



Development and Production Divisions

Review of Operations for Fiscal 2016

FY2016 marked the final year of mid-term management plan "GROW TOGETHER 2016". Our goal was to earn the unwavering trust of customers and set our superior products and services clearly apart from competitors.

The HCM Group aims to deliver the same standard of quality at all of its production sites around the world and is working to achieve the vision of "Made by Hitachi" so as to supply products that truly satisfy customers. In FY2016, we worked toward establishing a more global supply system by combining our approach of "local production for local consumption" where products manufactured at each production site are sold to that region and "product supply accommodation" where products are also supplied between regions.

In terms of product quality, we launched "Global Quality Diagnosis" activity in FY 2005 with the goal of improving the quality level of each production site. After repeated revisions, the activity evolved and was renamed "Global Monozukuri Diagnosis" that evaluates not only quality, but also safety, quality, delivery and cost (SQDC). The diagnosis activity was held in FY2016 as well. We have also standardized quality operation processes through the promotion of the Made by Hitachi vision.

For example, we have improved the efficiency of painting work by introducing painting robots and shifted to paints with fewer Volatile Organic Compounds (VOCs) such as electro-deposition paints and hybrid paints. This has enabled us to stabilize quality and to manufacture products with excellent environmen-

tal performance even more efficiently. These improvements paved the way for expanding shipments from our plant in Indonesia to markets in Southeast Asia, increasing exports to the Middle East from Tata Hitachi Construction Machinery Private Company Limited, and for pilot shipments to Northwest Africa. Furthermore, we are now more competitive in terms of procurement and we are in the process of establishing a system that will achieve lower cost price globally.

At our production plants, we have promoted the visualization of energy usage through the introduction of the Hitachi Group's

"EMilia" electricity monitoring system, and other measures. In FY2016, the energy intensity (energy consumption amount per work amount) for the entire Hitachi Construction Machinery Group was reduced by more than 30% compared to FY2010. The Tsuchiura Works, Kasumigaura Works, Hitachinaka-Rinko Works, and Hitachi Construction Machinery Tierra's Osaka Site were selected as eco factories as part of the Hitachi Group's "Eco Factory Select" program that recognizes business sites that have achieved environmental targets (as of March 31, 2017).

Challenges and future initiatives

Viewed globally, emissions regulations differ from country to country and region to region, while the uses construction machinery are also becoming more diverse as the utilization of ICT and IoT expands in business. To respond to such conditions, we are faced with the urgent task of building advanced production and procurement systems that can supply, in a timely manner, products that are safe and with a quality that satisfies customers, while adapting to constantly changing demand trends and the needs in the field as well as innovating our conventional approaches to manufacturing. In FY2017 and beyond, the HCM Group will work close together to further shorten production lead time and rebuild its production system so as to quickly keep pace with and respond to market changes.

Also, we also recognize it will be important to develop cutting edge technologies to set our products apart from competitors, maintain and improve product quality, enhance cost competitiveness, and establish a production system resilient in the face of demand volatility. This will involve development, production and procurement departments working together to create a

next-generation model for development while carrying our thorough preliminary reviews. At the same time, we will fully utilize Analysis Lead Design (ALD) to enhance development quality and efficiencies as well as shorten development lead time and reduce costs.

At our production sites, we will further broaden our efforts to visualize electricity usage using IoT carried out at our domestic sites in FY2016, expanding the initiative to production sites outside of Japan, while accelerating improvement activities aimed at energy conservation and reducing maintenance costs.

Our people represent the key component behind our efforts to achieve these goals. With Kenkijin spirit at the heart of everything we do, the HCM Group will develop its human resources globally and create an organization that can achieve continual improvement through innovation and ingenuity.

TOPICS

Release of the All-New ZH200-6 Hybrid Hydraulic Excavator

The Hitachi Construction Machinery Group will launch sales of its all-new ZH200-6 hybrid hydraulic excavator in September 2017. The ZH200-6 builds upon conventional hybrid systems by incorporating the latest technologies. This all-new model offers lower fuel consumption, while maintaining the same high levels of productivity and controllability because it uses the latest lithium ion batteries developed with "One Hitachi" technologies and an engine with electric motor adapted from automobiles.

Fuel consumption lowered by approx.

40% (compared to the ZX200-3)



The all-new ZH200-6 hybrid hydraulic excavator

TOPICS

Development of the EH4000AC-3 High Altitude Dump Truck

The AC-3 series of dump trucks, which come standard with the AC drive system jointly developed with the Hitachi Group and vehicle stability control, offer improved controllability and stability, as well as a range of engine choices. Dump trucks used at high altitude, such as in certain parts of South America, require a higher output engine than standard models. For this reason, we developed the EH4000AC-3 high altitude dump truck designed for heavy duty operations even at high altitude. This high altitude model offers increased engine output and cooling performance and underwent real world testing for a one-year period by one of our customers in Peru. This model cleared the target utilization rate of greater than 90%, earning it praise from the customer. By expanding high altitude models, we hope to increase our presence in the market going forward.

Cleared the target utilization rate of **greater than 90%**



The EH4000AC-3 high altitude dump truck during real world testing



Service Division

Review of Operations for Fiscal 2016

Under the mid-term management plan “GROW TOGETHER 2016”, we endeavored to enhance customer satisfaction and implement measures that helped lower life cycle costs and customers to achieve stable utilization of their machines. This included building a parts supply system and expanding our parts remanufacturing plants as well as promoting the greater use of ConSite service solutions utilizing the “Global e-Service” that remotely monitors customers’ machines.

The prolonged slump in the economy has caused more and more customers to have an interest in reducing Life-cycle Costs. As for remanufacturing parts service, we collect the original parts as the remanufacturing core parts that were replaced during machine repair work and then replace or repair parts that have

been worn-out at our parts remanufacturing plant. Newly remanufacturing parts are then sold to the customers at a reasonable price with undergoing considerable the same quality of brand new parts. This helps to shorten the machine down-time are not in service and also reduces waste. We operate a network of 12 parts remanufacturing plant around the world and in August 2016 we expanded our parts remanufacturing plant in Zambia, while also enhancing its remanufacturing technologies.

In addition, with regards to our ConSite services, we provide not only data reports on the condition of machines and their operating information that are automatically sent out to customers, but also other high value-added services, such as timely advice from service staff about maintenance and parts replace-

ment. The number of ConSite contracted machines increased 158% during the one year period running until the end of fiscal 2016. This number now totals over 56,000 machines worldwide.

As for mining machine services, we developed and now provide the Component Parts Replacement (CPR) System that manages all parts replacement data (including replacement history and replacement schedule, etc.) obtained from communications with the customers and our various IT systems. This allows us to improve productivity by promptly supplying parts

and preventing sudden breakdowns.

In terms of the parts business, we are working to expand our lineup following the life cycle of machines, which includes Hitachi Select Parts (HSP), Ground Engaging Tools (GET), and oil and lubricant products.

Furthermore, we are striving to secure and develop service staff and improve overall service skills through ongoing service training and Service Mechanic Competitions, among other measures.

Challenges and future initiatives

The efforts we make in the value chain that extends across the whole life cycle of construction machinery after customers purchase our products, or after market services, is an important challenge determining whether we can expand the scale of our business and boost its profitability.

The HCM Group will position the “Parts and Service Business” as a core aspect of its after-market strategy and work to increase both volume (sales volume) and quality (profitability). For example, we will introduce a new inventory control system to rebuild our parts supply system so that it increases product flexibility, enhances logistics, and improves the shipment ratio between our sites globally.

In relation to customers’ needs for “improved safety”, “improved productivity”, “reduced life-cycle costs”, demand for high quality services, such as predictive analysis to detect tendencies and indications of failures, is expected to grow further going forward. In response, we will work to develop more advanced technologies for predictive diagnosis by utilizing ICT and IoT.

At the same time as technical development, it will be import-

ant to identify and analyze user needs in advance and then help reinforce dealers that support the customers. Hitachi Construction Machinery has a worldwide network of dealers. Going forward, we will continue to bolster our support for dealers, improve our ability to make proposals to the customers, and increase the number of applicable products and target users.

To expand service solutions, we will increase synergies with HE-Parts and Bradken, which became Group companies in fiscal 2016, and make additional efforts toward bolstering the value chain. The key to service provision is “maintaining a level where customers’ machines can exert their maximum performance”. To achieve this goal, the entire HCM Group will work as one to reinforce its support capabilities.

TOPICS

Global promotion of Mining parts sales activity by using CPR(Component Parts Replacement) System

HCM Group implement Communication Program by using CPR (Component Parts Replacement) system for Mining business. Visualizing each machine & parts information (Replacement history, Next change-out schedule, etc.) obtained through communication with customer and various systems by centralizing the data on CPR system. Standardize Mining parts sales activity by preparing parts sales manual to support dealer’s service staff, and promote activities worldwide through meeting customer needs. Through the use of this system, we plan to supply components in a smooth manner, prevent unexpected breakdowns, and improve customer productivity.



Service staff checking components condition at a mine site in Mongolia

Centralization of Mining Components Replacement data

TOPICS

H-E Parts

| | |
|--|--|
| [Business Lines] | [Established] |
| •Provision of Services Solutions | 2006 |
| •Development, Fabrication and Sales of Parts | [When it became a consolidated subsidiary] |
| [Head Office] | December 2016 |
| Atlanta, Georgia, United States | |



Bradken

| | |
|---|--|
| [Business lines] | [Established] |
| •Casting and Manufacturing and Sales of Casted Products | 1922 |
| [Head Office] | [When it became a consolidated subsidiary] |
| Newcastle, New South Wales, Australia | March 2017 |





Client Solutions Division

Review of Operations for Fiscal 2016

Typically, customers engaged in civil engineering have required their construction machinery to have strong operating performance, excellence in operation, durability and lower fuel consumption. Today, however, in addition to performance, customers demand autonomous driving, improved overall work process efficiency, and site management optimization. At the same time, customer business challenges include “improved safety”, “improved productivity”, and “reduced life-cycle costs”. To support solve these challenges, we set up the Client Solutions Division* in April 2016 with the goal of developing and providing innovative solutions using ICT and IoT.

For example, the construction industry in Japan faces the challenges of improving the efficiency of construction work,

enhancing safety and addressing a shortage of skilled workers, among others. Amidst this, Japan’s Ministry of Land, Infrastructure, Transport and Tourism is advocating i-Construction to heighten productivity and optimize overall work processes on civil engineering projects. Hitachi Construction Machinery brought to market in June 2016 the ZX200X-5B ICT hydraulic excavator. The Customer Solutions Division is heading up efforts to promote with customers the development of solutions for overall work processes, from the surveying services with unmanned aerial vehicles (UAV) in a tie-up with surveying companies to inspections and post completion measurements as well as maintenance and replacement. Also, in October 2016, we set up the Hitachi Construction Machinery ICT Demo Site at

TOPICS

Opening of Hitachi Construction Machinery ICT Demo Site at Hitachinaka Works

In October 2016, we opened the Hitachi Construction Machinery ICT Demo Site in order for customers to realize the benefits of information-oriented construction processes based on a clear understanding of i-Construction being advocated by Japan’s Ministry of Land, Infrastructure, Transport and Tourism. This area enables customers to experience and understand each information-oriented construction process through actual work performed by ICT hydraulic excavators that can dig semi-autonomously and the preparation of survey and three dimensional survey data obtained from drones and other unmanned aerial vehicles (UAV). Going forward, we will continue to actively hold demonstrations and offer test drives of ICT construction machinery as well as drones to support efforts to promote the greater adoption of i-Construction.

Promote the greater adoption of i-Construction



Site area is approx. 14,000m². The largest demo site of its kind in Japan for information-oriented construction

Hitachinaka Works for customers to experience each process of i-Construction in an effort to increase its use.

In the area of mining, we are moving forward with development on the full-fledged commercialization of an Autonomous

Haulage System (AHS) for mining dump trucks.

* Client Solutions Division: The division was renamed from the Client Solutions Business Development Division in April 2017.

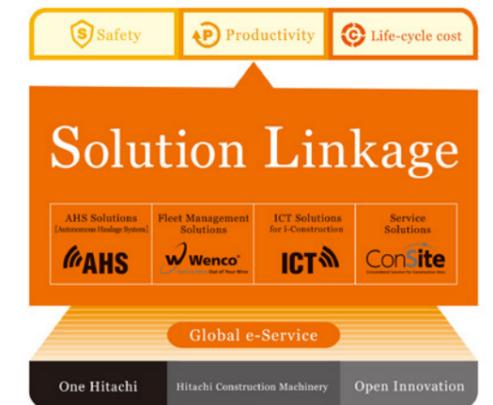
Challenges and future initiatives

In today’s construction machinery market, it has become difficult for companies to set themselves apart simply by selling products. It is now more important than ever to deliver solutions that generate new value based on a thorough understanding of customers’ business processes and through partnerships with other industries.

Furthermore, customers require solutions to such critical challenges as enhanced safety, improved productivity, and lower life cycle costs. At the same time, we must work on solving various social issues, including global climate change and response to natural disasters.

The HCM Group will continue thoroughly utilizing ICT and IoT in FY2017 and beyond, while responding to such demands from society, to introduce methods such as Big Data analysis in an effort to broaden products, services and solutions and enhance to resolve the challenges facing society and customers.

The HCM Group has decided to name its suite of ICT and IoT solutions “Solution Linkage”. With ICT and IoT making significant advancements, we are speeding up development by utilizing initiatives under the “One Hitachi” banner in which Hitachi provides the “Lumada” IoT platform and open innovation that is integrated with the expert technologies of business partners.



TOPICS

Launch of collaboration for the development of a cloud-based open platform

In March 2017, we began collaborating with Trimble (United States) on the development of a cloud-based open platform. Using the technologies of Trimble Connect™, a cloud-based integrated system supplied around the world, we hope to achieve seamless information management, from office to work site and the operator’s chair. For example, customers will be able to find and utilize the information they need from a smartphone or tablet device during every process, from surveying and design to maintenance and replacement. Going forward, we plan on launching a portal site containing all the information on solutions provided by Hitachi Construction Machinery and Trimble.

Provision of portal site for cloud solutions

