

Recycling of Steel Products

New Zealand Steel is committed to continual improvement of environmental performance and the efficient use of natural resources. Our objective is to produce a range of versatile steel building products and steel solutions that are innovative, durable, safe and aesthetic.

Key Facts

- Steel is the most recycled material in the world.
- Average recovery rate for steel in buildings is 85%.
- Steel does not suffer any product degradation through endless recycling.
- Average recycled content of steel produced by New Zealand steel is about 12%.

Improvements in Steelmaking

The steelmaking operation at New Zealand Steel's site at Glenbrook is a unique process



that uses ironsand found on the local coast and turns it into iron and steel - no other steelmaking operation in the world makes steel in the same way. Modern steel plants, such as New Zealand Steel, now produce a vast array of sophisticated steel products that find use throughout society. Steel is simply a purer form of iron with lower carbon content. The capabilities of steel manufacturing are always improving. In the past, the industry produced a limited product range, but today it produces a diverse and innovative range of pre-engineered steel products to meet the demands of the ever changing built environment. The use of recycled steel scrap continues to be integral to our steel manufacturing process and there is recycled content in all our various steel products.

In addition to scrap recycling New Zealand Steel has made recycling gains through creation of a significant by-products industry (referred to as co-products), in line with its commitment to reuse materials and reduce disposal of residual materials (waste). About 500 kilograms of co-products are produced per tonne of crude steel. These are on sold as valuable raw materials for other industry and the steel aggregate products offset the need for quarrying natural materials. Currently New Zealand Steel reuses or recycles around 80% of the non-steel material uprisings. Co-products from iron and steelmaking slag are used for road surfacing, soil conditioning, sports field drainage, and sand blasting and filtering in wastewater treatment.

Major improvements have also been made in energy efficiency through cogeneration where New Zealand Steel produces up to 70% of its own electricity requirements. All wastewater and stormwater is treated to a high environmental standard before discharge or recycling. Of the total volume of water in the steel mill's water circuits less than 1 percent is discharged to the Waiuku Estuary each day. The remaining water is recycled and recirculated to conserve this natural resource.



Kiwi to the core

**SUSTAINABLE STEEL
100% RECYCLABLE**



www.nzsteel.co.nz

Recycled Steel

Steel is acknowledged as the world's most recycled material. In fact, it is 100 percent recyclable over and over again, without product degradation. This means its life cycle is potentially continuous. Steel scrap is a necessary component in the production of new steel. The average recycled content of steel produced by New Zealand Steel is approximately 12%. As part of the total steel cycle some steel scrap is recycled directly into the BOS (Basic Oxygen Steel making) process at New Zealand Steel. The remainder is recycled by melting in an electrically heated furnace (the EAF Process) via other steel makers. This total process is illustrated in figure 1 below.

At our integrated steel plant at Glenbrook, steel scrap varies from between 10 to 15 percent of the material that goes into the oxygen steelmaking furnace. As well as providing a source of feed, scrap is used to control the temperature generated by the chemical reactions in the furnace.

In New Zealand the steel industry has always been a good recycler. In recent years, with growing community awareness of the benefits of recycling, the industry has made even greater efforts. Scrap steel for production comes from a variety of sources including scrap generated within steel plants, scrap from off-cuts generated by



manufacturers and steel locked up in items that have come to the end of their useful lives. Steel is always useful and can be infinitely recycled with out degradation of product.

- Average recovery rate for steel in buildings is 85%. Recent research of commercial construction waste found that more than 90% of steel was recycled. A current misconception is that specifying recycled steel content leads to improved sustainability. However, demand for steel products greatly outstrips supply from recycled sources, so all recycled

material will be used. What is crucial to sustainability for steel is the level of recycling at the end of life.

Partnering for Clean Production

New Zealand Steel is working with Government departments, other steelmakers and a range of stakeholders, locally and nationally, to increase the amount of recycling, reduce our energy intensity (and hence greenhouse gas emissions) and develop cleaner production. Some of these partnerships include Beacon Pathway, a research consortium, established with the aim of encouraging and improving New Zealand's sustainability in the residential built environment and Govt3, a New Zealand Government initiative to encourage Govt3 agencies to specify sustainable buildings.

Advantages of Steel Building Products

Steel is lustrous, malleable, ductile, durable, strong and can be alloyed and coated to provide a range of products ideally suited to today's built environment. The advantages of using steel in building applications include:

- Steel can be engineered to precise specifications resulting in minimal on-site wastage.
- Steel is non-toxic, minimising health and safety risks.
- Steel products can be used to reduce a building's cooling and heating requirement, leading to a reduced load on energy infrastructure. NB: 90% of a building's potential energy savings are achieved in the "use" of the building during its lifecycle, and only 10% in its construction (source: United Nations Environment Programme presentation at the World Green Building Council in Monterrey, Mexico).

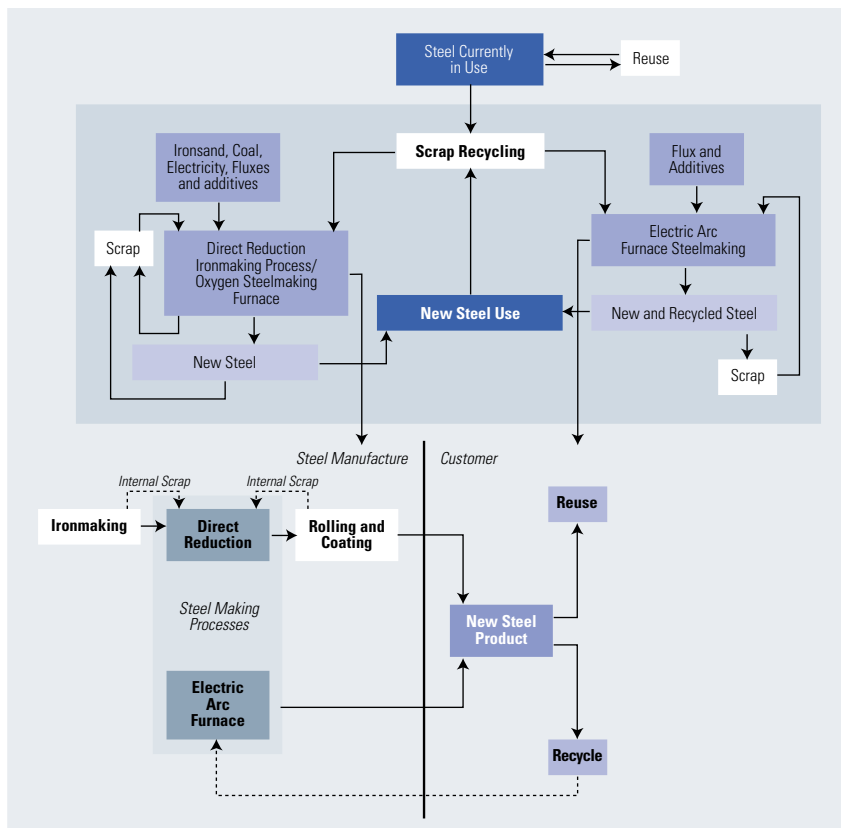


Figure 1: Steelmaking in New Zealand – the scrap cycle.

- Steel products are light and can be easily transported.
- Steel products have been used for more than 100 years in New Zealand for the catchment and storage of drinking water.
- Steel is the most recycled material in the world. In addition, many steel products are reusable.
- Steel is available with factory applied finishes for greater corrosion resistance and durability.
- Steel has minimal maintenance requirements and a long life.
- Steel is non-combustible.
- Steel has a high strength-weight ratio potentially allowing additions to buildings without having to alter foundations and the creation of wide spans, which provide greater flexibility in the use of the resulting spaces.
- Steel does not suffer any product degradation through endless recycling.



Cold rolled coil.

Steel Products, Best Practice, Best Solutions

At every stage of the production chain, from the initial mining of iron sand through to the finished product, New Zealand Steel strives to achieve leading industry practice. After extracting the iron sand (titanomagnetite) concentrate, unwanted material is returned to the areas that have been mined, to begin the process of returning the land to its original form.

Steel's inherent properties make it the ideal building material in today's environment.

New Zealand Steel is constantly conducting research for product improvement,



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development of new products and new applications for existing products. We do this through consultation with industry, customers and regulators. Through careful consideration of site requirements, product, design, aspect, colour and other properties, a practical sustainable steel solution can be achieved for your building. The steel used will contain recycled material but more importantly will be capable of reuse or endless recycling into other steel solutions.

New Zealand Steel has also established an Environmental Management System that is certified annually to ISO14001 – an international standard.