



Crafting a framework of embodied carbon education, tracking, and reduction for US-based structural engineers

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Abstract

Achieving reductions to embodied carbon, the global warming potential emissions due to the production of materials, is an essential component to meeting science-based climate targets. Studies have shown that a significant portion of embodied emissions within the built environment are due to structural materials. However, many structural engineers are, not only uneducated in the concept of embodied carbon, but also not aware of the role their decisions can make in addressing climate change. This is further exacerbated by a profession that does not have sufficient structural system embodied carbon benchmark information to make important and informed early design decisions. This required the collaborative development of a structural engineering commitment program, SE 2050, that is supported by leading professional organizations to spur the education and transformation of the profession.

Keywords: Structural Design, Sustainable Design, Embodied Carbon, Climate Change, Market Transformation

1 Introduction

The SE 2050 Commitment Program (SE 2050) was launched in late 2020 in response to the SE 2050 Challenge stating that, in effect, all structural systems shall be net-zero embodied carbon by the year 2050 [1]. The Challenge was issued as a necessary piece of the larger global push for carbon neutrality by 2050 to mitigate irreversible and detrimental changes to our climate. With this

recognition there has been a drastic, and necessary, level of attention on the global warming impact of building materials and construction, also known as embodied carbon. These impacts are locked into the system on the first day of building occupancy.

SE 2050, launched by the Structural Engineering Institute (SEI), the structural engineering branch of the American Society of Civil Engineers (ASCE), invites structural engineering firms to make a