SLAB AND BILLET GRINDING AND DEBURRING SOLUTIONS

Alexander Zeischka
BRAUN Maschinenfabrik GmbH

TOPICS PRESENTED

- ✓ Introduction
- ✓ Cracks! What to do?
- ✓ Presentation of Slab grinding machine
- ✓ Presentation of Billet grinding machine
- ✓ Presentation of Deburring machines for different applications
- ✓ Conclusion

IN BRIEF – FACTS ABOUT BRAUN

- ✓ Highly specialized medium-sized company head-quartered in Austria, **founded 1848, family owned in the 7th generation**
- ✓ More than **60 years experience** and know-how in abrasive cutting and high-performance grinding
- ✓ **Technology leader** for
  - high-performance abrasive cut-off machines
  - multi-functional high-pressure grinding machines
  - highly flexible deburring grinding machines
- ✓ World-wide sales & service network

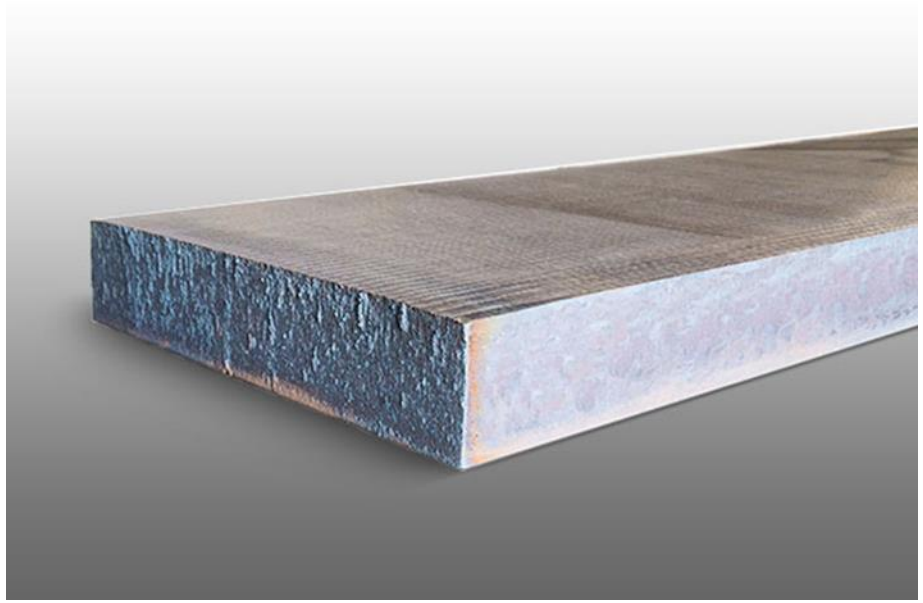
BRAUN® MACHINE TECHNOLOGIES
BRAUN Maschine Technologies, LLC - USA

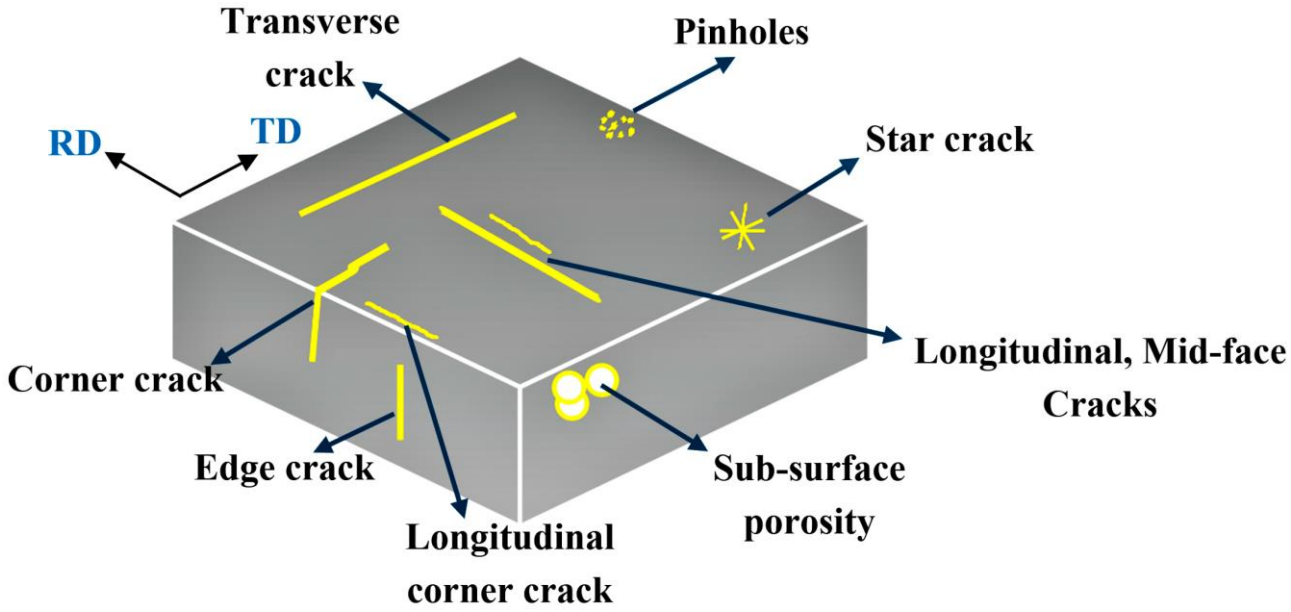
BRAUN® MASCHINENFABRIK
BRAUN Maschinenfabrik GmbH - Austria

BRAUN® MACHINE TECHNOLOGIES
BRAUN Machine Technologies (Beijing) Co., Ltd. - PR China

Reduction of Co2 Emissions in modern conditioning lines

Continuous casted slabs and billets may look like .....





➔ For quality improvement a surface conditioning would be necessary

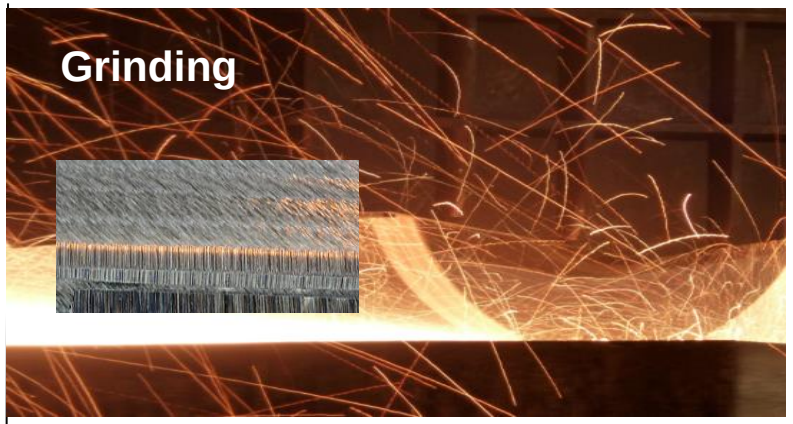
Comparison of slab conditioning methods

Pros:
- ✓ Fast
- ✓ Lower investment in the equipment

Cons:
- ❖ High dust & noise emission
- ❖ Low recycling rate (Iron oxide)
- ❖ High Energy Costs for Gas, water and Oxygen
- ❖ Environmental concerns
- ❖ Complicated watercirculation
- ❖ Expensive foundation work
- ❖ ➔ CO2 consumption per year is incredible

Pros:
- ✓ Clean
- ✓ Swarf recycling ++

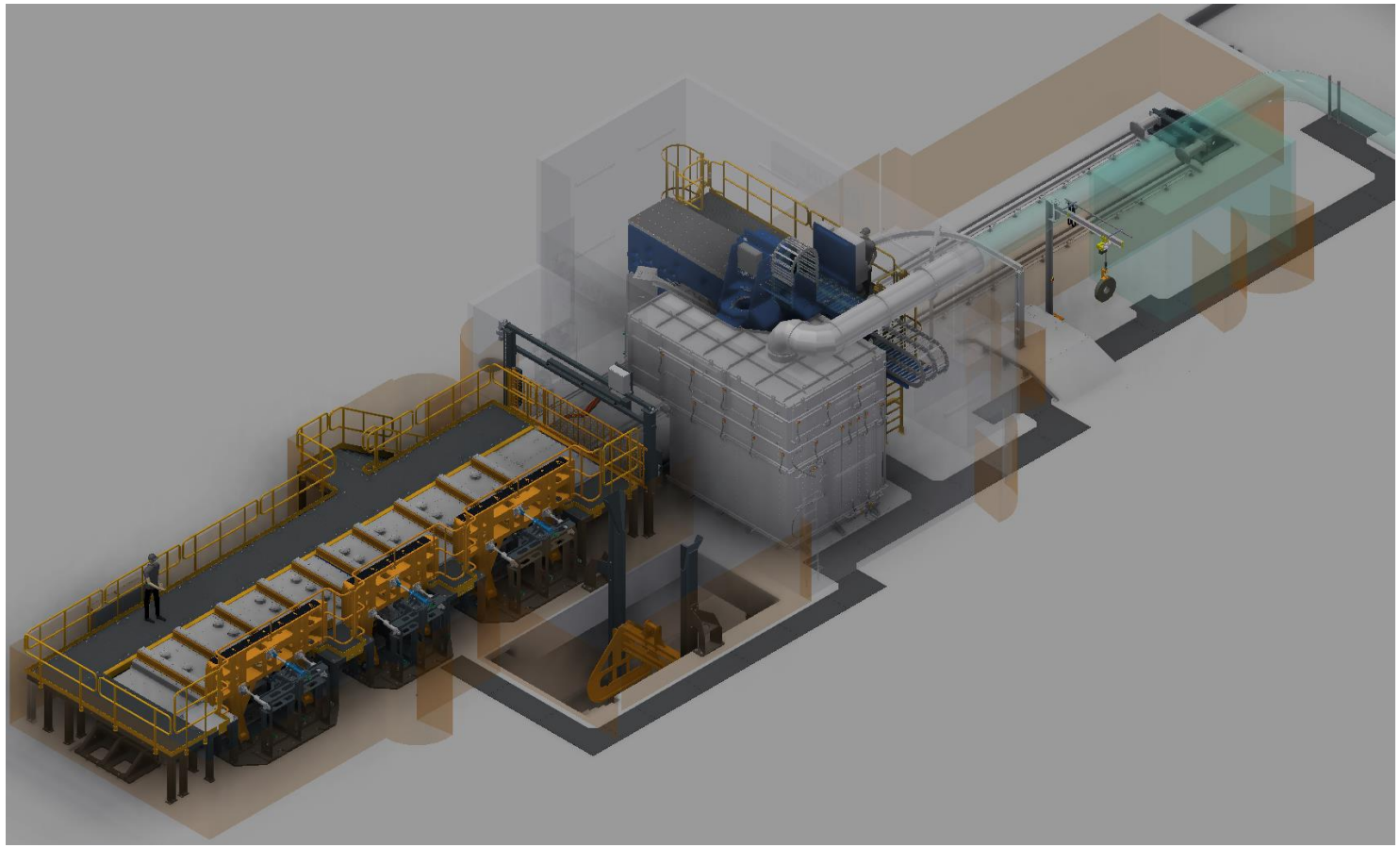
Cons:
- ❖ High investment
- ❖ Contamination risk (broken tooth)
- ❖ Sharp edges and steps between the passes
- ❖ Higher yield loss
- ❖ Versatility (spot removal not possible)

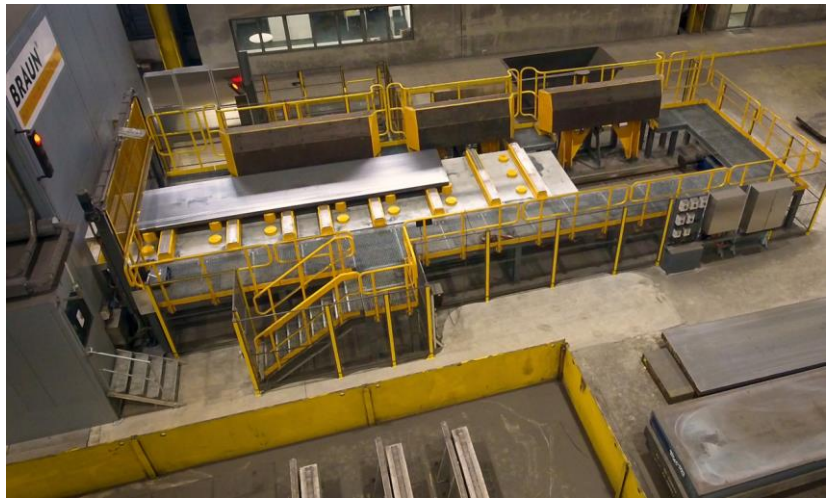


Pros:
- ✓ Slab quality
- ✓ « cheap » & versatile (spot and full skin grinding)
- ✓ Swarf recycling +
- ✓ Able to eliminate bending and bouncing
- ✓ **Significant Reduction** of CO2 consumption

Cons:
- ❖ Dust & sparks
- ❖ Investment
- ❖ « slow »

Layout of SLAB grinding machine, type HP 6 P, incl. material handling gear

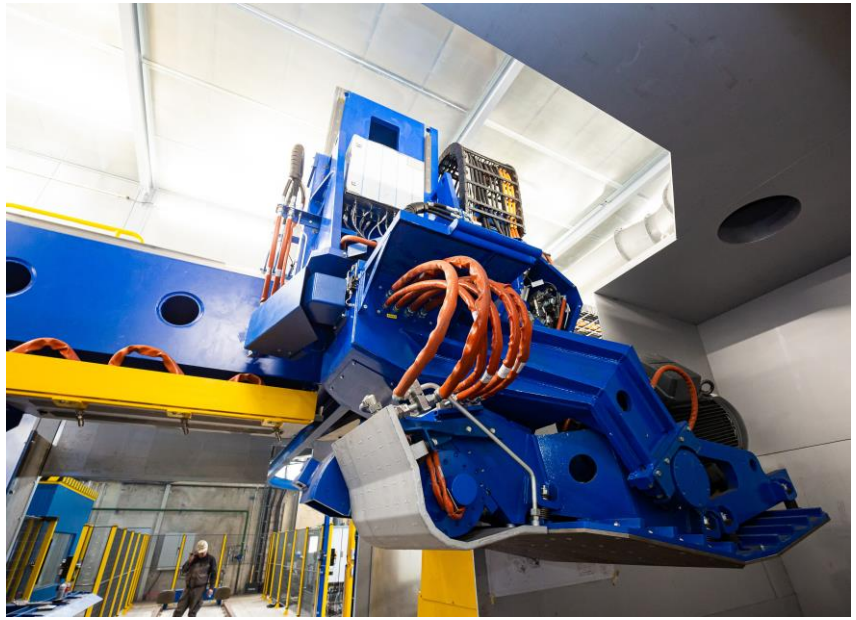


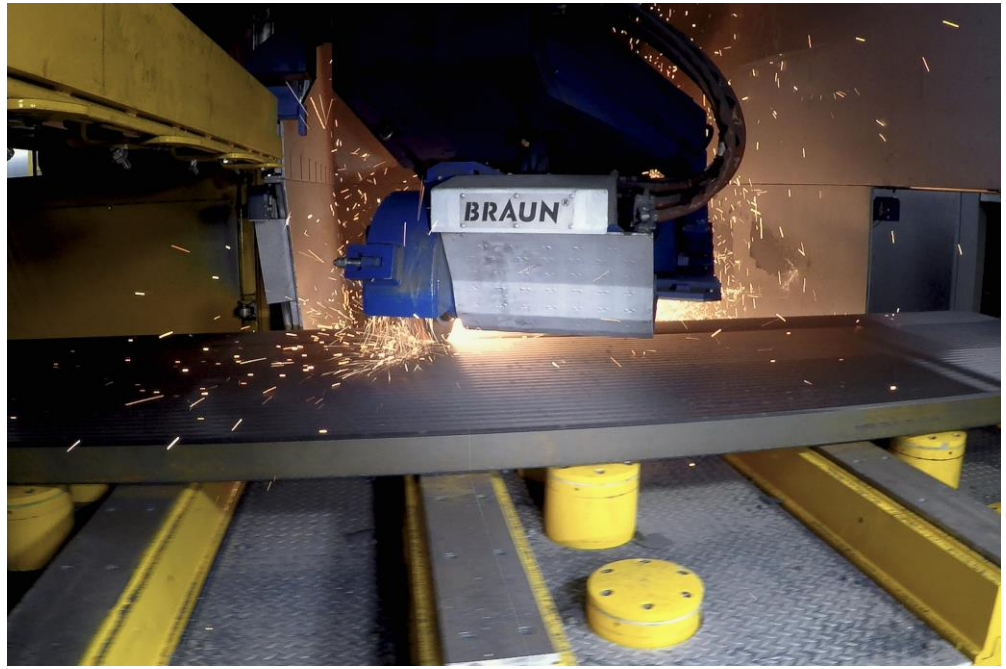


Some details about the introduced equipment

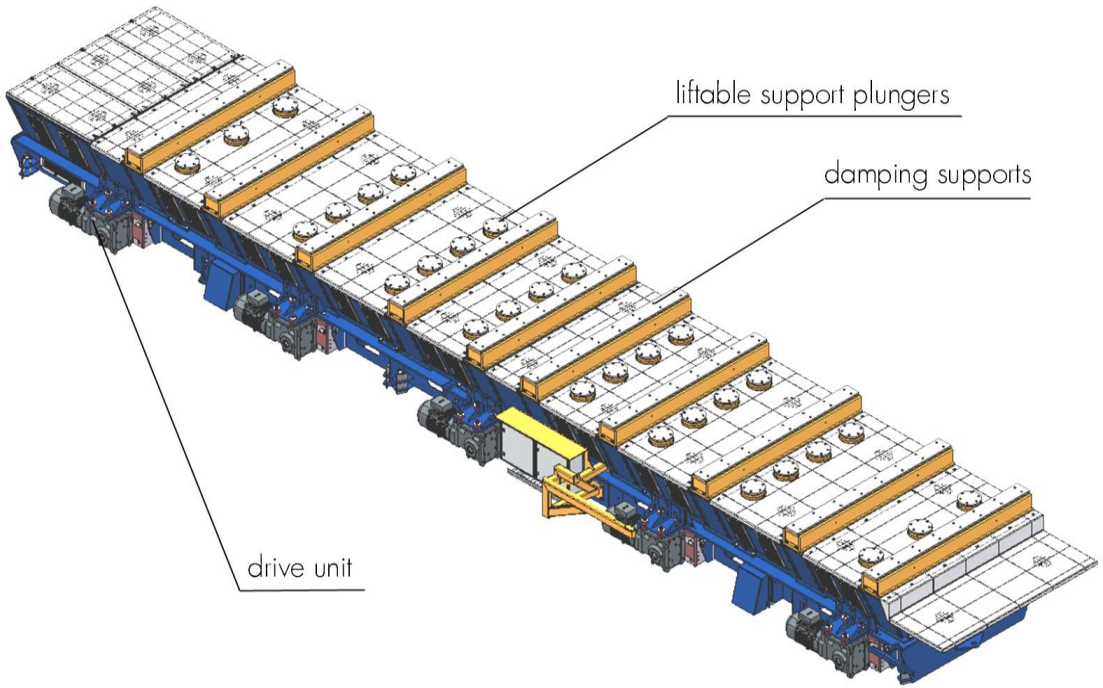
Technical data:

- Grinding process: dry, warm or cold
- Motor power: 250 kW, 1.500 to 3.000 rpm
- Wheel diameter: 635 mm
- Grinding pressure: up to 17 500 N (adjustable)
- Material thickness: 80 to 700 mm
- Material width: 800 to 2 250 mm
- Material length: 800 to 13 000 mm
- Material weight: 2 to 55 t
- Carriage speed: up to 60 m/min





Grinding carriage for bended and bounced slabs



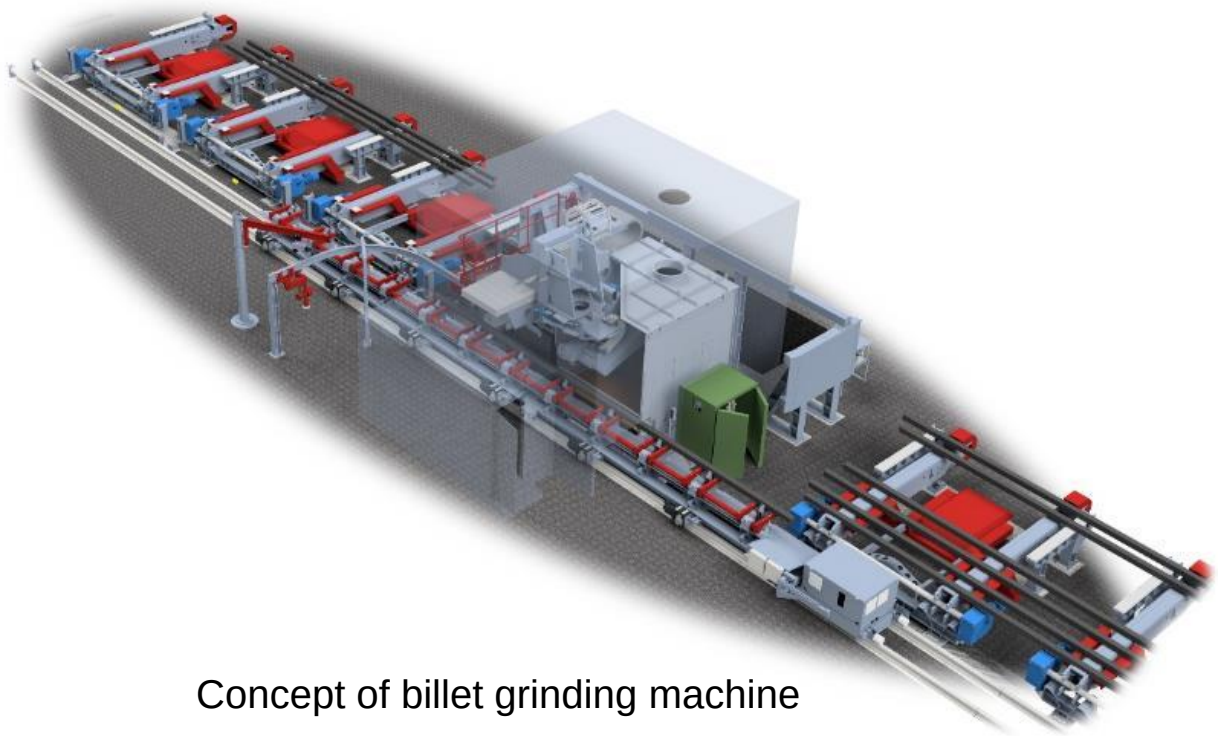
grinding carriage supports bended shape of the slab

ADVANTAGE: Repair grinding of bended and bounced slabs is economic and energy saving

SLAB GRINDING Video of reference

Courtesy of:
voestalpine
ONE STEP AHEAD.

BILLET GRINDING MACHINES



Concept of billet grinding machine

Billet grinding machines at Hyundai Steel Dangjin

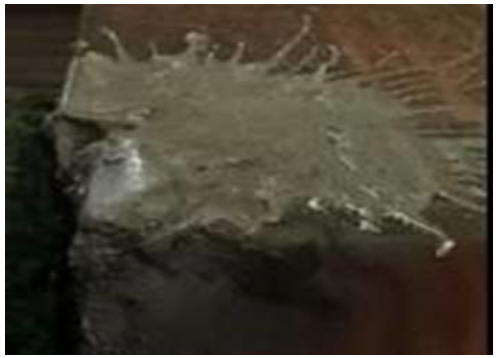
BILLET GRINDING MACHINES Video of reference

DEBURRING EQUIPMENT

Burr strips

Metal powder incenses

Slag reflow



Local slag baths

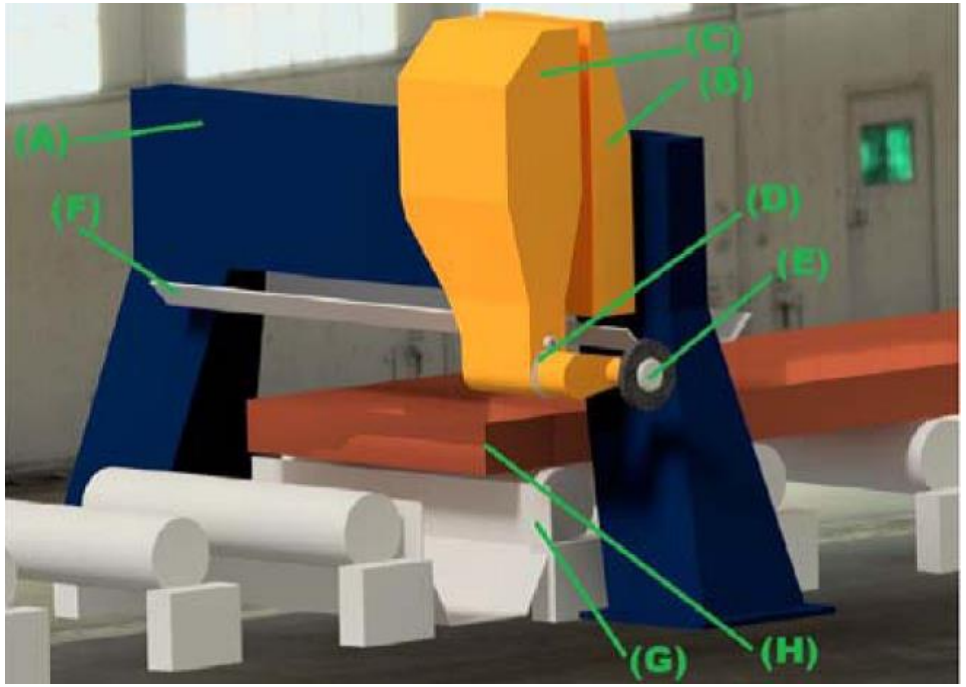
DEBURRING EQUIPMENT

Removal of burr and other flaws from product ends

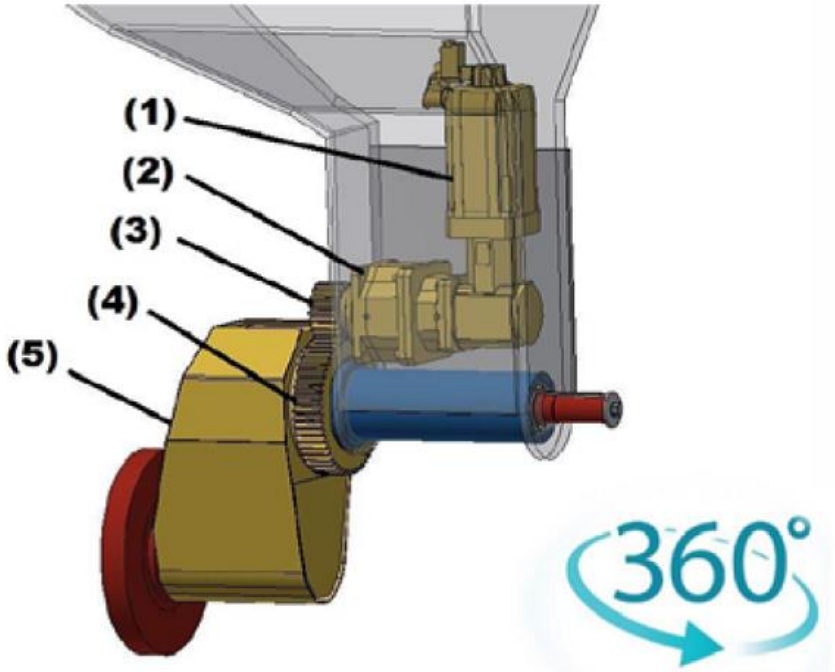
- Conventional deburring methods
  - Scarfing (expensive and not accurate)
  - Deburrers with rotating hammers (expensive spareparts)
  - Deburrers with shear knives
  - Manual (manpower and space required)

- ✓ BRAUN's deburring grinding technology
  - Highly flexible applicability
  - environmental friendly
  - No impact on metallurgical structure of product
  - Excellent reliability
- ✓ Superior to other deburring methods

DEBURRING EQUIPMENT, KEY FEATURES

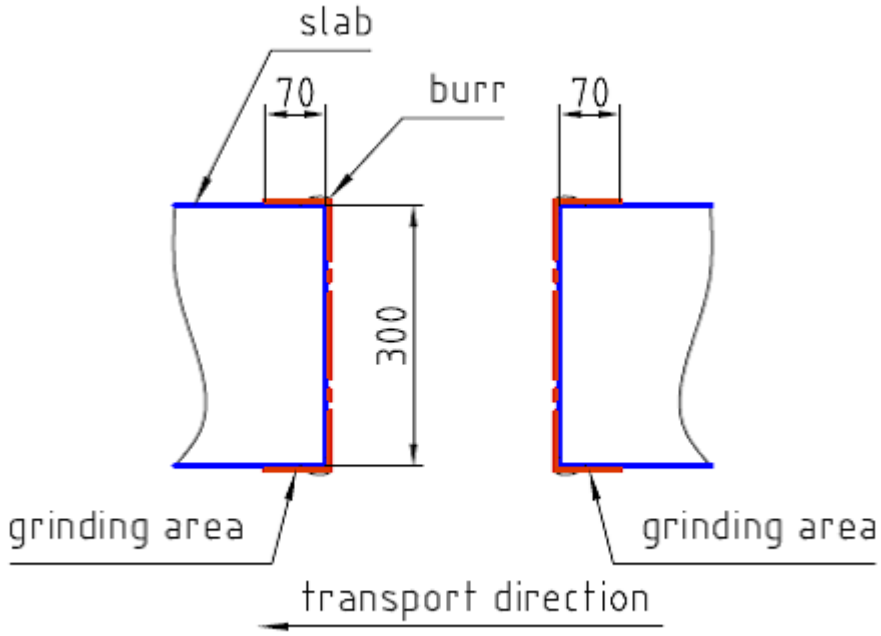


Deburring grinding machine

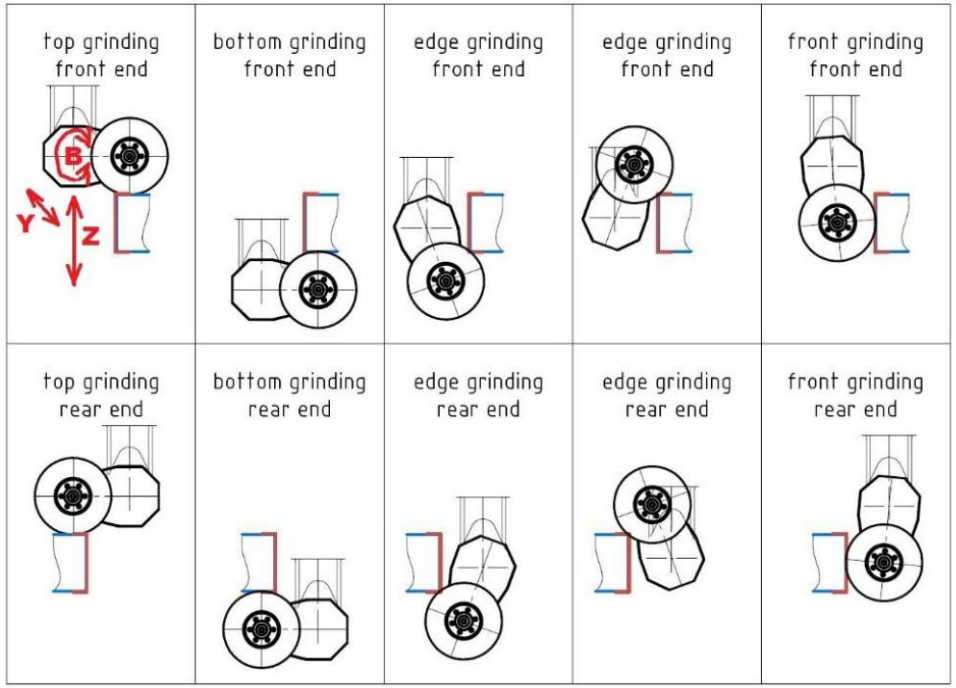


Swivel-mounted grinding head

DEBURRING EQUIPMENT, KEY FEATURES

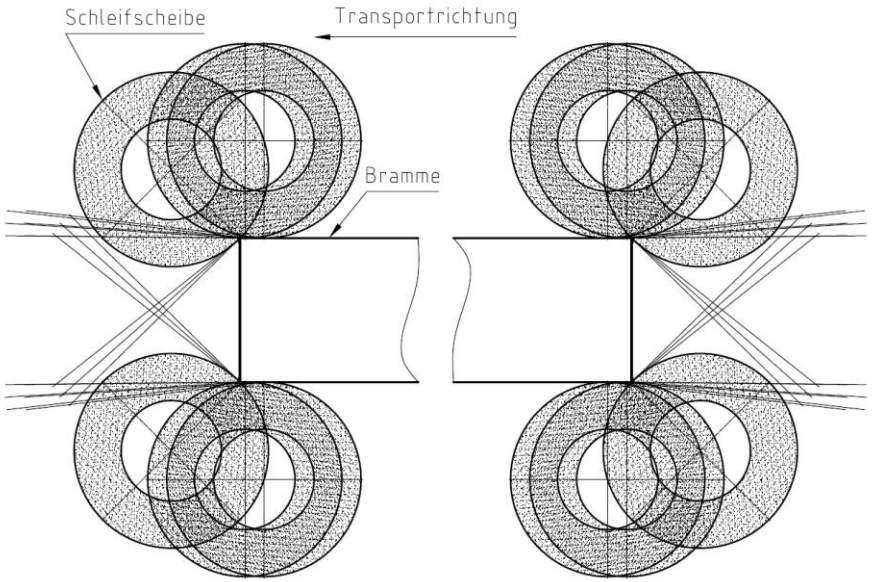


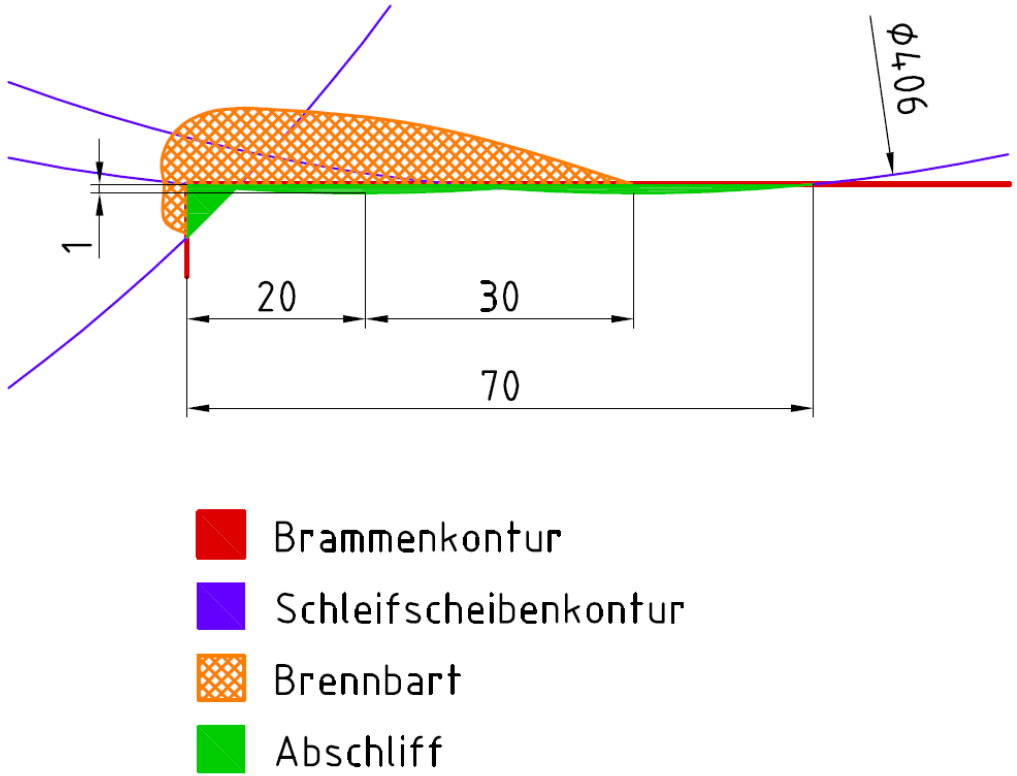
Deburring Area



360° Rotatable Grinding Head

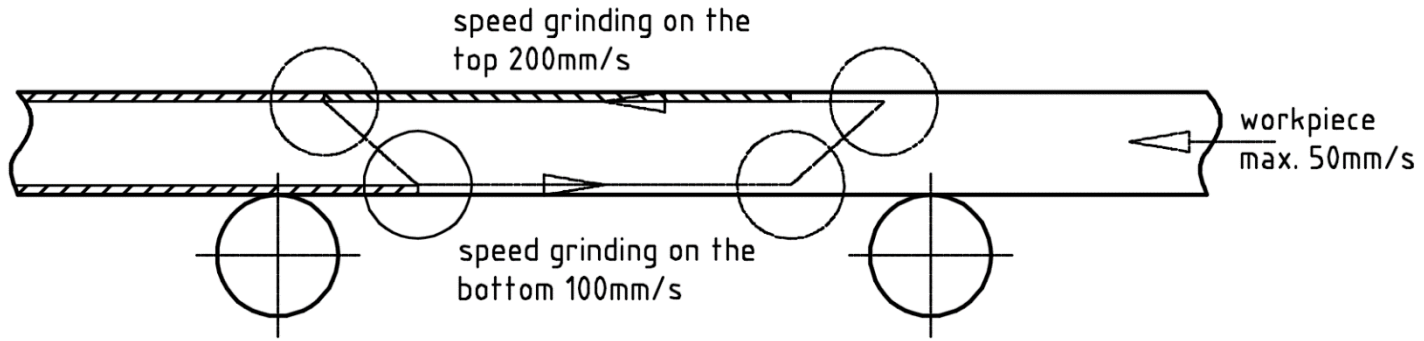
DEBURRING EQUIPMENT, PROCESS DESCRIPTION





DEBURRING EQUIPMENT, LONGITUDINAL DEBURRING OF SLAB

Industrial robot with grinding wheel



DEBURRING EQUIPMENT, LONGITUDINAL DEBURRING OF SLAB

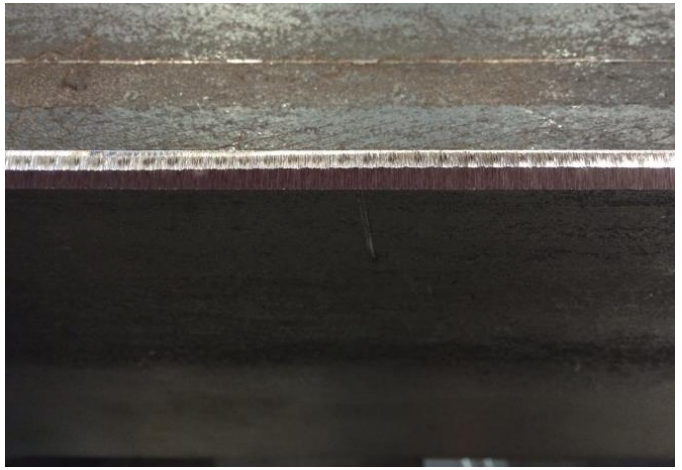
View on outlet area of deburring grinding facility

Deburring grinding facility with 2 deburring grinding machines, type ES 2 R

→ Removal of burr from all 4 longitudinal edges from hot slabs (while slabs are being transported on roller table)

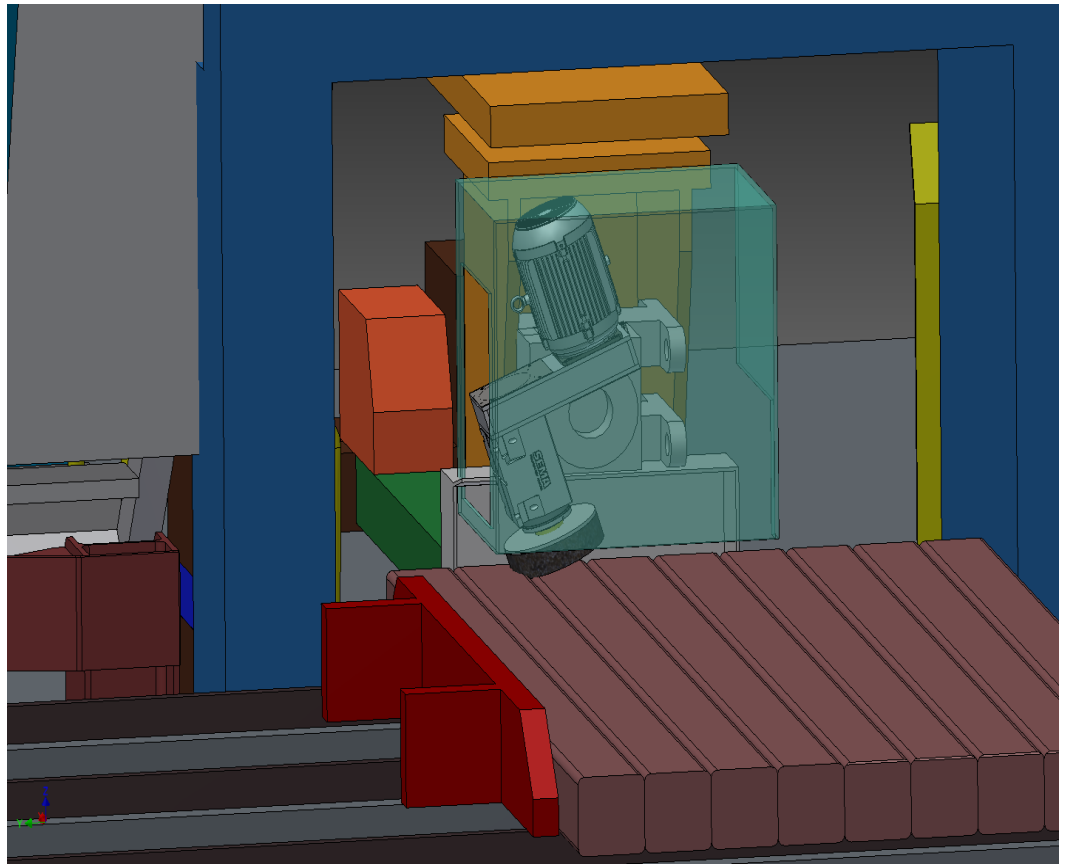
DEBURRING EQUIPMENT, LONGITUDINAL DEBURRING OF SLAB

also double chamfer (2 passes) possible

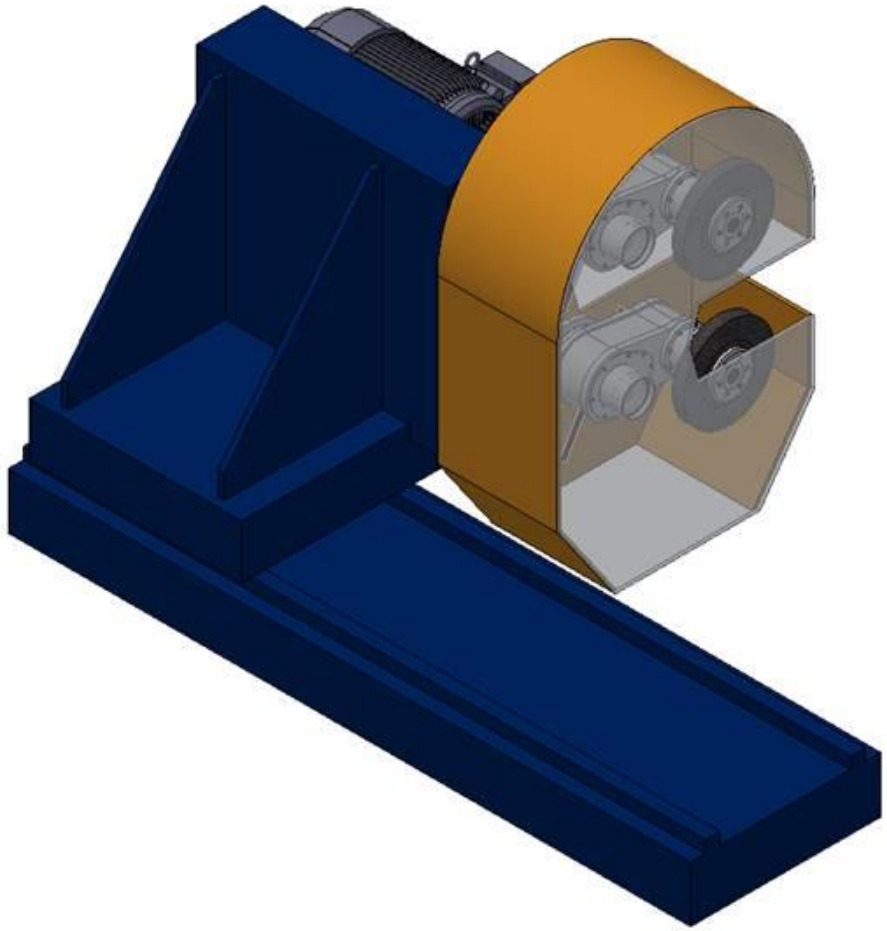


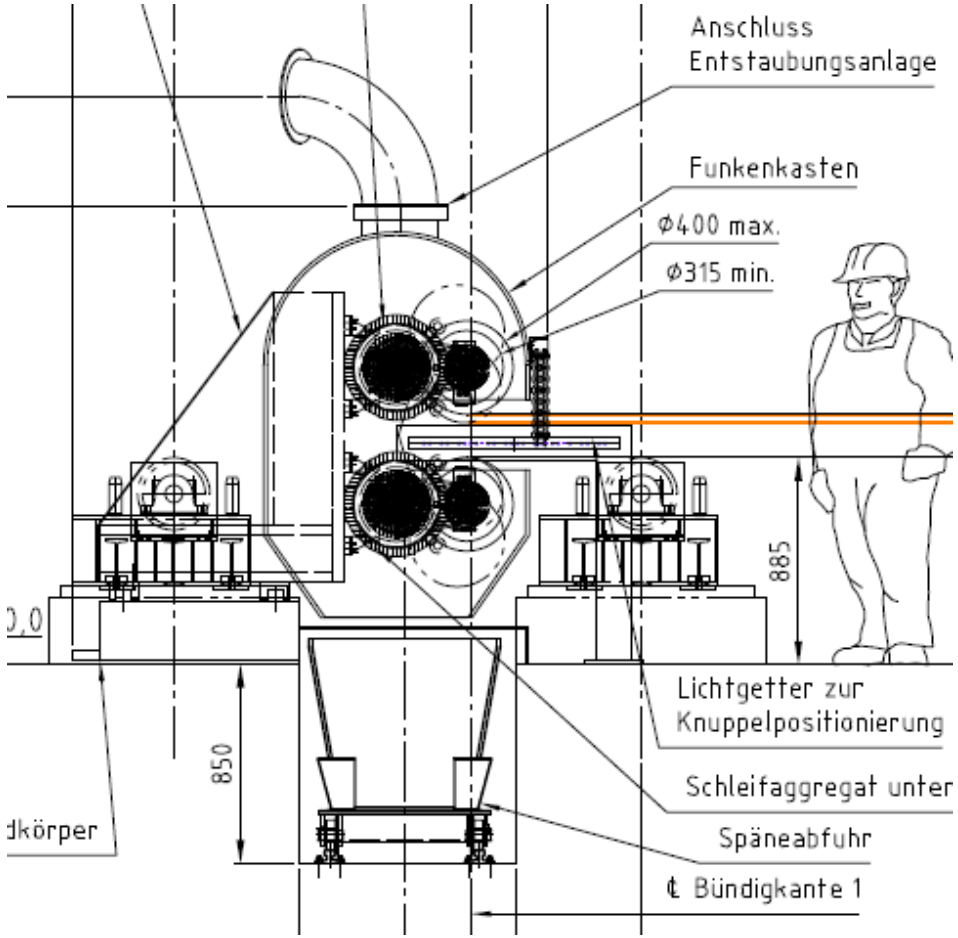
Longitudinal slab edge after deburring grinding (1 pass)

DEBURRING EQUIPMENT, LAYER DEBURRING OF BILLETS AFTER CONTINOUSE CASTER

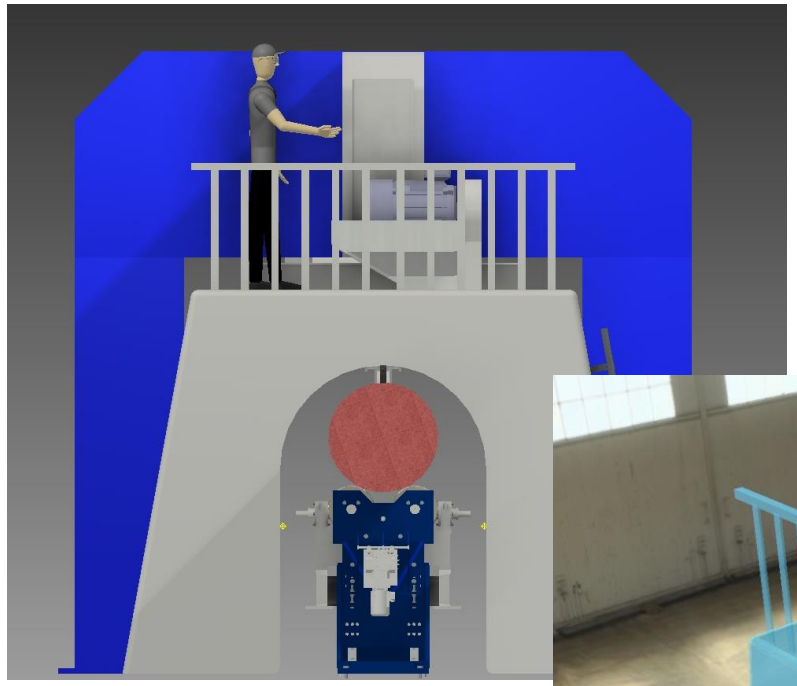


DEBURRING EQUIPMENT, DEBURRING OF SINGLE BILLETS AFTER CONTINOUSE CASTER

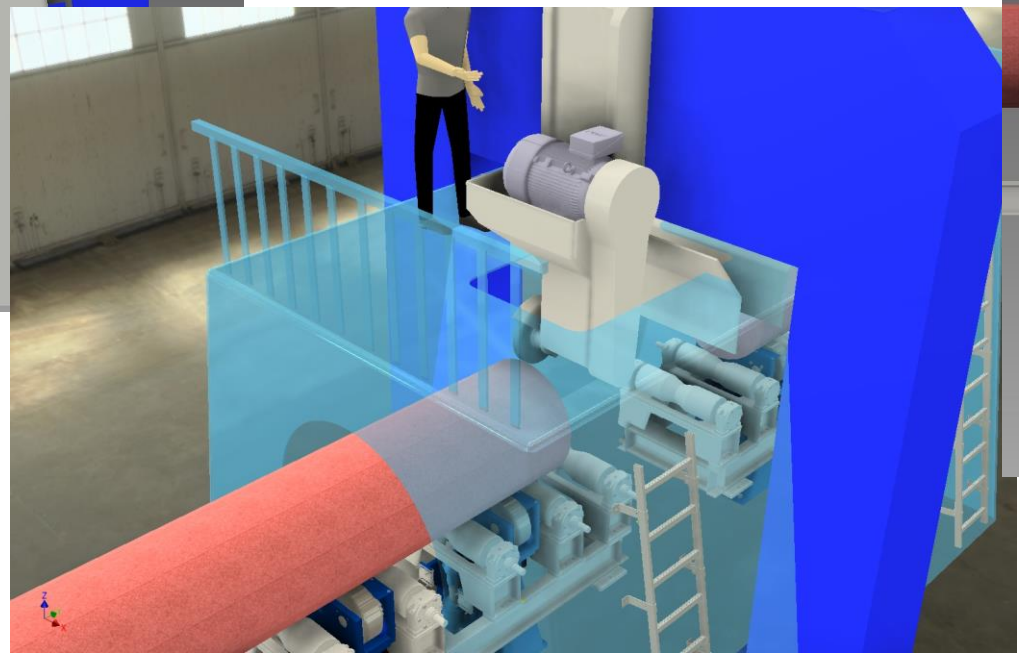


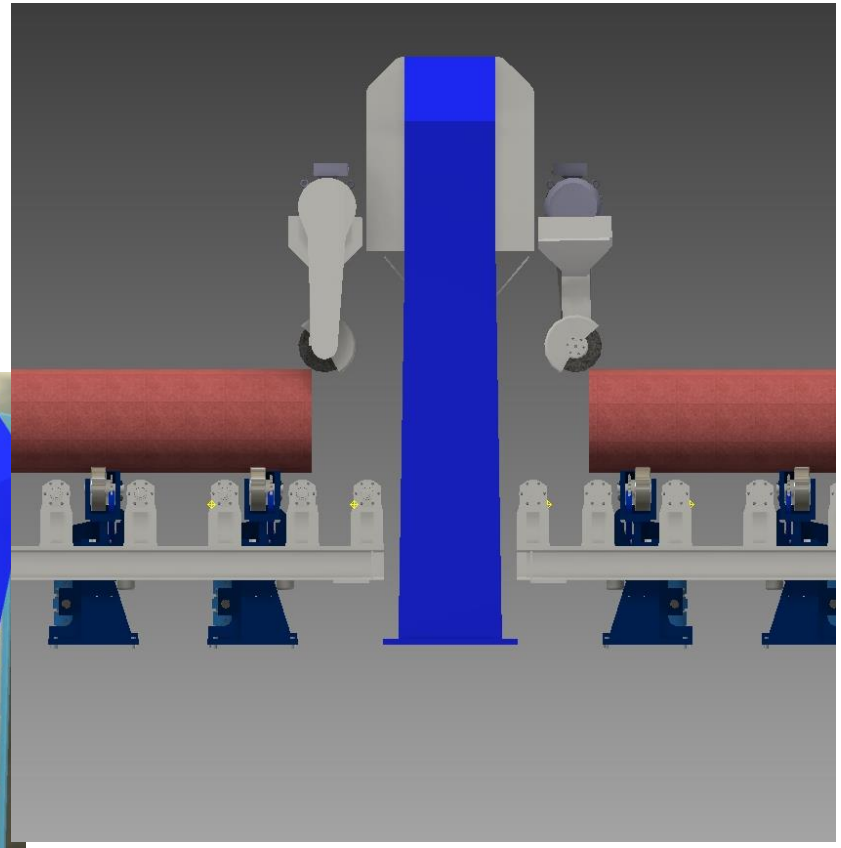


DEBURRING EQUIPMENT, DEBURRING OF ROUND BLOOMS AFTER CONTINOUSE CASTING



Tailor made customized solutions





DEBURRING EQUIPMENT, CHAMFERING OF ROUNDS

Chamfering grinding of head end of remelt ingot after cutting

Electrode with 45° chamfer

CONCLUSION

- SURFACE GRINDING IS THE ENVIRONMENTAL FRIENDLY CONDITIONING SOLUTION
- BRAUN IS YOUR PARTNER FOR TAILORMADE SOLUTIONS
- I´M YOUR CONTACT

FOR FURTHER INFORMATION PLEASE CONTACT…….

Alexander ZEISCHKA
+43-7672-72473-70
a.zeischka@braun.at

BRAUN Maschinenfabrik GmbH
Gmundner Str. 76
A-4840 Vöcklabruck, Austria