

# Looking Ahead to the 21st Century

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It has been thirty years since Kawasaki Steel Technical Research Laboratories, which had been divided between Chiba and Kobe, were consolidated at the present location, Chiba Works, in May 1969 and new facilities were constructed. The roots of the research laboratories can be traced back to the Product Research Section at the company's Works in Kobe, in virtually the same period as the establishment of Kawasaki Steel. Subsequently, the Research Section grew to become the Research Department, and in 1957, it became an independent part of the company's organization, as the Technical Research Laboratories which we have today. Among the important turning points in the history of the Technical Research Laboratories, the year 1969, when the laboratories were consolidated at Chiba, is the most crucial. With the guidance of numerous concerned persons and organizations, beginning with our customers, and also including government agencies, universities, and academic associations, the Technical Research Laboratories have poured great effort into research and development on production technologies and product, with iron and steel as its principal object. On behalf of the Technical Research Laboratories, I would like to express my warm thanks for all the guidance and encouragement which we have received during this period.

Research activities are roughly divided into process research and product research. During the period of rapid growth in iron and steel production until the beginning of the 1970s, the former was our main area of activity, and considerable effort was devoted to research aimed at adapting the technologies which had been introduced from various countries in Europe and the United States, and then improving and further developing them along Japanese way of production. We take pride in the fact that we were able to make some contributions to the establishment of Japanese iron and steel production technology, which today ranks among the best in the world. Since 1973, which was the peak year for crude steel production in Japan, in addition to process research, product development has also assumed increasing importance, and we have put much effort into research and development of new product in order to respond to the wide ranging needs of our customers. Examples of research and development in which process development and product development are closely interrelated can be seen in the development of cold rolled steel sheets with excellent formability. In this research and development, two technologies were simultaneously realized under the mutual collaboration on the basis of material science, namely decarburization technology for refining molten steel to the ultra low concentration range and continuous annealing technology of cold rolled steel sheets. Moreover, it appears that this kind of interrelated research and development will become increasingly important in the coming years.

Considering steel as a material, not only are abundant reserves of iron ore available, but steel is also excellent in recyclability and is superior to other industrial materials in strength relative to the energy required in production. (This index of eco-strength was proposed by Prof. Shigeo Asai of Nagoya University). Thus, from the viewpoint of global environmental preservation, which will become even more important in the future, steel is an excellent material like no other. The fact that

it is possible to control material properties such as elongation, toughness, strength, and others over a wide range, depending on the type and amount of alloying elements added, processing conditions in hot and cold rolling, and heat treatment conditions, is also a remarkable advantage of steel. Moreover, steel is important not only as a basic material, but also as a functional material with excellent electromagnetic properties, which are obtained by the control of the crystallographic structure, and is supporting today's electronic information society. Thus, it can be said that the importance of steel, both as a basic material and as a functional material, remains unchanged as we look ahead to the 21st century. However, without taking excessive pride in such outstanding properties of steel materials, we should intend to promote research and development with the aim of discovering further possibilities, and we will make every effort to contribute in some way to building a society which is in harmony with the environment in the rapidly approaching 21st century.

The present issue is published as a Special Issue of Kawasaki Steel Technical Report commemorating the 30th anniversary of the Technical Research Laboratories. The fruits of research and development in the last ten years in iron and steel technology and in other related technologies have been organized by research division.

In closing, I would like to express once more my profound gratitude for the guidance and support which we have received from all those concerned. At the same time, I also wish to request your continuing guidance and encouragement in the future.