Production of chess pieces
Part 2: Rook and knight

Rook and knight chess pieces

Check and checkmate - part 2. The chess set is further augmented. This time, you manufacture the rook and knight pieces. The pieces are becoming more complex and require the use of driven tools.

All information required for the reproduction, tool data and ShopTurn machining plans are summarized in the following sections.

www.siemens.com/cnc4you

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1. Safety note

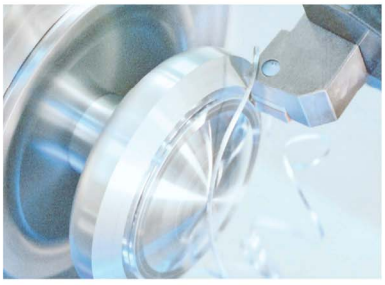
The handling of machines brings many dangers. Consequently, the legal and general company safety regulations must always be observed for the production of the chess pieces.

2. Preliminary remark

The following description is oriented to technicians familiar with a CNC turning machine who have experience or knowledge of the SINUMERIK CNC with ShopTurn. All technology data listed here is appropriate for the machines, tools, materials and machining plans used to produce the chess pieces. Although the wide range of conditions prevailing in other workshops mean they are only examplary for a reproduction, in most cases they should allow a problem-free reproduction.

The workpieces are provided as series in the Portal. The programs and data for two chess pieces will be made available for each series. The cutting speeds, feeds and the tool data must be adapted appropriately in the programs depending on the associated material.

ShopTurn permits the turning and milling of the chess pieces in a single clamping. The contours of the rook and knight are created in the first step. For the rook, the battlements are milled in the second work step. The contour and the mane of the knight are machined with the milling tool. For the knight, this machining step means the appropriate program must be used depending on the **positive rotational direction of the C axis**. The chess pieces are cut off as last work step.



Each of the chess pieces must be produced from two different materials. There are no limits placed on the fantasy of the material you use. For the white pieces, aluminum or steel, and for the black pieces, brass, are suitable as material, although any different colored material is conceivable.

To guarantee success, we recommend simulating the machining plans prior to the start. This detects and avoids any program errors.

You can download without charge all programs and production descriptions for the workpieces in the registered "My SINUMERIK" Internet area at **www.siemens.com/cnc4you**. We make the following files and formats available here:
Jobshop files for ShopTurn as of software version 6.4

3. Workpiece blank

- Rod material, AlCuMgPb material, material no. 3.1645; 30 mm diameter
- Further materials on request

4. Turning machine and turning programs

- Spinner turning machine, TC600 with C and Y axis, equipped with SINUMERIK 840D sl
- ShopTurn version 7.2 turning program
- TURM.MPF and SPRINGER_SPINDEL_LINKS.MPF or SPRINGER_SPINDEL_RECHTS.MPF machining plans for turning and milling

5. Used tools

Designation	Tool name in the machining plan	Order no. of the Kennametal tools
Turning holder with tool insert	SCHLICHTER_35	SVJBL 2020K11 VBGT110304HP KC5410
Turning holder with tool insert	SCHLICHTER_STIRN	SDJCR 2020K11 DCGT11T304HP KC5410
Cut-off tool with tool insert	STECHER_4	A3SCL 2020K0426 A2040N00CF02 KU25T
8 mm diameter end mill, three-sided cutter	FRAESER_STIRN_8	F3AA0800AWM45 K600
2 mm diameter end mill, two-sided cutter	FRAESER_MANTEL_R1	F2AH0200ADN30 DC625M
8 mm diameter end mill, three-sided cutter	FRAESER_MANTEL_8	F3AA0800AWM45 K600

6. Turning the rook chess piece

The rook is produced in the main spindle in a single work cycle.

Work steps on the turning machine:

1. Approach the reference point of the machine.
2. Import the TURM.MPF machining plan.
3. Enter measured tools in the tool list.
4. Place tools in the magazine.
5. Clamp round stock, clamping length approx. 50 mm.
6. Set workpiece zero point by scratching.
7. Perform simulation.
8. Start the manufacturing; process the machining plan.

7. Turning and milling the knight chess piece

The knight is manufactured in the main spindle in a single cycle.

Work steps on the turning machine:

1. Approach reference point of the machine.
2. Import the SPRINGER_SPINDEL_RECHTS.MPF or SPRINGER_SPINDEL_LINKS.MPF machining plan.
3. Enter measured tools in the tool list.
4. Place tools in the magazine.
5. Clamp round stock, clamping length approx. 60 mm.
6. Set workpiece zero point by scratching.
7. Perform simulation.
8. Start the manufacturing; process the machining plan.

8. Information in the Internet

Design of the parts, creation of the programs

R&D Steuerungstechnik GmbH & Co. KG
Hocksteiner Weg 87 - 95
41189 Mönchengladbach / Germany
in the Internet: www.rud-steuerungstechnik.de

Dimensions and performance data for the tools to be used

Kennametal Holding GmbH
Werkzeuge und Systeme für Metallzerspanung
Wehlauer Str. 73
90766 Fürth / Germany
in the Internet: www.kennametal.com

Details of the tool machine to be used

SPINNER Werkzeugmaschinenfabrik
Rudolf-Diesel-Ring 24
82054 Sauerlach / Germany
in the Internet: http://www.spinner-wzm.de

Siemens AG manuals and information

Manuals and detailed information about our products are available at www.siemens.com/sinumerik -> index or search: DOConWEB -> SINUMERIK

- "Simple turning with ShopTurn" training document
  -> Info/Training -> "Simple turning with ShopTurn" training document
- ShopTurn product brief
  -> 840D/840Di/810D users -> ShopTurn 840D/810D product brief
- ShopTurn operating/programming
  -> 840D/840Di/810D users -> ShopTurn operating and programming

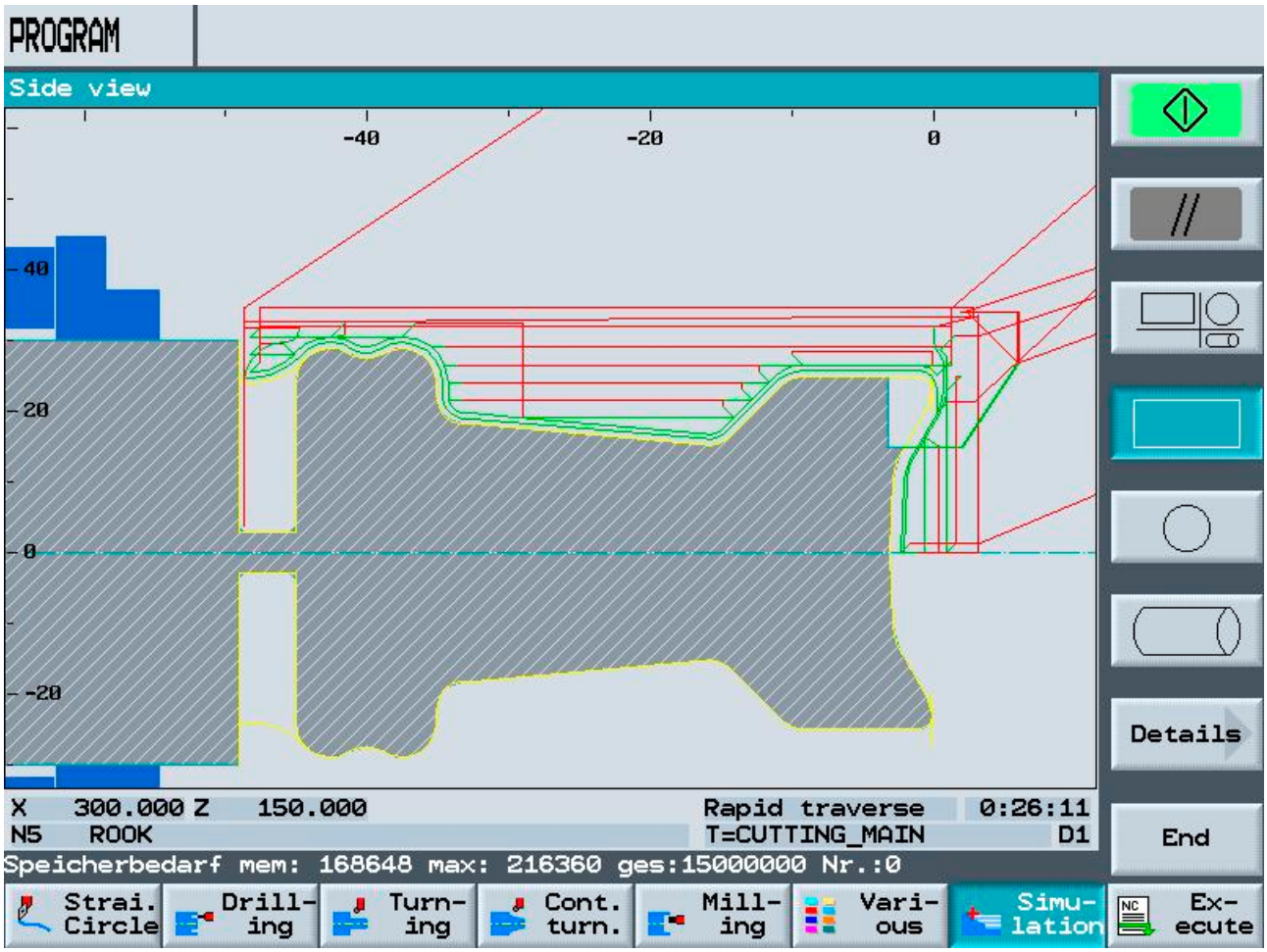
Searching tips at DOConWEB

DOConWEB permits the fast access to individual pages from documents without loading the complete file.

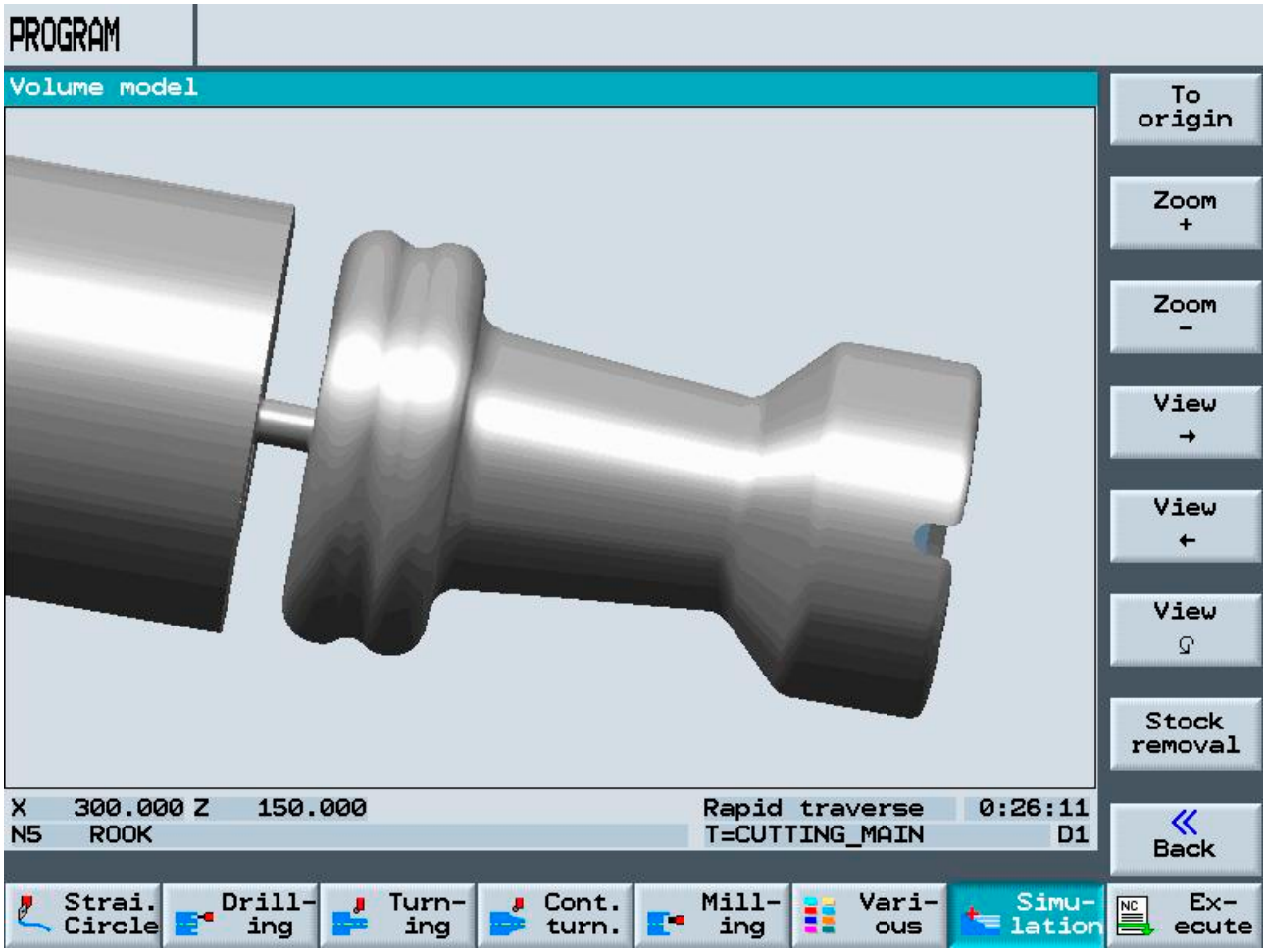
- You have the possibility to restrict the selection by clicking "A-Z"
  (-> a search is now only made within this item in the index),
- Or click the magnifying glass
  (-> the search is now made for complete text within this item).

9. Simulation pictures of the programs

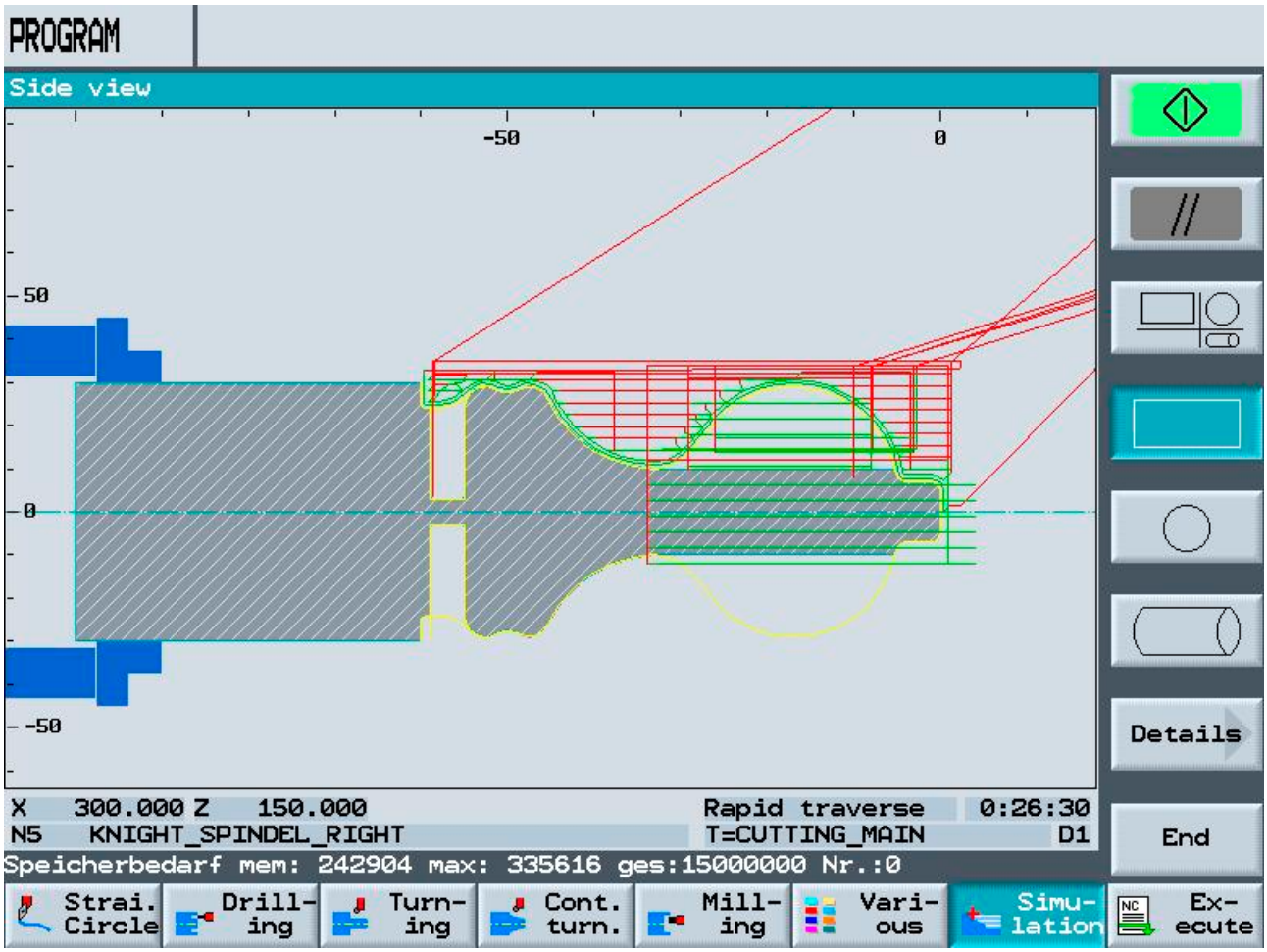
Simulation of the rook chess piece



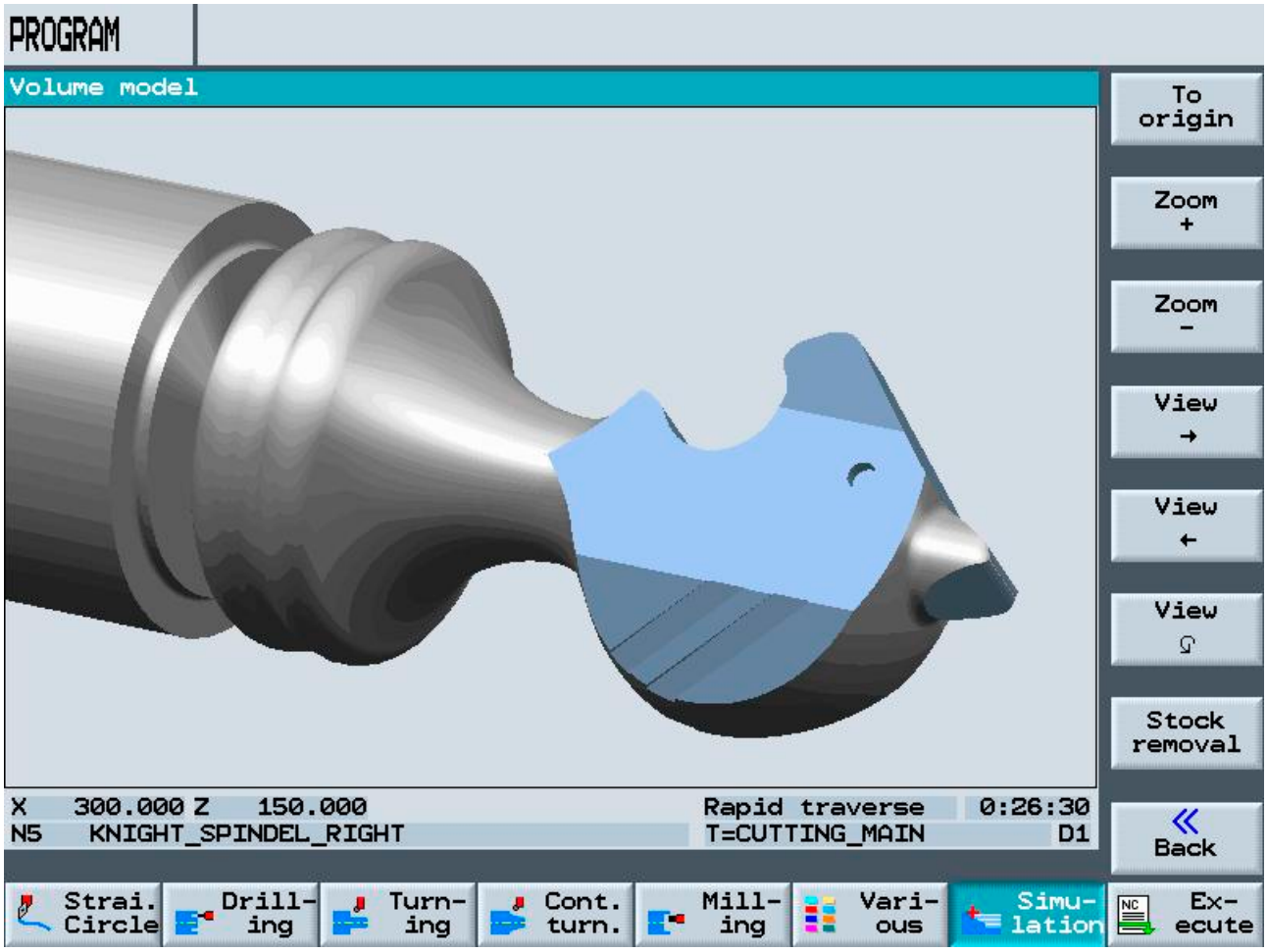
Simulation of the volume model of the rook chess piece



Simulation of the knight chess piece



Simulation of the volume model of the knight chess piece



10. Figures of the workpieces

Complete chess set