FOREWORD

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Steel plates play a key role as basic materials which support the industrial and social infrastructure, beginning with shipbuilding, building construction, bridges and various types of industrial machinery as well as offshore structures, storage tanks, and materials for UOE linepipe. It is no exaggeration to say that the environment surrounding steel plates has been changing dramatically in recent years, supported by the strong growth of the Asian economies led by China. With the continuing expansion in demand for plates, particularly in the shipbuilding and energy sectors, Japanese mills are increasing their production capacity. In Korea and China, not only increases in production capacity but also constructions of new mills are being planned and some of these plants are beginning to come on stream. At the same time, customers' quality requirements are becoming increasingly sophisticated, stricter, and more diverse. To ensure a stable supply of high performance steel plates, even more advanced plate manufacturing technologies are strongly required. This also includes new product development.

Against this background, JFE Steel is working to enhance its total capabilities by introducing the company's unique steel plate manufacturing equipments and developing new high performance plates utilizing these equipments, while also increasing its production capacity for high performance plates. Specifically in 2003–2004, immediately after the birth of JFE Steel, the company newly installed *Super*-OLAC® (On-Line Accelerated Cooling) equipments in the plate mills at West Japan Works (Kurashiki) and East Japan Works (Keihin) in order to realize more advanced thermo mechanical control process (TMCP) technology, which is the core technology for producing high performance plates. Including the plate mill at West Japan Works (Fukuyama), the company now has three plate mills equipped with the *Super*-OLAC. Another world-leading equipment, Heat treatment On-line Process or "HOP®" has also introduced at the Fukuyama plate mill. JFE Steel is actively developing next-generation plate products utilizing these advanced technologies. In 2005, JFE Steel launched an equipment modernization project aiming at increased its plate production capacity, beginning with system renovation for rolling and shearing at the Keihin

plate mill. As a result, the company's plate production in FY2007 is expected to be 5.6 million tons on a slab base. JFE Steel is also continuing its efforts to increase plate capacity in order to ensure a stable supply, and plans to increase plate production to approximately 6 million tons by the end of fiscal 2008 (the end of March 2009).

In order to respond to higher performance in quality in combination with these capacity increases, how to achieve a higher level of TMCP technology and expand application of TMCP has become an extremely important issue, from the viewpoint that TMCP is an on-line technology for improving the strength, toughness and weldability of steel materials. In particular, the world's first commercial process for accelerated cooling immediately after controlled rolling was realized at Fukuyama District in 1980. In the years that followed, this world-class technology flowered in Japan, and JFE Steel devoted great effort to innovative processes and product developments as the pioneer and the consistent leader in this field.

This special issue features recently developed products and technologies, focusing on high performance steel plates developed with TMCP technology utilizing JFE Steel's flagship equipments, the *Super*-OLAC and HOP.

In recent welded structures, more advanced properties of high strength plates with heavier gauge are required associated with high heat input welding and rationalization of welding work. In addition to refining its TMCP technology, therefore, JFE Steel has also developed new welding technologies such as "JFE EWEL®" and "J-STAR® (JFE Spray Transfer Arc Welding)". JFE EWEL is a microstructure control technology for large heat input welding, in which the toughness of heat affected zone (HAZ) is improved by controlling the grain size. J-STAR Welding enables both ultra-less spatter welding and deep penetration requirements. JFE Steel is developing high performance plates for various fields with TMCP technology and welding technology/HAZ microstructural control as mutually-complementary technologies for advanced steel plates and plate applications. For example, the new products for shipbuilding include the plate with 460 MPa class yield strength for container vessels or the heavy gauge crack resistant plates. For products of building construction or construction/industrial machinery, the Heat treatment On-line Process, HOP is utilized. The low-yield ratio (YR) 780 MPa plate with excellent earthquake resistance or the 960/1 100 MPa class yield strength plates with high hydrogen embrittlement resistance has been developed. For the energy application, JFE Steel has developed and applied high toughness 550/600