

Research and Development

Research and development activities were almost entirely funded by the Company during fiscal 2018. Combined spending on research and development for the Industrial Machinery Products Business, the Steel and Energy Products Business, and the Other Business amounted to ¥4,506 million (US\$41 million).

Aiming to become a company that contributes to the prosperity of society by generating changes through our innovative technologies, we strive to develop new products and production techniques using our proprietary technologies. To bring these products and techniques to market as soon as possible, we actively promote multidisciplinary and technological tie-ups and joint development.

Business divisions and Group companies collaborate to 1) improve the capabilities, performance, and reliability of core products; 2) develop and nurture offerings in new business fields based on core and differentiated technologies; and 3) promote the development and commercialization of new products through synergies with Group companies.

In order to facilitate R&D across the Group as well as further accelerate the R&D of existing products and the commercialization of products in new business fields, in April 2018 JSW implemented a partial reorganization of the Research and Development Headquarters. Details are as follows:

- (1) The Technological Strategy Office, which was tasked with the planning of R&D-related themes and the commercialization of new business as well as the survey of market and technological trends, has been integrated into the New Business Promotion Headquarters with its functions transferred.
- (2) Each research laboratory has been placed under the authority of the individual plants, and the research laboratories in Hiroshima and Yokohama have been reorganized into the Technological Development Department.

Basic Research and Development Policy

In terms of the promotion and commercialization of new businesses, the New Business Promotion Headquarters collaborates with each business division and prioritizes R&D on new energy and energy savings, information and telecommunications, nanotechnology and materials, aircraft components, and new production technologies, all of which are related directly to JSW's businesses. Through these efforts, we aim to focus on expanding and upgrading core technologies while cultivating and growing existing businesses.

We engage in basic research for future technologies and contemporary social needs and in researching component technologies for existing products. We will build on these efforts to undertake R&D projects that create new



Muroran Research Laboratory



Hiroshima Plant
Technical Development Department



Yokohama Plant
Technical Development Department

products and businesses and pursue innovations for existing products.

The focuses in Machinery Products are to enhance plastics machinery, IT equipment, and other industrial machinery. We will allocate significant resources to such machinery by clarifying that our commercialization framework is open to mergers, acquisitions, and alliances. In Steel Products, we aim for improving profitability of existing products while commercializing new areas.

Activities by Business Segment

Industrial Machinery Products Business

In machine-related product development, we are working to develop advanced processing technology for plastic molding machines; enhance the performance of plastic extruders; improve the functionality and performance of film and sheet equipment; enhance the performance and lower the cost of magnesium injection molding equipment and compressors; and develop manufacturing equipment for fiber-reinforced plastic composite components. We are also incorporating advanced technologies and systems to develop laser annealing equipment and other laser application equipment. R&D spending in this segment was ¥2,024 million (US\$18 million) in fiscal 2018.

Steel and Energy Products Business

Product development centers on developing materials and manufacturing process technologies, notably for clad steel pipes for natural gas transportation pipelines as well as large steel castings and high alloys for high-efficiency thermal power generation. Our technological development focuses on improving materials and element technologies for existing products. Segment R&D spending totaled ¥685 million (US\$6 million) in fiscal 2018.

Other Business

In addition to establishing the structure for commercializing the aircraft business and developing and enhancing materials and element technologies to create lighter and more reliable pressure accumulators for hydrogen fueling stations, we also conduct research into practical application of composite substrates for surface acoustic wave (SAW) devices and development of plasma application equipment. Segment R&D spending totaled ¥1,796 million (US\$16 million) in fiscal 2018.

