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Resource Utilization Subcommittee

In order to conserve natural resources, Toyota Industries will reduce wasteful consumption by implementing a more efficient manufacturing process

Toyota Industries is challenging the widespread assumption that mass production and mass consumption lead to mass disposal through the recycling and reuse of waste materials. We are also addressing the need to better utilize finite resources and properly dispose of spent resources in a way that does not contribute to global warming, air pollution, and other forms of environmental impact.

As we near our goal of zero landfill waste*1, Toyota Industries is now focusing on resource productivity enhancement by reviewing and changing our manufacturing practices. This marks a departure from our previous emphasis on recycling of spent resources.

Reducing Industrial Waste

Nearing the goal of zero landfill waste

Medium-Range Goals and Major Objectives

Toyota Industries has established the goal of achieving zero landfill waste, while its Third Environmental Action Plan has set the goals of zero direct landfill waste*2 at each of its plants by the end of FY 2003, and zero indirect landfill waste*3 by FY 2005. In addition to working toward these accomplishments, the company is considering measures that will further reduce waste generation by improving productivity and minimizing resource loss.

FY 2003 Achievements

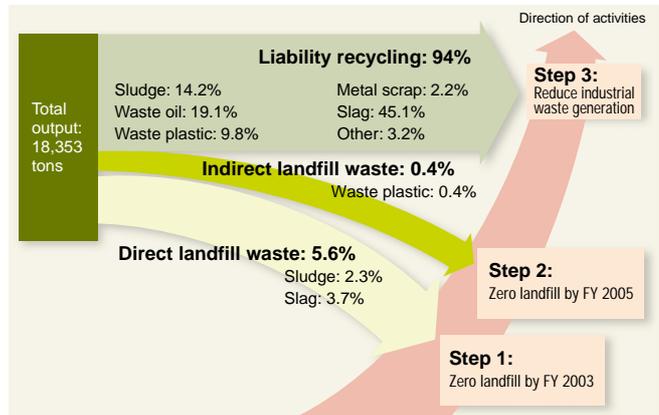
The company's major focus for FY 2003 was on better utilizing industrial waste generated from its casting processes. During the year, the company generated 18,368 tons of industrial waste*4 and was able to recycle 17,196 tons of it for a 94% recycling rate*5, surpassing the previous year's performance.

The company generated 1,097 tons of direct landfill waste, which fell short of the FY 2003 target of 340 tons. However, the company's progress through FY 2003 indicates that the target of zero direct landfill waste is within reach. Indirect landfill waste fell to 74 tons, partly as a result of efforts to recycle ash generated from the incineration of plastic waste. The company thus reached its zero indirect landfill waste target ahead of schedule.

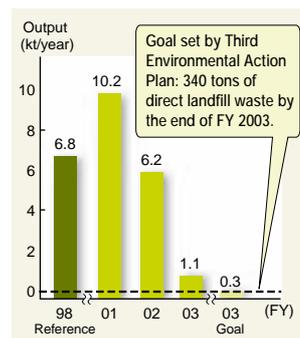
Industrial Waste



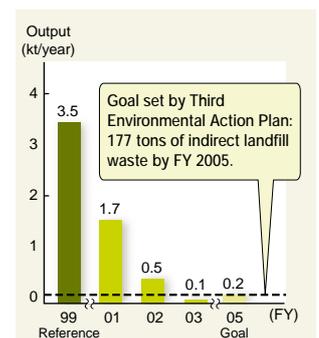
Breakdown of Industrial Waste in FY 2003



Direct Landfill Waste



Indirect Landfill Waste



*1 Zero landfill waste: defined by Toyota Industries as a 95% or greater reduction in direct landfill waste compared with FY 1998 levels, and a 95% or greater reduction in indirect landfill waste compared with FY 1999 levels.
 *2 Direct landfill waste: industrial waste that is directly disposed in landfills without intermediate treatment such as crushing or incineration.
 *3 Indirect landfill waste: industrial waste that is subjected to intermediate processing, such as crushing or incineration, before being disposed in landfills.
 *4 Industrial waste: all industrial waste including direct landfill waste, indirect landfill waste, and recycled waste.
 *5 Recycling rate: ratio of industrial waste that is recycled.
 *6 Deoxidizer: a reducing agent used to remove oxygen during casting.

FY 2003 Measures

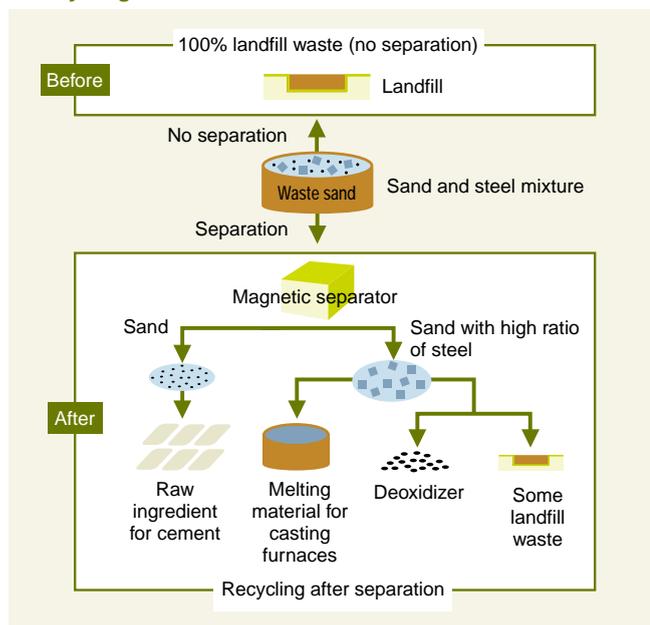
| Description | Efforts | Plant |
|--------------------------------------|--|-------------------------------------|
| Reduction of direct landfill waste | Installed magnetic separators to recycle waste sand | Higashichita Case Study A |
| | Decommissioned older wastewater treatment facilities to reduce sludge dewatering pollution | Obu |
| Reduction of indirect landfill waste | Reused waste plastic as a combustion improver and reducing agent, reducing waste after incineration; recycled burned ash from incineration | All plants |
| Reduction of industrial waste | Reused cutting scraps | Hekinan Case Study B |
| | Installed sludge dryers for wastewater treatment facilities; decreased wastewater sludge output by reducing coagulant usage | Kariya, Takahama |
| | Installed compressors designed to prevent waste oil resulting from hydraulic oil consumption | Higashichita |
| | Installed concentrators and revised specifications to reduce waste oil | Kariya |
| | Reused plastic waste through better sorting of waste | Nagakusa |

Case Study A Installing Magnetic Separators to Reduce Waste Sand

The slag produced from casting performed at the Higashichita Plant accounts for the majority of direct landfill waste generated by Toyota Industries. In order to address the need to recycle waste sand, which is largely composed of sand with a high ratio of steel, the plant installed magnetic separators. This enables the plant to recycle the separated sand as a raw ingredient for cement.

The collected sand with a high ratio of steel is then recycled by mixing them with scraps generated from the machining of casting parts. The resulting mixture is compressed and recycled for use as a melting material. Due to the plant's limited demand for melting materials, the remaining separated steel particles are recycled as a deoxidizer*6 by other companies. The amount of waste sand destined for landfill waste is now less than 10% of previous levels.

Recycling Waste Sand



Case Study B Reusing Cutting Scraps

The cutting scraps generated from the grinding processes at the Hekinan Plant were previously treated as industrial waste. However, observing the high percentage of steel content in its cutting scraps, the plant came up with the solution to recycle the scraps for use by external companies as raw material for steel. The plant has since installed compaction units to compress and solidify the cutting scraps for resale to other companies. This measure has enabled the plant to resell 240 tons of cutting scraps annually.

Future Activities

Toyota Industries has every intention of further improving its management and processing of landfill waste. The company is also considering the adoption of resource-productivity concepts as a tool for managing and reducing industrial waste.

Reducing Water Consumption

Using rainwater and reducing cleaning time of industrial water filtration equipment to reduce consumption levels

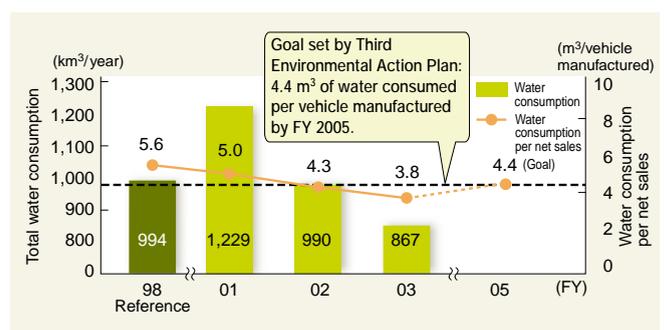
Medium-Range Goals and Major Objectives

Toyota Industries recognizes the importance of water as a natural resource and has made it an objective to reduce the company's water consumption. The Third Environmental Action Plan has set a FY 2005 goal of achieving a 20% reduction in water consumed per vehicle manufactured, compared with FY 1995 levels. In addition, plants, other than the one in automotive manufacturing, are currently applying themselves to the management and reduction of overall water consumption levels.

FY 2003 Achievements

Major achievements in FY 2003 include the further elimination of washing processes from vehicle manufacturing lines. The company's water consumption during FY 2003 stood at 3.8 m³ per vehicle manufactured, which surpassed the medium-range goal of 4.4 m³.

Total Water Consumption and Water Consumption per Vehicle Manufactured



FY 2003 Measures

| Efforts | Plant |
|---|------------------------------------|
| Changed coolant replacement cycle to save water | Kariya |
| Reduced cleaning times of industrial water filtration equipment | Kariya, Obu Case Study A |
| Eliminated vehicle washing processes | Nagakusa |
| Redirected and reused overflow water from cooling towers | Hekinan |
| Used rainwater for toilet sanitation | Higashiura |

Case Study A Reduced Cleaning Times of Industrial Water Filtration Equipment

The Kariya Plant uses filtration equipment to remove steel deposits from industrial water. Although this equipment requires regular cleaning to remove the deposits, the plant determined that its cleaning times could be shortened by one third without impacting the filtration performance. This prompted the plant to change its equipment operating standards, resulting in 34.8 km³ of water being saved annually.

Future Activities

Toyota Industries is looking at ways to reduce the consumption of dilution water by extending the useable life of cutting fluids and reuse purified groundwater. The company will seek to better distribute information on conservation measures taken by the company's plants in order to enable other plants to implement the same measures.

Reducing CO₂ Emissions from Logistics Operations

Maximizing cargo loads, improving transport routes, and switching to alternative transport methods

Medium-Range Goals and Major Objectives

Logistics operations have an undeniable impact on the environment and can contribute to global warming and air pollution through emissions of substances of concern. The Third Environmental Action Plan has set a FY 2005 goal of reducing the company's total CO₂ emissions from transport operations to within FY 1990 levels.

FY 2003 Achievements

Toyota Industries improved the efficiency of its land-based transport operations by combining its shipments with those of other companies, optimizing its shipping routes to reduce trips, and maximizing its cargo loads. Alternative transport methods such as rail and ship transport are also being increasingly used. These changes enabled the company to reduce its total CO₂ emissions to 6,278 tons, which surpassed the medium-range goal.

Subsidiary Spotlight

ST Liquid Crystal Display Corp.*1

■ Reducing Waste Liquid

ST Liquid Crystal Display Corp. generates acid waste and alkali waste from its manufacturing activities. Previously, the company used a third-party processing firm to process its acetone and isopropyl alcohol*2 waste. However, this waste is now completely reused as a source of nutrition for the bio-treatment of water conducted by the company's wastewater treatment facilities. This change has reduced the company's output of waste fluid by 2.4 tons annually, while reducing the consumption of

■ Measures to Reduce Waste Liquid

| Phase | Processing | Efforts |
|---|-------------|--|
| 1. Reuse as pure liquids | In-house | <ul style="list-style-type: none"> Changed to different chemicals Improved separation and recovery of impurities Identified solution of reusing waste liquid based on its characteristics (Seeking improvements for each phase) |
| 2. Use for separate manufacturing processes | | |
| 3. Treat wastewater | | |
| 4. Process industrial waste | Third party | |

methanol that was previously needed for use as a biological nutrient.

■ Water Conservation

The manufacturing of precision LCDs requires the use of vacuum pumps to supply pure water, whereupon it must undergo a further purification process before it can be used in manufacturing. Starting from FY 2003, the company began reusing the vacuum pump cooling water for other cooling tanks and boilers. This measure enabled the company to save 50 km³ of water annually.

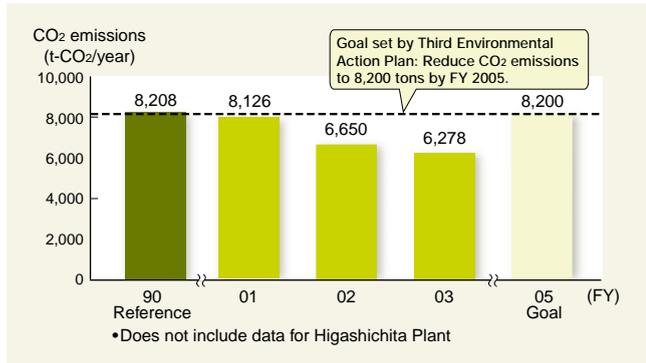
Michigan Automotive Compressor, Inc.

Michigan Automotive Compressor, Inc., uses coagulants to purify contaminated water at its wastewater treatment facilities. The sludge that results from this process is dewatered and treated as industrial waste. The company has discovered that the residual active coagulants from the sludge before dewatering can be reused in the coagulation process. This additional step has significantly reduced the company's overall consumption of coagulants. In addition, the company now uses multiple dewatering processes for better efficiency and reduced sludge output.

*1. ST Liquid Crystal Display Corp. is not a consolidated subsidiary but is accounted as an affiliate by the equity method.

*2. Isopropyl alcohol: a clear, colorless liquid that is mixed with water or ethanol for use as a paint solvent or industrial solvent.

CO₂ Emissions from Logistics Operations



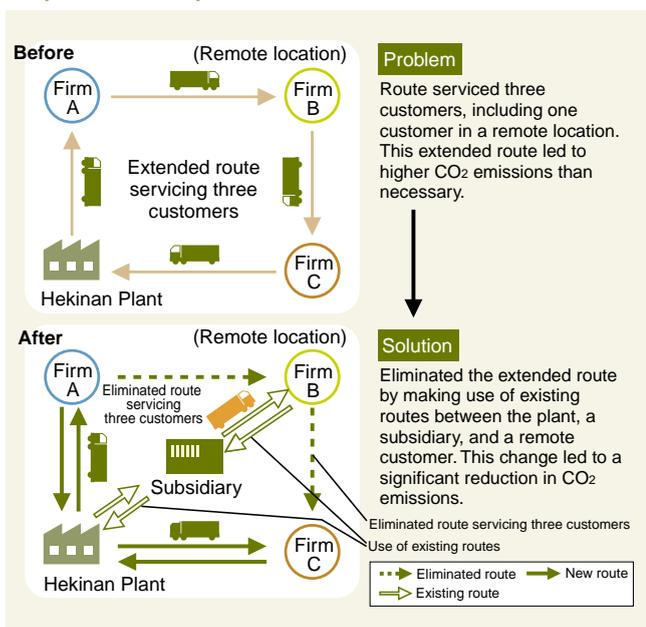
FY 2003 Measures

| Efforts | Plant |
|---|--------------------------------|
| Optimized transport routes | All plants Case Study A |
| Combined shipments with other companies | All plants |
| Maximized cargo loads | All plants Case Study B |
| Switched from truck to ship transport | Takahama |
| Expanded use of ship and rail transport | Takahama Case Study C |

Case Study A Optimizing Transport Routes

The Hekinan Plant uses trucks to deliver engines to its customers. Previously, the company used a daily trucking route that incorporated deliveries to three customers, including one customer in a remote location. The plant has since replaced this trucking route with two shorter ones by utilizing existing shipping routes between the plant, a Toyota Industries subsidiary, and its remote customer. This change reduced the plant's CO₂ emissions by 32.4 tons annually.

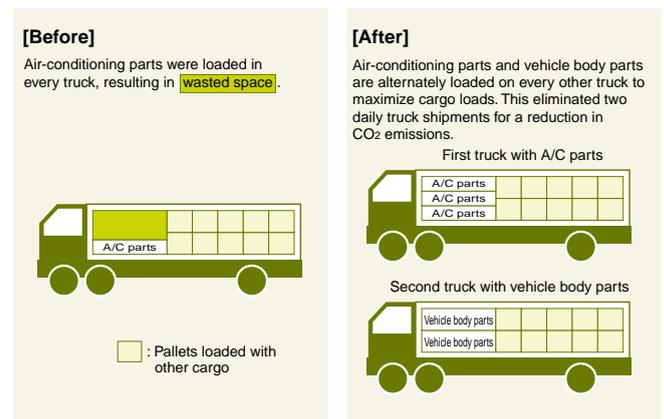
Optimized Transport Route



Case Study B Maximizing Cargo Loads

The Nagakusa Plant, which assembles vehicles, previously shipped air-conditioning parts in 30 daily truck shipments. In order to eliminate wasted cargo space, the plant decided to alternately ship air-conditioning parts and body parts in every other truck for better cargo loading efficiency. This measure enabled the plant to eliminate two of its daily truck shipments, which is expected to reduce the plant's CO₂ emissions by 14.4 tons annually.

Better Cargo Management



Case Study C Expanding use of ship and rail transport

Truck transport is generally considered to produce CO₂ emissions that exceed ship transport and rail transport in that order. Toyota Industries is switching to ship and rail transport in order to deliver forklift trucks to remote customers in areas such as Hokkaido and Kyushu. These measures have reduced the company's CO₂ emissions by 7.2 tons annually.

Future Activities

Future efforts will concentrate on further combining the company's shipments with those of other companies and making increased use of alternative transport methods.

Reducing Packaging

Switching to packaging methods that reduce waste

Medium-Range Goals and Major Objectives

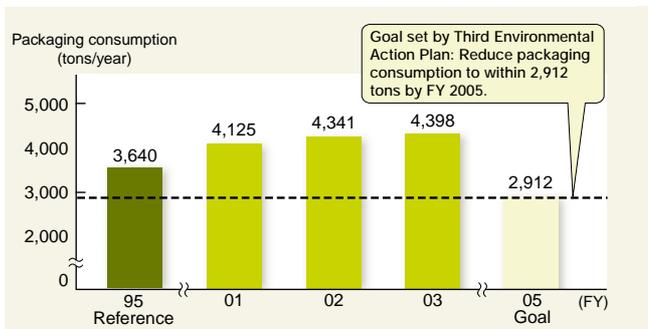
Toyota Industries is reducing its use of packaging materials as part of an effort to conserve resources. The company's Third Environmental Action Plan has set a target of achieving a 20% reduction in packaging consumption by FY 2005, compared with FY 1995 levels.

Production

FY 2003 Achievements

Toyota Industries consumed 4,398 tons of packaging materials in FY 2003, which continued a trend toward increased packaging consumption by the company. Improvements in packaging methods and the expanded use of returnable containers were offset by production increases. These increases were significantly higher, including a notable increase in textile machinery production. Based on future production forecasts, the company will fall short of its medium-range goal of reducing packaging consumption to within 2,912 tons annually. Looking forward, Toyota Industries will continue to implement measures aimed at reducing its overall packaging consumption. The company will also establish new targets on a net sales basis in order to better grasp its progress.

■ Packaging Consumption



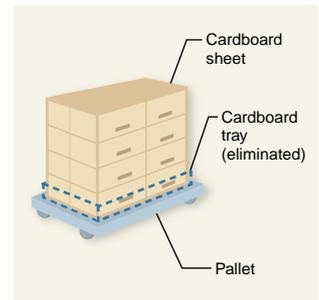
FY 2003 Measures

| Efforts | Plant |
|---|---|
| Improved part packaging method to save material | Kariya (Textile Machinery Division) |
| Changed packaging method to save cardboard | Kariya Case Study A (Compressor Division) |
| Expanded service area for returnable containers to other parts of Japan | Takahama Case Study B (TOYOTA Material Handling Company) |

Case Study A Changing Packaging Methods to Save Cardboard

The Compressor Division of the Kariya Plant exports compressors and parts using reinforced cardboard packaging. Previously, the company used a cardboard tray between pallets and boxes. By forgoing the use of this tray, the plant is expected to save six tons of cardboard annually.

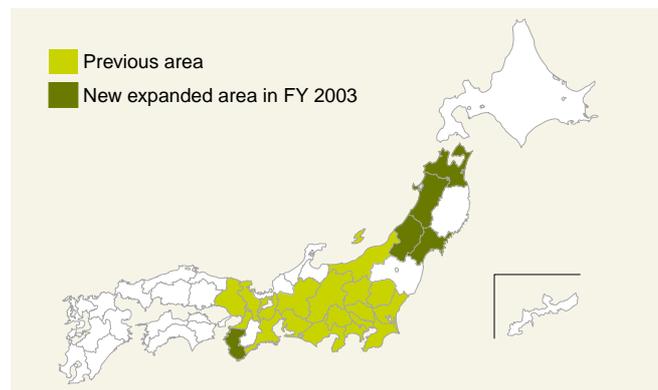
■ Streamlined Packaging



Case Study B Returnable Container Use

Since FY 2002, the Takahama Plant has gradually replaced its use of cardboard packaging, for service parts, with returnable containers that are collapsible. In FY 2003, the plant expanded the availability of this service to include five additional prefectures. This has saved 2.1 tons of packaging materials annually.

■ Areas Covered by Returnable Container Service



Future Activities

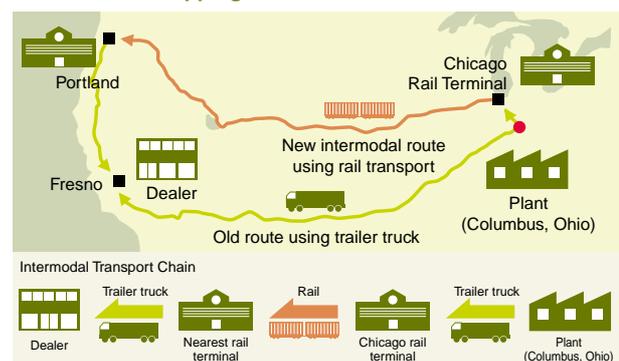
Toyota Industries will continue to streamline its packaging methods to reduce waste and will consider establishing a collection program to recycle waste packaging materials.

Subsidiary Spotlight

Toyota Material Handling USA, Inc. Switching to Intermodal Transport*

Toyota Material Handling USA, Inc., which markets forklift trucks in the United States, has switched to intermodal transport for its westbound shipments of forklift trucks. Previously, westbound shipments were transported solely by truck. The company now delivers its products to a rail terminal for transport on westbound rail routes. Upon reaching the rail destination, the forklift trucks are unloaded and delivered to dealers and customers by trailer truck. The use of intermodal transport effectively reduced the company's CO₂ emissions from truck transport.

■ Intermodal Shipping to West Coast



*Intermodal transport: movement of goods using more than one means of transport, such as truck and rail transport, for optimal efficiency.