Global Promotion of Use of Recycled Resources Based on the "Comet Circle"

● Concept

Based on the concept of the Comet Circle that puts "Priority on Inner Loop Recycling*," the Ricoh Group is working on recycling materials with less environmental impact and high economic efficiency. Our efforts are thus focused on the following activities (in order of priority)—recovering products, reusing parts, and recycling materials. Ricoh, with recognition that the flow from collection of used products to the recycling of materials is one business unit, is making efforts to improve profitability in the recycling business on a global scale by increasing sales of recycled products such as recycled copiers and by establishing an efficient recycling system.

*See page 16.

● Targets for Fiscal 2007

◎ Improve the quantity of reusable parts used by a factor of at least five (compared to fiscal 2003 figures in Japan).
◎ Increase the quantity of recycled plastics used to 1,000 tons or more.
◎ Increase the number of recycled copiers marketed by a factor of at least 10 (compared to fiscal 2003 figures in Japan).

● Review of Fiscal 2006

Compared to fiscal 2003, the quantity of reusable parts used increased 3.2 times and sales of recycled copiers in Japan increased 5.1 times, which indicates that we are making steady progress towards our fiscal 2007 targets. The quantity of recycled plastics used per year amounted to 1,132 tons, surpassing our target value for fiscal 2007. Through these activities, Ricoh is increasing the use of recovered resources globally and the amount is increasing steadily every year (see Graph ❷). We are also actively engaged in collecting used copiers and toner cartridges, and the number of used products collected is also increasing steadily (see Table ❶).

● Future Activities

We will continue to effectively use recovered resources by increasing the production and sales of recycled copiers as well as the use of recycled parts and materials, and thus provide our customers with products with less environmental impact and with higher economic efficiency. For this purpose, it is important to improve the collection rate and collection quality of used products. Through these activities, Ricoh will move forward with the utilization of recovered resources.

Segment Environmental Accounting of the Product Recycling Business (Japan)

Costs		Effects			
		Economic benefits		Effect on environmental conservation	
Items	Costs	Items	Benefits		
Product recycling cost	¥654 million	Sales	¥9,215 million	Amount of resource recovery: 31,430 (t) Down 230 (t) from that in the previous year	Amount of final disposal: 186 (t)
Collection/resource recovery cost	¥2,771 million				
Total cost	¥3,425 million	Social effect	¥2,514 million		

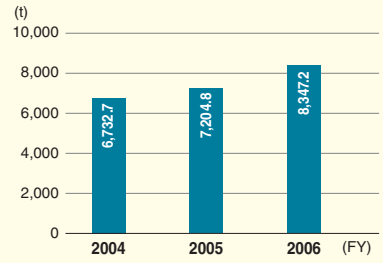
* Social effect refers to the cost of waste disposal that customers no longer have to pay.

<Global>

❶ Collection results and recycling rates for copiers and toner cartridges

	Amount of used products collected			Recycling rate
	Fiscal 2004	Fiscal 2005	Fiscal 2006	Fiscal 2006
Copiers	282,444 units	287,268 units	307,047 units	98.8%
Toner cartridges	671 (t)	1,388 (t)	1,023 (t)	98.7%

❷ Changes in amount of recovered resources used



Practicing Recycling with Less Environmental Impact Based on the Comet Circle

The Ricoh Group clearly prioritizes recycling methods to promote its recycling activities. Recycling collected products into commercially useful products generates less environmental impact and creates greater associated economic benefits than if they were disassembled and sorted to be recycled into resources/energy. This idea is represented in the Comet Circle.* The flow of the recycling process, from the recovery of copiers collected from the market to the launch of recycled copiers, is shown in the second innermost loop. The recycled copier business contributes to the creation of a recycling-based society, and we will, without a doubt, develop it.

*See page 16.

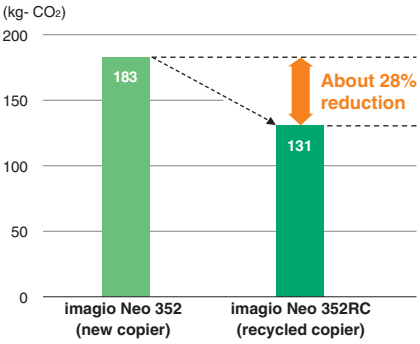
Sales of Recycled Copiers

<Ricoh (Japan)>

Since the launch of the recycled multifunctional digital copier, imagio MF6550RC, in December 2001, Ricoh has increased the number of models available. At present, a wide variety of recycled machines with a copying productivity ranging from 35 pages/min. to 75 pages/min. have become available. Recycled machines are based on used copiers collected from the market. Compared with new machines, the environmental impact of a recycled copier over the whole of its lifecycle from production to disposal is greatly reduced. More than 80% (mass ratio) of the parts used in the imagio Neo 352RC/452RC that we launched in fiscal 2006 are recycled parts, and the imagio Neo 352RC gives a 28% reduction in environmental impact over its whole lifecycle compared with newly-produced machines.

imagio Neo 452RC/352RC

❶ LCA Comparison Between a New Machine and a Recycled Copier (CO_2 Emissions)



* A comparison is made by calculating the annual environmental impact of new and recycled copiers over a 5-year period and 10-year period, respectively.
* Figures for CO_2 emissions by copiers in operation at customer sites were not included in the calculation of the data.

INTERVIEW

Employee Interview | **Putting the Recycling Business in the Black**

Sales of recycled copiers in Japan have exceeded 10,000 units, and we succeeded in making the recycling business profitable.

Kenji Kojima
General Manager
Recycle Business Center
MFP Business Group

We overcame many difficulties to put the recycling business on track.

The number of used Ricoh products collected in Japan reaches more than 200,000 units a year. Since the early 1990s, Ricoh has positioned "resource conservation and recycling" as one of the pillars of its environmental conservation activities and made great efforts in pursuing them. At present, we recycle more than 99.5% of collected used copiers, laser printers, etc. In order to continuously and actively promote recycling, it is necessary to create economic value from recycling. Thus, Ricoh has been engaged in recycling copiers by collecting used machines from the market and putting them back on the market again. Products collected in this way have less environmental impact and produce greater economic value when they are recycled in a form as close to the original products as possible, rather than when they are recycled as resources and energy. However, we had to deal with various problems before we could get our recycling business on track. Production plans for recycled products depend on the amount and quality of used machines collected from the market. We developed a simulation tool to forecast the amount collected from the market, and this enabled us to make an exact forecast on a monthly basis. In addition, in order to ensure that the used products remain in good condition, we established a method of transportation that prevents breakage and damage. We also faced the problem that recycled copiers are the previous generation's products and are thus functionally inferior to the current machines. To deal with this, we upgraded the used machines by adding the latest functions and security settings so that they satisfy the needs of the market, and thus improved their commercial value.

Environmental impact is reduced and the same after-sales service as for a new machine is provided.

More than 80% (mass ratio) of the parts used in recycled machines are recycled parts. Compared with new ones, recycled machines give around a 28% reduction in environmental impact over their whole lifecycle and around a 78% reduction in the manufacturing time*. In addition, we guarantee the quality and provide the same after-sales service as for a new machine. Use of recycled machines that are both environmentally-friendly and high quality has spread rapidly among public bodies, local governments, and companies promoting green procurement. In fiscal 2006, sales of recycled copiers exceeded 10,000 units and we achieved a profit for the first time since we commenced the recycling business in 1998. This is unquestionably the result of our sustainable environmental management efforts to achieve environmental conservation while generating a profit.

* Comparison data between the imagio Neo 352RC and the imagio Neo 352 (previous machine)

Used PET Bottles as Resource-recirculating Eco Packaging

<Ricoh (Japan)>

The Ricoh Group adopts resource-recirculating eco packaging for its large copiers by reusing empty PET bottles as cushioning material in delivering the imagio MP1350. For a copier that weighs 300 kg, 134 empty 500-ml PET bottles are used as cushioning material at the bottom and on the sides of the packaging. Because cushioning material made of PET bottles, which has a higher shock absorbing ability than conventional materials, can be used at least 20 times, its reuse will lead to a reduction in packaging materials. CO_2 emissions will be reduced by around 10 tons over four years compared with the use of traditional cushioning materials. This packaging received the Large-sized Equipment Packaging Category Award in the Japan Packaging Contest 2006 held under the sponsorship of the Japan Packaging Institute on October 6, 2006. The packaging was evaluated as "…responding to the needs of the age and society—an excellent packaging in terms of life culture."

134 empty PET bottles are used as cushioning material at the bottom and on the sides of the packaging

INTERVIEW

Employee Interview | **Reusing the Aluminum Tubes from Photosensitive Drums**

We developed the technology to reuse expensive aluminum parts for the effective use of resources and reduced costs.

Frank Drew (Left)
Technical Engineer, OPC Engineering Division

Martin Ball (Right)
Technical Engineer, OPC Engineering Division

The key was the development of a low-cost technology to strip off the photoconductor.

Photosensitive drums are used at the heart of copiers and printers and they incorporate aluminum tubes coated with a photoconductor. If we can separate the expensive aluminum tubes from the collected photosensitive drums and reuse them, we can use resources effectively and reduce costs. At Ricoh UK Products Ltd., which has positioned recycling as one of its business pillars, we started trying to find ways of reusing the aluminum tubes following the establishment of a system for collecting used products including photosensitive drums from all over Europe and recycling them. In the photosensitive drums collected from customers, only the photoconductor coating is damaged. In order to reuse the aluminum tubes, it was necessary to develop a technology to strip off the photoconductor coating at low cost.

Simultaneous resource conservation and cost reduction were achieved.

In 2006, we developed stripping liquid for the photoconductor to enable the aluminum tubes to be reused at low cost. After establishing a line for stripping the photoconductor from the photosensitive drums and recoating the aluminum tubes with photoconductor, 10% of the total production was covered by reused aluminum tubes last year. This lead to a reduction in the manufacturing costs of photosensitive drums. In the future, we will increase the reuse ratio by increasing the number of photosensitive drums collected and endeavor to develop low-cost and highly-efficient stripping liquid.

Disclosure of Information on Product Recycling in Response to the WEEE Directive

<Ricoh Europe B.V. (Europe)>

Electronic equipment, including copiers, contain parts such as printed circuit boards, cells, and chemical substances that require attention and special treatment during disassembly and recycling. Ricoh Europe, the European Regional Sales Headquarters, established a product information disclosure system for recyclers in August 2006 and disclosed information on approximately 300 models, including copiers, printers, and digital cameras, on its web site. The company also provides information on the use of chemical substances and appropriate treatment methods, and information that specifies the location of parts to assist recyclers with recycling. This is in response to the WEEE Directive*, and Ricoh has fully complied with the directive to disclose information on production recycling ahead of other companies in the industry.

* EU Directive on Waste Electrical and Electronic Equipment (WEEE)
Product recycling information
http://www.ricoh-europe.com/environment_/weee_rohs/index.xhtml