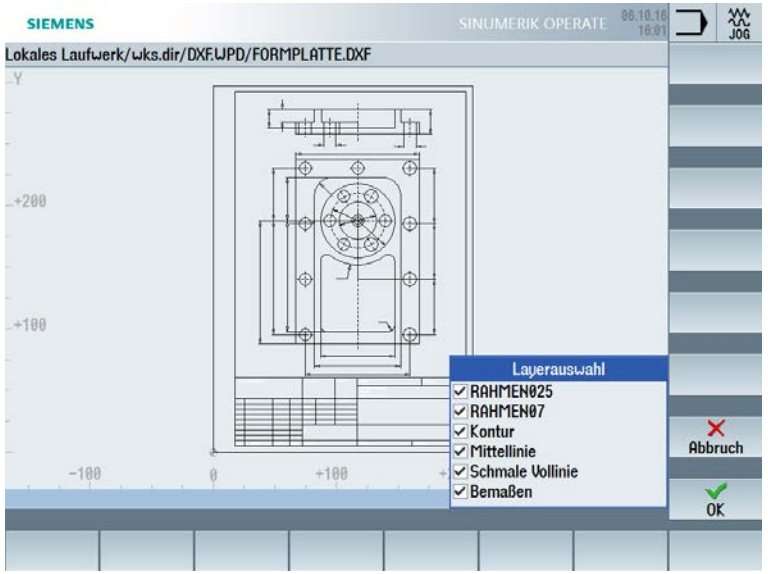
3 How does the DXF reader work on SINUMERIK?
Overview of application

The DXF file is displayed



Checking the layers and geometric properties and completeness of the contour





3 How does the DXF reader work on SINUMERIK?
Overview of application

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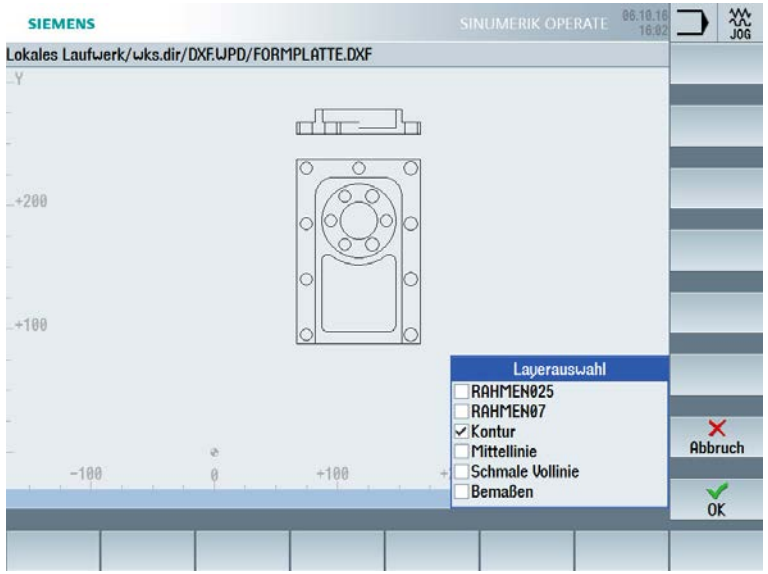
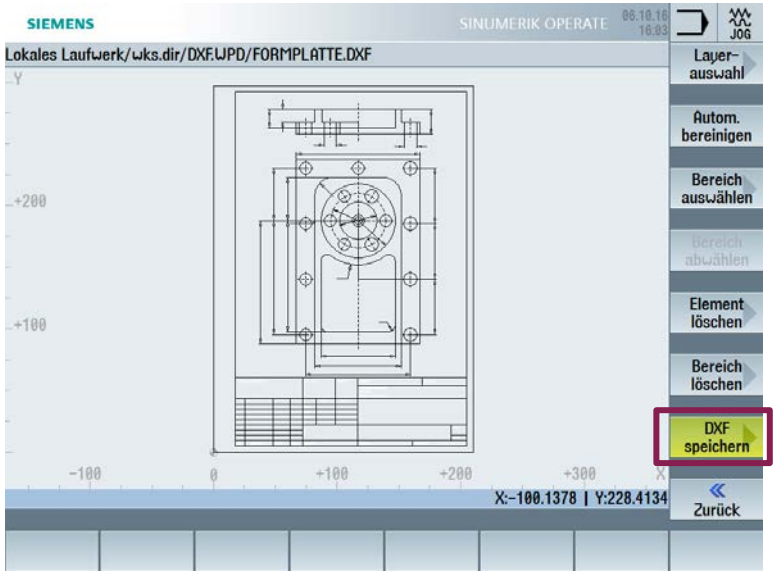
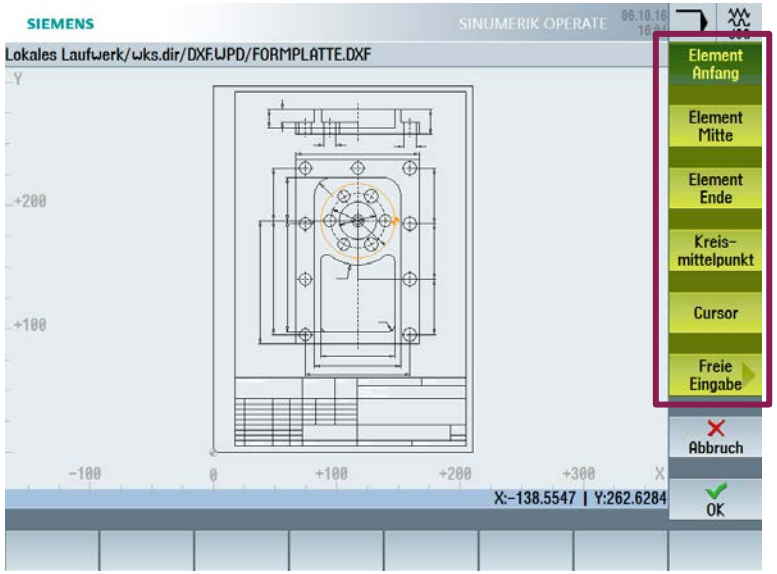
Layer: Unnecessary elements can be hidden



If required: The DXF data from the control can be saved

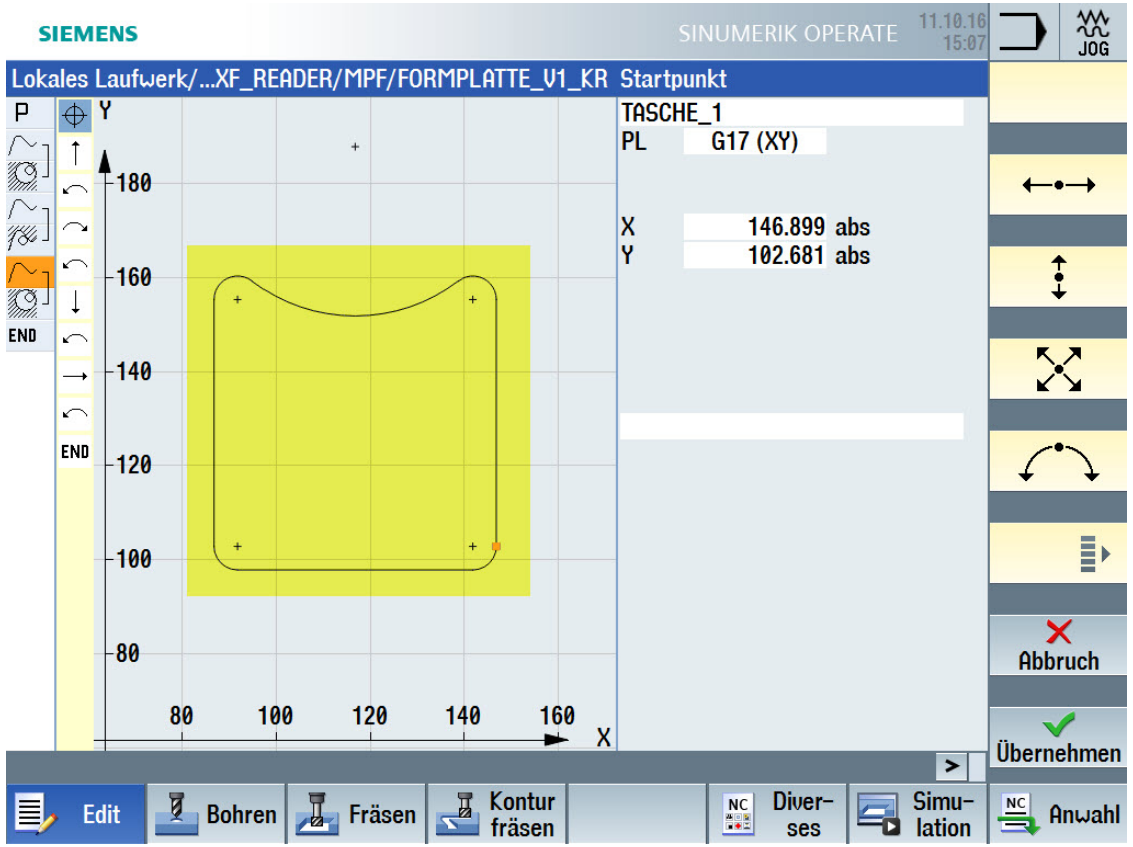


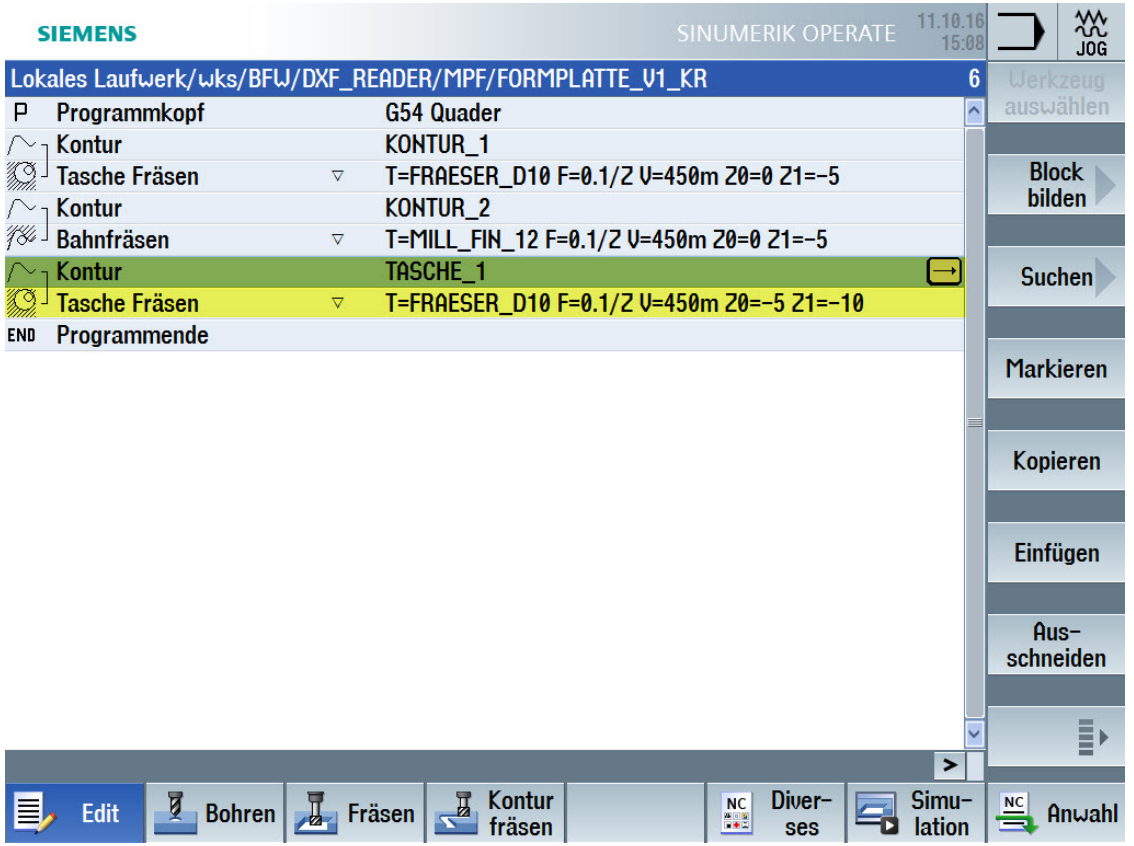
If necessary: Specify the zero point



4 Possibilities and limits of the SINUMERIK DXF reader
Possibilities

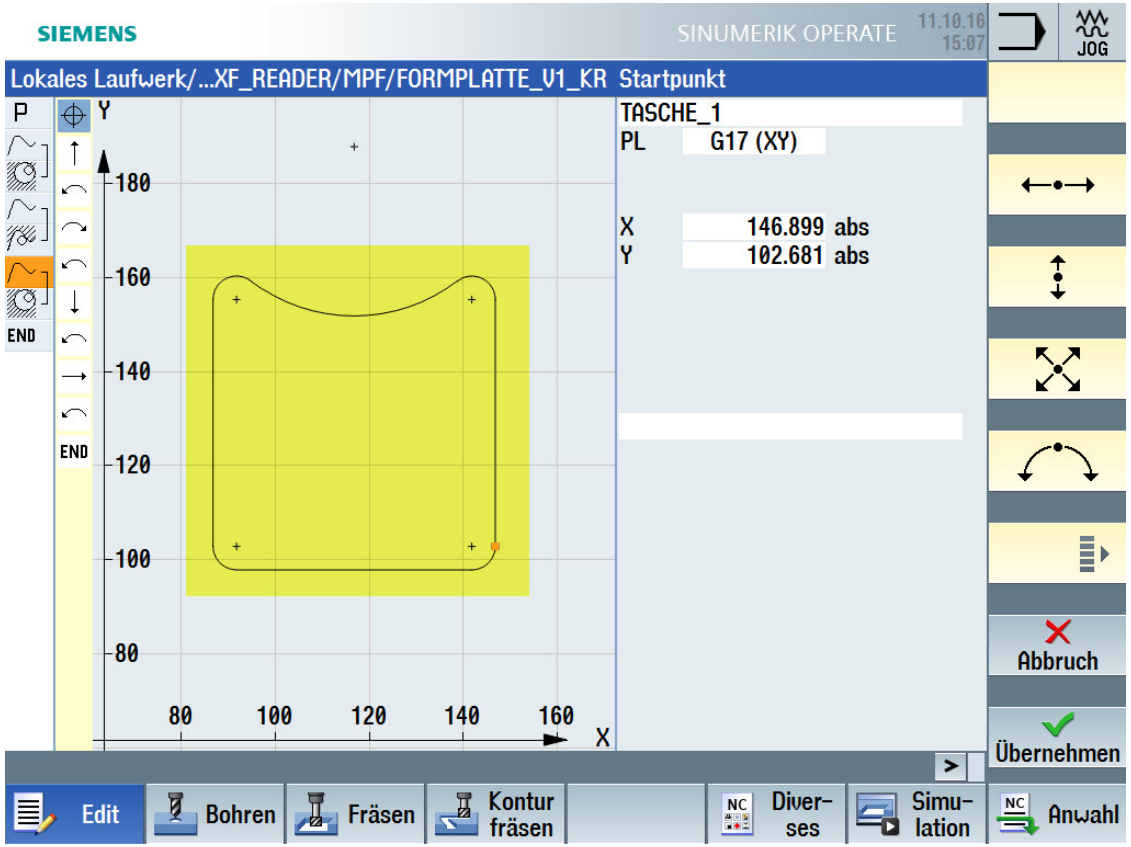
With ShopMill/ShopTurn, SINUMERIK Operate can output the movement commands to create the contour directly from the DXF data as a programmed contour.

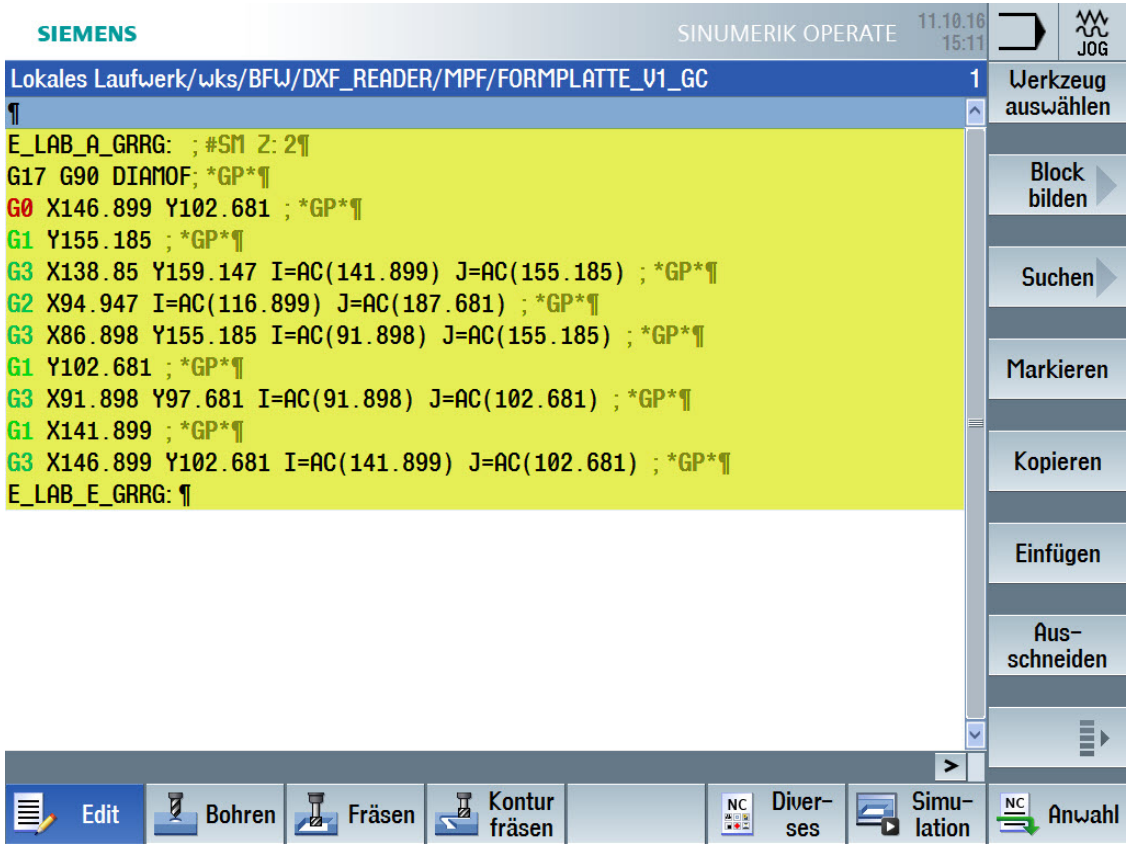




4 Possibilities and limits of the SINUMERIK DXF reader
Possibilities

With the programGuide, SINUMERIK Operate can output the movement commands to create the contour directly from the DXF data as a G code.





4 Possibilities and limits of the SINUMERIK DXF reader
Limits

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Strong dependence on the quality of the DXF file and the design!

"Quick and dirty" conversion to DXF leads to imperfections

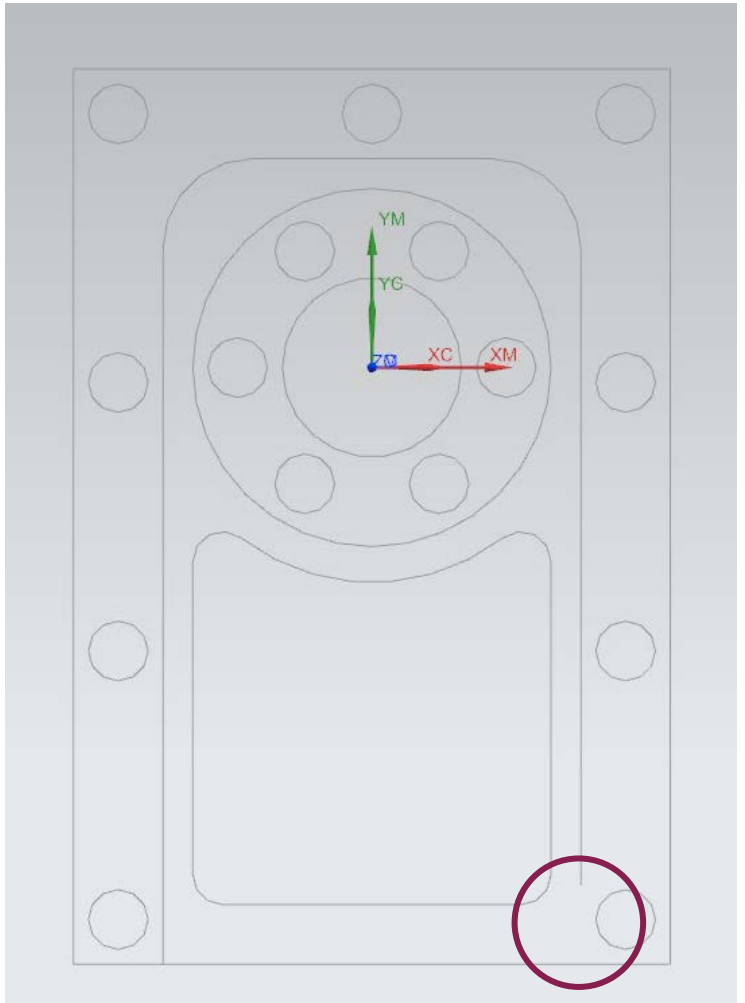
Design-related contour errors

Imperfect designs (contour open/lines do not end at intersections)

Layer not logically assigned (e.g.: dimension lines as contour)

Operating the control directly on the machine

As a rule, there are no input devices directly on the control, such as a PC mouse



5 Summary

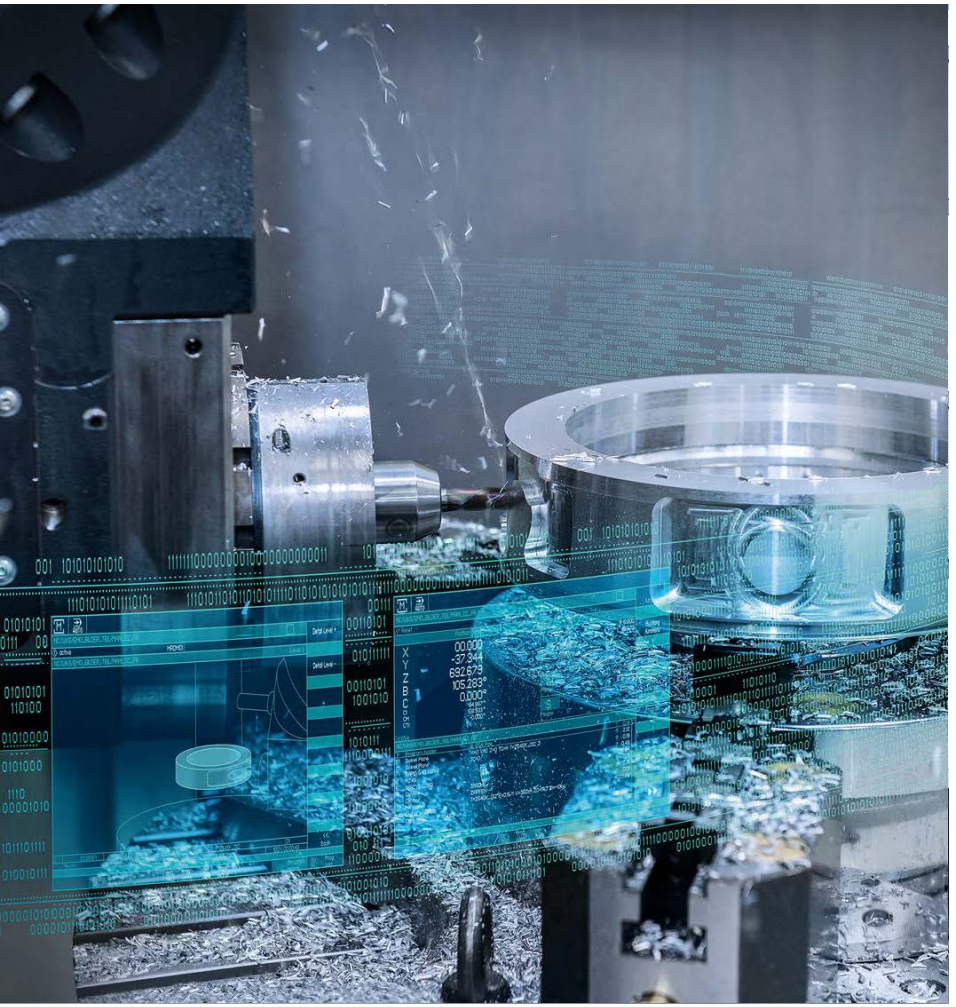
Advantages of the DXF application on SINUMERIK:

- Time saving and process reliability when creating contours
- Job planning on SinuTrain offers the best process reliability and maximum efficiency
- Use is easy (and) practical
- DXF data can be directly (re)worked on the control
- DXF is adequate as a CAD interface, only the really relevant information is read in

What have we learned?

- What is DXF?
- What is DXF used for on the CNC?
- How is DXF processed on SINUMERIK?
- What functions does SINUMERIK offer for DXF?
- What limits are set?
- What advantages does the integrated DXF reader offer?

Thank you for your attention!



Technology and Application Center Erlangen

Video in YouTube:
https://www.youtube.com/watch?v=XGXqqJtFYNs&index=2&list=PL45872A31E6FECBD0

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