



Remarks on Special Issue on Rolling and Cooling

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Rolling can be defined as plastic working that is performed using rolls or rotating tools. In many cases, steel rolling is performed continuously or semicontinuously with rotating tools, and thus, it is exceptionally efficient. In Japan, the great majority of more than 100 million tons of crude steel produced annually is rolled and shipped in the form of plates, sheets, pipes, shapes, bars, wire rods, etc. Even when compared with the most advanced fields of machining, the high productivity of steel rolling is particularly notable. In addition, unlike steel processing with cutting machines, steel rolling does not produce machining swarf, meaning that the material yield is very high. Thus, it can be said that steel rolling is an extremely efficient mechanical working process from the standpoint of saving resources and energy.

The history of rolling can be traced back to Leonardo da Vinci at the end of the 15th century. Since then, it has undergone tremendous technological progress. In Japan, rolling technology was first introduced from the United States and Europe. During the postwar period of rapid economic growth, when many new rolling mills were constructed in a short period of time, Japan actively developed and put into practical use innovative new rolling technologies. As a result, Japan now has some of the most advanced rolling technologies in the world. Although the recent rate of construction of new mills is not as rapid as in the past, the Japanese steel industry has been developing various new rolling technologies, such as those for energy-efficient rolling operations to cope with hikes in energy prices and for the production of high-function steel products that meet current and future customer needs.

Our company has developed and put into practical application many of these new advanced rolling technologies, several of which are described in the Special Issue of Shinnittetsu Giho, which commemorates the 100th anniversary of the foundation (No. 391; published in November 2011). Since the birth of Nippon Steel & Sumitomo Metal Corporation in October 2012, the company's capacity for technology development in the field of rolling has continually been enhanced with the aim of becoming a world leader in terms of R&D in rolling.

This Giho presents relatively recent examples of R&D in the field of rolling, almost all of which are strongly related to the production of high-function products mentioned above. Through these R&D efforts, the company has been continually improving its technologies to cut the cost, increase the yield, and enhance the productivity of high-function products. In particu-

lar, when it comes to rolling such high-grade steels as high-tensile and high-alloy steels, it is necessary to give special consideration to not only the product size and shape but also the material and surface qualities of the product. In that sense, in the present research on steel rolling, controlling cooling and scale has become an extremely important task. Recent examples of R&D activities on the task are also discussed in this Giho.

I hope that this Giho will help the reader take interest in the technology that supports the rolling processes used in the production of popular steel products such as cars and household appliances and in the R&D that underpins advances in that technology.