

Aluminium recycling makes economic and environmental sense as pure metals and many alloys need far less energy to recycle than to mine, extract and smelt. Aluminium is one of the most abundant metals in nature, accounting for 8% of the earth's crust.

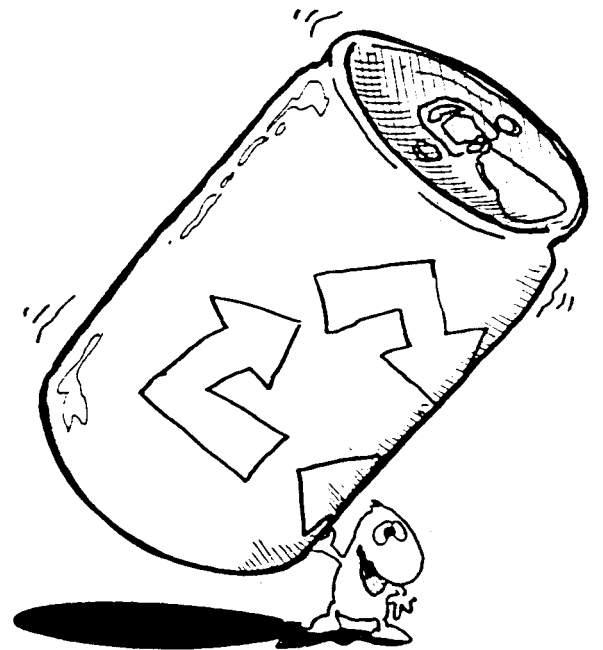
Aluminium is a silvery light metallic substance resistant to tarnishing by air. It comes from a clay-like mineral called bauxite that occurs in the form of small red pebbles 1 or 2 metres below the surface of the ground. Bauxite contains alumina, a compound of aluminium oxide made up of corundum and emery. Other varieties of corundum include rubies and sapphires.

Australia is one of the largest bauxite mining countries and the aluminium made in New Zealand uses alumina produced from bauxite mined in Australia.

In 1886, two men separately discovered the process for producing aluminium. Charles Martin Hall in Ohio, USA and Paul Heroult of Paris. Two years later a German Chemist, Karl Bayer, found a process for making alumina from bauxite. The basic process these three men found over a century ago is still being used today.

Advantages of Aluminium.

- *easily shaped*
- *resists corrosion*
- *lighter than most metals*
- *conducts electricity and transfers heat*
- *is not attracted by a magnet*
- *is easily recycled: The aluminium can is the simplest and most efficient beverage container to recycle. Used aluminium cans are an important source of scrap metal.*



ALUMINIUM PRODUCTION

Aluminium production involves three stages.

1. The mining of bauxite ore.

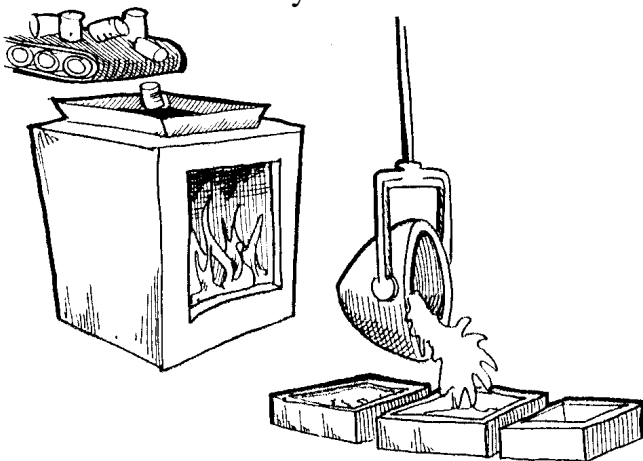
2. Refining:

The refining of bauxite to extract its alumina. The bauxite is crushed and mixed with caustic soda which removes impurities. This leaves a fine white powder that is heated to remove any moisture, leaving pure aluminium oxide (alumina) which is made up of aluminium and oxygen. Alumina, as well as being used to make aluminium metal is important to the chemical, ceramics, electrical and petroleum industries.

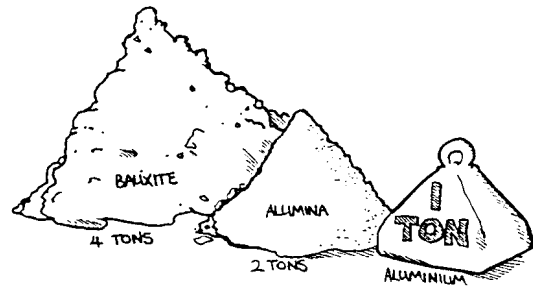
3. Smelting

To make aluminium it is necessary to separate the two elements in alumina. Electricity is passed through the alumina (electrolysis) separating the oxygen and leaving the pure aluminium.

Following this, small amounts of other elements (such as magnesium, silicon or manganese) are added to the molten aluminium to give it added strength, increased resistance to corrosion or better casting properties. Different elements give different alloys.



It is poured into moulds to solidify into shapes such as ingots, blocks or logs and is known as *primary aluminium*. From here it is exported to customers to be



manufactured into products.

It takes 4 tonnes of bauxite to produce 2 tonnes of alumina which in turn will produce 1 tonne of aluminium.

MANUFACTURING

Aluminium can be made into many different shapes using different processes.

Rolling

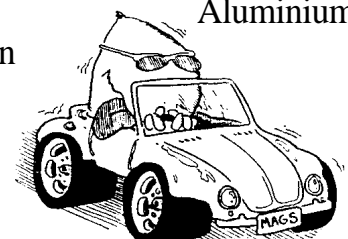
The aluminium is squashed between rollers into thin sheets, plate or foil. Plate is 6mm or thicker, sheet is from 0.15mm to 6mm and foil is less than 0.15mm thick.

Extruding

Aluminium is extruded by forcing hot round logs of the metal through a pattern cut in a steel die. The main uses of extruded aluminium are in the building trade, door and window frames, shop fronts and security screens, road and rail applications, and in engineering, made into machinery components.

Casting

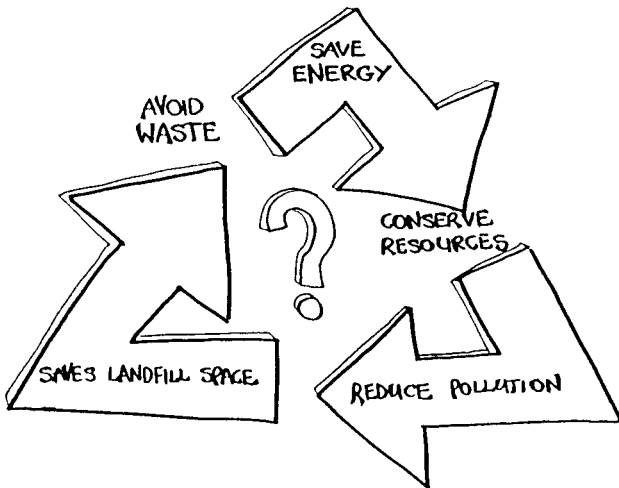
Aluminium is cast into wheels in Australia. These are sold all over



the world to Japanese and European car manufacturers.

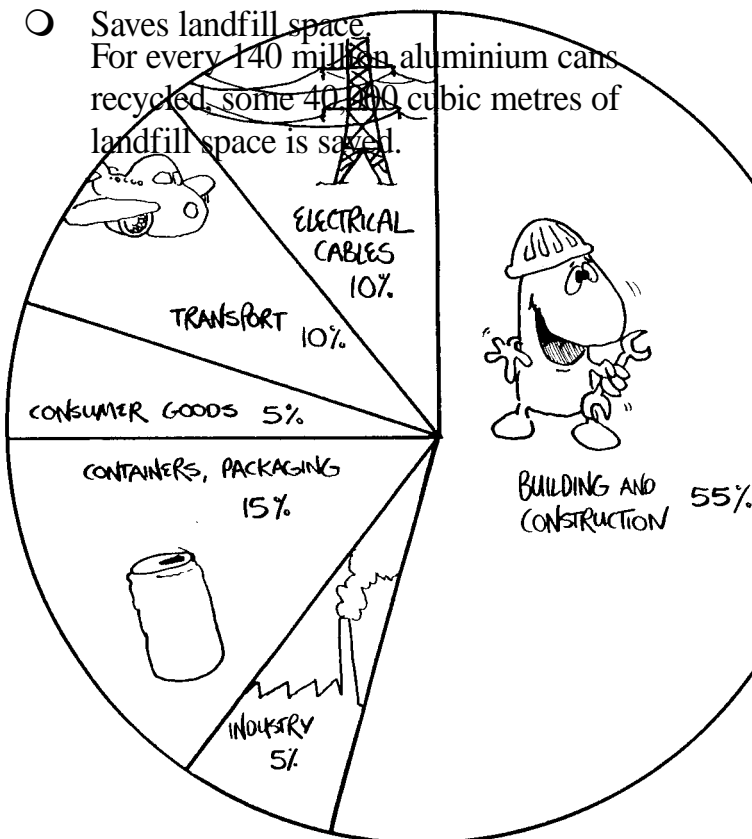
WHY RECYCLE?

- Saves energy
- Conserves natural resources of bauxite



- Reduces environmental pollution
- Avoids waste

- Saves landfill space
For every 140 million aluminium cans recycled, some 40,000 cubic metres of landfill space is saved.



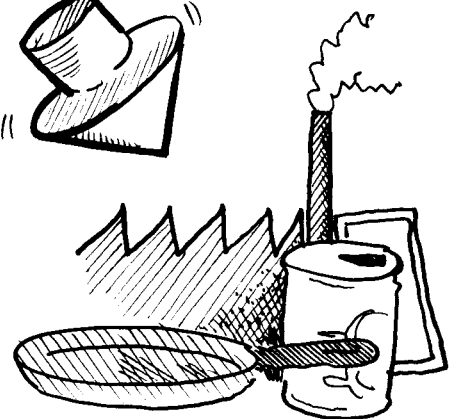
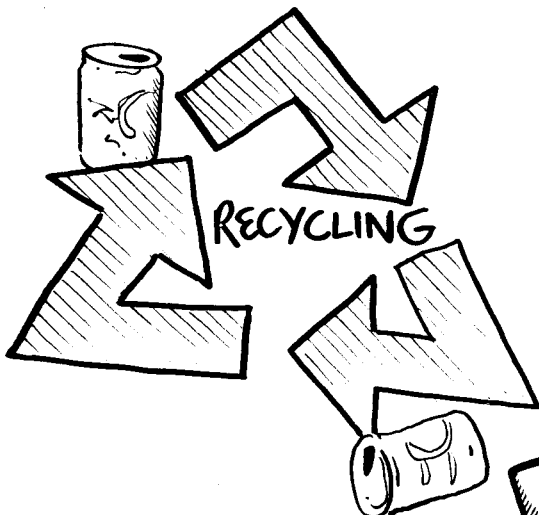
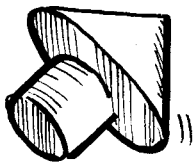
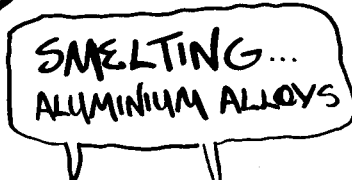
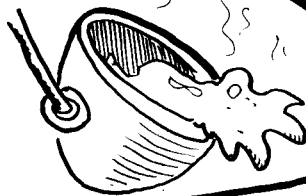
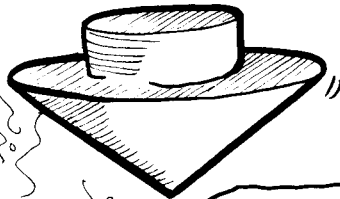
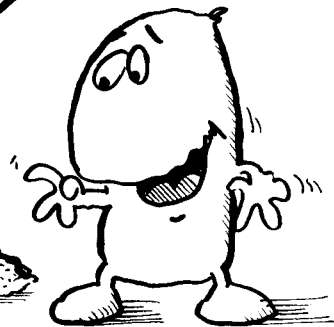
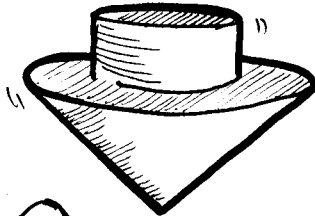
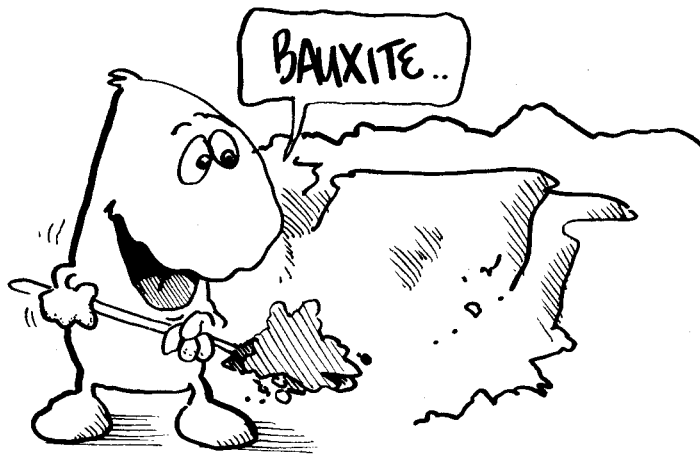
Large amounts of energy are used in the manufacture of primary aluminium from bauxite. Once the aluminium is in metal form it can be melted over and over again using only 5% of the energy used to make primary aluminium - an energy saving of 95% per tonne of secondary metal produced.

The most important source of recycled aluminium is used aluminium cans. Each tonne of cans saves about 5 tonnes of bauxite.

Comalco buys cans and sells the crushed bales to either Japan or Australia where they are remelted. From aluminium ingots come rolls of metal sheets which are remanufactured into new beverage cans.

Aluminium is used in many every day products. These include drink and food cans, window frames, furniture, cars, ships, aircraft, cooking utensils, solar heaters,

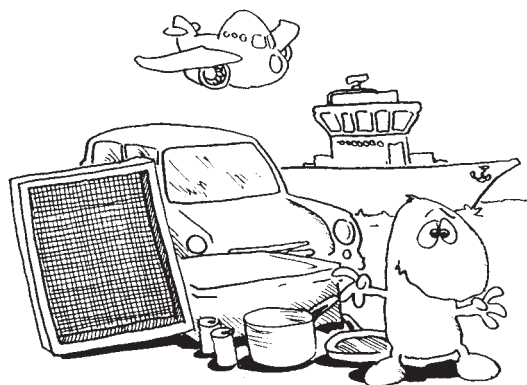




MANUFACTURING, CONSUMER PRODUCTS...



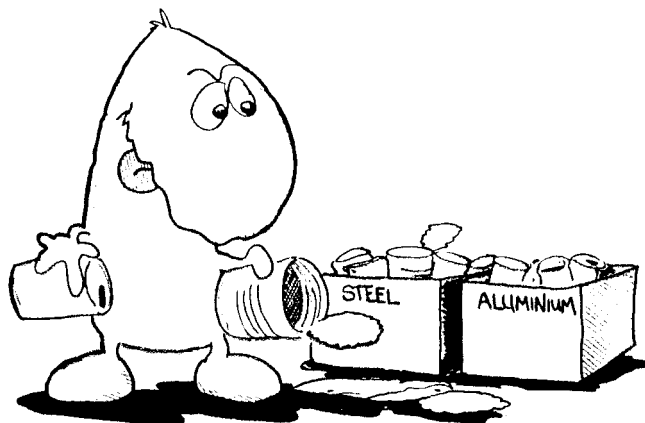
insulation, motor mowers, insect screens, sports equipment, roofs, electric wire and cable, and aluminium foil for packaging and use in the kitchen.



How *You* can help to recycle aluminium:

○ *Aluminium Cans*

Rinse out and place them in your recycling bin if you have a kerbside collection.



Auckland
Regional
Council

For further information

Regional Waste
Private Bag 92 012
Auckland

ARC Wasteline (09) 366-2070

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You may also take your aluminium cans to the following places:

- ☞ Your local transfer station
- ☞ Public drop-off facilities at schools, car parks and kindergartens
- ☞ "Cash for Cans" Drop-off facilities
Ph 579-5127 or
Toll Free Number 0800 254 226

○ *Other Aluminium Products*

These may be taken to your nearest recycling centre or to your nearest scrap metal dealer.

* Acknowledgements

We would like to acknowledge with thanks Comalco (NZ) Ltd, Auckland for assisting with the information in this pamphlet.

NOTES