

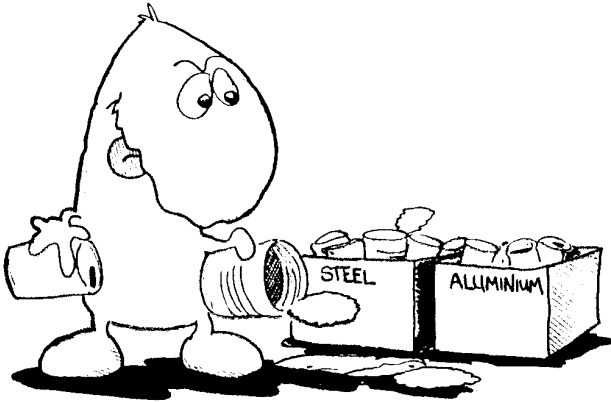
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STEEL RECYCLING

Steel recycling, like aluminium recycling makes economic and environmental sense.

of all vertebrates. When there is an iron deficiency it results in anaemia, which can be a serious illness.



Smelting iron ore has been traced back to about 1350 BC. Smelting is a process where ore containing iron is heated to a very high temperature in a blast furnace, turning it to liquid. Iron has a melting point of 1532°C (2790°F).

The main element of steel is iron, a silver white, ductile element which is the fourth most abundant substance in the earth's crust and the second most abundant metal. Five percent of the earth's crust is iron.

During the process a chemical change occurs producing the heavy iron and a lighter substance which is called slag.

Iron ore is found in Australia, Russia, China, and in the USA. In New Zealand there are iron sands from which iron is extracted to make steel.

Early man discovered the great strength of iron and since the iron age it has been very important for forging weapons, instruments and tools.

Iron is an essential element in all living organisms and is found in many green leafy vegetables like silver beet, spinach and taro leaves and meat such as beef and mutton.

STEEL PRODUCTION

Iron is needed in the production of haemoglobin, a red, oxygen carrying substance, present in the red blood cells

Steel is made by melting naturally occurring iron ore or scrap, which is needed in enormous quantities, and adding coal (carbon) and limestone, all of which occur in large quantities in the earth's surface. The carbon from coal forms a crystalline structure within the iron and gives the mechanical properties that allow the steel to be rolled very thin and curved to form all sorts of shapes.

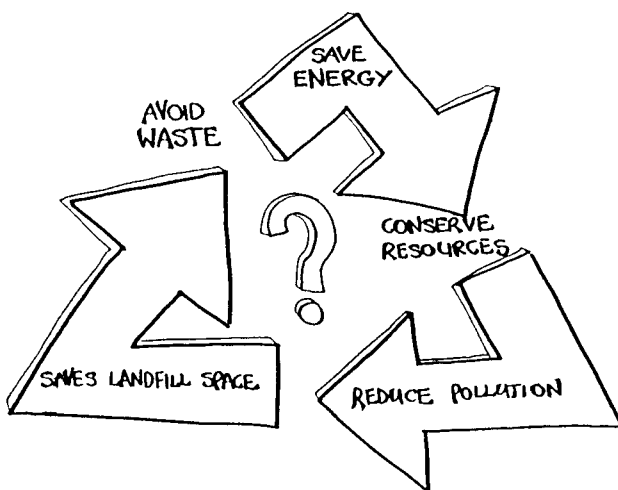
There are four principle steel making processes:

- 1. open hearth furnace*
- 2. the Bessemer Process*
- 3. basic oxygen furnace*
- 4. electric furnace*

The industrial revolution (1780's - 1880's) fostered the growth of the steel industry but mass production did not become viable until the early 1860's. Two men, William Kelly and Henry Bessemer, independently invented the steel converter, known today as the Bessemer Process. It is this process which made mass production of steel available. In 1974 the United States led the world in steel making, producing 132 million tonnes followed by the USSR and Japan. World wide, only coal and oil production exceed steel in amounts used.

Manufacturing:

Most steel is cast into ingots and sold in this form for further processing, depending on the intended final product.



Advantages of Steel.

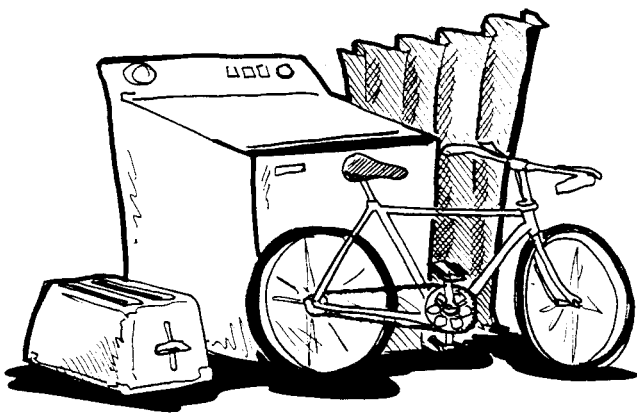
- 👍 *easily shaped*
- 👍 *very strong*
- 👍 *can be combined with many alloys to give it different properties for a wide variety of uses*
- 👍 *has magnetic properties*
- 👍 *is easily recycled: Most steel products contain at least 20% recycled content*
- 👍 *is a low cost commodity*

WHY RECYCLE?

Historically, steel was one of the first metals to be recycled and almost anything, be it cars, washing machines, steel (tin) food and beverage cans, or building materials, can be recycled.

Advantages of steel recycling

- 👍 *Can be recycled repeatedly without reduction of quality*
- 👍 *Saves energy*
- 👍 *Conserves natural reserves of iron ore, limestone and coal*
- 👍 *Reduces environmental pollution*
- 👍 *Avoids waste*
- 👍 *Saves landfill space*



Large amounts of energy are used to smelt iron ore and produce steel. By including used steel in the process, half the energy used for making steel from primary materials is used (ie coal and electricity). As well, the iron ore deposits around the world will last longer.

STEEL RECYCLING

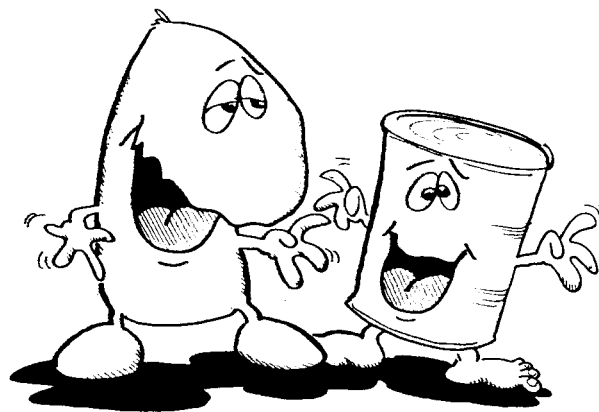
Many different types of scrap metal comes into the factory yard for recycling. Used and broken whiteware, cars, baths, roofing iron, fridges and thousands of **steel cans**.



The material is checked for any dangerous properties. Cars and trucks must have everything removed and only the shells of the cars are accepted. Petrol tanks must be empty and LPG and CNG tanks removed as these can explode when the car is crushed. Batteries are removed and are sent to Wellington where they are recycled (see battery recycling pamphlet).

Some large scrap is cut before it enters the shredder where it is reduced to pieces about the size of a person's fist. Non-ferrous metals are then sorted from ferrous metals with a magnet. The ferrous (made from iron) metal goes into a bin, is weighed and then transported to the steel plant to be made into new steel.

The non-ferrous material and all the rubbish which is called flock goes through a water separation system. All the other metals which are not steel are then collected, sorted and baled and are also recycled. These include copper, lead, brass aluminium and bronze.



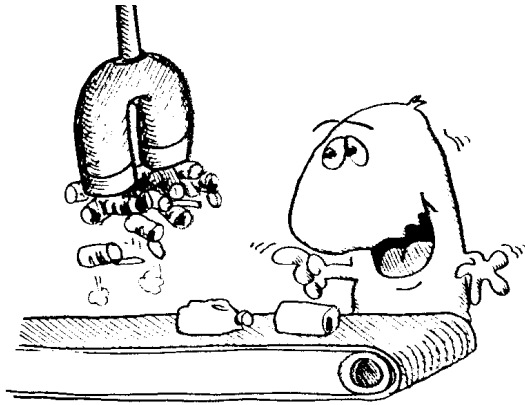
STEEL CAN RECYCLING

Steel cans are one of the most common forms of packaging and are found in most homes in New Zealand. Approximately 400 million cans are filled each year with fruit, vegetables, pet food and paint.

What are tin cans?

Steel cans are often called tin cans because they have a thin protective coating of tin on one or both sides. When metals such as steel and iron are coated it is called tin plate. Tin, which is a silver white metallic element, comes from Malaysia, Indonesia, China, Africa and Bolivia and is used in large

quantities to form protective coatings on iron and steel and for making alloys.



How old is tin plating?

As long ago as 1000AD people were developing the art of tin plating but tin cans were not invented until the early 19th Century by a Frenchman, Nicholas Apperte.

Tin resists oxidation and without the layer of tin, the steel cans would rust and react chemically to foods and other products they contain, contaminating it.

Does the tin affect recycling?

Any steel can is recyclable regardless of what has been in it, as long as it is empty. Steel cans are recycled by two methods, de-tinning, which removes the layer of tin before the steel is remelted (this is no longer done in New Zealand) and direct melt which melts the steel can with the tin on.

Advantages of steel cans as a form of packaging:

- *safe long term storage for food, beverages, chemicals, paint etc*
- *totally recyclable*
- *usually made from steel with 20% recycled content*

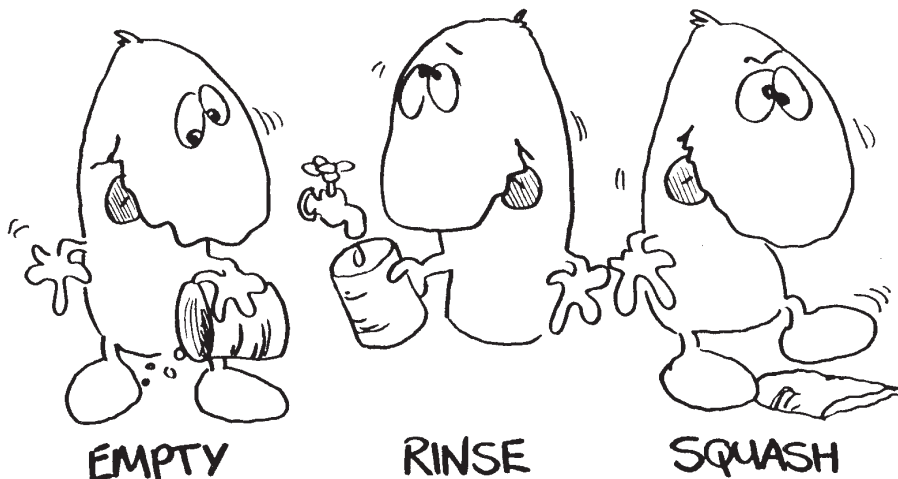
WHAT IS STAINLESS STEEL?

This is steel with the addition of chromium which makes it non corrosive and capable of resisting high temperatures. It is widely used for cooking utensils and food processing because it does not react to the acids in foods.

What You can do to help recycle steel products:

- ***Steel Cans***

Place them in your recycling bin if you have a kerbside collection. Make sure they are washed, with the lid inside and the open end squashed together.



You may take your steel cans to the following drop-off facilities.

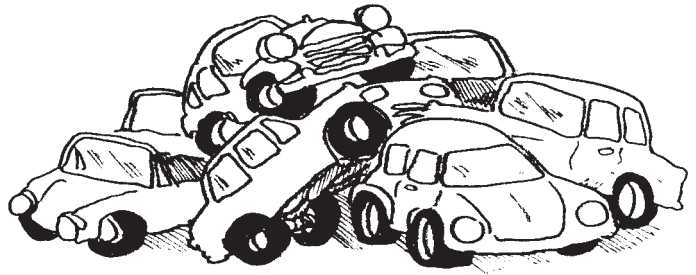
- In your kerbside recycling bin if you have one
- **Sims Pacific Metals**
James Fletcher Drive
Otahuhu Ph 270 0055
Bin by the main gate for the public to use

- ***Other Steel Commodities***

Whiteware (that is, washing machines, fridges and other household appliances) roofing iron, bikes, guttering etc may all be taken to:

- Your local transfer station
- Any scrap metal dealer

- ***Car Bodies***



Car parts may be taken to:

- Your nearest scrap metal dealer.
- Sims Pacific Metals will also take car bodies.
 - Remove Seats and upholstery
 - Remove the battery

Empty the petrol tank

If the car has a CNG or LPG tank this also must be removed

***DO YOUR PART TO HELP
PRESERVE OUR ENVIRONMENT
AND SAVE RESOURCES***

***ACKNOWLEDGEMENTS**

We would like to acknowledge with thanks Sims Pacific Metals Ltd, Otahuhu, Auckland, for assisting with this pamphlet.



**Auckland
Regional
Council**

For further information

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Private Bag 92 012
Auckland

ARC Wasteline (09) 366-2070

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11/08

HEAVY MELTING STEEL
(GIRDERS, PLATE)

PREMIUM SCRAP
(WAGON WHEELS)
SHREDDED CARS ETC
USED PRODUCTS

RECYCLABLE MATERIAL

NEW PRODUCTS

STEEL RECYCLING PROCESSING

LOCAL

EXPORT

FINISHED PRODUCT

FURNACES

SCRAP REDUCED IN SIZE

STORED

SHEARS

SORTING - DANGEROUS GOODS, RUBBISH REMOVED

"BALLETS"

HOUSEHOLD SCRAP

