Journal of Steel Structures & Construction

For the Decarbonized Iron and Steel Industry, Energy-saving Technologies and Mass-thermal Network Optimization are Important

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Iron and steel demand is a leading indicator of national growth and has a major impact on the global economy. Iron and steel manufacturing, which has become the second largest energy user in industry, uses high-temperature furnaces. From 2000 to 2011, the sector's energy consumption increased by 6.2 percent annually, owing to rises in crude steel demand (IEA, 2014). Furthermore, carbon dioxide (CO2) emissions from iron and steel plants account for the largest proportion of CO2 emissions in the industrial sector, at about 27%.

While iron and steel has made significant progress in recent decades, it still has significant potential to reduce energy consumption and CO2 emissions by about 20%, i.e. saving 4.7 EJ of energy and 350 Mt of CO2 . These gains may be made by reducing energy consumption before or after the manufacturing process. As a result, the mass network and thermal network will be used to illustrate primary and secondary energy for further optimization.

When it comes to primary oil, the iron and steel industry consumes the majority of fossil fuels, with coking coal accounting for the majority of energy consumption. Coal provides three quarters of the energy used in the iron and steel industry in 2017. (IEA, 2019).To follow the recent trend of risk management, the construction firms venturing into overseas markets are recommended to hold a global view to identify systemic risks rather than just project-only risks. Some professional reports have forecast ERM to grow in the construction industry. Compared with the traditional approach, ERM enables companies to shift the focus of the risk management function from primarily defensive to increasingly offensive and strategic and provides a new way to improve PRM in construction firms. Given the complexity and diversity of the risks, construction firms have been seen as prime candidates for ERM adoption.

Furthermore, owing to a large number of energy losses, global steel production's real resource efficiency is just 32.9 percent. With the increasingly increasing cost of primary oil, it is critical to increase energy efficiency in the iron and steel industry in order to minimise fossil fuel consumption and global CO2 emissions. To minimise the use of primary energy in steel plants, a variety of energy-saving technologies and steps are used.

In the iron and steel industry, these possible changes include composition management of incoming energy flows, modification of energy-related processes, and utilisation of outgoing flows. Various researches have partly achieved better energy consumption over the past decades, but the overall efficiency has not been significantly increased. Energy-saving technologies will continue to be relevant in the iron and steel industry in the future. These technologies should be tailored based on a mass network in order to reduce energy demands in the iron and steel industry.

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The other significant energy-saving option is secondary energy recovery. By-products and waste heat make up the majority of secondary resources in iron and steel plants. Steelworks, which account for roughly 30% of total energy consumption in s, produce a considerable amount of outgoing excess gases such as coke oven gas (COG), blast furnace gas (BFG), and Linz-Donawitz gas (LDG). These tools may be used as fuel or to produce electricity and heat in a cost-effective manner. Via top pressure recovery turbine (TRT) technology, high-pressure BFG is recycled to generate electricity. COG as a potential feedstock for H2 separation, CH4 enrichment, and methanol processing; for example, has sparked a lot of interest in repurposing these gases to make high-value goods.