

Title: The Structural Engineer's Role in Selecting Sustainable Materials: The Steel Industry's Perspective

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Abstract:

Steel beams, cold-formed steel studs and joists, metal roofing and decking, and related steel products are common components in today's construction market. And while steel is regularly lauded by structural engineers for its strength and durability, designers and builders are increasingly recognizing steel's environmental attributes - especially its high recycled content (25% to 95%) and high rate of reclamation (nearly 100% for steel beams).

While recycling is an important part of the modern United States steel industry, steel can also contribute toward several other aspects of sustainable design. Steel is often fabricated off-site and to exact specifications, so construction waste is minimized and any waste that does result from the process of production is efficiently reclaimed into established scrap markets. Material from demolition or construction can be easily recycled, with the magnetic properties of steel greatly facilitating its separation from other materials. When appropriately designed, steel can also be easily reused or adapted to a new purpose.

The results of the structural steel industry efforts are evident in recent Environmental Protection Agency findings on greenhouse gasses, which show that the iron and steel industry reduced carbon emissions by 37.7 percent between 1990 and 2003. By comparison, initiatives such as the Kyoto Protocol would have required U.S. industries to reduce emissions by 5.2 percent by 2012.

While all of these advances are notable, an engineer's choice of a sustainable structural material must respond to the overall goals of a project and must look at the structure from a system-wide perspective. This session will serve as a review of appropriate design strategies for

green structures that use steel and will compare and contrast design choices encountered by the structural engineer. Several of the strategies outlined in the “Report on Sustainability” will be included, as well as innovative uses of structural materials, such as thermal mass, interaction with the building envelope, and integration with other building systems. A key theme to the presentation will be “use materials where they make the most sense,” not only with respect to installed cost, but life cycle costs and environmental impact.