Welcome

DISCOVER
WHAT IS BEHIND

TECHNOLOGY DAYS
HORN **2015**

Precision tools in the added-value chain

Speaker: Brett Kischnick

Precision tools in the added-value chain

Energy consumption of a machine tool

- Energy Efficiency

Machine Builders looking anxiously at the light bulb

Per regulation of the European Union, the future will bring even more efficeint machine tools. The industry would like to avoid more regulation.

06.10.2011, von HOLGER PAUL

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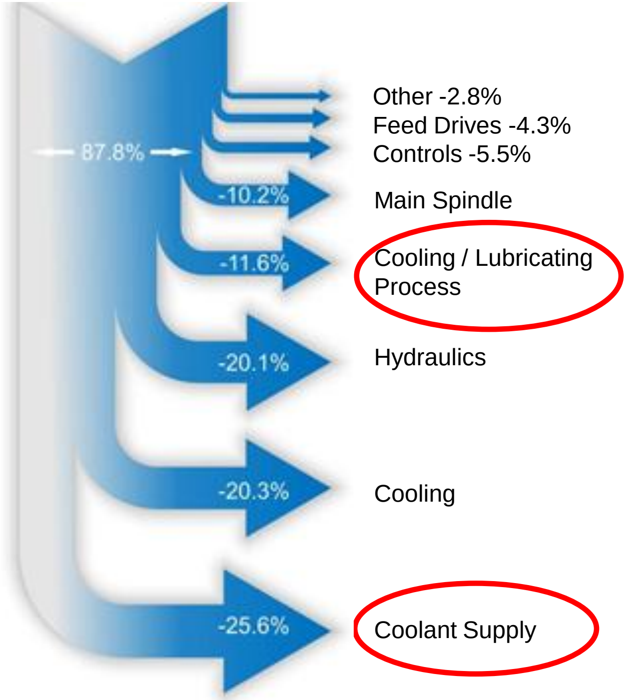
"Eco-Design Directive"

Source: FAZ

Aspect

Energy

Energy consumption of a machine tool.



- Approx. 37% of power consumption is attributable to cooling & lubricating cutting edges.

Less is more!

Either MMS or

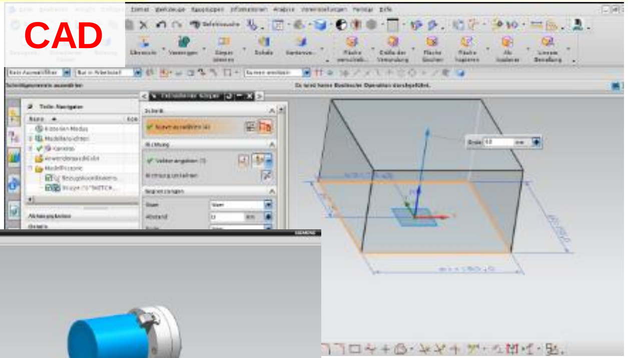
targeted use at the cutting zone

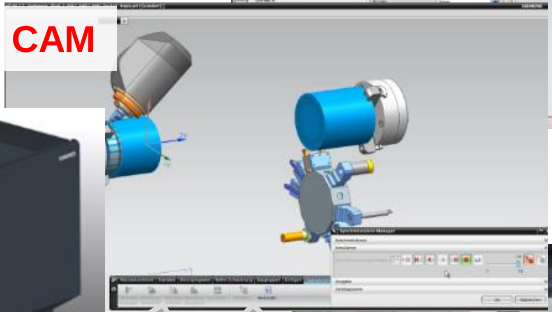
Source: WZL Aachen

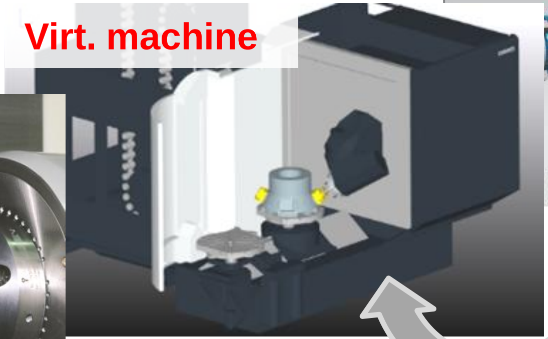
Aspect

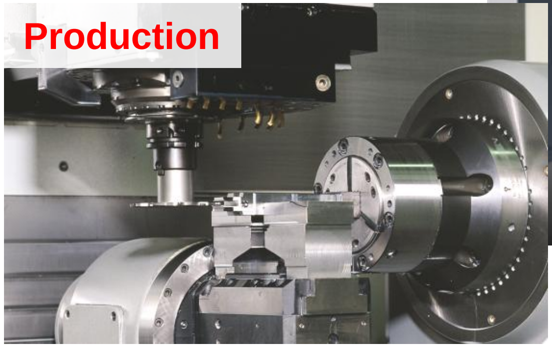
Virtual machine

- Simulation based on real NC data
- No post-processor as risk factor
- Availability of 3D data?









Errors caused by PP

Source: Rheinfaktor
Source: DMG

Aspect

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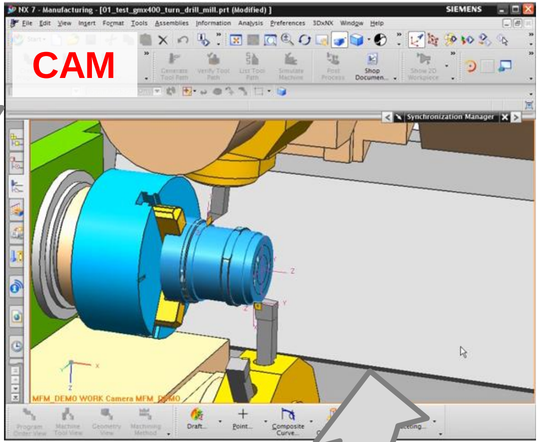
Virtual machine

- Data provision



eSHOP

Horn standard master data
CAD data ISO 13399

ToolsUnited

DIN/ISO master data
CAD data ISO 13399

GTDE Graphical Tool Data Exchange

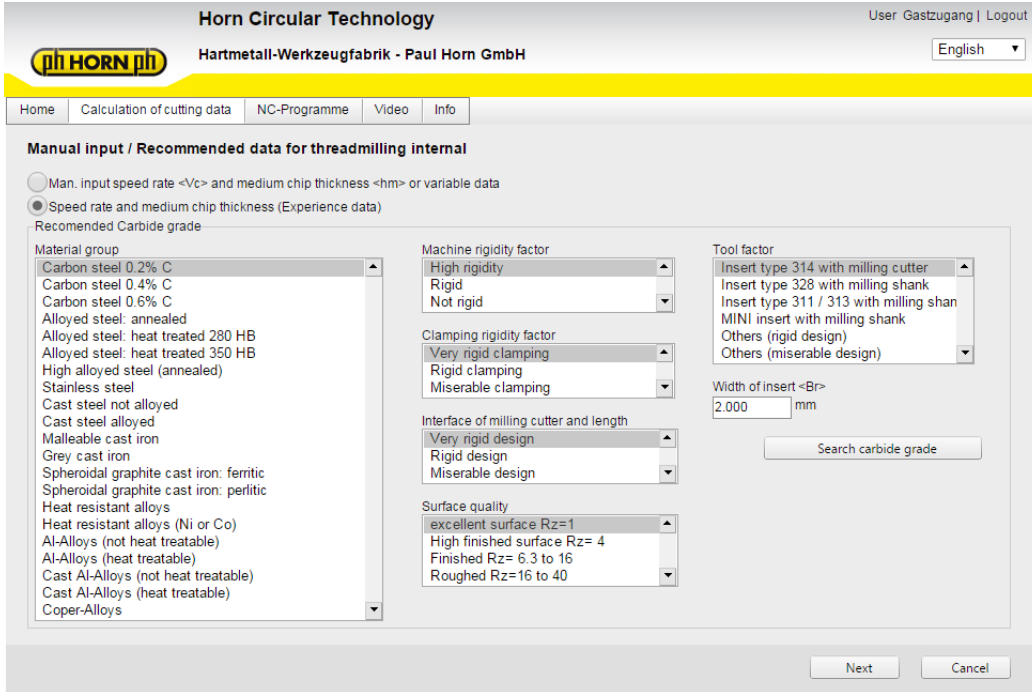
DIN 4000 master data
CAD data ISO 13399

Aspect

Simulation

Cutting data calculation – online ➔ http://hct.phorn.de

- Without access data

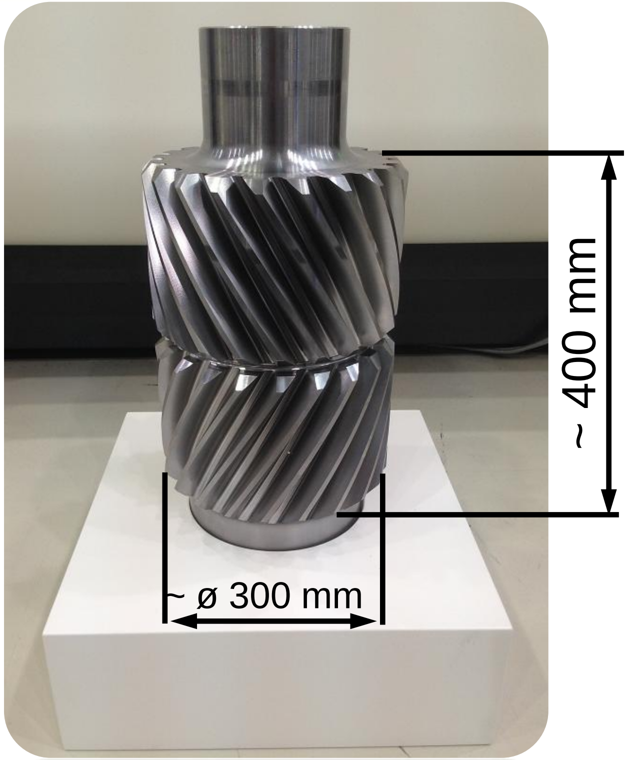


Aspect

New technologies

e.g. gear milling with standard tools

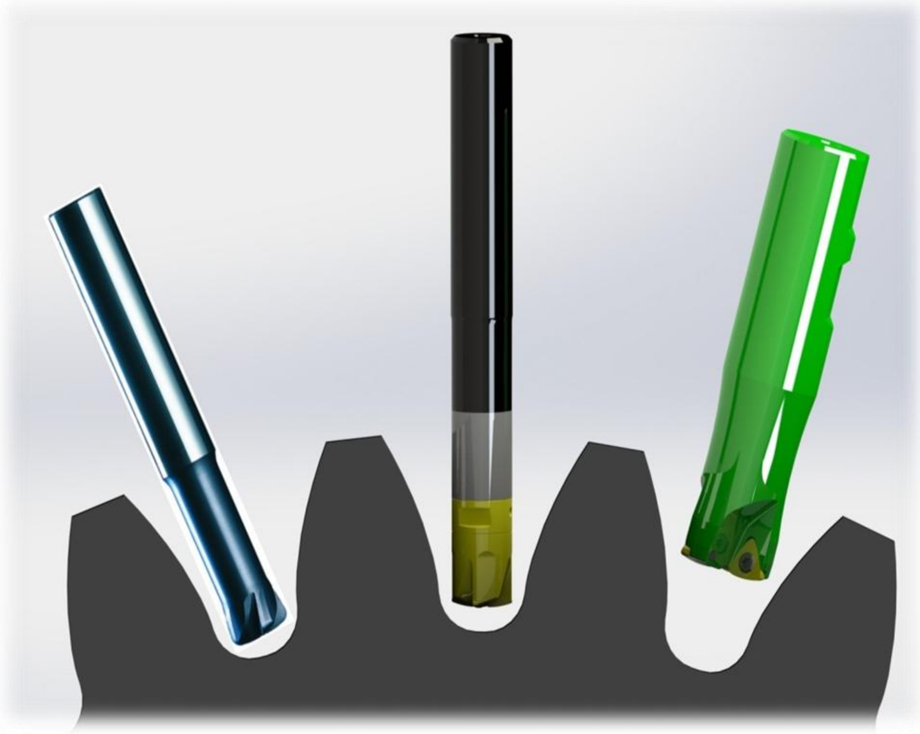
- Use of new high-feed rate technology
- New process workflows
- Standard tools
- Standard machines



Aspect

Gear milling

- Maximize material removal rate
- Adapted tool concepts
- Rough machining with DAHM25
- Finishing with DSM12



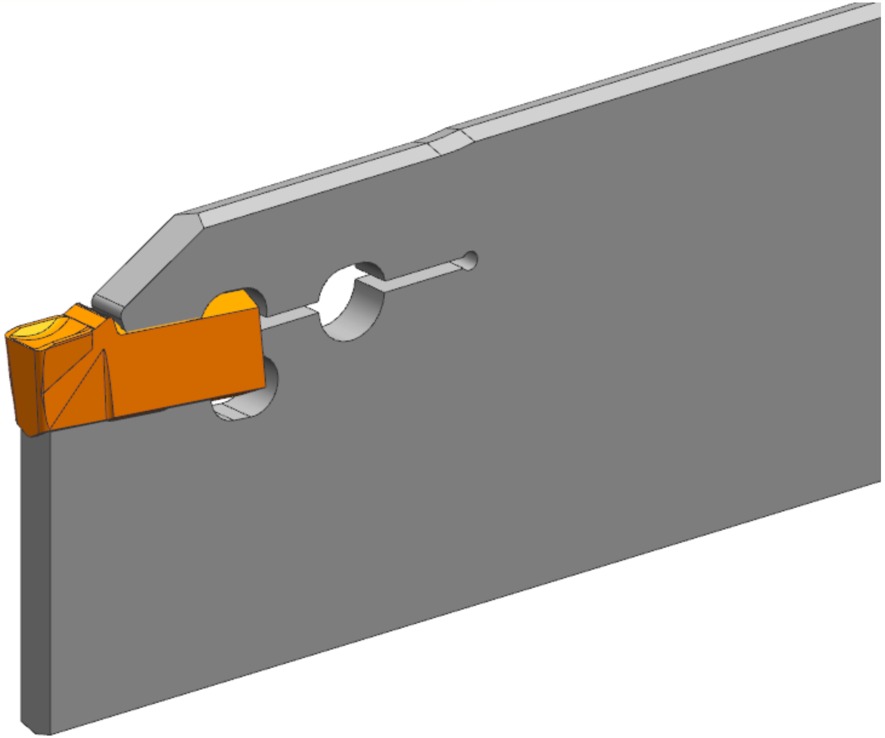
State-of-the-art technology

Blades with/without internal cooling

Projection length adjustable

BUT:

- Rigidity?
- Precision?
- Tool life?
- Productivity?



Precision

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The future

Modular grooving systems 845/842

- Maximum rigidity
- Integrated cooling
- Construction kit
- Height-adjustable

Advantages

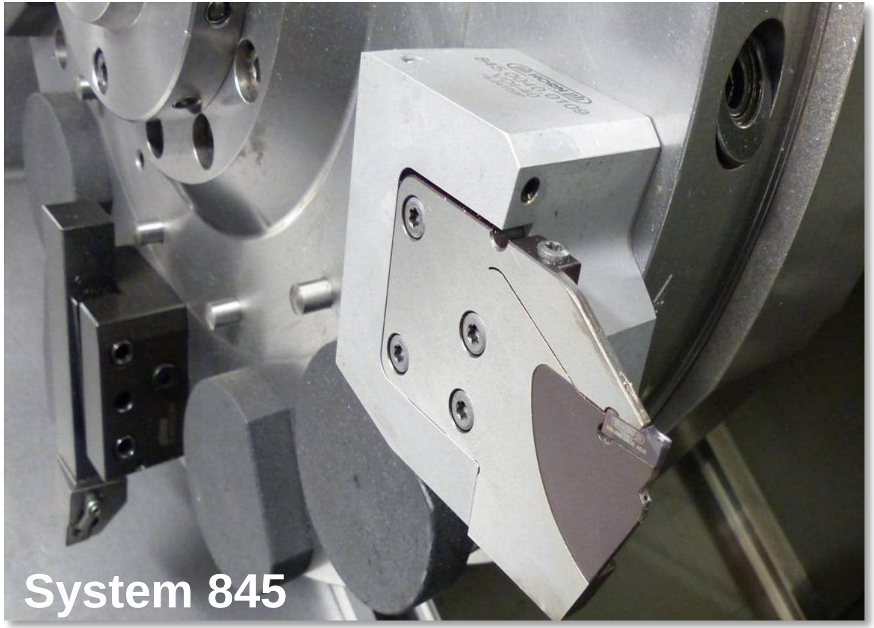
- Cutting parameters
- Tool life
- No face turning!

Aspect

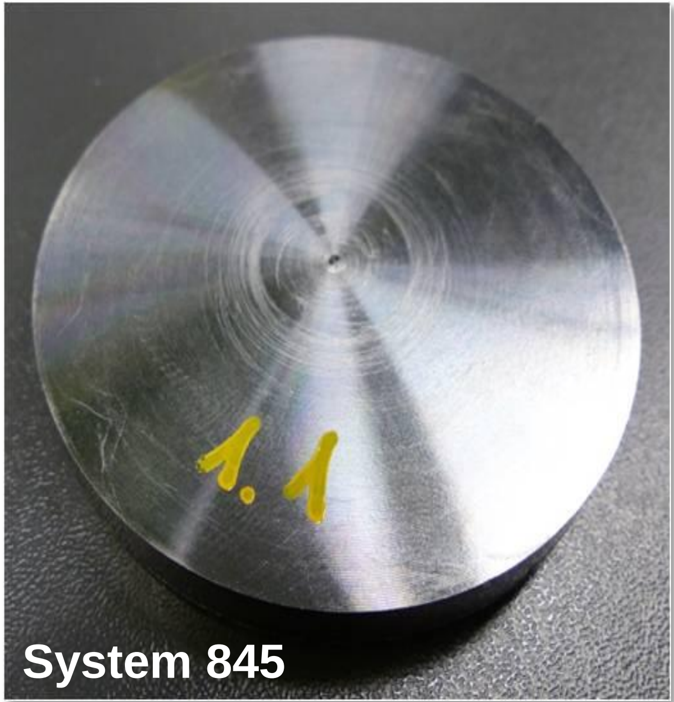
Precision

The proof

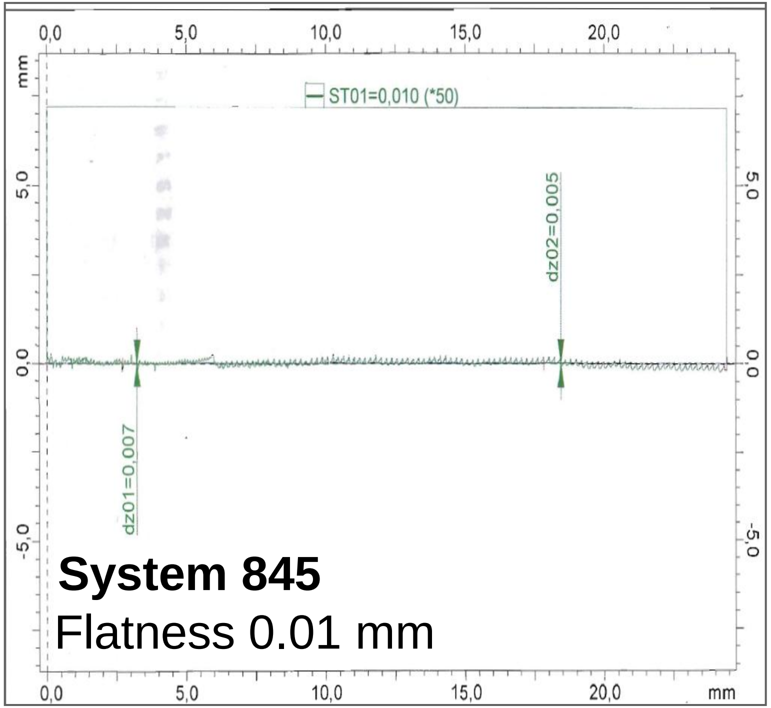
Comparison of flatness and roughness of cartridge 845/parting-off blade



Comparison of parting-off surface flatness

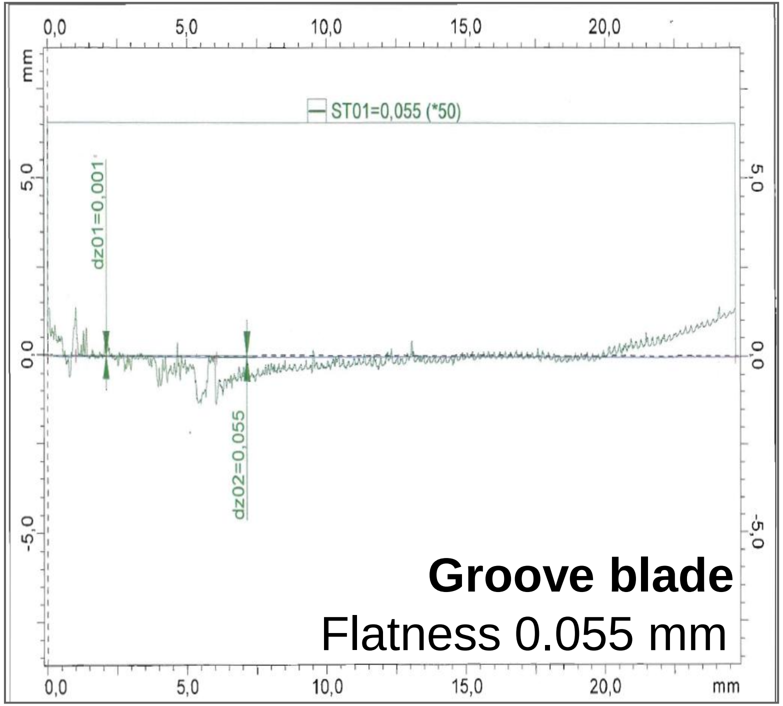


Comparison of parting-off surface flatness



System 845

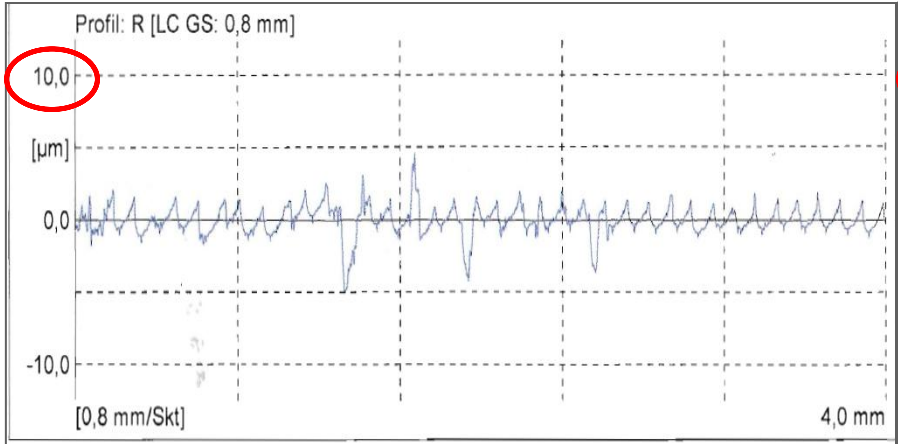
Flatness 0.01 mm



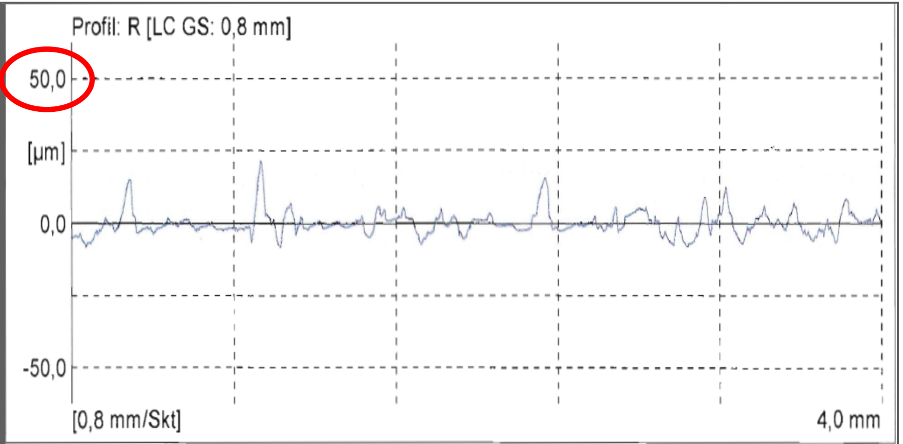
Groove blade

Flatness 0.055 mm

Comparison of parting-off surface roughness



Profil: R [LC GS: 0,8 mm]		
Ra	0,666	µm
Rz	5,865	µm



Profil: R [LC GS: 0,8 mm]		
Ra	2,814	µm
Rz	22,277	µm

System 845

$R_z = 6$ µm

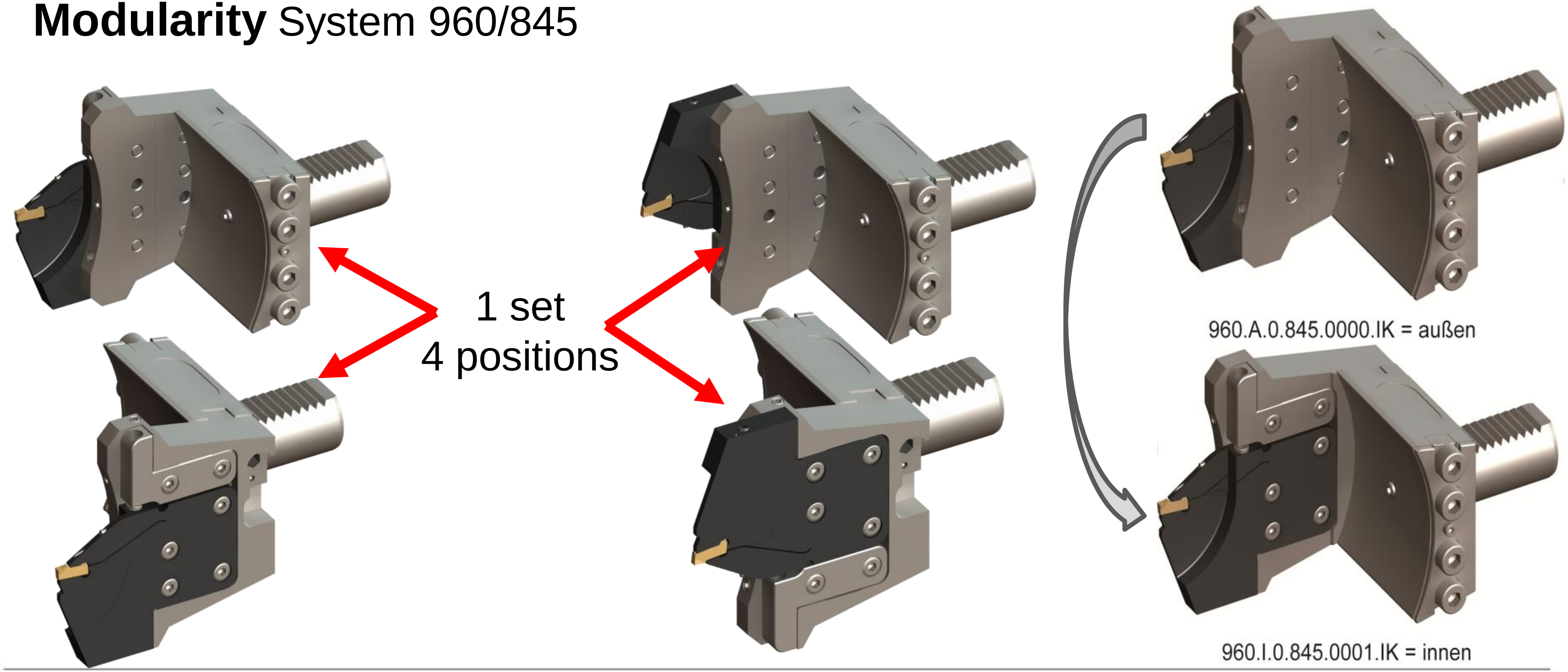
Groove blade

$R_z = 22$ µm

Modularity System 960/845

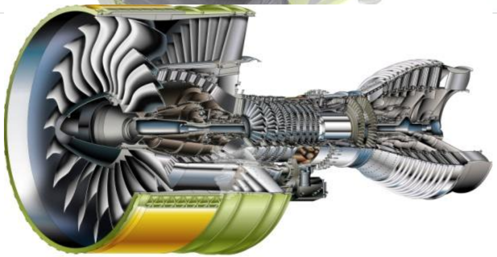
- For many BMT connections
- For VDI 25, 30, 40, 50
- Height-adjustable
- 1 holder ➔ 8 positions

Modularity System 960/845



Materials

Technological developments are promoting the use of special steels and materials.



Examples

- Lightweight construction: High-strength steels and carbon materials
- Appearance: Stainless steels in architecture
- Effectiveness: Superalloys in thermal processes
- Medical: Titanium, stainless and chromium cobalt steels

Increased use of duplex steels

Der neue international Flughafen von Doha mit seinem Dach aus nichtrostendem Duplex stahl (Quelle: Qatar Airways)

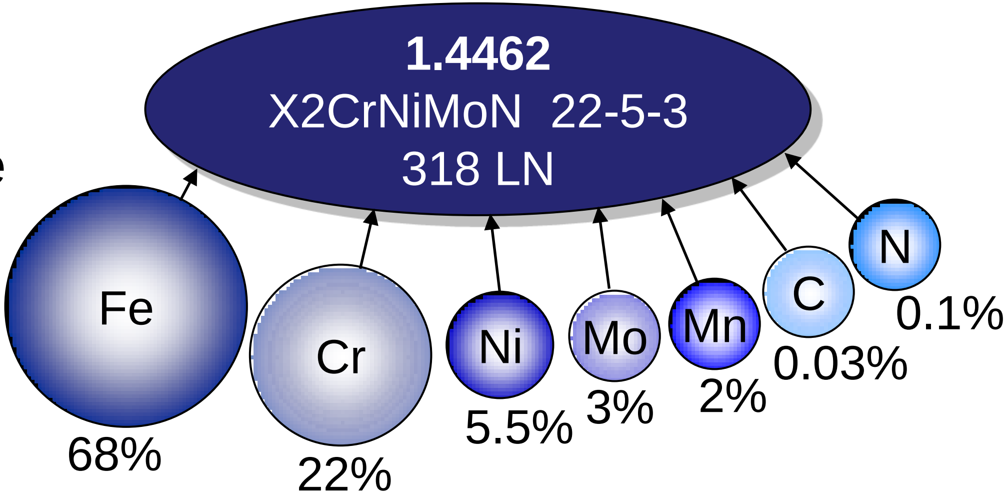
„The Helix“, Singapur, mit einem Tragwerk aus dem Duplexstahl EN 1.4462 (2205) (Quelle: Financial Dynamics/C. F. Jones)

Source: Swagelok

Increased use of duplex steels

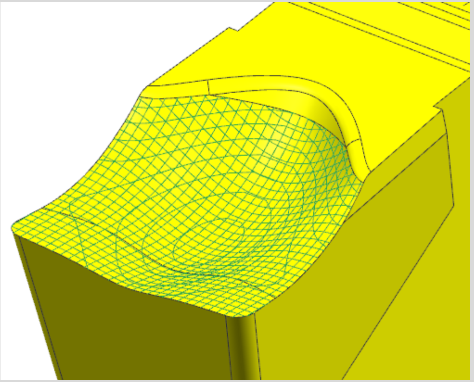
- Previously: Offshore, chemical, food
- New: Automotive (fuel, air conditioning, etc.

- Austenitic/ferritic structure
- Very good corrosion resistance
- High strength
- Low nickel content
- Price
- Processing?



Source: Swagelok

Parting off duplex steel 1.4462



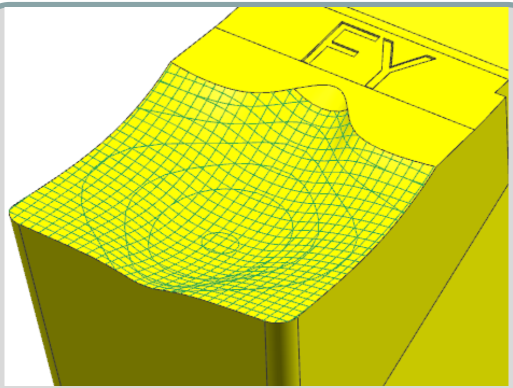
F geometry

v_c → 70 – 110 $^{m}/_{min}$

f → 0.04 – 0.1 $^{mm}/_{rev}$

Spiral chips

Good chip control



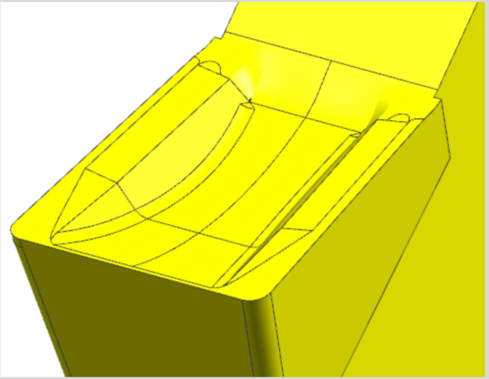
FY geometry

v_c → 50 – 110 $^{m}/_{min}$

f → 0.04 – 0.16 $^{mm}/_{rev}$

Spiral chip, short chip

Good chip control



3V2 geometry

v_c → 70 – 110 $^{m}/_{min}$

f → 0.08 – 0.16 $^{mm}/_{rev}$

High performance

Surface →

Parting off duplex steel 1.4462

FY / f=0.16 mm/rev

F / f=0.1 mm/rev

3V2 / f=0.1 mm/rev

Precision tools in the added-value chain

Summary

- New requirements being placed on tools, e.g. energy consumption or information procurement
- Increasing requirements in familiar areas, such as material removal rate
- Enhanced requirements, e.g. materials

THANK YOU

FOR YOUR ATTENTION!