

CTO Message

A Letter from **the Chief Technology Officer**



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Vice President and Executive Officer
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» Leading/Supporting Value Creation with Coordination of Business Units

At Hitachi Construction Machinery, we believe that the machinery we manufacture is a major source of value for customers. In our view, improvements in safety and productivity, the reduction of life cycle costs and responses to climate change are how we offer value to our customers. Co-creating with our customers, we aim to maximize social and environmental value with an eye to the realization of a sustainable society.

We are a construction machinery manufacturer with over 70 years of experience in mass production. Through the generations, our customers have consistently praised the durability and reliability of our products and

With a Vision for 2030, We Are Accelerating Forward-Looking Development in Five Thematic Areas.

expressed appreciation for their ease of operation and user friendliness. Recently, in addition to meeting a certain baseline regarding machine performance and durability, customers have been looking to us to help them improve their productivity in the areas of construction site safety management and operational assistance and management through the provision of digital and network technologies.

Against this backdrop, the Research & Development Group is tasked with the mission of consolidating technical requirements from each business unit, and leading and supporting value creation for the entire Group. As our vision for 2030, we aim to establish industry-leading R&D capabilities. Accordingly, we have set up five advanced R&D themes: improvement of safety, improvement of productivity, reduction of life cycle costs, prevention of global warming and adapting to global polarization. We have created an R&D roadmap by backcasting from this envisioned future.

In the Research and Development Group, the Advanced Development Center is where we develop future technologies while considering medium- to long-term changes in markets, leveraging our basic technologies and common technologies like hydraulics and electronic control. To speed up development, we established the Open Innovation Promotion Office in April 2023 to facilitate collaboration with startups and specialized manufacturers in various fields. We will strengthen open innovation focused on acquiring technologies from partners around the world, especially in rapidly advancing digital fields.

Hitachi Construction Machinery has developed construction machinery by complementing its unique hydraulic technology with electronics technology from Hitachi Ltd. We are now advancing technology development by integrating cutting-edge IT from both sides, releasing products and services like electric drive systems for dump trucks and operations

management systems. While maintaining and building on our ongoing technical cooperation with Hitachi Ltd., we plan to accelerate the development of products and solutions.

» Specific Initiatives for Advanced R&D Themes

The future of construction sites envisioned by Hitachi Construction Machinery is not one of complete automation devoid of human presence; rather, we see construction sites where humans and machines work together in harmony. Our aim is for worksites to generate more value than ever before in terms of improving safety and productivity, as places where people interact with people, machines with people, and machines with other machines. In order to stake out a lead in this domain, Hitachi Construction Machinery made an investment in and entered into a business partnership agreement with aptpod Inc. in May 2023. We are jointly working with aptpod to leverage its high-speed IoT platform and create digital twins* with real-time features in order to develop systems for remotely operating and autonomously driving construction machinery.

Through collaboration, this initiative aims to realize construction sites where safety and productivity are optimally balanced through coordinated safety measures. Based on various data collected from machines and sensing systems, such as the location and operational status data of construction machinery, the location and biometric data of workers, changes in topography as work progresses, and weather forecasts, digital twin systems will guide entire construction sites in a safer direction while maintaining high levels of productivity, issuing cautionary warnings to workers and controlling autonomous construction machinery.

* Digital twin: A technology that collects various data about the real world using IoT and other means for the purpose of replicating the real world in a virtual space. The information in the virtual space is then updated in real-time to reflect changes in the real world.

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In addition, to address the problem of occupational accidents in the construction industry, which accounts for about 30% of overall industrial accidents, Hitachi Construction Machinery provides driving assistance systems that help reduce contact damage between the bodies of machines and obstacles.

Meanwhile, KTEG GmbH is taking on the challenge as a leading electric construction machinery maker in Europe of preventing global warming.

Hitachi Construction Machinery aims to expand globally, including in Japan and North America, through the development and mass production of cost-competitive electric construction machinery, incorporating the products and technologies developed by KTEG while meeting the high quality standards set by the Hitachi Construction Machinery Group. Specifically, we sell electric excavators in the 2-ton, 8-ton and 13-ton classes in Europe based on Hitachi Construction Machinery's standard models. Furthermore, we have started accepting orders from 2023 for a 5-ton-class battery-powered mini excavator developed by Hitachi Construction Machinery Tierra, enriching our product lineup.

One of the challenges regarding increasing the uptake of electric

construction machinery is the development and procurement of specialized batteries. Compared with automobiles, construction machinery is sold in smaller volumes and has different battery load factors. While automobiles do not experience high load under constant-speed conditions, construction machinery continuously operates under high loads, necessitating specialized batteries.

Regarding product lifespan, on average a unit of construction machinery is used for at least 10 years, which means that reliable local parts procurement is essential. Furthermore, it is necessary to have a structure in place for battery replacements. To address these challenges, we are exploring collaboration with battery manufacturers both in Japan and overseas, and we aim to develop products near markets.

Reducing lifecycle costs is also an important topic. Because a machine breakdown at the construction site can adversely affect customer productivity,

we are advancing initiatives to detect failures before they happen.

ConSite OIL is our proprietary system that uses oil monitoring sensors installed in machinery to sense oil conditions 24 hours a day. A proprietary algorithm developed by Hitachi Construction Machinery enables the early detection of abnormalities in machine oil, which serves as a health barometer for construction machinery.

For mining sites, Hitachi Construction Machinery offers the ConSite Mine service solution, which remotely monitors ultra-large hydraulic excavators and rigid dump trucks 24 hours a day through IoT, contributing to solutions for mining site issues with AI-powered analysis of operational conditions.

Through these initiatives to address various social challenges, we will make steady progress toward achieving our vision for 2030 by establishing top-class R&D capabilities in the industry.

