Industry 4.0 Boosts the Steel Industry Into a New Era of Digitalization and Smart Technology

Hong Dai and Xiangjun Zuo
CISDI Engineering Co., Ltd.
No.1, Saidi Road, Liangjiang New Area, Chongqing 401122, China
Phone: +86 (23) 6354 5004
Email: hong.a.dai@cisdi.com.cn

ABSTRACT
This paper elaborates the connotation, function and influence of industry 4.0 on the digital and intelligent transformation of iron and steel industry, and summarizes the current integration of digital and intelligent transformation in the iron and steel industry worldwide, as well as analyzes the existing problems. The positive effects of industry 4.0 on transformation and upgrading of iron and steel industry are discussed from the aspects of personalized service, intelligent manufacturing, big data management and supply chain integration. It also expounds the key points of implementing the hierarchical strategy of iron and steel 4.0, and proposes suggestions for steel producers to implement industry 4.0 systematically in terms of intelligent equipment, intelligent factory, intelligent interconnection and basic design.

Keywords: Industry 4.0 Iron and Steel Industry Digitalization Smart Technology

INTRODUCTION
Industry 4.0 is regarded as an important point for the Internet to play its role in production and manufacturing system. Based on intelligent interconnected system, it collects data of featured and personalized requirements, and produces customized products using the intelligent manufacturing system. With the increasing emergence of complex artificial intelligence (AI) systems, the iron and steel industry is in urgent need of improving its production process while expanding the production capacity [1-3]. The process of iron and steel manufacturing is a complex, dynamic and integrated system, involving the integration of multiple factors, dimensions and units in multiple tiers, featuring emergent property rather than simple addition. Industry 4.0 means an iron and steel plant is almost fully intelligent, with operators, products and production equipment fully connected through the Internet of things (IoT). Massive data is acquired by sensors and then translated by artificial intelligence to optimize production lines and generate considerable synergies among devices. At present, the iron and steel industry, especially the Chinese steel producers, is suffering from excess production capacity, supply-demand imbalances and inadequate structure, so the way to implement industry 4.0 in iron and steel industry need to be further studied with innovative thinking, innovative mechanism, innovative pattern and innovative technology to achieve agile manufacturing, delicacy management, intelligent decision-making and operation optimization [4].

1. SMART TECHNOLOGY AND DIGITALIZATION OF IRON AND STEEL INDUSTRY WITH INDUSTRY 4.0
Industry 4.0 is about intelligent manufacturing, which is the development trend of Industrial Internet. The salient feature of industry 4.0 is the incorporation of Cyber Physical System (CPS) into the industrial system to comprehensively promote intelligent manufacturing. Intelligent manufacturing is a realistic need for transformation and upgrading of the iron and steel industry, and is a strong guarantee for the high-quality development of the iron and steel industry. The iron and steel industry has made great progress in basic automation, process automation and enterprise management system, laying a solid foundation for intelligent manufacturing in the iron and steel industry. Digital technologies are changing the world and dramatically improving the way organizations work. Companies that embrace digital technologies can forge new business models, develop innovative products and services, and transform the value chain, which will bring huge potential for value creation, especially for industrial enterprises such as steel producers [2-3].