SSBC Sustainability Guide

Structural steel is the most sustainable choice. Instead of going to the landfill or an incinerator, decommissioned bridges and buildings go right back into the supply chain as scrap material to become steel again and again. In some cases, entire steel highway bridges can be repurposed and moved to new locations. To find out more information, visit aisc.org/sustainability. Many of the sustainability principles that apply to real-life buildings and bridges can also apply to the Student Steel Bridge Competition (SSBC). While not a part of the official scoring of the 2025 SSBC, here are some ways to incorporate sustainability into your bridge.

Where does your steel come from?

Depending on whether steel comes from a Blast Oxygen Furnace (BOF) or Electric Arc Furnace (EAF), the environmental impact can vary greatly. Structural steel produced from an EAF uses an average of 93% recycled steel and contains a fraction of the embodied carbon of BOF steel. Most SSBC bridges do not use structural steel material that is used in real-life buildings and bridges but rather smaller plate and tube steel used for other applications. To investigate the environmental impact of structural steel (plate, tube, and wide flange), visit aisc.org/epd for Environmental Product Declarations (EPDs) of U.S. mills. If you want to learn more about the environmental impact of the steel used in your bridge, ask your material supplier where the steel used in your bridge is sourced from. Maybe you can determine if it was produced from a BOF or EAF mill or obtain the EPD and the steel grade.

Using less material

The environmental impact of structural steel is measured on a per weight or per mass basis of the raw mill material produced. Therefore, it is advantageous to use less material. In some cases, higher strength steel can be used to reduce material. This option should be evaluated carefully in order to balance the effects of reduced member weight and environmental impacts with the additional fabrication labor time and cost. For the SSBC, this might look like optimizing member size and shapes along the length of the bridge according to the anticipated force types (compression, tension, bending, shear) and force levels.

Incorporate salvaged materials

One advantage of structural steel is that it can be deconstructed and reused, bypassing the steel-making process altogether. If structural steel members are not reused, they

can also be recycled into new structural steel. For the SSBC, it can be sustainable and budget-friendly to reuse parts from previous bridges. If reusing parts, be sure to identify and exclude members that are damaged or have experienced plastic deformation.

Plan for adaptability and deconstruction

Consider what will happen after the useful life of the structure. A steel structure can be modified to carry additional load to serve a new purpose and it can be deconstructed and its members reused for new structures. For structural steel that cannot be reused, it is 100% recyclable. For the SSBC, this may look like identifying parts of the bridge that could be reused and developing a procedure for deconstruction, cataloging pieces, and storing them for reuse.

Other considerations

Of course, there are smaller yet still impactful ways to incorporate sustainability into the SSBC. Minimize energy consumption or use tools powered by rechargeable batteries or renewable energy sources. Ensure that any waste after machining doesn't go to the landfill by finding a use for scrap or sending it to be recycled. The same principles apply to any storage crates that you build to transport your bridge.

Ultimately, incorporating sustainability can impact schedule, economy, aesthetics, and other aspects of design and construction, and all of these aspects must be considered to meet the project objectives.