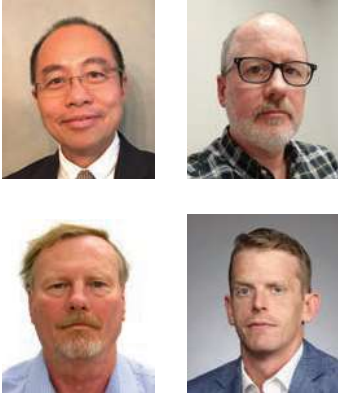


Digital Solutions for the Hot Strip Mill: Leveraging Industry 4.0



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Digital technologies are transforming industry at all levels. Steel has the opportunity to lead all heavy industries as an early adopter of specific digital technologies to improve our sustainability and competitiveness. This column is part of AIST's strategy to become the epicenter for steel's digital transformation, by providing a variety of platforms to showcase and disseminate Industry 4.0 knowledge specific for steel manufacturing, from big-picture concepts to specific processes.

In today's rapidly changing and competitive steel industry, producing consistent and high-quality products while reducing energy consumption and carbon footprint is a complex challenge. To add to the pressure, the industry must also remain nimble in the face of hectic market conditions and shifting workforce dynamics, all while tracking progress toward sustainability goals. Cyberphysical systems (CPS), digital twins and other digital solutions have emerged as valuable tools for navigating these challenges and reducing risks, while increasing the chances of success.¹ These concepts are fundamental to the ideas expressed in Connected Industries, Industry 4.0 and the Industrial Internet Consortium (IIC).² This article will examine the digital solutions that are being used in the hot strip mill. It will also explore the building blocks behind mill simulation technology and how they, combined with the significantly reduced cost and increased performance of sensors and computers, have become the basis for modern digital twins for the hot strip mill.

This article explores real-world examples where digitalization has transformed into practical and proven solutions

that can drive improvements in sustainability, maintainability, quality and productivity. The adoption of these solutions is becoming essential for achieving further improvements and staying competitive in the industry.

Brief History of Hot Strip Mill Automation

Before the 1990s, the main requirement for a metal rolling plant was to maintain operational productivity with high product quality for various steel products produced in diminishing batch sizes due to the just-in-time procurement practices of downstream customers. Beginning in the 1990s, steel producers were

Figure 1

Components of cyberphysical systems.

