FOREWORD

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This issue of JFE Technical Report introduces products and technologies related to "Super High-Rise Buildings" and "Steel Sheet Construction Materials" in the field of construction materials in the JFE Group.

■ Super High-Rise Buildings

In super high-rise office buildings constructed in central urban areas, steel frame construction is the main structural type used, and a trend toward larger spans and fewer columns can also be seen. The primary factor in this trend is heightened demand for greater freedom in the use of space, responding to the recent diversification of forms of work and adoption of hybrid designs incorporating other types of facilities in office buildings. As a result of the trend toward large spans/few columns, the requirements placed on steel in advanced super high-rise office buildings in recent years have included even larger cross-sections and higher strength in steel frame members, together with high quality in steel materials and welds from the viewpoint of seismic safety.

In order to meet these social needs, JFE Steel has already commercialized a number of high performance steel materials for building structural use which satisfy both high strength/heavy gauge and weldability requirements as products for super high-rise steel frame buildings. Representative examples include Only One and Number One products such as heavy H-shapes with cross-sectional dimensions in the 700 × 500 series, the 550 N/mm^2 steel plate "HBL385" for building structural use, which offers unique design strength, and high HAZ toughness plates utilizing the "JFE EWEL®" welding technology, which enables control of the microstructure of the heat affected zone in large heat input welding. In addition to these high performance steel products, the JFE Group also possesses a variety of technologies and products which can be applied to super high-rise buildings. First, among technologies for realizing efficient fabrication of steel frames, JFE Engineering's "High speed rotating arc welding process" and JFE Steel's "J-STAR® Welding" may be mentioned as narrow gap welding processes. JFE Group companies have also commercialized various types of hysteresis dampers as generalized vibration damping structure technologies for

recent super high-rise buildings, and are actively developing and applying the analysis/simulation techniques and design techniques required in technical development.

This "Special Issue on Super High-Rise Buildings" introduces representative examples from among the above-mentioned technologies and products related to super high-rise buildings.

■ Steel Sheet Construction Materials

The market for sheet construction materials in Japan is on the order of 4 million tons/year. Sheet construction materials are used in diverse applications in construction, centering on finishing materials such as metal roofing and walls, and also including fixtures, equipment, residential structural members, and the like, and in civil engineering, where applications include sound-insulating walls for expressways, guardrails, etc. Because these materials are frequently applied in outdoor environments, mainly galvanized steel sheets and prepainted sheets are used, considering durability and corrosion resistance. In the fields of sheet construction materials and residential construction materials, members of the JFE Steel Group have developed base materials which take advantage of the features of "steel," and are engaged in development activities, including technologies in the processing-to-use stages. This "Special Issue on Sheet Construction Materials" focuses on these topics.

Against the backdrop of heightened awareness of the environmental problems of energy conservation and reduction of CO_2 emissions, in recent years, JFE Group companies have developed various types of eco-products in the sheet construction materials field. With chromate-free surface treatments beginning to penetrate the construction materials field, JFE Group companies are developing environment-friendly products like "ECOGAL®," which is a chromate-free hot-dip Zn-Al alloy-coated steel sheet, as well as innovative technologies such a geothermal air-conditioning system utilizing steel pipe piles, among others. Details are presented in papers in this special issue.

In 2007, Japan's Building Standards Law was revised as a result of an incident involving falsification of structural calculation document for buildings, and implementation of the law has become stricter. In the field of sheet construction materials, JFE has developed and improved products with high reliability which respond to these circumstances, and is confident that these efforts will win high marks from customers in the future.

As a platform for solving customers' problems together with the customer, JFE Steel has opened and is actively utilizing a Technical Solution Centre for Steel Construction Materials called "THiNK SMART," with the main facilities at the company's East Japan Works (Keihin District). Initially, the focus of THiNK SMART was heavyweight construction products.

However, the area devoted to steel sheet construction materials has been expanded, and the centre is now operating as a base for strengthening collaboration and networks with a wider range of customers.

Through this kind of platform, the entire JFE Group, as one, will continue to grapple with the development of new technologies and products in order to realize JFE Steel's corporate vision of "Contributing to society with the world's most innovative technology."