FOREWORD

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In this issue of JFE Technical Report (No. 25), we are pleased to publish a Special Issue on Machine Technology focusing on "Management of high age equipment" in the steel works.

The steel industry is a typical equipment-intensive industry, and JFE Steel also has a huge number of units of production equipment. Since the majority of this equipment is "high age equipment" that was constructed prior to the 1980s, deterioration due to ultra-long-period use has become apparent, for example, in corrosion and fatigue. The importance of operation and maintenance of this aging equipment is increasing with each passing year.

Recently, many accidents, including fires, explosions and equipment breakdowns, have occurred in manufacturing industries in Japan, and it is generally thought that the causes include aging of the equipment itself and retirement of veteran employees with a deep knowledge of that equipment. JFE Steel is no exception to these trends. We have also experienced various accidents and other trouble, and as a result, we have come to recognize that there are human issues in equipment maintenance and as well advanced equipment management is indispensable. Based on this reflection, we began full-scale efforts to realized advanced "management of high age equipment" from the mid 2010s.

The largest challenge is the existence of several million individual units of equipment and other devices in our steel works. Operation and maintenance of all this equipment through a simple extension of the conventional techniques is not realistic, as it would require enormous manpower and cost. Therefore, more efficient measurement and diagnosis technologies, as well as management methods, are demanded as an issue for advanced equipment maintenance.

At JFE Steel, the tasks for realizing this advanced equipment maintenance are broadly divided into four fields of technology. One is high efficiency in equipment management by implementation of an integrated, company-wide management system. The second is high accuracy diagnosis by technologies and multi-dimensional measurement that enables early and efficient identification of locations where deterioration has occurred. The third is effi-

cient execution of renovation construction work and equipment life prolongation and resilience. As for the fourth field, during the past several years, we have been promoting the use of AI, IoT and robotics technologies that realize advanced equipment maintenance in coordination with the above-mentioned three fields.

In this Special Issue, we would like to introduce representative examples of maintenance technology development and use by JFE Steel to date. We will also introduce several diagnostic devices that were developed by companies in the JFE Steel Group.

In the future, we will devote even greater efforts to advanced and "smart" equipment management aimed at stabilizing the foundations of production at a high level, so that JFE Steel can contribute to society as a company that merits the full trust of its customers.

I will be extremely happy if this Special Issue is useful to others who are also involved in equipment management, and is helpful for the safety, security and further development of both the domestic steel industry and manufacturing industries as a whole. I hope that everyone will read these reports, and I look forward to your continuing guidance and encouragement.