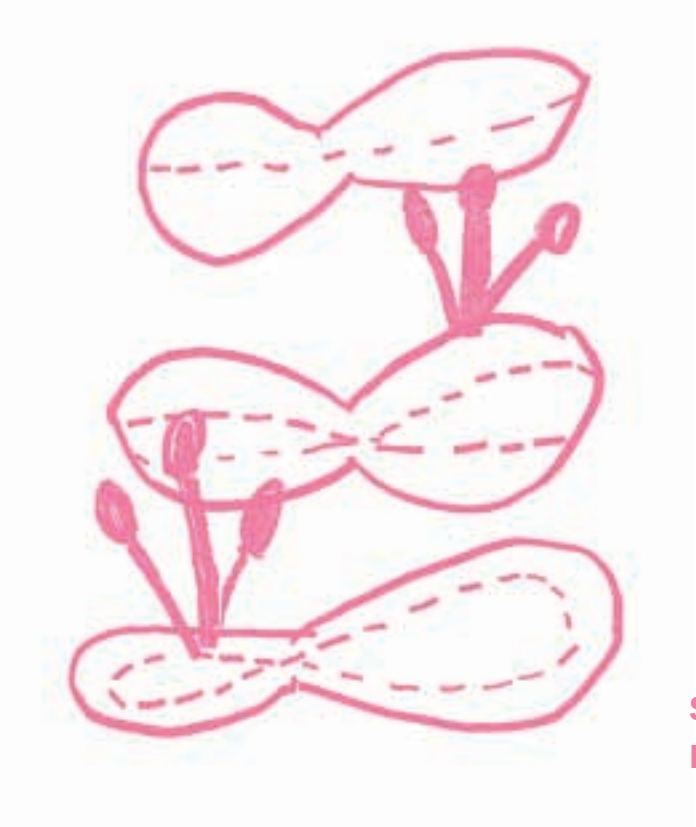


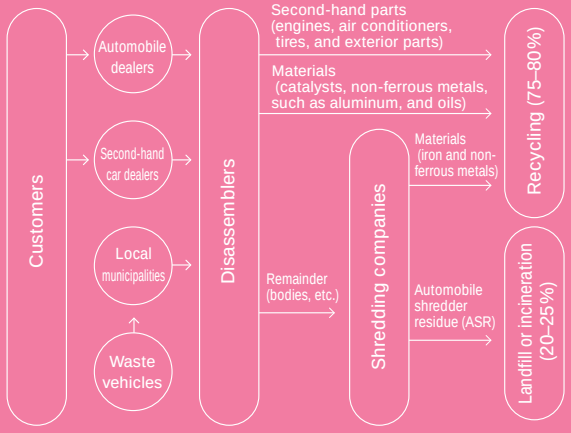
Section 4
Disposal and Recycling

Honda ECOLOGY 4

“From Cradle to Cradle” Pursing further recycling possibilities

Presently in Japan, approximately 5 million vehicles are annually wasted as end-of-life vehicles, of which approximately 4 million are disposed of within the country and 75–80% of them are recycled in terms of weight.
In recent years, the remaining 20–25% of shredder residues have become a problem in the lack of landfill sites and in the conversion to a recycling-based society, and people are increasingly demanding the proper disposal of these residues. To solve this problem, the End-of-Life Vehicle Recycling Law was enacted in 2002. Under these circumstances, Honda is continuing to implement aggressive measures to minimize the use of substances with environmental impacts and the amount of landfill waste, and promote the recycling of resources at every stage of its products’ lifecycles, including development, production, use, and waste.

Recycling flow of end-of-life vehicles (ELVs)



Consideration for Product Recyclability from the Product Development Stage

To promote recycling, Honda gives full consideration to product recyclability right from the earliest development stage. At the development stage, we strictly evaluate our products from the following three “R” aspects: Reduce, Reuse, and Recycle. Further, we use environment-friendly materials and structures for our products.

Consideration for recyclability at the development stage

1983
Consistent use of polypropylene (PP) bumpers, which can be easily recycled

1992
Clear indication of materials weighing 100 grams or heavier on all the products to make it easier to sort end-of-life products for recycling (Since 1999, names of materials weighing 5 grams or heavier have been indicated.)

1996
Introduction of bumpers that can be easily dismantled

1997
Improvement of recyclability by using only olefin materials for instrument panels instead of composites

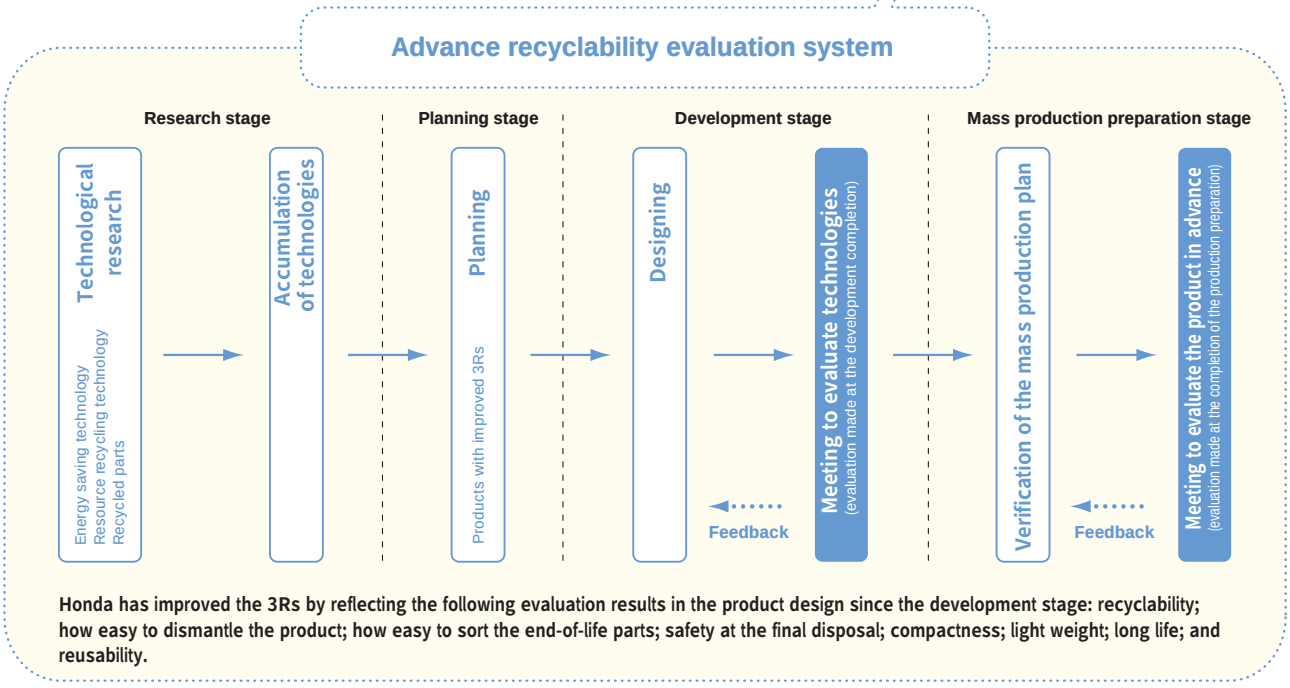
1998
Introduction of an integrated design for faster and more appropriate disposal of the air bags of end-of-life vehicles (ELVs)

Advance recyclability evaluation system

1992
>> Commencing introduction of an advance evaluation system for the recyclability of motorcycles

1994
>> Starting the introduction of an advance recyclability evaluation system for automobiles

2001
>> Improving the advance recyclability evaluation system based on the “3Rs”



Honda has improved the 3Rs by reflecting the following evaluation results in the product design since the development stage: recyclability; how easy to dismantle the product; how easy to sort the end-of-life parts; safety at the final disposal; compactness; light weight; long life; and reusability.

1 Product design based on the “3Rs”

Honda aims to reduce waste as far as possible and to minimize the environmental impacts of its production activities by adopting the “3R” concept in its product design.

●“Reduce”
means to reduce waste by making parts smaller, lighter, more durable, and easily repairable, which requires a design that provides sufficient functions with fewer resources.

●“Reuse”
means to reuse resources that were wasted in the past, thus reducing waste, which requires a design that enables easy dismantling and longer product lives.

●“Recycle”
means that materials that were wasted are once again used as materials, which also requires a design that enables easy dismantling and longer product lives. It is also important that materials that can be easily recycled are used for those parts that will be dismantled.

It is also necessary to design products for which the use of substances that do have an environmental impact can be reduced to the minimum.

Recycled materials need to be used as much as possible. They can be used to make new parts and thereby the use of new materials can be reduced, which contributes to the efficient use of resources.

Examples of "reduced" design

Downsizing side protectors

Traditional design: core metal of iron plate + PVC

Reduced design: PP integrated hollow casting

Side protector braids were traditionally made from metal and resin. For the CR-V, however, only polypropylene materials are used. Downsizing by gas assist injection molding made it possible to reduce the amount of materials used while maintaining the necessary rigidity, resulting in a reduction in weight by 50% compared with the previous model.

Dividing a bumper into parts

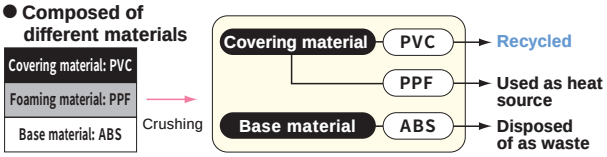
By dividing the bumper, which was integrally molded in the past, into parts, it can now be more easily dismantled and only the broken parts need be replaced with new ones, thereby reducing the generation of waste.

Example of a use of recyclable materials

Use of single resin material for instrument panels

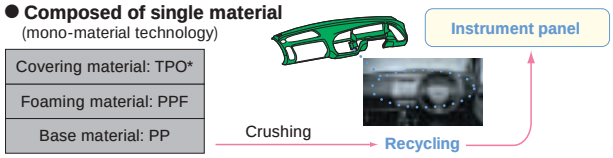
Traditional composition and recycling of instrument panels

● Composed of different materials



New composition and recycling of instrument panels

● Composed of single material (mono-material technology)



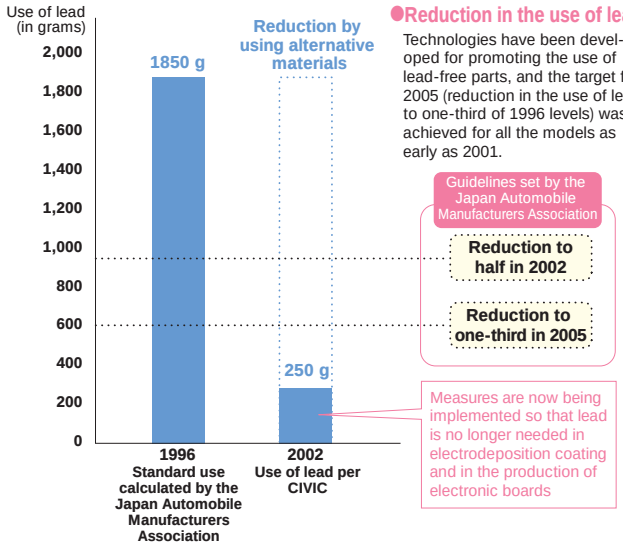
* Thermoplastic olefin

Traditionally, the following three different materials were used: polyvinylchloride (PVC) as the covering material; polypropylene foam (PPF) as the foaming material; and acrylonitrile-butadiene-styrene (ABS) as the base material. Presently, however, olefin materials mainly composed of polypropylene (PP) are used for all the instrument panel layers. This makes it unnecessary to sort the crushed materials and it is now possible to recycle them as a base material for instrument panels.

Use of colored material for the exterior of motorcycles

Acrylonitrile-Ethylene rubber-Styrene (AES) has been newly developed as a material for the exterior of motorcycles. AES, which can be clearly colored and is highly light resistant, is now used for rear cowls and front covers, eliminating the need for subsequent painting, which was necessary when ABS resin was used as the material. The use of ASE has improved the recyclability of motorcycles.

Example of a design that reduces environmental impacts



Reduction in the use of lead

Technologies have been developed for promoting the use of lead-free parts, and the target for 2005 (reduction in the use of lead to one-third of 1996 levels) was achieved for all the models as early as 2001.

Guidelines set by the Japan Automobile Manufacturers Association

- Reduction to half in 2002
- Reduction to one-third in 2005

Measures are now being implemented so that lead is no longer needed in electrodeposition coating and in the production of electronic boards

Reduction in the use of lead

Lead has been used to ensure the free-cutting ability of crankshafts, etc. Now lead-free materials are used in the crankshafts for the minicar That's, the motorcycle CBR954RR, and for the "GX Series" multipurpose engines.

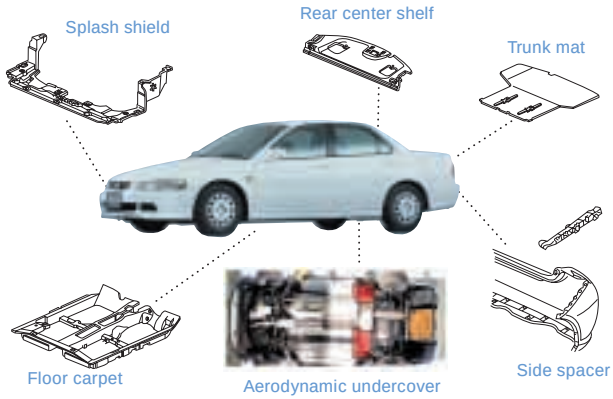
Minimum use of hexavalent chromium, mercury, and cadmium

Hexavalent chromium has been used to ensure resistance to corrosion. Already, chromium-free paints are used for outboard engines.

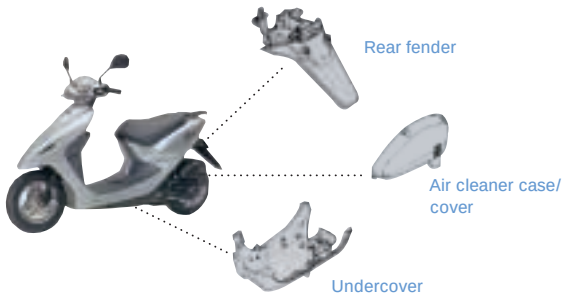
Example of using recycled materials

Parts for which materials recycled from bumpers are used

Materials recycled from bumpers replaced with new ones in repairing, etc. are used for various other parts.



Parts of a scooter to which recycled materials are used



Pursuit of Recyclability through the Development of Technologies

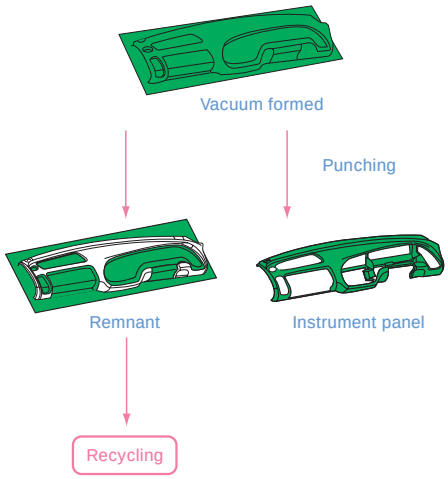
Honda is aggressively developing technologies to make effective use of resin materials, which are difficult to reuse or recycle. Based on newly developed technologies, we are examining the possibility of reusing or recycling wasted resin materials as parts for new products or as repair parts.

Recycling technologies for the production stage

1993
(PVC-PPF covering material)
Development of a sorting technology using a crusher and water tank
To PVC tool bag

1997
(PVC-PF covering material)
Development of an integrated sorting device with an air separator
To PVC covering material

2002
(Covering material composed of olefins alone)
Establishing recycling technologies by injection molding
Application to resin interior parts



1 Recycling technology for materials for covering instrument panels

In the production of instrument panels, it is important to reuse the material wasted from the punching process. Initially, it was difficult to reuse the waste because it was made of PVC and PPF. By the development of sorting technologies and devices, however, it became possible to recycle PVC materials. In 2002, it was decided to use only olefins as the covering material. Now the waste is crushed and recycled into pellets to be used for injection molding by adding virgin PP and talc (materials that provide rigidity). The pellets are used as resin materials for defroster ducts, etc.

Establishment of a System to Recover and Properly Dispose of Waste Parts

Honda has been making efforts to build networks for the recycling and proper disposal of waste parts. We started the establishment of a network to recover and recycle bumpers replaced with new ones in 1991. Since then, supported by our dealers and those in related industries, we have been expanding such

Establishment of a bumper recovery network

1991
Starting the recovery of bumpers (in the Kanto and Koshinetsu areas)

1995
Completion of the bumper recovery nationwide network

1999
Starting the recovery test of bumpers from wasted automobiles (in specific areas)

2000
Expanding the recovery from Honda dealers to general maintenance shops

Bumper recovery technology

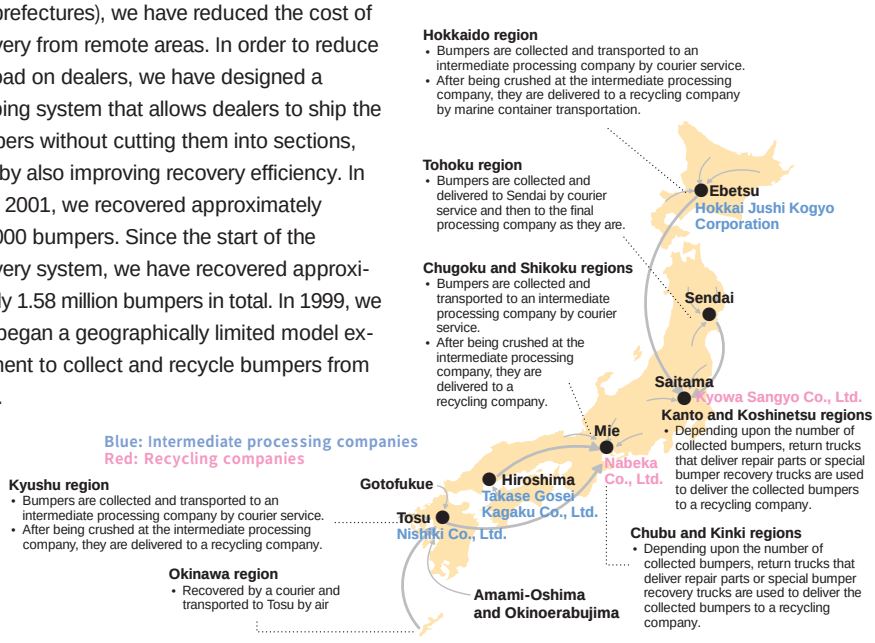
1996
>> Development of the sandwich molding technology

1999
>> Removing most of the paint films using metal mesh screens

2001
>> Development of a technology to remove the paint film on bumpers

1 Establishment of a nationwide network for recovery and recycling of bumpers

After a period of trial and error to establish an infrastructure for recovery, Honda has built up a network for recycling bumpers that have been replaced with new ones throughout Japan. We first began tests in the Kanto and Koshinetsu regions in October 1991. Later, we spread the area to the Chubu and Kinki regions, the Chugoku, Shikoku, and Kyushu regions, and the Hokkaido and Tohoku regions. Then, in November 1995, the network was extended to Okinawa and the remote islands (Okinoerabujima, Amami-Oshima, and Goto) to complete our nationwide coverage. We have taken steps to make the recovery process as smooth as possible. For example, by locating intermediate processing plants between the recycling plants (in Saitama and Mie prefectures), we have reduced the cost of recovery from remote areas. In order to reduce the load on dealers, we have designed a shipping system that allows dealers to ship the bumpers without cutting them into sections, thereby also improving recovery efficiency. In fiscal 2001, we recovered approximately 280,000 bumpers. Since the start of the recovery system, we have recovered approximately 1.58 million bumpers in total. In 1999, we also began a geographically limited model experiment to collect and recycle bumpers from ELVs.



2 Technology to recycle recovered bumpers

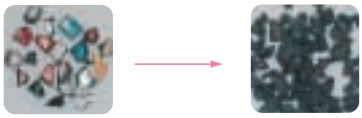
●Sandwich molding technology for bumpers

In 1996, we developed a technology to manufacture bumpers using recycled materials as core materials. This technology is called “sandwich molding technology,” and uses the recycled bumpers without removing the paint film. (The paint film on bumpers made it difficult to recycle them in the past.) The bumpers, with the paint film still on them, are crushed, washed and pelletized, and used as the core materials for bumpers.

Sandwich molded bumper

●Technology to remove the paint film from bumpers

We have established the technology to remove the paint film from bumpers jointly with recycling companies. Bumpers are crushed into chips and the chips are forcefully rubbed together to generate frictional heat, which removes the paint film. Materials recycled from bumpers using this technology have been used as repair bumpers made from 100% recycled materials.



Chips before removing the paint film

Chips after removing the paint film

3 Establishment of a system to recover and destroy CFC-12

Honda asked its dealers to cooperate in the establishment of systems to recover and destroy the CFC-12 used for automobile air conditioners, and completed the establishment of such systems all over Japan in 1998. We are further promoting the proper disposal of harmful substances through measures such as the introduction of equipment for recovering and recycling HFC134a.

Recovery of CFC-12

Further Reuse and Recycling of Parts

Honda started to market the parts that had been wasted after use as “Honda Recycle Parts” (composed of recycled and reused parts) under the slogan of “Effective use of second-hand parts for the environment while maintaining quality and minimizing the burdens imposed on customers” to further promote the recyclability of our parts.

Reuse and recycling of parts

1995
Launch of the remanufacturing business (in the U.S.)

1998
Launch of the remanufacturing business (in Japan)

2001
Starting the sale of Honda Recycle Parts

2002
Promoting the sale of Honda Recycle Parts

1 Remanufacturing of parts

Since October 1998, Honda has been selling at reasonable prices parts recycled from those parts replaced with new ones during repair work. At genuine Honda parts manufacturers, end-of-life components in those parts to be reused are replaced with new ones, and the new parts are recycled as fully functioning high-quality parts, monitored to Honda’s criteria.

2 Sale of reused parts

We have been selling those parts that were selected and removed from ELVs based on the Honda Standards and parts of new automobiles replaced with optional parts as reusable parts at lower prices since July 2001 in the Kanto region and since January 2002 in all the regions in Japan.

Recycled parts

Power steering pump assembly

Power steering gearbox assembly

Torque converter

Distributor

Drive shaft assembly

Reused parts

Second-hand parts

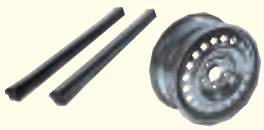
● Exterior parts and metal parts (doors, hoods, trunks, etc.)

● Lighting parts (headlights, taillights, etc.)

Removed parts

● Audio systems, radios, cassettes, etc.

● Functional parts, such as dampers



● Others
Side garnishes, wheels, etc.

Supporting People Engaged in Recycling by Providing Them with Devices and Systems for Efficient Dismantling

Honda is developing devices and systems to remove parts more rapidly in the dismantling process and to dispose of them more safely.

We are supporting dismantlers by proposing the use of such devices and systems and promoting the proper disposal and recycling of materials.

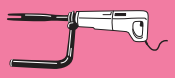
Development of dismantling support technologies

1996

Development of a vehicle turnover device for dismantling

1997

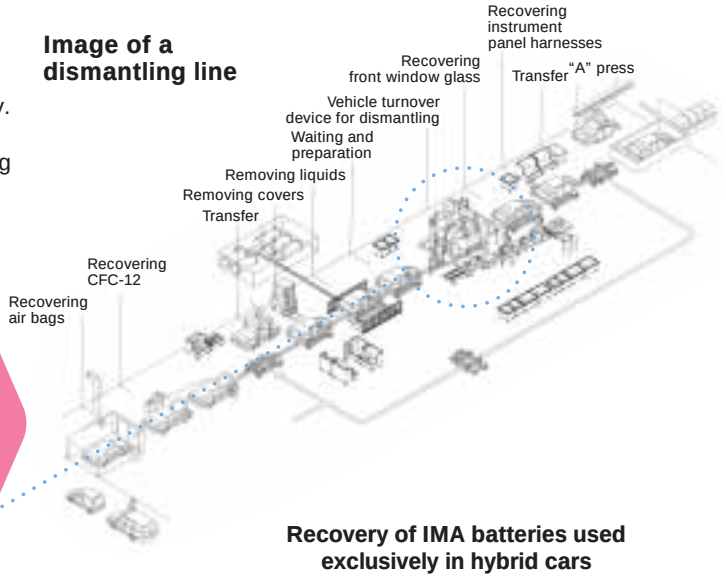
Development of diversified dismantling support devices such as a wire harness winder



2002

New vehicle turnover device for dismantling

Image of a dismantling line



1 Evolution of the vehicle turnover device for dismantling for a new dismantling line

In March 2003, we announced a new dismantling line equipped with a new vehicle turnover device for dismantling, which enables the recovery of glass and rear suspensions even while the automobile is being turned over. Due to such improvements, the time required for recovery has been reduced by approximately 62% compared with the previous model.

We commenced the sale of such devices, targeting vehicle dismantlers. The dismantling line enables dismantlers to deliver end-of-life vehicles to their plants, dispose of waste liquids, remove parts and press the dismantled automobiles in a single work flow. Accordingly, work efficiency has doubled compared with the traditional dismantling methods.

2 Publication of a dismantling manual

Honda prepared the manual explaining how to dismantle the parts designated by the public organizations and the parts recommended by Honda in an easy-to-understand manner. Copies have been distributed to all Honda sales bases and the associated dismantlers in January 2002.

3 System to recover batteries used exclusively in hybrid cars

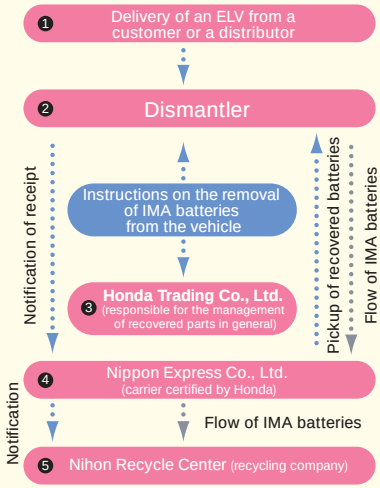
IMA batteries used for Honda's hybrid cars are nickel-metal hydride (Ni-MH) batteries, and we established our own system to recover these batteries in 1999. The recovered IMA batteries are effectively recycled into stainless steel and battery materials.

4 Management of ELVs using manifests, and proper recovery and disposal of air bag inflators

Honda has been asking its dealers to manage ELVs using manifests*. Also for air bag inflators, we are cooperating with other manufacturers in the examinations on their recovery and disposal system promoted by the automobile industry.

*Documents used for managing the disposal of industrial waste, including ELVs, which clearly shows the responsibilities of those generating the waste.

Recovery of IMA batteries used exclusively in hybrid cars



Dismantling manual

Manifest

Example of measures to improve the environment and to recycle waste

Development of an extremely light beach cleaner to be pulled by an ATV

In recent years, much of the beautiful and rich beach environment has been damaged due to waste generated by various leisure and sports activities conducted on beaches. Honda has developed a beach cleaner that efficiently collects driftwood, ropes, PET bottles, discarded cigarette stubs, etc.

The cleaner is to be pulled by an all terrain vehicle (ATV) equipped with balloon tires, which are entirely suitable for beach activities. This cleaner contributes to the efficient recovery of waste, which is a key to waste recycling, and to the maintenance of a wholesome beach environment.

Extremely light beach cleaner to be pulled by an ATV

Objects to be removed from the beach: discarded cigarette butts, filters, wood chips, charcoal, firework remains, etc.

To Further Promote Recycling for the Next Age

In Japan and indeed throughout the world, people are keenly moving towards the establishment of recycling societies. Honda, ahead of many others, has been implementing diverse environmental projects. In the future we intend to conduct research to establish our projected visions to enable us to steadily move towards realizing a true recycling society.

Honda's recycling activities

1990
Establishment of a recycling committee

1997
Launch of the New Recycle Project

1998
Announcement of the Honda Recycle Initiative

Launch of the Green Dealer Project

1999
The dismantling verification center started operations in Tochigi.

Establishment of the Europe Recycle Center (ERC).

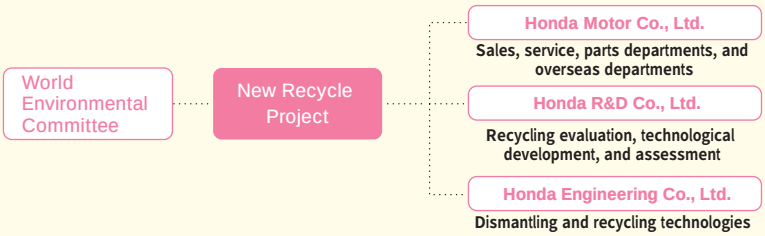
2001
Launch of a project to comply with automobile recycling laws

1 Establishment of the dismantling verification center


Dismantling verification center

In December 1999, we established a dismantling verification center within Honda Engineering's Tochigi technical center. The dismantling verification center is mainly engaged in research on the necessary technologies for dismantling ELVs, information provision, providing feedback in order to help design automobiles that can be more easily dismantled, and in identifying the requirements for ELV dismantling support devices.

Honda's organizations responsible for recycling



Honda's future recycling goals

Honda will try to reduce the environmental impact of its activities by accelerating recycling-friendly designs in order to achieve an actual recycling rate of 95% by 2015 and by reducing the use of substances with environmental impacts in compliance with its guidelines on chemical substances. Further, we are conducting surveys on ASR disposal technologies to achieve zero ASR* in landfill wastes.

* Automobile shredder residue

Example of measures taken overseas

Rebuilding motorcycles in Thailand

A.P. Honda Motor Co., Ltd. (APH)

In 1998, APH, Honda's distributor in Thailand, started to purchase second-hand Honda motorcycles sold in the domestic market, rebuild them at its special plant, and to sell them as rebuilt products. This was an attempt to make more effective use of resources, reduce waste, and to promote recycling. By June 2002, a total of 4,273 rebuilt motorcycles were marketed. Specifically, second-hand motorcycles purchased at auctions, etc. are dismantled at APH's special plant and the parts are stored after being sorted, repaired or repainted according to their condition.

These parts are then rebuilt into motorcycles, which are sold through sales companies selected by APH. APH has been providing the rebuilding know-how to sales companies, who themselves are establishing the system to procure, rebuild, and sell second-hand motorcycles. Already 23 sales companies have their own rebuilding facilities, demonstrating how such rebuilding efforts have been made across the entire country. AHP will further pursue the possibility of a completely closed recycling system for motorcycles by taking further appropriate measures.


Motorcycle rebuilding line in Thailand

column

Efforts Made by Suppliers

●Examples presented at the Honda Green Conference

Honda Green Conference

Honda aims to make both its employees and its suppliers more aware of the importance of environmental conservation by holding the Honda Green Conference. At this conference, which is held as a group-wide event, participants exchange information about their environmental improvement activities and evaluate them to obtain more knowledge and skills on environmental conservation. At the second conference, held in November 2000, and subsequently,conferences a total of 10 major Honda suppliers made presentations about their environmental conservation activities.

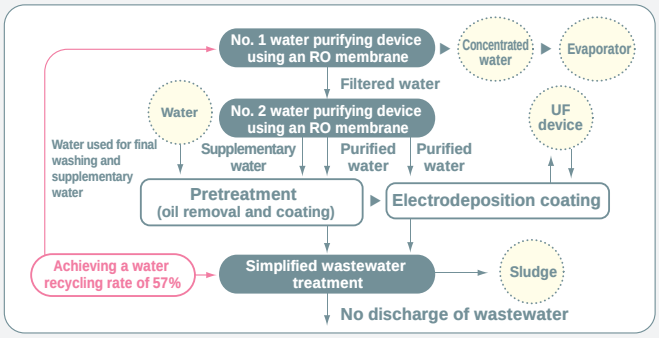
Yachiyo Industry Co., Ltd.

Achieving zero wastewater by recycling water in the coating process

Yachiyo Industry, which manufactures Honda minicars, implemented measures to achieve zero wastewater by maximizing the water recycling efficiency in its repair parts production line. As a result, the company achieved zero wastewater at its factory for the first time in the automobile industry. Specifically, the company introduced two water purifying devices using reverse osmosis (RO) membranes to filter wastewater from the factory in two stages, thereby achieving a water recycling rate of 57%. The treated water is reused in the pretreatment and electrodeposition coating processes. The remaining 43% of the wastewater, is evaporated, thereby achieving zero wastewater.

Water purifying device using an RO membrane to make wastewater reusable

● Zero wastewater



Water use: Reduced to 7,430 tons/year (May 2000 through April 2001)from the previous level approx 17,500 ton/year

Honda Express Co., Ltd.

Reducing waste to one-tenth by the introducing a new returnable case

Honda Express, which is one of the carriers of Honda products and parts, has been making efforts ahead of others in the industry to reduce the packaging materials used for transportation. For the export of products to Europe, the company has developed a returnable case that is lighter but as durable as the returnable cases traditionally used for exporting. The new returnable case is made more suitable for collection because it can be compactly folded. By promoting the usage of this cases, the company has reduced the amount of waste to one-tenth of previous levels. Furthermore, by reducing the amount of energy required for transportation through reducing the weight of the case, this has also reduced CO_2 emissions by 5,780 tons on an annual basis.

The new case can be easily assembled using square pipes and bolts.

Honda Verno Kobe Co., Ltd.

Reducing the consumption of electricity by using a power consumption monitoring unit

Honda Verno Kobe, which sells Honda automobiles in the Kobe District in Hyogo Prefecture, newly installed a unit to monitor power consumption on an hourly basis in cooperation with an electric appliance manufacturer. As a result, it was revealed that electricity was being consumed for lighting even on regular holidays, and that the peak of the consumption was during 9:00 a.m. to 10:00 a.m. Based on this finding, the company has implemented the following countermeasure: on the day before a holiday, electricity is turned off at the distribution board, and a timer is installed for the accurate management of power consumption. Also, the delivery of automobiles to the company is scheduled not to be concentrated at any one time, so that energy consumption can be spread. Thanks to these measures, power consumption has been reduced by 12% and CO_2 emissions by 6,494 kg.

A monitoring unit is installed in front of the signboard. A timer automatically turns off the lights.