

Nature-friendly Products & Eco-factories

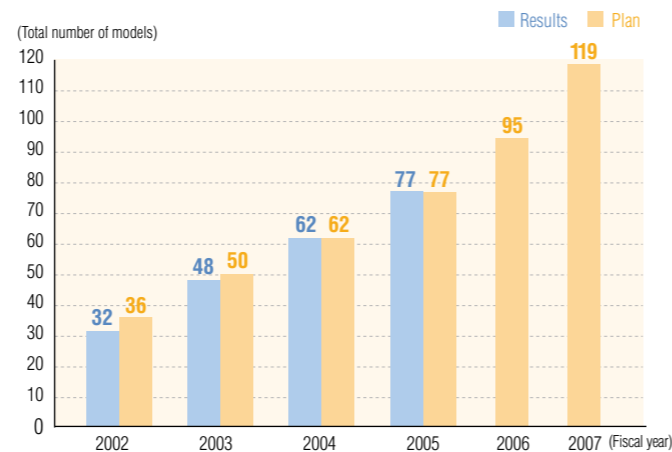
### Design for Environment Evaluating the Total Environmental Burden from the Design Stage

The Hitachi Construction Machinery Group has made efforts to employ a mechanism to evaluate the total environmental burden in product life cycles and to perform comprehensive improvements.

#### Design-for-Environment Assessment

In consideration of its business and product features, the Hitachi Construction Machinery Group promotes development of environment-friendly products and products for recycling, for environmental conservation from the design stage. Taken advantage of environmental burden reduction of products and manufacturing process is the "design-for-environment assessment" to evaluate overall impacts upon the environment by products through their life cycles especially at the design stage. The products that comply with environment-conscious standards are registered as eco-products, and eco-products can be identified with eco-marks on the website and brochures for environment-related information and disclosure to customers. In Fiscal 2005, 14 models were additionally registered as eco-products.

The Number of Green Product Models



Example of an Eco-Product

### Ultra-Short Turning Radius Mini Excavator ZX55UR-2 (launched in September 2005)

The Ultra-Short Turning Radius mini excavator is mainly used for installation and replacement work of water services and sewage pipes and is suitable for trenching. Moreover, the base machine turns within the crawler width, so ditching and other work can be smoothly carried out. The ZX55UR-2 Ultra-Short Turning Radius mini excavator has a set of basic performances including a traction force and a digging force that is improved by 20% and 10% respectively and offers better maintainability and enhanced comfort and safety of the operator's cabin. Moreover, this mini excavator is registered as an eco-product and offers such features as an engine that complies with the tier 2 exhaust emission regulations and noise regulations by the Ministry of Land, Infrastructure and Transport, twice-extended life of hydraulic fluid, employment of non-lead wires and more than 95% recycling ratio of materials used.



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### Research and Development of Environmental Technology Harmony with the Environment driven by Technological Power

The Hitachi Construction Machinery Group aims for harmony between construction machinery and the environment. Results of its research and development efforts include compliance with the tier 3 exhaust emission regulations, development of electric power excavator and R&D of environment restoration and recycling technologies.

#### Engagement toward Stricter Exhaust Emission and Noise Regulations

The mainstream power source of construction machinery is the diesel engine. Compared with the gasoline engine, this engine emits less CO<sub>2</sub> or CO (carbon monoxide) and more nitrogen oxides (NO<sub>x</sub>) and particle material (PM). Since January 2006, the tier 3 regulations with stricter standards than those of the tier 2 commenced in Europe and the USA. The tier 3 regulations will start in October 2006 in Japan. Ahead of these regulations, Hitachi Construction Machinery has developed low emission technologies, and the ZAXIS-3 series launched in January 2006 complies with the tier 3 regulations. The company plans to increase the number of regulation-compliant models. Construction machinery is often used in cities and at night, so low noise design is also an important technology. Hitachi Construction Machinery has promoted such low noise technologies as low-noise mufflers, new type fans, and fan guide ring to comply with the low noise standards of the Noise Control Law of the Ministry of Land, Infrastructure and Transportation as well as overseas noise regulations.

#### Development of Electric Power Excavators

Through joint efforts with Hitachi Industrial Equipment Systems Co., Ltd., the two companies succeeded in development of hydraulic excavators that use batteries as a power source and swing and running are electrically powered. These excavators offer performance that can match that of the conventional diesel engine-driven excavators. Moreover, thanks to regeneration (power is generated when the brake is operated) and other power-saving means contributed to 50% CO<sub>2</sub> reduction. The excavators will be commercialized in the future.



Electric power excavator

#### Research of Counterweight Recycling Technologies

One of the components of construction machinery, the recycling of which is not advanced, is counterweight. The component is made by plate working or casting, and especially as the latter requires transportation and processing costs, its recycling has not made progress. Assuming that the bottleneck of this problem lie in the sharing of these costs, the company executed a verification test of recycling where transportation costs were shared by Hitachi Construction Machinery and a construction equipment manufacturer in Kansai under the name of Japan Construction Equipment Manufacturers Association. As a result, a total of 324 counterweights were collected. Their processing was commissioned to a counterweight manufacturer, and their iron and other contents were reused. Based on the results, future-recycling promotion is under examination.



#### Employment of Lead-free Controllers

Conventionally, solder for mounting electronic parts contained lead. In consideration of environmental pollution caused by lead, the new ZAXIS-3 series now employs lead-free controllers.

#### Oil-reset Construction Method for Environmental Restoration

The soil of the sites where gas stations once stood may be polluted because of oil leakage. The oil-reset construction method is to purify the oil-polluted soil on site. Using mobile soil recycling machines, polluted soil and proprietary additives are mixed to reduce oil and increase hydrophobicity. After a certain curing period, the soil is used to refill the site to recycle the oil-polluted soil.

