

FA 02 New Equipment for Tube Manufacturing

Part 2: Boom in the USA

Fracking is a highly controversial topic and the subject of numerous discussions – not only in Germany. You don't have to be a bona fide environmentalist to be horrified at the idea of pumping highly toxic chemicals into the earth to mine oil and gas. While the pros and cons of this method are being discussed intensely here in Germany, fracking is already so widespread in the USA that it has an immense impact on the oil and gas supply there, not to mention the reported environmental damage.

The new mining methods for oil and gas in the USA have led to a boom in the demand for steel pipes that an increasing number of foreign manufacturers with plants in the USA are looking to satisfy. American companies are also increasing their capacities in order to satisfy the expanding demand. For the Düsseldorf-based machine and plant builder SMS, this development led to the USA being the most stable market for their products in the year 2012. The demand was especially high in the area of tube plant construction.

According to company statements, SMS Meer was able to secure a large share of the market with the PQF (Premium Quality Finishing) rolling technology. One highlight of the new 10 ¾" tube mill for TPCO America in Corpus Christi, Texas, is the so-called BCO (Bilateral Change-Over) construction method. With this technology, the stands on both sides of the mill are changed, so that the rolling force is distributed evenly across the mill. The compact and easily accessible construction makes the mill much more user-friendly. In addition to short changeover times, BCO also ensures significant improvement of wall thickness tolerances.

The plant will produce oil country tubular goods (OCTG) for the crude oil and natural gas industry in the region beginning in October 2014. The PQF mill is designed for a maximum capacity of 534,000 tons per year and is capable of producing tubes with diameters up to 273.1 mm.

Seamless Tubes with Improved Tolerances

In early December 2013, the world's largest pipe manufacturer, Tenaris, ordered a 9 5/8" PQF mill with BCO technology for their Bay City, Texas facility. Tenaris' first seamless pipe plant at a US production facility produces seamless pipes with improved tolerances. Among other things, Tenaris plans to satisfy the heightened demand for precise, high-strength pipes for shale gas extraction in the USA with the new plant. The plant has an annual capacity of 600,000 tons and is scheduled to go into operation in 2016.

One of the non-American companies that are building a new tube mill in the USA is Benteler International AG. With the project, the company plans to "position our steel/tube business area more internationally than previously, and strengthen its presence in one of the major growth markets in international oil and gas exploration," states Chairman of the Board Hubertus Benteler in the company's 2012 business report. The seamless tube plant in Shreveport, located in northwest Louisiana, is scheduled to begin production in the second half of 2015.

To implement the project, Benteler Steel/Tube (BSR) in Paderborn, Germany, signed a contract with Danieli & C. in Buttrio, Italy. The 4 ½" seamless tube mill is dimensioned for an annual capacity of 320,000 tons and is designed to produce high-

quality steel pipe with excellent tolerances and impeccable material properties according to API and ASTM standards once it is completed.

Within the framework of their cooperation with Danieli Centro Tube, the Hilden-based German company Friedrich Kocks GmbH & Co KG will deliver an EXB 315/3 extractor and an SRB 315/30 stretch reducing block for the hot rolling line – the heart of the new plant. With that, BSR has chosen rolling blocks with a modular design featuring adjustable and non-adjustable roll stands. The stands are freely interchangeable and operate with individually driven rolls. Both types of stands can be used in the extractor or the stretch reducing block in any desired stand position. The design also features, for example, a pass remote control system for the adjustable stands, as well as a quick-change system for stands and rolls. These features allow a considerable reduction in the number of stand changes and thus the investment and operating costs otherwise required for optimal production flow.

The automation system enables the visualization of the measured data of the rolling mill, as well as the control of the process in order to minimize heavy ends and wall thickness variation. This in turn ensures a consistently high level production of premium quality seamless tubes, while simultaneously reducing operational errors to an absolute minimum.

New Technology Reduces the Capital Expenditure

In November 2013, Benteler Steel/Tube of Salzburg, Austria, ordered a TemperLine™ system from SMS Elotherm for their new seamless tube mill. The centrepiece of the TemperLine™ are the flexible multi-zone converters with a total installed power of around 10 MW from the Elomat® series. Eight zones of the austenitizing

and annealing section are individually controlled with just three converters to ensure optimum process results. "This line configuration enables the manufacturer to achieve quality metallurgical and geometrical results that are considerably superior to the demands of the applicable API standard," explains Dr. Guido Opezzo from SMS Elotherm. Moreover, Benteler no longer needs to invest in straightening and sizing presses, since the heat treatment on the TemperLine™ produces sufficient straightness and ovality of the pipes, eliminating the need for additional straightening operations.

SMS Meer further developed their process and equipment technology for a new 24" HF tube welding line for California Steel Industries (CSI) of Fontana, California. The manufacturing line is designed for tube production at a speed of 35 m/min, and will produce up to 400,000 tons of tubular goods – primarily line pipes according to API 5L. Next to increased production capacity, the new mill will enable CSI to expand their product range to include outer diameters of up to 24 inches and lengths of up to 80 feet. Moreover, the mill will include an inline and offline quick-change system for the URD stands. This solution offers up to 30 % higher productivity compared to conventional changes using a shop crane.

The quick-change system is supported by the CSS-Quicksetting® system developed by SMS Meer, which uses a database-supported plant setting to ensure that product quality can be reproduced and improved over time. According to the manufacturer, an additional advantage is the travelling MF seam annealing system. In the case of a line stop, this system ensures that pipe sections not sufficiently annealed, and therefore not able to meet the quality standards, will be re-annealed. This

significantly increases the yield of prime material compared with a conventional seam annealing system. The mill is scheduled to go into operation in 2014.

Higher Product Quality and Less Required Maintenance

The contract to deliver a cross rolling mill for the Multistand Pipe Mill (MPM), located in Youngstown, Ohio, comes from Vallourec & Mannesmann Star. With the new mill, the company plans to improve product quality while reducing the amount of maintenance required. Outstanding features of the new barrel-type piercer include increased rigidity, a state-of-the-art disk arrangement and an exit side with the latest generation of three-roller guide pedestals. The Youngstown plant is Vallourec's primary production facility in the USA for hot-rolled seamless tubes, which are used chiefly for oil and gas exploration. Installation of the new equipment is scheduled for the 4th quarter of 2014.

Danieli Centro Tube, a company of the Italian Danieli Group headquartered in Milan, is also involved in V&M STAR's new Youngstown plant. Kocks delivered an extractor and a stretch reducing block of the latest generation. The hot-rolling line is a critical part of the new tube mill. Among other components, it consists of an FQM™ elongator, an EXB extractor and an SRB stretch reducing block. Once completed, the mill will be capable of producing up to 450,000 tons of high-quality seamless tubes with excellent tolerances and flawless material properties per year.

Number of Stand Changes Reduced

The 3-stand extractor and the 24-stand stretch reducing block are both based on the "Star Drive" design with individually driven rolls. Both blocks use 3-roll stands with a nominal roll diameter of 360 mm. The EXB is operated with non-adjustable stands, whereas

the SRB will be equipped with the non-adjustable stands for the reducing passes as well as the adjustable ones for the finishing passes. Special features of the concept include the quick-change system for the stands, as well as the roll shop with quick roll changing system and the remote-controlled pass adjustment for the adjustable stands. This leads to a significant reduction of the stand changes normally required for optimal production.

Borusan Mannesmann also intends to benefit from the growing demand for the pipes used in natural gas and fossil oil production with a new plant in the USA. This Turkish company is among the leading European manufacturers. The new plant will be built on a 500-hectare lot and is designed to produce 300,000 tons of steel pipe per year. The projected annual sales of approximately 500 million US dollars will be achieved by 350 employees. The mill is slated to go into operation in Baytown, Texas (near Houston) in mid-2014, after roughly 150 million dollars in investments. The mill will produce thick-walled, high-tensile steel pipes for natural gas and fossil oil production – OCTG (Oil Country Tubular Goods) and ERW (Electric Resistance Welded) line pipes. The industrial division of Siemens AG is involved in the quench and temper lines with furnaces, quench systems, material handling equipment and control technology.

Spotlight on Progress: The Tube Trade Fair in Düsseldorf

With SMS in Düsseldorf, SMS Meer in Mönchengladbach, SMS Elotherm in Remscheid and Kocks in Hilden, North Rhine-Westphalia is an extraordinary location for the tube plant industry. Very convenient, then, that the world's largest international trade fair for the tube industry is at home in Düsseldorf.

Every other year, the leading trade fair Tube documents the technological advancements in the production and processing of tubes. After the success of Tube 2014, the next international tube trade fair takes place from 4 to 8 April 2016, once again simultaneously with the industry's leading international trade fair, wire, at the Düsseldorf exhibition centre.

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