Research & Development / Intellectual Property Strategy

Yokohama Rubber responds to increasingly diverse customer needs by conducting research and development (R&D) across a wide range of fields, including tires, hoses and couplings, and industrial products. At the same time, we protect our proprietary technologies through patent acquisition and portfolio management, thereby sustaining our competitive advantages.

Basic Policy on R&D

The Group's R&D activities are focused on pushing the global frontiers of technology and delivering pioneering, innovative products to market. Guided by the principles of creativity and ingenuity, applied implementation, and technology integration, we conduct multifaceted and comprehensive R&D spanning material development, product design, testing, and evaluation. Through these efforts, we explore the potential of a wide range of technologies and products, including rubber polymer technology.

Beyond tires, we also leverage innovative thinking unconstrained by conventional assumptions together with cutting-edge technologies to develop new materials and product designs with an eye toward the next generation.

International Research & Development System

The Research and Development Integrated Center (RADIC) at the Hiratsuka Factory plays a central role in our R&D. With "local production for local consumption" as a guiding theme, we are strengthening our R&D activities in regions close to major markets both in Japan and overseas. To date, we have established the Tire Test Center of Asia in Thailand, the Yokohama China Technical Center in China, and the Yokohama Development Center America in North Carolina. New tires are tested through driving tests and multi-faceted testing conducted at test courses at D-PARC and the Hokkaido Tire Test Center in Japan, the Tire Test Center of Asia in Thailand, and the Yokohama Test Center of Sweden. The data obtained through these tests is used to develop next-generation tires.



* Includes evaluation facilities operated under leasing agreements.

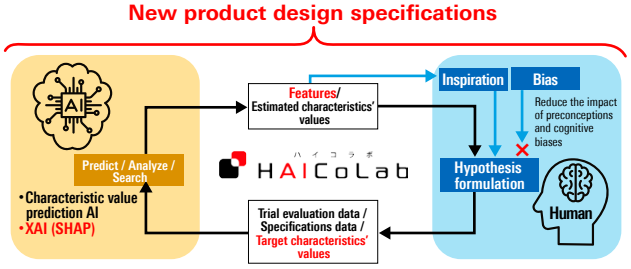
HAICoLab AI-powered Data Utilization Framework

For more than a decade, Yokohama Rubber has been developing technologies to apply computational science and machine learning to materials development. HAICoLab,*1 which has been in practical use since 2020, is our proprietary AI utilization framework that combines simulation technologies with AI technologies while also focusing on human characteristics. By harmonizing human intuition and creativity with AI's ability to process vast amounts of data, we promote new discoveries and aim to drive breakthrough innovation.

In fiscal 2024, we independently developed a tire design support system utilizing explainable AI. This enables engineers to understand and interpret the rationale behind AI-generated recommendations, improving design efficiency for less-experienced engineers while facilitating the development of even higher-performance products.

*1 An acronym for "Humans and AI Collaborate" for digital innovation.

Conceptual diagram of the tire specification examination process using a human-AI collaboration



For More Information About Our Technologies

Further information about our wide-ranging R&D activities and latest innovations is available on the "Yokohama's Innovative Technologies" page of our corporate website.

Yokohama's Innovative Technologies
https://www.y-yokohama.com/global/technology/

Featured Technologies

Next-Generation Mobility and Tire Technologies
Compact, high-load-capacity concept tires/aerodynamics technology/ultra-large tires for mining vehicles, etc.

Core and Sustainable Technologies
HAICoLab, our proprietary AI utilization framework/neo-FIALA analytical model/development of biomass-derived synthetic rubber/SensorTire Technology sensing technology, etc.

Multiple Business (MB) Technologies
Conveyor belts combining flame resistance and ultra-high wear resistance/automotive air-conditioning hoses delivering substantial weight reductions, etc.

Research & Development / Intellectual Property Strategy

Intellectual Property Strategy

We consider intellectual property to be an important foundation for business and proactively promote intellectual property-related activities to realize our business and sustainability strategies based on the medium-term management plan "YX2026."

We emphasize building a optimized intellectual property portfolio, and strategically and efficiently acquiring and managing the intellectual property required for our business activities, thereby maximizing the effectiveness of our intellectual property investments. We also continuously review and strengthen our intellectual property activities to maintain an optimal intellectual property framework.

Intellectual Property Portfolio Promotion Program

We position Intellectual Property Strategy as an important management strategy for innovation and sustained business growth. Through our Intellectual Property Portfolio Promotion Program, we promote the following initiatives.

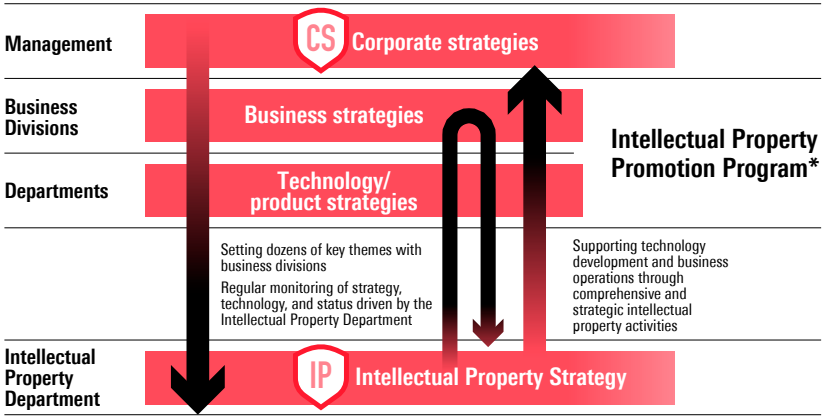
We currently work with business divisions on more than 50 themes annually to advance intellectual property activities. Through these efforts, we strategically leverage intellectual property to accelerate innovation and drive business growth.

• Strategic Development of Intellectual Property Portfolios

Based on management, business, technology, and product strategies, the Intellectual Property Department gathers and analyzes internal and external information and works with business divisions to propose the acquisition of patents, designs, trademarks, and other rights, thereby developing optimal intellectual property portfolios.

• Integrated Intellectual Property Activities

For each theme, we develop intellectual property activities with appropriate timing from a multifaceted perspective, including the details of rights acquisition, the status of intellectual property inside and outside the company, freedom-to-operate (FTO) analyses (investigation of the risk of infringement of third-party rights), and evaluating combinations of patents, design rights, and other forms of intellectual protection.



* Patented (Japanese Patent No. 5327365)

Strengthening Intellectual Property Management

While intellectual property rights, such as patents and design rights, are expensive to maintain, they play an important role in protecting our business and securing a competitive advantage.

We evaluate the effectiveness and validity of our intellectual property rights every year and review and refresh our portfolios as necessary to develop and maintain the intellectual property portfolios required for our business activities. This approach increases the efficiency of investments in intellectual property while ensuring both the protection of our businesses and technologies and the effective utilization of our intellectual property investments.

We also actively pursue legal action and other measures against infringements of our intellectual property rights by third parties, maximizing the value of those rights and supporting sustained business growth. For example, in November 2024, we successfully had counterfeit versions of our ADVAN Racing sports aluminum alloy wheels seized from a manufacturer in Hubei Province, China, through an administrative enforcement action conducted by the local market supervision authority. We will continue taking a firm stance against activities that damage our brands, including the manufacture and sale of counterfeit products, to ensure that all customers can use our products with confidence.

In recent years, the number of Group companies has increased both in Japan and overseas through M&A. While each Group company is principally responsible for conducting its own intellectual property activities independently, we maintain a framework under which specialized the Intellectual Property Department provide support across the Group when necessary.



Counterfeit products manufactured by the company subjected to administrative enforcement action

Future Issues and Measures

One of our key challenges is making more effective use of the vast and diverse R&D data accumulated over many years, including data from commercial products and laboratory sample testing, simulation results, and manufacturing and processing conditions. We will work on further enhancing the infrastructure that enables engineers to utilize this data more effectively, supporting individual skill development, generating new insights, and facilitating the quantification of tacit knowledge for technical skill transfer.

We face intellectual property-related challenges such as intensifying global competition, expanding sustainability requirements, and the increasing sophistication of intellectual property rights. We will strengthen our intellectual property strategy through initiatives such as optimizing our intellectual property portfolios, enhancing enforcement of intellectual property rights, and strengthening collaboration across the Group, thereby supporting sustained growth.