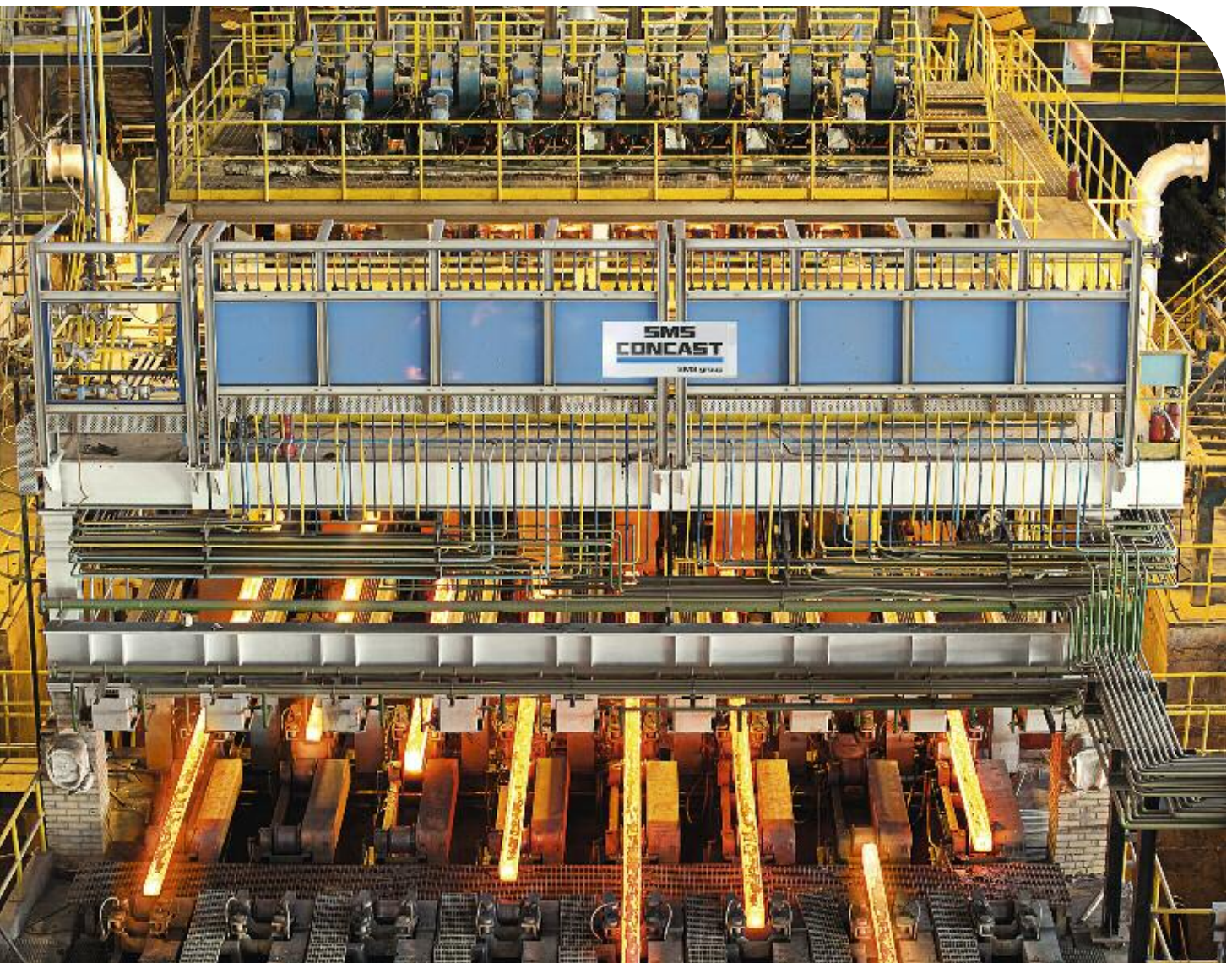


# CONTINUOUS CASTING



# INTRODUCTION

SMS Concast, as a part of the worldwide active SMS group, is proud of its reputation as a market leader in the planning, design and supply of continuous casting plants for long products. Specialised in production facilities for beam blanks, rounds, blooms and billets, the company is an acknowledged innovator in its field of activity.

SMS Concast has significantly influenced and improved the development of the casting industry and has set remarkable benchmarks. Substantiated knowledge of metallurgical process and more than 55 years of experience, optimised with modern automation, guarantees state-of-the-art equipment.

Our casting machines reach an outstanding performance level by achieving a constant and high

quality of the cast products, while the equipment design and manufacturing quality lead to a high availability and consequently to a high productivity.

Our broad know-how and experience allows us to find customised solutions for virtually every task.

Not only for new plants but also for modernisations, SMS Concast offers customised concepts and a large range of special products for improving the quality and production.

Steelmakers can count on SMS Concast to receive comprehensive technological packages. On top, a well approved project execution is a highly estimated service offered by SMS Concast.



6-Strand Billet Caster

# BLOOMS



3-Strand Bloom Caster

Bloom sections are the most widely used primary materials for the production of ultra-clean high strength carbon wire, special forgings, ball bearings and stainless steel products. The high quality of blooms produced on an SMS Concast bloom caster assures final steel products with ultimate cleanliness and sound internal quality for high-end applications. The same applies when the final product is simply large like for heavy axles for trucks, crankshafts, springs or rails.

Rectangular bloom sections range up to 600 mm in width and up to 450 mm in height. Bloom casters can be built with up to 8 strands with machine radii of typically 10 to 16.5 m or even as vertical casters and are equipped with the latest technology as indicated below. Such casters for high-end products do normally include Dynamic Mechanical Soft Reduction DMSR for squeezing the strand. The DMSR reduces the centre porosity and carbon segregation to enhance the final product quality. It is controlled by process simulation software to constantly and dynamically recalculate the actual solidification profile.

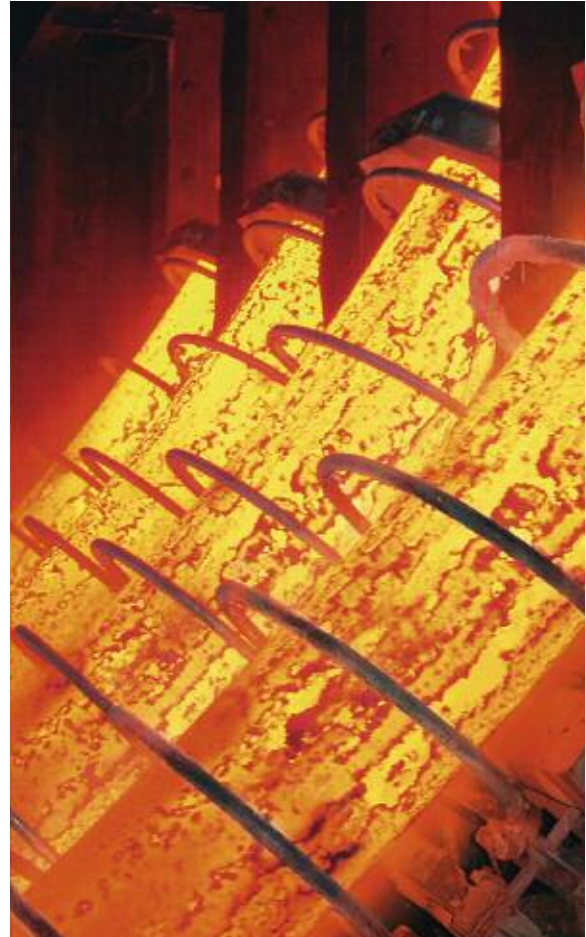
## Main characteristics:

- Large tundish volume for inclusion floating
- Steel flow control with stopper mechanism
- Hydraulic mould oscillation
- Integrated tubular mould or plate mould
- Eddy current mould level measuring
- Electromagnetic mould-, strand- and final stirrer
- Long containment zone
- Air mist secondary cooling
- Dynamic Mechanical Soft Reduction DMSR
- Metallurgical models, dynamic and online within the Level 2 system
- Top or bottom feeding chain dummy bar
- Modern dummy bar system designs for shortest restranding time
- Straightening concepts for biggest section sizes

# ROUND BLOOMS

Round blooms can be cast alternatively to rectangular sections to best suit the final product or finishing process whenever this is required. Round blooms feature the most homogeneous cross section in both temperature distribution and internal structure. Round blooms can be cast up to  $\varnothing$  800 mm with curved casters. As with the blooms, round casters can be designed for up to 8 strands as well. As for the rectangular blooms, the technological limits are pushed in the direction of even larger section sizes. Round blooms up close to  $\varnothing$  1000 mm are therefore conceivable. Dynamic Mechanical Soft Reduction even for round strands is a must for the ultra soundness of the big cross sections. The DMSR process assures the right pressure on the round bloom sections at the trade off point of the mushy bloom zone versus the metallurgical limits.

These casters are equipped with the latest technology as indicated below.



## Main characteristics:

- Steel flow control with stopper mechanism
- Hydraulic mould oscillation
- Tubular mould
- Eddy current mould level measuring
- Electromagnetic mould-, strand- and final stirrer
- Air mist secondary cooling
- Dynamic Mechanical Soft Reduction DMSR
- Metallurgical models, dynamic and online within the Level 2 control system
- Modern dummy bar system designs for shortest restranding time
- Straightening concepts for biggest section sizes

# BEAM BLANKS



Beam blanks are the most typical near-net-shape-products to feed medium and heavy section mills. This very special casting technology, which was invented by SMS Concast, is providing high cost reduction in the rolling of H-shaped sections. The large number of beam blank casters supplied by SMS Concast since 1968 proves competence and technological leadership.

Beam blank section widths range from 250 to 1150 mm whereas the section heights range from 150 to 500 mm. Beam blank casters are built with machine radii of typically 9 to 12 m.

The casters can be equipped with special reheating equipment to control the beam blank tip temperature before entering the straightening zone. This is especially important when micro alloy steel grades are cast with large beam blank sizes in order to control transversal cracks.

The world widest beam blank section with a width of 1150 mm, a height of 490 mm and a web-thickness of 130 mm has been installed and commissioned in February 2008 by SMS Concast at German Peiner Träger GmbH, a subsidiary of the Salzgitter Group.

## Main characteristics:

- Large tundish volume for inclusion floats
- Hydraulic mould oscillation
- Tubular moulds for small and medium sized beam blanks
- Plate moulds for medium and large beam blanks
- Single or double open stream or submerged casting technology
- Air mist secondary cooling
- Water stripper systems
- Special features to cast micro alloyed steel grades
- Systems to control flange tip temperature



Casting of the widest beam blank

# BILLETS

The processed steel grades range from simple construction steel grades (rebar) up to sophisticated Special Bar Qualities (SBO) for automotive and other engineering applications. Furthermore, steel grades for soft steel wires, pre-stressed concrete reinforcing wire, tire cord and stainless steel grades are also typical products of SMS Concast continuous billet casters. Billet sections cover rectangular, square and round sections in the range of 85 to 240 mm. Such casters can be built with up to 10 strands with machine radii of 6 to 10 m.

An especially large variety of different concepts can be found in the discharge area at the end of the casting machine. SMS Concast can provide proven concepts and designs to satisfy the particular needs of every customer such as:

- Direct charging of hot billets to the rolling mill in order to reduce cost for reheating equipment and energy
  - Tertiary slow cooling to allow for sufficient hydrogen diffusion
  - Optimisation of caster throughput for highest productivity at reduced billet handling operations
- In this respect, virtually every casting machine demonstrates its unique and customised discharge concept.

With our marking machine and the associated Optical Product Recognition system OPR, SMS Concast supports the steel plants with the ever more stringent quality requirements of the end users. With its capability for total tracking of the product, the OPR closes the gap in the chain of product tracking from the meltshop to the rolling mill by means of a most reliable system, even if the rolling mill is thousands of kilometres away from the meltshop.

## Main characteristics:

- High productivity plants with up to 2.3 million tons per year
- Large tundish volume for inclusion floating
- CONVEX Technology® and INVEX® moulds for top production and quality
- Cartridge mould design for shortest change over time
- Steel flow control with stopper mechanism
- Hydraulic oscillation
- Mould-, strand- and final stirrer
- Air mist secondary cooling
- SMS Concast Continuous Straightening (CCS) with two or more unbending points
- Rigid dummy bar with automatic disconnection for shortest restranding time

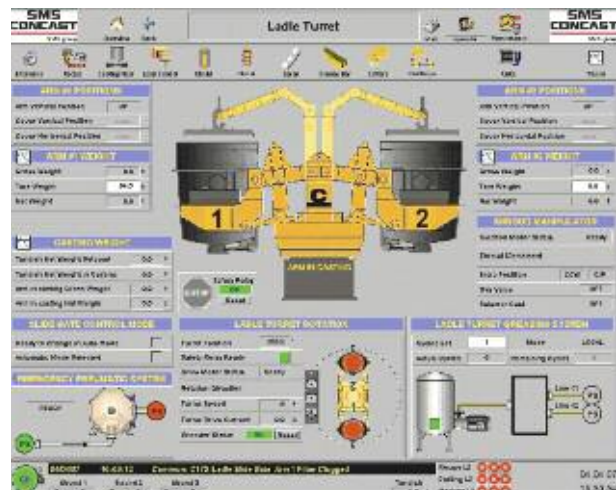
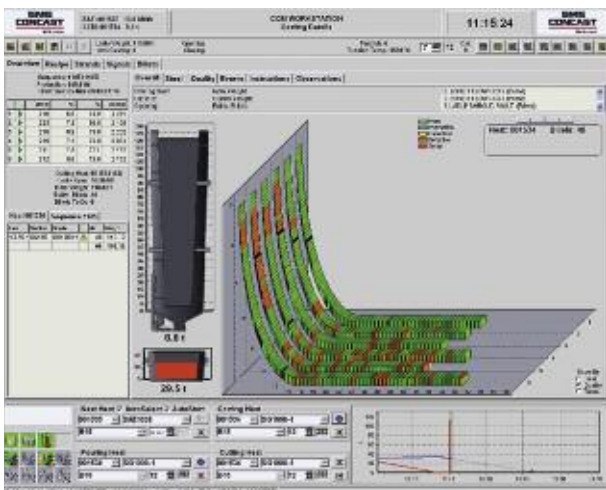


# AUTOMATION

SMS Concast puts a strong effort in building a set of integrated automation and control packages to ensure the best product quality from the very beginning of the solidification process. The integration of innovative sensor networks with advanced control techniques ensures mould liquid steel level stability and reduction of surface defects and maintenance downtimes. Our Level 2 control systems manage the casting process following predefined recipes and set-points established by the metallurgist or the relevant standards. In addition, each casting recipe includes a set of quality evaluation rules that indicate the most favourable conditions to produce the target product quality levels, as well as a set of metallurgical models which allow the casting process to be carried out automatically, reducing the need of operator inputs to the minimum. The process model connects all faculties to an overall optimum performance of SMS Concast.

The technological packages dedicated to billet, bloom and beam blank casting include:

- Steel flow control with stopper mechanism
- Mould level control
- Mould powder level control
- Automatic start of casting
- Mould breakout prevention system
- Mould-, strand- and final stirrer
- Hydraulic mould oscillation
- Heat tracking model
- Real-time quality evaluation
- Cut optimisation model
- Real-time strand solidification model
- On-line/off-line solidification curves calculator
- Dynamic Mechanical Soft Reduction DMSR
- Dynamic secondary cooling control
- Billet/bloom marking machine
- Optical Product Recognition OPR
- Process analysis and simulation
- Metallurgical data management
- Production delays detection
- Equipment life tracking



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**PASSION** for **PROCESS**