2. Waste Reduction and Recycling

(1) Environmental Approaches to Wastes by the JAL Group

The waste output from JAL Group’s operations are grouped in the following three categories and are all properly managed and disposed of in accordance with the Japanese Waste Management and Public Cleansing Law.

A. Aircraft cabin waste, and general office waste produced mainly by indirect activities

B. Industrial wastes and special management industrial wastes related to aircraft maintenance work and cargo handling.

C. Medical wastes related to employee health care work (industrial wastes and special management industrial wastes)

(2) Measures of the JAL Group

The JAL Group seeks to contain the use of natural resources, promote recycling, and dispose wastes appropriately. The amount of industrial wastes discharged by JAL in the Kanto area, and by JAS in the Kanto area and in 4 airports (New-Chitose, Itami, Kansai, Fukuoka) is as shown in the charts below.

The large amount of plastic wastes generated by JAS in FY2002 resulted from many unnecessary computers following the integration of JAL and JAS. The amount of plastic wastes generated by JAL in FY2002 (Kanto area) increased by 300 tons due to the increase in use of polyethylene sheets used in double layers as covers for quality protection of air cargos at our customers’ requests. However, because of the decrease in the amount of general wastes discharged, the total amount decreased by 360 tons, resulting in a total of 9,506 tons. In domestic areas other than the Kanto area, the amount of industrial wastes generated in FY2002 was 188 tons, and total wastes amounted to 1,300 tons.

From these results, the total amount of wastes discharged by JAL in FY2002 resulted in a 3.2% decrease from last year’s 11,163 tons to 10,806 tons. The percentage of industrial wastes also declined from last year’s 12% to this year’s 8.7%, falling below our final goal of 10% in FY2005.

Since the amount of aircraft cabin wastes and lavatory wastes depend on the number of passengers boarded, they are counted up separately and are approx. 5,300 and 15,300 tons respectively for FY2002 and for Narita and Haneda airports in total.

A. General office wastes

(a) Group-wide activity

1> Reduction of use

¥ To reduce paper wastes, taking copies using both sides of paper and using the reverse side of copied paper were promoted.

¥ Packing materials of give-away calendars have been changed from corrugated paper or plastic bags to more simple paper as much as possible.

Reusable company containers are used for packing company cargo for aircraft maintenance work.

¥ In addition, various waste reduction programs are in action at each workplace in small groups.

2> Reduction of paper use through electronic workflow

In order to share information within the JAL Group, maximize work efficiency and increase speed in work, we have created an electronic working environment. We seek to cut down on our use of paper in such items as follows:

¥ Use of electronic manuals instead of paper printed manuals

¥ Publication of in-house documents on the Intranet

¥ Changing the system of authorization of applications, communication and other work by paper to an electronic workflow on the Intranet.

3> Recycling

Each office is responsible for sorting wastes by type, and is recycling collected paper, bottles, cans, etc.
(b) Activity of Cabin Attendants Division

1. Sorted collection of aircraft cabin wastes
   - Collection of empty aluminum cans in cabin (Campaign name: "Alumi-Can Dream")
     Aluminum cans are collected by cabin attendants on inbound international flights to Narita and Kansai airports. For FY2002, an average of 2.1 and 2.0 tons of cans were collected respectively.

2. Collection of newspapers in cabin (used and outdated papers)
   Newspapers are collected by cabin attendants on inbound international flights to Narita Airport. For FY2002, a monthly average of 1.4 tons of newspapers was collected and passed to a recycling contractor.

(c) Activity of Cargo & Mail Division

1. Skids (wooden pallets) are repaired and reused exhaustively, and completely damaged skids are passed to recycling contractors and recycled into decorative boards. A total of 1,303 tons of skids were recycled in FY2002 at Narita and Kansai airports.

B. Industrial Wastes

(a) Activity of Engineering & Maintenance Division

1. Reduction of use
   - The volume of aircraft washing water and paint was reduced due to improvements in painting methods and quality control.
   - Continuously from the previous fiscal year, about 15 tons of industrial wastes were reduced through the change of containers used for disposal.
   - Industrial wastes are also reduced by the use of waste water treatment facility. In FY2002, by water treatment in 5 locations among a total of 6 facilities, the volume of wastes to be disposed was reduced to about 1/450 comparing with the volume before treatment.
   - As a result of positive feedbacks from experiments, application of bicarbonates in the process of paint removal of aircraft fire extinguishers and high-pressure gas cylinders for maintenance equipments started in FY2002. The application of bicarbonates resulted in the reduction of disposal of chemical solvents formerly used for paint removal.

2. Reuse
   - Inflight service items such as wet towels are reused as waste cloths for maintenance work.
   - Water used for cleaning and inspection in maintenance work is reused through a water purifying facility. The amount of reuse in FY2002 was 116,000 tons in Haneda area, and 54,000 tons in Narita area.
   - Waste cloths for maintenance work, water absorbing mats, and cartridges for sealant guns, which used to be disposed, are reused after washing or cleaning.
   - Packing materials for aircraft parts are reused.

3. Recycle
   - Worn-out aircraft tires, sent back to the manufacturer and reclaimed, are used again.
   - Metals retrieved from Engine Maintenance Center in Narita are sold as valuables.
   - Starting FY2002, recyclable dehydrated sludge generated from water treatment facilities has been reused as cement materials.

(b) Activity of Cargo & Mail Division

Polyethylene sheets used for protection of cargo from water and dust is 100% collected at Narita and Kansai airports. (1,463 tons for FY2002) The collected polyethylene sheet is received and recycled into chocks, boundary stakes and other gardening materials by a recycling contractor or recycled into polyethylene sheets again by a new recycling system (Results in FY2002 is 44 tons; refer to page 23). For the reduction in volume of use, thin sheets are used.

Bags Used to Collect Aluminum Cans

Aluminum cargo containers are handed over to recycling companies as valuables.
C. Medical Wastes

Medical wastes related to employee health care work are categorized as special management industrial wastes, and are incinerated in accordance with the Japanese Law.

The medical waste volume by year is shown on the next page.

The difference in the number between Haneda and Narita is due to differences in the number of persons receiving medical examination and/or care.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Narita</th>
<th>Haneda</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>1.63</td>
<td>1.55</td>
</tr>
<tr>
<td>1997</td>
<td>2.27</td>
<td>3.82</td>
</tr>
<tr>
<td>1998</td>
<td>4.37</td>
<td>0.38</td>
</tr>
<tr>
<td>1999</td>
<td>0.36</td>
<td>0.19</td>
</tr>
<tr>
<td>2000</td>
<td>0.37</td>
<td>0.12</td>
</tr>
<tr>
<td>2001</td>
<td>0.14</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Chokes and Boundary Stakes

Recycled from Polyethylene Sheets

(3) Compliance with Laws other than the Japanese Waste Management and Public Cleansing Law

Polyethylene bags used for in-flight sales items on domestic routes in Japan are in compliance with the Japanese Container and Packaging Recycling Law.

Leftovers from in-flight meals of international flights arriving at Japan are incinerated appropriately within the fixed term according to the Japanese Law.

Radioactive waste, halon, and chlorofluorocarbon are properly disposed of to meet the laws concerned. Storage status of PCB wastes is as follows.

<table>
<thead>
<tr>
<th>Storage Address</th>
<th>Building Type and Quantity of PCB Wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mimi, Chitose, Hokkaido</td>
<td>New airport JAL garage Condenser (1 ea)</td>
</tr>
<tr>
<td>Haneda airport, Tokyo</td>
<td>JAL line maintenance building annex High voltage condenser (11 ea), Stabilizer (325 ea), Low voltage condenser (4 ea)</td>
</tr>
<tr>
<td>Sanrizuka, Narita-city, Chiba</td>
<td>JAL No. 3 hangar High voltage condenser (48 ea), Reactor (7 ea), Switch gear (3 ea)</td>
</tr>
<tr>
<td>Toke, Chiba-city, Chiba</td>
<td>JAL old training center High voltage condenser (2 ea)</td>
</tr>
<tr>
<td>Takemidai, Suita-city, Osaka</td>
<td>JAL dormitory Condenser (1 ea)</td>
</tr>
<tr>
<td>Aira-gun, Kagoshima</td>
<td>Kagoshima airport JAS maintenance oil storage High voltage condenser (1 ea)</td>
</tr>
</tbody>
</table>

(4) Development of Polyethylene Sheet Recycle System

Since April 2001, JAL Foundation has been working on the development of the recycling system of polyethylene sheets used for air transport. Recycled polyethylene sheets have officially been used by JALCARGO since 2003. This system collects polyethylene sheets used for air cargo transport from airline companies, reclaims polyethylene sheets and passenger cabin garbage bags, and sells these recycled products to airlines at cheap prices. The system reduces the cost for airlines to dispose of polyethylene sheets and protects the global environment, thus contributing to the formation of a recycling-oriented society.

This recycling system is under the responsibility of the group with a general trading company acting as organizer. JAL will replace approximately 25% of polyethylene sheets used at Narita airport with recycled sheets. At JAL Narita Cargo Department, about 1,000 tons of polyethylene wastes are generated yearly. Conventionally, most of these polyethylene sheets were reclaimed as other plastic products after being used once for cargo packing, but with the recycling system, about 260 tons will be regenerated again as polyethylene sheets. The system of regenerating polyethylene sheets at an airline company is a new concept in Japan. On the receipt of ISO14001 by JAL Narita Cargo Office, the system was adopted ahead of other companies as an environment-friendly recycling system.

JALCARGO will monitor the quality and condition of recycled polyethylene sheets, and will give feedback to the recycling system company group to contribute to quality improvement. By creating thinner sheets and versatile regenerated polyethylene, we are considering expanding its use to other airports in Japan.