Steel recycling

Waste Sorted

INTRODUCTION

Steel's useful properties and relatively low cost make it the main structural metal in engineering and building projects, accounting for about 90% of all metal used each year.

The production of steel is an energy intensive process, consuming finite natural resources and resulting in greenhouse gas emissions. Recovery and recycling of steel requires significantly less energy than its production from raw materials and saves valuable resources.

About 98% of world iron ore production is used to make iron in the form of steel and provides the foundation for one of Australia's major export industries.[1.]

HOW IS IT MADE?

Iron ores are rocks from which metallic iron can be economically extracted. These rocks are usually found in the form of hematite (Fe2O3) or magnetite (Fe_3O_4).

Iron (Fe) is one of the most abundant rock-forming elements, constituting about 5% of the Earth's crust. It is the fourth most abundant element on Earth after oxygen, silicon and aluminium and, after aluminium, the most abundant and widely distributed metal.

The many different kinds of steel consist almost entirely of iron with the addition of small amounts of carbon (usually less than 1%) and other metals, to form different alloys (e.g. stainless steel). Pure iron is quite soft, but adding a small amount of carbon makes it significantly harder and stronger. Most of the additional elements in steel (e.g. chromium, manganese, nickel, molybdenum) are added to change the properties of the steel (e.g. to prevent rusting).[2.]

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THE PROBLEM

Australia is a major producer of steel and the iron ore from which it is made. Iron ore mining generates greenhouse gas emissions and damages natural environments. Further environmental impacts of the process are associated with the transport of the ore. The refining of the ore requires significant quantities of water, energy and virgin resources. If steel is not recycled at the end of its useful life then more ore must be mined and therefore more steel produced. Furthermore, the waste steel not recycled will contribute to litter or landfill.

THE SOLUTION

THE RECYCLING PROCESS

Magnets are used at Materials Recovery Facilities (MRFs) to separate steel from other materials as steel is magnetic. Most non-steel scrap metal is not collected through the ACT MRF. Steel sorted at MRFs is then baled and sent for reprocessing. Steel is reprocessed at a steel refinery. Any tin coating is removed using a process called reverse electroplating.[2.] The steel is then melted and reshaped before being used in the production of items as diverse as bikes, paper clips or new cans.[4.]

In the ACT steel is also recovered through the recycling of mattresses at the Soft Landing facility. On average, each mattress contains 12.5 kg of steel.

Scrap steel from building and construction, white goods and household items is recovered at the ACT resource management centres and through commercial recyclers.

BENEFITS OF RECYCLING STEEL

Steel can be recycled very efficiently – in terms of tonnage it is the most recycled material in the world.[4.]

Making steel from recycled cans uses 75% less energy than when producing steel from raw materials.[5.] Twenty-one per cent of all steel consumed in Australia is used in engineering and construction. Recycling rates are relatively high, with some 80–90% of scrap steel being reused or recycled.[6.]

CONTAINER DEPOSIT SCHEME

The ACT container deposit scheme (CDS) will allow consumers to return eligible beverage containers to designated drop-off points and receive a 10 cent refund. This will help reduce litter, increase resource recovery rates and help engage the community in recycling.

DID YOU KNOW?

- Every tonne of steel recycled saves 1.13 tonnes of iron ore, 633kg of coal and 54kg of limestone.
- In Australia, 97% of end of life structural steel and 83% of all scrap steel is recycled.
- Steel is the most commonly used metal product, used in industry 20 times more than all other metals put together. Steel is strong, durable and extremely versatile.
- About 60% of iron and steel products are used in transportation and construction, 20% in machinery manufacture, and the remainder in cans and containers.
- The tin-plated steel can was invented in 1810 and was originally hand made.
- Tin cans were first produced for the English Navy in 1813 to preserve food at sea.[3.]
- The first can opener was not invented until nearly 40 years after the first cans.

REFERENCES

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