



# 2004

SOCIAL & ENVIRONMENTAL REPORT



## Note from the Editors

Mazda Motor Corporation issues this annual Environmental Report, summarizing our activities in environmental protection for the prior year, with reference to the guidelines of the Ministry of the Environment.

As part of our ongoing effort to fulfill our obligations as a good corporate citizen, and to assist our diverse stakeholders in better understanding our activities from a range of perspectives, this year we have expanded the section on social issues within this report, renaming it the "Social & Environmental Report" as a result.

A variety of information has been added, touching on topics such as corporate ethics, compliance and corporate governance, as well as how we are working to make Mazda a better place to work.

Our commitment to environment protection remains unchanged, and there are more pages than ever of environmental information this year, evidencing our belief that this is a major issue.

We hope that this document will help you better understand Mazda Motor corporate activity, and our objective of sustainable development together with society.

## Scope of this Social & Environmental Report

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### [Organizations covered]

Mazda Motor Corporation, its domestic (Japan) Group companies, and selected overseas Group companies.

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### [Period covered]

In principle, the fiscal year from April 2003 to March 2004, but also including selected activities from 2004.

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### [Website]

URL <http://www.mazda.com>

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### [Major public information releases]

Environmental report	Annual
Environmental data for each model	Website
Mazda in brief	Annual
Press releases	As required

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The next Environmental Report is scheduled to be released in summer 2005.

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**mazda**

## Message from the president



In accordance with our management philosophy, "To create new values and bring enjoyment to people through the best possible automobiles and service," we have released a new generation of products like the Mazda6 (Atenza) and the Mazda3 (Axela). These automobiles are loved by drivers around the world, giving us confidence that in our business and product-led growth strategy. One of the values is the fascination of our cars, conceived under our international strategy and built with full consideration for quality, safety and the environment, which provide performance fully reflecting the Mazda brand DNA. Another value is that our corporate activities and products are

beneficial to society. To continue to make popular vehicles and remain beneficial to society, we are determined to continue our sound and highly-transparent management approach, engaging in business decisions and activities with awareness of the needs of our diverse stakeholders.

Mazda is committed to sharing the new values that we produce with all of our stakeholders, including customers, shareholders, suppliers, investors, Mazda dealers, employees and the local society. We believe that for continued growth, it is essential to be trusted by our stakeholders and contribute to society, and toward this end we are expanding our corporate governance program, promoting improved risk management, and working to ensure compliance with laws, regulations and corporate ethics. We will continue to progress together with society, and in pursuit of that objective will continue to improve our business processes to better match stakeholder expectations. We recognize this as our corporate social obligation, and will continue to improve our corporate stance accordingly and reflect it into our business plans.

This Report covers a wide range of interaction between Mazda and society, and our social responsibilities, primarily dealing with the successes achieved in fiscal 2003 in our activities to attain the goals spelled out in the Environmental Action Plan for protection of the global environment.

We have established the Mazda Global Environmental Charter as our basic policy in protection of the global environment, and are making steady progress in both protection efforts and in the realization of a recycling society.

In product development we have further expanded our line of low-emissions vehicles while improving fuel efficiency, as is apparent in the SU-LEV (Super ultra-low emission vehicle) certification (2005 standard) received by the Axela in October 2003 and the Verisa and Demio in June 2004, while almost all vehicles have achieved the 2010 fuel efficiency standards+5%. As of summer 2004, over 40% of passenger cars sold in Japan (excluding diesel models) were SU-LEV designs.

In the field of clean-energy vehicles, we announced the RX-8 Hydrogen RE, featuring hydrogen fuel technology and a new rotary engine developed in-house, at last years Tokyo Motor Show, making great strides toward practical adoption. We hope to ship commercial automobiles equipped with hydrogen-fueled rotary engines within two years.

In production and distribution we are maintaining our approach to zero emissions of landfill waste, and in addition to our ongoing modal shift in marine transport are also engaged in a range of activities related to environmental management systems. Through these and other activities we have reduced CO<sub>2</sub> emissions per unit sale and increased the waste recycling ratio. Our Ujina No.2 Plant, which began operation in May 2005 with a range of facilities like the three-layer wet paint system offering reduced environment impact, well represents our policy of expanding production capability while maintaining an appropriate balance between corporate activity and environmental protection.

We are also making preparations to fulfill our obligations as an automobile manufacturer under the Automobile Recycling Law (Japan), which is due to take effect in Japan in January 2005. R&D is now finding ways of further increasing the recyclability of end-of-life vehicles, and Mazda is constructing a system capable of collecting and processing air bags, CFCs and shredder residue when vehicles are scrapped. Research into recycling is continuing at our dealerships, and preparations are continuing to ensure smooth implementation.

Mazda is determined to continue to meet the challenge of providing new value, contributing to the sustainable development of society and the environment through corporate activity, increasing corporate value and achieving stable growth.

President and CEO Hisakazu Imaki

A handwritten signature in black ink, appearing to read "H. Imaki". The signature is written in a cursive, flowing style.

# Corporate Vision and Management Philosophy

## Corporate Vision

Mazda defined Corporate Vision in December 1999, consisting of a 'Vision' (corporate objectives) along with a statement of 'Mission' (roles and responsibilities) and 'Values' (the values Mazda seeks to produce). These principles are helping express the ways in which Mazda and Mazda's employees understand their roles and responsibilities, and help define their senses of value as they work toward personal and corporate goals. In the realization of this corporate vision, Mazda is determined to further enhance corporate governance, to continue to promote a harmonious relationship between people, the company and the environment, and to strive to share new value with all of our stakeholders, including customers, shareholders, suppliers, employees and the local society.

**Corporate Vision (established 1999)**

**Vision**  
Corporate objectives

To create new value, excite and delight our customers through the best automotive products and services.

**Mission**  
Roles and responsibilities

With passion, pride, and speed, we actively communicate with our customers to deliver insightful automotive products and services that exceed their expectations.

**Value**  
The values Mazda seeks to produce

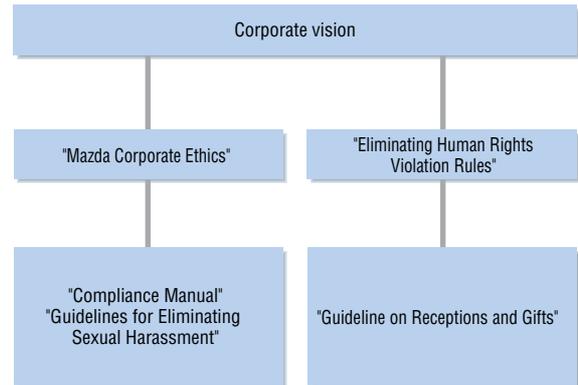
We value integrity, customer focus, creativity, efficient and nimble action and respect highly motivated people and team spirit. We positively support environmental matters, safety and society. Guided by these values, we provide superior rewards to all people associated with Mazda.

## Activities in corporate ethics and compliance

Mazda Motor believes that continued growth is impossible without the trust of all of our stakeholders, including customers, shareholders, suppliers, employees and the local society.

In 1998 we released the "Mazda Corporate Ethics Code of Conduct" and "Guideline on Receptions and Gifts," followed by "Guidelines for Eliminating Sexual Harassment" in April 1999, as part of our corporate ethics program. In October 2000 we further strengthened our approach to human rights protection by establishing "Eliminating Human Rights Violation Rules." Mazda conducts annual seminars on corporate ethics and human rights, and in March 2004 a "Compliance Manual" was distributed to all officers and employees to ensure a complete understanding of the importance and need for compliance with corporate ethics and applicable laws and regulations, as well as respect for human rights.

Positioning of "Mazda Corporate Ethics Code of Conduct" and "Eliminating Human Rights Violation Rules"



### ■ Outline of the "Mazda Corporate Ethics Code of Conduct"

Five key items defining corporate ethics as sincerity:

- (1) Comply with laws and regulations, corporate rules, common sense and sound practice in the international society.
- (2) Be fair and even-handed.
- (3) Fulfill the company's social responsibilities.
- (4) Fulfill your own duties faithfully.
- (5) Be honest.

Reports of violations of law or regulation:

\*Direct report to the Ethics Consulting Office as soon as any violation is known.

\*All retaliatory action or inappropriate treatment with respect to any person reporting or cooperating with investigation of violations is forbidden.

Action guidelines

- (1) Comply with laws and regulations and the company's rules. With respect to matters not clearly provided for, make a judgment considering their spirit.
- (2) Treat employees, customers and clients fairly and justly. Not obtain from or give to anybody an unjust benefit and/or favor taking advantage of the business position.
- (3) Make distinctions between public and private affairs, and should never pocket or abuse the company's assets.
- (4) Keep confidential information, never infringe on any intellectual property right, whether it belongs to Mazda or another party.
- (5) Seek to develop, manufacture and sell products taking into consideration human safety and environment.
- (6) Always act with a view to seeking sound profits.
- (7) Respect civil rights and human dignity.
- (8) Always state the truth honestly and timely in reporting internally and /or to the public.

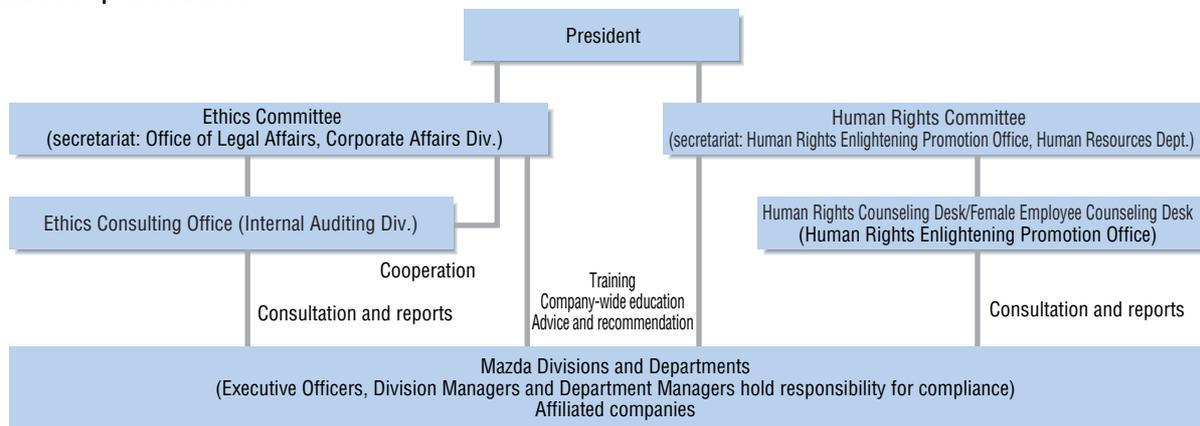
### ■ Outline of "Eliminating Human Rights Violation Rules"

\*All employees are forbidden from all violations of human rights in corporate activity, whether at the workplace or elsewhere, including rights related to race, nationality, creed, gender, social standing, origin, age, physical disability or sexual preference; from sexual harassment; and from other inappropriate actions.

\*All violations of these regulations, violations of human rights, or retaliatory actions shall be reported to Mazda.

\*All retaliatory action in response to reports of human rights violations, or to cooperation with investigations, is forbidden.

### Mazda's compliance stance

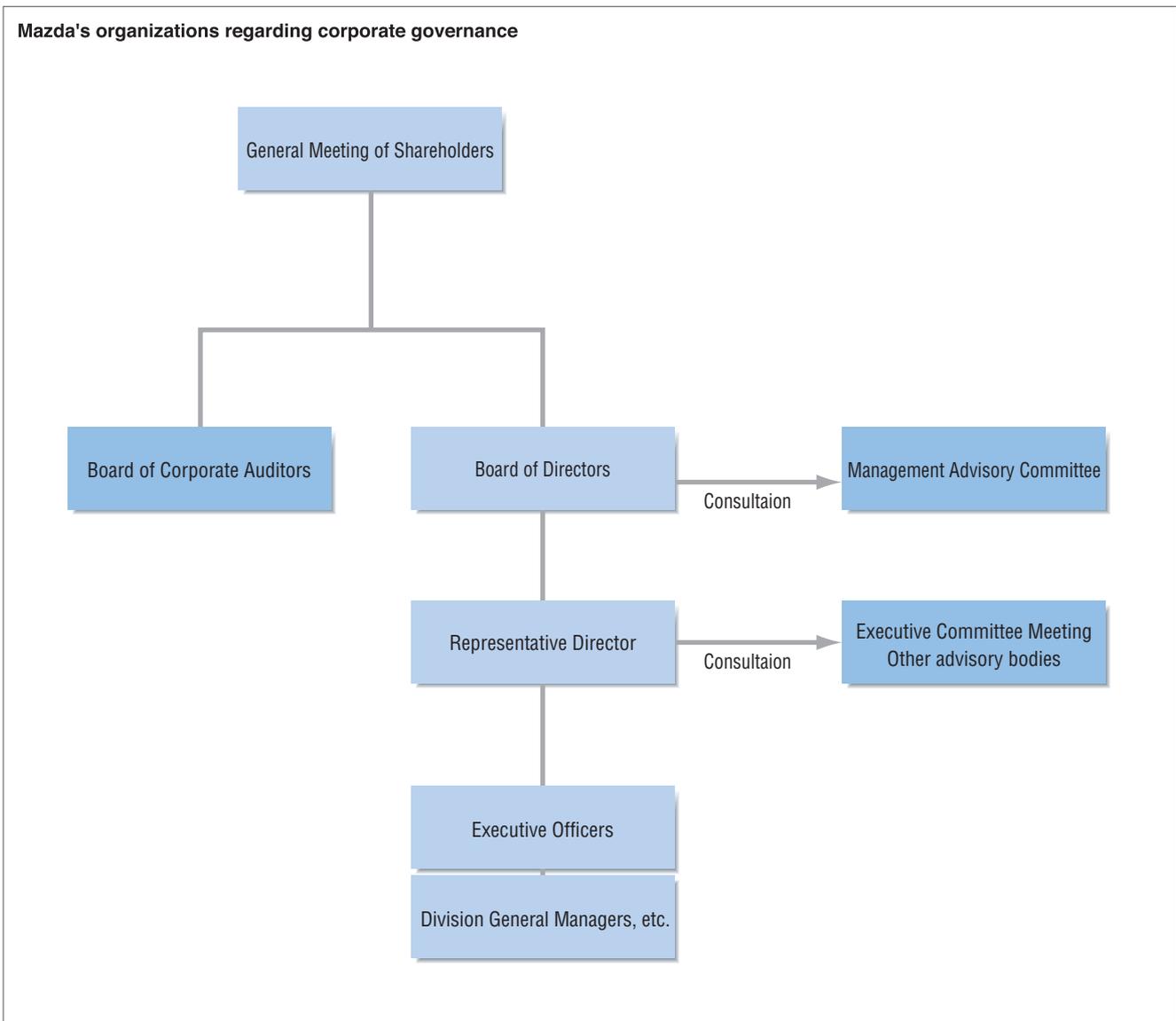


# For Trusted and Trustworthy Corporate Activities

## Corporate governance

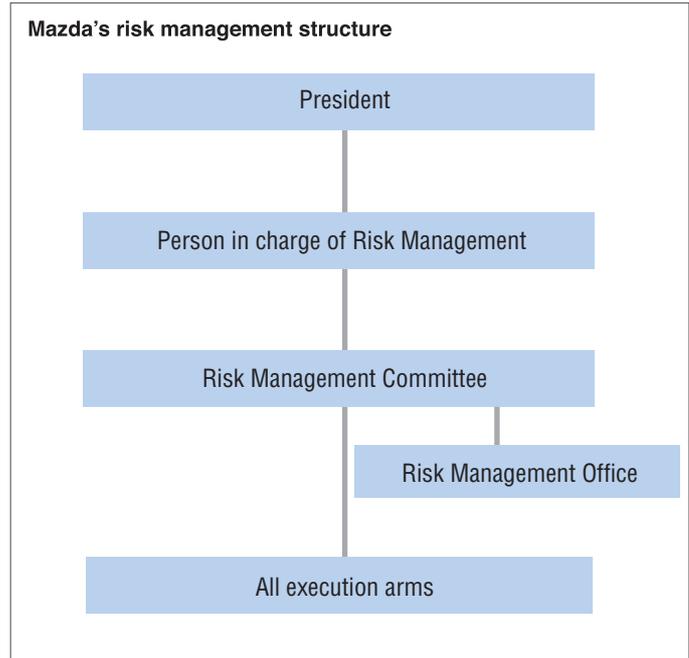
To achieve more transparent management and faster decision making, Mazda has been implementing various measures to enrich corporate governance. In addition to bodies prescribed by law, such as the general meeting of Shareholders, the board of directors and the board of corporate auditors, an executive committee has been established. Executive committee meetings are held to propose and debate important company-wide policies and measures and to report on information necessary for business management. Other advisory bodies that assist the president with decision-making have also been established. Mazda has also introduced the executive officer system; by promoting the separation of execution and management, the effectiveness of the board of directors as a supervisory body has been enhanced. Further, debate by the board of directors has been enhanced, and by delegating authority to the executive officer level, decision-making has been speeded up. In these ways we are working to further improve management efficiency.

Mazda has also established a Management Advisory Committee composed of outside notable figures and Mazda's directors. Mazda gets a wide range of opinions from a broad, global perspective from the committee members, who possess unsurpassed specialized knowledge and insight in their fields of expertise. Their opinions will be reflected in Mazda's management and enhance transparency.



## Risk management

In January 2002 we established the Risk Management Office as a company-wide administrative organization, and have been engaged in preparing related regulations, applying risk management activity throughout the company, in an effort to strengthen information management and improve our ability to withstand earthquakes and other major disasters. Each and every officer and employee is expected to be involved in implementation, as the Office works to appropriately manage internal and external risk to ensure business continuation and stable development.



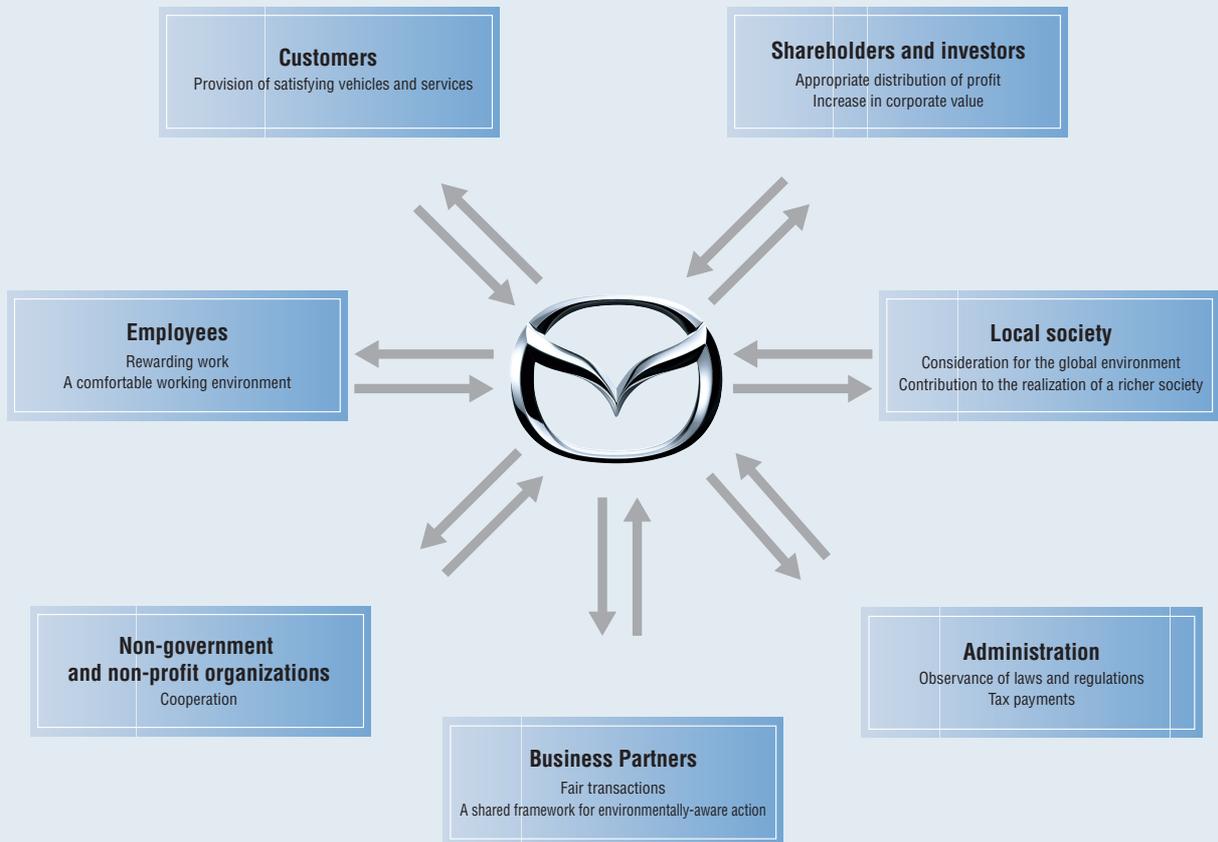
### Basic Mazda risk management policy (outline)

<b>Risk management philosophy</b>	The environment within which corporate activity is carried out is expected to become increasingly diverse in response to trends including widespread use of information technology, accelerating globalization, and heightened awareness of issues including the global environment and compliance. We are working to respond accurately to these environmental changes, minimizing the risk acting as an obstacle to continued and stable corporate activity while establishing a system capable of reacting promptly to unusual and emergency situations, thereby earning the trust of our customers, our shareholders and society. The entire Mazda Group is involved in risk management, working to become and remain a truly trusted corporation.
<b>Risk management objectives</b>	In the following ways, Mazda shall strive for Enhancement of Corporate Value and Harmony with the Community thereby realizing the company's "Corporate Vision" (1) Ensure the health and safety of all those who make up the Mazda Group as well as local citizens (2) Maintain and increase the trust from the community (3) Make appropriate use of the tangible and intangible corporate assets of the Mazda Group (4) Secure interests of the stakeholders, earn their trust and meet their expectations (5) Support the functions of the organization and seek a rapid restoration of business activities at the time of abnormal circumstances or emergencies
<b>Action guidelines</b>	All officers and employees shall be aware of potential risk in every phase of corporate activity, and shall implement appropriate risk management in every phase of implementation.
<b>Scope of application</b>	(1) Shall apply to all business risks (2) Shall apply to the entire Mazda Group, including subsidiaries and affiliates

# The interrelationship between Mazda and its stakeholders

For the continued development of the world and society, Mazda is engaged in a wide range of programs addressing environmental issues. Mazda is also working toward the attainment of the goals defined in its corporate vision, to share newly-created value with all its stakeholders, including customers, shareholders, suppliers, employees and the local society.

## Our interrelationship with our stakeholders



# Creating social value in the uniquely Mazda way

## Brand DNA, expressing a value shared worldwide

The goal of "creating new values" defined in the Mazda corporate vision is realized through our products. In April 1998 we defined our worldwide brand positioning as a key management strategy to strengthen the Mazda presence in all world markets, and began full-scale brand strategy implementation from February 1999. Mazda brand DNA was defined based on two key elements: personality and products. The core message contained in all Mazda brand products is "Zoom-Zoom," representing the zooming fascination with motion felt as a child. Our goal is to let customers experience once again the joy and emotion they felt with cars.

## Innovative product development, with superior environmental and safety performance

Innovative product development based on our individualistic brand DNA has made it possible for us to release automobiles delivering driving pleasure with outstanding design and function. To make the fun and convenience of our automobiles more valuable to society, we strive to provide the highest possible environmental and safety performance. Mazda product development continues to meet the challenge of creating new value by achieving a good balance between these elements.

### Evaluation as a global brand

Our brand DNA concept has been highly rated both in Japan and around the world, earning us a number of prestigious awards and demonstrating the strength of our global brand.

#### [Major awards garnered by new-generation Mazda products]

##### ◆ Mazda6 (Mazda Atenza)

2003 RJC Car of the Year (Japan)  
2004 Chinese Car of the Year



##### ◆ Mazda RX-8

2004 RJC Car of the Year (Japan)



2003-2004 Japan Automotive Hall of Fame Production Car of the Year / Production Car of the Year  
2003 Australian Car of the Year

##### ◆ Mazda3 (Mazda Axela)

2003 Canadian Car of the Year



In addition, the four new-generation models starting with the Mazda6 (Atenza) in May 2004, followed by the Mazda2 (Demio), the RX-8, and the Mazda3 (Axela), have won a total of over 150 awards, as of August 2004.

## Realizing the Mazda corporate vision through our products

### Corporate vision

Creating uniquely Mazda value

#### < Mazda brand DNA >

#### < Personality >

- Stylish
- Insightful
- Spirited

#### < Product >

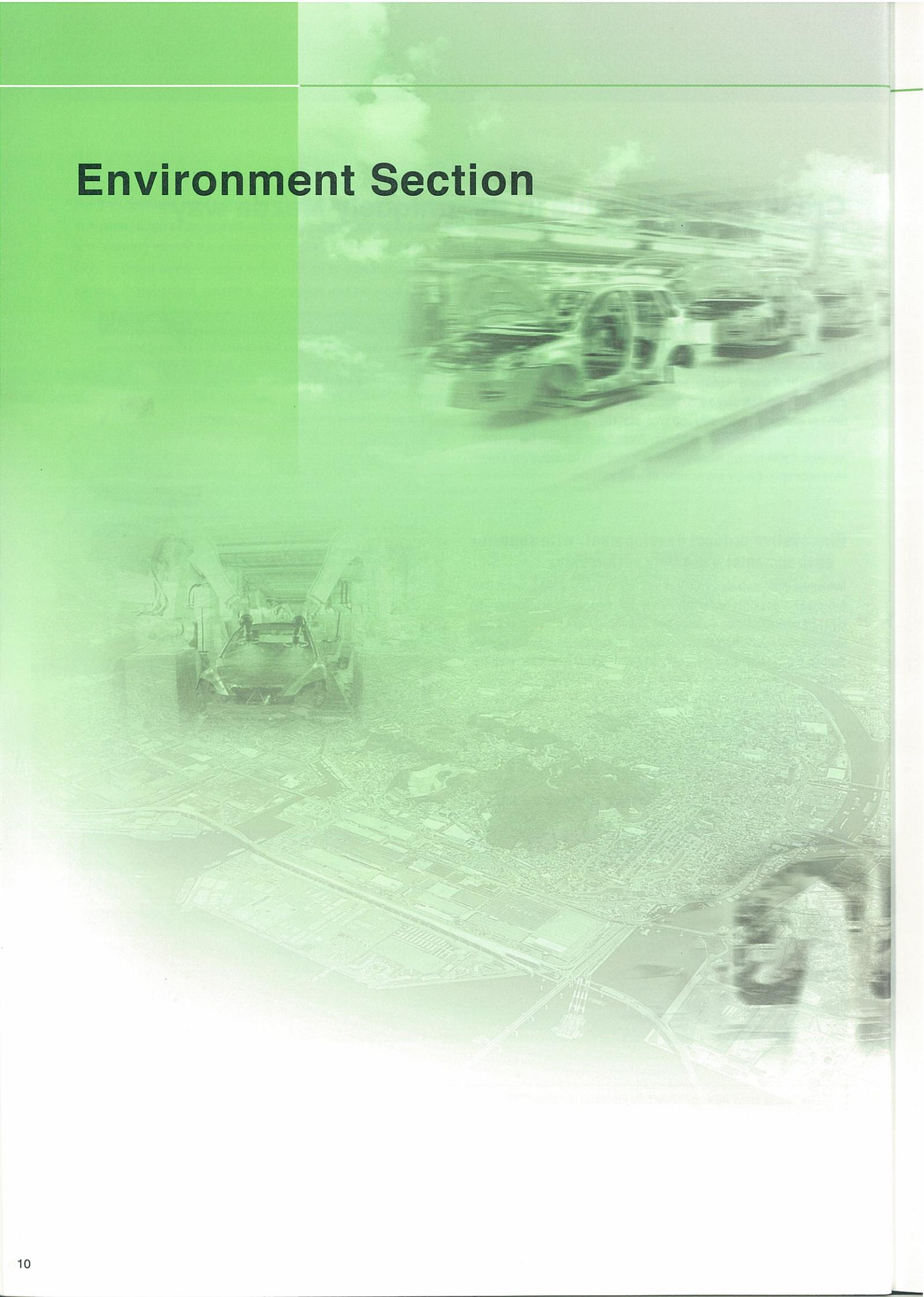
- Distinctive Design
- Exceptional Functionality
- Responsive Handling and Performance

[The Mazda brand message powerfully expresses our brand DNA:]

*Zoom-Zoom*

Expressing fascination with motion felt as a child

# Environment Section



# Quantity of resources invested, and output affecting the environment

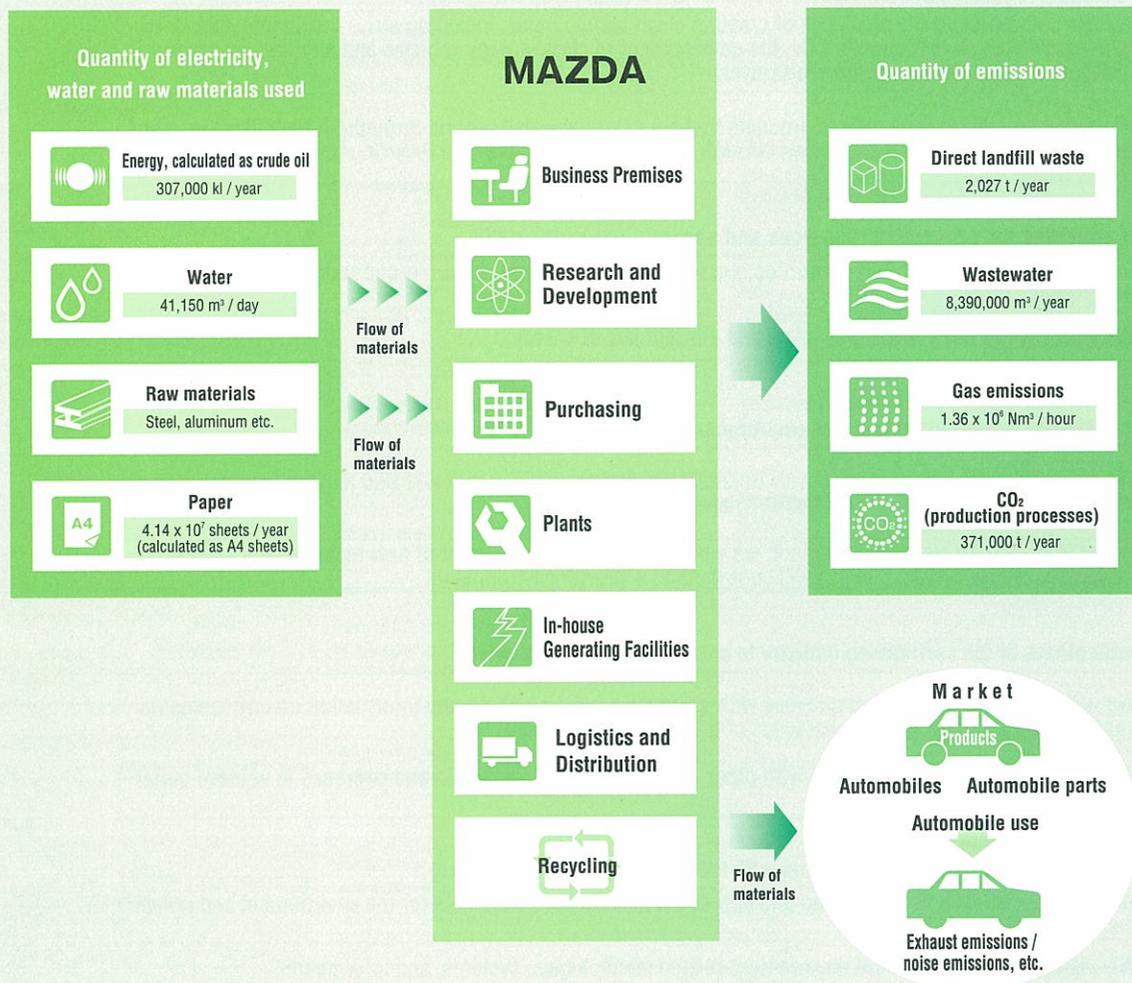
In addition to working to reduce the burden we place on the environment in every area of our corporate activities, Mazda is also committed to contributing to environmental protection through supplying our customers with products containing the latest in environmental technology.

This chapter is devoted to reporting on our environmental management system, and specific activities contained within it.

Efficient use of resources and reductions in emissions of environmentally damaging substances, such as CO<sub>2</sub>, are important in reducing environmental risk, and contributing to the formation of a recycling society. The chart below shows the quantities of resources input to Mazda's production processes, and the quantities of emissions produced. During 2003, we used the equivalent of 307,000 kiloliters of crude oil in energy, as well as 41,150 m<sup>3</sup> of water for each day our plant was in operation. Our processes resulted in the emission of 371,000 tons of CO<sub>2</sub> into the atmosphere, and we output 8.39 million cubic meters of wastewater.

Through reusing and recycling waste products, and successful 'zero emissions' activities, we reduced our direct landfill waste to 2,027 tons.

## Mazda's relationship to the environment



\*All figures based on results for 2003.

# Environmental Management

## Basic Environmental Policy

Mazda established its 'Environmental Principles' and 'Guidelines for Action' in 1992, and based on these, established these as the Mazda Basic Policy for the Global Environment (also known as the "Mazda Global Environmental Charter"). To promote specific activities in accordance with basic policies, Mazda also formulated the "Environmental Action Plan" and is continuing to make solid efforts.

## Mazda Global Environmental Charter

### Environmental Principles

We aim to promote environmental protection and contribute to a better society, while maintaining harmony with nature in our business activities.

1	We will contribute to society by creating environmentally friendly technologies and products.
2	We will use the Earth's resources and energy sparingly, and never overlook environmental considerations when conducting our business.
3	We will play our part in improving the environment, hand in hand with local communities and society at large.

### Guidelines for Action

#### ● Creation of environmentally sound technologies and products

1	We are committed to the challenge of creating clean technologies, including those facilitating cleaner exhaust emissions, a reduction in CO <sub>2</sub> , the development of clean-energy vehicles and alternative energy vehicles, and the protection of the ozone layer.
2	We will encourage the creation of products that are environmentally sound throughout their lifespan, from the planning and development stages through to manufacturing, use, and recycling/ disposal.

#### ● Corporate activities for conserving resources and energy

1	In order to conserve limited resources, we will actively promote resource-conservation and recycling activities.
2	We will strive to achieve the diversified and efficient use of energy.

#### ● Corporate activities in pursuit of a clean environment

1	We will not merely comply with environmental laws and regulations, but will also impose voluntary clean control standards and implement self-regulated control.
2	In our pursuit for a clean environment, we will promote the development of new technologies and the introduction of new systems, which will contribute to a cleaner environment.

#### ● Working with others in the car-making industry to create a better environment

1	We will actively provide our employees with in-house education about and information on environmental conservation to enhance their awareness of the global environment.
2	We will work in close cooperation with other car manufacturers in Japan and overseas to achieve better environmental protection.

#### ● Creating a better environment in cooperation with local communities and society

1	We will work actively to understand and appreciate society's requirements for the environment and reflect them in our business activities.
2	We will disclose and publicize environment-related technologies, systems, and information.
3	We will not only conduct our own environmental activities, but also will offer cooperation to and play an active part in other social activities for the conservation of the environment.

## Environmental activities promotion plans and results of activities during fiscal 2003

Mazda is working towards reducing the burden it places on the environment through its corporate activities and products. We have established activities promotion plans for each area and category of our work, and are committed to attaining the objectives set in these plans. Our activities promotion plans and the results of our activities in fiscal 2003 were as follows:

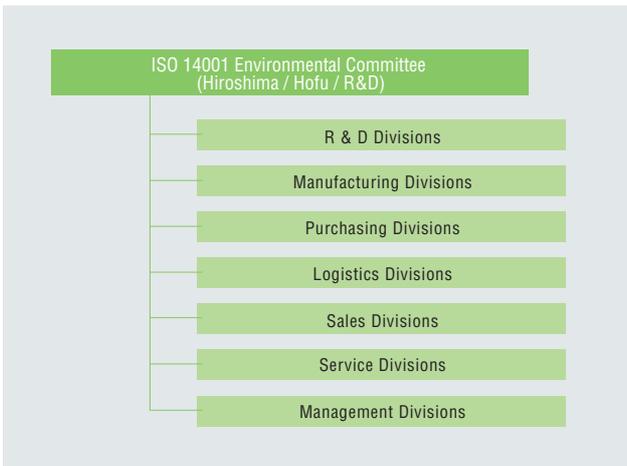
Environmental activities promotion plans			Results for fiscal 2003	Related pages
Category	Objective			
Environmental Management	ISO14001	Promote and support all production affiliates and suppliers in achieving ISO 14001 accreditation	All nine production affiliates achieved accreditation. 94% of main suppliers have also achieved accreditation	P 1 4 . P 3 5
Product development / R & D	Fuel efficiency	Attain 2010 fuel efficiency standards for all passenger car weight classes by fiscal 2005	2010 standards already achieved in two out of four weight classes	P 2 2 . P 2 3
	Exhaust Emission	Ensure that 90% or more of passenger cars are SU-LEV or U-LEV standard by end of 2005	U-LEV standard achieved in 71.2% of passenger cars	P 2 0 . P 2 3
	Noise	Comply with external noise regulations in all new cars	All cars compliant	P 2 3
	Clean energy vehicles	Promote the development of clean energy vehicles	RX-8 Hydrogen RE, with hydrogen Renesis engine, exhibited at the 2003 Tokyo Motor Show	P 2 4 . P 2 6
	Recycling		Raise the recyclability ratio of new cars to over 90% from 2002	New models of RX-8 and Mazda3 (Axela) attained recyclability ratio of 90% or higher
Actively promote the use of recycled bumper material in components for new models			45,314 damaged bumpers collected from the marketplace, and utilized as components for new cars	P 2 9
Production	Reduction in landfill waste	Achieve zero emissions by the end of fiscal 2002	All domestic production plants achieved zero emissions in fiscal 2002. This record was maintained in fiscal 2003 and we are working on continuing it in fiscal 2004.	P 3 2
	Energy savings	Reduce CO <sub>2</sub> emissions from production processes by 5% against fiscal 1990 levels by end of 2005, and by 10% by end of fiscal 2010	34% reduction against fiscal 1990 rate	P 3 2 . P 3 3
Logistics	Reduction in CO <sub>2</sub> emissions	Reduce CO <sub>2</sub> emissions through introducing more efficient distribution systems	A further reduction in CO <sub>2</sub> emissions of 2,233 tons	P 3 2 . P 3 3
	Efficient use of resources	Reduce use of resources by simplifying packaging and wrapping materials	A further 816 tons saved	P 3 6 . P 3 7
ELVs (End-of-Life Vehicles)	Recycling	Comply with domestic Recycling Act	R & D and the organization of promotional structures worked on in preparation for the implementation of the Automobile Recycling Act in 2005.	P 2 8 . P 3 1

# Organizational Structure

The Mazda Global Environmental Conference acts as the decision-making body in relation to our company-wide environmental policies and environmental activities plans. The Ford Group works in partnership with us in relation to various specific issues.

Concurrently with the formulation of the 1992 Environment-Related Activity Promotion Plan, we established a company-wide environmental structure with the Mazda Global Environmental Conference as the decision-making body. The Mazda Global Environmental Conference establishes environmental policies and plans for promoting environmental activities. These policies and plans are implemented by our various departments, as they roll out environmental management activities.

The Hiroshima District, Hofu Plant and R&D Environmental Committees provide a framework for follow-up for environmental management activities. For issues that require company-wide response, Mazda set up specific projects to address the issues. At present Mazda is promoting activities through the Recycling Steering Committee and the Community Services Committee. The Ford Group works together in regard to each separate issue involved in areas such as development, production and distribution.



## Promotion of ISO 14001 accreditation

Mazda promotes the international standard in environmental management, ISO 14001, in order to ensure that not only its head offices, but also its plants and project divisions, continue to raise their levels of environmental compliance and reduce the burden being placed on the environment. All our domestic production plants, along with the main six overseas plants, attained accreditation during fiscal 2000, and in fiscal 2002, our nine main affiliates completed the accreditation process.

The suppliers from whom we purchase parts and materials are also pressing ahead with accreditation, and as of fiscal 2003, 94% of our major suppliers had achieved the qualification. In fiscal 2003, our Headquarters-based research and development division also attained ISO14001 accreditation for each of its design and development projects and activities.

### ISO 14001 accreditation achieved by domestic production plants

Hiroshima Plant	Headquarters Plant	Accredited June 2006
	Miyoshi Office	
Hofu Plant	Nishinoura	Accredited September 1998
	Nakanoseki	Accredited September 1999

### ISO 14001 accreditation achieved by product development divisions

R & D Division	Accredited August 2003
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### ISO 14001 accreditation achieved by overseas production plants

AutoAlliance (Thailand)	Accredited May 2000
AutoAlliance International(USA)	Accredited June 2000

### Main affiliates and suppliers with ISO 14001 accreditation

Nihon Climate Systems Co., Ltd.	May 2000	Development and production of automobile air conditioning systems
*Mazda Engineering & Technology Co., Ltd.	June 2000	Manufacture and sale of parts and specially-equipped automobiles / automobile design / development and implementation of testing
*Toyo Advanced-Technologies Co. Ltd.	June 2000	Design, manufacture and sale of production machinery / automotive components
*Mazda Ace Co., Ltd.	June 2000	Security, insurance, rebuilding, maintenance, etc.
*Malox Co. Ltd.	June 2000	Sea shipping of automobiles, port and harbor management, land transportation, warehousing, packaging etc.
Keylex Co., Ltd.	March 2001	Design and manufacture of automotive body and components
MicroTechno Co., Ltd.	October 2001	Manufacture of AT components, air conditioning unit components etc.
Kurashiki Chemical Processing Co., Ltd.	December 2001	Development, manufacture and sale of vibration-preventing rubber, hoses, window frame rubber, etc.
Yoshiwa Industries Co., Ltd.	April 2002	Manufacture of automobile engines, chassis, drivetrain systems and parts

Companies indicated with a \* attained accreditation in conjunction with Mazda's Hiroshima Plant

# Environmental Auditing

In addition to our policies and plans, Mazda carries out regular internal and external environmental audits, in order to ensure that our environmental protection activities, based on the management systems introduced as part of ISO14001 compliance, are being carried out in an appropriate manner. External audits are carried out by a third party organization.

## Auditing system

In order to accurately assess how well our environmental management systems are functioning, we conduct annual internal audits, as well as external audits by an outside certification organization, and the results are reported to company management. The auditors who carry out internal audits are selected primarily from among middle management, who have

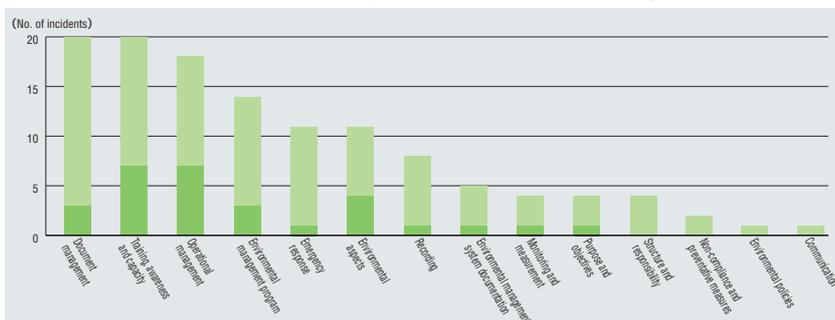
received training from an external educational organization, and have been certified as having obtained a certain level of qualification.

The FY2003 internal audit resulted in 29 citations for minor problems and 96 observations. The external audit resulted in no major or minor citations and only six observations. All citations and observations were dealt with promptly.

### Outline of areas covered by internal environmental audits

Category		Check point
Planning	Impact on the environment	<ul style="list-style-type: none"> <li>●Has an appropriate assessment been done of indirect effects?</li> <li>●Have such indirect effects assessments been carried out on all aspects of the work?</li> </ul>
	Applicable legal and / or other requirements	<ul style="list-style-type: none"> <li>●How are specified facilities and equipment being changed?</li> <li>●Have problems with industrial waste that requires special management been handled appropriately?</li> </ul>
	Purpose and objectives	<ul style="list-style-type: none"> <li>●Are environmental purposes and objectives compatible with environmental policies?</li> <li>●Is the relationship with assessment of indirect effects clear?</li> <li>●Are necessary revisions and reforms being carried out in line with changes to long term environmental planning?</li> </ul>
	Environmental management program	<ul style="list-style-type: none"> <li>●Is the program compatible with upper-level programs?</li> <li>●Is there evidence available to show progress of the program?</li> <li>●Are appropriate measures in place to deal with non-attainment of targets?</li> </ul>
Implementation and operation	Organizational structure	<ul style="list-style-type: none"> <li>●Have all divisions established an environmental management organization?</li> <li>●Is there a clearly defined alternative leadership structure for times when the person in charge is absent?</li> <li>●Is handover done appropriately when the person in charge changes?</li> </ul>
	Training / awareness and capacity	<ul style="list-style-type: none"> <li>●What types of training are planned for this fiscal year?</li> <li>●Is training given to temporary and new / transferred employees?</li> <li>●Is there an appropriately organized training record?</li> </ul>
	Communication	<ul style="list-style-type: none"> <li>●Are suggestions from employees regarding environmental policy taken up and implemented?</li> <li>●How are results and reviews from EMS audits reported to related persons within the organization?</li> </ul>
	Document management	<ul style="list-style-type: none"> <li>●How are documents managed?</li> <li>●How are old documents / destroyed documents stored?</li> <li>●How is the distribution of documentation handled?</li> </ul>
	Preparations for and response to emergency situations	<ul style="list-style-type: none"> <li>●Is there a process in place for handling accidents and emergencies?</li> <li>●Is the procedure document for accidents revised?</li> <li>●Is training implemented for accident situations?</li> </ul>
	Non-compliance, improvement and preventative measures	<ul style="list-style-type: none"> <li>●Are appropriate improvements implemented regarding areas specified by external auditors?</li> <li>●Is there a record of improvement measures and preventative measures taken in regard to areas of non-compliance?</li> <li>●Are the results of improvements and preventative measures recorded in the procedure manual?</li> </ul>
	Recording	<ul style="list-style-type: none"> <li>●How are environmental records stored?</li> <li>●Are tertiary documents created within departments periodically reviewed?</li> </ul>

### Results of internal environmental audit for fiscal 2003



As a result of this internal audit, we took appropriate measures in regard to the following observations

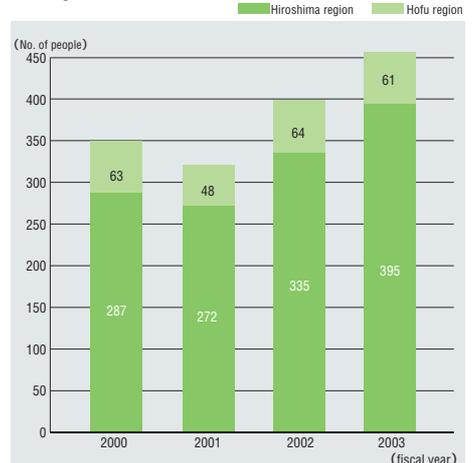
- Document management is inappropriate ●Environmental training and education is not properly organized
- There are some weak points in the Environmental Management Program Etc.

### 2003 External Environmental Audit

We took appropriate measures in regard to the following observations contained in the results of our external environmental audit:

- Some areas of evaluation of environmental aspects are being overlooked ● The purposes of the environmental training and education plans are not clear
- Target values are not clear for some divisions Etc.

### Changes in number of internal auditors available



# Environmental Risk Management

Mazda is committed to reducing to a minimum the environmental risks it takes through creating and appropriately implementing a comprehensive structure to ensure thorough compliance with environmental laws and regulations, as well as with our own high standards, and taking preventative measures to avoid accidents and incidents.

## Environmental Risk Management System

Mazda deals with a wide range of environmental risks, from production processes and development of production equipment to products themselves. Mazda is committed to minimizing these risks, through implementing environmental risk assessments and taking preventative measures to protect against pollution and environmental incidents. In addition to this, we implement training for accident and emergency situations to maintain our response capacity in regard to environmental risks.

Mazda implements periodic monitoring in regard to air pollution, water quality deterioration and pollution related to waste product processing. Each of our plants and business premises implements appropriate countermeasures and working hard towards prevention.

## Response to emergency situations

During fiscal 2003, Mazda experienced no environmental accidents or incidents.

Environmental accidents or incidents, or other emergency situations which carry a risk of environmental pollution, are covered by periodically reviewed procedure manuals and emergency action procedures instigated by each plant or division. Mazda also implements periodic training sessions in regard to emergency situations such as earthquakes and other natural disasters, or situations that could be considered potential emergencies within our work, in order to ensure that Mazda staff are well trained in the highest possible standard of response.

## Compliance with laws and regulations

During 2003, we recorded no incidences of legal or regulatory contravention. Mazda is promoting consistent improvement activities in regard to the environment, based on ISO 14001 management standards, and has imposed autonomous standards on its work that are stricter than national or regional regulations for all environmental aspects. Mazda is constantly striving to remain compliant with these standards.

## Complaints regarding environmental matters

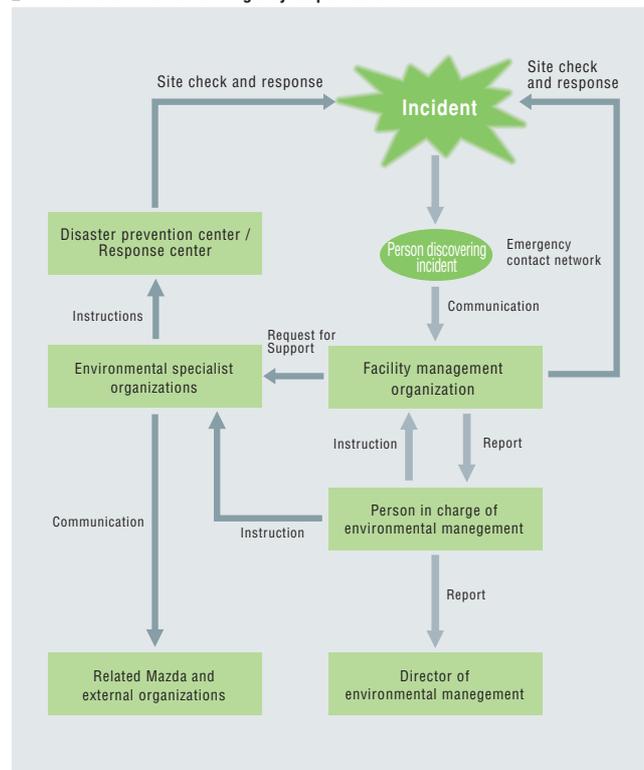
A legal decision was handed down in the preliminary hearing relating to the charge of pollution by vehicle exhaust emissions in Tokyo on 29th October 2002, but the trial is continuing on appeal.

During fiscal 2003, Mazda received 13 complaints relating to environmental matters. These included three complaints relating to noise and vibration, and one complaint relating to dust, which Mazda was immediately able to act upon and rectify. Mazda also received nine complaints to do with odors, and Mazda is in the process of tightening up our operations management so as to deal with this issue in a planned way.

## Environmental monitoring categories

	Scope of monitoring	Monitored categories	No. of times monitored per year
Air	Boilers, melting furnaces, heating furnaces, drying furnaces, waste product incineration furnaces, etc.	SOx, NOx, dust, HCs, dioxins (5 categories)	Approx. 500 times / year
Water quality	Waste processing water	Cadmium, cyan, organic phosphates, lead, hexavalent chromium, dioxins etc. (44 categories)	Approx. 1700 times / year
Noise / vibration	Levels at plant perimeter	Noise levels, vibration levels (2 categories)	Approx. 30 times / year
Odor	Levels at plant perimeter	Ammonia, methyl mercaptan, HCs, methyl chloride, etc. (22 categories)	Approx. 80 times / year
Waste product	Slag, sludge, dust etc.	Cadmium, cyan, organic phosphates, lead, hexavalent chromium, dioxins, etc. (28 categories)	Approx. 600 times / year

## Environmental incident emergency response route



# Education, Awareness and Communication

Mazda proactively promotes environmental education and awareness activities in an effort to enhance employee awareness of the environment, as Mazda believes it is the basics in implementing environmental measures.

## Environmental Education

To ensure that employees are aware of their roles in environmental protection, and assist them in implementing environmental activities in their work, Mazda offers structured environmental education programs on a company-wide basis. Environmental education is an important part of new employee training, and managers, team leaders, foreman and other management employees are given structured training based on the environmental management system.

Staff are also encouraged and supported in the gaining of public qualifications related to the environment. Each project division implements ongoing environmental training, to ensure thorough environmental awareness and the capacity to operate the environmental management system.

In addition to these training and awareness activities, Mazda also invites employees to make suggestions regarding environment-related issues and improvement strategies. Mazda has a remuneration system for new discoveries that ensures employees have a growing awareness of the need to promote such activities.



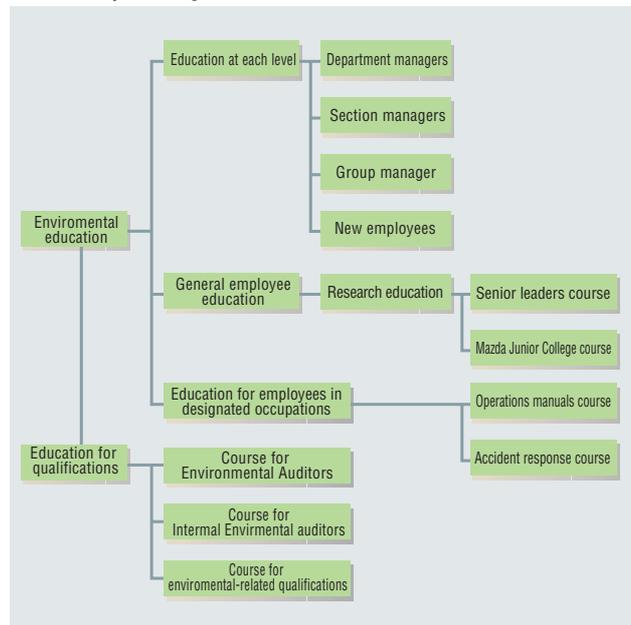
An environmental lecture meeting promoting company awareness.

## Awareness and communication

Mazda promotes awareness among all employees, including those of our affiliate companies, through the use of reports and awareness raising activities using our intranet, and also information printed in the company magazine, 'My Mazda'.

As part of the 'Environment Month', held every year in June, the company president broadcasts a message to the whole company, and environmental exhibitions are held throughout Mazda. In addition, employees take part in regional clean-up operations, and environmental events, which promote awareness among employees and also among their families. Mazda publishes environmental data relating to each of our models on our official website and in product catalogs, and publish an environmental report, as well as participating in a variety of environmental events, so as to communicate to our customers and society at large, and to preserve high levels of transparency in our information disclosure.

Education system diagram



Main examples of models exhibited at environmental events during fiscal 2003

Event	Duration	Models exhibited
Eco-Car World 2003	May 31 – June 1	Premacy FC-EV / U-LEV vehicles (Demio, Atenza, Premacy)
Tokyo Motor Show	October 30 – November 3	RX-8 Hydrogen RE
Nagoya Motor Show	November 21 – 24	RX-8 Hydrogen RE
Osaka Motor Show	December 5 – 8	RX-8 Hydrogen RE



Eco-Car World 2003 exhibition

# Environmental Accounting

Mazda implements an environmental accounting system in order to more accurately grasp the costs and benefits of our environmental protection activities, and uses this understanding to make corporate activities more efficient. Mazda also discloses its environmental accounts, with the intention of gaining the understanding of society in regard to its environmental efforts.

## The cost of environmental protection

The cost of environmental protection is calculated as the cost of reducing the burden placed on the environment, and the cost of investing in environmental protection benefits for the future, and includes management costs for projects and product lifecycles in all our areas of business. The cost of our environmental protection work during 2003 was as shown below. In comparison with the previous year, the cost of preventing pollution and research and development costs have risen during fiscal 2003.

Mazda's calculations are compatible with the guidelines and guidebook published by the Ministry of Environment for environmental accounting, but are collated using its own standards.

### The cost of environmental protection

(Unit: 100 million yen)

Category		Major activities	Capital investment	Expenditure
Cost by business area	Cost of preventing pollution	Compliance with environment-related laws and regulations Reduction in VOC emissions	26.4	19.2
	Cost of protecting the global environment	Activities to help prevent global warming and destruction of the ozone layer Other environmental protection activities	4.4	16.2
	Cost of recycling resources	Processing, disposal and reduction of waste products Recycling, etc	0.6	12.8
Upstream / downstream costs		Recycling of manufactured and sold products Recovery, re-use in products, and appropriate processing	0.2	2.3
Management activity costs		Construction and operation of an environmental management system Monitoring and measurement of burden placed on environment Environmental training for employees Public disclosure of environmental information and environment-related advertising Maintenance of environmental education and training programs, and upkeep of qualifications	0.1	7.4
R&D costs		Research and development of products contributing to environmental protection Research and development into controlling environmental loading at manufacturing and logistics stages Attainment of U-LEV standards	13.2	312.0
Cost of social activities		Environment-related improvements, including protection of the natural environment, greenery improvement and clean-up operations, etc. Support for local residents and provision of information Contributions to, and support for organizations involved in environmental protection Contributions to the Mazda Foundation, and discussions with local residents	0	3.8
Cost of environmental damage		Measures to address environmental problems	0	0
Total Environmental Cost			44.7	373.8
			418.5	

\*Criteria for calculation of environmental accounts

(1) Scope of data collection: Scope covered by Mazda Motor Corporation own accounting practices (2) Facilities investment: Cash flow managed base, with depreciation not included. Categories that do not fall naturally into fiscal year accounting are included for the current period only. In the case of multi-objective facilities investment, only the environmental aspect is included in the accounts. (3) Costs: Staff costs, general costs (4) Research and Development costs: Facilities investment, costs and staff costs for research and development were included.

## Benefits of Environmental Protection

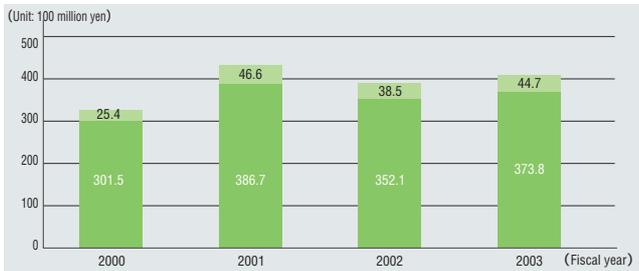
The following is an account of the direct and indirect benefits seen as a result of the investment in, and costs of, environmental protection. During fiscal 2003, the production, logistics and management divisions achieved the following reductions in the burden they are placing on the environment.

### Benefits of environmental protection

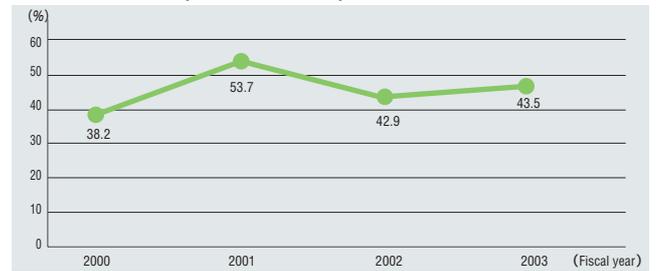
Benefits of environmental protection					Economic benefit		
Category	Unit	Fiscal 2002	Fiscal 2003	Improvement ratio	Detail of improvement	Economic benefit (unit: 100 million yen)	
VOC emission reductions	g/m <sup>2</sup>	4.5	8.0	14.8% improvement			
CO <sub>2</sub> emission reductions	tons-CO <sub>2</sub> / year	360.3	370.6	2.9% increase	Energy saving measures	16.6	
CO <sub>2</sub> emission per unit sales	tons-CO <sub>2</sub> / 100 million yen	23.4	22.3	4.7% improvement			
Reduction in waste product	Direct landfill waste	thousand tons / year	4.9	2.0	58.8% improvement	Efficient use of resources	0.6
	Incinerated waste	thousand tons / year	10.1	10.0	Maintained level	Thermal energy recovery	0.2
	Quantity of waste output	thousand tons / year	85.7	84.8	1.0% improvement	Reductions in packaging	0.6
	Recycling ratio	%	98.3	99.1	0.8% improvement	Recycling, income from sale of marketable substances	46.7
No. of damaged bumpers recovered	thousand tires / year	40.3	45.3	11.2% improvement			

Criteria for calculating economic benefit: 1) energy saving measures, 2) reduction in processing costs for waste product, or 3) in-house recycling, income from sale of marketable substances, throughout manufacturing / logistics sectors

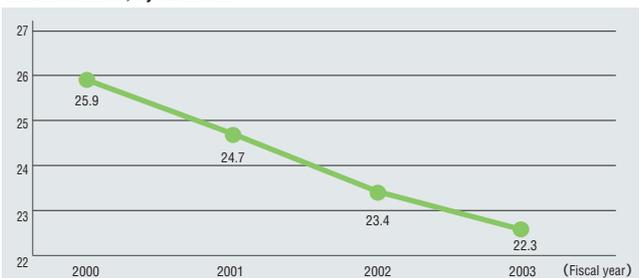
### Trends in environmental cost



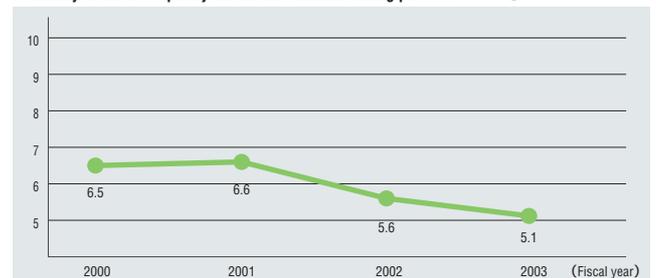
### Environmental development / total development costs



### CO<sub>2</sub> emissions, by unit sales



### Quantity of waste output by automobile manufacturing process



# Reducing exhaust emissions

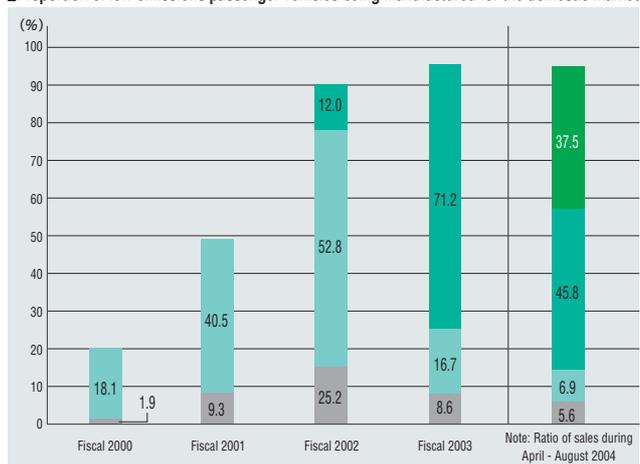
Mazda is committed to the reduction of exhaust emissions from its vehicles, through proactively researching and developing engine combustion, control and catalyst technologies.

<b>Mission objective</b>
Achieve SU-LEV or U-LEV rating for 90% of passenger cars by the end of 2005.
<b>Attainment status during fiscal 2003</b>
71.2% of our passenger cars are now U-LEV standard.

## Increased numbers of low-emissions vehicles.

Mazda is proactively introducing vehicles of many types that comply with the Ministry of Land, Infrastructure and Transport's Low Emissions Vehicle Approval System. In addition to the existing approval system, which was in place based on the Emissions Regulations for the year 2000, which were already in place, the Ministry introduced a new emissions approval system based on Emissions Regulations for the year 2005 on October 1, 2003. Mazda has been expanding its range of vehicles approved under this new system, and during fiscal 2003, 96.5% of all vehicles manufactured were compliant with new regulations. U-LEV vehicles, which are part of Mazda's mission objective to increase its SU-LEV and U-LEV range, comprised 71.2% of sales during the period under review, a spectacular rise of 59.2%. In addition to this, all Demio models, as well as Axela (1.5L), have al-

■ Proportion of low-emissions passenger vehicles being manufactured for the domestic market



■ SU-LEV : 75% lower than 2005 exhaust emissions standards  
■ U-LEV : 50% lower than 2005 exhaust emissions standards or 75% lower than 2000 exhaust emissions standards  
■ E-LEV : 50% lower than 2000 exhaust emissions standards  
■ T-LEV : 25% lower than 2000 exhaust emissions standards

ready attained approval as SU-LEV vehicles (75% lower than 2005 exhaust emissions standards), and in June 2004, all models of the Verisa were also approved and went on sale as SU-LEVs. During the period April–August 2004, 37.5% of passenger vehicles sold by Mazda were SU-LEVs.

## ■ Vehicles approved with low emissions ratings (as of April 2004)

2000 regulations			2005 regulations		
Ultra-low emissions vehicles	Excellent-low emissions vehicles	Good-low emissions vehicles	SU-LEV(☆☆☆☆)	U-LEV(☆☆☆☆)	2005 regulations
Demio (1.3L AWD) Demio (1.5L AWD) Premacy (1.8L) Atenza Sedan (2.3L) Atenza Sports (2.3L) Atenza Sports Wagon (2.3L) [Commercial vehicles] Familia Van (3 types) Familia Van (CNG)	MPV (2.3L) Tribute (3.0L) Atenza Sports Wagon (2.3L) RX-8 [Commercial vehicles] Scrum Van Scrum Truck	MPV (3L) Laputa Spiano Scrum Wagon Tribute (2.3L) [Commercial vehicles] Bongo Truck (2 types) Bongo Van (2 types) Bongo Brawny Van Titan Dash (2 types)	Demio (1.3L) Demio (1.5L) Axela (1.5L)	MPV (2.3L) Atenza Sedan (2.0L) Atenza Sports (2.0L) Atenza Sports Wagon (2.0L) AZ-Wagon Laputa Spiano Carol [Commercial Vehicles] Scrum Wagon	AZ-Wagon Spiano Carol



☆☆☆☆ 低排出力水準  
Approved: Mazda Demio (all models)



☆☆☆☆ 低排出力水準  
Approved: Mazda Verisa (all models)  
The Verisa went on sale in June 2004



☆☆☆☆ 低排出力水準  
Approved: Mazda Axela 1.5L and Axela Sports 1.5L

## Developing clean diesel

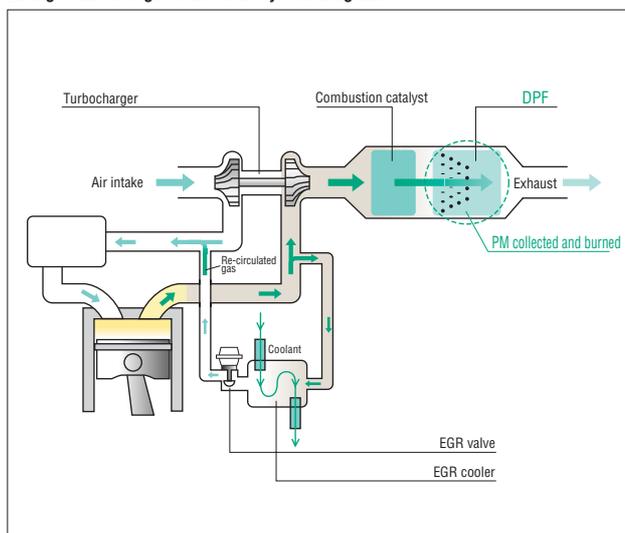
In December 2003, Mazda released a Bongo van and truck featuring a newly-developed diesel engine, which includes a new type of DPF\*1 and an improved engine control system, based on the MZR-CD engine which has been used in Atenza (Mazda6) models built for use in Europe. This has achieved significant reductions in the quantities of PM (particulate matter) and NOx (nitrogen oxides) contained in exhaust gas. The vehicle is the first of its class to comply with the 2003 emissions gas regulations (new short-term regulations) known as the Automobile NOx / PM Act. This system uses a combination of combustion catalyst and DPF to create a catalyst-supported DPF.

The ceramic filter collects PM, and when the regulated quantity of PM has accumulated on the DPF, the PM is removed by combustion control, utilizing the catalyst and the common rail injection system. NOx is reduced by optimizing combustion temperature via cooled EGR, and improved combustion efficiency resulting from the common-rail high pressure fuel injection. The same powertrain is utilized in the Bongo Brawny Van. The 4.8L diesel engine Titan, which underwent a full model change in June 2004, attained Ultra-Low PM Emissions Diesel Vehicle (85% reduction) four-star (☆☆☆☆) status, and the 4.8L turbo diesel engine vehicle attained Ultra-Low PM Emissions Diesel Vehicle (75% reduction) three-star (☆☆☆) status.

\*1 DPF (Diesel Particulate Filter): Fitted to the exhaust pipe at the rear of the engine, the filter collects and burns (oxidizes) PM contained in exhaust gas. Controls PM emission by turning it into CO2 and other gases.



Bongo emission gas reductions system diagram



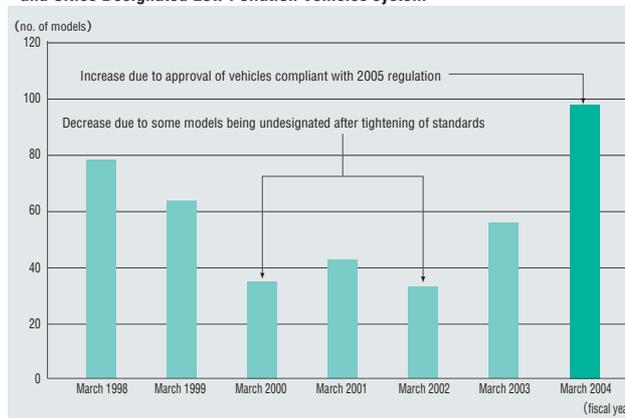
## Compatibility with local authority low-pollution designated vehicles systems.

Mazda made submissions under the 8 Metropolitan Prefectures and Cities Designated Low Pollution Vehicles\*1 approval system, and as of March 2004, a cumulative total of 98 types of vehicle have received accreditation under this scheme. In addition to this, we have submitted and received accreditation under the similar Kyoto / Osaka / Kobe 6 Prefectures and Cities\*2 low-pollution designation system.

\*1 8 Metropolitan Prefectures and Cities: Saitama Prefecture, Chiba Prefecture, Metropolitan Tokyo, Kanagawa Prefecture, Yokohama City, Kawasaki City, Chiba City and Saitama City.

\*2 Kyoto / Osaka / Kobe 6 Prefectures and Cities: Kyoto Prefecture, Osaka Prefecture, Hyogo Prefecture, Kyoto City, Osaka City and Kobe City.

Graph showing no. of models approved under the 8 Metropolitan Prefectures and Cities Designated Low Pollution Vehicles system



# Improvements in fuel efficiency

Mazda is committed to reductions in CO<sub>2</sub> emissions in order to contribute to the prevention of global warming, and as part of this commitment, is working hard on research and development aimed at improving the fuel efficiency of its vehicles.

**Mission objective**

Attain fuel efficiency standards established for 2010 in all weight classes by fiscal 2005.

**Attainment status during fiscal 2003**

Mazda attained fuel efficiency standards established for 2010 in two of its four weight classes.

## Attainment of fuel efficiency standards in two weight classes.

As part of our commitment to reducing CO<sub>2</sub> emissions, Mazda established the objective of attaining fuel efficiency standards established for 2010 in all weight classes sometime during fiscal 2005. During fiscal 2003, we attained these fuel efficiency standards in two of our four weight classes.

## MZR engine fuel efficiency improvement technology

Mazda's newly developed MZR engines (with displacement of 1.3L, 1.5L, 2.0L and 2.3L) are being used in our new-generation vehicles (Ateza, Demio, Axela, Verisa). These engines use a wide range of new technologies to offer output performance truly worthy of our brand message ('Zoom-Zoom') and gentle levels of engine noise, along with high fuel efficiency and reduced levels of emissions.

### Examples of technologies introduced to the MZR engine to improve fuel efficiency

● S-VT (Sequential Valve Timing)

At low to medium load, this technology allows for the air intake valve to be opened earlier than ordinarily, to expand the valve overlap, and increase the quantity of residual gas. This reduces pumping loss, and as well as improving fuel efficiency it reduces CO<sub>2</sub> and NO<sub>x</sub> emissions.

● Tumble Swirl Control Valve and EGR system

This valve is fitted to the inside of the air intake manifold, and optimizes the tumble and swirl strength within the combustion chamber, achieving an excellent mix of air and fuel, which promotes more stable combustion. All engines are fitted with an EGR (exhaust gas re-circulator) system, which improves fuel efficiency even further, and reduces NO<sub>x</sub> emissions.

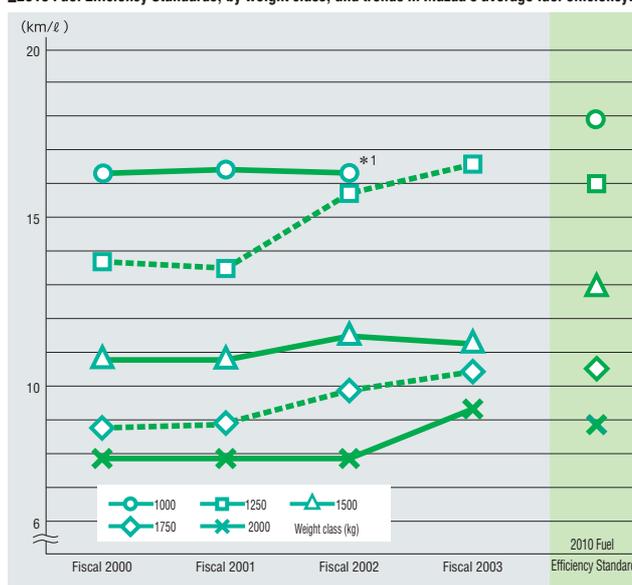
● New shape, light-weight pistons, low-tension piston rings, and shim-less tappets

In addition to low-μ finished, shim-less tappets, engine friction loss has been reduced by the introduction of new shape, lightweight pistons and low-tension piston rings, for improved fuel efficiency.

## Compatibility with new green tax standards

As of April 2004, the taxation system has been revised to include an 'automobile green tax', under the terms of which special measures are available for automobiles defined as having a low environmental impact. These are defined as 'Automobiles approved according to the 2005 emissions regulations standards as low emissions (new four-star ☆☆☆☆ status), which also meet 2010 fuel efficiency standards or standards+5%', and 'Automobiles approved according to the 2005 emissions regulations standards as low emissions (new three-star ☆☆☆ status), which also meet 2010 fuel efficiency standards +5%'. Mazda's Demio, Axela and Verisa models, along with almost all its other cars, are now covered by the scope of the new green tax regulations.

2010 Fuel Efficiency Standards, by weight class, and trends in Mazda's average fuel efficiency.



\*1 As of fiscal 2003, the weight rank 1,000kg has been abolished.

## MZR engine



Scope of new automobile green tax system, and weight reduction details (fiscal 2004 / 2005)

	New vehicle U-LEV 低排出力車	New vehicle SU-LEV 低排出力車
Vehicle meeting fuel efficiency standard 平成22年度 燃費基準達成車	(No reduction)	(Automobile tax) generally 25% reduction (Automobile acquisition tax) 200,000 yen reduction
Vehicle meeting fuel efficiency standards+5% 平成22年度 燃費基準+5%達成車	(Automobile tax) generally 25% reduction (Automobile acquisition tax) 200,000 yen reduction	(Automobile tax) generally 50% reduction (Automobile acquisition tax) 300,000 yen reduction

\*The above reductions apply to automobiles registered newly between April 1, 2004 and March 31, 2006. \*Reductions in automobile tax will be applied to all vehicles newly registered in fiscal 2004 or 2005, and will be applicable in the year following the year in which the vehicle was purchased.

## Cars to which the automobile green tax system applies (Japan)



\*As of July 2004.  
 \*Some models and specifications may not qualify for accreditation  
 \*The photograph accompanying the caption 'Familia Van CNG' is of a Familia Van.  
 \*The photograph accompanying the caption 'Titan CNG' is of a Titan  
 \*The Familia Van went on sale in May 2004.

## Reducing external noise emissions

<b>Mission objective</b>
Compliance with the latest in noise emission regulations
<b>Attainment status during fiscal 2003</b>
All passenger and commercial vehicles attained compliance. New models also complied with latest regulations.

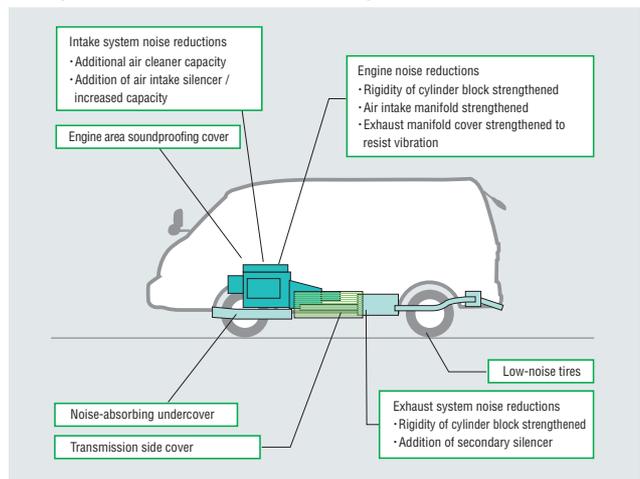
### All cars, including new models, compliant with latest regulations.

Mazda ensured that all models of passenger and commercial vehicle were compliant with the latest in noise emissions regulations by fiscal 2002, through working to reduce the noise emitted from its engines, exhaust systems, air intake systems, drive train systems and other parts. The new models of Verisa, which have been released since fiscal 2003, are also compliant with the latest regulations.

## Meeting the challenges posed by LCA

LCA (Life Cycle Assessment) is a total evaluation process, which measures the impact on the environment of mining resources, producing parts, and manufacturing automobiles, as well as using, maintaining and eventually disposing of a product. Mazda is researching and considering the utilization of LCAs as part of our commitment to further reduce the load placed on the environment by our products.

### Example of noise reduction measures on Bongo Van



## Improvements to the traffic environment

In addition to working for environmental preservation through our research and development and manufacturing activities, we also believe in the importance of improving the traffic environment. Reducing traffic congestion, for example, also helps to reduce the quantity of CO<sub>2</sub> being released into the environment as a result of waste fuel being burned while in holdups. Mazda is participating in the ITS (Intelligent Transport Systems) project, and is involved in research into next-generation traffic systems, as well as retailing optional ETC units for automobiles, to promote the popularization of ITS.

### An environmentally friendly brand message: the hydrogen rotary engine vehicle 'RX-8 Hydrogen RE'

During 2003, the release of the RX-8 focused a spotlight on the revival and evolution of the rotary engine.

Mazda exhibited its cutting edge technology, which offers suggestions for the future of automobiles and the environment, at the 37th Tokyo Motor Show, in October 2003.

The RX-8 Hydrogen RE concept car is fitted with a hydrogen rotary engine, which comprises a fusion of Mazda's hydrogen technology—developed over a period of several years—with a rotary engine. The RX-8 Hydrogen RE demonstrates the future of our brand message 'Zoom-Zoom', and is an indication that it can indeed be achieved.

#### Objective: to bring together environmental friendliness and the enjoyment of driving

The development and practical application of clean energy vehicles, with a much lower impact on the environment, is becoming an increasingly urgent task. Hydrogen is one of the clean energy sources thought to have the most potential for use in this field. Hydrogen is an extremely clean fuel, since on combustion, its only by-product is water. Research into the use of hydrogen is being carried out at several levels, mainly into the two areas of hydrogen-powered automobiles, and fuel cell electric vehicles.

Mazda began the research and development of electric automobiles in 1966, and has also developed natural gas powered vehicles, Liquefied natural gas powered vehicles, hybrid vehicles, and various other types of clean energy vehicles. We have been working on hydrogen technology since 1991, when our first prototype HR-X was unveiled, and work started in the same year on fuel cell electric vehicles. This gives Mazda more than 10 years of experience in these areas. The RX-8 Hydrogen RE is based on this accumulated experience within Mazda, but has also been developed with the intention of providing a car that is not only kind to the environment, but offers an enjoyable driving experience. This is the latest product of our ongoing development project.

#### The reason behind Mazda's emphasis on 'engines' for hydrogen cars.

In contrast to fuel cell electric vehicles, which use hydrogen energy to drive a motor, Mazda's RX-8 Hydrogen RE has been developed with an internal combustion engine. The reason for this is our desire to achieve the enjoyment of driving – in line with our brand message 'Zoom-Zoom'. Mazda is committed to achieving clean energy vehicles for the future, which are not only as environmentally friendly as possible, but also do manage not to lose the original enjoyment and emotional satisfaction of driving and movement. This is where Mazda's original rotary engine technology comes to the fore. Compared with a reciprocating engine, the rotary engine, with its relatively lower intake chamber temperature, is ideally suited to the use of highly-flammable hydrogen as automobile fuel. The adjustments required to use hydrogen in a rotary engine are also minimal, meaning that we are able to bring the hydrogen powered rotary engine to market at a relatively low cost to users, thus promoting the use and normalization of hydrogen as an energy source.

Mazda plans to continue deepening the emotional relationship between people, automobiles and the environment through the 21st century, on behalf of the global environment, motorized society and people everywhere who love to drive.



■ Mazda RX-8 Hydrogen RE Main specifications

Dimensions	Overall length	4435mm
	Overall width	1770mm
	Overall height	1340mm
	Wheelbase	2700mm
	Tread (front / rear)	1500mm/1505mm
	Seats	4
Engine	Type	Mazda RENESIS hydrogen rotary engine
	Max. output	Using gasoline: 154kW (210PS) / 7200rpm Using hydrogen: 81kW (110PS) / 7200rpm
	Max. torque	Using gasoline: 222N·m/5000rpm Using hydrogen: 120N·m/5000rpm
Transmission	Type	5MT
Suspension	Suspension method (front / rear)	Double wishbone / Multi-link
Brakes	Main break types (front / rear)	Ventilated disc brakes
Tires & wheels	Tires	225/45R18
	Wheels	18×8JJ

#### Dual fuel system means the RX-8 Hydrogen RE can run on either gasoline or hydrogen.

The RX-8 Hydrogen RE utilizes a dual fuel system, which can hold both hydrogen and gasoline, and allows the driver to change between the two at the flick of a switch. When driving on gasoline, the vehicle can achieve its ordinary power capacity of 210ps, while in hydrogen mode, maximum output achieved is 110ps, with a maximum torque of 120Nm. This makes the car suitable for practical use under a variety of circumstances. The high-pressure hydrogen tank can carry 74 liters of hydrogen at 350 atmospheres. A standard RX-8 can be simply converted with the addition of a hydrogen tank and some additional parts, which have a minimal effect on the standard running capacity of the car. In addition, the RENESIS hydrogen rotary engine uses the following technologies in order to ensure the optimum performance of the rotary engine in combination with hydrogen combustion.

The history of Mazda's clean energy vehicle development, focusing on hydrogen powered automobiles and fuel cell electric vehicles.

1991      1993      1995      1997      2001      2003

- 1991 - Development of the hydrogen rotary engine model HR-X (hydrogen-absorbent metal alloy fuel tank)
- 1992 - Began work on development of fuel cell electric vehicle
- 1992 - Experimental operation of fuel cell-powered golf cart
- 1992 - Developed passenger car powered by natural gas
- 1993 - Developed hydrogen rotary engine model HR-X2
- 1993 - Development of experimental hydrogen rotary engine-powered Roadster
- 1995 - Implemented two years' worth of public road testing with the hydrogen rotary engine-powered Capella Cargo
- 1997 - Developed the Demio FC-EV (powered directly by hydrogen)
- 2001 - Developed the Premacy FC-EV (uses reformed methanol). Received approval from the Ministry of Land, Infrastructure and Transport and given permission to be the first company to test a fuel cell electric vehicle on public roads.
- 2003 - Developed RX-8 Hydrogen RE (electronically controlled / hydrogen direct injection rotary engine + pressurized hydrogen fuel tank).

Direct injection system

Hydrogen is a highly flammable fuel, and with a conventional reciprocating engine, there is the possibility of the phenomenon known as 'backfiring' - the hydrogen may ignite during intake. A rotary engine, however, has a separate high-temperature combustion chamber and a low temperature intake chamber, which prevents backfiring, and facilitates excellent conditions for combustion. Furthermore, the hydrogen gas injector is fitted to the rotor housing, allowing the hydrogen to be directly injected to the engine, and offering even greater output.

Twin gas injectors

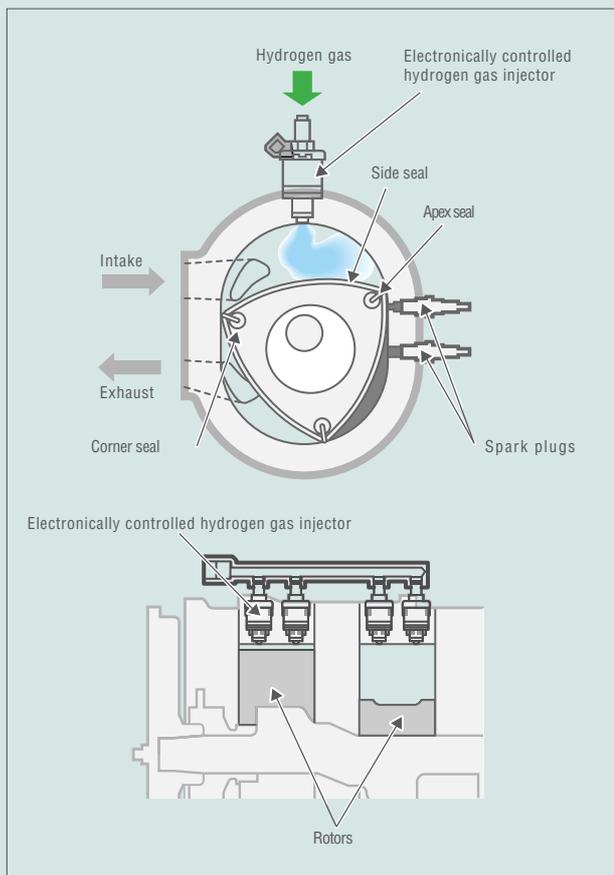
Due to the low density of hydrogen, a large amount of gas is required to be injected into the engine in comparison with using gasoline. For this reason, multiple gas injectors are required, and for structural reasons it is difficult to fix these into the combustion chamber of a reciprocating engine. A rotary engine, however, has sufficient space to do this, and we have succeeded in fitting two gas injectors per rotor. This twin gas injector system allows the RENESIS hydrogen rotary engine to achieve output sufficient for practical utilization.

Sufficient mixing of hydrogen and air

In a reciprocating engine, the output axle rotation is 180° per process, but with a rotary engine, this takes longer, and the rotation is 270°. This allows for sufficient mixing of the hydrogen and air, in relation to the strength of the fluidity of the mixed gases. For this reason, the RENESIS rotary engine is capable of producing consistently mixed gas, which is an extremely important factor in the combustion of hydrogen.

Further evolution, towards practical application within two years

Mazda aims to have the RX-8 Hydrogen RE in practical use within two years, and is pressing ahead with evolving the engine as necessary to achieve this. The development team leader is Akihiro Kashiwagi (Program Manager, Program Management Office No.3, Program Management Div.). 'I have been an engineer on many of Mazda's clean energy vehicle development projects, from the development team on the electric vehicle designs for California,



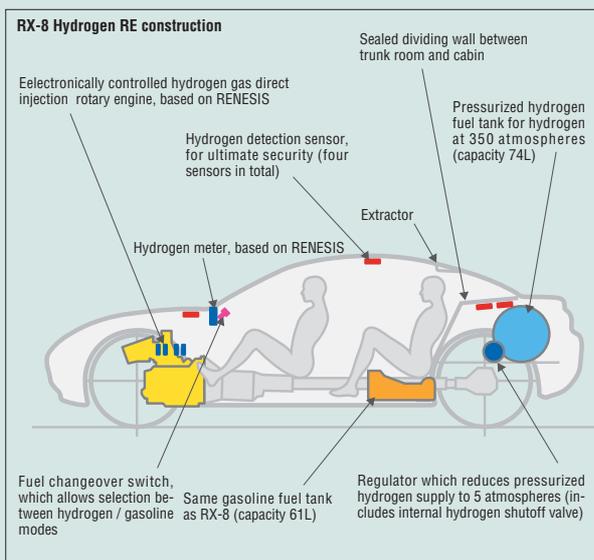
through to the development of fuel cell vehicles, and the first public road tests using the Premacy FC-EV. Before that, I was attached to a chassis design division, and was involved in the development of the RX-7 too, so I feel I have a definite connection to the RX-8 Hydrogen RE,' says Kashiwagi. His team are working hard on the issue of increased hydrogen combustion efficiency.

Kashiwagi speaks of the technical development process in the following way. 'The hydrogen rotary engine uses a process of hydrogen combustion, during which the nitrogen in the air also combusts, meaning that there is still a small amount of NOx released. This is, in some ways, unavoidable with an internal combustion engine, but by working to improve the lean burn, we can reduce this to the minimum level possible. Improving lean burn, however, makes it difficult to get a high output. We are working at the moment on achieving both at the same time, through improving the gas injectors, and various other methods that will give improved hydrogen combustion.'

## Aiming for cars that will contribute to the changeover to a hydrogen society.

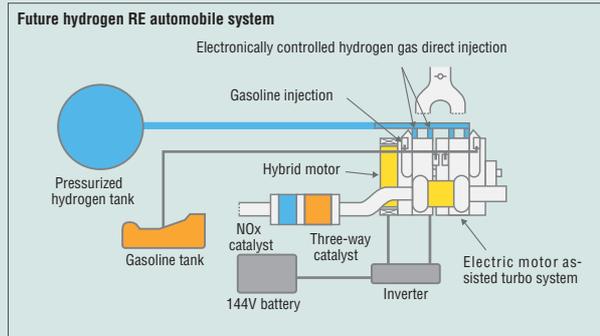
The background to Mazda's intention to bring the RX-8 Hydrogen RE to practical application within two years lies in the fact that society is in the process of making the changeover to using hydrogen more often, with hydrogen supply stations for fuel cell electric vehicles and other developments underway. Mazda believes that the RX-8 Hydrogen RE will be able to make a wide range of contributions to the excesses of the hydrogen society, due to the fact that, in comparison with hydrogen-only fuel cell electric powered vehicles, the RX-8 Hydrogen RE can operate on both Hydrogen or gasoline, and that, since it is an internal combustion-type clean energy car, it can be developed for a relatively low cost.

'Since the Motor Show, we have heard many people saying that they want the car to be available for use as soon as possible. At present, it seems that the cost of supplying the RX-8 will be significantly cheaper than a fuel cell electric vehicle. The fact that it is a four-door, four-seater sports car gives it a freshness and performance which complements the sense of being 'easy to use' and 'easy to purchase'. Since hydrogen supply stations are going up all around the country, we can develop the technology and continue to road test the vehicle in a wide variety of places', says Kashiwagi, who is keen to get the vehicle into practical use as soon as possible. Mazda is committed to creating the correct environment, through measures such as the improvement of the RX-8's practical usefulness and reliability, as well as compliance with the necessary laws and permits, and to working step by step to ensure the RX-8's contribution to the future hydrogen society.



As well as the RENESIS hydrogen rotary engine, the RX-8 Hydrogen RE also encompasses various environmentally friendly features, such as aerodynamic improvements, optimized tire features, and a lightweight body.

- Three-Layer Wet Paint System: significantly reduces the emission of volatile organic compounds (VOC), and contributes to reductions in CO<sub>2</sub> emissions. (Please see page 36 for further details).
- Interior parts made from plant-based resins: an alternative to fossil-fuel based resins, which reduces CO<sub>2</sub> emissions.
- Low-resistance brakes: reduce drag resistance
- Low-resistance hub bearings: reduce friction resistance in the axel bearings, and controls power loss.



The RX-8 hydrogen RE model exhibited at the Tokyo Motor Show 2003 also included the following support technologies, aiming to improve the performance of the hydrogen rotary engine.

## Electric motor-assisted turbo charger

An electric motor-assisted turbo charger, which offers supercharging effects from low speeds. At low revolutions, the motor assists the turbocharger operation and increases the supercharge effect, and at high speeds, the regular exhaust turbo serves as a supercharger to ensure sufficient output even when the hydrogen is being lean burned.

## Mazda Hybrid System

A motor, inverter and 144V battery comprise the auxiliary power supply in Mazda's hybrid system, which is included in the RX-8. When the car is stopped, for example at a traffic signal, the engine is in principle cut out so as to reduce fuel consumption, and the motor starts up the engine automatically when the car moves forward again.

At low revolutions, the motor assists the engine torque, and increases its responsiveness. When decelerating, the motor acts as a generator, recovering energy lost during deceleration and using it to charge the battery.

Development Topics

T O P I C S

## Utilizing digital data to change the way we manufacture automobiles MDI (Mazda Digital Innovation)

Mazda has been utilizing shared digital data to link its development, design, testing and production preparation processes since 1996, using the process known as MDI to ensure that functionality and productivity are included simultaneously in design processes for automobiles. These digital innovations have brought about significant cumulative results, and from April 2004, we have begun the second stage of the plan, known as MDI-II

### Development period shortened to 12 months

The Verisa, which went on sale in June 2004, was brought to mass production with a shortened development period after the design had been finalized. At the same time, the model offers a high level of quality. These achievements are due to the fact that the development period—to date, standing at a record of 14 months—was further shortened in the case of the Verisa. 3D design digital data was shared organizationally, allowing vehicle design, as well as production equipment design and construction, to be determined using highly accurate virtual testing, and quality to be built in from only digital data. This represents a further evolution of the MDI process.

The most significant feature of MDI is the way it makes possible prior testing of the automobile design and functional settings, as well as the production equipment designs, on a computer. This means that the performance and efficiency of a blueprint can be effectively verified, and improved if necessary, before the design is finalized. This has facilitated significant reductions in the time required to finalize a design, while ensuring that designs lead to more accurate products, and include more quality considerations.

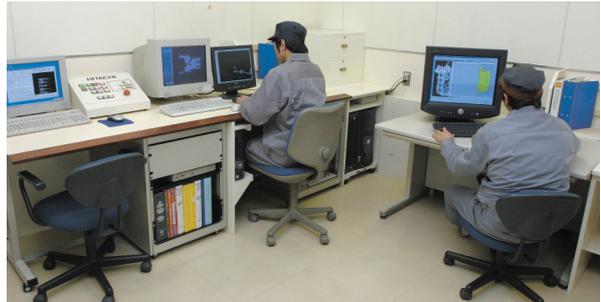
### Highly accurate 3D data utilized in all processes

MDI plays the role of the conventional prototype car, in that it provides a digital mock-up of the vehicle, containing consolidated design 3D data relating to everything from body shape to the location and type of each screw used. Most experimental verification work can be simulated using this digital mock-up. In addition to this, dies and other equipment required to manufacture the parts needed can also be created virtually using this 3D data, and the accuracy of virtual parts manufactured using these virtual dies can be verified using MDI. The manufacturing process can be created first as a digital factory using computers, and the accuracy and operating efficiency adjusted to achieve optimum results.

In this way, highly accurate 3D data was used to simulate various aspects of the production process before designs for the Verisa were finalized, and the development period required was shortened, while at the same time ensuring extremely high quality.

### 2nd stage of plans implemented from 2004

Mazda began the implementation of the second stage MDI-II plans in April 2004. Software has been developed and supercomputers were introduced to reduce the need for development work on prototypes, and expand the role of digital technology in development, creating the world's most cutting-edge experimental facilities. 13.9 billion yen is to be invested in this system over the next four years, and our development strengths are to be further enhanced.

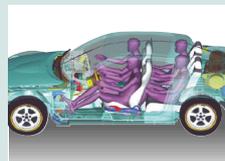


X-ray CT scanner control room

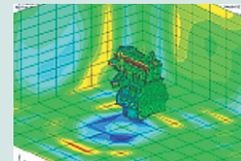
### Contributing to further reductions in environmental loading

The MDI development system also brings great benefits in terms of reducing environmental loading. The organizational sharing of 3D design digital data contributes to the saving of resources by reducing paper use. The use of crash simulators and the increased accuracy this gives, along with the virtual testing that the state of the art computer equipment makes possible, has allowed us to cut the number of cars we use in collision safety testing by 45%.

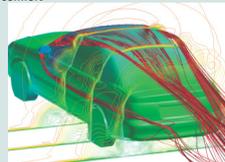
<b>Development periods</b>	Reduced to between 12 to 18 months, with further reductions being worked on
<b>No. of prototype models manufactured</b>	45% reduction in number of cars used in collision safety testing.
<b>MDI equipment introduced during fiscal 2003</b>	2 equipments (drive train and NVH development innovation equipments)
<b>Virtual testing systems introduced during fiscal 2003</b>	10 systems



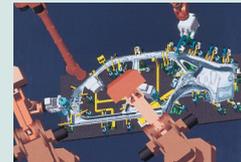
Ride comfort prediction technology (virtual development technology) has a significant effect on in-car comfort



Sound radiation prediction



Aerodynamic performance prediction technology (virtual development technology) has a significant effect on the car's fuel efficiency, drive performance and handling safety.



The virtual factory, which simulates the production process.

# Recycling

## Mission objective

- To raise the recyclability ratio of new cars to above 90% from 2002 onwards
- To raise the proportion of end-of-life vehicles recycled to 95% of actual recycling rate or more by 2015
- To proceed proactively with the introduction of recycled bumper material in parts for new cars

## Attainment status during fiscal 2003

- The recyclability ratio of the RX-8 and Axela has been raised to over 90%, and research continues into ways of increasing recyclability even further.
- 45,314 damaged bumpers were collected from within the marketplace, and reused in parts for new cars
- A collection and recycling system was established, and various environmentally friendly measures put in place, in preparation for the implementation of the Recycling Act.

The Act pertaining to Resource Recovery and other aspects of End of Life Vehicles (hereinafter referred to as the 'Automobile Recycling Act') will come into force on 1st January 2005. This act will require a new structure for automobile recycling, in which manufacturers are required to play a central role in recovering CFCs, airbags and shredder dust from end of life vehicles (ELV) and recycling them appropriately (or in the case of CFCs, destroying them). Mazda is working closely with related industries, and fully intends to be part of the creation and smooth operation of an integrated recycling system. In addition to this, Mazda is committed to raising the recyclability ratio of automobiles, and are developing ways of using more recycled materials in parts for our automobiles, as well as accelerating research into recycling technologies for plastic and rubber parts, etc.

\*ELV=End-of-Life Vehicle

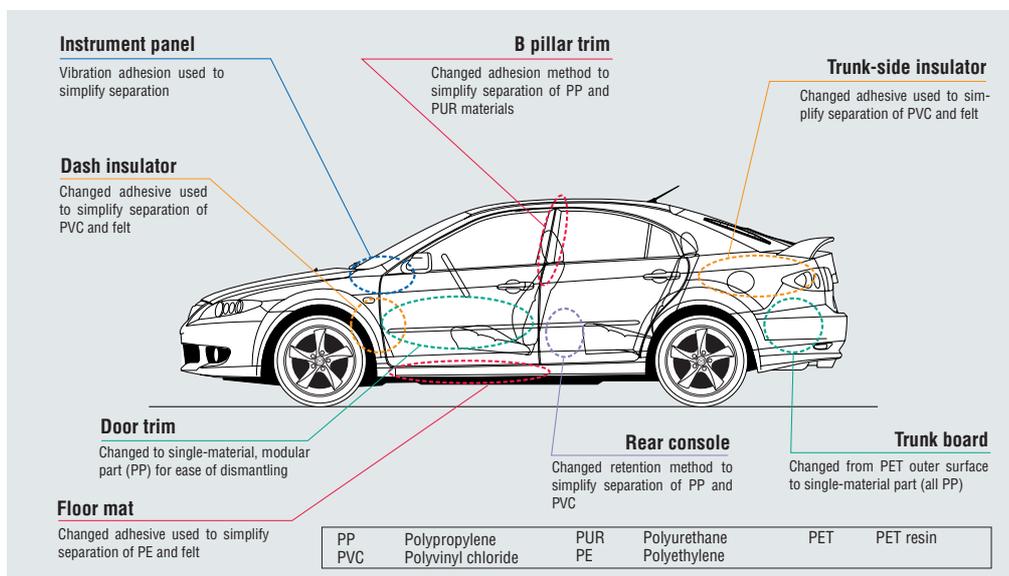
## Promoting recycling during the design / development stages

### Recyclability ratio of over 90% achieved in new models

Mazda has achieved a 90% or greater recyclability ratio in its new model automobiles since 2002 (Atenza, Demio, RX-8, Axela and Verisa). Based on the Automobile Recycling Act, we are aiming for an implemented actual recycling rate of 95% from 2015 onwards, and as such are currently engaged in research into scrapping techniques and the increased utilization of easily recycled materials, as well as implementing a system that will allow cooperation with related industries on the issues related to improving actual recycling rate.

### Improving the recycling ratio of shredder residue

Shredder dust comprises the ground waste, usually plastic, glass, rubber etc., which is left in the form of industrial waste product after the steel and non-ferrous metals have been recovered from an ELV. In order to improve the recyclability ratio of automobiles still further, a solution has to be found to the processing of this shredder dust. Automobile manufacturers are required to be 70% of actual recycling rate or more of their shredder residue by 2015. At present, recycling methods for shredder residue usually involve high-temperature processing, which allows the recovery of energy and metals, after which the remaining slag is used for road surfacing and concrete reinforcement materials. Automobiles tend to include many complex parts made from resins and other non-burnable materials, although the proportion of such parts in use varies with the make and model of the car. For this reason, shredded residue is made up of a large number of different materials. Efficient high-temperature processing, which allows the quantity of shredder residue to be reduced, is an extremely complex technology. Mazda, therefore, is working to achieve a balance between recyclability and processing costs, and operating alongside processing agents who have access to the high-level technologies required in order to prepare for the implementation of the Automobile Recycling Act.



Example of improved recyclability of plastic parts used in Atenza models

### ■ Reduction in quantity of shredder residue output

In order to improve the actual recycling rate of ELVs, not only will it be necessary to improve the recyclability ratio of shredder residue, it is also important to reduce the quantity of dust being produced. In order to achieve this, Mazda is pressing ahead with the following research and development projects in relation to its automobile manufacture.

1. Research into automobile design that takes into consideration ease of dismantling, and research into dismantling technology, to simplify the recovery of parts and materials that can be reused.
2. Research into use of resins, which make up a significant proportion of shredder residue, so as to produce more parts that are made from single materials and easier to recycle.
3. Research into the uncontaminated recovery of glass, which is currently difficult to recycle, and the development of recycling technology that allows its reuse as fiber or glass. This research is being carried out jointly with a materials supplier.

### ■ Surveys / research into ELV recycling technologies

In addition to the reduction in quantity of shredder residue produced, mentioned above, Mazda is also involved in surveying and researching recycling technologies for end-of-life vehicles (ELVs). An example of this is our work on reusing various types of metal, as well as improving the refining of iron, and reducing the quantity of shredder dust so as to make metals easier to extract, which allows simpler recovery of non-ferrous metals.

Mazda is also working towards carbon neutralization (bringing the quantity of CO<sub>2</sub> emitted when a substance is burned in line with the quantity consumed by photosynthesis as it is developed) through developing natural materials that can be made into eco-plastics.

### ■ Bumper-to-bumper recycling promotion

Mazda collects damaged bumpers at the point at which they are replaced with new ones, and reuses the bumpers in the production of component parts for cars. We have been recycling bumpers in this way since 1992. During fiscal 2003, we collected 45,314 bumpers (total weight approx. 158 tons).

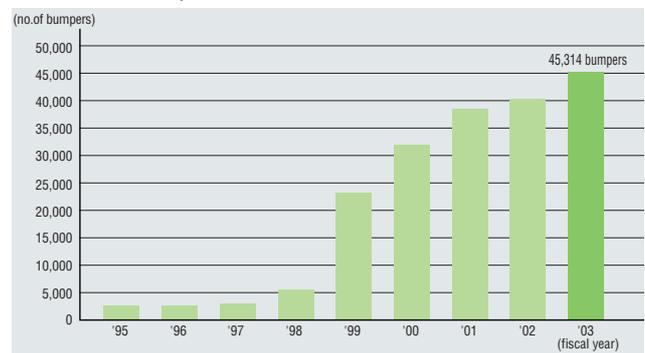
The recycling technology for collected bumpers, and their reuse in automobile parts, is improving and growing. The use of recycled bumper material in the splash shields, under-covers and footrests of new cars began in 1992, and in 2001, Mazda began to be able to use the recycled material in bumper strengthening parts, after being introduced to the paint stripped techniques made possible by machinery owned by plastic recycling manufacturer Takase Gosei Kagaku Corporation. In 2002, the paint stripped technique was further optimized, allowing between 98% – 99% of paint to be removed, and in July 2002, Mazda began to use the recycled material on the rear bumper of Bongo Friendee (the area with a bumpy surface) as well as further expanding the use of recycled bumper materials elsewhere.

In September 2003, Mazda, in partnership with the grain processing company Satake Corporation, developed an even higher-level paint removal technique, in combination with optical separation technology. This allows between 99% and 99.9% of the original paint layer to be removed. This development has allowed us to begin utilizing recycled

bumper material in the surface of ordinary automobile bumpers (the areas without a bumpy surface). This is a development which was conventionally impossible for quality standards reasons, but the new technology has allowed us to achieve 'bumper to bumper' recycling.

Mazda is in the process of testing and verifying this technology before introducing it to mass production, but it is anticipated that the technology will come into use during fiscal 2004, and that recycled material will make up 20 – 30% of bumper material (by weight) in the future. (see page 37 for related information)

■ Trends in no. of bumpers collected



■ Main models and parts in which recycled bumper material is used

Model	Part in which recycled material utilized
Atenza	Footrest
Demio	Splash shield
RX-8	Engine under-cover
Axela	Rear under-cover, etc.
Verisa	Splash shield
MPV	Rear bumper
Premacy	Splash shield
Bongo Friendee	Rear bumper / undercover



■ Splash shield



■ Bumper reinforcement parts



■ Bumper using recycled material, fitted to new car

# Recycling

## ■ Reduction in use of substances of concern

### ● Reduction in use of lead

Mazda is pressing ahead with the development of technologies that will allow us to use less lead in our automobiles. As of 2002, Mazda eliminated the use of lead in battery cable terminals, heater cores, radiators and other parts of all new models, as well as in electrodeposited paints and gasoline tanks. Our total use of lead has been reduced to less than one third the quantity used in 1996.

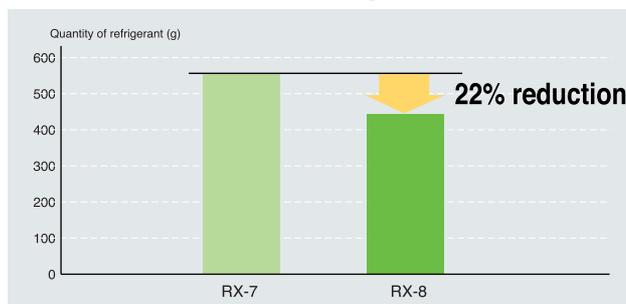
### ● Reduction in use of air conditioner refrigerant

Mazda is working on introducing of car air conditioner systems that operate with a reduced quantity of refrigerant (HFC134a), as part of its commitment to preventing further global warming.

### ● Use of IMDS (International Materials Data System)

Mazda is in the process of beginning a thorough survey of our use of hazardous substances, by utilizing IMDS, with the intention of managing and reducing our use of environmentally damaging substances.

### ■ Reduction in use of air conditioner refrigerant



## Compliance with the Automobile Recycling Act (Japan)

Three broad areas of compliance are required by the Automobile Recycling Act, which is to be implemented on January 1, 2005.

1. The recovery of CFCs, airbags, and shredder dust by the automobile manufacturer, and their recycling (or disposal in the case of CFCs).
2. The payment of recycling costs for the above 3 categories of substance by the user at the point at which a new car is purchased (in the case of cars in use when the Recycling Act is implemented, this charge will be applied at the first automobile safety test implemented after the implementation of the Act, or at the point at which the car is disposed of, if this happens before the first automobile safety test after the implementation of the Act).
3. End-of-life vehicles require a transference notice detailing the receipt of the vehicle from the user by a dealership, and processes taken until appropriate disposal has been arranged.

### ■ Appropriate processing of airbags and CFCs

The Japan Auto Recycling Partnership (JARP), a limited liability intermediary corporation, was founded jointly by automobile manufacturing companies in January 2004 as the implementing body for receiving and implementing the recycling of CFCs and airbags. Mazda has assigned staff to JARP, and is assisting the Partnership in preparing for the implementation of the Act.

In regard to the recovery and disposal of CFCs, the Mazda Group is proactively introducing the necessary infrastructure, such as collection equipment, to its maintenance centers. Since 1991, Mazda has been collecting and destroying specified CFCs (CFC12), and Mazda had begun collecting and destroying the CFC alternative (HFC134a) before the enactment of the CFC Collection / Disposal Act in October 2002. Mazda has continued to work on the improvement of our collection methods and efficiency in line with the requirements of the Act. From January 2005, the regulations relating to the collection and disposal of CFCs will be transferred from the CFC Collection / Disposal Act to the Automobile Recycling Act, and we are working with our dealerships to ensure that our operations make the transfer smoothly.

### ■ Collection and recycling of shredder residue

Two groups or teams have been established to implement the processing of shredder residue, in order to ensure improved recyclability ratios among automobile manufacturers, and the competition required to maintain low recycling charges. Mazda has teamed up with Nissan and other manufacturers to establish ART (the Automobile shredder residue Recycling promotion Team), which is working on the collection and recycling of such dust.

\*ART (Automobile shredder residue Recycling promotion Team)

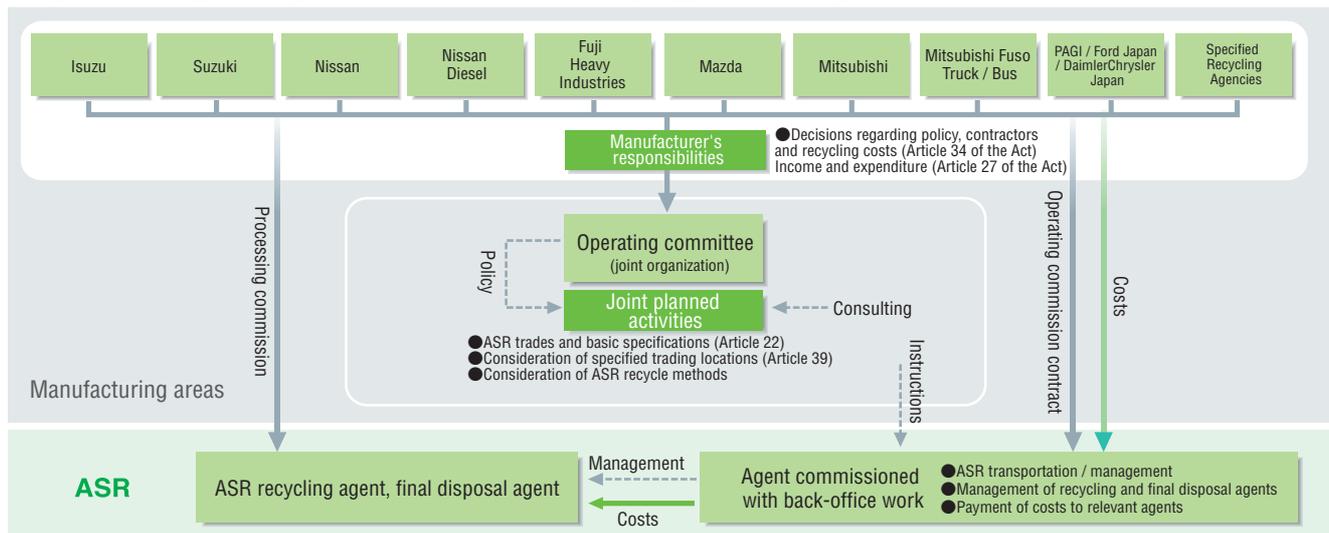
### ■ In-house IT System and automobile database creation

Mazda is collecting information about each of the roughly 4.7 million cars it has sold in Japan in order to be able to provide information regarding air conditioners and airbags, as well as recycling charges, both of which are required for compliance with the Automobile Recycling Act. This information is to be managed centrally, using the In-house IT System created by Mazda, which is linked to an external automobile recycling IT system in order to allow the management of everything from collection of recycling charges from users via dealerships through to appropriate processing of the three designated substances in the automobile and the management of recycling income / expenditure and recycling ratios.

### ■ Joint activities as part of the Ford Group

Mazda is the only brand of the Ford Group that is a member of the Japan Automobile Manufacturers' Association (JAMA). Mazda reports back on all JAMA activities related to compliance with the Automobile Recycling Act, and these are being rolled out gradually throughout the whole of the Ford Group, beginning with Ford Japan, in order to ensure that all Ford's companies complete preparations to comply with the terms of the Act. Our In-house IT System is also being developed to cover the special regulations for imported cars, so that other Ford Group companies can utilize the information it provides.

■Diagram of ART Organization (the Automobile shredder residue Recycling promotion Team)



ASR: Automobile Shredder Residue; the residue of plastic, glass, rubber and other parts of the automobile body, after having been ground in the shredder, and metals having been removed.

### ■ Establishing recycling charges

Mazda published its recycling charges for end of life vehicle CFCs, airbags and shredder dust from each of its models, in preparation for the implementation of the Automobile Recycling Act, on July 22, 2004. Mazda's recycling charges are established depending on the type of vehicle, and the basic equipment with which the model in question is fitted. The same type of CFCs is used in air-conditioning units in all vehicles other than a few microbus models, whether passenger or commercial vehicles. Airbag charges are set according to the number of airbags and seatbelt pretensioners fitted to the model in question. Shredder dust charges are implemented depending on the quantity of

shredder dust emitted from each model. Mazda will undertake to ensure the appropriate processing of end of life vehicles under commission from the user, who pays the recycling charges, via the use of recycling and final disposal agents. We also published the standards for payments to dismantling and collection agents, payable when collecting the three specified items from end of life vehicles, on July 30, 2004. Mazda is also engaged in the construction of a system which allows users to check the recycling charges appropriate to their vehicle using a web page. This system is being developed in conjunction with other automobile manufacturers and importers.

### ■ Support for dealerships in meeting legal requirements

Mazda is also working closely with its dealerships, to ensure that the implementation of the Automobile Recycling Act is handled smoothly from the point of view of our users. Mazda is in the process of creating and distributing easy-to-understand materials that explain the regulations contained in the Automobile Recycling Act, and Mazda is also creating and distributing an implementation manual for dealerships, to help them understand the need for collecting recycling charges to pro-

cess the three specified items (CFCs, airbags and shredder dust), and using electronic manifestos for the creation of transfer notification to ensure that the collected items are processed appropriately. Mazda has implemented a wide variety of training activities for recycling managers and office managers within Mazda dealerships, to ensure the smooth implementation of the required changes, and to maintain our support for the dealerships as they work on compliance.

■Mazda automobiles (models currently on sale) and applicable recycling charges

Model	CFC	Air bag	Shredder residue	Total
Demio	¥2,030	¥2,370~2,940	¥6,150	¥10,550~11,120
Verisa	¥2,030	¥2,370~2,940	¥6,270	¥10,670~11,240
Axela Sports	¥2,030	¥2,370~2,940	¥6,850	¥11,250~11,820
Atenza Sedan	¥2,030	¥2,370~2,940	¥7,310	¥11,710~12,280
MPV	¥2,030	¥2,370~2,680	¥9,110	¥13,510~13,820
Carol	¥2,030	¥2,370	¥4,210	¥8,610
Titan Dash	¥2,030	¥0~2,100	¥4,530	¥6,560~8,660

\*Users will also be required to pay a fund management fee and an information management fee.

\*The charges listed above do not include any additional equipment fitted to the vehicle which is not covered by the terms of the Automobile Recycling Act.

<http://www.mazda.co.jp/recycle/> Visit Mazda official website in Japan for further details regarding recycling charges for most Mazda automobiles.(Japanese Site)

# Production

Reducing to a minimum our impact on the environment means using resources and energy efficiently, as well as minimizing our emissions and processing waste appropriately. During fiscal 2003, we implemented the following measures.

## Mission

1. Ensure efficient utilization of resources, and reduce landfill waste
2. Promote energy efficiency and contribute to the prevention of further global warming
3. Promote environmental improvement measures
4. Increase environmental awareness among people involved in our project activities, and promote autonomous divisional management of environmental issues
5. Ensure harmony with the localities in which we are based through environmental protection activities.

## Resources-saving activities

### Objectives and results / Attainment of zero-emissions target

Mazda made a commitment to reduce the direct landfill waste emitted from all its domestic manufacturing bases (development, office and technical areas) to the zero level (less than 5% of the output level recorded in 1990) by the end of fiscal 2003. In fact, this was achieved a year earlier, during fiscal 2002.

### Reductions in by-products and waste emissions, and promotion of recycling

Reducing the quantity of waste product generated, and promoting recycling, are the two main aspects of our zero emissions policies. The waste products generated by our production processes consist mainly of metals, minerals, dust, waste oil, etc. Scrap metal has been reduced by firstly minimizing the quantity of sheet metal left over after the pattern cutting process, and then solidifying such metal remains by welding them together with cupola, and recycling them within own plants

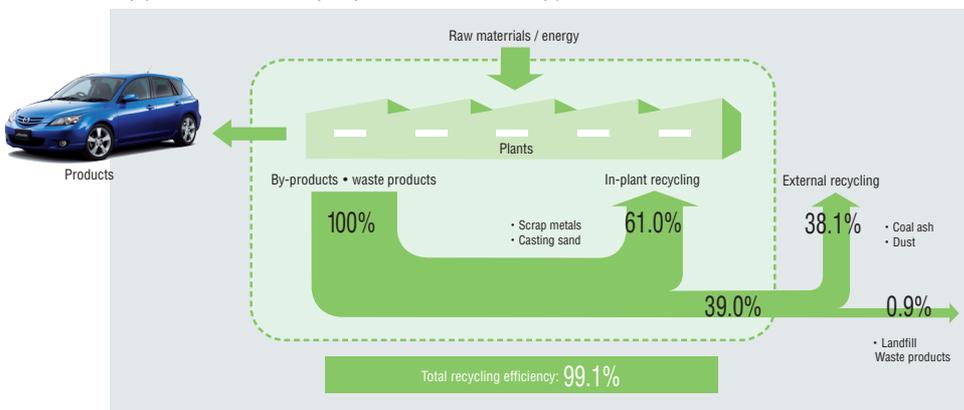
by using them for parts manufacture. Plastics and wooden pallets are also reused.

Burnable waste is incinerated in a furnace fitted with thermal collection equipment, and the heat energy (steam) collected in this way is reused efficiently within the plants. Mineral dust and coal ash, as well as cupola slag are recycled outside the plant as cement filler material and earth improvers. Metals and casting sand, along with plastics, waste paper and cardboard are recycled off-plant. As a result of these activities, total waste during fiscal 2003 totaled 414,000 tons, but total recycling ratio was 99.1%.

### Reduction in emissions and general waste

We effectively controlled our emissions of waste oil, cutting fluids, sludge, etc. through the use of separation, refining, concentration and dehydration equipment. Paper, empty cans and plastic containers generated as waste within our plants were recycled through the strict separation and collection of waste, to ensure further emissions reductions.

### By-products and waste recycling within the manufacturing process for fiscal 2003



## Energy saving activities

### Objective and results

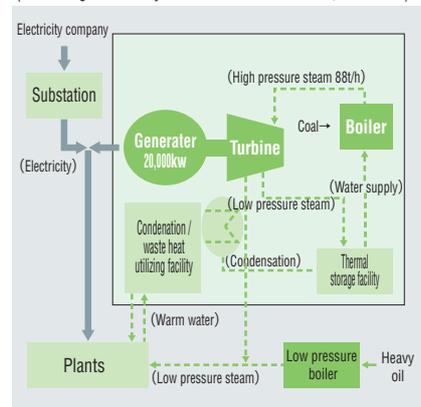
In addition to making the maximum use of our energy resources, Mazda aims to reduce its CO<sub>2</sub> emissions by 5% against the total emissions for 1990 by 2005, and by 10% by 2010, and our activities have been targeted accordingly. During fiscal 2003, Mazda improved the efficiency of steam supply, as well as implementing high-efficiency, multi-level energy utilization policies. Mazda have taken care to ensure that lights are switched off when not needed, and that air conditioning temperatures are set at appropriate levels to ensure the maximum possible energy savings, and Mazda is reviewing production quantity variations and operating systems to ensure efficiency within our plants. As a result of these measures, Mazda achieved a 19 ton, or 34% reduction in the quantity of CO<sub>2</sub> emitted from our plants during fiscal 2003 compared with 1990. Compared with the previous year (fiscal 2002), our sales for this year rose by 8.1%, but Mazda managed to ensure that the quantity of CO<sub>2</sub> emitted rose by only 2.9%.

### Changeover to LNG (Liquefied Natural Gas) as a source of power

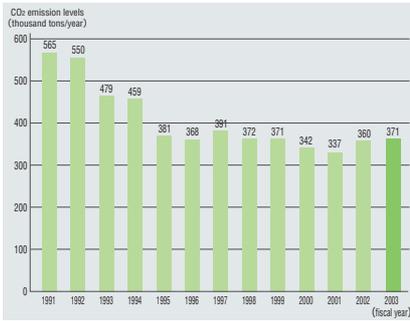
Mazda's head office plant in Hiroshima completed the switchover to LNG in December 2000, and following on from that, Hofu plant implemented the changeover in May 2002. Mazda is committed to

### Cogeneration system

(In-house generation system in the Nishinoura Area, Hofu Plant)



■ Levels of CO2 emission from zehicle manufacturing process



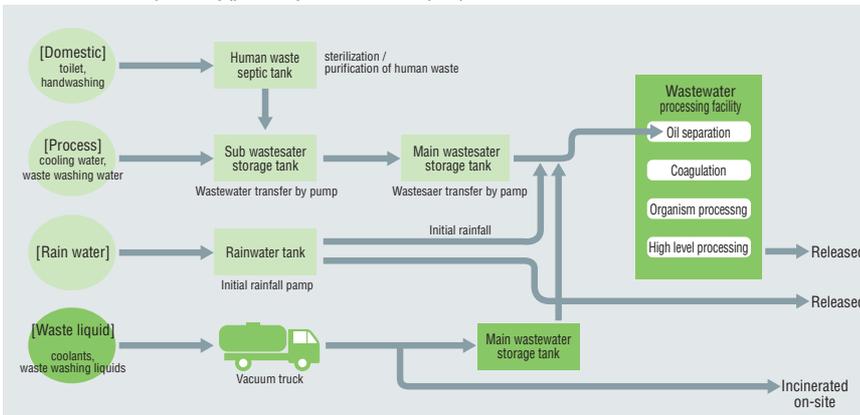
increasing the use of LNG within its plants, and thereby reducing CO2 emissions.

■ Cogeneration System

Mazda was one of the first manufacturers in the automobile industry to install a cogeneration system, which uses fuel to produce and supply steam, electricity and various other types of energy. The system gives thermal efficiency of 60% to 80%, compared with around 40% when generating electrical energy only. Mazda installed the industry's first large-scale in-house generation system at its head office plant in 1987, and in 1993, Mazda installed a new type of patent-applied in-house generation system in its Hofu Plant, which uses waste condensation heat, a previously untapped source of energy, and is capable of keeping up with the large fluctuations that occur in demand levels within automotive manufacturing plants.



■ Outline of wastewater processing (processing flow at head office plant)



■ Trends in CO2 emission per turnover unit



■ Clean production activities

Mazda's production bases within Japan are all located in the region of the Seto Inland Sea National Park, which is blessed with a warm climate and beautiful scenery. Mazda believes that the wonderful environment in which it is located is part of the earth's heritage, and aims for 'Clean Production' that will have minimal impact on this environment. It is for this reason that Mazda instigated the following environmental protection systems and controls.

■ Advance inspection system for chemical substances

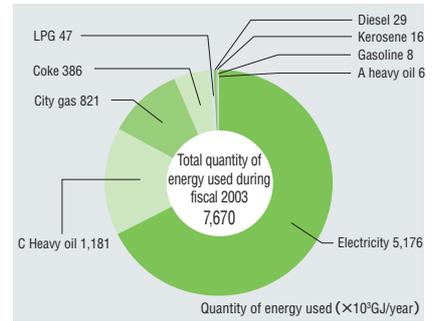
Before purchasing a new type of oil, chemical, paint or other such raw material or secondary material, an advance evaluation of labor safety and environmental aspects is carried out, based on the material safety data sheet (MSDS). Mazda is committed to the elimination or reduction in use of dangerous chemicals, and to finding alternatives where possible.

■ PRTR (Pollutant Release and Transfer Register)

During fiscal 2003, Mazda used a total of 22 types of substance that required reporting under the terms of the PRTR. Production totals increased by around 5% during this fiscal year, but Mazda was able to reduce by around 10% the quantities of pollutants emitted into the air and water systems. (For detailed data, please see site data from pages 52 - 55).

■ Prevention of wastewater pollution

■ Utilization of energy, by category



Mazda has defined its own standards, which are stricter than the legal regulations in regard to wastewater pollution, and is in fact clearing these standards by a certain margin, due to strict day-to-day controls. Mazda also processes its wastewater appropriately according to origin, by separating wastewater from processing systems, domestic systems, etc., as shown below.

■ Prevention of atmospheric pollution

Mazda has defined its own standards for regulating emissions of SOx (sulfur oxide), NOx (nitrogen oxides), dust, ground waste and mist, as well as hydrocarbons and VOCs (volatile organic compounds) which are stricter than the legal regulations in regard to atmospheric pollution, and is clearing these standards through the installation of removal equipment, low-impact facilities, and strict day-to-day controls. (For detailed emissions data, please see site data on pages 52-55).

■ Prevention of aesthetic pollution

Noise, odors, and other aspects that affect the aesthetic senses can upset people's sense of wellbeing even if falling within the boundaries of legal requirements. Mazda is well aware of this fact, and in order to live in cooperation with the local community, is committed to cleaning up the sources of pollution, and implementing plans to take measures against noise and odors.

■ Other environmental measures

Mazda is in the process of eliminating all chlorine-based substances from the cutting oils used in the machining process plants. In addition, Mazda abides strictly by the legal regulations relating to waste processing and cleaning, and currently stores PCB (polychlorinated biphenyl) for use as insulation oil for its condensers. As of the end of fiscal 2003, Mazda stored 280 units of PCB.

\*PRTR (Pollution Release and Transfer Register)

## Even higher production quality alongside environmental considerations Ujina No. 2 Plant begins operations

Mazda reopened the Ujina No. 2 Plant (also known as U2), which had been closed since September 2001, on May 26, 2004. U2 Plant began operations originally in December 1972, and was involved mainly in the production of the Familia, one of Mazda's mainstay models at the time. It was closed in September 2001 as part of our production capacity realignment. The restarting of operations at U2 indicates a significant strengthening of our production systems in order to cope with further product-led growth, and the opening of the plant has increased Mazda's domestic annual production capacity by 110,000 units, up 14% from the previous 788,000 units to 898,000 units.

### Production lines that are friendly both to the environment and the people who work on them

U2 Plant has been developed to be friendly both to the people who work there, and to the environment, with many technologies introduced that prioritize these two areas. Environmentally speaking, the Three Layer Wet Paint System, developed by Mazda as a cutting-edge painting technology, has allowed a 45% reduction in the use of VOCs (volatile organic substances), and energy savings have reduced CO<sub>2</sub> emissions from the plant by 15%. From the point of view of the people working at the plant, we have installed a kit supply system, which delivers the required parts to the people who need them at the right time, and a "just-fit" conveyor system, which allows reductions in tasks requiring operators to take up uncomfortable positions. This has improved working comfort significantly, and allowed us to realize a production line in which people and machines operate in harmony.

### Achieving high quality, speed and flexibility

The U2 Plant has thorough quality assurance systems in place on each of its production lines, which allow secure quality assurance to be built into completed automobiles during each process, and also allow production to take place exactly as planned. In addition to this, technologies that allow the consolidation of certain processes, for example in painting, have reduced production lead time by 30%, while at the same time assuring that our users receive a product with quality standards they can feel certain of within a very short time of their order, as a result



of our high-quality, concurrent production lines. The U2 Plant is highly flexible and can produce everything from Demio class to MPV class models on a mixed production schedule. In addition to this, a fusion of simulation technologies from MDI (Mazda Digital Innovation – see page 27 for more details) with the kit supply system and the 'just fit' conveyor system means that the plant is able to bring a new model vehicle to plant launch within a period of just two weeks (two weeks being the period required to prepare for full production, including the training period).

## Mazda's new production technologies receive a range of awards.

Our Aluminum Joining technology, which has reduced electricity consumption by 99%, received the Minister of Economy, Trade and Industry Award at the Superior Energy-Saving Application Example in 2003. In addition to this, the following technologies have been highly evaluated.

### Development of an injection molding process using high-strength plastic parts

This technology solved the problem of reduced strength in glass fibers as a result of bending, which was one of the biggest problems involved in the injection molding of glass fiber strengthening materials, through the inclusion of a newly developed material and a unique injection molding process. By using this process, it has become possible not only to save costs through consolidating various component functions onto the base material for parts assembly, making the most of the level of freedom offered by the injection molding technique, but also to increase fuel efficiency by reducing weight. This technology has already been put to practical use on the Atenza and subsequent new generation vehicles.

■ Received the 2002 Japan Society of Mechanical Engineers' Award (April 12, 2003)

■ Received the Technological Development Award from the Society of Automotive Engineers of Japan (JSAE) (May 22, 2003)

### Environmentally-friendly Three Layer Wet Paint System

This technique is a newly developed method, which allows the three paint layers (primer coat, coloring base and top coat) to be baked together after application, thus reducing the emission of VOCs (volatile organic compounds) by 45%, and reducing energy use by the equivalent of 15% CO<sub>2</sub> emissions, as well as allowing lower processing costs. The technology was introduced to both of our Hofu plants in August 2003, and to our U2 Plant when it opened, in May 2004.

■ Received Prize for Promoting Machine Industry / Minister of Trade, Economy and Industry Award from the Japan Society for the Promotion of Machine Industry (February 3, 2004)

■ Received the 2003 Production Award from the Okochi Memorial Foundation (March 9, 2004)

# Green Purchasing

Mazda recognizes the need to work with suppliers in order to further reduce the burden placed on the environment.

Mazda is engaged in the following activities promoting green purchasing.

### Mission

1. Promote ISO14001 accreditation among our suppliers
2. Purchase environmentally friendly parts, materials and equipment
3. Assess our use of environmentally damaging substances using IMDS activities
4. Reduce our use of paper through the increased utilization of IT

## Promoting ISO14001 accreditation among our suppliers

As part of its Environmental Management System, Mazda requires its suppliers of automobile parts and materials, as well as suppliers of manufacturing facilities and equipment, to attain ISO14001 accreditation, and Mazda works with suppliers to share information and good examples of practice to raise environmental awareness. During fiscal 2003, Mazda held training sessions entitled 'Environmental Laws and Risk Management', as well as 'Changes to Prefectural Regulations and a Request for Environmental Safety', and worked to ensure thorough compliance with laws and corporate ethics. As a result, in fiscal 2003, 94% of our suppliers had attained ISO14001 accreditation.

■ Status of suppliers' accreditation for ISO14001



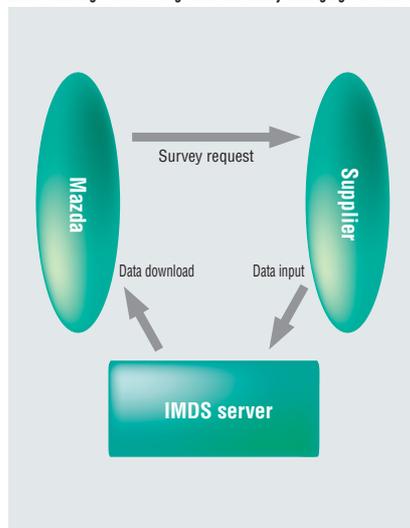
## Purchasing environmentally friendly parts, materials and equipment

Automobile manufacturing requires many purchased parts, and in order to reduce the burden Mazda places on the environment, it is important that Mazda understands and evaluate the environmental impact of the parts, materials and equipment Mazda purchases. Mazda has worked hard to ensure we are aware of hazardous substances contained in any parts and materials we purchase, and to reduce the use of such substances. Mazda also evaluates our energy use and promote green purchasing when procuring equipment.

## Assessing environmentally damaging substances by using IMDS

Mazda works in combination with its suppliers to ensure green purchasing, and to con-

■ The challenge of assessing environmentally damaging substances



tinue to strengthen its environmental management systems. In order to be in compliance with European regulations (for lead, mercury, cadmium and hexavalent chromium), Mazda collects all data regarding the presence of restricted substances in automobile parts purchased from suppliers, and are proceeding with measures to better understand and deal with these substances. Since July 2003, Mazda has been in compliance with relevant regulations. In addition to this, Mazda is working towards the increased management and reduction in use of environmentally damaging substances, and is pressing ahead with assessing all its hazardous substance use through the International Materials Data System. Our system is in place, and we are at present reviewing surveyed substances and adding parts to the data to keep it up to date at all times.

## Using IT to reduce paper use

As one aspect of our efforts to use resources wisely, Mazda is working towards reducing the amount of paper documents passed to suppliers. Utilizing Mazda's information communications system 'MGN' (Mazda Global supplier Network), Mazda began in December 2001 to replace paper document distribution with electronic versions of documents.

Step 1 of the system involves the digitization of information passed from Mazda to the supplier (originally a paper document). Step 2 involves the supplier and Mazda completing the purchasing transaction process on-line (using on-line approval, and the storage of digital documents). These two steps have allowed an increase in efficiency in two-way communication. As a result, Mazda saved around 360,000 sheets of paper per month in fiscal 2003, compared with fiscal 2000.

# Logistics

Logistics operations – which cover everything from shipping built-units vehicle through to parts procurement for customers, transporting repair parts, and shipping knock-down parts overseas – are subject to various environmental challenges, which Mazda is working on meeting appropriately through reductions in CO<sub>2</sub> emissions through increased efficiency, reducing the quantities of materials used, promoting recycling, and other measures

Mission	
1.	Reduce the use of energy and CO <sub>2</sub> emissions through greater logistics efficiency
2.	Promote the use of simplified, returnable packaging and wrapping materials, and recycling of such materials in order to reduce the quantities used

## Reductions in CO<sub>2</sub> emissions through rationalization of logistics

With the aim of reducing the CO<sub>2</sub> emissions generated through the transportation of built-units vehicles, production parts, parts for customers, and knock-down parts for overseas, Mazda has introduced a Milk-Run System (MRS), which has reduced the number of trucks in operation, shortened the transportation routes for parts being exported, facilitated the joint transportation of built-units vehicles and parts for customers, changed the mode of customer parts transportation from road to JR trains, and reduced the use of fork lift trucks within the parts center. These measures reduced CO<sub>2</sub> emissions by 2,234 tons compared with fiscal 2002.

### Transportation of production parts

In addition to continuing modal shift towards the transportation of parts from remote locations by rail and sea, the introduction of the Mazda MRS has led to an overall rationalization of truck transportation. Mazda now send out trucks from Mazda to pick up production parts from suppliers, resulting in fewer trucks on the road. During fiscal 2003, this resulted in a reduction of 1,170 tons of CO<sub>2</sub> emissions.

### Transportation of built-units vehicles

Mazda has conventionally utilized sea transportation to ship built-units vehicles to areas other than those immediately local to our area. More than 90% of our total transportation of automobiles is done using these sea routes. At the same time, we are also implementing joint distribution with other companies, along with other efficiency improving measures for distribution, including return carriage transportation, based on 11 distribution bases in regions throughout Japan. This allows higher efficiency and lower costs, as well as promoting the rationalization of all activities relating to the delivery of new cars to customers. The creation of this

optimized logistics system is enabling us to further reduce the burden placed on the environment.

### Distribution of parts to customers

Since 1994, shifting to increased joint distribution and rail distribution systems has allowed Mazda to achieve increased efficiency as well as reductions in emissions. During fiscal 2003, Mazda began working on shifting from the use of fork lift trucks to the use of compact towing tractors in the Parts Center, which is used to manage customer parts logistics, so as to further reduce CO<sub>2</sub> emissions. In addition to this, the Parts Center attained ISO14001 accreditation in May 2004, and Mazda will continue to promote the maintenance of the Center's Environmental Management System in the future.

### Distribution of parts for overseas production (knock-down (KD) parts)

KD production parts, which are destined for overseas assembly locations, and overseas customer parts, have been shipped directly to Busan (Korea) and Kaohsiung (Taiwan) as part of our global shipping system, in which such parts are loaded directly onto ships from Hiroshima, allowing shorter routes and a significant increase in transportation efficiency. As of June 2004, we also began the container shipping of KD parts to Changchun in China from Hofu Port, further improving the efficiency of our shipping routes and reducing CO<sub>2</sub> emissions.



Use of electric vehicles in logistics

	Total No. of vehicles	No. of electric vehicles
Trucks	258	0
Forklifts	690	158
Towing tractors	302	302
Other	139	139
Total *	1,389	599

\*Subcontractors handle transport of parts and built-unit vehicles. Mazda does not own such transport vehicles.

\*Vehicles used for on-site transport / parts procurement.

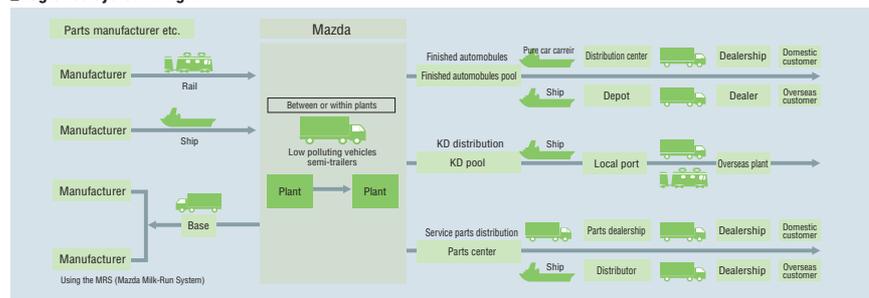
## Reductions in packaging and wrapping materials

When Mazda automobile parts are shipped to overseas assembly plants or sales companies within Japan, they are now packed using returnable packaging materials. Mazda is promoting '3R' activities (the principles of Return, Reuse and Reduce), and have implemented reviews of packaging materials in the light of this, with the aim of reducing use of resources. The reductions achieved during fiscal 2003 are shown on the opposite page. In addition to this, Mazda shifted to on-line information exchange with the transportation companies Mazda use during fiscal 2003, using the newly-created Mazda Logistics Site (MLS). This has allowed Mazda to eliminate the use of paper forms, saving a total of 130,000 sheets of paper (calculated in A4) per month.

## Training of affiliates

Since 2002, Mazda has been in the process of training affiliates companies involved in the running of its Logistics Center. Mazda is training these affiliates in the areas of facilities management, day-to-day and monthly management, checking, document, and other aspects of facilities and business operations, so as to achieve appropriate and efficient logistics across the entire group.

### Logistics system diagram



Quantitative results of reductions in packaging and wrapping materials (wooden materials and cardboard)

(Unit: tons)

Logistics area	Details	1999 standard			Details								
		2001 Results	2002 Results	2003 Results	Returned materials			Reuse			Reductions		
					2001	2002	2003	2001	2002	2003	2001	2002	2003
Sales logistics	KD parts transportation	1,558	2,243	2,398	242	446	494	278	360	399	1,038	1,437	1,505
	Customer parts transportation	808	1,023	1,436	523	675	798	128	137	230	157	211	408
<b>Total</b>		2,366	3,266	3,834									



Transportation pallets made from recycled plastics

## The challenge facing dealerships

Mazda dealerships are working hard to comply with environmental laws and contribute to the cleaning of the environment, through self-imposed targets. They are also contributing to our work at saving the environment, through the collection of damaged bumpers and CFC recovery.

**Definition of MECA 21 indexes for activities**

Mazda created MECA 21 (Mazda's Environment Care Approach 21) in cooperation with the Mazda Dealership Association, in order to have a set of indexes for our environmental activities. Mazda is working on strengthening the system whereby dealerships are required to gain certification according to these indexes to show that they are working towards environmental goals. In order to support dealerships working positively towards MECA 21 goals, Mazda has also produced, and distributes, a behavioral manual

for dealership sales and service staff known as the Mazda Excellent Navigator, as well as a collection of examples of excellence in regard to environmental regulation adherence and environmental improvement

**Bumper recovery and recycling**

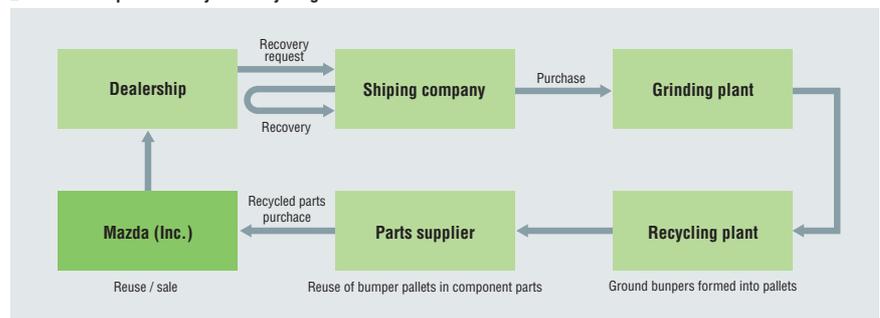
Damaged bumpers that are produced during repair or replacement work are collected from dealerships throughout the country and are used as resin parts in new cars. A bumper recycling corner was exhibited at the Mazda Service Skill Competition in November 2003, at which

the latest in recovery results, along with information regarding bumper recovery and the use of such materials as automobile parts, and Mazda's newly developed bumper to bumper recycling program, were displayed, alongside prototypes. Mazda is promoting even higher rates of recycling as well as higher levels of recovered bumper quality, through introducing its results, and examples of its work, in this way (see page 29 for further details).



Mazda Excellent Navigator

**Flow of bumper recovery and recycling**



**Compliance with the Automobile Recycling Act**

As of January 1, 2005, the recovery and disposal of CFCs, which was until now carried out by dealerships according to the specifications of the CFC Recovery and Disposal Act, will come under the auspices of the Automobile Recycling Act. The Act covers not only CFC recovery and disposal, but requires dealerships to take appropriate measures in a variety of other areas, including the processing of end-of-life vehicles. Mazda is creating and distributing support manuals for dealerships as well as publicity tools to assist our customers in understanding the new Recycling Act, and is rolling out a range of preparations that are designed to help the transition to the operation of the new Act go smoothly.



Collection of examples of compliance with environmental laws and environmental improvements (New 6S)

# Relationship with customers

Mazda is continuously striving to improve levels of quality and customer satisfaction, in order to be able to deliver the highest standards in automobiles and services to customers.

## Improvements in Customer Satisfaction (CS) levels

Mazda is constantly working on the following three areas, which Mazda consider vital in order to improve the level of satisfaction Mazda can offer to customers through corporate activities.

1. Improvements in product quality: Realize the highest level of satisfaction and product quality within the industry
2. Improvements in customer satisfaction within sales operations: Aim for top-level customer satisfaction, and promote CS improvement activities in sales, service, parts and logistics at every level of the car life cycle (post-manufacturing - delivery - replacement).
3. Create attractive products: Aim for product creation that reflects brand message 'Zoom Zoom', while at the same time improving customers' quality of life.

Mazda has established a call center, and is engaged in various other measures designed to improve our customers' level of satisfaction.

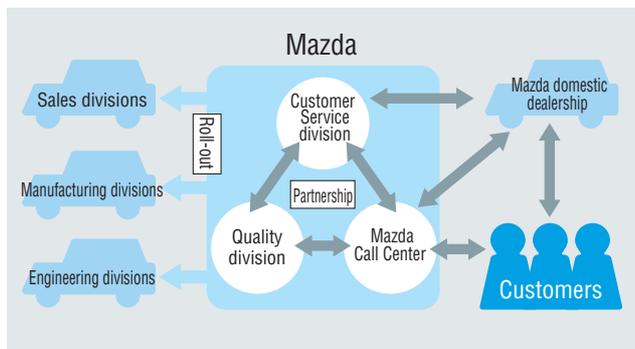
### Mazda Call Center

Mazda established the Mazda Call Center in February 1984, in order to facilitate our customers in making enquiries and requesting advice about products and any other aspect of our business operations. There are currently 55 operators working at the call center, who work hard to ensure that each enquiry arriving via free dial telephone numbers or website is taken seriously and given an appropriate response. Since October 2004, the call center has begun responding to calls on the free dial telephone line not only on a Monday-Friday basis, but also at weekends and on national holidays. During 2003, the call center was used by approximately 66,800 customers, and the opinions and requests presented by customers using the center were fed back into Mazda, to be reflected in product development, sales, service activities and other areas of our operations, to improve CS overall.



The Mazda Call Center

### CS improvement and responses to customers



## Quality Improvement Activities

Mazda is committed to the following activities as ways of improving its quality and service performance, as the basic tenets of CS improvement.

### MQ

Mazda began Quality Circle activities in 1962, and in 1978, broadened quality improvement activities into the MQ (Mazda Quality) program. In particular, Mazda product quality improvement activities have entered the All-Japan QC Circle Contest a total of seven times, and three times consecutively from 2001. Mazda has been awarded the General Manager Gold Prize Award in this contest twice.

In July 2004, QC Circle Team from the Hofu Plant Nakanoseki District received the Kaoru Ishikawa Medal for the fourth time, and the third consecutive year, at the 4650th National QC Circle Contest.

### ISO9001 accreditation

In December 1994, Mazda was the first domestic automobile manufacturer to gain ISO9002 accreditation for their quality system. In June 1996, we also received accreditation relating to the international quality management standard ISO9001\*, which covers a wide range of areas including design and development, through to manufacturing, sales and after-sales care.

\*ISO9001: The international standard for quality management systems, established by the International Organization for Standardization (ISO). ISO9001 defines standards for organizations to deliver products and services efficiently, and regulates requirements for improved customer service levels.

### Response to recalls etc.

If a quality problem emerges in regard to a product, and the rectification of the problem is considered vital, Mazda takes the following measures, as necessary.

- Registration of documents with the relevant authority, depending on laws and procedures in various countries
- Notification of customers using direct mail and newspaper and other advertising, and explanatory meetings at dealerships
- Publication of recall information on the website
- Recall and non-remunerated repair of such vehicles.

Please see the following page for further information regarding Mazda's recalls (Japan)

<http://www.mazda.co.jp/recall/>

Mazda's Quality Division explains and publishes information regarding quality problems with its products, as well as regarding appropriate measures, thereby facilitating a speedy and appropriate response.

## Manufacturing cars that are kind to people

From the development and retail of the first domestically manufactured automobile with a wheelchair ramp to the promotion of universal design, Mazda is engaged in meeting the individual needs of users through its automobile manufacture.

### Development and promotion of the use of specially designed wheelchair-accessible and other welfare vehicles

Mazda aims to manufacture cars that are kind, fun to drive and enjoyable for all users, and is working on the development and promotion of the use of specially designed wheelchair-accessible and other welfare vehicles. During fiscal 2003, Mazda received orders for 1,020 welfare vehicles.

Initially, in 1995, Mazda were the first domestic auto maker to retail a car with a ramp fitted to the rear of a car for wheelchair access, when Mazda based our first welfare vehicle on the compact model known as Carol. At present, Mazda offers a range of welfare vehicles known as the i-Series, including a model with a lifting passenger seat, one with a second-row lifting seat, a model that can be used to transport wheelchairs, and a model with a rotating passenger seat. These meet a wide range of needs among the elderly and those with disabilities, and also include a range of functions designed to make things easier for the caregiver or driver too.

Based on data recorded by the Ministry of Health, Labor and Welfare, which states that over 70% of caregivers are women aged 50 and over, we have worked hard on research and development aspects to introduce features that mean caregivers do not need to work so hard to facilitate the person they are caring for getting into and out of a vehicle, as well as simplifying operations and improving safety and comfort.

In addition to this, our Mazda Rotary Shin-Umeda and the ATC Ageless Center (located in Suminoe Ward, Osaka) have permanent displays of welfare vehicles, allowing customers who visit these centers to see and touch the vehicles themselves, and supporting customers as they select a vehicle that will suit their needs. Mazda also implements consultancy with customers regarding the most appropriate vehicle for their needs, and have created and distributed a Welfare Cars Handbook to Mazda dealership staff.



Demio i (a wheelchair transportation car with a ramp)

### The challenge of Universal Design\*

As part of our quest to create cars that are kind to people, Mazda is working on incorporating Universal Design into our automobiles. We are aiming to facilitate driving positions that are not dependent on the driver's physical condition, and seat arrangements that can be changed regardless of the user's physical strength. Concepts for Universal De-

sign include ease of operation and positioning, ease of operation, optimized organization and function, and safety in use. Mazda is working from an ergonomic point of view to ensure that the ease of use Mazda is building into our cars is also functional and aesthetically pleasing. For example, the center console in our Verisa models has been designed to operate on quantitative methods, instead of requiring strength of touch, so that any user can find enjoyment in operating the controls.

\*Universal design: The concept of designing products that can be understood and used comfortably by people of all ages, genders, physical types, and abilities.



The center console on the Verisa, which has been designed according to ergonomic principles.

### Responding to a wide variety of user needs

Alongside our development of welfare vehicles and the introduction of Universal Design to Mazda vehicles, Mazda believes that, as part of mission to create cars that are kind to people, Mazda needs to respond to the diversifying needs of our customers. In order to do this, Mazda are rolling out a program of 'Pleasure Customization', to allow cars to be customized according to the preferences and lifestyles of their users, and 'Business Customization', allowing cars to be optimized to suit the way in which they are being used.

#### Web Tune Factory

Since February 2001, Mazda has been accepting internet orders for cars via Web Tune Factory. Mazda offers a wide range of finishing options, and the site also allows customers to confirm the way their car will look, receive estimates for various different types of car, and discuss purchasing terms.

<http://www.w-tune.com> (Japanese Site)



#### TESMA

Mazda is currently in the process of rolling out specially finished commercial vehicles known as TESMA, which are developed and designed to meet a wide range of customer needs in relation to industrial use and transportation of loads.

## Mazda E & T cumulative production of ramp-type wheelchair access vehicles reaches 10,000 units.

Mazda's subsidiary company, Mazda E & T, is responsible for the design, development and conversion work on Mazda's welfare vehicles. In 1995, they were the first domestic manufacturer to develop a ramp-type wheelchair access vehicle based on a compact car. As of July 2003, the cumulative production of this car topped 10,000 units—the first time a domestic manufacturer has achieved this figure.

### Promoting increased universal access to welfare cars

Mazda E & T's development work is promoting increased universal access to cars, based on the company's ten-year experience in manufacturing such vehicles. The company is focusing on the following points in design and development, based on the fact that many caregivers nowadays are middle-aged or elderly women.

- 1) Operations that can be achieved without the need for particular strength
- 2) Safety and durability that allow the user to feel confident and secure
- 3) Design that offers comfort in driving and operation

Hiroshi Amahata, Manager, Product & Business Planning Dept., expresses it like this: 'We have introduced a spring assistance function to the tailgate, which doubles as a ramp, on our ramp-type wheelchair transportation cars,

for example, which allows the ramp to be moved with the minimum of effort. We have also included belts that fix the wheelchair in place, to stop it moving backwards when the car is being transported, which offer a sense of security and therefore increase the overall pleasure of driving the car.



MPV second-row lifting seat

### Tuning that allows optimum drive comfort

Mazda E & T is unique in that it not only works in cooperation with Mazda on design and functional developments, but also operates in the area of testing and prototypes relating to improvements in suspension and body strength, rigidity and reliability, and in finishing. This integrated approach allows not only standard vehicles but also welfare vehicles to be given the highest standards of consideration at every level. Naoyuki Nishimoto, Manager of the Automobile Design Division: 'Using the suspension tuning of the base vehicle enables us to create cars with the optimum level of drive comfort. By lowering the floor of the vehicle, we have brought the driver and the wheelchair passenger into eye-contact, which ensures a comfortable view and increases the communication in the cabin.'

### An integrated response to customization needs

At Mazda E & T, alongside the Welfare Customization Project, the company also offers a Pleasure Customization Project, which allows cars to be customized according to their owners' personalities and interests, and a Business Customization Project, which designs, develops and builds vehicles including refrigeration units and other special business-related accessories. The company is committed to ensuring that the needs of our car-oriented society are fully met, even in niche market areas.



Mazda Roadster RS Coupe (Type E)

### 《Mazda E & T's work for the environment》

Mazda E & T gained ISO14001 accreditation in June 2000, and is continuing to promote environmental management.

During fiscal 2003, their particular focus was reducing the quantity of waste product produced during the production processes used for welfare and other customized vehicles. The cars that are used as the basis for such vehicles are now supplied by Mazda in a state where seats and parts that would formerly have been removed are not in fact fitted. In the case of the Demio ramp-type wheelchair transportation vehicle, the vehicles are now supplied with the remodeled floor, which is used to store the wheelchair. This has allowed the company to reduce its waste product during fiscal 2003 by 20kg per unit for Demio models, and 69kg per unit for Premacy models.

During fiscal 2004, the company is working on reducing the quantities of PRTR substances it uses. 'As of September 2004, we changed over to using water-soluble paints on our wheel bases, which has saved the use of 240kg per year of toluene and 180kg per year of xylene. The special engineering technology and multi-skilled processes employed in building our welfare ve-

hicles are a particular feature of E & T's work. For this reason, we are not only working on reducing the burden our work places on the environment, such as switching over to water-based paints, but also committed to creating the optimum working environment for our staff,' says Hajime Shiomi, General Manager of the Painting Plant.



Hajime Shiomi, General Manager of the Painting Plant



Painting operation using water-based paints

## The Relationship with Dealers

Mazda is working on developing a program of sales and after-sales services that benefit its customers, in partnership with its dealerships, which are an important part of the corporate group.

### Strengthening the domestic sales network

Mazda has been working on regional integration of its dealerships over recent years, in order to meet the demands of a highly competitive domestic market, and to strengthen the business potential and financial stability of its dealerships overall, as well as increase customer satisfaction. By sharing business practices and resources, as well as reducing the quantity of inventory stock held, Mazda is achieving a stronger business base for Mazda dealerships.

### Creation of a broadband network

In October 2002, Mazda created the first domestic broadband network of its kind within the automobile industry, which allows manufacturers and domestic dealerships (not including Mazda Autozam) to exchange, share and utilize large volumes of information. The network allows confirmation of stock, includ-

ing parts and automobiles, as well as issuing instant estimates for insurance policies on new and second hand cars, allowing a significant reduction in the workload placed on dealerships, and increased efficiency in customer service. From fiscal 2004 onwards, the broadband network will be used to connect all domestic group companies to an IP (internet protocol) telephone system, which will improve the efficiency of our services, while significantly reducing communications costs.

### Improvements to customer convenience and expansion of sales networks

From March 2004 Mazda has been engaged in a process of reviewing the models available through each of dealerships, with the aim of improving the availability of various models of automobiles, while at the same time increasing the convenience of services offered to our

customers. This review involves not only Mazda dealerships, but also Anfini and Autozam network dealerships.

Mazda and Mazda Anfini have added six models of micro-mini vehicles to their lineup, resulting in a complete lineup of all types of Mazda car being available through such routes. Mazda Autozam dealerships now offer MPV, Bongo Friendee and Tribute models to add to their product lineup. This has allowed micro-mini vehicles, and RVs, which are subject to high levels of demand, to be made available across all dealerships in network, while at the same time, expanding the areas through which Mazda's cars and services are available, and improving levels of convenience to customers. For dealerships, this has also expanded the opportunities they have to meet a wide range of customer needs.

#### The challenges facing dealerships

C L O S E U P

### Working for greater customer satisfaction and improved services at the front line of the Mazda brand.

Takamasa Miyamoto,

Director and General Manager, Service and Sales Division, Kanto Mazda Co., Ltd.



Kanto Mazda is Mazda's largest dealership, with 119 outlets handling the sale of new cars in Tokyo, Saitama, Kanagawa and Gunma, and total sales of over 36,000 units per year. We are aware that we are at the front line of the Mazda brand, and as such, are committed to clear communication with customers at all times. Our vision is to have the top level of customer satisfaction and income productivity through every-member participation in our sales activities, which we are working daily to improve. Our company's role can be broadly divided into two areas – sales division and service division. We share information through a variety of channels with Mazda, and are working to improve our levels of customer satisfaction. This is a challenge faced by the company as a whole, but there are also various challenges to be faced by our individual dealerships. One of these challenges is our work for the environment – including the processing of old batteries, and parts from other manufacturers' cars. We have formed a new department to deal with

measures required by the Automobile Recycling Act, and are working in an integrated way on understanding the implications of the Act, charges and individual processing methods. In addition to this, we also believe that an important part of our role is to understand the large and small needs of our customers by dealing directly with them, so as to be able to respond swiftly to the needs expressed.

It is becoming more and more important to be able to communicate issues relating to safety and environmental considerations to our customers directly. In the future, we intend to continue sharing information throughout the Mazda group, so as to communicate information to customers about the Mazda brand, and help them to understand and believe in the work we do.

# Towards a safe automotive society

The safety issues relating to automobiles concern not only those driving and traveling in cars, but also pedestrians. Mazda is developing technologies to improve the safety of both these groups

## Our philosophy of vehicle safety

Mazda holds the concept of safety as central to its work in car manufacturing, and for this reason is concerned to offer the highest levels of capability possible in all aspects. Mazda aims for the highest levels of safety. For this reason, Mazda develops and implement safety regulations that not only meet but exceed those of the countries in which we work. In order to further improve our research and development into safety issues, we established a Safety Development Committee in 1990, which is responsible for defining our safety policy

## Safety policy

Based on the awareness that safety is a primary requirement for the enjoyment of life with automobiles, we are committed to the following:

- 1) Research into methods of automobile use by customers and the social and traffic environment in which such automobiles are being used
- 2) The search for ever-safer technology, and the application of such in ways that are most appropriate to our customers.

This safety policy is the basis for Mazda's 'Active Safety Technology', in which we work to proactively prevent the occurrence of car accidents, as well as our 'Passive Safety Technology', which seeks to minimize damage to passengers and pedestrians in cases where an accident does occur. In order to prevent traffic accidents, we believe that a holistic approach to automobiles and the traffic environment, as well as a focus on human behavior, is necessary when considering safety issues. The achievement of an efficient and safe traffic environment will, we believe, also contribute to a lessening of the burden placed by automobiles on the environment, since fewer accidents and less traffic congestion result in the more efficient utilization of resources.

Mazda is working on safety technology for the future using the most cutting edge techniques currently available. Mazda is also participating

in the ASV (Advanced Safety Vehicle) and next-generation high-level ITS (Intelligent Transport Systems) development projects being promoted by the Ministry of Land, Infrastructure and Transport.

## Safety Technology

### Active Safety Technology

Mazda supports control performance through technologies such as 4-Wheel ABS and EBD (Electronic Brakeforce Distribution system) systems, as well as utilizing DSC (Dynamic Stability Control) to prevent cars from slipping sideways. These systems promote extremely safe driving. Water repellent glass and self-leveling high intensity discharge headlamps also raise driver visibility.

### Passive Safety Technology

Mazda engineers has developed, and are now

evolving, an automobile body known as Mazda Advanced Impact-energy Distribution and Absorption System, which includes a 'crushable zone', which is able to absorb impact on collision, along with a rigid triple H-shaped construction, which can be combined to give a highly rigid, safe body. This is being developed further to offer greater guarantees of safety to passengers.

On the interior side, Mazda is pressing ahead with the introduction of various features to preserve the safety of passengers, including front seat belts with pretensioners and load limiters, energy absorbing soft interior materials, neck injury reduction seats, frontal airbags for driver and front passenger seats, and curtain-shield and front side airbags. Mazda is also concerned with pedestrian protection, and is working on developing body design that reflects these concerns.

### RX-8 - safety measures that protect in collision

The energy absorption light weight aluminum bonnet has been improved by the inclusion of many shock cones, in order to minimize damage to pedestrians if hit by the car

Front seat belts with pretensionerz and load limiters, and front passenger's seat airbags, with a two stage inflation control, are fitted in all models as standard

The crushable brake pedals reduces the chance of foot, ankle and lower leg injuries by minimizing brake pedal intrusion

Energy Absorbing Upper Interior used on pillar and roofside trim to absorb impact

Top tether anchor ISO-FIX com

Neck injury reductionseat

In a frontal collision, the impact energy is dispersed in three directions throughout the front of the cabin in order to reduce malformation of the body

If the car is subject to collision in the 'clashable zone', the impact is absorbed, and the strongly assembled floor / side / roof H-shape construction controls cabin deformation. This highly rigid and safe body construction has been uniquely developed by MAZDA.

The use aluminum strengthening materials inside the rear door and the hirthly tensile, vertical built in pillar gives the same or better side strength, despite it having no center pillar.

\*The Mazda RX-8 achieved the top rank of six stars in the fiscal 2003 Automobile Assessment

## ■ Top brake capacity within class

Mazda has optimized the balance between responsiveness, linearity and stopping power in its braking systems. In the Ministry of Land, Infrastructure and Transport's fiscal 2003 Automobile Assessments, the Mazda RX-8, which went on sale during 2003, broke the previously held record for the shortest stopping distance on a dry road in braking tests, with an excellent performance of 38.6m. In addition, the Axela achieved the top performance of its compact car class, with a stopping distance of 41.1m on a dry road.

## ■ DSC (Dynamic Stability Control) - prevents sideways slipping

Through the integration of ABS (anti-lock braking system) and traction control functions, we have achieved the function named DSC (Dynamic Stability Control), which offers engine braking in conjunction with individual brake control of all four wheels so as to prevent sideways slipping. This function enables the driver to control the car easily while braking, and to correct the car's direction after over-steering or under-steering, which can occur when cornering on slippery roads or turning suddenly to avoid an obstruction.

## ■ Safety verification

Mazda implement various verification tests on Mazda cars to ensure that Mazda is building-in genuine safety. Mazda testing includes the use of supercomputers in crash testing, a decelerating collision simulator, and various types of crash tests using actual vehicles. Mazda is working hard to ensure that we are able to deliver products that offer the utmost in safety to our customers.



Main safety equipment and technologies	Details	Utilized from
High-rigidity, safety body (Mazda Advanced Impact-energy Distribution and Absorption System)	Crushable zones to the front and rear of the car distribute and absorb impact, and triple H-shaped construction, in which the floor, sides and roof are combined strongly together in an H structure, reduces cabin distortion to offer a highly rigid and safe body.	1997
Collision technologies developed as part of MDI (Mazda Digital Innovation)	Digital crash simulations are carried out on new models before the prototypes are even built. This offers testing options that are difficult to implement on prototype models, and allows various tests to be repeatedly carried out under the same conditions. In addition, the precision information gained from the simulator regarding the collision of each component unit allows us to further develop collision safety features.	1996
SRS* Curtain and front side airbag system	Developed to cover all doors and windows to the front and rear, to protect driver and passengers. *SRS: Supplemental Restraint System.	2002
Crushable brake pedals	Pedals constructed in such a way that they do not move backwards, and therefore reduce leg injury.	2002
Neck injury reduction front seats	Seats that reduce impact when collision occurs either from the front or the rear	2002
ISO-FIX compatible child seat fitted construction with top tether (left and right sides of rear seat)	Ensures that the child seat is firmly fixed using a simple operation.	2000
Luggage compartment protection on rear seat construction	Construction prevents luggage bursting through from the trunk, thereby protecting passenger safety in the case of a forward collision.	2002
Pedestrian safety measures (shock cone bonnet)	Changes to the rib construction inside the bonnet have incorporated a shock cone bonnet that absorbs impact when a pedestrian's head hits the bonnet.	2003

# Activities in Employee Health and Safety

The source of all the energy Mazda pour into work comes from employees, and Mazda works to provide a workplace that is safe, healthy and comfortable.

## Health and safety management activities

Mazda prepares an annual plan under the direction of an appointed health and safety manager, covering five key points for the entire company: safety, hygiene, health, fire prevention and transportation. Our awards program recognizes departments that have achieved targets, or made outstanding contributions in improving the workplace.

<b>Safety</b>	Strives to ensure zero labor-related accidents by making safe people, safe workplaces and safe procedural frameworks. Mazda safety performance remains one of the highest in the industry.
<b>Hygiene</b>	Strives to improve hazardous or poor environments, working to achieve comfortable work environments.
<b>Health</b>	Promotes an expansion of individual physical and mental health management, improving health and wellbeing.
<b>Fire prevention</b>	Strives to ensure that effective disaster-control measures are in place, including fire prevention, and enforce risk management.
<b>Transportation</b>	Strives to improve traffic manners and make all Mazda personnel model drivers and pedestrians.

## Labor safety activities

Completely eliminating labor accidents demands that employee awareness be improved. Mazda is working to achieve this by training employees to recognize potential danger, to experience danger via simulations, and to help prevent accidents and disasters from occurring.

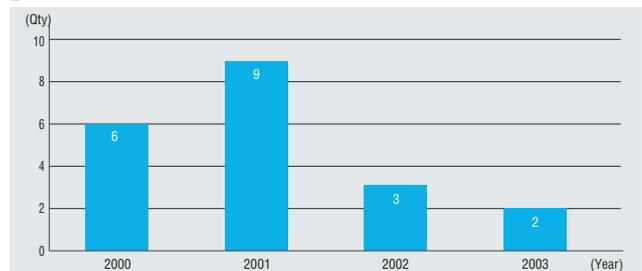
## Creating a comfortable workplace

Improvements in the workplace require more than merely eliminating hazards. For example, Mazda is also involving in preventing repetitive stress injuries (RSI) caused by repeated labor actions, and improving the workplace through ergonomic measures. We are also improving temperature and noise control, and isolating smoking areas from the rest of the workplace.

## Activities to improve employee health

The improvement of daily living customs is the most important factor in improving the health of each employee, and Mazda provides health check follow-ups, promotes walking as a daily exercise, and help employees quit smoking. Mazda also offers programs to help employees improve their mental health.

### Trend in labor-related accidents

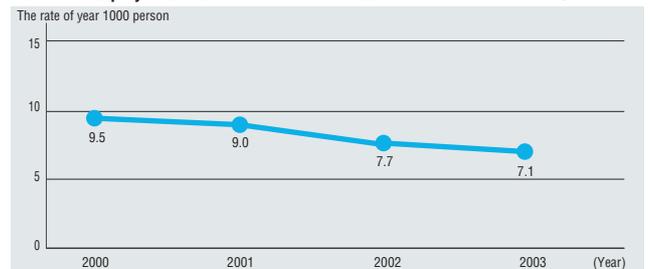


\* Number of employee absence cases per one million labor hours.

### Trends in suspended operation ratio\*



### Trend in employee absence due to severe sickness



Safety Training

### Basic outline of mental health program



## Creating a More Comfortable Workplace

To achieve our goal of showing respect for people, Mazda is working to make working environment one where employees can work without worry. A committee with representatives from both management and labor meets regularly for continuing improvement of the environment through concrete measures.

### Assuring employment and handling increasing diversity

Mazda believes that its first and foremost responsibility to its employees is to provide them with stable employment, and all employment activity is planned to maintain a balance with business activity. Mazda make active use of female labor resources, such as two department managers and other management-level staff, as well as post-retirement employees, to respond effectively to the changing employment environment. Mazda also actively employ the disabled.

### Personnel policies designed to promote workplaces that are easy to work in

Mazda operates a number of programs designed to make the workplace easier to work in. Administrative departments, for example, make use of flextime, without defining core working hours. From January 2004 we also adopted the free agent system, allowing employees to develop and achieve their own career paths.

### Supporting employee lifestyles

To also provide a range of facilities and services to support diverse employee lifestyles. Mazda efforts in this regard was recognized by receipt of the Family-Friendly Corporation Award from the Minister of Health, Labor and Welfare for fiscal 2003.

#### Female Employee Counseling Office

In addition to policies based on compliance, this office was established in 1998 to provide specialized consultation for female employees through a variety of means including a hotline, dedicated e-mail and women counselors.

#### Childcare support

Mazda has offered a childcare leave of absence system for some time, and in 2002 added an onsite nursery. Mazda provide childcare to match diverse employee lifestyles, such as extended care for long days, or temporary care for special occasions. At the same time, we also prepare handmade meals and offer a sickroom for those who feel unwell, helping parents feel more at ease when leaving their children with us. Temporary childcare is available through the end of the second grade, and leaves of absence are available to allow parents to take care of sick children.

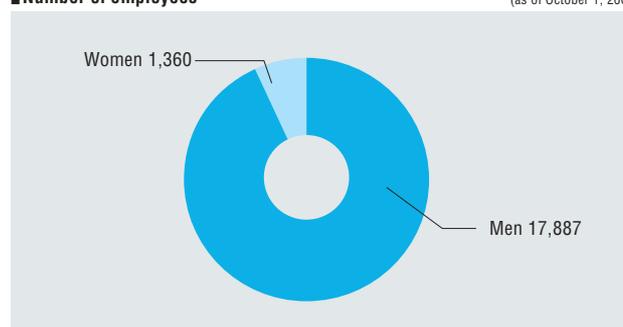
#### Long-term at-home medical care

Employees may take up to one year off to provide long-term medical care for a member of the family, while short-term leaves may be received on a flexible, case-by-case basis.

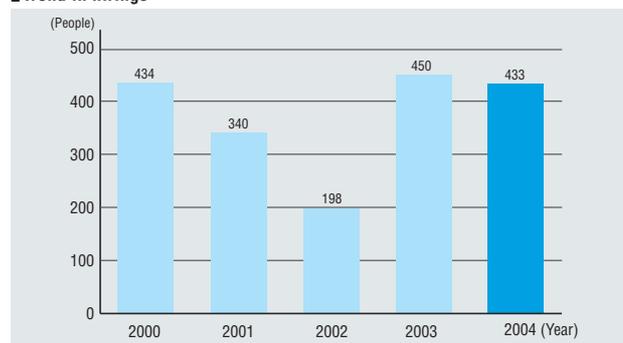
### Respect for human rights

All people deserve their rights to be respected, and Mazda has made a corporate declaration to eliminate violations of human rights. We are also involved in educating people concerning AIDS.

Number of employees (as of October 1, 2004)



Trend in hirings



Health and welfare facilities

(as of June 1, 2004)

Type	Qty	Remarks
Hospital	1	Mazda Hospital
Dormitory	11	7 in Hiroshima City, 1 in Hatsukaichi City, 3 in Hofu City
Company housing	7	5 in Hiroshima Pref., 2 in Yamaguchi Pref.
Nursery	1	Nursery 1 At head office
Athletic facility	3	Ohara Pool, Mazda Gymnasium, Mazda Sports Center

### Survey of employee awareness

To promote employee satisfaction and achieve the optimal workplace environment, this survey is taken regularly. Employee comments are evaluated and used to guide improvement efforts.

# Personnel Education and Training

Mazda provides a range of educational and training support, helping employees advance their careers and improve their skills.

## Education program

Mazda makes a variety of education programs available to all employees. Individual education programs not only allow employees to advance their careers, but are also designed to help each person help achieve the Mazda brand goals of compliance and consideration for the environment in daily activities.

(as of April 1, 2004)

Program name	Description	Remarks
Selective training (group training, e-learning)	Classes are offered during working hours, primarily on business skills.	FY2003 results: 17 group training courses with about 2,000 employees 9 e-learning courses with about 3,400 employees
MBLD (Mazda Business Leader Development)	For all employees, designed to nurture business leaders with a management perspective, promote achievement of business plans and revolutionize organizational culture.	Began in July 2000.
Leading Mazda 21	Human development program for managers, teaching strategic decision-making from the global perspective.	Began on April 1, 2002
Technical Olympics Training Program	This special skills training course for young employees aims at winning the gold for the Japan and World Skill Olympics.	Mazda has dispatched competitors to Japan and world skill Olympics since 1962. Total competitors dispatched: 322 Japan Olympics Gold medals: 23 Silver medals: 80 World Olympics Gold medals: 4 Silver medals: 10
Welding Skill Training Program	A special skills training course to take top place in arc-welding competitions in Japan.	Mazda has dispatched competitors to the national competition since 1984. Total competitors dispatched: 28 First place: 7 Second place: 15
Advanced technical skills training course	One-to-one (master and apprentice) training between recognized masters of the automobile manufacturing art and gifted students, to pass on core techniques to a new generation.	Began in July 1996. Completed master accreditation (technical meister): 43 Completed apprentice accreditation: 90
Environmental education	This source fosters environmental awareness and physical ability using our environmental management system.	(See page 17.)

## Enhanced training facilities

Mazda has opened a range of educational and training facilities to make it possible to offer effective services to administrative and technical employees both in Japan and overseas. Facilities are provided with equipment and functions appropriate for the particular programs they offer, assisting Mazda Group employees in improving their career choices.

(as of January 1, 2004)

Name	Participants	Location	Opened	Description
Mazda Education Center	Employees	Hiroshima	1979	Training for managers, administrative and technical employees, and skilled employees; international awareness training; departmental training, etc. About 5,000 participants/month
Mazda Technical College	Mazda Industrial Technology College New high school graduates and selected employees	Hiroshima	1988	A two-year corporate college certified by the Ministry of Health, Labor and Welfare. The curriculum is primarily corporate personnel training covering science and practical skill, focusing on basic skills and knowledge in the first year, and applied skills in the second. 65 students/year
Etre College of Business Arts	Sales staff for domestic (Japan) dealerships.	Nagoya, Osaka and Hiroshima	1991	Practical and specialty training for those from management to new hires. Students (about): 200 (Hiroshima), 50 (Nagoya), 100 (Osaka)
Technical Service Training Center, Mazda Training Center Taibi	Service technicians in Japan and overseas	Hiroshima	1972	Technical training for sales/service staff in Japan and overseas, and business training for domestic (Japan) dealerships. Participants: about 1,600/year
Technical Service Training Center, Mazda training Center Yokohama	Domestic (Japan) service technicians	Kanagawa	2002	Kanagawa 2002 Technical training for service staff at domestic (Japan) dealerships. Participants: about 400/year
Skill Training Center, Hiroshima Plant	Employees	28 locations at Hiroshima Plant	1997	Skill-improvement courses for various levels and fields. Participants: 4,700/year
Nishinoura Education Center, Hofu Plant	Employees	Yamaguchi Prefecture	1982	Training for managers, administrative and technical employees, and skilled employees, etc. About 500 participants/month

## Contribution to Society

In order to earn the trust of society as a good corporate citizen, Mazda is involved in a range of activities contributing to society. In particular, many of these activities take place in the local region, consisting of volunteer efforts and the contribution of willing hands. The Mazda Foundation also makes numerous contributions.

### Basic activity philosophy

In its corporate vision, Mazda has defined its goal as "To create new values and excite and delight our customer through the best automotive products and services." In the pursuit of this corporate goal, and to earn the trust of society as a good corporate citizen, Mazda contributes to society in a variety of ways under the guiding philosophy below.

#### 《Basic philosophy》

To contribute to the increased vitality of local economy and industry through corporate activity, working together with the local region as a good corporate citizen and contributing to a richer community.

#### 《Activity guidelines》

- \* Activity shall be immediately applicable to the needs of the region
- \* Volunteer activity by employees shall be stressed and supported
- \* Activities by multiple Mazda Group companies shall be cooperative
- \* Increase opportunities for interaction between employees and the local community
- \* Activities shall be continuing

### The Mazda Community Services Committee

Mazda believes it is important to develop positive and long-lasting activities that are suited to the needs of the local community in which it operates, as part of its contribution to society. This allows Mazda to share its joy and excitement with others, and to proceed on a course hand in hand with the community. Mazda believes that such community activities are an essential role that the company must play as a good corporate citizen.

To provide a basis for this, Mazda formed the Mazda Community Services Committee in 1993, composed of representatives from related corporate sectors at Mazda and Group companies, and with a company director as chair. Decisions regarding Mazda's community services are made based on the work of this and the Promotions Committee, which handles operations. The main feature of our community service is "The Contribution of Human Resources Matching Regional Needs."

### Active contribution to local society

The core of contribution to local society promoted by the Mazda Community Services Committee is our willing hands, for which reason the following organizations have been established within the Committee.

#### ■ Mazda Specialist Bank

Mazda established the Mazda Specialist Bank in 1994 to assist regional communities in planning and implementing events and activities for which specialist knowledge may be helpful, with the aim of assisting the facilitation of such activities. Employees of Mazda or our group companies with particular knowledge, skills or abilities as well as talents or interests that they have developed over the years, are registered at the Specialist Bank, and are

dispatched in response to requests for help from community members. Registrations are done under four categories of professional specialty (divisional), professional specialty (individual), sports and culture / other, and from these categories employees are dispatched to give lectures on the environment, teach lessons in schools, instruct in issues relating to health management, give sports training, and perform at regional cultural events. Mazda specialists are active in a wide range of community contributions.



Demonstrating disassembly/assembly of new RENESIS rotary engine at the Hiroshima City Transportation Museum

#### ■ Activities of the Mazda Specialist Bank

Year	Dispatches	FY2003 Specialist Bank Activity Breakdown	
1999	329	Society and business	28%
2000	238	Performing arts	30%
2001	196	Environment and technology	10%
2002	263	Health and medicine	15%
2003	225	Sports	5%
		Lectures on international issues and overseas operations	2%
		Other / lectures / guidance	10%

#### ■ The Mazda Volunteer Center

The Mazda Volunteer Center was formed in 1996 to support Mazda employees in their volunteer activities. Company or group employees register at the center if they wish to become involved in volunteer activities, and are dispatched to help regional groups when requests are received for volunteer assistance. In contrast to the Mazda Specialist Bank, whose members use their particular skills to meet regional needs, the Volunteer Center aims to place employees in situations where they will work alongside the people of the local community, in order to gain experience and empathy with local residents. Some examples of work done by volunteers include regional cleanup and environmental improvement activities, as well as assistance at welfare events, hosting visitors from overseas during international exchange events, and helping out at local festivals. Our volunteers are involved in a wide variety of humanitarian contributions to the local community.



"Clean Up Ota River" Campaign

## ■ Exchange with the local community, social welfare and cultural support activities

Mazda stays in close touch with the local community from our core facilities at the Head Office area, Hofu Plant area, Miyoshi office area and Mazda R&D Center area in Yokohama.

### 〈Exchange with the local community〉

#### ■ Opening company facilities

Mazda opens many of its facilities to tours and the general public, helping school children in their social studies programs and promoting exchange with the community.

- Mazda Museum (Head Office area)



This tour facility located at the head office offers exhibitions on Mazda's history, our concept cars, and a model assembly line.

#### ● Plant tours

Mazda offers tours of the Hofu Plant area, the Proving Ground and Engine Plant in the Miyoshi office area, and a variety of technology exhibitions at the Mazda R&D Center area in Yokohama.

#### ● Open sports facilities

The Mazda Gymnasium and Mazda Sports Center in the Head Office area are open to the public.

Mazda also issues the Letter from Mazda, an information paper for the local community, to deepen our relationship through participation in local events, while hosting our own.

### 〈Social welfare〉

● Head Office area: Mazda is continuing the campaign to collect used postcards and prepaid telephone cards to generate funds, and participating in "V-Heart Hiroshima," an organization promoting volunteer activities in Hiroshima Prefecture.

● Mazda R&D Center area in Yokohama: Contribution to social welfare activities through cooperation with the Owners' Club and other groups.

### 〈Environmental Protection〉

● Head Office and Hofu Plant areas: Participation in community clean-up projects, cleaning around our facilities, and continuing of the "Stop Idling" movement (Head Office area).

### 〈Support for sports and cultural activities〉

● Head Office area: Mazda provides financial and personnel assistance to the Hiroshima Toyo Carp baseball and Sanfrecce Hiroshima soccer teams, as well as financial assistance for the All-Japan Men's Ekiden and Hiroshima International Peace Marathon, organizing the Mazda Community Ekiden Road Relay Race, and providing financial assistance for the Hiroshima Symphony Orchestra.

● Hofu Plant area: Hosting the Mazda Youth Soccer Cup and other sports events.

### 〈Participation in local events〉

● Hofu Plant area: 35 companies with plants in Hofu City launched the "I Love Hofu" project in April 1993 designed to work together with the local community to contribute to a more vital city. The Hofu Plant General Affairs Department serves as the secretariat for the organization.

### 〈Cooperation in disaster control〉

Through cooperative disaster-control agreements with the local area, the fire-fighting teams of the Head Office area are available for emergencies offsite. Training is held cooperatively with local fire-fighting organizations.

## ■ Support for international exchange at the high school level

As part of its support for international exchange, Mazda has offered the Mazda/YFU Scholarship Program since 1984, cooperatively with the Youth for Understanding group headquartered in the United States. Designed to provide students in Japan and America with the opportunity to experience a foreign culture and develop an international perspective, high school students from America are invited to Japan for about six weeks from mid-June to early August.

On July 30, 2004, the YFU/Mazda Scholarship Summer Activities were held at our Head Office, welcoming 10 American high school students and 23 host family members to a tour of the Mazda Museum, a Zoom-Zoom sketch session and a talk with the president.

# The Mazda Foundation

## ■ Activities of the Mazda Foundation

The Mazda Foundation

Mazda established the Mazda Foundation in 1984 to promote science and technology, help nurture young people, and contribute to the creation of a society where the peoples of the world can prosper together and lead enriching lives. The assistance provided thus far by the foundation totaled 1,023 grants and 970.41 million yen, as of April 1, 2004.

The Foundation was involved in the following activities in fiscal 2003.

### ■ Promotion of science and technology

#### ● Research grants

The Foundation provides grants in both basic and applied research with priority in two key sectors, recycling and resource management engineering and support for young researchers. The major objective is to help universities and research institutions throughout Japan resolve issues faced today and in the future.

A total of 32 projects were funded in fiscal 2003, including research into a welfare robot designed to assist arm motion by the disabled, and research into the mechanism of pollutant transport promotion by colloidal soil particles.

#### ■ Breakdown of research grants by field

Field	Fiscal 2003	
	Number of applications received	Number of grants funded
Materials	116	13
Electronics and information	52	6
Precision and machinery	50	6
Recycling and resource management engineering	59	7
Total	277	32

(Left quantity is number of applications received and right is quantity funded. Field as of time of application.)

#### ● Waku-Waku Science Project

In an effort to help reverse the present trend of youth showing a dislike for science, Mazda launched the Waku-Waku Science Project together with Hiroshima University in fiscal 2003, to expose school children to the wonder and fascination of science. Major activities in fiscal 2003 included the following:

- Science lecture on "Exploring deep space" (for junior high school students)
- Junior Science Academy on "Advancing optical technology" (for junior high school students)
- Trial implementation of the "Elementary School Science Network" designed to promote information exchange related to science experiments and observations.

#### ● Funding for research groups and professional societies

This research funding is made available to young researchers in the Chugoku and Shikoku regions of Japan for projects contributing to the promotion of science and technology. Ten grants were given in fiscal 2003, including the 15th Chigoku-Shikoku Heat Transmission Seminar.

### ■ Support for healthy development of youth

#### ● Research grants

Designed to promote research at universities and research institutions in Japan contributing to the sound development of the youths who will build the future, this program stresses tie-ups with initiatives by the general public and especially on research aiming to revitalize activity by the citizens. Four grants were given in fiscal 2003, including one exploring "Potential for Extracurricular Activity as a Learning Community."

#### ■ Outline of research grants

Research objectives and outlines	Lead researcher	Grant (10,000 yen)
Sociological research into spirituality and the development of altruistic attitudes in young volunteers participating in charitable work	Yoshinobu Inaba Assoc. Prof., Faculty of Human Development, Kobe University	100
Research into development of class materials for the "General Education" course, oriented toward applied mathematics and science, and incorporation of community service into course content	Aiko Itoh Lecturer, School of Engineering, Kinki University	70
Potential for extracurricular activity as a learning community—New community creation centered on the university as an educational resource	Noboru Takahashi Assoc. Prof., Faculty of Education, Osaka Kyokai University	80
Effects of volunteer activity by high school students on infection by sexually-transmitted disease and health-related activities—Results of regional AIDS-related volunteer work	Yasuhide Nakamura Prof., Human Sciences Osaka University Graduate School	50
Total 4		300

#### ● Support for activity by the general public

Designed to promote the sound development of young people of the next generation, this support is provided to organizations in Hiroshima and Yamaguchi prefectures involved in the field, consisting of provision of funding, personnel and expertise. Some 21 activities were supported in fiscal 2003, including an after-school club for disabled children and an experiential school for parent-child participants.

### ■ University chairs

In cooperation with firms including Chugoku Electric Power, IBM Japan, Recruit, the Hiroshima City Citizen and Community Network Foundation and the Career Design Office, Mazda has funded chairs at Hiroshima University Graduate School and four other regional universities. The common key themes are "a flexible society," "the finite nature of the earth," "love for humankind," and "globalization," and the objective is to foster the perspectives and capabilities required of members of society and the corporation.

## ■ Activity overseas

### ■ Mazda Foundation USA

Established in 1990 to allow us to better contribute to American society as a good corporate citizen, the Foundation provides support related to education, such as education fees, literacy programs and extracurricular activities. From fiscal 1998 a program was added to help support volunteers involved in environmental protection.

### ■ Mazda Foundation Australia

Established in 1990 to provide assistance in youth education, promote science and technology and support protection of the natural environment, the foundation contributes to a spiritually richer lifestyle for Australians. Financial support is provided from funds provided by Mazda Australia, Mazda dealerships and contributions from outside sources.

# Company Outline

## Company Outline

- Company Name: Mazda Motor Corporation
- Established: January 30, 1920
- Representative: CEO and President Hisakazu Imaki
- Capital: 120.07805 billion yen (as of April 1, 2004)
- No. of employees: 19,458 (as of April 1, 2004)
- Major business lines: Manufacture and sale of passenger cars and commercial vehicles

● Head Office: 3-1 Shinchu, Fuchu-cho, Aki-gun, Hiroshima 730-8670 Japan

● Main business premises:

<Japan> Head Office / Tokyo Head Office / Osaka Branch / Hofu Plant / Miyoshi office / Mazda R & D Center (Yokohama) / Mazda Technical Service Center (Tokyo) / Mazda Technical Service Center (Nagoya) / Mazda Technical Service Center (Osaka) / Mazda Technical Service Center (Hiroshima) / Mazda Rotary Shin-Umeda

<Overseas> Beijing Office

● Domestic Manufacturing Bases

Head Office Plant / Miyoshi Plant / Hofu Plant

● Research and Development Bases

<Japan> Head Office Research & Development / Mazda R & D Center (Yokohama)

<Overseas> Mazda Motor of America / Mazda Motor Europe (Germany)

● Production volume: 811,333 units (during FY2003, non-consolidated)

● Turnover: 2,916.1 billion yen (during FY2003, consolidated)

● Units sold: 1.225 million units (during FY2003, consolidated)

● Operating profits: 70.2 billion yen (during FY2003, consolidated)

● Ordinary profits: 58.0 billion yen (during FY2003, consolidated)

● Net Income: 33.9 billion yen (during FY2003, consolidated)

## Main subsidiaries and affiliates

■ **Domestic subsidiaries** | Mazda Autozam, Inc., Kurashiki Kako Co., Ltd., Toyo Advanced Technology Co., Ltd., Microtechno Co., Ltd., Mazda Ace Co., Ltd., Mazda E & T Co., Ltd., Mazda Chuhan Co., Ltd., Mazda Butsuruyu Co., Ltd.,\*1 Mazda Car Rental Corporation,\*2 Malox Co., Ltd.

■ **Domestic affiliates** | Japan Climate Systems Co., Ltd., Yoshiwa Industrial Co., Ltd.

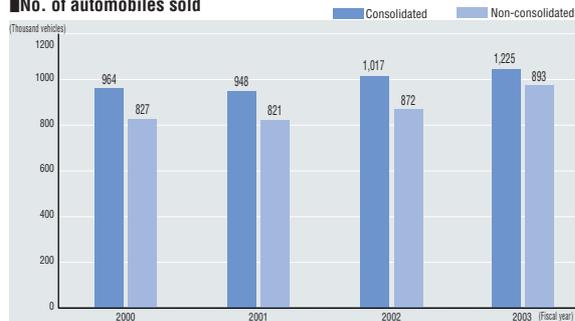
■ **Overseas subsidiaries** | Mazda Motor of America Inc. / Mazda Canada Inc. / Mazda Motors Europe GmbH / Mazda Motors (Deutschland) GmbH / Mazda Motor Logistics Europe N.V. / Mazda Motors UK Ltd. / Mazda Automobiles France S.A.S. / Mazda Suisse S.A. / Mazda Automobiles España S.A. / Mazda Motor de Portugal Lda. / Mazda Motor Italia S.p.A. / Mazda Austria GmbH / Mazda Sales Thailand Co., Ltd. / Compañia Colombiana Automotriz S.A. / Mazda Australia Pty. Ltd. / Mazda Motors of New Zealand Ltd.

■ **Overseas affiliates** | Auto Alliance International Inc. / AutoAlliance (Thailand) Co., Ltd.

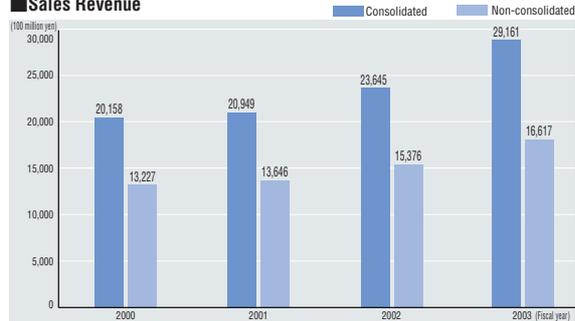
\*1 Merged October 1, 2004

\*2 Stock sold on September 7, 2004

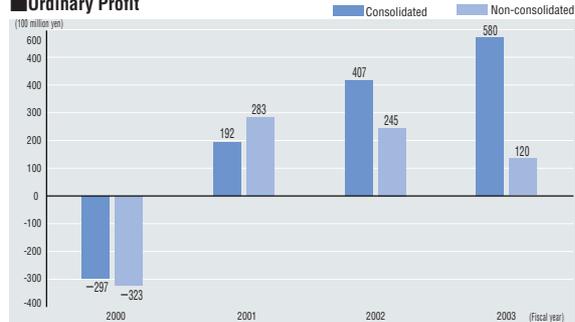
## No. of automobiles sold



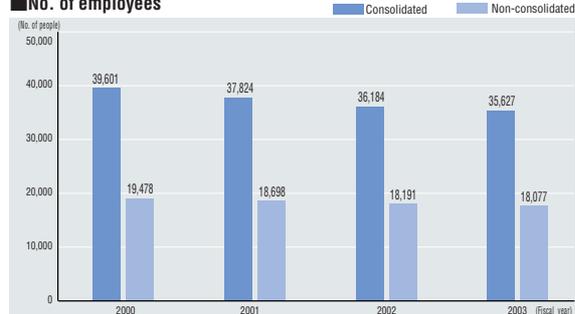
## Sales Revenue



## Ordinary Profit



## No. of employees



Employee data excludes personnel assigned to work at other companies.  
Note: Financial data affected by changes in the financial accounting period for 15 major overseas subsidiaries. Compared to the practice used last year, consolidated automobiles sold is 149,000 higher, and consolidated sale revenue is 341.4 billion yen higher.

# Environmental Data

## Environmental Data for New Models / Redesigned Models (Passenger Cars)

\*Data selected for typical version of each model

(As of April 2004)

Name		Demio	Axela	MPV	Atenza Sedan	Atenza Sport	Atenza Sport Wagon
Specifications	Vehicle type	DBA-DY3W	DBA-BK5P	CBA-LW3W	CBA-GGEP	CBA-GGES	CBA-GYEW
	Model	ZJ	ZY	L3	LF	LF	LF
	Type	in-line 4 DOHC 16V	in-line 4 DOHC 16V	in-line 4 DOHC 16V	in-line 4 DOHC 16V	in-line 4 DOHC 16V	in-line 4 DOHC 16V
	Engine Displacement (cc)	1348	1498	2260	1998	1998	1998
	Fuel	Unleaded regular	Unleaded regular	Unleaded regular	Unleaded regular	Unleaded regular	Unleaded regular
	Fuel supply system	EGI	EGI	EGI	EGI	EGI	EGI
	Drive	FF	FF	FF	FF	FF	FF
	Transmission	4AT	4AT	4AT	4AT	4AT	4AT
	Vehicle weight (kg)	1080	1210	1630	1310	1370	1370
	Passenger quota	5	5	7	5	5	5
Fuel economy	Fuel efficiency at 10.15 mode (km/L)	17.6	16.8	11.6	14.0	14.0	14.0
	Compliance with Japanese 2010 fuel efficiency standards	+5%	+5%	+5%	+5%	+5%	+5%
	Key measures for fuel efficiency improvement	Variable valve timing, torque converter with lockup function	Variable valve timing, motorized power steering, torque converter with lockup function	Torque converter with lockup function	Torque converter with lockup function	Torque converter with lockup function	Torque converter with lockup function
Exhaust emissions	Regulations complied with	2005	2005	2005	2005	2005	2005
	Low Emission Vehicle	SU-LEV	SU-LEV	U-LEV	U-LEV	U-LEV	U-LEV
	CO (g/km) [10.15+11mode]	1.15	1.15	1.15	1.15	1.15	1.15
	HC (g/km) [10.15+11mode]	0.013	0.013	0.025	0.025	0.025	0.025
	NOx (g/km) [10.15+11mode]	0.013	0.013	0.025	0.025	0.025	0.025
	Low pollution vehicle (local government*)	Yes	Yes	Yes	Yes	Yes	Yes
External noise	Regulation complied with	1998	1998	1998	1998	1998	1998
	Regulation value complied with (dB(A))	76	76	76	76	76	76
Greenhouse gases	Air conditioner refrigerant	HFC-134a	HFC-134a	HFC-134a	HFC-134a	HFC-134a	HFC-134a
	Amount of refrigerant used (g)	470	500	800	430	430	430
	CO <sub>2</sub> emissions (g/km)	134	140	203	168	168	168
Recycling	Parts using easily recycled materials	Bumper and interior materials use easily recycled thermosetting plastic	Bumper and interior materials use easily recycled thermosetting plastic	Bumper and interior materials use easily recycled thermosetting plastic	Bumper and interior materials use easily recycled thermosetting plastic	Bumper and interior materials use easily recycled thermosetting plastic	Bumper and interior materials use easily recycled thermosetting plastic
	Parts using recycled PP from bumpers, etc.	Splash shield	Engine under-cover, etc.	Rear bumper	Footrest	Footrest	Footrest
	Material marked on plastic parts	Yes	Yes	Yes	Yes	Yes	Yes
Lead usage Compared to 1996		1/3 or less	1/3 or less	1/2 or less	1/3 or less	1/3 or less	1/3 or less

\*7 metropolitan prefectures and cities, 6 prefectures and cities

● See the Mazda website for data on other models, at <http://www.mazda.com>

## Shipments of Low-Emission Vehicles

■ Shipments of low-emission vehicles (fiscal 2003)

		Passenger cars		Trucks		Total
		Full-size and compact cars	micro-mini Vehicles	Full-size and compact cars	micro-mini Vehicles	
Low-emission vehicles	Electric	0	0	0	0	0
	Hybrid	0	0	0	0	0
	Natural gas	0	0	14	0	14
	Methanol	0	0	0	0	0
Vehicles received good fuel economy, low emission rating*	75% lower than 2005 exhaust emissions standards ☆☆☆	0	0	0	0	0
	50% lower than 2005 exhaust emissions standards ☆☆☆	3,798	0	0	0	3,798
	75% lower than 2000 exhaust emissions standards ☆☆☆	110,274	25,439	3,451	254	139,418
	50% lower than 2000 exhaust emissions standards ☆☆☆	126	3,638	0	7,675	11,439
	25% lower than 2000 exhaust emissions standards ☆	11,512	187	0	0	11,699
	(LPG-fueled diesel replacement vehicles)	—	—	136	—	136
Total		125,710	29,264	3,601	7,929	166,504

\* Vehicles certified as meeting fuel efficiency standard defined in the Energy Conservation Law in advance of the deadline and which are also certified as low-emission vehicles.

## Site report: Hiroshima Area

### [Head office plant]

- Address: 3-1 Shinchi, Fuchu-cho, Aki-gun, Hiroshima, Japan
- Operation started: March 1931
- Major products: Passenger cars, commercial vehicles, trucks, engines, manual transmissions for passenger cars
- Employees: 14,331 (as of end March 2004)
- ISO14001 certification: June 2000
- Site area and floorspace: 2,247,000 square meters; 1,796,000 square meters

### [Miyoshi office]

- Address: 551-1 Higashi-sakaya-cho, Miyoshi City, Hiroshima, Japan
- Operation started: May 1974
- Major products: Major product: Engines
- Employees: 158 (as of end March 2004)
- ISO14001 certification: June 2000
- Site area and floorspace: 1,667,000 square meters; 64,000 square meters

### Basic environmental policy for the Hiroshima Area

The basic environmental policy in the Hiroshima Area calls for conservation of resources and energy, working toward clean business activity in harmony with society and the local region. Concretely, our efforts are designed to reduce environmental impact through reduction and wastes tonnage and energy consumption, while the employees of the Hiroshima region join other Mazda Group companies in a range of environmental activities.

(Masaharu Yamaki, Managing Executive Officer)



■ Hiroshima Plant



## Environmental data for fiscal 2003

### [Head office plant]

Atmospheric pollutants		Units	Regulation	Actual (max.)
NOx	Boilers	ppm	300	180
			230	220
	Drying ovens	ppm	150	32
			250	160
	Melting furnaces	ppm	180	100
	Diesel engines	ppm	950	800
	Heating furnaces	ppm	200	45
			180	30
150	62			
Incinerators	ppm	450	110	
Ash	Boilers	g/m <sup>3</sup> N	0.20	0.0290
			0.25	0.18
	Drying ovens	g/m <sup>3</sup> N	0.10	0.0062
			0.3	0.029
	Melting furnaces	g/m <sup>3</sup> N	0.35	0.044
			0.20	0.16
	Diesel engines	g/m <sup>3</sup> N	0.10	0.024
			0.25	0.025
0.20	0.028			
Incinerators	g/m <sup>3</sup> N	0.25	0.22	
SOx	K regulation	-	7	2.8
Hydrogen chloride	Waste incinerators	mg/m <sup>3</sup> N	700	7
Dioxin	Waste incinerators	ng-TEQ/m <sup>3</sup> N	10	0.56

### Wastewater drainage to Enko River and Kaita Bay

Water pollutants	Units	Regulation	Actual		
			Max.	Min.	Avg.
pH (freshwater)	-	5.8-8.6	7.6	6.9	7.2
pH (seawater)	-	5.5-9.0	7.5	6.8	7
BOD	mg/l	120	5.4	ND	<2.1
COD	mg/l	15	12.6	2.2	5.9
SS	mg/l	150	8.7	ND	<3.1
Oil	mg/l	5	1.6	ND	<0.6
Copper	mg/l	3	0.01	ND	<0.01
Fluorine (freshwater)	mg/l	8	0.5	ND	<0.2
Fluorine (seawater)	mg/l	15	5.1	0.2	2.1
Zinc	mg/l	5	1.6	0.02	0.3
Soluble manganese	mg/l	10	0.6	ND	<0.4
Total nitrogen	mg/l	60	9.3	1	3.9
Total phosphorus	mg/l	8	3.7	0.01	1.1
Coliform groups	mg/l	3000	1820	0	149
Phenol	colonies/cm <sup>3</sup>	5	0.07	ND	<0.02
Chromium	mg/l	2	0.04	ND	<0.02
Boric acid (freshwater)	mg/l	10	0.33	0.28	0.31
Boric acid (seawater)	mg/l	230	0.78	0.29	0.54
Ammonia, ammonium, nitrous acid and nitrous acid compounds	mg/l	100	2.7	0.9	1.6

The following regulated substances were not detected: cadmium, cyanogen, lead, hexavalent chromium, arsenic, mercury, alkyl mercury, PCB, trichloroethylene, tetrachloroethylene, dichloromethane, carbon tetrachloride, 1,2-dichloroethane, 1,1-dichloroethylene, cis 1,2-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,3-dichloropropane, thiuram, simazine, thiobencarb, benzene, selenium, and soluble iron.

## PRTR (Pollution Release and Transfer Register) for fiscal 2003

(\* indicates Class 1 Designated Chemical Substance of which 500 kg/year or more are handled)  
(Other indications are of Class 1 Designated Chemical Substances of which 1000 kg/year or more are handled)

### [Head office plant]

(Units: kg/year, except for dioxin which is mg - TEQ/year)

Substance No.	Substance group	Amount handled	Volume emitted			Total	Amount consumed	Amount disposed	Amount transferred	
			Air	Water	Soil				Waste product	Recycled
1	Water-soluble zinc compounds	16,754	0	183	0	183	12,824	0	3,747	0
16	2-aminoethanol	2,609	0	0	0	0	0	2,609	0	0
29	4,4'-isopropylidenediphenol	3,126	0	0	0	0	0	3,126	0	0
30	Polymer of 4,4'-isopropylidenediphenol and 1-chloro-2,3-epoxypropane	3,714	0	0	0	0	3,714	0	0	0
40	Ethyl benzene	219,207	120,246	0	0	120,246	45,569	53,392	0	0
43	Ethylene glycol	1,113,215	6	0	0	6	1,113,209	0	0	0
63	Xylene	1,121,314	547,118	0	0	547,118	210,793	260,683	0	102,720
68	Chromium and trivalent chromium compounds	107,806	0	0	0	0	101,413	0	6,381	12
69*	Hexavalent chromium compounds	15,599	0	0	0	0	9,218	6,381	0	0
179*	Dioxins	73.47	63	0.67	0	63.67	0	0	9.8	0
198	1,3,5,7-tetraazetoricyclo [3.3.1.1 <sup>3,7</sup> ] decane	108,595	0	0	0	0	0	108,595	0	0
224	1,3,5-trimethylbenzene	44,152	14,288	0	0	14,288	12,355	17,509	0	0
227	Toluene	1,168,967	282,466	0	0	282,466	405,917	449,566	0	31,018
231	Nickel	33,121	0	0	0	0	33,109	0	0	12
232*	Nickel compounds	2,823	0	341	0	341	971	0	1,511	0
253	Hydrazine	1,271	0	0	0	0	0	1,271	0	0
266	Phenol	822,209	20	24	0	44	0	822,165	0	0
272	Bis(2-ethylhexyl) phthalate	4,593	0	0	0	0	4,455	138	0	0
299*	Benzene	32,649	117	0	0	117	17,826	14,706	0	0
310	Formaldehyde	312,317	4,473	0	0	4,473	0	307,844	0	0
311	Manganese and its compounds	32,436	0	253	0	253	30,642	0	1,437	104
346	Molybdenum and its compounds	6,464	0	0	0	0	3,497	0	2,967	0

## Environmental data for fiscal 2003

### [Miyoshi office]

### Wastewater drainage to Basen River

Atmospheric pollutants		Units	Regulation	Actual (max.)
NOx	Boilers	ppm	250	150
	Diesel engines	ppm	950	820
Ash	Boilers	g/m <sup>3</sup> N	0.30	0.075
	Diesel engines	g/m <sup>3</sup> N	0.10	0.057
Sox	K regulation	-	17.5	6.3

Water pollutants	Units	Regulation	Actual		
			Max.	Min.	Avg.
pH	-	5.8-8.6	7.7	7.2	7.6
BOD	mg/l	70	4.4	0.7	2.6
SS	mg/l	70	6.5	ND	<3.9
Oil	mg/l	5	0.7	ND	<0.5
Fluorine	mg/l	8	0.2	0.2	0.2
Zinc	mg/l	5	0.05	0.05	0.05
Soluble iron	mg/l	10	0.3	0.3	0.3
Soluble manganese	mg/l	10	0.6	0.1	0.3
Total nitrogen	mg/l	60	2.1	2.1	2.1
Total phosphorus	mg/l	8	0.04	0.04	0.04
Coliform groups	colonies/cm <sup>3</sup>	3000	302	1	105
Boric acid	mg/l	10	0.05	0.04	0.04
Ammonia, ammonium, nitrous acid and nitrous acid compounds	mg/l	100	1	1	1

The following regulated substances were not detected: cadmium, cyanogen, organic phosphorus, lead, hexavalent chromium, arsenic, mercury, alkyl mercury, PCB, trichloroethylene, tetrachloroethylene, dichloromethane, carbon tetrachloride, 1,2-dichloroethane, 1,1-dichloroethylene, cis-1,2-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,3-dichloropropene, thiuram, simazine, thiobencarb, benzene, selenium, copper, phenol and chromium.

## PRTR (Pollution Release and Transfer Register) for fiscal 2003

(\* indicates Class 1 Designated Chemical Substance of which 500 kg/year or more are handled)  
(Other indications are of Class 1 Designated Chemical Substances of which 1000 kg/year or more are handled)

### Miyoshi office

(Units: kg/year, except for dioxin which is TEQ/year)

Substance No.	Substance group	Amount handled	Volume emitted			Total	Amount consumed	Amount disposed	Amount transferred	
			Air	Water	Soil				Waste product	Recycled
40	Ethyl benzene	8,011	27	0	0	27	0	7,984	0	0
63	Xylene	37,380	127	0	0	127	0	37,253	0	0
224	1,3,5-trimethylbenzene	2,350	7	0	0	7	0	2,343	0	0
227	Toluene	72,991	196	0	0	196	0	72,795	0	0
299*	Benzene	3,092	11	0	0	11	0	3,081	0	0

## Site report: Hofu Plant

### [Nishinoura district]

- Address: 888-1 Nishinoura, Hofu City, Yamaguchi, Japan
- Operation started: September 1982
- Major products: Passenger cars
- Employees: 3,159 (as of end March 2004/including Nakanoseki)
- ISO14001 certification: September 1998
- Site area and floorspace: 792,000 square meters; 297,000 square meters

### [Nakanoseki district]

- Address: 415-8 Hamakata, Hofu City, Yamaguchi, Japan
- Operation started: December 1981
- Major products: Transmissions
- ISO14001 certification: September 1999
- Site area and floorspace: 537,000 square meters; 100,000 square meters

### Basic environmental policy for the Hofu Plant

The basic environmental policy for the Hofu Plant calls for conservation of resources and energy, working toward clean business activity that is kind to people and the global environment. While operation continues at a high level, we are reducing the environment impact of our activities by slashing the use of organic solvents through the world's first Three Layer Wet Paint System, and reducing energy consumption. We will continue to work with the rest of Mazda Group in strengthening and expanding our environmental protection activities.

(Masamichi Kogai, Executive Officer and Hofu Plant Manager)



■ Hofu Plant



## Environmental data for fiscal 2003

### [Nishinoura District]

Atmospheric pollutants		Units	Regulation	Actual (max.)
NOx	Boilers	ppm	150	140
			250	29
	Drying ovens	ppm	230	220
Ash	Boilers	g/m <sup>3</sup> N	0.25	0.096
			0.20	0.0055
			0.10	0.002
	Drying ovens	g/m <sup>3</sup> N	0.35	0.027
			0.30	0.056
			0.20	0.023
SOx	K regulation	-	4.5	1.4
	Total regulation	m <sup>3</sup> N/h	52.66	5.68

### Wastewater drainage to Oumi Bay

Water pollutants	Units	Regulation	Actual		
			Max.	Min.	Avg.
pH	-	5.0~9.0	6.9	5.8	6.4
BOD	mg/ℓ	40	15	3.5	9.3
SS	mg/ℓ	30	7.9	ND	<2.3
Oil	mg/ℓ	2	0.6	ND	<0.5
Copper	mg/ℓ	3	0.03	ND	<0.02
Zinc	mg/ℓ	5	0.09	0.02	0.06
Total nitrogen	mg/ℓ	60	20	1.1	3.9
Total phosphorous	mg/ℓ	8	6.8	0.18	2.2
Coliform groups	colonies/cm <sup>3</sup>	3000	30	25	28
Phenol	mg/ℓ	5	0.02	ND	<0.02
Boric acid	mg/ℓ	230	0.2	0.1	0.15
Fluorine	mg/ℓ	15	1.1	0.92	1
Ammonia, ammonium, nitrous acid and nitrous acid compounds	mg/ℓ	100	3.9	2.5	3.2

The following regulated substances were not detected: cadmium, cyanogen, organic phosphorus, lead, hexavalent chromium, arsenic, mercury, alkyl mercury, PCB, trichloroethylene, tetrachloroethylene, dichloromethane, carbon tetrachloride, 1,2-dichloroethane, 1,1-dichloroethylene, cis 1,2-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,3-dichloropropene, thiuram, simazine, thiobencarb, benzene, selenium, chromium, copper, soluble manganese and soluble iron.

## [Nakanoseki District]

Atmospheric pollutants		Units	Regulation	Actual (max.)
NOx	Boilers	ppm	180	84
Ash	Boilers	g/m <sup>3</sup> N	0.30	0.014
	Heating furnace	g/m <sup>3</sup> N	0.25	0.002
			0.20	0.0044
Melting furnaces	g/m <sup>3</sup> N	0.20	0.009	
SOx	K regulation	K	4.5	0.59
	Total regulation	m <sup>3</sup> N/h	27.90	1.30

## Wastewater drainage to Oumi Bay

Water pollutants	Units	Regulation	Actual		
			Max.	Min.	Avg.
pH	-	5.0-9.0	7.9	6.9	7.6
COD	mg/l	40	19	4.4	8.5
SS	mg/l	30	11	ND	<0.5
Oil	mg/l	2	0.8	ND	<0.5
Zinc	mg/l	5	0.14	0.07	0.11
Total nitrogen	mg/l	60	11	1.9	4.9
Total phosphorous	mg/l	8	0.42	0.14	0.28
Coliform groups	colonies/cm <sup>3</sup>	3000	80	8	44
Boric acid	mg/l	230	0.3	0.3	0.3
Fluorine	mg/l	15	ND	ND	<0.1
Ammonia, ammonium, nitrous acid and nitrous acid compounds	mg/l	100	7.9	3.5	5.7

The following regulated substances were not detected: cadmium, cyanogen, lead, hexavalent chromium, arsenic, mercury, trichloroethylene, tetrachloroethylene, dichloromethane, carbon tetrachloride, 1,2-dichloroethane, 1,1-dichloroethylene, cis 1,2-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,3-dichloropropene, thiuram, simazine, thiobencarb, benzene, selenium, copper, soluble iron, soluble manganese, chromium and phenol.

## PRTR (Pollution Release and Transfer Register) for fiscal 2003

(\* indicates Class 1 Designated Chemical Substance of which 500 kg/year or more are handled)  
(Other indications are of Class 1 Designated Chemical Substances of which 1000 kg/year or more are handled)

## [Nishinoura District]

[Nishinoura District]

Substance No.	Substance group	Amount handled	Volume emitted				Amount consumed	Amount disposed	Amount transferred	
			Air	Water	Soil	Total			Waste product	Recycled
1	Water-soluble zinc compounds	14,798	0	232	0	232	12,970	0	1,596	0
30	Polymer of 4,4'-isopropylidenediphenol and 1-chloro-2,3-epoxypropane	2,013	0	0	0	0	2,013	0	0	0
40	Ethyl benzene	165,195	79,025	0	0	79,025	68,138	11,504	0	6,528
43	Ethylene glycol	1,345,593	8	0	0	8	1,345,585	0	0	0
63	Xylene	909,781	324,976	0	0	324,976	323,727	48,073	0	213,005
224	1,3,5-trimethylbenzene	38,122	9,881	0	0	9,881	27,015	1,226	0	0
227	Toluene	1,015,644	255,747	0	0	255,747	682,801	42,215	0	34,881
232*	Nickel compounds	2,833	0	343	0	343	975	0	1,515	0
272	Bis(2-ethylhexyl) phthalate	15,481	0	0	0	0	15,017	464	0	0
299*	Benzene	24,971	88	0	0	88	24,591	292	0	0
311	Manganese and its compounds	4,603	0	261	0	261	2,853	0	1,486	3

## [Nakanoseki District]

None (amounts of Designated Chemical Substances defined under the PRTR Law were all below levels requiring reporting).

## Third-Party Opinion



From my position as a party providing corporate information dealing with social responsibility to financial institutions, I have been asked to present a third-party statement on activities by Mazda Motor Corporation in this regard, as evidenced in this publication.

First, concerning the Mazda policy for information disclosure, I would like to point out that the name for the fiscal 2003 version was "Environmental Report," but for fiscal 2004 it has been changed to "Social & Environmental Report." The content has been changed accordingly to include reports on Mazda's interactions with its customers, its dealers and its employees, and I must praise this effort to more effectively respond to stakeholder concerns. Second, I think Mazda has made a major step forward by quantifying the results of their efforts.

Concerning the actual environmental protection activities reported by Mazda, I believe that a shift in emphasis is occurring in the automobile industry today with respect to the environment. Instead of merely focusing on environmental impact caused by the production process, more attention is being paid to the overall approach, including points such as how to minimize environmental impact in actual use, how to work with suppliers in achieving these goals, and how to dispose of end-of-life vehicles in the most environment-friendly manner.

The discussion of the hydrogen-fueled rotary engine in this publication is of extreme interest, and I believe that Mazda will accelerate its efforts to take advantage of the superiority of the rotary engine design in hydrogen-fueled vehicles.

A growing number of suppliers are working with Mazda under its Green Procurement plan, as evidenced by a number of concrete examples in this publication, along with honest evaluations of problems

encountered. Mazda can be expected to remain a front-runner in the field even as new laws are enacted and the legal environment evolves.

The section on activities in the social sector is being offered for the first time this year, and I hope that Mazda will increase the range of topics covered in future publications. It is also crucial that the firm remain sensitive to social issues. The discussion of vehicles developed for social welfare needs made quite an impression on me, but at the same time I think not only drivers, but all stakeholders who might be involved in traffic accidents or traffic congestion should be more aware of safety issues. Concerning social responsibility as related to dealers, I think additional emphasis on the responsibility to provide customers with complete explanations is necessary.

The World Business Council for Sustainable Development (WBCSD) issued a report on sustainable development this year, and recommended a direction for corporate activity in it, stating "Factoring in all these findings, it appears to the [Sustainable Mobility Project] that the present system of mobility is not sustainable, nor is it likely to become so if present trends continue... (section omitted) This is true, in particular, if mobility is to be made sustainable in the developing world."

I have high hopes for the Mazda approach, which maps out methods of maintaining an appropriate balance with short-term economic responsibilities while achieving sustainable development for both society and self.

### Eiichiro Adachi

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Note: The above third-party statement is not intended to evaluate the utility or reliability of processes related to collection or reporting of information in this publication.

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