

FOREWORD

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Steel plates are a representative basic material used for infrastructure such as buildings, bridges, pressure vessels, storage tanks, and pipelines and essential to shipbuilding. Steel plates are also used in many large structures so that their qualitative defects carry an incalculable risk of disaster. For this reason, strict standards require manufacturers to implement complete quality control measures. On the other hand, reductions in public expenditures have required thoroughgoing cost control in recent Japan. Increasing use of weathering steels, which avoid large repainting costs and reduce a life cycle cost of a bridges, is a typical trend. Thus, increasingly advanced properties are being required in steel plates, including higher tensile strength in order to reduce the amount of materials, higher weldability and workability for more efficient fabrication, and better corrosion and fatigue resistance properties for severer conditions.

Japanese steel plate production has kept at around 9 million tons/year, in 1974, since its bottom-out in 1988 after the first Oil Crisis. During this period, four plate mills were shut down in Japan, and efforts shifted from increasing production capacity to various forms of rationalization, such as equipment concentration, yield improvement, energy saving, and labor saving. On the other hand, where product development is concerned, Japanese plate manufacturers established a position as the world's leaders in new technologies such as the thermo-mechanical control process (TMCP), and have been enhancing their development capabilities. Among these trends, JFE Steel's predecessor companies, Kawasaki Steel and NKK, were leaders in steel plate manufacturing in Japan. Thus, the merger in April 2003 of these two companies, which had strengths in mutually complementary areas, created an even stronger plate maker in JFE Steel.

Over the last year, there have also been significant changes in the demand environment for plates. Demand for plates increased, particularly in the shipbuilding industry, due to the economic growth in the East Asian region, centering on China, and the attendant expansion of distribution needs. As a result, Japanese plate mills are now in full operation at a production level of 12 million tons/year. JFE Steel is contributing to the maximum extent

possible, utilizing its plate mill capacity of 5.4 million tons/year.

This special issue of JFE Technical Report introduces areas of plate manufacturing/production where fusion and innovation have been achieved through the merger of JFE Steel's predecessor companies. The *Super-OLAC*[®] realizes a cooling rate equivalent to the theoretical limit, has now been installed in all three of JFE Steel's plate mills as the company's essential plate manufacturing process for product quality. Another epoch-making process is the world's first on-line heating equipment HOP[®] (heat-treatment on-line process), which was put into operation and is now in commercial production at West Japan Works Fukuyama District. The HOP equipment enables on-line tempering for the first time in the world, making it possible to supply tempered steels of high quality with delivery times as short as those of as-rolled plates, in today's tightening supply-and-demand environment. Thus, HOP has overturned the conventional common sense. Moreover, the combination of the uniform cooling capability of the *Super-OLAC* with JFE Steel's high performance cold leveler and HOP has made it possible to supply plates with low residual stress, new easy-to-use "Easyfab[®]" steel plates.

This special issue also introduces representative plate products: For shipbuilding, EWEL[®] with large heat input weldability for high construction efficiency and improved corrosion fatigue resistant steels for the enhanced life cycle value of various vessels. In the field of bridges, the Ni-based high corrosion resistance weathering steels, the airborne salt prediction and the rust stabilization treatments for the minimum life cycle costs and a new high performance steel, "BHS steel." For building construction, a high strength SA440 steel (YS of 440 MPa) with ultra-large heat input weldability based on the EWEL technology, and a new reference design standard strength steel with yield strength of 550 MPa, "HBL385." For the construction/industrial machinery field and energy field, including pressure vessels and penstocks, making full use of the *Super-OLAC* and HOP technologies, JFE Steel also produces a full lineup of products with various high performance features such as high strength, high toughness, excellent weldability, and formability.

As outlined in this foreword, this special issue introduces innovative processes and products in the field of steel plates at JFE Steel. We look forward to the suggestions and criticisms of all those concerned.

In closing, I would like to sincerely request the continuing support and patronage of JFE Steel's many friends.