Remarks on Special Issue on Systems, Instrumentation, and Control Technologies

Ichiro YOSHIZAWA
General Manager, Head of Div., P.E., Systems & Control Engineering Div.,
Plant Engineering and Facility Management Center

Information and communication technology (ICT) has been advancing relentlessly, and it is quite common for everyone to always be in possession of one or more super high-performance devices (e.g., smartphone) nowadays. It is true that the steel industry, as one of the typical heavy industries, has to keep operating once-constructed steel manufacturing processes for several decades to make the investment profitable. People may think, therefore, that it is difficult to significantly improve their performances in a short period. However, by replacing measuring instruments, control devices, and production control systems, leading-edge fine control technology can be applied even to complicated and large-scale steel manufacturing processes.

Nippon Steel & Sumitomo Metal Corporation introduced computers into the manufacturing sites in the 1960s. Since then, the company has been continuously developing high-technologies in the field of systems, instrumentation, and control technologies, and has been applying such technologies to actual manufacturing processes. The recent improvement in the performance of computers and databases, in particular, is remarkable. The realization of complicated model calculation and high-speed processing of large-scale data along with the appearance of new types of small high-performance devices has made it possible to solve difficult problems that used to be impossible to work on one after another. Meanwhile, further advancement is continuously required in control technology to respond to perpetual customer demands for increasingly upscale steel products and in measuring technology to secure business segments with increasingly strict quality requirements. In addition, recently, manufacturers need to work on new issues such as preservation of the global environment and reduction of labor power in the near future. Furthermore, the appearance of new technological seeds such as the Internet of Things (IoT) and artificial intelligence (AI) will encourage the promotion of technological innovation even at our steel manufacturing sites.

Several processes are involved in steel manufacturing sites, and peculiar issues exist in each of the various product groups and various product types. Therefore, there are various specific element technologies and approaches in the field of systems, instrumentation, and control technologies that we use and we have been promoting development in wide-ranging themes. This special issue introduces as many aspects of our projects as possible. Especially in recent years, new algorithms have been developed to realize analysis and optimization using intelligent systems, in addition to instrumentation and control using advanced technologies. The range of this field, thus, is expanding beyond the existing scope. Although page space is limited, we hope that you enjoy the wide range of systems, instrumentation, and control technologies used in our steel manufacturing sites and maintain an interest in them.