

## Feature- I : Excavators & Cranes

### State-of-the-art technologies for hydraulic excavators and cranes

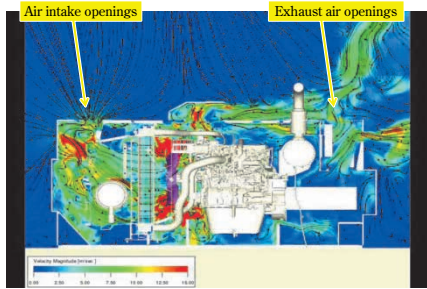


Fig. 1 Analysis of cooling air flow in engine room



Fig. 2 City Conscious Crane RK250-7

Markets are polarized into those for advanced countries, such as Japan, US and European countries, where specifications and regulations are more stringent, and those for rising nations, where the markets are growing rapidly. This is the case for both hydraulic excavators, a main product of KOBELCO CONSTRUCTION MACHINERY CO., LTD., and crawler cranes, a main product of KOBELCO CRANES CO., LTD. Global technical strategy and product line-up that is carefully considered are necessary to properly respond to the needs from these polarized markets. This special feature introduces technologies and products that are newly developed in the last few years in the fields of hydraulic excavators and cranes.

Fig.1 shows a result of Computational Fluid Dynamics (or CFD) simulation for the engine room of an excavator with the iNDr system. Utilizing CFD before making a prototype machine, we can analyze the flow in the engine room and reduce noise more efficiently.

Fig.2 shows a City Conscious Crane, RK250-7, which was launched in Japan in 2008. The weight saving and downsizing of the machine were realized, while maintaining crane capability, by placing the engine in the upper body and adapting a slanting boom; the first case for a rough terrain crane manufactured in Japan.

## Feature- II : Aluminum and Copper Technology

### Strategies and Products Responding to Customer Demand for Kobe Steel Aluminum and Copper Products

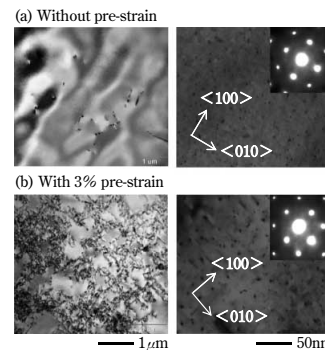


Fig. 3 TEM bright-field images and selected area diffraction patterns

Aluminum and copper products are materials that contribute to the creation of a recycling, low-carbon, and energy-conserving society, thereby helping to sustain everyday life. Due to customer demand, our company is tackling basic research for strengthening the characteristics of aluminum and copper alloy, as well as developing the technology for using these alloys and their manufacturing techniques, with the aim of supplying quality products with new functions that can be stabilized at a low price. This special number gives an update on our distinctive products and technologies.

Fig.3 shows TEM bright-field images and the selected area diffraction patterns of pre-aged Al-Mg-Si alloy with no pre-strain and with 3% pre-strain. The combined effect of the pre-strain and pre-aging treatment enhances the precipitation of beta phase, which results in an improved bake hardening response of the alloy for automobile panels. Through such a fundamental study, the performance of the material is improved.



Fig. 4 Visualization of joining dissimilar materials using aluminum flux-cored wire

Fig.4 shows high speed photographs taken during the laser braze welding of Al-Mg-Si series aluminum alloy sheet and 980MPa grade galvanized steel sheet using newly developed aluminum flux-cored wire. Such observation technique is used for studying the wettability and temperature of molten pools and the formation of intermetallic compounds to elucidate the mechanism of dissimilar joining and to improve the reliability.

#### <Cover photos>

The upper photos in the cover show examples of major aluminum products and their uses. Shown at the top are aluminum sheet coils waiting for shipment. In the middle, electronic materials made of copper (left) and various types of aluminum extrusions (right) are shown.

The lower-right picture shows an 8 tonne hybrid excavator, SK80H, newly developed by KOBELCO CONSTRUCTION MACHINERY CO., LTD., which has reduced CO<sub>2</sub> emissions and fuel consumption by 40 percent compared with conventional machines in the same class. The hybrid excavator was developed in cooperation with Kobe Steel's corporate laboratories and was launched in Japan in January 2010. The lower-left picture shows a new crawler crane 7120G, a typical model in the "Mastertech G series," having an engine that satisfies emission gas regulations in 2011. These models can reduce fuel consumption by a maximum of 25%, compared with conventional machines, and has been in the market in Japan since November 2011.

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