The Cradle-to-Cradle Life Cycle of Structural Steel

Structural steel has an industry average recycled content of 92% and recovery rate of 98%.

Waste from the manufacturing process of any steel product can be recycled into structural steel.

Mills typically use scrap collected from within 400 miles. The majority of scrap is shipped by rail or barge to the mill.

Scrap Processing

Electric Supply

85% of the energy used in the steelmaking process comes from electricity. As the electric grid becomes more renewable, steel's carbon footprint will decrease.

Emissions

Steel's greenhouse gas emissions have been reduced 38% since 1990 and overall emissions have been reduced by 67% since 1980.

Water

The steel production process has a water recycling rate of 95%, resulting in the consumption of only 60 net gallons of water per ton of steel produced.

Natural Gas Supply

Steelmaking's overall energy usage has decreased by 66% since 1980.

Electric Arc Furnace → Ladle → Continuous Casting → Reheating → Section Rolling

Home Scrap

The Structural Steel Mill

Productivity has increased from 12 labor hours per ton in 1980 to one half hour per ton today.

Structural steel's material strength has increased 40% since 1990 from 36 ksi to 50 ksi, further increasing steel's high-strength-to-weight ratio.

60% of steel shipped from structural steel mills travels by rail or water.

Fabrication

Steel fabrication is the manufacturing process for project-specific structural steel and accounts for 40% of the cost and 70% of the labor associated with the finished product. Fabrication facilities are located throughout the U.S. within 500 miles of any project location.

Fabrication Waste

All fabrication waste is reused or recycled.

Construction Waste

Structural steel generates virtually no onsite construction waste, and any "waste" that is generated flows back into the scrap stream instead of a landfill.

Pre-consumer waste stream

Post-consumer waste stream

In 2010 an estimated 3.9 million old automobiles were recycled into new structural steel products.

Scrap Collection

Efficient transportation and maximization of loads helps reduce trips and fuel usage.

While other construction materials cannot be recycled or are only recycled into lower quality products (down-cycled), steel can be recycled over and over again and remade into new steel members without any loss of quality (multi-cycled).

Deconstruction

Beams and columns removed from a building can be re-fabricated for use in new structures without having to be melted and rolled. Structural steel has an industry average recovery rate of 98%.

Building Operation

Energy

Steel framing allows easy integration of mechanical systems, resulting in low floor-to-floor heights, less building volume and lower energy consumption. It also allows for large window areas, resulting in plentiful natural lighting, higher occupant comfort and reduced electricity consumption.

Building Modification and Reuse

Steel framing systems are easily adaptable when it comes to building expansion or adaptive reuse projects.

Construction/Erection

Steel is fabricated offsite to strict tolerances and can be erected quickly in the field, meaning fewer workers on the job site, safer working conditions, shorter construction schedules and reduced emissions from construction equipment.

Emissions

The thermal capacity of a structural steel building has been shown to be comparable to that of buildings constructed with alternative framing system materials.

Building Design

Building design and structural steel fabrication are closely integrated through the use of Building Information Modeling (BIM) and collaborative design processes resulting in materials being used more efficiently, fewer field changes and a reduced environmental impact.

Careful design and detailing can avoid the challenges presented by issues such as thermal bridging.

SOME
TALK THE TALK.

OTHERS
WALK THE WALK.

www.aisc.org/sustainability

Sustainability has become a major factor in the construction market. The domestic structural steel industry has been lowering emissions, increasing the use of recycled materials, optimizing energy consumption and improving the performance of our products for decades.

There's always a sustainable solution in steel.

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This brochure is printed on recycled stock with soy based ink.

Sustainable Structural Steel