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Trend-setting modernization of the SBQ bar mill at Georgsmarienhütte, Germany

24 World Steel Association outlook for 2013 – 2014

World Steel Association forecasts that global apparent steel use will increase by 2.9% to 1,454 million t in 2013, following growth of 1.2% in 2012. The key risks to the global economy are expected to have all stabilized considerably in early 2013. A recovery in global steel demand is expected to kick in by the second half of the year, led by the emerging economies. In 2014, it is forecast that world steel demand will grow further by 3.2% and will reach 1,500 million t.

Hot rolling

A. Fontanini, N. Tomba, M. Zuccato, M. Tomba

46 Fast ring-locking system for bar and wire rod finishing blocks

With this new locking system for finishing blocks of bar and wire rod mills, ring changing can be accomplished in less than one minute. Presently, without the system, four to five minutes are required. The new system can be introduced without changing the mill configuration.

P. Bobig, F. Perotti, M. R. Bulfone, S. K. Bhaumik, G. Dal Moro

50 Start-up of the semi-continuous hot strip mill at Baosteel Meishan

In only six months from rolling the first coil, the new hot strip mill achieved a production of 68,000 t per week, which represents more than 80% of the rated capacity. This new hot strip mill has become an important asset for the steelmaker.

Strip processing

56 Improved surface quality of electrical steel strip

ThyssenKrupp Electrical Steel has carried out conversion measures at its Gelsenkirchen/Germany site. Significant improvement in the surface quality of grain-oriented electrical steel has been achieved through annealing process modification.



G. Astengo, L. Correale, T. DeLoia

58 Operation of a high production tinning line with insoluble anode technology

The application of Tenova insoluble anode technology minimizes the amount of sludge produced and hence the loss of tin, increasing both quality and productivity at the same time. The article describes the successful operation of a plant at Jiangsu Sunshine, China.

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Fast ring-locking system for bar and wire rod finishing blocks enables quick changeover

Pert has developed a new locking system for finishing blocks of bar and wire rod mills. With this system, ring changing can be accomplished in less than one minute. Presently, without the system, four to five minutes are required. Moreover, the effort involved in ring and groove changing is drastically reduced. The new system can be introduced without changing the mill configuration. By installing the system on existing blocks, its advantages can be directly tapped. The system is adaptable to all types of finishing blocks as well as cantilever stands in intermediate or finishing mills.

Innovation, first of all, means introducing improvements in the production process. But it also means reducing investment and operating costs. Starting out from these considerations, Pert has developed a system for locking/unlocking the rings in the fast finishing blocks in rebar/wire rod lines and in the cantilever stands of intermediate and finishing mills. The new system (**figure 1**) has been named FLUR®: Fast lock/unlock ring system. FLUR is a self-locking system which exploits the power of the incoming rolled bar for the mechanical locking between the ring and the shaft. It allows changing each single ring in approximately one minute; changing all the rings in a 10-pass block would take 20 minutes, requiring only three workers.

With traditional systems, changing one ring typically takes approximately four minutes. In total, 90 minutes are needed to change all the rings in a 10-pass finishing block. Hence, by using the fast lock/unlock ring system, an-

nual production can be significantly increased thanks to the much shorter changeover times in the finishing blocks. As additional hours for production become available, the yield of the rolling mill can be markedly increased.

Additionally, new plants can be designed with lower reheating capacity. In a new rolling mill, less shutdown hours mean more hours available for production. Therefore, for the same annual production, the reheating furnace can be designed for a lower hourly capacity than with a conventional solution. Among other things, this has the advantage of reduced operating costs, in particular lower fuel consumption of the furnace.

The fast lock/unlock ring system does not involve any additional operational costs or require any civil work. The installation time for the system is very short. Therefore the plant must be stopped only for a very brief period for installing the system.

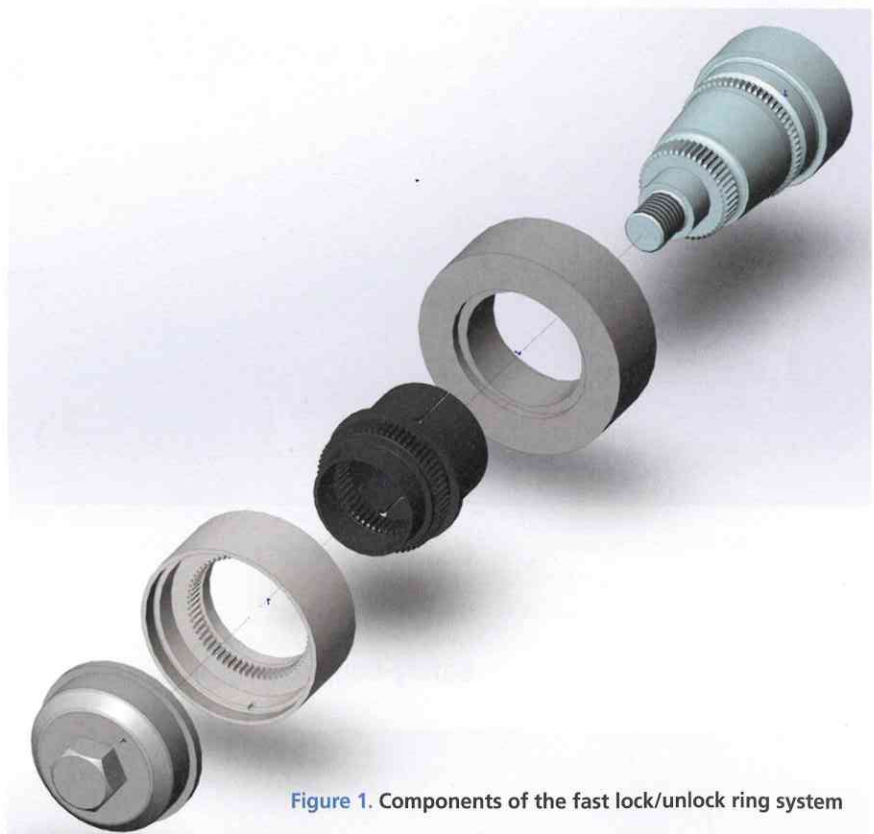


Figure 1. Components of the fast lock/unlock ring system

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Production capacity		Increase		ROI
80 t/h	500,000 t/a	+ 28,880 t/a	+ 5.8%	5 months
110 t/h	650,000 t/a	+ 54,780 t/a	+ 8.4%	2.6 months
130 t/h	800,000 t/a	+ 76,310 t/a	+ 9.5%	2 months
160 t/h	1 million t/a	+ 115,680 t/a	+ 11.6%	1.2 months

Table 1. Potential increase in production for a rebar mill

Production capacity		Strands	Increase		ROI
40 t/h	250,000 t/a	1	+ 6,000 t/a	+ 2.4%	20 months
80 t/h	500,000 t/a	1	+ 22,960 t/a	+ 4.6%	5.2 months
150 t/h	1.0 million t/a	2	+ 81,000 t/a	+ 8.1%	1.5 months
200 t/h	1.5 million t/a	2	+ 142,000 t/a	+ 11%	0.9 months

Table 2. Potential increase in production for a wire rod mill



Figure 2. Traditional locking system for the rings of a wire rod block

Compared to other means of capacity expansion, implementing the fast lock/unlock ring system pays back very quickly, i.e. already after a few months (one – six months). As a comparison, ROI for a billet welder may amount to 18 – 36 months, for multi-slitting technology it may be two years or more.

Rebar mill application

The fast lock/unlock ring system is suited for both high-speed rebar mills and wire rod mills. Approximately 80% of the annual production (500,000 t/year or 80 t/hour respectively) of these rebar mills is accounted by high-speed production of smaller rebar sizes (dia. 8 – 18 mm). Typically, the smaller rebar sizes are simultaneously rolled on two strands in the two 6-stand finishing blocks. Pert high-speed rebar finishing mill, on the other hand, comprises one “2xTechnology®” finishing block equipped with the fast lock/unlock ring system. In any case, there are 24 rings in use. In the standard

mill, ring changing time is four minutes per ring (requiring six workers). With the Pert FLUR system, ring changing time is reduced to one minute per ring (requiring only three workers). With the standard mill, over the year, the ring changing times add up to 482 hours, with the Pert high-speed rebar mill to only 121 hours. This extra working time results in additional production capacity for 28,880 t of rebar. The bigger the production capacity of the plant is, the greater are the benefits introduced by using FLUR system in terms of increasing the yearly production capacity (table 1). The benefits can be summarized as follows:

- Annual production increases between 5.8 and 11.6%.
- Due to the higher yield of the mill, less reheating furnace capacity is required, providing savings on fuel.
- Ring changing can be handled by a smaller team; three workers instead of six.
- Ring changes are performed without any hydraulic or special devices.
- Maintenance becomes easier.
- Safe change operations.

Thanks to the “2xTechnology®” solution, a second fast finishing block becomes superfluous. This results in additional advantages, namely only one quenching line is necessary, less civil work and spare parts are needed.

Wire rod mill application

A typical 80 t/h wire rod mill is equipped with a 10-stand finishing block, where the finishing speed may reach 120 m/s. In such situations, 20 rings are used. Ring changing time is four minutes per ring (involving ten workers). In Pert wire rod mill equipped with the fast lock/unlock ring system, ring changing time is reduced to one minute per ring (requiring only four workers). In the standard mill, annual ring changing times add up to 382 hours, in Pert wire rod mill to only 95 hours. This extra time available translates into additional production capacity for 22,960 t of wire rod. Also here it is true that the bigger the production capacity of the plant is, the greater are the benefits introduced by using FLUR system (table 2). The benefits are very similar to those of the rebar mill application:

- Annual production increases between 2.4 and 11%.
- Due to the higher yield of the mill, less reheating furnace capacity is required, with the associated savings on fuel.
- Ring changing can be handled by a smaller team, only four workers instead of ten.
- Ring changes are performed without any hydraulic or special devices.
- Maintenance becomes easier.

Conclusions

Use of the newly developed FLUR® fast lock/unlock ring system can be implemented without changing the mill configuration. In fact, this technology can be installed on the existing block in just a few days. Thus the advantages of the system can be immediately tapped. The changing operations are easier to be performed, that means more safety and less effort on the part of the worker. The new system, against a modest investment, increases the hours available for production, as the time spent on ring and groove changes is drastically reduced. ■