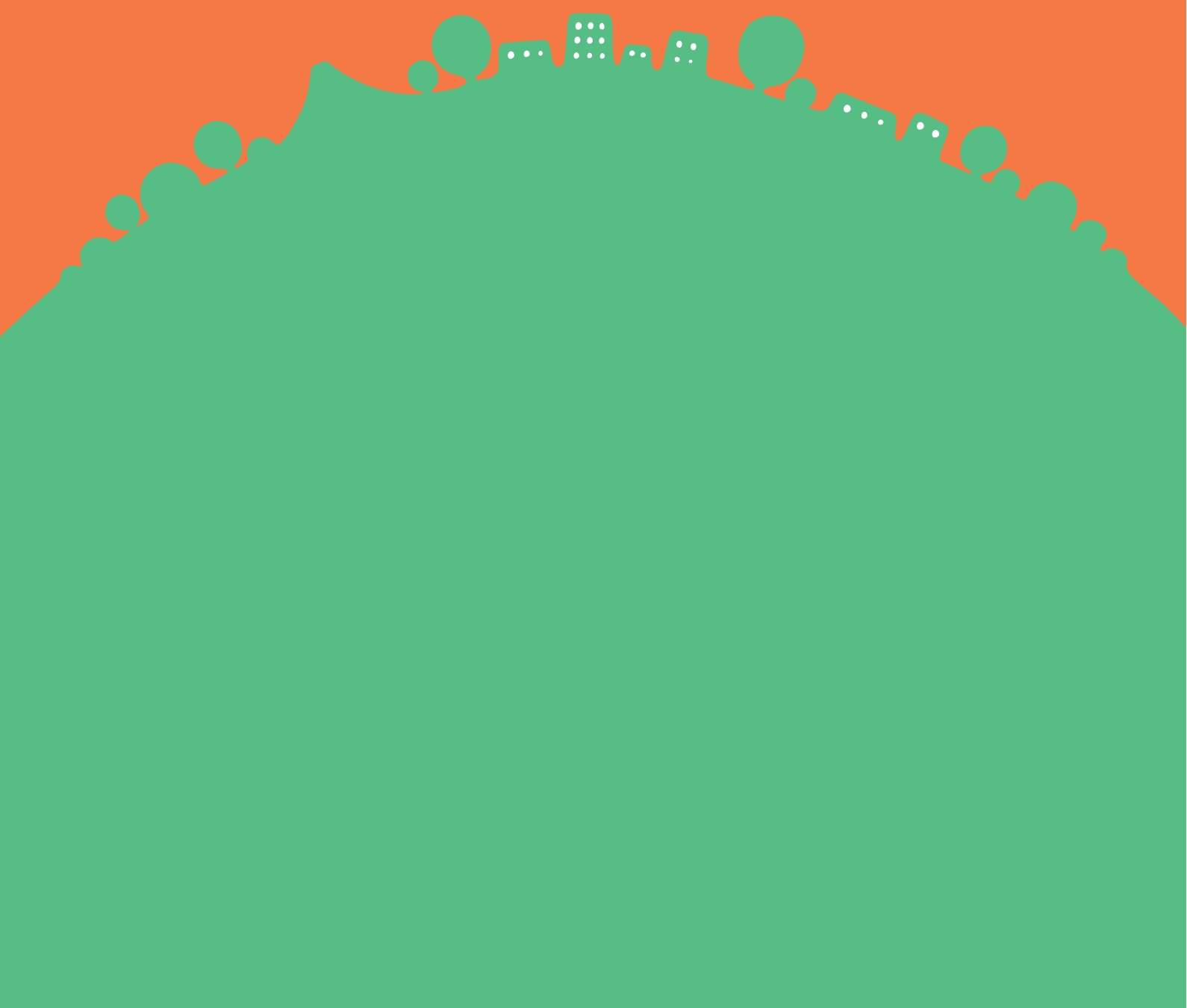


# TAKENAKA *e*-REPORT 2002

Takenaka Corporation's Fiscal 2001 Environmental Protection Activities Report



TAKENAKA

# Message from the President

The 21st century may be called the “Era of the Environment.” As society’s values are shifting from a focus upon the “richness of things” to a “richness of the heart,” we are becoming aware that the days of total devotion to economic efficiency have ended. Thus the era in which we must work to achieve concord with the world's environment, otherwise known as “sustainable society,” is upon us.

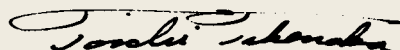
In order to bring about this type of society, we have taken it upon ourselves to urgently introduce and implement new regulations aimed at preventing global warming, controlling harmful substances and dealing with other environmental problems. And we have initiated discussions regarding the introduction of CO<sub>2</sub> emissions trading and environmental taxes.

In 1992, based upon the Global Environmental Charter, Takenaka Corporation started to aggressively tackle issues regarding global environmental conservation, we are seeing results in a wide range of fields, such as the promotion of reduction in resource usage and of energy savings, the prevention of greenhouse gases emissions, reduction in damage to the ozone layer, and reduction in soil pollution. We are leaders in industry environmental conservation activities.

On this occasion, we have created the “Takenaka e-Report 2002,” an overview of the last year’s environmental conservation activities, and I would like to introduce our company’s new environmental conservation initiatives. Please take the time to read and absorb the details of both our company’s environmental conservation initiatives and their results.

August 2002

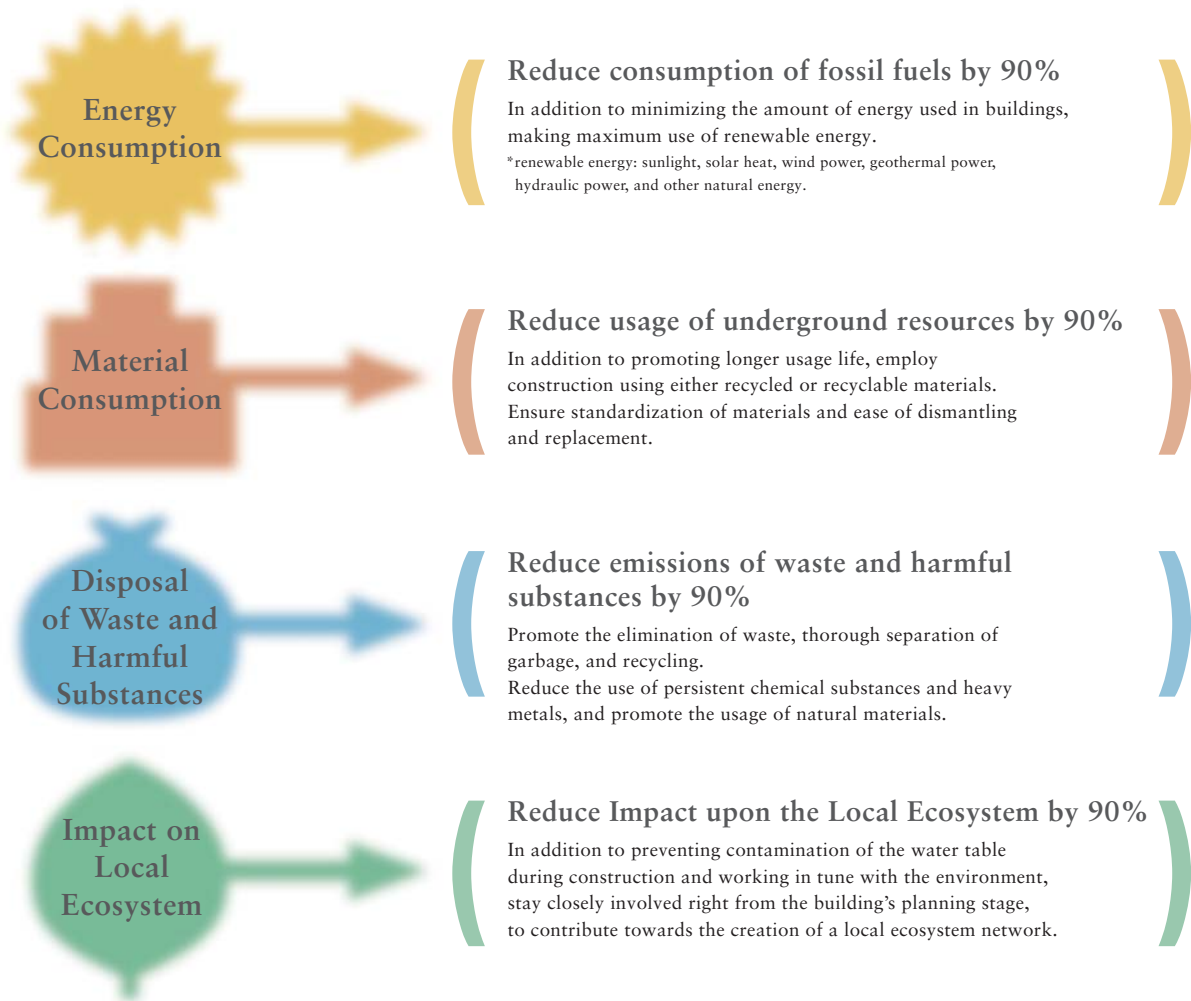
Toichi Takenaka  
President & C.E.O.



# Aiming for Zero Environmental Impact Construction

## The Challenge for Takenaka Corporation

Takenaka is promoting activities that contribute towards a recycling-oriented, sustainable society. To this end, Takenaka is working to implement a Zero Environmental Impact Construction system- “Takenaka Green Building,” which has an environmental impact of one-tenth of the present construction.



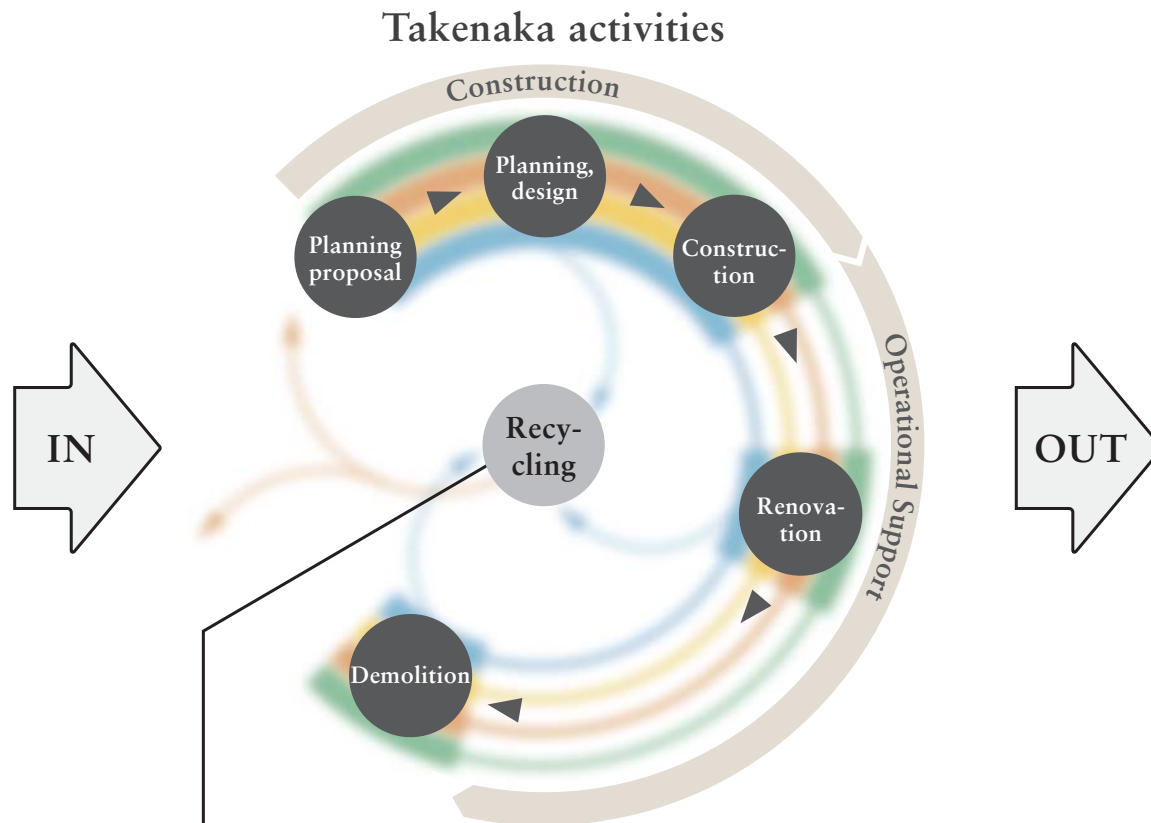
Our company is working towards our goal of “Zero Environmental Impact Construction,” which means to reduce the environmental burden by 90 percent through the life cycle of the building. It is essential that we make “Takenaka Green Building” a reality by giving utmost consideration to the environment. Naturally, in addition to improving the functionality of the buildings themselves, it is also important to stimulate the lifestyles of the people who use the building’s space and functions.

A global consensus, “A tenfold reduction in resource consumption in the industrialized countries is a necessary long-term target if adequate resources are to be released for the needs of developing countries” GEO2000: Global Environmental Outlook 2000 UNEP (United Nations Environment Program)

# Environmental Impact of Takenaka Activities

In order to effectively reduce the environmental load from our business activities, it is essential to both grasp the burden upon the environment of emissions in quantitative terms, including the total amount of resources, emissions and byproducts that are introduced, products, services, and transportation accompanying business activities, and to make efforts to reduce these. The current results of our company's efforts in reducing the impact upon the environment from our business activities are displayed quantitatively in the following charts.

Inputs		Unit	FY2001	Change (%)	
Construction Activities	Concrete	x1,000t	6,247.6	- 1.0 ▲	
	Structural steel	x1,000t	360.3	- 1.6 ▲	
	Reinforcing rods	x1,000t	283.2	-16.7 ●	
	Forms	x1,000m <sup>2</sup>	5,418.0	- 1.4 ●	
	ALC	x1,000t	41.7	-12.0 ●	
	Plasterboard	x1,000t	39.5	24.0 ✕	
	Sand	x1,000m <sup>3</sup>	-	-	
	Ballast	x1,000t	-	-	
	Tiles, glass, paint, rock wool sound absorbing board, ceilings, metal panels, plastic sheets				
	Water	x1,000m <sup>3</sup>	1,115.3	26.2 ✕	
Temporary materials, construction equipment, etc.					
Office Activities	Electricity	x1,000kWh	45,590.5	- 6.8 ●	
	Oils	kl	31,702.4	9.5 ✕	
	Water	x1,000m <sup>3</sup>	203.9	17.0 ✕	
	Paper purchased	x10M sheets	8.5	- 9.6 ●	
	Office supplies	x¥M	26.6	-	
	OA equipment	Unit	1,684	91.4 ●	
Electricity	x1,000kWh	24,707.2	-10.8 ●		



Outputs		Unit	FY2001	Change (%)
Construction Activities	NOx emissions	t-NOx	447.5	-15.5 ●
	SOx emissions	t-SOx	2.8	-14.5 ●
	CO <sub>2</sub> emissions	x1,000t-CO <sub>2</sub>	77.1	-17.9 ●
	Coatings and solvent discharge	t	80.5	-
	Wastewater	x1,000m <sup>3</sup>	1,115.3	26.2 ✕
	Construction waste	x1,000t	491.1	3.5 ✕
	Internal harmful waste materials	x1,000t	1.7	-24.4 ●
	Industrial sludge	x1,000t	159.8	-15.8 ●
	Excavated soil	x1,000m <sup>3</sup>	1,815.4	-31.8 ●
	Odors, harmful substances, noise, vibration, electromagnetic radiation, etc.			
Office Activities	CO <sub>2</sub> emissions	x1,000t-CO <sub>2</sub>	8.8	-20.5 ●
	Waste paper	t	607.0	8.5 ✕
	General waste products	t	273.1	-15.9 ●
	Wastewater	x1,000m <sup>3</sup>	203.9	17.0 ✕
	Medical waste	kg	343.0	-

Building operation by owners		Unit	FY2001	Change (%)
Environmental and energy conservation considerations made in the planning stage contribute to reducing the impact on the environment made during building use.				
Input	Output			
Water	Reduction in CO <sub>2</sub> emissions	x1,000t-CO <sub>2</sub>	24.0	-12.1 ✕
Gas	Reduction in fluorocarbons*1	t	9.1	28.5 ●
Materials / equipment	Reduction in fluorocarbons *2	t	14.8	
Energy / electricity	Exhaust gasses, waste products, noise, vibrations, odors, harmful substances, etc.			

\*1 nonfluorocarbons \*2 new alternatives for fluorocarbons

Recycling		Unit	FY2001	Change (%)
Construction Activities	Concrete debris	x1,000t	338.6	1.6 ▲
	Asphalt and concrete debris	x1,000t	18.9	-15.3 ✕
	Metals	x1,000t	8.8	-11.1 ✕
	Paper (packaging)	x1,000t	2.9	7.4 ●
	Wood	x1,000t	13.3	2.3 ●
	Other	x1,000t	11.1	33.7 ●
Office Activities	Used paper	t	565.5	138.3 ●
	General waste products	t	115.9	-45.9 ✕

Percentage Change

$$\frac{\text{FY2001-FY2000}}{\text{FY2000}} \times 100\%$$

- Impact upon local ecosystem
- Input resources
- Energy usage
- Waste / emissions
- Reduction in environmental impact compared to previous year
- ▲ No significant change
- ✕ Increase in environmental impact compared to previous year

# Environmental Management

## Takenaka Environmental Charter (established November 1992)

### Environmental Principles

As pioneers in environmentally-friendly construction technology and design, we at Takenaka Corporation affirm our commitment to the challenge of preserving a healthy environment by adapting environmentally-sound concepts to fit human needs.

### Environmental Pledge

#### Management Philosophy

We at Takenaka Corporation will strive to make "Environmental Protection" one of the most important functions of our daily operations, and will clearly define our corporate role to society in environmental matters.

#### Advancement Program

Our president, as chairman of the Central Committee for Global Environmental Protection, will develop a companywide "advancement structure" for conservation activities.

#### Corporate Activities

We will set management goals and make every effort to incorporate environmental protection policies into all our corporate activities.

#### Planning and Design

We will plan and design to prevent pollution and conserve energy and resources throughout the lifecycle of our buildings, and to minimize construction residuals during construction.

#### During Construction

We will endeavor to secure building materials and investigate construction methods which emphasize recycling, pollution reduction and conservation of energy and resources.

#### Technologies

We will strive to develop revolutionary new technologies which will not only reduce pollution, but will contribute to the improvement of the global environment.

#### Education of Employees

We will endeavor to instruct and enlighten our employees so that conservation and environmental protection will become an integral part of their daily activities.

#### Public Relations Campaigns

Through such corporate activities as information exchange, we will vigorously promote the transition to an environmentally-conscious society.

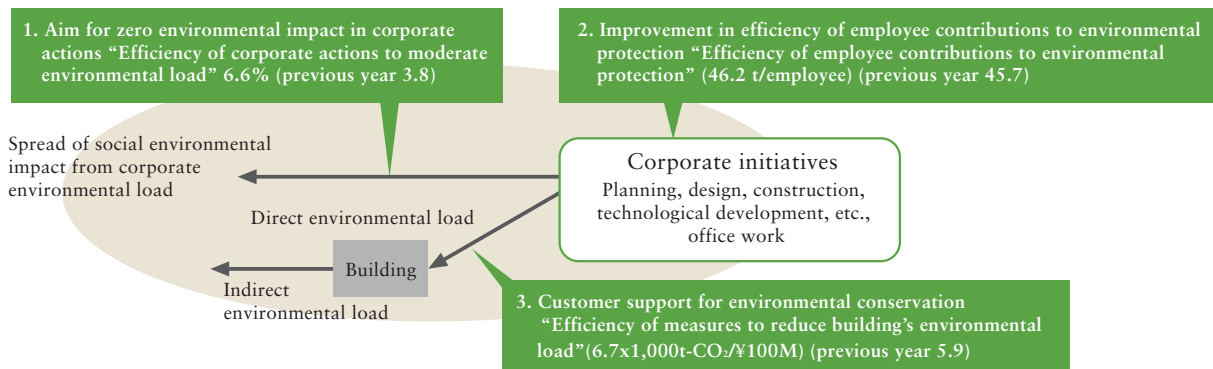
#### Contribution to Society

We will work hard to contribute to society both at home and abroad, and will make every effort to support and participate in environmental protection activities.

#### Cooperation with Other Organizations

We will work in cooperation with local authorities and international organizations, and will endeavor to expedite the introduction and implementation of policies developed therefrom.

## The three general indicators for Takenaka environmental management



# Action Plan 2001 to 2002

Achievements in 2001 based upon the “Action Plan 2001” are as below.

Takenaka was largely able to meet the goals detailed in the Action Plan 2001.

These accomplishments form the base of Action Plan 2002, and Takenaka is now striving to meet those goals.

## Action Plan 2001 Achievement and Action Plan 2002 Goals

	Activities	Action Plan 2001 Goals	Results and Achievements	Action Plan 2002 Goals
Design	Promote energy-saving designs	PAL and CEC goal achievement rate:100%	Achievement rate PAL 98% CEC 99%	Continued from 2001; 100%
		Environment and energy conservation technology roadmap score average 70 or more	Average 88 points Achievement rate 125%	Continued from 2001; average 75 points or more
		—	37 investigations into actual energy consumption	Over 30 simple investigations into energy consumption
	Reduction of LC-CO2	At least 40 LCA assessment proposals	47 proposals Achievement rate: 117%	Continued from 2001; 45 cases or more
	Introduction of alternative energy sources for oil	15 or more projects	Targets achieved 5 forms of alternative energy introduced at 24 projects. Achievement rate: 160%	Continued from 2001; at least 15 projects
Promotion of green procurement	—	Creation of green procurement system -guideline -implementation manual -ecofriendly material list -28 items adopted	Procure more than 7 ecofriendly materials 60% or more projects	
Construction	Control of construction-stage CO2 emissions	Reduce 1990 levels 12% by 2010	Conducted training courses for heavy equipment ecofriendly operation Investigations of actual CO2 emissions	Revision of prediction methods for reduction of construction-stage CO2 emissions Promotion of reduction of CO2 emissions at the construction-stage.
	Control of fluorocarbon emissions	Recover 100% of waste fluorocarbons and halon	Achievement rate:100%	Continued from 2001; 100% recovery
	Promote recycling of construction waste	Overall recycling rate of 50% (v/v, approx. 70% by weight), excluding excavated soil Recycle 90% by volume by 2010	Overall construction waste recycling rate; 52.3% (v/v) Achievement rate: 104%	Overall, recycling rate of 55% (v/v). Excluding soil produced in construction
	Promote control of chemical substances	Conduct investigation of actual conditions	Conducted preliminary investigations	Coatings and solvent usage quantities investigation. Create database of chemical-containing construction materials
	Promotion of green procurement	—	Creation of green procurement system	Procure more than 7 ecofriendly materials 60% or more projects
Technological Development	Promote development of environmental technology	Focus on 5 areas; soil purification, environmental harmony, zero emissions, energy conservation, and reductions in noise and vibration	Technological development promotional themes: 3 soil purification, 4 environmental harmony, 19 zero emissions, and 21 energy conservations.	Continued from 2001
Office work	Promote resource and energy conservation in the office	Targets set by each branch	All main and branch offices set and worked to achieve targets	Each office will set targets for office resource conservations
	Promotion of environmentally friendly materials procurement	—	Creation of green procurement system	50% or more value of office procurement to be on ecofriendly products. (paper and office supplies)

Action Plan 2002 calls for monitoring of the following five categories, established by daily management.

\*v/v: volume

- 1.Total construction waste generated
2. Total properly disposed waste asbestos
3. Number of illegal dumping citations
4. Total tropical timber used for forms
5. Number of noise and vibration complaints

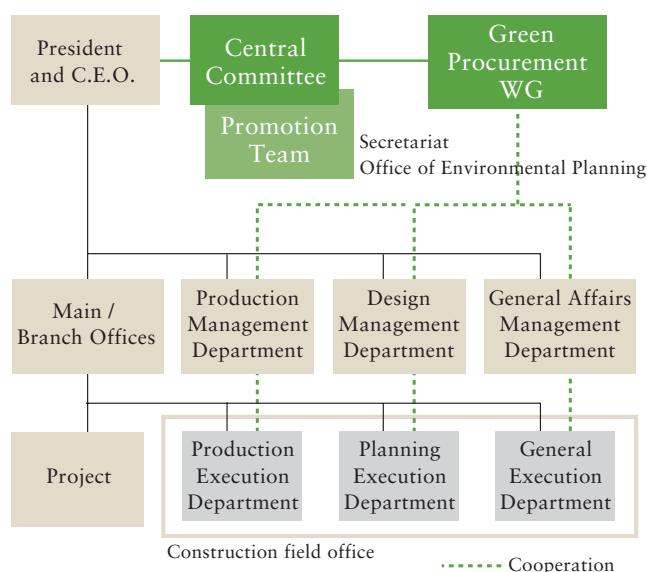
# Green Procurement

As a result of the Law on Promoting Green Purchasing\* in April 2001, there has been a demand for increase in environmental awareness not only in public institutions, but also in ecologically-advanced companies. In response to this, Takenaka has created the Green Procurement System, created guidelines, implementation outlines, and materials lists, and are working to implement these changes throughout the entire company.

## Promotion of the Green Procurement System

Takenaka has selected 28 items as green procurement subjects. To achieve positive procurement proposals, the Green Procurement Promotion System has been established and implemented throughout the company as on the right. The items are selected in accordance with prescribed quality and costing guidelines, and the company is working to use items that are judged to have a low environmental impact. The results of our main environmentally friendly procured materials for 2001 are as below. These are the materials purchased as being environmentally friendly at both the construction and purchasing stage.

## Green Procurement Promotion System



## Green Procurement Guidelines



## FY 2001 Green Procurement Results

Part	Item	Quantity purchased	Previous year
Pile and foundation	Blast slag concrete	50.7 x1,000t	46.4 x1,000t
Structure	Electric furnace steel	476.2 x1,000t	437.0 x1,000t
Structure	Deck plating	1334.1 x1,000m <sup>2</sup>	1425.0 x1,000m <sup>2</sup>
Interior / exterior walls and slabs	PCa, half-PCa.	298.7 x1,000m <sup>2</sup>	223.7 x1,000m <sup>2</sup>
Interior / exterior finishing	Water-based paint	1628.2 t	1806.3 t
Interior finishing	Rock wool sound absorbing board	524.1 x1,000m <sup>2</sup>	380.7 x1,000m <sup>2</sup>
Interior finishing	Particle board	675.1 t	553.3 t
External works, etc.	Recycled concrete	123.7 x1,000t	148.5 x1,000t
Office	Recycled paper	51,387 x1,000yen	55,506 x1,000yen
	Ecofriendly stationery	26,559 x1,000yen	15,198 x1,000yen

\*Law on Promoting Green Purchasing: A law that promotes and obliges the purchasing of ecofriendly goods and services in the national and other public sectors.

# Environmental Accounting

## Working for reductions in environmental loads arising directly from Takenaka activities

Environmental costs			Effects associated with environmental measures									
Main category	Categories	Cost (¥100M)	Economical effects (¥100M)		Environmental effect					Reduction rate		
	Subcategories				Related indicators	Environmental load reduction	Total environmental load	Reduction rate				
Business area cost	Pollution prevention	1. Air and water	28.0	0.0	NOX	Amount cut (t)	77.3	Emissions (t)	447.5	14.7%	14.6%	
		2. Noise and vibration			SOX	Amount cut (t)	0.5	Emissions (t)	2.8	14.5%		
		3. Other forms of pollution			Polluted wastewater	Volume Discharged (x1,000m³)	1115.0					
	Global environment protection	1. Global warming prevention, energy conservation	36.6	Savings from changing construction methods	16.8	Business area CO2	Amount cut (t- CO2)	15,875	Emissions (t- CO2)	77,108	17.1%	25.3%
		2. Ozone depletion prevention				Waste fluorocarbons	Amount recovered (kg)	15,321				
		3. Reduction in use of tropical timber forms				Tropical timber used in forms	Alternative materials (x1,000m²)	2,722	Materials used (x1,000 m²)	5,418	33.4%	
	Resource circulation	1. Reduction in construction waste	58.0	Profit from sellable materials; Savings in processing costs	6.6	Construction waste	Recycled amount (t)	393,892	Generated volume (t)	649,048	60.7%	69.2%
		2. Reduction in general waste products				Special waste products	Processed amount (t)	1,742				
		3. Construction waste processing				Using Recycled paper	Recycled amount (t)	539	Generated volume (t)	607	88.8%	
		4. General waste products and other processing				General waste products	Recycled amount (t)	84	Generated volume (t)	112	75.0%	
			122.7	Subtotal	23.5	Reduction rate in environmental load in business activities (%)				34.4		
	Management Cost	1. Environmental management systems maintenance and operation. 2. Environmental information disclosing and advertising. 3. Environmental load measurement & monitoring 4. Employee education 5. Environmental improvement of offices and environs.	19.6	<p>Note</p> <p>1.Scope: Takenaka Corporation</p> <p>2.Period: January 1, 2001 – December 31, 2001</p> <p>3.No investments in environmentally friendly equipment costing more than ¥10,000,000 for FY2001. FY2001 depreciation was ¥0.0 billion.</p> <p>4.The FY2001 securities report contained a total of ¥8.03 billion in research and development costs, but those costs associated with other joint ventures are not included. Costs born by other companies for joint ventures managed by Takenaka are approx. ¥2.82 billion.</p> <p>6.Figures are expressed in units of ¥100 million, rounded to one decimal place.</p>							Previous year 22.7%	
R&D Costs	Environmental R&D	12.0										
Social activity cost	Social Activity	0.1										
Environment Damage Cost	Damage repair	0.1										
Environmental protection cost (in ¥100M)		<b>154.5</b>	Environmental protection benefits (in ¥100M)		<b>23.5</b>							
		(Up / downstream costs included (¥100M)158.1)			(Previous year 14.8x¥100M)							

## Working for environmental loads arising indirectly from buildings

Construction environmental load reduction costs			Indirect benefits of environmental protection measures			
Up/downstream cost	Building-related environmental protection cost categories	Cost (¥100M)	Building-related contribution of environmental economics (materials, use) (¥100M)		Building-related environmental load reductions (materials, use)	
Up/downstream cost	Green procurement cost differential	0.0	Cost of green procurement (building supplies, office supplies, etc.)	201.5	Reduction in CO <sub>2</sub> emissions From using blast furnace concrete (t- CO <sub>2</sub> )	394,415
	Environmentally friendly design expenses	3.6 (previous year, 4.5)			Use of tropical timber for forms (trees)	3,129
					Benefits of environmentally-friendly design Energy conservation contribution (%)	[ PAL 16.1 CEC28.9
					Nonfluorocarbon coolant used (kg)	Non-CFC9,085
					New alternatives to fluorocarbon used (kg)	Alternatives to CFCs 14,800
					Reduction in CO <sub>2</sub> emissions when operating (t- CO <sub>2</sub> )	23,953

# Overseas Projects

## Japan Pavilion-EXPO 2000 Hannover

The Japan Pavilion was the first in the history of world expositions to demonstrate the innovative use of recycled paper as a construction material.

It symbolized paper's practicality as a recycling material and its suitability for use in ecofriendly technologies.

The paper tubes, wooden frames and paper membranes of the pavilion's roof were reused after the EXPO.

Japan's main theme was the reduction of carbon dioxide (CO<sub>2</sub>)

emissions to prevent global warming.

The Japan Pavilion measured 72 meters by 35 meters in floor area and the ceiling was 15.5 meters in height, making it the largest paper structure ever built.

It had a grid shell comprised of 440 thick paper tubes, each measuring 12 centimeters in diameter and 20 meters in length and weighing some 100 kilograms. Shigeru Ban, an architect renowned for his original paper tube structures, provided the pavilion's inspirational design.

Total Producer : Japan External Trade Organization (JETRO)

Design (Building) : Shigeru Ban Architects, Frei Otto (Consultant)



Interior view of paper tube dome



Japan Pavilion with triple arch

## Hyatt Regency Kauai Received Two Environmental Awards

The Hyatt Regency Kauai hotel, which is owned by Takenaka Corporation, received two Environmental awards in Hawaii in May 1993.

### “Malama Aina” Environmental Award

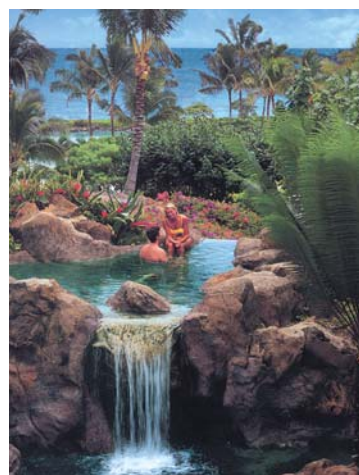
This prize was established in 1993 by the American Automobile Association, Hawaii branch, and it is awarded to hotels that carry out environmental conservation and preservation activities in Hawaii.

A thermal energy recovery system was evaluated. The system uses the warm air emitted by air-conditioners for swimming pools, showers and other utilities.

### “Investing in the Environment” Award

This prize is awarded by “Hawaii Investor Magazine.” The magazine evaluated the hotel's thermal energy recovery system and responsible tourism activities in regard to Kauai Island's natural environment.

Design : Wimberly, Allison, Tong & Goo



Hyatt Regency Kauai Resort and Spa



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