

Technology and Innovation

New Core Competency

Bridgestone E8 Commitment

- Energy
- Ecology
- Efficiency
- Extension
- Emotion
- Empowerment

“Technology and innovation” is one of the new core competencies supporting the evolution of the Group’s businesses. The Group will combine the strong “real” capabilities it has cultivated throughout its history with “digital” capabilities. It aims to generate technology and innovation through co-creation with stakeholders to create new value.

Full-scale Operation of Bridgestone Innovation Park: From Interaction with Empathy to Co-creation

Bridgestone’s R&D facility in Kodaira, Tokyo was redeveloped as Bridgestone Innovation Park, a global hub for innovation that helps the Company connect with employees, society, partners, and customers to create new value. Full-scale operation commenced in 2022. Bridgestone Innovation Park consists of three main facilities designed to promote interaction with empathy and cultivate relationships through co-ideation and co-R&D to realize co-creation of value. First, Bridgestone Innovation Gallery aims to acquire empathy by showcasing the Group’s history, DNA, business activities, and future initiatives. Second, B-Innovation is an innovation center composed of Bridgestone Open Innovation Hub, where people can view and engage with core Bridgestone technologies and products with the aim of giving rise to new ideas, the Rough Prototyping Studio, where machine tools are used to give shape to ideas, and the Co-creation Office, which is open to external partners. Third, B-Mobility is a proving ground that can be used to quickly experience and verify the performance and potential of prototype mobility technologies and products with actual vehicles.

Bridgestone Innovation Park aims to accelerate innovation in technology, business models, and design through co-creation. The Group will also promote more agile R&D by combining strong “real” capabilities, such as the craftsperson skill of mastering rubber that has been cultivated since its founding, with “digital” capabilities, such as simulations, to repeat the process of developing and testing new ideas immediately. In 2022, around 1,000 people visited the Open Innovation Hub, giving rise to roughly 200 seeds of co-creation, 10 of which have progressed to a joint research stage. Co-creation initiatives are being conducted in a limited members-only area designed specifically for this purpose.

Starting in 2023, Bridgestone Innovation Park will also be used as a base for the Japan tire business to encourage co-creation by integrating R&B (research and business). The Bridgestone Group is committed to working with employees, society, partners, and customers to realize a sustainable society through co-creation.



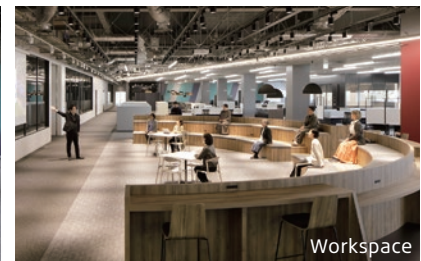
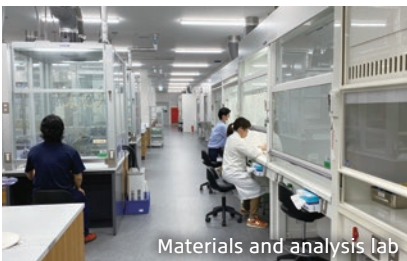
Kikuno Yamamoto
Specialist, Business
Development Strategy
Planning Department

One of my roles at the Open Innovation Hub is to help partners who have empathized with Bridgestone to understand the potential for value creation with the Company, and facilitate internal and external co-creation.

In the year since we began full-scale operation, many people with whom we had no previous contact have come to the Open Innovation Hub. Our circle of potential co-creation partners is expanding, and many visitors have commented that they could see how committed we are to co-creation. As a new initiative, we are also taking on the challenge of approaching co-creation opportunities based on affinity between our visions. We are excited about the prospect of creating new value together with our various stakeholders. Please watch for future developments at the Open Innovation Hub.



**Bridgestone
Innovation
Park**



Three Forms of “Mastering” Driving Technology and Innovation

The Bridgestone Group is constantly reinforcing its three masteries—mastering rubber, mastering road contact, and mastering manufacturing—as the core of its technology and innovation.

1. Mastering Rubber

Rubber, the main material in tires, has a unique material characteristic called “viscoelasticity”, and its complex nature makes it extremely difficult to handle at development and manufacturing sites. The Group has overcome these difficulties by making full use of the overwhelming experience and data accumulated by its experts in the field over many years as a leader in the tire and rubber industry, and have created highly acclaimed Dan-Totsu products. By combining these strong “real” capabilities with “digital” capabilities and utilizing materials informatics, the Group is driving the development of double network rubber, which simultaneously realizes both fuel efficiency and durability. From 2027, the Group aims to build this core technology into the Bridgestone MASTERCORE tires for off-the-road mining vehicles that are the core of the “new premium”, where its effects can be maximized. The development of sustainable materials such as recyclable rubber will also remain a priority.

2. Mastering Road Contact

The Group aims to further evolve its mastery of road contact by combining knowledge of the world’s roads, which has been reinforced and expanded through global motorsports activities, with digital technology.

One example is the advanced design simulation that comes from combining structural CAE (computer aided engineering) with our strong “real” capabilities. The Group has a vast amount of high-quality market and tire information. By combining this information with structural CAE, advanced design simulations can be done. It is possible to simulate the deformation and contact behavior of tires not only on snow and wet road surfaces, but also on soil and sand. Furthermore, by integrating it with other models, combined simulation of tires and suspensions or tires and vehicles is also possible. The Group’s Dan-Totsu tires for mining, Bridgestone MASTERCORE and the “new premium” ENLITEN were developed by combining strong real-world expertise with advanced design simulation.

The Group will create digital twin simulations that can reproduce tire usage conditions for each product market, including road surfaces, based on strong real-world expertise cultivated over many years. Toward 2030, the aim is to

realize a digital twin mastering road contact, which will enable real-time remote monitoring of tires on the market.

3. Mastering Manufacturing: Green & Smart Factories

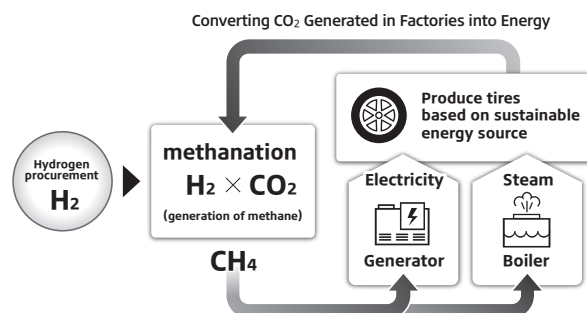
In manufacturing, the Bridgestone Group aims to establish Green & Smart factories that are rooted in sustainability and the creation of new value by digitally connecting the entire value chain.

» Green Factories

To establish green factories, the Group is promoting the introduction of renewable energy (electricity) with plans to attain a renewable energy (electricity) ratio of 50% globally by 2023. Under Mid Term Business Plan (2024-2026), the Group aims to achieve the electrification of energy sources for manufacturing equipment, particularly by exploring and implementing its unique process of electric curing. From Mid Term Business Plan (2027-2029), the Group will promote manufacturing that leverages methanation, a technology for synthesizing methane from hydrogen and CO₂, based on co-creation. By procuring hydrogen and recovering CO₂ generated in plants, the Group can produce methane gas that can then be converted into energy, making it possible to circulate energy within the plant. The Group plans to implement this technology in four global model plants, thereby contributing to the realization of carbon neutrality.

The Group will also incorporate the use of recycled and renewable resources into its product strategy to realize a circular economy. By doing so, the Group aims to enhance

• Green factories: Manufacturing Utilizing Methanation



Mid Term Business Plan (2024-2026)

Mastering rubber

Conventional rubber

Precise polymer Composite design

Double network rubber
Realizing both fuel efficiency and durability

Network component

2.5 times more durable
(vs. conventional ECOPIA material)

Reinforce and utilize materials informatics (start from 2010)

Mastering road contact

Tire advanced simulation based on contact mechanisms

Strong "real" based on market/tire data

Digital

Structural CAE

Combined simulation of tires & vehicles, etc.

Contact simulation on various road surfaces

Reinforce and expand from the knowledge from F1® and motorsports

Mid Term Business Plan (2027-2029)

- Double network rubber: Implement in MASTERCORE (OR*) 2nd stage
 - Drive to develop sustainable materials
Cure less / Sulfur free rubber which easily recycle
- Design sustainable multi-scale polymer composite by managing, creating, and returning chemical bonding

*OR: Off-the-road tires

2030
Multi-scale composite design
(from atoms to a tire for sustainability)

Realize digital twin which can reproduce tire conditions in market by incorporating complex real road contact mechanisms and tire/vehicle transient characteristics*

* Behavior before conditions become stable, such as force generated in tires, deformation, etc.

2030
Digital twin through mastering road contact to monitor tire in market on a real time basis

the recycled and renewable material ratio in Dan-Totsu products, and to realize sustainable manufacturing in which resources are continually circulated.

» Smart Factories

In smart factories, the Group will implement automatic control of the manufacturing process, which is one of the strong "real" capabilities fostered through manufacturing Dan-Totsu products. In 2023, the Group started automating each production process and is evolving and expanding its sensing technology cultivated through its unique, state-of-the-art tire building system, EXAMATION.

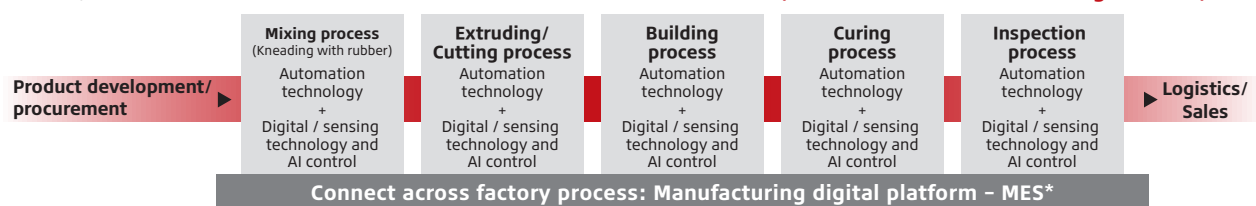
In Mid Term Business Plan (2024-2026), the Group will introduce digital, sensing, and AI control technologies to develop a manufacturing platform in which all processes are linked, and then in Mid Term Business Plan (2027-2029), the

Group intends to implement this platform at eight global model plants. Our aim is to create a next-generation manufacturing platform that connects not only plants but the entire value chain, from upstream processes such as product development and procurement to downstream processes such as logistics and sales, in order to create new value.

Through these initiatives, the Group will strive to further enhance tire quality, boost labor productivity by reinforcing *suru-raku* activities (streamlining operations), and promote diversity, equity, and inclusion in the on-site workplace. The Group is accelerating the transformation of its manufacturing in order to realize its vision of becoming a sustainable solutions company.

● Smart Factories: Next-Generation Manufacturing Platform (Vision)

Aspiration in 2030 **Connect across the Value Chain and Create New Value (Next Generation Manufacturing Platform)**



* Manufacturing Execution System