Material Selection

A closer look at the benefits of steel

Clearing the Air on

BY RACHEL COON

The world is made of steel—the **Golden Gate Bridge**, the **Empire State Building**, iconic structures, soaring skyscrapers, your local rec center, even the doors you throw open at home to let in fresh air. Steel is our very infrastructure—and yet, it is misunderstood as an antiquated industry. So you might be surprised to learn modern-day steel-making is remarkably that—modern. "A common misconception about the steel industry is that it is somehow a dirty process, but if you were to visit a modern steel facility, you would see it's actually very clean and efficient," says **Mark Thimons**, vice president of sustainability at the **Steel Market Development Institute (SMDI)**.

Over the past 25 years, the North American steel industry has significantly reduced its environmental impact—reducing energy intensity and greenhouse gas emissions by more than a third, making the production of steel more sustainable than many competing products. "The industry is constantly striving to make the steel production process as efficient as possible. In fact, we're rapidly approaching the efficiency limits defined by the laws of physics with the current technology we have. This is why **AISI (American Iron and Steel Institute)** is working to develop breakthrough steelmaking technologies," says **Brandie Sebastian**, director of Life Cycle Assessment at the **Steel Recycling Institute (SRI)**.

The material has always been and continues to be a popular choice for building construction—though, it's also one of the primary components in the automotive sector as well as for containers and cans for packaging. "Steel is everywhere," Thimons says. And it's constantly evolving and advancing. "There are new grades of steel being developed and produced all the time. The steel produced today is strong and versatile, allowing flexibility for builders and designers to try unique applications."

THE BENEFITS OF STEEL

Steel can be used for anything—from framing and walls to floors, roofing, doors, and windows. Unlike its counterparts like wood, steel doesn't expand or contract in the presence of moisture and is not vulnerable to pesky issues like termites. "Compared to other materials, it doesn't rot, warp, split, or crack," Thimons says. But what's more, steel lends itself to several types of fabrication, allowing for unique structures. "Steel creates very durable, resilient, and adaptable buildings that both endure and meet modern needs," says Sebastian. That's the very nature of steel structures—they can be easily assembled and disassembled, allowing for building adaptability and easy recyclability.

Virtually all steel products are composed of at least 25% recycled content, while some construction products like hot-rolled steel, rebar, and some heavy plate products are made from essentially 100% recycled steel. And while nearly 50% of wood products are landfilled and concrete is often down-cycled, steel can be recycled, reused, or repurposed—into steel beams, refrigerator doors, you name it. "As long as we can get steel back to a recycling facility, that steel remains within society for a very long time," Sebastian says.

And if a builder or designer wants to create a building that qualifies for green building rating programs like LEED or the Living Building Challenge, steel counts towards multiple credits. Plus, because steel can be so easily pre-engineered and prefabricated, very little waste is produced in the process of making or installing steel products. "The amount of waste generated at a job site is very low—and any that is generated can be easily recycled," Thimons says. Financial gains can also be achieved with the precise off-site production of steel construction components or assemblies, leading to significantly reduced labor and construction time.

Steel's durability, adaptability, and recyclability all add up to remarkable sustainability, meaning the lifespan of steel products and construction is greater than that of almost any other industry alternative. "If sustainability is a consideration, then industry professionals should be thinking about what will happen to that building at end of life, including whether or not it can be disassembled and recycled," Sebastian says. "Throughout the entire life cycle of a building, steel has a really great story." gb&d

THE NUMBERS

31% reduced energy intensity per ton of steel produced (since 1990)

BILLIONS– the number of dollars the North American steel industry has invested in innovating new technologies

Steel is **100%** recyclable

60 TO 80 MILLION tons of steel recycled annually

36% reduced CO2 emissions per ton of steel produced (since 1990)

Steel has been very popular for building construction since the late **1800S**

HUNDREDS– the number of different grades of steel available

VERY LITTLE– the amount of waste typically generated in any aspect of steel production or construction

50% of wood products get landfilled at their end-of-life cycle

20 MILLION TONS of wood products are annually contributed to the ever-expanding landfills

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