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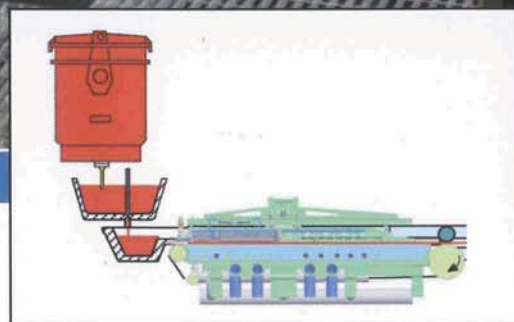
INTERNATIONAL

5
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2010



Regenerative flameless burners for reheating furnaces

Implementation of belt casting technology





Cover photo:
Tenova FlexyTech® TRGX burners at a reheating furnace

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Topical themes

M. Ageno, A. Della Rocca, M. Fantuzzi, M. Senarega

54 Regenerative flameless burners for reheating furnaces

During recent years, Tenova has conducted R&D projects aimed at the reduction of NO_x emissions and fuel consumption of industrial reheating furnaces. FlexyTech® flameless regenerative burners combine the advantages of the flameless combustion technology in terms of very low NO_x emissions and those of the regenerative technology in terms of higher energy efficiency.

Steelmaking

T. Feldhaus, B. Feldhaus

34 Efficient and maintenance-free technology for hot metal desulphurization

The fluidization cone made by Feldhaus-Technik guarantees trouble-free fluidization and even material flow coupled with a minimum of gas consumption over many years. All desulphurization plants at ThyssenKrupp Steel Europe in Duisburg, Germany, are equipped with the new fluidization system. Also Tata Steel in Jamshedpur, India, has installed the new technology.

J. Adams, T. Wübbels, H. Ester, K. Schmale

36 New technologies for BOF primary off-gas cleaning

In BOF plants, nowadays gas cleaning is possible by wet scrubbers or round dry-type electrostatic precipitators. A brand-new process has been developed to upgrade existing gas cleaning systems using wet scrubbers with round wet-type electrostatic precipitators. The combination of these two technologies enables existing BOF scrubber units to comply with most restrictive environmental regulations at very low investment cost.

Automation

P. Traynor

42 Online off-gas analysis for process optimization

Steel mills use process mass spectrometers to optimize a diverse range of hot metal and liquid steel production processes. Modern mass spectrometers are designed with low maintenance in mind, and play an important role in the efficient and safe operation of modern mills.

Modernization

50 New AOD converters at ThyssenKrupp Nirosta Krefeld plant, Germany

ThyssenKrupp Nirosta is one of the market leaders in flat stainless-steel products. To meet the high demands placed on steel quality and plant availability, the company modernized its slab casting plant and replaced two AOD converters.



AOD converter at ThyssenKrupp Nirosta

Metallurgical Plant and Technology

52 Implementation of belt cast technology at Salzgitter Flachstahl, Germany

Salzgitter Flachstahl is implementing a near-net-shape caster featuring belt casting technology. It is the first-time implementation worldwide of this plant technology on an industrial scale. The unique casting concept offers new steel grades and is resource-friendly. The technology has been jointly developed together with SMS Siemag.

Hot rolling

M. R. Bulfone

64 New wide plate mill complex for the Middle East region

A new plate production facility was put into operation in the first quarter of 2009. To cover a wide product range in terms of formats and steel grades the new plate mill is equipped with a modern rolling and finishing line and a separate heat treat line.

M. Zuccato, M. Tomba

70 New mill stand type for long products rolling

The Italian engineering company Pert has developed a new mill stand type to achieve higher yields in new and in revamped rolling mills with low investment costs. It provides for a dramatic increase in rolling load and for quick production programme changes.

M. Biskup

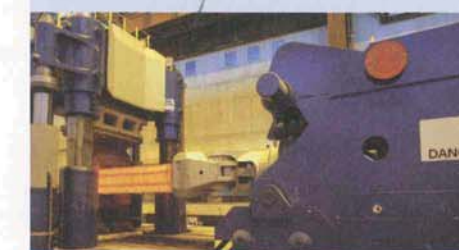
72 Mandrel bars for seamless tube production

Deutsche Edelstahlwerke, a leading producer of long specialty steel products, is one of the companies that manufacture mandrel bars and supplies them to nearly all seamless tube rolling mills of the world. Approximately 5,000 mandrel bars with diameters between 50 and 350 millimetres are produced by Deutsche Edelstahlwerke every year.

Forging

78 Advanced forging and manufacturing capacities at Saarlager, Germany

Saar Forge, Germany, has successfully commissioned its new 120 MN open-die forging press. The company further processes the forgings into heavy shafts (for turbines and generators) and other products, e.g. discs, rings, flange parts, tubes and pipes, cylinders, container parts, tools etc.



Parts weighing up to 250 t can now be produced

R. Grandt, K.-G. Penkatzki

82 Precise contour measurement of railway wheels directly after forging

Bochumer Verein Verkehrstechnik uses a new optical laser gauge to measure wheels for railway vehicles directly after the last forging pass. This enables the company to control the forging process more efficiently, as the operators can immediately intervene whenever the preset tolerances are not fully met.

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New mill stand type for long products rolling

During the last few years the most frequently used type of rolling stands for long products have been housingless and cantilever stands. The Italian engineering company Pert has now developed a new mill stand type to achieve higher yields in new and in revamped rolling mills with low investment costs. This development is a valid alternative to conventional stands as it provides for a dramatic increase in rolling load and for quick production programme changes.

During the last few years the most frequently used type of rolling stands for long products have been housingless and cantilever stands. Frequent requests from steel works aiming at lowering capital investments for complete rolling mills or for revamps of existing plants refer to the following aspects:

- reducing investments in civil works, buildings and cranes,
- reducing equipment delivery times,
- reducing investment cost for the mill train,
- reducing spare parts,
- hydraulics integrated in the machine,
- easy maintenance,
- high-performance equipment.

In other words, the rolling mill operator is primarily interested in lowering costs and increasing yields. In order to cater to these requests and suggestions by production and maintenance managers, Pert has developed the new generation of Bi Support stands (BS type stands). A vertical stand configuration of a roughing stand dia. 550 is shown in **figure 1** in comparison with a traditional stand.

Being a further development of the traditional housingless and cantilever stands, the new BS type stand is a valid alternative to conventional equipment as it provides for a dramatic increase in

rolling load and quick production programme changes. The advantages of this new type of stands can be summarized as follows:

The stand features a compact and rigid construction of the body, which is made of fabricated and not of cast components. Due to the new design, the rolling stands are extremely stiff (**figure 2**). Very close tolerances can be achieved during rolling even with a varying rolling process.

For the new stand rings are used instead of traditional cast iron rolls. Ring shafts of alloy steel are mounted in multi-roll bearings (in the intermediate and finishing area). The radius of the neck is dimensioned to minimize strain concentrations. Adjustment of the ring center distance is by means of simultaneous opening/closing of both shafts by screwing down gears which directly act on eccentric sleeves. The ring center distance will be encoder controlled and displayed at the main control pulpit. Regulation of the ring center distances is by hydraulic motor with double worm screw reduction gear in order to ensure absolute precision. Easy access to the stands facilitates ring change, removal of cobbles, maintenance, regulation of guides. High axial and radial rigidity are among the benefits of the stand design.

The new rolling stand design provides for an operator-friendly arrangement of the rolling line and flexible production of high quality products. In terms of economy and operation, the stands feature various benefits in comparison with today's conventional stands, for example: change-over times are short, downtimes for programme changes are minimized and stand replacement is easily performed. The changing time for a single stand is less than 2.5 minutes.

Due to the fact that horizontal and vertical stands are of the same design, the number of operational spare parts is minimized. Bearings and even the spindles are protected against water and scale. Exchangeable rings fastened on roll shafts result in low operation costs. The use of rolling rings requires smaller tools for machining the grooves and reduced storage space for the rings. The installed rings made of high-strength tool steel make for a longer groove life, resulting in an improved plant utilization factor.

Smaller overall stand dimensions reduce the effort involved in building foundations and require less space

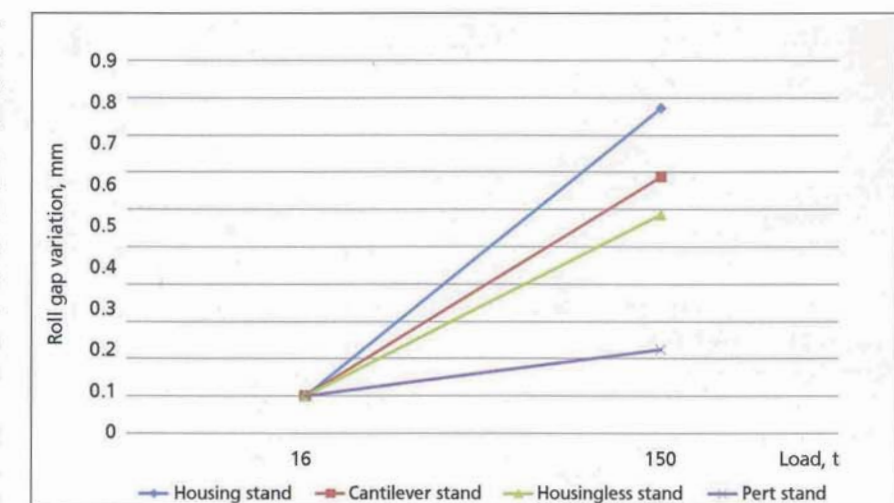


Figure 2. Stiffness of different stand types

in the mill building. Due to the lower weight of the stands, less overhead crane capacity is needed. Erection times are reduced. The new stand developed by Pert can be used in different areas of the mill train. Their reduced dimensions make the stands suitable for installations with limited space or for revamping existing mills.

The newly developed Bi Support stand (BS type) was launched in spring

2010, meeting with great interest in the industry and being confirmed by an immediate contract for the revamping of a bar rolling mill in Ethiopia. Thanks to the installation of the new stand type and a new double strand finishing block, production of the plant will be increased and the quality of the final products improved. After the revamp, the facility will be one of the most modern rolling mills in Africa. ■

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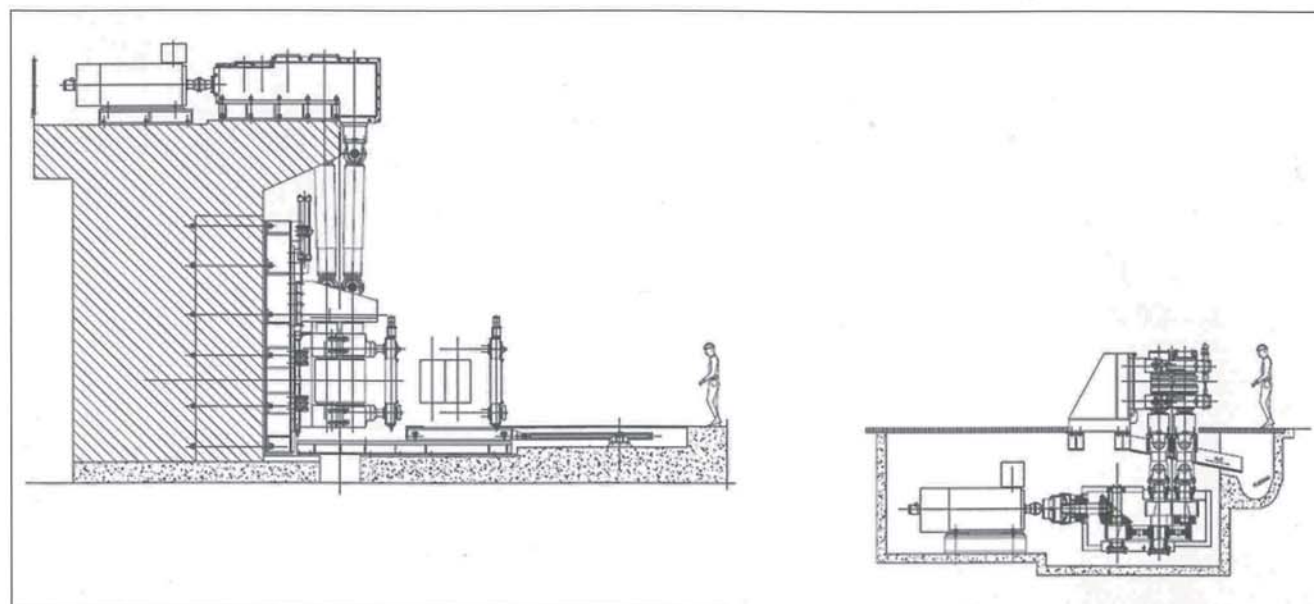


Figure 1. Vertical roughing stand, traditional design (left) and the Bi Support stand (right)