Mechanical Soft Reduction Technology for Increased Quality Demands in the Future Long Product Market

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Mechanical soft reduction (MSR) is an established technology to improve the internal quality and macrosegregation levels for products with the highest quality demands. A compact design of the MSR units, advanced on-line solidification and temperature modeling, as well as highest accuracies in terms of reduction rate and force stability, ensure a fully efficient and dynamically controlled process based on the actual casting parameters and process conditions. This article shall give insight into the latest MSR developments to meet rising quality standards of advanced applications, the demand for maximum production flexibility and larger rolled sizes with a strong focus on sustainability.

Introduction

Modern steelmaking technologies have enabled producers to create steels with better properties and fewer impurities, for improved quality and consistency of steel products, by using cleaner raw materials and improving melting, refining, and casting processes and equipment.

Advanced sensors and control systems allow for tighter process control during steel production, which results in more uniform and predictable properties within the steel.

The establishment of international standards and certification bodies has pushed manufacturers to comply with higher quality requirements to be competitive in the global market. Governments around the world have been imposing stricter regulations on the performance and safety of infrastructure and consumer products, which in turn requires higher-quality steel.

Industries such as automotive, aerospace, construction and energy have increasingly stringent requirements for the performance of steel products, driving steelmakers to improve quality to meet these demands.

As the steel market is global, producers in every part of the world are competing to supply the best quality material at the most competitive prices, which drives innovation and quality improvements.

These factors collectively contribute to the increased trend in steel quality, enabling industries to produce safer, more reliable, and more efficient products and structures. Steel companies that invest in quality improvement are better positioned to meet the high standards required by their customers and regulatory bodies, and to maintain a competitive edge in the market.

Concerning the continuous casting process of steel, mechanical soft reduction (MSR) has now become an established technology to improve the internal quality and macrosegregation levels for long products with the highest quality demands in all kind of blooms and billets section shapes (rectangular, square, round).

Continuous Casting of Steels and Segregation

Continuous casting has largely replaced ingot casting for mass steel production. In this process, molten steel is poured into a water-cooled mold, which solidifies just enough of the steel to form an external shell. This shell exits the bottom of the mold and is supported by rolls that guide the semisolid strand through