

Speed measurement on hot rolled strands at Georgsmarienhütte



The size of the process, the speed, the rolled strand geometry and the material temperature play a more crucial role in the modernization of merchant bar mills. The rolling, dressing and straightening of merchant bars today require a precise measurement of the speed. It is the prerequisite for the implementation of modern control concepts that help to achieve smaller manufacturing tolerances, short processing times and because of that reduced manufacturing costs.

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KOCKS hot rolling mill

Georgsmarienhütte GmbH, the merchant bar producer located on the edge of the Teutoburg Forest is well-known for its high-quality steels. Today, the chassis of the new ICE trains, the coating of the American space shuttles and practically every new car rolling off the European production lines are made of the steel of Georgsmarienhütte GmbH. The

Georgsmarienhütte merchant bar mill has a capacity of approx. 600,000 tons of high-grade structural steels, mainly for drop forge and automotive applications. Steels with round shape in the size range of 23 - 125 mm, steels with square cross-section of 50 -120 mm and with flat cross-section which conforms to various DIN standards are rolled. After the rolling of the raw material, there is the sizing rolling depending on the customer's specifications. A cooling bed shear cuts the hot bar to the length of the cooling bed, where, after the cooling, the rolled strands are cropped using a cut-off machine. The dressing and straightening, the cutting to the length of the packing as well as the inspection performed on the testing lines complete the production process.

Flexible rolling process

By integrating a reducing and sizing block (RSB) belonging to the new product generation of

the company Kocks, it is now possible at Georgsmarienhütte to abandon the traditional rolling rhythm from small to big diameters.

The hot rolling mill comprises 5-stand 370 mm 3-roll block which is equipped with a C-module drive system. This C-module drive system is KOCKS latest 3-roll technology. Each C-module has an individual drive. All stands use a roll adjustment and each roll is powered by single drive. The larger adjusting range and the adjustment via remote control enable a so-called „Free-size“ rolling for the whole production ranging from 16 to 75 mm. Within a very short time a dimensional change is therefore possible, regardless of the rolling cycle.

Smaller lot sizes can be rolled at low costs and we succeed in achieving each desired final dimension at short notice. A descaling unit and a vertical loop lifter with a maximum loop height of 550 mm enable the rolling without traction.

The roll-drafting of the RSB is important for the quality adjustment of the finished product. At the same time it is necessary to know the entry speed of the rolled strands into the stand very precisely. Until now, it could only be determined from the speeds of the previous rolling stands, the horizontal two-high stand or the 2-stand 3-roll two-high stand (alternatively) but the well-known problems associated with the calculated speeds, the slippage, etc. emerged. Due to the local distance to the previous stand of approx. 100 m additional deviations between the calculated and the real rolled strand speed were observed. For the modernized control of the rolling mill implemented by the company Alstom, more precise informations about the speed were needed. Therefore, the company decided to utilize the VLM 200 gauge for a contactless measurement. ▶

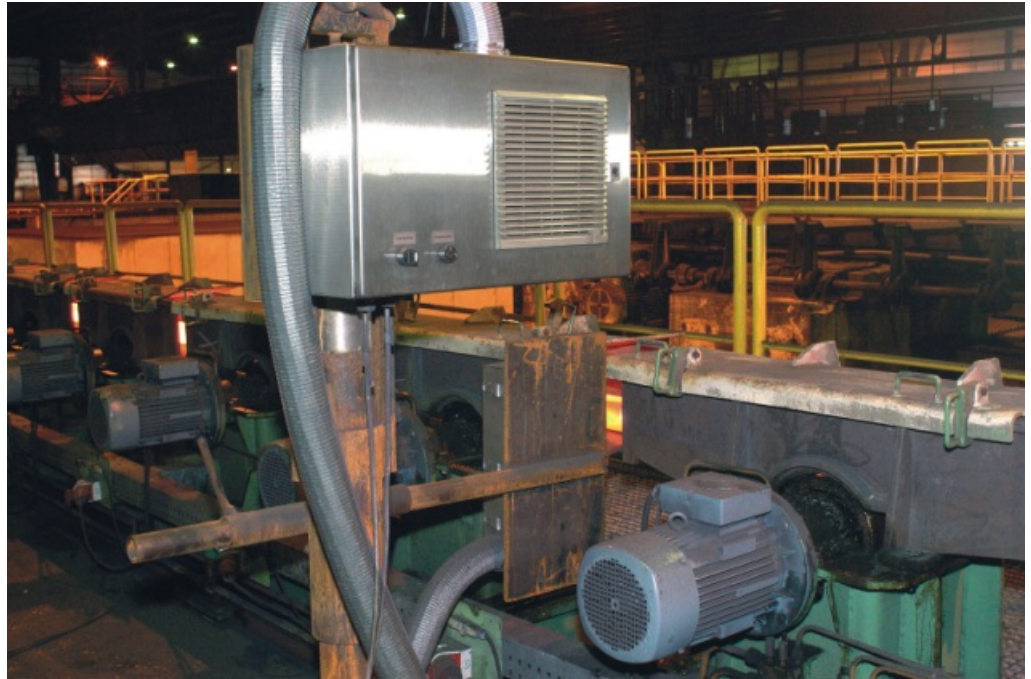
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KOCKS block

This technique developed by ASTECH GmbH had already made a name for itself in the merchant bar industry through the numerous applications on the testing lines. In order to prove the high degree of reliability of the hot rolled strands, a several-week test was made in the plant. The very good results obtained with this technique led, already two months later, to the takeover of the device by the company.

Challenge

The VLM 200 SD/h from the new series of hot appliances which has been developed especially for the measurement on incandescent materials was used. A heat protection filter avoids radiation emission entering into the optics and thus prevents emission load and overload of the sensor. The device operates with a white halogen light. An ASIC (an integrated circuit) ensures that, even at high rolling speeds, all raw values are checked for plausibility, before being, as measured values, included in the follow-up treatment. Thus, steam, scale and similar substances cannot affect unfavourably the measurement result. The high degree of precision results from the hardware reference, and therefore the dimensional accuracy of the sensor itself, a silicon chip that shows the manufacturing tolerances in the nanometer range and has a high temperature and long-term stability.

To assure the mechanical and thermal protection the device is mounted in a stainless steel protective housing. A blast supply system provides the necessary cooling and prevents soiling of the optical windows. The appliance air which is transported via a tube and comes out from the front of the tube is consequently able to keep away the scale and water drops between the measuring window and area. Due to the use of halogen source, the



Contactless speed measurement on rolling mill

advantages of the use on high-reflective metal surfaces also apply to incandescent materials. In the other rolling mills one could prove that the VLM 200 SD/h functions reliably on high-gloss chromium alloys and at material temperatures of 1200 °C.

The use can be extended to a speed difference measurement that consists of two or several measuring areas which can be synchronized electrically via a trigger line. In this way, the speed changes occurring between the rolling blocks can be recorded. It is advantageous for minimum tension controls which prevent the interlacing of rolled strands.

At Georgsmarienhütte rolled strand speeds up to 8 m/s are measured precisely with the VLM 200. After more than one year of use the operator has praised this technique which daily contributes to the quality assurance.



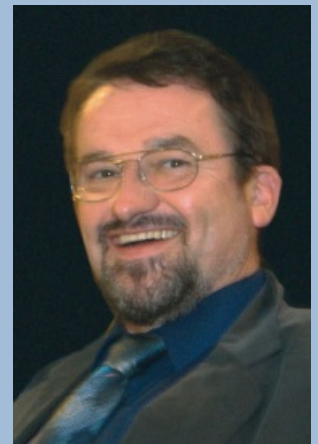
Measuring area of hot rolled strands

Technical office for abroad support

Since the company ASTECH takes the international increased demands into account it has reinforced its staff and established a technical office for abroad support. The new head of the office is Mr Johann J. Olech. With the technical office ASTECH aims to clearly reinforce its presence abroad and to more effectively support the sales network of representatives of 15 states. The area of competence of Mr Olech includes all abroad projects including commissioning and training. In this way, ASTECH meets the increased demands, especially when dealing with transnational projects. At the sales meeting Mr Olech recently led, the latter could prove his wide knowledge in an impressive way thanks to his comparison study of white light and laser speed measurement.

New co-worker

On July 1, 2003, Mr Johann J. Olech took over the new technical office for abroad support. With more than 25 years of professional experience in service activities, among other things as service head at several firms producing laser speed measuring instruments he is a competent worker. Owing to good relationships of many years with the most important rolling mills in the world he has wide knowledge in the field of process technology.



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