The Ricoh Group is working to reduce CO_2 emissions and costs from transportation by global optimization of SCM.

■ Concept

To achieve a sustainable society, one of the most important issues is to reduce CO_2 emissions from logistics. For this purpose, it is essential to optimize efficiency of logistics by minimizing wasteful operations and wastage related to transportation generated in supply chains. In our approach to this challenge, visual presentation of logistical flows are provided, data linking logistical costs and CO_2 emissions obtained, bottlenecks identified, and improvement measures undertaken. To strengthen the effects of these improvement efforts, we work to ensure that activities and related information are shared across the company. Specifically, giving priority to such issues as direct delivery to customers, cargo-carrying efficiency, and modal shifts, we are making concerted efforts at all the divisions involved, from product planning to customer contacts, aiming to further reduce environmental impact.

■ Target for Fiscal 2010

◎ Reduce CO_2 emissions from logistics by 1% or more over the previous year (per ton kilometer).

■ Review of Fiscal 2010

For the three years from fiscal 2008 to fiscal 2010, our average CO_2 emissions per basic unit were reduced by 1.9% as a result of our efforts. The data also reflects the improvement of data accuracy due to the upgrade of relevant systems conducted during the period. We started to collect the data regarding our CO_2 emissions during transportation in Japan in fiscal 2006, when we developed and started to operate a system to obtain the data from transport information. Since fiscal 2008, the scope of this process has been expanded to cover transportation between Japanese sites and overseas sites.

■ Future Activities

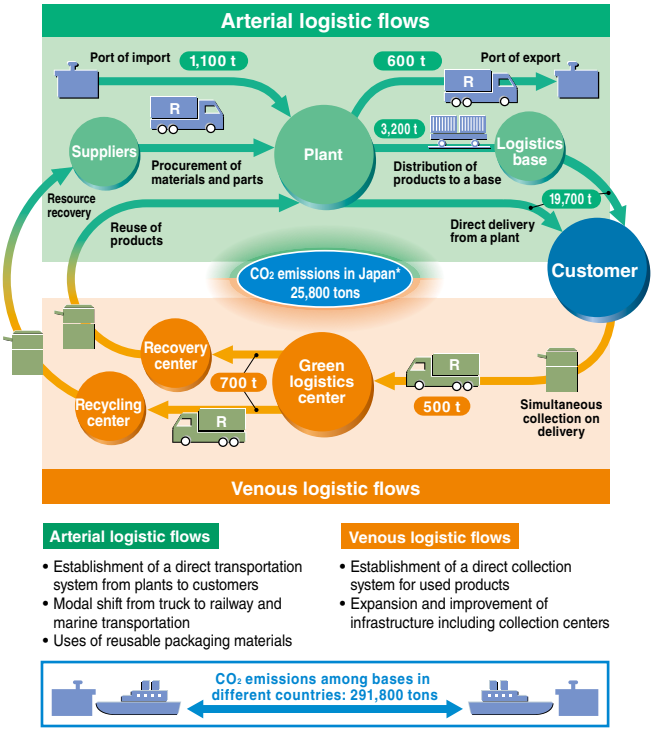
We have collected data on CO_2 emissions associated with our logistics operations within Japan as well as logistics from and to Japan. From fiscal 2011 and onwards, we will expand the scope of the data collection to a global scale and will set global emission reduction targets accordingly. As part of our sustainable environmental management, we will work to reduce CO_2 emissions and distribution costs in our logistics processes by implementing groupwide activities at all related business divisions and group companies both within and outside of Japan.

Efforts for reducing environmental impact via the supply chain as a whole

<Ricoh Group (Global)>

The Ricoh Group is promoting SCM (Supply Chain Management) in logistics for procurement, manufacturing, and sales, aiming to reduce CO_2 emissions and costs. The Ricoh Group's manufacturing bases are now in the Americas, Europe, China, and other Asia Pacific countries, which has caused year-to-year increases in transportation among global production sites. For example, the monthly transportation volume of products and parts from China to Japan is enough to fill 400 40-foot containers. To the Americas and Europe, products and parts of a volume equivalent to 1,000 40-foot containers are shipped from China each month. Given these volumes, efficiency improvement in logistics is an important issue in promoting business on a global scale. The Ricoh Group surveys all processes and promotes efforts on a global scale, including the improvement of cargo-carrying efficiency through reviewing packaging materials and mixed packing, modal shifts among warehouses, direct deliveries to customers, and by optimizing transportation routes through the introduction of the milk run system. The Group thus aims to reduce wastage related to packaging materials, transportation, space, trans-shipment, and storage.

CO_2 emissions in logistics
(FY 2010, Ricoh and Ricoh Japan Corporation)



Arterial logistic flows

- Establishment of a direct transportation system from plants to customers
- Modal shift from truck to railway and marine transportation
- Uses of reusable packaging materials

Venous logistic flows

- Establishment of a direct collection system for used products
- Expansion and improvement of infrastructure including collection centers

CO_2 emissions among bases in different countries: 291,800 tons

* CO_2 emissions in Japan (fiscal 2010 results) have been calculated in compliance with the Energy Saving Law.

Views held by employees

INTERVIEW

The Ricoh Group's Logistics Reform

We aim to build a global production and logistics system to maintain low-cost and low-CO_2 emission operations regardless of any changes to the environment.

Hiroyuki Murai
Logistics Innovation Group Leader
MONOZUKURI (Engineering Process) Innovation Center

Use of packaging materials largely depends on transportation method

I began to engage in activities to reduce the environmental impact of logistics operations in 1999, when our team implemented a joint project to create reusable packaging materials with the product and packaging design departments. As a result, we were able to develop "resource recirculating eco packaging" materials using resin. Subsequently we began work on full-scale packaging reforms, and have since been developing and promoting the use of unique packaging materials, such as eco-packaging materials for large machines and mini-racks to be used for delivery to households. We need to review the transportation methods if we want to reduce the use of packaging materials, which are designed to protect products during the transportation, transshipment and storage processes. In other words, we can transport our products with simple packaging—using only plastic wrap, for example—if we choose to and manage the appropriate transportation method for the products. In developing packaging materials, it was essential to visualize the entire logistics operations. We were able to achieve the "packageless" delivery of our products, such as delivering products simply wrapped in plastic, because we conducted activities targeting the entire logistics operations.

Reduction of packaging materials

"Resource-recirculating" packaging

- **Resource-recirculating eco packaging**
  Resin racks that can be used repeatedly

- **Simple racks**
  Simple racks made of pipes

"Packageless" delivery

- **Use of plastic wrap**
  Minimizing the use of packaging materials by using plastic wrap along with cushioning materials

Reducing CO_2 emissions from logistics operations through "visualization"

In the middle of 2000, the use of cardboard for transportation between our production bases began to increase rapidly in accordance with the full-scale launch of the global production system.

Logistics operations are the "blood vessels" of the supply chain, which connect the procurement, production, distribution, and recovery operations. At least 10 departments are related to the logistics operations for each of the domestic transportation routes. For global transportation, the number of related departments (including outsourcing partners) is doubled, because legal regulations and commercial customs differ by region and the frequency of transshipment is higher. It requires a considerable amount of work to collect precise information about daily transportation activities from related parties and to check the actual logistics situation. However, once the logistics operations are "visualized," we can easily identify what needs to be improved to reduce CO_2 emissions and if we make the improvements, the effects will accumulate day by day, leading to substantial reductions in both CO_2 emissions and cost.

In line with the three-year plan started in fiscal 2008, the Logistics Innovation Group has been conducting activities to minimize waste across five areas of packaging, transportation, space, transshipment, and storage, utilizing the ratio of logistics cost to sales, the use of cardboard, and CO_2 emissions from transportation as major management indicators. From fiscal 2011 onwards, we will further promote activities based on the results of past visualization and reduction activities. By 2013, we aim to build a group-wide production and logistics system to always respond flexibly to requests from the procurement, production, sales, and service departments as well as to changes in the environment surrounding logistics, and to choose optimal packaging materials and transportation routes to ensure low-cost and low-emission logistics operations.

* For examples of the activities for logistics reforms see page 56.

Improving the loading efficiency of marine transportation containers

<Ricoh Co., Ltd./Ricoh Electronics Inc. (Global)>

The Ricoh Group has production bases in five global regions (Japan, the Americas, Europe, China, and Asia-Pacific). In each of the regions, we have built a "local production and consumption" system. Specifically, in each region, our sales and production staff cooperate closely with each other to develop products and services that meet the true needs of local customers and to provide the customers with these products and services in a speedy and appropriate manner. Parts, semi-finished products and finished products are transported between these production bases, and the total transportation volume has exceeded the amount that can be transported using 20,000 40-foot containers. As part of its measures to promote logistics reform, the Ricoh Group has been endeavoring to visualize the loading efficiency of marine transportation containers used for its logistics operations.

Ricoh Electronics Inc. (REI), which is based in Tustin, California in the United States, has an assembly factory for copiers and a warehouse for finished products. The factory and warehouse had multiple contact points accepting cargos, and these contact points had different functions and delivery destinations. For marine transportation between Japan and the factory and warehouse, cargoes were delivered separately, although they shared the same location, because separate delivery was believed to be more efficient. However, by visualizing the loading efficiency of containers used for the transportation (a total of about 100 containers per month were used), it was revealed that the loading efficiency of containers used for transportation to some specific contact points within the site was low and that the efficiency was particularly low for containers used to transport large products.

In response, Ricoh and REI reviewed the flow of the logistics operations and the cargo handling in the warehouse, and made adjustments to shipments from the warehouse, shifting the focus from partial optimization by each contact point to total optimization. As a result, the companies decided to have parts and semi-finished products delivered to the assembly factory and finished products kept in the warehouse for delivery to a range of destinations transported in a mixed manner in a container, thereby improving the loading efficiency of marine transportation from Japan to the site.

As a result, the loading efficiency was improved by 10%, leading to substantial reductions in both the cost and CO_2 emissions associated with container transportation. It is estimated that at least 30 million yen can be saved per year and CO_2 emissions can be reduced by at least 700 tons a year through this improvement.

REI's plant in Tustin, California, the United States

"Packageless" delivery of production printers

<Ricoh Co., Ltd. /Ricoh Logistics System Co., Ltd. (Japan)>

The Ricoh Group is committed to reducing the use of packaging materials through such activities as promoting "resource-recirculating eco packaging." Production printers, the largest products both in terms of weight and size among our imaging systems, were traditionally delivered to users on wooden pallets and packaged in cardboard. This delivery method, however, resulted in a high packaging cost and a large environmental impact. It also caused inconvenience to customers, because it took time for them to open the packages, and a sufficiently large space was also necessary. In addition to these problems, "resource-recirculating eco packaging" was not very effective for large products produced only in a small quantity by model in terms of both cost and environmental impact reduction.

In response, the Logistics Innovation Group launched a project for the "packageless" delivery of production printers. First, the team asked all the departments related to the transportation of the printers, including the product design, logistics, and sales departments to join the project. Then the team "visualized" the transportation routes and methods for each of the transportation phases to examine how to transport the products in a better way. For three days in early August, the team conducted a transportation test on a route from Tohoku to Kansai via Kanto (1,830 km). In this test, production printers and accompanying bookbinding units wrapped in plastic wraps and fixed on pallets by belts were transported. In order to prevent the machines from being damaged by the belt, cushioning materials were used as required and also sleepers were applied to prevent the products from sliding on the pallets while being transported by truck. The team compared the temperature and moisture in the truck between the tested method and the conventional method, and it was revealed that the peak humidity was the same for the two methods, the highest temperature was 2°C lower in the tested method, thus giving less thermal impact on the products.

Based on the test results, the "packageless" delivery of production printers was actually started, and since January 2010, the transportation area for which this delivery method is used has been gradually expanded.

This activity has led to a reduction in the cost of packaging materials used for production printers and (bookbinding units). Specifically, the cost was reduced by about 40,000 yen per unit, and the waste of packaging materials was also reduced by 115 kg, equivalent to 70 kg in terms of CO_2 emissions reduction. Moreover, the time required for unpacking was reduced by as much as 70 minutes.

Implementing the packageless delivery

All packaging materials, except for the plastic wraps, can be reused, including the belts, cushioning materials, and sleepers.