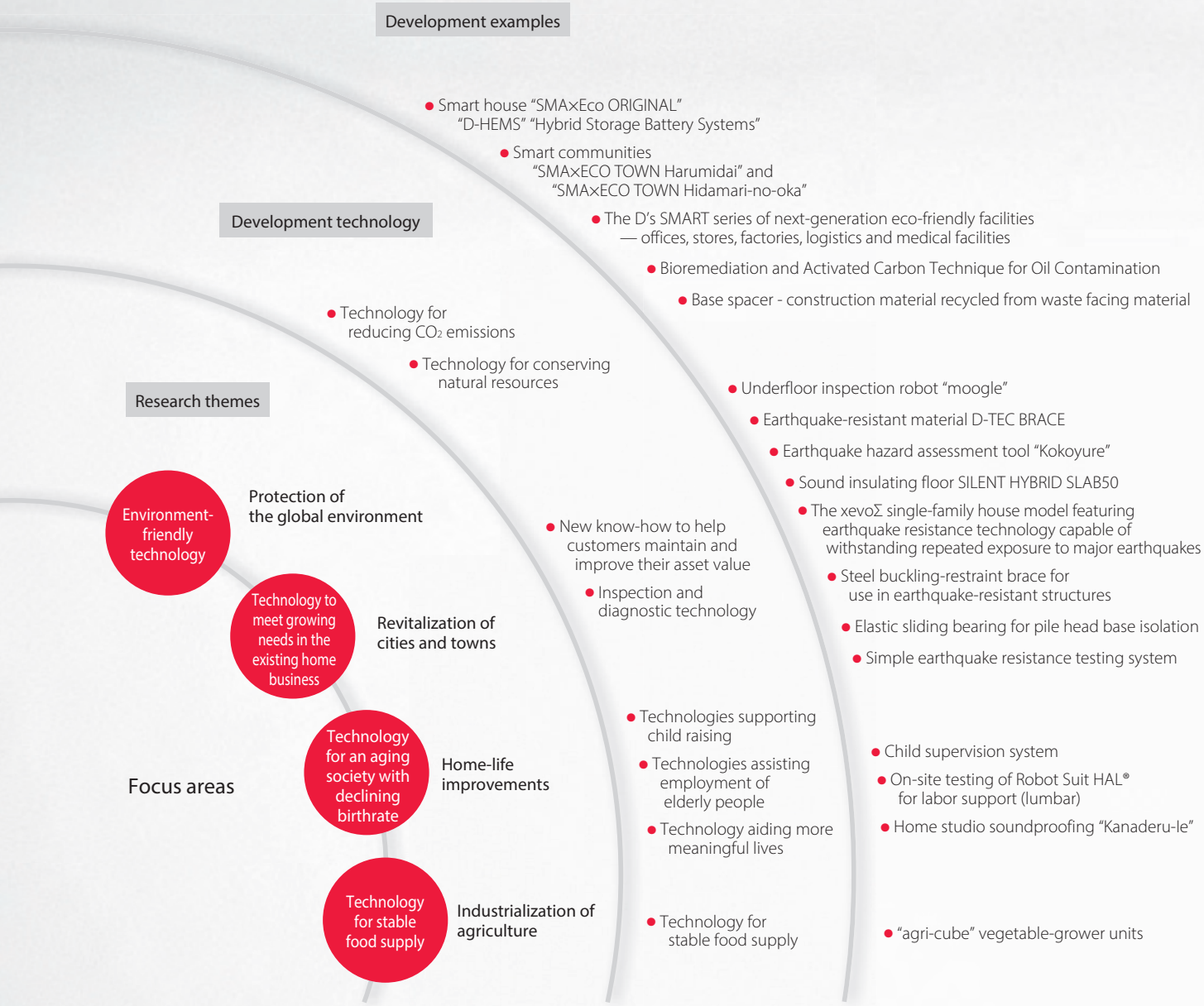
Research & Development

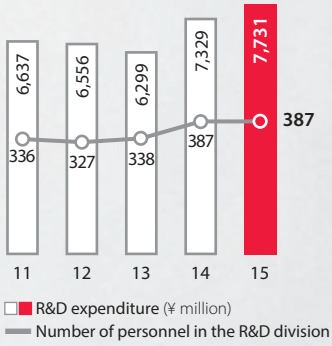
The Daiwa House Group is working in research and development for next-generation technologies in order to provide the products and services required for the many people of the world, to provide new value required for future societies and achieve a sustainable society.

The focus areas of technology research, and related initiatives



The Central Research Laboratory

R&D expenditure, and number of personnel in the R&D division



Measures relating to research and development

Our Central Research Laboratory was established in 1994 under the basic theme of research and development into harmony with the environment. Currently the laboratory is fully engaged in creating new value through progressive research activities to find solutions to the many issues faced by Japanese society, including global warming, shortages of energy and other resources, natural disasters and population aging.

Fiscal 2014 saw the successful development of the Hybrid Storage Battery System, a core technology for smart houses. Because electricity used in homes is alternating current but the power generated by solar cells or accumulated in storage batteries is direct current, up to now each device required a power conditioner to convert to alternating current. The single Hybrid Storage Battery System acts as a power conditioner for both the solar cells and storage batteries, holding down the price and limiting energy loss due to conversion. We have also collaborated with other companies to jointly develop an "elastic sliding bearing for pile head base isolation," which realizes an economic and reasonable base isolation structure primarily for logistics facilities.

Joint industry-academia technological development

In collaboration with Ritsumeikan University, Daiwa House Industry has developed the OIL BACT Method*1 for cleaning up soil polluted by mineral oil. The first such method developed in Japan, OIL BACT utilizes a combination of activated carbon and oil-degrading bacteria*2. This revolutionary new method of cleaning oil-contaminated soil enables the removal of oil odors and films from the sites of former gas stations or factories in only one hour. Compared with the conventional method, in which the surface soil is turned over and replaced by subsoil, this method cuts costs and also lowers the amount of CO_2 released into the atmosphere. We plan to employ the method wherever possible in our retail and wholesale facilities business, thus facilitating the use of the sites of former gas stations, manufacturing plants, and other locations where the soil is contaminated with oil. This will help boost earnings while protecting the environment.

*1 BACT stands for Bioremediation and Activated Carbon Technique (for oil contamination)

*2 The use of oil-degrading bacteria, which consume hydrocarbons like oil, allows the purification of contaminated soil by a natural, biological method that is both low-cost and eco-friendly. When employing such bacteria alone, without the use of activated carbon, the removal of petroleum odors and films takes much longer than with OIL BACT.

Seeking new possibilities through intra-Group synergies

In 2013 we set up the Daiwa House & Fujita Committee with a view to optimally combining the different strengths of Daiwa House Industry and Fujita, and we also established five subcommittees to handle matters such as operations, purchasing and supervision. The Technology Subcommittee set to work to facilitate the joint utilization of the proprietary technologies possessed by the two companies, including such business resources as research staff and facilities, with the aim of enhancing and streamlining the technology development process and investing more efforts in nurturing skilled personnel.

In research and development, we have been concentrating our efforts on the construction of structures in the field of logistics facilities and other non-housing areas, as well as environmental protection technologies, where the two companies' strengths can be effectively leveraged. Regarding human resources development, the two sides have been exchanging technical staff and taking other steps to enhance their abilities in technological proposals and raise the skill levels of their personnel, through joint participation by staff from Fujita and various other Group members in technical training courses and technology workshops. We have also started up a network for the female staff of technology sections and departments as part of our efforts to improve workforce diversity, and will continue working to build such networks for female staff and taking other steps to strengthen female employees' motivation.

Aiming at growth by making the most of our R&D achievements

The first product development to emerge from this system of harnessing intra-Group synergy was the steel buckling-restraint braces for use in earthquake-resistant structures for medium-rise buildings (three to four stories), which we unveiled in February 2014. Following this, we developed a variety of other technologies, including software for analysis of seismic waves, and the Footing Beam Method. These various parts, software, and methods were subsequently put to use in the business operations of a number of Group companies, where they have brought about improved efficiency and cost reductions, and have reinforced the companies' capabilities in proposal-led marketing. We are also working to effect improvements to existing methods by listening carefully to our customers' requirements and suggestions, as well as to the opinions of staff at the actual construction sites.

R&D activities at various Group companies

At Fujita, staff of the Fujita Technology Center are conducting research and development activities in three fields: 1) construction technology, including reinforced concrete structures for super-high-rise buildings, as well as vibration control and seismic isolation technologies; 2) civil engineering technology, including forward probe technology for use in tunneling work, and automated building-erection technologies to meet emergency needs in the event of natural disasters; and 3) environment-related technology, including methods of decontaminating air, water, and soil, as well as environmental assessment and simulation technologies.

In fiscal 2014 Fujita began the full-scale marketing of its FIRST BRACE earthquake-resistant construction brace, which shows superior performance in terms of both tensile and compressive force. In the field of civil engineering technology, the Company developed the Fukko Watcher system, which makes it easy for construction-site personnel to accurately keep tabs on the progress of the concrete pouring and drying process – from initial pouring to curing. This next-generation construction system was applied to work on a road tunnel.

In the field of environmental protection, the company developed the eco-friendly Kankyo No.8 series (Kankyo No.8 and Kankyo No.8R) of foaming agent. This is used in the "air bubble shield" tunneling method, which enables the shield face to maintain stability by injecting small bubbles generated by the foaming agent. With the use of this new agent, the bubbles in the discharged soil after excavation work are defoamed easily and volatilized without discharging substances of concern.

Meanwhile, Daiwa Lease has been constructing self-driving type multi-story parking facilities, and has developed products certified as safe by the Ministry of Land, Infrastructure, Transport and Tourism and other official bodies. These products allow a reduction in the use of fire-resistant coating or fire-retarding compartmentalization, and thus help cut construction costs as well as shortening the time required for construction.

The Fujita Technology Center

Intellectual property

Measures relating to intellectual property

At the Group we operate on the principle that intellectual property is a vital factor in corporate management, and our activities are directed toward securing the Group's competitive superiority, maintaining competitive order, and making full use of intellectual property. The development of new technologies is an essential means of ensuring business continuity and growth. The fruits of such efforts must be secured immediately as legal rights to maintain our position of competitive dominance, and by developing investigative structures for patents and trademarks, and respecting the intellectual property of other companies, we can maintain our competitive precedence. We are also promoting the use of intellectual property, actively licensing our patent rights, the fruits of our technology development. In addition, we also give invention scholarships to employees and hold annual excellent invention contests and competitions, ensuring a greater awareness toward intellectual property.

Thanks to these measures, the number of patents in our possession and the number of patents applied for in Japan have increased, and we have raised the percentage of applications relating to new business fields such as agriculture and electricity in addition to our core business field of construction.

Intellectual property management system

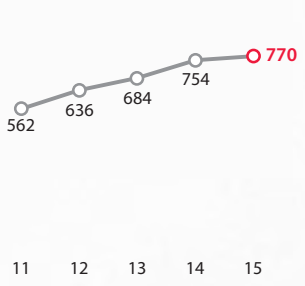
Intellectual Property Office

The Intellectual Property Office, which is attached to the Legal Department, is responsible for investigating matters relating to patent rights, design rights, trademark rights, and copyright, and for establishing such rights in courts of law where necessary and managing them subsequently. It also responds to infringements of intellectual property rights and lawsuits in liaison with the business departments concerned, as well as with the Company's Technology Department. In view of the need for close collaboration to enable quick resolution of urgent issues, staff from this office are permanently stationed at the Group's R&D headquarters – the Central Research Laboratory.

Inventions Committee

The Inventions Committee meets once a month to examine and make decisions on matters relating to the intellectual property possessed by the Company, including applications for registration of inventions or patents, necessity for maintenance of existing patents, advisability of licensing-out of patents, payments of rewards for inventions, and so on. The head of the Technology Division serves as the committee's chairman, and its members comprise the heads of the R&D, product development, and production divisions.

Number of patents in possession
(Patents)



Number of patents applied for in Japan
(Patents)