

R&D AND INTELLECTUAL PROPERTY ACTIVITIES

Supporting the Kobe Steel Group, the Technical Development Group is engaged in basic and advanced research. The Kobe Corporate Research Laboratories in the Technical Development Group work closely with development departments in the business segments, applying their wealth of technological expertise to effectively meet customers' needs. Blending technologies in the fields of materials, machinery, the environment, energy and electronics, the laboratories pursue the development of truly distinctive "Only One" products and ever higher levels of manufacturing expertise.

The Kobe Corporate Research Laboratories serve as the Group's R&D base. Combining the specialized technologies of the laboratories, the Technical Development Group undertakes research aimed at enhancing the profitability of the business segments, pioneering new products and technologies for the future.

R&D Activities

• Material Research Laboratory

The Material Research Laboratory (MRL) engages in research based upon four technological fields: refining and solidification, materials design, mechanical working, and surface control. For the materials business, MRL is working to develop new high-performance products based on material and surface design and control, and optimize manufacturing processes. For machinery-related businesses, MRL focuses on creating differentiated products utilizing its expertise in materials. MRL also strives to develop new businesses based on high-value added products.

• Mechanical Engineering Research Laboratory

The Mechanical Engineering Research Laboratory (MERL) conducts research and development in machinery, materials, the environment, energy, and steel structures. Through the use of advanced simulation, testing, measurement, and analysis techniques in the fields of structural, strength, dynamics, acoustics, fluids, thermal, combustion, and chemical technologies, MERL works to enhance product performance, improve production processes and design, and focus on developing new products and technologies in an effort to gain a competitive advantage.

• Production Systems Research Laboratory

The Production Systems Research Laboratory (PSRL) is active in bolstering and innovating production technologies for each of the Group's business segments, utilizing cutting edge technologies for instrumentation and control, production planning, machine systems, information systems and signal processing. With proprietary electronics and system technologies at its core, PSRL is also engaged in the creation of new product menus in machinery-related fields.

• Electronics Research Laboratory

The core technologies of the Electronics Research Laboratory (ERL) include thin-film materials design and film deposition, microfabrication, measurement evaluation, and superconductivity. ERL strives to develop new products and processes for application in such growth fields as electronics and information, next-generation automobiles, energy and biotechnology. ERL is also promoting the application of cutting-edge technologies in production facilities.

• Coal & Energy Technology Department

The Coal & Energy Technology Department (CETD) is developing energy conversion technologies such as the upgrading of brown coal through dewatering and deashing, coal liquefaction, and the hydrocracking of heavy oil. CETD is working to find ways to effectively use the world's untapped natural resources and contribute to securing stable and diversified energy sources for Japan.

• R&D-related subsidiaries

Kobelco Research Institute, Inc.
Shinko Research Co., Ltd.



Kobe Corporate Research Laboratories

Recent R&D Achievements

High-Performance Antibacterial Coating Technology for Consumable Goods

The application fields for KENIFINE, a high-performance anti-bacterial coating developed by MRL in 2001, are growing steadily. Initially, KENIFINE was targeted primarily for use on food machinery, kitchen utensils and medical applications and in care facilities. Since fall 2007, KENIFINE has also been used for nail clippers, ear cleaners, tweezers, bathroom heater and dryer parts, and in gaming halls (pachinko slot machine parlors, game centers, etc.). With this kind of growth in applications, Kobe Steel has decided not to commercialize the product on an exclusive basis, but rather to broadly license the technology to coating-related suppliers with extensive coating know-how and knowledge of customer needs.

Developed by Kobe Steel, KENIFINE is a special nickel-alloy coating technology that works by destroying bacteria with antibacterial ions that seep into the layer of atmospheric water attached to the coating surface. KENIFINE has 10 times the antibacterial properties of existing antibacterial technologies, and 50 times the antifungal properties. In research conducted by Kobe Steel with Dr. Norio Hirano (Faculty of Agriculture, Iwate University) on the SARS-associated coronavirus, and in research with Shizuoka Prefectural Research Institute of Fishery on the parasitic water mold on rainbow trout eggs, KENIFINE was found to have an inhibitive effect.

Orders Brisk for High-Performance Aluminum Sound-Absorbing Panels

Orders have been brisk for high-performance aluminum sound-absorbing panels used for soundproof walls developed by MERL and Shinko Kenzai, Ltd. Public transportation facilities have placed orders for these panels for use along roads and railways, and manufacturing and service industries have placed orders for panels to block out noise around plants and machinery. Orders have also been received for Q-PANE, high-performance, sound-absorbing partition panels that incorporate the same technology used in the aforementioned type. Developed by Shinko Kenzai, Ltd. and Comany Inc., Q-PANE panels are for use in hospital counseling rooms and in the conference rooms of companies and other facilities.

Conventional soundproof and sound insulating walls are composed of sound absorption and insulation sections. In the case of our high-performance aluminum sound-absorbing panels, however, aluminum foil pierced with numerous micro holes replaces the sections containing the sound-absorbing fiber material.

The technology works by converting acoustic energy into thermal energy through the friction generated when vibrating air passes through the micro holes. Moreover, being made of aluminum foil makes the panels highly durable and their environment-friendly structure ensures that they are easy to recycle.

In constructing the panels, MERL uses the same proven technologies that make compressors and construction machinery run silently and that keep the noise levels inside bullet trains to a minimum, providing an optimum acoustic design tailored to the characteristics of the sound source. Shinko Kenzai is responsible for panel sales, with annual sales of more than ¥1.0 billion targeted in fiscal 2011.



Aluminum sound-absorbing panel

Intellectual Property Activities

Intellectual Property Activities: Raising Corporate Value

Strategic intellectual property activities are essential to the Kobe Steel Group's goal of creating and expanding its range of distinctive Only One products. The importance of intellectual property has gained recognition with the recent enactment of the Basic Law on Intellectual Property. At the same time, a three-pronged strategy covering business, R&D and intellectual property has been advocated amid calls for a response to the increasing problems of imitations in Asia and higher incidence of technological leakage from companies.

The Kobe Steel Group is also taking a lead in energetically promoting intellectual property activities that raise corporate value by: (1) implementing three-pronged intellectual property programs, (2) improving cooperation in the area of intellectual property throughout the Group, and (3) establishing a platform for intellectual property activities. Most importantly, we are in the process of constructing a new intellectual property management framework with the goal of shifting to intellectual property management at the product and technology levels.

Overview of Fiscal 2008

In fiscal 2008, Kobe Steel received nearly 530 new patents in Japan, primarily to protect Only One products, which now gives the Company approximately 3,900 total patents. Moreover, as a result of the globalization of its business, Kobe Steel is strengthening its acquisition of new patents overseas, especially in Asia, which now account for almost 35% of the total number of patent applications.