

FOREWORD

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Today, half a century after the end of the Second World War, Japan is in midst of difficult political and economic changes. As realistic problems, we must decide how we are to deal with the vague anxieties that many feel about an aging society, which will become a fact in the near future, and with changes for the worse in the global environment, given the prolonged economic recession and political turmoil this country has experienced in recent years. Looking back on the last fifty years, at the end of the war Japan was confronted with a devastated national landscape, but the country rebuilt its political institutions and economy and rode the wave of high economic growth that began around 1955, taking full advantage of technical innovation, to become one of the economic superpowers, second only to the United States, with economic growth that sustains a GDP equal to that of the EU. However, the country has been developed based on policies designed to promote industry, and it is an indisputable fact that the resulting inadequacies in the infrastructure are a major cause of distortions in regional society and the life of Japan's people. Economically, we may feel that we have overtaken and surpassed the democratic and cultural welfare states which the advanced nations of Europe and the United States have built over the course of hundreds of years, but where the life of our people is concerned, we have not reached the point where we stand shoulder to shoulder with the other advanced countries. At all levels, there is a constant feeling of dissatisfaction and a lack of the sense of full abundance. Even economically, Japan's companies are under constant pressure to find answers to the problems of international competitiveness and others, and many have not been able to escape a feeling of uneasiness.

Social capital and assets for everyday life include various kinds of structures such as distribution and transportation facilities like roads, ports and harbors, airports, and railways, river and urban facilities such as those for the living environment, and buildings. Of course, all these structures are products of engineering technology. If structures are categorized into their main materials and the components which bear stress, earthwork structures, stone structures, and wooden structures have very long histories, but today, steel structures and concrete structures, used together with earthwork, constitute the majority of building. Even among concrete structures, reinforced concrete and steel framed reinforced concrete are the main component materials. The combined amount of steel used in steel structures and concrete structures is approximately 40 million tons, or about 1/2 of Japan's total steel output. Structures are used to fulfill certain specific functions, and are constructed as products of engineering technology, which should conform to public expectations in terms of economics and the social environment, based on a study of their relative merits.

Steel structures in the broad sense can be classified by form and purpose of use as steel bridges (roadway bridges, railway bridges, etc.), civil engineering structures, and architectural structures. Only civil engineering structures are also indicated in the narrow sense. Including offshore structures and port and harbor structures, structures such as various types of steel structures, foundations structures, pipelines and other transportation facilities, tanks and other storage facilities, and others are

not limited to the surface of the planet, but have expanded without limits, even into space. In the simplest terms, the process of construction of these structures can be divided into three stages: planning (including design), manufacturing and installation, and use. Those who are engaged in the process can be broadly divided into two groups: those involved in the planning and use of the structure, and those who are responsible for its manufacture and installation. Where bridges and civil works are concerned, the planning and use functions are almost always carried out by public enterprises. Electric utilities, railways, and large-scale industrial facilities also frequently have a public coloration. On the other hand, architectural structures, rather than being public facilities, are more often planned and used by private sector institutions, private businesses, and individuals. From the above, it is obvious that there are large differences in the social activities involved in the construction process.

Those responsible for the manufacture and installation of structures are in Japan generally called heavy industry. In terms of industrial sectors, their activities span both metal products and others. However, as manufacturing and installation activities, they are subject to the Construction Industry Law, and such businesses must be conducted with the approval of the Minister of Construction. This point deserves special mention. Approval is required because, unlike other manufacturing industries which are allowed to sell their products to the customer, the completion of the installation of a manufactured product or fabricated item in the location designated by the buyer (planner/user) completes the business or construction of a steel structure.

Looking at the history of Kawasaki Steel's steel structure business, since the company was established in 1950, it has constructed Chiba Works and Mizushima Works, the latter being one of the world's largest steelworks. The construction of one of these huge plants includes land reclamation, port and harbor facilities, power plants, a variety of furnaces beginning with the blast furnace, the series of rolling mills that begins with the roughing mill, and all the related plants. Constructing an integrated steelworks can be thought of as a civil engineering and construction business in which the steel structure business plays the leading part. The machinery and equipment installed through the execution of these projects, has produced products for industrial revival and economic growth, and resources for the recovery and construction of the nation. Following the construction era, how should those technical capabilities be used? Steel has been used in construction since ancient times, and is a valuable and even precious material which has been used in articles which would be impossible without it. Since the Industrial Revolution, steel has been tried in a large number of applications, and has come to be used in structures such as railways and others which have high economic value. In post-war Japan, the production of steel increased from around 1965 onward, the development of building material products was promoted, and large growth was achieved thanks to the outstanding ease of execution and stable form and quality of the material. If the durability and repair/improvement performance of steel can be improved, it will undoubtedly be the most economical and outstanding of building materials.

Kawasaki Steel's civil engineering and construction organization has demonstrated its effectiveness by planning and designing the huge steel structures represented by the company's integrated steelworks, supervising and examining their construction, and delivering the finished product to the production division. The company's engineering division was created on the basis of these technical capabilities, and began to function as a business which uses management and technical capabilities in the areas of construction, civil engineering, and architecture. On the other hand, the manufacturing division is responsible for fabricating structures at the processing centers of Kawaden Co., Ltd.'s two plants at Harima and Chiba and Shikoku Iron Works' Marugame Works. Large-scale projects include the construction of a sintering plant on Mindanao Island in the Philippines, the construction of Tsubarao Steelworks in Brazil, and the fabrication of the world's largest Bullwinkle Jacket in the Gulf of Mexico.

As a full-scale entry into the steel structure business, and particularly in the narrow sense of steel structures, the bridge business, where a full complement of unified functions is needed, the Bridge and Steel Structure Division was established in 1992. The organization of this new division was created by combining part of the engineering division's Civil Engineering Technology Department and the two plants of Kawaden Co., Ltd. and their sales departments. The aim for Kawasaki

Steel, as a steel maker, is not simply to increase its revenues, but to become a pioneer in technical development by making full use of its technology with respect to original steel materials as a producer of steel, its technology in the area of construction materials, and its superb research facilities for research and development, and using steel materials not only in steel structures, but also in the construction business through mutual linkage with its many group companies.

The Hanshin-Awaji Earthquake in 1995 pointed up the fact that man must give full consideration scientifically and technically to his response to nature. In this natural disaster, the superiority of steel as a construction material, as well as its weaknesses, became apparent. Considerable study is required in dealing with these points.

Construction investment in Japan already exceeds ¥80 trillion a year. Thus, technical development for more efficient design and execution are required in order to build the society of the future. At this company, in order to compete successfully with the well-developed software and hardware resources of makers with a long tradition in the steel structure business, we must move forward particularly quickly as a steel maker. This company already has an accurate grasp of the wishes of society and the intentions of its customers, and it is not an exaggeration to say that we are promoting technical development with an uncommonly high level of motivation. This in itself is the mission we have been given, as I have tried to describe it here in part.

Construction will continue as long as mankind survives. Thus far, man has built his dwelling upon the earth, but in the future he will perhaps also build on or under the sea or in space, and we must go on building structures to fulfill that purpose.