

STEEL REINFORCING BARS: Recycled...



Environmentally friendly, sustainable design encompasses a holistic, life-cycle view of a structure's short-term and long-term impacts on the earth's resources. Because of potential energy and cost savings, coupled with a commitment to long-term sustainability and reduced environmental impact, more and more owners and developers are requiring that their buildings be built **green**.

Designing for energy efficiency, minimizing the structure's waste stream, and using renewable materials, all join to create a **green** project.

Reinforced concrete, which has created strong and durable structures for over a century, is one of the most versatile **green** building materials available today. The steel reinforcing bars, as well as the concrete, provide outstanding benefits as a sustainable building material. Reinforcing bars, made from recycled steel, are the ultimate **green** product.

Most Recycled Material

In the United States in the year 2000, over 70 million tons of steel

— including car bodies, appliances, structural shapes and reinforcing bars — were melted down and recycled into new products. The amount of steel that ends up in a landfill is very small. The rest is either actively being used in buildings and infrastructure,

in vehicles and appliances, or is in the recycling process.

Recycled Feedstock

More than 7 million tons of steel is recycled into reinforcing bars every year, virtually the entire feedstock. If using only virgin feedstock, one ton of steel reinforcing bars would require about 2500 lbs of ore, 1400 lbs of coal, and 120 lbs of limestone.



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be expected if using virgin feedstock. Each year, producing reinforcing bars through steel recycling saves the energy equivalent to electrically power about one-fifth of the households in the United States (about 18 million homes) for one year.

However, not only does recycled steel scrap save the costs of mining ore, coal, and limestone, but when using recycled feedstock, a 75 percent savings of energy is achieved over that which might

Recycled and Recyclable: reinforcing bars used in reinforced concrete construction are a truly green building material.



...and Recyclable

Turning Scrap Into Steel

There are two basic technologies to create steel: the Basic Oxygen Furnace (BOF), used primarily for flat-rolled steel such as automobile bodies or appliance shells, and the Electric Arc Furnace (EAF), typically used to create long shapes, which includes reinforcing bars.

Nearly 100 percent of the feedstock used for production of reinforcing bars is **recycled** scrap.

EAF technology produces around 45 percent of the steel products in the United States. In 2000, EAF facilities consumed nearly 48,000,000 tons of ferrous scrap in the production of about 50,000,000 tons of liquid steel. On average, approximately 95 percent of the feedstock used is recycled ferrous scrap. For production of reinforcing bars, that feedstock number increases to nearly 100 percent.

An Electric Arc Furnace melts down ferrous scrap into new steel products, including reinforcing bars.

The demolition industry in the United States recycles millions of tons of concrete each year. Because steel is so recyclable, demolition contractors nearly always extract and sell the reinforcing bars in the concrete as ferrous scrap. The reinforcing bars are then melted down to create new steel products, which can include new reinforcing bars. The concrete is crushed and used as aggregate in new concrete, or as road base material, gravel, or riprap.

Recycling reinforced concrete entails breaking, removing, and crushing the concrete to a specified size. The work is typically performed at the job site, using custom attachments—such as hammers, breakers, and grappling hooks—mounted onto heavy equipment. As the concrete crumbles, the reinforcing bars are pulled out and cut using torches or cutting tools.

Not only are reinforcing bars made of nearly 100 percent recycled steel products, but they are infinitely recyclable. The market value of ferrous scrap is a strong incentive for recycling, especially compared to the cost of virgin feedstock.

When a reinforced concrete structure is no longer needed, its reinforcing bars can be used in the manufacture of new quality steel products. The Steel Recycling Institute estimates that now over 45 percent of reinforcing bars are recycled.

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